VOLUME 7

OFFICIAL RADIO SERVICE MANUAL

Cumulative Directory of Commercial Radio Receivers and Allied Apparatus

FULL RADIO SERVICE GUIDE

HUGO GERNSBACK
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. . . Introduction . . .

IN the preparation of the twelve installments of service data and diagrams which comprise this MANUAL, unusual care and effort are being exercised to obtain and incorporate all essential information which will be of material assistance to the radio technician and service man in repairing radio receivers and allied apparatus.

It is the firm intention of the editors to present in each installment timely, authentic service information . . . fresh, vital data . . . just as soon as it is made available to them by the various radio set manufacturers. Included, however, is service material on older sets which have not as yet been listed in any of the previously-published OFFICIAL RADIO SERVICE MANUALS. Upon the inclusion of the final installment, this large volume covers not only sets manufactured in 1936 and 1937, but advance 1938 models as well.

Wherever the information is at all obtainable, such data as Intermediate Frequency Peaks, Socket Voltages, Wiring Diagrams, Point-to-point Resistance Values, Service Data, Production Changes, etc. is included.

Each installment is accompanied by a cumulative index. Thus, the index of the second installment will list the sets contained in both the first and second installments; etc. As each new index is received, the previous one may be discarded. The Master Index which accompanies the final (twelfth) installment covers not only the sets listed in this volume but those listed in *every* GERNSBACK OFFICIAL RADIO SERVICE MANUAL since their inception in 1931.

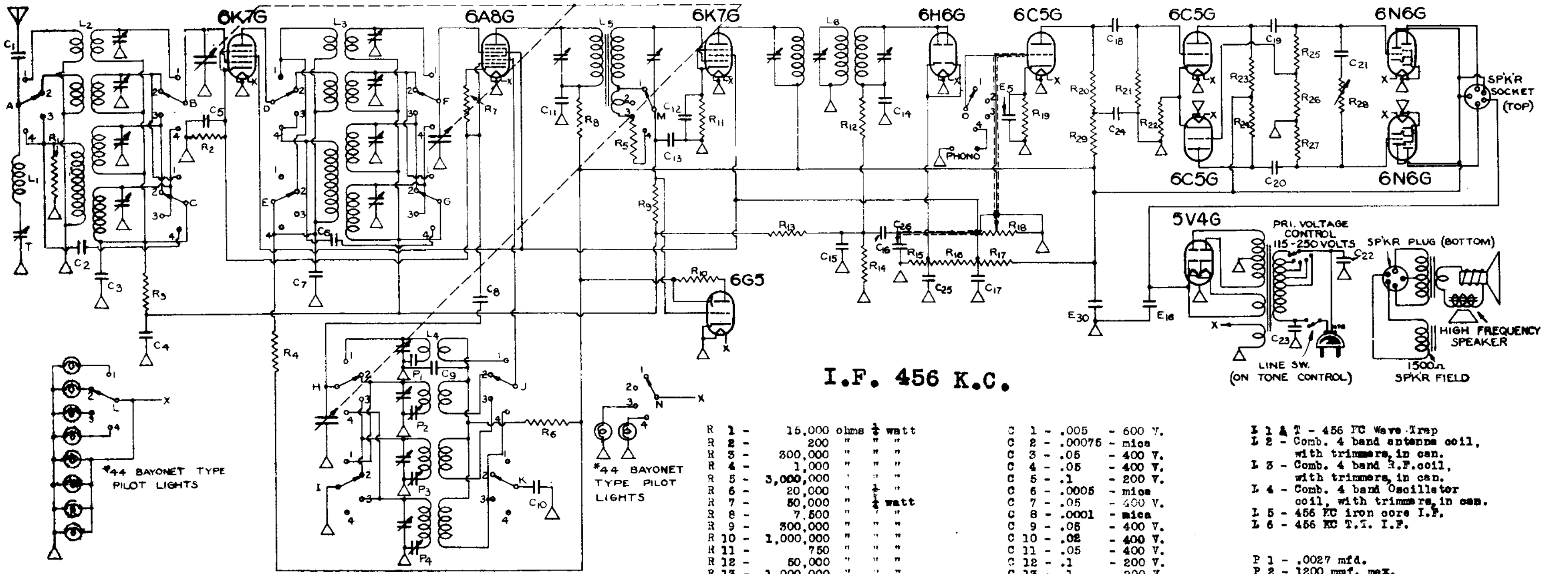
As will be noted, the sets in this MANUAL are indexed in a very practical manner. Not only is the page number of each set given but the exact nature of the information on the page is indicated. For example: reference to Emerson Model C134LW in the index shows at a glance that the schematic diagram is on page 34-VII (Volume seven), and that the alignment procedure, socket voltages and parts list are on page 35-VII. In some cases the alignment data and other pertinent information may follow the schematic by several pages; the index, however, will quickly reveal the location of the required data. Sets in all future MANUALS will be listed in this same manner.

—THE EDITORS.

AIR-KING PRODUCTS COMPANY, INC.

MODEL 11F

4 BAND ALL-WAVE A.C. SUPERHETERODYNE



I.F. 456 K.C.

R 1 -	15,000 ohms	½ watt
R 2 -	200 "	" "
R 3 -	300,000 "	" "
R 4 -	1,000 "	" "
R 5 -	3,000,000 "	" "
R 6 -	20,000 "	½ "
R 7 -	50,000 "	¼ watt
R 8 -	7,500 "	" "
R 9 -	300,000 "	" "
R 10 -	1,000,000 "	" "
R 11 -	750 "	" "
R 12 -	50,000 "	" "
R 13 -	1,000,000 "	" "
R 14 -	500,000 "	" "
R 15 -	250 "	bleeder
R 16 -	15,000 "	bleeder
R 17 -	10,000 "	bleeder
R 18 -	500,000 "	vol. control
R 19 -	9,000 "	¼ watt
R 20 -	100,000 "	" "
R 21 -	500,000 "	" "
R 22 -	4,500 "	" "
R 23 -	100,000 "	" "
R 24 -	100,000 "	" "
R 25 -	500,000 "	" "
R 26 -	35,000 "	" "
R 27 -	500,000 "	" "
R 28 -	500,000 "	tone control
R 29 -	50,000 "	¼ watt

C 1 -	.005	- 600 V.
C 2 -	.00075	- mica
C 3 -	.05	- 400 V.
C 4 -	.05	- 400 V.
C 5 -	.1	- 200 V.
C 6 -	.0005	- mica
C 7 -	.05	- 400 V.
C 8 -	.0001	- mica
C 9 -	.05	- 400 V.
C 10 -	.02	- 400 V.
C 11 -	.05	- 400 V.
C 12 -	.1	- 200 V.
C 13 -	.1	- 200 V.
C 14 -	.0001	- mica
C 15 -	.0001	- mica
C 16 -	.02	- 400 V.
C 17 -	.1	- 200 V.
C 18 -	.05	- 400 V.
C 19 -	.05	- 400 V.
C 20 -	.05	- 400 V.
C 21 -	.01	- 600 V.
C 22 -	.05	- 400 V.
C 23 -	.05	- 400 V.
C 24 -	.1	- 200 V.
C 25 -	.1	- 200 V.
C 26 -	.0001	- mica

E 16 - 16 mfd - 450 V.
E 30 - 30 mfd - 350 V.

L 1 & T - 456 KC Wave Trap
L 2 - Comb. 4 band antenna coil, with trimmers, in can.
L 3 - Comb. 4 band R.F. coil, with trimmers, in can.
L 4 - Comb. 4 band Oscillator coil, with trimmers, in can.
L 5 - 456 KC iron core I.F.
L 6 - 456 KC T.T. I.F.

P 1 - .0027 mfd.
P 2 - 1200 mmf. max.
P 3 - 500 mmf. max.
P 4 - 200 mmf. max.

Wave Band Switch - 4 deck
3 section each deck,
1 to 4 position each section.
(Switches A,B,C,D,E,F,G,H,I,J,K,L)

Selectivity Switch - 1 deck,
3 section, 1 to 4 position
each section.
(Switches M, N, O)

ALIGNMENT FREQUENCIES

I.F. - 456 KC (Selectivity switch in "Selective Position")

	TRIMMERS	PADDER
BAND 1 -	16 MC or 19M	-
BAND 2 -	5 MC or 60M	2 MC or 150 M
BAND 3 -	1500 KC or 200M	600 KC or 500 M
BAND 4 -	300 KC or 1000M	150 KC or 2000 M

WAVE BAND SWITCH POSITIONS

1. FOREIGN SHORT WAVE.
2. POLICE, AIRCRAFT, AMATEUR.
3. MEDIUM WAVE.
4. LONG WAVE.

SELECTIVITY SWITCH POSITIONS

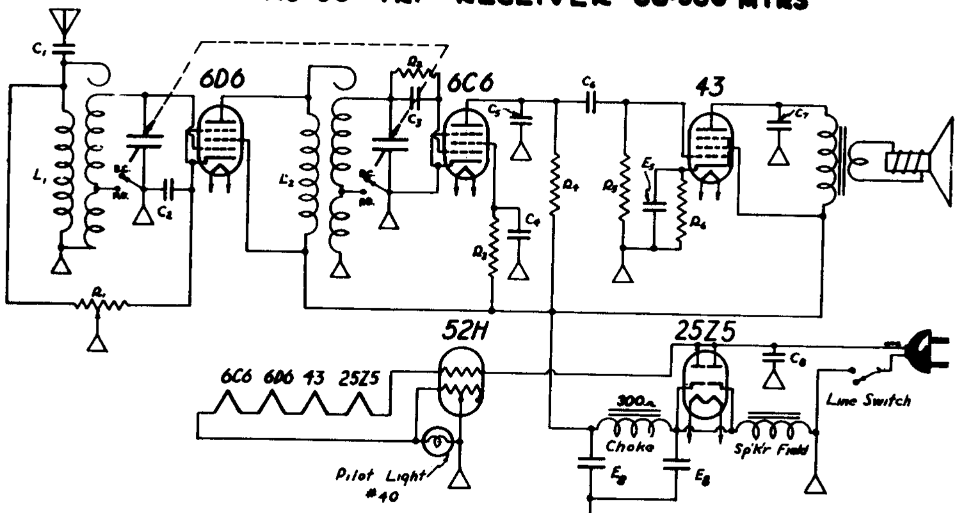
1. SELECTIVE.
2. MEDIUM FIDELITY.
3. HIGH FIDELITY.
4. PHONOGRAPH.

NOTE: - WAVE BAND SWITCH SHOWN IN BAND 2 POSITION, (POLICE, AIRCRAFT, AMATEUR) SELECTIVITY SWITCH SHOWN IN FIRST (SELECTIVE) POSITION.

AIR-KING PRODUCTS COMPANY, INC.

MODEL DYNAMIC 2 RANGE

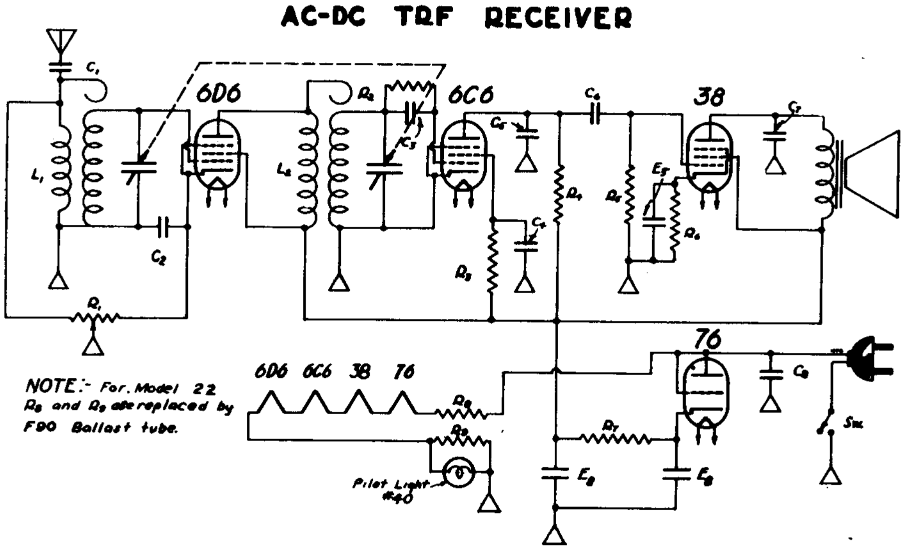
AC-DC TRF RECEIVER 80-560 MTRS



R1 - 25,000 ohm volume control	C1 - .005 - 400 V.	E5 - 5 mfd. - 25 V.
R2 - 3,000,000 " 1/4 watt	C2 - .1 - 200 V.	E8 - 8 mfd. -150 V.
R3 - 6,000,000 " 1/4 "	C3 - .005 - 400 V.	E8 - 8 mfd. -150 V.
R4 - 1,000,000 " 1/4 "	C4 - .1 - 200 V.	
R5 - 750,000 " 1/4 "	C5 - .0001 - MICA	L1 - Combination - Ant. Coil
R6 - 650 " 1 "	C6 - .02 - 400 V.	L2 - Combination - R.F. Coil
	C7 - .006 - 400 V.	
	C8 - .05 - 400 V.	

MODELS 22 & MAGNETIC

AC-DC TRF RECEIVER

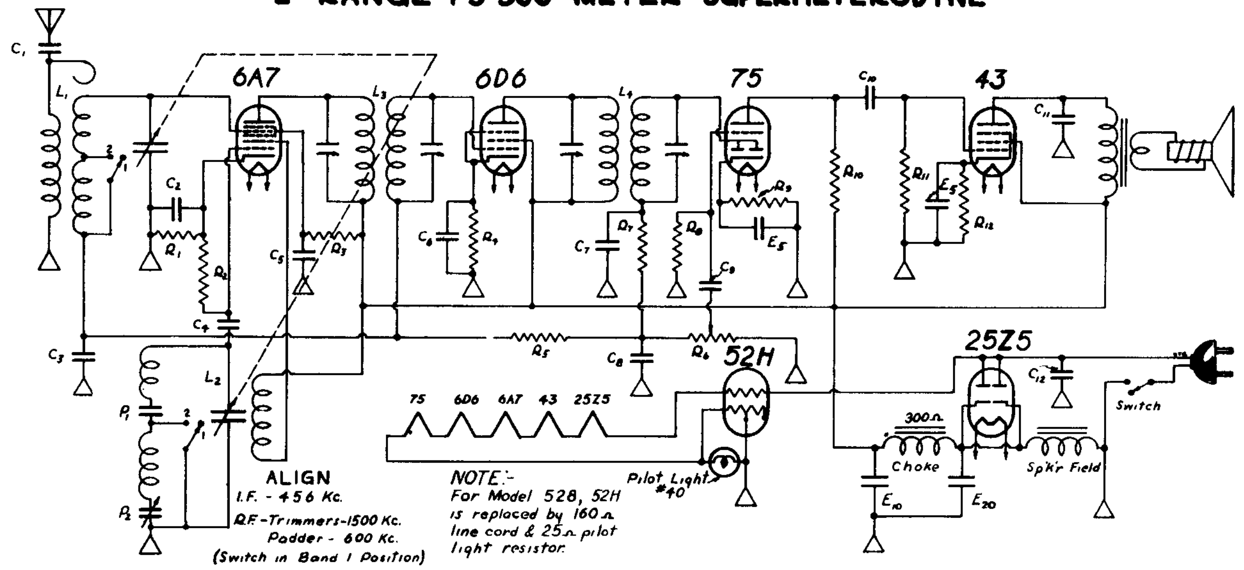


R 1 - 25,000 ohm vol. cont.	E 5 - 5 mfd. - 25V.	C 1 - .005 - 400 V.
R 2 - 3,000,000 " ¼ watt.	E 8 - 8 mfd. - 150 V.	C 2 - .1 - 200 V.
R 3 - 6,000,000 " ¼ watt.	E 8 - 8 mfd. - 150 V.	C 3 - .005 - 400 V.
R 4 - 1,000,000 " ¼ "		C 4 - .1 - 200 V.
R 5 - 750,000 " ¼ "	L 1 - Antenna Coil.	C 5 - .0001 - mica
R 6 - 1,000 " ¼ "	L 2 - R. F. Coil	C 6 - .02 - 400 V
R 7 - 800 " 1 "		C 7 - .006 - 400 V
R 8 - 275 " in line cord		C 8 - .05 - 400 V
R 9 - 25 " 2 watt		

AIR-KING PRODUCTS COMPANY, INC.

MODELS 27-28-528

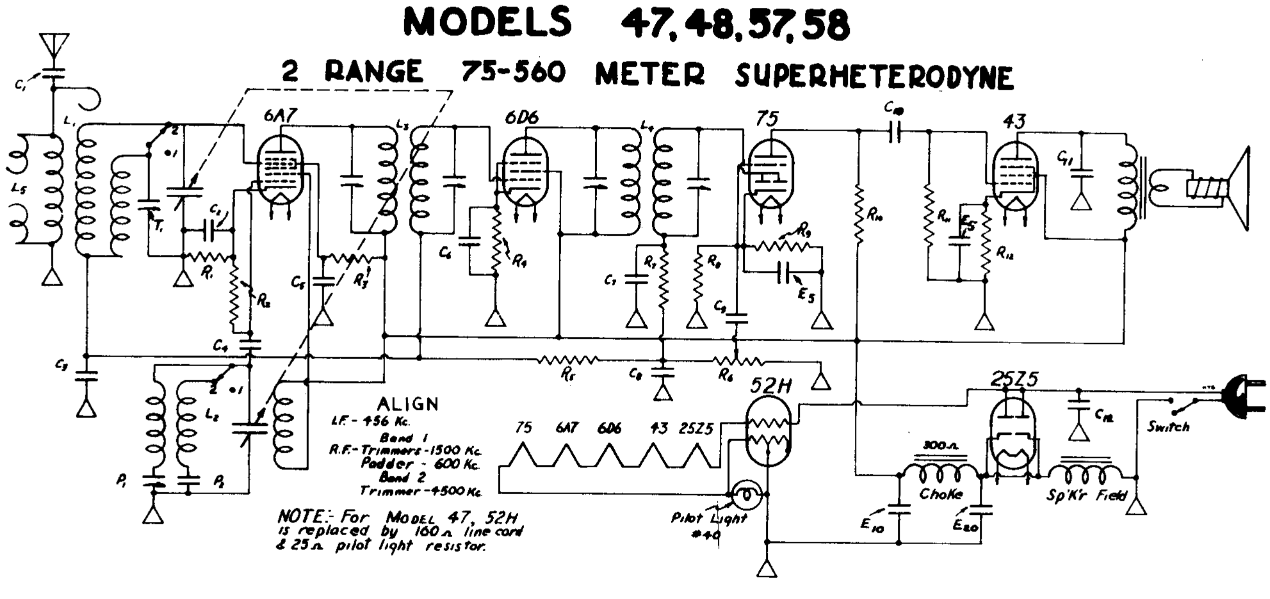
2 RANGE 75-560 METER SUPERHETERODYNE



R 1 - 250 ohm ½ watt.	L 1 - Comb. Police Band & B'do'st Ant. Coil.	C 1 - .005 - 600 V.
R 2 - 50,000 " ¼ watt.	L 2 - Comb. Police Band & B'do'st Osc. Coil.	C 2 - .1 - 200 V.
R 3 - 35,000 " ½ watt.	L 3 - 456 K.C. I.F.	C 3 - .05 - 400 V.
R 4 - 500 " ½ watt.	L 4 - 456 KC. I.F.	C 4 - .0001- mica.
R 5 -3,000,000 " ½ watt.	P 1 - .002 mica	C 5 - .1 - 200 V.
R 6 - 500,000 " vol.control.	P 2 - 500 mmf. max.	C 6 - .1 - 200 V.
R 7 - 50,000 " ½ watt.		C 7 - .0001- mica
R 8 - 750,000 " ½ watt.	E 20 - 20 mfd.- 150 V.	C 8 - .0001- mica
R 9 - 4,500 " ½ watt.	E 10 - 10 mfd. -150 V.	C 9 - .02 - 400 V.
R 10 - 500,000 " ½ watt.	E 5 - 5 mfd. -25 V.	C 10 - .02 - 400 V.
R 11 - 750,000 " ½ watt.	E 5 - 5 mfd. -25 V.	C 11 - .006 - 400 V.
R 12 - 650 " 1 watt.		C 12 - .05 - 400 V.

MODELS 47, 48, 57, 58

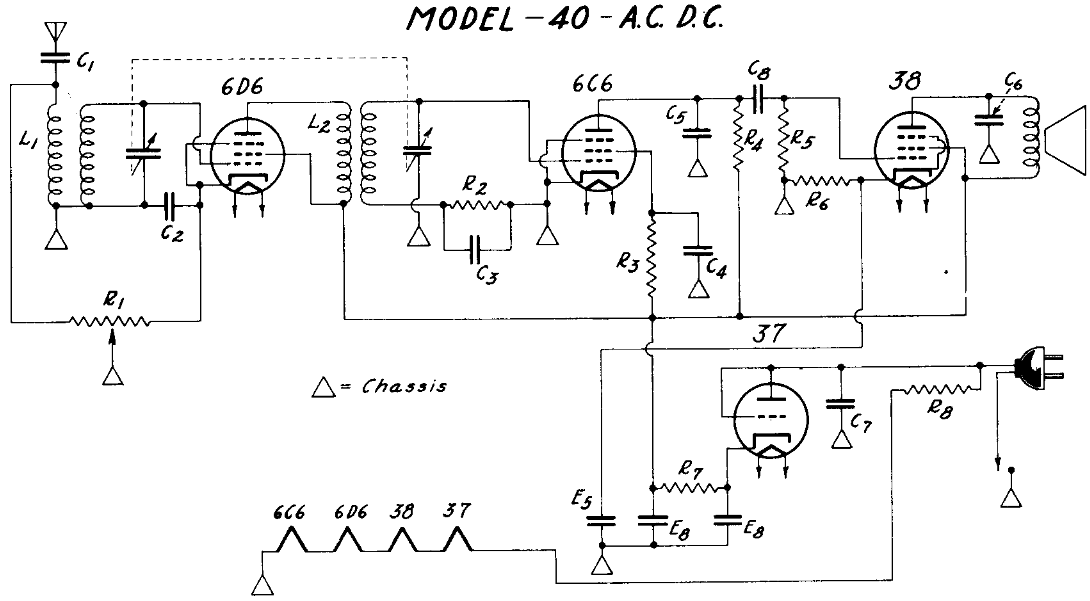
2 RANGE 75-560 METER SUPERHETERODYNE



R 1 - 300 ohm ½ watt	L 1 - Comb. Police Band & B'do'st Ant. Coil.	C 1 - .005 - 600 V
R 2 - 35,000 " ½ watt	L 2 - Comb. Police Band & B'do'st Osc. Coil.	C 2 - .05 - 400 V.
R 3 - 35,000 " ½ watt	L 3 - 456 KC I. F.	C 3 - .05 - 400 V.
R 4 - 700 " ½ watt	L 4 - 456 KC I. F.	C 4 - .0001- mica
R 5 - 5,000,000 " ½ watt	L 5 - 456 KC Wave Trap.	C 5 - .1 - 200 V.
R 6 - 500,000 " Vol. Control.	T 1 - 3-35 mmf. trimmer.	C 6 - .1 - 200 V.
R 7 - 50,000 " ½ watt		C 7 - .0001- mica
R 8 - 750,000 " ½ watt	P 1 - 500 mmf. max.	C 8 - .0001- mica
R 9 - 4,500 " ½ watt	P 2 -.0006 mfd.	C 9 - .02 - 400 V.
R 10 - 500,000 " ½ watt	E 20 - 20 mfd. 150 V.	C 10- .02 - 400 V.
R 11 - 750,000 " ½ watt	E 10 - 10 mfd. 150 V.	C 11- .006 - 400 V.
R 12 - 650 " 1 watt	E 5 - 5 mfd. 25 V.	C 12- .05 - 400 V.
	E 5 - 5 mfd. 25 V.	

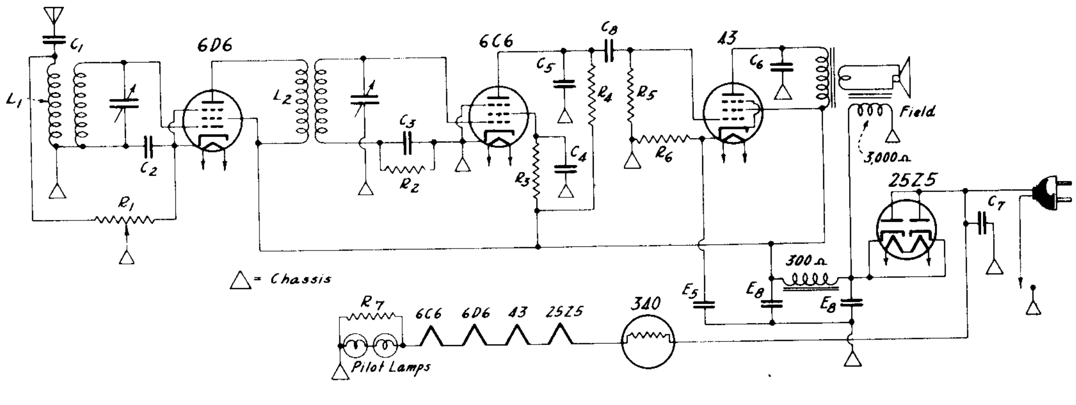
AIR-KING PRODUCTS COMPANY, INC.

MODEL -40 - A.C. D.C.



R 1 - 500,000 ohm vol. cont.	C 1 - .005 - 400 v.	L 1 - ant. coil
R 2 - 3,000,000 "	C 2 - .1 - 200 v.	L 2 - R.F. coil
R 3 - 6,000,000 "	C 3 - .02 - 400 v.	
R 4 - 1,000,000 "	C 4 - .1 - 200 v.	E 5 - 5 mfd. 25 v.
R 5 - 750,000 "	C 5 - .0001- mica	E 8 - 8 mfd.150 v.
R 6 - 1,100 "	C 6 - .005 - 400 v.	E 8 - 8 mfd.150 v.
R 7 - 800 "	C 7 - .05 - 400 v.	
R 8 - 300 " in line cord.		

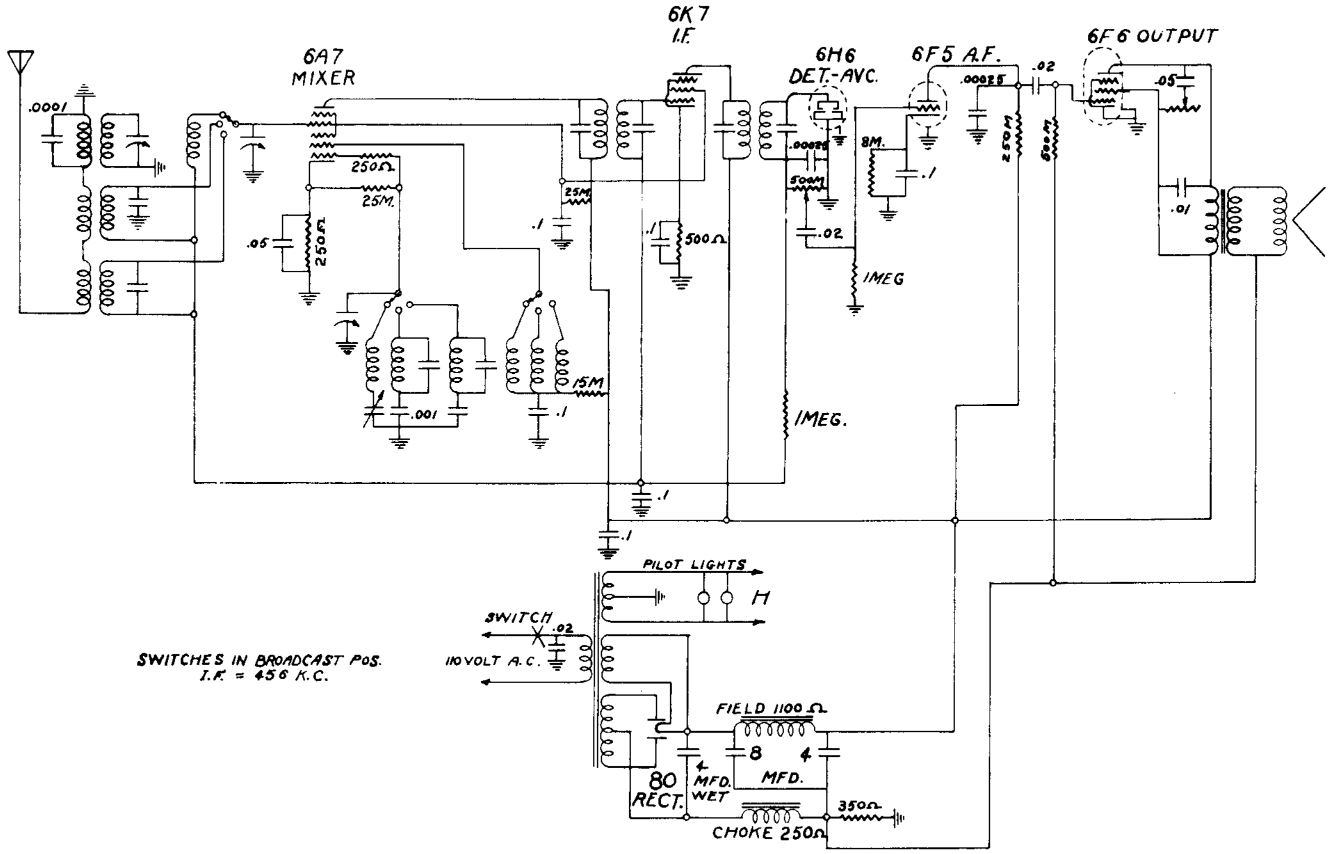
MODEL -50 - A.C. D.C.



R 1 - 500,000 ohm vol. cont.	C 1 - .005 - 400 v.	L 1 - ant. coil
R 2 - 3,000,000 "	C 2 - .1 - 200 v.	L 2 - R.F. coil
R 3 - 6,000,000 "	C 3 - .02 - 400 v.	
R 4 - 1,000,000 "	C 4 - .1 - 200 v.	
R 5 - 750,000 "	C 5 - .0001 - mica	E 5 - 5 mfd. - 25 v.
R 6 - 650 "	C 6 - .005 - 400 v.	E 8 - 8 mfd. -150 v.
R 7 - 40 " four watt	C 7 - .05 - 400 v.	E 8 - 8 mfd. -150 v.

ALLIED RADIO CORPORATION

MODELS H9830—H9831—H9832



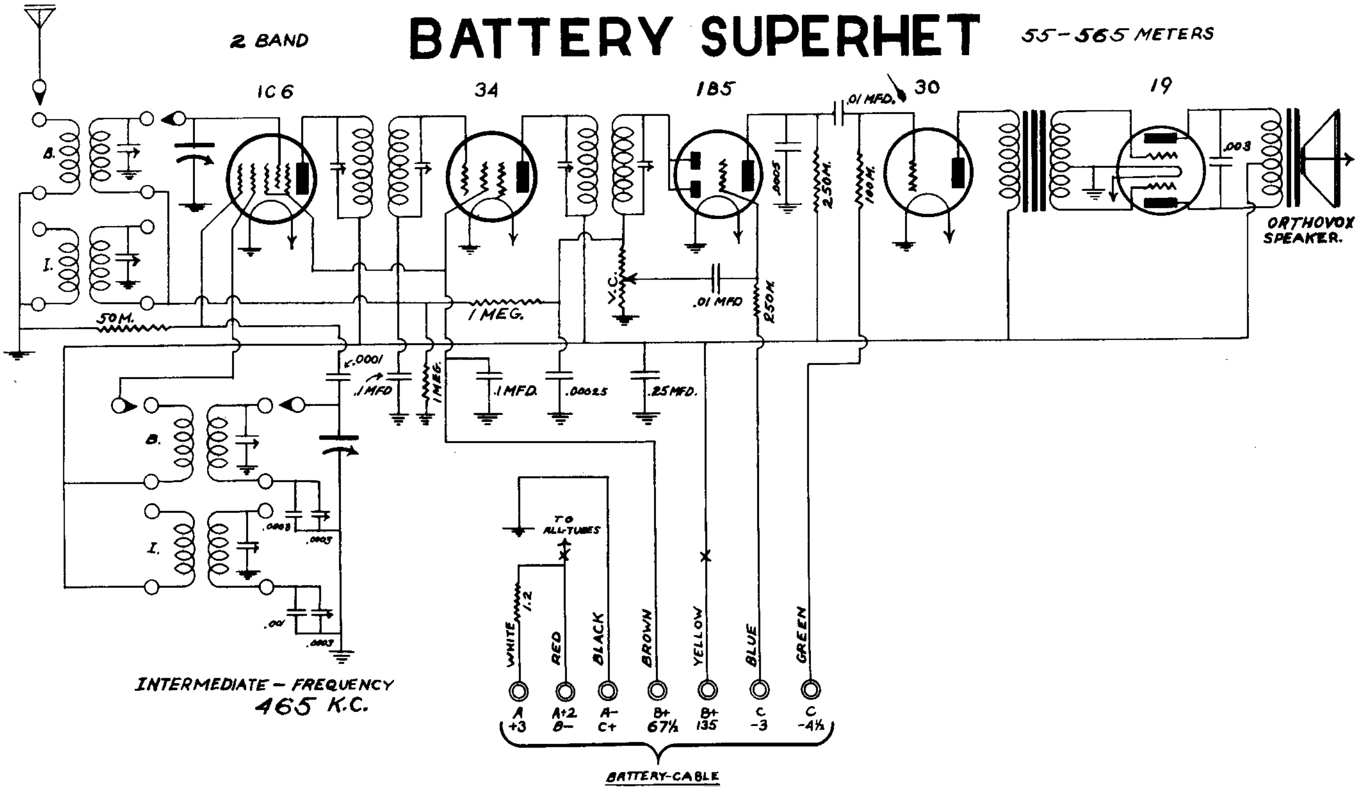
SWITCHES IN BROADCAST POS.
I.F. = 456 K.C.

MODELS H9819—H9820

BATTERY SUPERHET

2 BAND

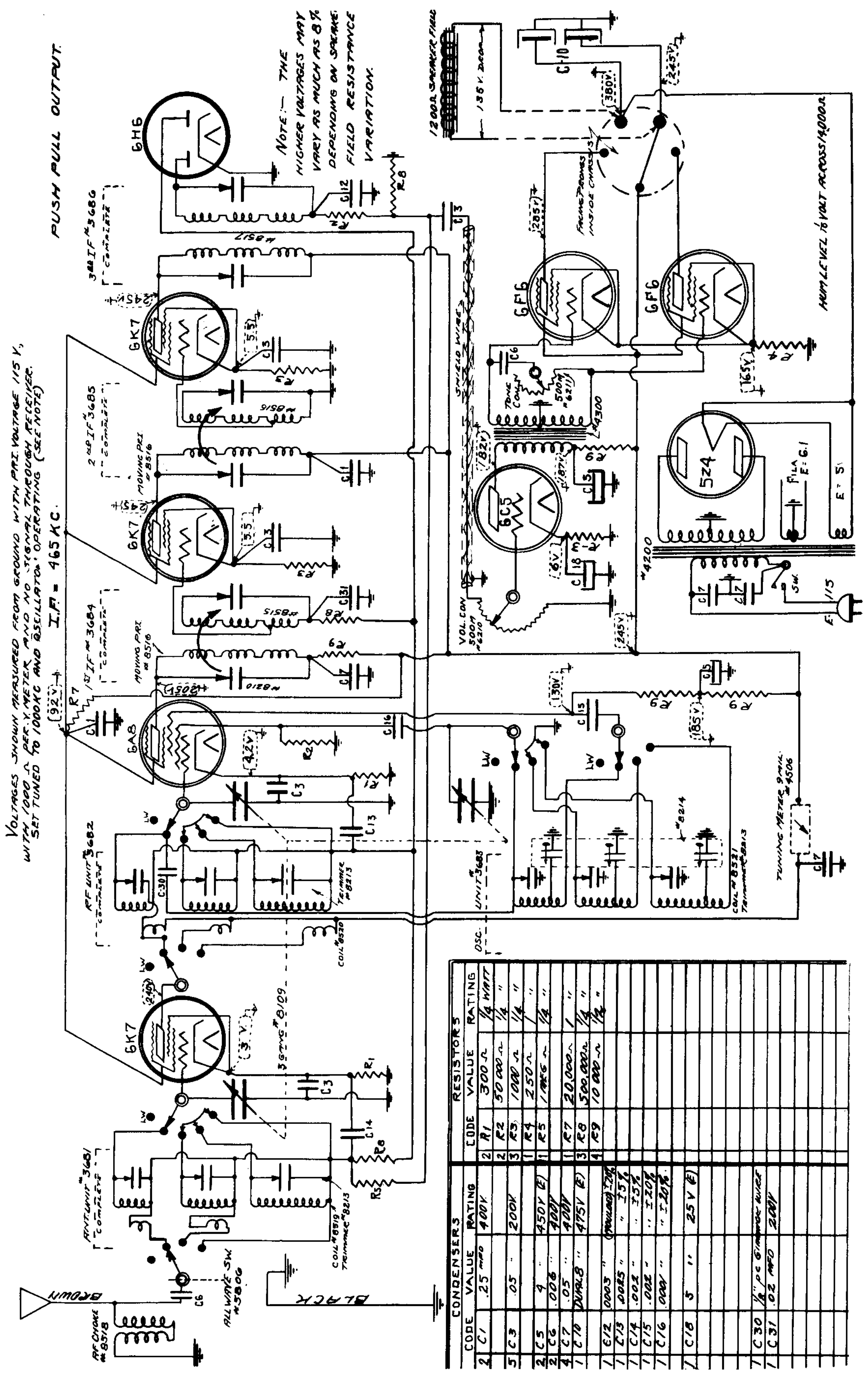
55–565 METERS



INTERMEDIATE — FREQUENCY
465 K.C.

ALLIED RADIO CORPORATION

MODELS H9891 & H9893

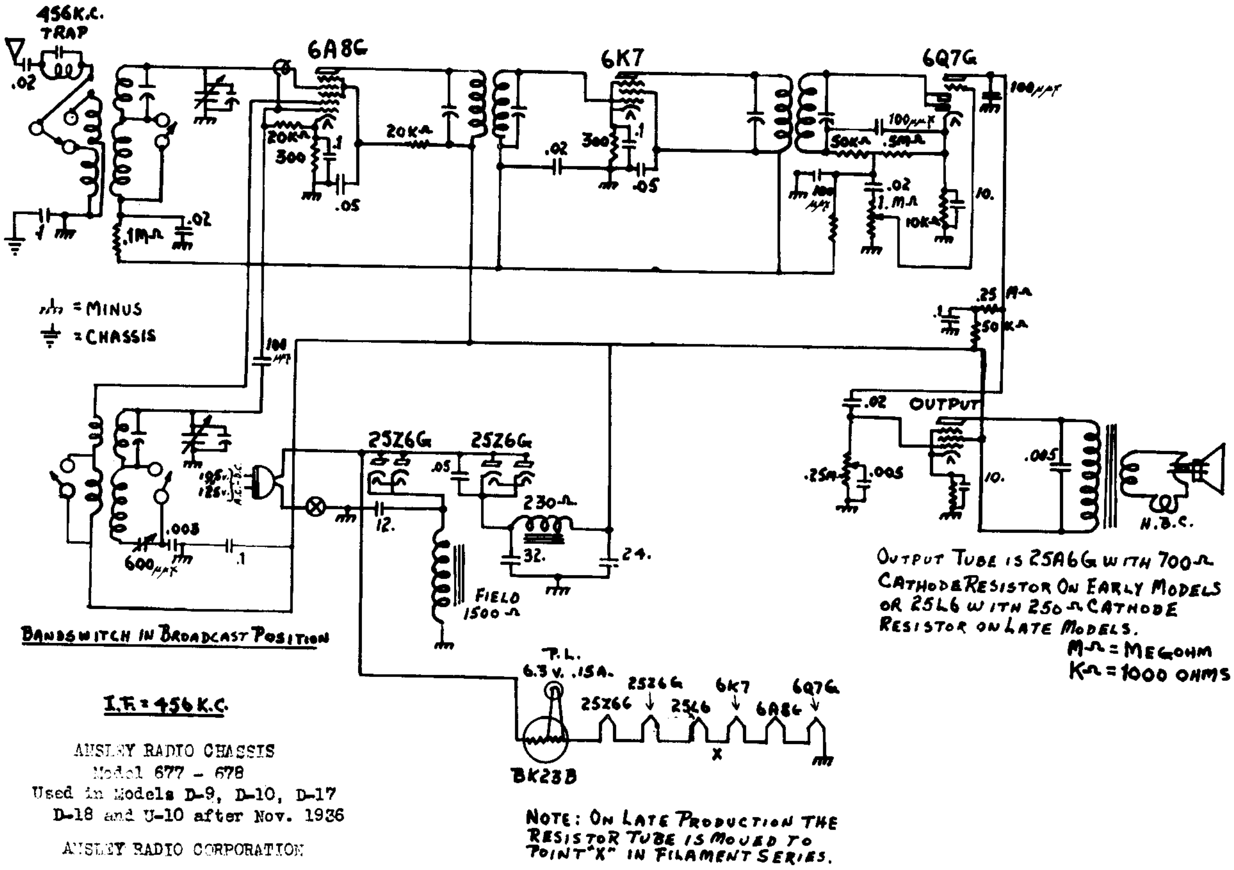


	CONDENSERS		
	CODE	VALUE	RATING
2	C1	.25 MFD	400V
5	C3	.05 "	200V
2	C5	4 "	450V (E)
2	C6	.006 "	400V
4	C7	.05 "	400V
1	C10	DUAL 8 "	475V (E)
1	C12	.0003 "	(MOULDED) ±20%
1	C13	.00025 "	" ±5%
1	C14	.002 "	" ±5%
1	C15	.002 "	" ±10%
1	C16	.0001 "	" ±20%
1	C18	5 "	25V (E)
1	C30	1/8" PC GIMMICK WIRE	
1	C31	.02 MFD	200V

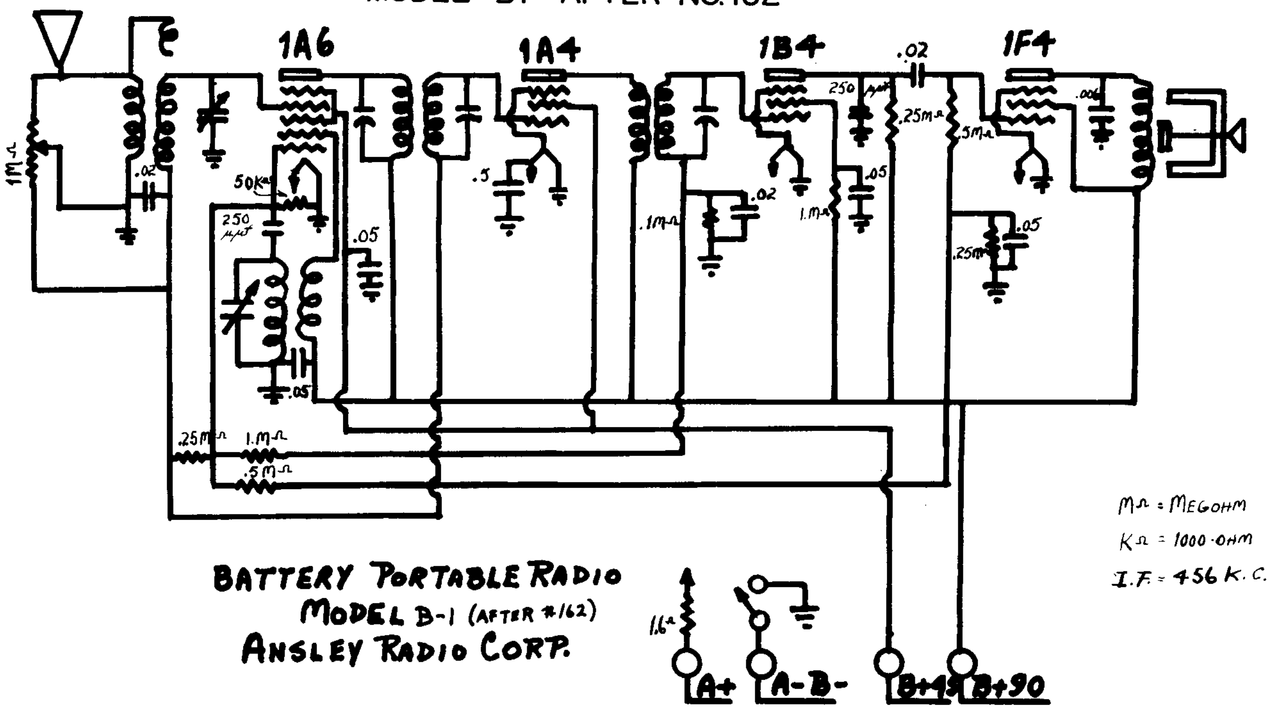
	RESISTORS		
	CODE	VALUE	RATING
2	R1	300 Ω	1/4 WATT
2	R2	50,000 Ω	1/4 "
3	R3	1000 Ω	1/4 "
1	R4	250 Ω	1 "
1	R5	1 MEG Ω	1/4 "
1	R7	20,000 Ω	1 "
3	R8	500,000 Ω	1/4 "
4	R9	10,000 Ω	1/2 "

ANSLEY RADIO LAB.

MODELS D9-D10-D17-D18-V10 AFTER NOV. 1936
CHASSIS 677-678

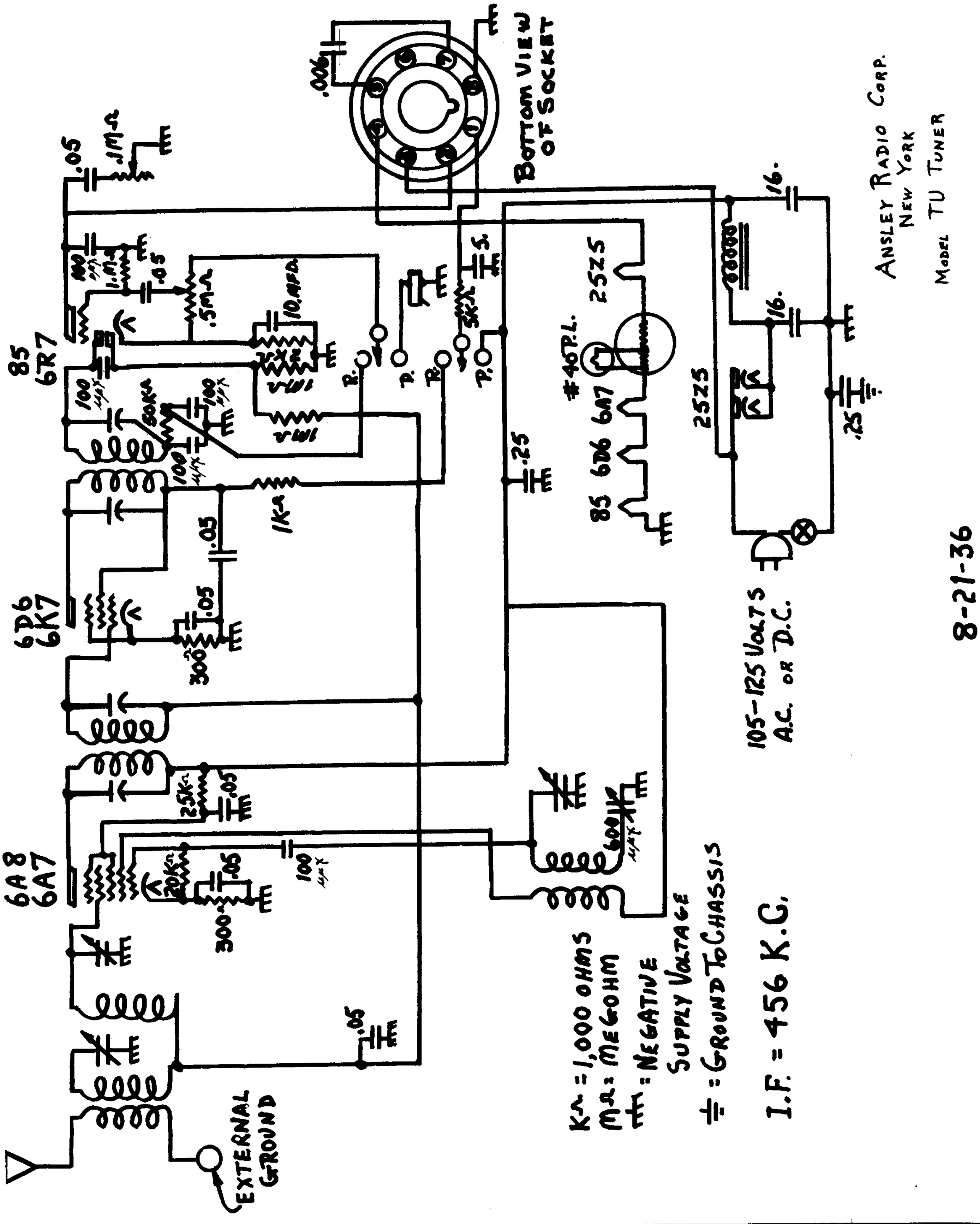


MODEL B1 AFTER NO. 162



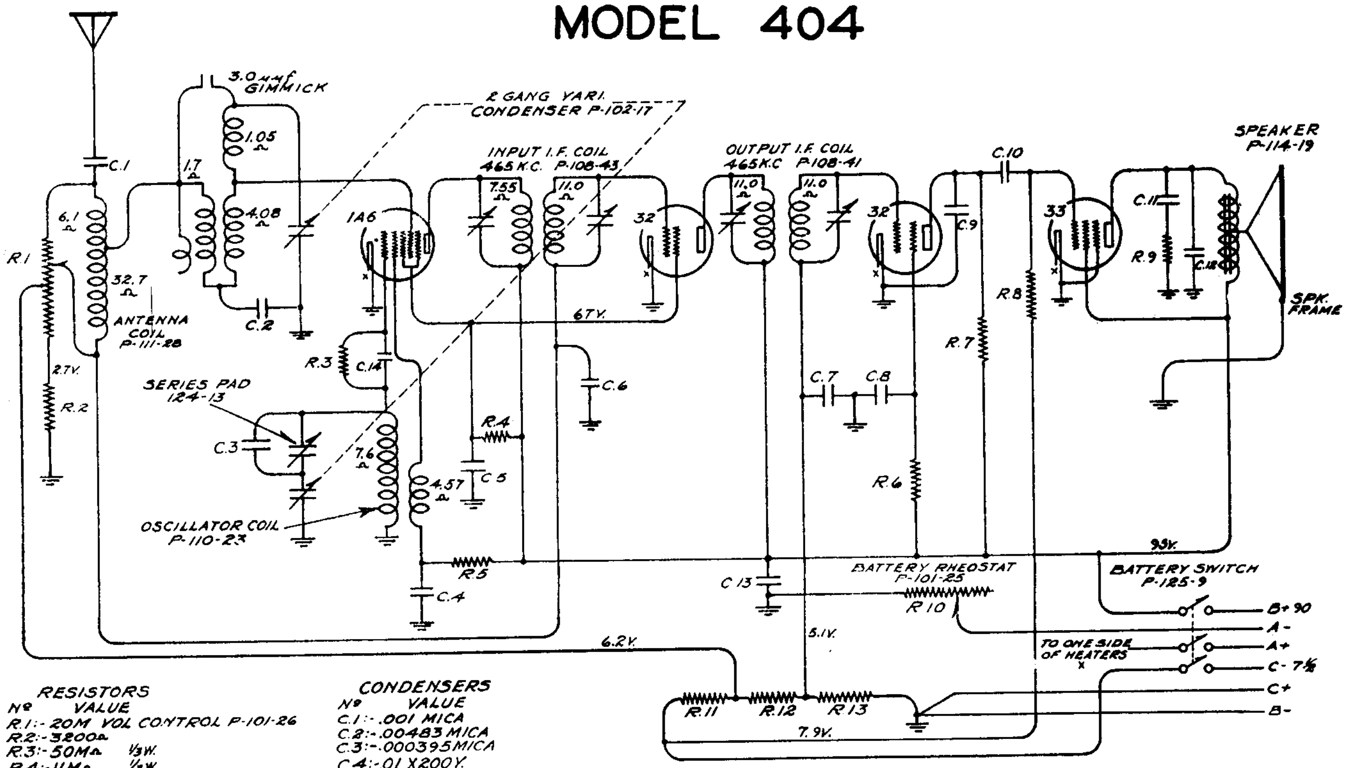
ANSLEY RADIO LAB.

MODEL TU TUNER



BELMONT RADIO CORPORATION

MODEL 404



RESISTORS

Nº	VALUE
R.1:-	20M VOL CONTROL P-101-26
R.2:-	3200Ω
R.3:-	50MΩ 1/3W.
R.4:-	11MΩ 1/3W
R.5:-	10MΩ 1/3W.
R.6:-	3 MEG.Ω 1/3W.
R.7:-	750MΩ 1/3W.
R.8:-	500MΩ 1/3W.
R.9:-	35MΩ 1/3W.
R.10:-	4Ω BAT. RHEOSTAT P-101-25
R.11:-	1300Ω
R.12:-	1920Ω
R.13:-	9800Ω 1/3W

CONDENSERS

Nº	VALUE
C.1:-	.001 MICA
C.2:-	.00483 MICA
C.3:-	.000395 MICA
C.4:-	.01 X 200V.
C.5:-	.05 X 200V
C.6:-	.25 X 200V.
C.7:-	.05 X 200V
C.8:-	.01 X 200V.
C.9:-	.00025 MICA
C.10:-	.01 X 400V
C.11:-	.01 X 400V
C.12:-	.0005 MICA
C.13:-	.25 X 200V
C.14:-	.00025 MICA

- NOTE -
R.2, R.11, R.12 ARE IN ONE UNIT. P-106-21
C.4, C.5 ARE IN ONE UNIT P-118-11
C.6, C.13 " " " " P-118-5
C.7, C.8 " " " " P-118-11
NUMBERS PREFIXED BY LETTER P ARE PART Nºs
ALL VOLTAGES INDICATED ARE WITH NEW BATTERIES, VOLUME CONTROL ON FULL

ALIGNING I.F. TRANSFORMERS: (465 K.C.)

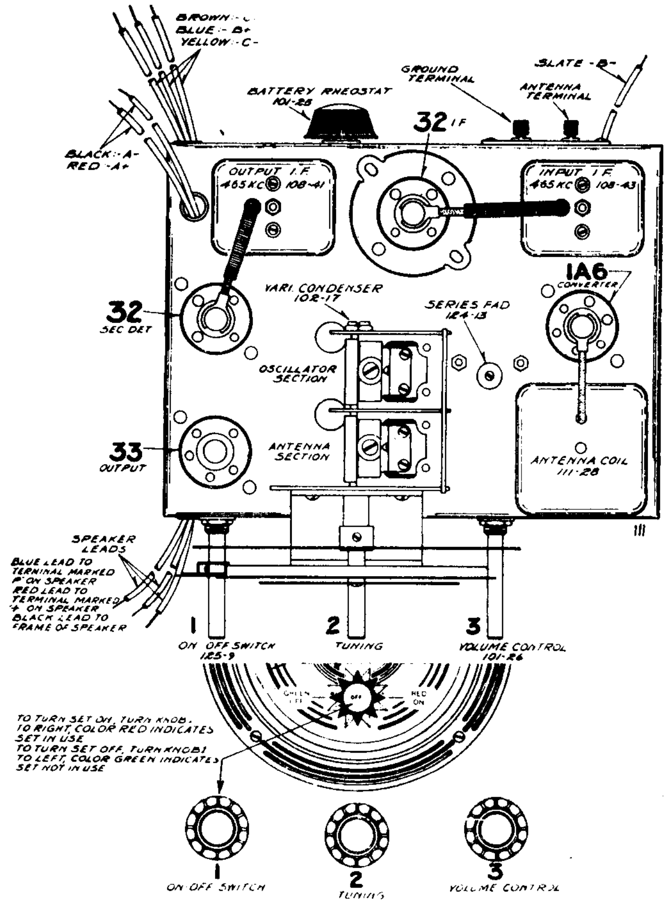
1. With volume control full on and with variable condenser at its minimum capacity position, plates entirely out of mesh, and with external oscillator set at 465 K.C. connected in series with a .1 mfd. condenser, to the grid of the 1A6 tube (cap at top of tube), adjust I.F. transformers, parts number 108-41 and 108-43, to resonance. Both of these transformers have two (2) adjustments each, they are accessible from the tops of the cans (for location see top view).

Use as a resonance indicator an output meter connected across the outside terminals of the speaker or by means of an adapter to the plate and screen of the type 33 output tube. Maximum deflection of the volt meter indicates resonance.
Use only enough signal to get a readily readable output.
A low range output meter or the low scale of a multi-range meter should be used.

BROADCAST BAND ALIGNMENT:

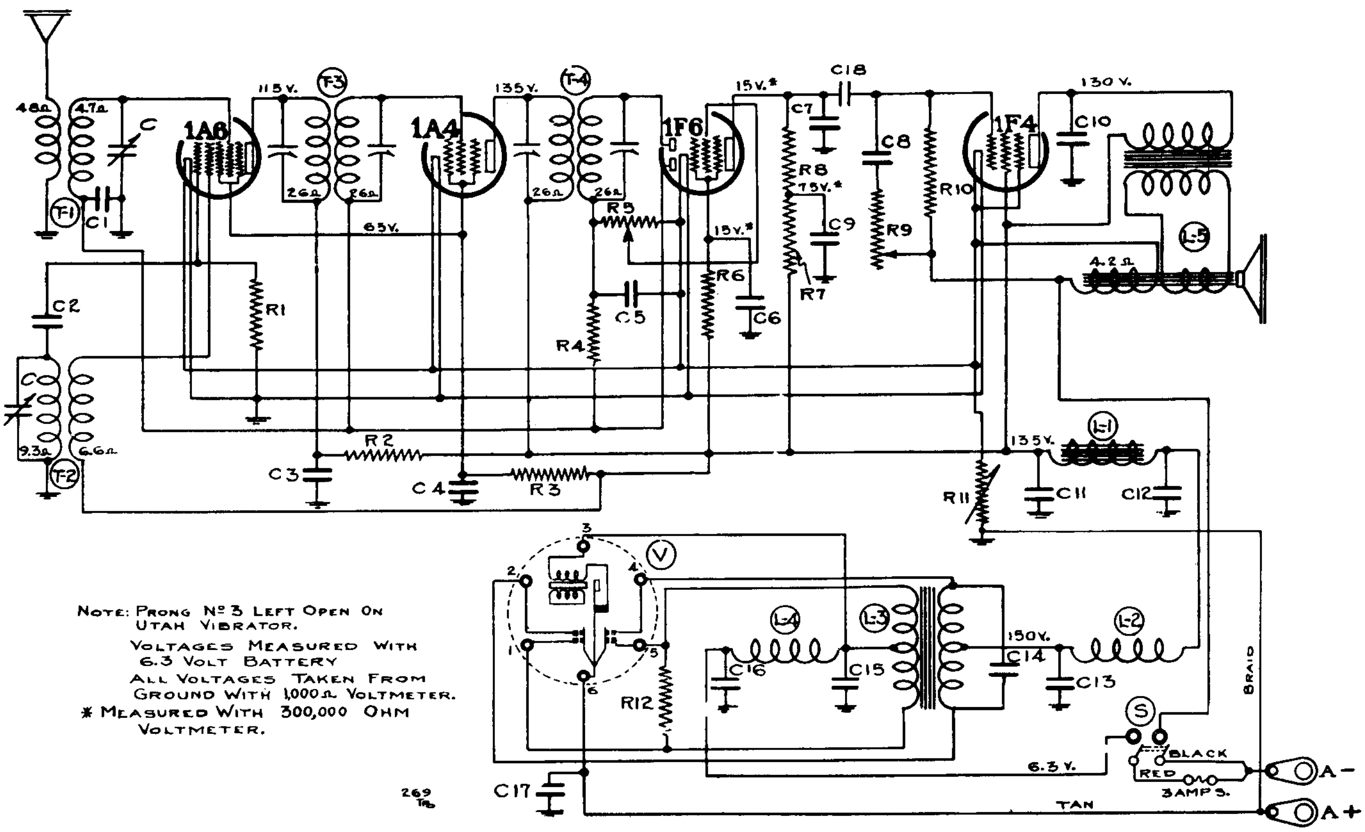
1. Set external oscillator to 1720 K.C. and connect it in series with a 200 mmfd. condenser to the antenna and ground posts.
   (a) With variable condenser in its minimum capacity position, plates entirely out of mesh, adjust oscillator trimmer (rear section of variable condenser) to resonance.
   (b) Re-set external oscillator to 1400 K.C. Rotate variable condenser, pick up signal and adjust antenna trimmer (front section of variable condenser) to resonance.
   (c) Re-set external oscillator to 600 K.C., move dial pointer to 600 K.C., and adjust series pad, part number 124-13 (see top view), to resonance. While making this adjustment, slowly rock variable condenser to and fro until maximum output is obtained.
   (d) Check for sensitivity at 800, 1000, 1200 K.C. DO NOT BEND PLATES.

CAUTION: No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as run down batteries, defective tubes, poor installations, open or grounded antenna systems, defective condensers and resistors. In order to properly align this chassis, an oscillator (generator) is necessary.



BELMONT RADIO CORPORATION

MODEL 415—SERIES A



No.	Part No.	Description
		CONDENSERS
C1	100-10	.05 x 200 Volts
C2	129-12	.00025 Mica
C3	100-33	.1 x 200 Volts
C4	100-33	.1 x 200 Volts
C5	129-12	.00025 Mica
C6	100-33	.1 x 200 Volts
C7	129-5	.0001 Mica
C8	100-25	.002 x 600 Volts
C9	100-9	.05 x 200 Volts
C10	100-7	.005 x 600 Volts
C11	119-28	5 mfd. x 200 Working Voltage
C12	119-28	5 mfd. x 200 Working Voltage
C13	100-33	.1 x 200 Volts
C14	100-34	.005 x 1200 Volts
C15	100-40	.5 mfd. x 200 Working Voltage
C16	100-40	.5 mfd. x 200 Working Voltage
C17	100-35	.5 x 200 Volts
C18	100-11	.01 x 400 Volts

NOTE: C11 & C12 in one unit—No. 119-28

		RESISTORS
R1	130-94	50M Ohm—1/3 Watt
R2	130-17	10M Ohm—1/3 Watt
R3	130-123	15M Ohm—1/2 Watt
R4	130-121	3.2 megohm—1/3 Watt
R5	101-56	1 meg ohm—Volume Control
R6	130-19	1 meg ohm—1/3 Watt
R7	130-20	100M Ohm—1/3 Watt
R8	130-11	250M Ohm—1/3 Watt
R9	101-59	1 meg ohm—Tone Control
R10	130-37	750M Ohm—1/3 Watt
R11	101-44	4.75 Ohm—Filament Rheostat
R12	130-124	200 Ohm—1/2 Watt

		MISCELLANEOUS PARTS
C	102-38	One Section of Two Gang
T1	111-66	Antenna Coil
T2	110-45	Oscillator Coil
T3	108-84	Input I.F.—465 Kc.
T4	108-85	Output I.F.—465 Kc.
L1	105-30	Filter Choke
L2	123-3	R.F. Choke Coil
L3	104-62	Power Transformer
L4	105-19	"A" Choke
L5	114-50	6" Spkr. (Field Res. 4.2 Ohms)
S	101-56	On Volume Control
V	126-4	Vibrator Unit

NOTE: R11, Part No. 101-44 Variable Filament Rheostat is adjusted at the factory to keep the filament voltage of the tubes at 2 volts.

DESCRIPTION:

TUBES:

The tube complement of this chassis consists of the following tubes:

The type and function of each tube is as follows:

1—Type 1A6 Pentagrid Mixer, First Detector-oscillator.

1—Type 1A4 Super Control R. F. Tetrode I. F. Amplifier (465 K.C.)

1—Type 1F6 Duplex Diode Pentode, Second Detector, A.V.C. and First Audio.

1 Type 1F4 Pentode Output Amplifier.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

In order to prevent signal from acting upon A.V.C and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good. If fuse blows out frequently and insulating sleeve has been properly placed over fuse, the trouble is probably in the vibrator, it should be replaced. Do not attempt to make any adjustments on the vibrators.

GROUND:

To obtain the best performance (freedom from radiated noise), a ground must be used.

ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low storage battery, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. Remove the knobs and the four bolts which are used to fasten the chassis.

All adjustments should be made with a non-metalic screw driver.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 1F4 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

ALIGNING I.F. TRANSFORMERS: (465 K. C.):

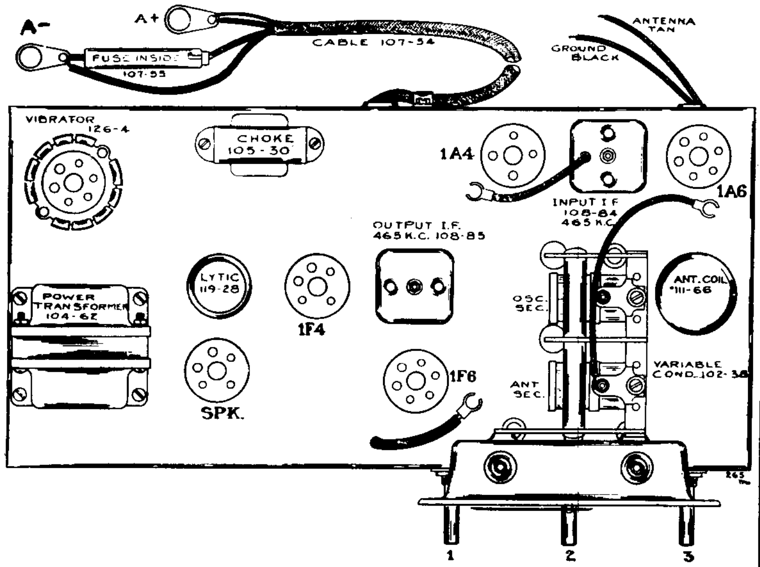
Part No. 108-85 Output I.F. Transformer.
Part No. 108-84 Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 1A4 tube, and adjust the output I.F. transformer (No. 108-85) to resonance.
   (b) Move oscillator output clip from grid of 1A4 to grid cap of 1A6 and adjust input I.F. transformer (No. 108-84) to resonance.
   (c) With oscillator still connected to 1A6, readjust output I.F. transformer (108-85) if necessary.

R.F. ALIGNMENT: (535-1720 K.C.)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to tan antenna and black ground leads and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer (rear of gang condenser).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance (front section of gang condenser).
   (c) Check sensitivity at 600 and 1000 kilocycles.



TUNING RANGE—
Standard Broadcast Band
535-1720 Kilocycles

I. F. FREQUENCY
465 K. C.

BELMONT RADIO CORPORATION
MODEL 746 SERIES A

TUNING RANGE—
Long Wave Band
860-2150 Meters
350-140 Kilocycles
Medium Wave Band
187-588 Meters
1600-510 Kilocycles
Short Wave Band
16.5-56.5 Meters
18.2-5.3 Megacycles

SERVICE MANUAL
Model 746 - Series A
7-Tube Including Cathode-Ray Tuning Indicator
3-Band A. C. Superheterodyne Receiver
190-280 Volts 50 Cycles A. C.

I. F. FREQUENCY
465 K. C. (645.1 Meters)

DESCRIPTION

TUBES:

The tube complement of this chassis consists of the latest metal type tubes, which are interchangeable with "metal-glass" types, or glass tubes with octal bases.

The type and function of each tube is as follows:

1—Type 6L7 Pentagrid Mixer, First Detector.
1—Type 6C5 Oscillator.
1—Type 6K7 Remote Cut-Off Pentode, I. F. Amplifier (465 K.C.)
1—Type 6Q7 Duplex Diode Triode Second Detector, A.V.C. and First Audio.
1—Type 6F6 Pentode Output Amplifier.
1—Type 5Y3 or 5W4 High Vacuum Rectifier.
1—Type 6G5 Cathode-Ray Tuning Indicator.
(Note—6G5 available in all glass only.)

POWER SUPPLY:

This receiver is normally supplied with a transformer for operation on 50 cycles (may be higher in frequency, not lower) and with a primary designed for operation on 190-280 volts.

Mains transformer is provided with two taps, one for voltages 190-240 volts another for voltages 240-280 volts. These taps are accessible upon removing plate fastened with two wing nuts to back of chassis.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25 and 50 cycles and with primary taps for 108, 127, 150, 225 and 260 volts (see illustrations).

Should the receiver be equipped with a special transformer, connect primary tap on voltage terminal which corresponds as nearly as possible to the actual mains voltage.

SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 220 volts on the primary of the power transformer.

With special transformers select primary tap nearest to actual mains voltage at time voltage measurements are to be made.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS
Dummy Antennas

The following dummy antennas are used in aligning the receiver, and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast and long wave)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

TEST FREQUENCIES USED

	Kilocycles	Meters
I. F.	465	645.1
Long Wave	150	2000
	350	860
	325	925
Broadcast	600	500
	1400	214
	1600	187
Short Wave	6000	50.0
	17000	17.6
	18200	16.5

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 6F6 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

CAUTION:

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems low line voltages, defective tubes, condensers and resistors In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the four bolts by which it is fastened.

ALIGNING I.F. TRANSFORMERS
(465 K.C.) (645.1 Meters)

Part No. 108-73 Output I.F. Transformer.
Part No. 108-74 Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the broadcast position, (center of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

(a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-73) to resonance.

(b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6L7 and adjust input I.F. transformer (No. 108-74) to resonance.

(c) With oscillator still connected to 6L7, readjust output I.F. transformer (108-73) if necessary.

ALIGNMENT PROCEDURE

The following adjustments to be made after the I.F.'s have been aligned as explained above.

SHORT WAVE BAND ALIGNMENT:
16.5 Meters (18.2 Mc.) to 56.5 Meters (5.3 Mc.)

1. With band changing switch in the short wave position, extreme right of its rotation, and with the gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

(a) Set external oscillator to 16.5 meters (18.2 Mc.) and adjust short wave oscillator trimmer (adjustment number 3, see Fig. 2) to resonance.

(b) Re-set external oscillator to 17.6 meters (17.0 Mc.) and pick up signal by rotating gang condenser. Adjust short wave antenna trimmer (adjustment number 6) to resonance.

(c) Re-set external oscillator to 50 meters (6.0 Mc.) and check for sensitivity.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 18.3 megacycle signal appears near 17.4 megacycles.

MEDIUM OR BROADCAST BAND ALIGNMENT:
588 Meters (510 K.C.) to 187 Meters (1600 K.C.)

1. With band changing switch in the medium wave position, center of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:

(a) Set external oscillator to 187 meters (1600 K.C.) and adjust medium wave oscillator trimmer to resonance (adjustment number 2: see bottom view of coil assembly. Fig. 2.)

(b) Re-set external oscillator to 214 meters (1400 K.C.), rotate variable gang condenser and pick up signal. Adjust medium wave antenna trimmer (Adjustment number 5) to resonance: also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)

(c) Re-set external oscillator to 500 meters (600 K.C.), and adjust medium wave series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 2.)

(d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

(e) Check for tracking and sensitivity at 300 meters (1000 K.C.) **Under no circumstances bend plates of variable condenser sections to correct tracking.**

IMPORTANT: This band must be completely rechecked after the long wave band has been adjusted.

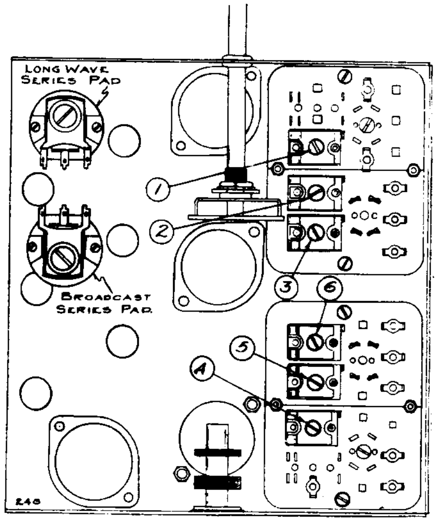


FIG. 2—BOTTOM VIEW (Showing Trimmers)

LONG WAVE BAND ALIGNMENT:
860 Meters (350 K.C.) to 2150 Meters (140 K.C.)

1. With band changing switch in the long wave position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:

(a) Set external oscillator to 860 meters (350 K.C.), and adjust long wave oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly Fig. 2.)

(b) Re-set external oscillator to 925 meters (325 K.C.), rotate variable gang condenser and pick up signal. Adjust long wave antenna trimmer (Adjustment number 4) to resonance.

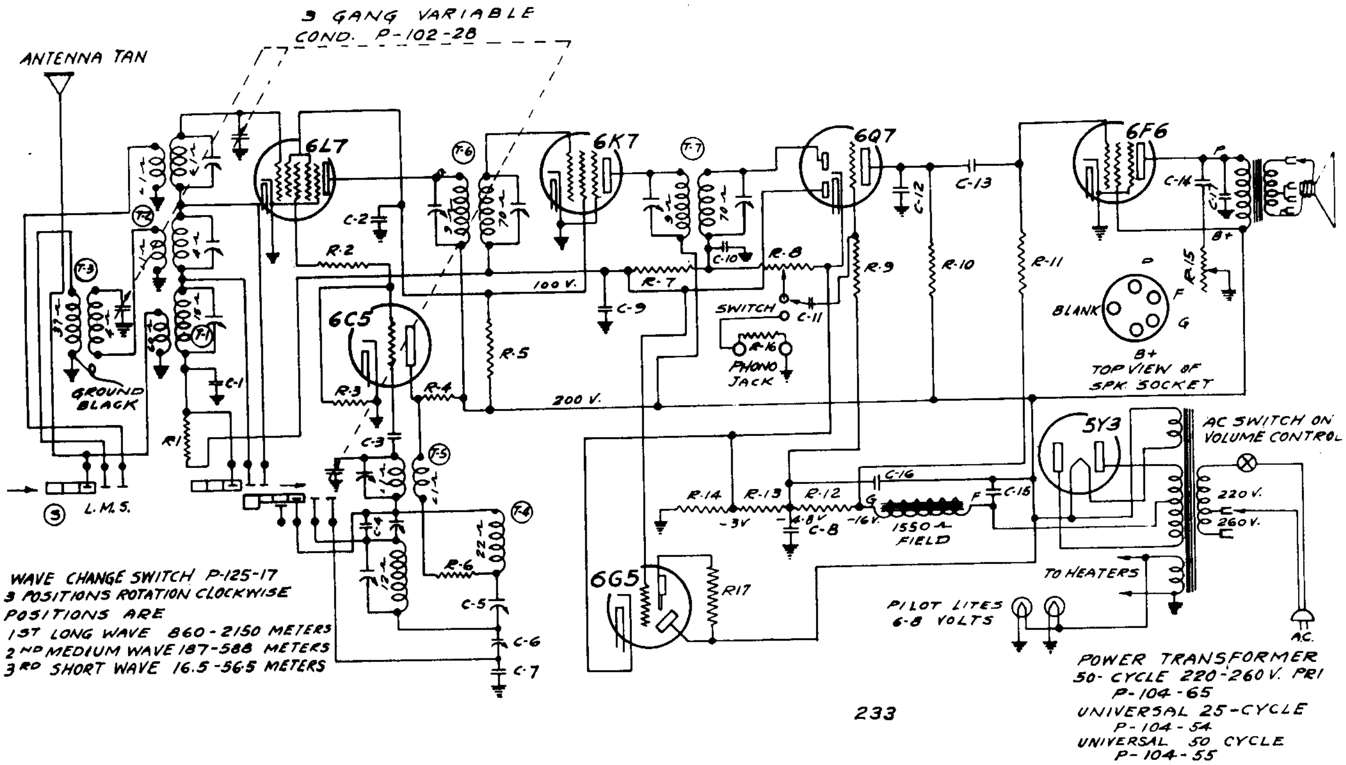
(c) Re-set external oscillator to 2000 meters (150 K.C.), and adjust long wave series pad to resonance by rotating condenser to approximately 2000 meters, rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 2.)

(d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

IMPORTANT: This band must be completely rechecked after the medium wave band has been rechecked.

BELMONT RADIO CORPORATION

MODEL 746 SERIES A



233

No.	Part No.	Description
		RESISTORS
R1	130-103	100M Ohm—⅓W—10%— 50V—Carbon
R2	130-105	150 Ohm—⅓W—20%— 10V—Carbon
R3	130-117	50M Ohm—1/10W—20%— 20V—Carbon
R4	130-104	9M Ohm— 1W—20%—100V—Carbon
R5	130-34	19M Ohm— 1W—20%—100V—Carbon
R6	130-27	50 Ohm—⅓W—20%— 3V—Carbon
R7	130-19	1 meg Ohm—⅓W—20%—100V—Carbon
R8	101-46	1 meg Ohm—Volume Control
R9	130-4	3 meg Ohm—⅓W—20%—100V—Carbon
R10	130-103	100M Ohm—⅓W—10%— 50V—Carbon
R11	130-102	500M Ohm—⅓W—10%— 50V—Carbon
R12	106-26	220 Ohm—Muter Strip
R13	106-26	33 Ohm—Muter Strip
R14	106-26	52 Ohm—Muter Strip
R15	101-53	Tone Control (50M Ohms)
R16	130-103	100M Ohm—⅓W—10%— 50V—Carbon
R17	130-110	1 meg Ohm—1/10W—20%—100V—Carb.

NOTE: R12, R13, and R14 in one unit—part No. 106-26

CONDENSERS

C1	100-22	.05 x 200 Volt—25%
C2	100-20	.1 x 200 Volt—25%
C3	129-39	.00005 Mica—MT—O—20%
C4	129-67	.00004 Mica—MT—O—10%
C5	124-31	Series Pad 300 mmf. Working Cap'y.
C6	124-32	Series Pad 565 mmf. Working Cap'y.
C7	129-54	.003 Mica—MW—W—2½%
C8	100-20	.1 x 200 Volt—25%
C9	100-22	.05 x 200 Volt—25%
C10	129-12	.00025 Mica—MT—O—20%
C11	100-11	.01 x 400 Volt—25%
C12	129-12	.00025 Mica—MT—O—20%
C13	100-11	.01 x 400 Volt—25%
C14	100-27	.025 x 600 Volt—25%
C15	103-6	8 mfd. x 350 Volt Electrolytic
C16	103-7	8 mfd. x 300 Volt Electrolytic
C17	100-25	.002 x 600 Volt—20%

MISCELLANEOUS PARTS

T1	111-61	Long Wave Antenna Coil
T2	111-64	Medium Wave & Short Wave An. Coil
T3	111-62	Antenna Preselector Coil
T4	110-47	Long Wave Oscillator Coil
T5	110-49	Med. Wave & Short Wave Osc. Coil
T6	108-74	Input I.F.—465 Kc.
T7	108-73	Output I.F.—465 Kc.
S	125-17	Band Switch

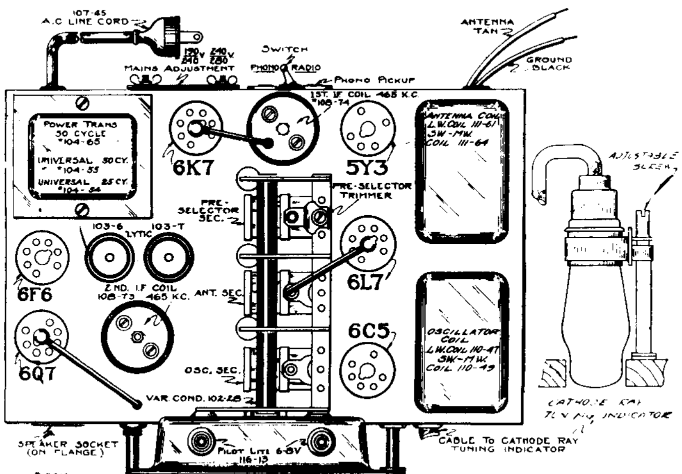
TUNING RANGE—

Long Wave Band
860-2150 Meters
350-140 Kilocycles

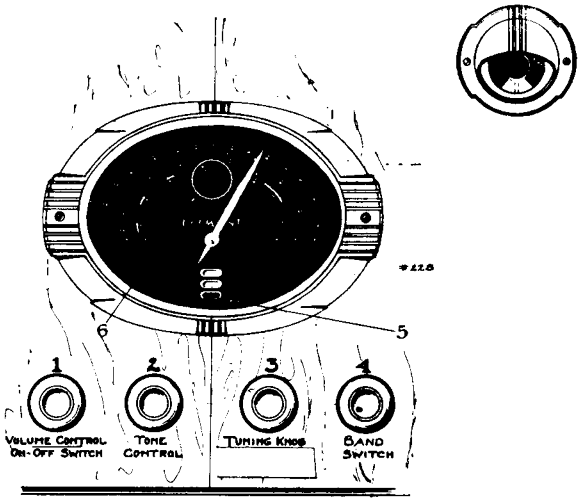
Medium Wave Band
187-588 Meters
1600-510 Kilocycles

Short Wave Band
16.5-56.5 Meters
18.2-5.3 Megacycles

I. F. FREQUENCY
465 K. C. (645.1 Meters)



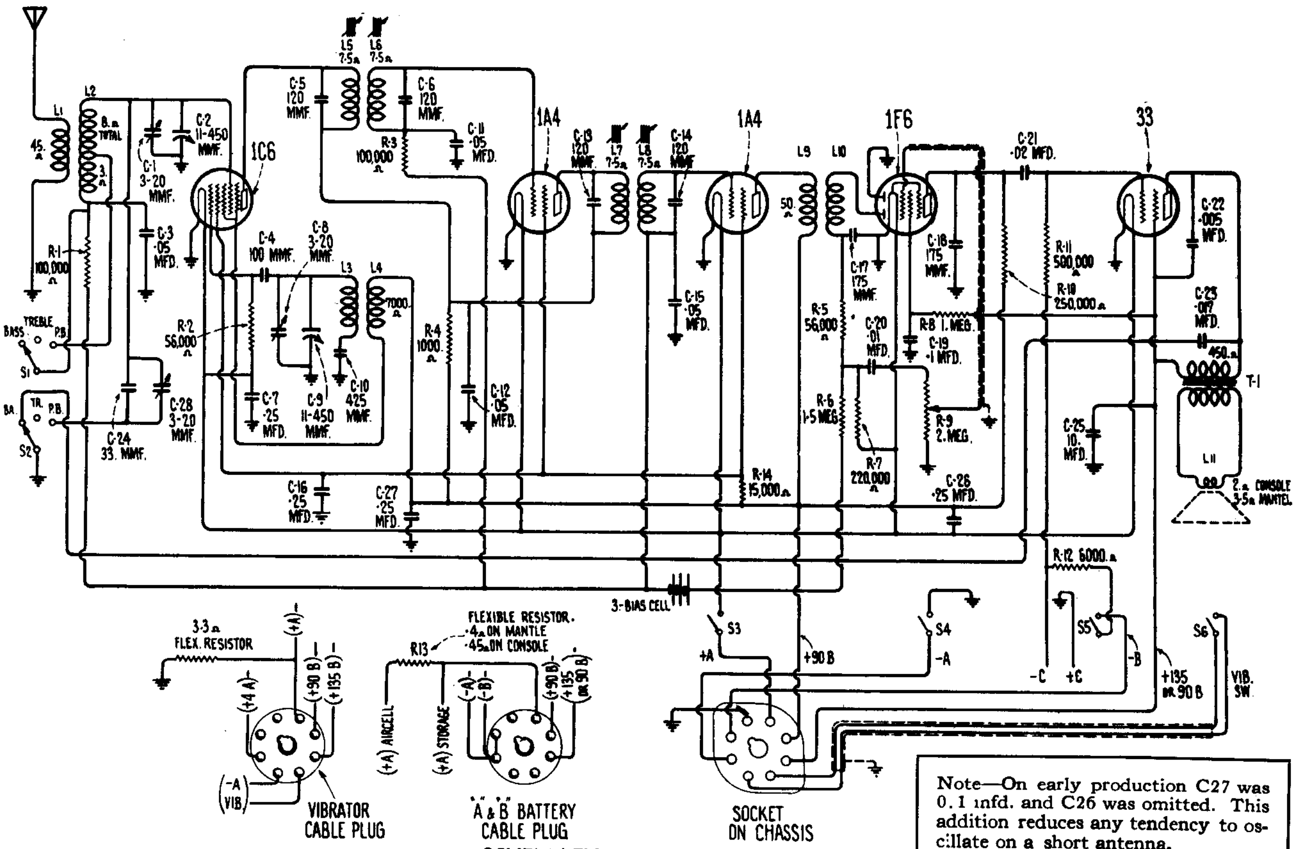
TOP VIEW—FIG. 1



FRONT VIEW—FIG. 3

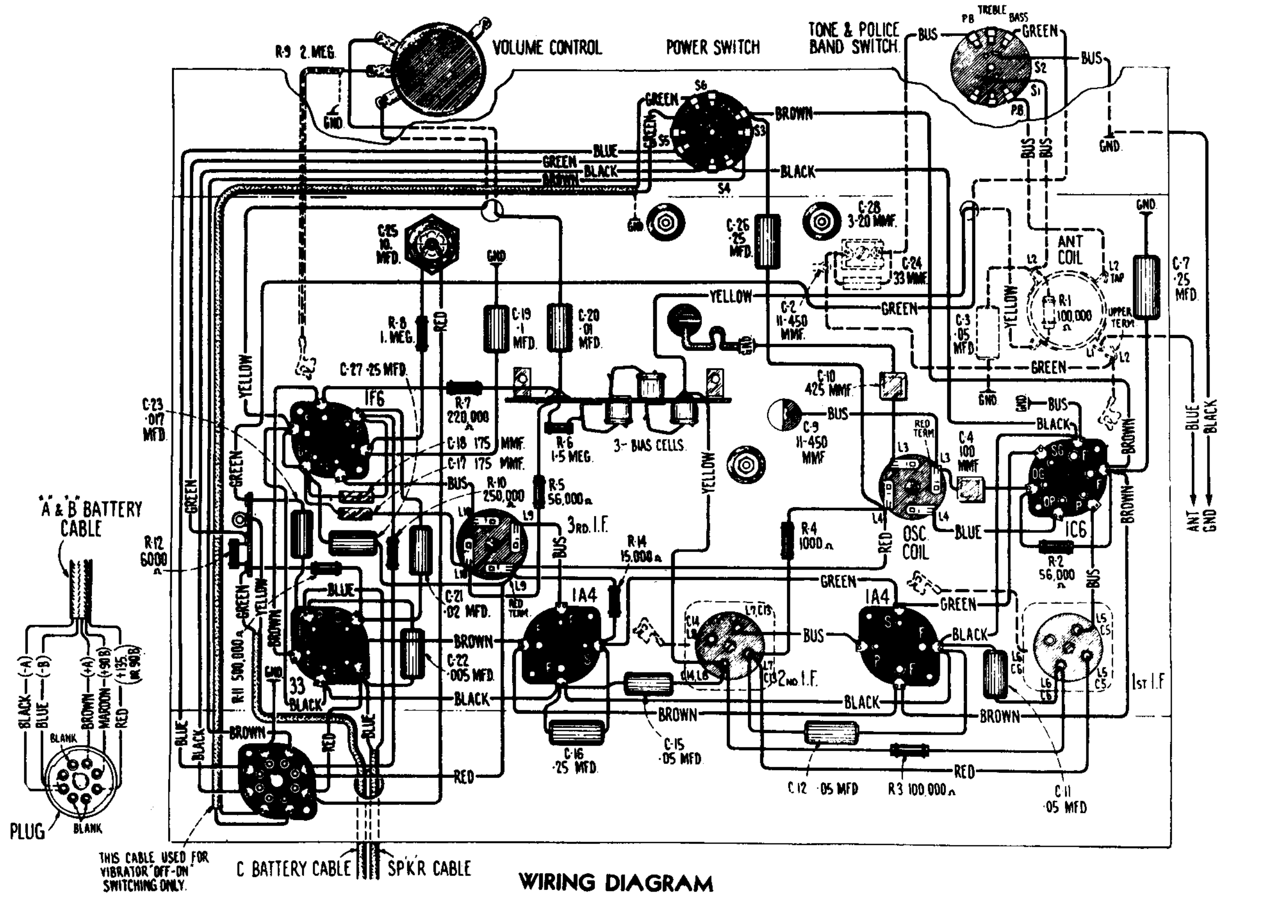
CANADIAN WESTINGHOUSE COMPANY Limited

MODELS B517A & B517X



Note—On early production C27 was 0.1 mfd. and C26 was omitted. This addition reduces any tendency to oscillate on a short antenna.

SCHEMATIC CIRCUIT DIAGRAM



WIRING DIAGRAM

CANADIAN WESTINGHOUSE COMPANY Limited

MODELS B517A & B517X

CHASSIS SERVICE DATA

"A" Battery—1 plug-in 2½ volt Air-cell (Eveready A-600 or equivalent) or 1 2.0 volt storage battery.
"B" Battery—2 (or 3) 45 volt, heavy duty plug-in type.
"C" Battery—(Audio)— 2 (or 3) 4½ volt plug-in type such as Eveready 771 or Burgess 237.
Battery Current— "A" = 560 milliamperes; "B" = 16 milliamperes (average).
Cabinet Dimensions—B-517A, 10" x 17½" x 8"; B-517X, 39" x 22" x 12".
Shipping Weights— B-517A, 19 lbs.; B-517X, 63 lbs.
Controls—(1) Tone and Police Band Switch; (2) Operating Switch; (3) Station Selector; (4) Volume.
Station Selector Drive Ratio....................7:1 (planetary type).
Number and types of radiotrons—2-W-1A4; 1-W1C6; 1-W1F6; 1-W33 Total 5.
Undistorted output....................0.2 Watt
Frequency range....................530 K.C. to 1720 K.C.
Also....................2200 K.C. to 2500 K.C.

This receiver is a five tube superheterodyne incorporating such features as wide broadcast range, two police ranges, chrome steel dynamic speaker, two position tone control, iron-core I.F. coils, automatic volume control, "cell" type "C" bias, unexcelled battery economy, provision for vibrator "B" supply and the inherent sensitivity, selectivity and tone quality of the superheterodyne circuit.

The following description of the circuit includes several new design features which are incorporated in this receiver.

The first tube is used as a combined first detector and oscillator, (Radiotron W-1C6). Separate tuned circuits are provided for each function. The detector coil is tapped so that the tuning range may be extended in the police band position by shorting out a portion of the coil. The oscillator coil is not tapped. The higher police frequency range is covered by operating the first detector at 460 K.C. higher frequency than the oscillator instead of 460 K.C. lower as on the standard range.

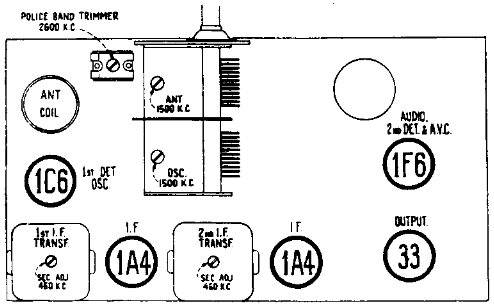
Two W-1A4 Radiotrons are used with three transformers to provide a highly efficient I.F. circuit.

The next tube (W-1F6) is used as a combined diode A.V.C. second detector and screen grid first A.F. amplifier.

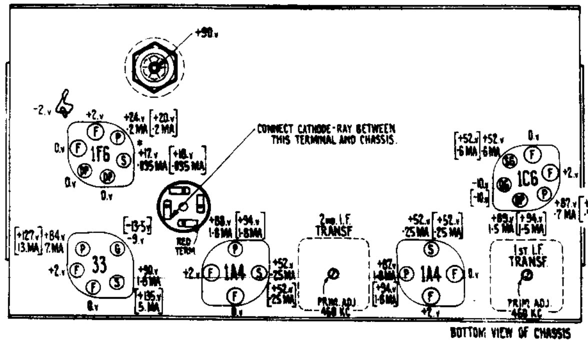
The amplified audio frequency voltage appears across the plate load resistor R-10, which is coupled to the output radiotron by condenser C-21. The first two I.F. transformers are tuned to 460 K.C. These transformers are tuned by fixed primary and secondary condensers and adjusted by movement of the iron core. The use of iron core I.F. transformers results in considerably improved sensitivity, selectivity and stability of adjustment. The third I.F. transformer is also tuned to 460 K.C., but is not adjustable.

The output stage is a single pentode W-33.

The line up adjustment is made in the usual way to the adjustment screws shown in the trimmer location diagram. When making adjustment the test oscillator frequency, receiver dial setting and switch position should correspond to the indicated line up frequency. When making I.F. adjustment the oscillator should be connected to the W-1C6 control grid through a .001 mfd. condenser and ground with the antenna and ground wires shorted.



TRIMMER LOCATIONS (also see below)



SOCKET VOLTAGES

RADIOTRON SOCKET VOLTAGES

Caution—Do not attempt to measure voltages on the control grids of the W-1C6 or W-1A4 with any conventional voltmeter as paralysis of the "C-bias" cells will result.

NOTE—Two voltage values are shown for some ratings. Those readings shown in parenthesis are for operation from Westinghouse Vibrator "B" Supply Unit.

All voltages are measured with respect to chassis frame, with all batteries at normal voltage (90 volts B, 9 volts C)—tuned to approximately 1000 K.C.—no signal being received.

Check "C" cells by noting whether plate current is abnormally high on tubes biased by cells.

A further check on the C bias cells, particularly if it is suspected that the control grid leads have been grounded, is to connect a 4½ volt C battery between the control grid cap of one of the tubes on the C cell circuit and the chassis frame. The negative of the C battery should be connected to control grid, positive to chassis frame. This connection should be momentarily made only, and if the C cell had been weakened before, it will now be found to be recharged and ordinarily will not need to be replaced.

CANADIAN WESTINGHOUSE MODELS B517A and B517X

Radio Replacement Parts — **Use only Genuine Canadian Westinghouse Parts**

Key No.	Part No.	DESCRIPTION	List Price
L1, L2	H-34404	Coil—Antenna Coil Assembly	$1.50
L3, L4	H-36134	Coil—Oscillator Coil Assembly	1.30
L5, L6, C5, C6	H-36138	Transformer—First I.F. ("Iron Core")	2.10
L7, L8, C13, C14	H-36138	Transformer—Second I.F. ("Iron Core")	2.10
L9, L10	H-33418	Transformer—Third I.F. (non-adjustable)	1.50
	H-34535	Shield Cap for I.F. Coil Assembly	.20
R9	H-36071	Volume Control—2 Meg.	1.20
S1, S2	H-34469	Tone Control and Range Switch	.60
S3, S4, S5, S6	H-36078	Operating Switch	.75
C25	M-68597-1	Capacitor—Inverted Electrolytic with mtg. nut 10 mfd. 180 volts	1.25
C1, C2, C8, C9	H-34446	Capacitor—Two Gang Tuning Condenser	On Application
	H-36131	Vernier Drive Assembly including Ball Race, 3 Balls and Vernier Shaft	.75
C28	H-33442	Capacitor—Trimmer——3—20 mfd.	.35
	H-34492	Dial Scale	.50
	H-33432	Control Knob	.25
	H-33433	Control Knob with White Dot	.25
	H-33436	Spring for Control Knob—pkge. of 5	.20
	H-34439	Socket—4 Contact	.20
	H-34441	Socket—5 Contact	.20
	H-34442	Socket—6 Contact	.20
	H-33478	Socket—Octal Base, for Cable Plug	.25
	D-593465-1	Dial Pointer	.10
	G-727-A	Goat Tube Shield	.25
	H-23786	Control Grid Clip—Large—pkge. of 5	.25
	D-592668-6	Shielded Lead—6½ inches long	.40
	C-6839-2	Shielded Cable—11½ inches long, 2 Conductor	.75
	C-6803-1	Bias Cell Mounting	.30
	K-79677-1	Bias Cell (Pkge. of 5)	1.20
	H-36298	"B" Battery Cable—B-517A	1.60
	H-36300	"B" Battery Cable—B-517X	1.50
	H-36297	"C" Battery Cable	1.10
	Cat. 30-3B	3 Prong "B" Battery Plug	.05
	Cat. 30-3C	3 Prong "C" Battery Plug	.05
	Cat. 7-E	Battery Cable Plug Complete	.30
	H-36097	"C" Battery Shorting Receptacle	.05
	H-36098	"B" Battery Shorting Receptacle	.05
R13	C-6201-5	Flexible Resistor—Brown, 0.4 ohms, ¼ watt B-517A	.20
R13	C-6201-6	Flexible Resistor—Orange 0.45 ohms, ¼ watt B-517X	.20
	H-34498	Reproducer Assembly complete—B-517X	12.00
L11	H-34508	Reproducer Cone Assembly—B-517X	1.60
T2	H-34511	Output Transformer—B-517X	2.00
	H-34496	Reproducer Assembly Complete—B-517A	10.00
L11	H-34507	Reproducer Cone Assembly—B-517A	1.50
		(Note—B-517A Cone cannot easily be replaced. The complete reproducer will be repaired (or exchanged) at a net price of $1.25 plus material)	
T2	H-34509	Output Transformer—B-517A	2.00
	C-6736-1	Mantel Cabinet—B-517A	On Application
	C-6738-1	Console Cabinet—B-517X	On Application
	C-6820-1	"On-Off" Escutcheon Plate	.10
	C-6813-1	"Bass-Treble Police Band" Escutcheon Plate	.20

CARBON RESISTORS

RS-150

Part No.	Ohms	Watts	Key No.
H-30205	1,000 (insulated)	½	R4
H-36108	6,000	½	R12
H-27714	15,000	½	R14
H-33484	56,000 (insulated)	½	R2, R5
H-30561	100,000 (insulated)	½	R1, R3
H-33508	220,000 (insulated)	½	R7
H-30176	250,000	½	R10
H-25528	500,000	½	R11
H-30541	1.0 Meg. (insulated)	½	R8
H-36064	1.5 Meg.	½	R6

MOULDED CAPACITORS

Part No.	Capacity	Key No.	List Price
H-34473	33	C24	$0.35
H-34367	100	C4	.30
K-77952-502	120	C5, C6, C13, C14	.35
H-34477	175	C17, C18	.30
H-34472	425	C10	.30

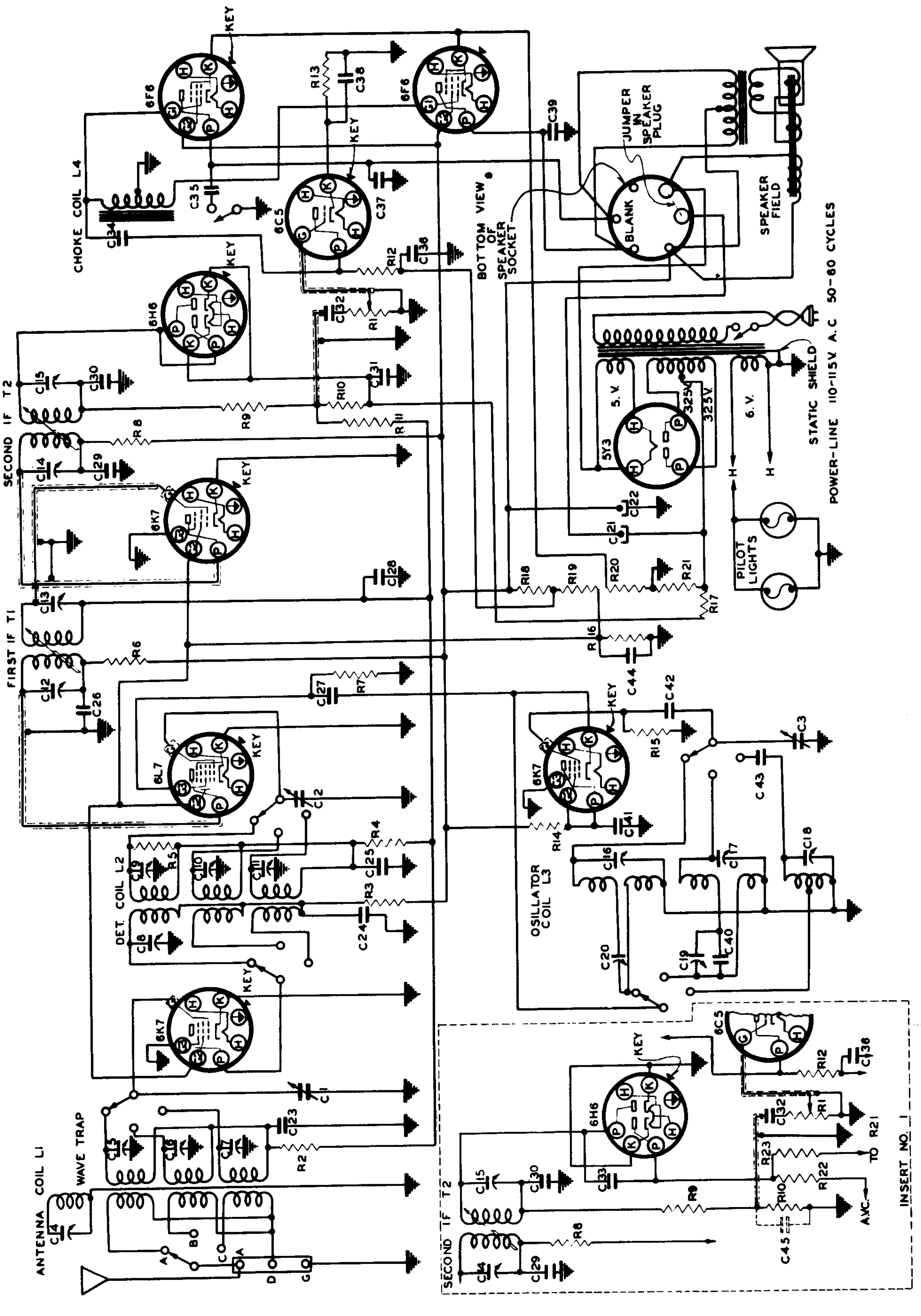
TUBULAR CAPACITORS

RS-150

Part No.	Description	Key No.
H-29601	0.005 mfd. 400	C22
H-34461	0.01 mfd. 400	C20
H-36061	0.017 mfd. 400	C23
H-32989	0.02 mfd. 400	C21
K-5302	0.05 mfd. 400	C3, C11, C12, C15
K-7020	0.1 mfd. 400	C19
K-6134	0.25 mfd. 200	C7, C16, C26, C27

CASE ELECTRIC CORPORATION

MODELS 915-916-917-918 CHASSIS 19 & 19A



CASE ELECTRIC CORPORATION

MODELS 915-916-917-918 CHASSIS 19 & 19A

TUBE COMPLEMENT

1 Type 6K7 RF Amplifier
1 Type 6L7 Converter
1 Type 6K7 Oscillator
1 Type 6K7 IF Amplifier
1 Type 6H6 Diode Detector and AVC
1 Type 6C5 Audio Amplifier
2 Type 6F6 Power Pentodes
1 Type 5Y3 Rectifier

Sockets are marked for the proper tubes.

ALIGNMENT PROCEDURE

Correct alignment is of extreme importance in all wave receivers. The receivers are properly aligned at the factory with precision equipment and realignment should not be attempted by the service technician until all other causes of faulty operation are corrected.

In order to properly realign the receiver the following equipment is necessary:

1. A signal generator which will provide an accurately calibrated signal at any frequency from 262 kilocycles to 18 megacycles. The generator should have adjustable signal output.

2. An output audio voltmeter of the low voltage type to be connected across the moving coil of the speaker. This should be capable of providing a readable deflection for relatively low output levels to avoid the effects of overload.

3. An insulated or non-metallic screw driver for the adjustment of trimmers.

IF ALIGNMENT 262.5 KC

1. Connect the output meter (low scale) across the loud speaker voice coil. Turn the wave band switch (outside of tuning knob) to its left-hand or counter-clockwise position. This brings the red indicator for broadcast band to the top. Turn the volume control to its maximum position.

2. Turn the Variable Selectivity (center bottom knob) to the left or sharpest position. Put tone control on brilliant or clockwise position. With Selectivity Control held all the way to the left or counter-clockwise loosen set screws of collars, which actuate Variable Selectivity coupling and rotate until the drive cables are drawn out as far as possible without forcing. Tighten set screws in the collars. This adjustment assures maximum selectivity and should be checked before IF Alignment is done.

3. Connect the test oscillator ground to chassis and the "hot" lead from the test oscillator to the grid of the 6L7 converter tube through a series .1 Mfd condenser. Set test oscillator to 262.5 kc.

4. With Variable Selectivity Control in sharpest position adjust IF alignment screws, C14, C15, of output transformer, (directly behind tuning condenser) to maximum output reducing output of test oscillator to keep the meter reading on scale as alignment proceeds.

5. Adjust alignment screws, C12, C13, of input transformer T1, (adjacent to electrolytic condenser) to maximum output as described above.

6. Readjust all four alignment screws to insure accurate alignment. Always use the lowest possible output from the test oscillator to preclude the possibility of automatic volume control action confusing proper adjustment.

ADJUSTMENT OF WAVE TRAP

Connect test oscillator to antenna and ground terminals of the receiver using a .00025 Mfd condenser in series with the antenna terminal. With oscillator set at 262.5 kc adjust antenna trap alignment screw C4, for minimum signal increasing output of test oscillator as a minimum is reached.

RF ALIGNMENT (Broadcast "A" or "Red" Band)

1. With test oscillator connecting antenna post through .00025 Mfd as above set signal generator to 1400 kc.

2. Set dial scale, hour and minute hands, to 6 o'clock when gang condenser is fully meshed at maximum capacitance.

3. Set dial to calibration mark 1400 kc using hour hand to indicate frequency (no further attention need be paid to position of minute hand which is used merely for convenience in logging stations by "TIME"). Adjust broadcast oscillator trimmer condenser C16, for maximum output meter reading. If it is found that two peaks occur within the range of the trimmer action use the one in which the trimmer is in its lowest capacitance or counter-clockwise position.

4. Adjust detector input trimmer C9, to a maximum.

In some receivers C9, is a separate trimmer located on the range switch shield under the chassis rather than in the top of the coil can. In these models C8, is a 100 Mmf fixed Mica Condenser instead of the variable trimmer shown on the diagram.

5. Adjust the Antenna stage trimmer C5, to a maximum.

6. Set test oscillator to 600 kc and tune in the signal, then adjust broadcast oscillator padder C20, for maximum output. This padder is mounted under the chassis at the side of the RF "deck." This adjustment is the outer nut of the concentric type padding condenser. Rock the condenser back and forth a degree or two in order to obtain proper maximum.

7. Repeat the 1400 kc adjustments described under 3, 4, 5, for greater accuracy. The output of the test oscillator should always be kept at the lowest output which will allow sufficient meter swing since this assures greater accuracy of adjustment.

Short Wave "B" or "Green" Band

1. Turn the wave band switch to the "B" or "Green" position. Leave the oscillator connected as above but with its output set to 6000 kc and the .00025 Mfd condenser replaced by a 400 Ohm resistor. Set dial scale to 6 mc on the green or middle band, adjust "B" band oscillator trimmer condenser C17, for maximum output observing as before that the proper point occurs at the minimum or counter-clockwise position of the screw if two points are found.

2. Adjust detector input "B" band trimmer condenser C10, to a maximum while rocking the tuning condenser slightly for maximum response.*

3. Adjust Antenna stage "B" band trimmer C6, for maximum output.

4. Set the test oscillator to 2000 kc and tune in the signal. Adjust "B" band oscillator padder condenser C19 for maximum output while rocking tuning condenser as described above. This adjustment is the inner screw of the concentric type padding condenser.

5. Repeat operations 1, 2, and 3 to assure precise alignment.

Short Wave "C" or "Yellow" Band

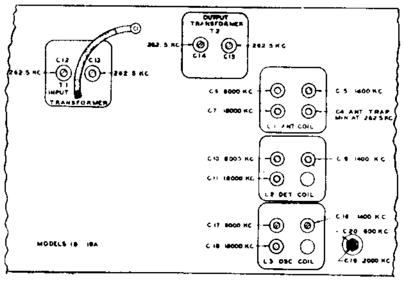
1. With test oscillator connected same as for "B" band and set to 18000 kc (18 mc) set dial scale to 18 mc on inner or yellow band.

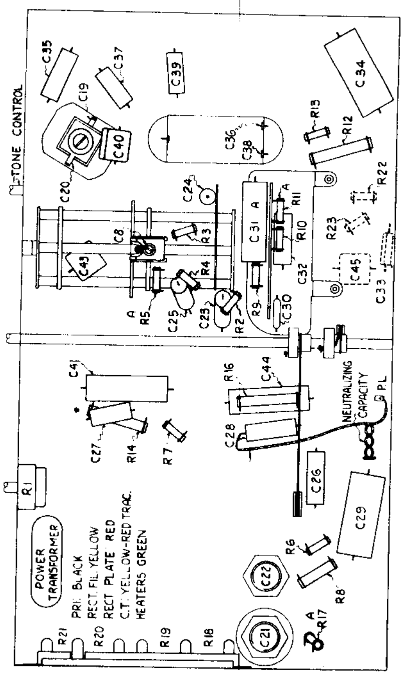
2. Adjust "C" band oscillator trimming condenser C18, for maximum response. Use lower capacity or counter-clockwise response point.

3. Adjust "C" band detector input trimmer C11, to a maximum, "rocking" tuning adjustment to obtain greatest output.*

4. Adjust antenna "C" band trimmer C7, for maximum response.

*The adjustment of the detector input trimmers on the "B" and "C" bands by the procedure outlined above is advisable as contrasted with the usual method of trimming without rocking the tuning adjustment because slight couplings through the tube circuits tend to disturb the oscillator frequency as the detector is tuned. This procedure should be followed on any type of all wave receiver.





Part of the production of Model 19 incorporated certain circuit alterations which are shown in the insert enclosed by dotted lines on the circuit diagram of Page three. The parts placement diagram above is a composite drawing showing the position of parts for both types of receivers. Parts dotted on this diagram refer to those shown in the insert of the schematic diagram. Circuit elements C31 and R17 are not used when dotted connections are employed.

When the variable selectivity control is in "tune" or narrow position certain 6K7 IF tubes may exhibit a tendency toward regeneration or instability due to control grid to plate capacity coupling. This may be "neutralized" by using several turns of twisted hook-up wire connected between the plate of the IF tube and blank lug of the RF socket which is used as a tie point for the AVC return. This is shown on the parts placement diagram.

THE DUAL SPEED PLANETARY DRIVE

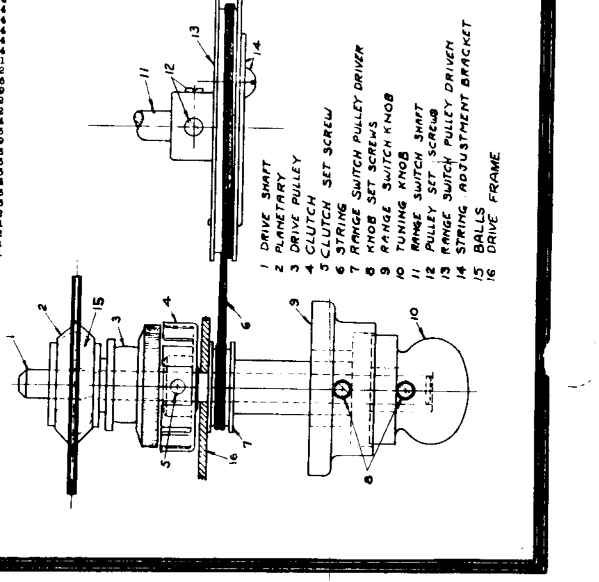
In order to make the tuning of short wave broadcast easier, a dual speed drive is provided, giving a ratio of 96-to-1 with the knob, No. 10, in the "OUT" position which is exceptionally good for short wave tuning, a ratio of 16-to-1 is provided with the knob, No. 10, pushed "IN," used for standard broadcast tuning. You can use this drive knob in the position you like best.

The mechanism of this drive is of the planetary type, using ball bearings, No. 15, housed between cantilever type spring housing, No. 2. When the drive knob, No. 10, is in "OUT" position, the balls, No. 15, operate direct on the drive shaft, No. 1, which gives a reduction in speed on the pointers. When the drive knob, No. 10, is at "IN" position the balls, No. 15, clear the drive shaft, No. 1, and a clutch, No. 4, contacts drive pulley, No. 3, and gives a direct drive on shaft, No. 1.

If drive should ever slip on the "IN" position you will likely find that set screws, No. 5, have become loose in clutch, No. 5. To reset clutch place shaft, No. 1, at "OUT" position. You can tell when it is at "OUT" position by the feel as just after the ball, No. 15, comes up the incline on the shaft, No. 1, it will locate in a very shallow groove on the shaft, No. 1, see that the clutch, No. 4, is against frame, No. 16, and then tighten set screws, No. 5, securely.

If the band switch knob, No. 9, appears to have excessive backlash, you will generally find that it was forced when the switch was at end of its rotation and the set screws, No. 12, are broken loose, tighten these screws and if backlash still appears, loosen screw and adjust bracket and screw, No. 14.

When placing knobs, No. 9 and No. 10, on shafts, be sure knob, No. 9, clears cabinet approximately 3/64 and tighten set screw, No. 8, securely. With shaft, No. 1, at the "IN" position place knob No. 10, on shaft No. 1, until it stops against knob No. 9, then pull to the front 3/64 inch and tighten set screw No. 8, securely.



REPLACEMENT PARTS & PRICE LIST

	A15016	Belt Drive	.21
	B15045	Bezel	.94
	15426	Book Instruction	.08
L4	B15238	Choke Audio	1.07
	15071	Clip Grid (Metal Tube)	.01
	15330	Clutch Assembly	.26
	A15069	Cord Attachment	.35
C1 C2 C3	D15076	Condenser Variable	5.21
C36 C38	A15258	Cond. Electrolytic 4 Mfd 25V 4 Mfd 350V	1.37
C22	A15237	Cond. Electrolytic 10 Mfd 300V	.80
C21	A15236	Cond. Electrolytic 25 Mfd 375V	1.19
C43	15911	Cond. Mica 4500 Mmfd	.29
C30 C33 C42	15918	Cond. Mica 100 Mmfd	.11
C40	15921	Cond. Mica 1250 Mmfd	.19
C45	15926	Cond. Mica 200 Mmfd	.12
C34	15750	Cond. Tubular .25 Mfd 400V	.19
C44 C41 C31	15751	Cond. Tubular .25 Mfd 200V	.18
C23 C25 C28 C32	15752	Cond. Tubular .05 Mfd 200V	.12
C39 C37	15753	Cond. Tubular .002 Mfd 600V	.11
C35	15755	Cond. Tubular .05 Mfd 600V	.14
C24 C26	15756	Cond. Tubular .06 Mfd 400V	.12
C29	15762	Cond. Tubular .5 Mfd 400V	.28
C27	15760	Cond. Tubular .02 Mfd 400V	.12
C19 C20	A15259	Cond. Variable Padder	1.06
C16 C17 C18 L3	15270	Coil Oscillator in Shield sold	2.75
C4 C5 C6 C7 L1	15271	Coil Antenna in Shield matched	3.53
C8 C9 C10 C11 L2	15272	Coil Detector in Shield sets	3.44
R1	A15253	Control Volume	.89
	15327	Dial & Paper Strip CASE	1.96
	15328	Dial & Paper Strip RADIOVOGUE	1.96
	B15044	Glass Convex	.25
	A15037	Knob Drive	.14
	A15098	Knob Switch	.23
	A15039	Knob Volume and Tone	.15
	A15036	Knob Pointer	.16
	15129	Lamp Dial Assembly	.68
	15089	Lamp Dial 6.3 V Baynet Type	.19
	A15082	Lug Ground Electrolytic	.01
	A15032	Mounting Chassis Rubber	.03
	A15023	Pointer (Minute)	.04
	A15024	Pointer (Tuning)	.04
	A15006	Pulley Idler Assembly	.10
	A15072	Planetary Assembly	.46
R21 R20 R19 R18	A15226	Resistor Candohm 5000-5w-230-44	.68
R12	15501	Resistor Carbon 25M 1 Watt	.11
R23 R11	15517	Resistor Carbon 1 Meg. 1/4 Watt	.06
R9	15510	Resistor Carbon 20M 1/4 Watt	.06
R7	15511	Resistor Carbon 50M 1/4 Watt	.06
R15 R5 R4 R2	15515	Resistor Carbon 100M 1/4 Watt	.06
R17 R10	15523	Resistor Carbon 200M 1/4 Watt	.06
R14	15544	Resistor Carbon 15M 1 Watt	.09
R22	15505	Resistor Carbon 500M 1/4 Watt	.06
R8	15541	Resistor Carbon 5000 1/4 Watt	.06
R6 R3	15542	Resistor Carbon 1000 1/4 Watt	.06
R13	15543	Resistor Carbon 1000 1/4 Watt	.07
R16	15545	Resistor Carbon 30M 1 Watt	.06
	B15041	Retaining Spring for Bezel	.18
	B15043	Retaining Ring Glass	.16
	A15020	Shaft Drive	.15
	15284	Shielded Antenna Lead Assembly	.15
	15283	Shielded Volume Control Lead	.20
	A15063	Socket Dial Lamp (Left Hand)	.11
	A15064	Socket Dial Lamp (Right Hand)	.11
	15066	Socket 6K7	.14
	15063	Socket 6C5	.14
	15064	Socket 6F6	.14
	15086	Socket 6H6	.14
	15067	Socket 6L7	.14
	15099	Socket 5Y3	.14
	15248	Socket Speaker 5-prong	.11
	A15033	Spacer Brass (For Chassis Rubber)	.02
	C15340	Speaker 10"	7.46
	C15359	Speaker 12"	9.79
	A15017	Spring Tension	.02
	C15376	Switch Range	2.52
	A15158	Switch Tone Control	.34
	15125	Switch Range Pulley & String	.65
C12 C13 T1	15278	Transformer Input Variable IF	3.49
C14 C15 T2	15279	Transformer Output Variable IF	3.16
	A15227	Transformer Power 60 Cycle 110V	5.85
	15265	Transformer Power 25 Cycle 110V	8.53
	15060	Trimmer RF 3-gang	.64
	15264	Trimmer RF 4-gang	.76
	A15031	Terminal Doublet	.13
	A2300	Washer Rubber RF Panel	.02
	A2103	Washer Plain Fibre	.01
	A2111	Washer Extruded Fibre	.02
	1950	Washer Felt (small knob)	.01
	1951	Washer Felt (small switch)	.01

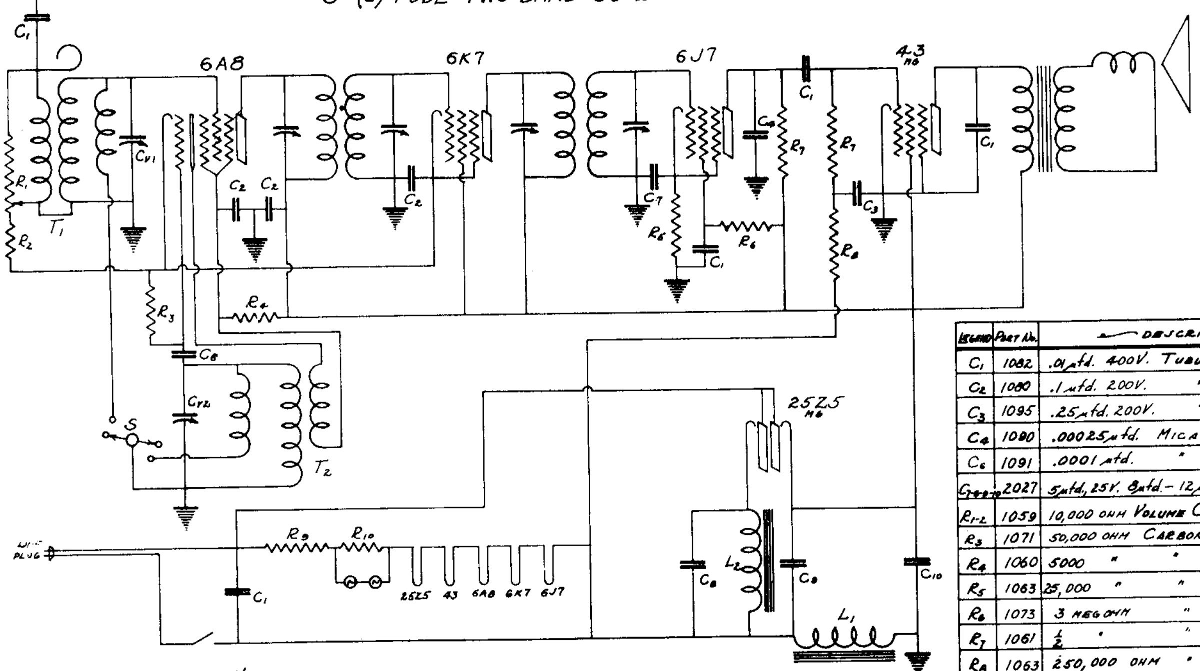
VOLTAGE CHART

Measurements from elements to chassis-1000 Ohms per Volt Meter Line Voltage-115V. AC.
RF negative grid bias 5.0 Volts
6F6 negative grid bias 18.0 Volts
AC--RMS each plate of recitifer to center tap 325.0 Volts
Total current drain 110 Ma. E - drop across speaker field 50.0 Volts

POSITION	TUBE	E_f	E_k	E_g SCREEN	E_g SUPPRESSOR	E_p TRIODE	E_p PENTODE
RF amplifier	6K7	6.3	0.0	125.0	0		260.0
Converter	6L7	6.3	0.0	125.0	0		260.0
Oscillator	6K7	6.3	0.0	190.0	0		190.0
IF Amplifier	6K7	6.3	0.8	125.0	.8		230.0
Diode Detector and AVC	6H6	6.3			0		
Audio Amplifier	6C5	6.3	2.6		0	100.0	
Power Pentode	6F6's	6.3	16.5	260.0	0		255.0
Rectifier	5Y3	5.2	320.0		0		

CLIMAX RADIO & TELEVISION CO., Inc.

5 (6) TUBE TWO BAND SUPERHETERODYNE RECEIVER

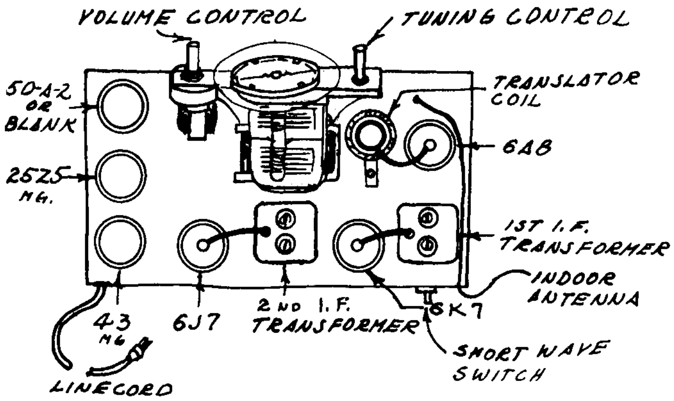


NOTE—
R_9 and R_{10} are replaced by 50-A-2 tube in six tube receiver.

I.F. 456 K.C.

Legend	Part No.	Description
C_1	1082	.01 mfd. 400V. Tubular Condenser
C_2	1080	.1 mfd. 200V. " "
C_3	1095	.25 mfd. 200V. " "
C_4	1090	.00025 mfd. Mica Condenser
C_6	1091	.0001 mfd. " "
$C_{7-8-9-10}$	2027	5 mfd, 25V. 8 mfd.-12 mfd.-4 mfd.-200V.
R_{1-2}	1059	10,000 ohm Volume Control, 250 w R.H.
R_3	1071	50,000 ohm Carbon Resistor ½ watt
R_4	1060	5000 " " " " "
R_5	1063	25,000 " " " " "
R_6	1073	3 meg ohm " " " "
R_7	1061	½ " " " " "
R_8	1063	250,000 ohm " " " "
R_9	1029	110 ohm Resistor Cord
R_{10}	1078	40 ohm Candohm Resistor
T_{1-2}	471	Translator Coil
S	759	Short Wave Switch
L_1	750	400 ohm, 10 hy., 40 M.A. Filter Choke

OPERATING INSTRUCTIONS FOR MODELS 5 (6) TUBE SUPERHETERODYNE RECEIVERS



GENERAL - This receiver is intended for operation on any power line having a voltage from 105 to 120 volts at any frequency or direct current.

Before the receiver is placed in operation make sure that the tubes are permanently inserted in their respective sockets as shown in the diagram to the left. The grid caps must also be placed firmly on each tube as shown. Note that in the five tube model no socket is provided next to the volume control, whereas in the six tube model an additional socket is provided there for the type 50-A tube ballast tube. After this is checked the line cord may be placed in any receptacle providing the proper voltage and the volume control knob turn clockwise as far as possible. The indoor antenna which is provided with this receiver should be uncoiled and placed along the floor around the walls of the room or may be suspended from the picture moulding. As this is a superheterodyne receiver and possesses great sensitivity it will generally not be necessary to use any additional antenna for practically any reception desired. If, however, it is desired to obtain the maximum possible distance on the short wave band an outside aerial may be connected to the end of the indoor antenna which will result in somewhat greater pick-up.

After the set has been turned on for about one minute rotate the tuning control knob back and forth whereupon the indicator hand on the dial will point to the frequency to which the set is tuned. Stations within the range of the receiver operating at those frequencies will then be heard. CAUTION: Always reduce the volume control when a station is tuned in and turn the tuning control for maximum volume and then turn up the volume control so the desired volume is secured. Never detune the receiver in order to reduce the volume.

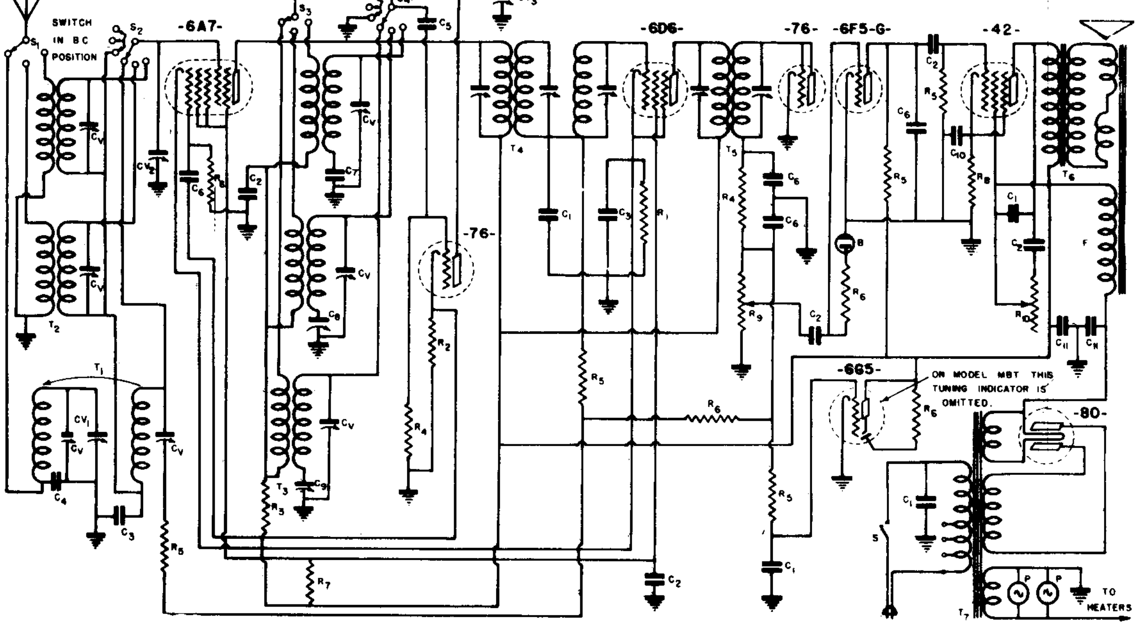
SHORT WAVE OPERATION: On the short wave band the receiver covers from 1700 - 4000 KC which includes all the police bands, several amateur bands, some experimental television bands as well as air-craft transmissions. Operation is exactly the same on short wave as on the broadcast band except that the knob on the back of the receiver is turned to the short wave position.

DC OPERATION NOTE: If the receiver is used on direct current and no stations can be heard after several minutes, remove the line cord from the wall socket and reverse its position by turning it half way around and reinserting it. The set should then work in the usual fashion.

CLIMAX RADIO & TELEVISION CO., Inc.

LONGWAVE 3 BAND SUPERHETERODYNE RECEIVER = *AC OPERATED*

MODEL MEBT



LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD-400V. TUBULAR CONDENSER
C_2	206	.05 MFD-400V. TUBULAR CONDENSER
C_3	203	.1 MFD-200V TUBULAR CONDENSER
C_4	214	.01 MFD-±5% TUBULAR CONDENSER
C_5	412	.00005 MICA CONDENSER
C_6	401	.00025 MICA CONDENSER
C_7	413	.0038 MICA CONDENSER
C_8	IN 1411	5 PLATE PADDING CONDENSER
C_9	506	3 PLATE PADDING CONDENSER
C_{10}	304	10 MFD 25 W.V. ELECTROLYTIC COND.
C_{11}	317	8 MFD 450 W.V. ELECTROLYTIC COND.
C_V	500	5-30 MFD TRIMMER CONDENSER

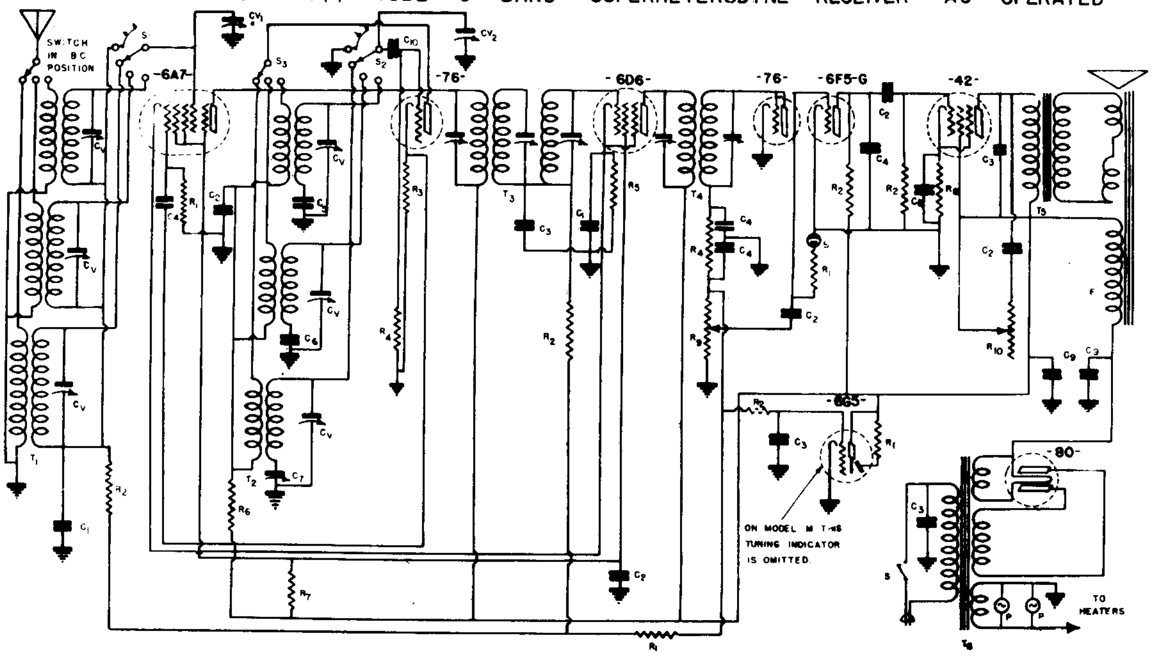
LEGEND	OUR PART NO.	DESCRIPTION
CV_{1-2-3}	613	3 GANG VARIABLE CONDENSER
R_1	103	250 OHM ½ WATT CARBON RESISTOR
R_2	105	1000 OHM ½ WATT CARBON RESISTOR
R_3	111	25,000 OHM ½ WATT CARBON RESISTOR
R_4	113	50,000 OHM ½ WATT CARBON RESISTOR
R_5	117	½ MEGOHM ½ WATT CARBON RESISTOR
R_6	119	1 MEGOHM ½ WATT CARBON RESISTOR
R_7	112	25,000 OHM ½ WATT CARBON RESISTOR
R_8	122	420 OHM 2 WATT WIRE WOUND RESIST.
R_9	2011	500,000 OHM VOLUME CONTROL
R_{10}	2012	75,000 OHM TONE CONTROL & SWITCH

LEGEND	OUR PART NO.	DESCRIPTION
T_1	1614	LONG-WAVE PRESELECTOR COIL
T_2	1221	B.C. & SKIP-BAND ANTENNA COIL
T_3	1411	LONG-WAVE 3 BAND OSCILLATOR COIL
T_4	1508	TRIPLE TUNE I.F TRANSFORMER
T_5	1506	DIODE I.F. TRANSFORMER
T_6	IN 851	SPEAKER TRANSFORMER
T_7	1013	POWER TRANSFORMER
F	IN 851	1600 OHM SPEAKER FIELD
$S_{1-2-3-4}$	1913	2 GANG BAND SWITCH
B	3000	BIAS CELL
S	—	SWITCH ON VOLUME CONTROL
P	2902	MAZDA #46 PILOT LIGHT

I.F.

456 K.C.

MODELS M & ME 8(7) TUBE 3 BAND SUPERHETERODYNE RECEIVER – AC OPERATED



LEGEND	OUR PART NO.	DESCRIPTION
C1	203	.1 MFD - 200V TUBULAR CONDENSER
C_2	206	.05 MFD - 400V TUBULAR CONDENSER
C_3	211	.01 MFD - 400V TUBULAR CONDENSER
C_4	401	.00025 MICA CONDENSER
C_5	415	[illegible] MICA CONDENSER
C_6	410	.0016 MICA CONDENSER
C_7	502	5 PLATE PADDING CONDENSER
C_V	500	5-30 MFD. TRIMMER CONDENSERS
C_8	364	10 MFD 25 W.V. TUBULAR ELECTROLYTIC COND.
C_9	317	8 MFD. 450 W.V. WET ELECTROLYTIC COND
C_{10}	412	.00005 MFD. MICA CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	611	2 GANG VARIABLE CONDENSER
R_1	119	1 MEGOHM ½ WATT CARBON RESISTOR
R_2	117	½ MEGOHM ½ WATT CARBON RESISTOR
R_3	105	1,000 OHMS ½ WATT CARBON RESISTOR
R_4	113	50,000 OHMS ½ WATT CARBON RESISTOR
R_5	103	250 OHMS ½ WATT CARBON RESISTOR
R_6	111	25,000 OHMS ½ WATT CARBON RESISTOR
R_7	112	25,000 OHMS ½ WATT CARBON RESISTOR
R_8	122	420 OHMS 2 WATT WIRE WOUND RESISTOR
R_9	2011	500,000 OHM VOLUME CONTROL
R_{10}	2012	75,000 OHM TONE CONTROL AND SWITCH

LEGEND	OUR PART NO.	DESCRIPTION
T_1	1215	SHIELDED 3 BAND ANTENNA COIL
T_2	1406	SHIELDED 3 BAND OSCILLATOR COIL
T_3	1508	TRIPLE TUNED I.F. TRANSFORMER
T_4	1506	DIODE I.F. TRANSFORMER
T_5	IN 851	SPEAKER TRANSFORMER
T_6	1012	POWER TRANSFORMER
$S_1 S_2 S_3$	1913	2 GANG BAND SWITCH
P	2902	MAZDA #46 PILOT LIGHT
S	—	SWITCH ON TONE CONTROL
F	IN 851	1600 OHM SPEAKER FIELD
B	3000	BIAS CELL

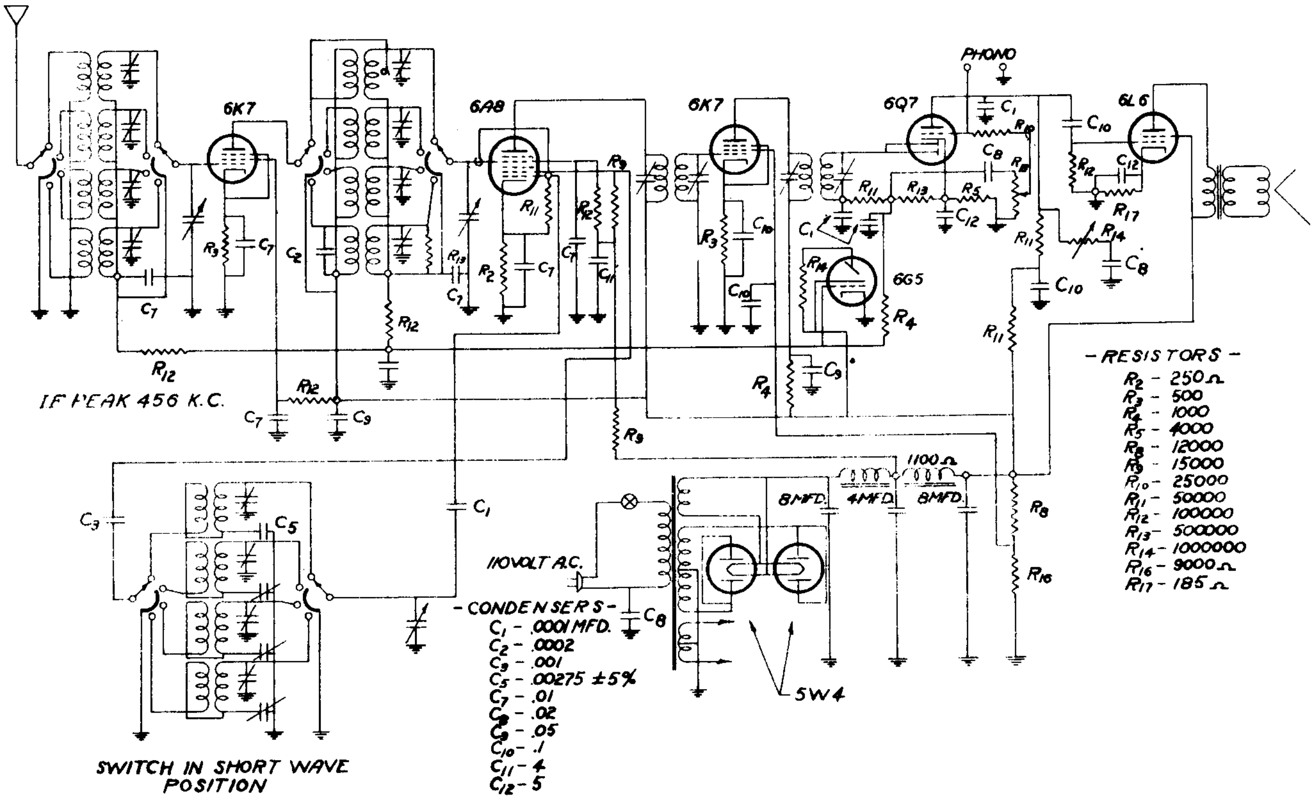
I.F.

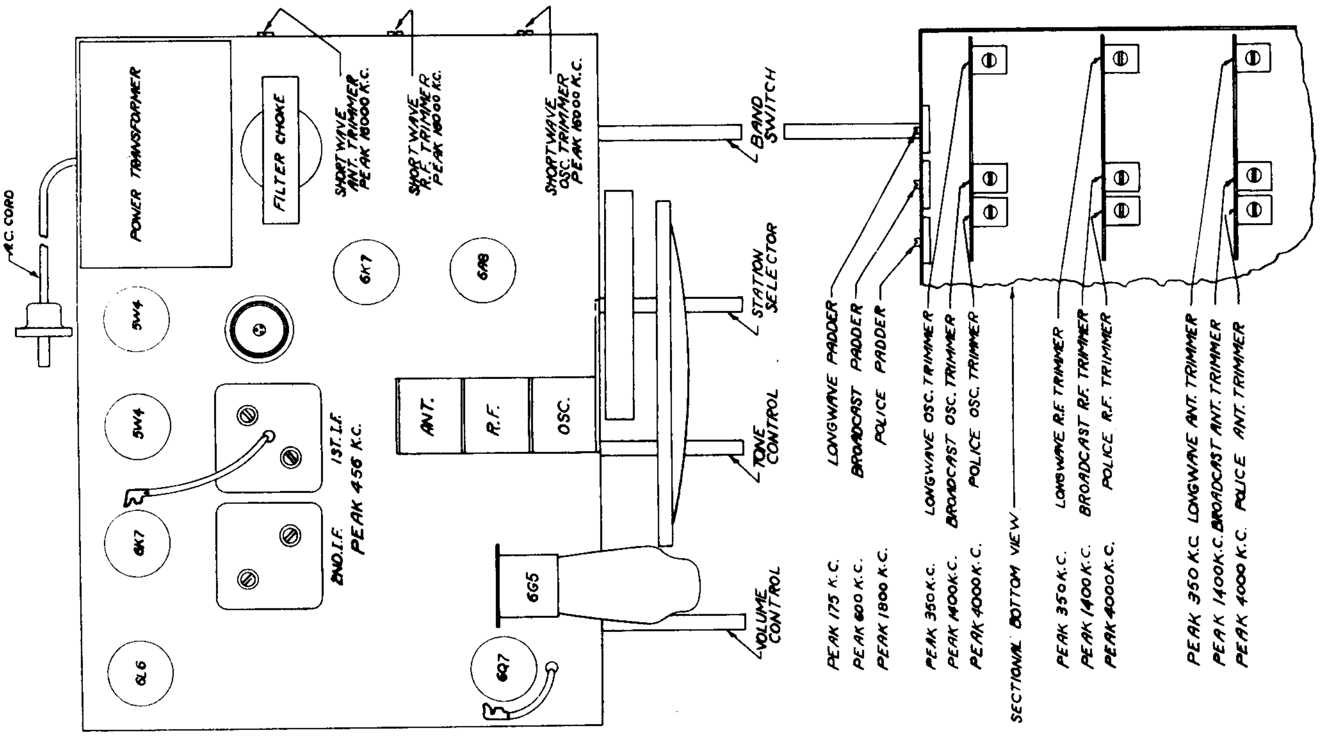
456 K.C.

CONTINENTAL RADIO & TELEVISION CORP.

MODEL AM387 CHASSIS AM3

Eight Tube A C Superheterodyne





CONTINENTAL RADIO & TELEVISION CORP.

MODEL AM387 CHASSIS AM3

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, and 6000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, the Short Wave Band may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tubes (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the ouput meter.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna lead (Blue) through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the rear gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak.

Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R.F. section. The padding condenser is located on the right hand end of the chassis near the 6A7 tube.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Band.

SHORT WAVE BAND There is only one adjustment to be made in the alignment of the Short Wave Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary.

Set the dial pointer to 600 KC (also the test oscillator) and adjust the antenna and antenna trimmer to resonance. The short wave band coils are under the chassis and are located at the right front corner along side of wave band switch.

IMPORTANT: This is the only adjustment necessary for the Short Wave Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Short Wave Band, otherwise the Broadcast Band will be thrown out of alignment.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 6000 KC.

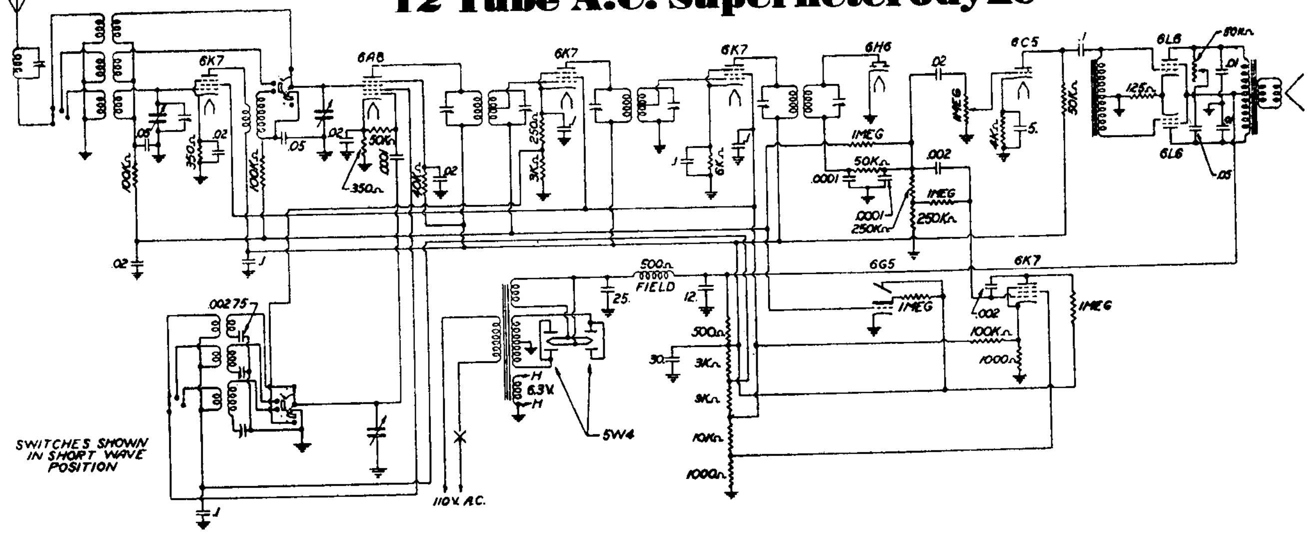
This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and MUST ALWAYS BE DONE BEFORE attempting to align the Short Wave Band.

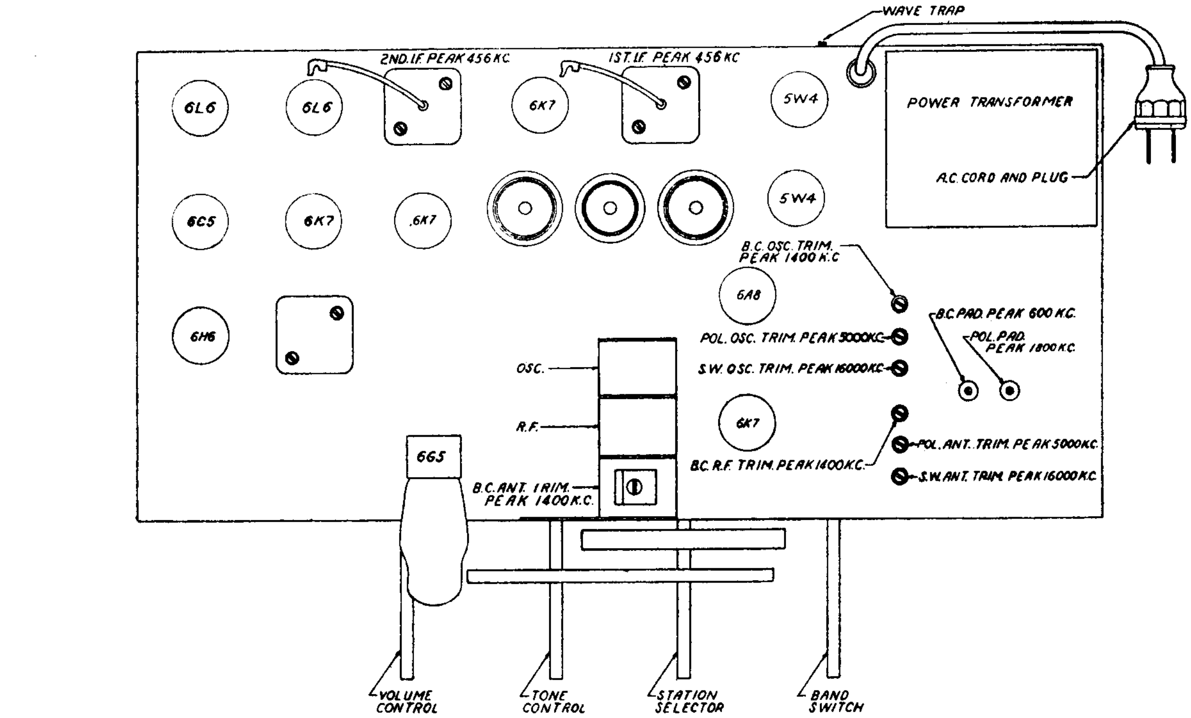
Part No.	Description	Part No.	Description	Part No.	Description
P189	1st I. F. Transformer	P559	25Z5 Tube Socket	P417	50,000 Ohm ¼ Watt Resistor
P190	2nd I. F. Transformer	P947	L49B Tube Socket	P418	150,000 Ohm ¼ Watt Resistor
P948	Antenna Coil	P928	Speaker With Output	P137	500,000 Ohm ¼ Watt Resistor
P949	Oscillator Coil	P929	AC Cord & Plug	P162	1 Megohm ¼ Watt Resistor
P341	Choke Coil	P930	Knob	P142	.10 - 200 Volt Condenser
P913	Wave Change Switch	P921	Pointer	P143	.02 - 400 Volt Condenser
P911	2 Gang Variable Condenser	P922	Dial Scale	P147	.00025 Mica Condenser
P912	Volume Control with Switch	P923	Dial Glass	P148	.05 - 200 Volt Condenser
P617	Padding Condenser	P124	Pilot Light	P276	.10 - 400 Volt Condenser
P544	Small Trimmer Condenser	P136	250 Ohm ¼ Watt Resistor	P335	.01 - 600 Volt Condenser
P194	Tube Shield	P953	650 Ohm ½ Watt Resistor	P336	.0005 Mica Condenser
P195	Tube Shield Cap	P168	8,000 Ohm ¼ Watt Resistor	P927	.0015 Mica Condenser
P506	6A7 Tube Socket	P258	15,000 Ohm ¼ Watt Resistor	P304	5.0 - 30 Volt Electrolytic Condenser
P521	75 Tube Socket	P419	20,000 Ohm ¼ Watt Resistor	P337	18-6 Mfd.-200 Volt Electrolytic Condenser
P560	48 Tube Socket	P166	25,000 Ohm ¼ Watt Condenser	P141	.25 - 200 Volt Condenser

CONTINENTAL RADIO & TELEVISION CORP.

MODEL AM4 CHASSIS

12 Tube A.C. Superheterodyne





The dial is calibrated with each band covering 340 degrees of tuning scale length and are each concentric with the center of the dial face. The innermost scale is calibrated from 150 to 375 K.C. (2000 to 800 meters) and covers the range necessary for receiving governmental time and weather reports. The second band from the center is for standard broadcasts covering from 550 to 1700 K.C. (175 to 545 meters). The third band from the center covers the intermediate short wave length broadcasts of Police, Amateur, Aircraft and ships and extends from 1700 to 5400 K.C. (55 to 180 meters). The fourth band covers all of the principle short wave channels for reception from countries all over the world. This band carries a calibration of from 5.5 to 18 megacycles (16.4 to 55 meters.) This short wave scale is the one which includes the five internationally assigned bands—the 19, 25, 31, 39 and 49 meter channels.

CONTINENTAL RADIO & TELEVISION CORP.

MODEL AM4 CHASSIS

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator which will cover the frequencies of 456, 600, 1400, 1800, 4000, 6000, and 14,000 KC and an output meter which is to be connection across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1C6) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all five I.F. trimmers to peak or maximum reading on the output meter. As there are two stages of I.F. in this receiver, there will be consequently three I.F. transformers to align.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .001 md. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the broadcast oscillator trimmer to peak. (See drawing for location.) After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak. The front condenser section tunes the pre-amplifier stage. Then adjust the Broalcast Band R. F. trimmer to peak. This trimmer aligns the grid or input circuit of the 6A8 tube. (See drawing for position of Broadcast R. F. trimmer). Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the B. C. oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the ~~easiest way to~~ adjust the oscillator to the R.F. section. (For location of B.C. padding condenser see drawing.) Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band.

FOREIGN BAND ALIGNMENT The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers marked and illustrated in the drawing as S.W. oscillator and S.W. trimmer. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. Set the receiver pointer to 14,000 KC (also test oscillator).

Then proceed to adjust these two trimmers for peak at 14,000 KC (adjust oscillator trimmer first) and as the inherent design of the circuit has been expressly developed for simplicity in servicing, only these two adjustments are necessary for aligning this band. NOTE: Always start this procedure by having the oscillator coil trimmer loose (out all the way), and the antenna coil trimmer fairly tight (in all the way); otherwise it is possible to make a false alignment on the image frequency. In order to prevent alignment on the image frequency, it is suggested that the following check be made: Readjust the pointer to 13,100 KC where the image frequency should be found. If properly aligned, the image frequency will be found to be weaker. If, however, the signal at 13,100 KC is found to be stronger than the signal at 14,000 KC, it signifies that alignment was incorrectly made on the image frequency.

POLICE BAND In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with a .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment.

Set the receiver pointer to 4000 KC (also test oscillator) and adjust the Police Band oscillator circuit trimmer to peak.

After this has been carefully done, the next step is to adjust the Police Band antenna trimmer to peak.

Now reset the dial pointer and the test oscillator to 1800 KC in preparation for adjusting the police band padding condenser.

Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated, but is the easiest way to correctly adjust the oscillator to the R.F. or antenna section. Return to 4000 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made 1800 KC.

If it is found that in returning to 4000 KC the pointer is accurately on scale, no further adjustment should be necessary (in this recheck). If the pointer is found off scale, it may be corrected and put on scale by readjustment of the police band oscillator trimmer. Alignment of the pointer can only be corrected by adjustment of the oscillator trimmer.

IMPORTANT: The Police Band Oscillator Trimmer, Police Band Antenna Trimmer Police Band Padding Trimmer are the only three adjustments required in aligning this band.

WAVE TRAP ADJUSTMENT At the rear of the chassis near the Antenna and Ground posts is an adjustment screw connected to a trap circuit for elimination of code interference when operating on the broadcast band. If code interference is encountered adjustment of this screw will filter it out. It is to be used only if such interference is experienced in broadcast reception. It's use prevents code transmitters operating on a frequency around 456 K. C. from being received by the I. F. amplifier which is tuned to 456 K. C.

SERVICE DATA FOR ALL BANDS

If it is suspected that the oscillator has stopped but is doubtful due to the presence of the usual amount of noise level, it is suggested that the oscillator plate voltage be checked. To ascertain whether the tube is oscillating, ground the oscillator grid of the 6A8 (short stator and rotor plates of oscillator section on gang condenser). If oscillating properly, grounding the grid will cause an appreciable drop in oscillator voltage. Grounding or shorting the stator and grid components should be accomplished by grounding the stator mounting nut to the frame of the condenser with a screw-driver or any metallic conductor.

Do not wedge a screw-driver between the plates for this is liable to permanently warp the plates and thus prevent the oscillator section of the gang condenser from tracking probably.

M4 12 TUBE RADIO SET

Part No.	DESCRIPTION
P 124	Pilot Light
P1029	Output Audio Transformer
P1038	Large Knob
P1040	Small Knob
P1047	Broadcast Interstage Coil
P1046	Broadcast Antenna Coil
P1162	Wave Trap Coil
P1172	Power Transformer
P 176	AC Cord and Plug
P1149	1st I.F. Transformer
P1151	2nd I.F. Transformer
P1152	Double Tuned I.F. Transformer
P1129	3 Gang Variable Condenser
P1146	Tilt Dial Complete
P 807	Escutcheon Plate
P 490	6H6 Tube Socket
P 844	5W4 Tube Socket
P 489	6K7 Tube Socket
P 488	6A8 Tube Socket
P 507	6F5 Tube Socket
P1041	6G6 Tube Socket

Part No.	DESCRIPTION
P1032	Input Audio Transformer
P 845	Speaker Socket
P 873	Speaker Plug
P1191	Gang Candohm Resistor
P1158	Volume Control with Switch
P1159	Tone Control
P1135	Wave Switch
P1160	6 Gang Trimmer Condenser
P 617	500 Mmfd. Padding Condenser
P1139	1500 Mmfd. Padding Condenser
G1187	Short Wave Antenna Coil Complete
G1188	Short Wave Oscillator Coil Comp.
G1189	Middle Band Antenna Coil Comp.
G1190	Middle Band Oscillator Coil Comp.
P1145	Straight Dial Complete
P1166	Volume Control with Switch (S. Dial)
P1167	Tone Control (S. Dial)
P1143	Wave Switch (S. Dial)
P 906	Escutcheon Plate and Glass (S. Dial)
P1154	30 Mfd. 300 V. Electrolytic Con.
P1155	12 Mfd. 300 V. Electrolytic Con.

Part No.	DESCRIPTION
P1156	25 Mfd. 450 V. Electrolytic Con.
P 304	5 Mfd. 30 V. Electrolytic Con.
P 334	.05-400 V. Condenser
P 142	.10-200 V. Condenser
P 276	.10-400 V. Condenser
P 143	.02-400 V. Condenser
P1193	.002-400 V. Condenser
P1194	.005-400 V. Condenser
P1055	.00275 Mica Condenser + 5%
P 480	.0001 Mica Condenser
P1114	2 Megohm ¼ Watt Resistor
P162A	1 Megohm Insulated ¼ Watt Resistor
P1192	1,500 Ohm ¼ Watt Resistor
P 417	50,000 Ohm ¼ Watt Resistor
P 278	1,000 Ohm ¼ Watt Resistor
P 162	1 Meg. Ohm ¼ Watt Resistor
P 136	250 Ohm ¼ Watt Resistor
P 280	100,000 Ohm ¼ Watt Resistor
P1186	600 Ohm ¼ Watt Resistor
P 757	4,000 Ohm ¼ Watt Resistor
P1169	15,000 Ohm 1 Watt Resistor

THE CROSLEY RADIO CORPORATION

MODEL A266

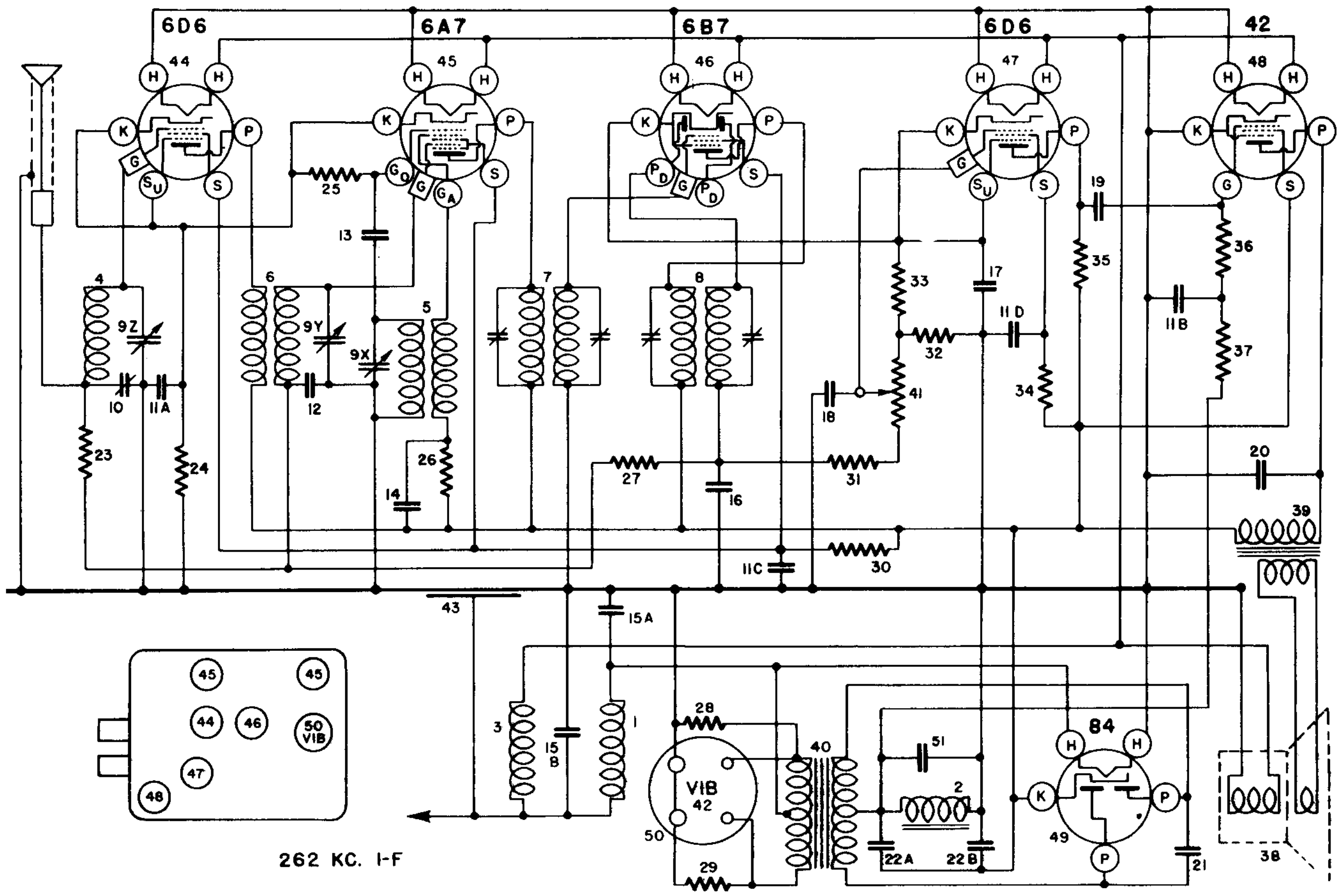


FIG. 1—WIRING DIAGRAM—MODEL A-266

PARTS LIST—MODEL A-266

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1	G16 —28067	"A" Filter Choke
2	G46 —24628	"B" Filter Choke
3	G13 —32977	Motor Noise Choke
4	G83 —32000	Ant. Coil
5	G27 —32002	Osc. Coil
6	G73 —32001	R-F Coil
7	G28 —32005	1st I-F Coil Assembly
8	G29 —32005	2nd I-F Coil Assembly
9	G51 —33002	3 Section Var. Tuning Condenser
10	W —38350	Ant. Compensating Condenser
11A	W —37021	.1 Mfd. 160 V. Condenser Block
11B		.1 Mfd. 160 V.
11C		.05 Mfd. 160 V.
11D		.05 Mfd. 160 V.
12	W —28621	Condenser .02 Mfd. 200 V.
13	G1 —34002	Condenser .00025 Mfd. (Molded)
14	G1 —34002	Condenser .00025 Mfd. (Molded)
15A	W —38787	Condenser .5 Mfd. 160 V.
15B		.5 Mfd. 160 V.
16	G3 —34002	Condenser .0005 Mfd. (Molded)
17	W —24029C	Condenser .1 Mfd. 200 V.
18	G2 —34002	Condenser .0001 Mfd. (Molded)
19	W —28621	Condenser .02 Mfd. 200 V.
20	W —34647	Condenser .006 Mfd. 400 V.
21	W —32762	Condenser .005 Mfd. 1000 V.
22A	W —38786	Electrolytic 6. Mfd. 350 V.
22B		6. Mfd. 350 V.
23	—35601	Resistor 300,000 Ohm ¼W. Insulated
24	W —22514	Resistor 750 Ohm ½W. Flexible
25	—35928	Resistor 60,000 Ohm ¼W. Insulated
26	—36760	Resistor 20,000 Ohm ¼W. Insulated
27	—35602	Resistor 1 Megohm ¼W. Insulated
28	W —27504	Resistor 100 Ohm ½W. Flexible
29	W —27504	Resistor 100 Ohm ½W. Flexible
30	—38624	Resistor 55,000 Ohm 1W. Insulated
31	—36760	Resistor 20,000 Ohm ¼W. Insulated
32	W —30127	Resistor 450 Ohm ½W. Flexible
33	W —28589	Resistor 350 Ohm ½W. Flexible
34	—38623	Resistor 750,000 Ohm ¼W. Insulated
35	—35929	Resistor 150,000 Ohm ¼W. Insulated
36	—36322	Resistor 500,000 Ohm ¼W. Insulated
37	—35601	Resistor 300,000 Ohm ¼W. Insulated
38	—339-BS-3	Speaker "M", Spec. 1-D-370
	—41374	Speaker Cone Assembly (Above Speaker)
	—41373	Speaker Field Coil (Above Speaker)
39	G45 —24628	Transformer—Output
40	—38737	Transformer—Power
41	—38785	Volume Control (300,000 Ohm)
42	G6 —38000	Vibrator
43	W —38618	M. N. Cond. Plate Rivited to Chassis
44	G75 —28807	Socket Type—6D6
45	G47 —28807	Socket Type—6A7
46	G48 —28807	Socket Type—6B7
47	G75 —28807	Socket Type—6D5
48	G25 —28807	Socket Type—42
49	G45 —28807	Socket Type—84
50	G1 —28807	Socket Type—V1B
51	W —24049C	Condenser .1 Mfd. 200 V.

THE CROSLEY RADIO CORPORATION
MODEL A266

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 42 Output tube. Be sure the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

NOTE: The receiver chassis must be in its case and a speaker similar to one used with the receiver must be connected to the chassis before making any adjustments. It is also advisable to use a spare control unit for making adjustments of the volume control and tuning condenser. A standard control unit with short cables (6″ to 8″) makes a very convenient and useful tool. If it is desired to shorten a pair of long cables it will be absolutely necessary to heavily tin the cables before cutting them.

1. Tuning I-F Amplifier To 262 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd., or larger, condenser to the top cap of the 6A7 Osc-Mod. tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the receiver chassis frame. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Adjust the station selector so that the rotor plates of the tuning condenser are completely in mesh.

(c) Turn the volume control of the receiver full on and turn the tone control to the treble position.

(d) Set the signal generator to 262 kilocycles.

(e) Adjust both trimmers located on the 2nd I-F transformer for maximum output. (Fig. 2).

(f) Adjust both trimmers located on the 1st I-F transformer for maximum output.

(g) Repeat operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R.F Amplifier.

(a) Connect the output lead from the signal generator through a .00025 mfd. condenser to the "ANT" connection of the receiver.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer on the "OSC" section of the tuning condenser for maximum output.

(e) Adjust the trimmer on the "R-F" section of the tuning condenser for maximum output.

(f) Adjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

(g) Readjust the station selector for maximum output. DO NOT READJUST THE OSC. TRIMMER.

(h) Repeat operations (e) and (f) for more accurate adjustments.

3. Adjusting Antenna Compensating Condenser.

(a) Set the signal generator to 600 kilocycles.

(b) Tune in the 600 kilocycle signal with the station selector for maximum output.

(c) Adjust the antenna compensating condenser, for maximum output.

(d) Repeat operations (b) and (c) alternately until no further improvement can be obtained.

(e) Set the signal generator to 1400 kilocycles again.

(f) Tune-in the 1400 kilocycle signal with the station selector for maximum output.

(g) Readjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

It will be necessary to adjust the antenna compensating condenser to the car antenna after the receiver has been installed in the car.

(a) After the installation is complete, tune-in a WEAK station between 55 and 65 on the dial.

(b) Adjust the antenna compensating condenser for maximum volume in the speaker.

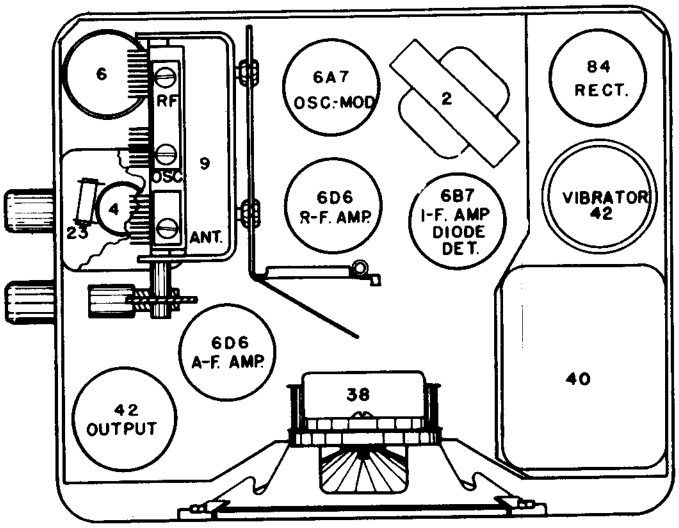


Fig. 2. Top View A-266

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	P2	S	G	K	Su	Ga	Go
6D6	R-F Amplifier	6.0	240	—	80	0	5.5	—	—	—
6A7	Osc.-Mod.	6.0	240	—	80	0	5.5	—	165	0 to -30
6B7	I-F, Diode Det. & AVC	6.0	240	—	80	0	3.5	—	—	—
6D6	1st A-F Amplifier	6.0	50	—	35	1.5	3.5	3.5	—	—
42	Output	6.0	220	—	230	-7*	0	—	—	—
84	Rectifier	6.0	240	240	—	—	—	—	—	—

Power Output Approximately 3 Watts.
Battery Drain Approximately 7.0 Amperes at 6 volts.
*True Bias Reading Approximately —15 Volts Measured Across Filter Choke.

THE CROSLEY RADIO CORPORATION

MODEL A366

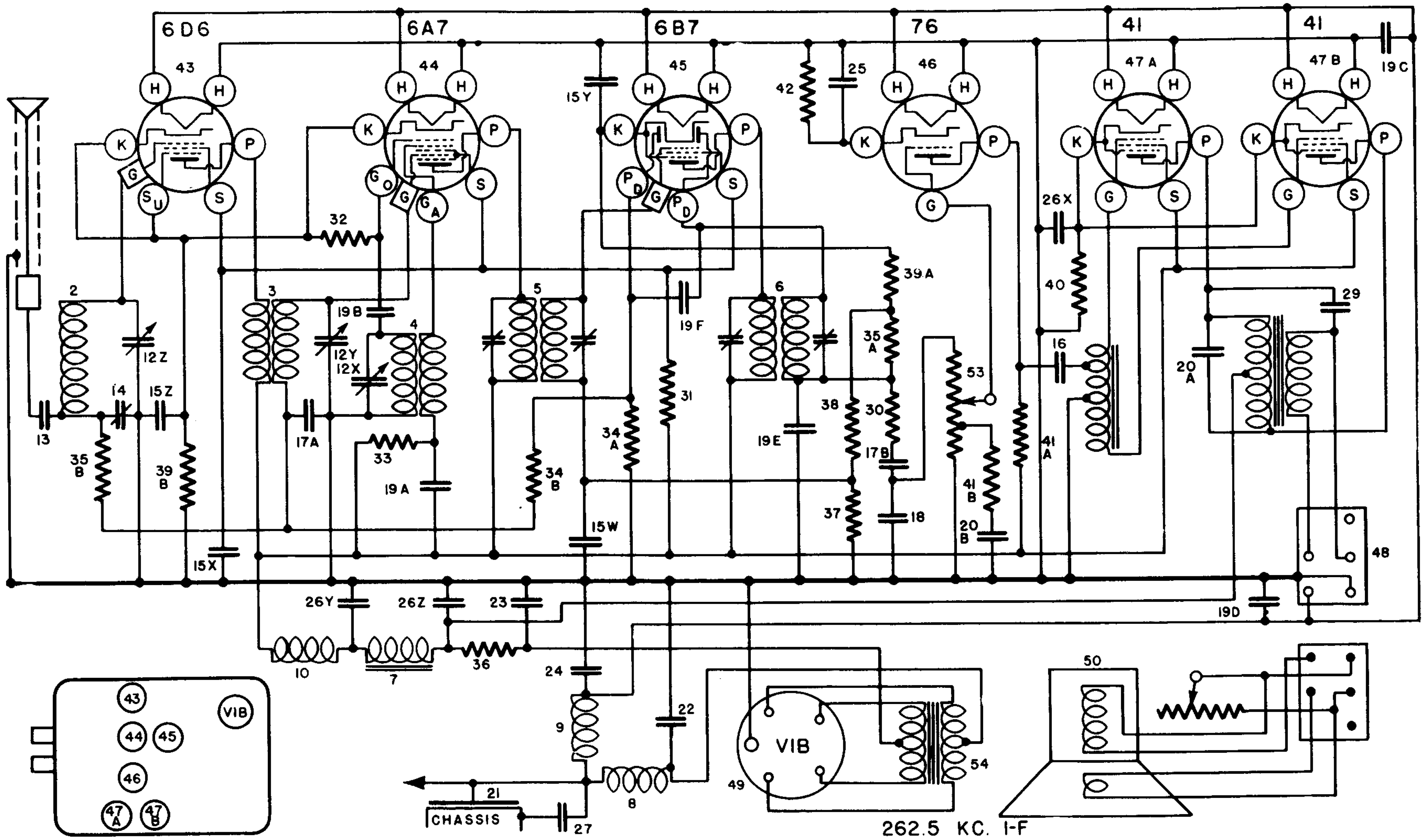


FIG. 1—WIRING DIAGRAM—MODEL A-366

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and the receiver chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with receiver in operating condition and no signal input. Voltage limits may vary plus or minus 10% of voltages given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	G	K	Ga	Go
6D6	R-F Amplifier	6.0	220	100	0	5.7	—	—
6A7	Osc.-Mod.	6.0	220	100	0	5.7	130	-5 to -10
6B7	I-F Amp. & Diode Detector	6.0	220	100	0	6.8	—	—
76	1st A-F Amp.	6.0	130	—	0	8.0	—	—
41	(2) Output	6.0	210	—	0	18.0	—	—

Power Output Approximately 3 Watts.
Battery Drain Approximately 6.2 Amperes at 6 Volts.

THE CROSLEY RADIO CORPORATION

MODEL A366

PARTS LIST—MODEL A-366

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
2	G83 —32000	Ant. Coil
	W —38420	Ant. Coil Shield
3	G20 —32001	R-F Coil
4	G27 —32002	Osc. Coil
5	G16 —32005	1st I-F Assembly
6	G30 —32005	2nd I-F Assembly
7	G31 —24628	"B" Filter Choke
8	G15 —28067	"A" Filter Choke
9	G6 —32977	Motor Noise Choke
10	G5 —32977	R-F "B" Choke
11	G50 —24628	A-F Grid Choke
12	G44 —33002	3 Section Var. Tuning Condenser
13	W —38367	Condenser .02 Mfd. 200 V.
14	W —38350	Condenser, Ant. Compensating
15Z, 15Y, 15X, 15W	W —38419A	Condenser .05 Mfd. 400 V. / .1 Mfd. 200 V. / .05 Mfd. 400 V. / .1 Mfd. 200 V.
16	W —22688	Condenser .1 Mfd. 400 V.
17A	W —28621	Condenser .02 Mfd. 200 V.
17B	W —28621	Condenser .02 Mfd. 200 V.
18	G2 —34002	Condenser .0001 Mfd. (Molded)
19A to 19F	G1 —34002	Condenser .00025 Mfd. (Molded)
20A	W —25435	Condenser .003 Mfd. 400 V.
20B	W —25435	Condenser .003 Mfd. 400 V.
21	W —32904	Condenser, Riveted Plate to Chassis
22	W —38433	Condenser .5 Mfd. 160 V.
23	W —38431	Condenser .15 Mfd. 400 V.
24	W —37190	Condenser .02 Mfd. 160 V.
25	W —38430	Condenser 4. Mfd. 10 V. Electrolytic
26Z, 26Y, 26X	W —38427	Condenser 8. Mfd. 350 V. / Condenser 8. Mfd. 350 V. / Condenser 12. Mfd. 25 V. — Electrolytic
27	W —29910A	Condenser .25 Mfd. 200 V.
28	NONE	
29	W —38488	Condenser .05 Mfd. 400 V.
30	—35600	Resistor 100,000 Ohm ¼W. Insulated
31	—36952	Resistor 30,000 Ohm ¼W. Insulated
32	—35928	Resistor 60,000 Ohm ¼W. Insulated
33	—36760	Resistor 20,000 Ohm ¼W. Insulated
34A	—35602	Resistor 1 Megohm ¼W. Insulated
34B	—35602	Resistor 1 Megohm ¼W. Insulated
35A	—35601	Resistor 300,000 Ohm ¼W. Insulated
35B	—35601	Resistor 300, 000 Ohm ¼W. Insulated
36	W —32961	Resistor 100 Ohm 3W. Flexible
37	W —21452	Resistor 1100 Ohm ½W. Flexible
38	W —28589	Resistor 350 Ohm ½W. Flexible
39A	W —30127	Resistor 450 Ohm ½W. Flexible
39B	W —30127	Resistor 450 Ohm ½W. Flexible
40	W —26049	Resistor 450 Ohm 3W. Flexible
41A	W —36761	Resistor 40,000 Ohm ¼W. Insulated
41B	W —36761	Resistor 40,000 Ohm ¼W. Insulated
42	—38428	Resistor 4,500 Ohm ¼W. Insulated
43	G75 —28807	Socket Type 6D6
44	G47 —28807	Socket Type 6A7
45	G48 —28807	Socket Type 6B7
46	G80 —28807	Socket Type 76
47A	G22 —28807	Socket Type 41
47B	G22 —28807	Socket Type 41
	W —32360A	Tube Shield Base
	W —31212	Tube Shield Type 76 (Cut out)
	W —31213	Tube Shield Type 76 (Plain)
	W —34174	Tube Shield Type 6D6 (Cut out)
	W —34175	Tube Shield Type 6D6 (Plain)
	W —31210	Tube Shield Ring
48	W —32895	Speaker Socket
49	W —32965A	Vibrator Socket

Item No.	Part No.	Description
50		Speakers (See Below)
51	NONE	
52	G51 —24628	Output Transformer
53	—38840	Volume Control (1 Meg.)
54	G8 —32769	Power Transformer
55	G7 —38000	Vibrator
	W —38413	Vibrator Ground Clip
	W —35181A	Distributor Suppressor
	W —32956A	Suppressor Adapter
	W —29754C	Generator Condenser
	—32783A	Antenna Lead
	C —38407	Case
	C —38408	Top Cover
	MG2 —38798	Bottom Cover
	W —32946	Cable Set Screw
	W —32947	Comp. Cond Hole Plug
	W —38412B	Oval Head Nut, Cover Mtg.
	W —32921	Cover Tie Bolt
	W —32956	Mounting Stud
	W —38455	Case Mtg. Spacer
	W —32957	Lock Washer
	— 6213	Hex. Nut
		Speaker Parts
	—424-G-6	Speaker Complete (under cowl) "M" Spec. 1-D-399
	—40311	Knob (Tone Control)
	—38824A	Tone Control (300,000 Ohm)
	—40148	Grille & Screen (424-G-6)
	—40461	Baffle Gasket (424-G-6)
	—40303	Speaker Unit only (424-G-6)
	—40304	Speaker Cone Assembly (424-G-6)
	—40305	Speaker Field Coil (424-G-6)
	—32974	Plug
	—32975	Plug Cover
	—38847	Cable
	—424-G-4	Speaker Complete (under cowl) "M" Spec. 1-D-398
	—40311	Knob (Switch)
	—40554	Switch
	—40555	Candohm Resistor
	—32895	Header Socket
	—40561	Choke
	W —37849	Cable
	—40448	Grille & Screen (424-G-4)
	—40461	Baffle Gasket (424-G-4)
	—40562	Speaker Unit only (424-G-4)
	—40304	Speaker Cone Assembly (424-G-4)
	—40305	Speaker Field Coil (424-G-4)
	—32974	Plug
	—32975	Plug Cover
	—324-G-5	Speaker Assembly (Headline) "M" Spec. 1-D-396
	W —35252A	Tone Control Knob
	—38852	Tone Control
	—38839	Speaker Unit (324-G-5)
	—40402	Speaker Cone Assembly (324-G-5)
	—40297	Speaker Field coil (324-G-5)
	—324-G-6	Speaker Assembly (Header) "M" Spec. 1-D-397
	W —41439	Grille & Screen (324-G-6)
	W —40260	Baffle Gasket (324-G-6)
	W —40257	Speaker Clamp (324-G-6)
	W —35252A	Tone Control Knob
	—38824A	Tone Control
	B —35280	Mtg. Bracket (324-G-6)
	—38820	Speaker Unit (324-G-6)
	—40402	Speaker Cone Assembly (324-G-6)
	—40297	Speaker Field Coil (324-G-6)

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 42 Output tube. Be sure the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

NOTE: The receiver chassis must be in its case and a speaker similar to one used with the receiver must be connected to the chassis before making any adjustments. It is also advisable to use a spare control unit for making adjustments of the volume control and tuning condenser. A standard control unit with short cables (6" to 8") makes a very convenient and useful tool. If it is desired to shorten a pair of long cables it will be absolutely necessary to heavily tin the cables before cutting them.

1. Tuning I-F Amplifier To 262 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd., or larger, condenser to the top cap of the 6A7 Osc-Mod. tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the receiver chassis frame. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Adjust the station selector so that the rotor plates of the tuning condenser are completely in mesh.

(c) Turn the volume control of the receiver full on and turn the tone control to the treble position.

(d) Set the signal generator to 262 kilocycles.

(e) Adjust both trimmers located on the 2nd I-F transformer for maximum output. (Fig. 2).

(f) Adjust both trimmers located on the 1st I-F ransformer for maximum output.

(g) Repeat operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R.F Amplifier.

(a) Connect the output lead from the signal generator through a .00025 mfd. condenser to the "ANT" connection of the receiver.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer on the "OSC" section of the tuning condenser for maximum output.

(e) Adjust the trimmer on the "R-F" section of the tuning condenser for maximum output.

(f) Adjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

(g) Readjust the station selector for maximum output. DO NOT READJUST THE OSC. TRIMMER.

(h) Repeat operations (e) and (f) for more accurate adjustments.

3. Adjusting Antenna Compensating Condenser.

(a) Set the signal generator to 600 kilocycles.

(b) Tune in the 600 kilocycle signal with the station selector for maximum output.

(c) Adjust the antenna compensating condenser, Illustration No. 14, Fig. 3, for maximum output.

(d) Repeat operations (b) and (c) alternately until no further improvement can be obtained.

(e) Set the signal generator to 1400 kilocycles again.

(f) Tune-in the 1400 kilocycle signal with the station selector for maximum output.

(g) Readjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

It will be necessary to adjust the antenna compensating condenser to the car antenna after the receiver has been installed in the car.

(a) After the installation is complete, tune-in a WEAK station between 55 and 65 on the dial.

(b) Adjust the antenna compensating condenser for maximum volume in the speaker.

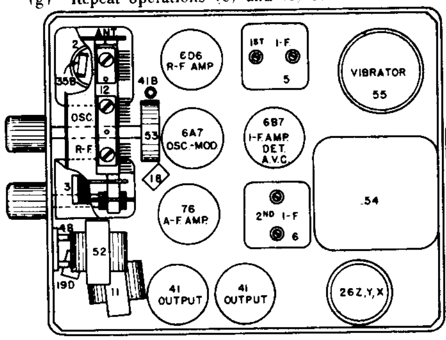


Fig. 2. Top View A-366

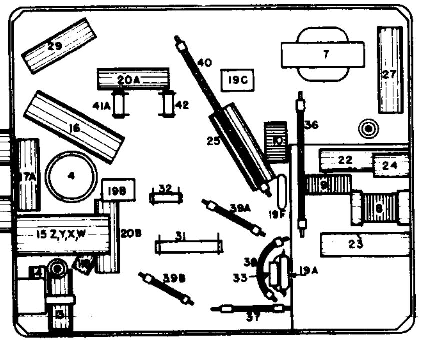
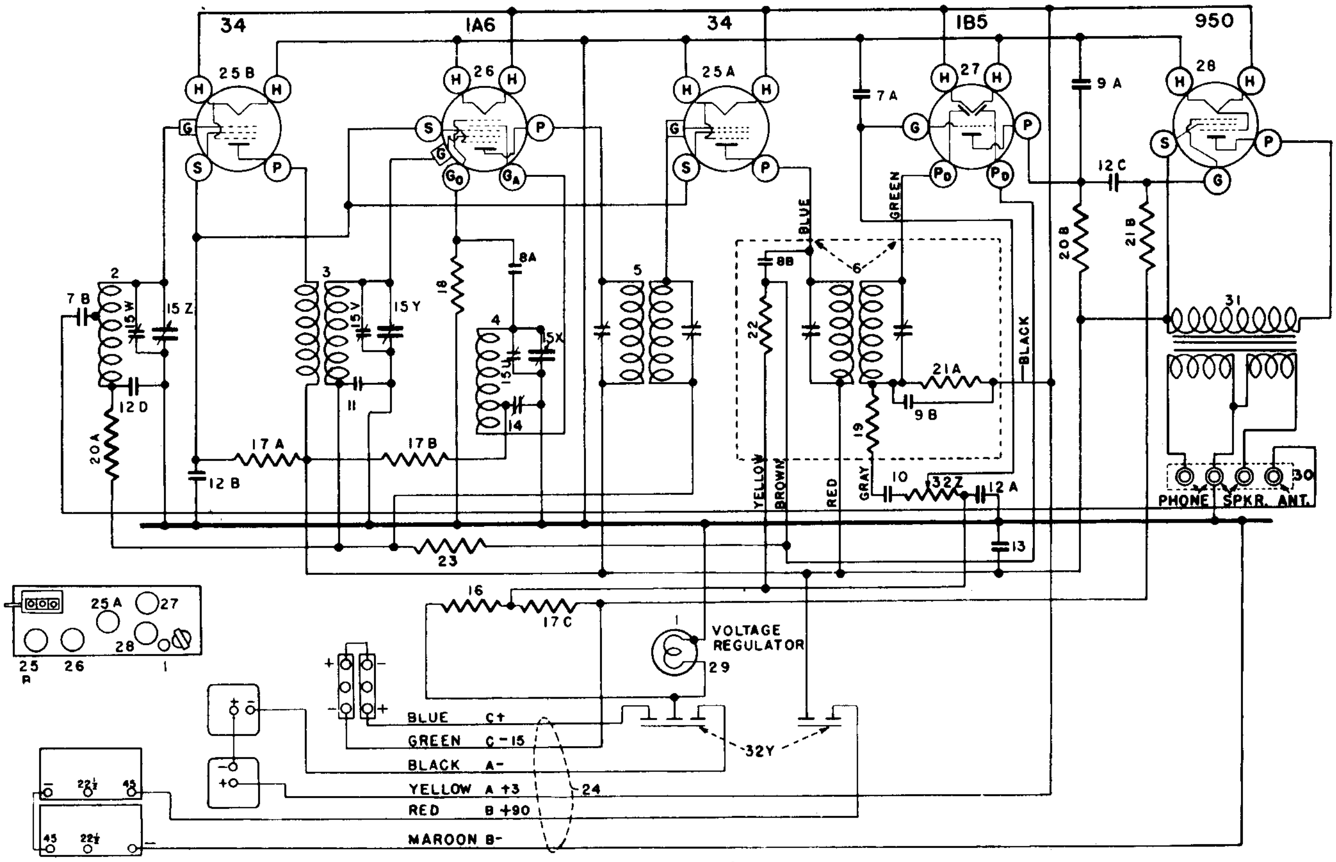


Fig. 3. Bottom View A-366

THE CROSLEY RADIO CORPORATION

MODEL B637 CHASSIS 586



MODEL 586 262 KC. I-F

FIG. 1—WIRING DIAGRAM—MODEL 586

PARTS LIST—MODEL 586

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1	W —42105A	Voltage Regulator Tube
2	G117—32000	Ant. Coil
3	G85 —32001	R-F Coil
4	G106—32002	Osc. Coil
5	G35 —32005	1st I-F Assembly
6	G31 —32005	2nd I-F Assembly (contains Items 8B, 9B, 19, 21A, 22)
7AB	G5 —34002	Condenser .00005 Mf. 200 V.
8AB	G2 —34002	Condenser .0001 Mf. 200 V.
9AB	G1 —34002	Condenser .00025 Mf. 200 V.
10	W —36541	Condenser .02 Mf. 160 V.
11	W —35936	Condenser .05 Mf. 200 V.
12AB CD	W —27216	Condenser .05 Mf. 200 V.
13	W —29910A	Condenser .25 Mf. 200 V.
14	—40769	Condenser (Osc. Series Trimmer)
15	G55 —33002	3 Sect. Var. Tuning Cond. Gang
	W —42162	Dial (Calibrated Disc.)
	W —42122	Bearing Support Bracket
	W —42141	Sprocket Shaft Assembly
	B —41315A	Sprocket Hub Assembly
	W —42160	Drive Chain
	W —42120	Take Up Spring (Chain)
	W —40486	Dial Mtg. Screw
16	W —22514	Resistor 750 Ohm ½W.
17A BC	—36318	Resistor 15,000 Ohm ¼W.
18	—36761	Resistor 40,000 Ohm ¼W.
19	—35600	Resistor 100,000 Ohm ¼W.
20AB	—35601	Resistor 300,000 Ohm ¼W.
21AB	—36322	Resistor 500,000 Ohm ¼W.
22	—35602	Resistor 1 Megohm ¼W.
23	—35927	Resistor 2 Megohm ¼W
24	MG36—42101	Battery Cable Assembly
25AB	G31 —28807	Socket Type 34
26	G55 —28807	Socket Type 1A6
27	G91 —28807	Socket Type 1B5
28	G94 —28807	Socket Type 950
29	W —42105	Socket Volt. Regulator
	W —40911	Tube Shield (Small)
	W —26974B	Tube Shield (Large)
31	G58 —24628	Out-Put Transformer
32Z 32Y	—41609	Vol. Cont. 1 Megohm / Battery Switch
30	MG3 —42101	Spk., Phone and Ant. Term. Assembly
	W —42119	Battery Clamp ("A" Batt.)
	W —42123	Battery Clamp ("C" Batt.)
	MG8 —42101	Case Assembly less End Covers
	MG4 —42101	Rear Cover
	MG9 —42101	Front Cover Assembly
	W —42195	Carrying Handle
	W —42178	Handle Fastener
	W — 5558	Phone Tip Jack (only)
	W —42179	Knob (Vol. Cont.)
	W —35252A	Knob (Sta. Sel.)
	W —42217	Head-Phones
	MG2 —42102	Antenna Assembly
	243PS2	Speaker
	MG22—42102	Speaker Case only
	B —42507	Speaker Grille
	W — 1500G	Speaker Cord
	—42201	Chassis Mtg. Screws

THE CROSLEY RADIO CORPORATION

MODEL B637 CHASSIS 586

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator aand an output meter.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 950 Output tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 262 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd., or larger, condenser to the top cap of the 1A6 Osc-Mod. tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the receiver chassis frame. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Adjust the station selector so that the rotor plates of the tuning condenser are completely out of mesh.

(c) Turn the volume control of the receiver full on.

(d) Set the signal generator to 262 kilocycles.

(e) Adjust both trimmers located on the 2nd I-F transformer for maximum output. (Fig. 2).

(f) Adjust both trimmers located on the 1st I-F transformer for maximum output.

(g) Repeat operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

(a) Connect the output lead from the signal generator through a .00025 mfd. condenser to the "ANT" connection of the receiver.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer on the "OSC" section of the tuning condenser for maximum output.

(e) Adjust the trimmer on the "R-F" section of the tuning condenser for maximum output.

(f) Adjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

(g) Readjust the station selector for maximum output. DO NOT READJUST THE OSC. TRIMMER.

(h) Repeat operations (e) and (f) for more accurate adjustments.

(i) Set the signal generator to 600 kilocycles.

(j) Tune-in this signal with the station selector for maximum reading on the output meter.

(k) Adjust the series trimmer, item 14, Fig. 2, while rocking the tuning condenser back and forth slightly until no further improvement in output can be obtained.

(l) Return the signal generator to 1400 kilocycles and repeat operations (g) and (h).

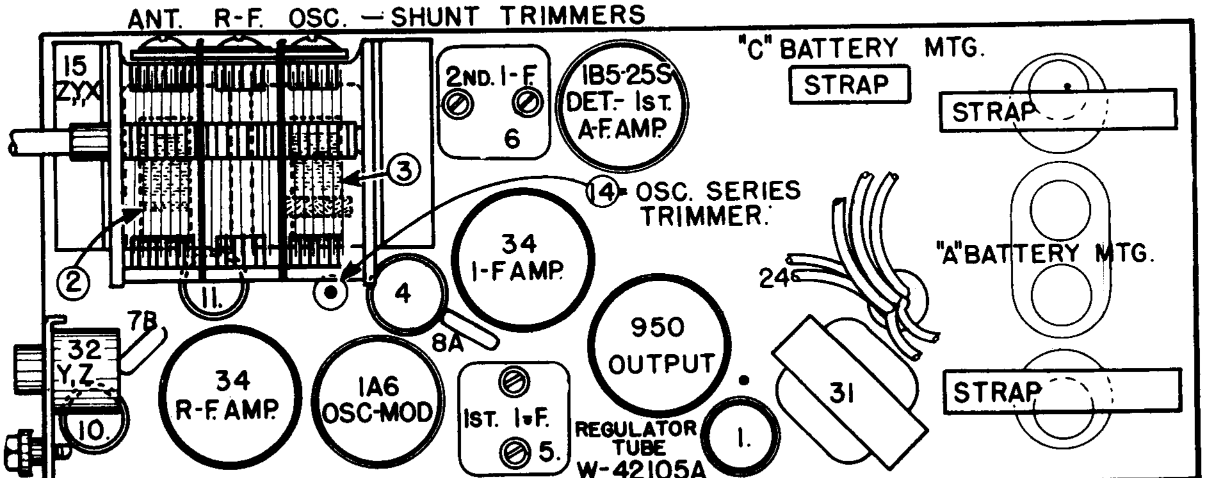


Fig. 2. Top View 586

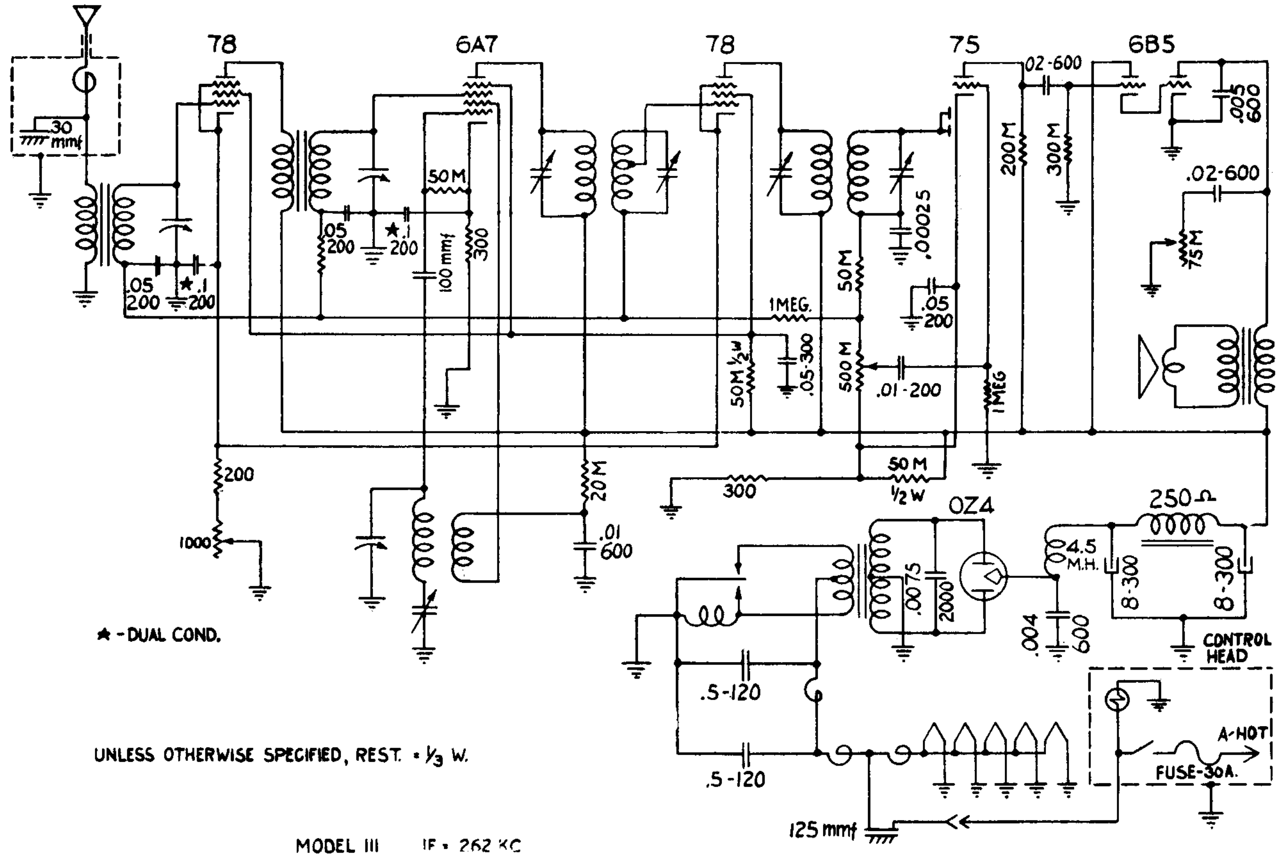
TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	G	Ga	Go
34	R-F Amplifier	2.0	90	45	-1.5	—	—
1A6	Oscillator-Modulator	2.0	90	45	-1.5	55	-2 to -5
34	I-F Amplifier	2.0	90	45	-1.5	—	—
1B5/25S	Detector and A-F Amplifier	2.0	90	—	-1.5	—	—
950	Output	2.0	90	90	-13.5	—	—

Power output approximately .2 watt.
"A" battery drain approximately .360 ampere.
"B" battery drain approximately .010 ampere.

DETROLA RADIO AND TELEVISION CORPORATION

MODEL 11 AUTO RADIO

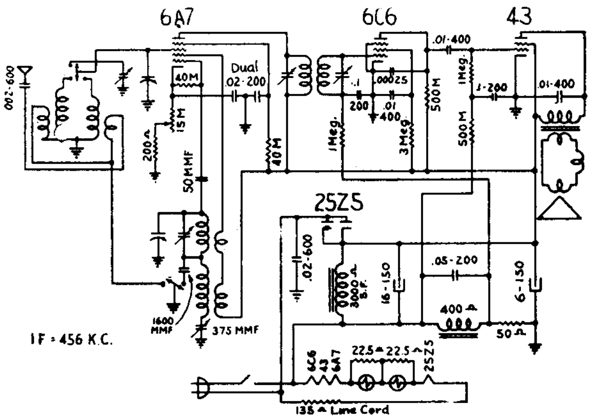


★ - DUAL COND.

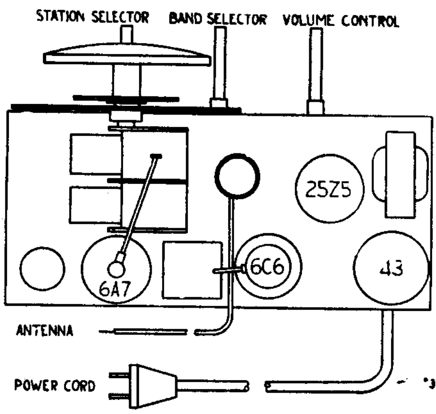
UNLESS OTHERWISE SPECIFIED, REST. = 1/3 W.

MODEL 111 IF = 262 KC

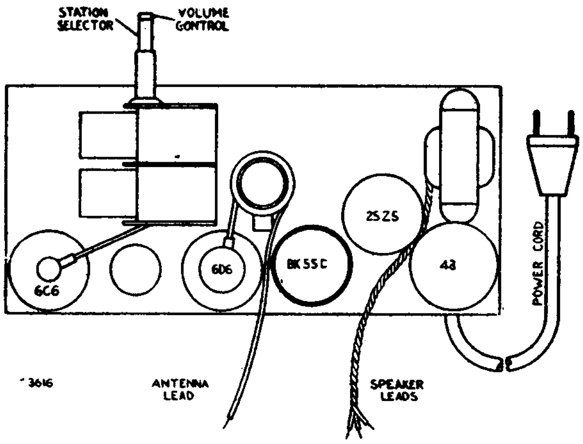
MODEL 134

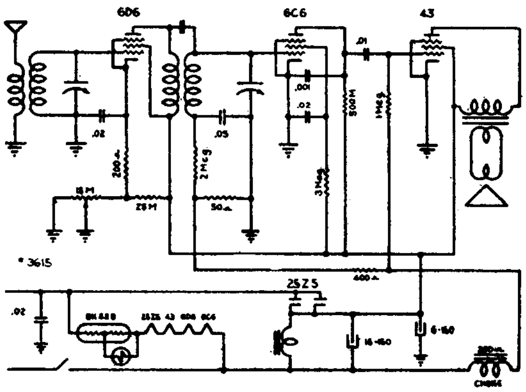


IF = 456 K.C.



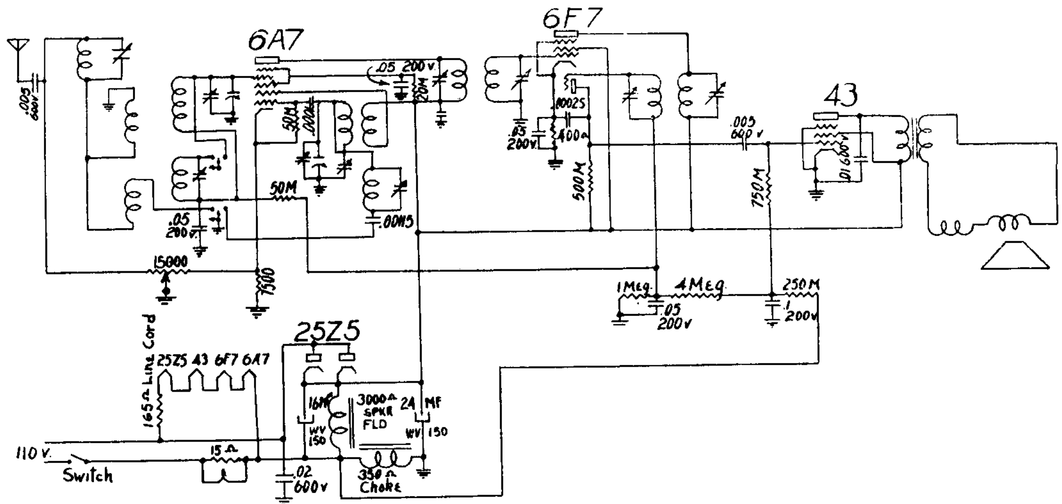
MODEL 130



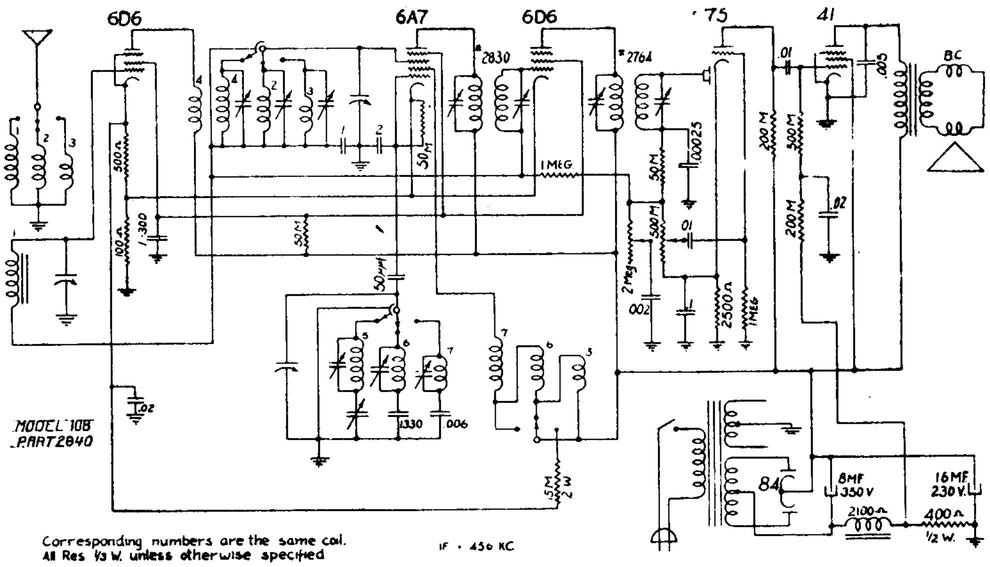


DETROLA RADIO AND TELEVISION CORPORATION

MODEL 101A



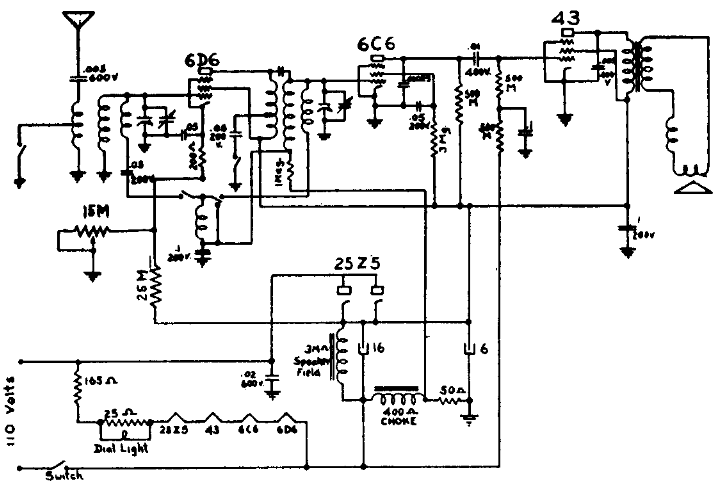
MODEL 108

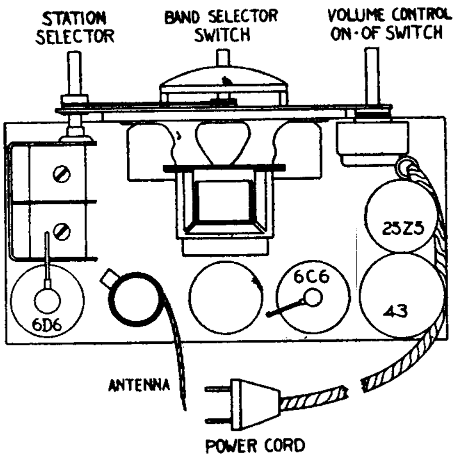


Corresponding numbers are the same coil.
All Res 1/3 W. unless otherwise specified

IF - 456 KC

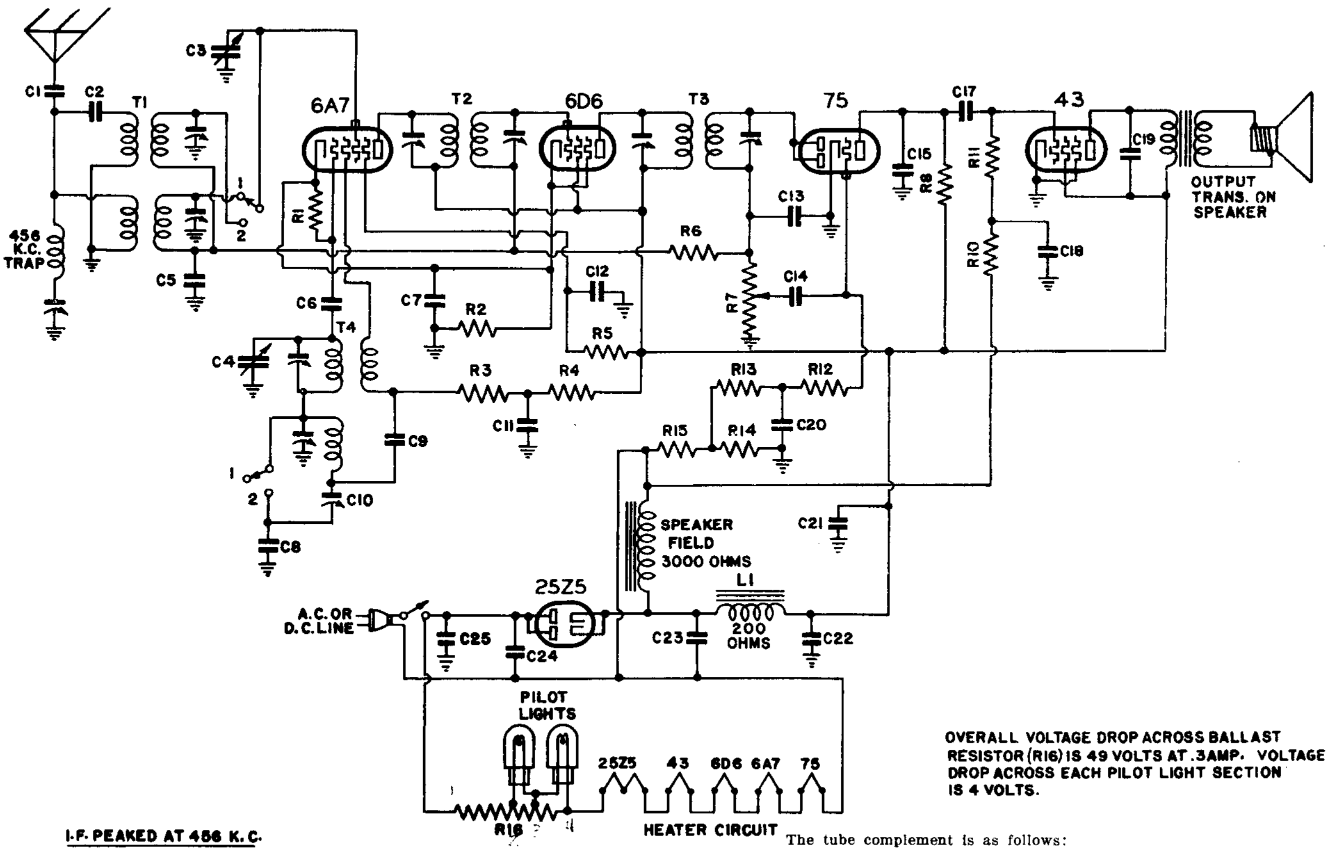
MODEL 104





EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL B131 CHASSIS B



I-F PEAKED AT 456 K.C.

SWITCH SHOWN IN BROADCAST POSITION

POSITION NO.1-BROADCAST
POSITION NO.2-SHORT WAVE

SCHEMATIC DIAGRAM

The tube complement is as follows:
1-6A7, pentagrid oscillator-modulator
1-6D6, first i-f amplifier
1-75, diode detector, a-f amplifier, automatic volume control
1-43, pentode power output
1-25Z5, dual half-wave rectifier
1-3CR-241, ballast tube (R-16 on schematic).

REPLACEMENT PARTS

*Item	Part No.	DESCRIPTION	List Price ea. Effective as of Aug. 1st, 1936 PRICE
T1	3CT-289	Two-band antenna coil	$2.40
T2	3CT-274	456 kc first i-f transformer	1.50
T3	3CT-275	456 kc second i-f transformer	1.35
T4	3CT-290	Two-band oscillator coil	1.10
L1	2CT-207	Iron-core filter choke	.90
R1	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R2, R9	AAR-119	300 ohm ½ watt wire-wound resistor	.16
R3, R4	LR-65	10,000 ohm ¼ watt carbon resistor	.16
R5	ZZR-196	30,000 ohm ¼ watt carbon resistor	.16
R6	KR-57	1 megohm ¼ watt carbon resistor	.16
R7	2NR-214C	Volume control with line switch—250,000 ohms	1.20
R8, R13	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R10	OR-73	25,000 ohm ¼ watt carbon resistor	.16
R11, R12	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R14	3CR-242	20 ohm ½ watt wire-wound resistor	.16
R15	3CR-261	230 ohm 1 watt metallized resistor	.16
R16	3CR-241	Plug-in type ballast resistor	.80
C1	AAC-114	.001 mf mica condenser	.20
C2		0.00005 mica condenser (part of 3CT-289 antenna coil assembly)	
C3, C4	3CC-275	Two-gang variable condenser	3.65
C5	BC-12	0.05 mf, 200 volt tubular condenser	.20
C6	AAC-106A	0.00005 mica condenser	.20
C7, C12, C18, C20, C21, C26	AC-6	0.1 mf, 200 volt tubular condenser	.20
C8	3EC-267	0.0042 mf mica condenser	.20
C9	CCC-127	0.01 mf, 200 volt tubular condenser	.20
C10	2NC-231	Single adjustable padding condenser, range: 300 to 600 mmf	.50
C11	YC-98A	4 mf, 150 volt tubular electrolytic condenser	1.05
C13, C15	AC-7A	0.00025 mf mica condenser	.20
C14, C17	LC-65	0.02 mf, 400 volt tubular condenser	.20
C19	TTC-177	0.01 mf, 600 volt tubular condenser	.20
C22, C23	3CC-261	20 mf, 150 volt wet electrolytic condenser	.90
C25	3LC-297A	0.01 mf, 400 volt molded type condenser	.20
C24	EEC-132	0.1 mf, 400 volt tubular condenser	.20

PRODUCTION CHANGES

1. In receivers bearing serial numbers below 812,500—
   a. A 50,000 ohm resistor, by-passed with a 0.1 mf, 200 volt condenser, was used in the plate circuit of the 75 tube as an r-c filter.
2. In receivers bearing serial numbers below 823,873—
   a. The rotor of C28 was returned to ground instead of the coil, as shown on the schematic.
3. In receivers bearing serial numbers below 826,500—
   a. R11 and R12 were 250,000 ohm carbon resistors.
   b. The 6A7 and 6D6 cathode were connected together. R2 was a 150 ohm, ½ watt wire-wound resistor, and C7 was 0.15 mf, 200 volt condenser. R9 and C26 were not in the circuit.
4. In receivers bearing serial numbers below 828,500—
   a. C1 was an 0.01 mf, 200 volt condenser.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	100.0	42	2.0	60	6.3 a.c.
6D6	100.0	100	2.0	—	6.3 a.c.
75	39.5	0	0	—	6.3 a.c.
43	87.0	100	0	—	25 a.c.

Voltage at 25Z5 cathode—110 volts.
Voltage drop across ballast tube (including pilot-light section) —49 volts.
Voltage drop across each pilot light section—4 volts.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1425 and 15,000 kc should be used.

In addition an output meter should be used across the voice coil or output transformer for observing maximum response.

Location of Coils and Trimmer Adjustments

The broadcast antenna coil, the short-wave antenna coil and the 456 kc wave trap are one assembly mounted underneath the chassis deck to the right of the variable condenser. The trimmers for these coils are accessible through three holes in the top of the chassis. The trimmer closest to the front of the chassis is for the short-wave antenna coil. The central trimmer is for the broadcast antenna coil and the trimmer farthest from the chassis front is for the 456 kc wave trap.

The broadcast oscillator and short-wave oscillator coils are wound on one tubing and mounted on the inside of the rear chassis wall. The trimmers for these coils are accessible through two holes in the rear chassis wall. The left-hand trimmer (looking at the rear wall) is for the short-wave oscillator coil and the right-hand trimmer is for the broadcast oscillator coil.

The two i-f transformers are in oblong coil cans located on the top of the chassis. The first i-f transformer is the one behind the variable condenser. The trimmers for these transformers are accessible through holes in the tops of the cans.

The broadcast series padding condenser is located on the rear wall of the chassis below the 6A7 tube.

I-f Transformer and Wave-Trap Alignment

Turn the switch clockwise to the broadcast position and rotate the variable condenser to the minimum capacity position. Feed 456 kc to the grid cap of the 6A7 tube and adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna and adjust the wave-trap trimmer (rear screw beside variable condenser) for minimum response.

Short-Wave Alignment

Use a dummy antenna (400 ohm resistor) when aligning the short-wave coils.

Rotate the wave-band switch counter-clockwise to the short-wave position and set the dial pointer to 15 megacycles. Feed 15 megacycles through the dummy antenna and adjust the short-wave oscillator trimmer (left-hand screw on rear chassis wall) for maximum response and then adjust the short-wave antenna trimmer (front screw beside variable condenser) for maximum response. The variable condenser should be rocked while adjusting the antenna trimmer. (Rotate variable condenser rotor shaft back and forth through a small arc).

Broadcast Alignment

Rotate the wave-band switch to the broadcast position, clockwise, and set the dial pointer at 60. Feed 600 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute).

Adjust the broadcast series padding condenser (on rear chassis wall, below 6A7 tube) for maximum response. Move pointer to 142.5, feed 1425 kc and adjust the broadcast oscillator trimmer (right-hand screw on rear chassis wall) for maximum response and then adjust the broadcast antenna trimmer (central screw beside variable condenser) for maximum response. Return pointer to 60, feed 600 kc and readjust the series padding condenser rocking the variable condenser for maximum response.

GENERAL INSTRUCTIONS

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

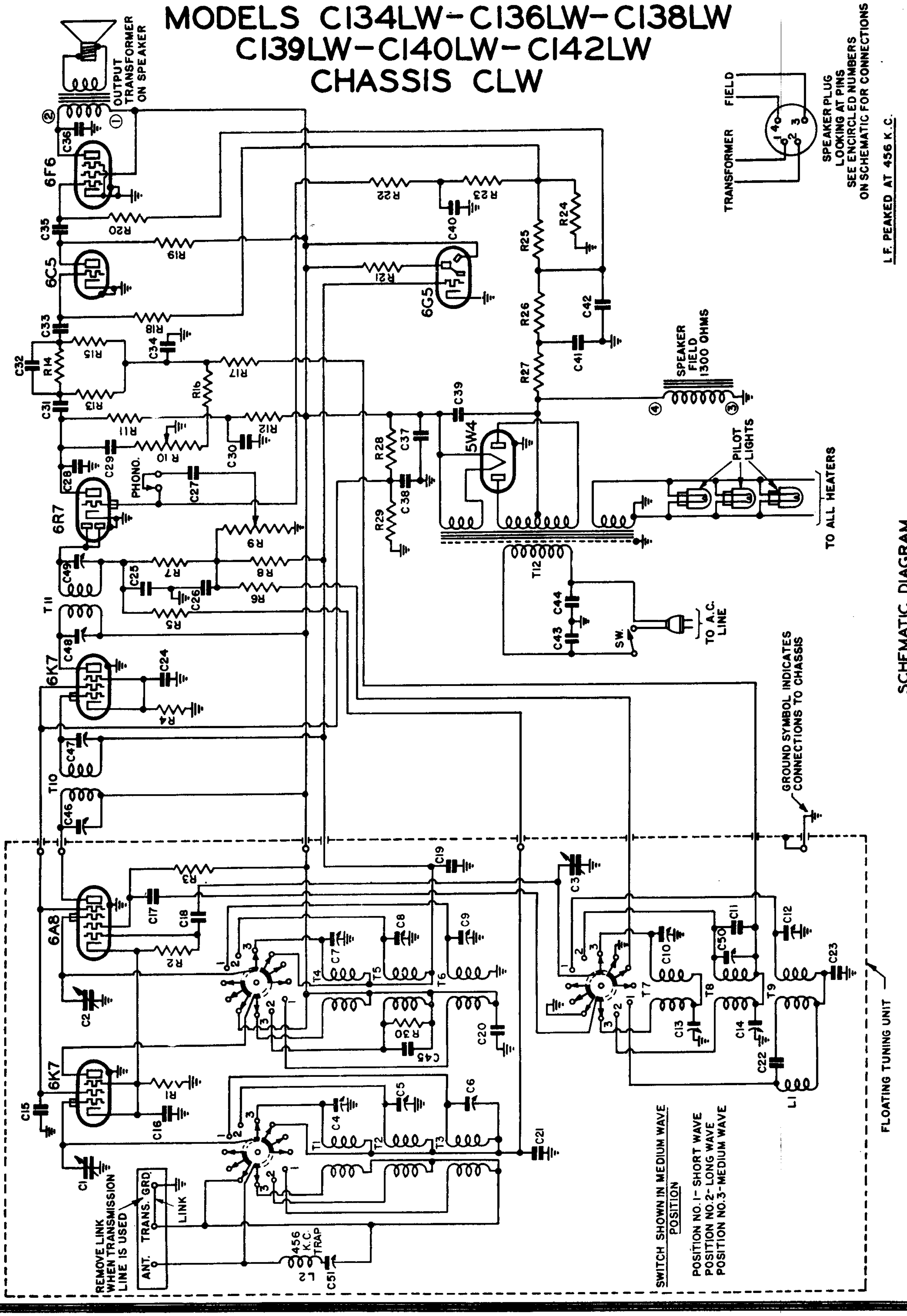
Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Always use as weak a test signal as possible during alignment.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS C134LW-C136LW-C138LW C139LW-C140LW-C142LW CHASSIS CLW



SCHEMATIC DIAGRAM

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS C134LW-C136LW-C138LW C139LW-C140LW-C142LW CHASSIS CLW

GENERAL NOTES

1. A jack is provided at the rear of the chassis for a phonograph attachment. The pickup to be used should be of the high impedance type. A separate potentiometer type volume control is required, the overall resistance to be determined by the type of pickup chosen. The pickup leads should be connected to the two outside terminals of the volume control with the ground lead of the pickup on the right-hand terminal (looking at front with terminals at top) of the control. A lead from this terminal should be plugged into the hole in the phono jack nearest the end of the chassis. A lead from the center terminal of the volume control should be plugged into the other hole in the jack (grid side of jack). Ends of leads to be plugged in jack should be fitted with tips. The volume control in the receiver should be turned to the extreme counter-clockwise (low) position when operating phonograph. Since the phono jack is of the shorting type signals cannot be received by the set when the leads are plugged into the jack. The leads should be removed before attempting to receive broadcast stations.
2. The receiver should never be turned on with either the speaker plug or the 6F6 tube out of their sockets, since the rapid rise in rectifier voltage would damage the electrolytic condenser.
3. Pilot lights may be replaced by slipping the push-on sockets off the dial and unscrewing the bulbs. It is not necessary to remove either the dial or chassis from cabinet.
4. In replacing chassis in cabinet do not tighten mounting screws so much that chassis will not float freely, and do not allow any part of the dial assembly to touch the cabinet. Do not push control knobs on so far that they touch the cabinet front panel. If these precautions are not observed the receiver may become microphonic.
5. The color coding of the power transformer leads is as follows:
   - Primary—two black leads
   - High voltage sec.—two red leads
   - High voltage secondary center tap—red and yellow lead
   - 6.3v sec.—two heavy green leads
   - 5v sec.—two heavy yellow leads
6. The tuning indicator (6G5 tube) is mounted in the cabinet above the dial on all the console type receivers, and in the speaker compartment on the table type receivers. On the table type receivers it is necessary to remove the speaker from the baffle, in order to remove the tuning indicator tube assembly. The color coding of the tuning indicator tube cable is as follows:
   - Shield—cathode
   - Blue—plate
   - Red—target
   - Black—filament
   - Green—grid
7. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. The Emerson All-Wave Antenna is especially designed for high efficiency and reduction of noise on all three frequency ranges. Complete instructions for the installation of this antenna are supplied with each kit.
8. The wave trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

Tube Data

The tube complement is as follows:

1—6K7—R-f amplifier (on tuner unit)
1—6A8—Pentagrid modulator-oscillator (on tuner unit)
1—6K7—I-f amplifier
1—6R7—Second detector, a.v.c., and a-f amplifier
1—6C5—A-f amplifier
1—6F6—Pentode output
1—6G5—Electron ray tuning indicator
1—5W4—Full-wave rectifier

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground, with no signal. Line voltage for these readings was 117.5 volts, 60 cycles.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6K7 (r-f)	250	100	3.8	—	6.3 a.c.
6A8	250	100	3.8	180	6.3 a.c.
6K7 (i-f)	250	100	3.6	—	6.3 a.c.
6R7	90	—	0	—	6.3 a.c.
6C5	150	—	0	—	6.3 a.c.
6F6	240	250	0	—	6.3 a.c.
6G5	10 (blue lead)	250 (red lead)	0	—	6.3 a.c.

Voltage across speaker field—100 volts.
B plus at 5W4 filament to B minus (center tap of secondary)—350 volts.

ADJUSTMENTS

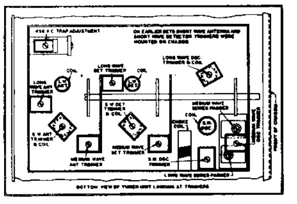
An oscillator with frequencies of 150, 345, 456, 600, 1600 and 16000 kc should be used.

An output meter should be used across the voice coil or speaker output transformer for observing maximum response.

Use a standard dummy antenna for aligning any of the three bands. A .0002 mf condenser may be used for the medium-wave band and the long-wave band dummy antenna and a 400 ohm resistor for the short-wave dummy antenna.

The i-f transformers are located on the extreme left side of the chassis. The transformer nearest the front of the chassis is the first i-f transformer. The four trimmers for the i-f adjustment are available through holes in the tops of the cans.

The medium-wave, long-wave and short-wave coils are all located on the tuner unit. The tuner unit is the separate chassis section floated on rubber and mounted in center of chassis. The location of the trimmers for the coils is shown in the illustration at the right. The three coils for the medium-wave band are in separate cans on top of the tuner unit.



I-f Alignment

Set the wave-band switch at the medium-wave (clockwise) position and the variable condenser at the minimum capacity position. Feed 456 kc to the grid cap of the 6A8 tube. Adjust the four i-f trimmers carefully for maximum response. Feed 456 kc through a dummy antenna into the antenna terminal and adjust the 456 kc wave-trap for *minimum response.* (See General Notes.)

Medium-Wave Alignment

Both pointers on the dial should coincide vertically at 890 kc. For adjustment, the gold pointer may be slipped around its shaft. With the wave-band switch at the medium-wave (clockwise) position, set the pointer at 60, feed 600 kc through the antenna (using a standard dummy antenna), and adjust the medium-wave series padder for maximum response. Move pointer to 160, feed 1600 kc to the antenna and adjust the oscillator trimmer for maximum response, then adjust detector and antenna trimmers. Reset the pointer to 60, feed 600 kc to antenna and rock the variable condenser (rotate the condenser back and forth through a small arc) while resetting the oscillator padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary, return to 600 and repeat entire procedure.

Long-Wave Alignment

Set the wave-band switch at the long-wave (central) position and the pointer to 150. Feed 150 kc through a standard dummy antenna to the antenna terminal and adjust the long-wave series padder for maximum response. Move the pointer to 345, feed 345 kc and adjust the long-wave oscillator trimmer, then the r-f trimmer and then the antenna trimmer for maximum response. Return to 150 kc and re-adjust the long-wave series padder for maximum response. Return to 345 kc and re-adjust all three trimmers. Return again to 150 and check the alignment. Repeat the entire procedure until no appreciable re-adjustment is required.

Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move pointer to 16, feed 16000 kc to antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator for maximum response. If two peaks are obtained choose minimum capacity peak. Then adjust the detector and antenna trimmers for maximum response. If two peaks are obtained choose the maximum capacity peak.

GENERAL INSTRUCTIONS

The set's oscillator is higher in frequency than the signal on all three bands. Images, therefore, should be observed on the low-frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmer and maximum capacity peaks on antenna and r-f trimmers. The last motion in adjusting trimmers should always be a tightening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a source of noise, frequency drift and microphonism.

In aligning antenna trimmers on the high-frequency signals there is usually a tendency for the oscillator to drift, due to interlocking. To compensate for this always keep re-tuning the variable condenser as you align.

REPLACEMENT PARTS LIST

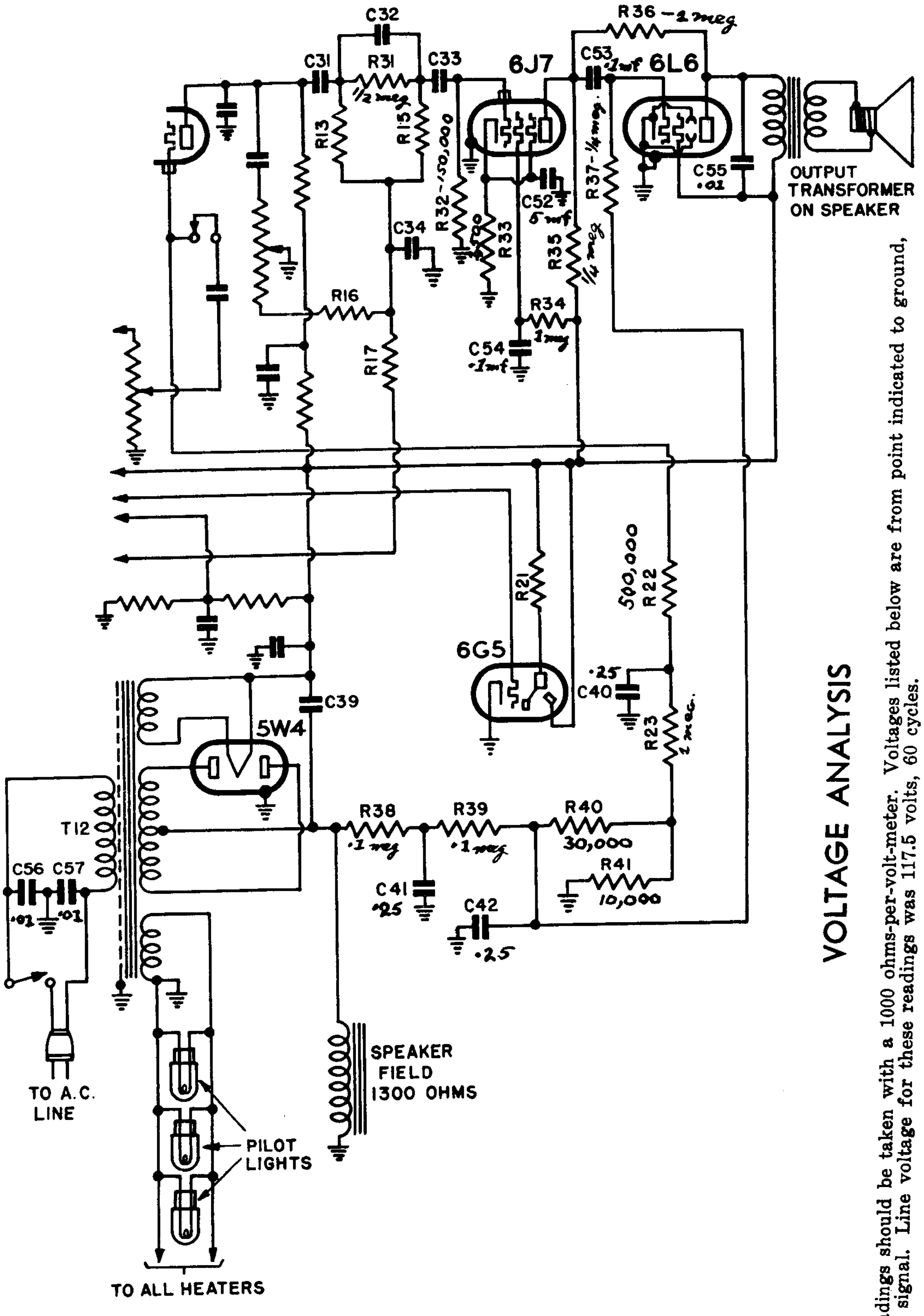
*Item	Part No.	DESCRIPTION	List Price Effective as of Aug. 1st, 1936 PRICE
L1	3AT-291	Oscillator choke	$ .20
L2	2PT-283	456 kc wave-trap	.60
T1	3AT-251	Medium-wave antenna coil	.95
T2	3MT-301	Long-wave antenna coil	1.05
T3	3AT-257	Short-wave antenna coil	.60
T4	3AT-252	Medium-wave detector coil	.95
T5	3MT-302	Long-wave detector coil	1.05
T6	3AT-258	Short-wave detector coil	.70
T7	3AT-253	Medium-wave oscillator coil	.75
T8	3MT-303	Long-wave oscillator coil	.95
T9	3AT-259	Short-wave oscillator coil	.50
T10	3BT-269	456 kc first i-f transformer	2.00
T11	3AT-261	456 kc second i-f transformer	1.90
T12	3BT-271	Power transformer	5.40
R1	3AR-245	220 ohm ½ watt wire-wound resistor	.16
R2, R16, R20	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3	YR-97	15,000 ohm ½ watt carbon resistor	.16
R4	FFR-126	500 ohm ½ watt wire-wound resistor	.16
R5, R8, R14, R18, R21, R23	KR-57	1 megohm ¼ watt carbon resistor	.16
R6, R7, R11, R15, R26	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R9	NNR-157B	Volume control—500,000 ohms	.90
R10	NNR-157B	Tone control—500,000 ohms	.90
R12, R17	OR-73	25,000 ohm ¼ watt carbon resistor	.16
R13	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R19	2CR-193	30,000 ohm ½ watt carbon resistor	.16
R22	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R24	KR-63	15,000 ohm ¼ watt carbon resistor	.16
R25	3BR-247	40,000 ohm ¼ watt carbon resistor	.16
R27	LLR-152	150,000 ohm ¼ watt carbon resistor	.16
R28	3BR-246	10,000 ohm 2 watt carbon resistor	.28
R29	2TR-225	12,000 ohm 2 watt carbon resistor	.28
R30	GR-85	2,000 ohm ¼ watt carbon resistor	.16
C1, C2, C3	3AC-276	Three-gang variable condenser	7.40
C4, C5, C7 C8, C10, C12	3AC-278	1.5 to 12 mmf trimmer condenser. (See Production Changes)	.15
C6		Trimmer—part of short-wave antenna coil assembly. (Will not be supplied separately.)	
C9		Trimmer—part of short-wave detector coil assembly. (Will not be supplied separately.)	
C11, C18	AAC-106A	0.00005 mf mica condenser	.20
C13, C14	3MC-295	Dual adjustable padding condenser C13—250 to 550 mmf C14—100 to 200 mmf	.60
C15	LC-65	0.02 mf, 400 volt tubular condenser	.20
C16, C24	AC-6	0.1 mf, 200 volt tubular condenser	.20
C17	AAC-114	0.001 mf mica condenser	.20
C19	NNC-158	0.05 mf, 200 volt tubular condenser	.20
C20, C35	EEC-132	0.1 mf, 400 volt tubular condenser	.20
C21, C40, C41, C42	BC-13	0.25 mf, 200 volt tubular condenser	.20
C22	IIC-133A	0.000025 mf mica condenser	.20
C23	XXC-197	0.0038 mf mica condenser	.35
C25, C45	EC-24A	0.0001 mf mica condenser	.20
C26	IC-47	0.0005 mf mica condenser	.20
C27, C33, C34	CCC-127	0.01 mf, 200 volt tubular condenser	.20
C28	AC-7A	0.00025 mf mica condenser	.20
C29	KC-58	0.01 mf, 400 volt tubular condenser	.20
C30	AAC-112	0.25 mf, 400 volt tubular condenser	.20
C31	LC-64	0.05 mf, 400 volt tubular condenser	.20
C32	NC-70A	0.0002 mf mica condenser	.20
C36	ZC-115	0.006 mf, 1000 volt tubular condenser	.20
C37	3BC-289	40 mf, 300 volt wet electrolytic condenser	1.30
C38	3BC-281	8 mf, 250 volt dry electrolytic condenser	1.00
C39	3BC-282	12 mf, 400 volt wet electrolytic condenser	1.15
C43, C44	3AC-313	Dual 0.01 mf, 400 volt a-c metal clad tubular condenser	.35
C46, C47		Trimmers—part of first i-f assembly. (Will not be supplied separately.)	
C48, C49		Trimmers—part of second i-f assembly. (Will not be supplied separately.)	
C50		Trimmer—part of long-wave oscillator coil assembly. (Will not be supplied separately.)	
	3AS-166	Wave-band switch	2.25
	3BS-226	On-off switch	.55
	3BS-191	8" dynamic speaker (For Models C-134 and C-140)	8.80
	3BS-176	12" dynamic speaker (For Models C-136, C138, C-139 and C-142)	10.60
	XL-9	Pilot light, 6.3 volt, .25 amp. Mazda No. 46	.20
	3AD-41	Dial plate with band-indicator mechanism	2.20

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS C134LW–C136LW–C138LW C139LW–C140LW–C142LW CHASSIS CLW & C

NOTE: This is a supplement to the Service Notes for the Models C and CLW chasses.

The information contained in this supplement illustrates only the revised audio system used in Model C chassis bearing serial numbers above 880,050, and in the Model CLW chassis bearing serial numbers above 848,410.



VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt-meter. Voltages listed below are from point indicated to ground, with no signal. Line voltage for these readings was 117.5 volts, 60 cycles.

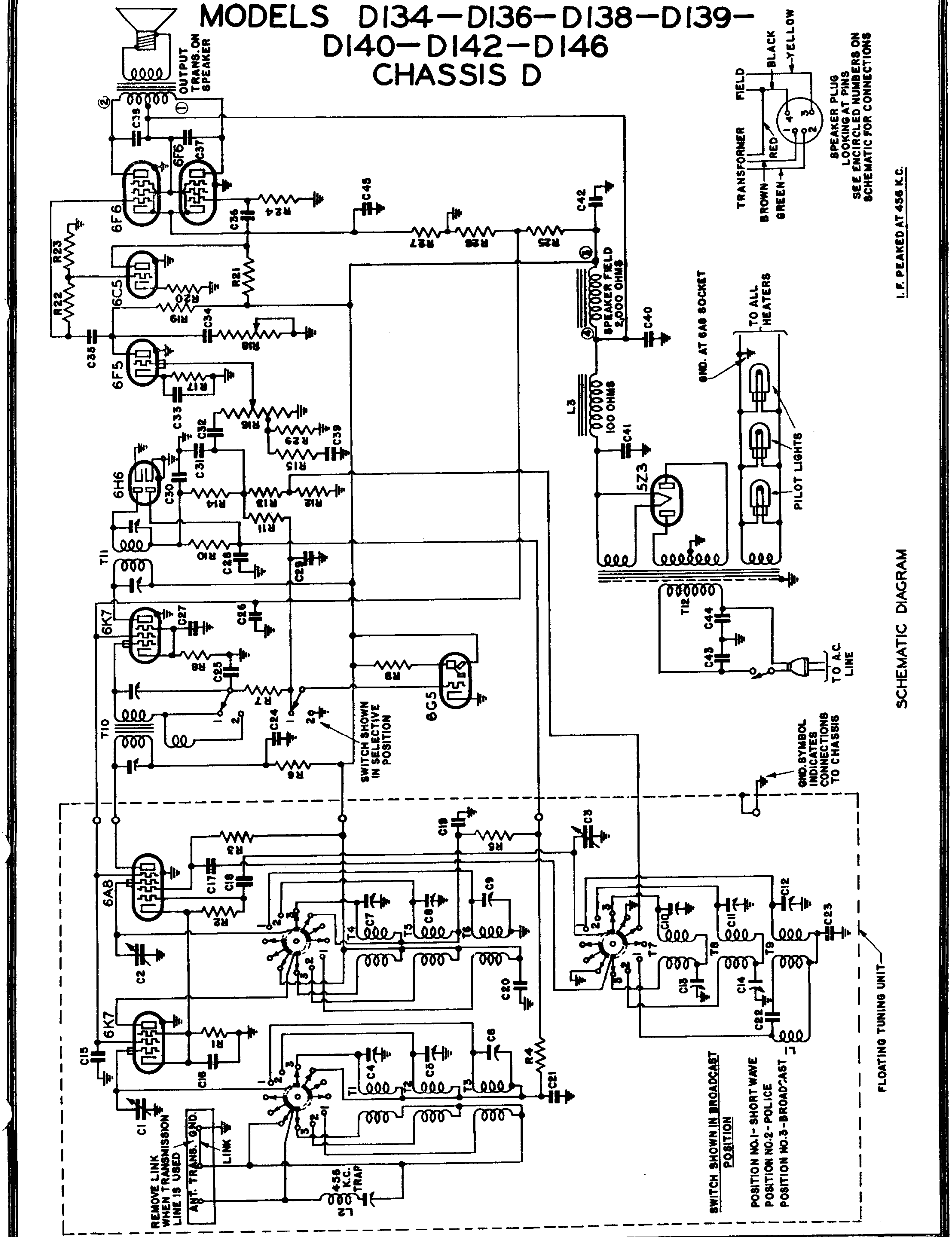
Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6K7 (r-f)	250	100	3.8	—	6.3 a.c.
6A8	250	100	3.8	180	6.3 a.c.
6K7 (i-f)	250	100	3.6	—	6.3 a.c.
6R7	90	—	0	—	6.3 a.c.
6J7	115	45	1.2	—	6.3 a.c.
6L6	240	250	0	—	6.3 a.c.
6G5	10 (blue lead)	250 (red lead)	0	—	6.3 a.c.

Voltage across speaker field—100 volts.

B plus at 5W4 filament to B minus (center tap of secondary)—350 volts.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS D134—D136—D138—D139—D140—D142—D146 CHASSIS D



EMERSON RADIO AND PHONOGRAPH CORPORATION
MODELS D-134—D-136—D-138—D-139—D-140—D-142—D-146 CHASSIS D

SERVICE NOTES

Emerson Radio

Ten-Tube, A.C., All-Wave Superheterodyne

MODELS D-134, D-136, D-138, D-139, D-140, D-142 and D-146

Chassis Model D

Listed by Underwriters' Laboratories

Voltage rating	105-125 volts, a.c.
Current drain	1.1 amps., a.c.
Frequency ranges	540 to 1800 kc, 1750 to 6000 kc, 5.5 to 18.0 megacycles.

GENERAL NOTES

1. A jack is provided at the rear of the chassis for a phonograph attachment. The pickup to be used should be of the high impedance type. A separate potentiometer type volume control is required, the overall resistance to be determined by the type of pickup chosen. The pickup leads should be connected to the two outside terminals of the volume control with the ground lead of the pickup on the right-hand terminal (looking at front with terminals at top) of the control. A lead from this terminal should be plugged into the hole in the phono jack nearest the center of the chassis. A lead from the center terminal of the volume control should be plugged into the other hole in the jack (grid side of jack). Ends of leads to be plugged in jack should be fitted with tips. The volume control in the receiver should be turned to the extreme counter-clockwise (low) position when operating phonograph. Since the phono jack is of the shorting type signals cannot be received by the set when the leads are plugged into the jack. The leads should be removed before attempting to receive broadcast stations.
2. The receiver should never be turned on with either the speaker plug or the 6F6 tubes out of their sockets, since the rapid rise in rectifier voltage would damage the electrolytic condensers.
3. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraph station the wave-trap trimmer may be readjusted until the response from the interfering station is at a minimum.
4. In replacing chassis in cabinet do not tighten mounting screws so much that chassis will not float freely, and do not allow any part of the dial assembly to touch the cabinet. Do not push control knobs on so far that they touch the cabinet front panel. If these precautions are not observed the receiver may become microphonic.
5. The color coding of the power transformer leads is as follows:
   Primary—two black leads; 6.3v sec.—two heavy green leads
   High voltage sec.—two red leads; 5v sec.—two heavy yellow leads
   High voltage center tap—red and yellow lead
6. The tuning indicator (6G5 tube) is mounted in the cabinet above the dial on all the console type receivers, and in the speaker compartment on the table type receivers. On the table-type receivers it is necessary to remove the speaker from the baffle, in order to remove the tuning indicator tube assembly. The color coding of the tuning indicator tube cable is as follows:
   Shield—cathode; Black—filament
   Blue—plate; Green—grid
   Red—target
7. An efficient antenna system (aerial) is necessary to enable a full realization of the merits of the receiver. The Emerson All-Wave Antenna is especially designed for high efficiency and reduction of noise on all three frequency ranges. Complete instructions for the installation of this antenna are supplied with each kit.

Tube Data

The tube complement is as follows:

1—6K7—R-f amplifier (on tuner unit)
1—6A8—Pentagrid modulator-oscillator (on tuner unit)
1—6K7—I-f amplifier
1—6H6—Diode detector and automatic volume control
1—6F5—First a-f amplifier
1—6C5—Phase inverter (audio)
2—6F6—Push-pull pentode output
1—6G5—Electron ray tuning indicator
1—5Z3—Full-wave rectifier.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground, with no signal. Line voltage for these readings was 117.5 volts, 60 cycles.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A8 osc.-mod.	210	100	3.2	150	6.3 a.c.
6K7 r-f amp.	215	100	3.2	—	6.3 a.c.
6K7 i-f amp.	215	100	2.6	—	6.3 a.c.
6H6 diode det.	—	—	0	—	6.3 a.c.
6F5 1st audio	75	—	1.1	—	6.3 a.c.
6C5 phase inverter	98	—	4	—	6.3 a.c.
6F6 output	330	335	22	—	6.3 a.c.
6F6 output	330	335	22	—	6.3 a.c.

Voltage at 5Z3 filament—350.
Voltage across speaker field—110.
Voltage across choke—15.
Voltages, to chassis measured along voltage divider, starting at end nearest rear of chassis.
Tap 1 (nearest rear of chassis)—215; Tap 3—0
Tap 2—100; Tap 4—22

REPLACEMENT PARTS

*Item	Part No.	DESCRIPTION	List Price as Effective as of Aug. 1st, 1936 PRICE
L1	3AT-291	Oscillator choke	$ .20
L2	2PT-283	456 kc wave trap	.60
L3	3AT-264	Iron core filter choke	.90
T1	3AT-251	Broadcast antenna coil	.95
T4	3AT-252	Broadcast detector coil	.95
T7	3AT-253	Broadcast oscillator coil	.75
T2	3AT-254	Intermediate band antenna coil	.60
T5	3AT-255	Intermediate band detector coil	.60
T8	3AT-256	Intermediate band oscillator coil	.50
T3	3AT-257	Short-wave antenna coil	.60
T6	3AT-258	Short-wave detector coil	.70
T9	3AT-259	Short-wave oscillator coil	.50
T10	3AT-260	Band-spread, iron core, 456 kc first i-f transformer	2.90
T11	3AT-261	456 kc second i-f transformer	1.90
T12	3AT-262	Power transformer	6.65
R1	3AR-245	220 ohm ½ watt wire-wound resistor	.16
R2	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3	YR-97	15,000 ohm ½ watt carbon resistor	.16
R4, R5, R7, R13, R14, R21	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R6	GR-85	2,000 ohm ¼ watt carbon resistor	.16
R8	CCR-140	350 ohm ½ watt wire-wound resistor	.16
R9, R10, R11	KR-57	1 megohm ¼ watt carbon resistor	.16
R12, R22, R24	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R15, R20	LR-65	10,000 ohm ¼ watt carbon resistor	.16
R16	3AR-228	Volume control with line switch—500,000 ohms tapped at 100,000 ohms	1.20
R17	3AR-250	3,500 ohm ¼ watt carbon resistor	.16
R18	NNR-157B	Tone control—500,000 ohms	.90
R19	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R28	KR-63	15,000 ohm ¼ watt carbon resistor	.16
R23	3AR-244	80,000 ohm ¼ watt carbon resistor	.16
R25, R26, R27	3AR-280	Wire-wound voltage divider R25—3000 ohms, 4.8 watts; R27—240 ohms, 2.4 watts R26—3000 ohms, 3.35 watts	.95
C1, C2, C3	3AC-276	Three-gang variable condenser	7.40
C4, C5, C6, C7, C8, C9, C10, C11, C12	3AC-278	1.5 to 12 mmf trimmer condensers. (See production changes.)	.15
C13, C14	JJC-144C	Dual padding condenser C13—250 to 500 mmf; C14—800 to 1400 mmf	.90
C15, C35, C36	LC-65	0.02 mf 400 volt tubular condenser	.20
C16, C27	AC-6	0.1 mf 200 volt tubular condenser	.20
C17	AAC-114	0.001 mf mica condenser	.20
C18	AAC-106A	0.00005 mf mica condenser	.20
C19	NNC-168	0.05 mf 200 volt tubular condenser (with mounting strap)	.20
C20, C24	EEC-132	0.1 mf 400 volt tubular condenser	.20
C21	BC-13	0.25 mf 200 volt tubular condenser	.20
C22	HC-133A	0.000025 mf mica condenser	.20
C23	XXC-197	0.0035 mf mica condenser	.35
C25, C32	FC-29	0.02 mf 200 volt tubular condenser	.20
C33	IC-43B	5 mf 25 volt dry electrolytic condenser	.90
C28, C29	BC-12	0.05 mf 200 volt tubular condenser	.20
C26	AAC-112	0.25 mf 400 volt tubular condenser	.20
C30, C31	AC-7A	0.00025 mf mica condenser	.20
C45	3AC-256	5 mf 50 volt dry electrolytic condenser	.80
C34	XXC-207	0.005 mf 400 volt tubular condenser	.20
C37, C38	NNC-214	0.002 mf 1000 volt tubular condenser	.20
C39	ZZC-211	0.03 mf 200 volt tubular condenser	.20
C40, C41	3AC-255	8 mf 400 volt wet electrolytic condenser	1.20
C42	3AC-277	40 mf 250 volt wet electrolytic condenser	1.20
C43, C44	XXC-220	Dual 0.01 mf 250 volt a.c. tubular condenser in metal container	.45
	2AS-137A	Fidelity switch	.90
	3AS-166	Wave-band switch	2.25
	3AS-190	8" dynamic speaker (for Models D-134 and D-140)	8.50
	3AS-167	12" dynamic speaker (for Models D-136, D-138, D-139 and D-142)	11.35
	3AS-221	15" dynamic speaker (for Model D-146)	27.00
	XL-9	Pilot light, 6.3 volt, .25 amp. Mazda No. 46	.20
	3AD-41	Dial plate with band-indicator mechanism	2.20
	3AZ-397	Dial face	1.25
	3AZ-369	Idler pulley	.05
	3AZ-370	Idler pulley spring	.05
	3AZ-371	Dial drive belt	.20
	3AZ-414	Planetary dial drive (for two knob assembly)	1.85
	3AZ-372	Planetary dial drive (for single knob assembly)	1.85
	3AZ-366	Frequency indicating pointer	.10
	3AZ-367	Band-spread pointer	.15
	3AZ-406	Dial escutcheon with crystal	1.65
	3AZ-322	Electron Ray socket and cable	.85
	3AZ-407	Electron Ray escutcheon	.20

PRODUCTION CHANGES

On early receivers C4, C5, C6, C7, C8, C9, C10, C11 and C12 were air trimmers part No. 3AC-252. On these trimmers a clockwise rotation of the trimmer screw decreases the capacity. C21 was a .05 mf 200 volt tubular condenser.

a. In receivers bearing serial numbers below 850,000, R28 was not in the circuit.
b. In receivers bearing serial numbers below 864,755, R20 was a 5,000 ohm ¼ watt carbon resistor.

The receiver was carefully aligned and checked at the factory by means of an oscillograph, and it is strongly recommended that servicemen use one for realignment.

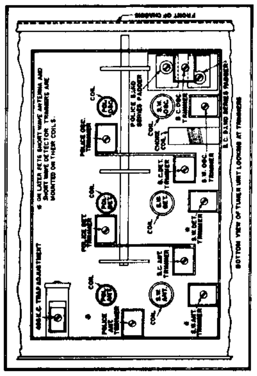
An oscillator with frequencies of 456, 600, 1600, 1800, 6000 and 16000 kc should be used.

An output meter should be used across the voice coil or speaker output transformer for observing maximum response.

Use a standard dummy antenna for aligning any of the three bands. A .0002 mf condenser may be used for the broadcast band dummy antenna, a .0001 mf condenser for police-band dummy antenna and a 400 ohm resistor for the short-wave dummy antenna.

The i-f transformers are located on the extreme left side of the chassis. The transformer nearest the front of the chassis is the first i-f transformer. The four trimmers for the i-f adjustment are available through holes in the tops of the cans.

The broadcast, police and short-wave coils are all located on the tuner unit. The tuner unit is the separate chassis section floated on rubber and mounted in center of chassis. The location of the trimmers for the coils is shown in the illustration at the right. The three coils for the broadcast band are in separate cans on top of the tuner unit.



Checking High-Fidelity Operation

On the oscillograph screen the peak of the selectivity curve (i-f response curve with fidelity-selectivity switch in selective position, clockwise) should appear in a position midway between the two peaks of the high-fidelity curve (i-f response curve with fidelity-selectivity switch in fidelity position, counter clockwise). In other words the central vertical axis of the selectivity curve should be coincident on the screen with the central vertical axis of the high-fidelity curve.

An approximate check of the high-fidelity operation can be made with the use of the oscillator and output meter. First, the i-f's should be very carefully peaked at 456 kc *with the fidelity-selectivity switch in the selective position.* Turn the switch to the fidelity position, counter-clockwise, and vary the frequency of the oscillator. Two peaks should be observed on the output meter, approximately 7 kc on each side of the selectivity peak.

I-f Alignment

Set the wave-band switch at the broadcast (clockwise) position and the variable condenser at the minimum capacity position. Feed 456 kc to the grid cap of the 6A8 tube. Adjust the four i-f trimmers carefully for maximum response. Feed 456 kc through a dummy antenna into the antenna terminal and adjust the 456 kc wave-trap for ***minimum response.*** (See General Instructions, paragraph No. 3.)

Broadcast Alignment

Both pointers on the dial should coincide vertically at 890 kc. (For adjustment, the gold pointer may be slipped around its shaft.) With the wave-band switch at the broadcast (clockwise) position, set the pointer at 60, feed 600 kc through the antenna (using a standard dummy antenna), and adjust the broadcast series padder for maximum response. Move pointer to 160, feed 1600 kc to the antenna and adjust the oscillator trimmer for maximum response, then adjust detector and antenna trimmers. Reset the pointer to 60, feed 600 kc to antenna and rock the variable condenser (rotate the condenser back and forth through a small arc) while resetting the oscillator padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary, return to 600 and repeat entire procedure.

Police Alignment

Set the switch at police (central) position and the pointer at 1.8. Feed 1800 kc to antenna (using a 0.0001 mf condenser for a dummy antenna), and adjust the police band series padder for maximum response. Move the pointer to 6.0, feed 6000 kc to the antenna and adjust the police-band oscillator for maximum response. If two peaks are obtained select the minimum capacity peak. (See General Instructions below.) Then adjust the antenna and detector trimmers for maximum response. If two peaks are obtained select the maximum capacity peak. Return the pointer to 1.8, feed 1800 kc to the antenna and rock the variable condenser while adjusting the police-band series padder for maximum response. Return to 6000 and check alignment. If readjustment is necessary return to 1800 and repeat entire procedure.

Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move pointer to 16, feed 16000 kc to antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator for maximum response. If two peaks are obtained choose minimum capacity peak. Then adjust the detector and antenna trimmers for maximum response. If two peaks are obtained choose the maximum capacity peak.

GENERAL INSTRUCTIONS

The set's oscillator is higher in frequency than the signal on all three bands. Images, therefore, should be observed on the low-frequency side of the signals.

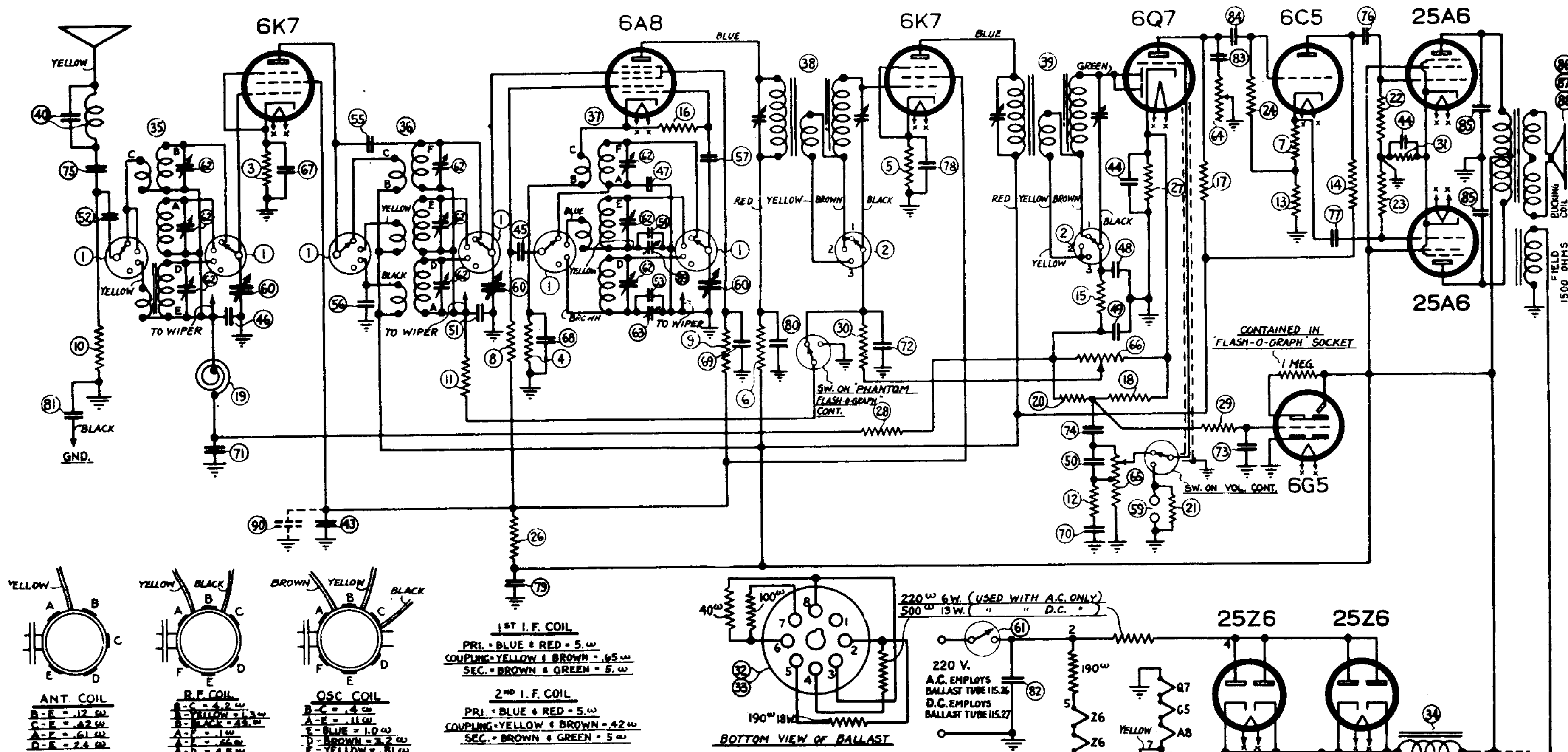
Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna and r-f trimmers. The last motion in adjusting trimmers should always be a tightening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a source of noise, frequency drift and microphonism.

In aligning antenna ~~trimmers on~~ the high-frequency signals there is usually ~~a tendency~~ for the oscillator to drift, due to interlocking. To compensate for this always keep re-tuning the variable condenser as you align.

FADA RADIO AND ELECTRIC COMPANY

MODEL 211



REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION
1	45.34	BAND SWITCH	23	30.23	CARB. RES. - 500,000 OHMS 1/3 W. ±20	45	15.7	MICA COND. - .002 MF. ± 10%	67	10.5	TUBULAR COND. .05 MF 200 V.
2	45.32	SELECTIVITY SWITCH	24	30.23	" " 500,000 " " "	46	15.5	" " .002 " 3	68	10.5	" " .05 " 200 "
3	30.45	CARB. RES. - 250 OHMS 1/3 W. ±10%	25			47	15.62	" " .004 " 5	69	10.5	" " .05 " 200 "
4	30.45	" " 250 " " " "	26	30.12	" " 4,000 " " "	48	15.3	" " .0001 " 10	70	10.5	" " .05 " 200 "
5	30.63	" " 300 " " " "	27	30.65	" " 4,400 " " "	49	15.3	" " .0001 " "	71	10.26	" " .02 " 200 "
6	30.35	" " 1000 " " " 20	28	30.28	" " 2,000,000 " " "	50	15.3	" " .0001 " "	72	10.26	" " .02 " 200 "
7	30.15	" " 2000 " " " 10	29	30.28	" " 2,000,000 " " "	51	15.6	" " .0025 " 3	73	10.26	" " .02 " 200 "
8	30.1	" " 5000 " " " "	30	30.28	" " 2,000,000 " " "	52	15.2	" " .0005 " 10	74	10.4	" " .01 " 200 "
9	30.2	" " 10000 " " " "	31	30.43	" " 315 " 1 W. 10	53	15.52	" " .00026 " 5	75	10.4	" " .01 " 200 "
10	30.31	" " 10,000 " " " 20	32	115.26	BALLAST RES. - 40ω 100ω 190ω 18W. 220ω 6W.	54	15.68	" " .0007 " 5	76	10.2	" " .1 " 200 "
11	30.31	" " 10,000 " " " "	33	115.27	" " " " " " 500ω 13W.	55	15.16	" " 3 MMF 10	77	10.2	" " .1 " 200 "
12	30.58	" " 20,000 " " " 10	34	40.3A	CHOKE COIL - 200 OHMS	56	15.61	" " 35 " 5	78	10.2	" " .1 " 200 "
13	30.59	" " 27,000 " " " "	35	35.15	ANTENNA "	57	15.10	" " 50 " 10	79	10.2	" " .1 " 200 "
14	30.10	" " 30,000 " " " "	36	35.16	R. F.	58	120.3	PILOT LT'S. - 6-8 V. .15 A.	80	10.2	" " .1 " 200 "
15	30.26	" " 50,000 " " " 20	37	35.17	OSCILLATOR	59	125.1	PHONO JACK	81	10.23	" " .006 " 200 "
16	30.8	" " 100,000 " " " 10	38	35.18	1ST I. F.	60	25.61	VARIABLE COND	82	10.9	" " .1 " 400 "
17	30.66	" " 150,000 " " " 20	39	35.19	2ND I. F.	61		ON-OFF SW. ON TONE CONT	83	10.10	" " .01 " 400 "
18	30.6	" " 1,000,000 " " " 10	40	35.6	WAVE TRAP	62		MIN. ADJ. ON COILS	84	10.10	" " .01 " 400 "
19	32.16	CHOKE COIL - 2.3 MH	41	20.47	ELECTRO COND. - 32 MF 100 W.V.	63	25.49	PADDING COND. - 70 MMF	85	10.17	" DUAL " .001 " 600 "
20	30.20	CARB. RES 250,000 OHMS 1/3 W ±20	42	20.47	" " 16 " 100 "	64	55.11	TONE CONTROL - 1/2 MEG	86	105.44	SPEAKER - 1500ω (MODEL 211 T)
21	30.23	" " 500,000 " " " "	43	20.25	" " 8 " 100 " tub.	65	50.25	VOLUME - 1 MEG - TAPPED @ 50,000ω	87	105.45	" " (" 211 C)
22	30.23	" " 500,000 " " " "	44	20.44	" DUAL " 10-10 " 25 " "	66	50.24	PHANTOM FLASH-O-GRAPH CONTROL 1 MEG.	88	105.46	" " (" 211 CK)
									89	25.64	PADDING COND. - 110 - 250 MMF.

NOTE:
BAND SW. SHOWN IN S.W. POSITION
SELECTIVITY SW. " " SHARP "
I.F. TO BE ALIGNED " " "
POS. #1 (SHARP). POS. #2 (BROAD). POS. #3 (HI-FIDELITY)
⏚ = CHASSIS
90 91 92 ELECTRO. COND. - 8 MF. 100 W.V. (FOR 25 CYCLE OPERATION ONLY) (PART NO. 20.25)

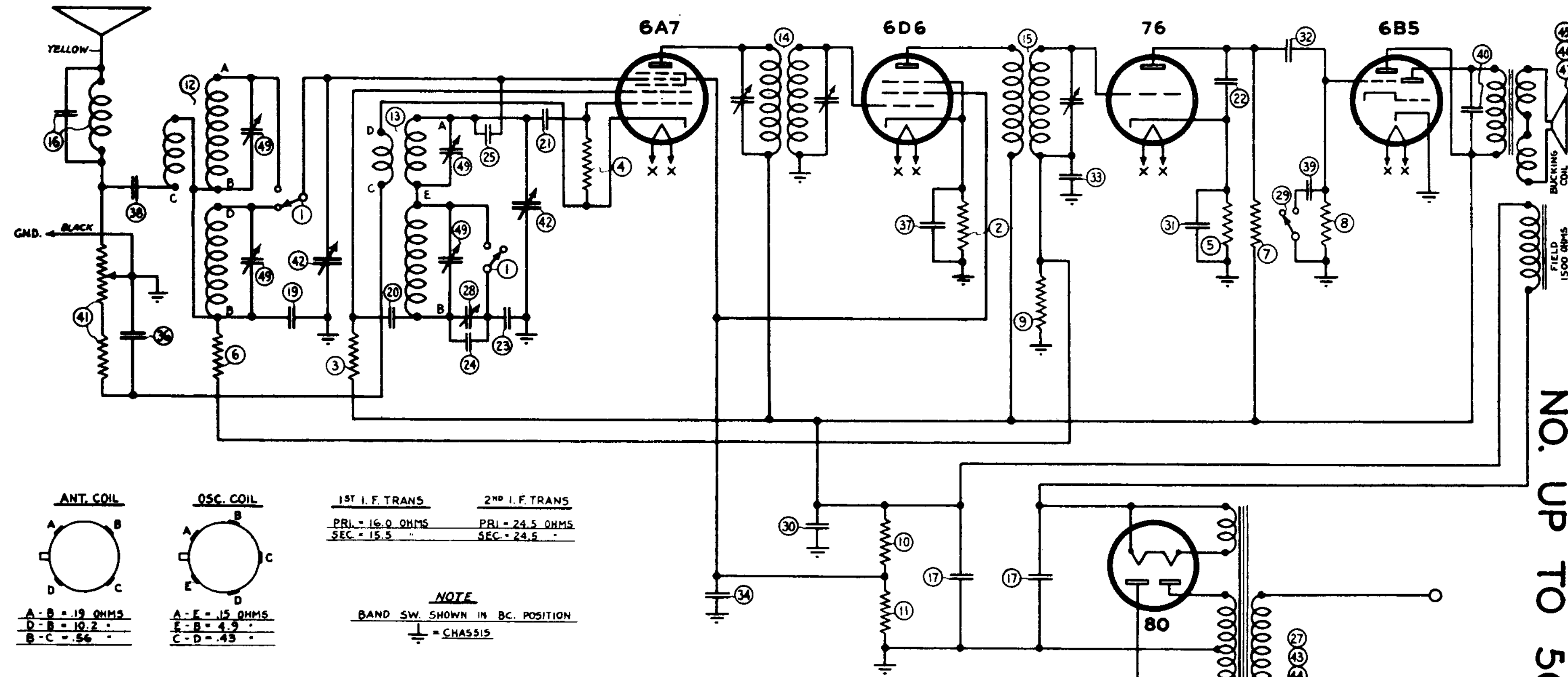
I. F. = 456 KC.

FADA RADIO & ELECTRIC CO LONG ISLAND CITY, N.Y.	
220V - MODEL 211	
DRAWN BY JD	DATE 11-12-36
CHECKED BY AB	APPROVED BY PFS

FADA RADIO AND ELECTRIC COMPANY

MODEL 250 FOR SERIAL NO. UP TO 50698

I. F. - 456 KC.



REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	45.28	BAND SWITCH	23	15.50	MICA COND. - .00071 MFD. ± 3%	45	105.37	SPEAKER - 1500 ω (MODEL 250T)
2	30.48	CARB. RES. - 350 OHMS 1/3 W. ± 10%	24	15.53	" " .00043 " 5	46	105.20	" " " (" 250C)
3	30.31	" " 10,000 " " " 20	25	15.51	" " 1.5 MMF. TO 2.0 MMF.	47	105.37	" " " (" 250B)
4	30.3	" " 50,000 " " " 10	26	120.1	PILOT LIGHTS - 6-8 V. .25 A.	48		ON-OFF SW. ON VOL. CONT.
5	30.26	" " 50,000 " " " 20	27	40.29A	POWER TRANS. - 115 V. 50-60 ~	49		MIN. ADJ. ON COILS
6	30.20	" " 250,000 " " " "	28	25.40	PADDING COND. - 140 MMF.			
7	30.20	" " 250,000 " " " "	29	45.29	TONE CONT. SW.			
8	30.23	" " 500,000 " " " "	30	10.9	TUBULAR COND. - .1 MFD. 400 V.			
9	30.22	" " 1,000,000 " " " "	31	10.1	" " .35 " 200 "			
10	30.13	" " 20,000 " 1 " 10	32	10.10	" " .01 " 400 "			
11	30.14	" " 50,000 " 1/2 " "	33	10.4	" " .01 " 200 "			
12	35.1	ANT. COIL	34	10.7	" " .05 " 400 "			
13	35.2	OSC. "	35	10.7	" " .05 " " "			
14	9879	D.T. I.F. "	36	10.5	" " .05 " 200 "			
15	4336A	S.T. I.F. "	37	10.5	" " .05 " " "			
16	35.6	WAVE TRAP	38	10.18	" " .002 " " "			
17	20.48	ELECTRO. COND. (DUAL) 8 MFD. 450 W.V.	39	10.23	" " .006 " " "			
18	30.45	CARB. RES. - 250 OHMS 1/3 W. ± 10%	40	10.3	" " .006 " 400 "			
19	15.6	MICA COND. - .0025 " ± 3%	41	50.20	VOL. CONT. - 10,000 ω - 250 ω MIN. WITH ON OFF SW.			
20	15.7	" " .002 " 10	42	25.55	VARIABLE COND.			
21	15.3	" " .0001 " "	43	40.30A	POWER TRANS. 115 V. 25 ~ (OPTIONAL)			
22	15.2	" " .0005 " "	44	40.38A	" " TAPPED PRI. (OPTIONAL)			

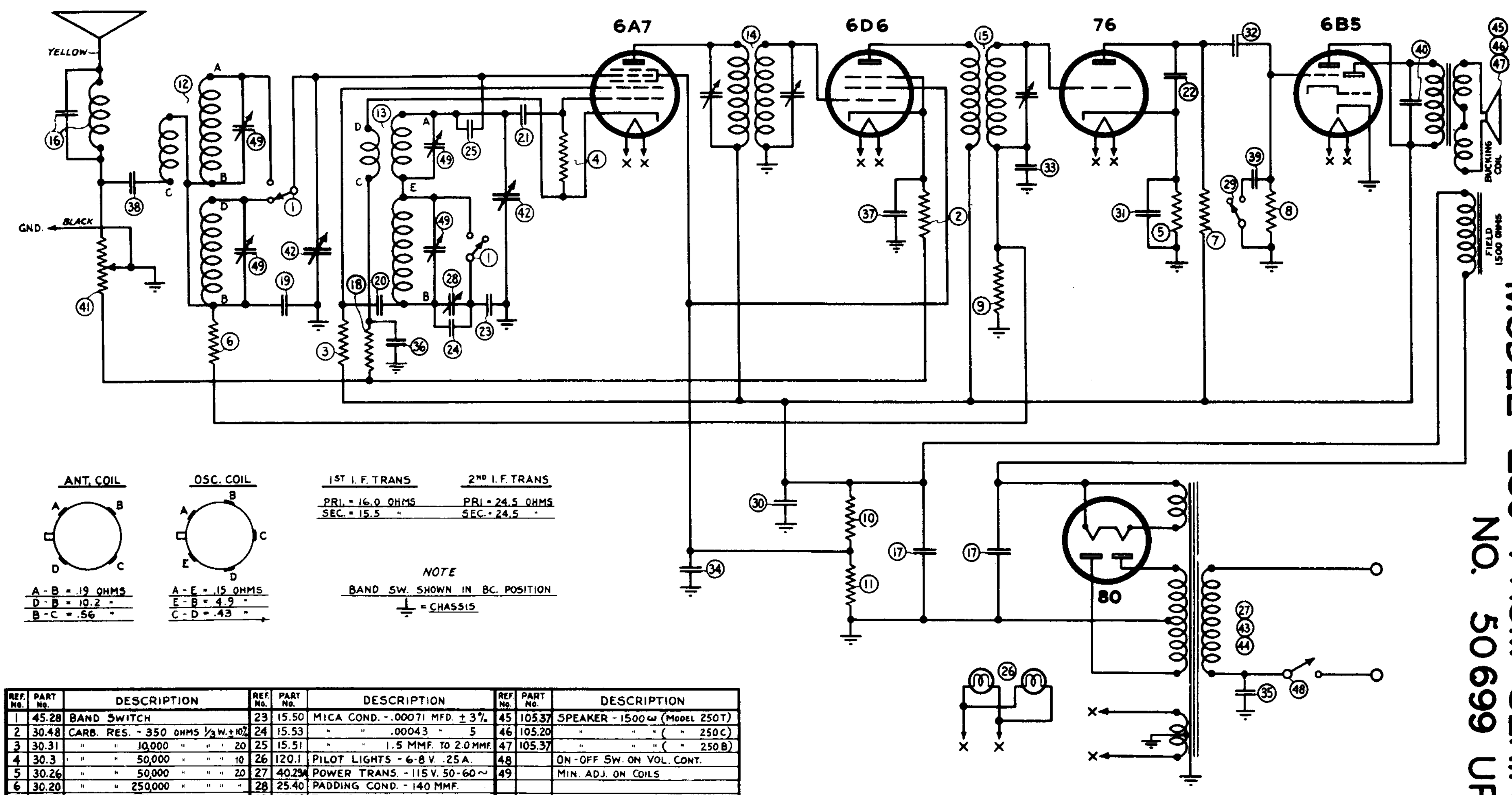
THIS DIAGRAM APPLIES TO ALL RECEIVERS WITH SERIAL Nos. UP TO 50,698 INCLUSIVE.

FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.
MODEL 250
DRAWN BY JD DATE 8-7-36
CHECKED BY APPROVED

FADA RADIO AND ELECTRIC COMPANY

MODEL 250 FROM SERIAL NO. 50699 UP

I. F. = 456 KC.



REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	45.28	BAND SWITCH	23	15.50	MICA COND. - .00071 MFD. ± 3%	45	105.37	SPEAKER - 1500 ω (MODEL 250T)
2	30.48	CARB. RES. - 350 OHMS 1/3 W. ± 10%	24	15.53	" " .00043 " 5	46	105.20	" " " (" 250C)
3	30.31	" " 10,000 " " " 20	25	15.51	" " 1.5 MMF. TO 2.0 MMF.	47	105.37	" " " (" 250B)
4	30.3	" " 50,000 " " " 10	26	120.1	PILOT LIGHTS - 6-8 V. .25 A.	48		ON-OFF SW. ON VOL. CONT.
5	30.26	" " 50,000 " " " 20	27	40.29A	POWER TRANS. - 115 V. 50-60 ~	49		MIN. ADJ. ON COILS
6	30.20	" " 250,000 " " " "	28	25.40	PADDING COND. - 140 MMF.			
7	30.20	" " 250,000 " " " "	29	45.29	TONE CONT. SW.			
8	30.23	" " 500,000 " " " "	30	10.9	TUBULAR COND. - .1 MFD. 400 V.			
9	30.22	" " 1,000,000 " " " "	31	10.1	" " .35 " 200 "			
10	30.13	" " 20,000 " 1 " 10	32	10.10	" " .01 " 400 "			
11	30.14	" " 50,000 " 1/2 " "	33	10.4	" " .01 " 200 "			
12	35.1	ANT. COIL	34	10.7	" " .05 " 400 "			
13	35.2	OSC. "	35	10.7	" " .05 " " "			
14	9B79	D.T. I.F. "	36	10.5	" " .05 " 200 "			
15	4336A	S.T. I.F. "	37	10.5	" " .05 " " "			
16	35.6	WAVE TRAP	38	10.18	" " .002 " " "			
17	20.48	ELECTRO. COND. (DUAL) 8 MFD. 450 W.V.	39	10.23	" " .006 " " "			
18	30.45	CARB. RES. - 250 OHMS 1/3 W. ± 10%	40	10.3	" " .006 " 400 "			
19	15.6	MICA COND. - .0025 " ± 3%	41	50.27	VOL. CONT. - 5,000 ω - WITH ON-OFF SW.			
20	15.7	" " .002 " 10	42	25.55	VARIABLE COND.			
21	15.3	" " .0001 " "	43	40.30A	POWER TRANS. 115 V. 25 ~		OPTIONAL	
22	15.2	" " .0005 " "	44	40.38A	" " TAPPED PRI.			

THIS DIAGRAM APPLIES TO ALL RECEIVERS WITH SERIAL Nos. FROM 50,699 AND UP

FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.

MODEL 250

DRAWN BY JD | DATE 8-7-36
CHECKED BY F.M.S. | APPROVED BY RFS

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION
MODELS 42TOB & 42CIB CHASSIS 42

TUBES AND CIRCUIT

The model 42 chassis employs a type 1C6 pentagrid converter. The incoming signal is supplied to this tube through a preselector coil arrangement. This tube serves the dual function of first detector and oscillator. A type 1B4 is employed as the intermediate frequency amplifier. This tube and the two intermediate frequency transformers are responsible for most of the selectivity and gain in the receiver. A type 1B4 tube performs the dual function of detector and first audio amplifier. The output of the second type 1B4 tube is resistance coupled to a type 33 tube in the power output stage.

ALIGNMENT PROCEDURE

To insure obtaining the performance the model 42 chassis is capable of delivering, it is essential that it be aligned perfectly. For this reason, it is urged that the following instructions be studied carefully before any alignment adjustments are attempted.

Proper adjustment of the various tuned circuits will be possible only throuth the use of an accurate and reliable signal generator employed in conjunction with an output meter, which may be connected from plate to ground on the output tube. A fixed condenser (.1 Mfd.) should be connected in series with the output meter.

NOTE - All adjustments should be made with the volume control "full on". Any desired variation in signal strength should be obtained by adjusting the output of the signal generator.

INTERMEDIATE FREQUENCY

1.- Turn the gang condenser to maximum capacity (fully meshed).

2.- Set the dial pointer at 530 kilocycles and then tighten the set screw.

3.- Supply a 456 kilocycle signal from the signal generator to the grid of the type 1C6 first detector tube through a .1 Mfd. condenser connected in series with the signal generator lead.

4.- Adjust the four trimmers of the two intermediate frequency transformers (see Figure 1) for maximum output with minimum input from the service oscillator.

RADIO FREQUENCY ALIGNMENT

The parallel or high frequency trimmer condensers for each stage located on the gang condenser (see Figure 1)

1.- Tune the receiver to 1500 kilocycles.

2.- Supply a 1500 kilocycle signal from the signal generator to the antenna lead of the receiver through a standard dummy antenna or a 200 Mmfd. (.0002 Mfd.) condenser, connected in series with the signal generator lead.

3.- Adjust the oscillator stage trimmer condenser ("A" Figure 1) for maximum output with minimum input from the signal generator.

4.- Adjust the radio frequency trimmer ("B" Figure 1) for maximum output with minimum input from the signal generator.

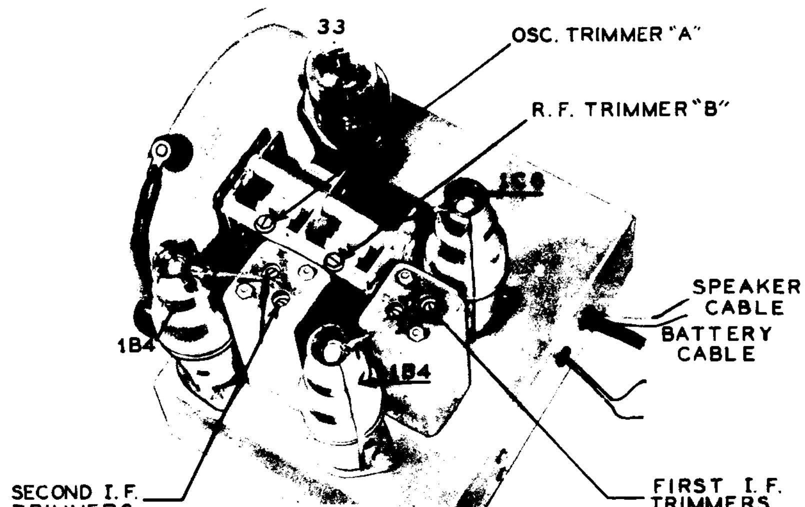
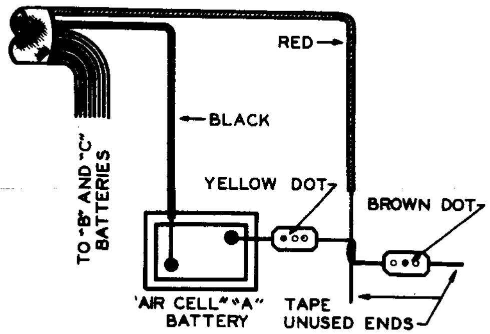
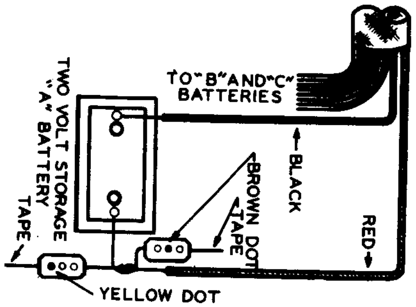
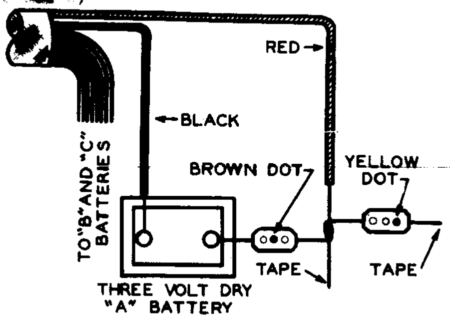


FIGURE 1

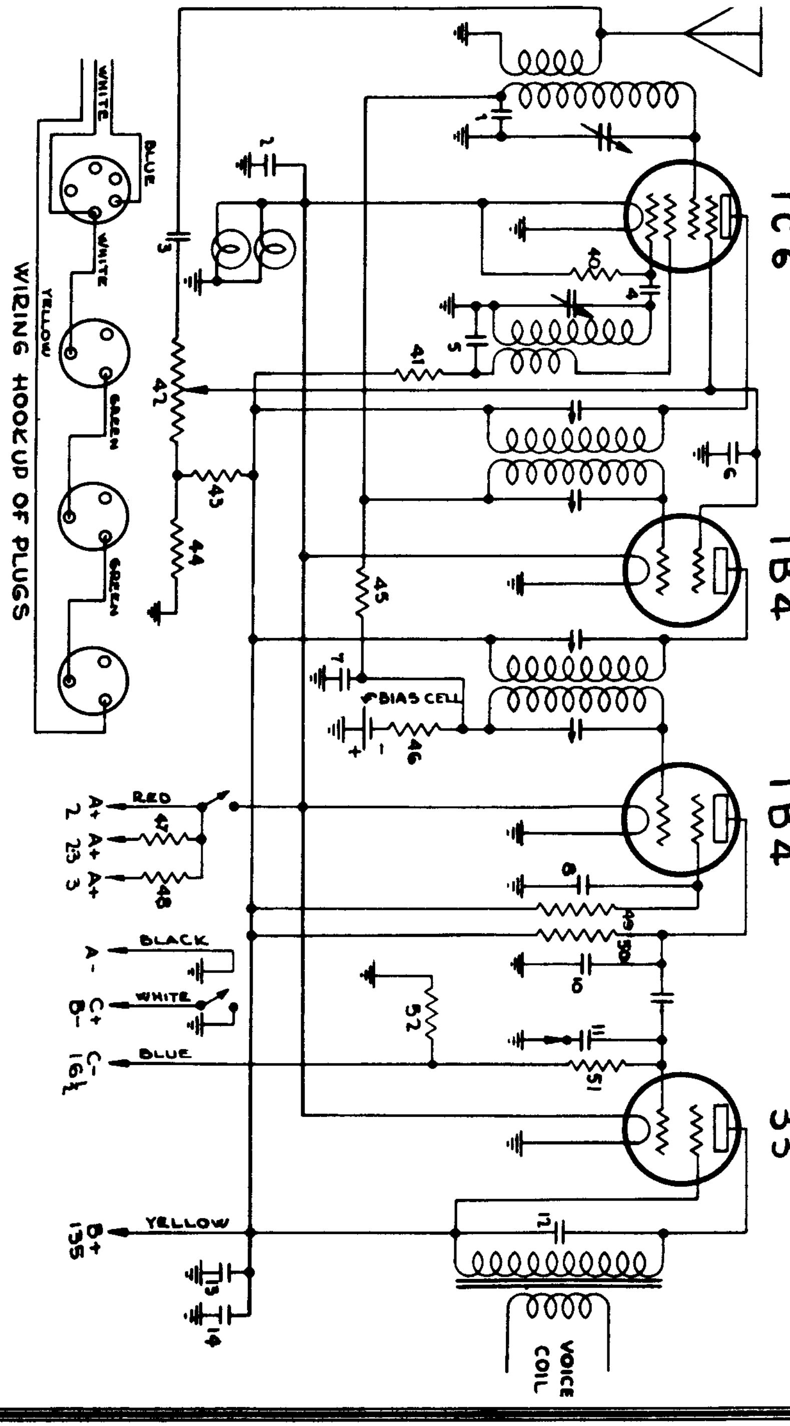






FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODELS 42TOB & 42CIB CHASSIS 42



CONDENSERS

1 - .1	MFD	8 - .05	MFD
2 - .5	MFD	9 - .02	MFD
3 - .05	MFD	10 - .0005	MFD
4 - .001	MFD	11 - .006	MFD
5 - .1	MFD	12 - .006	MFD
6 - .1	MFD	13 - .25	MFD
7 - .1	MFD	14 - 8.	MFD

RESISTORS

40 - 50M	Ohms	47 - .4	Ohms
41 - 25M	Ohms	48 - 1.2	Ohms
42 - 400M	Ohms	49 - 2	Meg.
43 - 25M	Ohms	50 - 250M	Ohms
44 - 50M	Ohms	51 - 500M	Ohms
45 - 100M	Ohms	52 - 20M	Ohms
46 - 250M	Ohms		

COLOR CODES

FIRST I. F. TRANSFORMER

Plate	Blue
"B" Plus	Red
Grid Return	Black
Grid (Top)	Green

SECOND I. F. TRANSFORMER

Plate	Blue
"B" Plus	Red
Diode Return	Black
Diodes	Green

RESISTOR AND CONDENSER COLOR CODE

0	Black	5	Green
1	Brown	6	Blue
2	Red	7	Purple
3	Orange	8	Grey
4	Yellow	9	White

RESISTORS

The BODY COLOR represents the FIRST FIGURE of the resistance value.
The END COLOR represents the SECOND FIGURE of the resistance value.
The DOT COLOR represents the NUMBER OF CIPHERS following the First two figures.

MICA CONDENSERS

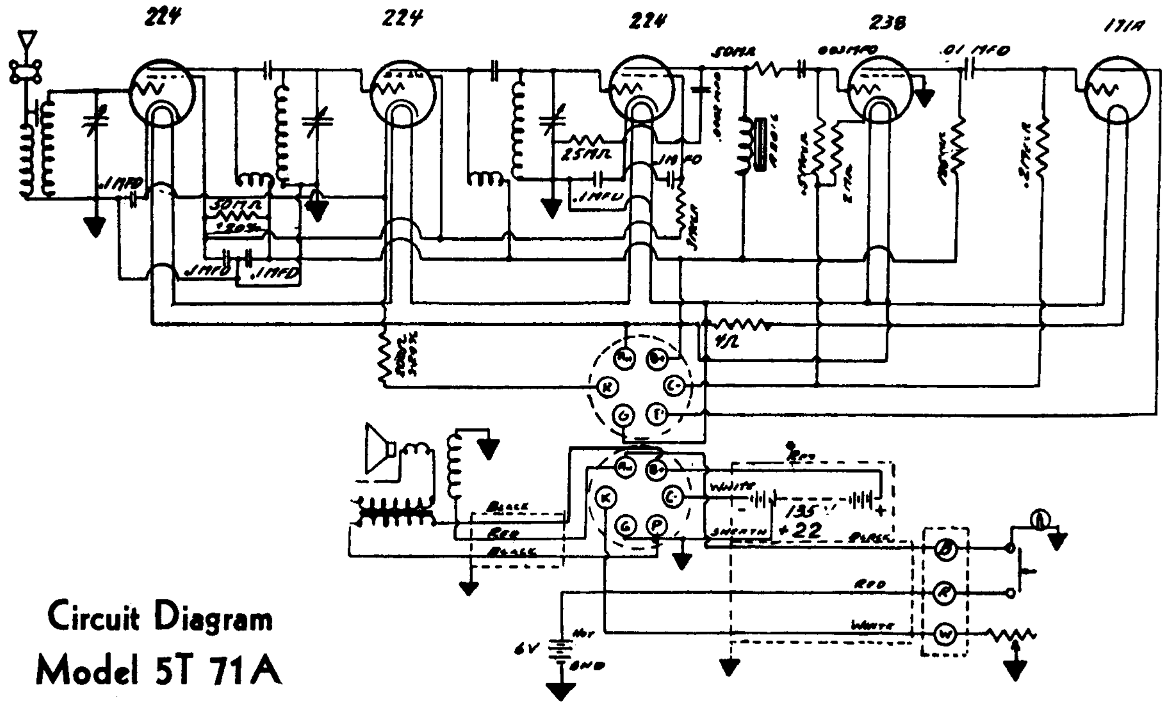
The FIRST DOT on the condenser represents the FIRST FIGURE of the capacity.
The SECOND DOT on the condenser represents the SECOND FIGURE of the capacity.
The THIRD DOT on the condenser represents the NUMBER OF CIPHERS following the first two figures.
The colors on the condensers should be read from left to right with the condenser in an upright position.

POWER TRANSFORMERS

Lead Color	Voltage
Black	115V. Primary
Green	6.3V. Filament
Yellow	5.0V. Filament
Red	High Voltage Sec.
Red and White	High Voltage C.T.

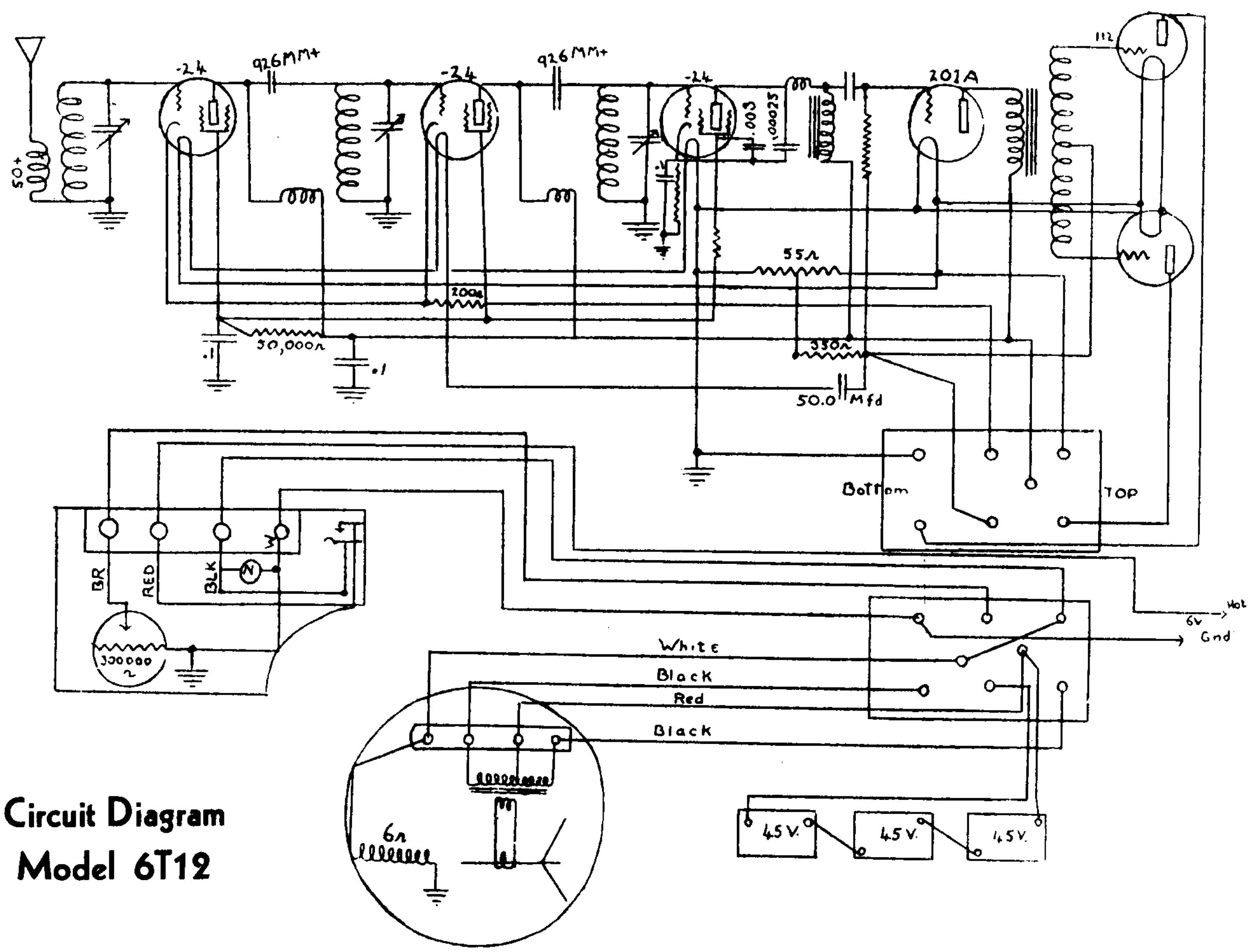
GALVIN MFG. CORP.

MOTOROLA MODEL 5T71A



Circuit Diagram
Model 5T 71A

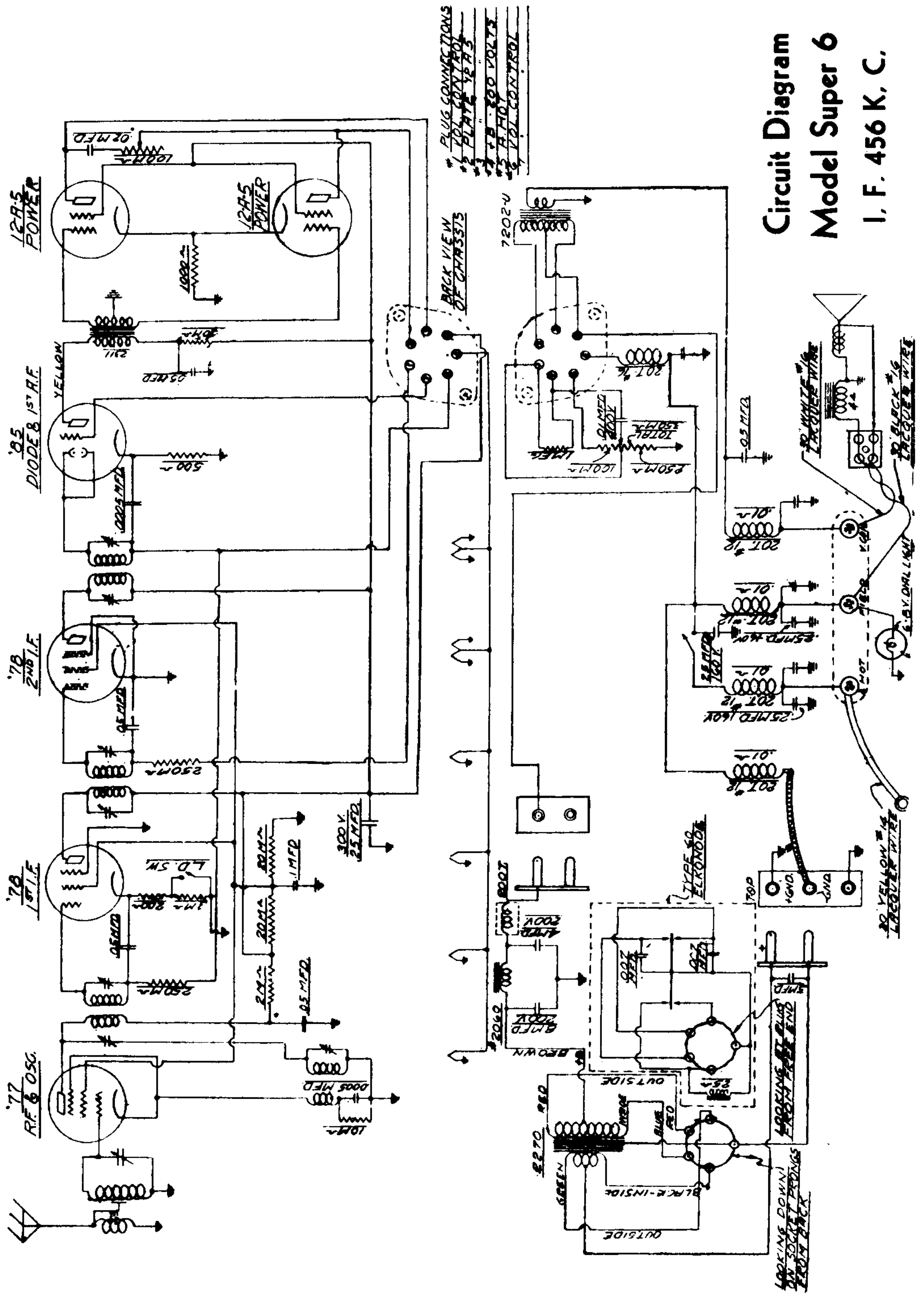
MOTOROLA MODEL 6T12



Circuit Diagram
Model 6T12

GALVIN MFG. CORP.

MOTOROLA MODEL SUPER 6



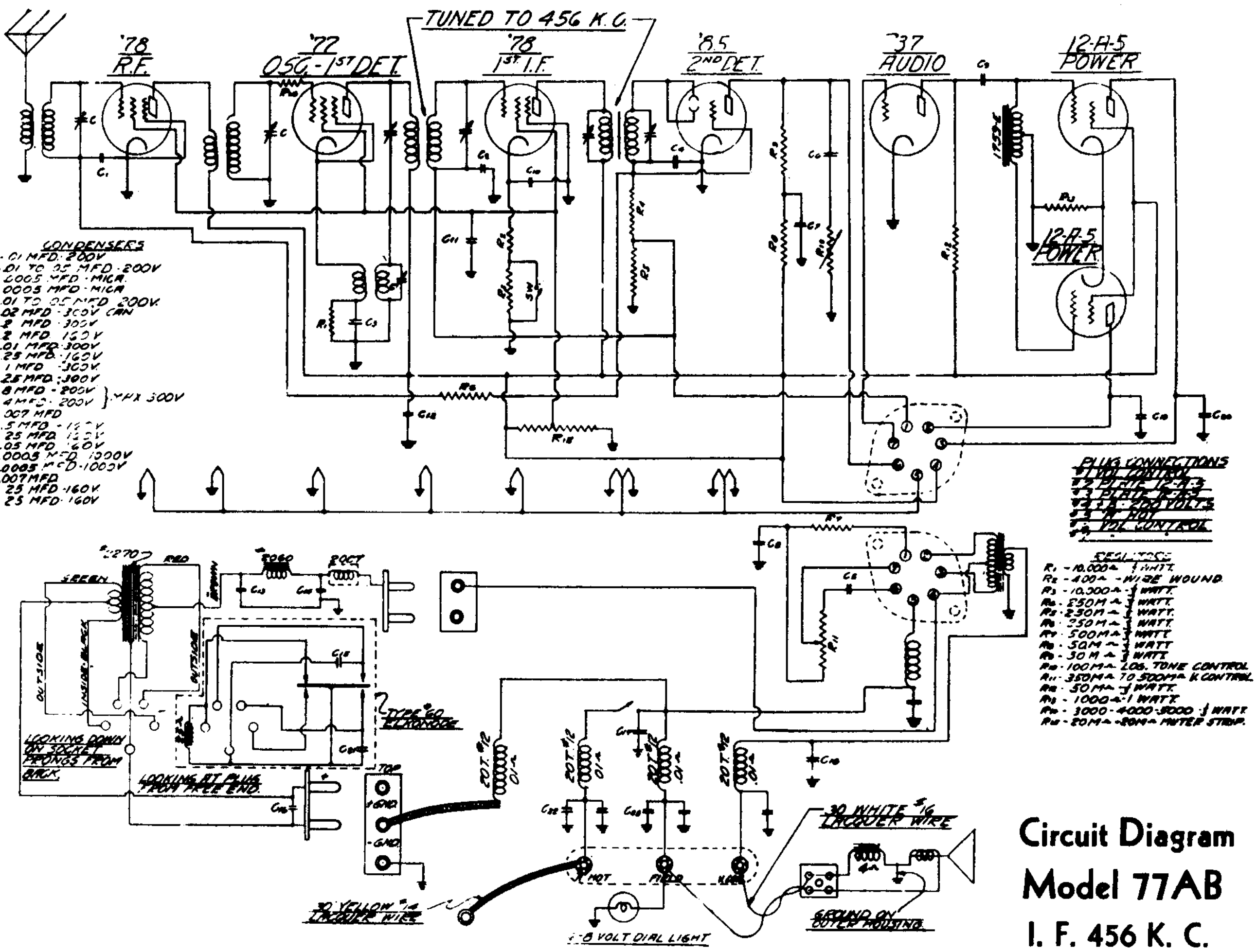
POOR TONE ... (A) Defective power tube (B) Defective tone-control condenser (C) Grounded tone control (D) Defective input transformer

LOW SENSIVITY ... (A) Defective IF coil (B) Defective 78 tube (C) Defective antenna coil (D) High bias cathode IF No.78

LOW VOLUME ... (A) improper grounding of speaker mounting bolt (B) Low plate voltage

GALVIN MFG. CORP.

MOTOROLA MODEL 77A SERIES B

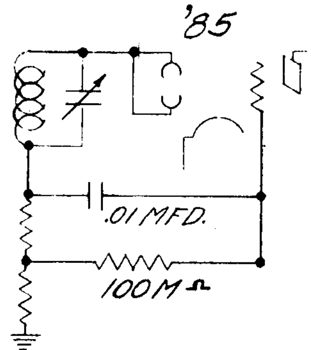


Circuit Diagram
Model 77AB
I. F. 456 K. C.

SERVICE HINTS ON MODEL 77-A-B

POOR TONE—(A) Defective 12A5 tube (B) Defective coupling condenser.

Time delay in the A.V.C. action may be eliminated and bass note response if desired can be obtained by making a slight change in the grid bias of the 85 Diode tube as shown in accompanying sketch.

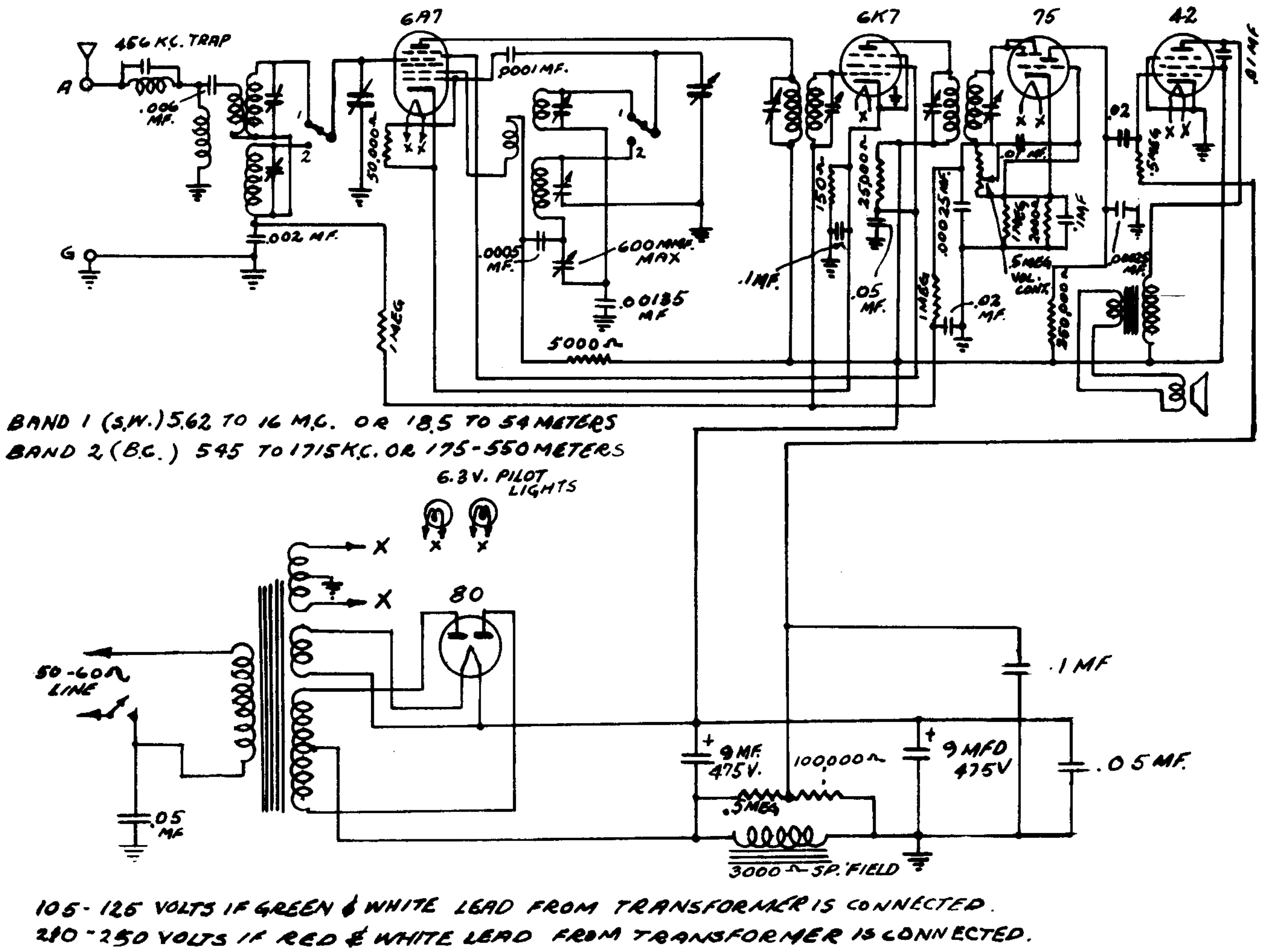


VOLTAGE-CURRENT CHART 77-AB

	1st R.F.	Auto-Dyne	1st I.F.	2nd Det.	2nd Audio	12A5	12A5
Ep	195 V.	195 V.	195 V.	35 V.	45 V.	195 V.	195 V.
Eg	A.V.C.	0	A.V.C.	A.V.C.	.2 V.	0	0
Es	75 V.	75 V.	75 V.	0	0	195 V.	195 V.
Ef	5.8 V.	5.8 V.	5.8 V.	5.8 V.	5.8 V.	5.8 V.	5.8 V.
Ec	0	8 V.	L. DX. 7V 2V.	0	A.V.C.	39 V.	39 V.

Total B current of set 58 mils. at 195 volts. Battery Voltage 6.5 volts at battery terminals. Approximate voltages Motorola Model 77-A Series B Voltage Chart.

GAROD RADIO CORPORATION
MODEL 250



ALIGNMENT PROCEDURE

Realignment of this receiver should not be attempted unless all other possible causes of faulty operation have first been thoroughly investigated. An accurately calibrated signal generator which will cover the various wave bands, and an output meter for indicating the effects of adjustments, are required.

I.F. ADJUSTMENT - The signal generator is set at 456 kc. The "hot" lead from the signal generator is connected to the grid cap on the 1st detector (6A7) tube, the clip having first been removed from the tube cap. The ground lead is connected to the receiver chassis. The oscillator section (front) of the gang tuning condenser is short-circuited and the volume control turned on full. The i.f. trimmers are then adjusted for maximum gain in the receiver. These trimmers are located on top of the i.f. transformer shield cans, which are situated in the rear of the chassis. The one towards the right is the 1st i.f. transformer and the left one is the 2nd i.f. transformer.

14 MEGACYCLE ADJUSTMENT - The short-circuit is removed from the oscillator condenser and the grid clip replaced in its normal position on the cap of the 6A7 tube. The "hot" lead from the signal generator is connected to the antenna lead of the receiver and the ground lead to the ground of the receiver. With the volume control set at maximum and a minimum input signal from the signal generator, the band switch is turned to the left and the receiver dial set at 14 mc. The oscillator trimmer is adjusted so as to bring the signal in at this setting. The oscillator coil is underneath the chassis and is located directly under the variable gang condenser. The short wave trimmer is over the short wave winding (Heavy spaced wire.) After the oscillator is set, the antenna trimmer is adjusted for maximum output as indicated by the output meter. (Again the S.W. antenna trimmer is located over the heavy spaced winding on the antenna coil, and is accessible from the top of the chassis.) There are no other adjustments on this band.

1500 KC KILOCYCLE ADJUSTMENT - Turn the Wave Band Switch to the right. Set the signal generator to 1500 kc. and turn the dial pointer to correspond to this frequency. Adjust the oscillator trimmer for this band so that the signal is received exactly at this setting. (This trimmer is located over the close-wound fine winding on the oscillator coil.) Adjust the Broadcast antenna trimmer for maximum output as described previously, (this trimmer is over the small 5 section winding and is accessible from the top.)

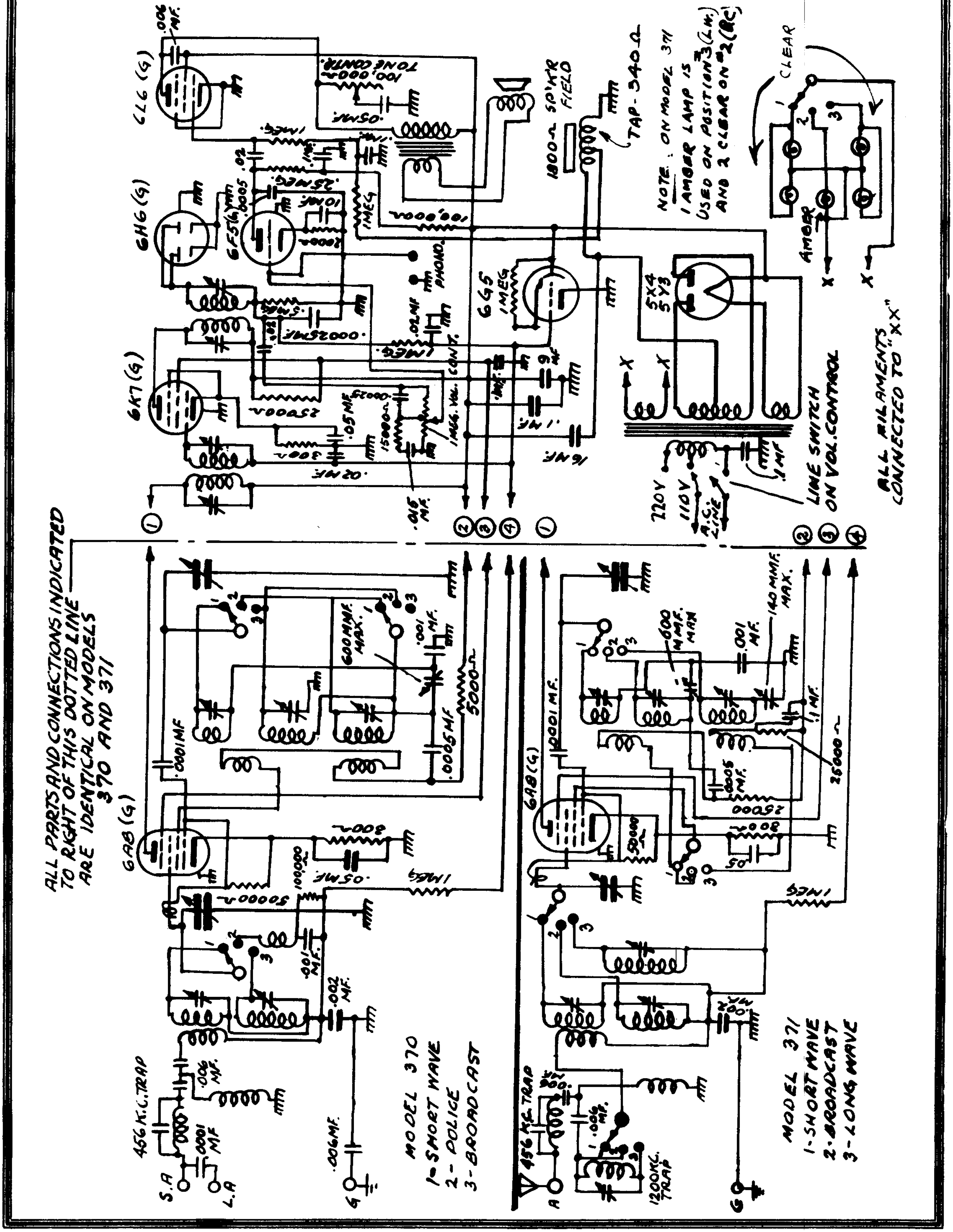
600 KC PADDER ADJUSTMENT - With all connections as above, the signal generator is set at 600 KC and the signal tuned in on the dial. The padder for this frequency is found on the front sub-panel of the receiver, directly under the dial. This padder should be adjusted for maximum response of the receiver, while the tuning condenser is rocked slightly back and forth. The 1500 kc adjustment should then be rechecked.

VOLTAGE TABLE

TUBE	FUNCTION	H'T'R	PLATE	SC.GR	CATH.	OSC.PL.
6A7	Det.-Osc.	6.3	205	85	2.5	180
6K7	I.F. Amp.	6.3	205	85	2.5	---
75	Diode Det. and 1st audio	6.3	80	--	1.2	---
42	Audio Output	6.3	200	205	0	---
80	Rectifier	5.0	---	---	205	---

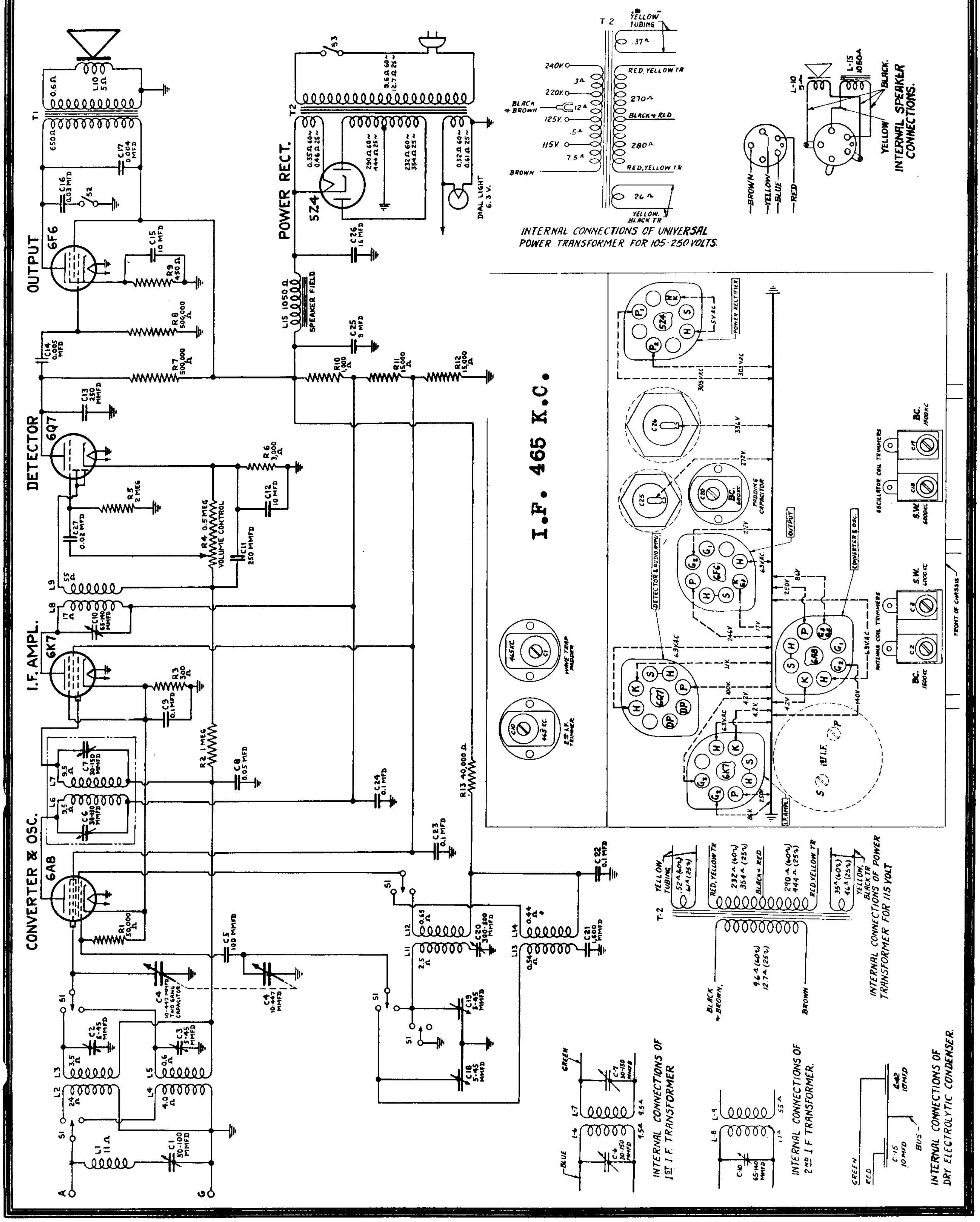
GAROD RADIO CORPORATION

MODELS 370-371-370C-370D-371D-370KC-371KC



GENERAL ELECTRIC COMPANY

MODELS A52 & A55



GENERAL ELECTRIC COMPANY
MODEL E51

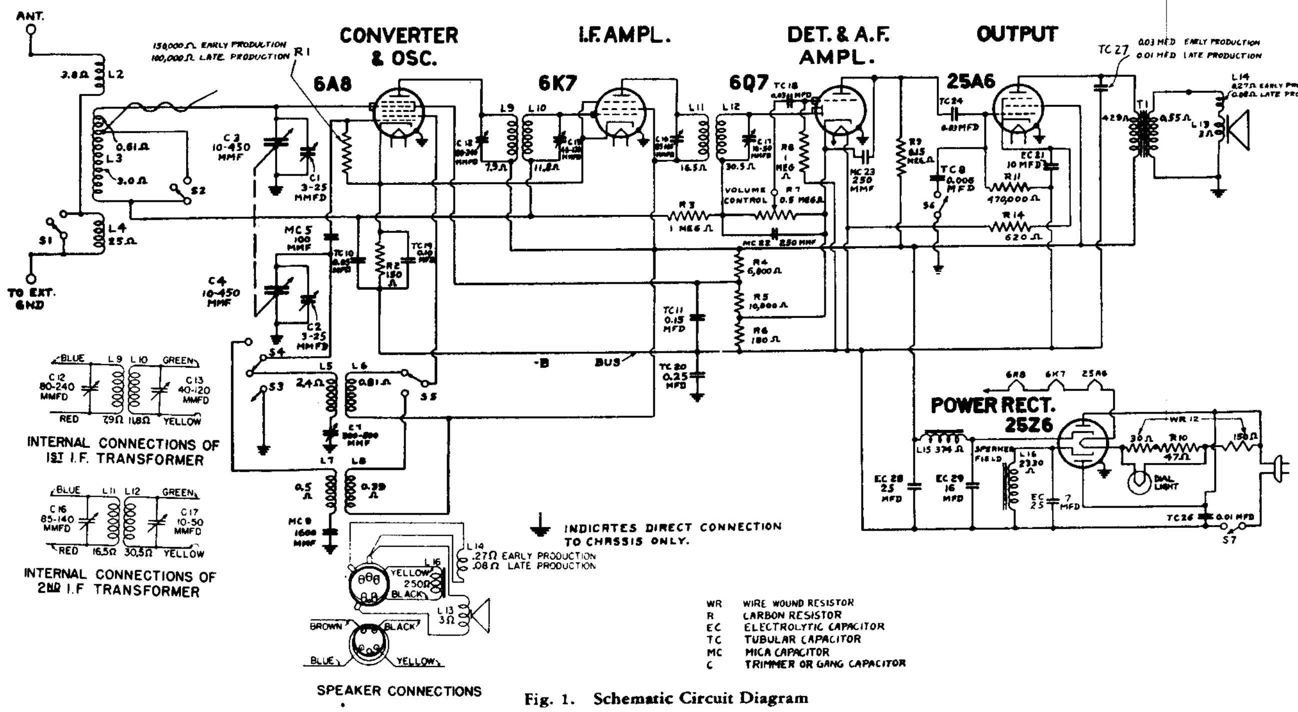
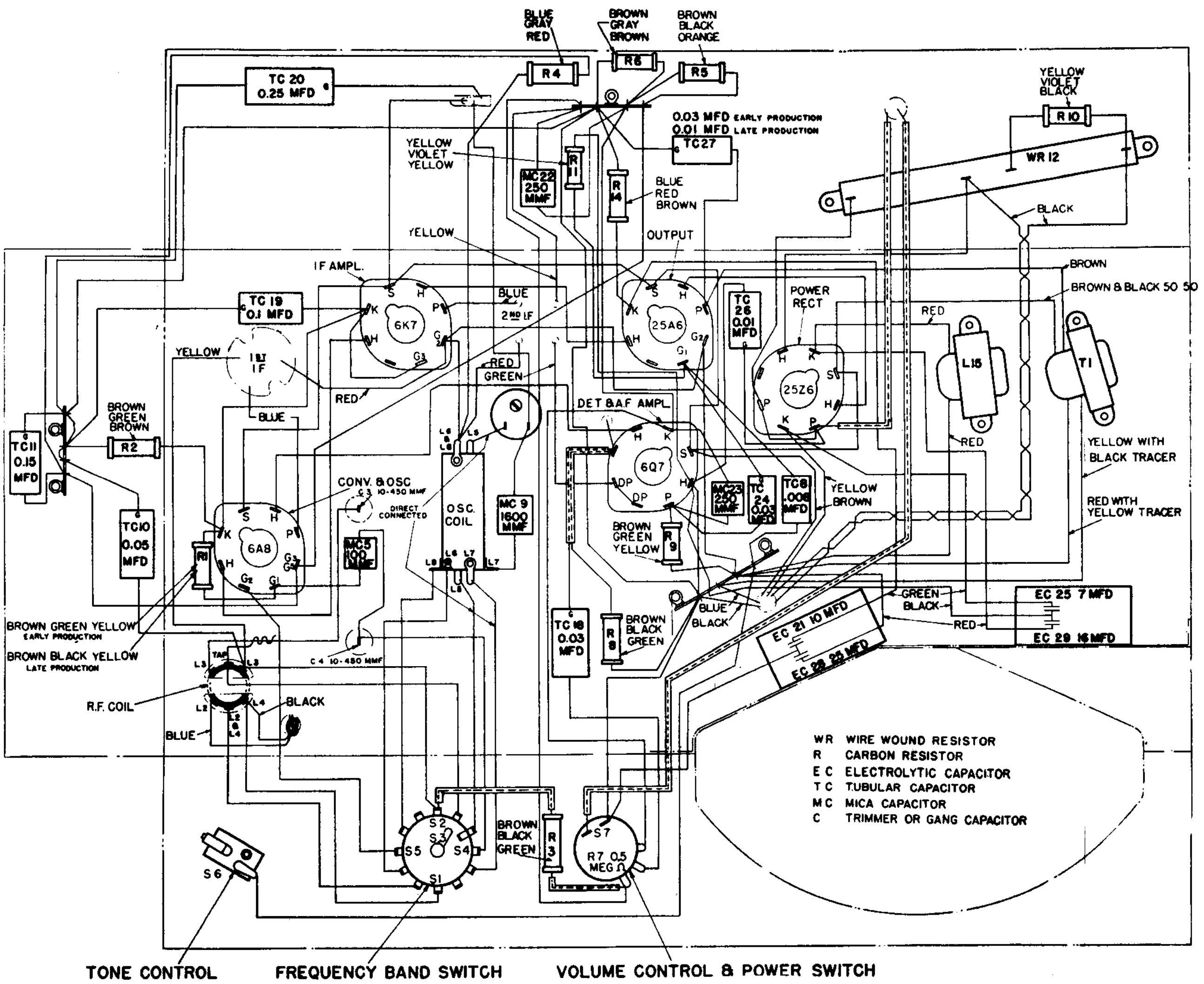


Fig. 1. Schematic Circuit Diagram



FRONT OF CHASSIS Fig. 2. Chassis Wiring Diagram

GENERAL ELECTRIC COMPANY

MODEL C-67, 32 VOLT D.C. SET

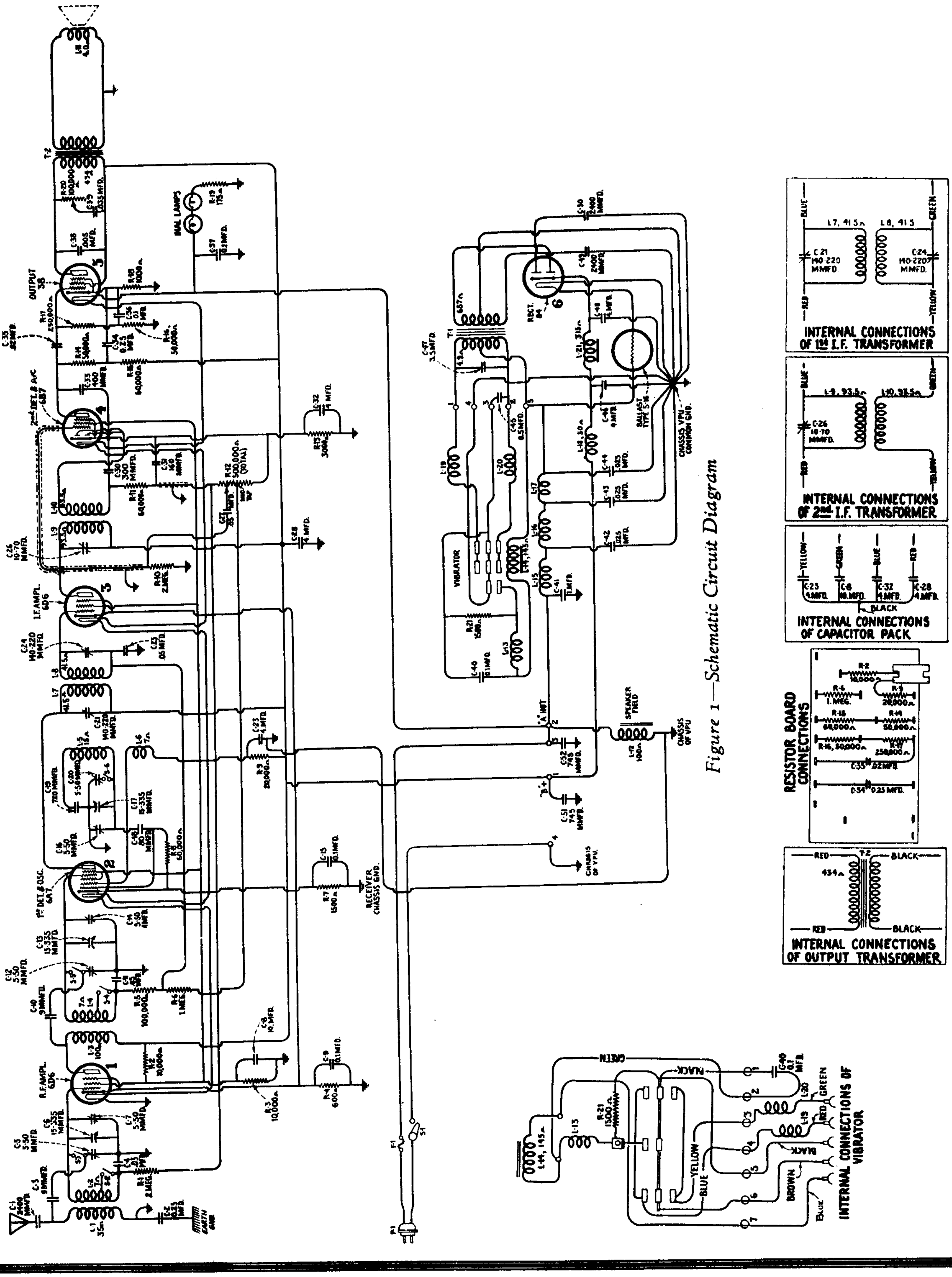


Figure 1—Schematic Circuit Diagram

GENERAL ELECTRIC COMPANY

MODEL C-67 32VOLT D.C. SET

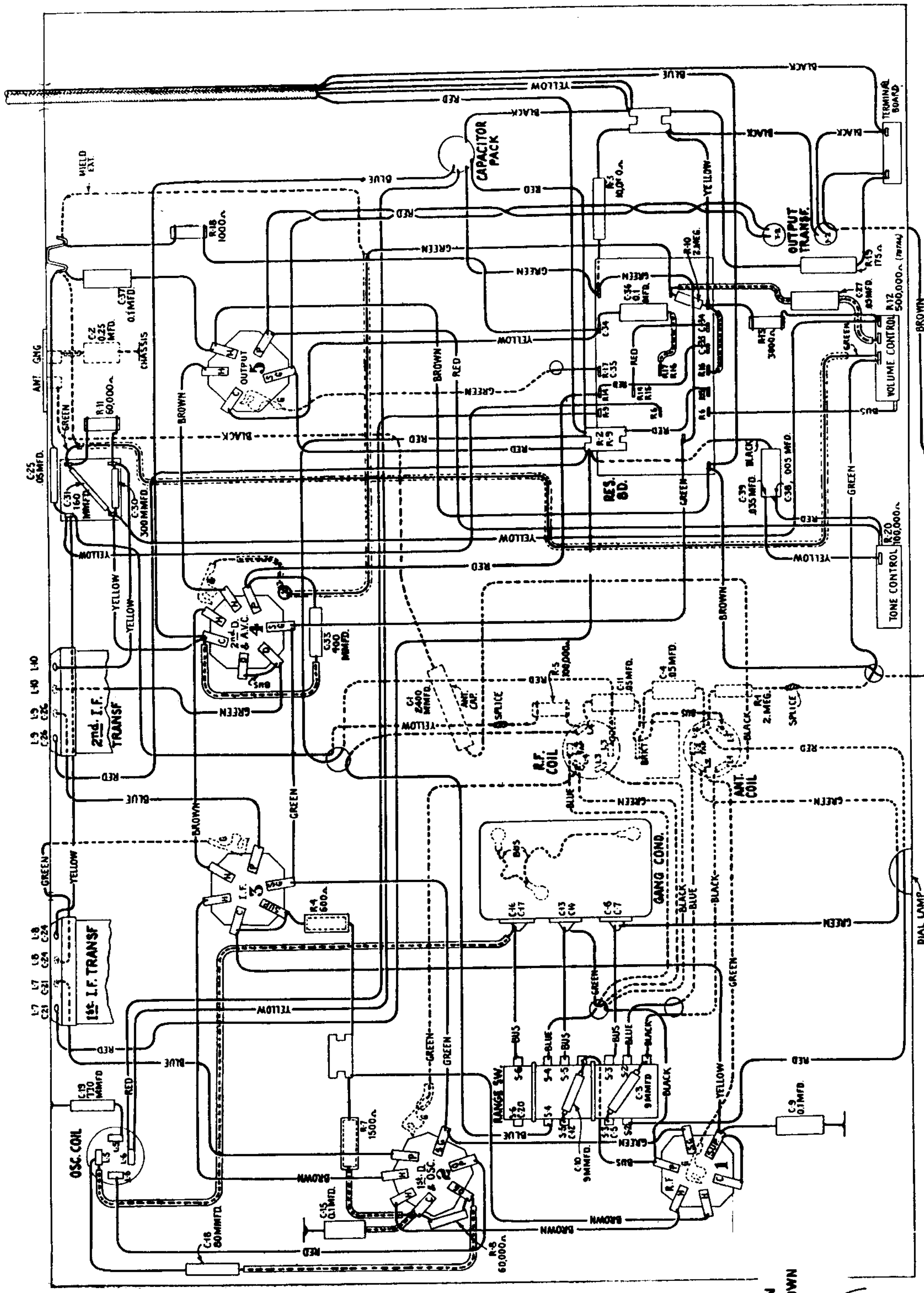


Figure 2—Chassis Wiring Diagram

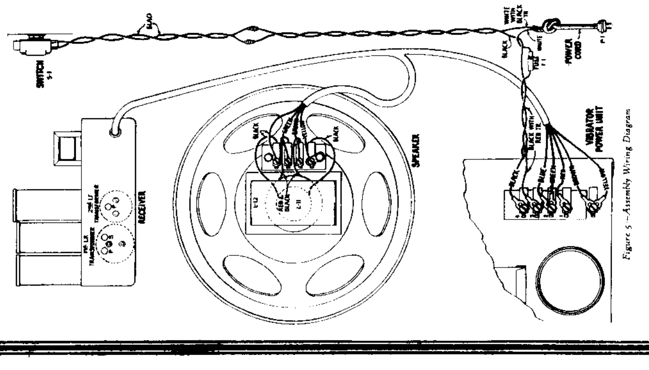
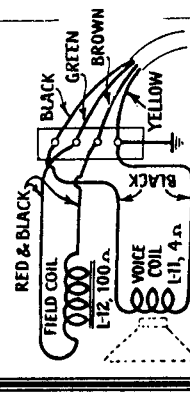


Figure 5—Assembly Wiring Diagram



INTERNAL CONNECTIONS OF SPEAKER

GENERAL ELECTRIC COMPANY

MODEL C-67 32VOLT D.C. SET

GENERAL ELECTRIC MODEL C-67

SERVICE NOTES

Electrical Specifications

Voltage Rating..............26-40 Volts D. C.
Power Consumption.........60 Watts at 32 Volts
Number and Types of Radiotrons.....2 RCA-6D6, 1 RCA-6A7, 1 RCA-6B7, 1 RCA-38, 1 RCA-84 —Total, 6
Type of Ballast Lamp.............Amperite 5-16
Undistorted Output....1.1 Watts (Max. 1.6 Watts)
Tuning Frequency Range.....540 K. C.-1500 K. C. and 1400 K. C.-2800 K. C.

This receiver is a six-tube, 32-volt D. C. superheterodyne designed primarily for operation from 32-volt farm lighting circuits. Excellent sensitivity and selectivity, large undistorted output and excellent tone quality are inherent features of this receiver. Other outstanding features include 10-inch electro-dynamic loudspeaker, wide tuning range (police, aviation and broadcast), ballast lamp for voltage fluctuations, and a separate power supply with a newly designed filter units.

Figure 1 shows the schematic circuit diagram, Figures 2 and 3 the chassis and power unit wiring, and Figure 5 the assembly wiring diagram. The replacement parts are given on page 9.

Description of Circuit

The circuit of this receiver is similar in many ways to the usual six-tube superheterodyne, although the power supply differs in several respects. Chiefly among the differences is the use of a vibrator interrupter for obtaining alternating current and a tube rectifier for rectifying it at a higher voltage.

The R. F. stage uses Radiotron RCA-6D6, which is a six-volt heater type super-control R. F. amplifying tube. The function of this stage is to select and amplify the desired incoming signal and apply it to the first detector.

The next tube is a combined oscillator-detector which is known as the RCA-6A7 and which provides a local signal and a detector for obtaining an I. F. frequency. The local oscillator, due to the bridge circuits used, provides a signal that has a constant frequency difference from the incoming R. F. signal (175 K. C. higher) at all points throughout the tuning range. The detector portion of the tube serves to extract the beat frequency from the combined signals (oscillator and signal) and apply it to the grid of the I. F. stage.

The plate circuit of the first detector and the grid and plate circuits of the I. F. tube are all tuned by means of small adjustable capacitors to 175 K. C. This group of tuned circuits, together with the R. F. circuits, provides the high selectivity of the receiver. Radiotron RCA-6D6 is used in the I. F. stage.

Radiotron RCA-6B7 is used as a diode second detector, automatic volume control and audio amplifier. The D. C. component of the rectified I. F. signal on the second detector diode is used for automatic bias on the R. F., first detector and I. F. tubes. The audio component of the rectified signal is applied to the pentode section of the RCA-6B7 for further amplification at audio frequencies.

The output of the second detector is applied to the grid of Radiotron RCA-38, pentode output amplifier. Resistance coupling is used between the detector and the output tube while a step-down transformer serves as an impedance matching device between the plate circuit of the RCA-38 and the voice coil of the loudspeaker.

Field excitation for the loudspeaker is obtained by connecting it directly across the 32-volt direct current supply. Heater excitation for the tubes described is obtained by connecting them in series and placing the entire circuit across the 32-volt line.

Plate and grid voltages for all tubes are obtained from a special plate supply unit which consists of a vibrator, a tube rectifier, a thermal voltage regulator and a special filter network for reducing hum or vibrator interference to a negligible degree. The purpose of the vibrator is to interrupt the direct current and apply it first in one direction and then in the opposite direction across individual sections of the primary of the power transformer. The transformer steps the voltage up several times and applies it to the plates of the full-wave rectifier, Radiotron RCA-84. The filament of this tube is connected in series with the Amperite 5-16 voltage regulating tube. This regulating tube maintains a constant current through the rectifier filament over a wide variation of line voltages.

The range switch provides a quick means of shifting from one frequency band to the other. The regular band covers from 540 K. C. to 1500 K. C., while the police band covers from 1400 K. C. to 2800 K. C. This shift is accomplished in the following manner.

A tap is provided on the grid coils of the R. F. and first detector circuits. Also additional coupling capacitors are connected from the antenna to the R. F. grid and from the R. F. plate to the first detector grid. In the oscillator, R. F. and detector circuits, an extra trimmer capacitor is available for paralleling to the main tuning condenser. The effect of these various taps and capacitors is to change the tuning range as follows:

1. At the broadcast position all of the additional circuits are open as shown in Figure 1.

2. At the police band position, all of the additional switches are closed. Shorting of turns in the grid coils reduces their inductance so that the tuning capacitors cover the high frequency range. Connecting the two coupling capacitors increases the coupling and thereby the sensitivity at the higher frequency position. The trimmer capacitor on the oscillator circuit provides proper tracking with the R. F. circuits.

Line-up Adjustments

Inoperation, poor tone quality, or lack of proper sensitivity and selectivity are direct results of lack of alignment. In event the receiver is to be aligned, carefully use the following procedure:

I. F. TUNING ADJUSTMENTS—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure 4. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter. Test Oscillator, Stock No. 9050, is suitable and recommended for making these adjustments.

(b) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. AND OSCILLATOR ADJUSTMENTS—The three-gang capacitor screws are accessible at the bottom of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C. (Stock No. 9050), a non-metallic screwdriver such as Stock No. 4160, and an output meter.

(b) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position. Also the minimum input signal necessary from the oscillator will permit a more accurate adjustment.

TUBE SOCKET VOLTAGES

32-Volt D.C. Input — No Signal — Volume Control at Minimum

Radiotron No.	Cathode to Ground, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A	Heater Volts
RCA-6D6 R. F.	8.4	77	216	4.2	6.2
RCA-6A7—Osc. Det.	9.7	76	215	6.5	6.2
RCA-6D6 I. F.	8.4	77	216	4.2	6.2
RCA-6B7—2nd Det.	5.7	80	52	1.9	6.2
RCA-38 Pwr.	19.5	205	197	21.5	6.2
RCA-84 Rect.	244			50	6.5–7.0*

*Varies with ballast tubes and with time.

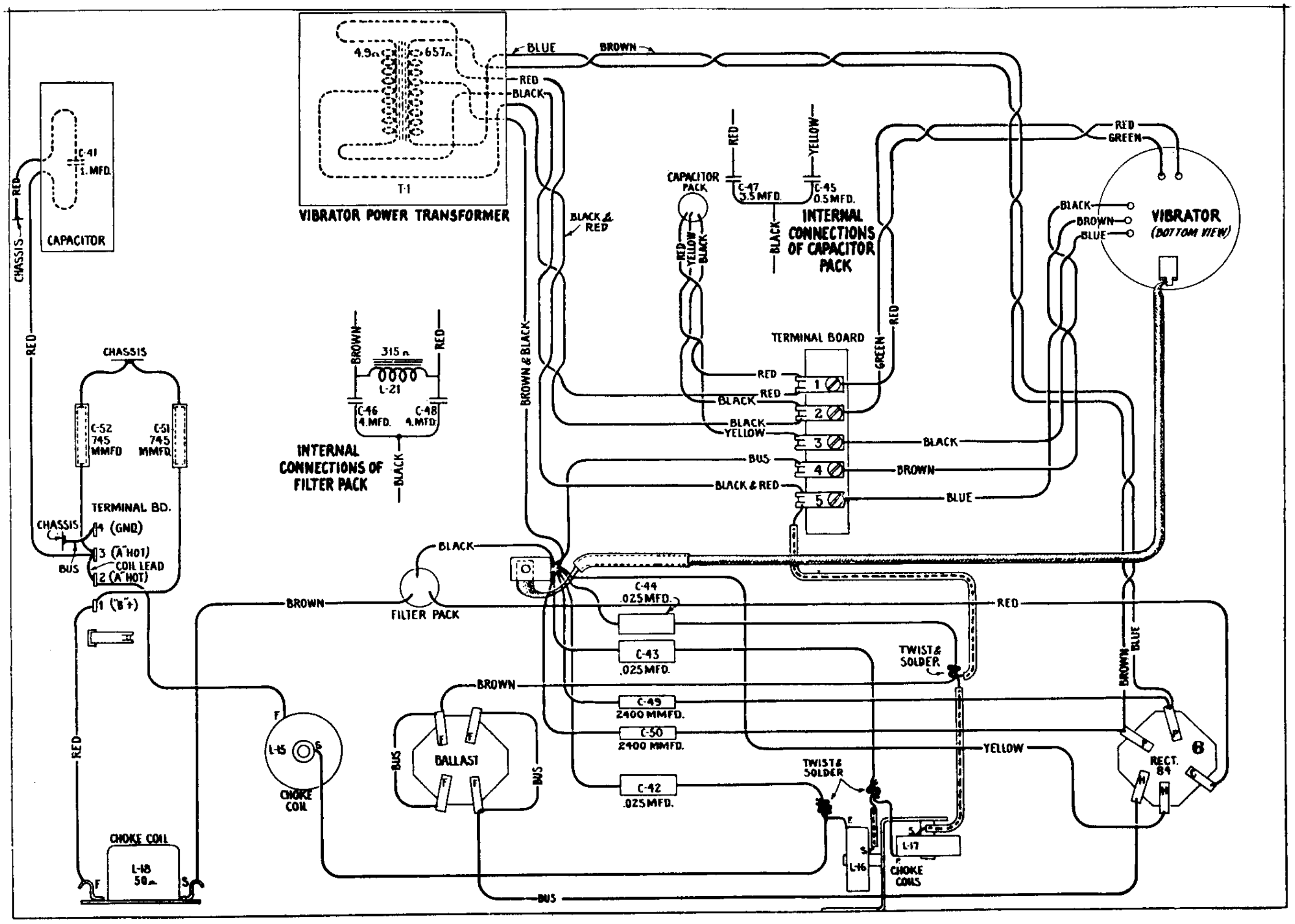


Figure 3—Power Unit Wiring Diagram

GENERAL ELECTRIC COMPANY
MODEL E51

SERVICE DATA

Physical Specifications

Model E-51
Height . . . . 9 1/16 in.
Width . . . . 14 3/4 in.
Depth . . . . 7 7/16 in.
Weight Packed . . . . 17 lb.

Electrical Specifications

Power Supply—Volts	Frequency Cycles on A.C.	Power Watts
115 A.C. or D.C.	50-60	45

Tuning Frequency Range

Broadcast . . . . 540–1720 kc.
Short-wave . . . . 2.2–7.0 mc.
Tuning Control Drive Ratio: 8:1

Electrical Power Output

Undistorted . . . . 0.3 watts
Maximum . . . . 0.7 watts

Loud-speaker—Electrodynamic

Cone: 6 1/2-in. type.
Cone Coil Impedance 3.3 ohms at 400 cycles.

Tubes

Oscillator and Converter . . 6A8 Pentagrid Converter
I.F. Amplifier . . . . 6K7 Triple-Grid Super-Control Amplifier.
Detector, AVC and First Audio Amplifier . . . . 6Q7 Duo-Diode High-mu Triode.
Audio Power Amplifier . . . 25A6 Power Amplifier Pentode.
Rectifier . . . . 25Z6 Rectifier.
Dial Lamp . . . . MAZDA No. 46.

DESCRIPTION OF ELECTRICAL CIRCUIT

The signal from the antenna is applied to the control grid of the 6A8 tube through the R.F. transformer, the secondary of which is tuned to the incoming signal by the rear section of the main tuning condenser. In the 6A8 tube the incoming signal is combined with the local oscillator signal which is 465 kc. higher in frequency. The local signal is generated by the oscillator section of this tube, and the proper frequency difference is maintained throughout the tuning range by the front section of the tuning condenser in conjunction with the oscillator coils and padding capacitors.

The combination of the two signals produces the intermediate frequency of 465 kc. This particular frequency is chosen to reduce image response and improve short-wave performance. The intermediate frequency amplifier consists of a 6K7 tube and two transformers, both of which have tuned primaries and secondaries.

The output of the I.F. amplifier is rectified by the diode section of the 6Q7 tube, providing automatic volume control bias as well as detection. The audio frequency voltage developed across R-7 is applied through TC-18 to the grid of the triode section of this tube from the variable arm of R-7, which constitutes the volume control of the receiver. The D.C. voltage developed across R-7 is applied to the control grids of the 6A8 and 6K7 tubes for automatic volume control.

The output of the 6Q7 amplifier section is resistance coupled to the grid of the 25A6 power amplifier pentode. The plate circuit of the 25A6 is suitably matched to the loud-speaker by means of a step-down output transformer.

The tone control circuit consists of a .006-mfd. capacitor which is connected from the grid of the 25A6 tube to ground through the tone control switch. When it is desired to reduce the high frequency output of the receiver the tone control switch is closed by turning the tone control knob to the left.

When the receiver is used on alternating current, plate and grid voltages and loud-speaker field current are supplied by a 25Z6 rectifier tube and its associated filter circuits. Each section of the 25Z6 tube acts as a separate half-wave rectifier, one for speaker field current, and the other for plate and grid voltages, each section having its own filter circuit.

When the receiver is used on a D.C. supply the *25Z6 rectifier tube remains in the circuit and serves two purposes. If the power cord should be plugged in with incorrect polarity, the 25Z6 tube protects the filter condensers from damage. On correct D.C. polarity the 25Z6 tube aids the filter circuits in smoothing the supply, thus minimizing line noise.

The heaters of all tubes and the dial light with its shunt ballast resistor (the 30-ohm section of WR-12 and R-10) are all in series and are furnished current from the power line through a dropping resistor (the 150-ohm section of WR-12).

Note that the chassis is not connected directly to either the ground lead or to the power supply, but is by-passed to the "B-" lead capacitor TC-20.

ALIGNMENT PROCEDURE

Before making any adjustments to the R.F. circuits, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal from the test oscillator to the receiver and inserting a "tuning wand" into the antenna coil. The "tuning wand" consists of a bakelite rod having a brass cylinder attached to one end, and a small core of finely divided iron compacted into the opposite end. By inserting the brass cylinder end into the antenna coil, the inductance is lowered, increasing its resonant frequency. Inserting the iron-filled end into the coil raises its inductance, lowering its resonant frequency. If the circuits are in exact alignment, inserting either end of the tuning wand in the coil will result in a decrease in output. When an increase in signal is obtained with the iron-filled end of the wand at the 1500-kc. point, a decrease in resonant frequency of that circuit by increasing the antenna trimmer capacity is indicated. When an increase in signal is obtained with the brass cylinder, a decrease in antenna trimmer capacity is indicated. In the event that the brass cylinder end causes an increase in output at the 580-kc. point when inserted in the antenna coil, it is necessary to increase the oscillator padder capacity, meanwhile rocking the tuning dial. An increase in output, resulting from inserting the iron-filled end, indicates a decrease in oscillator padder capacity.

ALIGNMENT FREQUENCIES

I.F.	Broadcast	Short-wave
465 kc.	580 kc.	None
	1500 kc.	

In order to properly align this receiver, it will be necessary to have the following service tools

1. Test Oscillator capable of producing the above alignment frequencies.
2. Non-metallic alignment screwdriver.
3. Output meter.

Trimmer locations as well as socket voltages are illustrated in Fig. 3.

(1) *I.F. Alignment*

The I.F. amplifier should be tuned to 465 kc.; set the test oscillator dial at this frequency. Turn the volume control to maximum and short-circuit the antenna and ground leads. Tune the receiver to a point where no signal comes in.

Connect the test oscillator output between the 6A8 converter tube grid (with the grid cap on) and the chassis. Connect the output meter across the cone coil of the speaker and adjust the oscillator output until a small deflection is observed in the output meter.

The four I.F. trimmers are adjusted in the following sequence:

1. Secondary trimmer on second I.F. transformer.
2. Primary trimmer on second I.F. transformer.
3. Secondary trimmer on first I.F. transformer.
4. Primary trimmer on first I.F. transformer.

Throughout all adjustments the output should be maintained at a low level by decreasing the test oscillator output as the various stages are brought in line. After these adjustments have been made, the same procedure should be repeated as a final check. The I.F. alignment will then be complete.

(2) *R.F. Alignment*

The R.F. and oscillator transformers are aligned at 580 and 1500 kc. With the tuning condenser plates fully meshed, line up the pointer and dial by adjusting the dial drive drum set screws so that the line at the extreme right-hand end of the dial is indicated.

(a) *Broadcast Band*

With the band switch in the clockwise position, set the tuning dial to 1500 kc. Set the test oscillator at 1500 kc. and adjust the oscillator trimmer for maximum output. Next, adjust the R.F. trimmer for maximum output, taking care that the output from the test oscillator is not high enough to overload any part of the set. After these adjustments, tune the set and the test oscillator to 580 kc. Adjust the broadcast padding capacitor for maximum output while rocking the tuning condenser back and forth until maximum output is obtained. The dial setting after this adjustment may not agree exactly with the frequency, but this is not important.

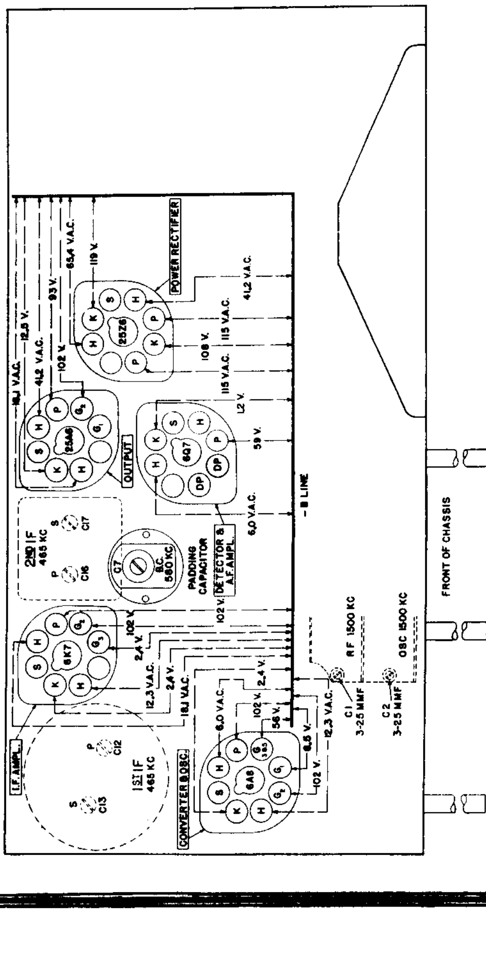
To complete the broadcast band line-up, repeat the adjustment at 1500 kc. as before.

(b) *Short-wave—22-7.0 M.C. (2200-7000 kc)*

No separate short-wave trimmers are provided on this receiver. The correct adjustment of the broadcast band automatically aligns the short-wave band.

Stock No.	Description	List Price
	RECEIVER ASSEMBLY	
*RB-002	BOARD—Terminal Board (Chassis Deck)	$0.15
*RB-021	BOARD—Terminal Board (Chassis side wall)	.10
*RB-023	BOARD—Terminal Board (Rear Chassis Wall)	.10
RB-150	BRACKET—Dial Light Bracket and Scale Support	.25
*RC-030	CAPACITOR—.006 mfd., 400 V Paper (TC-8)	.25
*RC-037	CAPACITOR—.01 mfd., 250 V A.C. (TC-26) (Pkg. of 5)	.75
*RC-040	CAPACITOR—.01 mfd., 400 V Paper (TC-27)	.25
*RC-058	CAPACITOR—.03 mfd., 200 V Paper (TC-18, TC-24)	.25
*RC-072	CAPACITOR—.05 mfd., 200 V Paper (TC-10)	.25
*RC-096	CAPACITOR—.1 mfd., 200 V Paper (TC-19)	.30
*RC-110	CAPACITOR—.15 mfd., 200 V Paper (TC-11)	.30
*RC-150	CAPACITOR—.25 mfd., 200 V Paper (TC-20)	.30
RC-235	CAPACITOR—100 mmfd., Mica (MC-5)	.25
*RC-258	CAPACITOR—250 mmfd., Mica (MC-22, MC-23)	.25
*RC-348	CAPACITOR—1600 mmfd., Mica (MC-9)	.35
RC-565	CAPACITOR—25 mfd., 150 V; 10 mfd., 25 V, Dry Electrolytic (EC-28, EC-21)	1.30
RC-566	CAPACITOR—16 mfd., 150 V; 7 mfd., 150 V Dry Electrolytic (EC-29, EC-25)	1.20
RC-608	CAPACITOR—Oscillator Padder, 300-500 mmfd. (C-7)	.45
RC-713	CONDENSER—Two-gang Tuning Condenser (C-3, C-4)	3.00
RC-815	CABLE—Dial Cable (Pkg. of 5)	.50
RC-822	CABLE—Speaker Cable and Female Plug	.50
RC-860	CORD—Power Cord and Plug	.65
RD-030	DRUM—Dial Drive Drum	.40
RD-041	DIAL—Dial Scale	.25
RD-042	DRIVE—Condenser Drive Shaft	.80
*RG-001	GRID CAP—Control Grid Cap (Pkg. of 5)	.10
*RK-004	KNOB—Control Knob (Push-on) (Pkg. of 5)	.40
RK-008	KNOB—Knob for use with Red Cabinet	.10
RK-009	KNOB—Knob for use with Black or Ivory Cabinet	.10
RL-023	COIL—Antenna Coil (L-2, L-3, L-4)	1.10
*RL-221	COIL—Oscillator Coil (L-5, L-6, L-7, L-8)	.90
RL-302	REACTOR—Filter Reactor (L-15)	1.35
RP-041	POINTER—Dial Pointer and Guide	.10
RP-042	PULLEY—Dial Pulley (Pkg. of 2)	.25
RP-061	PLATE—Asbestos Plate (Under Chassis)	$0.15
*RQ-039 (RR-005)	RESISTOR—150 ohm, 1/4 watt Carbon (R-2) (Pkg. of 5)	.60
RQ-041	RESISTOR—180 ohm, 1/4 watt Carbon (R-6) (Pkg. of 5)	.60
*RQ-083 (RR-021)	RESISTOR—10,000 ohm, 1/4 watt Carbon (R-5) (Pkg. of 5)	.60
*RQ-107 (RR-049)	RESISTOR—100,000 ohm, 1/4 watt Carbon (R-1) Late Production (Pkg. of 5)	.70
*RQ-111 (RR-054)	RESISTOR—150,000 ohm, 1/4 watt Carbon (R-9) [(R-1) Early Production] (Pkg. of 5)	.70
RQ-123	RESISTOR—470,000 ohm, 1/4 watt Carbon (R-11) (Pkg. of 5)	.70
*RQ-131 (RR-067)	RESISTOR—1 meg., 1/4 watt Carbon (R-3, R-8) (Pkg. of 5)	.70
RQ-254	RESISTOR—620 ohm, 1/2 watt Carbon (R-14) (Pkg. of 5)	.70
RQ-279	RESISTOR—6800 ohm, 1/2 watt Carbon (R-4) (Pkg. of 5)	.70
RQ-427	RESISTOR—47 ohm, 1 watt Carbon (R-10) (Pkg. of 5)	.70
RR-714	RESISTOR—Candohm Tapped Bleeder Resistor (WR-12)	.65
RR-904	REFLECTOR—Dial Light Reflector	.15
*RS-200	SOCKET—8 Pin Tube Socket (Pkg. of 5)	.75
RS-210	SOCKET—Dial Light Socket	.30
*RS-314	SWITCH—Band Switch (S-1, S-2, S-3, S-4, S-5)	.80
RS-331	SWITCH—Tone Control Switch ~~(S-6)~~	.30
RS-415	SPRING—Spring Bracket Supporting Cable Pulley (Pkg. of 2)	.10
RT-214	TRANSFORMER—2nd I.F. Transformer Assembled (L-11, L-12)	1.50
RT-219	TRANSFORMER—1st I.F. Transformer Assembled (L-9, L-10)	1.50
RT-419	TRANSFORMER—Output Transformer (T-1)	1.45
RV-018	VOLUME CONTROL—Volume Control and Power Switch (R-7, S-7)	.90
RW-004	WINDOW—Dial Window	.15
*RW-101	WASHER—Felt Washers for Control Shafts (Pkg. of 10)	.45
RX-018	SCREW ASSEMBLY—Chassis Mounting Screw Assembly	.15
	SPEAKER ASSEMBLY	
RC-914	CONE—6 1/2-in. Cone and Voice Coil (L-13)	$0.85
RP-059	PLUG—Male Speaker Plug	.20
RP-060	PLUG—Female Speaker Plug	.20
RS-039	SPEAKER—6 1/2-in. Type Speaker (L-13, L-14, L-16)	5.50

*Indicates part also used on 1936 "A" line of receivers.



VIEWED FROM UNDERSIDE OF CHASSIS

Fig. 3. Trimmer Locations and Socket Voltages (115 V., 60 Cycle, AC Supply)

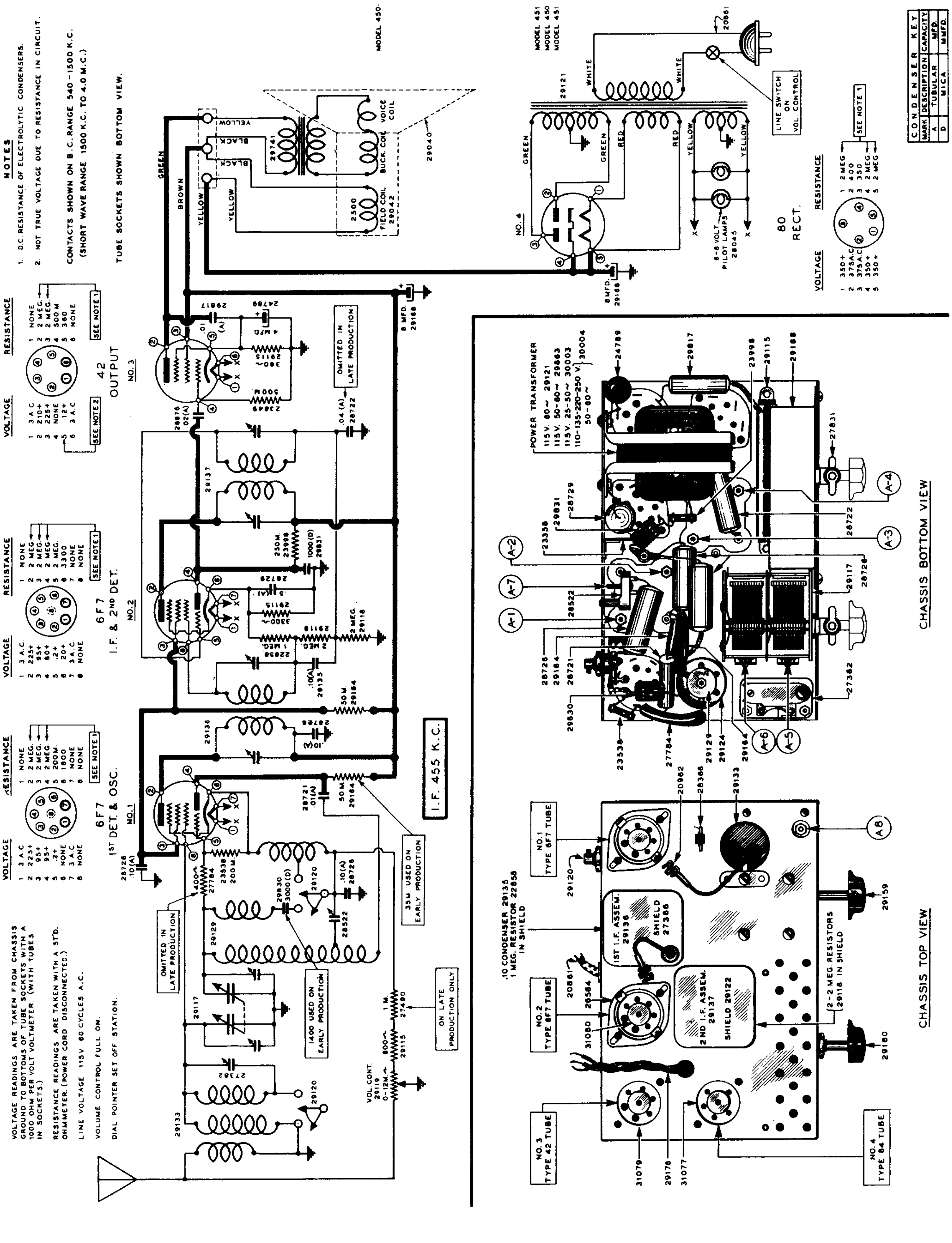
SOCKET VOLTAGES

Power Supply	Cathode to "-B" Volts D.C.		Screen Grid to "-B" Volts D.C.		Plate to "-B" Volts D.C.		Plate Current M.A.-D.C.		Heater Volts	
	AC	DC	AC	DC	AC	DC	AC	DC	AC	DC
6A8 Converter	2.4	2.2	56	51	102	92	1.1	.9	6.3	6.3
Oscillator					102	92	.9	.8		
6K7 I.F. Amplifier	2.4	2.2	102	92	102	92	9.1	7.8	5.8	5.8
6Q7 Detector and A.F. Amplifier	1.2	1.1			59	51	.2	.19	6.0	6.0
25A6 Pur. Amp.	12.5	10.5	102	92	93	84	17.2	15.6	23.1	23.1
25Z6 Rectifier "+B"	119	108			(15-A.C.)	115	42.8	37.2	24.2	24.2
Spkr. Field	108	106				115	45.6	45.6		

Measured at 115 volts 60 cycles or 115 volts D.C. supply. Dial 1000 kc. No signal input. Voltmeter 1000 ohms per volt; measurements taken on highest scale giving accurate readable deflection.

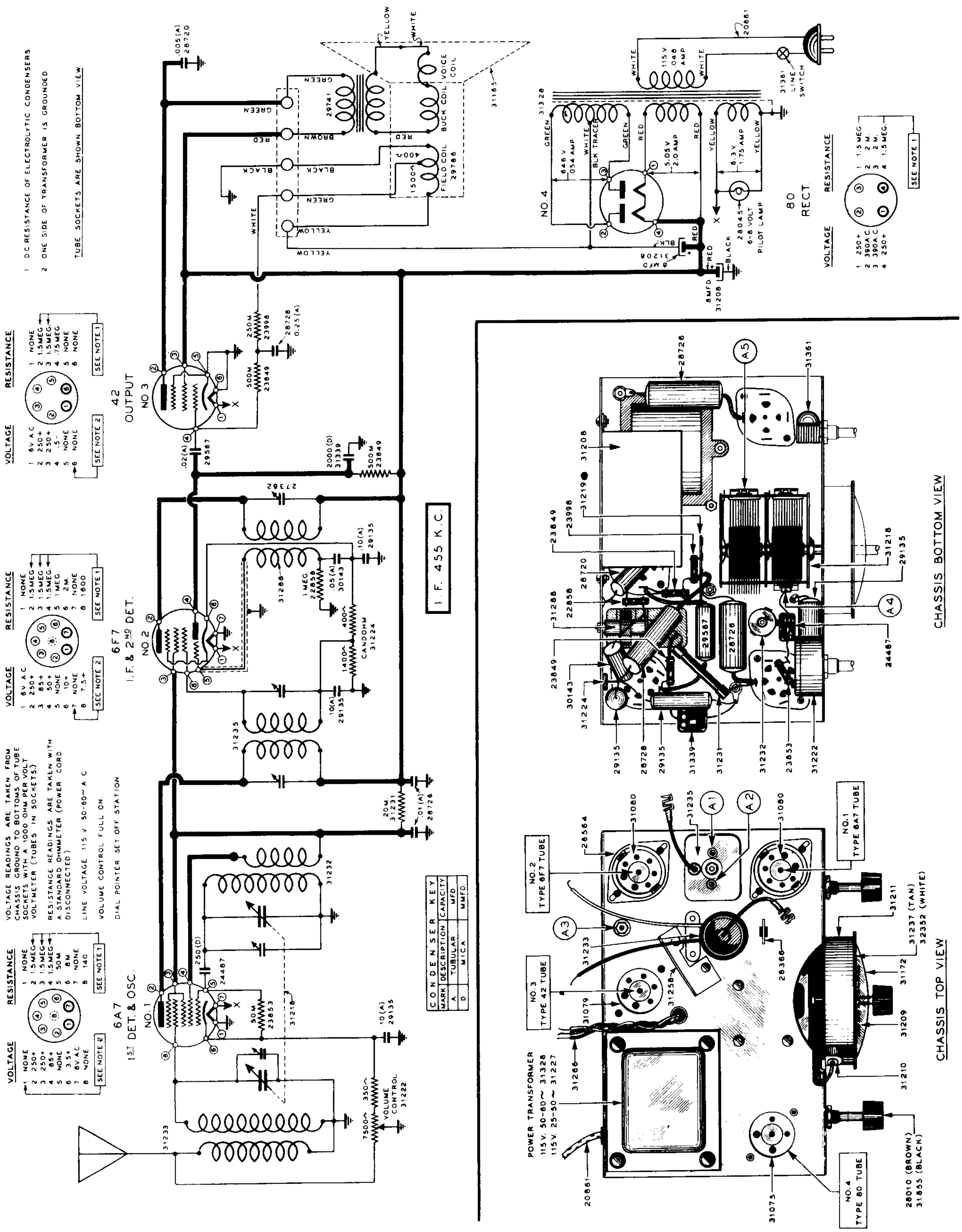
GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 450 & 451 CHASSIS 4A



GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 460 & 461 CHASSIS 4B & 4BX
460X & 461X



GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 450 & 451 CHASSIS 4A

Grunow Radio

Chassis Type 4A
Receiver Models 450 and 451
Speaker Type 8B1

GENERAL HOUSEHOLD UTILITIES COMPANY
31554-2 CHICAGO, U. S. A.

INTRODUCTION

The following characteristics apply to the GRUNOW Radio—Chassis 4A:

This model is a 4 tube Super-Heterodyne Dual Wave (540 to 1500 KC and 1500 to 4000 KC) Receiver using 1-6F7 tube as 1st Detector and Oscillator, 1-6F7 tube as an I.F. Amplifier, and audio Amplifier. The 42 output tube is a power amplifier pentode and is capable of producing large power output with a relatively small signal input. The rectifier tube is an 80, the output of which is well filtered through the action of the speaker field and the two 8 mfd. electrolytic condensers.

The tuning range is divided into two bands or divisions, one covering the band of 540 to 1500 K.C. and the other 1500 to 4000 K.C. In both bands the following three variable circuits are used: R.F. input, detector or mixer input and oscillator. These circuits are tuned by a 2-gang variable condenser of rugged construction.

The remainder of the circuit is typical and has been designed along lines of what is considered the best engineering practice to date. Parts are all oversize and of the finest quality.

SERVICE DATA

CONTINUITY AND VOLTAGE

Continuity and voltage readings should be taken from the underside of the chassis. The values given on the schematic diagram are average and allow the service man to make a quick check of the chassis constants. The socket layouts given on the schematic diagram show each socket from the underside.

ALIGNMENT PROCEDURE CHASSIS 4A

1. EQUIPMENT.

A—Test Oscillator.

A modulated oscillator capable of producing signals at 262 K.C., 455 K.C., 1400 K.C., 3700 K.C., is necessary.

B—Output Meter.

This may be any of the standard output meters on the market but should be sufficiently sensitive to provide a good deflection at low signal strength, it should also incorporate an adjustable shunt so that extremely strong signals may be read.

C—Coupling Means.

Coupling condensers of .25 Mfd. and 200 Mmf. should be used when coupling oscillator to receiver during alignment as specified in following paragraphs.

2. DIAL SETTING.

Turn dial pointer so that end mark of dial is directly under pointer with variable condenser fully meshed.

It will be necessary to simulate the dial plate during alignment when Chassis is removed from cabinet.

3. I.F. ALIGNMENT.

A—Connect signal lead of oscillator through .25 Mfd. condenser to grid of 6F7 (1st Detector Tube) located on rear right hand corner of Chassis as you face same. Connect the ground lead to the Chassis.

B—Place oscillator in operation at 455 K.C. and turn receiver volume control to maximum. (Volume Control should remain at maximum during entire alignment procedure and signal should be attenuated at oscillator to lowest value consistent with obtaining a readable indication on output meter.

C—Align four I.F. trimmers (A1, A2, A3, A4) located on under side of Chassis at base of I.F. Coils.

4. 1400 K.C. ALIGNMENT.

A—Connect signal lead of oscillator to antenna lead (the blue wire leading from rear of Chassis) through 200 Mmf. Condenser.

B—Set Dial at 1400 K.C. and place oscillator in operation at 1400 K.C. Throw range switch on rear of Chassis to broadcast position.

C—Align oscillator trimmer (A5), which is the first of the two on the variable condenser as you face Chassis.

D—Align Antenna Trimmer (A6), which is the second trimmer on variable condenser as you face Chassis.

5. 600 K.C. ALIGNMENT.

A—Place oscillator in operation at 600 K.C.

B—Tune in signal to maximum (this point does not have to be exactly at the 600 K.C. dial setting).

C—Adjust the 600 K.C. trimmer (A7—located on rear face of Chassis and covered with a seal) in direction of signal increase and at the same time rock the tuning condenser back and forth through resonance. Continue this procedure until maximum signal is obtained on the output meter.

D—This should be performed with great care so that the alignment is the best that can be obtained, otherwise the selectivity of the set will suffer.

E—Recheck adjustment on 1400 K.C. antenna trimmer.

6. 3700 K.C. ALIGNMENT.

A—Throw Range Switch to S.W. position.

B—Set oscillator in operation at 3700 K.C.

C—Turn Dial pointer to 3700 K.C. or 3.7 M.C.

D—Adjust 3700 K.C. Trimmer (A8) located on top of Chassis near variable condenser.

7. Recheck Dial Calibration and 1400 K.C. Alignment.

MODELS 460-461-460X-461X CHASSIS 4B & 4BX

Grunow Radio

Chassis Type 4B	Chassis Type 4BX
Receiver Models 460 and 461	Receiver Models 460X and 461X
Speaker Type 8B3	Speaker Type 8B3

GENERAL HOUSEHOLD UTILITIES COMPANY
31555-2 CHICAGO, U. S. A.

INTRODUCTION

The following characteristics apply to the GRUNOW Radio—Chassis 4B:

This model is a 4 tube Super-Heterodyne Broadcast (540 to 1500 K.C.) Receiver using 1-6A7 tube as a 1st Detector and Oscillator, 1-6F7 tube as an I.F. Amplifier, 2nd Detector and audio Amplifier. The 42 output tube is a power amplifier pentode and is capable of producing large power output with a relatively small signal input. The rectifier tube is an 80, the output of which is well filtered through the action of the speaker field and the two 8 mfd. electrolytic condensers.

The following three variable circuits are used: R.F. input, detector or mixer input and oscillator. These circuits are tuned by a 2 gang variable condenser of rugged construction.

The remainder of the circuit is typical and has been designed along lines of what is considered the best engineering practice to date. Parts are all oversize and of the finest quality.

SERVICE DATA

CONTINUITY AND VOLTAGE

Continuity and voltage readings should be taken from the underside of the chassis. The values given on the schematic diagram are average and allow the service man to make a quick check of the chassis constants. The socket layouts given on the schematic diagram show each socket from the underside.

ALIGNMENT PROCEDURE CHASSIS 4B

1. EQUIPMENT.

A—Test Oscillator.

A modulated oscillator capable of producing signals at 455 K.C., 600 K.C., 1400 K.C. and 1700 K.C. is necessary for alignment of the 4B Grunow Receivers.

B—Output Meter.

This may be any of the standard output meters on the market but should be sufficiently sensitive to provide a good deflection at low signal strength, it should also incorporate an adjustable shunt so that extremely strong signals may be read.

C—Coupling Means.

Coupling condensers of .25 Mfd. and 200 Mmf. should be used when coupling oscillator to receiver during alignment as specified in following paragraphs.

2. DIAL SETTING.

Turn dial pointer until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

3. I.F. ALIGNMENT.

A—Connect signal lead of oscillator through .25 Mfd. condenser to grid of 6A7 (1st Detector Tube) located on front right hand corner of Chassis. Connect the ground lead to the Chassis.

B—Place oscillator in operation at 455 K.C. and turn receiver volume control to maximum. (Volume Control should remain at maximum during entire alignment procedure and signal should be attenuated at oscillator to lowest value consistent with obtaining a readable indication on output meter.)

C—Align three I.F. trimmers (A1—A2—A3) located on top of Chassis. Two on top of 1st I.F. Can and 1 on Chassis between 42 and 6F7 tube.

4. 1700 K.C. ALIGNMENT.

A—Connect signal lead of oscillator to antenna lead (the blue wire leading from rear of chassis) through 200 Mmf. Condenser.

B—Set dial pointer at 1700 K.C. and place oscillator in operation at 1700 K.C.

C—Align oscillator trimmer (A4) which is the first of the two on the variable condenser.

5. 1400 K.C. ALIGNMEINT.

A—Place oscillator in operation at 1400 K.C.

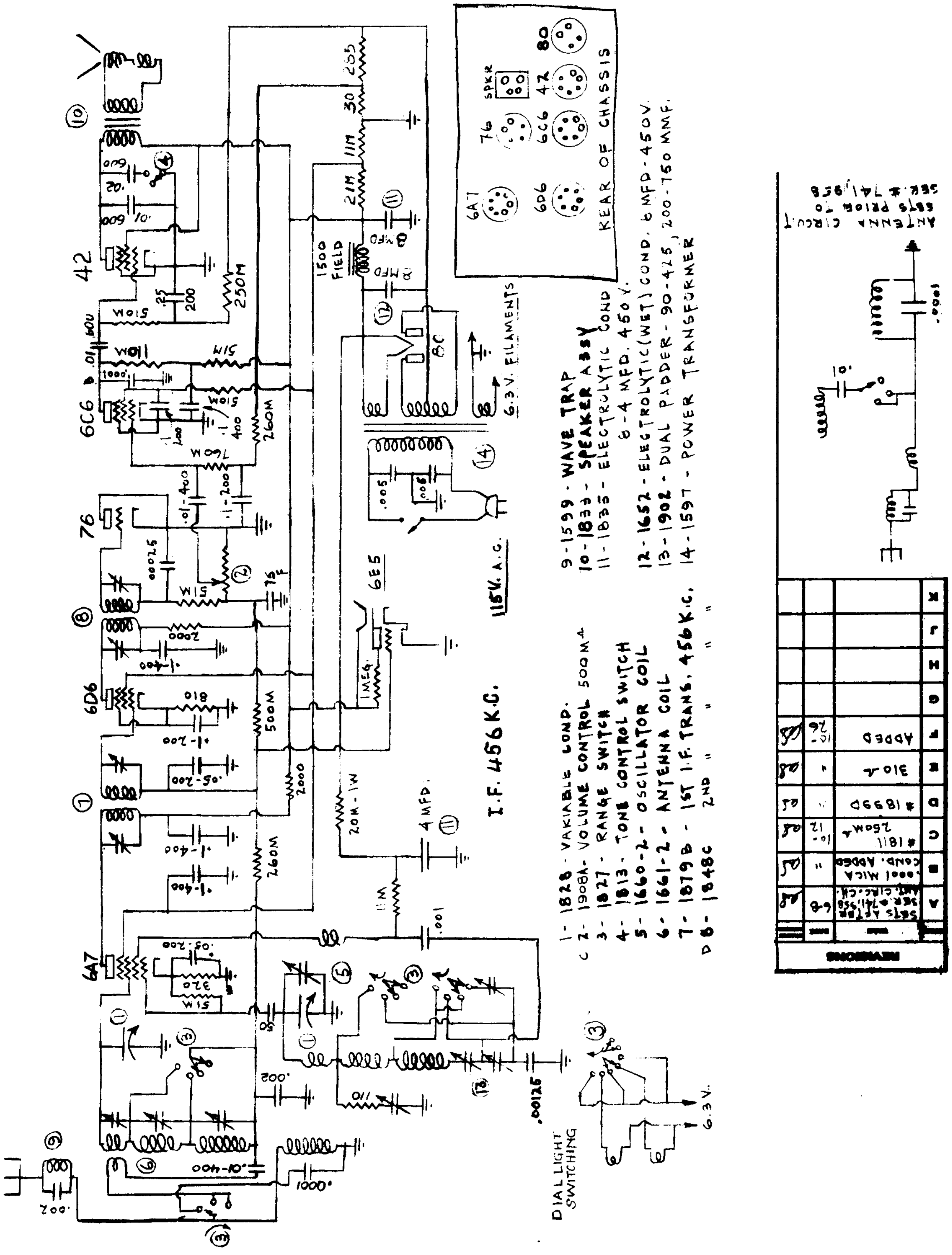
B—Set dial pointer at 1400 K.C.

C—Align antenna trimmer (A5). This operation may require rocking the variable condenser back and forth through resonance.

The object of this operation is to be sure that the receiver will reach 1712 K.C. and at the same time have maximum sensitivity on the rest of the broadcast band.

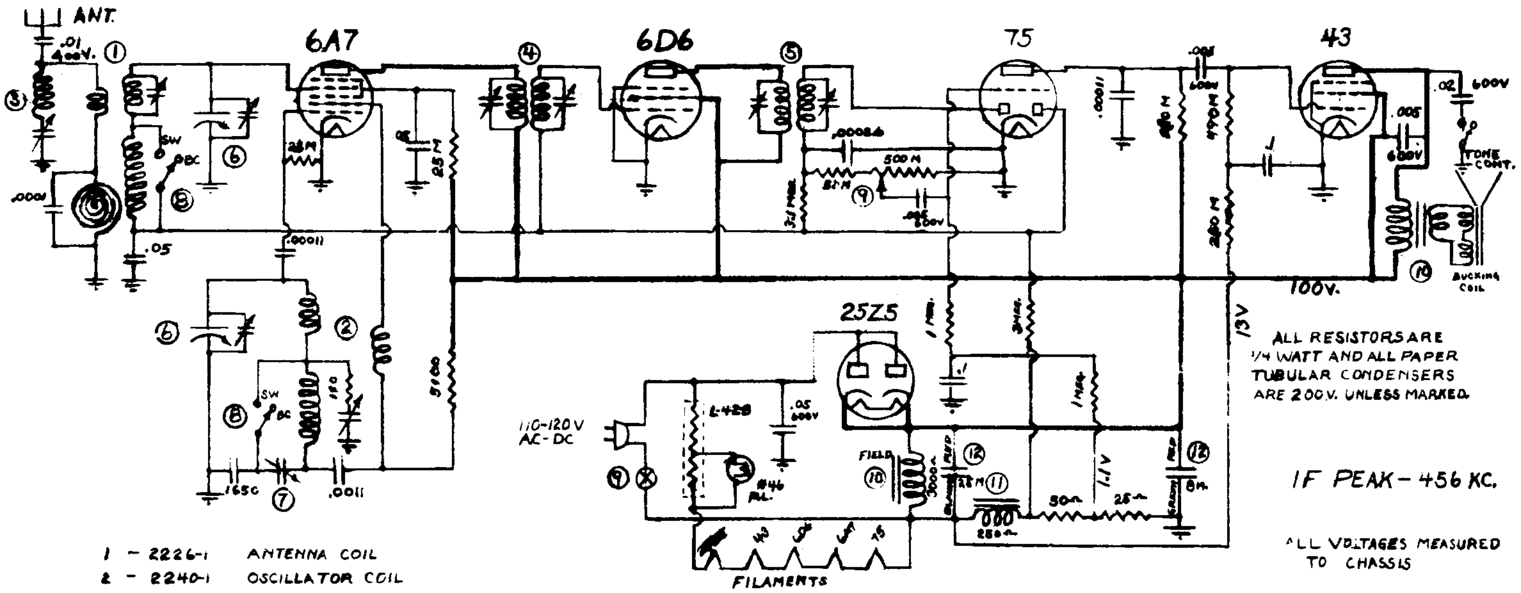
HALSON RADIO MFG. COMPANY

MODEL 6L6



HALSON RADIO MFG. COMPANY

MODEL 25



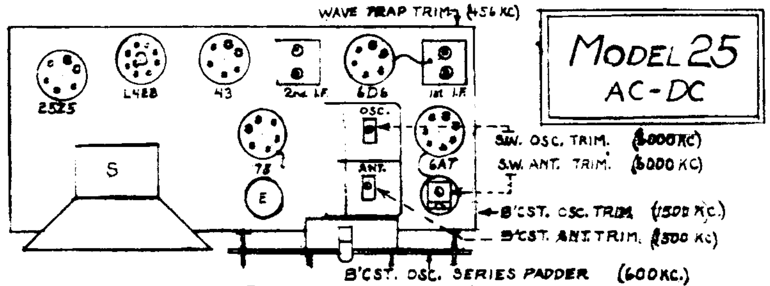
ALL RESISTORS ARE 1/4 WATT AND ALL PAPER TUBULAR CONDENSERS ARE 200V. UNLESS MARKED.

IF PEAK - 456 KC.

ALL VOLTAGES MEASURED TO CHASSIS

1	2226-1	ANTENNA COIL
2	2240-1	OSCILLATOR COIL
3	1981-1	WAVE TRAP - 456 KC.
4	1900 F	1ST. I.F. TRANSFORMER - 456KC.
5	1848 K	2ND I.F. TRANSFORMER - 456KC.
6	2248	2-GANG VARIABLE CONDENSER
7	1621	PADDER CONDENSER
8	2254	RANGE SWITCH
9	1908 D	VOLUME CONTROL - SWITCH (500M-Ω)
10	2287	SPEAKER ASSEMBLY
11	1976 B	FILTER CHOKE
12	2263	ELECTROLYTIC COND. 25-8 MFDS. 150V
13	1903-1	TONE CONTROL

FOR 135, 150, 220, 250, VOLT OPERATION USE BALLAST TUBE NO. L42BX



TUBE LAYOUT AND TRIMMER LOCATION

ALIGNMENT PROCEDURE

1) Set service oscillator to 456 kilocycles and connect the output lead to the top grid of the 6A7. Adjust the intermediate frequency trimmers for maximum response.

2) Connect oscillator set at 456 kc. to the antenna lead through a .0002 mfd. condenser band switch in the broadcast position, and adjust the wave trap trimmer for minimum signal.

3) Set the oscillator for 6 megacycles (6000 kc.), band switch in the short wave position, dial pointer set for 6 mc. calibration and adjust the short wave oscillator trimmer until the signal is heard.

4) Turn the band switch to the broadcast band, set the dial to 1500 kc. calibration. Feed a 1500 kc. signal from the test oscillator through the antenna, and adjust the broadcast osc. trimmer until the signal is heard, then adjust the broadcast ant. trimmer for maximum response.

5) Set the test oscillator to 600 kc. and adjust the broadcast osc. series padder for maximum response by simultaneously adjusting the padder and rocking the tuning dial.

6) Repeat procedure numbers 4 and 5 for greater accuracy.

7) Turn the set to the S. W. band, set the test oscillator to 6000 kc., tune in the signal with the set and adjust the S. W. antenna trimmer for maximum response.

LINE VOLTAGE 110 to 120 Volts, A C or D C, Alternating or direct current.

TUNING RANGES Broadcast and State Police Band - 545 Kilocycles (540 Meters) to 1750 Kilocycles (170 Meters).
Short Wave, Municipal Police, Aviation, Amateur and Foreign Broadcast Band - 2.3 Megacycles (130 M.) to 7.5 Megacycles (40 M)

OPERATION

VOLUME CONTROL AND SWITCH - Turn clockwise to turn on the receiver, and adjust the volume to the desired level. To turn the set off, turn to the extreme left, (counterclockwise) until you hear the switch snap off.

STATION SELECTOR - This knob operates the dial. The dial is calibrated in kilocycles for the broadcast band on the top half, and the lower portion is calibrated in megacycles for the short wave band.

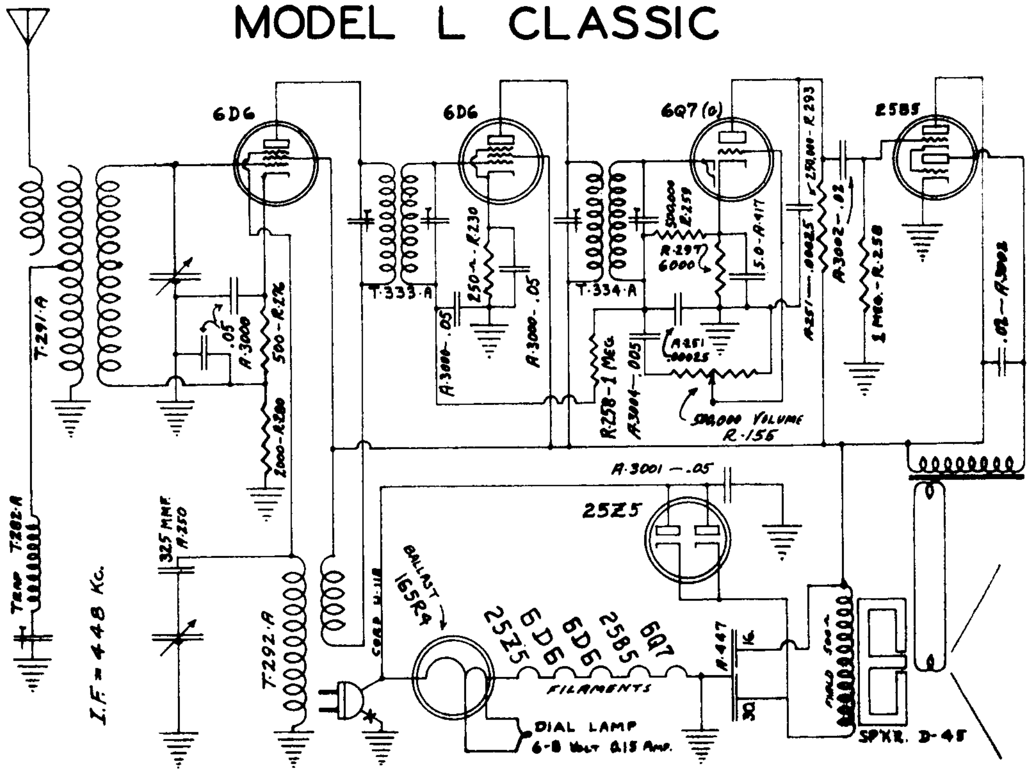
BAND SELECTOR - For broadcast reception, turn this knob to the left (counter-clockwise) and for short wave reception turn to the right.

TONE CONTROL - To adjust the set for bass tones turn to the right, treble to the left.

MINOR REASONS FOR FAILURE TO FUNCTION - Defective tubes, grid caps off, volume control not fully turned on, line plug reversed on D C, tubes not in their proper sockets, shorted aerial, defective plug, or wiring loose in socket.

INTERNATIONAL RADIO CORP.

MODEL L CLASSIC



ESSENTIAL DATA: The intermediate frequency employed is 448 Kc.

The standard type of output meter should be used to indicate signal strength. It should be connected from the output plate of the 25B5 tube to ground.

Poor sensitivity may be an indication of incorrectly adjusted I.F. trimmers.

Aligning should be done on 1400, 1000 and 600 kilocycles.

INTERMEDIATES: To align the I.F. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. Adjust the first I.F. transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second I.F. transformer. If adjustments are not made accurately, selectivity will be poor and I.F. oscillation may result. Finally, adjust the trimmer in the tuned wave trap for <u>minimum</u> meter reading.

BROADCAST: Turn the dial to 1400 Kc. and feed a <u>very weak</u> 1400 Kc. modulated signal from your signal generator to the antenna. Adjust the broadcast oscillator trimmer and detector trimmer (on condenser gang) for maximum reading.

There is no adjustable padder condenser in this model so resonance on lower frequencies is accomplished by bending plates on tuning condensers.

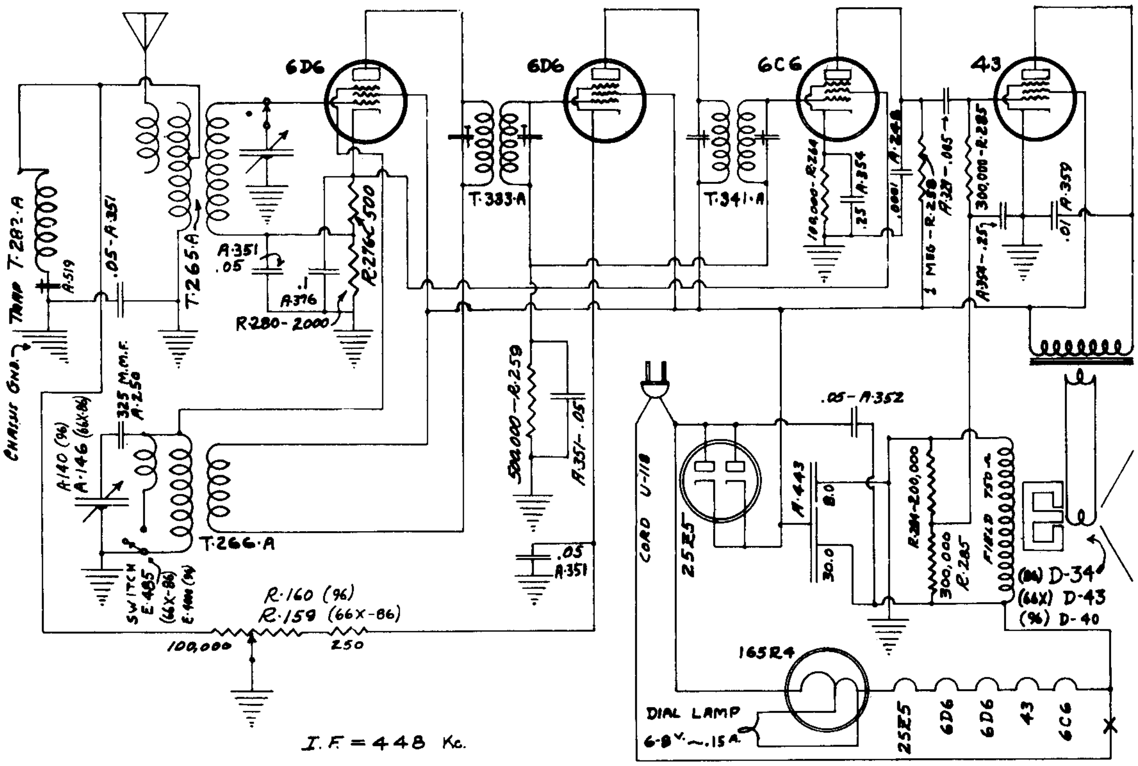
AVERAGE SOCKET VOLTAGES

Tube	Position	E_k	EG_3	EG_2	E_p	E_p input
6D6	Det.-Osc.	12	0	100	100	-
6D6	I.F.	2	2	100	100	-
6Q7	2nd-Det. AVC-AF	1	-	-	*	-
25B5	Output	0	-	-	95	100
25Z5	Rect.	125	-	-	115 AC	-

Line 112 volts. Volume control full on. 10% variation allowable. Measurements made from tube prongs to ground with 1000 ohms per volt instrument.
* Through 250M ohms.

INTERNATIONAL RADIO CORP.

MODEL 66X - 86 - 96



ALIGNMENT

ESSENTIAL DATA: The intermediate frequency employed is 448 Kc.

The standard type of output meter should be used to indicate signal strength. It should be connected from the plate of the 43 tube to ground.

Poor sensitivity may be an indication of incorrectly adjusted I. F. trimmers.

Aligning of Broadcast band should be done on 1400, 1000 and 600 kilocycles.

INTERMEDIATES: To align the I. F. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. Adjust the first I. F. transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second I. F. transformer. If adjustments are not made accurately, selectivity will be poor and I. F. oscillation may result. Finally, adjust the trimmer in the tuned wave trap for minimum meter reading.

BROADCAST BAND: Place the band change switch on the Broadcast position. Turn the dial to 1400 Kc. and feed a very weak 1400 Kc. modulated signal from your signal generator to the antenna. Adjust the broadcast oscillator trimmer and detector trimmer (on condenser gang) for maximum reading.

There is no adjustable padder condenser in this model so resonance on lower frequencies is accomplished by bending plates on tuning condensers.

SHORT WAVE BAND: No alignment necessary.

AVERAGE SOCKET VOLTAGES

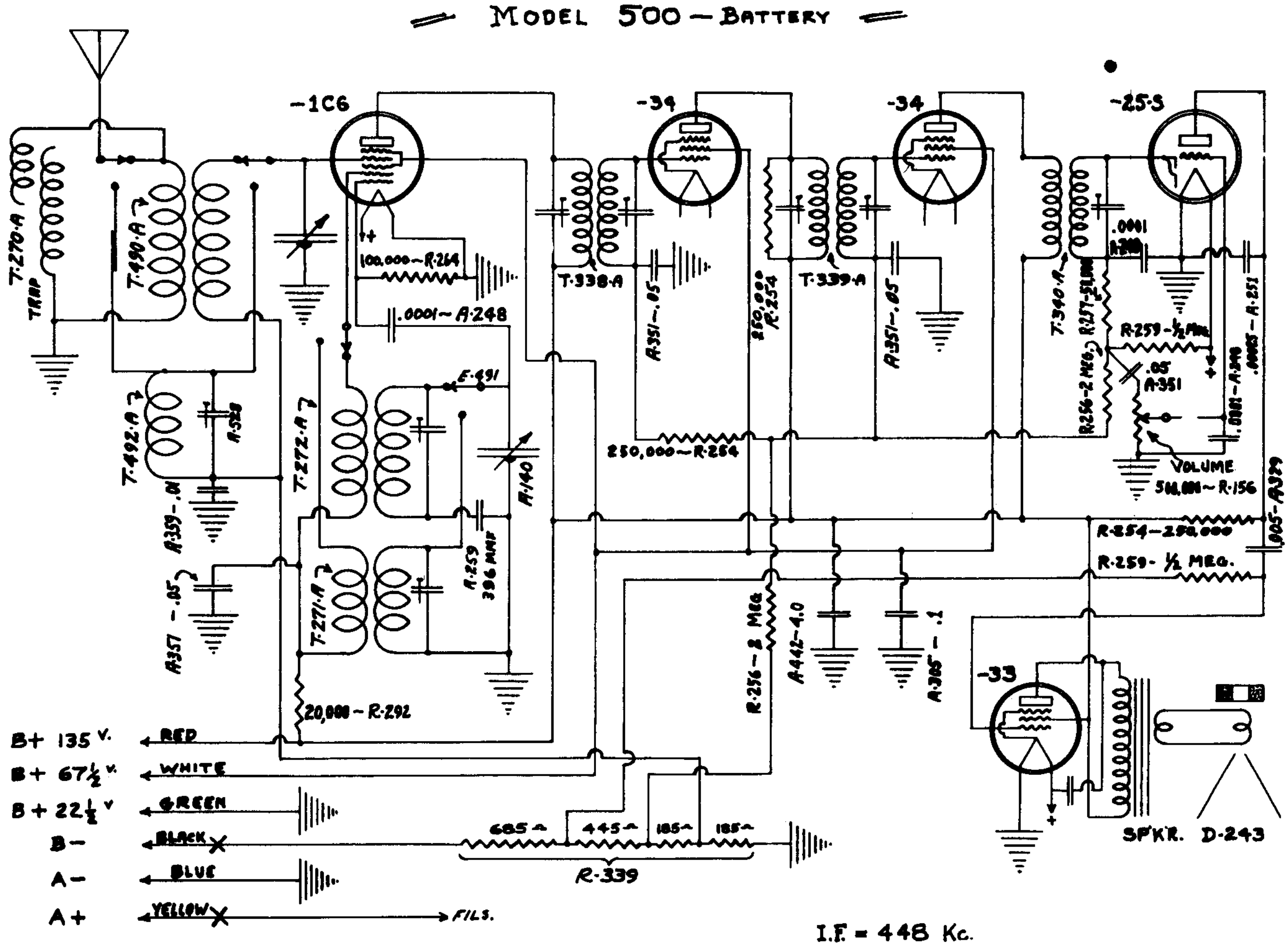
Tube	Position	E_K	E_{G3}	E_{G2}	E_P
6D6	Det.-Osc.	14	0	100	100
6D6	I.F.	1	1	100	100
6C6	2nd Det.	2.5	-	14	25
43	Output	0	-	100	87
25Z5	Rect.	100	-	-	35

LINE 118 VOLTS. VOLUME CONTROL FULL ON. 10% VARIATION ALLOWABLE.

Measurements made from tube prongs to circuit ground.

INTERNATIONAL RADIO CORP.

Model 500 — Battery



I.F. = 448 Kc.

INTERMEDIATES: To align the I.F. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. Short out the oscillator section of the two gang condenser. Adjust the first I.F. transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second I.F. transformer. The third I.F. transformer has only one trimmer. If adjustments are not made accurately, selectivity will be poor and I.F. oscillation may result. Due to the I.F. trap in the antenna circuit a strong signal is necessary.

BROADCAST BAND: Place the band change switch on Broadcast position. Turn the dial to 1400 Kc. and feed a very weak 1400 Kc. modulated signal from your signal generator to the antenna. Adjust the broadcast oscillator trimmer for maximum reading. A three gang trimmer will be found on the bottom of the chassis. The oscillator trimmer mentioned is the section nearest the end of the chassis

There is no adjustable padder condenser in this model so resonance on the low frequency end is accomplished by bending plates on the tuning condensers. Check the alignment at 1000 Kc. Insert a thin bakelite, celluloid or mica feeler strip between the plates of the variable condensers to determine whether the circuits are properly matched. The action is this--the dielectric constant of the celluloid feeler strip being higher than that of the air it displaces, results in an increase of capacity. Open the variable condenser just enough to indicate two or three points below maximum signal. As the feeler is inserted the meter reading should indicate increasing signal and then decreasing as the feeler is inserted farther. This procedure should be followed on both sections. Should the meter fail to show an increase in signal as the strip is inserted in one section this indicates too great a capacity for that section. This may be corrected by bending the outside rotor plates out at the point where they begin to mesh with the stator.

After checking the alignment at 1000 Kc. repeat the process at 600 Kc.

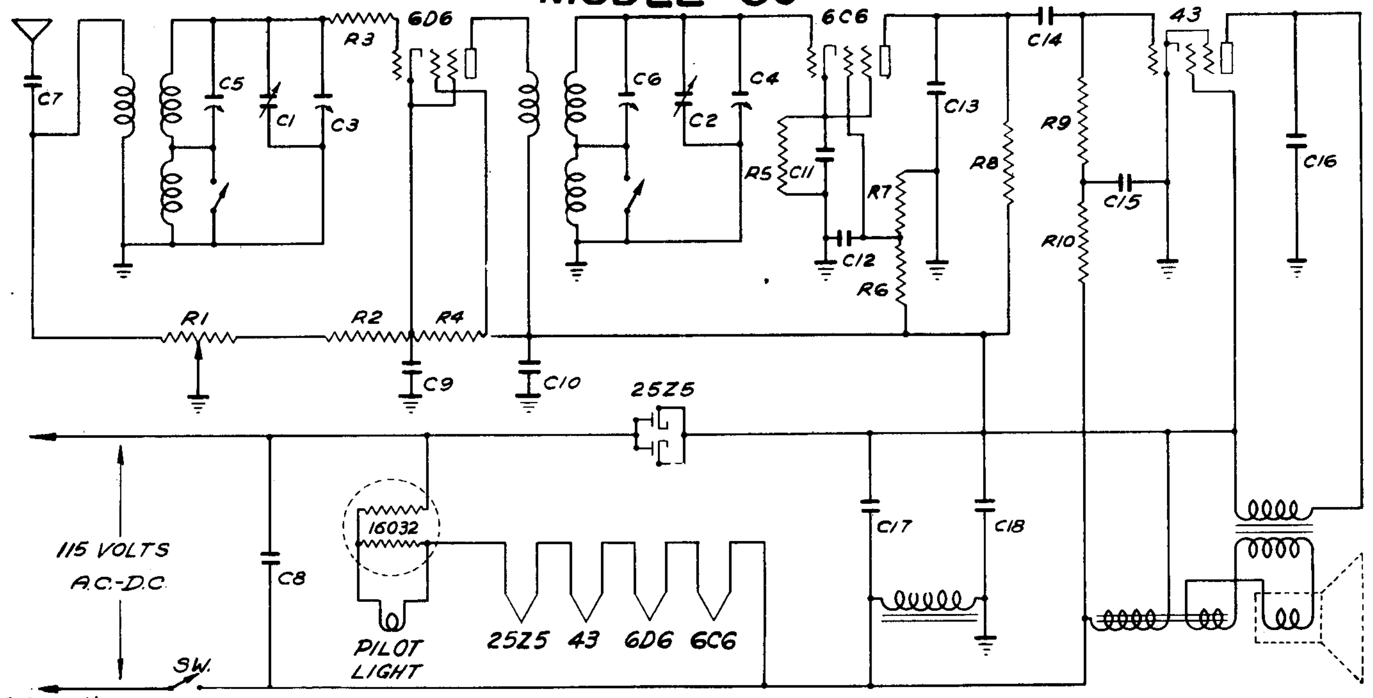
SHORT WAVE BAND: Place the band change switch on the Short Wave position. Turn the dial to 15.5 megacycles and feed a very weak 15.5 megacycle modulated signal from your signal generator to the antenna. Adjust the S. W. oscillator trimmer (at opposite end of three gang trimmer) for maximum reading on the output meter. This trimmer should not be touched again when checking alignment on other frequencies.

Next go to 12 megacycles and adjust the S. W. detector trimmer.

Instead of bending condenser plates at 6 megacycles alignment is accomplished by spreading or crowding turns on the S. W. detector coil. If much crowding or spreading is necessary it is advisable to go back and recheck at 12 megacycles.

MAJESTIC RADIO & TELEVISION COMPANY

MODEL 50



Schematic Location	Description
C1 C2	Condenser Variable Gang
C3 C4	Condenser Trimmers, part of Variable Gang
C5 C6	Condenser Trimmer 3-25 Mmfd. bakelite base
C7	Condenser Tubular .001 Mfd. 400 volts
C8	Condenser Tubular .1 Mfd. 400 volts
C9 C12	Condenser Tubular .05 Mfd. 200 volts
C10	Condenser Tubular .1 Mfd. 400 volts
C11	Condenser Tubular .25 Mfd. 200 volts
C13	Condenser Mica 250 Mmfd. +—20% type O
C14 C16	Condenser Tubular .01 Mfd. 400 volts
C15	Condenser Tubular .5 Mfd. 200 volts
C17	Condenser Wet Electrolytic 30 Mfd. 150 volts
C18	Condenser Wet Electrolytic 25 Mfd. 150 volts
R1	Control volume and line switch 50,000 ohms
R2	Resistor Carbon 300 +— 20% ¼ watt
R3	Resistor Carbon 2,000 +—20% ¼ watt
R4	Resistor Carbon 100,000 +—¼ watt
R5	Resistor Carbon 10,000 +—20% ¼ watt
R6	Resistor Carbon 35,000 +—10% ¼ watt
R7	Resistor Carbon 15,000 +—10% ¼ watt
R8	Resistor Carbon 250,000 +—20% ¼ watt
R9	Resistor Carbon 400,000 +—20% ¼ watt
R10	Resistor Carbon 100,000 +—20% ¼ watt

In order to properly realign the receiver, the following equipment is necessary.

1. A signal generator which will provide an accurately calibrated signal at any frequency from 540 to 4000 kilocycles. The generator should have a modulated and adjustable signal output.
2. An output audio voltmeter to be connected across the moving coil of the speaker. This meter should be capable of providing a readable deflection for output levels of ½ volt, to avoid the effects of overload.
3. One screw driver; one .25 Mfd. 600 volt condenser; one 100 Mmfd. mica condenser.

BROADCAST BAND 540 TO 1550 KILOCYCLES

1. Connect output meter across loud speaker voice coil.
2. Connect ground or low potential terminal of signal generator to receiver chassis through a .25 Mfd. 600 volt condenser.
3. Connect antenna or high potential terminal of signal generator through a 100 Mmfd mica condenser to antenna lead from the receiver.
4. Adjust signal generator to 1400 kilocycles and 5000 microvolts output.
5. Adjust receiver range indicator to broadcast or "B" band and pointer to 1400 kilocycles.
6. Adjust trimmers C3 and C4 until maximum output is obtained and reduce volume level with volume control to approximately 0.5 volt. Repeat until C3 and C4 cannot be adjusted to give greater output.
7. Turn volume control to clockwise or most sensitive position; reduce output from signal generator; retune receiver and check sensitivity.
8. Check sensitivity at 1000 kilocycles and 550 kilocycles.

POLICE BAND 1550 to 4000 KILOCYCLES

1. Adjust signal generator to 4000 kilocycles.
2. Adjust receiver range indicator to police or "P" band and pointer to 4000 kilocycles.
3. Turn receiver volume control to maximum or extreme clockwise position, and increase signal generator output until a signal is heard.
4. Adjust trimmers C5 and C6 until maximum output is obtained and reduce output from signal generator until receiver output is approximately 0.5 volt. Repeat until C5 and C6 cannot be adjusted to give greater output.
5. Check sensitivity at 2400 kilocycles and 1600 kilocycles.
6. Sensitivity at 1600 kilocycles may be adjusted by moving position of lead from wave switch to chassis.

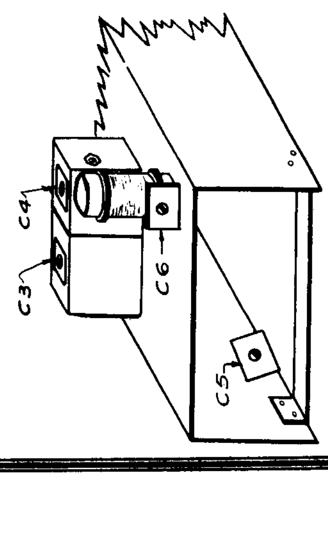


Fig. 2 Location of Trimmers

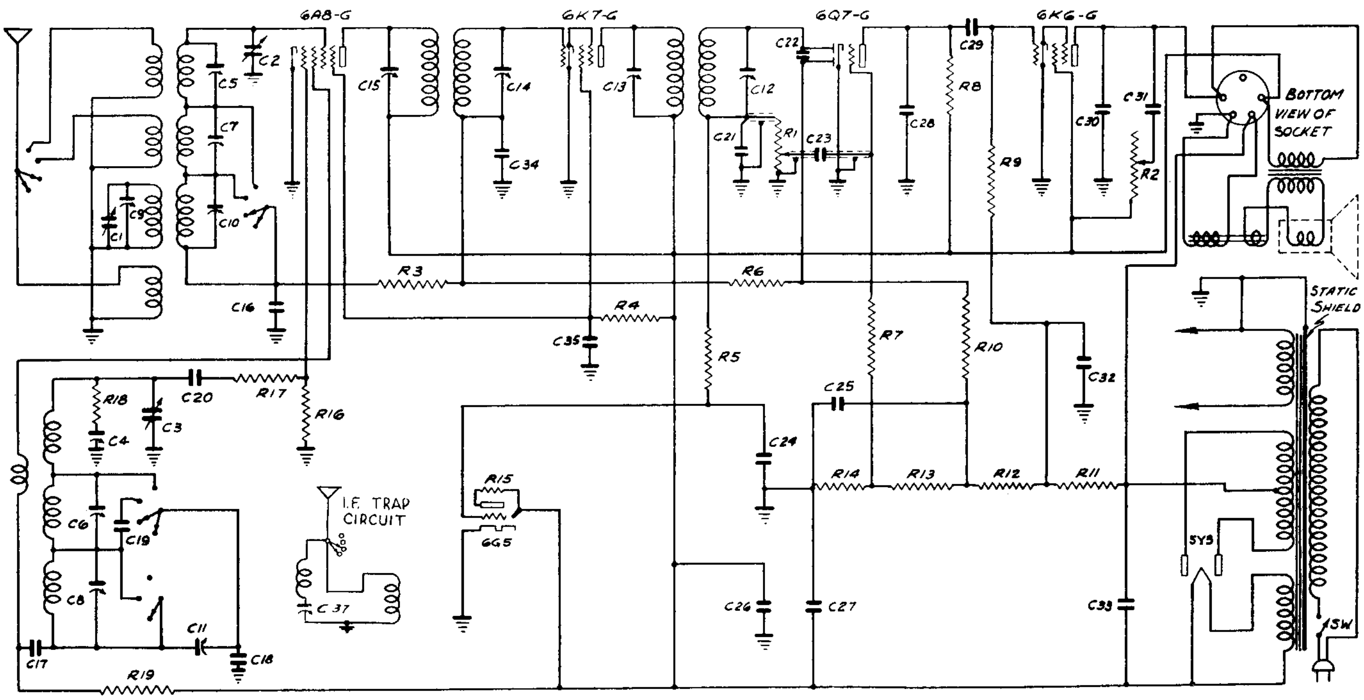
VOLTAGE CHART

Position	Tube	Ef	Ek	Eg Screen	Ep Suppressor	Ep Pentode
R. F. Amplifier	6D6	6.3	3.2	103	3.2	103
Detector	6C6	6.3	1.8	28 Note "C"	1.8 Note "D"	35 Note "C"
Power Output	43	25	Note "A"	103		96
Rectifier	25Z5	25				103
Ballast	16032	Note "B"				

All above voltages to chassis with 115 volt 60 cycle line. Cathode, screen, suppressor and pentode voltages when operating from 115 volt d.c. line will be 10 percent lower.
Note "A"—Output pentode bias should be measured across filter choke at 14 volts.
Note "B"—Pins 3 to 7 should measure 50 volts a.c.
Note "C"—Measured with 250,000 ohm voltmeter.
Note "D" Measured with 25,000 ohm voltmeter.

MAJESTIC RADIO & TELEVISION COMPANY

MODELS 65—66—650



ALIGNMENT PROCEDURE

Correct alignment is of extreme importance in all wave receivers. The receivers are properly aligned at the factory with precision equipment and realignment should not be attempted by the service technician until all other causes of faulty operation are corrected.

In order to properly realign the receiver the following equipment is necessary:

1. A signal generator which will provide an accurately calibrated signal at any frequency from 456 kilocycles to 18 megacycles. The generator should have adjustable signal output.

2. An output audio voltmeter of the low voltage type to be connected across the moving coil of the speaker. This should be capable of providing a readable deflection for relatively low output levels to avoid the effects of overload.

3. An insulated or non-metallic screw driver for the adjustment of trimmers.

I F ALIGNMENT 456 KC

1. Connect the output meter (low scale) across the loud speaker voice coil. Turn the wave band switch to broadcast position. Turn the volume control to its maximum position.

2. Connect the test oscillator ground to chassis and the "hot" lead from the test oscillator to the grid of the 6L7 converter tube through a series .1 Mfd. condenser. Set test oscillator to 456 KC.

3. Adjust I F alignment screws of second I F transformer adjacent to 6F6 power tube to maximum output, reducing output of test oscillator to keep the meter reading on scale as alignment proceeds.

4. Adjust alignment of first I F transformer. (directly behind tuning condenser) to maximum output as described above.

5. Readjust these trimmers for accurate alignment. Always use the lowest possible output from the test oscillator to preclude the possibility of automatic volume control action confusing proper adjustment.

6. Connect "hot" lead of test oscillator to receiver antenna lead in series with 200 Mmfd. condenser, and tune receiver to 550 kilocycles.

7. Adjust C-37 for minimum receiver output.

NOTE: Since coils are used in series it is absolutely necessary to align the high frequency bands first, in the order indicated.

FOREIGN BAND 5.7 TO 18.5 MEGACYCLES

1. With test oscillator connected to the antenna and ground terminals through a 400 ohm resistor set oscillator at 16 megacycles.

2. Set the dial scale to 16 megacycles and adjust the oscillator trimmer condenser (C 4) to a resonance using the counterclockwise or low capacity point.

3. Adjust input circuit trimmer (C 5) to maximum response, rocking the gang condenser back and forth a degree or two to obtain proper maximum.

POLICE OR MIDDLE BAND 1.75 TO 5.8 MEGACYCLES

1. With the test oscillator connected as above set the oscillator and dial to 5.5 megacycles.

2. Adjust oscillator trimmer condenser (C 6) for maximum response using the counterclockwise or low capacity point.

3. Adjust input circuit trimmer (C 7) to maximum response rocking the gang condenser as described above.

BROADCAST BAND 535 TO 1800 KC

1. With test oscillator connected to antenna and ground through a 200 Mfd. condenser set oscillator and receiver dial to 1600 kilocycles.

2. Adjust broadcast oscillator trimmer (C 8) to obtain maximum response.

3. Adjust antenna circuit trimmer (C 9) for maximum output.

4. Adjust preselector trimmer (C 10) for maximum output.

5. Set test oscillator anu dial to 600 kilocycles and tune in the signal, then adjust broadcast band padding condenser (C 11) for maximum output This padder is mounted on the aluminum coil deck near the panel and is adjusted through a hole provided in the back of the chassis pan. Rock the condenser back and forth a degree or two in order to obtain proper maximum.

6. Repeat the 1600 KC adjustments described above for greater accuracy.

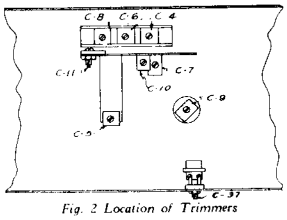


Fig. 2 Location of Trimmers

REPLACEMENT PARTS MODELS 65-66-650

State serial number of receiver when ordering parts.

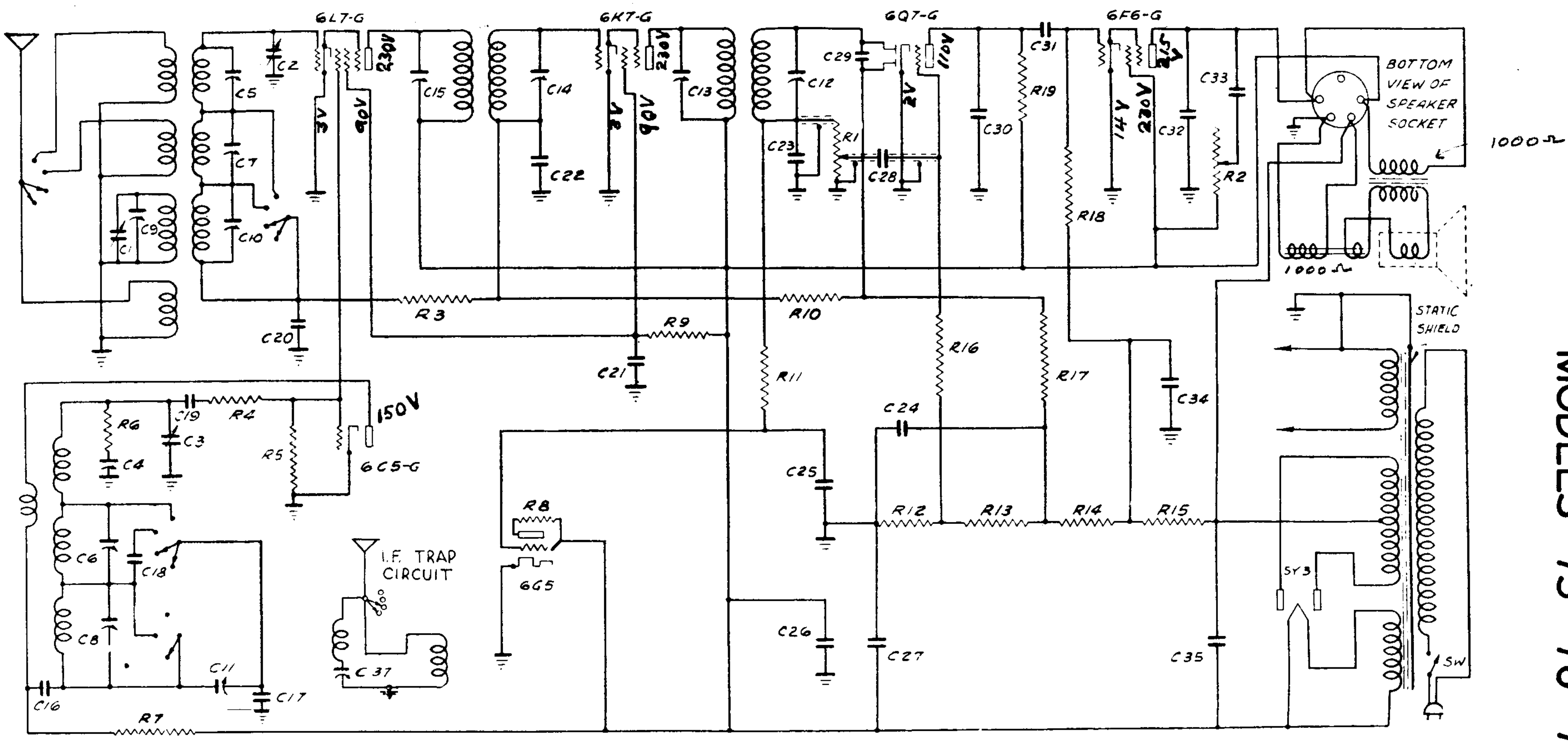
SCHEMATIC LOCATION	PART No.	DESCRIPTION
	15089	Bulb Pilot Light (edgelight)
	16589	Bulb Pilot Light (travelite)
C1 C2 C3	B-16461-3	Condenser Variable Gang
C4 C6 C8	A-16473	Condenser Trimmer 3-30 Mmfd. triple strip bakelite
C5 C9 C10	A-16474	Condenser Trimmer 3-30 Mmfd. ceramic base
C7	A-15246-2	Condenser Trimmer 3-30 Mmfd. bakelite base
C11	A-16472	Condenser Variable Padder 340 Mmfd. 960 Mmfd.
C33	B-16466	Condenser Wet Electrolytic 16 Mfd. 350 volts
C27	B-16467-2	Condenser Wet Electrolytic 8 Mfd. 250 volts regulator
C28	15918	Condenser Mica 100 Mmfd. 20% type O
C21	15928	Condenser 250 Mmfd. 20% type O
C20 C22	15929	Condenser Mica 50 Mmfd. 20% type O
C17	15930	Condenser Mica 2000 Mmfd. 20% type W
C18	15931	Condenser Mica 4300 Mmfd. 5% type W
C19	15932	Condenser Mica 1750 Mmfd. 5% type W
C26	15750	Condenser Tubular. 25 Mfd. 400 volts
C16 C34	15752	Condenser Tubular .05 Mfd. 200 volts
C23 C29	15754	Condenser Tubular .01 Mfd. 400 volts
C35	15757	Condenser Tubular .1 Mfd. 400 volts
C25	15761	Condenser Tubular .1 Mfd. 200 volts
C24	15763	Condenser Tubular .01 Mfd. 200 volts
C31	15764	Condenser Tubular .03 Mfd. 400 volts
C32	15770	Condenser Tubular .2 Mfd. 200 volts
C30	15771	Condenser Tubular .004 Mfd. 600 volts
R2	B-16540-2	Control Tone 150,000 ohms
R1	B-16542-2	Control Volume and line switch 1 megohm
	17210	Coil and Mounting Assembly (sold only as complete unit) Model 650
	17212	Preselector Coil Assembly—Model 65-66-650
	17209	Coil and Mounting Assembly Models 65-66
	17298	Dial Glass
	17199	Dial Glass Backing
	17213	Drive and Indicator Assembly
	17376	Escutcheon No. 3 with Indicator Lens
	A-16597	Knob (Tune and Wave Band)
	A-16598	Knob (Volume and Tone)
R4	15501	Resistor Carbon 25,000 ohms 20% 1 watt
R8	15512	Resistor Carbon 250,000 ohms 20% ¼ watt
R3	15515	Resistor Carbon 100,000 ohms 20% ¼ watt
R5 R6 R10 R15	15517	Resistor Carbon 1 megohm 20% ¼ watt
R9	15520	Resistor Carbon 500,000 ohms 20% ¼ watt
R16	15511	Resistor Carbon 50,000 ohms 20% ¼ watt
R13 R14	15557	Resistor Carbon 20,000 ohms 10% ¼ watt
R19	15558	Resistor Carbon 10,000 ohms 20% ½ watt
R7	15559	Resistor Carbon 3 megohms 20% ¼ watt
R17	15601	Resistor Carbon 100 ohms 20% ¼ watt
R12	15602	Resistor Carbon 250,000 ohms 10% ¼ watt
R11	15603	Resistor Carbon 900,000 ohms 10% ¼ watt
R18	3320	No. 38 D.C.C. Manganin wire 2 ohms
	A-16829	Socket Speaker
C12 C13	A-16631	Condenser 2nd I. F. Trimmer (Part of I. F. Assembly)
C14 C15	A-16630	Condenser 1st I. F. Trimmer (Part of I. F. Assembly)
C37	B-16786	Condenser (part of trap coil assembly)
	A-16701	Trap Coil Assembly
	B-16633-2	Socket 6G5 with leads
	A-17204	Socket Pilot Light R H.
	A-17205	Socket Pilot Light L. H.
	A-17168	Socket Pilot Light (Travelite)
	C-16579	Speaker Models 65-66
	C-16640	Speaker Model 650
	A-16630-3	Transformer 1st I. F.
	A-16631-3	Transformer 2nd I. F.
	C-16574-6	Transformer Power 110 volt, 50-60 cycle, Models 65-66
	C-16575-6	Transformer Power 110 volt, 50-60 cycle, Model 650
	A-1954	Washer Felt (volume and Tone)
	A-1955	Washer Felt (Tune and Wave Band)

VOLTAGE CHART

POSITION	TUBE	Ef	Ek	Eg SCREEN	Eg SUPPRESSOR	Ep TRIODE	Ep PENTODE
Converter	6 A8-G	6.3	3.0	90.0		150.0	220.0
I. F. Amplifier	6 K7-G	6.3	3.0	90.0	Connected to gr'd.		220.0
Detector—AVC	6 Q7-G	6.3	2.0			195.0	
Power Output	6 K6-G	6.3	16.0	220.0	Connected to Cathode in Tube		208.0
Rectifier	5 Y3	5.0					

MAJESTIC RADIO & TELEVISION COMPANY

MODELS 75—76—750

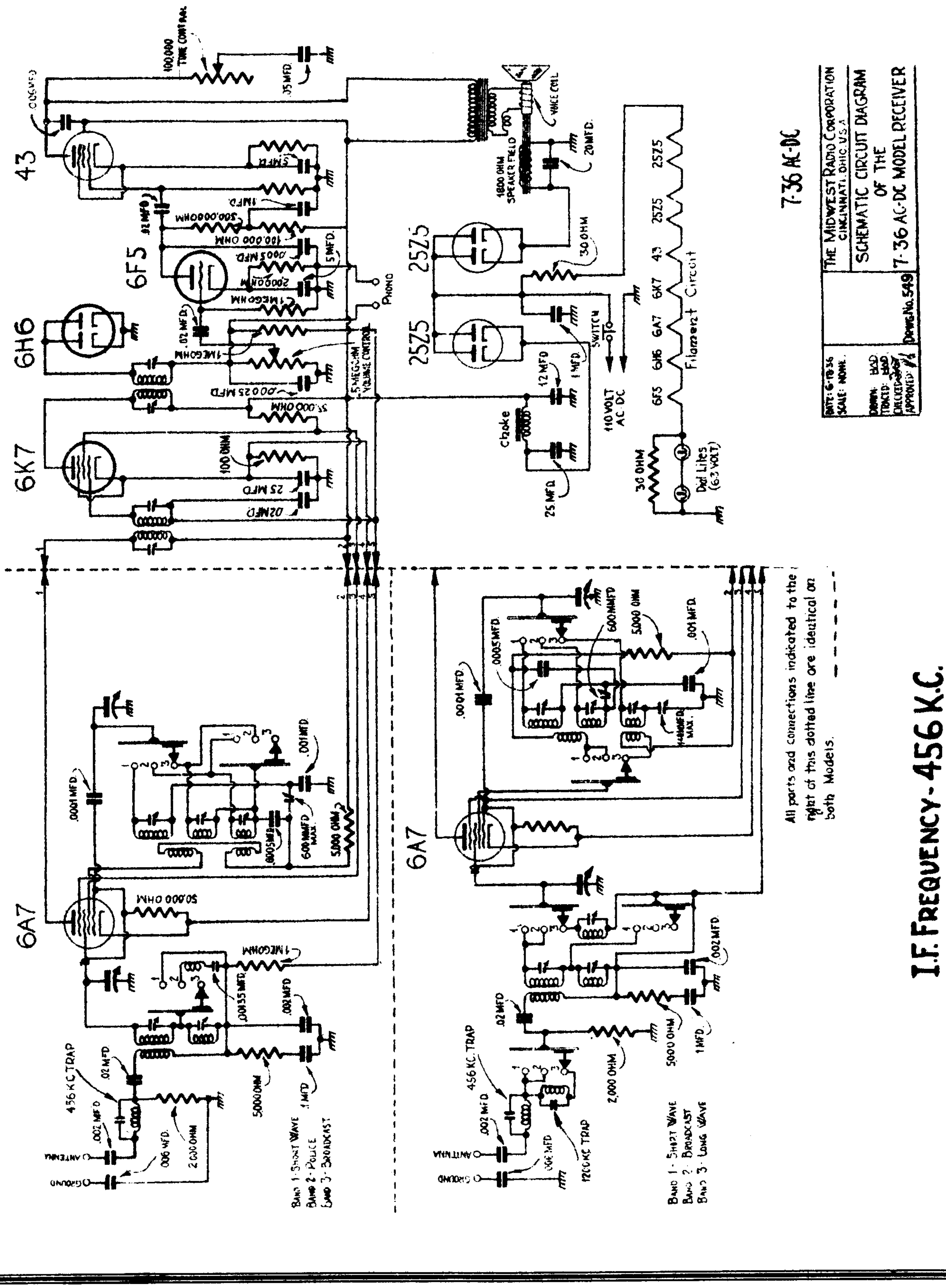


C1 C2 C3	Condenser, variable gang
C4 C6 C8	Condenser, trimmer 3-30 mmf triple strip bakelite
C5 C9 C10	Condenser, trimmer 3-30 mmf ceramic base
C7	Condenser, trimmer 3-30 mmf bakelite base
C11	Condenser Variable Padder 340 Mmfd. —960 Mmfd.
C12 C13	Condenser, 2nd I. F. trimmer (part of I. F. assembly)
C14 C15	Condenser, 1st I. F. trimmer (part of I. F. assembly)
C27	Condenser, wet electrolytic 8 mfd. 250 volt
C35	Condenser, wet electrolytic 16 mfd. 350 volt
C30	Condenser, mica 100 mmfd. +—20% type O
C23	Condenser, mica 250 mmfd. +—20% type O
C19 C29	Condenser, mica 50 mmfd. +—20% type O
C16	Condenser, mica 2000 mmfd. +—20% type W
C17	Condenser, mica 4300 mmfd. +—5% type W
C18	Condenser, mica 1750 mmfd. +—5% type W
C26	Condenser, tubular .25 mfd. 400 volts
C20 C22	Condenser, tubular .05 mfd. 200 volts
C28 C31	Condenser, tubular .01 mfd. 400 volts
C21	Condenser, tubular .1 mfd. 400 volts
C24	Condenser, tubular .1 mfd. 200 volts
C25	Condenser, tubular .01 mfd. 200 volts

C33	Condenser, tubular .03 mfd. 400 volts
C34	Condenser, tubular .2 mfd. 200 volts
C32	Condenser, tubular .004 mfd. 600 volts
R2	Control Tone 150,000 ohms
R1	Control, volume with 110 switch
	Knob (tune and band switch)
	Knob (volume and tone)
R9	Resistor, carbon 25,000 +—20% 1 watt
R19	Resistor, carbon 250,000 +—20% ¼ watt
R3	Resistor, carbon 100,000 +—20% ¼ watt
R10 R8 R11 R17	Resistor, carbon 1 meg. +—20% ¼ watt
R18	Resistor, carbon 500,000 +—20% ¼ watt
R5	Resistor, carbon 30,000 +—20% ¼ watt
R15	Resistor, carbon 500,000 +—10% ¼ watt
R14	Resistor, carbon 125,000 +—10% ¼ watt
R13	Resistor, carbon 10,000 +—10% ¼ watt
R12	Resistor, carbon 20,000 +—10% ¼ watt
R7	Resistor, carbon 10,000 +—20% ½ watt
R16	Resistor, carbon 3 meg. +—20% ¼ watt
R6	No. 38 D. C. C. Manganin wire 2 ohms
R4	Resistor carbon 100 ohms +—20% ¼ watt

MIDWEST RADIO CORP.

MODEL 7-36 A.C.-D.C.



MIDWEST RADIO CORP.
MODEL 7-36 A.C.-D.C.

INSTRUCTIONS FOR ALIGNING THE MIDWEST 36 MODEL 7 TUBE AC-DC RECEIVER

Using a standard signal generator and have an approximate frequency from 300 k.c. to 16 m.c. and a standard output meter.

I.F. ALIGNMENT

(1) Set signal generator to 1450 k.c. Connect output meter from plate of 43 output tube to ground. Connect output of signal generator to grid cap of 6A7 tube. The front section of the tuning condenser if short circuited and the volume control is turned to max-position. The I.F. trimmers are then adjusted for maximum gain on output meter.

This completes the I.F. alignment.

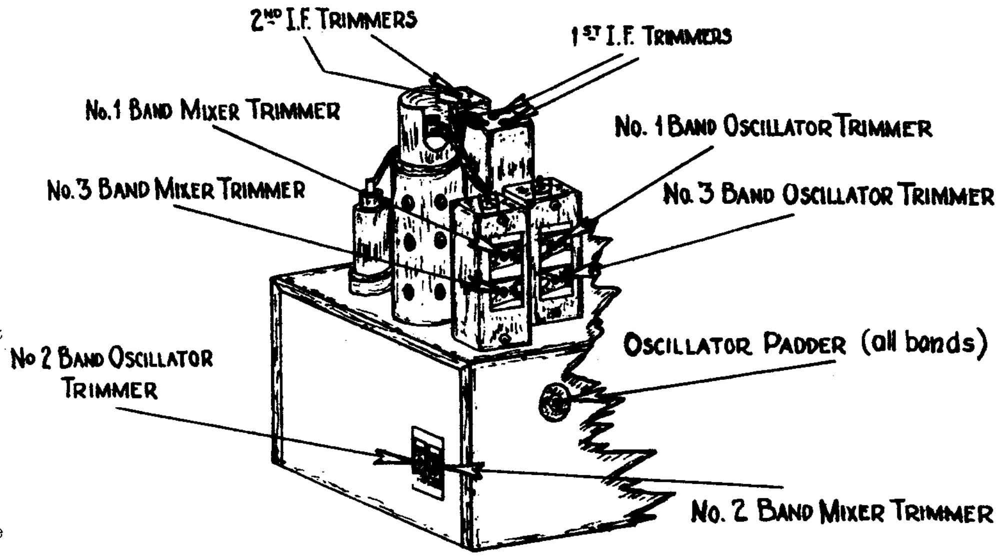
Note: To assure more accurate trimmer setting always use lowest possible test oscillator output consistent with readable output meter scale deflection.

R.F. ALIGNMENT

(2) Band #1 Alignment :- The short circuit is removed from oscillator condenser and the signal generator is connected to the antenna post of the receiver through a standard dummy antenna. The receiver and signal generator are set at 16 m.c. The oscillator trimmer is adjusted so as to bring in the signal at this setting The antenna trimmer is adjusted for maximum output.

(3) Band #2 Alignment: - With the signal generator still connected to antenna post of receiver, set generator and receiver dial at 1400 k.c. Adjust oscillator trimmer so that signal comes in at this setting. The Antenna and R.F. trimmers are adjusted for maximum output. The signal generator is set at 600 k.c. and the padder is adjusted so that the signal comes in at this point on the dial. After making this adjustment the 1400 k.c. adjustment should then be rechecked.

(4) Band #3 Alignment: - With the receiver and signal generator both set at 325 k.c., the oscillator trimmer is adjusted so that this signal agrees with the dial. Antenna trimmer is then adjusted for maximum output.



THE MIDWEST RADIO CORP. CINCINNATI, OHIO

LIST OF TUBE VOLTAGES OF AC-DC 36 MODEL 7 TUBE RECEIVER

type	position	plate volts	screen volts	supp. volts	cathode volts	fil volts
6A7	Osc.) Mixer)	102 113	38	0	.6	5.8
6K7	1st I. F.	113	38	.6	.6	5.8
6H6	2nd Det.	0	0	0	0	5.8
6F5	1st Audio	40	0.	0	.2	5.8
43	Output	102	113	0	14	25
25Z5	Rect.	106	0	0	0	25
25Z5	Rect.	106	0	0	0	25

LINE VOLTAGE 106 VOLTS A.C. 60 CYCLES B PLUS 113

1000 Ohm per volt meter used on all D. C. measurements from ground. Voltages plus or minus 15% depending on line voltage.

MIDWEST RADIO CORP.

MODEL REGAL 37

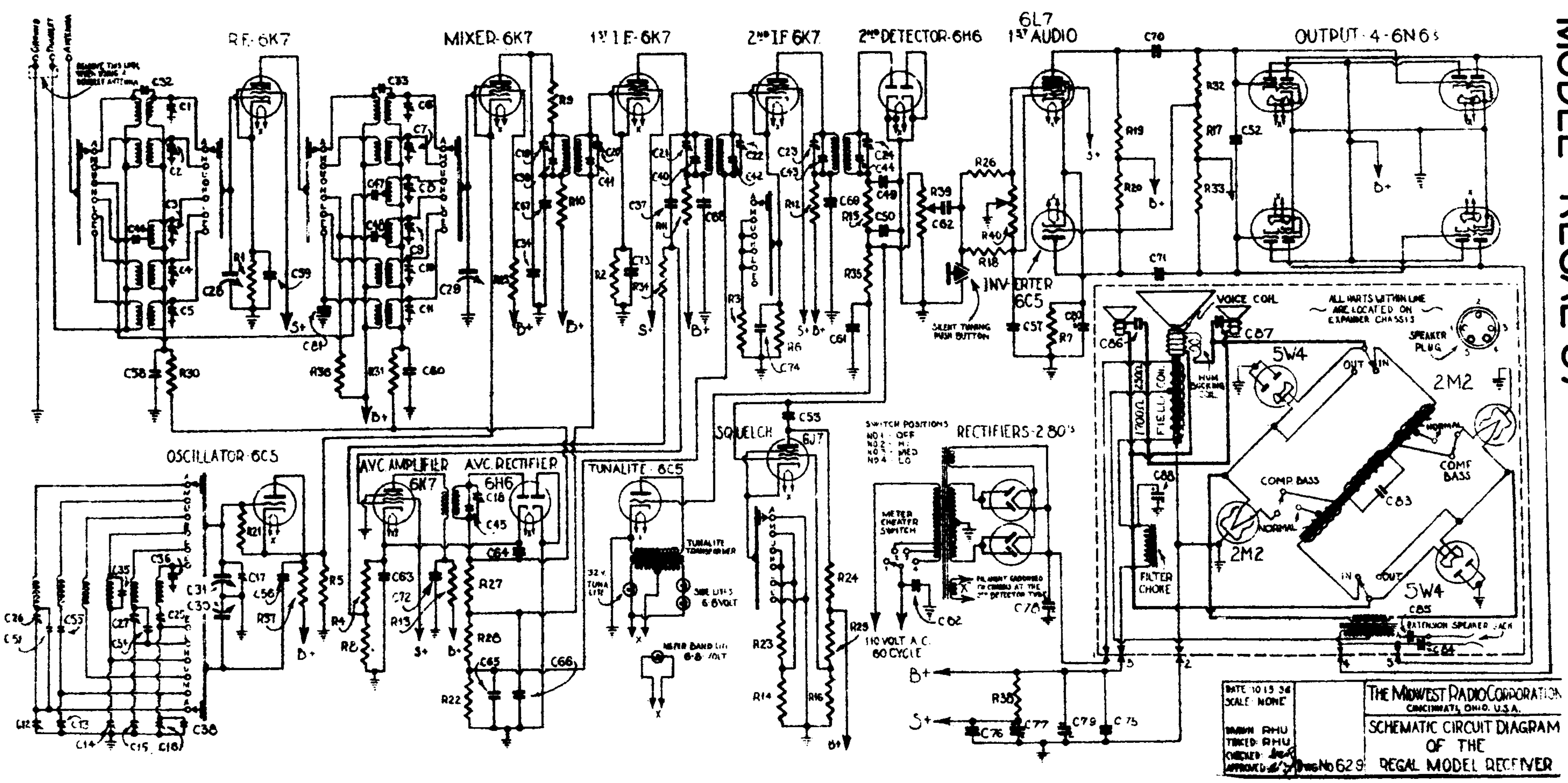
CONDENSERS

C1	35MMFD TRIMMER
C2	" "
C3	" "
C4	" "
C5	" "
C6	" "
C7	" "
C8	" "
C9	" "
C10	" "
C11	" "
C12	" "
C13	" "
C14	" "
C15	" "
C16	" "
C17	" "
C18	" "
C19	I.F. TRIMMER
C20	" "
C21	" "
C22	" "
C23	" "
C24	" "
C25	70 MMFD PADDER
C26	
C27	350MMFD
C28	365MMFD TUNING COND
C29	" " "
C30	" " "
C31	" " "
C32	5 MMFD MICA
C33	" "
C34	10MMFD "
C35	" "
C36	" "
C37	25MMFD MICA
C38	"
C39	75MMFD "
C40	"
C41	100MMFD "
C42	" "
C43	" "
C44	" "
C45	" "
C46	" "
C47	" "
C48	" "
C49	" "
C50	" "
C51	200MMFD. "
C52	250 MMFD "
C53	" "
C54	350MMFD "
C55	2000 MMFD MICA
C56	
C57	.02 MFD 200 VOLT
C58	.05 MFD "
C59	" "
C60	" "
C61	" "
C62	" "
C63	" "
C64	" "
C65	" "
C66	" "
C67	.05 MFD 400VOLT
C68	" "
C69	" "
C70	" "
C71	" "
C72	" "
C73	.25MFD 200 VOLT
C74	" "
C75	.25MFD 400VOLT
C76	" "
C77	20 MFD. 175V. WET ELECTROLYTIC
C78	25. MFD 500V " "
C79	40 MFD 350V " "
C80	60 MFD 10 V. " "
C81	500MMFD MICA
C82	.05 MFD 400 VOLT
C83	.1MFD - 200 VOLT
C84	25MFD - 600 VOLT
C85	" "
C86	2 MFD 200 VOLT
C87	" "
C88	24 MFD - 500V WET ELECT.

RESISTORS

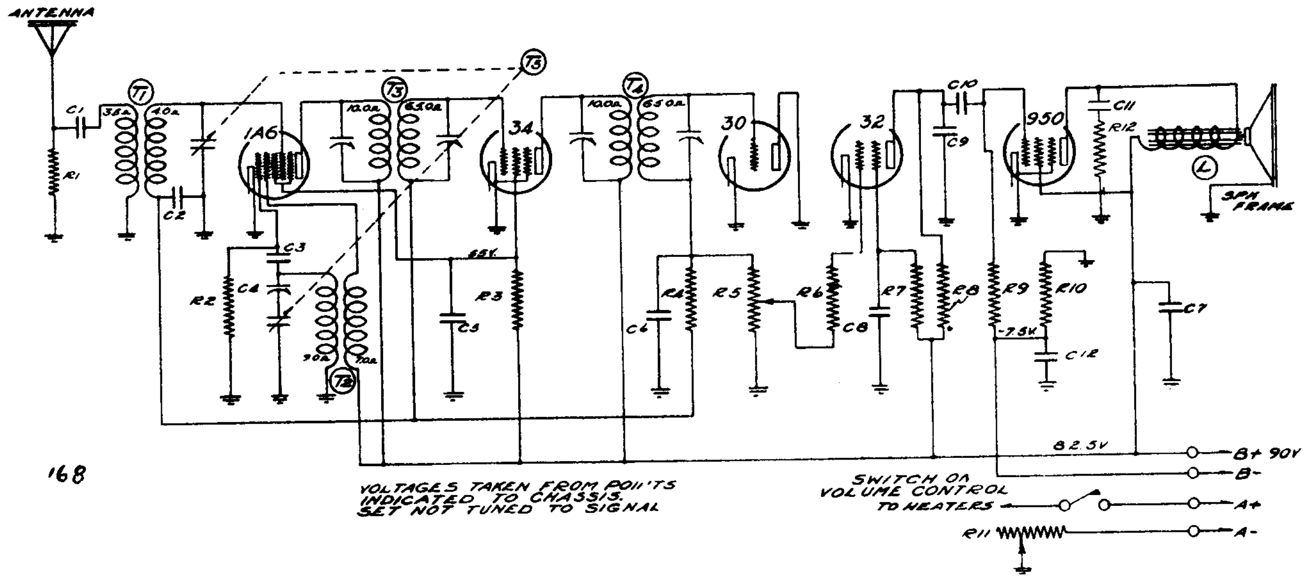
R1	350 OHMS WIREWOUND
R2	" "
R3	" "
R4	" "
R5	500 OHM .25 WATT
R6	1,000 OHM "
R7	" "
R8	4,000 OHM "
R9	5,000 OHM "
R10	" "
R11	" "
R12	" "
R13	" "
R14	" "
R15	25,000 OHM "
R16	"
R17	40,000 OHM "
R18	100,000 OHM "
R19	100,000 OHM .25 WATT
R20	" "
R21	" "
R22	45,000 OHMS "
R23	100,000 " "
R24	"
R25	200,000 OHM "
R26	" "
R27	" "
R28	" "
R29	" "
R30	500,000 OHM "
R31	" "
R32	" "
R33	" "
R34	1 MEGOHM "
R35	3 MEGOHM "
R36	25,000 OHM .5 WATT
R37	50,000 OHM .5 WATT
R38	" "
R39	500,000 OHM VOLUME CONTROL
R40	" TONE "

I.F. 456 K.C.



MONTGOMERY WARD & CO.

MODELS 62-230 & 62-240



168

No.	Part No.	Description
		RESISTORS
R1	130-17	10M Ohm-½ Watt - 20% - 20 Volt - Carbon
R2	130-52	50M Ohm-½ Watt - 20% - 10 Volt - Carbon
R3	130-17	10M Ohm-½ Watt - 20% - 20 Volt - Carbon
R4	130-38	2 Meg Ohm - ½ Watt - 20% 100 Volt - Carbon
R5	101-43	1 Meg Ohm Volume Control and Switch
R6	130-52	50M Ohm - ½ Watt - 20% 10 Volt - Carbon
R7	130-19	1 Meg Ohm - ½ Watt - 20% 100 Volt - Carbon
R8	130-9	200M Ohm - ½ Watt - 20% - 20 Volt - Carbon
R9	130-19	1 Meg Ohm - ½ Watt - 20% 100 Volt - Carbon
R10	130-93	450 Ohm - ½ Watt - 10% 10 Volt - Carbon
R11	101-44	4.75 Ohms - Rheostat
R12	130-52	50M Ohm - ½ Watt - 20% 10 Volt - Carbon
		CONDENSERS
C1	100-11	.01 x 400 Volt - 25%
C2	100-22	.05 x 200 Volt - 25%
C3	129-12	.00025 Mica - MT - 20%
C4	124-14	Series Pad
C5	100-9	.05 x 200 Volt - 25%
C6	129-5	.0001 Mica - MT - 20%
C7	100-6	.25 x 200 Volt
C8	100-9	.05 x 200 Volt - 25%
C9	129-2	.0005 Mica - MT - 20%
C10	100-11	.01 x 400 Volt - 25%
C11	100-11	.01 x 400 Volt - 25%
C12	119-22	10.0 Mfd. x 25 Volts - Working Voltage
		PARTS
T1	111-46	Antenna Coil
T2	110-36	Oscillator Coil
T3	108-67	Input I.F. Coil 465 K.C.
T4	108-68	Output I.F. Coil 465 K.C.
T5	102-29	Two Gang Condenser
L	114-19	Six Inch Magnetic Speaker

DESCRIPTION

TUBES:

The tube complement of this chassis is as follows:

1 Type 1A6—first detector oscillator.
1 Type 34—I.F. amplifier. 465 K. C.
1 Type 30—second detector. A. V. C.
1 Type 32—audio.
1 Type 950—output.

SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram, are measured with a new set of batteries.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

ALIGNING INSTRUCTIONS

CAUTION: No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as run down batteries, defective tubes, poor installations, open or grounded antenna systems, defective condensers and resistors.

In order to properly align this chassis, an oscillator (generator) is necessary.

All adjustments should be made with a non-metallic screw driver.

ALIGNING I.F. TRANSFORMERS: (465 K.C.)

With volume control full on and with variable condenser at its minimum capacity position, plates entirely out of mesh, and with external oscillator set at 465 K.C. connected in series with a .1 mfd. condenser, to the grid of the 1A6 tube (cap at top of tube), adjust I.F. transformers, parts number 108-67 and 108-68, to resonance. Both of these transformers have two (2) adjustments each, they are accessible from the tops of the cans (for location see top view).

Use as a resonance indicator an output meter connected across the outside terminals of the speaker or by means of an adapter to the plate and screen of the type 950 output tube. Maximum deflection of the volt meter indicates resonance.

Use only enough signal to get a readily readable output.

A low range output meter or the low scale of a multi-range meter should be used.

BROADCAST BAND ALIGNMENT:

Set external oscillator to 1720 K.C. and connect it in series with a 200 mmfd. condenser to the antenna and ground posts.

(a) With variable condenser in its minimum capacity position, plates entirely out of mesh, adjust oscillator trimmer (rear section of variable condenser) to resonance.

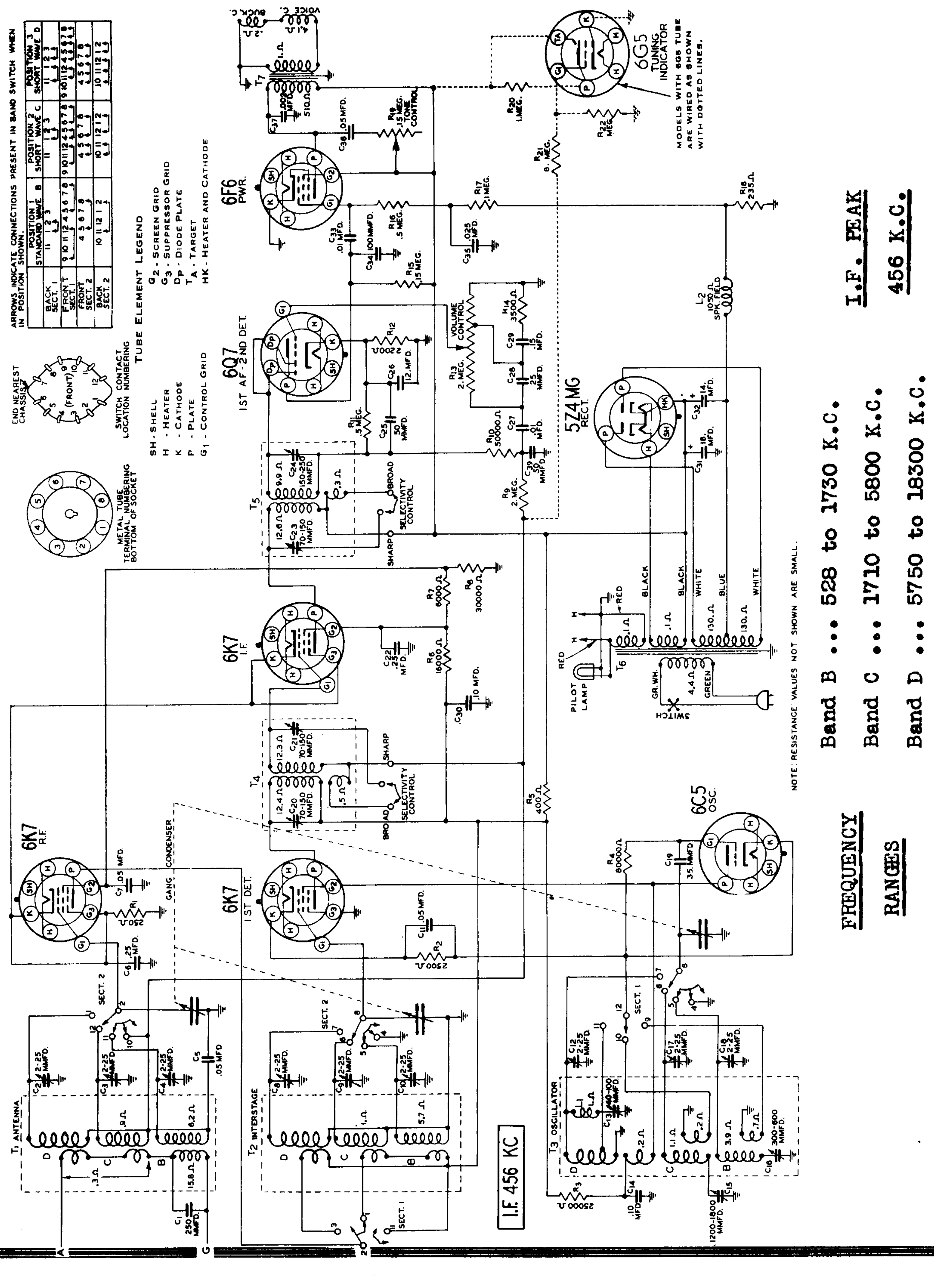
(b) Re-set external oscillator to 1400 K.C. Rotate variable condenser, pick up signal and adjust antenna trimmer (front section of variable condenser) to resonance.

(c) Re-set external oscillator to 600 K.C., move dial pointer to 600 K.C., and adjust series pad, part number 124-14 (see top view), to resonance. While making this adjustment, slowly rock variable condenser to and fro until maximum output is obtained.

(d) Check for sensitivity at 1400, 1000, 600 K.C. DO NOT BEND PLATES.

MONTGOMERY WARD & CO.

MODELS 308–318–408–418 62–226 62–228 62–259



MONTGOMERY WARD & CO.

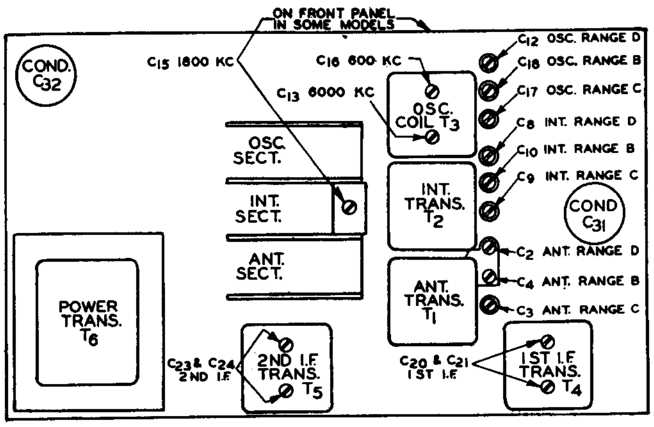
MODELS 308-318-408-418 62-226 62-228 62-259

Line Voltage: 115
Volume Control: Maximum

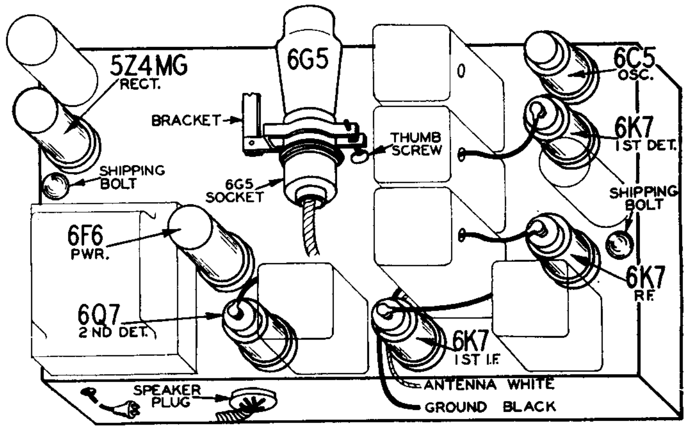
Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	RF..................	0	6.1(1)	260	100	4.0	....	6.1(1)	4.0
6K7	1st Det.............	0	6.1(1)	260	118	0	....	6.1(1)	9.0
6C5	Osc................	0	6.1(1)	120	...	0	....	6.1(1)	0
6K7	I F................	0	6.1(1)	260	138	4.0	....	6.1(1)	4.0
6Q7	1st A.F.—2nd Det.....	0	6.1(1)	105	0	0	....	6.1(1)	1.4
6F6	Power Amp..........	0	6.1(1)	238	260	18	....	6.1(1)	0
5Z4MG	Rect................	0	4.9(2)	...	680(3)	...	680(3)	....	4.9(2)
6E5	Tuning Indicator	Plate to Ground 30(4)		Target to Ground 270		Cathode to Ground 0		Across Heater 6.1 A.C.	

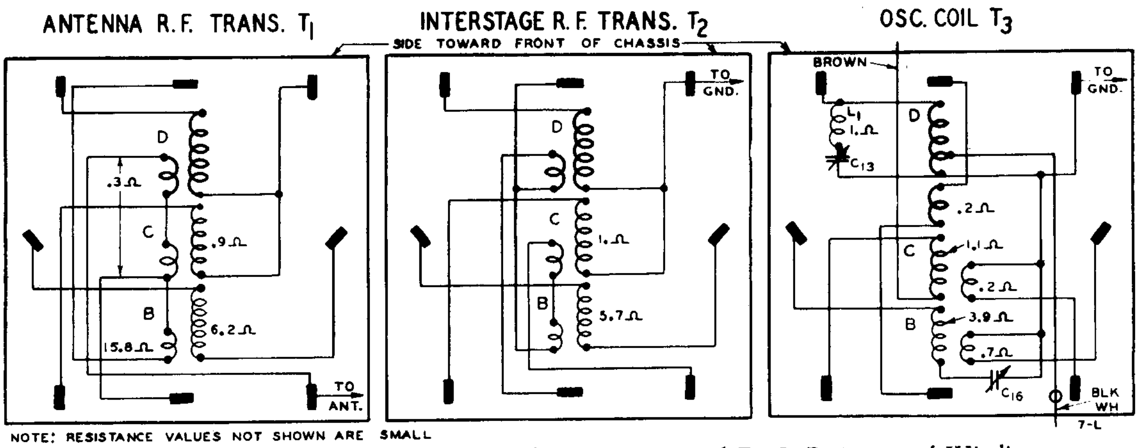
(1) A.C. voltage as read across heater terminals 2 and 7.
(2) A.C. voltage as read across heater terminals 2 and 8.
(3) A.C. voltage as read across terminals 4 and 6.
(4) As read with 500,000 ohm meter.



Location of Trimmers



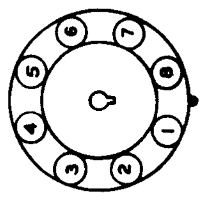
Location of Tubes



NOTE: RESISTANCE VALUES NOT SHOWN ARE SMALL

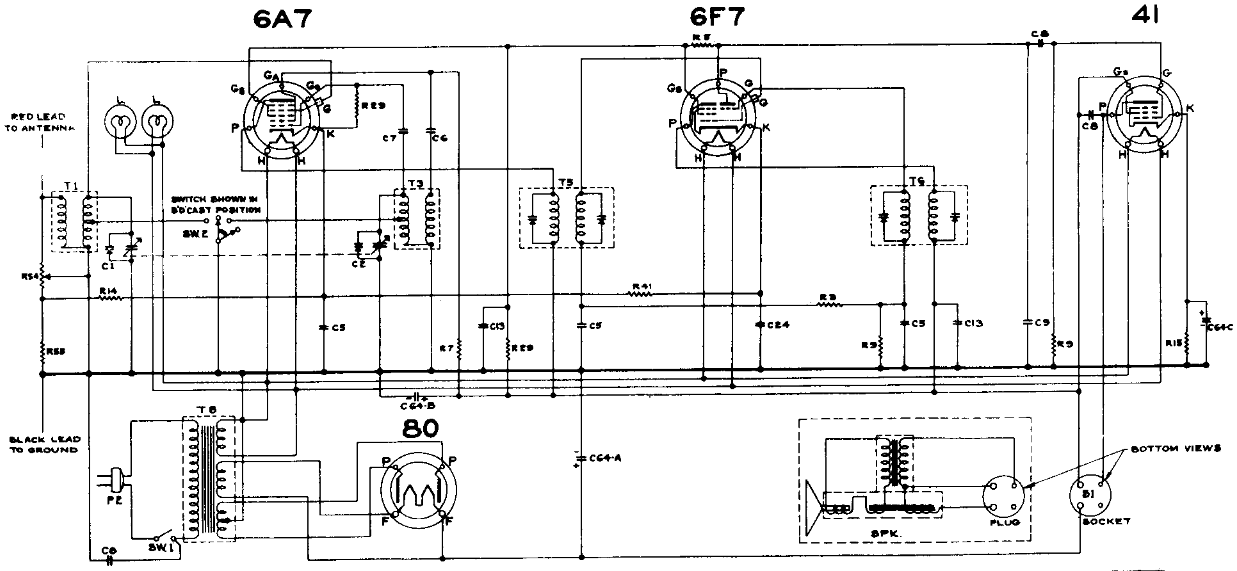
R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

Metal tube terminal numbering (bottom of socket)



NOBLITT-SPARKS INDUSTRIES, Inc.

ARVIN HOME RADIO MODELS 417 & 467



RESISTORS

R	OHMS	W	PART NO.
3	100M	1/4	17-2068
5	500M	1/4	17-2070
7	20M	1/4	17-2072
9	1MEG	1/4	17-2080
14	200	1/4	17-4287
15	500	1/2	17-4717
29	50M	1/4	17-2060
41	100	1/4	17-14082
54	10M	V.C.	17-15759
55	2500	1/4	17-2087

CONDENSERS

C	CAPACITY	VOLT.	PART NO.
1, 2	2 GANG VARIABLE		17-14757
5	.05 TINY	160	17-14015
6	.002 MICA	600	17-2063
7	.0001 MICA	600	17-2064
8	.01	600	17-14016
9	.001 MICA	600	17-4292
13	.1	400	17-14046
24	.5 PAPER	160	17-14040
64-A, 64-B	8, 8 ELECT.	475	17-14060
64-C	12 ELECT.	25	

CHOKES & TRANSFORMERS

T-X	TYPE	PART NO.
T	TRANSFORMERS	
1	ANTENNA COIL	[illegible]-14751
3	OSCILLATOR COIL	[illegible]-14752
5	FIRST I.F. COIL	[illegible]-14753
6	SECOND I.F. COIL	[illegible]-14754
8	POWER TRANSF.	[illegible]-15750

MISCELLANEOUS UNITS

SYMBOL	DESCRIPTION	PART NO.
SW. 1	VOLUME CONTROL SWITCH (SEE R54)	17-15759
SW. 2	BAND SWITCH	17-15777
SPK.	DYNAMIC SPEAKER ASSEMBLY	17-15760
S1	SPEAKER SOCKET	17-13026
L	DIAL LIGHT	17-13904
PE	POWER CORD & PLUG	17-15791

I.F. PEAK 456 K.C.
BALANCE AT 1400 K.C.
NOTE:- THERE ARE NO ADJUSTMENTS ON THIS RECEIVER FOR THE POLICE BAND

MODEL 417-467 SOCKET VOLTAGES

(INPUT VOLTAGE 115 RMS)

Tube	Heater	Plate	Screen	Cathode	Triode Plate	Anode Grid
6A7	6.3 A. C.	275	98	3.15†	....	200
6F7	6.3 A. C.	275	98	3.75†	32	.....
41	6.3 A. C.	245	278	19.0	....	.....
80	5.0 A. C.	393 A. C.	......	392.0	....	.....

†Volume control full on.

POINT TO POINT RESISTANCES

All readings taken to ground unless otherwise specified.
Tubes removed and speaker connected.

6A7

Heater	.1 Ω
Heater	.1 Ω
Anode Grid to B+	20,000 Ω
Plate to B+	15 Ω
Screen to B+	50,000 Ω
Cathode	200 Ω
*Control Grid	5 Ω
Oscillator Grid	50,200

*Band Switch set in

6F7

Heater	.1 Ω
Heater	.1 Ω
Plate to B+	15 Ω
Screen to B+	50,000 Ω
Cathode	300 Ω
Control Grid	1,100,000 Ω
Triode Grid	1,000,000
Triode Plate to B+	550,000

41

Heater	.1
Heater	.1
Plate to B+	700 Ω
Screen to B+	0
Cathode	500 Ω
Control Grid	1,000,000

80

Filament to B+	1,600 Ω
Plate	440 Ω
Plate	410 Ω
Plate to Plate	850 Ω
Filament to Filament	.1

COIL, TRANSFORMER AND SPEAKER RESISTANCES

Speaker Field	1,600 Ω
Speaker Voice Coil	.7 Ω
T1 Ant. Primary	12 Ω
T1 Ant. Secondary	5 Ω
T3 Osc. Primary	11.0 Ω
T3 Osc. Secondary	1.4 Ω
T5 1st I. F. Trans. Pri.	15.0 Ω
T5 1st I. F. Trans. Sec.	15.0 Ω
T6 2nd I. F. Trans. Pri.	15.0 Ω
T6 2nd I. F. Trans. Sec.	15.0 Ω
T7 Output Trans. Pri.	700 Ω
T7 Output Trans. Sec.	.7 Ω
T8 Power Trans. Pri.	19.5 Ω
T8 Power Trans. Sec. Hi-volt	850 Ω
T8 Power Trans. Sec. 6V	.2 Ω
T8 Power Trans. Sec. 5V	.1 Ω

1. Connect the balancing oscillator to grid cap of the 6A7 tube. (456 KC.)
2. Adjust padder condensers 1, 2, 3 and 4 in the order designated by their numbering, for maximum output.
3. Recheck the adjustment of each padder beginning with number 1 to prevent interlocking.
4. Disconnect oscillator from 6A7 grid cap and replace grid clip.
5. Connect oscillator to antenna lead (red wire). Rotate condenser entirely out of mesh and adjust oscillator padder number 5 for resonance at 1650 KC.
6. Reset the balancing oscillator to 1500 KC and rotate the tuning condenser until this signal is received. Then adjust padder number 6 for maximum output.
7. Slide dial pointer until it points directly to 15 with radio tuned to 1500 KC.

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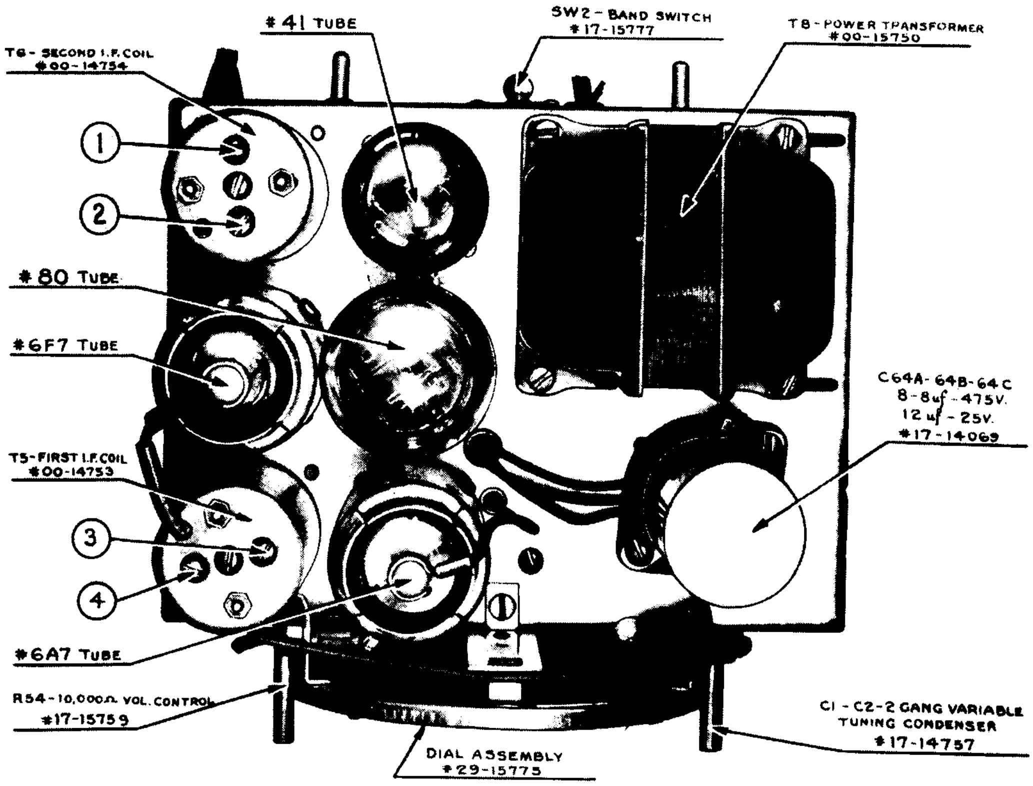
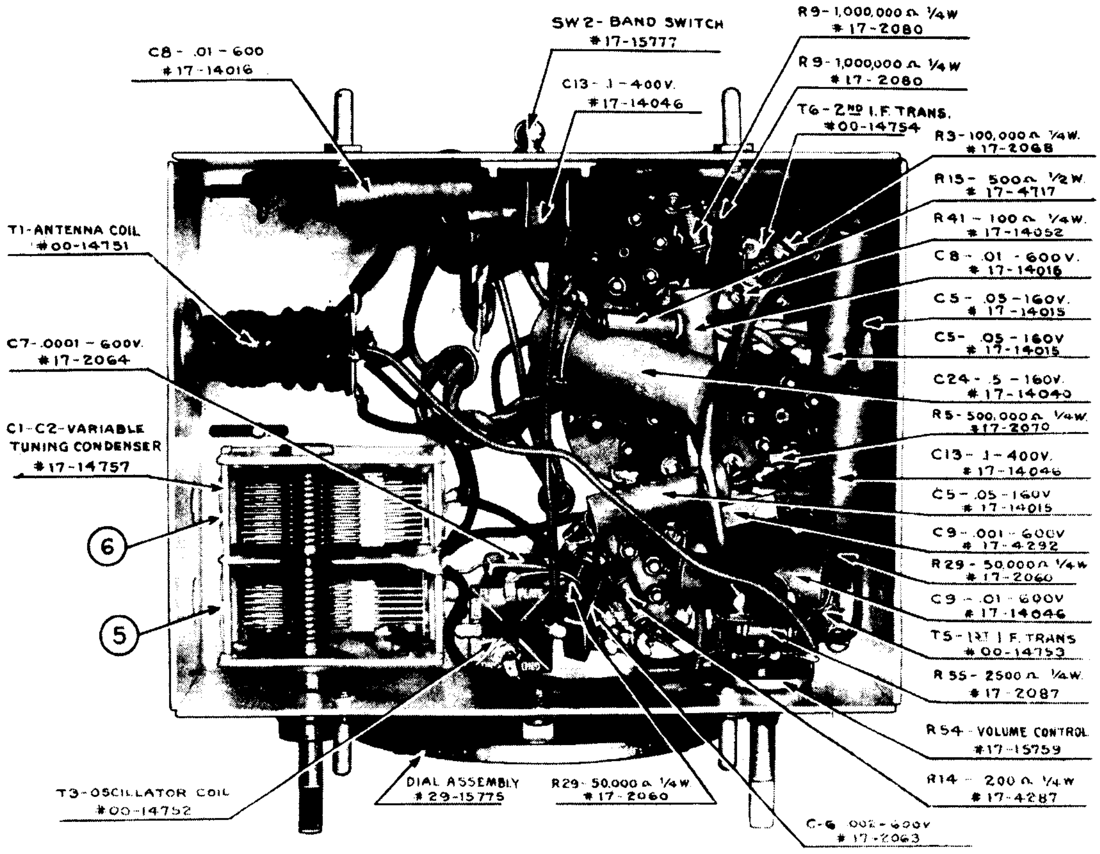
MODELS 417-467 ARVIN RADIO





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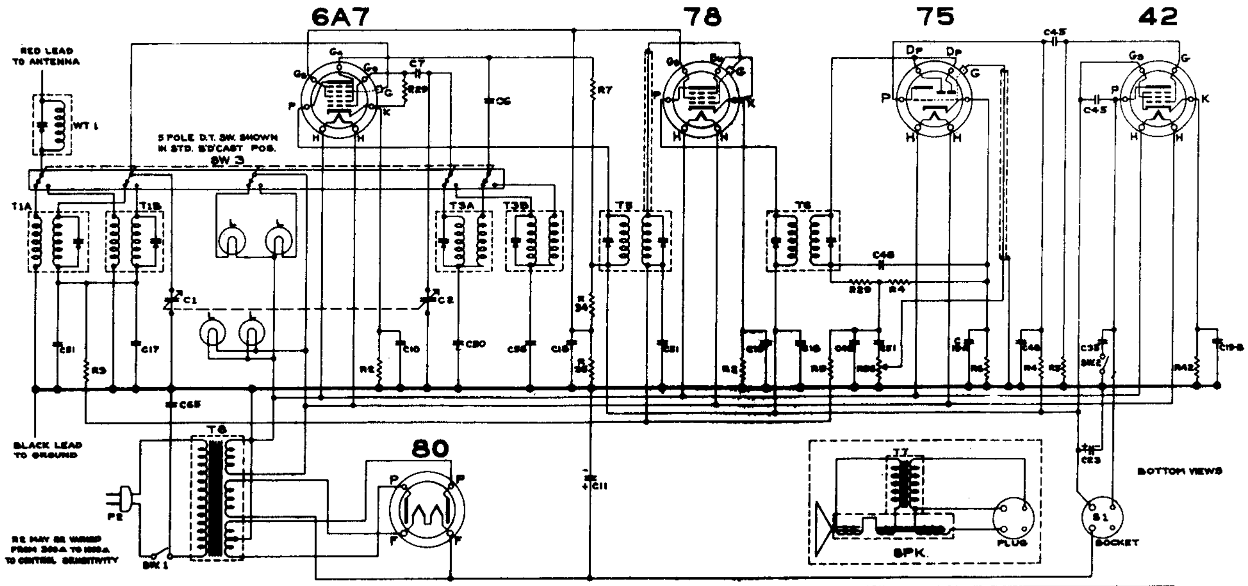
ARVIN HOME RADIO MODELS 517 & 527



RESISTORS				CONDENSERS								CHOKES & TRANSFORMERS			MISCELLANEOUS UNITS		
R	Ohms	W	Part No.	C	Capacity	Volt	Part No.	C	Capacity	Volt	Part No.	T	Type	Part No.	Symbol	Description	Part No.
2	400	1/4	17-4762	1	2 Gang		17-15786	38	[illegible] Mica	600	[illegible]	T	Transformers	[illegible]	W.T. 1	Wave Trap	[illegible]
3	[illegible]	1/4	17-2068	2	Variable			65	.01 Strap	400	[illegible]	1-A	Ant. Coil-[illegible]	[illegible]	SPK.	517 Dynamic Speaker Assy.	17-15786
4	[illegible]	1/4	17-2069	6	.002 Mica	600	17-2063	[illegible]	.05 Can	160	17-14041	1-B	Ant. Coil - S.W.	[illegible]	SPK.	527 Dynamic Speaker Assy.	17-15628
5	[illegible]	1/4	17-2070	7	.0001	600	17-2064					3-A	Osc. Coil-[illegible]	[illegible]	SW. 1	On-Off Switch (See R56)	17-15756
6	[illegible]	1/4	17-2071	10	.1 Can	400	17-14024					3-B	Osc. Coil - S.W.	[illegible]	SW. 2	Tone Control Switch	17-15766
7	[illegible]	1/4	17-2072	11	16. Elect.	475	17-14002					5	First I.F. Coil	[illegible]	SW. 3	Band Switch	17-15768
9	1 Meg.	1/4	17-2060	17	.005 Mica	600	17-14029					6	Second I.F. Coil	[illegible]	L	Dial Light	17-13904
29	50 M	1/4	17-2060	18	.15 Paper Can	400	17-4714					7	Output Transf. 517	[illegible]	S 1	Speaker Socket	17-13026
34	15 M	1	17-14032	19-A	12. Elect.	25	17-4707					7	Output Transf. 527	[illegible]	P 2	Power Cord & Plug	17-15731
35	[illegible]	1/2	17-14049	19-B	12.	25						8	Power Transf.	[illegible]			
42	400	1/2	17-4169	23	16. Wet Elect.	475	17-14000										
[illegible]	[illegible]	[illegible]	17-15728	35	.05 Can	600	17-14011										
				45	.01 Can	600	[illegible]										
				46	[illegible] Mica	600	[illegible]										
				[illegible]	[illegible]		[illegible]										

I.F. PEAK 456 K.C.

2 BANDS { BALANCE AT 1400 K.C.-PAD AT 600 K.C. / BALANCE AT 15.0 M.C.-CHECK AT 6.0 M.C.

MODEL 517-527 SOCKET VOLTAGES

(INPUT VOLTAGE 118 RMS)

Tube	Heaters	Plate	Screen	Cathode	Oscillator Grid. 1500 KC.	Anode Grid.
6A7	6.3	270	100	5	10	195
78	6.3	270	100	4	....	......
75	6.3	130	......	1.5	....	......
42	6.3	250	270	15	....	......
80	5.0	340	......	390	....	......

POINT TO POINT RESISTANCES

All readings taken to ground unless otherwise stated. Tubes removed and speaker connected volume control in full on position

6A7

Heater	.0
Heater	.1
Cathode	400 ohms
Oscillator Grid	50,400 ohms
Anode Grid to B+	20,000 ohms
Screen Grid to B+	15,000 ohms
Plate to B+	15 ohms
Control Grid	1,305,000 ohms

42

Heater	.0
Heater	.1
Cathode	400 ohms
Screen Grid to B+	0
Plate to B+	700 ohms
Control Grid	500,000 ohms
Screen Grid to Ground	35,000 ohms

75

Heater	.0
Heater	.1
Cathode	5,000 ohms
Diodes	255,000 ohms
Plate to B+	200,000 ohms
Control Grid	500,000 ohms

80

Filament to B+	1,750 ohms
Plate	155 ohms
Plate	145 ohms
Plate to Plate	300 ohms

78

Heater	.0
Heater	.1
Cathode	400 ohms
Suppressor Grid	400 ohms
Screen to B+	15,000 ohms
Plate to B+	15 ohms
Control Grid	1,205,000 ohms

COIL, TRANSFORMER AND SPEAKER RESISTANCES

WT1 Wave Trap	3.0 ohms
T1A Broadcast Ant. Pri.	15.0 ohms
T1A Broadcast Ant. Sec.	3.5 ohms
T1B Short Wave Ant. Pri.	2.6 ohms
T1B Short Wave Ant. Sec.	1.7 ohms
T3A Broadcast Osc. Pri.	2.6 ohms
T3A Broadcast Osc. Sec.	1.7 ohms
T3B Shortwave Osc. Pri.	.2 ohms
T3B Shortwave Osc. Sec.	.7 ohms
T5 First I. F. Pri.	15.0 ohms
T5 First I. F. Sec.	15.0 ohms
T6 Second I. F. Pri.	15.0 ohms
T6 Second I. F. Sec.	15.0 ohms
T7 Speaker Trans. Pri.	570 ohms
T7 Speaker Trans. Sec.	2.6 ohms
Speaker Field	1,500 ohms
Speaker Voice Coil	2.6 ohms
T8 Power Trans. Pri.	6.5 ohms
T8 Power Trans. Sec. (5V)	.2 ohms
T8 Power Trans. Sec. (6V)	.2 ohms

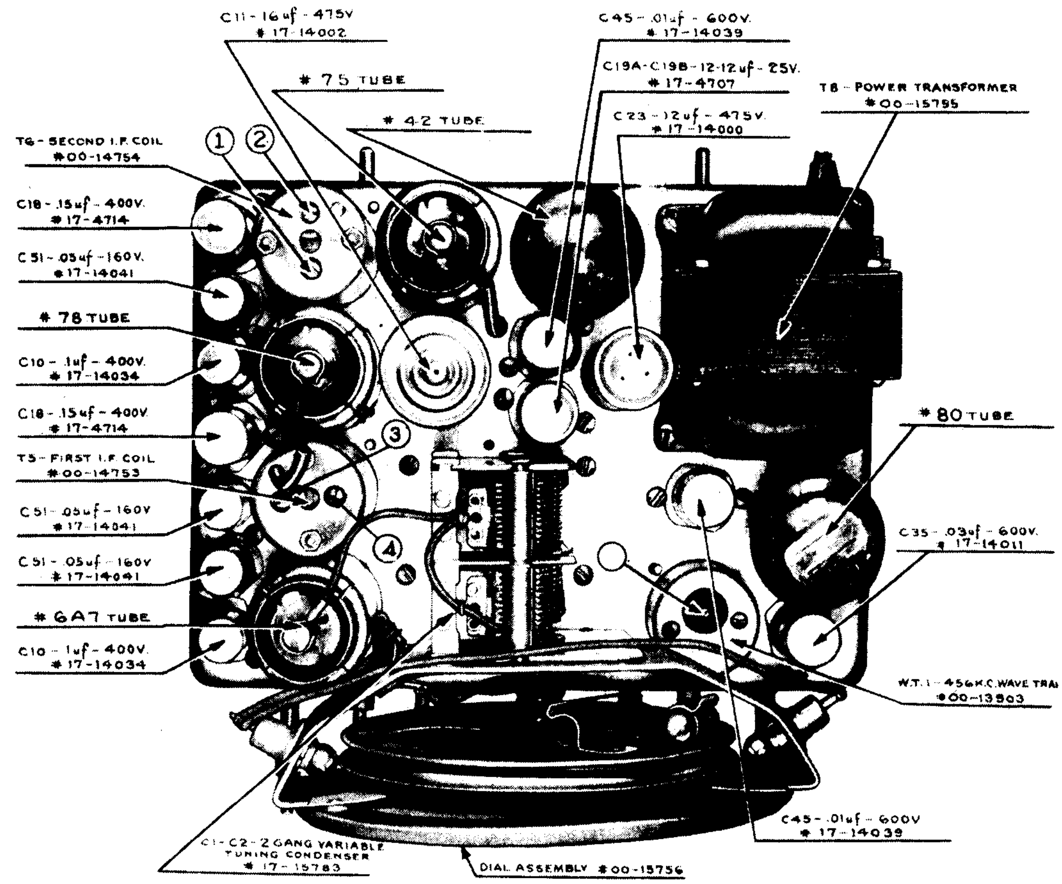
FREQUENCY RANGE: 535—1650 Kilocycles
5.5—18.5 Megacycles

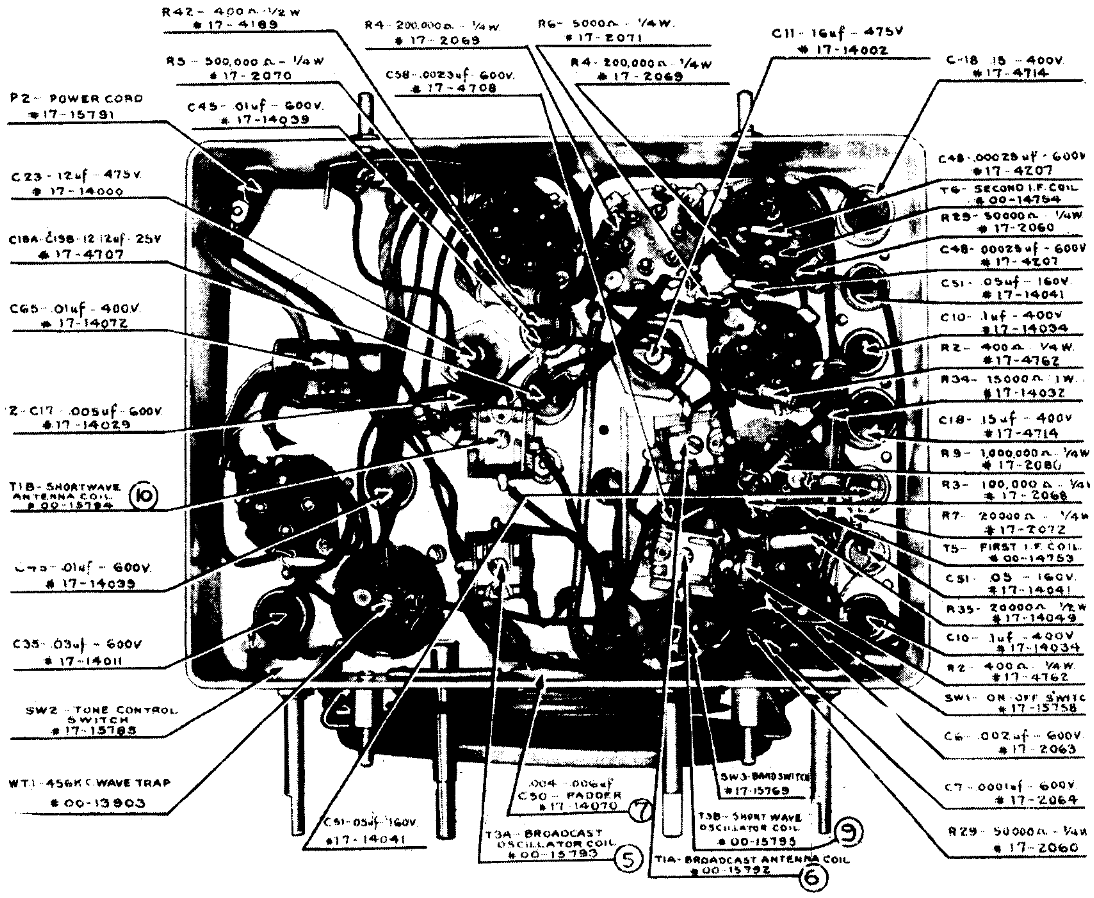
POWER OUTPUT: 3.5 Watts

SPEAKER: 6" Dynamic; 3 Ohm Voice Coil

NOBLITT-SPARKS INDUSTRIES, Inc.

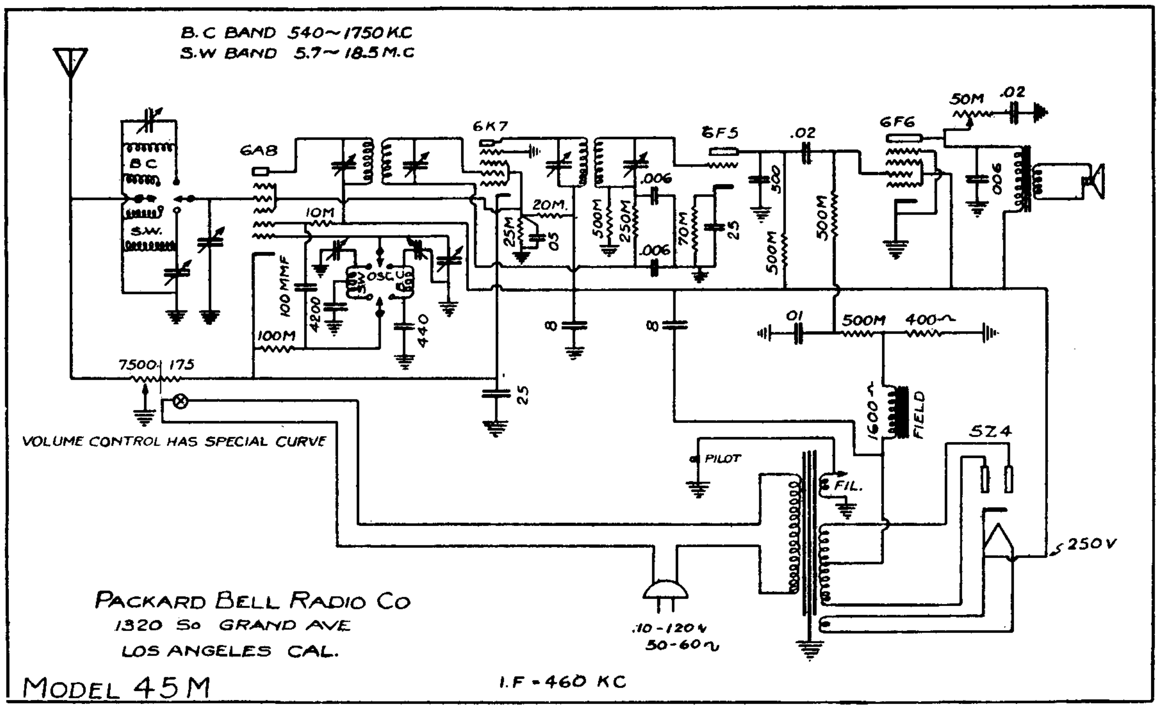
MODELS 517-527 ARVIN RADIO



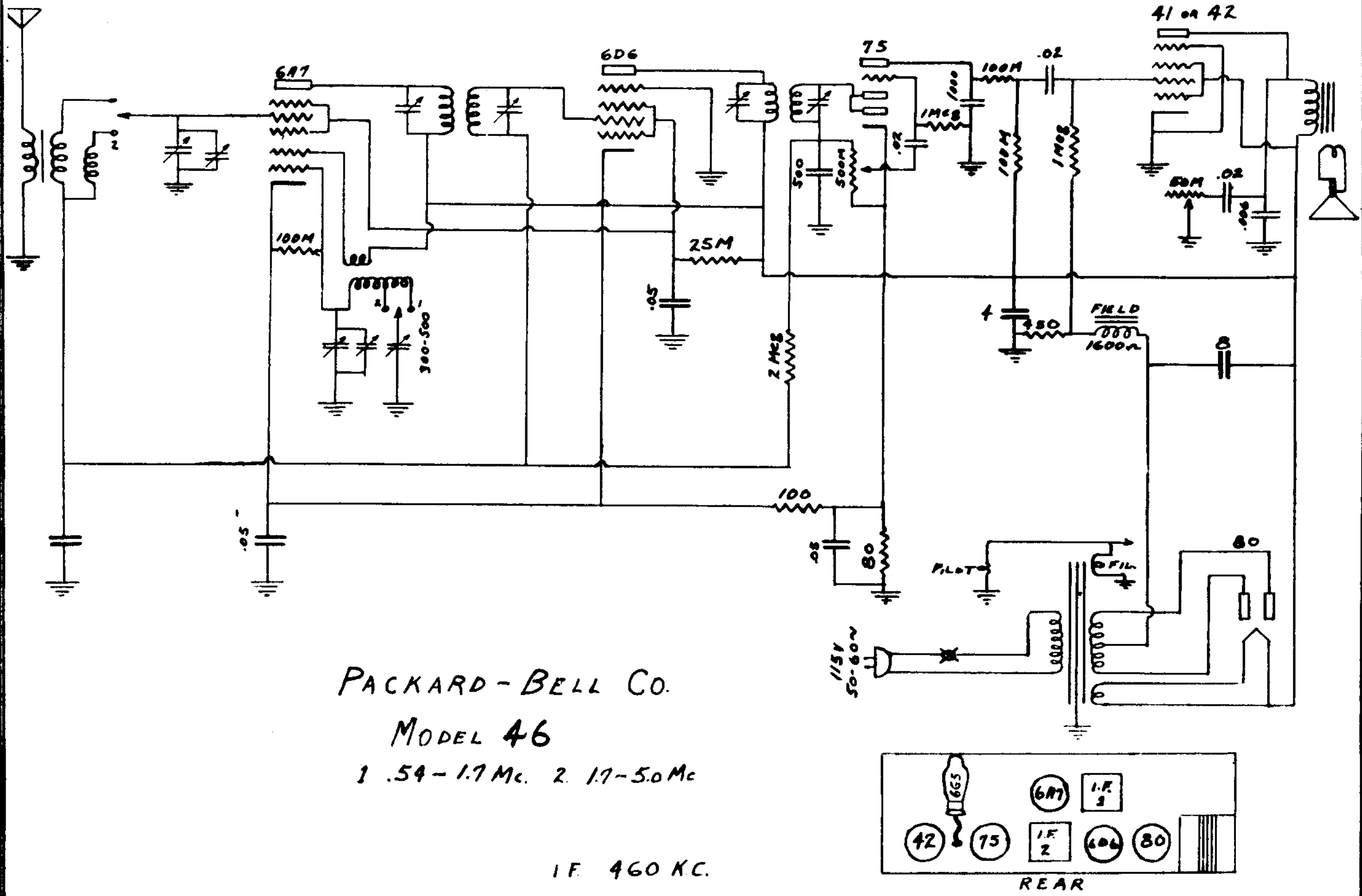


PACKARD-BELL CO.

MODEL 45M

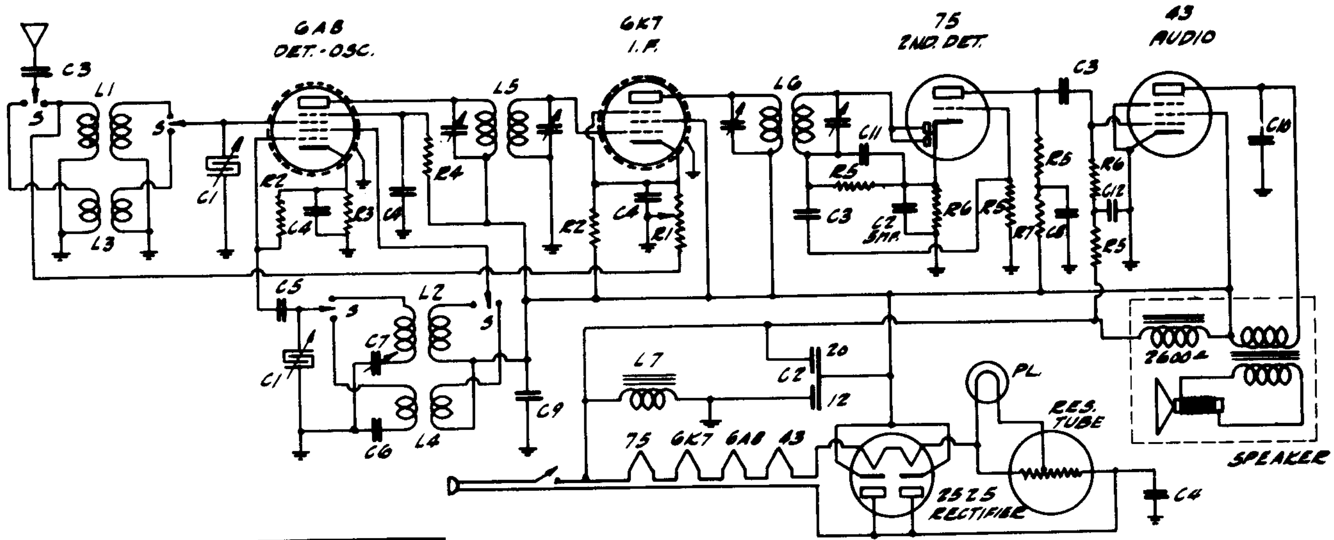


MODEL 46



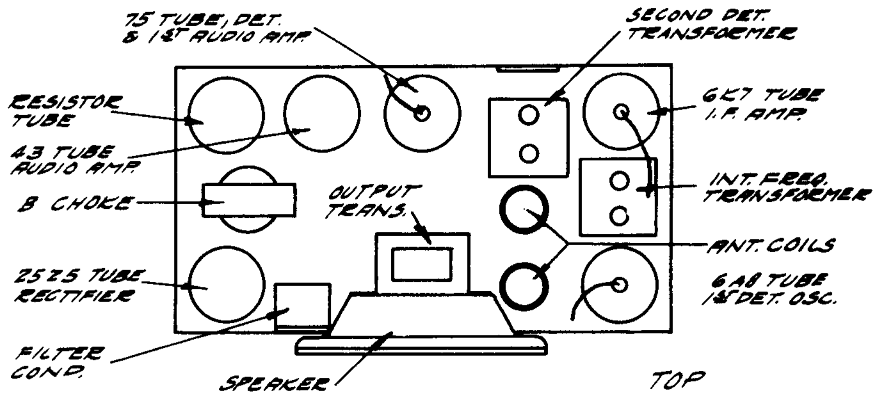
PIERCE AIRO, Inc.

MODEL 505 REVISED



CONDENSERS		
SYM.	MFD.	NO.
C1	VAR.C.	2264
C2	20-12-5	2296
C3	.02	2191
C4	.05	2046
C5	.0001	2123
C6	.0028	2253
C7	PADDER	2229
C8	.1-200V.	2022
C9	.1-400V.	2188
C10	.006	2007
C11	.00035	2233
C12	.25	2053

RESISTORS		
SYM	OHMS	NO.
R1	VOL.CON.	8474
R2	50,000	3269
R3	240	3252
R4	25,000	3228
R5	.5 MEG.	3161
R6	6,500	3319
R7	67,000	3321



SERVICE NOTES

INT. FREQ. ALIGNMENT. Intermediate frequency peaked at 456 KC. Connect test oscillator to grid of 6A7 and chassis. (Ground stator of front section of variable condenser during this operation.)

R. F. ALIGNMENT

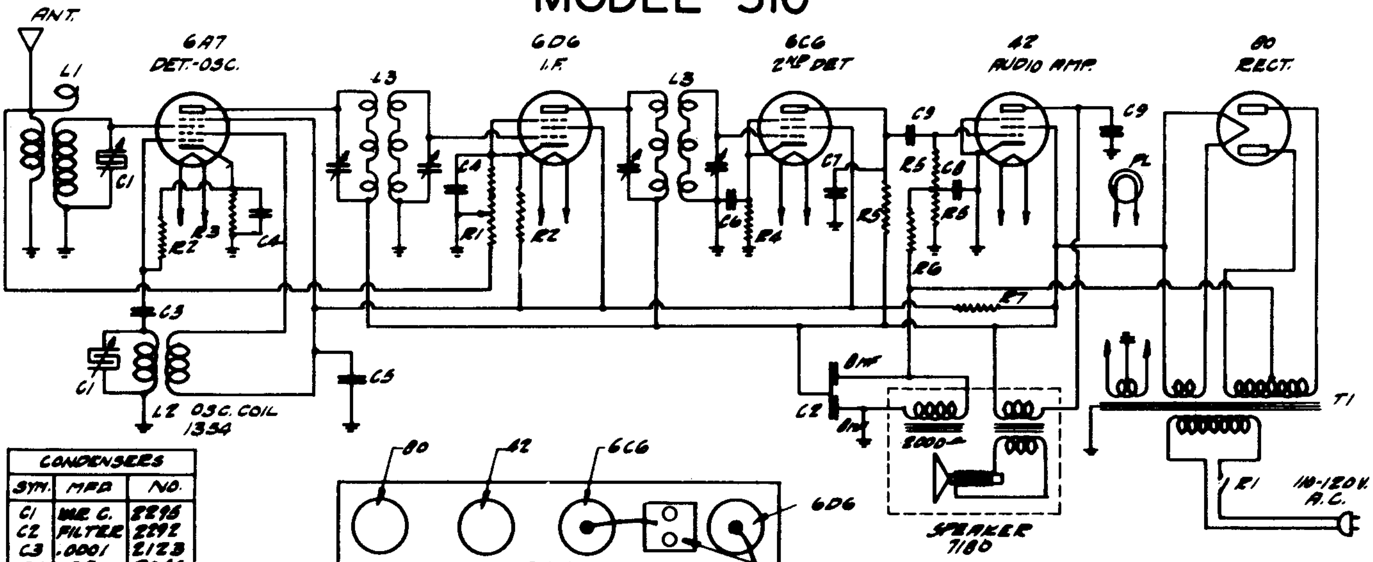
Connect test oscillator to antenna and chassis and set dial to 1500 KC and peak variable condensers. For low frequency adjustment set dial at 600 KC. and repeak padding condenser on front of chassis, rocking variable condenser at the same time. Short Wave Calibration is automatically taken care of by repeaking at 1500 KC. The short wave coils are matched carefully for this setting. A fixed Calibrated padder automatically peaks the short waves for the low frequency setting.

LIST PRICES OF REPLACEMENT PARTS

PART NUMBER		LIST PRICE
1328	B Choke	.75
1358	B. C. Ant. Coil	.60
1357	B.C. Oscillator Coil	.55
1250	S.W. Antenna Coil	.55
1249	S.W. Oscillator Coil	.55
1355	I.F. Transformer	1.40
1356	2nd Det. Transformer	1.40
2264	Variable Condenser	2.45
2296	Comb. Electrolytic	1.40
2007	.006 Tubular Cond.	.35
2191	.02 " "	.35
2188	.1 " "	.35
2046	.05 " "	.35
2123	.0001 " "	.40
2253	.0028 Mica Condenser	.45
2233	.00035 " "	.35
2033	.25 Mica Condenser	.40
2229	Padding Condenser	.45
7172	Spea ker	4.25
8496	Line Cord	.35
8474	Volume Control	1.05
8475	Wave Band Switch	.65
8512	Knobs	.20

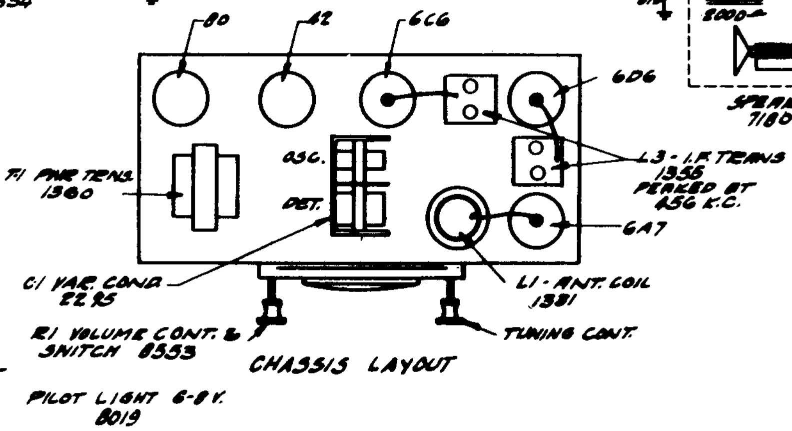
PIERCE AIRO, Inc.

MODEL 510



CONDENSERS		
SYM.	MFD.	NO.
C1	VAR. C.	2295
C2	FILTER	2292
C3	.0001	2123
C4	.05	2046
C5	.1	2188
C6	.25	2033
C7	.00025	2047
C8	.1	2022
C9	.01	2056

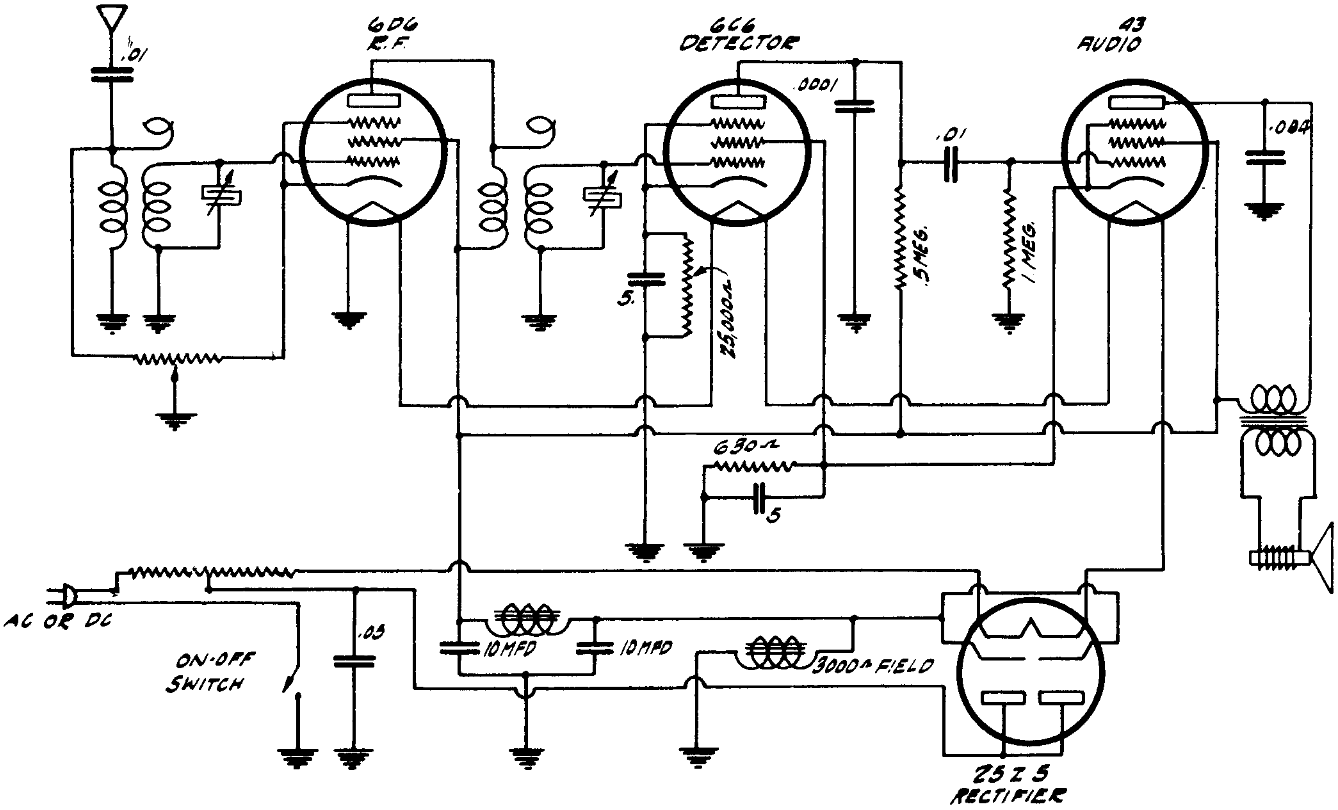
RESISTORS		
SYM.	OHMS	NO.
R1	VOL. CONT.	8553
R2	54,000	3292
R3	300	3346
R4	35,000	3180
R5	.5 MEG.	3161
R6	2. MEG.	3184
R7	18,000	3347



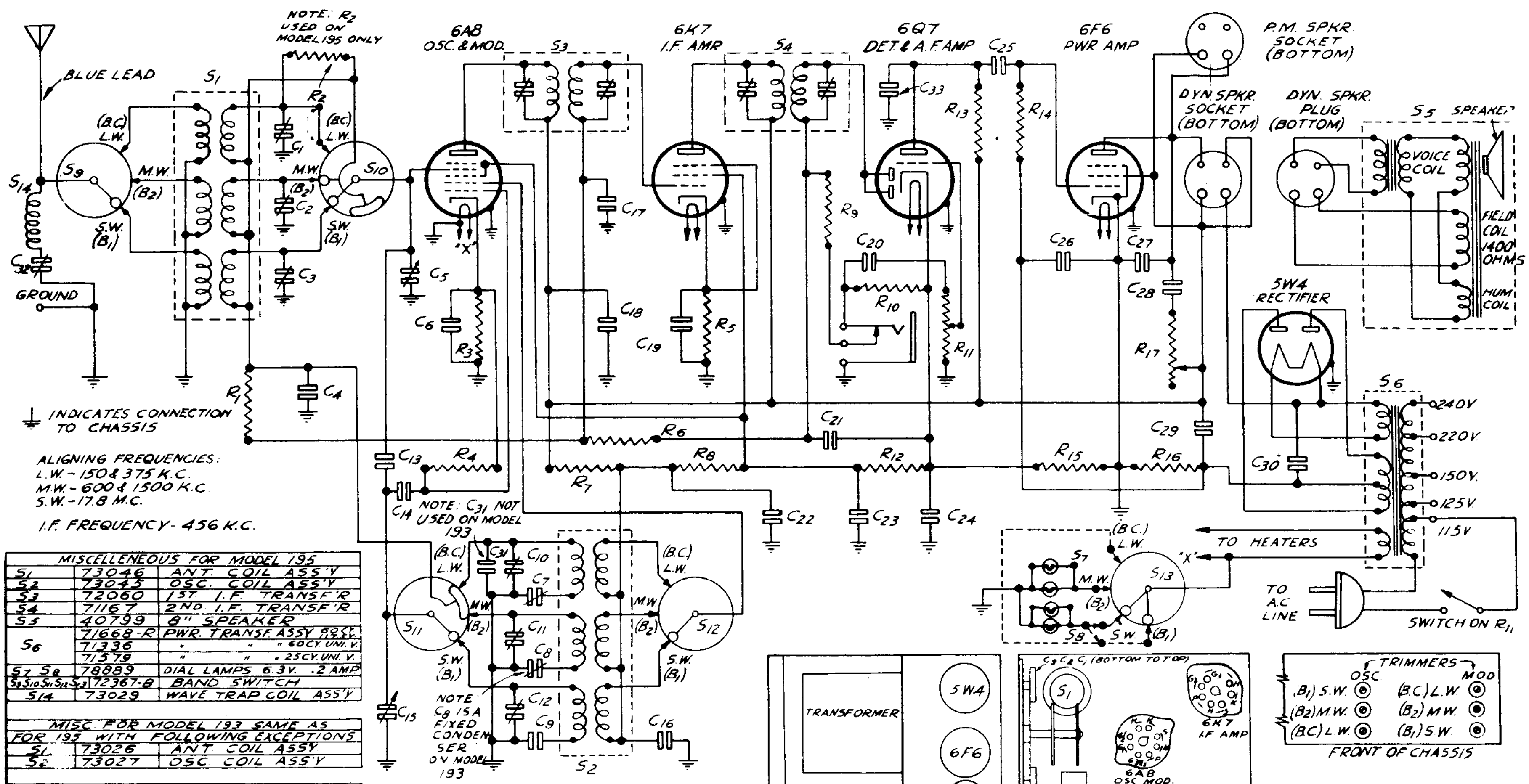
CHASSIS LAYOUT

MODEL 510

MODEL 4405



PILOT RADIO CORPORATION
MODELS 193 & 195



INDICATES CONNECTION TO CHASSIS

ALIGNING FREQUENCIES:
L.W. - 150 & 375 K.C.
M.W. - 600 & 1500 K.C.
S.W. - 17.8 M.C.

I.F. FREQUENCY - 456 K.C.

MISCELLENEOUS FOR MODEL 195		
S_1	73046	ANT. COIL ASS'Y
S_2	73045	OSC. COIL ASS'Y
S_3	72060	1ST I.F. TRANSF'R
S_4	71167	2ND I.F. TRANSF'R
S_5	40799	8" SPEAKER
S_6	71668-R	PWR. TRANSF. ASSY 60 CY. 115 V.
	71336	" " " 60 CY. UNI. V.
	71579	" " " 25 CY. UNI. V.
S_7 S_8	78889	DIAL LAMPS 6.3 V. .2 AMP.
S_9 S_{10} S_{11} S_{12} S_{13}	72367-B	BAND SWITCH
S_{14}	73029	WAVE TRAP COIL ASS'Y

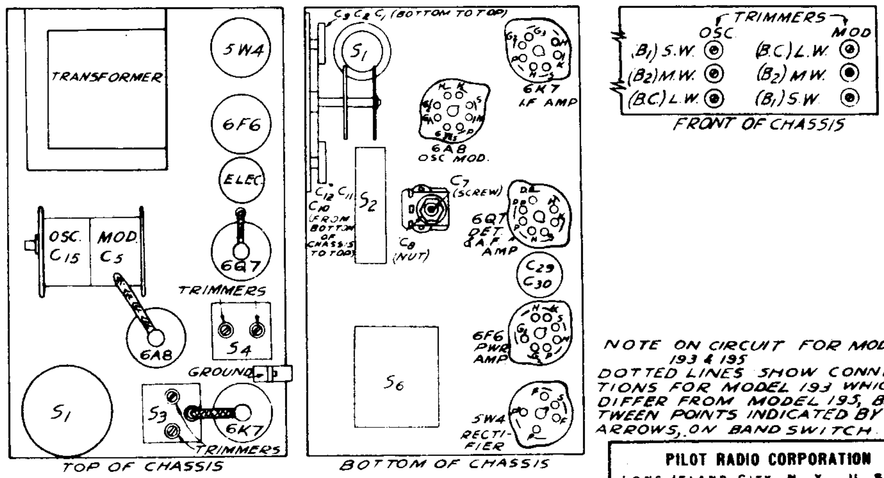
MISC. FOR MODEL 193 SAME AS FOR 195 WITH FOLLOWING EXCEPTIONS		
S_1	73026	ANT. COIL ASSY
S_2	73027	OSC. COIL ASS'Y

CONDENSERS FOR MODEL 195		
C_1 C_2 C_3	72363	TRIMMER
C_4 C_{17}	22055-I	.05 MFD. 200V. PAPER
C_5 C_{15}	78851	405 MMFD. 2 GANG VAR.
C_6 C_{19}	22055-M	.1 MFD. 200V PAPER
C_7 C_8	72355-G	PADDER 3-150 & 300-600 mmfd.
C_9	27734-W	6000 mmfd. MICA
C_{10} C_{11} C_{12}	72363	TRIMMER
C_{13}	71525-A	NEUTRALIZING ASS'Y
C_{14}	27723-W	50 mmfd MICA
C_{16}	22055-C	.05 mfd. 600V. PAPER
C_{18}	22055-AB	.1 mfd 600V. "
C_{20} C_{25}	22055-A	.01 mfd 600V. "
C_{21} C_{33}	27701-W	250 mmfd. MICA
C_{22}	72353	ELEC. 4 mfd. 475V.
C_{23}	22055-P	.05 mfd. 400V PAPER
C_{24}	22055-F	.25 mfd 200V PAPER
C_{26}	22055-S	.5 mfd 200V. "
C_{27}	22055-R	.005 mfd. 1000V. "
C_{28}	22055-E	.05 mfd. 1000V. "
C_{29} C_{30}	71045-A	ELEC. 8-8 mfd. 475V.
C_{31}	27736-O	25 mmfd. MICA
C_{32}	71503-F	TRIMMER 15-100 mmfd.

CONDENSERS FOR MODEL 193 SAME AS 195 WITH FOLLOWING EXCEPTIONS		
C7	71503-A	PADDER 250-500 mmfd
C8	27732-W	1600 mmfd MICA
C31	27736-O	NOT USED ON 193

RESISTORS FOR MODEL 195		
R_1	13031	100,000 OHMS 1/4 WATT
R_2 R_{14}	13024	500,000 " 1/4 "
R_3 R_5	13115	400 " 1/4 "
R_4 R_9	13164	50,000 " 1/4 "
R_6	13001	1 MEGOHM 1/4 "
R_7	13073	3000 OHMS 1/2 "
R_8	13129	15000 OHMS 1 "
R_{10}	13147	300,000 " 1/4 "
R_{11}	78845	750,000 " VOL. CONT. & SW.
R_{12}	13148	30,000 OHMS 1/4 WATT
R_{13}	13171	250,000 " 1/4 "
R_{15}	13130	420 " 1/4 "
R_{16}	13059	250 " 1/4 "
R_{17}	78846	100,000 OHMS TONE CONTR.

R_2 — 13024 — NOT USED ON MODEL 193
ALL OTHER RESISTORS ARE THE SAME FOR BOTH MODELS, 193 & 195



NOTE ON CIRCUIT FOR MODELS 193 & 195
DOTTED LINES SHOW CONNECTIONS FOR MODEL 193 WHICH DIFFER FROM MODEL 195, BETWEEN POINTS INDICATED BY ARROWS, ON BAND SWITCH.

PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
SCHEMATIC CIRCUIT DIAGRAM & CHASSIS LAYOUT FOR MODELS 193 & 195
DATE 6-23-36
DRWG NO 25131

PILOT RADIO CORPORATION

SERVICE INFORMATION FOR PILOT MODELS 193 AND 195

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require re-alignment, the procedure outlined below should be followed. In the schematic wiring diagram, the location and function of the various alignment capacitors are clearly illustrated. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast," and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator leads from the type 6K7 I. F. Amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. Amplifier, it is essential to repeat the alignment process in both I. F. units with the external oscillator leads connected across the control grid of the 6A8 tube.

WAVE TRAP ADJUSTMENT: With the oscillator still set at 456 kc., connect the oscillator to the antenna and ground. Then adjust the wave trap condenser to minimum deflection on the output meter.

BROADCAST ALIGNMENT: After the I. F. Amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads, through a .0002 mfd. condenser. Set the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response. Adjust the signal section trimmer in the same manner.

Next adjust the 600 kc. padder condenser. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjuscment, following in every detail the procedure previosuly described.

ALIGNMENT OF THE SHORT-WAVE BANDS: The procedure in aligning the short-wave bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser whch is of fixed value and requires no adjustment. The alignment frequency is 16.6 Meters—(18,000 kc.)

Turn the Band Switch to the right. Tune the external oscillator to 16.6 meters. Tune the receiver so that the dial pointer is in a position coincidental with the 16.6 meter indication on the dial scale. Adjust the short wave oscillator trimmer for maximum response. Next adjust the signal circuit trmmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain.

Model 193 is aligned in the same manner at 6,000 kc. with the switch in Band 2 position.

LONG WAVE ALIGNMENT: Procedure in the Model 195 is similar to the Broadcast section of that receiver. Align at 375 kc. Adjust the padder at 160 kc.

Should it be necessary to remove the band switch assembly, it is advisable to realign the receiver after reinstalling.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

VOLTAGES

The D. C. Voltages measured at the tube sockets of the set should be read with a high resistance voltmeter of at least 1000 ohms per volt.

	OSC. DET. Type 6A8	I. F. Type 6K7	POWER DIODE DET. Type 6Q7	PENTODE Type 6F6	RECTIFIER Type 5W4
Plate	230	230	105*	205	***
Cathode	4.	3.	1.5	**	
Screen	85	85	6.3	230	
Filament	6.3	6.3	6.3	6.3	

*Voltages measured through 250,000 ohm resistor.

Speaker field voltage 90 volts. All plate voltages measured to cathode. All screen voltages measured to cathode. All cathode voltages measured to chassis frame.

**Grid bias voltage for No. 42 tube obtained across R-16 (250 ohms resistor).

***Filament to chassis ground 315 volts D. C.

Anode grid of 6A7 to cathode—195 volts.

RECEIVER DESCRIPTION

Frequency Rating —50 to 60 cycles.

Power Consumption—60 Watts.

Tubes —1 type 6A8, 1 type 6K7, 1 type 6Q7, 1 type 6F6, 1 type 5W4.

Undistorted power output—3 watts.

Intermediate Frequency—456 kc.

Tube Functions —Type 6A8 Electron emission control oscillator-detector.
Type 6K7 I. F. amplifier.
Type 6Q7 Duo-diode det. amplifier.
Type 6F6 Class "A" power pentode.
Type 5W4 Full-wave rectifier for power supply.

PHILCO RADIO & TELEVISION CORPORATION

Model 37-675—Codes 121-122

To accurately adjust this receiver, precision test equipment is necessary. A signal generator such as the PHILCO MODEL 088 SIGNAL GENERATOR, covering from 110 to 20,000 K. C. is designed for adjusting the compensators at the various frequencies specified. A visual indication of the receiver output is also necessary to obtain correct adjustment of the compensators. PHILCO MODEL 025 CIRCUIT TESTER contains a sensitive output meter and is recommended for these adjustments.

Philco Fibre Handle Screw-driver No. 27-7059 completes the necessary equipment for these adjustments. The locations of the various compensators are shown in Figs. 5 and 6.

NOTE—The receiver should be allowed to heat for at least 15 minutes before adjusting the compensators.

OUTPUT METER

The 025 Output Meter is connected to the plate and cathode terminals of the 6F6G driver tube. Adjust the meter to use the (0-30) Volt Scale.

INTERMEDIATE FREQUENCY CIRCUIT

Frequency 470 K. C.

IMPORTANT — Before adjusting the compensators, calibrate tuning dial as given on Page 1.

1. Connect the 088 Signal Generator output lead in series with a 1 mfd. condenser to the grid of the 6K7G tube, 2nd I.F., and the ground connection of the output lead to the chassis.
2. Set the receiver volume control in the maximum position; tone control counter-clockwise; Magnetic Tuning Switch "Off" (counter-clockwise); range switch in position No. 1 (Broadcast); bass compensation switch on first tap from "off" position, and the receiver dial to approximately 580 K. C. Adjust the signal generator for 470 K. C.
3. Now adjust compensator **(84P)** for maximum output.
4. Remove the signal generator output lead with the .1 mfd. condenser from the 6K7G 2nd I.F. grid and connect them to the 6K7G, 1st I.F. grid.
5. Turn compensator **(69T)** clockwise until it is tight, then adjust compensators **(68)** and **(69S)** for maximum output. Now adjust compensator **(69T)** for maximum output. Caution: Do not adjust compensators **(68)** and **(69S)** unless compensator **(69T)** is turned to the extreme clockwise position.
6. Remove the signal generator output lead and condenser from the 6K7G, 1st I.F. tube and connect them to the grid of the 6L7G tube, 1st detector, and adjust compensators **(64P)** and **(64S)** for maximum output.

RADIO FREQUENCY CIRCUIT

Tuning Range 11.5-18.2 M. C.

1. The signal generator output lead with the .1 mfd. condenser, is connected to terminal No. 1 on the aerial input panel (rear of chassis) and the generator ground lead to terminal No. 3. Terminals 2 and 3 must be connected with the shorting link provided on the panel.
2. Set the magnetic tuning control in the "off" position. Set the range switch in position No. 5 (11.5 to 18.2 M. C.). Turn the receiver and signal generator dials to 18 M. C. and adjust the generator attenuator for a readable indication on the output meter. Now adjust compensator **(44D)** by turning the screw (clockwise) to the maximum capacity position, then slowly turn it counter-clockwise until a second maximum peak is reached on the output meter. The first peak from maximum capacity is the image signal and the receiver *must not* be adjusted to this signal. On some receivers, however, only one peak will be found, therefore, adjust compensator **(44D)** to this peak. If the above procedure is correctly performed, the image signal will be found at 17.06 M. C. by advancing the signal generator input, and turning the receiver dial to this frequency mark on the scale.
3. Leaving the signal generator and receiver dials at 18 M. C. the antenna and R. F. compensators **(7D)** and **(25D)** are now adjusted by connecting a variable condenser (Philco Part No. 45-2325) across the oscillator compensator **(44D)** contact (first contact from the left side of the receiver facing rear underside view of the chassis) and ground. Now tune the added condenser until the second harmonic of the receiver oscillator beats against the signal from the generator, resulting in a maximum indication on the output meter. Note: it may be necessary to increase the signal generator output to obtain a signal of sufficient strength for reading on the output meter. Compensators **(7D)** and **(25D)** are now adjusted for maximum output. After these adjustments, remove the external condenser and readjust compensator **(44D)** as given in paragraph 2 above.
4. Turn the signal generator and receiver dials to 12 M. C. and adjust compensators **(44E)**, **(25E)** and **(7E)** for maximum output.
5. Readjust compensator **(44D)** as given in paragraph 2 above, for maximum output.
6. Readjust compensators **(7D)**, **(25D)** and **(44D)** as given in paragraph 3 above. This readjustment is to correct any variation that the low frequency compensator may have caused in the high end of this range.

Tuning Range (7.35-11.6 M. C.)

1. Turn selector switch to Range 4. Set the signal generator and receiver dials to 11.0 M. C. Now adjust compensator **(44B)** for maximum output. Check for image at 10.06 M. C.
2. Leaving signal generator and receiver dial turned to 11.0 M. C., connect the external variable condenser across the oscillator compensator **(44B)** contact (third contact from left side of the receiver facing rear underside view of chassis) and ground. Tune the added condenser for maximum output, then adjust compensators **(7B)** and **(25B)** for maximum output. Remove the added condenser and adjust **(44B)** for maximum.
3. Turn the signal generator and receiver dials to 7.5 M. C. and adjust compensators **(44C)**, **(25C)** and **(7C)** for maximum output.
4. Readjust compensator **(44B)** as given in paragraph 1 above.
5. Readjust compensators **(7B)**, **(25B)** and **(44B)** as given in paragraph 2 above.

Tuning Range (4.7 to 7.4 M. C.)

1. Turn selector switch to range 3. Set the signal generator and receiver dials for 7.0 M. C. and adjust compensators **(44)**, **(25)** and **(7)** for maximum output.
2. Rotate the signal generators and receiver dials to 5.0 M. C., then adjust compensators **(44A)**, **(25A)** and **(7A)** for maximum output.
3. Readjust compensators **(44)**, **(25)** and **(7)** on the 7.0 M. C. signal.

Tuning Range (1.58 to 4.75 M. C.)

1. Turn the selector switch to range 2. Set the signal generator and receiver dials to 4.5 M. C. Now adjust compensators **(42B)**, **(24A)** and **(6A)** for maximum output.
2. Rotate the signal generator and receiver dials to 1.7 M. C. Compensator **(42C)** Osc. series is now adjusted for maximum output as follows: First tune compensator **(42C)** for maximum output, then vary the tuning condenser of the receiver for maximum output about the 1.7 M. C. dial mark. Now turn compensator **(42C)** slightly to the right or left and vary the receiver tuning condenser for maximum output. If the output reading increases, turn compensator **(42C)** in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.
3. Readjust compensators **(42B)**, **(24A)** and **(6A)** for maximum output as given in paragraph 1 above.

Tuning Range (530 to 1600 K. C.)

1. Set selector switch in range 1. Rotate the signal generator and receiver dial to 1500 K. C. Adjust compensators **(42)**, **(24)** and **(6)** for maximum output.
2. Turn the signal generator and receiver dials to 580 K. C. Compensator **(42A)** Osc. series is now adjusted, using the same procedure as given in paragraph 2 under Tuning Range (1.58 to 4.75 M. C.). The only difference in the two adjustments is the frequency and compensator used.
3. Readjust compensator **(42)**, on 1500 K. C. and compensators **(24)** and **(6)** on a 1400 K. C. signal.

ADJUSTMENT OF THE MAGNETIC TUNING CONTROL

1. Leaving the selector switch in position 1. Set the Magnetic tuning switch in the "out" position. Turn the signal generator and dial to 1000 K. C., then adjust the receiver dial for maximum output.

   NOTE: It is very important to accurately adjust the receiver tuning condenser for peak output, also, adjust the signal generator attenuator to maximum output position.
2. Turn the (Magnetic Tuning Control) to the "on" position (clockwise). Compensator **(84S)** Sec. of magnetic tuning transformer is now adjusted for maximum output. If the indicator of the output meter goes off scale, turn the volume control of the receiver toward the miminum position until a readable indication is obtained.
3. The above adjustment is now checked for accuracy, by turning the magnetic tuning control "off". When this is done there should be no change in the tone of the received signal. If a change of tone or hiss develops, it indicates a shift in frequency and the adjustment must be made again.

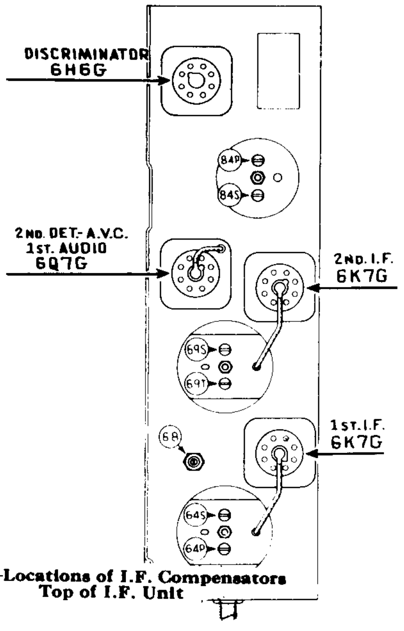


Fig. 5—Locations of I.F. Compensators Top of I.F. Unit

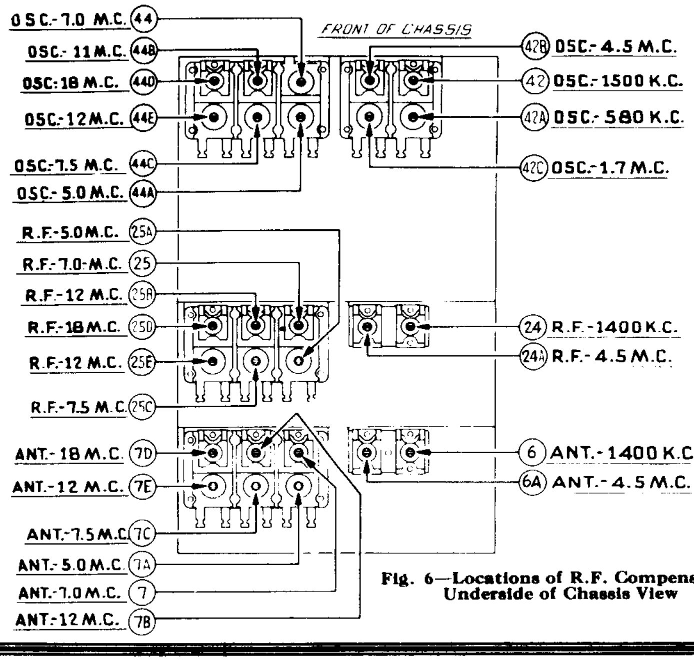


Fig. 6—Locations of R.F. Compensators Underside of Chassis View

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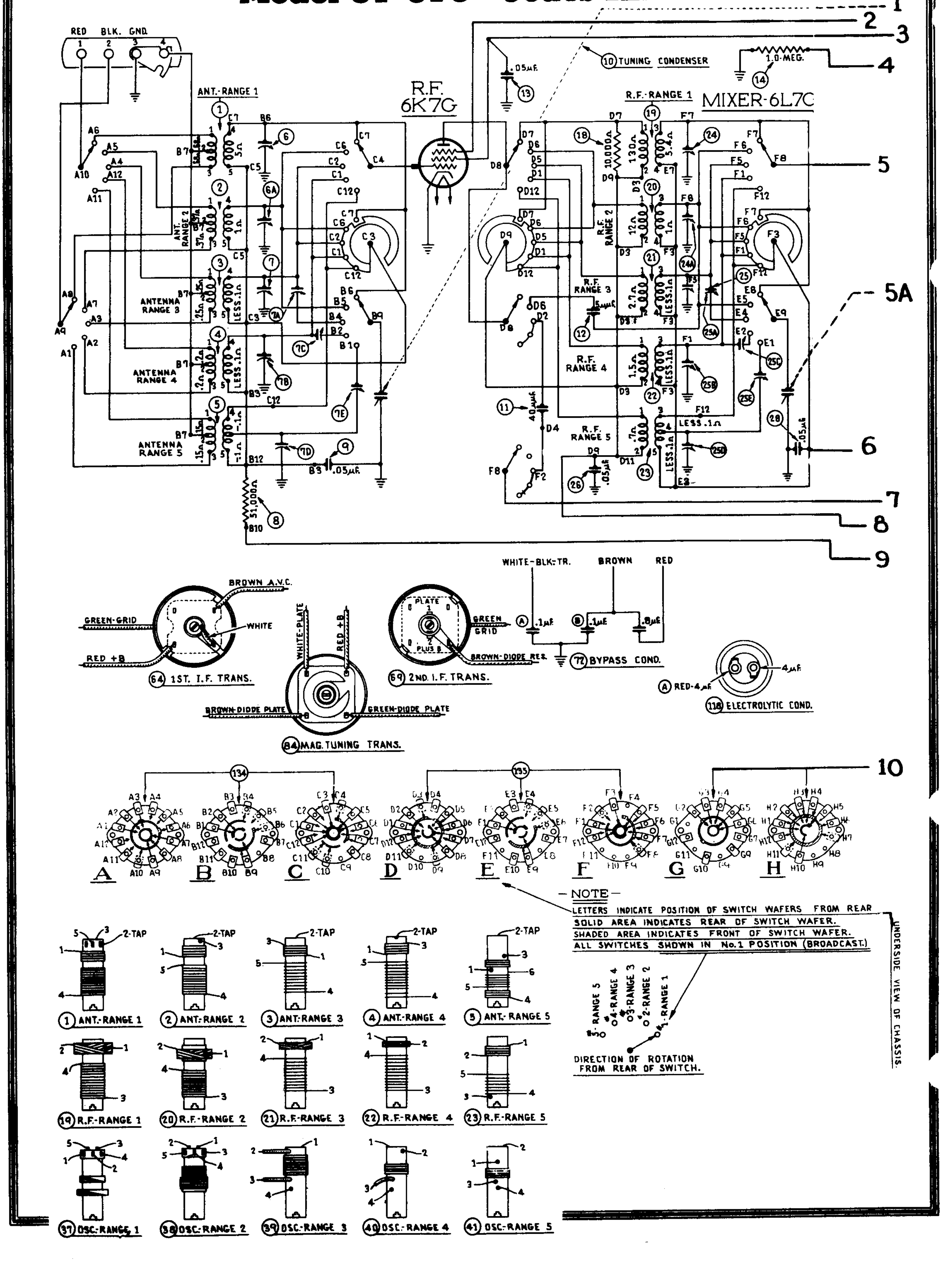
Model 37-675 – Codes 121-122



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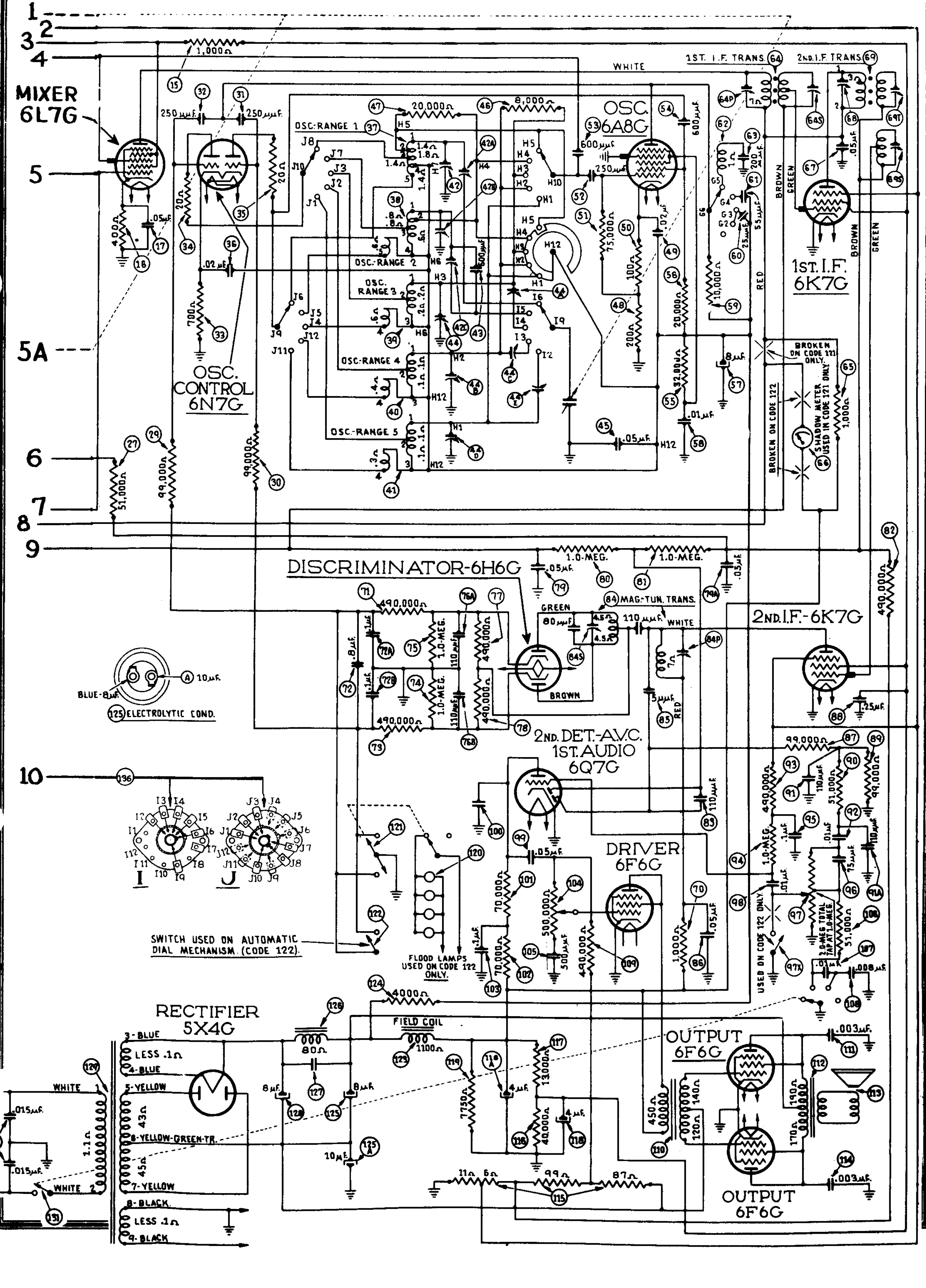


PHILCO RADIO & TELEVISION CORPORATION

Replacement Parts—Model 37-675—Codes 121-122

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2108	$0.80
2	Antenna Transformer (Range 2)	32-2146	.80
3	Antenna Transformer (Range 3)	32-2183	.60
4	Antenna Transformer (Range 4)	32-2185	.70
5	Antenna Transformer (Range 5)	32-2175	.80
6	Compensator (2 sections)	31-6093	.40
7	Compensator (6 sections)	31-6112	1.40
8	Resistor (51000 ohms, ½ watt)	33-351339	.20
9	Condenser (.05 mfd. tubular)	30-4020	.20
10	Tuning Condenser	31-1892	3.75
11	Condenser (40 mmfd. mica)	30-1076	.20
12	Condenser (5 mmfd. mica)	30-1077	.20
13	Condenser (.05 mfd. tubular)	30-4123	.20
14	Resistor (1 megohm ½ watt)	33-510339	.20
15	Resistor (1000 ohms ½ watt)	33-210339	.20
16	Resistor (400 ohms wirewound)	33-3016	.20
17	Condenser (.05 mfd. tubular)	30-4444	.20
18	Resistor (10000 ohms ½ watt)	33-310339	.20
19	R. F. Transformer (Range 1)	32-2105	.75
20	R. F. Transformer (Range 2)	32-2147	.60
21	R. F. Transformer (Range 3)	32-2177	.60
22	R. F. Transformer (Range 4)	32-2178	.60
23	R. F. Transformer (Range 5)	32-2176	.70
24	Compensator (2 sections)	31-6093	.40
25	Compensator (6 sections)	31-6113	1.40
26	Condenser (.05 mfd. tubular)	30-4123	.20
27	Resistor (51000 ohms ½ watt)	33-351339	.20
28	Condenser (.05 mfd. tubular)	30-4020	.20
29	Resistor (99000 ohms ½ watt)	33-399339	.20
30	Resistor (99000 ohms ½ watt)	33-399339	20
31	Condenser (250 mmfd. mica)	30-1032	.25
32	Condenser (250 mmfd. mica)	30-1032	.25
33	Resistor (700 ohms wirewound)	33-170339	.20
34	Resistor (20 ohms ½ watt)	33-020339	.20
35	Resistor (20 ohms ½ watt)	33-020339	.20
36	Condenser (.02 mfd. tubular)	30-4481	
37	Osc. Transformer (Range 1)	32-2191	.80
38	Osc. Transformer (Range 2)	32-2194	.80
39	Osc. Transformer (Range 3)	32-2197	.50
40	Osc. Transformer (Range 4)	32-2198	.50
41	Osc. Transformer (Range 5)	32-2199	.50
42	Compensator (4 sections)	31-6124	1.00
43	Condenser (600 mmfd. mica)	30-1049	.25
44	Compensator (6 section)	31-6117	1.20
45	Condenser (.05 mfd. tubular)	30-4123	.20
46	Resistor (8000 ohms ½ watt)	33-280339	.20
47	Resistor (20000 ohms ½ watt)	33-320339	.20
48	Resistor (200 ohms wirewound)	7217	.20
49	Condenser (.02 mfd. tubular)	30-4481	
50	Resistor (100 ohms wirewound)	33-3023	.25
51	Resistor (75000 ohms ½ watt)	33-375339	.20
52	Condenser (250 mmfd. mica)	30-1032	.25
53	Condenser (600 mmfd. mica)	30-1049	.25
54	Condenser (600 mmfd. mica)	30-1049	.25
55	Resistor (32000 ohms ½ watt)	33-332339	.20
56	Resistor (20000 ohms ½ watt)	33-320339	.20
57	Electrolytic Condenser (8 mfd.)	30-2024	1.10
58	Condenser (.01 mfd. tubular)	30-4169	.20
59	Resistor (10000 ohms ½ watt)	33-310339	.20
60	Condenser (25 mmfd. mica)	30-1067	.20
61	Condenser (55 mmfd. mica)	30-1045	.20
62	Coil (6A8G plate)	32-2242	.25
63	Condenser (200 mmfd. mica)	30-1047	.25
64	1st I. F. Transformer	32-2209	
65	Resistor (1000 ohms ½ watt)	32-210339	.20
66	Shadowmeter (Code 121 only)	45-2189	2.50
67	Condenser (.05 mfd. bakelite)	3615-SG	.35
68	Compensator (Pri. 2nd I.F. Trans.)	31-6079	
69	2nd I. F. Transformer	32-2211	
70	Resistor (1000 ohms ½ watt)	33-210339	.20
71	Resistor (490000 ohms ½ watt)	33-449339	.20
72	Condenser (.1-.1-.8 mfd. metal case)	30-4470	1.40
73	Resistor (490000 ohms ½ watt)	33-449339	.20
74	Resistor (1 megohm ½ watt)	33-510339	.20
75	Resistor (1 megohm ½ watt)	33-510339	.20
76	Condenser (110 mfd. dual bakelite)	8035-DG	.25
77	Resistor (490000 ohms ½ watt)	33-449339	.20

Schem. No.	Description	Part No.	List Price
78	Resistor (490000 ohms ½ watt)	33-449339	$0.20
79	Condenser (.05 mfd. dual bakelite)	3615-DG	.40
80	Resistor (1.0 megohm ½ watt)	33-510339	.20
81	Resistor (1.0 megohm ½ watt)	33-510339	.20
82	Resistor (490000 ohms ½ watt)	33-449339	.20
83	Condenser (110 mmfd. mica)	30-1031	.20
84	Magnetic Tuning Transformer	32-2217	2.40
85	Condenser (5 mmfd. mica)	30-1083	
86	Condenser (.05 mfd. bakelite)	3615-SG	.35
87	Resistor (99000 ohms ½ watt)	33-399339	.20
88	Condenser (.25 mfd. bakelite)	6287-DG	.40
89	Resistor (99000 ohms ½ watt)	33-399339	.20
90	Resistor (51000 ohms ½ watt)	33-351339	.20
91	Condenser (110 mmfd. dual bakelite)	8035-DG	.25
92	Condenser (.01 mfd. tubular)	30-4124	.25
93	Resistor (490000 ohms ½ watt)	33-449339	.25
94	Resistor (1 megohm ½ watt)	33-510339	.25
95	Condenser (.1 mfd. bakelite)	4989-SG	.35
96	Condenser (75 mmfd. mica)	30-1053	.20
97	Volume Control	33-5158	1.00
97X	Ring & Contact Assem. (For shorting volume control Code 122 dial)	45-2350	
98	Condenser (.01 mfd. tubular)	30-4124	.25
99	Condenser (.05 mfd. tubular)	30-4449	.20
100	Condenser (110 mmfd. mica)	30-1031	
101	Resistor (70000 ohms ½ watt)	33-370339	.20
102	Resistor (70000 ohms ½ watt)	33-370339	.20
103	Condenser (.1 mfd. tubular)	30-4455	.25
104	Tone Control	33-5173	
105	Condenser (500 mmfd. mica)	30-1086	
106	Resistor (51000 ohms ½ watt)	33-351339	.20
107	Condenser (.01 mfd. tubular)	30-4169	.20
108	Condenser (.008 mfd. tubular)	30-4112	.20
109	Resistor (490000 ohms ½ watt)	33-449339	.20
110	Transformer (Audio Input)	32-7057	
111	Condenser (.003 mfd. tubular)	30-4469	.20
112	Output Transformer	32-7685	2.00
113	Cone-Voice Coil U-15	36-3631	1.75
114	Condenser (.003 mfd. tubular)	30-4469	.20
115	Resistor (203 ohms 3 taps wirewound)	33-3290	.60
116	Resistor (40000 ohms 1 watt)	33-340439	.20
117	Resistor (13000 ohms 2 watt)	33-313539	.30
118	Electrolytic Condenser (2 sections 4-4 mfd.)	30-2170	1.50
119	Resistor (7750 ohms wirewound)	33-3279	.55
120	Flood Lamp	34-2039	.07
121	Magnetic Tuning Switch (Chassis)	42-1216	.75
122	Magnetic Tuning Switch (Code 122 dial assembly)	45-2330	
123	Field Coil Assembly U-15	36-3162	8.00
124	Resistor (4000 ohms 2 watts)	33-240539	.30
125	Electrolytic Condenser (2 sections 8-10 mfd.)	30-2046	1.85
126	Choke	32-7056	2.20
127	Condenser (.15 mfd. dual bakelite)	6287-DU	.40
128	Electrolytic Condenser (8 mfd.)	30-2025	1.10
129	Power Transformer 115 V, 50-60 cycles	32-7699	7.50
	Power Transformer 115 V, 25-40 cycles	32-7700	
	Power Transformer 220 V, 50-60 cycles	32-7701	
130	Condenser (twin bakelite .015 mfd.)	3793-DG	.40
131	Base Compensation & A. C. Switch	42-1196	.75
132	Pilot Lamp (Dial)	34-2039	.07
133	Shadowmeter Lamp (Code 121 only)	34-2039	.07
134	Range Switch (Ant.)	42-1211	1.60
135	Range Switch (R. F.)	42-1212	1.60
136	Range Switch (Osc.)	42-1217	2.00
	Used on Code 121 and 122		
	Brace (Drive Mtg.)	28-4119	.05
	Coupling Assembly (drive)	31-1907	.45
	Shaft & Index Plate (Range Switch)	42-1208	.50
	Volume Control Shaft	38-8061	
	Retaining Clip	28-4394	.01
	Spring	28-4117	.40 C
	Socket (8 prong)	27-6058	.11
	Socket (7 prong)	27-6057	.11
	Socket (Power Transformer)	27-6061	
	Tube Shield	28-2726	.10

Description	Part No.	List Price
Tube Shield Base	28-3898	$0.03
Tube Shield (6N7G)	8005	.10
Tube Shield Base (6N7G)	8004	.03
Mtg. Grommet (R. F. Unit)	27-4317	.04
Mtg. Sleeve (R. F. Unit)	28-2257	.01
Mtg. Screw (R. F. Unit)	W-729	.45 C
Mtg. Spacer (R. F. Unit) code 121	27-8339	.40 C
Mtg. Spacer (R. F. Unit) code 122	27-7807	.50 C
Mtg. Washer	28-3927	.01
Mtg. Rubber (Tuning Condenser)	27-4325	.02
Mtg. Rubber (Chassis)	3558	.03
Mtg. Bushing	27-4360	.04
Mtg. Plate (R. F. Transformer)	28-3808	.02
Mtg. Spacer (R. F. Transformer)	27-8228	.01
Mtg. Screw (R. F. Transformer)	W-1635	.30 C
Terminal Panel (Ant.)	38-7714	.15
Terminal Cover (Speaker)	36-3672	.15
Knob (Tuning)	27-4330	.10
Knob, Vernier	27-4331	.10
Knob, Tone & Volume	27-4332	.10
Knob, Range Switch	27-4326	.10
Cable (Speaker)	41-3223	
A. C. Plug & Cord	L-2288	.40
Fuses	45-2046	.05
Bottom Shield Plate	38-8143	
Snap Fasteners	28-4279	.75 C
Speaker (U-15)	36-1252	16.00
CODE 121		
Dial	27-5249	.40
Hub	28-7187	.12
Clamp	28-2837	.10
Set Screw	W-1641	.02
Dial Screen Holder Assembly	31-1945	
Drive Mtg. Assembly	31-1901	1.80
Vernier Drive	31-1895	
Gear (Dial)	28-7185	.10
Thrust Spring	28-8611	.01
Thrust Washer	28-3976	.30 C
"C" Washer	28-3904	.01
Gear (Drive)	31-1884	.25
Mask	27-5206	.30
Mask Arm & Link Assembly	31-1899	.50
Mask Washer	27-8318	.50 C
Mask Guide & Bracket	38-7876	.25
Pilot Lamp Assembly	38-7909	.40
Bezel Frame & Plate Assembly	40-5948	.80
Glass	27-8300	.06
Ring	28-3988	.45
Gasket	27-8313	.01
CODE 122		
Dial Escutcheon Assembly	45-2324	
Auto Dial Tuning Assembly Complete	31-1886	25.00
Dial Scale	27-5207	.80
Dial Screen Holder Assembly	31-1946	
Gasket (Dial Scale)	27-8398	.01
Mask & Link Assembly	45-2328	
Mask Guide	28-4118	.25
Ring (Retaining Mask Assembly)	28-7195	.20
Spring (Retaining Mask Assembly)	28-8629	.04
Control Screw	31-1898	
Range Switch Shaft Coupling	28-7198	.15
Felt Washer	27-8399	.30 C
Washer	W-495	.30 C
Snap Fastener	28-4279	.75 C
Control Handle	45-2329	
Cover (Handle)	28-4077	.25
Set Screws (Handle)	28-6493	.02
Screws (Cover)	W-1669	.40 C
Flood Lamp Assembly (single)	38-7937	
Pilot Lamp Assembly	38-8051	.35
Bezel Assembly	40-5980	1.00
Bezel Gasket	27-8517	
Screws	W-480	.55 C
Station Tab Kit	40-6013	.90
Insulator Ring and Contact Assembly	27-8351	

Figures in black type indicate circled figures in Base View. Prices Subject to Change Without Notice.

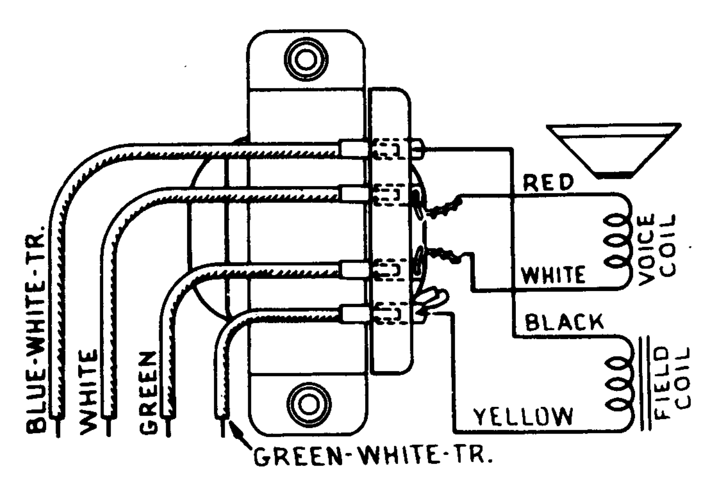


Fig. 2—U15 Speaker Wiring

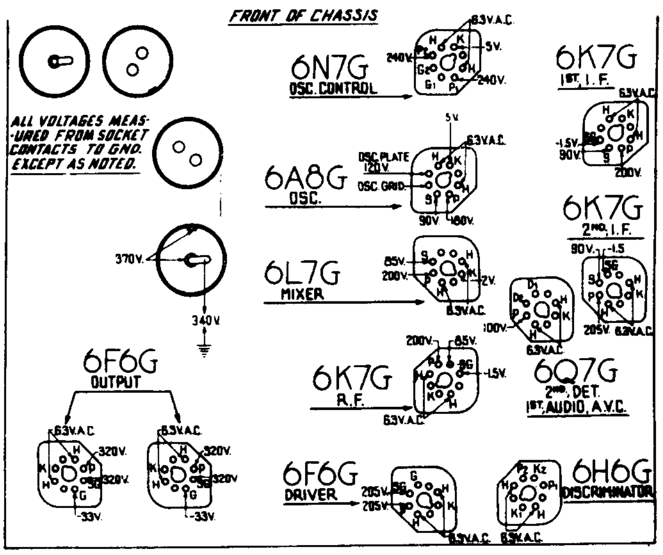
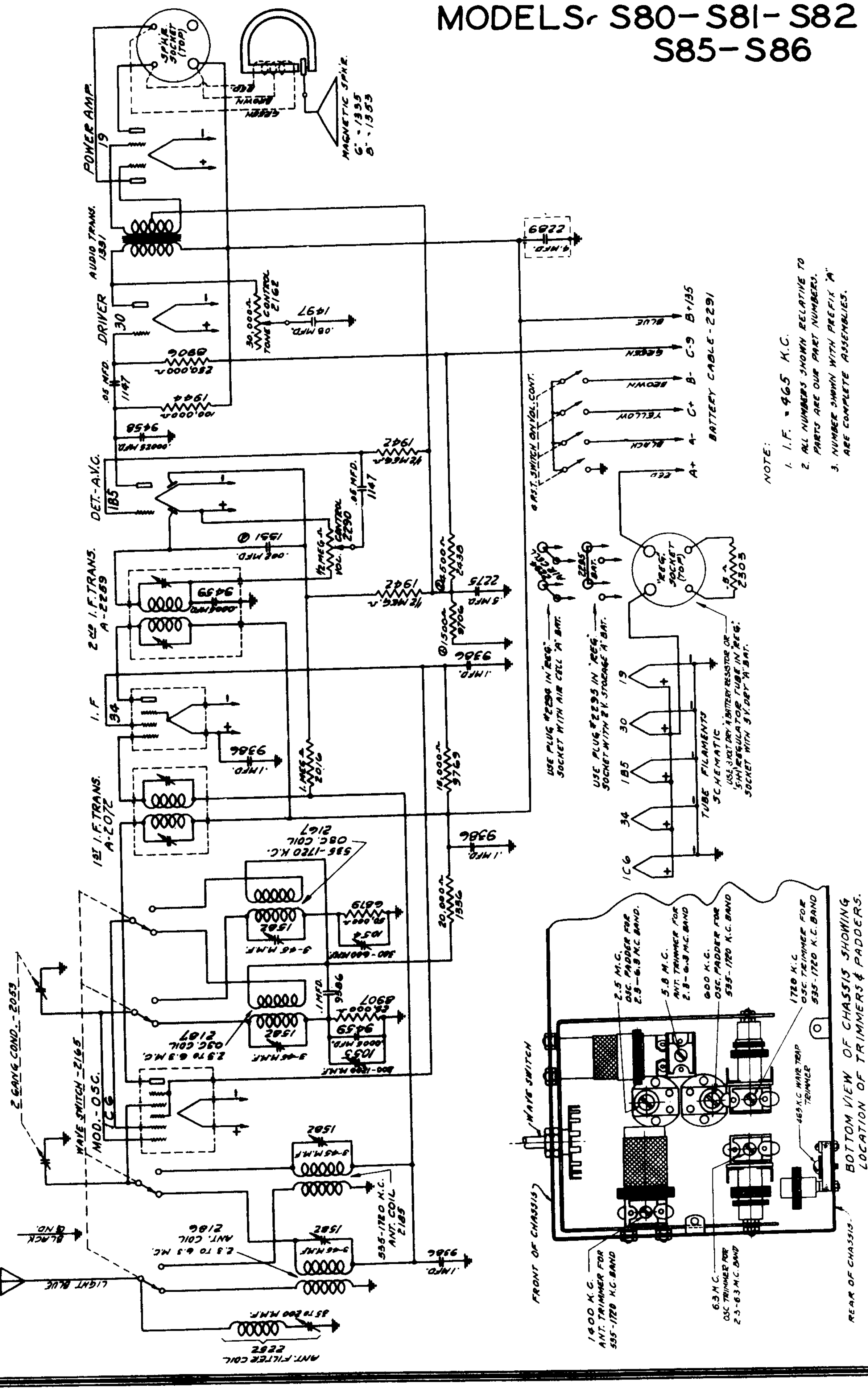


Fig. 1—Socket Voltages, Measured from Underside of Chassis

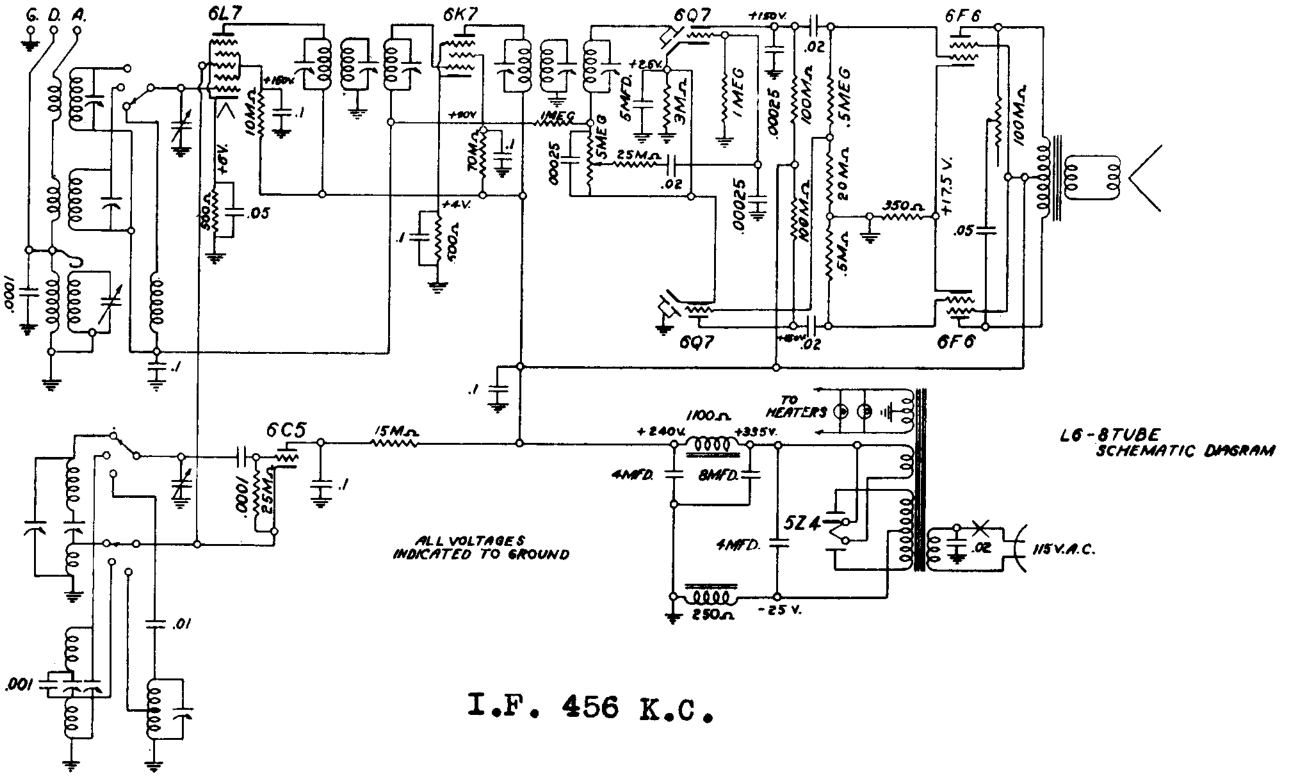
RADOLEK COMPANY

MODELS S80-S81-S82 S85-S86

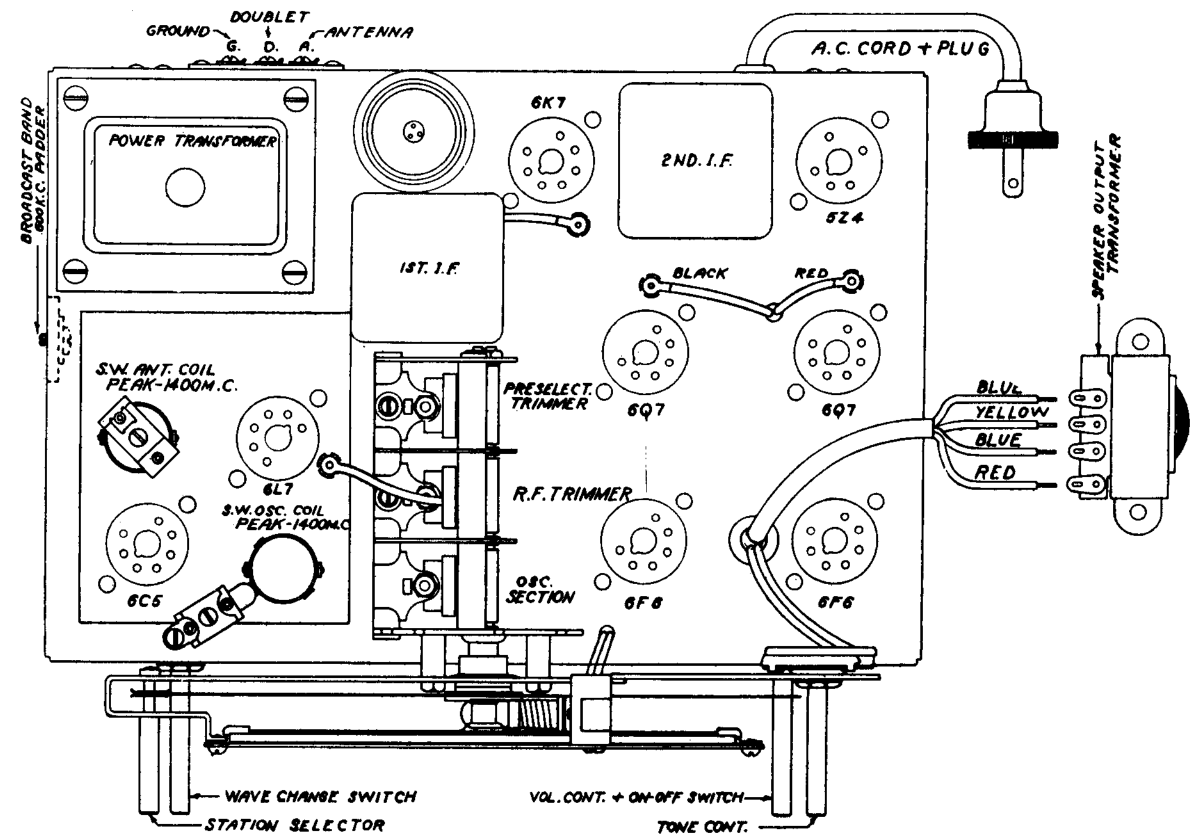


RADOLEK COMPANY

MODEL J 10953



I.F. 456 K.C.



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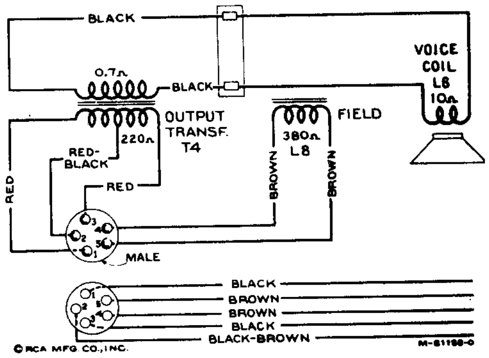

Figure 10—Loudspeaker Wiring

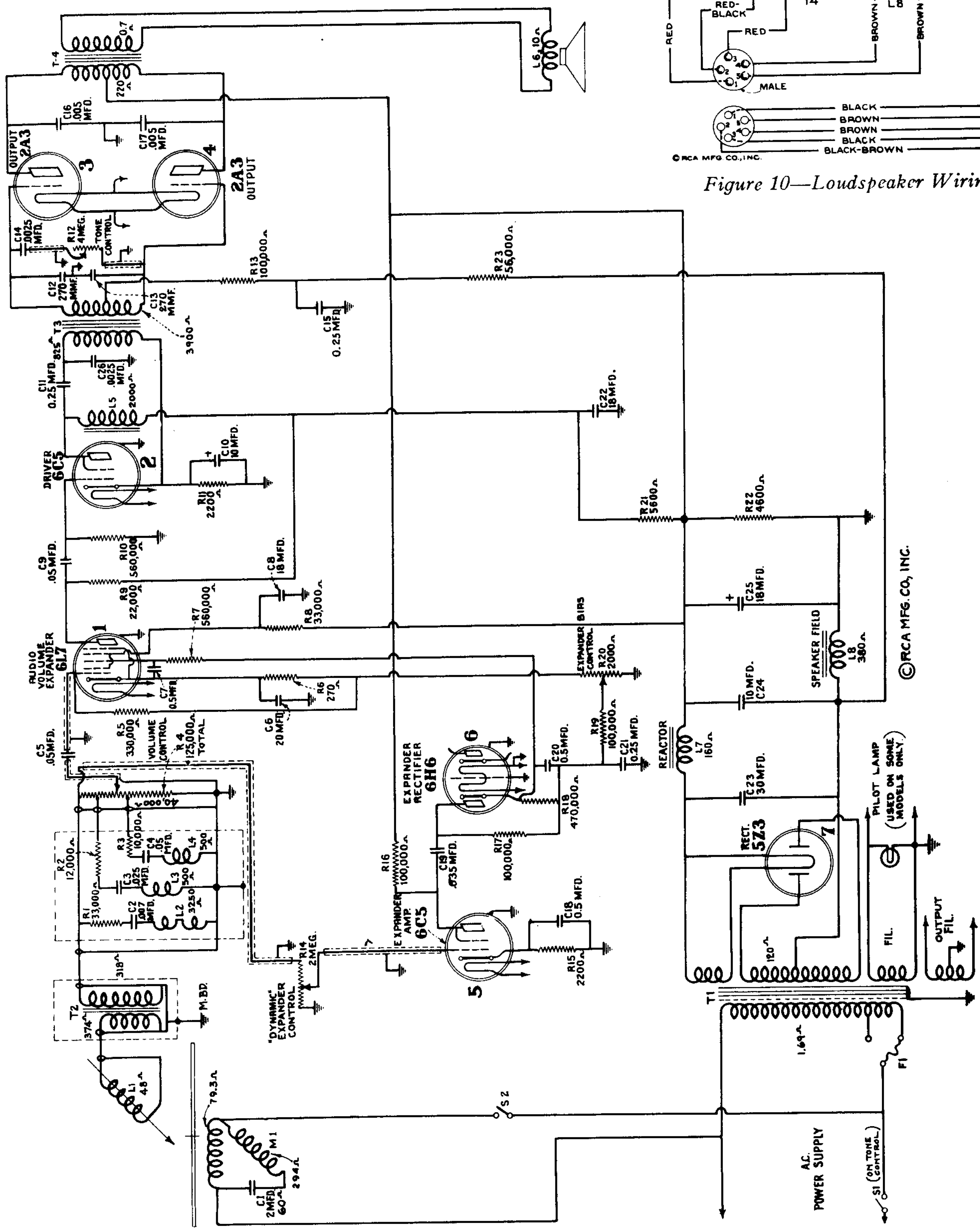

Figure 1—Schematic Circuit Diagram

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Dynamic Amplifier Adjustments

It is essential that correct voltages and currents exist at the RCA-6L7 audio expander stage in order that the expanding function may take place in the proper manner. A screw-driver adjustment is accordingly provided to regulate the RCA-6L7 control grid No. 2 bias to the correct operating value. Two methods of adjustment are applicable. Either method requires a normal voltage of 300 volts across the filter output (resistor R22, see figure 7). The one to be preferred (a) requires the use of the **RCA Stock No. 9633 Beat Frequency Oscillator** or the equivalent, a 100-ohm resistor, a 200-ohm resistor, and a 1,000-ohm-per-volt a-c voltmeter (rectifier-type) having a "low" range of 1.0 volt and a "high" range of 250 volts or greater. The less accurate method (b) requires the use of the **RCA Stock No. 12353 Split Plate Adapter** (supplied with instrument), and a suitable d-c milliammeter. Both of these procedures are outlined below. **CAUTION: Before using either method, be sure that power-supply fuse is in proper position for the line voltage.**

(a) **Preferred Method.**

Turn power switch (left front) off. Connect the 200-ohm and the 100-ohm resistors in series between the beat-frequency oscillator terminals (upper "250" and "CT") with the 100-ohm resistor connected to "CT." Calibrate the beat-frequency oscillator, adjust it to 1,000 cycles, and reduce its output. Connect the 1,000-ohm-per-volt a-c voltmeter (1-volt range) to the beat-frequency oscillator terminals (upper "250" and "CT"). Remove the "M" plug from the "F" receptacle on the shielded cable running between the input transformer T2 and the compensator pack "Comp." (see figure 9). Connect beat-frequency oscillator terminal "CT" to the large pin on the "M" plug. Connect the junction of the 200-ohm and the 100-ohm resistors to the small pin on the "M" plug.

Adjust beat-frequency oscillator output until the voltmeter reads exactly 1.0 volt. Remove the voltmeter leads from beat-frequency oscillator terminals without disturbing any of the oscillator adjustments. Place the voltmeter to its 250-volt or greater range and connect it between the plate prongs of the two RCA-2A3 power-output tubes. Connections to the tube prongs may be made by stripping approximately ½ inch of insulation from the ends of two short leads of rubber-covered wire, wrapping one bare end around each plate prong (being careful not to allow the bare ends to short on the chassis when the tubes are placed in their sockets), and connecting the voltmeter to these leads. **CAUTION: Do not touch these plate connections after the power is turned on since the potential at these points is rather high and carelessness might result in a serious shock.**

Set the expander "Dynamic" control (center front) to its extreme counter-clockwise position. Set the phonograph volume control (right front) to its extreme clockwise position. Turn on power switch (left front) and rotate this control to its extreme clockwise position, allowing it to remain in this position for all adjustments. Allow a few minutes for the instrument to become stabilized. Adjust the expander bias control R20, on rear apron of amplifier (see figure 9), until the voltmeter reads 195 volts. Turn phonograph volume control to extreme counter-clockwise position. Transfer lead from the junction of the 200-ohm and the 100-ohm resistors to the beat-frequency oscillator (upper "250") terminal without disturbing any of the oscillator adjustments. Adjust phonograph volume control (right front) until the voltmeter reads 50 volts. Turn the expander "Dynamic" control (center front) to its extreme clockwise position allowing maximum expansion to take place. The voltmeter reading should now read not less than 150 volts if the expander circuit is operating correctly. Failure to do so indicates a defect in the system and the usual service procedure should be followed.

(b) **Alternate Method.**

Turn power switch (left front) off. Place **RCA Stock No. 12353 Split Plate Adapter** under the RCA-6L7. Connect a suitable d-c milliammeter to the adapter. Turn both the phonograph volume control (right front) and the expander "Dynamic" control (center front) to their extreme counter-clockwise positions. Turn on power switch (left front) and allow a few minutes for the instrument to become stabilized. Adjust expander bias control R20, on rear apron of amplifier (see figure 9), to give 1.0 milliampere of plate current with no signal input to the dynamic amplifier.

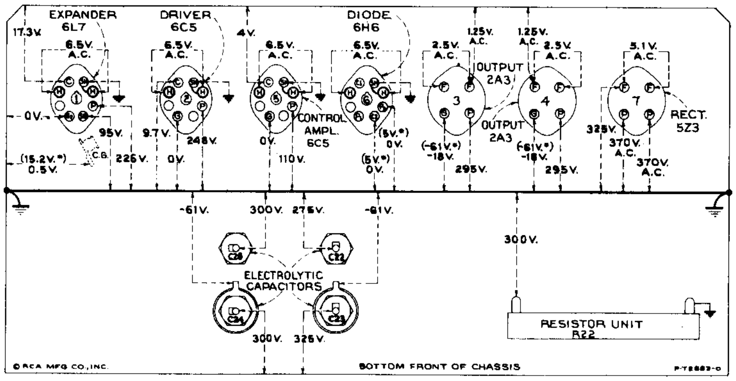

Figure 7—Radiotron Socket Voltages

Measured at 120 volts on 120-volt tap, rated frequency—Volume control minimum—Expander "Dynamic" control minimum—Dynamic amplifier adjusted as per text—No signal

***Note:** Two voltage values are shown for some readings. The higher value shown in parenthesis with asterisk (*) indicates operating conditions without voltmeter loading. The lower value is the actual measured voltage and differs from the higher value because of the additional loading of the voltmeter through the high series circuit resistance.*

The voltage values indicated from the Radiotron socket contacts, grid caps, resistors, and terminals to amplifier chassis ground on figure 7 will assist in locating cause for faulty operation. Each value as specified should hold within $\pm 20\%$ when the amplifier is normally operative at its rated line voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, 500, and 1,000 volts. Use the nearest range above the voltage to be measured. A-c voltages were measured with a corresponding a-c meter.

Magnetic Pickup

The pickup used in the phonograph unit is of an improved design. The horseshoe magnet is rigidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. The frequency response is substantially uniform over a wide range. Service operations which may be necessary on the pickup are as follows:

Centering Armature

Refer to figure 4 showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, i.e., exactly centered. Whenever this centering adjustment has been disturbed, the screws A, B, and C should be loosened and the armature clamp adjusted to the point where the vertical axis of the armature is at right angles to the horizontal axis of the pole pieces, and centered between them. This centering operation may be facilitated by inserting a small rod or nail into the armature needle hole, using it as a lever to test the angular movement of the armature. The limitations of the movement in each direction will be caused by the armature striking the pole pieces. The proper adjustment is obtained when there is equal angular displacement of the armature and adjustment rod or nail to each side of the vertical axis of the magnet and coil assembly. The screws A and B should then be secured, observing care not to disturb the adjustment of the armature clamp. Then place the pickup in a vise and secure the centering spring-clamp by means of the screw C, allowing the centering spring to remain in the position at which the armature is exactly centered between the pole pieces. With a little practice, the correct adjustment of the armature may be readily obtained. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other such foreign materials which would obstruct the movement of the pickup armature.

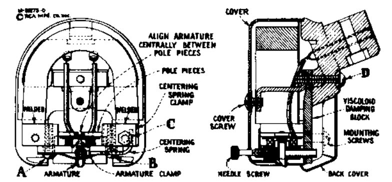

Figure 4— Details of Pickup

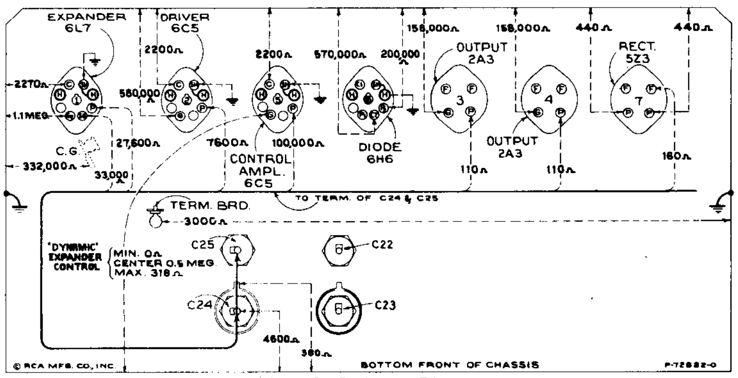

Figure 5—Resistance Diagram

Power supply disconnected—Radiotrons in sockets

The resistance values shown between Radiotron socket contacts, grid caps, resistors, terminals, and amplifier chassis ground, on figure 5, have been carefully selected so as to facilitate a rapid continuity check of the circuits. The use of this diagram in conjunction with the Schematic Circuit Diagram, figure 1, and Chassis Wiring Diagram, figure 2, will permit the location of certain troubles which might otherwise be difficult to ascertain. Each value as specified should hold within $\pm 20\%$. Variations in excess of this limit will usually be indicative of trouble in circuit under test. When measuring the resistance between points of the circuit and ground, it will be necessary to connect the negative terminal of the resistance meter to chassis-ground. If the polarity of the resistance meter is not known, it may be readily ascertained by connecting a d-c voltmeter of indicated polarity across the terminals of the device.

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MODEL R99

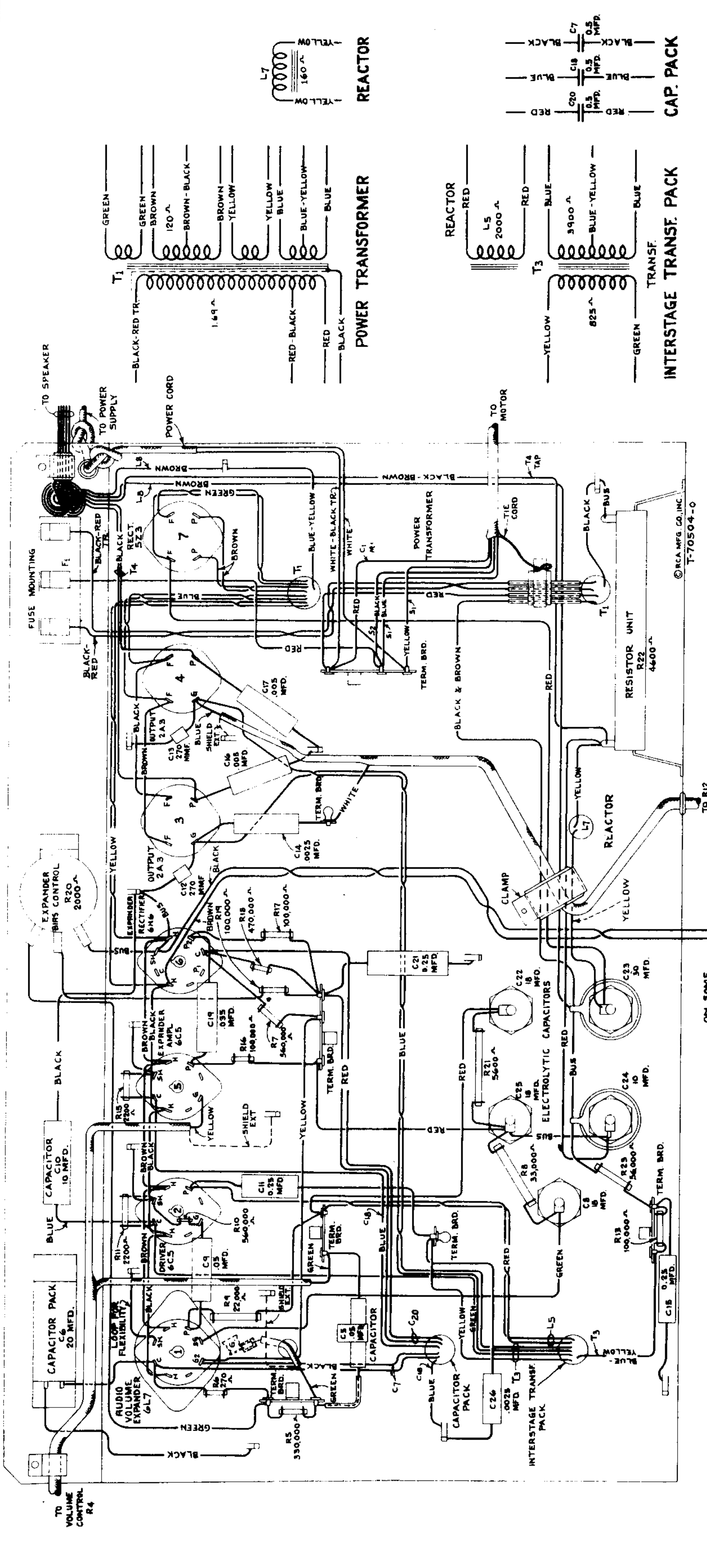

Figure 2

Stock No.	Description
	AMPLIFIER ASSEMBLIES
11350	Cap—Grid contact cap—Package of 5...
12110	Cap—Top shield cap for 6L7 Radiotron.
12488	Capacitor—270 Mmfd. (C12, C13).....
5107	Capacitor—.0025 Mfd. (C14, C26).....
4838	Capacitor—.005 Mfd. (C16, C17).....
5196	Capacitor—.035 Mfd. (C19)..........
4886	Capacitor—.05 Mfd. (C9)............
4518	Capacitor—.05 Mfd. (C5)............
5170	Capacitor—.25 Mfd. (C11)...........
4840	Capacitor—.25 Mfd. (C15, C21).......
11240	Capacitor—10 Mfd. (C24)............
12472	Capacitor—10 Mfd. (C10)............
5212	Capacitor—18 Mfd. (C8, C22).........
11496	Capacitor—18 Mfd. (C25)............
12470	Capacitor—20 Mfd. (C6).............
12467	Capacitor—30 Mfd. (C23)............
12465	Capacitor—Capacitor pack, comprising 3 sections, each 0.5 Mfd. (C7, C18, C20)
11272	Clamp—Volume control or speaker cable clamp ....
5240	Cover—Fuse cover...................
12468	Expander—Control (R20)............
10907	Fuse—3-ampere fuse (F1)—Package of 5.
5239	Mounting—Fuse mounting............
12471	Plate—6L7 socket mounting plate assembly, less socket...................
12466	Reactor—Filter reactor (L7)..........
12206	Resistor—270 ohms, insulated, 1/4 watt (R6)—Package of 5..............
12195	Resistor—2,200 ohms, insulated, 1/4 watt (R11, R15)—Package of 5.........
12469	Resistor—4,600 ohms, wire wound (R22)
11298	Resistor—5,600 ohms, carbon type, 1 watt (R21) ....
11332	Resistor—22,000 ohms, carbon type, 1 watt (R9)—Package of 5..........
12487	Resistor—33,000 ohms, carbon type, 2 watt (R8).......................
12286	Resistor—56,000 ohms, insulated, 1/4 watt (R23)—Package of 5.............
12263	Resistor—100,000 ohms, insulated, 1/4 watt (R13, R16, R17, R19)—Package of 5..........................
12452	Resistor—330,000 ohms, insulated, 1/4 watt (R5)—Package of 5...........
12285	Resistor—470,000 ohms, insulated, 1/4 watt (R18)—Package of 5..........
12486	Resistor—560,000 ohms, insulated, 1/4 watt (R7, R10)—Package of 5......
4794	Socket—4-contact 5Z3 or 2A3 Radiotron socket ....
11197	Socket—6 contact 6C5 Radiotron socket.
11198	Socket—7-contact 6H6 or 6L7 Radiotron socket ....
12464	Transformer—Interstage transformer (T3, L5) ....
12463	Transformer—Power transformer, 110-120 volt, 50-60 cycle (T1)............

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminal under Conditions Similar to Those of Voltage Measurements

(1) RCA-6L7—Expander...........	7.6	ma.
(2) RCA-6C5—Audio Driver........	4.4	ma.
(3) RCA-2A3—Power Output.......	41	ma.
(4) RCA-2A3—Power Output.......	41	ma.
(5) RCA-6C5—Expander Amplifier..	1.9	ma.
(6) RCA-6H6—Expander Rectifier...	0	ma.
(7) RCA-5Z3—Rectifier...........	165	ma.*

(* Cannot be measured at socket)

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MODEL R99

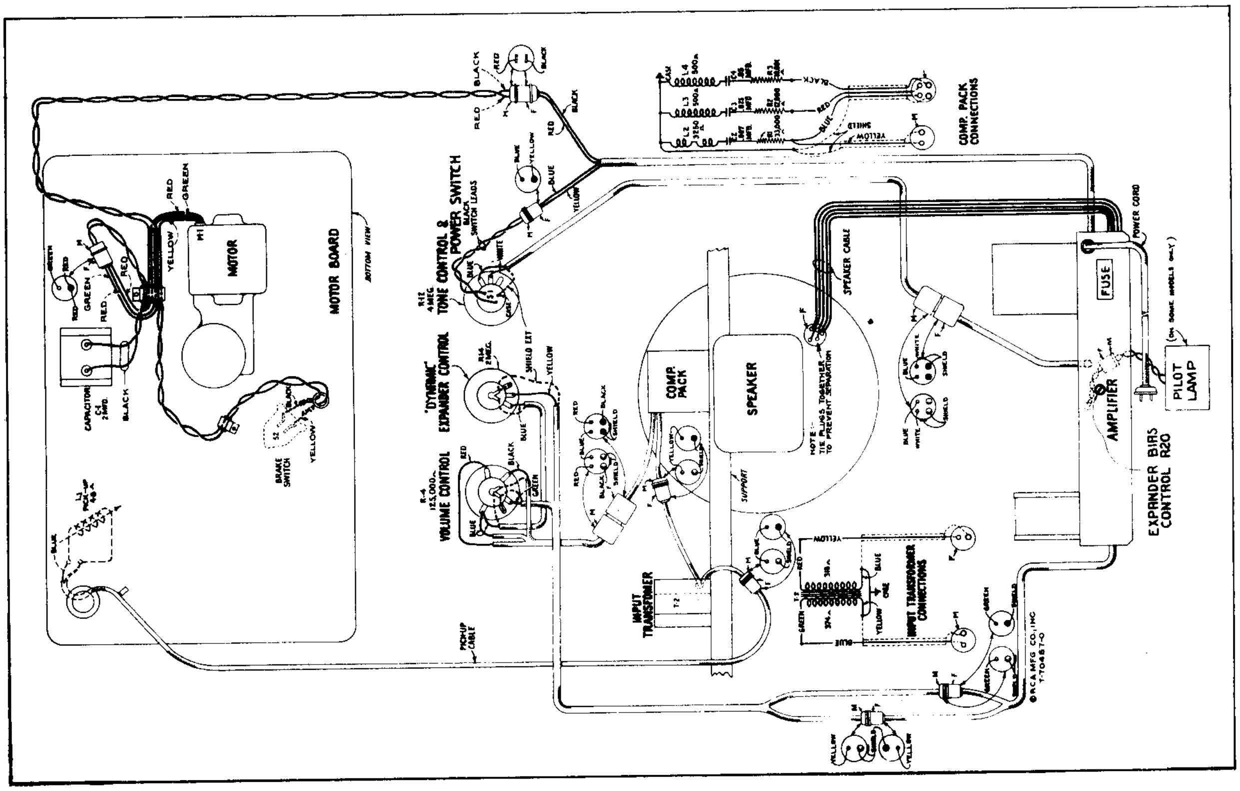


Figure 9—Assembly Wiring

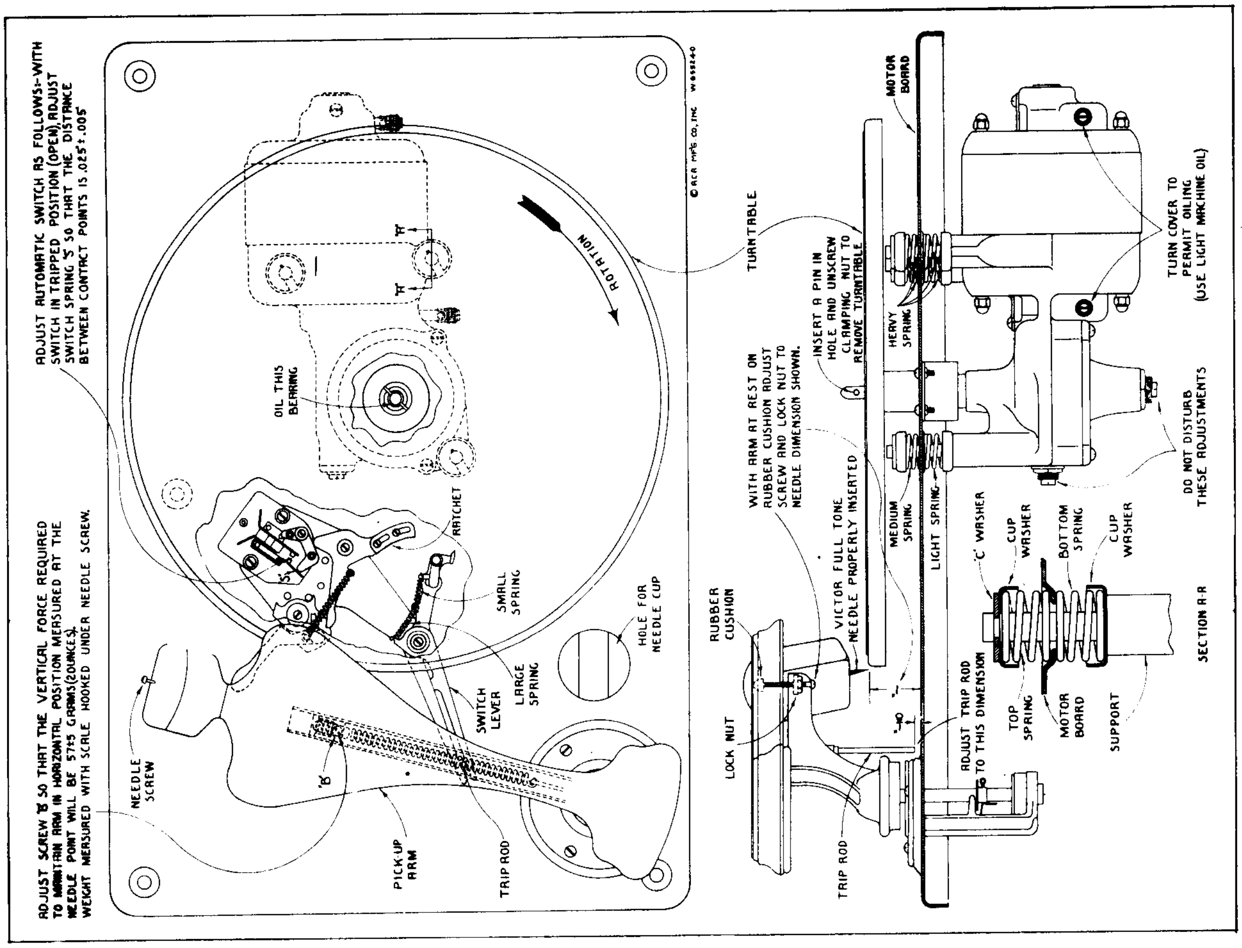


Figure 8—Motor Board Adjustments

RCA MANUFACTURING COMPANY, Inc.

MODEL 4T

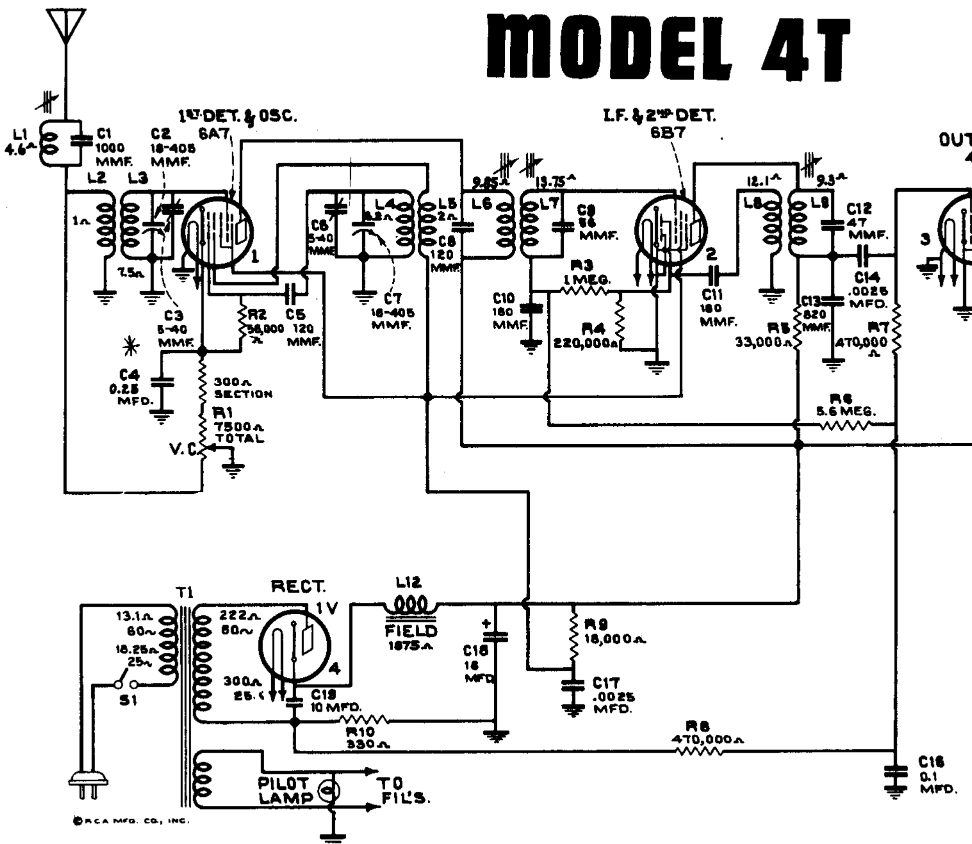
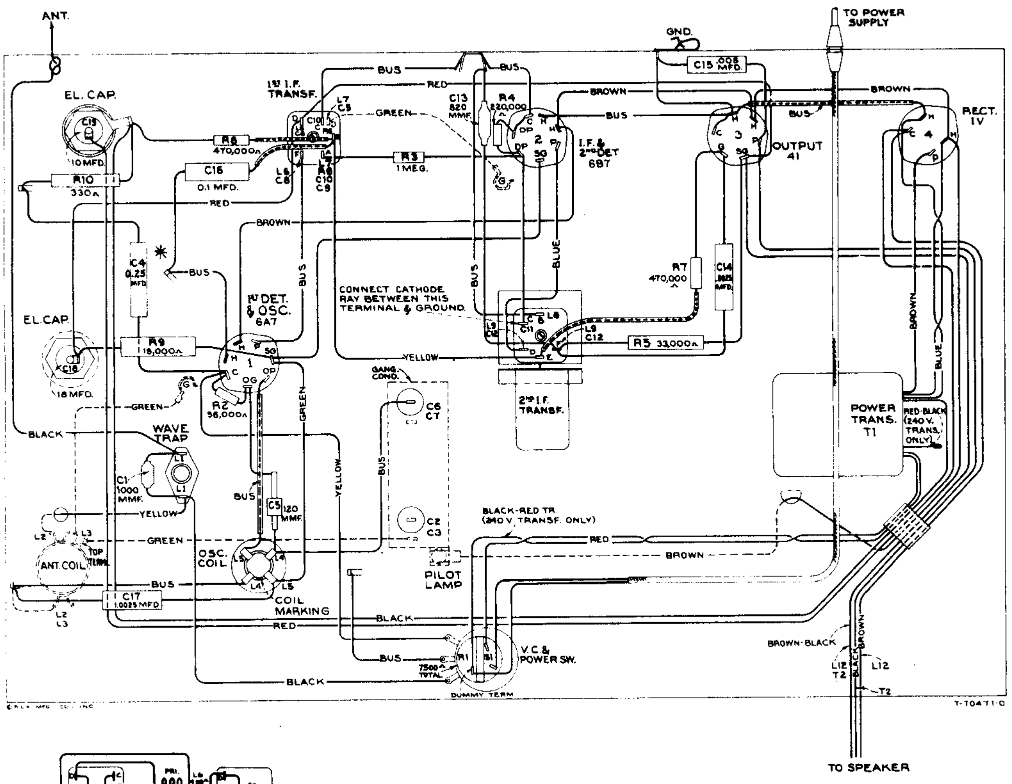
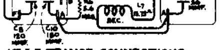


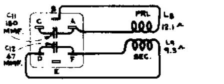
Figure 1—Schematic Circuit Diagram

* On some instruments C-4 is .05 mfd. Make all replacements with Stock No. 4840



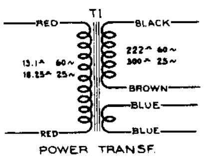


1ST I.F. TRANSF. CONNECTIONS



2ND I.F. TRANSF. CONNECTIONS

Figure 2—Chassis Wiring Diagram



REPLACEMENT PARTS

Stock No.	Description
	RECEIVER ASSEMBLIES
6956	Cap—Radiotron shield top for Stock No. 3942
12118	Cap—Grid contact cap—Package of 5
12405	Capacitor—47 Mmfd. (C12)
12629	Capacitor—56 Mmfd. (C9)
12404	Capacitor—120 Mmfd. (C8)
12634	Capacitor—120 Mmfd. (C5)
12406	Capacitor—180 Mmfd. (C10, C11)
12536	Capacitor—820 Mmfd. (C13)
12635	Capacitor—1,000 Mmfd. (C1)
5107	Capacitor—.0025 Mfd. (C14, C17)
4838	Capacitor—.005 Mfd. (C15)
4841	Capacitor—0.1 Mfd. (C16)
4840	Capacitor—0.25 Mfd. (C4)
11240	Capacitor—10 Mfd. (C19)
5212	Capacitor—18 Mfd. (C18)
11661	Coil—Antenna coil (L2, L3)
11662	Coil—Oscillator coil (L4, L5)
12624	Condenser—2-gang variable tuning condenser (C2, C3, C6, C7)
12006	Core—Core and stud assembly for Stock Nos. 12627, 12630 and 12631
12632	Dial—Indicator dial scale
12626	Indicator—Tuning indicator for Stock No. 12625—Package of 10
4340	Lamp—Dial lamp—Package of 5
11670	Resistor—330 ohms, carbon type, 1 watt (R10)—Package of 5
11671	Resistor—18,000 ohms, carbon type, 2 watt (R9)
11669	Resistor—33,000 ohms, carbon type, 1 watt (R5)—Package of 5
12286	Resistor—56,000 ohms, Insulated, 1/4 watt (R2)—Package of 5
12264	Resistor—220,000 ohms, Insulated, 1/4 watt (R4)—Package of 5
12285	Resistor—470,000 ohms, Insulated, 1/4 watt (R7, R8)—Package of 5
12200	Resistor—1 megohm, Insulated, 1/4 watt (R3)—Package of 5
12628	Resistor—5.6 megohm, carbon type, 1/10 watt (R6)—Package of 5
12633	Screw—Set screw for dial, Stock No. 12632—Package of 10
12008	Shield—First I.F. transformer shield
12607	Shield—First I.F. transformer shield cap
11126	Shield—Oscillator coil shield
3942	Shield—Radiotron shield
12408	Shield—Second I.F. transformer shield
4794	Socket—4-contact rectifier RCA-1V Radiotron socket
4786	Socket—6-contact RCA-41 Radiotron socket
4787	Socket—7-contact RCA-6A7 or RCA-6B7 Radiotron socket
12625	Socket—Dial lamp socket, bracket and indicator
12007	Spring—Retaining spring for Stock No. 12006—Package of 10
12627	Transformer—First I.F. transformer (L6, L7, C8, C9, C10, R6)
11664	Transformer—Power transformer, 105-125 volts, 50-60 cycles (T1)
11665	Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1)
11666	Transformer—Power transformer, 100-130, 140-160, 195-250 volts, 40-60 cycles
12630	Transformer—Second I.F. transformer (L8, L9, C11, C12)
12631	Trap—Wave trap (L1)
11663	Volume Control—Volume control and operating switch (R1, S1)
	REPRODUCER ASSEMBLIES
12446	Coil—Neutralizing coil (L10)
12576	Coil—Reproducer field coil (L12)
12574	Cone—Reproducer cone complete (L11)
5118	Connector—3-contact male connector plug for Reproducer
5119	Connector—3-contact female connector plug for Reproducer
9698	Reproducer, complete
12575	Transformer—Output transformer (T2)
	MISCELLANEOUS ASSEMBLIES
11347	Knob—Station selector knob—Package of 5
12638	Knob—Volume control knob—Package of 5
11349	Spring—Retaining spring for knob, Stock Nos. 11347 and 12638—Package of 5

RCA MANUFACTURING COMPANY, Inc.

MODEL 4T

RCA VICTOR MODEL 4T

Four-Tube, Single-Band, A-C, Superheterodyne-Reflex Receiver

TECHNICAL INFORMATION

Electrical Specifications

RADIOTRON COMPLEMENT

(1) RCA-6A7............First Detector–Oscillator
(2) RCA-6B7....I-F., 2nd Det., Audio, and A.V.C.
(3) RCA-41......................Power Output
(4) RCA-1V................Half-Wave Rectifier

Frequency Range.............................540-1,720 kc.
Intermediate Frequency.............................460 kc.
Alignment Frequencies..........460 kc. (I.F.), 1,500 kc. (antenna and oscillator)

POWER SUPPLY RATINGS
Rating A..........................105-125 volts, 50-60 cycles, 50 watts
Rating B..........................105-125 volts, 25-60 cycles, 50 watts
Rating C..............100-130/140-160/195-250 volts, 40-60 cycles, 50 watts

POWER OUTPUT
Undistorted...........................1.75 watts
Maximum..............................2.5 watts

LOUDSPEAKER
Type..........................Electrodynamic
Impedance (V.C.)...........3.2 ohms at 400 cycles

Pilot Lamp..........................Mazda No. 46, 6.3 volts, 0.25 amperes

Mechanical Specifications

CABINET DIMENSIONS
Height..............14¾ inches Width...............11¼ inches Depth..............6¼ inches
Weight (Net).........................13 pounds Weight (Shipping)....................16 pounds
Chassis Base Dimensions..............................9¾ inches x 5½ inches x 2 inches
Over-all Height of Chassis....................................6½ inches
Operating Controls..........................(1) Tuning, (2) Power Switch—Volume

General Features

This model contains a four-tube chassis mounted in a table-type cabinet. The superheterodyne circuit is used, incorporating such features of design as automatic volume control, magnetite core adjusted i-f transformers, diode detection, reflexed audio system, electrodynamic speaker, and improved antenna wave-trap. The frequency range extends from 540 to 1,720 kc. which covers the regular broadcast band and includes police calls in the 1,600 to 1,720 kc. portion of the range.

Circuit Description

Four Radiotrons are associated in combination with a superheterodyne circuit. Two of the Radiotrons are applied so as to obtain plural functions. The first tube, an RCA-6A7 pentagrid converter tube, is employed as a combination first detector and oscillator. The second tube, an RCA-6B7, performs the functions of i-f amplification, diode detection, audio amplification, and automatic volume control. A power-amplifier pentode, RCA-41, is used in the output stage.

Half-wave rectification is used in the power-supply stage. The speaker field winding serves as a reactor in the filter circuit.

The radio-frequency and intermediate-frequency stages are intercoupled by means of transformers. The antenna transformer couples directly into the first detector, having its secondary tuned by one section (front) of the two-gang tuning condenser. The oscillator system is tuned by the second (rear) section of the condenser. Adjustable magnetite-core trimmers are provided for adjusting the inductance of the windings of the input i-f transformer (primary and secondary) and the output transformer (primary) so as to resonate at 460 kc. with the fixed capacitors shunting these respective coils. The i-f signal originating in the first-detector circuit is transferred to the control grid of the RCA-6B7, amplified in the pentode section, coupled back to the diode section of this same tube where it is rectified before passing through resistor R-4. A fraction of the audio component developed across resistor R-4 appears across resistor R-6 from whence it is transferred to the control grid of the Radiotron 6B7 through winding L-7; L-7 and capacitor C-10 offering low and high reactance respectively to audio frequencies. The amplified audio signal, in the plate circuit of the RCA-6B7, developed across resistor R-5 is coupled to the control grid of the power-output tube for final amplification. The output of this stage is coupled to the loudspeaker through the output transformer T-4. The d-c signal component, of the diode rectified current, developed across resistor R-4, increases the bias of the RCA-6B7, thereby reducing its gain and giving A.V.C. action.

SERVICE DATA

NOTE: Oscillation may occur in receiver if external ground connection is not used.

The various diagrams of this booklet contain such information as will be needed to locate causes for defective operation if such develops. The values of resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams.

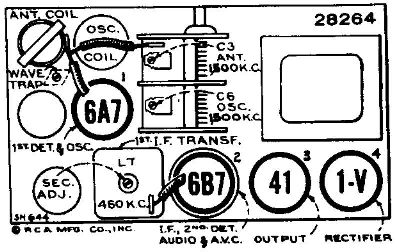


Figure 3—Radiotron, Coil, and Trimmer Locations

Identification titles, such as R-3, L-2, C-1, etc., are provided for reference between the illustrations and the Replacement Parts List. The coils, reactors, and transformer windings are rated in terms of their d-c resistance only. Ratings of less than one ohm are generally omitted.

Alignment Procedure

There are two alignment trimmers provided in the antenna coil and oscillator coil tuned circuits. The i-f transformer adjustments are made by means of three screws attached to molded magnetite cores.

All of the adjustable circuits of this receiver have been properly aligned at the factory to give correct performance and their settings should remain intact indefinitely when the receiver is used under ordinary conditions. However, necessity for re-adjustment may occasionally occur from continued extremes of temperature, climate, tampering or purported alteration for services, or after repairs have been made to the r-f or i-f tuned circuits. Improper alignment usually causes the impairment of sensitivity, selectivity, and tone quality. Such conditions will usually exist simultaneously.

In re-adjusting the tuned circuits, it is important to apply a definite procedure, and to use adequate and reliable test equipment. A standard test oscillator such as the RCA Stock No. 9595 will be required as the source of the signal at the specified alignment frequencies. Visual indication of the receiver output during alignment is also necessary to accurately show when the correct point of adjustment is reached. The RCA Stock No. 4317 Neon Output Indicator is especially suitable for this use.

The following procedure should be observed in adjusting the various trimming capacitors and molded magnetite cores:

I-F Core Adjustments

The three adjustment screws (one on top and one on bottom of first i-f transformer and one on bottom of second i-f transformer) are located as shown by Figures 3 and 7. Each circuit must be aligned to a basic frequency of 460 kc. To do this, attach the output indicator across the loudspeaker voice coil or across the output transformer primary. Connect the output of the test oscillator to the RCA-6A7 control grid, the ground of the test oscillator being connected to the receiver ground terminal. Adjust the test oscillator to **460 kc.** Advance the receiver tuning control to a point within its range where no interference is encountered either from local broadcast stations or local oscillator. Set the volume control to its maximum position. Increase the output of the test oscillator until a slight indication is apparent on the output indicator. Adjust the bottom screw of the second i-f transformer to produce maximum (peak) indicated receiver output. Then adjust the two screws of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device.

During these adjustments, regulate the test oscillator output so the indication is always as low as possible. By doing so, broadness of tuning, due to A.V.C. action, will be avoided. It is advisable to repeat the adjustment of all i-f screws to assure that the interaction between them has not disturbed the original adjustment.

RCA MANUFACTURING COMPANY, Inc.

MODEL 4T

Wave-Trap Adjustment

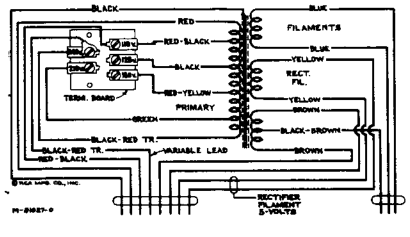
Attach the output of the test oscillator to the black antenna lead through a 300-ohm resistor, the ground connection of the test oscillator remaining the same. Leave the test oscillator adjusted to 460 kc. as before. Turn the rotor plates of the two-gang tuning condenser completely out of mesh. Then adjust the wave-trap trimmer to the point which causes maximum suppression of the 460 kc. signal.

R-F Trimmer Adjustments

Calibrate the tuning dial by first loosening its set screw and then rotating dial until the extreme end calibration mark (beyond 55 on dial) is in alignment with the dial shadow-indicator while the two-gang tuning condenser plates are in full mesh. Re-tighten set screw.

The output meter should be left connected to the output system. The connections for the test oscillator remain the same as for "Wave-trap adjustment."

Adjust the test oscillator to 1,500 kc. and set the receiver tuning control to a dial reading of 1,500 kc. Leave the volume control at its maximum position. Regulate the output of the test oscillator until a slight indication is perceptible at the receiver output. Then adjust the two trimming capacitors C-6 and C-3 of the oscillator and antenna coils, Figure 3, so that each produces maximum (peak) receiver output.



Primary Resistance - 23.6 ohms Total
Secondary Resistance - 180 ohms Total

Figure 5—Universal Transformer

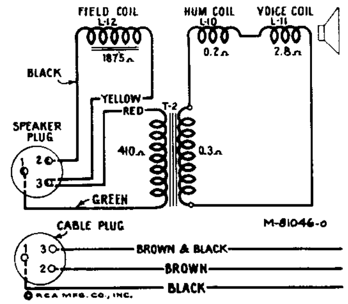
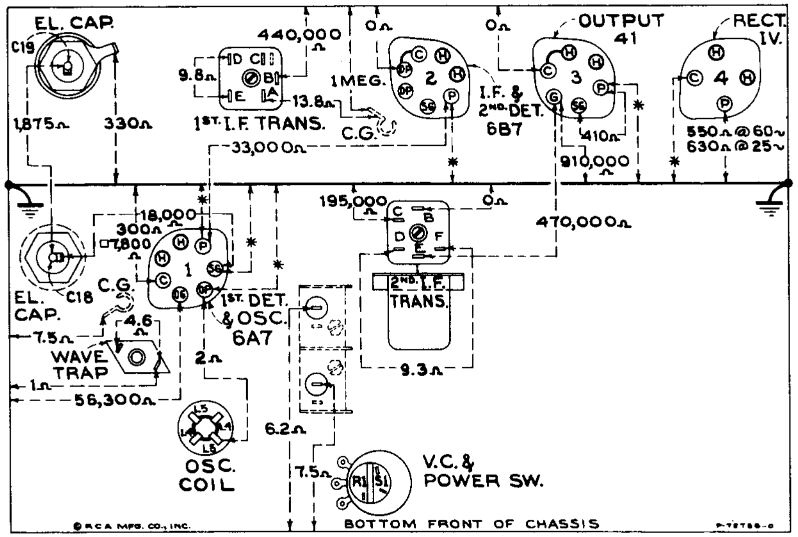


Figure 6—Loudspeaker Wiring



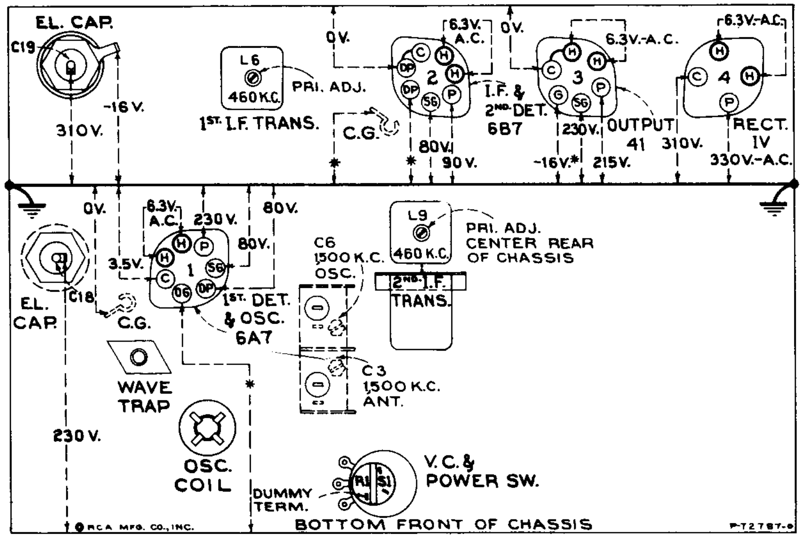
NOTE: ☐ VOLUME CONTROL AT "MIN." POSITION.
✱ OPEN CIRCUIT (LEAKAGE OF ELECTROLYTIC CAPACITORS ONLY).

Figure 4—Resistance Diagram

Power Supply Disconnected—Radiotrons in sockets—Tuning Condenser in full mesh—Volume Control Maximum

Resistance Measurement

The resistance values shown between Radiotron socket contacts, grid caps, resistors, terminals, and receiver chassis ground, on Figure 4, have been carefully selected so as to facilitate a rapid continuity check of the circuits. The use of this diagram in conjunction with the Schematic Circuit Diagram, Figure 1, and Chassis Wiring Diagram, Figure 2, will permit the location of certain troubles which might otherwise be difficult to ascertain. Each value as specified should hold within ±20%. Variations in excess of this limit will usually be indicative of trouble in circuit under test. Resistance values were measured with the Radiotrons in sockets; tuning condenser in full mesh, and volume control set at maximum except where otherwise noted. In all cases of measuring the resistance between points of the circuit and ground, it will be necessary to connect the negative terminal of the resistance meter to chassis-ground. If the polarity of the resistance meter is not known, it may be readily ascertained by connecting a d-c voltmeter of indicated polarity across the terminals of the device.



✱ CANNOT BE MEASURED WITH ORDINARY VOLTMETER.

Figure 7—Radiotron Socket Voltages and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc.—No signal being received—Volume Control Maximum

Radiotron Socket Voltages

The voltage values indicated from the Radiotron socket contacts, grid caps, resistors, and terminals to receiver chassis ground on Figure 7 will assist in locating cause for faulty operation. Each value as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. These voltages were measured with receiver tuned to approximately 1,000 kc., no signal being received and volume control set at maximum. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the voltage to be measured. A-C voltages were measured with a corresponding a-c meter.

RCA MANUFACTURING COMPANY, Inc.

MODEL 5BT

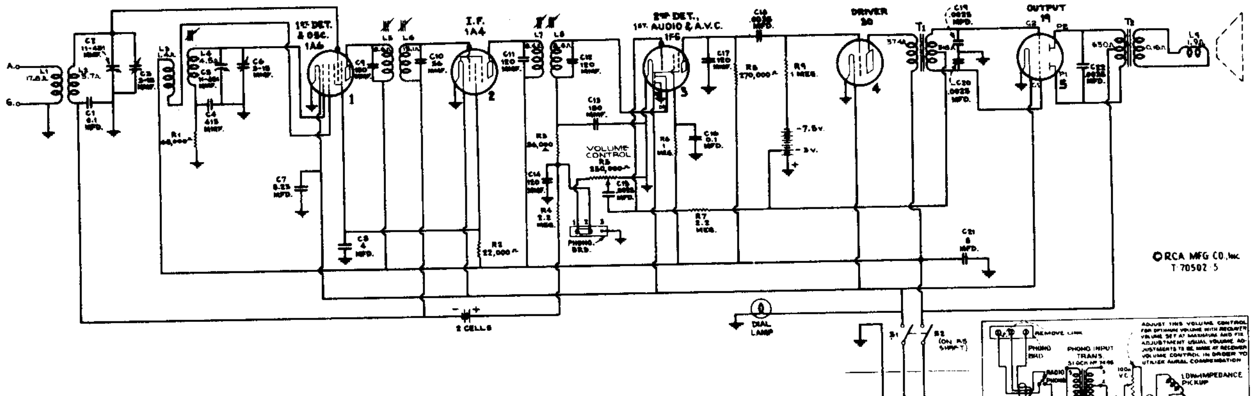


Figure 1—Schematic Circuit Diagram

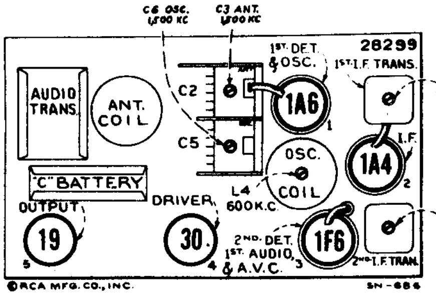


Figure 3—Radiotron, Coil, and Trimmer Locations

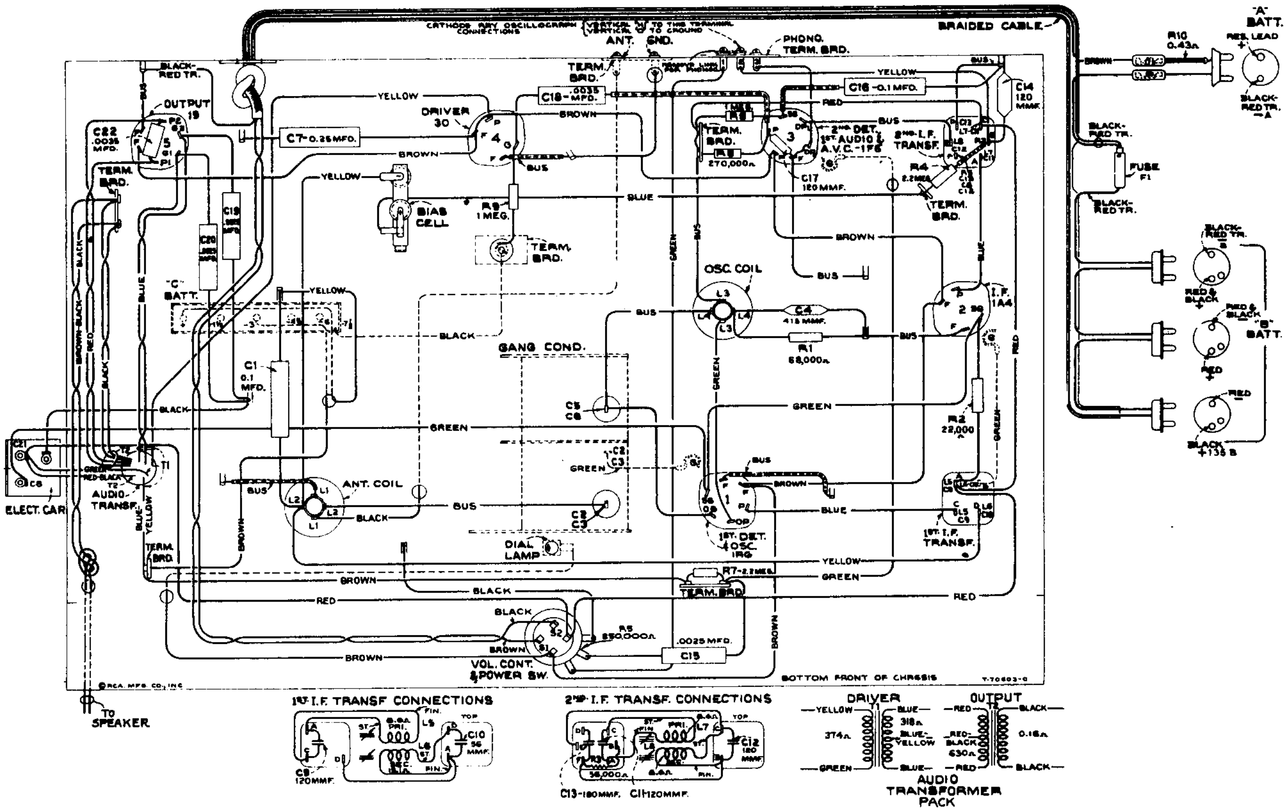
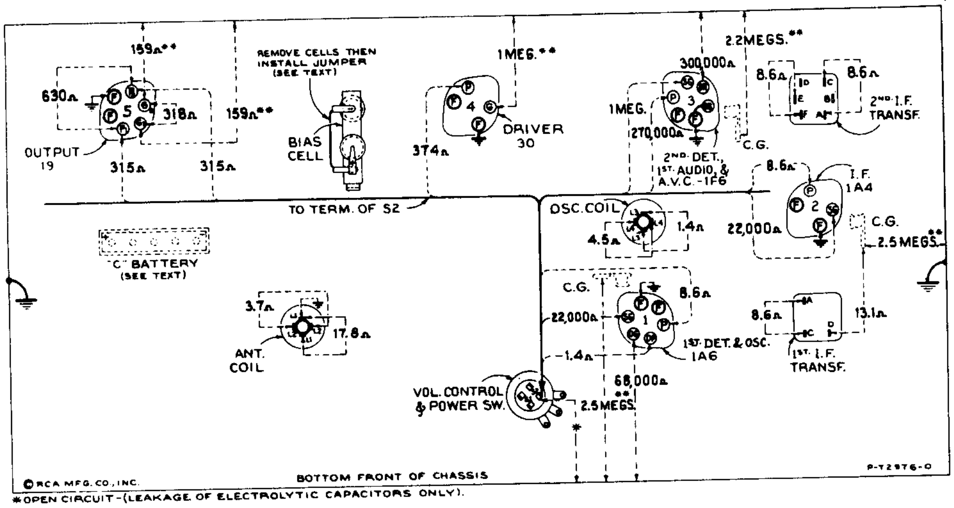


Figure 2—Chassis Wiring Diagram

RCA MANUFACTURING COMPANY, Inc.
MODEL 5BT



*OPEN CIRCUIT-(LEAKAGE OF ELECTROLYTIC CAPACITORS ONLY).

Figure 4—Resistance Diagram

Resistance Measurements

***Before making any resistance measurements, remove the two bias cells and connect jumpers on bias-cell board as shown. Also, remove the "C" battery and connect the two leads (—7½ v. and —3 v.) to chassis ground. After measurements are completed, remove jumpers from bias-cell board and then carefully insert bias cells. Next, insert "C" battery and restore leads to their respective positions.*

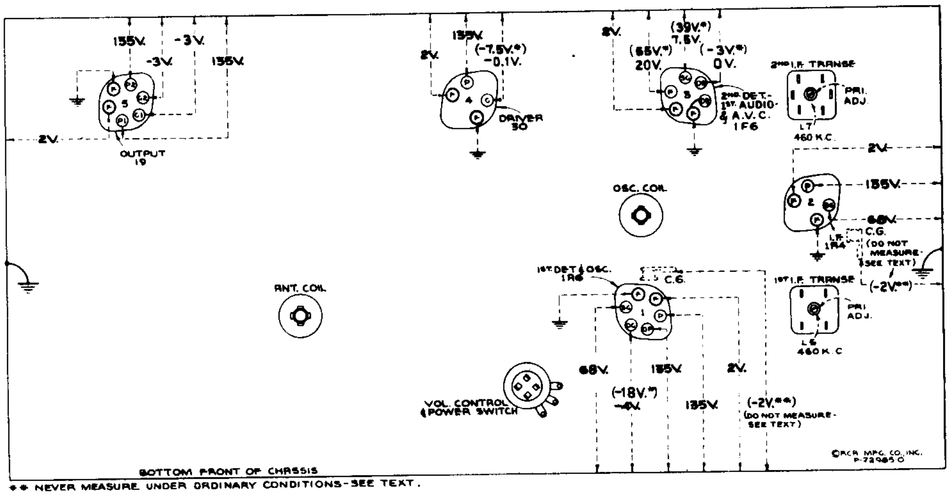
The resistance values shown between Radiotron socket contacts, grid caps, resistors, terminals and receiver chassis ground, on figure 4, have been carefully selected so as to facilitate a rapid continuity check of the circuits. The use of this diagram in conjunction with the Schematic Circuit Diagram, figure 1, and Chassis Wiring Diagram, figure 2, will permit the location of certain troubles which might otherwise be difficult to ascertain. Each value as specified should hold within ± 20%. Variations in excess of this limit will usually be indicative of trouble in circuit under test. In all cases of measuring the resistance between points of the circuit and ground, it will be necessary to connect the negative terminal of the resistance meter to chassis-ground. If the polarity of the resistance meter is not known, it may be readily ascertained by connecting a d-c voltmeter of indicated polarity across the terminals of the device.

Radiotron Socket Voltages

CAUTION: Do not attempt to measure voltages on control grids of RCA-1A6 or RCA-1A4, with any conventional voltmeter, due to presence of bias cells. See "Caution" under "Service data" for method of measuring these cells.

Note: Two voltage values are shown for some readings. The higher value shown in parenthesis with asterisk (*) indicates operating conditions without voltmeter loading. The lower value is the actual measured voltage and differs from the higher value because of the additional loading of the voltmeter through the high series circuit resistance.

The voltage values indicated from the Radiotron socket contacts, grid caps, resistors, and terminals to receiver chassis ground on figure 6 will assist in locating cause for faulty operation. Each value as specified should hold within ± 20% when the receiver is normally operative at its rated line voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, and 250 volts. Use the nearest range above the voltage to be measured.



** NEVER MEASURE UNDER ORDINARY CONDITIONS-SEE TEXT.

Figure 6—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured with all batteries at normal voltage—Tuned to approximately 1,000 kc—No signal being received—Volume control optional

Radiotron Plate Current Readings

Measured with Milliammeter Connected at Tube Socket Plate Terminals under Conditions Similar to Those of Voltage Measurements

(1) RCA-1A6—1st. Det.	2.26 ma.
—Osc.	1.86 ma.
(2) RCA-1A4—I.F.	3.6 ma.
(3) RCA-1F6—2nd Det.—A.F.—A.V.C.	0.3 ma.
(4) RCA-30—Driver	3.8 ma.
(5) RCA-49—Output	2.8 ma.**

(** Total plate current.)

Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed by softening its cement with a very light application of acetone, using care not to allow the acetone to flow down into the air gap. The dust cover should be cemeted back in place with ambroid upon completion of adjustment.

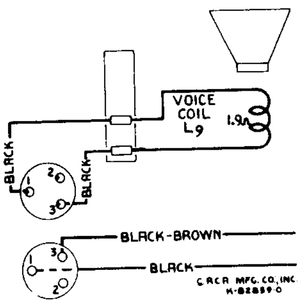


Figure 5—Loudspeaker Wiring

Power Supply

Filament voltage for this receiver is obtained from either a 2½-volt Air-cell or a 2-volt storage battery. When the Air-cell is used, the 0.43 ohm resistor R10 must be connected in series with the A-battery lead on a 2-volt storage battery. The 7½-volt C battery is located on the top-side of the chassis and securely held in place by a metal cover (see figure 3). The two bias cells are located underneath the chassis (see figures 2 and 5).

RCA MANUFACTURING COMPANY, Inc.

MODEL 5BT

Electrical Specifications

Frequency Range .... 530-1,800 kc

Alignment Frequencies 600 kc (osc.), 1,500 kc (osc., ant.)

Intermediate Frequency .... 460 kc

Radiotron Complement

(1) RCA-1A6 .... First Detector (Oscillator)
(2) RCA-1A4 .... Intermediate Amplifier
(3) RCA-1F6 ... Second Detector—A. F.—A.V.C.
(4) RCA-30 .... Audio Driver
(5) RCA-19 .... Power Output

Pilot Lamp (1) .... Mazda 2.0 volts, .06 ampere, miniature screw base

Batteries Required

"A," one plug-in 2½-volt Air-cell (heavy duty), or one 2-volt storage battery; "B," three 45-volt B batteries (heavy duty); "C" one 7½-volt C battery and two bias cells (Stock No. 12681)

Current Consumption

"A" at 2 volts .... 0.54 amp.
"B" at 135 volts .... 18 ma.
Fuse Rating .... ½ ampere

Power Output (135 volts "B" Battery)

Undistorted .... 1.3 watts
Maximum .... 2.2 watts

Loudspeaker (Permanent-Magnet Dynamic) .... Impedance (V. C.) 2.2 ohms at 400 cycles

Alignment Procedure

A test oscillator, such as the **RCA Stock No. 9595**, is required as a source of the specified alignment frequencies. Visual indication of receiver output during the adjustments is necessary and should be accomplished by the use of an indicator such as the **RCA Stock No. 4317 Neon Output Indicator.**

Attach the output indicator across the loudspeaker voice coil. Advance the receiver volume control to its maximum position, letting it remain in such position for all adjustments. For each adjusting operation, regulate the test-oscillator output so that the signal level is as low as possible and still be observable at the receiver output. Use of such small signal will obviate broadness of tuning which would otherwise result from a.v.c. action on a stronger one.

I-F Adjustments

The four adjustment screws (attached to molded magnetite cores) of the two i-f transformers (one on top and one on bottom of each i-f transformer) are located as shown by figures 3 and 6. Each circuit must be aligned to a basic frequency of **460 kc.**

Connect the "Ant." output of the test-oscillator to the control grid of the RCA-1A6 through a **.001 mfd.** capacitor. Connect the test oscillator "Gnd." terminal to the ground terminal of the receiver chassis. Tune the test oscillator to **460 kc.** Adjust the receiver tuning control to a point, within its range, where no interference is encountered either from broadcast stations or short stator of oscillator tuning condenser C5 to ground, eliminating local (hetrodyne) oscillator signals.

Adjust the two magnetite core screws **L8** and **L7** of the second i-f transformer to produce maximum (peak) indicated receiver output. Then, adjust the two magnetite core screws **L6** and **L5** of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. It is advisable to repeat the adjustment of all i-f magnetite core screws to assure that the interaction between them has not disturbed the original adjustments. Remove temporary jumper, stator C5 to ground, if used.

R-F Adjustments

Calibrate the tuning dial by adjusting the dial pointer to the extreme low-frequency end calibration mark (**530 kc**) on dial scale while the gang tuning condenser plates are in their full-mesh position. Reduce output of test oscillator to minimum. Set receiver dial pointer to **600 kc.** Tune the test oscillator to **600 kc** and increase its output until an indication is obtained on the output indicator.

Adjust oscillator magnetite core screw **L4** (top of oscillator coil) so that maximum (peak) indication is shown by the output indicator.

Set receiver dial pointer to **1,500 kc.** Tune test oscillator to **1,500 kc.** Adjust the oscillator and antenna trimmers **C6** and **C3** for maximum (peak) indicated output.

Tune test oscillator to **600 kc** and adjust receiver to pick up this signal **near 600 kc.** Readjust the oscillator magnetite core screw **L4** for maximum (peak) indicated output while rocking the receiver gang tuning condenser back and forth through this signal.

Repeat adjustments of **C6** and **C3** as above to correct for any changes in the oscillator tuning caused by the adjustment of **L4.**

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
13216	Board—Antenna and ground terminal board	$0.25
12717	Board—Phonograph terminal board	.22
4289	Body—Female section of fuse holder—Package of 10	.35
4286	Bushing—Bushing and ferrule assembly for fuse holder—Package of 10	.38
13217	Cable—Battery cable complete with four 2-contact male connectors, fuse holder and fuse	3.05
4288	Cap—Male section of fuse holder—Package of 10	.36
12629	Capacitor—56 Mmfd. (C10)	.20
12404	Capacitor—120 Mmfd. (C9, C11, C12)	.26
12724	Capacitor—120 Mmfd. (C14, C17)	.28
12406	Capacitor—180 Mmfd. (C13)	.26
13297	Capacitor—415 Mmfd. (C4)	.25
5107	Capacitor—.0025 Mfd. (C15, C19, C20)	.16
5005	Capacitor—.0035 Mfd. (C18, C22)	.16
4841	Capacitor—0.1 Mfd. (C1, C16)	.22
4840	Capacitor—0.25 Mfd. (C7)	.30
13295	Capacitor Pack—Comprising one 4 mfd. and one 8 mfd. sections (C8, C21)	1.70
13293	Coil—Antenna coil with shield (L1, L2)	1.00
13294	Coil—Oscillator coil with shield (L3, L4)	1.00
13212	Condenser—2-gang variable tuning condenser (C2, C3, C5, C6)	3.40
12828	Connector—2-contact male connector for cable, Stock No. 13217	.20
12827	Connector—2-contact and guide pin male connector for cable Stock No. 13217	.30
5119	Connector—3-contact female connector for speaker cable	.25
12006	Core—Adjustable core and stud assembly for Stock Nos. 12801 and 12802	.22
12681	Cell—Bias cell	.30
13391	Dial—Station selector dial scale	.45
3748	Fuse—½ ampere—Package of 5 (F1)	.40
13215	Holder—Bias cell holder	.25
13213	Indicator—Station selector indicator pointer	.15
4290	Insulator—Insulator for female section of fuse holders—Package of 10	.35
4348	Lamp—Dial lamp	.38
13298	Resistor—Flexible type, 0.43 ohm—Package of 5 (R10)	.90
11305	Resistor—22,000 ohms, carbon type, ¼ watt—Package of 5 (R2)	1.00
11282	Resistor—56,000 ohms, carbon type, 1/10 watt—Package of 5 (R3)	.75

Stock No.	DESCRIPTION	List Price
12009	Resistor—68,000 ohms, carbon type, ¼ watt—Package of 5 (R1)	$1.00
11323	Resistor—270,000 ohms, carbon type, ¼ watt—Package of 5 (R8)	1.00
12200	Resistor—1 meg., insulated, ¼ watt—Package of 5 (R6, R9)	1.00
11626	Resistor—2.2 meg., carbon type, ¼ watt—Package of 5 (R4, R7)	1.00
13296	Shield—Coil shield for coil Stock Nos. 13293 and 13294	.30
12008	Shield—First or second I. F. transformer shield	.28
12607	Shield—First I. F. transformer shield top	.30
12581	Shield—Second I. F. transformer shield top	.36
3682	Shield—1A4, 1A6, or 1F6 Radiotron shield	.22
8098	Socket—Dial lamp socket	.10
4794	Socket—4-contact 1A4 or 30 Radiotron socket	.15
4786	Socket—6-contact 1A6, 1F6 or 19 Radiotron socket	.15
12007	Spring—Retaining spring for core, Stock No. 12006—Package of 10	.36
4284	Spring—Spring for female section fuse holder—Package of 10	.30
12803	Transformer—Audio transformer pack (T1, T2)	3.55
12801	Transformer—First I. F. transformer (L5, L6, C9, C10)	1.70
12802	Transformer—Second I. F. transformer (L7, L8, C11, C12, C13, R3)	1.85
13214	Volume control and power switch (R5, S1, S2)	1.50
4285	Washer—Insulating washer for female section of fuse holder—Package of 10	.22
	REPRODUCER ASSEMBLIES	
12642	Cone—Reproducer cone and dust cap	.94
5118	Plug—3-contact male connector for reproducer	.25
9712	Reproducer—Complete	6.60
	MISCELLANEOUS ASSEMBLIES	
12638	Knob—Station selector control knob—Package of 5	.58
11347	Knob—Volume control knob—Package of 5	.75
11377	Screw—Chassis mounting screw assembly—Package of 4	.12
11349	Spring—Retaining spring for knob, Stock Nos. 11347 and 12638—Package of 5	.25

Prices quoted above are subject to change without notice.

REMLER COMPANY, Ltd.

MODEL 91

MODEL 91 RADIO RECEIVER

This is a five tube superheterodyne receiver with short wave coverage on American and Foreign short wave bands. It is designed to operate from batteries.

INSTALLATION:

An antenna having an overall length, including lead-in, of one hundred to one hundred and fifty feet should be connected to the blue wire extending from the back of the set. The antenna should be as high as possible and the lead-in should be kept clear of all metal objects, such as pipes and wires, and should be run in as straight a line as possible to the set. A good ground connection is essential for best performance. Connect the black wire to a water pipe or to a pipe driven several feet into moist earth. The pipe should be cleaned to insure good connection.

CONTROLS:

The knob on the lower left is the tone control; when turned to the right, the higher frequency tones are suppressed and static and interfering noises are reduced in intensity. The knob above the tone control is the volume control and ON and OFF switch. The selector knob is on the right of the dial. The outer portion of the dial is calibrated for the standard broadcast band.

The short wave range switch is below the selector. When turned to the right the standard broadcast and police ranges are covered. The police stations may be tuned in, when operating between 1500 and 1700 on the dial. When the range switch is turned to the left, the short wave range between 5.5 and 10.5 megacycles is covered. This range includes airport and aircraft transmissions and the most popular American and Foreign bands. The calibration for the short wave is on the inner or red portion of the dial. Airports and Aircraft may be tuned in from 5.5 to 5.8 megacycles. The 49 meter broadcast band, best for night reception is indicated by a heavy line, as is also the 31 meter broadcast band. The reception on the latter band is best in the late afternoon and evening.

BATTERY CONNECTIONS:

The receiver is intended to be operated from a two volt aircell, two volt storage cell, or a dry battery for the filament supply. When dry cells are used the most economical connection is with the use of four cells connected in series parallel as shown in the diagram. When the aircell or two volt storage cell is used, remove the 1A1 tube from its socket and plug in the adapter furnished with the receiver. Connect the wires from the adapter to the two volt storage cell or aircell as shown in the sketch. The storage or aircell will give the most economical operation. Three 45 volt "B" batteries should be used for the "B" supply connected in series as shown in the diagram. The larger size "B" batteries are preferable where portability is not a factor. The manufacturer's numbers of the standard and heavy duty "B" batteries are as follows:

Bond #3044 or 3061, Burgess #2308 or #10308
Eveready 672 or 870 General V30D or V30F

The portable type "B" batteries are designated as follows:

Bond #4061, Burgess #5308, Eveready #762, General #V30S.

OPERATION:

When the batteries are properly connected, turn the volume control to the right and slowly turn the selector knob until the desired program is heard. If too loud, reduce the volume by turning the volume control to the left. For best quality the selector should be adjusted to the center of the range on the dial within which the station is heard loudest, and the volume adjusted with the volume control only.

SERVICE DATA:

The following tubes are used in the receiver:

1C6 - Pentagrid converter
1A4 - Super Control Amplifier
1F6 - Duplex-diode pentode
33 - Power amplifier pentode
1A1 - Voltage regulator tube

The location of the antenna coil is near the variable condenser. The oscillator coil is mounted under the chassis with the short wave coil adjacent. Trimmers for the broadcast band are located on the side of the variable condenser. The I. F. transformers are within the square shields on the top of the chassis with trimmers adjustable thru holes in the tops of the shields. The I. F. frequency is 450 K. C.

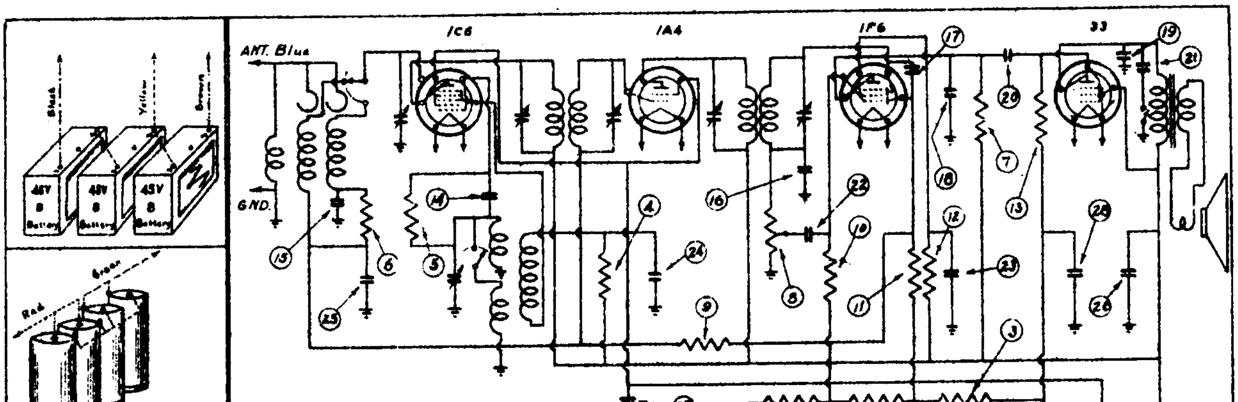
VOLTAGE READINGS FOR SERVICE WORK:

With fresh batteries, no signal.

From chassis to:-

33	power amplifier	tube	plate	118	volts
33	" "	"	screen	122	"
33	" "	"	grid bias	13	"
1F6	duplex diode	"	plate	46	"
1F6	" "	"	screen	20	"
1F6	" "	"	grid bias	1	"
1A4	I.F. amplifier	"	plate	122	"
1A4	" "	"	screen	90	"
1A4	" "	"	grid bias	3.5	"
1C6	pentagrid converter	"	plate	122	"
1C6	" "	"	screen	90	"
1C6	" "	"	osc. anode	75	"
1C6	" "	"	grid bias	3.5	"

I.F. PEAK 450 K.C.

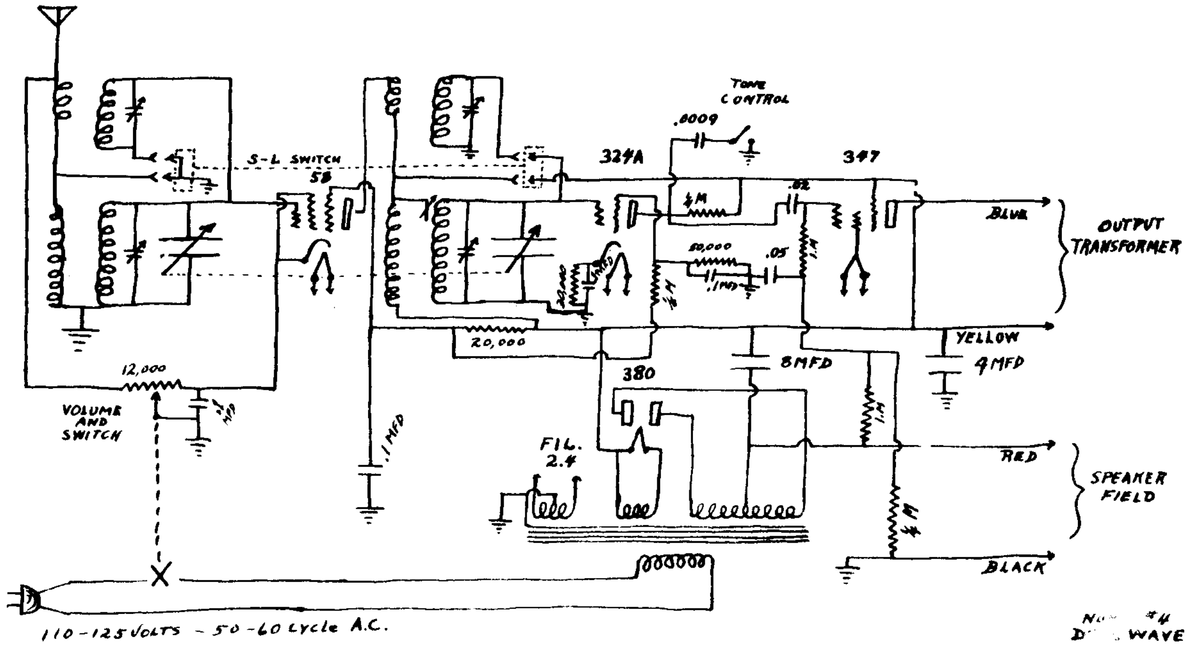


RESISTORS		CONDENSERS	
1	30 Ohms	14	.00007 Mfd.
2	100	15	.0003
3	400	16	.0003
4	25000	17	.0003
5	100000	18	.0005
6	70000	19	.001
7	250000	20	.01
8	500000	21	.01
9	1 Meg.	22	.01
10	1 "	23	.02
11	1 "	24	.05
12	1 "	25	.1
13	1 "	26	.25
		27	.25
		28	10

Beginning Serial No 7275D

REMLER COMPANY, Ltd.

NORCO MODEL 4 T.R.F.



Voltage readings for servicing purposes follow:

A.C. Voltages:

Heater filaments -- 2.4 volts
Power Tube filament - 2.4 volts
Rectifier filament -- 4.8 volts

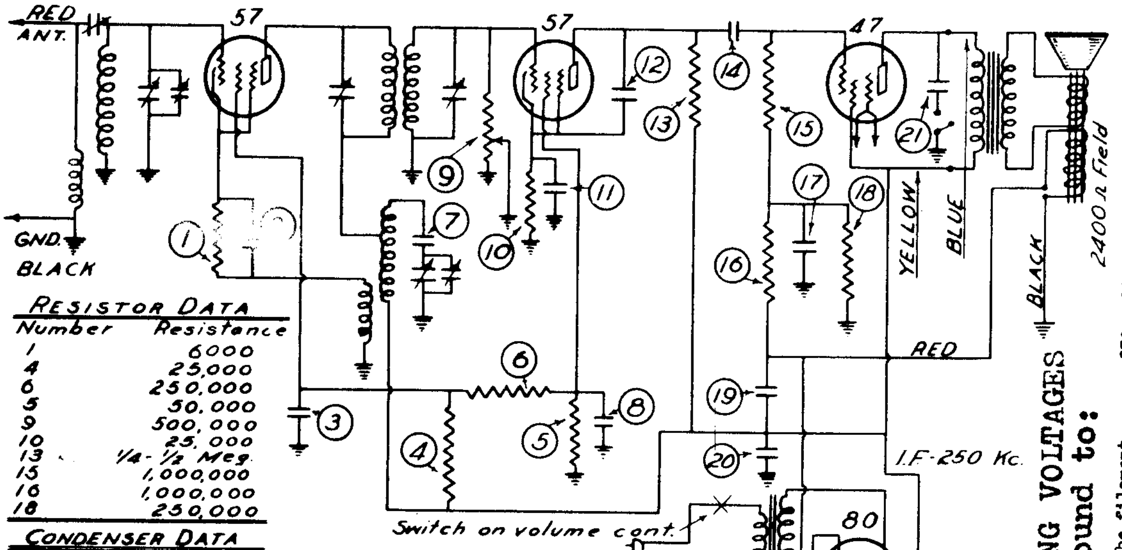
D.C. Voltages:

From Ground to:

#380 tube filament ---- 250 volts
#347 " screen grid ---- 250 "
#347 " Plate ---- 245 "
#58 " Plate ---- 250 "
#58 " screen grid ---- 130 to 180 volts varies with position of volume control
#324A tube plate ---- 100 volts measured with one mil. meter and 600,000 ohm series resister due to small current.
#324A Tube Screen grid---- 12 volts
#324A " Kathode ---- 4 volts
#347 " Grid ---- 17 volts

Due to small current meter readings will be inaccurate
Speaker field (Red Lead) - 100 volts negative
Use positive side of meter to ground.

NORCO MODEL 4 SUPERHET.



RESISTOR DATA

Number	Resistance
1	6000
4	25,000
6	250,000
5	50,000
9	500,000
10	25,000
13	1/4-1/2 Meg.
15	1,000,000
16	1,000,000
18	250,000

CONDENSER DATA

Number	Capacity	Number	Capacity
2	.005	14	.02
3	.05	17	.05
7	.001	19	8 mfd
8	.1	20	4 mfd
11	.1	21	.02
12	.00025		

OPERATING VOLTAGES From ground to:

#380 Rectifier tube filament -- 270 volts
#347 Power screen grid -- 270 "
#347 " plate -- 265 "
#347 " grid -- 17 "
#57 Mixer-Osc. plate -- 270 "
#57 " screen grid -- 215 "
#67 " kathode -- 12 "
#67 Detector plate -- 150 "
#57 " screen grid -- 30 "
#67 " kathode -- 3½ "

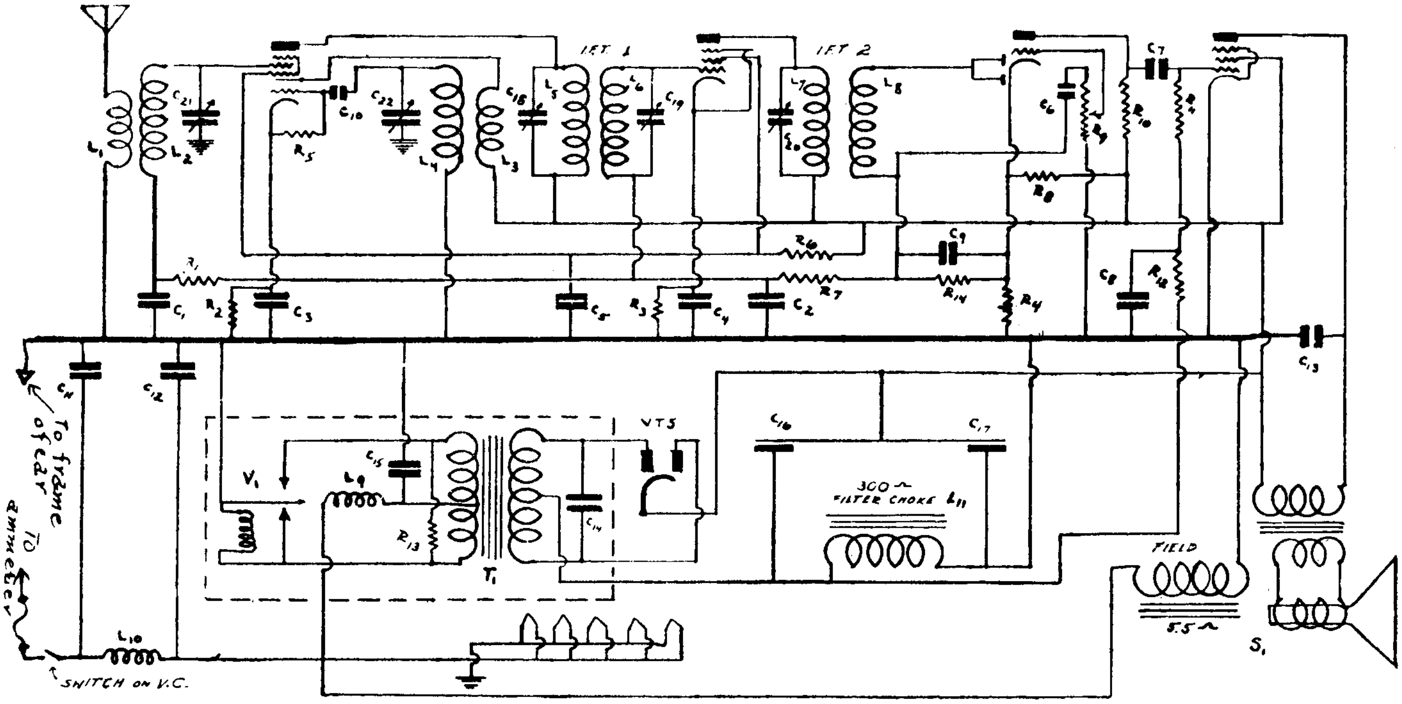
Due to small current, meter readings will be inaccurate on detector plate and power tube grid.

I.F. PEAK 250 K.C.

Speaker field (red lead) -- 80 volts negative.

SEARS, ROEBUCK & CO.

MODEL AI AUTO SET



ALIGNMENT PROCEDURE

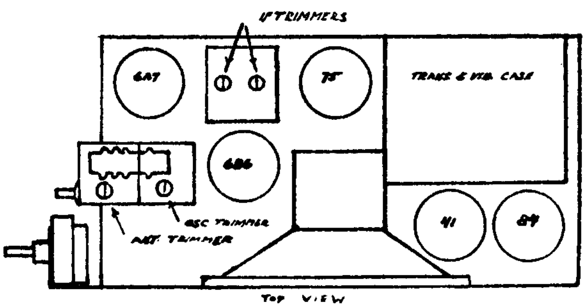
I. F. Alignment. Connect a signal generator set at 480kc to the 6A7 input and connect an output meter to the speaker output. Using a weak signal tune the two I. F. condensers on the composite coil and the single I. F. condenser on the output I. F. coil for maximum response.

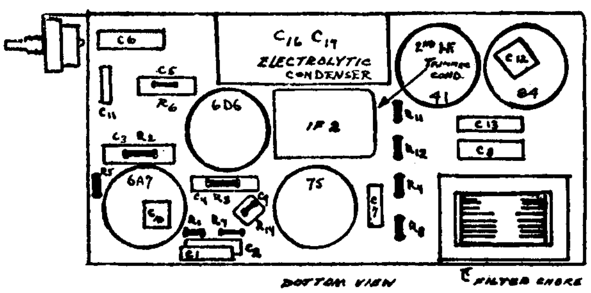
Connect the signal generator set at 1400kc to the antenna lead using a dummy antenna of 150 mmf. Tune the set by means of the dial to 1400kc position. Adjust oscillator trimmer for this frequency. Then trim antenna stage for maximum response. Repeating the alignment may result in improved sensitivity.

TUBE SOCKET DATA (Voltages to Ground)

Tube	Filament	Plate	Screen	Cathode
6A7 Det. Osc.	6.1	220	95	3
6D6 I. F.	6.1	220	95	3.7
75 2nd Det. Amp.	6.1	120	......	1.3
41 Output	6.1	200	220	......
84 Rectifier	6.1	......	......	220

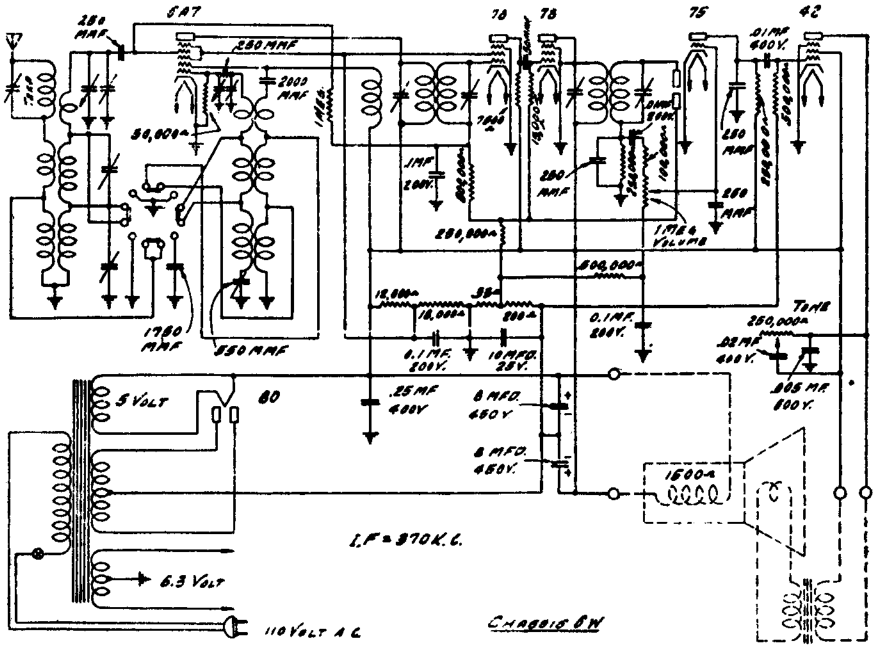
Note: 6A7 Osc. Plate—200 Volts
41 Bias—14 Volts (Drop across B choke)





SEARS, ROEBUCK & CO.

MODEL 6W



Service Notes

The 6-W is a 6 tube superheterodyne receiver designed for reception on frequencies from 550 to 1500 K. C. and from 1.6 to 4.8 megacycles on the police band and from 5 to 17 megacycles on the foreign band. The 6-W employs the following tubes in their respective circuits: 1 type 6A7, first detector and electron coupled oscillator; 2 type 78, intermediate amplifier; 1 type 75, second detector, delayed AVC and first audio; 1 type 42, final audio stage; and 1 type 80, double wave rectifier.

I. F. and R. F. ADJUSTMENTS:

Should it become necessary to check the adjustments of the I. F. and R. F. alignment of the receiver, it will be necessary to employ the use of a calibrated oscillator for the various frequencies used in this receiver in connection with a sensitive output meter.

In order to prevent the AVC from operating and giving a false reading while making alignment adjustments, the oscillator should be loosely coupled to the receiver so that only a small deflection will show on the output meter with the volume control of the receiver set at the maximum position. This applies to both I. F. and R. F. adjustments.

I. F. ALIGNMENT:

To align the intermediate transformer, the test oscillator should be adjusted to 370 K. C. and coupled to the control grid of the first detector and adjust the trimmer condensers on the first and second intermediate transformers for maximum reading on the output meter.

R. F. ALIGNMENT:

To adjust the R. F. circuits: (1) Set pointer on tuning chart to 1400 K. C. with band switch in the broadcast position. (2) Adjust test oscillator to 1400 K. C. and connect to antenna lead on chassis. (3) Adjust trimmer on the oscillator section of the tuning condenser for maximum reading. (4) Reset dial pointer on receiver and test oscillator to 600 K. C. (5) Adjust 600 K. C. padding condenser for maximum reading moving tuning condenser back and forth slowly while making adjustment (the 600 K. C. padding condenser is mounted on the base at the left of the tuning condenser). (6) Reset oscillator and tuning pointer on the receiver to 1400 K. C. and readjust trimmer on oscillator section of tuning condenser for maximum reading. (7) Reset dial pointer on receiver and test oscillator to 15 megacycles. (8) Set band change switch in the right hand position. (9) Adjust trimmer on first section of tuning condenser for maximum reading. (10) Reset dial pointer on receiver and test oscillator to 3.6 megacycles. (11) Set band change switch in left hand position. (12) Adjust 3.6 megacycle trimmer condenser for maximum reading (the 3.6 megacycle trimmer is mounted under the chassis and directly in front of the band change switch. (13) Reset dial pointer on receiver and test oscillator to 1400 K. C. (14) Set band change switch in broadcasting position and adjust 1400 K. C. trimmer for maximum reading (the 1400 K. C. trimmer is mounted under the chassis directly over the antenna coil).

WAVE TRAP ADJUSTMENT:

This receiver is designed with a wave trap to prevent interference from commercial code stations operating on or about 370 K. C. To adjust the wave trap, set test oscillator on 370 K. C. and connect to antenna lead on chassis and adjust wave trap trimmer condenser for minimum signal on the output meter (the wave trap is mounted on the rear left end of the chassis).

POWER SUPPLY:

The 6-W is designed for operation on different sources of power supply: namely, 110 volts, 25 cycles; 110 volts, 60 cycles, and 220 volts, 60 cycles. If there is any doubt about the voltage or frequency of current you should consult your local power supply company before attempting to operate the receiver.

ANTENNA AND GROUND CONNECTIONS:

Best results will be obtained from an outside antenna 30 to 60 feet over all length, including lead in. For installations close to powerful broadcasting stations an antenna not more than 30 feet in length should be used. On installations at considerable distance from broadcasting stations, a longer antenna may be used with better results. There are on the market at the present time a number of antennae especially designed for short wave reception. These antennae tend to reduce local interference caused by electrical apparatus in the nearby vicinity. A good ground lead is important and should be as direct as possible. If a water or steam pipe is not available, a metal rod may be driven in the ground. It is also important that the antenna and antenna lead in be as far removed as possible from power lines, metal drain spouts, and other metal structure.

TUBE SOCKET VOLTAGE

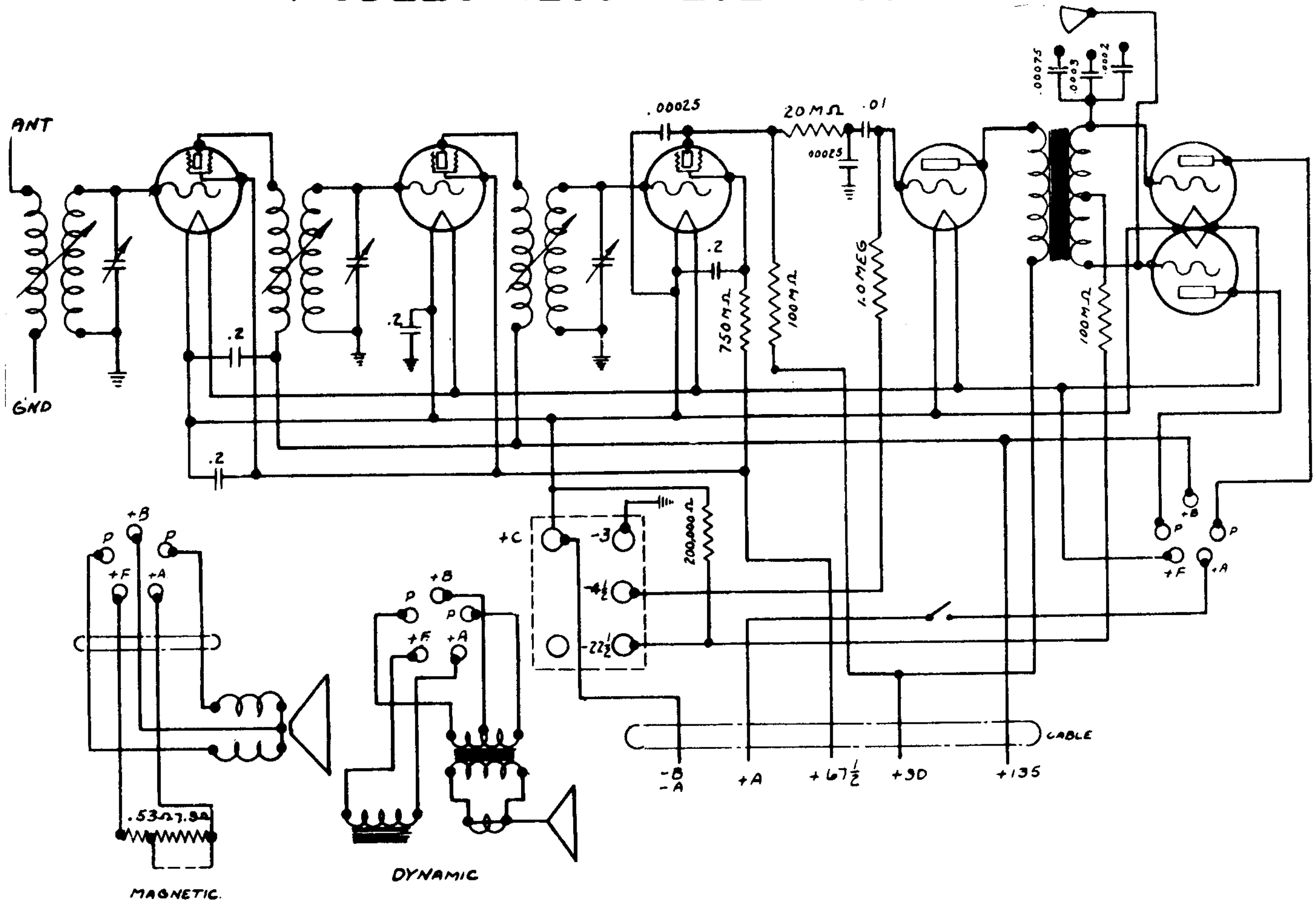
Tube Number		Control Grid to Cathode	Screen to Cathode	Plate to Cathode	M. A. Plate	Heater Voltage
6A7	1st Det.	*2	85	210	3.	6.3
	OSC.			210	4.	
78—1st I. F.		*2	85	· 150	7.	6.3
78—2nd I. F.		*2	85	210	4.	6.3
75—2nd Det.		*2		110	.5	6.3
42—2nd Audio		**15	210	190	32.	6.3
80—Rect.					25 Per Plate	5.

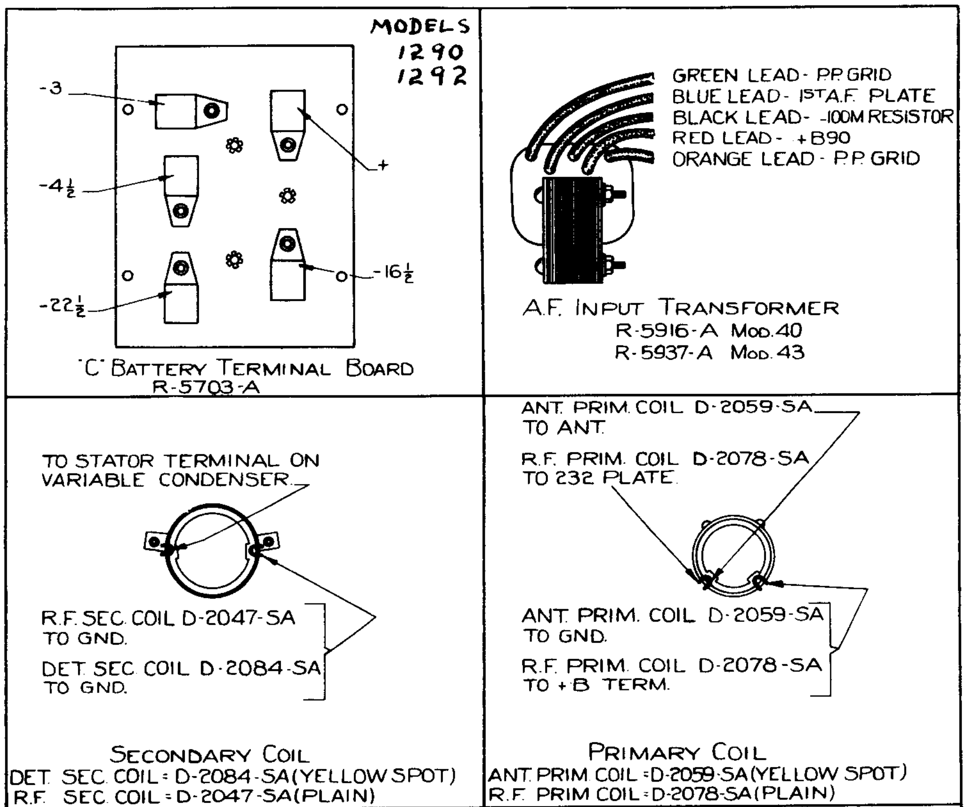
*Terminal No. 5 on candohm to ground.

**Terminal No. 6 on candohm to ground.

SEARS, ROEBUCK & CO.

MODELS 1290-1292-1300-1302





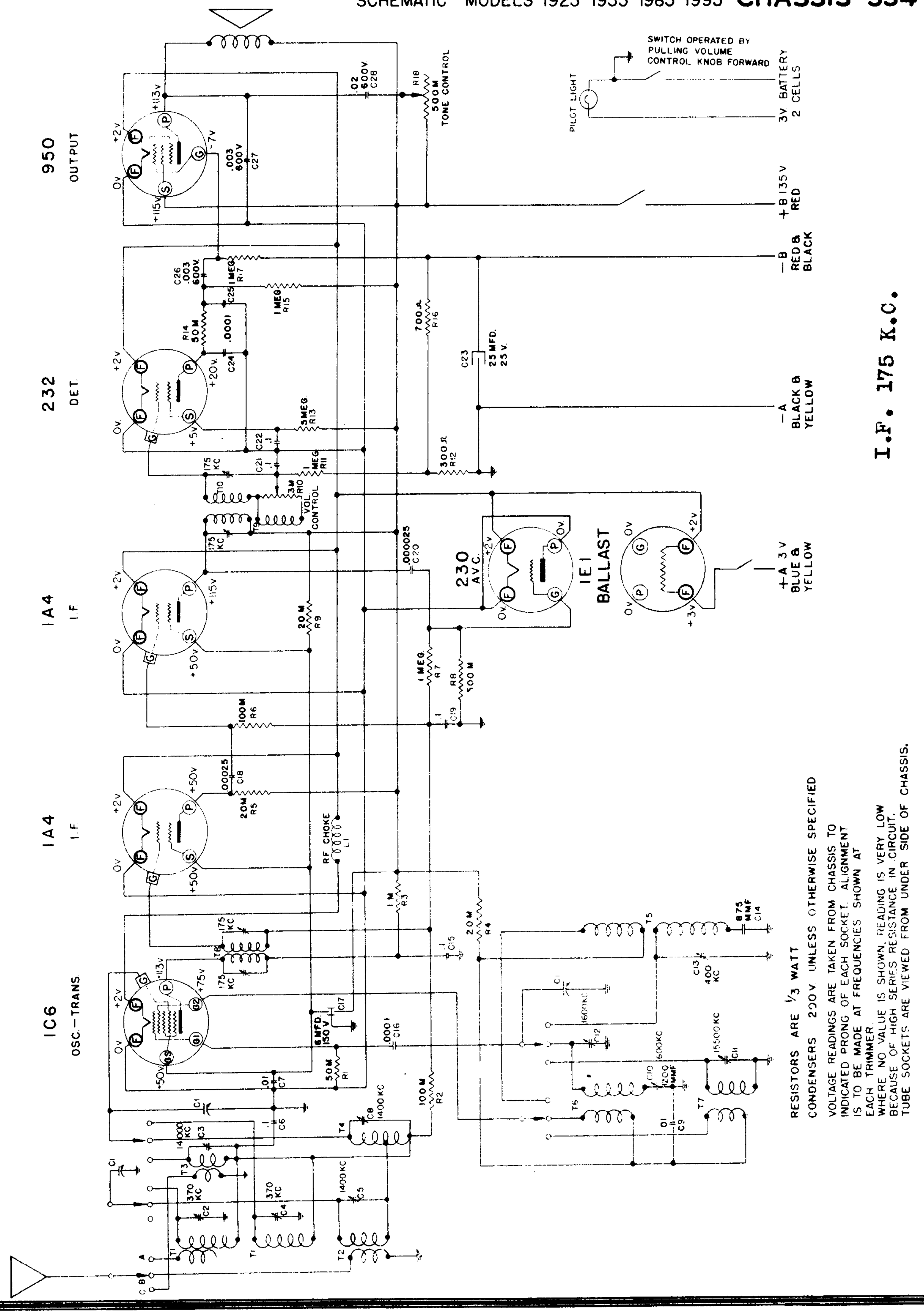
LEAD DETAILS OF A.F. INPUT TRANSFORMER, PRIMARY & SECONDARY R.F. COILS & "C" BATTERY TERMINAL BOARD

Voltage Table

	RF1	RF2	Det.	1st Audio	231
Plate Voltage	135	135	80	90	130
Screen Voltage	67	67	25		
Filament Voltage	2.0	2.0	2.0	2.0	2.0
Control Grid Voltage	3	3		4.5	22.5

SEARS, ROEBUCK & CO.

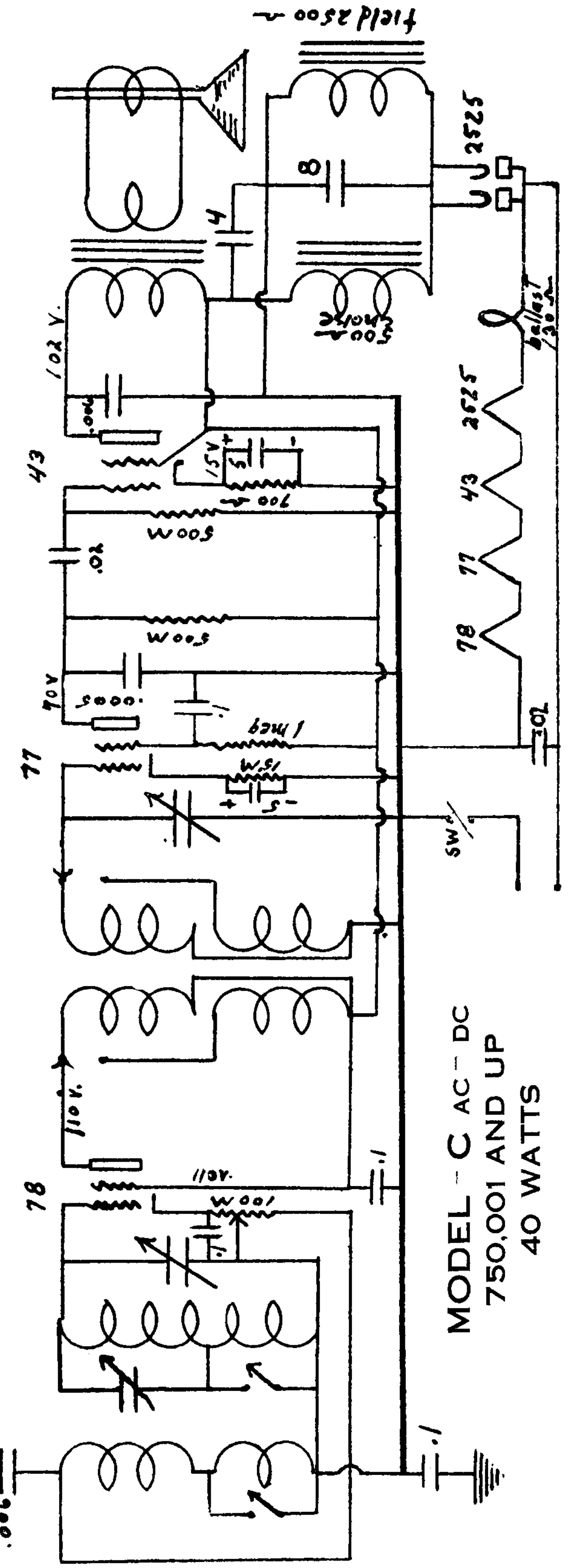
SCHEMATIC - MODELS 1923-1933-1983-1993 **CHASSIS 334**

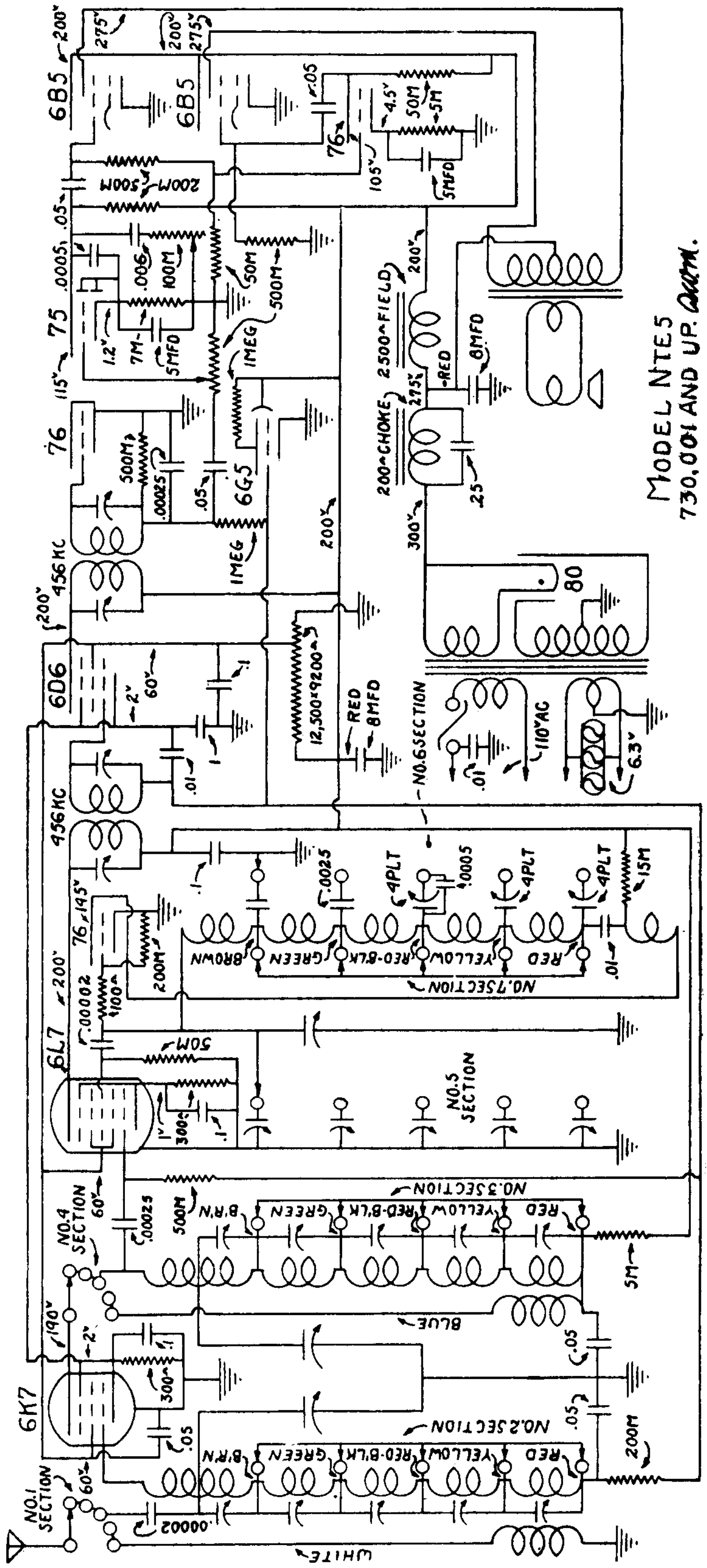


THE SIMPLEX RADIO CO.

MODEL C–A.C.–D.C. SERIAL 750001 UP

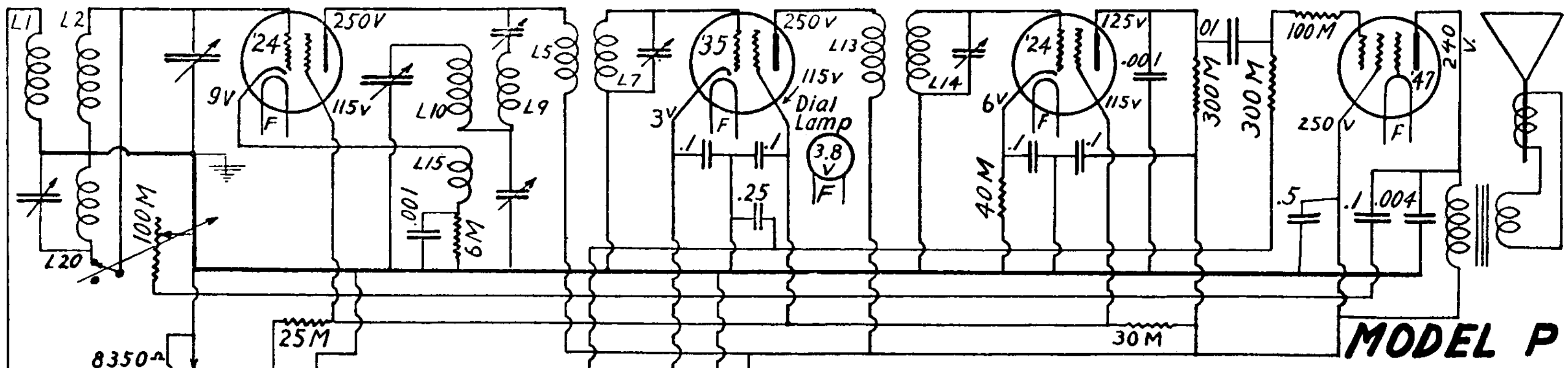
MODEL NTE5 A.C. SERIAL 730001 UP

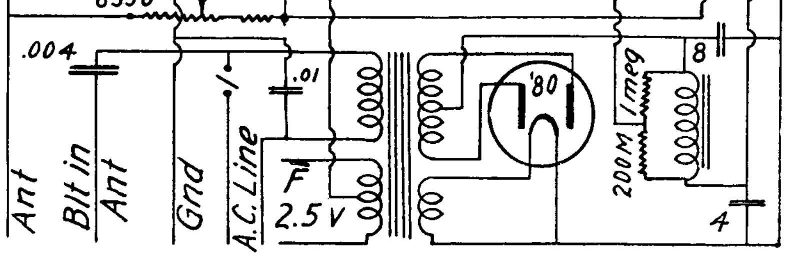




THE SIMPLEX RADIO CO.

MODEL P-A.C.





CAUTION: *DO NOT ATTEMPT TO OPERATE ON CURRENT OTHER THAN THAT NOTED ON INSTRUMENT.*

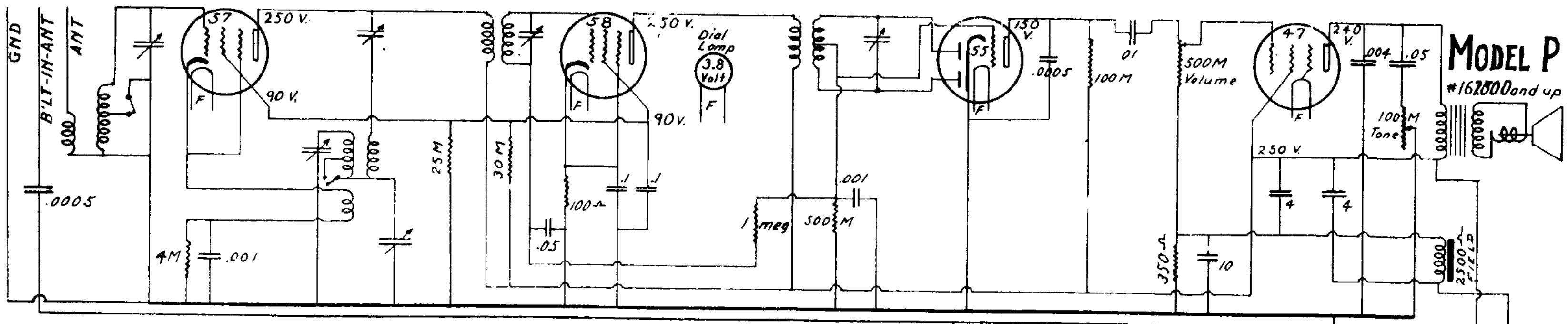
INSTALLATION: "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or out door aerial, radiator, bed springs or any large metal object, if desired.

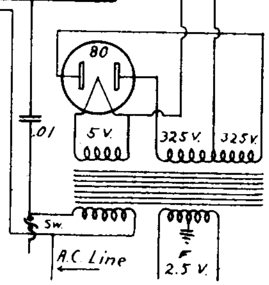
BALANCING: The intermediate stage is carefully phased and sealed to 175 K.C. and should not be tampered with.

TO RECEIVE ON 1500 TO 4000 KILO-CYCLES: Turn tone control knob to end of range until switch throws to 4000 k. c. band. To throw back to broadcast band turn tone control in opposite direction until switch throws.

PHONOGRAPH: Use a single pole switch mounted as near as possible to second detector socket, connect in series with lead from ground end of grid coil of second detector tube. Solder phonograph pickup leads to switch terminals

MODEL P-A.C. SERIAL 162500 UP





CAUTION: *Do not attempt to operate on current other than that noted on instrument.*

INSTALLATION: "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or out door aerial, radiator, bed springs or any large metal object, if desired.

BALANCING: The intermediate stage is carefully phased and sealed to 175 K. C. and should not be tampered with.

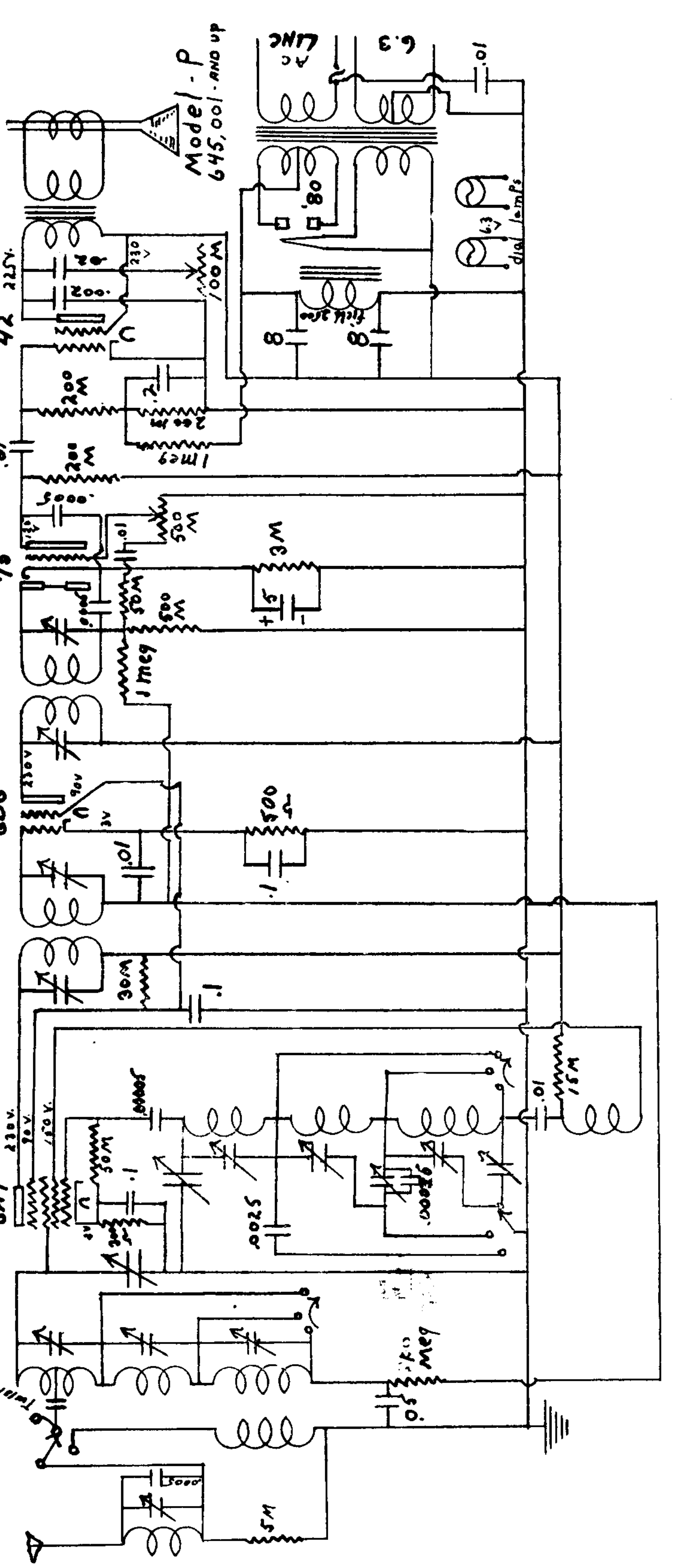
THE TONE CONTROL: is on short wave when turned to extreme left. A slight turn to right is regular broadcast. Further movement is tone control.

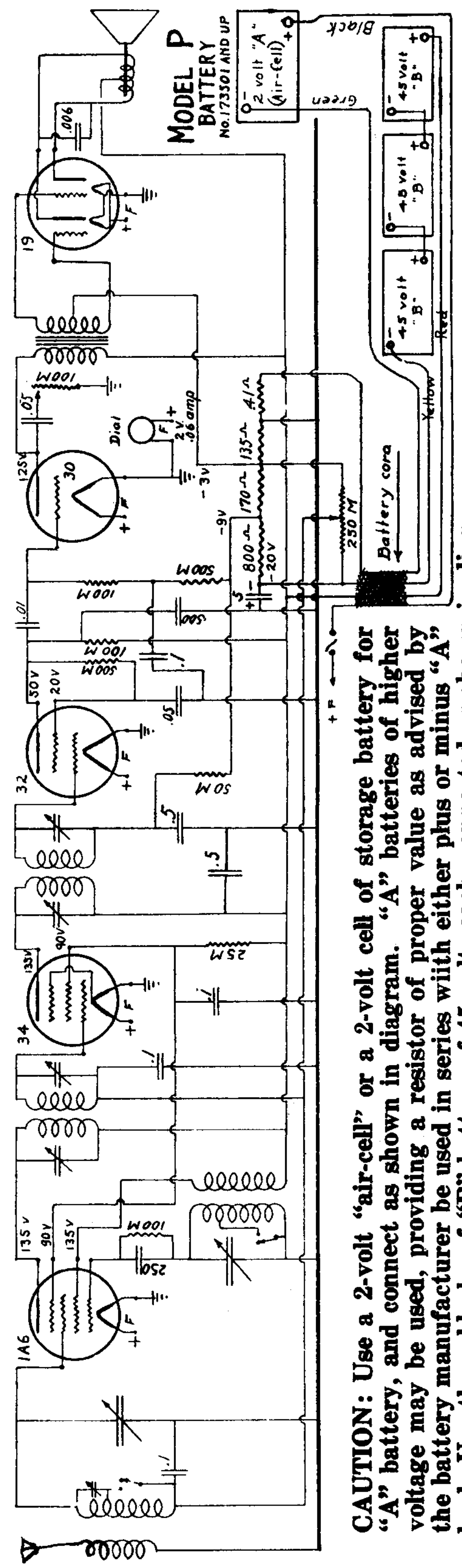
PHONOGRAPH: Use a single pole switch mounted as near as possible to socket marked "55"; connect one side to green resistor with yellow dot at end attached to yellow wire; connect other side, in series with phonograph pickup leads, to chassis.

THE SIMPLEX RADIO CO.

MODEL P
SERIAL 645001 UP

MODEL P BATTERY SET
SERIAL 173001 UP





CAUTION: Use a 2-volt "air-cell" or a 2-volt cell of storage battery for "A" battery, and connect as shown in diagram. "A" batteries of higher voltage may be used, providing a resistor of proper value as advised by the battery manufacturer be used in series wiith either plus or minus "A" lead. Use three blocks of "B" battery of 45 volts each, connected as shown in diagram.

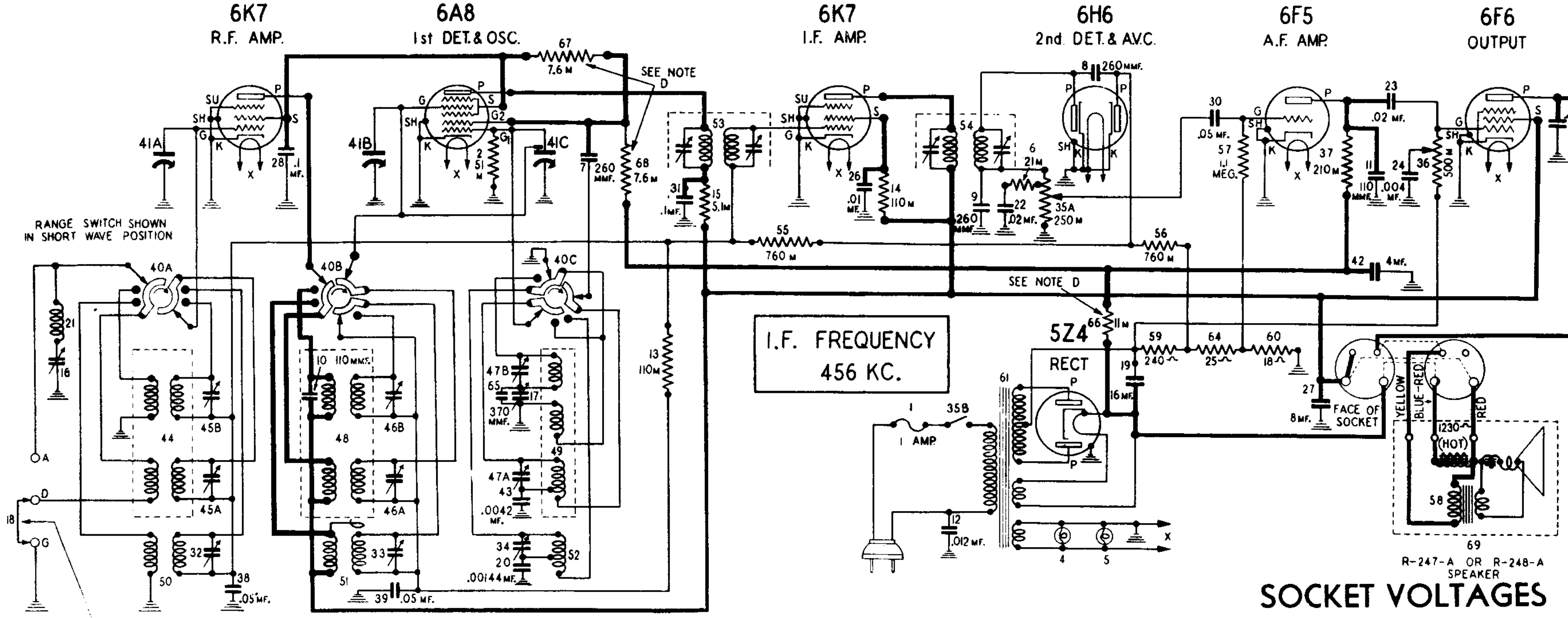
INSTALLATION: A good outdoor aerial will give best results, especially on short wave. No ground wire is usually required.

PHONOGRAPH: Use single pole toggle switch mounted as near as possible to socket marked "32." Cut black wire coming from bottom of coil can adjacent to this tube and connect across switch. Connect phonograph pickup across switch.

SERVICE NOTES: Intermediate stage is carefully phased to 456 k.c. at the factory. Should rephasing be necessary, feed 456 k.c. signal into grid cap of "1A6" tube, and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400 k.c., carefully remove chassis from cabinet, feed 1400 k.c. signal into antenna lead and adjust trimmers on tuning condenser to loudest signal.

STEWART WARNER CORP.

STEWART-WARNER MODEL R-146 CHASSIS (RECEIVER MODELS 1461 to 1469)

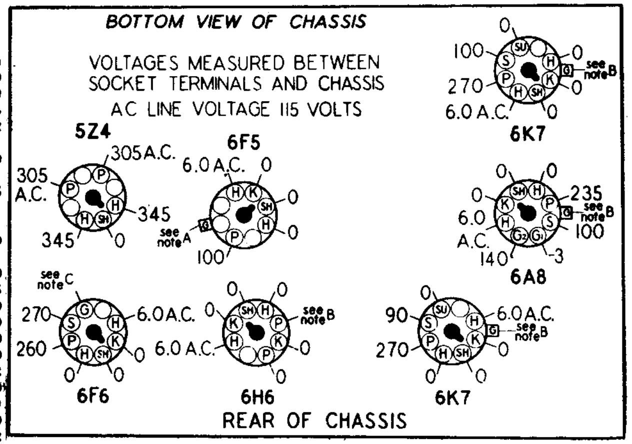


NOTE D: In receivers having serial numbers below 332,599, resistor 67 is omitted, and the screen grids of the 6K7, R.F. amplifier and the 6A8 receive their current through a 31,000 ohm, 1 watt carbon resistor which is connected to the screen grid of the 6F6. In addition, resistor 66 has a rating of 30,000 ohms, 1 watt and resistor 68 has a rating of 16,000 ohms, ¼ watt.

Diagram Number	Part Number	Description	List Price
1	38841	Fuse, 1 amp.	$ .10
2	83080	51,000 ohm, ¼ watt carbon resistor	.20
4-5	83278	Pilot lamp	.15
6	83286	21,000 ohm, ¼ watt carbon resistor	.20
7-8-9	83539	260 mmfd. mica condenser	.15
10-11	83783	110 mmfd. mica condenser	.16
12	83976	.012 mfd. 1000 v. shielded condenser	.35
13-14	84198	110,000 ohm ¼ watt carbon resistor	.30
57	84235	1.1 megohm ¼ watt carbon resistor	.20
15	84720	5,100 ohm ¼ watt carbon resistor	.12
16	85285	Wave Trap Condenser	.40
17	85285	Padding Trimmer	.40
18	85321	Ground Connector for G.D.A. strip	.01
19	85431	16 mfd. 400 v. electrolytic condenser	1.25
20	85562	.00144 mfd. mica condenser	.30
61	85782	Power transformer 115 V. 60 cycles	5.20
22-23	88026	.02 mfd. 400 V. paper condenser	.30
24-25	88029	.004 mfd. 400 V. paper condenser	.30
26	88030	.01 mfd. 400 V. paper condenser	.30
27	88033	8 mfd. 350 V. electrolytic condenser	1.10
28	88046	.1 mfd. 150 V. paper condenser	.30
30	88189	.05 mfd. 200 V. paper condenser	.35
31	88191	.1 mfd. 300 V. paper condenser	.35
64	88465	25 ohm ½ watt wire wound resistor	.12
32-33-34	88477	Trimmer condenser	.12
35-A / 35-B	88487	Volume Control (250,000 ohms) / A.C. line switch	1.25
36	88488	Tone control 500,000 ohms	.80
58	88529	Output transformer on R-247-A speaker	2.00
37	88532	210,000 ohm ¼ watt carbon resistor	.12
38-39	88534	.05 mfd. 150 V. condenser (low loss)	.24
40A to C	88573	Range switch	2.50
41A to C	88574	Three gang condenser	5.00
42	88576	4 mfd. 250 V. electrolytic condenser	.80
60	88584	18 ohm ½ watt wire wound resistor	.15
43	88587	.0042 mfd. mica condenser	.32
44	88592	Antenna coil & shield assem. (B.C.&S.W.) with trimmer	2.20
45A-45B / 46A-46B / 47A-47B	88596	Trimmer Condenser	.25
48	88597	R.F. coil & shield assem. (B.C. & S.W.) with trimmer	2.40
49	88599	Oscillator coil & shield assem. (B.C.&S.W.) with trimmer	2.20
50	88602	Antenna coil assem. (Police) with trimmer	.85
51	88604	R.F. coil assem. (Police) with trimmer	1.00
52	88605	Oscillator coil (Police) with trimmer	.70
53	88606	1st I.F. transformer	2.50
54	88607	2nd I.F. transformer	2.50
55-56	88854	760,000 ohm ¼ watt carbon resistor	.12
57	84235	1.1 megohm ¼ watt carbon resistor	.20
58	88796	Output transformer on R-248 spkr.	2.50
58	88529	Output transformer on R-247 spkr.	2.00
59	89439	240 ohm 2 watt wire wound resistor	.12
60	88584	18 ohm ½ watt wire wound resistor	.15
61	85782	Power transformer, 115 V. 60 cycles	5.20
64	88465	25 ohm ½ watt wire wound resistor	.12
65	89525	370 mmfd. mica condenser	.40
66	89751	11,000 ohm 1 watt carbon resistor	.12
67	89752	7,600 ohm ½ watt carbon resistor	.12
68	89754	7,600 ohm 1 watt carbon resistor	.12
69	R-247-A	Dynamic speaker, 8"	9.00
69	R-248-A	Dynamic speaker, 12"	11.50

SOCKET VOLTAGES

RANGE SWITCH ON BROADCAST POSITION — DIAL TUNED TO 530 KC.
VOLUME CONTROL ON FULL — ANTENNA GROUNDED



IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The grid bias for the 6F5 is −1.3 volts measured across resistor 60.

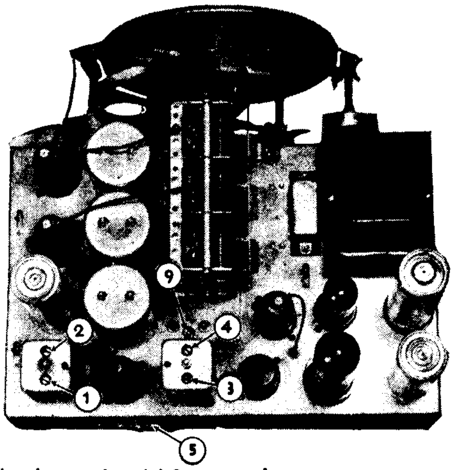
NOTE B: The grid bias for the 6A8, 6K7's, and the anode voltage of the A.V.C. section of the 6H6 is −3.0 volts measured across resistors 60 and 64.

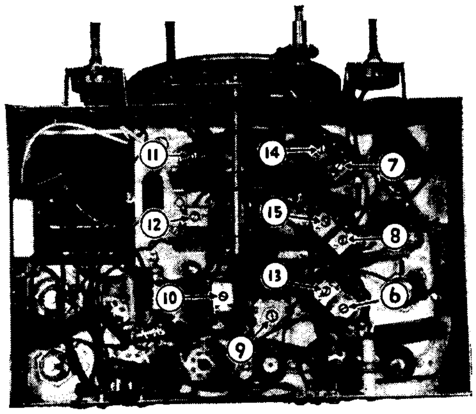
NOTE C: The grid bias for the 6F6 output tube is −19.0 volts measured across resistor 59, 64 and 60.

STEWART WARNER CORP.

MODELS 1461 TO 1469 CHASSIS 146

CALIBRATION AND ALIGNMENT





ALIGNING EQUIPMENT: For proper alignment, an output meter and an accurately calibrated oscillator with a tuning range from 456 KC. to 16 MC. are required.

Connect the output meter from the plate of the output tube to chassis. A convenient point to make the plate connection is to the yellow wire on speaker socket.

ALIGNING THE I. F. AMPLIFIER: Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (fully clockwise).

Connect the test oscillator output leads to the 6A8 control grid and chassis with a **.1 mfd. condenser in series with the oscillator output.** Set the oscillator to exactly 456 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

Adjust the four I.F. trimmers, Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.

WAVE-TRAP ADJUSTMENT: The wave-trap adjusting trimmer, No. 5, is located on the back of the chassis. Leave the test oscillator at 456 KC. Connect the oscillator output to the A and G terminals with a 400 ohm **resistor in series** with the A terminal and oscillator output. Then adjust the wave-trap trimmer No. 5 for **minimum** output. If some particular station with a frequency near 456 KC. causes code interference, it may be desirable to adjust the wave-trap on the actual frequency of the interfering station.

BROADCAST BAND CALIBRATION AND ALIGNMENT: With the gang condenser in full mesh, the dial pointer should be on the white horizontal line below 530 KC. on the dial scale. Leave the range switch in the extreme clockwise position, and leave the test oscillator connected to the A and G terminals of the receiver through a 400 ohm resistor.

Adjust the test oscillator to exactly 1500 KC. and turn the receiver dial pointer to 1500 KC. on the tuning dial. To calibrate the dial, adjust trimmer No. 6 for maximum output.

Carefully tune the receiver to the signal and adjust trimmers Nos. 7 and 8 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 9 for maximum output. Then try to increase the output meter reading by detuning No. 9 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though the dial may be slightly off calibration at 600 KC.

BAND NO. 2 CALIBRATION AND ALIGNMENT: Turn the range switch to the center position.

Adjust the test oscillator to exactly 5.0 MC. and turn the receiver dial pointer to exactly 5.0 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 10 for maximum output. If two peaks are found, the proper one is that with the trimmer screw farthest **out.**

Carefully tune the receiver to the signal and adjust trimmers Nos. 11 and 12 for maximum output. Then try to increase the output by detuning No. 12 slightly and retuning the receiver dial. Continue detuning No. 12 and retuning the dial until the output meter deflection is a maximum. Then readjust No. 11 for maximum output.

BAND NO. 3 CALIBRATION AND ALIGNMENT: Turn the range switch to the extreme counter-clockwise position. Be sure the D and G terminals on the antenna terminal strip are connected together.

Set the test oscillator to 16 MC. and turn the receiver dial pointer to exactly 16 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 13 for maximum output. Check to see that it has been adjusted to the proper peak by tuning the receiver to approximately 15.1 MC. A repeat signal should be heard at this point. If none is present, even with greatly increased oscillator output, retune the receiver to 16 MC. and adjust trimmer No. 13 to the proper peak with the trimmer screw farther **out.**

Carefully tune the receiver to the signal and adjust trimmers Nos. 14 and 15 to a peak. Then try to increase the output by detuning No. 15 slightly and retuning the dial until a maximum output meter deflection is secured. Then readjust No. 14 for maximum output. Check the adjustment by tuning the receiver to the image at about 15.1 MC. The image should be much weaker than the 16 MC. signal. If the signal at 15.1 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 15 is not set to the proper peak. Turn the trimmer in a turn or so, then readjust as above.

TRIMMER LOCATIONS

Trimmer Number		Alignment Frequency
1	1st I.F. transformer trimmer	456 KC.
2	1st I.F. transformer trimmer	456 KC.
3	2nd I.F. tranformer trimmer	456 KC.
4	2nd I.F. tranformer trimmer	456 KC.
5	Wave trap trimmer	456 KC.
6	Broadcast oscillator shunt trimmer	1500 KC.
7	Broadcast antenna shunt trimmer	1500 KC.
8	Broadcast detector shunt trimmer	1500 KC.
9	Broadcast oscillator series padder	600 KC.
10	Police oscillator shunt trimmer	5 MC.
11	Police antenna shunt trimmer	5 MC.
12	Police detector shunt trimmer	5 MC.
13	Short wave oscillator shunt trimmer	16 MC.
14	Short wave antenna shunt trimmer	16 MC.
15	Short wave detector shunt trimmer	16 MC.

MISCELLANEOUS PARTS

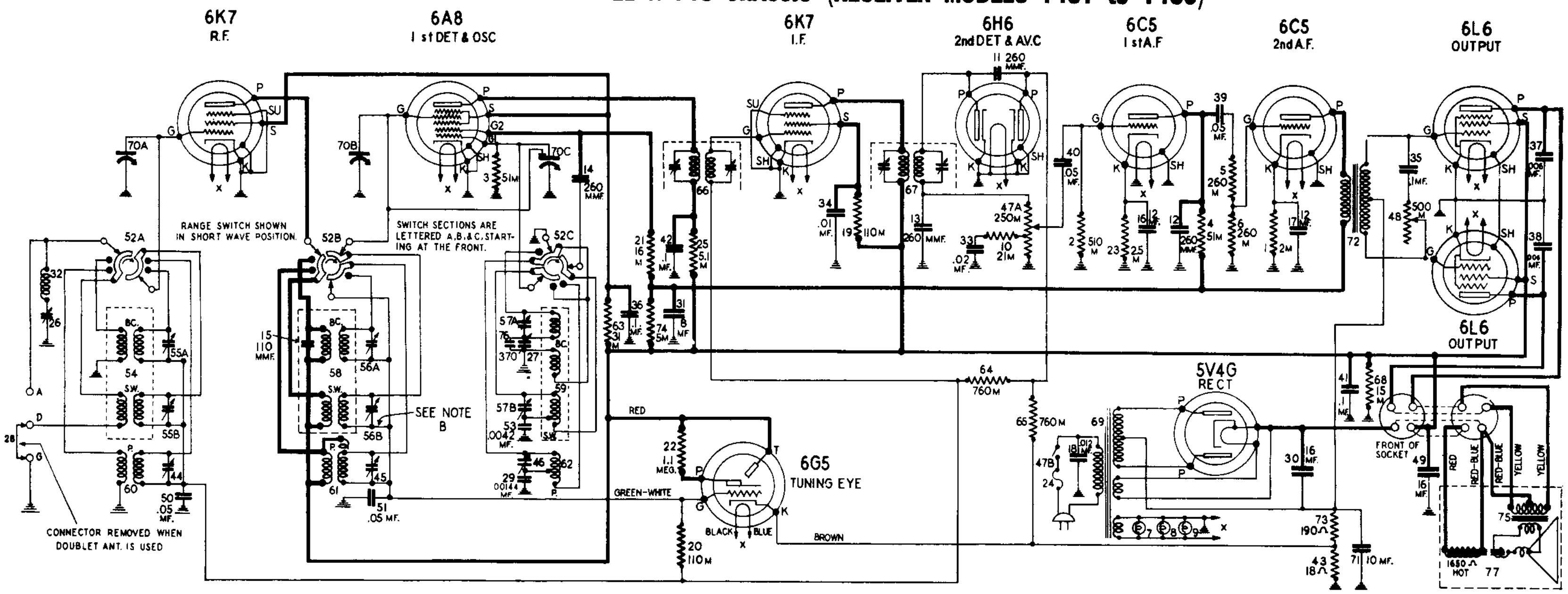
Part No.	Description	List Price
67977	No. 14x1¼ mtg. screw	$ .03
77381	Flat steel washer	.01
84428	Rubber chassis mtg. bushing	.03
85066	G.D.A. terminal strip	.20
85321	Ground connector for G.D.A. strip	.01
88056	Fuse mounting	.16
88057	Fuse cover	.06
88675	Speaker socket	.12
88825	Link and lever assembly	.14
88831	Bracket for range selector knob shaft	.02
88832	Shaft, range selector knob	.10
88985	Tuning knob, front section	.20
88986	Tuning knob, rear section	.25
88987	Knob, range switch	.20
89038	Knob, tone and volume control	.20

DIAL PARTS

Part No.	Description	List Price
83278	Pilot lamp No. 40, 6-8 volts	.15
85902	Dual ratio planetary dial drive	.90
88835	Idler gear and pinion assembly	.25
88839	Tension spring (for idler gear)	.10
88840	Dial disc and bushing assem.	.40
88844	Dial ring, bracket and shaft assem. (for edge lighting)	1.00
88956	Escutcheon with glass	1.65
88958	No. 2 x ⅜ round head wood screw (each)	.01
88998	Second pointer	.05
89000	Dial scale (for rear lighting)	2.00
89001	Main pointer and stud assem.	.10
89027	Spring washer (for planetary drive)	.01
89144	Tension spring (for idler gear)	.10
89283	Pilot lamp socket	.10
89284	Pilot lamp shield	.02
89285	Dial background (with edge lighting)	.12
89286	Dial scale (for edge lighting)	1.80
89484	Dial ring, bracket and shaft assembly (for rear lighting)	1.60
89799	Dial scale retaining clip	.02

STEWART WARNER CORP.

STEWART-WARNER MODEL R-148 CHASSIS (RECEIVER MODELS 1481 to 1489)



NOTE B: In chassis stamped with the letter "H," the lead indicated does not connect to A.V.C. but is by-passed to ground through an .05 mfd. condenser and is connected through a 110,000 ohm resistor to a permanent bias of 1.8 volts at the negative end of resistor No. 43.

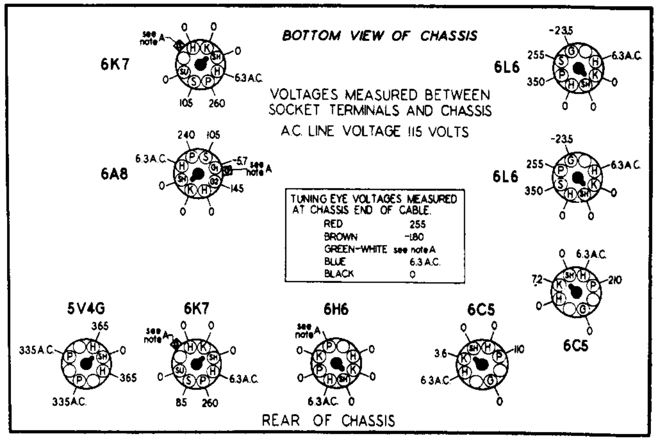
SOCKET VOLTAGES

VOLUME CONTROL ON FULL — RANGE SWITCH SET ON BROADCAST POSITION

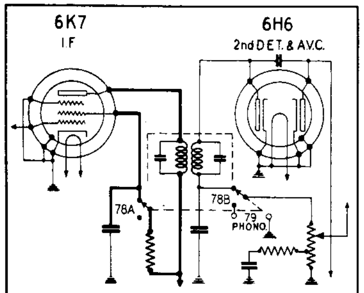
ANTENNA GROUNDED — SET TUNED TO 530 K. C.

IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: —1.8 volts measured across resistor 43.



I.F. FREQUENCY 456 KC.



MODEL R 148 X PHONOGRAPH CONNECTIONS

MODEL R-148 PARTS LIST

Diag. No.	Part No.	DESCRIPTION	List Price
1	67303	2000 ohm 1/4 watt carbon resistor	$0.15
2	83072	510,000 ohm 1/4 watt carbon resistor	.12
3-4	83080	51,000 ohm 1/4 watt carbon resistor	.12
5-6	83082	260,000 ohm 1/4 watt carbon resistor	.12
7-8-9	83278	Pilot lamp (6-8 volt)	.15
10	83286	21,000 ohm 1/4 watt carbon resistor	.12
11-12, 13-14	83539	260 mmfd. mica condenser	.20
15	83783	110 mmfd. mica condenser	.20
16-17	83803	12 mfd. 15V. electrolytic condenser	.80
18	83976	.012 mfd. 1000 V. shielded condenser	.40
19-20	84198	110,000 ohm 1/4 watt carbon resistor	.12
21	84199	16,000 ohm 1/4 watt carbon resistor	.12
22	84235	1.1 megohm 1/4 watt carbon resistor	.12
23	84236	2,500 ohm 1/4 watt carbon resistor	.12
24	84672	Fuse, 2 amperes	.10
25	84720	5,100 ohm 1/4 watt carbon resistor	.12
26	85285	Antenna trap condenser	.40
27	85285	Padding trimmer	.40
28	85321	Ground connector (on terminal strip)	.01
29	85562	.001440 mfd. mica condenser	.25
30	85583	16 mfd. 450 V. electrolytic condenser	2.50
31	88007	8 mfd. 250 V. electrolytic condenser	1.00
32	88014	Antenna trap coil	.50
33	88026	.02 mfd. 400 V. paper condenser	.25
34	88030	.01 mfd. 400 V. paper condenser	.25
35-36	88046	.1 mfd. 150 V. paper condenser	.25
37-38	88185	.006 mfd. 600 V. paper condenser	.25
39-40	88189	.05 mfd. 200 V. paper condenser	.25
41-42	88191	.1 mfd. 300 V. paper condenser	.25
43	88584	18 ohm 1/3 watt wire wound resistor	.15
44, 45, 46	88477	Trimmer condenser	.15
47A, 47B	88487	Vol. control (250,000 ohm) Tap 50,000 ohms from ground and A.C. line switch	1.25
48	88488	Tone control (500,000 ohms)	.80
49	88511	16 mfd. 300 V. electrolytic condenser	1.10
50-51	88534	.05 mfd. 150 V. condenser (low loss)	.25
52A, 52B, 52C	88573	Range switch	2.50
53	88587	.0042 mfd. mica condenser	$0.35
54	88592	Ant. coil & shield (B.C. & S.W.) with trimmer	2.70
55A-55B, 56A-56B, 57A-57B	88596	Trimmer condenser	.30
58	88597	R.F. coil & shield (B.C. & S.W.) with trimmer	3.10
59	88599	Oscillator coil & shield (B.C. & S.W.) with trimmer	2.50
60	88602	Antenna coil assembly (Police) with trimmer	.85
61	88604	R.F. coil assembly (Police) with trimmer	.90
62	88605	Oscillator coil assembly (Police) with trimmer	.70
63	88852	31,000 ohm 1/4 watt carbon resistor	.15
64-65	88854	760,000 ohm 1/4 watt carbon resistor	.12
66	89005	1st I.F. transformer	2.50
67	89006	2nd I.F. transformer	2.40
68	89032	15,000 ohm bleeder resistor	.50
69	89035	Power transformer 115 V.—60 cycles (See Part No. 89473 for other voltages)	7.50
70A, 70B, 70C	89044	Variable gang condenser	5.20
71	89053	10 mfd. 25 V. electrolytic condenser	.92
72	89062	Push-pull input transformer	3.00
73	89065	190 ohm 3 watt wire wound resistor	.50
74	89255	5000 ohm 1 watt carbon resistor	.15
75	89293	Output transformer (R-254-A spkr.)	3.25
76	89525	370 mmfd. mica condenser	.30
77	R-254-A	12" dynamic speaker	12.75

R-148-X PARTS

Diag. No.	Part No.	DESCRIPTION	List Price
78A-78B	84404	Phonograph toggle switch D.P.D.T.	$1.10
	89473	Power transformer (100-240 V.—25-133 cycles)	14.50
79	89709	Phonograph terminal strip	.15

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STEWART WARNER CORP.

MODEL R-148 CHASSIS (Receiver Models 1481 to 1489)

CIRCUIT DESCRIPTION

The Stewart-Warner Model R-148 Chassis is a ten-tube, all-wave, superheterodyne with an intermediate frequency of 456 KC. It has three tuning ranges, 527 to 1750 KC., 1720 to 5600 KC., and 5.5 to 18.0 MC. Individual coils and trimmer condensers are provided for each band so that each circuit can be adjusted to give maximum efficiency on every frequency range. To guard against coupling effects between coils, the range switch has a shorting arrangement on the oscillator and detector sections for unused coils.

The antenna coils are designed to give efficient reception with either a standard or doublet type antenna without the use of any additional coupling transformer. A small connector is provided on the antenna terminal strip to short the "D" and "G" terminals when a standard antenna is used. If a doublet antenna is used, the connector should be turned or removed to open the connection between the "D" and "G" terminals.

A tuned R.F. stage providing greater selectivity is used on all tuning ranges. After selection and amplification in this stage, the signal is tuned and impressed on the control grid of the 6A8 first detector and oscillator tube. The 456 KC. output of the 6A8 is amplified in the I.F. stage using a 6K7 tube and impressed on both diode plates of the 6H6 second detector and A.V.C. tube. The diode of the 6H6 connected directly to the I.F. transformer is used as a linear detector. This diode rectifies the signal and produces a modulated D.C. voltage drop across the 250,000 ohm volume control. The moving arm of the volume control applies any portion of the audio frequency component to the grid of the 6C5 first audio amplifier tube which is resistance coupled to a second 6C5 audio amplifier tube. This tube is transformer coupled to the output stage which uses two 6L6 tubes in push-pull. The grid bias for the 6L6 tubes is obtained from the negative end of resistors 43 and 73.

The second diode of the 6H6 fed through condenser No. 11 (.00026 mfd.) is used for A.V.C. The A.V.C. action is delayed by the negative bias on this diode obtained from the negative end of resistor No. 43. No rectification occurs until sufficient signal is applied to overcome this bias. The A.V.C. voltage is then produced by the diode current flowing through resistor No. 65. This voltage is applied to the control grids of the 6C5, 6A8 and the two 6K7 tubes through a resistance capacity filter.

CALIBRATION AND ALIGNMENT

Experience has definitely shown that a selective chassis such as the Stewart-Warner Model R-148 cannot be properly aligned by ear or "on the air." A high grade modulated service oscillator and an output meter are absolutely essential.

The oscillator should cover a frequency range extending from 456 KC. to 16,000 KC. It should have a wide range of signal output with a continuously variable output control. A very weak signal is needed for proper alignment without actuating the A.V.C. and a very strong one for use when the receiver is badly out of alignment.

PRECAUTIONS

When using your oscillator, do not rely on calibration curves for frequency determination, but check the frequencies by comparison with broadcast signals.

During calibration and alignment, keep the receiver volume control in the maximum volume position if noise is not too great, and adjust the osc'llator output so that the output meter reads near the center of its scale.

Use the lowest output meter scale that will provide a steady reading. For making trimmer adjustments, use a bakelite aligning tool which has only a small metal screwdriver tip.

IMPORTANT

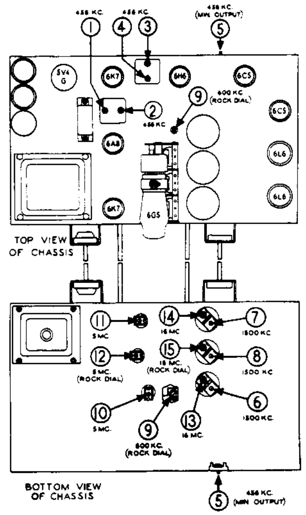
In aligning this chassis it is absolutely essential to connect a .1 to .25 mfd. condenser in series with the oscillator output lead when aligning the I.F. trimmers. If no condenser is used, the oscillator may short out all bias on the 6A8 and 6K7 tubes which results in improper alignment.

In aligning all other trimmers but the I.F. trimmers, a 400 or 500 ohm carbon resistor must be connected in series with the oscillator output and receiver antenna terminal. **Do not omit this resistor or the alignment will be incorrect.**

FORM 7824 PRINTED IN U.S.A. 8-17-36

PRELIMINARY STEPS

To align the R-148 chassis proceed as follows:
Remove the chassis from the cabinet.
Connect the output meter across the two plates of the two 6L6 power output tubes. A convenient method of doing this is to connect to the two yellow wires connected to the speaker socket.



TRIMMER LOCATIONS

I.F. AMPLIFIER

Trimmer No.	
1, 2	First I.F. transformer trimmers
3, 4	Second I.F. transformer trimmers
	WAVE TRAP
5	456 KC. wavetrap trimmer
	BAND No. 1 (BROADCAST) (527 to 1750 KC.)
6	Broadcast band oscillator shunt trimmer
7	Broadcast band antenna shunt trimmer
8	Broadcast band detector shunt trimmer
9	Broadcast band oscillator series padder
	BAND No. 2 (1720 to 5600 KC.)
10	Band No. 2 oscillator shunt trimmer
11	Band No. 2 antenna shunt trimmer
12	Band No. 2 detector shunt trimmer
	BAND No. 3 (5.5 to 18 MC.)
13	Band No. 3 oscillator shunt trimmer
14	Band No. 3 antenna shunt trimmer
15	Band No. 3 detector shunt trimmer

CALIBRATION AND ALIGNMENT

The following procedure on the proper adjustment of the various trimmers is divided into two classifications, calibration and alignment. Calibration is the adjustment of certain trimmers so that the radio signals can be received at the proper dial settings. Calibration of the R-148 is made at the high-frequency end of each dial scale. Alignment is the adjustment of trimmers so that the antenna and detector circuits are tuned to give maximum sensitivity and selectivity.

The R.F. calibration and alignment of each band is independent of all others, so that one band may be re-calibrated or re-aligned without affecting the trimmer adjustments on any of the other bands.

ALIGNMENT OF THE I.F. AMPLIFIER

1. (a) Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure.
(b) Connect the test oscillator output leads to the 6A8 control grid and the chassis with a .1 or **.25 mfd. condenser in series with the oscillator lead to the 6A8 grid.**
(c) Set the test oscillator to exactly 456 KC. Adjust the output of the test oscillator to give about half scale deflection on the output meter.
(d) Turn the range switch to the extreme clockwise position and set the tuning dial to any point where there is no tuning effect on the oscillator signal.
(e) Adjust the four I.F. transformer trimmers (trimmers No. 1, 2, 3, and 4) for maximum output meter deflection.
(f) Repeat the four trimmer adjustments, since the adjustment of each trimmer has some effect on the others.

ADJUSTMENT OF WAVE TRAP

2. (a) Leave the test oscillator at 456 KC. but connect the oscillator output to the A and G terminals of the receiver with a 400 or 500 ohm carbon resistor in series with the oscillator output and the A terminal.
(b) Adjust trimmer No. 5 for **minimum** output. Increase the oscillator output as necessary to obtain a clearly defined point of minimum output. If some particular station with a frequency slightly different than 456 KC. causes code interference, it may be advisable to adjust trimmer No. 5 on the actual frequency of the interfering station.

BAND NO. I (BROADCAST) CALIBRATION

3. (a) Check the position of the dial pointer on its shaft by turning the tuning knob until the rotor plates of the gang condenser are in full mesh. The slow-moving dial pointer should then coincide with the low frequency end of the dial scale. If it does not, hold the dial gear and turn the pointer to the correct position.
(b) Turn the range switch control to the extreme right position. (Clockwise.)
(c) Connect a 400 or 500 ohm carbon resistor in series with the test oscillator output and the receiver antenna terminal. (Note: This resistor should remain connected for all subsequent adjustments.
(d) Ground the receiver.
(e) Adjust the test oscillator to exactly 1500 KC.
(f) Tune in the 1500 KC. oscillator signal or a station above 1300 KC. on the dial and determine whether the dial calibration is correct at the high frequency end of the dial. If it is not correct, adjust trimmer No. 6 to give proper calibration. Do not adjust this trimmer if the dial calibration is correct at the high frequency end of the dial.

BAND NO. I (BROADCAST) ALIGNMENT

4. (a) With the test oscillator set at 1500 KC. tune the receiver to the signal for maximum output.
(b) Adjust trimmers No. 7 and 8 for maximum output. Do not touch trimmer No. 6 as this will change the calibration.
(c) Adjust the test oscillator to exactly 600 KC. and tune the receiver to the signal. Adjust trimmer No. 9 for maximum output. Then try to increase the output by detuning the trimmer and retuning the receiver dial. If this reduces the output, detune the trimmer on the opposite direction. Continue detuning the trimmer and retuning the dial until a maximum output meter deflection is secured. This operation is commonly known as "rocking." The object of this adjustment is to find the combination of trimmer adjustment and tuning condenser position which gives the maximum output. This adjustment should not be changed regardless of whether the dial reads exactly 600 KC. or slightly off 600 KC. for maximum output.
(d) Check the adjustment of trimmers Nos. 6, 7 and 8 at 1500 KC.

BAND NO. 2 CALIBRATION

5. (a) Turn the range switch to the center position.
(b) Adjust the test oscillator to exactly 5.0 MC.
(c) Tune in the 5 MC. oscillator signal at or near 5 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 5 MC. If it is, do not adjust trimmer No. 10. If the calibration is incorrect, set the dial pointer at 5 MC. on the dial, and adjust trimmer No. 10 until the oscillator signal comes in at this point. If there are two peaks, the proper one is that with the trimmer screw farthest out.

BAND NO. 2 ALIGNMENT

6. (a) With the test oscillator set at 5.0 MC., tune the receiver for maximum output.
(b) Adjust trimmer No. 11 and 12 for maximum output. After this is done try to increase the output meter reading by detuning No. 12 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning No. 12 and retuning the set until maximum output meter deflection is secured. Then readjust No. 11.

BAND NO. 3 CALIBRATION

7. (a) Turn the range switch to the extreme left (counter clockwise.)
(b) Be sure that the D and G terminals on the antenna terminal strip are connected together.
(c) Adjust the test oscillator to exactly 16 megacycles.
(d) Tune in the 16 MC. oscillator signal at or near 16 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 16 MC. If it is, do not adjust trimmer No. 13. If the calibration is incorrect, set the receiver dial pointer exactly at 16 MC. and adjust trimmer No. 13 until the oscillator signal comes in at this point.
(e) Check to see that trimmer No. 13 is adjusted to the proper peak by tuning the receiver to approximately 15.1 MC. If a repeat signal is not heard at this point, even with greatly increased oscillator output, retune the receiver to 16.0 MC. and adjust trimmer No. 13 to the proper peak with the trimmer screw farther out.

BAND NO. 3 ALIGNMENT

8. (a) With the test oscillator set at 16 MC. tune the receiver for maximum output.
(b) Adjust trimmer No. 14 and 15 for maximum output. After this is done, try to increase the output meter deflection by detuning No. 15 slightly and retuning the receiver dial. If this causes the output to drop, detune the trimmer in the opposite direction. Continue detuning No. 15 and retuning the set until the output is at a maximum. Then readjust No. 14.
(c) Check the adjustment of No. 15 by tuning the receiver to the image at 15.1 MC. and noting if the image is much weaker than the 16 MC. signal. If the signal at 15.1 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 15 is not set to the proper peak. Turn the trimmer in a turn or so, then readjust as in 8 (b).

MISCELLANEOUS PARTS NOT SHOWN ON CIRCUIT DIAGRAM

Part No.	DESCRIPTION	List Price
67667	Flat steel mtg. washer	$0.01
67977	#14 x 1¼ chassis mtg. screw	.02
85066	G.D.A. terminal strip	.20
85578	Rubber chassis mtg. washer	.04
88036	Fuse strip	.15
88832	Range switch knob shaft	.10
88985	Tuning knob, front section	.20
88986	Tuning knob, rear section	.25
88996	Knob, range switch	.15
89038	Knob, volume and tone control	.20
89066	Link and lever assembly (for range switch)	1.20
89119	Tuning indicator cable & plug	1.50
89132	Escutcheon and glass assembly	2.25

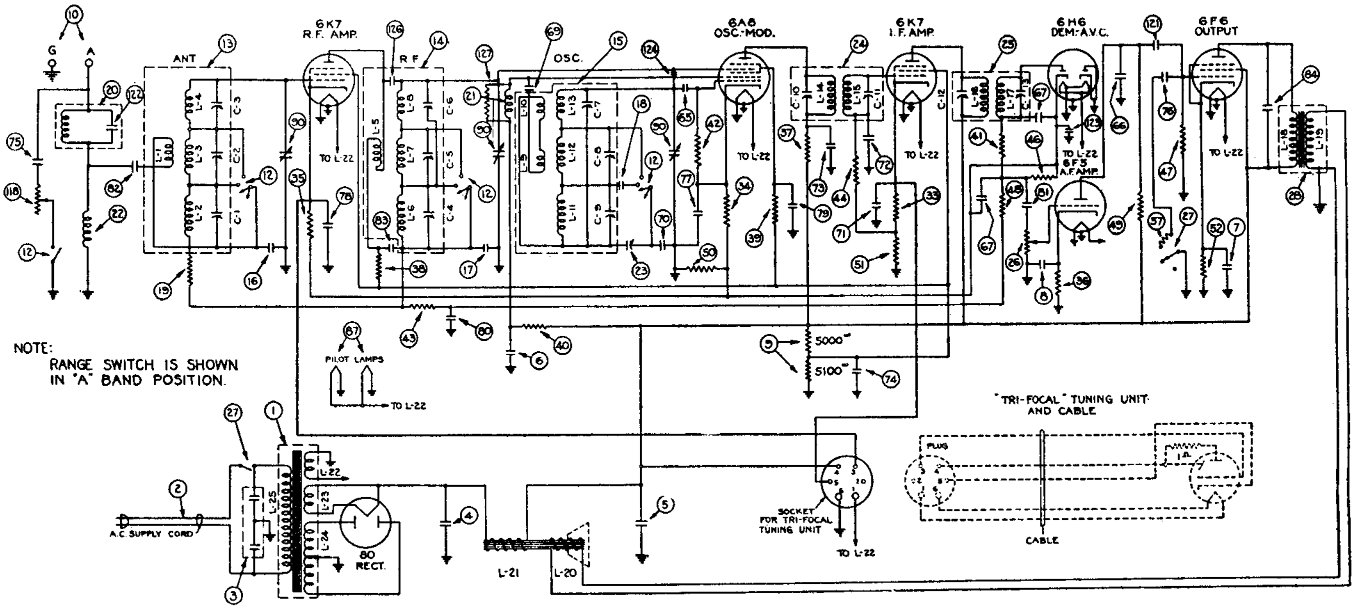
TUNING DRIVE AND DIAL PARTS

Part No.	DESCRIPTION	List Price
85902	Dual ratio planetary dial drive	$1.00
88839	Gear tension spring	.10
88982	Compression spring for band indicator	.01
89027	Spring washer (for planetary)	.01
89072	Dial ring bracket & shaft assem. (for edge lighting)	2.50
89073	Split second shaft (band spread ratio 10 to 1) See part No. 89724	.20
89075	Main pointer gear and shaft assem.	.30
89078	Idler gear and pinion (band spread ratio 10 to 1) See part No. 89721	.25
89081	Driven disc and bushing	.65
89086	Compression spring for driven disc gear	.01
89092	Second pointer	.04
89093	Main pointer and stud	.10
89095	Spring washer (for pointer shaft)	.01
89099	Dial scale for rear lighting	2.00
89283	Pilot lamp socket	.10
89284	Pilot lamp shield	.02
89308	Bracket & light bracket assem. (for idler gear)	.15
89311	Dial background (for edge lighting dials)	.12
89312	Dial scale (for edge lighting)	2.00
89328	Band indicator and link	.60
89485	Dial ring bracket and shaft assem. (for rear lighting)	2.40
89721	Idler gear and pinion (band spread ratio 12 to 1)	.45
89724	Split second shaft (band spread ratio 12 to 1)	.18

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODEL 130 SERIES

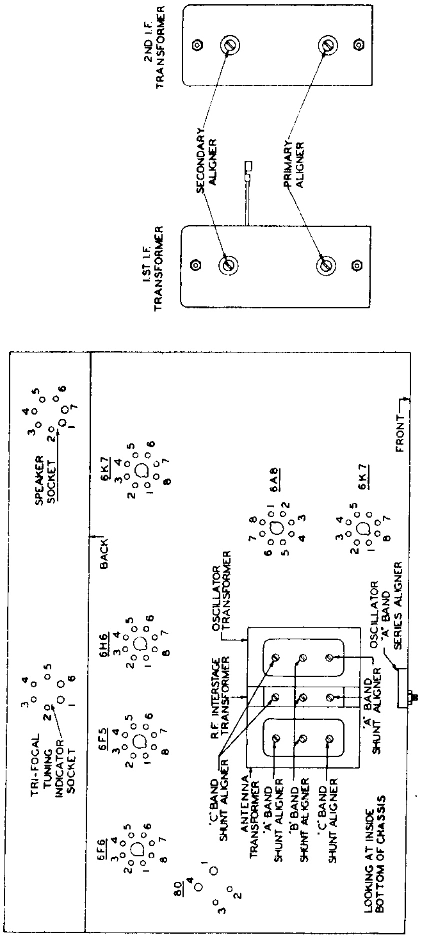


REPLACEMENT PARTS

Item Number	Piece Number	Part
1	26248	Power Transformer (50 to 60 Cycles)
1	26249	Power Transformer (25 to 60 Cycles)
2	24268	Cord, A. C. Supply
3	21535	Capacitor Assembly (2-.01 Mf. Capacitors)
4	26403	Capacitor, Electrolytic, 25Mf.
5	25458	Capacitor, Electrolytic, 16 Mf.
6	25458	Capacitor, Electrolytic, 16 Mf.
7	24207	Capacitor, Electrolytic, 10 Mf., 25 Volts
8	24207	Capacitor, Electrolytic, 10 Mf., 25 Volts
9	26405	Resistor, "B" Voltage Divider
12	26402	Range Switch
13	25510	Coil Assembly, Antenna
14	25511	Coil Assembly, R. F.
15	25512	Coil Assembly, Oscillator
16	25488	Capacitor, .002 Mf.
17	25527	Capacitor, .0027 Mf.
18	25490	Capacitor, .0038 Mf.
19	26383	Resistor, Type "E1", .1 Megohm
20	25513	Coil Assembly, Wave Trap
21	25814	Coil Assembly, R. F. Choke
22	25814	Coil Assembly, R. F. Choke
23	26047	Capacitor, Osc. Series Aligner
24	26406	1st I. F. Transformer
25	25506	2nd I. F. Transformer
26	26114	Potentiometer, Volume Control
27	26271	Switch, "Off-On-Tone"
28	26411	Transformer, Audio Output
29	22988	Socket, 4 Pong
30	22974	Socket, 6 Prong
31	23517	Socket, 7 Prong
32	25539	Socket, 8 Prong
33	26327	Resistor, Type "E", 330 Ohms
34	26326	Resistor, Type "E", 270 Ohms
35	26331	Resistor, Type "E", 680 Ohms
36	26340	Resistor, Type "E" 3900 Ohms
37	26341	Resistor, Type "E", 47,000 Ohms
38	26345	Resistor, Type "E", 10,000 Ohms
39	26345	Resistor, Type "E", 10,000 Ohms
40	26350	Resistor, Type "E", 27,000 Ohms
41	26353	Resistor, Type "E", 47,000 Ohms
42	26353	Resistor, Type "E", 47,000 Ohms
43	26357	Resistor, Type "E", .1 Megohm
44	26357	Resistor, Type "E", .1 Megohm
46	26365	Resistor, Type "E", .47 Megohm
47	26365	Resistor, Type "E", .47 Megohm
48	26369	Resistor, Type "E", 1 Megohm
49	26362	Resistor, Type "E", .27 Megohm
50	26328	Resistor, Type "E", 390 Ohms
51	26330	Resistor, Type "E", 560 Ohms
52	25500	Resistor, 400 Ohms, 1 Watt
57	26353	Resistor, Type "E", 47,000 Ohms
60	25998	Bracket Assembly
65	25504	Capacitor, 100 Mmf.
66	25504	Capacitor, 100 Mmf.
67	26512	Capacitor Assembly, 2—100 Mmf.
69	25487	Capacitor, .001 Mf.
70	25489	Capacitor, .00125 Mf.
71	24402	Capacitor Assembly, .1 Mf.
72	24402	Capacitor Assembly, .1 Mf.
73	25483	Capacitor Assembly, .1 Mf., 400 Volts
74	25483	Capacitor Assembly, .1 Mf., 400 Volts
75	25149	Capacitor Assembly, .01 Mf.
76	25149	Capacitor Assembly, .01 Mf.
77	25150	Capacitor Assembly, .02 Mf.
78	25150	Capacitor Assembly, .02 Mf.
79	25150	Capacitor Assembly, .02 Mf.
80	25150	Capacitor Assembly, .02 Mf.
81	25150	Capacitor Assembly, .02 Mf.
82	25150	Capacitor Assembly, .02 Mf.
83	25481	Capacitor Assembly, .002 Mf.
84	25533	Capacitor Assembly, .006 Mf.
87	26287	Pilot Lamp
89	26285	Dial Assembly
90	26414	Gang Tuning Capacitor
121	25149	Capacitor Assembly, .01 Mf.
122	25488	Capacitor, .002 Mf.
123	24402	Capacitor Assembly, .1 Mf.
124	26417	Capacitor, Gimmick
127	26350	Resistor, Type "E", 27,000 Ohms

MISCELLANEOUS PARTS

Piece Number	Part
26250	Cone Assembly (For P-26170 Speaker)
25492	Cone Assembly (For P-26171 Speaker)
26043	Plug (For Loud Speaker Cable)
26491	Plug (For Tri-Focal Tuning Unit Cable)
26369	Resistor, Type "E", 1 Megohm (Used at Socket of No. 6E5 Tube)
26147	Pilot Lamp Socket
26302	Knob (For Volume Control. Used on the Nos. 130-H, 130-U, 130-L, 130-M Receivers)
26303	Knob (For Volume Control. Used only on the No. 130-R Receivers)
26385	Knob (For Range Switch. Used on Nos. 130-H, 130-U, 130-L, 130-M Receivers)
26304	Knob (For Range Switch. Used only on the No. 130-R Receivers
26384	Knob (For Off-On-Tone Control. Used on Nos. 130-H, 130-U, 130-L, 130-M Receivers)
26298	Knob (For Off-On-Tone Control. Used only on the No. 130-R Receiver)
26305	Knob (For Large Portion of Tuning Shaft. Used on the Nos. 130-H, 130-U, 130-L, 130-M Receivers)
26307	Knob (For Large Portion of Tuning Shaft. Used only on the No. 130-R Receivers)
26306	Knob (For Vernier Portion of Tuning Shaft. Used on the Nos. 130-H, 130-U, 130-L, 130-M Receivers
26308	Knob (For Vernier Portion of Tuning Shaft. Used only on the No. 130-R Receivers)



Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODEL 130 SERIES

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, this alignment procedure should be carefully followed.

In making any alignment adjustments always adjust the signal generator's output to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal.

Figure 2 shows the location of all the aligning capacitors used in this receiver.

Intermediate Frequency Amplifier Adjustments

The intermediate frequency used in these receivers is 465 kilocycles. In making these I. F. circuit adjustments always align in the following order:

1. Secondary of 2nd I. F. Transformer (Capacitor C-13).
2. Primary of 2nd I. F. Transformer (Capacitor C-12).
3. Secondary of 1st I. F. Transformer (Capacitor C-11).
4. Primary of 1st I. F. Transformer (Capacitor C-10).

Radio Frequency Adjustments

The adjustments of the aligning capacitors used in the radio frequency circuits in this receiver should be very carefully made in the following order and at the frequencies specified below:

1. Oscillator's "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-7).
2. R. F. Interstage "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-6).
3. Antenna "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-3).
4. Oscillator's "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-8).
5. R. F. Interstage "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-5).
6. Antenna "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-2).
7. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-9).
8. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
9. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).
10. Oscillator's "A" Band Series Aligner at 0.6 Megacycles (Capacitor (23)).
11. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-9).
12. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
13. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: O-2.5, O-10, O-100, O-250, O-500, O-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

Tube	*Circuit*	*Cap.*	*Terminals of Sockets* 1	2	3	4	5	6	7	8	*Heater Voltages Between Heater Terminals* *Socket Terminal Numbers*	*Volts*
6K7	R. F. Amp.	0	0	0	+ 54	+ 96	+7.6	+4.5	*6.3*	+7.6	2-7	*6.3*
6A8	Osc.-Mod.	0	0	0	+222	+ 72	—1.0	+143	*6.3*	+6.1	2-7	*6.3*
6K7	I. F. Amp.	0	0	0	+240	+ 96	+7.4	+4.5	*6.3*	+7.4	2-7	*6.3*
6H6	Dem.—A.V.C.	—	0	0	0	0	0	—	*6.3*	+4.5	2-7	*6.3*
6F5	Audio Amp.	0	0	0	—	+122*	—	—	*6.3*	+.75	2-7	*6.3*
6F6	Audio Output	—	0	0	+226	+237	0	0	*6.3*	+ 15	2-7	*6.3*
80	Rectifier	—	+330	*325*	*325*	+330	—	—	—	—	1-4	*4.8*
Tri-Focal Tuning Indicator Plug's Socket When Tri-Focal Tuning Unit Is Used			*6.3*	0	+7.6	+235	+7.8	0	—	—	1-6	*6.3*
Tri-Focal Tuning Indicator Plug's Socket When Tri-Focal Tuning Unit Is Not Used			*6.3*	0	+7.6	+237	+7.3	0	—	—	1-6	*6.3*
Speaker Socket			+327	0	0	+327	+327	0	+237	—	—	—

Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODEL 145

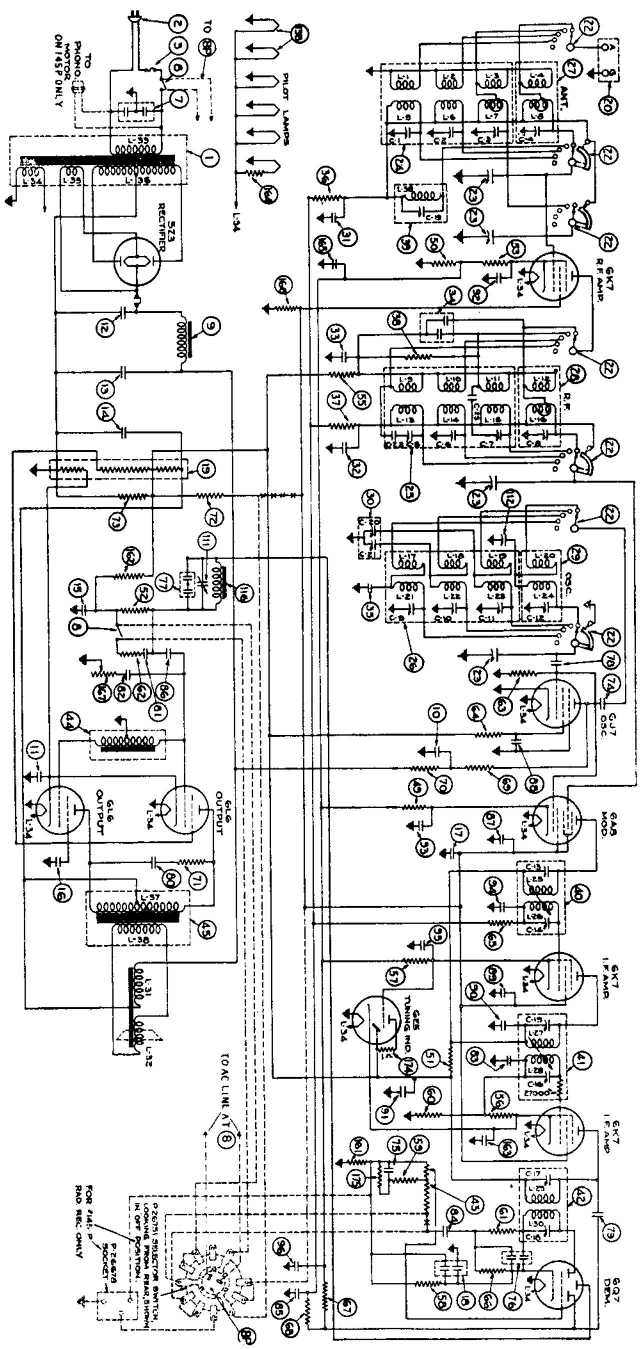


Fig. 2. Schematic Circuit of Receiver.

REPLACEMENT PARTS

Item Number	Piece Number	Part
1	26440	Power Transformer (50 to 60 Cycles Chassis)
1	26441	Power Transformer (25 to 60 Cycles Chassis)
2	24268	Cord (A. C. Power Supply)
3	23150	Fuse (2 Amperes)
4	21984	Fuse Block Assembly
7	21535	Capacitor Assembly (2—.01 Mf. Capacitors)
8	26061	Switch ("Off-On" and Tone Control)
9	26260	Choke Coil Assembly (Filter of Rectifier)
10	25788	Electrolytic Capacitor, 1 Mf., 450 Volts
11	24207	Electrolytic Capacitor, 12 Mf., 25 Volts
12	22757	Electrolytic Capacitor (50 to 60 Cycles Chassis)
12	26510	Electrolytic Capacitor (25 to 60 Cycles Chassis)
13	22789	Electrolytic Capacitor (50 to 60 Cycles Chassis)
13	26511	Electrolytic Capacitor (25 to 60 Cycles Chassis)
14	25458	Electrolytic Capacitor, 16 Mf.
15	26693	Electrolytic Capacitor, 4 Mf., 350 Volts
16	26693	Electrolytic Capacitor, 4 Mf., 350 Volts
17	26693	Electrolytic Capacitor, 4 Mf., 350 Volts
18	26048	Capacitor, Dual, 10 Mf.
19	26442	Resistor "B" Voltage Divider
22	26443	Range Switch Assembly
23	26444	Gang Tuning Capacitor Assembly
24	26446	Coil Assembly, Antenna ("A", "B" and "C" Ranges)
25	26447	Coil Assembly, R. F. ("A", "B" and "C" Ranges)
26	26448	Coil Assembly, Oscillator ("A", "B" and "C" Ranges)
27	26507	Coil Assembly, Antenna ("X" Range)
28	26508	Coil Assembly, R. F. ("X" Range)
29	26509	Coil Assembly, Oscillator ("X" Range)
30	26564	Capacitor Assembly, Series Aligner ("A" and "B" Ranges)
31	24405	Capacitor Assembly, .04 Mf.
32	24405	Capacitor Assembly, .04 Mf.
33	24994	Capacitor Assembly, .05 Mf.
34	26513	Capacitor, Double, 200 Mmf.
35	25155	Capacitor, .0035 Mf.
36	26357	Resistor, Type "E", .1 Megohm
37	26357	Resistor, Type "E", .1 Megohm
38	26353	Resistor, Type "E", 47,000 Ohms
39	26474	Coil Assembly (Bi-Resonator)
40	26481	1st I. F. Transformer
41	26482	2nd I. F. Transformer
42	26243	3rd I. F. Transformer
43	26077	Potentiometer (Volume Control)
44	26272	Transformer Assembly, Audio Input
45	26469	Transformer Assembly, Audio Output
46	22988	Socket, 4 Prong
47	23517	Socket, 7 Prong
48	25539	Socket, 8 Prong
49	26326	Resistor, Type "E", 270 Ohms
50	26324	Resistor, Type "E", 180 Ohms
51	26330	Resistor, Type "E", 560 Ohms
52	26357	Resistor, Type "E", .1 Megohm
53	26329	Resistor, Type "E", 470 Ohms
55	26330	Resistor, Type "E", 560 Ohms
56	26330	Resistor, Type "E", 560 Ohms
57	26333	Resistor, Type "E", 1000 Ohms
58	26340	Resistor, Type "E", 3900 Ohms
59	26341	Resistor, Type "E", 4700 Ohms
60	26331	Resistor, Type "E", 680 Ohms
61	26345	Resistor, Type "E", 10,000 Ohms
62	26349	Resistor, Type "E", 22,000 Ohms
63	26353	Resistor, Type "E", 47,000 Ohms
64	26353	Resistor, Type "E", 47,000 Ohms
65	26357	Resistor, Type "E", .1 Megohm
66	26362	Resistor, Type "E", .27 Megohm
67	26369	Resistor, Type "E", 1 Megohm
68	26369	Resistor, Type "E", 1 Megohm
69	18696	Resistor, Type "B", 10,000 Ohms
70	24073	Resistor, Type "B", 25,000 Ohms
71	18696	Resistor, Type "B", 10,000 Ohms
72	25526	Resistor, Type "F", 15,000 Ohms
73	26567	Resistor, Type "F", 30,000 Ohms
74	25487	Capacitor, Type "W", .001 Mf.
75	24994	Capacitor Assembly, .05 Mf.
76	26512	Capacitor, Double, 100 Mmf.
77	26512	Capacitor, Double, 100 Mmf.
78	24560	Capacitor, 50 Mmf.
79	24560	Capacitor, 50 Mmf.
80	25487	Capacitor, Type "W", .001 Mf.
81	25149	Capacitor Assembly, .01 Mf.
82	25149	Capacitor Assembly, .01 Mf.
83	24405	Capacitor Assembly, .04 Mf.
84	24405	Capacitor Assembly, .04 Mf.
85	24405	Capacitor Assembly, .04 Mf.
86	24405	Capacitor Assembly, .04 Mf.
87	24994	Capacitor Assembly, .05 Mf.
88	24994	Capacitor Assembly, .05 Mf.
89	24994	Capacitor Assembly, .05 Mf.
90	24994	Capacitor Assembly, .05 Mf.
91	24994	Capacitor Assembly, .05 Mf.
92	24402	Capacitor Assembly, .1 Mf.
93	24402	Capacitor Assembly, .1 Mf.
94	24402	Capacitor Assembly, .1 Mf.
95	24402	Capacitor Assembly, .1 Mf.
96	24402	Capacitor Assembly, .1 Mf.
111	26568	Adjustable Capacitor (High Frequency Cut-off Filter)
112	26569	Capacitor (Oscillator Series Aligner, "X" Range)
113	26485	Potentiometer and Bracket Assembly (Tone Control and High Fidelity)
116	26515	Coil Assembly (High Frequency Cut-off Filter)
122	26220	Drive Shaft Assembly
123	26520	Dial Assembly
124	26533	Dial Assembly (Main)
125	26672	Drive Cord Assembly, R. T. Disc
126	26673	Drive Cord Assembly, L. T. Disc
127	26683	Cord Assembly (Dial Elevator)
128	26226	Spring
132	26682	Reel Assembly (Range Switch)
133	26667	Reel Assembly (Tone Control)
134	26666	Reel Assembly (Volume Control)
136	26147	Dial Lamp Socket
137	26257	Lamp Shades (For Dial Lamps)
138	26287	Pilot Lamp
141	26497	Cable Assembly, Tri-Focal Indicator
161	26353	Resistor, Typé "E", 47,000 Ohms
162	26353	Resistor, Type "E", 47,000 Ohms
163	24402	Capacitor Assembly, .1 Mf.
164	26780	Resistor, 3.5 Ohms, (Pilot Lamp)
165	24207	Electrolytic Capacitor, 12 Mf., 25 Volts
166	26353	Resistor, Type "E", 47,000 Ohms
167	26439	Potentiometer (Tone Control)
174	26369	Resistor, Type "E", .1 Megohm

MISCELLANEOUS PARTS

Piece Number	Part
26250	Cone Assembly (For P-26170 Speaker)
26043	Plug (For Loud Speaker Cable)
26369	Resistor, Type "E", 1 Megohm (Used at Socket of No. 6E5 Tube)
26302	Knob (For "Volume" Control)
26299	Knob (For "Tone-Fidelity" Control)
26305	Knob (For "Stations" Selector Control Shaft)
26306	Knob (For "Vernier" Stations Selector Control Shaft)
26301	Knob (For "Ranges" Switch)
26300	Knob (For "Off-On-Bass" Control)
26391	Knob (For "Off-On-Bass-Phono" Control. Used only on No. 145-P Receivers)

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODEL 145

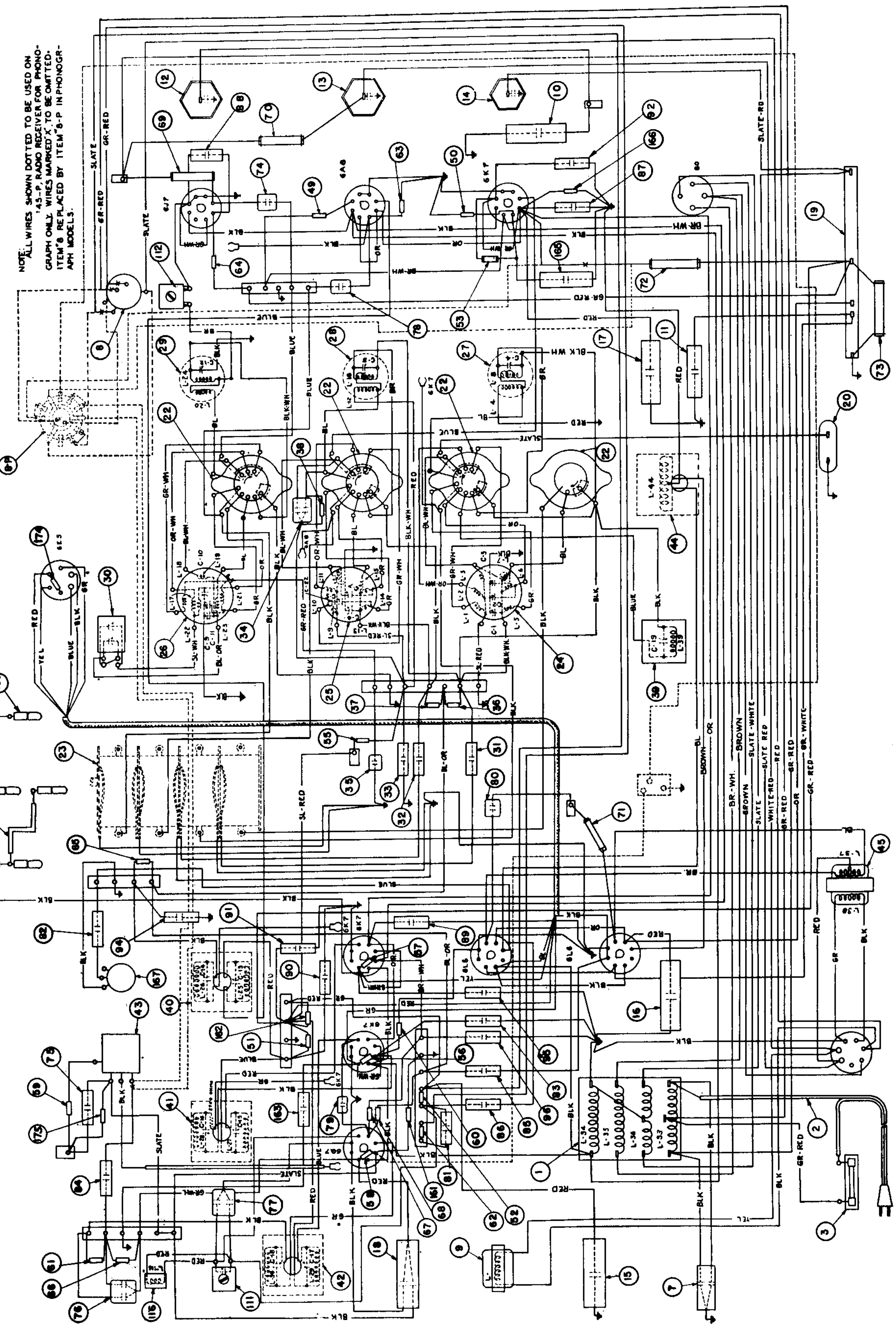


Fig. 3. Wiring Diagram of Chassis.

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODEL 145

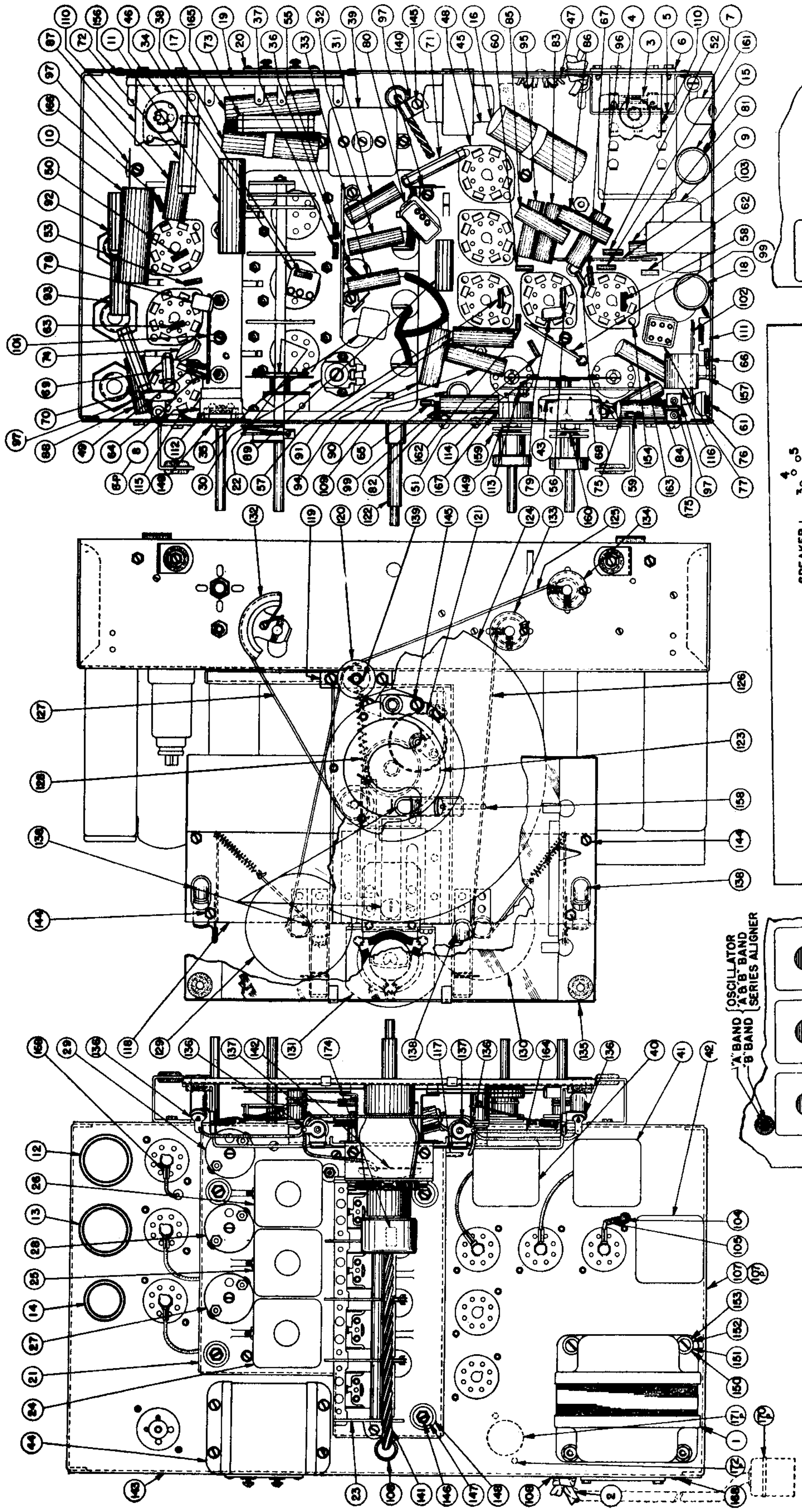


Fig. 4. Chassis Assembly.

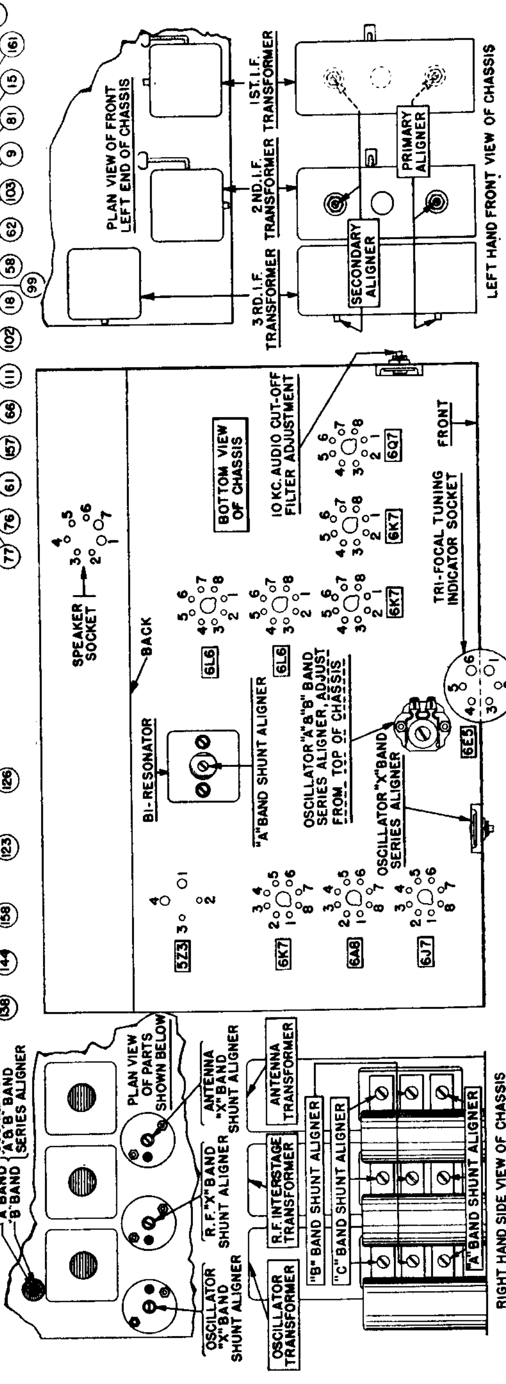


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODEL 145

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on this receiver, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, this alignment procedure should be carefully followed.

In making any alignment adjustments always adjust the signal generator's output to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal.

Figure 1 shows the location of all the aligning capacitors used in this receiver.

Intermediate Frequency Amplifier Adjustments

Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed.

Operate the range switch of the receiver to the "A" range position. Set the tuning dial at its extreme low frequency position, and operate the "Tone-Fidelity" control knob so that the receiver is adjusted for the standard fidelity position as indicated by the fidelity indicator located on the front panel of the receiver. **Never attempt to align the I. F. circuits of this receiver with the "Tone-Fidelity" control set at any position other than the standard fidelity.** The I. F. circuits may then be checked for alignment by adjusting the aligning capacitors in the exact order as follows:

1. Secondary of 3rd I. F. Transformer (Capacitor C-18).
2. Primary of 3rd I. F. Transformer (Capacitor C-17).
3. Secondary of 2nd I. F. Transformer (Capacitor C-16).
4. Primary of 2nd I. F. Transformer (Capacitor C-15).
5. Secondary of 1st I. F. Transformer (Capacitor C-14).
6. Primary of 1st I. F. Transformer (Capacitor C-13).

Radio Frequency Adjustments

The alignment of the radio frequency circuits for the various ranges in this receiver should be very carefully made in the order and at the frequencies specified.

It will be noted that no instructions are given for aligning the receiver at other than two frequencies for any range. Each receiver is given an exacting check for "tracking" at various frequencies in each range before leaving the factory. It is felt by the manufacturers that should any receiver through accident require a check on the "tracking", it should be returned to the factory, where this may be easily and accurately done.

Alignment of Long-Wave-Weather Range (Also Referred to as "X" Band) Circuits

1. Oscillator's "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-12).
2. R. F. Interstage "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-8).
3. Antenna "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-4).
4. Oscillator "X" Band Series Aligning Capacitor at 150 Kilocycles (Capacitor Item 112). When operation No. 4 has been completed repeat operations 1, 2, and 3 again and in the exact order given.

Alignment of Standard Broadcast Range (Also Referred to as "A" Band) Circuits

1. Oscillator's "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-11).
2. R. F. Interstage "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-7).
3. "A" Band, R. F. Bi-resonator Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-19).
4. Antenna "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-3).
5. Oscillator "A" Band Series Aligning Capacitor at 600 Kilocycles (Capacitor C-20). When operation No. 4 has been completed repeat operations 1, 2, and 3 again and in the exact order given.

Alignment of Amateur, Police, and Aircraft Range (Also Referred to as "B" Band) Circuits

1. Oscillator's "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-10).
2. R. F. Interstage "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-6).
3. Antenna "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-2).
4. Oscillator "B" Band Series Aligning Capacitor at 1.8 Megacycles (Capacitor C-21). When operation No. 4 has been completed repeat operations 1, 2, and 3 again and in the exact order given.

Alignment of Short-Wave-Foreign Range (Also Referred to as "C" Band) Circuits

1. Oscillator's "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-9).
2. R. F. Interstage "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-5).
3. Antenna "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-1).

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1 shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: O-2.5, O-10, O-100, O-250, O-500, O-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

			Terminals of Sockets								*Heater Voltages Between Heater Terminals*	
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6K7	R. F. Amp.	0	0	0	+245	+102	+6.8	+3.5	*6.3*	+6.8	2-7	*6.3*
6A8	Mod.	0	0	0	+247	+102	— 25	+102	*6.3*	+5.2	2-7	*6.3*
6J7	Osc.	—25	0	0	+180	+145	0	—	*6.3*	0	2-7	*6.3*
6K7	I. F. Amp.	0	0	0	+240	+ 96	+7.6	+3.2	*6.3*	+7.6	2-7	*6.3*
6K7	I. F. Amp.	+.25	0	0	+242	+ 96	+6.9	+3.8	*6.3*	+6.9	2-7	*6.3*
6Q7	Dem.	0	0	0	+150*	0	+.15	+4.2	*6.3*	+7.5	2-7	*6.3*
6L6	Output	—	0	0	+260	+190	0	—	*6.3*	+ 12	2-7	*6.3*
6E5	Tuning Ind.	—	*6.3*	+.5	+7.5	+238	+ 9	0	—	—	1-6	*6.3*
5Z3	Rectifier	—	+442	*400*	*400*	+442	—	—	—	—	1-4	*4.8*
Speaker		—	+425	0	0	+442	+442	—	+262	—		

Voltage across vernier dial pilot lamp—*5.3* volts

Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.

ELECTRICAL SPECIFICATIONS

Type of Circuit .... Superheterodyne
Tuning Ranges .... X—145 to 370 Kc.; A—530 to 1700 Kc.; B—1700 to 5600 Kc.; C—5600 to 18,000 Kc.
Number and Type of Tubes .... 3 No. 6K7, 1 No. 6A8, 1 No. 6J7, 1 No. 6Q7, 2 No. 6L6, 1 No. 6E5, 1 No. 5Z3
Power Supply Voltage .... 105 to 125 Volts
Power Supply Frequency .... 25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating—
No. 145-L .... 118 Watts
No. 145-P .... 162 Watts
Frequency of Intermediate Amplifier .... 465 Kilocycles

CIRCUIT DESCRIPTION

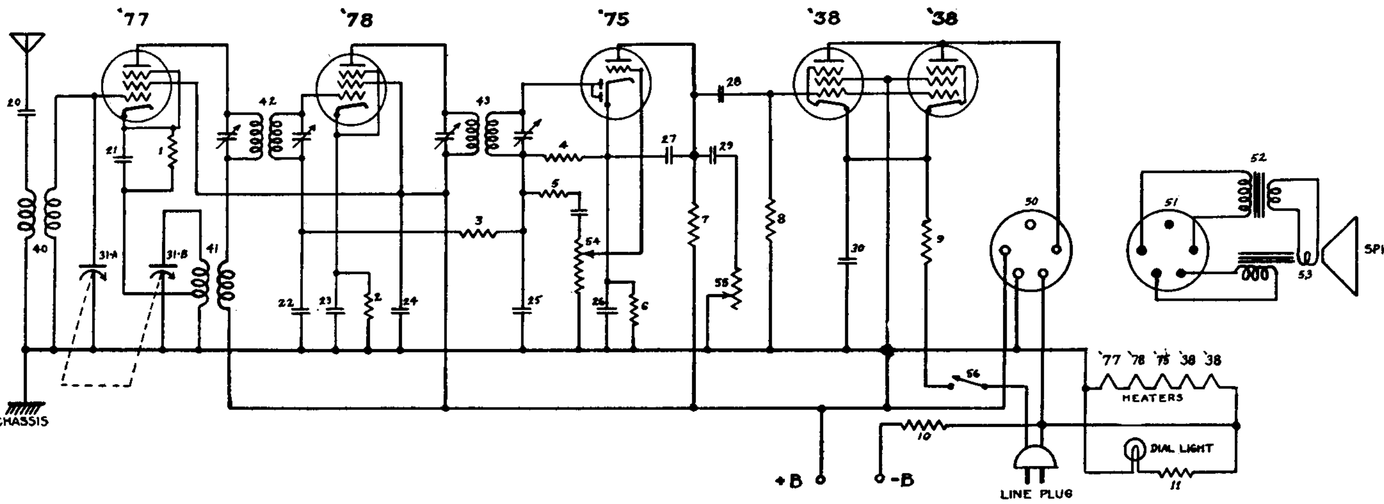
The No. 145 Radio Receiver is a ten tube, "Adjustable High Fidelity" receiver employing metal tubes including the new "Beam" power tubes. This receiver uses a Carpinchoe high fidelity dynamic speaker, and has incorporated in it the exclusive "Patent Applied For", Stromberg-Carlson "Tri-Focal" tuning system and the exclusive Stromberg-Carlson Acoustical Laboratories' revolutionary new development, the "Acoustical Labyrinth". This new device extends the bass response, provides reproduction only from the front of the cabinet, and eliminates all cabinet resonance. Audio reproduction is further improved in this receiver by employing sound diffusing vanes in front of the loud speaker opening which distribute the higher pitched tones, thereby providing excellent reproduction in all parts of the room by spreading out these directional frequencies.

Maximum selectivity between adjacent stations located in the standard broadcast band is obtained by the use of an additional tuned radio frequency ("Bi-resonator") circuit. When either the "X", "B", or "C" ranges are in operation, this additional tuned radio frequency circuit is automatically cut out of the receiver circuit. Adjustable high fidelity is obtained from this receiver by means of the variable band width, intermediate frequency transformers which are used in the two intermediate amplifier stages.

The various tubes are used in this receiver as follows: One No. 6K7 tube is used in the R. F. Amplifier, and the other two No. 6K7 tubes are used in the First and Second I. F. Amplifier Stages. The No. 6A8 tube is used as the Modulator tube, and the No. 6J7 tube is used as the Oscillator tube. The No. 6Q7 tube is used as the Demodulator, Automatic Volume Control, and Audio Amplifier tube. The two No. 6L6 tubes are used in the Audio Power Output Stage. The No. 6E5 tube is used as the Indicator of the "Tri-Focal Tuning System", and the No. 5Z3 tube is the Rectifier tube of the Power Supply Unit.

L. TATRO PRODUCTS CORP.

MODELS A525 & B525



ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.	ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.	ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.
1	2L-24	5000 ohms 1/4 watt		20	3L-16	.02 mfd 400 v.		40	8L-1	Antenna coil	
2	2L-13	400 ohms 1/4 watt		21	3L-24	.0015 mfd 600 v.		41	8L-2	Osc. coil, with item 42	
3	2L-57	1 megohm 1/4 watt		22	3L-17	.05 mfd 400 v.		42	8L-2	Composite IF trans. 456	
4	2L-53	500M ohms 1/4 watt		23	3L-18	.10 mfd 400 v.		43	8L-3	2nd IF trans. 456 KC.	
5	2L-33	30M ohms 1/4 watt		24	3L-18	.10 mfd 400 v.		44			
6	2L-24	5000 ohms 1/4 watt		25	3L-12	.00025 mfd 400 v.		45			
7	2L-53	500M ohms 1/4 watt		26	4L-5	10 mfd 6v. electr.		46			
8	2L-57	1 megohm 1/4 watt		27	3L-23	.0005 mfd 600 v.		47			
9	2L-17A	800 Ohms 1/2 watt		28	3L-17	.05 mfd 400 v.		50	13L-6	Speaker socket (5 pin)	
10	1L-5F	25 ohms 10 watt		29	3L-40	.005 mfd 600 v.		51		Spkr plug pt of item 53	
11	1L-13F	200 ohms 10 watt		30	4L-11	10 mfd 25v. electr.		52		Output trans.(item 53)	
12				31A	7L-1	Antenna section V. C.		53	18L-2	Dynamic speaker	
13				31B	7L-1	Osc. section V. C.		54	10L-1	Volume control	
14				32				55	10L-11	Tone Control	
15				33				56		Switch, part of item 55	
16				34				57			
17				35				58			
18				36				59			

L'TATRO PRODUCTS CORPORATION
DECORAH IOWA
MODEL A & B CIRCUIT DIAGRAM
DRAWN BY— J.E.B.
CHECKED BY—
APPROVED BY—
RELEASED — 11-28-34
CIRCUIT DRAWING
No 3A2

The Model A & B chassis is an efficient 5 tube superheterodyne receiver operating from 32 volt farm lighting systems, and employes a 45 volt B battery to increase the output power without the use of transformers or vibrators.

The heaters of the five tubes are connected in series across the 32 volt line. The failure of one filament will therefore cause all the tubes to become inoperative.

If all the tubes light and the receiver fails to operate, make sure that the 45 volt B battery is connected in the proper direction and try reversing the plug connection to the 32 volt line. If the operation is then unsatisfactory check the tubes one at a time in a normal operating receiver, and replace all defective tubes.

Drawing Number 3A2 shows the complete circuit diagram with itemized parts list. In ordering replacement parts always use the part number shown to facilitate filling orders and to avoid mistakes and delay.

Tube socket voltage readings: (with B battery connected)

Tube	Use	(a) cathode	screen	* plate
'77	1st det.	3.2 v.	77 v.	77 v.
'78	IF ampl.	2.0 v.	77 v.	77 v.
'75	2nd det.	0.5 v.	(none)	38 v.
'38's	Output	7.0 v.	77 v.	73 v.

(a) measured with a voltmeter having a resistance of 30,000 ohms.
(*) measured with a voltmeter having a resistance of 300,000 ohms.
All measurements made from points indicated to chassis.

No adjustments are to be made to any trimmer condensers, either I.F. or R.F. without the aid of a correctly calibrated signal generator of reliable make used in conjunction with a high resistance output meter connected from plate to screen of the type 38 output tubes. The normal I. F. frequency is 456 KC.

L. TATRO PRODUCTS CORP.

MODELS GN 66 & FN66

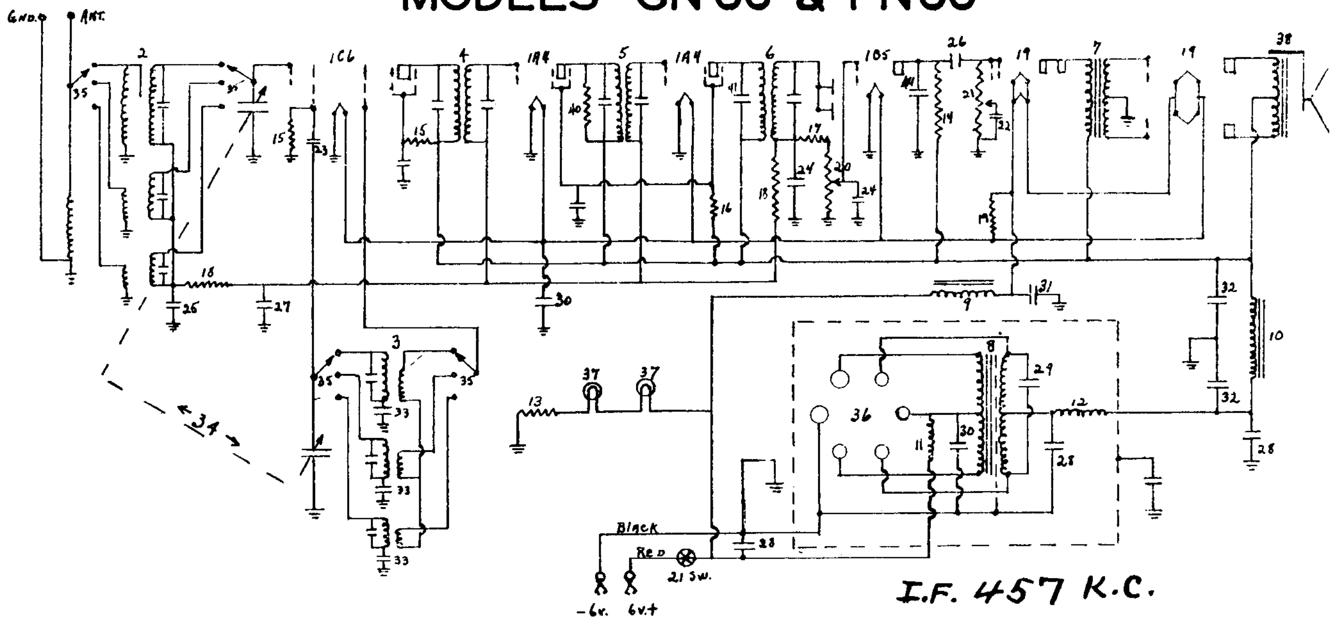


Diagram No.	Part No.	Description
1.	11N-3	I. F. Trap Coil.
2.	10N-2	3 Band Antenna Coil.
3.	10N-3	3 Band Oscillator Coil.
4.	11N-1	1st I. F. Coil.
5.	11N-1	2nd I. F. Coil.
6.	11N-2	3rd I. F. Coil.
7.	15N-1	Class "B" Driver Trans.
8.	13N-2	Power Transformer.
9.	14N-3	Filament Choke.
10.	14N-2	Filter Choke.
11.	12N-3	Primary R. F. Choke.
12.	12N-1	Secondary R. F. Choke.
13.	3N-1	Resistor 33 Ohm.
14.	4N-4	Resistor 250 M. Ohm.
15.	4N-1	Resistor 50 M. Ohm.
16.	4N-7	Resistor 30 M. Ohm.
17.	4N-5	Resistor 38 M. Ohm.
18.	4N-8	Resistor 500 M. Ohm.
19.	3N-5	Resistor 53 Ohm.
20.	16N-2	Volume Control 500 M. Ohm.

Diagram No.	Part No.	Description
21.	16N-1	Tone Control 500 M. Ohm.
22.	5N-10	Condenser .0025 Mf.
23.	7N-2	Condenser .00005 Mf.
24.	7N-1	Condenser .0001 Mf.
25.	7N-3	Condenser .0025 Mf.
26.	5N-5	Condenser .005 Mf..
27.	5N-1	Condenser .05 Mf.
28.	5N-2	Condenser .1 Mf.
29.	5N-7	Condenser .005 Mf.
30.	5N-8	Condenser .5 Mf.
31.	6N-3	Condenser 60.Mf.
32.	6N-2	Condenser 8. Mf.
33.	8N-1	Triple Oscillator Pad.
34.	9N-2	Variable Tuning Cond.
35.	21N-1	Band Switch 4P3T.
36.		Vibrator Socket Con.
37.		Dial Light Bulbs 2V. .06A.
38.		Permanent Magnet Speaker.
39.		Vibrator Unit Oak V5118.
40.	4N-3	Resistor 20 M. Ohm.
41.	5N-3	Condenser .00025 Mf.

Frequency Ranges:
- Band No. 1—530 K. C.—1700 K. C.
- Band No. 2—1.7 M. C.—5.5 M. C.
- Band No. 3—5.5 M. C.—18.25 M. C.

Alignment Frequencies:
- Band No. 1.—600 K. C. (Osc.)—1500 K. C. (Osc.—Ant.)
- Band No. 2.—1.75 M. C. (Osc.)— 5 M. C. (Osc.—Ant.)
- Band No. 3.— 6 M. C. (Osc.)— 18 M. C. (Osc.—Ant.)

Intermediate Frequency: 457 K. C.

Tube Complement:
- (1) Type 1C6—First Detector and Oscillator.
- (2) Type 1A4—First I. F. Amplifier.
- (3) Type 1A4—Second I. F. Amplifier.
- (4) Type 1B5—2nd Detector, 1st Audio and A. V. C.
- (5) Type 19—Second Stage Audio Amplifier.
- (6) Type 19—Power Output Class "B" Amplifier.

Batteries Required:
"A," "B" and "C" Power Supply—Storage Battery 6 Volt.

Current Drain:
- No Signal Input—1.2 amp.
- Normal Room Volume—1.25 amp.
- Maximum Output—1.4 amp.

Power Output: Undistorted 1 Watt, Maximum 1.6 Watt.

Loud Speaker: 8½ Inch Permanent Magnet Type.

TRANSFORMER CORP. OF AMERICA

MODELS TC1 & TC2 CLARION

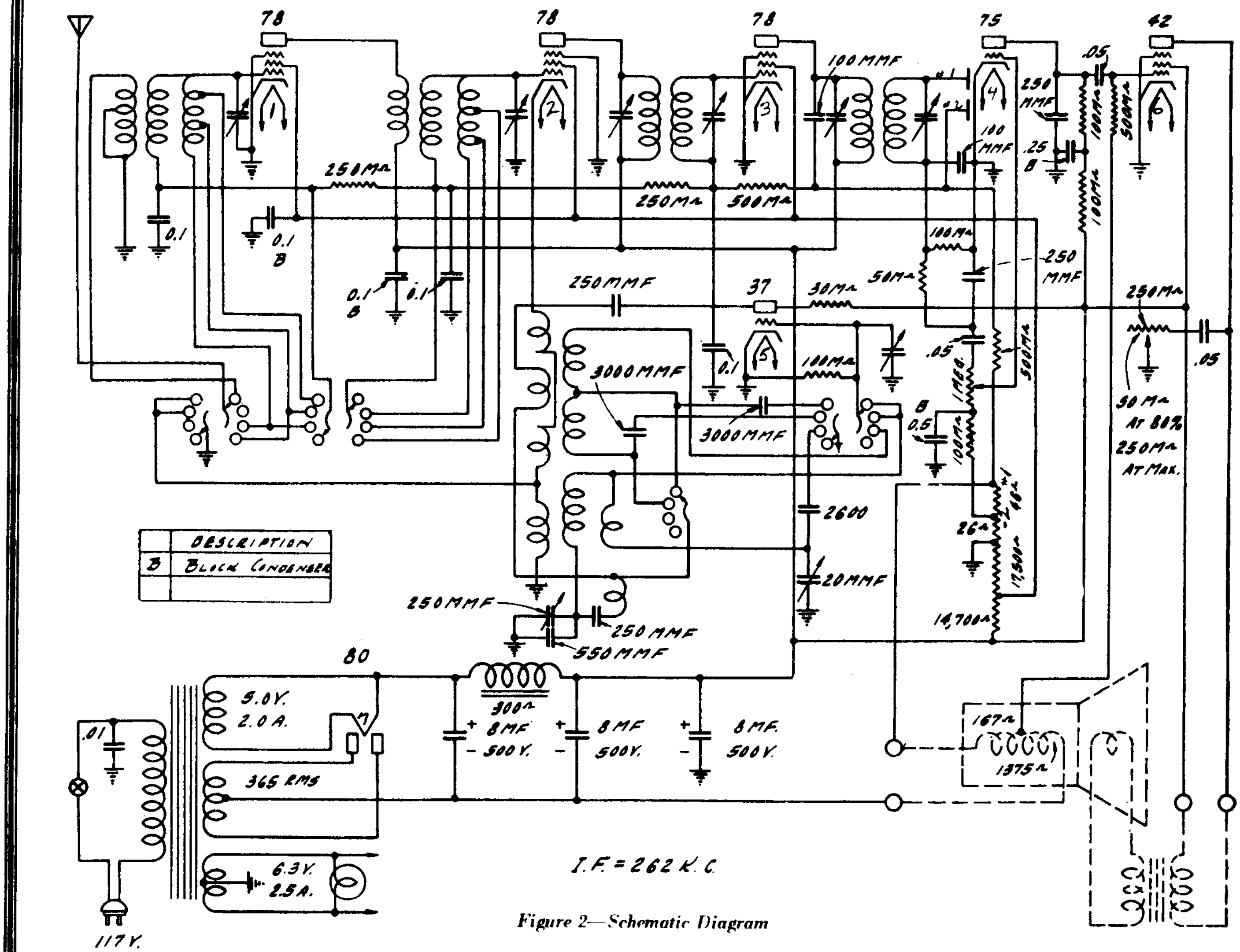
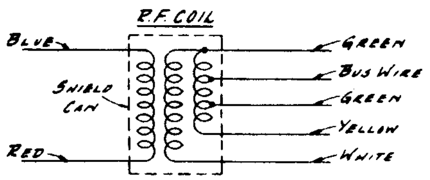


Figure 2—Schematic Diagram

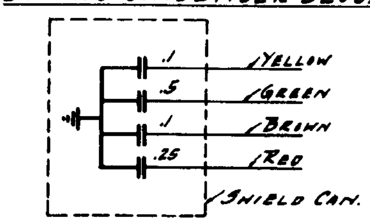
TUBE SOCKET VOLTAGES

Tube No.	Heater to Cathode Voltage	Control Grid to Cathode Voltage	Screen to Cathode Voltage	Plate to Cathode Voltage	Plate MA	Heater or Fil. Voltage
1—R. F.	0	4.5*	100	250	6.0	6.3
2—1st Det.	0	4.5*	100	250	6.0	6.3
3—I. F.	0	4.5*	100	250	6.0	6.3
4—2nd Det. AVC	0	2.0**	0	125	75	6.3
5—Osc.	0	2.6	0	95	5.5	6.3
6—Audio	0	20.0	250	225	31.0	6.3
7—Rect.	0				32 per plate	5.0

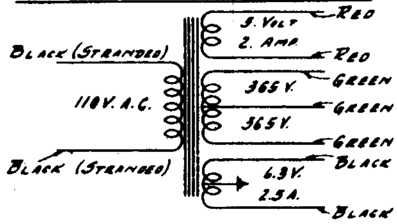
Voltage reading taken with 1000 ohm per volt meter using test prods. All tubes in sockets, Ant. ground to chassis, no signal.
*Voltage from ground to terminal No. 1 ON THE VOLTAGE DIVIDER.
**Voltage from ground to terminal No. 2 ON THE VOLTAGE DIVIDER.



BY PASS CONDENSER BLOCK.

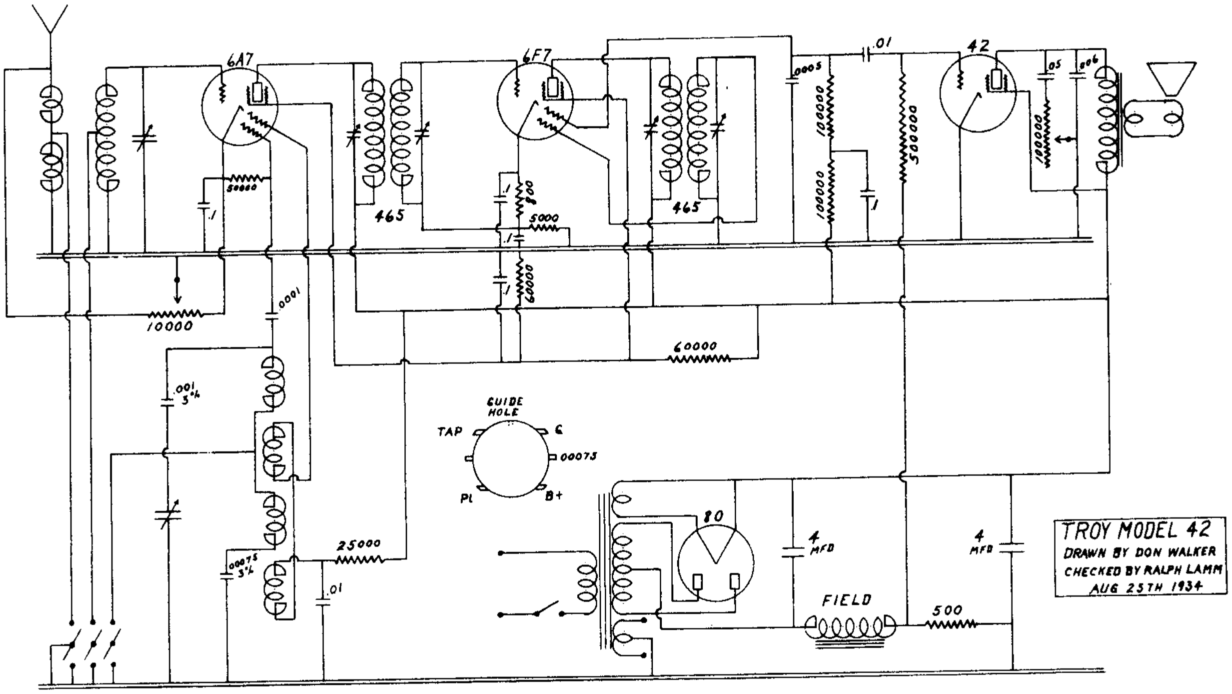


POWER TRANS. CONNECTIONS.

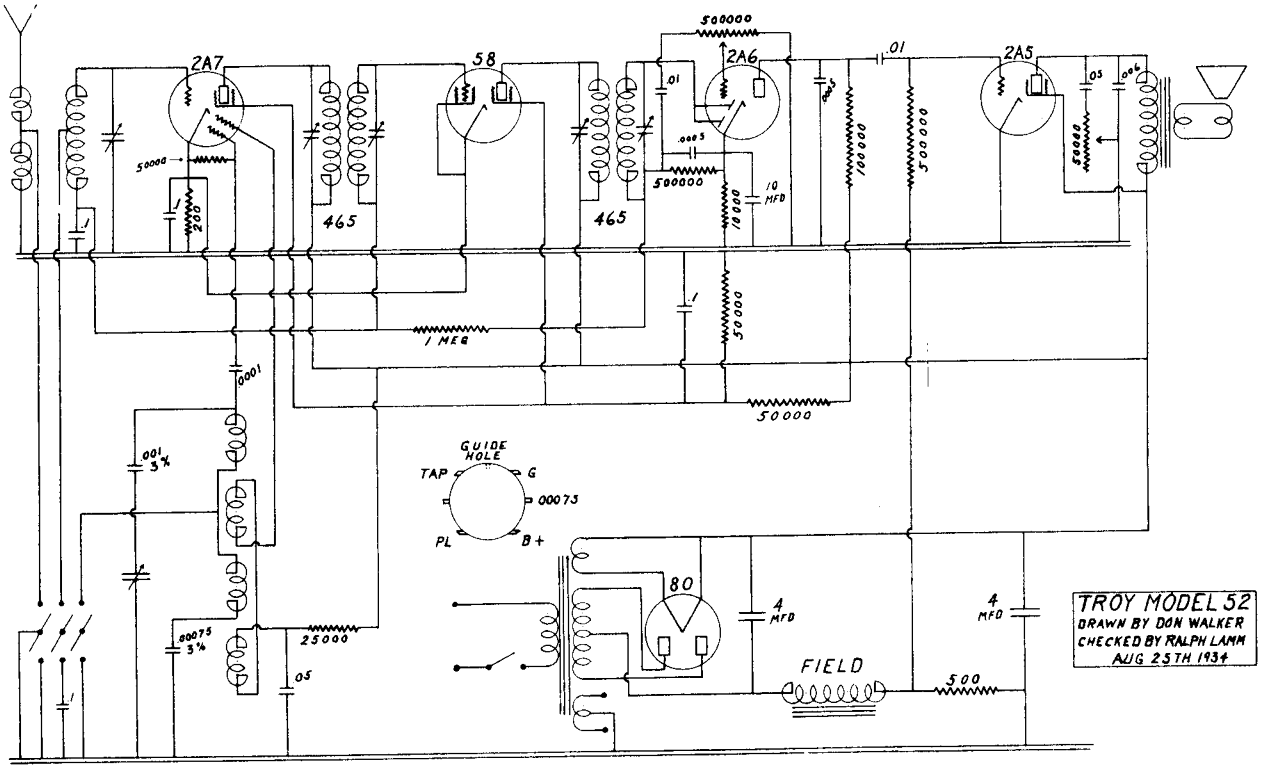


TROY RADIO MANUFACTURING CO.

MODEL 42

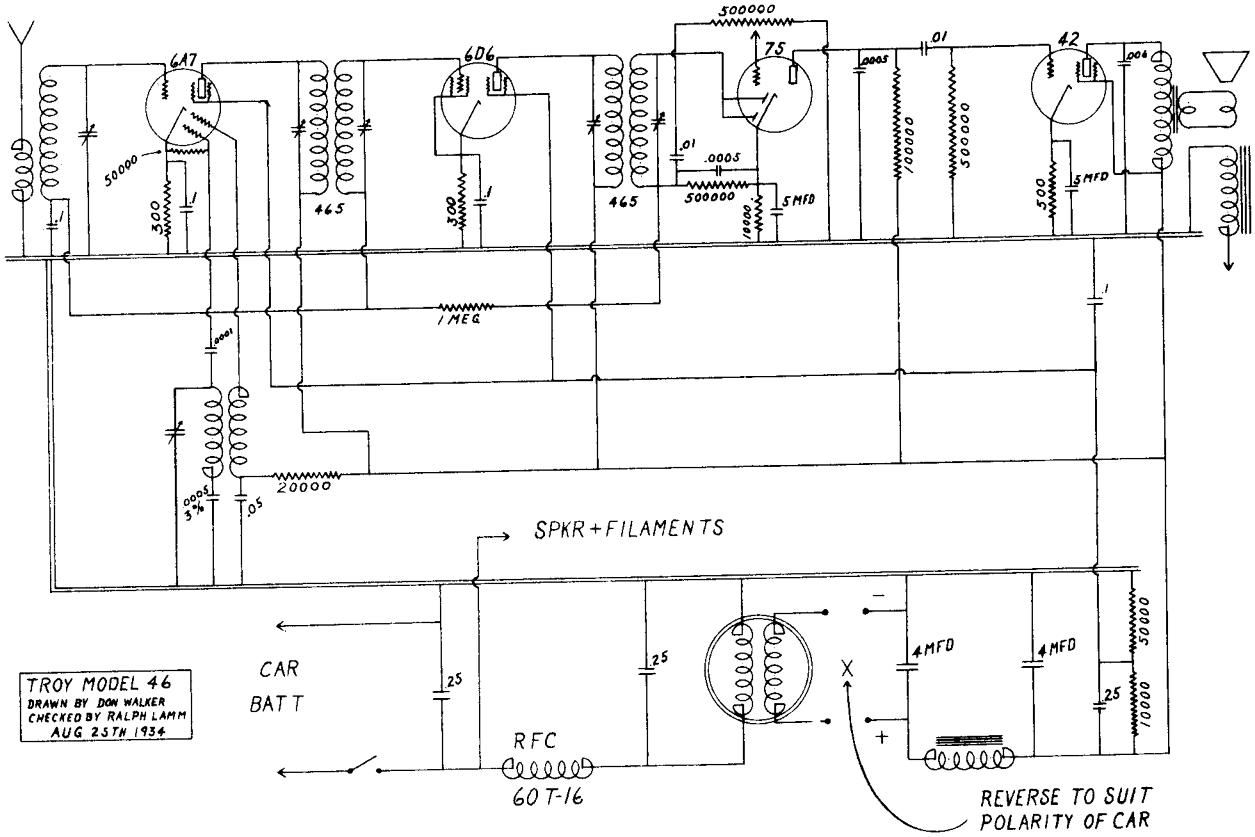


MODEL 52

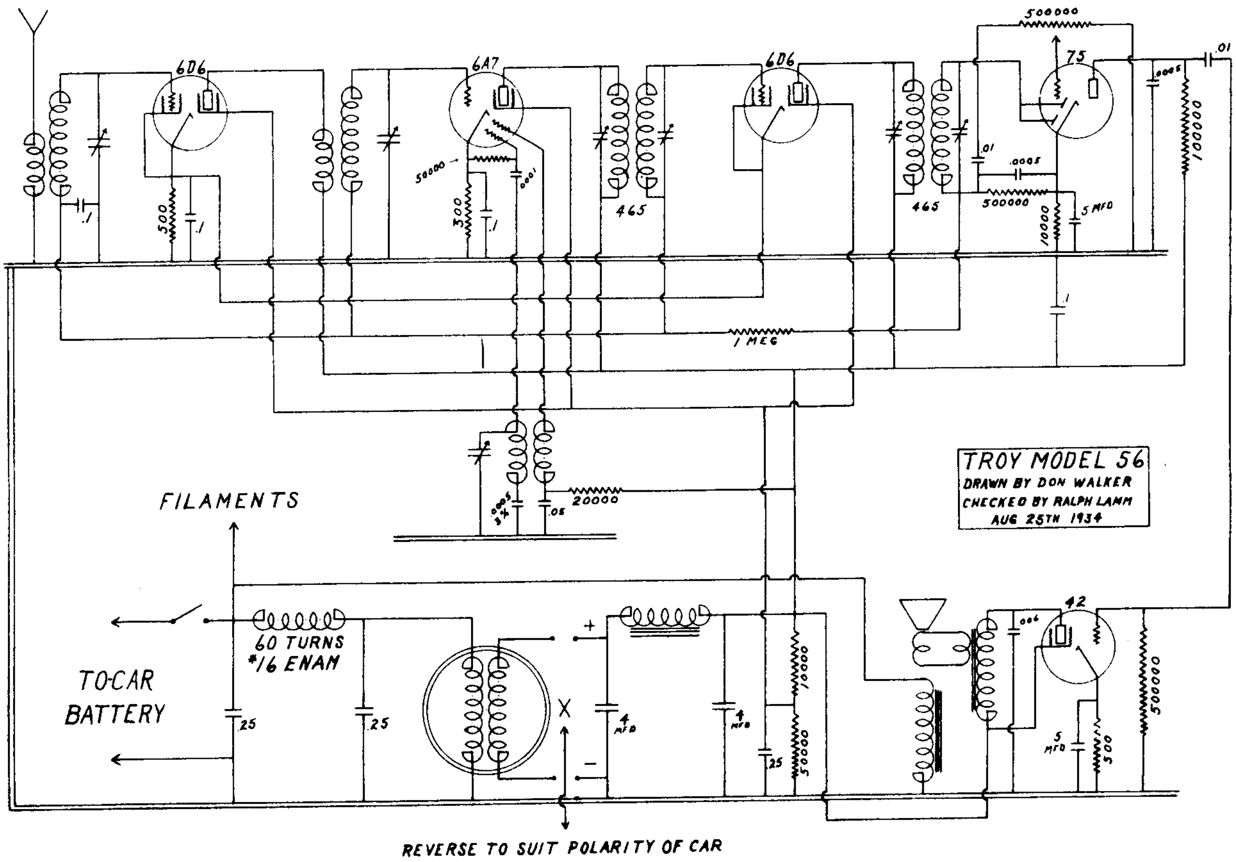


TROY RADIO MANUFACTURING CO.

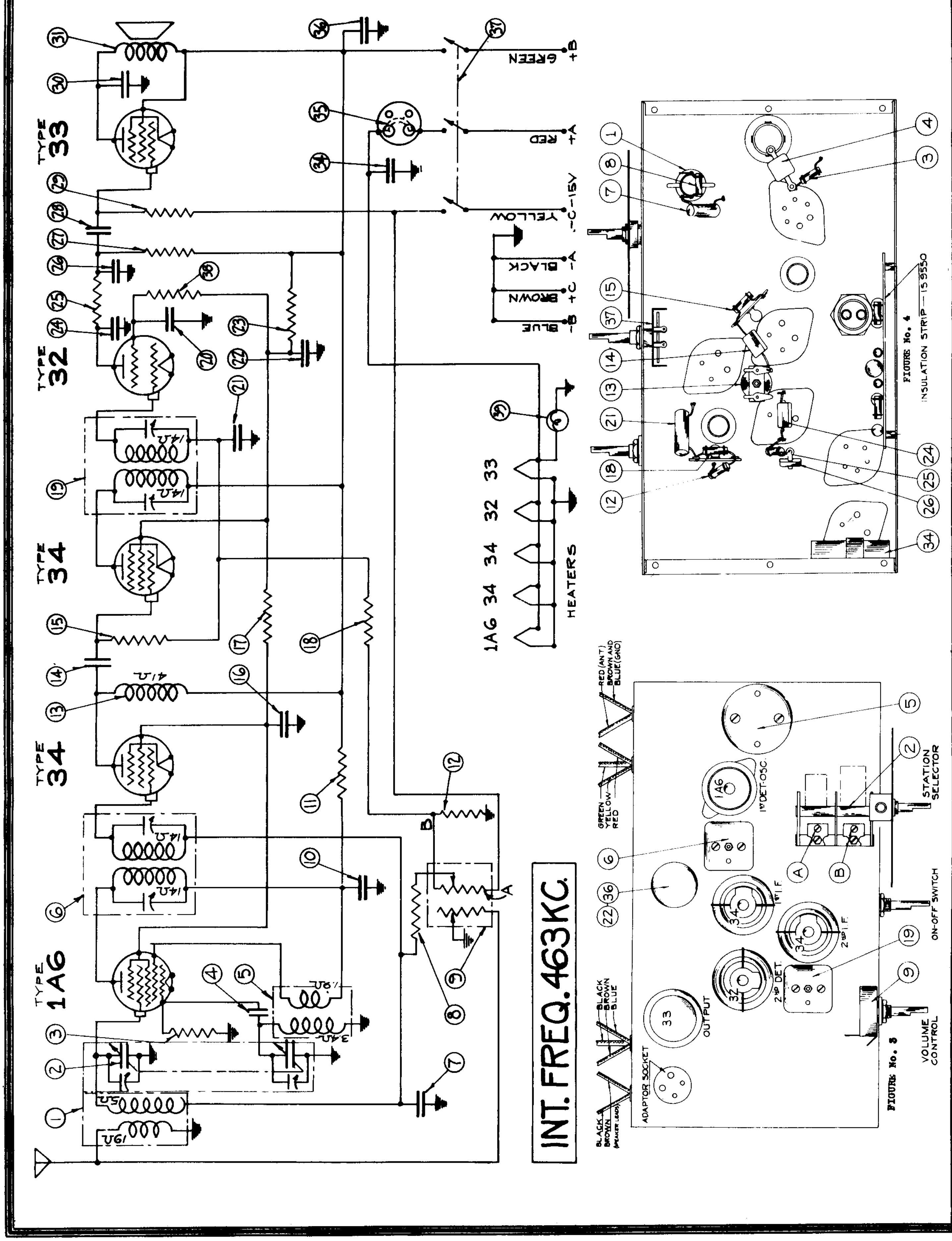
MODEL 46



MODEL 56



UNITED AMERICAN BOSCH CORPORATION
MODEL 385



UNITED AMERICAN BOSCH CORPORATION
MODEL 385

AMERICAN-BOSCH RADIO MODEL 385

Five-Tube, Battery Receiver

SERVICE NOTES

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ------------------------- 1 #1A6, 2 #34, 1 #32, 1 #33 - Total 5
Total "A" Battery Current --- .56 Amperes
Maximum "B" Battery Current -- 29. M. A.
Tuning Range --- 540 to 1620 K. C.
Maximum Undistorted Output --- .7 Watts
Maximum Output --- .9 Watts
Line-Up Frequencies ---------------------------------- 463 K.C., 600 K.C., and 1500 K.C.

GENERAL DESCRIPTION

The model 385 is a five tube battery operated superheterodyne receiver. Its circuits comprise a combined first detector-oscillator, two stages of intermediate frequency amplification, a combined second detector-A.V.C. and a power pentode output amplifier.

The receiver is designed to operate on the broadcast band extending from 540 to 1620 kilocycles.

BATTERY CONNECTIONS

The receiver is supplied without batteries Any one of the following three types of "A" supply may be used.

1. AIR CELL: When a 2-volt air cell is used, the resistance lead (#RE 9515) which is supplied with the receiver, must be plugged in to the two large holes of adapter socket (see Fig. #3).

2. STORAGE BATTERY: When a 2-volt storage battery is used, the brass short circuiting link (#CT 953) which is also supplied with the receiver, must be plugged into the two large holes of adapter socket.

3. DRY CELL PACK: If a 3-volt dry cell pack is used, a ballast tube (LP 953) must be used in the adapter socket. This tube is not supplied with the receiver but can be obtained at a slight additional cost.

B BATTERIES: Three 45-volt B batteries are required. Heavy duty type of B batteries are recommended.

C BATTERY: 15-volts of C battery are required. This can be obtained froma single 15-volt C battery or two 7½-volt C batteries connected in series.

The battery connections and color code of the battery cable are shown in fig. #1.

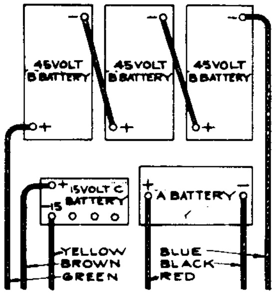


Figure No. 1

SPEAKER ADJUSTMENT

The speaker has been carefully adjusted at the factory and should not require any further attention, as this design has been found to be very stable in maintaining its

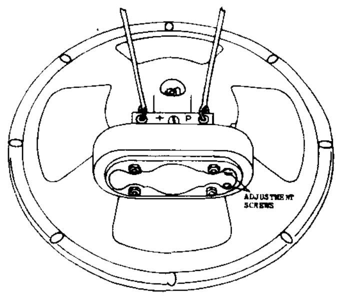


Figure No. 2

adjustment. However, if for any reason an adjustment is needed, it may be done as follows:

1. With speaker connected to the receiver, tune in a strong signal and advance the volume control until the speaker begins to rattle (armature striking pole pieces).

2. Uncover the two holes shown in Fig. #2 by piercing the paper label.

3. This adjustment is of the rocker type and one screw must be loosened and the other tightened to adjust the position of the armature. Adjustment should proceed in quarter turn steps until best position of armature is found. When this condition is obtained, both screws should be tight.

LINE-UP CAPACITOR ADJUSTMENTS

To align the chassis, it is essential to use a high grade modulated oscillator, the output of which can be continuously adjusted to assure freedom from tube overload as individual circuits are brought into alignment.

This model uses an improved type of magnetic speaker, the windings of which are directly in the plate circuit of the output tube. The windings are of high impedance and necessitate care in the use of the output meter when aligning the chassis.

When an output meter of low resistance is connected across the windings of this type of speaker, the power output is materially reduced. For this reason, it is necessary to use an output meter of high sensitivity and a resistance of at least 4000 ohms.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures #3 and #4, and should be carefully studied before the actual work is started.

I.F. ADJUSTMENT (463 K.C.)

1. Set volume control on full.

2. Short circuit the antenna and ground leads to prevent local stations from interfering with subsequent aligning operations.

3. Connect output meter across the loud speaker terminals (see note above).

4. Set test oscillator to 463 K.C. and apply test signal to grid of 34 second I.F. tube thru a .25 mfd. blocking condenser and adjust the two trimmers on top of I.F. coil #19 to maximum output reducing output of test oscillator as required.

5. Apply test signal to grid of 1A6 detector-oscillator tube and adjust the two trimmers on top of I.F. coil #6 to maximum output.

OSCILLATOR AND R.F. ADJUSTMENT

1. Set test oscillator and dial scale to 1500 K.C.

2. With test signal still applied to the grid of 1A6 tube, adjust trimmer "A" to maximum output.

3. Apply test signal to antenna lead of chassis thru a .0002 mfd. condenser and with dial scale still set at 1500 K.C. adjust trimmer "B" to maximum output.

4. Check sensitivity and calibration at several points of dial scale.

SERVICE PARTS LIST

Dia. #	Part #	Description of Parts
1	RC 9546	Ant. coil assembly
2	CG 9515	Variable condenser assy.
3	SA 105278	100,000 ohms, ¼ W. res.
4	SA 101143	.0001 mfd., mica cond.
5	RC 9547	Oscillator coil assembly
6	SA 106835	I.F. Coil Assembly
7	SA 106386	.05 mfd., 200 V. cond.
8	SA 105278	100,000 ohms, ¼ W. res.
9	SA 106829	Dual volume control (10,000 ohms per unit)
10	SA 106386	.05 mfd., 200 V. cond.
11	SA 105267	1000 ohms, ¼ W. res.
12	SA 105270	2500 ohms, ¼ W. res.
13	SA 107021	Choke coil assembly
14	SA 106417	.0001 mfd., mica cond.
15	SA 105278	100,000 ohms ¼ W. res.
16	SA 106386	.05 mfd., 200 V. cond.
17	SA 105267	1000 ohms, ¼ W. res.
18	SA 105281	1 meg., ¼ W. res.
19	SA 106835	I.F. coil assembly
20	SA 102497	.25 mfd., 200 V. cond.
21	SA 106386	.05 mfd., 200 V. cond.
22		2 mfd., 200 V. cond. (part of CE 959)
23	SA 105254	15,000 ohms, ¼ W. res.
24	SA 106417	.0001 mfd., mica cond.
25	SA 105276	50,000 ohms, ¼ W. res.
26	CM 955	.000025 mfd., mica cond.
27	SA 105246	½ meg., ¼ W. resistor
28	SA 103659	.005 mfd., 400 V. cond.
29	SA 105281	1 meg., ¼ W. resistor
30	SA 103659	.005 mfd., 400 V. cond.
31	SA 106918	Speaker assembly
34	SA 106720	1 mfd., 200 V. condenser
35	RE 9515	Adaptor socket resistance lead
35	CT 953	Adaptor socket short circuit link
36		4 mfd., 200 V. cond. (part of CE 959)
37	SW 9513	Switch assembly
38	SA 105281	1 meg., ¼ W. resistor
39	LP 954	Dial lamp

NORMAL OPERATING VOLTAGES

TUBE	STAGE	FILAMENT	PLATE	SCREEN	BIAS
33	output	2.15	135	140	15(A to Gnd)
32	2nd Det.	2.15	25	12	2.5(B to Gnd)
34	Int.Freq.	2.15	140	70	2.5(B to Gnd)
34	Int. Freq.	2.15	140	65	2.5(B to Gnd)
1A6	1st Det.	2.15	135	65	2.5(B to Gnd)
	Oscillator		135		

Total "B" voltage 140

UNITED AMERICAN BOSCH CORPORATION

MODEL 450

SERVICE INSTRUCTIONS AND PARTS LISTS
Model 450 American-Bosch Radio Receiver

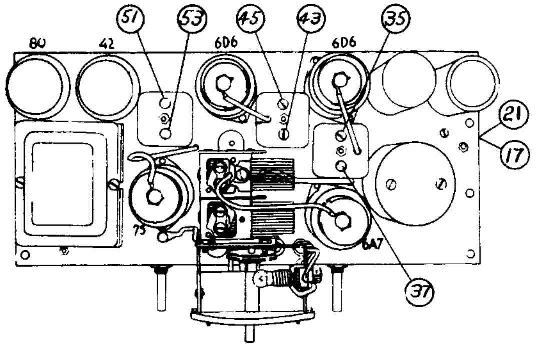


Figure #1

Alignment Nomenclature

#8 Short wave preselector trimmer*
#10 Broadcast preselector trimmer*
#13 Police preselector trimmer*
#15 Short wave oscillator trimmer*
#17 Short wave osc. lag (bottom screw)
#20 Broadcast oscillator trimmer*
#21 Broadcast osc. lag (top screw)
#35 First I.F. trimmer
#37 First I.F. trimmer
#43 Second I.F. trimmer
#45 Second I.F. trimmer
#51 Third I.F. trimmer
#53 Third I.F. trimmer
* See Figure #2

ALIGNMENT PROCEDURE

To properly align the receiver, it is essential to use a high grade modulated test oscillator and a sensitive output meter. The R. F. signal fed into the receiver must be relatively weak or it will cause the A.V.C. to function making correct alignment difficult. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the location of the tubes and the various alignment condensers. The top and bottom view of the chassis are shown in Figure #1 and #2 and should be carefully studied before the actual work is started.

A - I.F. ADJUSTMENT (450 K.C.)

1. Set test oscillator to 450 K.C.

2. Connect output meter across voice coil of speaker. (Impedance 3.5 ohms.)

3. Connect in series with high side of test oscillator leads a blocking condenser of at least .25 mfd.

4. Connect test oscillator to grid of 1st I. F. tube (6D6 in rear of condenser gang) and adjust #51 and #53 to maximum output reducing test oscillator as required.

5. Connect test oscillator to grid of 1st I. F. tube (6D6 rear right hand tube) and adjust #43 and #45 to maximum output.

6. Connect test oscillator to grid of 1st detector (6A7 and adjust #35 and #37 to maximum output. This completes the I. F. adjustment.

B - ADJUSTMENT OF BROADCAST BAND

1. Set wave change switch to broadcast scale position.

2. Set test oscillator to 1500 K.C. and connect to grid of 1st detector (6A7).

3. Adjust dial scale to maximum mark beyond 540 K.C. calibration point when the gang is entirely closed.

4. Set dial scale at 1500 K.C. and adjust #20 to maximum output.

5. Connect test oscillator to antenna and ground leads of the receiver (red and brown) through a .0002 mfd. condenser and with scale still set at 1500 K. C. adjust #10 and #20 to maximum output.

6. Set dial scale and test oscillator to 600 K. C. and adjust #21 simultaneously changing this adjustment and the station selector for maximum output. This type of adjustment is known as "max-max" and is obtained in the following manner:

Tune the receiver with your left hand by means of tuning knob and adjust #21 in either direction and then without changing it, tune the receiver through a maximum noting the value of output meter reading. If output drops with second adjustment reverse direction of the adjustment of #21. Continue this type of trial and error adjustment until no further improvement can be made when either tuning control or #21 are changed. While this procedure may appear difficult, facility can be easily acquired and the operation requires only a few moments.

7. With test oscillator and scales set at 1500 K. C. readjust #10 and #20 since previous operations may have altered oscillator trimmer setting.

8. Check sensitivity across band.

C - ADJUSTMENT OF POLICE BAND

1. Set combination tone control - police band switch (lower center knob) on first or left-hand position.

2. Leave wave change switch on standard broadcast position.

3. Set dial scale at 1500 K. C. (this is the reception point for 2400 K.C. on range marked "police switch" or dial scale).

4. Set test oscillator to 2400 K. C. and tune in signal with station selector.

5. Adjust #13 to maximum output.

D - ADJUSTMENT OF SHORT-WAVE BAND

1. Set wave change switch to short wave or lower dial scale position.

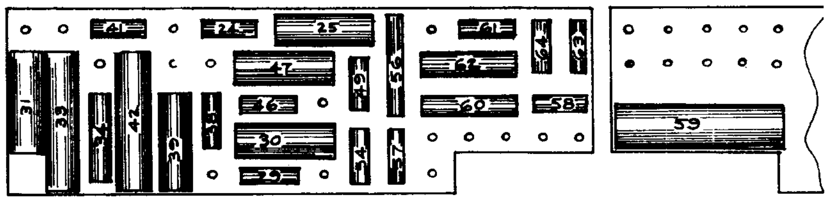
2. Connect test oscillator to antenna thru a .0002 mfd. condenser and a 400 ohm resistor in series. (This resistor-condenser combination is the approximate equivalent of a short wave antenna.)

3. Set test oscillator and dial to 16 M. C. (16,000 K. C.) and adjust #15 and #9 to obtain reading on output meter.

4. Simultaneously adjust station selector, knob and #8 trim condenser in the same manner as described under operation #6 of broadcast alignment. (This is necessary because sufficient coupling exists in the 6A7 tube to cause a serious shift to the frequency of the oscillator as #8 is adjusted.)

5. Set test oscillator and dial scale to 6 M.C.(6000 K.C.) and adjust "max-max" #16.

6. Repeat operation #4 as operation #5 may have disturbed oscillator adjustment.
7. Check sensitivity across band.



SPEAKER (107369)
(450L, 451L, 454L)

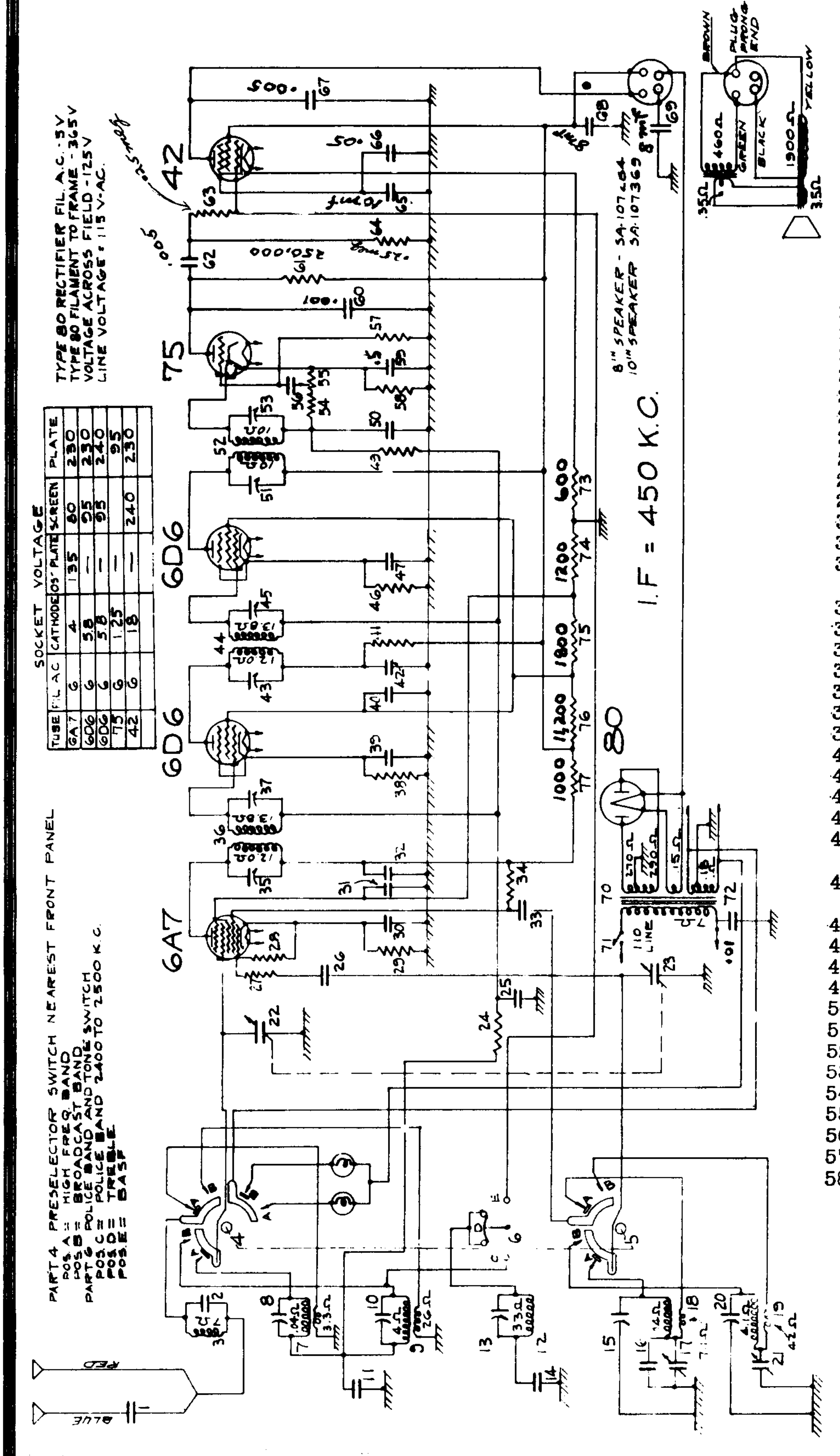
102283	Diaphragm and coil assembly
95226	Centralizer screw plain wash.
99005	Centralizer screw
101590	Diaphragm bracket assembly
102270	Steel plate
101742	Paper washer
107367	Speaker field coil
101733	Core and frame assembly
94018	Core and frame fastening screw - plain washer
62873	Core and frame fastening screw - lock washer
102132	Core and frame fast. screw
79381	Cable clamp
101865	Diaphragm fast. screw
101020	Core and frame pin
107280	Speaker output transformer
101864	Speaker output transformer fastening screw
107278	Speaker plug
107279	Speaker plug cover
101740	Copper ring

SPEAKER (107284)
(450H, 451H, 454H)

106492	Core and frame assembly
101856	Insulation plate assembly
107273	Copper washer assembly
106677	Fastening screw - housing to frame
74084	Fastening screw lock washer
107169	Transformer bracket
53544	Plain washer - insulation plate
79381	Clamp - cable
95226	Washer - between brkt. & hsg.
107282	Diaphragm and coil assembly
95226	Centralizer screw plain washer
107280	Speaker output transformer
99005	Centralizer screw
107187	Diaphragm housing
106496	Steel plate
107163	Speaker field coil
105642	Fastening screw - transformer to bracket
107278	Speaker plug
107279	Speaker plug cover

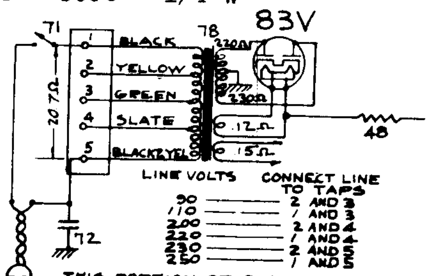
UNITED AMERICAN BOSCH CORPORATION

MODEL 450



SOCKET VOLTAGE

TUBE	FIL AC	CATHODE	OS' PLATE	SCREEN	PLATE
6A7	6	4	135	80	230
6D6	6	5.8	—	95	230
6D6	6	5.8	—	95	240
75	6	1.25	—		95
42	6	18	—	240	230

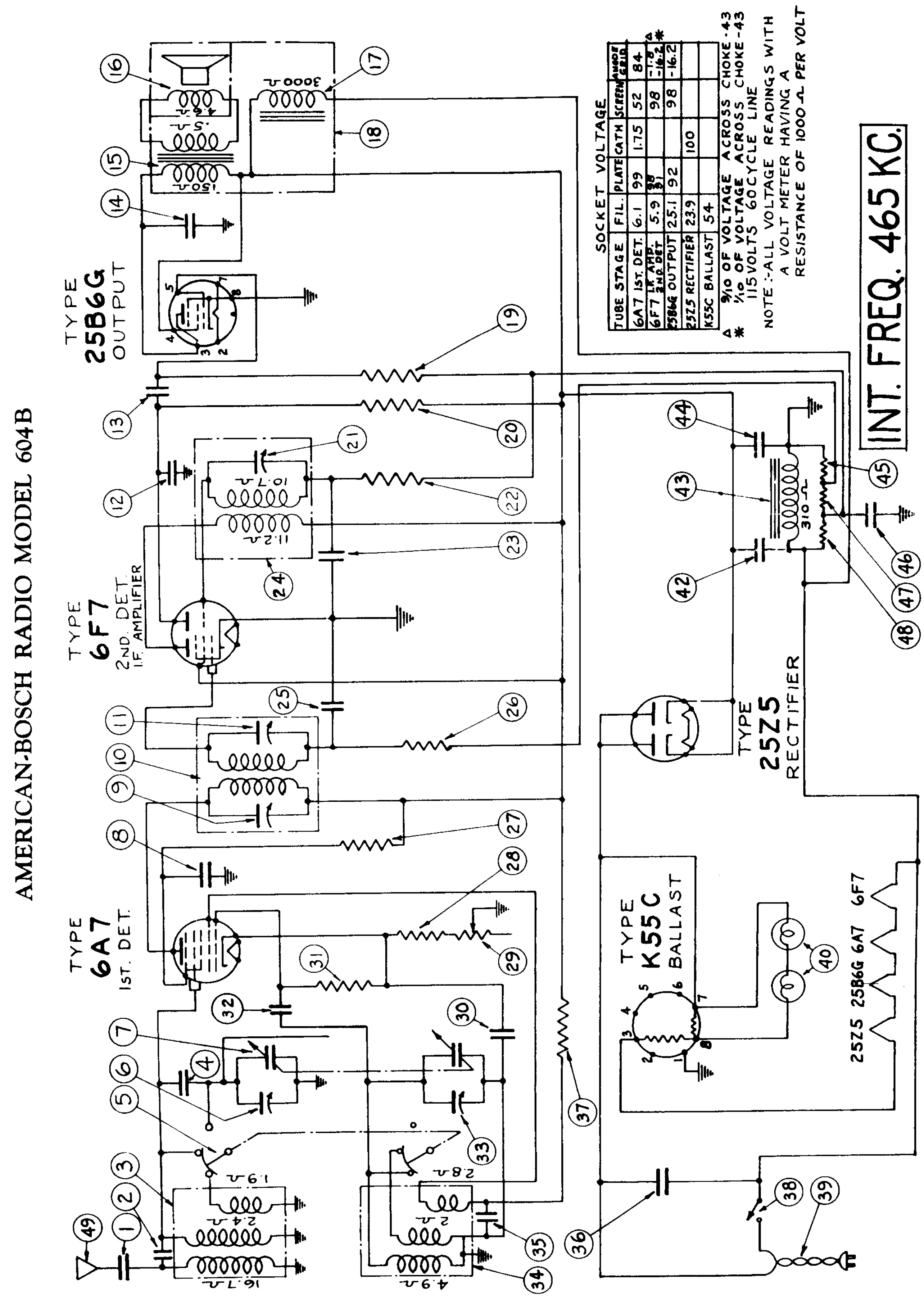


THIS PORTION OF DIAGRAM COVERS MOD. 454 ONLY

Dia. #	Description of Parts
1	100 Mfd. mica
2	.005 mfd. mica)part of
3	Trap coil-)107434
4	Preselector switch)part of
5	Osc. switch)SW 954
6	Tone control switch
7	H.F. pres. coil)part of
8	0-60 mmf. 107936
9	B.C. pres. coil - part of 107936
10	0-15 mmf.
11	.05 - 2 ply
12	Police band coil)part of
13	10-55 mmf.)RC95248
14	.001 - 4 ply
15	0-15 mmf.
16	1500 mmf. mica
17	1100-2000 mmf)part of 108001
18	H.F. osc. coil)part of
19	B.C. osc. coil)RC9523A
20	0-25 mmf.
21	300-600 mmf part of 108001
22	Var. gang part of CG 957
23	Var. gang part of CG 957
24	.1 meg. 1/4 W.
25	.05 - 2 ply
26	100 mmf. mica
27	100 - 1/4 W.
28	50,000 - 1/4 W.
29	500 - 1/4 W.
30	.05 - 2 ply
31	.05 - 2 ply
32	8 mfd. elec. (dry) part of 107288
33	.02 mfd. - 3 ply
34	20,000 - 1/2 W.
35	.30 mmf. part of IC952A
36	I.F. trans. part of IC952A
37	35-130 mmf. part of IC952A
38	1000 - 1/4 W.
39	.05 - 2 ply
40	.05 - 2 ply
41	1000 - 1/4 W.
42	.05 - 3 ply
43	35-130 mmf.
44	I.F. trans. coil- part of IS952A
45	35-130 mmf.- part of IC 952A
46	1000 - 1/4 W.
47	.05 - 2 ply
48	400 - 1 W.
49	5 meg. - 1/4 W.
50	.0001 mmf. mica
51	30-130 mmf.) part of
52	3rd IF coil) IC954 A
53	30-130 mmf.)
54	.1 meg. 1/4 W.
55	.5 meg. vol. cont.
56	.005 mfd. - 3 ply
57	1 meg. 1/4 W.
58	5000 - 1/4 W

UNITED AMERICAN BOSCH CORPORATION

MODEL 604B



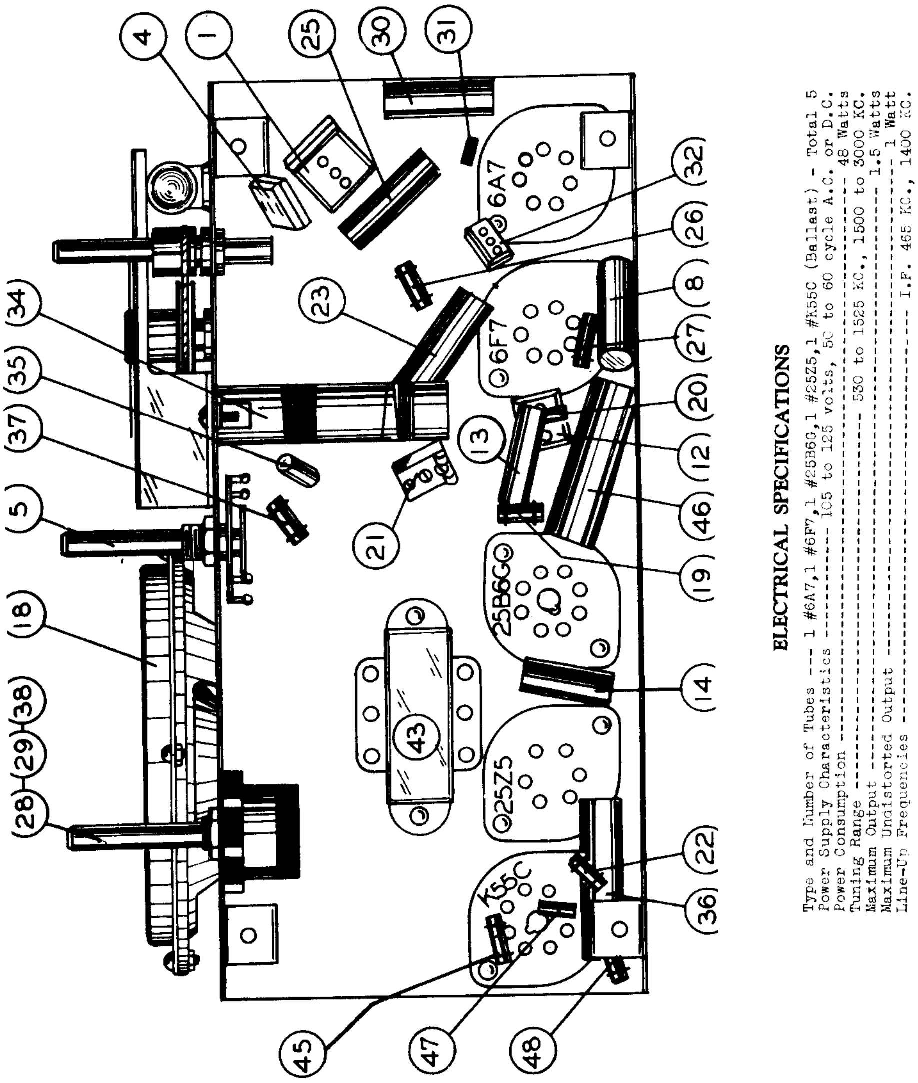
SOCKET VOLTAGE

TUBE	STAGE	FIL.	PLATE	CATH	SCREEN	ANODE GRID
6A7	1ST. DET.	6.1	99	1.75	52	84
6F7	I.F. AMP. 2ND. DET	5.9	98 91		98	-1.8 Δ -16.2 *
25B6G	OUTPUT	25.1	92		98	-16.2
25Z5	RECTIFIER	23.9		100		
K55C	BALLAST	54				

Δ 9/10 OF VOLTAGE ACROSS CHOKE -43
* 1/10 OF VOLTAGE ACROSS CHOKE -43
115 VOLTS 60 CYCLE LINE

NOTE:-ALL VOLTAGE READINGS WITH A VOLT METER HAVING A RESISTANCE OF 1000 Ω PER VOLT

UNITED AMERICAN BOSCH CORPORATION
MODEL 604B



LINE-UP CAPACITOR ADJUSTMENTS

To align this model, it is essential to use a high grade modulated oscillator and sensitive output meter. The R.F. signal fed into the receiver must be very weak or it will cause the receiver to overload, making correct alignment impossible. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low signal.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures #1 and #2 and should be carefully studied before the actual work is started.

I.F. ADJUSTMENT (465 KC.)

NOTE: The signal generator or alignment oscillator should have no external ground connection of the low potential side of its output, either to ground or to the power line and the low potential output terminal may be connected to the frame of the receiver. An external ground of the receiver frame will result in a loud hum making alignment impossible.

1. Connect the output meter across the voice coil of speaker.

2. Set volume control at maximum.

3. Set the test oscillator to 465 KC., and apply test signal to the grid of the 6F7 tube through a 0.5 mfd. condenser.

4. Adjust second I.F. alignment condenser #21 to maximum output.

5. Apply the test signal to the grid of the 6A7 first detector-oscillator tube.

6. Adjust alignment condensers #9 and #11 to maximum output.

OSCILLATOR AND R.F. ADJUSTMENT

1. Set the test oscillator and dial indicator to 1500 KC., and apply the test signal to the antenna of the receiver through an 85 mmf. condenser.

2. Adjust the oscillator and antenna alignment condensers #33 and #6 to maximum output.

3. Check sensitivity over scale.

4. Check sensitivity on short-wave band.

ELECTRICAL SPECIFICATIONS

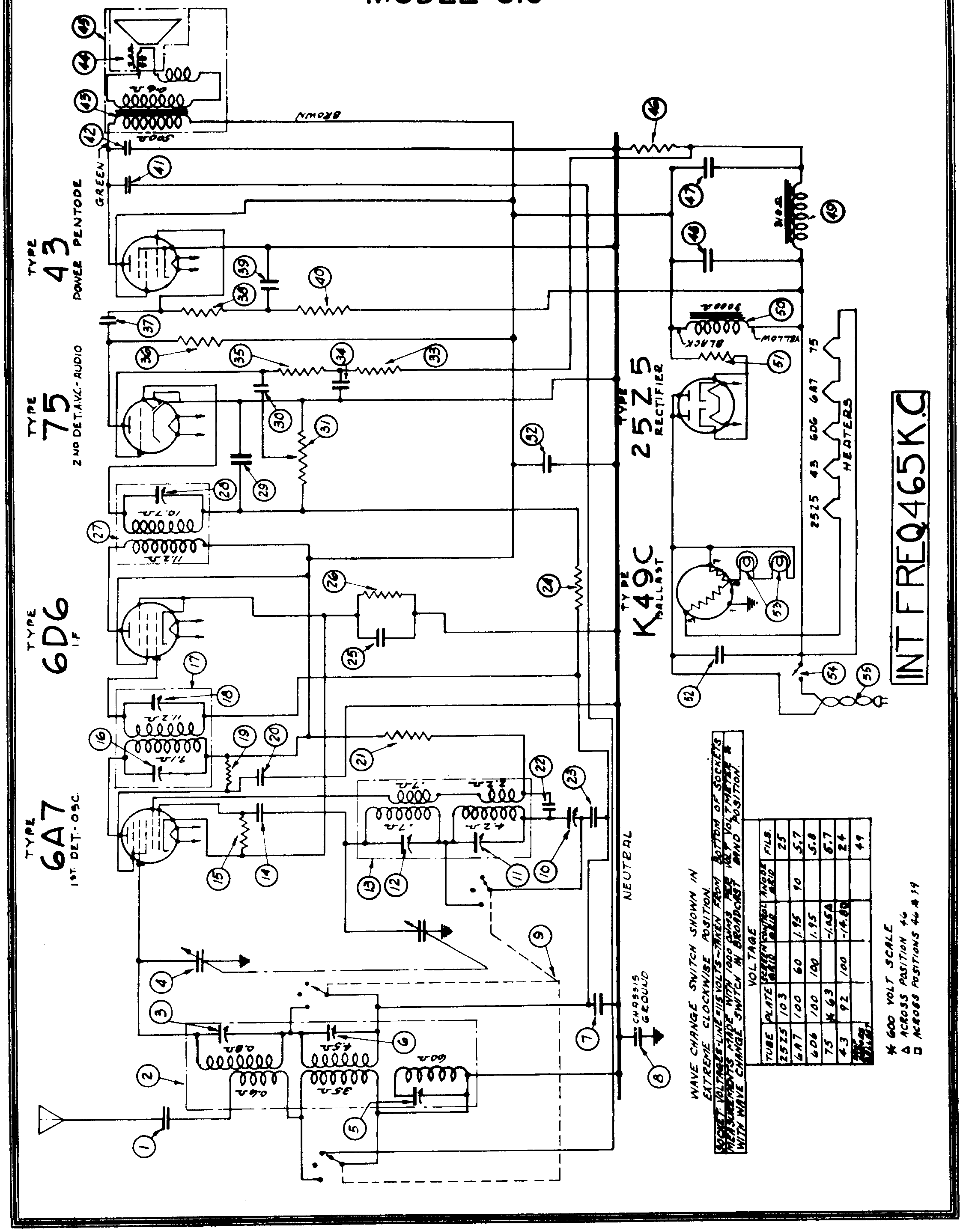
Type and Number of Tubes --- 1 #6A7, 1 #6F7, 1 #25B6G, 1 #25Z5, 1 #K55C (Ballast) - Total 5
Power Supply Characteristics ------------ 105 to 125 volts, 50 to 60 cycle A.C. or D.C.
Power Consumption -- 48 Watts
Tuning Range ------------------------ 530 to 1525 KC., 1500 to 3000 KC.
Maximum Output -- 1.5 Watts
Maximum Undistorted Output ---------------------------------- 1 Watt
Line-Up Frequencies ---------------------------- I.F. 465 KC., 1400 KC.

Dia. #	Part #	Description of Parts
1	SA 103775	.001 mfd. mica condenser
2	CS 9546	5 mmf. mica condenser
3	RC 95197	Preselector coil
4	CM 9522	.00048 mfd. mica condenser
5	SW 9545	Wave-change switch
6		Trimmer condenser - part of CG 9547
7	CG 9547	2-gang tuning condenser
8	CW 2-05	.05 mfd., 200 V. condenser
9		35-130 mmf. trimmer condenser - part of IC 9596
10	IC 9596	1st I.F. coil
11		35-135 mmf. trimmer condenser - part of IC 9596
12	SA 103775	.001 mfd. mica condenser
13	CW 4-005	.005 mfd., 400 V. condenser
14	CW 4-005	.005 mfd., 400 V. condenser
15	TR 9588	Output transformer
16	DM 9512	Diaphragm and voice coil
17		Field coil - part of SK 9548
18	SK 9548	Speaker
19	RE 9545	1/2 meg., 1/8 W. resistor
20	RE 95112	1/4 meg., 1/2 W. resistor
21		30-60 mmf. trimmer condenser - part of IC 9568
22	RE 9530	1 meg., 1/8 W. resistor
23	CW 2-10	.1 mfd., 200 V. condenser
24	IC 9568	2nd I.F. coil
25	CW 2-05	.05 mfd., 200 V. condenser
26	RE 9572	1/2 meg., 1/4 W. resistor
27	RE 9569	30,000 ohm, 1/8 W. resistor
28		350 ohm resistance - part of VR 9531
29	VR 9531	10,000 ohm volume control
30	CW 4-005	.005 mfd., 400 V. condenser
31	RE 9524	50,000 ohm, 1/8 W. resistor
32	CM 9513	.0001 mfd. mica condenser
33		Trimmer condenser - part of CG 9547
34	RC 95166	Oscillator coil
35	CW 4-005	.005 mfd., 400 V. condenser
36	CW 2-10	.1 mfd., 200 V. condenser
37	RE 9527	5000 ohm, 1/8 W. resistor
38		Switch - part of VR 9531
39	CB 9512	Line cable
40	LP 9516	Dial light - 6.3 V., .15 amp.
42	CE 9553	40 mfd., 150 V., electrolytic condenser
43	SA 105311	Choke coil assembly
44	CE 9534	16 mfd., 150 V. electrolytic condenser
45	RE 9545	1/2 meg., 1/8 W. resistor
46	CW 2-25	.25 mfd., 200 V. condenser
47	RE 95119	4 meg., 1/2 W. resistor
48	RE 9545	1/2 meg., 1/8 W. resistor
49	KL 105344	Antenna cable

Part #	Description of Parts
	MAIN ASSEMBLIES
CH 95178	Chassis assembly
KA 9545	Cabinet
SK 9548	Speaker
	MISCELLANEOUS
BE 956	Base for tube shield
BK 95182	Bracket for mounting electrolytic condenser
BK 95193	Bracket for mounting dial light
BK 95244	Bracket for top of dial scale
BK 95246	Bracket and dial scale assembly
CV 95189	Cover in front of speaker
CV 95198	Cover over dial scale
FP 101869	Felt foot
KN 9568	Knob
PR 97160	Dial drive cord .... Per Yard
PU 9516	Pulley - dial drive
PU 9517	Pulley - dial driven
SC 952	Screw - dial indicator
SH 9539	Shaft - dial drive
SI 9565	Dial indicator
SA 104617	Socket - 6 prong tube
SA 105461	Socket - 7 prong tube
SO 956	Socket - 8 prong tube
SO 9518	Socket - dial light
SP 9539	Spring - dial drive cord

UNITED AMERICAN BOSCH CORPORATION

MODEL 610



WAVE CHANGE SWITCH SHOWN IN EXTREME CLOCKWISE POSITION.

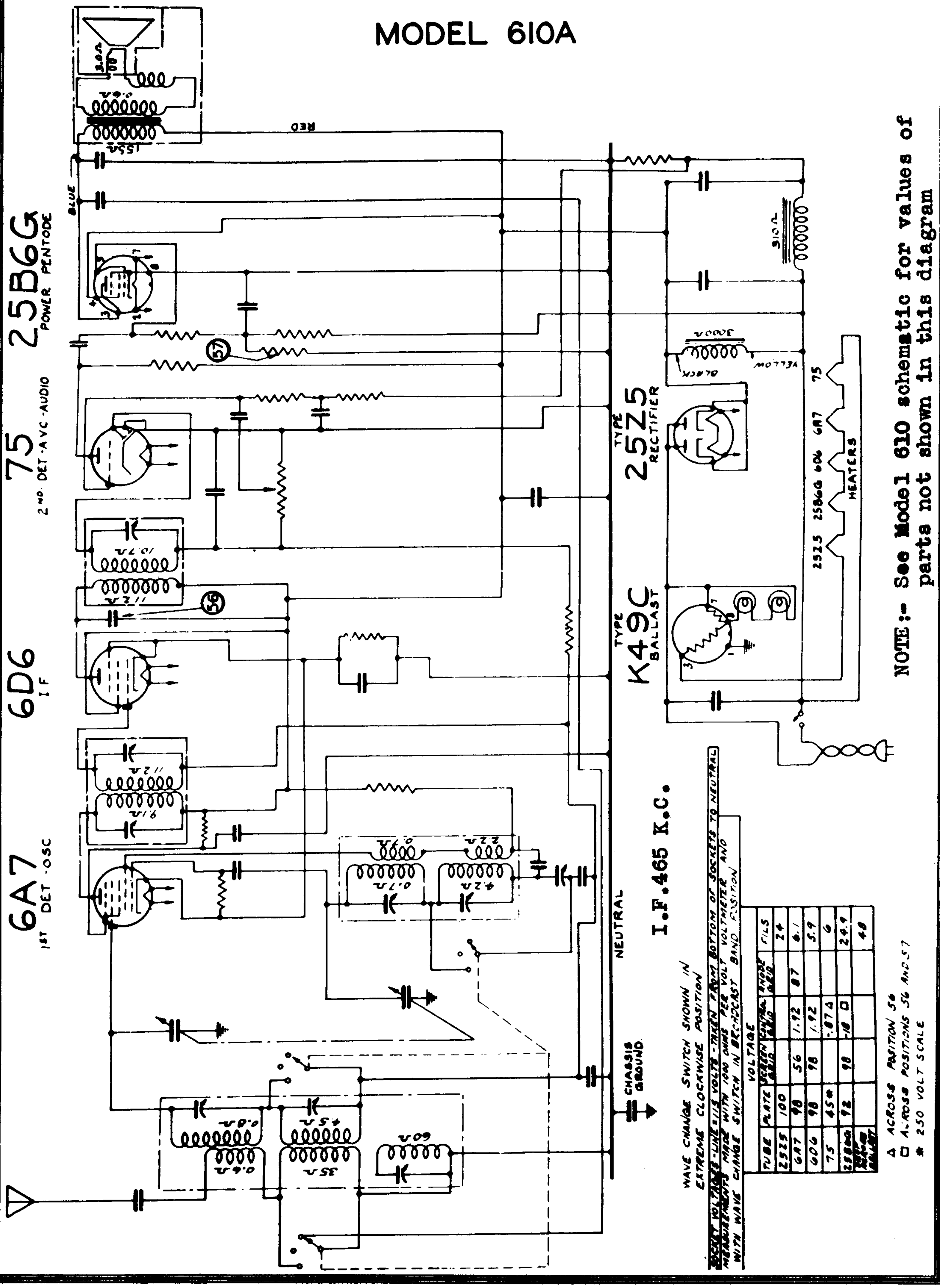
SOCKET VOLTAGES-LINE=115 VOLTS-TAKEN FROM BOTTOM OF SOCKETS MEASUREMENTS MADE WITH 1000 OHMS PER VOLT VOLTMETER & WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION.

VOLTAGE					
TUBE	PLATE	SCREEN GRID	CONTROL GRID	ANODE GRID	FILS.
2525	103				25
6A7	100	60	1.95	90	5.7
6D6	100	100	1.95		5.8
75	✱63		-1.65Δ		6.7
43	92	100	-14.80□		24
[illegible]					49

✱ 600 VOLT SCALE
Δ ACROSS POSITION 46
□ ACROSS POSITIONS 46 & 39

UNITED AMERICAN BOSCH CORPORATION

MODEL 610A



WAVE CHANGE SWITCH SHOWN IN EXTREME CLOCKWISE POSITION

SOCKET VOLTAGES - LINE 115 VOLTS - TAKEN FROM BOTTOM OF SOCKETS TO NEUTRAL. MEASUREMENTS MADE WITH 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION

TUBE	VOLTAGE PLATE	SCREEN GRID	CONTROL GRID	ANODE GRID	FILS
2525	100				24
6A7	98	56	1.92	87	6.1
6D6	98	98	1.92		5.9
75	45*		-.87 Δ		6
25B6G	92	98	-18 □		24.9
[illegible]					48

Δ ACROSS POSITION 56
□ ACROSS POSITIONS 56 AND 57
* 250 VOLT SCALE

UNITED AMERICAN BOSCH CORPORATION
MODELS 610 & 610A

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes - 1 #6A7, 1 #6D6, 1 #75, 1 #43, 1 #25Z5, 1 #K49C (Ballast) - Total 6
Power Supply Characteristics ---- 105-125 volts D.C. or 105-125 volts, 50-60 cycle A.C.
Power Consumption ---------- 47 Watts
Maximum Output ---------- 1.0 Watt
Maximum Undistorted Output ---------- 0.75 Watt
Tuning Ranges ---------- (Broadcast Band - 540 to 1720 KC. / (Short-wave Band - 2100 to 7200 KC.
Line-Up Frequencies ---------- I.F. 465 KC., 1600 KC., 600 KC., 6000 KC.

GENERAL DESCRIPTION

This model is a six-tube, two-band, A.C.-D.C. superheterodyne receiver. A type 6A7 tube is used as a combined first detector-oscillator, a type 6D6 tube as an intermediate frequency amplifier, a type 75 tube as a second detector and automatic volume control and first audio frequency amplifier, a type 43 as an output amplifier, a type 25Z5 as a rectifier, and a type K49C as a ballast tube.

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment.

A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figs. #1 and #2 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 KC.)

1. Set the volume control to maximum position and tone control to treble position.

2. Connect the output meter to the terminals of the voice coil.

3. Set the test oscillator to 465 KC. and apply the test signal to the grid of the type 6D6 I.F. tube through a .5 mfd. blocking condenser.

4. Adjust trimmer condenser #28 to maximum output.

5. Apply the test signal to the grid of the type 6A7 first detector-oscillator tube and adjust trimmer condensers #16 and #18 to maximum output.

6. Connect the test oscillator to the antenna of the receiver and with a strong input signal, adjust wave trap trimmer condenser #5 to minimum output.

BROADCAST BAND ADJUSTMENT

1. Set the test oscillator and dial indicator to 1600 KC.

2. Apply the test signal to the antenna of the receiver through a .0002 mfd. condenser.

3. Adjust oscillator trimmer condenser #11 until the signal is received.

4. Adjust the preselector trimmer condenser #6 to maximum output.

5. Set test oscillator and dial indicator to 600 KC., and adjust the oscillator series condenser #10 until the signal is received. Tune the receiver to a slightly lower frequency and readjust trimmer #10 to maximum output. If the sensitivity increases, continue this procedure in the same direction until maximum sensitivity is reached. If the sensitivity decreases, try this procedure at slightly higher frequencies until maximum sensitivity is reached.

6. Return test oscillator and dial indicator to 1600 KC. and check adjustment of the oscillator and preselector trimmer condensers.

ADJUSTMENT OF SHORT-WAVE BAND

1. Set the wave-change switch to the short-wave band position.

2. Set the test oscillator and dial indicator to 6000 KC. and adjust the oscillator trimmer condenser #12 until the signal is received.

3. Adjust the preselector trimmer condenser #3 to maximum output.

4. Check the sensitivity and calibration over scale.

SERVICE PARTS LIST MODEL 610

Dia. #	Part #	Description of Parts	List Price
1	CM 9519	.0005 mfd. mica condenser	$ .20
2	RC 95262	Antenna coil	2.25
3		4-25 mmf. trimmer condenser - part of RC 95262	
4	CG 9548	Variable condenser - 2 gang	2.75
5		30-60 mmf. trimmer condenser - part of RC 95262	
6		1.5-10 mmf. trimmer condenser - part of RC 95262	
7	CW 2-10	.1 mfd., 200 V. condenser	.15
8	CW 6-10	.1 mfd. 600 V. condenser	.20
9	SW 9562	Wave-change switch	.75
10	CS 9545	300-600 mmf. oscillator series condenser	.40
11		4-25 mmf. trimmer condenser - part of RC 95199	
12		10-35 mmf. trimmer condenser - part of RC 95199	
13	RC 95199	Oscillator coil assembly	1.25
14	SA 106417	.0001 mfd. mica condenser	.20
15	RE 9581	50,000 ohm, 1/4 W. resistor	.15
16		35-130 mmf. trimmer condenser - part of IC 9586	
17	IC 9586	First I.F. coil (465 KC.)	2.00
18		35-130 mmf. trimmer condenser - part of IC 9586	
19	RE 9536	20,000 ohm, 1/4 W. resistor	.10
20	CW 2-10	.1 mfd., 200 V. condenser	.15
21	SA 105249	50,000 ohm, 1/4 W. resistor	.15
22	CW 2-10	.1 mfd., 200 V. condenser	.15
23	CM 9525	.0027 mfd. mica condenser	.30
24	RE 9572	.5 meg., 1/4 W. resistor	.15
25	CW 2-10	.1 mfd., 200 V. condenser	.15
26	SA 105257	150 ohm, 1/4 W. resistor	.15
27	IC 9595	Second I.F. coil (465 KC.)	1.60
28		30-60 mmf. trimmer condenser - part of IC 9595	
29	CM 9519	.0005 mfd. condenser	.20
30	CW 4-005	.005 mfd., 400 V. condenser	.15
31	VR 957	.5 meg. volume control	1.25
32	CW 2-10	.1 mfd., 200 V. condenser	.15
33	RE 9572	.5 meg., 1/4 W. resistor	.15
34	CW 2-10	.1 mfd., 200 V. condenser	.15
35	RE 9572	.5 meg., 1/4 W. resistor	.15
36	SA 105279	.25 meg., 1/4 W. resistor	.15
37	CW 4-005	.005 mfd., 400 V. condenser	.15
38	RE 9572	.5 meg., 1/4 W. resistor	.15
39	CW 9525	1 mfd., 100 V. condenser	.40
40	RE 9572	.5 meg., 1/4 W. resistor	.15
41	CW 2-05	.05 mfd. 200 V. condenser	.15
42	CW 4-005	.005 mfd., 400 V. condenser	.15
43	TR 9583	Output transformer	1.25
44	DM 9514	Diaphragm and voice coil	1.15
45	SK 9544	Speaker	4.50
46	RE 9566	.25 ohm, 1/4 W. resistor	.15
47	CE 9546	12 mfd., 150 V. electrolytic condenser	.85
48	CE 9545	20 mfd., 150V. electrolytic condenser	.85
49	SA 105311	Choke coil assembly	.95
50		Field coil	
51	RE 9564	25 ohm, 1/4 W. resistor	.15
52	CW 2-10	.1 mfd., 200 V. condenser	.15
53	LP 9516	Dial lamp - 6.3 V., .15 amp.	.20
54		On-Off switch - part of VR 957	
55	CB 9512	Line cable	.50

MISCELLANEOUS

Part #	Description of Parts	List Price
CV 95199	Dial cover	.35
KN 9561	Knob	.20
BK 95248	Dial scale and bracket	.85
PU 9518	Dial pulley	.35
SO 9518	Dial lamp socket	.10
SH 9546 CA	Dial drive shaft	.15
BK 95244	Bracket (dial top)	.05
SI 9567	Dial indicator	.15
PU 9516	Pulley - dial drive	.10
SP 9539	Dial cable spring	.05
BK 95182	Electrolytic condenser mounting bracket	.05

MODEL 610A

The Model 610-A is the same as the Model 610, except for the following items:

Power Tube .... 25 B 6G
Power Consumption .... 48 Watts
Maximum Output .... 1.5 Watts
Maximum Undistorted Output .... 1 Watt

Part #	Description of Parts	List Price
CH 95179	Chassis assembly	
SK 9549	Speaker	4.50

Dia. #	Part #	Description of Parts	List Price
41	CW 2-10	.1 mfd., 200 V. condenser	.15
43	TR 9590	Output transformer	1.25
45	SK 9549	Speaker	4.50
46	RE 95121	13 ohm, 1/2 W. resistor	.10
48	CE 9553	40 mfd., 150 V. electrolytic condenser	.80
51	RE 9564	Omitted	
56	CM 952	.00001 mfd. mica condenser	.20
57	RE 95113	4 meg., 1/2 W. resistor	.10

UNITED AMERICAN BOSCH CORPORATION

MODEL 610

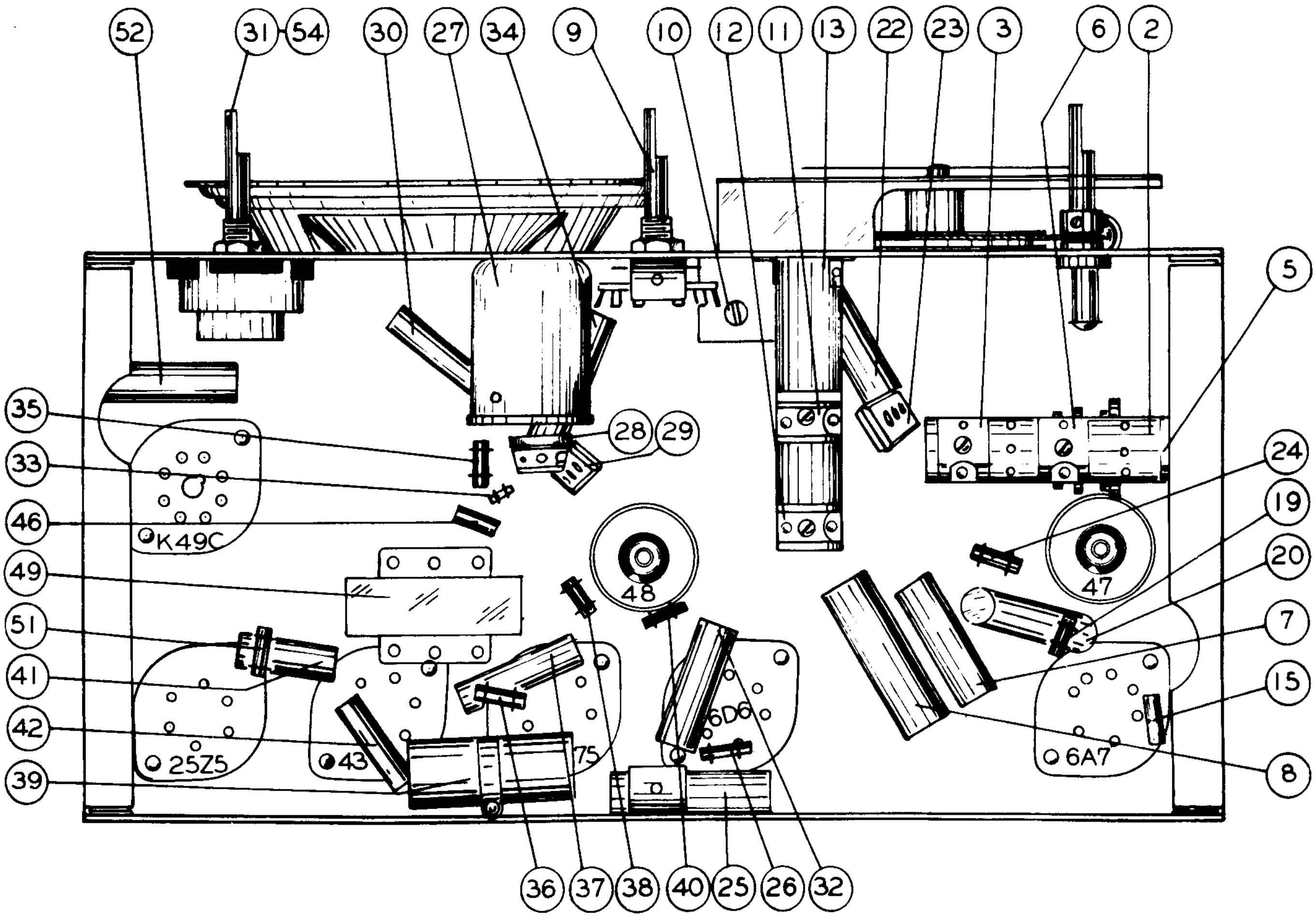


Figure No. 2

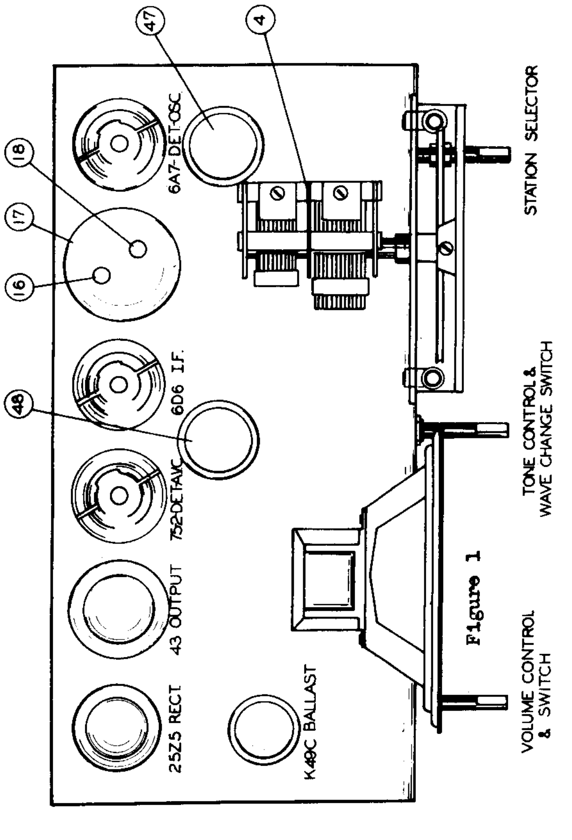
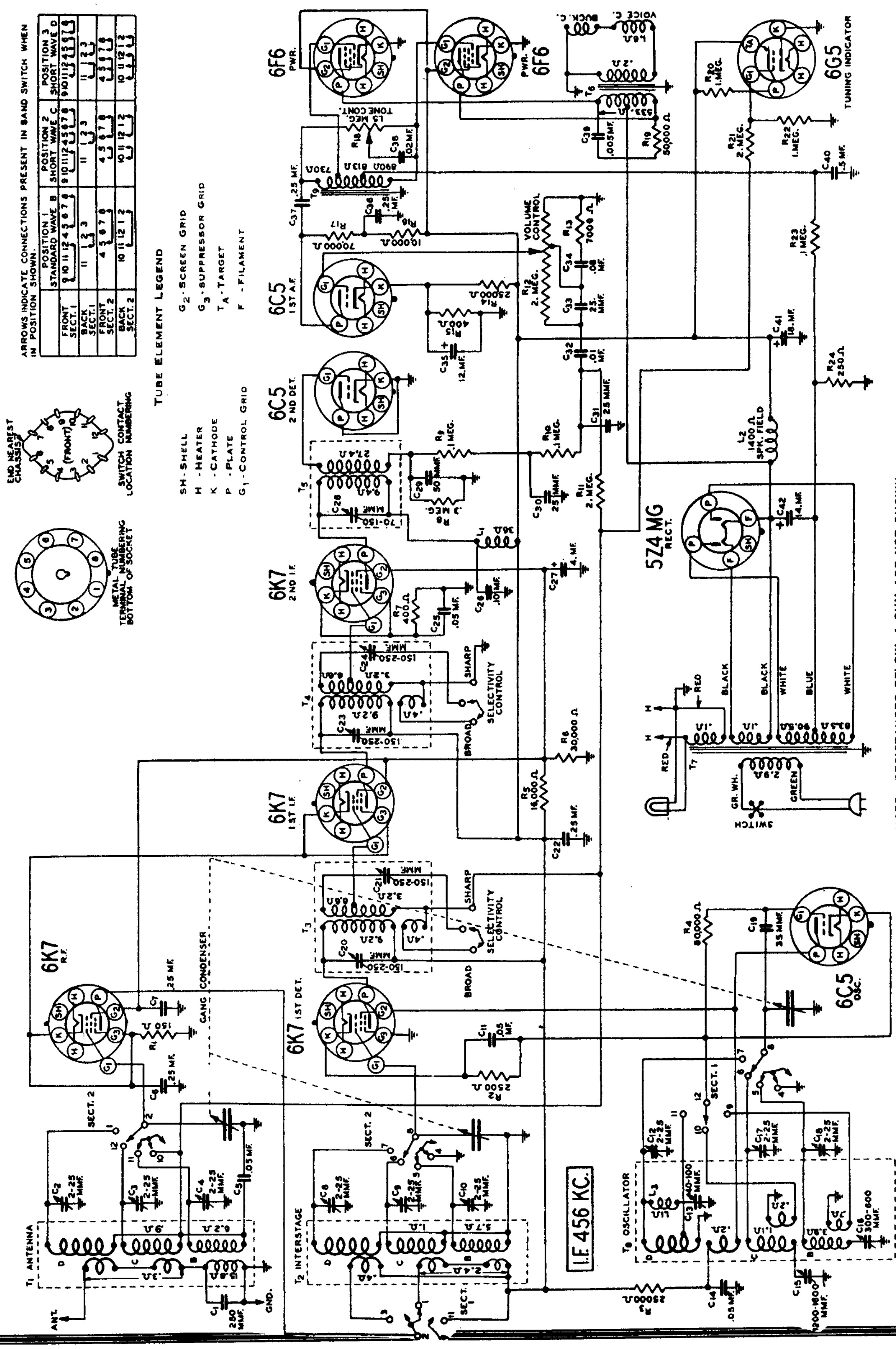


Figure 1

Part #	Description of Parts	List Price
	MAIN ASSEMBLIES	
CH 95147	Chassis assembly	
KA 9570	Cabinet	
SK 9544	Speaker	$ 4.50
	CABLES	
CB 95108	Antenna cable	.10
PR 97160	Dial drive cord - 18" .... Per Yard	.05
	TUBE SOCKETS AND TUBE SHIELDS	
CV 9560	Tube shield - plain top	.05
CV 9559	Tube shield - slotted top	.05
FP 105947	Tube shield ring	.05
SA 105461	Tube socket - 7 prong	.20
SA 104617	Tube socket - 6 prong	.20
SO 956	Tube socket - 8 prong	.20
BE 9536	Tube shield base	.05
	SCREWS	
SC 953	Mounting screw and felt foot	.05
SC 97061	Set screw - dial pulley	.05
SC 102441	Set screw - dial drive pulley	.05
SC 952	Dial indicator screw	.05

WELLS GARDNER & CO.

MODEL OEL SERIES



NOTE: RESISTANCES BELOW .1 OHM ARE NOT SHOWN.

Fig. 2—Schematic Circuit Diagram

WELLS GARDNER & CO.

MODEL 2DL SERIES

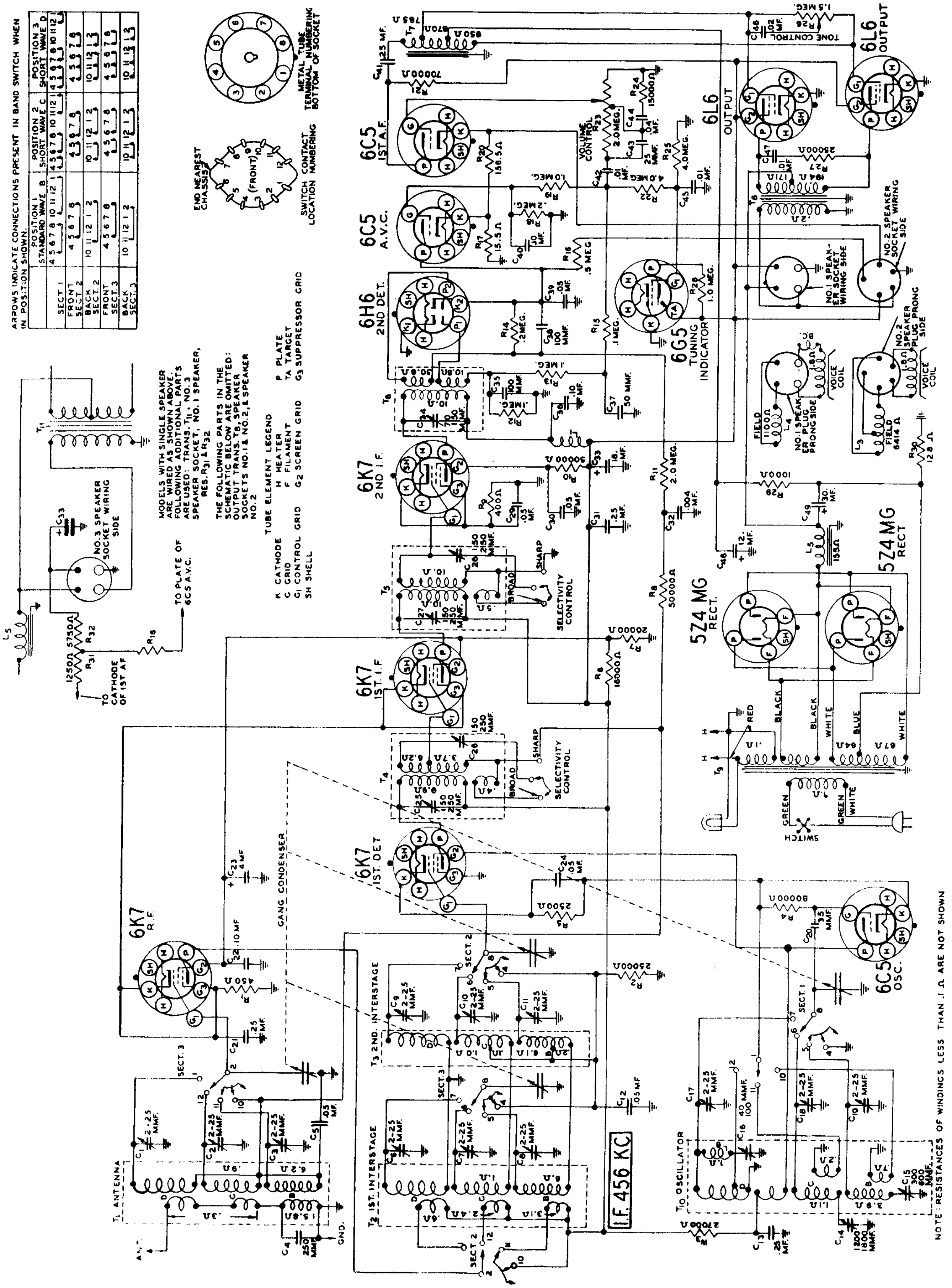


Fig. 2—Schematic Circuit Diagram

WELLS GARDNER & CO.

MODEL 2DL SERIES

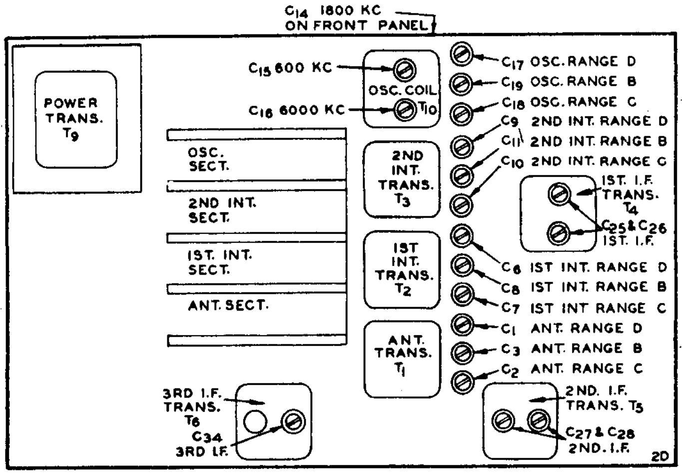


Fig. 3—Location of Trimmers

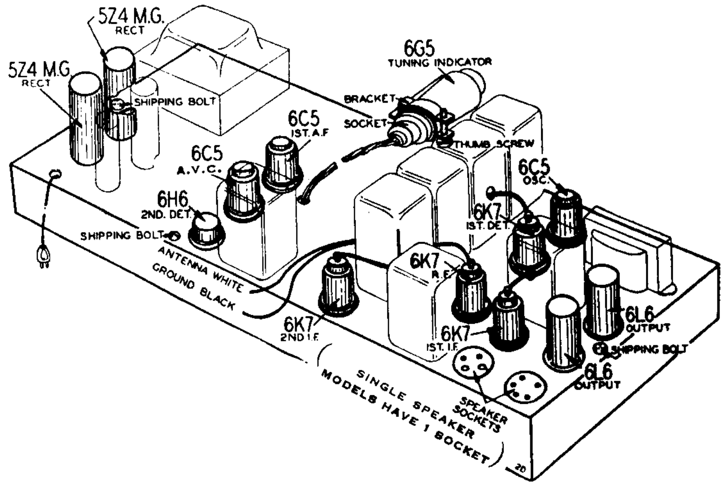
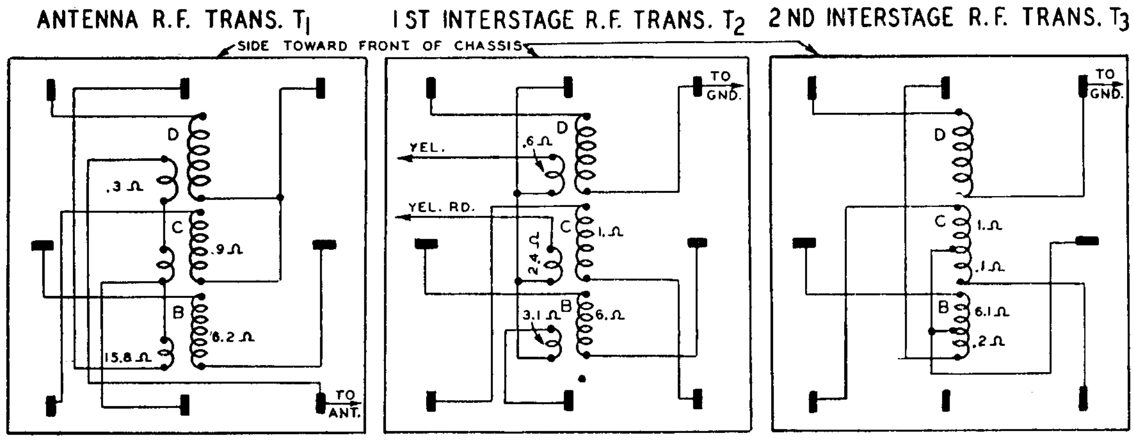
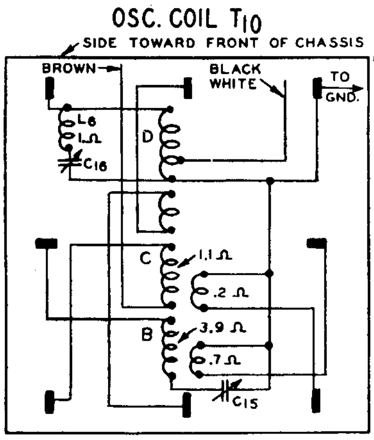


Fig. 5—Location of Tubes



NOTE: RESISTANCES OF WINDINGS LESS THAN .1 Ω ARE NOT SHOWN.

Fig. 6—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings



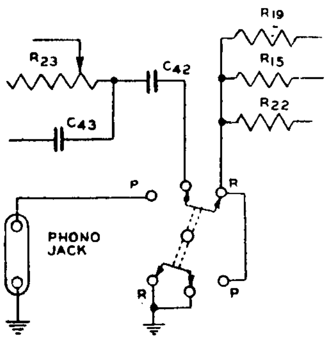


Fig. 7—Phonograph Connections

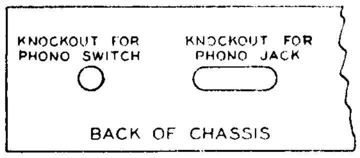


Fig. 8—Location of Phono Knockouts

WELLS GARDNER & CO.

MODEL 2DL SERIES

Alignment and Calibration

Correct alignment is extremely important in connection with all wave radios. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 1800, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C19) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

In sets using pointers, loosen the screw of the large pointer and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

In sets using the moving beam of light, there is moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until it is at the 1500 KC mark on the dial. Retighten the screw.

Adjust the 1st and 2nd interstage Range B trimmers (C8 and C11) and antenna Range B trimmer (C3) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C18) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range C trimmers (C7 and C10) and antenna Range C trimmer (C2) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 1800 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C17) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range D trimmers (C6 and C9) and antenna Range D trimmer (C1) to maximum.

When adjusting the 2nd interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Voltage Chart

The voltage readings are taken with a voltmeter having a resistance of 1000 ohms per volt.

The standard metal tube socket terminal numbering system (bottom of socket) is shown in Fig. 4. On the schematic circuit diagram, Fig. 2, is a list giv-

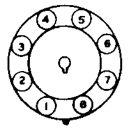


Fig. 4—Metal Tube Terminal numbering (bottom of socket)

Line Voltage: 115 — Volume Control: Maximum — Antenna Shorted to Ground — Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	R.F.	0	6.2(1)	250	110	7.5(2)		6.2(1)	7.5(2)
6K7	1st Det.	0	6.2(1)	250	110			6.2(1)	9.0
6C5	Osc.	0	6.2(1)	110				6.2(1)	
6K7	1st I.F.	0	6.2(1)	250	110	7.5		6.2(1)	7.5(2)
6K7	2nd I.F.	0	6.2(1)	250	145	5(2)		6.2(1)	5.0
6H6	2nd Det.	0	6.2(1)					6.2(1)	
6C5	A.V.C.	0	6.2(1)	5(3)				6.2(1)	0.5
6C5	1st A.F.	0	6.2(1)	130				6.2(1)	6.0
6L6	Power	0	6.2(1)	350	250	20(4)		6.2(1)	
5Z4MG	Rectifier	0	5.0(5)		1024(6)		1024(6)		5.0(5)
6G5	Tuning Indicator	Plate to Ground 25(3)		Target to Ground 250		Cathode to Ground 0		Across Heater 6.2 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Subject to variation.
(3) As read with 500,000 ohm meter.
(4) As read across R-30.
(5) A.C. voltage as read across heater terminals 2 and 8.
(6) A.C. voltage as read across terminals 4 and 6.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required as shown in the parts list. Knockouts are provided in the back of the chassis for mounting the phono jack and phono switch—See Fig. 8.

The phono switch should be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. This is done by removing the wire connecting condenser C42 to resistors R15, R19 and R22, at the terminal strip located near the back of the planetary drive. Cut this wire to correct length and solder it to the proper terminal on the phono switch—See Fig. 7, keeping the wire close to the back of the chassis base.

A wire is then connected from the lug on the above mentioned terminal strip to which C42 was connected, to the correct terminal on the phono switch—See Fig. 7. This wire should be brought directly to the back of the chassis at a point close to the phono jack pin tip nearest the channel provided for a chassis mounting bolt, and then routed over to the switch.

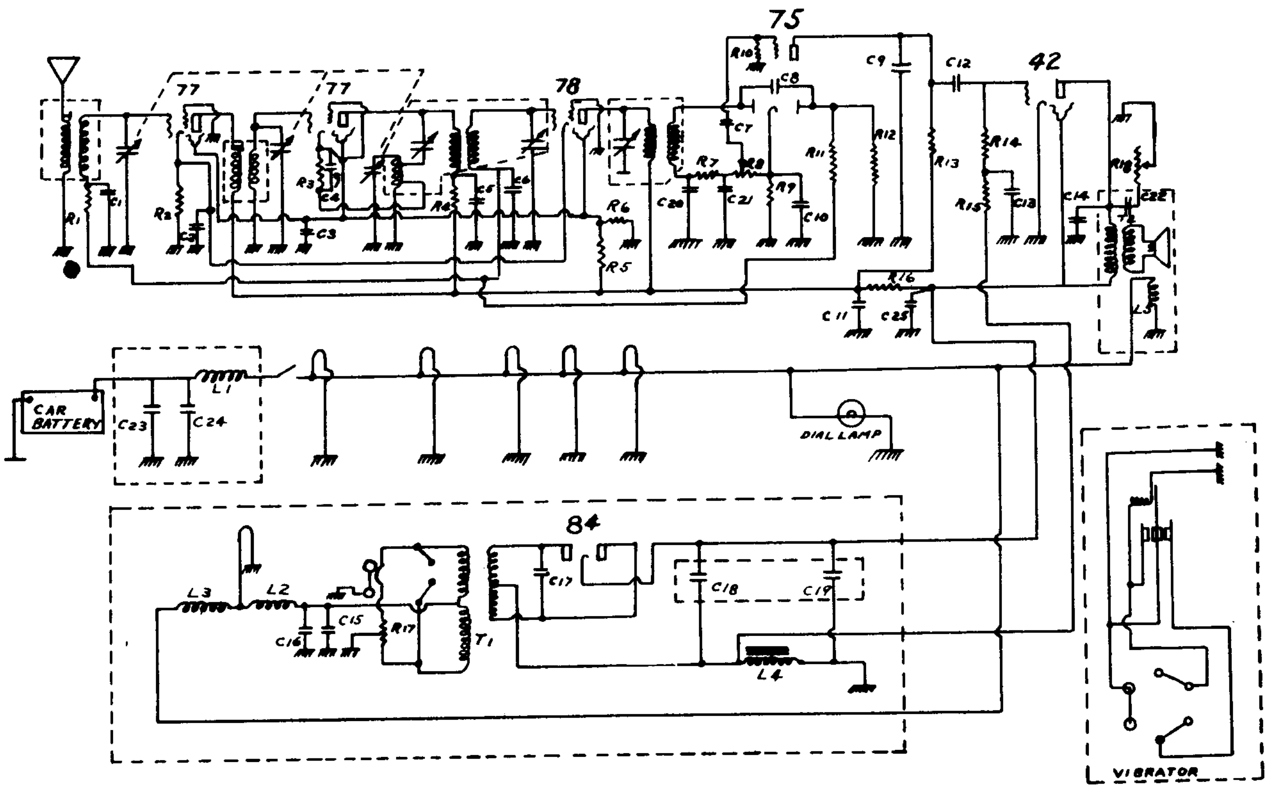
Complete the other connections as illustrated in Fig. 7.

It will be necessary to re-route the AC line cord away from the 6C5 1st audio grid lead by running it between the volume control and the filter choke and then straight back to the hole provided for it in the chassis base.

If a hum is heard when the phono pickup is touched, reverse the two pickup leads.

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODEL WR-26



I.F. 175 K.C.

ELECTRICAL VALUES

C1 .05 mfd. 2 ply
C2 .25 mfd. 2 ply
C3 .25 mfd 2 ply
C4 .002 mfd. 4 ply
C5 .05 mfd. 3 ply
C6 .05 mfd. 2 ply
C7 .005 mfd. 3 ply
C8 100 mmfd. mica
C9 .002 mfd. 4 ply
C10 .5 mfd. 2 ply
C12 .005 mfd. 3 ply
C13 .1 mfd. 2 ply

C14 .005 mfd. 3 ply
C15 .5 mfd. 2 ply
C16 .5 mfd. 2 ply
C17 .02 mfd. 4 ply
C18 6. mfd.
C19 10. mfd.
C20 10 mmfd. mica
C21 100mmfd. mica
C22 .05 mfd. 3 ply
C23 .001 mica
C24 .5 mfd. 2 ply
C25 .001 mica

R1 100,000 ohms 1/4 W.
R2 500 ohms 1/4 W.
R3 7500 ohms 1/4 W.
R4 2000 ohms 1/4 W.
R5 40,000 ohms 1/4 W.
R6 75,000 ohms 1/4 W.
R7 50,000 ohms 1/4 W.
R8 1/2 meg. Vol. Control
R9 5000 ohms 1/4 W.
R10 1 meg. 1/4 W.
R12 1/2 meg. 1/4 W.
R13 100,000 ohms 1/4 W.

R14 250,000 ohms 1/4 W.
R15 250,000 ohms 1/4 W.
R16 4,000 ohms 1 W.
R17 200 Center tapped
R18 1/2 meg. Tone Control
T1 Power Trans.
T2 Output Trans.
L1 Filter Choke
L2 Filter Choke
L3 Filter Choke
L4 Power Choke
L5 Field Coil

MODEL WR-26 SOCKET VOLTAGES
(Car Battery 6 Volts Under Load)

Tube	Use	Fil.	Plate	Screen	Cathode	Bias
77	RF	5.3	179	79	2.9	
77	Det. Osc.	5.3	178	79	4.3 to 8.4	
78	IF	5.3	179	79	2.9	
75	2nd Det. AVC	5.3	113			
42	AF	5.3	201	217	1.2	13.0

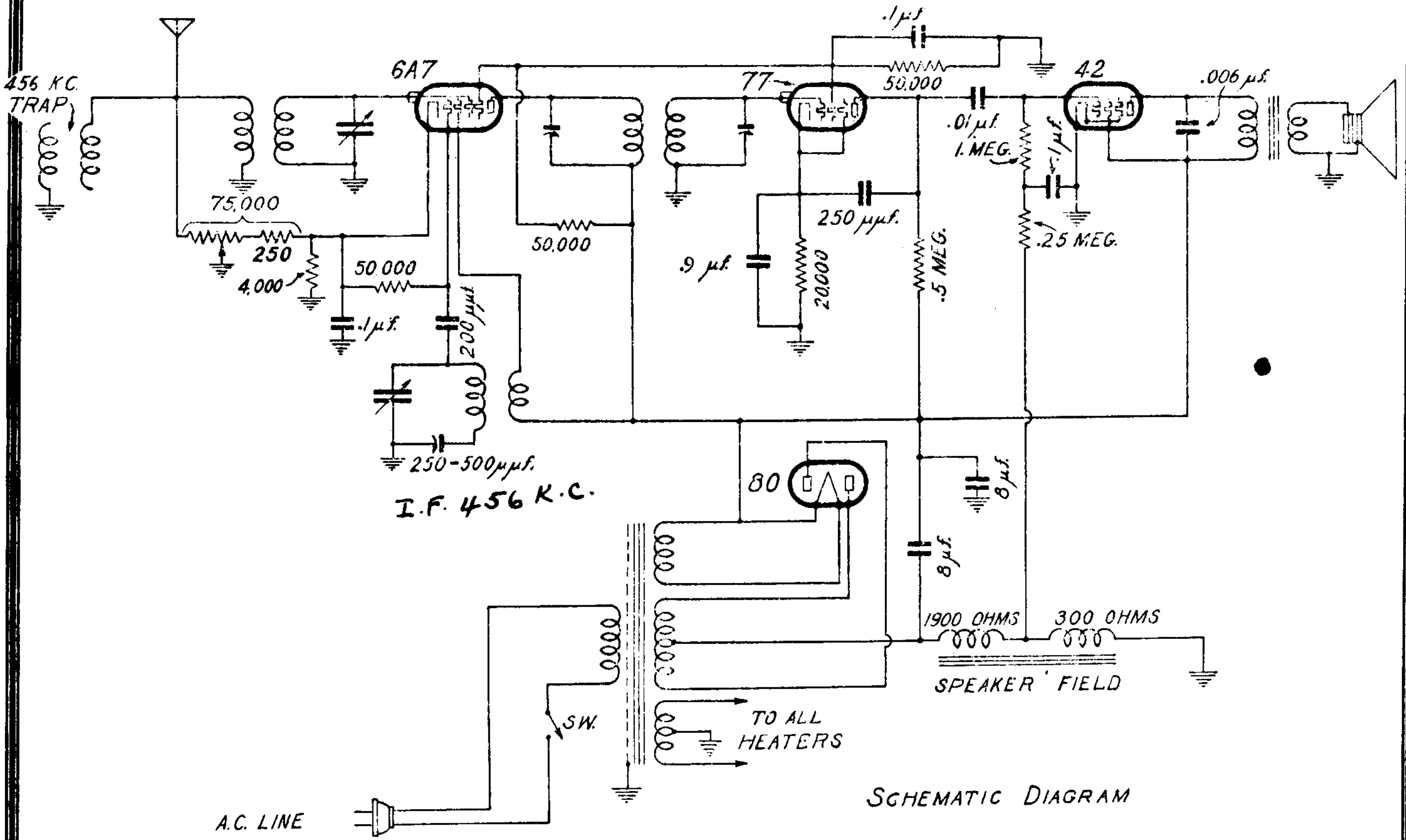
The above readings were taken from ground or metal of chassis to socket terminals and will vary slightly with different types of voltmeters used.

TUBES

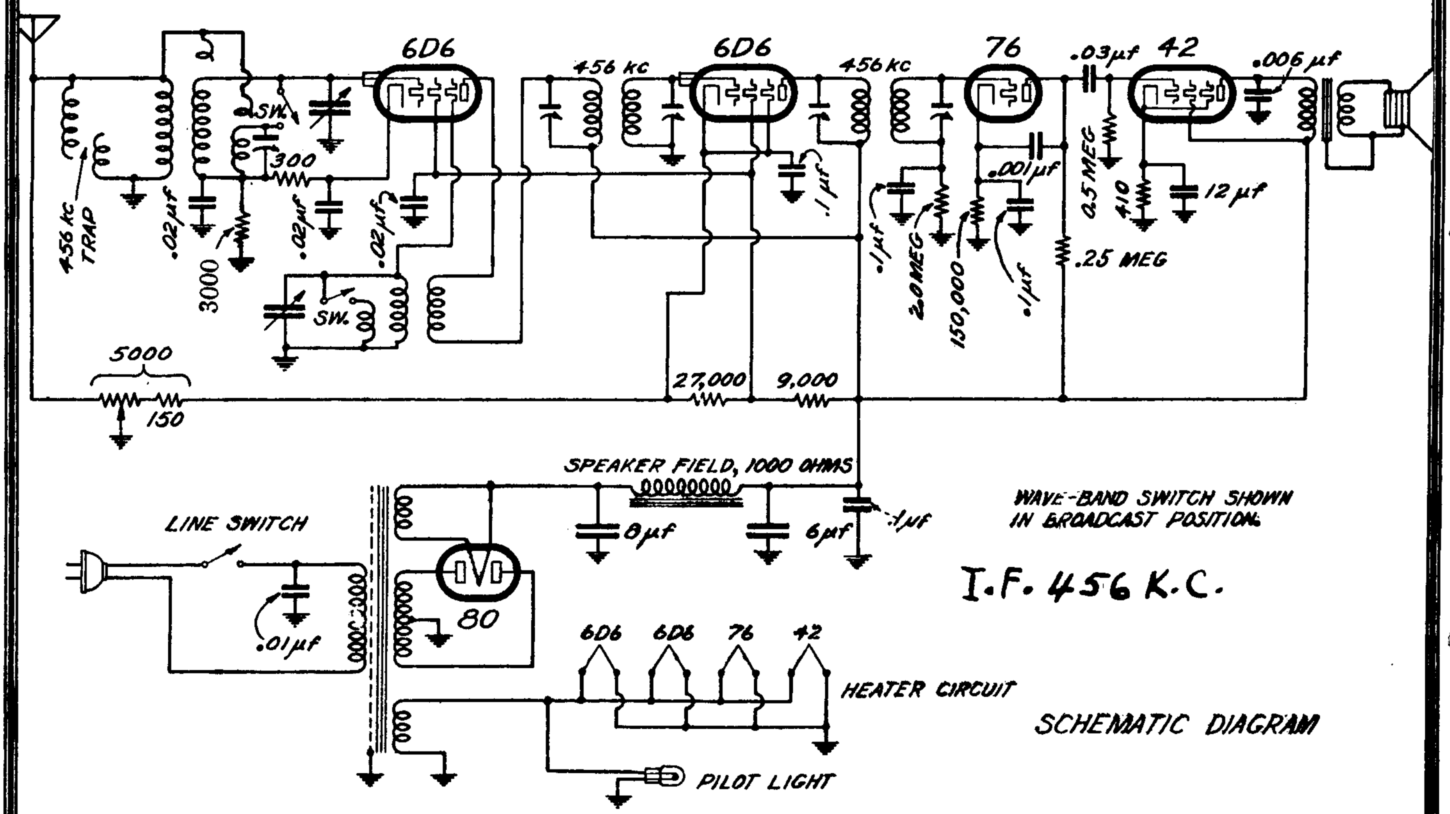
75 2nd Det. AVC & AF Amplifier
77 Detector & Osc. - RF Amplifier
42 Power output
78 I.F. Amplifier
84 Rectifier

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODEL WR27

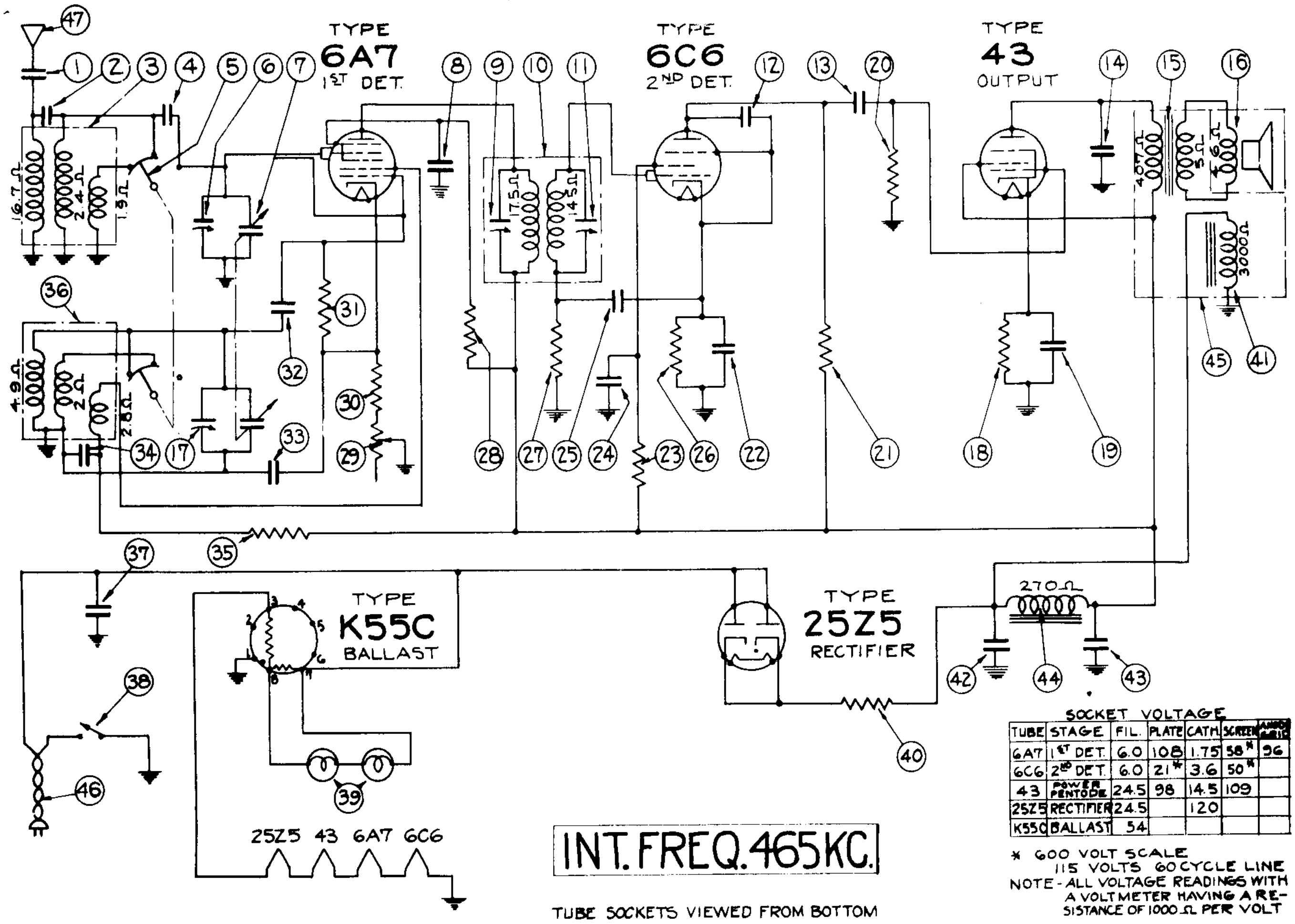


MODEL WR201



WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODEL WR102



TUBE SOCKETS VIEWED FROM BOTTOM

SOCKET VOLTAGE

TUBE	STAGE	FIL.	PLATE	CATH.	SCREEN	ANODE GRID
6A7	1ST DET.	6.0	108	1.75	58*	96
6C6	2ND DET.	6.0	21*	3.6	50*	
43	POWER PENTODE	24.5	98	14.5	109	
25Z5	RECTIFIER	24.5		120		
K55C	BALLAST	54				

* 600 VOLT SCALE
115 VOLTS 60 CYCLE LINE
NOTE - ALL VOLTAGE READINGS WITH A VOLTMETER HAVING A RESISTANCE OF 1000 Ω PER VOLT

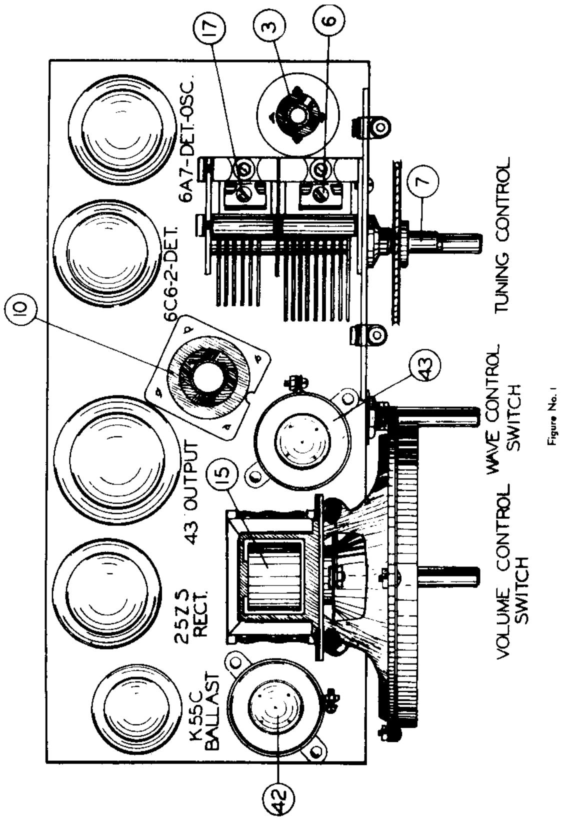


Figure No. 1

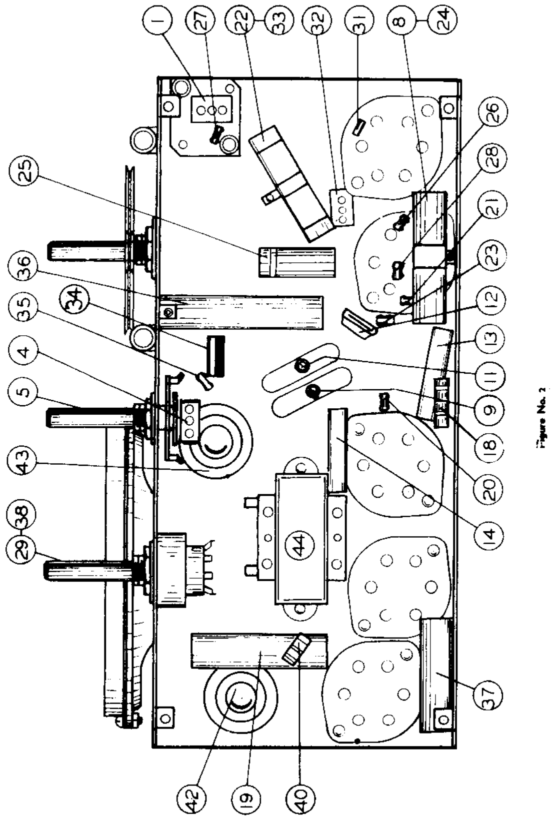


Figure No. 2

WESTINGHOUSE ELECTRIC SUPPLY COMPANY
MODEL WR102

GENERAL DESCRIPTION

This model is a four-tube (plus a ballast tube), two-band superheterodyne receiver, designed to operate over the standard broadcast band extending from 535 to 1525 K.C., and a short-wave band extending from 1500 to 3000 K.C.

The receiver uses a type 6A7 tube as a first detector-oscillator, a type 6C6 as a second detector, a type 43 as a power output tube, a type 25Z5 as a rectifier and a type K55C as a ballast tube.

LINE-UP CAPACITOR ADJUSTMENTS

To properly align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied and reduced sufficiently to prevent overload as the individual circuits of the receiver are brought into alignment. A conventional output meter should be connected across the terminals of the speaker voice coil to indicate when the individual circuits are correctly aligned. The sensitivity of this meter must be sufficient to give satisfactory readings with low input signals.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, location of the various tubes and alignment condensers. Top and bottom views of the chassis are shown in Figures #1 and #2 and should be carefully studied before actual work is started.

ALIGNMENT OF I.F. (465 K.C.)

1. Set the volume control to maximum position and wave change switch to standard broadcast band.
2. Connect the output meter across the voice coil terminals of the speaker.
3. Set the test oscillator tc 465 K.C. and adjust its output to produce a measureable reading on the output meter when the test signal is applied to the grid of the type 6A7 first detector-oscillator tube through a 0.5 mfd. blocking condenser.
4. Adjust trimmers #9 and #11 to maximum output.

ALIGNMENT OF OSCILLATOR AND R. F.

1. Check the pointer setting to be sure that is is exactly horizontal when the tuning condenser is completely closed.
2. Set the test oscillator and dial indicator to 1400 K.C. and adjust the oscillator trimmer condenser #17 to maximum output.
3. Apply the test signal to the antenna of the receiver through a .0001 mfd. blocking condenser and adjust trimmer condenser #6 to maximum output.
4. Check sensitivity over the band.
5. Turn wave change switch to the shortwave band and check the sensitivity over scale.

SERVICE PARTS LIST

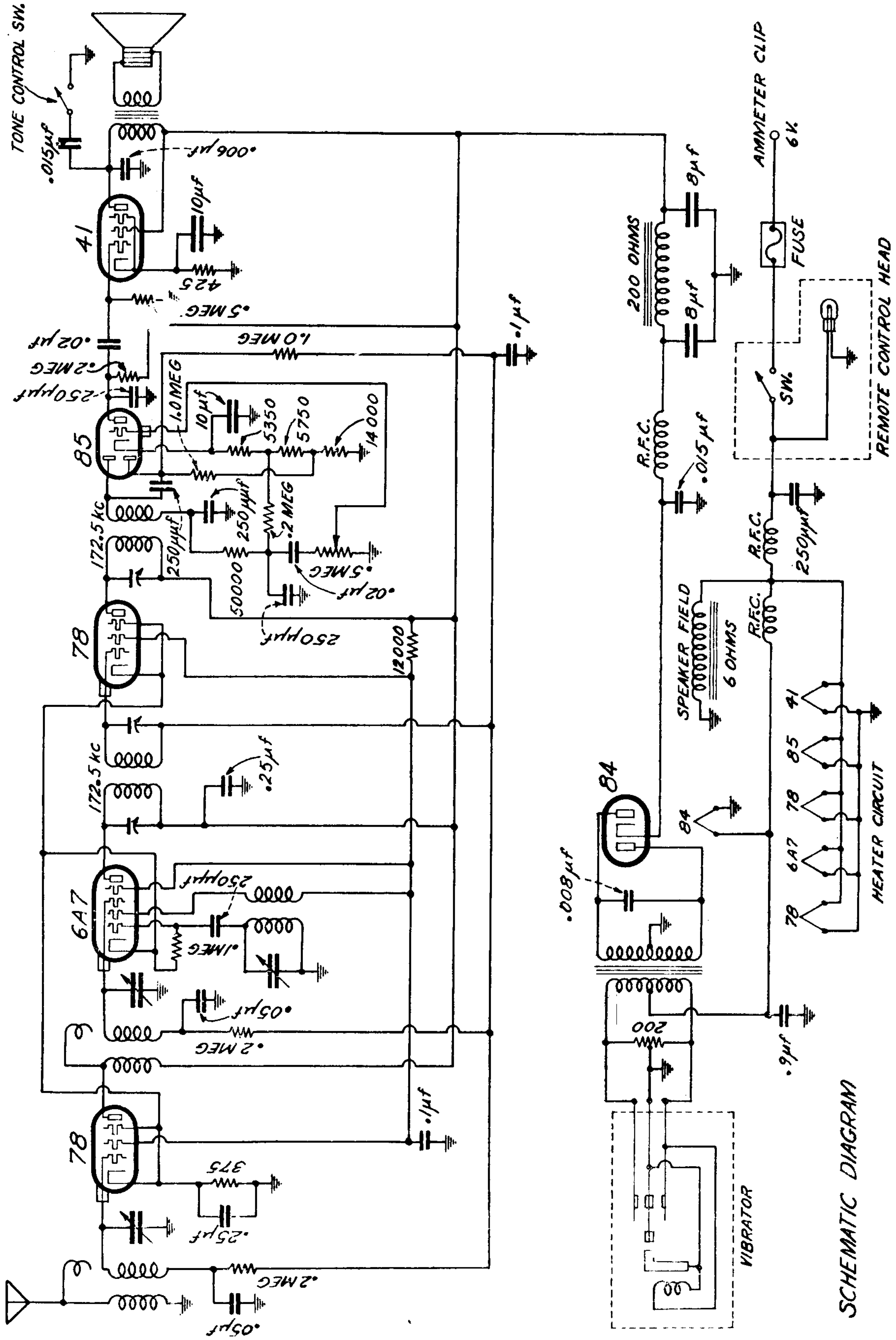
Dia. #	Part #	Description of Parts	List Price
1	CM 9519	.0005 mfd., mica condenser	$ .20
2	CS 9546	5 mmf., mica condenser	.20
3	RC 9519'	Antenna coil assembly	1.50
4	CM 9522	.00048 mfd., mica condenser	.20
5	SW 9545	Wave change switch	.45
6		Trimmer condenser - part of CG 9547	
7	CG 9547	Tuning condenser (2 gang)	2.50
8		.05 mfd., 200 V. condenser - part of SA 105327	
9		Trimmer condenser - part of IC 9566	
10	IC 9566	I.F. coil (465 KC.)	1.50
11		Trimmer condenser - part of IC 9566	
12	CM 9519	.0005 mfd., mica condenser	.20
13	CW 4-01	.01 mfd., 400 V. condenser	.15
14	CW 4-01	.01 mfd., 400 V. condenser	.15
15	TR 9560	Output transformer	1.25
16	DA 9512	Diaphragm and voice coil assembly	1.50
17		Trimmer condenser - part of CG 9547	
18	RE 9567	600 ohm, 1/2 W. resistor	.15
19	CE 9515	12 mfd., 25 V. electrolytic condenser	.65
20	RE 9545	1/2 meg., 1/8 W. resistor	.10
21	RE 9545	1/2 meg., 1/8 W. resistor	.10
22		.05 mfd., 200 V. condenser - part of SA 105327	
23	RE 9545	1/2 meg., 1/8 W. resistor	.10
24		.05 mfd., 200 V. condenser - part of SA 105327	
25	CW 2-10	.1 mfd., 200 V. condenser	.15
26	RE 9568	25,000 ohm, 1/8 W. resistor	.10
27	RE 9530	1 meg., 1/8 W. resistor	.10
28	RE 9569	30,000 ohm, 1/8 W. resistor	.10
29	VR 9531	Volume control (10,000 ohms)	.90
30		300 ohm resistor - part of VR 9531	
31	RE 9524	50,000 ohm, 1/8 W. resistor	.10
32	CM 9513	.0001 mfd., mica condenser	.10
33		.05 mfd., 200 V. condenser - part of SA 105327	
34	CW 4-005	.005 mfd., 400 V. condenser	.15
35	RE 9527	5,000 ohm, 1/8 W. resistor	.10
36	RC 95166	Oscillator coil assembly	.70
37	CW 2-10	.1 mfd., 200 V. condenser	.15
38		Switch (On-Off) - part of VR 9531	
39	LP 9516	Dial lamp - 6.3 V. (.15 amp.)	.20
40	RE 9566	25 ohm, 1/2 W. resistor	.15
41		Speaker field coil - part of SK 9531	
42	CE 9533	12 mfd., 150 V. electrolytic condenser	.70
43	CE 9534	16 mfd., 150 V. electrolytic condenser	.70
44	SA 105311	Choke coil assembly	.95
45	SK 9531	Speaker	3.75
46	CB 9512	Line cable and plug	.50
47	KL 105344	Antenna cable	.20

MISCELLANEOUS

DS 9550	Dial scale	.55
KN 9575	Knobs	.20
SI 9565	Dial indicator (pointer)	.10
FP 101869	Felt feet	.05
SC 952	Screw for dial indicator	.05
CV 95189	Cover - front of speaker	.20
PU 9517	Large pulley on tuning condenser	.25
SH 9539	Dial drive shaft	.10
PU 9516	Small dial drive pulley	.10
BK 95193	Dial lamp bracket	.05
SO 9518	Dial lamp socket	.10
FP 105427	Dial lamp contact spring	.05
SP 9539	Spring on dial drive cord	.05
BK 95182	Electrolytic condenser mounting bracket	.05
BG 9523	Dial drive shaft bearing	.05
PR 97160	Dial drive cord (per yard)	.05
CB 95113	Line cable for 220 V. operation	2.00

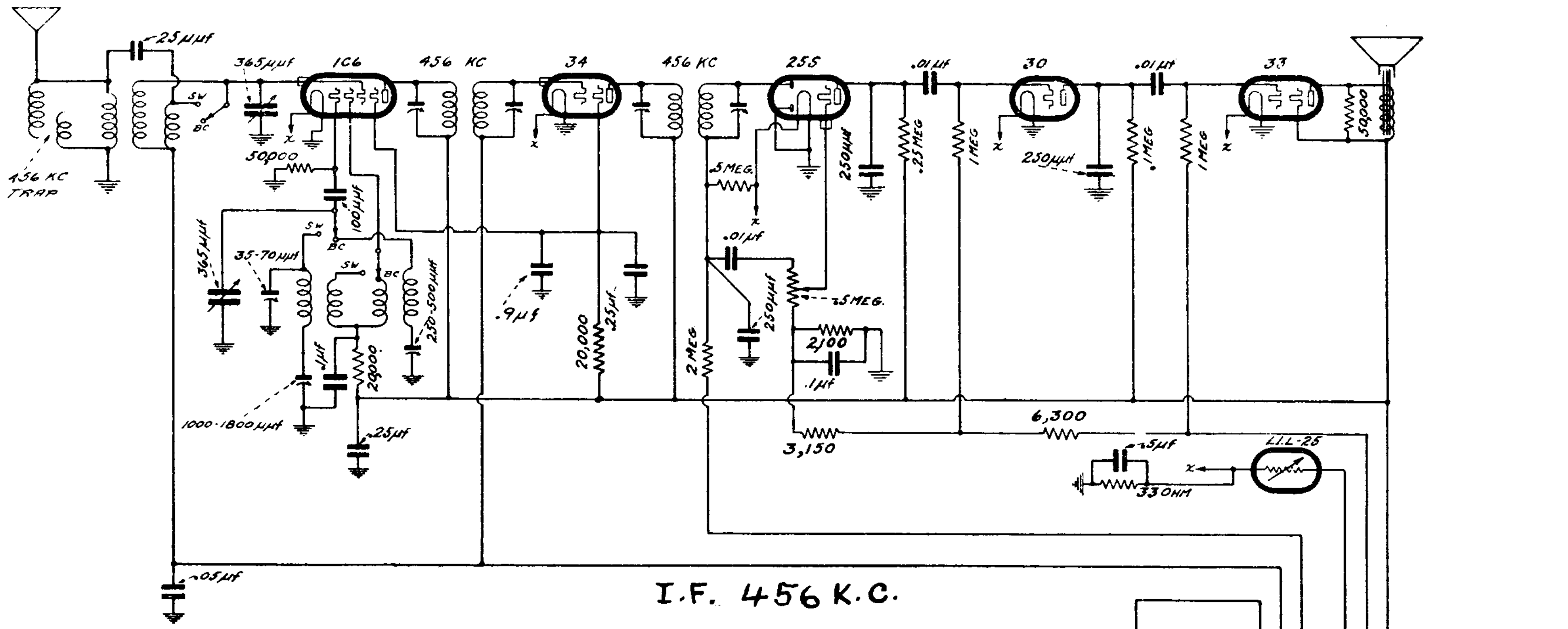
WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODEL WR501 AUTO SET

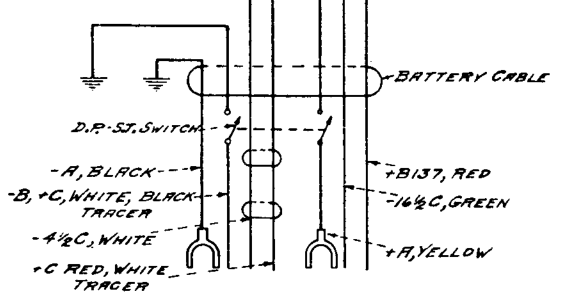


WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODEL WR601 BATTERY SET



I.F. 456 K.C.



The following batteries are recommended:

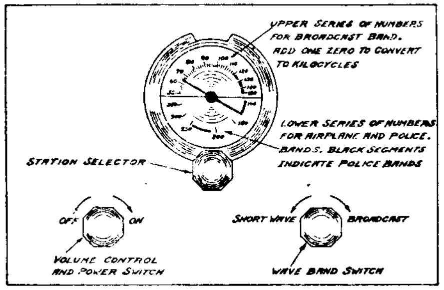
"A" battery (filament supply)—one 3 volt dry cell pack.

"B" battery (high voltage)—three 45 volt "B" batteries connected in series to give 135 volts.

"C" battery (bias)—one 4½ volt "C" battery.
one 22½ volt "C" battery.

The receiver, as shipped, requires an "A" battery supply of 3 volts (dry cell pack). It may be quickly and easily adapted, however, to a different type of "A" battery supply, such as 6 volt storage battery, or 2½ volt air cell, or 2 volt storage battery. Simply remove the ballast tube (marked LLL-25) and insert, in the same tube socket, the proper resistance-conversion plug, which may be obtained from dealers or by writing directly to the manufacturer. Below is a table showing the correct conversion plug required for the desired "A" battery supply.

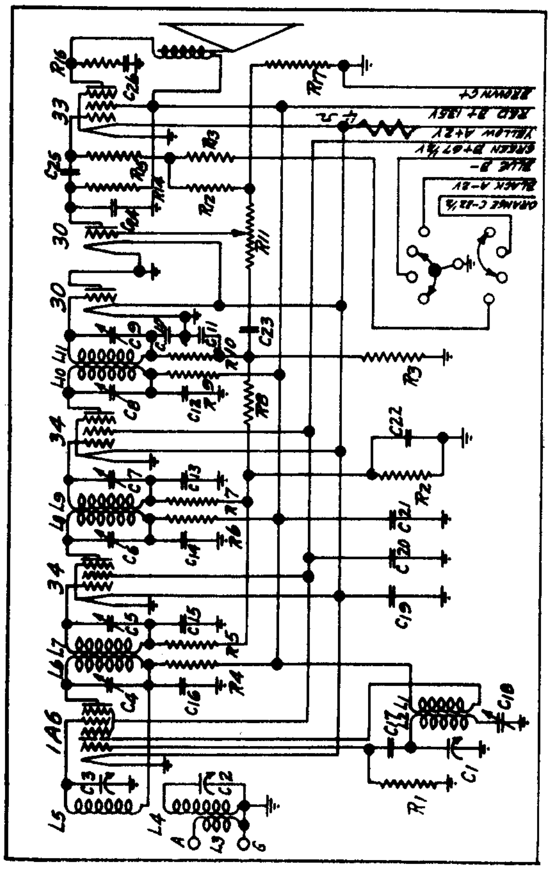
"A" BATTERY SUPPLY	CONVERSION PLUG
6 volt storage battery	No. VVZ-215
2½ volt air cell	No. VVZ-216A
2 volt storage battery	No. VVZ-214
3 volt dry cell pack	Ballast tube No. LLL-25 (Shipped with receiver as standard equipment)



1—1C6 Pentagrid converter and 1st detector.
1—34 Pentode i-f amplifier.
1—25S Duplex diode-triode 2nd detector and a.v.c.
1—30 Audio amplifier.
1—33 Pentode output.
1—LLL-25 Ballast tube for 3-volt operation.

WILCOX-GAY CORP.

MODEL 5A6

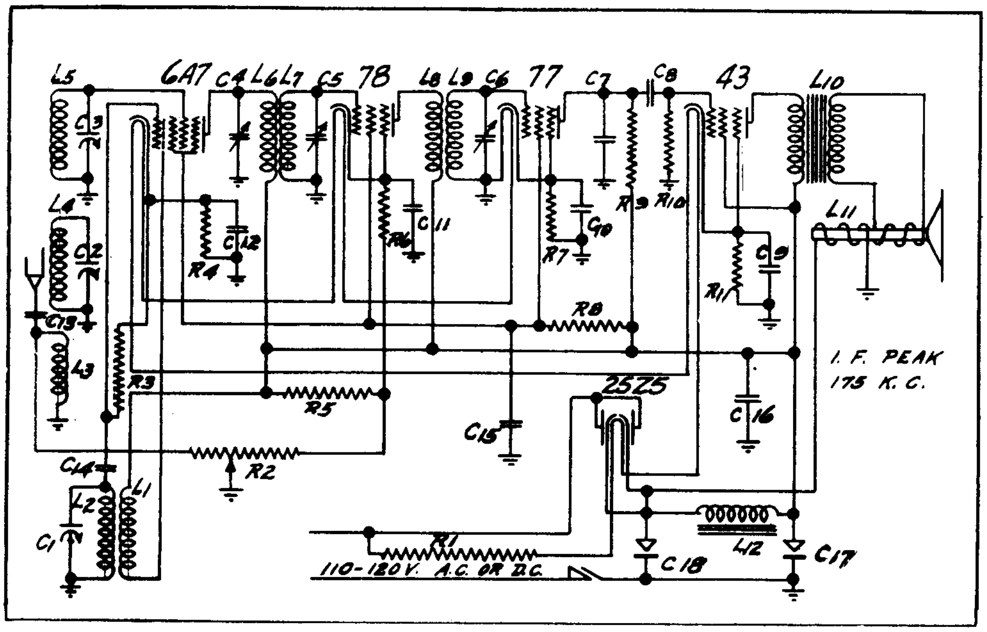


CODE	PART NO.	RESISTORS
R1	53-926	1 Megohm Oscillator Grid
R2	53-926	1 Megohm A.V.C. Network
R3	53-925	500,000 Ohm A.V.C. Network
R4	53-919	5,000 Ohm First Detector Plate Isolation
R5	53-923	100,000 Ohm First I.F. Grid Isolation
R6	53-919	5,000 Ohm First I.F. Plate Isolation
R7	53-923	100,000 Ohm Second I.F. Grid Isolation
R8	53-926	1 Meg Ohm A.V.C. Network
R9	53-919	5,000 Ohm Second I.F. Plate Isolation
R10	53-896	50,000 Ohm Diode Filter
R11	19-1317	250,000 Ohm Volume Control
R12	~~53-926~~	~~1 Meg~~ Ohm C Bias Network 10,000
R13	~~53-924~~	~~250,000~~ Ohm C Bias Network 2,500
R14	53-923	100,000 Ohm First Audio Plate
R15	53-925	500,000 Ohm Output Grid
R16	53-920	10,000 Ohm Tone Series Resistor
R17	~~53-925~~	~~100,000~~ 1,000 Ohm C Bias Network Resistor

CODE	PART NO.	CONDENSERS
C1	77-1581	16-366 Oscillator Section of 3 Gang
C2	77-1581	16-366 First Preselector Section of 3 Gang
C3	77-1581	16-366 Second Preselector Section of 3 Gang
C4	78-1561	70-120 MMFD. First I.F. Primary Trimmer
C5	78-1561	70-120 MMFD. First I.F. Secondary Trimmer
C6	78-1561	70-120 MMFD. Second I.F. Primary Trimmer
C7	78-1561	70-120 MMFD. Second I.F. Secondary Trimmer
C8	78-1561	70-120 MMFD. Third I.F. Primary Trimmer
C9	78-1561	70-120 MMFD. Third I.F. Secondary Trimmer
C10	76-339	.0001 Mfd. Mica Diode Filter
C11	76-339	.0001 Mfd. Mica Diode Filter
C12	75-259A	.01 Mfd. 400 Volt Second I.F. Plate Isolation Cond.
C13	75-269A	.01 Mfd. 400 Volt Second I.F. Grid Isolation Cond.
C14	75-269A	.01 Mfd. 400 Volt First I.F. Plate Isolation Cond.
C15	75-269A	.01 Mfd. 400 Volt First I.F. Grid Isolation Cond.
C16	75-269A	.01 Mfd. 400 Volt First Detector Plate Isolation Cond.
C17	76-264	.00005 Mfd. Mica Oscillator Coupling Cond.
C18	78-1569	450 MMFD. Oscillator Reciprocal Trimmer
C19	75-267A	.5 Mfd. 200 Volt Filament By-Pass Condenser
C20	75-267A	.5 Mfd. 200 Volt Screen By-Pass Condenser
C21	75-266	1. Mfd. 400 Volt B. Supply By-Pass Condenser
C22	75-272A	.1 Mfd. 200 Volt A.V.C. Network By-Pass Condenser
C23	75-269A	.01 Mfd. 400 Volt Audio Feed Condenser
C24	76-265	.001 Mfd. Mica First Audio Plate Filter Cond.
C25	75-269A	.01 Mfd. 400 Volt Audio Feed Condenser
C26	75-1132	.002 Mfd. 600 Volt Tone Condenser

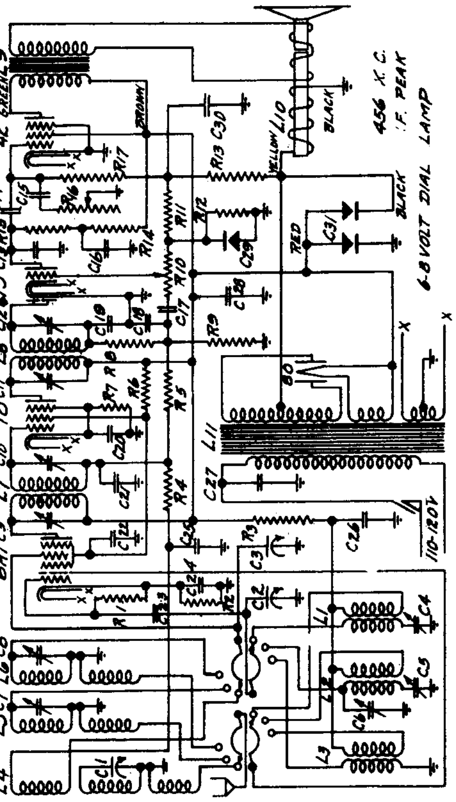
CODE	PART NO.	INDUCTANCES
L1	17-1645	Oscillator Primary
L2	17-1645	Oscillator Secondary
L3	17-2003	Preselector Primary
L4	17-2003	Preselector Frist Secondary
L5	17-2003	Preselector Second Secondary
L6	17-1633	First I.F. Primary
L7	17-1633	First I.F. Secondary
L8	17-1633	Second I.F. Primary
L9	17-1633	Second I.F. Secondary
L10	17-1633	Third I.F. Primary
L11	17-1633	Third I.F. Secondary

MODEL 3JF5



WILCOX-GAY CORP.

MODELS 5B5 & 5BC5



CODE	PART NO.	RESISTORS
R1	53-941	20,000 Ohm Oscillator Grid Resistor
R2	53-1062	250 Ohm Oscillator Cathode Resistor
R3	53-277	10,000 Ohm Oscillator Plate Resistor
R4	53-923	100,000 Ohm A.V.C. Network Resistor
R5	53-926	1 Meg Ohm A.V.C. Network Resistor
Ro	53-1042	20,000 Ohm R.F. & I.F. Screen Resistor
R7	53-1063	500 Ohm I.F. Cathode Resistor
R8	53-898	50,000 Ohm Diode Filter Resistor
R9	53-925	500,000 Ohm Diode Load Resistor
R10	19-1291	500,000 Ohm Volume Control & Switch
R11	53-923	100,000 Ohm C Bias Network Resistor
R12	53-919	5,000 Ohm C Bias Network Resistor
R13	53-926	1 Meg Ohm C Bias Network Resistor
R14	53-923	100,000 Ohm 75 Plate Hum Resistor
R15	53-924	250,000 Ohm 75 Plate Resistor
R16	19-1317	250,000 Ohm Tone Control
R17	53-925	500,000 Ohm 42 Grid Resistor

CONDENSERS

CODE	PART NO.	CONDENSERS
C1	77-1581	16-366 MMFD. Third Section of 3 Gang Condenser
C2	77-1581	16-366 MMFD. First Section of 3 Gang Condenser
C3	77-1581	16-366 MMFD. Second Section of 3 Gang Condenser
C4	78-1572	600 MMFD. Broadcast Oscillator Series Trimmer
C5	78-1572	1600 MMFD. Police Band Oscillator Series Trimmer
C6	78-1588	3-30 MMFD. Police Band Oscillator Parallel Trimmer
C7	78-1588	3-30 MMFD. Police Band Preselector Trimmer
C8	78-1588	3-30 MMFD. Foreign Band Preselector Trimmer
C9	78-2005	80 MMFD. First I.F. Primary Trimmer
C10	78-2005	80 MMFD. First I.F. Secondary Trimmer
C11	78-2005	80 MMFD. Second I.F. Primary Trimmer
C12	78-2005	80 MMFD. Second I.F. Secondary Trimmer
C13	76-265	.001 Mfd. Mica 75 Plate R.F. By-pass condenser
C14	75-2003	.01 Mfd. 400 Volt Audio Feed Condenser
C15	75-2003	.01 Mfd. 400 Volt Tone Control Condenser
C16	75-2007	.1 Mfd. 400 Volt 75 Plate Hum Condenser
C17	75-2003	.01 Mfd. 400 Volt Audio Feed Condenser
C18	76-2001	.0001 Mfd. Mica Diode Filter Condenser
C19	76-2001	.0001 Mfd. Mica Diode Filter Condenser
C20	75-2005	.1 Mfd. 200 Volt I.F. Cathode By-pass Condenser
C21	75-2005	.1 Mfd. 200 Volt A.V.C. Network By-pass Condenser
C22	75-2005	.1 Mfd. 200 Volt Screen By-pass Condenser
C23	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C24	75-2005	.1 Mfd. 200 Volt 6A7 Cathode By-Pass Condenser
C25	75-2005	.1 Mfd. 200 Volt A.V.C. Network By-Pass Condenser
C26	75-2003	.01 Mfd. 400 Volt Oscillator Plate By-Pass Condenser
C27	75-2003	.01 Mfd. 400 Volt Line By-Pass Condenser
C28	75-2013	1. Mfd. 400 Volt B Supply By-Pass Condenser
C29	18-928	25 Mfd. 25 Volt C. Bias Network By-Pass Condenser
C30	75-2008	.2 Mfd. 200 Volt C Bias NetworkBy-Pass Condenser
C31	18-2002	4-4 Mfd. 450 Volt Dry Electrolytic Condenser

INDUCTANCES

CODE	PART NO.	INDUCTANCES
L1	17-1646	Broadcast Oscillator Coil Assembly
L2	17-1667	Police Band Oscillator Coil Assembly
L3	17-2018	Foreign Band Oscillator Coil Assembly
L4	17-2052	Broadcast Preselector Coil Assembly
L5	17-1668	Police Band Preselector Coil Assembly
L6	17-2017	Foreign Band Preselector Coil Assembly
L7	17-2016	First I.F. Trans. Coil Windings
L8	17-2016	Second I.F. Trans. Coil Windings
L9	64-2003	8" Speaker 42 Tube Output Transformer
L10	64-2003	8" Speaker 2500 Ohm Field
L11	80-1068	Power Transformer (Unless Special)

MODEL 6D6 PARTS LIST

CODE	PART NO.	RESISTORS
R1	53-898	50,000 Ohm Oscillator Grid Resistor
R2	53-1062	250 Ohm Oscillator Cathode Resistor
R3	53-1042	25,000 Ohm 6A7 & 78 Screen Resistor
R4	53-1063	500 Ohm 78 Cathode Resistor
R5	53-926	1 Meg Ohm AVC Network Resistor
R6	19-1291	500,000 Ohm Volume Control & Switch
R7	53-925	500,000 Ohm Diode Resistor
R8	53-924	250,000 Ohm 75 Plate Resistor
R9	53-925	500,000 Ohm 43 Grid Resistor
R10	53-1062	500 Ohm 43 Cathode Resistor
R11	53-1122	40 Ohm 75 Cathode Resistor

CONDENSERS

CODE	PART NO.	CONDENSERS
C1	77-833	366 MMFD. Preselector Section of 3 Gang
C2	77-833	366 MMFD. Preselector Section of 3 Gang
C3	77-833	328 MMFD. Oscillator Section of 3 Gang
C4	78-2010	3-30 MMFD. Foreign Band Preselector Trimmer
C5	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C6	75-2006	.1 Mfd. 200 Volt Paper 6A7 Cathode By-Pass
C7	78-2008	First I.F. Primary Trimmer Condenser
C8	78-2011	First I.F. Secondary Trimmer Condenser
C9	75-2005	.1 Mfd. 200 Volt Paper 78 Cathode By-Pass
C10	78-2009	Second I.F. Trimmer Condenser
C11	76-265	.001 Mfd. Mica 75 Plate Filter Condenser
C12	75-2003	.01 Mfd. 400 Volt Paper Audio Feed Condenser
C13	75-2002	.004 Mfd. 600 Volt Paper 43 Plate Filter Cond
C14	18-928	25 Mfd. 25 Volt Dry Electrolytic Condenser
C15	75-2003	.01 Mfd. 400 Volt Paper Audio Feed Condenser
C16	75-2011	.5 Mfd. 200 Volt Paper B Supply By-Pass Cond.
C17	76-307	.0005 Mfd. Mica Diode Filter Condenser
C18	75-2006	.1 Mfd. 200 Volt Paper Line By-Pass Condenser
C19	75-2006	.1 Mfd. 200 Volt Paper A.V.C. Network By-Pass,
C20	75-2006	.1 Mfd. 200 Volt Paper 6A7 & 78 Screen By-Pass
C21	75-2003	.01 Mfd. 400 Volt Paper Antenna Series Cond
C22	18-2003	11 Mfd. 150 W.V. Dry Electrolytic Condenser
C23	18-2003	4 Mfd. 150 W.V. Dry Electrolytic Condenser
C24	18-2003	4 Mfd. 150 W.V. Dry Electrolytic Condenser

MODEL 3JF5 PARTS LIST

CODE	PART NO.	RESISTORS
R1	20-809	170 Ohm Resistor In Power Cord
R2	19-1296	10,000 Ohm Volume Control & Switch
R3	53-898	50,000 Ohm Resistor Oscillator Grid
R4	53-1062	250 Ohm Resistor Oscillator Cathode
R5	53-922	75,000 Ohm Resistor I.F. Cathode Feed
R6	53-1063	500 Ohm Resistor I.F. Cathode
R7	53-941	20,000 Ohm Resistor 77 Cathode
R8	53-919	5,000 Ohm Resistor Screen
R9	53-923	100,000 Ohm Resistor 77 Plate
R10	53-925	500,000 Ohm Resistor Output Grid
R11	53-1063	500 Ohm Resistor Output Cathode

CONDENSERS

CODE	PART NO.	CONDENSERS
C1	77-833	336 Oscillator Section of 3 Gang
C2	77-833	371 Preselector Section of 3 Gang
C3	77-833	371 Preselector Section of 3 Gang
C4	78-2008	First I.F. Primary Trimmer
C5	78-2007	First I.F. Secondary Trimmer
C6	78-2009	Second I.F. Trimmer
C7	76-265	.001 Mfd. Mica 77 Plate Filter
C8	75-269A	.01 Mfd. 400 Volt Audio Feed Condenser
C9	75-267A	.5 Mfd. 200 Volt 43 Cathode By-Pass
C10	75-272A	.1 Mfd. 200 Volt 77 Cathode By-Pass
C11	75-272A	.1 Mfd. 200 Volt 78 Cathode By-Pass
C12	75-272A	.1 Mfd. 200 Volt 6A7 Cathode By-Pass
C13	76-265	.001 Mfd. Mica Antenna Series Condenser
C14	76-264	.00005 Mfd. Mica Oscillator Grid Cond.
C15	75-272A	.1 Mfd. 200 Volt Screen By-Pass
C16	75-272A	.1 Mfd. 200 Volt B supply By-Pass
C17	18-2001	6 Mfd. 150 Volt Dry Electrolytic Condenser
C18	18-2001	6 Mfd. 150 Volt Dry Electrolytic Condenser

INDUCTANCES

CODE	PART NO.	INDUCTANCES
L1	17-2030	Oscillator Coil Primary
L2	17-2030	Oscillator Coil Secondary
L3	17-2019	Preselector Coil Primary
L4	17-2019	Preselector Coil First Secondary
L5	17-2019	Preselector Coil Second Secondary
L6	17-2024	First I.F. Transformer Primary
L7	17-2024	First I.F. Transformer Secondary
L8	17-2023	Second I.F. Transformer Primary
L9	17-2023	Second I.F. Transformer Secondary
L10	64-2006	Output Transformer for #43 Tube
L11	64-2006	3000 Ohm Speaker Field
L12	14-940	20 Henry Choke

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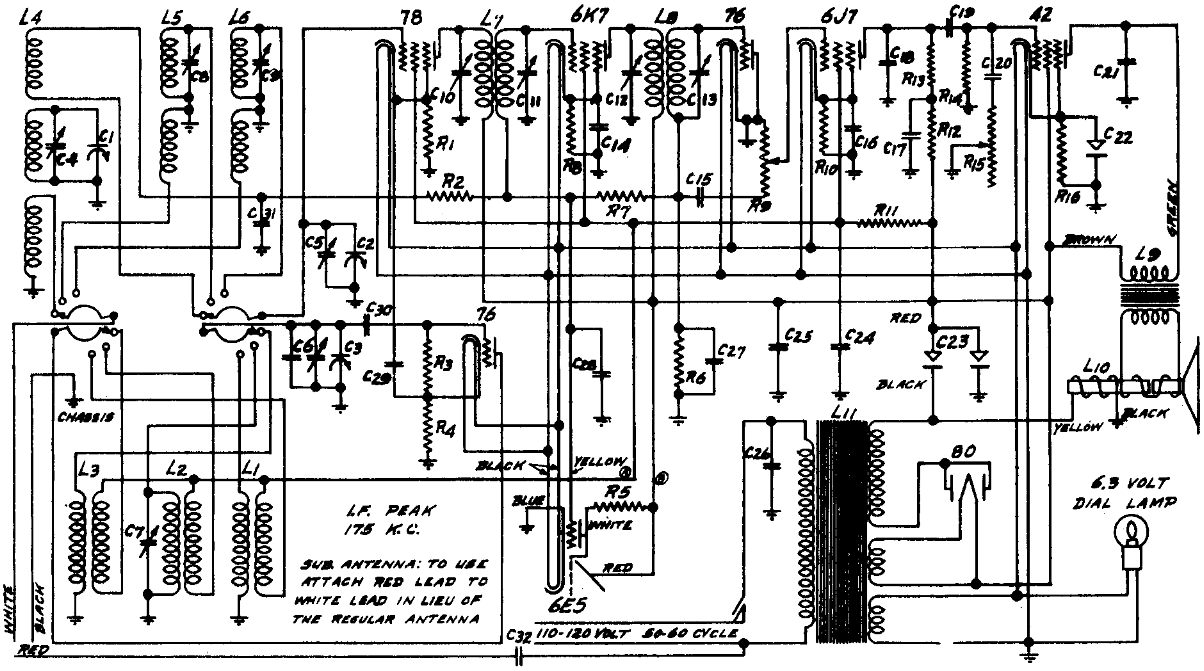
MODEL 6B8



MODEL 6B8 PARTS LIST

CODE	PART NO.	RESISTORS
R1	53-1065	1,000 Ohm First Detector Cathode Resistor
R2	53-923	100,000 Ohm A.V.C. Network Resistor
R3	53-941	20,000 Ohm Oscillator Grid Resistor
R4	53-1062	250 Ohm Oscillator Cathode Resistor
R5	53-926	1 Meg Ohm 6E5 Triode Plate Resistor
R6	53-925	500,000 Ohm Diode Load Resistor
R7	53-926	1 Meg Ohm A.V.C. Network Resistor
R3	53-1062	250 Ohm I.F. Amplifier Cathode Resistor
R9	19-1291	500,000 Ohm Volume Control & Switch
R10	53-920	10,000 Ohm First Audio Cathode Resistor
R11	53-280	5,000 Ohm Screen Resistor
R12	53-923	100,000 Ohm First Audio Plate Hum Resistor
R13	53-924	250,000 Ohm First Audio Plate Resistor
R14	53-925	500,000 Ohm Output Grid Resistor
R15	19-1317	250,000 Ohm Tone Control
R16	.53-1426	750 Ohm Output Cathode Resistor

		CONDENSERS
C1	77-833	16-366 MMFD. Preselector Section of 3 Gang
C2	77-833	16-366 MMFD. Preselector Section of 3 Gang
C3	77-833	16-328 MMFD. Oscillator Section of 3 Gang
C4	77-833	First Preselector Trimmer on C1
C5	77-833	Second Preselector Trimmer on C2
C6	77-833	Oscillator Trimmer on C3
C7	78-1588	3-30 MMFD. Police Band Oscillator Trimmer
C8	78-1588	3-30 MMFD. Police Band Preselector Trimmer
C9	78-1588	3-30 MMFD. Foreign Band
C10	78-2008	First I.F. Primary Trimmer Condenser
C11	78-2011	First I.F. Secondary Trimmer Condenser
C12	78-2008	Second I.F. Primary Trimmer Condenser
C13	78-2013	Second I.F. Secondary Trimmer Condenser
C14	75-2005	.1 Mfd. 200 Volt I.F. Cathode By-Pass Cond.

CODE	PART NO.	CONDENSERS (Cont.)
C15	75-2003	.01 Mfd. 400 Volt Audio Feed Condenser
C16	75-2011	.5 Mfd. 200 Volt First Audio Cathode By-Pass
C17	75-2005	.1 Mfd. 200 Volt First Audio Plate Hum Filter
C18	76-265	.001 Mfd. Mica First Audio Plate By-Pass Cond.
C19	75-2003	.01 Mfd. 400 Volt Audio Feed Condenser
C20	75-2003	.01 Mfd. 400 Volt Tone Control Condenser
C21	75-2001	.002 Mfd. 600 Volt Output Plate By-Pass Cond.
C22	18-928	.25 Mfd. 25 Volt Dry Electrolytic Condenser
C23	18-2002	4-4 Mfd. 450 W.V. Dry Electrolytic Condenser
C24	75-2005	.1 Mfd. 200 Volt Screen By-Pass Condenser
C25	75-2013	1. Mfd. 400 Volt B Supply By-Pass Condenser
C26	75-2003	.01 Mfd. 400 Volt Line By-Pass Condenser
C27	76-307	.0005 Mfd. Mica Diode Filter Condenser
C28	75-2005	.1 Mfd. 200 Volt A.V.C. Network By-Pass Cond.
C29	75-2003	.01 Mfd. 400 Volt Oscillator Coupling Cond.
C30	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C31	75-2003	.01 Mfd. 400 Volt A.V.C. Network By-Pass Cond.
C32	75-2003	.01 Mfd. 400 Volt Sub Antenna Condenser

		INDUCTANCES
L1	17-2077	Foreign Band Oscillator Coil Assembly
L2	17-1667	Police Band Oscillator Coil Assembly
L3	17-2030	Broadcast Oscillator Coil Assembly
L4	17-2052	Broadcast Preselector Coil Assembly
L5	17-1668	Police Band Preselector Coil Assembly
L6	17-2078	Foreign Band Preselector Coil Assembly
L7	68-2026	First I.F. Trans. Assembly
L8	68-2094	Second I.F. Trans. Assembly
L9	64-2025	Speaker With #42 Output Trans.
L10	64-2026	Speaker With 2500 Ohm Field
L11	80-2010	Power Transformer (Unless Special)

MODEL 5E7 PARTS LIST

CODE	PART NO.	RESISTORS
R1	53-377	10,000 Ohm Oscillator Plate Resistor
R2	53-1062	250 Ohm Oscillator Cathode Resistor
R3	53-941	20,000 Ohm Oscillator Grid Resistor
R4	53-923	100,000 Ohm A.V.C. Network Resistor
R5	53-1144	2,000 Ohm First Detector Cathode Resistor
R6	53-1063	500 Ohm First I.F. Cathode Resistor
R7	53-1063	500 Ohm Second I.F. Cathode Resistor
R8	53-919	5,000 Ohm Second I.F. Plate Resistor
R9	53-898	50,000 Ohm Diode I.F. Filter Resistor
R10	19-1291	500,000 Ohm Volume Control & Switch
R11	53-926	1 Megohm A.V.C. Network Resistor
R12	53-923	100,000 Ohm Screen Resistor
R13	53-925	500,000 Ohm Diode Load Resistor
R14	19-1317	250,000 Ohm Tone Control
R15	53-1042	25,000 Ohm C Bias Network Resistor
R16	53-926	1 Megohm C Bias Network Resistor
R17	53-924	250,000 Ohm C Bias Network Resistor
R18	53-923	100,000 Ohm Second Detector Plate Hum Filter Resistor
R19	53-924	250,000 Ohm Second Detector Plate Resistor
R20	53-925	500,000 Ohm Output Grid Resistor

		CONDENSERS	
C1	77-1581	16-366 MMFD.	First Section of 3 Gang Condenser
C2	77-1581	16-366 MMFD.	Second Section of 3 Gang Condenser
C3	77-1581	16-366 MMFD.	Third Section of 3 Gang Condenser
C4	77-1581		Broadcast Oscillator Parallel Trimmer on C3
C5	77-1581		Broadcast First Preselector Trimmer on C1
C6	77-1581		Broadcast Second Preselector Trimmer on C2
C7	78-1588	3-30 MMFD.	Foreign Band Preselector Trimmer
C8	78-1588	3-30 MMFD.	Police Band Preselector Trimmer
C9	78-1588	3-30 MMFD.	Police Band Oscillator Parallel Trimmer
C10	78-1572	1600 MMFD.	Police Band Oscillator Series Trimmer
C11	78-1572	600 MMFD.	Broadcast Oscillator Series Trimmer
C12	78-1561	70-120 MMFD.	First I.F. Primary Trimmer
C13	78-1561	70-120 MMFD.	First I.F. Secondary Trimmer
C14	78-1561	70-120 MMFD.	Second I.F. Primary Trimmer
C15	78-1561	70-120 MMFD.	Second I.F. Secondary Trimmer
C16	78-1561	70-120 MMFD.	Third I.F. Primary Trimmer
C17	78-1561	70-120 MMFD.	Third I.F. Secondary Trimmer
C18	75-2005	.1 MFD.	200 Volt First I.F. Cathode By-Pass
C19	75-2005	.1 MFD.	200 Volt Second I.F. Cathode By-Pass
C20	75-2003	.01 MFD.	400 Volt Second I.F. Plate Isolation Condenser
C21	76-2001	.0001 MFD.	Mica Diode Filter Condenser
C22	76-2001	.0001 MFD.	Mica Diode Filter Condenser
C23	75-2007	.1 MFD.	400 Volt Second Detector Plate Hum Filter

CODE	PART NO.	CONDENSERS (Cont.)	
C24	76-265	.001 MFD.	Mica Second Detector Plate By-Pass
C25	75-2003	.01 MFD.	400 Volt Audio Feed Condenser
C26	75-2006	.2 MFD.	200 Volt C Bias Network Condenser
C27	18-928	25 MFD.	25 Volt Electrolytic Condenser
C28	18-2002	4-4 MFD.	450 Volt Electrolytic Condenser
C29	75-2013	1. MFD.	400 Volt B Supply By-Pass Condenser
C30	75-2003	.01 MFD.	Tone Control Condenser
C31	75-2003	.01 MFD.	Audio Feed Condenser
C32	75-2005	.1 MFD.	200 Volt A.V.C. Network Condenser
C33	75-2003	.01 MFD.	400 Volt Paper Line By-Pass Condenser
C34	75-2007	.1 MFD.	400 Volt Screen By-Pass Condenser
C35	75-2005	.1 MFD.	200 Volt A.V.C. Network By-Pass
C36	75-2003	.01 MFD.	400 Volt Oscillator Coupling Condenser
C37	76-2002	.00005 MFD.	Mica Oscillator Grid Condenser
C38	75-2003	.01 MFD.	400 Volt Oscillator Plate Condenser
C39	18-2004	4. MFD.	450 W. Volt Dry Electrolytic Condenser

		INDUCTANCES
L1	17-2080	Broadcast Preselector Primary
L2	17-2080	Broadcast Preselector First Secondary
L3	17-2080	Broadcast Preselector Second Secondary
L4	17-1668	Police Band Preselector Primary
L5	17-1668	Police Band Preselector Secondary
L6	17-2017	Foreign Band Preselector Primary
L7	17-2017	Foreign Band Preselector Secondary
L8	17-2062	1200 Microhenry First I.F. Primary
L9	17-2062	1200 Microhenry First I.F. Secondary
L10	17-2062	1200 Microhenry Second I.F. Primary
L11	17-2062	1200 Microhenry Second I.F. Secondary
L12	17-2062	1200 Microhenry Third I.F. Primary
L13	17-2062	1200 Microhenry Third I.F. Secondary
L14	64-2017	8" Speaker, Single 42 Output Transformer
L15	64-2016	12" Speaker, 2500 Ohm Speaker Field
L16	80-1675	Power Transformer
L17	17-2018	Foreign Band Oscillator Primary
L18	17-2018	Foreign Band Oscillator Secondary
L19	17-1667	Police Band Oscillator Primary
L20	17-1667	Police Band Oscillator Secondary
L21	17-1646	Broadcast Oscillator Primary
L22	17-1646	Broadcast Oscillator Secondary
	68-2019	First I.F. Transformer Assembly
	68-2019	Second I.F. Transformer Assembly
	68-2018	Third I.F. Transformer Assembly

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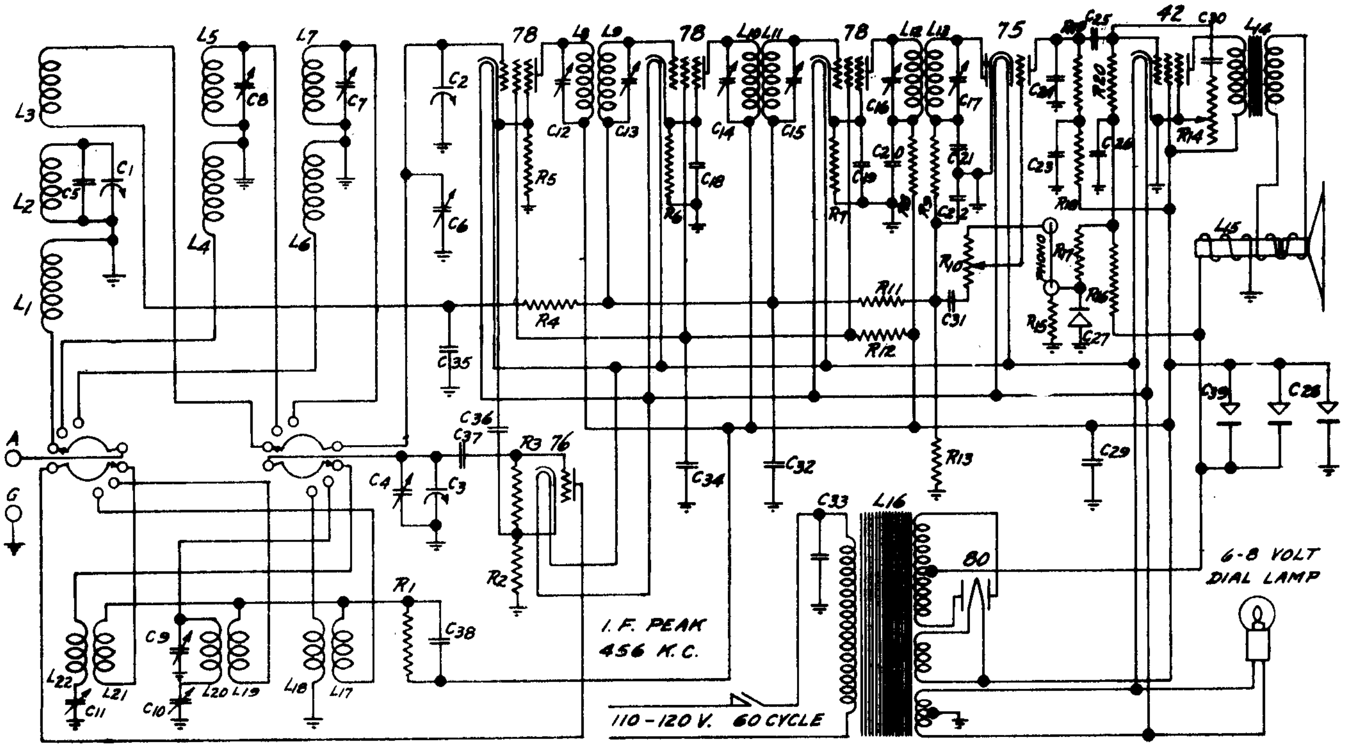
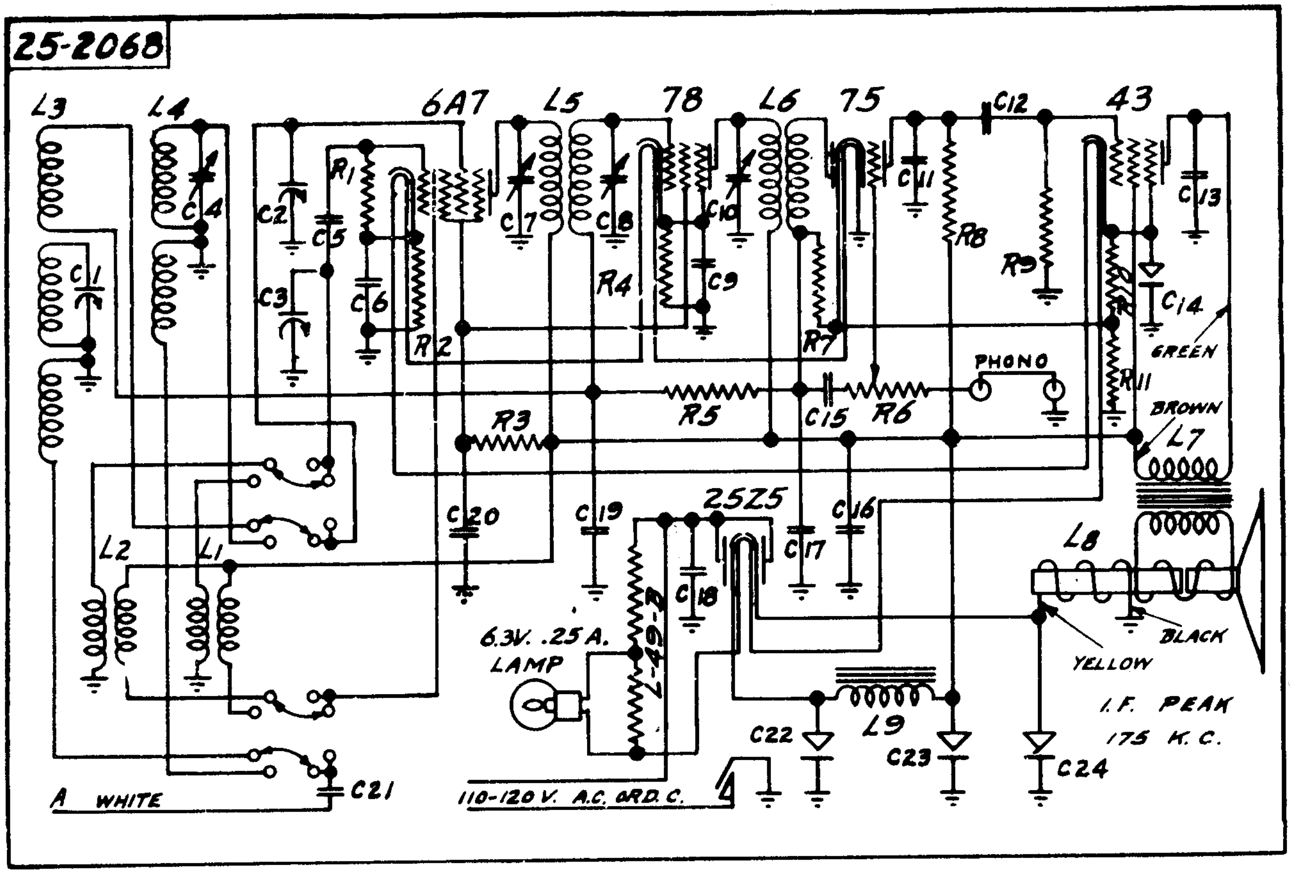
MODEL 5E7

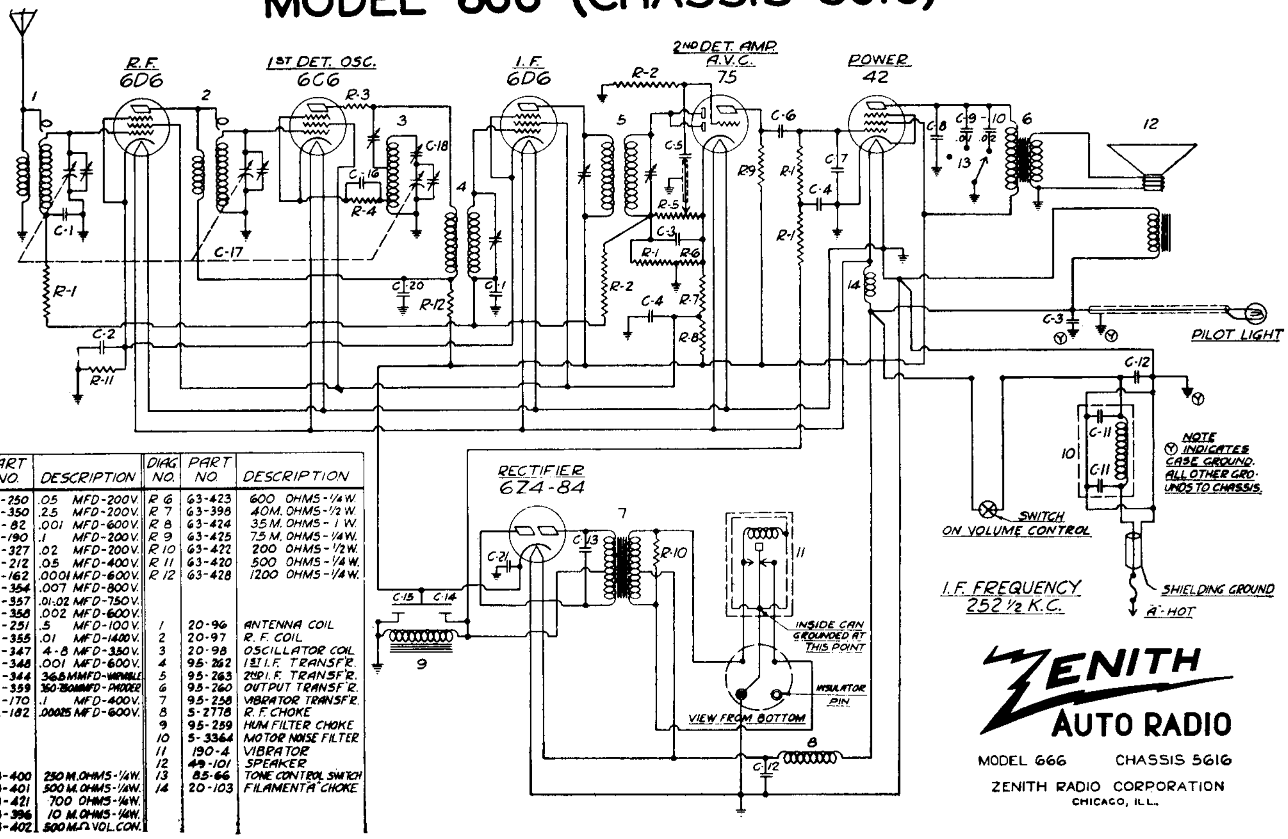


MODEL 6D6



ZENITH RADIO CORPORATION

MODEL 666 (CHASSIS 5616)



DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C 1	22-250	.05 MFD-200V.	R 6	63-423	600 OHMS-1/4 W.
C 2	22-350	.25 MFD-200V.	R 7	63-398	40M. OHMS-1/2 W.
C 3	22-82	.001 MFD-600V.	R 8	63-424	35 M. OHMS-1 W.
C 4	22-190	.1 MFD-200V.	R 9	63-425	75 M. OHMS-1/4 W.
C 5	22-327	.02 MFD-200V.	R 10	63-422	200 OHMS-1/2 W.
C 6	22-212	.05 MFD-400V.	R 11	63-420	500 OHMS-1/4 W.
C 7	22-162	.0001 MFD-600V.	R 12	63-428	1200 OHMS-1/4 W.
C 8	22-354	.007 MFD-800V.			
C 9-10	22-357	.01-.02 MFD-750V.			
C 11	22-358	.002 MFD-600V.			
C 12	22-251	.5 MFD-100V.	1	20-96	ANTENNA COIL
C 13	22-355	.01 MFD-1400V.	2	20-97	R. F. COIL
C 14-15	22-347	4-8 MFD-350V.	3	20-98	OSCILLATOR COIL
C 16	22-348	.001 MFD-600V.	4	95-262	1ST I.F. TRANSF'R.
C 17	22-344	368 MMFD-VARIABLE	5	95-263	2ND I.F. TRANSF'R.
C 18	22-359	350-750 MMFD-PADDER	6	95-260	OUTPUT TRANSF'R.
C 20	22-170	.1 MFD-400V.	7	95-258	VIBRATOR TRANSF'R.
C 21	22-182	.00025 MFD-600V.	8	5-2778	R. F. CHOKE
			9	95-259	HUM FILTER CHOKE
			10	5-3364	MOTOR NOISE FILTER
			11	190-4	VIBRATOR
			12	49-101	SPEAKER
R 1	63-400	250 M. OHMS-1/4 W.	13	85-66	TONE CONTROL SWITCH
R 2	63-401	500 M. OHMS-1/4 W.	14	20-103	FILAMENT "A" CHOKE
R 3	63-421	700 OHMS-1/4 W.			
R 4	63-396	10 M. OHMS-1/4 W.			
R 5	63-402	500 M.Ω VOL. CON.			

I.F. FREQUENCY 252 1/2 K.C.

ZENITH AUTO RADIO

MODEL 666 CHASSIS 5616

ZENITH RADIO CORPORATION
CHICAGO, ILL.

Tube Operating Voltages:

Position	Tube	EF	EK	EG1	EG2	EG3	EP
R. F. Amplifier	6D6	5.6	4.1	*	4.1	76	200
1st Det.-Osc.	6C6	5.6	4.5	0	4.5	76	200
I. F. Amplifier	6D6	5.6	4.1	*	4.1	76	200
2nd Det. A. V. C.	75	5.6	1.3	0	0	—	165
Power Amp.	42	5.6	0	3	0	200	192
Rectifier	6Z4	5.6	200	—	—	—	—

f—Filament; k—Cathode; g1—Control Grid; g2—Suppressor Grid; g3—Screen Grid; p—Plate; *—Depends on applied signal strength. All voltages measured from indicated points to ground. Battery voltage 6 volts. (Check voltages with condenser gang in full mesh.)

Alignment

Every Zenith automobile receiver is balanced on an accurate crystal controlled oscillator before leaving the factory and, unless a part is changed or the calibration has shifted, the adjustments should never be tampered with. Where it is absolutely necessary, however, a good test oscillator capable of delivering a modulated signal at 1600, 1400, 600 and 252½ K. C. will be essential. Proceed as follows:

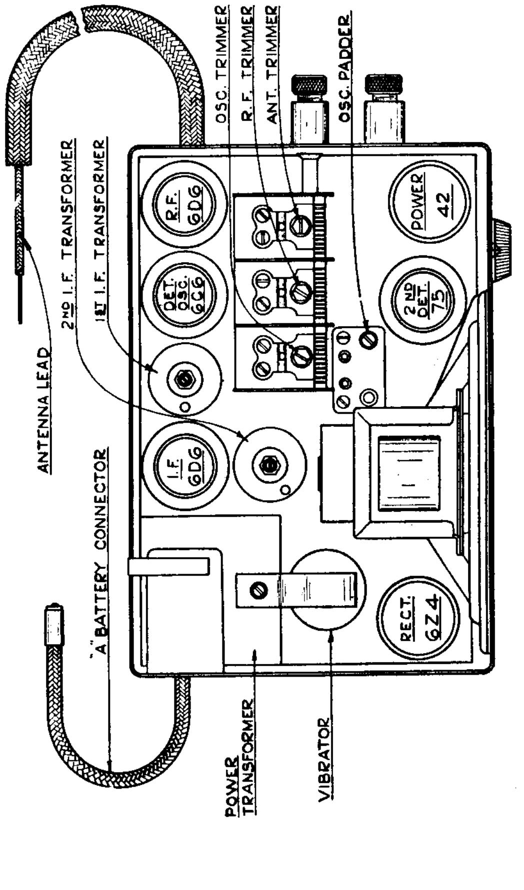
I. F. Alignment:

To balance the I. F. Circuit, connect the 252½ K. C. test oscillator signal to the grid of the 6C6 tube through a 0.5 mfd condenser and to ground. Adjust the 1st I. F. primary trimmer to maximum output from either the speaker or an output meter. Follow in the same manner with the secondary, and the primary and secondary of the 2nd I. F. transformer. This completes the I. F. circuit adjustment.

R. F. Alignment:

1. Next attach the test oscillator thru a 150 mmf. condenser to the antenna and ground leads.
2. Turn condenser plates completely out of mesh.
3. Set test oscillator to 1600 K. C.
4. Adjust the oscillator condenser trimmer (see fig. 1) to approximate resonance at 1600. Disregard dial setting for this operation.
5. Set test oscillator to 1400 K. C. and turn gang condenser to resonance and peak the three trimmers accurately. Now set pointer on dial to 1400 K. C. by turning indicator screw in rear center of head.
6. Set test oscillator to 600 K. C. and tune set to pick up the signal. Rock the dial over this point while adjusting the padder condenser (see fig. 1) for greatest output.

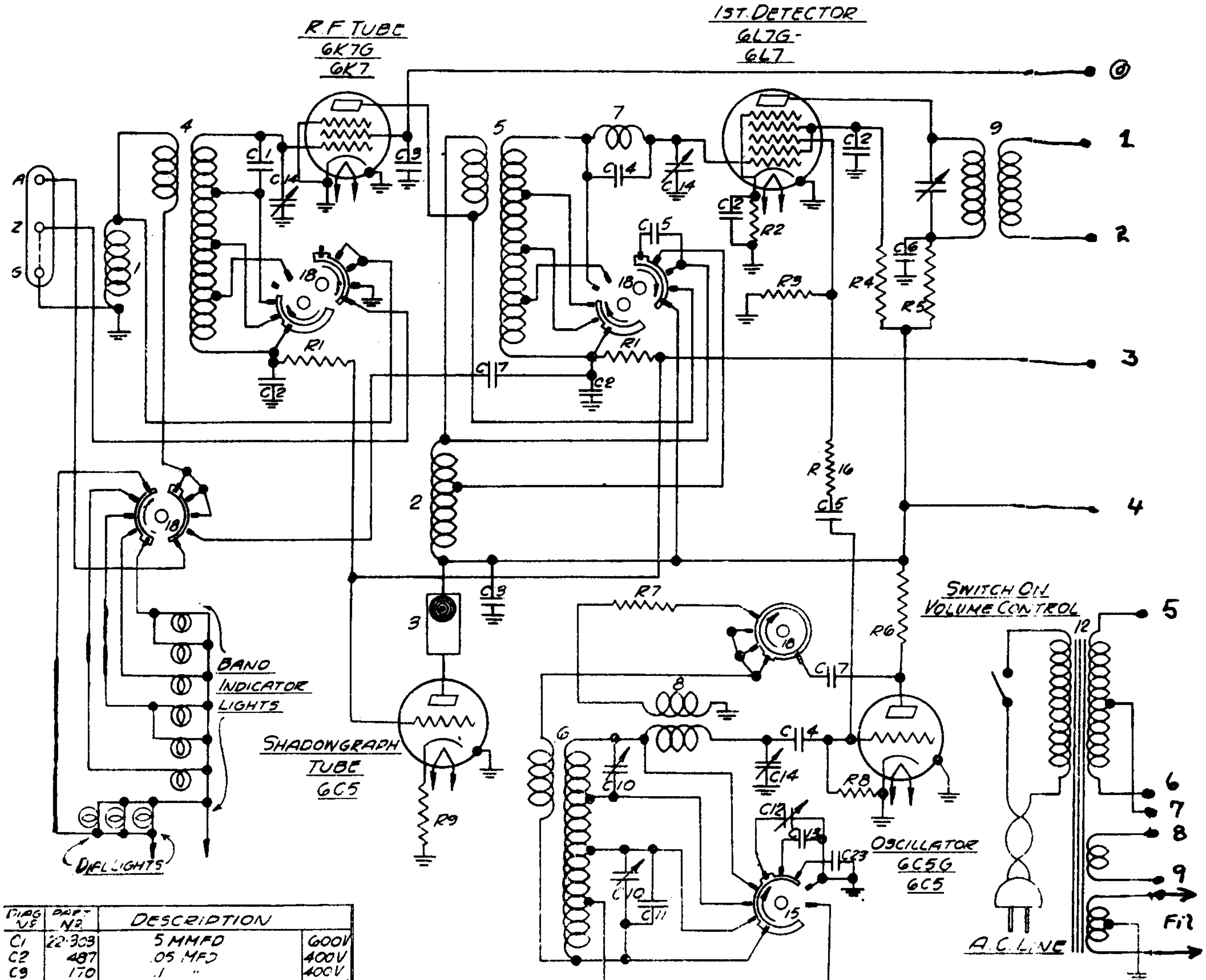
If the dial is off calibration at the low frequency end after this is done the indicator may be moved slightly in either direction to give a uniform accuracy over the entire scale.



ZENITH RADIO CORP.

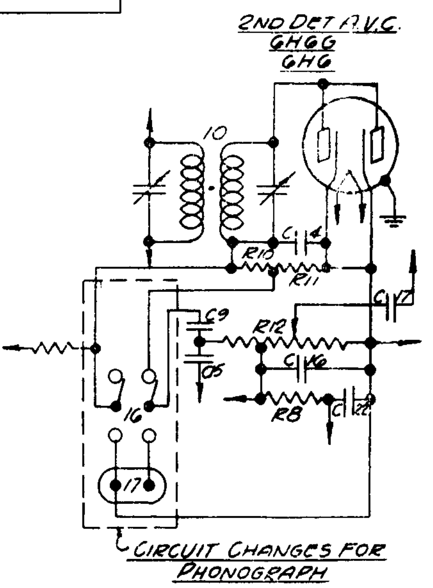
MODELS 12-U-158, 12-U-159

CHASSIS No. 1203



DIAG NO.	PART NO.	DESCRIPTION	
C1	22-303	5 MMFD	600V
C2	487	.05 MFD	400V
C3	170	.1 "	400V
C4	289	50 MMFD	600V
C5	127	25 MMFD	600V
C6	212	05 MFD	400V
C7	486	.0012 "	600V
C8	243	01 "	400V
C9	250	05 "	200V
C10	508	TRIMMER COND	
C11	285	10 MMFD	600V
C12	205	200-550 MFD PADDER	
C13	384	0015 MFD	600V
C14	489	3 GANG VARIABLE	
C15	182	.00025 MFD	600V
C16	147	.0005 "	600V
C17	188	02 "	400V
C18	162	.0001 "	600V
C19	455	02	600V
C20	509	10 MFD DRY ELEC COND	50V
C21	506	16 " WET " "	250V
C22	229	.005 MFD (TUBULAR)	600V
C23	485	.005 "	600V
C24	125	8 MFD WET ELEC. COND	450V
C25	294	16 " " " "	450V
C26	304	8 " " " (CHROM.)	450V
C27	405	10 " DRY " COND.	50V
R1	63-278	99 M OHM	¼W
R2	357	900 "	¼W
R3	299	990 M "	¼W
R4	208	12 M "	1W
R5	466	990 "	½W
R6	592	5100 "	1W
R7	590	5 "	¼W
R8	280	49 M "	¼W
R9	305	700 "	¼W

DIAG NO.	PART NO.	DESCRIPTION	
R10	63-260	100 M OHMS	¼W
R11	385	300 M "	¼W
R12	522	2 MEGOHM VOL. CONT & SW.	
R13	531	650 OHM	1W
R14	525	2 MEGOHM	¼W
R15	528	CANDOHM	
R16	411	20 OHM	¼W
R17	261	9900 OHM	¼W
1	20-71	ANTENNA CHOKE	
2	20-155	R.F. PLATE "	
3	122-14	TUNING METER	
4	S4545	ANTENNA COIL ASSEM	
5	S4546	DETECTOR " "	
6	S4547	OSCILLATOR " "	
7	S4387	H.F. DETECTOR " "	
8	S-4388	H.F. OSCILLATOR " "	
9	95-368	1ST I.F. TRANS	
10	95-369	2ND I.F. "	
11	95-367	AUDIO "	
12	95-370	POWER " 115V 50-60 CYCLE	
	95-373	" " 25 CYCLE ALL VOLT	
13	85-92	TONE CONT SWITCH	
14	85-91	SENSITIVITY CONT SW	
15	95-366	POWER CHOKE	
16	85-39	PHONO SWITCH	
17	44-7	" JACK	
18	85-94	BAND SELECTOR SWITCH	



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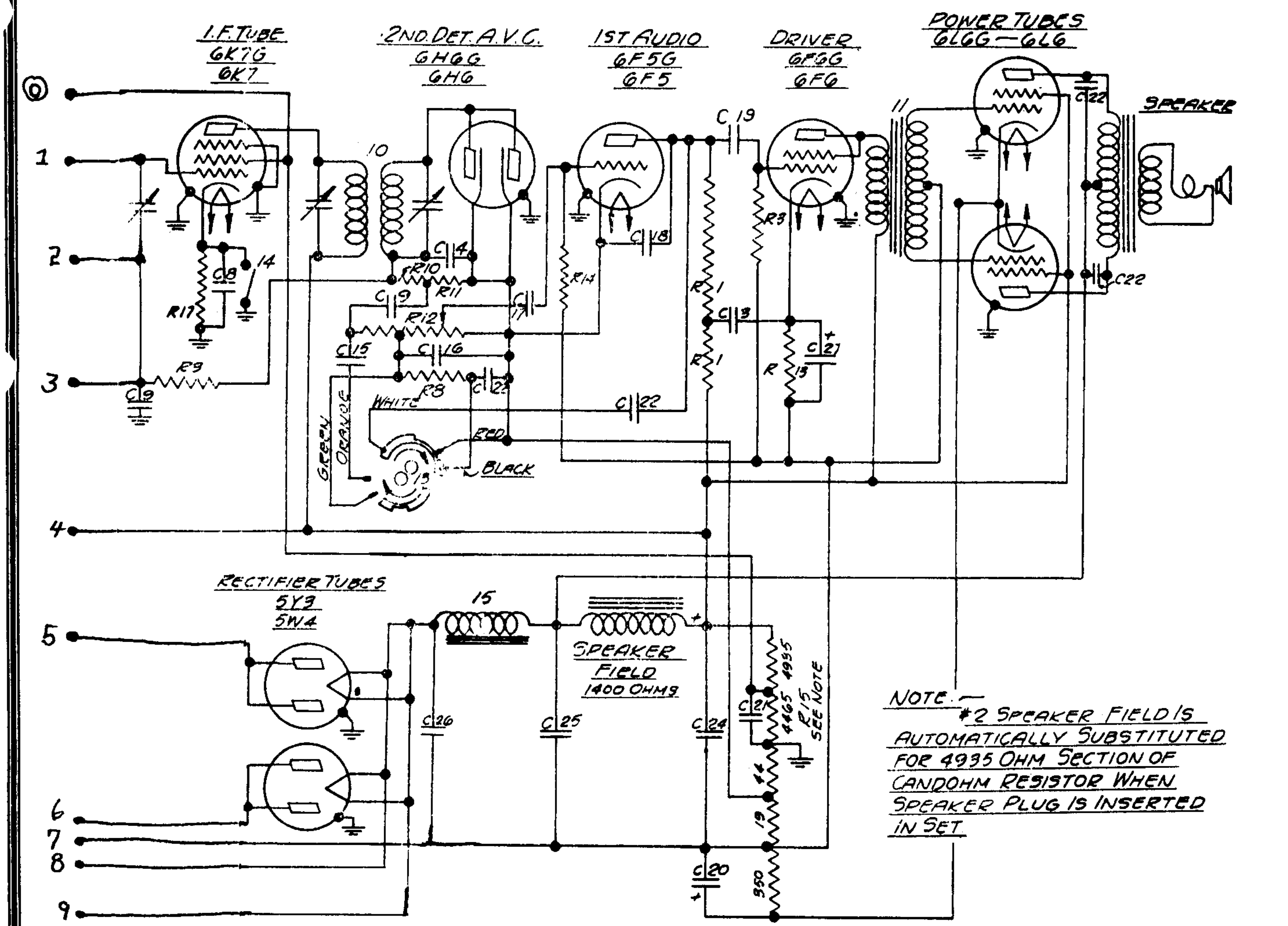
ZENITH RADIO CORP.

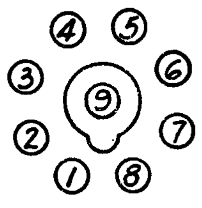
Models 12-U-158, 12-U-159. (Chassis No. 1203)



SOCKET VOLTAGES

I.F. = 456 K.C.

Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	3AC	235	100	0	—	3AC	0	0
6L7	1st Det.	0	3AC	230	120	–.5	—	3AC	0	0
6C5	Osc.	0	3AC	185	—	–8	—	3AC	0	—
6K7	I. F.	0	3AC	235	100	0	—	3AC	Local 9	0
6H6	2nd Det. A.V.C.	0	3AC	–2.5	–2.5	–2.5	—	3AC	–2.5	—
6F5	1st Audio	0	3AC	—	90	—	—	3AC	–2.5	—
6F6	Driver	0	3AC	215	215	–.5	—	3AC	11	—
6L6	Power	0	3AC	330	210	–3	—	3AC	14	—
6C5	Target Tuning Amp.	0	3AC	230	—	0	—	3AC	0	—
5Y3 5W4	Rectifier	0	340	—	AC	—	AC	—	340	—



BOTTOM VIEW OF SOCKET

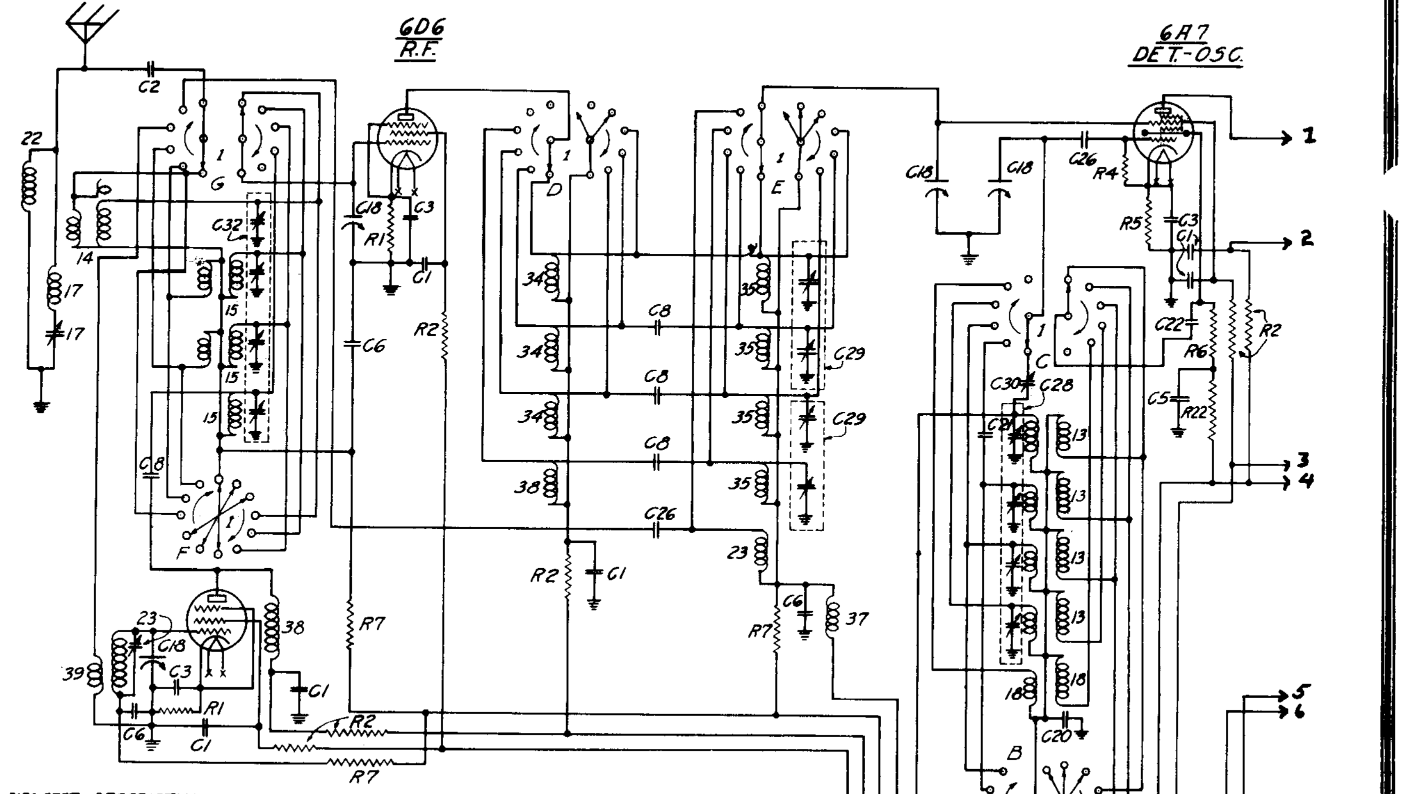
All voltages measured from point indicated to ground, using a 1000 ohm per volt meter. Antenna and ground disconnected.

Line Voltage 112V.

Current Consumption 120 watts.

ZENITH RADIO CORPORATION

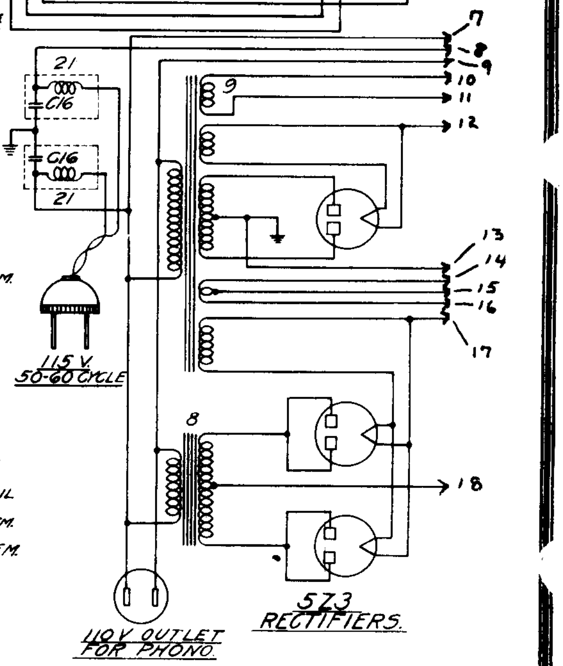
STRATOSPHERE MODEL 1000Z (REVISED) (CHASSIS 2501C & 2501P)



DIAG. Nº	PART Nº	DESCRIPTION	
C1	22-371	.01 MFD.	600V.
C2	22-374	.01 "	300V.
C3	22-373	.05 "	300V.
C4	22-377	.1 "	600V.
C5	22-361	16 "	450V.
C6	22-372	.01 "	300V.
C7	22-365	.0001 "	600V.
C8	22-127	.000025 MFD.	600V.
C9	22-375	.1 MFD.	300V.
C10	22-367	.00005 MFD.	600V.
C11	22-189	20 MFD.	25V.
C12	22-378	.04 "	600V.
C13	22-362	8 MFD.	300V.
C14	22-225	5 "	25V.
C15	22-360	4 "	600V.
C16	22-379	.002 MFD.	600V.
C17	22-289	.0005 "	600V.
C18	22-395	450 MMFD.	4 GANG
C19	22-287	.03 MFD.	600V.
C20	22-342	.0029 MFD.	600V.
C21	22-341	.00092 "	600V.
C22	22-147	.0005 "	600V.
C23	22-305	2-35 MFD.	
C24	22-383	ORDER BY PART Nº ONLY	
C25	22-338	SPECIAL TOLERANCES.	
C26	22-289	.00005 MFD.	600
C27	22-199	.5 MFD. "	200V.
C28	22-397	2-35 MMFD.	4 GANG
C29	22-398	2-35 "	2 GANG
C30	22-205	200-500 MMFD.-PADDER	
C31	22-321	8 MFD.	450V.
C32	22-396	2-35 MMFD.	4 GANG
C33	22-229	.005	600V.

DIAG. Nº	PART Nº	DESCRIPTION	
R1	63-362	400 OHMS	1/4 W.
R2	63-416	1400 "	1/4 W.
R3	63-258	490M "	1/4 W.
R4	63-136	50M "	1/2 W.
R5	63-357	300 "	1/4 W.
R6	63-291	29M "	1/2 W.
R7	63-260	100M "	1/4 W.
R8	63-412	3500 "	1/2 W.
R9	63-390	1 MEG. DUAL VOL. C.	
R10	63-391	" T.C.	
R11	63-387	4M OHMS CANDOHM	
R12	63-389	1M-1857-CANDOHMS	
R13	63-406	5M OHMS CANDOHM	
R14	63-413	4M "	1/2 W
R15	63-405	330 " CANDOHM	
R16	63-408	500M " "Q" CONTROL	
R17	63-404	60 OHMS CANDOHM	
R18	63-279	3M "	1/4 W.
R19	63-414	99M OHMS	1/2 W.
R20	63-417	99 OHMS	1/4 W.
R21	63-326	4M "	1/4 W.
R22	63-407	10M OHMS CANDOHM	
R23	63-396	10M "	1/4 W.
R24	63-442	50M "	1/4 W.
R25	63-440	200M "	1/4 W.
R26	63-441	1 MEG.	1/4 W.
R27	63-290	260M "	1/4 W.
R28	63-241	5M "	1/2 W.
R29	63-432	5 OHMS CANDOHM	
R30	63-430	20M OHMS	1/4 W.
R31	63-439	2700 OHMS	1/4 W.
R32	63-378	250	1/4 W.

DIAG. Nº	PART Nº	DESCRIPTION
1	85-71	BAND SELECTOR SWITCH
2	95-250	DRIVER TRANS.
3	95-251	LOW BOOST AUDIO TRANS.
4	95-252	HIGH FREQUENCY TRANS.
5	95-253	SPEAKER OUTPUT TRANS.
6	95-254	POWER CHOKE
7	95-255	" "
8	95-256	OUTPUT "B" SUPPLY TRANS.
9	95-257	POWER TRANS.
10	95-264	3RD I.F. TRANS.
11	122-9	SHADOWGRAPH
12	195-1	SINGLE CONTACT RELAY
13	S-3587	OSC. COIL ASSEM.
14	S-3593	ANT. COIL
15	S-3589	R.F. COIL ASSEM.
16	S-3358	VAR. SELECT I.F. ASSEM.
17	20-109	WAVE TRAP COIL ASSEM.
18	S-3115	H.F. OSC. COIL ASSEM
19	20-99	DET. FILTER CHOKE
20	20-100	UNTUNED I.F. COIL
21	S-3367	LINE FILTER COIL ASSEM.
22	20-88	ANT. CHOKE
23	20-114	7 METER DET. COIL
24	85-69	PHONO. SWITCH
25		SPKR. FIELD 49-102-49-103
26		" " 49-99
27	49-99	SPEAKER
28	49-102	#2 JENSEN SPEAKER
29	49-103	#1 " "
30	85-64	TOGGLE SWITCH
31	95-266	ORDER BY PART Nº ONLY
32	95-265	SPECIAL TOLERANCES
33	95-267	
34	20-81	R.F. PLATE CHOKE ASSEM.
35	S-3588	DET. COIL ASSEM.
36	20-79	DET. BROADCAST BAND COIL
37	20-71	R.F. CHOKE
38	S-3538	R.F. PLATE CHOKE ASSEM.
39	S-3591	10-23 MEGACYCLE COIL
40	85-75	TWEETER SWITCH ASSEM.
41	85-75	" SWITCH
42	20-118	SCRATCH FILTER COIL

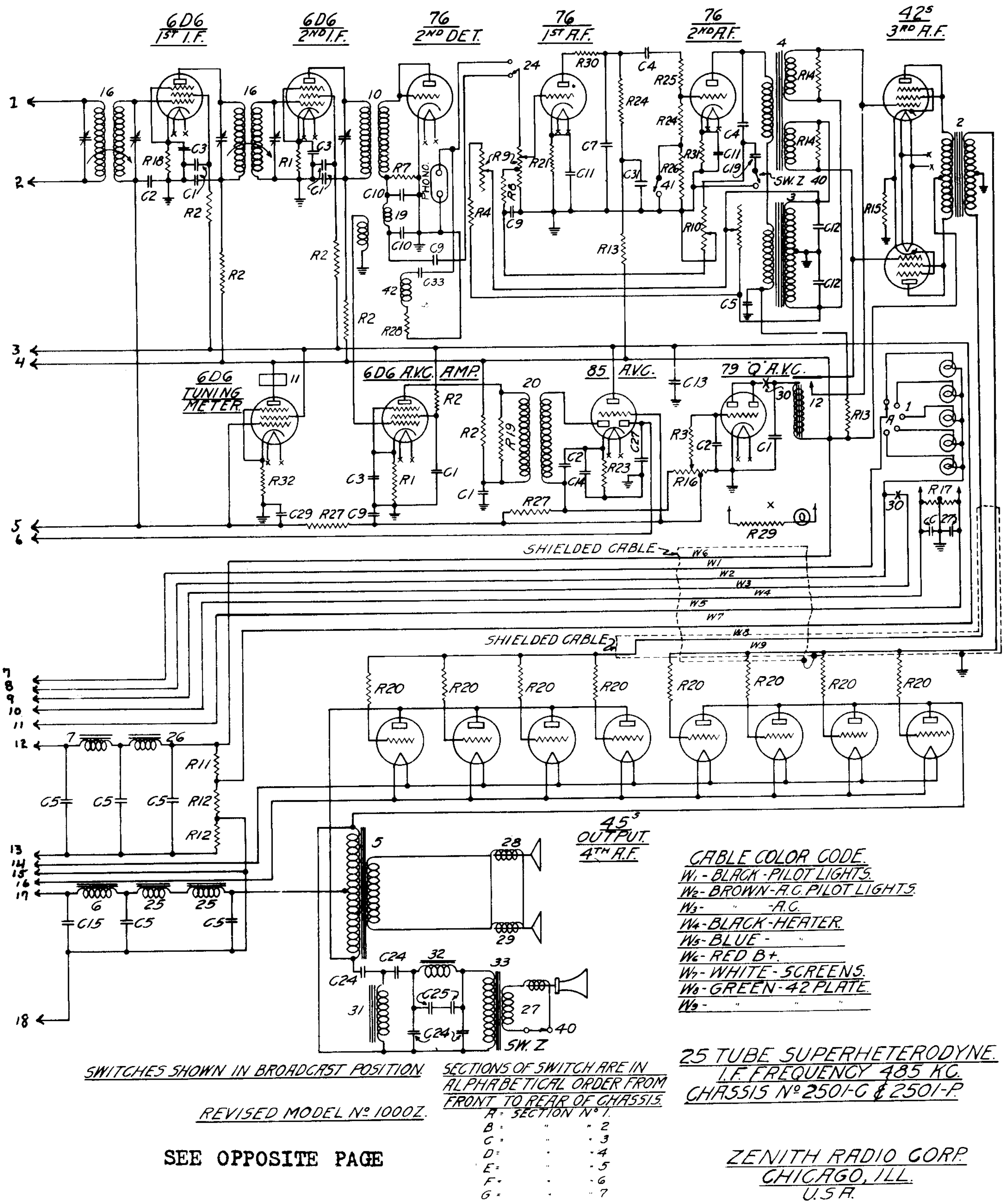


I.F. PEAK 485 K.C.

SEE NEXT PAGE

ZENITH RADIO CORPORATION

STRATOSPHERE MODEL 1000Z REVISED
CHASSIS 2501C & 2501P



SEE OPPOSITE PAGE

ZENITH RADIO CORPORATION

STRATOSPHERE MODEL 1000Z (REVISED)

Socket Voltages

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6D6	1st R. F.	6.3	3	0	100	3	300
6D6	2nd R. F.	6.3	3	0	100	3	300
6A7	1st Det.	6.3	3	0	100	-	300
	Osc.			3	-	-	130
6D6	1st I. F.	6.3	7	0	100	7	300
6D6	2nd I. F.	6.3	3	0	100	3	300
76	2nd Det.	6.3	0	0	-	-	0
76	1st A.F.	6.3	8	0	-	-	140
76	2nd A. F.	6.3	14	0	-	-	270
42	Driver	6.3	22	0	300	-	300
45	Power A.F.	2.5	63	0	-	-	330
79	Q.A.V.C.	6.3	0	0	-	-	250 Q on 0 Q off
6D6	Shadowmeter Amplifier	6.3	3	0	100	3	300
6D6	A.V.C.Amplf.	6.3	3	0	100	3	300
85	A.V.C.	6.3	0	0	-	-	100
5Z3	Rect. Power Amplifier	5	-	-	-	-	-
5Z3	Rect.for Upper Chassis	5	-	-	-	-	-

Line Voltage 112. Antenna and Ground shorted.

f - filament; k - cathode; g1 - control grid; g2 - screen grid; g3 - suppressor grid; p - plate.

Balance Procedure: Caution - Test set thoroughly for defective tubes, antenna and ground, check line voltage and chassis voltages before any attempt is made to rebalance. All balancing should be done with a calibrated oscillator capable of a steady signal and minimum attenuation of signal input strength. The screw driver used should be of non metallic type and output meter usually connected across plates of 45 tubes at point where the two green speaker wires come out of power pack.

Warning. Do not rebalance this chassis unless absolutely necessary as all chassis are balanced on an accurate signal generator before shipment. Set volume control in full on position, tone control on treble, high fidelity control in selective position. Band switch set on broadcast position, gang 580 K.C., approximately. Connect 485 K.C. service oscillator to grid of 6A7 and chassis ground, adjust I.F.transformers, to maximum output with minimum input signal. Rotate selectivity control to broad position, I.F. output should remain constant 6 K.C. plus and minus 485 K. C. Next, connect the same 485 K.C. signal directly across aerial and ground binding post. Balance wave trap to minimum signal. Gang set at 550.

Note: Refer to drawing of trimmer assembly to identify trimmers.

Set service oscillator at 600 K.C. Adjust broadcast padder "A" meanwhile rocking pointer past 600 K.C. on dial to combination giving greatest output.

Set chassis dial to exactly 1400 K.C., and service oscillator to 1400 K.C. Balance "L" oscillator trimmer to scale. Reset oscillator to 600 K.C., rotate gang to 600 and re-check 600 padder for maximum output. Next, retune oscillator trimmer at 1400 K.C. Adjust detector trimmer "H" and R.F. trimmer "B" to maximum output.

Police or Orange band. Rotate chassis band switch to police band, gang should be rotated to 3 megacycles, oscillator to 3 megacycles also. Adjust oscillator trimmer "K" to scale, peak "G" detector and "C" R.F. trimmers to maximum peak.

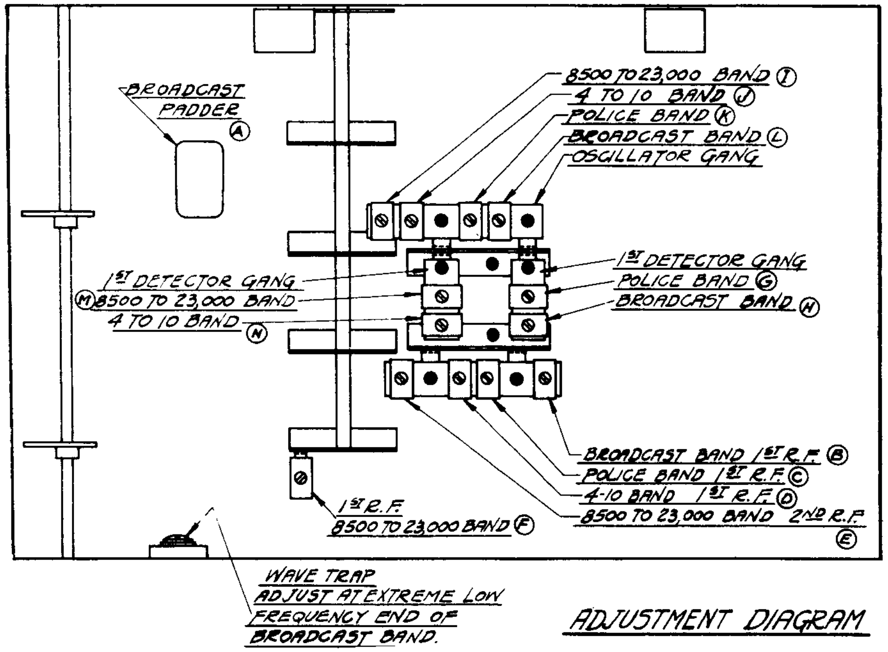
Yellow band. Set dial and oscillator to 9 megacycles. Peak oscillator trimmer "J" for scale, "N" detector and "D" R. F. trimmers for maximum peak.

Red band. Set dial and oscillator at 21 megacycles, peak "I" oscillator for scale, "M" detector and "E" R.F., and trimmer "F" located at back of band switch for maximum peak. There are no adjustments on the Blue band.

On all short wave adjustments be careful not to balance the oscillator circuit to the image frequency of the signal. This is equal to signal frequency minus twice the I.F. frequency.

Tuning Ranges.

Color	Kilocycles	Megacycles	Meters
Green	520 - 1,500	.52 - 1.5	576 - 200
Orange	1,450 - 4,200	1.45 - 4.2	207 - 71
Yellow	3,700 - 10,000	3.7 - 10	81 - 30
Red	8,500 - 23,000	8.5 - 23	35 - 13
Blue	18,000 - 45,000	18 - 45	16.6- 6.5

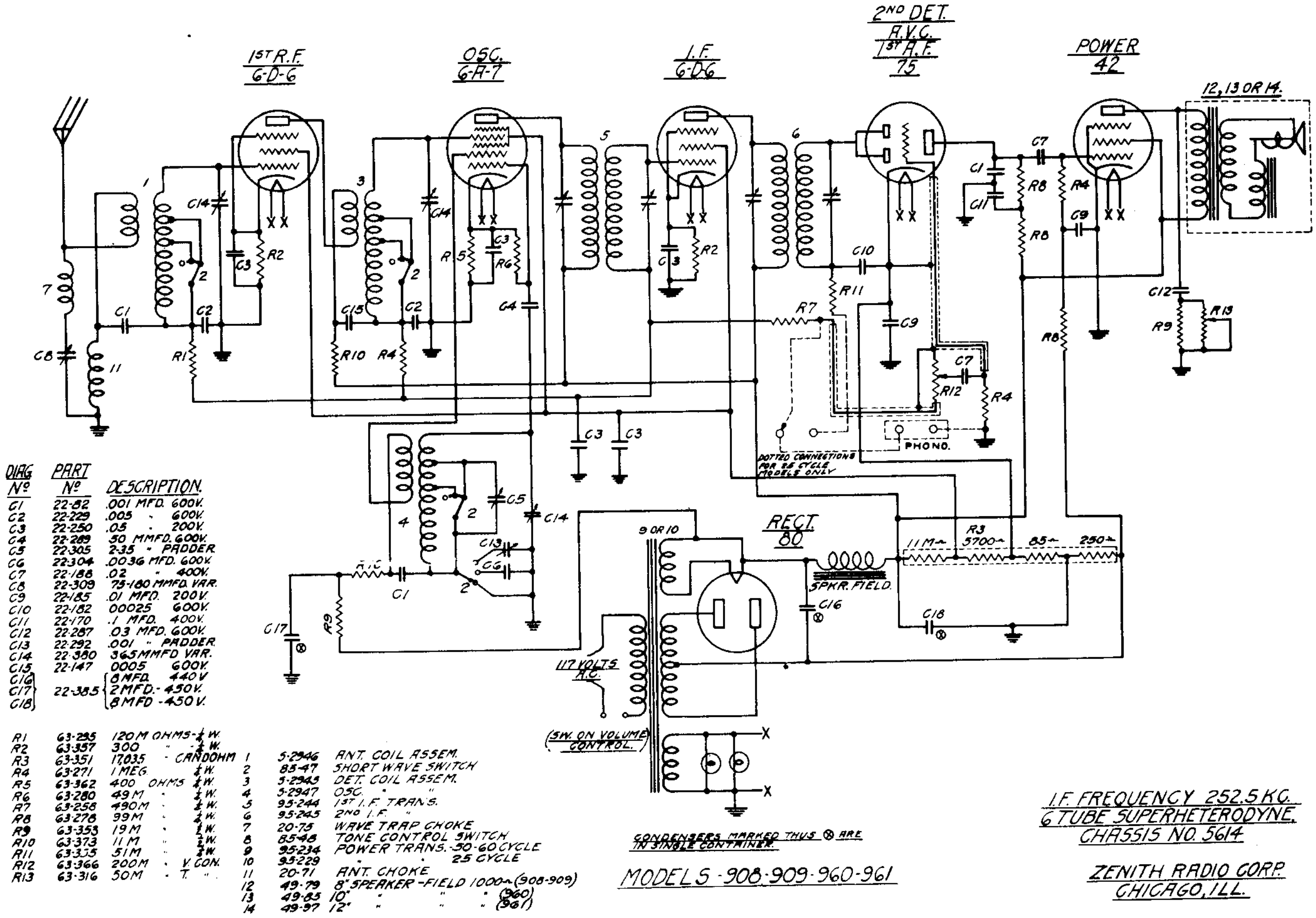


ADJUSTMENT DIAGRAM

STRATOSPHERE MODEL 1000Z (REVISED)

ZENITH RADIO CORPORATION

MODELS 908-909-960-961 CHASSIS 5614



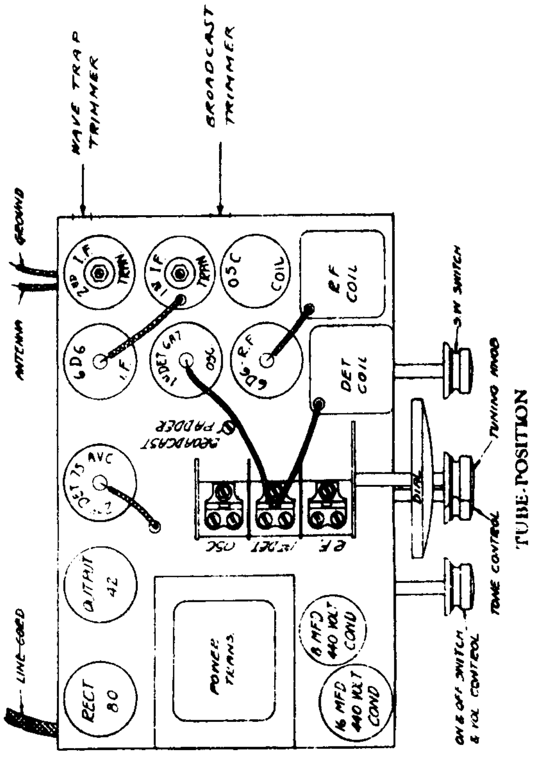
TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6D6	R.F.	5.6	2.4	0	70	2.4	200
6A7	1St. Det.	5.6	3	0	70	-	250
	Osc.			3.6	-	-	230
6D6	I.F.	5.6	2.6	0	70	2.6	250
75	2nd. Det. 1st Audio	5.6	1.4	0	-	-	148
42	PWR.	5.6	0	-.6	250	-	250
80	RECT.	4.6	-	-	-	-	300

Line Voltage 112 Antenna and Ground Disconnected

All measurements taken from point indicated to ground, using a 1000 ohm per volt D.C. meter (except heaters).
F - Filament; K - Cathode; g1 - Control Grid; g2 - Screen Grid; g3 - Suppressor Grid; p - Plate.

Alignment

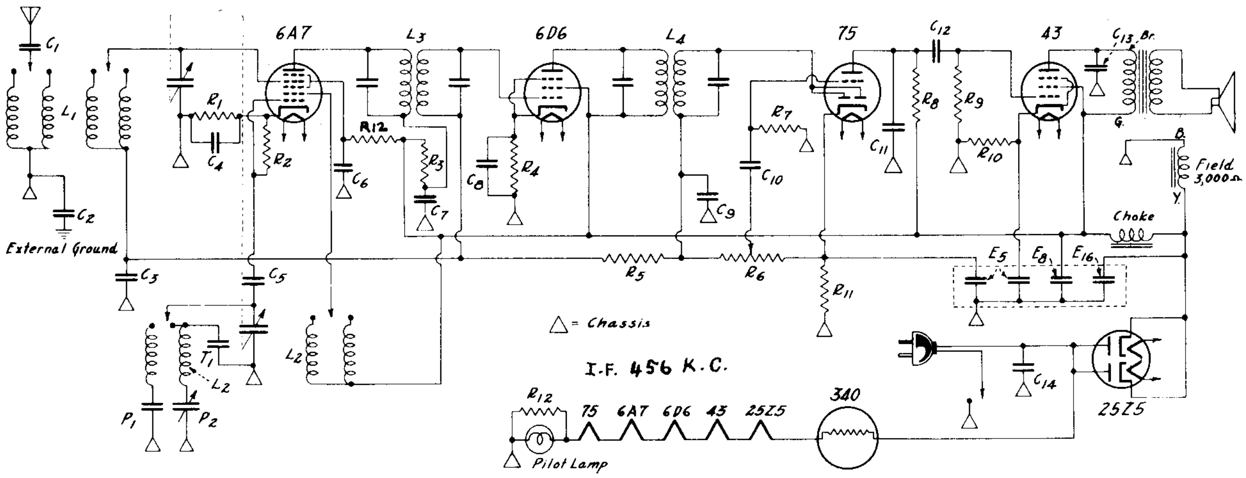
1. Balance intermediate transformers at 252.5 K.C. with oscillator connected to grid of first detector and ground.
2. Adjust wave trap padder (located underneath chassis at rear right side) for weakest signal with 252.5 K.C. oscillator connected to aerial and ground.
3. Turn wave band switch clockwise to the highest frequency band. Connect 15,000 K.C. oscillator to aerial and ground. Balance oscillator trimmer on three-gang condenser for correct dial reading at this frequency.
4. Turn wave band switch counter-clockwise to standard broadcast position. Adjust broadcast oscillator trimmer (located underneath chassis at right center) for correct dial reading at 1400 K.C. and balance R.F. and 1st detector trimmers on three-gang condenser for loudest signal.
5. Adjust oscillator padder (located next to oscillator section of gang on top of chassis) while rocking pointer back and forth past 600 K.C. for combination giving maximum output.
6. Recheck 1400 K.C.



TUBE POSITION

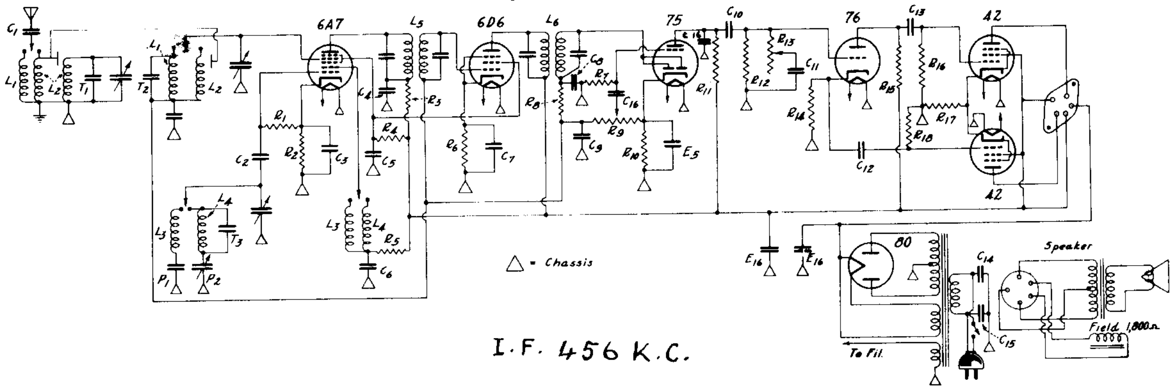
AIR-KING PRODUCTS COMPANY, INC.

MODEL-66-A.C. D.C.



R 1 - 300 ohm	L 1 - comb. antenna coil.	C 1 - .005 - 400 v.
R 2 - 35,000 "	L 2 - comb. oscillator coil.	C 2 - .05 - 400 v.
R 3 - 7,500 "	L 3 - input I.F.	C 3 - .05 - 400 v.
R 4 - 750 "	L 4 - output I.F.	C 4 - .1 - 200 v.
R 5 - 3,000,000 "		C 5 - .0001 - mica
R 6 - 500,000 " vol. cont.	P 1 - .003 mica	C 6 - .1 - 200 v.
R 7 - 750,000 "	P 2 - 260-500 padder.	C 7 - .1 - 200 v.
R 8 - 500,000 "		C 8 - .1 - 200 v.
R 9 - 750,000 "	T 1 - 3-30 mmfd. trimmer.	C 9 - .0005 - mica
R 10 - 650 "		C 10 - .02 - 400 v.
R 11 - 7,500 "		C 11 - .00025 - mica
R 12 - 35,000 "	E 5 - 5 mfd. - 25 v.	C 12 - .02 - 400 v.
	E 8 - 8 mfd. - 150 v.	C 13 - .005 - 400 v.
	E 16 -16 mfd. - 150 v.	C 14 - .05 - 400 v.

MODEL-70-A.C.

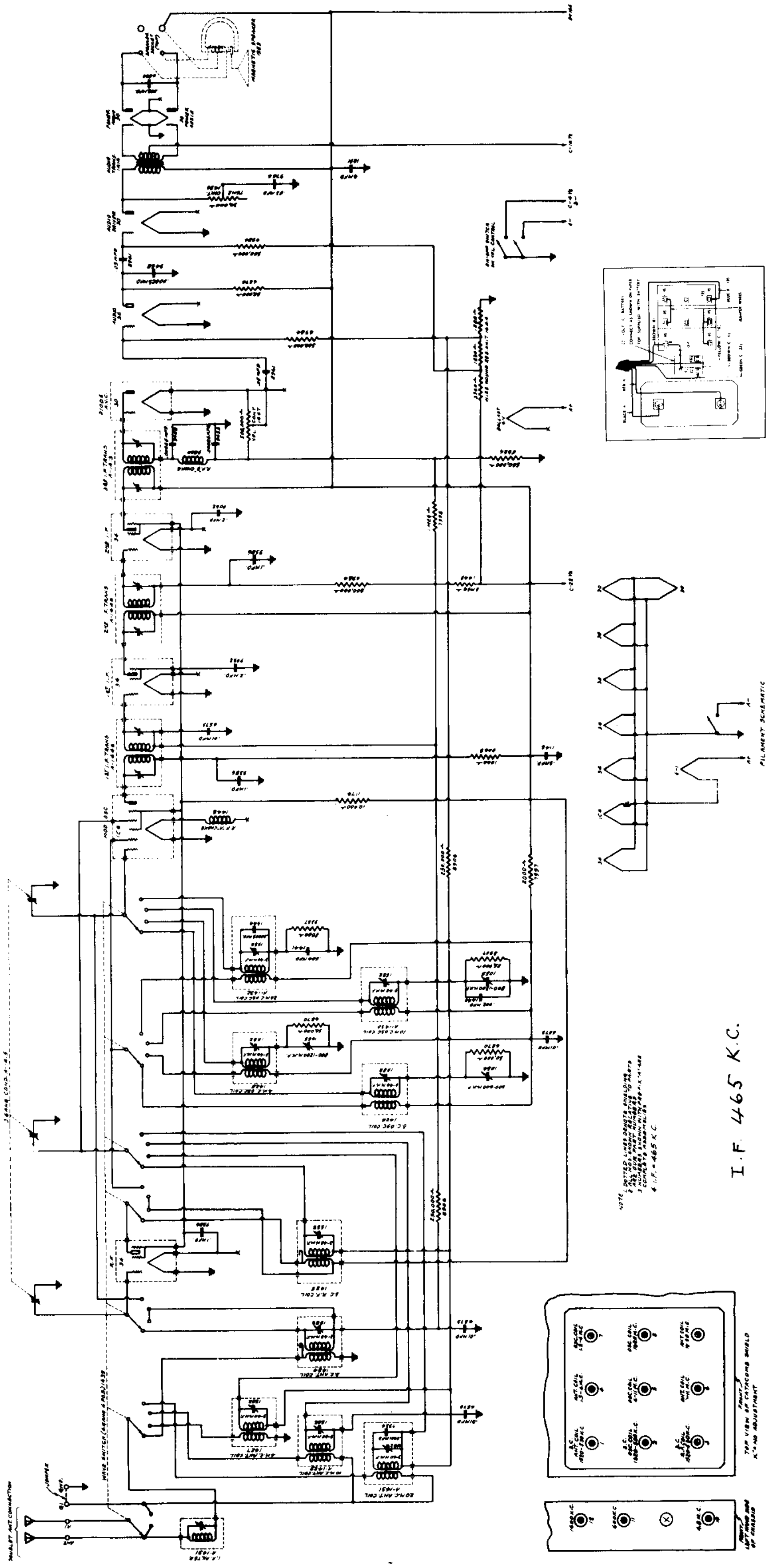


I.F. 456 K.C.

R 1 - 35,000	C 1 - .005 - 400 v.	T 1 - 3-30 mmfd.
R 2 - 300	C 2 - .0001 - mica	T 2 - 3-30 mmfd.
R 3 - 7,500	C 3 - .1 - 200 v.	T 3 - 3-30 mmfd.
R 4 - 40,000	C 4 - .05 - 400 v.	
R 5 - 20,000	C 5 - .25 - 200 v.	
R 6 - 750	C 6 - .05 - 400 v.	
R 7 - 1,000,000	C 7 - .1 - 20 v.	P 1 - .003 mica
R 8 - 3,000,000	C 8 - .00025 - mica	P 2 - 260-500 padder
R 9 - 500,000	C 9 - .00025 - mica	
R 10 - 7,500	C 10 - .02 - 400 v.	
R 11 - 500,000	C 11 - .005 - 400 v.	L 1 - S.W. ant.
R 12 - 300,000	C 12 - .02 - 400 v.	L 2 - B.C. ant. and preselector
R 13 - 500,000	C 13 - .02 - 400 v.	L 3 - S.W. osc.
R 14 - 60,000	C 14 - .02 - 400 v.	L 4 - B.C. osc.
R 15 - 60,000	C 15 - .02 - 400 v.	L 5 - input I.F.
R 16 - 500,000	C 16 - .00025 - mica	L 6 - output I.F.
R 17 - 310		
R 18 - 500,000		

ALLIED RADIO CORPORATION

MODELS G9629-G9631-G9633-G9635-G9637-G9639-H9880-H9882 H9883-H9884-H9885-H9886



VOLTAGE TABLE

"A" Battery - 3 Volt Dry Cell
"B" Battery - 3 45 Volt "B"
"C" Battery - 1 22½ Volt "C"

RANGES

1520-535 KILOCYCLES
1.5 -4.2 MEGACYCLES
4 -11 MEGACYCLES
10 -20 MEGACYCLES

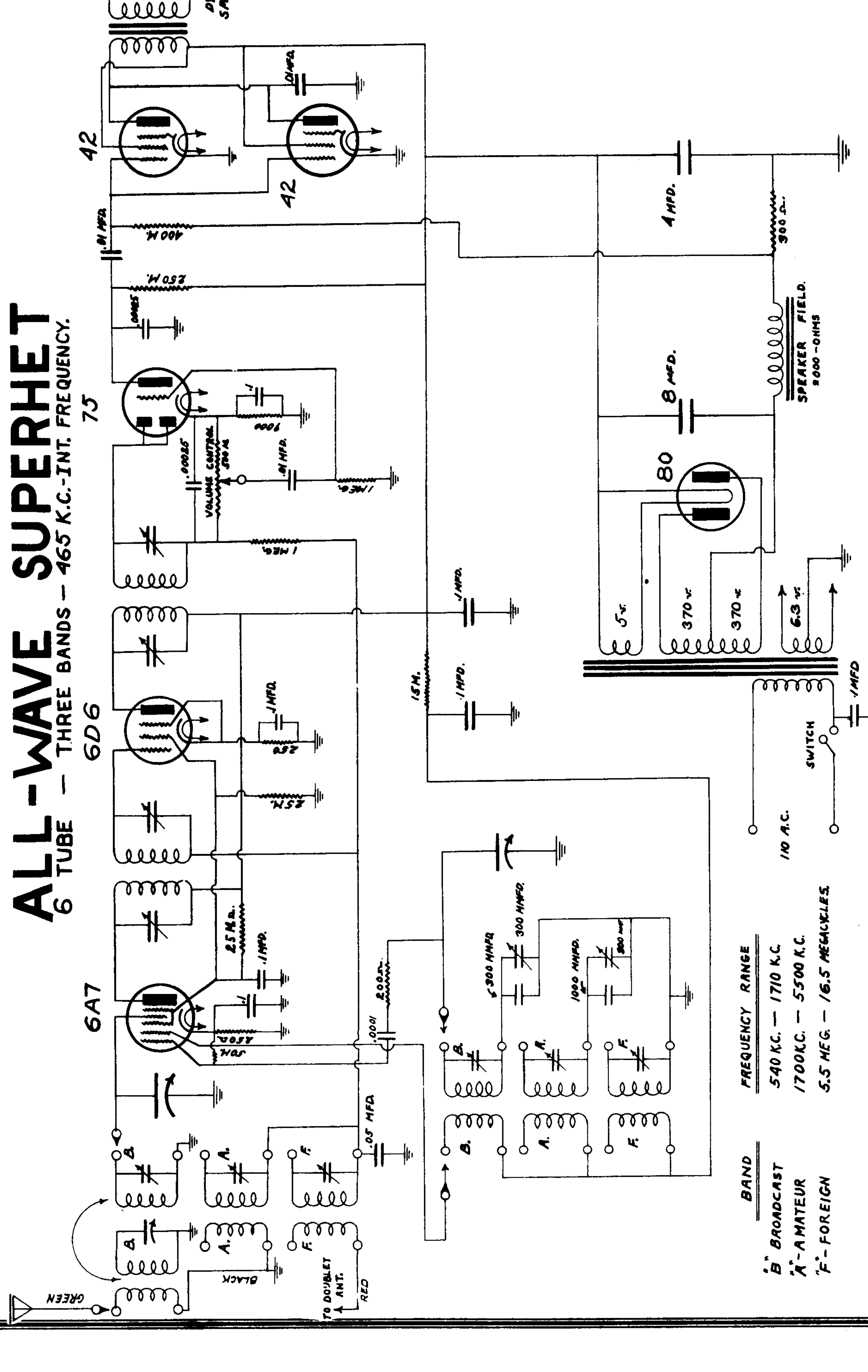
TUBE		FILAMENT	PLATE	SCREEN	GRID NO. 2	GRID NO. 3 & 5	CONTROL GRID
1C6	Oscillator & 1st Detector	1.9	135		135	75	3.5
34	Radio Frequency	1.9	135	75			
34	1st Intermediate Frequency	1.9	135	75			
34	2nd Intermediate Frequency	1.9	135	75			
30	2nd Detector & AVC	1.9					
30	1st Audio	1.9	60#				
30	Audio Driver	1.9	125				
30	Output	1.9	125				
30	Output	1.9	125				

(Total "A" Drain 600 M.A.)
(Total "B" Drain 23 M.A.) with no signal)

Comparative voltage only. Read all voltages from socket to chassis with 1,000 ohm per volt meter. When making voltage checks use batteries that deliver full voltage with the receiver turned on.

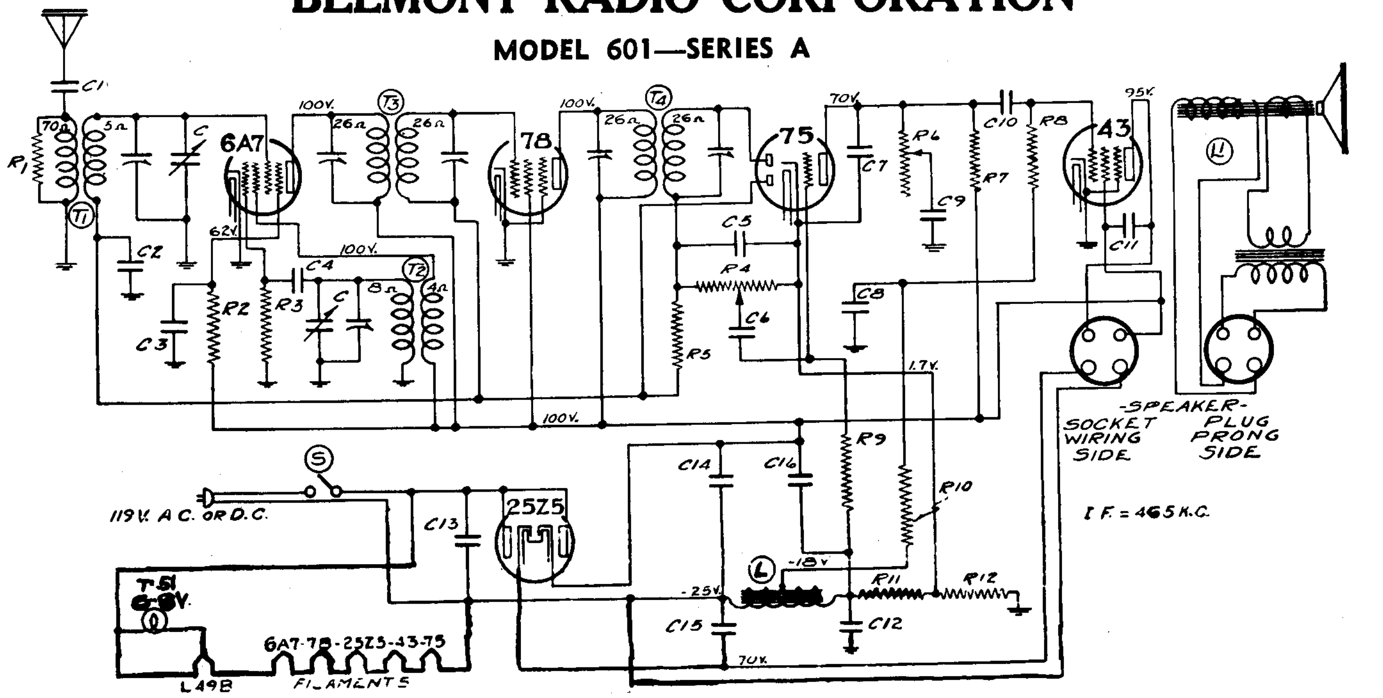
ALLIED RADIO CORPORATION

MODELS G9864 & G9865



BELMONT RADIO CORPORATION

MODEL 601—SERIES A



No.	Part No.	Description
R1	130-12	50M Ohm—⅓W—20%— 20V—Carbon
R2	130-21	20M Ohm—⅓W—20%— 20V—Carbon
R3	130-12	50M Ohm—⅓W—20%— 20V—Carbon
R4	101-54	1 meg Ohm—Volume Control
R5	130-119	3 meg Ohm—⅓W—20%—100V—Carbon
R6	101-55	1 meg Ohm—Tone Control
R7	130-120	100M Ohm—⅓W—20%— 50V—Carbon
R8	130-5	300M Ohm—⅓W—20%—100V—Carbon
R9	130-38	2 meg Ohm—⅓W—20%—100V—Carbon
R10	130-9	200M Ohm—⅓W—20%— 20V—Carbon
R11	106-28	35 Ohm—Muter Strip
R12	106-28	50 Ohm—Muter Strip

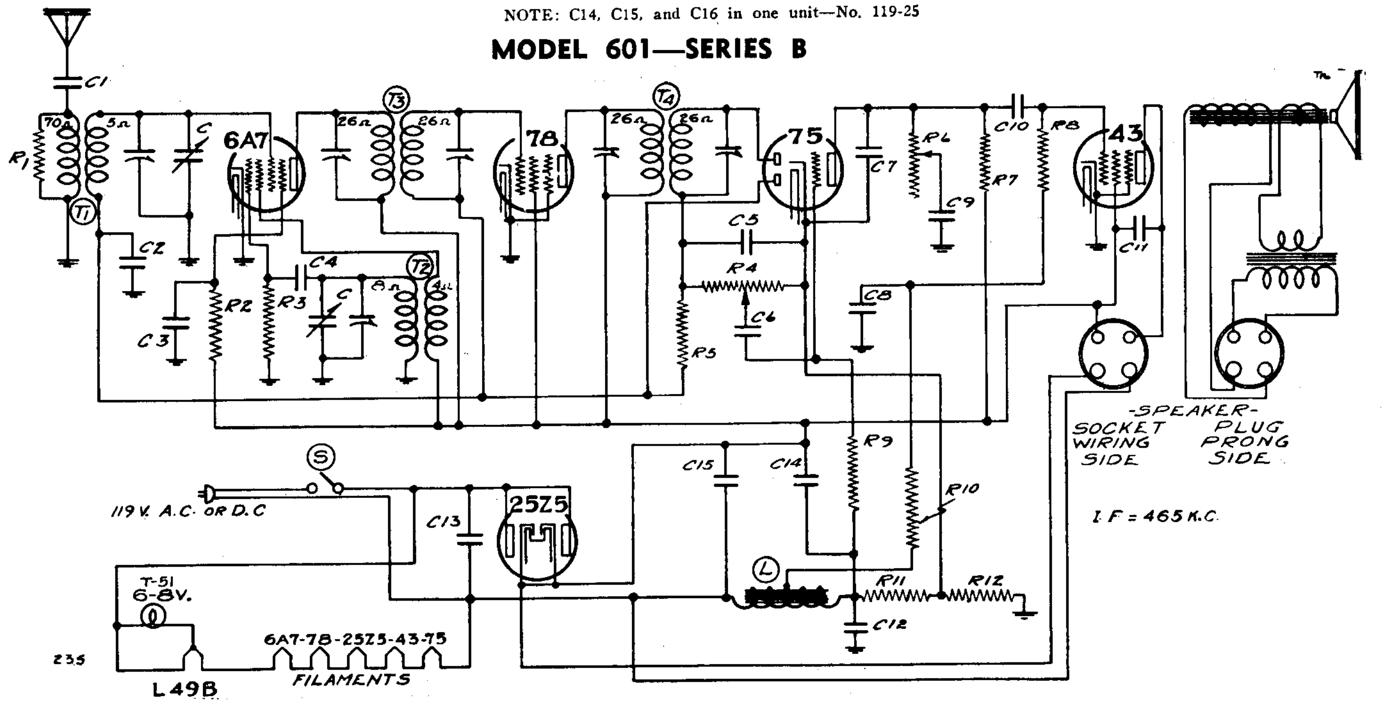
NOTE: R11 and R12 in one unit—No. 106-28.

C1	100-25	.002 x600 Volt—25%
C2	100-22	.05 x200 Volt—25%
C3	100-22	.05 x200 Volt—25%
C4	129-12	.00025 Mica—MT—20%
C5	129-12	.00025 Mica—MT—20%
C6	100-11	.01 x400 Volt—20%
C7	129-2	.0005 Mica—MT—20%
C8	100-20	.1 x200 Volt—25%
C9	100-11	.01 x400 Volt—25%
C10	100-11	.01 x400 Volt—25%
C11	100-25	.002 x600 Volt—25%
C12	100-6	.25 x200 Volt—20%
C13	100-39	.1 x400 Volt—20%
C14	119-25	16 mfd.x100 Volt—Working Voltage
C15	119-25	5 mfd.x100 Volt—Working Voltage
C16	119-25	8 mfd.x100 Volt—Working Voltage

NOTE: C14, C15, and C16 in one unit—No. 119-25

C	102-33	One section of two gang condenser
T1	111-57	Antenna Coil
T2	110-46	Oscillator Coil
T3	108-82	Input I.F. Coil—465 Kc.
T4	108-83	Output I.F. Coil—465 Kc.
L	105-29	Filter Choke (Resistance 600 Ohms)
L1	114-43	Five Inch Speaker (Field resistance 3000 Ohms)
S	101-54	On and off switch on Volume Control

MODEL 601—SERIES B



No.	Part No.	Description
R1	130-12	50M Ohm—⅓W—20%— 20V—Carbon
R2	130-21	20M Ohm—⅓W—20%— 20V—Carbon
R3	130-12	50M Ohm—⅓W—20%— 20V—Carbon
R4	101-54	1 meg Ohm—Volume Control
R5	130-119	3 meg Ohm—⅓W—20%—100V—Carbon
R6	101-55	1 meg Ohm—Tone Control
R7	130-120	100M Ohm—⅓W—20%— 50V—Carbon
R8	130-5	300M Ohm—⅓W—20%—100V—Carbon
R9	130-38	2 meg Ohm—⅓W—20%—100V—Carbon
R10	130-9	200M Ohm—⅓W—20%— 20V—Carbon
R11	106-28	35 Ohm—Muter Strip
R12	106-28	50 Ohm—Muter Strip

NOTE: R11 and R12 in one unit—No. 106-28.

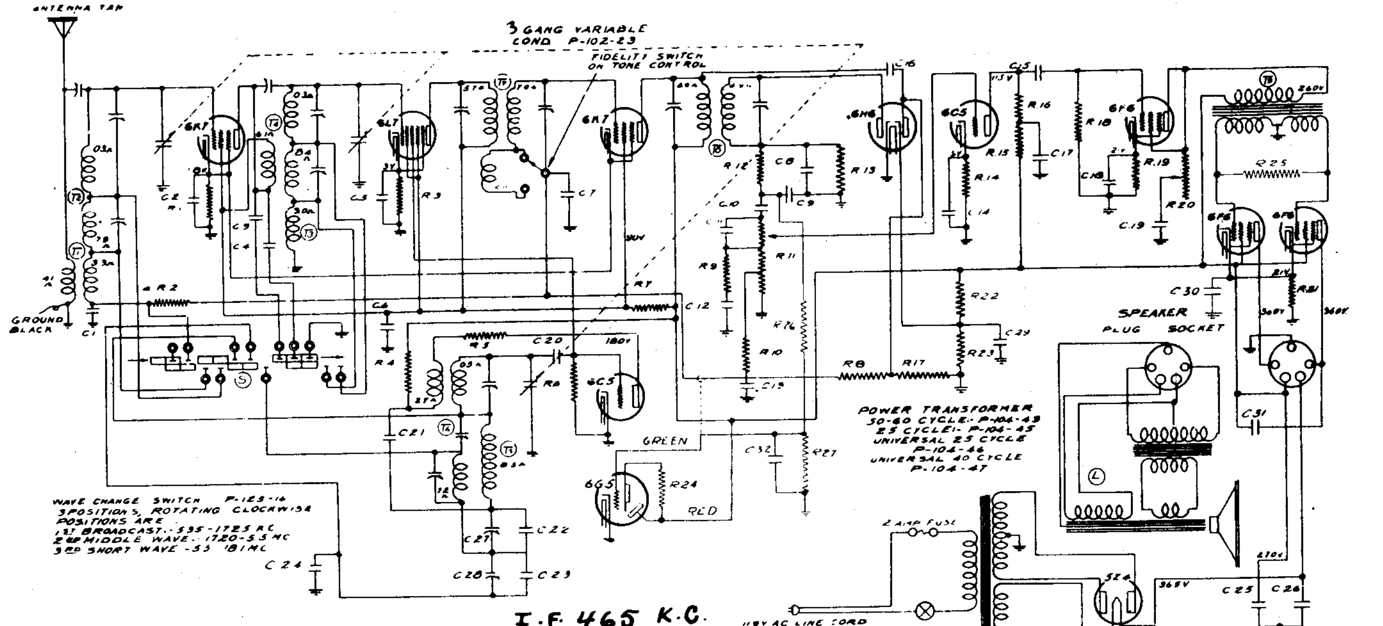
C1	100-25	.002 x 600 Volt—25%
C2	100-22	.05 x 200 Volt—25%
C3	100-22	.05 x 200 Volt—25%
C4	129-12	.00025 Mica—MT—20%
C5	129-12	.00025 Mica—MT—20%
C6	100-11	.01 x 400 Volt—20%
C7	129-2	.0005 Mica—MT—20%
C8	100-20	.1 x 200 Volt—25%
C9	100-11	.01 x 400 Volt—25%
C10	100-11	.01 x 400 Volt—25%
C11	100-25	.002 x 600 Volt—25%
C12	100-6	.25 x 200 Volt—20%
C13	100-39	.1 x 400 Volt—20%
C14	119-29	5 mfd. x 100 Working Voltage
C15	119-29	30 mfd. x 100 Working Voltage

C	102-33	One section of two gang condenser
T1	111-57	Antenna Coil
T2	110-46	Oscillator Coil
T3	108-82	Input I.F. Coil—465 Kc.
T4	108-83	Output I.F. Coil—465 Kc.
L	105-29	Filter Choke (Resistance 600 Ohms)
L1	114-43	Five Inch Speaker (Field Resistance 3000 Ohms)
S	101-54	On and off switch on Volume Control

NOTE: C14, C15 in one unit—No. 119-29.

BELMONT RADIO CORPORATION

MODEL 1070—SERIES B



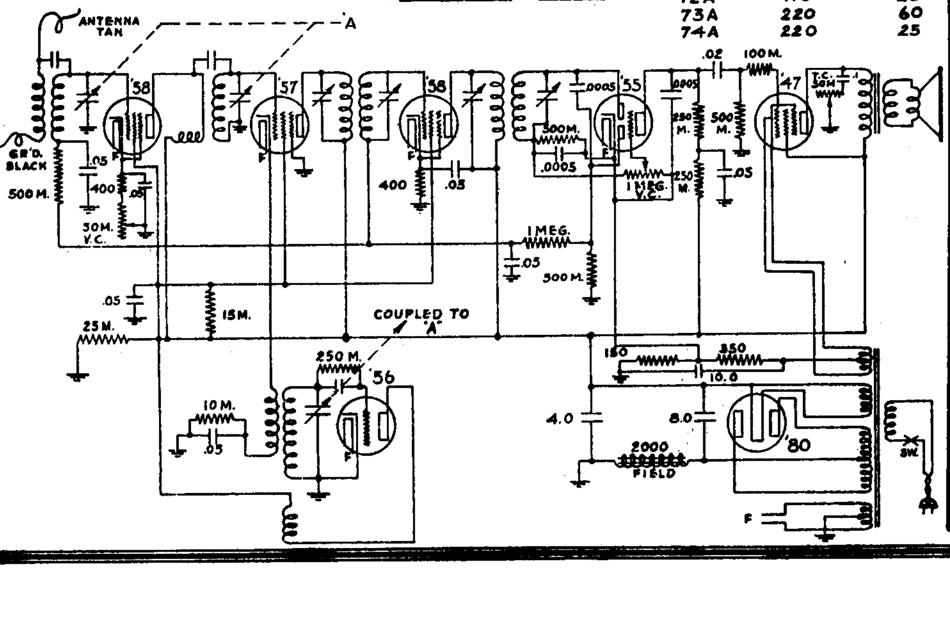
No.	Part No.	Description
		RESISTORS
R1	130-60	100 Ohm—⅓W—20%— 10V—Carbon
R2	130-20	100M Ohm—⅓W—20%— 50V—Carbon
R3	130-54	500 Ohm—⅓W—20%— 10V—Carbon
R4	130-49	12M Ohm— 1W—20%—150V—Carbon
R5	130-53	180 Ohm—⅓W—20%— 10V—Carbon
R6	130-52	50M Ohm—⅓W—20%— 10V—Carbon
R7	130-88	10M Ohm— 2W—Wire Wound
R8	130-3	500M Ohm—⅓W—20%—100V—Carbon
R9	130-22	5M Ohm—⅓W—20%— 10V—Carbon
R10	130-85	3M Ohm—⅓W—20%— 10V—Carbon
R11	101-36	1 Meg Ohm—Volume Control
R12	130-20	100M Ohm—⅓W—20%— 50V—Carbon
R13	130-11	250M Ohm—⅓W—20%— 50V—Carbon
R14	130-36	10M Ohm—⅓W—20%— 50V—Carbon
R15	130-20	100M Ohm—⅓W—20%— 50V—Carbon
R16	130-20	100M Ohm—⅓W—20%— 50V—Carbon
R17	130-3	500M Ohm—⅓W—20%—100V—Carbon
R18	130-3	500M Ohm—⅓W—20%—100V—Carbon
R19	106-25	1000 Ohm—⅓W—Muter
R20	101-40	5000 Ohm—Tone Control
R21	106-25	370 Ohm—⅓W—Muter
R22	130-9	200M Ohm—⅓W—20%— 20V—Carbon
R23	130-21	20M Ohm—⅓W—20%— 20V—Carbon
R24	130-110	1 Megohm—1/10W—10%—100V—Carb.
R25	130-21	20M Ohm—⅓W—20%— 20V—Carbon
R26	130-126	3 Megohm—1/10W—20%—100V—Carb.
R27	130-127	4 Megohm—1/10W—20%—100V—Carb.
		CONDENSERS
C1	100-9	.05 x 200 Volt—25%
C2	100-6	.25 x 200 Volt—20%
C3	129-30	.0014 Mica—MW—20%
C4	129-21	.0002 Mica—MT—20%
C5	100-20	.1 x 200 Volt—25%
C6	100-24	.25 x 400 Volt—25%
C7	100-9	.05 x 200 Volt—25%
C8	129-38	.00005 Mica—MT—10%
C9	129-38	.00005 Mica—MT—10%
C10	100-9	.05 x 200 Volt—25%
C11	129-2	.0005 Mica—MT—20%
C12	100-22	.05 x 200 Volt—25%
C13	100-22	.05 x 200 Volt—25%
C14	119-19	20 Mfd. x 25 Volts
C15	100-13	.05 x 400 Volt—25%
C16	129-3	.00002 Mica—20%
C17	100-1	.1 x 400 Volts—Plus 50%—Minus 10%
C18	119-19	20 Mfd. x 25 Volts
C19	100-1	.1 x 400 Volts—Plus 50%—Minus 10%
C20	129-52	.000018 Mica—MT—10%
C21	100-13	.05 x 400 Volts—25%
C22	129-28	.00064 Mica—MT—5%
C23	129-22	.0014 Mica—MW—5%
C24	129-29	.0038 Mica—MW—2½%
C25	103-8	14 Mfd. x 400 Volts
C26	103-10	30 Mfd. x 450 Volts
C27	124-27	Series Pad
C28	124-27	Series Pad
C29	100-7	.005 x 600 Volt—25%
C30	119-23	25 Mfd. x 25. Volts
C31	100-32	.0005 x 1000 Volts—20%
C32	100-11	.01 x 400 Volts—25%
		PARTS
T1	111-40	Broadcast Antenna Coil
T2	111-39	Short Wave, Middle Wave Ant. Coil
T3	109-24	Broadcast R.F. Coil
T4	109-25	Short Wave, Middle Wave, R.F. Coil
T5	110-32	Broadcast Oscillator Coil
T6	110-33	Short Wave, Middle Wave, Osc. Coil
T7	108-55	Input I.F. Coil 465 Kc.
T8	108-62	Output I.F. Coil 465 Kc.
T9	105-17	Audio Transformer
L	114-29	Speaker (Field Resistance 1550 Ohms)

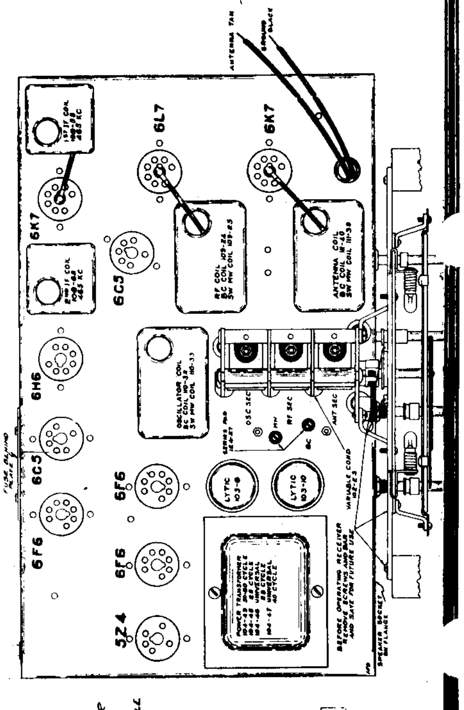
224

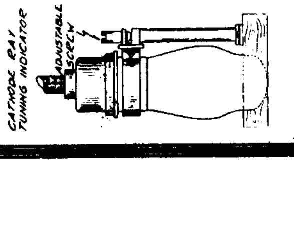
MODELS 71A-72A-73A-74A

SERIES 70A

MODEL	VOLTAGE	CYCLES
71A	110	60
72A	110	25
73A	220	60
74A	220	25

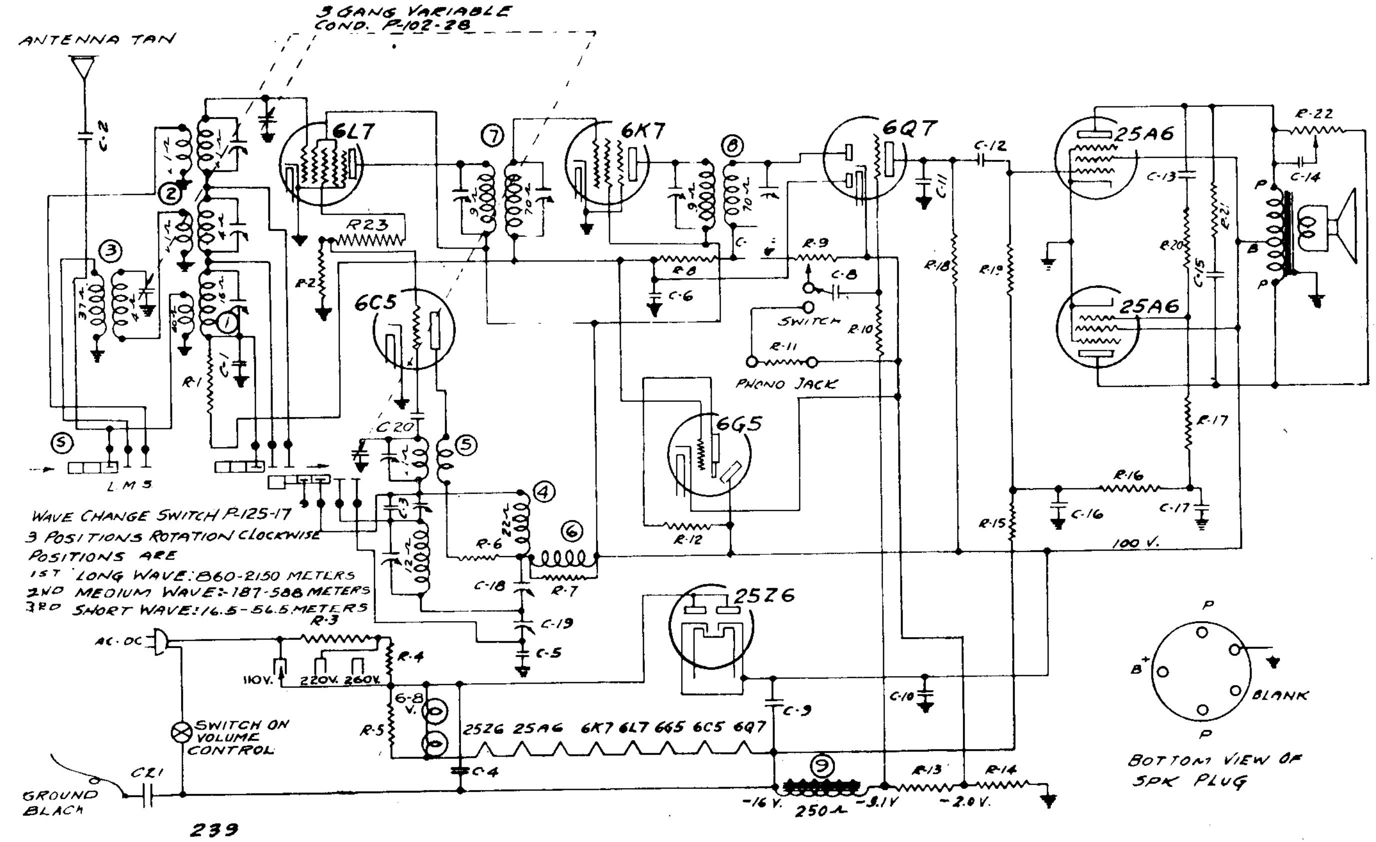






BELMONT RADIO CORPORATION

MODEL 845—SERIES "A"



No.	Part No.	Description
		RESISTORS
R1	130-20	100M Ohm—⅓W—20%— 50V—Carbon
R2	130-12	50M Ohm—⅓W—20%— 20V—Carbon
R3	107-48	250 Ohm—40 Watt in Line Cord
R4	106-30	100 Ohm—Muter Strip
R5	106-30	40 Ohm—Muter Strip
R6	130-27	50 Ohm—⅓W—20%— 3V—Carbon
R7	130-12	50M Ohm—⅓W—20%— 20V—Carbon
R8	130-4	3 meg Ohm—⅓W—20%—100V—Carbon
R9	101-46	1 meg Ohm—Volume Control
R10	130-4	3 meg Ohm—⅓W—20%—100V—Carbon
R11	130-20	100M Ohm—⅓W—20%— 50V—Carbon
R12	130-110	1 meg Ohm—1/10W—10%—100V—Car.
R13	130-128	20 Ohm—⅓W—20%— 10V—Carbon
R14	130-27	50 Ohm—⅓W—20%— 3V—Carbon
R15	130-11	250M Ohm—⅓W—20%— 50V—Carbon
R16	130-11	250M Ohm—⅓W—20%— 50V—Carbon
R17	130-66	75 M Ohm—⅓W—10%— 50V—Carbon
R18	130-100	150M Ohm—⅓W—20%— 50V Carbon
R19	130-102	500M Ohm—⅓W—10%— 50V—Carbon
R20	130-102	500M Ohm—⅓W—10%— 50V—Carbon
R21	130-17	10M Ohm—⅓W—20%— **20V—Carbon**
R22	101-51	300M Ohm—Tone Control
R23	130-56	100 Ohm—⅓W—20%— 10V—Carbon

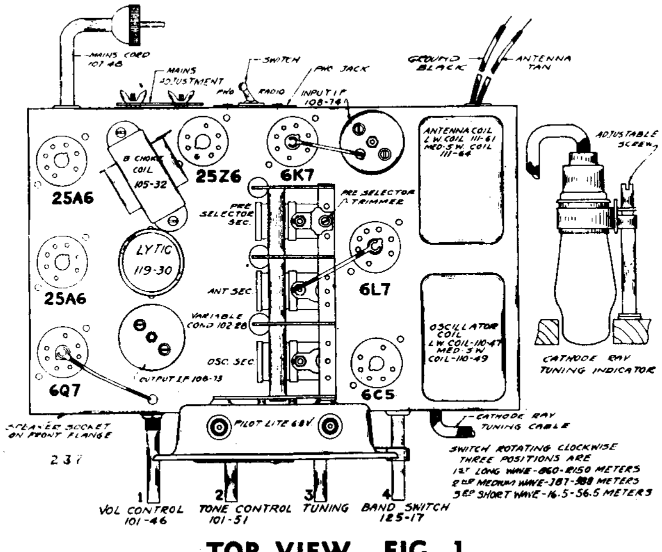
NOTE: R4 and R5 in one unit—part No. 106-30

No.	Part No.	Description
		CONDENSERS
C1	100-22	.05 x 200 Volt—25%
C2	100-11	.01 x 400 Volt—25%
C3	129-67	.00004 Mica—MT—O—10%
C4	100-39	.1 x 400 Volt—20%
C5	129-54	.003 Mica—MW—W—2½%
C6	100-26	.02 x 400 Volt—20%
C7	129-12	.00025 Mica—MT—O—20%
C8	100-11	.01 x 400 Volt—25%
C9	119-30	26 mfd. 100 Working Voltage
C10	119-30	26 mfd. 100 Working Voltage
C11	129-12	.00025 Mica—MT—O—20%
C12	100-11	.01 x 400 Volt—25%
C13	100-11	.01 x 400 Volt—25%
C14	100-11	.01 x 400 Volt—25%
C15	100-44	.003 x 600 Volt—20%
C16	100-43	.25 x 200 Volt—25%
C17	100-20	.1 x 200 Volt—20%
C18	124-31	Adjustable Condenser 300 mmf. working capacity
C19	124-32	Adjustable Condenser 565 mmf. working capacity
C20	129-39	.00005 Mica—20%
	100-36	.01 x 1400 Volt—10%

Part

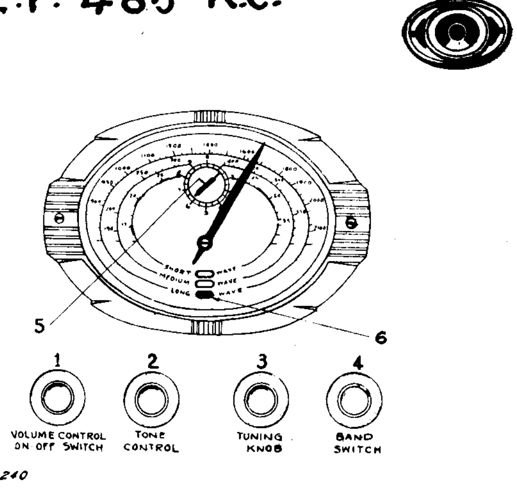
NOTE: C9 and C10 in one unit—part No. 119-30

No.	Part No.	Description
		PARTS
1	111-61	Long Wave Antenna Coil
2	111-64	Medium Wave & Short Wave Antenna Coil
3	111-62	Antenna Preselector Coil
4	110-47	Long Wave Oscillator Coil
5	110-49	Medium Wave & Short Wave Oscillator Coil
6	110-46	Oscillator Choke Coil
7	108-88	Input I.F. Coil—465 Kc.
8	108-73	Output I.F. Coil—465 Kc.
9	105-32	"B" Choke Coil
S	125-17	Band Switch



TOP VIEW—FIG. 1

I.F. 465 K.C.



FRONT VIEW—FIG. 3

BELMONT RADIO CORPORATION

MODEL 845 SERIES A

TUNING RANGE—
Long Wave Band
860-2150 Meters
350-140 Kilocycles
Medium Wave Band
187-588 Meters
1600-510 Kilocycles
Short Wave Band
16.5-56.5 Meters
18.2-5.3 Megacycles

Model 845 - Series A

8-Tube Including Cathode-Ray Tuning Indicator
3-Band A. C.-D. C. Superheterodyne Receiver
110-220-260 Volts A. C. (Any Cycles) or D. C.

I. F. FREQUENCY
465 K. C. (645.1 Meters)

DESCRIPTION

TUBES:

The tube complement of this chassis consists of the latest metal type tubes, which are interchangeable with "metal-glass" types, or glass tubes with octal bases.

The type and function of each tube is as follows:

1—Type 6L7 Pentagrid Mixer, First Detector.
1—Type 6C5 Oscillator.
1—Type 6K7 Remote Cut-Off Pentode, I. F. Amplifier (465 K.C.)
1—Type 6Q7 Duplex Diode Triode Second Detector, A.V.C. and First Audio.
2—Type 25A6 Output Pentodes in Push Pull.
1—Type 25Z6 High Vacuum Rectifier.
1—Type 6G5 Cathode-Ray Tuning Indicator.
(Note:—6G5 available in all glass only.)

POWER SUPPLY:

This receiver is supplied for operation on 110-220-260 volts A.C. (any cycle) or D.C.

Three taps are provided for mains voltages. These taps are accessible upon removing the plate fastened with two wing nuts to back of chassis.

Set the tap at the voltage supplied by the local power company.

This is important.

NOTE:

If set does not operate in one minute on Direct Current reverse plug in receptacle.

SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages as indicated on diagram are measured with 119 volt A.C. or D.C. mains.

With special mains voltages select tap nearest to actual mains voltage at time voltage measurements are to be made.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS

Dummy Antennas

The following dummy antennas are used in aligning the receiver, and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast and long wave)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

TEST FREQUENCIES USED

	Kilocycles	Meters
I. F.	465	645.1
Long Wave	150	2000
	350	860
	325	925
Broadcast	600	500
	1400	214
	1600	187
Short Wave	6000	50.0
	17000	17.6
	18200	16.5

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

CAUTION:

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the four bolts by which it is fastened.

ALIGNING I.F. TRANSFORMERS

(465 K.C.) (645.1 Meters)

Part No. 108-73 Output I.F. Transformer.
Part No. 108-74 Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the broadcast position, (center of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-73) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6L7 and adjust input I.F transformer (No. 108-74) to resonance.
   (c) With oscillator still connected to 6L7, readjust output I.F. transformer (108-73) if necessary.

ALIGNMENT PROCEDURE

The following adjustments to be made after the I.F.'s have been aligned as explained above.

SHORT WAVE BAND ALIGNMENT:

16.5 Meters (18.2 Mc.) to 56.5 Meters (5.3 Mc.,

1. With band changing switch in the short wave position, extreme right of its rotation, and with the gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Set external oscillator to 16.5 meters (18.2 Mc.) and adjust short wave oscillator trimmer (adjustment number 3, see Fig. 2) to resonance.
   (b) Re-set external oscillator to 17.6 meters (17.0 Mc.) and pick up signal by rotating gang condenser. Adjust short wave antenna trimmer (adjustment number 6) to resonance.
   (c) Re-set external oscillator to 50 meters (6.0 Mc.) and check for sensitivity.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 18.3 megacycle signal appears near 17.4 megacycles.

MEDIUM OR BROADCAST BAND ALIGNMENT:

588 Meters (510 K.C.) to 187 Meters (1600 K.C.)

1. With band changing switch in the medium wave position, center of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 187 meters (1600 K.C.) and adjust medium wave oscillator trimmer to resonance (adjustment number 2; see bottom view of coil assembly. Fig. 2.)
   (b) Re-set external oscillator to 214 meters (1400 K.C.), rotate variable gang condenser and pick up signal. Adjust medium wave antenna trimmer (Adjustment number 5) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 500 meters (600 K.C.), and adjust medium wave series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 2.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 300 meters (1000 K.C.) **Under no circumstances bend plates of variable condenser sections to correct tracking.**

IMPORTANT: This band must be completely rechecked after the long wave band has been adjusted.

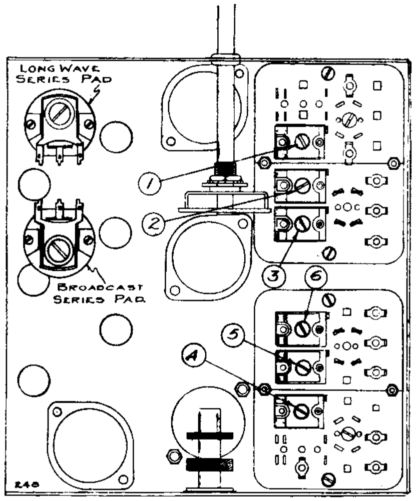


FIG. 2—BOTTOM VIEW (Showing Trimmers)

LONG WAVE BAND ALIGNMENT:

860 Meters (350 K.C.) to 2150 Meters (140 K.C.)

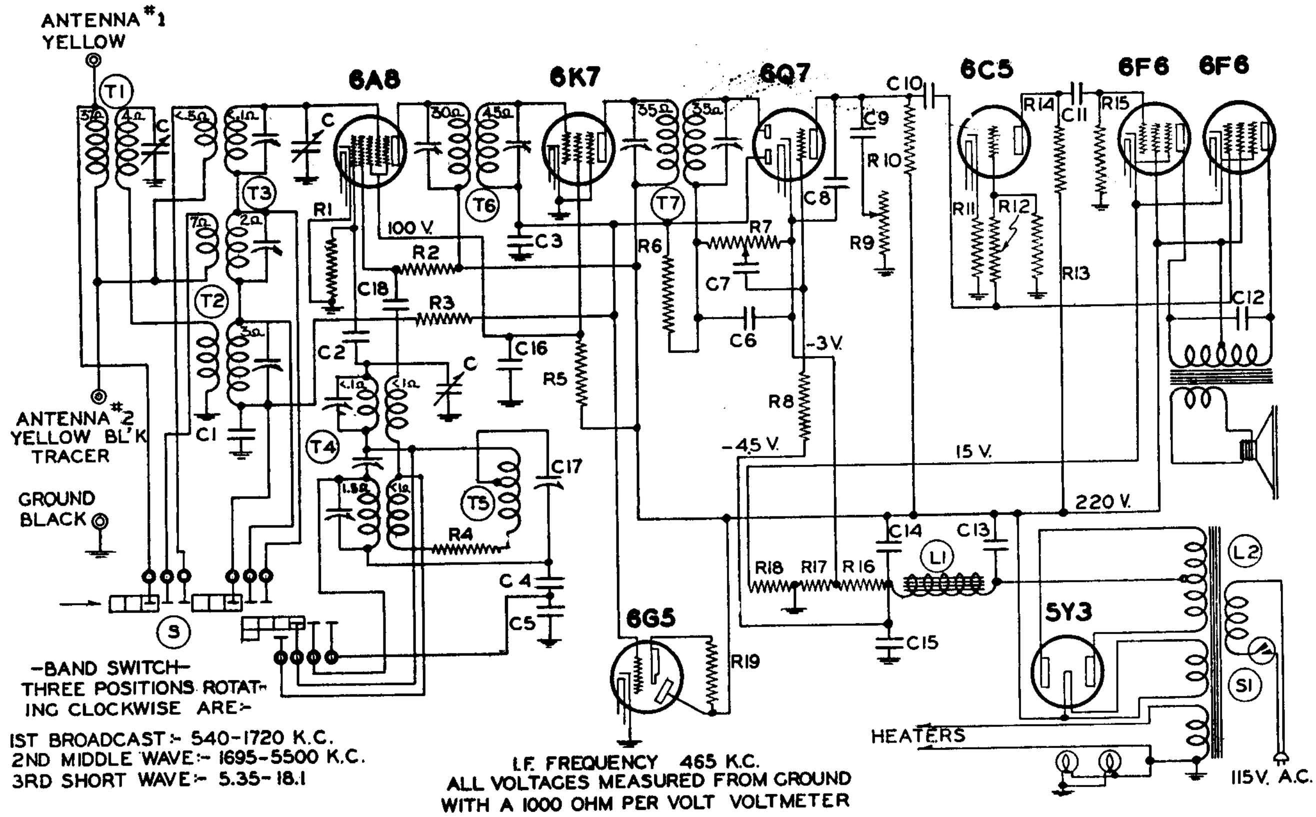
1. With band changing switch in the long wave position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 860 meters (350 K.C.), and adjust long wave oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly. Fig. 2.)
   (b) Re-set external oscillator to 925 meters (325 K.C.), rotate variable gang condenser and pick up signal. Adjust long wave antenna trimmer (Adjustment number 4) to resonance.
   (c) Re-set external oscillator to 2000 meters (150 K.C.), and adjust long wave series pad to resonance by rotating condenser to approximately 2000 meters, rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 2.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

IMPORTANT: This band must be completely rechecked after the medium wave band has been rechecked.

BELMONT RADIO CORPORATION

MODEL D699

FACTORY NO. 840



232

No.	Part No.	Description
		RESISTORS
R1	130-12	50M ohms - 1/3 w.
R2	130-48	15M ohms - 1/3 w.
R3	130-103	100M ohms - 1/3 w.
R4	130-27	50 ohms - 1/3 w.
R5	130-96	25M ohms - 1/2 w.
R6	130-4	3 megohm - 1/3 w.
R7	101-74	1 megohm - Volume Control
R8	130-4	3 megohm - 1/3 w.
R9	101-75	300M ohms - Tone Control
R10	130-100	150M ohms - 1/3 w.
R11	130-22	5M ohms - 1/3 w.
R12	130-163	400M ohms - 1/3 w.
R13	130-103	100M ohms - 1/3 w.
R14	130-12	50M ohms - 1/3 w.
R15	130-100	150M ohms - 1/3 w.
R16	106-37	20 ohms - Muter
R17	106-37	42 ohms - Muter
R18	106-37	250 ohms - Muter
R19	130-110	1 megohm - 1/10 w.

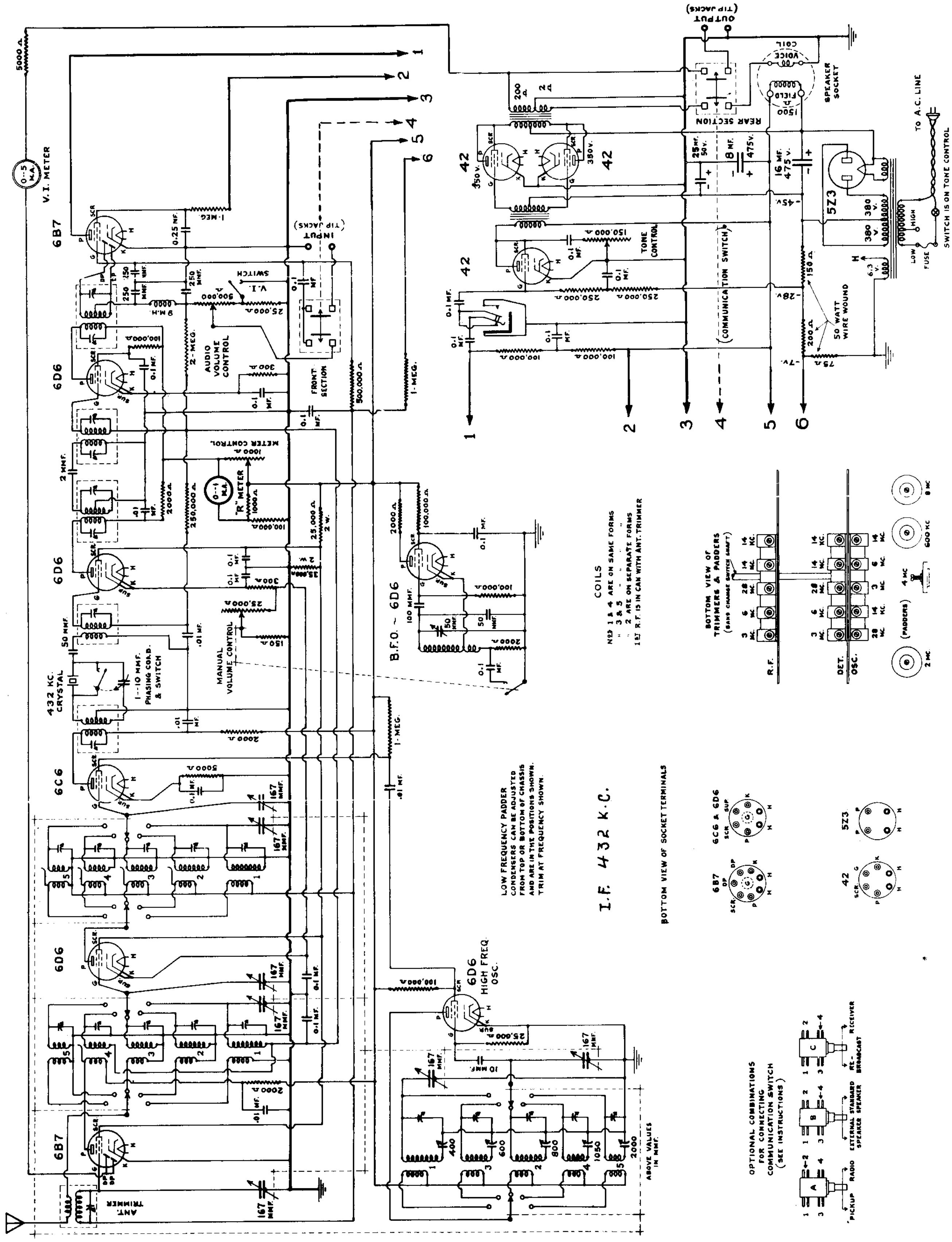
NOTE: R16, R17 and R18 in one unit, No. 106-37

No.	Part No.	Description
		CONDENSERS
C1	100-22	.05 x 200 v.
C2	129-39	.00005 Mica
C3	100-22	.05 x 200 v.
C4	129-55	.0034 Mica
C5	129-54	.003 Mica
C6	129-5	.0001 Mica
C7	100-11	.01 x 400 v.
C8	129-2	.0005 Mica
C9	100-57	.006 x 600 v.
C10	100-26	.02 x 400 v.
C11	100-26	.02 x 400 v.
C12	100-12	.003 x 600 v.
C13	103-6	8 mfd. x 350 v.
C14	103-14	16 mfd. x 250 v.
C15	100-20	.1 x 200 v.
C16	100-39	.1 x 400 v.
C17	124-35	Adjustable Padder - Working Capacity 740 mmf.
C18	100-12	.003 x 600 v.

PARTS

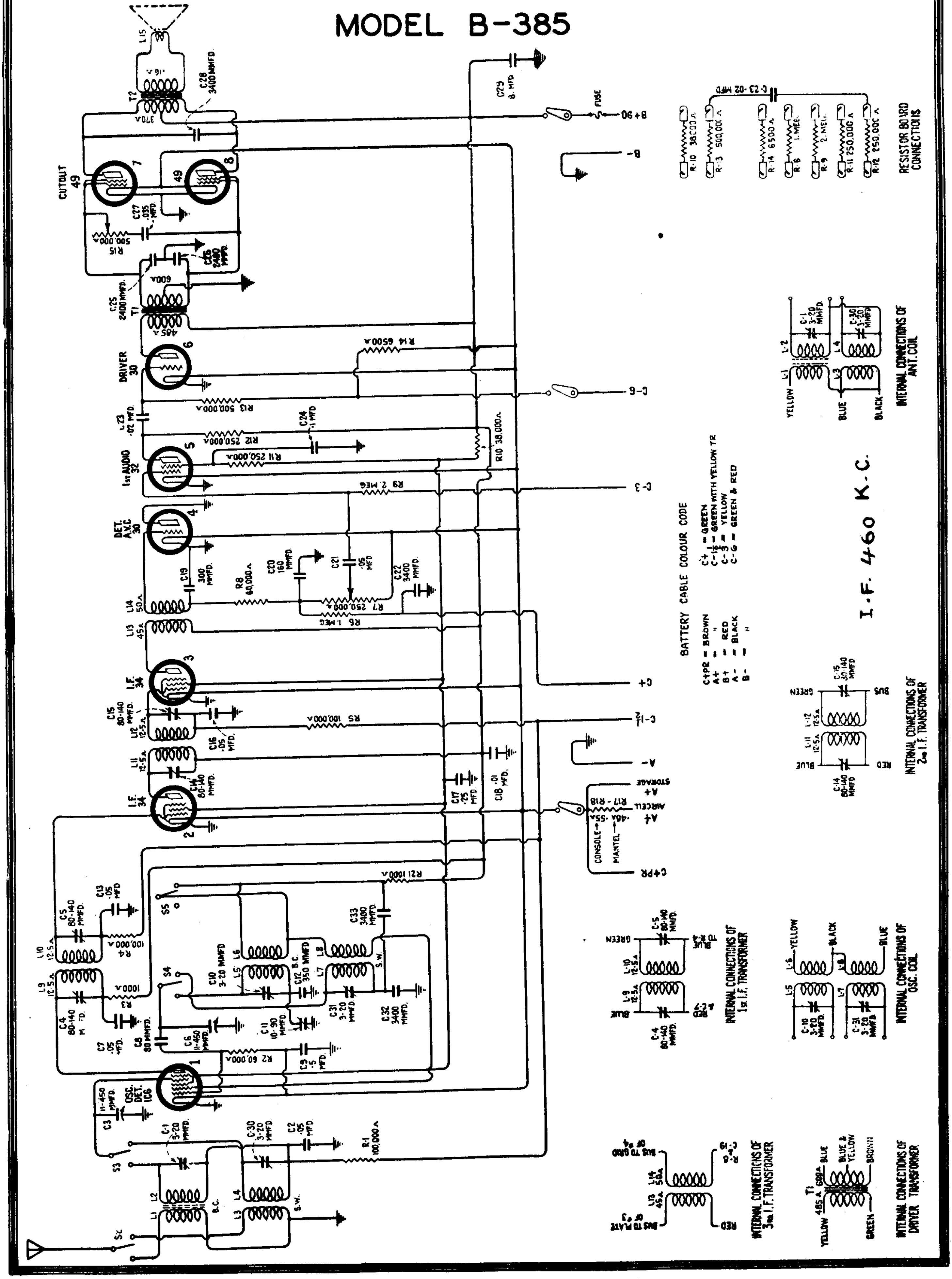
No.	Part No.	Description
C	102-47	One section of three gang condenser
T1	111-51	B.C. Pre-Selector
T2	111-49	B.C. Antenna Coil Assembly
T3	111-50	MW - SW Antenna Coil Assembly
T4	110-39	MW - SW Oscillator Coil Assembly
T5	110-55	B.C. Oscillator Coil Assembly
T6	108-105	Input I.F. - 465 kc.
T7	108-106	Output I.F. - 465 kc.
L1	114-66	6" Speaker (Field Resistance 900 ohms)
L2	104-87	Power Transformer (60 cycle) 115 volts
S	125-17	Band Switch
S1	101-74	On-off Switch on volume control.

BRETING RADIO MANUFACTURING COMPANY
MODEL BRETING "12"



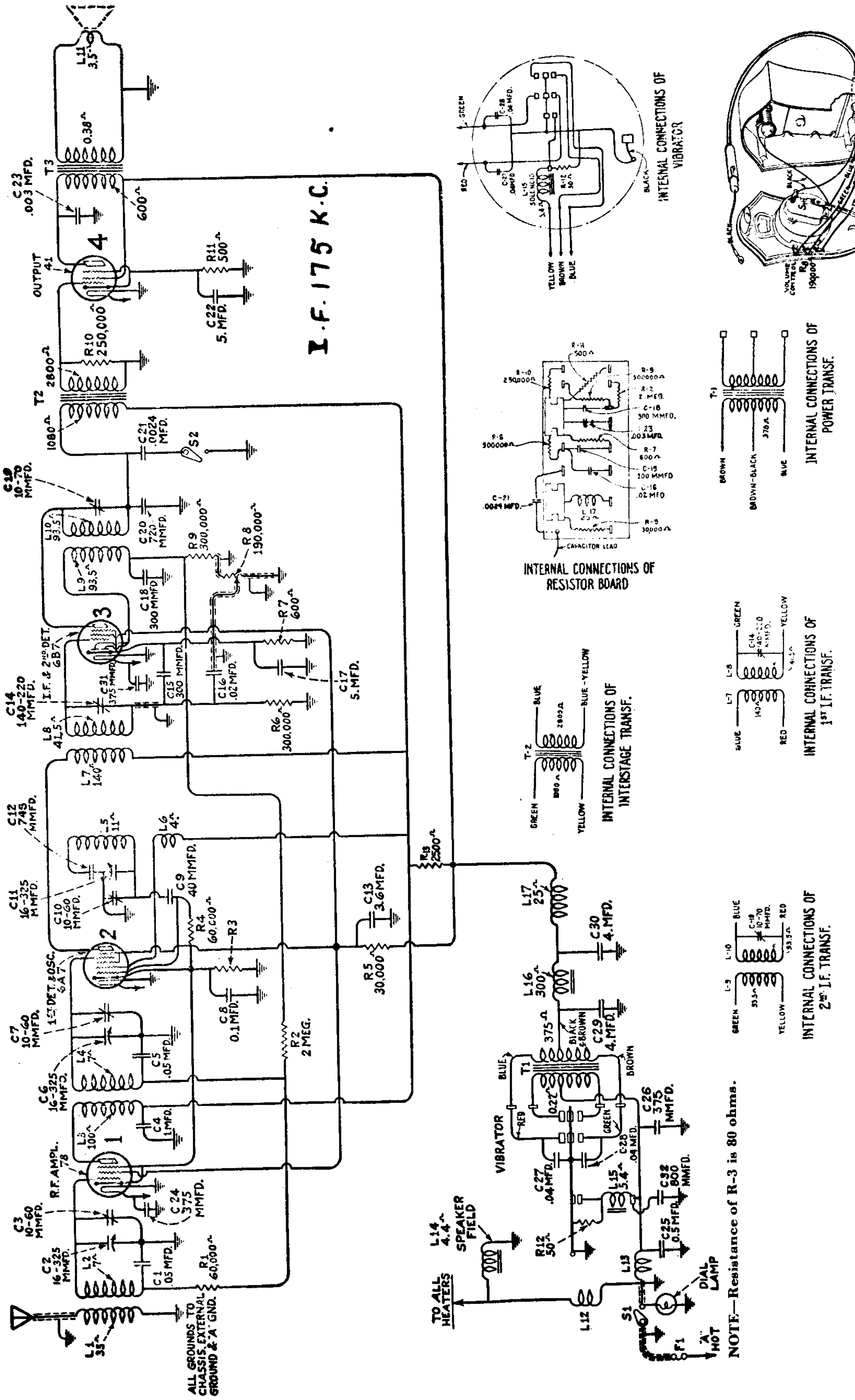
CANADIAN WESTINGHOUSE COMPANY Limited

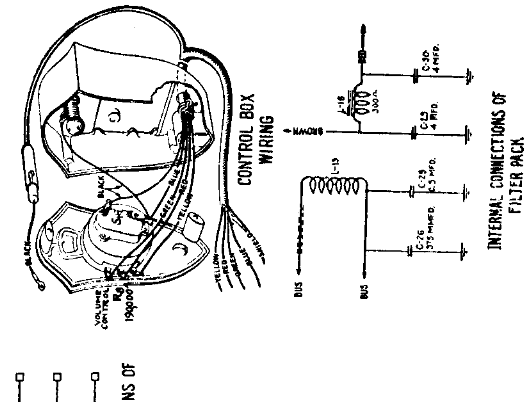
MODEL B-385



CANADIAN WESTINGHOUSE COMPANY Limited

MODEL A-44



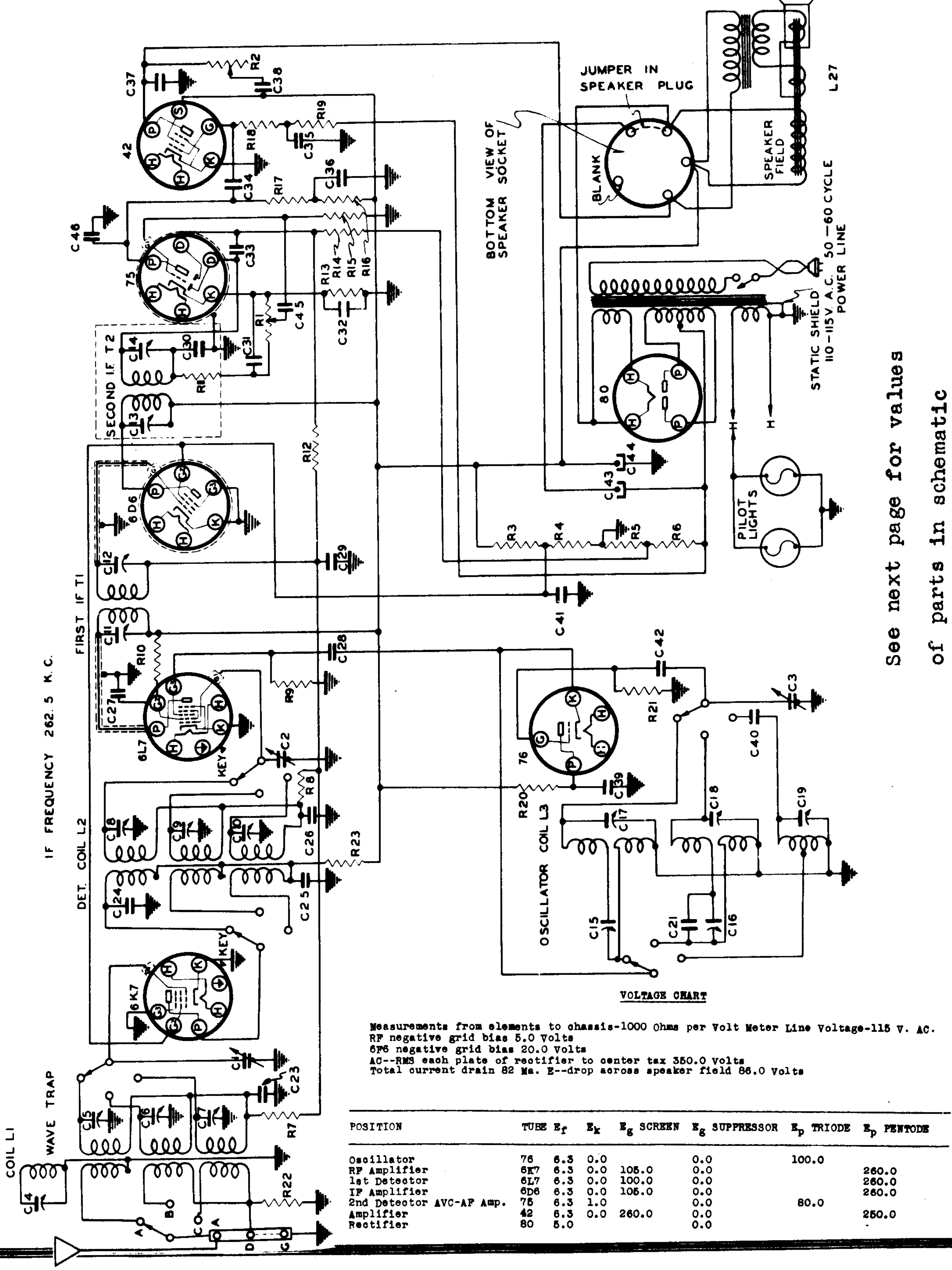


RADIOTRON SOCKET VOLTAGES
6.3 Volt Battery—No Signal

Radiotron No.		Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Cathode Current M.A.	Heater Volts
W-78 R. F.		4.42	83	180	5.25	6.0
W-6A7	First Detector	4.42	83	180	11.0	6.0
	Oscillator	4.42	—	180	Total	
W-6B7 Second Detector		3.22	84	176	5.25	6.0
W-41 Power		13.0	214	200	26.0	6.0

CASE ELECTRIC CORPORATION

MODELS 710A & AR-713A & AR-714A & AR-715A & AR-716A & AR-718A & AR-719A & AR-7113 & 7113R CHASSIS 27 & 27A



See next page for values of parts in schematic

VOLTAGE CHART

Measurements from elements to chassis-1000 Ohms per Volt Meter Line Voltage-115 V. AC.
RF negative grid bias 5.0 Volts
6F6 negative grid bias 20.0 Volts
AC--RMS each plate of rectifier to center tax 350.0 Volts
Total current drain 82 Ma. E--drop across speaker field 86.0 Volts

POSITION	TUBE	E_f	E_k	E_g SCREEN	E_g SUPPRESSOR	E_p TRIODE	E_p PENTODE
Oscillator	76	6.3	0.0		0.0	100.0	
RF Amplifier	6K7	6.3	0.0	105.0	0.0		260.0
1st Detector	6L7	6.3	0.0	100.0	0.0		260.0
IF Amplifier	6D6	6.3	0.0	105.0	0.0		260.0
2nd Detector AVC-AF Amp.	75	6.3	1.0		0.0	80.0	
Amplifier	42	6.3	0.0	260.0	0.0		250.0
Rectifier	80	5.0			0.0		

CASE ELECTRIC CORPORATION

MODELS 710A&AR-713A&AR-714A&AR-715A&AR-716A&AR-718A&AR-719A&AR-7113&7113R CHASSIS 27 & 27A

ALIGNMENT PROCEDURE

Correct alignment is of extreme importance in all wave receivers. The receivers are properly aligned at the factory with precision equipment and realignment should not be attempted by the service technician until all other causes of faulty operation are corrected.

In order to properly realign the receiver the following equipment is necessary:

1. A signal generator which will provide an accurately calibrated signal at any frequency from 262 kilocycles to 18 megacycles. The generator should have adjustable signal output.

2. An output audio voltmeter of the low voltage type to be connected across the moving coil of the speaker. This should be capable of providing a readable deflection for relatively low output levels to avoid the effects of overload.

3. An insulated or non-metallic screw driver for the adjustment of trimmers.

IF ALIGNMENT 262.5 KC

1. Connect the output meter (low scale) across the loud speaker voice coil. Turn the wave band switch (outside of tuning knob) to its left hand or counter-clockwise position. This brings the red indicator for broadcast band to the top. Turn the volume control to its maximum position.

2. Connect the test oscillator ground to chassis and the "hot" lead from the test oscillator to the grid of the 6L7 converter tube through a series .1 Mfd. condenser. Set test oscillator to 262.5 kc.

3. Adjust IF alignment screws C11, C12, (see illustration below) of second IF transformer, T2, adjacent to rectifier tube (type 80) to maximum output, reducing output of test oscillator to keep the meter reading on scale as alignment proceeds.

4. Adjust alignment screws C13, C14, of first IF transformer, T1, (directly behind tuning condenser) to maximum output as described above.

5. Readjust these trimmers for accurate alignment. Always use the lowest possible output from the test oscillator to preclude the possibility of automatic volume control action confusing proper adjustment.

ADJUSTMENT OF WAVE TRAP

Connect test oscillator to antenna and ground terminals of the receiver using a .00025 Mfd. condenser in series with the antenna terminal. With oscillator set at 262.5 kc adjust antenna trap alignment screw C4, for minimum signal increasing output of test oscillator as a minimum is reached.

RF ALIGNMENT (Broadcast "A" or "Red" Band)

1. With test oscillator connecting antenna post through .00025 Mfd. as above set signal generator to 1400 kc.

2. Set dial scale, hour and minute hands, to 6 o'clock when gang condenser is fully meshed at maximum capacitance.

3. Set dial to calibration mark 1400 kc using hour hand to indicate frequency (no further attention need be paid to position of minute hand which is used merely for convenience in logging stations by "TIME"). Adjust broadcast oscillator trimmer condenser C17, for maximum output meter reading. If it is found that two peaks occur within the range of the trimmer action use the one in which the trimmer is in its lowest capacitance or counter-clockwise position.

4. Adjust detector input trimmer C8, to a maximum.

5. Adjust the Antenna stage trimmer C5, to a maximum.

6. Set test oscillator to 600 kc and tune in the signal, then adjust broadcast oscillator padder C15, for maximum output. This padder is mounted under the chassis at the side of the RF "deck." Rock the condenser back and forth a degree or two in order to obtain proper maximum.

7. Repeat the 1400 kc adjustments described under 3, 4, 5, for greater accuracy. The output of the test oscillator should always be kept at the lowest output which will allow sufficient meter swing since this assures greater accuracy of adjustment.

Short Wave "B" or "Green" Band

1. Turn the wave band switch to the "B" or "Green" position. Leave the oscillator connected as above but with its output set to 6000 kc and the .00025 Mfd. condenser replaced by a 400 ohm resistor. Set dial scale to 6 mc on the green or middle band, adjust "B" band oscillator trimmer condenser C18, for maximum output observing as before that the proper point occurs at the minimum or counter-clockwise position of the screw if two points are found.

2. Adjust detector input "B" band trimmer condenser C9, to a maximum while rocking the tuning condenser slightly for maximum response.

3. Adjust Antenna stage "B" band trimmer C6, for maximum output.

4. Set the test oscillator to 2000 kc and tune in the signal. Adjust "B" band oscillator padder condenser C16 for maximum output while rocking tuning condenser as described above.

5. Repeat operations 1, 2, and 3 to assure precise alignment.

Short Wave "C" or "Yellow" Band

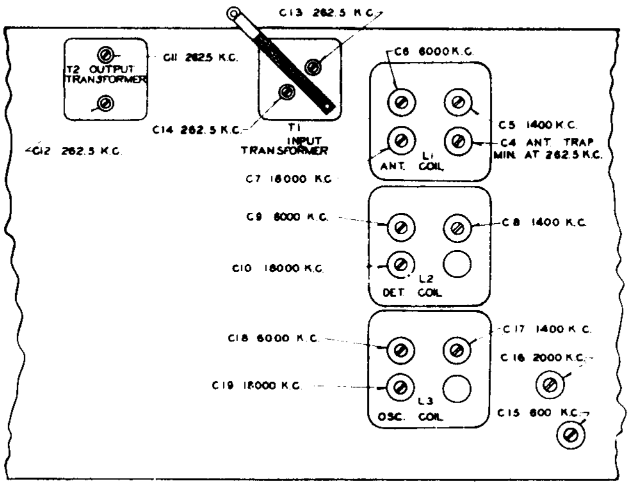
1. With test oscillator connected same as for "B" band and set to 18000 kc (18 mc) set dial scale to 18 mc on inner or yellow band.

2. Adjust "C" band oscillator trimming condenser C19, for maximum response. Use lower capacity or counter-clockwise response point.

3. Adjust "C" band detector input trimmer C10, to a maximum, "rocking" tuning adjustment to obtain greatest output.

4. Adjust antenna "C" band trimmer C7, for maximum response.

*The adjustment of the detector input trimmers on the "B" and "C" bands by the procedure outlined above is advisable as contrasted with the usual method of trimming without rocking the tuning adjustment because slight couplings through the tube circuits tend to disturb the oscillator frequency as the detector is tuned. This procedure should be followed on any type of all wave receiver.

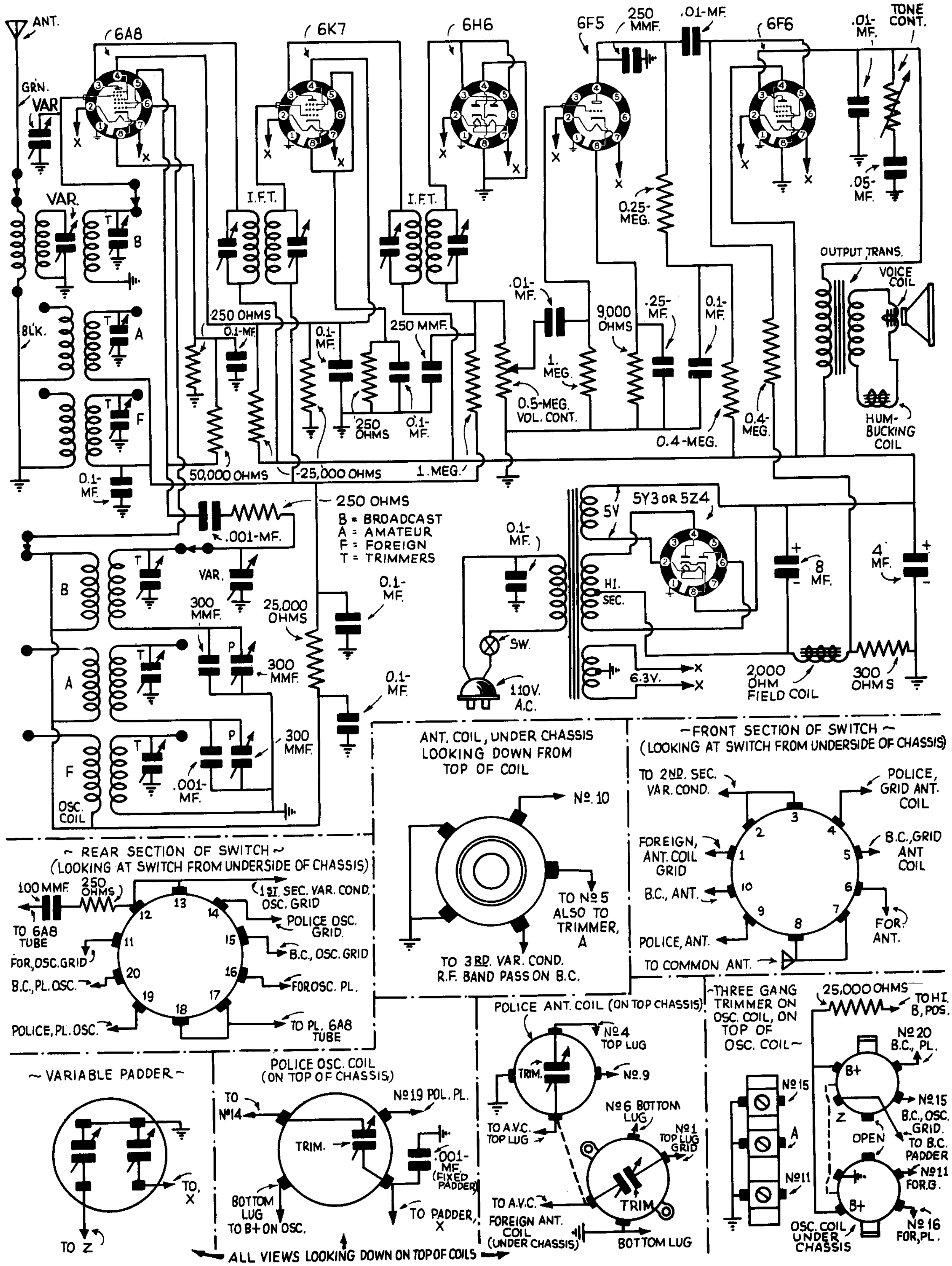


C4 C5 C6 C7 L1	15271	Coil Antenna & Shield	Sold	3.53
C8 C9 C10 L2	15272	Coil Detector & Shield	in matched	3.44
C17 C18 C19 L3	15270	Coil Oscillator & Shield	sets	2.75
	A15069	Cord Attachment		.35
C44	A15237-2	Cond. Electrolytic 10 Mfd 300V		.80
C43 (25 Cycle)	A15427	Cond. Electrolytic 16 Mfd 300V		.96
C43 (60 Cycle)	A15313	Cond. Electrolytic 16 Mfd 400V		1.07
C24	15906	Cond. Mica 100 Mmfd		1.07
C30 C31 C42 C46	15918	Cond. Mica 100 Mmfd		.11
C21	15927	Cond. Mica 1500 Mmfd		.20
C33	15923	Cond. Mica 50 Mmfd		.12
C40	15911	Cond. Mica 4500 Mmfd		.37
C35 C41	15750	Cond. Tubular .25 Mfd 400V		.19
C23 C26 C29 C32	15752	Cond. Tubular .05 Mfd 200V		.12
C37	15753	Cond. Tubular .002 Mfd 600V		.11
C25 C27 C28	15756	Cond. Tubular .05 Mfd 400V		.12
C39	15757	Cond. Tubular .1 Mfd 400V		.14
C34 C45	15760	Cond. Tubular .02 Mfd 400V		.12
C36	15762	Cond. Tubular .5 Mfd 400V		.28
C38	15768	Cond. Tubular .03 Mfd 600V		.16
C1 C2 C3	D15076	Cond. Variable		5.21
C15 C16	A15357	Cond. Variable Padder		.72
R2	A15116	Control Tone 0-150M Ohms		.70
R1	A15368	Control Volume 0-200M Ohms		.89

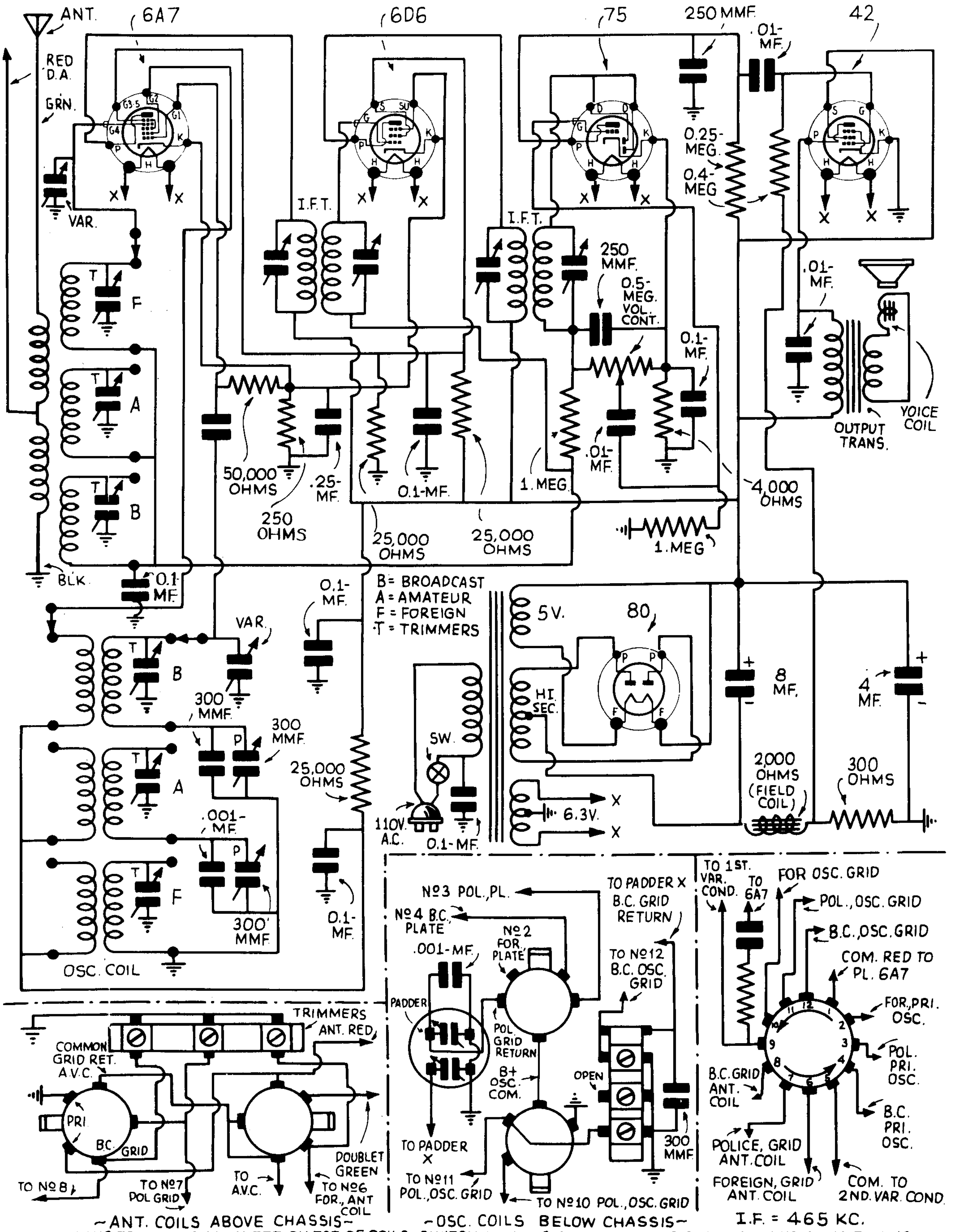
R9	15511	Resistor Carbon 50M 1/4W	.08
R7 R8 R16 R19	15515	Resistor Carbon 100M 1/4W	.08
R14 R15	15517	Resistor Carbon 1 meg. 1/4W	.08
R13	15530	Resistor Carbon 2500 1/4W	.07
R3	15535	Resistor Carbon 15M 2W	.17
R22	15523	Resistor Carbon 200M 1/4W	.08
R10	15524	Resistor Carbon 50M 1W	.09
R17 R18	15512	Resistor Carbon 250M 1/4W	.08
R4	15526	Resistor Carbon 10M 1W	.09
R12	15520	Resistor Carbon 500M 1/4W	.08
R21	15529	Resistor Carbon 25M 1/4W	.08
R23	15542	Resistor Carbon 1M 1/4W	.08
R5 R6	A15358	Resistor Candohm 182-61 Ohms	.23
R20	15501	Resistor Carbon 25M 1W	.11
R11	15510	Resistor Carbon 20M 1/4W	.08
C11 C12 T1	B15208-4	Transformer Input IF	1.42
C13 C14 T2	B15209-4	Transformer Output IF	1.63

1	Type 6K7	RF Amplifier
1	Type 76	Oscillator
1	Type 6L7	First Detector and Converter
1	Type 6D6	IF amplifier
1	Type 75	Second Detector AVC and AF Amplifier
1	Type 42	Amplifier
1	Type 80	Rectifier

CHAMPION RADIO
6 TUBE 3 BAND SUPERHET



CHAMPION RADIO
5 TUBE 3 BAND SUPERHET



THREE GANG TRIMMERS MOUNTED ON TOP OF COILS. SWITCH LOOKING AT REAR UNDER CHASSIS. TWO GANG TUNING COND. .000365-MF. ALL VIEWS LOOKING DIRECTLY AT ENDS OF COILS.

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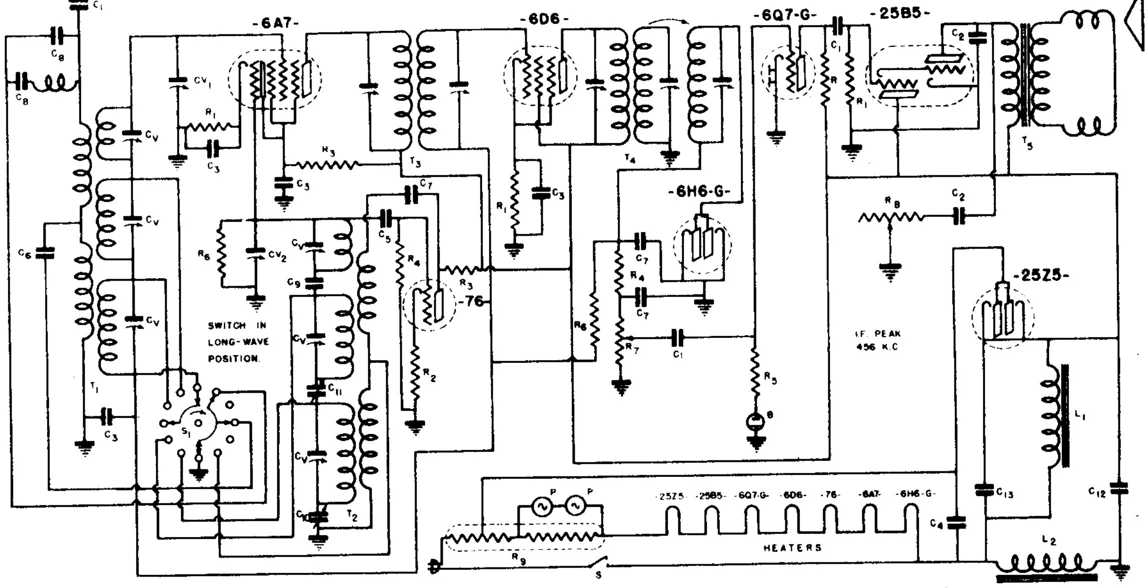
8 TUBE LONGWAVE 3 BAND SUPERHETERODYNE RECEIVER = *AC-DC TYPE*

MODEL SBT



I.F. 456 K.C.

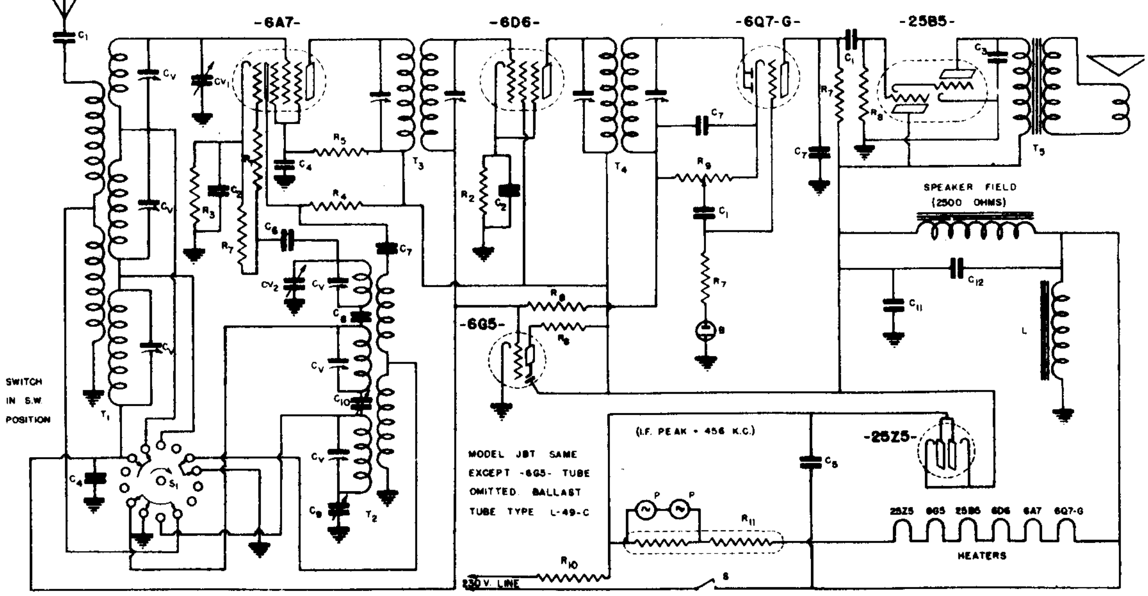
LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD-400 V TUBULAR CONDENSER
C_2	206	.05 MFD-400 V TUBULAR CONDENSER
C_3	203	.1 MFD-200 V. TUBULAR CONDENSER
C_4	210	1 MFD-400 V TUBULAR CONDENSER
C_5	412	00005 MICA CONDENSER
C_6	400	.0001 MICA CONDENSER
C_7	401	.00025 MICA CONDENSER
C_8	406	.0005 MICA CONDENSER
C_9	407	006 MICA CONDENSER
C_{10}	506	3 PLATE PADDING CONDENSER
C_{11}	507	5 PLATE PADDING CONDENSER
C_V	ON COIL	TRIMMER CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	608	2 GANG VARIABLE CONDENSER
C_{12}	314	10 MFD 150 W.V ELECTROLYTIC COND
C_{13}	311	20 MFD 150 W.V ELECTROLYTIC COND
R_1	103	250 OHM ¼ WATT CARBON RESISTOR
R_2	105	1000 OHM ½ WATT CARBON RESISTOR
R_3	119	10,000 OHM ½ WATT CARBON RESISTOR
R_4	113	50,000 OHM ¼ WATT CARBON RESISTOR
R_5	117	500,000 OHM ¼ WATT CARBON RESISTOR
R_6	119	1 MEGOHM ¼ WATT CARBON RESISTOR
R_7	2007A	500,000 OHM VOLUME CONTROL
R_8	2008A	75,000 OHM TONE CONTROL

LEGEND	OUR PART NO.	DESCRIPTION
R_9	2911	230 V. BALLAST TUBE
T_1	1207	LONG WAVE ANTENNA COIL
T_2	1401	LONG WAVE OSCILLATOR COIL
T_3	1509	INPUT I.F. TRANSFORMER
T_4	1505	TRIPLE TUNED DIODE I.F. TRANSFORMER
T_5	IN 854	SPEAKER TRANSFORMER
L_1	IN 854	SPEAKER FIELD (2500 OHMS)
L_2	1101	FILTER CHOKE
S_1	1908	3 BAND SELECTOR SWITCH
P	2902	MAZDA #46 PILOT LIGHT
S	—	SWITCH ON VOLUME CONTROL
B	3000	BIAS CELL

7 TUBE LONGWAVE 3 BAND SUPERHETERODYNE RECEIVER = *AC-DC TYPE*

MODEL JEBT



I.F. 456 K.C.

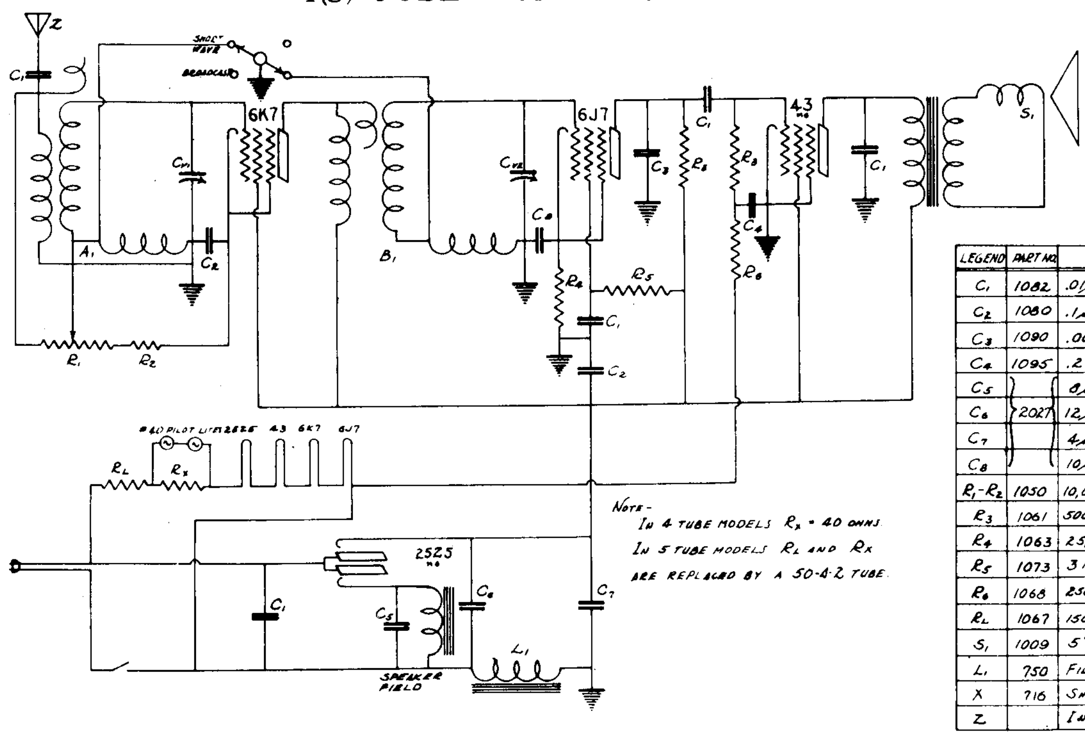
LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD-400 V TUBULAR CONDENSER
C_2	212	.05 MFD-200 V TUBULAR CONDENSER
C_3	206	.05 MFD-400 V TUBULAR CONDENSER
C_4	203	.1 MFD-200 V TUBULAR CONDENSER
C_5	210	.1 MFD-400 V TUBULAR CONDENSER
C_6	400	.0001 MICA CONDENSER
C_7	401	.00025 MICA CONDENSER
C_8	407	.006 MICA CONDENSER
C_9	506	3 PLATE PADDING CONDENSER
C_{10}	507	5 PLATE PADDING CONDENSER
C_{11}	314	10 MFD 150 W.V. ELECTROLYTIC COND.
C_{12}	311	20 MFD 150 W.V. ELECTROLYTIC COND.

LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	612	2 GANG VARIABLE CONDENSER
C_V	ON COIL	TRIMMER CONDENSER
R_1	101	150 OHM ¼ WATT CARBON RESISTOR
R_2	103	250 OHM ¼ WATT CARBON RESISTOR
R_3	136	400 OHM ¼ WATT CARBON RESISTOR
R_4	108	5,000 OHM ¼ WATT CARBON RESISTOR
R_5	111	25,000 OHM ¼ WATT CARBON RESISTOR
R_6	113	50,000 OHM ¼ WATT CARBON RESISTOR
R_7	117	500,000 OHM ¼ WATT CARBON RESISTOR
R_8	119	1 MEGOHM ¼ WATT CARBON RESISTOR
R_9	2009	500,000 OHM VOLUME CONTROL & Switch
R_{10}	1801	285 OHM RESISTOR CORD

LEGEND	OUR PART NO.	DESCRIPTION
R_{11}	2905	L-49-C BALLAST TUBE (MODEL JBT)
R_{11}	2906	L-42-C BALLAST TUBE (MODEL JEBT)
T_1	1220	LONG WAVE ANTENNA COIL
T_2	1410	LONG WAVE OSCILLATOR COIL
T_3	1503	I.F. TRANSFORMER
T_4	IN 1506	DIODE I.F. TRANSFORMER
T_5	IN 805	SPEAKER TRANSFORMER
L	1101	FILTER CHOKE
S_1	1915	3 BAND SELECTOR SWITCH
P	2902	MAZDA 46 PILOT LIGHT
S	—	LINE SWITCH ON VOLUME CONTROL
B	3000	BIAS CELL

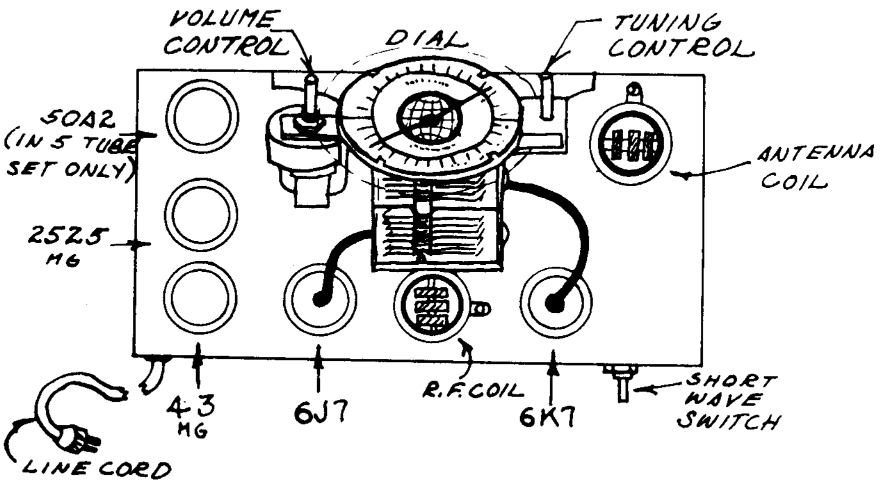
CLIMAX RADIO & TELEVISION CO., Inc.

4(5) TUBE T.R.F. TWO BAND RECEIVER



LEGEND	PART NO.	DESCRIPTION
C_1	1082	.01 mfd.-600V. Tubular Condenser
C_2	1080	.1 mfd.-200V. " "
C_3	1090	.00025 mfd Mica Condenser
C_4	1095	.25 mfd.-200V. Tubular Condenser
C_5	2027	8 mfd. 200V. Electrolytic Condenser
C_6	2027	12 mfd. 200V. " "
C_7	2027	4 mfd. 200V. " "
C_8	2027	10 mfd. 35V. " "
R_1-R_2	1050	10,000 ω Volume Control, 275 ω R.H. Min.
R_3	1061	500,000 ω 1/5 watt Resistor
R_4	1063	25,000 ω 1/5 watt "
R_5	1073	3 Megohm 1/5 watt "
R_6	1068	250,000 ω 1/5 watt "
R_L	1067	150 ω Resistance Line Cord
S_1	1009	5" Dynamic Speaker - 2500 ω Field
L_1	750	Filter Choke - 10 HYS - 400 ω - 40 M.A.
X	716	Short Wave Switch
Z		Indoor Antenna

OPERATING INSTRUCTIONS FOR MODEL 4 & 5 TUBE RECEIVERS



GENERAL INSTRUCTIONS-

Make certain that the tubes are placed in the proper sockets as shown in the diagram to the left. Note that the type 50-A-2 tube is used only in the five tube model and there is no socket for an additional tube in the 4 tube sets.

Now plug the cord into a wall socket supplying 105-120 volts at any frequency and turn the knob operating the volume control clockwise. In about one minute or less the set will be ready to operate. Turn the tuning control knob so the pointer indicates the frequency of the station which it is desired to receive. Turn the volume control knob clockwise to increase the volume or counter-clockwise to decrease it. Always tune in the station at low volume and then turn up the volume to the desired level. Any attempt to vary the volume by means of the tuning control will result in distorted reception.

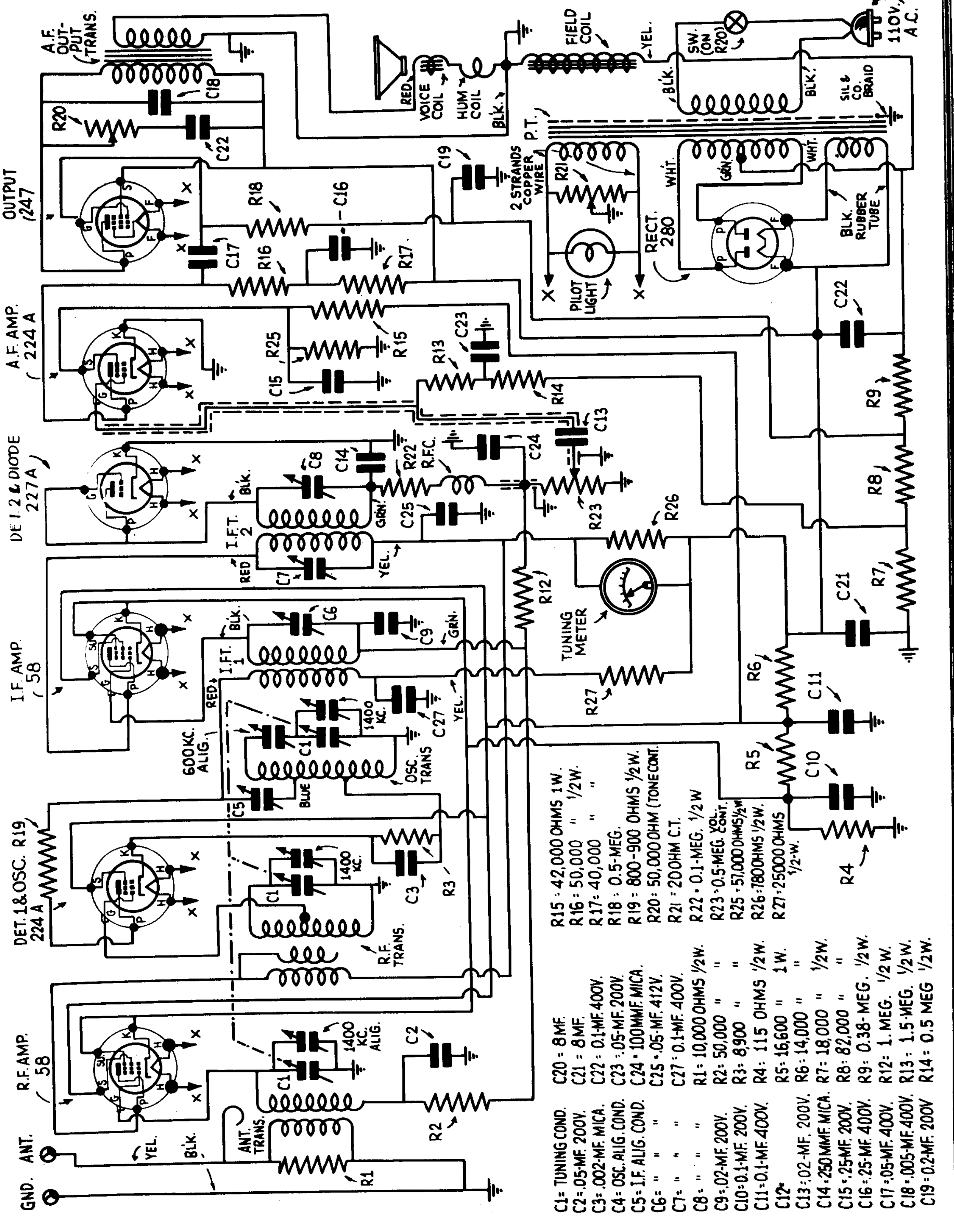
ANTENNA- These receivers are normally supplied with an indoor antenna which consists of a twenty foot length of insulated wire as shown in the diagram above. This is entirely satisfactory for all local reception and for the more powerful distant stations. However, if reception of long distance stations is primarily desired or if best results are wanted on short waves, the use of an outside antenna of about 50 to 100 feet in length is desirable. The lead-in from the outside antenna should be connected to the bared end of the indoor antenna and the connection taped. If possible, solder the splice.

DC OPERATION- No special precautions are necessary for operation on DC current except that if no reception can be had after a few minutes, the position of the plug in the socket should be reversed.

SHORT WAVE- Operating procedure for short wave reception is exactly as for broadcast except the knob on the rear of the chassis is turned to the short wave position. The frequency coverage on this band is 1600 KC to 4000 KC which includes both police bands and several amateur and aircraft bands.

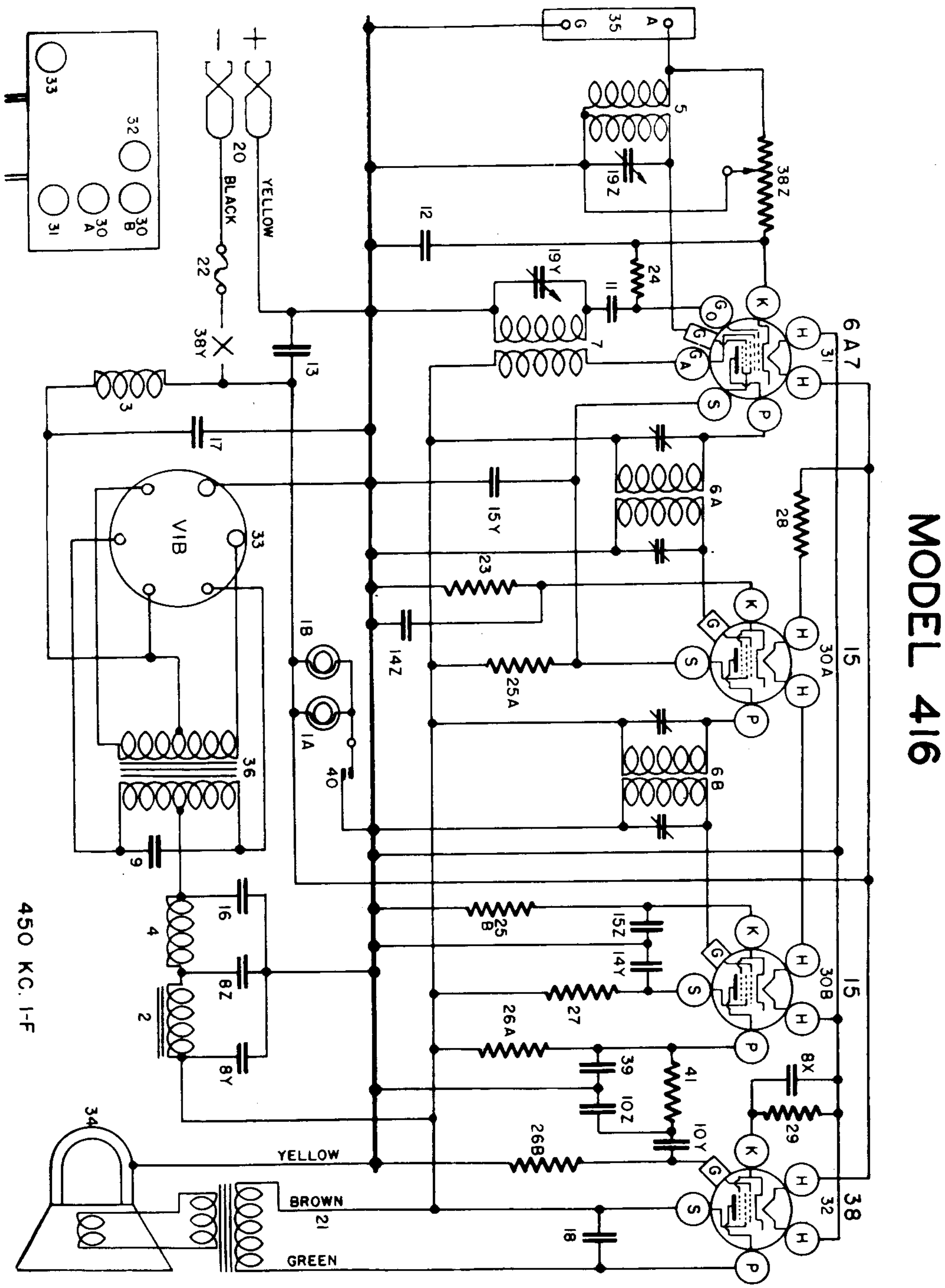
CONSOLIDATED INDUSTRIES PRODUCTS, Ltd.

MODEL S 70



C1 = TUNING COND.
C2 = .05-MF. 200V.
C3 = .002-MF. MICA.
C4 = OSC. ALIG. COND.
C5 = I.F. ALIG. COND.
C6 = " " "
C7 = " " "
C8 = " " "
C9 = .02-MF. 200V.
C10 = 0.1-MF. 200V.
C11 = 0.1-MF. 400V.
C12 =
C13 = .02-MF. 200V.
C14 = 250 MMF. MICA.
C15 = .25-MF. 200V.
C16 = .25-MF. 400V.
C17 = .05-MF. 400V.
C18 = .005-MF. 400V.
C19 = 0.2-MF. 200V
C20 = 8 MF.
C21 = 8 MF.
C22 = 0.1-MF. 400V.
C23 = .05-MF. 200V.
C24 = 100 MMF. MICA.
C25 = .05-MF. 412V.
C27 = 0.1-MF. 400V.
R1 = 10,000 OHMS 1/2 W.
R2 = 50,000 " "
R3 = 8,900 " "
R4 = 115 OHMS 1/2 W.
R5 = 16,600 " 1 W.
R6 = 14,000 " "
R7 = 18,000 " 1/2 W.
R8 = 82,000 " "
R9 = 0.38-MEG. 1/2 W.
R12 = 1. MEG. 1/2 W.
R13 = 1.5-MEG. 1/2 W.
R14 = 0.5 MEG 1/2 W.
R15 = 42,000 OHMS 1 W.
R16 = 50,000 " 1/2 W.
R17 = 40,000 " "
R18 = 0.5-MEG.
R19 = 800-900 OHMS 1/2 W.
R20 = 50,000 OHM (TONE CONT.
R21 = 20 OHM C.T.
R22 = 0.1-MEG. 1/2 W
R23 = 0.5-MEG. VOL. CONT.
R25 = 57,000 OHMS 1/2 W
R26 = 780 OHMS 1/2 W.
R27 = 25000 OHMS 1/2-W.

THE CROSLEY RADIO CORPORATION
MODEL 416



SPECIFICATIONS

The Crosley Model 416 radio is a four-tube superheterodyne receiver designed for operation from a six-volt storage battery. It contains a completely shielded, built-in power supply unit which employs a self-rectifying type vibrator.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and the chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with volume control full on and no signal input. Voltage limits may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Where Used	S	G	S	G	K	Ga	Go
6A7	Osc.-Mod.	6.3	185	70	0	2.5	185	-10 to -20
15	I-F Amplifier	2.1	185	70	0	2.5	—	—
15	Detector	2.1	20	4	0	4.5	—	—
38	Output	6.3	170	185	0	11.0	—	—

POWER OUTPUT APPROXIMATELY 1 WATT.
"A" BATTERY DRAIN APPROXIMATELY 1.95 AMPERES AT 6 VOLTS.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 38 Output tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A7 tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Adjust the station selector so that the plates of the condenser gang are completely out of mesh and turn the volume control to the right (ON).

(c) Set the signal generator to 450 kilocycles.

(d) Adjust both trimmers located on top of the 2nd. I-F Transformer for maximum output. (Fig. 2).

(e) Adjust both trimmers located on top of the 1st. I-F Transformer for maximum output.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

(a) Connect the output lead from the signal generator through a .00025 mfd. condenser to the "ANT" terminal of the receiver.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer on the "OSC" section of the condenser gang for maximum output. (Fig. 3.)

(e) Adjust the trimmer on the "ANT" section of the condenser gang for maximum output.

(f) Repeat operations (d) and (e) for more accurate adjustments.

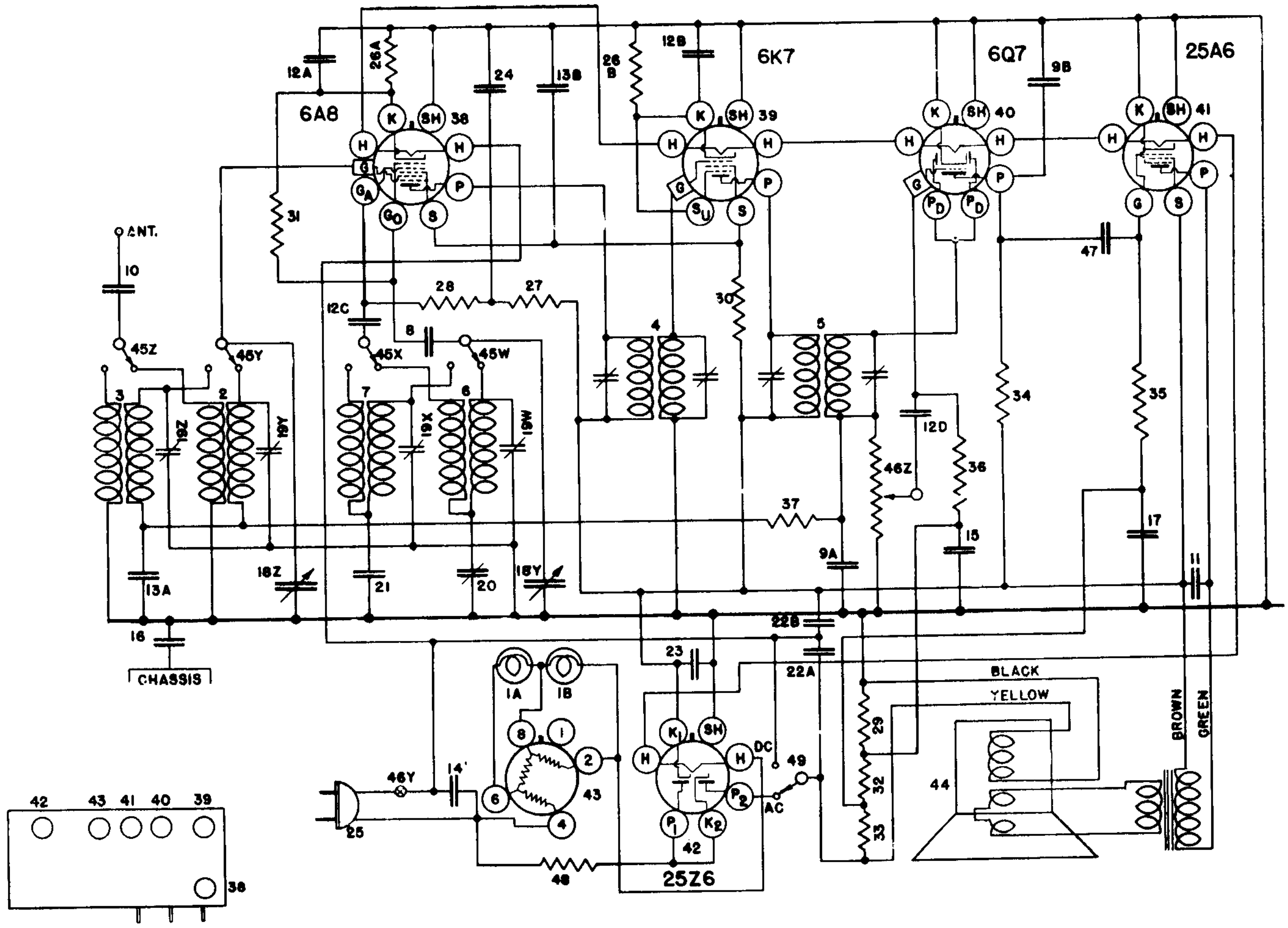
PARTS LIST—MODEL 416

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1AB	W —37922	Bulb Dial Light
	G3 —37965	Socket Assembly Dial Light
2	G10 —29535	Choke 2.4H. Hum Filter
3	G13 —28067	Choke Vib. "A" Filter
4	G1 —24234	Choke R-F Filter
5	G55 —32000	Coil 540-1725 Kc. Antenna
6A	G119—32004	Coil 450 Kc. 1st I-F Assembly
6B	G119—32004	Coil 450 Kc. 2nd I-F Assembly
7	G9 —32002	Coil 540-1725 Kc. Oscillator
8Z	W —34896	Cond. 12 MF. 250V. Filter Bypass
8Y		Cond. 8 MF. 250V. Plate Bypass
8X		Cond. 8 MF. 25V. Output Bias Bypass
9	W —37214	Cond. .001 MF. 1000V. Synchronizing
10Z	W —30322A	Cond. .00017 MF. Det. Plate Bypass
10Y		Cond. .006 MF. A-F Coupling
11	G1 34002	Cond. .00025 MF. Osc. Grid Coupling
12	W 28621	Cond. .02 MF. 200V. Osc.-Mod. Cathode Bypass
13	W 37190	Cond. .02 MF. 160V. Filament Bypass (Metal Clad H-F)
14Z	W —28623	Cond. .02MF. 200V. I-F Cathode Bypass
14Y		Cond. .02MF. 200V. Det. Screen Bypass
15Z	W —28622	Cond. .1MF. 200V. Det. Cath. Bypass
15Y		Cond. .1MF. 200V. Common Scr. Bypass
16	W —37173	Cond. .25 MF. 300V. V1B. "B" Bypass (Metal Clad H-F Type)
17	W —37174	Cond. .5MF. 160V. V1B. "A" Bypass (Metal Clad H-F Type)
18	W —34647	Cond. .006MF. 400V. Output Plate to Screen
19Z	G25 —33001	Cond. Var. Tuning Antenna Section
19Y		Cond. Var. Tuning Osc. Section
	C —41755	Glass Dial—Calibrated
	W —41739	Dial Drive Unit
	W —41751	Dial Support Brkt. (R. H.)
	W —41752	Dial Support Brkt. (L. H.)
	W —41753	Dial Mtg. Brkt. (R. H.)
	W 40797	Dial Mtg. Brkt. (L. H.)
	W —40795B	Hand Shaft
	W —40907	Shaft Bearing Brkt.
	W —40909	Spring Washer (Shaft)
	W —41611	Shaft Retaining Ring
	B —40818C	Pointer Disc.
	W —40486	Disc. Mtg. Screw
	W —41578	Gear Spring
20	MG25—37103	Cable (Assembly) Battery Supply
21	G6 —35696	Cable 3 Lead Speaker
22	W — 7983A	Fuse 3 Amp. "A" Supply
	G2 —33339	Panel (Assembly) Fuse

Item No.	Part No.	Description
23	W —22514	Resistor 750 Ohm. ½W. I-F Cathode
24	—21453	Resistor 40,000 Ohm. ¼W. Osc. Grid Leak
25A	—21237A	Resistor 60,000 Ohm. ¼W. Screen Series
25B	—21237A	Resistor 60,000 Ohm. Det. Cathode Bypass
26A	—35602	Resistor 1 Megohm ¼W. Det. Plate
26B	—35602	Resistor 1 Megohm ¼W. Output Grid
27	—33490	Resistor 10 Megohm ¼W. Det. Screen
28	W —41786	Resistor 9 Ohm. Filament Series
29	W —21452	Resistor 1100 Ohm. ¾W. Output Cathode
30A	G88 —28807	Type 15 I-F Amp.
30B	G88 —28807	Type 15 A-F Amp.
31	G47 —28807	Type 6A7 Osc.—Mod.
32	G15 —28807	Type 38 Output
33	G92 —28807	Type V1B Full Wave Vibrator
	W —35772	Tube Shield (Half) (6)
	W —35774	Tube Shield Base
	W —35773	Tube Shield Cap
34	—41316	Speaker Type 33PJ3, "A"
	—41434	Cone Assembly Used on 41316
	—41458	Mtg. Ring Used on 41316
	—41454	Output Trans. Used on 41316
35	G26 —26719	Terminal Board Assy. Ant. & Gnd.
36	G5 —31618	Transformer Power
37	W —37216	Vibrator
	W —37195	Vibrator Shield
	W —37217	Vibrator Side Packing
	W —37218	Vibrator Top Packing
	W —26973B	Shield Base
38Z	—41754	Volume Control 4800 Ohm.
38Y		Battery Switch
39	G2 —34002	Cond .0001 MF. Det. Plate Bypass
40	W —41068A	Switch Momentary Dial Light
41	—35600	Resistor 100,000 Ohm. ¼W. I-F Filter
		Misc. Parts
	B —37172A	Cover V1B. Compartment
	B —41886	Escutcheon
	D — 28	Escutcheon Mtg. Screw
	W —40840A	Crosley Shield
	W —41221	Knob (Upper) Volume Control
	W —41222	Knob (Lower) Dial Light Switch
	W —41606	Knob Station Selector

THE CROSLEY RADIO CORPORATION
MODEL C629 CHASSIS 676



Item No.	Part No.	Description
1AB	W —4099B	Dial Light Bulb
	G6 —27130	Socket—Dial Light
2	G124—32000	Ant. Coil B-C-B
3	G123—32000	Ant. Coil H-F-B
4	G128—32004	1st I-F Assembly
5	G129—32001	2nd I-F Assembly
6	G118—32002	Osc. Coil B-C-B
7	G117—32002	Osc. Coil H-F-B
8	G2 —34002	Condenser .0001 Mf.
9AB	G1 —34002	Condenser .00025 Mf.
10	W —30325	Condenser .003 Mf.
11	W —32378	Condenser .01 Mf. 400V.
12AB CD	W —36541	Condenser .02 Mf. 160 V.
13AB	W —35936	Condenser .05 Mf. 200 V.
14	W —32780B	Condenser .05 Mf. 400 V.
15	W —34712	Condenser .25 Mf. 160 V.
16	W —24049C	Condenser .1 Mf. 200 V.
17	W —30321	Condenser 1. Mf. 160 V.
18ZY	G26 —33001	2 Section Var. Tuning Cond. Gang
	MG15—42502	Dial Assembly (Complete)
	C —42553A	Drive Unit—Dial
	B —42481A	Dial (Calibrated)
	W —42494	Dial Hand
	W —40186	Screw (Hand Mtg.)
	—42713A	Band Indic. Dial Assembly
	—43412	Dial Vern.-Indic. Assembly
	—43413	Drive Chain
	—43414	Take-Up Spring
19	W —37241B	4 Section Shunt Trimmer
20	—40769	B-C Osc. Series Trimmer
21	G21 —34000	H-F Osc. Series Cond.
22AB	W —40325	Condenser 50 Mf. 150 V.
23	W —36057	Condenser 40 Mf. 300 V.
24	W —41081	Condenser 16 Mf. 250 V.
25	B —33907A	Power Cord and Plug

Item No.	Part No.	Description
26AB	W —28589	Resistor 350 Ohm ½W. Flexible
27	—31093	Resistor 2700 Ohm ¼W.
28	—24814	Resistor 7000 Ohm ¼W.
29	—27024	Resistor 8000 Ohm ¼W.
30	—36318	Resistor 15000 Ohm ¼W.
31	—35928	Resistor 60000 Ohm ¼W.
32	—35600	Resistor 100,000 Ohm ¼W.
33	—35930	Resistor 200,000 Ohm ¼W.
34	—34020	Resistor 250,000 Ohm ¼W.
35	—36321	Resistor 400,000 Ohm ¼W.
36	—35602	Resistor 1. Megohm ¼W.
37	—35927	Resistor 2 Megohm ¼W.
38	G156—36400	Socket Type 6A8
39	G151—36400	Socket Type 6K7
40	G160—36400	Socket Type 6Q7
41	G161—36400	Socket Type 25A6
42	G162—36400	Socket Type 25Z6
43	G169—36400	Socket Type Ballast
	W —35774	Tube Shield Base
	W —35772	Tube Shield (Half)
	W —35773	Tube Shield Cap
44	346BL9 "M"	Speaker Spec. 1-D-667
	—41638	Cone Assembly } For Above Speaker
	—40275	Field Coil } For Above Speaker
	—42878	Output Trans. } For Above Speaker
45	—42519	Band Selector Switch
46Z	—42522	Volume Control
46Y	—42522	Line Switch
47	W —27216	Condenser .05 Mf. 200 V.
48	W —42686	Resistor 50 Ohm 1½W. Flexible
49	W —42701	A. C.—D. C. Switch
	G111—34403	Ant. Lead Assembly
	B —42543	Escutcheon and Lens
	W —37341	Knob—3 Req.
	—6AA	Cabinet

THE CROSLEY RADIO CORPORATION

MODEL C629 CHASSIS 676

SALES MODEL C-629 **CHASSIS MODEL 676**

SPECIFICATIONS

The Crosley Model 676 radio is a six-tube receiver designed for operation on 110-volt electric circuits, either A.C. or D.C.

The tuning range of the receiver is approximately from 540 to 1710 kilocycles (555 to 175 meters) in the Broadcast Band and from 6.0 to 18.0 megacycles (50 to 17 meters) in the High Frequency or Short Wave Band.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and one of the terminals of the 25Z6 tube. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with volume control full on and no signal input. The filament voltages should be measured with an accurate low range voltmeter. Voltage limits may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube		H	P	S	G	Su	K	Ga	Go
6A8G	Oscillator-Modulator	6.3	150	90	—	—	3.0	115	Neg.
6K7G	I-F Amplifier	6.3	150	90	—	3.0	3.0	—	—
6Q7G	Det. & A-F Amp.	6.3	80	—	-3	—	0	—	—
25A6G	Output	25.0	125	150	-16	—	0	—	—
25Z6G	Rectifier	25.0							
W-42520	Ballast Tube		Variable						

Power output approximately 3 watts.
Power consumption approximately 75 watts.
Voltage drop across speaker field 80 volts.
All readings taken on 117.5 volt A.C. power supply.
All voltages except filaments will be approximately 40% lower if measured on 117.5 volt D.C. power supply.

A.C.-D.C. SWITCH

A switch is located on the rear of the receiver chassis for the purpose of adapting the receiver to either an A.C. or D.C. power supply. To change the position of the switch, remove the screw in the locking bracket and move the end of the bracket to the other position as marked on the chassis. Replace the screw so as to lock the switch in the new position.

The receiver will operate satisfactorily on either A.C. or D.C. with the switch in the D.C. position, but the performance of the receiver will be greatly improved with the switch in the A.C. position when being operated on A.C. DO NOT OPERATE THE RECEIVER ON A D.C. POWER SUPPLY WITH THE SWITCH IN THE A.C. POSITION AS IT WILL CAUSE DAMAGE TO THE RECEIVER PARTS.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 25A6 Output tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 condenser to the top cap of the 6A8 Oscillator-Modulator tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator through a .05 mfd. or larger, condenser to the receiver chassis. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh, turn the band selector switch to the right (High Frequency Position) and turn the volume control to the right (ON).

(c) Set the signal generator to 450 kilocycles.

(d) Adjust both trimmer condensers located on top of the 2nd I-F transformer for maximum reading on the output meter.

(e) Adjust both trimmers located on top of the 1st I-F transformer for maximum reading on the output meter.

(f) Check operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

(a) When aligning the R-F Amplifier the output lead from the signal generator should be connected through a dummy antenna to the "ANT" terminal of the receiver. For the broadcast band the dummy antenna should be a .00025 mfd. condenser and for the high frequency band this condenser should be replaced by a 400 ohm (Non Inductive) carbon resistor.

Each band should be shunt aligned, series aligned (Broadcast Band) and then shunt aligned again in the order given. The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated below for each adjustment.

Adjust the "OSC" and "ANT" shunt trimmers. (See Fig. 3) in the order given for maximum output. Tune the station selector to the generator signal for maximum output and then check the adjustment of the "ANT" trimmer. NOTE: When aligning the high frequency band care should be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator approximately 10 times and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles below the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct dial setting.

To adjust the "series" trimmer (Fig. 3) set the signal generator to the frequency indicated below and then tune-in this signal with the station selector for maximum output. Adjust the series trimmer while rocking the tuning condenser back and forth slightly, until no further improvement in output can be obtained.

(b) Signal Generator Frequencies.

	Shunt Alignment	Series Alignment
High Frequency Band	1400 Kc	600 Kc.
Broadcast Band	6000 Kc.	

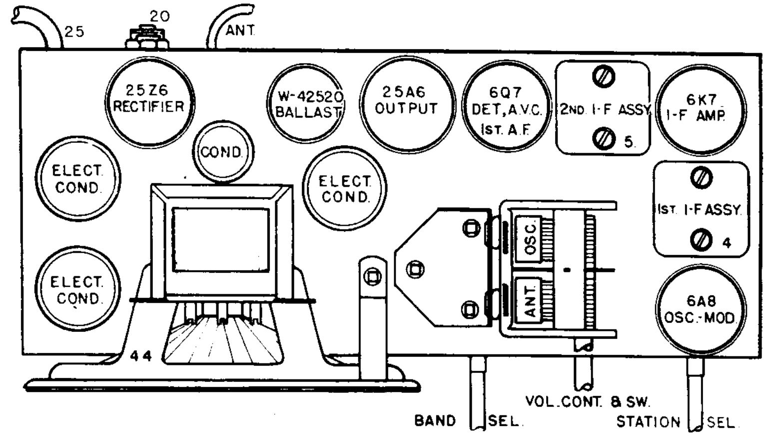


Fig. 2 Top View 676

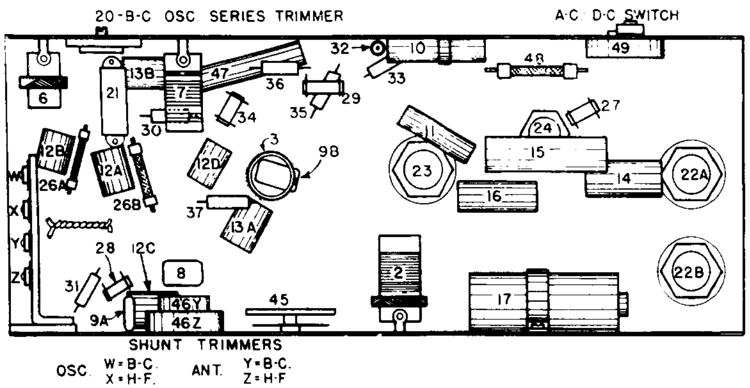
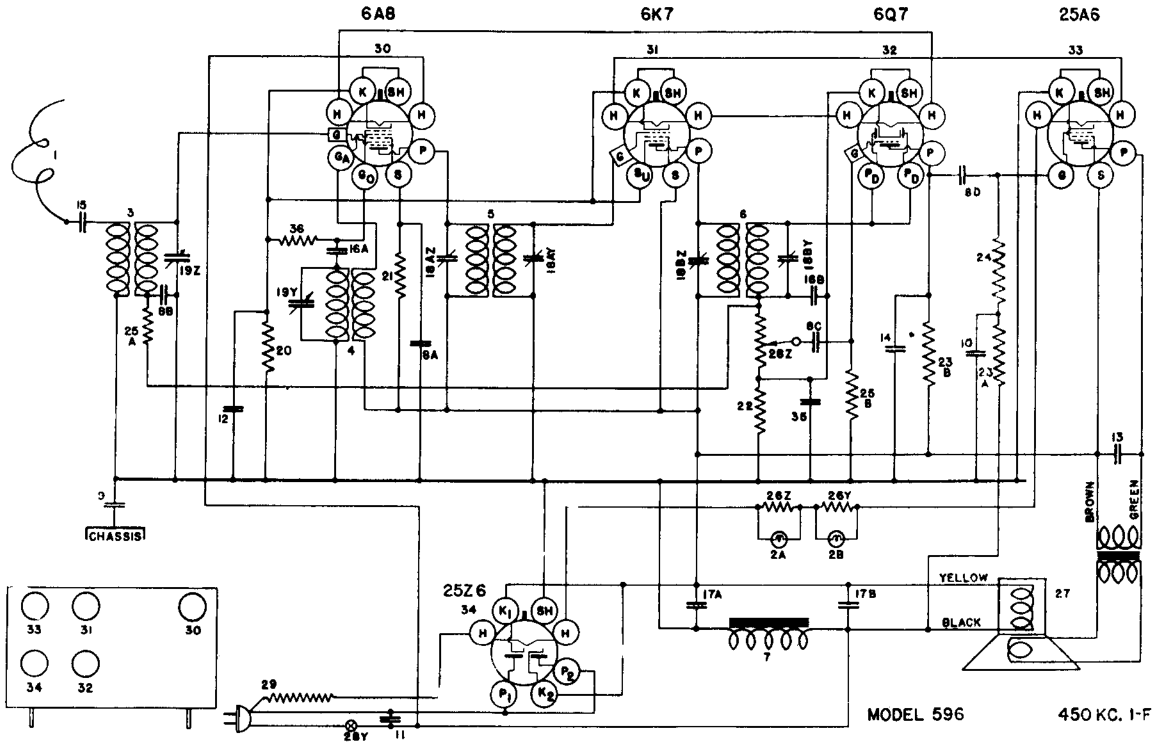


Fig. 3 Bottom View 676

THE CROSLEY RADIO CORPORATION
MODEL C526 CHASSIS 596



SPECIFICATIONS

This model Crosley radio is a five-tube receiver designed for operation on a 110 to 120 volt power supply, either A. C. or D. C.

The tuning range of the receiver is approximately from 540 to 1710 kilocycles (555 to 175 meters).

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and one of the terminals of the 25Z6 tube. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with volume control full on and no signal input. The filament voltages should be measured with an accurate low range voltmeter. Voltage limits may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	Su	K	Ga	Go
6A8G	Oscillator-Modulator	6.3	115	65	—	3.8	115	Neg.
6K7G	I-F Amplifier	6.3	115	115	3.8	3.8		—
6Q7G	Det and A-F Amplifier	6.3	25	—	—	1.2	-	-
25A6G	Output	25.0	115	115	—	0		—
25Z6G	Rectifier	25.0	—	—	—	115	—	—

Power output approximately 1.8 watts.
Power consumption approximately 50 watts.
Voltage drop across speaker field 125 volts.
All readings taken on 117.5 volt A. C. power supply.
All readings except filaments will be approximately 10% lower on 117.5 volts D. C.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 25A6 Output tube. Be sure the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 condenser to the top cap of the 6A8 Oscillator-Modulator tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator through a .05 mfd., or larger, condenser to the receiver chassis. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh and turn the volume control to the right (ON).

(c) Set the signal generator to 450 kilocycles.

(d) Adjust the 2nd I-F trimmer condensers (18B, Fig. 3) located on the rear of the receiver chassis for maximum reading on the output meter.

(e) Adjust the 1st I-F trimmer condensers (18A, Fig. 3) located on the rear of the receiver chassis for maximum reading on the output meter.

(f) Check operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

(a) Connect the output lead from the signal generator through a .00025 mfd. condenser to the antenna condenser at the point where the antenna wire is connected.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer located on the "OSC" section of the condenser gang for maximum output.

(e) Adjust the trimmer located on the "ANT" section of the condenser gang for maximum output.

(f) Readjust the station selector slightly for maximum output.

(g) Repeat operation (e) for more accurate adjustment.

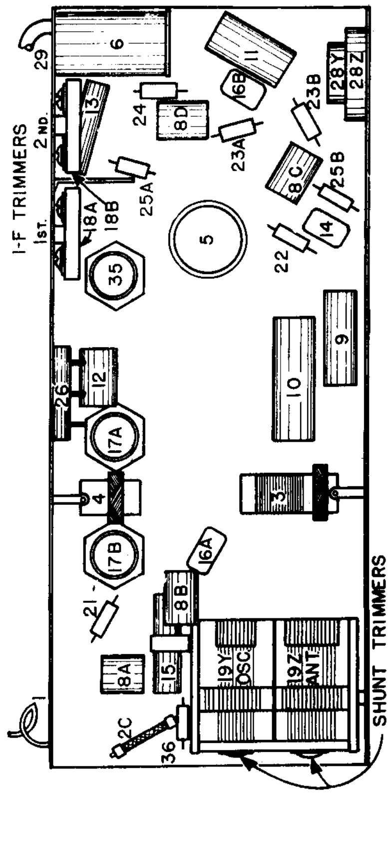
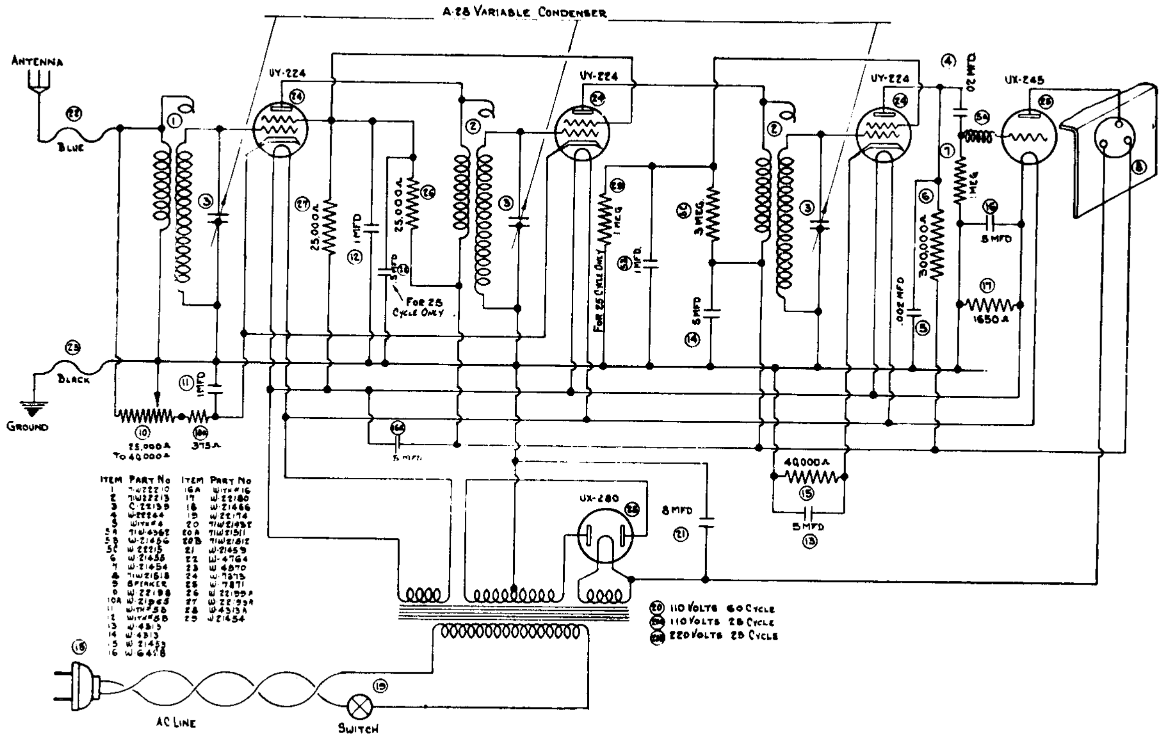


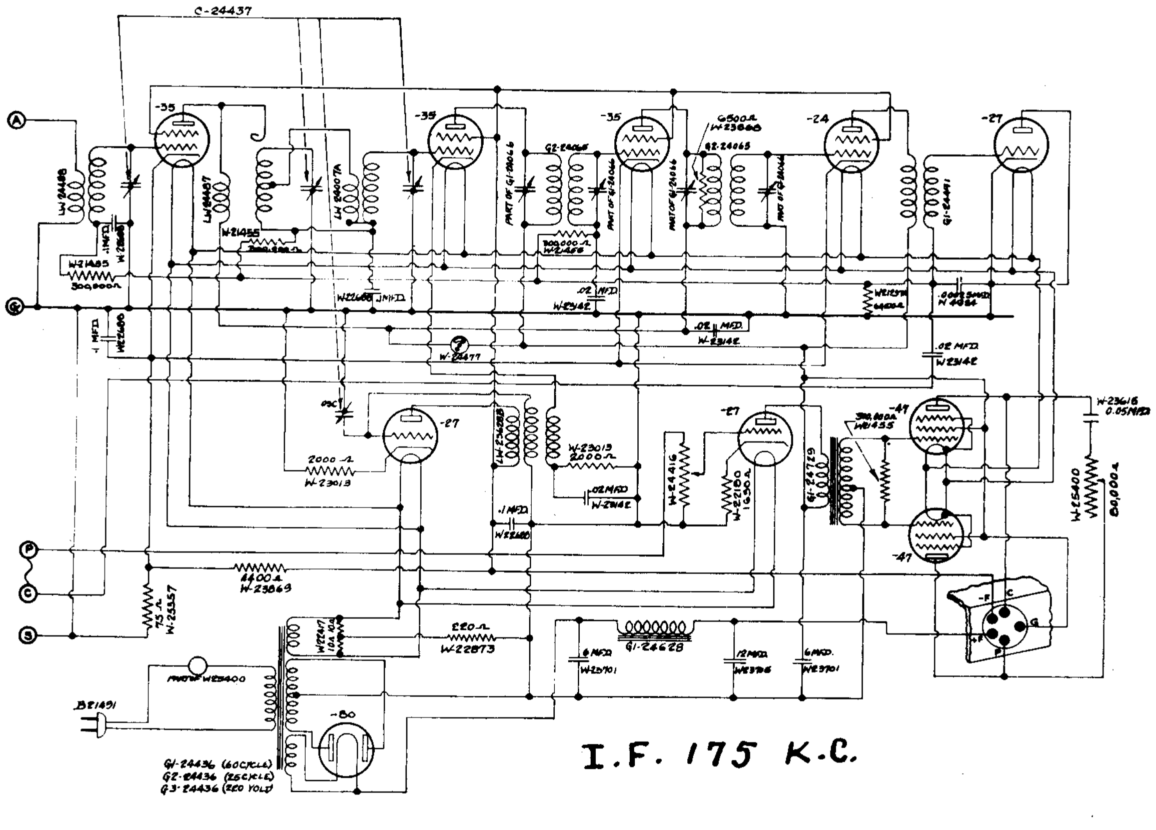
Fig. 3 Bottom View 596

THE CROSLEY RADIO CORPORATION

MODEL 48



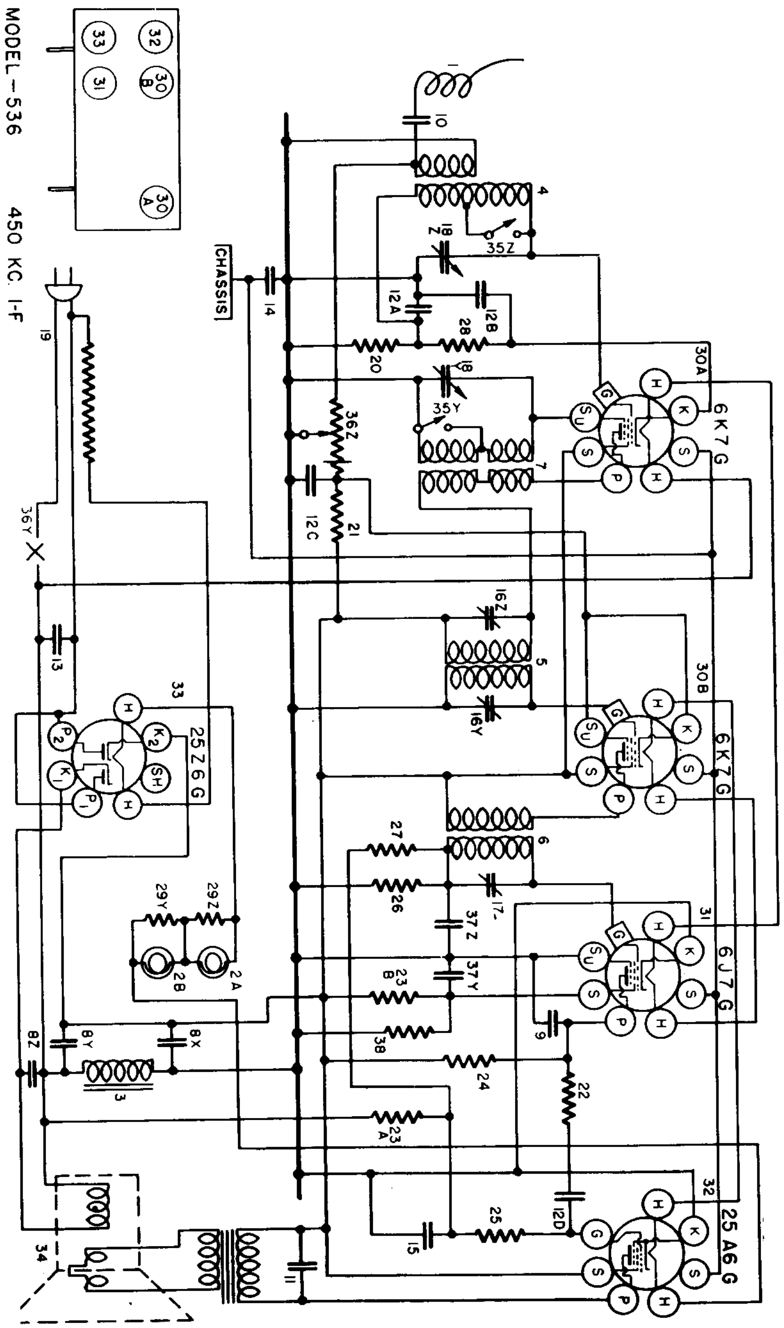
MODEL 127 I



I.F. 175 K.C.

THE CROSLEY RADIO CORPORATION

MODEL 536 AND 5536



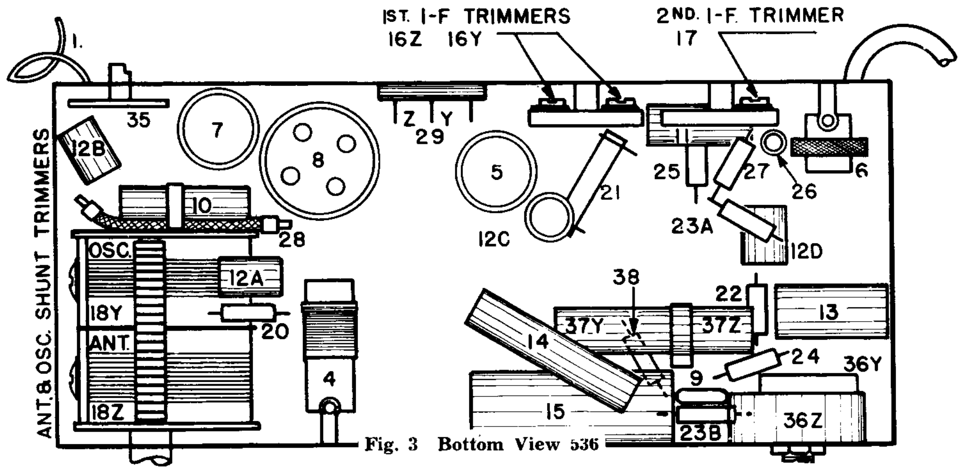


Fig. 3 Bottom View 536

TUBE SOCKET VOLTAGE READINGS

Tube	Where Used	H	P	S	G	K
6K7	Osc.- Modulator	6.5	100	100	16	19
6K7	I-F Amplifier	6.5	100	100	0	3
6J7	Detector	6.5	35	10	0	—
25A6	Output	25.2	92	100		—
25Z6	Rectifier	25.2				—

Readings taken on 117.5 Volt A-C Power Supply.
Power Consumption Approximately 50 Watts at 117.5 Volts.
Voltage Reading Approximately 10% Lower on 117.5 Volts, D.C.

Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with volume control full on and no signal input.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 25A6 Output tube. Be sure the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 condenser to the top cap of the 6K7 Oscillator-Modulator tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator through a .05 mfd., or larger, condenser to the receiver chassis. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh, turn the band selector switch to the right (High Frequency Position) and turn the volume control to the right (ON).

(c) Set the signal generator to 450 kilocycles.

(d) Adjust the 2nd I-F trimmer condenser, Illus. No. 17—Fig. 3, located on the rear of the chassis for maximum output.

(e) Adjust the 1st I-F trimmer condensers, Illus. Nos. 16Z and 16Y, located on the rear of the chassis for maximum output.

(f) Check operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

(a) Connect the output lead from the signal generator through a .00025 mfd. condenser to the antenna condenser at the point where the antenna wire is connected.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer (18-Y Fig. 3) located on the "OSC" section of the condenser gang for maximum output.

(e) Adjust the trimmer (18-Z) located on the "ANT" section of the condenser gang for maximum output.

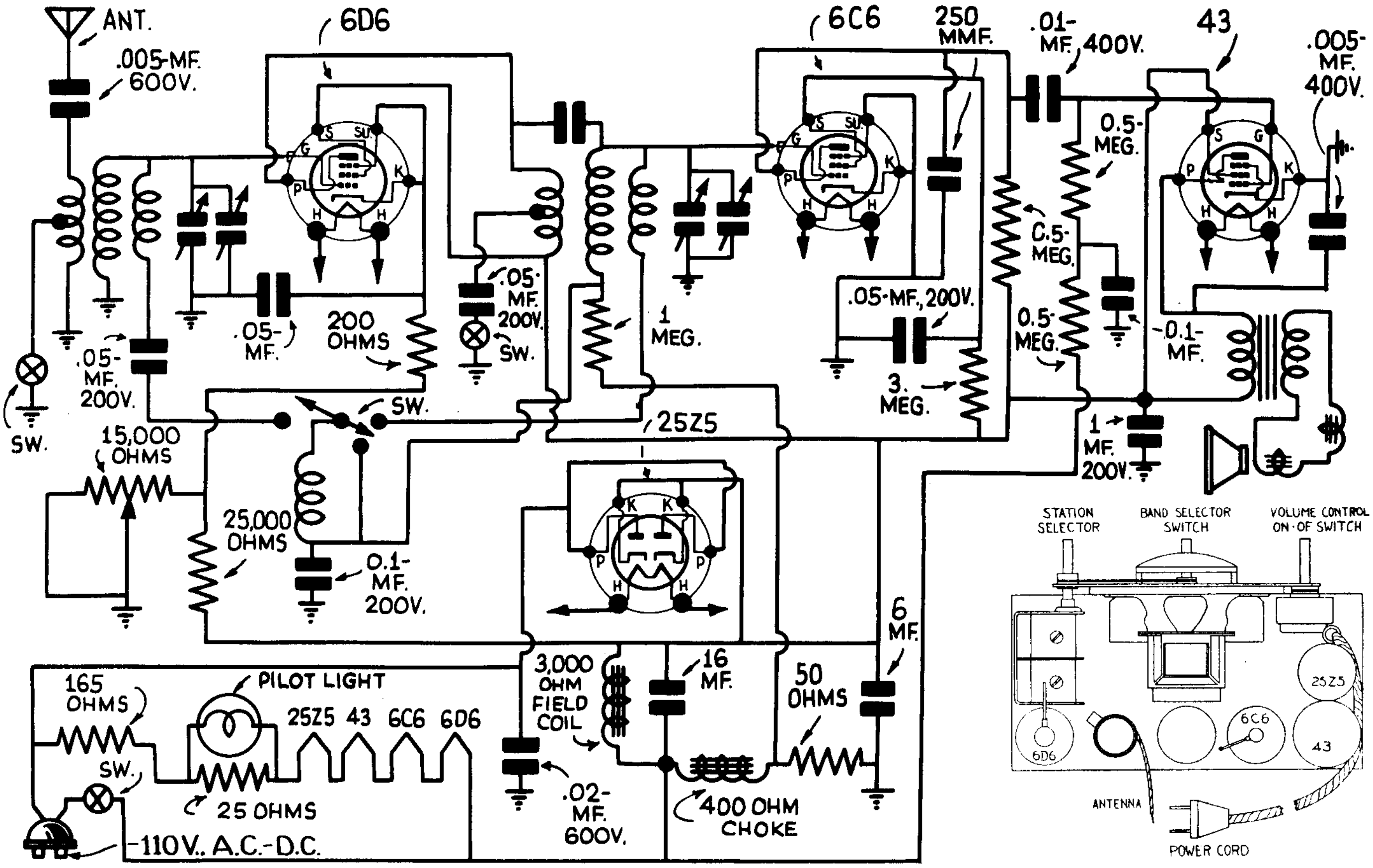
(f) Readjust the tuning condenser slightly for maximum output.

(g) Repeat operation (e) for more accurate adjustment.

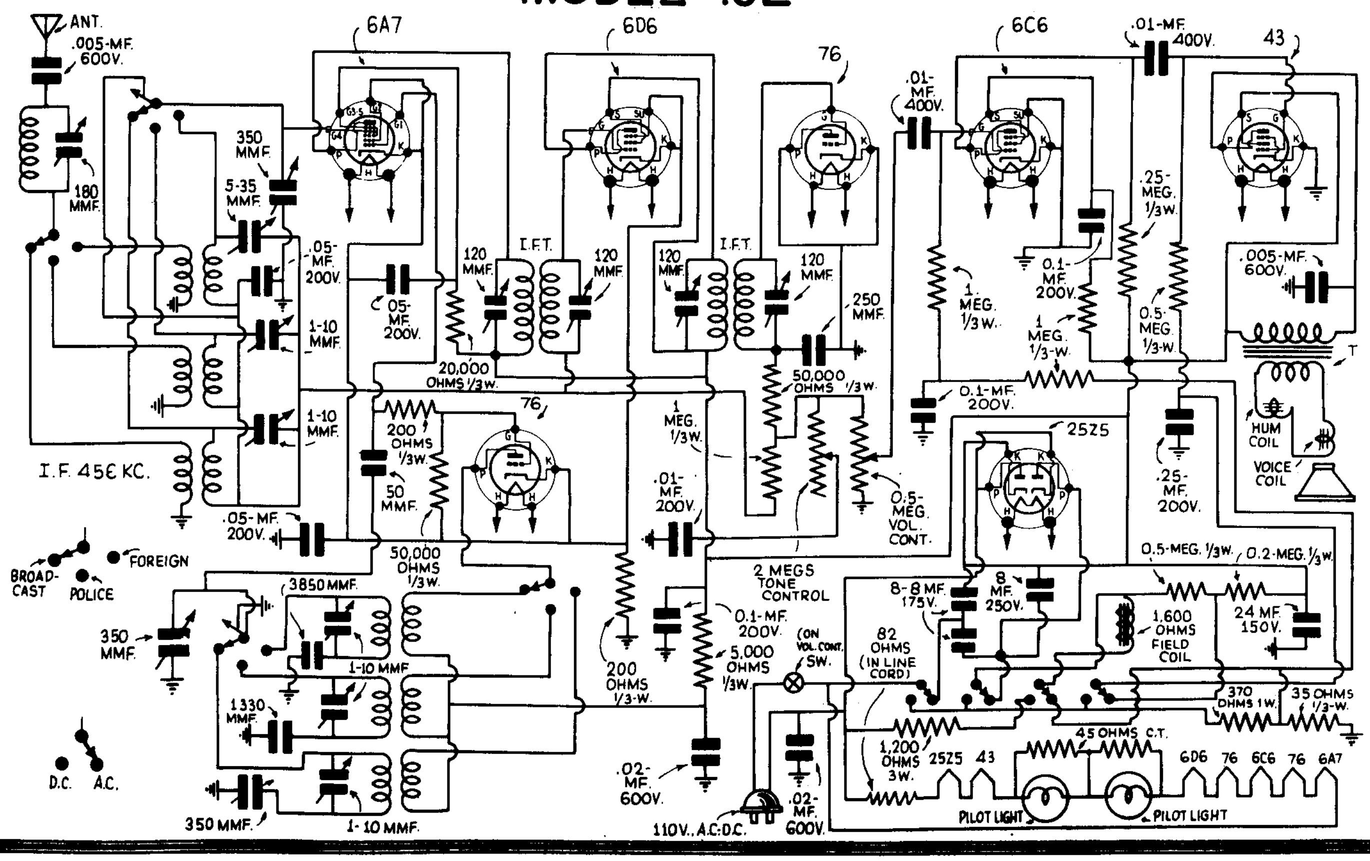
NOTE: The locations of the speaker and electrolytic condenser (Illus. No. 8) are interchanged on Models 536 and 5536. The dial used on Model 5536 is larger than the dial used on Model 536 and replacement parts are clearly indicated in the Parts List.

DETROLA RADIO AND TELEVISION CORPORATION

MODELS 41-42-43 CHASSIS 104

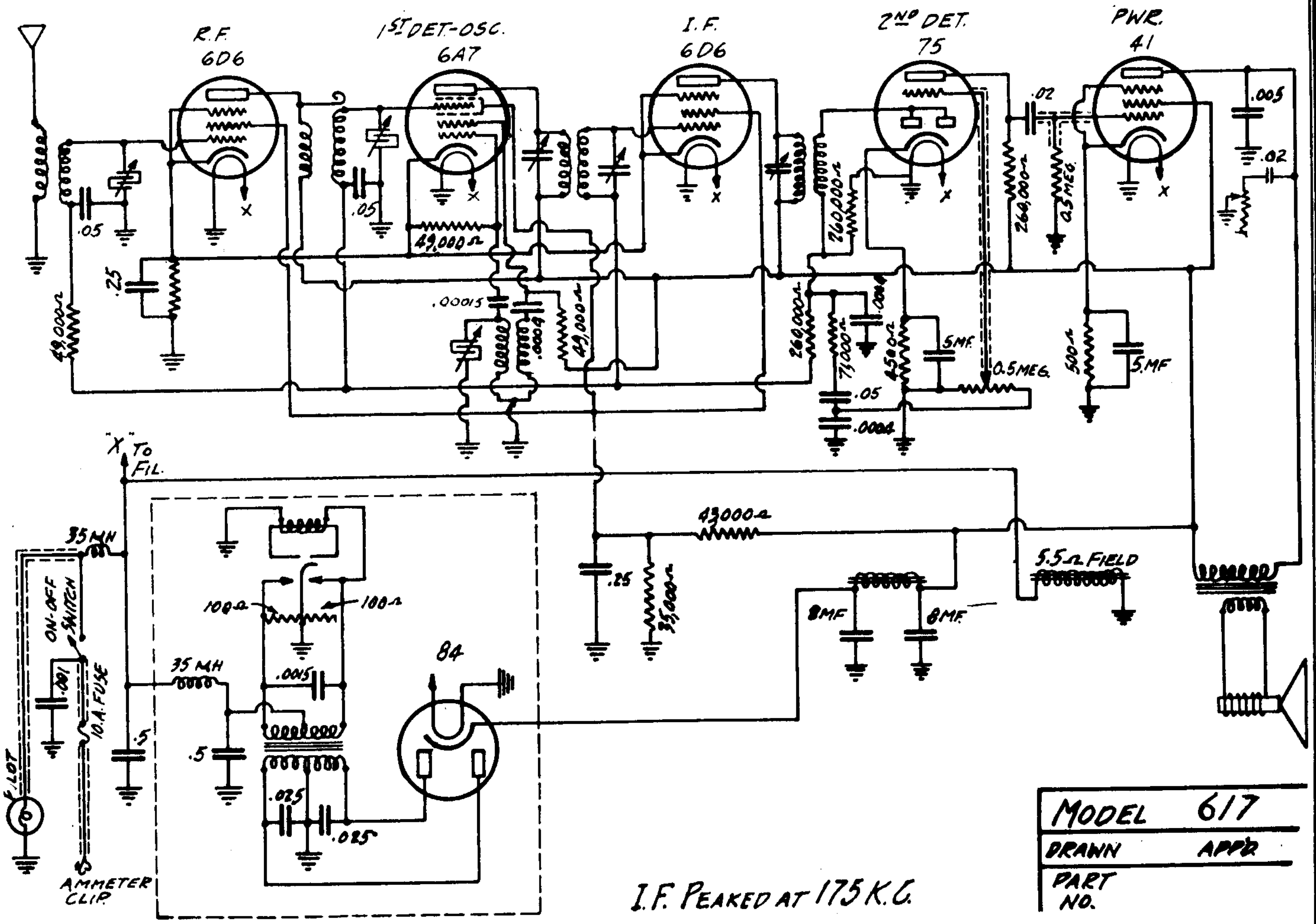


MODEL 102

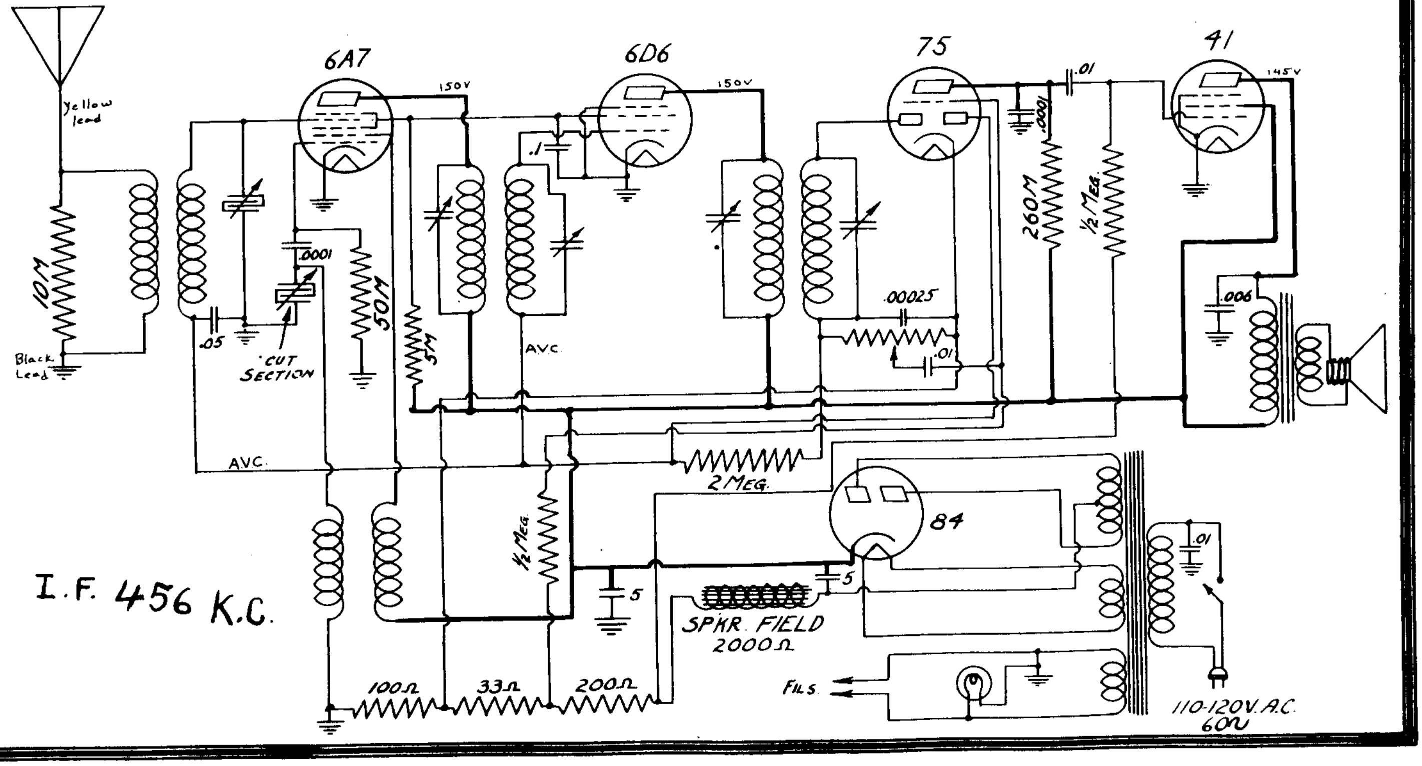


DeWALD RADIO

MODEL 617

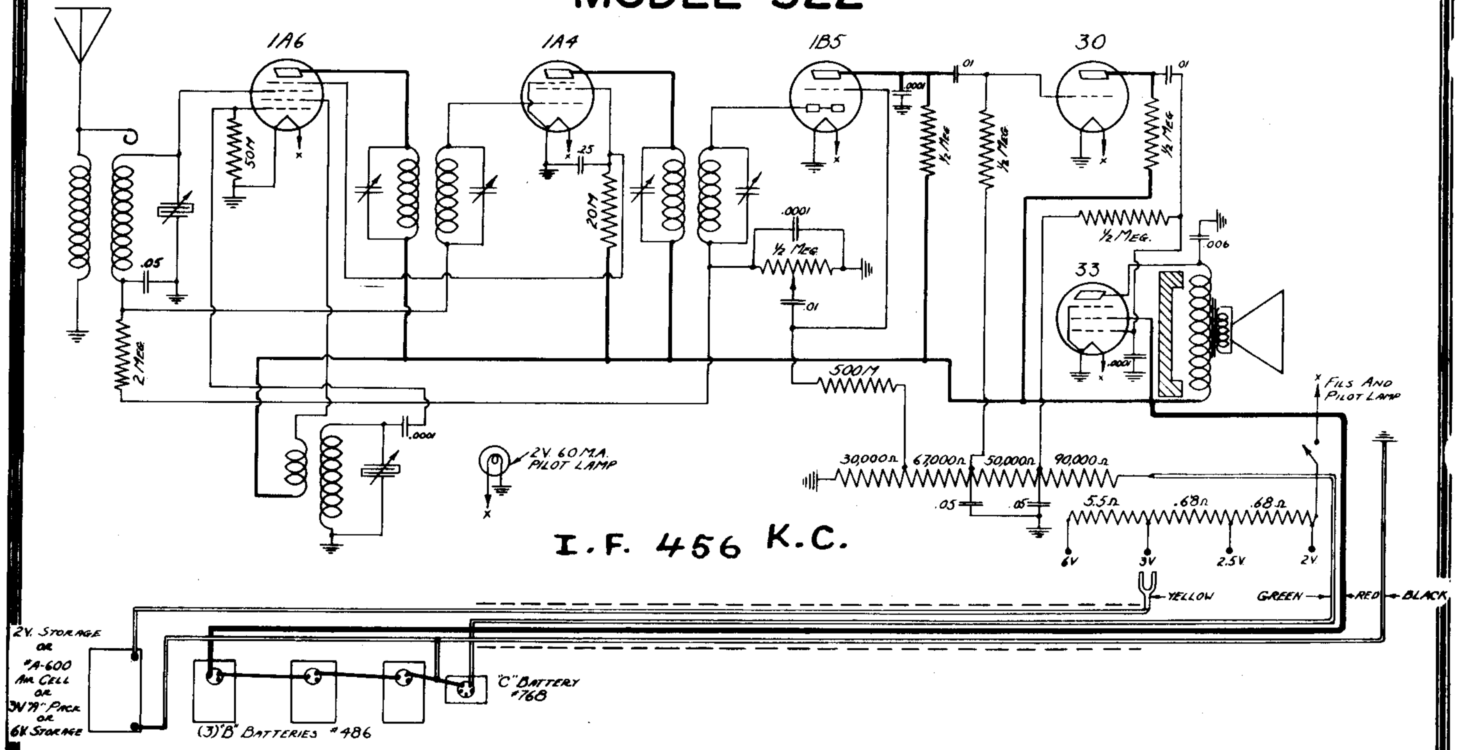


MODEL 523

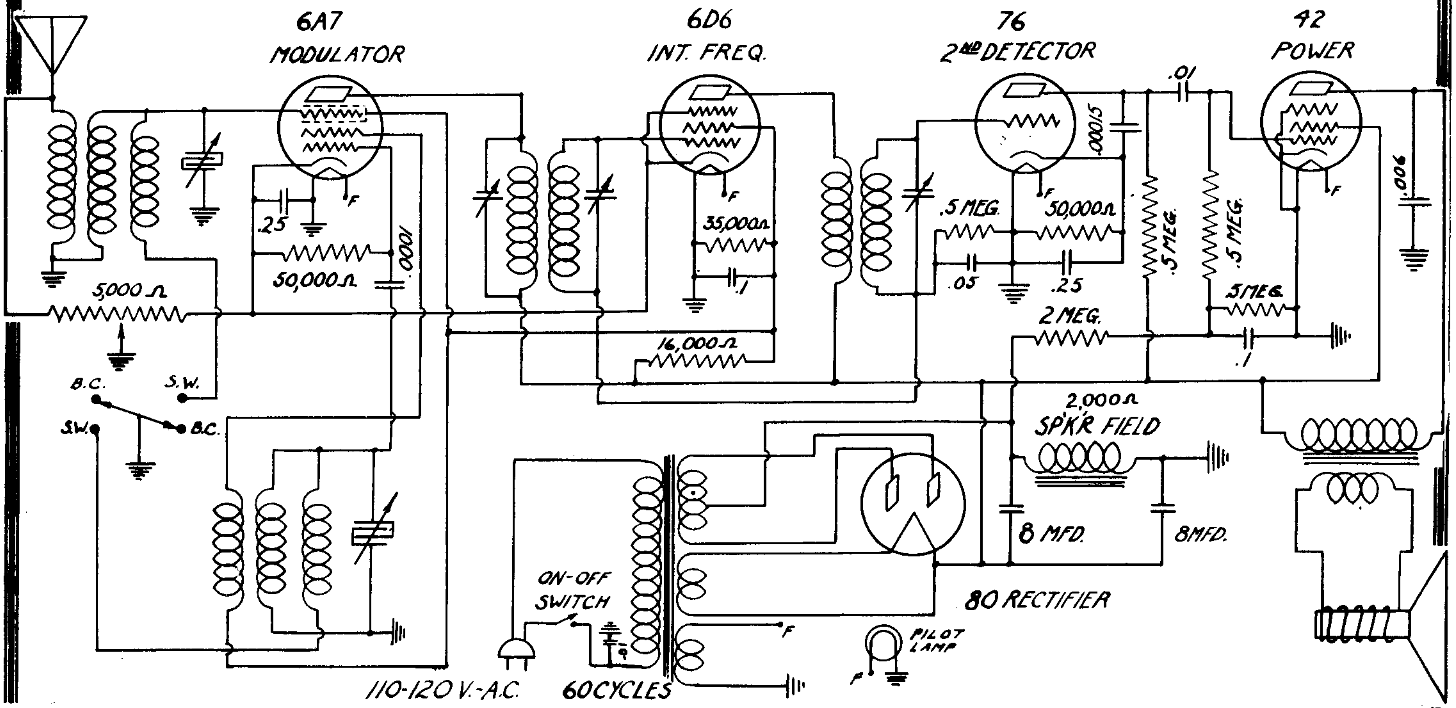


DeWALD RADIO

MODEL 522



MODEL 520



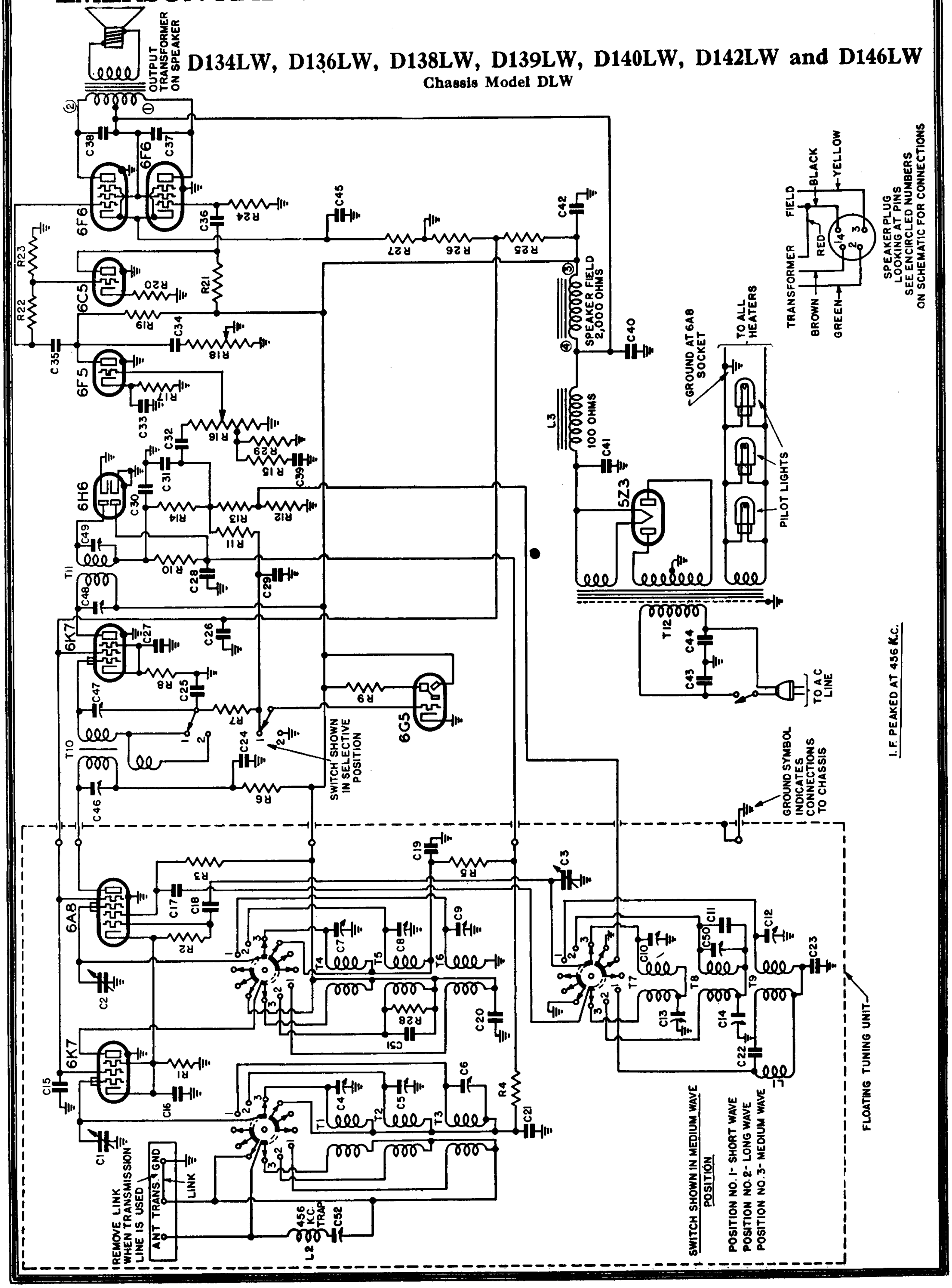
TO CALIBRATE- SET SERVICE OSCILLATOR TO 456 K.C. AND CONNECT 'HOT' LEAD TO GRID OF 6A7 TUBE GROUND STATOR OF REAR (OSCILLATOR) SECTION OF VARIABLE CONDENSER. TURN VOLUME CONTROL FOR MAXIMUM OUTPUT AND PEAK INTERMEDIATE FREQUENCY TRIMMERS FOR MAXIMUM GAIN

REMOVE SHORT FROM VARIABLE CONDENSER. REMOVE SERVICE OSCILLATOR LEAD FROM GRID OF 6A7 TUBE AND CONNECT SAME TO RED LEAD ON REAR OF SET. ADJUST SERVICE OSCILLATOR AND THE RECEIVER TO 1500 K.C. AND PEAK TRIMMERS ON VARIABLE CONDENSER FOR MAXIMUM GAIN. ALL THE OTHER FREQUENCIES ARE AUTOMATICALLY CALIBRATED WHEN RECEIVER IS PEAKED AT 1500 K.C. DUE TO THE CONSTRUCTION OF THE CUT SECTION OF VARIABLE CONDENSER.

EMERSON RADIO AND PHONOGRAPH CORPORATION

D134LW, D136LW, D138LW, D139LW, D140LW, D142LW and D146LW

Chassis Model DLW



EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS D134LW, D136LW, D138LW, D139LW, D140LW, D142LW and D146LW

Chassis Model DLW

PRODUCTION CHANGES

a. C6 and C9 trimmers were supplied separately and later incorporated as part of the short-wave antenna and detector coil assemblies.
b. R20 in early receivers was a 5,000 ohm ¼ watt resistor.
c. R29 was not used in early receivers.

ADJUSTMENTS

The receiver was carefully aligned and checked at the factory by means of an oscillograph, and it is strongly recommended that servicemen use one for realignment.

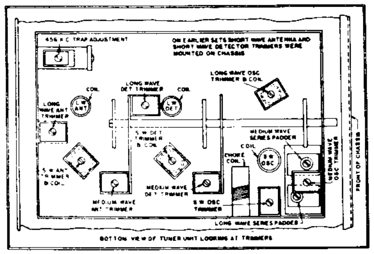
An oscillator with frequencies of 150, 345, 456, 600, 1600 and 16000 kc should be used.

An output meter should be used across the voice coil or speaker output transformer for observing maximum response.

Use a standard dummy antenna for aligning any of the three bands. A .0002 mf condenser may be used for the medium-wave and long-wave dummy antenna, and a 400 ohm resistor for the short-wave dummy antenna.

The i-f transformers are located on the extreme left side of the chassis. The transformer nearest the front of the chassis is the first i-f transformer. The four trimmers for the i-f adjustment are available through holes in the tops of the cans.

The medium-wave, long-wave and short-wave coils are all located on the tuner unit. The tuner unit is the separate chassis section floated on rubber and mounted in center of chassis. The location of the trimmers for the coils is shown in the illustration at the right. The three coils for the medium-wave band are in separate cans on top of the tuner unit.



Checking High-Fidelity Operation

On the oscillograph screen the peak of the selectivity curve (i-f response curve with fidelity-selectivity switch in selective position, clockwise) should appear in a position midway between the two peaks of the high-fidelity curve (i-f response curve with fidelity-selectivity switch in fidelity position, counter clockwise). In other words the central vertical axis of the selectivity curve should be coincident on the screen with the central vertical axis of the high-fidelity curve.

An approximate check of the high-fidelity operation can be made with the use of the oscillator and output meter. First, the i-f's should be very carefully peaked at 456 kc *with the fidelity-selectivity switch in the selective position.* Turn the switch to the fidelity position, counter-clockwise, and vary the frequency of the oscillator. Two peaks should be observed on the output meter, approximately 7 kc on each side of the selectivity peak.

Alignment

Set the wave-band switch at the medium-wave (clockwise) position and the variable condenser at the minimum capacity position. Feed 456 kc to the grid cap of the 6A8 tube. Adjust the four i-f trimmers carefully for maximum response. Feed 456 kc through a dummy antenna into the antenna terminal and adjust the 456 kc wave-trap for *minimum response.* (See General Notes.)

Both pointers on the dial should coincide vertically at 890 kc. For adjustment, the gold pointer may be slipped around its shaft. With the wave-band switch at the medium-wave (clockwise) position, set the pointer at 60, feed 600 kc through the antenna (using a standard dummy antenna), and adjust the medium-wave series padder for maximum response. Move pointer to 160, feed 1600 kc to the antenna and adjust the oscillator trimmer for maximum response, then adjust detector and antenna trimmers. Reset the pointer to 60, feed 600 kc to antenna and rock the variable condenser (rotate the condenser back and forth through a small arc) while resetting the oscillator padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary, return to 600 and repeat entire procedure.

Set the wave-band switch at the long-wave (central) position and the pointer to 150. Feed 150 kc through a standard dummy antenna to the antenna terminal and adjust the long-wave series padder for maximum response. Move the pointer to 345, feed 345 kc and adjust the long-wave oscillator trimmer, then the r-f trimmer and then the antenna trimmer for maximum response. Return to 150 kc and re-adjust the long-wave series padder for maximum response. Return to 345 kc and re-adjust all three trimmers. Return again to 150 and check the alignment. Repeat the entire procedure until no appreciable re-adjustment is required.

Set the wave-band switch at the short-wave (counter-clockwise) position. Move pointer to 16, feed 16000 kc to antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator for maximum response. If two peaks are obtained choose minimum capacity peak. Then adjust the detector and antenna trimmers for maximum response. If two peaks are obtained choose the maximum capacity peak.

GENERAL INSTRUCTIONS

Use as weak a test signal as possible during alignment.

The set's oscillator is higher in frequency than the signal on all three bands. Images, therefore, should be observed on the low-frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmer and maximum capacity peaks on antenna and r-f trimmers. The last motion in adjusting trimmers should always be a tightening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a source of noise, frequency drift and microphonism.

In aligning antenna trimmers on the high-frequency signals there is usually a tendency for the oscillator to drift, due to interlocking. To compensate for this always keep re-tuning the variable condenser as you align.

The color coding of the power transformer leads is as follows:

Primary—two black leads
High voltage sec.—two red leads
High voltage secondary center tap—red and yellow lead
6.3v sec.—two heavy green leads
5v sec.—two heavy yellow leads

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground, with no signal. Line voltage for these readings was 117.5 volts, 60 cycles.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A8 osc.-mod.	210	100	3.2	150	6.3 a.c.
6K7 r-f amp.	215	100	3.2	—	6.3 a.c.
6K7 i-f amp.	215	100	2.6	—	6.3 a.c.
6H6 diode det.	—	—	0	—	6.3 a.c.
6F5 1st audio	75	—	1.1	—	6.3 a.c.
6C5 phase inverter	98	—	4	—	6.3 a.c.
6F6 output	330	335	22	—	6.3 a.c.
6F6 output	330	335	22	—	6.3 a.c.

Voltage at 5Z3 filament—350.
Voltage across speaker field—110.
Voltage across choke—15.
Voltages, to chassis measured along voltage divider, starting at end nearest rear of chassis.

Tap 1 (nearest rear of chassis)—215
Tap 2—100
Tap 3—0
Tap 4—22

REPLACEMENT PARTS LIST

*Item	Part No.	DESCRIPTION	List Price as Effective as of Aug. 1st, 1936 PRICE
L1	3AT-291	Oscillator choke	$ .20
L2	2PT-283	456 kc wave trap	.60
L3	3AT-264	Iron core filter choke	.90
T1	3AT-251	Medium-wave antenna coil	.95
T4	3AT-252	Medium-wave detector coil	.95
T7	3AT-253	Medium-wave oscillator coil	.75
T2	3MT-301	Long wave antenna coil	1.05
T5	3MT-302	Long-wave detector coil	1.05
T8	3MT-303	Long-wave oscillator coil	.95
T3	3AT-257	Short-wave antenna coil	.60
T6	3AT-258	Short-wave detector coil	.70
T9	3AT-259	Short-wave oscillator coil	.50
T10	3AT-260	Band-spread, iron core, 456 kc first i-f transformer	2.90
T11	3AT-261	456 kc second i-f transformer	1.90
T12	3AT-262	Power transformer	6.65
R1	3AR-245	220 ohm ½ watt wire-wound resistor	.16
R2	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3	YR-97	15,000 ohm ½ watt carbon resistor	.16
R4, R5, R7, R13, R14, R121	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R6, R28	GR-85	2,000 ohm ¼ watt carbon resistor	.16
R8	CCR-140	350 ohm ½ watt wire-wound resistor	.16
R9, R10, R11	KR-57	1 megohm ¼ watt carbon resistor	.16
R12, R22, R24	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R15, R20	LR-65	10,000 ohm ¼ watt carbon resistor	.16
R16	3AR-228	Volume control with line switch—500,000 ohms tapped at 100,000 ohms	1.20
R17	3AR-250	3,500 ohm ¼ watt carbon resistor	.16
R18	NNR-157B	Tone control—500,000 ohms	.90
R19	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R29	KR-63	15,000 ohm ¼ watt carbon resistor	.16
R23	3AR-244	80,000 ohm ¼ watt carbon resistor	.16
R25, R26, R27	3AR-230	Wire-wound voltage divider R25—3000 ohms, 4.8 watts R26—3000 ohms, 3.35 watts R27—240 ohms, 2.4 watts	.95
C1, C2, C3	3AC-276	Three-gang variable condenser	7.40
C4, C5, C7, C8, C10, C12	3AC-27[illegible]	1.5 to 12 mmf trimmer condensers. (See Production Changes.)	.15
†C6		Trimmer—part of short-wave coil assembly.	
†C9		Trimmer—part of short-wave detector coil assembly.	
C13, C14	3MC-295	Dual padding condenser C13—250 to 550 mmf C14—100 to 200 mmf	.60
C15, C35, C36	LC-65	0.02 mf 400 volt tubular condenser	.20
C16, C27	AC-6	0.1 mf 200 volt tubular condenser	.20
C17	AAC-114	0.001 mf mica condenser	.20
C11, C18	AAC-106A	0.00005 mf mica condenser	.20
C19	NNC-158	0.05 mf 200 volt tubular condenser (with mounting strap)	.20
C20, C24	EEC-132	0.1 mf 400 volt tubular condenser	.20
C21	BC-13	0.25 mf 200 volt tubular condenser	.20
C22	IIC-133A	0.000025 mf mica condenser	.20
C23	XXC-197	0.0038 mf mica condenser	.35
C25, C32	FC-29	0.02 mf 200 volt tubular condenser	.20
C33	IC-43B	5 mf 25 volt dry electrolytic condenser	.90
C28, C29	BC-12	0.05 mf 200 volt tubular condenser	.20
C26	AAC-112	0.25 mf 400 volt tubular condenser	.20
C30, C31	AC-7A	0.00025 mf mica condenser	.20
C45	3AC-256	5 mf 50 volt dry electrolytic condenser	.80
C34	XXC-207	0.005 mf 400 volt tubular condenser	.20
C37, C38	NNC-214	0.002 mf 1000 volt tubular condenser	.20
C39	ZZC-211	0.03 mf 200 volt tubular condenser	.20
C40, C41	3AC-255	8 mf 400 volt wet electrolytic condenser	1.20
C42	3AC-277	40 mf 250 volt wet electrolytic condenser	1.20
C43, C44	3AC-299	Dual 0.01 mf, 400 volt tubular condenser in metal container	.20
†C46, C47		Trimmers—part of first i-f assembly.	
†C48, C49		Trimmers—part of second i-f assembly.	
†C50		Trimmer—part of long-wave oscillator coil assembly.	
†C51	EC-24A	0.0001 mf mica condenser	
†C52		Trimmer—part of wave-trap.	
	2AS-137A	Fidelity switch	.90
	3AS-166	Wave-band switch	2.25
	3AS-190	8" dynamic speaker	8.50
	3AS-167	12" dynamic speaker	11.35
	3AS-221	15" dynamic speaker	27.00
	XL-9	Pilot light, 6.3 volt, .25 amp. Mazda No. 46	.20
	3AD-41	Dial plate with band-indicator mechanism	2.20
	3MZ-422	Dial face	1.30
	3AZ-369	Idler pulley	.05
	3AZ-370	Idler pulley spring	.05
	3AZ-371	Dial drive belt	.20
	3AZ-414	Planetary dial drive (for two knob assembly)	1.85
	3AZ-372	Planetary dial drive (for single knob assembly)	1.85
	3AZ-366	Frequency indicating pointer	.10
	3AZ-367	Band-spread pointer	.15
	3AZ-406	Dial escutcheon with crystal	1.65
	3AZ-322	Electron Ray socket and cable	.85
	3AZ-407	Electron Ray escutcheon	.20

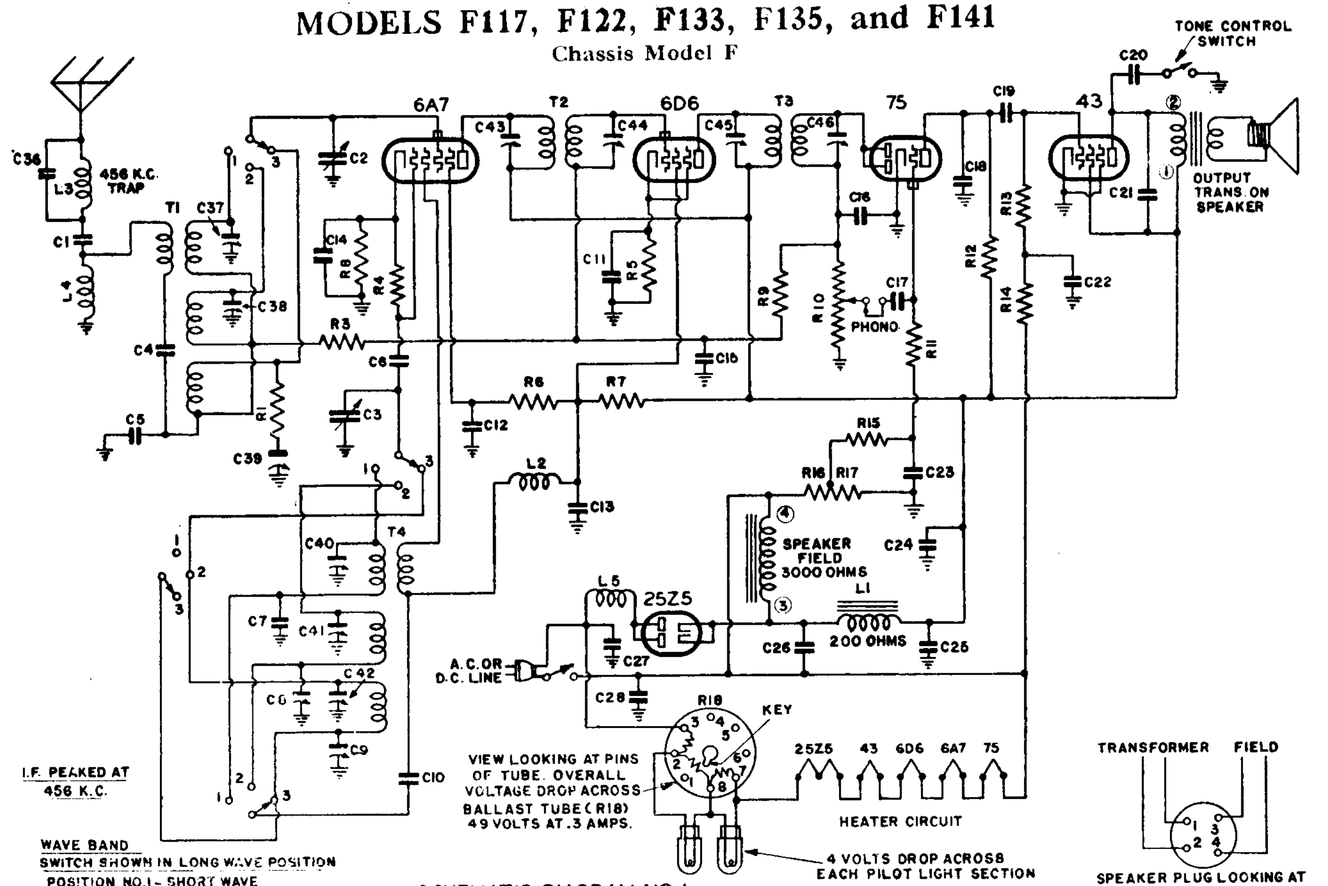
WHEN ORDERING REPLACEMENT PARTS SPECIFY PART NUMBERS.

*Item number locates the article on the schematic diagram.
† These condensers are part of coil assemblies and can not be supplied separately.

EMERSON RADIO AND PHONOGRAPH CORPORATION

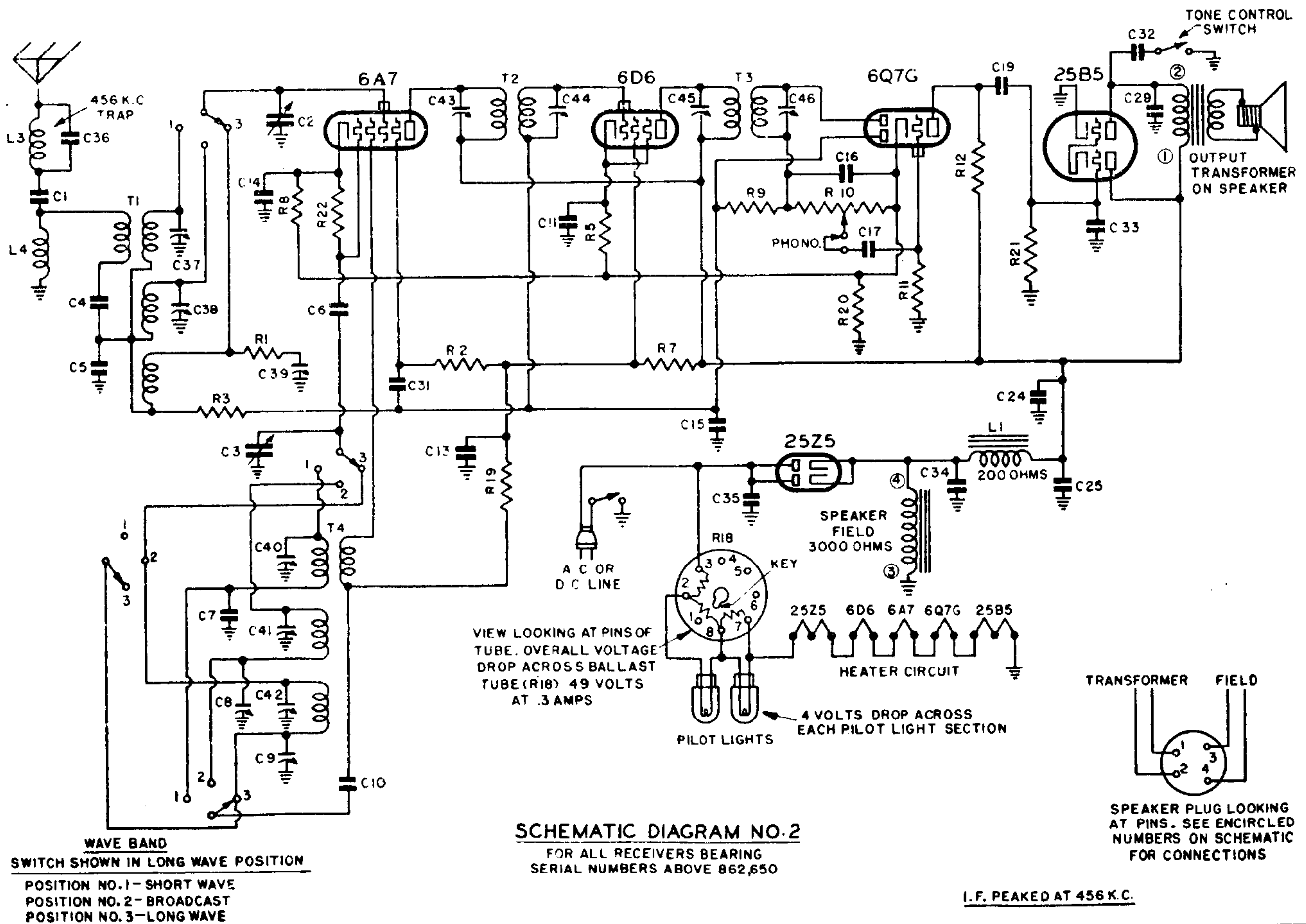
MODELS F117, F122, F133, F135, and F141

Chassis Model F



SCHEMATIC DIAGRAM NO. 1

FOR ALL RECEIVERS BEARING SERIAL NUMBERS BELOW 862,650



SCHEMATIC DIAGRAM NO. 2

FOR ALL RECEIVERS BEARING SERIAL NUMBERS ABOVE 862,650

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS F117, F122, F133, F135, and F141

PRODUCTION CHANGES

a. Schematic No. 1 applies to receivers bearing serial numbers below 862,650.
b. Schematic No. 2 applies to receivers bearing serial numbers above 862,650.
c. In receivers bearing serial numbers between 861,950 and 862,950 C21 was .006 mmf, 600 volt tubular condenser.
d. In receivers bearing serial numbers below 861,950 r-f choke L5 was not in the circuit.
e. In receivers bearing serial numbers below 847,350 the 6A7 and 6D6 cathodes were connected together. R5 was 150 ohm, 1/2 watt wire-wound resistor and C11 was .25 mf, 200 volt tubular condenser. R8 and C14 were not in the circuit. The screen of 6D6 was connected to B plus through a separate 5000 ohm 1/4 watt carbon resistor and by-passed with a .1 mf, 200 volt tubular condenser. R11 and R13 were 250,000 1/4 watt carbon resistors. R1 was a 500,000 ohm 1/4 watt carbon resistor and was connected directly across the long-wave antenna coil secondary.

ADJUSTMENTS

An oscillator with frequencies of 150, 350, 456, 600, 1500 and 15,000 kc should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Use a standard dummy antenna when aligning either the long-wave or medium-wave bands. A .0002 mf condenser may be used as a substitute. When aligning the short-wave band use a 400 ohm dummy antenna (a 400 ohm resistor in series with antenna lead).

Location of Coils and Trimmers

The two i-f transformers are located on top of the chassis deck. The second i-f transformer is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of the cans.

The dual adjustable padding condenser is mounted on the left side of the front chassis wall.

The antenna coils for the three bands are wound on one form and mounted underneath the chassis deck directly behind the adjustable padding condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the medium-wave antenna trimmer. The central trimmer is the short-wave antenna trimmer. The trimmer farthest from the front of the chassis is the long-wave antenna trimmer.

The oscillator coils for the three bands are wound on one form and mounted underneath the chassis deck near the variable condenser. The trimmers for these coils are also accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the medium-wave oscillator trimmer. The central trimmer is the short-wave oscillator trimmer. The trimmer farthest from the front of the chassis is the long-wave oscillator trimmer.

I-f Alignment

Rotate the wave-band switch to the medium-wave (central) position and set the variable condenser to minimum. Feed 456 kc to the grid cap of the 6A7 tube. Adjust the four i-f trimmers for maximum response.

Long-Wave Alignment

With the wave-band switch at long-wave (clockwise) position set the dial pointer at 15 and feed 150 kc to antenna. Adjust the long-wave series padder (hex nut on dual padder) for maximum response. Move pointer to 35 and feed 350 kc to antenna. Adjust the long-wave oscillator trimmer then the long-wave antenna trimmer for maximum response. Reset pointer to 15, feed 150 kc and rock (rotate back and forth through a small arc) the variable condenser while adjusting long-wave series padder for maximum response. Reset pointer to 35, feed 350 kc and check alignment. If readjustment is necessary return to 150 kc and repeat entire procedure.

Medium-Wave Alignment

Set switch at medium-wave (central) position and dial pointer at 60. Feed 600 kc to antenna and adjust medium-wave series padder (slotted screw on dual padder) for maximum response. Move pointer to 150, feed 1500 kc and adjust medium-wave oscillator trimmer and then the medium-wave antenna trimmer for maximum response. Reset pointer to 60, feed 600 kc and rock variable condenser while readjusting medium-wave series padder for maximum response. Reset pointer to 150, feed 1500 kc and check alignment. If readjustment is necessary return to 600 and repeat entire procedure.

Short-Wave Alignment

Set wave-band switch at short-wave (counter-clockwise) position. Set pointer at 15, feed 15 megacycles to antenna and adjust short-wave oscillator trimmer and then short-wave antenna trimmer for maximum response.

GENERAL INSTRUCTIONS

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Always use as weak a test signal as possible during alignment.

Never leave a trimmer with its outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

The following are voltages for receivers bearing serial numbers *below* 862,650:

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	100	48	*1.1	80	6.3
6D6	100	90	2	—	6.3
75	45	—	0	—	6.3
43	88	100	0	—	24

Voltage across speaker field—125.

Voltage across filter choke—10.

The 250 ohm bias resistor, R14 and R15 on schematic diagram, is located underneath the chassis near the volume control. Voltage across the two outside terminals of this resistor—12. Voltage from chassis to central terminal of resistor—1.

The voltage drop across the ballast resistor (R18—see schematic) is 49 volts between pins 3 and 8.

The following are voltages for receivers bearing serial numbers *above* 862,650:

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	112	34	2.4	67	6.3
6D6	112	90	4.2	—	6.3
6Q7G	52	—	1.2	—	6.3
25B5	102	112	0	—	25

Voltage across speaker field—126.

Voltage across filter choke—10.

The voltage drop across the ballast resistor (R18—see schematic) is 49 volts between pins 3 and 8.

**On receivers bearing serial numbers below 847,450, this voltage is 2 volts.*

REPLACEMENT PARTS LIST

*Item Schematic No. 1	*Item Schematic No. 2	Part No.	DESCRIPTION	List Price ea. Effective as of Aug. 1st, 1936 PRICE
L1	L1	2CT-207C	Iron-core filter choke	$ .90
L2	——	3ET-299	R-f choke—5 millihenries	.55
L3	L3	2ZT-268	456 kc wave-trap	.75
L4	L4	3ET-299	R-f choke—5 millihenries	.55
L5	——	3ET-315	R-f choke—400 microhenries	.30
T1	T1	3ET-297	Three-band antenna coil	2.05
T2	T2	2NT-230	456 kc first i-f transformer	1.35
T3	T3	2NT-231	456 kc second i-f transformer	1.35
T4	T4	3ET-298	Three-band oscillator coil	1.90
R1	R1	TTR-201	3,000 ohm 1/4 watt carbon resistor	.16
——	R2	3ER-263	60,000 ohm 1/4 watt carbon resistor	.16
R3	R3	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R4	——	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R5	R5	AAR-119	300 ohm 1/2 watt wire-wound resistor	.16
R6	——	LR-60	20,000 ohm 1/4 watt carbon resistor	.16
R7	R7	LR-64	5,000 ohm 1/4 watt carbon resistor	.16
R8	R8	AAR-119	300 ohm 1/2 watt wire-wound resistor	.16
R9	R9	KR-57	1 megohm 1/4 watt carbon resistor	.16
R10	R10	2NR-214D	Volume control with switch—250,000 ohms	1.20
R11	R11	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R12	R12	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R13	——	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R14	——	OR-73	25,000 ohm 1/4 watt carbon resistor	.16
R15	——	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R16, R17	——	2CR-211	Metal-clad 1 watt wire-wound tapped resistor R16—230 ohms R17—20 ohms	.35
R18	R18	3ER-248	Plug-in type ballast resistor	.80
——	R19	LR-60	20,000 ohm 1/4 watt carbon resistor	.16
——	R20	IIR-130	150 ohm 1/2 watt wire-wound resistor	.16
——	R21	KR-57	1 megohm 1/4 watt carbon resistor	.16
——	R22	KR-54	100,000 ohm 1/4 watt carbon resistor	.16
C1	C1	FC-29	0.02 mf, 200 volt tubular condenser	.20
C2, C3	C2, C3	3EC-284	Two-gang variable condenser	3.65
C4	C4	FC-29	0.02 mf, 200 volt tubular condenser	.20
C5	C5	2ZC-253	0.0025 mf mica condenser	.30
C6	C6	AAC-106A	0.00005 mf mica condenser	.20
C7	C7	3EC-286	0.0024 mf mica condenser	.30
C8, C9	C8, C9	2ZC-257	Dual adjustable padding condenser C8—250 to 500 mmf C9—100 to 200 mmf	.65
C10	C10	FC-29	0.02 mf, 200 volt tubular condenser	.20
C11	C11	AC-6	0.1 mf, 200 volt tubular condenser	.20
C12	——	AC-6	0.1 mf, 200 volt tubular condenser	.20
C13	C13	YC-98A	4 mf, 150 volt tubular dry electrolytic condenser	1.05
C14	C14	AC-6	0.1 mf, 200 volt tubular condenser	.20
C15	C15	BC-12	0.05 mf, 200 volt tubular condenser	.20
C16	C16	AC-7A	0.00025 mf mica condenser	.20
C17	C17	FC-29	0.02 mf, 200 volt tubular condenser	.20
C18	——	AC-7A	0.00025 mf mica condenser	.20
C19	C19	LC-65	0.02 mf, 400 volt tubular condenser	.20
C20	——	QQC-173	0.015 mf, 600 volt tubular condenser	.20
C21	——	TTC-177	0.01 mf, 600 volt tubular condenser	.20
C22	——	AC-6	0.1 mf, 200 volt tubular condenser	.20
C23	——	AC-6	0.1 mf, 200 volt tubular condenser	.20
C24	C24	AC-6	0.1 mf, 200 volt tubular condenser	.20
C25	C25	3EC-288	20 mf, 200 volt wet electrolytic condenser	1.00
C26	——	3EC-288	20 mf, 200 volt wet electrolytic condenser	1.00
C27	——	3EC-296	0.01 mf, 400 volt a.c. tubular condenser	.20
C28	——	3EC-296	0.01 mf, 400 volt tubular condenser	.20
——	C29	QQC-173	0.015 mf, 600 volt tubular condenser	.20
——	C31	KC-58	0.01 mf, 400 volt tubular condenser	.20
——	C32	EC-23	0.03 mf, 400 volt tubular condenser	.20
——	C33	AC-7A	0.00025 mf mica condenser	.20
——	C34	3EC-311	40 mf, 200 volt wet electrolytic condenser	1.15
——	C35	3EC-326A	0.05 mf, 400 volt molded type paper condenser	.20
†C36	†C36		0.0015 mf mica condenser, part of wave-trap assembly.	
†C37, C38, C39	†C37, C38, C39		Trimmer, part of antenna coil assembly.	
†C40, C41, C42	†C40, C41, C42		Trimmer, part of oscillator coil assembly.	
†C43, C44	†C43, C44		Trimmer, part of first i-f transformer assembly.	
†C45, C46	†C45, C46		Trimmer, part of second i-f transformer assembly.	
		3ES-175	6 1/2" dynamic speaker (for receivers using type 43 output tube)	5.60
		3ES-219	6 1/2" dynamic speaker (for receivers using type 25B5 output tube)	5.60
		3ES-241	10" dynamic speaker (for receivers using type 25B5 output tube)	9.00
		3ES-218	Wave-band switch	1.10
		2TS-145E	Tone-control switch	.35
		XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20

*Item number locates the article on the schematic diagram.

†These trimmers are part of coil assemblies and can not be supplied separately.

Tube Data

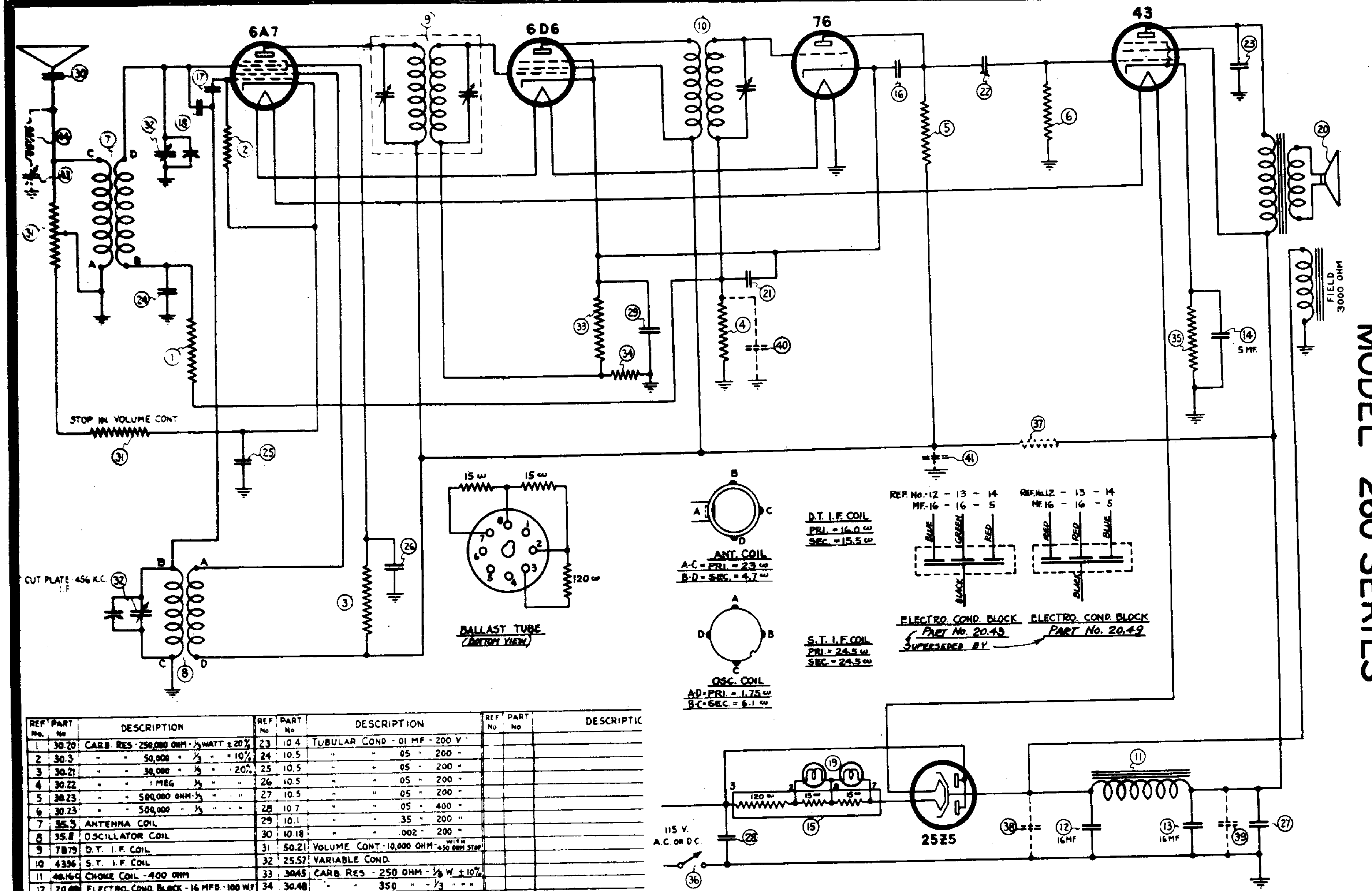
The tube complement for receivers bearing serial numbers *below* 862,650 is as follows:

1—6A7 pentagrid oscillator-modulator.
1—6D6 first i-f amplifier.
1—75 diode detector, a.v.c., audio amplifier.
1—43 pentode power output.
1—25Z5 dual half-wave rectifier.
1—3ER-248 ballast tube.

The tube complement for receivers bearing serial numbers *above* 862,650 is as follows:

1—6A7 pentagrid oscillator-modulator.
1—6D6 first i-f amplifier.
1—6Q7G diode detector, a.v.c., audio amplifier.
1—25B5 duplex-triode power output.
1—25Z5 dual half-wave rectifier.
1—3ER-248 ballast tube.

FADA RADIO & ELECTRIC CO.
MODEL 260 SERIES



REF No.	PART No	DESCRIPTION	REF No	PART No	DESCRIPTION	REF No	PART No	DESCRIPTION
1	30.20	CARB. RES. - 250,000 OHM - ⅓ WATT ± 20%	23	10.4	TUBULAR COND. - .01 MF - 200 V.			
2	30.3	" " 50,000 " ⅓ " " 10%	24	10.5	" " .05 " 200 "			
3	30.21	" " 30,000 " ⅓ " " 20%	25	10.5	" " .05 " 200 "			
4	30.22	" " 1 MEG ⅓ " "	26	10.5	" " .05 " 200 "			
5	30.23	" " 500,000 OHM - ⅓ " "	27	10.5	" " .05 " 200 "			
6	30.23	" " 500,000 " ⅓ " "	28	10.7	" " .05 " 400 "			
7	35.3	ANTENNA COIL	29	10.1	" " .35 " 200 "			
8	35.8	OSCILLATOR COIL	30	10.18	" " .002 " 200 "			
9	7879	D.T. I.F. COIL	31	50.21	VOLUME CONT. - 10,000 OHM - WITH 450 OHM STOP			
10	4336	S.T. I.F. COIL	32	25.57	VARIABLE COND.			
11	40.16C	CHOKE COIL - 400 OHM	33	3045	CARB. RES. - 250 OHM - ⅓ W. ± 10%			
12	20.49	ELECTRO. COND. BLOCK - 16 MFD. - 100 W.V.	34	30.48	" " 350 " - ⅓ " " "			
13	20.49	" " " 16 " " "	35	30.47	" " 625 - ½ " " "			
14	20.49	" " " " 5 " 25 "	36		ON-OFF SW. ON VOLUME CONT.			
15	[illegible]	BALLAST RES. - 120 - 15 - 15 OHMS	37	30.30	CARB. RES. - 1,400 OHM - ⅓ W. ± 10%			
16	15.2	MICA COND. - .0005 MF. ± 10%	38	20.25	TUBULAR ELECTRO COND. - 8 MFD. - 100 W.V.			
17	15.3	" " .0001 " " "	39	20.25	" " " 8 " " " "			FOR 25 CYCLE OPERATION ONLY
18	15.16	" " 3. MMF - ± ½ MMF	40	10.2	" COND. - .1 MF. - 200 V.			
19	120.3	PILOT LIGHTS - 6-8 V. .15 A	41	10.8	" " .25 " " "			
20	105.21	SPEAKER - 3000 OHMS	42					
21	10.4	TUBULAR COND. - .01 MF - 200 V.	43	25.50	TRIMMING COND. - 150 MMF.			OPTIONAL EQUIPMENT
22	10.4	" " .01 " 200 "	44	4697	WAVE TRAP COIL			

NOTE

⏚ = CHASSIS

I.F. = 456 K.C.

PARTS SHOWN IN DOTTED LINES ARE FOR 25 CYCLE OPERATION ONLY.

FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.
MODEL 260
DRAWN BY [signature] DATE 8-7-36
CHECKED [signature] APP

FADA RADIO & ELECTRIC CO.
MODELS 211-250-260 SERIES

MODEL 211 SERIES

CONTINUITY AND VOLTAGE READINGS

Line voltage 117 A. C. - Input current .78 Amp. (No signal input)

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CATHODE VOLTS	SCREEN GRID VOLTS
6K7	R.F. Amp.	110	6.1	2.0	81
6A8	1st Detector	107	2.1	1.4	56
	Oscillator	75	1.6	---	--
6K7	Int. Freq.	110	5.5	2.2	81
6Q7	2nd Detector	---	---	---	--
	A.V.C.	---	---	---	--
	1st Audio	55	0.3	1.5	--
6C5	A.F. Driver	50	1.1	25.0	--
6E5*	Flash-o-graph	110	1.8	---	--
25A6	P.P. Output	89	20.0	14.5	96
25Z5	Rectifier	---	147.0 TOTAL	---	--

TOTAL RECEIVER CURRENT----71 ma. SPEAKER FIELD CURRENT-----76 ma.

*Superseded by 6G5 on late production models.

Above readings taken with a 105.44 speaker in circuit. These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

VOLTAGES ACROSS ELECTROLYTIC CONDENSER (#20.47)
1st - 126 volts 2nd - 111 volts

Voltage across speaker field 126 volts
Voltage across filter choke (#40.3A) 15 volts

SPEAKER D.C. RESISTANCE VALUES

PART NO.	FIELD COIL	AUDIO TRANS. PRI.	AUDIO TRANS. SEC.	V.C.
105.44	1500*	740*	.5**	2.0
105.45	1500*	740*	.7**	2.7
105.46	1500*	700*	.8**	2.5

*These are cold D.C. resistance values.
**This reading includes resistance of hum bucking coil.

MODEL 250 SERIES

CONTINUITY AND VOLTAGE READINGS

Line voltage 117 A.C. - Input current .52 Amp. - No signal input - Volume control----Max.

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CATHODE VOLTS	SCREEN GRID VOLTS
6A7	1st Detector	214	3.8	2.5	92
	Oscillator	176	3.4	---	--
6D6	Int. Freq.	214	6.6	3.1	92
76	2nd Detector	98	0.2	9.1	--
6B5	Pwr. Input	214	6.3	---	--
	Pwr. Output	202	27.0	---	--
80	Rectifier	---	52.0 TOTAL	---	--

These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages. Above readings taken with a 105.37 speaker in circuit.

VOLTAGES ACROSS ELECTROLYTIC CONDENSERS
1st - 305 volts 2nd - 214 volts

Voltage across speaker field - - - - - - - - - - - - - - 91 volts

SPEAKER D.C. RESISTANCE VALUES

PART NO.	FIELD COIL	AUDIO TRANS. PRI.	AUDIO TRANS. SEC.	V.C.
105.20	1500*	625*	.8 **	2.0
105.37	1500*	400*	.25**	2.1

*These are cold D.C. resistance values.
**This reading includes resistance of hum bucking coil.

MODEL 260 SERIES

CONTINUITY AND VOLTAGE READINGS

Line voltage - 119 v. A.C. Input watts - 48

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CONTROL GRID VOLTS	SCREEN GRID VOLTS
6A7	1st Det. Osc.	108	1.4	2.6**	54
6D6	I.F. Amp.	105	8.4	2.6	105
76	2nd Det.	36*	.05	6.2**	--
43	Pwr. Pentode	90	20.0	15.0**	97
25Z5	Rectifier	--	78. TOTAL	---	--

* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.
** Correct readings cannot be obtained at control grid due to series resistors. To be measured across each respective bias resistor.

VOLTAGES ACROSS ELECTROLYTIC CONDENSER (Part #20.49)
1st section - 128 volts 2nd section - 112 volts

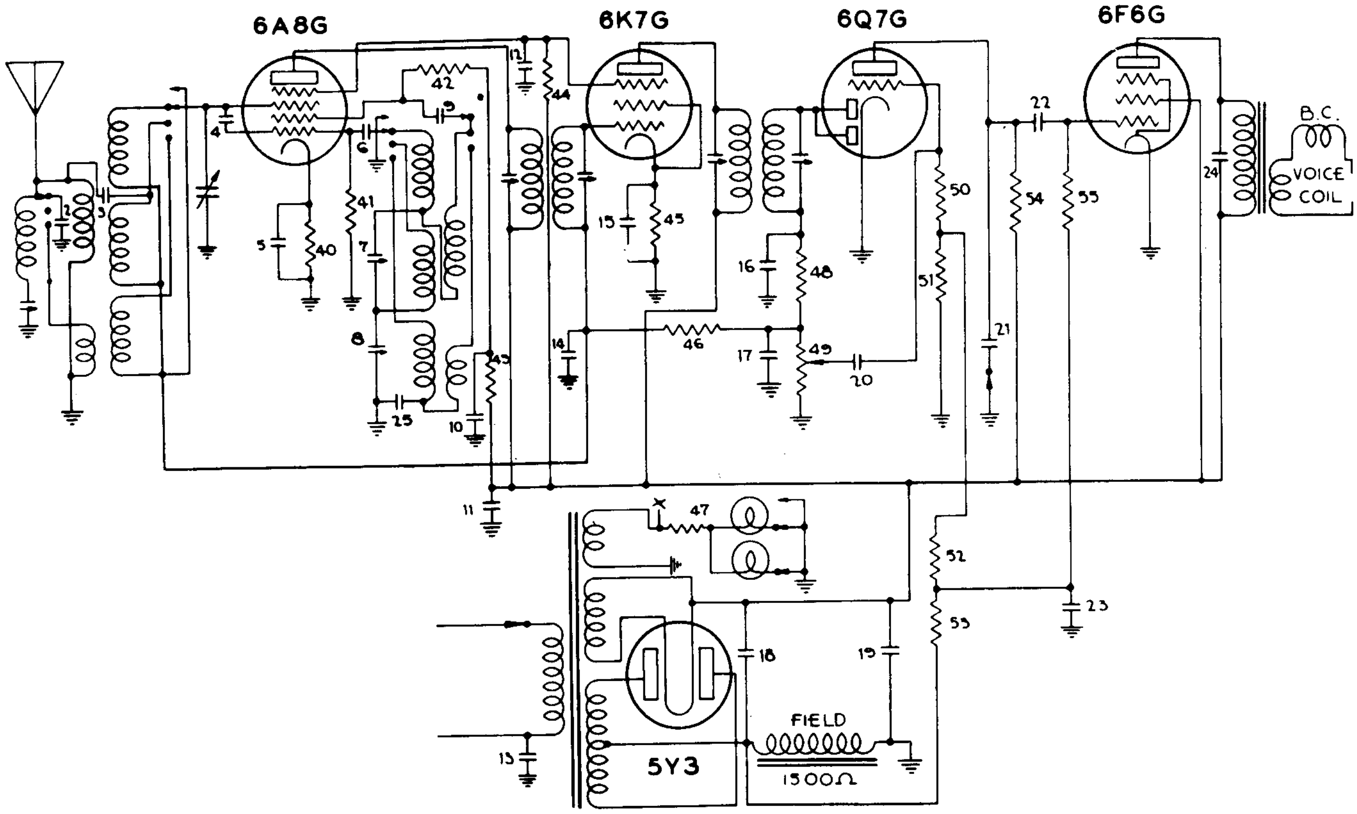
Voltage across 3,000 ohm speaker field - - - - - - - - - - - 128 volts
Voltage across 300 ohm filter choke - - - - - - - - - - - - - 15.5 vol

DC RESISTANCE VALUES

		PRIMARY	SECONDARY
35.3	Antenna coil	23.0 ohms	4.7 ohms
35.8	Oscillator coil	1.75 "	6.1 "
7B79	1st I.F. trans.	15.0 "	15.0 "
4336	2nd I.F. trans.	25.0 "	25.0 "
40.16C	Filter choke	400.0 "	
105.21	Speaker input audio trans.	340.0 "	.5 "
105.21	Speaker field	3000.0 "	
105.21	Speaker voice coil	3.0 "	

ADJUSTMENT OF I.F. CONDENSERS: 1 - Connect a .1 mfd. tubular condenser from oscillator stator section of ganged variable condenser to chassis. 2 - Disconnect control grid lead from 6A7 oscillator-modulator tube. 3 - Connect high potential lead of signal generator to control grid of 6A7 oscillator-modulator tube, and low potential lead to the receiver chassis. 4 - Place an output meter across speaker voice coil terminals so variations in signal output can be noted. 5 - Adjust oscillator to 456 KC. Regulate the attenuator control of oscillator so output signal is low enough to insure accuracy in adjusting I.F. condensers. 6 - With the aid of a bakelite type screw driver, adjust the three I.F. condensers to resonance as indicated by the greatest swing of the needle on the output meter.

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION
MODELS 58T1-58T2-58C1-CHASSIS 58



CONDENSERS

1.-- 220 mmfd.
2.-- .0001 mfd.
3.-- 6.5 mmfd.
4.-- 1.2 mmfd.
5.-- .05 mfd.

6.-- .0001 mfd.
7.-- 800 mmfd.
8.-- 1600 mmfd.
9.-- .001 mfd.
10.-- 8 mfd.

11.-- .1 mfd.
12.-- .1 mfd.
13.-- .01 mfd.
14.-- .1 mfd.
15.-- .25 mfd.

16.-- .0001 mfd.
17.-- .0001 mfd.
18.-- 8 mfd.
19.-- 8 mfd.
20.-- .02 mfd.

21.-- .006 mfd.
22.-- .02 mfd.
23.-- .25 mfd.
24.-- .006 mfd.
25.-- .004 mfd.

OHMS	VOLTS	6A8G TUBE	VOLTS	OHMS
INF.	100		-11	40M
INF.	242		155	INF.
			0	1 MEG.
0	0		6.3	.5
0	0		3.6	300

OHMS	VOLTS	6F6G TUBE	VOLTS	OHMS
INF.	248		-.3	1 MEG
INF.	235			
0	0		6.3	.5
0	0		0	0

OHMS	VOLTS	6Q7G TUBE	VOLTS	OHMS
500M	-.1			
INF.	90		-.1	500M
0	0		6.3	.5
0	0		0	0

OHMS	VOLTS	6K7G TUBE	VOLTS	OHMS
INF.	100		2.2	300
INF.	245		0	1 MEG.
0	0		6.3	.5
0	0		2.2	300

OHMS	VOLTS	5Y3 TUBE	VOLTS	OHMS
1800	-100			
			-100	1800
INF.	248			
0	0		248	INF.

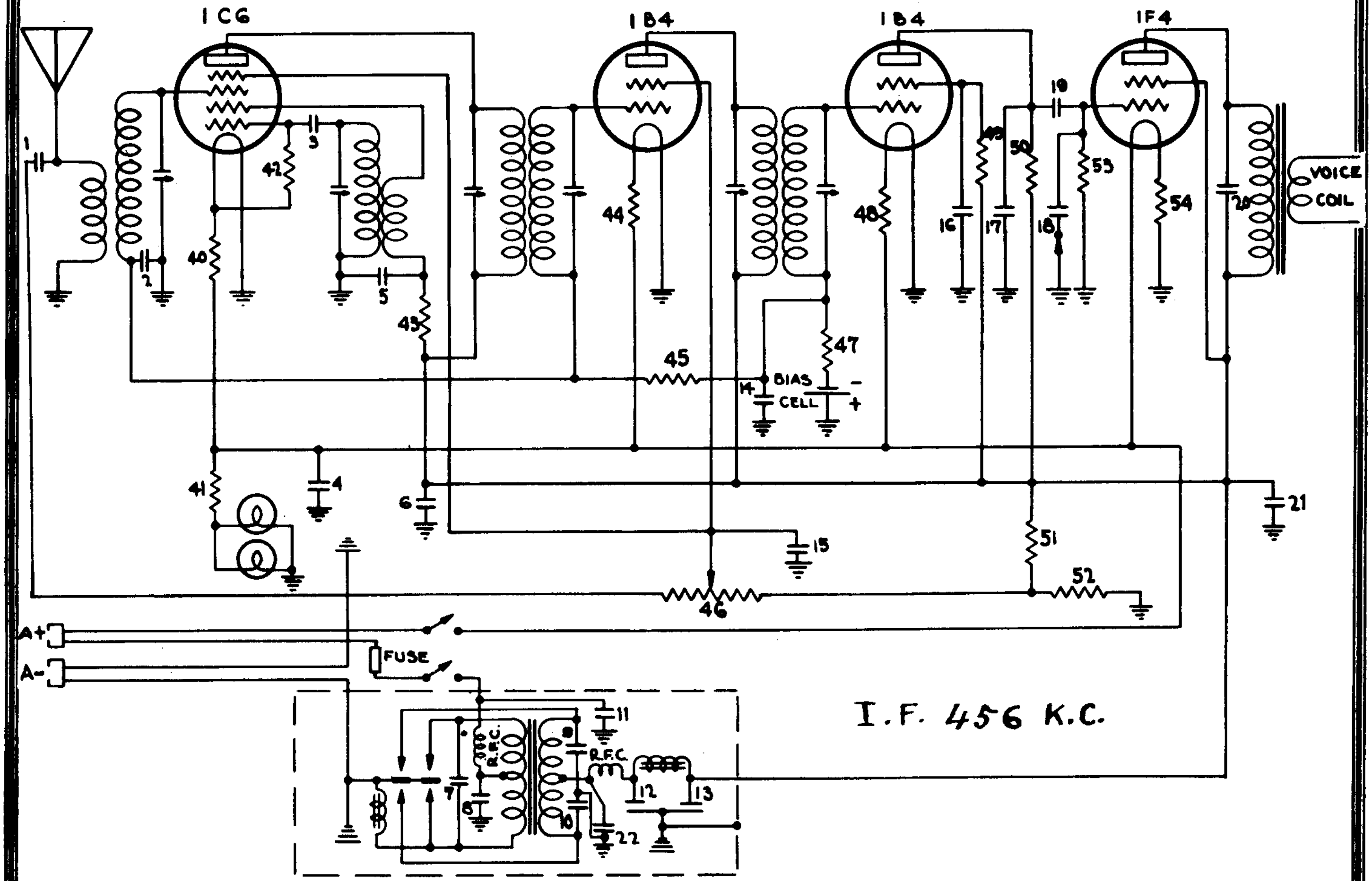
RESISTORS

40.-- 300 ohms
41.-- 35 M ohms
42.-- 10 M ohms
43.-- 5 M ohms
44.-- 25 M ohms

45.-- 300 ohms
46.-- 1 megohm
47.-- .4 ohms
48.-- 50 M ohms
49.-- 500 M ohms

50.-- 500 M ohms
51.-- 50 M ohms
52.-- 400 M ohms
53.-- 2 megohms
54.-- 500 M ohms
55.-- 500 M ohms

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION
MODELS 43TIB & 43CIB CHASSIS 43



CONDENSERS

1 -	.05	MFD	12 -	8.	MFD
2 -	.1	MFD	13 -	8.	MFD
3 -	.001	MFD	14 -	.1	MFD
4 -	.5	MFD	15 -	.1	MFD
5 -	.1	MFD	16 -	.05	MFD
6 -	8.	MFD	17 -	.0005	MFD
7 -	.25	MFD	18 -	.006	MFD
8 -	.5	MFD	19 -	.02	MFD
9 -	.01	MFD	20 -	.003	MFD
10 -	.01	MFD	21 -	.25	MFD
11 -	.5	MFD	22 -	.1	MFD

RESISTORS

40 -	33	Ohms	48 -	67	Ohms
41 -	33	Ohms	49 -	2	Meg.
42 -	50	Ohms	50 -	250M	Ohms
43 -	25M	Ohms	51 -	25M	Ohms
44 -	67	Ohms	52 -	50M	Ohms
45 -	100M	Ohms	53 -	500M	Ohms
46 -	400M	Ohms	54 -	33	Ohms
47 -	250M	Ohms			

VOLTAGE AND RESISTANCE TABLE

1B4 TUBE — I.F.

OHMS	VOLTS	VOLTS	OHMS
75M	137	50	50M
		0	300M
72	2	0	0

1B4 TUBE — 2 DET. I.A.F.

OHMS	VOLTS	VOLTS	OHMS
300M	55	15	2MEG.
		0	200M
72	2	0	0

1C6 TUBE — 1DET. OSC.

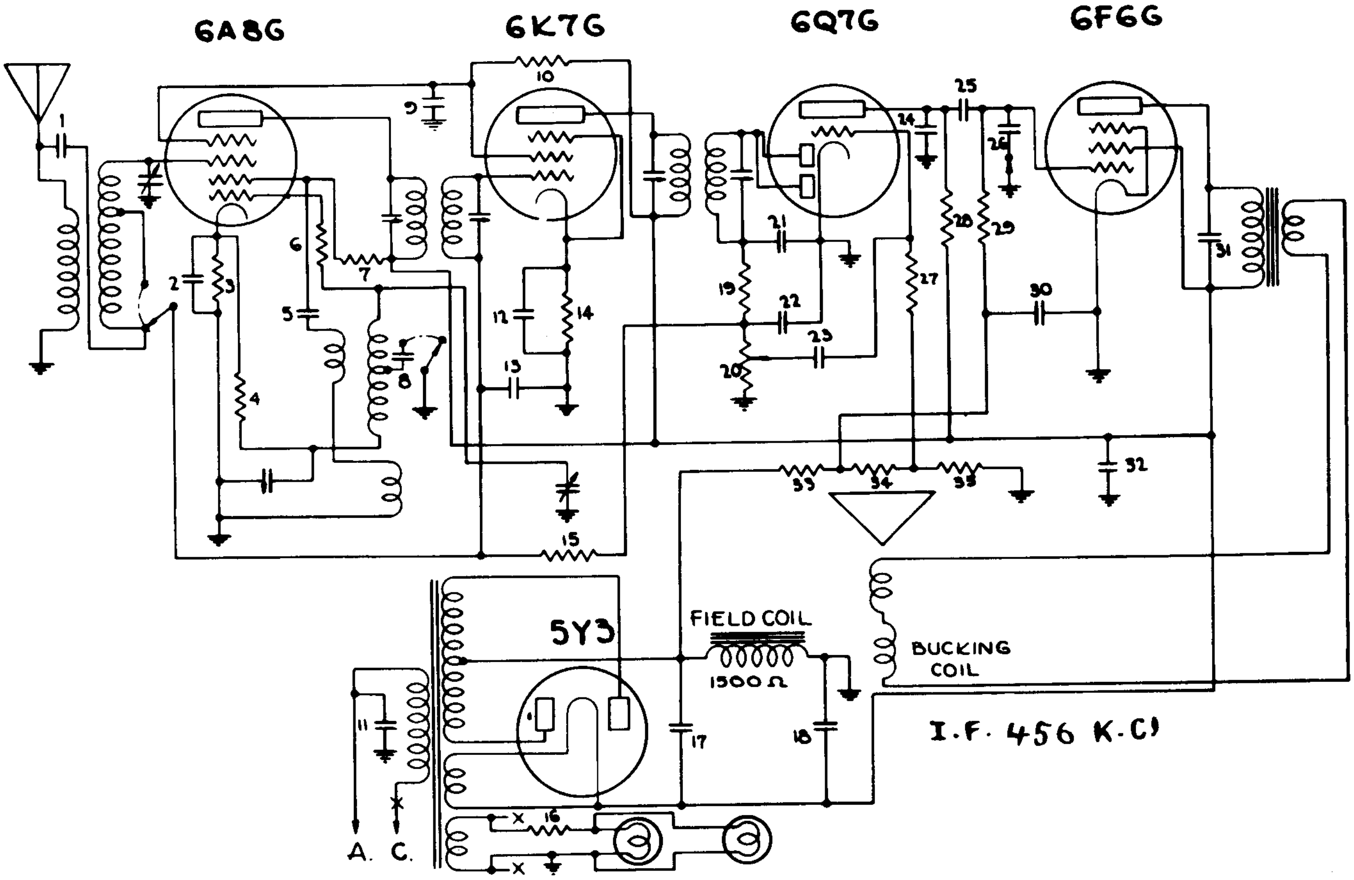
OHMS	VOLTS	VOLTS	OHMS
100M	65	-.6	40M
		0	300M
80M	140	50	55M
40	2	0	0

1F4 TUBE — OUT PUT

OHMS	VOLTS	VOLTS	OHMS
		0	500M
75M	135	140	75M
8	6	4	34

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODEL 57TO CHASSIS 57



RESISTORS

3.-- 300 ohms
4.-- 20 M ohms
6.-- 150 ohms
7.-- 10 M ohms
10.-- 20 M ohms

28.-- 500 M ohms
29.-- 500 M ohms
33.-- 2 megohms
34.-- 400 M ohms
35.-- 50 M ohms

14.-- 300 ohms
15.-- 1 megohm
19.-- 50 M ohms
20.-- 500 M ohms
27.-- 500 M ohms

CONDENSERS

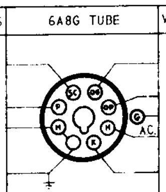
1.-- .0001 mfd.
2.-- .05 mfd.
5.-- .001 mfd.
8.-- .003 mfd.
9.-- .1 mfd.
18.-- 8 mfd.
21.-- .0001 mfd.
22.-- .0001 mfd.

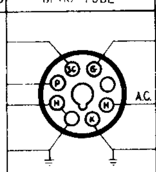
23.-- .02 mfd.
24.-- .0001 mfd.

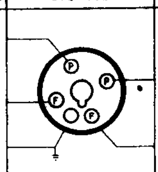
11.-- .01 mfd.
12.-- .1 mfd.
13.-- .1 mfd.
16.-- .6 mfd.
17.-- 8 mfd.

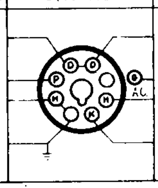
25.-- .02 mfd.
26.-- .006 mfd.
30.-- .25 mfd.
31.-- .006 mfd.
32.-- .1 mfd.

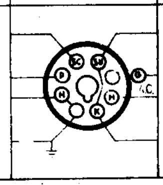
VOLTAGE RESISTANCE TABLE

OHMS	VOLTS	6A8G TUBE	VOLTS	OHMS
INF.	106		.5	23M
INF.	218		150	INF.
			0	1MEG
0	0		6.3	.5
0	0		4.2	300

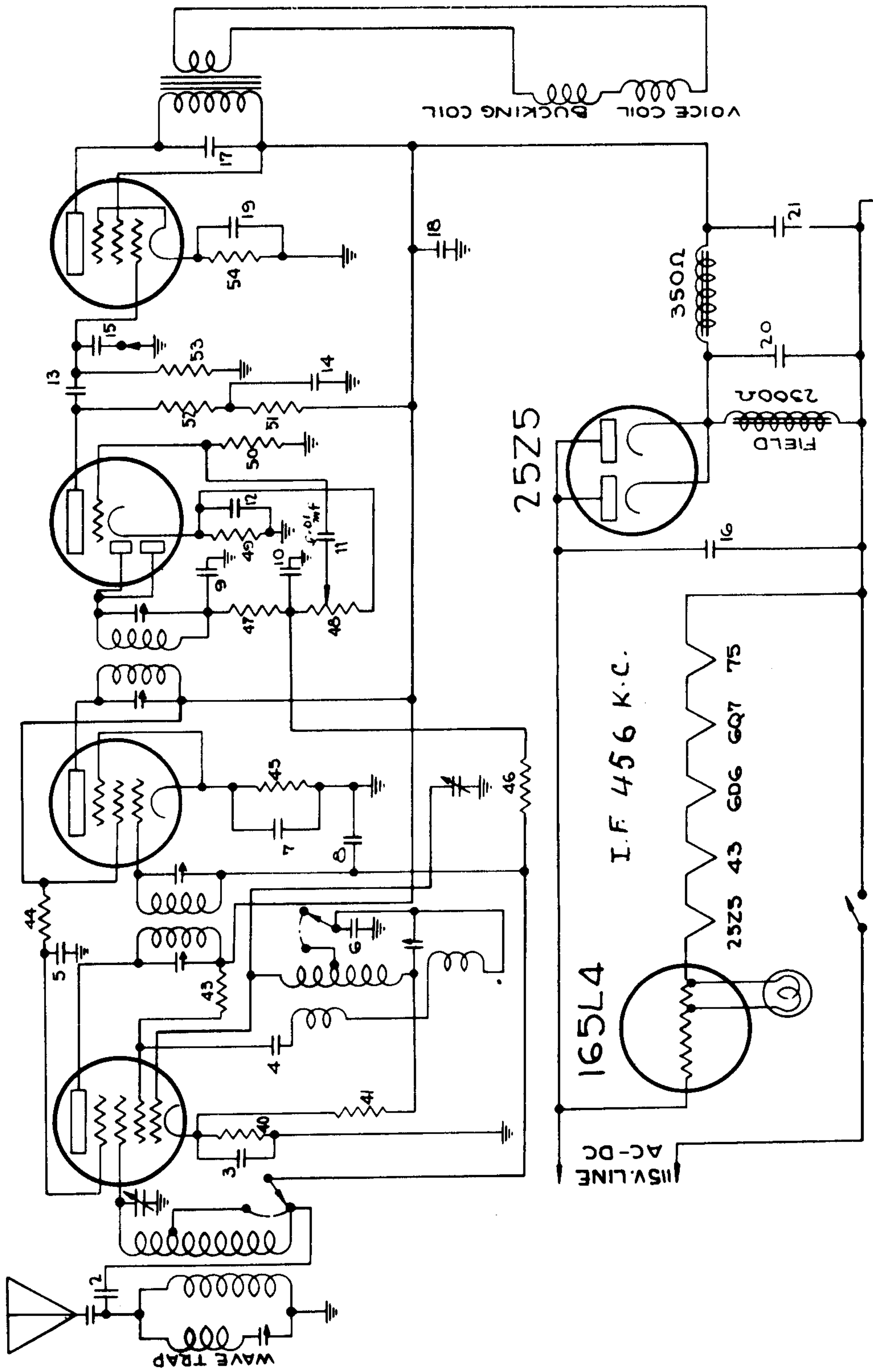
OHMS	VOLTS	6F6G TUBE	VOLTS	OHMS
INF.	218		-5	1MEG
INF.	208			
0	0		6.3	.5
0	0		0	0

OHMS	VOLTS	5Y3 TUBE	VOLTS	OHMS
1900	-95			
			-95	1900
INF.	222			
0	0		222	INF.

OHMS	VOLTS	6Q7G TUBE	VOLTS	OHMS
500M	.15			
500M	76		-.17	500M
0	0		6.3	.5
0	0		0	0

OHMS	VOLTS	6K7G TUBE	VOLTS	OHMS
1MEG	106		2.5	300
1MEG	213		0	1MEG
0	0		6.3	.5
0	0		2.5	300

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION
MODEL 68



RESISTORS

40 -	300 OHMS
41 -	20M OHMS
42 -	
43 -	10M OHMS
44 -	35M OHMS
45 -	300 OHMS
46 -	1 MEGOHM
47 -	50M OHMS
48 -	500M OHMS
49 -	10M OHMS
50 -	500M OHMS
51 -	100M OHMS
52 -	250M OHMS
53 -	500M OHMS
54 -	600 OHMS

CONDENSERS

1 -	.01 MFD.
2 -	.0001 MFD.
3 -	.05 MFD.
4 -	.001 MFD.
5 -	.1 MFD.
6 -	.003 MFD.
7 -	.1 MFD.
8 -	.1 MFD.
9 -	.0001 MFD.
10 -	.0001 MFD.
12 -	.5 MFD.
13 -	.01 MFD.
14 -	.1 MFD.
15 -	.006 MFD.
16 -	.01 MFD.
17 -	.01 MFD.
18 -	.1 MFD.
19 -	.5 MFD.
20 -	16 MFD.
21 -	16 MFD.

FIRST I. F. TRANSFORMER

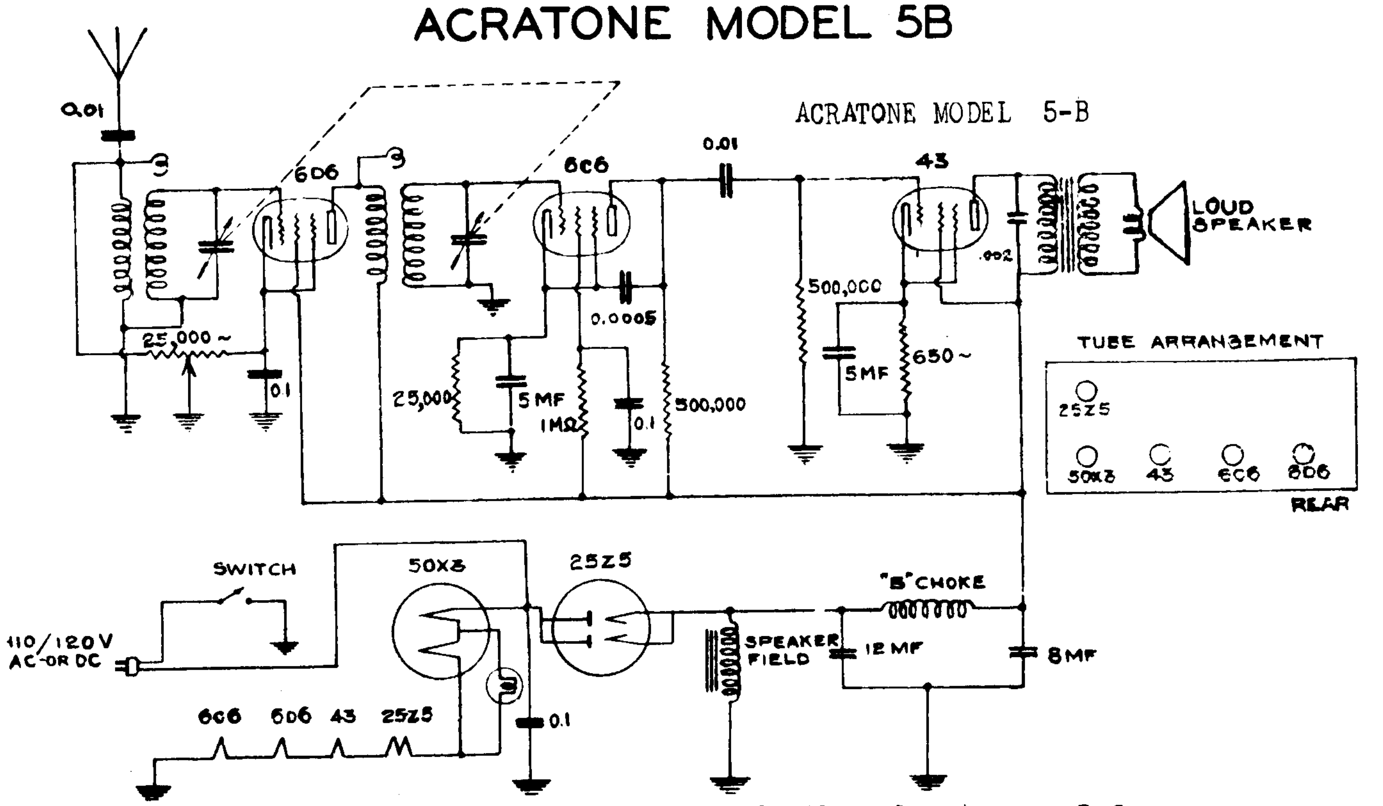
Plate. . . . . Blue
"B" Plus . . . . Red
Grid Return. . . . . Black
Grid (Top) . . . . Green

SECOND I. F. TRANSFORMER

Plate. . . . . Blue
"B" Plus . . . . Red
Diode Return . . . . Black
Diodes . . . . Green

FEDERATED PURCHASER INC.

ACRATONE MODEL 5B

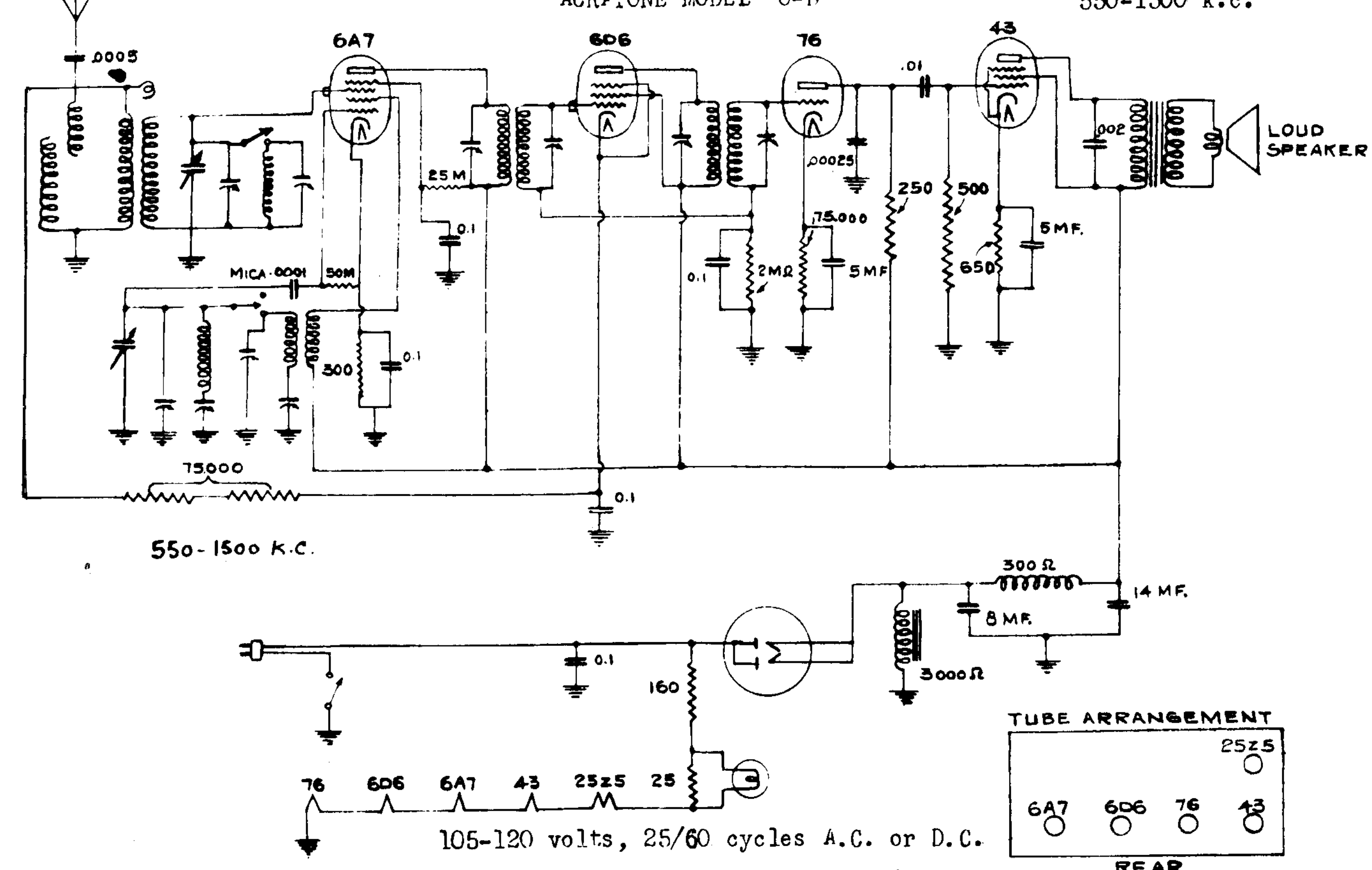


Operates on 110-120 volts, 25-60 cycles A.C. or D.C.

FEDERATED PURCHASER, INC. 1936

ACRATONE MODEL 6B

ACRATONE MODEL 6-B 550-1500 k.c.

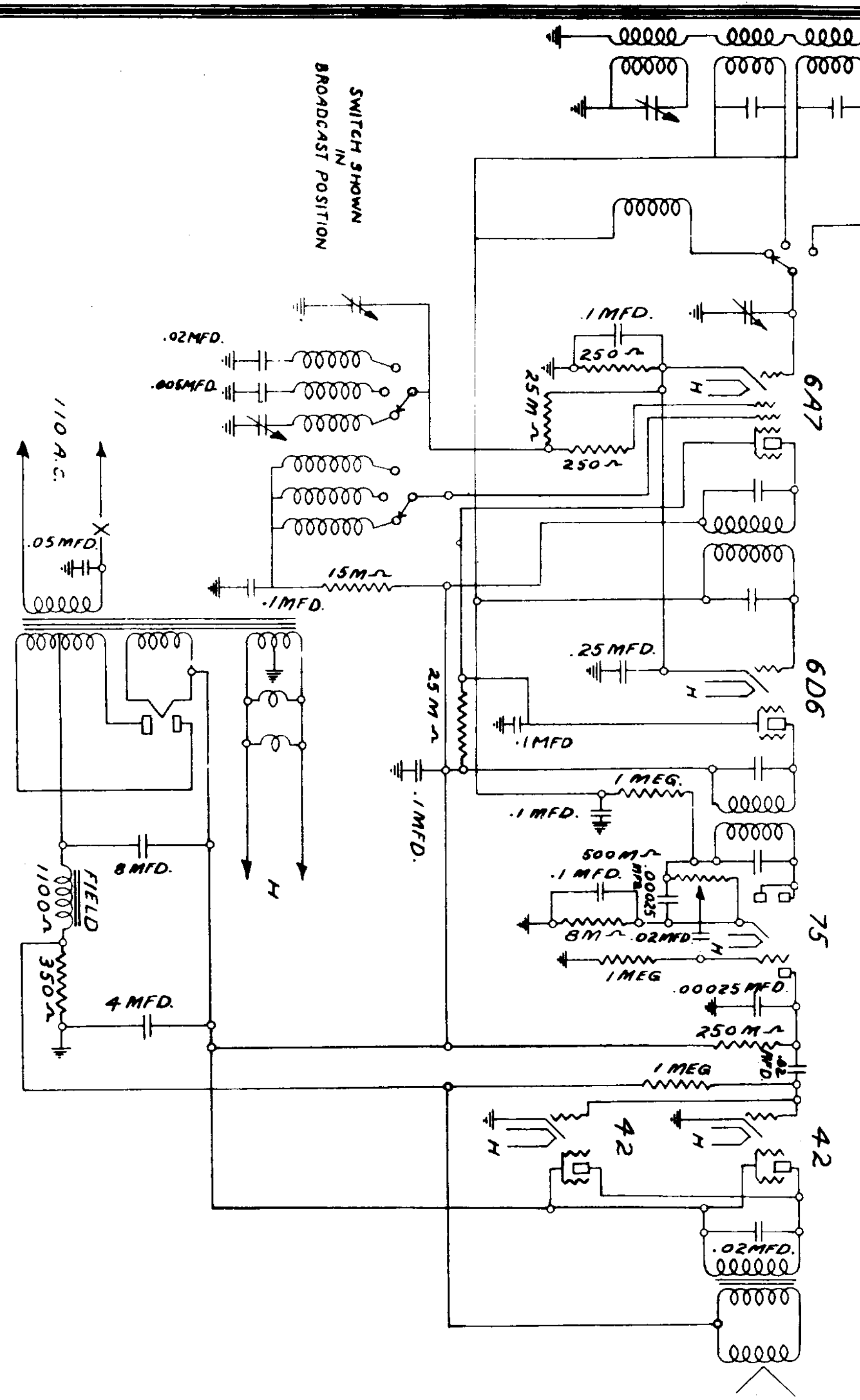


105-120 volts, 25/60 cycles A.C. or D.C.

FEDERATED PURCHASER, INC. 1936

FEDERATED PURCHASER INC.

ACRATONE MODEL 7B



The Alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456,600,1400,3000 and 10,000 K.C. and an output meter to be connected across the primary or secondary of the output transformers.

If possible all alignment should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

I.F. ALIGNMENT Adjust the test oscillator to 456 K.C. and connect the output to the grid of the 1st detector tube (6A7) through an .05 or .1 mfd condenser. If desired the ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

R.F. ALIGNMENT Adjust the oscillator to 1400 K.C. and connect the output to the antenna post through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 K.C. and adjust the rear gang condenser trimmer to peak.

Next rest the dial pointer on the receiver and the test oscillator to 600 K.C. Slowly increase or decrease the oscillator padding condenser, and at the same time continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the preselector or R.F. section. The padding condenser is located on the left hand end of the chassis.

Return to 1400 K.C. and again go over the adjustments at that frequency to be sure they have not been thrown out of adjustment.

The foreign band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coil located next to the gang condenser. Set the test oscillator to 10 megacycles or 31 meters.

The police and aviation band can be adjusted from a signal set at 3,000 K.C. or 300 on the Dial. The oscillator trimmer is located underneath the chassis set and the R.F. trimmer is between the 6A7 tube and the wave change switch.

The gang condenser trimmers are not to be used for alignment of either of the short wave bands.

LOW VOLUME This may be caused by weak or defective tubes (Replace with set of tubes known to be in good condition), antenna disconnected from the receiver, open antenna coil, open or shorted by-pass condensers, or defective wave change switch.

LOW VOLTAGE Low voltage may be caused by a defective 80 rectifier, low line voltage, a defective power transformer or shorted by-pass condensers.

HUM Excessive hum may be caused by a defective 80 tube, open filter condenser, or open audio grid lead.

DISTORTED REPRODUCTIONS This may be caused by a defective 75 or 42 tube or a ground or open in the automatic volume control circuits. Check all circuits with an ohmmeter or continuity tester.

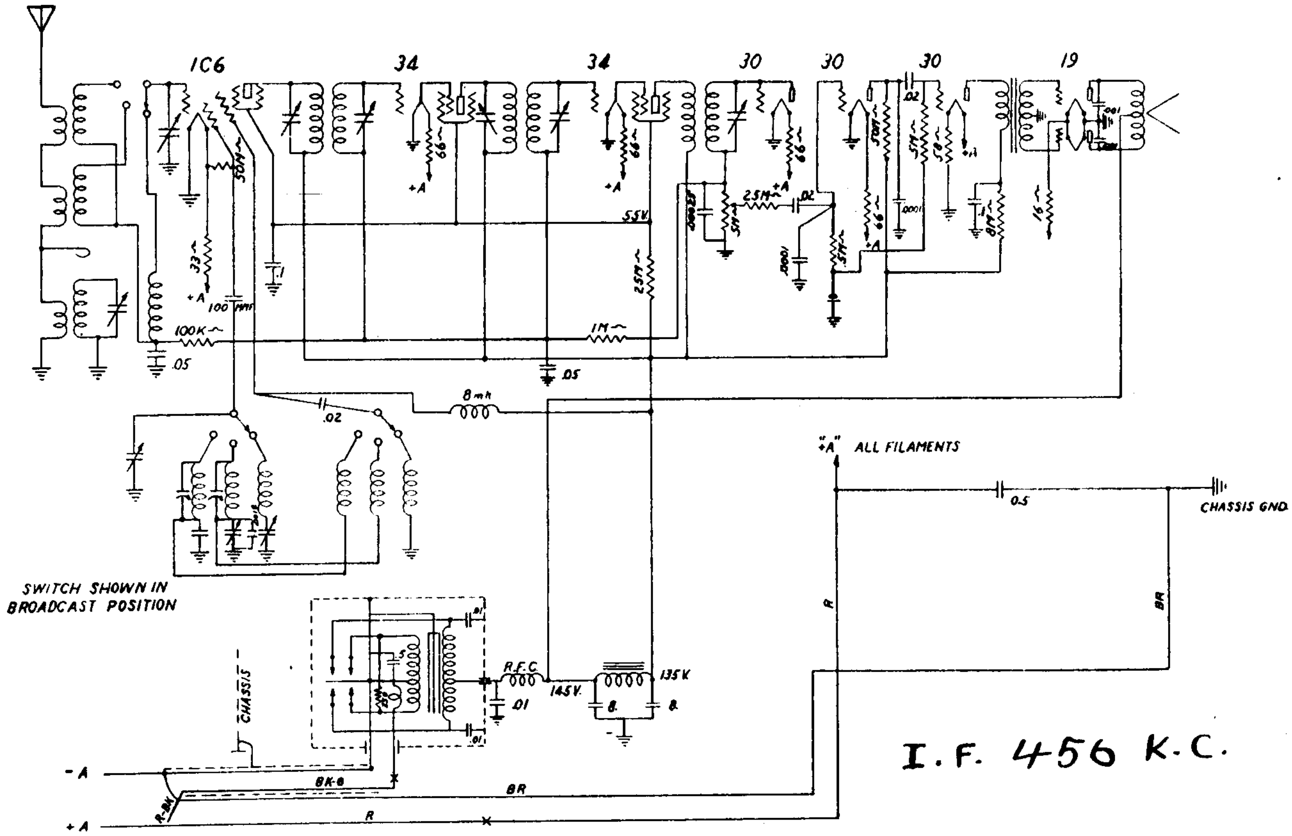
OSCILLATION Most trouble from oscillation is due to open by-pass or defective filter condenser. The grid lead on the 75 tube may also cause a howl if it runs too close to the 42 tube.

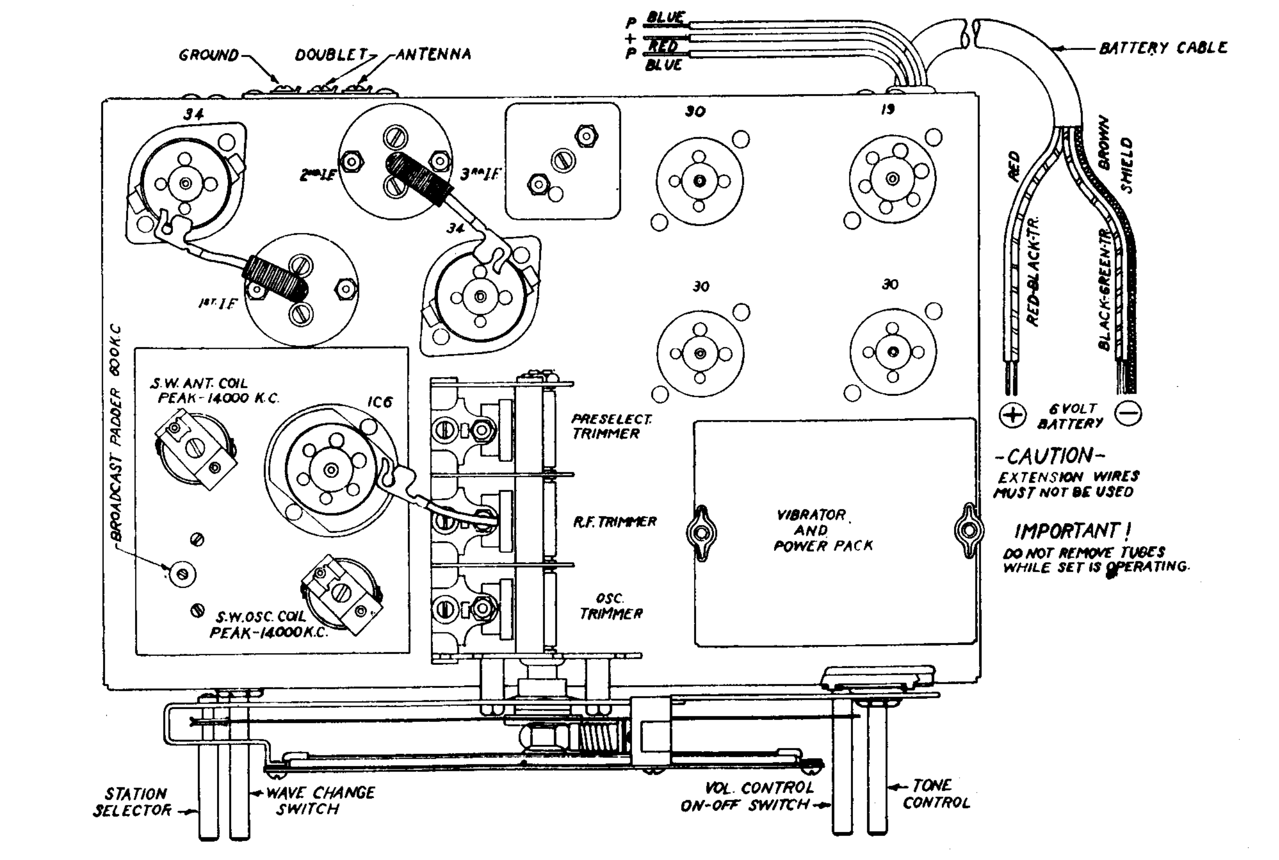
ACRATONE MODEL 7-B

I.F. - 456 K.C.

Power Source: 105-125 Volts
50/60 Cycles A.C.

FEDERATED PURCHASER INC.
MODELS 32C & 33C





FEDERATED PURCHASER INC.
MODELS 32C & 33C
ALIGNMENT DATA AND SERVICING

GENERAL DATA

The alignment of this receiver requires the use of a test oscillator which will cover the frequencies of 456, 600, 1400, 1800, 4000, 6000, and 14,000 KC and an output meter which is to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE

The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT

Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1C6) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all five I.F. trimmers to peak or maximum reading on the output meter. As there are two stages of I.F. in this receiver, there will be consequently three I.F. transformers to align. The I.F. transformer nearest the type (30) diode detector has only one trimmer, (single tuned) and should be the first adjustment. Next adjust the center I.F. transformer, which has two trimmers (double tuned) for maximum output; then adjust the two trimmers on the input I.F. transformer (double tuned) for peak.

BROADCAST BAND ALIGNMENT

Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the front gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the center trimmer of the gang condenser to peak. The center condenser section tunes the RF or grid circuit of the 1C6 tube. Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the R.F. section. The padding condenser is located on the left hand side of the chassis, near the extreme front left corner.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Bands.

FOREIGN BAND ALIGNMENT

The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coils located on the top of the chassis. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. Set the receiver pointer to 14,000 KC (also test oscillator). The oscillator coil is located alongside the oscillator section of the tuning condenser (front section of gang), and the antenna or R.F. is the other coil remaining on top of the chassis. These two trimmers should be adjusted for peak at 14,000 KC (adjust oscillator trimmer first) and as the inherent design of the circuit has been expressly developed for simplicity in servicing, no other adjustments are necessary for aligning this band.

Note: Always start this procedure by having the oscillator coil trimmer loose (out all the way), and the antenna coil trimmer fairly tight (in all the way); otherwise it is possible to make a false alignment on the image frequency. In order to prevent alignment on the image frequency, it is suggested that the following check be made: Readjust the pointer to 13,100 KC where the image frequency should be found. If properly aligned, the image frequency will be found to be weaker. If, however, the signal at 13,100 KC is found to be stronger than the signal at 14,000 KC, it signifies that alignment was incorrectly made on the image frequency.

IMPORTANT: Do not attempt any adjustment of the gang condenser trimmers in aligning the Foreign Band as this will throw the Broadcast Band out of alignment.

POLICE BAND

In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with a .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment.

Set the receiver pointer to 4000 KC (also test oscillator) and adjust the oscillator circuit trimmer to peak. The oscillator trimmer is mounted on the oscillator coil, which is located underneath the chassis. The oscillator coil is wound with enamel wire and is mounted to the front edge of the chassis. This coil can be identified by the use of a layer of yellow cambric (Empire Cloth) separating the two windings. After this has been carefully done, the next step is to adjust the antenna trimmer to peak. The antenna trimmer is attached to the antenna coil; also mounted underneath the chassis and wound with enamel wire. The antenna coil is mounted at right angles to the oscillator coil and is nearest to the rear of the chassis.

Now reset the dial pointer and the test oscillator to 1800 KC in preparation for adjusting the police band padding condenser. This padding condenser is mounted on the underside of the chassis, directly underneath the gang condenser. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated, but is the easiest way to correctly adjust the oscillator to the R.F. or antenna section.

Return to 4000 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made 1800 KC.

If it is found that in returning to 4000 KC the pointer is accurately on scale, the only readjustment that should be made (in this recheck) is the trimmer on the enamel wire antenna coil located underneath the chassis near the power transformer. If the pointer is found off scale, it may be corrected and put on scale by readjustment of the oscillator trimmer. Alignment of the pointer can only be corrected by adjustment of the oscillator trimmer.

Important: There are only three trimmer adjustments necessary for the Police Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Police Band; otherwise, the Broadcast Band will be thrown out of alignment.

SERVICE DATA FOR ALL BANDS

If it is suspected that the oscillator has stopped but is doubtful due to the presence of the usual amount of noise level, it is suggested that the oscillator plate voltage be checked. To ascertain whether the tube is oscillating, ground the oscillator grid of the 1C6 (short stator and rotor plates of oscillator section on gang condenser). If oscillating properly, grounding the grid will cause an appreciable drop in oscillator voltage.

REASONS FOR UNSATISFACTORY OPERATION

HUM

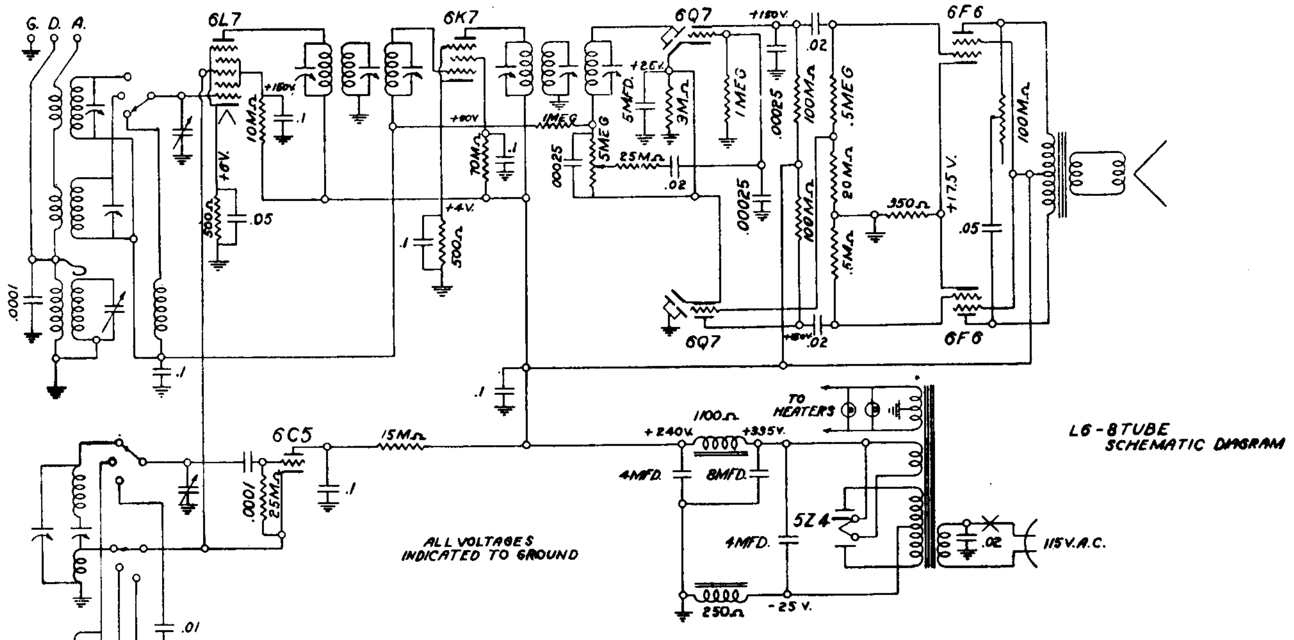
A minimum amount of hum, equivalent to A.C. receivers, may be present. Excessive hum may be traced to the following causes:

1. Omitting the use of a ground or a poor ground connection.
2. Vibrator unit not securely fitted in socket.
3. Antenna picking up interference from high tension power lines.
4. Weak or rundown battery. Battery with defective cell.
5. Poor battery connections.
6. Extending or lengthening battery leads cause an enormous increase in "hum." The battery cable attached to the receiver is of special design and its ends **must** be connected directly to the battery terminals.

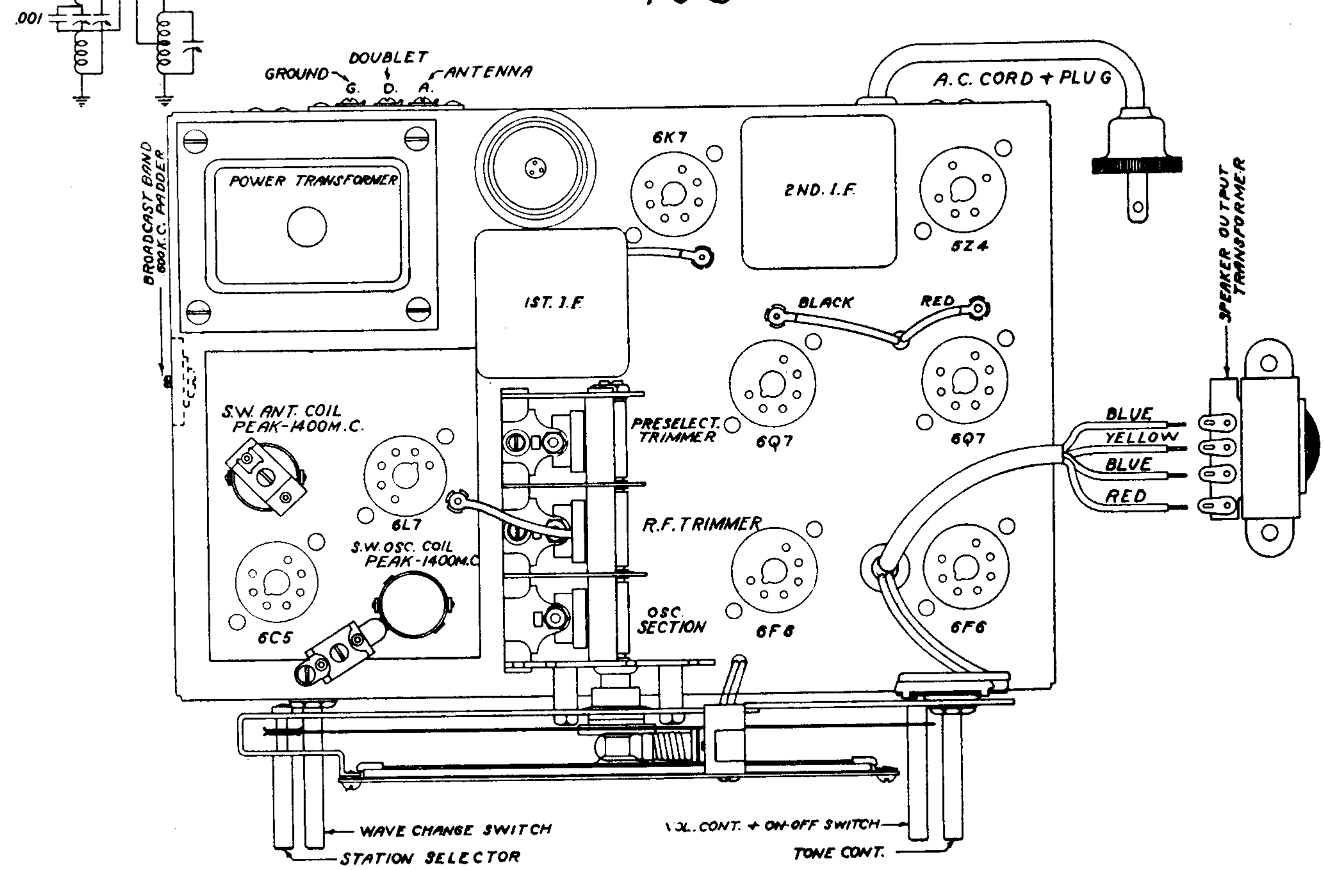
HOWLS AND SQUEALS

1. Omitting the use of a ground or poor ground connections.
2. Speaker leads placed near the tubes. These leads should be kept away from this locality. Speaker leads should be kept along the end of chassis and front corner of cabinet.
3. Check shields on (34) tubes for good connection to chassis.

FEDERATED PURCHASER INC.
MODELS 29C-30C-31C



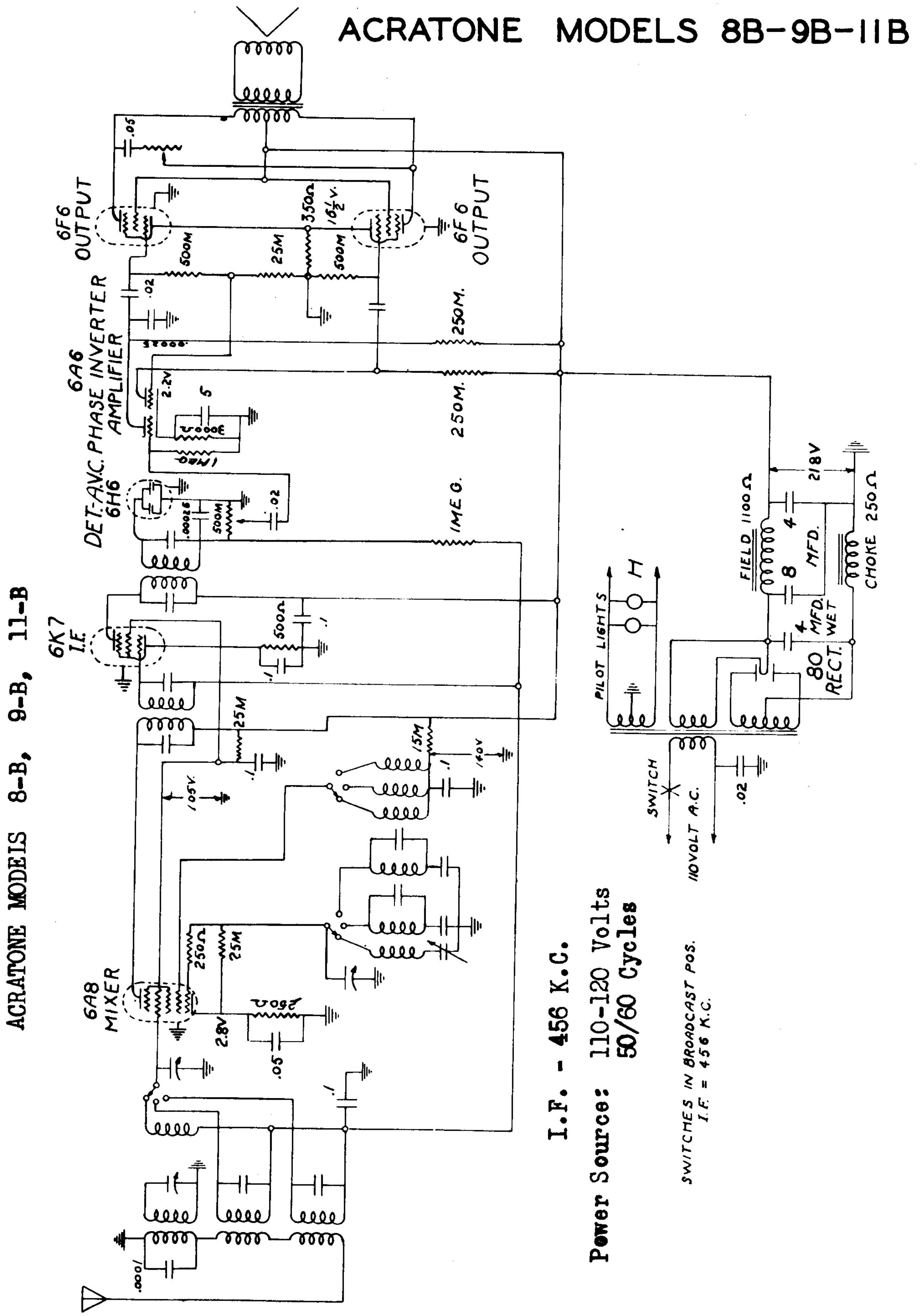
I.F. 456 K.C.



This receiver is designed to operate over three tuning ranges. The broadcast range which extends from 540 to 1700 Kilocycles (KC) (175 to 550 meters), Police and Aviation Band which extends from 1700 to 5000 Kilocycles (KC) (52 to 175 Meters) and the International Short Wave Band which extends from 5800 to 15,200 Kilocycles (KC) (18.5 to 52 meters). This short wave range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

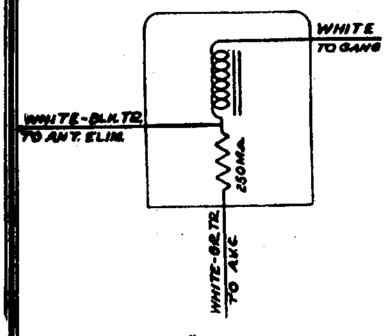
FEDERATED PURCHASER INC.

ACRATONE MODELS 8B-9B-11B

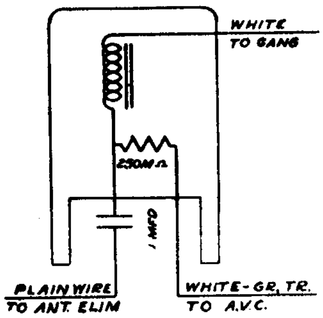


GALVIN MFG. CORP.

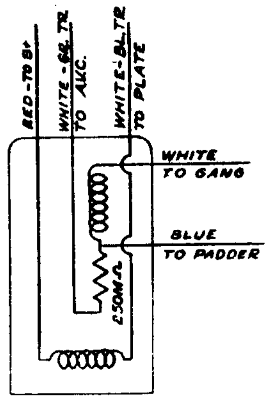
MOTOROLA MODELS 50-60-80 "GOLDEN VOICE"



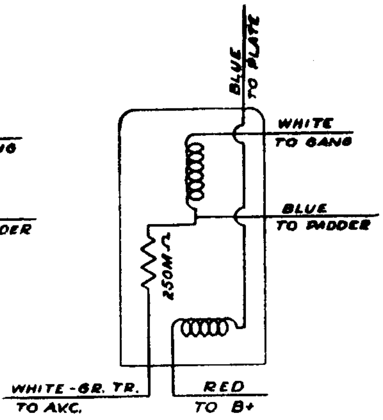
MODEL *50 ANT. COIL



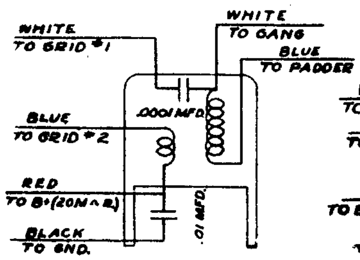
MODELS *60, *80 & GOLDEN VOICE ANTENNA COIL



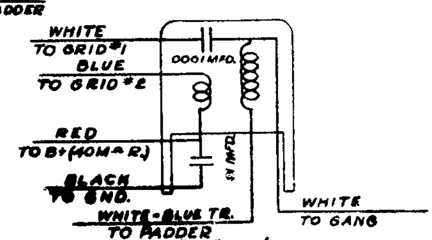
MODEL *50 RF COIL



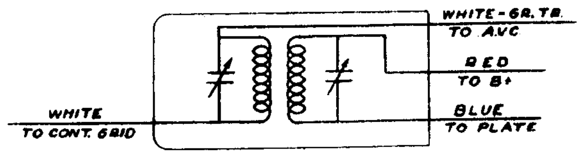
MODELS *60, *80 & GOLDEN VOICE R.F. COIL



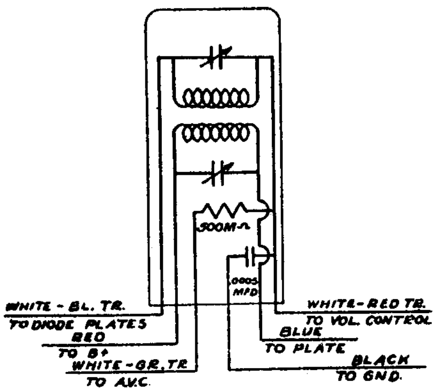
MODEL *50 OSC. COIL



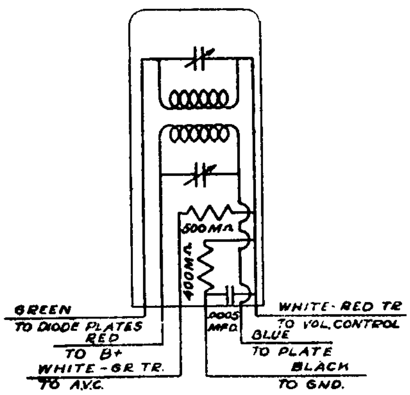
MODELS *60 *80 & GOLDEN VOICE OSCILLATOR COIL



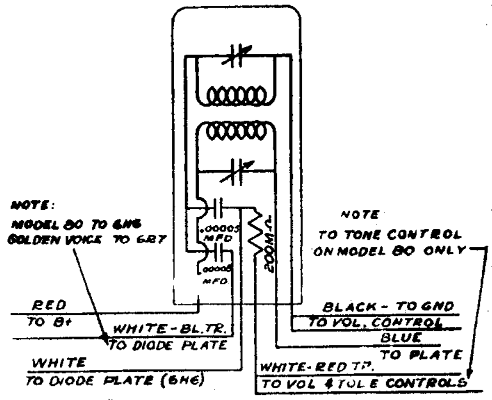
MODELS *50 *60 *80 & GOLDEN VOICE I.F. COIL



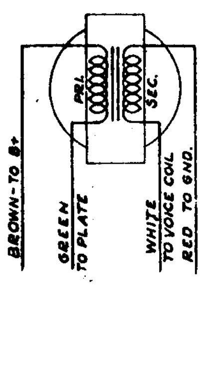
MODEL *50 DIODE COIL

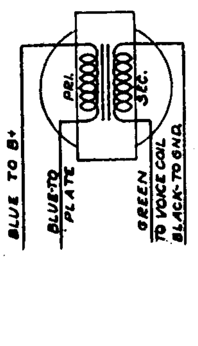


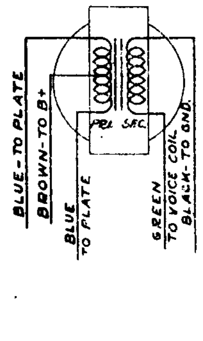
MODEL *60 DIODE COIL



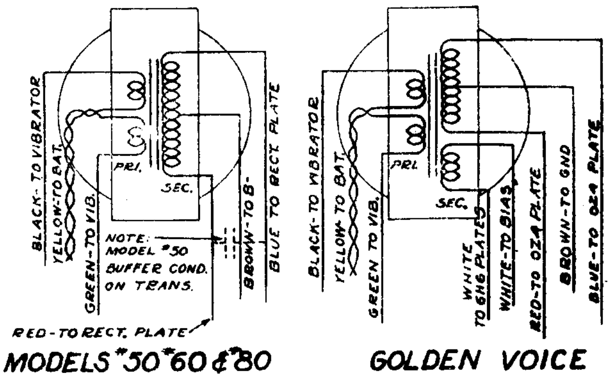
MODELS *80 & GOLDEN VOICE DIODE COIL







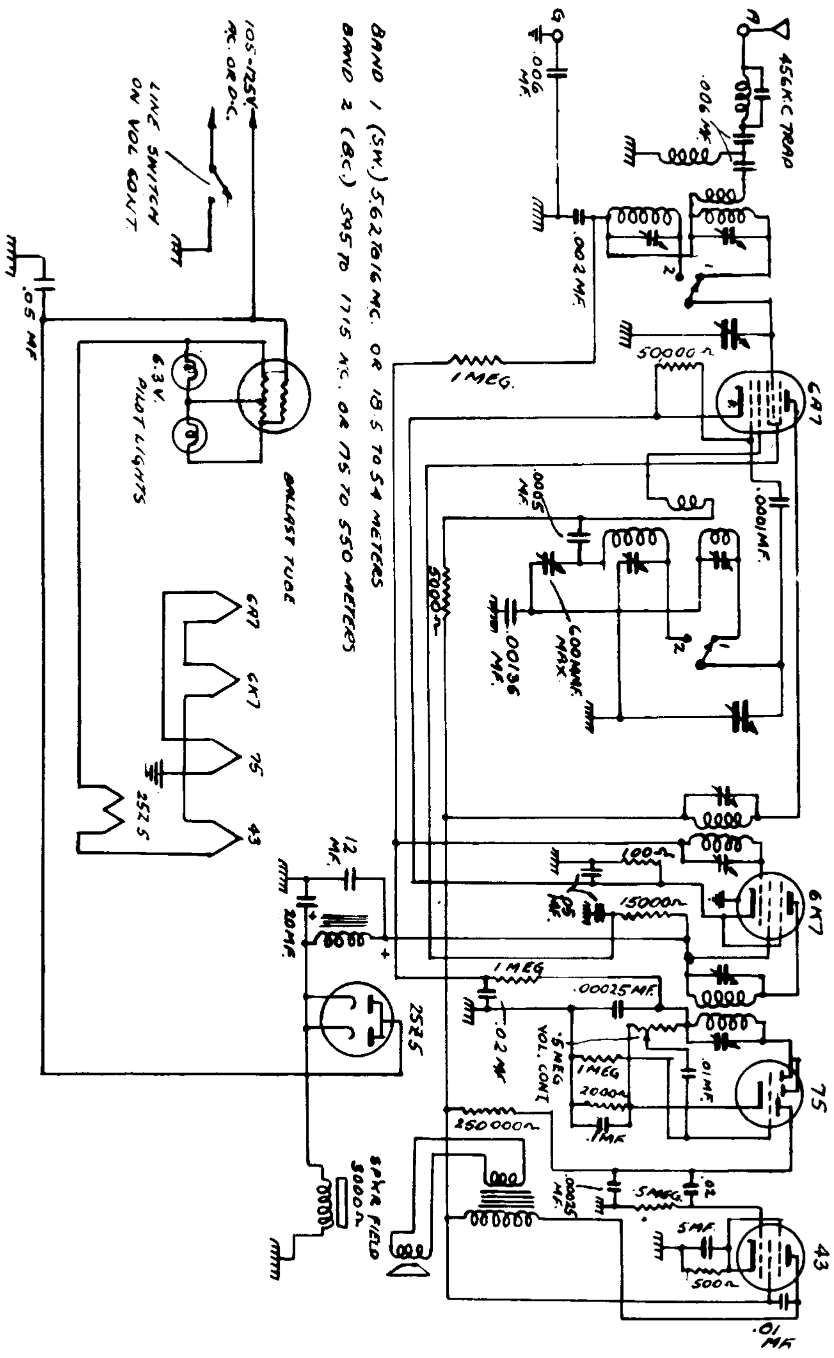
MODEL *50 MODEL *60 MODELS *80 & G.V.
OUTPUT TRANSFORMERS



MODELS *50 *60 & *80 GOLDEN VOICE
POWER TRANSFORMERS

GAROD RADIO CORPORATION

MODEL 620



ALIGNMENT PROCEDURE

Realignment of this receiver should not be attempted unless all other possible causes of faulty operation have first been thoroughly investigated. An accurately calibrated signal generator which will cover the various wavebands, and an output meter for indicating the effects of adjustments, are required.

I.F. ADJUSTMENT - The signal generator is set at 456 kc. The "hot" lead from the signal generator is connected to the grid cap on the 1st detector (6A7) tube, the clip having first been removed from the tube cap. The ground lead is connected to the receiver chassis. The oscillator section (front) of the gang tuning condenser is short-circuited and the volume control turned on full. The i.f. trimmers are then adjusted for maximum gain in the receiver. These trimmers are located on top of the i.f. transformer shield cans, which are situated in the rear of the chassis, The one towards the right is the 1st i.f. transformer and the left one is the 2nd i.f. transformer.

14 MEGACYCLE ADJUSTMENT - The short-circuit is removed from the oscillator condenser and the grid clip replaced in its normal position on the cap of the 6A7 tube. The "hot" lead from the signal generator is connected to the antenna lead of the receiver and the ground lead to the ground of the receiver. With the volume control set at maximum and a minimum input signal from the signal generator, the band switch is turned to the left and the receiver dial set at 14 mc. The oscillator trimmer is adjusted so as to bring the signal in at this setting. The oscillator coil is underneath the chassis and is located directly under the variable gang condenser. The short wave trimmer is over the short wave winding (Heavy spaced wire.) After the oscillator is set, the antenna trimmer is adjusted for maximum output as indicated by the output meter. (Again the S. W. antenna trimmer is located over the heavy spaced winding on the antenna coil, and is accessible from the top of the chassis.) There are no other adjustments on this band.

1500 KC KILOCYCLE ADJUSTMENT - Turn the Wave Band Switch to the right. Set the signal generator to 1500 kc. and turn the dial pointer to correspond to this frequency. Adjust the oscillator trimmer for this band so that the signal is received exactly at this setting. (This trimmer is located over the close-wound fine winding on the oscillator coil.) Adjust the Broadcast antenna trimmer for maximum output as described previously, (this trimmer is over the small 5 section winding and is accessible from the top.)

600 KC PADDER ADJUSTMENT - With all connections as above, the signal generator is set at 600 KC and the signal tuned in on the dial. The padder for this frequency is found on the front sub-panel of the receiver, directly under the dial. This padder should be adjusted for maximum response of the receiver, while the tuning condenser is rocked slightly back and forth. The 1500 kc adjustment should then be rechecked.

VOLTAGE TABLE

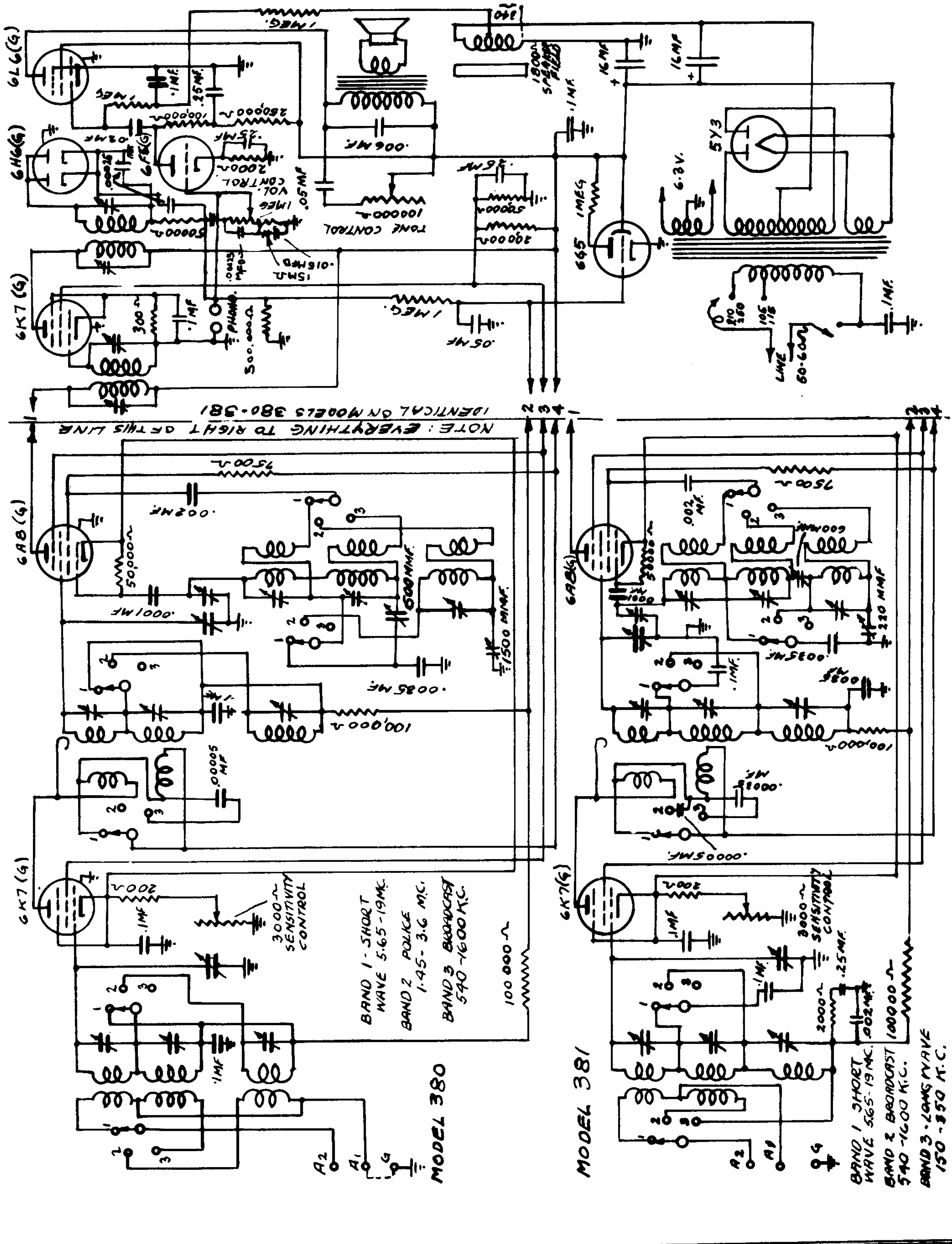
TUBE	FUNCTION	H'T'R	PLATE	SC.GR.	CATH.	OSC.PL.
6A7	det.-osc.	4.5	100.2	65.0	---	90.0
6K7	i.f. ampl.	4.3	100.2	100.0	---	----
75	diode det. and 1st audio	4.4	40.0	---	---	----
43	audio outp.	20.2	94.0	100.0	12.3	----
25Z5	rectifier	21.0	114.0	---	---	----

NOTE: Fil. voltages measured with a low impedance A.C. voltmeter. Actually, the voltages at 110V line are approximately 6 volts and 23 volts for the 6.3, and 25 volt tubes respectively.

ANTENNA: A small indoor antenna consisting of about 20 feet of wire, laid around the moulding, or placed under a rug, or thrown out the window is generally sufficient to give excellent operation. In locations very remote from broadcast stations, it is advantageous to use an outdoor antenna from 50 to 75 feet long. In particularly difficult cases, it may be necessary to use a special short-wave antenna with shielded or transposed lead-in. Kits containing all parts necessary for such an installation are available.

GAROD RADIO CORPORATION

MODELS 380-381-380D-381D-380KC-381KC



GAROD RADIO CORPORATION

MODELS 380-381-380D-381D-380KC-381KC

It is important to remember that in receivers of this kind which are equipped with automatic volume control it is necessary to use the minimum possible signal from the signal generator; otherwise the A.V.C. action will tend to nullify the variations in output as the trimmers are adjusted.

I.F. ADJUSTMENT - The signal generator is set at 456 kc. and is connected to the grid of the first detector (6A8). With the oscillator section of the tuning condenser short-circuited and the receiver volume control at its maximum position, the i.f. trimmers are adjusted for maximum output. These trimmers may be found on tops of the i.f. transformer shield cans.

MODEL 380 SERIES

18 MEGACYCLE ADJUSTMENT - The high side of the signal generator is connected to the antenna lead of the receiver and the low side to the ground lead. The receiver and the signal are both tuned to a frequency of 18 mc. with the selector switch in position for band no. 1. The oscillator trimmer condenser is adjusted so that the 18 mc signal is tuned in exactly at the 18 mc calibration point, with the volume control on full and the signal generator adjusted for minimum input. The antenna preselector and first detector trimmers are then adjusted in the order named for maximum output. These trimmers are located on the sides of the shield cans and are opposite the lower openings. This is the only adjustment on Band #1.

1500 K.C. ADJUSTMENT - With the band selector switch in position for operation on band no. 3. and the receiver and signal generator both set at 1500 K.C. the procedure outlined above is repeated. The oscillator trimmer is found on the rear coil can, and is opposite the upper opening. The antenna preselector and interstage coil trimmers are located in the same positions on the corresponding shield cans.

The signal generator is set at 600 K.C. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 1500 K.C. adjustment should then be rechecked. The 600 K.C. Padder is located as indicated in the sketch.

3 MC. ADJUSTMENT - The band selector switch is set in position for operation on the No. 2. band. The receiver and signal generator are both set at 3 M.C. and the procedure outlined above is repeated. The oscillator trimmer is found on the Police Band Coil located under the chassis and is towards the rear. The other trimmers for this band are located in similar positions on the corresponding coils.

The signal generator is set at 1.7 M.C. and the signal tuned in on the dial. The padder condenser for the police band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 3 M.C. adjustment should then be rechecked. The 1.7 MC. padder is located as indicated.

MODEL 381 SERIES

Model 381 is the same as Model 380 except that the Long Wave band is substituted for the Police Band. Alignment procedure is identical for the Short Wave and Broadcast Bands. The Long Wave Band is aligned as follows:

300 KC. ADJUSTMENT - The band selector switch is set in position for operation on band no. 3. The receiver and generator are both tuned to 340 kc. and the procedure outlined above is repeated. The oscillator trimmer is located under the chassis and is mounted on the rear coil.

The signal generator is set at 150 kc. and the signal is tuned in on the dial. The padder condenser for this band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 300 kc. adjustment should then be rechecked. The 150 kc. padder is located as indicated.

MODEL 380 - 381

TUBE	FUNCTION	HEATER	PLATE	SC. GR.	CATH Volts	CATH Curr.	OSC. PL.
6K7(G)	R.F. Amp.	6.3	265	110	3	7	
6A8(G)	Det. Osc.	6.3	265	110	3	8	220
6K7(G)	I.F. Amp.	6.3	265	110	3.5	7	
6H6(G)	Diode Det.	6.3	0				
6F5(G)	1st Audio Amp.	6.3	80		1	.5	
6L6(G)	Audio Output	6.3	255	265	0	45	
5Y3	Rectifier	5.0			380	68	

All voltages except filament, are measured from socket terminals to chassis and with a 1000 Ohms per volt voltmeter. The set must be in operation and the sensitivity control in its maximum clockwise position. Wave Band switch in broadcast position.

Filament voltages are taken from filament prong to filament prong at tube socket and measured with a low impedance AC voltmeter.

GENERAL ELECTRIC COMPANY

MODELS E91 & E95

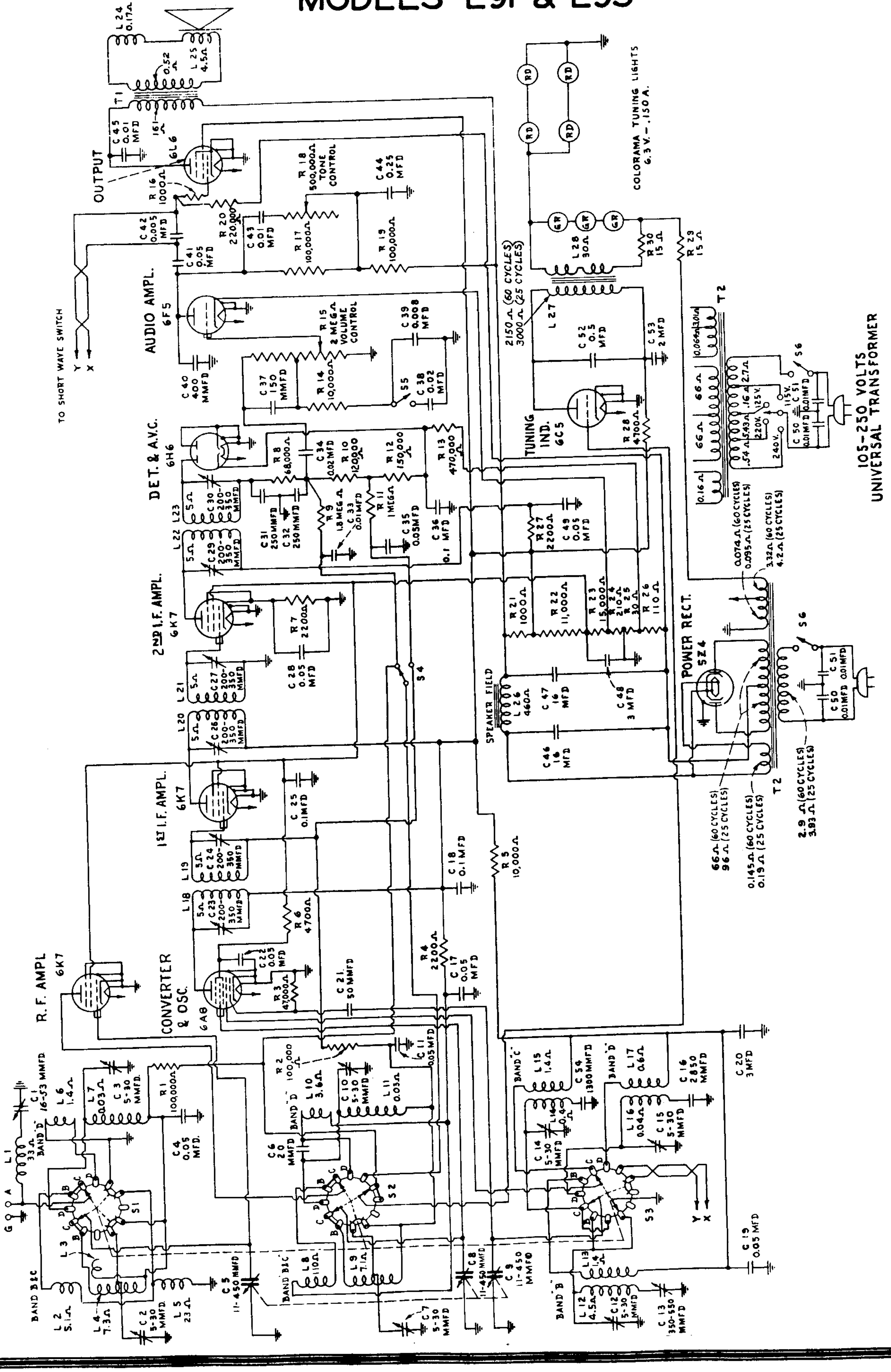
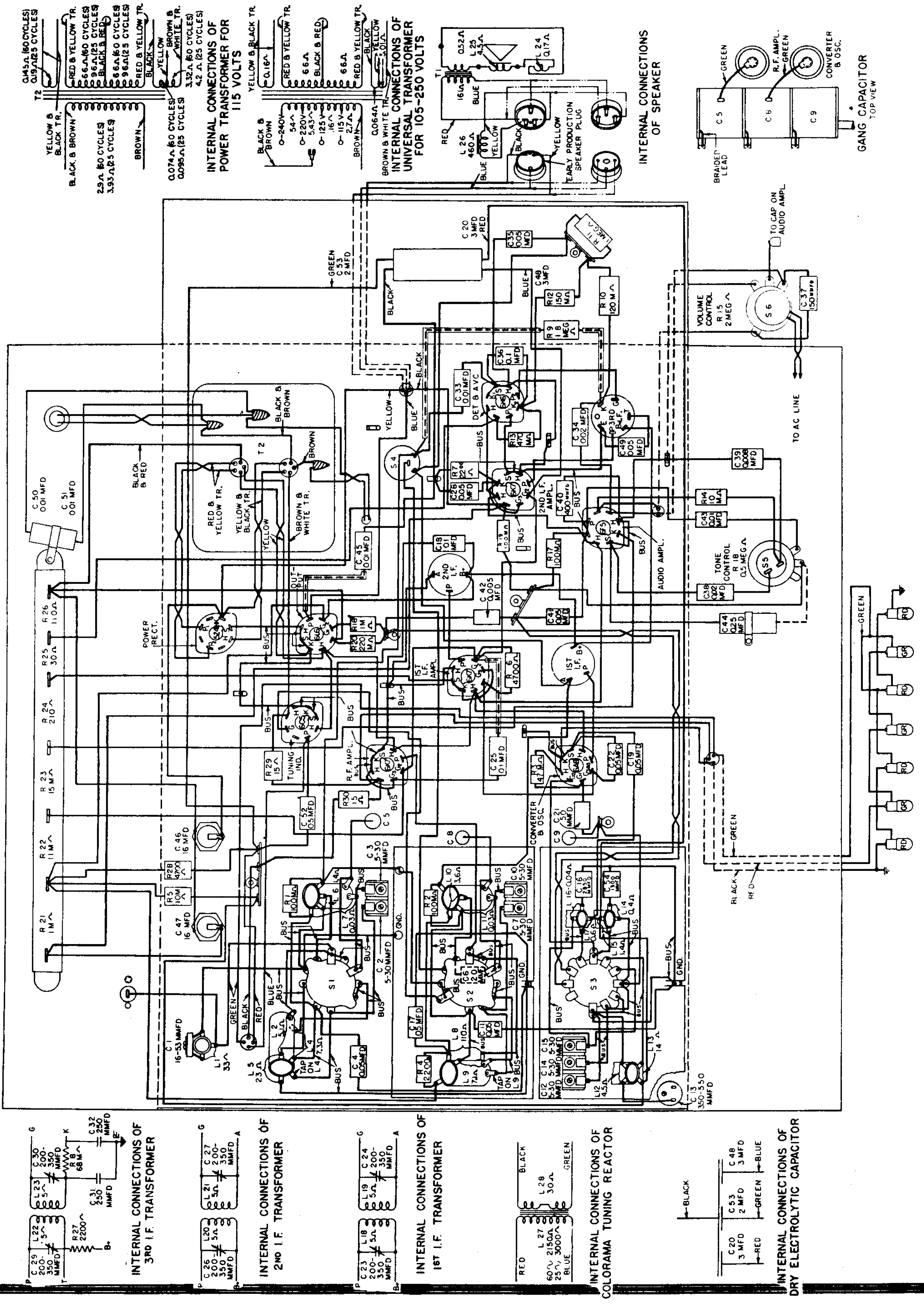


Fig. 1. Schematic Circuit Diagram

GENERAL ELECTRIC COMPANY

MODELS E91 & E95



FRONT OF CHASSIS

Fig. 2. Chassis Wiring Diagram

GENERAL ELECTRIC COMPANY

MODELS E91 & E95

COLORAMA TUNING

These receivers are equipped with Color Tuning, a novel method which indicates approach to resonance by means of a change of color of the light illuminating the tuning scale.

The colored light is produced by a group of four red-stained pilot bulbs and a group of three green stained bulbs behind the scale. At zero signal strength the red group is at full brilliance and the green invisibly dim. As the signal increases from zero, the red gets dimmer and the green brighter over a broad range until at extreme signal strength the green is fully bright and the red below visibility through the dial. Hence, as a station is tuned-in the color changes smoothly, and the maximum change in the green direction is an indication of resonance.

Weak stations will produce a small color change and strong stations a larger change. The difference in signal strength, between the weakest and the strongest station likely to be listened to, has been found to be so great in different localities that the receivers have been equipped with a two-position sensitivity range switch for "sensitive" and "insensitive" settings of the color tuning. The switch is located near the power transformer on the chassis and may be reached from the rear of the cabinet. In the sensitive position, the weakest station to which the user can listen comfortably, above the general noise level, will shift the color to neutral white at resonance. Stronger stations give resonant points at bright greens. In localities near a relatively large group of high-powered stations and having a high noise level, such as Chicago and New York, the range switch must be thrown to the insensitive position when standard outdoor antennas are used, or else the color will be fixed green over so wide a band that resonance cannot be accurately found. The difference in sensitivity is about twenty to one. On short wave bands the band switch connects the color tuning to the sensitive setting and the switch on the chassis is inoperative. This is because practically all the short-wave signals are relatively weak. The insensitive setting is used only on the 540-1680 KC band.

There is a group of four red and a group of three green pilot bulbs behind the scale. These are controlled by a Saturable Reactor in a circuit which is shown in the schematic diagram, Fig. 1. The saturable reactor is controlled by a D. C. coil which decreases its reactance smoothly from a high-value at no D. C. to a very low value at maximum D. C. The saturable reactor acts very much like a dimming rheostat except that it is controlled by the D. C. plate current of a 6C5 tube used solely for that purpose. This tube receives for its bias a portion of the A.V.C. voltage of the set so that at no signal the bias is nearly zero. At this point, the plate current is at maximum; therefore, the red is brightest and the green invisibly dim.

SOME THINGS WHICH MAY AFFECT THE OPERATION OF COLOR TUNING ARE AS FOLLOWS:

Seven colored bulbs are used to give good diffusion of color over the scale; but if one of the seven fails it unbalances the whole group and should be replaced immediately. The lamp socket assembly may be removed by reaching into the rear of the cabinet, pulling the lamp socket assembly up on its guides and drawing it partly out. A shipping screw, which should be removed when the set is unpacked, may need to be removed the first time. There is enough slack in connecting wires to allow the assembly to be drawn forward. When the socket assembly has been drawn far enough out for unscrewing the bulbs turn on the power switch and replace the bulbs which do not glow. All will not be bad as each group is in series (green) or series parallel (red). Take care the wires do not foul the tuning mechanism when the assembly is replaced. The colored lamps used for replacement *MUST ALL BE 6.3 VOLTS, 0.15 AMPERE LAMPS.* No other size will work.

If the red is unusually dim on no signal and the colored bulbs are all good, try removing the antenna. Next try replacing the 6C5 Colorama tube or replace the rectifier. Sometimes the antenna noise level is so high that it dims the red like a signal. If the tubes in the set become weak, or the set is out of alignment, or for any other reason loses its sensitivity, the color tuning will appear insensitive.

ALIGNMENT PROCEDURE

The receiver should first be allowed to run for fifteen minutes in order to reach its approximate normal operating temperature. Before making any adjustments, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal from the test oscillator to the receiver and inserting a "Tuning Wand" into the coil involved. The "Tuning Wand" consists of a rod of insulating material having a ring of nonmagnetic metal attached to one end, and a small core of finely divided iron compacted into the opposite end. By inserting the metal ring end into the center of a particular coil, the inductance of the coil is lowered, increasing its resonant frequency. Inserting the iron-filled end into the coil raises its inductance, lowering its resonant frequency. If the circuits are in exact alignment, inserting either end of the tuning wand in any coil will result in a decrease in output. When an increase in signal is obtained with the iron-filled end of the wand, a decrease in resonant frequency of that circuit by increasing its trimmer capacity is indicated. When an increase in signal is obtained with the metal ring, a decrease in trimmer capacity is indicated.

Changes Indicated by Wand

Wand	Signal	Trimmer adjustment required
Metal Ring Iron filings	Decrease Decrease	None
Metal Ring Iron filings	Increase Decrease	Decrease capacity
Metal Ring Iron filings	Decrease Increase	Increase capacity

Alignment Frequencies

I. F.	Band "B"	Band "C"	Band "D"	Wave Trap
465 kc	580 kc 1500 kc	5220 kc	18,000 kc	465 kc

In order to align this receiver properly, it is necessary to have available the following test equipment:

1. A modulated test oscillator with frequencies available of 465, 580, 1500, 5220 and 18,000 Kc.
2. An output indicator, such as a high resistance a-c voltmeter with a maximum scale reading of 3 to 5 volts, or a neon lamp indicator.
3. An alignment tool consisting of an insulating shaft with a small screwdriver blade.
4. A tuning wand.

The location of all trimmer capacitors, as well as socket voltages to chassis, is shown in Fig. 3.

1. *I. F. Alignment*

Set the frequency band switch of the receiver to Band "D" short circuit the antenna and ground terminals and tune the receiver to some point near maximum tuning condenser capacity where no signal is heard. Set the volume control at its maximum position and ground the chassis.

The I. F. amplifier is tuned to 465 Kc; set the test oscillator so as to produce a signal at this frequency. Connect the test oscillator output between the top grid terminal of the 6K7 2nd I. F. tube and the chassis using a .05 mfd. Capacitor (RC-072) in series with the oscillator output lead to the top grid connection, after first removing the grid lead connecting to the same point from the 2nd I. F. transformer. Provide a path for grid bias by connecting a 10,000 ohm resistor (RQ-083) between grid cap and top grid terminal of tube.

Connect the output meter across the voice coil of the speaker and adjust the test oscillator output control so that, with the receiver volume control at maximum, a small deflection is observed on the output meter. During both I. F. and R.F. alignment, the test oscillator signal should be maintained at the lowest level that will give a good readable output indication.

Adjust the secondary trimmer of the third I. F. transformer until a maximum output reading is obtained. Maintain a small deflection on the output meter throughout alignment by adjusting the test oscillator output. Next, adjust the primary trimmer of the third I. F. transformer for maximum output. This transformer is then adjusted and should not require readjustment when aligning transformers ahead of it.

Transfer the test oscillator connections to the top grid terminal of the 6K7 1st I. F. tube, replace the grid lead on 2nd I. F. tube, and reduce the output of the test oscillator as low as possible consistent with obtaining an easily readable indication on the output meter. Adjust secondary and primary trimmers respectively on the 2nd I. F. transformer until a maximum deflection on the output meter is obtained.

Transfer the test oscillator connections to the top grid terminal of the 6A8 converter tube and replace the grid cap connection on the 6K7 1st I. F. tube. It will probably be found desirable to set the tone control for minimum high response, and to reduce the volume control setting, to lessen the noise reproduced due to the extremely high sensitivity of this receiver. Again adjust the test oscillator output to as low a value as will allow accurate adjustment. Adjust secondary and primary trimmers respectively on the 1st I. F. transformer until maximum deflection on the output meter is obtained.

2. *I. F. Wave Trap Alignment*

Set the band switch to Band "B" and tune the receiver to about 1000 Kc. With the test oscillator still set at 465 Kc., remove the shorting connections between antenna and ground terminals and apply this signal to the antenna terminal through a dummy antenna consisting of a 400 ohm resistor and 250 mmfd. capacitor in series. With the 465 Kc. signal applied to the antenna terminal, adjust the I. F. Wave Trap Trimmer for *minimum* output indication.

3. *R. F. Alignment*

First check the position of the dial pointer by rotating the tuning condenser to maximum capacity position, i.e., plates fully meshed. At this position, the pointer should coincide with the end mark at the left-hand end of the scale. If it does not, it may be set by loosening the dial drum set screws and rotating the drum on the tuning condenser shaft. Hold the tuning condenser rotor while doing this, to prevent its rotating. Tighten the two set screws after the pointer is correctly set.

Band "B" (540-1680 Kc.)

Set the test oscillator for operation at 1500 Kc. and connect its output to the antenna terminal of the receiver through the dummy antenna described under I. F. Wave Trap Alignment. Tune the receiver until the pointer is at 1500 on the scale. Set the tone control for minimum high response and reduce the volume control setting so as to avoid excessive noise response. Adjust the Band "B" oscillator, R. F., and antenna trimmers respectively (C-12, C-7 and C-2, Fig. 3) to give maximum deflection on the output meter. Maintain the test oscillator output at the lowest level which will give an easily readable output indication.

Now set the test oscillator to 580 Kc. and tune the receiver to resonance with this signal. Adjust the 580 Kc. padding capacitor, C-13, rocking the tuning condenser back and forth through resonance as the padding capacitor is adjusted and note the deflection of the tuning meter each time the receiver is tuned through resonance. Leave the padding capacitor at the setting which gives greatest deflection.

Retune the receiver to 1500 Kc. and reset the test oscillator for this frequency. Check the alignment by again adjusting the Band "B" oscillator, R. F. and antenna trimmers for maximum deflection on the tuning meter.

Band "C" (1680-6000 Kc.)

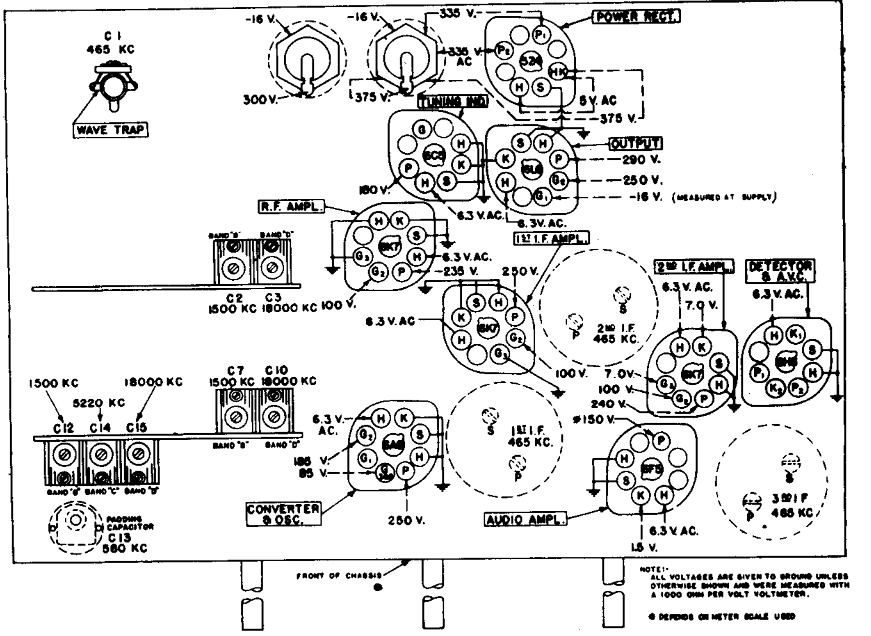
No trimmers are provided for alignment of the R. F. and antenna transformers in Band "C" of these receivers. Correct tracking between R. F. and antenna transformers is obtained by the action of the capacity coil, L-3, and between oscillator and the other tuned circuits by means of the adjustable oscillator trimmer C-14 and the fixed padding capacitor, C-54.

Turn the band switch to Band "C". Set the test oscillator at 5220 Kc. and tune the receiver to resonance at this frequency. Adjust the Band "C" oscillator trimmer, C-14, for maximum output indication on the tuning meter, rocking the tuning condenser back and forth through resonance while making the adjustment.

Band "D" (6.0-18.0 Mc.)

Turn the band switch to Band "D". Set the test oscillator at 18,000 Kc. (18.0 Mc.) and tune the receiver until the pointer coincides with the 18.0 mark. Adjust the Band "D"

(continued on next page)



VIEWED FROM UNDERSIDE OF CHASSIS

Fig. 3. Trimmer Location and Socket Voltages

GENERAL ELECTRIC COMPANY
MODELS E91 & E95

oscillator trimmer, C-15, to give maximum output indication. It will probably be found that there will be two settings of the oscillator trimmer that will give an output response. The lower capacity setting of the trimmer is the one that should be used. To be sure that correct adjustment has been obtained, tune for the image signal at 17.07 Mc. with the test oscillator set at 18.0 Mc. It may be necessary to increase the test oscillator output to obtain response at this point.

Retune the receiver to 18.0 Mc. and adjust Band "D" antenna and R. F. trimmers, respectively (C-3 and C-10) for maximum output indication. When adjusting the R. F. trimmer, C-10, rock the tuning condenser back and forth through resonance as in the 580 Kc. padding capacitor adjustment.

Alignment of the receiver is now complete.

VISUAL ALIGNMENT OF I.F.

In order to realize to full advantage the performance built into these receivers at the factory, circuit alignment using cathode ray oscilloscope equipment is much to be preferred. The oscilloscopic method is particularly advantageous in aligning the I. F. tuned circuits.

For visual alignment it is necessary to vary the frequency of an unmodulated test oscillator signal over a range extending on both sides of the peak frequency. This variation must take place in synchronism with the horizontal traverse of the cathode ray beam on its screen. The frequency modulator must, therefore, provide means for synchronizing the periodic test frequency variation with the cathode ray horizontal deflection circuit. The test oscillator may advantageously have facilities for audio frequency amplitude modulation of a fixed radio frequency test signal, as well as for frequency modulation, but audio modulation is not required for visual I. F. alignment.

Instead of an output meter across the speaker voice coil, the vertical plates of the cathode ray tube are connected across the load resistor of the diode rectifier. With the frequency modulator in operation in conjunction with the test oscillator, the resonance curve of the circuit under test will be then shown on the screen.

Preliminary Procedure

For visual alignment, adjust the receiver controls and connect the test oscillator as outlined in the section entitled "I. F. Alignment" under "ALIGNMENT PROCEDURE." Connect the vertical deflecting plates of the cathode ray tube across the diode rectifier load resistor, which in these receivers consists of R-10 and R-12 in series. The location of these resistors is clearly shown in Fig. 2.

Place the oscilloscope in operation as an output indicator and proceed as outlined in the section entitled, "I. F. Alignment."

Alignment Adjustments

Adjust the oscilloscope so that the luminescent spot on the cathode ray screen traces a horizontal line across the screen. Now place the frequency modulator and test oscillator in operation to give an unmodulated radio frequency signal varying from one side to the other of 465 Kc. Adjust the oscilloscope and test oscillator controls to show a single overall resonance curve of the I. F. channel on the cathode ray tube screen. Do not change the test oscillator setting thereafter.

To align the I. F. transformers, follow in sequence the same procedure outlined in the sections under "ALIGNMENT PROCEDURE" describing this operation. Instead of aligning for maximum output on an output indicator, the object should be to make the curve symmetrical. If the sweep circuit is so arranged that two symmetrically reversed curves appear on the screen, the curves should be made to coincide by adjusting the I. F. trimmer capacitors.

Visual R. F. alignment may be carried out in the same general manner as above by applying a suitable frequency-modulated signal between the antenna and ground terminals of the receiver and connecting the cathode ray vertical deflecting plates across the diode rectifier load resistors.

ADJUSTMENT OF DIAL MECHANISM

The dial mechanism (Fig. 4) is rigidly mounted to the chassis by means of two brackets and four self-tapping screws. The dial pointer is operated by means of an "automatic vernier" reduction drive unit, mounted on the gang condenser, and connected to the gang rotor by a set of anti-backlash gears. Motion imparted to the gang condenser rotor is transmitted through a series of pulleys and an interconnecting cable to the dial pointer slider which is supported on a rail above the dial scale.

To Mount Escutcheon

Care should be taken to use a well ground screw driver of proper size to fasten the screws in the escutcheon plate. Holes have been jigged in the cabinet front panel to insure the proper location of the escutcheon with respect to the scale housing.

To Replace Drive Cable

Remove the defective drive cable to be replaced. Rotate the drive wheel (14) counter-clockwise until the gang condenser plates are fully open. Place the end of the cable having an eyelet in slot [A]. Thread the cable as shown in Fig. 4, making certain that the cable passes *over* the pin [B] and runs along the *correct* grooves, the looped end hooking over the tension spring (16). Check the position of the drive wheel (14) on the condenser shaft to make sure that the cable coming off the right hand idler pulley lines up with the groove in the drive pulley. Also, as the condenser plates become fully meshed, the drive wheel (14) should just meet the bushing [D] of the reduction drive unit (39). With the drive wheel in this position, place the pointer on the rail [E] and, with the tip of the pointer (11) on the extreme left hand dial scale division, crimp the pointer tab on the drive cable.

To Adjust Pointer for Scale Calibration

Three positions of the dial pointer cable are provided on the drive wheel (14) to adjust the dial pointer up or down scale. The position shown in Fig. 4 with the cable over pin [B] is the medium position. Changing the cable to the position between pins [B] and [C] moves the pointer down scale. The position below the pin [C] moves the pointer up scale from the medium position.

To Replace Scale

Remove the band change cable (12) by unhooking it from the fork [F] on gear (41). Remove the end support bracket (8) held by a single self-tapping screw and withdraw the scale assembly from its housing. Replace the end caps (37) and (38) on the new scale and reassemble. Before reattaching the band change cable to the fork [F] the tension spring (7) should be given two full turns to provide proper tension for the cable.

To Adjust Rotation of Scale

The forked tab [F] may be bent up or down to give the correct position of the scale divisions with respect to the dial pointer. The pointer tip should slightly overlap the scale divisions.

To Change Dial Lamps

Make certain that the shipping screw [G] has been removed before attempting to remove the dial lamp bracket. Lift up the lamp bracket from the tabs under which it is clipped. Care should be taken that the lamp leads do not put an undue strain upon the drive cable. With the lamp bracket laid back horizontally, the lamps may be replaced. When the lamp bracket is reinserted, care should be exercised to avoid having the lamp leads foul the gang mechanism.

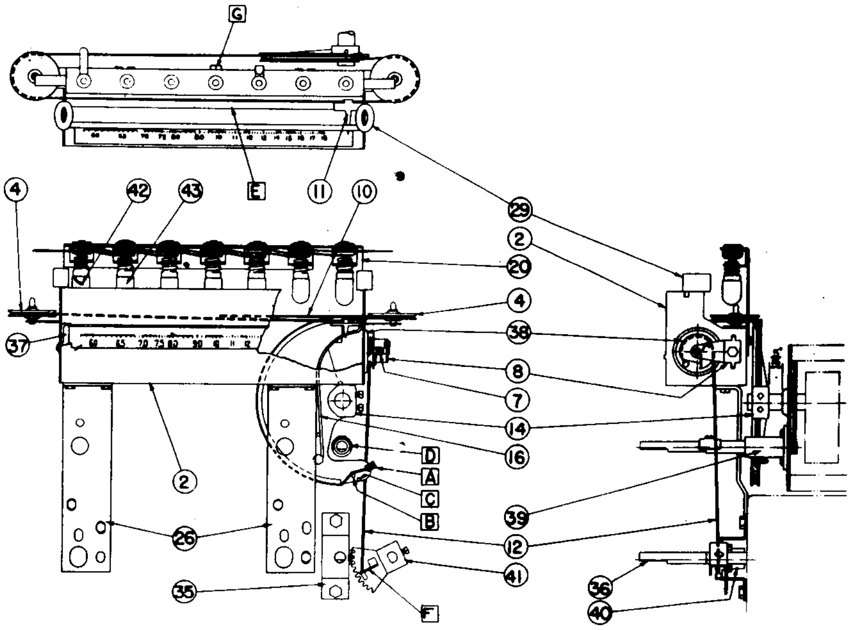


Fig. 4. Dial Drive Mechanism

SOCKET VOLTAGES

Tube No.		Cathode to Ground Volts D.C.	Screen Grid to Ground Volts D.C.	Plate to Ground Volts D.C.	Cathode Current M.A.	Heater Volts A.C.
6K7 R. F. Amp.		†...	100	235	8.0	6.3
6A8	Oscillator	...	...	185	10.3	6.3
	Converter	†...	85	250		
6K7 1st I. F. Amp.		†...	100	250	8.0	6.3
6K7 2nd I. F. Amp.		7.0	100	240	3.1	6.3
6H6 Detector & AVC.		...	...	...	...	6.3
6F5 Audio Amplifier		1.5	...	*150	0.3	6.3
6L6 Output		**...	250	290	63.5	6.3
6C5 Colorama Control		...	...	180	9.5	6.3
5Z4 Power Rectifier		360 D.C.	...	670/335 R.M.S.	110.0	5.0

Measured at 115 volts supply. No signal input. Volume control maximum. Voltmeter 1000 ohms per volt; measurements taken on highest scale giving accurate readable deflection.
* Supply voltage minus drop in load resistor. ** Grid bias at source—16 volts.
† Grid bias at source—3.3 volts.

Tuning Frequency Range

Band "B"............540-1680 KC
Band "C"............1680-6000 KC
Band "D"............6.0-18.0 MC (6,000-18,000 KC)

Tuning Control Drive Ratio

Fast Tuning..........8 to 1
Vernier Tuning........40 to 1

Electrical Power Output

Undistorted..........6.5 watts
Maximum............14.0 watts

Loud-speaker—Electrodynamic

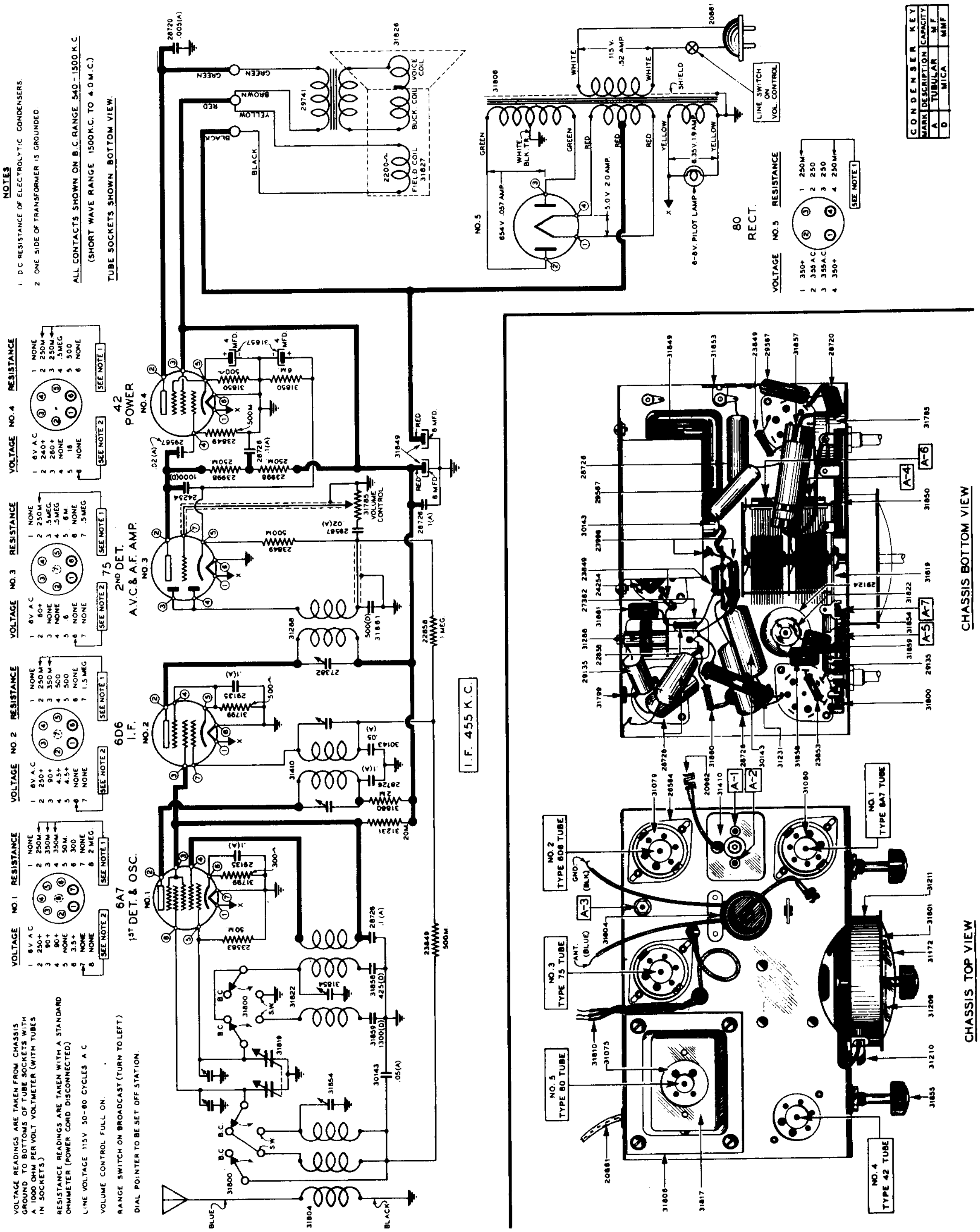
Cone: Model E-91....... 8 in.
Model E-95.......12 in.
Cone Coil Impedance....5.5 ohms at 400 cycles

Tubes

R. F. Amplifier....6K7 Triple-grid Super-control Amplifier
Converter and Oscillator.......6A8 Pentagrid Converter
1st I. F. Amplifier..6K7 Triple-grid Super-control Amplifier
2nd I. F. Amplifier.6K7 Triple-grid Super-control Amplifier
Detector and AVC.6H6 Twin Diode
Audio Amplifier...6F5 High Gain Triode
Output..........6L6 Beam Amplifier Tetrode
Colorama Control..6C5 Low Gain Triode
Rectifier..........5Z4 Full-wave Rectifier
Dial Lamps.......6.3 V—0.15 A. (4 red and 3 green)

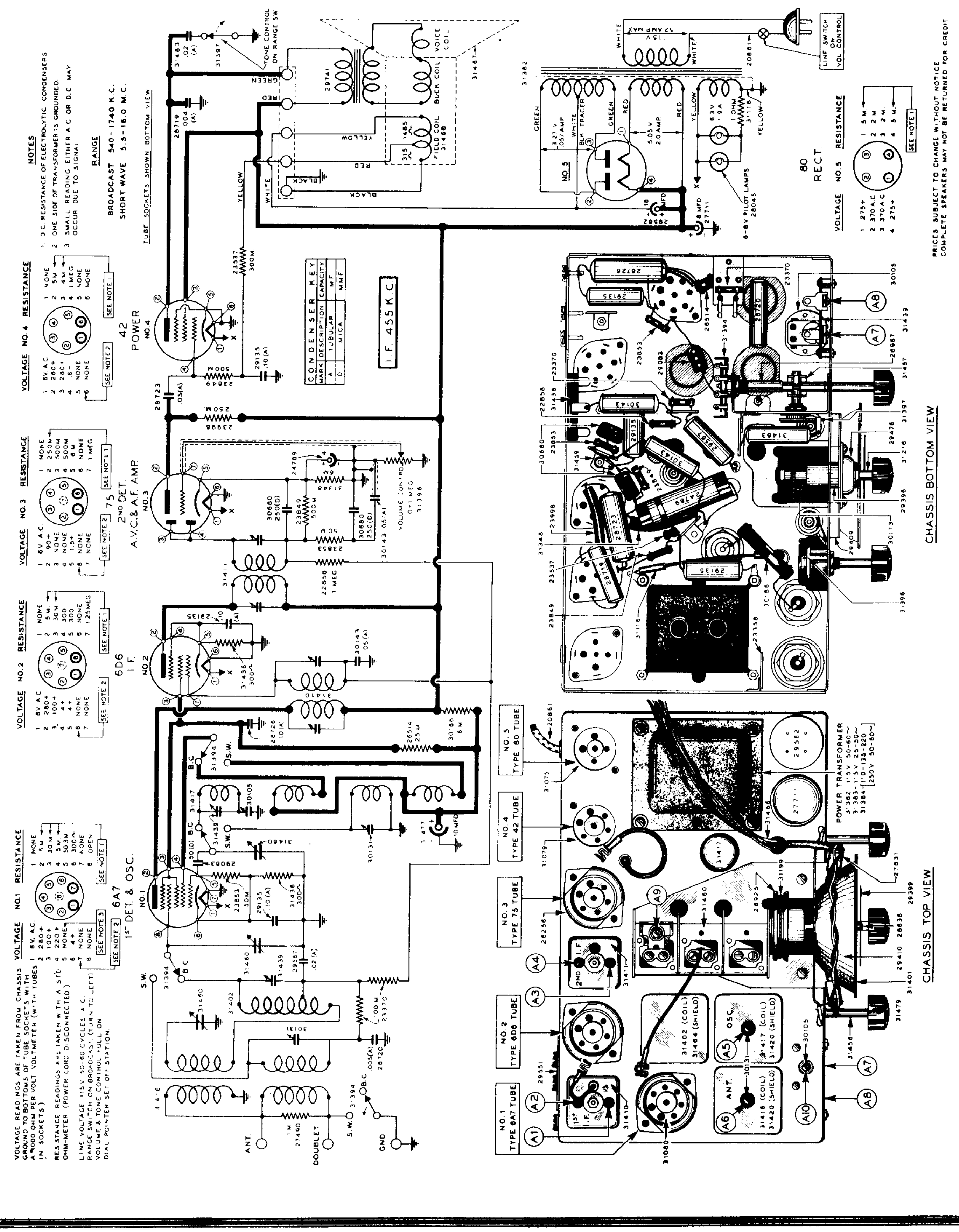
GENERAL HOUSEHOLD UTILITIES COMPANY

MODEL 560 CHASSIS 5E



GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 570-571—570X-571X—570Z-571Z
CHASSIS 5D———5DX———5DZ



GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 560-5E-5D-570-571-5DX-570X-571X-5DZ-570Z-571Z

Grunow Radio

CHASSIS TYPE 5E
Receiver Model 560
Speaker Type 8B6

GENERAL HOUSEHOLD UTILITIES COMPANY
31568-1 CHICAGO, U. S. A.

INTRODUCTION

The following characteristics apply to the GRUNOW Radio—Chassis 5E:

This model is a 5 tube Super-Heterodyne Dual Wave (540 to 1500 K.C. and 1500 to 4000 K.C.) Receiver using 1-6A7 tube as a 1st Detector and Oscillator, 1-6D6 tube as an I.F. Amplifier, 1-75 tube as a Diode Detector, delayed Automatic Volume Control (AVC) and high gain audio Amplifier. The 42 output tube is a power amplifier pentode and is capable of producing large power output with a relatively small signal input. The rectifier tube is an 80, the output of which is well filtered through the action of the speaker field and the two 8 mfd. electrolytic condensers.

The tuning range is divided into two bands or divisions, one covering the band of 540 to 1500 K.C. and the other 1500 to 4000 K.C. In both bands the following three variable circuits are used: R.F. input, detector or mixer input and oscillator. These circuits are tuned by a 2 gang variable condenser of rugged construction.

The remainder of the circuit is typical and has been designed along lines of what is considered the best engineering practice to date. Parts are all oversize and of the finest quality.

SERVICE DATA

CONTINUITY AND VOLTAGE

Continuity and voltage readings should be taken from the underside of the chassis. The values given on the schematic diagram are average and allow the service man to make a quick check of the chassis constants. The socket layouts given on the schematic diagram show each socket from the underside.

The Range switch is a simple four pole double throw switch.

ALIGNMENT PROCEDURE

Do not attempt to align the 5E Chassis without the proper equipment. Alignment condensers are shown in the accompanying illustrations and are numbered in order of procedure.

1. EQUIPMENT.

a. Test Oscillator.

A modulated oscillator capable of producing signals at 455 K.C.—600 K.C.—1400 K.C., and 3700 K.C. is necessary for alignment of the 6A Chassis.

b. Non-metallic screw driver (all bakelite or fibre) about 6 inches long.

c. Output Meter.

This may be any of the standard output meters on the market, but should be sufficiently sensitive to provide a good deflection at low signal strength, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

d. Coupling Means.

Coupling condensers of 200 Mmf., and .25 Mfd. should be used when coupling oscillator to receiver during alignment as specified in the following paragraphs.

2. DIAL SETTING.

Turn dial knob until condensers are fully meshed.

3. I.F. ALIGNMENT.

a. Connect signal lead of test oscillator to grid of the 6A7 (first detector tube) through a .25 Mfd. condenser. Connect the ground lead to the Chassis.

b. Set dial pointer to 140 and range switch on broadcast position.

c. Place test oscillator in operation at 455 K.C. Turn receiver volume control to maximum.

d. Attenuate test oscillator output to lowest value consistent with obtaining a readable indication on output meter.

e. Adjust the three I.F. trimmers (A1-A2-A3) until maximum output is obtained. During alignment maintain as low a value of signal as will allow obtaining of accurate adjustment.

4. 3700 K.C. ALIGNMENT.

a. Connect signal lead of test oscillator through 200 Mmf. condenser to antenna binding post of Chassis.

b. Connect the ground lead to ground terminal of Chassis.

c. Set range switch to S.W. range.

d. Place test oscillator in operation at 3700 K.C. and set dial pointer on 3700 K.C.

e. Adjust oscillator trimmer (A4) (located on variable condenser).

5. 1400 K.C. ALIGNMENT.

a. Turn range switch to broadcast position.

b. Place test oscillator in operation at 1400 K.C. and set dial pointer at 140.

c. Adjust the 1400 K.C. trimmer (A5) located on the front face of the Chassis, the upper right of the two at this location.

d. Adjust the second and third trimmers (A6 and A7).

e. Repeat the 1400 K.C. alignment at least twice.

PARTS PRICE LIST

PART NO.	DESCRIPTION	NO. REQ.	PRICE
20881	ATTACHMENT CORD	1	.35
20962	GRID CAP	2	.02
22858	RESISTOR 1 MEG	1	.20
23849	RESISTOR 500M	3	.20
23853	RESISTOR 50M	1	.20
23998	RESISTOR 250M	2	.20
24254	1000 MMF MICA COND.	1	.20
26270	250M TURBO ASSEM	1	.25
26564	TUBE SHIELD BASE	3	.10
26764	TERM. INSULATOR	1	.02
27382	TRIMMER CONDENSER	1	.35
28366	OSC COIL MTG STRIP	1	.05
28720	TUB COND .005 MFD 700V	1	.25
28726	TUB COND .1 MFD 400V	4	.30
29087	TUBE SHIELD	2	.10
29124	OSC COIL SHIELD	1	.10
29135	TUB COND .1 MFD 100V	2	.30
29587	TUB COND .02 MFD 400V	2	.25
29575	TUBE SHIELD	1	.10
30143	TUB COND .05MFD 100V	2	.20
31075	4 PRONG SOCKET	1	.10
31079	6 PRONG SOCKET	3	.15
31080	7 PRONG SOCKET	1	.15
31172	DIAL WINDOW	1	.20
31209	DIAL POINTER	1	.15
31210	PILOT LIGHT ASSEM	1	.10
31211	REFLECTOR & DIAL MTG.	1	.25
31219	4 TERM JUNC BOARD	1	.05
31231	RESISTOR 20M	1	.25
31288	2ND I.F. TRANSFORMER	1	1.85
31410	1ST I.F. COIL & SHIELD	1	4.00
31785	VOLUME CONTROL	1	1.10
31799	CANDOHM 300~-500~	1	.25
31800	RANGE SWITCH	1	.75
31801	DIAL CHART	1	.25
31804	ANTENNA COIL ASSEM	1	1.35
31806	POWER TRANS 115V 50-60~	1	6.50
31810	SPEAKER CABLE	1	.25
31817	MTG BRACKET & SOCKET	1	.35
31819	VARIABLE CONDENSER	1	3.50
31822	OSC COIL ASSEM.	1	1.25
31831	SOCKET INSULATOR	1	.03
31849	ELEC COND DUAL 8MFD	1	2.25
31850	CANDOHM 500~-8M~	1	.40
31853	4 LUG VERT TERM ASSEM.	1	.10
31854	TRIM COND DUAL 5-25MF	1	.35
31855	KNOB	3	.20
31857	ELEC COND DUAL 4MFD	1	1.00
31858	425 MMF MICA COND	1	.30
31859	1300 MMF MICA COND	1	.30
31880	RESISTOR 2M	1	.15
31861	500 MMF MICA COND	1	.20
31862	JUNC TERM BOARD	1	.05

Grunow Radio

CHASSIS TYPE 5D
115 volt, 50-60 cycle
Receiver Models 570-571
Speaker Types 8B4

CHASSIS 5DX
115 volt, 25-50 cycle
Model 570X
Model 571X

CHASSIS 5DZ
110-135-220-250 volt, 50-60 cycle
Model 570Z
Model 571Z

GENERAL HOUSEHOLD UTILITIES COMPANY
31558-1 CHICAGO, U. S. A.

INTRODUCTION

The following characteristics apply to the Grunow Radio—Chassis Type 5D:

This model is a 5-tube Super-Heterodyne Broadcast and Short Wave (550 to 1720 K.C. and 5.5 to 16.00 M.C.) Receiver using 1-6A7 (Pentagrid converter) tube as a 1st Detector and Oscillator. 1-6D6 (Triple-grid super-control) tube as an I.F. Amplifier. 1-75 (Duplex-diode high mu triode) tube is used as a Diode Detector or Signal Rectifier, delayed Automatic Volume Control (AVC) and high gain audio amplifier. The 42 output tube is a power amplifier pentode and is capable of producing large power output with a relatively small signal input. This tube receives its bias through the voltage drop produced in the tapped speaker field. The rectifier tube is an 80, the output of which is well filtered through the action of the speaker field and the 8, 10 and 18 mfd. electrolytic condensers.

The tuning range is divided into two bands or divisions, one covering the band of 550 to 1720 K.C. and the other 5.5 to 16.00 M.C.

ALIGNMENT PROCEDURE

Do not attempt to align the 5D Chassis without the proper equipment. Alignment condensers are shown in the accompanying illustrations and are numbered in order of procedure.

1. EQUIPMENT.

a. Test Oscillator.

A modulated oscillator capable of producing signals at 455 K.C.—6[illegible] K.C.—1400 K.C. and 15 M.C. is necessary for alignment of the [illegible] Chassis.

b. Non-metallic screw driver (all bakelite or fibre) about 6 inches long.

c. Output Meter.

This may be any of the standard output meters on the market, but should be sufficiently sensitive to provide a good deflection at low signal strength, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

d. Coupling Means.

Coupling condensers of 200 Mmf., .25 Mfd., and a 400 Ohm resistor should be used when coupling oscillator to receiver during alignment as specified in the following paragraphs.

e. The receiver should be aligned in a location free from local interference (man made static)—as high frequency disturbances will cause difficulties when the short wave section is being adjusted. (A screen room is to be recommended.)

2. DIAL SETTING.

Turn dial knob until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

3. I.F. ALIGNMENT.

a. Connect signal lead of test oscillator to grid of the 6A7 (first detector tube) through a .25 Mfd. condenser. Connect the ground lead to the Chassis.

b. Set dial pointer to 1400 K.C. and range switch on broadcast position.

c. Place test oscillator in operation of 455 K.C. Turn receiver volume control to maximum.

d. Attenuate test oscillator output to lowest value consistent with obtaining a readable indication on output meter.

e. Adjust the four I.F. trimmers (A1-A2-A3-A4) located on the top side of Chassis, until maximum output is obtained. During alignment maintain as low a value of signal as will allow obtaining of accurate adjustment.

4. 15 M.C. ALIGNMENT.

a. Connect signal lead of test oscillator through 400 ohm resistor to antenna binding post of Chassis.

b. Connect the ground lead to ground terminal of Chassis.

c. Set range switch to S.W. range.

d. Place test oscillator in operation at 15 M.C. and set dial pointer on 15 M.C.

e. Adjust trimmer (A5) on top of oscillator coil, trimmer (A6) on top of the antenna coil—to maximum output—(the oscillator and antenna coils are located on left hand side on top of the Chassis).

f. On oscillator alignment use the lower of the images for the oscillator alignment point. It will be noted that there are two settings at which the signal will be received. Use the setting giving most capacity, that is, the setting at which the trimmer screw is farthest in. While adjusting the oscillator and antenna coil trimmers, rock the variable condensers back and forth through resonance until maximum output is obtained.

5. 1400 K.C. ALIGNMENT.

a. Turn range switch to broadcast position.

b. Connect signal lead of test oscillator through 200 Mmf. condenser to antenna binding post.

c. Place test oscillator in operation at 1400 K.C. and set dial pointer on 1400 K.C.

d. Adjust the two trimmers (A7 Oscillator and A8 Detector) located at the left front end of Chassis and trimmer (A9) on 3rd section of variable condensers to maximum output.

6. RECHECK OPERATION No. 4.

(15 M.C. Alignment.)

7. 600 K.C. ALIGNMENT.

a. Place test oscillator in operation at 600 K.C.

b. Tune in signal to maximum. (This point does not have to be exactly at 600 K.C. dial setting.)

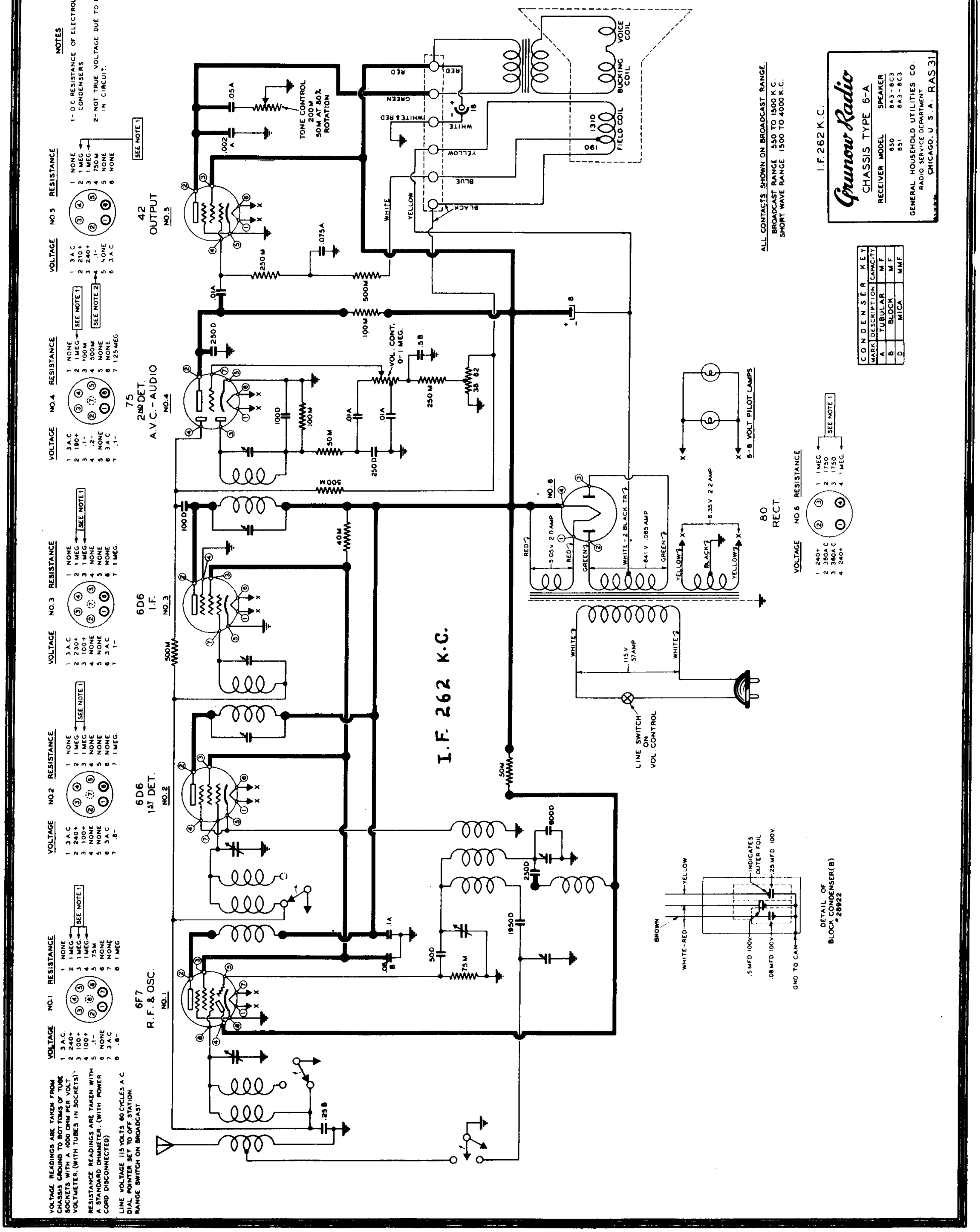
c. Adjust the 600 K.C. padding condenser (A10) (this is the upper of the two trimmers located at the left front end of Chassis), in direction of signal increase; at the same time rock the tuning condenser back a[illegible] forth through resonance while adjusting padding condenser [illegible] maximum output is obtained.

PARTS PRICE LIST

PART NO.	DESCRIPTION	REQ.	PRICE
20881	ATTACHMENT CORD	1	.35
20962	GRID CAP	3	.02
22858	RESISTOR 1 MEG.	1	.20
23370	RESISTOR 100M	2	.20
23537	RESISTOR 300M	1	.20
23849	RESISTOR 500M	2	.20
23853	RESISTOR 50M	2	.20
23998	RESISTOR 250M	1	.20
24789	4 MFD ELECT CONDENSER	1	.60
26514	RESISTOR 25M	1	.20
26967	RANGE SW DRIVE SLEEVE	1	.08
27490	RESISTOR 1M	1	.20
27711	8 MFD ELEC CONDENSER	1	1.10
28638	POINTER SCREW	1	.02
28719	TUB CONDENSER .004 MFD	1	.25
28720	TUB CONDENSER .005 MFD	1	.25
28723	TUB CONDENSER .05 MFD	1	.25
28726	TUB CONDENSER .10 MFD	1	.30
28925	DRIVE DRUM ASSEMBLY	1	.35
29083	MICA COND 50MMF	1	.20
29135	TUB CONDENSER .10 MFD	3	.30
29398	DRIVE SLEEVE	1	.35
29399	POINTER	1	.05
29410	REFLECTOR & BRACKET	1	.20
29478	BALL RACE	1	.10
29485	DR SHAFT THRUST SPRING	1	.05
29522	11/32" BALL	4	.02
29551	ANTENNA BINDING POST	1	.10
29562	18 MFD ELEC CONDENSER	1	1.25
29587	TUB CONDENSER .02 MFD	2	.25
29932	WINDOW	1	.15
29933	WINDOW RETAIN RING	1	.10
29934	ESCUTCHEON	1	.40
29947	ESCUTCHEON SPRING	1	.15
30105	PADDER COND 600 K.C	1	.40
30131	TRIMMER	2	.35
30143	TUB CONDENSER .05 MFD	2	.20
30173	DRIVE SHAFT (INNER)	1	.10
30177	DRIVE SPRING	1	.02
30188	RESISTOR 8M	1	.20
30680	MICA CONDENSER 250	2	.20
31075	4 PRONG SOCKET	1	.10
31079	6 PRONG SOCKET	3	.15
31080	7 PRONG SOCKET	1	.15
31116	RESISTOR 1 OHM OHMITE	1	.20
31199	DRIVE STRING & EYELET	1	.10
31216	DRIVE SHAFT (OUTER)	1	.35
31348	RESISTOR 6M	1	.20
31359	WINDOW GASKET	1	.05
31382	TRANSFORMER 115V 50-60~	1	6.00
31394	RANGE SWITCH	1	.75
31396	VOLUME CONTROL	1	1.30
31397	TONE CONTROL SWITCH	1	.40
31401	DIAL CHART	1	.50
31402	INTERSTAGE COIL	1	1.00
31410	1ST I.F COIL & SHIELD	1	4.00
31411	2ND I.F COIL & SHIELD	1	3.65
31416	ANT. COIL ASSY.	1	2.25
31417	OSC COIL ASSY	1	1.60
31420	SHIELD OSC & ANT COIL	2	.40
31436	CANDOHM 300-300~	1	.30

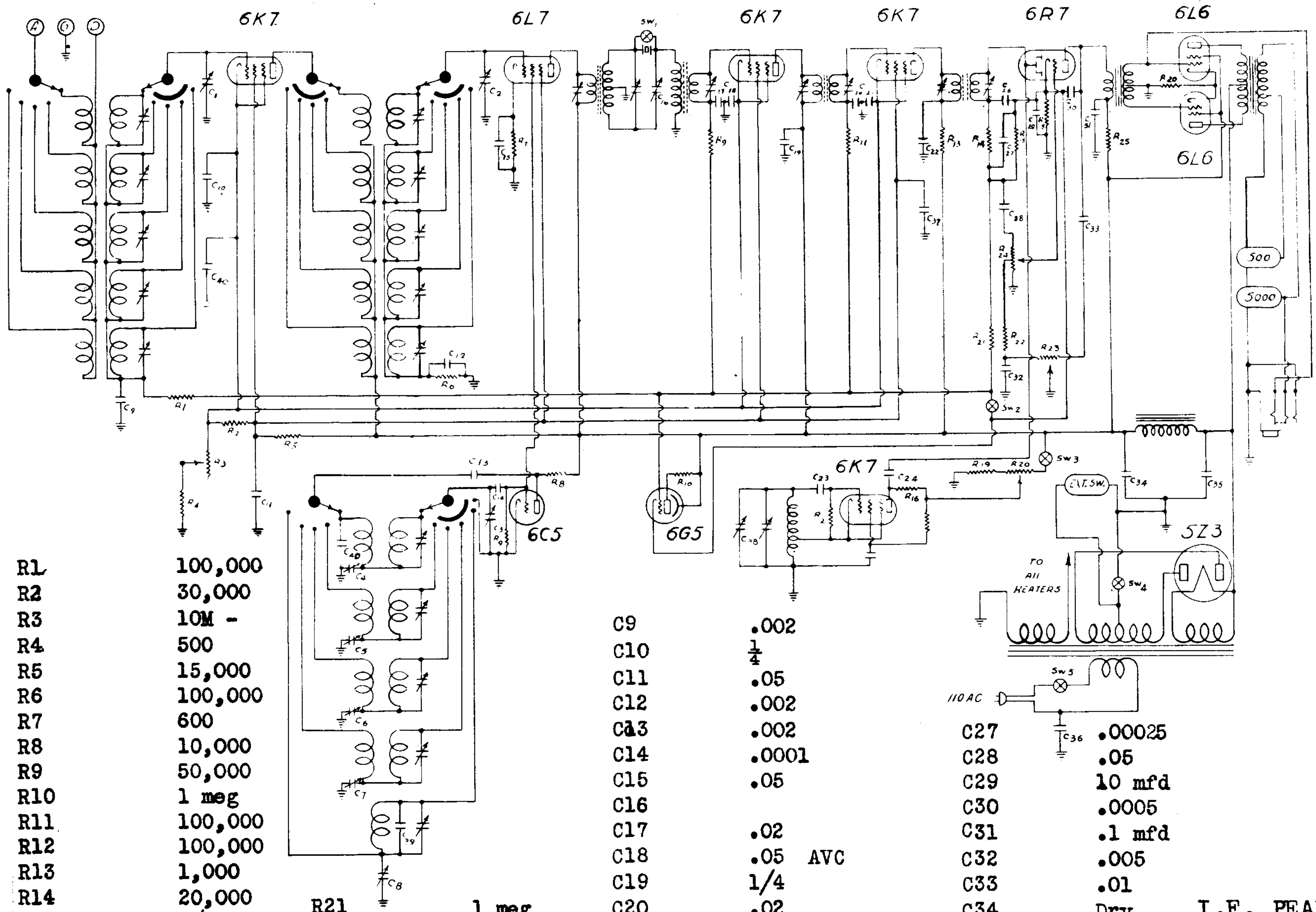
GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 650-651 "CHASSIS 6A"



THE HALLICRAFTERS, INC.

SUPER SKYRIDER MODEL S-11

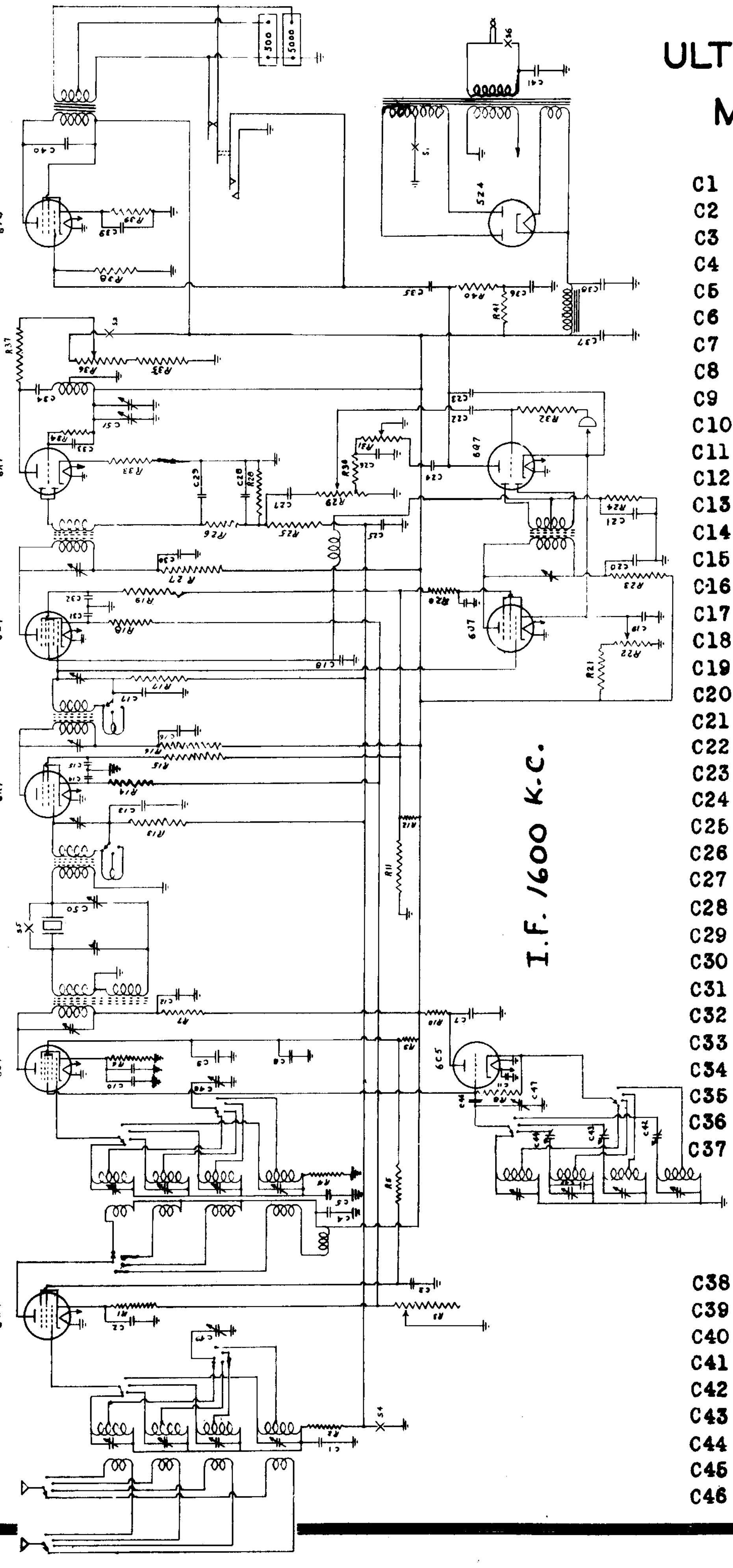


R1	100,000	R21	1 meg	C9	.002	C27	.00025
R2	30,000	R22	20,000	C10	1/4	C28	.05
R3	10M -	R23	1 meg	C11	.05	C29	10 mfd
R4	500	R24	500,000	C12	.002	C30	.0005
R5	15,000	R25	10,000	C13	.002	C31	.1 mfd
R6	100,000	R26	125	C14	.0001	C32	.005
R7	600	R27	100,000	C15	.05	C33	.01
R8	10,000			C16		C34	Dry
R9	50,000			C17	.02	C35	Wet
R10	1 meg			C18	.05 AVC	C36	.01
R11	100,000			C19	1/4	C37	1/10
R12	100,000			C20	.02	C38	Pitch Cont.
R13	1,000			C21	.02	C39	.00001
R14	20,000			C22	.05	C40	.001
R15	1/2 meg			C23	.00025 B.O		
R16	100,000			C24	.00005		
R17	50,000			C25	.002		
R18	1,000			C26	.00025		
R19	50,000						
R20	500,000						

I.F. PEAK 465 K.C.

THE HALLICRAFTERS, INC.

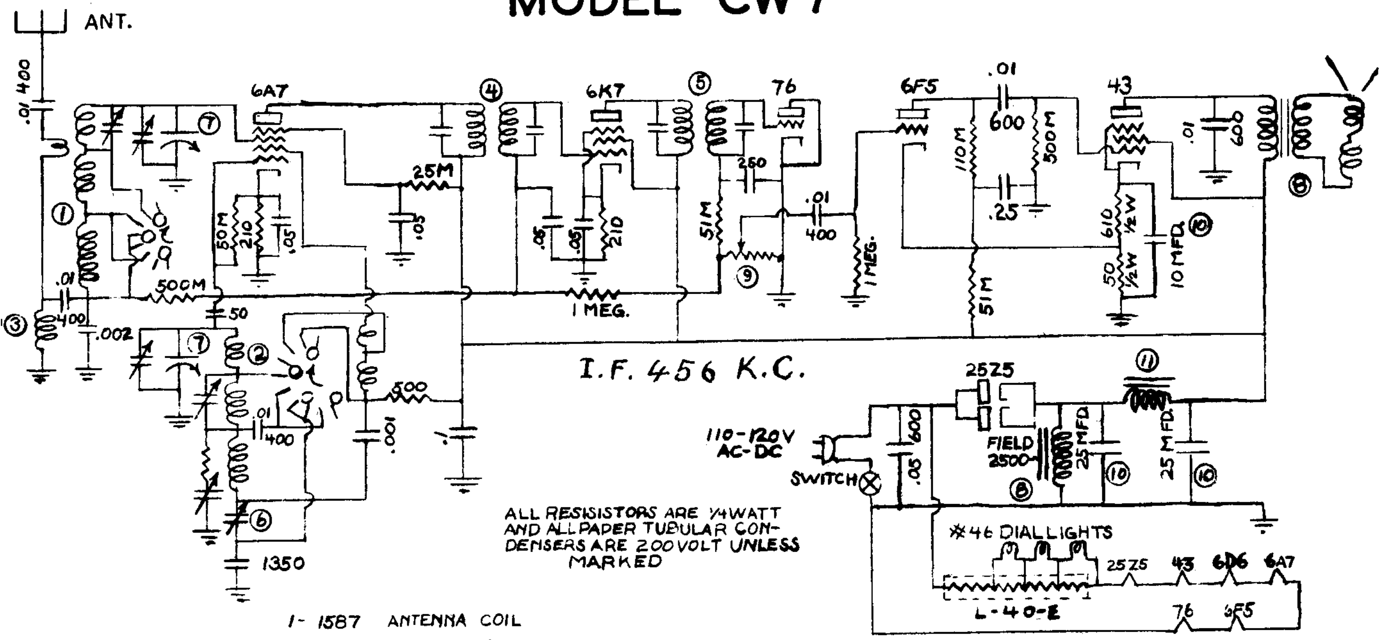
ULTRA SKYRIDER MODEL S-10



C1	.002	R1	100
C2	.002	R2	100,000
C3	.002	R3	10,000
C4	.002	R4	100,000
C5	.002	R5	1000
C6	.05	R6	600
C7	.002	R7	1500
C8	.05	R8	50,000
C9	.002	R9	10,000
C10	.002	R10	10,000
C11	.002	R11	50,000
C12	.01	R12	30,000
C13	.01	R13	100,000
C14	.05	R14	300
C15	.05	R15	1000
C16	.01	R16	1500
C17	.01	R17	100,000
C18	.00005	R18	300
C19	10 mfd	R19	1000
C20	.01	R20	1000
C21	.00005	R21	50,000
C22	.05	R22	10,000
C23	.0005	R23	1500
C24	.004	R24	100,000
C25	.05	R25	1 Meg
C26	.01	R26	30,000
C27	.01	R27	1500
C28	.00025	R28	500,000
C29	.0001	R29	500,000
C30	.01	R30	50,000
C31	.05	R31	1 meg
C32	.05	R32	500,000
C33	.00025	R33	1000
C34	.01	R34	50,000
C35	.05	R35	40,000
C36	.1	R36	500,000
C37	16 mfd	R37	50,000
		R38	100,000
		R39	500
		R40	250000
		R41	100,000
C38	16 mfd		
C39	10 mfd		
C40	.005		
C41	.01		
C42	.0005		
C43	.0005		
C44	.0005		
C45	.000015		
C46	.0001		

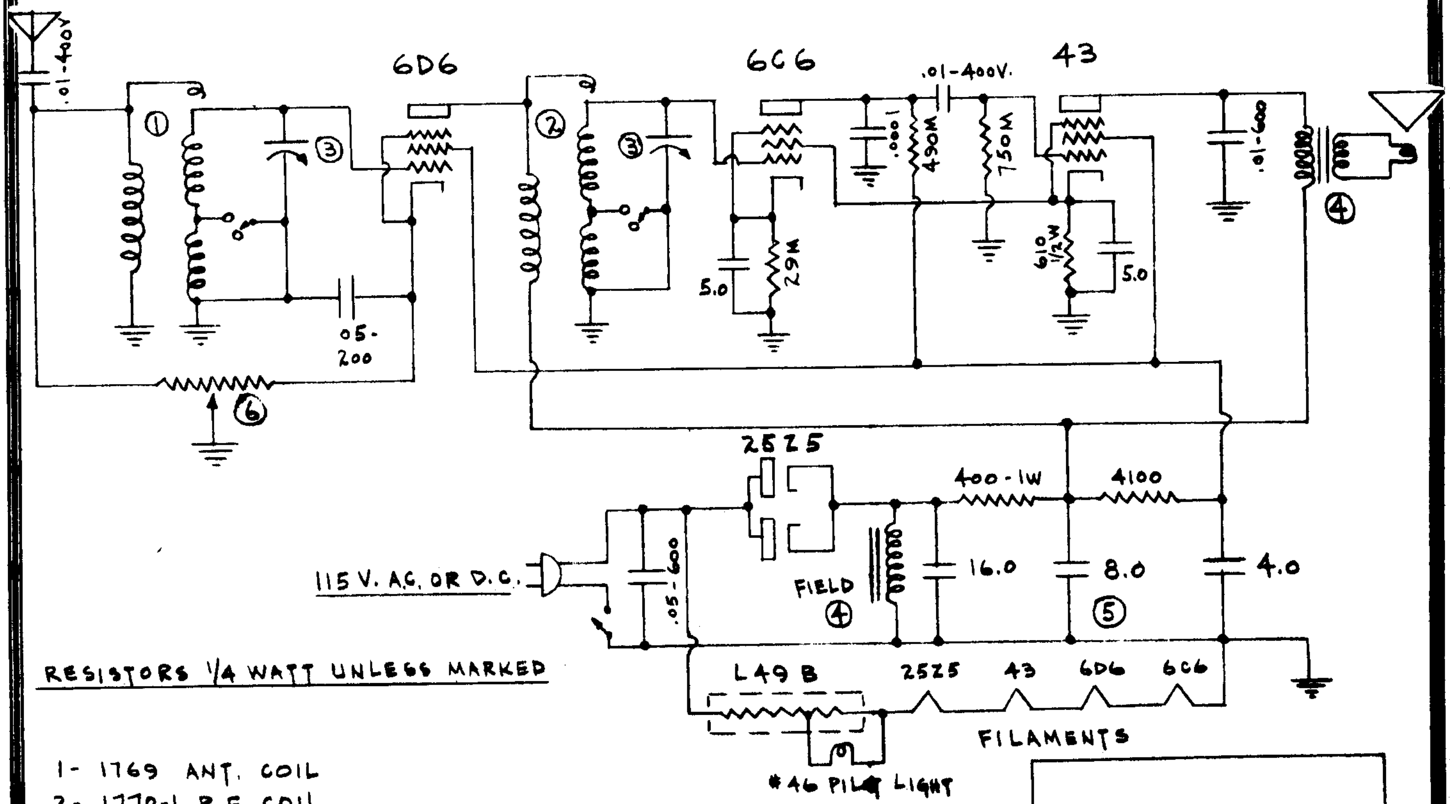
HALSON RADIO MFG. COMPANY

MODEL CW7

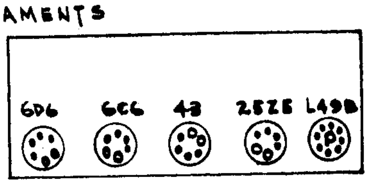


1- 1587 ANTENNA COIL
2- 1772 OSCILLATOR COIL
3- 1600 CHOKE COIL
4- 1649-1 I.F. TRANSFORMER 456 KC.
5- 1650-1 " " "
6- 1621 PADDER CONDENSER
7- 1783 VARIABLE CONDENSER
8- 1670 SPEAKER ASSEMBLY
9- 1666 VOLUME CONTROL (250M~)
10- 1773 ELECTROLYTIC CONDENSER
11- 1777 FILTER CHOKE

MODEL 05



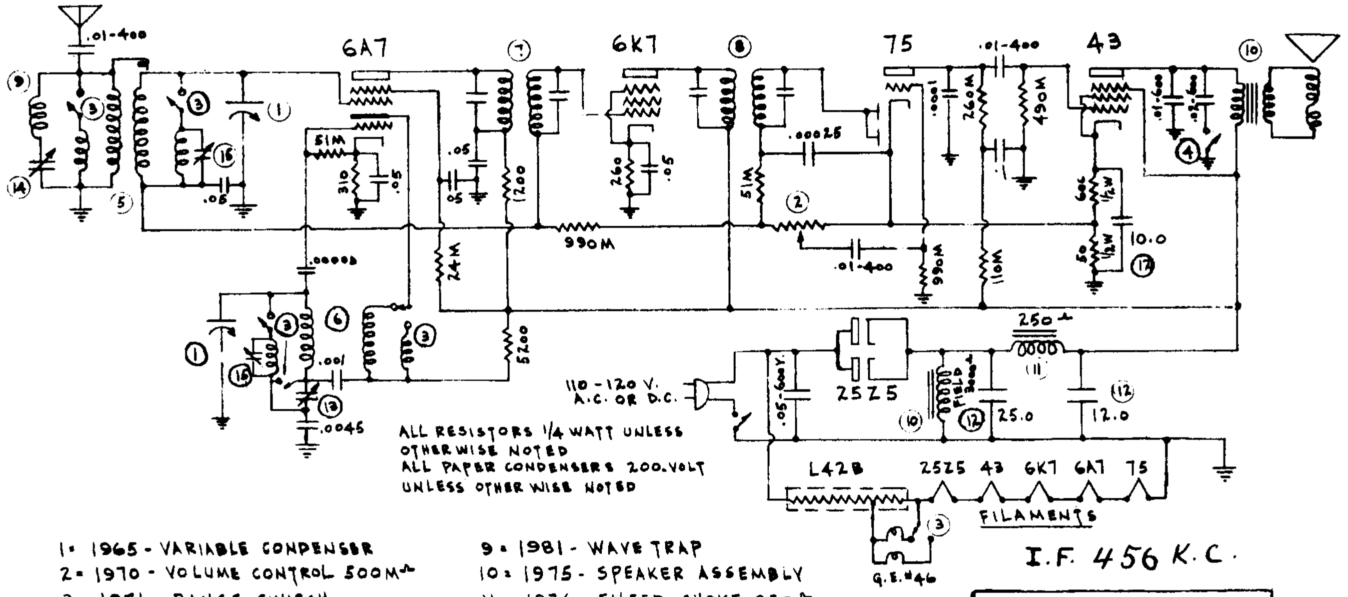
1- 1769 ANT. COIL
2- 1770-1 R.F. COIL
3- 1745 VARIABLE COND.
4- 1768 SPEAKER ASSY.
5- 1751-1 ELECTROLYTIC COND. 16-8-4 150V. 8-5 35V.
6- 1748 VOLUME CONTROL



REAR OF CHASSIS

HALSON RADIO MFG. COMPANY

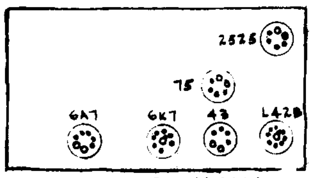
MODEL 50X



ALL RESISTORS 1/4 WATT UNLESS OTHERWISE NOTED
ALL PAPER CONDENSERS 200. VOLT UNLESS OTHERWISE NOTED

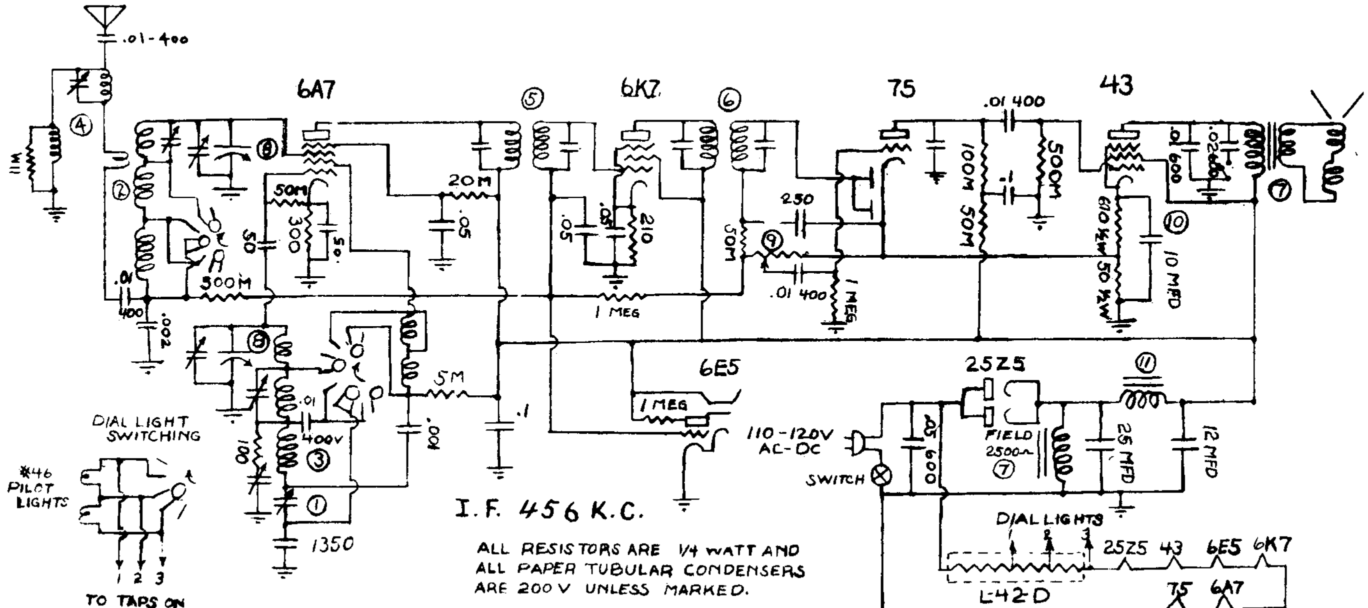
I.F. 456 K.C.

1 = 1965 - VARIABLE CONDENSER
2 = 1970 - VOLUME CONTROL 500M Ω
3 = 1971 - RANGE SWITCH
4 = 1972 - TONE CONTROL SWITCH
5 = 1973 - ANTENNA COIL
6 = 1974 - OSCILLATOR COIL
7 = 1900E - 1ST I.F. TRANS. 456 K.C.
8 = 1848B - 2ND I.F. " " "
9 = 1981 - WAVE TRAP
10 = 1975 - SPEAKER ASSEMBLY
11 = 1976 - FILTER CHOKE 250 Ω
12 = 1977 - ELECTROLYTIC COND. 25-12 MF. - 150V. 10 MF. - 35V.
13 = 1966 - PADDER CONDENSER 330-960 MMF.
14 = 1547 - TRIMMER COND. 3-70 MMF.
15 = 1631 - " " 3-30 "



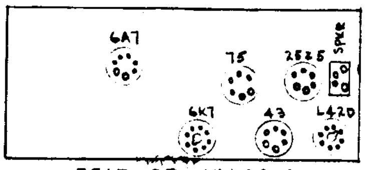
REAR OF CHASSIS

MODEL 60M



I.F. 456 K.C.

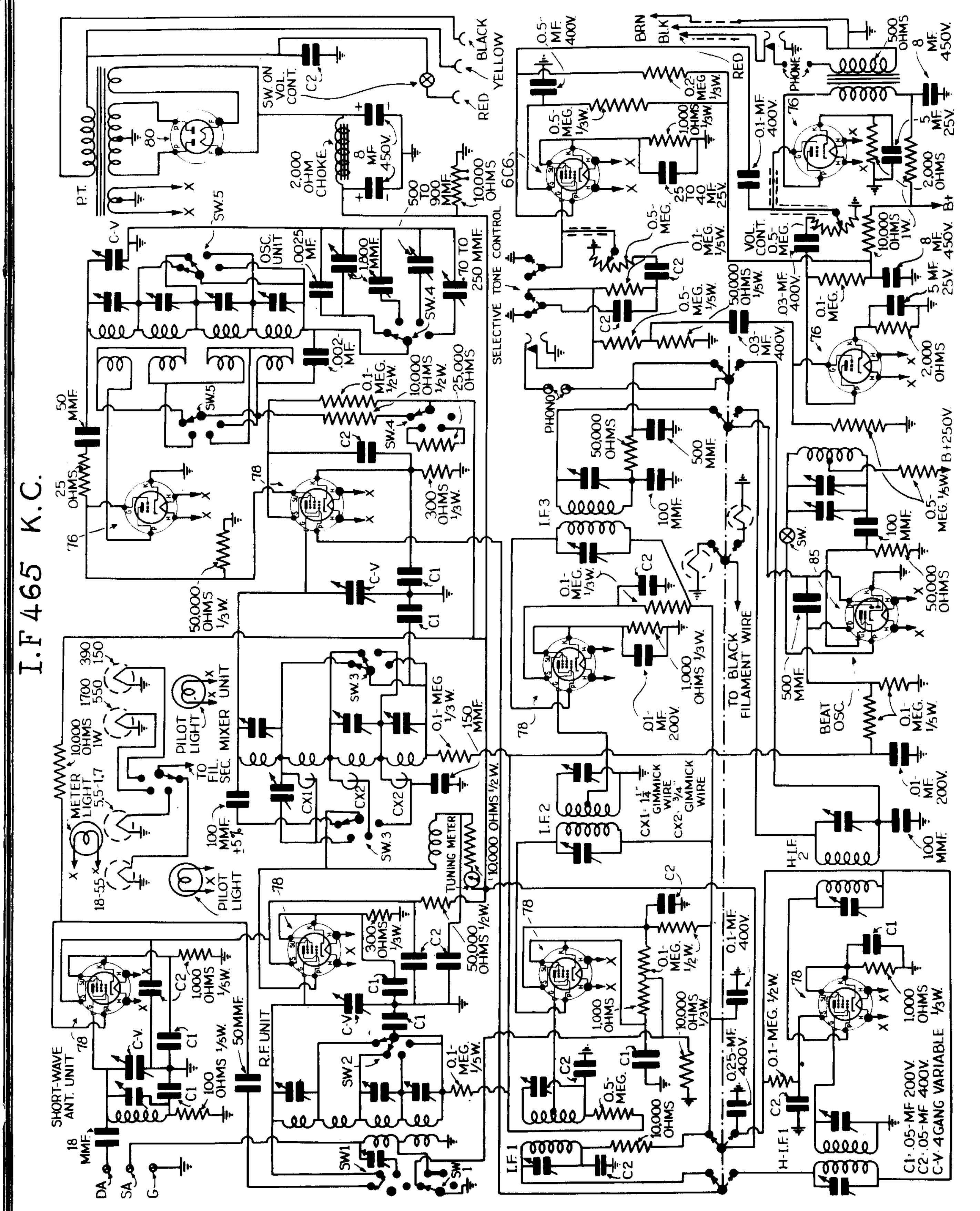
ALL RESISTORS ARE 1/4 WATT AND ALL PAPER TUBULAR CONDENSERS ARE 200 V UNLESS MARKED.



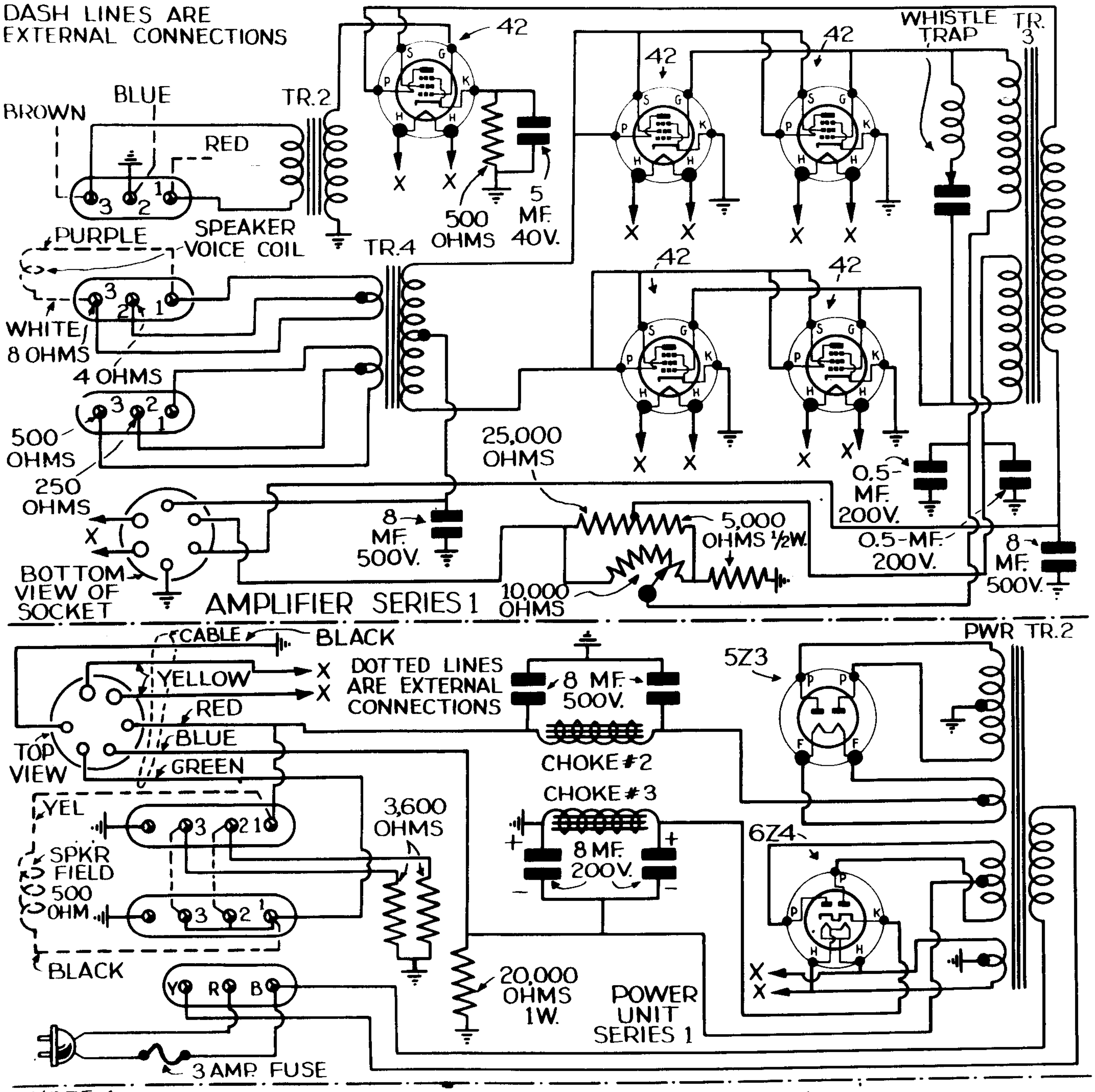
REAR OF CHASSIS

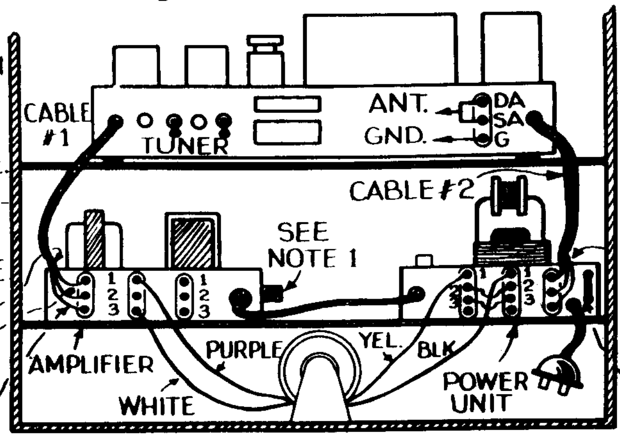
1- 1621 PADDER CONDENSER
2- 1587 ANTENNA COIL
3- 1814 OSCILLATOR COIL
4- 1929 WAVE TRAP
5- 1898A I.F. TRANSFORMER 456 KC.
6- 1899B " " " "
7- 1817 SPEAKER ASSEMBLY
8- 1809 VARIABLE CONDENSER
9- 1811 VOLUME CONTROL -(250M Ω)
10- 1818 ELECTROLYTIC CONDENSER
11- 1823 FILTER CHOKE

HOWARD RADIO COMPANY
MODEL "GRAND" SERIES 1



HOWARD RADIO COMPANY
MODEL "GRAND" SERIES 1



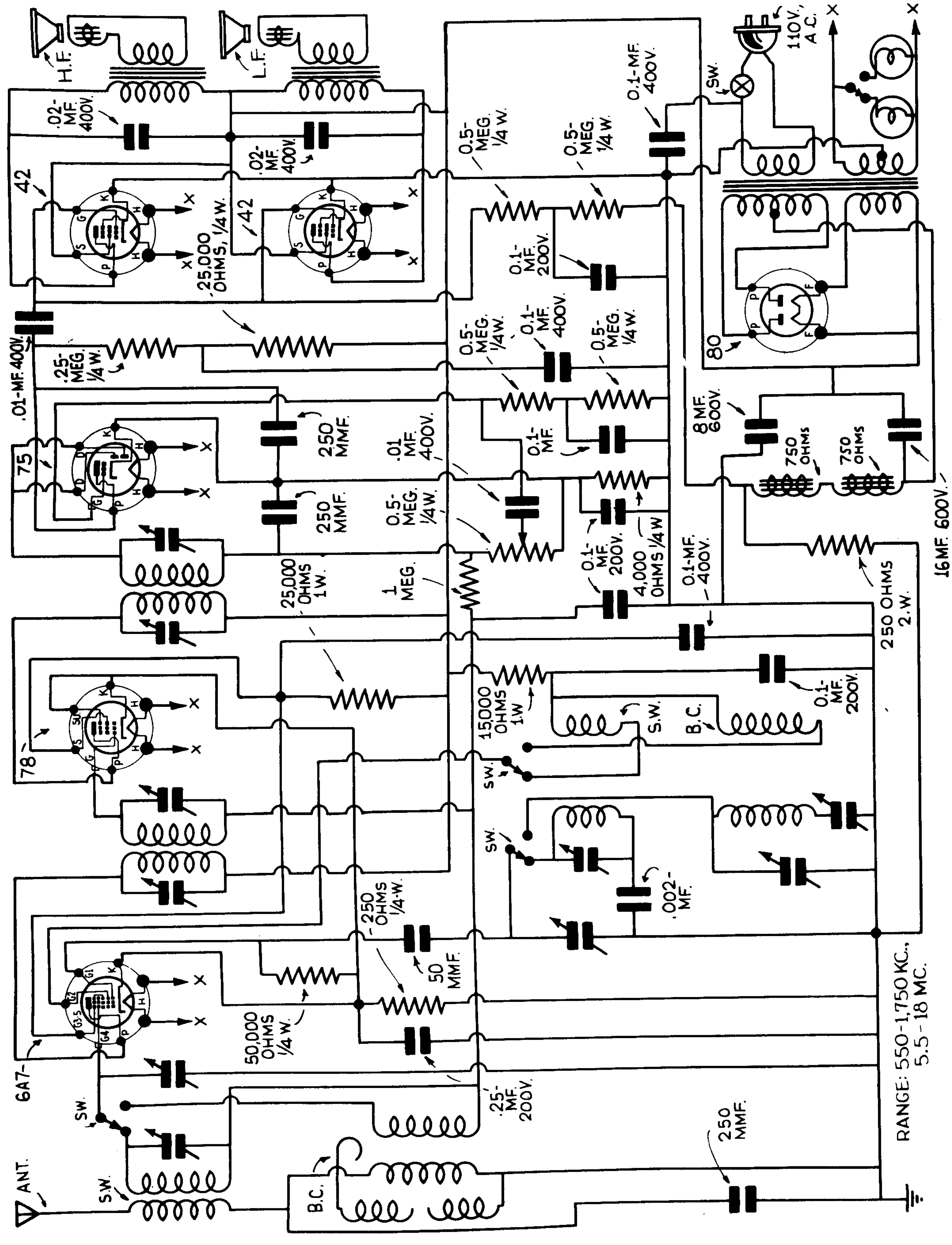


NOTE 1: THIS SHAFT MUST BE TURNED EITHER WAY WITH THE EAR CLOSE TO THE SPEAKER TO A POINT WHERE THE HUM IS GONE. THIS WILL NOT NEED ADJUSTING AGAIN UNTIL THERE HAS BEEN A TUBE CHANGE IN THE AMPLIFIER.

NOTE: AMPLIFIER AND POWER UNITS MAY BE PLACED ANY DISTANCE FROM TUNER BY EXTENDING CABLES #1 & #2.

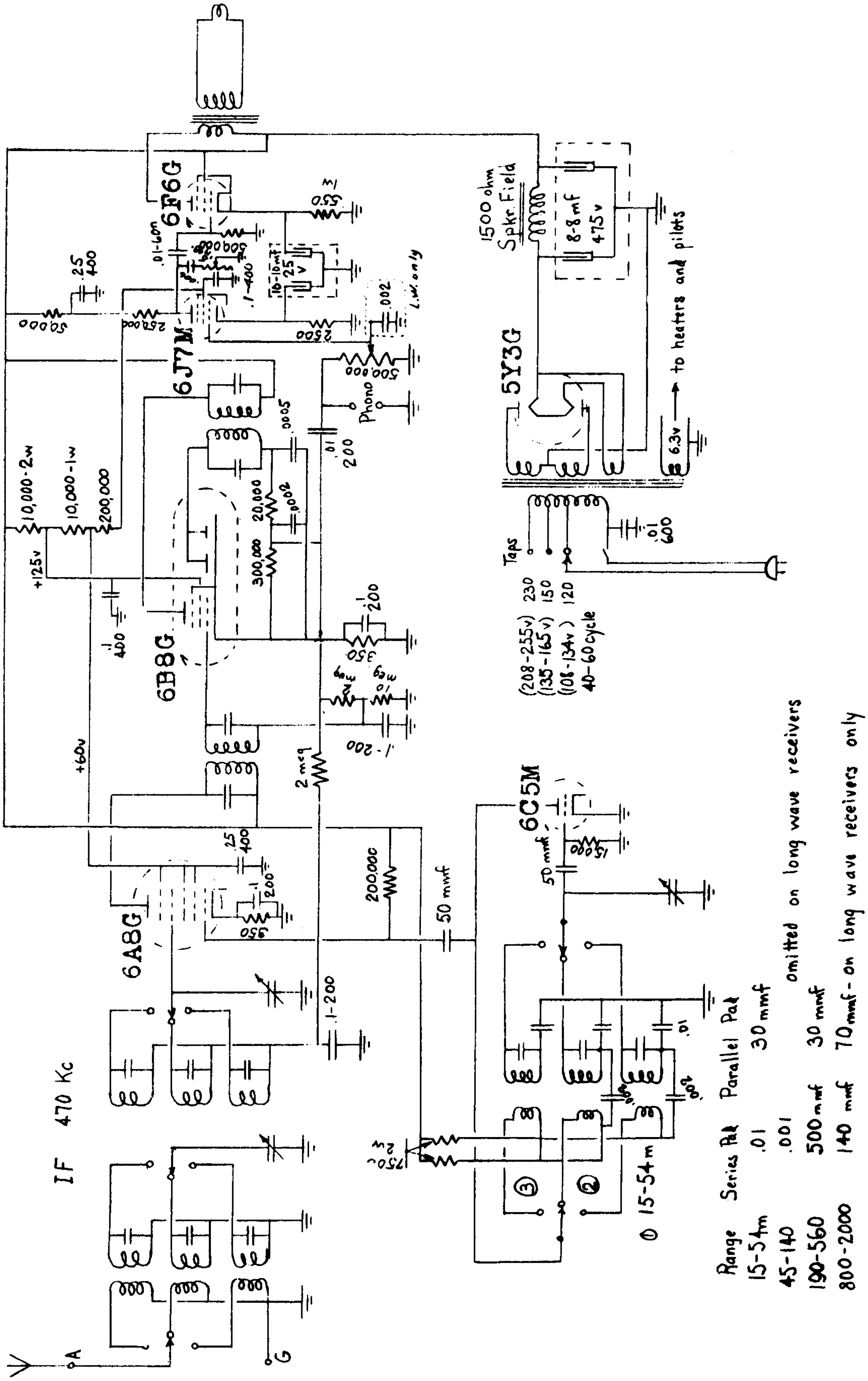
NOTE: CONNECT TO LETTERED TERMINALS ACCORDING TO THE COLORS Y-R-B

HI-LO RADIO CO.
MODEL 40



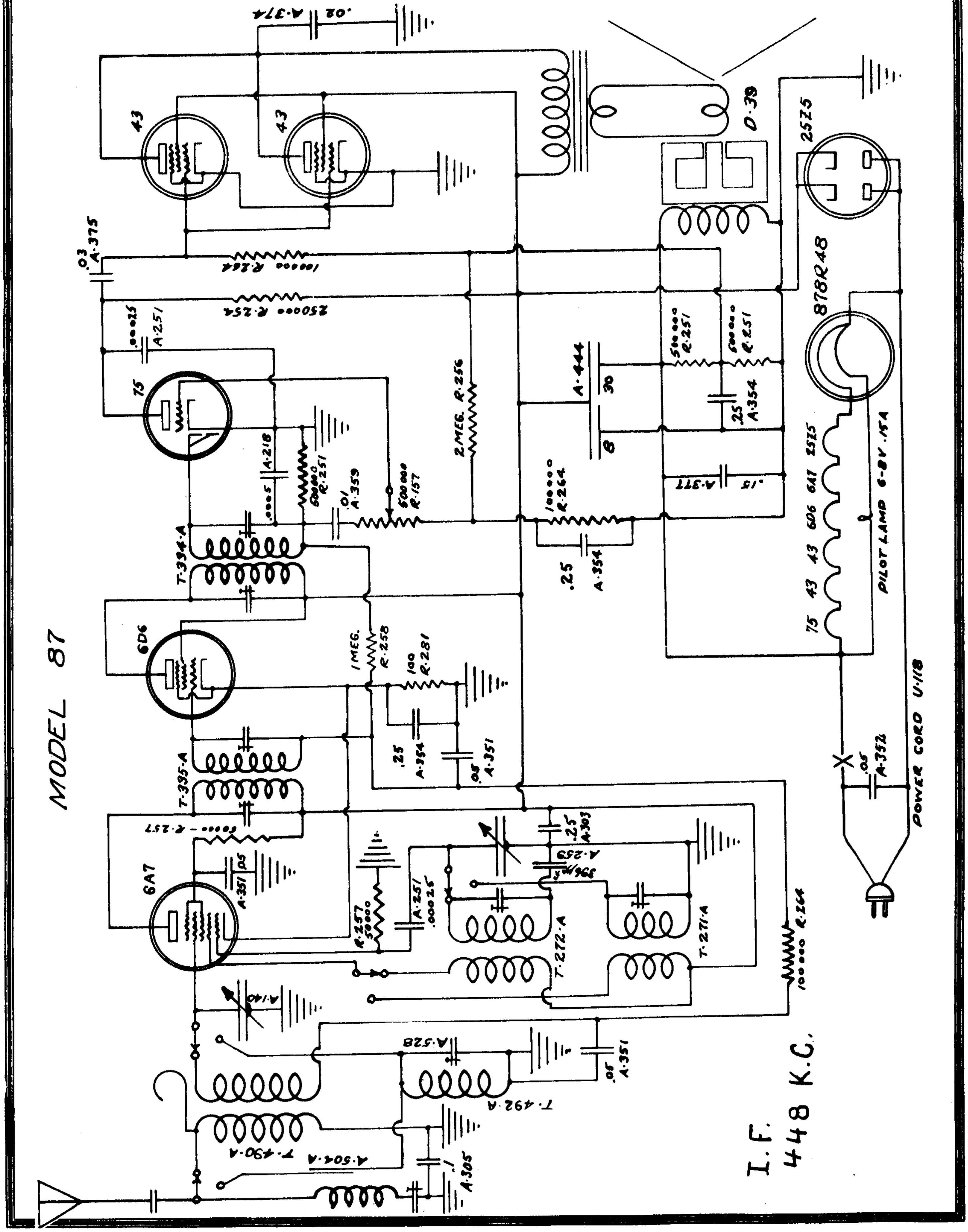
I. C. A. EXPORT CORP.

MODELS 66SW & 67AW



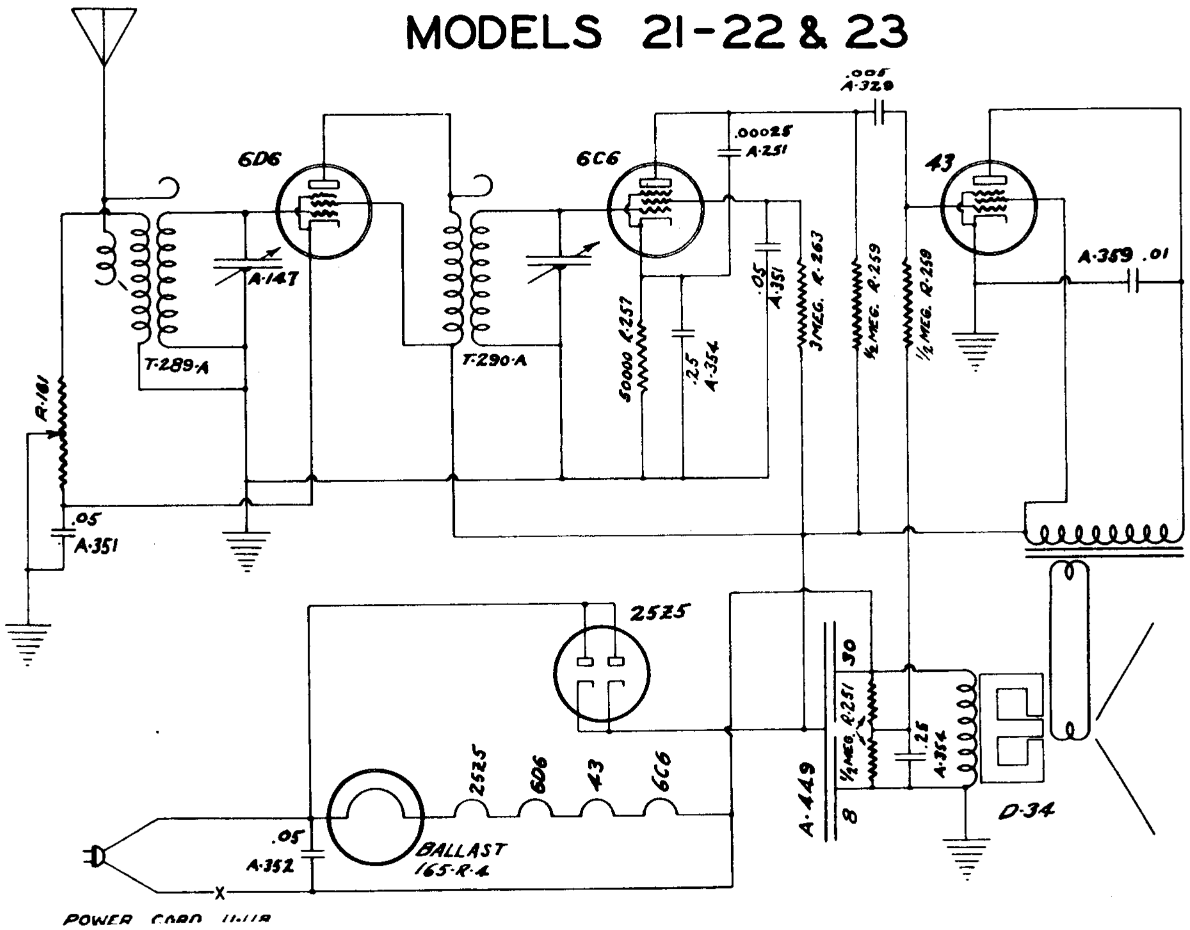
INTERNATIONAL RADIO CORP.

MODEL 87



INTERNATIONAL RADIO CORP.

MODELS 21-22 & 23



Part No.	Description	List Price
A-147	2 gang tuning condenser	$1.50
A-251	.00025 mfd. mica condenser	.20
A-329	.005 mfd. 200 v. paper condenser	.15
A-351	.05 mfd. 200 v. paper condenser	.15
A-352	.05 mfd. 300 v. paper condenser	.15
A-354	.25 mfd. 25 v. paper condenser	.20
A-359	.01 mfd. 400 v. paper condenser	.15
A-449	Electrolytic filter condenser	1.00
F-166	Knobs (Model 21 & 22)	.10
E-167	Knobs (Model 23)	.10
E-388	Escutcheon ring compléte--bright gold (Model 21 & 23)	1.20
E-388	Escutcheon ring complete--frosted gold (Model 22)	1.20
E-2005	Dial pointer & set screw--bright gold (Model 21 & 23)	.25
E-2005A	Dial pointer & set screw--frosted gold (Model 22)	.25
G-112	Dial spring	.05
H-18	25Z5 tube socket	.10

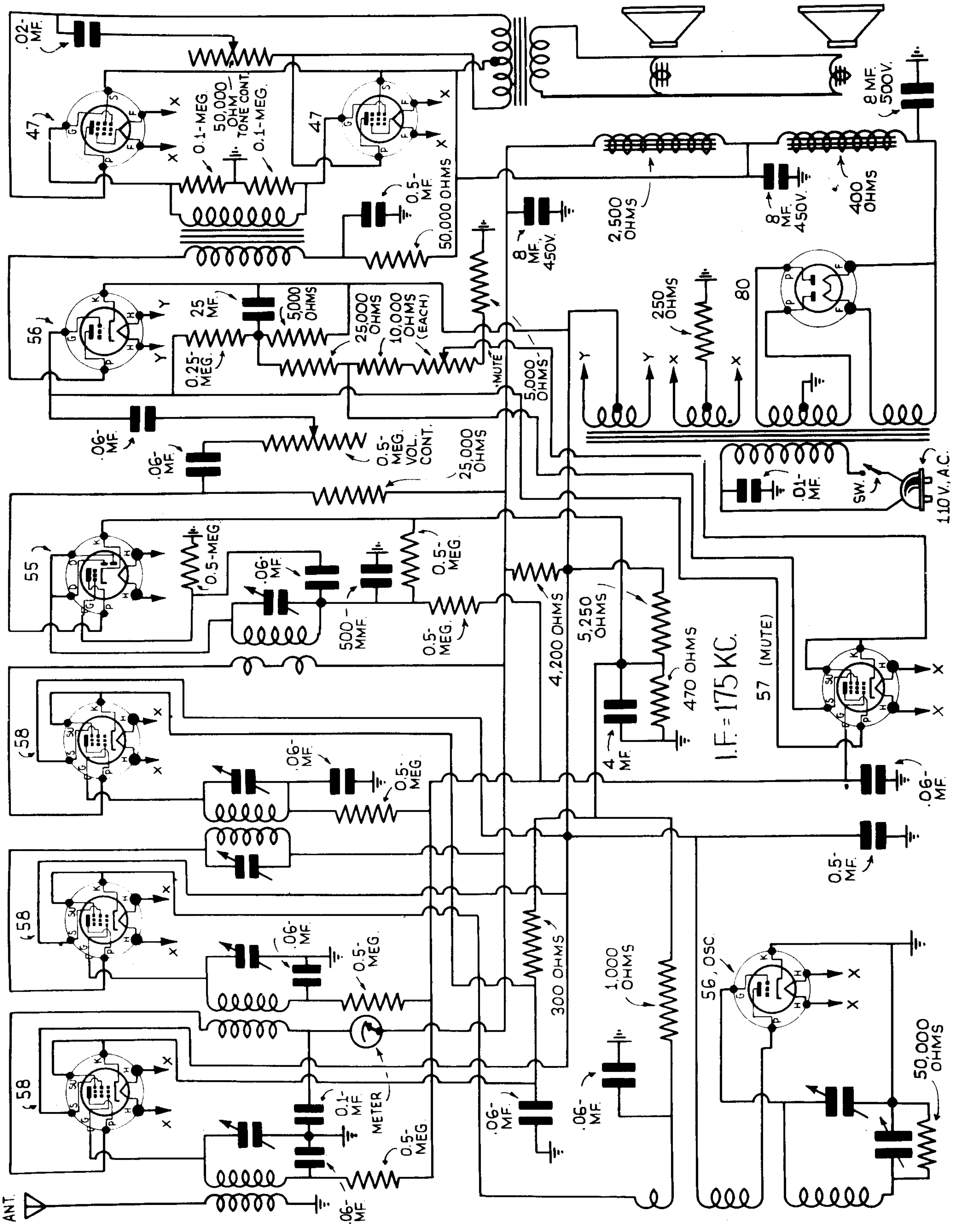
Part No.	Description	List Price
H-19	6D6 tube socket	$ .10
H-21	43 tube socket	.10
H-41	6CC tube socket	.10
H-58	165R4 tube socket	.10
R-161	Volume control and switch	.65
R-251	500M carbon resistor	.20
R-257	50M carbon resistor	.20
R-259	500M carbon resistor	.20
R-263	3 megohm carbon resistor	.20
S-119	Goat tube shield	.10
S-201	Tuning condenser shield plate	.10
T-289A	Antenna coil	1.00
T-290A	R. F. coil	1.00
U-118	Power cord & plug	.30
X-372	Cabinet (Model 21--Moderne; less escutcheon)	4.50
X-373	Cabinet (Model 22--Colonial; less escutcheon)	4.50
X-374	Cabinet (Model 23--Sheraton; less escutcheon)	4.50

AVERAGE SOCKET VOLTAGES

Tube	Position	E_K	E_{G3}	E_{G2}	E_P
6D6	Tuned R. F.	4	4	100	100
6C6	Detector	2*	2*	5	20
43	Output	0	-	100	92
25Z5	Rectifier	100	-	-	115 A.C.

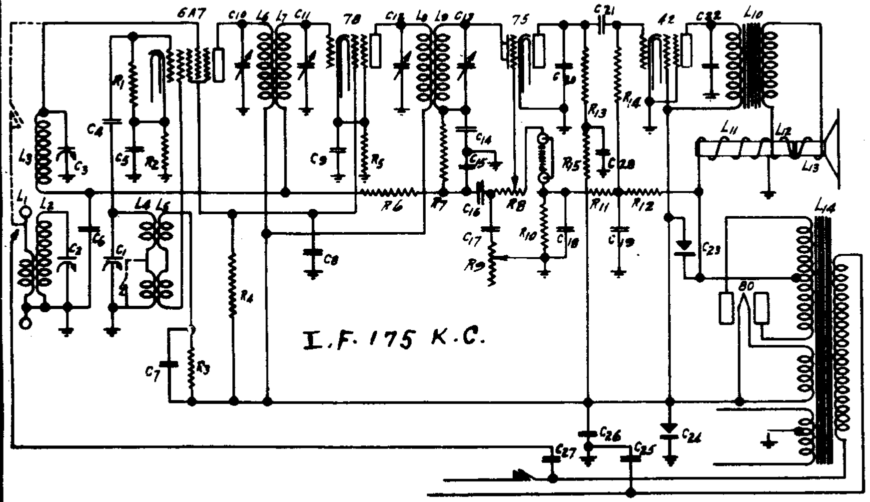
Line 118 volts. Volume control full on. 10% variation allowable. Measurements made from tube prongs to ground with 1000 ohms per volt instrument on 250 volt scale except figures with * which are on 50 volt scale.

COLIN B. KENNEDY CORP.
MODEL 62D



LAFAYETTE RADIO MFG. CO.
MODELS A11 & A12

MODEL A12



RESISTORS

Code	Part No.	
R1	921	40,000 Ohm Oscillator Grid Leak
R2	1062	250 Ohm 6A7 Cathode Resistor
R3	920	10,000 Ohm Oscillator Feed Resistor
R4	898	50,000 Ohm 6A7 & 78 Screen Feed Resistor
R5	1063	500 Ohm 78 Cathode Resistor
R6	926	1 Megohm A.V.C. Network Resistor
R7	898	50,000 Ohm A.V.C. Network Filter Resistor
R8	535	500,000 Ohm Volume Control & A. C. Switch
R9	534	250,000 Ohm Tone Control
R10	919	5,000 Ohm Bias Network Resistor
R11	922	75,000 Ohm Bias Network Resistor
R12	926	1 Megohm Bias Network Resistor
R13	924	250,000 Ohm 75 Plate Resistor
R14	925	500,000 Ohm 42 Grid Resistor
R15	898	50,000 Ohm 75 Plate Resistor

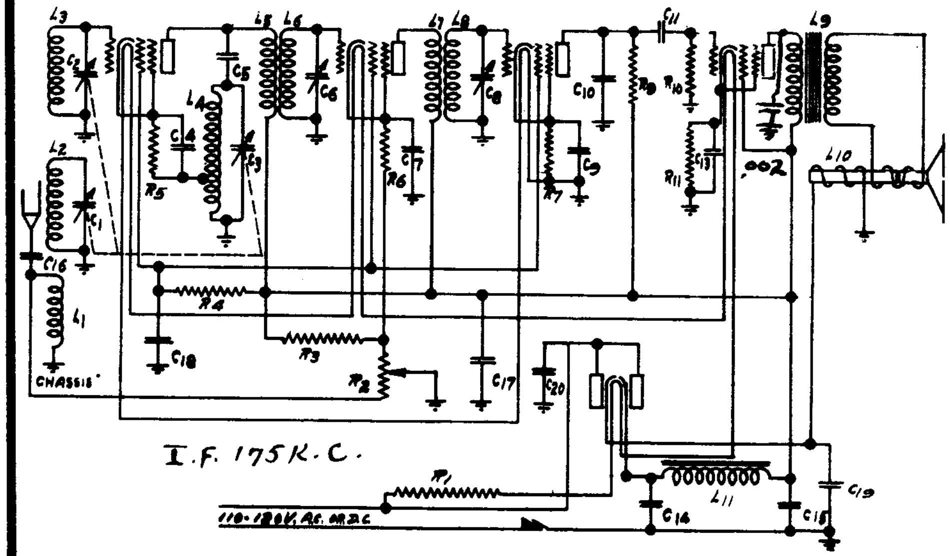
CONDENSERS

Code	Part No.	
C1	833	336 MMFD. Oscillator Section of Tuning Condenser
C2	833	371 MMFD. Preselector Section of Tuning Condenser
C3	833	371 MMFD. Preselector Section of Tuning Condenser
C4	268	.00025 MFD. Oscillator Coupling Condenser
C5	272	.1 MFD. 6A7 Cathode By-pass Condenser
C6	272	.1 MFD. A.V.C. By-pass Condenser
C7	272	.1 MFD. Oscillator Feed By-pass Condenser
C8	272	.1 MFD. 6A7 & 78 Screen By-pass Condenser
C9	272	.1 MFD. 78 Cathode By-pass Condenser
C10	1104	70-200 MMFD. First I.F. Primary Trimmer Condenser
C11	1105	70-200 MMFD. First I.F. Secondary Trimmer Condenser
C12	1106	70-200 MMFD. Second I.F. Primary Trimmer Condenser
C13	1107	70-200 MMFD. Second I.F. Secondary Trimmer Condenser
C14	339	.0001 Diode Filter Condenser
C15	339	.0001 MFD. Diode Filter Condenser
C16	269	.01 MFD. Second Detector Feed Condenser
C17	269	.01 MFD. Tone Control Condenser
C18	928	25 MFD. A.V.C. Network By-pass Condenser
C19	569	.2 MFD. 42 Bias By-pass Condenser
C20	516	.001 MFD. 75 Plate Filter Condenser
C21	269	.01 MFD. Audio Feed Condenser
C22	1132	.002 MFD. 42 Plate Filter Condenser 600 Volt
C23	496	4 MFD. B Filter Condenser
C24	496	4 MFD. B Filter Condenser
C25	269	.01 MFD. Line By-pass Condenser
C26	794	1 MFD. B Supply By-pass Condenser
C27	307	.0005 MFD. Sub. Antenna Condenser
C28	272	.1 MFD. 75 Plate Hum Filter Condenser

INDUCTANCES

Code	Part No.	
L1	1109	Antenna Coil Primary 178 Turns #36 S.S.E.
L2	1109	Antenna Coil Secondary 136 Turns #36 S.S.E.
L3	1109	Preselector Secondary 126 Turns #36 S.S.E.
L4	1111	Oscillator Secondary 72 and 50 Turns #36 D.D.C.
L5	1111	Oscillator Primary 35 Turns and 15 Turns #36 S.S.E.
L6	1101	8,000 Microhenries First I.F. Primary
L7	1101	8,000 Microhenries First I.F. Secondary
L8	1101	8,000 Microhenries Second I.F. Primary
L9	1101	8,000 Microhenries Second I.F. Secondary
L10		Single 42 Output Transformer
L11		3,000 Ohm Speaker Field
L12		Hum Bucking Coil
L13		Speaker Voice Coil
L14	1068	Power Transformer 115 Volts A. C. 60 Cycle

MODEL A11



RESISTORS

Code	Part No.	
R1	809	170 Ohm Filament Resistor In Power Cord
R2	853	10,000 Ohm Volume Control and Switch
R3	922	75,000 Ohm Resistor I.F. Cathode Feed
R4	921	40,000 Ohm Resistor Screen Feed
R5	919	5,000 Ohm Resistor First Detector & Oscillator Cathode
R6	1063	500 Ohm Resistor I.F. Cathode Feed
R7	941	20,000 Ohm Resistor Second Detector Cathode
R8		
R9	924	250,000 Ohm Resistor Second Detector Plate Load
R10	925	500,000 Ohm Resistor Output Grid Bias
R11	1063	500 Ohm Resistor 43 Bias

CONDENSERS

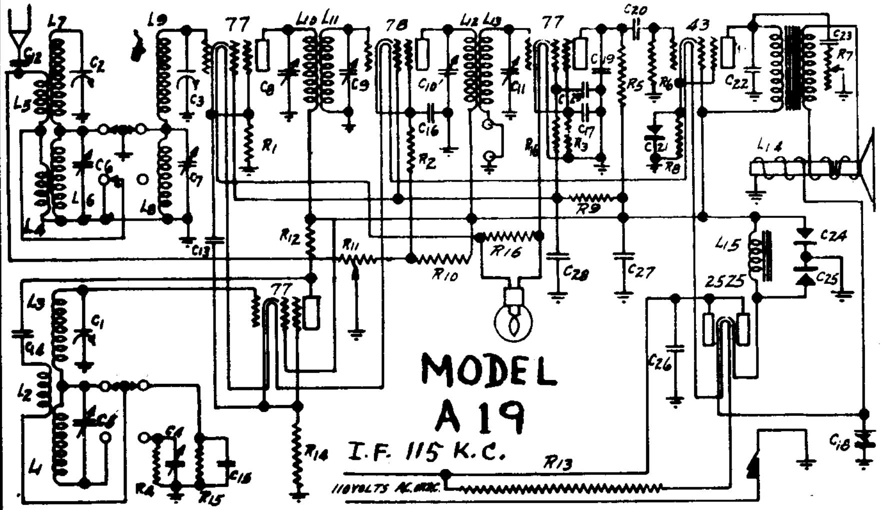
Code	Part No.	
C1	833	365 MMFD. Preselector Section of Variable Condenser
C2	833	365 MMFD. Preselector Section of Variable Condenser
C3	833	350 MMFD. Oscillator Section of Variable Condenser
C4	265	.001 MFD. First Detector & Oscillator Cathode Condenser
C5	264	.00005 MFD. Oscillator Coupling Condenser
C6	477	75-150 MMFD. First I.F. Trimmer Condenser
C7	272	.1 MFD. I.F. Cathode By-pass Condenser
C8	849	75-150 MMFD. Second I.F. Trimmer Condenser
C9	~~869~~ 183A	.2 MFD. Second Detector Cathode
C10	265	.001 MFD. Second Detector Plate R.F. Filter
C11	269	.01 MFD. Audio Feed Condenser
C12		
C13	928	25 MFD. C. Bias By-pass
C14	965	12 MFD. Voltage Filter Condenser
C15	965	4 MFD. Voltage Filter Condenser
C16	265	.001 MFD. Antenna Series Condenser
C17	267	.5 B Supply By-pass Condenser
C18	272	.1 200 Volt Screen By-pass Condenser
C19	965	4 MFD. Voltage Filter Condenser
C20	272	.1 MFD. 200 Volt Line By-pass Condenser

INDUCTANCES

Code	Part No.	
L1	847	Preselector Primary 178 Turns #36 S.S.E. U.W.
L2	847	Preselector First Secondary 128 Turns #36 S.S.E. U.W.
L3	847	Preselector Second Secondary 133 Turns #36 S.S.E. U.W.
L4	938	Oscillator Coil 98 Turns Tapped 15 Turns #36 S.S.E.
L5	938	First I.F. Primary 650 Turns #36 S.S.E. U.W.
L6	938	First I.F. Secondary 650 Turns #36 S.S.E. U.W.
L7	937	Second I.F. Primary 650 Turns #36 S.S.E. U.W.
L8	937	Second I.F. Secondary 650 Turns #36 S.S.E. U.W.
L9		Single #43 Output Transformer
L10	917	3,000 Ohm Speaker Field
L11	940	32 Henry Choke

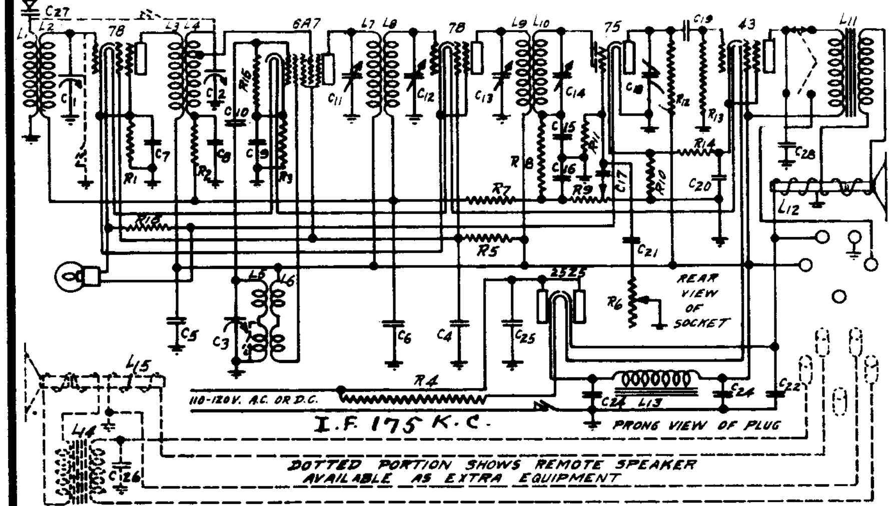
LAFAYETTE RADIO MFG. CO.

MODELS A14 & A19



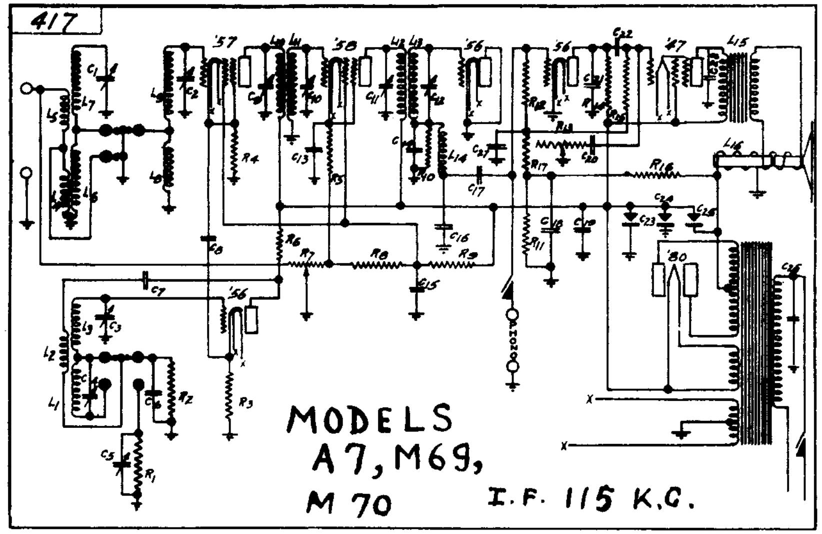
Code	Part No.	RESISTORS
R1	919	5,000 Ohm First Detector Cathode
R2	1062	250 Ohm I. F. Cathode
R3	1003	15,000 Ohm Second Detector Cathode
R4	1042	25,000 Ohm Long Wave Oscillator Grid
R5	924	250,000 Ohm Second Detector Plate
R6	925	500,000 Ohm 43 Grid
R7	534	250,000 Ohm Tone Control
R8	1063	500 Ohm 43 Cathode
R9	921	40,000 Ohm Screen Feed
R10	922	75,000 Ohm I. F. Cathode Feed
R11	512	10,000 Ohm Volume Control & Switch
R12	941	20,000 Ohm Oscillator Plate Feed
R13	1125	130 Ohm Resistance in Power Cord
R14	1064	600 Ohm Oscillator Cathode
R15	1042	25,000 Ohm Broadcast Oscillator Grid
R16	924	250,000 Ohm Second Detector Screen
R17	1119	36 Ohm Pilot Light Shunt Resistor
		CONDENSERS
C1	833	26 - 336 MMFD. Oscillator Section of 3 Gang
C2	833	26 - 371 MMFD. Preselector Section of 3 Gang
C3	833	26 - 371 MMFD. Preselector Section of 3 Gang
C4	784	4 Plate Long Wave Oscillator Trimmer
C5	972	2 Plate Long Wave Oscillator Trimmer
C6	971	2 Plate First Preselector Trimmer
C7	971	2 Plate Second Preselector Trimmer
C8	993	75 - 150 MMFD. First I.F. Primary Trimmer
C9	994	75 - 150 MMFD. First I.F. Secondary Trimmer
C10	995	75 - 150 MMFD. Second I.F. Primary Trimmer
C11	996	75 - 150 MMFD. Second I.F. Secondary Trimmer
C12	269	.01 Antenna Coupling Condenser
C13	269	.01 Oscillator Feed Condenser
C14	269	.01 Mfd. Oscillator Plate Condenser
C15	503	.004 Mfd. Broadcast Oscillator Condenser
C16	272	.1 Mfd. I.F. Cathode By-pass Condenser
C17	569	.2 Mfd. Second Detector Cathode By-pass Condenser
C18	1085	4. Mfd. Dry Electrolytic Filter Condenser
C19	544	.001 Mfd. Second Detector Plate Filter Condenser
C20	269	.01 Mfd. Audio Feed Condenser
C21	928	25 Mfd. Electrolytic 43 Cathode 30 Volt Tubular
C22	503	.004 Mfd. 43 Plate Filter Condenser
C23	272	.1 Mfd. Tone Control Condenser
C24	1085	4 Mfd. Dry Electrolytic Condenser
C25	1085	12 Mfd. Dry Electrolytic Condenser
C26	272	.1 Mfd. Power Line By-pass Condenser
C27	266	1. Mfd. B Supply By-pass Condenser
C28	267	.5 Mfd. Screen By-pass Condenser
C29	269	.01 Mfd. Second Detector Screen By-pass Condenser
		INDUCTANCES
L1	782	Long Wave Oscillator Secondary 1975 Microhenries
L2	782	Long Wave & Broadcast Oscillator Primary 10 Turns #36 P.E.
L3	782	Long Wave Oscillator Secondary 97 Turns #32 P.E.
L4	781	Long Wave First Preselector Primary U.W. 800 Turns #36 S.S.E.
L5	976	Broadcast First Preselector Primary U.W. 178 Turns #36 S.S.E.
L6	781	Long Wave First Preselector Secondary U.W. 3380 Microhenries
L7	976	Broadcast First Preselector Secondary 139 Turns #32 S.S.E.
L8	781	Long Wave Second Preselector Secondary 3380 Microhenries
L9	976	Broadcast Second Preselector Secondary 132 Turns #36 S.S.E.
L10	999	25,000 Microhenries First I.F. Primary U.W.
L11	999	25,000 Microhenries First I.F. Secondary U.W.
L12	1156	14,000 Microhenries Second I.F. Primary U.W.
L13	1156	14,000 Microhenries Second I.F. Secondary U.W.
L14	917	3,000 Ohm Speaker Field
L15	940	20 Henry Choke

MODEL A14



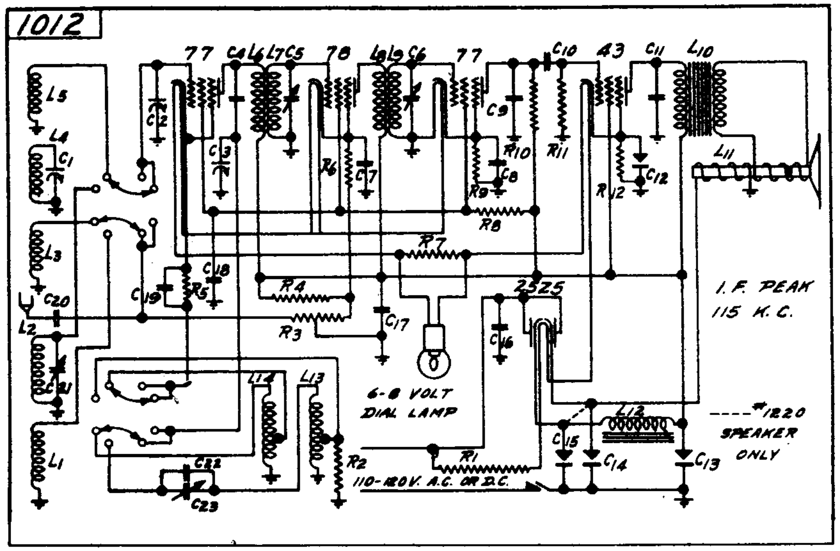
Code	No.	
R1	1062	250 Ohm R.F. & I.F. Cathode & Screen Resistor
R2	923	100,000 Ohm A.V.C. Network Resistor
R3	1062	250 Ohm 6A7 Cathode Resistor
R4	1125	130 Ohm Resistor In Power Cord
R5	941	20,000 Ohm 78 & 6A7 Screen Feed Resistor
R6	534	250,000 Ohm Tone Control
R7	926	1 Megohm A.V.C. Network Resistor
R8	898	50,000 Ohm A.V.C. Network Filter Resistor
R9	535	500,000 Ohm Volume Control & Power Switch
R10	1122	40 Ohm Bias Network Resistor
R11	925	500,000 Ohm 75 Grid Leak Resistor
R12	945	100,000 Ohm 75 Plate Resistor
R13	925	500,000 Ohm 43 Grid Resistor
R14	1063	500 Ohm Bias Resistor
R15	921	40,000 Ohm Oscillator Grid Leak Resistor
R16	1119	36 Ohm Pilot Light Shunt Resistor
		CONDENSERS
C1	833	371 MMFD. Preselector Section of Tuning Condenser
C2	833	371 MMFD. Preselector Section of Tuning Condenser
C3	833	336 MMFD. Oscillator Section of Tuning Condenser
C4	272	.1 MFD. 78 & 6A7 Screen By-pass Condenser
C5	266	1. MFD. B By-pass Condenser
C6	272	.1 MFD. A.V.C. Network By-pass Condenser
C7	272	.1 MFD. R.F. & I.F. Cathode By-pass Condenser
C8	272	.1 MFD. First Detector R.F. By-pass Condenser
C9	272	.1 MFD. 6A7 Cathode By-pass Condenser
C10	266	.00025 MFD. Oscillator Coupling Condenser
C11	1104	70-200 MMFD. First I.F. Primary Trimmer Condenser
C12	1105	70-200 MMFD. First I.F. Secondary Trimmer Condenser
C13	1106	70-200 MMFD. Second I.F. Primary Trimmer Condenser
C14	1107	70-200 MMFD. Second I.F. Secondary Trimmer Condenser
C15	339	.0001 MFD. Diode Filter
C16	339	.0001 MFD. Diode Filter Condenser
C17	269	.01 MFD. First Detector Feed Condenser
C18	516	.001 MFD. 75 Plate Filter Condenser
C19	269	.01 MFD. Audio Feed Condenser
C20	928	25 MFD. 43 Cathode Electrolytic By-pass Condenser
C21	269	.01 MFD. Tone Control Condenser
C22	1085	4 MFD. Dry Electrolytic Condenser
C23	1085	4 MFD. Dry Electrolytic Condenser
C24	1085	11 MFD. Dry Electrolytic Condenser
C25	272	.1 MFD. Line By-pass Condenser
C26	1085	19 MFD. Dry Electrolytic Condenser
C27	269	.01 MFD. Antenna Series Condenser
C28	1186	.002 MFD. Output Plate Filter Condenser
		INDUCTANCES
L1	1138	Preselector Primary 450 Turns #36 S.S.E.
L2	1138	Preselector Secondary 144 Turns #36 D.D.C.
L3	1137	Detector Coil Primary 750 Turns #36 S.S.E.
L4	1137	Detector Coil Secondary 118 Turns & 77 Turns #36 D.D.C.
L5	1111	Oscillator Secondary 72 Turns & 50 Turns #36 D.D.C.
L6	1111	Oscillator Primary 35 Turns & 15 Turns #36 S.S.E.
L7	1101	8,000 Microhenries First I.F. Primary
L8	1101	8,000 Microhenries First I.F. Secondary
L9	1101	8,000 Microhenries Second I.F. Primary
L10	1101	8,000 Microhenries Second I.F. Secondary
L11		#43 Output Transformer
L12		3,000 Ohm Speaker Field
L13	940	20 Henry Choke
L14		#43 Output Transformer
L15		2,500 Ohm Speaker Field

LAFAYETTE RADIO MFG. CO.
MODELS A7-M69-M70-AM25



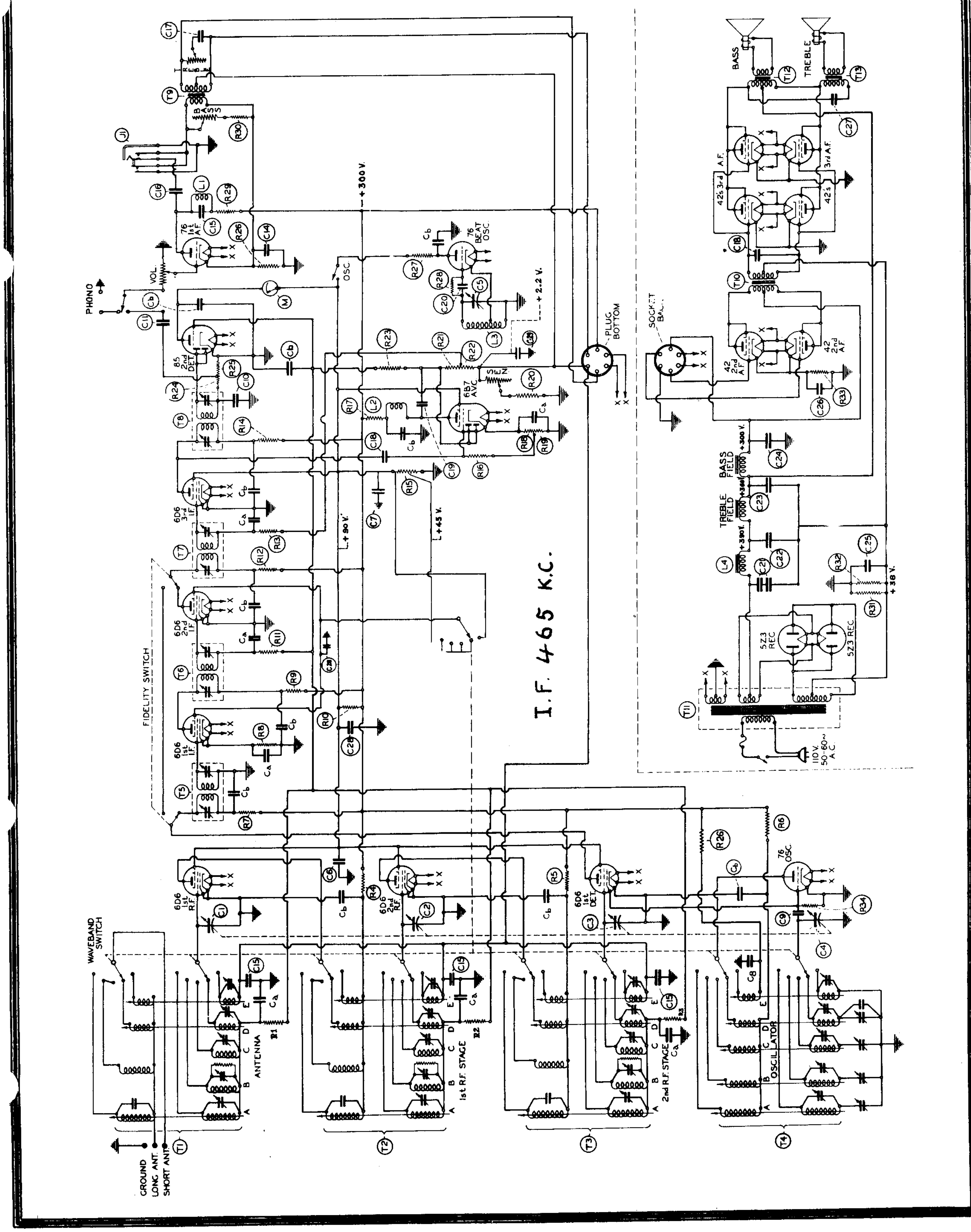
CODE	PART NO.	RESISTORS
R1	94	25,000 Ohm Type J Resistor Long Wave Oscillator Grid
R2	94	25,000 Ohm Type J Resistor Broadcast
R3	279	500 Ohm Type J Resistor Oscillator Cathode
R4	193	1,000 Ohm Type J Resistor First Detector Cathode
R5	323	250 Ohm Type J Resistor First I.F. Cathode
R6	278	20,000 Ohm Type J Resistor Oscillator Plate Feed
R7	512	10,000 Ohm Potentiometer Volume Control and Switch
R8	192	40,000 Ohm Type J Resistor Volume Control Voltage Feed
R9	278	20,000 Ohm Type J Resistor R.F. and I.F. Screen Feed
R10	201	500,000 Ohm Type J Resistor Second Detector Grid
R11	200	100,000 Ohm Type J Resistor C Bias Network
R12	201	500,000 Ohm Type J Resistor First Audio Grid Bias
R13	534	250,000 Ohm Variable Resistance, Tone Control
R14	200	100,000 Ohm Type J Resistor First Audio Plate Feed
R15	201	500,000 Ohm Type J Resistor 247 Grid Bias
R16	198	1 Megohm Type J Resistor C Bias Network
R17	201	500,000 Ohm Type J Grid Bias Hum Filter
		CONDENSERS
C1)		(365 MMFD Preselector Section of Three Gang Condenser
C2)	547	(365 MMFD Preselector Section of Three Gang Condenser
C3)		(350 MMFD Oscillator Section of Three Gang Condenser
C4		One Plate Long Wave Reciprocal Oscillator Trimmer
C5		Four Plate Long Wave Grid Oscillator Trimmer
C6	503	.004 Broadcast Oscillator Condenser
C7	503	.004 MFD Oscillator Feed Condenser
C8	269	.01 MFD Oscillator Cathode Feed Condenser
C9		75 - 150 MMFD First I.F. Primary Trimmer
C10		75 - 150 MMFD First I.F. Secondary
C11		75 - 150 MMFD Second I.F. Primary Trimmer
C12		75 - 150 MMFD Second I.F. Secondary Trimmer
C13	272	.1 MFD I.F. Cathode By-pass Condenser
C14	339	.0001 MFD Second Detector Grid By-pass
C15	272	.1 MFD R.F. and I.F. Screen By-pass Condenser
C16	307	.0005 MFD Second Detector R.F. Filter Condenser
C17	269	.01 MFD First Audio Feed Condenser
C18	180	1. MFD C Bias By-pass Condenser
C19	266	1. MFD B. By-pass Condenser
C20	269	.01 MFD Tone Control Condenser
C21	662	.002 MFD First Audio Plate Filter Condenser
C22	269	.01 MFD Second Audio Coupling Condenser
C23	721	8 MFD Electrolytic Filter Condenser
C24)	533	(4 MFD Electrolytic Filter Condenser
C25)		(4 MFD Electrolytic Filter Condenser
C26	269	.01 MFD Power Line By-pass Condenser
C27	272	.1 MFD Grid Bias Hum Filter Condenser
C28	343	.004 MFD Output Plate Filter Condenser
		INDUCTANCES
L1		Long Wave Oscillator Secondary 1975 Microhenrys
L2		Long Wave and Broadcast Oscillator Primary 10 Turns #36 P.E.
L3		Long Wave Oscillator Secondary 95 Turns #32 P.E.
L4		Long Wave First Preselector Primary U.W. 800 Turns #36 S.S.E.
L5		Broadcast First Preselector Primary U.W. 110 Turns #36 S.S.E.
L6		Long Wave First Preselector Secondary U.W. 3380 Microhenries
L7		Broadcast First Preselector Secondary 126 Turns #32 P.E.
L8		Long Wave Second Preselector Secondary 3380 Microhenries
L9		Broadcast Second Preselector Secondary 118 Turns #32 P.E.
L10)	A	(25,000 Microhenries First I.F. Primary U.W. 115 K.C.
L11)	999	(25,000 Microhenries First I.F. Secondary U.W. 115 K.C.
L12)	A	(25,000 Microhenries Second I.F. Primary U.W. 115 K.C.
L13)	999	(25,000 Microhenries Second I.F. Secondary U.W. 115 K.C.
L14	100	5.5 Millihenries R.F. Choke
L15		Output Transformer
L16		2,500 Ohm Speaker Field

MODEL AM-25



CODE	PART NO.	RESISTORS
R1	1125	130 Ohm Resistor in Power Cord A.P.
R2	1063	500 Ohm Long Wave Oscillator Resistor
R3	1296	10,000 Ohm Volume Control & Switch
R4	922	75,000 Ohm I.F. Cathode Resistor
R5	919	5,000 Ohm Oscillator Feed Resistor
R6	1063	500 Ohm I.F. Cathode Bias Resistor
R7	1308	20 Ohm Pilot Light Shunt Resistor
R8	921	40,000 Ohm R.F. & I.F. Screen Feed Resistor
R9	941	20,000 Ohm Second Detector Cathode Bias Resistor
R10	924	250,000 Ohm Second Detector Plate Load Resistor
R11	925	500,000 Ohm 43 Grid Bias Resistor
R12	1063	500 Ohm 43 Cathode Bias Resistor
		CONDENSERS
C1	833	371 MMFD. First Preselector Section of 3 Gang
C2	833	371 MMFD. Second Preselector Section of 3 Gang
C3	833	336 MMFD. Oscillator Section of 3 Gang
C4	264	.00005 MFD. Oscillator Plate Feed Condenser
C5	1521	75-150 MMFD. First I.F. Trimmer
C6	1523	75-150 MMFD. Second I.F. Trimmer
C7	272A	.1 MFD. 200 Volt I.F. Cathode By-Pass
C8	183A	.2 MFD. 200 Volt Second Detector Cathode By-Pass
C9	662	.002 MFD. Mica Second Detector Plate Filter
C10	269A	.01 MFD. 400 Audio Feed Condenser
C11	269A	.01 MFD. 400 Volt Output Plate Filter
C12	928	25 MFD. 25 Volt 43 Cathode By-Pass
C13	1295	4 MFD. 150 W.V. Dry Electrolytic
C14	1295	4 MFD. 150 W.V. Dry Electrolytic
C15	1295	10 MFD. 150 W.V. Dry Electrolytic
C16	272A	.1 MFD. 200 Volt Line By-Pass Condenser
C17	267A	.5 MFD. 200 Volt B. Supply By-Pass Condenser
C18	272A	.1 MFD. 200 Volt R.F. & I.F. Screen By-Pass
C19	265	.001 MFD. Mica Oscillator Coupling Condenser
C20	265	.001 MFD. Mica Antenna Series Condenser
C21	972	2 Plate L.W. Preselector Trimmer
C22	339	2-.0001 MFD. Mica L.W. Oscillator Series Condenser
C23	1522	75-100 MMFD. L.W. Oscillator Series Trimmer
		INDUCTANCES
L1	1475	L.W. Preselector Primary 800 Turns #36 S.S.E.
L2	1475	Long-Wave Preselector Secondary 490 Turns #36 S.S.E.
L3	847	Broadcast Preselector Primary 178 Turns #36 S.S.E.
L4	847	Broadcast First Secondary 133 Turns #36 S.S.E.
L5	847	Broadcast Second Secondary 128 Turns #36 S.S.E.
L6	1470	Microhenry First I.F. Primary
L7	1470	25,000 Microhenry First I.F. Secondary
L8	1473	25,000 Microhenry Second I.F. Primary
L9	1473	25,000 Microhenry Second I.F. Secondary
L10		#43 Output Transformer 917 Rola 1220 Quam
L11		3000 Ohm Speaker Field 917 Rola 1220 Quam
L12	940	20 Henry Choke
L13	1476	L.W. Oscillator 390 Turns #36 S.S.E. Tapped 20 Turns
L14	1470	Broadcast Oscillator 106 Turns #36 S.S.E. Tapped 30 Turns

McMURDO SILVER INC.
MODEL MASTERPIECE IV



McMURDO SILVER INC.

MODEL MASTERPIECE IV

I.F. AMPLIFIER

The eight i.f. amplifier trimmers are seen identified for first, second, third and fourth i.f. transformers at the right of the photograph. The third and fourth i.f. transformers are aligned for a band pass effect with the FIDELITY switch set BROAD and may not be realigned without a cathode ray oscilloscope for visual examination of the response curve. In brief, THEY SHOULD NEVER BE TOUCHED. The first and second i.f. transformers may be realigned with the fidelity switch set sharp by simply adjusting for maximum deflection of output meter when using a 465 kc. oscillator of definitely known frequency connected between first detector grid and ground with sensitivity control set at 10.

The beat oscillator may be aligned by ear with OSCILLATOR switch ON to give the desired beat note upon a received carrier. For telephone reception it should be adjusted for zero beat with properly tuned carrier, while for single signal code reception it should be offset or adjusted for 1,000 to 1,500 cycle beat note after a modulated carrier has been accurately tuned in. This will result in a very considerable reduction in the "other side" or second audio beat note, which is desirable for telegraph reception.

R.F. ALIGNMENT.

At the left of the photo all trimmers are labeled for bands A, B, C, D and E, and for first and second r.f. stages, first detector and oscillator. All high frequency trimmers should be aligned upon test signals at frequencies specified below with the main tuning dial set to these frequencies:

A. 350 kc.
B. 1400 kc.
C. 4000 kc.
D. 11,000 kc.

After the above high frequency alignment the low frequency oscillator trimmers must be set. This is done on the following listed test frequencies:

A. 175 kc.
B. 600 kc.
C. 2000 kc.
D. 5000 kc.

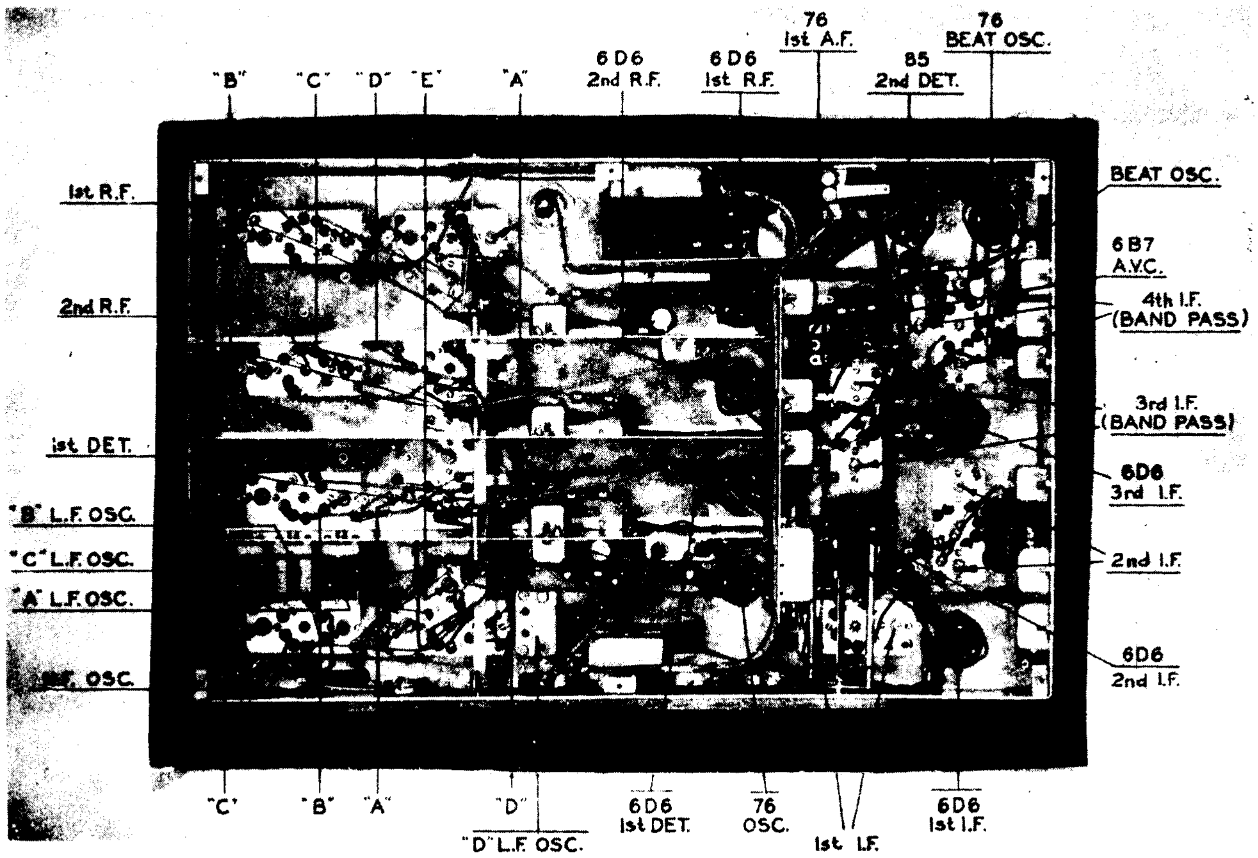
In this low frequency oscillator alignment ONLY the oscillator low frequency trimmers are adjusted. The method involves, for an example applicable to all four bands, tuning in on band B a 600 kc. signal with the tuning dial set at 600 kc. and then adjusting the B low frequency oscillator trimmer at the same time the tuning dial is rocked very slightly around its 600 kc. setting in order to obtain the maximum output meter deflection. In this low frequency alignment dial calibration is of secondary importance and the alignment is intended to permit of accurate tracking between the UNTOUCHED r.f. and the varied oscillator circuit by means of the low frequency oscillator trimmer adjustment in conjunction with dial rocking to bring all four circuits into track. After the above low frequency oscillator alignment, high frequency alignment should be rechecked for the above bands.

Band E has no low frequency oscillator trimmer. It is preferably aligned by means of its four high frequency trimmers at 15,000 kc.

All above alignment instructions will require the use of an insulated screw driver or one having a very short metal shank, particularly in D and E band alignment where the insulated screw driver is practically essential.

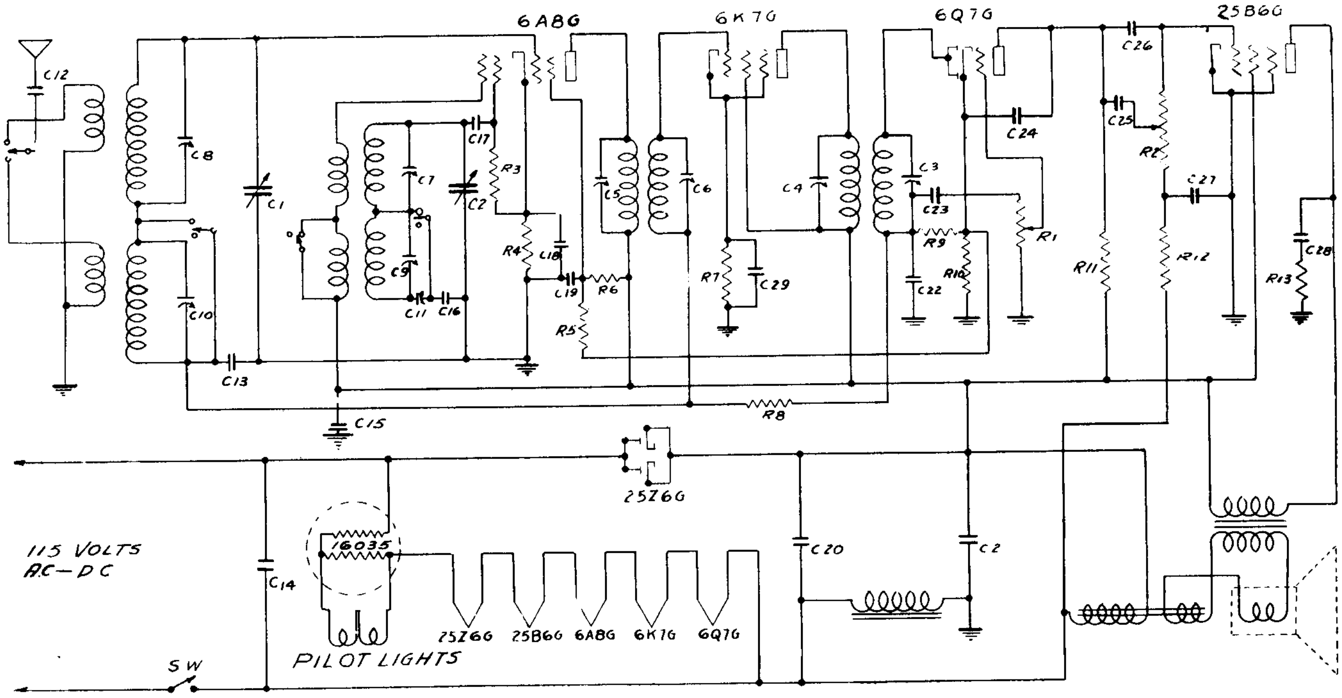
A. 100 mmf. variable and 100 mmf. shunt mica.
B. 100 mmf. variable and 400 mmf. shunt mica.
C. 100 mmf. and 1500 mmf. shunt mica.
D. 1000 mmf. variable compression and 2500 mmf. shunt mica.
C5. 100 mmf. air trimmer.
C6. 1/2 mfd. 400 volt.
C7. 8 mfd. 475 volt wet electrolytic.
C8. .004 mica.
C9. 50 mmf. mica
C10. 100 mmf. mica.
C11. .01 mfd. 600 volt.
C14. 4 mfd. 75 volt dry electrolytic.
C15. .004 mfd. mica.
C16. .05 mfd. 600 volt
C17. .025 mfd. 600 volt.
C18. 250 mmf. mica
C19. 250 mmf. mica
C20. 250 mmf. mica.
C21. Two 1/2 mfd. 400 volt in series.
C22. Sixteen mfd. 475 volt wet electrolytic.
C23. 12 mfd. 400 volt self-regulating wet electrolytic.
C24. 18 mfd. 300 volt self-regulating wet electrolytic.
C25. 4 mfd. 75 volt dry electrolytic.
C26. 4 mfd. 75 volt dry electrolytic.
C27. Part of treble speaker.
C28. 1/2 mfd., 400 volt.
C29. 4 mfd. 75 volt dry electrolytic.
R1, R2, R3, R11 and R13. 100,000 ohm 1/2 watt.
R4, R5, R7, R9, R12, R14, R17. 5,000 ohm 1/2 watt.
R6. 15,000 ohm 1 watt.
R8. 500 ohm 1/2 watt.
R10. 7500 ohm 10 watt.
R15. Two 2750 ohm 10 watt in series.
R16. 1/2 megohm, 1/2 watt.
R18. 2750 ohms, 1/2 watt.
R19. 150,000 ohms, 1/2 watt.
R20. 35 ohms 10 watt.
SEN. 400 ohm wire wound reostat.
R21. 250,000 ohms, 1/2 watt.
R22. 250,000 ohms, 1/2 watt.
R23. 1/2 megohm, 1/2 watt.
R24. 50,000 ohm 1/2 watt.
R25. 250,000 ohm 1/2 watt.
R26. 2750 ohm 1/2 watt.
R27. 50,000 ohm, 1/2 watt.
R28. 15,000 ohm 1/2 watt.
R29. 15,000 ohm 1/2 watt.
VOL. 500,000 ohm audio volume control.
BASS. 1 megohm audio volume control
TREBLE. 1 megohm audio volume control.
R30. 15,000 ohm 1/2 watt.
R31-R32. 320 ohm 10 watt each.
R33. 500 ohm 10 watt.
R34. 30,000 ohm one watt.
T5, T6, T7, T8. i.f. transformers consisting of two 100 mmf. air trimmers, Steatite dowel and two 1.5 m.h. i.f. coils (secondaries tapped?).

Voltage check data is found in sufficient amount to indicate voltages to be anticipated at different points in the circuit directly upon the diagram herewith. All voltage measurements must be made with a high resistance voltmeter and should be within plus or minus 10% of specified values.



MAJESTIC RADIO & TELEVISION COMPANY

MODEL 60



ADJUSTMENTS FOR SERVICE MEN ONLY

ALIGNMENT PROCEDURE—Correct alignment is of extreme importance. Your receiver is properly aligned at the factory and realignment should not be attempted by the service technician until all other causes of faulty operation are corrected.

In order to properly realign the receiver, the following equipment is necessary.

1. A signal generator which will provide an accurately calibrated signal at any frequency from 400 to 7500 kilocycles. The generator should have a modulated and adjustable signal output.

2. An output audio voltmeter to be connected across the moving coil of the speaker. This meter should be of providing a readable deflection for output levels of ⅛ volt, to avoid the effects of overload.

3. One screw driver; one .25 Mfd. 600 volts condenser; one 200 Mmfd. mica condenser and one 400 ohm resistor.

I. F. SYSTEM

Apply 456 k.c. signal to the grid of 6A8G tube through a tubular condenser on the order of .1 Mfd. Make certain that the wave change switch is in the broadcast position fully counter-clockwise. Turn variable condenser until it is engaged completely.

Referring to figure two which is the trimming diagram: adjust the I. F. capacities in the following order for maximum signal; C6, C5, C3, and C4. Of course to begin with, a very strong signal may be necessary on the input to "find" the preliminary adjustments. As alignment is approached, it is advisable to reduce the generator signal to minimum satisfactory value to prevent the possibility of misalignment due to A.V.C. action When the I. F. system has been adjusted, it will be found advisable to once again readjust C4. In order to derive a symetrical tuning curve, it will be found highly advisable to make all adjustments approach the resonance condition by starting at too high a capacity on the trimmer and working to a smaller value to give maximum output. In other words, having all trimmers down tight, unscrew them and bring the adjustment to a point of resonance. This should be done twice with C4. The general idea being to adjust C4 until the capacity has passed through resonance and has become to small. This is merely to indicate the maximum reading position. Return the capacity to an excess value again and gradually reduce it until it reaches its maximum tuning point.

SHORT WAVE BAND

In all cases the ground side of the generator should be connected to the ground on the chassis of the receiver through a .1 Mfd. or larger tubular paper condenser Apply a 7.2 m.c. signal through a 400 ohm resistance dummy antenna to the terminal strip where the antenna hank connects. Turn the wave change switch in the clockwise direction. Turn the variable condenser until it is completely disengaged. Unscrew trimmer C7 to a minimum capacity. Slowly turn the screw so that trimmer capacity increases until the signal is heard. Adjust C8 until the response is maximum. It may be necessary here to "rock" the variable condenser slightly with the adjustment of C8. The short wave antenna circuit range is now set. Adjust variable condenser until the dial indicator points to 6 m.c. Turn trimmer C7 until signal comes in and reaches maximum. This means that the two circuits are absolutely aligned at this point. Inasmuch as a fixed padder is utilized and comes accurately matched, the two circuits should remain correctly aligned over entire band. It is considered advisable to check this at 4.25 m.c. and 2.4 m.c. These are the three tracking frequencies.

BROADCAST BAND

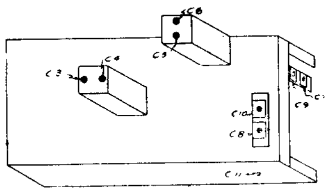


Fig. 2 Location of Trimmers

Shift wave change switch to broadcast position. Replace the 400 ohms dummy antenna with a 200 Mmfd. mica condenser. Apply signal to same input. (Caution—Applying the signal from the generator to the set through the antenna hank may cause serious misalignment.) Apply a 600 k.c. signal. Rotate variable condenser until dial scale pointer indicates 600 k.c. Adjust padder screw C11 until signal is approximately maximum. Disengage variable condenser. Apply 1750 k.c. signal. Turn trimmer C9 to max. sig. Adjust trimmer C10 for max sig. Turn variable condenser until dial indicator reads 1500 k.c. Adjust C9 until signal is maximum at this point. Shift variable condenser to 600 k.c. Apply this frequency on the generator. Note the direction in which this frequency has shifted on the dial scale. Accordingly this will determine whether C11 should be increased or decreased to effect a meeting of the oscillator circuit with th antenna circuit by the usual "rocking" process. Reurn again to 1500 k.c. on both generator and dial scale of the receiver; if necessary make a slight adjustment of C9 until signal is maximum at this point.

REPLACEMENTS PARTS LIST MODEL 60

Please Specify Receiver Serial No. When Ordering Parts.

Schematic Location	Part No.	Description
C1 C2	C-17004	Condenser Variable Gang
C11	A-16472	Condenser Variable Padder
C12 C25	15759	Condenser Tubular .006 Mfd. 600 volt
C13 C15	15761	Condenser Tubular .1 Mfd. 200 volt
C14	15757	Condenser Tubular .1 Mfd. 400 volt
C16	15942	Condenser Mica Padder 1710 Mmfd. 5%
C17	15929	Condenser Mica 50 Mmfd. 20%
C18 C19 C29	15752	Condenser Tubular .05 Mfd 200 volt
C20	B-17041-3	Condenser Electrolytic 40 Mfd. 150 volt 1½" can
C21	B-17197	Condenser Electrolytic 40 Mfd. 150 volt 1⅝" can
C22	15928	Condenser Mica 250 Mmfd. (located inside 2nd I. F can)
C23 C26	15760	Condenser Tubular .02 Mfd. 400 volt
C24	15928	Condenser Mica 250 Mmfd.
C27	15775	Condenser Tubular .5 Mfd. 200 volt
C28	15764	Condenser Tubular .03 Mfd. 400 volt
R1	B-17010	Volume control 1,000,000 ohms
R2	B-17047	Tone control 300,000 with on-off line switch
R3	15511	Resistor Carbon 50,000 ohms ¼ watt +— 20%
R4	15571	Resistor Carbon 500 ohms ¼ watt +—10%
R5	15557	Resistor Carbon 20,000 ohms ¼ watt +—10%
R6	15575	Resistor Carbon 12,500 ohms ¼ watt +—10%
R7	15519	Resistor Carbon 700 ohms ¼ watt +—10%
R8	15517	Resistor Carbon 1,000,000 ohms ¼ watt +—20%
R9	15520	Resistor Carbon 500,000 ohms ¼ watt +—20%
R10	15537	Resistor Carbon 400 ohms ¼ watt +—10%
R11	15504	Resistor Carbon 150,000 ohms ¼ watt +—20%
R12	15512	Resistor Carbon 250,000 ohms ¼ watt +—20%
R13	15577	Resistor Carbon 7,500 ohms ¼ watt +—20%
	15089	Pilot Light Bulb Mazda No. 44
	A-16983	Pilot Light Socket bayonet base
	A-17095	Dial Drive Belt
	A-17020	Dial Drive Belt Spring
	A-17136	Dial Backing
	B-17098	Dial Glass
	17009	Complete Dial and Drive Assembly
	17142	Antenna Transformer Assembly
	17143	Oscillator Transformer Assembly
	17144	1st I. F. transformer Assembly
	B-17007-2	2nd I. F. transformer Assembly
	16994	Antenna Hank
	A-17013	Wave Change Switch
	C-17008-3	Filter Choke
	C-17001	Speaker
	B-16471	Line Cord
	16988	Fish Paper Insulation for Electrolytic Condenser
	A-16598	Knob (Vol. Control, Tuning, Tone Control and Band Switch)
	A-1954	Knob Washers (felt)
	17382	Escutcheon with indicator lens
	16036	Ballast Tube

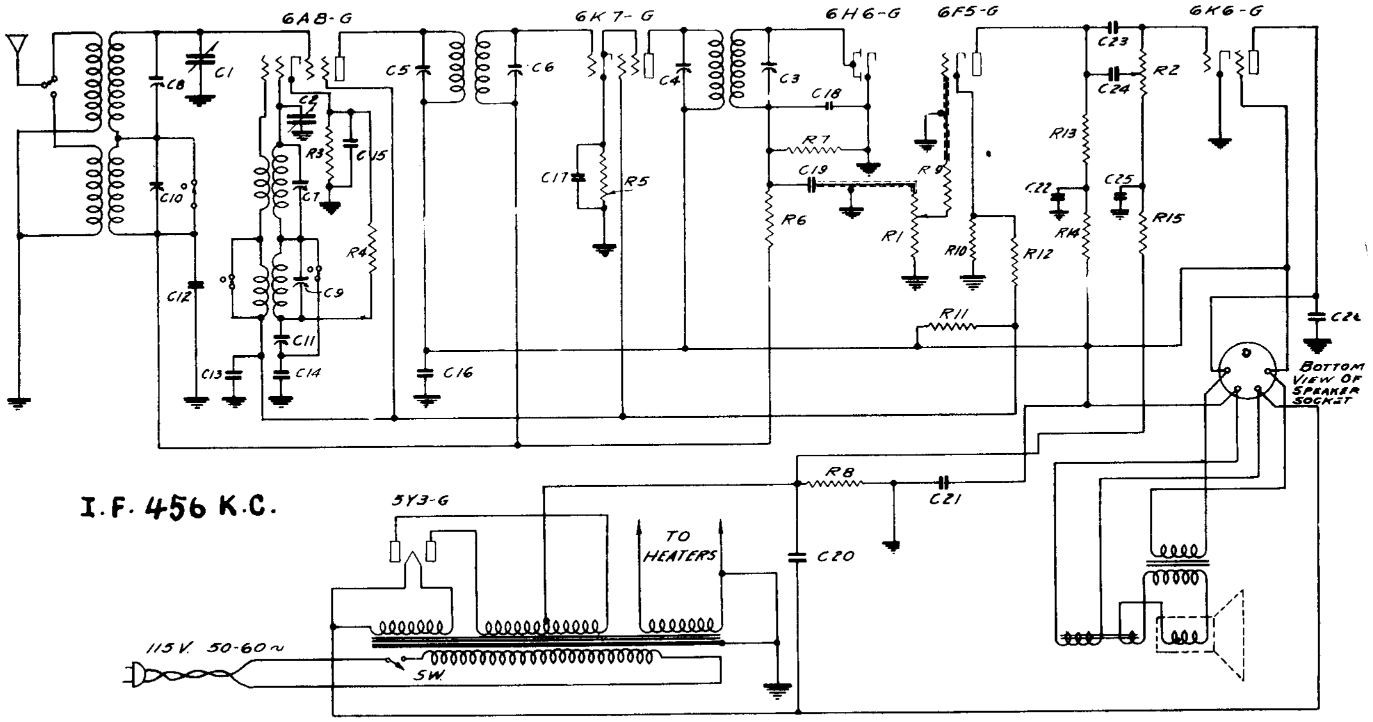
VOLTAGE CHART

TUBE	FUNCTION	Ef	Ep	E SCREEN	E BIAS
6A8G	Converter	6	106	53	2.3†
6K7G	I. F Amplifier	6	106	106	4.6†
6Q7G	Detector and 1st audio amplifier	6	53*		1.1
25B6G	Power Output Tube	25	99	106	
25Z6G	Rectifier	25			
Ballast	Voltage Equalizer	45			

Line voltage- 115 volts A.C.
B supply voltage, B+ to chassis (ground)—106 volts.
B supply voltage, B+ to B— (line)—121 volts
Voltage across filter choke (in negative lead) chassis ground to B— 16.5 volts Note this is the bias voltage for the 25B6G output tube.
* This reading taken with 1000 ohm voltmeter on 250 volt scale. True plate voltage is nearer 60 volts.
† Deduct the bias voltage of the 6Q7G from these values for the net bias.
Voltage across pilot lights approximately 4.8 volts each.
These voltages will be about 10% lower for 115 volts D.C. power supply.

MAJESTIC RADIO & TELEVISION COMPANY

MODEL 620



Schematic Location	Part No.	Description
	15089	Bulb Pilot Light (Edgelight)
C1 C2	C-17004	Condenser Variable Gang
C11	A-16472	Condenser Variable Padder
C8 C10	A-17589	Condenser Trimmer (antenna coil)
C7 C9	A-17590	Condenser Trimmer (oscillator coil)
C5 C6	B-17560	Condenser 1st I. F. Trimmer (part of I. F. assembly)
C3 C4	B-17561	Condenser 2nd I. F. Trimmer (part of I. F. assembly)
C15 C17 C25	15752	Condenser Tubular .05 Mfd. 200 V.
C13 C22	15756	Condenser Tubular .05 Mfd. 400 V.
C16	15757	Condenser Tubular .1 Mfd. 400 V.
C12	15761	Condenser Tubular .1 Mfd. 200 V.
C24	15759	Condenser Tubular .006 Mfd. 600 V.
C19 C23	15760	Condenser Tubular .02 Mfd. 400 V.
C26	15771	Condenser Tubular .004 Mfd. 600 V.
C14	15942	Condenser Mica 1710 Mmfd. 5% type W
C20	B-16466	Condenser Wet Electrolytic 16 Mfd. 350 volts
C21	B-16467-2	Condenser Wet Electrolytic 8 Mfd. 250 volts
R1	B-17010	Control Volume 1,000,000 ohms
R2	B-17047	Control Tone 300,000 ohms
R4 R14	15511	Resistor Carbon 50,000 +—20% ¼ watt
R9 R13	15516	Resistor Carbon 100,000 +—20% ¼ watt
R6	15517	Resistor Carbon 1 meg. +—20% ¼ watt
R7	15520	Resistor Carbon 500,000 +—20% ¼ watt
R15	15523	Resistor Carbon 200,000 +—20% ¼ watt
R5	15571	Resistor Carbon 500 +—10% ¼ watt
R8	15584	Resistor Carbon 250 +—10% 1 watt
R12	15586	Resistor Carbon 15,000 +—10% 1 watt
R11	15587	Resistor Carbon 5,000 +—10% 2 watt
R3	15588	Resistor Carbon 350 +—10% ¼ watt
R10	15589	Resistor Carbon 220 +—10% ¼ watt
	A-16829	Socket Speaker
	A-17562	Socket Pilot Light
	A-17095	Dial Drive Belt
	A-17606	Dial Backing
	B-17591	Dial Glass
	17597	Complete Dial and Drive Assembly
	17583	Antenna Coil Assembly
	17584	Oscillator Coil Assembly
	17567	1st I. F. Transformer Assembly
	B-17561	2nd I. F. Transformer Assembly
	A-17013	Wave Change Switch
	C-17580	Speaker 8"
	B-16471	Attachment Cord
	A-16598	Knob
	A-1954	Washer Felt
	17382	Escutcheon with Indicator Lens
	C-16575-6	Transformer Power 110 volts 50-60 cycle
	A-17196	Tension Spring (indicator)
	A-17477	Dial Drive Belt Spring
	A-17607	Tuning Pointer

VOLTAGE CHART

TUBE	FUNCTION	Ef	Ep	E SCREEN	E BIAS	E OSC. PLATE
6A8G	Converter	6.3	210	115	4.7	115
6K7G	I. F. Amplifier	6.3	210	115	3.8	
6H6G	Detector—AVC	6.3				
6F5G	Audio Amplifier	6.3	125*		1.5	
6K6G	Power Output	6.3	200	210	14.5	
5Y3G	Rectifier	5.0				

Line voltage—115 volts—60 cycle AC. All d. c. voltages measured to chassis.

* Measured with 250,000 ohm voltmeter. Volts across speaker field—100 d. c.

MIDWEST RADIO CORP.

MODEL SW 5-36 A.C.-D.C. SUPERHET

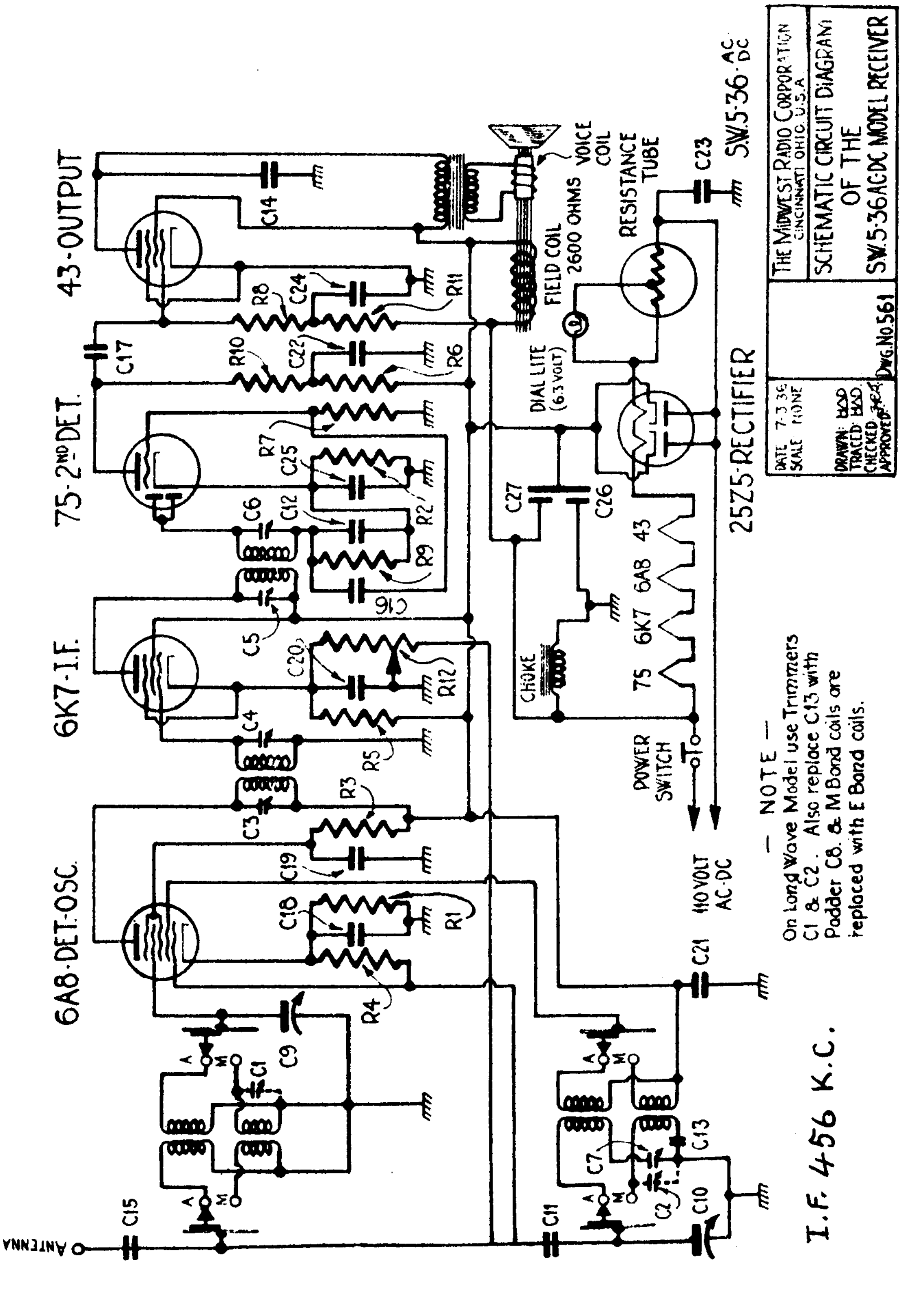
CONDENSERS

C1	L.W. TRIMMER	C7	PADDER	C13	.0028 MFD. MICA
C2	"	C8	"	C14	.006 MFD
C3	I.F. TRIMMER	C9	TUNING CONDENSER	C15	.02 MFD PAPER
C4	"	C10	"	C16	"
C5	"	C11	100 MMFD. MICA	C17	"
C6	"	C12	350 MMFD. "	C18	.05 MFD

C19	.05 MFD. PAPER
C20	"
C21	"
C22	.1 MFD. 200V.
C23	.1 MFD. 400V.
C24	.25 MFD. PAPER
C25	5 MFD. ELECTROLYTIC COND.
C26	12 MFD. ELECTROLYTIC COND.
C27	20 MFD. ELECTROLYTIC COND.

RESISTORS

R1	240 OHMS	R7	100,000 OHMS
R2	6,500 OHMS	R8	260,000 OHMS
R3	25,000 OHMS	R9	500,000 OHMS
R4	50,000 OHMS	R10	"
R5	"	R11	"
R6	67,000 OHMS	R12	VOLUME CONTROL



— NOTE —
On Long Wave Model use Trimmers C1 & C2. Also replace C13 with Padder C8. & M Band coils are replaced with E Band coils.

MIDWEST RADIO CORP.

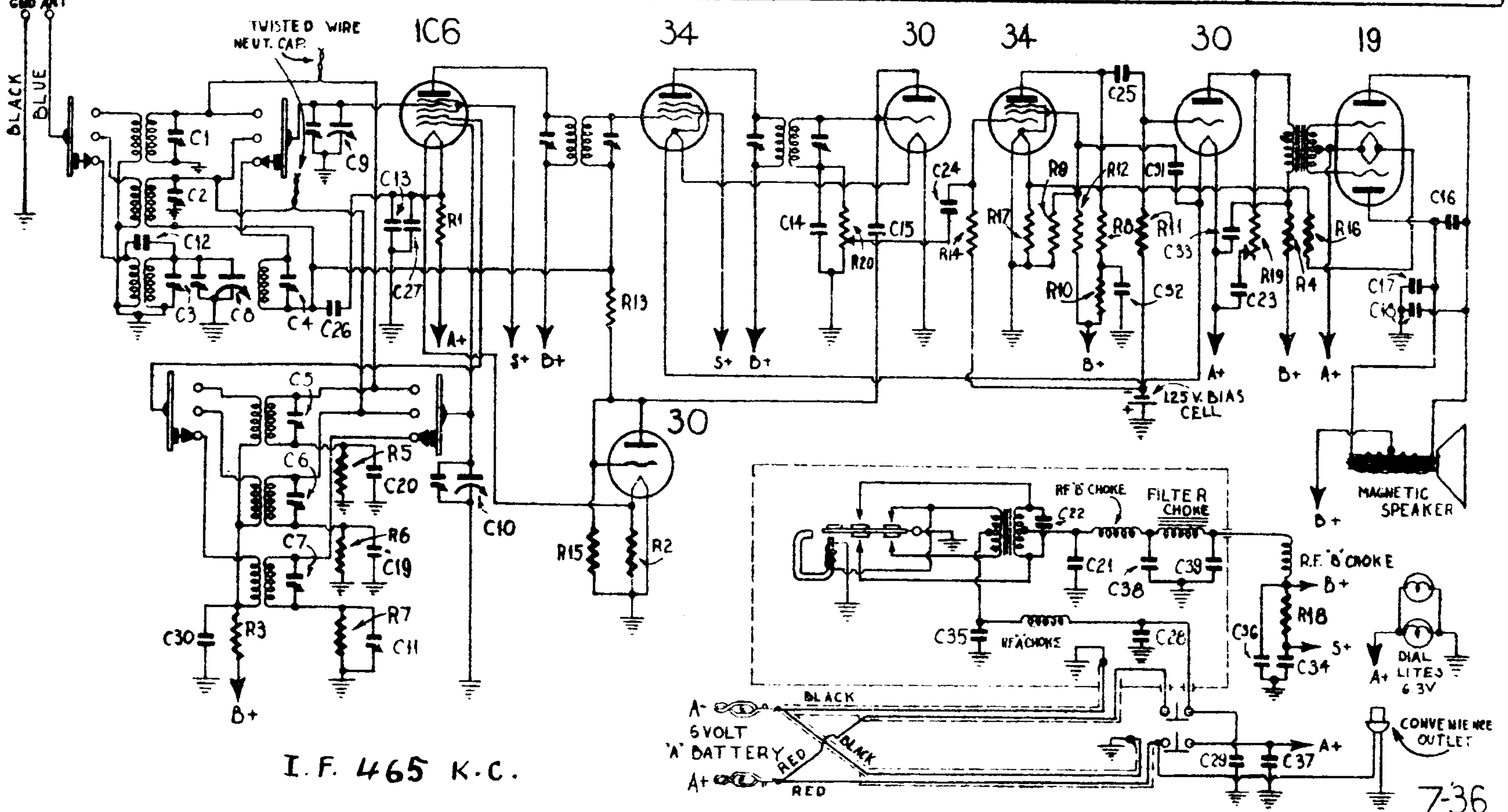
MODEL 7-36 BATTERY SET

CONDENSERS

C1 50MMFD TRIMMER	C11 600-MMFD-PADDER	C21 .004 MFD	C31 .1 MFD - 400V.
C2 " "	C12 6 MMFD	C22 .02 MFD 1200V.	C32 " "
C3 " "	C13 .00025 MFD.	C23 .03 MFD. 600V.	C33 " "
C4 " "	C14 .0005 MFD	C24 .05 MFD 200V.	C34 " "
C5 " "	C15 "	C25 .05 MFD 400V.	C35 .5 MFD - 200V.
C6 " "	C16 .002 MFD.-600V.	C26 .1 MFD 200V.	C36 .5 MFD - 400V.
C7 " "	C17 " "	C27 " "	C37 1. MFD - 400V.
C8 TUNING COND.	C18 "	C28 " "	C38-8MFD- DRY ELECT.
C9	C19 .0021 MFD "	C29 " "	C39 20MFD " "
C10	C20 .0027 MFD "	C30 .1 MFD 400V.	

RESISTORS

R1 16.7 OHM - 1/3 WATT	R11 500,000 OHM 1/3 WATT
R2 33.3 OHM "	R12 " "
R3 5,000-OHM "	R13 1.MEGOHM "
R4 " "	R14 " "
R5 15,000-OHM "	R15 " "
R6 25,000-OHM "	R16 7.7 OHM .5 WATT
R7 50,000 OHM "	R17 10-OHM "
R8 100,000 OHM "	R18 15,000 OHM "
R9 250,000 OHM "	R19 50M. OHM TONE CONT
R10 " "	R20-500M. OHM VOL. CONT

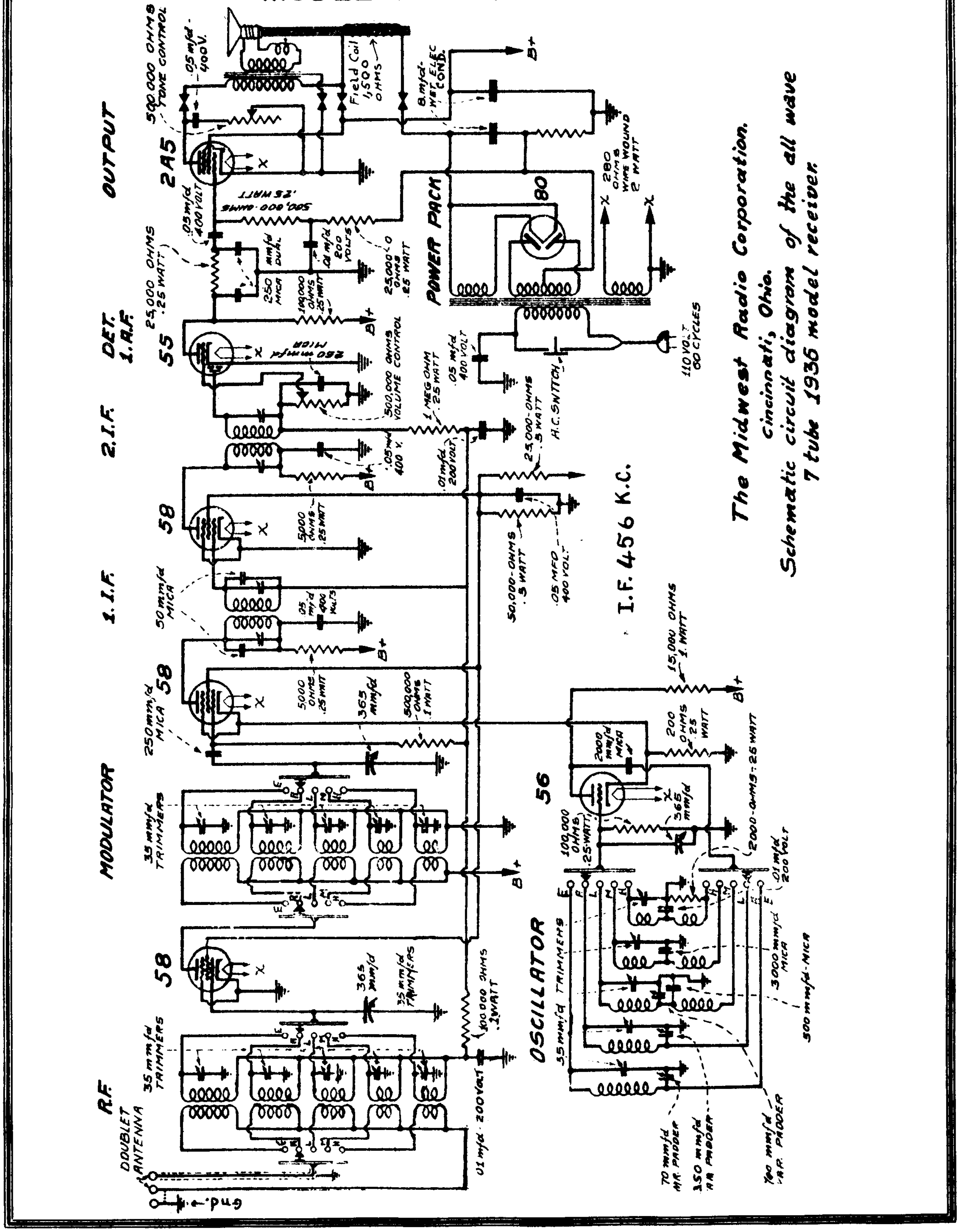


I.F. 465 K.C.

DATE 1936 SCALE NONE		THE MIDWEST RADIO CORPORATION CINCINNATI OHIO U.S.A.
DRAWN RHU TRACED RHU CHECKED MAD. APPROVED	Drg.No. 620	SCHEMATIC CIRCUIT DIAGRAM OF THE 7-36 BATTERY MODEL RECEIVER

MIDWEST RADIO CORP.

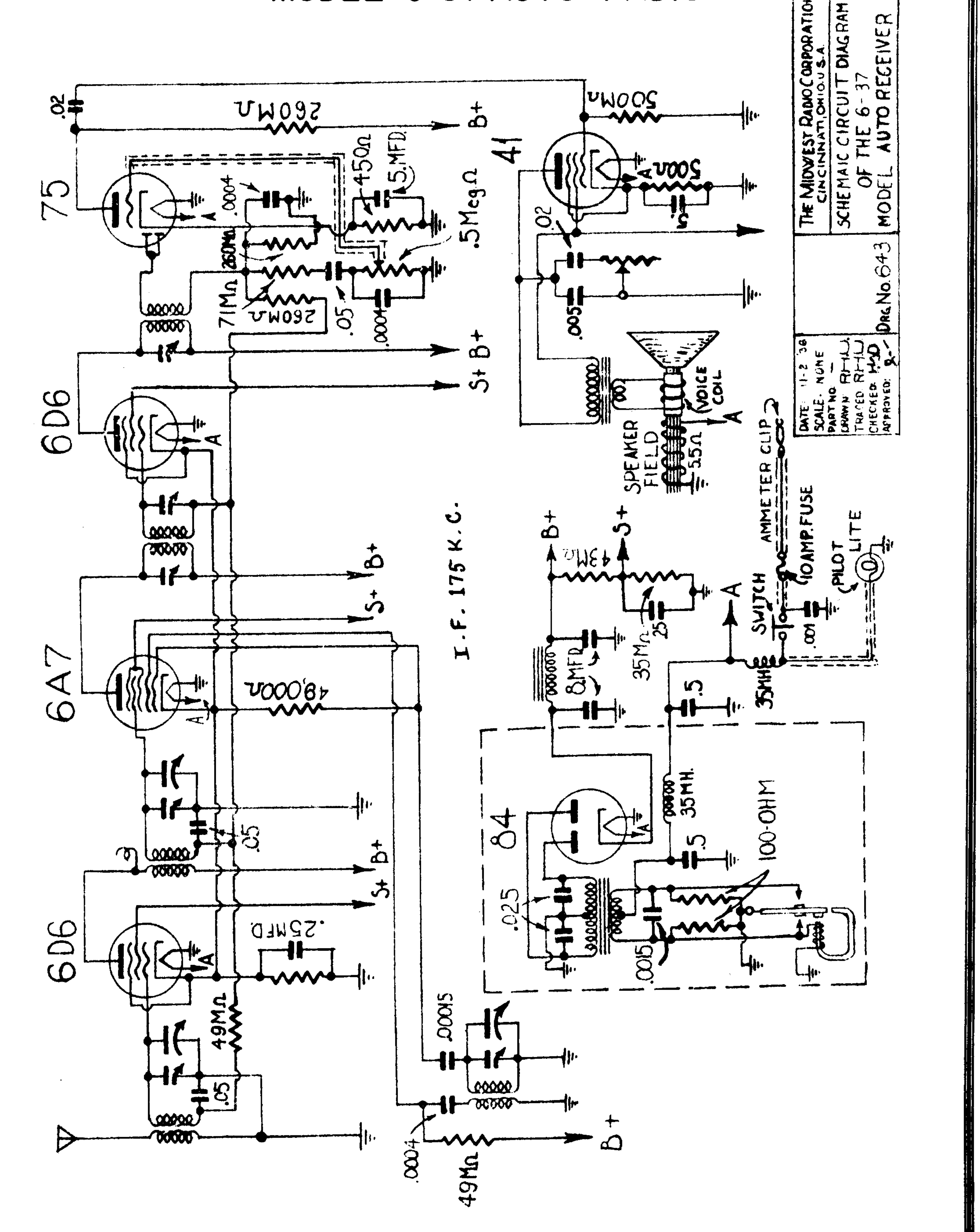
MODEL 7-36 A.C. SUPERHET



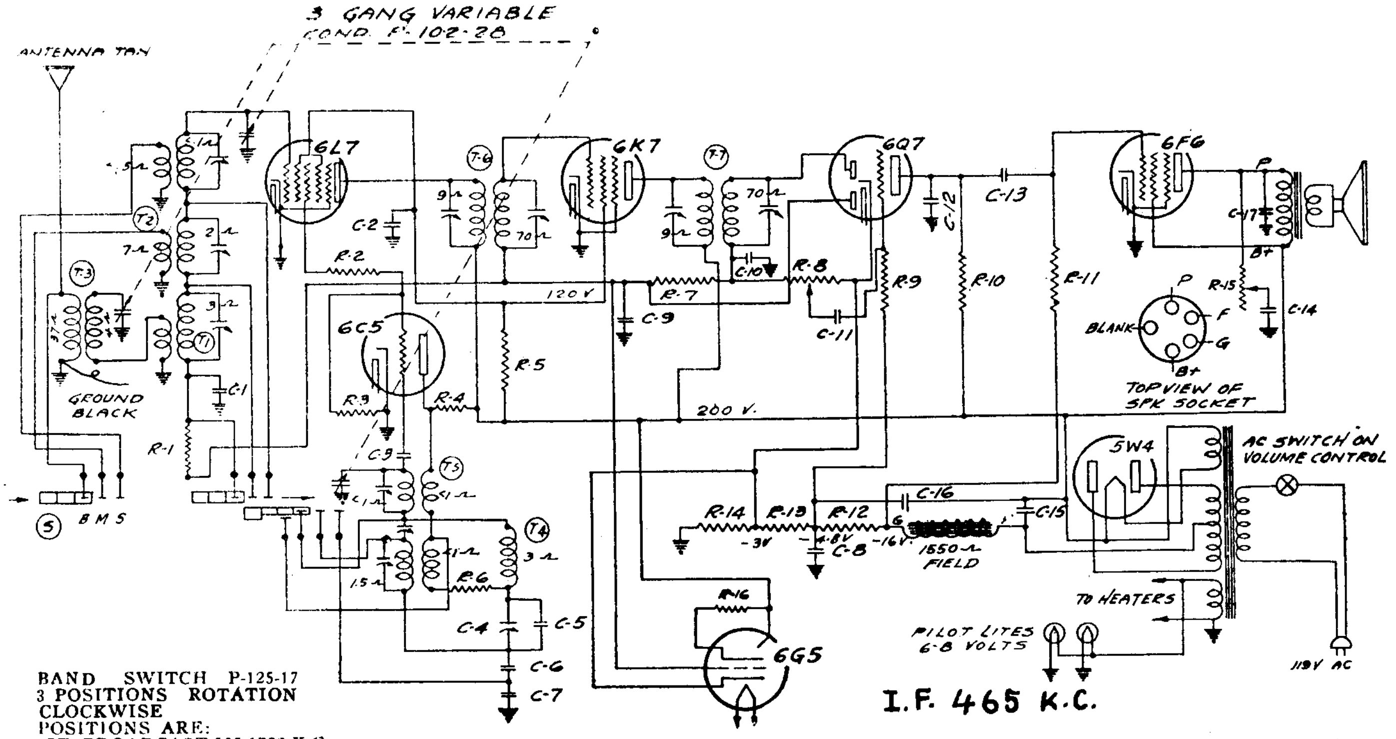
The Midwest Radio Corporation.
Cincinnati, Ohio.
Schematic circuit diagram of the all wave 7 tube 1936 model receiver.

MIDWEST RADIO CORP.

MODEL 6-37 AUTO RADIO



MONTGOMERY WARD & CO.
MODELS 62-249 & 62-317



BAND SWITCH P-125-17
3 POSITIONS ROTATION
CLOCKWISE
POSITIONS ARE:
1ST BROADCAST-535-1720 K.C.
2ND MIDDLE WAVE-1695-5500 K.C.
3RD SHORT WAVE-5.2M.C.-18.3M.C.

I.F. 465 K.C.

Power Transformer 50-60 Cycle P-104-52 25 Cycle P 104-53
Universal 25 Cycle P-104-54
Unive sal 40 Cycle P-104-55

LIST OF REPAIR PARTS (Serial No. 6E249976 and up)

Use Only Genuine Factory Replacement Parts

Part No.	Schematic Reference	Description	No. Used in Set	Selling Price Ea.
		CONDENSERS		
BE 100-1	C-2	.1 x 400 Volt Tubular	1	
BE 100-11	C-11: C-13	.01 x 400 Volt Tubular	2	$0.09
BE 100-20	C-8	.1 x 200 Volt Tubular	1	.11
BE 100-22	C-1: C-9	.05 x 200 Volt Tubular	2	.10
BE 100-25	C-17	.002 x 600 Volt Tubular	1	.09
BE 100-27	C-14	.025 x 600 Volt Tubular	1	.10
BE 103-6	C-15	8 Mfd. x 350 Volt Electrolytic	1	.50
BE 103-7	C-16	8 Mfd. x 300 Volt Electrolytic	1	.44
BE 129-2	C-12	.0005 Mica—Type MT—20%	1	.09
BE 129-12	C-10	.00025 Mica—Type MT—20%	1	.12
BE 129-39	C-3	.00005 Mica—Type MT—20%	1	.12
BE 129-54	C-7	.003 Mica—Type MW—2½%	1	.25
BE 129-55	C-6	.0034 Mica—Type MW—2½%	1	.25
BE 129-56	C-5	.00055 Mica—Type MT—10%	1	.10
		RESISTORS		
BE 106-26	R-12: R-13: R-14	(R-12, 220 Ohm) (R-13, 32 Ohm) (R-14, 52 Ohm) Metal Clad Resistor	1	.24
BE 130-4	R-9	3 Meg Ohm—½ Watt—20%—100 Volt Carbon	1	.08
BE 130-12	R-3	50M Ohm—½ Watt—20%— 20 Volt Carbon	1	.08
BE 130-19	R-7	1 Meg Ohm—½ Watt—20%—100 Volt Carbon	1	.08
BE 130-20	R-1	100M Ohm—½ Watt—20%— 50 Volt Carbon	1	.08
BE 130-27	R-6	50 Ohm—½ Watt—20%— 3 Volt Carbon	1	.10
BE 130-102	R-11	500M Ohm—½ Watt—10%— 50 Volt Carbon	1	.10
BE 130-103	R-10	100M Ohm—½ Watt—10%— 50 Volt Carbon	1	.10
BE 130-104	R-4: R-5	9M Ohm— 1 Watt—20%—100 Volt Carbon	2	.10
BE 130-105	R-2	150 Ohm—½ Watt—20%— 10 Volt Carbon	1	.10
BE 130-110	R-16	1 Meg Ohm—1/10 Watt—10%—100 Volt Carbon	1	.08
		COILS		
BE 108-73	T-7	Output I.F. Coil Assem. Comp. with Can.	1	.90
BE 108-74	T-6	Input I.F. Coil Assem. Comp. with Can.	1	.90
BE 110-38	T-4	Broadcast Oscillator Coil Assem. Comp. with Can.	1	.35
BE 110-39	T-5	Mid Wave and Short Wave Oscillator Assem. less Can.	1	.75
BE 111-49	T-1	Broadcast Antenna Coil Assem. Comp. with Can.	1	.40
BE 111-50	T-2	Mid Wave and Short Wave Antenna Coil Assem. less Can.	1	.80
BE 111-51	T-3	Broadcast Preselector Coil Assembly	1	.35
		SOCKETS		
BE 121-8		Five Prong Socket—Marked "SPKR"	1	.08
BE 121-12		Seven Prong Socket—Marked "6K7"	1	.10
BE 121-14		Seven Prong Socket—Marked "6F6"	1	.10
BE 121-15		Five Prong Socket—Marked "5W4"	1	.08
BE 121-17		Six Prong Socket—Marked "6C5"	1	.09
BE 121-18		Seven Prong Socket—Marked "6L7"	1	.10
BE 121-26		Seven Prong Socket—Marked "6Q7"	1	.10
		SPEAKER		
BE 114-15		Six Inch Dynamic	1	3.00
		TRANSFORMERS		
BE 104-52		Power Transformer, 50/60 Cycle	1	2.00
BE 104-53		Power Transformer, 25 Cycle	1	2.50
BE 104-54		Universal Power Transformer, 25 Cycle Primary	1	2.50
BE 104-55		Universal Power Transformer, 40 Cycle Primary	1	3.00
		MISCELLANEOUS		
BE 101-46	R-8	Volume Control and Switch (1 Meg Ohm)	1	$0.60
BE 101-58	R-15	Tone Control 50M Ohm	1	.30

Part No.	Schematic Reference	Description	No. Used in Set	Selling Price Ea.
BE 102-28		Three Gang Variable Condenser	1	2.[illegible]
BE 107-5		Line Cord and Plug	1	.30
BE 115-35		Antenna, Oscillator, Shield	2	.12
BE 124-28	C-4	J-S Series Pad 3 Pl. (30-225)	1	.16
BE 125-17	S	Band Switch	1	.35
BE 128-44		"Volume" Knob with Spring	1	.08
BE 128-46		"Band Switch" Knob with Spring	1	.08
BE 128-47		"Tuning" Knob with Spring	1	.08
BE 128-45		"Tone" Knob with Spring	1	.08

CATHODE RAY TUNING INDICATOR PARTS

Part No.	Description	No. Used in Set	Selling Price Ea.
BE 107-35	Cable and Socket Assembly	1	$0.40
BE 112-158	Metal Oval Escutcheon	1	.15
BE 117-57	Holder and Clamp	1	.15
BE 130-110	1 Meg Ohm—1/10 Watt—10%—100 Volt Carbon	1	.08

DIAL PARTS LIST

ASSEMBLIES

Part No.	Description	No. Used in Set	Selling Price Ea.
BE 117-41	Drive Bracket including: 1—No. 117-19—Tuning Shaft Bushing	1	$0.06
BE 117-66	Switch Disc and Link Assembly, including: 1—No. 117-12 —Switch Arm; 1—No. 117-35 —Bushing with Screws; 1—No. 117-40B—Switch Link; 3—No. 131-26 —Spring Washers; 3—No. 162-5 —Rivets; 1—No. 112-144—Switch Disc—Inc. Red Tape	1	.12

DIAL PARTS ONLY

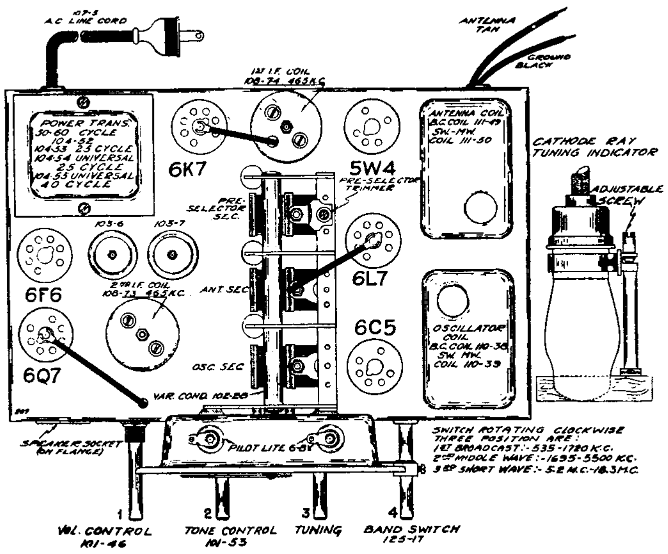
Part No.	Description	No. Used in Set	Selling Price Ea.
BE 112-125	Drive Belt	1	.10
BE 112-143	Oval Eschutcheon complete with Celluloid Crystal	1	.50
BE 112-143A	Dial Scale complete with Fastener, Pointer Disc, and Screw	1	.24
BE 112-147	Tuning Shaft	1	.06
BE 112-151	Pointer complete with Screw	1	.02
BE 112-156	Pilot Light Assembly	2	.06
BE 116-13	6.8 Volt T-51 Pilot Light	2	.08
BE 117-20A	Tuning Shaft Pulley	1	.03
BE 117-38	Stud, for take-up Spring	1	.03
BE 117-39	Pulley, for take-up Spring	1	.02
BE 120-14	Take-up Spring	1	.02
BE 134-9	Horse Shoe Washer	1	.01
BE 134-40	Rubber Grommet	2	.02

Note: Speakers cannot be ordered, defective speakers must be repaired.
All resistors and mica condensers are RMA color coded — specify value and/or resistor, or condenser (per schematic diagram) and model number.
Mica condensers are coded with an additional dot indicating tolerance:

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More than—20%	None

When ordering parts, always specify part and model number as well as serial number of chassis.
When ordering condensers, specify part number, tolerance and/or schematic reference number.

MONTGOMERY WARD & CO.
MODELS 62-249 & 62-317



Service Data for Professional Service Men

DESCRIPTION:

TUBES.

The tube complement of this chassis consists of the latest metal type tubes.

The type and function of each tube is as follows:

1—Type 6L7 Pentagrid Mixer, First Detector.
1—Type 6C5 Oscillator.
1—Type 6K7 Remote Cut-Off Pentode, I. F. Amplifier (465 K.C.)
1—Type 6Q7 Duplex Diode Triode Second Detector, A.V.C. and First Audio.
1—Type 6F6 Pentode Output Amplifier.
1—Type 5W4 High Vacuum Rectifier.
1—Type 6G5 Cathode-Ray Tuning Eye.
(Note:—6G5 available in all glass only.)

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 108, 125, 150, 220 and 250 volts (see parts list) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with 119 volts on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

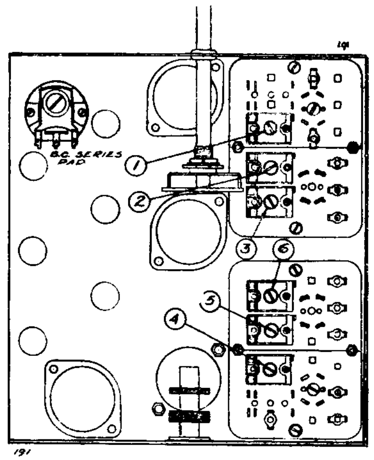


FIG. 3 — BOTTOM VIEW SHOWING TRIMMERS

ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary.

No aligning adjustments should be attempted with the chassis in the cabinet. Remove the knobs and the four bolts which are used to fasten the chassis.

All adjustments should be made with a non-metallic screw driver.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 6F6 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-73 Output I.F. Transformer
Part No. 108-74 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-73) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6L7 and adjust input I.F. transformer (No. 108-74) to resonance.
   (c) With oscillator still connected to 6L7, readjust output I.F. transformer (108-73) if necessary.

BROADCAST BAND ALIGNMENT:
535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance (Adjustment number 1; see bottom view of coil assembly, Fig. 3).
   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis; Fig. 1, for location of this adjustment).
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. Under no circumstances bend plates of variable condenser sections to correct tracking.

SHORT WAVE BAND ALIGNMENT:
5.2 to 18.3 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment number 3) and short wave antenna (Adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.3 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental on the receiver dial. As an example of this a fundamental 18.3 megacycle can be tuned in not only at 18.3 on the dial, but also at approximately 17.4 megacycles.

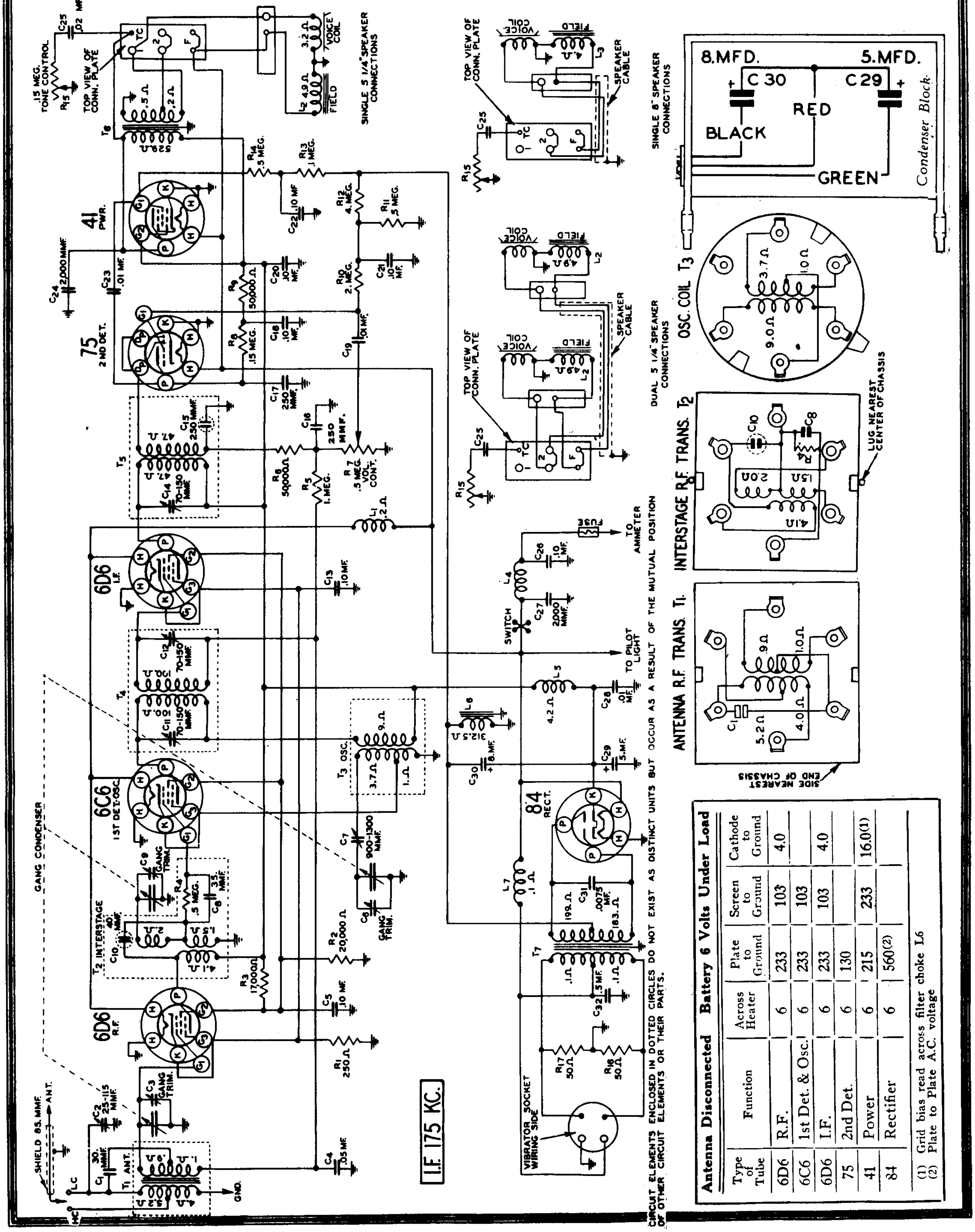
MIDDLE WAVE BAND ALIGNMENT:
1695 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (adjustment number 2) and middle wave antenna (adjustment number 5) to resonance.
   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 5400 kilocycles and 1700 kilocycles for band coverage.

BAND	DIAL SCALE	FREQUENCY RANGE
Broadcast	Outer Scale —Blue	535 to 1720 K.C. (Kilocycles)
Middle Wave	Center Scale—Green	1695 to 5500 K.C. (Kilocycles)
Short Wave	Inner Scale —Buff	5.2 to 18.3 M.C. (Megacycles)

MONTGOMERY WARD & CO.

MODEL 62-236

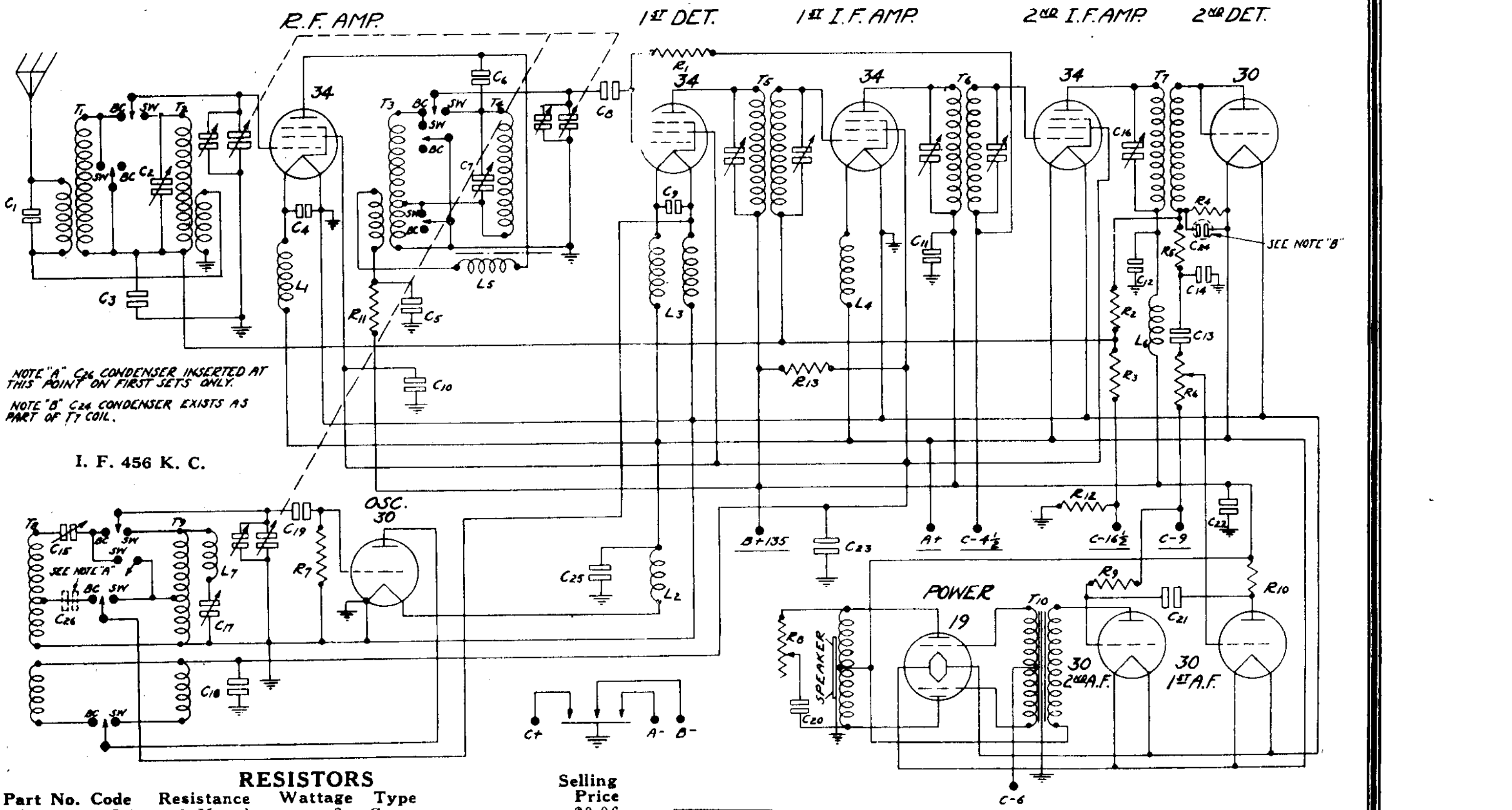


Antenna Disconnected — Battery 6 Volts Under Load

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground
6D6	R.F.	6	233	103	4.0
6C6	1st Det. & Osc.	6	233	103	
6D6	I.F.	6	233	103	4.0
75	2nd Det.	6	130		
41	Power	6	215	233	16.0(1)
84	Rectifier	6	560(2)		

(1) Grid bias read across filter choke L6
(2) Plate to Plate A.C. voltage

MONTGOMERY WARD & CO.
MODELS 62-124 & 62-129



RESISTORS

Part No.	Code	Resistance	Wattage	Type	Selling Price
P-A95305	R1	3 Megohm	.2	Carbon	$0.06
P-A95305	R2	3 Megohm	.2	Carbon	.06
P-A94805	R3	8 Megohm	.2	Carbon	.08
P-A94304	R4	300,000 Ohm	.2	Carbon	.08
P-A95104	R5	100,000 Ohm	.2	Carbon	.08
P- 96016	R6	2 Megohm		Volume Control	.40
P-A94104	R7	100,000 Ohm	.2	Carbon	.08
P- 97013	R8	45,000 Ohm		Tone Control	.36
P-A94105	R9	1 Megohm	.2	Carbon	.08
P-A94104	R10	100,000 Ohm	.2	Carbon	.08
P-A95102	R11	1,000 Ohm	.2	Carbon	.06
P-A95153	R12	15,000 Ohm	.2	Carbon	.08
P-B94652	R13	6,500 Ohm	.2	Carbon	.08
*P- 97011		150,000 Ohm		Tone Control	.36
*P-A95603		60,000 Ohm	.2	Carbon	.08

* These parts were used on first models only—see article on Changes in Early Models.

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	Selling Price
P-80919	C1	250 mmf.		Moulded	$0.08
P- 2102	C2	3-40 mmf.		Trimmer	.08
P-81076	C3	.05 mf.	200V	Tubular	.08
P-81076	C4	.05 mf.	200V	Tubular	.08
P-81076	C5	.05 mf.	200V	Tubular	.08
P-81094	C6	.006 mf.	600V	Tubular	.08
P- 2102	C7	3-40 mmf.		Trimmer	.08
P-81800	C8	50 mmf.		Wire Capacitor	.08
P-81076	C9	.05 mf.	200V	Tubular	.08
P-81102	C10	.25 mf.	140V	Tubular	.14
P-81110	C11	.25 mf.	200V	Tubular	.08
P-81076	C12	.05 mf.	200V	Tubular	.08
P-81076	C13	.05 mf.	200V	Tubular	.08
P-80977	C14	100 mmf.		Wire Capacitor	.10
P- 2112	C15	300-500 mmf.		Trimmer	.22
P- 1685	C16	40—100 mmf.		Trimmer	.18
P- 1685	C17	40—100 mmf.		Trimmer	.18
P-81076	C18	.05 mf.	200V	Tubular	.08
P-81005	C19	35 mmf.		Moulded	.08
P-81071	C20	.05 mf.	400V	Tubular	.10
P-81094	C21	.006 mf.	600V	Tubular	.08
P-82001	C22	4.0 mf.	150V	Electrolytic	.66
	C23	8.0 mf.	150V		
	C24	Part of 3rd I. F. Coil Assembly T7			
P-81102	C25	.25 mf.	140V	Tubular	.14
*P-81076	C26	.05 mf.	200V	Tubular	.08
P-81027		3 Gang Condenser			1.76

Changes in Early Models

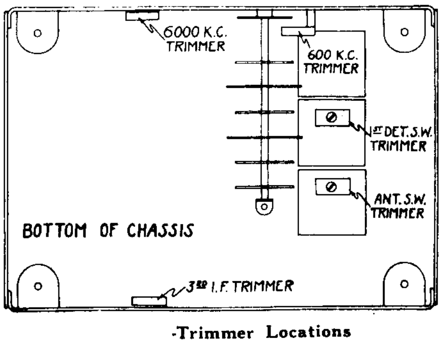
The condenser, C26 was used only on the early models of this receiver. Another change was in the tone control circuit. In the early models R8 was a 150,000 ohm resistor paralleled by a 60,000 ohm resistor. However, in the later models this arrangement was replaced by a single 45,000 ohm resistor to provide greater sensitivity in tone control.

Voltages at Sockets

Antenna Shorted to Ground
Batteries Up to Rated Voltages. See Fig. 1
Voltages Read from Negative Filament Terminal

Type of Tube	Function	Across Filament	Plate to Gnd.	Control Grid to Ground	Screen to Gnd.	Normal Plate M. A.
34	R. F.	2.0	135	4.5(1)	80	2.8
34	1st Det.	2.0	135	4.5(1)	80	3.0
30	Osc.	2.0	80			2.8
34	1st I. F.	2.0	135	4.5(1)	80	2.8
34	2nd I. F.	2.0	135	4.5	80	2.8
30	2nd Det.	2.0				
30	1st Audio	2.0	95	9.0(2)		0.35
30	2nd Audio	2.0	135	9.0(3)		3.0
19	Output	2.0	135	6.0		1.3

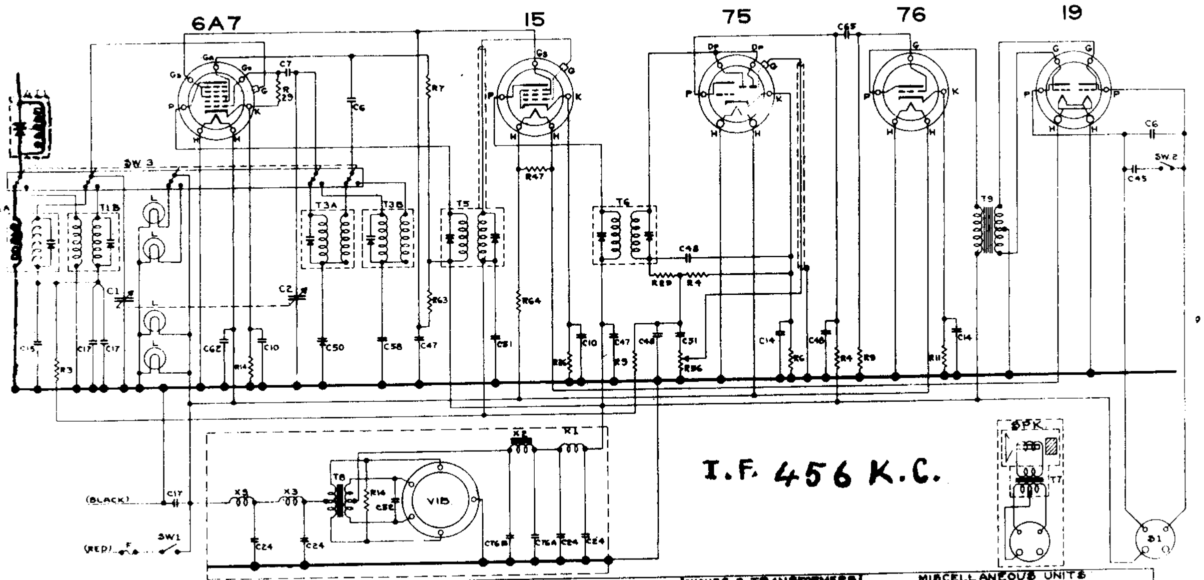
(1) Computed figure—cannot be read because of high resistance cir.
(2) Volume Control at minimum.
(3) As read at battery.



Trimmer Locations

NOBLITT-SPARKS INDUSTRIES, Inc.

ARVIN HOME RADIO MODELS 517B & 527B



R	OHMS	W	PART NO.		R	OHMS	W	PART NO.	
3	100M	1/4	17-2068						
4	200M	1/4	17-2069						
6	5M	1/4	17-2071						
7	20M	1/4	17-2072						
9	1 MEG	1/4	17-2080						
11	2M	1/4	17-4202						
14	200	1/4	17-4267						
26	600	1/4	17-2060						
29	50M	1/4	17-2060						
47	50	1/4	17-14059						
56	500M	V.C.	17-15758						
63	25M	1/4	17-14091						
64	7.8	[illegible]	17-14085						

CONDENSERS

C	CAPACITY	VOLT.	PART NO.		C	CAPACITY	VOLT.	PART NO.	
1	2 GANG		17-15763A		65	.01 STRAP	400	17-14072	
2	VARIABLE				76A	4 ELECT.	25	17-14082	
6	.002 MICA	600	17-2063		76B	12 ELECT.			
7	.0001 MICA	600	17-2064						
10	.1 CAN	400	17-14034						
14	12. ELECT.	25	17-14005						
15	.05 MA. MOLDED	200	17-14036						
17	.005 MICA	600	17-14029						
47	.15 CAN	400	17-4714						
24	.5	160	17-14040						
45	.01 CAN	600	17-14039						
48	.00025 MICA	600	17-4207						
50	PADDER		17-14070						
51	.05 CAN	160	17-14041						
52	.01 STRAP	1200	17-14602						
58	.0023 MICA	400	17-14071						
62	.5 CAN	15	17-4708						

CHOKES & TRANSFORMERS

T-X	TRANSFORMERS	PART NO.	
T	TRANSFORMERS		
1-A	ANT. COIL STD. BDCST.	00-15792	
1-B	ANT. COIL S.W.	00-15794	
3-A	OSC. COIL STD. BDCST.	00-15793	
3-B	OSC. COIL S.W.	00-15795	
5	FIRST I.F. COIL	00-14753	
6	SECOND I.F. COIL	00-14754	
7	OUTPUT TRANSF. 517B	17-15834	
7	OUTPUT TRANSF. 527B	17-15679	
8	POWER TRANSF.	00-13065	
9	AUDIO INPUT TRANSF.	00-13567	
X	CHOKES		
1	"RF" "B" CHOKE	00-2161-1	
2	"B" FLTER CHOKE	00-13966	
3	"RF" "A" CHOKE	00-13969	
5	"RF" "A" CHOKE	00-13964	

MISCELLANEOUS UNITS

SYMBOL	DESCRIPTION	PART NO.	
WT 1	WAVE TRAP	00-13903	
SPK.	517B DYNAMIC SPEAKER ASSY.	17-15833	
SPK.	527B DYNAMIC SPEAKER ASSY	17-15677	
SW 1	ON-OFF SWITCH (SEE R56)	17-15756	
SW 2	TONE CONTROL SWITCH	17-15835	
SW 3	BAND SWITCH	17-15769	
L	DIAL LIGHT	17-13904	
S1	SPEAKER SOCKET.	17-13026	
F	FUSE 5 AMP. -25 VOLT.	17-2210	
VIB.	VIBRATOR	17-15831	

I.F. PEAK 456 K.C.

2 BANDS: BALANCE AT 1400 K.C. -PAD AT 600 K.C.; BALANCE AT 15.0 M.C. -CHECK AT 6.0 M.C.

DILGES

MODELS 517B-527B SOCKET VOLTAGES

Tube	Filament or Heater	Plate	Screen	Cathode	Oscillator Grid	Anode Grid
6A7	6.0	135	60	1.4	2.4	135
15	2.0	135	60	1.2	....	..
75	6.0	65	....	.8	....	....
76	6.0	140	....	5.6	....	....
19	2.0	....	....	....	....	....

POINT TO POINT RESISTANCES

All Readings Taken to Ground Unless Otherwise Specified

15

Heater	9.8 ohms
Heater	61.8 ohms
Cathode	600 ohms
Screen to B+	25,000 ohms
Plate to B+	15 ohms
Control Grid	1,205,000 ohms

75

Heater	0
Heater	2 ohms
Cathode	5,000 ohms
Diode	255,000 ohms
Diode	255,000 ohms
Plate to B+	200,000 ohms
Control Grid	500,000 ohms

76

Heater	0
Heater	2 ohms
Cathode	2,000 ohms
Control Grid	1,000,000 ohms
Plate to B+	265 ohms

19

Filament	0
Filament	60 ohms
Grid	150 ohms
Grid	150 ohms
Plate to B+	175 ohms
Plate to B+	175 ohms

6A7

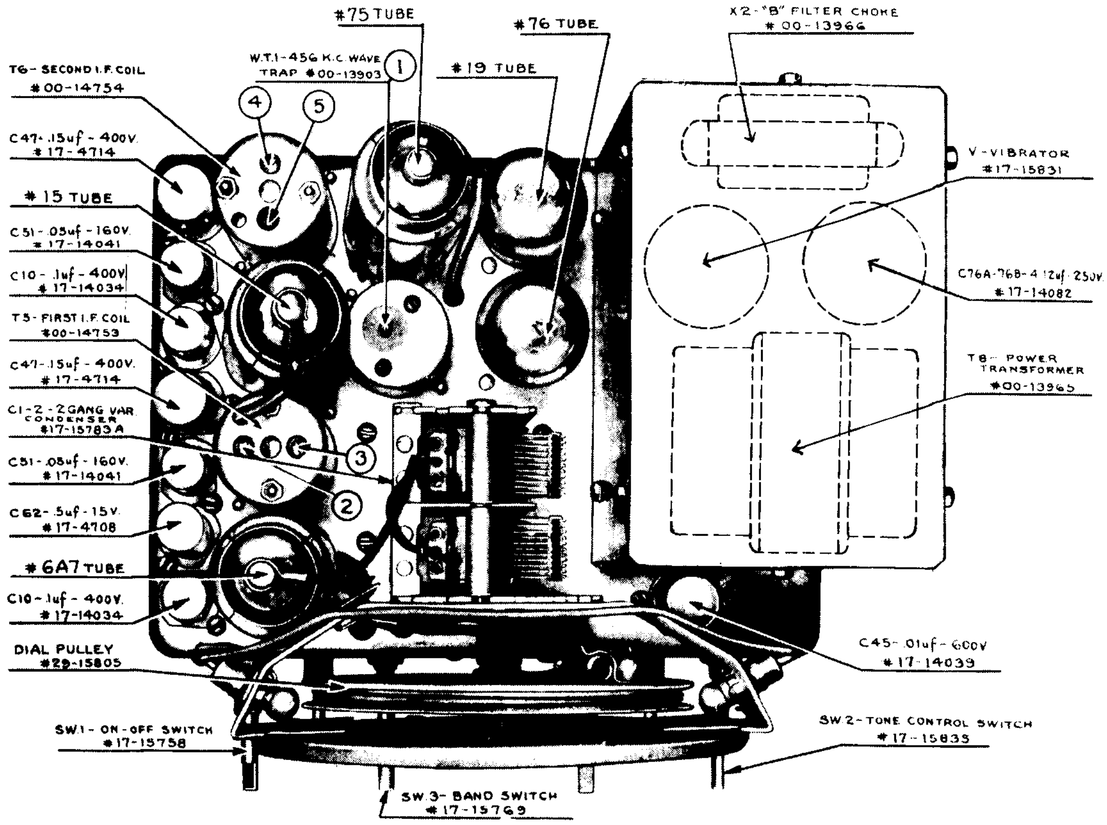
Heater	0
Heater	2 ohms
Cathode	400 ohms
Oscillator Grid	50,400 ohms
Anode Grid to B+	20,000 ohms
Screen to B+	25,000 ohms
Plate to B+	15 ohms
Control Grid	1,305,000 ohms

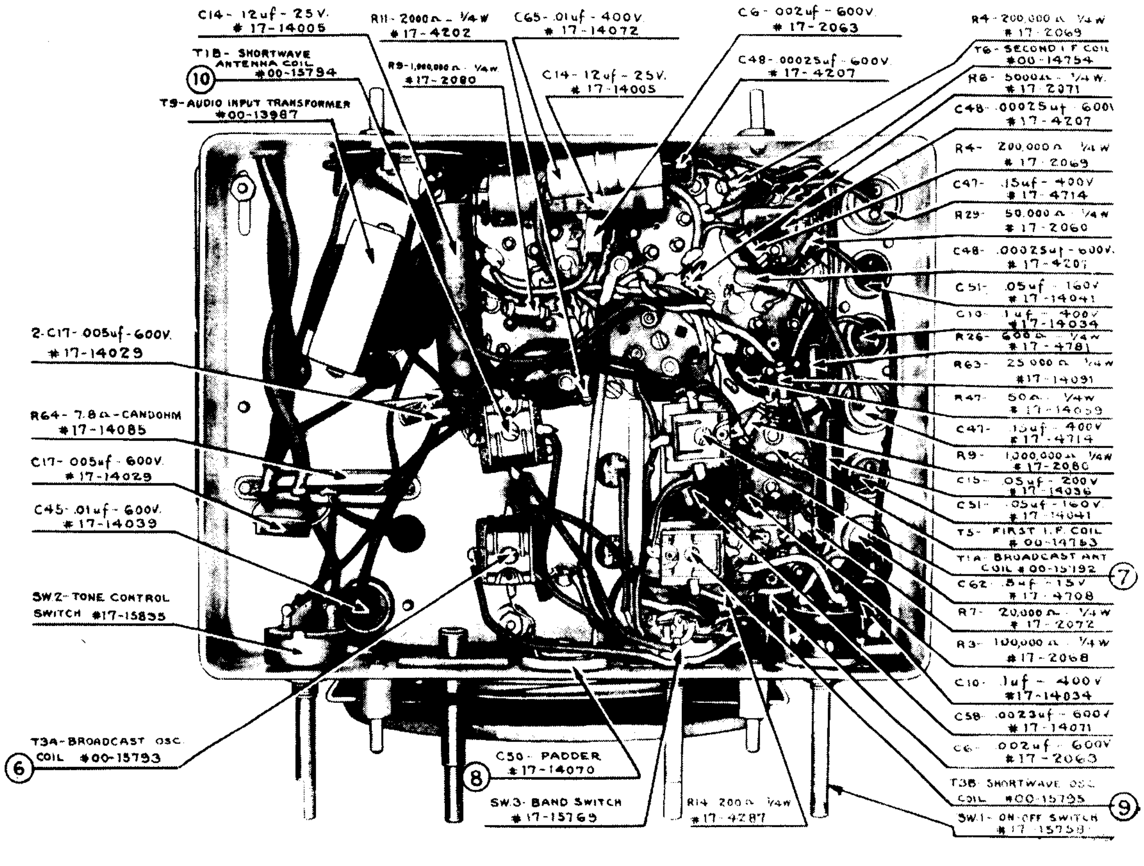
COIL, TRANSFORMER AND SPEAKER RESISTANCES

WT1 Wave Trap	3.0 ohms
T1A Broadcast Ant. Pri.	15.0 ohms
T1A Broadcast Ant. Sec.	3.5 ohms
T1B Short Wave Ant. Pri.	2.6 ohms
T1B Short Wave Ant. Sec.	1.7 ohms
T3A Broadcast Osc. Pri.	2.6 ohms
T3A Broadcast Osc. Sec.	1.7 ohms
T3B Shortwave Osc. Pri.	.2 ohms
T3B Shortwave Osc. Sec.	.7 ohms
T5 First I. F. Pri.	15.0 ohms
T5 First I. F. Sec.	15.0 ohms
T6 Second I. F. Pri.	15.0 ohms
T6 Second I. F. Sec.	15.0 ohms
T7 Speaker Trans. Pri.	570 ohms
T7 Speaker Trans. Sec.	2.6 ohms
Speaker Voice Coil	2.6 ohms
T8 Power Trans. Pri.	.1-0-.1 ohms
T8 Power Trans. Sec.	170-0-170 ohms

NOBLITT-SPARKS INDUSTRIES, Inc.

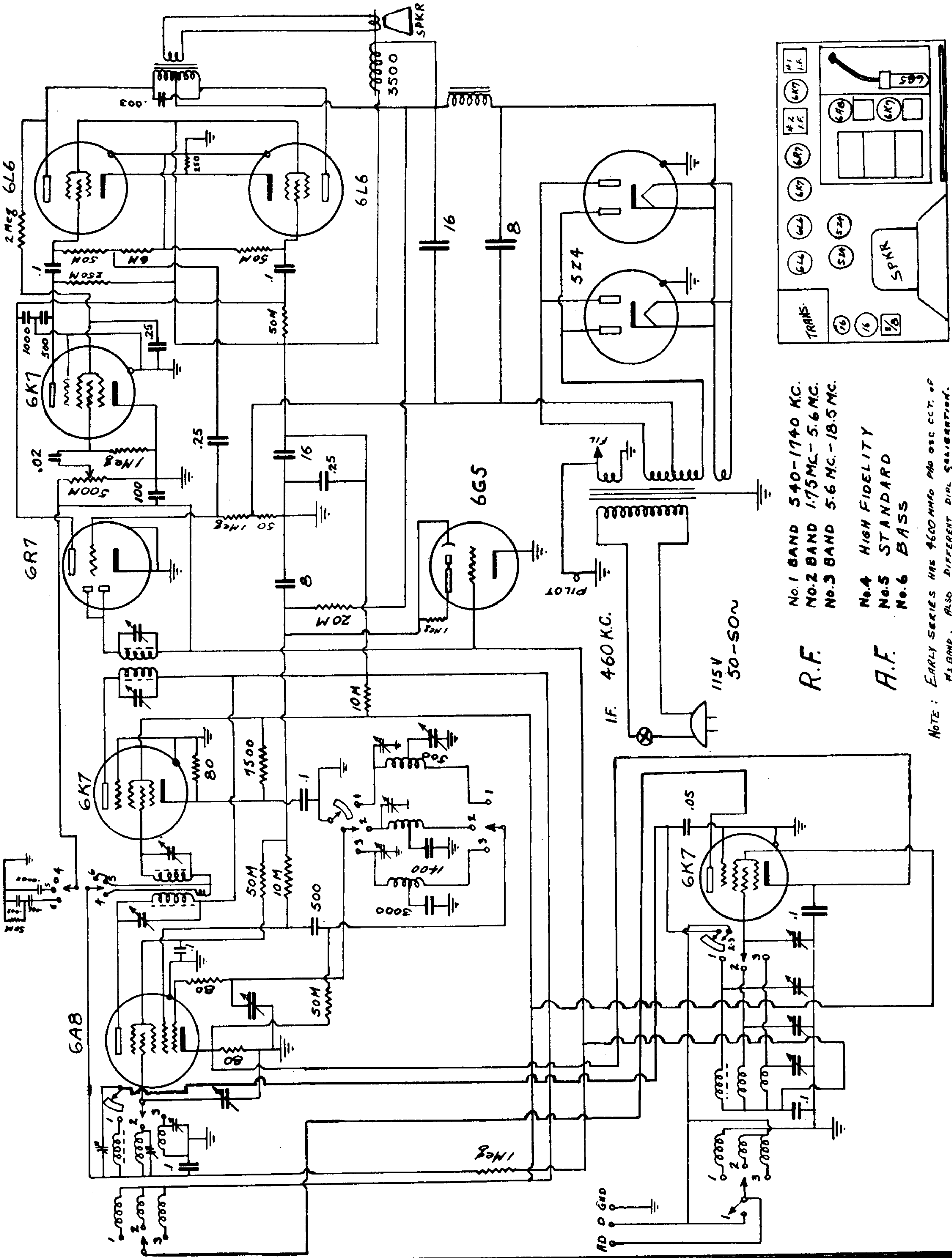
MODELS 517B & 527B





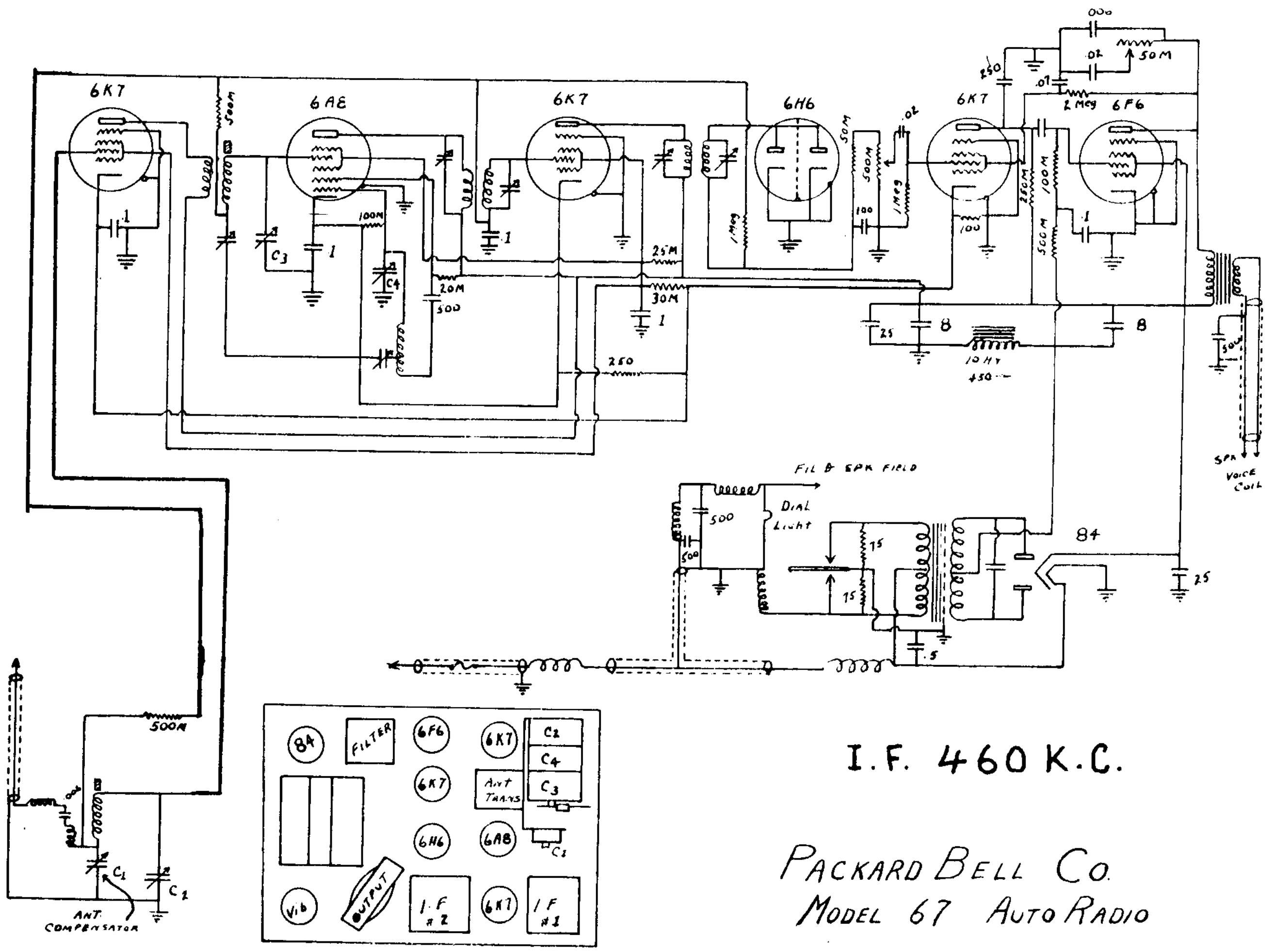
PACKARD-BELL CO.

MODEL 50 "HIGH FIDELITY"

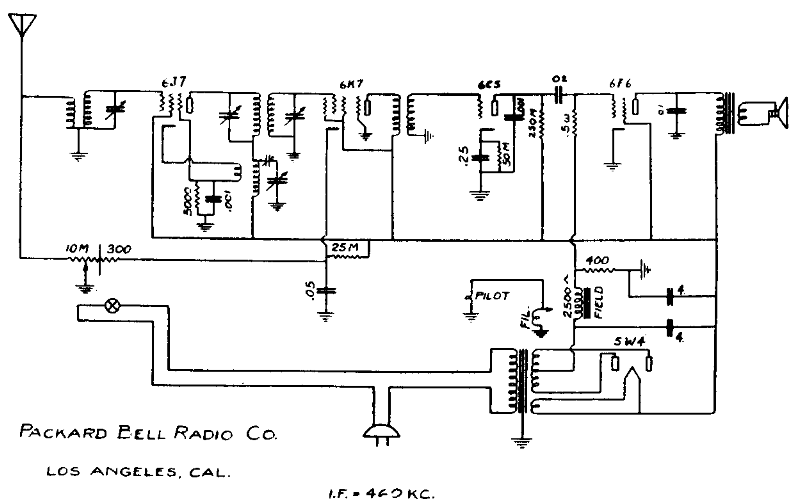


PACKARD-BELL CO.

MODEL 67 "AUTO SET"



MODEL 5 "KOMPAK"

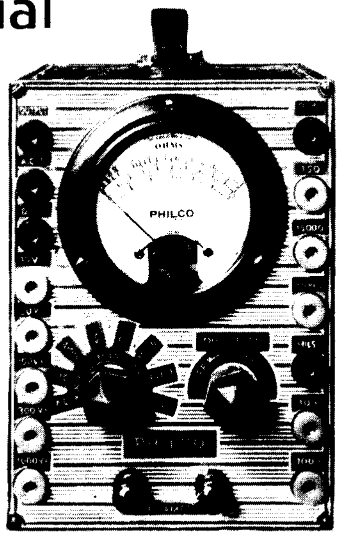


PHILCO RADIO & TELEVISION CORPORATION

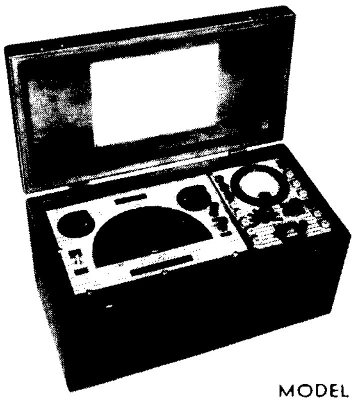
Important Information on Adjusting the Philco Radio Models Listed in this Manual

The alignment procedures supplied in connection with the Service Data on the various Philco models listed in this Manual, are based on the use of the Philco All-Wave Signal Generator (Model 088) and the Philco Output Meter and Circuit Tester (Model 025). The combinat.on of these two units in a single case (Model 099) also meets the necessary requirements.

Through the use of the equipment, illustrated below the serviceman is assured that all adjustments necessary on any Philco receiver can be accurately and correctly made.



MODEL 025



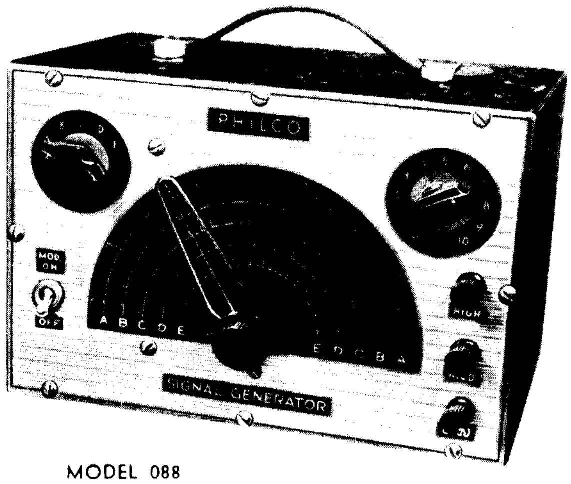
MODEL 099

The instrument illustrated above is Philco Model 025 Circuit Tester which incorporates a meter especially adapted for output measurement.

This unit is recommended for use in connection with Model 088 Signal Generator. The latter is provided with a means of varying output through two separate antenna connections.

The Model 088 All-Wave Signal Generator illustrated above was developed by the Philco Engineering Laboratories to be particularly suitable for aligning Philco receivers of all models.

The frequency coverage is from 110 to 20,000 K.C. It is equipped with a special demodulating switch necessary for adjusting Philco high-fidelity models.

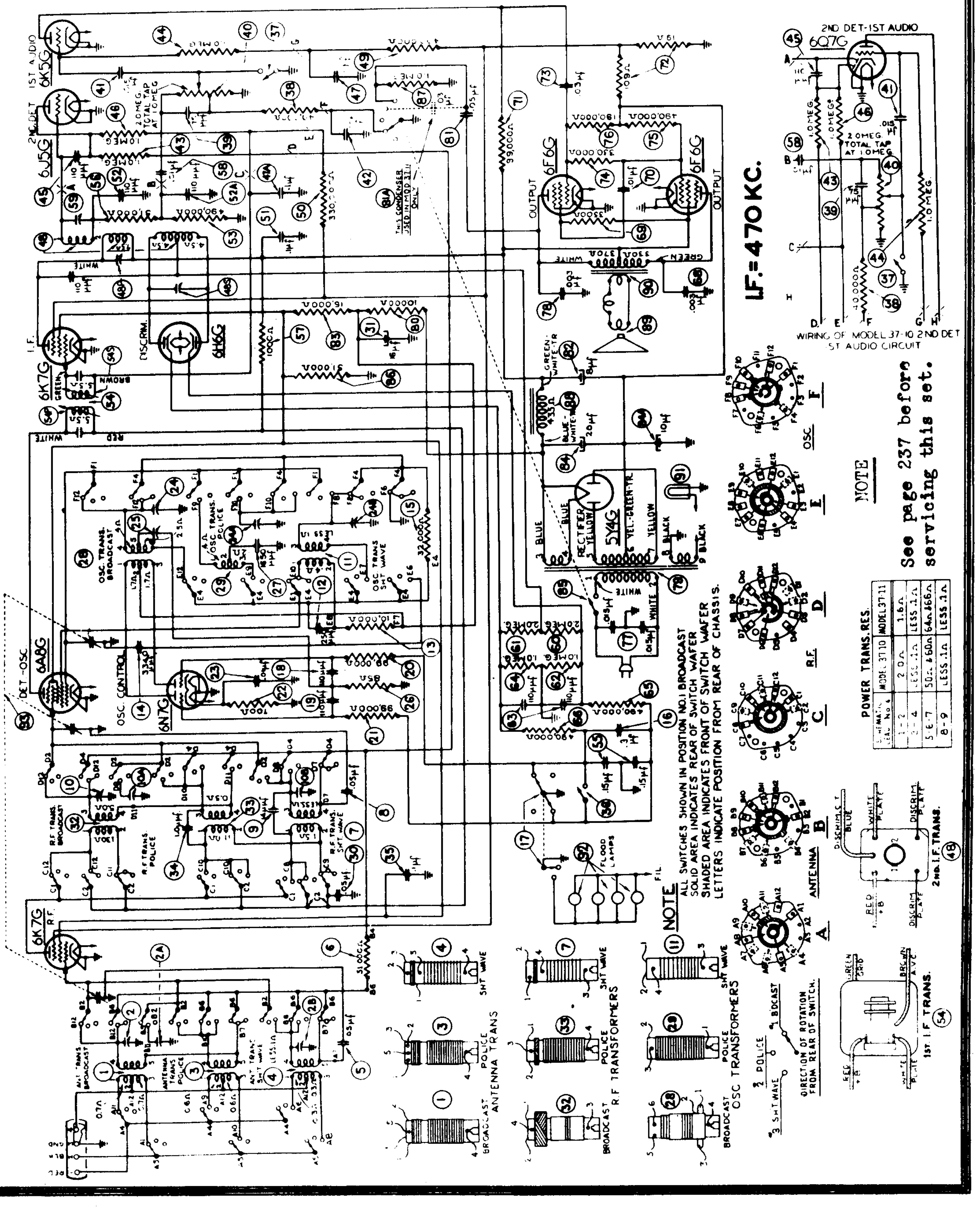


MODEL 088

The Models 088 and 025 combined in one case form the instrument known as Philco Model 099. This contains all equipment necessary for adjusting any Philco model in a single unit, providing easier portability and greater convenience.

PHILCO RADIO & TELEVISION CORPORATION

MODELS 37-10 & 37-11 CODE 121



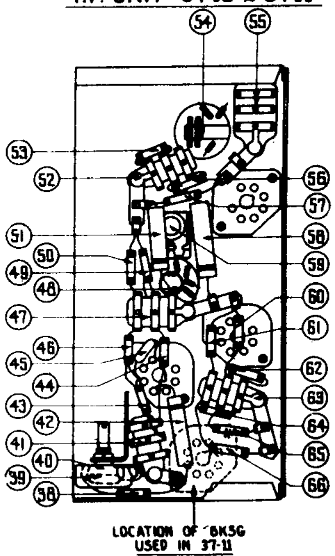
PHILCO RADIO & TELEVISION CORPORATION

MODELS 37-10 & 37-11 CODE 121

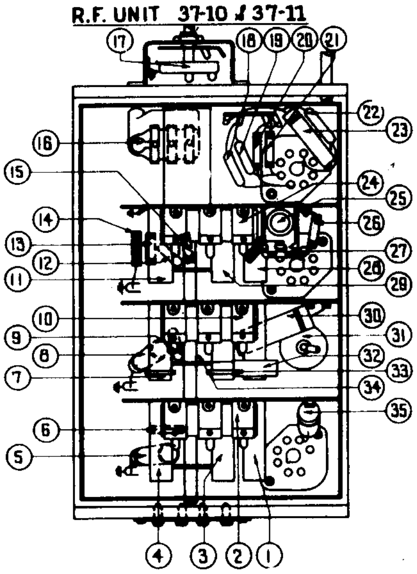
Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2108	$1.60
2	Compensator (Three section)	31-6092	.60
3	Antenna Transformer (Range 2)	32-2119	1.20
4	Antenna Transformer (Range 3)	32-2109	1.20
5	Condenser (.05 mfd. tubular)	30-4020	.20
6	Resistor (51,000 ohms, ½ watt)	33-351339	.20
7	R. F. Transformer (Range 3)	32-2126	.70
8	Condenser (.05 mfd. tubular)	30-4020	.20
9	Condenser (14 mmfd. mica)	30-1073	.20
10	Compensator (Three section)	31-6092	.60
11	Oscillator Transformer (Range 3)	32-2110	.70
12	Condenser (250 mmfd. mica)	30-1032	.25
13	Resistor (10,000 ohms, ½ watt)	33-310339	.20
14	Condenser (3340 mmfd. semi-fixed)	31-6152	.60
15	Resistor (32,000 ohms, ½ watt)	33-332339	.20
16	Condenser (.15 mfd. dual)	6287-DU	.40
17	Magnetic Tuning Switch	42-1269	.75
18	Condenser (.10 mmfd. mica)	30-1031	.20
19	Condenser (110 mmfd. mica)	30-1031	.20
20	Resistor (99,000 ohms, ½ watt)	33-399339	.20
21	Resistor (99,000 ohms, ½ watt)	33-399339	.20
22	Resistor (700 ohms)	33-1220	.20
23	Condenser (.01 mfd. tubular)	30-4169	.20
24	Compensator (Three section)	31-6149	.75
25	Compensator (Broadcast series)	31-6151	.40
26	Resistor (85 ohm, ½ watt)	33-085339	
27	Condenser (1650 mfd. semi-fixed)	31-6096	.40
28	Oscillator Transformer (Range 1)	32-2336	1.60
29	Oscillator Transformer (Range 2)	32-2121	.70
30	Condenser (.05 mfd. tubular)	30-4123	.20
31	Electrolytic Condenser (16 mfd.)	30-2118	1.65
32	R. F. Transformer (Range 1)	32-2105	1.00
33	R. F. Transformer (Range 2)	32-2106	.70
34	Condenser (Lug & Wire Twisted)	38-7878	.04
35	Condenser (.1 mfd. tubular)	30-4455	
36	Magnetic Tuning Switch (Automatic Dial)	45-2330	1.20
37	Audio Shorting Switch (Automatic Dial)	28-4110	.15
		45-2350	.15
	Washer Insulator for above switch	27-8361	.01
38	Resistor (40,000 ohms, ½ watt)	33-340339	.20
39	Condenser (75 mmfd. mica)	30-1053	.20
40	Volume Control	33-5158	1.00
41	Condenser (.015 mfd. bakelite)	3793-SU	.35
42	Condenser (.006 mfd. tubular)	30-4445	$0.20
43	Resistor (1.0 megohm, ½ watt)	33-510339	.20
44	Resistor (1.0 megohm, ½ watt)	33-510339	.20
45	Condenser (110 mmfd. mica)	30-1031	.20
46	Resistor (1.0 megohm, ½ watt)	33-510339	.20
47	Condenser (.1 mfd. dual bakelite)	4989-DG	.40
48	2nd I. F. & Discriminator Transformer	32-2362	3.30
49	Resistor (490,000 ohms, ½ watt)	33-449339	.20
50	Resistor (330,000 ohms, ½ watt)	33-433339	.20
51	Condenser (.1 mfd. tubular)	30-4455	.25
52	Condenser (110 mmfd. dual bakelite)	8035-DG	.25
53	Resistor (490,000 ohms, ½ watt)	33-449339	.20
54	1st I. F. Transformer	32-2333	2.20
55	Condenser (.15 mfd. dual bakelite)	6287-DG	.40
56	Resistor (51,000 ohms, ½ watt)	33-351339	.20
57	Resistor (1000 ohms, ½ watt)	33-210339	.20
58	Condenser (.01 mfd. tubular)	30-4479	
59	Compensator	31-6147	.40
60	Resistor (2 megohms, ½ watt)	33-520339	.20
61	Resistor (2 megohms, ½ watt)	33-520339	.20
62	Resistor (1 megohm, ½ watt)	33-510339	.20
63	Condenser (110 mmfd. dual bakelite)	8035-DG	.25
64	Resistor (1 megohm, ½ watt)	33-510339	.20
65	Resistor (490,000 ohms, ½ watt)	33-449339	.20
66	Resistor (490,000 ohms, ½ watt)	33-449339	.20
67	Speaker Cord	41-3258	
68	Condenser (.003 mfd. tubular)	30-4469	.20
69	Resistor (3500 ohms, ½ watt)	33-235339	.20
70	Condenser (.01 mfd. tubular)	30-4169	.20
71	Resistor (99,000 ohms, ½ watt)	33-399339	.20
72	Resistor (Bias)	33-3280	.30
73	Condenser (.03 mfd. bakelite)	8318-SU	.35
74	Resistor (330,000 ohms, ½ watt)	33-433339	.20
75	Resistor (490,000 ohms, ½ watt)	33-449339	.20
76	Resistor (190,000 ohms, ½ watt)	33-419339	.20
77	Condenser (.015 mfd. dual bakelite)	3793-DG	.40
78	Condenser (.003 mfd. tubular)	30-4469	.20
79	37-10 Power Transformer (115 V., 50 to 60 cycles)	32-7606	6.25
	37-10 Power Transformer (115 V., 25 to 40 cycles)	32-7607	9.00
	37-10 Power Transformer (115-240 V., 50 to 60 cycles)	32-7608	8.00
79	37-11 Power Transformer (115 V., 50 to 60 cycles)	32-7640	
	37-11 Power Transformer (115 V., 25 to 40 cycles)	32-7641	
	37-11 Power Transformer (115-240 V., 50 to 60 cycles)	32-7642	
80	37-10 Resistor (10,000 ohms, 2 watt)	33-310639	$0.30
81	Condenser (.05 mfd. bakelite) 37-10	3615-SU	.35
	Condenser (.03, .05 mfd. bakelite) 37-11	3615-YU	
82	Electrolytic Condenser (8 mfd.)	30-2024	1.10
83	Resistor (15,000 ohms, 3 watt)	33-315639	.30
84	Electrolytic Condenser (10, 20 mfd.)	30-2183	2.00
85	Bass Comp. Control & A.C. switch (37-10)	42-1267	
	Base Comp. Control & A.C. switch (37-11)	42-1268	
86	Resistor (51,000 ohms, 1 watt)	33-351439	.20
87	Resistor (1 megohm, ½ watt)	33-510339	.20
88	Speaker Field Assembly (H30)	36-3687	4.00
89	Cone Voice Coil (H30)	36-3801	
90	Output Transformer (H30)	32-7754	1.50
91	Pilot Lamp	34-2039	.07
92	Floodlight Assembly	38-8210	2.40
93	Tuning Condenser	31-1948	3.75
	Antenna Terminal Panel	38-7714	.15
	Automatic Dial Assembly	31-1949	25.00
	Brace (Drive Mtg.)	28-4119	.05
	Bracket (Drive Mtg. Assembly)	31-1901	1.80
	Cable & Plug (Pilot lamps)	41-3253	
	Cable & Plug (Speaker)	41-3258	
	Cable Power	L-2183	.40
	Coupling Assembly (Tuning Shaft)	31-1961	
	Set Screws Assembly	W-650	.40 C
	Set Screws Assembly	W-644	1.50 C
	Control Screws (Station Index)	31-1898	.15
	Dial	27-5271	1.00
	Dial Guide	27-8580	.03
	Dial Screen Holder	31-1968	
	Dial Escutcheon Assembly	45-2324	.40
	Gear No. 1 Front (Dial Assembly)	45-2347	
	Gear No. 2 Rear (Dial Assembly)	45-2348	.60
	Handle (Dial)	45-2329	
	Handle (Hub Assembly)	45-2344	
	Housing (Control Screw)	28-7196	1.00
	Mask Guide	28-4118	.25

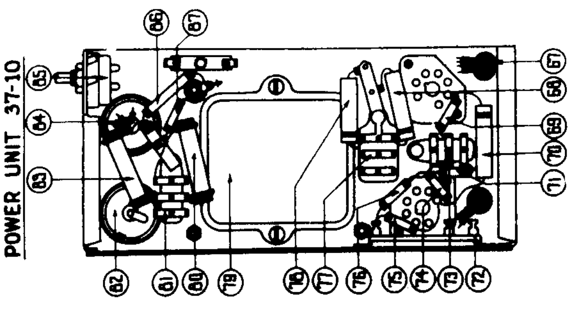
Schem. No.	Description	Part No.	List Price
	Mask	27-5272	$0.60
	Mask & Link Assembly	45-2367	
	Pilot Lamp Assembly	38-8407	
	Pilot Lamp Assembly (Auto Dial)	38-8210	2.40
	Ring (Retaining Handle Hub)	28-8630	.02
	Ring (Retaining Mask Assembly)	28-7195	.20
	Reflector Ring	28-4099	.35
	Range Switch Ant.	42-1200	
	Range Switch R. F.	42-1245	
	Range Switch Osc.	42-1274	
	Range Switch Index Plate & Shaft	42-1265	.50
	Range Switch Shaft Coupling	28-7198	.15
	Station Tab Kit	40-6056	
	Set Screw	W-481	2.00 C
	Socket (7 Prong)	27-6057	
	Socket (8 Prong)	27-6058	
	Socket (Rectifier)	27-6052	
	Shield (Tube) (Square)	27-2726	.10
	Shield Base	28-3898	.03
	Shield Tube (Round)	8005	.10
	Shaft (Volume Control)	38-8198	
	Paper Tube (Vol. Shaft)	27-8530	.01
	Retaining Clip (Vol. Shaft)	28-4394	.01
	Spring (Vol. Shaft)	28-4117	.40 C
	Spring (Mask retaining ring)	28-8629	.04
	Speaker (H-30)	36-1295	
	Vernier Drive	45-2342	2.40
	Washer (Dial ring contact)	27-8361	
	Washer (Dial scale)	27-8398	.01

I.F. UNIT 37-10 & 37-11



R.F. UNIT 37-10 & 37-11





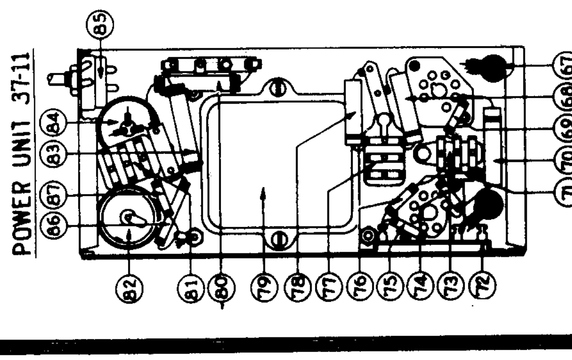


Fig. 5. 37-11 Power Unit Base View

PHILCO RADIO & TELEVISION CORPORATION

MODELS 37-10 & 37-11 CODE 121

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator; Philco Model 088 (fundamental frequency 110 to 20,000 K. C.) is the correct instrument for this purpose; (2) Output meter; Philco Model 025 Circuit Tester incorporates a sensitive output meter and is recommended; (3) Fibre handle screw-driver (Philco Part No. 27-7059); (4) Special variable condenser (Philco Part No. 45-2325).

OUTPUT METER: The 025 Output Meter is connected to the plate and cathode terminals of one of the (6F6G) tubes. Adjust the meter to use the (0-30) volt scale.

INTERMEDIATE FREQUENCY CIRCUIT

1. Set controls as follows:
   - **a.** Magnetic Tuning "off"
   - **b.** Bass compensation minimum
   - **c.** Volume control maximum
   - **d.** Receiver Dial 580 K. C.
   - **e.** Signal Generator 470 K. C.

2. Adjust the I. F. compensators for maximum with signal generator output lead connected through a .1 mfd. condenser to the grid of the tubes as follows:

Input Point	Compensators in Order
6K7G—1st I. F.	(59) (48P)
6A8G—1st Det.	(54S) (54P)

RADIO FREQUENCY CIRCUIT

Tuning Range 7.35 to 22 M. C.

1. Connect the signal generator output lead through a .1 mfd. condenser to terminal 1 and the generator ground to terminal 3 on aerial input panel. Terminals 2 and 3 must be connected with the shorting link provided on the aerial panel.

2. Other controls set as given under intermediate frequency circuit, with the exception of those as follow:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
3	18 M. C.	18 M. C.	(24B) See Note A
3	18 M. C.	18 M. C.	(10B) (2B) Use shunt condenser on (24B) (Note B)
3	18 M. C.	18 M. C.	(24B) (Note A)

Tuning Range 2.3 to 7.4 M. C.

Adjust compensators for maximum as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
2	7 M. C.	7 M. C.	(24A)
2	6 M. C.	6 M. C.	(10A) (2A)

Tuning Range 530 to 1720 K. C.

Adjust compensators for maximum as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
1	1600 K. C.	1600 K. C.	(24) (10) (2)
1	580 K. C.	580 K. C.	(25) Roll gang
1	1600 K. C.	1600 K. C.	(24)
1	1500 K. C.	1500 K. C.	(10) (2)

MAGNETIC TUNING ADJUSTMENT

Set the range switch in position one (530 to 1720 K. C.) and the magnetic tuning switch in the "out" position. Now turn the signal generator and receiver dial to any frequency in the Broadcast band. The receiver dial must be adjusted very accurately for maximum output.

Set the magnetic tuning control in the "on" position (clockwise). Compensator (48S) of the magnetic tuning transformer is now adjusted for maximum output.

The above adjustment is now checked for accuracy, by turning the magnetic tuning control "off" and "on". When this is done, there should be no change in the tone of the received signal. If a change of tone or hiss develops, it indicates a shift in frequency and the adjustment must be made again.

NOTE "A"—To accurately adjust the compensator to the fundamental and not the image signal, turn the oscillator compensator to the maximum capacity position clockwise. Then slowly turn the compensators counter-clockwise until a second maximum peak is obtained on the output meter. The first peak is the image signal and the receiver must not be adjusted to it. If the above procedure is correctly performed, the image signal will be found 940 K. C. below the frequency being used.

NOTE "B"—To eliminate the effect of the R. F. compensator detuning the Osc. circuit, a variable tuning condenser, Philco Part No. 45-2325 is connected from the oscillator compensator to ground when designated in the padding instruction above. Tune the added condenser until the second harmonic of the receiver oscillator beats against the signal from the generator, resulting in a maximum indication on the output meter. Then adjust compensators as noted for maximum output.

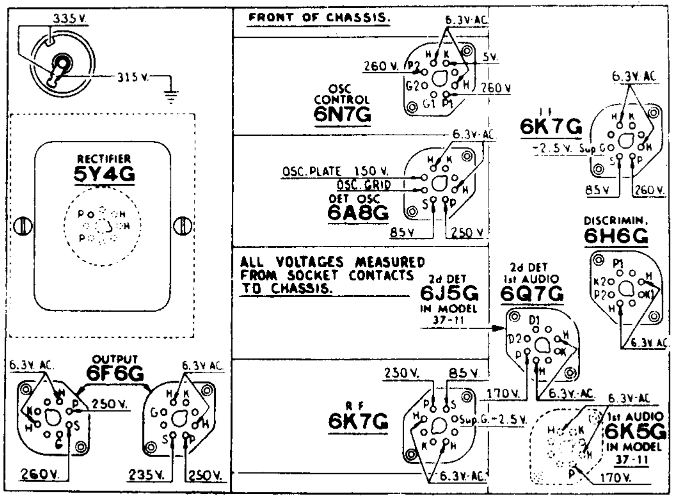


Fig. 1. Socket Voltages 37-10-11

Underside of Chassis View

The voltages indicated by arrows were measured with a **Philco 025 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

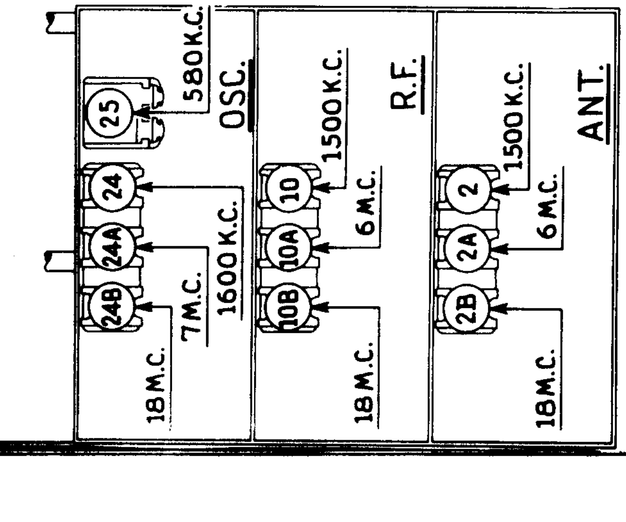


Fig. 8. R. F. Compensators, Underside of Chassis

NOTE

Models 37-10 and 37-11 are similar in circuit design, with the exception that the 6Q7G tube, 2nd Det. 1st Audio in the 37-10 is replaced with a 6J5G as a diode detector and a 6K5G tube for 1st audio stage in the Model 37-11. The schematic diagram Fig. 3 shows the complete circuit of the 37-11 receiver, also the 6Q7G, 2nd Det. 1st Audio circuit of the 37-10. The parts of these two chasses are the same with the exception of condenser (**81A**) in the tone control circuit and the tone controls. In Model 37-10 the condenser is Part No. 3615-SU .05 mfd., and in the 37-11 it is Part No. 3615-YU .05 mfd., .03 mfd.

Resistor locations in both receiver power units are slightly different as will be noted in Figs. 5 and 7.

TUNING RANGES: Three.
Range 1—530 to 1720 K. C.
Range 2—2.3 to 7.4 M. C.
Range 3—7.35 to 22 M. C.

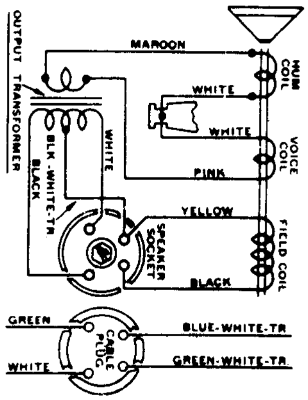


Fig. 3. Speaker

NOTE

See page 237 before servicing this set.

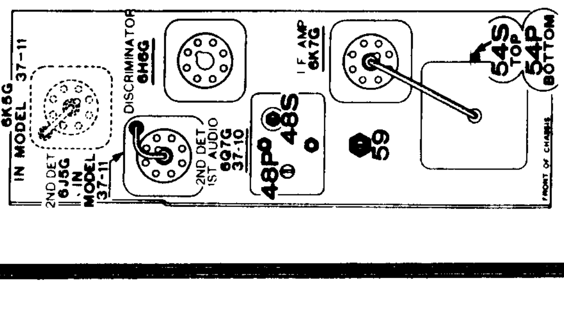


Fig. 7

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-84 CODE 122

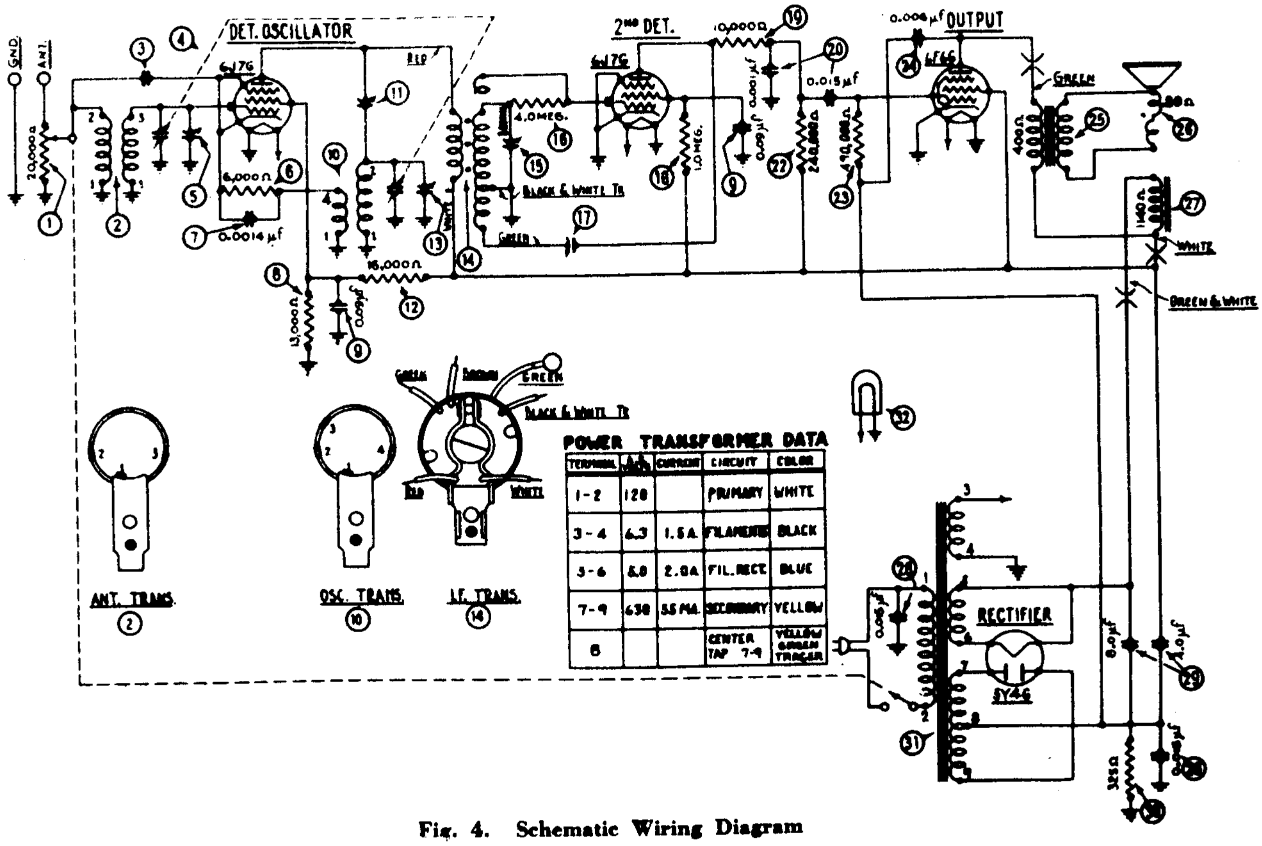


Fig. 4. Schematic Wiring Diagram

Replacement Parts for Model 37-84

No. On Figs.	Description	Part No.	List Price
①	Volume Control and On-off Switch	33-5055	1.45
②	Antenna Transformer	32-1310	.40
③	Condenser—Capacity obtained by twisting end of two leads together		
④	Tuning Condenser Assembly	31-1122	4.00
⑤	Compensator (Antenna)	Part of ④	...
⑥	Resistor (6000 ohms, ½ watt)	33-260339	.20
⑦	Condenser (.0014 mfd. Mica)	7007	.30
⑧	Resistor (13,000 ohms. ½ watt)	33-313439	.20
⑨	Condenser (Double .09-.09 mfd. Bakelite)	4989-DG	.40
⑩	Oscillator Transformer	32-1311	.40
⑪	Compensator (I. F. Primary)	04000A	.15
⑫	Resistor (16.000 ohms. 3 watt)	33-316639	.30
⑬	Compensator (Osc. 1700 K.C.)	Part of ④	...
⑭	I.F. Transformer	32-1313	1.05
⑮	Compensator (I.F. Sec.)	0-4000Y	.15
⑯	Resistor (4 meg.) inside (14)	35-540339	.20
⑰	Sensitivity Control	0-4000	...
⑱	Resistor (1 meg., ½ watt)	33-510339	.20
⑲	Resistor (10,000 ohms, ½ watt)	33-310339	.20
⑳	Condenser (.015-.001 mfd. Bakelite)	7762-EU	.25
㉑	Eliminated by Production Changes		
㉒	Resistor (24,000 ohms, ½ watt)	33-424339	.20
㉓	Resistor (490,000 ohms. ½ watt)	33-449339	.20
㉔	Condenser (.006 mfd. Bakelite)	7625-SU	.25
㉕	Output Transformer	32-7019	.85
㉖	Voice Coil and Cone Assembly	36-3157	...
㉗	Field Coil and Pot Assembly	36-3243	1.70
㉘	Condenser (.015-.015 mfd. Bakelite)	7762-EU	.40
㉙	Condenser (Electrolytic 4.-8. mfd.)	30-2013	1.95
㉚	Resistor (Wire Wound 325 ohms)	7465	.15
㉛	Power Transformer (50-60 cycle 115)	32-7180	3.60
	Power Transformer (25 cycle 115)	7422	...
㉜	Pilot Lamp	6608	.09
	Eight Prong Socket Rectifier	27-6053	.11
	Seven Prong Socket	27-6057	.11
	Tube Shield	28-2726	.10
	Tube Shield Cap	28-2727	.02
	Knob	27-4282	.10
	Pointer	27-7933	.01
	AC Cord and Plug	L-2183	.00
	Speaker Cord	L-1474	.15
	Base Shield Plate	27-7452	.10
	Chassis Mounting Screw	W-490-A	2.75C
	Chassis Mounting Washer	W-315-A	.50C
	Output Transformer Shield	36-3025	.08
	Dial	27-5210	1.50C
	R.F. Shield Assembly	38-5483	.50
	Speaker Mounting Screw	W-1604	...
	Speaker Mounting Nut	W-124-A	...
	Speaker SB	36-1073	...
	Baffle Silk Assembly	40-5961	...
	Spacer Padder Assem.	3098	...
	Screw Padder Assem.	W-614 FA-3	
	Nut Padder Assemb.	W-95 FA-3	
	Felt Washer Tuning Knob	27-7807	...
	Pilot Lamp Assem.	38-7578	...

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-84 CODE 122

General Specifications

TYPE CIRCUIT: Superheterodyne with Pentode output.
POWER SUPPLY: 115 V., 60 cycle A.C.
TUBES USED: 1 type 6J7G, Det Osc., 1 type 6J7G 2nd detector—first audio, 1 type 6F6G output, 1 type 5Y4G Rectifier.
FREQUENCY RANGE: 540-1700 K.C.
INTERMEDIATE FREQUENCY: 470 K.C.
POWER CONSUMPTION: 45 watts.
SPEAKER: SB.
POWER OUTPUT: ½ watt.

Adjusting Compensating Condensers

To accurately adjust the compensating condensers in the Model 37-84 receiver, it is necessary to use a signal generator of high stability on all frequencies, such as the PHILCO MODEL 088 Signal Generator. This instrument has a continuous frequency range from 110 to 20,000 K.C., and is designed to meet every requirement of the serviceman.

An output meter is also needed,—**PHILCO Model 025 Circuit Tester** includes a very sensitive output meter.

Convenient tools to use in adjusting the compensators are the **PHILCO No. 3164 Fibre Wrench** and **No. 27-7059 Fibre Handled Screw-driver.**

The locations of the various compensating condensers are shown in Fig. 1. Connect the output meter to the plate and cathode contacts of the 6F6G power tube, and adjust it to use the 0-30 volt range.

When adjusting each circuit, care should be taken to have the signal generator attenuator set to approximately ¼ scale reading on output meter.

Intermediate Frequency Circuit

1. Turn gang condenser to maximum capacity (counter-clockwise) and set the volume control of the receiver in the maximum position (clockwise).
2. Connect the 088 signal generator output lead through a .1 mfd. condenser, to the grid of the 6J7G Detector-oscillator tube and the generator ground to the chassis.
3. Turn the sensitivity control (17) to maximum capacity position (clockwise), and then release 1½ turns (counter-clockwise).
4. Set signal generator at 470 K.C. and adjust compensators (11) and (15) for maximum reading on the output meter. Then turn sensitivity control (17) clockwise until a hiss (oscillation) is heard. Now turn sensitivity control (17) counter-clockwise until the hiss ceases, then continue for ¼ turn more.

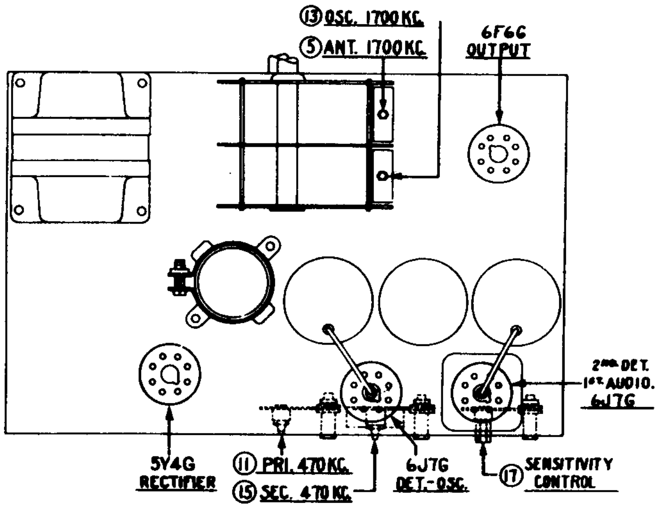


Fig. 1. Locations of Compensating Condensers

Radio Frequency Circuit

1. Turn the gang condenser to the minimum capacity position (extreme clockwise) and place a .006" (six-thousandths inch) gauge between the stator and rotor plates. Now turn the gang counter-clockwise until stator and rotor plates touch gauge.
2. Remove gauge from gang condenser. Now place signal generator output lead through a 100 mmfd. condenser to the aerial post of the receiver. Set signal generator at 850 K.C., (using second harmonic, 1700 K.C.). Adjust compensators (13) osc., and (5) ant., for maximum reading on output meter.
3. Turn signal generator to 1400 K.C. and adjust gang condenser for maximum output. Then adjust compensator (5) for maximum reading on output meter.
4. After the above adjustments are completed, the dial pointer is checked for calibration by turning signal generator to 1000 K.C. Then tune receiver for maximum signal. The dial pointer should then indicate 1000 K.C.

TUBE SOCKET VOLTAGES
(Measured from Tube Contact to Chassis)

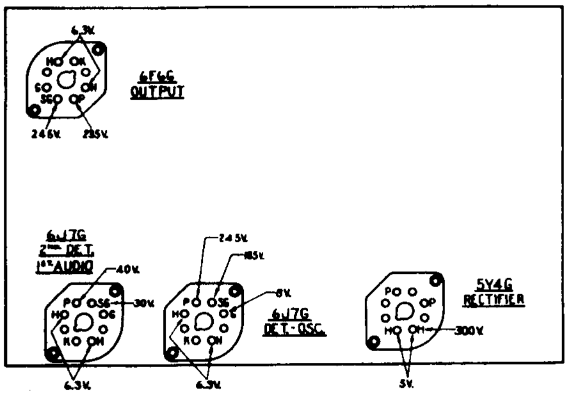


Fig. 2. Tubes as viewed from underside of Chassis

The voltages at the points indicated by the arrows above were obtained with a Philco type 025 Circuit Tester which contains a high resistance (1000 ohms per volt) voltmeter.

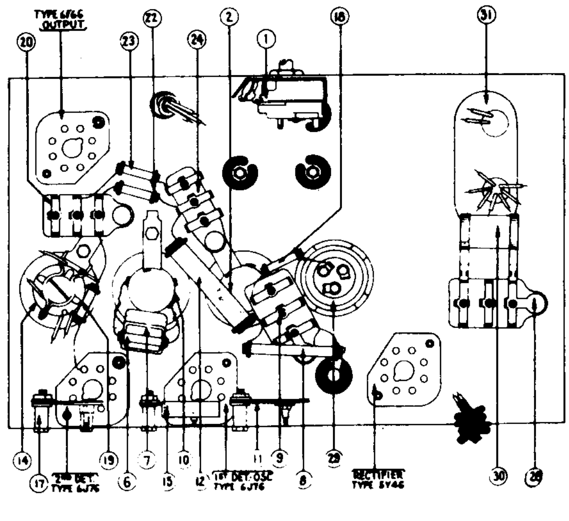


Fig. 3. Base view of Chassis

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-38

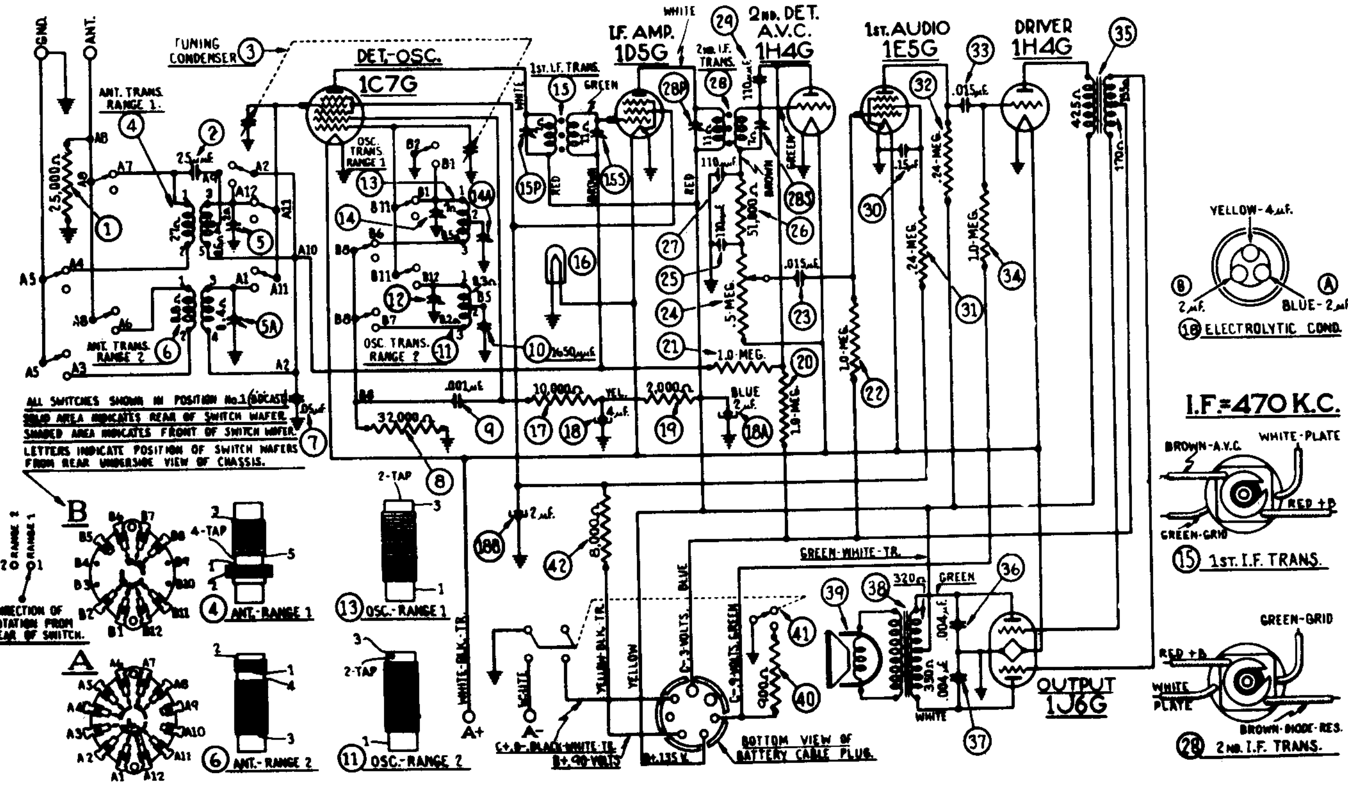


Fig. 5—Schematic Diagram—Model 37-38

Replacement Parts—Model 37-38

Schem. No.	Description	Part No.	List Price
1	Resistor (25,000 ohm, ½ watt)	33-325339	$0.20
2	Condenser (25 mmfd. mica)	30-1067	.20
3	Tuning Condenser	31-1826	3.00
4	Antenna Transformer (Broadcast)	32-2159	1.20
5	Compensator (Twin)	31-6120	.50
6	Antenna Transformer (Police)	32-2246	.80
7	Condenser (.05 mfd. tubular)	30-4444	.20
8	Resistor (32,000 ohm, ½ watt)	33-332339	.20
9	Condenser (.001 mfd. tubular)	30-4453	.20
10	Condenser (1650 mmfd. semi-fixed)	31-6096	.40
11	Oscillator Transformer (Police)	32-2121	.40
12	Compensator (Single)	31-6101	.20
13	Oscillator Transformer (Broadcast)	32-2120	.65
14	Compensator (Twin)	31-6100	.40
15	1st I.F. Transformer	32-2100	1.50
16	Pilot Lamp	34-2150	.26
17	Resistor (10,000 ohm, ½ watt)	33-310339	.20
18	Electrolytic Condenser (4-2-2 mfd.)	30-2162	1.40
19	Resistor (2,000 ohm, ½ watt)	33-220339	.20
20	Resistor (1 megohm, ½ watt)	33-510339	.20
21	Resistor (1 megohm, ½ watt)	33-510339	.20
22	Resistor (1 megohm, ½ watt)	33-510339	.20
23	Condenser (.015 mfd. tubular)	30-4358	.20
24	Volume Control	33-5165	1.00
25	Condenser (110 mmfd. mica)	30-1031	.20
26	Resistor (51,000 ohm, ½ watt)	33-351339	$0.20
27	Condenser (110 mmfd., mica)	30-1031	.20
28	2d I.F. Transformer	32-2102	1.50
29	Condenser (110 mmfd., mica)	30-1031	.20
30	Condenser (.15 mfd. bakelite)	6287BG	.35
31	Resistor (240.000 ohm, ½ watt)	33-424339	.20
32	Resistor (240,000 ohm, ½ watt)	33-424339	.20
33	Condenser (.015 mfd. tubular)	30-4226	.20
34	Resistor (1 megohm, ½ watt)	33-510339	.20
35	Audio Transformer (Interstage)	32-7637	2.00
36	Condenser (.004 mfd. tubular)	30-4456	.20
37	Condenser (.004 mfd. tubular)	30-4456	.20
38	Output Transformer—KR17, HR12	32-7639	1.60
39	Cone Voice Coil—KR17	36-3540	.80
	Cone Voice Coil—HR12	36-3557	1.20
40	Resistor (900 ohm, ½ watt)	33-1223	.20
41	Power Switch	33-5170	1.20
42	Resistor (8,000 ohms, ½ watt)	33-280339	.20
	Range Switch	42-1195	
	Screen Bracket Assembly	31-1878	.25
	Dial	27-5196	.45
	Hub	28-7152	.10
	Clamp	28-2837	.10
	Set Screw	W-1506	2.00 C
	Pilot Lamp Assembly	38-7875	
	Pilot Lamp	34-2150	
	Vernier Drive	31-1863	.35
	Socket—8 prong	27-6068	$0.11
	Socket—7 prong	27-6067	.11
	Tube Shield	28-2726	.10
	Tube Shield Base	28-3896	.08
	Volume Control Shaft	38-8058	
	Shaft Spring	28-4117	.40 C
	Shaft Retaining Clip	28-4394	.01
	Mounting Grommet R.F. Unit	27-4317	.04
	Mounting Sleeve	28-2257	.01
	Washer	W-425	.85 C
	Screw	W-729	.45 C
	Washer	28-3927	.01
	Terminal Panel (I.F. Unit)	38-7703	.25
	Spacer	28-4001	.25 C
	Cable Assembly (Battery)	41-3198	1.40
	A Battery, Wet	172R	
	A Battery, Dry	41-8011	
	B Battery	41-8007	
	Cable (Speaker)	41-3207	.30
	Knob, Tuning	27-4321	.10
	Knob, Tone and Volume	27-4332	.10
	Speaker, KR-17, B. and F. Cabinets	36-1248	10.00
	Speaker, HR-12, J. Cabinet	36-1250	11.00

Figures in black type indicate circled figures in Base View.

Prices Subject to Change without Notice.

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-38

Electrical Specifications

Type Circuit: Superheterodyne, with class "B" audio output, battery operated.

Batteries Required:

"A" supply—**Philco 172R** 2 volt storage battery or a dry A battery Philco Part No. 41-8011. If a dry A supply is used, a ballast lamp Philco type **1F1 must** be inserted in the socket provided in the dry A battery (Part 41-8011). This small lamp acts as a voltage regulator, and maintains a constant potential of two volts on the filaments of the receiver tubes.

"BC" supply—Philco battery Part No. 41-8007 is used to supply B and C voltages. This battery contains a socket into which the receiver battery cable plug is inserted.

Current Drain: A Battery, 720 M. A.; B Battery, 20 M. A.

Philco Tubes Used: 1C7G, Detector Oscillator; 1D5G, I.F. Amplifier; 1H4G, 2nd Detector, A.V.C.; 1E5G, 1st Audio; 1H4G, Driver; 1J6G, Output.

Frequency Range: Range 1, 530-1720 K. C.; Range 2, 2.3-7.4 M. C.

Intermediate Frequency: 470 K. C.

Speaker: KR-17—B, F Cabinets; HR-12—J Cabinet.

Alignment of Compensators

To accurately adjust this receiver, precision test equipment is necessary. A signal generator such as the PHILCO MODEL 088 Signal Generator, covering from 110 to 20,000 K. C. is recommended for use in adjusting the compensators at the various frequencies specified. A visual indication of the receiver output is also necessary to obtain correct adjustment of the compensators. PHILCO MODEL 025 Circuit Tester contains a sensitive output meter and is recommended for these adjustments.

Philco Fibre Wrench No. 3164 and Fibre Handle Screw-Driver No. 27-7059 complete the necessary equipment for these adjustments. The locations of the various compensators are shown in Figs. 2 and 3.

The following procedure must be observed in adjusting the compensators:—

DIAL ADJUSTMENT—The tuning condenser is set at the maximum capacity position, by turning the tuning knob clockwise. Loosen the set screw of dial hub and set dial, with Glowing Indicator centered between the first and second index lines at the low frequency end of scale.

OUTPUT METER—The 025 Output Meter is connected between one of the plate prongs of the 1J6G tube and the chassis. Then adjust the meter to use the (0-30) volt scale.

INTERMEDIATE FREQUENCY CIRCUIT

Frequency 470 K. C.

1. Connect the 088 Signal Generator output lead through a .1 mfd. condenser, to the control grid of the 1C7G tube, and the generator ground lead to the chassis.
2. Set the range switch in position No. 1 (Broadcast), then rotate the tuning condenser of the receiver to the maximum capacity position (clockwise) and adjust the signal generator for 470 K. C. Now adjust compensators (28s) 2nd I.F. Sec., (28p) 2nd I.F. Pri., (15s) 1st I.F. Sec. and (15p) 1st I.F. Pri. for maximum output.

RADIO FREQUENCY CIRCUIT

Tuning Range 2.3 M. C. to 7.4 M. C.

1. Remove the signal generator output lead from the grid of the 1C7G tube and connect it through a 200 mmf Condenser to the antenna terminal on input panel (rear of chassis), and the generator ground lead to the ground terminal of this panel.
2. Set the range switch in position No. 2. Turn the receiver and signal generator dials to 7.0 M. C. Now adjust compensator (12) for maximum output.

SOCKET VOLTAGES

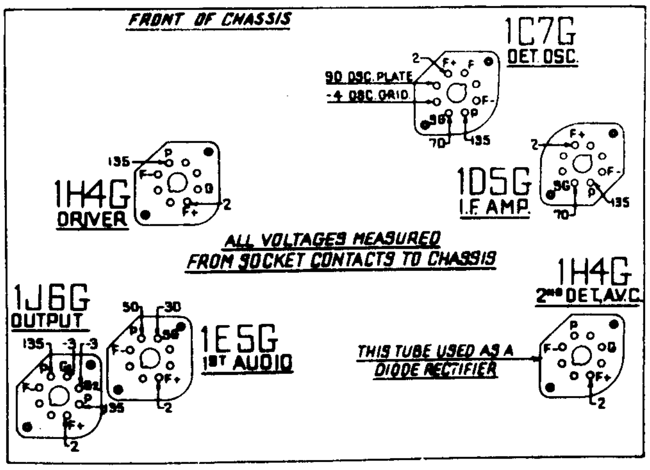


Fig. 1—Socket Voltages—Underside of Chassis View

The voltages indicated by arrows were measured with a **Philco 025 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position.

3. Turn signal generator and receiver dials to 6.0 M. C. and adjust compensator (5)a for maximum output.

Tuning Range 530 to 1720 K. C.

1. Set range switch in position No. (1) (Broadcast). Turn signal generator and receiver dials to 1600 K. C. Then adjust (14) Osc. "Screw", and (5) antenna for maximum output.
2. Turn signal generator and receiver dials to 580 K. C. and adjust compensator (14a) Osc., "nut"—see Fig. 3—as follows: To adjust compensator (14a) the tuning condenser must be rolled for maximum output, thusly: First turn the compensator (14a) for maximum output. Then vary the tuning condenser for maximum output about 580 K. C. Now retune compensator (14a) and again vary the tuning condenser back and forth about the 580 K. C. dial mark for maximum output.

This operation of first tuning the compensator, then the tuning condenser is continued until maximum output is obtained at the 580 K. C. dial mark. If the signal generator is not accurately calibrated the maximum point on the dial of the receiver may fall slightly above or below the 580 K. C. dial mark.

3. Turn signal generator and receiver dials to 1600 K. C. and readjust compensator (14) Osc. "screw" for maximum output.
4. Turn signal generator and receiver dials to 1500 K. C. and readjust compensator (5) for maximum output.

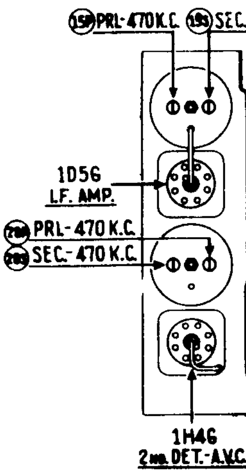


Fig. 2—I.F. Compensators Top of Chassis

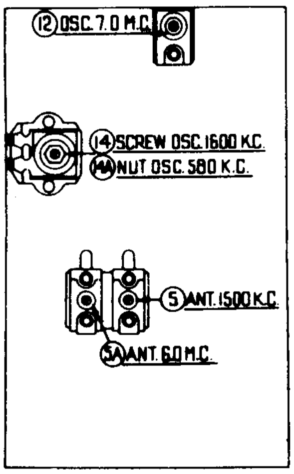


Fig. 3—R.F. Compensators Underside of Chassis

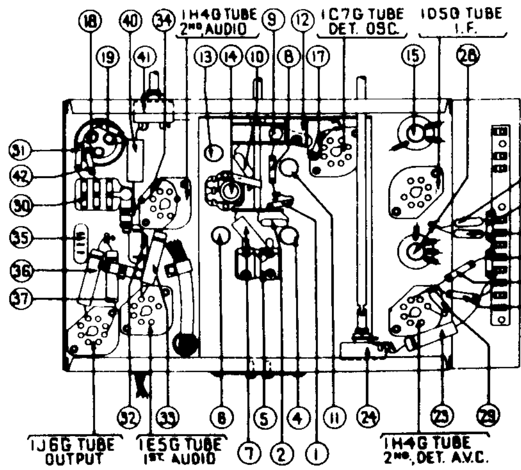


Fig. 4—View of Parts from Underside of Chassis

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-33

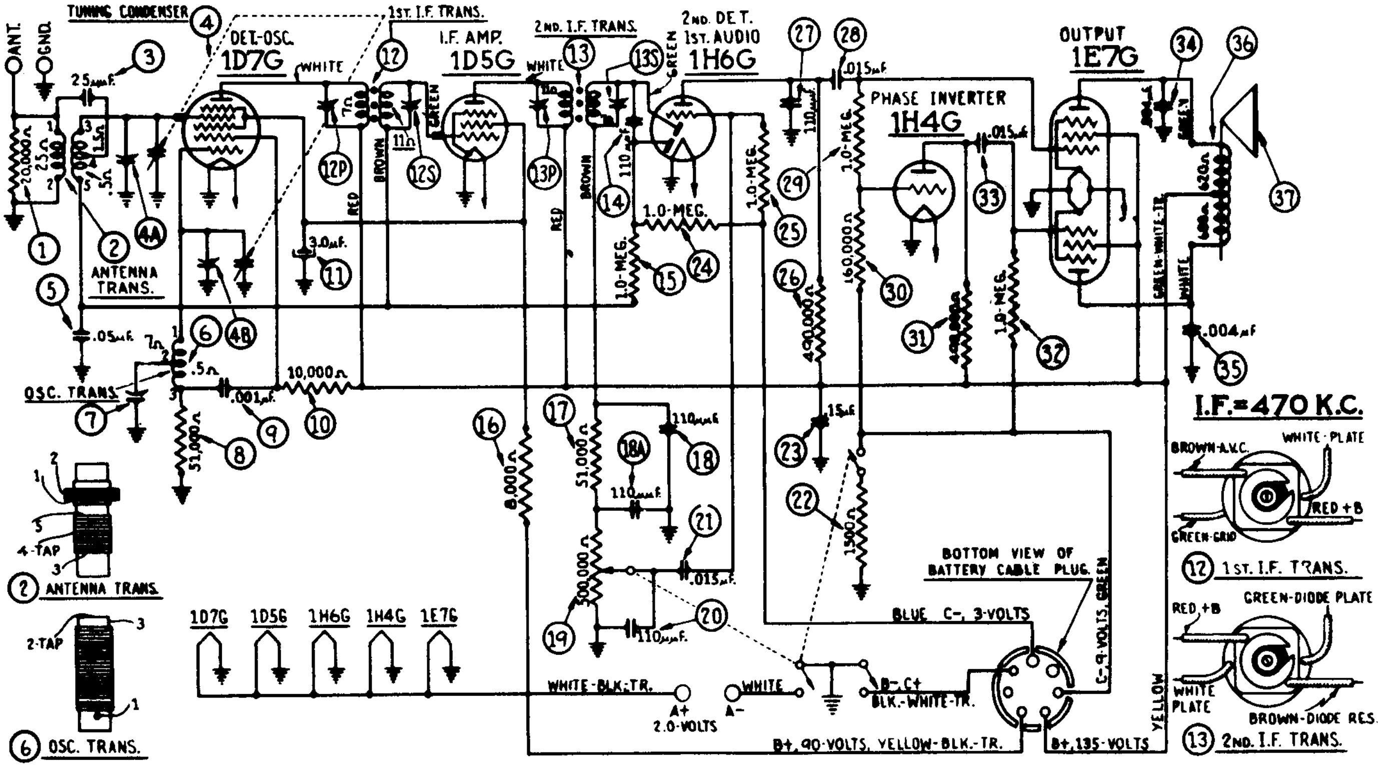


Fig. 4—Schematic Diagram

Replacement Parts—Model 37-33

Schem. No.	Description	Part No.	List Price
1	Resistor (20,000 ohm, ½ watt)	33-320339	$0.20
2	Transformer, Antenna	32-2212	1.20
3	Condenser (25 mmfd., mica)	30-1067	.20
4	Tuning Condenser	31-1902	3.00
5	Condenser, Tubular (.05 mfd.)	30-4444	.20
6	Oscillator Transformer	32-2213	.55
7	Compensator (580 K.C.)	04000S	.35
8	Resistor (51,000 ohms)	33-351339	.20
9	Condenser (.001 mfd., tubular)	30-4201	.20
10	Resistor (10,000 ohm, ½ watt)	33-310339	.20
11	Electrolytic Condenser (3 mfd.)	30-2158	.90
12	1st I. F. Transformer	32-2100	1.50
13	2d I. F. Transformer	32-2102	1.50
14	Condenser (110 mmfd., mica)	30-1081	.20
15	Resistor (1 megohm, ½ watt)	33-510339	.20
16	Resistor (8,000 ohm, ½ watt)	33-280339	.20
17	Resistor (51,000 ohm, ½ watt)	33-351339	.20
18	Condenser (110 mmfd., double bakelite)	8035DG	.35
19	Volume Control & Power Switch	33-5169	1.45
20	Condenser (110 mmfd., mica)	30-1081	.20
21	Condenser (.015 mfd.)	3793SU	.35
22	Resistor (1,500 ohm, ½ watt)	33-215339	.20
23	Condenser (.15 mfd., tubular)	30-4191	.25
24	Resistor (1 megohm, ½ watt)	33-510339	.20
25	Resistor (1 megohm, ½ watt)	33-510339	.20
26	Resistor (490,000 ohm, ½ watt)	33-449339	.20
27	Condenser (110 mmfd., mica)	30-1081	$0.20
28	Condenser (.015 mfd., bakelite)	3793SU	.35
29	Resistor (1 megohm, ½ watt)	33-510339	.20
30	Resistor (160,000 ohm, ½ watt)	33-416339	.20
31	Resistor (490,000 ohm, ½ watt)	33-449339	.20
32	Resistor (1 megohm, ½ watt)	33-510339	.20
33	Condenser (.015 mfd., bakelite)	3793SU	.35
34	Condenser (.004 mfd., tubular)	30-4185	.25
35	Condenser (.004 mfd., tubular)	30-4185	.25
36	Speaker L2B, B and F Cabinets	36-1256	6.50
37	Cone Assembly	45-2315	
	Dial	27-5243	.15
	Pointer	27-7033	.01
	Felt Washer	27-7807	.50 C
	Knob Assembly	27-4282	.10
	Vernier Drive	31-1926	
	Pilot Lamp	5316	.23
	Pilot Lamp Assembly	38-7964	.45
	Cable Assembly	41-3208	1.40
	Clamp	28-2845	.60 C
	Terminal Panel R.F.	38-7962	.06
	Spacers	28-4001	.35 C
	Washers	W-442	.20 C
	Mounting Plate (Coil)	28-3886	.02
	Spacer	27-8328	.01
	Screw	W-1635	.30 C
	Socket—7 prong	27-6957	$0.11
	Socket—8 prong	27-6058	.11
	Shield Base	28-3898	.03
	Shield	28-2726	.10
	Fahnstock Clip	L-1126	1.25 C
	Washer	4243	.01
	Washer	27-7414	70 C
	Lugs	L-1125	75 C
	B Battery	41-8007	
	A Battery (Wet)	172R	
	A Battery (Dry)	41-8011	
	Ballast Lamp	1Y1	
	Mounting Screw (Chassis)	W-567	3.00 C
	Mounting Washer (Chassis)	W-315	.50 C
	Mounting Nut (Chassis)	W-124	.35 C
	Mounting Bolt (Speaker)	W-1604	.50 C
	Nut (Speaker)	W-134	.35 C
	B CABINET		
	Baffle Silk Assembly	40-5988	.30
	F CABINET		
	Baffle Silk Assembly	40-5933	.75
	Bottom Shield	27-8440	.08

Figures in black type indicate circled figures in base view.

Prices Subject to Change Without Notice

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-33

SERVICE DATA

Electrical Specifications

Type Circuit: Superheterodyne, with push-pull pentode audio output, battery operated.

Batteries Required:

"A" supply—**Philco 172R** 2 volt storage battery or a dry A battery **Philco Part No. 41-8011.** If a dry A supply is used, a ballast lamp (**Philco Part No. 1Y1**) must be inserted in the socket provided in the dry A battery **Part No. 41-8011.** This lamp acts as a voltage regulator, and maintains a constant potential of two volts on the filaments of the receiver tubes.

"BC" supply—Philco battery Part No. 41-8007 is used to supply B and C voltages. This battery contains a socket into which the receiver battery cable plug is inserted.

Current Drain: A Battery, 540MA. B Battery, 13MA.

Philco Tubes Used: 1D7G, Detector Oscillator; 1D5G, I.F. Amplifier; 1H6G, 2nd Detector, 1st audio; 1H4G, Phase inverter; and 1E7G, Output.

Frequency Range: 530–1720 K.C.

Intermediate Frequency: 470 K.C.

Speaker: Permanent Magnet Model L2B.

Aligning Compensators

To accurately adjust this receiver precision test equipment is necessary. A signal generator such as the **Philco Model 088,** covering from 110 to 20,000 K.C. is recommended for adjusting the various compensators at the frequencies specified. A visual indication of the receiver output is also necessary, **Philco Model 025 Circuit Tester** contains a sensitive output meter and is recommended for this purpose.

Philco fibre handle screw-driver No. 27-7059 and wrench Part No. 3164 complete the equipment necessary for the following adjustments. The locations of the various compensators are shown in Fig. (2).

OUTPUT METER—The 025 Output Meter is connected between one of the plate contacts of the 1E7G tube and ground. Adjust the meter to use the (0-30) volt scale.

INTERMEDIATE FREQUENCY CIRCUIT

Frequency 470 K. C.

1. Connect the 088 Signal Generator output lead through a .1 mfd. condenser to the control grid of the 1C7G tube; and the ground connection of the output lead to the chassis. Then turn the tuning condenser to approximately 580 K.C. and adjust the signal generator for 470 K.C.

2. Now adjust compensators 13s, 2nd I. F. Sec., 13p 2nd I. F. Pri., 12s 1st I. F. Sec., and 12p 1st I. F. Pri. for maximum output.

RADIO FREQUENCY, CIRCUIT

530 to 1720 K.C.

1. Remove the signal generator output lead from the 1C7G tube and connect it through a 200 mmfd. condenser to the antenna post of the receiver, and the generator ground lead to the chassis.

2. Turn signal generator to 1700 K.C. Rotate receiver tuning condenser to minimum capacity position (clockwise); then place a 006" gauge between the rotor and stator plates (left side of tuning condenser facing front of receiver), and turn condenser until rotor and stator gauge touch gauge. Now remove gauge without disturbing setting of the plates. Compensators 4b Osc. and 4a Ant. are then adjusted for maximum output.

3. Turn signal generator and receiver dials to 580 K.C. and adjust compensator 7 as follows:

First tune compensator 7 for maximum output. Then vary the tuning condenser for maximum output. Now retune compensator 7 and again vary the tuning condenser back and forth about 580 K.C. for maximum output. This operation of first tuning the compensator, then the tuning condenser is continued until maximum output is obtained at the 580 K.C. frequency.

4. Readjust the 1700 K.C. end of dial as given in paragraph 2 above.

5. Then turn signal generator and receiver dials to 1500 K.C. and adjust compensator 4a Ant. for maximum output.

DIAL CALIBRATION—After the above adjustments have been performed, the dial pointer is adjusted to track properly with the tuning condenser. To do this turn signal generator to 1000 K.C. and tune the receiver tuning condenser for maximum output at this frequency. When maximum output is obtained dial pointer is adjusted to the 1000 K.C. mark on dial.

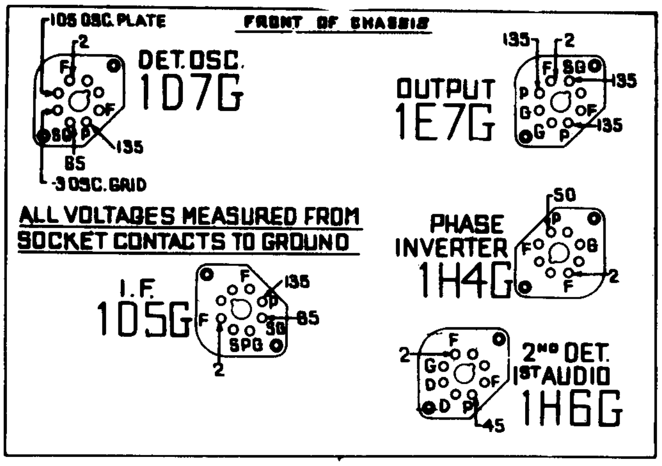


Fig. 1.—View of Sockets from Underside Chassis

The voltages indicated by arrows were measured with a **Philco 25 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum.

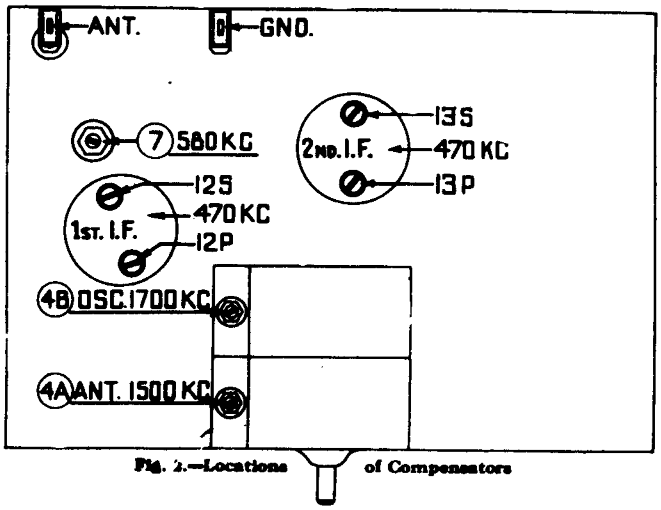


Fig. 2.—Locations of Compensators

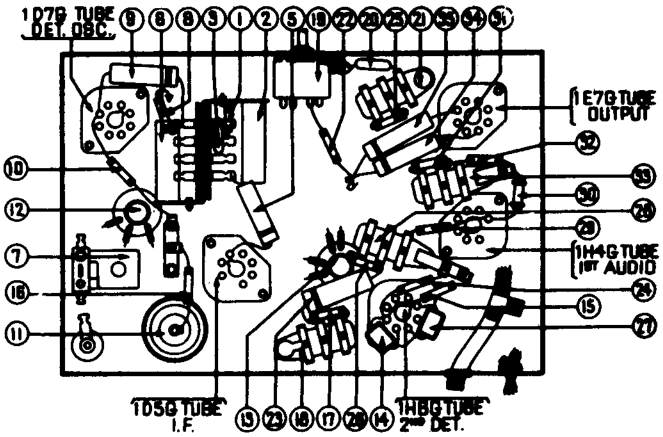
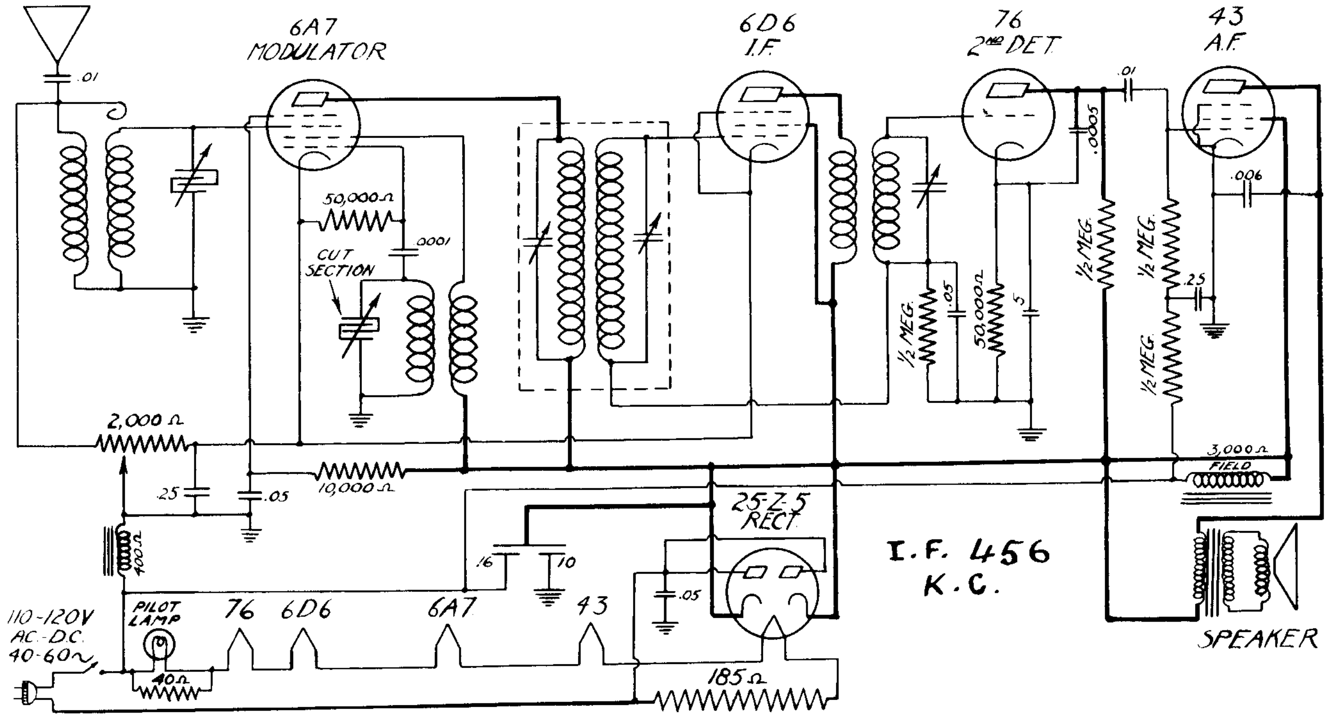


Fig. 3.—Parts Location. Underside of Chassis View

NOTE: See page 237 before servicing this set.

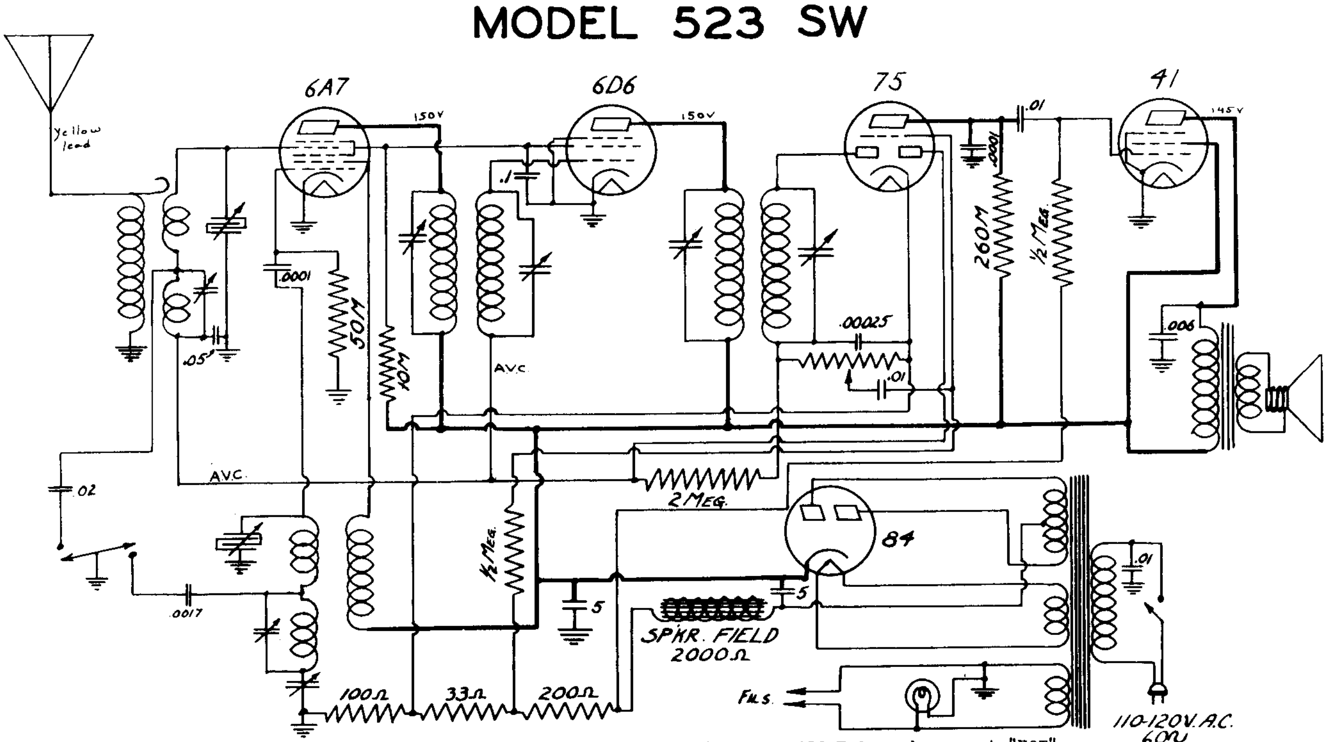
PIERCE AIRO, Inc.

MODEL 525



TO CALIBRATE:— CONNECT TEST OSCILLATOR TO GRID OF 6A7 AND CHASSIS. SHORT SET OSCILLATOR STATOR. PEAK I.F. TRANSFORMER AND 2nd DET. TO 456 KC. NEXT CONNECT TEST OSCILLATOR TO ANT. AND CHASSIS REMOVE STATOR SHORT AND SET TEST OSCILLATOR AND REC. DIAL AT 1500 KC. PEAK VAR. COND. TRIMMERS.

MODEL 523 SW

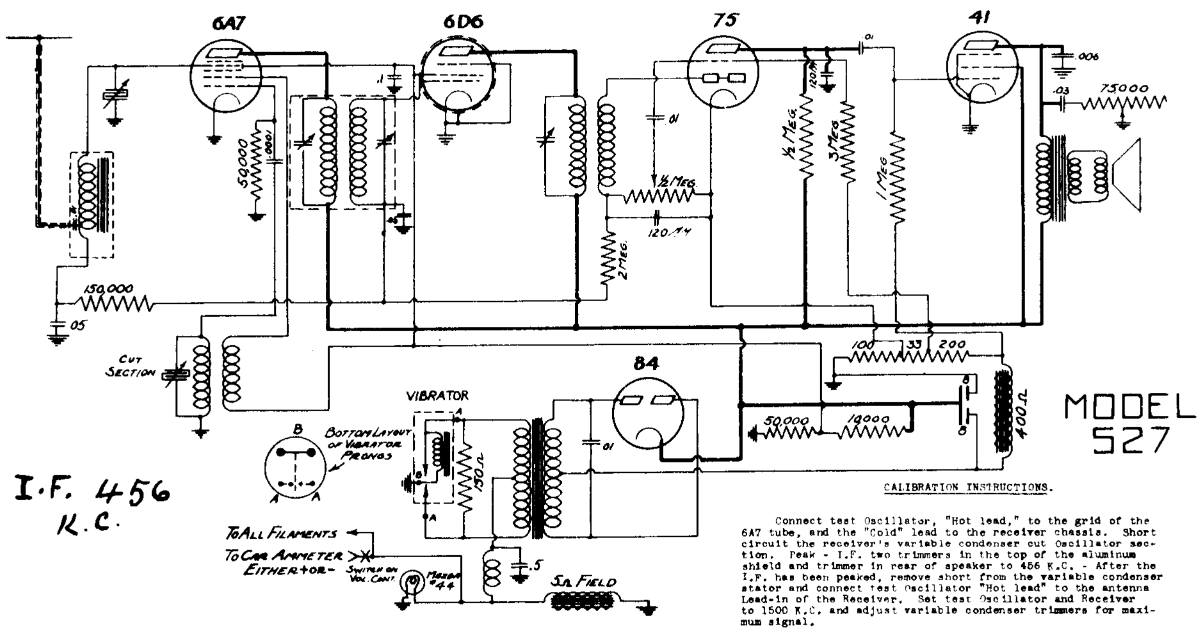


I.F. 456
K.C.

TO CALIBRATE: Set service oscillator to 456 K.C. and connect "HOT" lead to grid of 6A7 tube. Ground stator of front (oscillator) section of variable condenser. Turn volume control for maximum output and peak intermediate frequency trimmers for maximum gain. Turn wave band switch knob toward left. Adjust service oscillator and receiver to 7 megacycles and peak variable condenser trimmers for maximum gain. Turn wave band switch toward right and adjust service oscillator and receiver to 1500 K. C. Peak the trimmer next to the variable condenser and the one underneath chassis for maximum gain. Then adjust service oscillator and receiver to 600 K.C. and "rock" the variable condenser and adjust the padder (near front of chassis at the same time for maximum gain.

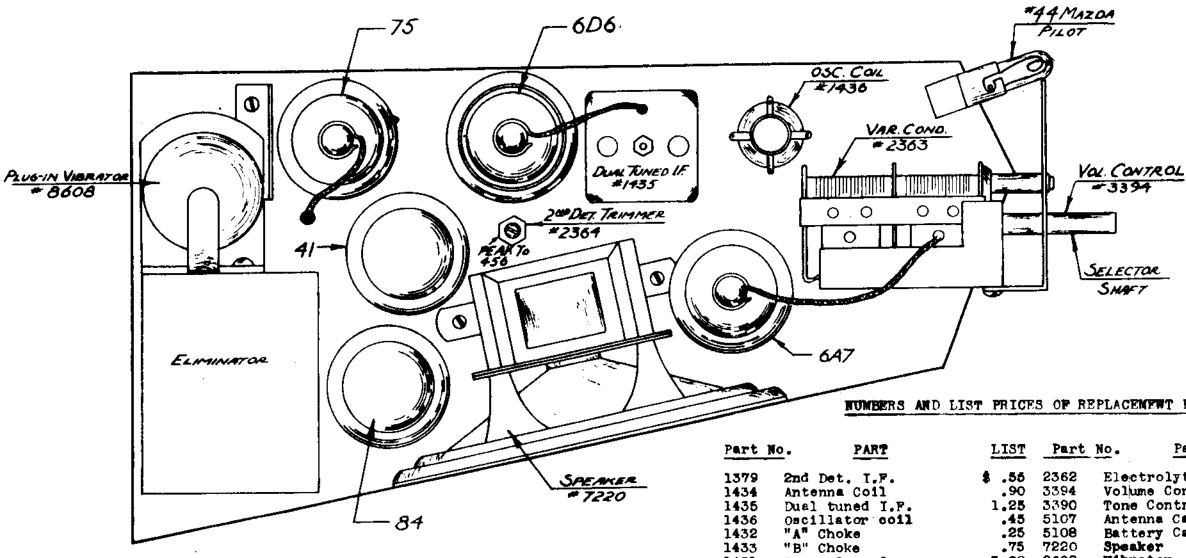
PIERCE AIRO, Inc.

MODEL 527 AUTO SET



CALIBRATION INSTRUCTIONS.

Connect test Oscillator, "Hot lead," to the grid of the 6A7 tube, and the "Cold" lead to the receiver chassis. Short circuit the receiver's variable condenser cut Oscillator section. Peak - I.F. two trimmers in the top of the aluminum shield and trimmer in rear of speaker to 456 K.C. - After the I.F. has been peaked, remove short from the variable condenser stator and connect test Oscillator "Hot lead" to the antenna Lead-in of the Receiver. Set test Oscillator and Receiver to 1500 K.C. and adjust variable condenser trimmers for maximum signal.



NUMBERS AND LIST PRICES OF REPLACEMENT PARTS

Part No.	PART	LIST	Part No.	Part	LIST
1379	2nd Det. I.F.	$ .55	2362	Electrolytic Cond.	$1.25
1434	Antenna Coil	.90	3394	Volume Control	.85
1435	Dual tuned I.F.	1.25	3390	Tone Control	.75
1436	Oscillator coil	.45	5107	Antenna Cable	.50
1432	"A" Choke	.25	5108	Battery Cable	.25
1433	"B" Choke	.75	7220	Speaker	4.50
1431	Power Transformer	3.00	8608	Vibrator	3.50
2363	2 Gang Variable Cond.	2.25			

F. 116

It is important that all items and connections in the electrical system of the car be in good condition. If excessive noises are present, it may be well to examine the following points:--

1. Antenna Lead: A Shielded Antenna lead is connected to the set. If any connections, extensions, or alterations are made to this lead, care should be taken to see that the lead is well shielded to a point without the field of interference. It is also necessary to ground the "far" end of the Antenna Lead-in Shield.

2. Battery: The battery should be kept in a well charged condition and the terminals cleaned of corrosion. Check generator charging rate to keep battery in charged condition.

3. Ignition Coil: In cases where noise is originating from the ignition coil, it may be overcome by placing a copper shield around the coil and grounding same.

4. Battery Cables: May be corroded at the battery and are making imperfect contact. Keep all battery cables and wires away from the high tension system. It may also be of advantage to place a choke coil of about 50 turns of #16 wire in series with the main battery lead to the set.

5. Wires under Car: Where wires run along chassis or other metal parts below the car, they should be inspected for quality of insulation and general condition. It may be well to place a condenser at the stop light switch and at the tail light.

6. Distributor: Points may be burned or improperly adjusted. Rotor arm may be making poor contact with cap.

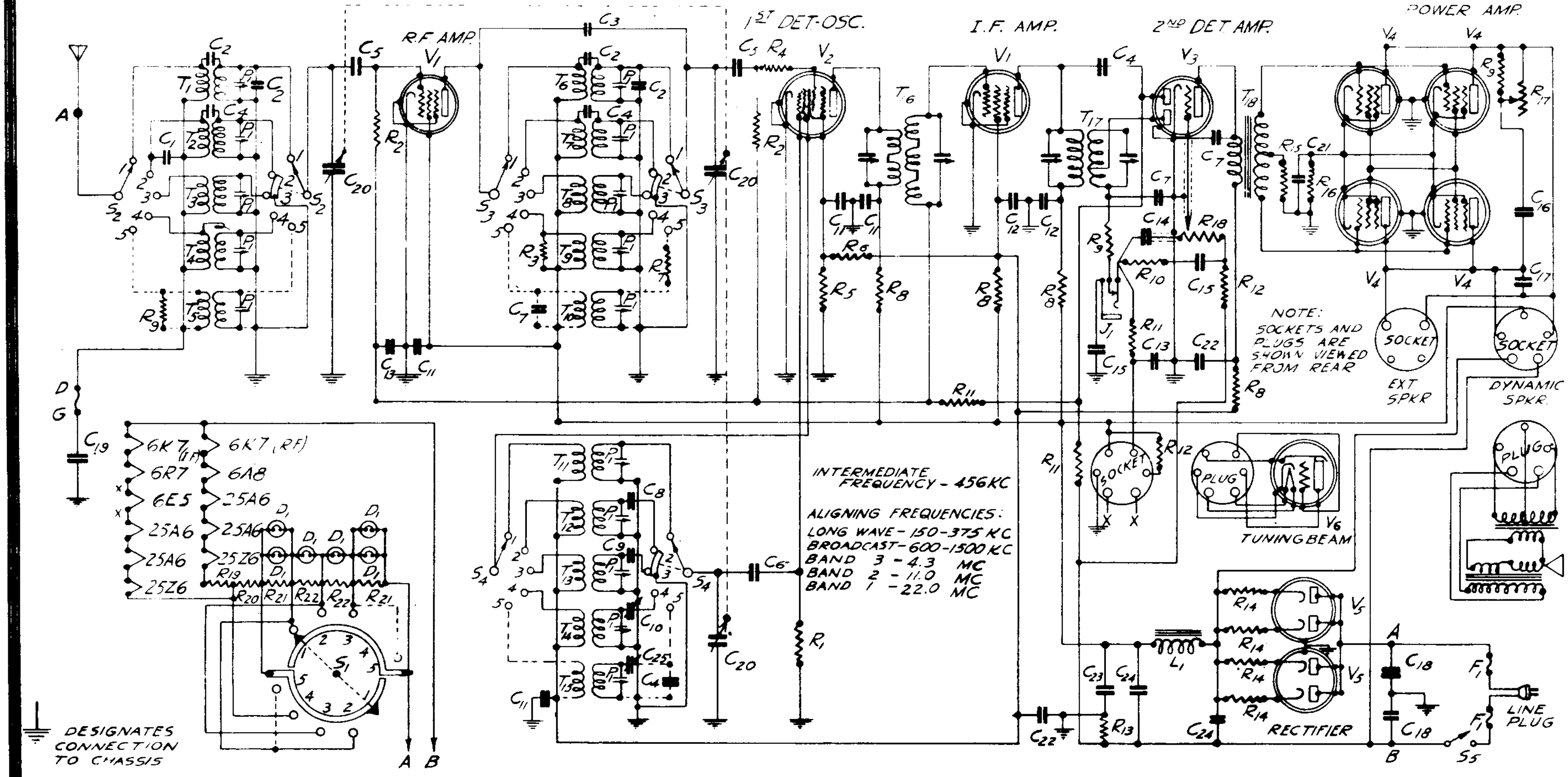
7. Distributor Cables: Cables may be "leaking" due to poor or burned insulation. In some installations, it may be necessary to shield the high tension leads with copper braid. If ignition cables are insulated with plain rubber insulation, it is not advisable to place shielding directly over the wire. In this case, the wire should be first covered with a varnished composition covering or loom. The battery lead from the ammeter to the distributor coil and the battery lead to the generator should be shielded.

8. Dome Light Wire: If dome light wire is radiating, it may be necessary to shield this wire. A .5 Mfd. condenser or a choke in series with this lead by-passed at either side of choke to chassis may help considerably. These connections should be made at the point where the dome light enters the upright post.

9. Bonding: Although metal joints on the car, such as dash panel to side of car, etc., may appear to be soldered, they may not be making good electrical contact and are causing noise. Paint and other material may get into seams and cause poor or intermittant contacts, and for this reason, it may be necessary to bond certain parts of the car. The brake rods, drive shaft tubes, and parts around the motor should be bonded.

PILOT RADIO CORPORATION

MODELS 304 & 305



R_1	72212	50,000 OHMS 1/4 WATT I.R.C.	R_{22}		14 OHMS PART OF $R_{19,20,21}$	C_{16}	22055C	.05 MF, 600V PAPER COND.	T_{16}	73030	1ST IF TRANSFORMER (WITH COND.)	L_1	78675	POWER FILTER CHOKE 8H, 100Ω
R_2	72213	500,000 " " " "				C_{17}	22055R	.005 ", 1000V " "	T_{17}	73031	2ND " " "			
R_3	72211	5000 " " " "				C_{18}	78503	DUAL .01 MF, 1000V " "	T_{18}	78664	AUDIO INPUT " , 1:4	V_1	71966	TYPE 6K7 VACUUM TUBE
R_4	78804	15 OHMS, 1/4 WATT FLEX'LE	P_1	72226 (304) 72227 (305)	RF COIL TRIM'R ASSY 3-35 mmf	C_{19}	22055U	" " " " "	T_{19}	PART OF 40806-07	OUTPUT TRANSFORMER (ON LOUD SPEAKER)	V_2	71961	" 6A8 " "
R_5	13074	20,000 OHMS 1/4 WATT CARB				C_{20}	72146B	10-450 mmf VAR AIR COND.				V_3	81961	" 6R7 " "
R_6	13149	6000 " " "				C_{21}	85002	30 MF, 25V ELECTR. "	S_1	78755 (MOD. 304)	LIGHTING (FRONT) SECT. BAND SW.	V_4	81960	" 25A6 " "
R_7	13029	250 " " "	C_1	28016-O	.0001 MF MICA COND, TYPE O	C_{22}	78688	10-10 MF, 150V " "	S_2	OR	ANTENNA (2ND) " " "	V_5	71968	" 25Z6 " "
R_8	13028	1,000 " " "	C_2	27737-O	.00001 " " " "	C_{23}		20 " " " "	S_3	78754	DETECTOR (3RD) " " "	V_6	71993	" 6E5 " " (FOR 100V OPER'N)
R_9	13164	50,000 " " "	C_3		.000002 MF	C_{24}	78689	30-30 " " " "	S_4	(MOD. 305)	OSCILLATOR (REAR) " " "	F_1	70053A	2 AMP. FUSE
R_{10}	13147	300,000 " " "	C_4	27736-O	.000025 MF MICA COND, TYPE O	C_{25}	71577C	PART OF C_{10} IN MOD. 305 (30-150 mmf)	S_5	PART OF 78669	LINE SWITCH (ON VOL. CONT.)	D_1	71282	6V, .25A PILOT LAMP (BLUE BEAD)
R_{11}	13007	2 MEGOHMS " "	C_5	27701-O	.00025 " " " "			(250-500 mmf)				LS_1	40806	10" DYNAMIC (LOUD SPEAKER) (500Ω FIELD)
R_{12}	13001	1 " " "	C_6	28016-W	.0001 " " " W				J_1	70950	PHONOGRAPH INPUT JACK	LS_2	40807	12" " "
R_{13}	13188	23 OHMS, 1 WATT CARB	C_7	27701-W	.00025 " " " "	T_1, T_3	73032	BANDS 1&3 ANT. COILS						
R_{14}	13189	30 " " "	C_8	27747-W	.00267 " " " "	T_2, T_4	73035	" 2&4 " "						
R_{15}	13044	10,000 ", 1/4 WATT "	C_9	27748-W	.00130 " " " "	T_5	73038	" 5 " "						
R_{16}	13190	200 ", 3 WATTS "	C_{10}	71503D	300-700 mmf MICA PADDER	T_6, T_8	73033	" 1&3 DET. "						
R_{17}	78668	100,000 " TONE CONTROL	C_{11}	22055Z	.02 MF, 400V PAPER COND.	T_7, T_9	73036	" 2&4 " "						
R_{18}	78669	2 MEGOHMS VOL. "	C_{12}	22055W	.01 " " " "	T_{10}	73039	" 5 " "						
R_{19}		20 OHMS VITREOUS	C_{13}	22055I	.05 " 200V " "	T_{11}, T_{13}	73034	" 1&3 OSC. "						
R_{20}	78700	23 " ENAMELED	C_{14}	22055H	.02 " " " "	T_{12}, T_{14}	73037	" 2&4 " "						
R_{21}		28 " RESISTOR	C_{15}		.5 " " " "	T_{15}	73040	" 5 " "						

$T_5 (P_1)$, $T_{10} (P_1)$, $T_{15} (P_1)$, $1-C_4$, $1-C_5$, R_7, $1-R_9$, C_{25} TO BE OMITTED IN MODEL 304.

NOTE: ADDITIONAL WIRING FOR LONG WAVE BAND ON MODEL 305 IS SHOWN IN DOTTED LINES

PILOT RADIO CORPORATION

SERVICE INFORMATION FOR PILOT MODELS 304 AND 305

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the knobs and felt washers from the controls on the front panel.

Remove the back from the cabinet.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet and pull chassis out.

Remove the tuning beam connector cable from the socket at the front of the chassis.

REALIGNMENT: If the receiver requires alignment, the procedure outlined below should be followed. In the service information sheet, the location and function of the various alignment capacitors are clearly illustrated. For best results, an external modulated oscillator with adequate frequency range and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis, and reinsert the tuning beam cable plug in the socket at the front of the chassis.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. When aligning the receiver on all positions, the volume control and the tone control should be turned to the maximum clockwise position. Connect the antenna lead of the external oscillator to the control grid of the 6K7 tube in the I. F. Amplifier through a .1 mfd. fixed condenser. Connect the ground lead of the external oscillator to the chassis. The I. F. alignment trimmers are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. Following this, connect the external oscillator leads to the control grid of the 6A8 tube. Adjust each trimmer on I. F. Unit No. 1 for maximum gain.

During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in all I. F. Units, with the external oscillator leads connected to the control grid of the 6A8 tube.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads through a .0002 mfd. condenser. Leave the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Tune the external oscillator to 1500 kc. Adjust the broadcast band oscillator trimmer to maximum response.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located in the lower rear partition of the band switch, under the chassis. Set the external oscillator at 600 kc. Rotate the receiver tuning control to the resonance position, and at the same time adjust the padder condenser for the highest peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

The alignment frequencies are as follows:

Band 5—150 and 375 kc.—2000 and 800 m.
Band 4—600 and 1500 kc.—500 and 200 m.
Band 3—69.7 meters— 4,300 kc.
Band 2—27.2 meters—11,000 kc.
Band 1—13.6 meters—22,000 kc.

When aligning Band 3, set the Band Switch in the position marked Band 3. Rotate the tuning condenser to the 4300 kc. indication on the dial scale. Set the external oscillator at 4300 kc. Adjust the Band 3 oscillator trimmer for maximum sensitivity. Next adjust the interstage and antenna trimmer condensers for maximum sensitivity. Check the overall sensitivity of the band at several points along the dial scale.

Align Band 2 in a similar manner using a 400-ohm non-inductive resistor in place of the .0002 mfd. condenser. The alignment frequency is 11,000 kc. (27.2 meters).

The alignment of Band 1 requires greater care due to the higher frequencies covered by this band. The tracking characteristic of Band 1 of this receiver differs from that of the other bands, in that the 1st detector and T.R.F. circuits resonate on the high frequency side of the oscillator. This condition applies only to Band 1. The alignment frequency is 22,000 kc. or 13.6 meters. Set the external oscillator at 22,000 kc. Rotate the tuning condenser of the receiver until the dial pointer is co-incidental with the 22,000 kc. indication on the dial scale. Adjust the oscillator trimmer condenser for maximum sensitivity. Proceed next to align the interstage section. In doing this it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonant peak. Next align the antenna section for minimum sensitivity.

THE LONG WAVE ALIGNMENT procedure in the Model 305 is similar to that of the broadcast. Turn the Band Switch to the Long Wave position. The alignment frequency is 375 kc. Adjust the padder condenser at 150 kc. Use a .0002 mfd. condenser in the antenna lead from the external oscillator.

REMOVAL OF BAND SELECTOR SWITCH ASSEMBLY: Should it be necessary to remove the switch assembly, it is advisable to realign the receiver after reinstalling it.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

RECEIVER DESCRIPTION

Undistorted power output—4 watts.
I. F.—456 kc.

Type of Circuit — All wave Superheterodyne with TRF stage on all bands, A. V. C., Class "A" push pull parallel power output stage.

VOLTAGES

The D. C. Voltages measured at the tube sockets of the set should be read with a high resistance voltmeter of at least 1,000 ohms per volt.

	R.F. 6K7	Osc. & 1st Det. 6A8		I.F. 6K7	2nd Det. & Amp. 6R7	Pwr. Pent. 25A6	Pwr. Pent. 25A6	Pwr. Pent. 25A6	Pwr. Pent. 25A6	Rect. 25Z6	Rect. 25Z6	T.B. 6E5
Plate	91	80	88	83	73	80	80	80	80	......	......	*6
Screen	91	......	49	80	......	90	90	90	90	......	......	......
Cathode	0	0	0	0	0	12.5	12.5	12.5	12.5	99	99	......
Filament	6.3	6.5	......	6.3	6.3	26	26	26	26	26	26	6.3

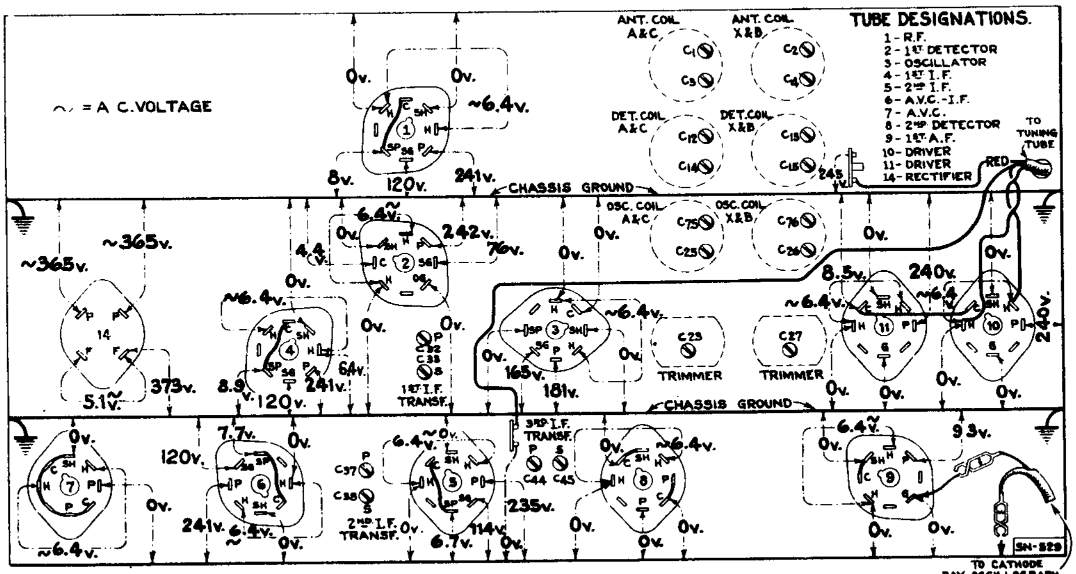
Speaker field—99 Volts. Tuning Beam—Target 90 volts to ground.

A 6E5 tuning beam should be plugged into the tuning beam socket on the chassis, whenever the receiver is operated outside the cabinet.

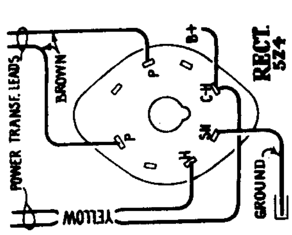
* Measured through 1 megohm.

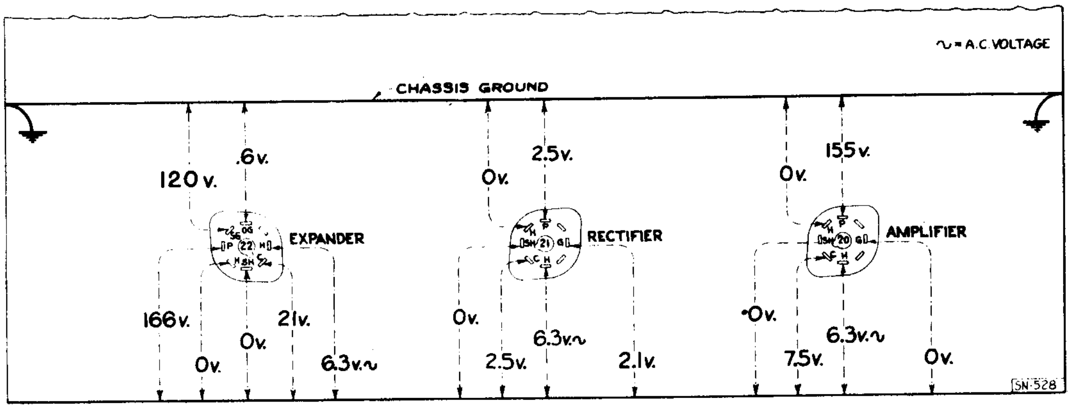
RCA MANUFACTURING COMPANY, Inc.

MODELS D22-1 & D22-1A

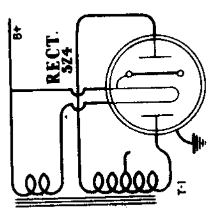


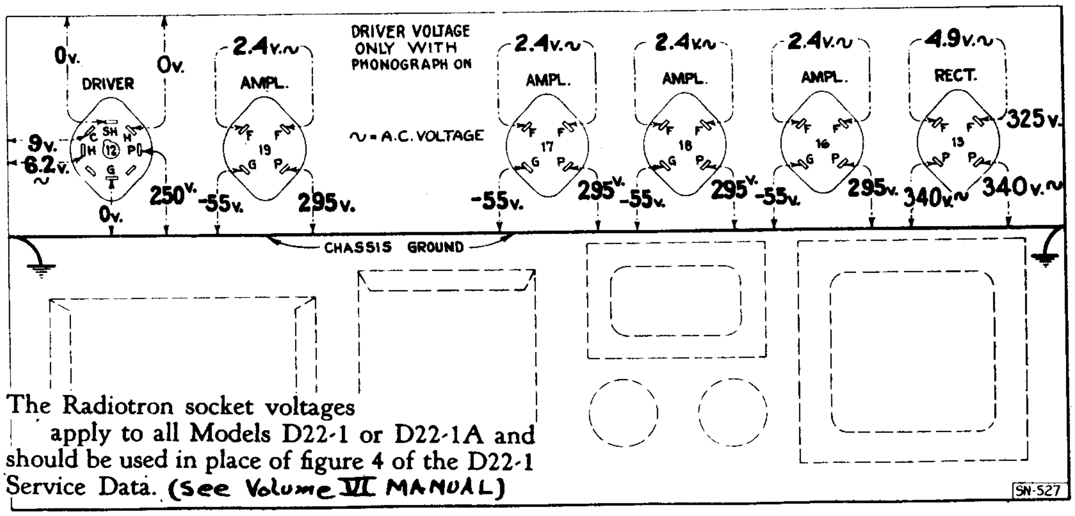
Receiver Chassis





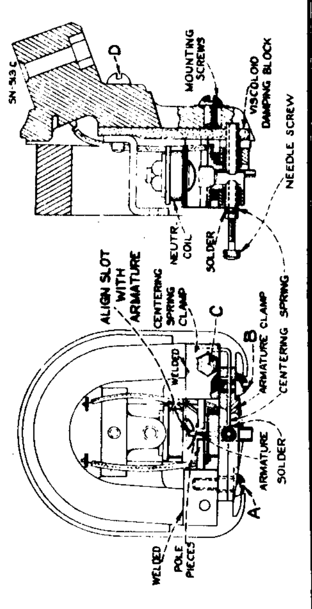
Dynamic Amplifier





The Radiotron socket voltages apply to all Models D22-1 or D22-1A and should be used in place of figure 4 of the D22-1 Service Data. (See Volume VI MANUAL)

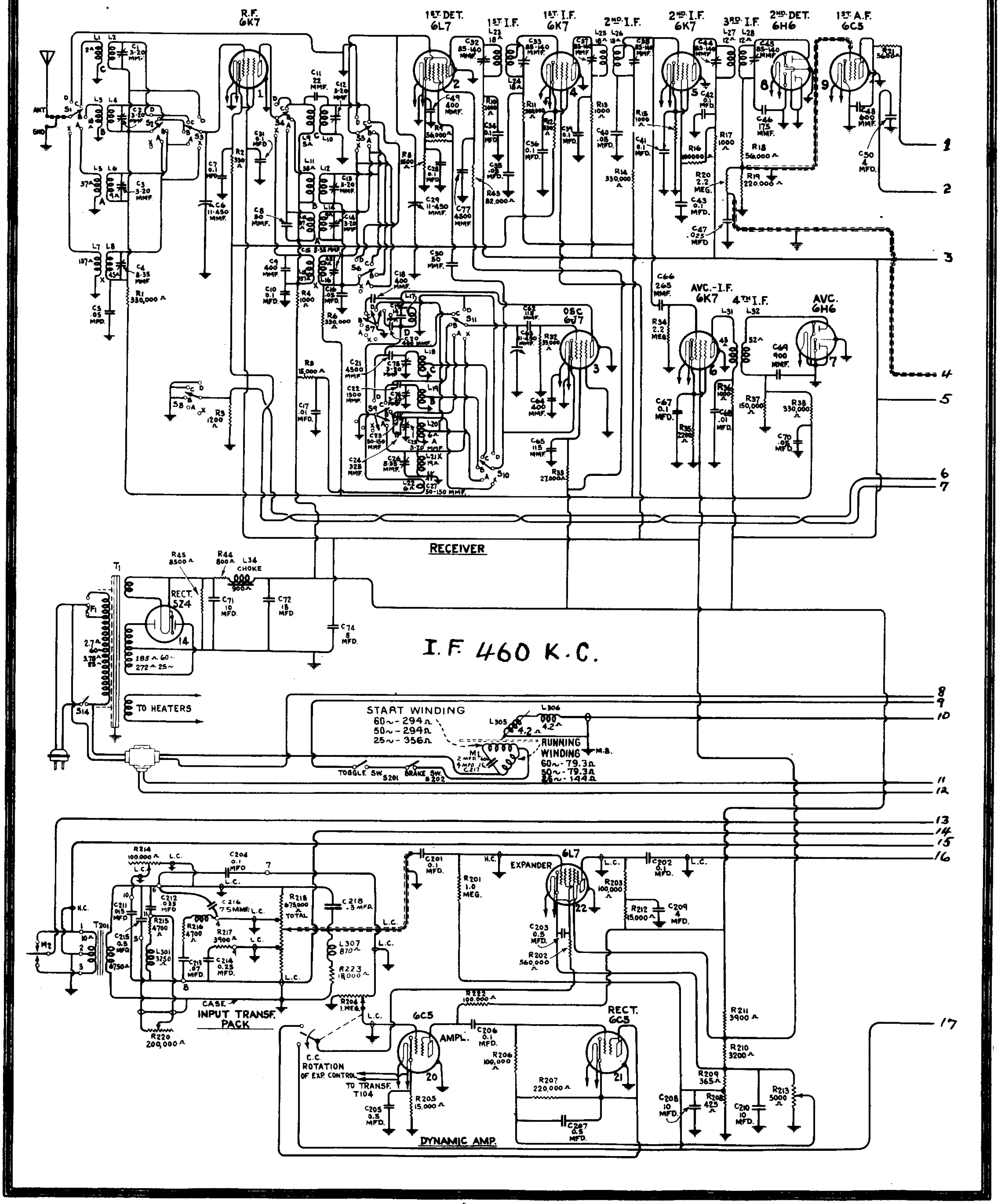
Power Amplifier



—*Radiotron Socket Voltages* (D22-1 and D22-1A)
Measured at 115 volts, 60-cycle supply—No signal being received

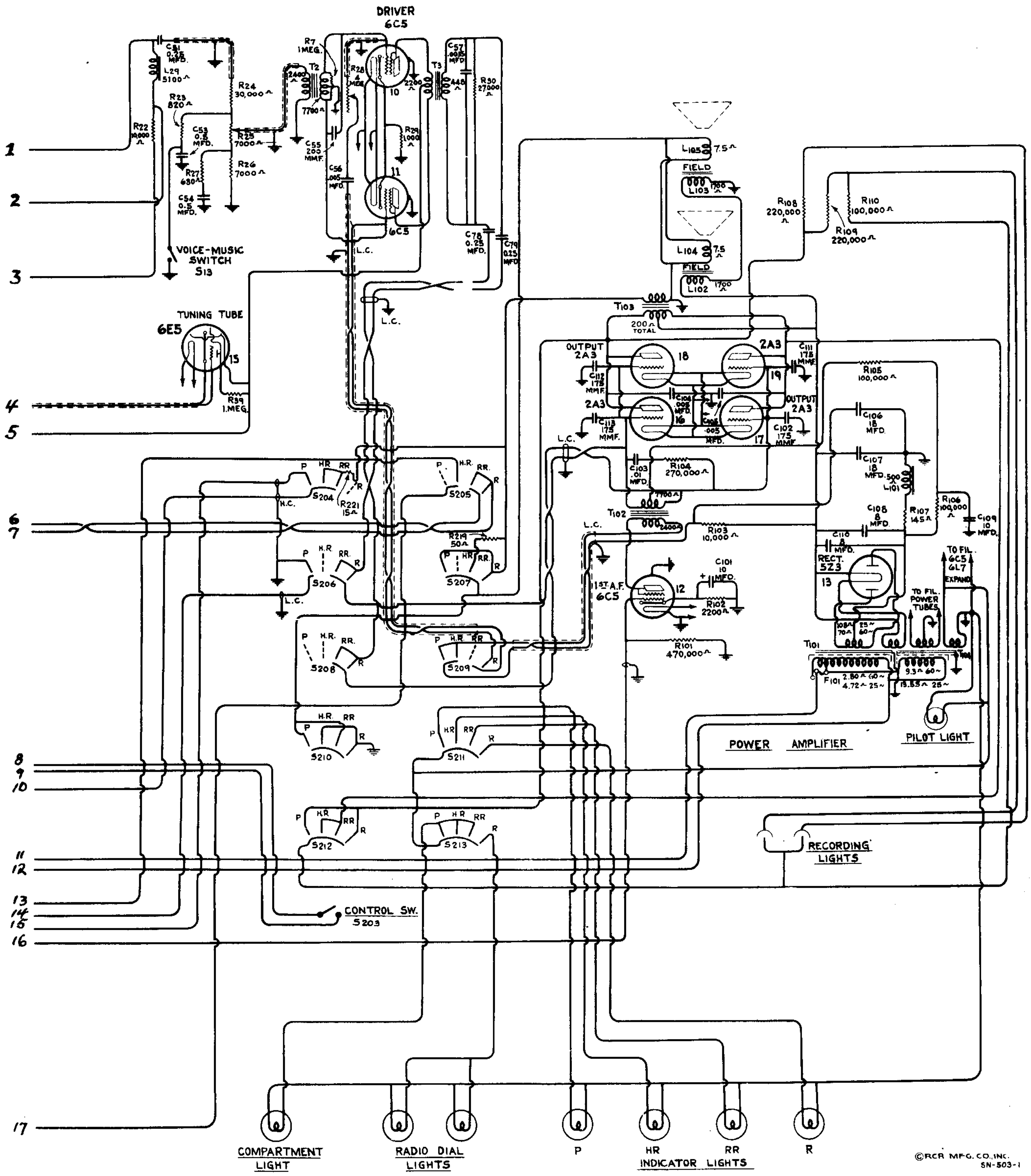
RCA MANUFACTURING COMPANY, Inc.

MODEL D22-1A



RCA MANUFACTURING COMPANY, Inc.

MODEL D22-1A



NOTE: Same Alignment data as for Model D22-1. See VOLUME 6 of Official RADIO SERVICE MANUAL

—Schematic Circuit Diagram (Model D22-1A)

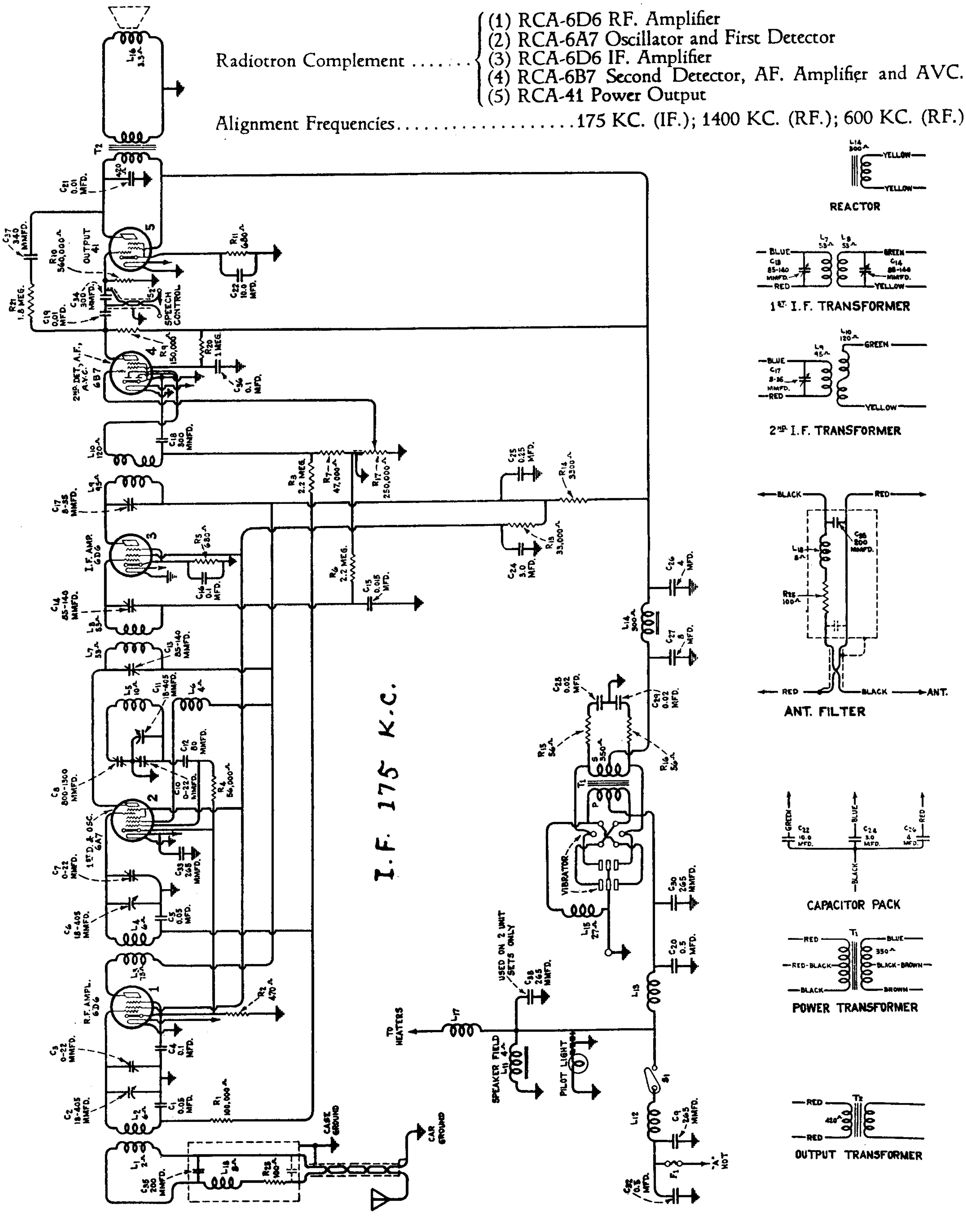
I.F 460 K.C

RCA MANUFACTURING COMPANY, Inc.

MODELS M104 & M108

Radiotron Complement . . . .
(1) RCA-6D6 RF. Amplifier
(2) RCA-6A7 Oscillator and First Detector
(3) RCA-6D6 IF. Amplifier
(4) RCA-6B7 Second Detector, AF. Amplifier and AVC.
(5) RCA-41 Power Output

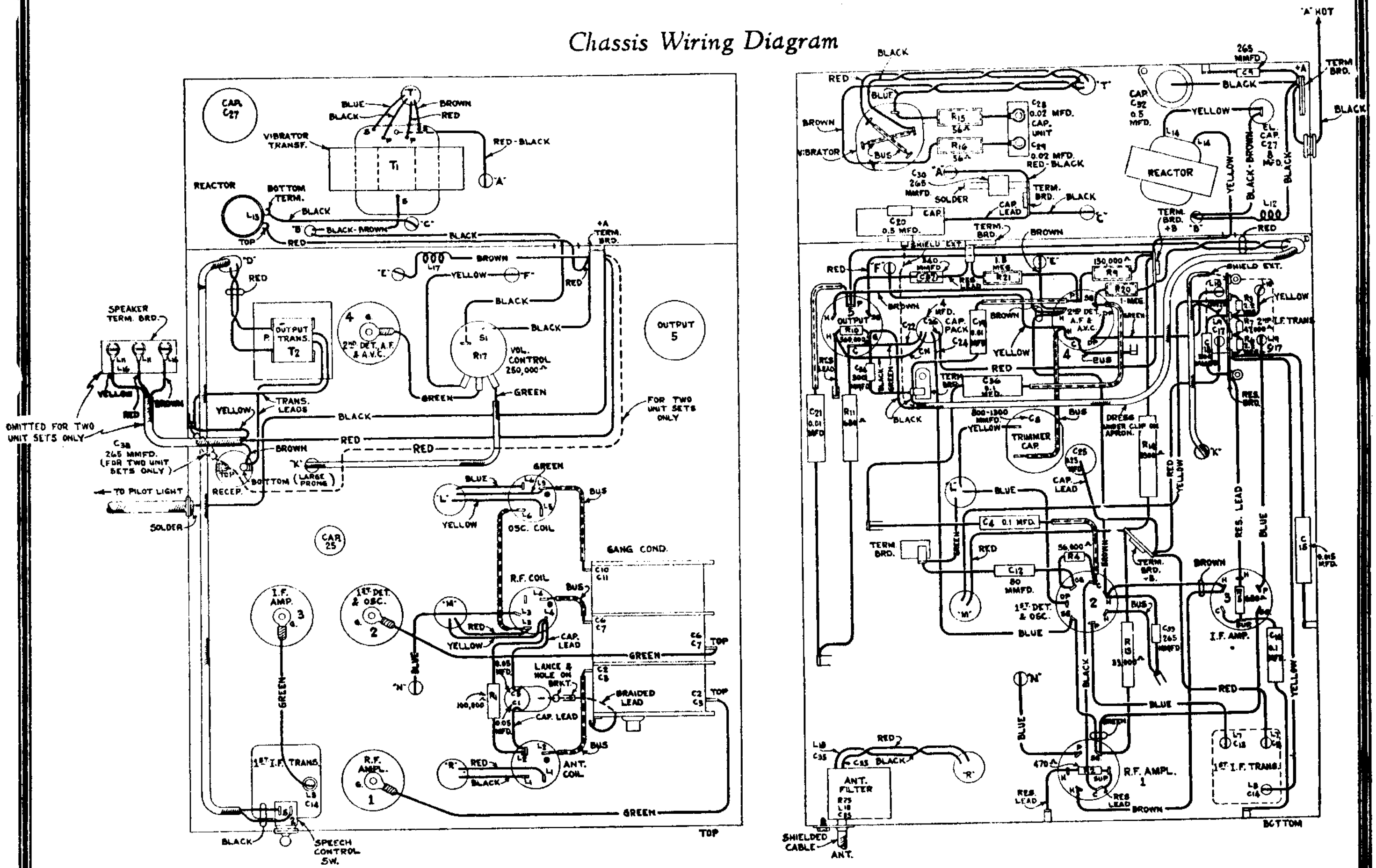
Alignment Frequencies . . . . 175 KC. (IF.); 1400 KC. (RF.); 600 KC. (RF.)

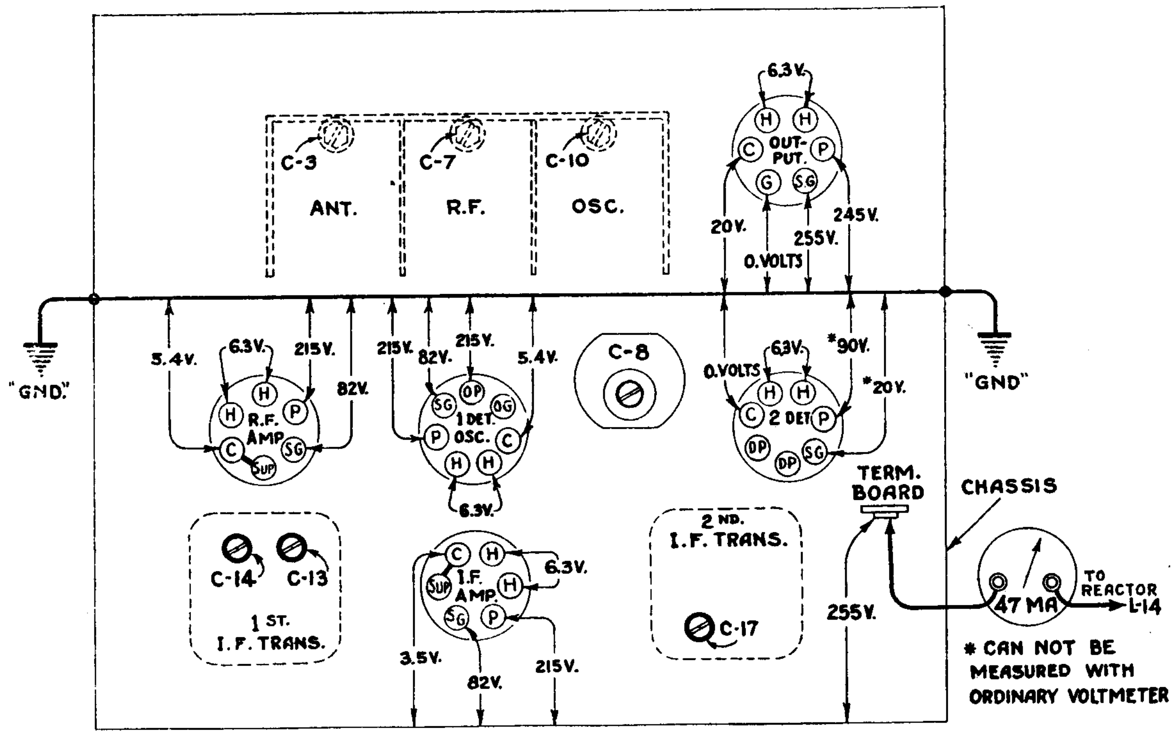


RCA MANUFACTURING COMPANY, Inc.

MODELS M104 & M108

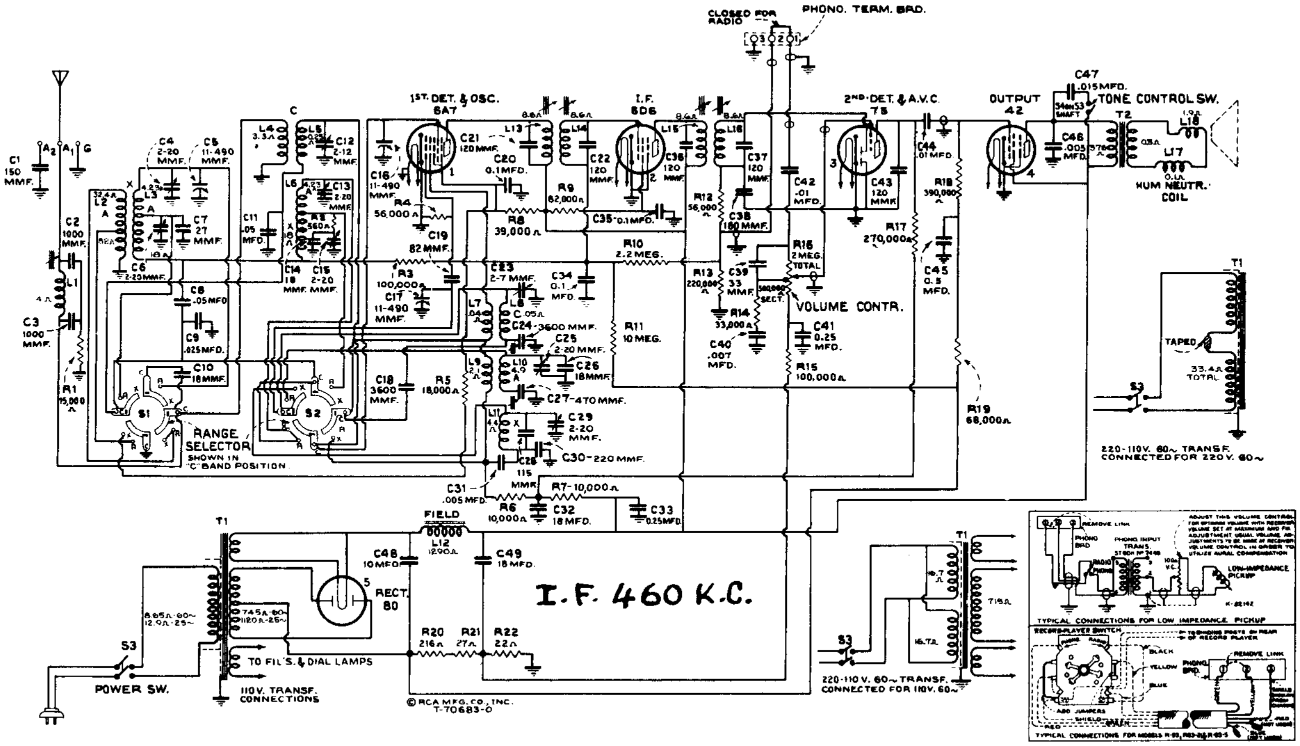
Chassis Wiring Diagram

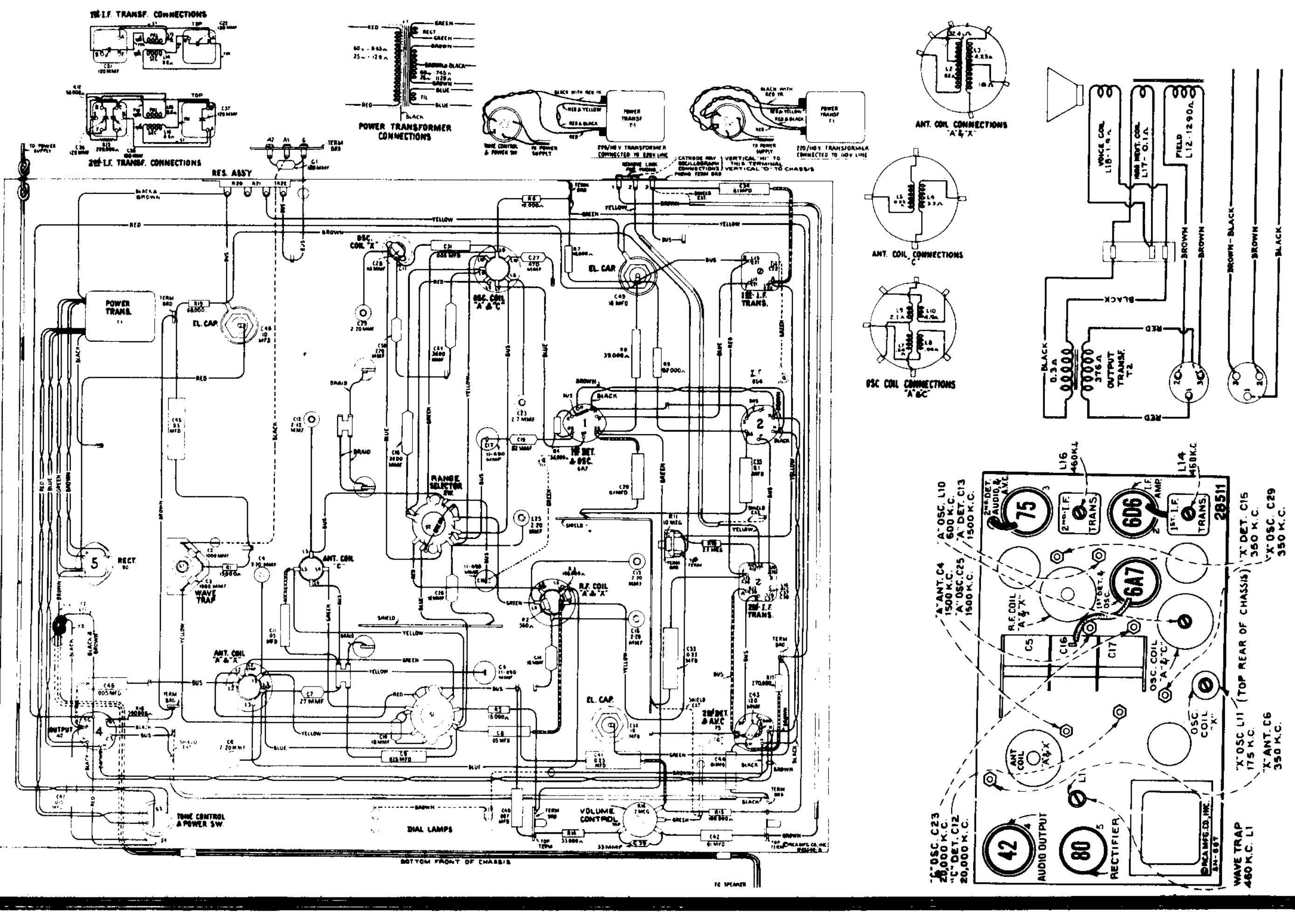




–Trimmer Locations and Radiotron Socket Voltages to Ground
(Measured at 6.6 volts battery supply—Volume Control Maximum—No Signal)

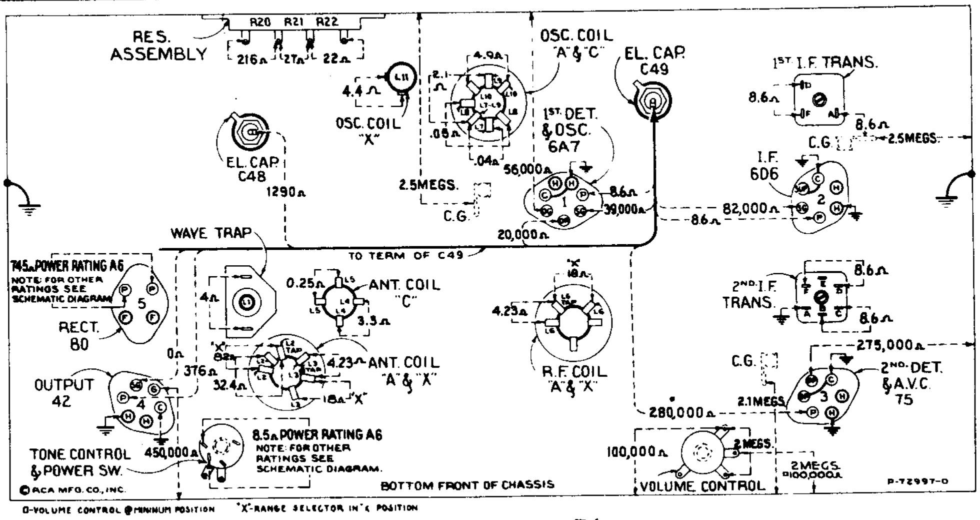
RCA MANUFACTURING COMPANY, Inc.
MODEL 5T4





RCA MANUFACTURING COMPANY, Inc.

MODEL 5T4

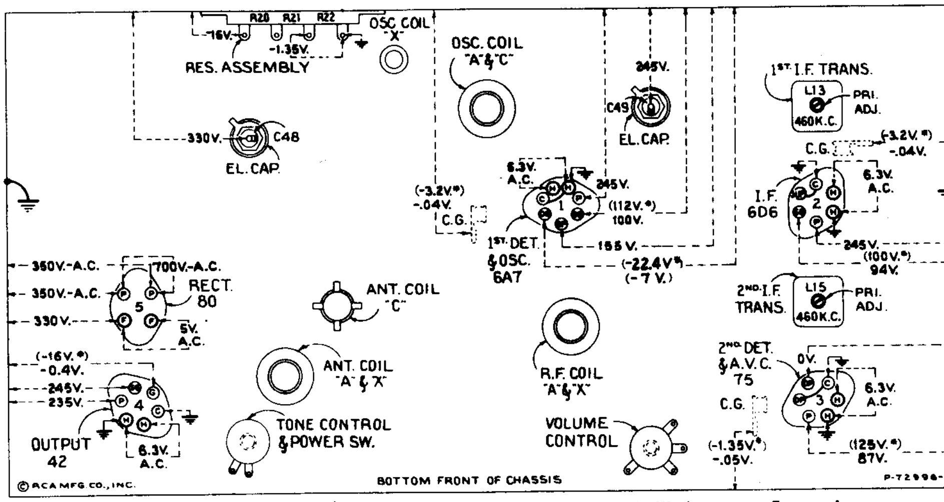


–Resistance Diagram

Power supply disconnected—Radiotrons in sockets—Tuning condenser in full mesh—Volume control maximum—Range selector in "A" position

Resistance Measurements

The resistance values shown between Radiotron socket contacts, grid caps, resistors, and terminals to receiver chassis-ground or other pertinent point on figure 4, permit a rapid continuity check of the circuits. The use of this diagram in conjunction with the Schematic Circuit Diagram, figure 1, and Wiring Diagram, figure 2, will permit the location of certain troubles which might otherwise be difficult to ascertain. Each value as specified should hold within ± 20%. Variations in excess of this limit will usually be indicative of trouble in circuit under test. When measuring the resistance between points of the circuit and ground, it will be necessary to connect the negative terminal of the resistance meter to chassis-ground. If the polarity of the resistance meter is not known, it may be readily ascertained by connecting a d-c voltmeter of indicated polarity across the terminals of the device.



–Radiotron Socket Voltages, Coil and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc or 300 meters "A" band—No signal being received—Volume control minimum

Radiotron Socket Voltages

***Note:** Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.*

The voltage values indicated from the Radiotron socket contacts, grid caps, resistors, and terminals to receiver chassis-ground on figure 6 will assist in locating cause of faulty operation. Each value as specified should hold within ± 20% when the receiver is normally operative at its rated line voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

RCA MANUFACTURING COMPANY, Inc.

MODEL 5T4

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles, such as L1, C1, R1, etc., are provided for reference between the illustrations and the Replacement Parts List. The coils, reactors, and transformer windings are rated in terms of their d-c resistances only. Ratings of less than one ohm are generally omitted.

Alignment Procedure

There are ten alignment trimmers provided in the antenna transformer, detector, and oscillator coil tuned circuits. The i-f transformer, low-frequency oscillator, and wave-trap adjustments are made by means of screws attached to molded magnetite cores. All of these circuits have been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions or altered during servicing. Loss of sensitivity, improper tone quality, and poor selectivity are the usual indications of improper alignment.

The correct performance of this receiver can only be obtained when the aligning has been done with adequate and reliable apparatus. The manufacturer of this receiver has available for sale, through its distributors and dealers, a complete assortment of such service equipment as may be needed for the alignment operation.

A test oscillator, such as the **RCA Stock No. 9595**, is required as a source of the specified alignment frequencies. Visual indication of receiver output during the adjustment is necessary and should be accomplished by the use of an indicator such as the **RCA Stock No. 4317 Neon Output Indicator.**

The procedure outlined below should be followed in adjusting the various trimmer capacitors and molded cores:

I-F Adjustments

The four adjustment screws (attached to molded magnetite cores) of the two i-f transformers (one on top and one on bottom of each i-f transformer) are located as shown by figures 3 and 6. Each circuit must be aligned to a basic frequency of **460 kc.** To do this, attach the output indicator across the loudspeaker voice coil.

Connect the "Ant" output of the test oscillator to the control grid of the RCA-6A7 through a **.001 mfd.** capacitor. Connect the test oscillator "Gnd" terminal to the ground terminal of the receiver chassis. Tune the oscillator to **460 kc.** Advance the receiver volume control to its full-on position and adjust the receiver tuning control to a point, within its range, where no interference is encountered from local broadcast stations or from the local (heterodyne) oscillator. To eliminate signals from the local oscillator short stator of C17 to chassis-ground. Increase the output of the test oscillator until a slight indication is present on the output indicator. Adjust the two magnetite core screws of the second i-f transformer L16 and L15 to produce maximum (peak) indicated receiver output. Then adjust the two magnetite core screws L14 and L13 of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. During these adjustments, regulate the test oscillator output so that the indication is always as low as possible. By doing so, broadness of tuning due to a.v.c. action will be avoided. It is advisable to repeat the adjustment of all i-f magnetite core screws to assure that the interaction between them has not disturbed the original adjustment. Remove temporary jumper, stator C17 to chassis-ground if used.

R-F Adjustments

Calibrate the tuning dial by adjusting the scale pointer to the extreme right-hand end calibration mark, on any scale, while the three-gang tuning condenser plates are in full mesh.

Wave-Trap Adjustment

Attach the "Ant" output of the test oscillator to the receiver "A1" terminal through a 200 mmfd. (**important**) capacitor. The ground connections remain connected together. Leave the test oscillator adjusted to **460 kc.** Adjust range selector to band "A" position. Then adjust the wave-trap screw to the point which causes maximum suppression (minimum output) of the 460 kc signal.

"C" Band

(a) Attach the "Ant" output of the test oscillator to the receiver "A1" terminal through a **300-ohm** resistor, leaving the "Gnd" of the oscillator connected to the receiver chassis.
Adjust range selector to band "C" position. Set receiver dial pointer to **20,000 kc (20 on scale).**

(b) Tune test oscillator to **20,000 kc.** Set oscillator trimmer C23 to minimum capacity (plunger full out), and detector trimmer C12 to maximum capacity (plunger full in). Slowly push in oscillator trimmer C23 until maximum (peak) output is reached. Two peaks may be found. Adjust C23 to the peak with minimum capacity (plunger near out) for maximum indication. Tighten lock nut. Slowly pull out plunger of detector trimmer C12 until maximum (peak) indicated output is reached while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacity (plunger near in) should be used. Tighten lock nut.

"A" Band

(c) Attach the "Ant" output of the test oscillator to the receiver "A1" terminal through a **200 mmfd.** capacitor, leaving the "Gnd" of the oscillator connected to the receiver chassis. Adjust range selector to band "A" position. Reduce output of test oscillator to a minimum. Tune the test oscillator to **600 kc** and set receiver dial pointer to **600 kc (500 meters).** Adjust output of test oscillator until a slight indication of output is visible.

(d) Adjust the oscillator magnetite core screw L10 (top of oscillator coil) so that maximum (peak) indicated output results.

(e) Set receiver dial pointer to **1,500 kc (200 meters).** Tune the test oscillator to **1,500 kc.** Carefully adjust the oscillator, detector, and antenna trimmers C25, C13 and C4 respectively so that each brings about maximum (peak) indicated output.

(f) Tune the test oscillator to **600 kc.** Adjust the receiver to pick up this signal disregarding the dial reading at which it is best received. Adjust oscillator magnetite core screw L10 (top of oscillator coil), simultaneously rocking the tuning control of the receiver backward and forward through the signal, until maximum (peak) output results from the combined operations. After completing this adjustment, the trimmers C25, C13 and C4 should be re-adjusted as in (e) to correct for any change in the oscillator high-frequency tuning which has been caused by the preceding adjustment.

"X" Band

(g) Adjust receiver range selector to band "X" position and set receiver tuning control to a dial reading of 350 kc or **857.14 meters (19.75 on** "C" scale). Tune test oscillator to 350 kc and adjust oscillator, detector, and antenna trimmers C29, C15 and C6, respectively, for maximum indicated receiver output.

(h) Set receiver to 175 kc or **1,714.28 meters** (7.4 on "C" scale) and tune test oscillator to **175 kc.** Adjust screw L11 for maximum indicated output, simultaneously rocking tuning control of the receiver backward and forward through the signal.

(i) The adjustment of C29, C15 and C6 should now be repeated at 350 kc as described in (g) to compensate for any changes caused by the low-frequency adjustment L11.

Radiotron Cathode Current Readings
Measured with Milliammeter Connected at Tube Socket Cathode Terminal under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6A7—1st Det.—Osc.	12.4 ma.
(2)	RCA-6D6—I. F. Amp.	10.2 ma.
(3)	RCA-75—2nd Det., A.V.C. and A. F.	0.23 ma.
(4)	RCA-42—Power Amp.	39 ma.
(5)	RCA-80—Rectifier	64 ma.*

(*Cannot be measured at socket)

REPLACEMENT PARTS

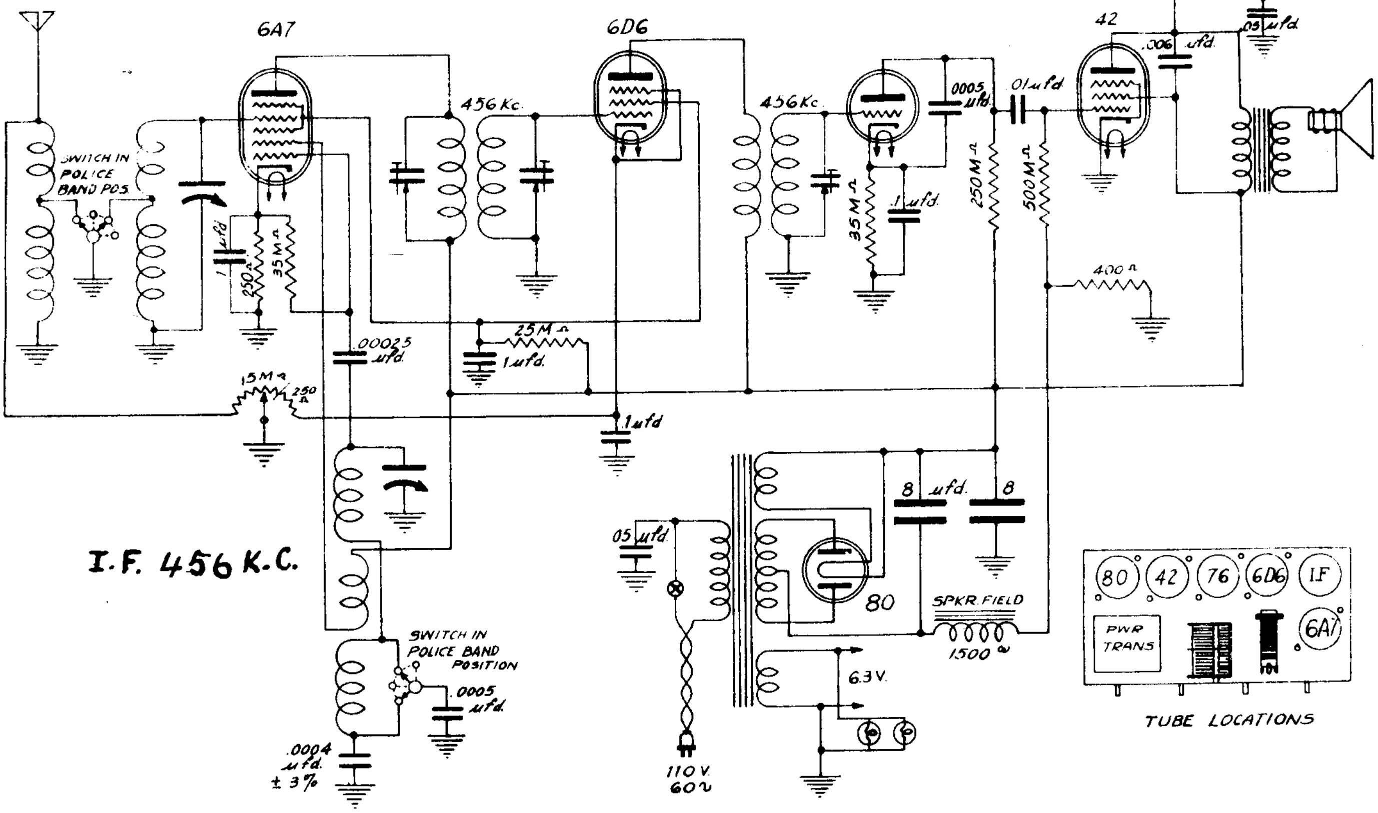
Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
12806	Board—Antenna and ground terminal board	$0.25
12717	Board—Phonograph terminal board	.22
5237	Bushing—Variable condenser mounting bushing assembly—Package of 3	.43
12118	Cap—Grid contact cap—Package of 5	.15
12722	Capacitor—15 Mmfd. (C10, C14, C26)	.20
13605	Capacitor—27 Mmfd. (C7)	.25
12948	Capacitor—33 Mmfd. (C39)	.20
12813	Capacitor—82 Mmfd. (C19)	.20
13604	Capacitor—115 Mmfd. (C28)	.25
12724	Capacitor—120 Mmfd. (C43)	.28
12404	Capacitor—120 Mmfd. (C21, C22, C36, C37)	.26
12725	Capacitor—150 Mmfd. (C1)	.28
12406	Capacitor—180 Mmfd. (C38)	.26
13602	Capacitor—220 Mmfd. (C30)	.25
13603	Capacitor—470 Mmfd. (C27)	.25
13593	Capacitor—1,000 Mmfd. (C2, C3)	.25
12811	Capacitor—3,600 Mmfd. (C18, C24)	.35
4868	Capacitor—.005 Mfd. (C31)	.20
4838	Capacitor—.005 Mfd. (C46)	.20
5148	Capacitor—.007 Mfd. (C40)	.28
13138	Capacitor—.01 Mfd. (C42)	.25
4858	Capacitor—.01 Mfd. (C44)	.28
11315	Capacitor—.015 Mfd. (C47)	.20
13606	Capacitor—.025 Mfd. (C9)	.20
13607	Capacitor—.05 Mfd. (C8)	.20
4836	Capacitor—.05 Mfd. (C11)	.30
4841	Capacitor—0.1 Mfd. (C20, C34, C35)	.22
4840	Capacitor—0.25 Mfd. (C41)	.30
5170	Capacitor—0.25 Mfd. (C33)	.25
12741	Capacitor—0.5 Mfd. (C45)	.30
11240	Capacitor—10 Mfd. (C48)	1.08
5212	Capacitor—18 Mfd. (C32, C49)	1.16
12807	Capacitor—Trimmer capacitor (C23)	.35
12714	Capacitor—Trimmer capacitor (C12)	.38
12884	Capacitor—Trimmer capacitor (C4, C6, C13, C15, C25, C29)	.40
13587	Coil—Antenna coil and shield, X and A bands (L2, L3)	2.00
13589	Coil—Antenna coil, C band (L4, L5)	.55
12798	Coil—Oscillator coil and shield, A and C bands (L7, L8, L9, L10)	1.65
13590	Coil—Oscillator coil and shield, X band (L11)	.95
13588	Coil—R. F. coil and shield, X and A bands (L6)	1.45
13584	Condenser—3-gang variable tuning condenser (C5, C16, C17)	5.65
5119	Connector—3-contact female speaker cable connector	.25
11979	Connector—2-contact male connector for power cable, mounts on back of cabinet	.30
12006	Core—Adjustable core and stud for I. F. transformer, Stock Nos. 12652 and 12653	.22
12800	Core—Adjustable core and stud for Stock No. 12798	.20
12882	Core—Adjustable core and stud for Stock No. 13590	.20
12664	Core—Adjustable core and stud for wave-trap, Stock No. 13592	.22
13595	Dial—Station selector dial and mounting bracket assembly	1.00
12702	Drive—Vernier drive and pinion gear for variable condenser	.68
12712	Indicator—Station selector indicator pointer	.22
5226	Lamp—Dial lamp—Package of 5	.70
11324	Resistor—560 ohms, carbon type, ¼ watt—Package of 5 (R2)	1.00
3078	Resistor—10,000 ohms, carbon type, ½ watt—Package of 5 (R6, R7)	1.00
13594	Resistor—15,000 ohms, carbon type, 1/10 watt—Package of 5 (R1)	.75
3219	Resistor—18,000 ohms, carbon type, ½ watt—Package of 5 (R5)	1.00
11364	Resistor—33,000 ohms, carbon type, ¼ watt—Package of 5 (R14)	1.00
13206	Resistor—39,000 ohms, carbon type, 2 watts (R8)	.30
5029	Resistor—56,000 ohms, carbon type, ¼ watt—Package of 5 (R4)	1.00
11282	Resistor—56,000 ohms, carbon type, 1/10 watt—Package of 5 (R12)	.75
12333	Resistor—68,000 ohms, carbon type, ¼ watt—Package of 5 (R19)	1.00
8064	Resistor—82,000 ohms, carbon type, ½ watt—Package of 5 (R9)	1.00
5145	Resistor—100,000 ohms, carbon type, ¼ watt—Package of 5 (R3, R15)	$1.00
11398	Resistor—220,000 ohms, carbon type, 1/10 watt—Package of 5 (R13)	.75
12199	Resistor—270,000 ohms, insulated, ½ watt—Package of 5 (R17)	1.00
11847	Resistor—390,000 ohms, carbon type, ¼ watt—Package of 5 (R19)	1.00
11626	Resistor—2.2 meg., carbon type, ¼ watt—Package of 5 (R10)	1.00
13601	Resistor—10 meg., insulated, ¼ watt—Package of 5 (R11)	1.00
12004	Resistor—Voltage divider resistor, comprising one 216-ohm, one 27-ohm and one 22-ohm sections (R20, R20, R22)	.45
12008	Shield—First or second I. F. transformer shield	.28
12607	Shield—First I. F. transformer shield top	.30
12581	Shield—Second I. F. transformer shield top	.36
4233	Shield—6D6 Radiotron shield	.22
3682	Shield—6A7 or 75 Radiotron shield	.22
11383	Shield—42 Radiotron shield	.20
13591	Shield—Chassis bottom shield and mounting foot assembly	1.30
12710	Shield—Coil shield for Stock Nos. 13587 and 13588	.28
12799	Shield—Coil shield for Stock No. 12798	.15
12883	Shield—Coil shield for Stock No. 13590	.20
4794	Socket—4-contact 80 Radiotron socket	.15
4786	Socket—6-contact 6D6, 42 or 75 Radiotron socket	.15
4787	Socket—7-contact 6A7 Radiotron socket	.15
11199	Socket—Dial lamp socket	.14
12007	Spring—Retaining spring for core, Stock Nos. 12006, 12800, 12882, 12664—Package of 10	.36
13585	Switch—Range switch (S1, S2)	2.15
13586	Switch—Tone control and power switch (S3, S4)	1.20
12652	Transformer—First I. F. transformer (L13, L14, C21, C22)	1.60
13392	Transformer—Power transformer, 100-120 volts, 50-60 cycles (T1)	4.95
13566	Transformer—Power transformer, 100-120 volts, 25-50 cycles (T1)	4.08
13393	Transformer—Power transformer, 110 and 220 volts, 50-60 cycles (T1)	4.95
12653	Transformer—Second I. F. transformer (L15, L16, C36, C37, C38, R12, R13)	2.06
13592	Trap—Wave-trap complete (L1, C2, C3, R1)	1.60
13144	Volume control (R16)	1.00
	REPRODUCER ASSEMBLIES	
12641	Board—3-contact reproducer terminal board	.15
12640	Bracket—Output transformer mounting bracket	.18
12012	Coil—Field coil (L12)	1.85
11469	Coil—Neutralizing coil (L17)	.20
12642	Cone—Reproducer cone and dust cap (L18)	.94
5118	Connector—3-contact male speaker cable connector	.25
9699	Reproducer—Reproducer complete	6.38
11253	Transformer—Output transformer (T2)	1.56
11886	Washer—Spring washer to hold field coil securely—Package of 5	.20
	MISCELLANEOUS ASSEMBLIES	
11824	Connector—2-contact female power cord connector	.34
11823	Cord—Power cord and connector assembly	.65
12698	Escutcheon—Station selector escutcheon and crystal	1.02
12699	Knob—Large station selector knob—Package of 5	.66
12700	Knob—Small (vernier) station selector knob—Package of 5	.58
11582	Knob—Range switch knob—Package of 5	.50
11347	Knob—Volume control or tone control and power switch knob—Package of 5	.75
11210	Screw—Chassis mounting screw assembly, comprising one screw, one washer and one lockwasher—Package of 4	.28
11349	Spring—Retaining spring for knob, Stock Nos. 11347, 11582, 12700—Package of 5	.25
4982	Spring—Retaining spring for knob, Stock No. 12699—Package of 10	.50

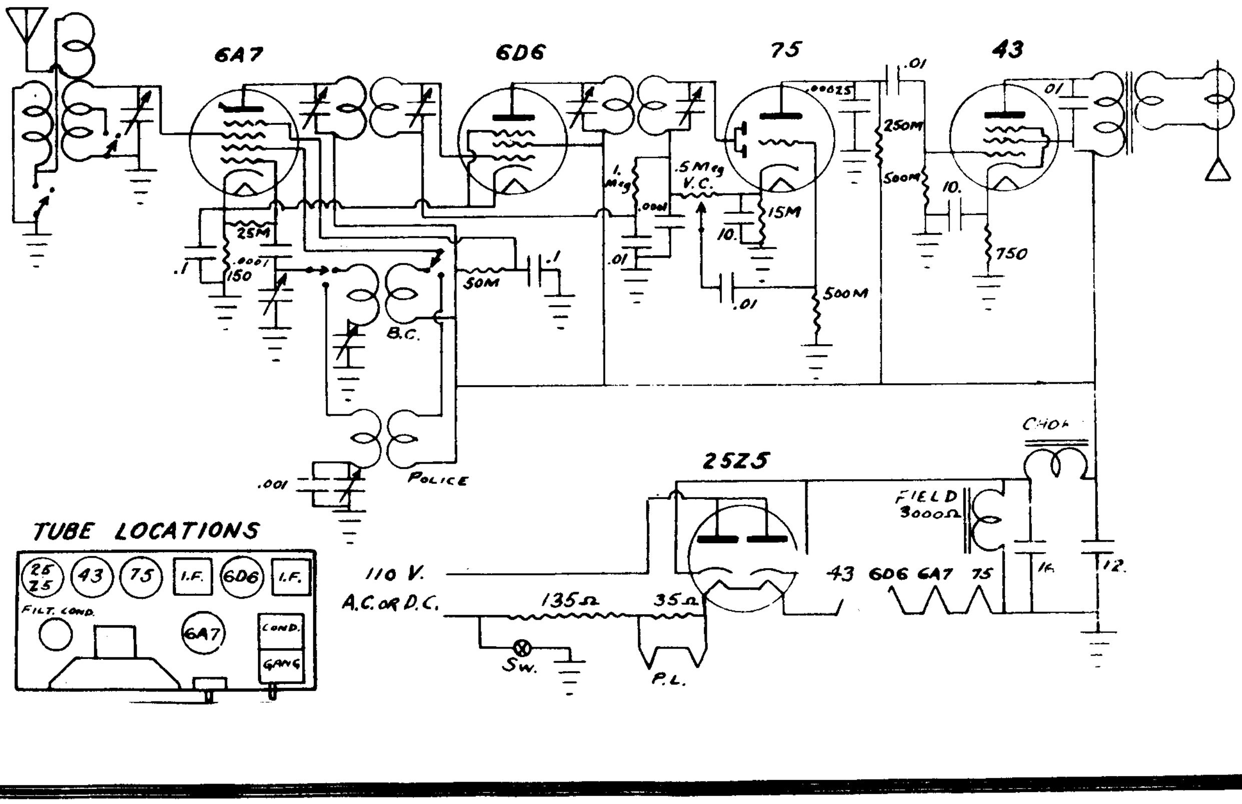
Prices quoted above are subject to change without notice.

RADOLEK COMPANY

MODELS 502 & 11911

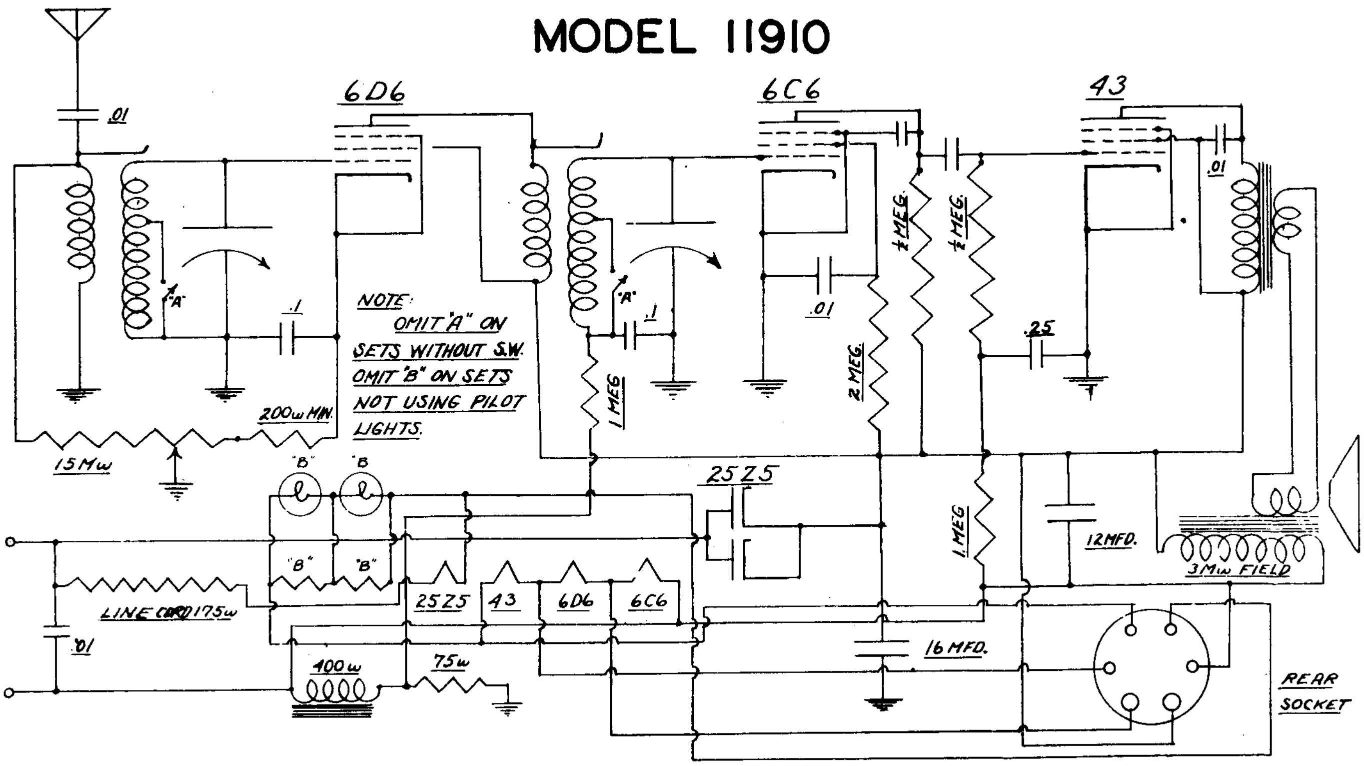


MODEL 11908

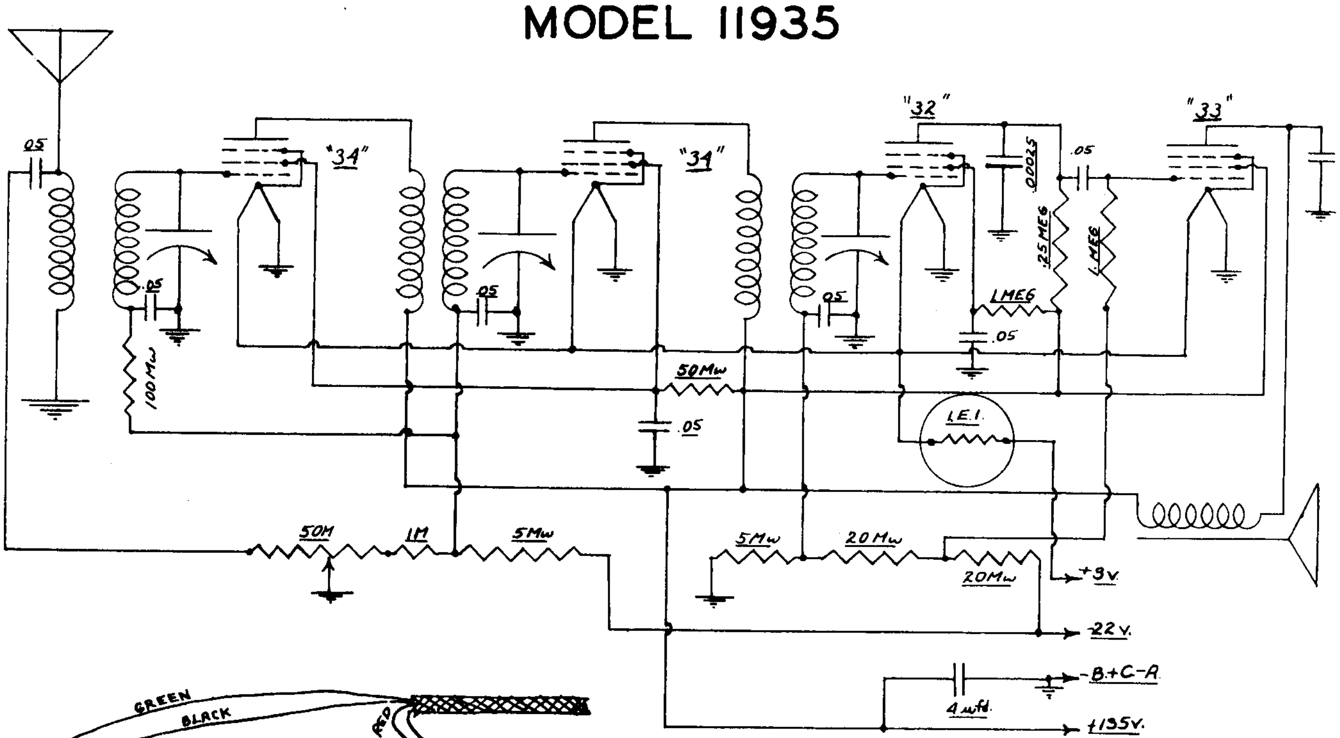


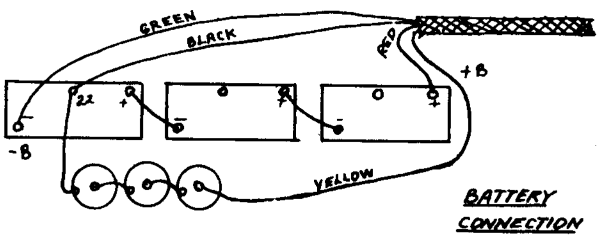
RADOLEK COMPANY

MODEL 11910



MODEL 11935



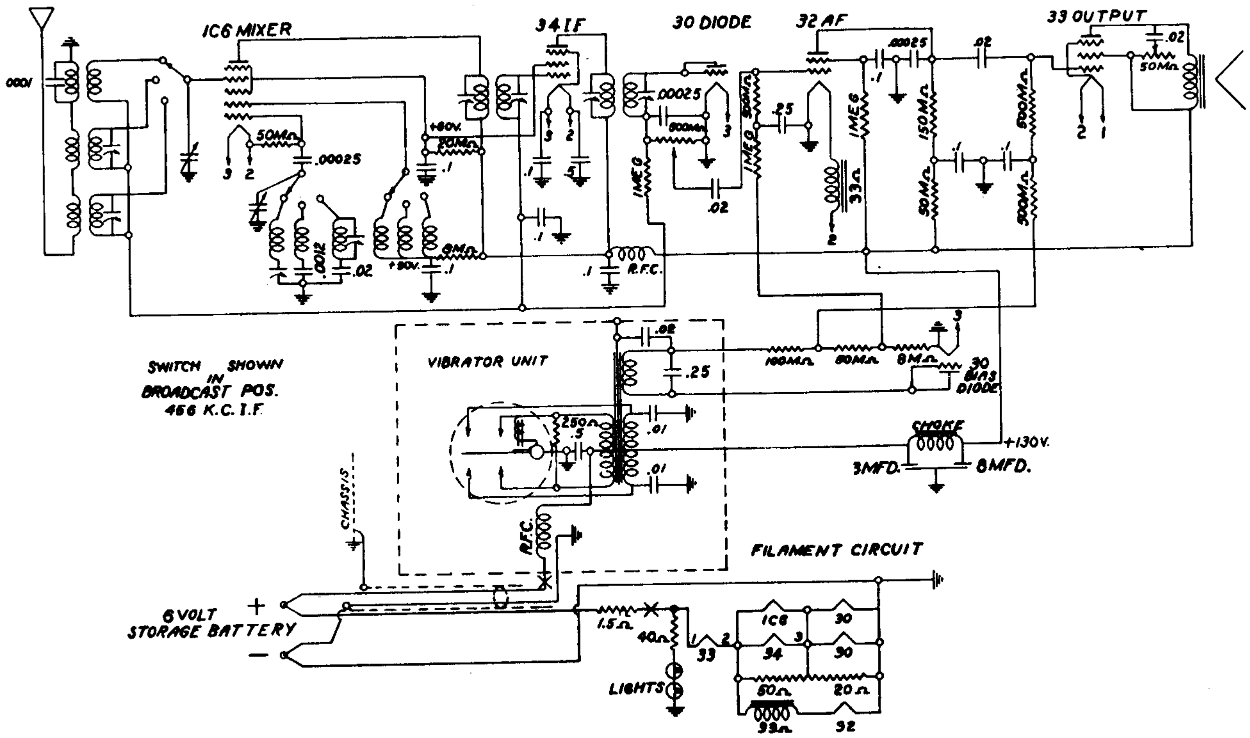


BATTERY CONNECTION

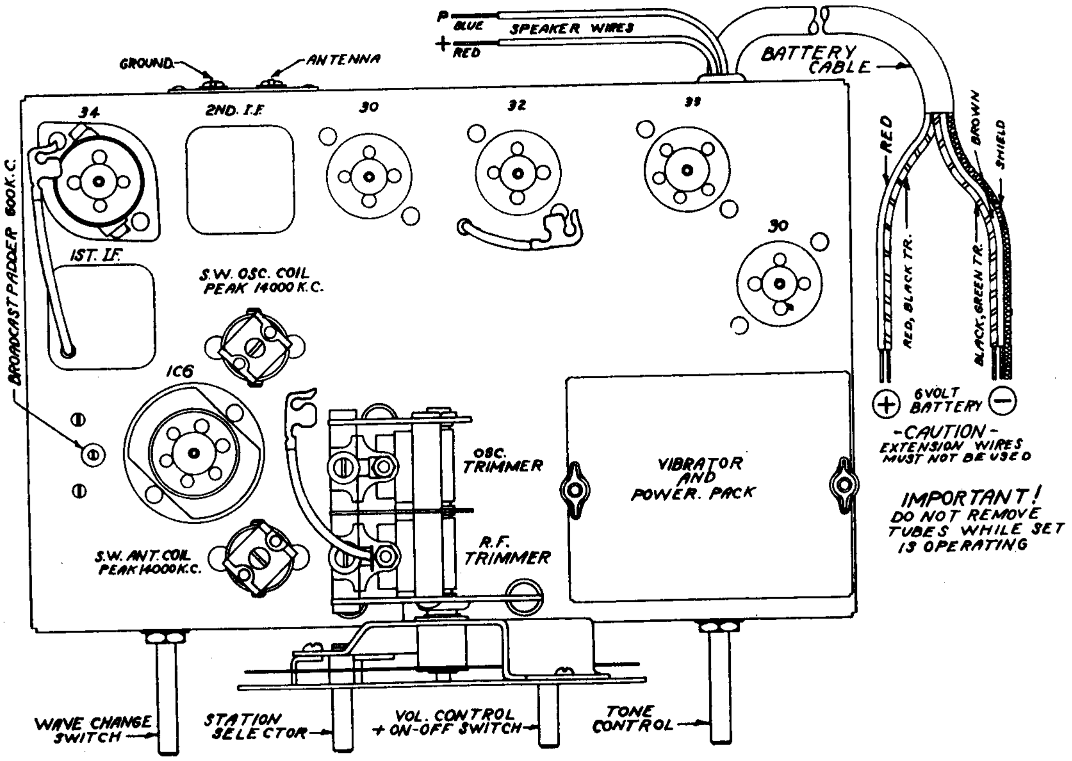
PRECAUTIONS

If the volume suddenly becomes less at any time, make sure the connections to the ground, antenna, are still in place. Also see that the batteries are not badly discharged. If the "B" batteries are lower than 32 volts for each 45 volt section, it is advisable to replace with new ones. The "A" batteries must deliver at least 2 volts to the set or it will not function properly. Therefore, do not operate after "A" battery has reached a value of 2 volts.

RADOLEK COMPANY
MODEL J10936

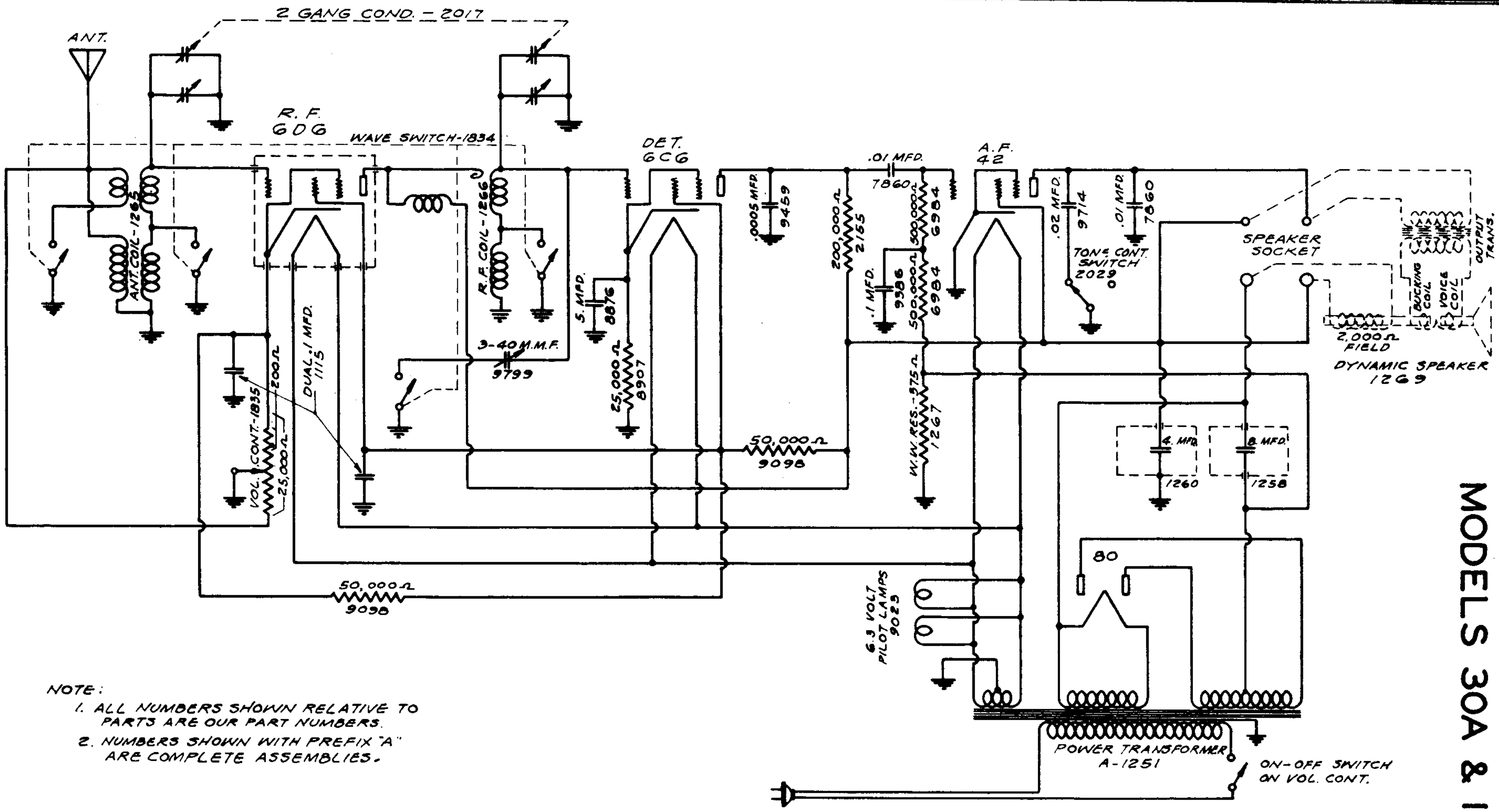


I.F. 456 K.C.



RADOLEK COMPANY

MODELS 30A & 11904



NOTE:
1. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
2. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.

VOLTAGE TABLE

LINE VOLTAGE : 115
VOLUME CONTROL : FULL ON
WAVE BAND : BROADCAST

TUBE		FILAMENT	PLATE	SCREEN	CATHODE
6C6	RADIO FREQUENCY	6	225	85	2
6D6	DETECTOR	6	105*	85	3.5
42	OUTPUT	6	200	225	15**
80	RECTIFIER	4.9			

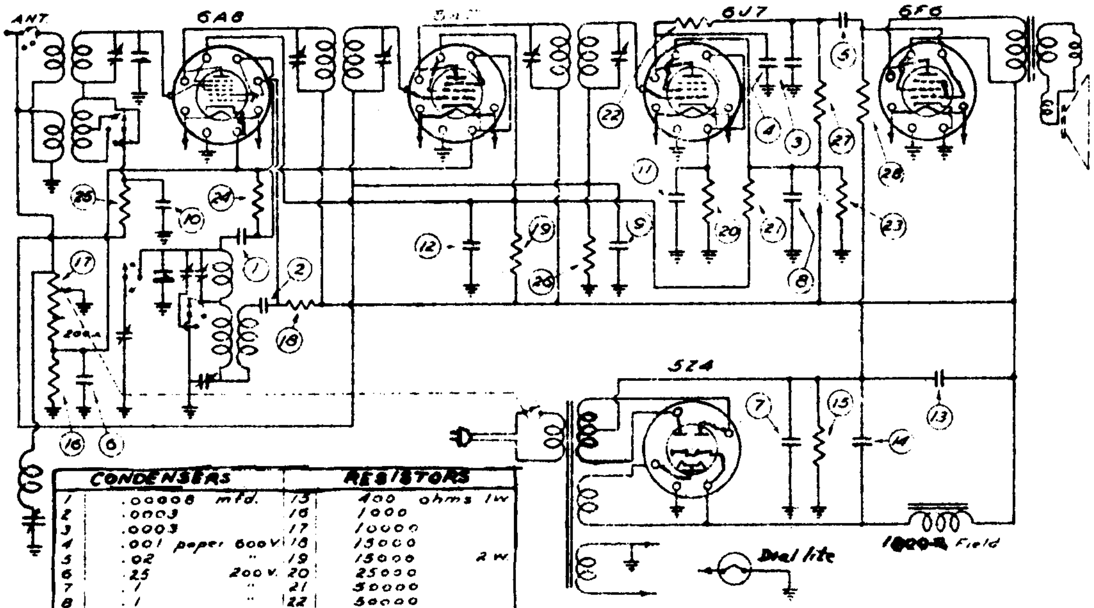
READ ALL VOLTAGES FROM SOCKET PRONG TO GROUND UNLESS OTHERWISE SPECIFIED. (EXCEPT FILAMENT)

** READ FROM 375 OHM RESISTOR #1267 TO GROUND.

* COMPARATIVE VOLTAGE IS NOT TRUE VOLTAGE APPLIED.

REMLER COMPANY, Ltd.

MODEL 41

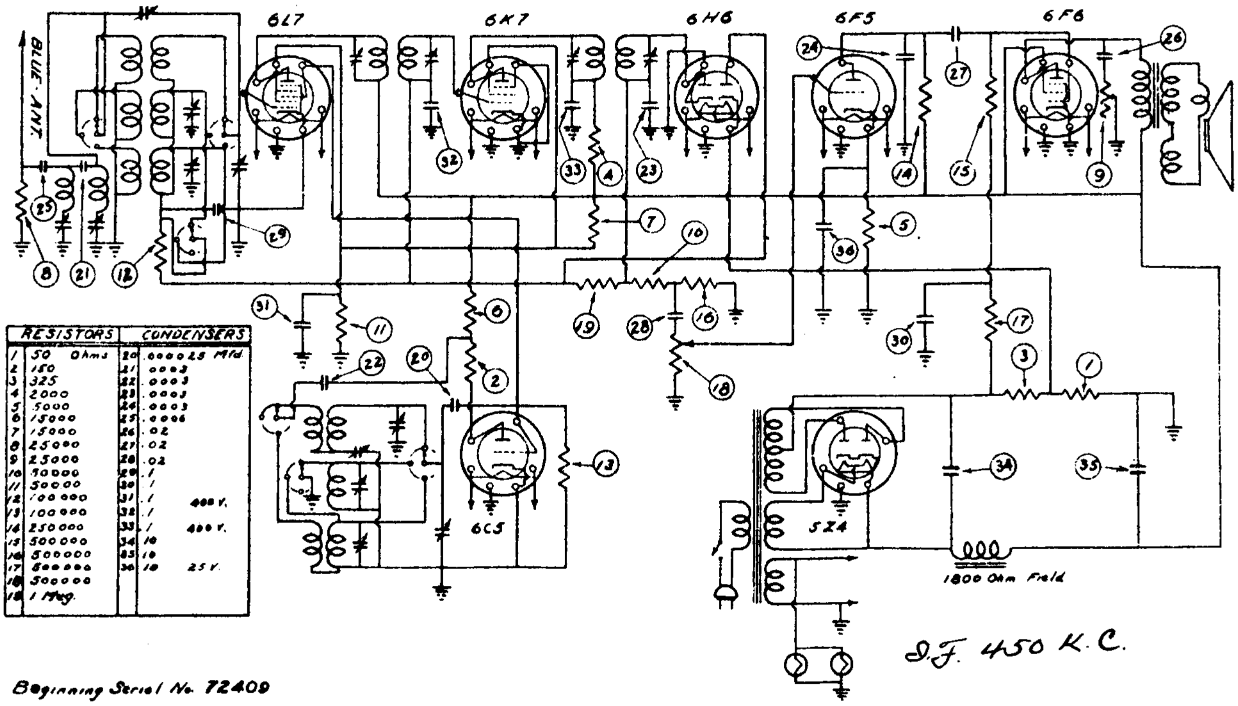


CONDENSERS		RESISTORS	
1	.00008 mfd.	15	400 ohms 1w
2	.0003	16	1000
3	.0003	17	10000
4	.001 paper 600V	18	15000
5	.02 "	19	15000 2 w.
6	.25 200 V.	20	25000
7	.1 "	21	50000
8	.1 "	22	50000
9	.1 "	23	100000
10	.1 "	24	100000
11	.25 "	25	250000
12	2. 300 V	26	250000
13	4.	27	250000
14	4.	28	500000

REMLER
MODEL 41
BEGINNING SR 60411

I.F. 450 K.C.

MODEL 45



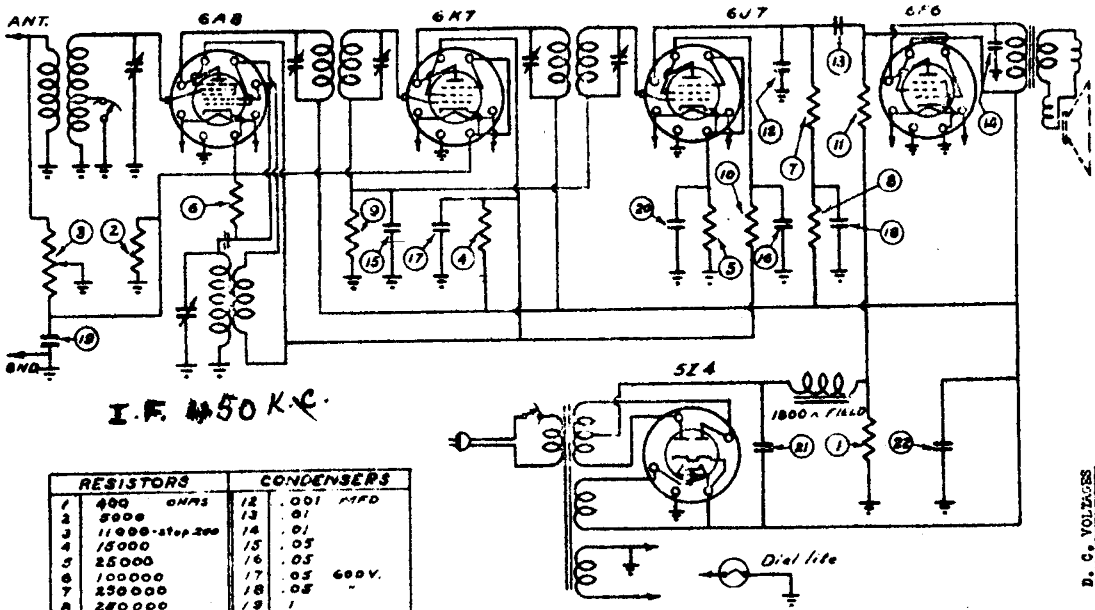
RESISTORS		CONDENSERS	
1	50 Ohms	20	.000025 Mfd.
2	150	21	.0003
3	325	22	.0003
4	2000	23	.0003
5	5000	24	.0003
6	15000	25	.0006
7	15000	26	.02
8	25000	27	.02
9	25000	28	.02
10	50000	29	.1
11	50000	30	.1
12	100 000	31	.1 400 V.
13	100 000	32	.1
14	250 000	33	.1 400 V.
15	500 000	34	10
16	500 000	35	10
17	500 000	36	10 25 V.
18	500 000		
19	1 Meg.		

I.F. 450 K.C.

Beginning Serial No. 72409

REMLER COMPANY, Ltd.

MODEL 46 "SCOTTIE"



I.F. 450 K.C.

RESISTORS		CONDENSERS	
1	400 OHMS	12	.001 MFD
2	5000	13	.01
3	11000-stop 200	14	.01
4	15000	15	.05
5	25000	16	.05
6	100000	17	.05 600 V.
7	250000	18	.05 "
8	250000	19	1
9	500000	20	.25
10	1 Meg.	21	4
11	1 Meg.	22	4

BEGINNING SERIAL No. 83786

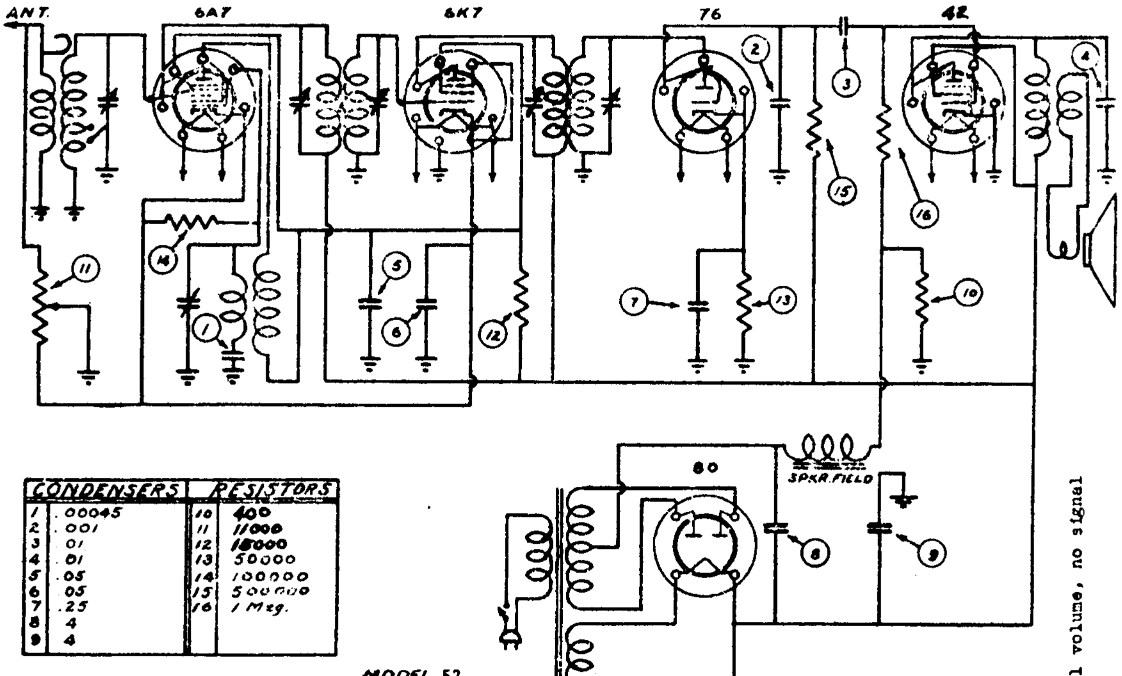
The antenna-R.F. coil is located over the variable condenser and is trimmed by the trimmer on the rear section of the variable condenser. The oscillator coil is mounted under the chassis and is trimmed by the front trimmer section. The I.F. transformers and trimmers are mounted under the chassis. The I.F. frequency is 450 K.C.

D. C. VOLTAGES
No signal, full volume

From ground to:		
6A8	Plate	240 volts
6A8	Screen	75
6A8	Osc. Plate	75
6A8	Cathode	3.3
6K7	Plate	240
6K7	Screen	75
6K7	Cathode	3.8
6J7	Plate	85
6J7	Screen	15
6J7	Cathode	2
6F6	Plate	230
6F6	Screen	240
6F6	Grid Bias	13

Voltages read with 1000-Ohm per volt meter.

MODEL 52



I.F. 450 K.C.

CONDENSERS		RESISTORS	
1	.00045	10	400
2	.001	11	11000
3	.01	12	15000
4	.01	13	50000
5	.05	14	100000
6	.05	15	500000
7	.25	16	1 Meg.
8	4		
9	4		

MODEL 52

BEGINNING SERIAL No. 78143

The antenna-R.F. coil is located over the variable condenser and is trimmed by the trimmer on the rear section of the variable condenser. The oscillator coil is mounted under the chassis and is trimmed by the front trimmer section. The I.F. transformers and trimmers are mounted under the chassis. The I.F. frequency is 450 K.C.

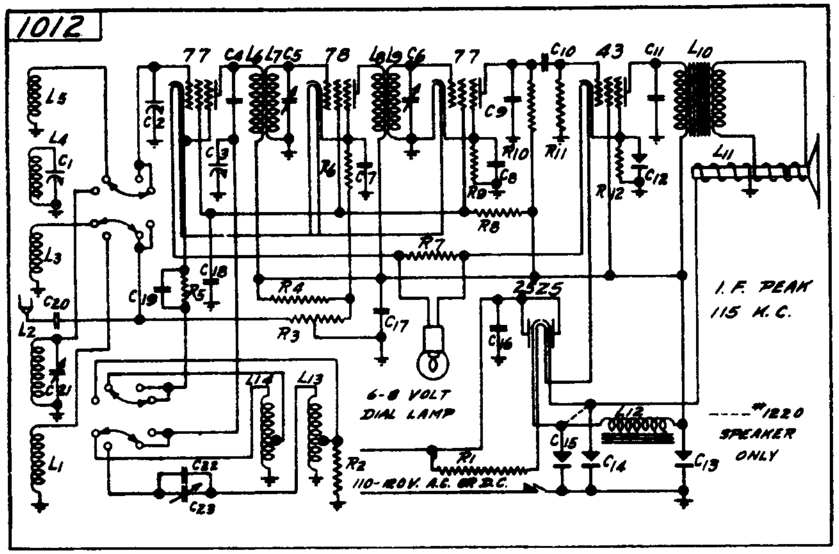
D.C. VOLTAGES: Full volume, no signal

From ground to:		
80	Rectifier filament	315 volts
42	Plate	200 "
42	Screen	215 "
42	Grid - bias	15 "
76	Plate	50 "
76	Cathode	5 "
6K7	Plate	215 "
6K7	Screen	100 "
6K7	Cathode	3.5 "
6A7	Plate	215 "
6A7	Osc. Plate	100 "
6A7	Screen	100 "
6A7	Cathode	3.5 "

Voltages read with 1000-Ohm per volt meter.

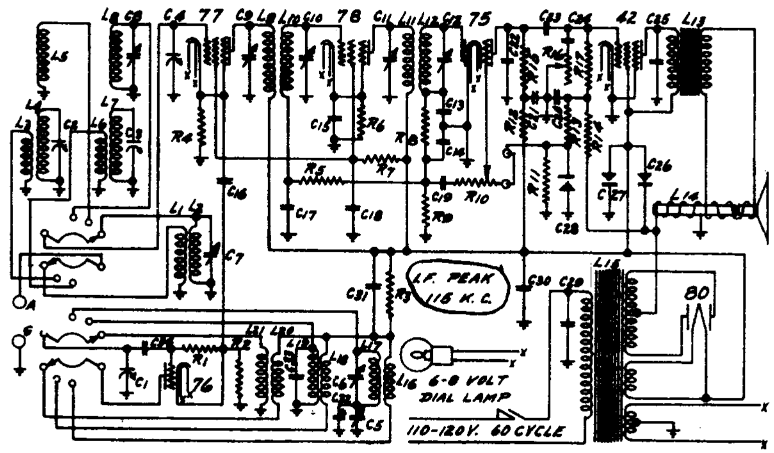
REPUBLIC INDUSTRIES

MODELS SL5 & "PATRICIAN"



CODE	PART NO.	RESISTORS
R1	1125	130 Ohm Resistor in Power Cord A.P.
R2	1063	500 Ohm Long Wave Oscillator Resistor
R3	1296	10,000 Ohm Volume Control & Switch
R4	922	75,000 Ohm I.F. Cathode Resistor
R5	919	5,000 Ohm Oscillator Feed Resistor
R6	1063	500 Ohm I.F. Cathode Bias Resistor
R7	1308	20 Ohm Pilot Light Shunt Resistor
R8	921	40,000 Ohm R.F. & I.F. Screen Feed Resistor
R9	941	20,000 Ohm Second Detector Cathode Bias Resistor
R10	924	250,000 Ohm Second Detector Plate Load Resistor
R11	925	500,000 Ohm 43 Grid Bias Resistor
R12	1063	500 Ohm 43 Cathode Bias Resistor
		CONDENSERS
C1	833	371 MMFD. First Preselector Section of 3 Gang
C2	833	371 MMFD. Second Preselector Section of 3 Gang
C3	833	336 MMFD. Oscillator Section of 3 Gang
C4	264	.00005 MFD. Oscillator Plate Feed Condenser
C5	1521	75-150 MMFD. First I.F. Trimmer
C6	1523	75-150 MMFD. Second I.F. Trimmer
C7	272A	.1 MFD. 200 Volt I.F. Cathode By-Pass
C8	183A	.2 MFD. 200 Volt Second Detector Cathode By-Pass
C9	662	.002 MFD. Mica Second Detector Plate Filter
C10	269A	.01 MFD. 400 Audio Feed Condenser
C11	269A	.01 MFD. 400 Volt Output Plate Filter
C12	928	25 MFD. 25 Volt 43 Cathode By-Pass
C13	1295	4 MFD. 150 W.V. Dry Electrolytic
C14	1295	4 MFD. 150 W.V. Dry Electrolytic
C15	1295	10 MFD. 150 W.V. Dry Electrolytic
C16	272A	.1 MFD. 200 Volt Line By-Pass Condenser
C17	267A	.5 MFD. 200 Volt B. Supply By-Pass Condenser
C18	272A	.1 MFD. 200 Volt R.F. & I.F. Screen By-Pass
C19	265	.001 MFD. Mica Oscillator Coupling Condenser
C20	265	.001 MFD. Mica Antenna Series Condenser
C21	972	2 Plate L.W. Preselector Trimmer
C22	339	2-.0001 MFD. Mica L.W. Oscillator Series Condenser
C23	1522	75-100 MMFD. L.W. Oscillator Series Trimmer
		INDUCTANCES
L1	1475	L.W. Preselector Primary 800 Turns #36 S.S.E.
L2	1475	Long-Wave Preselector Secondary 490 Turns #36 S.S.E.
L3	847	Broadcast Preselector Primary 178 Turns #36 S.S.E.
L4	847	Broadcast First Secondary 133 Turns #36 S.S.E.
L5	847	Broadcast Second Secondary 128 Turns #36 S.S.E.
L6	1470	Microhenry First I.F. Primary
L7	1470	25,000 Microhenry First I.F. Secondary
L8	1473	25,000 Microhenry Second I.F. Primary
L9	1473	25,000 Microhenry Second I.F. Secondary
L10		#43 Output Transformer 917 Rola 1220 Quam
L11		3000 Ohm Speaker Field 917 Rola 1220 Quam
L12	940	20 Henry Choke
L13	1476	L.W. Oscillator 390 Turns #36 S.S.E. Tapped 20 Turns
L14	1470	Broadcast Oscillator 106 Turns #36 S.S.E. Tapped 30 Turns

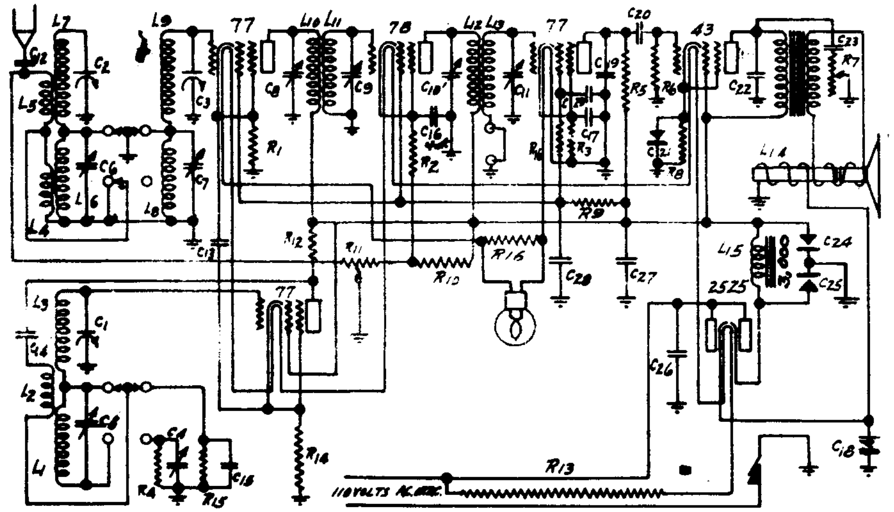
MODEL CS6



CODE	PART NO.	RESISTORS
R1 921	921	40,000 Ohm Oscillator Grid
R2	1062	250 Ohm Oscillator Cathode
R3	920	10,000 Ohm Oscillator Feed
R4	1065	1,000 Ohm 77 Cathode
R5	926	1 Meg Ohm A.V.C. Network
R6	1063	500 Ohm 78 Cathode
R7	922	75,000 Ohm 77 & 78 Screen
R8	898	50,000 Ohm Diode Filter
R9	925	500,000 Ohm A.V.C. Load
R10	1291	500,000 Ohm Volume Control & Switch
R11	919	5,000 Ohm Bias Network
R12	923	100,000 Ohm 75 Plate Hum Filter
R13	922	75,000 Ohm Bias Network
R14	926	1 Meg Ohm C Bias Network
R15	924	250,000 Ohm 75 Plate Load
R16	1317	250,000 Ohm Tone Control
R17	925	500,000 Ohm 42 Grid
		CONDENSERS
C1	1173	336 MMFD. Oscillator Section of 4 Gang
C2	1173	371 MMFD. Preselector Section of 4 Gang
C3	1173	371 MMFD. Preselector Section of 4 Gang
C4	1173	371 MMFD. Preselector Section of 4 Gang
C5	784	4 Plate Oscillator Reciprocal Trimmer
C6	972	2 Plate Oscillator Parallel Trimmer
C7	972	2 Plate S. W. Preselector Trimmer
C8	972	2 Plate L. W. Preselector Trimmer
C9	1228	60 - 130 MMFD. First I.F. Primary Trimmer
C10	1534	60 - 130 MMFD. First I.F. Secondary Trimmer
C11	1536	60 - 130 MMFD. Second I.F. Primary Trimmer
C12	1535	60 - 130 MMFD. Second I.F. Secondary
C13	339	.0001 MFD. Mica Diode Filter
C14	339	.0001 MFD. Mica Diode Filter
C15	272A	.1 MFD. 200 Volt 78 Cathode By-Pass
C16	269A	.01 MFD. 400 Volt Oscillator Coupling Condenser
C17	272A	.1 MFD. 200 Volt A.V.C. Network By-Pass
C18	272A	.1 MFD. 200 Volt 77 & 78 Feed Condenser
C19	269A	.01 MFD. 400 Volt 75 Feed Condenser
C20	183A	.2 MFD. 200 Volt C Bias Network By-Pass
C21	272A	.1 MFD. 200 Volt 75 Plate Hum Filter Condenser
C22	265	.001 MFD. Mica 75 Plate Filter Condenser
C23	269A	.01 MFD. 400 Volt Audio Feed Condenser
C24	269A	.01 MFD. 400 Volt Tone Control Condenser
C25	343A	.004 MFD. 600 Volt 42 Plate Filter Condenser
C26	1129	4 MFD. Dry Electrolytic Condenser
C27	1129	4 MFD. Dry Electrolytic Condenser
C28	928	25 MFD. 25 Volt Dry Electrolytic Condenser
C29	269A	.01 MFD. 400 Volt Power Line By-Pass Condenser
C30	266	1 MFD. 400 Volt B By-Pass Condenser
C31	272A	.1 MFD. 200 Volt Oscillator Feed By-Pass
C32	339	.0001 MFD. Mica L.W. Oscillator Reciprocal Condenser
C33	347	.00001 MFD. Mica Broadcast Oscillator Condenser
C34	264	.00005 MFD. Mica Oscillator Grid Condenser
		INDUCTANCES
L1	1525	F. Preselector Primary 16 Turns #32 P.E.
L2	1525	F. Preselector Secondary 8¼ Turns #24 S.S.C.
L3	1527	B. Preselector Primary 175 Turns #36 S.S.E.
L4	1527	B. Preselector Secondary 136 Turns #36 S.S.E.
L5	1527	B. Preselector Secondary 126 Turns #36 S.S.E.
L6	1529	L. Preselector Primary 800 Turns #36 S.S.E.
L7	1529	L. Preselector Secondary 500 Turns #36 S.S.E.
L8	1529	L. Preselector Secondary 490 Turns #36 S.S.E.
L9	999	25,000 Microhenry First I.F. Primary
L10	999	25,000 Microhenry First I.F. Secondary
L11	999	25,000 Microhenry Second I.F. Primary
L12	999	25,000 Microhenry Second I.F. Secondary
L13	1395	42 Tube Output Transformer
L14	1395	2500 Ohm Speaker Field
L15	1068	Power Transformer (Unless Special)
L16	1533	L. Oscillator Primary 100 Turns #36 S.S.E.
L17	1533	L. Oscillator Secondary 360 Turns #36 S.S.E.
L18	1531	B. Oscillator Primary 25 Turns #36 S.S.E.
L19	1531	B. Oscillator Secondary 106 Turns #36 D.C.C.
L20	1444	F. Oscillator Primary 9¼ Turns #36 D.C.C.
L21	1444	F. Oscillator Secondary 8¼ Turns #24 S.S.C.

REPUBLIC INDUSTRIES

MODEL SL6

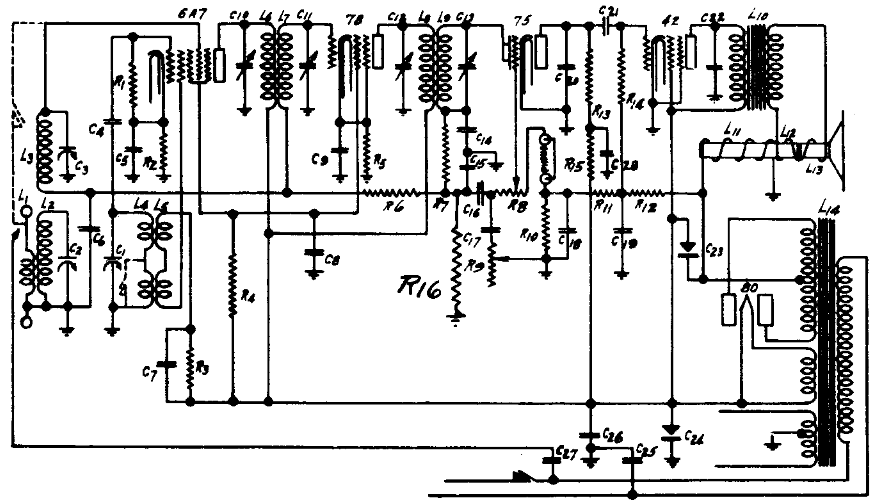


Code	Part No.	RESISTORS
R1	919	5,000 Ohm First Detector Cathode
R2	1062	250 Ohm I. F. Cathode
R3	1003	15,000 Ohm Second Detector Cathode
R4	1042	25,000 Ohm Long Wave Oscillator Grid
R5	924	250,000 Ohm Second Detector Plate
R6	925	500,000 Ohm 43 Grid
R7	534	250,000 Ohm Tone Control
R8	1063	500 Ohm 43 Cathode
R9	921	40,000 Ohm Screen Feed
R10	922	75,000 Ohm I. F. Cathode Feed
R11	512	10,000 Ohm Volume Control & Switch
R12	941	20,000 Ohm Oscillator Plate Feed
R13	1125	130 Ohm Resistance in Power Cord
R14	1064	600 Ohm Oscillator Cathode
R15	1042	25,000 Ohm Broadcast Oscillator Grid
R16	924	250,000 Ohm Second Detector Screen
R17	~~1119~~ 1308	~~[illegible]~~ 20 Ohm Pilot Light Shunt Resistor

Code	Part No.	CONDENSERS
C1	833	26 - 336 MMFD. Oscillator Section of 3 Gang
C2	833	26 - 371 MMFD. Preselector Section of 3 Gang
C3	833	26 - 371 MMFD. Preselector Section of 3 Gang
C4	784	4 Plate Long Wave Oscillator Trimmer
C5	972	2 Plate Long Wave Oscillator Trimmer
C6	971	2 Plate First Preselector Trimmer
C7	971	2 Plate Second Preselector Trimmer
C8	993	75 - 150 MMFD. First I.F. Primary Trimmer
C9	994	75 - 150 MMFD. First I.F. Secondary Trimmer
C10	995	75 - 150 MMFD. Second I.F. Primary Trimmer
C11	996	75 - 150 MMFD. Second I.F. Secondary Trimmer
C12	269	.01 Antenna Coupling Condenser
C13	269	.01 Oscillator Feed Condenser
C14	269	.01 Mfd. Oscillator Plate Condenser
C15	503	.004 Mfd. Broadcast Oscillator COND.
C17	~~[illegible]~~ 267	.5 Mfd. Second Detector Cathode By-pass Condenser
C18	1085	4. Mfd. Dry Electrolytic Filter Condenser
C19	544	.001 Mfd. Second Detector Plate Filter Condenser
C20	269	.01 Mfd. Audio Feed Condenser
C21	928	25 Mfd. Electrolytic 43 Cathode 30 Volt Tubular
C22	503	.004 Mfd. 43 Plate Filter Condenser
C23	272	.1 Mfd. Tone Control Condenser
C24	1085	4 Mfd. Dry Electrolytic Condenser
C25	1085	12 Mfd. Dry Electrolytic Condenser
C26	272	.1 Mfd. Power Line By-pass Condenser
C27	266	1. Mfd. B Supply By-pass Condenser
C28	267	.5 Mfd. Screen By-pass Condenser
C29	269	.01 Mfd. Second Detector Screen By-pass Condenser

Code	Part No.	INDUCTANCES
L1	782	Long Wave Oscillator Secondary 1975 Microhenries
L2	782	Long Wave & Broadcast Oscillator Primary 10 Turns #36 P.E.
L3	782	Long Wave Oscillator Secondary 97 Turns #32 P.E.
L4	781	Long Wave First Preselector Primary U.W. 800 Turns #36 S.S.E.
L5	976	Broadcast First Preselector Primary U.W. 178 Turns #36 S.S.E.
L6	781	Long Wave First Preselector Secondary U.W. 3380 Microhenries
L7	976	Broadcast First Preselector Secondary 139 Turns #32 S.S.E.
L8	781	Long Wave Second Preselector Secondary 3380 Microhenries
L9	976	Broadcast Second Preselector Secondary 132 Turns #36 S.S.E.
L10	999	25,000 Microhenries First I.F. Primary U.W.
L11	999	25,000 Microhenries First I.F. Secondary U.W.
L12	1156	14,000 Microhenries Second I.F. Primary U.W.
L13	1156	14,000 Microhenries Second I.F. Secondary U.W.

MODEL SL-5D



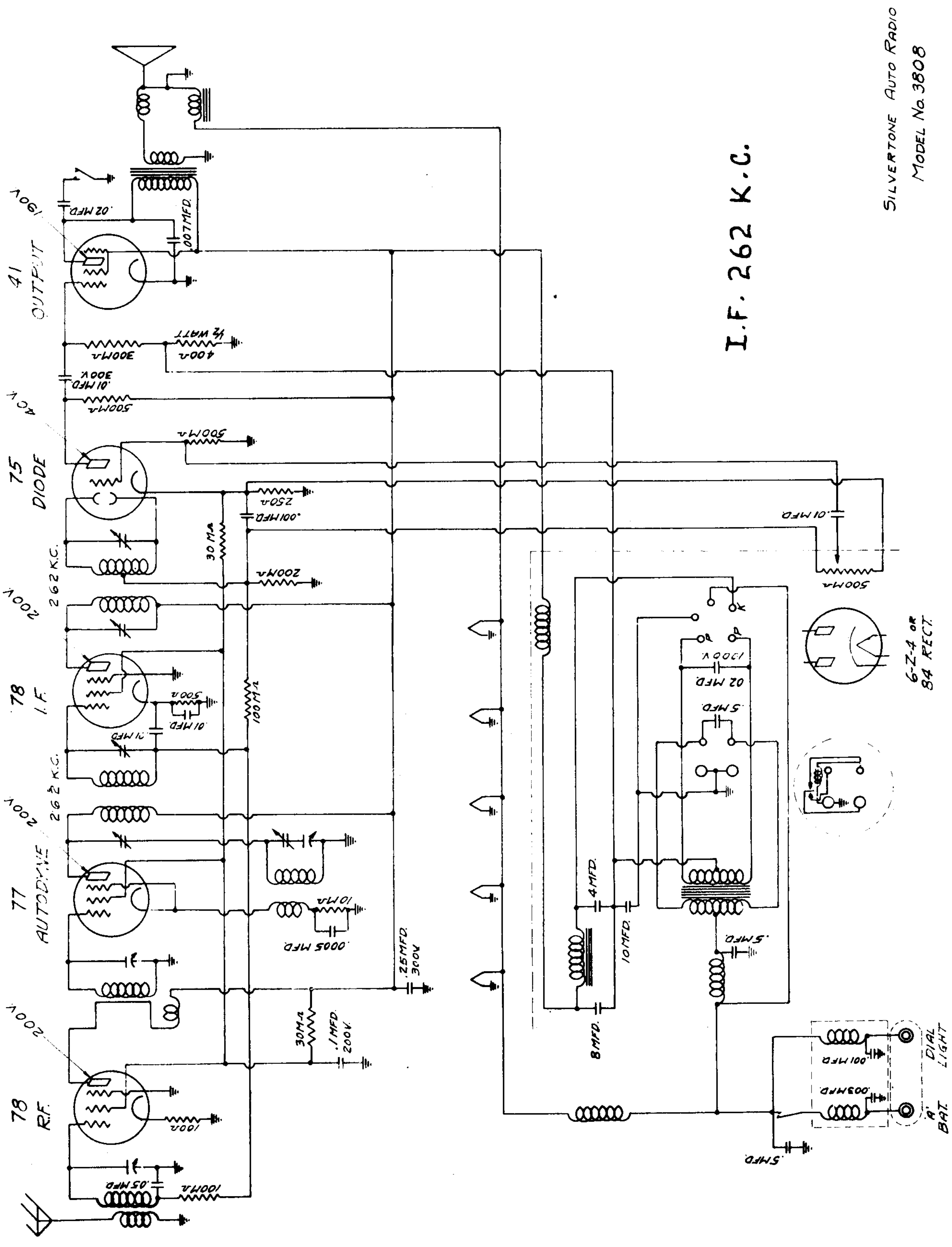
Code	Part No.	RESISTORS
R1	921	40,000 Ohm Oscillator Grid Leak
R2	1062	250 Ohm 6A7 Cathode Resistor
R3	920	10,000 Ohm Oscillator Feed Resistor
R4	898	50,000 Ohm 6A7 & 78 Screen Feed Resistor
R5	1063	500 Ohm 78 Cathode Resistor
R6	926	1 Megohm A.V.C. Network Resistor
R7	898	50,000 Ohm A.V.C. Network Filter Resistor
R8	535	500,000 Ohm Volume Control & A. C. Switch
R9	534	250,000 Ohm Tone Control
R10	919	5,000 Ohm Bias Network Resistor
R11	922	75,000 Ohm Bias Network Resistor
R12	926	1 Megohm Bias Network Resistor
R13	924	250,000 Ohm 75 Plate Resistor
R14	925	500,000 Ohm 42 Grid Resistor
R15	898	50,000 Ohm 75 Plate Resistor
R16	925	500,000 OHM AVC. NETWORK

Code	Part No.	CONDENSERS
C1	833	336 MMFD. Oscillator Section of Tuning Condenser
C2	833	371 MMFD. Preselector Section of Tuning Condenser
C3	833	371 MMFD. Preselector Section of Tuning Condenser
C4	268	.00025 MFD. Oscillator Coupling Condenser
C5	272	.1 MFD. 6A7 Cathode By-pass Condenser
C6	272	.1 MFD. A.V.C. By-pass Condenser
C7	272	.1 MFD. Oscillator Feed By-pass Condenser
C8	~~[illegible]~~ 266	1 MFD. 6A7 & 78 Screen By-pass Condenser
C9	272	.1 MFD. 78 Cathode By-pass Condenser
C10	1104	70-200 MMFD. First I.F. Primary Trimmer Condenser
C11	1105	70-200 MMFD. First I.F. Secondary Trimmer Condenser
C12	1106	70-200 MMFD. Second I.F. Primary Trimmer Condenser
C13	1107	70-200 MMFD. Second I.F. Secondary Trimmer Condenser
C14	339	.0001 Diode Filter Condenser
C15	339	.0001 MFD. Diode Filter Condenser
C16	269	.01 MFD. Second Detector Feed Condenser
C17	269	.01 MFD. Tone Control Condenser
C18.	928	25 MFD. A.V.C. Network By-pass Condenser
C19	569	.2 MFD. 42 Bias By-pass Condenser
C20	516	.001 MFD. 75 Plate Filter Condenser
C21	269	.01 MFD. Audio Feed Condenser
C22	1132	.002 MFD. 42 Plate Filter Condenser 600 Volt
C23	496	4 MFD. B Filter Condenser
C24	496	4 MFD. B Filter Condenser
C25	269	.01 MFD. Line By-pass Condenser
C26	794	1 MFD. B Supply By-pass Condenser
C27	307	.0005 MFD. Sub. Antenna Condenser
C28	272	.1 MFD. 75 Plate Hum Filter Condenser

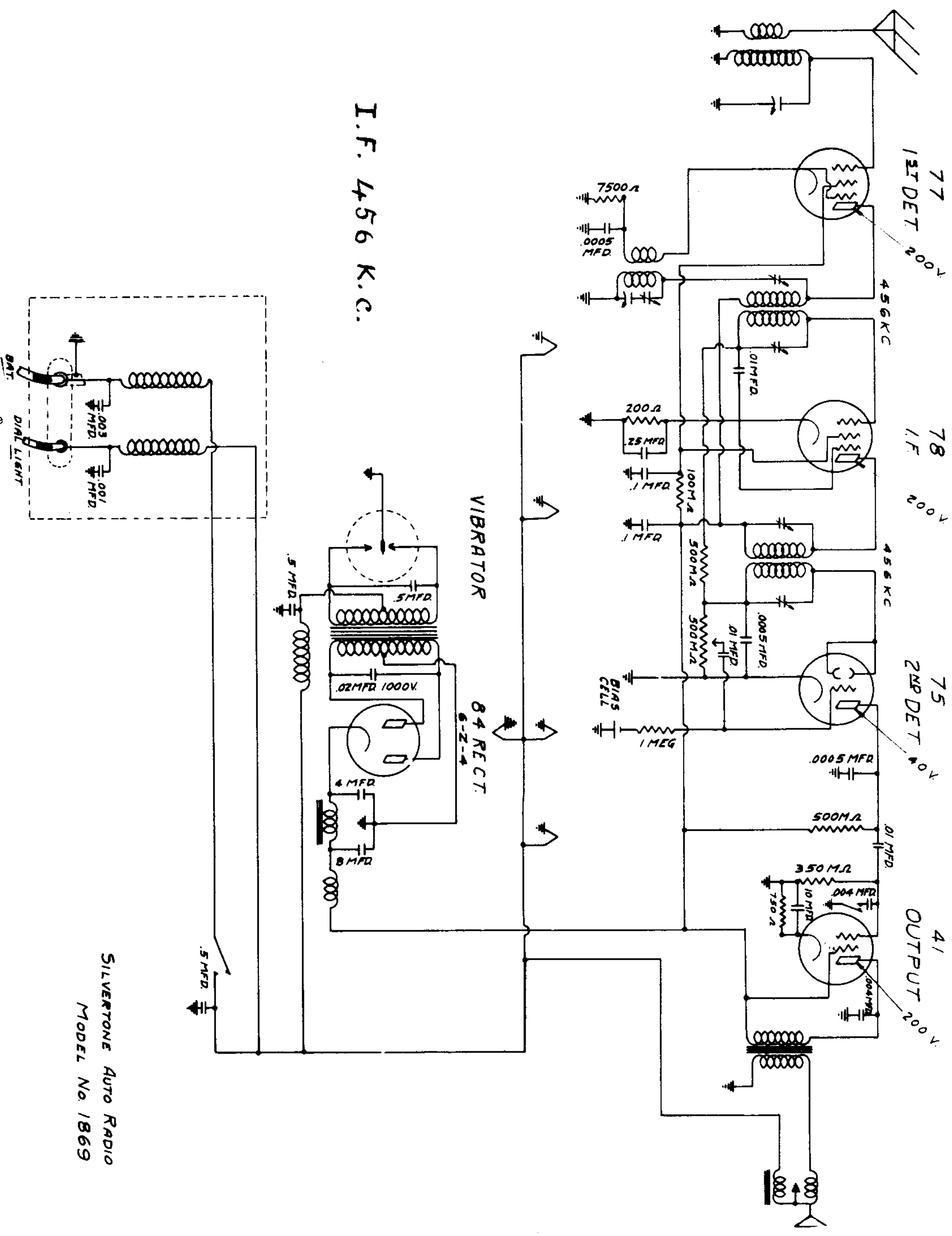
Code	Part No.	INDUCTANCES
L1	1109	Antenna Coil Primary 178 Turns #36 S.S.E.
L2	1109	Antenna Coil Secondary 136 Turns #36 S.S.E.
L3	1109	Preselector Secondary 126 Turns #36 S.S.E.
L4	1111	Oscillator Secondary 72 and 50 Turns #36 D.D.C.
L5	1111	Oscillator Primary 35 Turns and 15 Turns #36 S.S.E.
L6	1101	8,000 Microhenries First I.F. Primary
L7	1101	8,000 Microhenries First I.F. Secondary
L8	1101	8,000 Microhenries Second I.F. Primary
L9	1101	8,000 Microhenries Second I.F. Secondary
L10		Single 42 Output Transformer
L11		3,000 Ohm Speaker Field
L12		Hum Bucking Coil
L13		Speaker Voice Coil
L14	1068	Power Transformer 115 Volts A. C. 60 Cycle

SEARS, ROEBUCK & CO.

MODEL 3808 AUTO RADIO



SEARS, ROEBUCK & CO.
MODEL 1869 AUTO RADIO



MODEL NUMBER 1869

The #1869 Silvertone is a 5-tube superheterodyne, using: 1 Type 77 Oscillator
1 Type 78 I. F.
1 Type 75 Second Detector
1 Type 41 Output
1 Type 84 Rectifier

I. F. - 456 K. C.

In this model the signal is fed into the primary of the antenna coil and is induced into the secondary circuit which feeds the grid of the 77 autodyne tube.

The padder is also used in the oscillator system of this set.

The intermediate frequency of this model is 456 K. C.

In the 75 tube half-wave rectification is used and full A. V. C. voltage is applied to the grid of the 78 I. F. tube. The manual volume control is used as the resistance across which the A. V. C. voltage is obtained. From the movable arm of the volume control through a condenser the audio component is applied to the triode section of the 75 and this is resistance coupled to the 41 used as an output tube.

Bias is obtained for the 75 triode section from a bias cell in its grid circuit. A voltage drop across the 750 ohm resistor in the cathode circuit of the 41 supplies its bias.

The tone control switch is in the grid circuit of the 41 tube.

SERVICE HINTS

HASH ...

"Hash" is a term given the audible, buzz appearing in the speaker and originating from the ionization frequency occurring between make and break of the points in the vibrator unit. This is kept out of the radio by means of low pass filters in the leads from the power supply and from direct radiation by the metal partition between the power supply and set. If this condition occurs, polish the edges of this metal partition with emery cloth and the housing to insure good conductivity at the points of contact.

A defective vibrator unit will aggravate this condition, as well as shorted "hash" chokes in the power supply leads or open bypasses in these same circuits.

HOWL ...

This may be caused by defective tubes, I. F. trimmer plates not clinched tightly, open bypass condenser, or defective variable condenser gang.

HUM ...

This may originate from open filter or bypass condensers, open grid leads, defective tubes, shorted filter choke, defective vibrator unit, or high resistant connections between storage battery and set.

NO "B" VOLTAGE ...

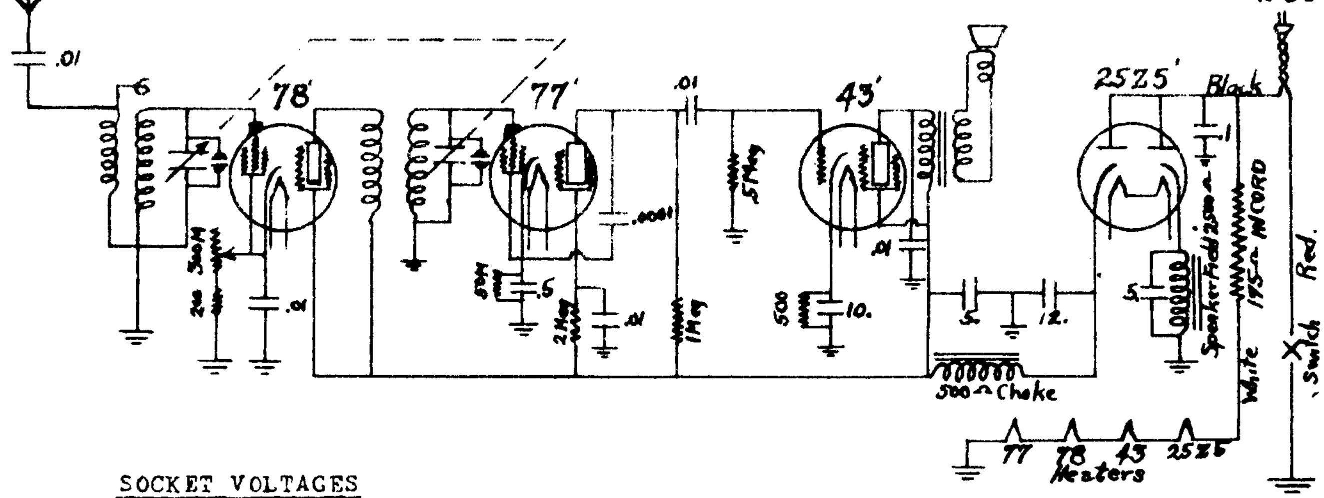
Open choke, defective rectifier, defective vibrator, shorted filter or bypass condensers may cause this condition.

BIAS CELL ...

This unit is used on the Model "1869" to supply a fixed bias to the 75 tube and offers the advantage of fixed bias in increased sensitivity and fidelity of tone from that tube. The life of the cell in the set is the same as its shelf life since there is no current drain at this point in the circuit. It should be checked only with a vacuum tube voltmeter or by replacement.

SEARS, ROEBUCK & CO.

MODELS 1728 A & 7135

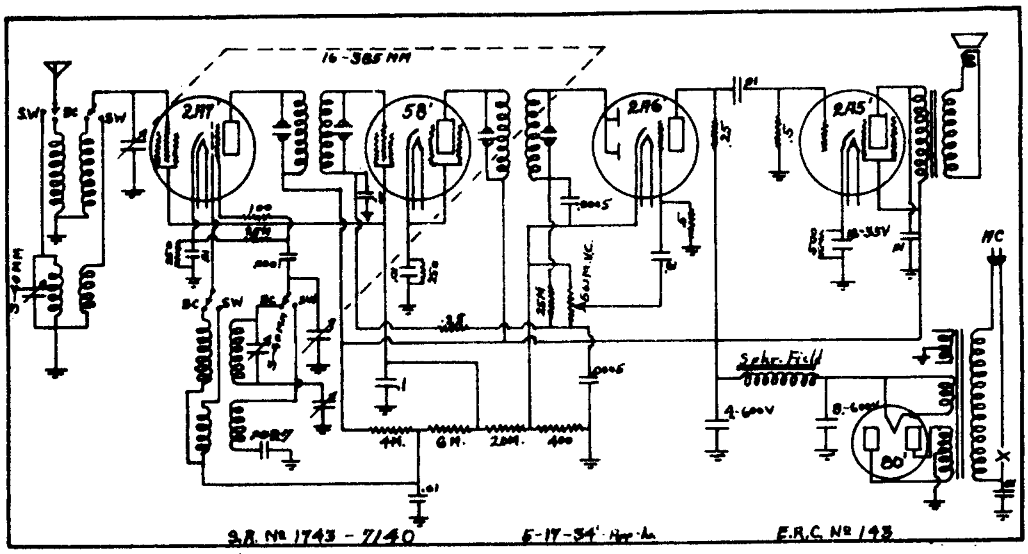


SOCKET VOLTAGES						
TUBE	POSITION	EF	EK	EG2	EG3	EP
78	RF	6.3	2.1	110	2.1	108
77	DET.	6.3	1.4	14	1.4	18
43	PR.OUTPUT	25	16	110	-	100

Line voltage 115 Volts - Volume control all the way up
All voltages taken with 1000 ohms per volt D.C. meter except heaters. From points indicated to ground.

F - Filament K - Cathode G2 - Screen Grid
G3 - Suppressor Grid P - Plate

MODELS 1743A & 7140

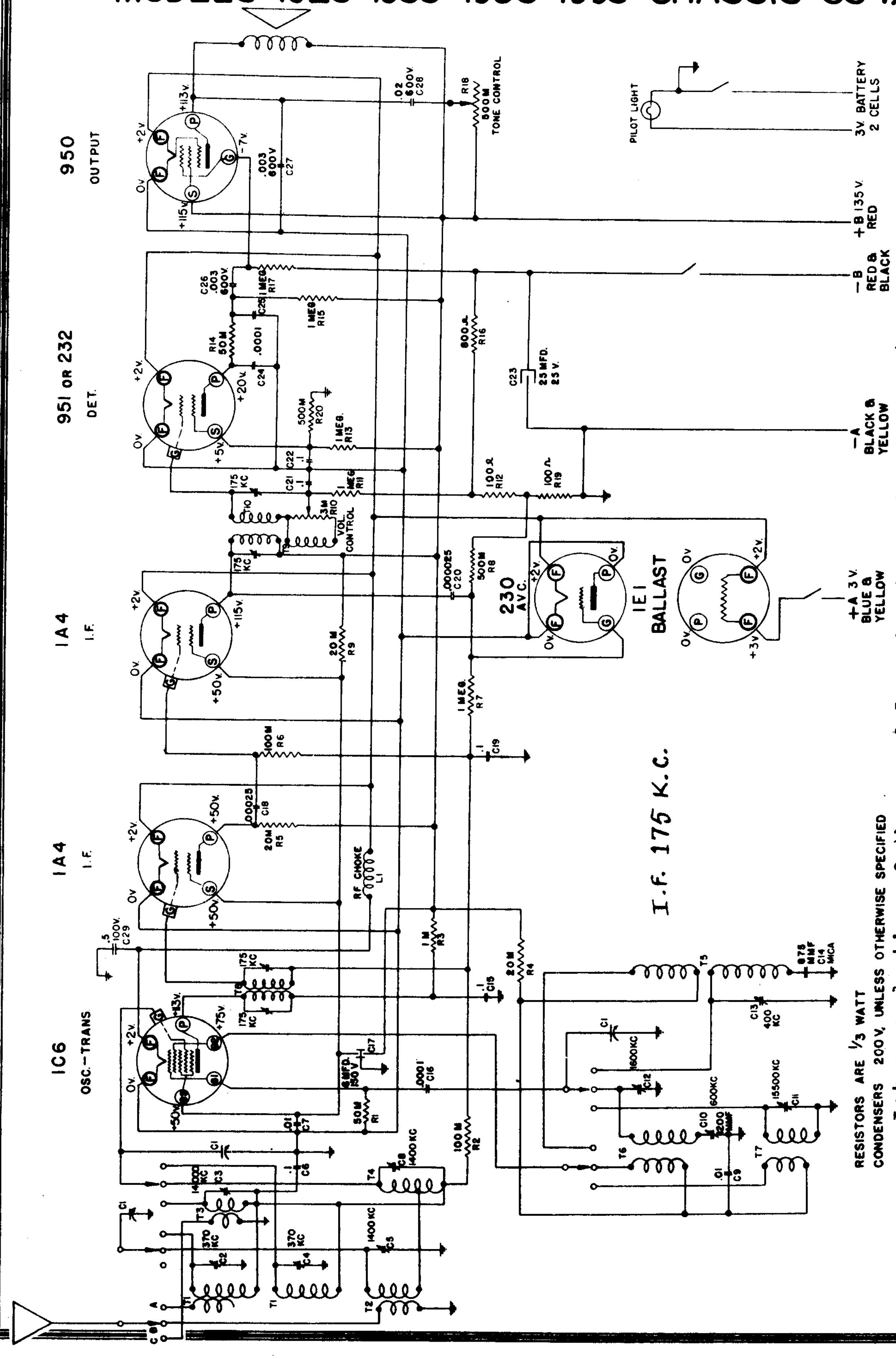


SOCKET VOLTAGES						
TYPE	POSITION	EF	EK	EG2	EG3	EP
2A7	Osc.1st Det.	2.4	2.3	115	170•	225
58	I F	2.4	1.8	115	1.8	225
2A6	2nd det.AVC first audio	2.4	1.3	-	-	95
2A5	Power Output	2.4	16	230	-	210

• Osc. Plate
Line voltage-115 V.
F- Filament
K- Cathode
G2-Screen Grid
G3- Suppressor Grid
P- Plate

All readings taken with 1000 ohms per volt D.C. meter (except filaments) points indicated to ground.

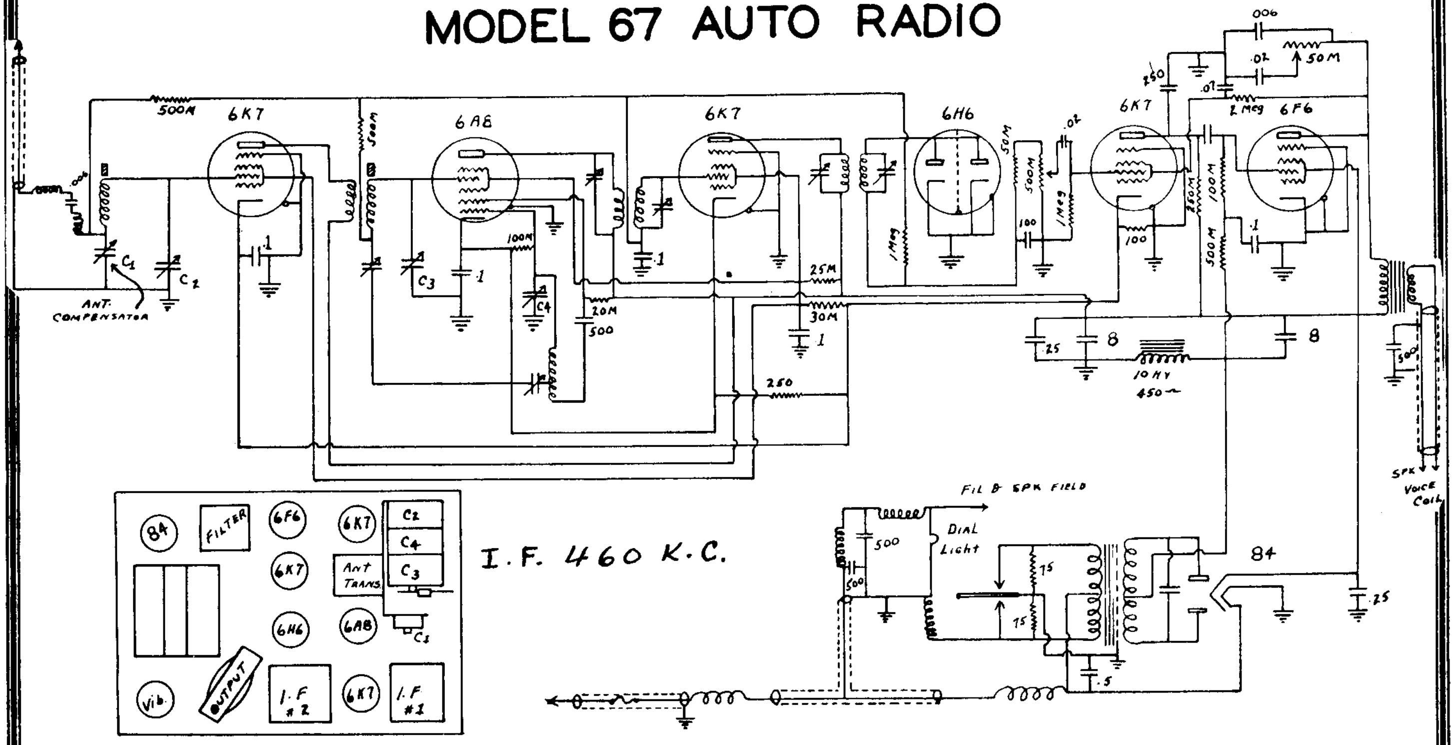
SEARS, ROEBUCK & CO.
MODELS 1923-1933-1983-1993 CHASSIS 334X



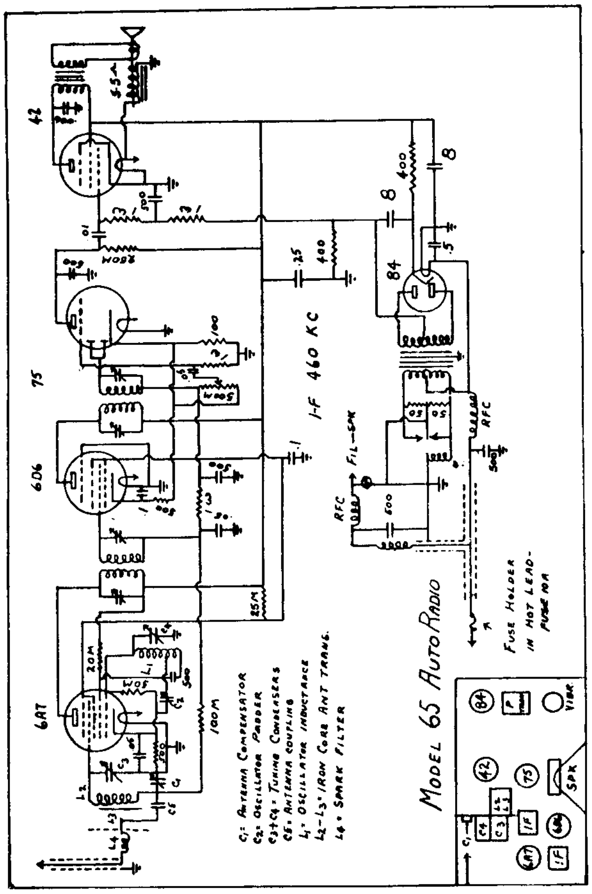
Later production of these models using the 334X chassis (not 334 chassis) had the following circuit changes made. These changes reduce tube noise. The 100 ohm resistor, R12, was removed and replaced by a wire jumper. The value of R19 was changed from 100 ohms to 200 ohms (Part #R7227).

SHELLEY RADIO COMPANY

MODEL 67 AUTO RADIO



MODEL 65 AUTO RADIO



Model 65, 67

The successful performance of this radio will depend largely upon how accurately the following instructions are followed:

1. Packard Bell has not provided means permitting operation of the radio in an inverted position, therefore, should be avoided.

2. After drilling half-inch hole in fire-wall, thoroughly clean surface surrounding hole to permit thorough grounding of bolt to frame of car. In some cases a small wood block may be used to permit the box to be drawn snugly against fire-wall.

3. It is sometimes more convenient to attach remote control cables in box before mounting.
A piece of wadding is suggested to hold bolt in place when working in close quarters.

4. Two metal encased by-pass condensers and one distributor suppressor are standard equipment.
One of these condensers is fastened to generator frame and flexible wire connected at point where generator connects to cutout.
If generator is equipped with automatic charge rate regulator another similar condenser may be necessary to successfully eliminate noise.

5. The heavy hielded wire with fuse housing is the "A" battery lead. In all cars connect this lead to ammeter; at same point connect flexible lead of remaining by-pass condenser and ground case to dash. Grounding the wire shield at the same point is recommended.

6. Most factory installed antenna have an unshielded lead wire. The shielding of this wire is a very essential and important requirement. The preferred method is to cover a length of Electrician's Loom with copper braid and threading same over antenna lead as far as conveniently possible. Thoroughly insulate joint and join shielding together over this point. It is important that this shielded wire be carried close to the body of the car and preferably well up under cowl.

If a running board or any other type antenna is installed be sure the lead wire is of the low-loss, low-capacity type especially designed for this purpose and commercially available. Existing factory installed antennas are often improved by use of this lead wire.

It is quite important that the lead-wire shield be properly grounded at point where antenna is connected as well as at point where connected to receiver.

7. Various types of control heads are available. It is beyond the scope of these instructions to include installation procedure covering the numerous applications.

ADJUSTMENT OF DIAL is accomplished by removing pilot light in rear of control head and inserting small screw-driver in slot provided for this purpose, turning pointer to desired setting.

8. ANTENNA COMPENSATOR is located in upper left hand corner of box and may be trimmed with a quarter-inch socket wrench, preferably insulated.

Turn station selector knob to right until stop is reached; adjust dial pointer to right hand stop line mark on dial face. This sets pointer for calibration.

Tune in a weak signal between 550 and 650 Kcs. and adjust compensator for maximum volume . . . no other adjustments are necessary as radio will be perfectly matched to your antenna.

In cases where antenna or lead wire contribute excessive capacity to system a small series by-pass condenser of from 250 to 500 micro-microfarads capacity must be connected in series at the receiver and shielded.

Excessive antenna capacity may be detected by an apparent broad trimming action when adjusting compensator.

9. DISTRIBUTOR SUPPRESSOR. Ordinarily no motor noise will be present. However, in some cars an intense field is set up by the ignition system and this radiation is picked up by the antenna. In such cases the distributor suppressor is mounted on distributor head to reduce the intensity of this radiation since it serves no useful purpose. This is usual practice in auto radio installation and has been found to have no effect upon the performance of the motor.

10. In extreme cases motor noise interferes with radio reception. A brief outline of procedure will be given to aid in determining the manner in which this noise is entering the receiver.

The first step is to disconnect the antenna and hold unshielded end close to right side of box or close to front cover, being careful not to touch this unshielded portion either to the hand or to the box.

If noise is reduced it is safe to assume part of the noise to be entering the antenna and part to be entering by some other means.

If remote control cables are not perfectly grounded to box or if cable mounting brackets are not thoroughly grounded noise can enter via cables.

If by-pass condenser on ammeter is not properly connected or grounded noise may enter via battery lead.

If an ignition coil is mounted in driver compartment side of fire-wall, direct radiations from this coil are strong enough to cause noise by induction or shield leakage; in such cases thoroughly shield the coil or move into engine compartment.

In a few cases insufficient shielding between engine and driver compartments must be supplemented by wire screen fastened to floor board inclining to fire-wall and grounded to same.

Sometimes proper grounding of the steering column is necessary.

Without antenna connected more extensive applications than those mentioned are seldom necessary.

With antenna connected and properly shielded, noise pickup is usually due to re-radiation from the ignition system.

If a top antenna is used, disconnect dome light; this source of noise may be eliminated by use of a dome light filter.

Radiation fed into driver compartment and thence to antenna is generally through the medium of choke, throttle or other control rods, oil or temperature gauge lines, steering post, etc. Proper bonding with heavy copper braid is recommended.

Undercar antenna noise may be picked up from proximity to "A" battery, tail-light and gas-gauge cables, poorly grounded shafts, rods, etc.

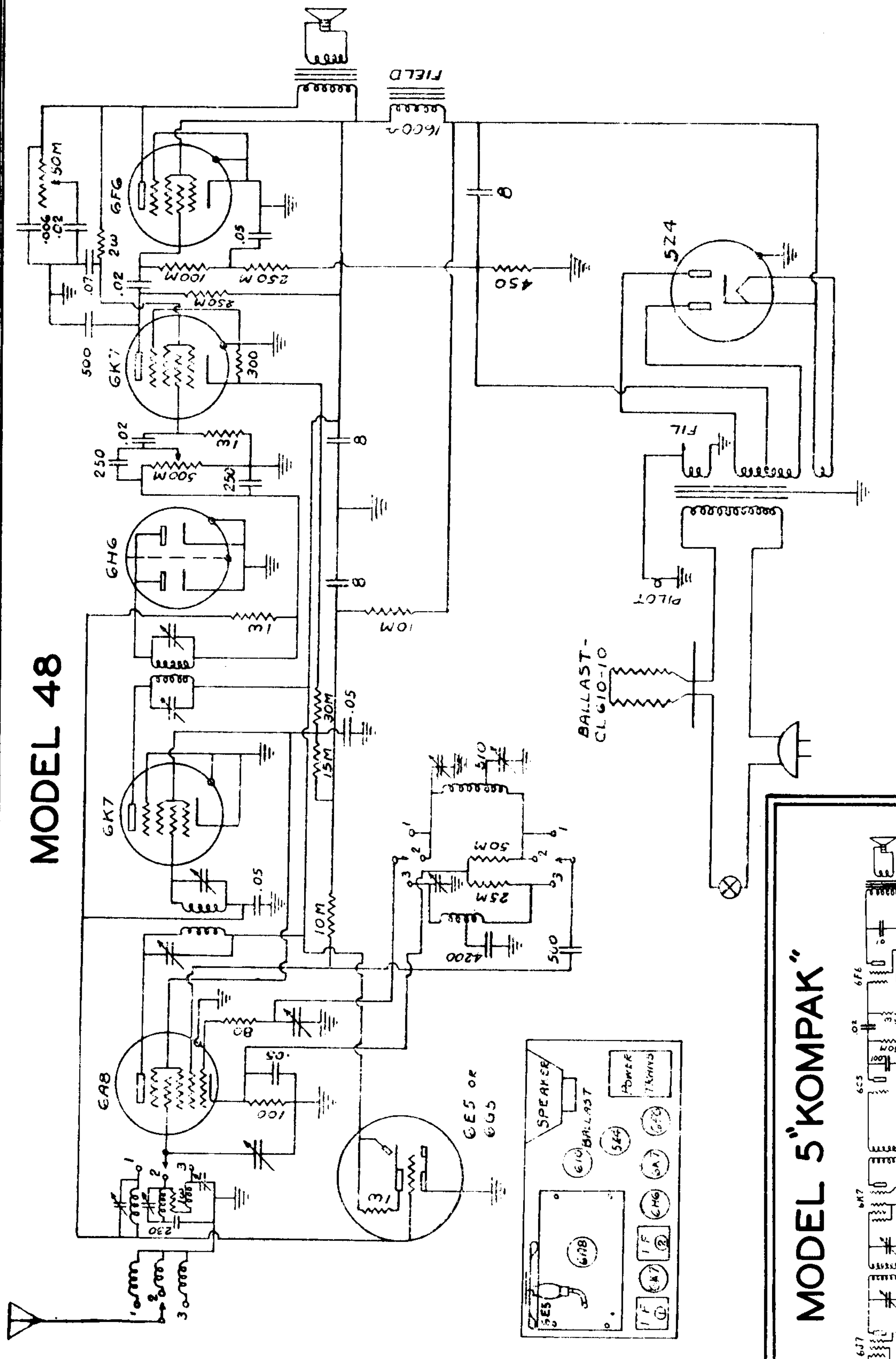
Undercar antenna also may pick up brake static; use of grounding brushes in wheel hubs is recommended in such cases.

Schematic Diagram to be found inside front cover.

NOTE: THE EFFICIENCY OF A GOOD UNDERCAR ANTENNA IS SELDOM GREATER THAN 60% AS EFFICIENT AS A GOOD TOP ANTENNA AND OFTEN MUCH LESS. BEFORE YOU PASS JUDGMENT OF PERFORMANCE BE SURE YOU HAVE AN EFFICIENT ANTENNA.

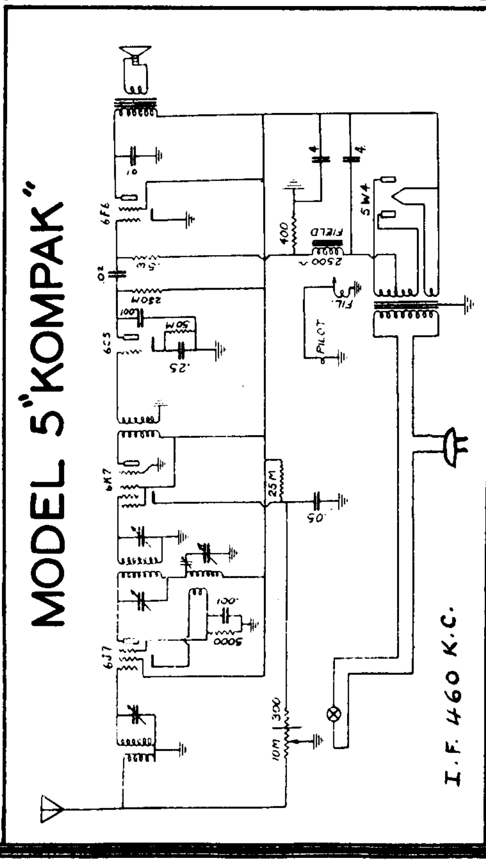
SHELLEY RADIO COMPANY

MODELS 48 & 5 "KOMPAK"



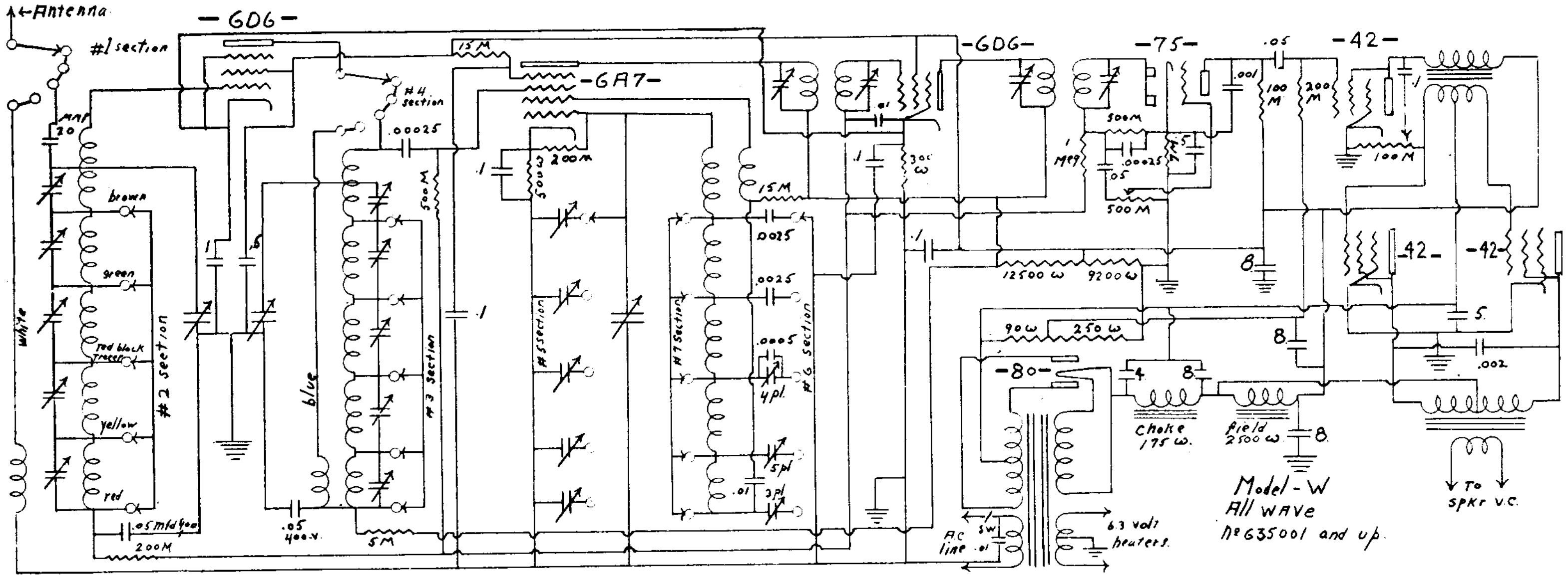
MODEL 48 is a seven-tube superheterodyne with an intermediate frequency peaked at 458 kilocycles.

BAND No. 1 ...540 to 1600 K.C.
BAND No. 2 ...1.64 Mc to 2.5 Mc.
BAND No. 3 ...5.7 Mc to 18.5 Mc.



THE SIMPLEX RADIO CO.

MODEL W (SERIAL № 635001 AND UP)



CAUTION: Do not attempt to operate on current other than that noted on the instrument.

INSTALLATION: A good aerial, 25 to 50 feet long, well away from surrounding metal structures and power lines, is essential for best results. Power noise interferes especially with short-wave reception. If the set is located where power noise is prevalent it may be necessary to install an aerial high above the street and use a "transposition" lead-in to the set. A good ground connection (water pipe or equivalent) will also contribute to quieter reception.

CONTROL KNOBS: The left hand knob is, initially, the power switch and thereafter, tone control. The second knob from the left is band selector switch. The third knob from the left is tuning control. The right hand knob is volume control.

OPERATION: After the set has been properly installed by the attachment of suitable aerial and ground connection and the power cord plugged into an outlet of the proper voltage, the left hand knob is turned to the right and a few seconds allowed for the tubes to reach operating temperature. The second knob from the left is then set to the position covering the frequency band desired as indicated on the dial by the numbers 1, 2, 3, 4, and 5, each in the circle. The volume control knob is turned full to the right and then the tuning knob turned slowly until the desired station is heard. Note that each frequency band is indicated on the dial by a number corresponding to the various positions of the band selector switch, and also that in connection with each band, there is shown on the dial the type of stations that may be tuned in.

SERVICE NOTES: If the radio fails to operate when unpacked, or stops working after a few days, proceed as follows: (1) Have the tubes checked. (2) Remove the chassis from the cabinet and check for loose connections. (3) Have a competent "Radio Service Man" check over entirely. Do not return unless you have made the above tests. This set left the factory carefully inspected.

The intermediate stages are carefully phased to 456 KC at the factory. Should rephasing be necessary attach the output lead from a 456 KC test oscillator to the grid cap of the 6A7 tube, keep the signal to a very low audible value and carefully adjust the two trimmer screws in the top of each of the two intermediate cans to the loudest volume. If an output meter is available it should be used across the two voice coil leads at the speaker transformer. An all-wave oscillator having a range from 150 KC to 20 MC will be necessary to rephase the frequency bands. The oscillator output is attached to the aerial lead of the set and oscillator output kept always at a law audible level. The R. F. coil trimmers are reached through a series of five (5) holes in the side of the R. F. shield cans and correspond to frequency band Nos. 1, 2, 3, 4, and 5, from top down. The oscillator parallel trimmers are seen on the under side of the set when the front of it is raised and are located along side the band switch, No. 1 being the one nearest the back of chassis and No. 5 nearest the front. The dual porcelain trimmers at back of chassis are series padders, the left hand for band No. 2 and the right hand one for band No. 1. The series padder for band No. 3 is the single trimmer at the center of the chassis.

Each band is trimmed first at the minimum end of its range, band No. 5 being first, No. 4 second, then No. 3, etc. Bands 3, 2, and 1 are also tracked near their maximum ranges, or with the tuning condenser turned well in, by adjusting that series padder belonging to the particular band being used, location of which is given above.

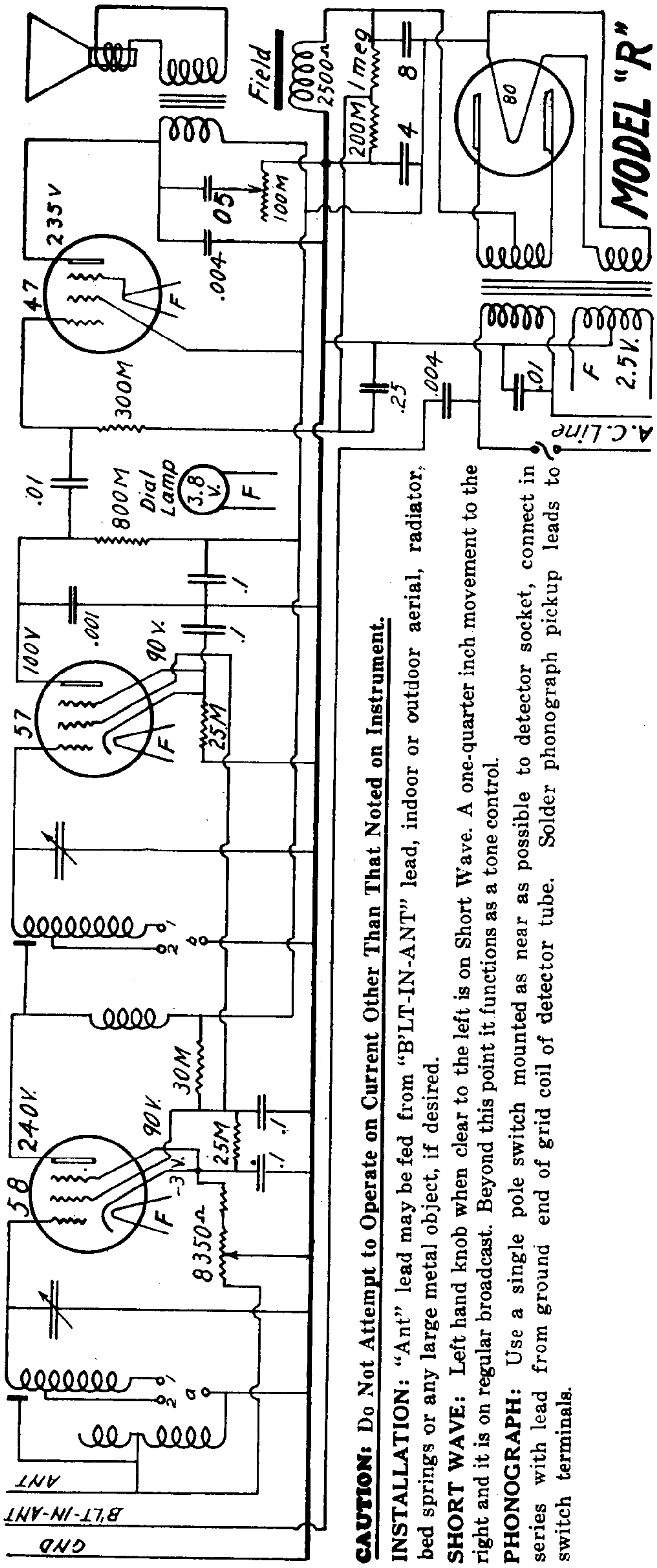
NOTE: Should it be necessary to write to the factory for parts or information, always give the serial number of the set as stamped on the back of the chassis.

PHONOGRAPH: Install a single pole double throw toggle switch at any convenient place on the chassis. Disconnect the .05 mfd. condenser from the volume control and attach it to one side of the toggle switch, connect volume control to center switch terminal, remaining switch terminal to one side of phonograph pickup and other side of phonograph pickup to ground.

SHORT-WAVE TIPS: In listening for short-wave broadcast DON'T forget to consider the difference in time between the location of the broadcaster and the receiver. DON'T expect to hear a station because it is on the air, as many things govern short-wave reception. DON'T get discouraged if reception is poor one night; it may be fine the next. DON'T expect stations to tune broadly; most stations tune sharply. DON'T tune below 10,000 kilocycles (above 30 meters) for distant stations in daylight. DON'T expect to find stations on all parts of the dial. Short-wave stations are widely separated, except in a few instances. DON'T skim over the dial. It requires some knowledge of tuning to get good results. Tune very slowly. DON'T pass up any weak signal, as it may often be brought in stronger by careful tuning.

THE SIMPLEX RADIO CO.

MODEL R



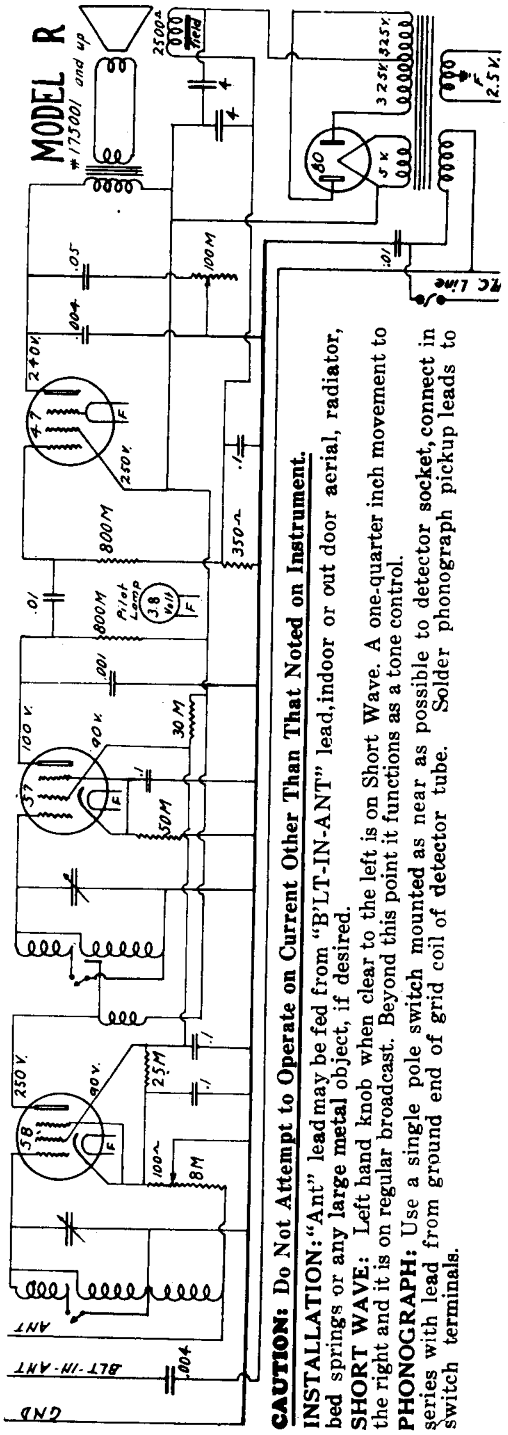
CAUTION: Do Not Attempt to Operate on Current Other Than That Noted on Instrument.

INSTALLATION: "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or outdoor aerial, radiator, bed springs or any large metal object, if desired.

SHORT WAVE: Left hand knob when clear to the left is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket, connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to switch terminals.

MODEL R (SERIAL № 175001 AND UP)



CAUTION: Do Not Attempt to Operate on Current Other Than That Noted on Instrument.

INSTALLATION: "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or out door aerial, radiator, bed springs or any large metal object, if desired.

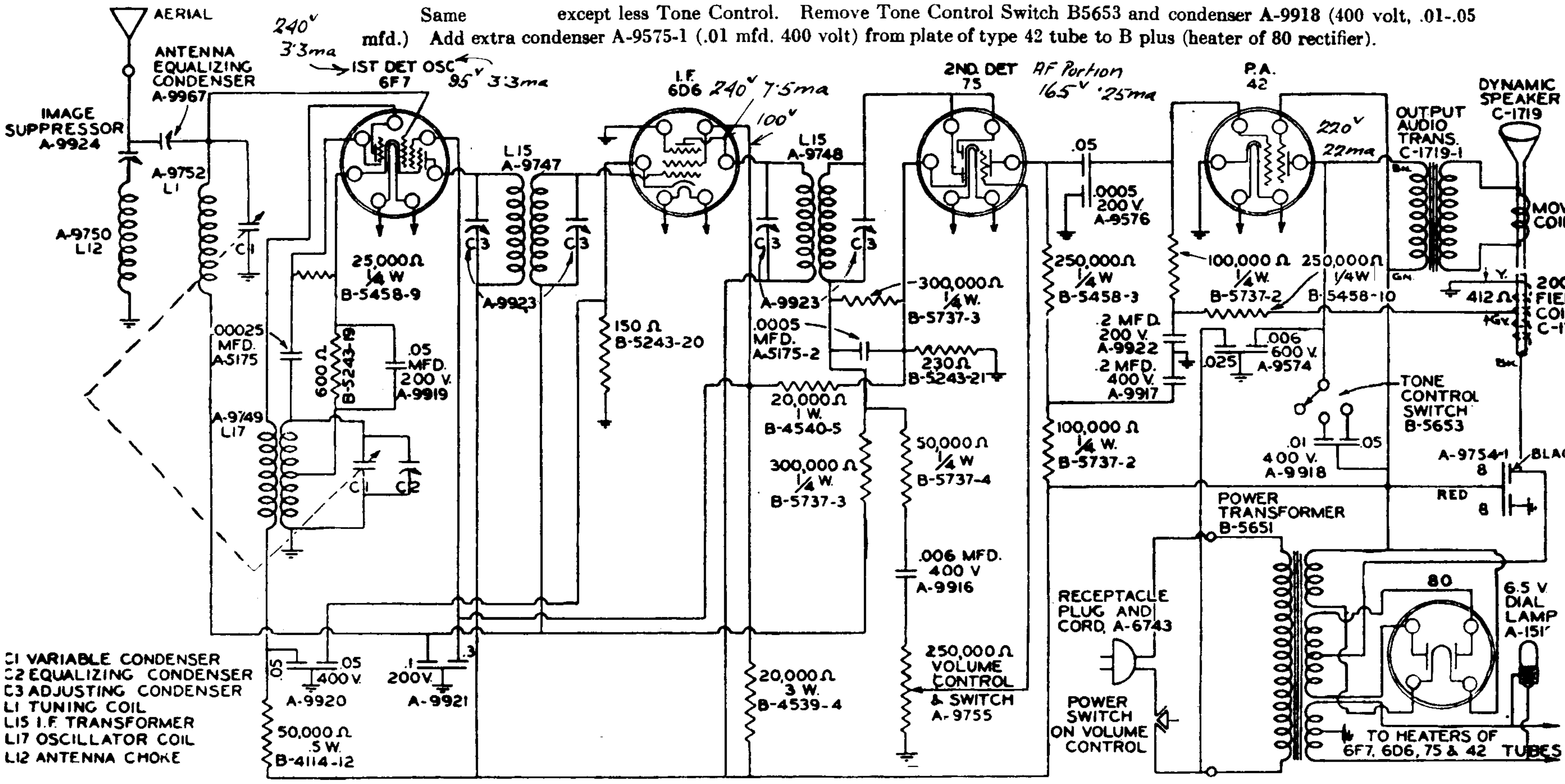
SHORT WAVE: Left hand knob when clear to the left is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket, connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to switch terminals.

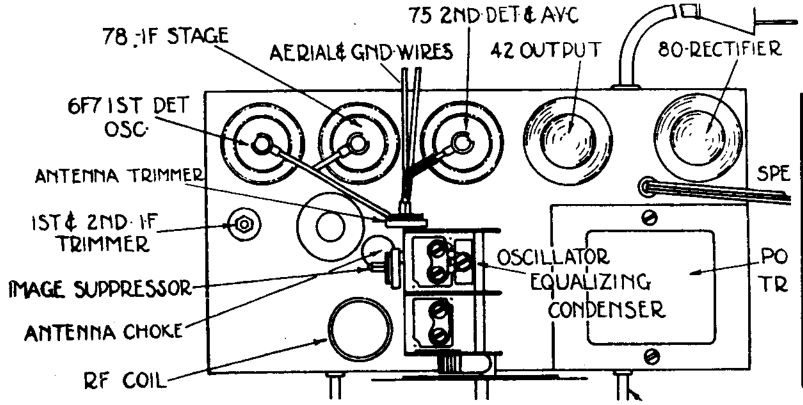
SPARKS-WITHINGTON COMPANY
MODELS 251 & 252

MODEL 251 SCHEMATIC Same except less Tone Control. Remove Tone Control Switch B5653 and condenser A-9918 (400 volt, .01-.05 mfd.) Add extra condenser A-9575-1 (.01 mfd. 400 volt) from plate of type 42 tube to B plus (heater of 80 rectifier).

Intermediate Frequency 456 K.C.



NOTE—Type 6D6 tube replaceable with type 78 tube. Regular production includes both tubes.



ALIGNMENT PROCEDURE

Models 252 and 251 Chassis

1. Attach output meter to voice coil of speaker. Adjust 1st and 2nd I. F. Trimmers to maximum output meter reading with oscillator set at 456 K.C. and fed into the grid of the type 6F7 1st Detector-Oscillator tube.

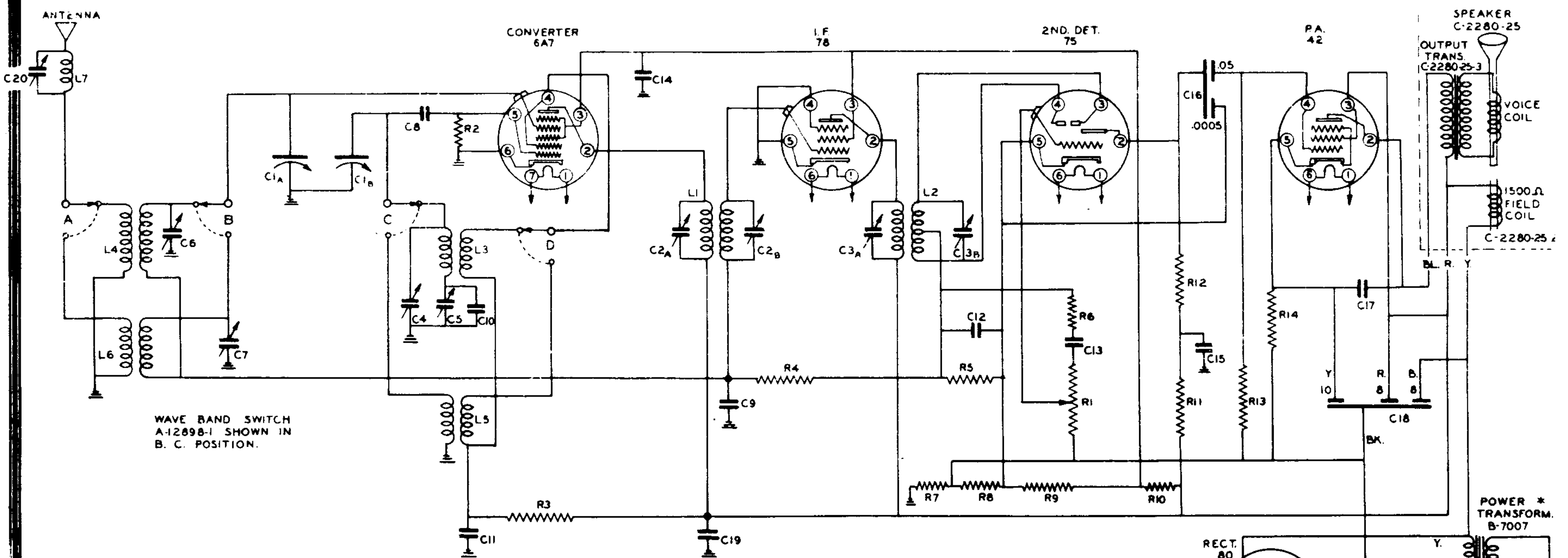
2. Leaving oscillator set at 456 K.C. feed the signal into the antenna of the set, and adjust the Image Suppressor (See Fig. 1) to a minimum speaker output.

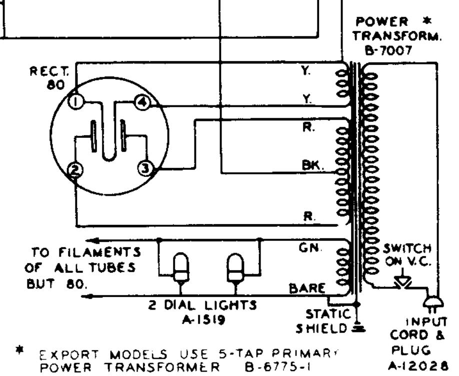
3. Set oscillator to exactly 1500 K. C and adjust the Oscillator Equalizing Condenser (See Fig. 1) so that when the set is tuned to the 1500 K.C. signal the dial pointer reads exactly 1500.

4. Adjust the Antenna Compensator (See Fig. 1) to the same signal with the receiver set at 1500, for the greatest output meter reading. If necessary the plates of the R. F. section of the gang condenser may be bent slightly at 900 and 600 K.C. positions to increase the sensitivity at those frequencies.

SPARKS-WITHINGTON COMPANY

MODELS 517-517B-517W-517X-557-567





* EXPORT MODELS USE 5-TAP PRIMARY POWER TRANSFORMER B-6775-1

C1	VARIABLE CONDENSER	B-7008
C2	NO. 1 I.F. TRIMMER	A-12668
C3	NO. 2 I.F. TRIMMER	A-12668
C4	B. C. OSC. TRIMMER	A-12444
C5	B. C. OSC. PADDER	A-12444
C6	B. C. R.F. TRIMMER	A-12333
C7	S. W. R.F. TRIMMER	A-12333
C8	.00005 MFD. MOLDED	C-720-321
C9	.05 MFD. 100 V.	C-720-58
C10	.00025 MFD. MOLDED	C-720-327
C11	.1 MFD. 400 V.	C-720-61
C12	.00025 MFD. MOLDED	C-720-327
C13	.02 MFD. 200 V.	C-720-18
C14	.1 MFD. 200 V.	C-720-60
C15	.1 MFD. 400 V.	C-720-61
C16	.05-.0005 MFD. 400 V.	C-720-134
C17	.0035 MFD. 600 V.	C-720-8
C18	8-8-10 MFD. ELECTROLYTIC	A-14102
C19	.1 MFD. 400 V.	C-720-61
C20	I. F. REJECTOR TRIM.	A-12834-1

R1	1 MEGOHM V.C. & SWITCH	A-12988-1
R2	47,000 Ω .25 W.	C-2795-82B
R3	22,000 Ω .5 W.	C-2796-78A
R4	1 MEGOHM .25 W.	C-2795-31B
R5	470,000 Ω .25 W.	C-2795-29B
R6	22,000 Ω .25 W.	C-2795-78B
R7	270 Ω .25 W.	C-2795-55B
R8	330 Ω .25 W.	C-2795-56B
R9	27,000 Ω 1 W.	C-2797-79A
R10	22,000 Ω 2 W.	C-2798-78B
R11	100,000 Ω .25 W.	C-2795-25B
R12	220,000 Ω .25 W.	C-2795-27B
R13	330,000 Ω .25 W.	C-2795-28B
R14	470 Ω 1 W.	C-2797-58A

L1	NO. 1 I.F. COIL	A-12064-7
L2	NO. 2 I.F. COIL	A-12989-1
L3	B. C. OSC. COIL	A-12055-7
L4	B. C. R.F. COIL	A-12056-4
L5	S.W. OSC. COIL	A-12062-11
L6	S.W. R.F. COIL	A-12061-5
L7	I.F. REJECTOR COIL	A-12666-3

VOLTAGE-RESISTANCE CHART

Line Voltage: 118 volts

Position of Volume Control: Full with Antenna Disconnected

Position of Band Selector Switch: Broadcast

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Grid Cap
6A7	Converter	Volts	0	280	115	270	*	0	0	0
		Ohms	0	40000	24000	60000	47000	0	0	**
78	I-F Amplifier	Volts	0	275	118	0	C	0	-	0
		Ohms	0	40000	24000	0	C	0	-	**
75	Detector-A.V.C.-A-F Amp.	Volts	0	110	0	0	0	0	-	0
		Ohms	0	350000	460000	460000	550	0	-	**
42	Power Amplifier	Volts	0	350	355	0	6	0	-	-
		Ohms	0	40000	40000	300000	600	0	-	-
80	Rectifier	Volts	0	350	350	0	-	-	-	-
		Ohms	40000	450	450	40000	-	-	-	-

* Cannot be measured with Weston Selective Analyzer No. 665, Type 2.

** Over 1 megohm

I.F. 456 K.C.

TOP VIEW OF ALL SOCKETS IN ABOVE DIAGRAM

SPARKS-WITHINGTON COMPANY

MODELS 517-517B-517W-517X-557-567

Detailed Alignment Instructions for SPARTON Models

517 517-B 517-W 517-X 557 567

Foreword: The use of quality test equipment is highly recommended and a good test oscillator becomes a virtual necessity when aligning the all-wave or short-wave type of receiver. Due to the fact that the ear cannot distinguish small changes in sound intensity, an output meter is essential to the proper adjustment of the various condensers.

Unless otherwise specified, the adjusting of any condenser consists of turning the adjusting screw or nut to the right or left until the output meter registers the greatest deflection.

1. EQUIPMENT REQUIRED

A. Modulated test oscillator (accurately calibrated) capable of generating frequencies from 456 kilocycles to 15,000 kilocycles.

B. Output meter.

C. Part A-5732 adjusting wrench.

D. Dummy antennas, consisting of a 150 mmf. condenser and a 400 ohm non-inductive resistor.

2. STEP BY STEP PROCEDURE

Note: For proper alignment of these chasses, the procedure should be followed in the same order as given.

The dial pointer should be exactly parallel with the horizontal line of the dial scale when the condenser plates are fully meshed. If the pointer does not read correctly, loosen the two small set screws directly back of the diffusion disc and dial drum, hold the rotor plates fully meshed with the stator plates and set the pointer so that it is parallel with the horizontal lines on the kilocycle scale, then tighten the set screws.

A. Alignment of Intermediate-Frequency Stages

1. Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

2. Turn the band selector switch to the broadcast position and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

3. Connect "antenna" of test oscillator to grid cap of Type 6A7 1st detector-oscillator tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of Type 42 tube to ground.

Note: It is advisable to read carefully the operating instructions included with the test oscillator being used in the alignment procedure.

4. Tune test oscillator to obtain a signal of 456 kilocycles.

5. Turn the volume control of receiver on full and adjust I-F condensers C2 and C3 which are reached from the top of the chassis.

Note: Care should be taken when adjusting the I-F stages in order to insure proper and accurate adjustment.

B. Alignment of Broadcast Band

1. Disconnect "antenna" lead of test oscillator from grid cap of 1st detector-oscillator tube Type 6A7 and connect it in series with a 150 mmf. condenser dummy antenna to the antenna terminal of the chassis.

2. Tune test oscillator to a frequency of 456 kilocycles and adjust condenser C20 (reached from back of the chassis) to a point where the output of the receiver is at an absolute minimum.

Note: This condenser is the adjustment for the code rejector circuit and must be very carefully adjusted if best performance of the receiver is to be expected.

3. Tune test oscillator and receiver to a frequency of 1500 kilocycles and adjust condensers C4 (broadcast band oscillator trimmer) and C6 (broadcast antenna trimmer) reached from the bottom of the chassis.

4. Tune test oscillator and receiver to 600 kilocycles and adjust condenser C5 (broadcast oscillator padder) reached from the front of the chassis.

5. Retune test oscillator and receiver to 1500 kilocycles and check adjustments of condenser C4 and condenser C6. Calibration of the broadcast band should also be checked at 900 kilocycles and 600 kilocycles.

DETAILED ALIGNMENT INSTRUCTIONS (Continued)

C. Alignment of Short-Wave Band

1. Turn the band selector switch to the short wave or "foreign" band.

2. Remove the 150 mmf. condenser from the test oscillator "antenna" lead and replace with a 400 ohm non-inductive resistor dummy antenna.

3. Tune test oscillator and receiver to a frequency of 15,000 kilocycles (15 megacycles) and adjust condenser C7 (short-wave antenna trimmer) reached from the bottom of the chassis.

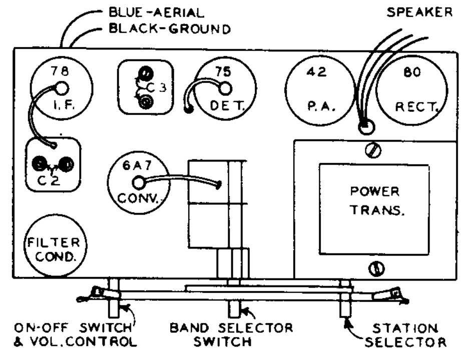
Caution: On this band care must be taken to adjust this condenser to the fundamental of the 15 megacycle signal and not to the image. The image signal is equal to the fundamental minus twice the intermediate frequency of the receiver.

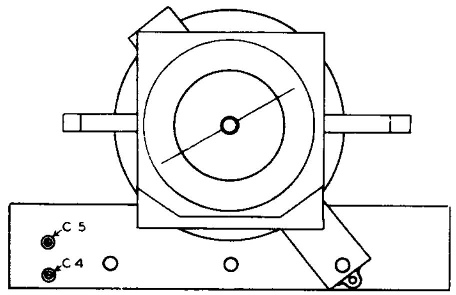
A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condenser for that band has probably been adjusted to the image instead of to the fundamental.

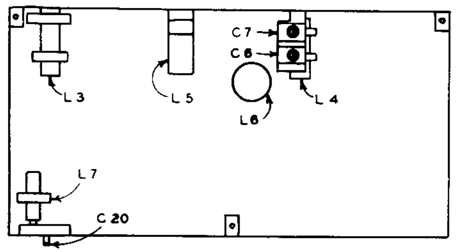
This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector of the receiver to approximately 15,900 kilocycles. If a strong signal is found approximately at this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 15,000 kilocycles would be 15,000 kilocycles minus twice 456 kilocycles or approximately 14,100 kilocycles. Therefore, a signal of this frequency may be found with the test oscillator generating a 15,000 kilocycle.

Note: There are no other trimmers for the short-wave or foreign band. However, it is advisable to check the receiver for sensitivity and calibration at both 15,000 kilocycles and 7,500 kilocycles.

Important: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.

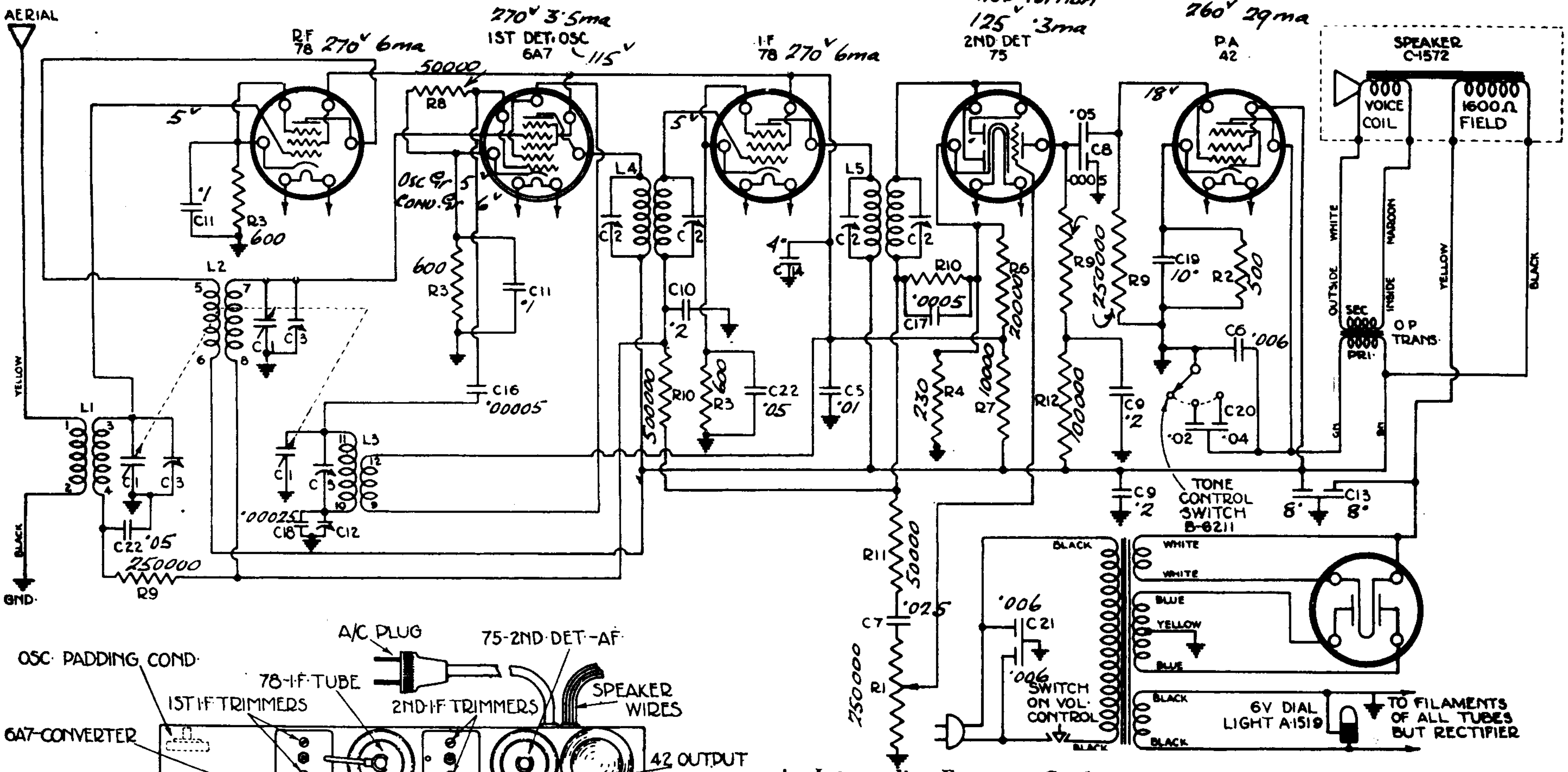






SPARKS-WITHINGTON COMPANY

MODEL 367



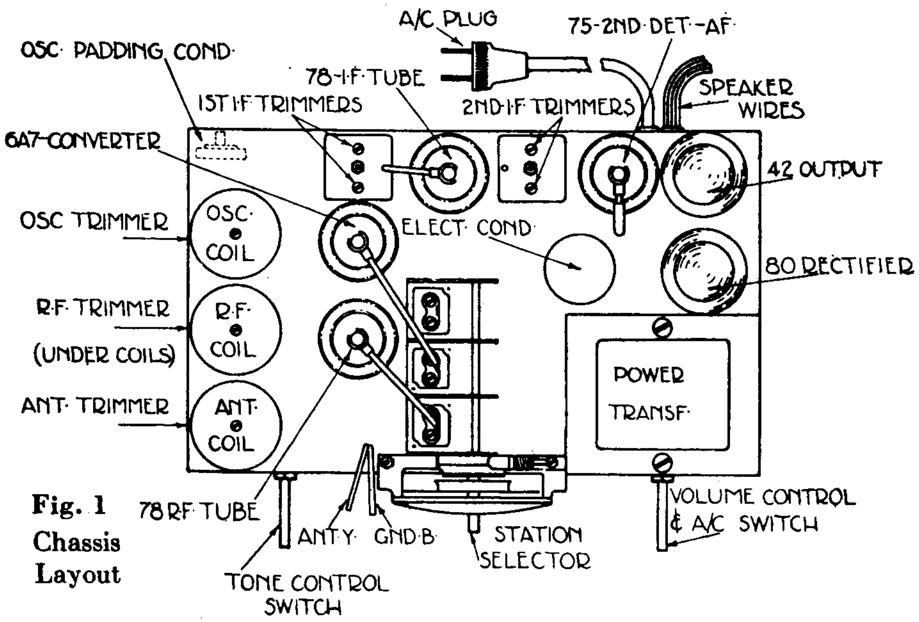


Fig. 1 Chassis Layout

I.F. 354 K.C.

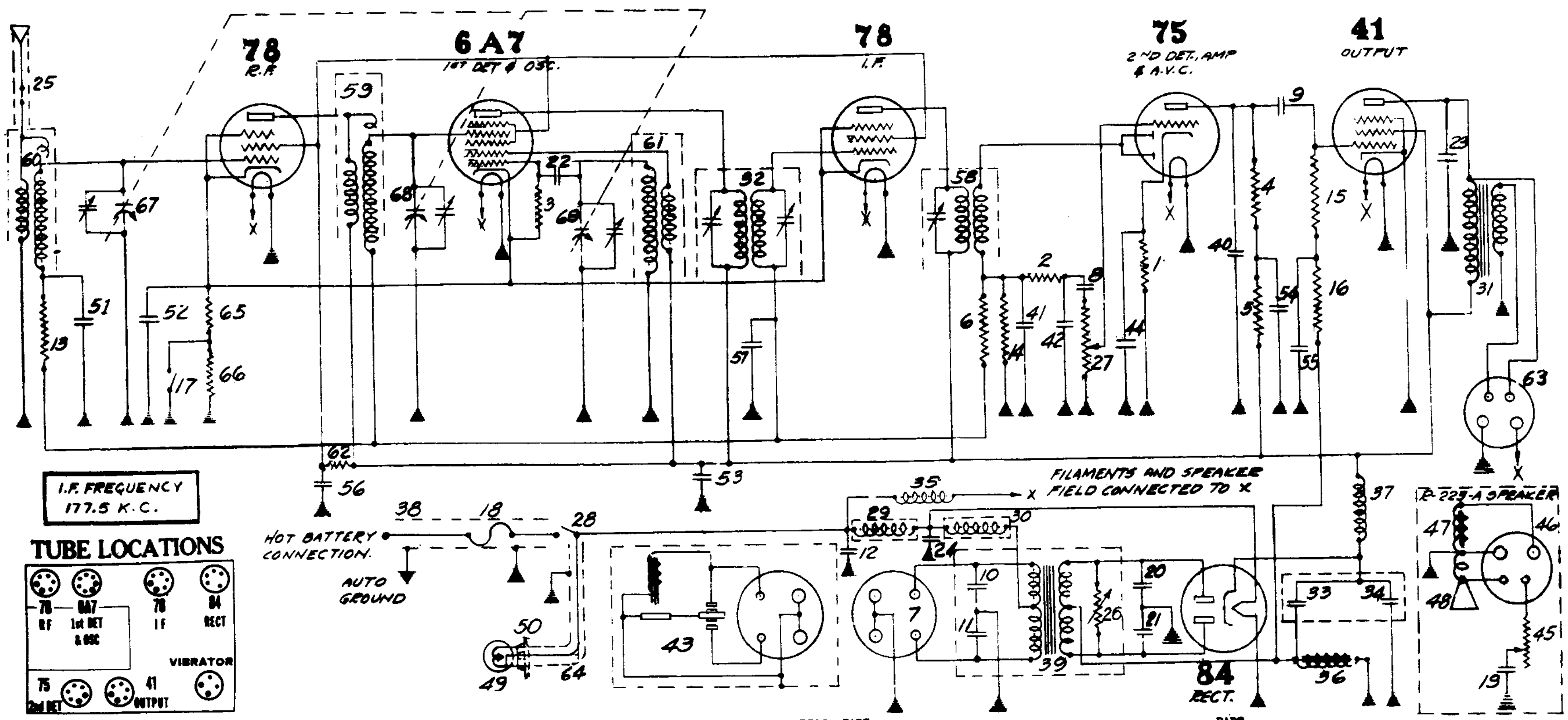
Intermediate Frequency Condensers—Adjust the test oscillator to 345 kilocycles, and feed the signal to the grid of the type 6A7 Converter. Adjust 1st and 2nd I.F. Trimmers to maximum output meter reading.

Oscillator Trimmer Condenser—Adjust oscillator trimmer condenser (see Fig. 1) to bring dial reading to 1500 with test oscillator signal of same frequency. If necessary, oscillator plates may be fanned at 600 K.C., and 900 K.C. and 1200 K.C. to correct calibration, over entire dial. Test oscillator fed into antenna.

Adjust R.F. and Antenna Trimmers (see Fig. 1) at 1200 kilocycles for maximum output meter reading. R.F. gang condensers may be fanned at 600 K.C. and 900 K.C. for increased output at those frequencies.

STEWART-WARNER CORPORATION

MODELS R-118 - 1181 - 1182 & 1183



MODEL R-118 PARTS LIST

DIAG. NO.	PART NO.	DESCRIPTION
1	67580	6000 ohm 1/4 watt carbon resistor
2	81152	10,000 ohm 1/4 watt carbon resistor
3	81645	50,000 ohm 1/4 watt carbon resistor
4	81645	50,000 ohm 1/4 watt carbon resistor
5	81645	50,000 ohm 1/4 watt carbon resistor
6	81682	1.1 megohm 1/4 watt carbon resistor
7	81837	Vibrator socket (standard 4 prong)
8	83007	.02 mfd. 600 volt paper condenser
9	83007	.02 mfd. 600 volt paper condenser
10	83058	.25 mfd. 100 volt paper condenser
11	83058	.25 mfd. 100 volt paper condenser
12	83063	.5 mfd. 100 volt paper condenser
13	83082	260,000 ohm 1/4 watt carbon resistor
14	83082	260,000 ohm 1/4 watt carbon resistor
15	83082	260,000 ohm 1/4 watt carbon resistor
16	83082	260,000 ohm 1/4 watt carbon resistor
17	83179	Local distance switch (SPST)
18	83207	15 ampere fuse
19	83217	.04 mfd. 600 volt paper condenser
20	83352	.015 mfd. 600 volt paper condenser
21	83352	.015 mfd. 600 volt paper condenser
22	83539	.00025 mfd. molded mica condenser
23	83706	.006 mfd. 600 volt paper condenser
24	83714	1.5 mfd. 100 V. shielded paper cond.
25	83723	Antenna lead and plug
26	83725	Special Globar resistor
27) 28)	83728	(800,000 ohm volume control) (On-off switch) In One Unit
29	83730	Vibrator R.F. choke
30	83730	Vibrator R.F. choke
31	83731	Output transformer
32	83732	First I.F. transformer
33) 34)	83734	(Dual 8 mfd. 350 volt dry) (Electrolytic Condenser)
35	83742	Filament R.F. choke
36	83760	Filter choke
37	83770	B supply R.F. choke
38	83777	Battery lead and fuse housing
39	83780	Power transformer
40	83784	.0011 mfd. molded mica condenser
41) 42)	83785	Dual .0005 mfd molded mica cond.
43	83800	Plug-in vibrator
44	83803	12 mfd 25 V. dry Electrolytic Condenser
45	83812	35,000 ohm tone control variable resistor
46	83845	Male speaker plug and bracket
47	83850	Speaker field coil and housing (5.5 ohms)
48	84021	Diaphragm & Shell assem. (R-223 Spkr.)
49	84058	6-8 volt dial light bulb (Mazda #60)
50	84076	Dial light socket and button
51)		(.05 mfd. 100 V. cond., black lead)
52)		(.05 mfd. 100 V. cond., black lead) In one
53)		(.5 mfd. 100 V. cond., blue lead) Unit.
54)	84077	(.1 mfd. 400 V. cond., red lead) Common
55)		(.1 mfd. 400 V. cond., red lead) Terminal
56)		(.25 mfd. 100 V. cond., green lead) grounded
57)		(.25 mfd. 300 V. cond., brown lead) to can
58	84079	2nd. I.F. transformer
59	84080	R.F. (B) coil
60	84081	Antenna (A) coil
61	84082	Oscillator (O) coil
62	84088	12,000 ohm 2 watt carbon resistor
63	84091	Speaker cable and female plug
64	84099	Dial light cable
65	84129	100 ohm, 1/2 watt flexible resistor
66	84131	400 ohm, 1/2 watt flexible resistor
67) 68) 69)	84224	3- gang variable condenser with mounting plate and shaft coupling
	R-223-A	Dynamic speaker

MISCELLANEOUS PARTS NOT SHOWN ON CIRCUIT DIAGRAM

PART NO.	DESCRIPTION
12606	Receiver mtg. nut, (5/16-18 hex.)
81346	1 lug terminal strip
83144	15,000 ohm spark plug suppressor
83145	10,000 ohm distributor suppressor
83242	#8 x 1/4" self tapping screws (dark finish) (for mtg.back cover and casing brackets)
83319	Fuse insulating tube
83624	#8 x 1/4 self tapping screw (Cad.Plate)
83711	8 lug terminal strip
83719	Front cover mtg. spade bolt (8-32)
83720	4 lug terminal strip
83721	Battery lead plug rubber grommet
83727	Back cover
83737	Front cover knurled nuts
83771	Receiver mounting stud
83772	Receiver mounting dash support washer
83806	Speaker grill cloth
83816	Aluminum vibrator shield
83836	Front cover & speaker grill cloth
83889	Shaft casing mtg. bracket
83892	Variable condenser shaft coupling
83904	Generator condenser
83957	Tone control knob
84094	Case assembly, less covers

MODEL 1181 REMOTE CONTROL HEAD PARTS

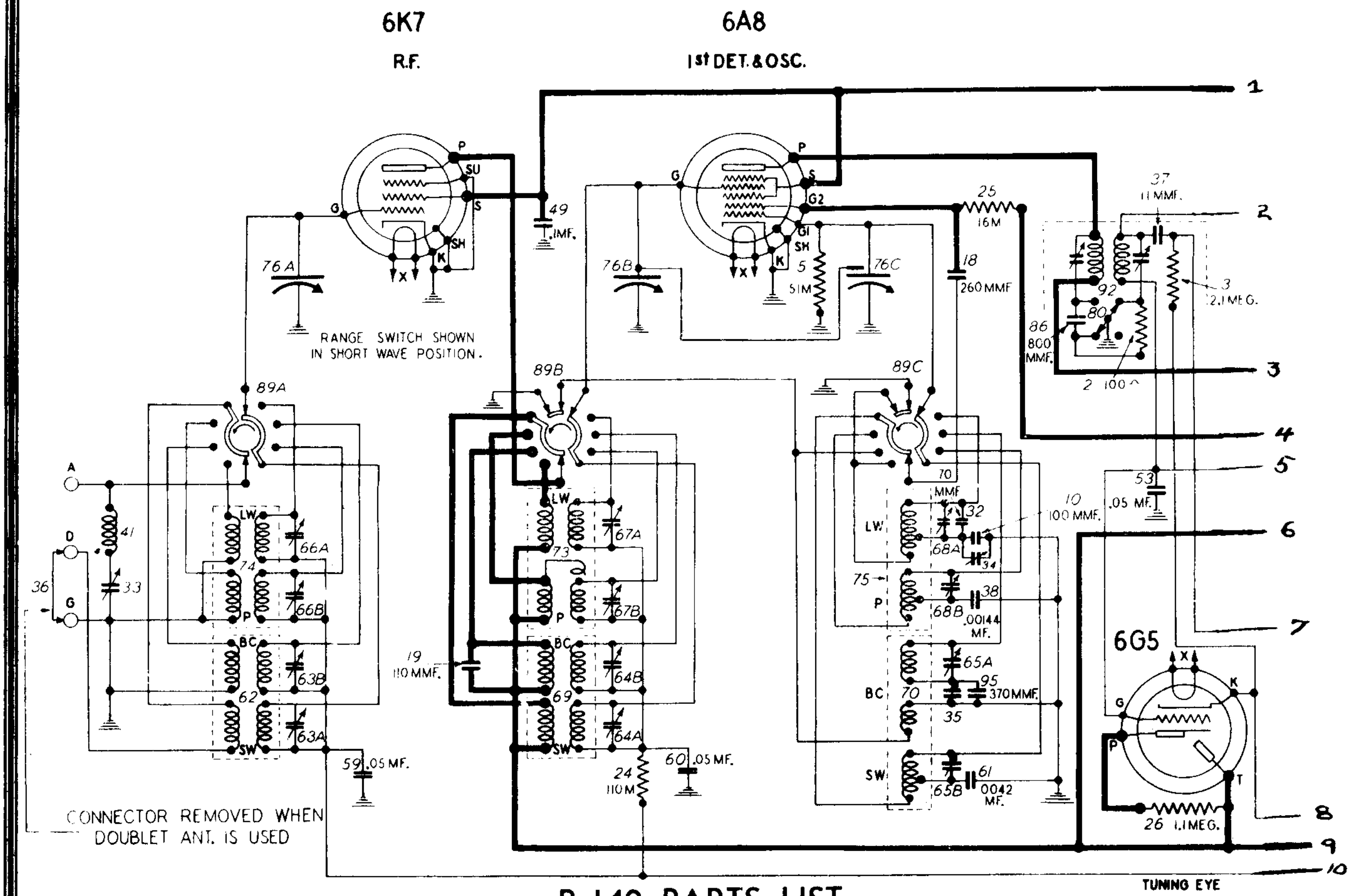
PART NO.	DESCRIPTION
15214	Long mtg. strap screw (10-32 x 1-1/4" RHMS)
84050	Bezel only, less glass
84052	Glass retainer ring
84053	Glass only
84054	Bezel gasket (blotting paper)
84058	Pilot light bulb (Mazda #60, 6-8 volts)
84059	Case Screw (4-40 x 3/16")
84060	Flexible casing set screw
84067	Steering post mounting bracket
84068	Steering post mounting strap
84076	Dial light button and socket
84100	Remote control head (less flexible shafts)
84106	Volume control knob
84309	Instrument panel mounting accessories

MODEL 1181 FLEXIBLE SHAFTS

PART NO.	DESCRIPTION
84065	Special tuning shaft, 28½ inches long
84066	Special volume control shaft, 28½ inches long
84110	Standard volume control shaft, 24½ inches long
84111	Standard tuning shaft, 24½ inches long
84127	Special tuning shaft, 36 inches long
84128	Special volume control shaft, 36 inches long

STEWART-WARNER CORPORATION

MODELS 1491 TO 1499 CHASSIS R-149



R-149 PARTS LIST

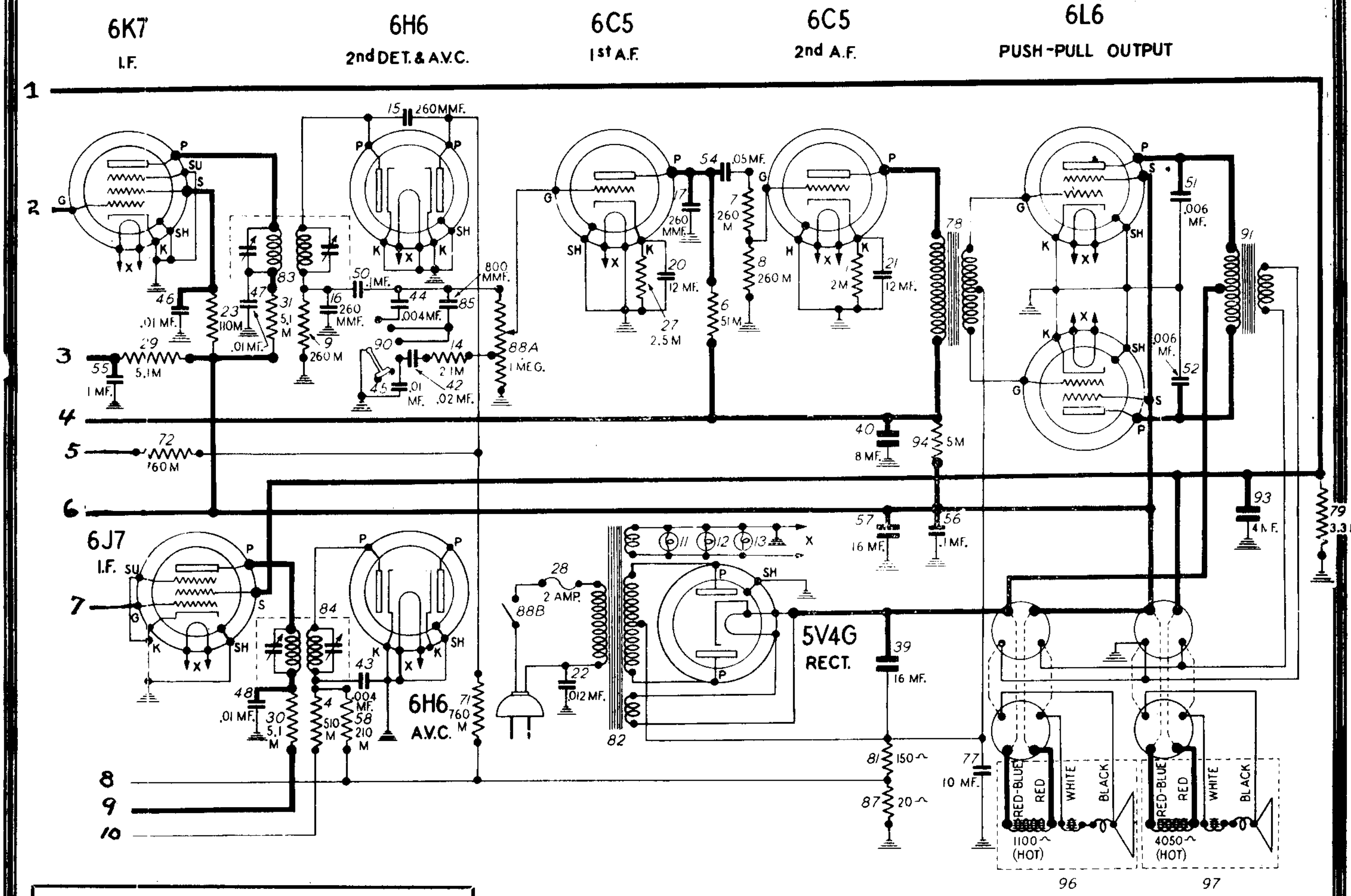
Diagram Number	Part Number	DESCRIPTION	List Price
1	67303	2000 ohm ¼ watt carbon resistor	$0.15
2	67786	100 ohm ¼ watt carbon resistor	.12
3	81644	2.1 megohm ¼ watt carbon resistor	.12
4	83072	510,000 ohm ¼ watt carbon resistor	.12
5-6	83080	51,000 ohm ¼ watt carbon resistor	.12
7-8-9	83082	260,000 ohm ¼ watt carbon resistor	.12
10	83109	100 mmfd. mica condenser	.20
11-12-13	83278	Pilot lamp No. 40 6-8 volts	.15
14	83286	21,000 ohm ¼ watt carbon resistor	.12
15-16, 17-18	83539	260 mmfd. mica condenser	.20
19	83783	110 mmfd. mica condenser	.20
20-21	83803	12 mfd. 15 V. electrolytic condenser	.80
22	83976	.012 mfd. 1000 V. shielded condenser	.40
23-24	84198	110,000 ohm ¼ watt carbon resistor	.12
25	84199	16,000 ohm ¼ watt carbon resistor	.12
26	84235	1.1 meghom ¼ watt carbon resistor	.12
27	84236	2,500 ohm ¼ watt carbon resistor	.12
28	84672	Fuse, 2 amperes	.10
29-30-31	84720	5,100 ohm ¼ watt carbon resistor	.12
32	84833	70 mmfd. mica condenser	.20
33	85285	Antenna trap condenser	.40
34-35	85285	Padding trimmer	.40
36	85321	Ground connector	.01
37	85454	11 mmfd. mica condenser	.15
38	85562	.00144 mfd. mica condenser	.25
39	85583	16 mfd. 450 V. electrolytic condenser	2.50
40	88007	8 mfd. 250 V. electrolytic condenser	1.00
41	88014	Antenna trap coil	.50
42	88026	.02 mfd. 400 Volt paper condenser	.25
43-44	88029	.004 mfd. 400 Volt paper condenser	.25
45-46, 47-48	88030	.01 mfd. 400 Volt paper condenser	.25
49-50	88046	.1 mfd. 150 Volt paper condenser	.25
51-52	88185	.006 mfd. 600 Volt paper condenser	.25
53-54	88189	.05 mfd. 200 Volt paper condenser	.25
55-56	88191	.1 mfd. 300 Volt paper condenser	.25
57	88511	16 mfd. 300 Volt electrolytic condenser	1.10
58	88532	210,000 ohm ¼ watt carbon resistor	.12
59-60	88534	.05 mfd. 150 Volt condenser (low loss)	.25
61	88587	.0042 mfd. mica condenser	.35
62	88592	Antenna coil and shield (B.C. & S.W.) with trimmers	2.70
63A-63B, 64A-64B, 65A-65B, 66A-66B, 67A-67B, 68A-68B	88596	Trimmer condenser	.30
69	88597	R.F. coil and shield (B.C. & S.W.) with trimmers	$3.10
70	88599	Osc. coil and shield (B.C. & S.W.) with trimmers	2.50
71-72	88854	760,000 ohm ¼ watt carbon resistor	.12
73	88925	R.F. coil and shield (Police & L.W.) with trimmers	2.50
74	88930	Antenna coil and shield (Police & L.W.) with trimmers	2.65
75	88932	Osc. coil and shield (Police & L.W.) with trimmers	2.10
76A to C	89044	Variable gang condenser	5.20
77	89053	10 mfd. 25 V. electrolytic condenser	.92
78	89062	Push-pull input transformer	3.00
79	89096	3300 ohm 3 watt wire wound resistor	.40
80	89103	Selectivity switch	.85
81	89105	150 ohm 3 watt wire wound resistor	.50
82	89106	Power transformer (115 volts—60 cycles)	9.00
		(See Part No. 89537 for other voltages, etc.)	
83	89111	2nd I. F. transformer	2.50
84	89112	I. F. transformer (A.V.C.)	2.10
85-86	89114	800 mmfd. mica condenser	.20
87	89116	20 ohm ½ watt wire wound resistor	.12
88A, 88B	89118	Vol. cont. (1 megohm) tap 200,000 ohm from gr'nd & A.C. line switch	1.25
89A to C	89124	Range switch	2.50
90	89128	Tone control switch	1.10
91	89139	Output transformer	3.00
92	89180	1st I. F. transformer	3.40
93	89186	4 mfd. 150 V. electrolytic condenser	1.00
94	89255	5000 ohm 1 watt carbon resistor	.15
95	89525	370 mmfd. mica condenser	.40
96	R-255-A	12" Dynamic speaker	10.50
97	R-256-A	10" Dynamic speaker	9.50

R-149-X PARTS

Diagram Number	Part Number	DESCRIPTION	List Price
98A-98B	84404	Phonograph toggle switch D.P.D.T.	1.10
	89537	Power transformer 100 to 240V—25 to 133 cycles	13.25
99	89709	Phonograph terminal strip	.15

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STEWART-WARNER CORPORATION
MODELS 1491 TO 1499 CHASSIS R-149

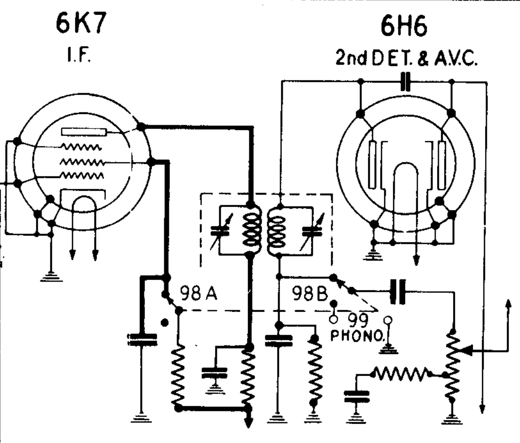


I.F. FREQUENCY
456 KC.

SOCKET VOLTAGES

VOLUME CONTROL ON FULL — ANTENNA GROUNDED
RANGE SWITCH SET ON BROADCAST POSITION — SET TUNED TO 530 K. C.

IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.
NOTE A: —2.6 volts measured across resistor 87.



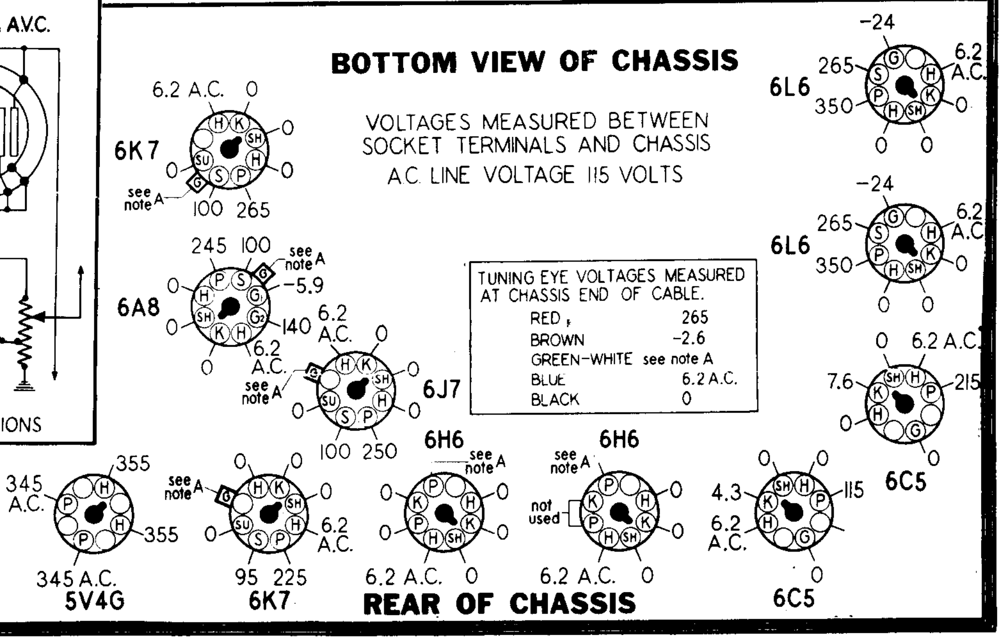
MODEL R-149-X PHONOGRAPH CONNECTIONS

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS
A.C. LINE VOLTAGE 115 VOLTS

TUNING EYE VOLTAGES MEASURED AT CHASSIS END OF CABLE.

RED	265
BROWN	-2.6
GREEN-WHITE	see note A
BLUE	6.2 A.C.
BLACK	0



STEWART-WARNER CORPORATION

MODELS 1491 TO 1499 CHASSIS R-149

MODEL R-149 CHASSIS (Receiver Models 1491 to 1499)

CIRCUIT DESCRIPTION

The Stewart-Warner model R-149 chassis is a 12 tube, all-wave superheterodyne with an intermediate frequency of 456 kc. It has four tuning ranges which are 140 to 400 kc., 527 to 1750 kc., 1720 to 5600 kc., and 5.5 to 18.0 mc. Individual coils and trimmer condensers are provided for each band so that each circuit can be adjusted to give maximum efficiency on every frequency range.

The antenna coils are designed to give efficient reception with either a standard or doublet type antenna without the use of any additional coupling transformer. A small connector is provided on the antenna terminal strip to short the D and G terminals when a standard antenna is used. If a doublet antenna is used, the connector should be turned or removed to open the connection between the D and G terminals.

SELECTIVITY—SENSITIVITY SWITCH

Two degrees of selectivity are obtainable by means of the selectivity-sensitivity control operating on the first I. F. transformer. When the control is in the sharp position (counter-clockwise) the first I. F. transformer functions as a typical transformer with sharply tuned primary and secondary circuits. When it is in the broad position (clockwise) the resonant frequency of the primary is decreased and that of the secondary circuit increased. At the same time the selectivity curve of the secondary is broadened and the amplification reduced. The combined effect gives a broad flat top to the intermediate frequency amplifier selectivity curve.

AUTOMATIC VOLUME CONTROL

This chassis uses an amplified and dual A. V. C. action to keep the second detector signal more constant and still have sharp tuning. The diode of the 6H6 second detector tube which is capacity coupled to the second I. F. transformer, produces the A. V. C. voltage for the I. F. tube and the tuning eye only. The A. V. C. voltage for the R. F. and first detector tubes is secured by means of the 6J7 A. V. C. amplifier tube and the second 6H6 tube. The control grid of the 6J7 tube is capacity coupled to the control grid of the 6K7 first I. F. tube.

FIVE POINT TONE CONTROL

This control permits the following combinations of treble and bass response. No. 1 is with the switch in the extreme counter-clockwise position.

1. Minimum treble and emphasized bass.
2. Medium treble and emphasized bass.
3. Medium treble and normal bass.
4. Maximum treble and normal bass.
5. Maximum treble and emphasized bass.

CALIBRATION AND ALIGNMENT

Experience has definitely shown that a selective chassis such as the Stewart-Warner Model R-149 cannot be properly aligned by ear or "on the air." A high grade modulated service oscillator and an output meter are absolutely essential.

The oscillator should cover a frequency range extending from 175 KC. to 16,000 KC. It should have a wide range of signal output with a continuously variable output control. A very weak signal is needed for proper alignment without actuating the A. V. C. and a very strong one to align the A. V. C. channel and for use when the receiver is badly out of alignment.

PRECAUTIONS

During calibration and alignment, keep the receiver volume control in the maximum volume position if noise is not too great, and adjust the oscillator output so that the output meter reads near the center of its scale.

Use the lowest output meter scale that will provide a steady reading. For making trimmer adjustments, use a bakelite aligning tool which has only a small metal screwdriver tip.

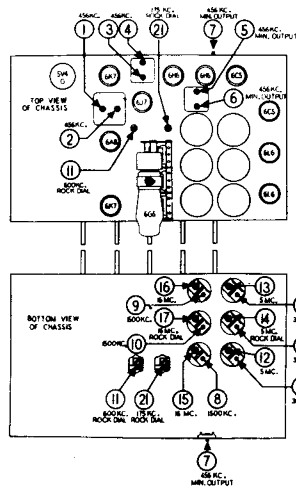
PRELIMINARY STEPS

Connect the output meter across the two plates of the two 6L6 power output tubes. **Important:** Do not connect from one 6L6 plate to chassis since this would unbalance the circuit and cause hum.

CALIBRATION AND ALIGNMENT

The following procedure on the proper adjustment of the various trimmers is divided into two classifications, calibration and alignment. Calibration is the adjustment of certain trimmers so that the radio signals can be received at the proper dial settings. Calibration of the R-149 is made at the high-frequency end of the dial. Alignment is the adjustment of trimmers so that the antenna and detector circuits are tuned to give maximum sensitivity and selectivity.

The R. F. calibration and alignment of each band is independent of all others, so that one band may be re-calibrated or re-aligned without affecting the trimmer adjustments on any of the other bands.



ALIGNMENT OF THE I. F. AMPLIFIER

1. (a) Turn the volume control to maximum volume position and turn the sensitivity-selectivity control to the sharp position (counter-clockwise).

(b) Turn the range switch to the broadcast position (second from the right) and set the tuning dial to any point where there is no tuning effect on the oscillator signal.

(c) Connect the test oscillator output leads to the 6A8 control grid and the chassis with a .1 or .25 mfd. **condenser in series with the lead to the 6A8 grid. DO NOT OMIT THIS CONDENSER OR ALIGNMENT WILL BE INCORRECT.**

(d) Set the test oscillator to exactly 456 KC. Adjust the output of the test oscillator to give about half scale deflection on the output meter.

(e) Adjust the four I. F. transformer trimmers (trimmers No. 1, 2, 3 and 4) for maximum output meter deflection.

ALIGNMENT OF THE A. V. C. AMPLIFIER

2. (a) Leave the test oscillator set at 456 KC. and connected to the 6A8 control grid through a condenser.

(b) Turn the volume control down to protect the output meter and turn the output control of the oscillator up to give enough signal so that the tuning eye closes more than half way. If your oscillator cannot give this much 456 KC. output, the A. V. C. amplifier can be aligned immediately after completing the Broadcast Alignment by means of a 1500 KC. signal fed into the antenna terminal, with the receiver tuned to the signal.

(c) Readjust the volume control so that the output meter shows about half scale deflection.

(d) Adjust the two A. V. C. amplifier trimmers No. 5 and 6 for **minimum output meter deflection.** Readjust the volume control or oscillator output to the point necessary to obtain a clearly defined point of minimum output when adjusting the trimmers.

(e) Reduce the oscillator output to normal and turn the volume control full on and repeat the adjustment of the I. F. trimmers as explained in 1 (a) to (e).

ADJUSTMENT OF WAVE TRAP

3. (a) Leave the test oscillator at 456 KC. but connect the oscillator output to the A and G terminals of the receiver with a 400 or 500 ohm carbon resistor in series with the oscillator output and the A terminal.

(b) Adjust the wave trap trimmer No. 7 for **minimum** output. Increase the oscillator output as necessary to obtain a clearly defined point of minimum output. If some particular station with a frequency slightly different than 456 KC. causes code interference, it may be advisable to adjust trimmer No. 7 on the actual frequency of the interfering station.

BROADCAST BAND CALIBRATION

4. (a) Check the position of the dial pointer on its shaft by turning the tuning knob until the rotor plates of the gang condenser are in full mesh. The slow-moving dial pointer should then coincide with the low frequency end of the dial scale. If it does not, hold the dial gear and turn the pointer to the correct position.

(b) Turn the range switch control to the broadcast position (second from the right).

(c) Connect a 400 or 500 ohm carbon resistor in series with the test oscillator output and the receiver antenna terminal. Note: This resistor should remain connected for all subsequent adjustments.

(d) Ground the receiver.

(e) Adjust the test oscillator to exactly 1500 KC.

(f) Tune in the 1500 KC. oscillator signal or a station above 1300 KC. on the dial and determine whether the dial calibration is correct at the high frequency end of the dial. If the calibration is correct, do not adjust the broadcast oscillator shunt trimmer No. 8. If the calibration is incorrect, adjust trimmer No. 8 to give proper calibration.

BROADCAST BAND ALIGNMENT

5. (a) With the test oscillator set at 1500 KC. tune the receiver to the signal for maximum output and adjust the broadcast antenna and detector shunt trimmers No. 9 and 10 for maximum output. Do not touch the oscillator shunt trimmer No. 8 as this will change the calibration.

(b) Adjust the test oscillator to exactly 600 KC. and tune the receiver to the signal. Adjust the broadcast oscillator series padder No. 11 for maximum output. Then try to increase the output by detuning the padder and retuning the receiver dial. If this reduces the output, detune the padder on the opposite direction. Continue detuning the padder and retuning the dial until a maximum output meter deflection is secured. This operation is commonly known as "rocking." The object of this adjustment is to find the combination of padder adjustment and tuning condenser position which gives the maximum output. This adjustment should not be changed regardless of whether the dial reads exactly 600 KC. or slightly off 600 KC. for maximum output.

(c) Check the adjustment of trimmers No. 8, 9 and 10 at 1500 KC.

POLICE BAND CALIBRATION

6. (a) Turn the range switch to the Band No. 3 (green) position (second from the left).

(b) Adjust the test oscillator to exactly 5.0 megacycles.

(c) Tune in the 5 MC. oscillator signal at or near 5 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 5 MC. If it is, do not adjust police band oscillator shunt trimmer No. 12. If the calibration is incorrect, set the dial pointer to 5 MC. on the dial, and adjust the oscillator shunt trimmer No. 12 until the oscillator signal comes in at this point. If there are two peaks, the proper one is that with the trimmer screw farthest out.

POLICE BAND ALIGNMENT

7. (a) With the test oscillator set at 5.0 MC. tune the receiver for maximum output.

(b) Adjust the police band antenna and detector trimmers No. 13 and 14 for maximum output. After this is done try to increase the output meter reading by detuning the detector trimmer No. 14 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning No. 14 and retuning the set until maximum output meter deflection is secured. Then readjust No. 13.

SHORT WAVE BAND CALIBRATION

8. (a) Turn the range switch to the extreme left (counter-clockwise).

(b) Be sure that the D and G terminals on the antenna terminal strip are connected together.

(c) Adjust the test oscillator to exactly 16 megacycles.

(d) Tune in the 16 MC. oscillator signal at or near 16 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 16 MC. If it is, do not adjust the short wave band oscillator shunt trimmer No. 15. If the calibration is incorrect, set the receiver dial pointer exactly at 16 MC. and adjust the oscillator shunt trimmer No. 15 until the oscillator signal comes in at this point.

(e) Check to see that trimmer No. 15 is adjusted to the proper peak by tuning the receiver to approximately 15.1 MC. If a repeat signal is not heard at this point, even with greatly increased oscillator output, retune the receiver to 16.0 MC. and adjust trimmer No. 15 to the proper peak with the trimmer screw farther out.

SHORT WAVE BAND ALIGNMENT

9. (a) With the test oscillator set at 16 MC. tune the receiver for maximum output.

(b) Adjust the short wave antenna and detector trimmers No. 16 and 17 for maximum output. After this is done, try to increase the output meter deflection by detuning the detector trimmer No. 17 slightly and retuning the receiver dial. If this causes the output to drop, detune the trimmer in the opposite direction. Continue detuning No. 17 and retuning the set until the output is at a maximum. Then readjust No. 16.

(c) Check the adjustment of No. 17 by tuning the receiver to the image at 15.1 MC. and noting if the image is much weaker than the 16 MC. signal. If the signal at 15.1 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 17 is not set to the proper peak. Turn the trimmer in a turn or so, then readjust as in 9 (b).

LONG WAVE BAND CALIBRATION

10. (a) Turn the range switch to the extreme right position (clockwise).

(b) Adjust the test oscillator to exactly 350 KC.

(c) Turn the receiver dial pointer to 350 KC. on the tuning dial and adjust the long wave band oscillator shunt trimmer No. 18 for maximum output.

LONG WAVE BAND ALIGNMENT

11. (a) With the test oscillator set at 350 KC., tune the receiver to the signal for maximum output.

(b) Adjust the antenna and detector trimmers No. 19 and 20 for maximum output. Do not touch the oscillator trimmer No. 18 as this will change the calibration.

(c) Adjust the test oscillator to exactly 175 KC. and tune the receiver to the signal. Adjust the long wave oscillator series padder No. 21 for maximum output, then try to increase the output by detuning the padder No. 21 and retuning the receiver dial.

(d) Repeat adjustments of trimmers No. 18, 19 and 20 at 350 KC.

MISCELLANEOUS PARTS

Part Number	DESCRIPTION	List Price
67667	Flat steel mtg. washer	$ .01
67977	No. 14 x 1¼ chassis mtg. screw	.02
85066	G.D.A. terminal strip	.20
85578	Rubber chassis mtg. washer	.04
88056	Fuse mounting	.15
88057	Fuse cover	.08
88985	Tuning knob, front section	.20
88986	Tuning knob, rear section	.25
89038	Knob, volume control	.20
89051	Knob, range switch	.20
89119	Tuning indicator cable and plug	1.50
89267	Knob, selectivity control	.20
89268	Knob, tone control	.20

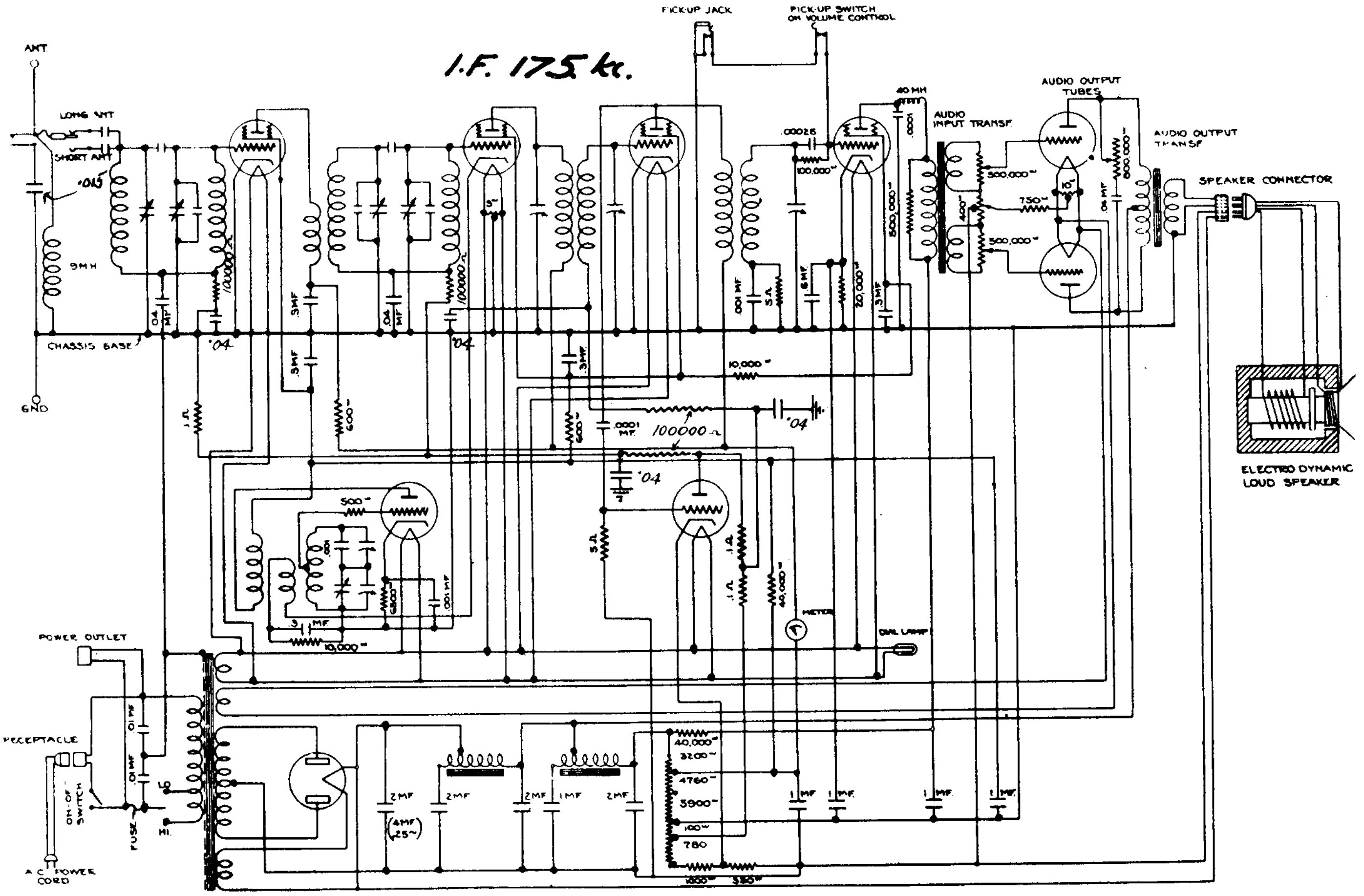
TUNING DRIVE AND DIAL PARTS

Part Number	DESCRIPTION	List Price
85902	Dual ratio planetary dial drive	$1.00
88839	Gear tension spring	.10
88958	No. 2 x ⅜ R.H.W. screw for escutcheon (each)	.01
88982	Compression spring for band indicator	.01
89027	Spring washer for planetary	.01
89072	Dial ring bracket and shaft assembly (for edge lighting)	2.50
89073	Split second shaft (band spread ratio 10 to 1) See part No. 89724	.20
89075	Main pointer gear and shaft assembly	.30
89078	Idler gear and pinion (band spread ratio 10 to 1) See part No. 89721	.25
89081	Driven disc and bushing	.65
89086	Compression spring for driven disc gear	.01
89092	Second pointer	.04
89093	Main pointer and stud	.10
89095	Spring washer (for pointer shaft)	.01
89100	Dial scale for rear lighting	2.20
89120	Band indicator and link assembly	.60
89132	Escutcheon and glass assembly	2.25
89283	Pilot lamp socket	.10
89284	Pilot lamp shield	.02
89308	Bracket and light bracket assem. (for idler gear)	.15
89311	Dial background (for edge lighting dials)	.12
89313	Dial scale for edge lighting	2.00
89485	Dial ring bracket and shaft assembly (for rear lighting)	2.40
89721	Idler gear and pinion (band spread ratio 12 to 1)	.45
89724	Split second shaft (band spread ratio 12 to 1)	.18
89799	Dial scale retaining clip	.02

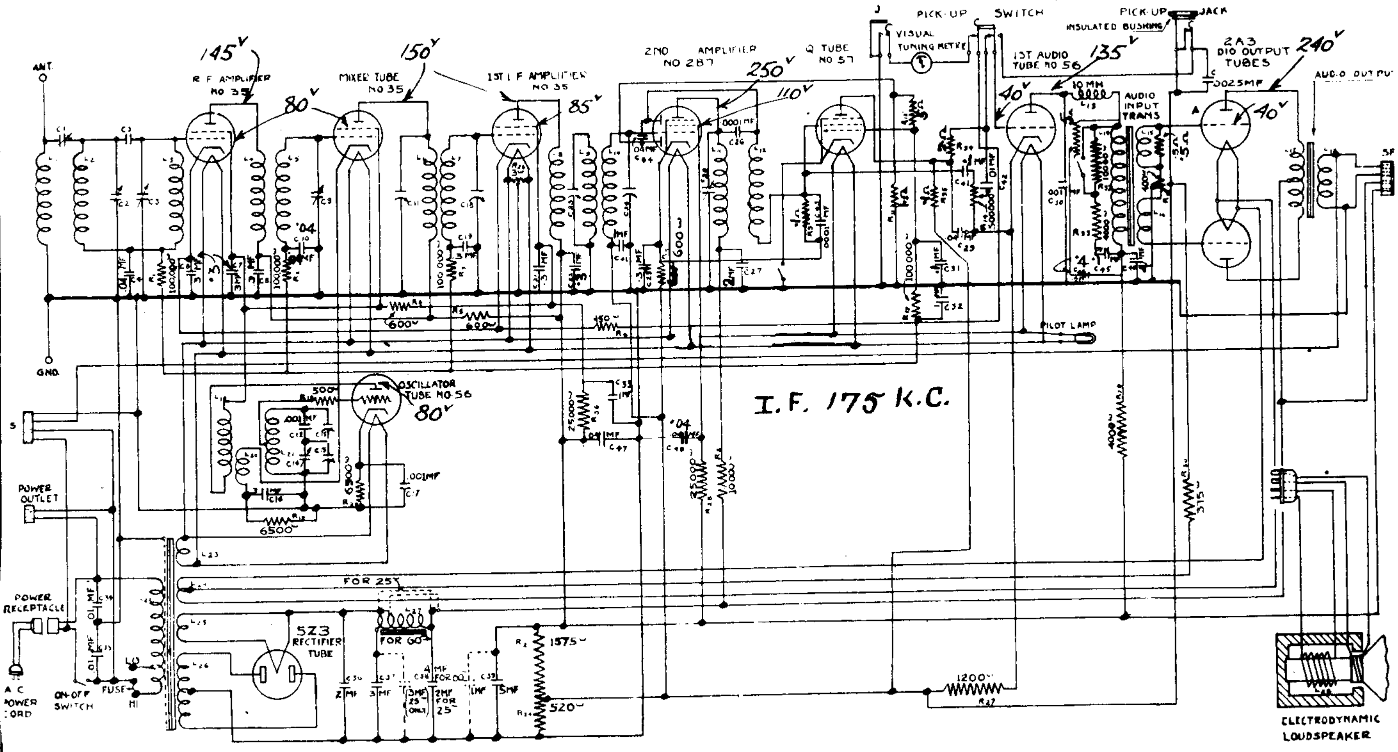
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODELS 35-36



MODEL 42



STROMBERG-CARLSON TELEPHONE MFG. CO.

MODEL 126 A.C.-D.C.

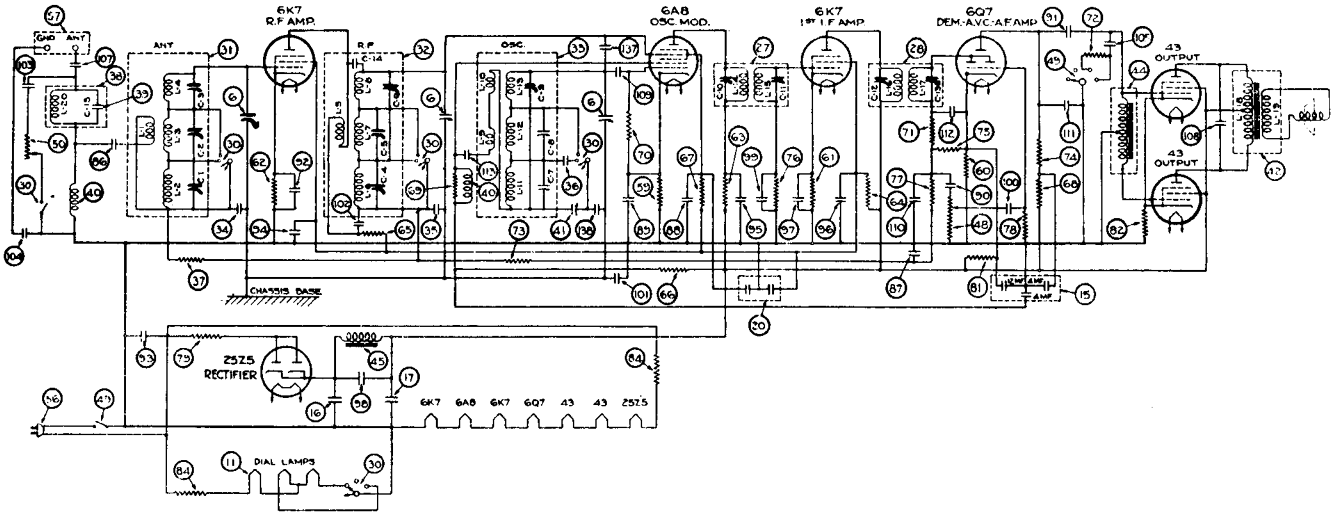


Fig. 3. Schematic Circuit of Receiver.

REPLACEMENT PARTS

Item Number	Piece Number	Part
5	26848	Dial Assembly
6	26414	Gang Tuning Capacitor Assembly
8	26852	Lamp Socket Assembly
9	26059	Bracket (Chassis Spacer)
11	25952	Pilot Lamp
15	26164	Electrolytic Capacitor Assembly, 4 Mf., 150 Volts; 4 Mf., 150 Volts; 12 Mf., 25 Volts
16	26163	Electrolytic Capacitor, 40 Mf.
17	26163	Electrolytic Capacitor, 40 Mf.
20	26872	Electrolytic Capacitor Assembly (Two 4 Mf.)
27	26141	1st I. F. Transformer
28	25506	2nd I. F. Transformer
30	26864	Range Switch
31	25510	Coil Assembly, Antenna
32	25511	Coil Assembly, R. F.
33	25512	Coil Assembly, Oscillator
34	25488	Capacitor, .002 Mf.
35	25527	Capacitor, .0027 Mf.
36	25490	Capacitor, .0038 Mf.
37	26383	Resistor, Type "EI", .1 Megohm
38	25513	Coil Assembly (Wave Trap)
39	25488	Capacitor .002 Mf.
40	25814	Coil Assembly, R. F. Choke, 5 Millihenrys
41	26047	Capacitor, Oscillator Series Aligner
42	26855	Transformer, Audio Output
44	26865	Transformer, Audio Input
45	25936	Choke Assembly (Filter of Rectifier)
48	26114	Potentiometer (Volume Control)
49	26271	Switch ("Off-On" and Tone Control)
50	26095	Potentiometer (Sensitivity Control)
51	26499	Knob (For Sensitivity Control)
52	22974	Socket, 6 Prong
54	25539	Socket, 8 Prong
56	24268	Cord, Power Supply
59	26326	Resistor, Type "E", 270 Ohms
60	26327	Resistor, Type "E", 330 Ohms
61	26329	Resistor, Type "E", 470 Ohms
62	26331	Resistor, Type "E", 680 Ohms
63	26333	Resistor, Type "E", 1000 Ohms
64	26333	Resistor, Type "E", 1000 Ohms
65	26345	Resistor, Type "E", 10,000 Ohms
66	26333	Resistor, Type "E", 1000 Ohms
67	26345	Resistor, Type "E", 10,000 Ohms
69	26350	Resistor, Type "E", 27,000 Ohms
70	26353	Resistor, Type "E", 47,000 Ohms
71	26353	Resistor, Type "E", 47,000 Ohms
72	26353	Resistor, Type "E", 47,000 Ohms
73	26357	Resistor, Type "E", .1 Megohm
74	26362	Resistor, Type "E", .27 Megohm
75	26365	Resistor, Type "E", .47 Megohm
76	26365	Resistor, Type "E", .47 Megohm
77	26369	Resistor, Type "E", 1 Megohm
78	26373	Resistor, Type "E", 2.2 Megohms
79	25911	Resistor, Type "B", 50 Ohms
81	26408	Resistor, Type "C", 27,000 Ohms
82	26869	Resistor, Type "B", 310 Ohms
84	25914	Resistor, Voltage Divider
86	25150	Capacitor Assembly, .02 Mf.
87	25150	Capacitor Assembly, .02 Mf.
88	25150	Capacitor Assembly, .02 Mf.
89	25150	Capacitor Assembly, .02 Mf.
90	25150	Capacitor Assembly, .02 Mf.
91	25150	Capacitor Assembly, .02 Mf.
92	25150	Capacitor Assembly, .02 Mf.
94	24402	Capacitor Assembly, .1 Mf.
95	24402	Capacitor Assembly, .1 Mf.
96	24402	Capacitor Assembly, .1 Mf.
97	24402	Capacitor Assembly, .1 Mf.
98	26890	Capacitor Assembly, .3 Mf.
99	24405	Capacitor Assembly, .04 Mf.
100	24405	Capacitor Assembly, .04 Mf.
101	25389	Capacitor Assembly, .2 Mf.
102	25481	Capacitor Assembly, .002 Mf.
103	25149	Capacitor Assembly, .01 Mf.
104	25149	Capacitor Assembly, .01 Mf.
105	26151	Capacitor Assembly, .005 Mf.
107	25533	Capacitor Assembly, .006 Mf.
108	26151	Capacitor Assembly, .005 Mf.
109	24559	Capacitor, Type "O", 100 Mmf.
110	24559	Capacitor, Type "O", 100 Mmf.
111	24559	Capacitor, Type "O", 100 Mmf.
112	24559	Capacitor, Type "O", 100 Mmf.
113	25487	Capacitor, Type "W", .001 Mf.
137	26417	Capacitor (Gimmick)
138	25489	Capacitor, .00125 Mf.

MISCELLANEOUS PARTS

Piece Number	Part
26302	Knob (For Volume Control)
26385	Knob (For Range Switch)
26384	Knob (For Off-On-Switch and Tone Control)
26305	Knob (For Large Portion of Tuning Shaft)
26306	Knob (For Vernier Portion of Tuning Shaft)

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODEL 126 A.C.-D.C.

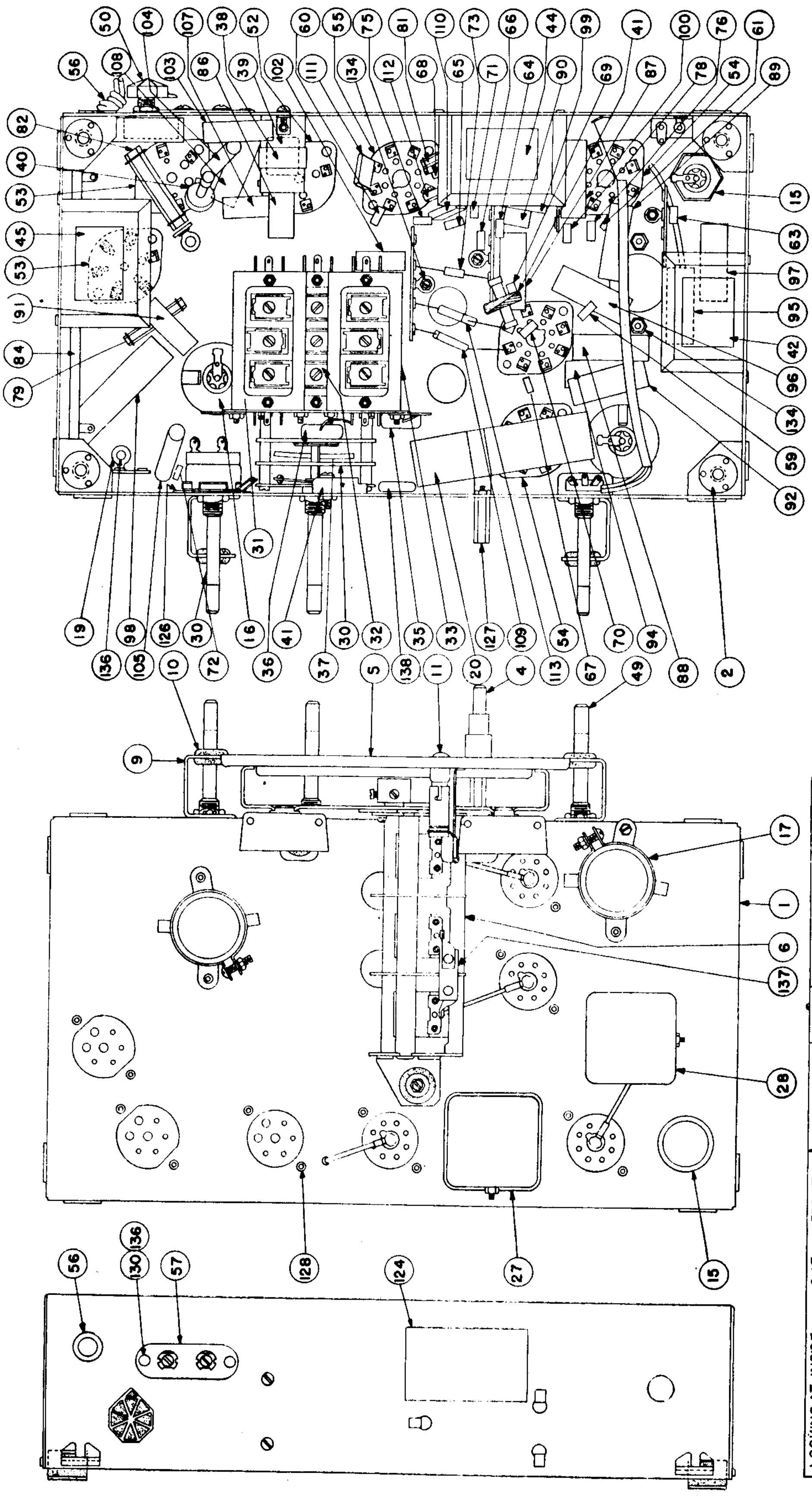


Figure 5. Chassis Assembly.

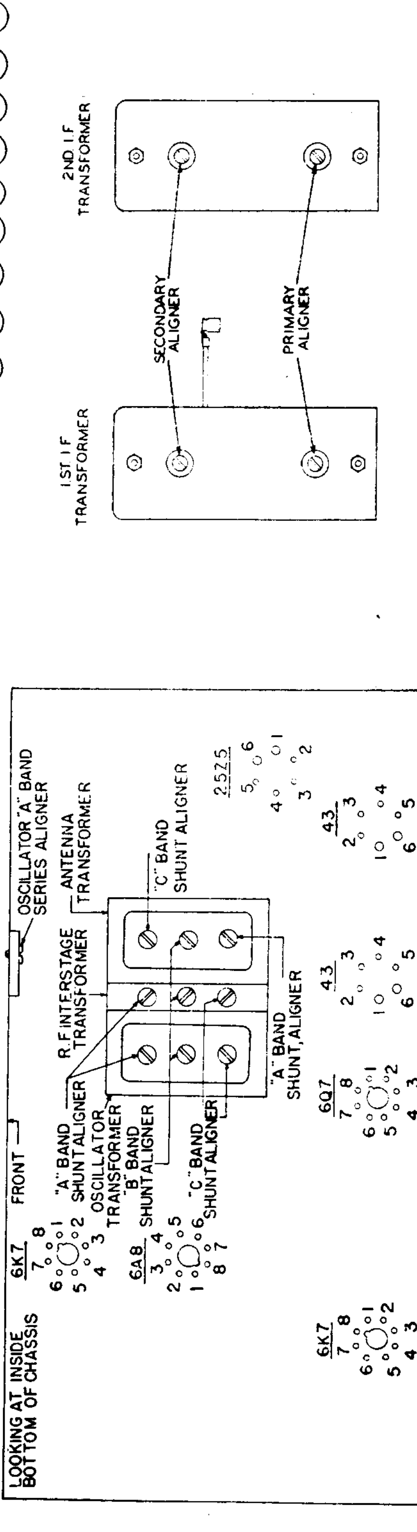


Fig. 2. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODEL 126 A.C.–D.C.

Intermediate Frequency Amplifier Adjustments

The intermediate frequency used in these receivers is 465 kilocycles. In making these I. F. circuit adjustments always align in the following order:

1. Secondary of 2nd I. F. Transformer (Capacitor C-13).
2. Primary of 2nd I. F. Transformer (Capacitor C-12).
3. Secondary of 1st I. F. Transformer (Capacitor C-11).
4. Primary of 1st I. F. Transformer (Capacitor C-10).

Radio Frequency Adjustments

The adjustments of the aligning capacitors used in the radio frequency circuits in this receiver should be very carefully made in the following order and at the frequencies specified below:

1. Oscillator's "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-9).
2. R. F. Interstage "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-6).
3. Antenna "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-3).
4. Oscillator's "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-8).
5. R. F. Interstage "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-5).
6. Antenna "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-2).
7. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-7).
8. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
9. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).
10. Oscillator's "A" Band Series Aligner at 0.6 Megacycles (Capacitor, Item No. 41).
11. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-7).
12. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
13. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).

NORMAL VOLTAGE READINGS

These voltage readings are obtained by measuring between the various tube socket contacts and the heavy bus wire with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. The heavy bus wire, which is the negative side of the grid and plate voltages, is plainly marked on the schematic and wiring diagram shown on pages three and four. Figure 2 shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, A. C. Allowance should be made for the difference when the line voltage is higher or lower.

IMPORTANT—If the receiver is operated from a direct current power supply circuit, the various voltages measured will be slightly lower than those listed in the table for A. C. operation. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: O-2.5, O-10, O-100, O-250, O-500, O-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

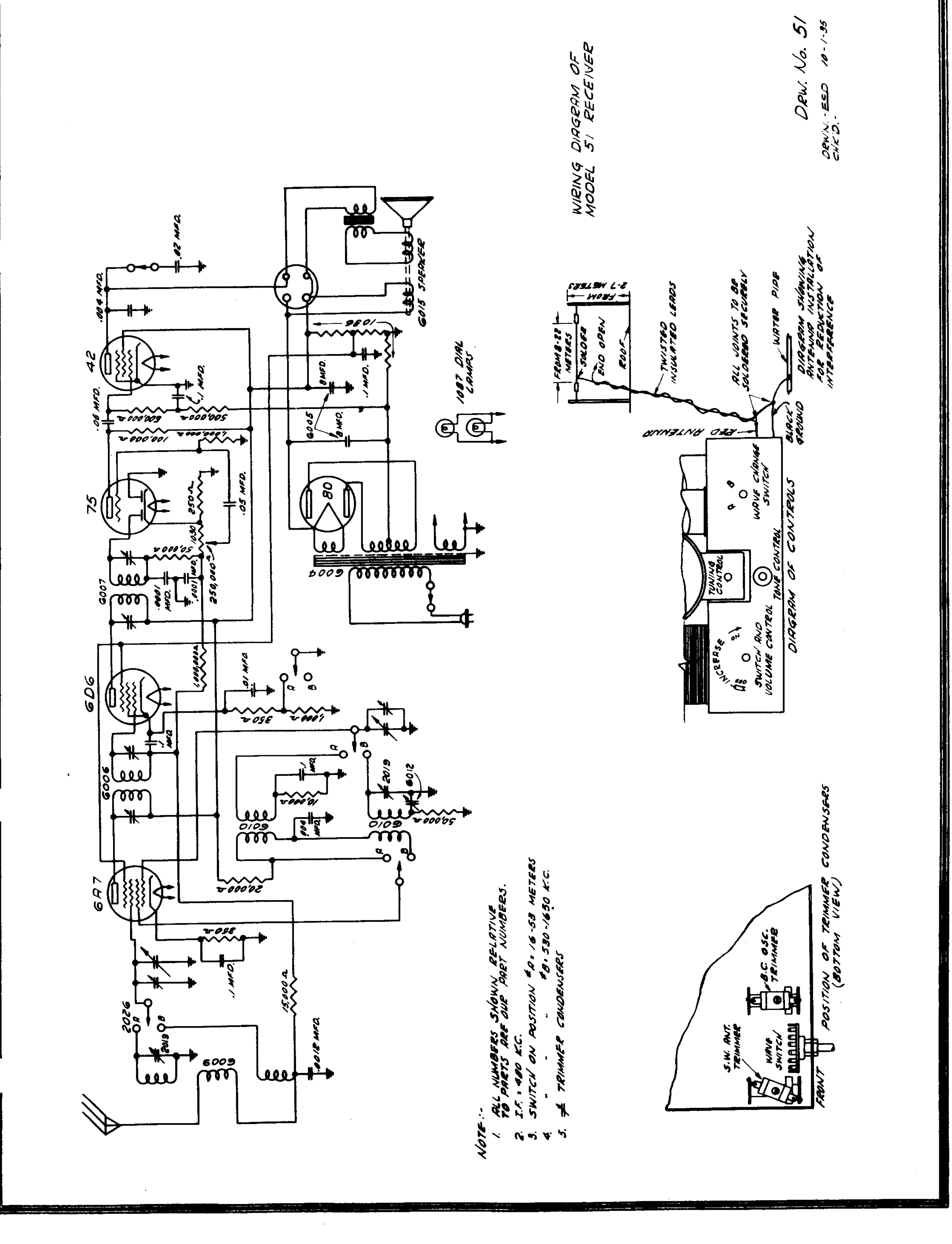
When the receiver is being operated from an alternating current power supply circuit, it will be necessary to have a high resistance A. C. voltmeter for checking the A. C. voltages.

			Terminals of Sockets								*Heater Voltages Between Heater Terminals*	
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6K7	R. F. Amp.	0	0	*12.8*	+42	+93	+3.7	0	*6.4*	+3.7	2-7	*6.4*
6A8	Mod.—Osc.	0	0	*12.8*	+100	+64	–4.8	+100	*19.2*	+1.6	2-7	*6.4*
6K7	I. F. Amp.	0	0	*26*	+102	+93	+3.1	0	*19.6*	+3.1	2-7	*6.4*
6Q7	Dem.—A.V.C.—Audio	0	0	*0*	+61*	0	0	+93	*6.4*	+1.1	2-7	*6.4*
43	Audio Output	—	*26*	+100	+103	0	+14.5	*53*			1-6	*27*
43	Audio Output	—	*53.2*	+100	+103	0	+14.5	*80.2*			1-6	*27*
25Z5	Rectifier	—	*80*	*116*	+108	+108	*116*	*105*			1-6	*25*
Voltage across pilot lamps—*28.7* volts.												

A. C. voltages are indicated by italics; when the receiver is operated from a D. C. power supply, D. C. voltages will be obtained in place of the A. C. voltages.
Receiver tuned to 1000 kc., no signal.

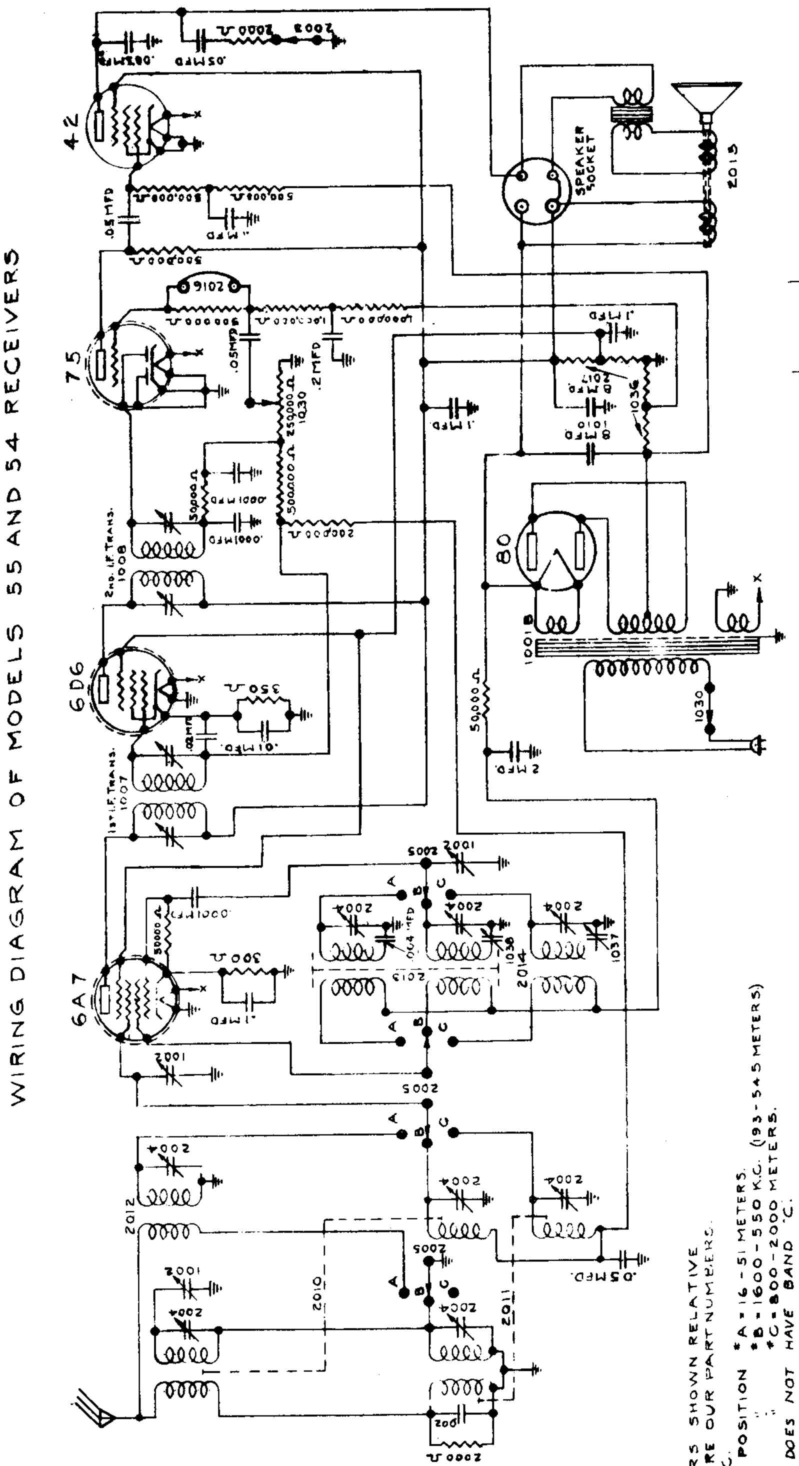
ULTRAMAR MANUFACTURING CORPORATION

MODEL 51

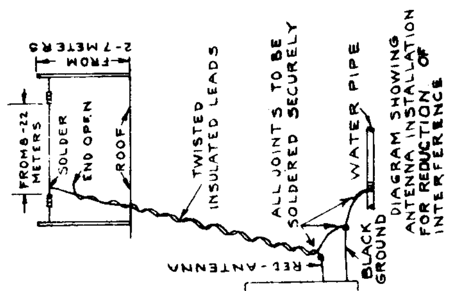


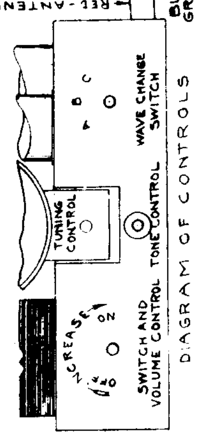
ULTRAMAR MANUFACTURING CORPORATION

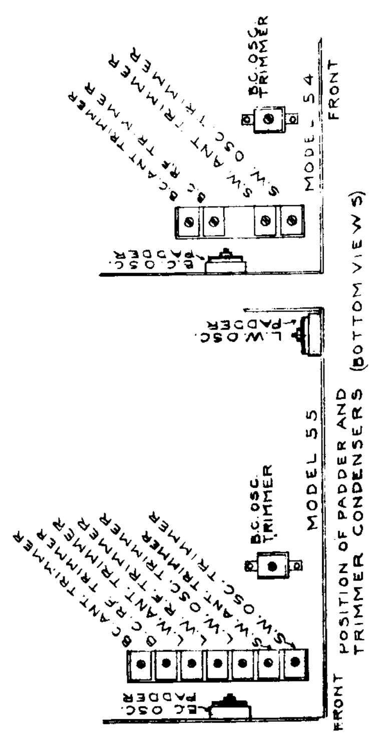
MODELS 54 & 55



NOTE:
① ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
② I.F. = 480 K.C.
③ SWITCH ON POSITION *A = 16 - 51 METERS.
④ " " " *B = 1600 - 550 K.C. (193 - 545 METERS)
⑤ " " " *C = 800 - 2000 METERS.
⑥ MODEL 54 DOES NOT HAVE BAND 'C'.



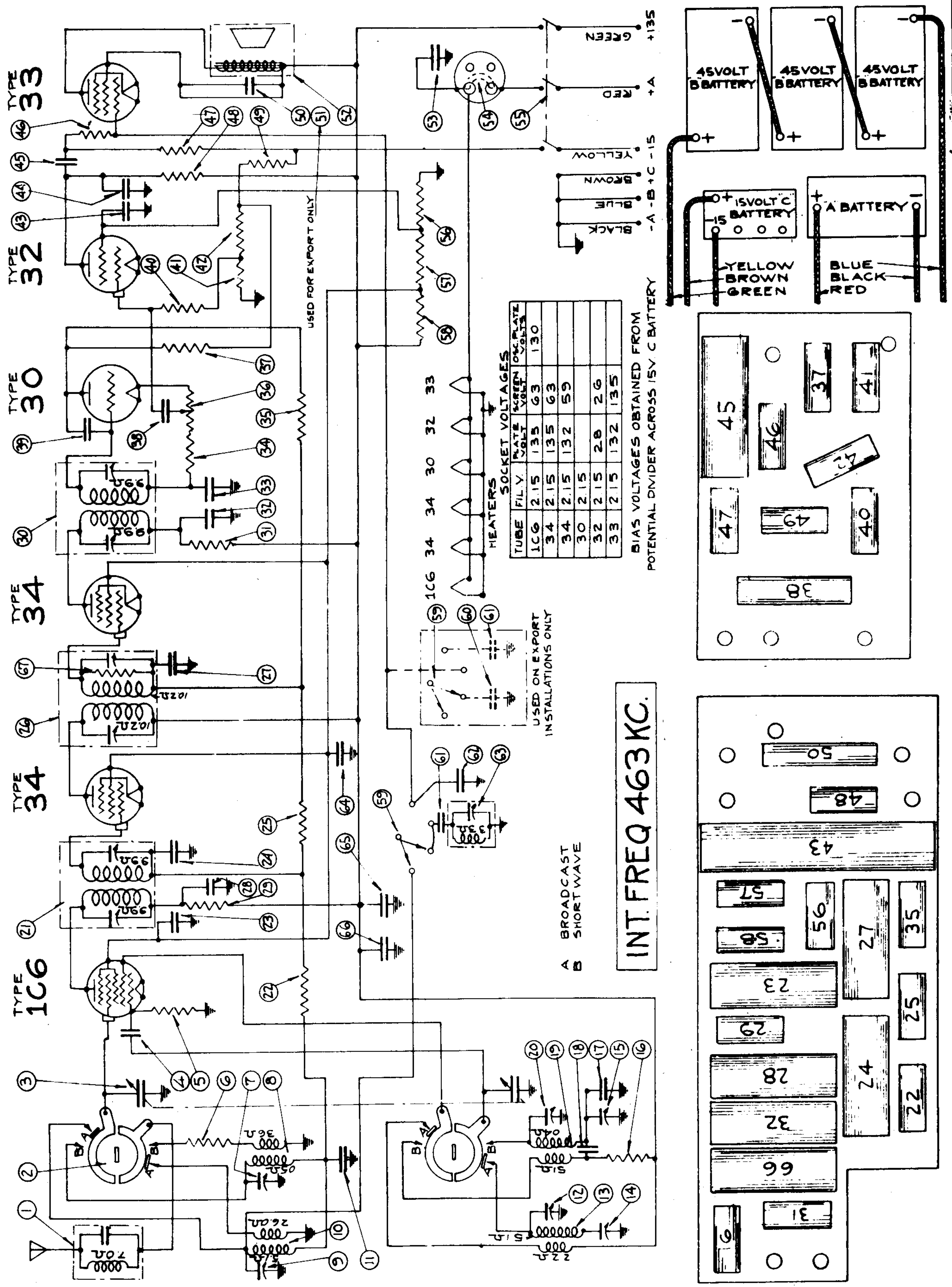




POSITION OF PADDER AND TRIMMER CONDENSERS (BOTTOM VIEWS)

UNITED AMERICAN BOSCH CORPORATION

MODEL 386



SOCKET VOLTAGES

TUBE	FIL. V.	PLATE VOLT	SCREEN VOLT	OSC. PLATE VOLTS
1C6	2.15	135	63	130
34	2.15	135	63	
34	2.15	132	59	
30	2.15			
32	2.15	28	26	
33	2.15	132	135	

BIAS VOLTAGES OBTAINED FROM POTENTIAL DIVIDER ACROSS 15V. C BATTERY

UNITED AMERICAN BOSCH CORPORATION
MODEL 386

SERVICE PARTS LIST MODEL 386

Dia. #	Part #	Description of Parts
1	RC 9544	Antenna trap coil assy.
2	SW 9510	Wave switch
3	CG 956	Variable condenser
4	SA 101143	100 mf. mica condenser
5	SA 105276	50,000 ohms 1/4 W. resistor
6	SA 105255	50 ohms 1/4 W. resistor
7	SA 108080	1.5-10 mmf. condenser
8	RC 9542	S.W. antenna coil
9	CS 9510	1-6 mmf. condenser
10	RC 9540	B.C. antenna coil
11	SA 106386	.05 mfd. 200 V. condenser
12	SA 107503	3-25 mmf. condenser
13	RC 9541	B.C. oscillator coil
14) 15)	SA 108001	300-600 mmf. condenser 750-1500 mmf. condenser
16	SA 105267	1,000 ohms 1/4 W. resistor
17	SA 103775	1,000 mmf. mica condenser
18	SA 106386	.05 mfd. 200 V. condenser
19	RC 9543	S.W. oscillator coil
20	SA 108080	1.5 - 10 mmf. condenser
21	IC 9514	1st I.F. transformer
22	SA 105276	100,000 ohms 1/4 W.resistor
23	SA 106386	.05 mfd. 200 V. condenser
24	SA 106386	.05 mfd. 200 V. condenser
25	SA 105278	100,000 ohms 1/4 W.resistor
26	IC 9515	2nd I. F. transformer
27	SA 106386	.05 mfd. 200 V. condenser
28	SA 106386	.05 mfd. 200 V. condenser
29	SA 105283	4,000 ohms 1/4 W. resistor
30	IC 9516	Diode transformer
31	SA 105267	1,000 ohms 1/4 W. resistor
32	SA 106386	.05 mfd. 200 V. condenser
33	SA 106417	100 mmf. mica condenser
34	SA 105276	50,000 ohms 1/4 W. resistor
35	SA 105246	0.5 meg. 1/4 W. resistor
36	VR 954	Volume control (500,000 ohms)
37	SA 105281	1 meg. 1/4 W. resistor
38	SA 103659	.005 mmf. 350 V. condenser
39	SA 106417	100 mmf. mica condenser
40	SA 105281	1 meg. 1/4 W. resistor
41	SA 105264	500 ohms 1/4 W. resistor
42	SA 105245	2,000 ohms 1/4 W. resistor
43	SA 102497	.25 mfd. 200 V. condenser
44	SA 106417	100 mmf. mica condenser
45	SA 106386	.05 mfd. 200 V. condenser
46	SA 105246	0.5 meg. 1/4 W. resistor
47	SA 105246	0.5 meg. 1/4 W. resistor
48	SA 105279	250,000 ohms 1/4 W.resistor
49	SA 105249	5,000 ohms 1/4 W. resistor
** 50	CW 952	.005 mfd. 350 V. condenser
* 51	SA 105743	.003 mfd. 500 V. condenser
52	SA 106918	Speaker
53	SA 103828	2 mfd. 200 V. condenser
54		Adapter socket jumper
55	SA 106824	Battery switch
56	SA 105275	25,000 ohms 1/4 W. resistor
57	SA 105284	30,000 ohms 1/4 W. resistor
58	SA 105254	15,000 ohms 1/4 W. resistor
59	SW 956	Tone control
* 60	CM 956	250 mmf. mica condenser
61	CM 954	500 mmf. mica condenser
** 62	SA 106417	100 mmf. mica condenser
**63	RC 9562	Police coil assembly
64) 65)	CE 959	2 mfd. 200 V. condenser 4 mfd. 200 V. condenser
66	SA 106386	.05 mfd. 200 V. condenser
67	RE 9514	350,000 ohms 1/8 W.resistor

MAIN ASSEMBLIES

CH 9519	Chassis assembly
KA 9510	Cabinet
SA 106918	Speaker assembly

BRACKETS, CLIPS AND CLAMPS

FP 107113	Chassis mounting bracket
BK 9552	Bracket for police switch
FP 98705	Clamp for 2 mfd. condenser
BK 9536	Dial scale assembly bracket.

CABLE & CABLE ASSEMBLY

SA 107037	Speaker cable assembly (brown & black)
SA 107038	Battery cable assembly (yellow, green & red)
SA 107039	Battery cable assembly (blue, brown & black)
SA 107045	Antenna cable assembly
SA 104445	Ground cable assembly
PR 98511	Dial operating cable (12" long)

TUBE SOCKETS & TUBE SHIELDS

SA 103686	Tube socket - 4 prong
SA 103514	Tube socket - 5 prong
SA 103513	Tube socket - 6 prong
FP 105937	Clip for split tube shield (6 used)
BE 955	Tube shield base (2 used)
FP 106196	Tube shield - split top
FP 106197	Tube shield - plain top
CV 9516	Tube shield - short
CV 954	Tube shield - long
LP 953	Ballast tube

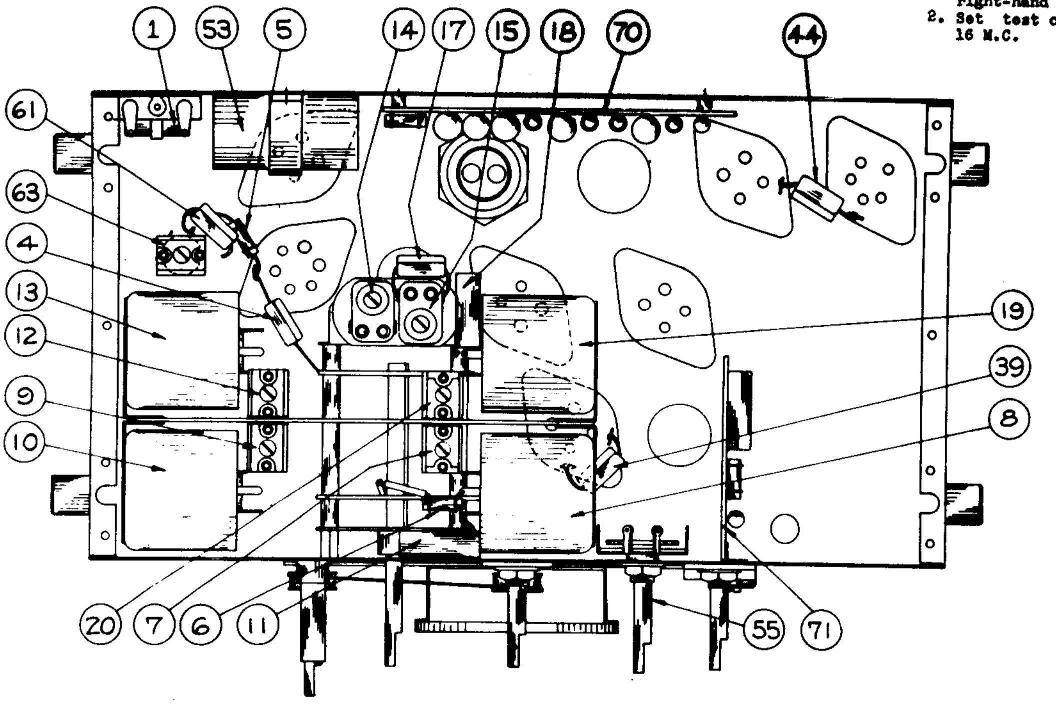
NUTS

NT 96071	Nut for speaker fastening screw
NT 103039	Nut for volume control - police switch - on & off switch

WASHERS, BUSHINGS AND SPACERS

IB 107115	Rubber bushing for chassis mounting bracket
WA 107586	Chassis mounting screw washer
FP 108004	**Felt washer for knob (1 used)**

* Used on Export installations only.
** Omit on Export installations.



ADJUSTMENT OF I.F. (463 K.C.)

1. Set volume control on full.
2. Set tone control (center knob) at right hand or bass position.
3. Connect output meter across speaker terminals through a .5 mfd. series condenser.
4. Connect in series with high side of test oscillator leads a .25 mfd. blocking condenser.
5. Set test oscillator at 463 K.C. and adjust its output to produce measureable reading on output meter when test oscillator leads are connected between frame of chassis and grid of 34 second I.F. tube.
6. Adjust trimmers on I.F. coil #30 to maximum output.
7. Connect test oscillator to grid of 34 first I.F. tube and adjust trimmers on I.F. coil #26 to maximum output.
8. Connect test oscillator to grid of 1C6 first detector and adjust trimmers on first I.F. coil #21 to maximum output.
9. With test oscillator still connected to grid of 1C6, readjust trimmers on coils #26 and #30 for greatest sensitivity.

ADJUSTMENT OF BROADCAST BAND

1. With test oscillator on grid of 1C6 tube, set its output to 1500 K.C.
2. With gang condenser in maximum position, adjust dial pointer until either end is directly over the long horizontal lines on the dial scale.
3. Now set dial pointer to 1500 K.C. and adjust #12 (Fig. #4) to maximum output.
4. Connect test oscillator to antenna through a .0002 mfd. condenser and with dial pointer still set at 1500 K.C., adjust #12 and #9 to maximum output.
5. Set dial pointer and test oscillator to 550 K.C. and adjust #14 to maximum output. Reset dial pointer in either direction from the 550 K.C. mark and readjust #14 until greatest sensitivity is obtained.
6. Return to 1500 K.C. setting and readjust #9 and #12 for maximum output. Check sensitivity and calibration across scale.

ADJUSTMENT OF POLICE BAND

1. Set combination tone control-police switch (center knob) on first or left hand position.
2. Leave wave change switch in standard broadcast position.
3. Set test oscillator at 2400 K.C. and tune in signal at approximately 1500 K.C. on dial scale.
4. Adjust trimmer on coil #63 to maximum output.

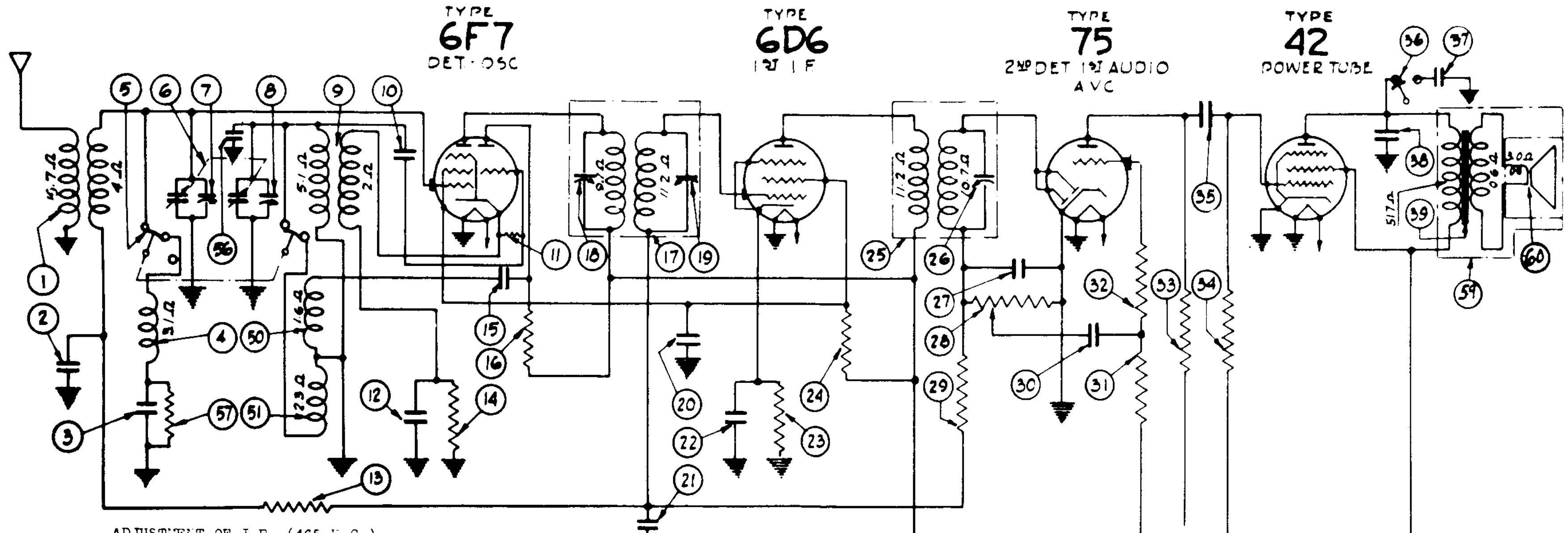
ADJUSTMENT OF SHORT-WAVE BAND

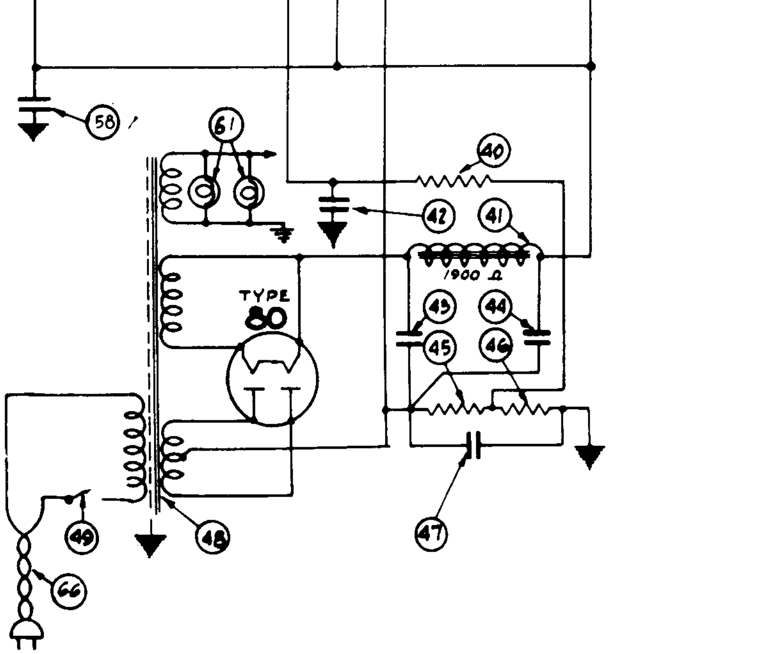
1. Set tone control to right-hand or bass position and set wave change switch (lower right-hand knob) to left hand position.
2. Set test oscillator and dial pointer to 16 M.C.
3. Connect test oscillator to antenna through a .0002 mfd. condenser and a 400 ohm resistor in series (this condenser-resistor combination is the approximate equivalent of a short-wave antenna).
4. Adjust trimmer #20 until signal is tuned in.
5. Adjust trimmer #7 and station selector alternately until maximum sensitivity is obtained. (This is necessary as the adjustment of #7 affects the oscillator frequency slightly.)
6. Set test oscillator and dial pointer to 6 M.C. and adjust #15 to maximum output.
7. Check sensitivity across scale.

UNITED AMERICAN BOSCH CORPORATION

MODEL 515

AMERICAN-BOSCH RADIO MODEL 515





ADJUSTMENT OF I.F. (465 K.C.)

1. Set volume control on full, turn tone control knob to the right hand position. Set wave-change switch on the broadcast position and the dial indicator at approximately 600 K.C.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 K.C. and adjust its output to produce a measurable reading on output meter when test signal is applied to the grid of the 6D6 I.F. tube thru a .5 mfd. blocking condenser.
4. Adjust #26 (see Fig. #2) to maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 6F7 first detector-oscillator tube and adjust #18 and #19 (Fig. #1) to maximum output.
6. With test signal still on the grid of 6F7 tube, repeat the above adjustments for greatest sensitivity.

ADJUSTMENT OF BROADCAST BAND

1. Leave test signal on grid of 6F7 tube and set the test oscillator to 1400 K.C.
2. Turn the gang condenser to its maximum position. Adjust dial indicator until either end is directly over the long horizontal lines on the dial scale. Then set dial indicator to 1400 K.C.
3. Adjust trimmer #8 to maximum output.
4. Apply test signal to antenna of set thru a .0002 mfd. condenser and adjust trimmer #7 to maximum output.

RESISTANCE OF POWER TRANSFORMER WINDINGS

WINDING	PRIMARY	SEC. TOTAL	6.3 FIL.	RECT FIL.
TR 9511	16 Ω	550Ω	.32 Ω	.13Ω
TR 9564	16.5 Ω	570 Ω	.29 Ω	.14Ω
TR 9565	61 Ω	580 Ω	.29Ω	.15Ω

VOLTAGE

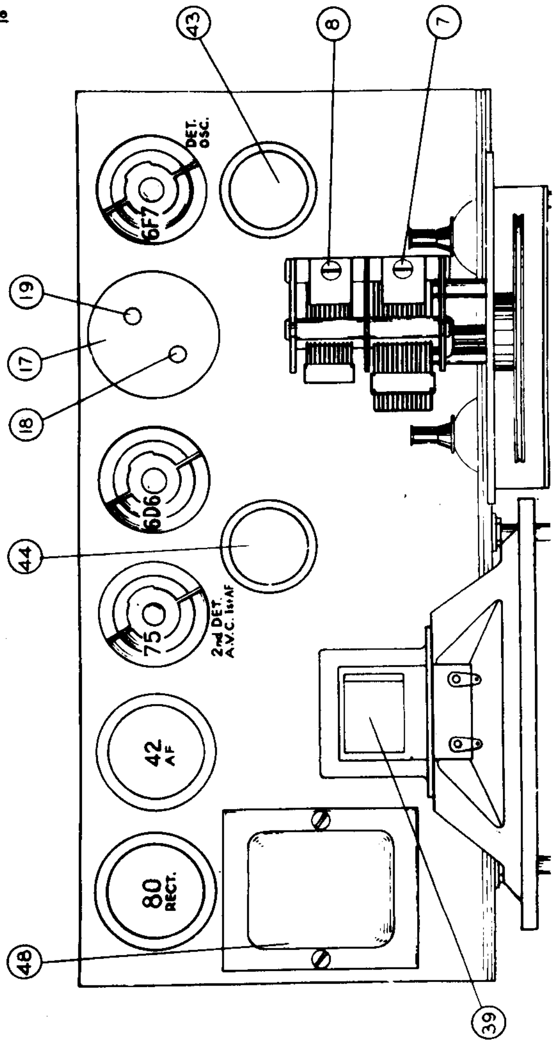
TUBE	PLATE	SCREEN GRID	CONTROL GRID	ANODE GRID	FILS.
80	300 BETWEEN FILS & GROUND				5.0
6F7	200	75	9	110	6.3
6D6	200	75	2.4		6.3
75	100		1.3		6.3
42	185	200	10		6.3
ACROSS SPKR FLD		90			

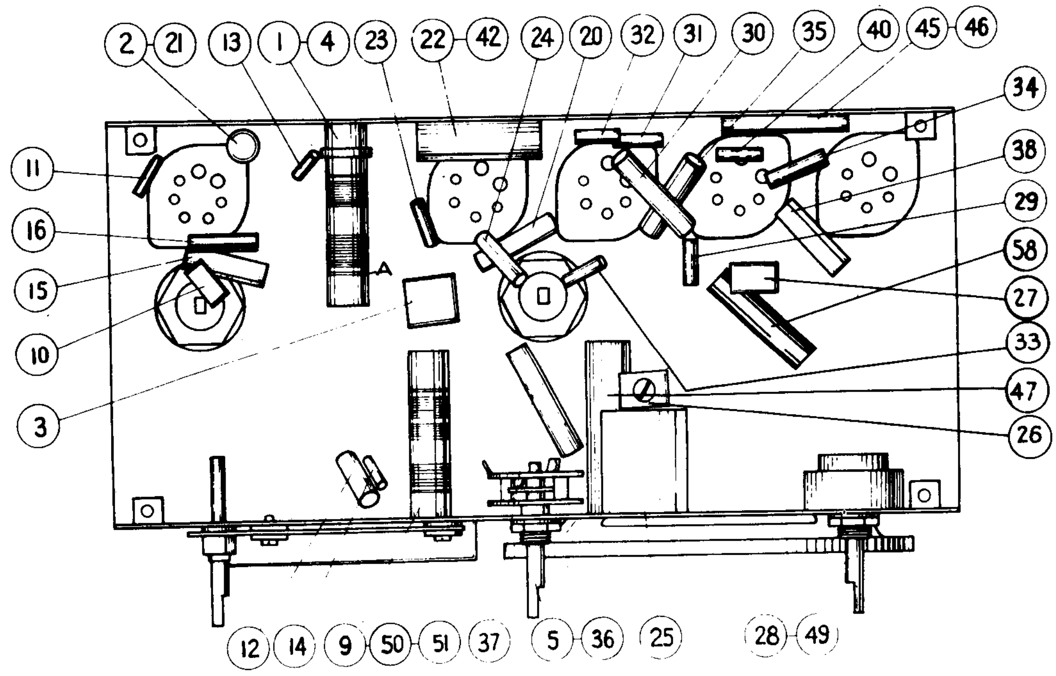
ADJUSTMENT OF POLICE BAND

When adjustments as outlined under the broadcast band are completed, the police band requires no adjustment unless the coil had been changed. In this event, set test oscillator and station indicator to 1700 K.C. and apply test signal to antenna lead. The police band winding is indicated by "A" in Fig. #2. Adjust the position of this winding by sliding it back and forth on the core until maximum output is indicated on the output meter. This winding should then be secured in place by applying a thin coat of coil cement.

UNITED AMERICAN BOSCH CORPORATION
MODEL 515

Dia. #	Part #	Description of Parts	List Price
1	RC 9588	Antenna coil assembly	$ 1.10
2		.05 mfd., 200 V. condenser - part of SA 105327 (dual).	.30
3	CM 958	400 mmfd. mica condenser	.20
4		Police pre-selector coil - part of RC 9588	
5	SW 9519	Switch assembly	.85
6	CG 9522	Variable gang condenser	2.45
7		Trimmer condenser - part of CG 9522	
8		Trimmer condenser - part of CG 9522	
9	RC 9589	Oscillator coil assembly	.95
10	SA 106417	100 mmfd. mica condenser	.20
11	SA 105276	50,000 ohm, 1/4 W. resistor	.15
12	CW 2-05	.05 mfd., 200 V. condenser	.15
13	SA 105279	250,000 ohm, 1/4 W. resistor	.15
14	SA 105269	1800 ohm, 1/4 W. resistor	.15
15	CW 4-01	.01 mfd., 400 V. condenser	.15
16	SA 100197	25,000 ohm, 1/2 W. resistor	.15
17	IC 9532	1st I.F. transformer (465 KC.)	1.75
18		I.F. trimmer condenser - part of IC 9532	
19		I.F. trimmer condenser - part of IC 9532	
20	CW 4-10	.1 mfd., 400 V. condenser	.15
21		.05 mfd., 200 V. condenser - part of SA 105327 (dual).	.30
22		.05 mfd., 200 V. condenser - part of SA 105327 (dual).	.30
23	SA 105264	500 ohm, 1/4 W. resistor	.15
24	SA 101163	75,000 ohm, 1/2 W. resistor	.15
25	IC 9533	2nd I.F. transformer (465 KC.)	1.10
26		I.F. trimmer condenser - part of IC 9533	
27	SA 106417	100 mmfd. mica condenser	.20
28	VR 957	Volume control and line switch - (500,000 ohm)	1.25
29	SA 105281	1 meg., 1/4 W. resistor	.15
30	CW 4-02	.02 mfd. 400 V. condenser	.15
31	SA 105281	1 meg., 1/4 W. resistor	.15
32	SA 105278	100,000 ohm, 1/4 W. resistor	.15
33	SA 105279	250,000 ohm, 1/4 W. resistor	.15
34	SA 100195	250,000 ohm, 1/2 W. resistor	.15
35	CW 4-02	.02 mfd. 400 V. condenser	.15
36	SW 9519	Tone control switch	.85
37	CW 4-02	.02 mfd. 400 V. condenser	.15
38	CW 4-005	.005 mfd. 400 V. condenser	.15
39	SA 107357	Speaker output transformer	1.25
40	SA 105276	50,000 ohm, 1/4 W. resistor	.15
41	SA 107358	Speaker field coil - (1900 ohm)	1.75
42		.05 mfd. 200 V. condenser - part of 105327 (dual)	.30
43	CE 9512	12 mfd. electrolytic condenser (450 V.)	1.25
44	CE 9511	8 mfd. electrolytic condenser (300 V.)	.95
45	RE 9513	320 ohm resistor	.25
46		30 ohm resistor - part of RE 9513	
47	CE 958	10 mfd. electrolytic condenser	.65
48	TR 9511	Power transformer 105-125 V., 50-60 cycles	3.50
49		Line switch - part of VR 957	
50		Oscillator feed back coil - part of RC 9589	
51		Police oscillator coil - part of RC 9589	
56	SA 108043	.00001 mfd. mica condenser	.20
57	SA 105272	10,000 ohm, 1/4 W. resistor	.15
58	CW 4-05	.05 mfd., 400 V. condenser	.15
59	SK 9536	Speaker	6.00
60	SA 106617	Diaphragm and voice coil	1.15
61	LP 951	Dial lamp	.20
66	CB 9512	Line cable and plug	.50





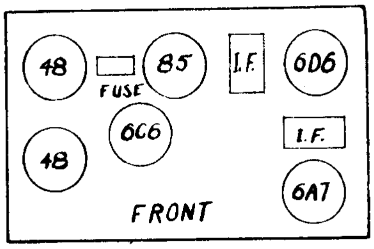
UNIVERSAL BATTERY COMPANY

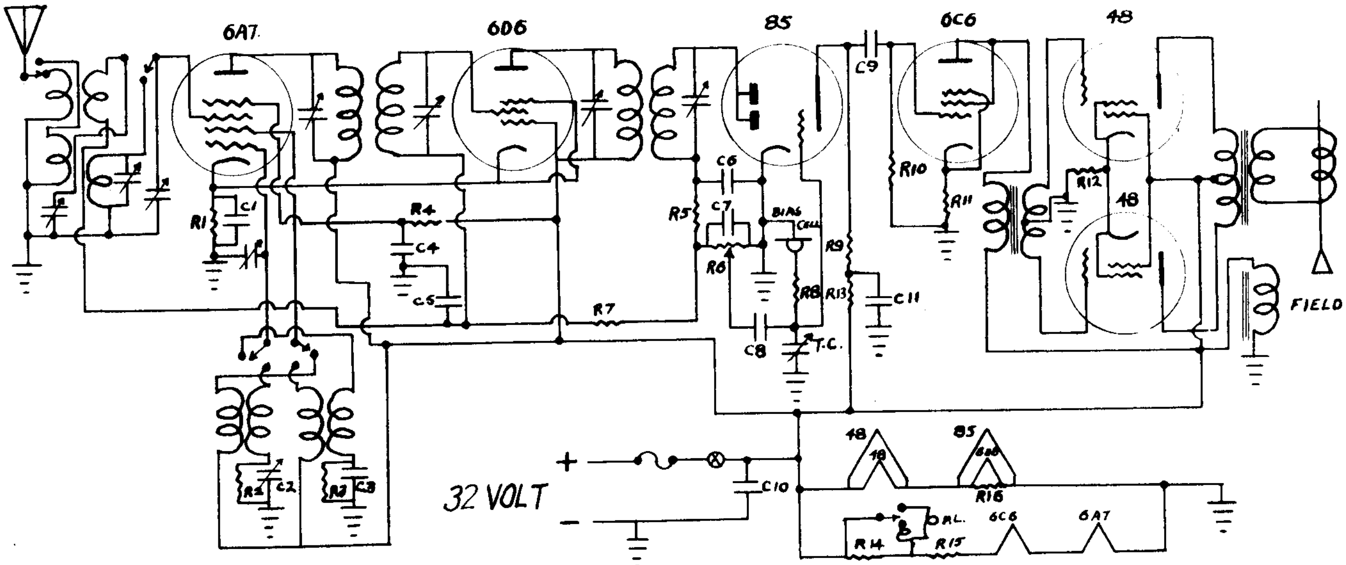
MODEL 6 TUBE 32V. SET

PARTS

- R1-250Ω RESISTOR
- R2-50MΩ "
- R3-15MΩ "
- R4-25MΩ "
- R5-50MΩ "
- R6-500M VOL. CONTROL
- R7-1 MEG. RESISTOR
- R8-500MΩ "
- R9-100MΩ "
- R10-500MΩ RESISTOR
- R11-750Ω "
- R12-350Ω "
- R13-100MΩ "
- R14-40Ω 2 Watt "
- R15-40Ω 2 " "
- R16-40Ω 2 " "
- C1-.1-200 V. CONDENSER
- C2-500MMF PAD "
- TC-TONE CONTROL
- C3-.004 MICA CONDENSER
- C4-.1-200V. "
- C5-.01-200V. "
- C6-.0001 MICA "
- C7-.0001 " "
- C8-.05-200V. "
- C9-.05-200V. "
- C10-.25-200V. "
- C11-.1-200V. "

TUBE LOCATIONS



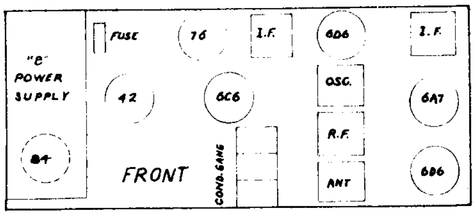


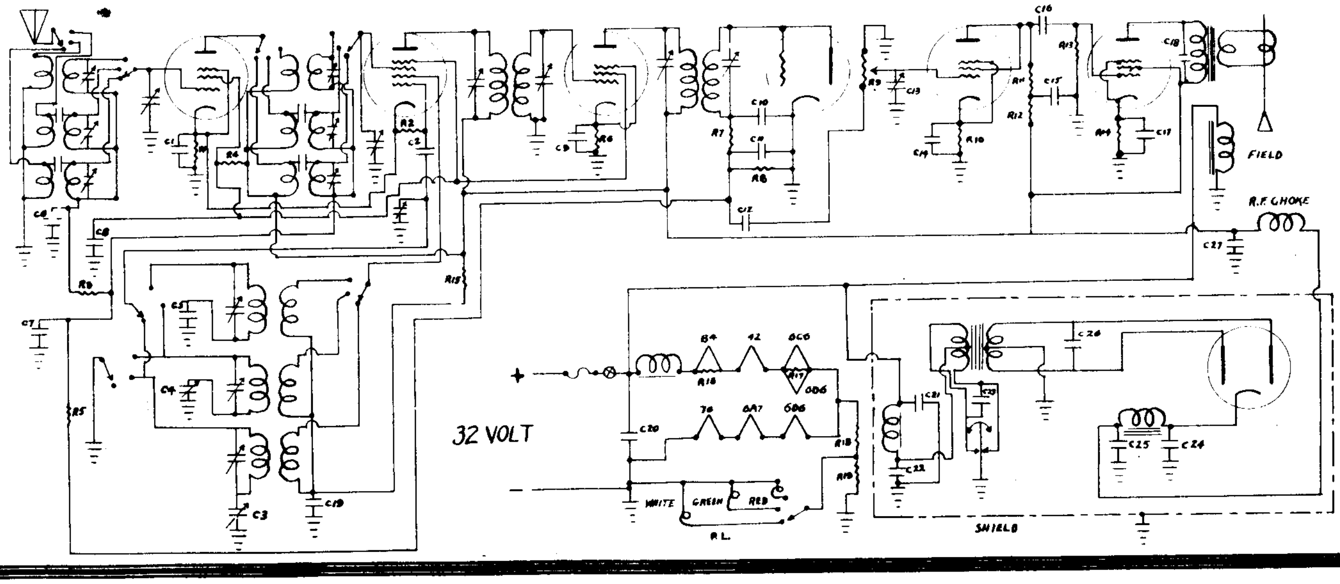
MODEL 7 TUBE 32V. SET

PARTS

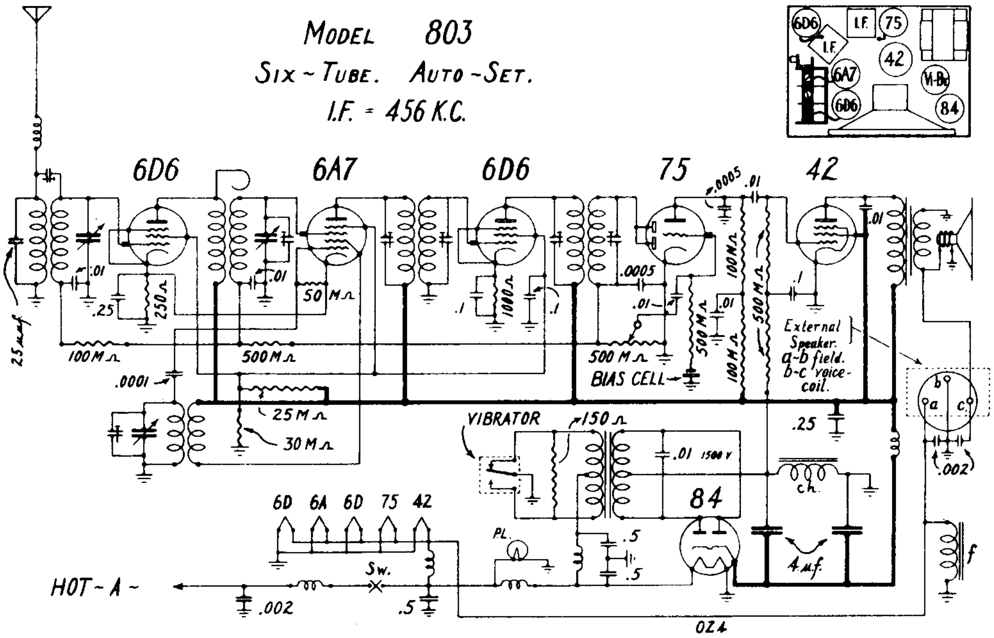
- R1-250Ω RESISTOR
- R2-50MΩ "
- R3-1MEG. "
- R4-25MΩ "
- R5-1MEG. "
- R6-250Ω "
- R7-50MΩ "
- R8-500MΩ "
- R9-500M VOL CONTROL
- R10-5MΩ RESISTOR
- R11-100MΩ "
- R12-100MΩ "
- R13-250MΩ "
- R14-1MΩ "
- R15-10MΩ "
- R16-30Ω 1½ WATT
- R17-60Ω ½ WATT
- R18-30Ω 5 WATT
- R19-15Ω 2½ WATT
- C1-.1-200V. CONDENSER
- C2-.0001 MICA "
- C3-450MMF PAD.
- C4-1000MMF PAD.
- C5-.003 MICA COND.
- C6-.01-200V. "
- C7-.01-200V. "
- C8-.1-400V. "
- C9-.1-200V. "
- C10-.0001 MICA COND.
- C11-.0001 MICA "
- C12-.05-200V. "
- C13-TONE CONTROL
- C14-.25-200V. COND.
- C15-.1-400V. "
- C16-.05-400V. "
- C17-10MFD-35V.
- C18-.005-600V. COND.
- C19-.1-400V. COND.
- C20-.004 MICA "
- C21-.25-200V. "
- C22-.25-200V. "
- C23-.5-200V. "
- C24-12MFD.-500V.
- C25-6MFD.-500V.
- C26-.02-800V.
- C27-.25-600V.

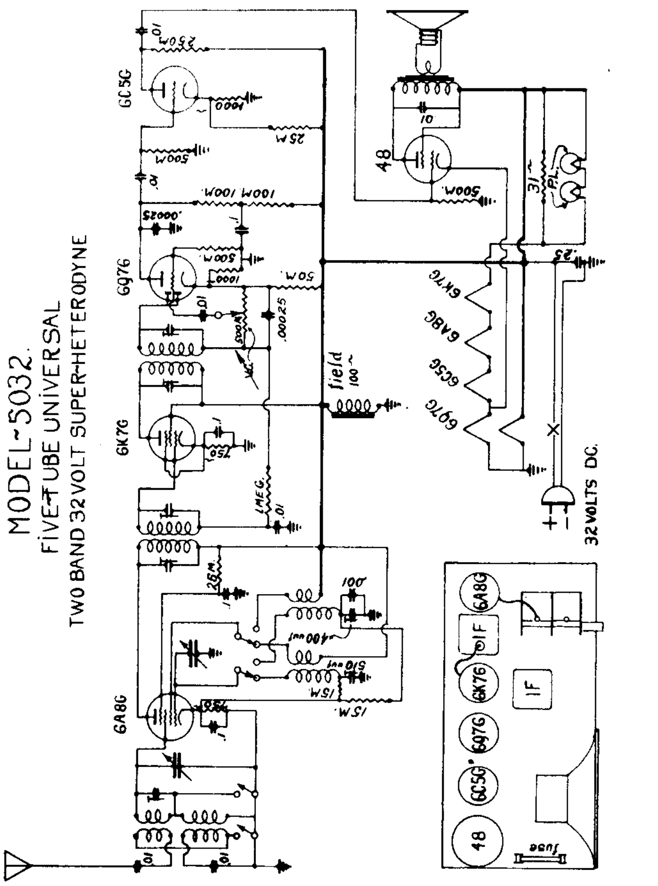
TUBE LOCATIONS

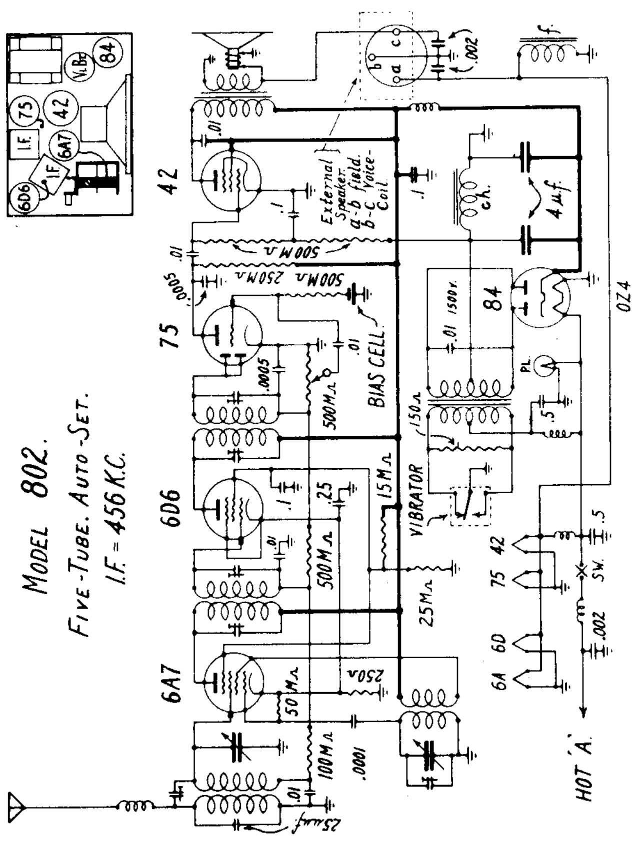




UNIVERSAL BATTERY COMPANY







WELLS GARDNER & CO.
SERIES "OF"

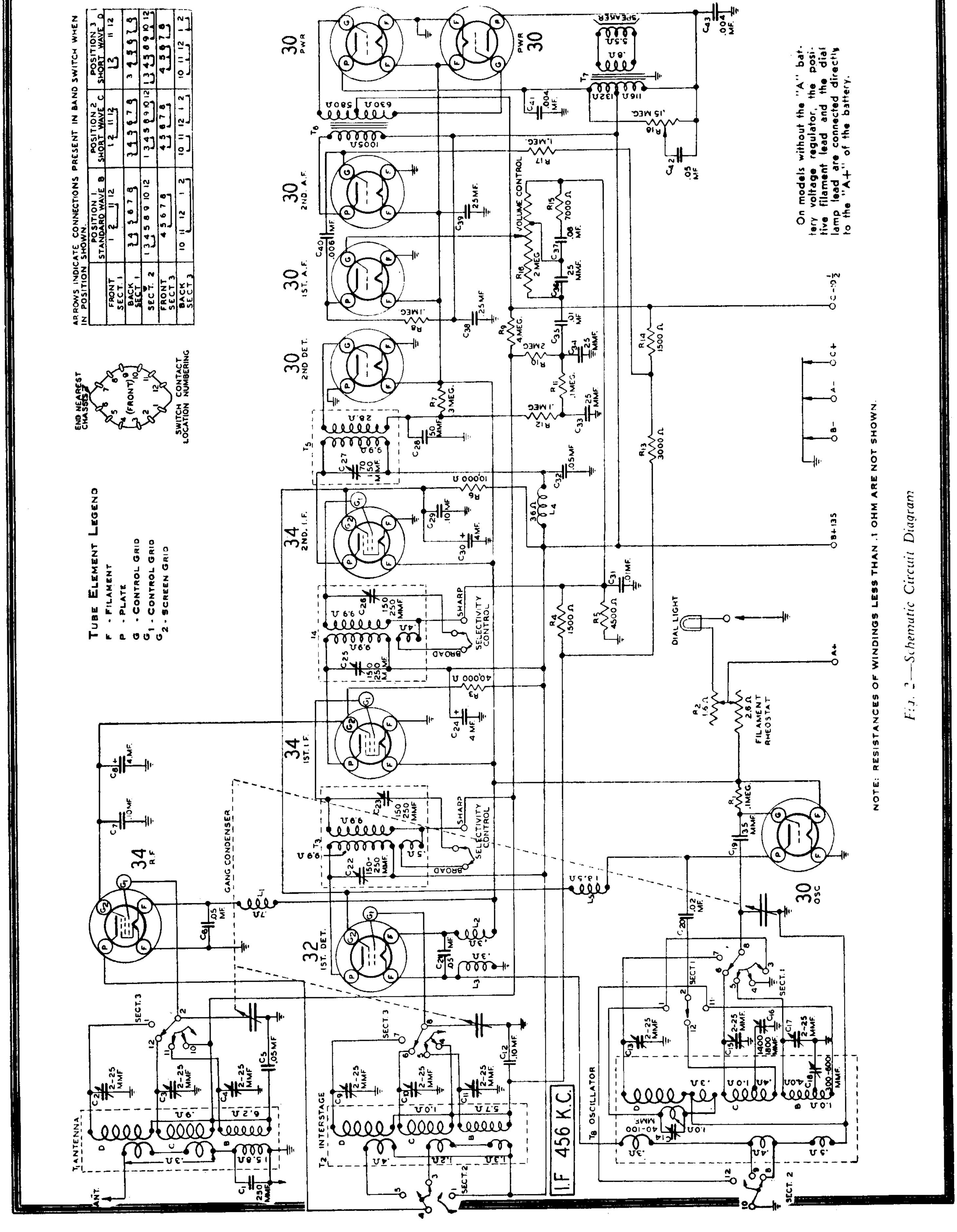


Fig. 2—Schematic Circuit Diagram

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SERIES "OF"

Alignment Procedure

Correct alignment is extremely important in connection with all wave radios. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 1800, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

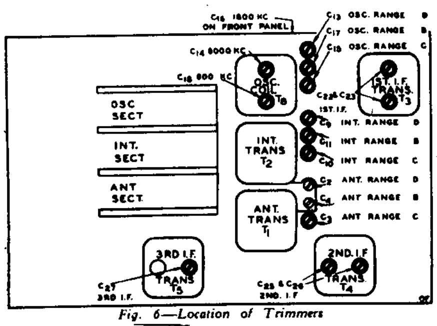


Fig. 6—Location of Trimmers

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 6.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and **all subsequent** adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C17) until maximum output is obtained. The location of this trimmer is shown in Fig. 6.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

Adjust the interstage Range B trimmer (C11) and antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 600 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C15) until maximum output is obtained. See Fig. 6 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C10) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 1800 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C13) until maximum output is obtained. See Fig. 6 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage and antenna Range D trimmers, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 6000 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

Voltages

Check the voltages at the sockets to see if correct values are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together. The volume control should be turned to the right or maximum position.

All of the voltage readings as shown in the chart are read with a 1,000 ohm-per-volt meter. As high a range as possible should be used. In general, the higher the resistance of the meter, the more accurate the reading will be.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition. These voltages are typical of the sets but will vary slightly with variations in individual receivers, tubes, test equipment used and battery voltages.

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground — Band Switch in Standard Wave Position

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Control Grid to Ground
34	R. F.	2.0	135	65	
32	1st Det.	2.0	135	90	6
30	Osc.	2.0	90		
34	1st I. F.	2.0	135	65	
34	2nd I. F.	2.0	135	90	4.5
30	2nd Det.	2.0			
30	1st A. F.	2.0	75		4.5 (1)
30	2nd A. F.	2.0	132		9 (2)
30	Power	2.0	135		10.5

(1) Volume control at minimum setting.
(2) As read from connection between R13 and R14, and ground.

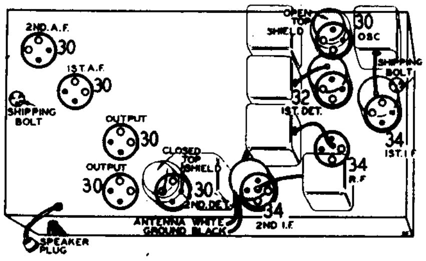
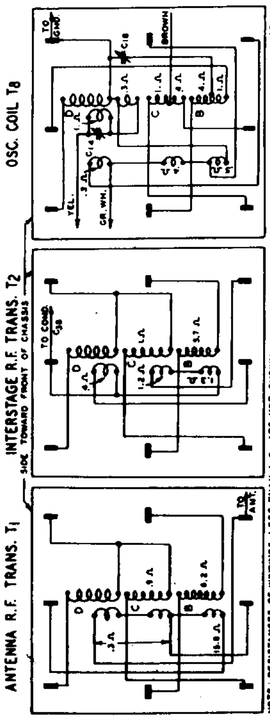


Fig. 7—Location of Tubes



NOTE: RESISTANCES OF WINDINGS LESS THAN 1 A. ARE NOT SHOWN.

Fig. 8—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

WELLS GARDNER & CO.

SERIES OEL

The receivers are properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 1800, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C18) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

In sets using pointers, loosen the screw of the large pointer and set the pointer at the 1500 KC mark on the standard wave band scale. Re-tighten the screw.

In sets using the moving beam of light, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until it is at the 1500 KC mark on the dial. Re-tighten the screw.

Adjust the interstage Range B trimmer (C10) and antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

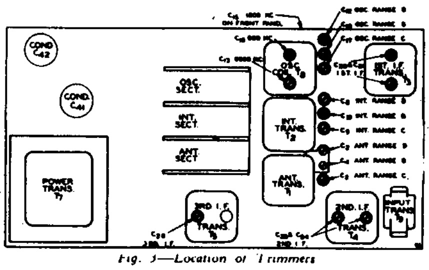


Fig. 3—Location of Trimmers

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C17) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C9) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 1800 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C12) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C8) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage and antenna Range D trimmers, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

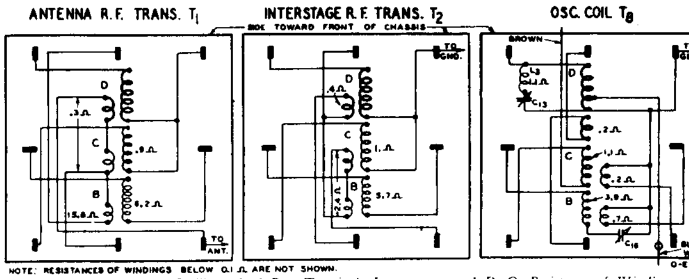
Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

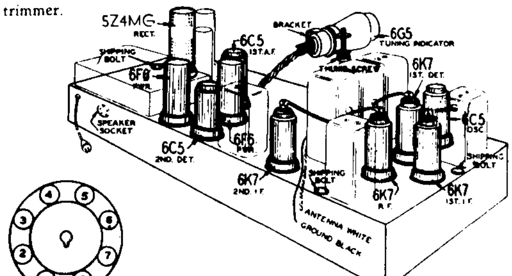
Turn the tuning condenser rotor until maximum output is obtained.

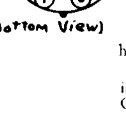
Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.



NOTE: RESISTANCES OF WINDINGS BELOW 0.1 Ω ARE NOT SHOWN.

Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings





(Bottom View)

Voltage Chart

The voltage readings are taken with a voltmeter having a resistance of 1000 ohms per volt.

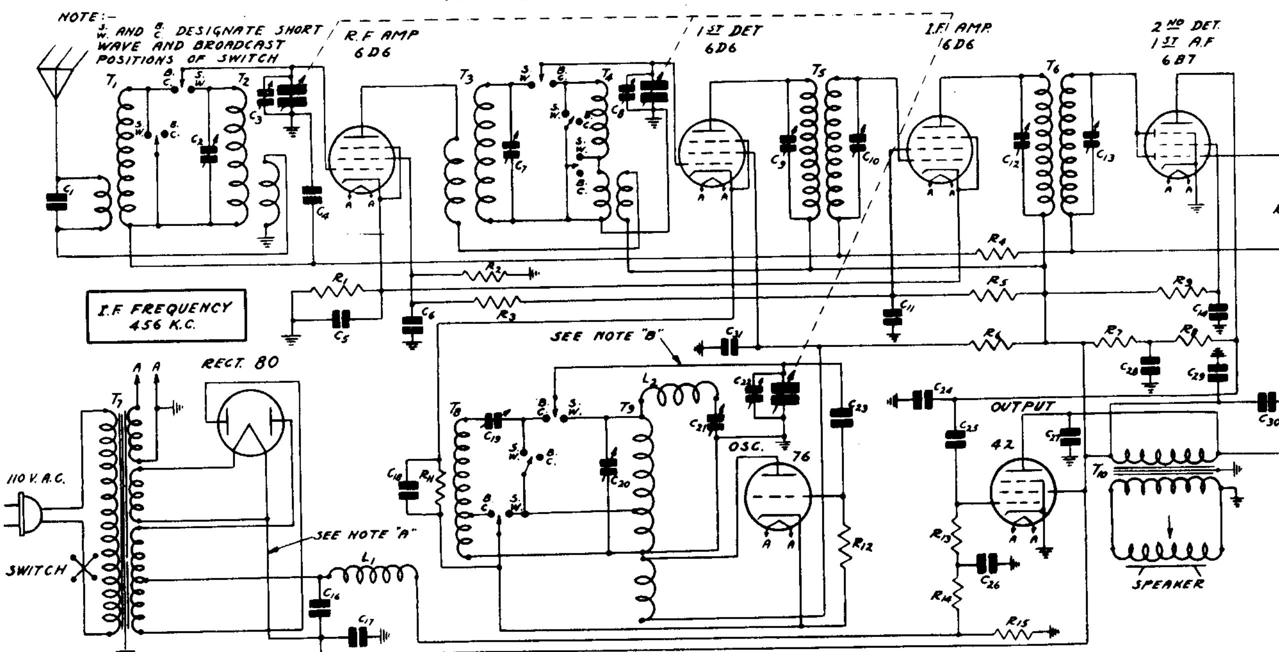
The standard metal tube socket terminal number ing system (bottom of socket) is shown in Fig. 5. On the schematic circuit diagram, Fig. 2, is a list giving the complete names of the tube elements and the corresponding symbols as used on the sockets on the schematic.

Line Voltage: 115 — Antenna Shorted to Ground
Volume Control: Maximum — Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	R.F.	0	6.1[1]	250	100	2.5	...	6.1[1]	2.5
6K7	1st Det.	0	6.1[1]	250	120	0	...	6.1[1]	9
6C5	Osc.	0	6.1[1]	120	...		...	6.1[1]	0
6K7	1st I.F.	0	6.1[1]	250	100	2.5	...	6.1[1]	2.5
6K7	2nd I.F.	0	6.1[1]	250	100	3	...	6.1[1]	3
6C5	2nd Det.	0	6.1[1]	0			...	6.1[1]	0
6C5	1st A.F.	0	6.1[1]	110	...		...	6.1[1]	4.5
6F6	Power Amp.	0	6.1[1]	330	250	25[2]		6.1[1]	0
5Z4MG	Rect.	0	4.8[3]	...	640[4]	...	640[4]	...	4.8[3]
6G5	Tuning Indicator	Plate to Ground 20[5]		Target to Ground 250		Cathode to Ground 0		Across Heater 6.1 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) As read across resistor R24.
(3) A.C. voltage as read across heater terminals 2 and 8.
(4) A.C. voltage as read across terminals 4 and 6.
(5) As read with 500,000 ohm meter.

WELLS GARDNER & CO.
MODEL 7D SERIES



NOTE "A":-FILTER CHOKE USED IN SERIES AT THIS POINT IN 1ST MODELS. NOTE "B":-SERIES PADDER USED IN SERIES AT THIS POINT IN 1ST MODELS. L_2 & C_{21} WERE NOT USED.

The series 7D is a broadcast and short wave receiver with a coverage of 530 to 1740 K. C. on the broadcast band and 5.8 to 18.3 M. C. on the short wave band. Dual band coverage is accomplished by means of dual sets of R. F. and oscillator coils and a three section double throw switch. The various circuits made and broken as this switch is thrown, are indicated in the schematic circuit diagram

Voltages at Sockets
LINE VOLTAGE — 115
ANTENNA SHORTED TO GROUND

Type of Tube	Function	Across Fila. or Heater	Plate to Cath.	Screen to Cath.	Control Grid to Cath.	Normal Plate M. A.
6D6	R. F.	6.3	246	100	3.6(1)	5.3
6D6	1st Det.	6.3	237	97	8.0(2)	3.4
76	Osc.	6.3	115		0	4.8
6D6	I. F.	6.3	246	130	3.6(1)	8.3
6B7	2nd Det.	6.3	50(3)	40(3)	0	2.7
42	Power	6.3	230	245	17.0(4)	33.0
80	Rectifier	5.0				37.0 per plate

(1) Cathode to ground
(2) Subject to variation
(3) Read with 1,000,000 ohm meter
(4) As read across R15

RESISTORS

Part No.	Code	Resistance	Watts	Type	List Price
P-98016	R1	200 ohm	.2	Flex. Wire Wound	$ .15
P-B93303	R2	30,000 ohm	.5	Carbon	.20
P-B94602	R3	6,000 ohm	.5	Carbon	.15
P-A95205	R4	2.0 megohm	.2	Carbon	.15
P-98020	R5 / R6	16,000 ohm / 25,000 ohm	1.5 / 1.0	Armored wire wound	.65
P-A94203	R7	20,000 ohm	.2	Carbon	.15
P-B94603	R8	60,000 ohm	.5	Carbon	.15
P-B94254	R9	250,000 ohm	.5	Carbon	.15
P-96014	R10	500,000 ohm		Vol. Control & Switch	1.05
P-A94252	R11	2,500 ohm	.2	Carbon	.15
P-A94104	R12	100,000 ohm	.2	Carbon	.15
P-A95504	R13	500,000 ohm	.2	Carbon	.20
P-A94104	R14	100,000 ohm	.2	Carbon	.15
P-98015	R15	235 ohm	2.0	Flex. Wire Wound	.15
P-97011	R16	150,000 ohm		Tone Control	.75

* Used in early Models. See Article on changes in this Manual
† Used in Later Models. See Article on changes in this Manual

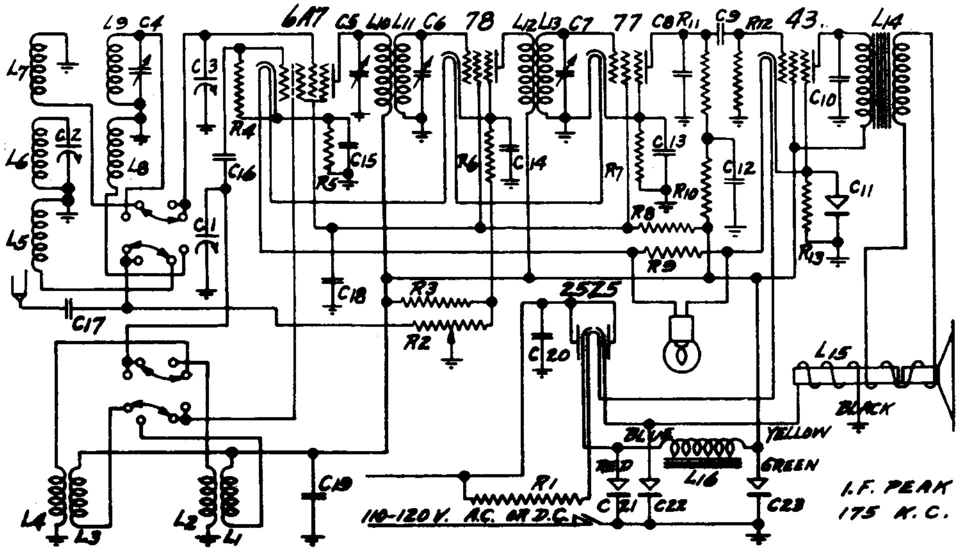
CONDENSERS

Part No.	Code	Capacity	Volts	Type	List Price
P-80919	C1	.00025 mfd.		Moulded	$ .20
P-2102	C2	3-40 mmfd.		Ant. S.W. Trimmer	.15
	C3	(See 3 Gang Cond.)		Gang Trimmer	
P-80862	C4	.05 mfd.	200V.	Tubular	.15
P-80888	C5	.25 mfd.	200V.	Tubular	.25
P-80890	C6	.05 mfd.	400V.	Tubular	.20
P-2102	C7	3-40 mmfd.		1st Det.S.W. Trim	.15
	C8	(See 3 Gang Cond.)		Gang Trimmer	
P-1386-B	C9 / C10	90±30 mmfd. / 90±30 mmfd.		Dual Trimmer Part of I. F. Assem.	
P-81034	C11	.25 mfd.	300V.	Tubular	.30
P-1386-B	C12 / C13	90±30 mmfd. / 90±30 mmfd.		Dual Trimmer Part of I. F. Assem.	
P-81040	C14	.25 mfd.	400V.	Tubular	.35
P-80977	C15	.0001 mfd.		Moulded	.20
†P-81043	C16	18.0 mfd.	300V.	Electrolytic Wet	1.30
*P-80916	C16	8.0 mfd.	450V.	Electrolytic Wet	1.25
*P-81032	C17	8.0 mfd.	500V.	Electrolytic Wet	1.30
†P-81042	C17	14.0 mfd.	400V.	Electrolytic Wet	1.45
P-80862	C18	.05 mfd.	200V.	Tubular	.15
P-2112	C19	300-500 mmfd.		600 K.C. Trimmer	.45
P-2102	C20	3-40 mmfd.		Osc. S.W. Trimmer	.15
†P-1685	C21	70±30 mmfd.		6000 K.C. Trimmer	.35
	C22	(See 3 Gang Cond.)		Gang Trimmer	
P-81005	C23	.000035 mfd.		Moulded	.15
P-80914	C24	.002 mfd.	600V.	Tubular	.20
P-80981	C25	.01 mfd.	400V.	Tubular	.20
P-81044	C26	.03 mfd.	400V.	Tubular	.15
P-80914	C27	.002 mfd.	600V.	Tubular	.20
P-81033	C28	.25 mfd.	400V.	Tubular	.35
P-80887	C29	.1 mfd.	400V.	Tubular	.20
P-80890	C30	.05 mfd.	400V.	Tubular	.20
P-80887	C31	.1 mfd.	400V.	Tubular	.20
P-81027-B	3 Gang Condenser				3.35
*P-2113		600-1200 mmfd.		6000 K.C. Trimmer	.61

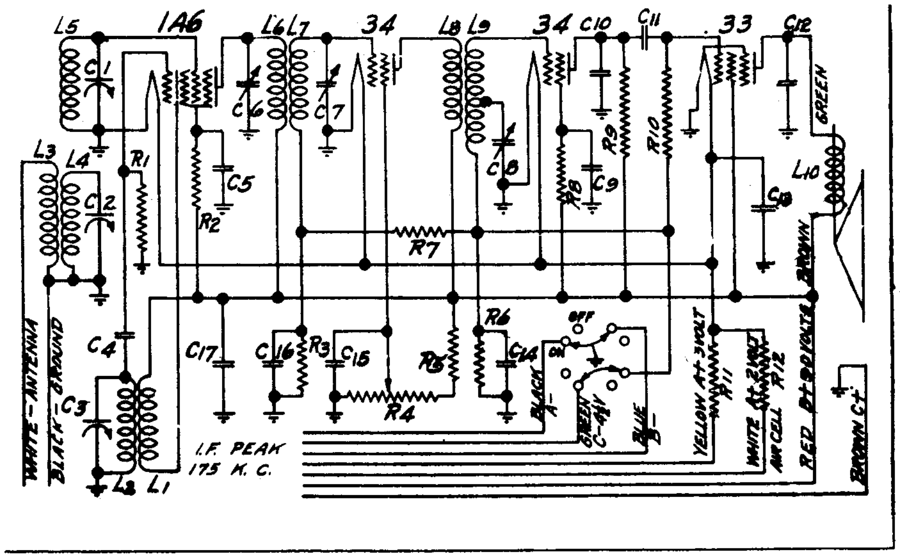
WILCOX-GAY CORP.

MODEL 3JE5

CODE	PART NO.	RESISTORS
R1	20-1125	130 Ohm Resistor in Power Cord
R2	19-1296	10,000 Ohm Volume Control & Switch
R3	53-922	75,000 Ohm Resistor I.F. Cathode Feed
R4	53-898	50,000 Ohm Resistor Oscillator Grid
R5	53-1062	250 Ohm Resistor 6A7 Cathode
R6	53-1063	500 Ohm Resistor I.F.Cathode
R7	53-941	20,000 Ohm Resistor 77 Cathode
R8	53-921	40,000 Ohm Resistor Screen Feed
R9	53-1308	20 Ohm Resistor Pilot Light Shunt
R10	53-923	100,000 Ohm 77 Plate Hum Resistor
R11	53-924	250,000 Ohm Resistor 77 Plate
R12	53-925	500,000 Ohm Resistor Output Grid
R13	53-1063	500 Ohm Resistor Output Cathode
		CONDENSERS
C1	77-833	336 MMFD. Oscillator Section of 3 Gang
C2	77-833	371 MMFD. Preselector Section of 3 Gang
C3	77-833	371 MMFD. Preselector Section of 3 Gang
C4	78-2010	Foreign Band Preselector Trimmer
C5	78-2008	First I.F. Primary Trimmer
C6	78-2007	First I.F. Secondary Trimmer
C7	78-2009	Second I.F. Trimmer
C8	76-265	.001 Mfd. Mica 77 Plate By-Pass
C9	76-269A	.01 Mfd. 400 Volt Audio Feed Condenser
C10	76-543A	.004 Mfd. Paper Output Plate By-Pass
C11	18-928	25 Mfd. 25 Volt Output Cathode
C12	75-272A	.1 Mfd. 200 Volt 77 Plate Hum Filter.
C13	75-267A	5. Mfd. 200 Volt 77 Cathode By-Pass
C14	75-272A	.1 Mfd. 200 Volt 78 Cathode By-Pass
C15	75-272A	.1 Mfd. 200 Volt 6A7 Cathode By-Pass
C16	76-264	.00005 Mfd. Mica Oscillator Grid Condenser
C17	76-265	.001 Mfd. Mica Antenna Series Cond.
C18	75-272A	.1 Mfd. 200 Volt Screen By-Pass
C19	75-267A	.5 Mfd. 200 Volt B Supply By-Pass
C20	75-272A	.1 Mfd. 200 Volt 110 volt Line By-Pass
C21	18-1085	10 Mfd. 150 Volt Dry Electrolytic Cond.
C22	18-1085	4 Mfd. 150 Volt Dry Electrolytic Cond.
C23	18-1085	4 Mfd. 150 Volt Dry Electrolytic Cond.
		INDUCTANCES
L1	17-1444	Foreign Band Oscillator Primary
L2	17-1444	Foreign Band Oscillator Secondary
L3	17-2030	Broadcast Oscillator Primary
L4	17-2030	Broadcast Oscillator Secondary
L5	17-2028	Broadcast Preselector Primary
L6	17-2028	Broadcast Preselector First Secondary
L7	17-2028	Broadcast Preselector Second Secondary
L8	17-1525	Foreign Band Preselector Primary
L9	17-1525	Foreign Band Preselector Secondary
L10	17-2024	First I.F. Transformer Primary
L11	17-2024	First I.F. Transformer Secondary
L12	17-2023	Second I.F. Trans. Primary
L13	17-2023	Second I.F. Trans. Secondary
L14	64-1260	Single 43 Output Trans.
L15	64-1260	5000 Ohm Speaker Field
L16	14-940	20 Henry Filter Choke



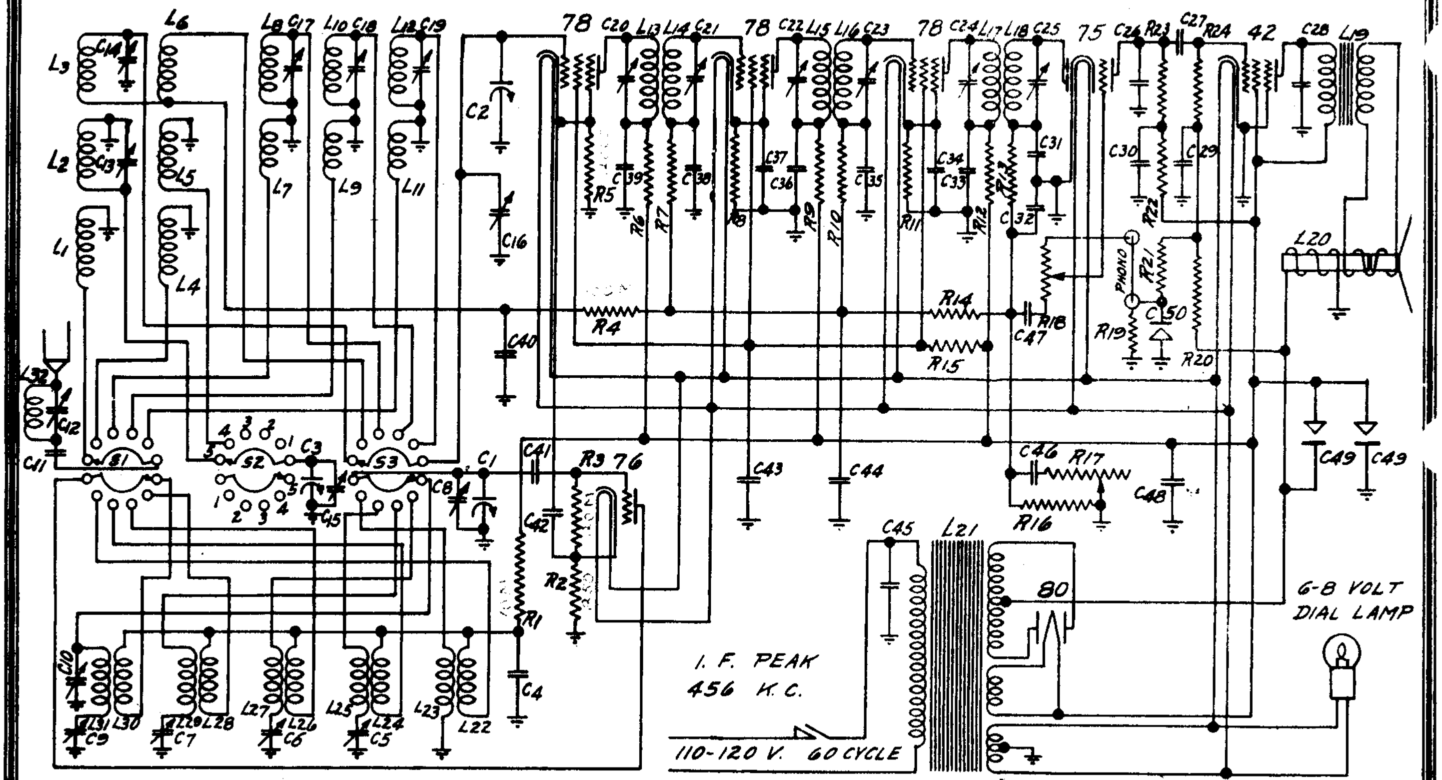
MODEL 3J4



CODE	PART NO.	RESISTORS
R1	53-923	100,000 Ohm Resistor Oscillator Grid
R2	53-921	40,000 Ohm Resistor 1A6 Screen
R3	53-898	50,000 Ohm Resistor I.F. Grid Isolation
R4	19-1315	500,000 Ohm Volume Control
R5	53-1042	25,000 Ohm Resistor I.F. Screen
R6	53-1065	1,000 Ohm Resistor C Bias Network
R7	53-898	50,000 Ohm Resistor C Bias Network
R8	53-925	500,000 Ohm Resistor Second Detector Screen
R9	53-924	250,000 Ohm Resistor Second Detector Plate
R10	53-925	500,000 Ohm Resistor Output Grid
R11	53-2005	2.25 Ohm Resistor Filament Series
R12	53-2001	.4 Ohm Resistor Filament Series
		CONDENSERS
C1	77-833	366 MMFD. First Preselector Section of 3 Gang
C2	77-833	366 MMFD. Second Preselector Section of 3 Gang
C3	77-833	328 MMFD. Oscillator Section of 3 Gang
C4	76-2004	.00025 Mfd. Mica Oscillator Grid Condenser
C5	75-2005	.1 Mfd. 200 Volt 1A6 Screen By-Pass
C6	78-2008	First I.F. Primary Trimmer Condenser
C7	78-2011	First I.F. Secondary Trimmer Condenser
C8	78-2009	Second I.F. Trimmer Condenser
C9	75-2005	.1 Mfd. 200 Volt Second Detector Screen By-Pass
C10	76-662	.002 Mfd. Mica Second Detector Plate Filter
C11	75-2003	.01 Mfd. 400 Volt Audio Feed Condenser
C12	75-2002	.004 Mfd. 600 Volt Output Plate Filter
C13	75-2013	1. Mfd. 400 Volt Filament By-Pass Condenser
C14	75-2005	.1 Mfd. 200 Volt C Bias Network By-Pass
C15	75-2005	.1 Mfd. 200 Volt I.F. Screen By-Pass Condenser
C16	75-2005	.1 Mfd. 200 Volt I.F. Grid Isolation By-Pass
C17	75-2005	.1 Mfd. 200 Volt B By-Pass Condenser
		INDUCTANCES
L1	17-2030	Oscillator Coil Primary
L2	17-2030	Oscillator Coil Secondary
L3	17-2048	Preselector Coil Primary
L4	17-2048	Preselector First Secondary
L5	17-2048	Preselector Second Secondary
L6	17-2024	First I.F. Trans. Coil Primary
L7	17-2024	First I.F. Trans. Coil Secondary
L8	17-2050	Second I.F. Trans. Coil Primary
L9	17-2050	Second I.F. Trans. Coil Secondary
L10	64-2009	Magnetic Speaker 33 Output Armature
	68-2012	First I.F. Transformer Assembly

WILCOX-GAY CORP.

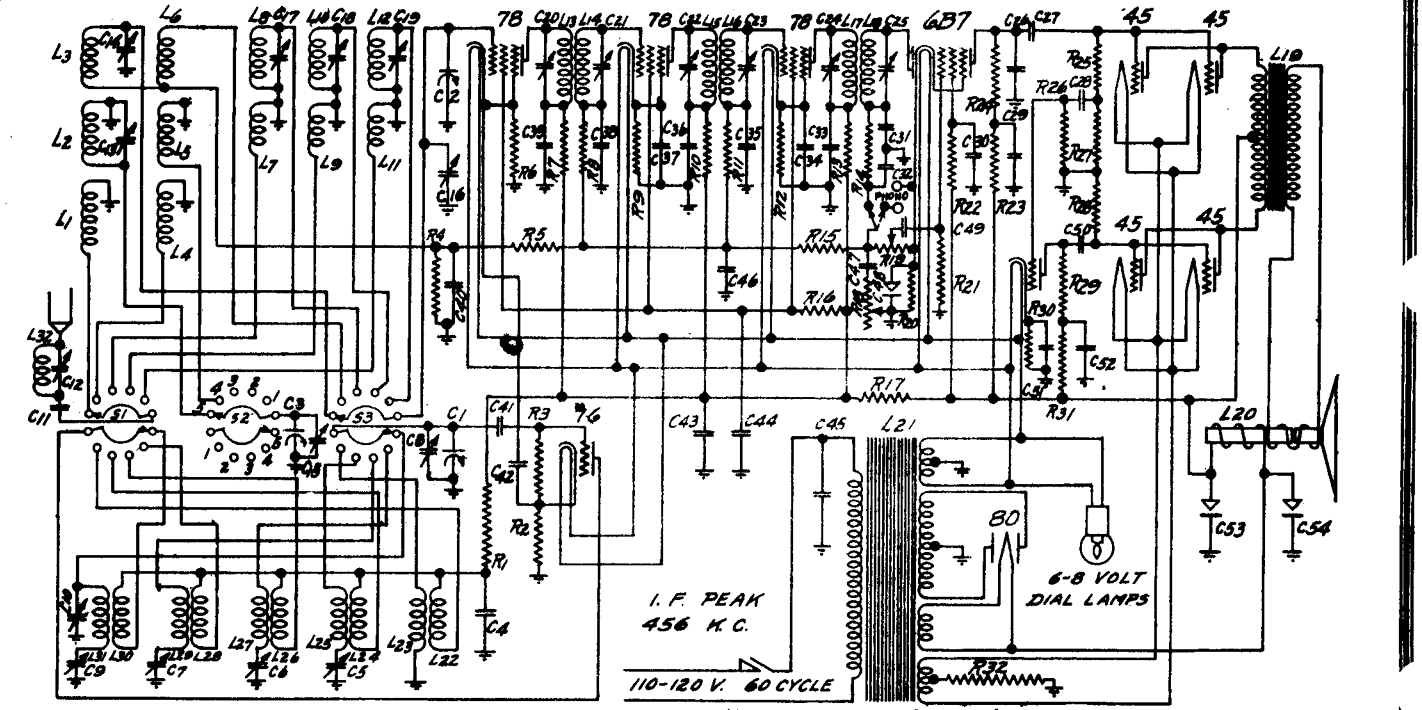
MODEL 4G7



Condensers(mf.)--C4-0.01;C11,C27,C33,C35,C36,C38,C39,C42,C45,C46,C47-0.01;C26-0.001;C28-0.002;C29-0.2;C30,C34,C37,C40,C44-0.1;C31,C32-0.0001;C41-0.00005;C43-0.5;C48-1.0;C49-4-4.0

Resistors(Ohms)--R1-10000;R2-250;R3-20M;R4,R7,R10,R22-100M;R5-2M;R8,R11-500;R6,R9,R12,R19-5M;R13-50M;R14,R20-1 meg;R21-75M;R15-40M;R16,R18,R24-500M;R17,R23-250M

MODEL 4H11



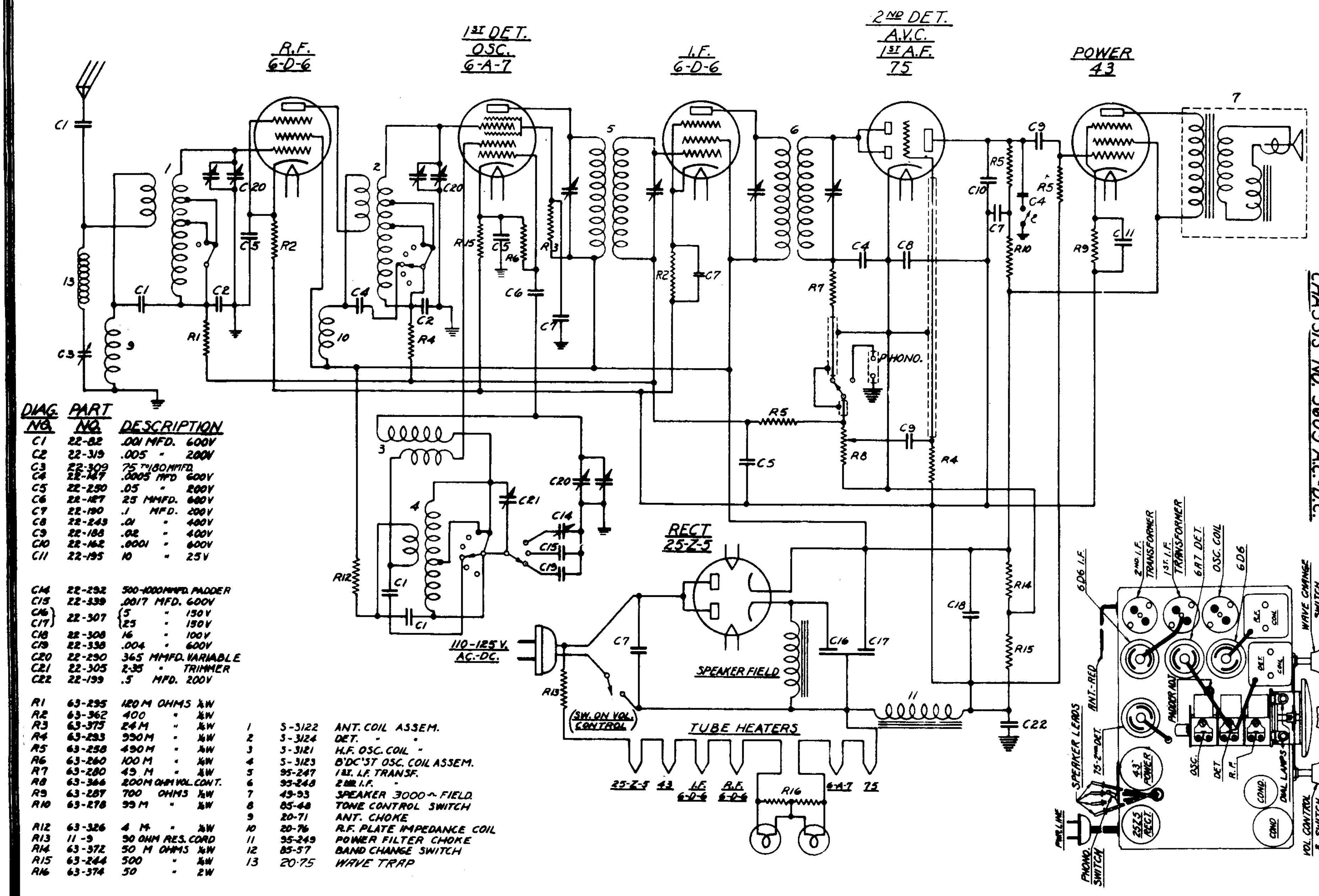
Condensers(mf)--C4,C29,C30,C34,C37,C40,C46,C51,C52-0.1;C11,C27,C28,C33,C35,C36,C38,C39,C42,C45,C47,C49,C50-0.01;C26-0.001;C31,C32-0.0001;C41-0.00005;C43-1.0;C44-5.0;C48-25.0;C53,C54-8.0 mf.

Resistors(Ohms)--R1,R3-20M;R2-250;R4,R15,R22-1 meg;R5,R8,R11,R23,R24 R27,R29,R31-100M;R6,R30-2M;R7,R10,R13-5M;R9,R12-500;R14,R16-50M;R17-2500;R18-250M;R19,R21,R25,R26,R28-500M;R20-1M;R32-650

ZENITH RADIO CORPORATION

MODELS 811-862-865-866-1162

CHASSIS NO. 5609 A.C.-D.C.



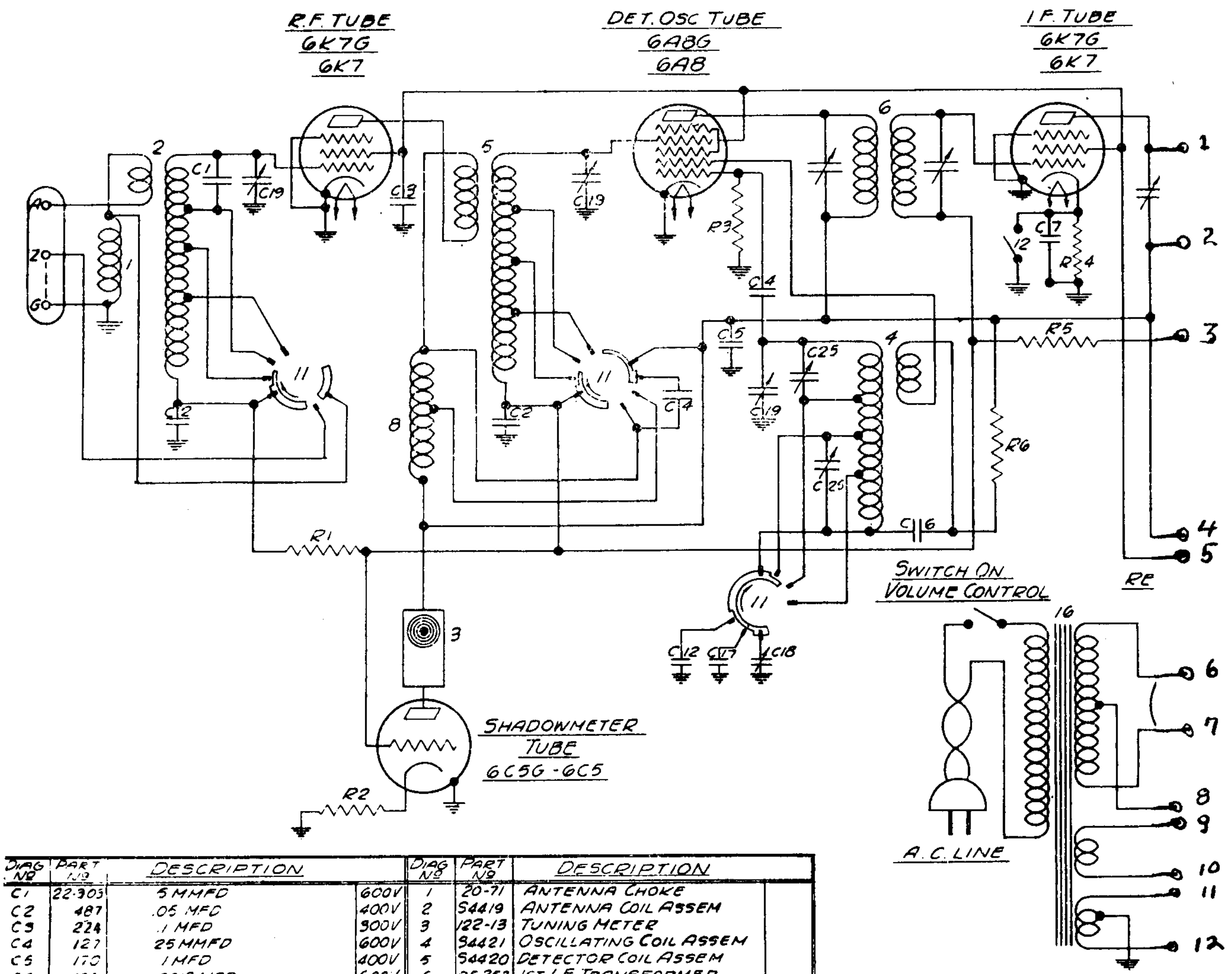
DIAG. NO.	PART NO.	DESCRIPTION
C1	22-82	.001 MFD. 600V
C2	22-319	.005 " 200V
C3	22-309	75 TO 180 MMFD.
C4	22-147	.0005 MFD 600V
C5	22-250	.05 " 200V
C6	22-127	25 MMFD. 600V
C7	22-190	.1 MFD. 200V
C8	22-243	.01 " 400V
C9	22-188	.02 " 400V
C10	22-162	.0001 " 600V
C11	22-195	10 " 25V
C14	22-292	500-1000 MMFD. PADDER
C15	22-339	.0017 MFD. 600V
C16	22-307	5 " 150V
C17	22-307	25 " 150V
C18	22-308	16 " 100V
C19	22-338	.004 " 600V
C20	22-290	365 MMFD. VARIABLE
C21	22-305	2-35 " TRIMMER
C22	22-199	.5 MFD. 200V
R1	63-295	120 M OHMS ¼W
R2	63-362	400 " ¼W
R3	63-375	24 M " ¼W
R4	63-293	990 M " ¼W
R5	63-258	490 M " ¼W
R6	63-260	100 M " ¼W
R7	63-280	49 M " ¼W
R8	63-366	200 M OHM VOL. CONT.
R9	63-287	700 OHMS ½W
R10	63-278	99 M " ¼W
R12	63-326	4 M " ¼W
R13	11-9	90 OHM RES. CORD
R14	63-372	50 M OHMS ¼W
R15	63-244	500 " ¼W
R16	63-374	50 " 2W

1	S-3122	ANT. COIL ASSEM.
2	S-3124	DET. " "
3	S-3121	H.F. OSC. COIL "
4	S-3123	B'DC'ST OSC. COIL ASSEM.
5	95-247	1ST. I.F. TRANSF.
6	95-248	2ND I.F. "
7	49-93	SPEAKER 3000~ FIELD
8	85-48	TONE CONTROL SWITCH
9	20-71	ANT. CHOKE
10	20-76	R.F. PLATE IMPEDANCE COIL
11	95-249	POWER FILTER CHOKE
12	85-57	BAND CHANGE SWITCH
13	20-75	WAVE TRAP

I.F. PEAK 252.5 K.C.

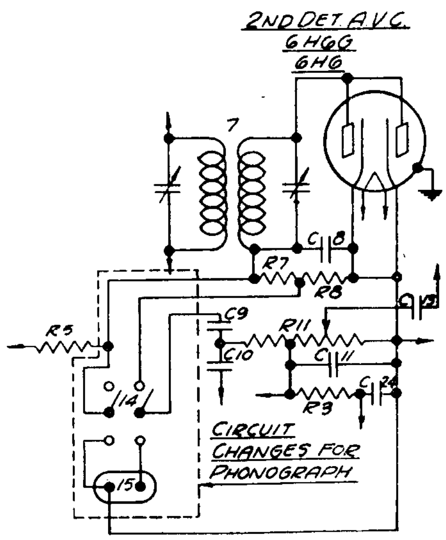
ZENITH RADIO CORP.

Models 10-S-30, 10-S-155, 10-S-156, 10-S-160, 10-S-147, 10-S-153, 10-S-157. (Chassis No. 1004)



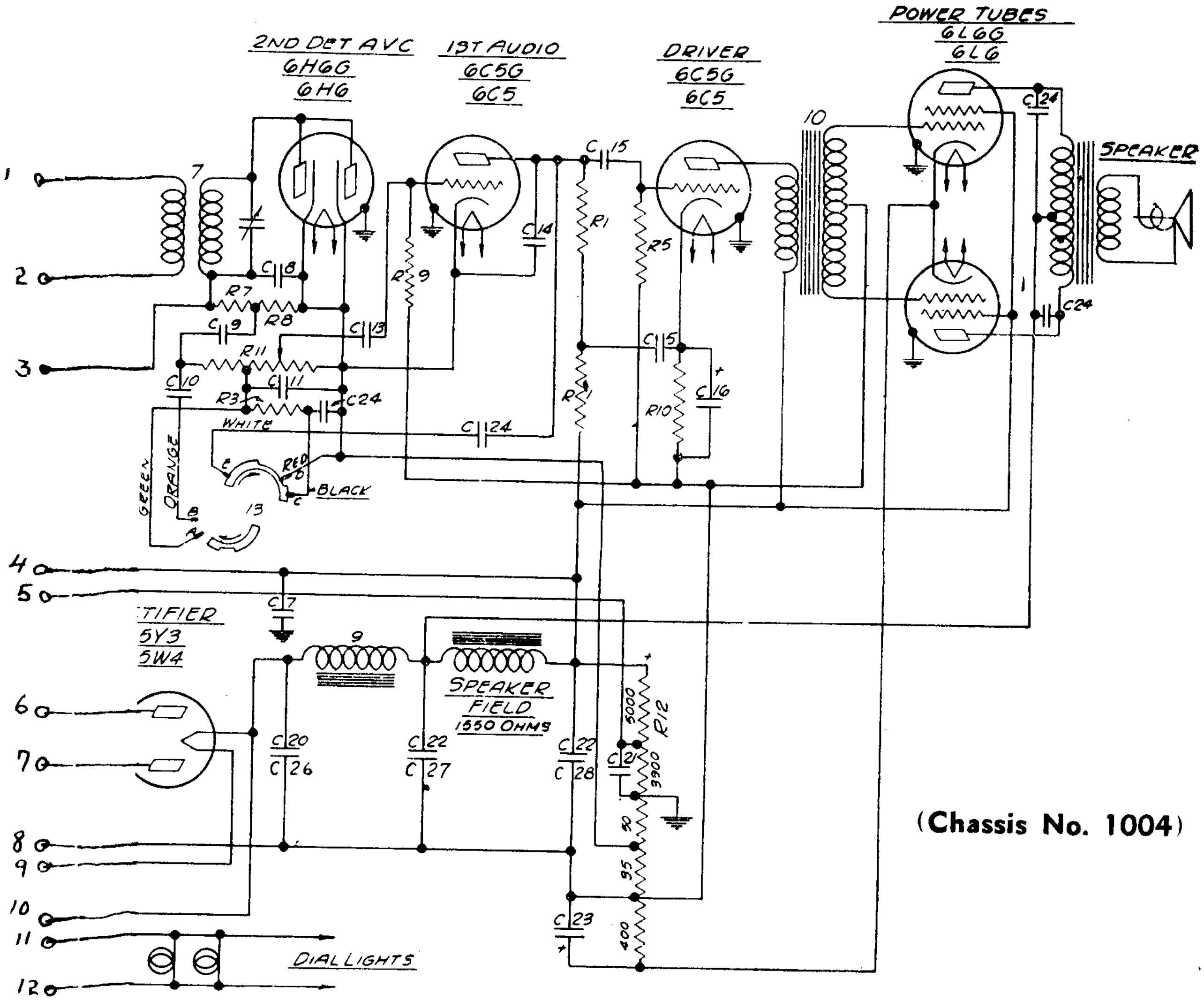
DIAG NO	PART NO	DESCRIPTION		DIAG NO	PART NO	DESCRIPTION	
C1	22-303	5 MMFD	600V	1	20-71	ANTENNA CHOKE	
C2	487	.05 MFD	400V	2	S4419	ANTENNA COIL ASSEM	
C3	224	.1 MFD	300V	3	122-13	TUNING METER	
C4	127	25 MMFD	600V	4	S4421	OSCILLATING COIL ASSEM	
C5	170	1 MFD	400V	5	S4420	DETECTOR COIL ASSEM	
C6	436	.0012 MFD	600V	6	95-353	1ST I.F. TRANSFORMER	
C7	243	.01 MFD	400V	7	95-354	2ND I.F. TRANSFORMER	
C8	289	50 MMFD	600V	8	20-135	R F PLATE CHOKE	
C9	250	.05 MFD	200V	9	95-356	POWER CHOKE	
C10	182	.00025 MFD	600V	10	95-360	AUDIO TRANSFORMER	
C11	147	.0005 MFD	600V	11	85-93	BAND SELECTOR SWITCH	
C12	485	.005 MFD	600V	12	85-91	SENSITIVITY CONT. SWITCH	
C13	188	.02 MFD	400V	13	85-92	TONE CONTROL SWITCH	
C14	162	.0001 MFD	600V	14	85-39	PHONOGRAPH SWITCH	
C15	435	.02 MFD	600V	15	44-7	PHONOGRAPH JACK	
C16	507	10 MFD DRY ELEC. COND	25V	16	95-355	POWER TRANS 115V 50-60 CYCLE	
C17	384	.0015 MFD	600V		95-365	POWER TRANS 25 CYCLE - ALL VOLTAGE	
C18	205	200-550 MMFD OSC PADDER					
C19	488	3 GANG VARIABLE COND					
C20	504	8 MFD WET ELEC. COND. 60 CYCLE	450V				
C21	506	16 MFD WET ELEC COND	250V				
C22	493	8 x 8 MFD DRY ELEC. COND 60~	450V				
C23	405	10 MFD DRY ELEC COND	50V				
C24	229	.005 MFD	600V				
C25	408	2-35 MMFD TRIMMER					
R1	63-278	99 M OHMS	1/4 W				
R2	303	700 OHMS	1/4 W				
R3	280	49 M OHMS	1/4 W				
R4	261	9900 OHMS	1/4 W				
R5	293	990 M OHMS	1/4 W				
R6	373	11 M OHMS	1/2 W				
R7	260	100 M OHMS	1/4 W				
R8	385	300 M OHMS	1/4 W				
R9	523	2 MEGOHMS	1/4 W				
R10	300	990 OHMS	1/4 W				
R11	522	2 MEGOHM VOLUME CONT & SW					
R12	516	CANDOHM RESISTOR					
				C26	22-294	16 MFD WET ELEC COND. 25 CYCLE	450V
				C27	22-502	16 MFD DRY ELEC. COND 25 CYCLE	450V
				C28		8 MFD DRY ELEC. COND 25 CYCLE	450V

NOTE — #22-510 8x8x8 MFD DRY ELECTROLYTIC REPLACES #22-493 & #22-506. #22-512 8 MFD DRY ELECTROLYTIC REPLACES #22-504 8 MFD WET ELECTROLYTIC IN MODEL #10 S-147 END TABLE.



ZENITH RADIO CORP.

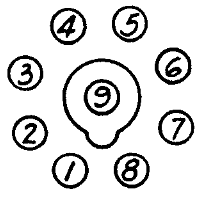
Models 10-S-30, 10-S-155, 10-S-156, 10-S-160, 10-S-147, 10-S-153, 10-S-157.



(Chassis No. 1004)

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	3AC	250	100	0	—	3AC	0	0
6A8	1st Det. Osc.	0	3AC	250	100	−6.5	175	3AC	0	0
6K7	I. F.	0	3AC	250	100	0	—	3AC	Local 9	0
6H6	2nd Det. A.V.C.	0	3AC	−2.5	.25	−2.5	—	3AC	−2.5	—
6C5	1st Audio	0	3AC	45	—	−2	—	3AC	−2.5	—
6C5	Driver	0	3AC	235	—	−2	—	3AC	2	—
6L6	Power	0	3AC	320	120	−4	—	3AC	13	—
6C5	Target Tuning Amp.	0	3AC	250	—	−.5	—	3AC	4	—
5Y3 5W4	Rectifier	0	340	—	AC	—	AC	—	340	—



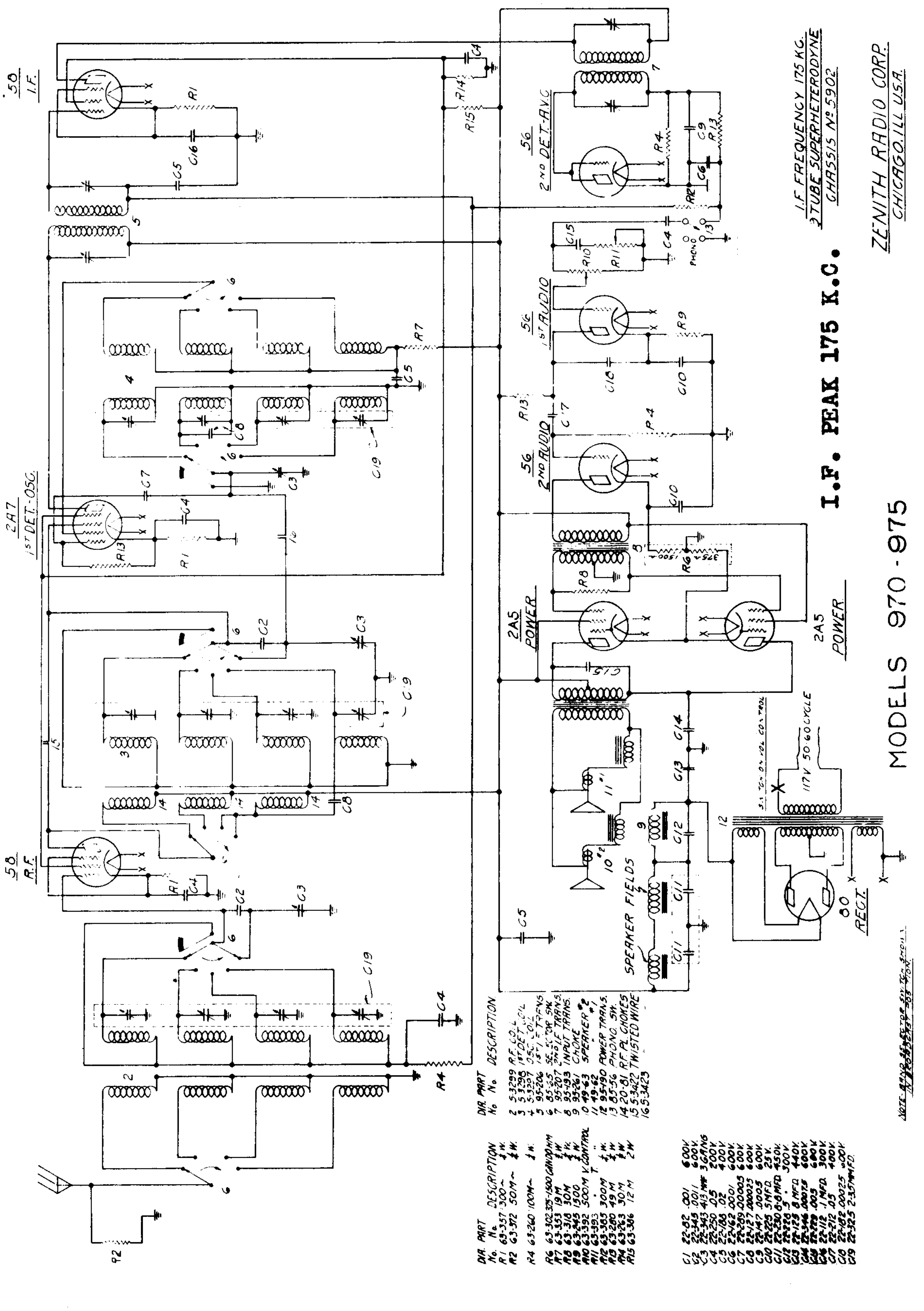
All voltages measured from point indicated to ground, using a 1000 ohm per volt meter. Antenna and ground disconnected.

Line Voltage 112V.

Current Consumption 110 watts.

ZENITH RADIO CORPORATION

MODELS 970 & 975 "CHASSIS 5902"



ZENITH RADIO CORPORATION

MODELS 970 & 975 "CHASSIS 5902"

SERVICE HINTS ON CHASSIS 5902

Hums - Defective 56, 2A5 or 58 tube. Open condenser or defective filter. Yellow and white resistor shorted to brown, white tip, orange, at band switch.

Cuts out - No plate click on 2A5 when tube is removed from socket. Check bias candohm resistor R6 for open.

Audio howl or tendency to oscillate at center of volume control, particularly on end of one of the S.W. bands caused by coupling of #2 I.F. red plate wire. Remove the wire from aeroplane lug at .02 condensers. Lengthen I.F. wire about 2 inches and re-route this wire on other side of 8 mfd. condenser, connecting to plate choke. This places I.F. in the same circuit but reduces coupling tendency. May be necessary to repeak I.F.

Weak on C band - Open one 22-224.

Dead on B.C. - 58 Grid cap - 1st R.F. will read approximately 10,000 ohms to ground. Signal will come through if aerial is placed on grid of 58 R.F. tube. This is very difficult to locate, band switch has high resistance short across red R.F. coil lug to 9900 ohm resistor lug, may be necessary to replace band switch.

Set smokes - Grounded filament or 300 ohm across .1 is shorted to 22-188 - .02 condenser in I.F. plate circuit.

Distorted - Check tubes and speaker, balance, resistors and bypass condensers. If voltage across red black speaker wires read approximately 160 instead of 120 volts, and 1 - 2A5 excessively hot, check bias candohm for ground on both ends. Also check push-pull transformer for open or short.

Weak 9 Megacycles - D band - Check for open or leaky .0011 micamold on band switch.

Noisy on S.W. - Check static shields making contact with gang, poor contact on Band Switch.

Mushy on full volume. Tendency to oscillate on edge of carrier. Check C9 .0005 micamold condenser for open.

Dead, or very distorted on strong signal only. Check for open R4 100,000 ohm resistor on 56 tube - 2nd detector and A.V.C.

Weak and distorted - Check R 13 49,000 ohms for open.

Too much audio hiss and flutter on broadcast, .005 - C15 across 2A5 open. Weak audio if condenser is shorted or leaky.

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
58	R.F.	2.6	A 14 B 9.5 C 3 D 3	0	110	A 14 B 9.5 C 3 D 3	250
2A7	1st Det.	2.6	3	0	110	-	250
	Osc.			-1	-	-	180
58	I.F.	2.6	2.8	0	110	2.8	250
56	2nd Det.	2.6	0	0	-	-	0
56	1st Aud.	2.6	6	0	-	-	120
56	2nd Aud.	2.6	13.5	0	-	-	250
2A5	PWR.	2.6	18	0	250	-	250
2A5	PWR.	2.6	18	0	250	-	250
80	Rect.	4.6	-	-	-	-	-

Line 116 V. Antenna and Ground Disconnected

F - filament; K - cathode; G1 - control grid; G2 - screen grid; G3 - suppressor grid; P - plate.

ALIGNMENT PROCEDURE

A suitable high frequency service oscillator capable of excellent atenuation is required and no adjustments should be made without one. Separate coils are used for each band. Mounted on the coils are individual trimmers that align each band, independent of the other bands.

(I.F.) - Connect 175 K.C. service oscillator to grid of 6A7 and chassis ground. Adjust I.F. trimmers to point of maximum output.

(A) - Set service oscillator at 1400 K.C. and connect to antenna and ground leads. Place pointer at 1400 K.C. on dial and first adjust top trimmer on oscillator coil, then top trimmer on detector coil and top trimmer on R.F. coil to resonance. There is no 600 K.C. adjustment necessary.

(B) - Set service oscillator at 3 megacycles. Adjust second from top trimmer on oscillator coil to secure correct dial reading. Adjust second from top trimmers on detector and R.F. coils to resonance.

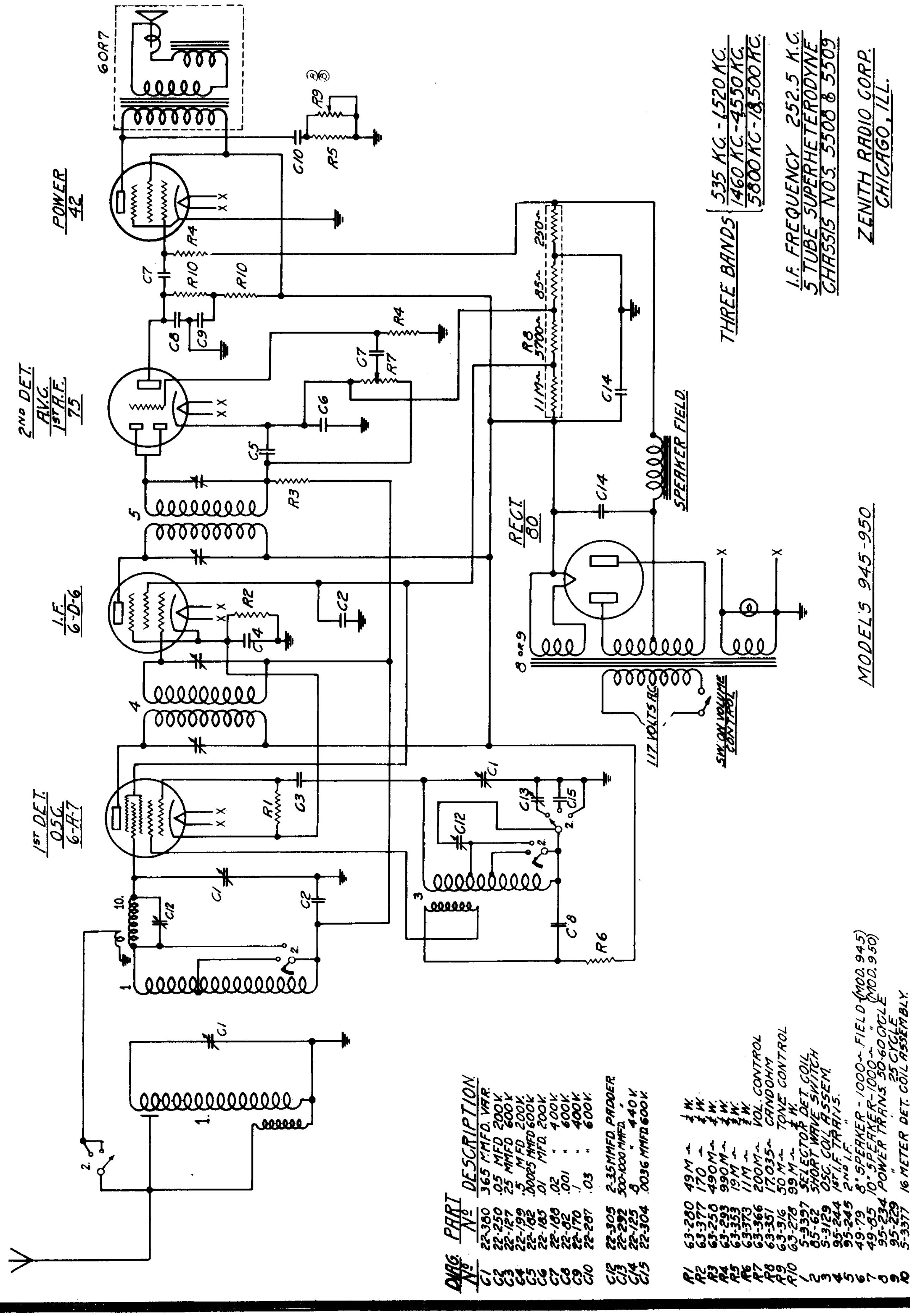
(C) - Set service oscillator at 6 megacycles. Adjust third from top trimmer on oscillator coil to secure correct dial reading. Adjust third from top trimmers on detector and R.F. coils to resonance.

(D) - Set service oscillator at 18 megacycles. Adjust bottom trimmer on oscillator coil to secure correct dial reading. Adjust bottom trimmers on detector and R.F. coils to resonance. Check for scale at 9 megacycles, if off, either twist or untwist blue wire loop on rear section of gang-switch and rebalance.

NOTE: It may be possible to obtain two settings on the oscillator and detector trimmers, particularly on bands C and D. If this occurs the oscillator should always be left on the loosest setting and the detector on the tightest one. Otherwise, reception over the band will be very erratic.

ZENITH RADIO CORPORATION

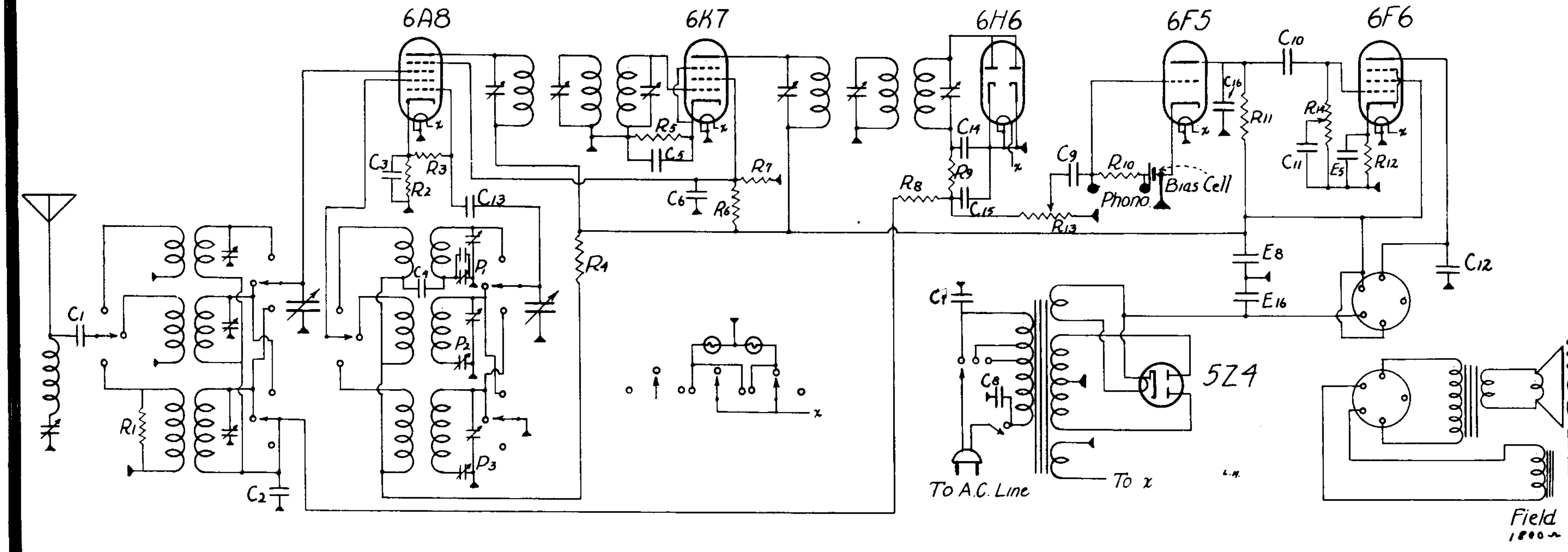
MODELS 945-950 CHASSIS 5508-5509



DIAG. No	PART No	DESCRIPTION
C1	22-380	365 MMFD. VAR.
C2	22-250	.05 MFD 200V.
C3	22-127	25 MMFD 600V.
C4	22-199	.5 MFD 200V.
C5	22-182	.00025 MMFD 600V.
C6	22-185	.01 MFD. 200V.
C7	22-188	.02 " 400V.
C8	22-82	.001 " 600V.
C9	22-170	.1 " 400V.
C10	22-287	.03 " 600V.
C12	22-305	2-35 MMFD. PADDER.
C13	22-292	500-1000 MMFD. "
C14	22-125	.8 " 440V.
C15	22-304	.0036 MMFD. 600V.
R1	63-280	49M~ 1/4 W.
R2	63-377	170~ 1/4 W.
R3	63-258	490M~ 1/4 W.
R4	63-293	990M~ 1/4 W.
R5	63-353	19M~ 1/2 W.
R6	63-373	11M~ 1/2 W.
R7	63-366	200M~ VOL. CONTROL
R8	63-351	17,035~ CANDOHM
R9	63-316	50M~ TONE CONTROL
R10	63-278	99M~ 1/4 W.
1	S-3397	SELECTOR DET. COIL
2	85-62	SHORT WAVE SWITCH
3	S-3129	OSC. COIL ASSEM.
4	95-244	1ST I.F. TRANS.
5	95-245	2ND I.F. "
6	49-79	8" SPEAKER - 1000~ FIELD (MOD. 945)
7	49-85	10" SPEAKER - 1000~ " (MOD. 950)
8	95-234	POWER TRANS. 50-60 CYCLE
9	95-229	" " 25 CYCLE
10	S-3377	16 METER DET. COIL ASSEMBLY.

AIR-KING PRODUCTS COMPANY, INC.

MODEL 6E



R 1 -	15,000	ohms	-	1/4 w.
R 2 -	300	"	-	"
R 3 -	50,000	"	-	"
R 4 -	20,000	"	-	1/2 w.
R 5 -	400	"	-	1/4 w.
R 6 -	25,000	"	-	2 w.
R 7 -	40,000	"	-	1/2 w.
R 8 -	1,000,000	"	-	1/4 w.
R 9 -	60,000	"	-	"
R 10 -	1,000,000	"	-	"
R 11 -	500,000	"	-	"
R 12 -	400	"	-	1 w.
R 13 -	500,000	"	-	vol. cont.
R 14 -	500,000	"	-	tone cont.

P 1 -	.0027	max.
P 2 -	.0005	max.
P 3 -	.00015	max.

E 5 -	5 mfd.	- 35 v.
E 8 -	8 mfd.	- 400 v.
E 16 -	16 mfd.	- 450 v.

C 1 -	.005	- 600 v.
C 2 -	.05	- 400 v.
C 3 -	.1	- 200 v.
C 4 -	.02	- 400 v.
C 5 -	.1	- 200 v.
C 6 -	.1	- 200 v.
C 7 -	.05	- 400 v.
C 8 -	.05	- 400 v.
C 9 -	.02	- 400 v.
C 10 -	.02	- 400 v.
C 11 -	.005	- 600 v.
C 12 -	.005	- 600 v.
C 13 -	.000085	- mica
C 14 -	.0001	- mica
C 15 -	.0001	- mica
C 16 -	.0001	- mica

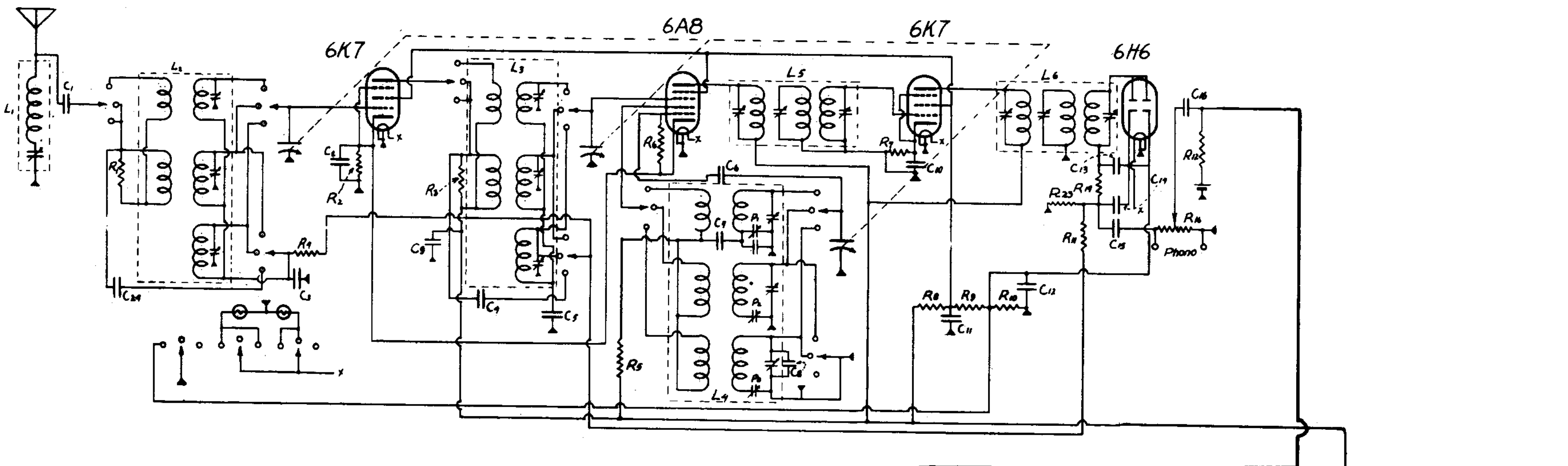
ANTENNA AND GROUND CONNECTIONS. An antenna from 50 to 100 feet long is recommended. A good ground wire is absolutely essential on this receiver.

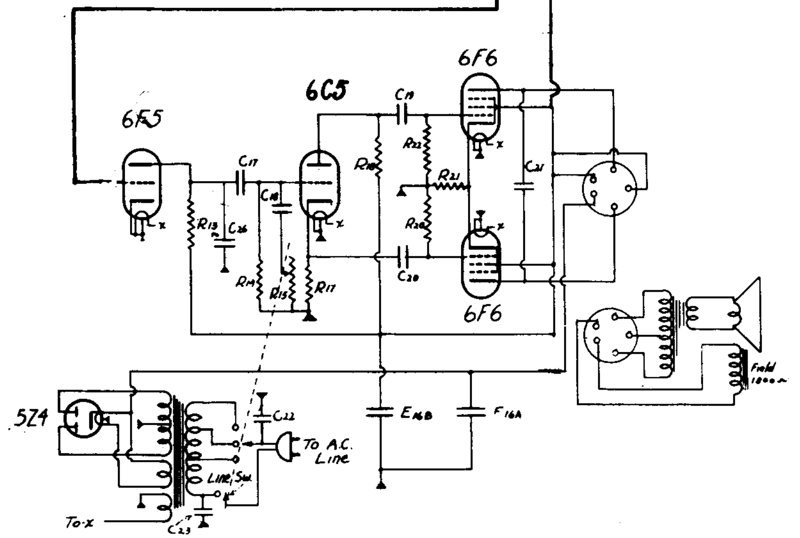
POWER SUPPLY. This receiver is designed to operate from the 115-135 or 220 A.C. 50 cycle lines. The voltage change is accomplished by removing the cover from the power transformer and connecting the flexible lead to the desired voltage terminal.

LOCATION OF CONTROLS. The knob on the lower right is the on-off switch and the tone control. The knob on the lower left is the volume control and the knob directly below the selector knob is the wave change switch.

OPERATION. Turn station selector knob to secure desired stations. When tuning in a set, set tuning control carefully to maximum station volume, then adjust volume to desired level with volume control knob.

AIR-KING PRODUCTS COMPANY, INC.
MODEL 9E





R 1 -	15,000 ohms	- 1/4 w.	
R 2 -	200	" -	"
R 3 -	25,000	" -	"
R 4 -	300,000	" -	"
R 5 -	20,000	" -	1/2 w.
R 6 -	50,000	" -	1/4 w.
R 7 -	400,000	" -	"
R 8 -	10,000	" -	3 w.
R 9 -	15,000	" -	3 w.
R 10 -	650	" -	1 w.
R 11 -	1,000,000	" -	1/4 w.
R 12 -	1,000,000	" -	"
R 13 -	500,000	" -	"
R 14 -	500,000	" -	"
R 15 -	500,000	" -	tone cont.
R 16 -	500,000	" -	vol. cont.
R 17 -	60,000	" -	1/4 w.
R 18 -	60,000	" -	"
R 19 -	60,000	" -	"
R 20 -	500,000	" -	"
R 21 -	310	" -	2 w.
R 22 -	500,000	" -	1/4 w.
R 23 -	500,000	" -	"

P 1 -	.005	max.
P 2 -	.0005	max.
P 3 -	.00015	max.

C 1 -	.005	- 600 v.
C 2 -	.1	- 200 v.
C 3 -	.05	- 400 v.
C 4 -	.0005	- mica
C 5 -	.05	- 400 v.
C 6 -	.000085	- mica
C 7 -	.05	- 400 v.
C 8 -	.00002	- mica
C 9 -	.02	- 400 v.
C 10 -	.1	- 200 v.
C 11 -	.1	- 200 v.
C 12 -	.1	- 200 v.
C 13 -	.0001	- mica
C 14 -	.0001	- mica
C 15 -	.02	- 400 v.
C 16 -	.02	- 400 v.
C 17 -	.02	- 400 v.
C 18 -	.005	- 600 v.
C 19 -	.02	- 400 v.
C 20 -	.02	- 400 v.
C 21 -	.0025	- 600 v.
C 22 -	.05	- 400 v.
C 23 -	.05	- 400 v.
C 24 -	.0008	- mica
C 25 -	.02	- 400 v.
C 26 -	.0001	- mica
E 16A -	16 mfd.	- 450 v.
E 16B -	16 mfd.	- 350 v.

ANTENNA AND GROUND CONNECTIONS. An antenna from 50 to 100 feet long is recommended. A good ground wire is absolutely essential on this receiver.

POWER SUPPLY. This receiver is designed to operate from the 115-135 or 220 A.C. cycle lines. The voltage change is accomplished by removing the cover from the power transformer and connecting the flexible lead to the desired voltage terminal.

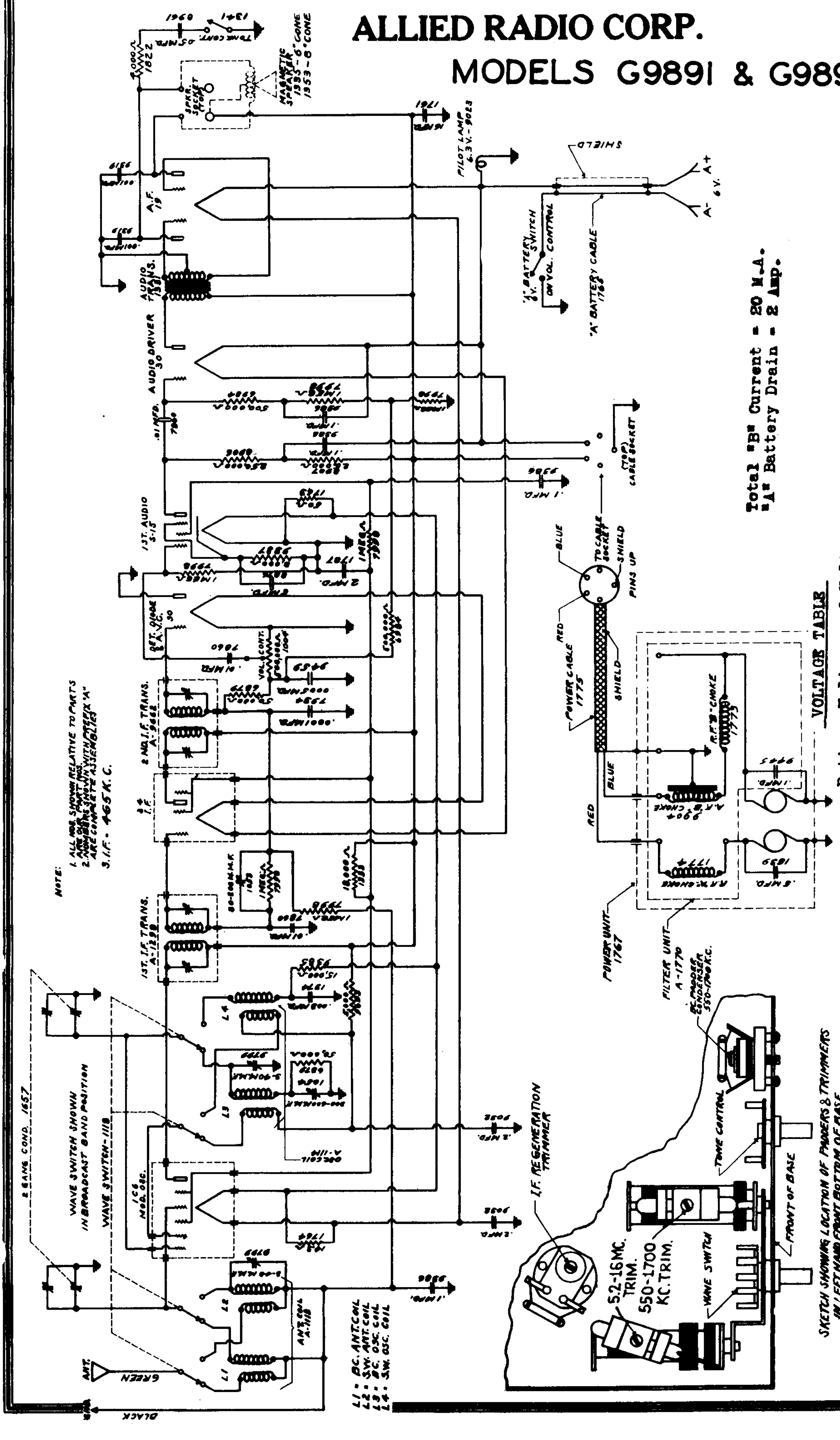
LOCATION OF CONTROLS. The knob on the extreme left is the on-off switch and tone control. The knob on the extreme right is the interchannel noise suppressor switch. The other lower knobs are wave change switch and volume control.

OPERATION. Turn station selector knob to secure desired stations. When tuning in a station, set tuning control carefully to maximum station volume, then adjust volume to desired level with volume control knob. When the knob on extreme right is turned clockwise, the noise suppressor functions. This control is only effective on high wave stations.

I.F. PEAK 456 K.C.

ALLIED RADIO CORP.

MODELS G9891 & G9892



Total "B" Current = 20 M.A.
"A" Battery Drain = 2 Amp.

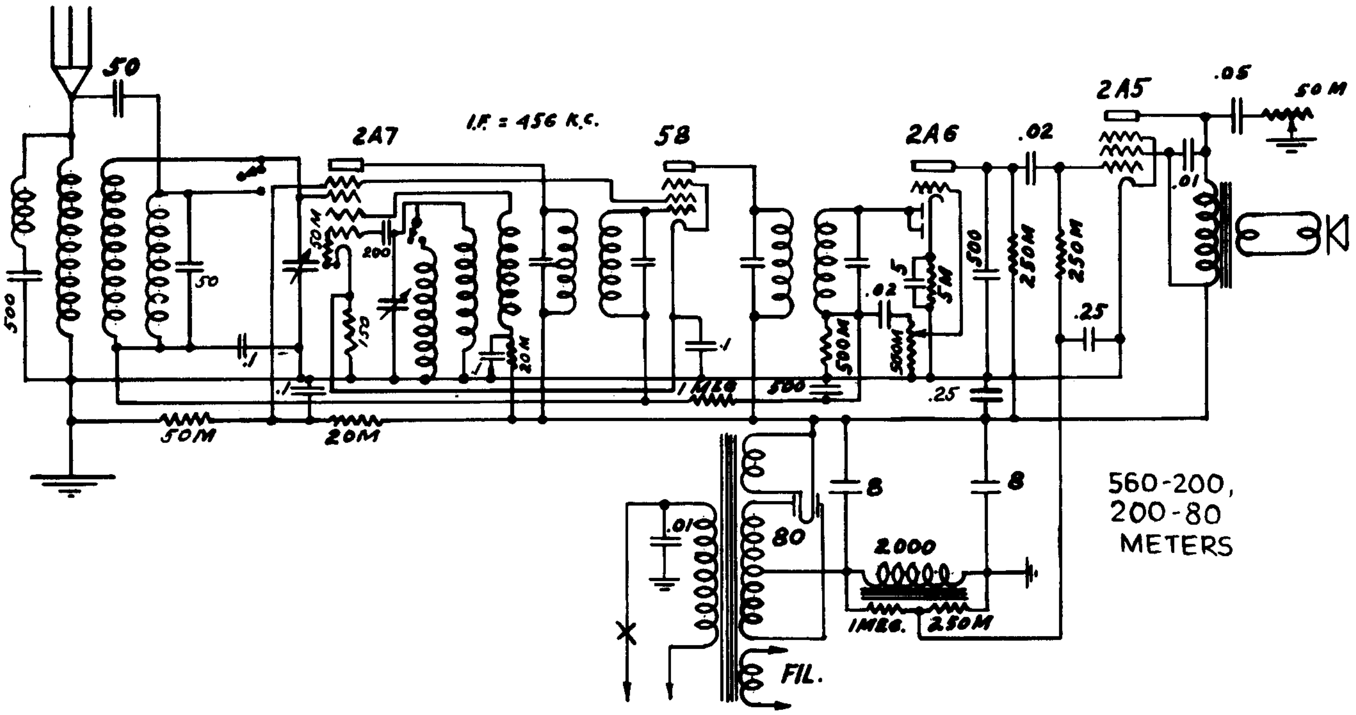
VOLTAGE TABLE

Battery Voltage - 6 Volts
Wave Band - Broadcast

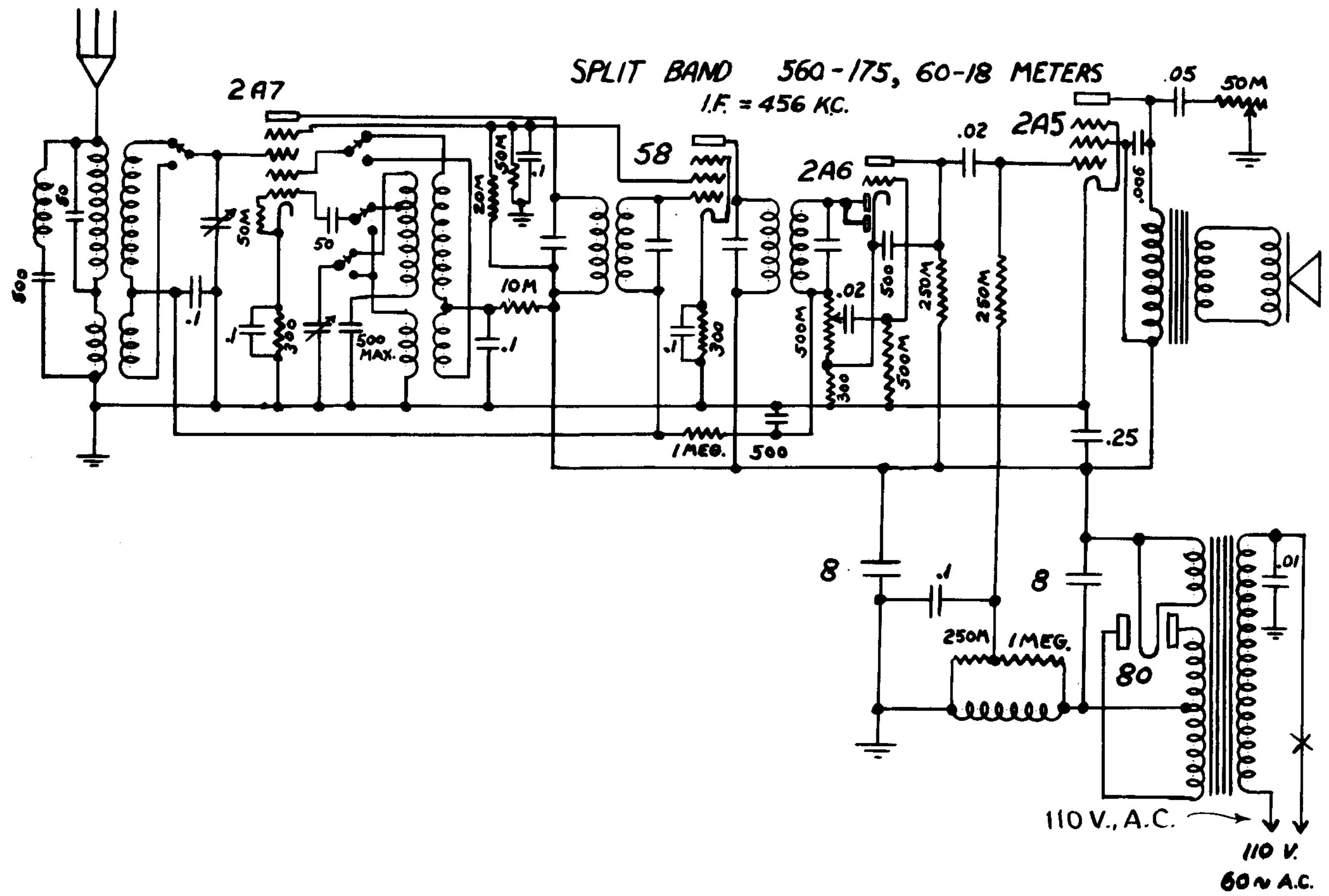
TUBE		FILAMENT	PLATE	SCREEN	GRID NO.1	GRID NO.2	GRID NO.3 & 5
1C6	1st Detector & Oscillator	2	135	70	3.5	110	70
34	I.F. Amplifier	2	135	70			
30	2nd Detector & A.V.C.	2					
15	1st Audio	2	33*	12*			
30	Audio Driver	2	125				
19	Output	2	135 each plate				

ALLIED RADIO CORP.

MODELS 52 & F9685

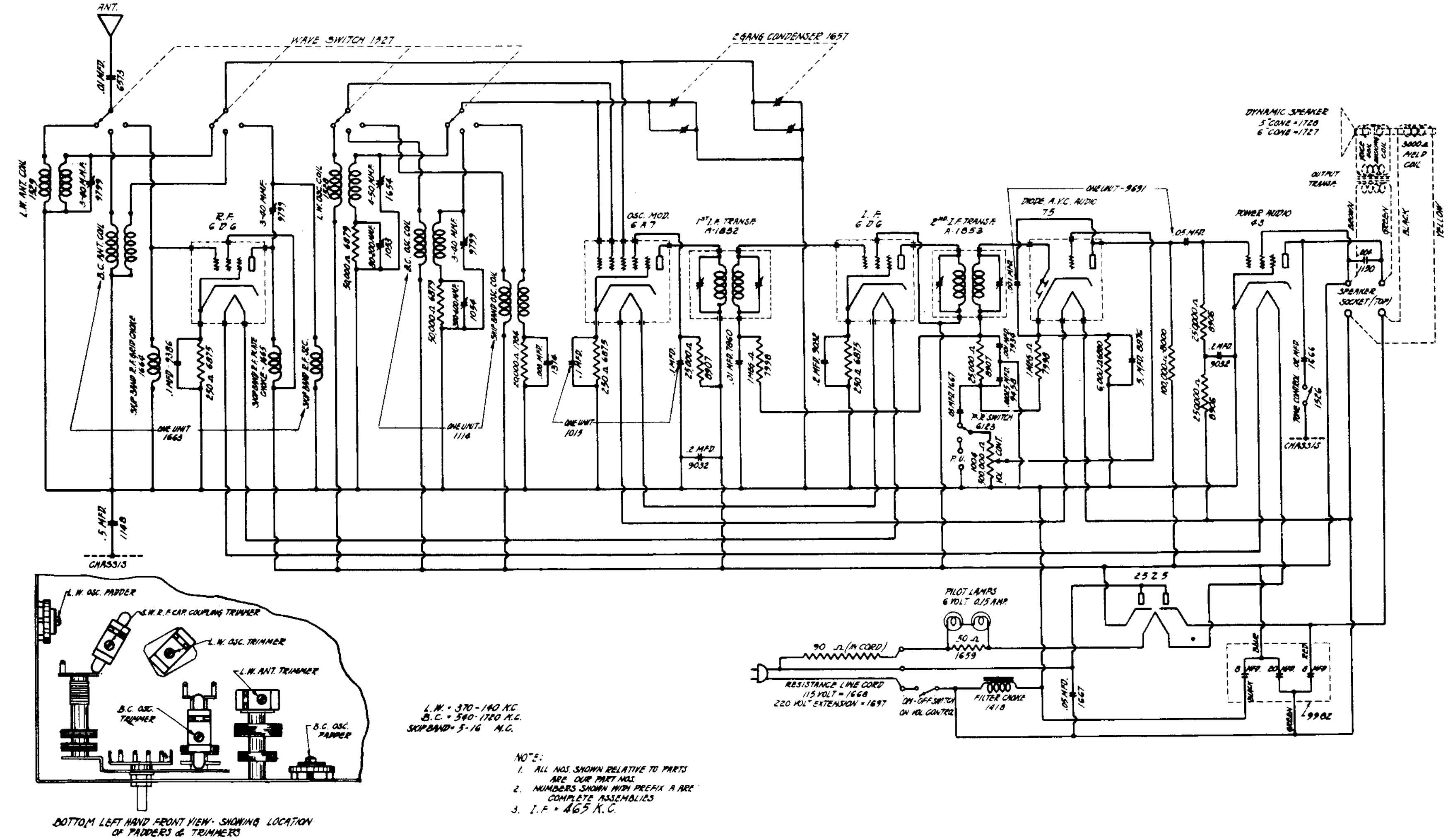


MODELS 53 & F9687



ALLIED RADIO CORP.

MODEL G9885



VOLTAGE TABLE

Line Voltage: 115 — Volume Control: Full on — Wave Band: 1715-535 K.C.Band

TUBE		FILAMENT	PLATE	SCREEN	CATHODE	G.2	G.3 & 5
6A7	Oscil. & 1st Det.	6	110	60	1.2	100	60
6D6	R.F.	6	110	110	2.5		
6D6	I.F.	6	110	110	2.5		
75	2nd Det. & AVC & 1st A.F.	6	60*		.75		
43	Output	25	95	110	20**		
2525	Rectifier	25	78 M.A.Total drain both cathodes.				

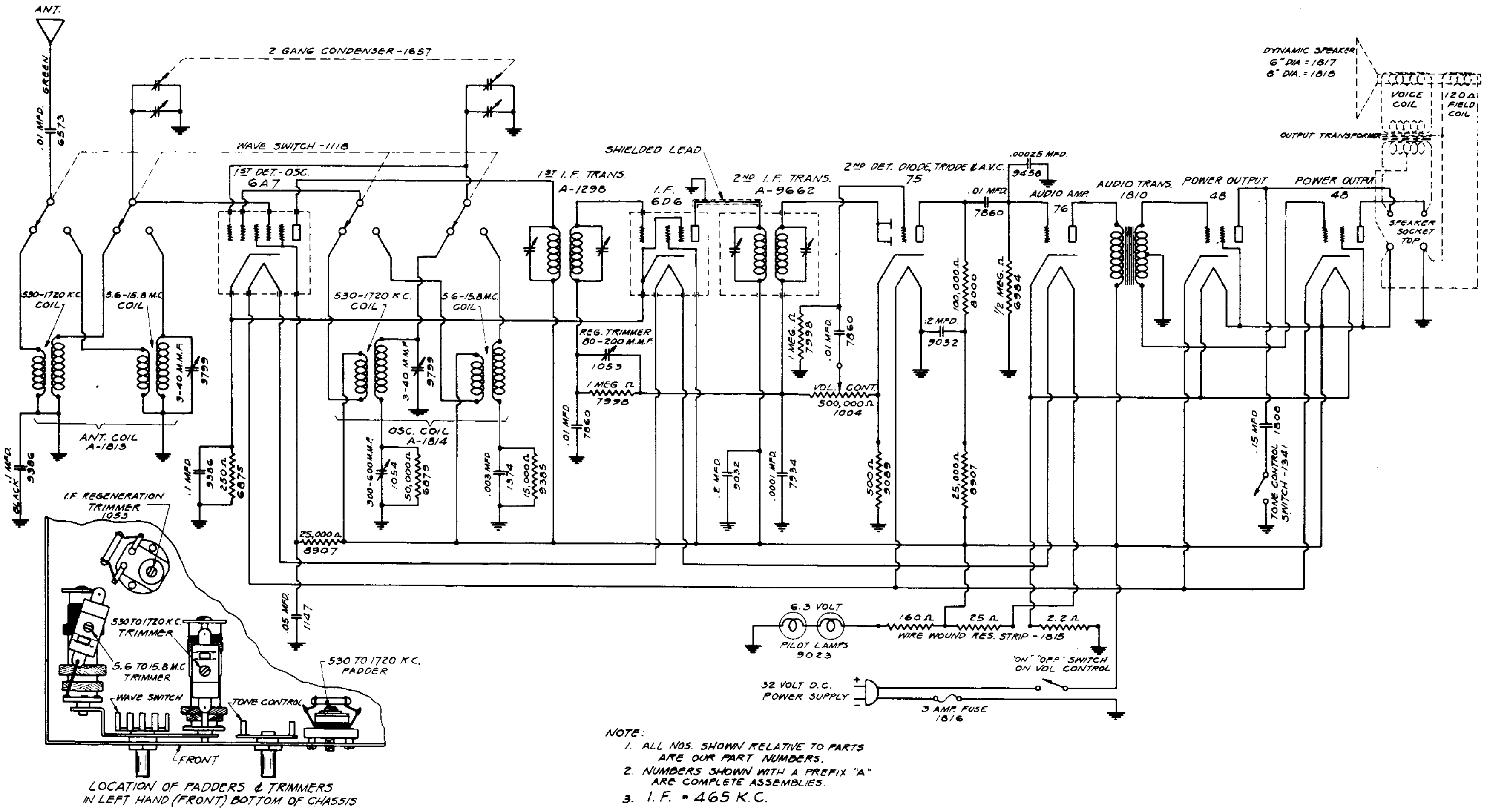
Read all voltages from socket to chassis ground with 1000 ohm per volt voltmeter.

* Triode plate. Comparative voltage only.

** Bias is obtained by the voltage drop across choke. Read from cathode to negative side of filter choke.

ALLIED RADIO CORP.

MODEL G9888



NOTE:
1. ALL NOS. SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
2. NUMBERS SHOWN WITH A PREFIX "A" ARE COMPLETE ASSEMBLIES.
3. I.F. = 465 K.C.

VOLTAGE TABLE

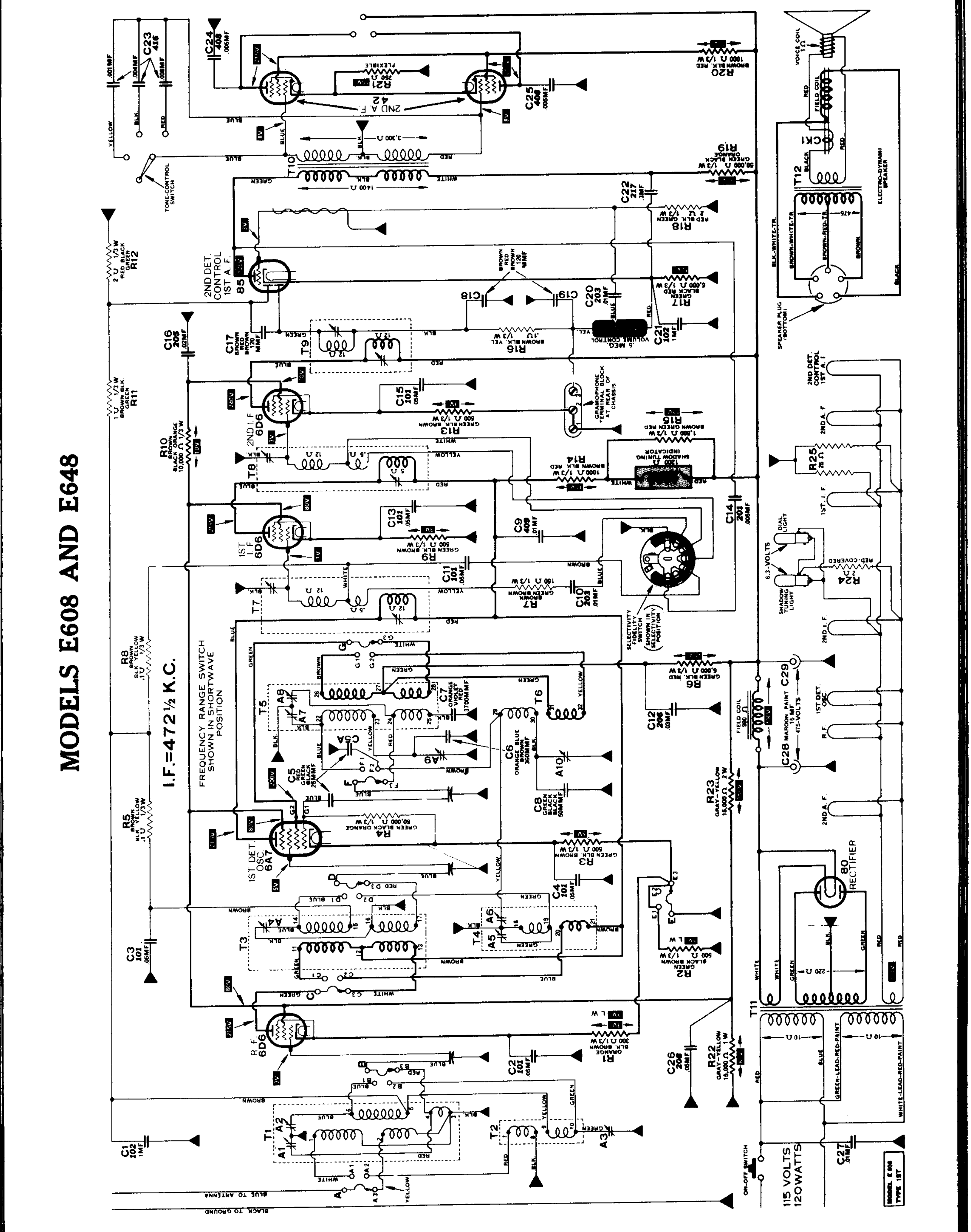
Battery Voltage - 32 volts — Wave Band - Broadcast

TUBE		FILAMENT	PLATE	SCREEN	CATHODE	G.2	G.3 & 5
6A7	1st Det. & Oscil.	6	32		.5	32	15
6D6	I.F. Amplifier	6	32	32	.6		
75	2nd Det. & A.V.C.	6	5*				
76	1st Audio	6	30				
48	Output	6	30	32	5		
48	Output	6	30	32	5		

* Triode plate comparative voltage only. Read all voltages from socket to chassis.

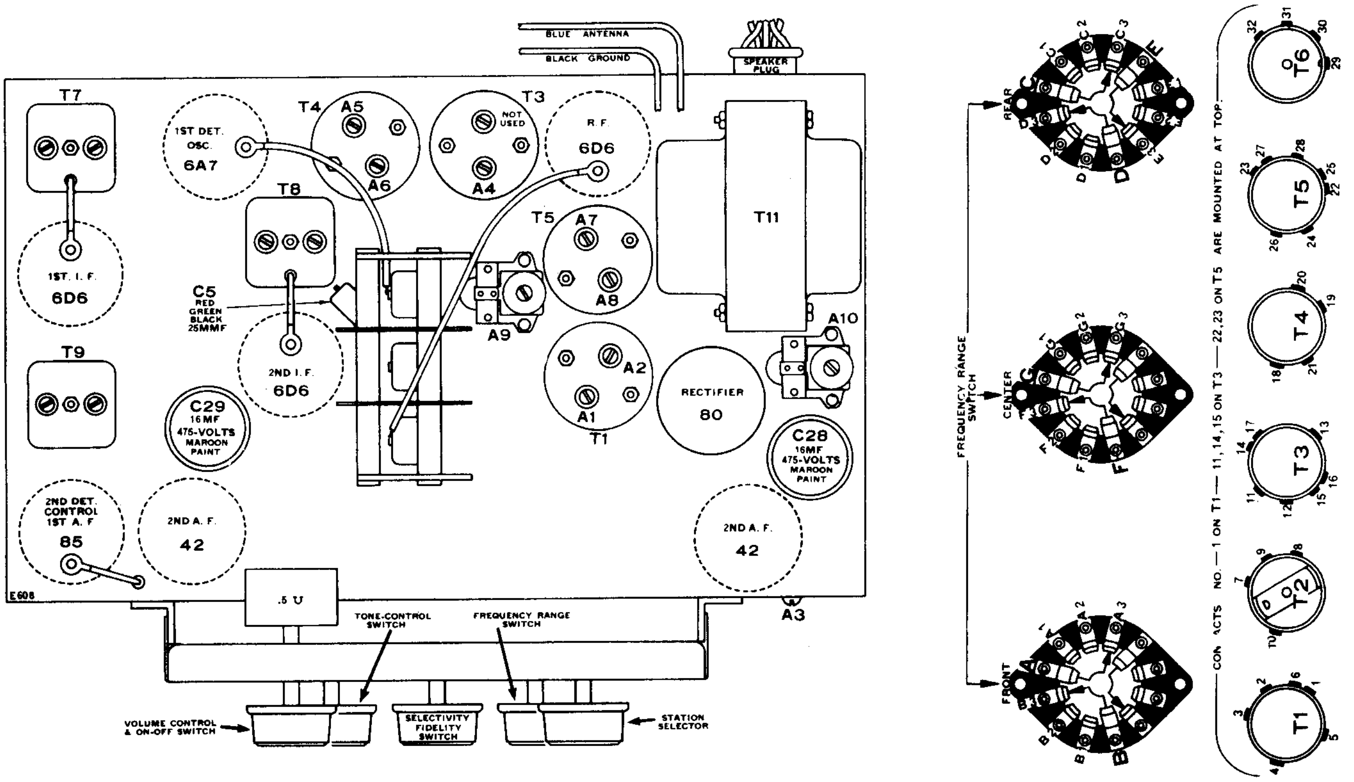
ATWATER KENT MFG. CO.

MODELS E608 & E648



ATWATER KENT MFG. CO.

MODELS E608 AND E648



ADJUSTING TRIMMER CONDENSERS

Turn volume on full, turn tone control to "high", and turn switch to "selectivity." Use the weakest possible signal that will give a reading on a sensitive output meter.

I. F. TRIMMERS.

Connect I. F. test oscillator (472½ KC) to 2nd-I. F. grid by means of the regular I. F. coupling unit No. 42590. Peak two trimmers on top of T9.

Connect I. F. oscillator to 1st-I. F. grid. Peak two trimmers on T8.

Connect I. F. oscillator to 1st-detector grid. Peak two trimmers on T7.

DIAL POINTER ADJUSTMENT.

If the dial gear and indicator have not been tampered with, leave them alone; but if they have been changed in any way, reset as follows:

1. Loosen the two set screws which hold pointer gear on condenser shaft.
2. Turn condenser to minimum.
3. See illustration (Fig. 1). Place straight-edge gauge in vertical position with the long flat face against the front mounting plate of the variable condenser as shown. Turn the condenser until the front edge of the rotor spacing bar just touches the straight edge. Hold the condenser in this position and move the pointer arm so the pointer is at 1562 KC, after which tighten the set screws to hold the dial gear securely.
4. Loosen the screws which hold the pointer to the pointer arm, and adjust the pointer so that when the condenser is completely meshed, the pointer is at 535 KC.

Recheck at 1562 KC and repeat procedure 3 and 4, if necessary.

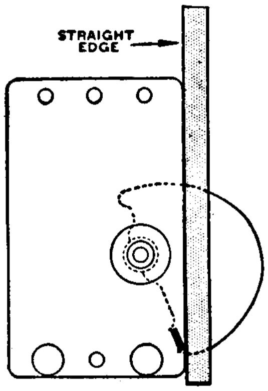


Fig. 1

This illustration shows the correct position of the variable condenser rotor for a dial-pointer setting of 1562 KC. The straight edge is held firmly against the front mounting plate of the variable condenser and the rotor is turned so the spacing bar (shown at lower edge of rotor) is just touching the straight edge. The straight edge is a strip of bakelite or hard rubber ¼" thick, ⅝" wide, and 6" long. The ⅝" side is held against the mounting plate.

R. F. TRIMMERS.

Connect an R. F. test oscillator to the antenna and ground terminals of set. Use the weakest possible oscillator signal that will give a reading on the output meter. Loosen the trimmer screws for the frequency range or ranges that are to be adjusted.

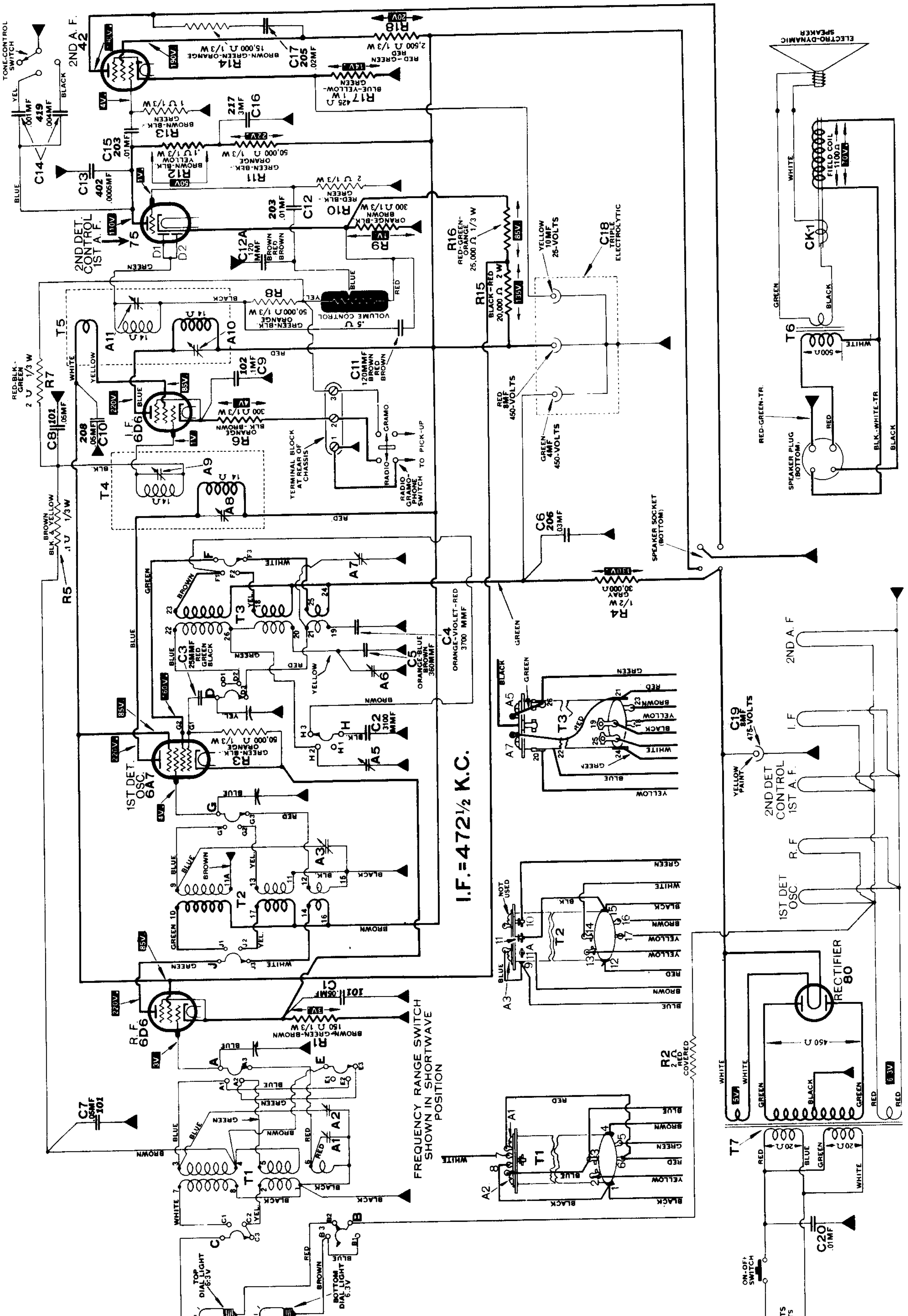
Short-wave range. Oscillator at 18 MC, dial pointer at 18 MC, peak A8 and A1.

Medium-wave range. Oscillator at 1500 KC, dial pointer at 1500 KC, peak A7, A4 and A2. Tune oscillator to 560 KC, turn dial to 560 KC, and peak A9. Repeat adjustment on A7 at 1500 KC, and A9 at 560 KC, if necessary.

Long-wave range. Oscillator at 405 KC, dial pointer at 405 KC, peak A6, A5 and A3. Tune oscillator to 160 KC, turn dial to 160 KC, and peak A10. Repeat adjustments on A6 at 405 KC and A10 at 160 KC, if necessary.

ATWATER KENT MFG. CO.

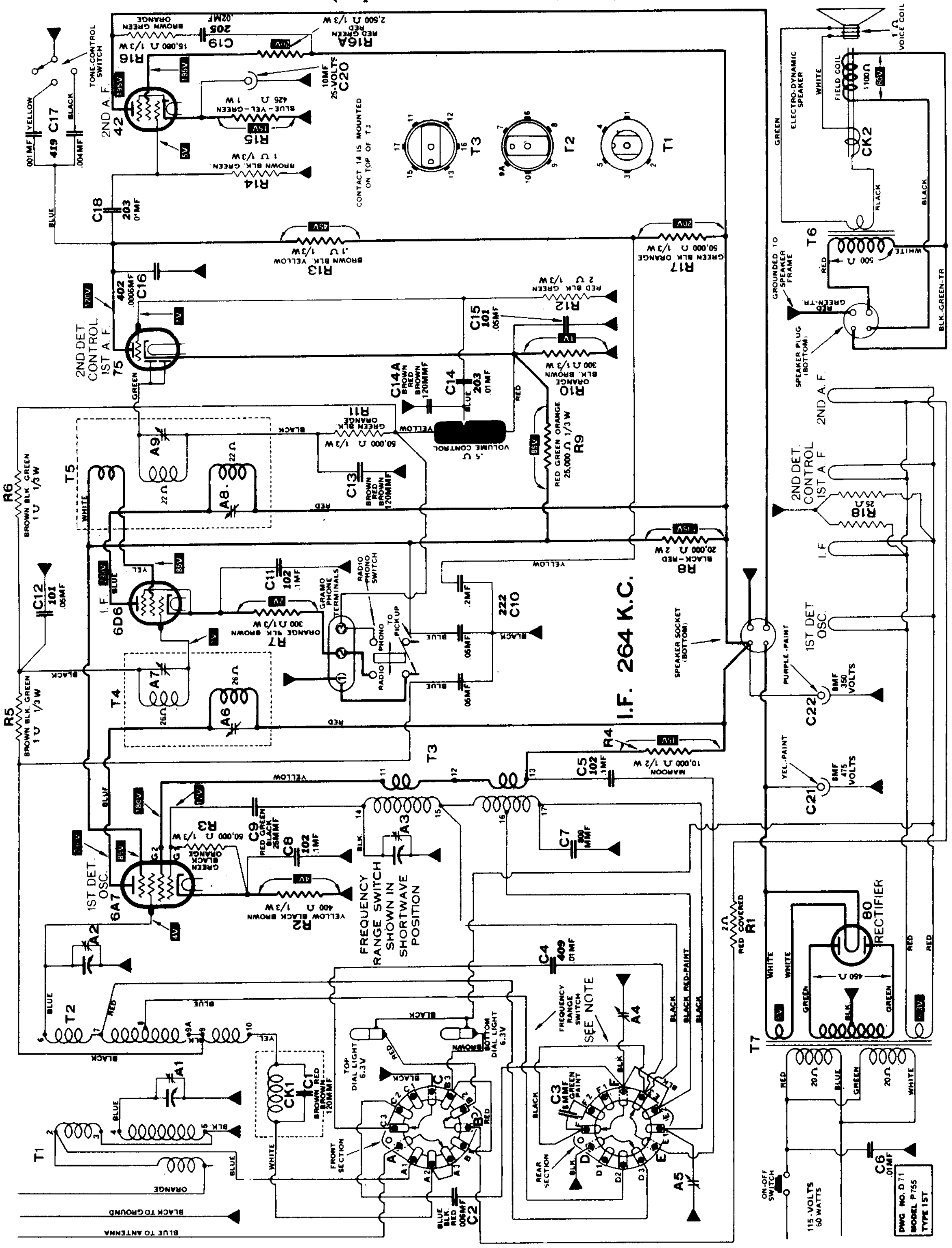
MODELS P216 AND P336



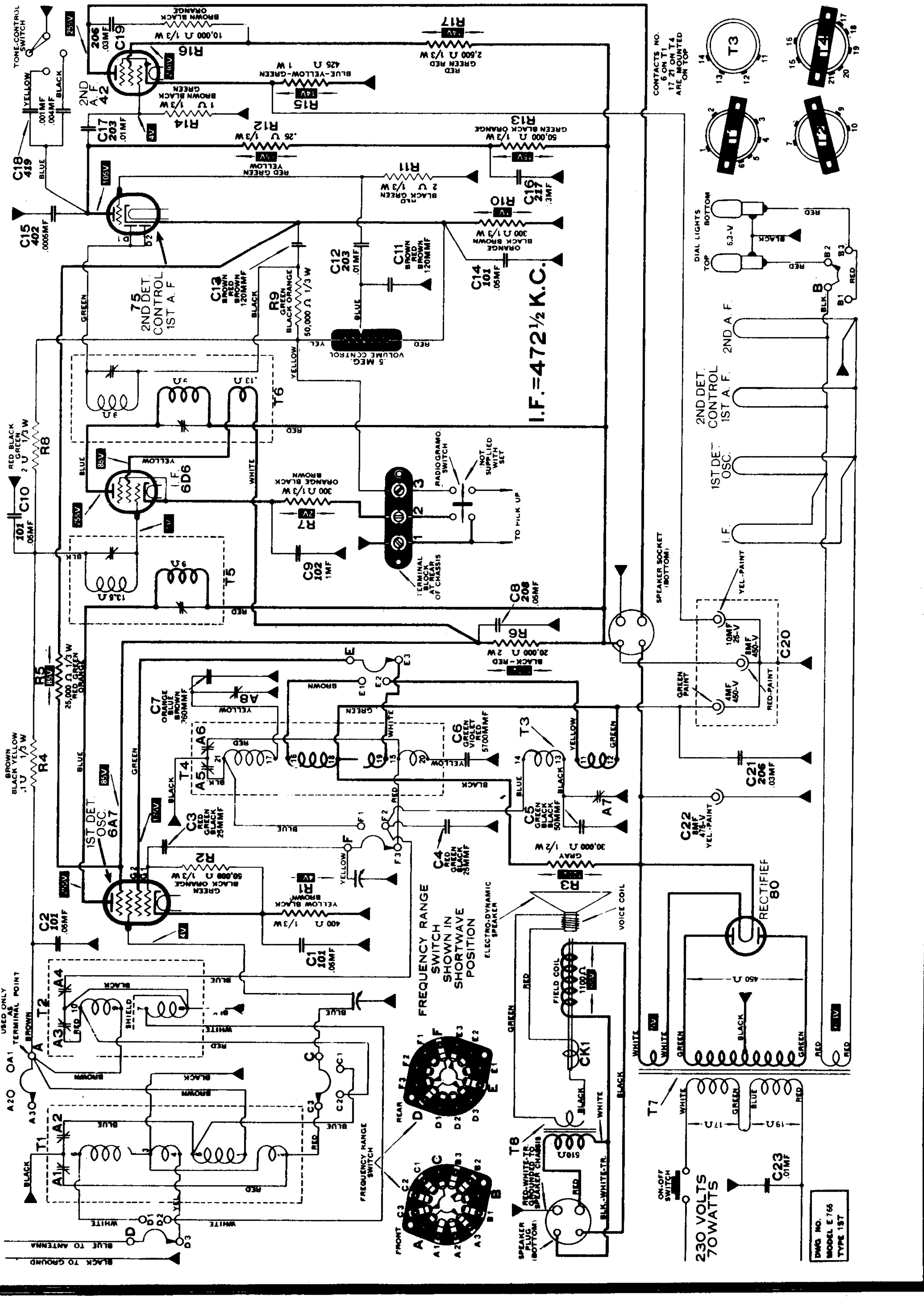
ATWATER KENT MFG. CO.

MODELS P755 AND P875

(Top view and chart on page 4)

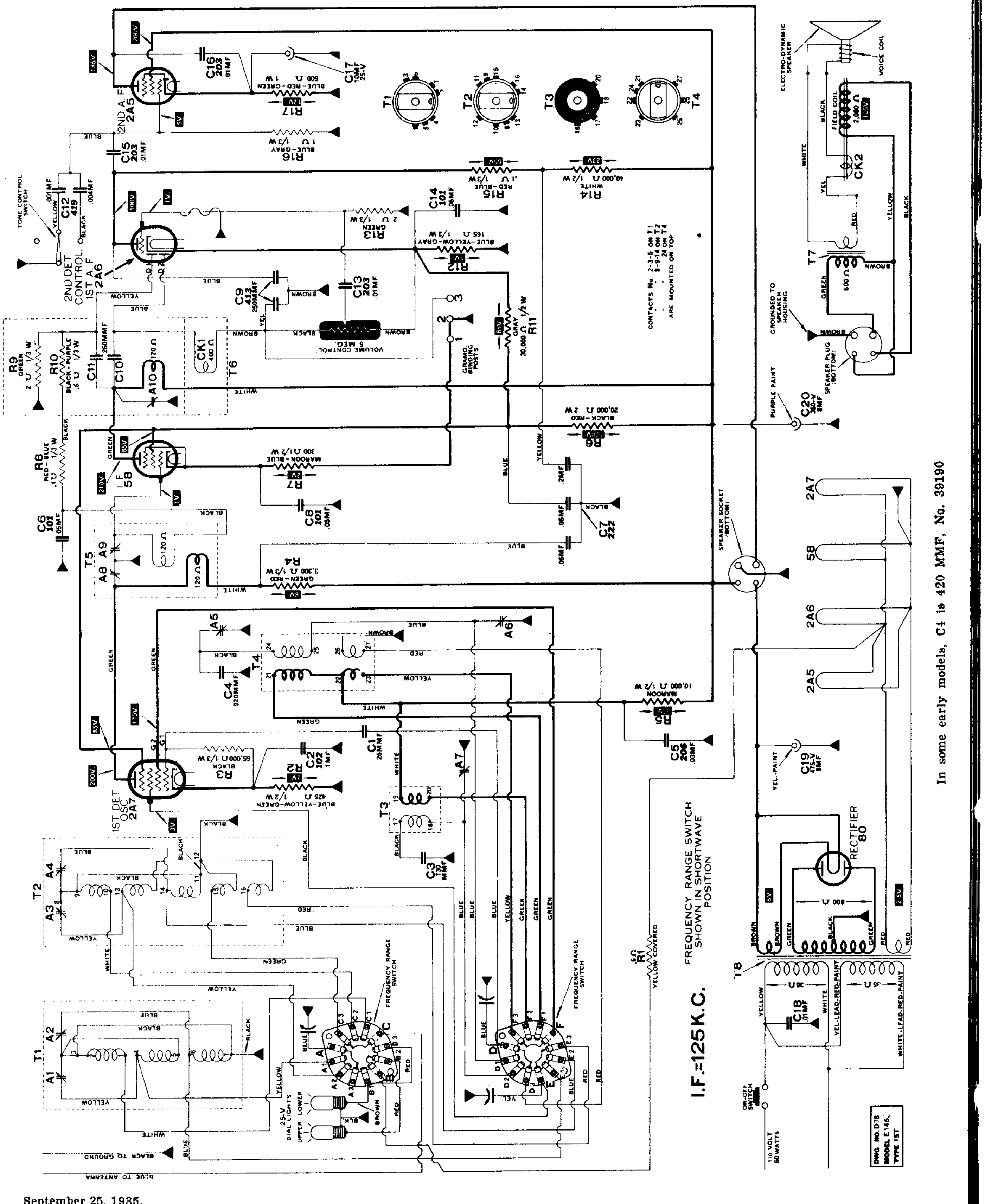


ATWATER KENT MFG. CO.
MODEL E765



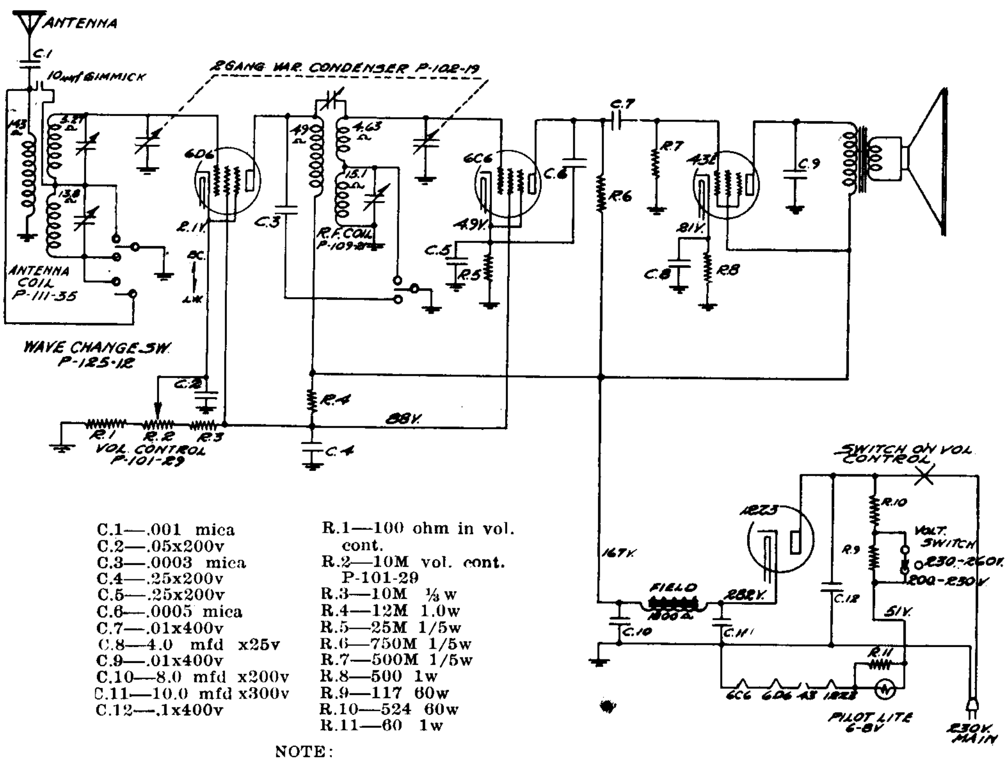
ATWATER KENT MFG. CO.

MODEL E145



September 25, 1935.

BELMONT RADIO CORPORATION
Model 444



C.1—.001 mica	R.1—100 ohm in vol. cont.
C.2—.05x200v	R.2—10M vol. cont. P-101-29
C.3—.0003 mica	R.3—10M 1/3 w
C.4—.25x200v	R.4—12M 1.0w
C.5—.25x200v	R.5—25M 1/5w
C.6—.0005 mica	R.6—750M 1/5w
C.7—.01x400v	R.7—500M 1/5w
C.8—4.0 mfd x25v	R.8—500 1w
C.9—.01x400v	R.9—117 60w
C.10—8.0 mfd x200v	R.10—524 60w
C.11—10.0 mfd x300v	R.11—60 1w
C.12—.1x400v	

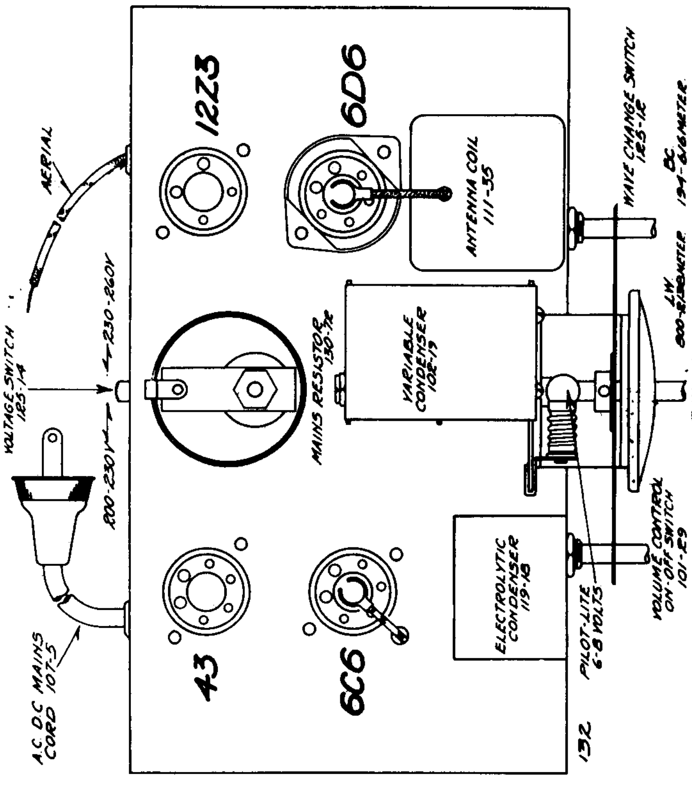
NOTE:

C.4 and C.5 in one unit—P-118-5
C.8, C.10, C.11 in one unit—P-119-18
R.9 and R.10 in one unit—P-130-72
R.8, R.11 in one unit—P-106-22
Voltages taken from points indicated to chassis ground.
Vol. control on full. Line voltage switch at 230-260 v. position.
Numbers prefixed by letter "P" are part nos.
Serial No. 5G130820A and up.

Tuning Range

194— 616 Meters
800—2136 Meters

NOTE:—Buffer Resistor (106-24) of 300 Ohms added in series with cathode of 12Z3 tube not shown on diagram.



SERVICE NOTES

To check for open by-pass condensers, shunt each condenser with another of similar capacity and of the same voltage rating, which is known to be good, until the defective unit is located. Open by-pass condensers frequently cause oscillation and distorted tone. Defective and shorted electrolytic filter condensers cause excessive hum, motor-boating, low volume and a reduction in all D.C. voltages. Open or shorted electrolytic and by-pass condensers (across bias resistor of type 43E tube) will cause low volume and distorted tone.

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a voltmeter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

All voltages are measured with 230 volt mains and the switch in the 230-260 volt position.

Resistance of coils and transformer windings are indicated in ohms on schematic circuit diagram.

BELMONT RADIO CORPORATION
MODEL D699 FACTORY №840

BAND	DIAL SCALE	FREQUENCY RANGE
Broadcast	Outer Scale	540 to 1720 K.C. (Kilocycles)
Middle Wave	Center Scale	1690 to 5500 K.C. (Kilocycles)
Short Wave	Inner Scale	5.35 to 18.1 M.C. (Megacycles)

I. F. Frequency 465 K.C.

DESCRIPTION:

The tube complement of this chassis consists of the following metal and octal base glass tubes which are interchangeable with metal tubes:

1—Type 6A8G—Pentagrid mixer, first detector and oscillator.
1—Type 6K7 Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6Q7G duplex diode triode second detector, A.V.C. and audio.
1—Type 6C5 Inverter stage.
2—Type 6F6G—pentode push-pull output amplifier.
1—Type 5Y3G high vacuum rectifier.
1—Type 6G5 Cathode ray tuning indicator.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 108, 127, 150, 225, and 260 volts, (see instructions) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to measured with 115 volts on the primary of the power transformer.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS:

CAUTION: No aligning adjusments should be attempted without first thoroughly checking over all other possible causes of trouble, such as defective tubes, poor installations, open or grounded antenna systems, defective condensers and resistors.

In order to properly align this chassis, an oscillator (generator) is necessary.

All adjustments should be made with a non-metallic screw driver.

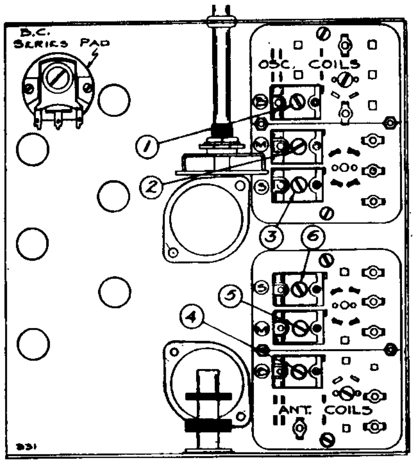


FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-106 Output I.F. Transformer
Part No. 108-105 Input I.F Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   - (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-106) to resonance.
   - (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap of 6A8G and adjust input I.F. transformer (No. 108-105) to resonance

BROADCAST BAND ALIGNMENT:
540 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   - (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly. Fig. 3.)
   - (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   - (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   - (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   - (e) Check for tracking and sensitivity at 1000 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

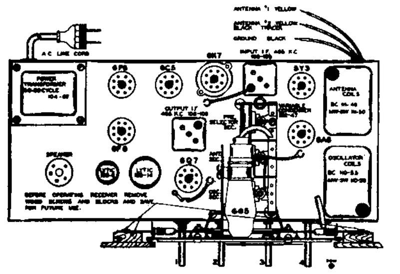
SHORT WAVE BAND ALIGNMENT:
5.35 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   - (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment number 3) and short wave antenna (Adjustment number 6) to resonance.
   - (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   - (c) Re-set external oscillator and check set at 18.1 megacycles and 5.3 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 18.3 megacycle signal appears near 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:
1690 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   - (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (Adjustment number 2) and middle wave antenna (Adjustment number 5) to resonance.
   - (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   - (c) Re-set external oscillator and check set at 5400 kilocycles and 1700 kilocycles for band coverage.
   - (d) Recheck broadcast band alignment.



DIAL PARTS LIST

Part No.	Description	List Price Each
	ASSEMBLIES	
112-193	Dial Plate and Switch Assembly—Including:	.85
	1—No. 117-76 Dial Plate	
	1—No. 117-115 Tuning Shaft Bushing	
	1—No. 117-77 Band Disc Bushing	
	1—No. 112-182 Band Indicator Disc	
	2—No. 131-64 Brass Washers	
	1—No. 117-40C Switch Link	
	1—No. 117-12 Switch Arm	
	1—No. 131-30 Spring Washer	
	2—No. 131-115 Rivets	
	1—No. 117-35 Bushing	
	2—No. 132-18 Set Screw	
	DIAL PARTS ONLY	
107-47	Pilot Light Bracket and Socket (Left)	.10
107-46	Pilot Light Bracket and Socket (Right)	.10
107-14	6-8 Volt T-46 Pilot Light	.10
107-90	Pilot Light Shield	.01
112-139G	Oval Glass Retaining Spring	.10
112-175AB	Background Plate Gasket	.10
112-198	Cork Gasket for Oval Glass	.10
112-199	Dial Drum Including 117-84 Bushing and Set Screw	.20
112-210	Oval Glass Crystal Only	.35
112-241T	Glass Dial Scale	1.00
112-221	Metal Oval Escutcheon Only Less Glass	1.50
112-231	Metal Oval Escutcheon Complete with Glass, Cork Gasket and Retaining Spring	2.00
112-119	Dial Pointer with No. 132-19 Screw	.20
112-224	Tuning Shaft	.10
117-72	Reflector	.10
117-116	Pulley for Drive String	.01
120-9	Black Irish Linen String	.05
120-97	Coil Take-up Spring for Dial Drive String	.03
131-67	Retaining Clips for Glass Dial Scale	.03

LIST OF REPAIR PARTS (Serial No. 7C 552550 and up)

Use Only Genuine Factory Replacement Parts

Part No.	Circuit Diagram Reference	Description	List Price Each
		CONDENSERS	
100-11	C7	.01 x 400 Volt Tubular	.25
100-12	C12, C18	.003 x 600 Volt Tubular	.25
100-20	C15	.1 x 200 Volt Tubular	.25
100-22	C1, C3	.05 x 200 Volt Tubular	.25
100-26	C10, C11	.02 x 400 Volt Tubular	.25
100-39	C16	.1 x 400 Volt Tubular (with Bracket)	.25
100-57	C9	.006 x 600 Volt Tubular	.25
103-6	C13	8 Mfd Lytic Filter 350 v.	.85
103-14	C14	16 Mfd Lytic Filter 250 v.	.85
129-2	C8	.0005 Mica - Type MT - 20%	.25
129-5	C6	.0001 Mica - Type MT - 20%	.25
129-39	C2	.00005 Mica - Type MT - 20%	.25
129-54	C5	.003 Mica - Type MW - 2 1/2%	.35
129-55	C4	.0034 Mica - Type MW - 2 1/2%	.35
124-35	C17	Series Padder Condenser (740 mmf)	.40
		RESISTORS	
106-37	R16, R17, R18	Muter Metal Clad Resistor	.40
130-4	R6, R8	3 Megohm - 1/3 Watt - 20%	.20
130-12	R1, R14	50M ohm - 1/3 Watt - 20%	.20
130-22	R11	5M ohm - 1/3 Watt - 20%	.20
130-27	R4	50 ohm - 1/3 Watt - 20%	.20
130-48	R2	15M ohm - 1/3 Watt - 10%	.20
130-96	R5	25M ohm - 1/2 Watt - 10%	.20
130-100	R10, R15	150M ohm - 1/3 Watt - 20%	.20
130-103	R3, R13	100M ohm - 1/3 Watt - 20%	.20
130-163	R12	400M ohm - 1/3 Watt - 10%	.20
130-110	R19	1 Meg ohm - 1/10 Watt - 10%	.20
		COILS	
108-105	T6	Input I.F. complete with can	1.25
108-106	T7	Output I.F. complete with can	1.25
110-39	T4	Mid-Wave & Short Wave Oscillator Coil Assembly complete less can	1.50
110-55	T5	Broadcast Oscillator Coil Assembly complete less can	.65
111-49	T2	Broadcast Antenna Coil Assembly complete less can	.75
111-50	T3	Mid-Wave & Short Wave Antenna Coil Assembly complete less can	1.50
111-51	T1	Broadcast Pre-Selector Coil Assembly complete	.75
		SOCKETS	
121-8		Five Prong Socket - Marked "Spkr"	.10
121-12		Seven Prong Octal Socket - Marked "6K7"	.15
121-14		Seven Prong Octal Socket - Marked "6F6"	.15
121-17		Six Prong Octal Socket - Marked "6C5"	.15
121-21		Eight Prong Octal Socket - Marked "6Q7"	.15
121-22		Eight Prong Octal Socket - Marked "6A8"	.15
121-51		Six Prong Octal Socket - Marked "5Y3"	.15
		TRANSFORMERS	
104-87	L2	50/60 Cycle Power Transformer	4.00
104-94		25 Cycle Power Transformer	7.50
104-95		Universal Transformer - 25 Cycle Primary	8.50
104-96		Universal Transformer - 40 Cycle Primary	8.25
		SPEAKER	
114-67	L1	Eight inch Dynamic Speaker (900 ohm Field)	6.00
		MISCELLANEOUS	
101-74	R7, S1	Volume Control & Switch (1 Meg ohm)	1.00
101-75	R9	Tone Control (300M ohm)	.75
102-47	C	Three-Gang Variable Condenser	4.00
107-5		Line Cord and Plug	.50
115-35		Antenna, Oscillator Coil Shield	.15
115-22		Tube Shield	.15
124-35		Series Padder Condenser	.40
125-17	S	Band Switch	.85
128-67		"Volume" Knob with Spring-Wood	.15
128-68		"Tone" Knob with Spring - Wood	.15
128-69		"Band" Knob with Spring - Wood	.15
128-70		"Tuning" Knob with Spring - Wood	.15
134-37		Rubber Grommet for Variable Condenser	.05
134-47		Rubber Mounting Cushions for Chassis	.05

Tubes are coded and guaranteed by the tube manufacturer.

Prompter service can be rendered on adjustments if defective tubes are returned direct to the tube manufacturer rather than through our factory.

All resistors are RMA color coded—specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and /or capacitor (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance percent	Color of Dot
2½ %	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None

All prices quoted are list and are subject to the usual trade discounts.

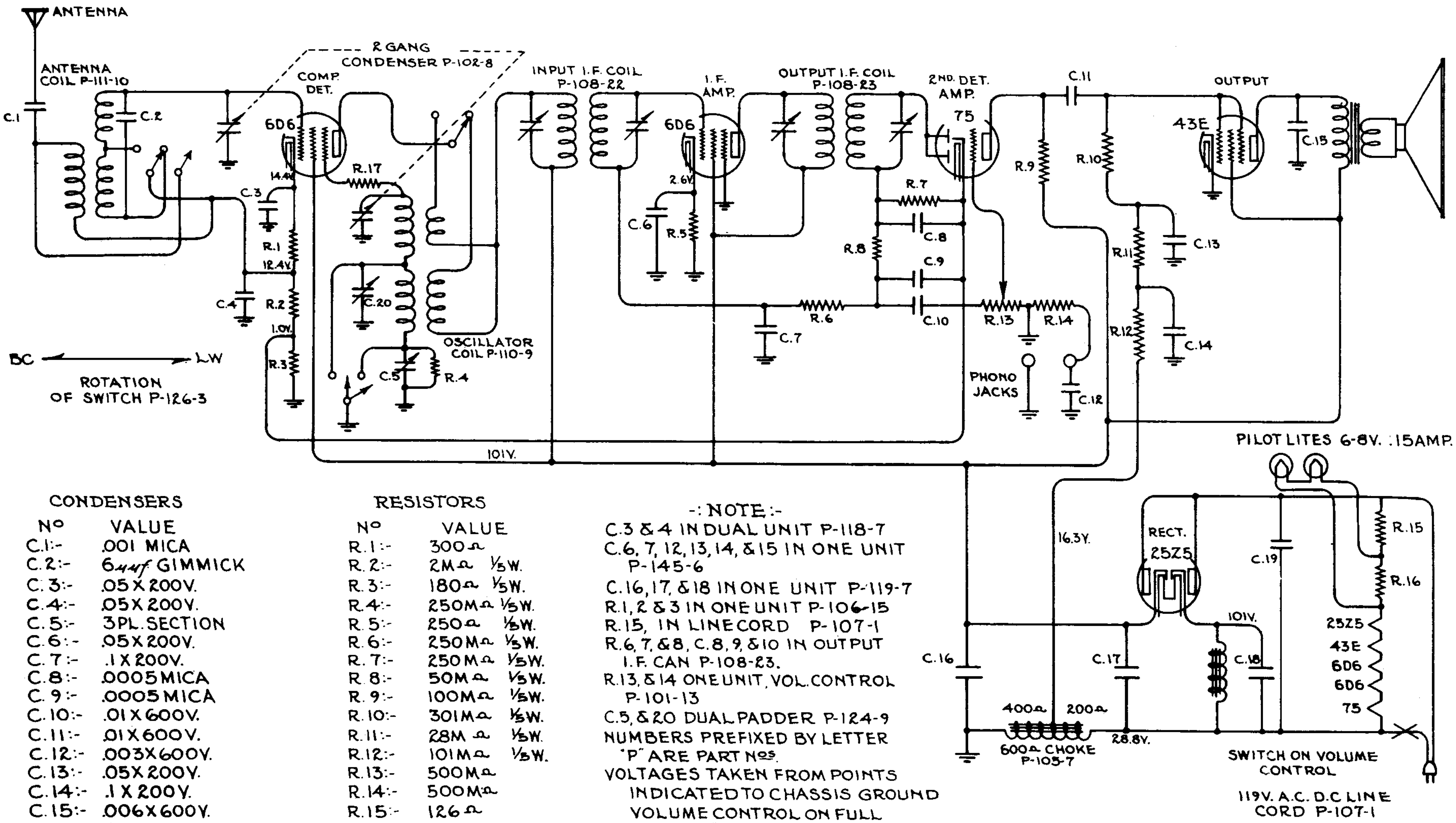
Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

WE CANNOT SUPPLY SPEAKER PARTS, CONES, TRANSFORMERS, OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $1.75 NET, IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

BELMONT RADIO CORPORATION

MODEL 541



CONDENSERS	
Nº	VALUE
C.1:-	.001 MICA
C.2:-	6μμf GIMMICK
C.3:-	.05 X 200V.
C.4:-	.05 X 200V.
C.5:-	3PL. SECTION
C.6:-	.05 X 200V.
C.7:-	.1 X 200V.
C.8:-	.0005 MICA
C.9:-	.0005 MICA
C.10:-	.01 X 600V.
C.11:-	.01 X 600V.
C.12:-	.003 X 600V.
C.13:-	.05 X 200V.
C.14:-	.1 X 200V.
C.15:-	.006 X 600V.
C.16:-	8.0 MFD. X 100V.
C.17:-	12.0 MFD. X 100V.
C.18:-	4.0 MFD. X 100V.
C.19:-	.1 X 400V.
C.20:-	2PL. SECTION

RESISTORS		
Nº	VALUE	
R.1:-	300Ω	
R.2:-	2MΩ	1/5W.
R.3:-	180Ω	1/5W.
R.4:-	250MΩ	1/5W.
R.5:-	250Ω	1/5W.
R.6:-	250MΩ	1/5W.
R.7:-	250MΩ	1/5W.
R.8:-	50MΩ	1/5W.
R.9:-	100MΩ	1/5W.
R.10:-	301MΩ	1/5W.
R.11:-	28M Ω	1/5W.
R.12:-	101MΩ	1/5W.
R.13:-	500MΩ	
R.14:-	500MΩ	
R.15:-	126Ω	
R.16:-	40Ω	
R.17:-	900Ω	

-: NOTE :-

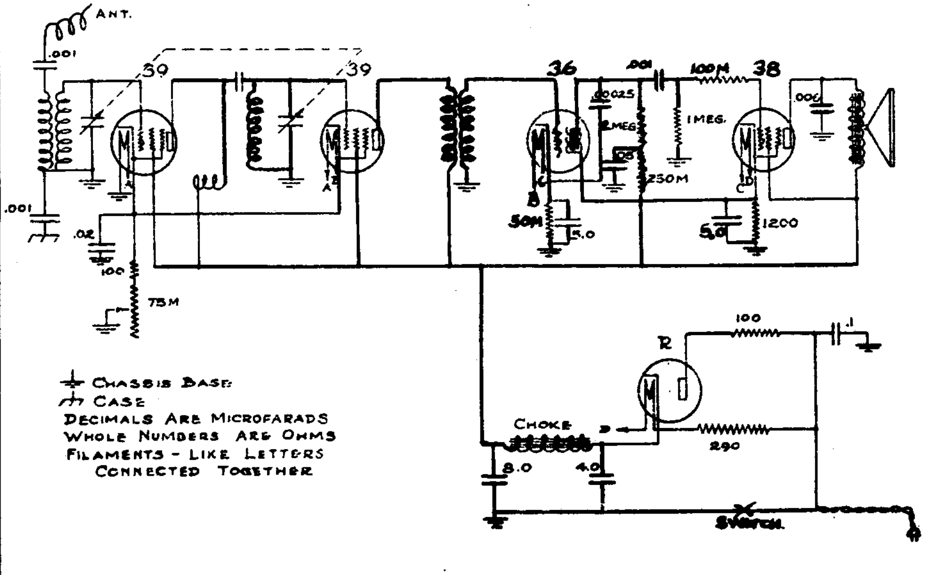
C.3 & 4 IN DUAL UNIT P-118-7
C.6, 7, 12, 13, 14, & 15 IN ONE UNIT P-145-6
C.16, 17, & 18 IN ONE UNIT P-119-7
R.1, 2 & 3 IN ONE UNIT P-106-15
R.15, IN LINECORD P-107-1
R.6, 7, & 8, C.8, 9, & 10 IN OUTPUT I.F. CAN P-108-23.
R.13, & 14 ONE UNIT, VOL. CONTROL P-101-13
C.5, & 20 DUAL PADDER P-124-9
NUMBERS PREFIXED BY LETTER "P" ARE PART Nos.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND VOLUME CONTROL ON FULL
A GIMMICK IS AN IMPROVISED CAPACITY FORMED BY TWISTING WIRES.

The tube complement of this chassis is as follows:

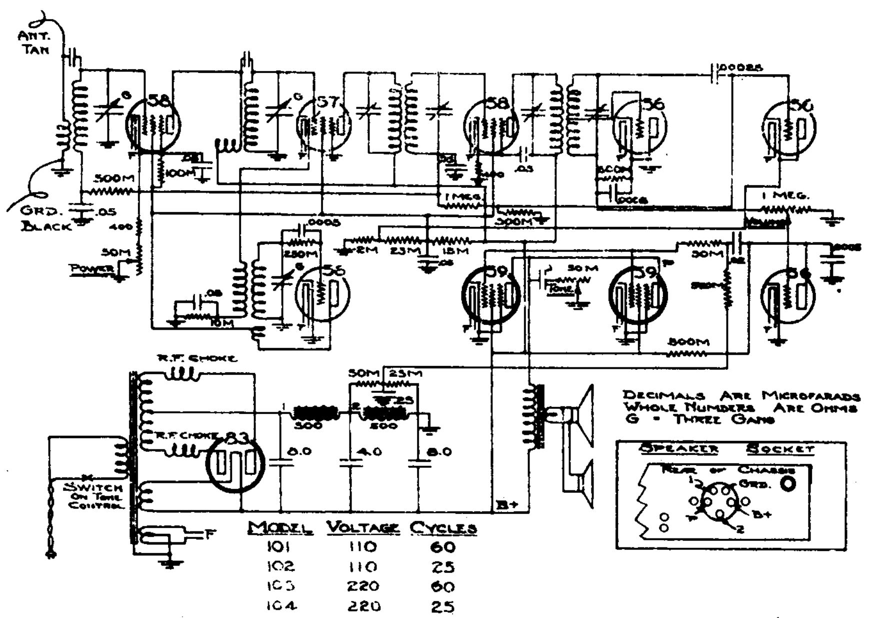
1 Type 6D6 - remote cut-off pentode as oscillator and first detector
1 Type 6D6 - remote cut-off pentode as intermediate frequency amplifier (456 k.c.)
1 Type 75 - duplex diode triode as a diode detector AVC and first AF amplifier
1 Type 43E - pentode output A.F. amplifier
1 Type 25Z5 - high vacuum rectifier.

BELMONT RADIO CORPORATION

MODELS 50F & 55F



MODELS 100-101-102-103-104



MODEL	VOLTAGE	CYCLES
101	110	60
102	110	25
103	220	60
104	220	25

MODEL 530

SERVICE SUGGESTIONS

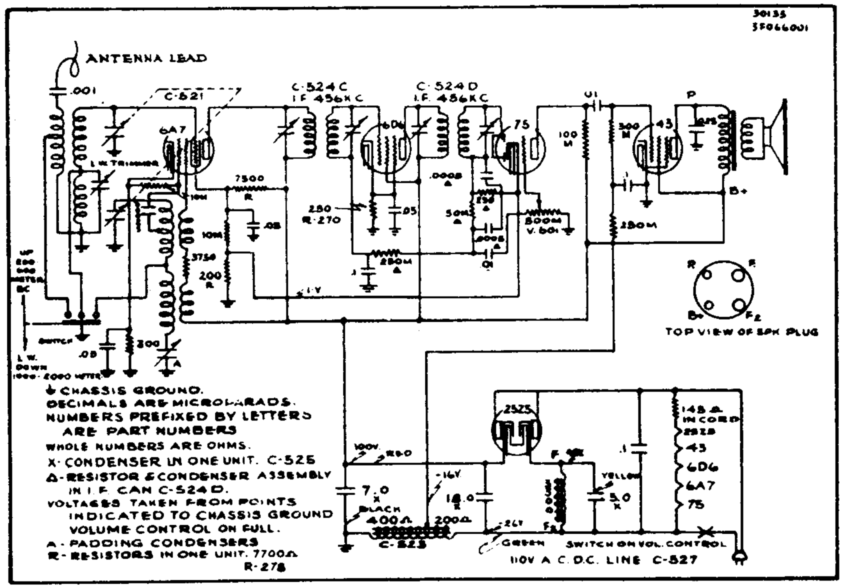
NOTE—CONNECTING CORD OF SET GETS WARM IN NORMAL OPERATION. DO NOT BECOME ALARMED.

Make sure that all tubes are pushed firmly in their proper sockets and that the clips are securely fastened to the caps on the tops of the tubes.

That the aerial is stretched out and that the connections to an outdoor antenna (if used) are good.

If necessary to change tubes or service chassis, UNDER NO CIRCUMSTANCES REMOVE BACK OR CHASSIS WITHOUT FIRST REMOVING PLUG FROM LIGHT SOCKET.

To remove chassis from cabinet, pull off knobs from front, remove back (held with screws to case). Remove four mounting screws, then chassis can be slipped out of case.



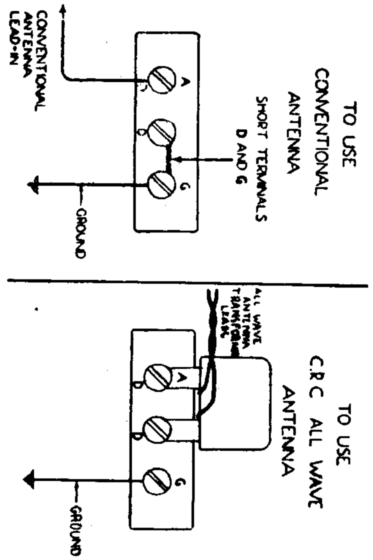
Schematic Circuit Diagram and Aligning Instructions Model 530 AC-DC Superheterodyne 200-600 Meters: 1000-2000 Meters

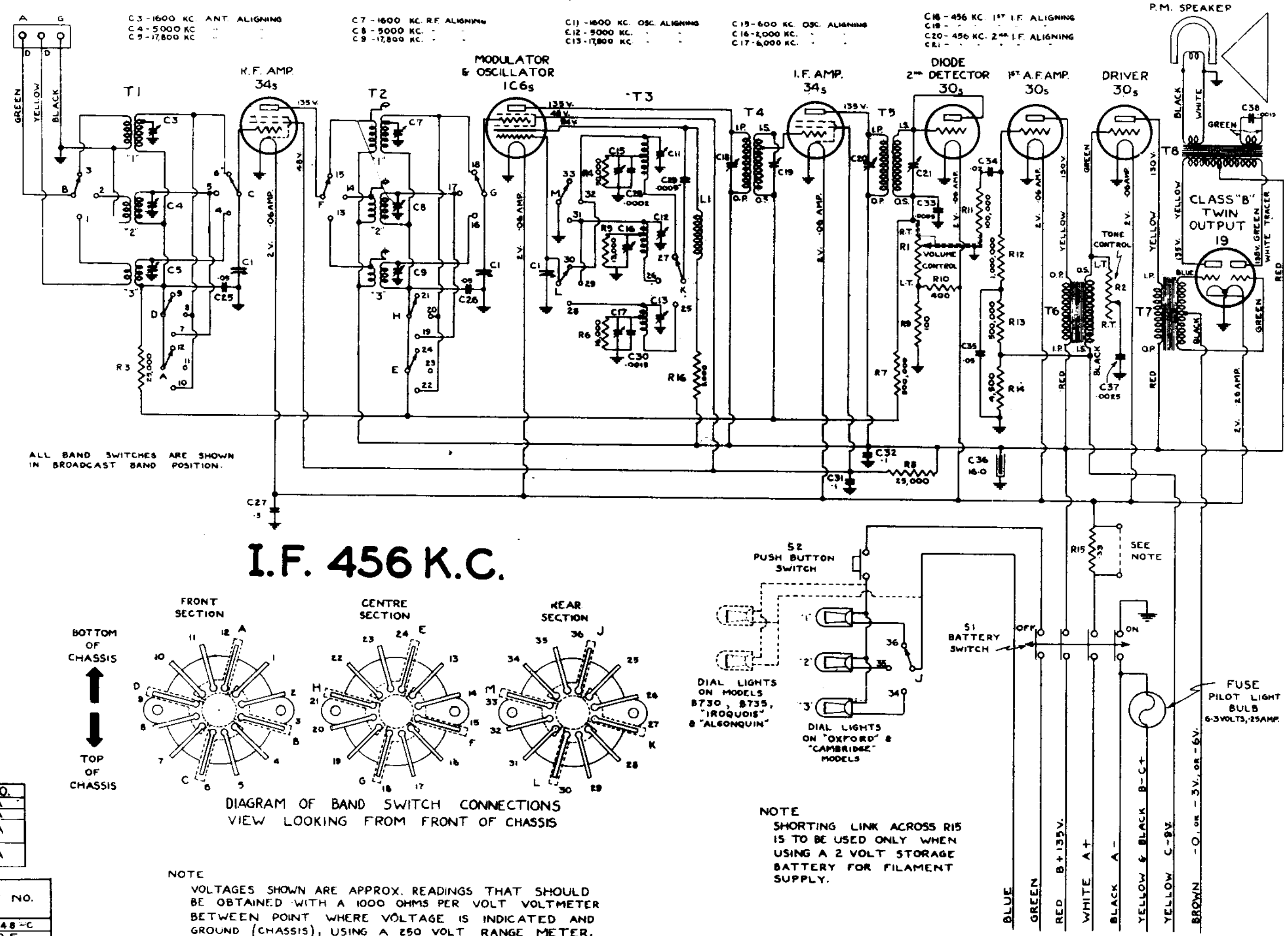
Should it be necessary, at any time, to rebalance this set the procedure is as follows: Attach a 456 kilocycle oscillator to the grid of the 6A7 tube in back of the variable condenser and adjust the trimming condensers of the I. F. transformers to maximum deflection on an output meter connected across the primary of the speaker input transformer. While adjusting these trimmers, the variable condenser should be at the maximum capacity position—at the extreme right of its rotation.

With switch lever up in 200-600 meter position, disconnect the antenna wire and connect an oscillator in series with a 250 mfd. condenser to the antenna coil, rotate the condenser plates to the minimum capacity position, extreme left turn, and adjust trimmer condenser of the oscillator and rear section of the variable to resonance with the oscillator set at 200 meters, adjust the front section to resonance at 215 meters, align at 250—300—400—500 meters and bend slotted plates of variable condenser if necessary. To adjust long wave, 1000-2000 meters, with switch lever down, set variable at maximum capacity, extreme right turn, and tune generator to maximum output, then peak long wave padder (hexagon nut of L. W. Padder), at the same time tuning oscillator until maximum output is attained. Attach oscillator leads to grid of 6A7 ground, set variable condenser at minimum capacity, extreme left turn, and adjust oscillator to resonance with set. Remove oscillator lead from grid of 6A7 and attach to antenna lead, then adjust long wave R.F. trimmer to maximum output (set screw adjustment of L. W. Padder). Do not disturb either oscillator or variable condenser while making this adjustment.

CANADIAN RADIO CORP.

MODELS "IROQUOIS"-"ALGONQUIN" & 53





NOTE
SHORTING LINK ACROSS R15 IS TO BE USED ONLY WHEN USING A 2 VOLT STORAGE BATTERY FOR FILAMENT SUPPLY.

NOTE
VOLTAGES SHOWN ARE APPROX. READINGS THAT SHOULD BE OBTAINED WITH A 1000 OHMS PER VOLT VOLTMETER BETWEEN POINT WHERE VOLTAGE IS INDICATED AND GROUND (CHASSIS), USING A 250 VOLT RANGE METER.

FIXED RESISTANCES HAVE VALUES SHOWN IN OHMS
FIXED CONDENSERS HAVE VALUES SHOWN IN MFDS.

ITEM	DESCRIPTION	PART NO.
S1	4 POLE BATTERY SWITCH	12613-A
S2	PUSH BUTTON DIAL LIGHT SWITCH	4802-A
SPEAKER	ON CONSOLE MODELS "CAMBRIDGE", B735 & "ALGONQUIN"-10" P.M. 252	4809-A
SPEAKER	ON MANTEL MODELS "OXFORD" B730 & "IROQUOIS"-8" P.M. 254.	4792-A

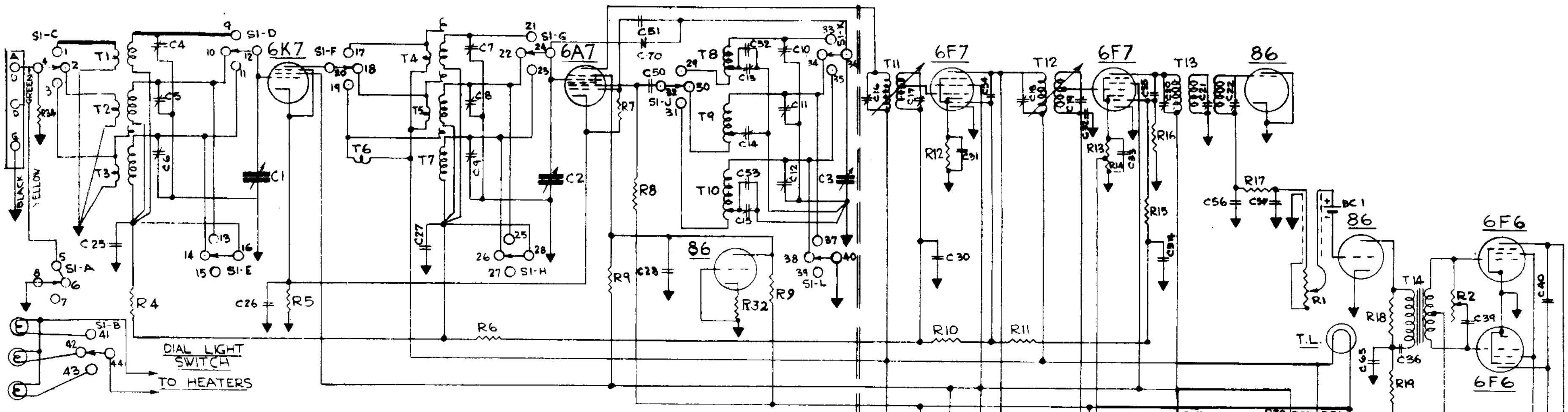
ITEM	CAPACITY	RATED WORKING VOLTAGE	TYPE	PART NO.
C1	3 GANG COND.		VARIABLE	12448-C
C3	1600 KC. ANT. ALIGNING		"	IN R.F.
C4	5000 " "		"	ANTENNA
C5	17,800 " "		"	TRANS. ASS'Y.
C7	1600 KC. R.F.		"	IN R.F.
C8	5,000 " "		"	INTERSTAGE
C9	17,800 " "		"	TRANS. ASS'Y.
C11	1600 KC. OSC.		"	IN OSC.
C12	5,000 " "		"	COIL
C13	17,800 " "		"	ASSEMBLY
C15	600 " "		"	4670
C16	2000 " "		"	4671
C17	6,000 " "		"	4672
C18	456 KC. 1st I.F. "		"	IN 1st I.F.
C19	" " " "		"	TRANS. ASS'Y.
C20	456 KC. 2nd I.F. "		"	IN 2nd I.F.
C21	" " " "		"	TRANS. ASS'Y.
C25	·05 MFD.	200 V.	TUBULAR	38102
C26	·05	200 V.	"	38102
C27	·5	200 V.	"	38108
C28	·0002	750 V.	MICA	37908
C29	·0005	750 V.	"	34105
C30	·0015	750 V.	"	34122
C31	·1	200 V.	TUBULAR	38106
C32	·1	200 V.	"	38106
C33	·0005	750 V.	MICA	34110
C34	·02	400 V.	TUBULAR	38104
C35	·05	200 V.	"	38102
C36	16·0	150 V.	WET ELEC.	11511
C37	·0025	750 V.	MICA	34109
C38	·0015	750 V.	"	34108

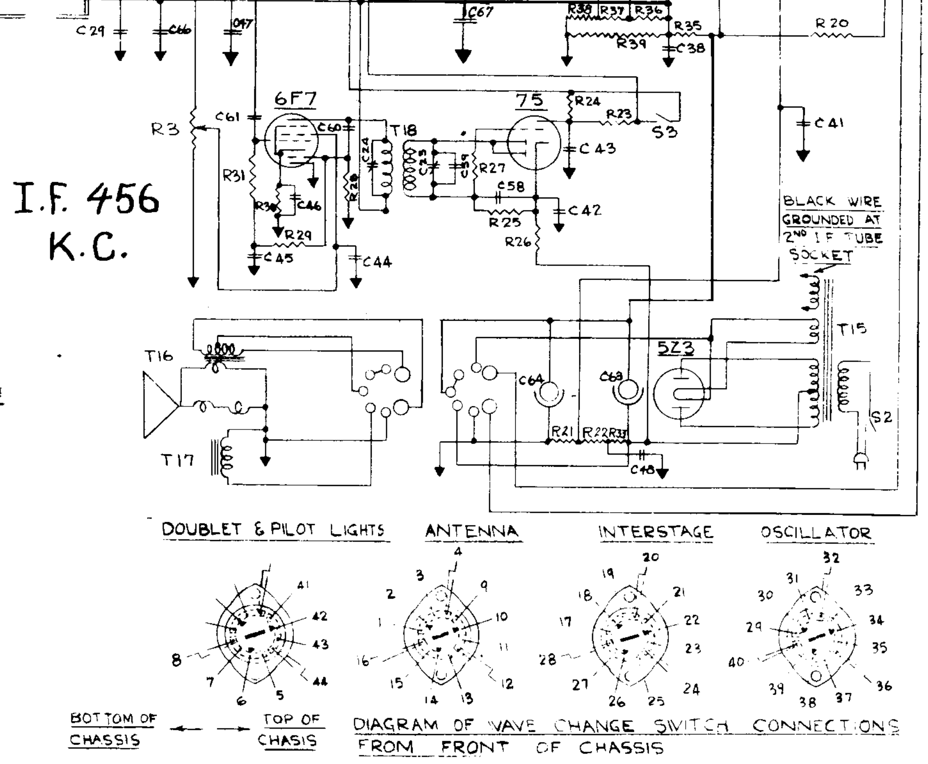
ITEM	DESCRIPTION	PART NO.
T1	ANTENNA TRANS ASSEMBLY	5052
T2	R.F. INTERSTAGE " "	5053
T3	OSCILLATOR COIL "	5054
T4	1st I.F. TRANSFORMER "	4741
T5	2nd " " " "	4743
T6	INPUT TRANSFORMER	4713
T7	DRIVER "	4715
T8	OUTPUT "	4717
L1	R.F. CHOKE	4676

ITEM	RESISTANCE	WATTS	TYPE	PART NO.
R1	250,000 OHMS		VOL. CONTROL	12611-A
R2	1,500,000 "		TONE "	12612-A
R3	25,000 "	1/3 W	INSULATED	40504
R4	50,000 "	1/3		40511
R5	13,000 "	1/3		40515
R6	16,000 "	1/3		40516
R7	500,000 "	1/2	LUGS	33709
R8	25,000 "	1/2		33701
R9	100 "	1/4	LEADS	32629
R10	400 "	1/4		32630
R11	100,000 "	1/2	LUGS	33706
R12	1,000,000 "	1/2	"	33705
R13	500,000 "	1/2		33709
R14	4,500 "	1/2		33751
R15	·33 "		CANDOHM	38205
R16	5,000 "	1/3	INSULATED	40517

CANADIAN RADIO CORP.

DEFOREST CROSLEY MODELS 6D1231-"JUPITER" & "ROYAL STAR"





RESISTORS

Item #	Resistance	Part #
Variable		
R1	1,000,000 Ohm L.C.	13466
R2	10,000,000 Ohm T.C.	13400
R3	100,000 Ohm S.C.	13585
Graphite		
R4	100,000 Ohm	40531
R5	150 Ohm	33315
R6	100,000 Ohm	40531
R7	50,000 Ohm	33301
R8	20,000 Ohm	40546
R9	20,000 Ohm	40542
R10	500,000 Ohm	33303
R11	500,000 Ohm	33303
R12	400 Ohm	33310
R13	400 Ohm	33310
R14	1,000 Ohm	33315
R15	500,000 Ohm	33303
R16	500,000 Ohm	33303
R17	50,000 Ohm	33301
R18	50,000 Ohm	33301
R19	50,000 Ohm	33301
R20	750 Ohm	40543
R21	50,000 Ohm	33301
R22	50,000 Ohm	33301
R23	500,000 Ohm	33303
R24	250,000 Ohm	33316
R25	250,000 Ohm	33316
R26	10,000 Ohm	33318
R27	250,000 Ohm	33316
R28	500,000 Ohm	33303
R29	500,000 Ohm	33303
R30	400 Ohm	33310
R31	1,000,000 Ohm	33306
R32	2,000 Ohm	33319
R33	50,000 Ohm	33301
R34	10,000 Ohm	33318
Wire Wound		
R35	1,180 Ohm)	
R36	3,600 Ohm) Candohm	
R37	10,000 Ohm)	13554
R38	10,000 Ohm)	
R39	20,000 Ohm)	

CONDENSERS

Item #	Capacitance	Part #
Variable Air		
C1	450 mmf. Gang)Def.	13521
C2	450 mmf. Gang)R.& M.	
C3	450 mmf. Gang)	13565
Variable Mica		
C4	S.W. Ant. Pad.)	
C5	P.C. Ant. Pad.)	5363
C6	B.C. Ant. Pad.)	
C7	S.W. Int. P. Pad.)	
C8	P.C. Int. P. Pad.)	5353
C9	B.C. Int. P. Pad.)	
C10	S.W. Osc. Pad.)	
C11	P.C. Osc. Pad.)	5353
C12	B.C. Osc. Pad.)	
C13	S.W. Osc. S. Pad.)	
C14	P.C. Osc. S. Pad.)	5287
C15	B.C. Osc. S. Pad.	4670
C16	1st I. F. Pad.)	4639
C17	1st I. F. Pad.)	
C18	2nd I. F. Pad.)	4639
C19	2nd I. F. Pad.)	
C20	3rd I. F. Pad.)	4639
C21	3rd I. F. Pad.)	
C22	3rd I. F. Pad.	12404
C23	Sup. I. F. Pad.)	4639
C24	Sup. I. F. Pad.)	
Tubular		
C25	0.05 mf. 200 V.	38102
C26	0.1 mf. 200 V.	38106
C27	0.05 mf. 200 V.	38102
C28	0.1 mf. 200 V.	38106
C29	0.1 mf. 400 V.	38121
C30	0.05 mf. 200 V.	38102
C31	0.1 mf. 200 V.	38106
C32	0.05 mf. 200 V.	38102
C33	0.1 mf. 200 V.	38106
C34	0.05 mf. 200 V.	38102
C36	0.25 mf. 200 V.	38107
C38	0.25 mf. 400 V.	38127
C39	0.005 mf. 600 V.	38110
C40	0.0015 mf. 800 V.	11977
C41	0.5 mf. 200 V.	38108
C42	0.5 mf. 200 V.	38108
C43	0.25 mf. 200 V.	38107
C44	0.1 mf. 200 V.	38106
C45	0.1 mf. 200 V.	38106
C46	0.1 mf. 200 V.	38106
C47	0.1 mf. 200 V.	38106
C48	0.5 mf. 200 V.	38108

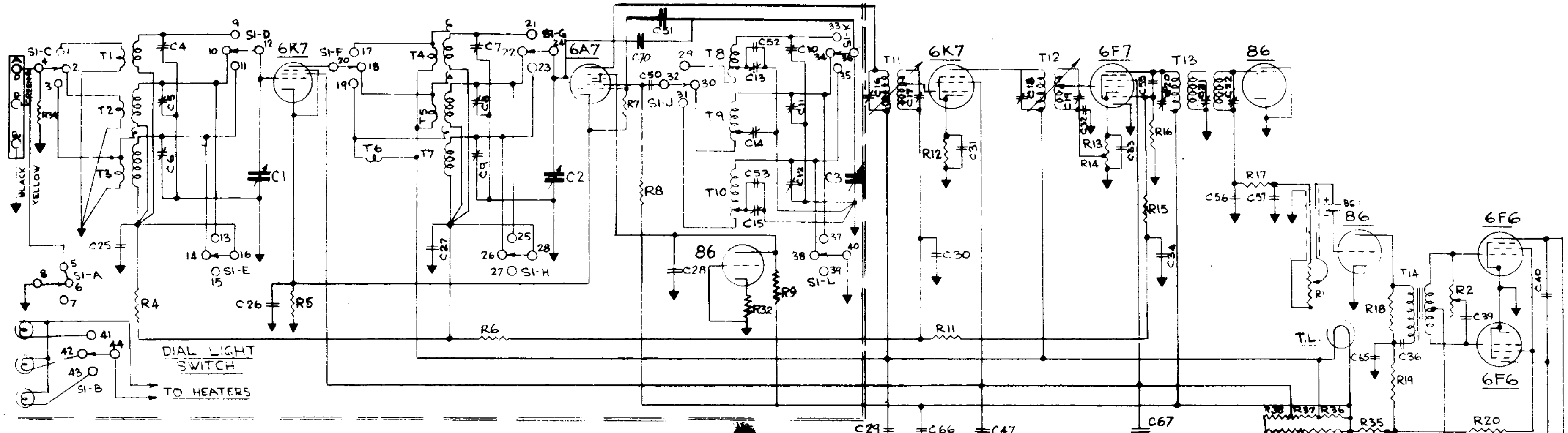
CONDENSERS

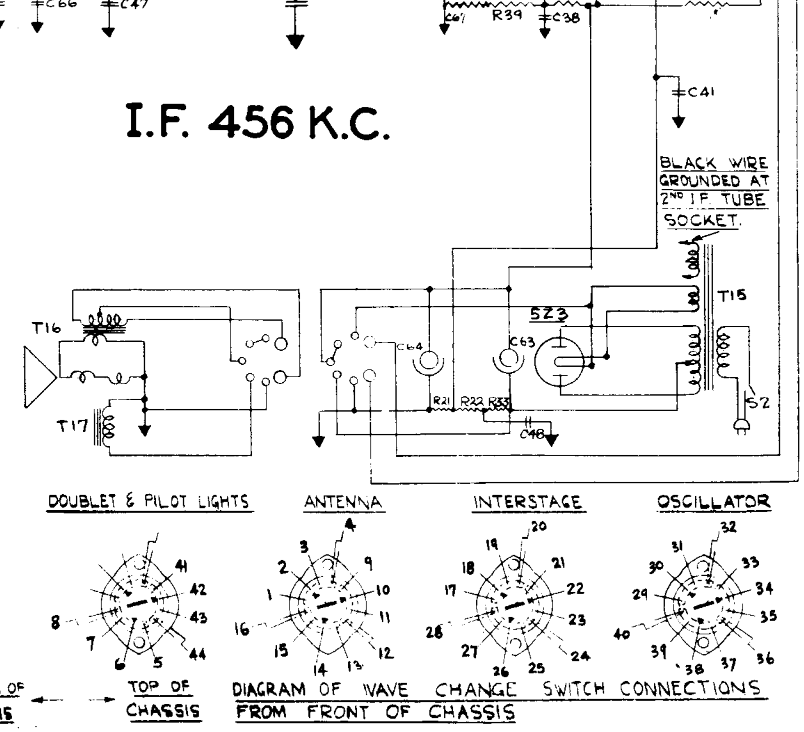
Item #	Capacitance	Part #
Mica		
C50	200 mmf.	37905
C51	100 mmf.	37906
C52	1500 mmf.	34122
C53	200 mmf.	37908
C54	50 mmf.	37904
C55	50 mmf.	37904
C56	200 mmf.	37902
C57	100 mmf.	37906
C58	25 mmf.	37910
C59	200 mmf.	37905
C60	50 mmf.	37904
C61	50 mmf.	37904
C63	30 mf. Wet	39012
C64	30 mf. Wet	13014
C65	2 mf. Dry)	
C66	4 mf. Dry)	13085
C67	4 mf. Dry)	
C70	Neutralizing Capacity	

TRANSFORMERS

Item #	Description	Part #
T1	S.W. Ant. Trans.	5279
T2	P.C. Ant. Trans.	5278
T3	B.C. Ant. Trans.	5277
T4	S.W. Int. Trans.	5283
T5	P.C. Int. Trans.	5282
T6	B.C. Int. Pri.	5281
T7	B.C. Int. Sec.	5280
T8	S.W. Osc. Trans.	5286
T9	P.C. Osc. Trans.	5285
T10	B.C. Osc. Trans.	5284
T11	1st I. F. Trans.	5257
T12	2nd I. F. Trans.	5257
T13	3rd I. F. Trans.	5007
T14	1st A. F. Trans.	5333
T15	Power Trans.	5335
T16	Output Trans.	5331
T17	Speaker	5411
T18	Supp. I. F. Trans.	5384

CANADIAN RADIO CORP.
DEFOREST CROSLEY MODELS 6D1031 & "COMET"





RESISTORS

Item #	Resistance	Part #
Variable		
R1	1,000,000 Ohm	L.C. 13402
R2	10,000,000 Ohm	T.C. 13400
Graphite		
R4	100,000 Ohm	40531
R5	150 Ohm	33313
R6	100,000 Ohm	40531
R7	50,000 Ohm	33301
R8	20,000 Ohm	40542
R9	20,000 Ohm	40546
R11	500,000 Ohm	33303
R12	400 Ohm	33310
R13	400 Ohm	33310
R14	1,000 Ohm	33315
R15	500,000 Ohm	33303
R16	500,000 Ohm	33303
R17	50,000 Ohm	33301
R18	50,000 Ohm	33301
R19	50,000 Ohm	33301
R20	750 Ohm	40543
R21	50,000 Ohm	33301
R22	50,000 Ohm	33301
R32	2,000 Ohm	33319
R33	50,000 Ohm	33301
R34	10,000 Ohm	33318
Wire Wound		
R35	1,180 Ohm)	
R36	3,600 Ohm)	Candohm
R37	10,000 Ohm)	13554
R38	10,000 Ohm)	
R39	20,000 Ohm)	

CONDENSERS

Item #	Capacitance	Part #
Variable Air		
C1	450 mmf. Gang)Def.	13521
C2	450 mmf. Gang)R.& M.	
C3	450 mmf. Gang)	13365
Variable Mica		
C4	S.W. Ant. Pad.)	
C5	P.C. Ant. Pad.)	5353
C6	B.C. Ant. Pad.)	
C7	S.W. Int. P. Pad.)	
C8	P.C. Int. P. Pad.)	5353
C9	B.C. Int. P. Pad.)	
C10	S.W. Osc. Pad.)	
C11	P.C. Osc. Pad.)	5353
C12	B.C. Osc. Pad.)	
C13	S.W. Osc. S. Pad.)	
C14	P.C. Osc. S. Pad.)	5287
C15	B.C. Osc. S. Pad.	4670
C16	1st I. F. Pad.)	
C17	1st I. F. Pad.)	4659
C18	2nd I. F. Pad.)	4639
C19	2nd I. F. Pad.)	
C20	3rd I. F. Pad.)	4639
C21	3rd I. F. Pad.)	
C22	3rd I. F. Pad.	12404
Tubular		
C25	0.05 mf. 200 V.	38102
C26	0.1 mf. 200 V.	38106
C27	0.05 mf. 200 V.	38102
C28	0.1 mf. 200 V.	38106
C29	0.1 mf. 400 V.	38121
C30	0.05 mf. 200 V.	38102
C31	0.1 mf. 200 V.	38106
C32	0.05 mf. 200 V.	38102
C33	0.1 mf. 200 V.	38106
C34	0.05 mf. 200 V.	38102
C36	0.25 mf. 200 V.	38107
C38	0.25 mf. 400 V.	38127
C39	0.005 mf. 600 V.	38110
C40	0.0015 mf. 800 V.	11977
C41	0.5 mf. 200 V.	38108
C47	0.1 mf. 200 V.	38106
C48	0.5 mf. 200 V.	38108
Mica		
C50	200 mmf.	37905
C51	100 mmf.	37906
C52	1500 mmf.	34122
C53	200 mmf.	37908
C55	50 mmf.	37904
C56	200 mmf.	37902
C57	100 mmf.	37906

CONDENSERS

Item #	Capacitance	Part #
C63	30 mf. Wet	[illegible]012
C64	30 mf. Wet	13014
C65	2 mf. Dry)	
C66	4 mf. Dry)	13085
C67	4 mf. Dry)	
C70	Neutralizing Capacity	

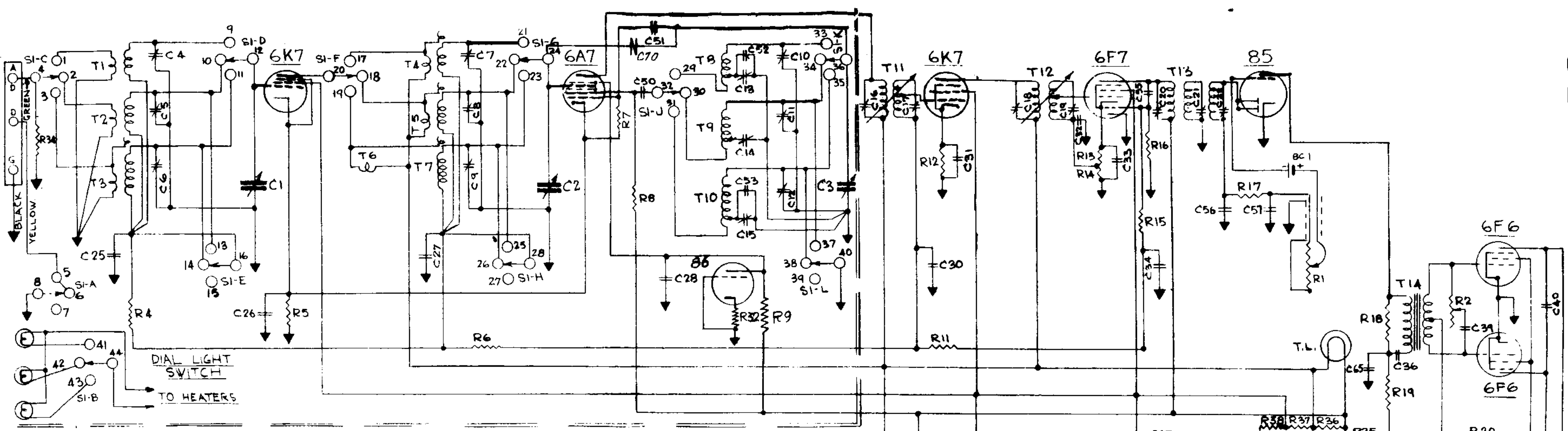
TRANSFORMERS

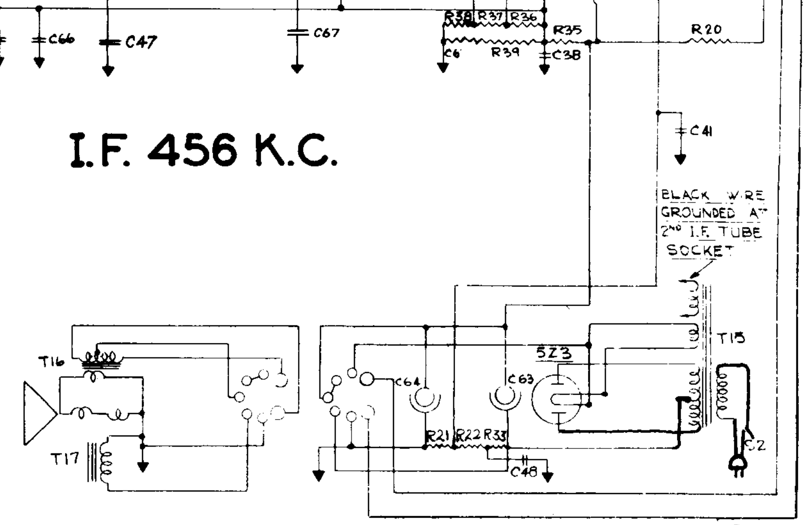
Item #	Description	Part #
T1	S.W. Ant. Trans.	[illegible]
T2	P.C. Ant. Trans.	5278
T3	B.C. Ant. Trans.	5277
T4	S.W. Int. Trans.	5283
T5	P.C. Int. Trans.	5282
T6	B.C. Int. Pri.	5281
T7	B.C. Int. Sec.	5280
T8	S.W. Osc. Trans.	5286
T9	P.C. Osc. Trans.	5285
T10	B.C. Osc. Trans.	5284
T11	1st I. F. Trans.	5257
T12	2nd I. F. Trans.	5257
T13	3rd I. F. Trans.	5007
T14	1st A. F. Trans.	5333
T15	Power Trans.	5335
T16	Output Trans.	5413
T17	Speaker	5330

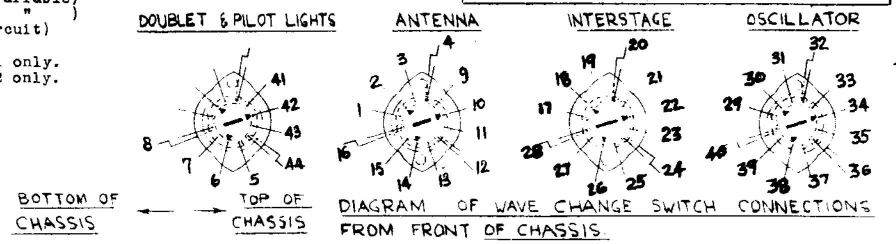
CHASSIS NUMBERS
6D1031 - DEFOREST
6R1031 - ROGERS

CANADIAN RADIO CORP.

DEFOREST CROSLEY MODELS 6D932 & LYRA







RESISTORS

Item #	Resistance	Part #
Variable		
R1	1,000,000 Ohm	L.C.13402
R2	10,000,000 Ohm	T.C.13400
Graphite		
R4	100,000 Ohm	40531
R5	150 Ohm	33313
R6	100,000 Ohm	40531
R7	50,000 Ohm	33301
R8	20,000 Ohm	40542
R9	20,000 Ohm	40546
R11	500,000 Ohm	33303
R12	400 Ohm	33310
R13	400 Ohm	33310
R14	1,000 Ohm	33315
R15	500,000 Ohm	33303
R16	500,000 Ohm	33303
R17	50,000 Ohm	33301
R18	50,000 Ohm	33301
R19	50,000 Ohm	33301
R20	750 Ohm	40543
R21	50,000 Ohm	33301
R22	50,000 Ohm	33301
R32	2,000 Ohm	33319
R33	50,000 Ohm	33301
R34	10,000 Ohm	33318
Wire Wound		
R35	1,180 Ohm)	
R36	3,600 Ohm)	Candohm
R37	10,000 Ohm)	13554
R38	10,000 Ohm)	
R39	20,000 Ohm)	

CONDENSERS

Item #	Capacitance	Part #
Variable Air		
C1	450 mmf. Gang)	Def. 13521
C2	450 mmf. Gang)	R.& M.
C3	450 mmf. Gang)	13365
Variable Mica		
C4	S.W. Ant.Pad.)	
C5	P.C. Ant.Pad.)	5353
C6	B.C. Ant.Pad.)	
C7	S.W. Int. P. Pad.)	
C8	P.C. Int. P. Pad.)	5353
C9	B.C. Int. P. Pad.)	
C10	S.W. Osc. Pad.)	
C11	P.C. Osc. Pad.)	5353
C12	B.C. Osc. Pad.)	
C13	S.W. Osc. S. Pad.)	
C14	P.C. Osc. S. Pad.)	5287
C15	B.C. Osc. S. Pad.	4670
C16	1st I. F. Pad.)	4639
C17	1st I. F. Pad.)	
C18	2nd I. F. Pad.)	4639
C19	2nd I. F. Pad.)	
C20	3rd I. F. Pad.)	4639
C21	3rd I. F. Pad.)	
C22	3rd I. F. Pad.	12404
Tubular		
C25	0.05 mf. 200 V.	38102
C26	0.1 mf. 200 V.	38106
C27	0.05 mf. 200 V.	38102
C28	0.1 mf. 200 V.	38106
C29	0.1 mf. 400 V.	38121
C30	0.05 mf. 200 V.	38102
C31	0.1 mf. 200 V.	38106
C32	0.05 mf. 200 V.	38102
C33	0.1 mf. 200 V.	38106
C34	0.05 mf. 200 V.	38102
C36	0.25 mf. 200 V.	38107
C38	0.25 mf. 400 V.	38127
C39	0.005 mf. 600 V.	38110
C40	0.0015 mf. 800 V.	11977
C41	0.5 mf. 200 V.	38108
C47	0.1 mf. 200 V.	38106
C48	0.5 mf. 200 V.	38108
Mica		
C50	200 mmf.	37905
C51	100 mmf.	37906
C52	1500 mmf.	34122
C53	200 mmf.	37908
C55	50 mmf.	37904
C56	200 mmf.	37902
C57	100 mmf.	37906

CONDENSERS

Item #	Capacitance	Part #
C63	30 mf. Wet	39012
C64	30 mf. Wet	13014
C65	2 mf. Dry)	
C66	4 mf. Dry)	13085
C67	4 mf. Dry)	
C70	Neutralizing Capacity	

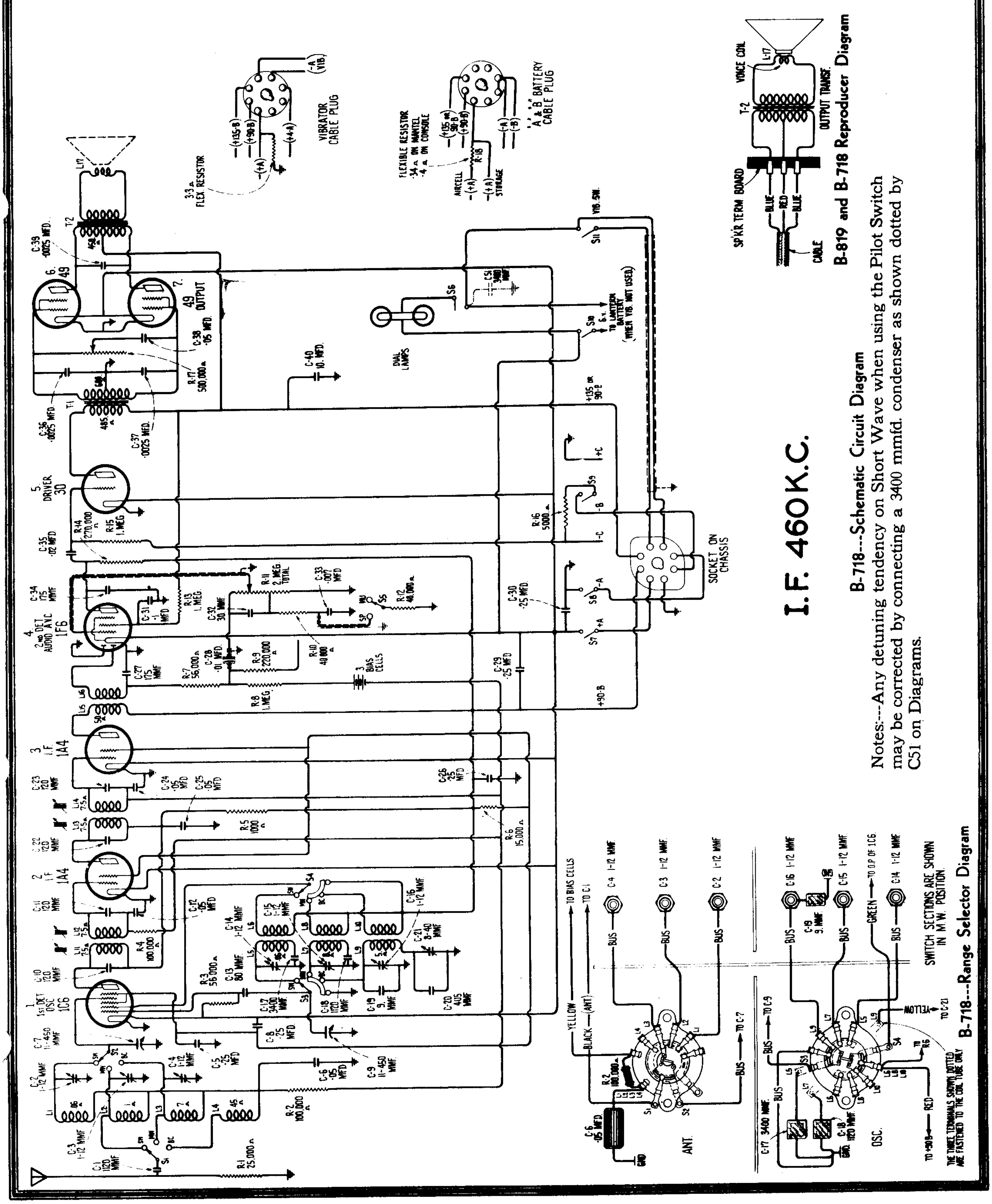
TRANSFORMERS

Item #	Description	Part #
T1	S.W. Ant. Trans.	5279
T2	P.C. Ant. Trans.	5278
T3	B.C. Ant. Trans.	5277
T4	S.W. Int. Trans.	5283
T5	P.C. Int. Trans.	5282
T6	B.C. Int. Pri.	5281
T7	B.C. Int. Sec.	5280
T8	S.W. Osc. Trans.	5286
T9	P.C. Osc. Trans.	[illegible]5
T10	B.C. Osc. Trans.	[illegible]
x T11	1st I. F. Trans.	5257
x T12	2nd I. F. Trans.	5257
x T13	3rd I. F. Trans.	5007
T14	1st A.F. Trans.	5333
T15	Power Trans.	5335
T16	Output Trans.	5331
x T17	Speaker	5328
⊙ T17	Speaker	5329
⊙ T11	1st I.F. Trans.	5379 (Not Variable)
⊙ T12	2nd I.F. Trans.	5379 (" ")
⊙ T13	3rd I.F. Trans.	5380 (2 Circuit)

Items marked x are used on Model 931 only.
Items marked ⊙ are used on Model 932 only.

CANADIAN WESTINGHOUSE COMPANY Limited

MODEL B 718



I.F. 460 K.C.

B-718---Schematic Circuit Diagram

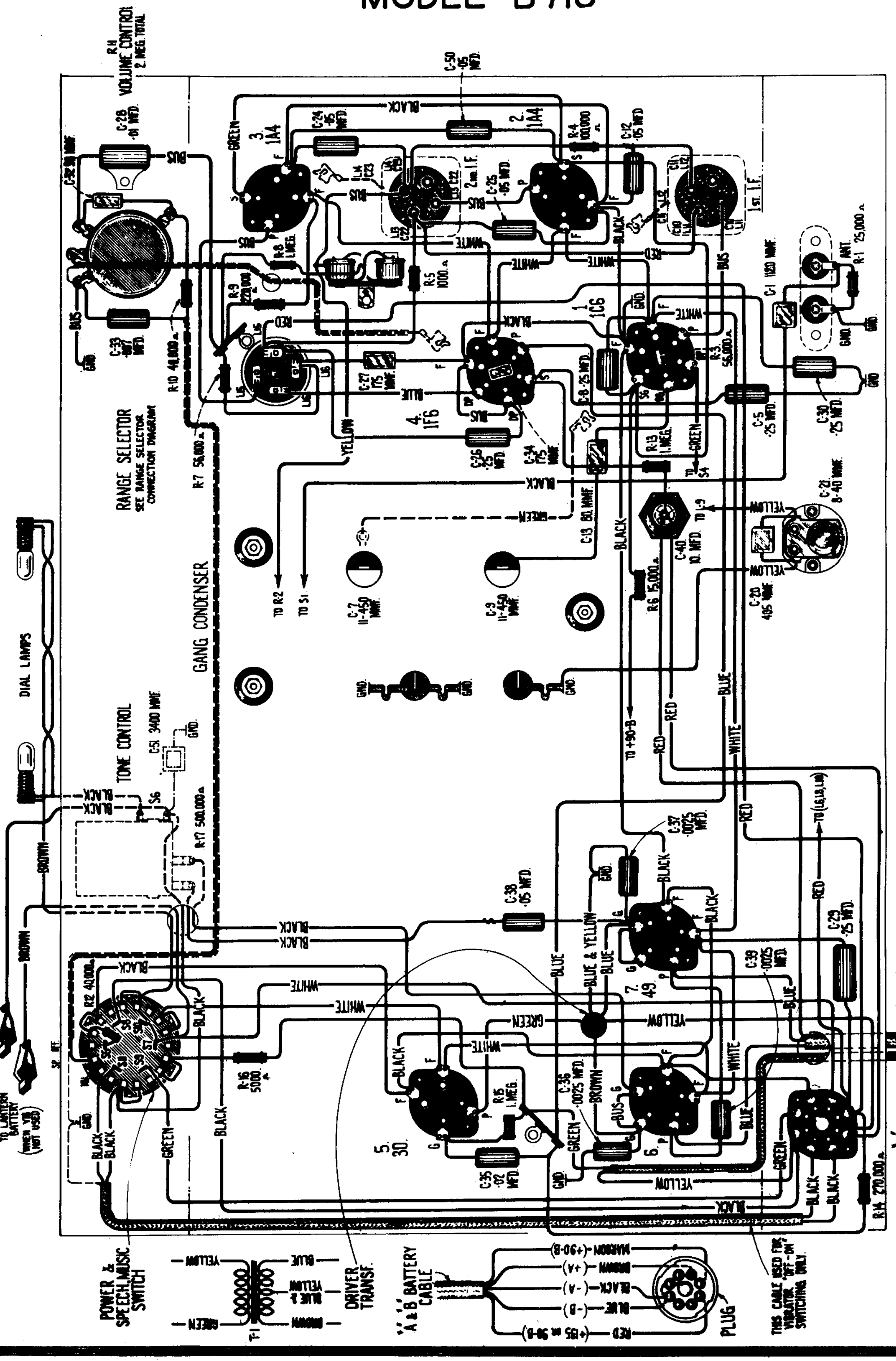
Notes:--Any detuning tendency on Short Wave when using the Pilot Switch may be corrected by connecting a 3400 mmfd. condenser as shown dotted by C51 on Diagrams.

B-819 and B-718 Reproducer Diagram

B-718---Range Selector Diagram

CANADIAN WESTINGHOUSE COMPANY Limited

MODEL B718



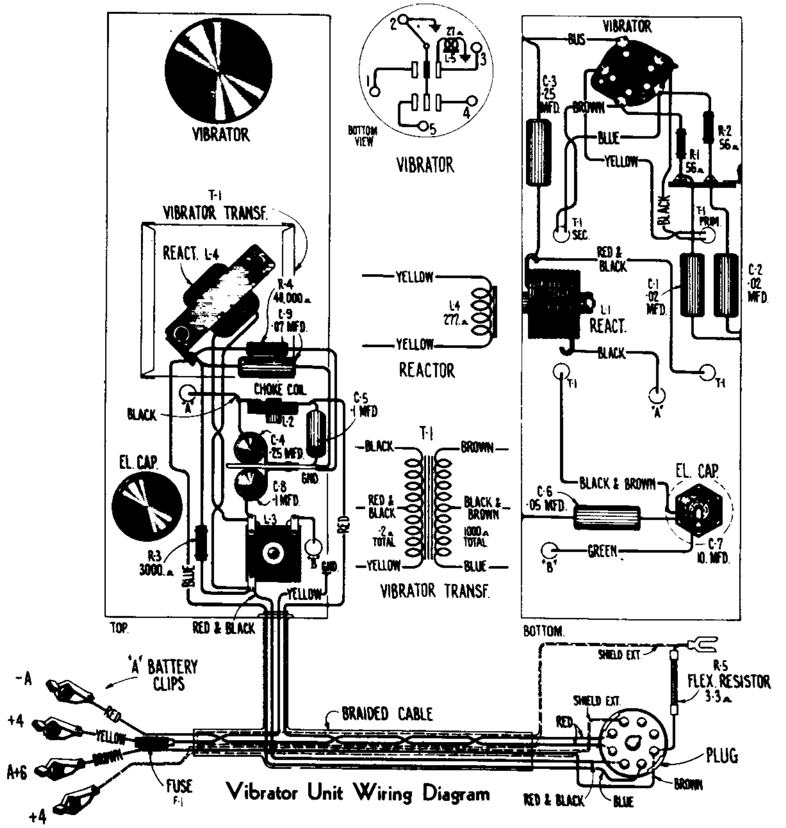
B-718---Wiring Diagram

See note under B-718 Schematic Circuit Diagram also note that filament wiring shown White was Brown on early models.

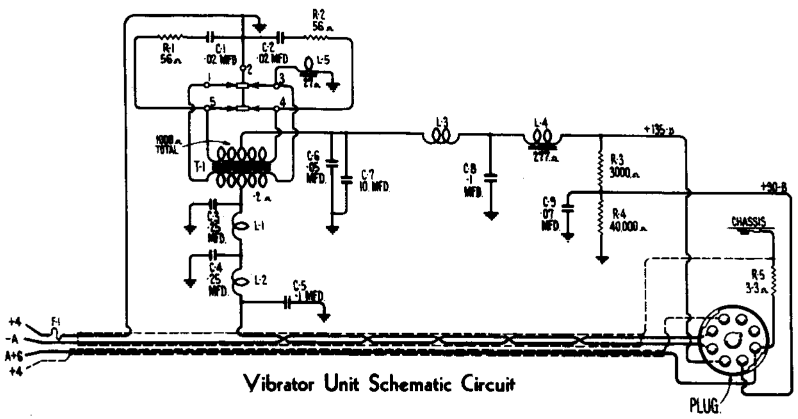
CANADIAN WESTINGHOUSE COMPANY Limited

MODEL B718

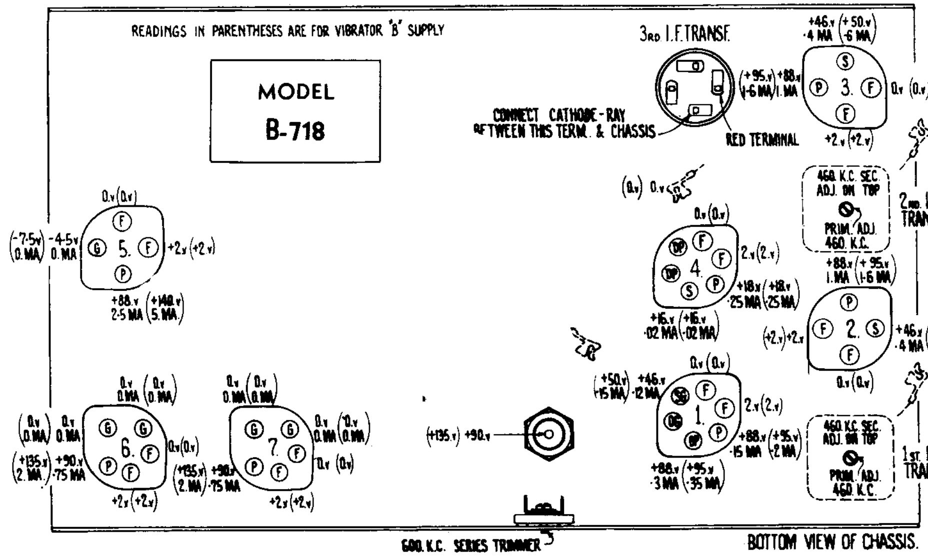
MODELS B718 & B819



Vibrator Unit Wiring Diagram



Vibrator Unit Schematic Circuit

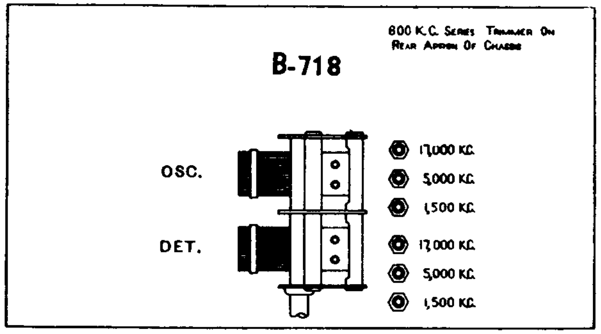


Radiotron Socket Voltages and I.F. Trimmer Locations

CAUTION—Do not attempt to measure voltages on the control grids of the W-1C6 or W-1A4 with any conventional volt-meter as paralysis of the "C-bias" cells will result.

NOTE—Two voltage values are shown for some ratings. Those readings shown in parenthesis are for operation from Westinghouse Vibrator "B" Supply Unit.

All voltages are measured with respect to chassis frames, with all batteries at normal voltage (90 volts B, 9 volts C)—tuned to approximately 1000 K.C.—no signal being received.



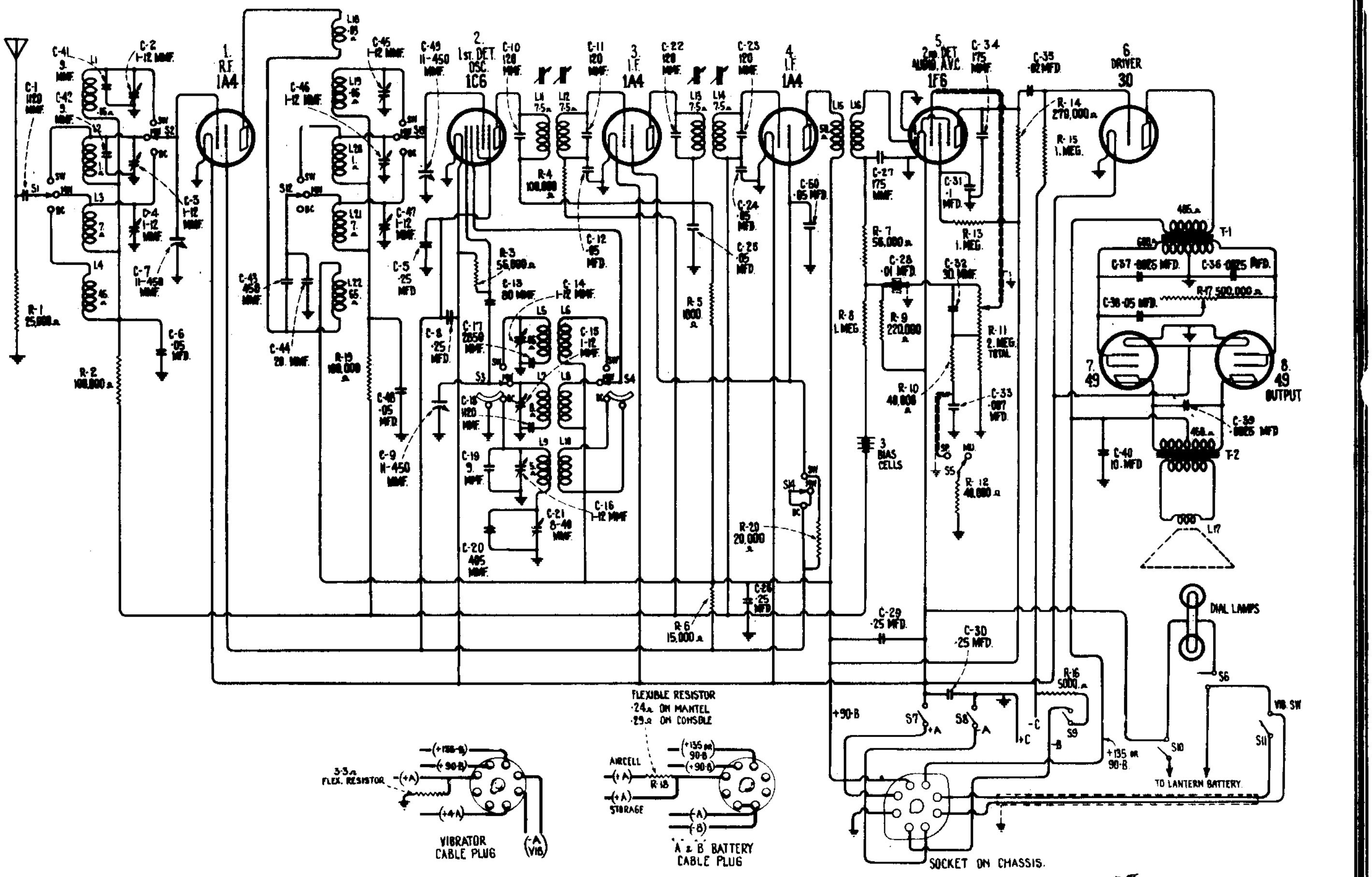
When adjusting the Air Dielectric R.F. trimmers, it is necessary to use a special tool (See H-29644 in parts list) to slacken the locknut on the trimmer, previous to the adjustment, and to tighten it again after the adjustment. Another special tool (See H-29643 in parts list) is available for making the actual adjustment to the trimmer. The adjustment should be made upward or downward on the plunger with a twisting motion. The special tool designed by the Canadian Westinghouse Company for this purpose is double ended; one end having a pin for the R.F. adjustments, the other end is a special socket screw driver for use in making I.F. adjustments.

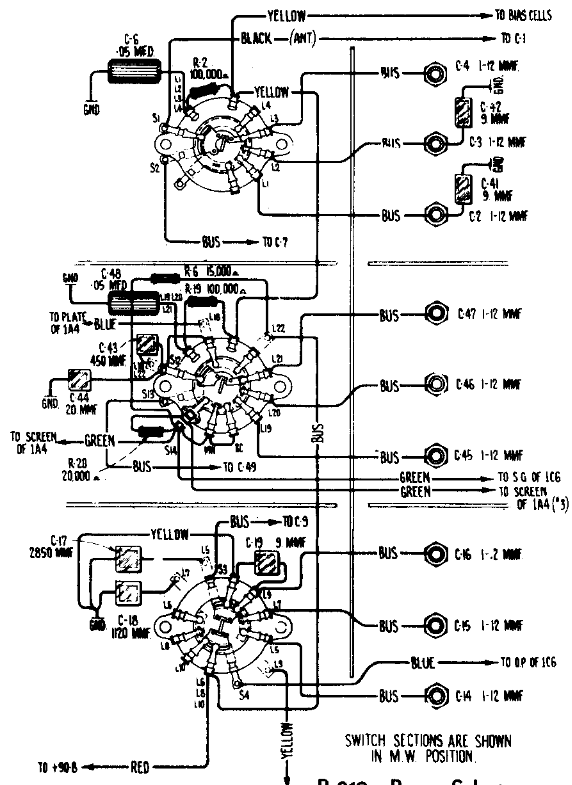
Check "C" cells by noting whether plate current is abnormally high or tubes biased by cells.

A further check on the C bias cells, particularly if it is suspected that the control grid leads have been grounded, is to connect a 4½ volt C battery between the control grid cap of one of the tubes on the C cell circuit and the chassis frame. The negative of the C battery should be connected to control grid, positive to chassis frame. This connection should be momentarily made only, and if the C cells had been weakened before, they will now be found to be recharged and ordinarily will not need to be replaced.

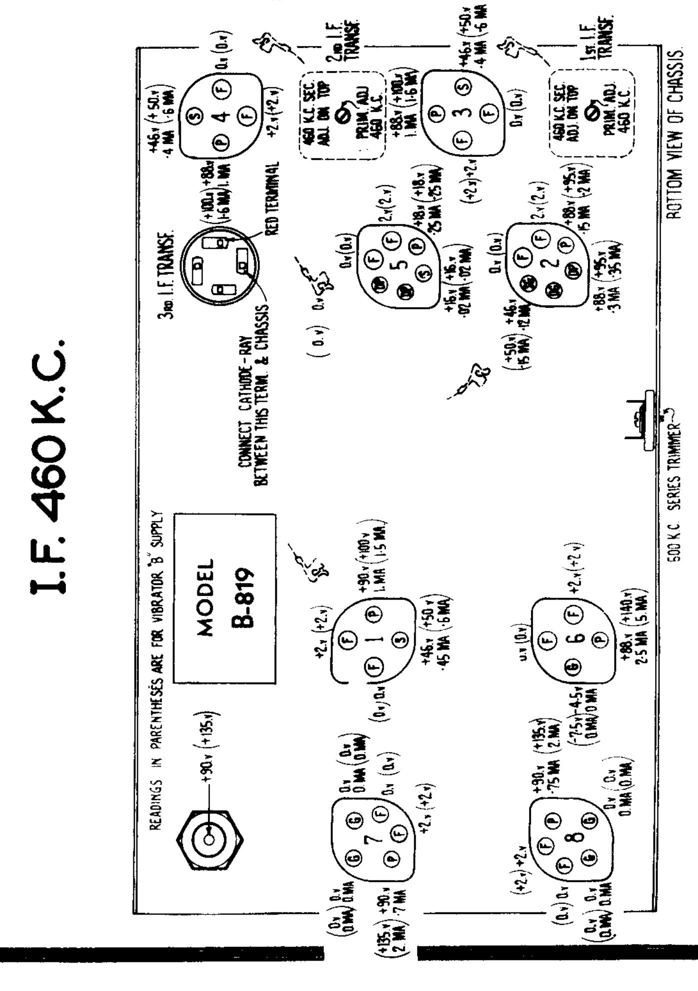
CANADIAN WESTINGHOUSE COMPANY Limited

MODEL B-819



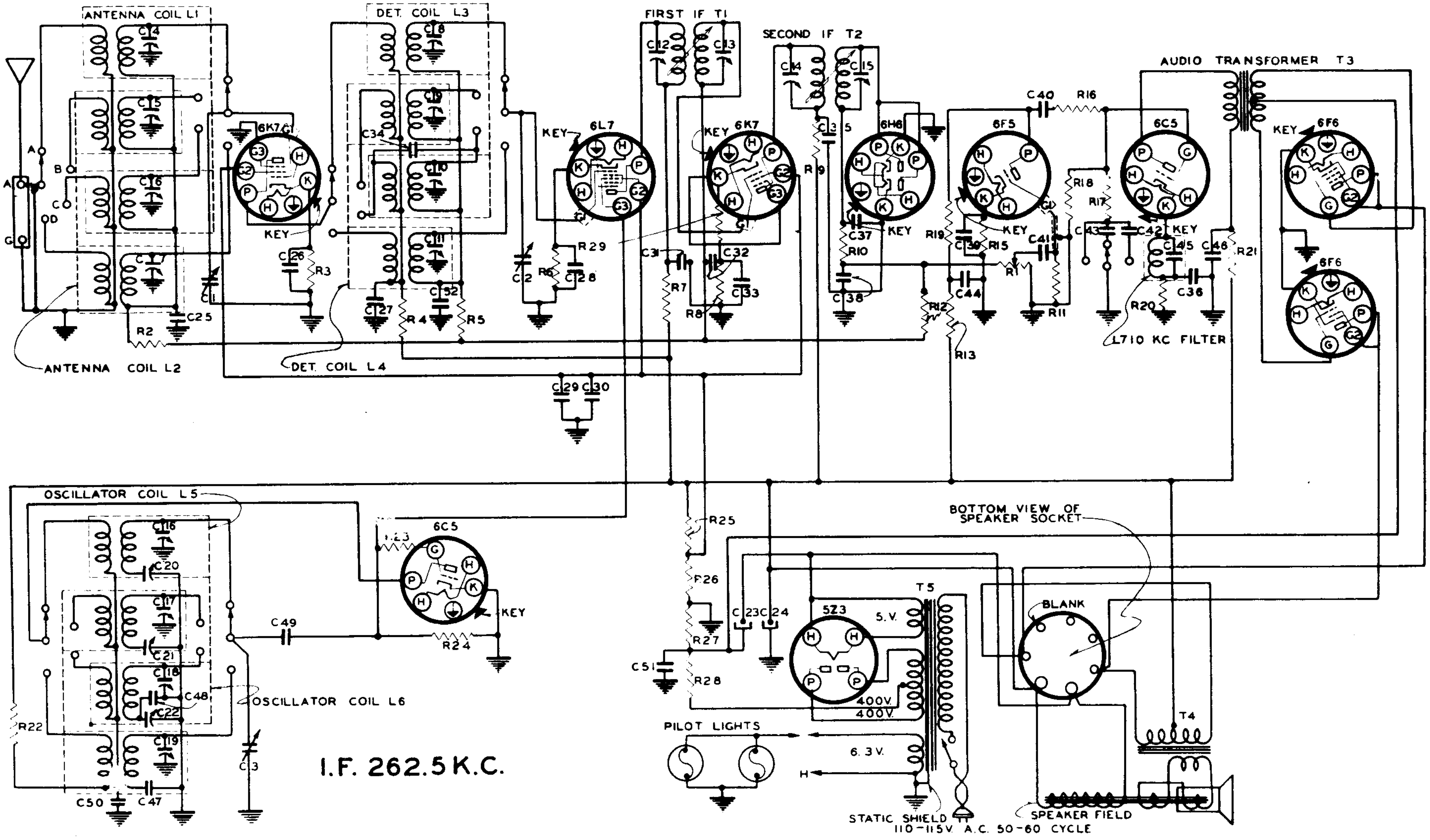


B-819---Range Selector Diagram.



CASE ELECTRIC CORPORATION

MODELS 110 & 110A



C1 C2 C3	A15001	Cond. Variable
C20 C21 C22	A15228	Cond. Variable Padder
C51	A15102	Cond. Dry Electrolytic
C36 C39 C30	A15178	Cond. Dry Electrolytic
C23	A15100	Cond. Wet Electrolytic
C24	A15101	Cond. Wet Electrolytic
C49 C37 C38	15906	Cond. Mica 100 Mmfd
C47	15911	Cond. Mica 1915 Mmfd
C48	15925	Cond. Mica 2500 Mmfd
C34	15924	Cond. Mica 20 Mmfd
C52 C41 C43	15752	Cond. Tubular .05 Mfd 200V
C32 C25	15752	Condenser Tubular .05 Mfd 200V
C40	15756	Cond. Tubular .05 Mfd 400V
C46 C35 C33 C31	15757	Cond. Tubular .1 Mfd 400V
C29 C28 C27 C50	15757	Cond. Tubular .1 Mfd 400V
C42	15760	Cond. Tubular .02 Mfd 400V
C26	15761	Cond. Tubular .1 Mfd 200V
C44	15762	Cond. Tubular .5 Mfd 400V
C45	15765	Cond. Tubular .06 Mfd 200V
C4 C6 L1	15223	Coil 1 & 3 Band Ant. in Shield
C5 C7 L2	15224	Coil 2 & 4 Band Ant. in Shield
C8 C10 L3	15221	Coil 1 & 3 Band Det. in Shield
C9 C11 L4	15222	Coil 2 & 4 Band Det. in Shield
C16 C18 L5	15219	Coil 1 & 3 Band Osc. in Shield
C17 C19 L6	15220	Coil 2 & 4 Band Osc. in Shield
R1	A15026	Control Volume
R25 R26 R27 R28	A15298	Resistor Candohm 150-320-4M-6M
R13 R24 R10	15511	Resistor Carbon 50M 1/4 Watt
R5 R2	15515	Resistor Carbon 100M 1/4 Watt
R12 R11	15517	Resistor Carbon 1 Meg. 1/4 Watt
R19 R18 R16	15523	Resistor Carbon 200M 1/4 Watt
R22	15525	Resistor Carbon 35M 1 Watt
R4 R21 R9	15526	Resistor Carbon 10M 1 Watt
R17	15529	Resistor Carbon 25M 1/4 Watt
R8 R3	15534	Resistor Carbon 230 Ohm 1/4 Watt
R29 R23	15536	Resistor Carbon 100 Ohm 1/4 Watt
R15	15539	Resistor Carbon 400 Ohm 1/4 Watt
R6	15543	Resistor Carbon 1000 Ohm 1/4 Watt
R7	15546	Resistor Carbon 40M 1 Watt
R20	15547	Resistor Carbon 1500 Ohm 1/4 Watt
T3	B15052	Transformer Audio
C12 C13 T1	15278	Transformer Input Variable IF
C14 C15 T2	15279	Transformer Output Variable IF

CASE ELECTRIC CORPORATION

MODELS 110 & 110A

TUBE COMPLEMENT

1 Type 6K7 RF Amplifier
1 Type 6C5 Oscillator
1 Type 6L7 Converter
1 Type 6K7 IF Amplifier
1 Type 6H6 Diode Detector & AVC Rectifier
1 Type 6F5 First Audio Amplifier
1 Type 6C5 Driver Amplifier
2 Type 6F6 Class A-B--push pull output
1 Type 5Z3 Rectifier

Sockets are marked for the proper tubes.

ALIGNMENT PROCEDURE

Correct alignment is of extreme importance in all wave receivers. The receivers are properly aligned at the factory with precision equipment and realignment should not be attempted by the service technician until all other causes of faulty operation are corrected.

In order to properly realign the receiver the following equipment is necessary:

1. A signal generator which will provide an accurately calibrated signal at any frequency from 262 kilocycles to 18 megacycles. The generator should have adjustable signal output.

2. An output audio voltmeter of the low voltage type to be connected across the moving coil of the speaker. This should be capable of providing a readable deflection for relatively low output levels to avoid the effects of overload.

3. An insulated or non-metallic screw driver for the adjustment of trimmers.

IF ALIGNMENT 262.5 KC

1. Connect the output meter (low scale) across the loud speaker voice coil. Turn the wave band switch (outside of tuning knob) to its left-hand or counter-clockwise position. This brings the red indicator for broadcast band to the top. Turn the volume control to its maximum position.

2. Turn the Variable Selectivity (center bottom knob) to the left or sharpest position. Put tone control on brilliant or clockwise position. With Selectivity Control held all the way to the left or counter-clockwise loosen set screws of collars, which actuate Variable Selectivity coupling and rotate until the drive cables are drawn out as far as possible without forcing. Tighten set screws in the collars. This adjustment assures maximum selectivity and should be checked before IF Alignment is done.

3. Connect the test oscillator ground to chassis and the "hot" lead from the test oscillator to the grid of the 6L7 converter tube through a series .1 Mfd condenser. Set test oscillator to 262.5 kc.

4. With Variable Selectivity Control in sharpest position adjust IF alignment screws, C14, C15, of output transformer, (directly behind tuning condenser) to maximum output reducing output of test oscillator to keep the meter reading on scale as alignment proceeds.

5. Adjust alignment screws, C12, C13, of input transformer T1, (adjacent to electrolytic condenser) to maximum output as described above.

6. Readjust all four alignment screws to insure accurate alignment. Always use the lowest possible output from the test oscillator to preclude the possibility of automatic volume control action confusing proper adjustment.

RF ALIGNMENT (Broadcast "A" or "Red" Band)

1. With test oscillator connecting antenna post through .00025 Mfd. as above set signal generator to 1400 kc.

2. Set dial scale, hour and minute hands, to 6 o'clock when gang condenser is fully meshed at maximum capacitance.

3. Set dial to calibration mark 1400 kc using hour hand to indicate frequency (no further attention need be paid to position of minute hand which is used merely for convenience in logging stations by "TIME"). Adjust broadcast oscillator trimmer condenser C16, for maximum output meter reading. If it is found that two peaks occur within the range of the trimmer action use the one in which the trimmer is in its lowest capacitance or counter-clockwise position.

4. Adjust detector input trimmer C8, to a maximum.

5. Adjust the antenna stage trimmer C4, to a maximum.

6. Set test oscillator to 600 kc and tune in the signal, then adjust broadcast oscillator padder C20, for maximum output. This padder is mounted under the chassis at the front of receiver. Rock the condenser back and forth a degree or two in order to obtain proper maximum.

TUBE	E_f	E_k	E_g SCREEN	E_g SUPPRESSOR	E_p TRIODE	E_p PENTODE
6K7	6.3	2.5	110	2.5		215
6C5	6.3					100
6L7	6.3	5	110			215
6K7	6.3	3	110			235
6H6	6.3					
6F5	6.3	1.5				110
6C5	6.3	8.5				235
6F6		32			310	
5Z3	5					400

7. Repeat the 1400 kc adjustments described under 3, 4, 5, for greater accuracy. The output of the test oscillator should always be kept at the lowest output which will allow sufficient meter swing since this assures greater accuracy of adjustment.

Short Wave "B" or "Green" Band

1. Turn the wave band switch to the "B" or "Green" position. Leave the oscillator connected as above but with its output set to 4000 kc and the .00025 Mfd. Condenser replaced by a 400 Ohm resistor. Set dial scale to 4 mc on the green band, adjust "B" band oscillator trimmer condenser C17, for maximum output observing as before that the proper point occurs at the minimum or counter-clockwise position of the screw if two points are found.

2. Adjust detector input "B" band trimmer condenser C9, to a maximum while rocking the tuning condenser slightly for maximum response.

3. Adjust antenna stage "B" band trimmer C5, for maximum output.

4. Set the test oscillator to 1600 kc and tune in the signal. Adjust "B" band oscillator padder condenser C21, for maximum output while rocking tuning condenser as described above.

5. Repeat operations 1, 2, 3, to assure precise alignment.

Short Wave "C" or "Yellow" Band

1. With test oscillator connected same as for "B" band and set to 9000 kc (9 mc) set dial scale to 9 mc on yellow band.

2. Adjust "C" band oscillator trimming condenser C18, for maximum response. Use lower capacity or counter-clockwise response point.

3. Adjust "C" band detector input trimmer C10, to a maximum, "rocking" tuning adjustment to obtain greatest output.

4. Adjust antenna "C" band trimmer C6, for maximum response.

5. Set test oscillator to 4000 kc (4 mc) and tune in the signal. Adjust "C" band padder condenser C22, for maximum output while rocking tuning condenser as described above.

6. Repeat operations 1, 2, 3, 4, to assure precise alignment.

Short Wave "D" or "Blue" Band

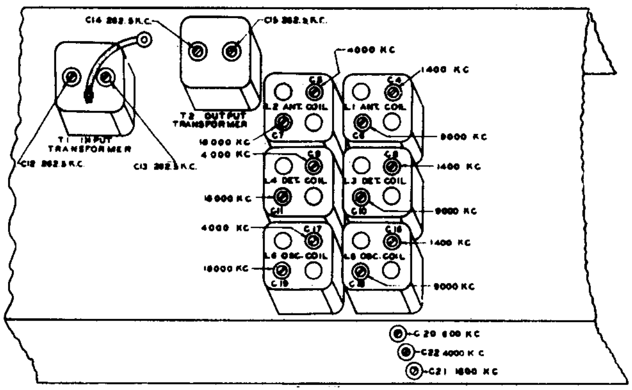
1. With test oscillator connected as for "B" and "C" bands and set to 18000 kc (18 mc) set dial scale to 18 mc on blue band.

2. Adjust "D" band oscillator trimmer C19, for maximum response. Use lower capacity or counter-clockwise response point.

3. Adjust "D" band detector input trimmer C11, to a maximum. "rocking" tuning adjustment to obtain greatest output.

4. Adjust "D" band antenna trimmer C7, for maximum response.

5. Repeat operations 1, 2. 3. 4, to assure precise alignment.



In the event of failure of the receiver, time may often be saved by making a few preliminary checks before removal of the chassis and speaker from the cabinet.

1. Check the antenna and ground connections both at the receiver and also at all points where joints have been made. Noisy operation can often be traced to faults in antenna and ground installation especially when the receiver has been connected to an old antenna.

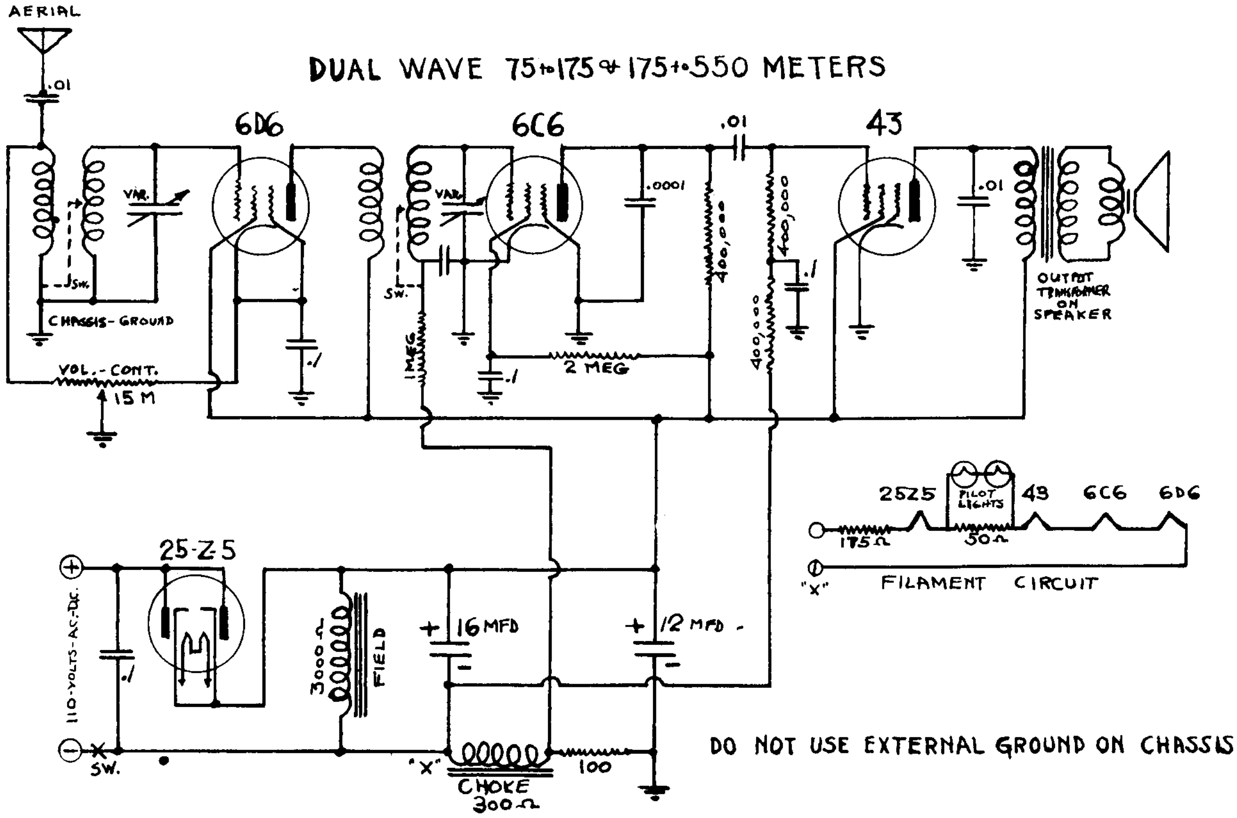
2. Check the tubes. If a reliable tube checking instrument is not at hand, secure a set of known good tubes and interchange the tubes in the receiver, one at a time, until the defective tube is located. Low sensitivity can often be traced to gas or grid current in an RF, first detector or IF tube. Hum is often due to heater-cathode shorts in any one of the tubes.

If the above checks to not disclose the reason for failure of the receiver remove the chassis and speaker from the cabinet and check the supply voltages as indicated on the chart. To assist in the location of the various tube prongs, the schematic diagram tube symbols have been so drawn as to represent the socket as viewed from the bottom of the chassis.

CHAMPION RADIO

MODEL 4 TUBE A.C.-D.C.

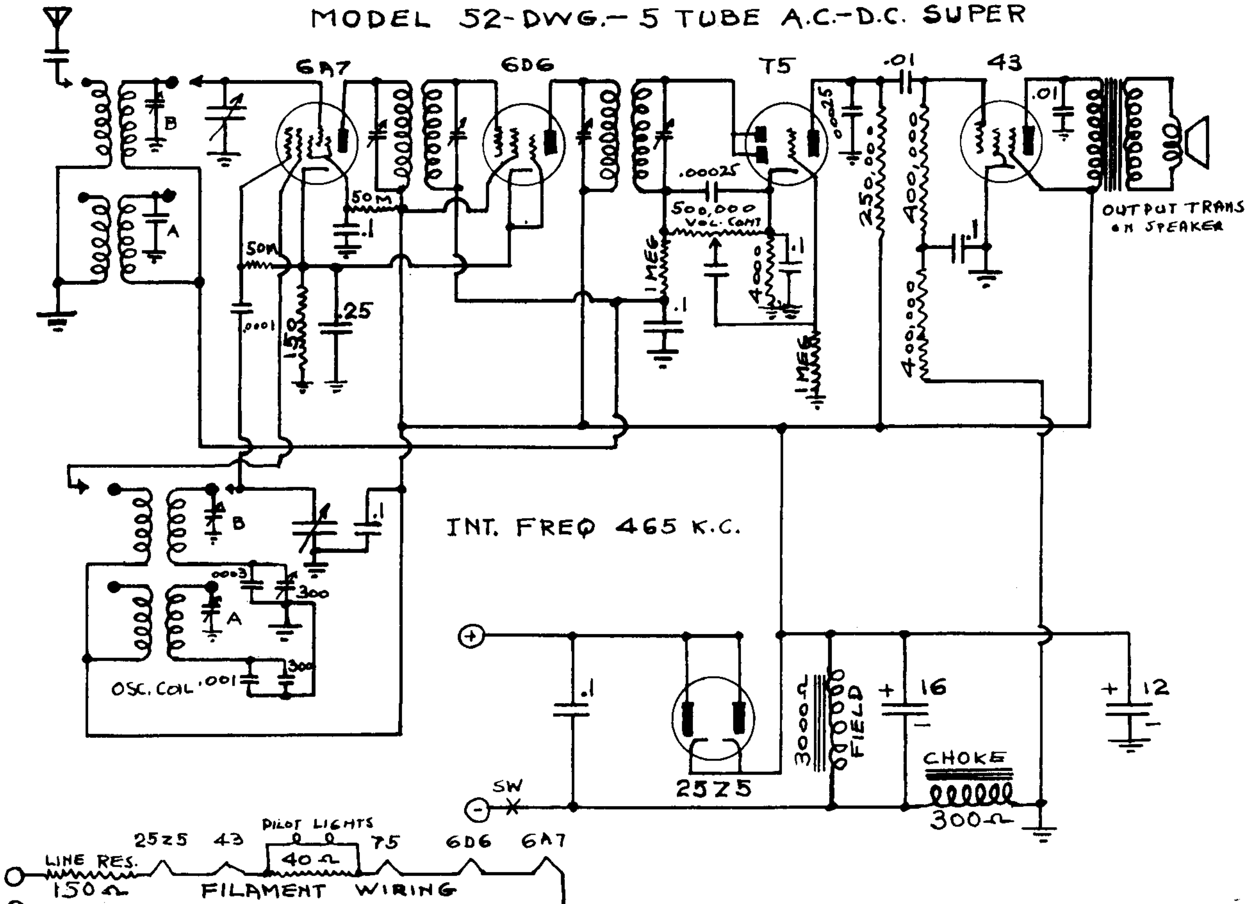
DUAL WAVE 75 to 175 & 175 to 550 METERS



DO NOT USE EXTERNAL GROUND ON CHASSIS

MODEL 52 DWG

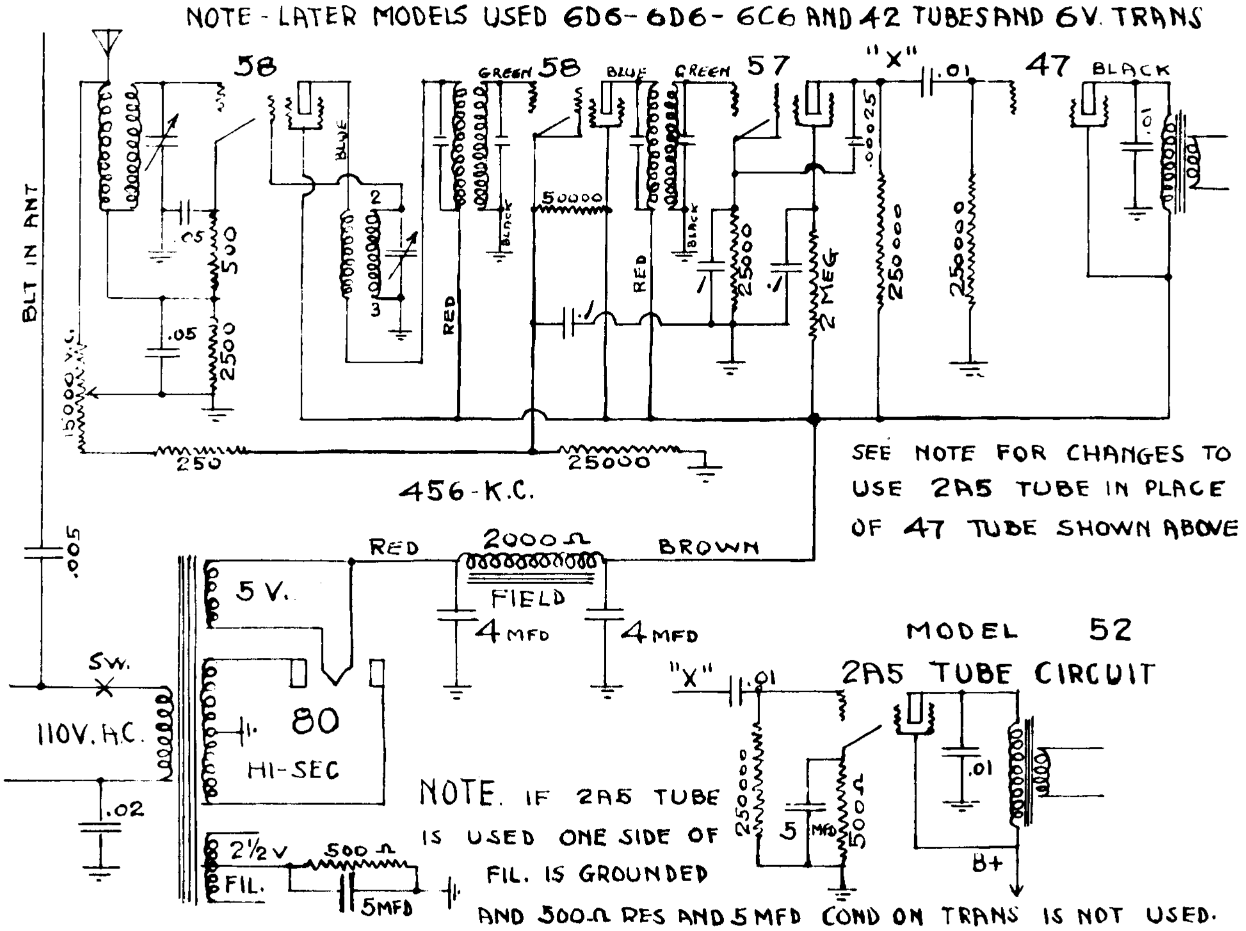
MODEL 52-DWG.– 5 TUBE A.C.-D.C. SUPER



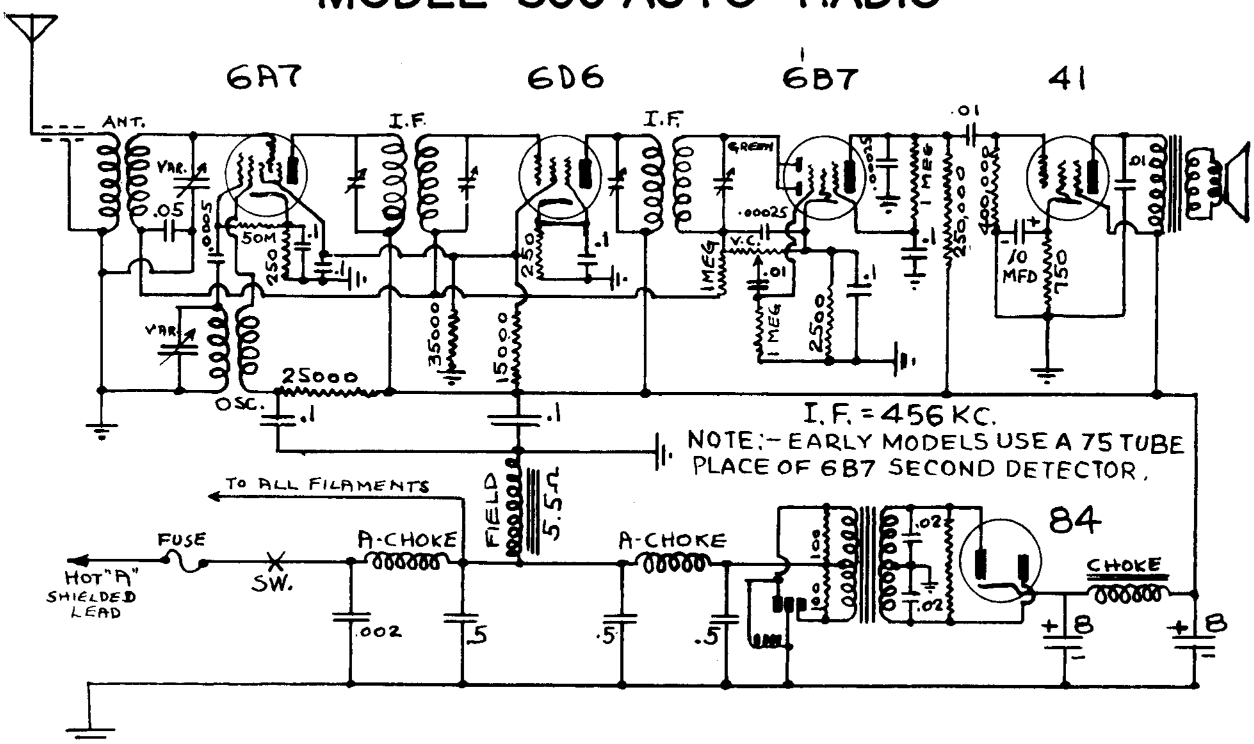
LAKEWOOD OHIO

CHAMPION RADIO
MODEL 52

NOTE - LATER MODELS USED 6D6 - 6D6 - 6C6 AND 42 TUBES AND 6V. TRANS



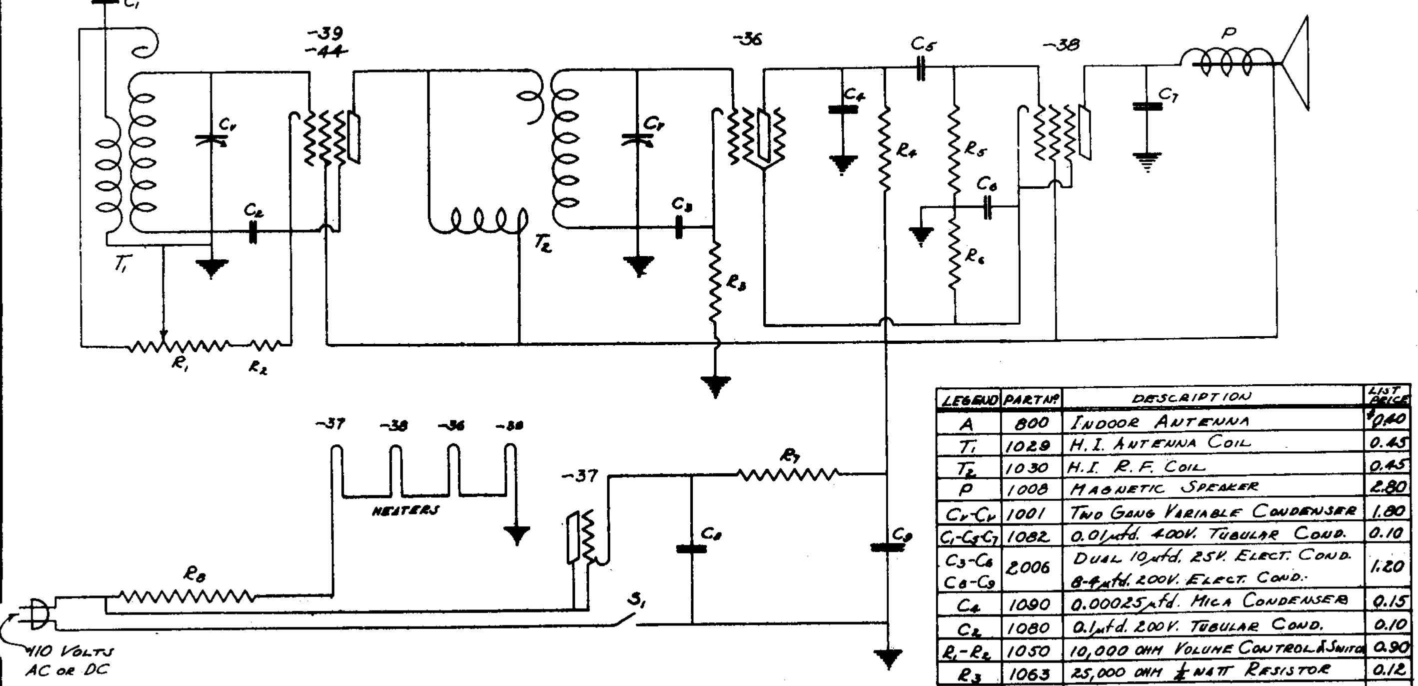
MODEL 500 AUTO RADIO



POWER UNIT COMPLETELY SHIELDED

CLIMAX RADIO & TELEVISION CO., Inc.

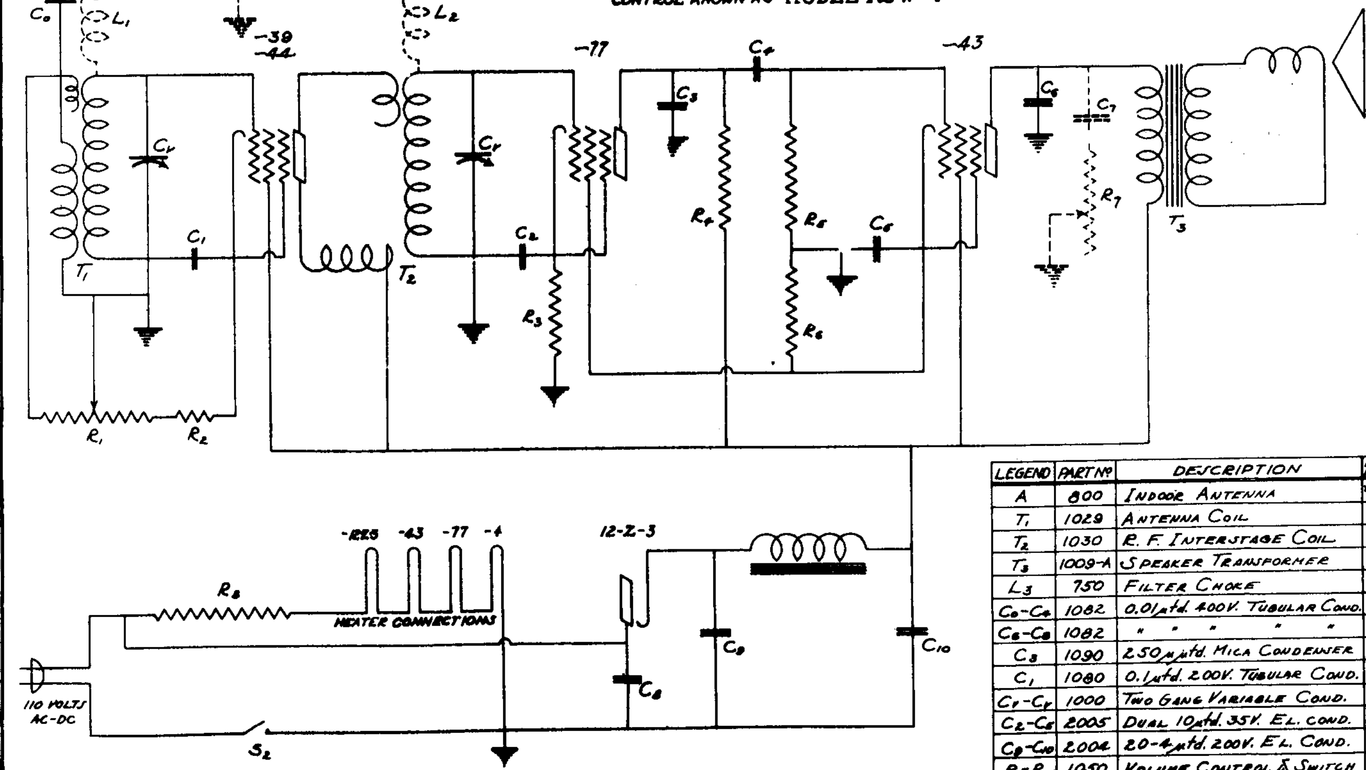
MODEL M-4



LEGEND	PART Nº	DESCRIPTION	LIST PRICE
A	800	INDOOR ANTENNA	$0.40
T_1	1029	H.I. ANTENNA COIL	0.45
T_2	1030	H.I. R.F. COIL	0.45
P	1008	MAGNETIC SPEAKER	2.80
C_V-C_V	1001	TWO GANG VARIABLE CONDENSER	1.80
C_1-C_5-C_7	1082	0.01 mfd. 400V. TUBULAR COND.	0.10
C_3-C_6 C_8-C_9	2006	DUAL 10 mfd. 25V. ELECT. COND. 8-4 mfd. 200V. ELECT. COND.	1.20
C_4	1090	0.00025 mfd. MICA CONDENSER	0.15
C_2	1080	0.1 mfd. 200V. TUBULAR COND.	0.10
R_1-R_2	1050	10,000 OHM VOLUME CONTROL & SWITCH	0.90
R_3	1063	25,000 OHM ½ WATT RESISTOR	0.12
R_4	1061	500,000 " " " "	0.12
R_5	1062	1 MEGOHM " " "	0.12
R_6	1068	1000 OHM ½ " "	0.15
R_7	1069	600 " " " "	0.15
R_8	1066	285 OHM RESISTOR LINE CORD	0.75

MODELS A-4 & ASW-4

DOTTED LINES INDICATE ADDITIONAL CONNECTIONS FOR SHORT WAVE AND TONE CONTROL KNOWN AS MODEL ASW-4



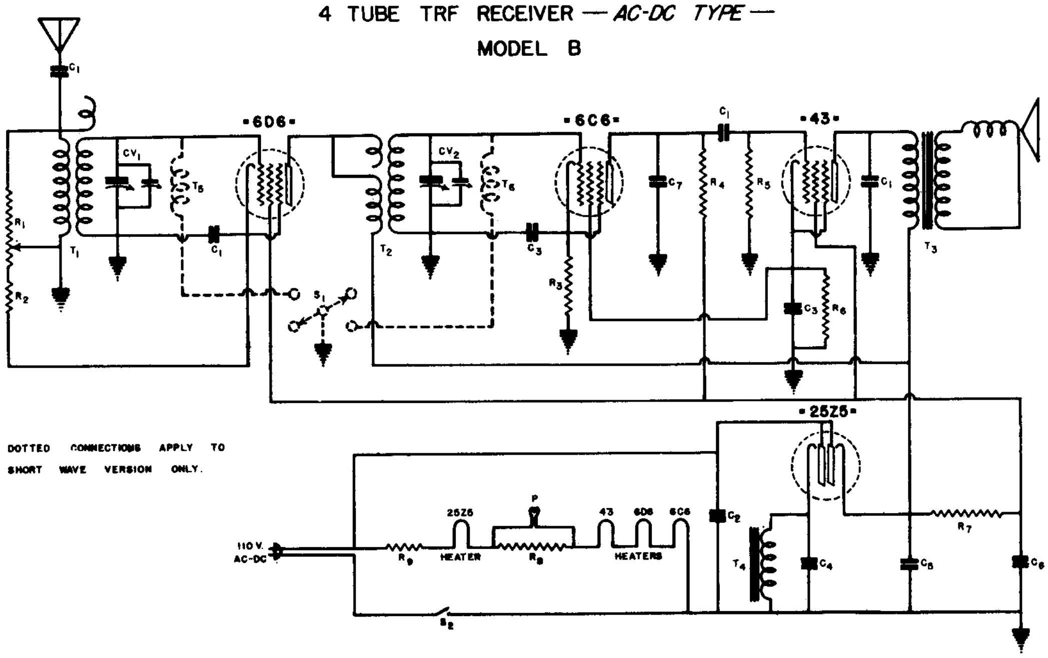
LEGEND	PART Nº	DESCRIPTION	LIST PRICE
S_1	1051	SELECTOR SWITCH ON TONE CONTROL	$1.00
L_1-L_2	1031	SHORT WAVE SHUNTS	0.15
	1009	DYNAMIC SPEAKER	3.60
C_7	1083	0.05 mfd. 400V. TUBULAR COND.	0.10
S_2		AC SWITCH ON VOLUME CONTROL	

LEGEND	PART Nº	DESCRIPTION	LIST PRICE
A	800	INDOOR ANTENNA	$0.40
T_1	1029	ANTENNA COIL	0.45
T_2	1030	R. F. INTERSTAGE COIL	0.45
T_3	1009-A	SPEAKER TRANSFORMER	0.65
L_3	750	FILTER CHOKE	0.60
C_0-C_4	1082	0.01 mfd. 400V. TUBULAR COND.	0.10
C_6-C_8	1082	" " " " "	0.10
C_3	1090	250 mmfd. MICA CONDENSER	0.15
C_1	1080	0.1 mfd. 200V. TUBULAR COND.	0.10
C_V-C_V	1000	TWO GANG VARIABLE COND.	1.80
C_2-C_5	2005	DUAL 10 mfd. 35V. EL. COND.	0.60
C_9-C_{10}	2004	20-4 mfd. 200V. EL. COND.	1.20
R_1-R_2	1050	VOLUME CONTROL & SWITCH	0.90
R_3	1063	25,000 OHM ½ WATT RESISTOR	0.12
R_4	1062	1 MEGOHM ½ WATT "	0.12
R_5	1061	½ " " " "	0.12
R_6	1069	600 OHM ½ " "	0.15
R_7	1051	50,000 OHM TONE CONTROL	1.00
R_8	1067	200 OHM LINE CORD & PLUG	0.85

CLIMAX RADIO & TELEVISION CO., Inc.

4 TUBE TRF RECEIVER — *AC-DC TYPE* —

MODEL B



DOTTED CONNECTIONS APPLY TO SHORT WAVE VERSION ONLY.

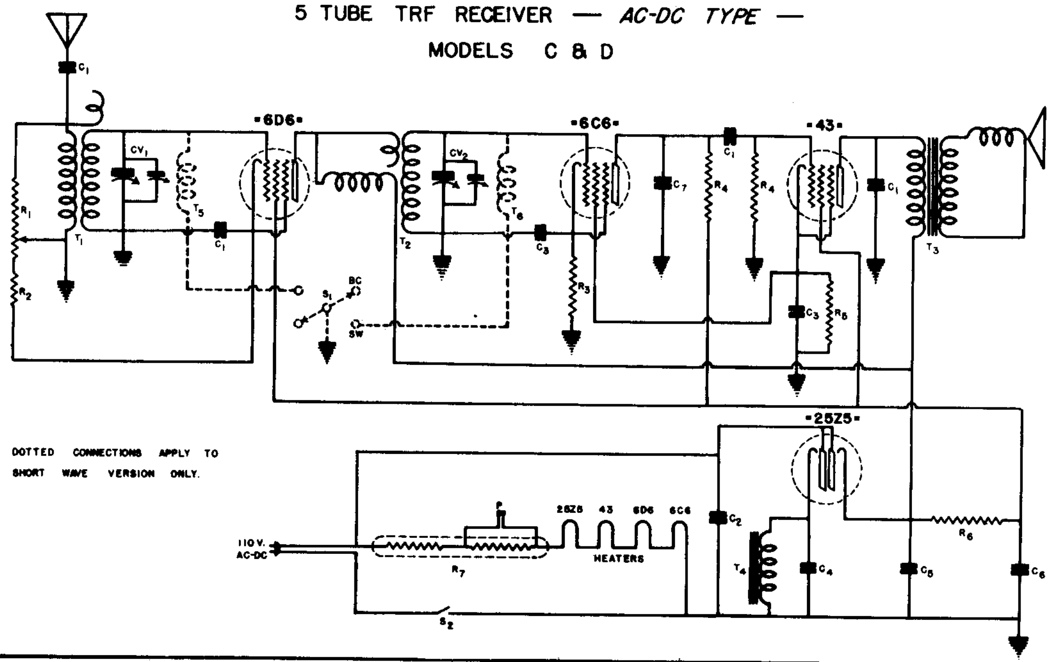
LEGEND	OUR PART NO.	DESCRIPTION
R_1	2006	10,000 OHM VOLUME CONTROL
R_2	—	275 OHM (Minim. on Volume Control)
R_3	111	25,000 OHM ½ WATT CARBON RESISTOR
R_4	117	500,000 OHM ½ WATT CARBON RESISTOR
R_5	141	350,000 OHM ½ WATT CARBON RESISTOR
R_6	104	600 OHM ½ WATT CARBON RESISTOR
R_7	109	5,000 OHM ½ WATT CARBON RESISTOR
R_8	142	90 OHM 2 WATT WIRE WOUND RES.
R_9	1607	165 OHM RESISTOR CORD

LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	610	2 GANG VARIABLE CONDENSER
C_1	211	.01 MFD. 400V. TUBULAR CONDENSER
C_2	210	.1 MFD. 400V. TUBULAR CONDENSER
C_3	1N 316	5 MFD. 25V. ELECTROLYTIC CONDENSER
C_4	1N 316	4 MFD. 150V. ELECTROLYTIC CONDENSER
C_5	1N 316	14 MFD. 150V. ELECTROLYTIC CONDENSER
C_6	1N 316	8 MFD. 150V. ELECTROLYTIC CONDENSER
C_7	401	.00025 MFD. MICA CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
S_1	1914	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
T_1	1200	ANTENNA COIL
T_2	1300	R.F. COIL
T_3	1N 810	SPEAKER OUTPUT TRANSFORMER
T_4	1N 810	SPEAKER FIELD (2500 OHMS)
T_5	1612	SHORT WAVE ANTENNA SHUNT
T_6	1612	SHORT WAVE R.F. SHUNT
P	2902	MAZDA #46 PILOT LIGHT

5 TUBE TRF RECEIVER — *AC-DC TYPE* —

MODELS C & D



DOTTED CONNECTIONS APPLY TO SHORT WAVE VERSION ONLY.

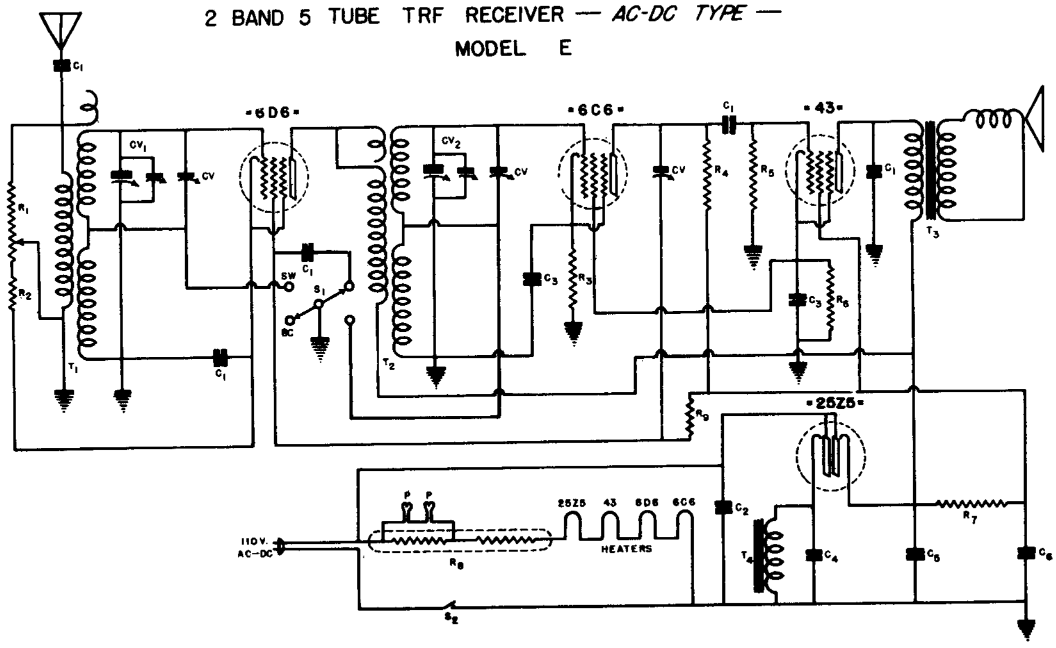
LEGEND	OUR PART NO.	DESCRIPTION
R_1	2006	10,000 OHM VOLUME CONTROL
R_2	—	275 OHM (Minimum on Volume Control)
R_3	111	25,000 OHM ½ WATT CARBON RESISTOR
R_4	117	500,000 OHM ½ WATT CARBON RESISTOR
R_5	104	600 OHM ½ WATT CARBON RESISTOR
R_6	109	5000 OHM ½ WATT CARBON RESISTOR
R_7	2803	L-55-B BALLAST TUBE
P	2902	MAZDA #46 PILOT LIGHT

LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	607	2 GANG VARIABLE CONDENSER
C_1	211	.01 MFD. 400V. TUBULAR CONDENSER
C_2	210	.1 MFD. 400V. TUBULAR CONDENSER
C_3	1N 316	5 MFD. 25 W.V. ELECTROLYTIC CONDENSER
C_4	1N 316	4 MFD. 150 W.V. ELECTROLYTIC CONDENSER
C_5	1N 316	14 MFD. 150 W.V. ELECTROLYTIC CONDENSER
C_6	1N 316	8 MFD. 150 W.V. ELECTROLYTIC CONDENSER
C_7	401	.00025 MFD. MICA CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
S_1	1914	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
T_1	1204	ANTENNA COIL
T_2	1304	RF COIL
T_3	1N 810	SPEAKER OUTPUT TRANSFORMER
T_4	1N 810	SPEAKER FIELD (2500 OHMS)
T_5	1206	SHORT WAVE ANTENNA SHUNT
T_6	1306	SHORT WAVE RF SHUNT

CLIMAX RADIO & TELEVISION CO., Inc.

2 BAND 5 TUBE TRF RECEIVER — *AC-DC TYPE* —
MODEL E

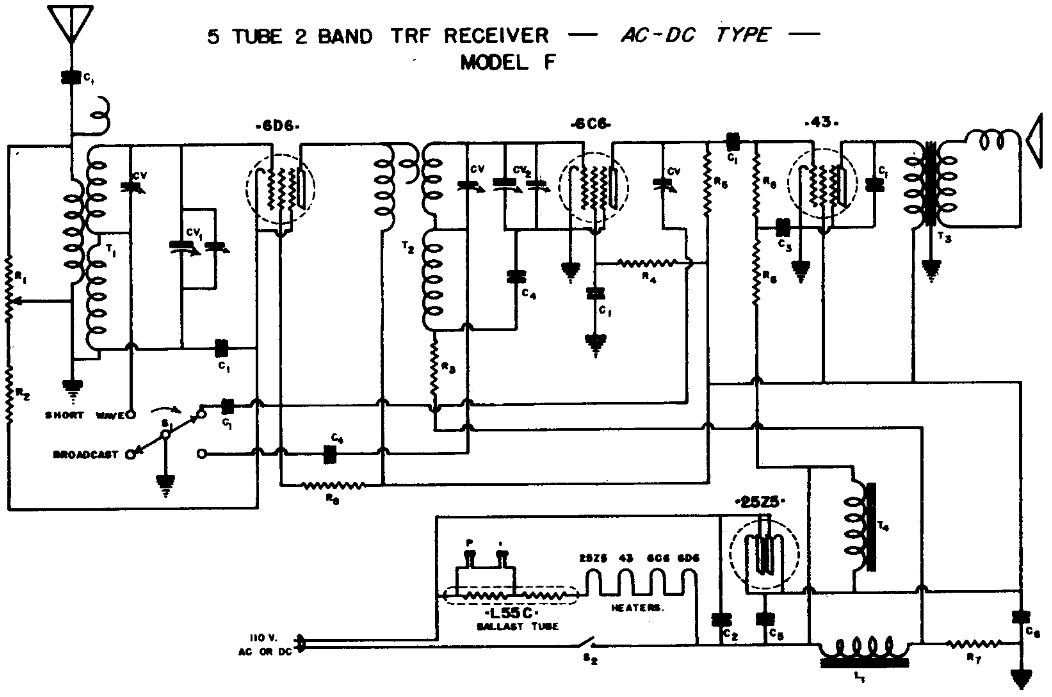


LEGEND	OUR PART NO.	DESCRIPTION
R_1	2006	10,000 OHM VOLUME CONTROL
R_2	—	275 OHM (Minimum on Volume Control)
R_3	111	25,000 OHM ½ WATT CARBON RESISTOR
R_4	117	500,000 OHM ½ WATT CARBON RESISTOR
R_5	141	350,000 OHM ½ WATT CARBON RESISTOR
R_6	104	600 OHM ½ WATT CARBON RESISTOR
R_7	106	5000 OHM ½ WATT CARBON RESISTOR
R_8	2904	L-55-C BALLAST TUBE

LEGEND	OUR PART NO.	DESCRIPTION
R_9	110	15,000 OHM ¼ WATT CARBON RESISTOR
CV_1 CV_2	616	2 GANG VARIABLE CONDENSER
CV	500	5-30MMFD. TRIMMER CONDENSER
C_1	211	.01 MFD. 400V. TUBULAR CONDENSER
C_2	210	.1 MFD. 400V. TUBULAR CONDENSER
C_3	IN 316	5 MFD. 25 WV. ELECTROLYTIC CONDENSER
C_4	IN 316	4 MFD. 160 WV. ELECTROLYTIC CONDENSER
C_5	IN 316	4 MFD. 160 WV. ELECTROLYTIC CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
C_6	IN 316	8 MFD. 160 WV. ELECTROLYTIC CONDENSER
S_1	1914	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
T_1	1218	2 BAND ANTENNA COIL
T_2	1311	2 BAND R.F. COIL
T_3	IN 810	SPEAKER OUTPUT TRANSFORMER
T_4	IN 810	SPEAKER FIELD (2500 OHMS)
P	2902	MAZDA # 46 PILOT LIGHT

5 TUBE 2 BAND TRF RECEIVER — *AC-DC TYPE* —
MODEL F



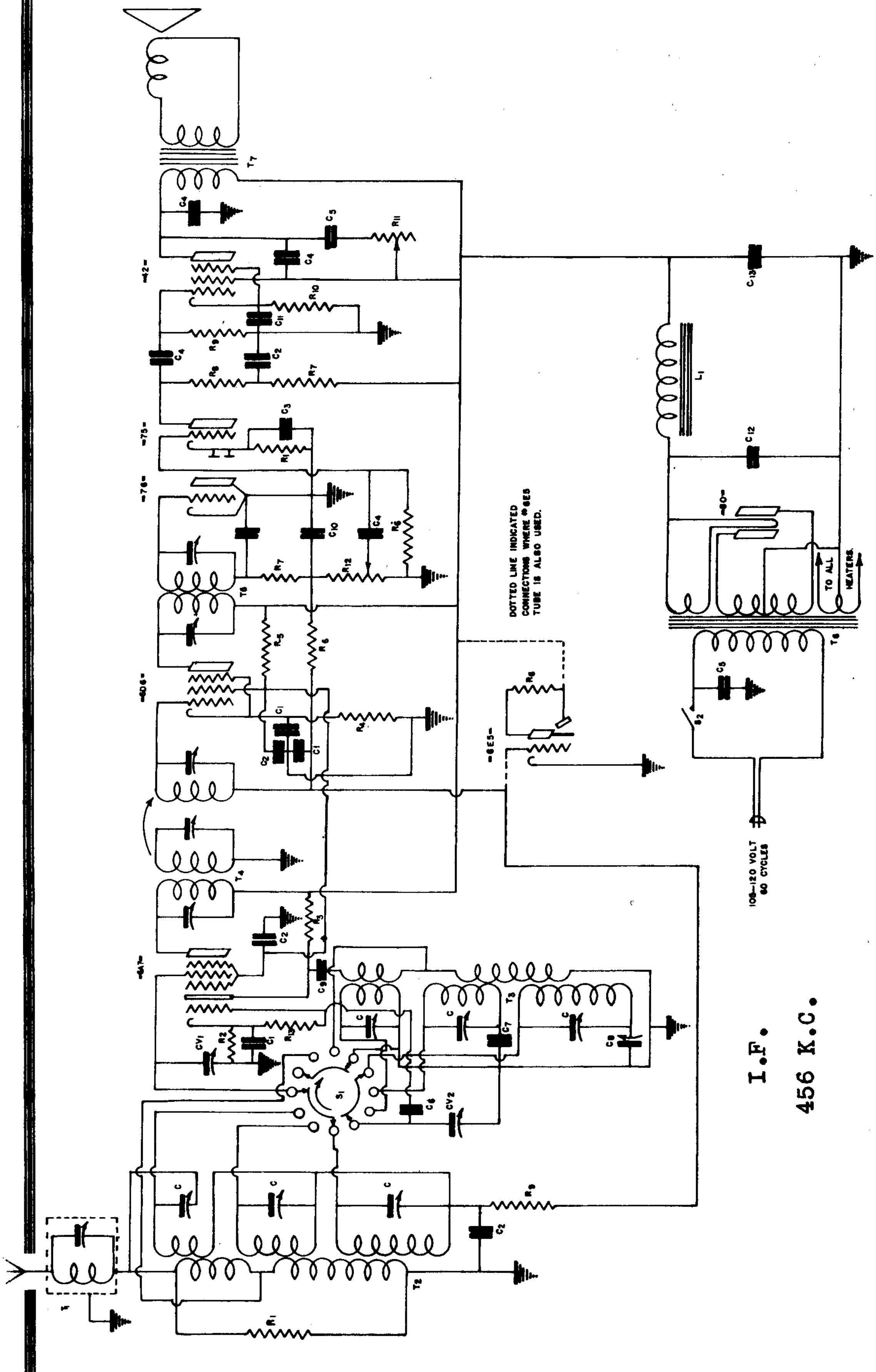
LEGEND	OUR PART NO.	DESCRIPTION
R_1	2006	10,000 OHM VOLUME CONTROL
R_2	—	275 OHM (Minimum on Volume Control)
R_3	119	1 MEGOHM ½ WATT CARBON RESISTOR
R_4	120	3 MEGOHM ½ WATT CARBON RESISTOR
R_5	117	½ MEGOHM ¼ WATT CARBON RESISTOR
R_6	116	¼ MEGOHM ¼ WATT CARBON RESISTOR
R_7	139	65 OHM ½ WATT WIRE WOUND RESIS.
R_8	110	15,000 OHM ¼ WATT CARBON RESISTOR

LEGEND	OUR PART NO.	DESCRIPTION
CV	500	5-30MMFD. TRIMMER CONDENSER
CV_1 CV_2	615	TWO GANG VARIABLE CONDENSER
C_1	211	.01 MFD 400V. TUBULAR CONDENSER
C_2	210	.1 MFD 400V. TUBULAR CONDENSER
C_3	204	.25 MFD 200V. TUBULAR CONDENSER
C_4	203	.1 MFD 200V. TUBULAR CONDENSER
C_5	311	20 MFD 150V. ELECTROLYTIC COND.
C_6	314	10 MFD 150V. ELECTROLYTIC COND.

LEGEND	OUR PART NO.	DESCRIPTION
T_4	IN 800	SPEAKER FIELD (2500 OHM)
L_1	1100	IRON CORE FILTER CHOKE
S_1	1914	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
T_1	1212	BC & SW ANTENNA COIL
T_2	1306	BC & SW RF COIL
T_3	IN 800	SPEAKER OUTPUT TRANSFORMER
P	2900	MAZDA # 46 PILOT LIGHT

CLIMAX RADIO & TELEVISION CO., Inc.

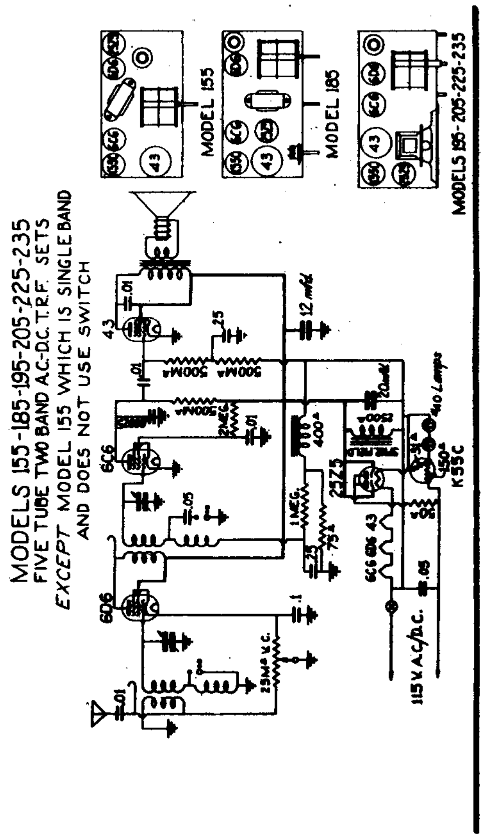
MODELS 90-99 3 BAND SUPERHETERODYNE RECEIVER *AC* TYPE

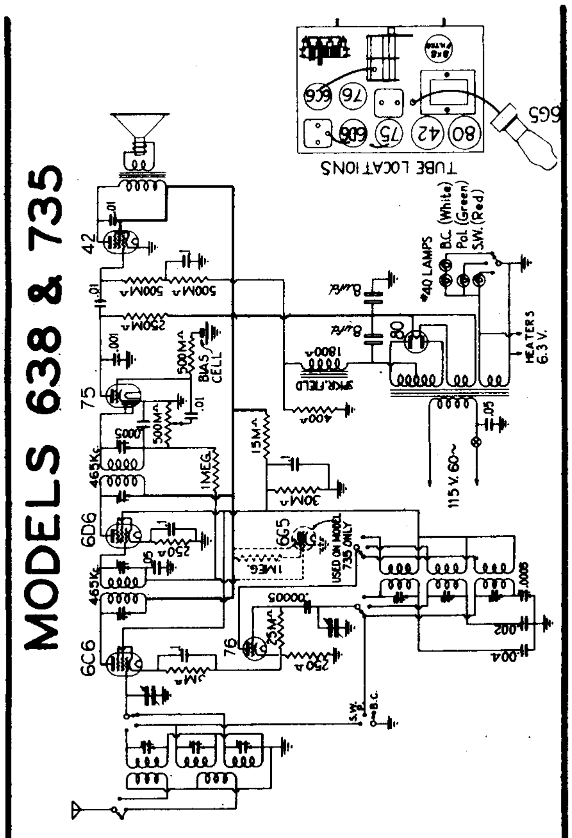


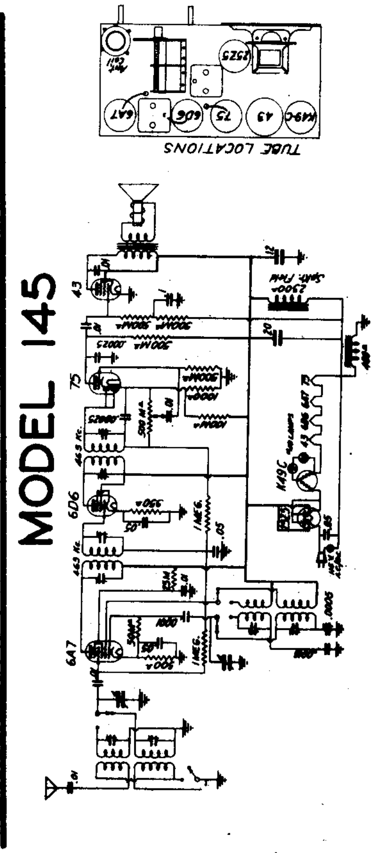
I.F. 456 K.C.

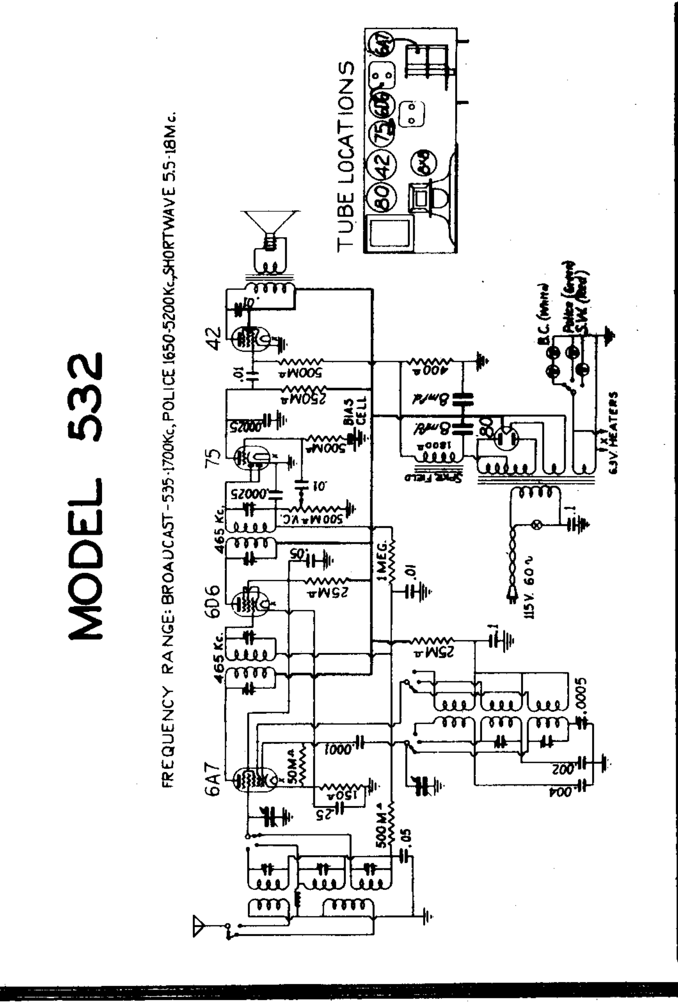
LEGEND	OUR PART NO.	DESCRIPTION
R_1	108	5,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_2	103	250 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_3	109	10,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	101	150 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_5	112	25,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_6	119	1 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	113	50,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_8	116	$\frac{1}{4}$ MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_9	117	$\frac{1}{2}$ MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_{10}	122	420 OHM 2 WATT CARBON RESISTOR
R_{11}	2008	TONE CONTROL
R_{12}	2007	500,000 OHM VOLUME CONTROL
R_{13}	111	30,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
CV_1 CV_2	608	TWO GANG VARIABLE CONDENSER
C	501	30 MMFD. MAX. TRIPLE CONDENSER
C_1	203	.1 MFD. 200 VOLT TUBULAR CONDENSER
C_2	210	.1 MFD. 400 VOLT TUBULAR CONDENSER
C_3	204	.25MFD. 200 VOLT TUBULAR CONDENSER
C_4	201	.01 MFD. 600 VOLT TUBULAR CONDENSER
C_5	206	.05 MFD. 400 VOLT TUBULAR CONDENSER
C_6	400	.0001 MFD. MICA CONDENSER
C_7	404	.002 MFD. MICA CONDENSER
C_8	502	5 PLATE PADDING CONDENSER
C_9	403	.001 MFD. MICA CONDENSER
$C_{11-12-13}$	302	10 MFD. 35 VOLT— 10 MFD. AND 4 MFD. 500 VOLT ELECTROLYTIC CONDENSER
C_{10}	401	.00025 MFD. MICA CONDENSER.
T_1	1602	SERIES WAVE TRAP
T_2	1203	3 BAND ANTENNA COIL
T_3	1403	3 BAND OSCILLATOR COIL
T_4	1504	TRIPLE TUNE I.F. TRANSFORMER
T_5	1503	DIODE I.F. TRANSFORMER
T_6	1000	POWER TRANSFORMER
T_7	8504	DYNAMIC SPEAKER TRANSFORMER
L_1	850	1800 OHM SPEAKER FIELD
S_1	1905	BAND SELECTOR SWITCH

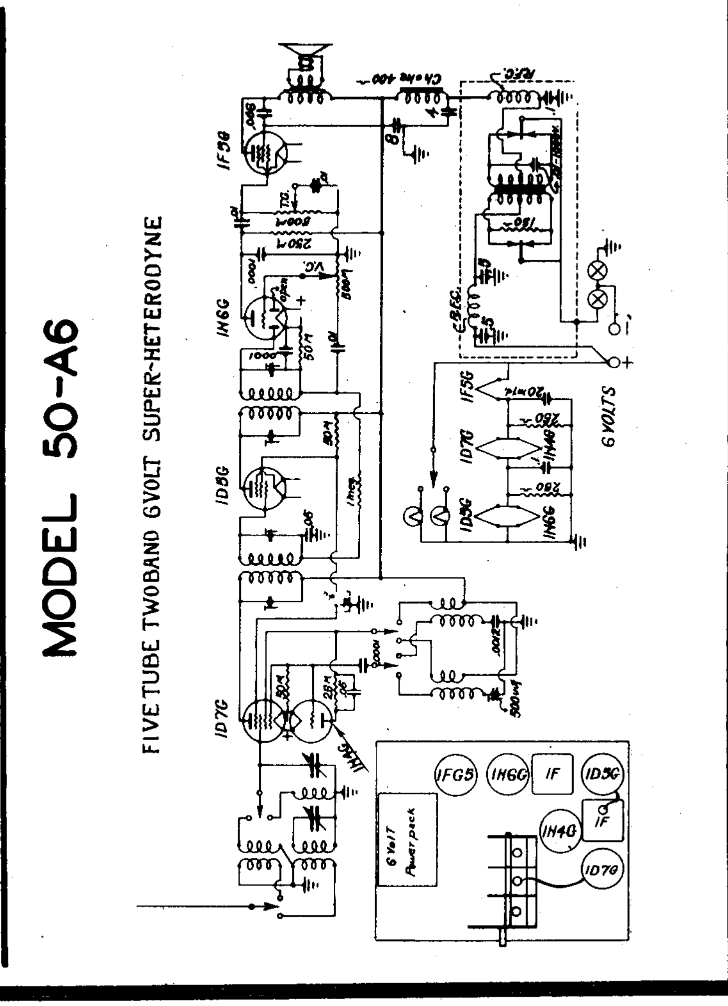
CLINTON MANUFACTURING CO., Inc.







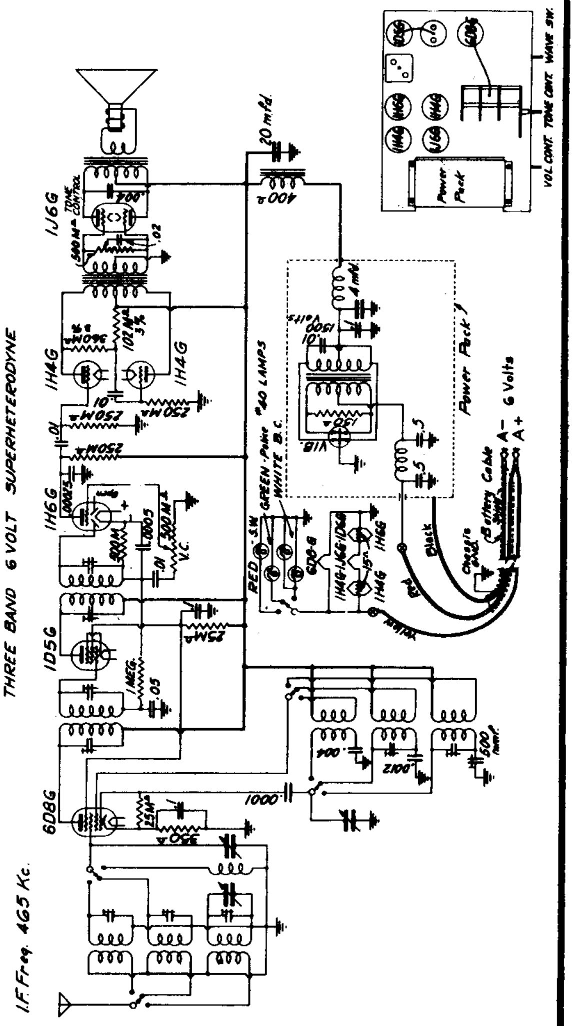




CLINTON MANUFACTURING CO., Inc.

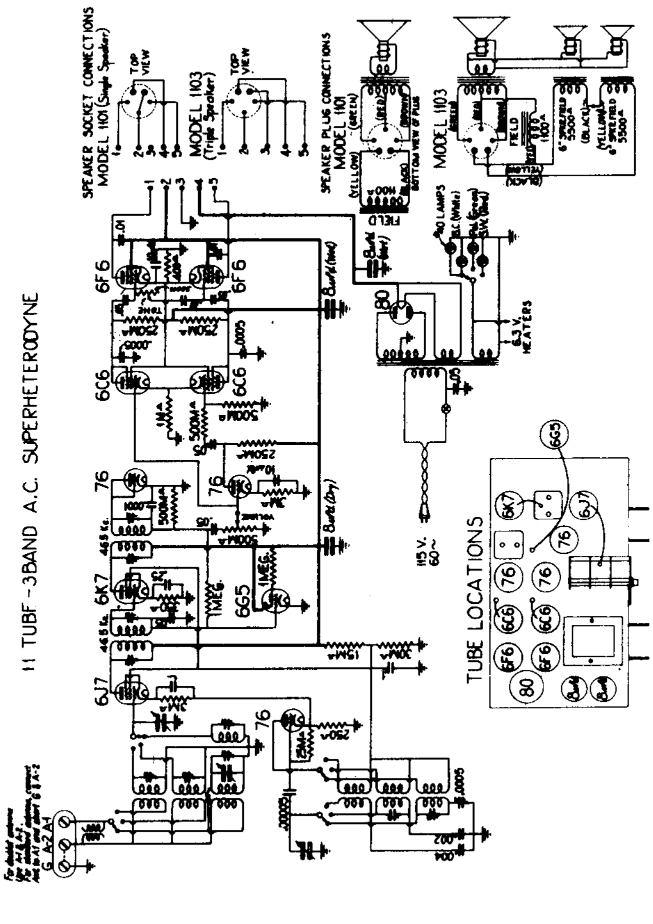
MODEL 61-A6

THREE BAND 6 VOLT SUPERHETERODYNE

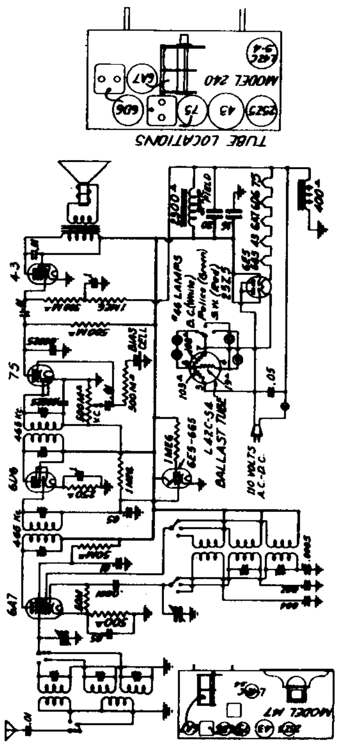


MODELS 1101 & 1103

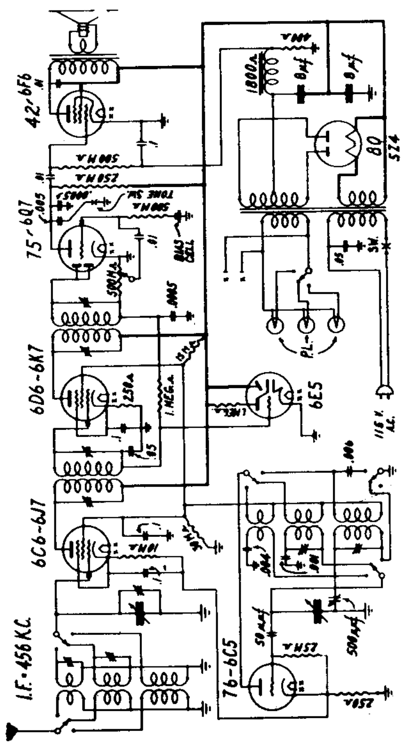
11 TUBE - 3BAND A.C. SUPERHETERODYNE



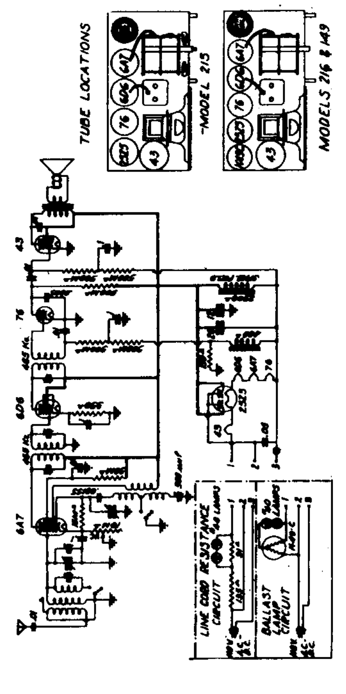
MODELS 147 & 240



MODELS 601 & 701



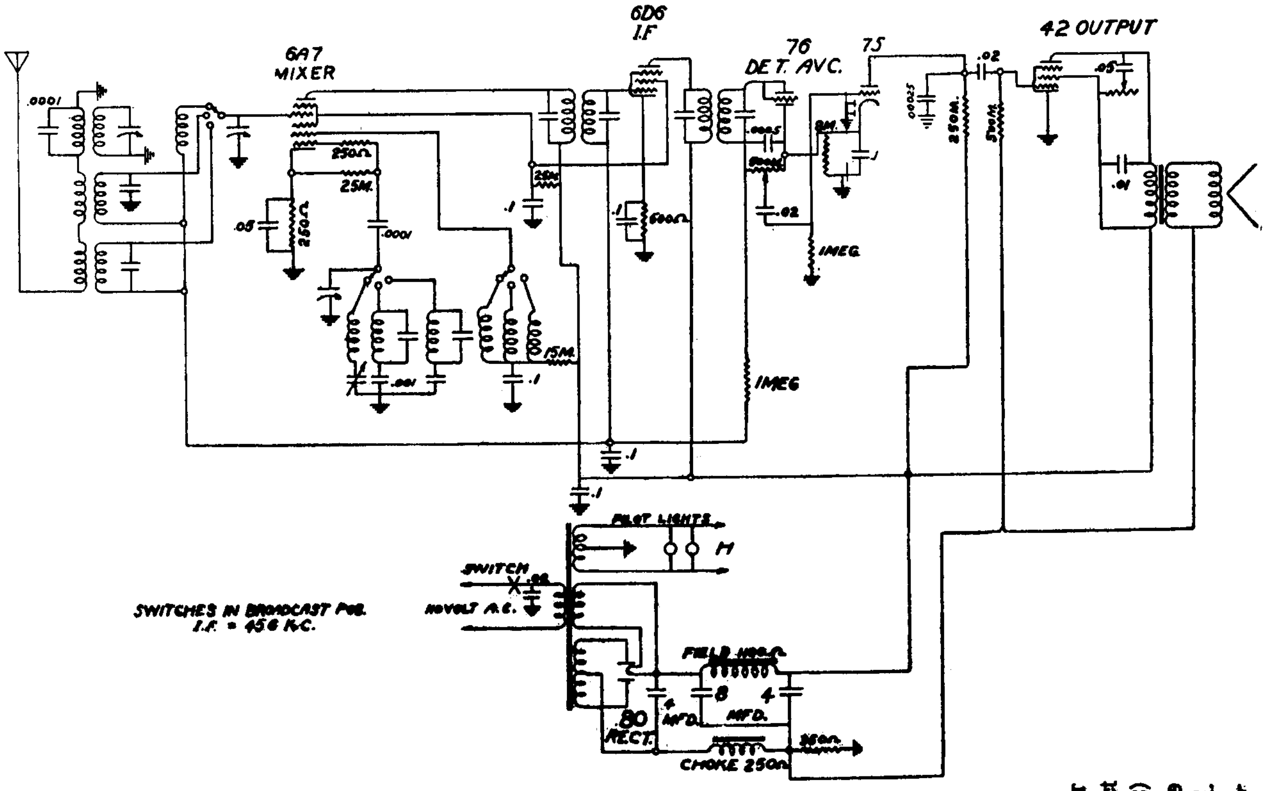
MODELS 149-215 & 216

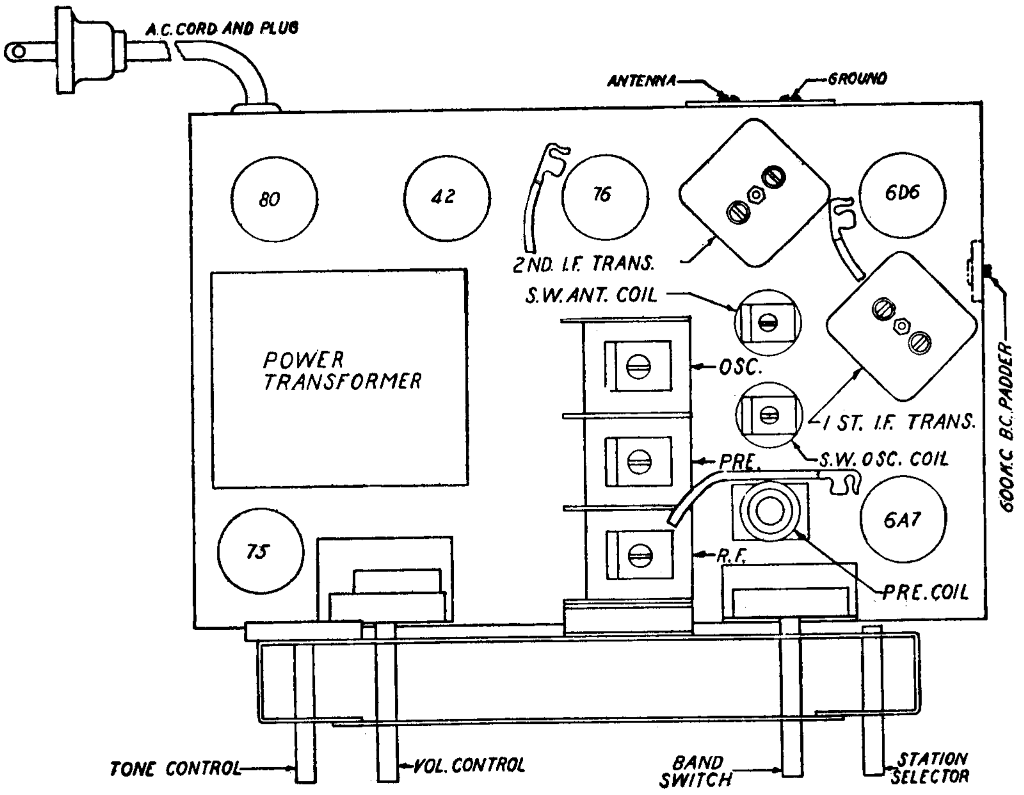


CONTINENTAL RADIO & TELEVISION CORP.

MODEL A3 SERIES

This receiver is designed to operate over three tuning ranges. The broadcast range which extends from 545 to 1715 Kilocycles (KC) (175 to 550 meters), Police and Aviation Band which extends from 1715 to 5350 Kilocycles (KC) (56 to 175 Meters) and the International Short Wave Band which extends from 5760 to 16200 Kilocycles (KC) (18.5 to 52 meters). This short wave range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.



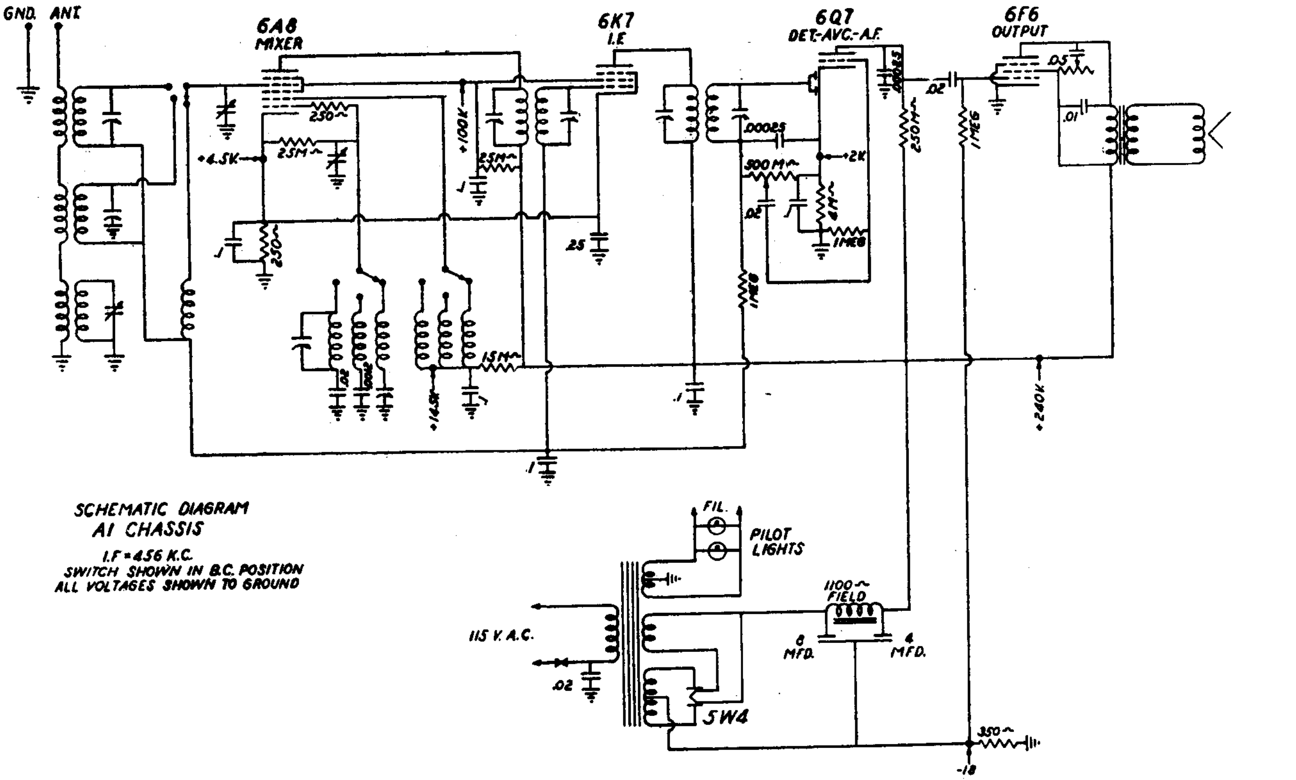


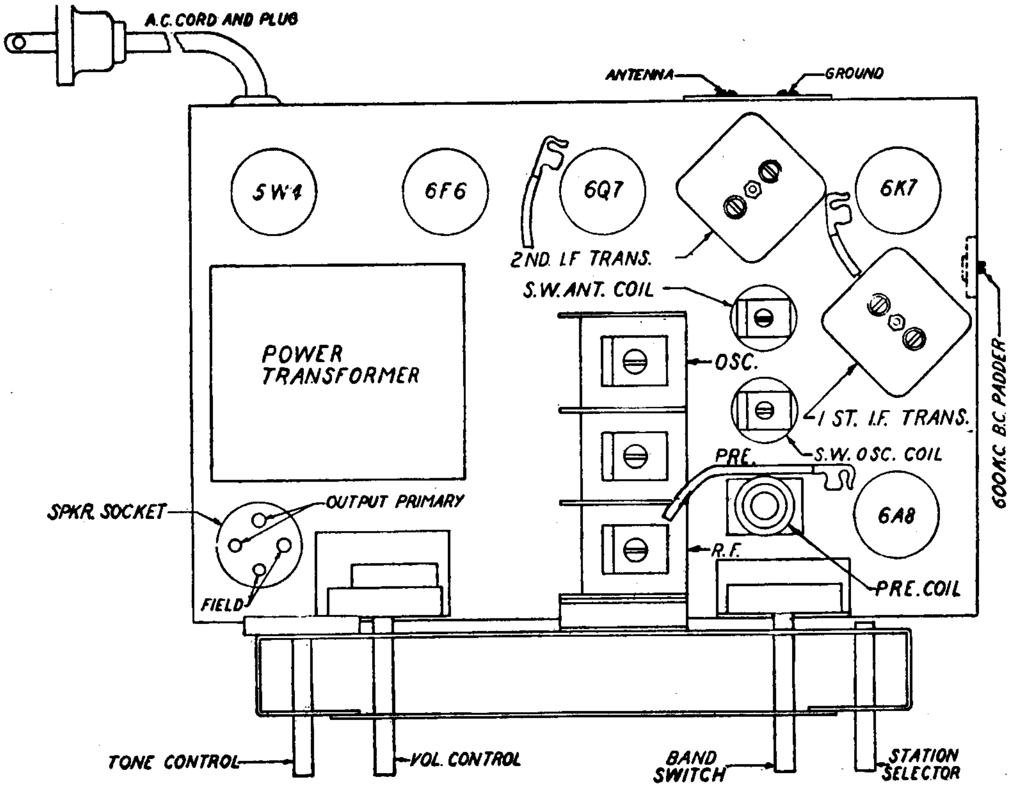
I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tubes (6A8) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

CONTINENTAL RADIO & TELEVISION CORP.

MODEL A1 SERIES

This receiver is designed to operate over three tuning ranges. The broadcast range which extends from 545 to 1715 Kilocycles (KC) (175 to 550 meters), Police and Aviation Band which extends from 1715 to 5350 Kilocycles (KC) (56 to 175 Meters) and the International Short Wave Band which extends from 5760 to 16200 Kilocycles (KC) (18.5 to 52 meters). This short wave range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.



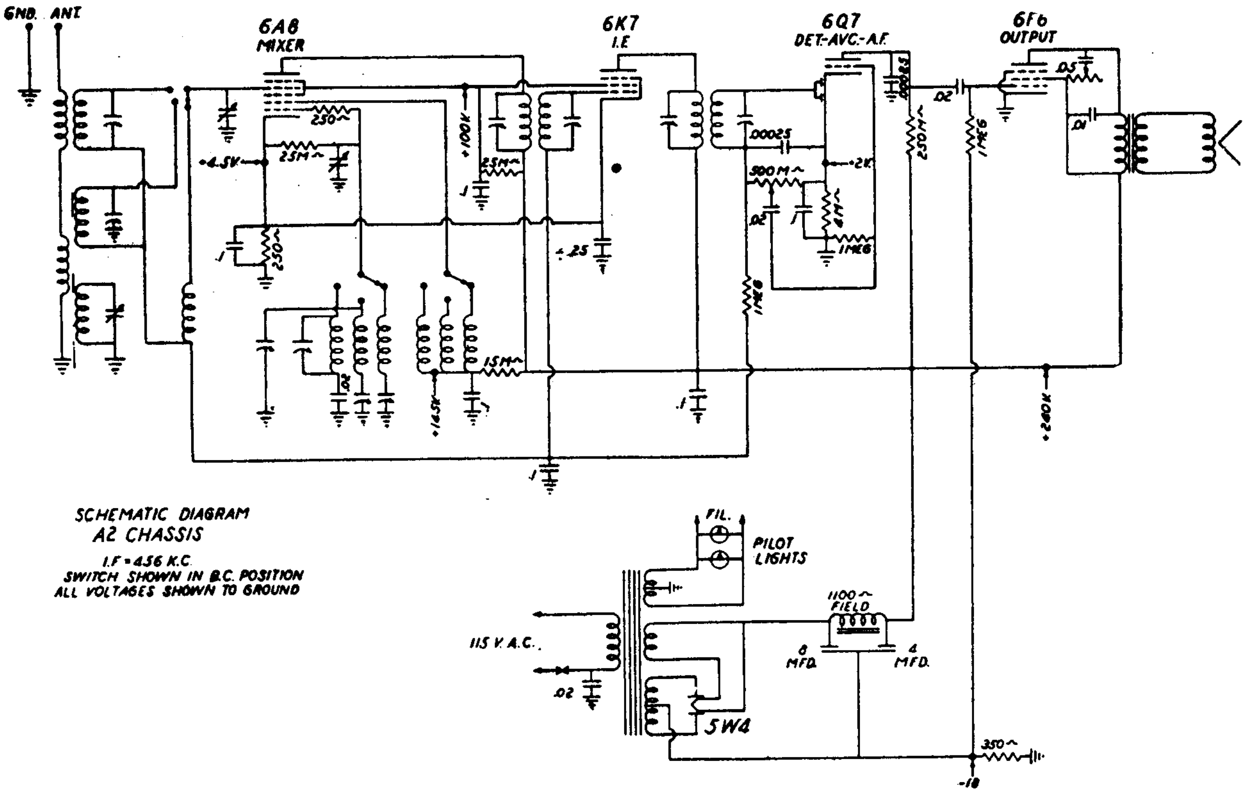


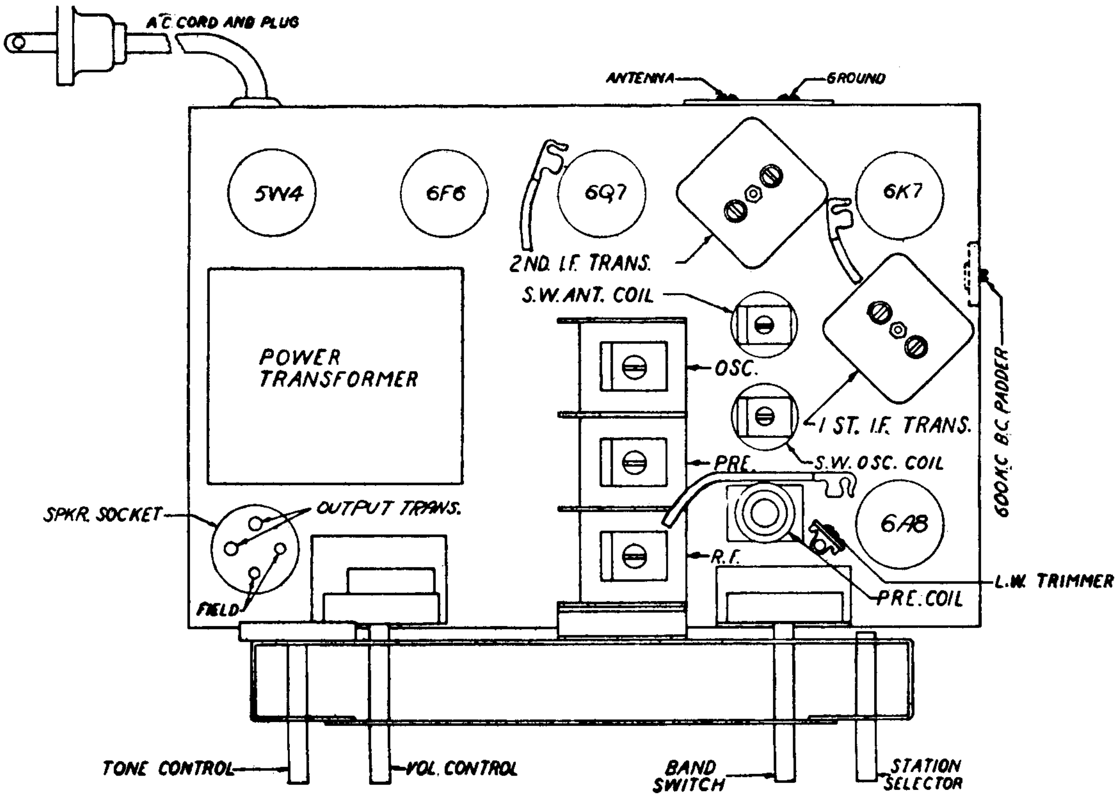
I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tubes (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

CONTINENTAL RADIO & TELEVISION CORP.

MODEL A2 SERIES

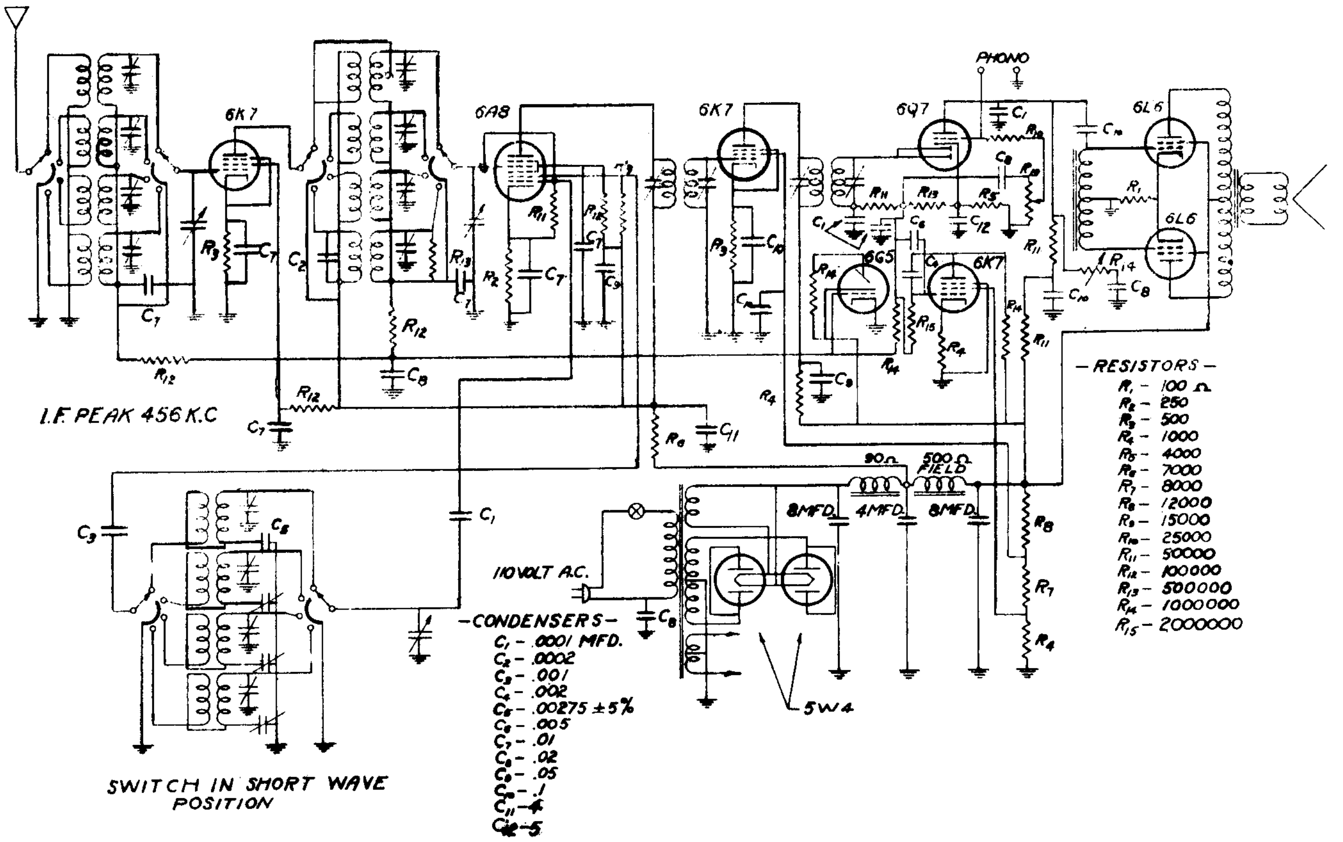
This receiver is designed to operate over three tuning ranges. The broadcast range which extends from 545 to 1715 Kilocycles (KC) (175 to 550 meters), Police and Aviation Band which extends from 1715 to 5350 Kilocycles (KC) (56 to 175 Meters) and the International Short Wave Band which extends from 5760 to 16200 Kilocycles (KC) (18.5 to 52 meters). This short wave range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

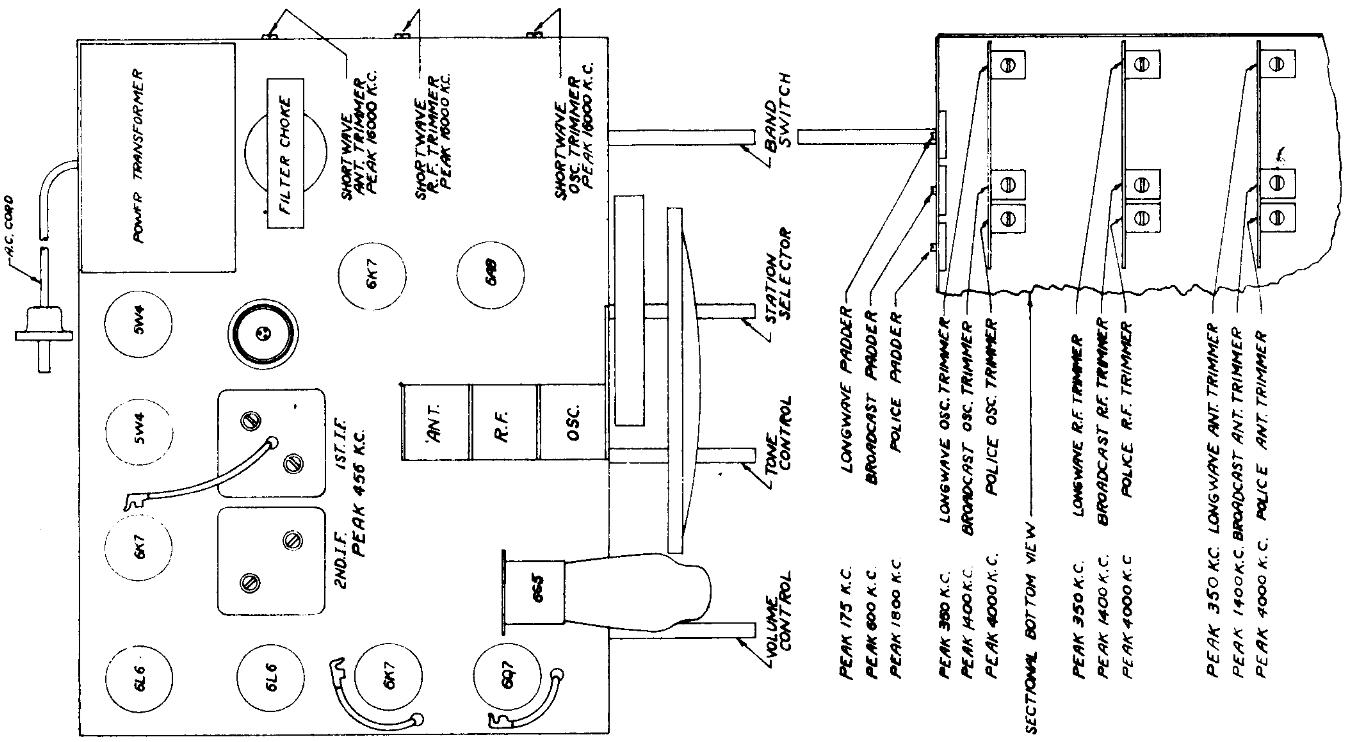




CONTINENTAL RADIO & TELEVISION CORP.

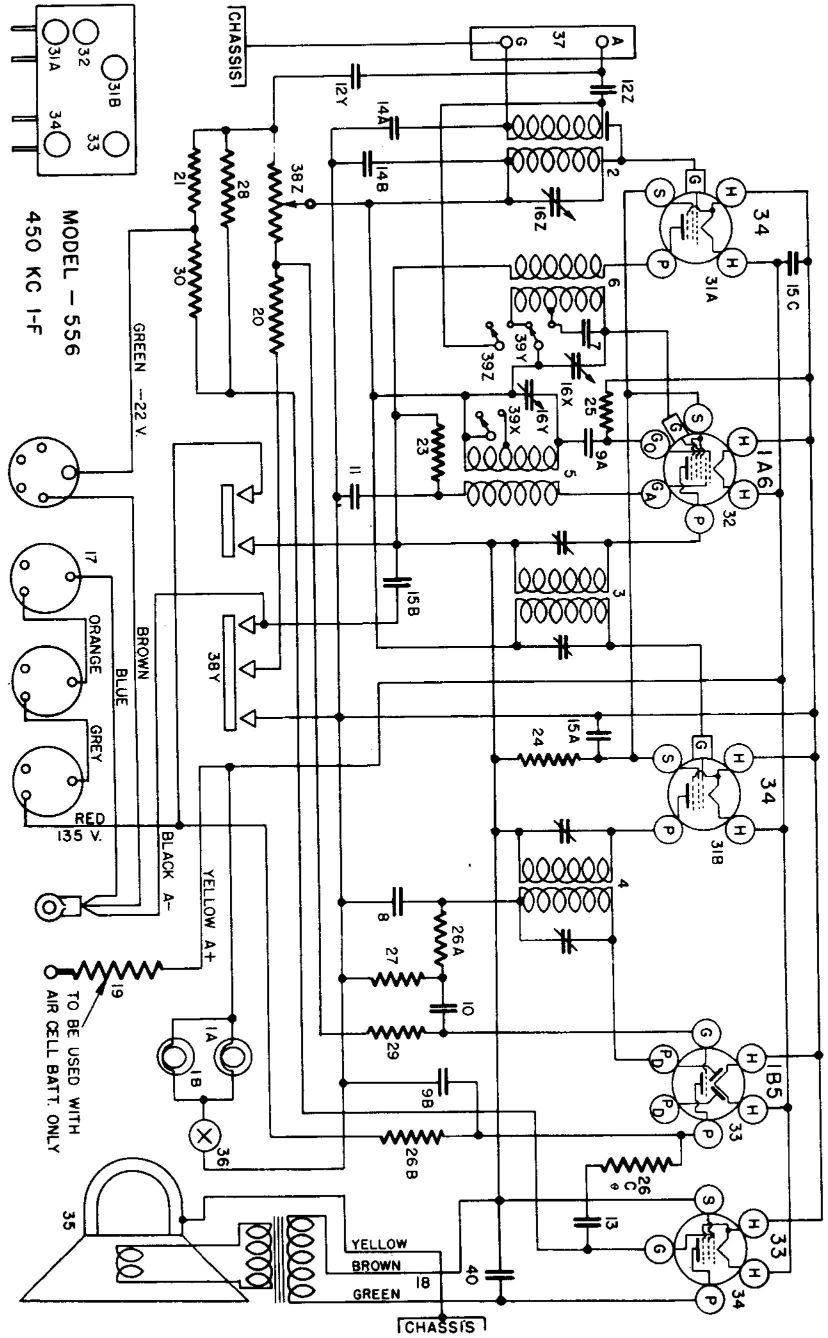
MODEL AM6 SERIES





THE CROSLEY RADIO CORPORATION

MODEL 556



SPECIFICATIONS

The Crosley Model 566 radio is a five-tube superheterodyne receiver designed for operation from batteries. The method of connecting the battery cable to the batteries is shown on the Wiring Diagram. The batteries required are: one two-volt storage battery or air cell battery and three plug-in type 45 volt "B" batteries.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and the negative side of the "A" battery circuit. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with receiver in operating condition and the volume control full on and no signal input. The filament voltages should be measured with an accurate low range D-C voltmeter (Approximately 0 to 10 volts). Voltage limits may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Where Used	H	P	S	G	Ga	Go
1C6	(*) Oscillator-Modulator	2.0	112	45	0	112	−5 to −20.
34	I-F Amplifier	2.0	112	45	0	—	—
1B5	Detector & A-F Amplifier	2.0	60	—	0	—	—
30	2nd. A-F Amplifier	2.0	45	—	0	—	—
950	Output	2.0	110	112	−4 (□)	—	—

Power output approximately .5 watt.
"A" Battery drain approximately .36 ampere at 2 volts.
"B" Battery drain approximately 16 milliamperes at 135 volts.
*This model radio previous to Serial No. 1,196,783 employed a type 1A6 tube as an Oscillator-Modulator. Socket voltage readings as given.
□Measured at grid through 500,000 ohm grid resistor.

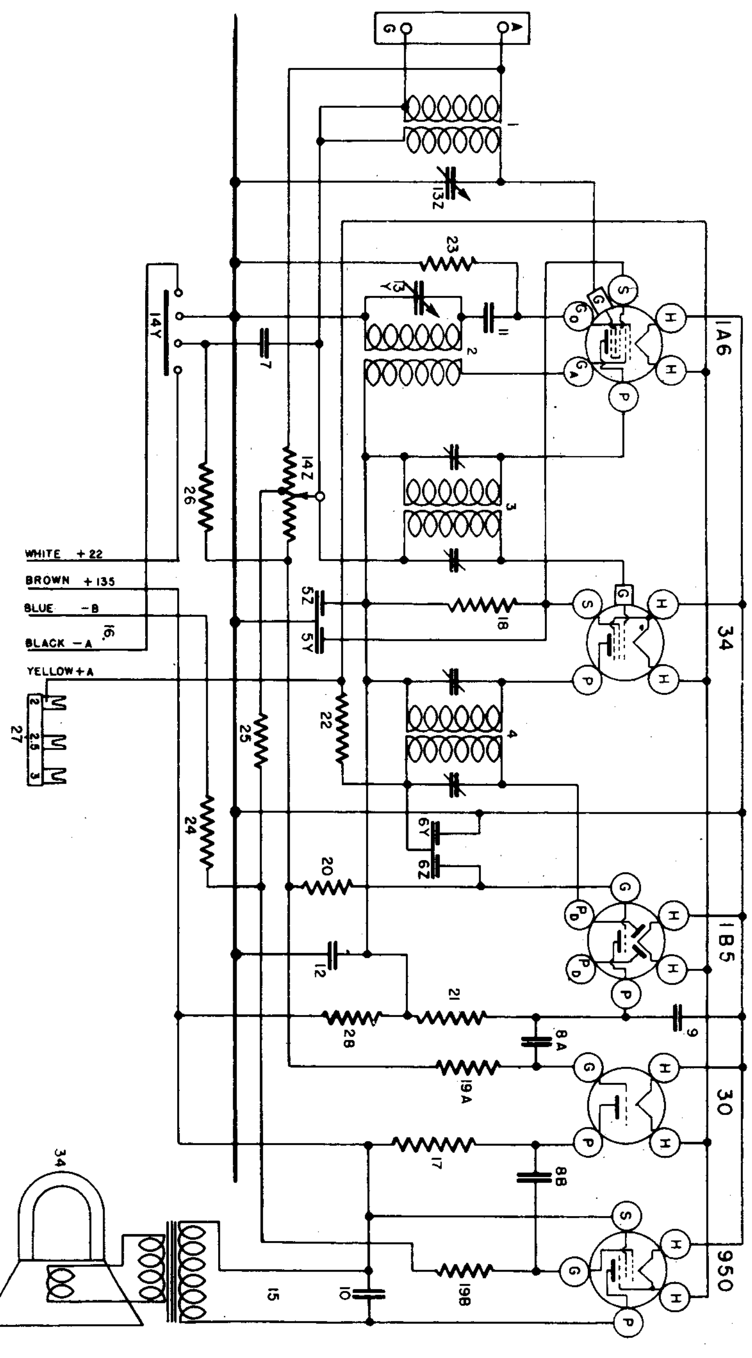
PARTS LIST—MODEL 566

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Function
1	G116—32000	Coil Ant. Transformer 540-1725Kc.
2	G105—32002	Coil Osc. Transformer 540-1725Kc.
3	G117—32004	Coil Assy. 1st I-F Transformer 450Kc.
4	G115—32004	Coil Assy. 2nd I-F Transformer 450Kc.
5Z	W —28623	Cond..02MF.200V.PlateSupply Bypass
5Y		Cond..02MF.200V.Scr.Supply Bypass
6Z	W —30322A	Cond. .006 MF. Det.-1st A-F Coupler
6Y		Cond. .00017 MF. Diode Load Bypass
7	W —37226	Cond..02 MF.160V.R-F&I-F Bias Filter
8A	W —36541	Cond..02 MF.160 V.1st&2ndA-FCoup.
8B	W —36541	Cond. .02 MF. 160V. 2nd & Output A-F Coupler
9	W —30270	Cond. .001 MF. 400V. 1st A-F Plate Bypass
10	W —28904	Cond. .004 MF. 200V. Output Plate Bypass
11	G2 —34002	Cond. .0001 MF. Molded Osc. Grid Coupler
12	W —41081	Cond. 16 MF. 250V. Plate supply Filter (Electrolytic)
13Z	G24 —33001	Cond. Var. Tuning Antenna Section
13Y		Cond. Var. Tuning Osc. Section
14Z	—41792	Volume Control 3410 Ohm, Tapped
14Y		4 Contact Switch Battery A & B Supply
15	MG11—41760	Cable Speaker
16	B —41748	Cable 5 Lead Battery
17	—21237	Resistor 60,000 Ohm. ¼W. 2nd A-F Plate Load
18	—37472	Resistor 50,000 Ohm. ¼W. Screen Supply Filter
19A	—23785	Resistor 500,000 Ohm. ¼W. 2nd A-F Grid Return
19B	—23785	Resistor 500,000 Ohm. ¼W. Output Grid Return
20	—37583	Resistor 2.5 Megohm ¼W. 1st A-F Grid Return
21	—23403	Resistor 150,000 Ohm. ¼W. 1st A-F Plate Load
22	—35602	Resistor 1 Megohm Ins. ¼W. Diode Load
23	—21875	Resistor 100,000 Ohm. ¼W. Osc. Grid Return
24	W —29585	Resistor 600 Ohm. Flex. ½W. 1st Bias Divider
25	W —35467	Resistor 220 Ohm. Flex. ½W. 2nd Bias Divider
26	W —41759	Resistor 140 Ohm. Flex. ½W. Audio Bias Divider
27	W —41955A	Resistor on "A" Bat. Lead Used with 1C6 Tube
(27)	W —41955	Resistor on "A" Bat. Lead Used with 1A6 Tube
28	W —30960	Resistor 2600 Ohm. Flex. 1½W. Plate Supply Filter
29	G89 —28807	Socket 1C6 Osc.-Mod.
(29)	G55 —28807	Socket 1A6
30	G31 —28807	Socket 34 I-F.
31	G91 —28807	Socket 1B5 Det. 1st A-F.
32	G9 —28807	Socket 30 2nd A-F
33	G94 —28807	Socket 950 Output
34	—41056	Speaker Type 31PJ3, "A"
	—41434	Cone Assy. for 41056 Speaker
	—41453	Output Trans. for 41056 speaker
	—41458	Mtg. Ring for 41434 Cone Assembly
35	G1 —26719	Terminal Strip Ant. & Grd.
	W —41790	Tube Shield (Plain Half)
	W —41789	Tube Shield (Half with Slot)
	W —41784	Tube Shield Ring
	W —41785	Tube Shield Base
	W —42247	Metal Pointer for Dial
	W —42258	Escutcheon Pins
	W —41822	Dial & Drive Assembly
	G1 —23472	Knob Control

THE CROSLEY RADIO CORPORATION

MODEL 566



MODEL — 566 450 KC. I-F

SPECIFICATIONS

The Crosley Model 556 radio is a five-tube superheterodyne receiver designed for operation from batteries. The method of connecting the battery cable to the batteries is shown on the Wiring Diagram. The batteries required are: one two-volt storage battery or air cell battery, three plug-in type 45 volt "B" batteries and one plug-in type 22½ volt "C" battery.

The frequency ranges covered are from 540 to 1500 kilocycles in the broadcast band and from 1500 to 3500 kilocycles in the high frequency band.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and the negative side of the "A" battery circuit. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with receiver in operating condition and the volume control full on and no signal input. The filament voltages should be measured with an accurate low range D-C voltmeter (Approximately 0 to 10 volts). Voltage limits may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Where Used	H	P	S	G	Ga	Go
34	R-F Amplifier	2.0	135	65	-2.5	—	—
1A6	Osc.-Modulator	2.0	135	65	-2.5	85	-5 to -20
34	I-F Amplifier	2.0	135	65	-2.5	—	—
1B5	Diode Detector and A-F Amplifier	2.0	60	—	—	—	—
33	Output	2.0	135	135	-1.0	—	—

Power Output Approximately 1.0 Watt.
"A" Battery Drain Approximately .5 Ampere at 2 Volts.
"B" Battery Drain 14 to 20 Milliamperes, Depending Upon Setting of Volume Control.

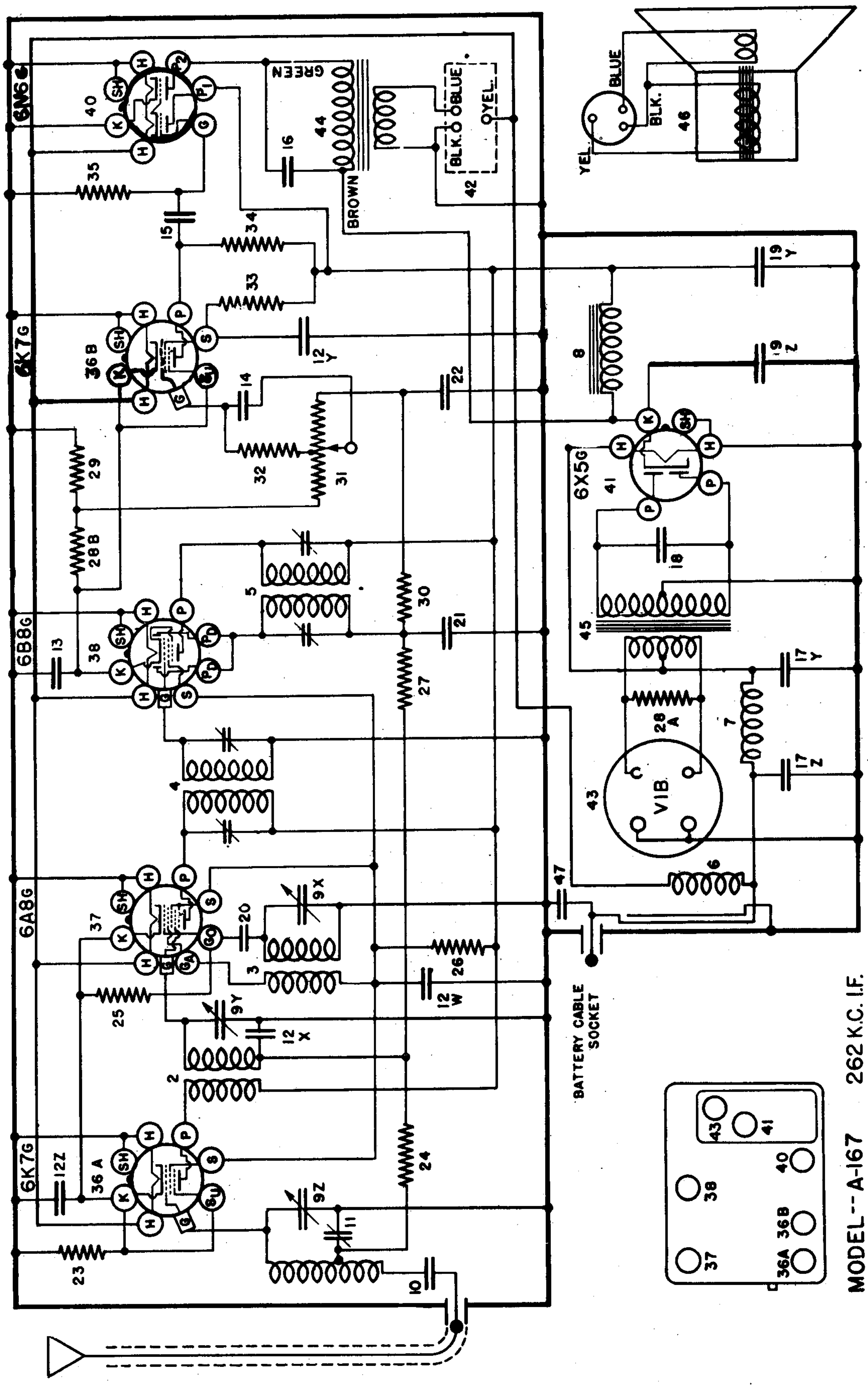
PARTS LIST—MODEL 556

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description	Item No.	Part No.	Description
1A	W —37188	Dial Light	20	W —23013	Resistor 2000 Ohm 1¼W. Flex.
1B	W —37188	Dial Light	21	—27121	Resistor 5000 Ohm ¼W.
	G6 —27134	Dial Light Bracket Assembly	22	NONE	
2	G76 —32000	Ant. Coil	23	—22196	Resistor 20,000 Ohm ¼W.
3	G73 —32004	1st I-F Assembly	24	—37377	Resistor 20,000 Ohm 1W.
4	G38 —32004	2nd I-F Assembly	25	—34019	Resistor 75,000 Ohm ¼W.
5	G47 —32002	Osc. Coil	26A	—35601	Resistor 300,000 Ohm ¼W.
6	G53 —32001	R-F Coil	26B	—35601	Resistor 300,000 Ohm ¼W.
7	G9 —34002	Condenser .00002 Mfd. (Molded)	26C	—35601	Resistor 300,000 Ohm ¼W.
8	G2 —34002	Condenser .0001 Mfd. (Molded)	27	—21454	Resistor 1 Megohm ¼W.
9A	G1 —34002	Condenser .00025 Mfd. (Molded)	28	—34883	Resistor 2 Megohm ¼W.
9B	G1 —34002	Condenser .00025 Mfd. (Molded)	29	—26577	Resistor 3 Megohm ¼W.
10	W —28619	Condenser .006 Mfd. 200 V.	30	—26578	Resistor 5 Megohm ¼W.
11	W —28621	Condenser .02 Mfd. 200 V.	31A	G31 —28807	Socket Type—34
12Z	W —28623	Condenser .02 Mfd. 200 V.	31B	G31 —28807	Socket Type—34
12Y		Condenser .02 Mfd. 200 V.	32	G55 —28807	Socket Type—1A6
13	W —32378	Condenser .01 Mfd. 400 V.	33	G41 —28807	Socket Type—1B5
14A	W —24049B	Condenser .1 Mfd. 200 V.	34	G36 —28807	Socket Type—33
14B	W —24049B	Condenser .1 Mfd. 200 V.		W —26973B	Tube Shield Base
15A	W —29910A	Condenser .25 Mfd. 200 V.		W —26974B	Tube Shield
15B	W —29910A	Condenser .25 Mfd. 200 V.	35	—41056	Speaker (Table) 31 P. J. 3
15C	W —29910A	Condenser .25 Mfd. 200 V.		—41390	Speaker (Console) 41 P. J. 3
16	G43 —33002	3 Section Var. Tuning Condenser	36	W —41068	Dial Light Switch
	C —41059	Dial Glass	37	G1 —26719	Ant. & Grd. Terminal Assembly
	B —40818B	Pointer Disc	38Z	—41069	Volume Control (10,000 Ohm)
	W —40794	Bearing Bracket	38Y		Battery Switch
	W —31840A	Snap Ring	39	—37108A	Band Selector Switch
	W —40909	Spring Washer	40	W —35758	Condenser .008 Mfd. 400 V.
	W —40795A	Hand Shaft		B —40839A	Escutcheon Ring
	W —40804	Dial Glass Cushion		W —28760B	Escutcheon Pin
	W —40797	Dial Glass Bracket (2)		W —31585C	Knob (Large)
	W —40798	Support Bracket L-H.		W —36355A	Knob (Small)
	W —40799	Support Bracket R-H.		W —25025B	Osc. Coil Shield
	W —41578	Gear Spring		W —21541	Retaining Ring
	W —40793A	Drive Unit		W —25200	Coil Socket
	MG16—40765	Drive Mtg. Bracket		W —26891	Insulating Washer
17	C —37396	Battery Cable		W —30802A	R-F & Ant. Coil Shield
18	G6 —35696	Speaker Cable		W —30026A	Retaining Ring
19	G2 —23300	Resistor .53 Ohm (Air Cell)		W —37164	Insulating Washer

THE CROSLEY RADIO CORPORATION

MODEL A 167



THE CROSLEY RADIO CORPORATION

MODEL A167

SPECIFICATIONS

The Crosley Model A-167 auto radio is a single unit, six-tube superheterodyne receiver. The power supply unit is built into a completely shielded compartment and is an integral part of the receiver chassis.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and the receiver chassis. Voltage readings taken with a 1000 ohm per volt, 500 volt voltmeter (except filaments) with receiver in operating condition and no signal input. The filament voltages should be measured with any accurate low range D-C voltmeter (approximately 0 to 10 volts). Voltage limits may vary plus or minus 10% of values given.

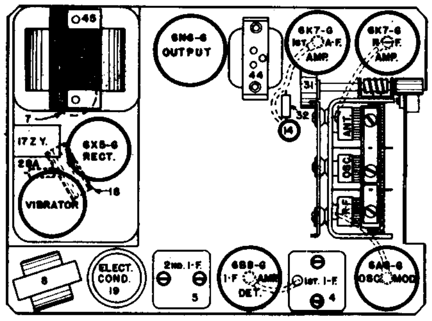


Fig. 2 Top View A-167

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	P2	S	Su	K	Ga	Go
6K7G	R-F Amplifier	6.0	270		100	8.5	8.5	—	—
6A8G	Osc.-Modulator	6.0	270	—	100	—	8.5	100	0
6B8G	I-F Amplifier & Diode Detector	6.0	270	—	100	—	4.0	—	—
6K7G	A-F Amplifier	6.0	135	—	35	4.0	4.0	—	—
6N6G	Output	6.0	235	270	—	—	0	—	—
6X5G	Rectifier	6.0	—	—	—	—	285	—	—

Power output approximately 5 watts.
Battery drain approximately 8.0 amperes at 6.0 volts.

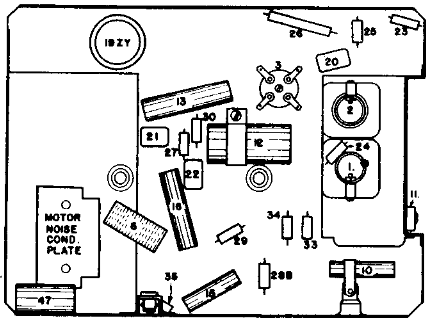


Fig. 3 Bottom View A-167

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to P1 and P2 of the 6N6G Output tube. Be sure the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

NOTE:The receiver chassis should be in its case and a speaker similar to one used with the receiver must be connected to the chassis before making adjustments. It is advisable to use a spare control unit for making adjustments of the volume control and tuning condenser. A standard control unit with short cables (6" to 8") makes a very convenient and useful tool. If it is desired to shorten a pair of long cables it will be absolutely necessary to heavily tin the cables before cutting them.

1. Tuning I-F Amplifier To 262 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd., or larger, condenser to the top cap of the 6A8G Osc-Mod. tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the receiver chassis frame. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Adjust the station selector so that the rotor plates of the tuning condenser are completely in mesh.

(c) Set the signal generator to 262 kilocycles.

(d) Adjust both trimmers located on the 2nd I-F transformer for maximum output. (Fig. 2).

(e) Adjust both trimmers located on the 1st I-F transformer for maximum output.

(f) Repeat operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier

(a) Connect the output lead from the signal generator through a .00025 mfd. condenser to the "ANT" connection of the receiver.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer on the "OSC" section of the tuning condenser for maximum output.

(e) Adjust the trimmer on the "R-F" section of the tuning condenser for maximum output.

(f) Adjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

(e) Set the signal generator to 1400 kilocycles again.

(f) Tune-in the 1400 kilocycle signal with the station selector for maximum output.

(g) Readjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

It will be necessary to adjust the antenna compensating condenser to the car antenna after the receiver has been installed in the car.

(a) After the installation is complete, tune-in a WEAK station between 55 and 65 on the dial.

(b) Adjust the antenna compensating condenser for maximum volume in the speaker.

(g) Readjust the station selector for maximum output. DO NOT READJUST THE OSC. TRIMMER.

(h) Repeat operations (e) and (f) for more accurate adjustments.

3. Adjusting Antenna Compensating Condenser.

(a) Set the signal generator to 600 kilocycles.

(b) Tune in the 600 kilocycle signal with the station selector for maximum output.

(c) Adjust the antenna compensating condenser, Illustration No. 11, Fig. 3, for maximum output.

(d) Repeat operations (b) and (c) alternately until no further improvement can be obtained.

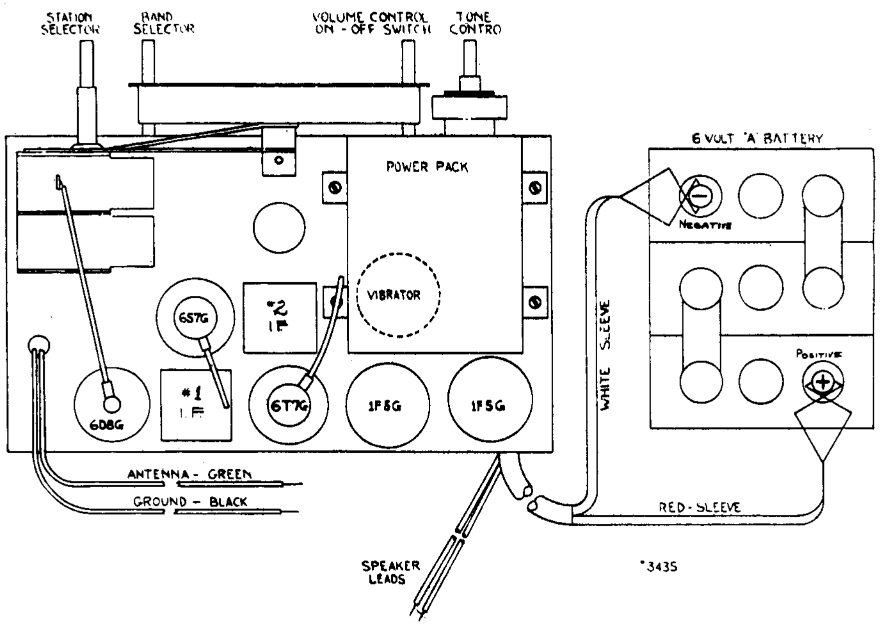
PARTS LIST — MODEL A-167

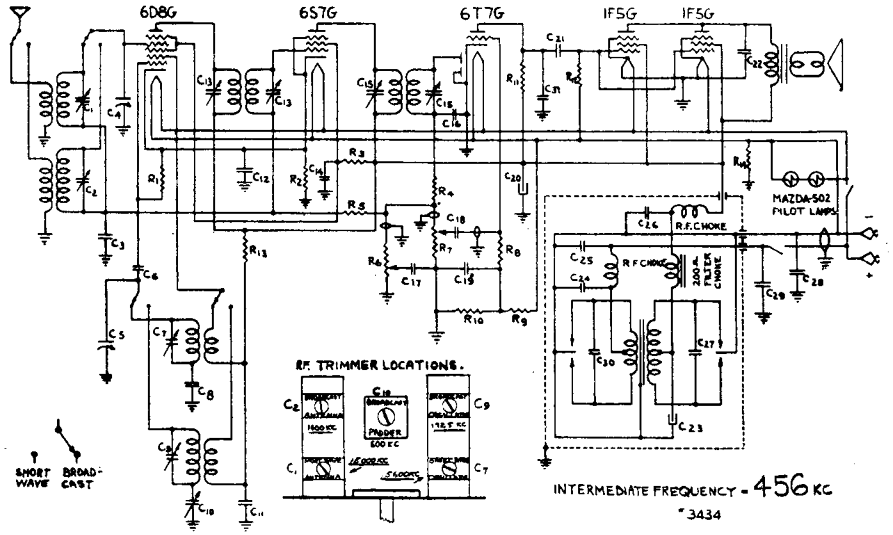
Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description	Item No.	Part No.	Description
1	G134—32000	Ant. Coil	41	G168—36400	Socket Type 6Y5
2	G93 —32001	R-F Coil	42	W —38991A	Socket Speaker
	W —38995	Coil Shield only	43	G105—28807	Socket Vibrator
	MG23 —50000	Ant. and R-F Shield Assy. (Cans and Brackets)		W —38873	Vibrator Ground Clip
	MG24 —50000	Ant. and R-F Coils and Shield Assy. Complete		W —50002	Syncronode Mtg. Stud
	W —32912	Wood Coil Spacer		W —50020	Base—Tube Shield
3	G134—32002	Osc. Coil		W —50021	Tube Shield—Half } 6K7G, 6B8G
4	G38 —32005	1st I-F Assembly		W —50022	Tube Shield—Half } 6K7G, 6B8G
5	G37 —32005	2nd I-F Assembly		W —50023	Tube Shield—Half (2), 6x5
6	G15 —32977	Choke—Motor Noise		W —31210	Ring—Tube Shield
7	G20 —28067	Choke "A" Filter	44	G74 —24628	Output Transformer
8	G75 —24628	Choke "B" Filter		W —38991A	Speaker Socket, part of G1—43619 Brkt. Assy.
9	G57 —33002	3 Section Var. Tuning Cond.	45	G13 —32769	Power Transformer
	W —38899A	Var. Cond. Connection		G6 —38000	Vibrator
10	W —50039	Condenser .003 Mf. 160 V.	46	356BP9 "M"	Speaker Spec. 1-D-895
11	W —50054	Condenser Ant. Series Trimmer		—43818	Cone Assembly
	W —40698	Plug Ant. Trimmer Hole		—43819	Field Coil
12	W —50014A	Condenser .1 Mf. 160 V.		MG2 —50000	Top Cover Assembly
12Y	W —50014A	Condenser .1 Mf. 160 V.		B —50028A	Escutcheon
12X	W —50014A	Condenser .05 Mf. 160 V.		B —50029A	Screen—Speaker
12W	W —50014A	Condenser .05 Mf. 400 V.		B —50030A	Grille Cloth
13	W —24049C	Condenser .1 Mf. 200 V.		W —50070	Clamp—Speaker Cable
14	W —37226	Condenser .02 Mf. 160 V.		W —38935	Ground Clip (16 used)
15	W —32380	Condenser .05 Mf. 200 V.		W —50002	Stud—Sync. Mtg.
16	W —50013	Condenser .006 Mf. 600 V.		W —41010	Clamp—Condenser
17ZY	W —38990	Condenser .5 Mf. 160 V.		W —31303A	Bushing and Ferrule
18	W —38901	Condenser .005 Mf. 1000 V.		W —31393A	"A" Lead Cap
19ZY	W —50045A	Condenser 6 Mf. 350 V.		W —31301	Spring
20	G1 —34002	Condenser .00025 Mf.		W —32778	Insul. Washer
21	G3 —34002	Condenser .0005 Mf.			
22	G2 —34002	Condenser .0001 Mf.			**Mounting Parts**
23	W —50046	Resistor 1000 Ohm ½W.			
24	—35601	Resistor 300,000 Ohm ¼W.			
25	—35928	Resistor 60,000 Ohm ¼W.		W —38455A	Template and Spacer —Case Mtg.
26	—36952	Resistor 30,000 Ohm 1W.		— 6213	Nut—Hex. Mtg.
27	—35602	Resistor 1 Megohm ¼W.		W —32957	Washer—Shakeproof Mtg.
28AB	W —38977	Resistor 220 Ohm ½W.		—32783	Lead—24" Ant. Connector
29	W —38918	Resistor 600 Ohm ½W.		W —38038D	Suppressor—Distributor
30	—36760	Resistor 20,000 Ohm ¼W.		W —29754C	Condenser—Gen. and Am.
31	W —38989	Volume Control 300,000 Tap 150,000 Ohm		W —32956A	Stud—Case Mtg.
32	—35927	Resistor 2 Megohm ¼W.		B —38985	Control Head and Cables—Remote Pointer Disc (Specify Type Ad'r Pkg)
33	—38623	Resistor 750,000 Ohm ¼W.		—50098	Lead, Fuse to Ammeter
34	—35600	Resistor 100,000 Ohm ¼W.		—50097	Lead, Fuse to Remote Controls
35	—38976	Resistor 250,000 Ohm ¼W.		—50099	"A" Lead to Set
36AB	G151—36400	Socket Type 6K7		—50095	Flexible Cable (Volume Control)
37	G156—36400	Socket Type 6A8		—50096	Flexible Cable (Condenser Drive)
38	G175—36400	Socket Type 6B8		—50103	Switch—On-Off (on V. C. Head)
39	NONE			W —43567	Bulb—Dial Light
40	G165—36400	Socket Type 6N6			

DETROLA RADIO AND TELEVISION CORPORATION

MODEL 144





Tubes and Batteries must be in proper position and connected as shown.

ALINEMENT PROCEDURE

WARNING! This information is to be used by a COMPETENT SERVICE MAN ONLY and not by an untrained person.

Connect a high impedance AC voltmeter across loud-speaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from generator, strong signals tend to cause improper adjustments

IF. Connect generator ground to receiver ground. Using .1 mfd condenser in series with "high" side of generator, apply 456 kc signal to grid of 6S7G and adjust second IF transformer: same for first IF, applying signal to grid of 6D8G. (See above diagram for location of tubes and transformers.)

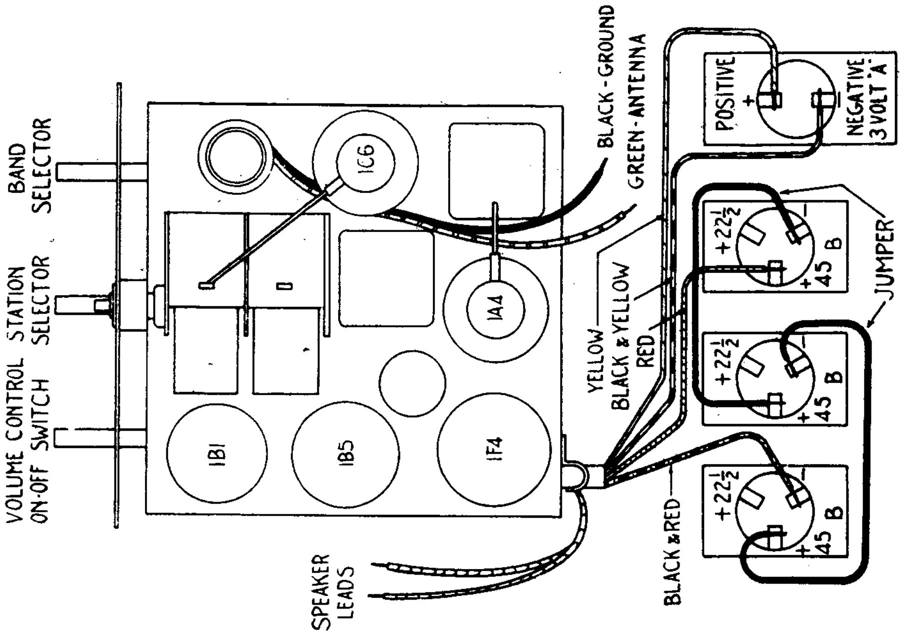
RF. (See circuit diagram for location of trimmers.) Using 200 mmf condenser in series with generator, feed 1725 kc signal to antenna lead and adjust oscillator top frequency. Set generator at 1400 kc, tune receiver to signal and adjust broadcast antenna trimmer. Set generator to 600 kc, tune receiver and adjust padder. The tuning condenser should be rocked back and forth through the signal while the padder is being adjusted in order to obtain perfect alinement.

Using 400 ohm resistor in series with generator, set band selector in short wave (right) position, feed 15,600 kc signal to antenna and adjust oscillator trimmer—screw trimmer down tight and unscrew to SECOND peak. Set generator to 15,000 kc, tune receiver and adjust antenna trimmer—screw trimmer down tight and unscrew to FIRST peak, rocking the condenser back and forth through the signal while the adjustment is being made. **Above procedure for alinement at 15,000 kc must be followed exactly to insure proper tracking. A 'dead spot" at about 12,000 kc will result if antenna and oscillator are not set in proper relation to each other.**

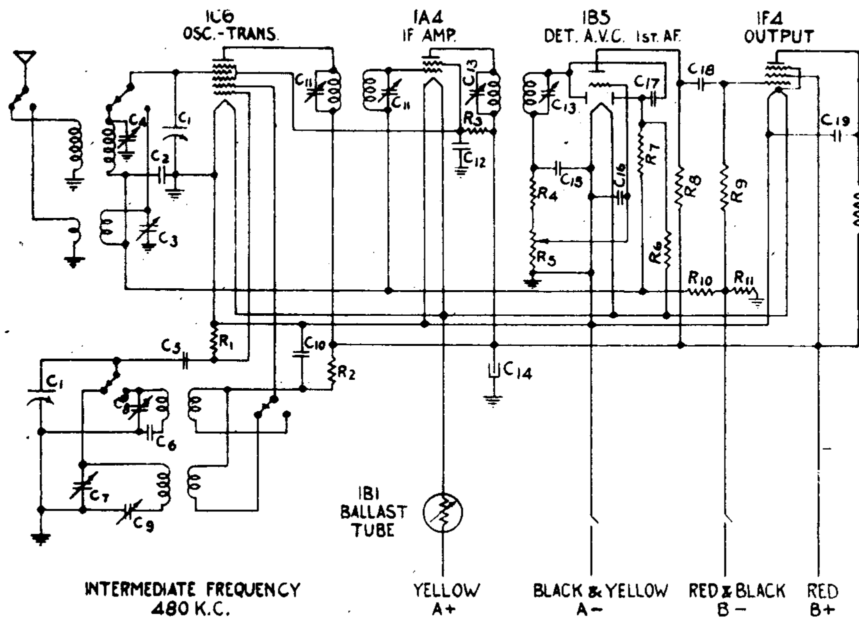
Symbol	Part No.	Description
C1	1611	3-35 Trimmer
C2, 7, 9	2597	1-10 Trimmer
C3, 12, 19	572	.1 200V
C4, 5	2871	350 mmf Variable
C6	2780	50 mmf Mica
C8	2694	.005 $\pm$ 5%
C10	2560	350 mmf Padder
C11, 18	568	.01 400V
C13, 15		IF Trimmers
C14, 28, 29	580	.05 200V
C16, 31	1286	250 mmf Mica
C17	581	.005 400V
C20	2594	24 mf 150V
C21	576	.02 400V
C22	3196	.001 Mica
C23	3417	8 mf 200V
C24, 25, 30	3003	.5 160V
C26	824	.002 600V
C27	3432	.015 1200V
R1, 4	631	50 M 1/3 W
R2	3004	150 Ohms
R3	609	15 M 1/3 W
R5, 8, 10	624	1 Meg 1/3 W
R6	3571	2 Meg TC
R7	3418	500 M VC with DPST Switch
R9	2693	2 Meg 1/3 W
R11	599	150 M 1/3 W
R12	615	500 M 1/3 W
R13	614	5 M 1/3 W
R14	3433	15 Ohms $\pm$ 5% 1w
	3412	No. 1 IF Trans.
	3413	No. 2 IF Trans.
	3415	Power Transformer
	3416	Filter Choke
	3570	Band Selector Switch
	3419	Antenna Coil
	3420	Oscillator Coil
	3421	Vibrator
	2378	Pointer
	1408	Pointer Screw
	2163	Drive Cable
	3268	8 Prong Socket
	2165	7 Prong Socket
	1489	5 Prong Socket
	3426	Pilot Lamp
	3431	Battery Connector
	3436	PM Dynamic Speaker

DETROLA RADIO AND TELEVISION CORPORATION

MODEL 117



Tubes and Batteries must be in proper position and connected as shown.



Symbol	Part No.	Description
R1, R4	631	50M 1/3 watt
R2	617	20M 1/3 watt
R3	621	25M 1/3 watt
R5	2699	500M volume control with DPST switch
R6, R7	2599	1 meg ± 10% 1/3 watt
R8	602	250M 1/3 watt
R9	624	1 meg 1/3 watt
R10	2693	2 meg ± 10% 1/3 watt
R11	2946	400 ohms ± 10% ½ watt
C1	2664	350 mmf variable
C2, C12	572	.1 200V
C3, C7	1611	3-35 Trimmer
C4, C8	2597	1-10 Trimmer
C5	2780	50 mmf Mica
C6	2694	.005 ± 5%
C9	2560	Variable padder
C10	2385	.02 200V
C11, C13		IF trimmers
C14	2698	16 MF electrolytic
C15, C16, C17	1286	250 mmf Mica
C18	581	.005 600V
C19	2695	.003 600V

Part No.	Description
1408	Pointer screw
2364	Dial glass
2365	Dial glass retainer
1151	Escutcheon screw
2707	First IF transformer
2942	Second IF transformer
2685	Broadcast antenna coil
2686	Broadcast oscillator coil
2761	Short wave oscillator coil
2762	Short wave antenna coil
2696	Band selector switch
833	4-prong socket
789	6-prong socket
1489	5-prong socket
2949	PM dynamic speaker
2378	Pointer

ALINEMENT PROCEDURE

WARNING! This information is to be used by a COMPETENT SERVICE MAN ONLY and not by an untrained person.

Connect a high impedance AC voltmeter across loud-speaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from generator, strong signals tend to cause improper adjustments.

IF. Connect signal generator ground to receiver ground. Using .1 mfd condenser in series with "high" side of generator, apply 480 KC signal to grid of 1A4 and adjust second IF transformer; same for first IF transformer, applying signal to grid of 1C6.

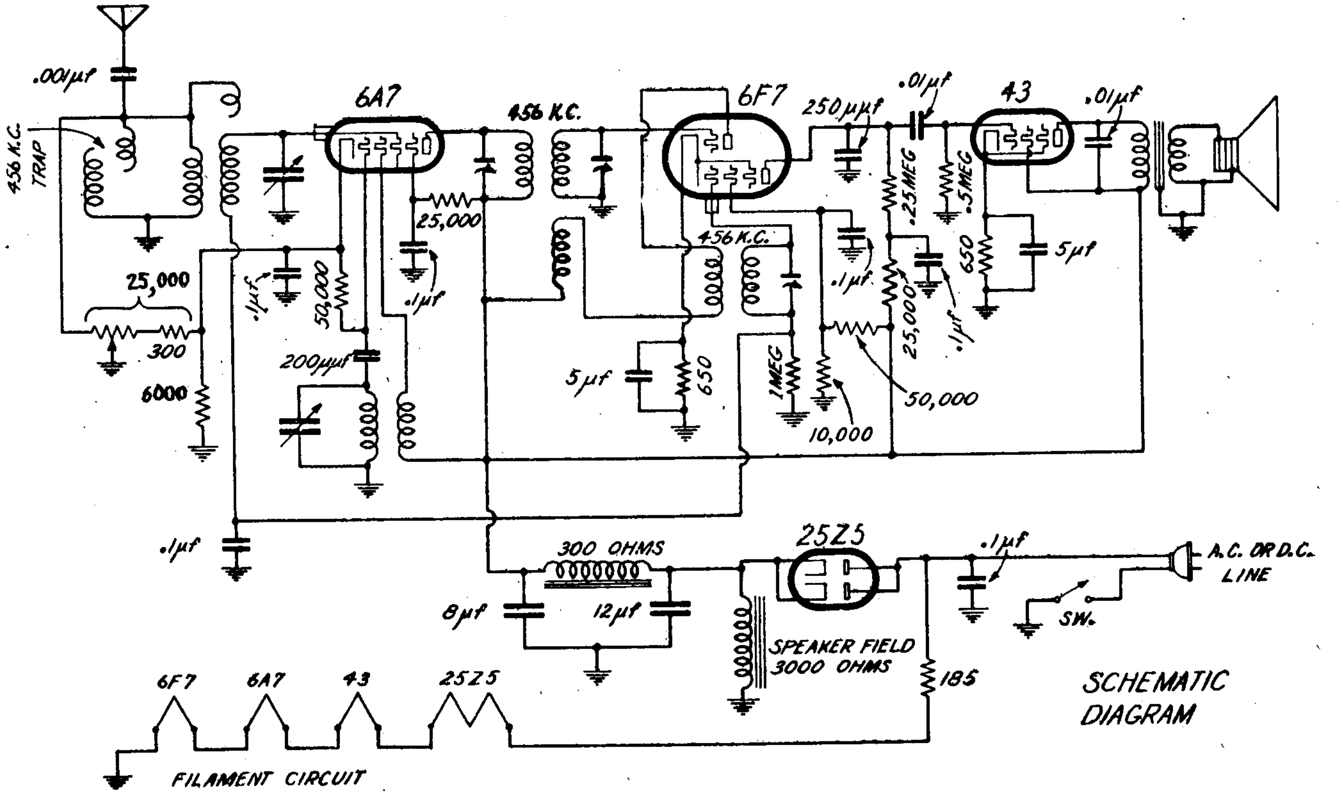
RF. Using 200 mmf condenser in series with generator, feed 1725 KC signal to antenna lead and adjust BC oscillator trimmer (located center under base). Set generator to 1400 KC, tune receiver and adjust BC antenna trimmer (located on coil on top of base). Set generator to 600 KC, tune receiver and adjust BC oscillator padder (located between variable and 1B1 tube). The tuning condenser should be rocked back and forth through the signal while padder is being adjusted to obtain perfect alinement.

Using 400 ohm resistor in series with generator, set band selector in SW (right) position, and feed 15600 KC signal to antenna lead and adjust SW oscillator trimmer (on coil back of band selector switch); screw trimmer down tight and unscrew to SECOND peak. Set generator to 15000 KC and adjust SW antenna trimmer (on coil back of tuning control); screw trimmer down tight and unscrew to FIRST peak, rocking tuning control back and forth through signal while adjusting screw. Above procedure for alinement at 15000 KC should be followed exactly to insure proper tracking. A "dead spot" at about 12000 KC will result if oscillator and antenna circuits are not set in proper relation to each other.

EMERSON RADIO AND PHONOGRAPH CORPORATION

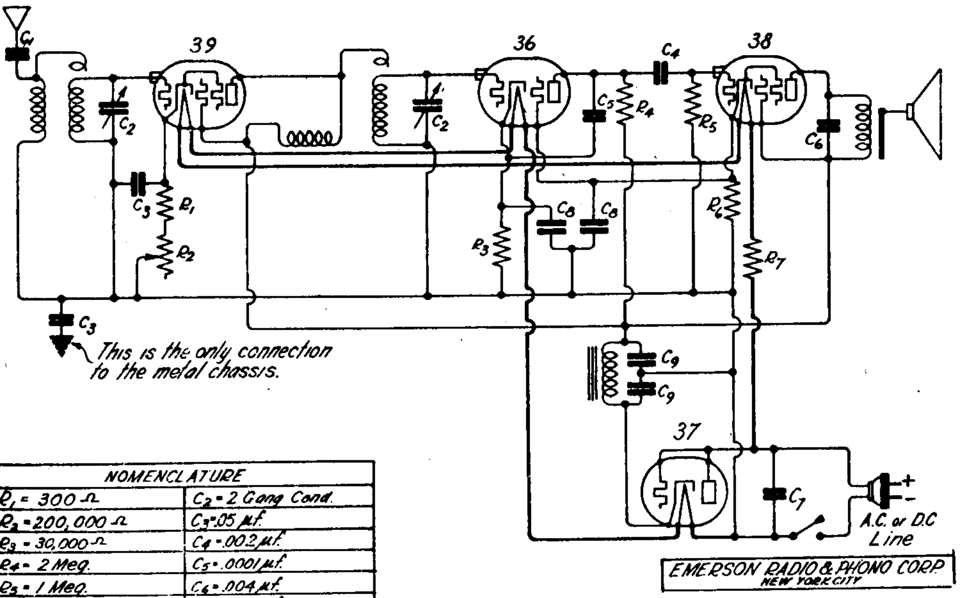
MODELS UV4 & 19

456K



SCHEMATIC DIAGRAM

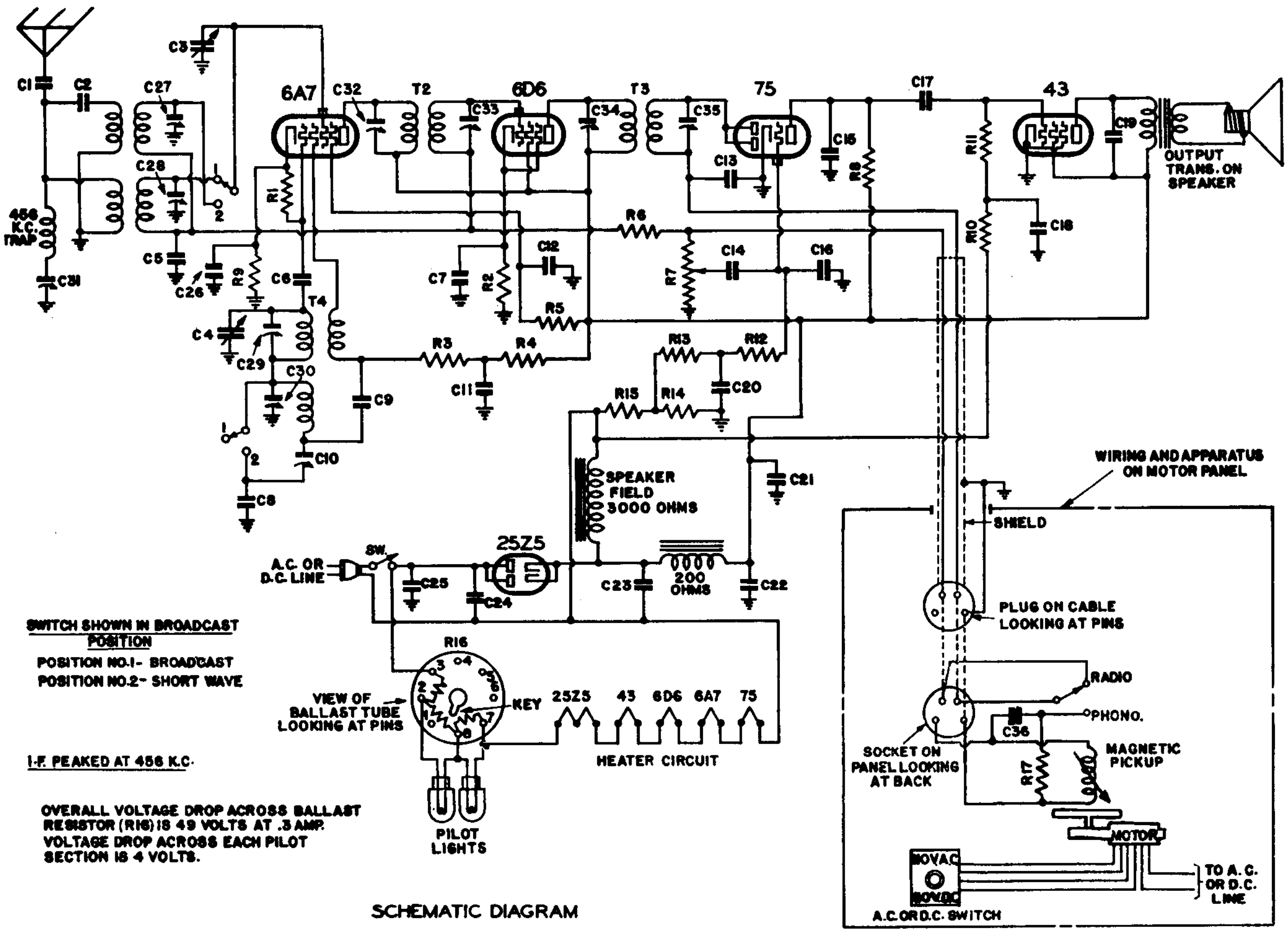
MODELS 20A-25A & G4



NOMENCLATURE	
R_1 = 300 Ω	C_2 = 2 Gang Cond.
R_2 = 200,000 Ω	C_3 = .05 μf.
R_3 = 30,000 Ω	C_4 = .002 μf.
R_4 = 2 Meg.	C_5 = .0001 μf.
R_5 = 1 Meg.	C_6 = .004 μf.
R_6 = 1500 Ω	C_7 = .006 μf.
R_7 = 305 Ω	C_8 = 5 μf.
C_1 = .002	C_9 = 4 μf.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS G & G127



SCHEMATIC DIAGRAM

*Item	Part No.	DESCRIPTION
T1	3CT-289	Two-band antenna coil
T2	3CT-274	456 kc first i-f transformer
T3	3CT-275	456 kc second i-f transformer
T4	3CT-290	Two-band oscillator coil
L1	2CT-207	Iron-core filter choke
R1	KR-53	50,000 ohm 1/4 watt carbon resistor
R2, R9	AAR-119	300 ohm 1/2 watt wire-wound resistor
R3, R4	LR-65	10,000 ohm 1/4 watt carbon resistor
R5	ZZR-196	30,000 ohm 1/4 watt carbon resistor
R6	KR-57	1 megohm 1/4 watt carbon resistor
R7	2NR-214C	Volume control with line switch—250,000 ohms
R8, R13	KR-55	250,000 ohm 1/4 watt carbon resistor
R10	OR-73	25,000 ohm 1/4 watt carbon resistor
R11, R12	KR-56	500,000 ohm 1/4 watt carbon resistor
R14	3CR-242	20 ohm 1/2 watt wire-wound resistor
R15	3CR-261	230 ohm 1 watt metallized resistor
R16	3CR-241	Plug-in type ballast resistor
R17	KR-54	100,000 ohm 1/4 watt carbon resistor
C1	AAC-114	.001 mf mica condenser
C2		0.00005 mica condenser (part of 3CT-289 antenna coil assembly)
C3, C4	3CC-275	Two-gang variable condenser
C5	BC-12	0.05 mf, 200 volt tubular condenser
C6	AAC-106A	0.00005 mica condenser
C7, C12, C18, C20, C21, C26	AC-6	0.1 mf, 200 volt tubular condenser
C8	3EC-267	0.0042 mf mica condenser
C9, C36	CCC-127	0.01 mf, 200 volt tubular condenser
C10	2NC-231	Single adjustable padding condenser, range: 300 to 600 mmf
C11	YC-98A	4 mf, 150 volt tubular electrolytic condenser
C13, C15	AC-7A	0.00025 mf mica condenser
C14, C17	LC-65	0.02 mf, 400 volt tubular condenser
C19	TTC-177	0.01 mf, 600 volt tubular condenser
C22, C23	3CC-261	20 mf, 150 volt wet electrolytic condenser
C25	3LC-297A	0.01 mf, 400 volt molded type condenser
C24	EEC-132	0.1 mf, 400 volt tubular condenser

EMERSON RADIO AND PHONOGRAPH CORPORATION
MODELS G & G127

Location of Coils and Trimmer Adjustments

The broadcast antenna coil, the short-wave antenna coil and the 456 kc wave trap are one assembly mounted underneath the chassis deck to the right of the variable condenser. The trimmers for these coils are accessible through three holes in the top of the chassis. The trimmer closest to the front of the chassis is for the short-wave antenna coil. The central trimmer is for the broadcast antenna coil and the trimmer farthest from the chassis front is for the 456 kc wave trap.

The broadcast oscillator and short-wave oscillator coils are wound on one tubing and mounted on the inside of the rear chassis wall. The trimmers for these coils are accessible through two holes in the rear chassis wall. The left-hand trimmer (looking at the rear wall) is for the short-wave oscillator coil and the right-hand trimmer is for the broadcast oscillator coil.

The two i-f transformers are in oblong coil cans located on the top of the chassis. The first i-f transformer is the one behind the variable condenser. The trimmers for these transformers are accessible through holes in the tops of the cans.

The broadcast series padding condenser is located on the rear wall of the chassis below the 6A7 tube.

I-f Transformer and Wave-Trap Alignment

Turn the switch clockwise to the broadcast position and rotate the variable condenser to the minimum capacity position. Feed 456 kc to the grid cap of the 6A7 tube and adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna and adjust the wave-trap trimmer (rear screw beside variable condenser) for minimum response.

Short-Wave Alignment

Use a dummy antenna (400 ohm resistor) when aligning the short-wave coils.

Rotate the wave-band switch counter-clockwise to the short-wave position and set the dial pointer to 15 megacycles. Feed 15 megacycles through the dummy antenna and adjust the short-wave oscillator trimmer (left-hand screw on rear chassis wall) for maximum response and then adjust the short-wave antenna trimmer (front screw beside variable condenser) for maximum response. The variable condenser should be rocked while adjusting the antenna trimmer. (Rotate variable condenser rotor shaft back and forth through a small arc).

Broadcast Alignment

Rotate the wave-band switch to the broadcast position, clockwise, and set the dial pointer at 60. Feed 600 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute).

Adjust the broadcast series padding condenser (on rear chassis wall, below 6A7 tube) for maximum response. Move pointer to 142.5, feed 1425 kc and adjust the broadcast oscillator trimmer (right-hand screw on rear chassis wall) for maximum response and then adjust the broadcast antenna trimmer (central screw beside variable condenser) for maximum response. Return pointer to 60, feed 600 kc and readjust the series padding condenser rocking the variable condenser for maximum response.

The two i-f transformers are held to the chassis by snap-on fasteners. To remove an i-f, unsolder all the leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.

The color coding of the i-f transformer leads is as follows:

Grid—green	Plate—blue
Grid return—black	B plus—red

The phonograph motor has been adjusted at the factory, to turn at a speed of 78 r.p.m. The speed may be checked by counting the turns per minute or by using a stroboscope disc and a neon light (the stroboscope method will only work when the neon bulb is lighted from a 60 cycle a.c. supply).

An a.c.-d.c. switch is provided to switch the motor for a.c. or d.c. power supply. It is important that this switch be in the proper position for the power supply available.

Tube Data

The tube complement is as follows:

1-6A7, pentagrid oscillator-modulator
1-6D6, first i-f amplifier
1-75, diode detector, a-f amplifier, automatic volume control
1-43, pentode power output
1-25Z5, dual half-wave rectifier
1-3CR-241, ballast tube (R-16 on schematic).

VOLTAGE ANALYSIS

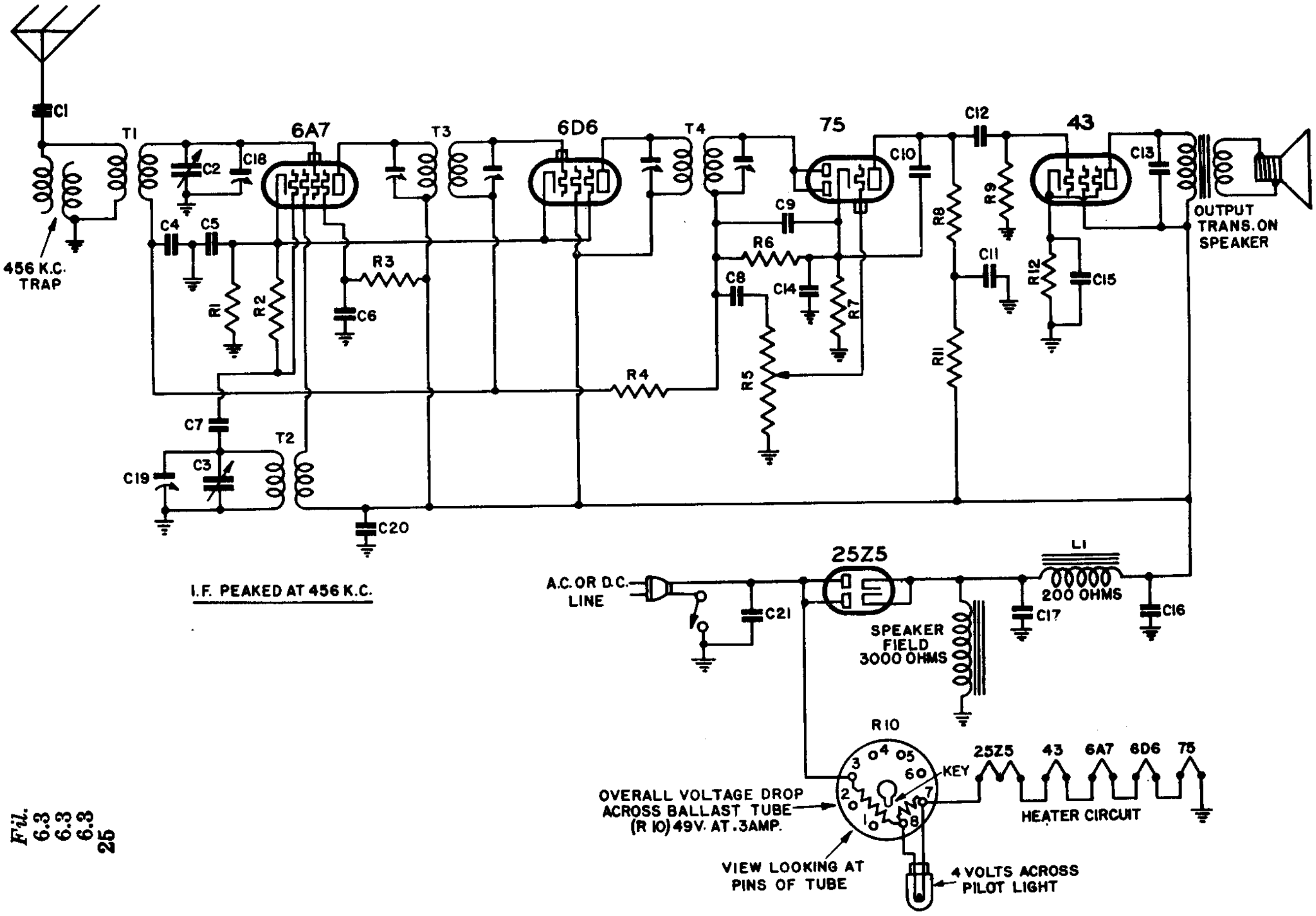
Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	100.0	42	2.0	60	6.3 a.c.
6D6	100.0	100	2.0	—	6.3 a.c.
75	39.5	0	0	—	6.3 a.c.
43	87.0	100	0	—	25 a.c.

Voltage at 25Z5 cathode—110 volts.
Voltage drop across ballast tube (including pilot-light section) —49 volts.
Voltage drop across each pilot light section—4 volts.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS J & J106



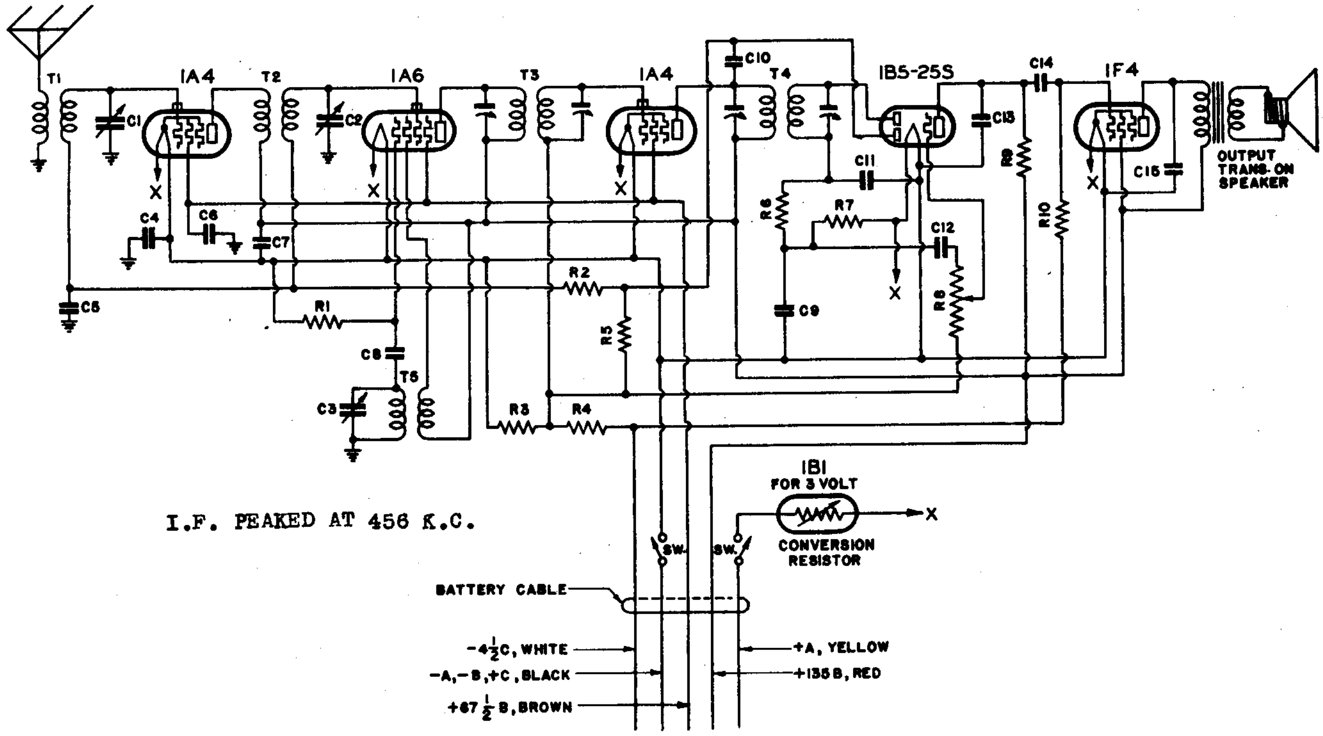
Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	105	55	2.6	105	6.3
6D6	105	105	2.6	—	6.3
75	25	—	.6	—	6.3
43	99	105	13	—	25

Voltage across speaker field—115 volts.
Voltage across choke—8.9 volts.
Voltage drop across ballast tube (R10—see schematic)—49 volts.
Voltage drop across pilot light section of ballast tube—4 volts.

Item	Part No.	DESCRIPTION
T1	3JT-292	Antenna coil with 456 kc wave-trap
T2	3JT-293	Oscillator coil
T3	3JT-294	456 kc first i-f transformer
T4	3JT-295	456 kc second i-f transformer
L1	2CT-207B	Iron-core filter choke
R1	IIR-130	150 ohm ½ watt wire-wound resistor
R2	KR-53	50,000 ohm ¼ watt carbon resistor
R3	ZZR-196	30,000 ohm ¼ watt carbon resistor
R4	KR-57	1 megohm ¼ watt carbon resistor
R5	2CR-195	Volume control with line switch, 500,000 ohms
R6, R8, R9	KR-56	500,000 ohm ¼ watt carbon resistor
R7	KR-63	15,000 ohm ¼ watt carbon resistor
R10	2UR-224	Plug-in type ballast tube
R11	KR-54	100,000 ohm ¼ watt carbon resistor
R12	FFR-126	500 ohm ½ watt wire-wound resistor
C1	AAC-114	0.001 mf mica condenser
C2, C3	3JC-279	Two-gang variable condenser
C4, C5, C6, C11	AC-6	0.1 mf 200 volt tubular condenser
C7	EC-24A	0.0001 mf mica condenser
C8, C12	CCC-127	0.01 mf 200 volt tubular condenser
C9	IC-47A	0.0005 mf mica condenser
C10	AC-7A	0.00025 mf mica condenser
C13	HC-34	0.006 mf 600 volt tubular condenser
C14, C15	CCC-146B	Dry electrolytic condenser C14—10 mf 25 volt C15—5 mf 25 volt
C18, C19	3JC-280	Dual trimmer strip (3 to 30 mmf)
C20	BC-13	0.25 mf 200 volt tubular condenser
C16, C17	2CC-222	Dual 12 mf 150 volt dry electrolytic condenser in metal container
C21	2VC-242	0.1 mf 250 volt a.c. tubular condenser

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS H 130 & H 137



I.F. PEAKED AT 456 K.C.

*ITEM	PART NO.	DESCRIPTION
T1	3HT-284	Antenna coil
T2	3HT-285	R-f interstage coil
T3	3HT-287	456 kc first i-f transformer
T4	3HT-288	456 kc second i-f transformer
T5	3HT-286	Oscillator coil
R1, R6	KR-53	50,000 ohm, ¼ watt carbon resistor
R2	KR-57	1 megohm, ¼ watt carbon resistor
R3	GR-85	2000 ohm, ¼ watt carbon resistor
R4	PR-79	1000 ohm, ¼ watt carbon resistor
R5, R7	KR-56	500,000 ohm, ¼ watt carbon resistor
R8	3HR-240	Volume control with line switch—500,000 ohms
R9	KR-54	100,000 ohm, ¼ watt carbon resistor
R10	KR-55	250,000 ohm, ¼ watt carbon resistor
C1, C2, C3	3HC-273	Three-gang variable condenser
C4, C5, C6	AC-6	0.1 mf, 200 volt tubular condenser
C7	VVC-221A	8 mf, 150 volt tubular dry electrolytic condenser
C8	EC-24A	0.0001 mf mica condenser
C9, C11, C13	AC-7A	0.00025 mf mica condenser
C10	AAC-106A	0.00005 mf mica condenser
C12	FC-29	0.02 mf, 200 volt tubular condenser
C14	LC-65	0.02 mf, 400 volt tubular condenser
C15	3HC-274	0.002 mf, 600 volt tubular condenser

Chassis Model H

Current drain .... "A" battery—0.3 amps
"B" battery—0.023 amps. with no signal

Frequency range .... 540 to 1700 kc.

VOLTAGE ANALYSIS

Readings should be taken with a 1,000 ohms-per-volt meter. The voltages listed below are from point indicated to A minus with volume control turned on full and no signal. The battery voltages for these readings were as follows: "A" battery 3 volts, "B" battery 135 volts, "C" battery 4.5 volts.

Tube	*Plate*	*Screen*	*Osc. Plate*	*Fil.*
1A4	135	67.5	—	2.0
1A6	135	67.5	135	2.0
1A4	135	67.5	—	2.0
1B5/25S	85	—	—	2.0
1F4	125	135	—	2.0

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS H 130 & H 137

GENERAL NOTES

1. The battery complement should be as follows:

PORTABLE (Small Batteries)

Type	No. Req.	BATTERY MANUFACTURER Eveready Part No.	Burgess Part No.	Ray-o-vac Part No.
1½ volt "A"	2	No. 7111	No. 4FA	No. 6 Railroad
45 volt "B"	3	No. 762	No. 5308	No. 5303
4½ volt "C"	1	No. 771	No. 5360	No. 531R
HOME (Heavy Duty Batteries)				
3 volt "A"	1	No. X125 or A600	No. 20F2	No. P9403
45 volt "B"	3	No. 486	No. 21308	No. P9303
4½ volt "C"	1	No. 771	No. 2370	No. P231W

The batteries indicated above for portable use are chosen for size so that the entire complement can be housed by the portable cabinet.

2. The receiver is designed for an "A" supply of 2 to 3 volts. A 2 volt storage battery may be used, in which case the 1B1 (ballast) tube, in the chassis becomes unnecessary and may be eliminated as follows:
   If it is definitely known that a 2 volt storage battery will always be used it is permissable and advisable to short-circuit the two heavy prongs on the 1B1 tube by connecting them with a short piece of bare wire. *Be sure that the two small prongs on the tube are free of this bare wire.*

3. The i-f transformers are of the snap-on type. To remove, unsolder all leads under the chassis, pinch together the prongs of the snap-on fastener and lift out.

4. The color coding of the i-f transformer leads is as follows:
   Grid—green; Plate—blue
   Grid return—black; B plus—red

5. Note that each lead in the battery cable is color-coded and tagged with a small metal marker on which the battery connection is clearly stamped. Be sure that all connections are tight. The color coding of the battery cable is as follows:
   Red .... B plus 135
   Brown .... B plus 67.5
   Black .... A neg., B neg. and C plus
   Yellow .... A plus 3
   White .... C neg. 4.5

6. If replacements are made in the r-f section of the circuit, the receiver should be carefully re-aligned.

Tube Data

1—1A4, r-f amplifier
1—1A6, oscillator-modulator
1—1A4, 1st i-f amplifier
1—1B5/25S 2nd detector, a.v.c., a-f amplifier
1—1F4, pentode output
1—1B1 ballast tube

Location of I-f Transformers and Trimmers

The first i-f transformer, part number 3HT-287 is in an oblong coil can located on the top of the chassis to the right of the speaker. The two trimmers for this i-f are accessible through holes in the top of the coil can.

The second i-f transformer, part number 3HT-288 is in an oblong coil can located directly behind the second i-f tube. The two trimmers for this i-f are accessible through holes in the top of the coil can.

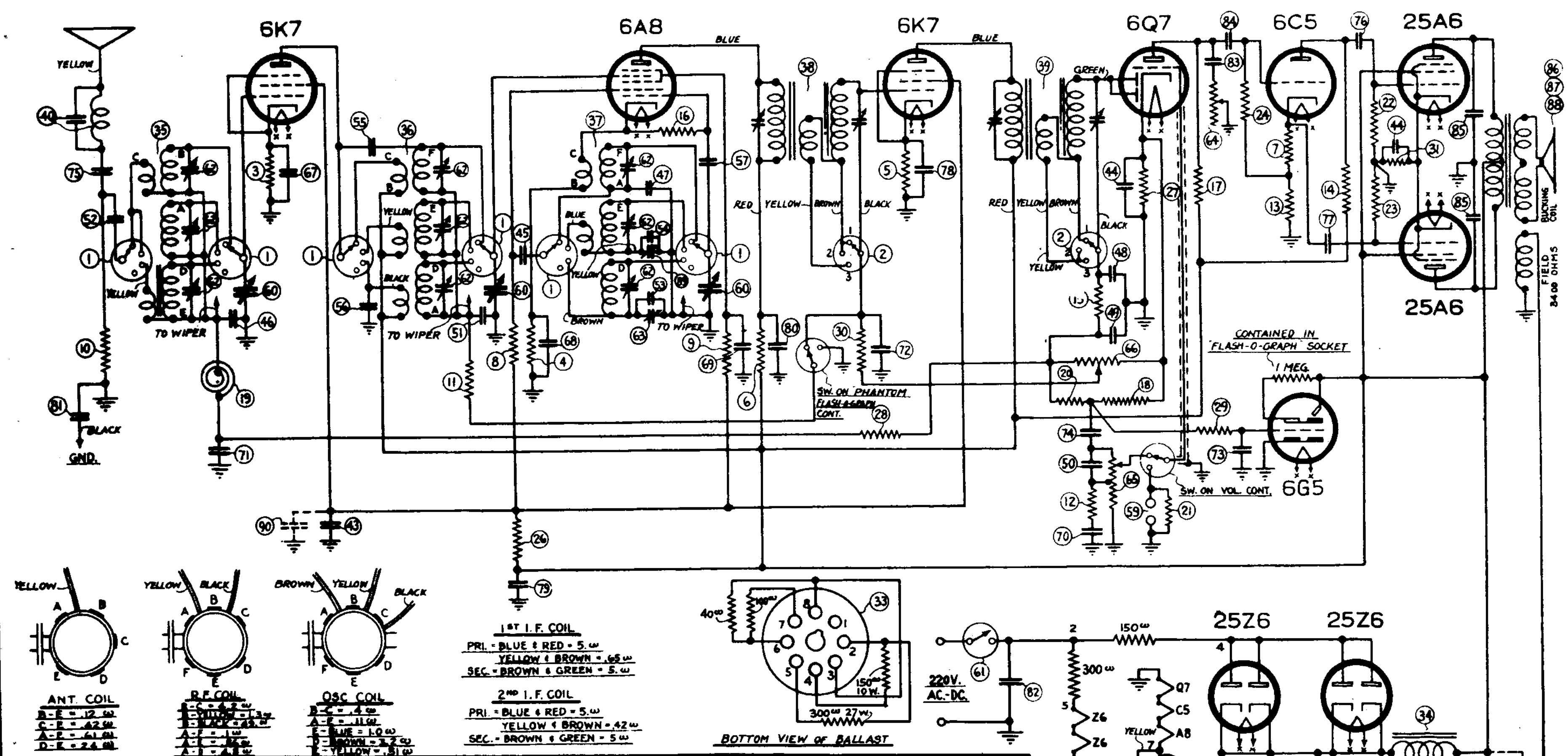
The oscillator, antenna, and r-f trimmers are located on the top of the variable condenser. The oscillator trimmer is on the center section of the variable condenser, the antenna trimmer is on the front section of the variable condenser and the r-f trimmer is on the rear section of the variable condenser.

Alignment Procedure

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 456 kc to the grid cap of the 1A6 tube.
3. Adjust the four i-f trimmers, repeating for maximum response.
4. Set dial pointer to 1500 and feed 1500 kc to the antenna lead through a standard broadcast dummy antenna (a .0002 mf mica condenser may be used as a substitute).
5. Adjust the oscillator trimmer (on center section of variable condenser) for maximum response.
6. Adjust the r-f trimmer (on rear section of variable condenser) for maximum response.
7. Adjust the antenna trimmer (on front section of variable condenser) for maximum response.

FADA RADIO & ELECTRIC CO.

MODEL 211B SERIES



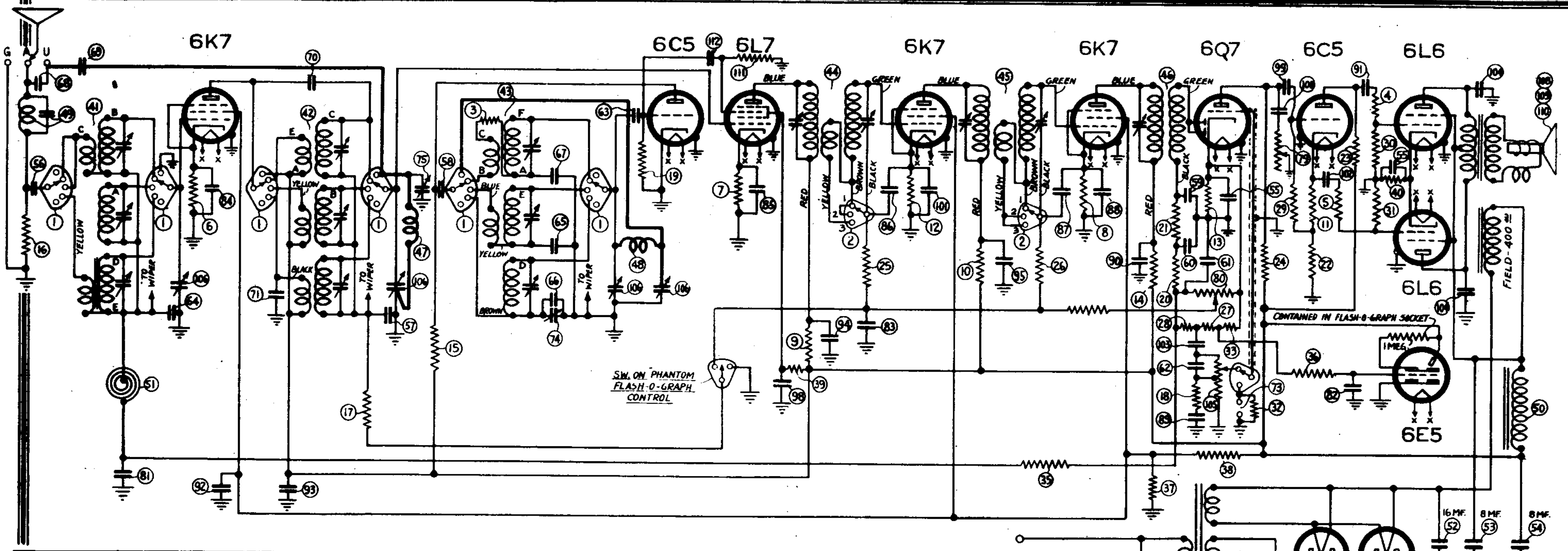
REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	45.34	BAND SWITCH	23	30.23	CARB. RES. - 500,000 OHMS 1/3 W. ±20	45	15.7	MICA COND. - .002 MF. ± 10%	67	10.5	TUBULAR COND. .05 MF 200 V.
2	45.32	SELECTIVITY SWITCH	24	30.23	" " 500,000 " " "	46	15.5	" " .002 " 3	68	10.5	" " .05 " 200 "
3	30.45	CARB. RES. - 250 OHMS 1/3 W. ±10	25			47	15.62	" " .004 " 5	69	10.5	" " .05 " 200 "
4	30.45	" " 250 " " " "	26	30.12	" " 4,000 " " "	48	15.3	" " .0001 " 10	70	10.5	" " .05 " 200 "
5	30.63	" " 300 " " " "	27	30.65	" " 4,600 " " "	49	15.3	" " .0001 " "	71	10.26	" " .02 " 200 "
6	30.35	" " 1000 " " " 20	28	30.28	" " 2,000,000 " " "	50	15.3	" " .0001 " "	72	10.26	" " .02 " 200 "
7	30.15	" " 2,000 " " " 10	29	30.28	" " 2,000,000 " " "	51	15.6	" " .0025 " 3	73	10.26	" " .02 " 200 "
8	30.1	" " 5000 " " " "	30	30.28	" " 2,000,000 " " "	52	15.2	" " .0005 " 10	74	10.4	" " .01 " 200 "
9	30.2	" " 10000 " " " "	31	30.43	" " 315 " 1W. 10	53	15.52	" " .00026 " 5	75	10.4	" " .01 " 200 "
10	30.31	" " 10,000 " " " 20	32	10.30	TUBULAR COND. - .75 MF. 200 V.	54	15.63	" " .00093 " 3	76	10.2	" " .1 " 200 "
11	30.31	" " 10,000 " " " "	33	115.18	BALLAST RES. - 40-100-[illegible]	55	15.16	" " 3 MMF 10	77	10.2	" " .1 " 200 "
12	30.58	" " 20,000 " " " 10	34	40.3A	CHOKE COIL - 200 OHMS	56	15.61	" " 35 " 5	78	10.2	" " .1 " 200 "
13	30.59	" " 27,000 " " " "	35	35.15	ANTENNA "	57	15.10	" " 50 " 10	79	10.2	" " .1 " 200 "
14	30.10	" " 30,000 " " " "	36	35.16	R.F. "	58	120.3	PILOT LTS. - 6-8 V. .15 A.	80	10.2	" " .1 " 200 "
15	30.26	" " 50,000 " " " 20	37	35.17	OSCILLATOR "	59	125.1	PHONO JACK	81	10.23	" " .006 " 200 "
16	30.8	" " 100,000 " " " 10	38	35.18	1ST I.F. "	60	25.61	VARIABLE COND.	82	10.9	" " .1 " 400 "
17	30.66	" " 150,000 " " " 20	39	35.19	2ND I.F. "	61		ON-OFF SW. ON TONE CONT.	83	10.10	" " .01 " 400 "
18	30.6	" " 1,000,000 " " " 10	40	35.6	WAVE TRAP	62		MIN. ADJ. ON COILS	84	10.10	" " .01 " 400 "
19	3216	CHOKE COIL - 2.3 MH.	41	20.54	ELECTRO. COND. - 32 MF 175 W.V.	63	25.49	PADDING COND. - 70 MMF.	85	10.17	" DUAL " .001 " 600 "
20	30.20	CARB. RES. 250,000 OHMS 1/3 W. ±20	42	20.54	" " 16 " 175 "	64	55.11	TONE CONTROL - 1/2 MEG.	86	105.55	SPEAKER - 3400 ω (MODEL 211 T)
21	30.23	" " 500,000 " " " "	43	20.55	" " 8 " 175 " tub	65	50.25	VOLUME - 1 MEG. - TAPPED @ 50,000 ω	87	105.56	" " (" 211 C)
22	30.23	" " 500,000 " " " "	44	20.44	" DUAL " 10-10 " 25 " "	66	50.24	PHANTOM FLASH-O-GRAPH CONTROL TUBE	88	105.57	" " (" 211 CK)
									89	25.64	PADDING COND. - 110 - 250 MMF.

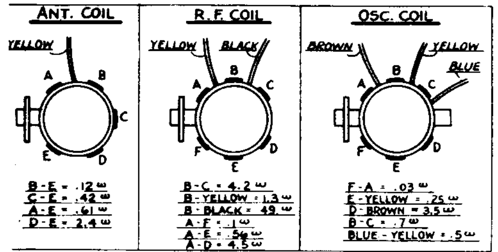
I. F. = 456 KC.

NOTE:
BAND SW. SHOWN IN S.W. POSITION.
SELECTIVITY SW. - SHARP
I. F. TO BE ALIGNED " "
POS. #1 (SHARP). POS. #2 (BROAD). POS. #3 (HI-FIDELITY)
⏚ = CHASSIS
(90)(91)(92) ELECTRO. COND. - 8 MF. 175 W.V. (FOR 25 CYCLE OPERATION ONLY) (PART No. 20.55)

FADA RADIO & ELECTRIC CO.

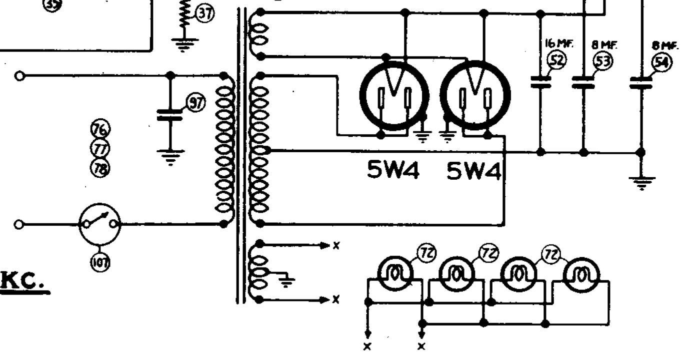
MODEL 212 SERIES





I. F. COILS	PRI.	COUPLING	SEC.
1ST	BLUE & RED = 8 ω	YELLOW & BROWN = .09 ω	BROWN & GREEN = 8 ω
2ND	" " = 8 ω	" " = .10 ω	" " = 8 ω
3RD	" " = 8 ω	———	" " = 8 ω

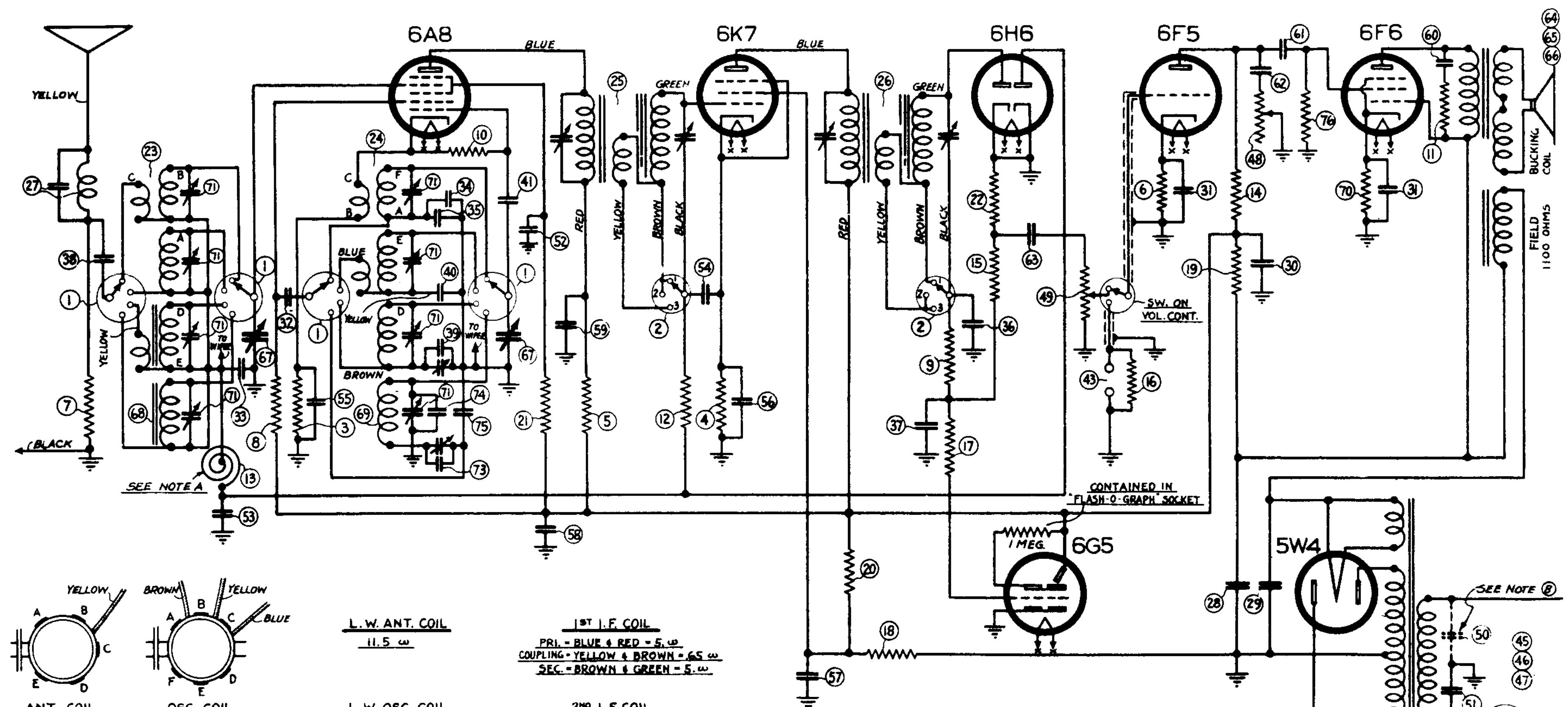
NOTE:
BAND SW. SHOWN IN BAND "A" POSITION.
I. F. SELECTIVE SW. " SHARP " .
I. F. TO BE ALIGNED " " " .
POS. #1 (SHARP). POS. #2 (BROAD) POS. #3 (HI-FIDELITY).
⏚ = CHASSIS.



I. F. = 456 KC.

REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION
1	45.36	BAND SW.	25	30.20	CARB. RES. - 250,000 OHMS 1/3W ± 20%	49	35.6	COIL - WAVE TRAP	73	125.1	PHONO. JACK	97	10.7	TUBULAR COND. - .05 MF. 400 V.
2	45.32A	SELECTIVITY SW.	26	30.20	" " 250,000 " " " " "	50	40.53	" CHOKE - 900 ω	74	25.40	PADDING COND. - 140 MMF.	98	10.10	" " .01 " 400 "
3	30.78	CARB. RES. - 25 OHMS 1/3W. ± 10%	27	30.62	" " 400,000 " " " " 10	51	3216	" R. F. CHOKE - 2.3 MH.	75	25.49	" " 70 "	99	10.10	" " .01 " 400 "
4	30.70	" " 130 " " " " 20	28	30.5	" " 500,000 " " " " "	52	20.50	ELECTRO. COND. - 16 MF. 475 W.V.	76	40.49	POWER TRANS. - 115 V. 50-60 ~	100	10.10	" " .01 " 400 "
5	30.70	" " 130 " " " " "	29	30.23	" " 500,000 " " " " 20	53	20.4	" " 8 " 450 "	77	40.50	" " - 115 V. 25 ~	101	10.2	" " .1 " 200 "
6	30.45	" " 250 " " " " 10	30	30.23	" " 500,000 " " " " "	54	20.4	" " 8 " 450 "	78	40.51	" " TAP. PRI. 110,130,150,220,250 V.	102	10.2	" " .1 " 200 "
7	30.71	" " 450 " " " " "	31	30.23	" " 500,000 " " " " "	55	20.44	" DUAL " 10-10 " 25 "	79	55.13	TONE CONTROL - 1/2 MEG.	103	10.4	" " .01 " 200 "
8	30.15	" " 2,000 " " " " "	32	30.23	" " 500,000 " " " " "	56	15.2	MICA COND. - .0005 MF. ± 10%	80	50.24	FLASH-O-GRAPH CONTROL - 1 MEG.	104	10.17	" DUAL " .001 " 600 "
9	30.64	" " 2,000 " " " " 20	33	30.67	" " 600,000 " " " " 10	57	15.6	" " .0025 " " 3	81	10.26	TUBULAR COND. - .02 MF. 200 V.	105	50.25	VOLUME CONTROL - 1 MEG. TAPPED AT 50,000 ω
10	30.64	" " 2,000 " " " " "	34	30.28	" " 2,000,000 " " " " 20	58	15.7	" " .002 " " 10	82	10.26	" " .02 " 200 "	106	25.63	VARIABLE COND.
11	30.57	" " 3,000 " " " " 10	35	30.28	" " 2,000,000 " " " " "	59	15.3	" " .0001 " " "	83	10.26	" " .02 " 200 "	107	45.37	ON-OFF SW. (LINE)
12	30.1	" " 5,000 " " " " "	36	30.28	" " 2,000,000 " " " " "	60	15.3	" " .0001 " " "	84	10.5	" " .05 " 200 "	108	105.49	SPEAKER - 400 ω (MODEL 212T)
13	30.1	" " 5,000 " " " " "	37	30.14	" " 50,000 " 1/2 " " 10	61	15.3	" " .0001 " " "	85	10.5	" " .05 " 200 "	109	105.50	" " (" 212C)
14	30.36	" " 5,000 " " " " 20	38	30.33	" " 25,000 " 1 " " "	62	15.3	" " .0001 " " "	86	10.5	" " .05 " 200 "	110	105.51	" " (" 212CK)
15	30.2	" " 10,000 " " " " 10	39	30.73	" " 12,500 " 2 " " "	63	15.10	" " 50 MMF. " "	87	10.5	" " .05 " 200 "	111	30.3	CARB. RES. - 50,000 OHMS 1/3W ± 10%
16	30.31	" " 10,000 " " " " 20	40	30.72	" " 210 " 2 " " "	64	15.5	" " .002 MF. " 3	88	10.5	" " .05 " 200 "	112	15.10	MICA COND. - 50 MMF. ± 10%
17	30.31	" " 10,000 " " " " "	41	35.15	COIL - ANT.	65	15.69	" " .0018 " " "	89	10.5	" " .05 " 200 "	113		
18	30.58	" " 20,000 " " " " 10	42	35.16	" R. F.	66	15.66	" " .0005 " " 5	90	10.9	" " .1 " 400 "	114		
19	30.11	" " 25,000 " " " " "	43	35.31	" OSC.	67	15.32	" " .0056 " " "	91	10.9	" " .1 " 400 "	115		
20	30.32	" " 25,000 " " " " 20	44	35.25	" 1ST I. F.	68	15.9	" " 10 MMF. " 10	92	10.9	" " .1 " 400 "	116		
21	30.32	" " 25,000 " " " " "	45	35.26	" 2ND I. F.	69	15.9	" " 10 " " "	93	10.9	" " .1 " 400 "	117		
22	30.59	" " 27,000 " " " " 10	46	35.27	" 3RD I. F.	70	15.16	" " 3 " " 1/2 MMF.	94	10.7	" " .05 " 400 "	118		
23	30.10	" " 30,000 " " " " "	47	35.28	" U. H. F. ANT.	71	15.61	" " 35 " " 5%	95	10.7	" " .05 " 400 "	119		
24	30.53	" " 200,000 " " " " 20	48	35.29	" " OSC.	72	120.3	PILOT LTS. - 6-8 V. .15 A.	96			120		

FADA RADIO & ELECTRIC CO.
MODEL 271 SERIES



ANT. COIL
B-E = .12 ω
C-E = .42 ω
A-E = .61 ω
D-E = 2.4 ω

OSC. COIL
B-C = .4 ω
A-F = .11 ω
F-BLUE = 1.0 ω
D-BROWN = 3.2 ω
E-YELLOW = .51 ω

L.W. ANT. COIL
11.5 ω

L.W. OSC. COIL
BLACK & GREEN = 64 ω

1ST I.F. COIL
PRI. = BLUE & RED = 5. ω
COUPLING = YELLOW & BROWN = 65 ω
SEC. = BROWN & GREEN = 5. ω

2ND I.F. COIL
PRI. = BLUE & RED = 5. ω
COUPLING = YELLOW & BROWN = 42 ω
SEC. = BROWN & GREEN = 5. ω

REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	45.33	BAND SWITCH	23	35.15	ANTENNA COIL	45	40.32A	POWER TRANS. 115 V. 50-60 ~	67	25.60	VARIABLE COND.
2	45.32	SELECTIVITY "	24	35.17	OSCILLATOR "	46	40.33A	" " 115 V. 25 ~	68	35.20	L. W. ANT. COIL
3	30.45	CARB. RES. - 250 OHMS 1/3 W. ± 10%	25	35.18	1ST I.F. "	47	40.39A	" " TAP PRI. - 110-130-150 220-250 V.	69	35.22	" OSC. "
4	30.42	" " 500 " " "	26	35.19	2ND I.F. "	48	55.11	TONE CONTROL - 1/2 MEG.	70		ON-OFF SW. ON TONE CONT.
5	30.35	" " 1000 " " 20	27	35.6	WAVE TRAP	49	50.23	VOLUME " 1 MEG. WITH S.P.D.T. SW.	71		MIN. ADJ. ON COILS
6	30.15	" " 2000 " " 10	28	20.4	ELECTRO. COND. - 8 MF. 450 W.V.	50	10.7	TUBULAR COND. - .05 MF 400 V.	72	30.54	CARB. RES. - 410 OHMS 1/2 W. ± 10%
7	30.31	" " 10,000 " " 20	29	20.4	" " 8 " 450 "	51	10.7	" " .05 " 400 "	73	15.58	MICA COND. - .00018 MF. ± 5%
8	30.31	" " 10,000 " " "	30	20.45	" " 6 " 450 "	52	10.7	" " .05 " 400 "	74	15.10	" " 50 MMF. 10
9	30.26	" " 50,000 " " "	31	20.44	" DUAL " 10-10 " 25 "	53	10.26	" " .02 " 200 "	75	15.2	" " .0005 MF. "
10	30.8	" " 100,000 " " 10	32	15.7	MICA COND. - .002 MF. ± 10%	54	10.26	" " .02 " 200 "	76	30.23	CARB. RES. - 500,000 OHMS 1/3 W. ± 20%
11	30.24	" " 100,000 " " 20	33	15.5	" " .002 " 3 -	55	10.5	" " .05 " 200 "			
12	30.24	" " 100,000 " " "	34	15.21	" " .003 " 5	56	10.2	" " .1 " 200 "			
13	5409	CHOKE COIL - 20. MH.	35	15.62	" " .004 " 5	57	10.9	" " .1 " 400 "			
14	30.20	CARB. RES. 250,000 OHMS 1/3 W. ± 20	36	15.3	" " .0001 " 10	58	10.9	" " .1 " 400 "			
15	30.19	" " 200,000 " " 10	37	15.3	" " .0001 " "	59	10.9	" " .1 " 400 "			
16	30.23	" " 500,000 " " 20	38	15.2	" " .0005 " "	60	10.13	" " .002 " 400 "			
17	30.28	" " 2,000,000 " " "	39	15.52	" " .00026 " 5	61	10.10	" " .01 " 400 "			
18	30.14	" " 50,000 " 1/2 W. 10	40	15.63	" " .00093 " 3	62	10.10	" " .01 " 400 "			
19	30.55	" " 2,500 " 1 W. "	41	15.10	" " 50 MMF. 10	63	10.4	" " .01 " 200 "			
20	30.68	" " 40,000 " "	42	120.3	PILOT LTS. 6-8 V. .15 A.	64	105.38	" " (MODEL 270 T)			
21	30.56	" " 30,000 " "	43	125.1	PHONO JACK	65	105.39	" " (" 270 C)			
22	30.62	" " 400,000 " 1/3 "	44	25.49	PADDING COND.	66	105.43	" " (" 270 CK)			

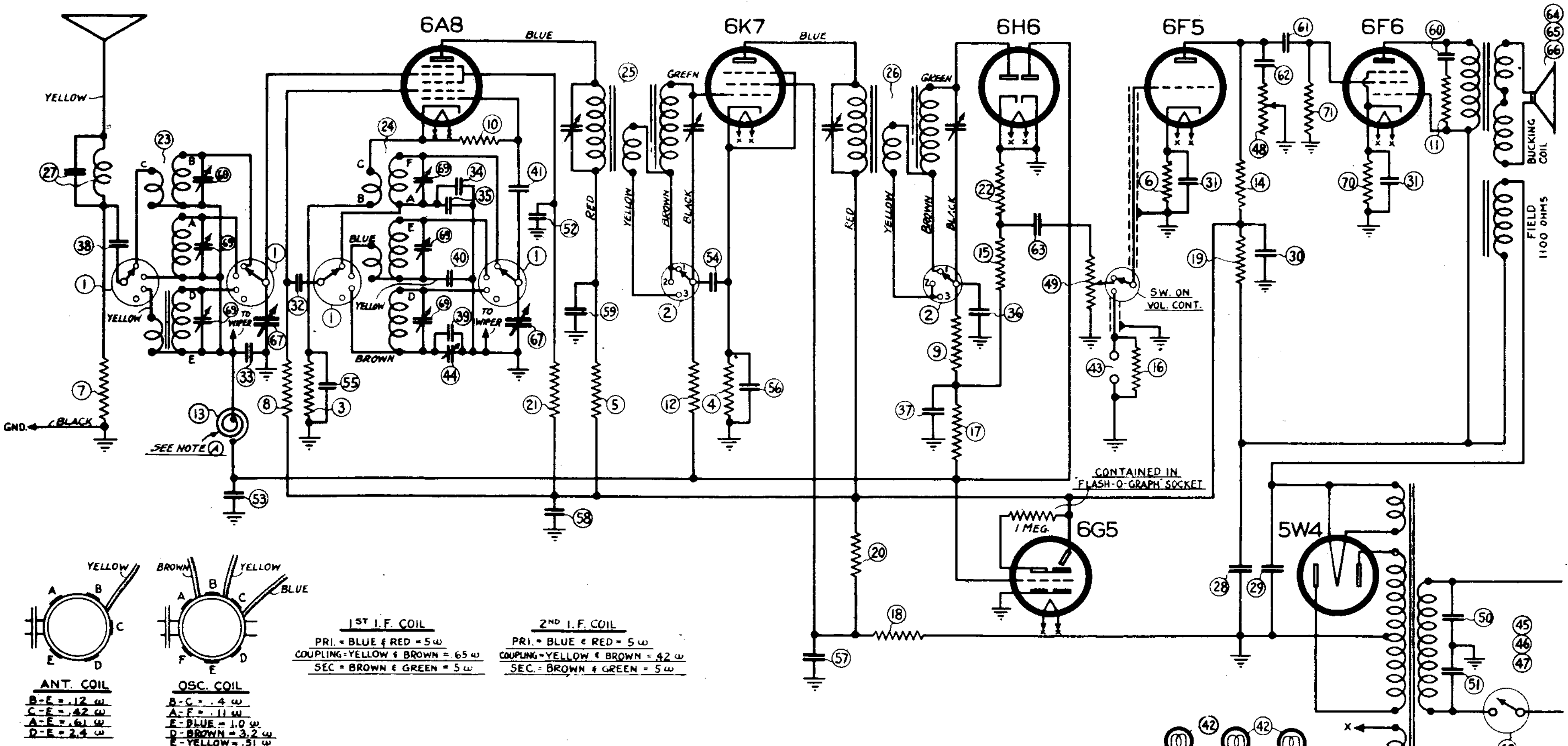
NOTE:
BAND SW. SHOWN IN S.W. POSITION.
SELECTIVITY SW. " " SHARP "
I.F. TO BE ALIGNED " " "
POS. #1 (SHARP). POS. #2 (BROAD). POS. #3 (HI-FIDELITY).
⏚ = CHASSIS

NOTE Ⓐ - ON SOME EARLY MODELS, A 250,000 CARB. RES. WAS USED IN PLACE OF THIS CHOKE.
NOTE Ⓑ - ON SOME EARLY MODELS, THIS COND. IS USED.

I. F. = 456 KC.

FADA RADIO & ELECTRIC CO.

MODEL 270 SERIES



REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	45.33	BAND SWITCH	23	35.15	ANTENNA COIL	45	40.32A	POWER TRANS. 115 V. 50-60 ~	67	25.60	VARIABLE COND.
2	45.32	SELECTIVITY "	24	35.17	OSCILLATOR "	46	40.33A	" " 115 V. 25 ~	68		ON-OFF SW. ON TONE CONT.
3	30.45	CARB. RES. - 250 OHMS 1/3 W. ±10%	25	35.18	1ST I.F. "	47	40.39A	" " TAP PRI. 110-130-150 220-250 V.	69		MIN. ADJ. ON COILS
4	30.42	" " 500 " " "	26	35.19	2ND I.F. "	48	55.11	TONE CONTROL - 1/2 MEG.	70	30.54	CARB. RES. - 410 OHMS 1/2 W. ±10%
5	30.35	" " 1000 " " 20	27	35.6	WAVE TRAP	49	50.23	VOLUME " 1 MEG. WITH S.P.S.T. SW.	71	30.23	" " 500,000 " 1/3 " "
6	30.15	" " 2000 " " 10	28	20.4	ELECTRO. COND. - 8 MF. 450 W.V.	50	10.7	TUBULAR COND. - .05 MF. 400 V.			
7	30.31	" " 10,000 " " 20	29	20.4	" " 8 " 450 "	51	10.7	" " .05 " 400 "			
8	30.31	" " 10,000 " " "	30	20.45	" " 6 " 450 "	52	10.7	" " .05 " 400 "			
9	30.26	" " 50,000 " " "	31	20.44	" DUAL " 10-10 " 25 "	53	10.26	" " .02 " 200 "			
10	30.8	" " 100,000 " " 10	32	15.7	MICA COND. - .002 MF. ± 10%.	54	10.26	" " .02 " 200 "			
11	30.24	" " 100,000 " " 20	33	15.5	" " .002 " 3	55	10.5	" " .05 " 200 "			
12	30.24	" " 100,000 " " "	34	15.21	" " .003 " 5	56	10.2	" " .1 " 200 "			
13	3216	CHOKE COIL - 2.3 MH	35	15.62	" " .004 " 5	57	10.9	" " .1 " 400 "			
14	30.20	CARB. RES. 250,000 OHMS 1/3 W ± 20	36	15.3	" " .0001 " 10	58	10.9	" " .1 " 400 "			
15	30.19	" " 200,000 " " 10	37	15.3	" " .0001 " "	59	10.9	" " .1 " 400 "			
16	30.23	" " 500,000 " " 20	38	15.2	" " .0005 " "	60	10.13	" " .002 " 400 "			
17	30.28	" " 2,000,000 " " "	39	15.52	" " .00026 " 5	61	10.10	" " .01 " 400 "			
18	30.14	" " 50,000 " 1/2 W. 10	40	15.63	" " .00093 " 3	62	10.10	" " .01 " 400 "			
19	30.55	" " 2,500 " 1 W. "	41	15.10	" " 50 MMF. 10	63	10.4	" " .01 " 200 "			
20	30.68	" " 40,000 " " "	42	120.3	PILOT LTS. - 6-8 V. .15 A.	64	105.38	SPEAKER 1100 ω (MODEL 270 T)			
21	30.56	" " 30,000 " " "	43	125.1	PHONO JACK	65	105.39	" " (" 270 C)			
22	30.62	" " 400,000 " 1/3 W. "	44	25.49	PADDING COND. - 70 MMF.	66	105.43	" " (" 270 CK)			

NOTE:

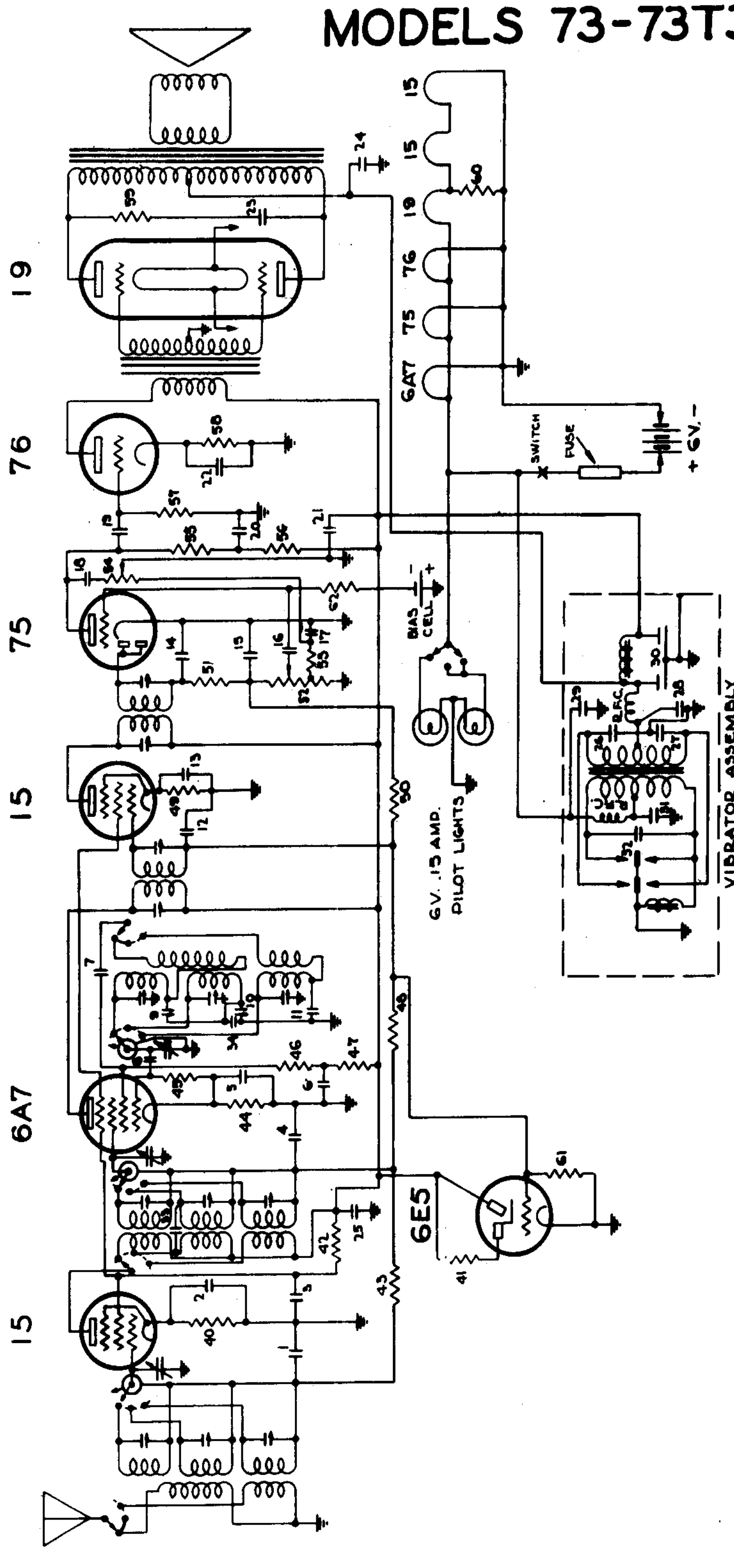
BAND SW. SHOWN IN S.W. POSITION.
SELECTIVITY SW. " " SHARP "
I.F. TO BE ALIGNED " " "
POS. #1 (SHARP). POS. #2 (BROAD). POS. #3 (HI-FIDELITY).
⏚ = CHASSIS

NOTE (A) - ON SOME EARLY MODELS, A 250,000 CARB. RES. WAS USED IN PLACE OF THIS CHOKE.

I. F. = 456 KC.

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODELS 73-73T3B & 73C3B



I.F. 456 K.C.

40 - 500 ohms
41 - 1 megohm
42 - 25M ohms
43 - 50 ohms
44 - 150 ohms

45 - 50M ohms
46 - 10M ohms
47 - 10M ohms
48 - 500M ohms
49 - 500 ohms

50 - 1 megohm
51 - 50M ohms
52 - 500M ohms
53 - 3M ohms
54 - 500M ohms

55 - 250M ohms
56 - 250M ohms
57 - 500M ohms
58 - 1M ohms
59 - 10M ohms

60 - 100 ohms
61 - 2 megohms
62 - 500M ohms

1 - .05 mfd
2 - .05 mfd
3 - .1 mfd
4 - .05 mfd
5 - .05 mfd

6 - 8 mfd
7 - .001 mfd
8 - 100 mmfd
9 - .0005 mfd
10 - .00175 mfd

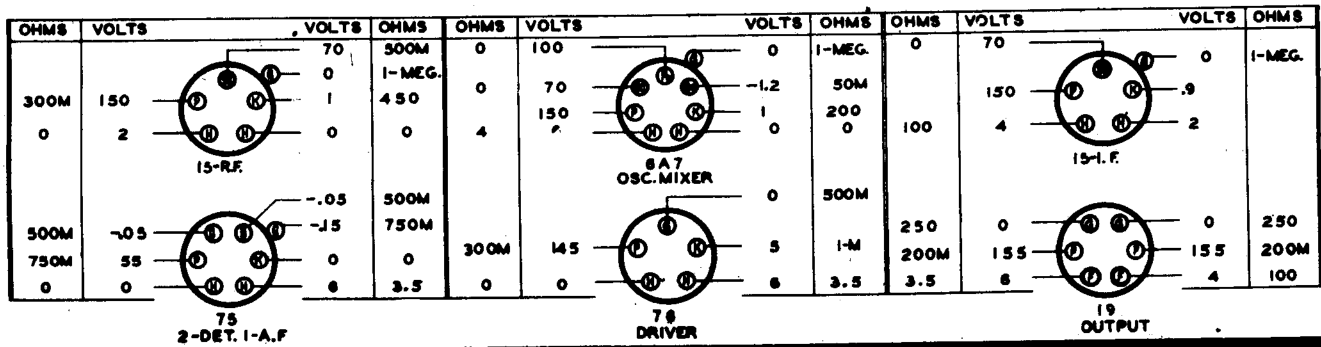
11 - .004 mfd
12 - .05 mfd
13 - .05 mfd
14 - .0001 mfd
15 - .0001 mfd

16 - .01 mfd
17 - .1 mfd
18 - .03 mfd
19 - .01 mfd
20 - .1 mfd

21 - .25 mfd
22 - .10 mfd
23 - .01 mfd
24 - .25 mfd
25 - .1 mfd

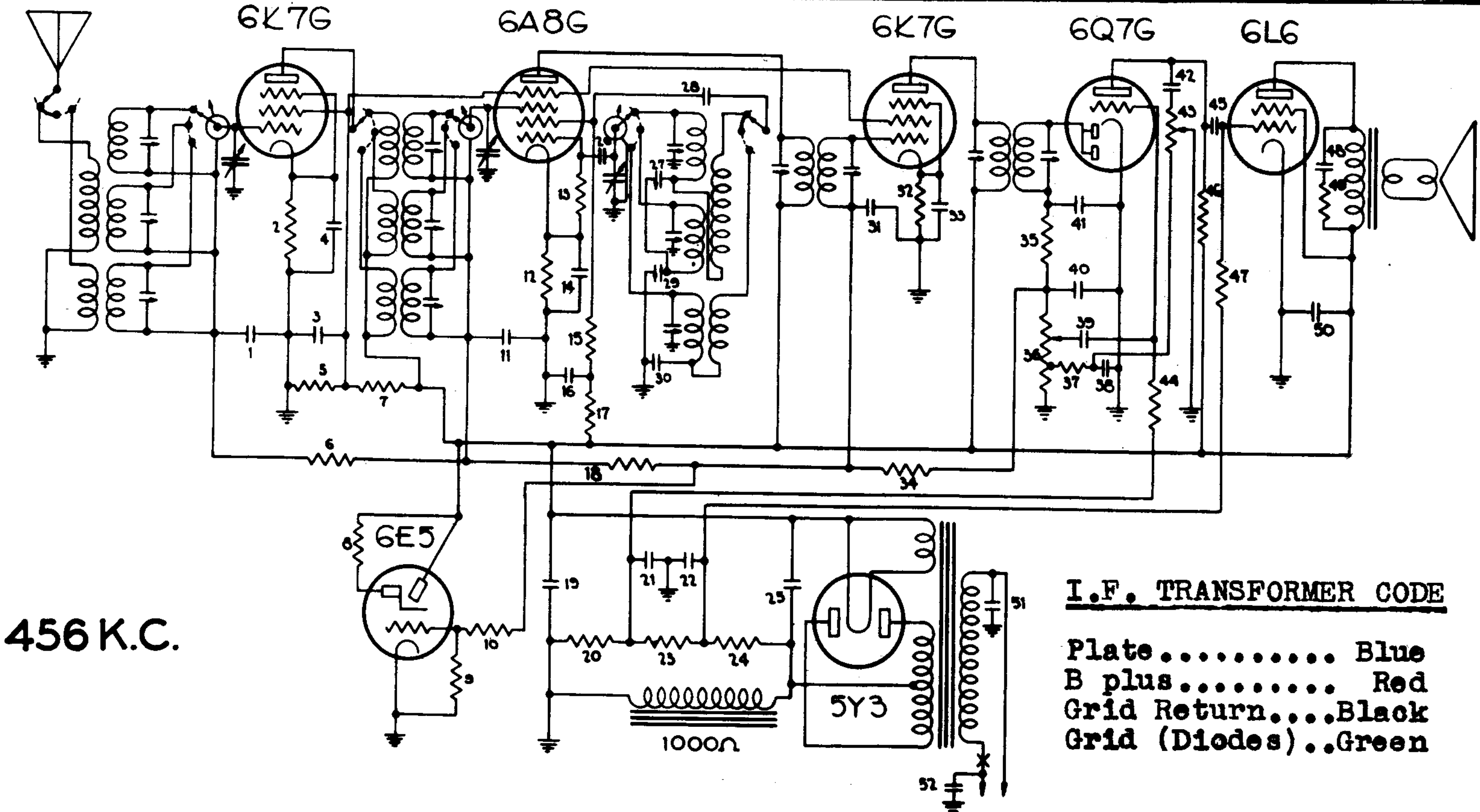
26 - .01 mfd
27 - .01 mfd
28 - .1 mfd
29 - .05 mfd
30 - Dual 8 mfd

31 - .5 mfd
32 - .25 mfd
33 - .10 mfd
34 - 300 mmfd



FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODELS 72-72T3-72C2 & 72C3



I.F. 456 K.C.

I.F. TRANSFORMER CODE

Plate.......... Blue
B plus......... Red
Grid Return....Black
Grid (Diodes)..Green

2.-- 300 ohms	17.-- 10 M ohms	1.-- .05 mfd.	31.-- .05 mfd.	26.-- 100 mfd.
5.-- 50 M ohms	18.-- 500 M ohms	3.-- .05 mfd.	33.-- .05 mfd.	27.-- 750 M mfd.
6.-- 50 M ohms	20.-- 50 M ohms	4.-- .05 mfd.	38.-- .1 mfd.	28.-- 1000 M mfd.
7.-- 15 M ohms	23.-- 300 M ohms	11.-- .05 mfd.	39.-- .01 mfd.	29.-- 1800 M mfd.
8.-- 1 megohm	24.-- 2 megohms	14.-- .05 mfd.	40.-- 100 M mfd.	30.-- 4000 M mfd.
				43.-- 500 M ohms
				44.-- 500 M ohms
9.-- 2 megohms	32.-- 300 ohms	16.-- 8 mfd.	41.-- 100 M mfd.	46.-- 250 M ohms
10.-- 1 megohm	34.-- 1 megohm	19.-- 8 mfd.	42.-- .03 mfd.	47.-- 250 M ohms
12.-- 300 ohms	35.-- 50 M ohms	21.-- .25 mfd.	45.-- .01 mfd.	49.-- 5 M ohms
13.-- 50 M ohms	36.-- 500 M ohms	22.-- .25 mfd.	48.-- .02 mfd.	51.-- .01 mfd.
15.-- 10 M ohms	37.-- 3 M ohms	25.-- 16 mfd.	50.-- .1 mfd.	52.-- .01 mfd.

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODELS 72-72T3-72C2 & 72C3

OHMS	VOLTS	6A8G TUBE	VOLTS	OHMS
50M	85		-2	55M
65M	195		125	85M
.5	6.3	A.C.	0	1 MEG.
			0	0
0	0		2	300

OHMS	VOLTS	6K7G TUBE	VOLTS	OHMS
50M	85		1.75	300
65M	195		0	1 MEG.
.5	6.3	A.C.	0	0
0	0		1.75	300

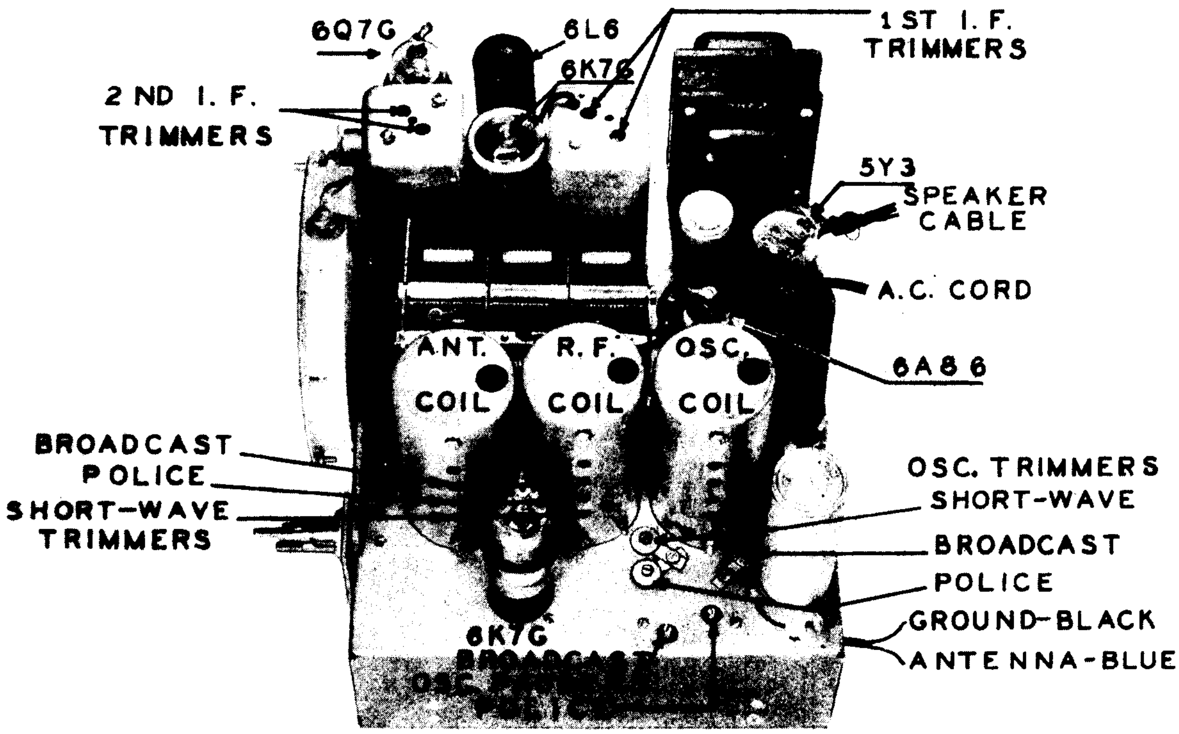
OHMS	VOLTS	6K7G TUBE	VOLTS	OHMS
50M	85		1.75	300
55M	195		0	1 MEG.
0	0	A.C.	6.3	.5
0	0		1.75	300

OHMS	VOLT	6Q7G TUBE	VOLTS	OHMS
500M	-.2		-2	500 M
300M	95		-.25	500 M
.5	6.3	A.C.	0	0
0	0		0	0

OHMS	VOLTS	6L6 TUBE	VOLTS	OHMS
65M	195		-.25	500M
65M	185			
.5	6.3	A.C.	0	0
0	0		0	0

OHMS	VOLTS	5Y3 TUBE	VOLTS	OHMS
1150	-95			
			-95	1150
65M	195			
0	0		195	65M

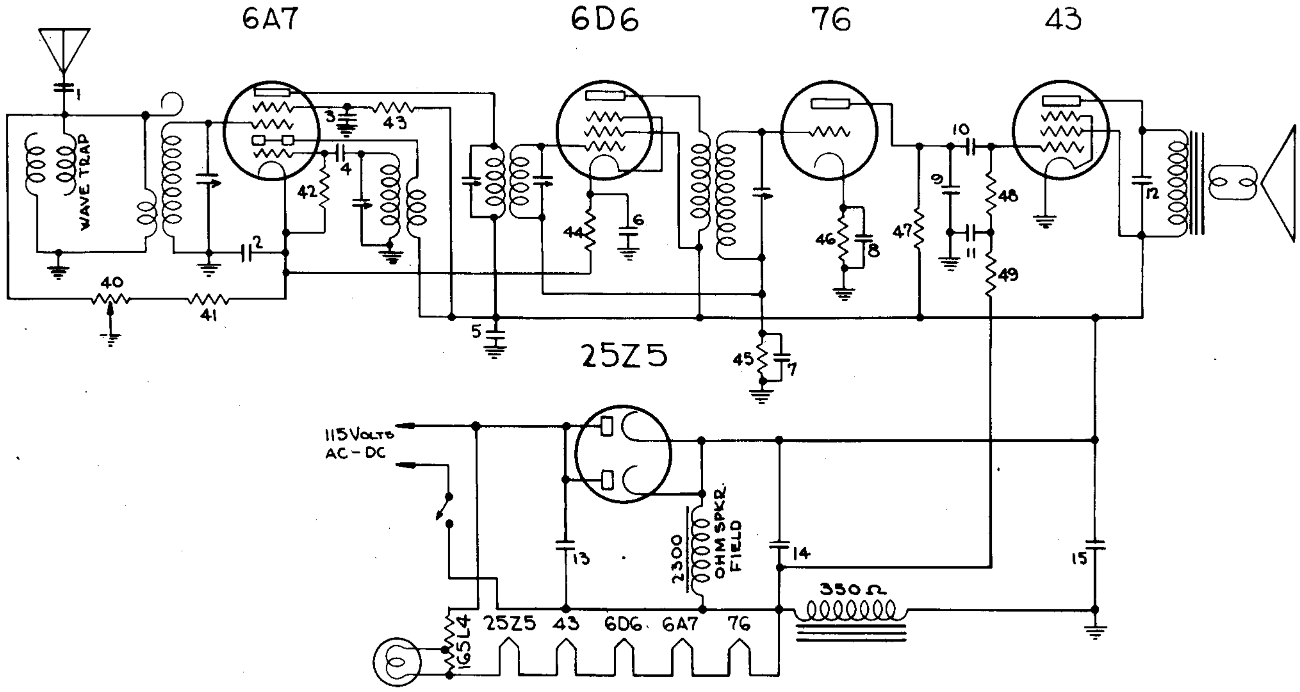
OHMS	VOLTS	6E5 TUBE	VOLT	OHMS
1 MEG	-.1		195	65M
2 MEG	5		0	0
.5	6.3	A.C.	0	0



Lead Color	POWER TRANSFORMER	Voltage
Black		115 Volt Primary
Green		6.3 Volt Filament
Yellow		5.0 Volt Filament
Red		High Voltage Sec.
Red & White		High Voltage C.T.

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODELS 69 & 69T7



1 - .01 MFD.	9 - .0005 MFD.	40 - 5M OHMS	45 - 500M OHMS
2 - .05 MFD.	10 - .01 MFD.	41 - 150 OHMS	46 - 100M OHMS
3 - .05 MFD.	11 - .25 MFD.	42 - 50M OHMS	47 - 250M OHMS
4 - .0001 MFD.	12 - .006 MFD.	43 - 35M OHMS	48 - 500M OHMS
5 - .25 MFD.	13 - .01 MFD.	44 - 150 OHMS	49 - 500M OHMS
6 - .05 MFD.	14 - 16 MFD.		
7 - .1 MFD.	15 - 8 MFD.		
8 - .1 MFD.			

Tube	OHMS	VOLTS	VOLTS	OHMS
6D6	2500	95 / 95	0 / 0	500M
6D6	2500	95 / 95	3 / 3.8	300
6D6	450	29AC / 2.1	3 / 3.5	300
6D6			29AC / -3.5	450
43	2500	95 / 95	-45 / -.4	1 MEG.
43	3000	87 / 77	0 / 0	0
43	450M	35AC / 25	29AC / 2.5	450M
25Z5	2500	95 / 95	95 / 95	2500
25Z5	590	98AC / 95	98AC / 95	590
25Z5	450	54AC / 50	35AC / 25	450
6A7	2500	95 / 95	0 / 0	6.8
6A7	3300	44 / 45	-1.75 / -1.75	50M
6A7	2500	95 / 95	1.75 / 2.85	150
6A7	450	29AC / 1.6	30AC / 17.5	450
76			0 / 0	
76	250M	48 / 50	1 / 4	100M
76	450	92.5AC / -15	30AC / -9	450
165L4			59AC / 55	490
165L4	590	98AC / 95	54AC / 50	450

FIRST I. F. TRANSFORMER

Plate. . . . . Blue
"B" Plus . . . . Red
Grid Return. . . . . . . Black
Grid (Top) . . . . Green

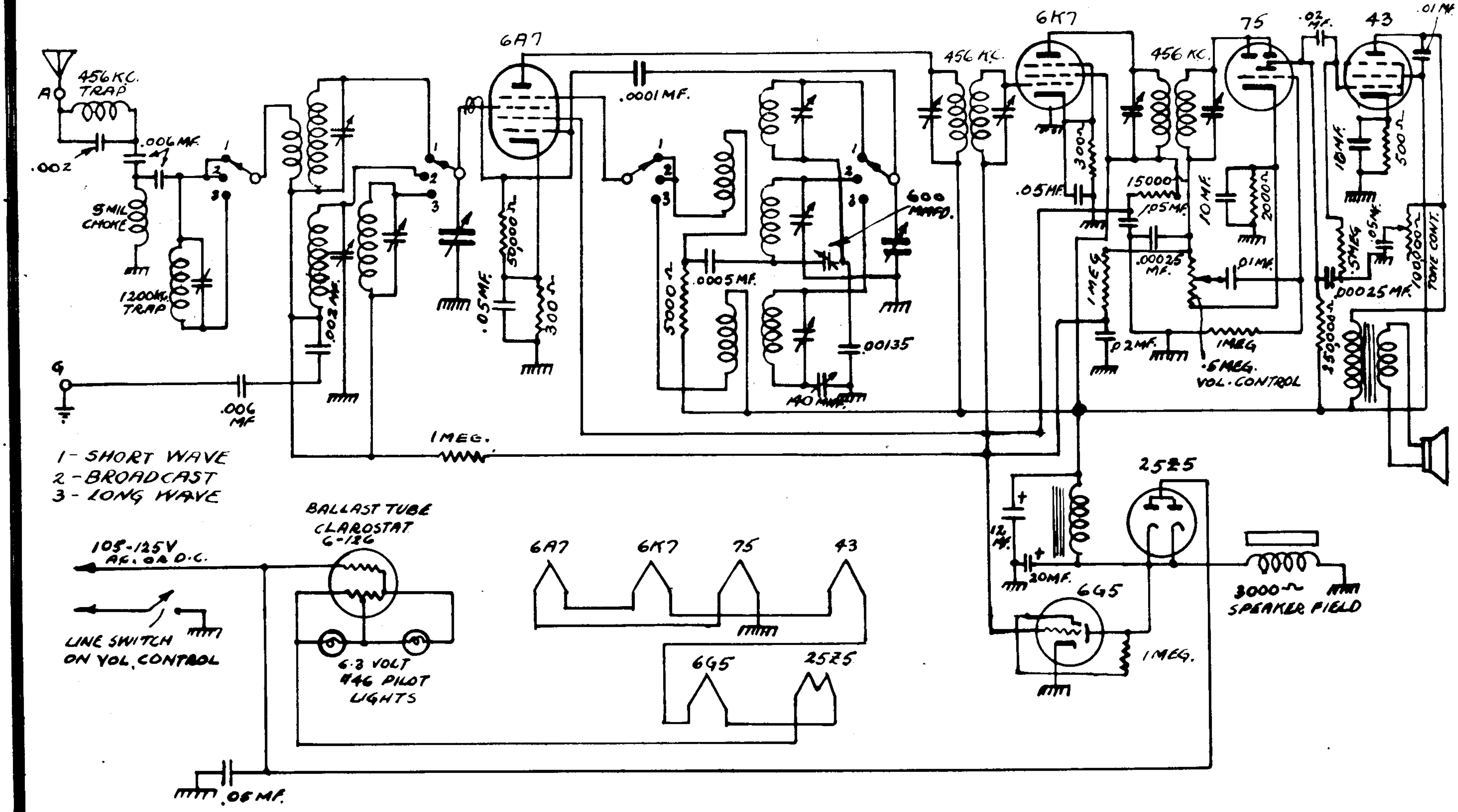
SECOND I. F. TRANSFORMER

Plate. . . . . Blue
"B" Plus . . . . Red
Grid Return. . . . . . . Black
Grid . . . . Green

NOTE: The readings in the above VOLTAGE TABLE are from the points indicated to chassis. Read upper values when set is operating on A.C. and lower readings when set is operating on D.C.

GAROD RADIO CORPORATION

MODEL 731



This receiver operates on either direct current or alternating current of any frequency on voltage between 105 and 130. If voltages in excess of this value are to be applied to the receiver, a special voltage reducing resistor must be used. When operating from direct current, if after the receiver has been turned on for about three quarters of a minute, no reception is obtained, the plug must be reversed in the socket. On alternating current, there is generally no difference, though sometimes, quieter operation results.

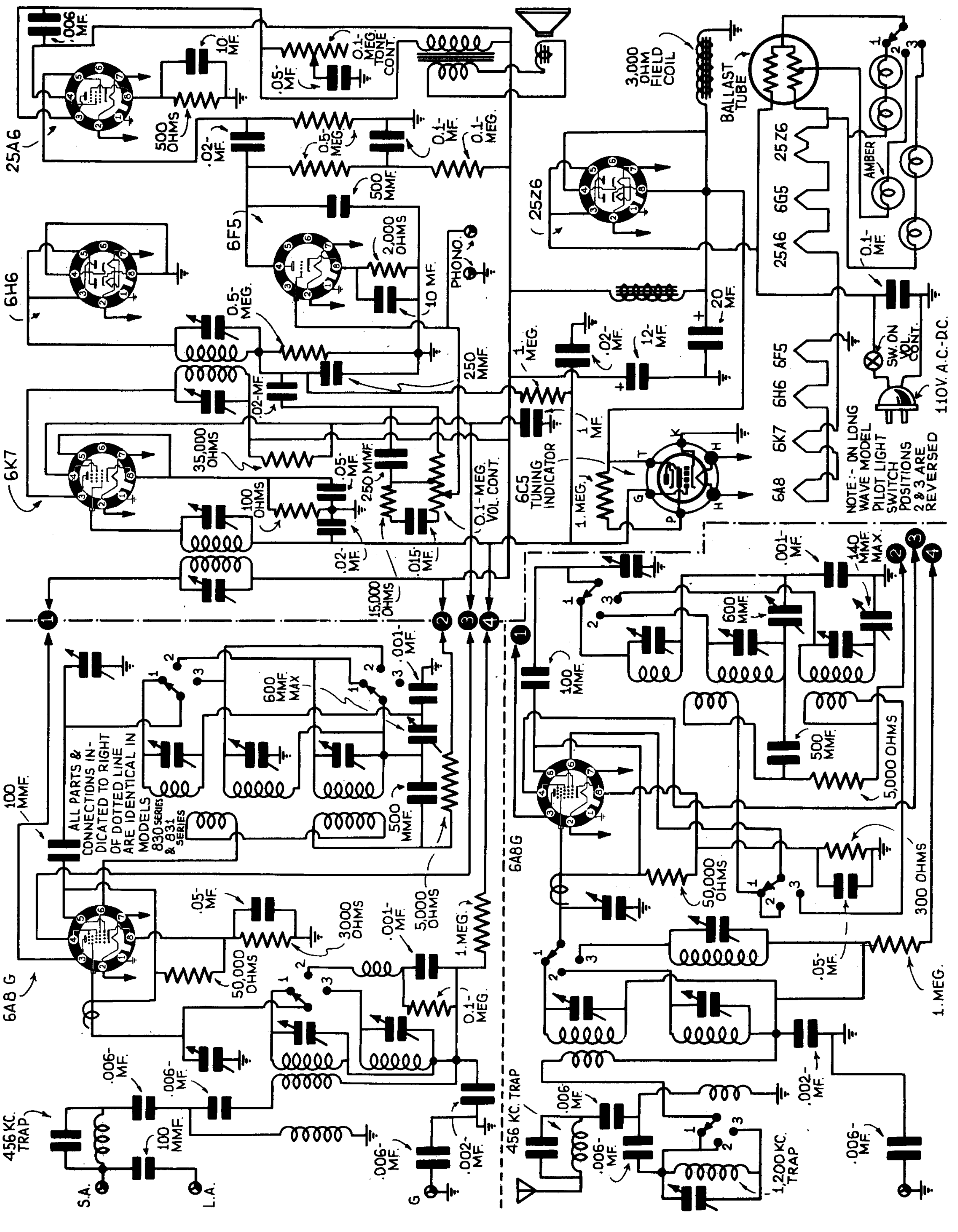
ANTENNA A small indoor antenna consisting of about 20 feet of wire, laid around the moulding, or placed under a rug, or thrown out the window is generally sufficient to give excellent operations. In locations very remote from broadcast stations, it is advantageous to use an outdoor antenna from 50 to 75 feet long. In particularly difficult cases, it may be necessary to use a special short-wave antenna with shielded or transposed lead-in. Kits containing all parts necessary for such an installation are available.

POSITION	WAVE BAND	
1	17 to 53 meters	- Foreign & American Short Waves
2	200 " 560 "	- Regular Broadcast
3	750 " 2000 "	- Weather reports in the U.S.A.

If this receiver is used in Europe, Near East, etc., numerous broadcast stations operating within this band of 750 to 2000 meters (Long-Wave) can be heard.

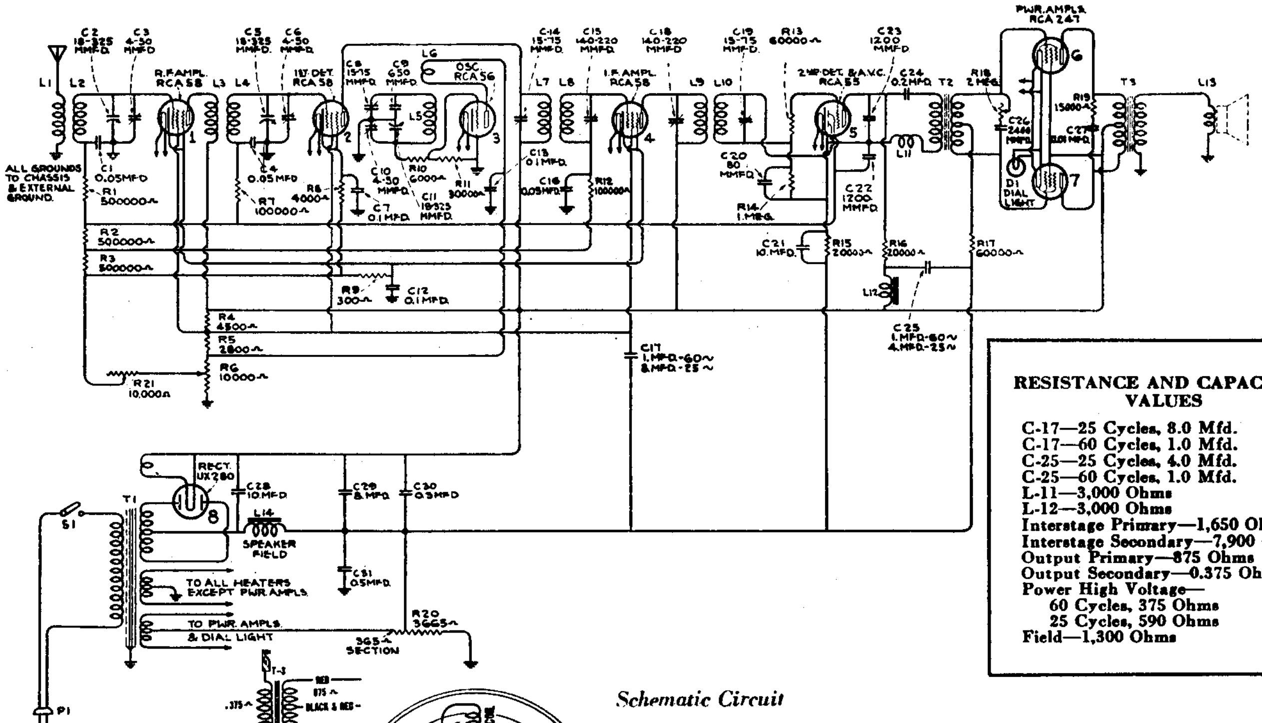
GAROD RADIO CORPORATION

MODELS 830-830C-831-831C-830D-830KC-831KC



GENERAL ELECTRIC COMPANY

MODEL J-87

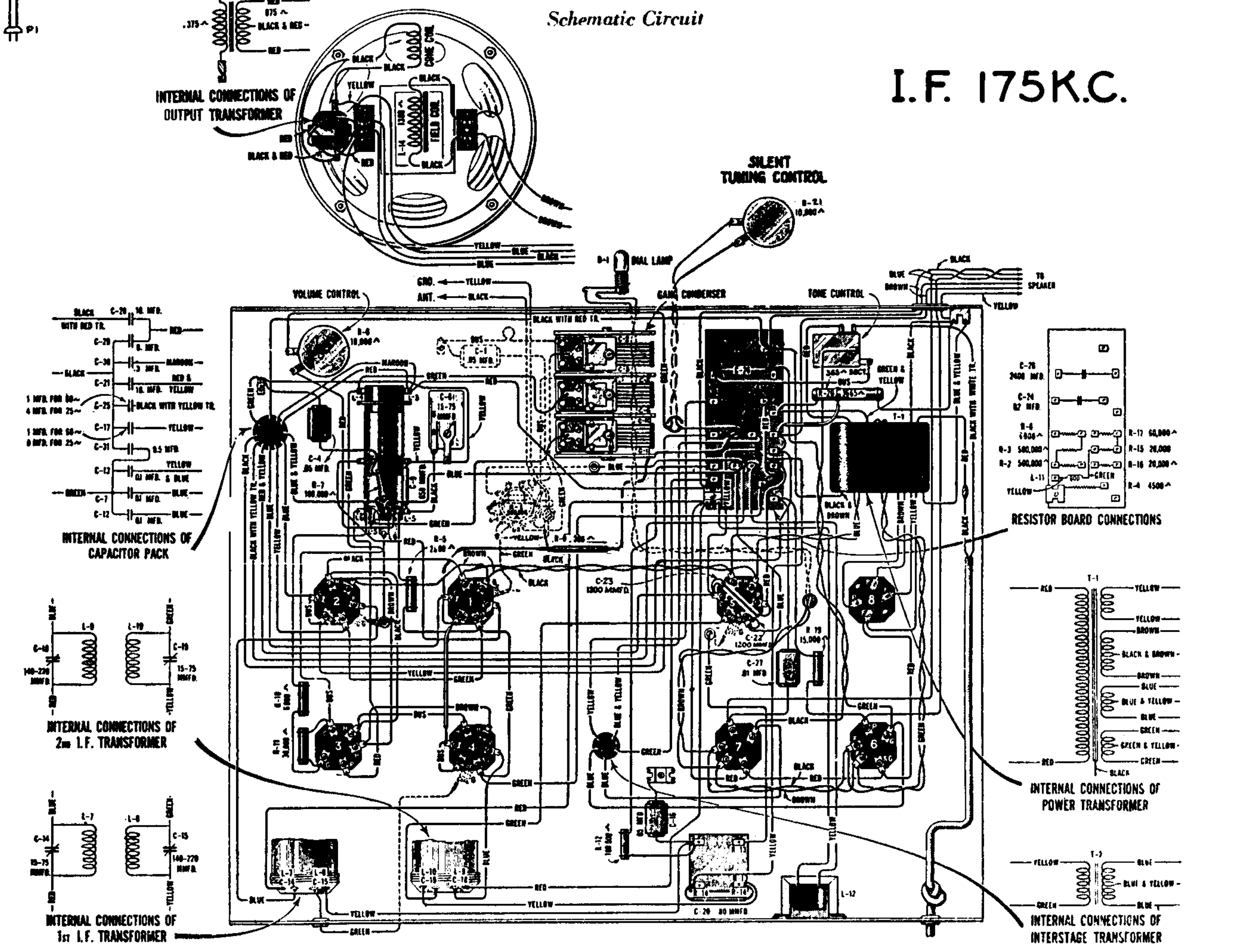


RESISTANCE AND CAPACITOR VALUES

C-17—25 Cycles, 8.0 Mfd.
C-17—60 Cycles, 1.0 Mfd.
C-25—25 Cycles, 4.0 Mfd.
C-25—60 Cycles, 1.0 Mfd.
L-11—3,000 Ohms
L-12—3,000 Ohms
Interstage Primary—1,650 Ohms
Interstage Secondary—7,900 Ohms
Output Primary—875 Ohms
Output Secondary—0.375 Ohm
Power High Voltage—
60 Cycles, 375 Ohms
25 Cycles, 590 Ohms
Field—1,300 Ohms

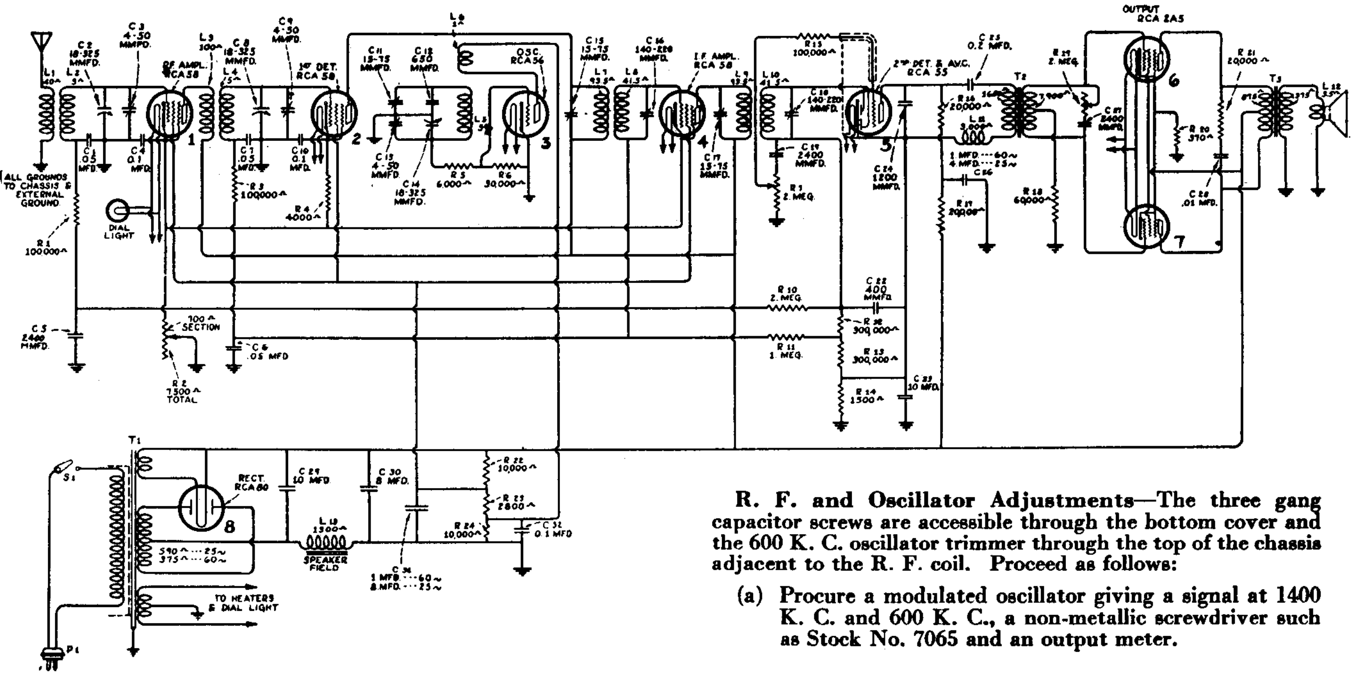
Schematic Circuit

I.F. 175K.C.



Chassis Wiring Diagram

GENERAL ELECTRIC COMPANY
MODEL J-83-A



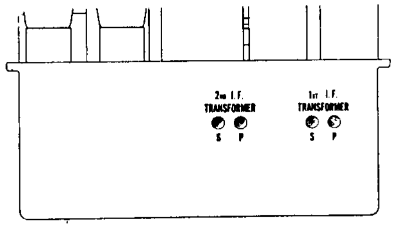


Figure C—I. F. Alignment Location

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C., and the adjustment screws are accessible from the rear of the chassis. See Figure C for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 7065 and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis.

(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screwdriver such as Stock No. 7065 and an output meter.

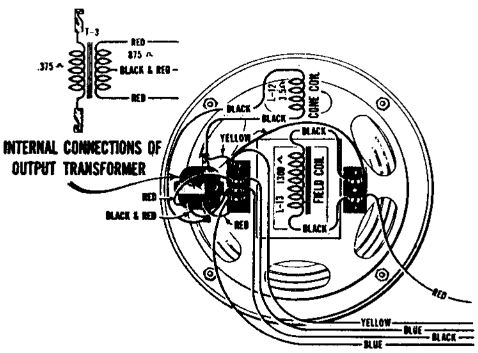


Figure D—Loudspeaker Wiring

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three line-up capacitors, accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

Radiotron No.	Control Grid to Cathode, Volts	Screen Grid to Filament or Cathode, Volts	Plate to Filament or Cathode, Volts	Plate Current, M. A.	Heater or Filament, Volts
1. R. F. RCA-58	4.0	100	240	6.0	2.4
2. 1st Det RCA-58	10.0	90	230	2.0	2.4
3. Osc. RCA-56	—	—	75	4.5	2.4
4. I. F. RCA-58	4.0	100	240	6.0	2.4
5. 2nd Det. RCA-55 and A.V.C.	5.8	—	100	4.0	2.4
6. PWR. RCA-2A5	19.0	230	220	20.0	2.4
7. PWR. RCA-2A5	19.0	230	220	20.0	2.4

Rectifier—370 Volts R.M.S. Each Plate

GENERAL ELECTRIC COMPANY

MODELS E-101 — E-105 — E-106

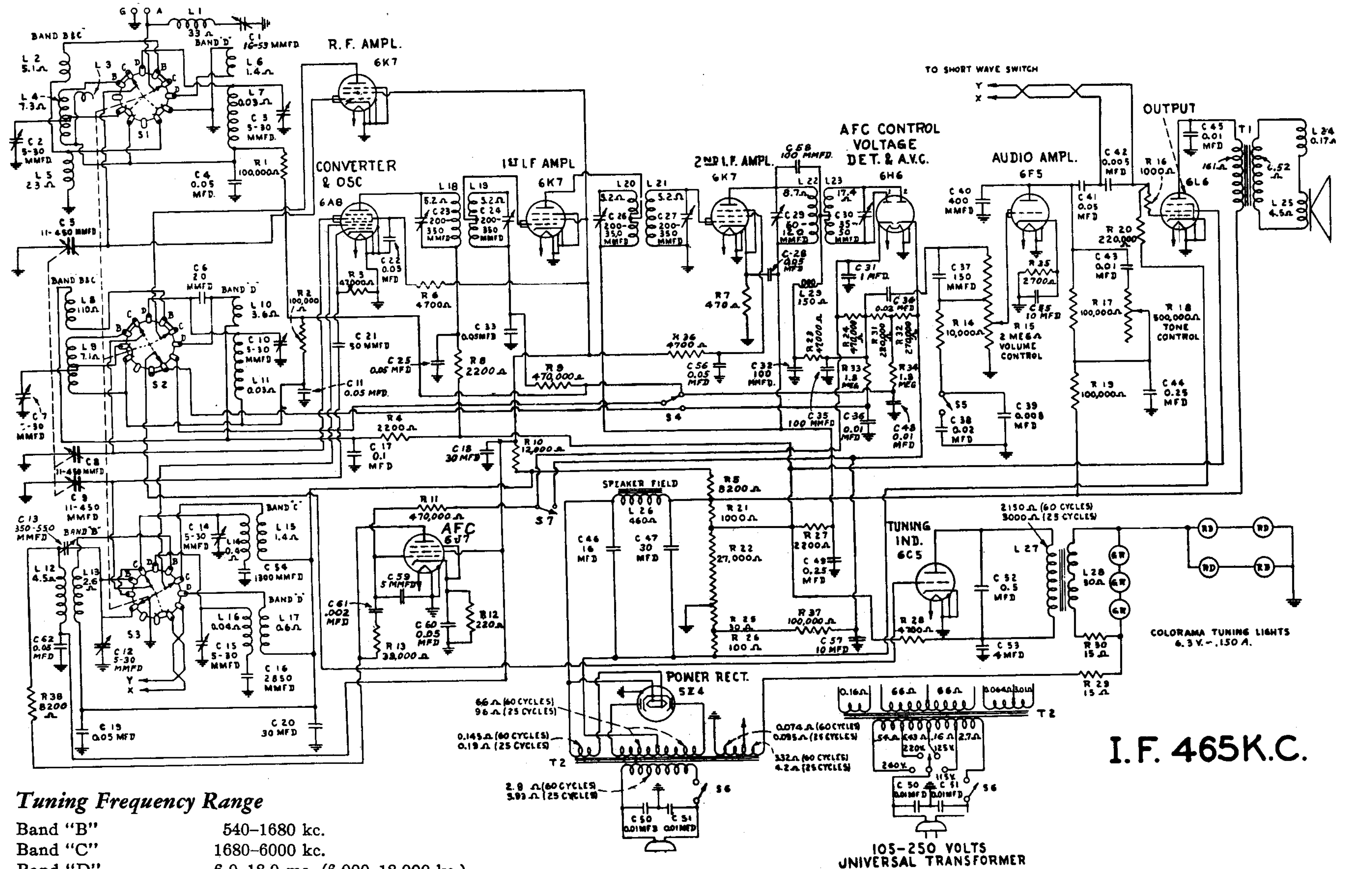


Fig. 1. Schematic Circuit Diagram

Tuning Frequency Range

Band "B"	540–1680 kc.
Band "C"	1680–6000 kc.
Band "D"	6.0–18.0 mc. (6,000–18,000 kc.)

Tuning Control Drive Ratio

Fast Tuning	8 to 1
Vernier Tuning	40 to 1

Electrical Power Output

Undistorted	6.5 watts
Maximum	14.0 watts

Tubes

R. F. Amplifier.....6K7 Triple-grid Super-control Amplifier
Converter and
Oscillator........6A8 Pentagrid Converter
First
I. F. Amplifier....6K7 Triple-grid Super-control Amplifier
Second
I. F. Amplifier....6K7 Triple-grid Super-control Amplifier
Detector AVC and
AFC Bias Supply..6H6 Twin Diode
Audio Amplifier....6F5 High Gain Triode
Output............6L6 Beam Power Amplifier Tetrode
Colorama Control...6C5 Low Gain Triode
AFC Control.......6J7 Triple-grid Amplifier
Rectifier...........5Z4 Full-wave Rectifier
Dial Lamps........6.3 V.-0.15 A. (4 red and 3 green)

GENERAL ELECTRIC COMPANY

MODELS E-101—E-105—E-106

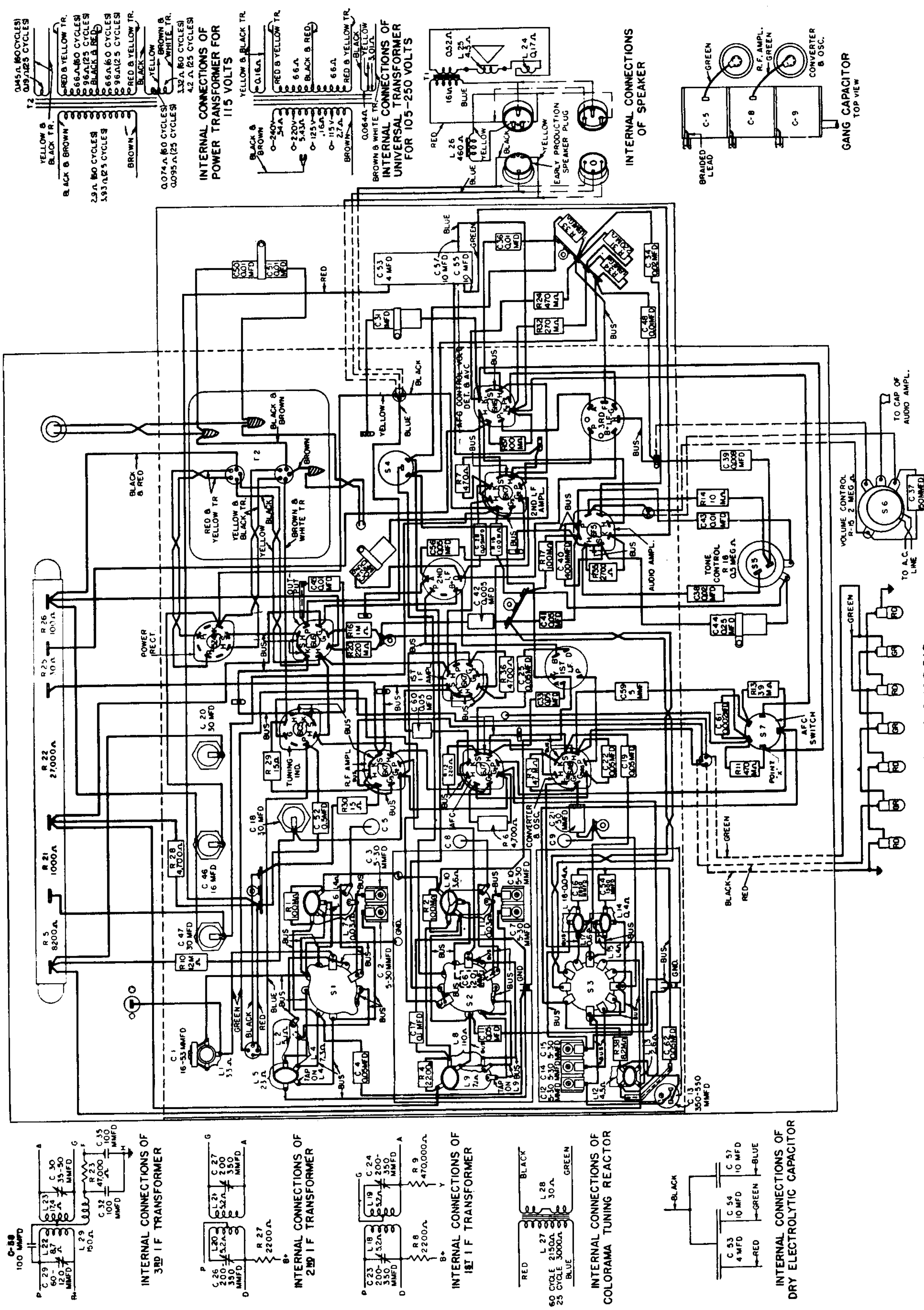


Fig. 2. Chassis Wiring Diagram

GENERAL ELECTRIC COMPANY
MODELS E-101—E-105—E-106

ALIGNMENT PROCEDURE

The receiver should first be allowed to run for fifteen minutes in order to reach its approximate normal operating temperature. Before making any adjustments, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal to the receiver from the test oscillator at the alignment frequency and inserting a "Tuning Wand" into the coil involved. The tuning wand consists of a rod of insulating material having a ring of non-magnetic metal attached to one end, and a small core of finely divided iron compacted into the opposite end. By inserting the metal ring end into the center of the R. F. coil, the inductance of this coil is lowered, increasing its resonant frequency. Inserting the iron-filled end into the coil raises its inductance, lowering its resonant frequency. If the R. F. circuits are in exact alignment, inserting either end of the tuning wand into the coil will result in a decrease in output. When an increase of signal is obtained with the iron-filled end of the wand, a decrease in resonant frequency of that circuit by increasing its trimmer capacity is indicated. When an increase of signal is obtained with the metal ring, a decrease in trimmer capacity is indicated.

Changes Indicated by Wand

Wand	Signal	Trimmer Adjustment Required
Metal Ring Iron Filings	Decrease Decrease	None
Metal Ring Iron Fillings	Increase Decrease	Decrease capacity
Metal Ring Iron Filings	Decrease Increase	Increase capacity

ALIGNMENT FREQUENCIES

I.F.	Band "B"	Band "C"	Band "D"	Wave Trap
465 kc.	580 kc. 1500 kc.	5220 kc.	18,000 kc.	465 kc.

In order to align these receivers properly it is necessary to have available:

1. A modulated test oscillator capable of producing the above alignment frequencies.
2. An output indicator, such as a high resistance a-c voltmeter with a maximum scale reading of 3 to 5 volts, or a neon lamp indicator.
3. An alignment tool consisting of a fiber shaft screw-driver.
4. A tuning wand.

To realize the full advantage of the performance built into these receivers at the factory, circuit alignment using cathode ray oscilloscope equipment is much to be preferred. The oscilloscopic method is particularly advantageous in aligning the I. F. tuned circuits.

The location of all alignment trimmer capacitors, as well as socket voltages, is shown in Fig. 3.

Visual Alignment of I. F.

For visual alignment it is necessary to vary the frequency of an unmodulated test oscillator signal over a range extending on both sides of the peak frequency. This variation must take place in synchronism with the horizontal traverse of the cathode ray beam on its screen. The frequency modulator must, therefore, provide means for synchronizing the periodic test frequency variation with the cathode ray horizontal deflection circuit. The test oscillator may advantageously have facilities for audio frequency amplitude modulation of a fixed radio frequency test signal, as well as for frequency modulation, but audio modulation is not required for visual I. F. alignment.

Instead of an output meter across the speaker voice coil, the vertical plates of the cathode ray tube are connected across the load resistor of the diode rectifier. With the frequency modulator in operation in conjunction with the test oscillator, the resonance curve of the circuit under test will be then shown on the screen.

Set the tuning dial indicator at the low end of the broadcast band to some point where no signal is received since an extraneous signal might interfere with the aligning process. The volume control should be in an "off," or nearly "off" position. Apply a frequency modulated signal to the grid of the 1st I. F. amplifier tube through a .05-mfd. (RC-072) capacitor leaving the grid cap in place. Connect the vertical plates of the oscilloscope between ground and the junction point between R-24 and R-31, which are the diode load resistors, and with the AFC switch in the "off" position proceed to align the primary and secondary of the 2nd I. F. and the AFC I. F. transformers.

The object should be to make the two curves coincide with each other at the top and throughout their length with the maximum amplitude obtainable. This will require that all four I. F. trimmers be adjusted in the usual manner *excepting the AFC secondary (hexagonal nut) trimmer which must be adjusted for minimum amplitude* before the curves will coincide properly. Fig. 4 gives the appearance of the curve when the alignment adjustments have been completed satisfactorily thus far. Apply the same frequency modulated input to the grid of the converter (6A8) tube through a .05-mfd. capacitor as before. Adjust the primary and secondary of the 1st I. F. transformer until the curves coincide as before and have the appearance of Fig. 4.

A further adjustment of the AFC secondary (hexagonal nut) trimmer is necessary in order to complete the I. F. alignment satisfactorily. Apply the *same* signal to the grid of the second I. F. amplifier tube. Unsolder the ground end of C-31 and connect the vertical deflecting plates of the oscilloscope between ground and the 6H6 cathode prong No. 8. Since the cathode prong is inaccessible this connection can be made at the AFC switch contact marked "Point X" on the parts layout, Fig. 2.

Carefully adjust the AFC secondary trimmer until a curve is obtained which is similar to that shown in Fig. 5. Correct adjustment is made when the two sides of the curve are symmetrical and intersect exactly at the axis. No adjustment of the other I. F. trimmers should be made at this time.

2. *I. F. Wave Trap Alignment*

Set the band switch to Band "B" and tune receiver to about 1000 kc.

With the test oscillator still set at 465 kc. apply this signal to the antenna terminal through a dummy antenna consisting of a 400-ohm resistor and 250-mmfd. capacitor in series. With the 465 kc. signal applied to the antenna terminal, adjust the I. F. Wave Trap Trimmer for *minimum* output indication.

3. *R. F. Alignment*

First check the position of the dial pointer by rotating the tuning condenser to maximum capacity position, i.e., plates fully meshed. At this position, the pointer should coincide with the end mark at the left-hand end of the scale. If it does not, it may be set by loosening the dial drum set screws and rotating the drum on the tuning condenser shaft. Hold the tuning condenser rotor while doing this, to prevent its rotating. Tighten the two set screws after the pointer is correctly set. During R. F. alignment the AFC switch must be set in its "Off" (counterclockwise) position.

Fig. 4. Overall I. F. Curve

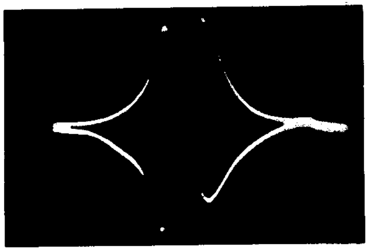


Fig. 5. AFC Adjustment Curve

(Curves taken with RCA Oscillograph Type TMV-122-B)

Band "B" (540-1680 Kc.)

Set the test oscillator for operation at 1500 kc. and connect its output to the antenna terminal of the receiver through the dummy antenna described under I. F. Wave Trap Alignment. Tune the receiver until the pointer is at 1500 on the scale. Set the tone control for minimum high response and reduce the volume control setting so as to avoid excessive noise response. Adjust the Band "B" oscillator, R. F., and antenna trimmers respectively (C-12, C-7, and C-2, Fig. 3) to give maximum deflection on the output meter. Maintain the test oscillator output at the lowest level which will give an easily readable output indication.

Now set the test oscillator at 580 kc. and tune the receiver to resonance with this signal. Adjust the 580 kc. padding capacitor, C-13, rocking the tuning condenser back and forth through resonance as the padding capacitor is adjusted and note the deflection of the tuning meter each time the receiver is tuned through resonance. Leave the padding capacitor at the setting which gives greatest deflection.

Retune the receiver to 1500 kc. and set the test oscillator for this frequency. Check the alignment by again adjusting the Band "B" oscillator, R. F. and antenna trimmers for maximum deflection on the tuning meter.

Band "C" (1680-6000 Kc.)

No trimmers are provided for alignment of the R. F. and antenna transformers in Band "C" of these receivers. Correct tracking between R. F. and antenna transformers is obtained by the action of the capacity coil, L-3, and between oscillator and the other tuned circuits by means of the adjustable oscillator trimmer, C-14, and the fixed padding capacitor, C-54.

Turn the band switch to Band "C." Set the test oscillator at 5220 kc., and tune the receiver to resonance at this frequency. Adjust the Band "C" oscillator trimmer, C-14, for maximum output indication on the tuning meter, rocking the tuning condenser back and forth through resonance while making this adjustment.

Band "D" (6.0-18.0 Mc.)

Turn the band switch to Band "D." Set the test oscillator at 18,000 kc. (18.0 mc.) and tune the receiver until the pointer coincides with the 18.0 mark. Adjust the Band "D" oscillator trimmer, C-15, to give maximum output indication. It will probably be found that there will be two settings of the oscillator trimmer that will give an output response. The lower capacity setting of the trimmer is the one that should be used. To be sure that correct adjustment has been obtained, tune for the image signal at 17.07 mc. with the Test Oscillator set at 18.0 mc. It may be necessary to increase the test oscillator output to obtain response at this point.

Retune the receiver to 18.0 mc. and adjust Band "D" antenna and R. F. trimmers, respectively (C-3 and C-10) for maximum output indication. When adjusting the R. F. trimmer, C-10, rock the tuning condenser back and forth through resonance as in the 580 kc. padding capacitor adjustment.

4. *I. F. Alignment with Output Meter*

Although the use of the cathode-ray oscillograph for alignment purposes is to be preferred, it is possible to make the I. F. adjustments with reasonable accuracy using a 465 kc. signal generator and output meter.

Place a modulated signal of 465 kc. on the grid of the last I. F. (6K7) tube with the volume control set at maximum and the AFC switch turned off. Place a low range A.C. voltmeter or other output indicator across the voice coil of the loud-speaker. Adjust the output of the signal generator so that an indication of not more than two or three volts is obtained on the output meter.

Adjust and readjust the primary trimmer for maximum output and *the secondary for minimum output*. This latter adjustment will be very broad. Apply the signal input to the grid of the 1st I. F. (6K7) tube and adjust both primary and secondary trimmers for maximum output, reducing the input as necessary to obtain approximately the same output indication as before. Apply the signal input to the grid of the converter (6A8) tube and adjust both primary and secondary trimmers for maximum output indication in the same manner as before.

It is now necessary to make a fine adjustment of the secondary trimmer of the last I. F. (AFC) transformer, which is as follows: Without changing the frequency of the signal generator, place the input lead on the rubber insulation of the converter (6A8) grid lead. This will provide a small signal input through the capacity between the leads. Increase the attenuator setting if necessary to make the output audible. If the signal generator is provided with a means of removing the modulation, this should be done. However, the adjustment may be carried out satisfactorily even with a modulated generator signal.

Now tune in any broadcast signal in the usual manner and tune carefully for zero beat between this carrier and the 465 kc. signal generator. It may be necessary to use a short antenna or to remove it entirely if the station is a strong local. Throw the AFC on and adjust the last I. F. secondary (AFC) trimmer by ear for zero beat. This adjustment is very critical and must be made with great care. When the adjustment is properly made, there will be no appreciable change from zero beat as the AFC switch is thrown off and on. This completes the alignment of the I. F. and AFC circuits.

The alignment of the oscillator and R. F. circuits may be carried out in the usual manner. However, the AFC switch must remain in the off position.

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	115	50-60	110
C	115	25-60	110
V	105-130 and 200-250	40-60	115

NOTE—Taps on universal transformers (Rating "V") are accessible by removing the cap cover on the top of the transformer.

GENERAL ELECTRIC COMPANY

MODELS E-101—E-105—E-106

Colorama Tuning

These receivers are equipped with Color Tuning, a novel method which indicates the approach to resonance by means of a change in the color of the light illuminating the tuning scale.

The colored light is produced by a group of four red-stained pilot bulbs and a group of three green-stained bulbs behind the scale. At zero signal strength the red group is at full brilliance and the green invisibly dim. As the signal increases from zero, the red gets dimmer and the green brighter over a broad range until at extreme signal strength the green is fully bright and the red below visibility through the dial. Hence, as a station is tuned-in the color changes smoothly, and the maximum change in the green direction is an indication of resonance.

Weak stations will produce a small color change and strong stations a larger change. The difference in signal strength between the weakest and the strongest station likely to be listened to, has been found to be so great in different localities that the receivers have been equipped with a two-position sensitivity range switch for "sensitive" and "insensitive" settings of the color tuning. The switch is located on the chassis near the power transformer and may be reached from the rear of the cabinet. In the sensitive position, the weakest station to which the user can listen comfortably above the general noise level, will shift the color to neutral white at resonance. Stronger stations give resonant points at bright greens. In localities near a relatively large group of high-powered stations and having a high noise level, such as Chicago and New York, the range switch must be thrown to the insensitive position when standard out-door antennas are used, or else the color will be a fixed green over so wide a band that resonance cannot be accurately found. The difference in sensitivity is about twenty to one. On short-wave bands the band switch connects the color tuning to the sensitive setting and the switch on the chassis is inoperative. This is because practically all the short-wave signals are relatively weak. The insensitive setting is used only on the 540-1680 kc. band.

There is a group of four red and a group of three green pilot bulbs behind the scale. These are controlled by a Saturable Reactor, L-27 and L-28, in a circuit which is shown in the schematic diagram, Fig. 1. The saturable reactor is controlled by a D.C. coil which decreases its reactance smoothly from a high value at no D.C. to a very low value at maximum D.C. The saturable reactor acts very much like a dimming rheostat except that it is controlled by the D.C. plate current of a 6C5 tube used solely for that purpose. This tube receives for its bias a portion of the AVC voltage of the set so that at no signal the bias is nearly zero. At this point, the plate current is at maximum; therefore, the red is brightest and the green invisibly dim.

Some things which may affect the operation of color tuning are as follows:

Seven colored bulbs are used to give good diffusion of color over the scale; but if one of the seven fails it unbalances the whole group and should be replaced immediately. The lamp socket assembly may be removed by reaching into the rear of the cabinet, pulling the lamp socket assembly up on its guides and drawing it partly out. A shipping screw, which should be removed when the set is unpacked, may need to be removed the first time. There is enough slack in connecting wires to allow the assembly to be drawn forward. When the socket assembly has been drawn far enough out for unscrewing the bulbs, turn on the power switch and replace the bulbs which do not glow. All will not be bad as each group is in series (green) or series parallel (red). Take care the wires do not foul the tuning mechanism when the assembly is replaced. The colored lamps used for replacement *must all be 6.3 volts 0.15 ampere lamps*. No other size will work.

If the red is unusually dim on no signal and the colored bulbs are all good, try removing the antenna. Next try replacing the 6C5 colorama tube, or replace the rectifier. Sometimes the antenna noise level is so high that it dims the red color like a signal. If the tubes in the set become weak, or the set is out of alignment, or the set for any other reason loses sensitivity the color tuning will appear insensitive.

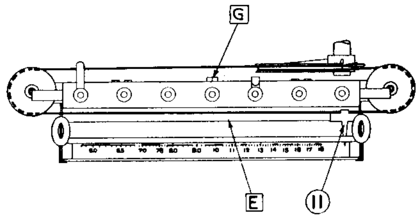
Automatic Frequency Control

These receivers employ automatic frequency control (AFC) which is a device for automatically controlling the oscillator frequency in such a way that, although the receiver is not exactly tuned to the signal being received, the correct intermediate frequency will still be produced. This control of the oscillator frequency is secured by means of the 6J7 AFC tube, so connected to the oscillator that it draws a lagging current from the tank circuit and thus gives the effect of a shunt inductance. Variation of the D.C. grid bias on the 6J7 control tube will affect the mutual conductance of the tube, thereby changing the amount of lagging current drawn from the oscillator tank with a consequent effect of variation of the amount of shunt inductance connected across the oscillator coil. This alters the total inductance in the oscillator tuned circuit and changes its resonant frequency.

Grid bias for the 6J7 control tube, which will vary in accordance with the amount of detuning of the receiver, is obtained from the 6H6 diode rectifier operating in conjunction with its special I. F. transformer. This control voltage is the difference between the drop across resistor R-24, the load resistance for one diode section of the 6H6 diode rectifier, and the drop across resistors R-31 and R-32, which constitute the load resistance for the other diode section. When the receiver is correctly tuned to the incoming signal, the intermediate frequency produced will be 465 kc. which is the resonant frequency of the tuned circuit feeding the 6H6 diode rectifier. Under this condition each diode plate receives equal signal voltage and the D.C. voltage drops across the load resistors will be equal, giving no change in grid bias on the 6J7 control tube. If the receiver is so tuned that the intermediate frequency produced is above 465 kc., the signal voltage applied to diode plate No. 2 will exceed that applied to diode plate No. 1. In this case, the D.C. voltage drop across load resistor R-31 and R-32 will be larger than that across load resistor R-24 and a resultant voltage will be produced which will increase the 6J7 AFC tube grid bias, lowering the mutual conductance of the tube and causing it to draw less lagging current from the oscillator tank. This is the same effect as would be produced by increasing the amount of shunt inductance across the oscillator coil and the oscillator frequency is thereby lowered by the amount necessary to compensate for the detuning. The opposite takes place when the receiver is tuned so as to produce an intermediate frequency below 465 kc. Diode plate No. 1 then receives more signal voltage than diode plate No. 2 and the resultant voltage developed across the load resistance is such as to decrease the grid bias on the 6J7 AFC tube. This causes a larger current to be drawn from the oscillator tank circuit, which in effect is the same as a decrease in shunt inductance with its consequent increase in oscillator frequency to overcome the detuning.

To Change Dial Lamps

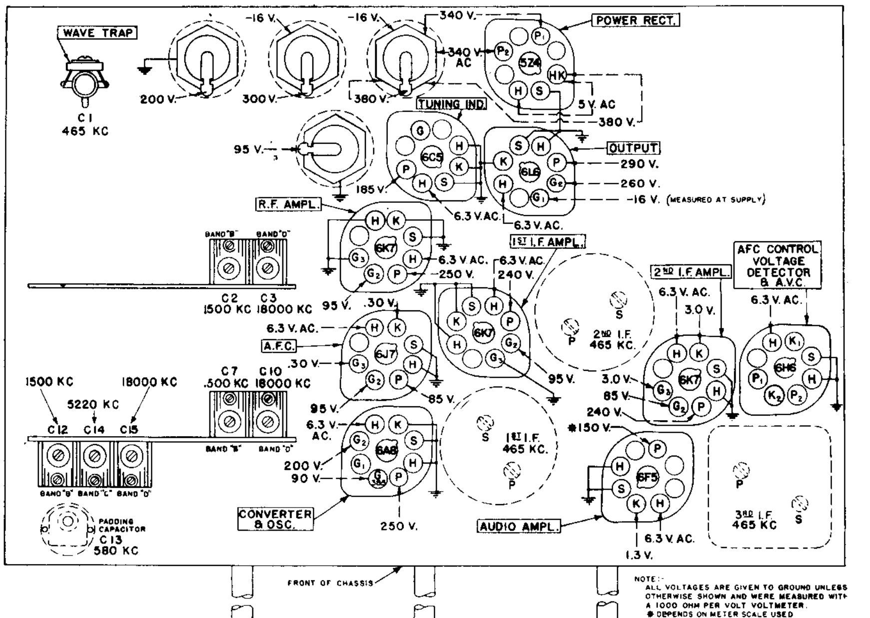
Make certain that the shipping screw [G] *has been removed before attempting to remove the dial lamp bracket.* Lift up the lamp bracket from the tabs under which it is clipped. Care should be taken that the lamp leads do not put an undue strain upon the drive cable. With the lamp bracket laid back horizontally, the lamps may be replaced. When the lamp bracket is reinserted, care should be exercised to avoid having the lamp leads foul the gang mechanism.



SOCKET VOLTAGES

Tube No.		Cathode to Ground Volts D.C.	Screen Grid to Ground Volts D.C.	Plate to Ground Volts D.C.	Cathode Current M.A.	Heater Volts A.C.
6K7 R. F. Amp.		†	95	250	6.8	6.3
6A8	Oscillator	...	...	200	9.8	6.3
	Converter	†	90	250		
6K7 1st I. F. Amp.		†	95	240	6.3	6.3
6K7 2nd I. F. Amp.		3.0	85	240	6.7	6.3
6H6 Detector & AVC.		...	...	...	...	6.3
6F5 Audio Amplifier		1.3	...	*150	0.6	6.3
6L6 Output		**	260	290	68.5	6.3
6C5 Colorama Control		†	...	185	10.0	6.3
6J7 AFC Control		.30	95	85	1.6	6.3
5Z4 Power Rectifier		364 D.C.	...	680/340 R.M.S.	120.0	5.0

Measured at 115 volts supply. No signal input. Volume control maximum. Voltmeter 1000 ohms per volt; measurements taken on highest scale giving accurate readable deflection.
* Supply voltage minus drop in load resistor. **Grid bias at source—16 volts.
† Grid bias at source—3.3 volts.

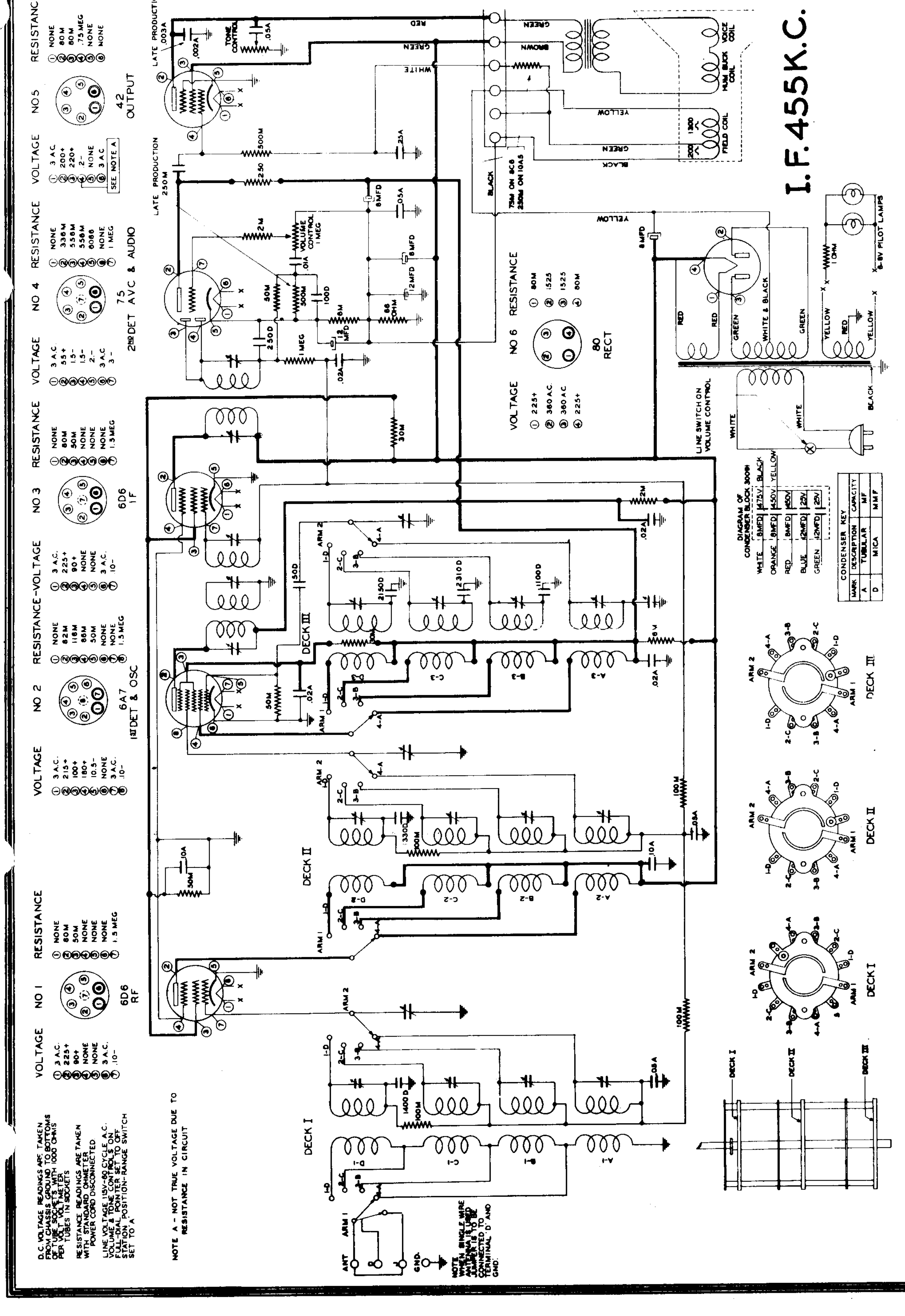


VIEWED FROM UNDERSIDE OF CHASSIS

Fig. 3. Trimmer Location and Socket Voltages

GENERAL HOUSEHOLD UTILITIES COMPANY

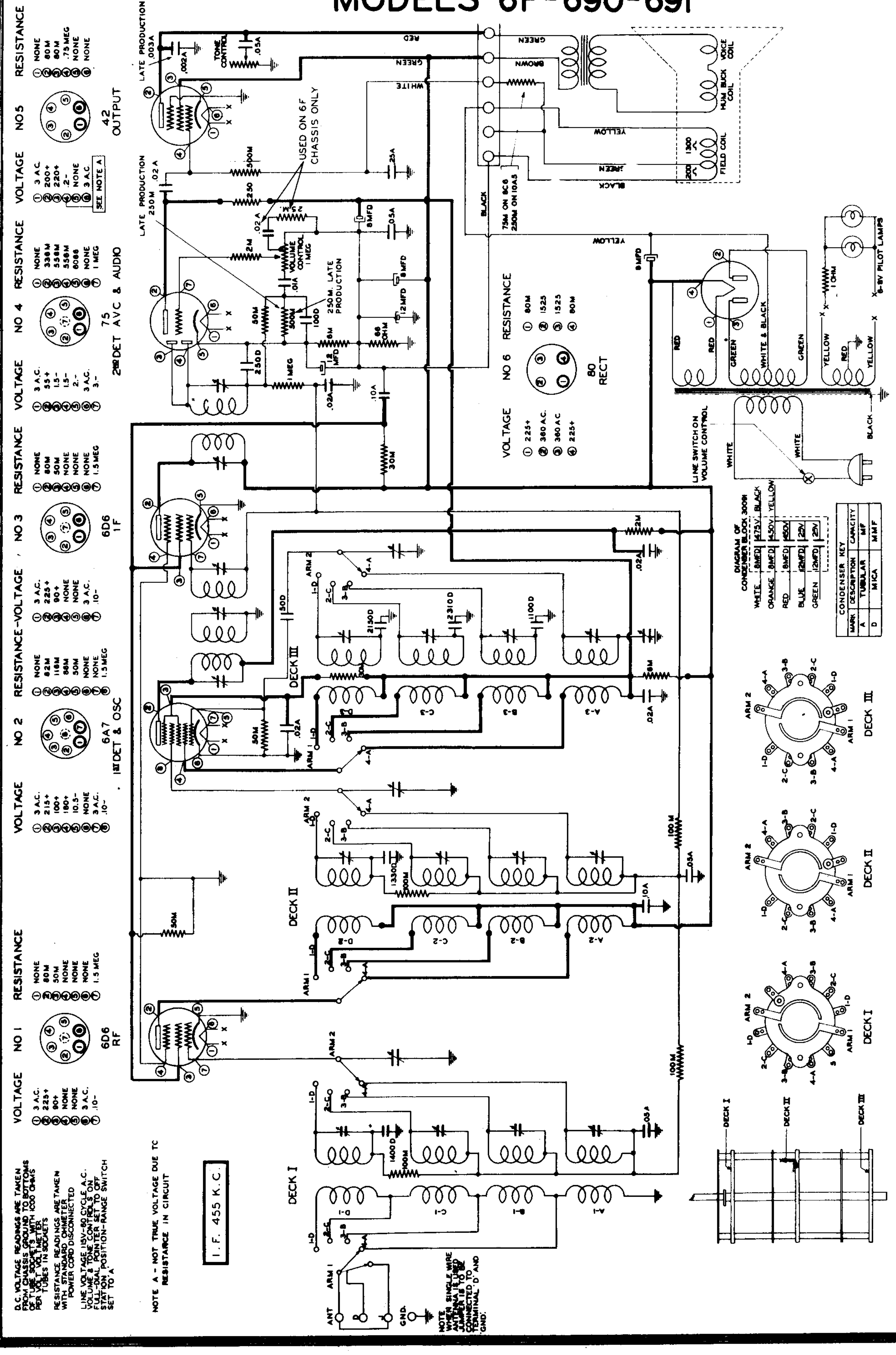
MODELS 6D-670-671



Note: The 8mf. electrolytic section of the filter condenser should be shunted with a 40M ohm 5 Watt resistor to prevent line surges from breaking it down and finally shorting it.

GENERAL HOUSEHOLD UTILITIES COMPANY

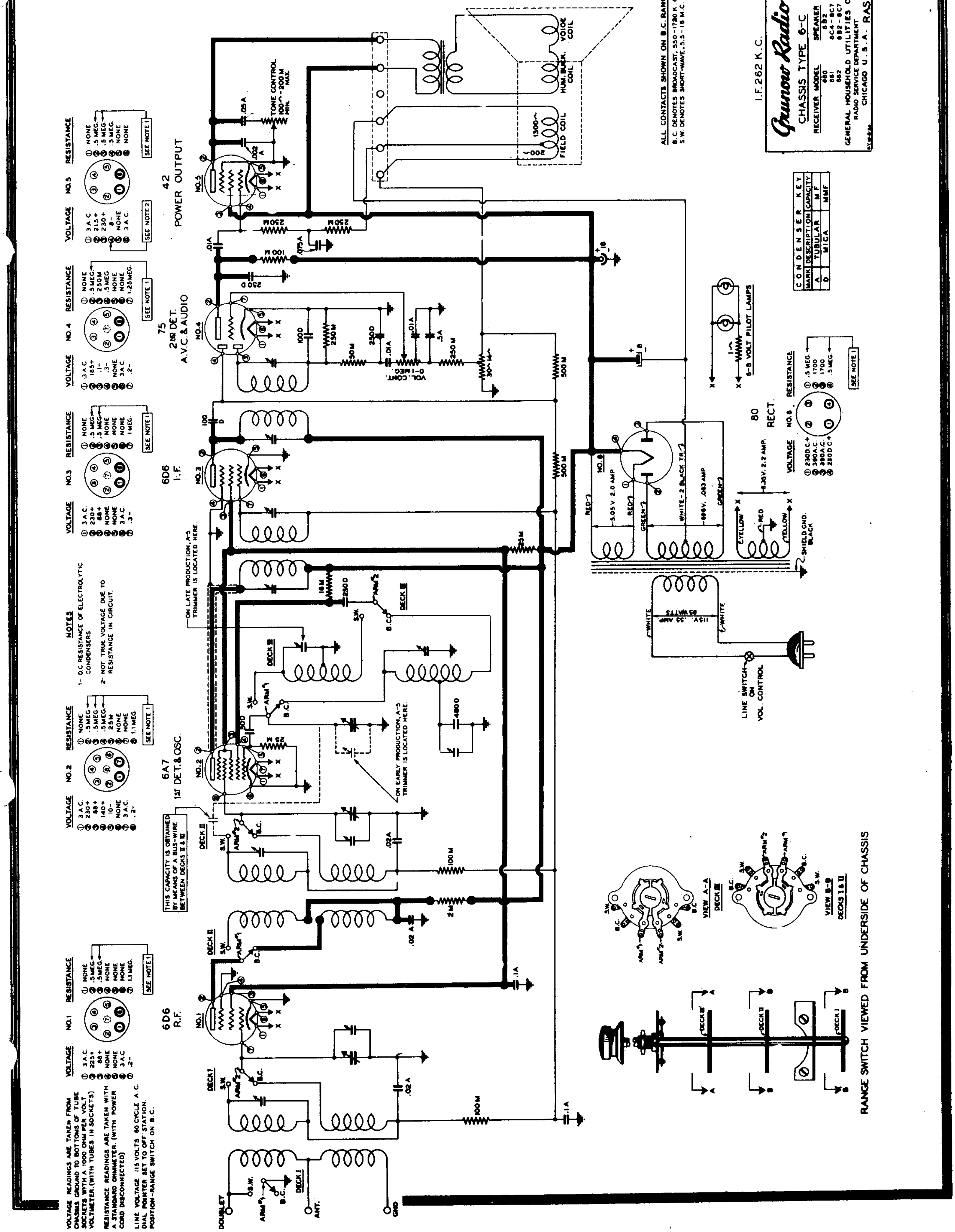
MODELS 6F-690-691



Note: The 8mf. electrolytic section of the filter condenser should be shunted with a 40M ohm 5-Watt resistor to prevent line surges from breaking it down and finally shorting it.

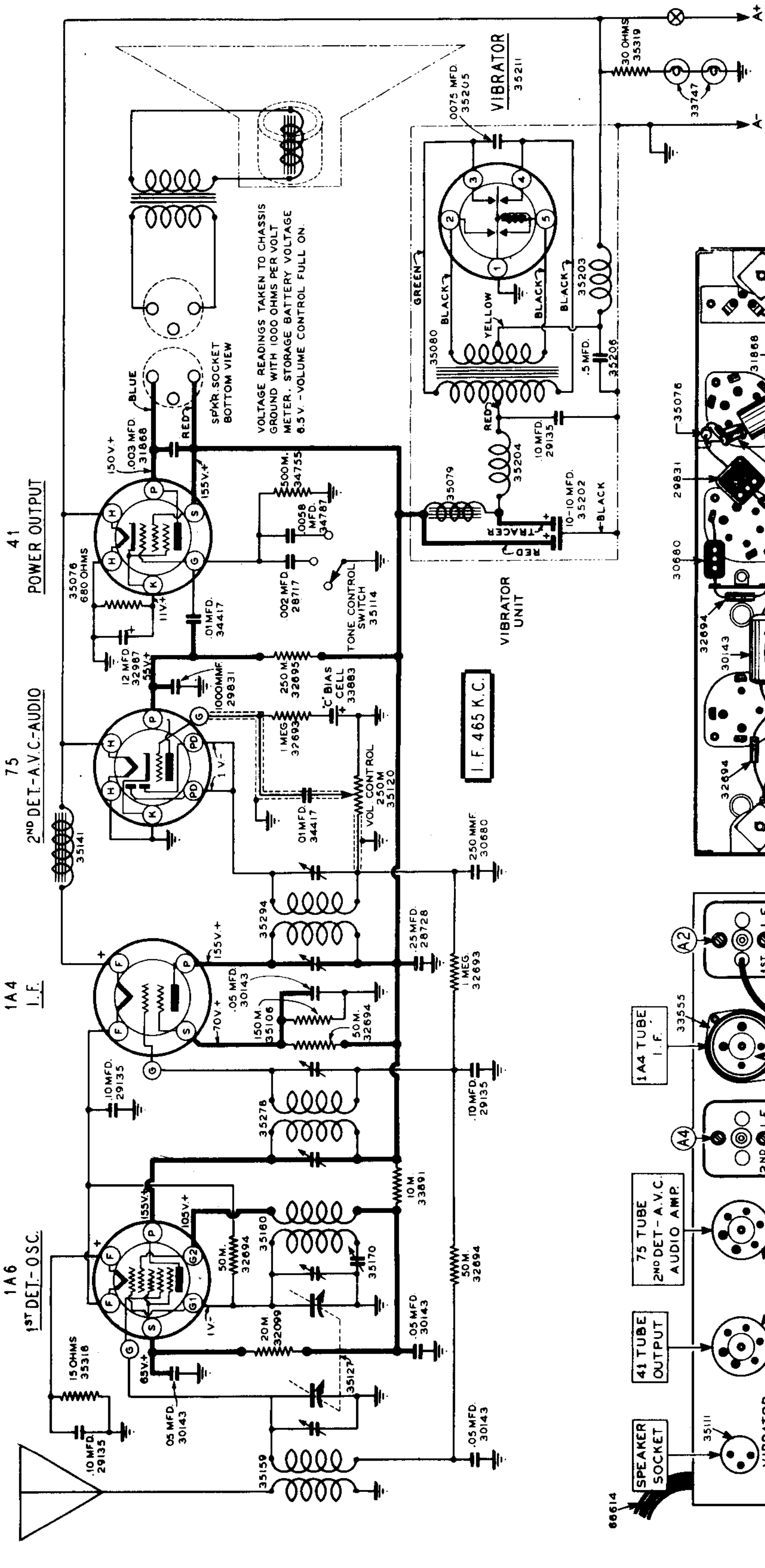
GENERAL HOUSEHOLD UTILITIES COMPANY

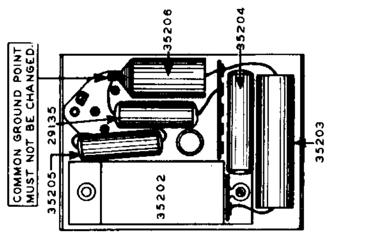
MODELS 6C-660-661-662



GENERAL HOUSEHOLD UTILITIES COMPANY

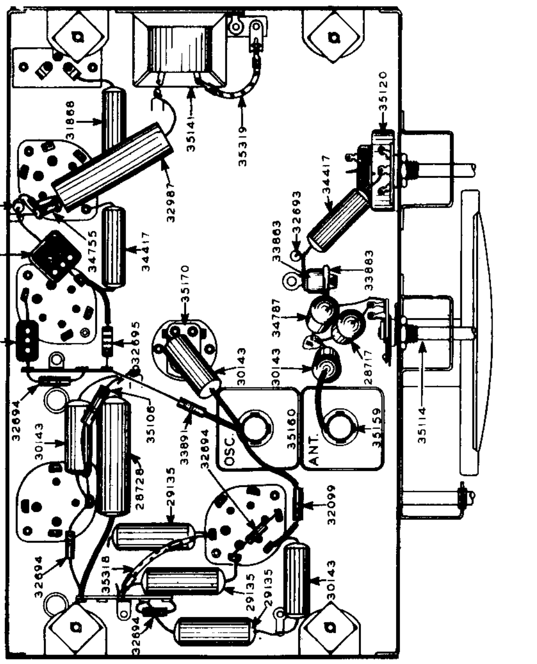
MODELS 4NB-410-411



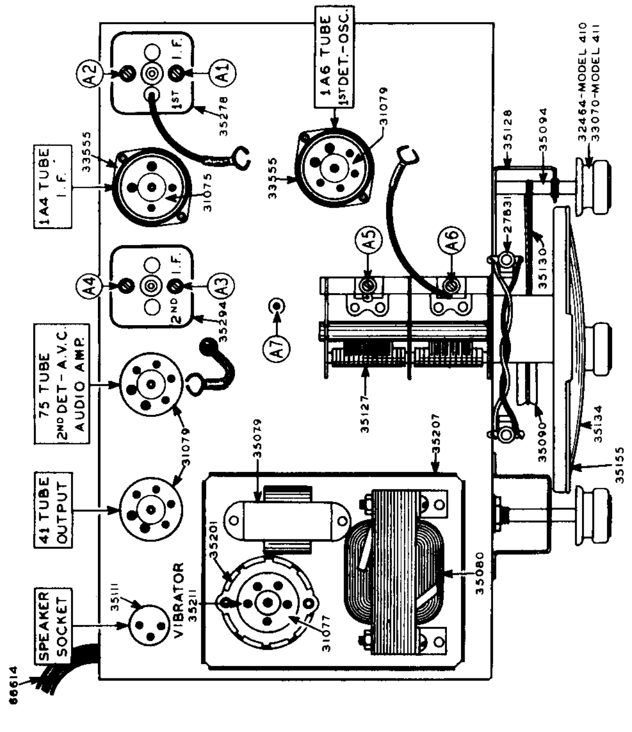


VIBRATOR-UNIT BOTTOM VIEW

COMPLETE VIBRATOR UNIT MAY NOT BE RETURNED FOR CREDIT.



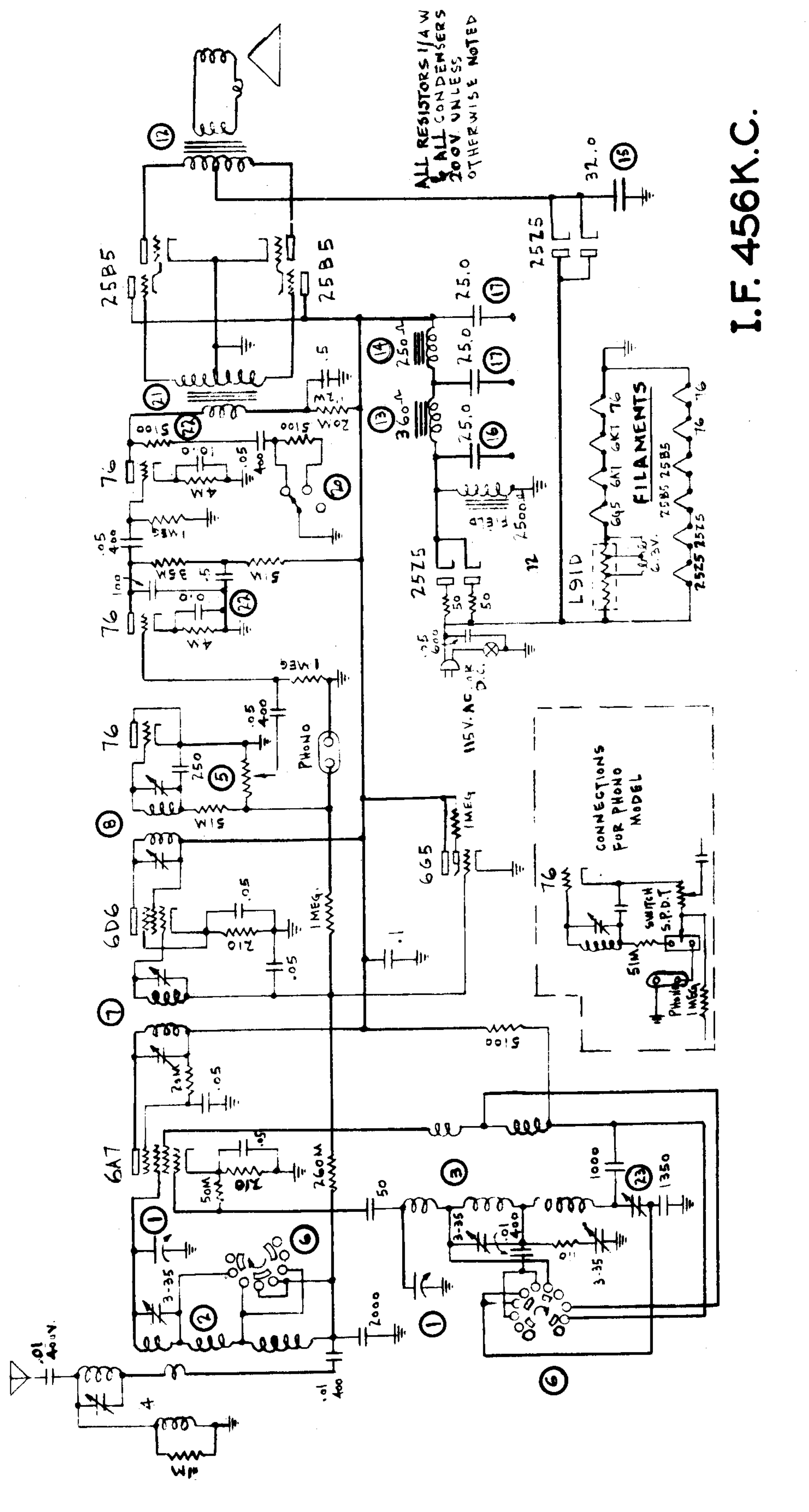
CHASSIS BOTTOM VIEW

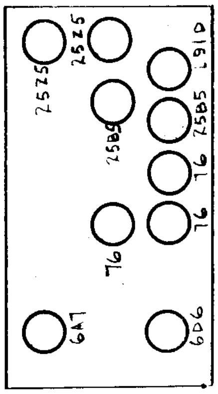


CHASSIS TOP VIEW

HALSON RADIO MFG. COMPANY

MODEL CW-11

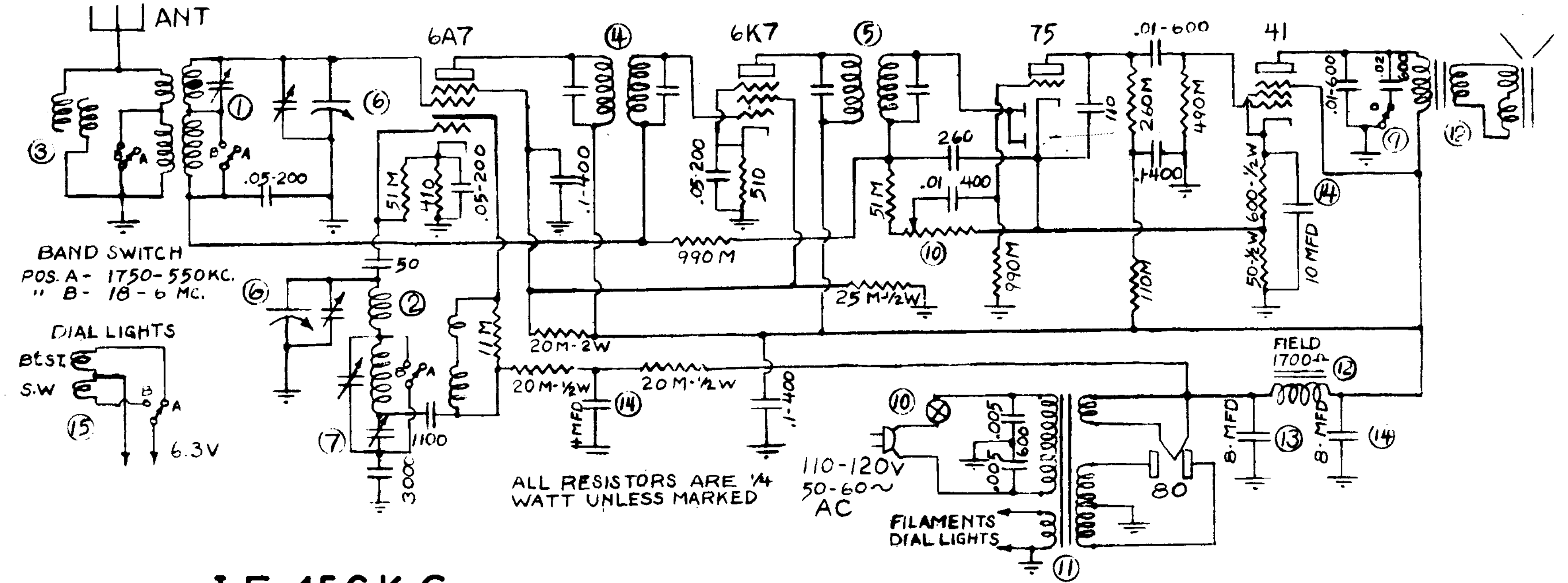




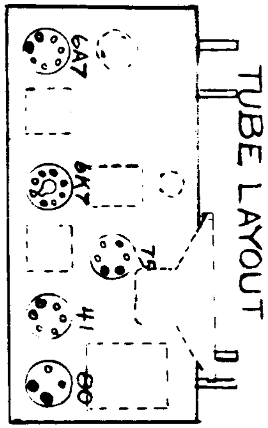
1 = 1783-1 VARIABLE COND.
2 = 1587 ANTENNA COIL
3 = 1772 OSCILLATOR COIL
4 = 1929 WAVE TRAP
5 = 1666 VOL. CONTROL 250M OHMS.
6 = 2176 RANGE SWITCH
7 = 1900C I.F. TRANS. 1st
8 = 1899F I.F. TRANS. 2nd
12 = 2053 SPEAKER ASS'Y
13 = 2192 FILTER CHOKE
14 = 2193 FILTER CHOKE
15 = 2060-1 ELECT. COND. (WET)
16 = 2061-1 ELECT. COND. (WET)
17 = 2186 ELECT. COND. 25-25 MFD. 150 V.
20 = 2187 TONE CONTROL SWITCH
21 = 2191 P. PULL INPUT TRANS.
22 = 2172 ELECT. COND. 10 MFD. 25 V.
23 = 1621 PADDER COND. 200-685 MMF.

HALSON RADIO MFG. COMPANY

MODEL 536



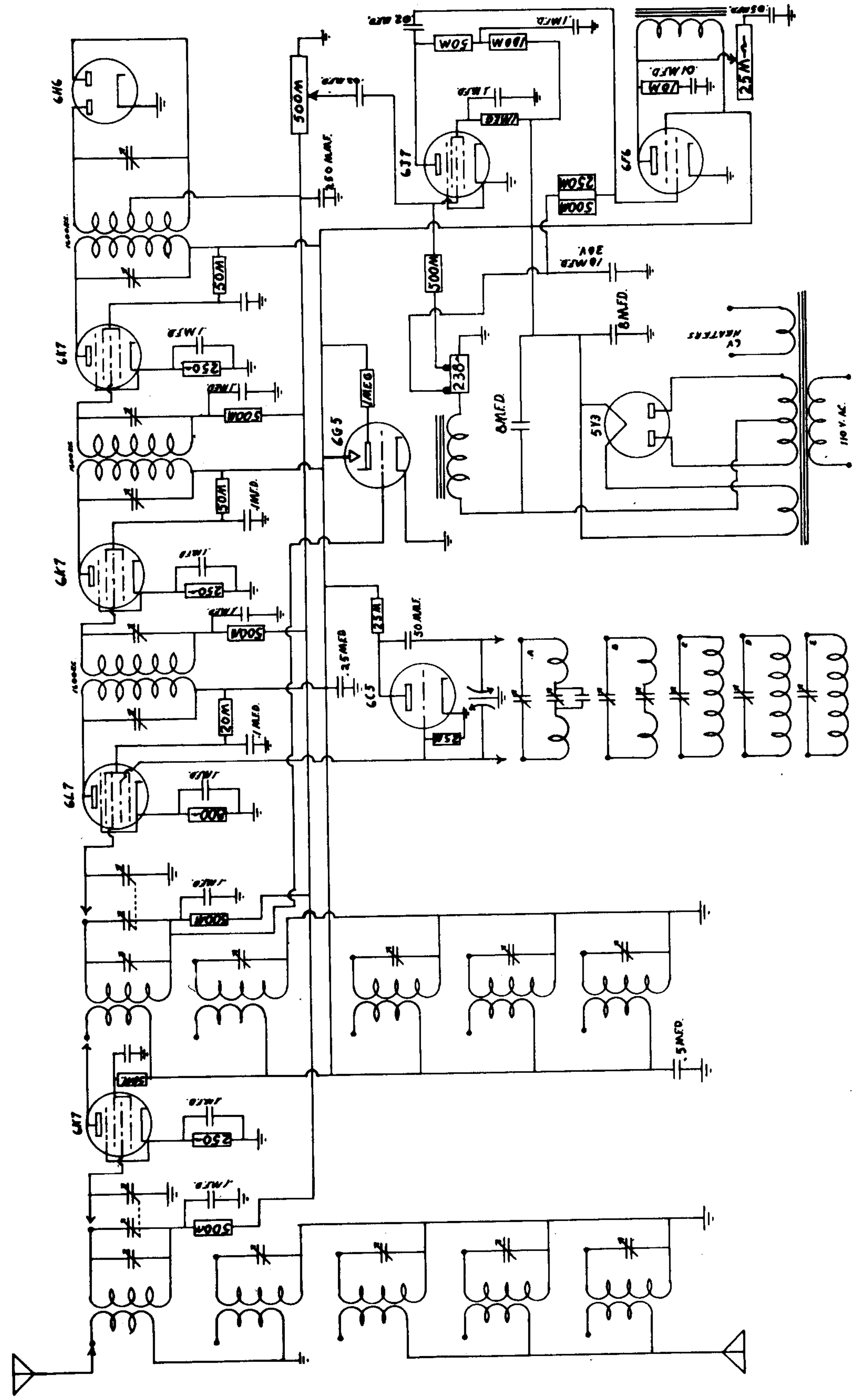
I.F. 456 K.C.



1 =	1910	ANTENNA COIL
2 =	1911	OSCILLATOR COIL
3 =	1762	WAVE TRAP - 456 KC.
4 =	1900-B	1st I.F. TRANS. - 456 KC.
5 =	1899-E	2nd I.F. TRANS. - 456 KC.
6 =	1906	VARIABLE CONDENSER
7 =	1621	PADDER CONDENSER
8 =	1909	WAVE CHANGE SWITCH
9 =	1924	TONE CONTROL
10 =	1908	VOLUME CONTROL (500M OHMS.)
11 =	1913	POWER TRANSFORMER
12 =	1912	SPEAKER ASSEMBLY
13 =	1921	ELECTROLYTIC COND. (WET)
14 =	1914	ELECTROLYTIC COND. (DRY)
15 =		G.E. #46 DIAL LIGHTS

HERBERT H. HORN RADIO MFG. CO.

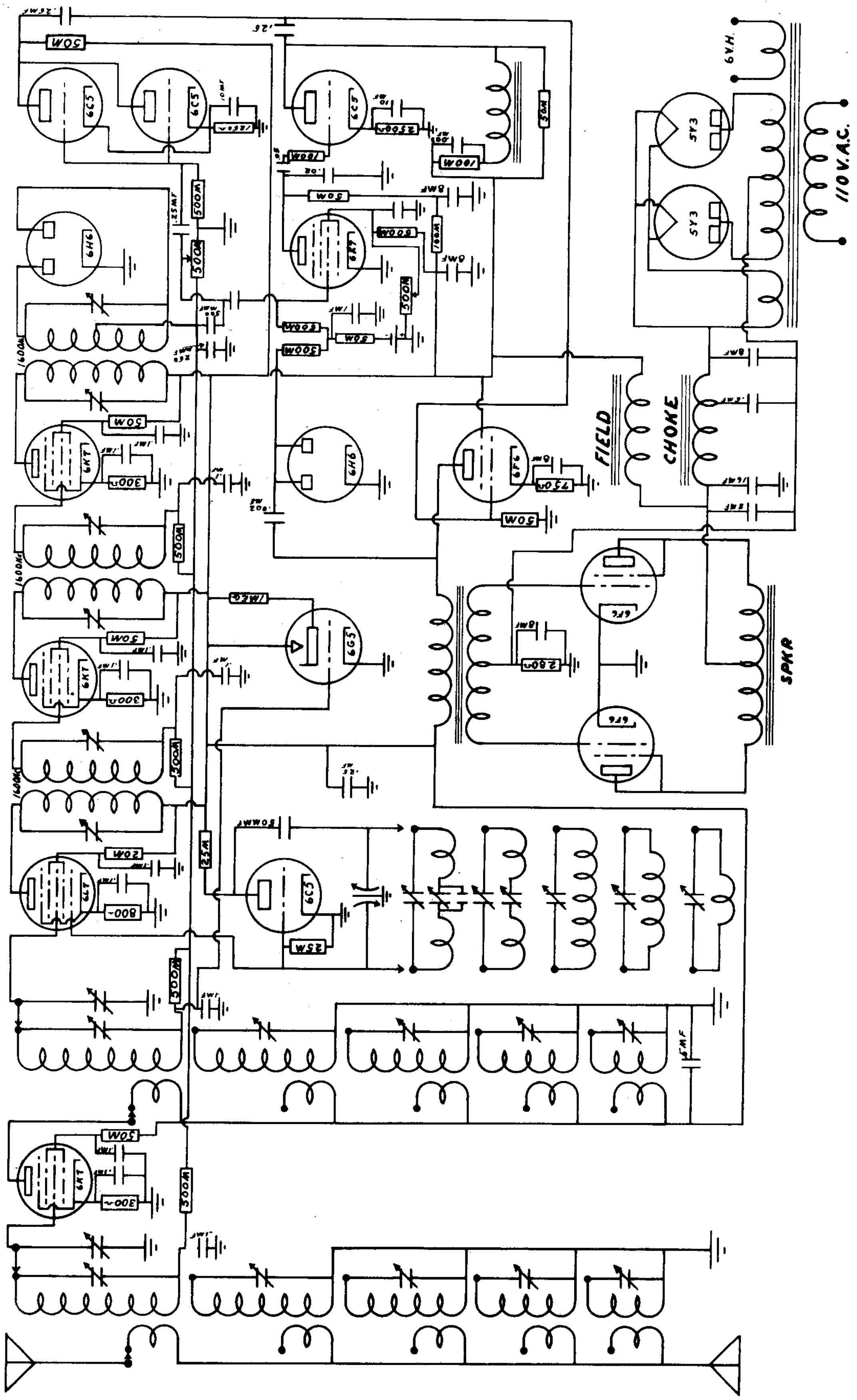
MODEL 10MT "TIFFANY TONE"



I.F. 1600 K.C.

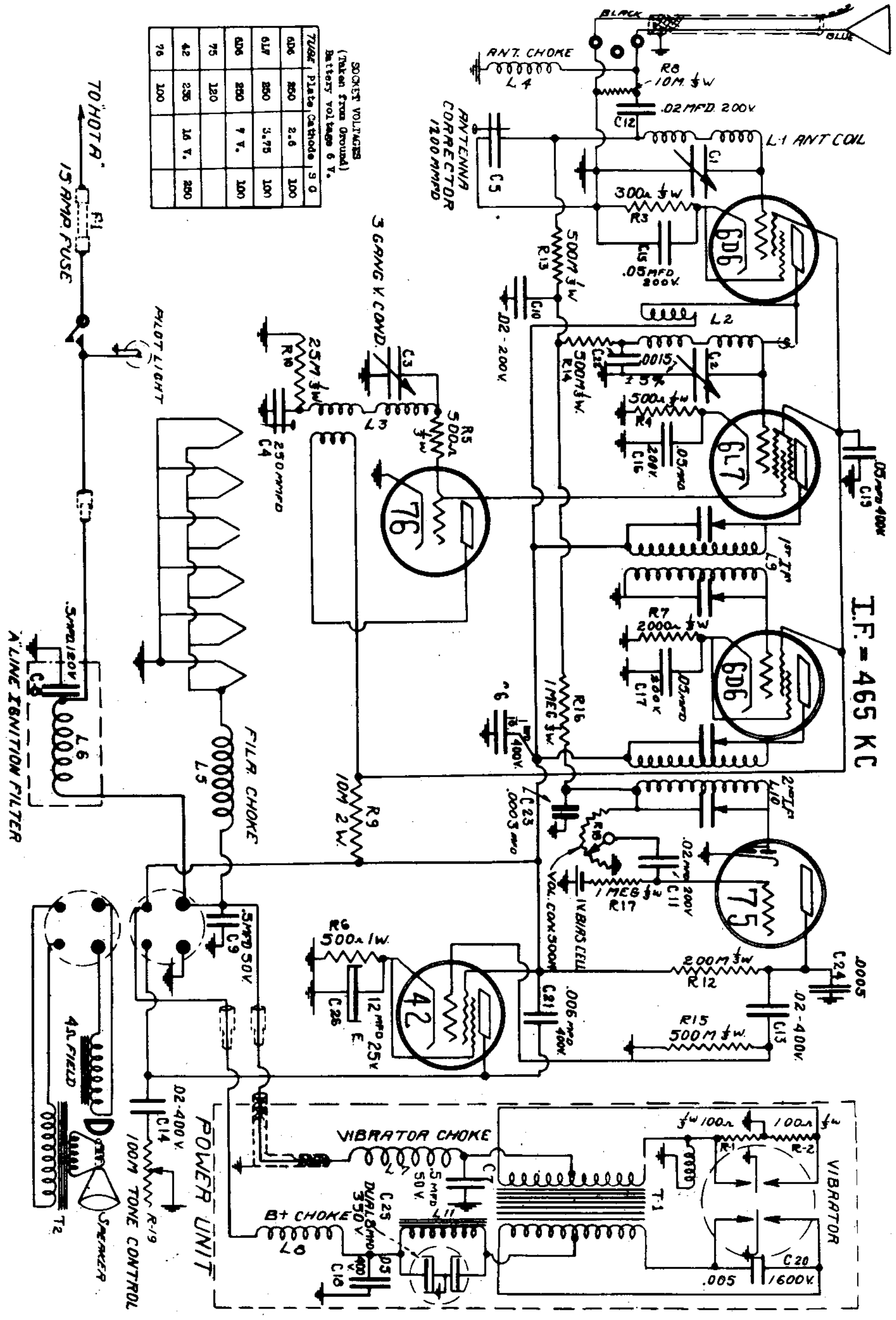
HERBERT H. HORN RADIO MFG. CO.

MODEL 17MT TIFFANY TONE



I.F. 1600 K.C.

HOWARD RADIO COMPANY
MODEL HA6 SERIES I



SOCKET VOLTAGES
(Taken from Ground)
Battery voltage 6 V.

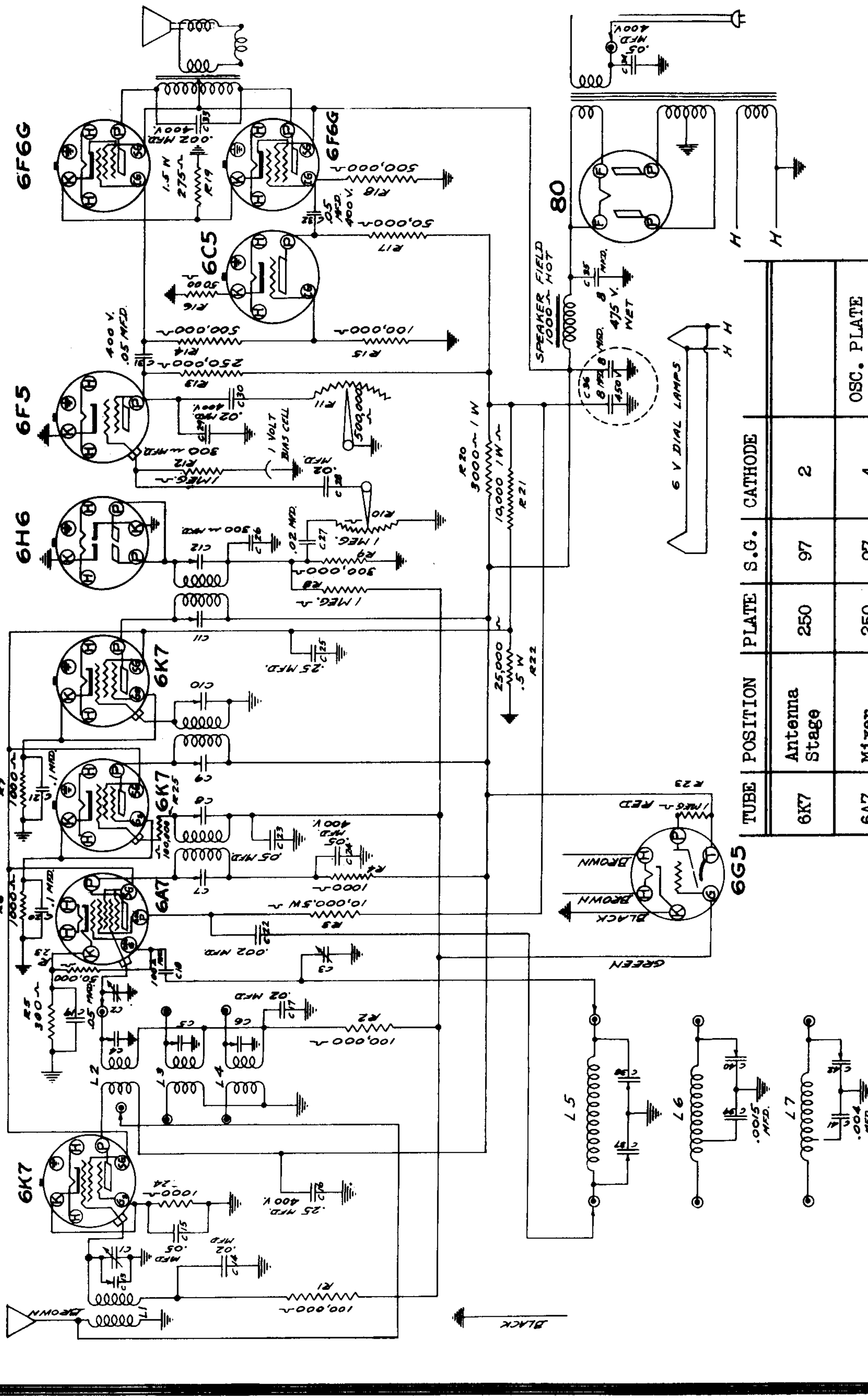
TUBE	Plate	Cathode	S G
6D6	250	2.6	100
6L7	250	3.75	100
6D6	250	7 V.	100
75	120		
42	235	16 V.	250
76	100		

SERVICE FIRST AID
EVERY GOOD SERVICEMAN CHECKS TUBES AND THE ANTENNA SYSTEM FIRST.

DEFECT	GENERALLY CAUSED BY	REMEDY
QUALITY POOR	After Checking Voltage, Tubes and Vibrator; Check .02 Condenser in the plate circuit of the 75 tube which may be open	Change if necessary
	Speaker Cone off center	Adjust or change speaker
DEAD RECEIVER	Blown Fuse, Defective Off-On Switch, Open Voice Coil or Speaker Transformer	Check
	Defective Vibrator, Blown Condenser, Open Coil Winding	Check "B" Voltage
LOW VOLUME INSENSITIVE	Poor Antenna System, Receiver not aligned, Speaker Field Coil shorted	Check
	2nd. I.F. Transformer having lost its gain due to the softening of the wax and the shifting of the iron core coupling	Change to new type I.F. (# 8542 on can)
AUDIO OSCILLATION OR HOWL	Possible open .006 in place circuit of 42	Change if necessary
	Variable Condenser not floating freely in its rubber mountings	Free Condenser
RADIO FREQUENCY OSCILLATION	Open C6 bypass condenser .1 Mfd. 400 volt in B - Circuit	Change
	The grid lead between the mixer tube 6L7 and the variable condenser may be too close to the Antenna Stage of the variable condenser (Top Section)	Push lead away
OFF CALIBRATION	Set not properly aligned	Check
	Dial hand not set to maximum line when condenser is at full capacity	Reset screw on back of drive head
SET NOT SELECTIVE	Check Alignment, especially the I.F. stages.	
SLIPPING OF THE VOLUME CONTROL SHAFT	Cable may not be meshed with slot in control shaft due to cable not being far enough in the coupling, or volume control bracket may be bending back at an angle which does not allow the control to meet the shaft slot.	Correct as described

HOWARD RADIO COMPANY

MODELS 118 & 218



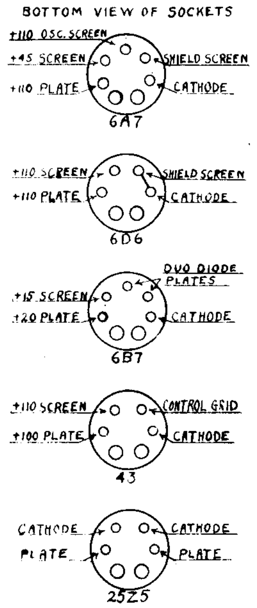
I.F. 465K.C.

TUBE	POSITION	PLATE	S.G.	CATHODE	
6K7	Antenna Stage	250	97	2	
6A7	Mixer	250	97	4	OSC. PLATE 145
6K7	I.F.	250	97	4	
6K7	I.F.	250	97	4	
6H6	Diode	-	-	-	
6F5	Audio	75	-	-	
6C5	Audio	130	-	6	
6F6G	PP Output	242	245	18	
80	Rectifier				H.V. OFF RECTIFIER = 340 VOLTS DROP ACROSS SPEAKER FIELD=90 VOLTS

VOLTAGE READINGS TAKEN FROM GROUND
WITH LINE VOLTAGE AT 115 VOLTS
NO SIGNAL IN ANTENNA

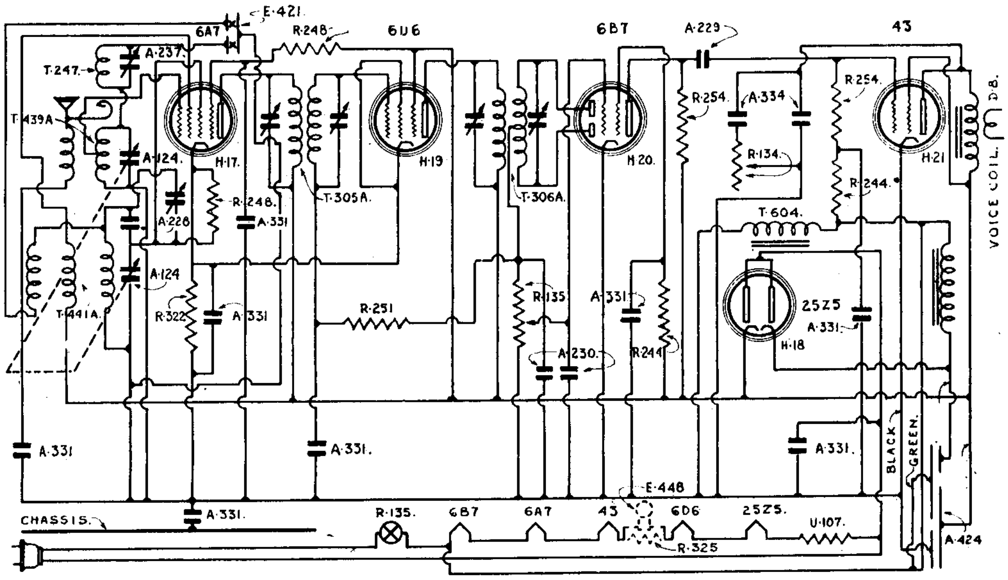
INTERNATIONAL RADIO CORP.

MODELS A & B "KADETTE"



I.F. 262.5 K.C.

A-331	
BLACK	—
RED	.006 mf
GREEN	.05 mf
YELLOW	.05 mf
BLUE	.15 mf



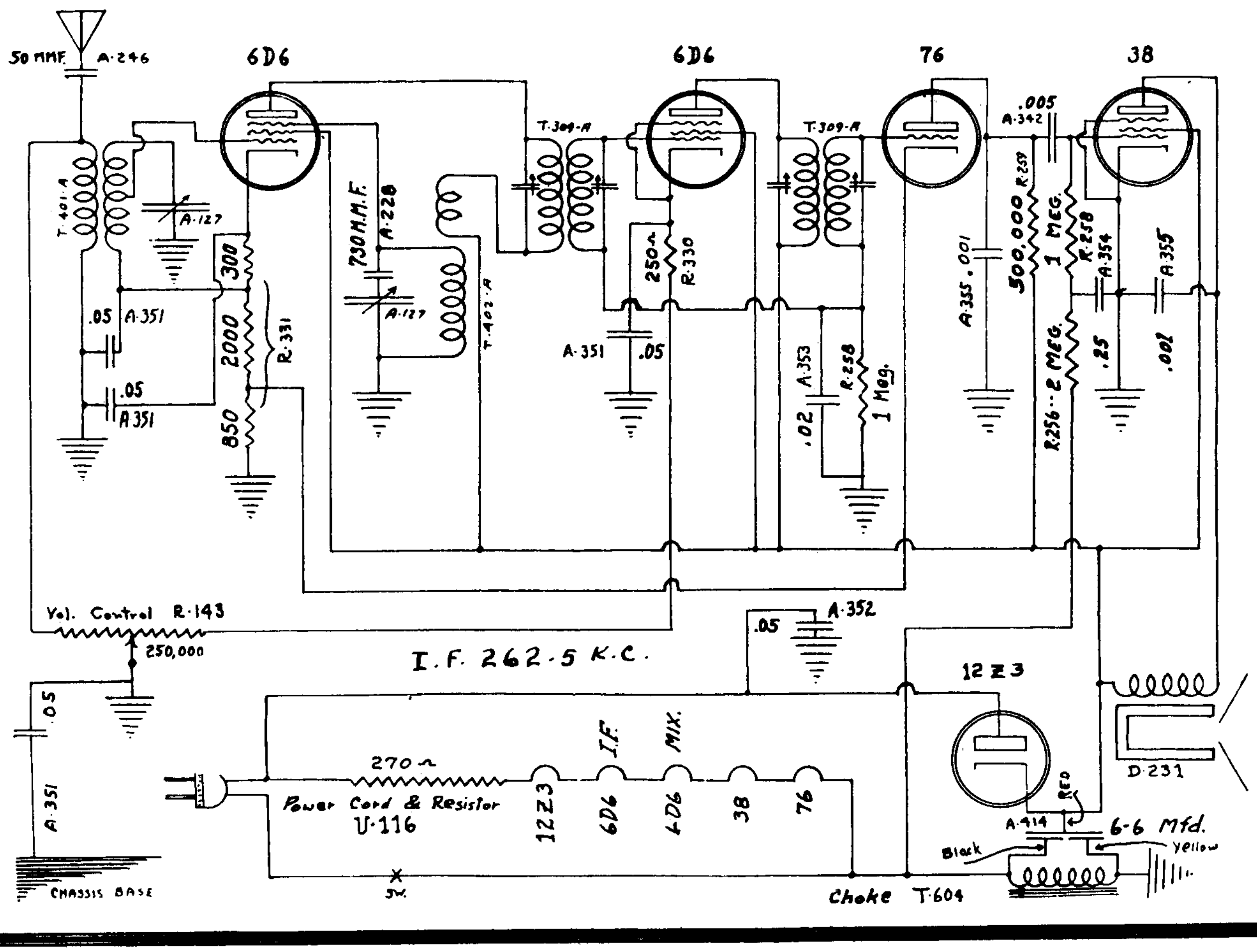
A-124 · 2 GANG VAR. COND.
A-228 · 730 M.MFD.
A-229 · .003 MFD.
A-230 · .00035 MFD.
A-331 · .15 .05 .05 .006 MFD. BY PASS.
A-334 · .01 .08 MFD. 200V.
A-424 · 24 MFD.
A-237 · 16 M.MFD.

D-8 · DYNAMIC SPEAKER 5"
H-17 · 7-PRONG 6A7 SOCKET.
H-18 · 6-PRONG 25Z5 SOCKET.
H-19 · 6-PRONG 6D6 SOCKET.
H-20 · 7-PRONG 6B7 SOCKET.
H-21 · 6-PRONG 43 SOCKET.
E-448 · PILOT LIGHT BR'KT.
E-421 · S.W. SWITCH.

R-135. 250M. OHM VOL. CONTROL.
R-134 · 50M. OHM. TONE CONTROL.
R-244 · 1 MEGOHM.
R-248 · 50M. OHM.
R-251 · 500M. OHM.
R-254. 250M. OHM.
R-325 · 20 OHM.

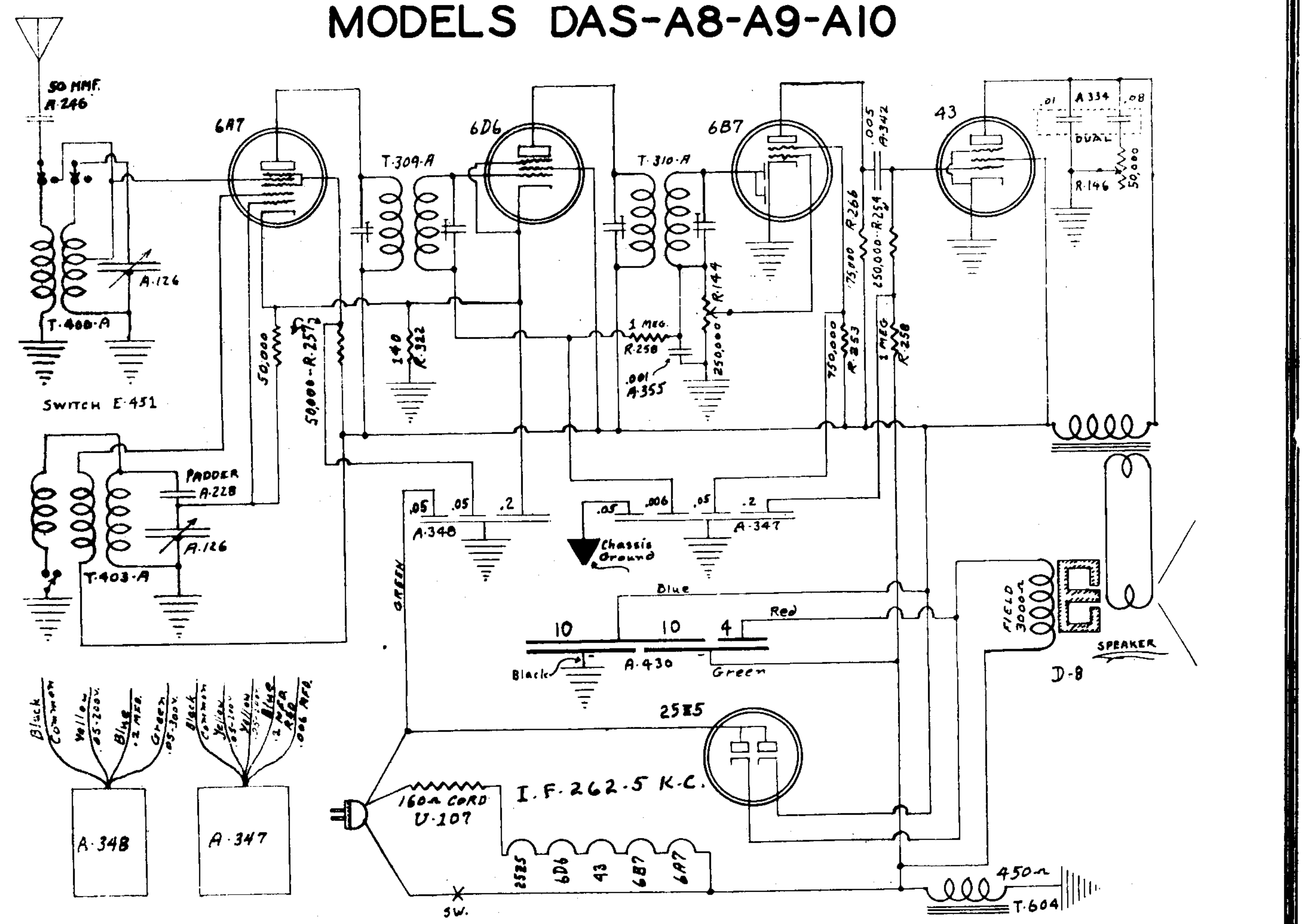
R-322 · 140 OHMS.
T-305A · 1ST. I.F. ASSEMBLY.
T-306A · 2ND. IF. ASSEMBLY.
T-439A · ANT. COIL.
T-441A · OSC. COIL. S.W.
T-604 · 450 OHM FILTER CHOKE.
U-107 · 160 OHM POWER COR
T-247. S.W. RF. COIL.

MODEL CM "KADETTE"

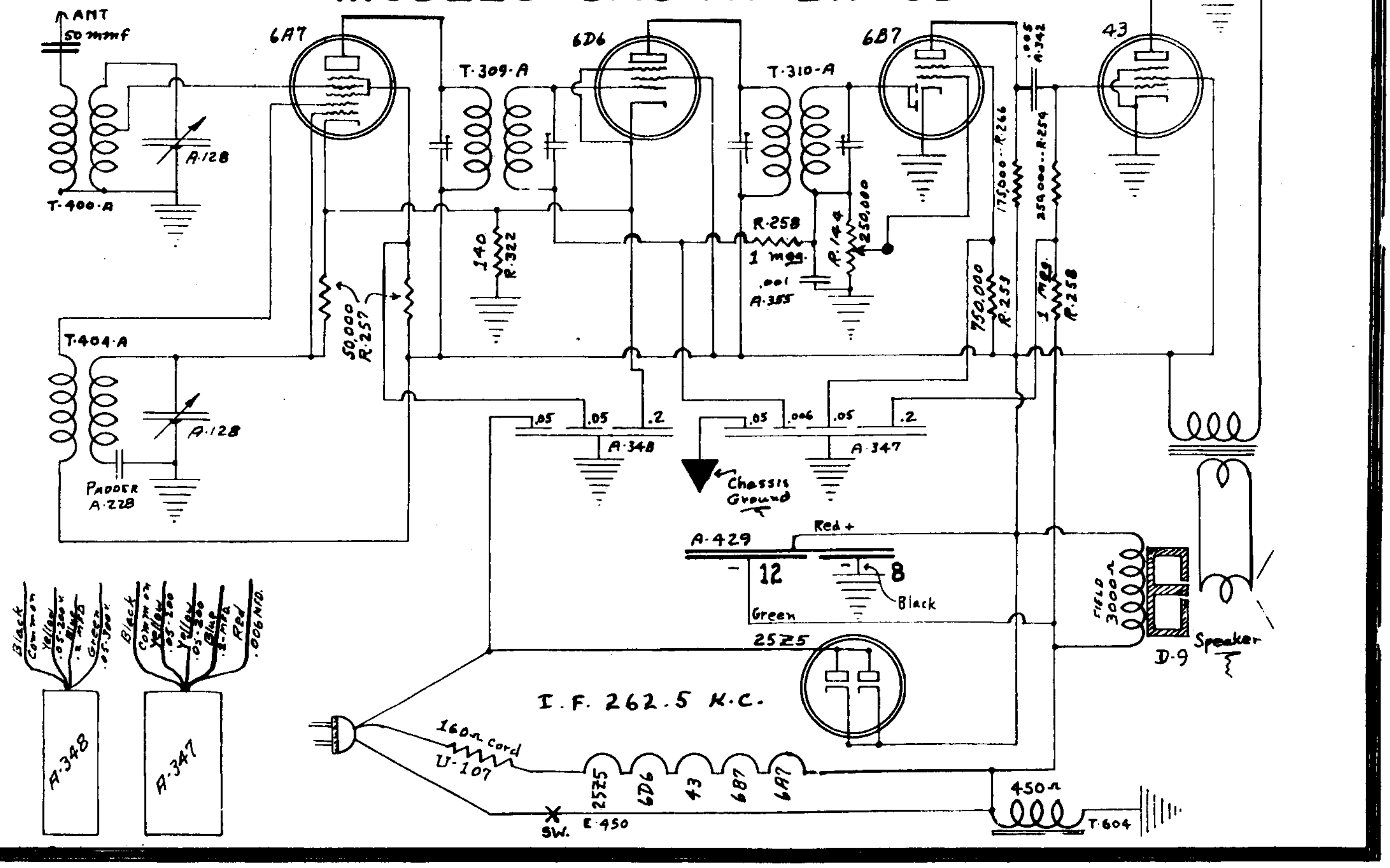


INTERNATIONAL RADIO CORP.

MODELS DAS-A8-A9-A10

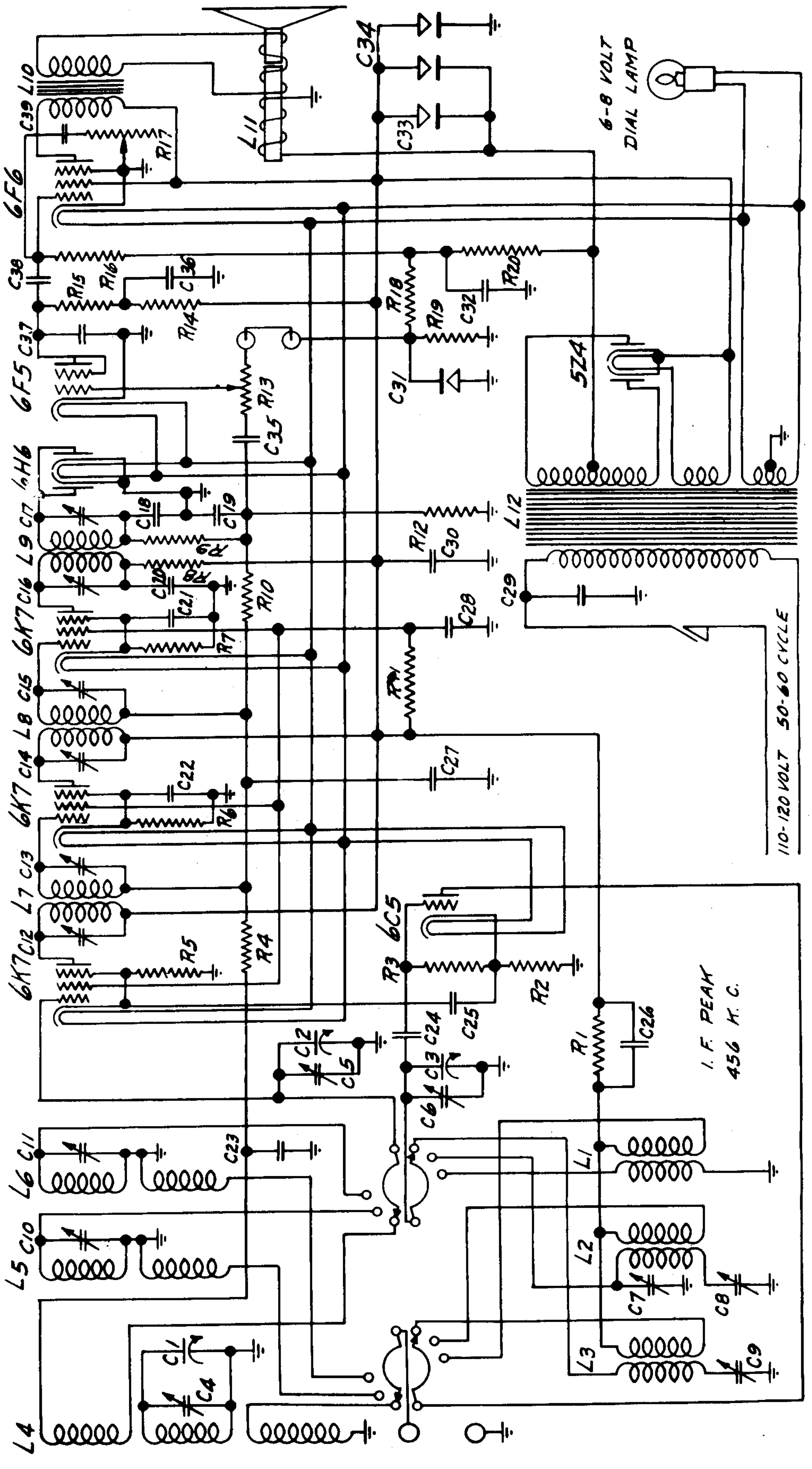


MODELS DAC-A7-BW-CD



LAFAYETTE RADIO MFG. CO.

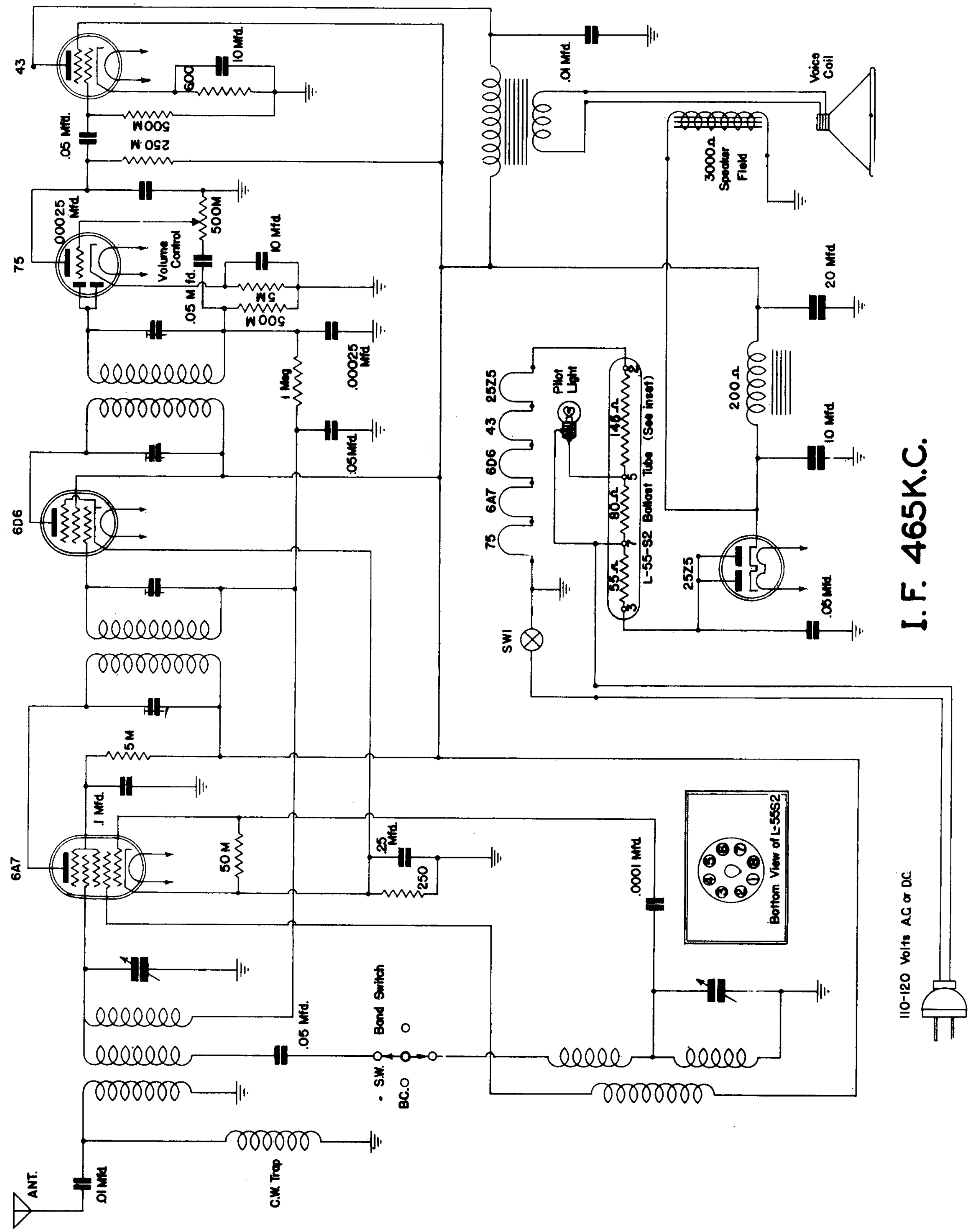
MODELS A-33 & A-38



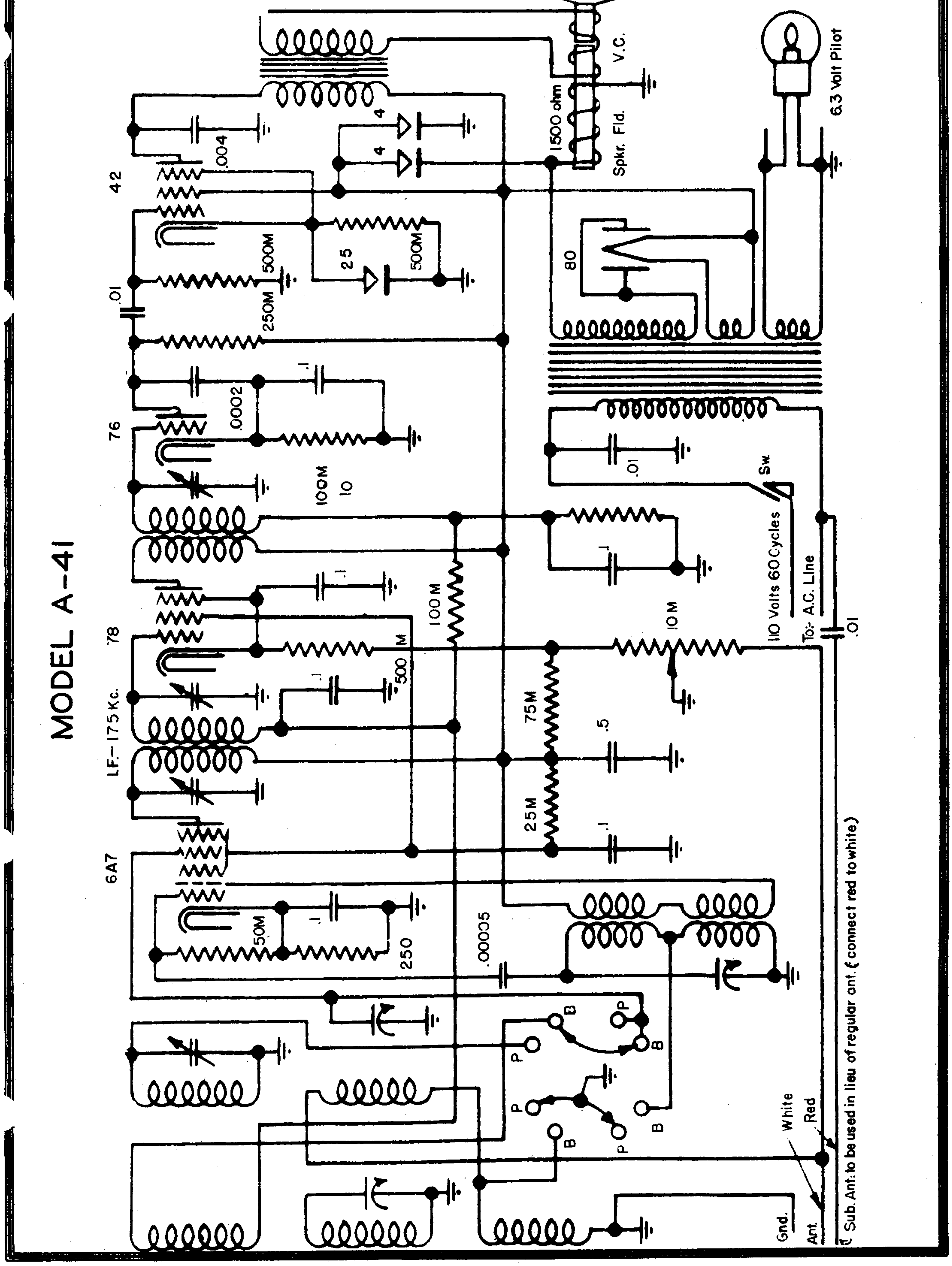
R1	10,000 OHMS	R11	75,000 OHMS	C18	.0001 Mf.	C28	.1 Mf.			
R2	250 "	R12	500,000 "	C19	.0001 "	C29	.01 "			
R3	20,000 "	R13	500,000 "	C20	.01 "	C30	1. "			
R4	100,000 "	R14	100,000 "	C21	.1 "	C31	25. "			
R5	2,000 "	R15	250,000 "	C22	.1 "	C32	.2 "		C38	.01 Mf.
R6	500 "	R16	500,000 "	C23	.1 "	C33	4. "		C39	.01 "
R7	500 "	R17	250,000 "	C24	.00005 "	C34	4-4 "			
R8	5,000 "	R18	250,000 "	C25	.01 "	C35	.01 "			
R9	50,000 "	R19	25,000 "	C26	.01 "	C36	.1 "			
R10	1,000,000 "	R20	1,000,000 "	C27	.1 "	C37	.001 "			

LAFAYETTE RADIO MFG. CO.

MODEL AS-6

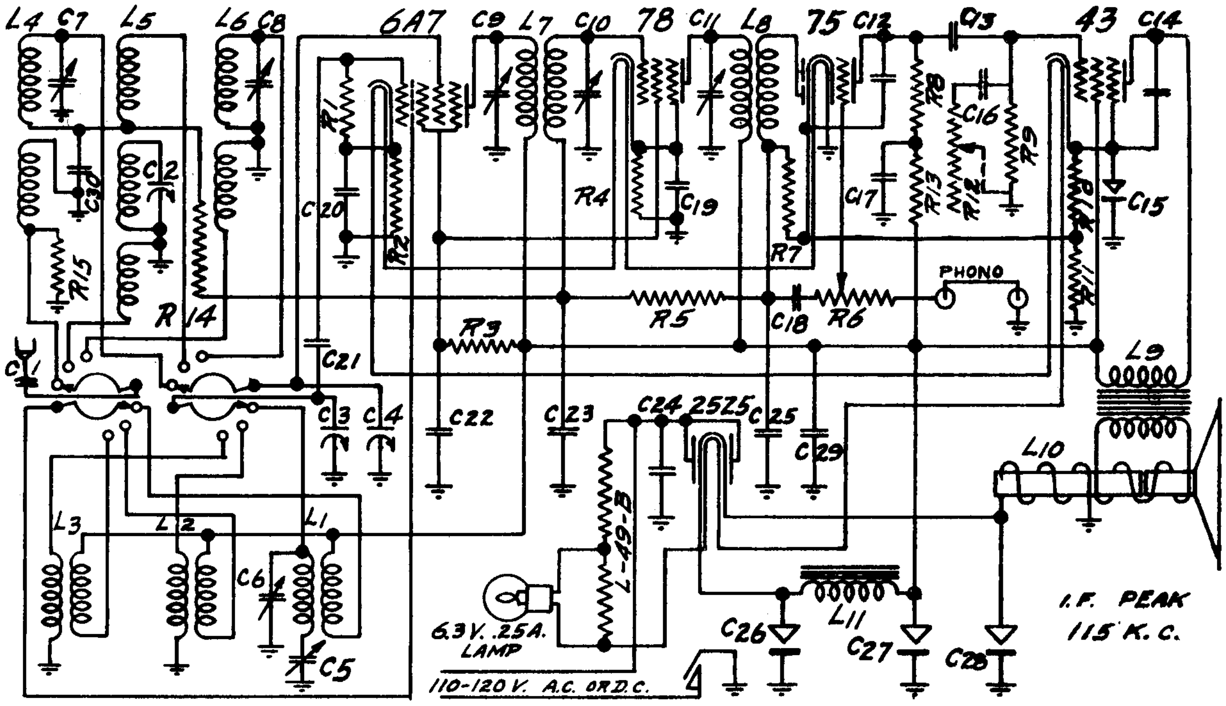


LAFAYETTE RADIO MFG. CO.



LAFAYETTE RADIO MFG. CO.

MODELS A22 & A26



CODE	PART NO.	RESISTORS
R1	53-898	50,000 Ohm Oscillator Grid Resistor
R2	53-1062	250 Ohm Oscillator Cathode Resistor
R3	53-1042	25,000 Ohm 6A7 & 78 Screen Resistor
R4	53-1063	500 Ohm 78 Cathode Resistor
R5	53-926	1 Meg Ohm A.V.C. Network Resistor
R6	19-1291	500,000 Ohm Volume Control & Switch
R7	53-925	500,000 Ohm Diode Resistor
R8	53-924	250,000 Ohm 75 Plate Resistor
R9	53-923	500,000 Ohm 43 Grid Resistor
R10	53-1062	500 Ohm 43 Cathode Resistor
R11	53-1122	40 Ohm 75 Cathode Resistor
R12	19-1317	250,000 Ohm Tone Control on Model 3JR6
R13	53-898	50,000 Ohm 75 Plate Hum Resistor
R14	53-923	100,000 Ohm A.V.C. Network Resistor
R15	53-920	10,000 Ohm Long Wave Ant. Control Resistor

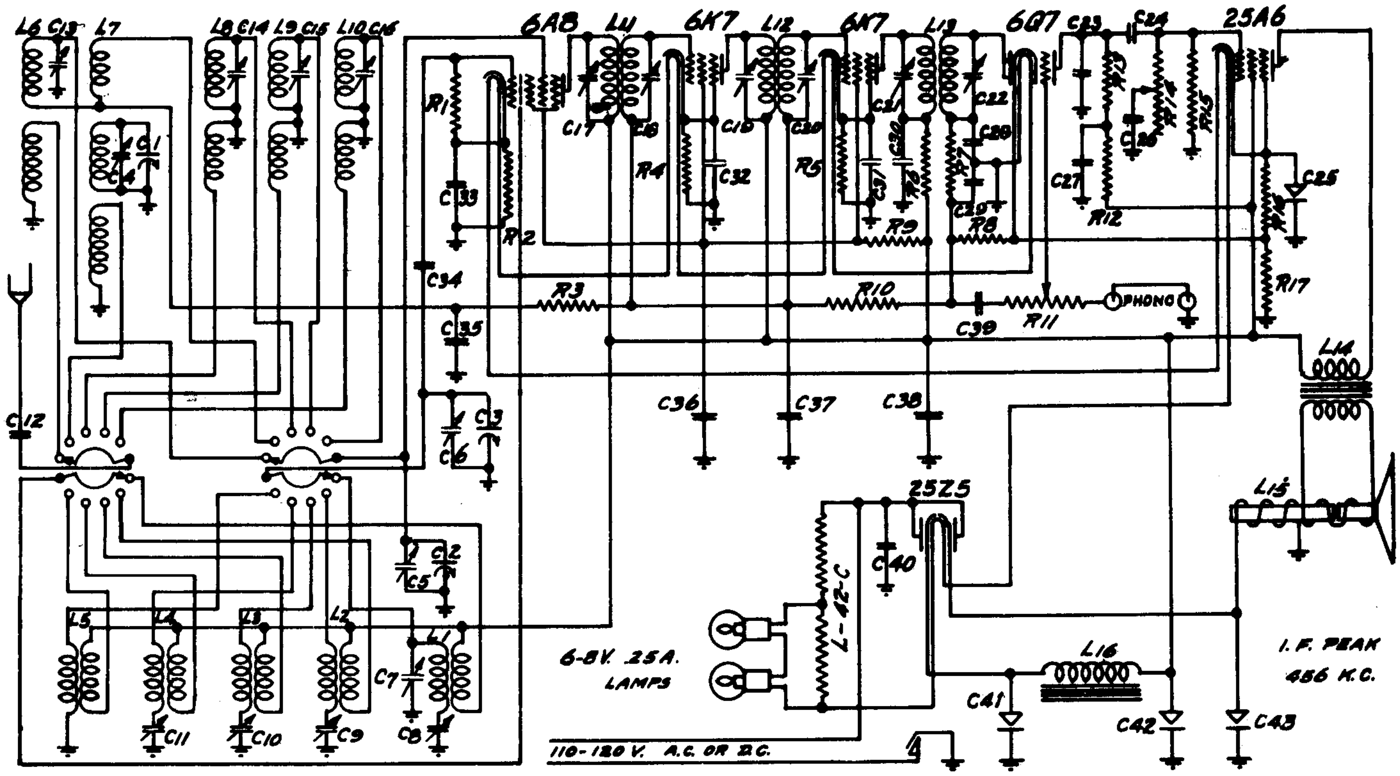
CODE	PART NO.	CONDENSERS
C1	75-2003	.01 Mfd. 400 V. Paper Ant. Series Cond.
C2	77-833	366 MMFD. Preselector Section of 3 Gang
C3	77-833	328 MMFD. Oscillator Section of 3 Gang
C4	77-833	366 MMFD. Preselector Section of 3 Gang
C5	78-2006	Long Wave Oscillator Series Trimmer
C6	78-1587	3-30 MMFD. Long Wave Osc. Parallel Trimmer
C7	78-2010	3-30 MMFD. Long Wave Preselector Trimmer
C8	78-1587	3-30 MMFD. Foreign Band Preselector Trimmer
C9	78-993	First I.F. Primary Trimmer
C10	78-1228	First I.F. Secondary Trimmer
C11	78-2009	Second I.F. Primary Trimmer
C12	76-265	.001 Mfd. Mica 75 Plate Filter Condenser
C13	75-2003	.01 Mfd. 400 V. Paper Audio Feed Cond.
C14	75-2002	.004 Mfd. 600 V. Paper Output Plate Filter Cond.

CODE	PART NO.	CONDENSERS (Cont'd.)
C15	18-928	25 Mfd. 25 V. Elect. Output Cathode By-Pass Cond.
C16	75-2003	.01 Mfd. 400 V. Paper Tone Control Cond. on Model
C17	75-2005	.1 Mfd. 200 V. Paper 75 Plate Hum Filter Condenser
C18	75-2003	.01 Mfd. 400 V. Paper Audio Feed Condenser
C19	75-2005	.1 Mfd. 200 V. Paper 78 Cathode By-Pass Cond.
C20	75-2005	.1 Mfd. 200 V. Paper Osc. Cathode Cond.
C21	76-2002	.00005 Mfd. Mica Oscillator Grid Cond.
C22	75-2005	.1 Mfd. 200 V. Paper Screen By-Pass Cond.
C23	75-2005	.1 Mfd. 200 V. Paper A.V.C. Network By-Pass Cond.
C24	75-2005	.1 Mfd. 200 V. Paper Line By-Pass Cond.
C25	76-307	.0005 Mfd. Mica Diode Filter Condenser
C26	18-2003	11 Mfd. 150 W.V. Dry Elect. Filter Cond.
C27	18-2003	4 Mfd. 150 W.V. Dry Elect. Filter Cond.
C28	18-2003	4 Mfd. 150 W.V. Dry Elect. Filter Cond.
C29	75-2011	.5 Mfd. 200 V. Paper B Supply By-Pass Cond.
C30	75-2005	.1 Mfd. 200 V. Paper A.V.C. Network By-Pass Cond.

CODE	PART NO.	INDUCTANCES
L1	17-2099	Long Wave Oscillator Coil Assembly
L2	17-2099	Broadcast Band Osc. Coil Assembly
L3	17-2095	Foreign Band Oscillator Coil Assembly
L4	17-2108	Long Wave Preselector Coil Assembly
L5	17-2108	Broadcast Band Preselector Coil Assembly
L6	17-2096	Foreign Band Preselector Coil Assembly
L7	65-2022	First I.F. Transformer Assembly
L8	17-2097	Second I.F. Transformer Coil Assembly
L9	64-1260	6½" Speaker 43 Output Trans. on L10
L10	64-1260	6½" Speaker 3000 Ohm field
L11	14-940	20 Henry Filter Choke

LAFAYETTE RADIO MFG. CO.

MODEL A 23



CODE	PART NO.	RESISTORS
R1	53-898	50,000 Ohm Oscillator Grid Resistor
R2	53-1062	250 Ohm Oscillator Cathode Resistor
R3	53-923	100,000 Ohm A.V.C. Network Resistor
R4	53-1063	500 Ohm First I.F. Cathode Resistor
R5	53-1063	500 Ohm Second I.F. Cathode Resistor
R6	53-919	5,000 Ohm Second I.F. Plate Isolation Resistor
R7	53-898	50,000 Ohm Diode Filter Resistor
R8	53-925	500,000 Ohm Diode Load Resistor
R9	53-921	40,000 Ohm Screen Feed Resistor
R10	53-926	1 Meg Ohm A.V.C. Network Resistor
R11	19-1291	500,000 Ohm Volume Control & Switch
R12	53-898	50,000 Ohm Second Detector Plate Hum Resistor
R13	53-924	250,000 Ohm Second Detector Plate Resistor
R14	19-1317	250,000 Ohm Tone Control
R15	53-925	500,000 Ohm Output Grid Resistor
R16	53-1426	750 Ohm Output Cathode Resistor
R17	53-1122	40 Ohm Second Detector Cathode Resistor

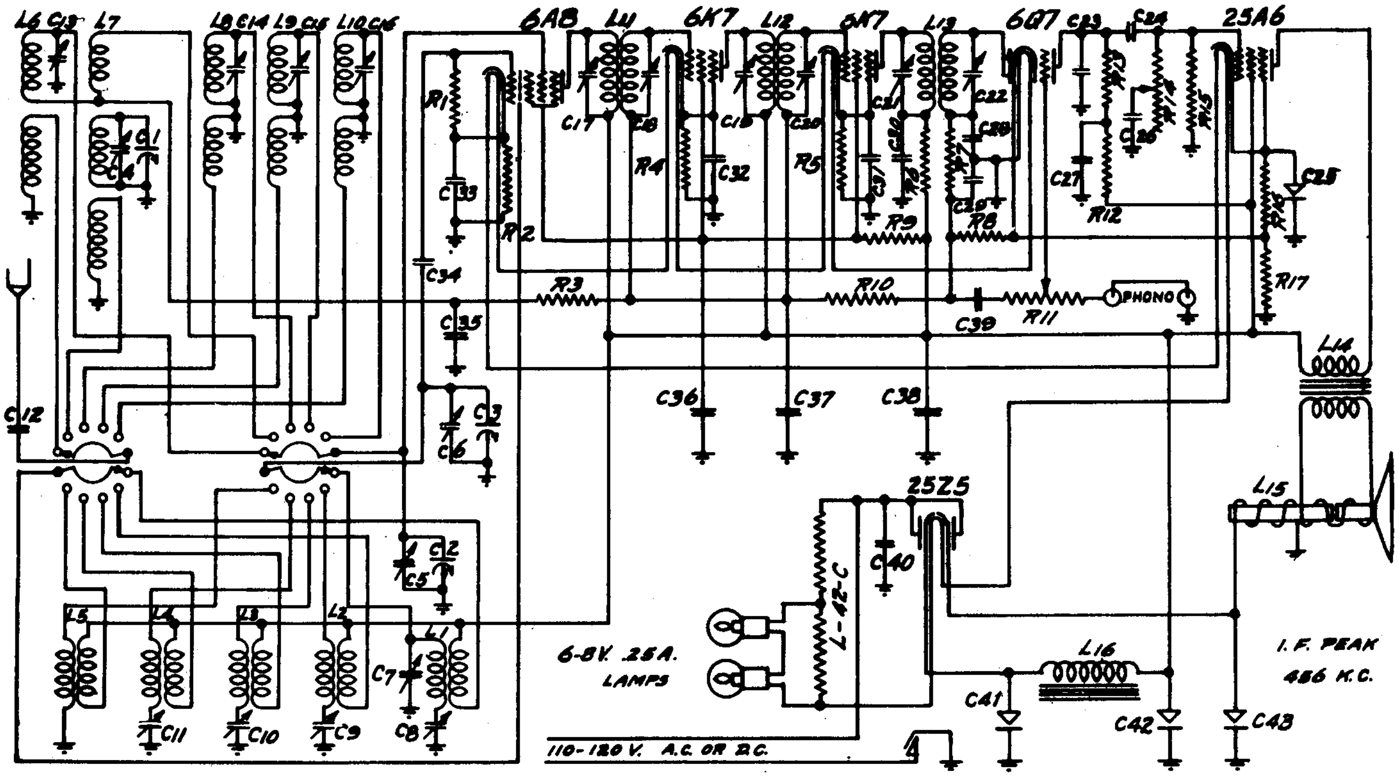
CODE	PART NO.	CONDENSERS (Cont.)
C22	78-1561	70-120 MMFD. 3rd. I.F. Secondary Trimmer
C23	76-265	.001 Mfd. Second Detector Plate Filter
C24	75-2003	.01 Mfd. Audio Feed Condenser
C25	18-928	25 Mfd. Electrolytic Condenser 25A6 Cathode By-Pass
C26	75-2003	.01 Mfd. Tone Control Condenser
C27	75-2005	.1 Mfd. 200 Volt Paper Second Detector Plate Hum Filter
C28	76-2001	.0001 Mfd. Mica Diode Filter Condenser
C29	76-2001	.0001 Mfd. Mica Diode Filter Condenser
C30	75-2003	.01 Mfd. 400 V. Paper 2nd. I.F. Plate Isolation Cond.
C31	75-2005	.1 Mfd. 200 Volt Paper 2nd. I.F. Cathode Resistor
C32	75-2005	.1 Mfd. 200 Volt Paper 1st. I.F. Cathode Resistor
C33	75-2005	.1 Mfd. 200 Volt Paper Osc. & 1st. Det. Cathode Resistor
C34	76-268	.00025 Mfd. Mica Oscillator Grid Condenser
C35	75-2005	.1 Mfd. 200 Volt Paper A.V.C. By-Pass Condenser
C36	75-2011	.5 Mfd. 200 Volt Paper Screen Grid By-Pass Condenser
C37	75-2005	.1 Mfd. 200 Volt Paper A.V.C. By-Pass Condenser
C38	75-2013	1. Mfd. 400 Volt Paper B Supply By-Pass Condenser
C39	75-2003	.01 Mfd. 400 Volt Paper Audio Feed Condenser
C40	75-2005	.1 Mfd. 200 Volt Paper Line By-Pass Condenser
C41	18-2003	11 Mfd. Dry Electrolytic Condenser 150 W.V.
C42	18-2003	4 Mfd. Dry Electrolytic Condenser 150 W.V.
C43	18-2003	4 Mfd. Dry Electrolytic Condenser 150 W.V.

		CONDENSERS
C1	77-1581	1st. Preselector Section of 3 Gang Condenser
C2	77-1581	2nd. Preselector Section of 3 Gang Condenser
C3	77-1581	Oscillator Section of 3 Gang Condenser
C4		C1 Reciprocal Trimmer
C5		C2 Reciprocal Trimmer
C6		C3 Reciprocal Trimmer
C7	78-2010	3-30 MMFD. No. 5 Band Oscillator Trimmer
C8	78-1569	140 MMFD. No. 5 Band Oscillator Series Trimmer
C9	78-1569	450 MMFD. No. 4 Band Oscillator Series Trimmer
C10	78-1572	600 MMFD. No. 3 Band Oscillator Series Trimmer
C11	78-1572	1600 Mfd. No. 2 Band Oscillator Series Trimmer
C12	75-2003	.01 Mfd. Antenna Series Condenser
C13	78-2010	3-30 MMFD. No. 5 Band Preselector Coil Parallel Trimmer
C14	78-2010	3-30 MMFD. No. 3 Band Preselector Coil Parallel Trimmer
C15	78-2010	3-30 MMFD. No. 2 Band Preselector Coil Parallel Trimmer
C16	78-2010	3-30 MMFD. No. 1 Band Preselector Coil Parallel Trimmer
C17	78-1561	70-120 MMFD. 1st. I.F. Primary Trimmer
C18	78-1561	70-120 MMFD. 1st. I.F. Secondary Trimmer
C19	78-1561	70-120 MMFD. 2nd. I.F. Primary Trimmer
C20	78-1561	70-120 MMFD. 2nd. I.F. Secondary Trimmer
C21	78-1561	70-120 MMFD. 3rd. I.F. Primary Trimmer

		INDUCTANCES
L1	17-1648	No. 5 Band Oscillator Coil Assembly
L2	17-1646	No. 4 Band Oscillator Coil Assembly
L3	17-2083	No. 3 Band Oscillator Coil Assembly
L4	17-1665	No. 2 Band Oscillator Coil Assembly
L5	17-2084	No. 1 Band Oscillator Coil Assembly
L6	17-2085	No. 5 Band Preselector Coil Assembly
L7	17-2080	No. 4 Band Preselector Coil Assembly
L8	17-2082	No. 3 Band Preselector Coil Assembly
L9	17-1666	No. 2 Band Preselector Coil Assembly
L10	17-1664	No. 1 Band Preselector Coil Assembly
L11	68-2014	First I.F. Transformer Assembly
L12	68-2014	Second I.F. Transformer Assembly
L13	68-2021	Third I.F. Transformer Assembly
L14	64-2026	8" Speaker 25A6 Output Trans. on L15
L15	64-2026	8" Speaker 3000 Ohm Field
L16	14-940	20 Henry Filter Choke

LAFAYETTE RADIO MFG. CO.

MODEL A18



CODE	PART NO.	RESISTORS
R1	53-898	50,000 Ohm Oscillator Grid Resistor
R2	53-1062	250 Ohm Oscillator Cathode Resistor
R3	53-923	100,000 Ohm A.V.C. Network Resistor
R4	53-1063	500 Ohm First I.F. Cathode Resistor
R5	53-1063	500 Ohm Second I.F. Cathode Resistor
R6	53-919	5,000 Ohm Second I.F. Plate Isolation Resistor
R7	53-898	50,000 Ohm Diode Filter Resistor
R8	53-925	500,000 Ohm Diode Load Resistor
R9	53-921	40,000 Ohm Screen Feed Resistor
R10	53-926	1 Meg Ohm A.V.C. Network Resistor
R11	19-1291	500,000 Ohm Volume Control & Switch
R12	53-898	50,000 Ohm Second Detector Plate Hum Resistor
R13	53-924	250,000 Ohm Second Detector Plate Resistor
R14	19-1317	250,000 Ohm Tone Control
R15	53-925	500,000 Ohm Output Grid Resistor
R16	53-1426	750 Ohm Output Cathode Resistor
R17	53-1122	40 Ohm Second Detector Cathode Resistor

CONDENSERS

C1	77-1581	1st. Preselector Section of 3 Gang Condenser
C2	77-1581	2nd. Preselector Section of 3 Gang Condenser
C3	77-1581	Oscillator Section of 3 Gang Condenser
C4		C1 Reciprocal Trimmer
C5		C2 Reciprocal Trimmer
C6		C3 Reciprocal Trimmer
C7	78-2010	3-30 MMFD. No. 5 Band Oscillator Trimmer
C8	78-1569	140 MMFD. No. 5 Band Oscillator Series Trimmer
C9	78-1569	450 MMFD. No. 4 Band Oscillator Series Trimmer
C10	78-1572	600 MMFD. No. 3 Band Oscillator Series Trimmer
C11	78-1572	1600 Mfd. No. 2 Band Oscillator Series Trimmer
C12	75-2003	.01 Mfd. Antenna Series Condenser
C13	78-2010	3-30 MMFD. No. 5 Band Preselector Coil Parallel Trimmer
C14	78-2010	3-30 MMFD. No. 3 Band Preselector Coil Parallel Trimmer
C15	78-2010	3-30 MMFD. No. 2 Band Preselector Coil Parallel Trimmer
C16	78-2010	3-30 MMFD. No. 1 Band Preselector Coil Parallel Trimmer
C17	78-1561	70-120 MMFD. 1st. I.F. Primary Trimmer
C18	78-1561	70-120 MMFD. 1st. I.F. Secondary Trimmer
C19	78-1561	70-120 MMFD. 2nd. I.F. Primary Trimmer
C20	78-1561	70-120 MMFD. 2nd. I.F. Secondary Trimmer
C21	78-1561	70-120 MMFD. 3rd. I.F. Primary Trimmer

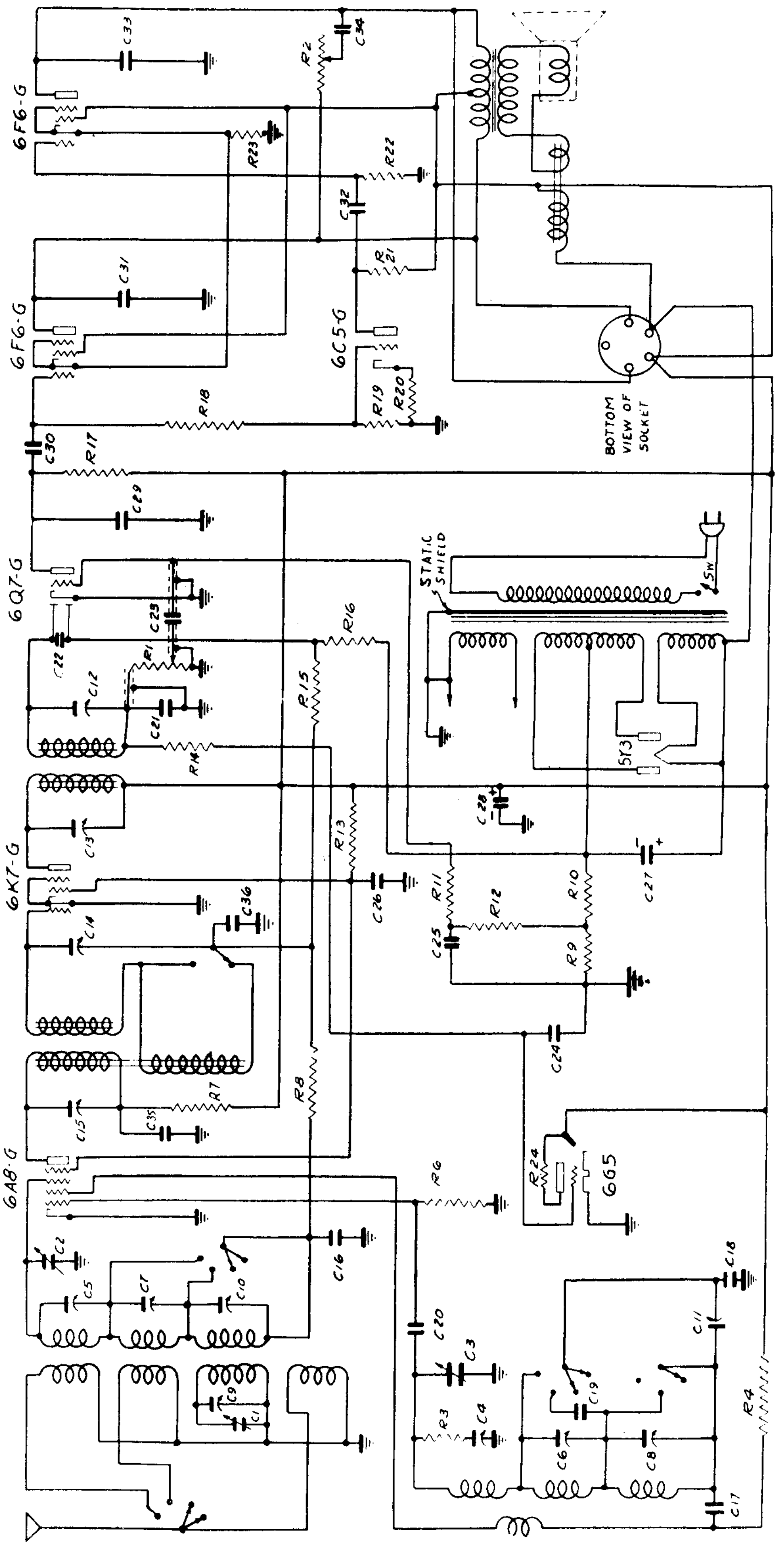
CODE	PART NO.	CONDENSERS (Cont.)
C22	78-1561	70-120 MMFD. 3rd. I.F. Secondary Trimmer
C23	76-265	.001 Mfd. Second Detector Plate Filter
C24	75-2003	.01 Mfd. Audio Feed Condenser
C25	18-928	25 Mfd. Electrolytic Condenser 25A6 Cathode By-Pass
C26	75-2003	.01 Mfd. Tone Control Condenser
C27	75-2005	.1 Mfd. 200 Volt Paper Second Detector Plate Hum Filter
C28	76-2001	.0001 Mfd. Mica Diode Filter Condenser
C29	76-2001	.0001 Mfd. Mica Diode Filter Condenser
C30	75-2003	.01 Mfd. 400 V. Paper 2nd. I.F. Plate Isolation Cond.
C31	75-2005	.1 Mfd. 200 Volt Paper 2nd. I.F. Cathode Resistor
C32	75-2005	.1 Mfd. 200 Volt Paper 1st. I.F. Cathode Resistor
C33	75-2006	.1 Mfd. 200 Volt Paper Osc. & 1st. Det. Cathode Resistor
C34	76-268	.00025 Mfd. Mica Oscillator Grid Condenser
C36	75-2005	.1 Mfd. 200 Volt Paper A.V.C. By-Pass Condenser
C36	75-2011	.5 Mfd. 200 Volt Paper Screen Grid By-Pass Condenser
C37	75-2005	.1 Mfd. 200 Volt Paper A.V.C. By-Pass Condenser
C38	75-2013	1. Mfd. 400 Volt Paper B Supply By-Pass Condenser
C39	75-2003	.01 Mfd. 400 Volt Paper Audio Feed Condenser
C40	75-2005	.1 Mfd. 200 Volt Paper Line By-Pass Condenser
C41	18-2003	11 Mfd. Dry Electrolytic Condenser 150 W.V.
C42	18-2003	4 Mfd. Dry Electrolytic Condenser 150 W.V.
C43	18-2003	4 Mfd. Dry Electrolytic Condenser 150 W.V.

INDUCTANCES

L1	17-1648	No. 5 Band Oscillator Coil Assembly
L2	17-1646	No. 4 Band Oscillator Coil Assembly
L3	17-2083	No. 3 Band Oscillator Coil Assembly
L4	17-1665	No. 2 Band Oscillator Coil Assembly
L5	17-2084	No. 1 Band Oscillator Coil Assembly
L6	17-2085	No. 5 Band Preselector Coil Assembly
L7	17-2080	No. 4 Band Preselector Coil Assembly
L8	17-2082	No. 3 Band Preselector Coil Assembly
L9	17-1666	No. 2 Band Preselector Coil Assembly
L10	17-1664	No. 1 Band Preselector Coil Assembly
L11	68-2014	First I.F. Transformer Assembly
L12	68-2014	Second I.F. Transformer Assembly
L13	68-2021	Third I.F. Transformer Assembly
L14	64-2026	8" Speaker 25A6 Output Trans. on L15
L15	64-2026	8" Speaker 3000 Ohm Field
L16	14-940	20 Henry Filter Choke

MAJESTIC RADIO & TELEVISION COMPANY

MODELS 85-86-850



I.F. 456K.C.

VOTAGE CHART

POSITION	TUBE	Ef	Ek	Eg SCREEN	Eg SUPPRESSOR	Ep TRIODE	Ep PENTODE
Converter	6 A8G	6.3	3.0	110.0			225.0
I. F. Amplifier	6 K7G	6.3	3.0	110.0			230.0
Detector—AVC	6 Q7G	6.3	2.0			95.0	
Phase Inverter	6 C5G	6.3	7.0			150.0	
Power Output	6 F6G	6.3	14.0	230.0			225
Power Output	6 F6G	6.3	14.0	230.0			225
Rectifier	5 Y3	5.0					

MAJESTIC RADIO & TELEVISION COMPANY

MODELS 85-86-850

REPLACEMENT PARTS MODELS 85-86-850

Schematic Location	Part No.	Description
	15089	Bulb Pilot Light (edgelight) models 85-86-850
	15689	Bulb Pilot Light Frosted (travelite) 85-86-850
C1 C2 C3	B-16461-3	Condenser Variable Gang Models 85-86
C1 C2 C3	A-16543-2	Condenser Variable Gang Model 850
C11	A-16472	Condenser Padder 340 Mmfd. —960 Mmfd.
C4 C6 C8	A-16473	Condenser Trimmer 3-30 Mmfd. triple strip (bakelite base)
C7	A-15246-2	Condenser Trimmer 3-30 Mmfd. (bakelite base)
C5 C9 C10	A-16474	Condenser Trimmer 3-30 Mmfd. (ceramic base)
C27	A-15236-3	Condenser Wet Electrolytic 25 Mfd. 400 volts
C28	A-15237-2	Condenser Wet Electrolytic 10 Mfd. 300 volts
C29	15918	Condenser Mica 100 Mfd. +—20% type O
C21	15928	Condenser Mica 250 Mfd. +—20% type O
C20 C22	15929	Condenser Mica 50 Mmfd. +—20% type O
C17	15930	Condenser Mica 2000 Mmfd. +—20% type W
C18	15931	Condenser Mica 4300 Mmfd. +—5% type W
C19	15932	Condenser Mica 1750 Mmfd. +—5% type W
C16 C36	15752	Condenser Tubular .05 Mfd. 200 volts
C31 C33	15753	Condenser Tubular .002 Mfd. 600 volts
C23 C30 C32	15754	Condenser Tubular .01 Mfd. 400 volts
C35	15757	Condenser Tubular .1 Mfd. 400 volts
C24	15763	Condenser Tubular .01 Mfd. 200 volts
C34	15764	Condenser Tubular .03 Mfd. 400 volts
C25	15770	Condenser Tubular .2 Mfd. 200 volts
C26	15773	Condenser Tubular .2 Mfd. 400 volts
R2	B-16539-2	Control Tone with High Fidelity Switch (models 85-86)
R2	B-16540-2	Control Tone (model 850)
	A-16541-2	Control High Fidelity (model 850)
R1	B-16542-2	Control Volume
	A-16597	Knob (tune and band switch) models 85-86
	A-16598	Knob (volume and tone) models 85-86-850
	A-16599	Knob (band switch) model 850
	A-16596	Knob (tune and high fidelity) model 850
R13	15501	Resistor Carbon 250,000 +—20% 1 watt
R12	15511	Resistor Carbon 50,000 +—20% ¼ watt
R17	15512	Resistor Carbon 250,000 +—20% ¼ watt
R8	15515	Resistor Carbon 100,000 +—20% ¼ watt
R14 R15 R16 R24	15517	Resistor Carbon 1 meg. +—20% ¼ watt
R7	15542	Resistor Carbon 1,000 +—20% ¼ watt
R22	15554	Resistor Carbon 500,000 +—10% ¼ watt
R4	15558	Resistor Carbon 10,000 +— 20% ½ watt
R11	15559	Resistor Carbon 3 meg. +— 20% ¼ watt
R3	3320	No. 38 D. C. C. Manganin wire 2 ohms
R18	15604	Resistor Carbon 435,000 +—10% ¼ watt
R19	15605	Resistor Carbon 100,000 +—10% ¼ watt
R20	15606	Resistor Carbon 5,000 +—10% ½ watt
R23	15607	Resistor Carbon 250 +—10% 2 watt
R12	15608	Resistor Carbon 50,000 +—10% ¼ watt
R9 R10	A-16564	Resistor Candohm 27.5 and 15 ohms .245 watts
R6	15511	Resistor Carbon 50,000 +—20% ¼ watt
	16886	Shield Pilot Light
	B-16635-2	Socket 6G5 with leads
	C-16584-2	Speaker (models 85-86)
	C-16585-2	Speaker (model 850)
	B-16548-4	Transformer 1st I. F.
	B-16549-3	Transformer 2nd I. F.
	C-16544-5	Transformer Power 110 v. 50-60 cycles (models 85-86)
	C-16545-4	Transformer Power 110 v. 50-60 cycles (model 850)
	A-1954	Washer Felt (large)
	A-1955	Washer Felt (small)
	17256	Coil and Mounting Assembly (models 85-86)
	17257	Coil and Mounting Assembly (model 850)
	17252	Preselector Coil Assembly (models 85-86-850)
	17298	Dial Glass (models 85-86)
	17301	Dial Glass (model 850)
	17199	Dial Glass Backing (models 85-86)
	17161	Dial Glass Backing (model 850)
	17271	Drive and Indicator Assembly (models 85-86)
	17272	Drive and Indicator Assembly (model 850)
	17375	Escutcheon No. 3 with Indicator Lens (models 85-86)
	17384	Escutcheon No. 4 with Indicator Lens (model 850)
	A-16829	Speaker Socket
	A-17114	Socket Pilot Light R. H. Edgelight (model 850)
	A-17115	Socket Pilot Light L. H. Edgelight (model 850)
	A-17204	Socket Pilot Light R. H. Edgelight (models 85-86)
	A-17205	Socket Pilot Light L. H. Edgelight (models 85-86)
	A-17168	Socket Pilot Light Travelite (models 85-86-850)
	A-16701	Trap Coil Assembly
C37	B-16786	Condenser Trimmer (part of Trap Coil Assembly

ALIGNMENT PROCEDURE

Correct alignment is of extreme importance in all-wave receivers. The receivers are properly aligned at the factory with precision equipment and realignment should not be attempted by the service technician until all other causes of faulty operation are corrected.

In order to properly realign the receiver the following equipment is necessary:

1. A signal generator which will provide an accurately calibrated signal at any frequency from 456 kilocycles to 18 megacycles. The generator should have adjustable signal output.

2. An output audio voltmeter of the low voltage type to be connected across the moving coil of the speaker. This should be capable of providing a readable deflection for relatively low output levels to avoid the effects of overload.

3. An insulated or non-metallic screw driver for the adjustment of trimmers.

I F ALIGNMENT 456 KC

1. Connect the output meter (low scale) across the loud speaker voice coil. Turn the wave band switch to broadcast position. Turn the volume control to its maximum position.

2. Connect the test oscillator ground to chassis and the "hot" lead from the test oscillator to the grid of the 6L7 converter tube through a series .1 Mfd. condenser. Set test oscillator to 456 KC.

Models 85 and 86 have a two point selectivity or high fidelity control associated with the tone control. This adjustment should be set for highest selectivity during alignment. Highest selectivity is obtained when the switch at the end of the tone control action is in its left or counterclockwise position.

Model 850 has this same control as a separate adjustment (second knob from the left). This adjustment should also be in its left hand or counterclockwise position during alignment.

3. Adjust I F alignment screws of second I F transformer adjacent to 6F6 power tube to maximum output, reducing output of test oscillator to keep the meter reading on scale as alignment proceeds.

4. Adjust alignment of first I F transformer, (directly behind tuning condenser) to maximum output as described above.

5. Readjust these trimmers for accurate alignment. Always use the lowest possible output from the test oscillator to preclude the possibility of automatic volume control action confusing proper adjustment.

6. Connect "hot" lead of test oscillator to receiver antenna lead in series with 200 Mmfd. condenser, and tune receiver to 550 kilocycles.

7. Adjust C-37 for minimum receiver output.

NOTE: Since coils are used in series it is absolutely necessary to align the high frequency bands first, in the order indicated.

FOREIGN BAND 5.7 TO 18.5 MEGACYCLES

1. With test oscillator connected to the antenna and ground terminals through a 400 ohm resistor set oscillator at 16 megacycles.

2. Set the dial scale to 16 megacycles and adjust the oscillator trimmer condenser (C 4) to a resonance using the counterclockwise or low capacity point.

3. Adjust input circuit trimmer (C 5) to maximum response, rocking the gang condenser back and forth a degree or two to obtain proper maximum.

POLICE OR MIDDLE BAND 1.75 TO 5.8 MEGACYCLES

1. With the test oscillator connected as above set the oscillator and dial to 5.5 megacycles.

2. Adjust oscillator trimmer condenser (C 6) for maximum response using the counterclockwise or low capacity point.

3. Adjust input circuit trimmer (C 7) to maximum response rocking the gang condenser as described above.

BROADCAST BAND 535 TO 1800 KC

1. With test oscillator connected to antenna and ground through a 200 Mfd. condenser set oscillator and receiver dial to 1600 kilocycles.

2. Adjust broadcast oscillator trimmer (C 8) to obtain maximum response.

3. Adjust antenna circuit trimmer (C 9) for maximum output.

4. Adjust preselector trimmer (C 10) for maximum output.

5. Set test oscillator and dial to 600 kilocycles and tune in the signal, then adjust broadcast band padding condenser (C 11) for maximum output. This padder is mounted on the aluminum coil deck near the panel and is adjusted through a hole provided in the back of the chassis pan. Rock the condenser back and forth a degree or two in order to obtain proper maximum.

6. Repeat the 1600 KC adjustments described above for greater accuracy.

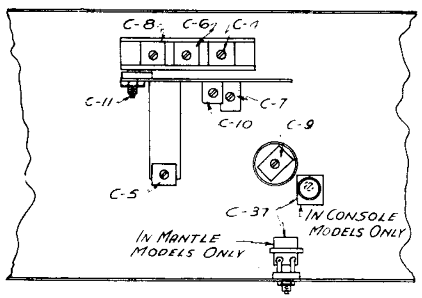
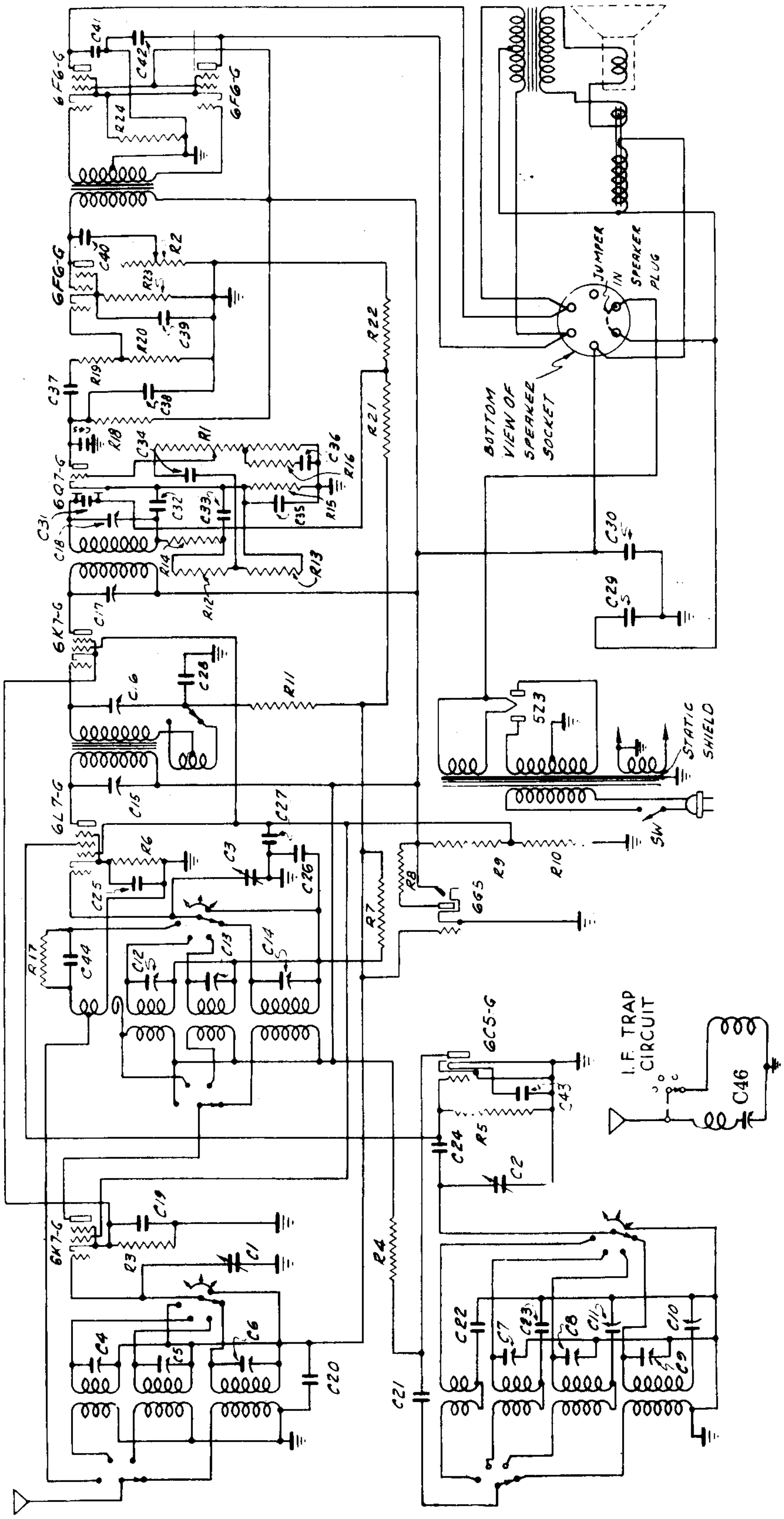


Fig. 2 Location of Trimmers

MAJESTIC RADIO & TELEVISION COMPANY

MODEL 1050



I.F. 456 K.C.

VOLTAGE CHART

Position	Tube	Ef	Ek	Eg Screen	Eg Suppressor	Ip Triode	Ep Pentode
R. F. Amplifier	6 K7G	6.3	4	90.0	Connected to Cathode		235
Converter	6 L7G	6.3	4	90.0	Connected to Cathode		235
Oscillator	6 C5G	6.3				110	
I. F. Amplifier	6 K7G	6.3	4	90.0	Connected to Cathode		235
Detector A.V.C.	6 Q7G	6.3	1.1			105	
Driver	6 F6G	6.3	16.5	connected to plate	Connected to Cathode in tube	212	
Power Output	6 F6G	6.3	18.5	235	Connected to Cathode in tube		335
Power Output	6 F6G	6.3	18.5	235	Connected to Cathode in tube		335
Rectifier	5 Z3	5.0	340				

MAJESTIC RADIO & TELEVISION COMPANY

MODEL 1050

ALIGNMENT PROCEDURE

Correct alignment is of extreme importance in all-wave receivers. The receivers are properly aligned at the factory with precision equipment and realignment should not be attempted by the service technician until all other causes of faulty operation are corrected.

In order to properly realign the receiver the following equipment is necessary:

1. A signal generator which will provide an accurately calibrated signal at any frequency from 456 kilocycles to 18 megacycles. The generator should have adjustable signal output.
2. An output audio voltmeter of the low voltage type to be connected across the moving coil of the speaker. This should be capable of providing a readable deflection for relatively low output levels to avoid the effects of overload.
3. An insulated or non-metallic screw driver for the adjustment of trimmers.

I F ALIGNMENT 456 KC

1. Connect the output meter (low scale) across the loud speaker voice coil. Turn the wave band switch to broadcast position. Turn the volume control to its maximum position.
2. Connect the test oscillator ground to chassis and the "hot" lead from the test oscillator to the grid of the 6L7 converter tube through a series .1 Mfd. condenser. Set test oscillator to 456 KC.
3. Turn selectivity control (second from the left) to its high selectivity position. This is the left hand or counter-clockwise position.
4. Adjust I. F. alignment screws C17 and C18 of the output transformer to maximum output reducing output of test oscillator to keep meter reading on scale as alignment proceeds.
5. Adjust alignment screws. C15 and C16. of input transformer to maximum output as described above.
6. Readjust all four alignment screws to insure accurate alignment. Always use the lowest possible output from the test oscillator to preclude the possibility of automatic volume control action confusing proper adjustment.
7. Connect "hot" lead of test oscillator to receiver antenna lead in series with 250 Mmfd. condenser and tune receiver to 550 kilocycles.
8. Adjust C-46 for minimum receiver output.

R. F. ALIGNMENT BROADCAST BAND

1. With test oscillator connected to the antenna post through .00025 Mfd., set signal generator to 1600 KC.
2. Set travelite indicator to end of scale (beyond 550 KC calibration) with gang condenser fully meshed at maximum capacitance.
3. Set dial to 1600 KC. Adjust broadcast oscillator trimming condenser. C9, for maximum output meter reading.
4. Adjust detector input trimmer. C14 to a maximum.
5. Adjust antenna stage trimmer, C6, to a maximum.
6. Set test oscillator to 600 KC and tune in the signal, then adjust broadcast oscillator padder, C10, for maximum output. Rock the main tuning adjustment back and forth a degree or two in order to obtain proper maximum.
7. Repeat adjustments described under 3, 4, and 5 for greater accuracy.

POLICE OR SECOND BAND

1. Turn the wave switch to second or police band. Leave oscillator connected as above but with the output set to 5000 KC and the .00025 Mfd. condenser replaced by a 400 ohm resistor. Set dial scale to 5 MC on the second band. Adjust oscillator trimming condenser C8 for maximum output, observing as before that the proper point occurs at the minimum or counter-clockwise position of the screw as two points are found.
2. Adjust detector input trimming condenser. C13. to maximum, while rocking the tuning condenser slightly for maximum response.
3. Adjust antenna stage trimmer, C5, for maximum output.
4. Set test oscillator to 2000 KC and tune in the signal. Adjust oscillator padding condenser, C11, for maximum output, while rocking the tuning condenser as described above.
5. Repeat operations 1, 2 and 3 to assure precise alignment.

FOREIGN OR THIRD BAND

1. With the test oscillator connected the same as above and set to 16000 KC (16MC) set the dial to 16MC on the third band.
2. Adjust oscillator trimming condenser, C7, for maximum response. Use lower capacity or counter-clockwise response point.
3. Adjust detector input trimmer, C12, to maximum, rocking tuning adjustment.
4. Adjust antenna trimmer, C4, for maximum response.

ULTRA HIGH FREQUENCY OR INSIDE BAND

This band was adjusted at the factory and will not require further adjustment.

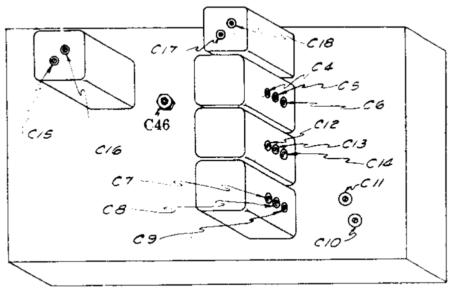


Fig. 2 Location of Trimmers

REPLACEMENT PARTS MODEL 1050

Schematic Location	Part No.	Description
	15089	Bulb Pilot Light (edgelight)
	16589	Bulb Pilot Light Frosted (travelite)
C1 C2 C3	C-16543-2	Condenser Variable Gang
C4 C5 C6	A-16552	Condenser Trimmer 3-30 Mmfd. triple strip
C7 C8 C9	A-16552	Condenser Trimmer 3-30 Mmfd. triple strip
C12 C13 C14	A-16552	Condenser Trimmer 3-30 Mmfd. triple strip
C15 C16	B-16559-5	Condenser Trimmer 1st I. F. (part of I. F. assembly)
C17 C18	B-16560-5	Condenser Trimmer 2nd I. F. (part of I. F. assembly)
C10 C11	B-16550	Condenser Dual Padding
C29	B-16554-2	Condenser Wet Electrolytic 30 Mfd. 450 volts
C30	B-15427	Condenser Wet Electrolytic 16 Mfd. 350 volts
C35 C39	B-16551-3	Condenser Dry Electrolytic Dual 12-12 Mfd. 18-25 V.
C22 C44	15934	Condenser Mica 650 Mmfd. 20%
C23	15936	Condenser Mica 3000 Mmfd. 5%
C24 C31	15929	Condenser Mica 50 Mmfd. 20%
C32 C33 C43 C45	15918	Condenser Mica 100 Mmfd. 20%
C19	15770	Condenser Tubular .2 Mfd. 200 volts
C20	15761	Condenser Tubular .1 Mfd. 200 volts
C21 C41 C42	15753	Condenser Tubular .002 Mfd. 600 volts
C25 C26 C28	15752	Condenser Tubular .05 Mfd. 200 volts
C27	15757	Condenser Tubular .1 Mfd. 400 volts
C34	15763	Condenser Tubular .01 Mfd. 200 volts
C40	15756	Condenser Tubular .05 Mfd. 400 volts
R2	B-16540-2	Control Tone 150,000 ohms
R1	B-16553-3	Control Volume with Switch 2 megohms
	A-16541-2	Control High Fidelity
	16672	Antenna coil and shield
	16673	Detector coil and shield
	16674	Oscillator coil and shield
	A-16596	Knob (tune and high fidelity)
	A-16598	Knob (volume and tone)
	A-16597	Knob (band switch)
R9 R10	A-16615	Resistor Candohm wire wound 6500 ohms and 5300 ohms
R3	15609	Resistor Carbon 300 +—10% ¼ watt
R4	15513	Resistor Carbon 20,000 +—20% ½ watt
R5	15552	Resistor Carbon 30,000 +—20% ¼ watt
R6	15610	Resistor Carbon 900 +—10% ¼ watt
R7 R11	15515	Resistor Carbon 100,000 +—20% ¼ watt
R8 R21 R22	15517	Resistor Carbon 1 meg. +—20% ¼ watt
R12 R13	15512	Resistor Carbon 250,000 +—20% ¼ watt
R14	15510	Resistor Carbon 20,000 ohms +—20% ¼ watt
R15	15611	Resistor Carbon 3,000 ohms +—10% ¼ watt
R16	15511	Resistor Carbon 50,000 ohms +—20% ¼ watt
R18	15523	Resistor Carbon 200,000 ohms +—20% ¼ watt
R19	15549	Resistor Carbon 300,000 ohms +—20% ¼ watt
R17 R20	15520	Resistor Carbon 500,000 ohms +—20% ¼ watt
R23	15563	Resistor Carbon 500 ohms +—10% ½ watt
R24	15562	Resistor Carbon 324 ohms +—10% 2 watt
	A-16828	Socket Speaker
	B-16637-2	Socket 6G5 with leads
	C-16582-2	Speaker 12"
	B-16559-5	Transformer 1st I. F.
	B-16560-5	Transformer 2nd I. F.
	C-16573-5	Transformer Power
	B-16555-2	Transformer Audio Driver
	A-1954	Washer Felt (large)
	A-1955	Washer Felt (small)
	17275	Drive and Indicator Assembly
	17302	Dial Glass
	17161	Dial Glass Backing
	17384	Escutcheon No. 4 with Indicator Lens
	A-17114	Socket Pilot Light, Edgelight R. H.
	A-17115	Socket Pilot Light, Edgelight L. H.
	A-17168	Socket Pilot Light, Travelite
	A-16701	Trap Coil Assembly
C46	B-16786	Condenser Trimmer (part of Trap Coil Assembly)

MIDWEST RADIO CORP.

MODEL 7-37 A.C.-D.C.

CONDENSERS

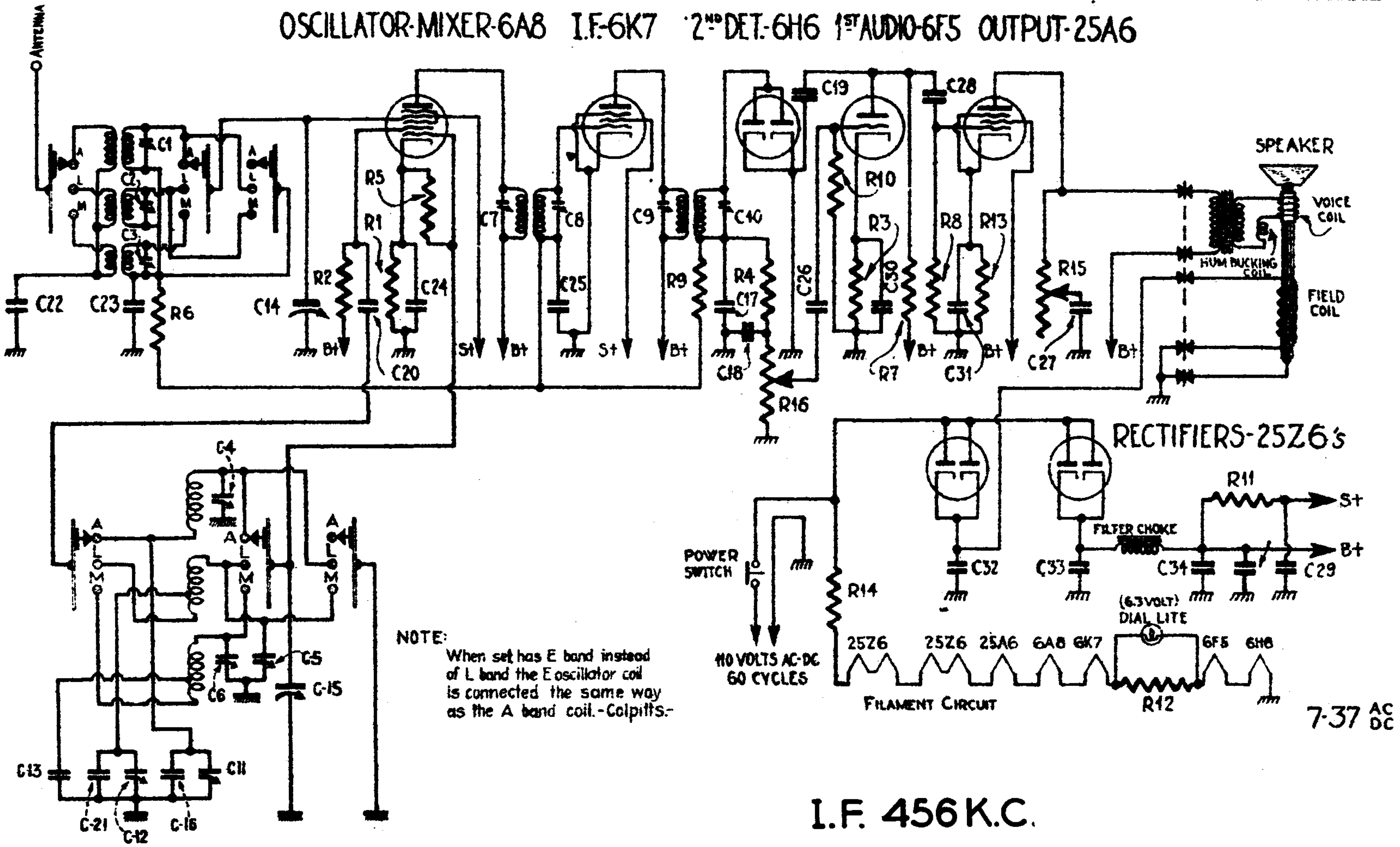
C1	35 MMFD. TRIMMERS
C2	" "
C3	" "
C4	" "
C5	" "
C6	" "
C7	I.F. "
C8	" "
C9	" "
C10	" "
C11	350 MMFD. PADDER
C12	" "
C13	3000 MMFD. PADDER
C14	450 MMFD. TUNING CONDENSER
C15	" " "
C16	100 MMFD. MICA
C17	250 MMFD. MICA } DUAL
C18	" " } DUAL
C19	250 MMFD. MICA
C20	2000 MMFD. "
C21	1250 MMFD. "
C22	.01 MFD. 200 VOLT
C23	.05 MFD. 200 VOLT
C24	" "
C25	.05 MFD. 200 VOLT
C26	" "
C27	" "
C28	" 400 VOLT
C29	.25 MFD. 200 VOLT
C35	" "

ELECTROLYTIC CONDENSERS

C30	10. MFD. 25 VOLT-DRY
C31	12. MFD. " "
C32	20. MFD. 175 VOLT-WET
C33	" " "
C34	" " "

RESISTORS

R1	100 OHMS .25 WATT
R2	2000 OHMS "
R3	" "
R4	25,000 OHMS "
R5	200,000 OHMS "
R6	500,000 OHMS "
R7	" "
R8	" "
R9	1 MEGOHM "
R10	3 MEGOHM "
R11	15000 OHMS 1. WATT
R12	21 OHMS 1. WATT
R13	500 OHMS 1. WATT
R14	28 OHMS 2 WATT
R15	500,000 OHM TONE CONTROL
R16	500,000 OHM VOLUME "



I.F. 456 K.C.

MIDWEST RADIO CORP.

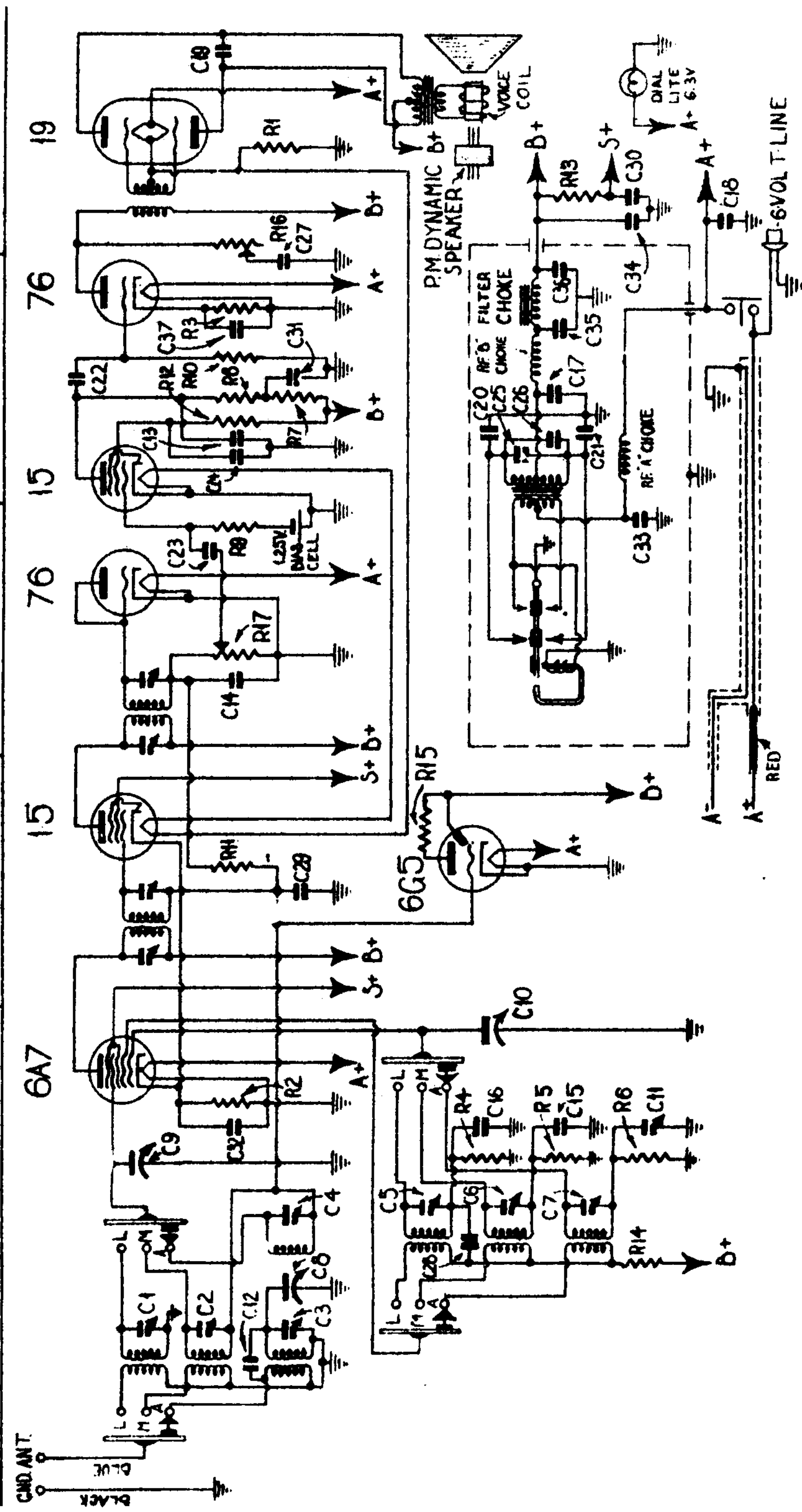
MODEL 7-37 BATTERY SET

CONDENSERS

C1	45MMF TRIMMER	
C2	"	
C3	"	
C4	"	
C5	"	
C6	"	
C7	"	
C8	TUNING COND.	
C9	"	
C10	"	
C11	600MMF. PADDER	
C12	6MMF.	
C13	.00025 MFD. MICA	
C14	"	
C15	.0021 MFD MICA.	
C16	.0027 MFD "	
C17	.004 MFD "	
C18	.004 MFD "	
C19	.004 MFD	600 V.
C20	.005 MFD	400 V.
C21	.005 MFD -	400V.
C22	.01 MFD	"
C23	"	"
C24	"	"
C25	.01 MFD	1200V.
C26	"	"
C27	.03 MFD.	400V.
C28	.1 MFD.	200V.
C29	"	"
C30	"	"
C31	.1 MFD.	200V.
C32	.2 MFD	"
C33	.5 MFD	"
C34	"	"
C35	8 MFD	DRY ELECT.
C36	"	"
C37	10 MFD	"

RESISTORS

R1	100 OHM 1/3 WATT
R2	200 OHM "
R3	2,500-OHM "
R4	15,000-OHM "
R5	25,000-OHM "
R6	50,000-OHM "
R7	100,000-OHM "
R8	250,000-OHM "
R9	500,000 OHM "
R10	"
R11	1 MEGOHM 1/3 WATT
R12	2 MEGOHM "
R13	15,000-OHM .5 WATT
R14	20,000-OHM "
R15	1 MEGOHM 1. WATT
R16	50,000-OHM-TONE CONT.
R17	.5 MEGOHM-VOL. CONT.



I.F. 465 K.C.

MIDWEST RADIO CORP.

MODEL 10-34

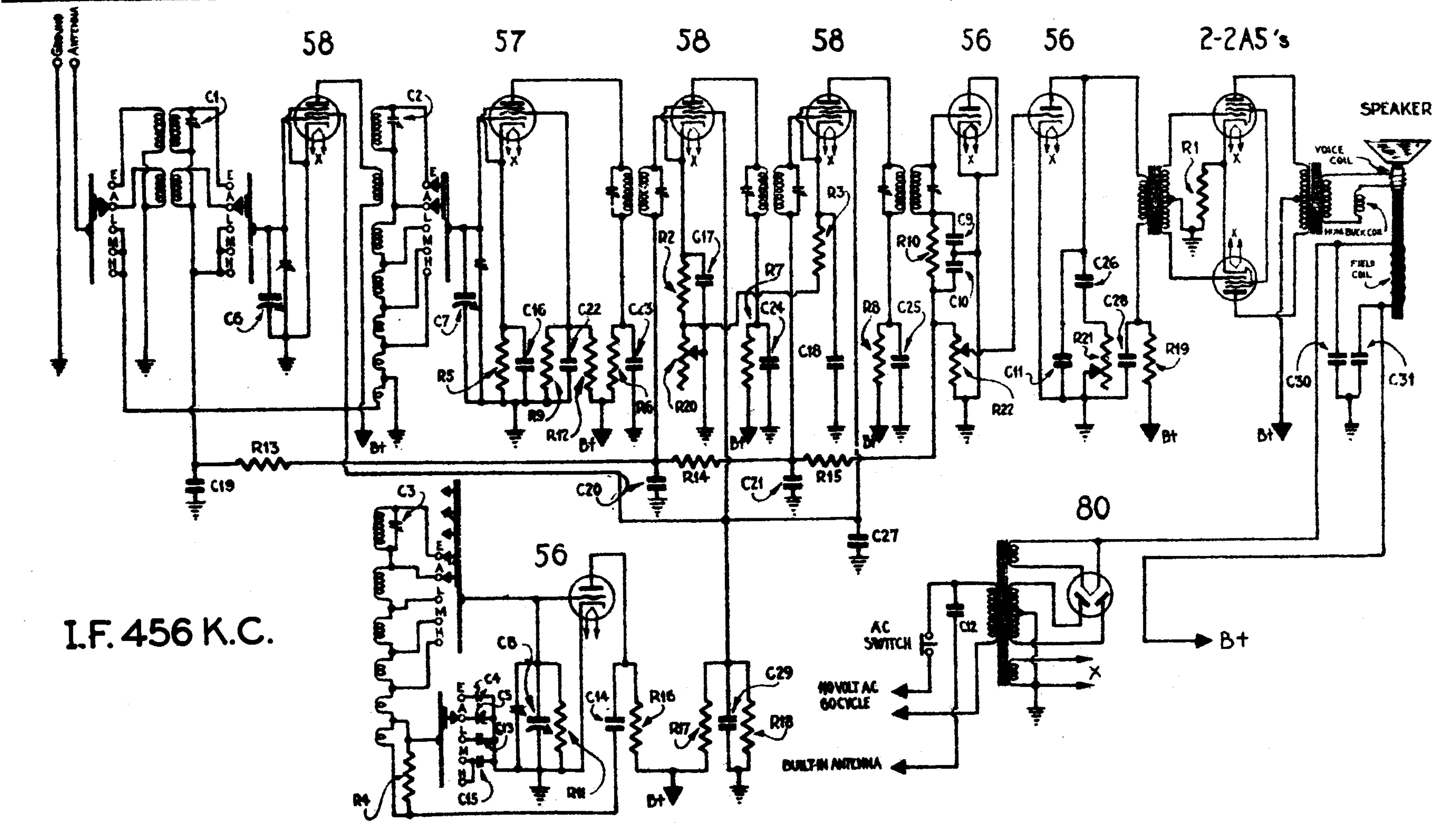
CONDENSERS

C1	35 MMFD. TRIMMER	C13	1500 MMFD. MICA	C25	.05 MFD. 400 VOLT	C28	1. MFD. 300 VOLT DRY
C2	" "	C14	2000 MMFD. "	C26	" "	C29	2. MFD. 300 VOLT DRY
C3	" "	C15	3000 MMFD. "	C27	.25 MFD. 400 VOLT	C30	8. MFD. 450 VOLT WET
C4	70 MMFD. PADDER	C16	.05 MFD. 200 VOLT			C31	" " "
C5	350 MMFD. "	C17	" "				
C6	365 MMFD. TUNING CONDENSER	C18	" "				
C7	" " "	C19	" "				
C8	" " "	C20	" "				
C9	250 MMFD. MICA } DUAL	C21	" "				
C10	" "	C22	.05 MFD. 400 VOLT				
C11	" "	C23	" "				
C12	" "	C24	" "				

ELECTROLYTIC-CONDENSERS

RESISTORS

R1	210 OHM 2 WATT FLEX.	R13	500,000 OHM .25 WATT
R2	500 OHM .25 WATT	R14	" "
R3	" "	R15	" "
R4	1500 OHM "	R16	10,000 OHM .5 WATT
R5	5000 OHM "	R17	25,000 OHM "
R6	" "	R18	" "
R7	" "	R19	" "
R8	" "	R20	1,000 OHM VARIABLE
R9	10,000 OHM "	R21	50,000 OHM TONE CONTROL
R10	25,000 OHM "	R22	500,000 OHM VOLUME CONTROL
R11	200,000 OHM "		
R12	" "		

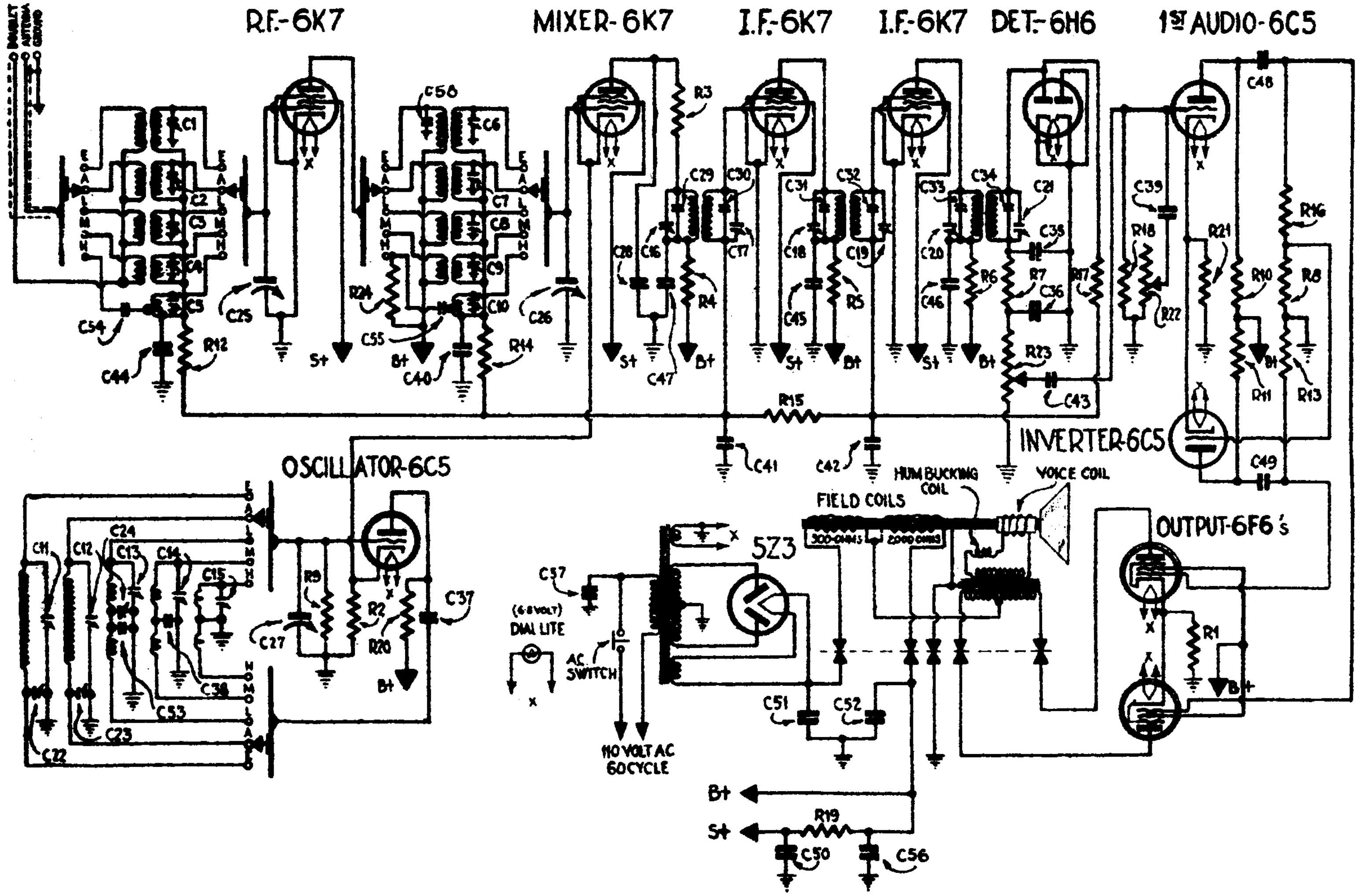


I.F. 456 K.C.

MIDWEST RADIO CORP.

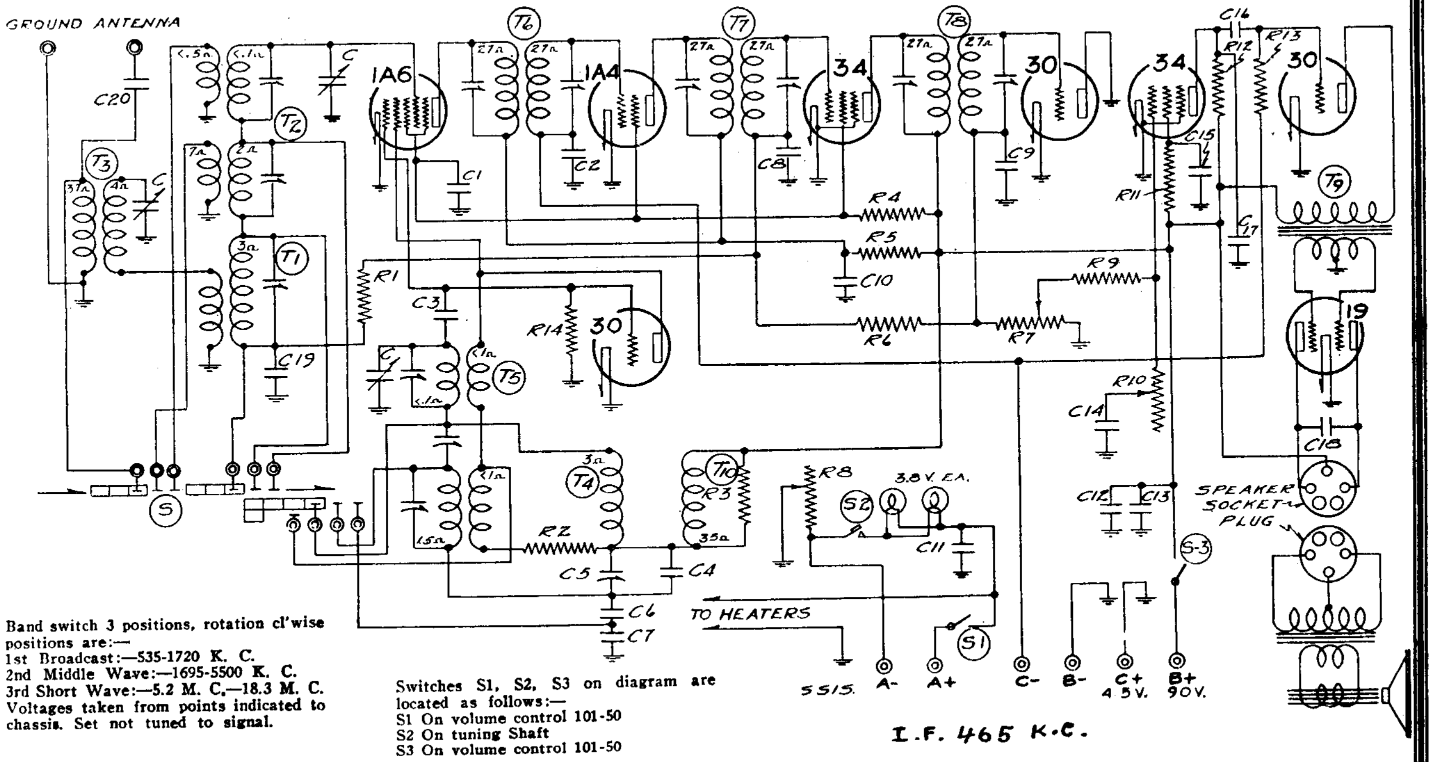
MODEL 11-37 A.C.

CONDENSERS										RESISTORS			
C1	35 MMFD. TRIMMERS	C13	35 MMFD. TRIMMERS	C25	365 MMFD. TUNING COND.	C37	2000 MMFD. MICA	C49	.05 MFD. 400 VOLT	R1	350 OHMS 2 WATT FLEX.	R13	500,000 OHMS .25 WATT
C2	" "	C14	" "	C26	" " " "	C38	3000 MMFD. "	C50	.25 MFD. "	R2	500 OHMS .25 WATT	R14	" "
C3	" "	C15	" "	C27	" " " "	C39	.01 MFD. 200 VOLT	C51	24 MFD. 500 VOLT WET ELEC	R3	5,000 OHMS "	R15	" "
C4	" "	C16	I.F. "	C28	10 MMFD. MICA	C40	.05 MFD. "	C52	40 MFD. 350 VOLT " "	R4	" "	R16	" "
C5	" "	C17	" "	C29	75 MMFD. "	C41	" "	C53	750 MMFD. MICA	R5	" "	R17	1 MEGOHM
C6	" "	C18	" "	C30	" "	C42	" "	C54	100 MMFD. "	R6	" "	R18	3 MEGOHM
C7	" "	C19	" "	C31	" "	C43	" "	C55	" "	R7	25,000 OHMS "	R19	50,000 OHMS .5 WATT
C8	" "	C20	" "	C32	" "	C44	" "	C56	.25 MFD. 400 VOLT	R8	40,0000 HMS "	R20	15,000 OHMS 2 WATT
C9	" "	C21	" "	C33	" "	C45	" 400 VOLT	C57	.05 MFD "	R9	100,0000 HMS "	R21	2,500 OHMS "
C10	" "	C22	70 MMFD. PADDER	C34	" "	C46	" "	C58	500 MMFD. MICA	R10	" "	R22	500,000 OHMS TONE CONT.
C11	" "	C23	350 MMFD. "	C35	250 MMFD. MICA } DUAL	C47	" "			R11	" "	R23	500,000 OHMS VOL. CONT.
C12	" "	C24	" "	C36	250 MMFD. MICA } DUAL	C48	" "			R12	500,000 OHMS "	R24	25,000 OHMS .5 WATT



MONTGOMERY WARD & CO.

MODELS 62-251-62-253-62-255-62-328-62-338-62-428



Band switch 3 positions, rotation cl'wise positions are:—
1st Broadcast:—535-1720 K. C.
2nd Middle Wave:—1695-5500 K. C.
3rd Short Wave:—5.2 M. C.—18.3 M. C.
Voltages taken from points indicated to chassis. Set not tuned to signal.

Switches S1, S2, S3 on diagram are located as follows:—
S1 On volume control 101-50
S2 On tuning Shaft
S3 On volume control 101-50

(Serial No. 6E 247201 and up)

Factory Replacement Parts

Part No.	Schematic Reference	Description
		CONDENSERS
BE 100-5B	C11	1.0 x 120 Volt Tubular with Bracket
BE 100-6	C1	.25 x 200 Volt Tubular less Bracket
BE 100-6B	C13	.25 x 200 Volt Tubular with Bracket
BE 100-11	C14, C16, C20	.01 x 400 Volt Tubular
BE 100-20	C10	.1 x 200 Volt Tubular
BE 100-22	C2, C8, C15, C19	.05 x 200 Volt Tubular
BE 100-25	C18	.002 x 600 Volt Tubular
BE 103-11	C12	8 Mfd. x 200 Volt Electrolytic
BE 129-5	C17	.0001 Mica—Type MT—20%
BE 129-12	C9	.00025 Mica—Type MT—20%
BE 129-50	C3	.00004 Mica—Type MT—30%
BE 129-54	C7	.003 Mica—Type MW—2½%
BE 129-55	C6	.0034 Mica—Type MW—2½%
BE 129-65	C4	.00055 Mica—Type MT—5%
		RESISTORS
BE 130-11	R12	250M Ohm—⅓ Watt—20%—50 Volt Carbon
BE 130-12	R3, R9, R14	50M Ohm—⅓ Watt—20%—20 Volt Carbon
BE 130-19	R6, R11, R13	1 Meg Ohm—⅓ Watt—20%—100 Volt Cabron
BE 130-20	R1	100M Ohm—⅓ Watt—20%—50 Volt Carbon
BE 130-27	R2	50 Ohm—⅓ Watt—20%—3 Volt Carbon
BE 130-31	R5	1500 Ohm—⅓ Watt—20%—10 Volt Carbon
BE 130-109	R4	7500 Ohm—⅓ Watt—20%—50 Volt Carbon
		COILS
BE 108-77	T6	Input I.F. complete with Can
BE 108-78	T7	Interstage I.F. complete with Can
BE 108-79	T8	Output I.F. complete with Can
BE 110-38	T4	Broadcast Oscillator Coil Complete
BE 110-39	T5	Mid-Wave & Short Wave Oscillator Coil Comp.
BE 111-49	T1	Broadcast Antenna Coil Assembly Complete
BE 111-50	T2	Mid.-Wave & Short Wave Antenna Coil Assem. Comp.
BE 111-51	T3	Broadcast Preselector Coil
BE 123-3	T10	R.F. Choke Coil
		SOCKETS
BE 121-6		Six Prong Socket—Marked "1A6"
BE 121-6		Six Prong Socket—Marked "19"
BE 121-8		Five Prong Socket—Marked "Spkr"
BE 121-9		Four Prong Socket—Marked "34"
BE 121-9		Four Prong Socket—Marked "30"
BE 121-9		Four Prong Socket—Marked "1A4"
		SPEAKERS
BE 114-38		Six Inch Permanent Magnet Dynamic (Mantle)
BE 114-39		Eight Inch Permanent Magnet Dynamic (Console)
		MISCELLANEOUS
BE 101-50	R7	Volume Control and Switch (250 M ohm)
BE 101-51	R10	Tone Control (300 M ohm)
BE 101-52	R8	Filament Rheostat (2 ohm)
BE 102-28	C	Three Gang Variable Condenser
BE 105-28	T9	Audio Input Transformer
BE 113-34		Ant.-Gnd. Strip
BE 115-35		Antenna,-Oscillator, Shield
BE 115-46		Shield Cap for Part 115-49
BE 115-49		Tube Shield for Types 1A4—1A6 Tub-
BE 115-55		Tube Shield for Type 34 Tube
BE 124-28	C5	J-3 Series Pad
BE 125-17	S	Band Switch

DIAL PARTS ONLY

ASSEMBLIES

BE 117-41A	Drive Bracket & Pilot Light Switch Assembly, including: 1—No. 117-19—Tuning Shaft Bushing 2—No. 127-30—Contact Insulating Washers 2—No. 127-5 —Fibre Bushings 2—No. 162-2 —Rivets 2—No. 131-57—Lugs
BE 117-65	Switch Disc & Link Assembly, including: 1—No. 117-12—Switch Arm 1—No. 117-35—Bushing with screw 1—No. 117-40B—Switch Link 3—No. 131-26—Spring Washers 3—No. 162-5 —Rivets 1—No. 112-144—Switch Disc—Inc. Red Tape
BE 107-31	3.8 Volt—G-3½ Pilot Light
BE 107-36	Pilot Light Socket
BE 112-125	Drive Belt
BE 112-143	Oval Escutcheon complete with Celluloid Crystal
BE 112-148A	Dial Scale complete with Fasteners, Band Spread Pointer Disc and Screw
BE 112-151	Pointer complete with Screw
BE 112-162	Tuning Shaft
BE 117-20A	Tuning Shaft Pulley
BE 117-38	Stud, for Take Up Spring
BE 117-39	Pulley, for Take Up Spring
BE 120-14	Take Up Spring
BE 127-29	Extruded Washer, for Tuning Shaft
BE 127-28	Insulating Washer, for Tuning Shaft
BE 131-55	Spring Washer, for Tuning Shaft
BE 131-56	Steel Washer, for Tuning Shaft
BE 134-9	Horse Shoe Washer, for Take Up Spring
BE 134-40	Rubber Grommet

BE 128-44	"Volume" Knob with Spring—Wood
BE 128-45	"Tone" Knob with Spring—Wood
BE 128-46	"Band Switch" Knob with Spring—Wood
BE 128-47S	"Tuning" Knob with Set Screw—Wood
BE 131-12	Bakelite Knob with Arrow

Note: Speakers cannot be ordered, defective speakers must be repaired.

All resistors and mica condensers are RMA color coded—specify value and/or resistor or condenser (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None

When ordering condensers, specify part number, tolerance and/or schematic reference number.

When ordering parts, always specify part and model number as well as serial number of chassis.

MONTGOMERY WARD & CO.

MODELS 62-251-62-253-62-255-62-328-62-338-62-428

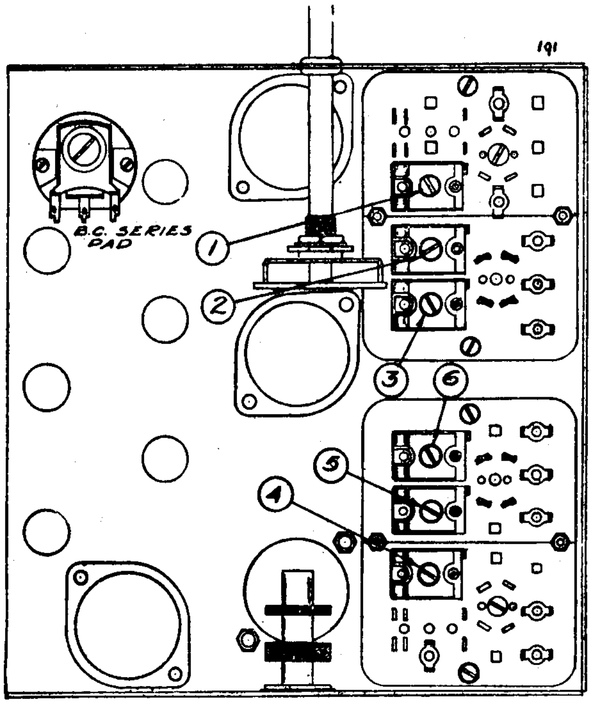


FIG. 3 — BOTTOM VIEW SHOWING TRIMMERS

All adjustments should be made with a non-metallic screw driver.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the two plate terminals of the type 19 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected **in series with the external oscillator.**

Dummy 2: **(Broadcast)**—Consists of a 200 mmfd. condenser **and a 20 ohm resistor connected in series with each other and in series with the external oscillator.**

Dummy 3: **(Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.**

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-79 Output I.F. Transformer
Part No. 108-78 Interstage I.F. Transformer
Part No. 108-77 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, **(extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:**
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 34 tube, and adjust the output I.F. transformer (No. 108-79) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 34 to grid cap to 1A4 and adjust interstage I.F. transformer (No. 108-78) to resonance.
   (c) Move oscillator to grid cap of 1A6 and adjust input I.F. transformer (No. 108-77).

BROADCAST BAND ALIGNMENT:

535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground posts, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 1; see bottom view of coil assembly, Fig. 3)
   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment).
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

SHORT WAVE BAND ALIGNMENT:

5.2 to 18.3 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the antenna and ground posts, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 3) and short wave antenna (adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.3 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental on the receiver dial. As an example of this a fundamental 18.3 megacycle signal can be tuned in not only at 18.3 on the dial but also at approximately 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:

1695 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the antenna and ground posts make the following adjustments:
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (adjustment number 2) and middle wave antenna (adjustment number 5) to resonance.
   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 5400 kilocycles and 1700 kilocycles for band coverage.

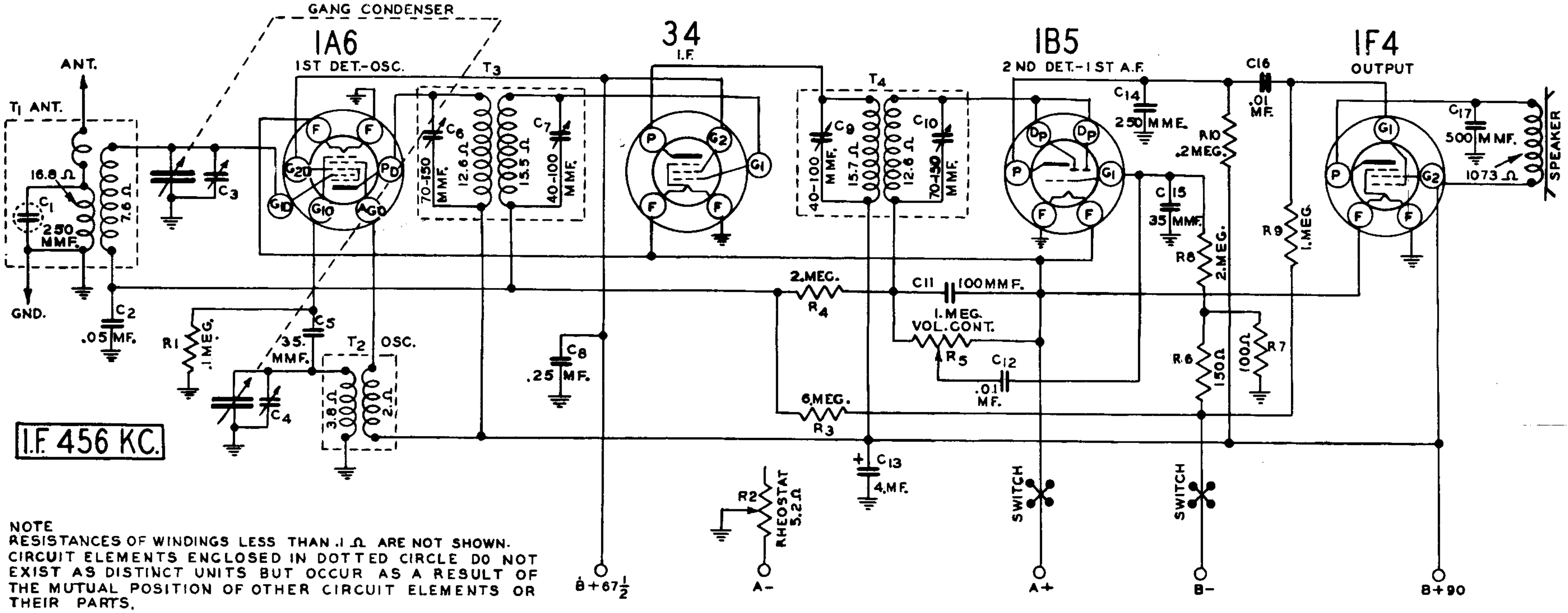
MONTGOMERY WARD & CO.

MODEL 62-254

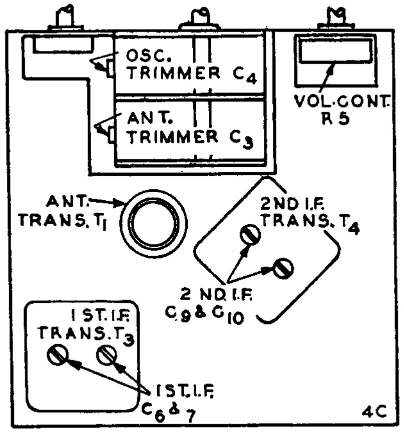
TUBE ELEMENT LEGEND

F - FILAMENT
P - PLATE
P_D - PLATE DETECTOR
D_P - DIODE PLATE
G_1 - CONTROL GRID
G_{1O} - CONTROL GRID OSCILLATOR
G_{1D} - CONTROL GRID DETECTOR
G_2 - SCREEN GRID
G_{2D} - SCREEN GRID DETECTOR
A_{GO} - ANODE GRID OSCILLATOR

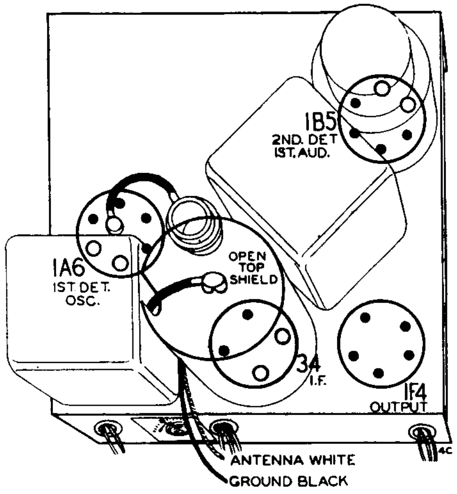
BOTTOM SOCKET CONNECTIONS SHOWN.



NOTE
RESISTANCES OF WINDINGS LESS THAN .1 Ω ARE NOT SHOWN.
CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLE DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.



Location of Trimmers



Tube Arrangement

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground — "A" Battery — 2 Volts

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Grid to Ground
1A6	1st Det.-Osc.	2.0	87 87(1)	64.5	
34	I.F.	2.0	87	64.5	
1B5	2nd Det.-1st Audio	2.0	42(2)		1.2(3)
1F4	Power	2.0	82	87	3.0(4)

(1) Anode Grid (AGo) to ground
(2) As read on 250 volt scale (1000 ohm per volt meter)
(3) As read across R7
(4) As read across R6 and R7

MONTGOMERY WARD & CO.

MODEL 62-258 AUTO RADIO

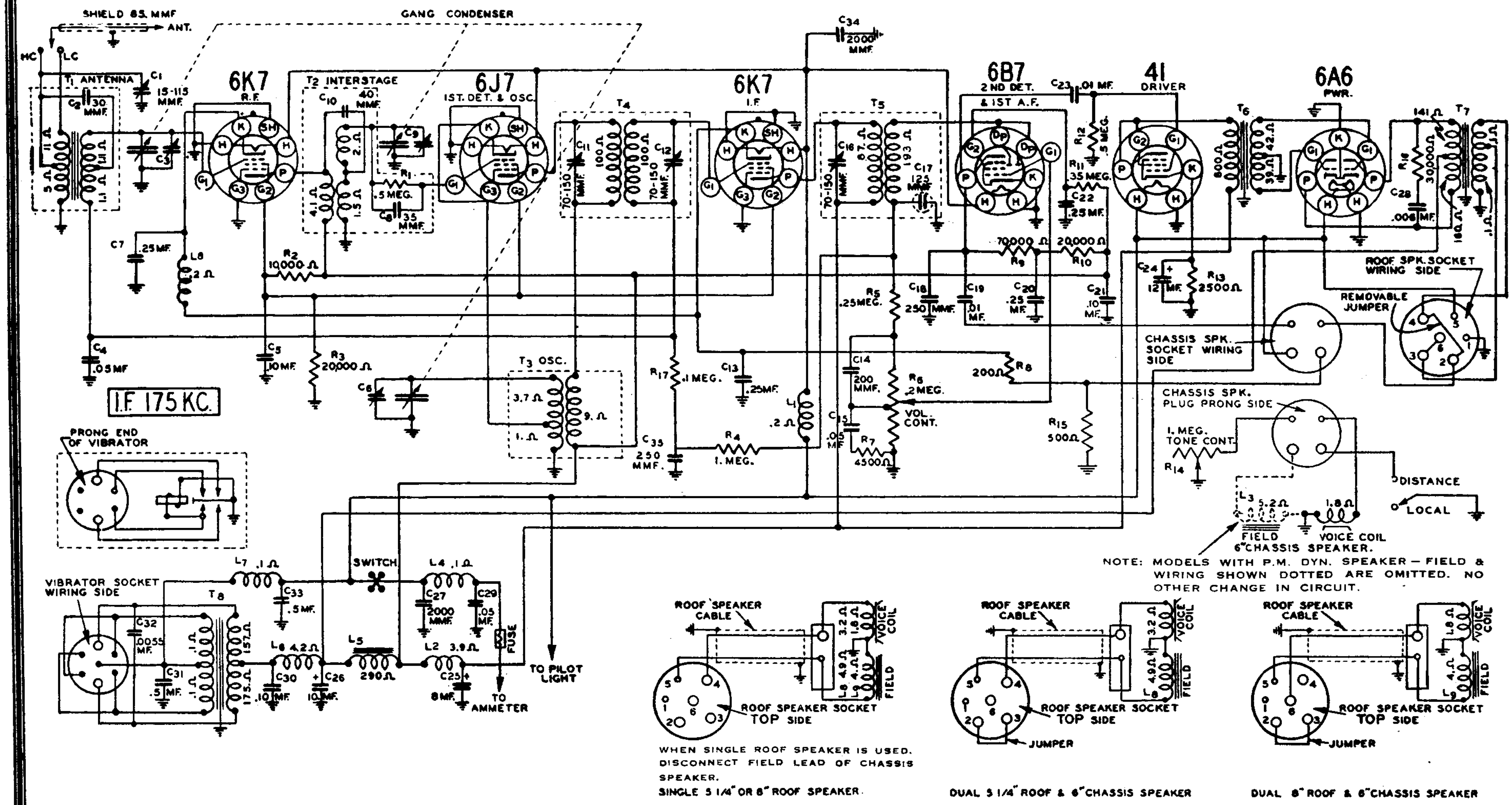
Set the signal generator for 175 KC and connect the output of the signal generator through a .05 mf. condenser to the stator of the 1st detector section of the tuning condenser. Set the volume control at maximum and the L-D switch in the distance position. Attenuate the signal from the signal generator to prevent the levelling off action of the AVC. Then adjust the three IF trimmers until maximum output is obtained—See Fig. 5.

Set the signal generator for 1581 KC. Turn the rotor of the tuning condenser to the full open position. Insert the antenna plug with the mark on the high capacity (HC) side. Connect the shielded antenna lead from the chassis through a 120 mmf. condenser to the antenna post of the signal generator. Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained.

Set the signal generator for 1400 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained. Adjust the 1st detector and antenna 1400 KC trimmers for maximum output. Do not change the setting of the oscillator trimmer.

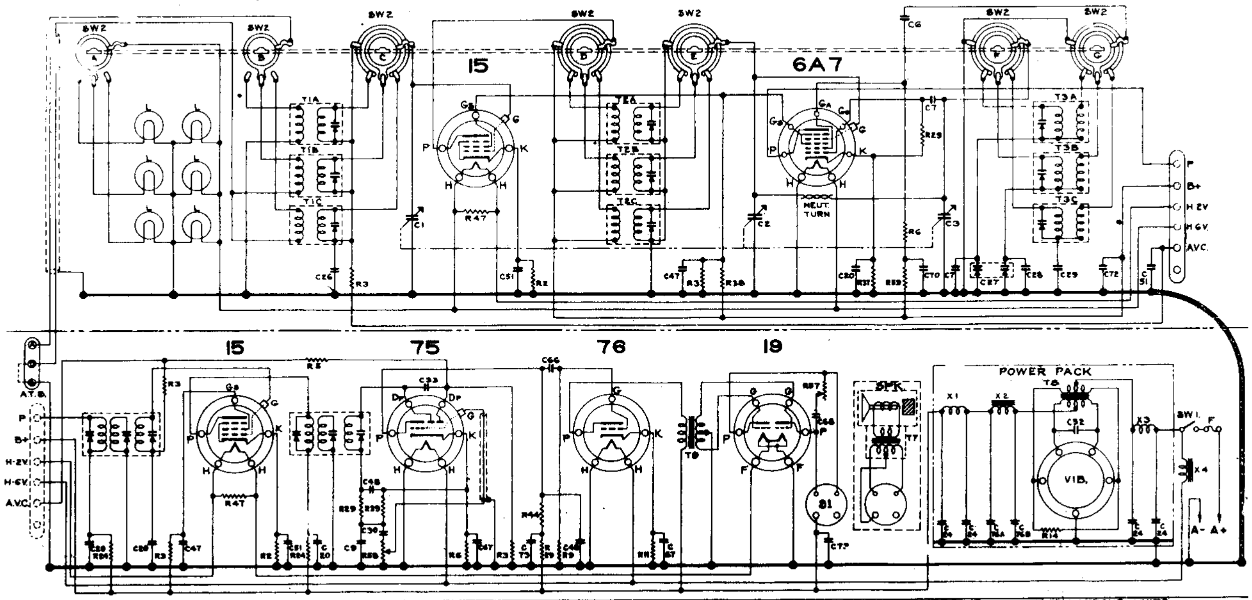
Then set the signal generator for 600 KC. Tune in this signal and adjust the 600 KC antenna trimmer to maximum (See Fig. 3 for location of this trimmer).

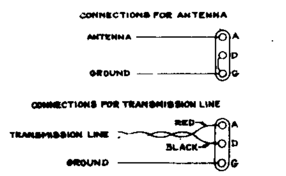
After the alignment procedure is completed, the antenna plug may be withdrawn and reinserted on the LC side if a low capacity (70 mmf.) car antenna is used.



NOBLITT-SPARKS INDUSTRIES, Inc.

ARVIN HOME RADIO MODELS 617B & 627B





RESISTORS R	OHMS	W	PART NO.
2	400	1/4	17-4762
3	100M	1/4	17-2060
5	500M	1/4	17-2070
6	5M	1/4	17-2071
9	1MEG.	1/4	17-2080
11	2500	1/4	17-4202
14	200	1/4	17-4257
24	1000	1/4	17-2065
29	90M	1/4	17-2068
37	300	1/4	17-14033
38	[illegible]	1/2	[illegible]
39	300M	1/4	17-14051
44	150M	1/4	17-4283
47	50	1/4	17-14089
57	166M	T.C.	17-15604
58	500M	V.C.	17-15601
59	15M	1/4	17-4191

CHOKES X	TYPE	PART NO.
1	R.F. CHOKE	80-2201-1
2	"B" FILTER	80-13966
3	R.F."A" CHOKE	80-13969
4	FILAMENT CHOKE	80-13968

CONDENSERS C	CAPACITY	VOLT	PART NO.	C	CAPACITY	VOLT	PART NO.
1	3 GANG VARIABLE		17-15632	66	.25 CAN	400	17-14076
2				67	12 MF. ELECT	25	17-14078
3				68	.1 STRIP TYPE	600	17-14073
6	.002 MICA	1600	17-2063	70	8. ELECT.	250	17-14084
7	.0001 MICA	600	17-2064	73	1. CAN	300	17-14072
9	.001 MICA	600	17-4298	76A	4. ELECT.	250	17-14082
20	.05 STRIP TYPE	200	17-14027	76B	2.		
24	.5	160	17-14060	72	.25	200	17-14078
26	.05 CAN	150	17-14012				
27	PADDER		17-13877				
28	.001 MICA	600	17-14023				
29	.002 MICA	600	17-14022				
30	.02 CAN	150	17-14010				
39	.0005 MICA	600	17-14047				
47	.15 CAN	400	17-4714				
48	.00025	600	17-4207				
51	.05 CAN	160	17-14041				
52	.01 STRIP TYPE	1600	17-14602				

TRANSFORMERS T	TYPE	PART NO.
T	TRANSFORMERS	
1-A	"A" BAND ANT. COIL	80-13875
1-B	"B" BAND ANT. COIL	80-13878
1-C	"C" BAND ANT. COIL	80-13981
2-A	"A" BAND R.F. COIL	80-13876
2-B	"B" BAND R.F. COIL	80-13979
2-C	"C" BAND R.F. COIL	80-13982
3-A	"A" BAND OSC. COIL	80-13877
3-B	"B" BAND OSC. COIL	80-13980
3-C	"C" BAND OSC. COIL	80-13983
5	FIRST I.F. COIL	80-13679
6	SECOND I.F. COIL	80-13680
7	617B OUTPUT TRANSF.	17-15679
7	627B OUTPUT TRANSF.	17-15680
8	POWER TRANSF.	80-13965
9	INPUT TRANSF.	80-13967

MISCELLANEOUS UNITS SYMBOL	DESCRIPTION	PART NO.
SPK.	617-B DYNAMIC SPEAKER ASSEMBLY	17-15677
SPK.	627-B DYNAMIC SPEAKER ASSEMBLY	17-15678
VIB.	SYNCHRONOUS VIBRATOR	17-15631
S1	SPEAKER SOCKET	17-13026
SW. 1	POWER SWITCH	17-15601
F	FUSE 5 AMP. 25 VOLT	17-2210
SW2 A&B	BAND SWITCH WAFER	17-15606
SW2 C-G	BAND SWITCH WAFER	17-13044
L	DIAL LIGHT	17-13904
A.T.S.	ANTENNA TERMINAL STRIP	17-15643

I.F. PEAK 456 K.C.

3 BANDS:
- BALANCE 1.5 M.C. PAD .60 M.C.
- BALANCE 4.7 M.C. PAD 1.9 M.C.
- BALANCE 15. M.C. CHECK 6.0 M.C.

MODELS 617B-627B SOCKET VOLTAGES

Tube	Filament of Heater	Plate	Screen	Cathode	Oscillator Grid	Anode Grid
15	2.0	135	55	.7	....	....
6A7	6.0	135	55	1.4	2.4	135
15	2.0	135	75	1.2	....	....
75	6.0	65	....	.8	....	....
76	6.0	140	....	5.6	....	....
19	2.0	140	....	....	....	....

POINT TO POINT RESISTANCES

All readings taken to ground unless otherwise specified

15

Heater	50 ohms
Heater	20 ohms
Cathode	400 ohms
Screen to B+	30,000 ohms
Screen to Ground	100,000 ohms
Plate to B+	1.35-1.1-.9 ohms
Control Grid	700,000 ohms

6A7

Heater	0
Heater	2 ohms
Cathode	300 ohms
Oscillator Grid	50,300 ohms
Anode Grid to B+	20,000 ohms
Screen to B+	30,000 ohms
Screen to Ground	100,000 ohms
Plate to B+	1,000 ohms
Control Grid	5.-.45-.15 ohms

15

Heater	50 ohms
Heater	2 ohms
Cathode	400 ohms
Screen to B+	10,000 ohms
Screen to Ground	230,000 ohms
Plate to B+	1,000 ohms
Control Grid	700,000 ohms

75

Heater	0
Heater	2 ohms
Cathode	5,000 ohms
Diode	100,000 ohms
Diode	355,000 ohms
Plate to B+	200,000 ohms
Control Grid	500,000 ohms

76

Heater	0
Heater	2 ohms
Cathode	2,000 ohms
Control Grid	1,000,000 ohms
Plate to B+	265 ohms

19

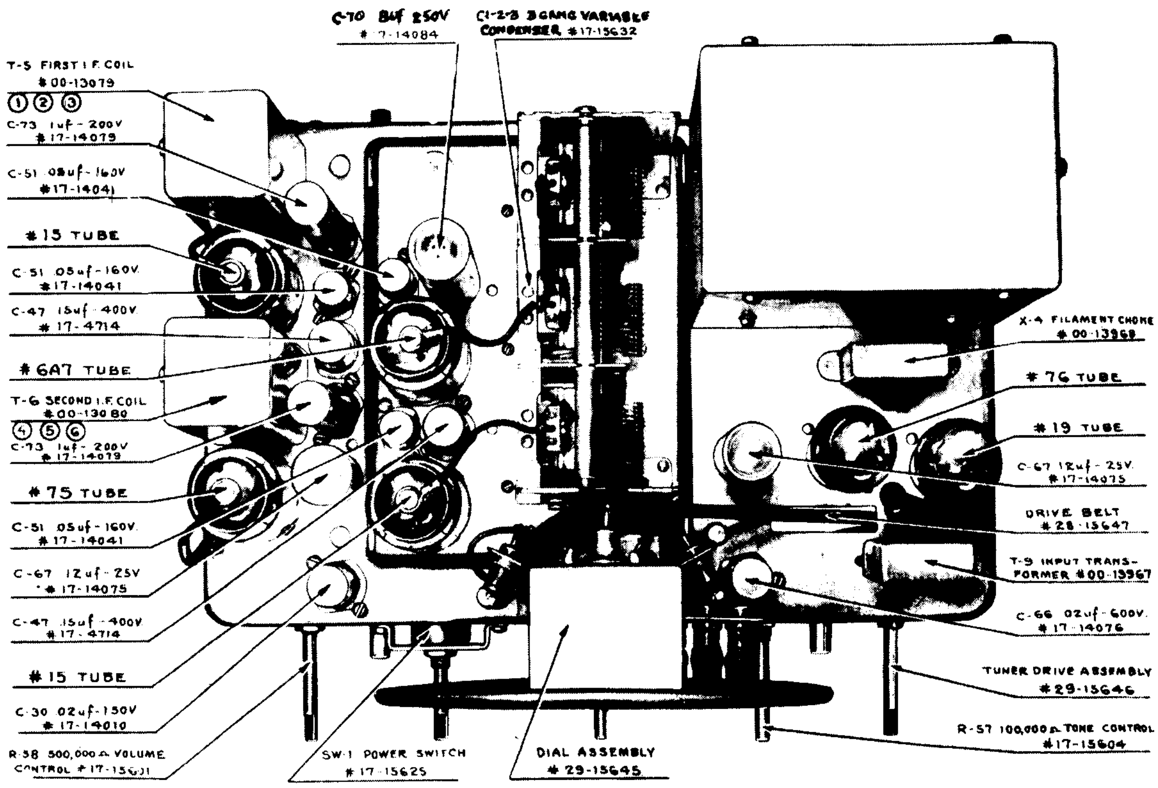
Filament	0
Filament	52 ohms
Grid	150 ohms
Grid	150 ohms
Plate to B+	175 ohms
Plate to B+	175 ohms

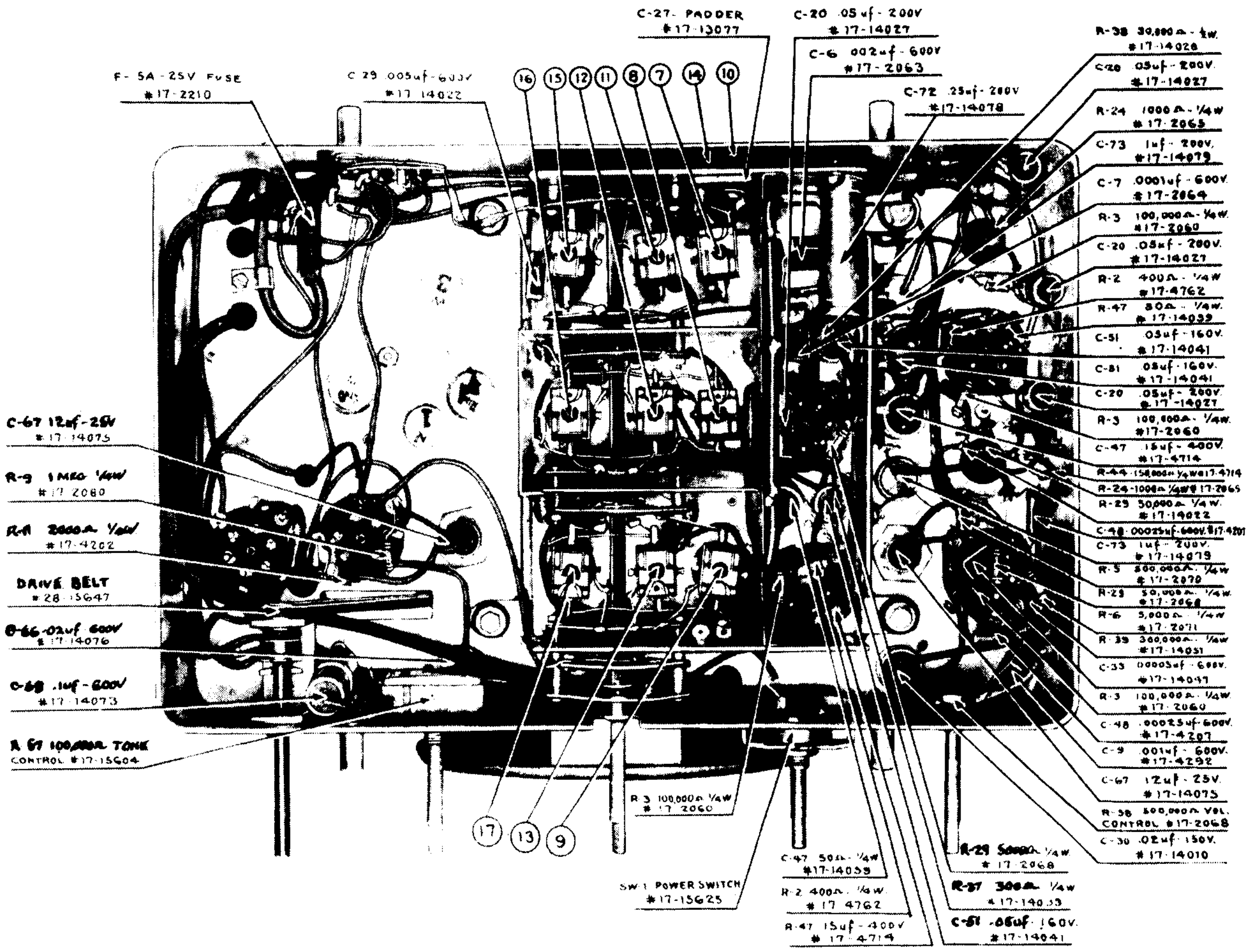
COIL AND TRANSFORMER RESISTANCES

A Band Ant. Pri.	20. ohms
A Band Ant. Sec.	5. ohms
A Band R. F. Pri.	1.35 ohms
A Band R. F. Sec.	5. ohms
A Band Osc. Pri.	2.0 ohms
A Band Osc. Sec.	7.0 ohms
B Band Ant. Pri.	1. ohms
B Band Ant. Sec.	.45 ohms
B Band R. F. Pri.	1.1 ohms
B Band R. F. Sec.	.9 ohms
B Band Osc. Pri.	1.2 ohms
B Band Osc. Sec.	.75 ohms
C Band Ant. Pri.	.75 ohms
C Band Ant. Sec.	.15 ohms
C Band R. F. Pri.	.9 ohms
C Band R. F. Sec.	.2 ohms
C Band Osc. Pri.	.5 ohms
C Band Osc. Sec.	.25 ohms
1st I. F. Trans. Pri.	8.2 ohms
1st I. F. Trans. Sec.	14.2 ohms
2nd I. F. Trans. Pri.	13.0 ohms
2nd I. F. Trans. Sec.	13.0 ohms
Power Trans. Pri.	.1-0-.1 ohms
Power Trans. Hi-V. Sec.	170-0-170 ohms
Output Trans. Pri.	175-0-175 ohms
Output Trans. Sec.	.4 ohms
Speaker Voice Coil	.50 ohms
Input Audio Trans. Pri.	265 ohms
Input Audio Trans. Sec.	150-0-150 ohms

NOBLITT-SPARKS INDUSTRIES, Inc.

MODELS 617B & 627B





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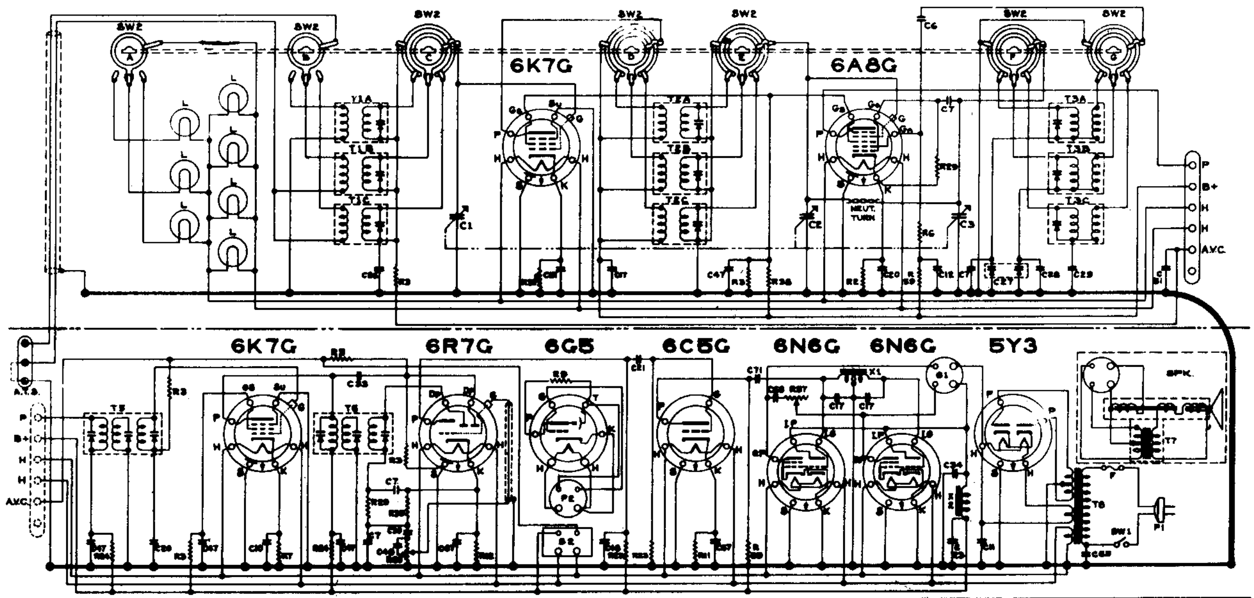
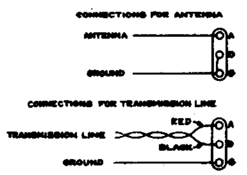
ARVIN HOME RADIO MODEL 927





RESISTORS							
R	RESIST.	W	PART NO.	R	RESIST.	W	PART NO.
2	400	1/4	17-4768				
3	100 M	1/4	17-2066				
5	250 M	1/4	17-2070				
6	5 M	1/4	17-2071				
9	1 MEG.	1/4	17-2060				
11	2000	1/4	17-4262				
12	10000	1/4	17-4275				
23	250 M	1/4	17-2011				
24	300	1/4	17-2062				
26	50 M	1/4	17-2066				
27	300	1/4	17-14066				
28	30 M	1/2	17-14026				
29	360 M	1/4	17-14061				
37	100 M	T.C.	17-13664				
38	15 M	1/4	17-4191				
60	500 M	[illegible]	17-15066				

CONDENSERS							
C	CAPACITY	VOLT	PART NO.	C	CAPACITY	VOLT	PART NO.
1, 2, 3	3 GANG VARIABLE		IT-15632	47	.15 CAN	400	IT-4714
4	.002 MICA	600	IT-2063	48	.00025 MICA	600	IT-4027
7	.0001 MICA	600	IT-2064	51	.05 CAN	160	IT-14041
10	.1 CAN	400	IT-14034	65	.01 STRAP	400	IT-14072
11	10. ELECT.	475	IT-14062	67	10. ELECT.	25	IT-14075
16	8. ELECT.	475	IT-14061	68	.1 STRAP	600	IT-14073
17	.002 MICA.	600	IT-14029	71	.1 CAN	600	IT-14077
22	.05 STRAP CAN	160	IT-14027	21	.02 CAN	600	IT-14068
23	10. ELECT.	475	IT-14060				
26	.05	150	IT-14012				
27	DIAL PADDER		IT-13077				
28	.001 MICA	600	IT-14023				
29	.00025 MICA	600	IT-14022				
30	.02 CAN	150	IT-14010				
32	.0005	600	IT-14047				
34	25. ELECT.	475	IT-14066				

CHOKES & TRANSFORMERS		
T-X	TYPE	PART NO.
T	TRANSFORMERS	
1A	"A" BAND ANT. COIL	20-13975
1B	"B" BAND ANT. COIL	20-13978
1C	"C" BAND ANT. COIL	20-13081
2A	"A" BAND R.F. COIL	20-13076
2B	"B" BAND R.F. COIL	20-13079
2C	"C" BAND R.F. COIL	20-13082
3A	"A" BAND OSC. COIL	20-13077
3B	"B" BAND OSC. COIL	20-13080
3C	"C" BAND OSC. COIL	20-13083
5	FIRST I.F. COIL	20-15084
6	SECOND I.F. COIL	20-13085
7	OUTPUT TRANSF.	17-15404
8	POWER TRANSF.	20-15623
X	CHOKES	
1	INPUT CHOKE	20-13071
2	FILTER CHOKE	20-13066

MISCELLANEOUS UNITS		
SYMBOL	DESCRIPTION	PART NO.
SPK.	DYNAMIC SPEAKER	17-15630
SW1	POWER SWITCH	17-15623
SW2 A-B	BAND SWITCH WAFER	17-13662
SW2 C-G	BAND SWITCH WAFER	17-13644
S1	SPEAKER SOCKET	17-13666
S2	6G5 PLUG SOCKET	17-4447
P1	POWER CORD & PLUG ASSY.	17-15794
P2	6G5 PLUG & SOCKET ASSY.	20-13611
L	DIAL LIGHT	17-13604
A.T.S.	ANTENNA TERMINAL STRIP	17-15648
F	FUSE - 2 AMP. - 250 V.	17-13076

I.F. PEAK 456 K.C.

38-456 BALANCE 15 M.C. PAD 60 M.C.
BALANCE 4.7 M.C. PAD 1.6 M.C.
BALANCE 15 M.C. CHECK 6.0 M.C.

MODEL 927 SOCKET VOLTAGES

Tube	Heaters	Cathode	Suppressor Grid	Screen Grid	Plate	Oscillator Grid	Anode Grid	Shell
6K7G	6.3	2.5	0	95	250	..	..	0
6A8G	6.3	3.0	..	95	250	8	175	0
6K7G	6.3	3.0	0	95	250	..	..	0
6R7G	6.3	.6	..	....	65	..	..	0
6C5G	6.3	4.0	..	....	120	..	..	0
6N6G	6.3	0	..	260	250	..	..	0
6N6G	6.3	0	..	260	250	..	..	0
5Y3	5.0	......	..	....	....	..	..	0
6G5	6.3	0	..	....	250	..	..	..

POINT TO POINT RESISTANCES

6K7G

Heater	0
Shell	0
Heater	.1
Cathode	300 ohms
Suppressor	0
Screen	100,000 ohms
Plate to B+	1.35 ohms
Control Grid	700,000 ohms
Screen to B+	30,000 ohms

6A8G

Heater	0
Shell	0
Heater	.1
Cathode	400 ohms
Oscillator Grid	50,400 ohms
Anode Grid to B+	20,000 ohms
Screen	100,000 ohms
Plate to B+	1,000 ohms
Control Grid	5.-9.2 ohms
Screen to B+	30,000 ohms

6K7G

Heater	0
Shell	0
Heater	.1
Cathode	400 ohms
Suppressor	0
Screen to B+	100,000 ohms
Plate to B+	1,000 ohms
Control Grid	700,000 ohms

6R7G

Heater	0
Shell	0
Heater	.1
Cathode	10,000 ohms
Diode	360,000 ohms
Diode	100,000 ohms
Control Grid	500,000 ohms
Plate to B+	250,000 ohms

6C5G

Heater	0
Shell	0
Heater	.1
Cathode	2,000 ohms
Control Grid	250,000 ohms
Control Grid	250,000 ohms

6N6G

Heater	0
Shell	0
Heater	.1
Cathode	0
Screen to B+	120 ohms
Plate to B+	330 ohms
Control Grid	2,500 ohms

6N6G

Heater	0
Shell	0
Heater	.1
Cathode	0
Screen to B+	120 ohms
Plate to B+	330 ohms
Control Grid	2,500 ohms

5Y3

Filament	131,000 ohms
Shell	0
Filament	131,000 ohms
Plate	110 ohms
Plate	120 ohms

6G5

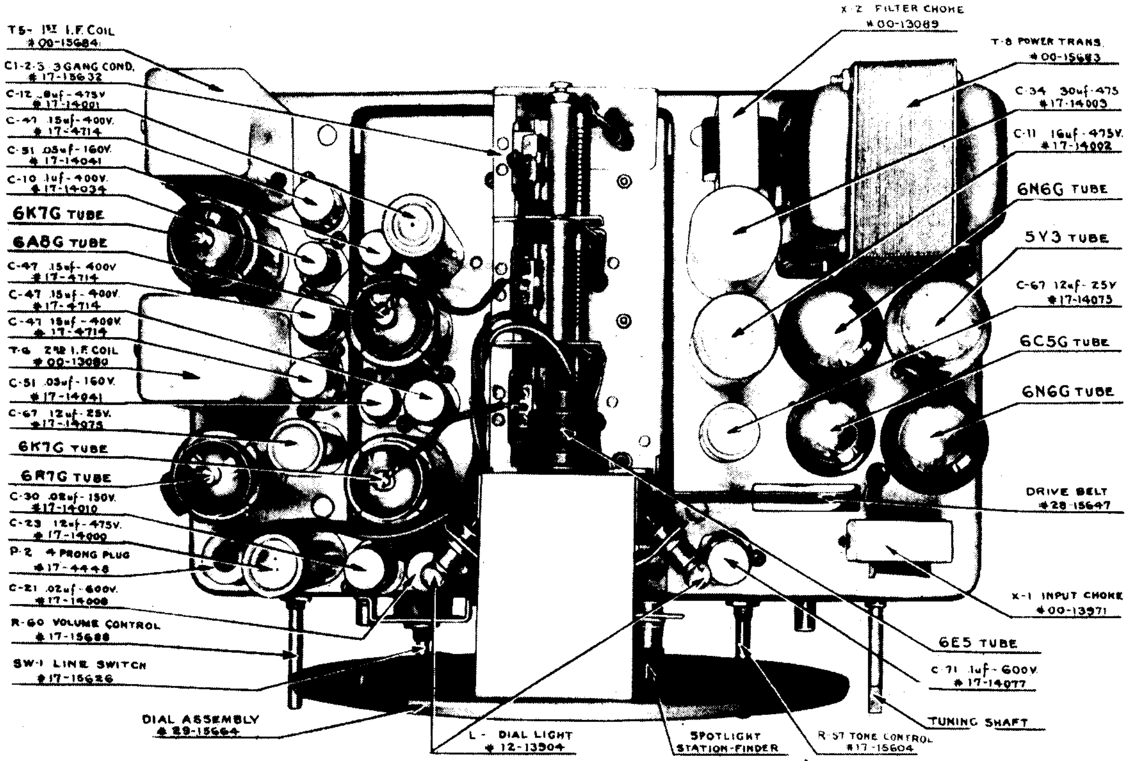
Heater	0
Heater	.1
Cathode	0
Control Grid	600,000 ohms
Plate to B+	1,000,000 ohms
Target to B+	0

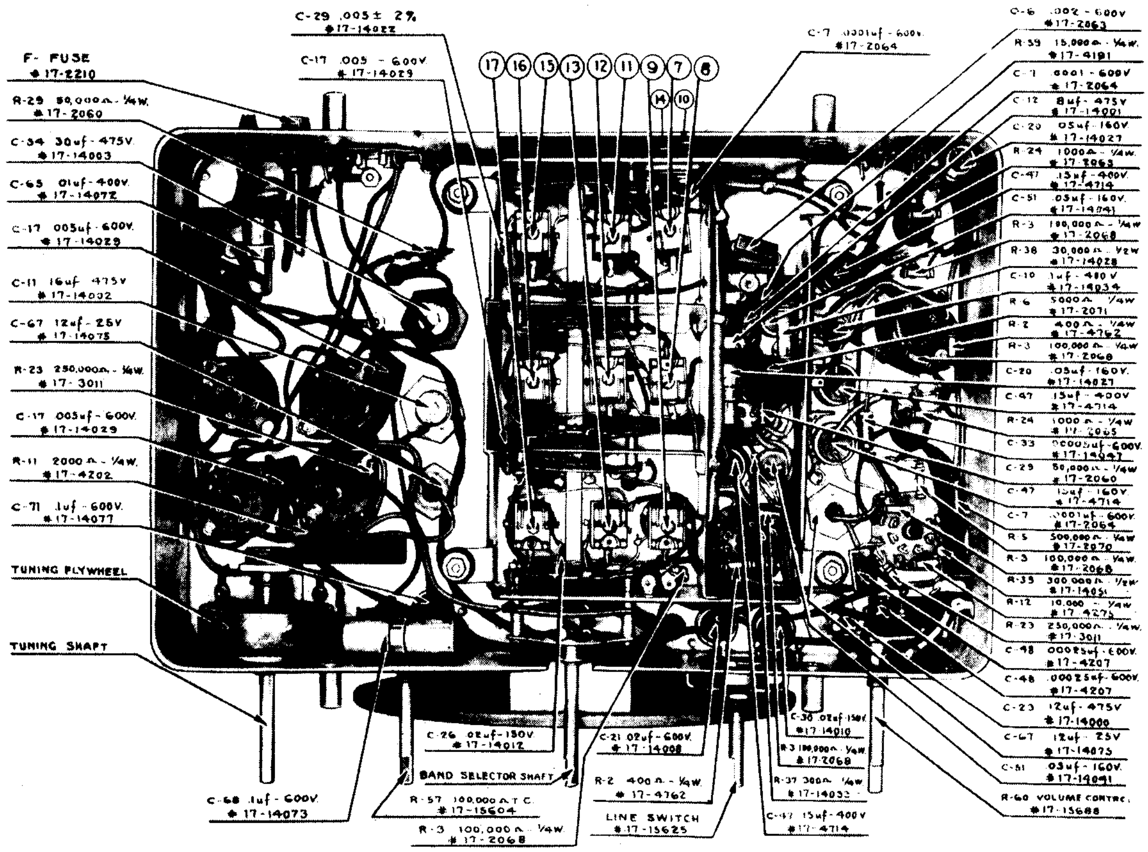
COIL, TRANSFORMER AND SPEAKER RESISTANCES

T1A Broadcast Ant. Pri.	19.00 ohms
T1A Broadcast Ant. Sec.	4.70 ohms
T1B Mid Wave Ant. Pri.	.43 ohms
T1B Mid Wave Ant. Sec.	.55 ohms
T1C Short Wave Ant. Pri.	.26 ohms
T1C Short Wave Ant. Sec.	.05 ohms
T2A Broadcast R. F. Pri.	.90 ohms
T2A Broadcast R. F. Sec.	5.50 ohms
T2B Mid Wave R. F. Pri.	.72 ohms
T2B Mid Wave R. F. Sec.	.50 ohms
T2C Short Wave R. F. Pri.	.50 ohms
T2C Short Wave R. F. Sec.	.05 ohms
T3A Broadcast Osc. Pri.	8.20 ohms
T3A Broadcast Osc. Sec.	.67 ohms
T3B Mid Wave Osc. Pri.	.58 ohms
T3B Mid Wave Osc. Sec.	.47 ohms
T3C Short Wave Osc. Pri.	.50 ohms
T3C Short Wave Osc. Sec.	.05 ohms
T5 First I. F. Pri.	9.00 ohms
T5 First I. F. Sec.	13.50 ohms
T6 Second I. F. Pri.	9.00 ohms
T6 Second I. F. Sec.	13.50 ohms
T7 Speaker Trans. Pri.	410.00 ohms
Speaker Field (Cold)	680.00 ohms
T8 Power Trans. Pri.	3.68 ohms
T8 Power Trans. 5V Sec.	.108 ohms
T8 Power Trans. 6V Sec.	.115 ohms
T8 Power Trans. H. V. Sec.	124-129-253
X2 "B" Filter Choke	120.00 ohms
X1 Audio Input Choke	1500.00 ohms

NOBLITT-SPARKS INDUSTRIES, Inc.

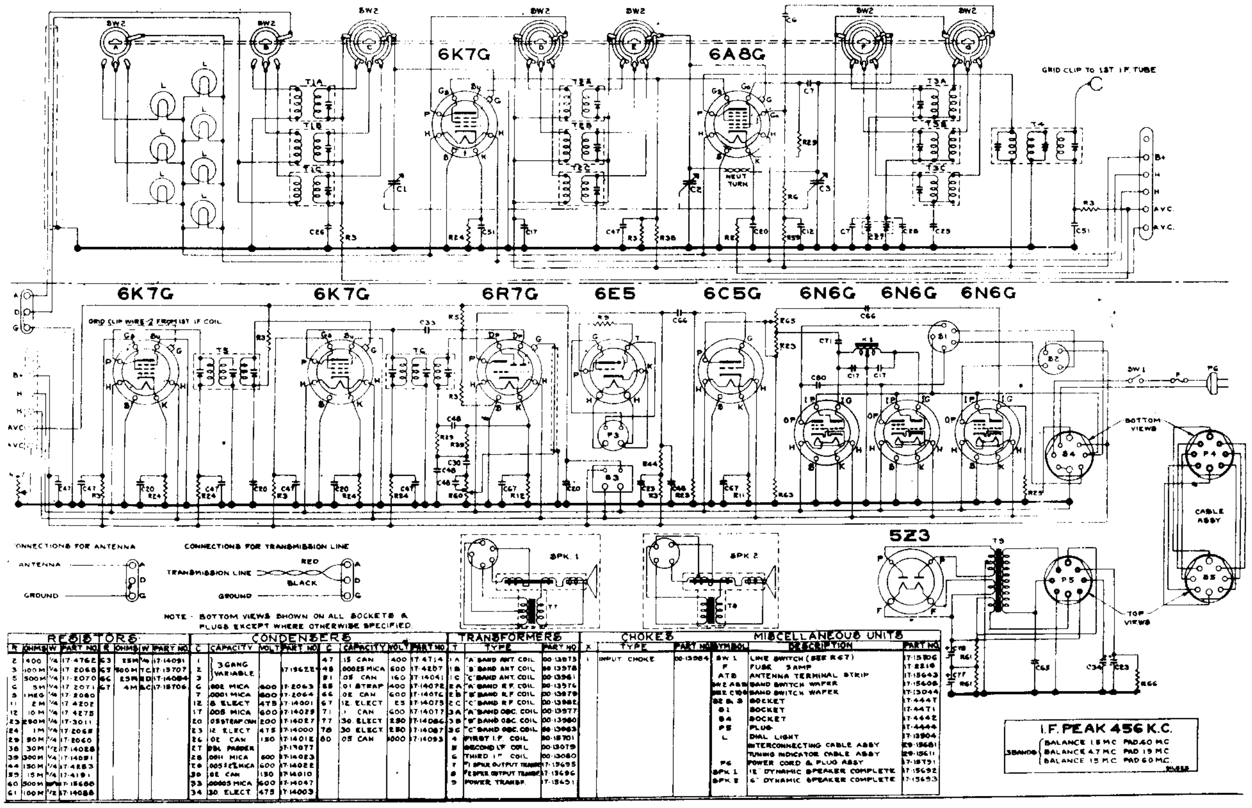
MODEL 927





NOBLITT-SPARKS INDUSTRIES, Inc.

ARVIN HOME RADIO MODEL 1127



MODEL 1127 SOCKET VOLTAGES

Tube	Heaters	Cathode	Suppressor Grid	Screen Grid	Plate	Oscillator Grid—1,500 K. C.	Anode Grid	Shell
6K7G	6.3	4.2	0	100	230	....	....	0
6A8G	6.3	3.6	....	105	235	11	140	0
6K7G	6.3	5.0	0	90	225	....	....	0
6K7G	6.3	4.8	0	100	225	....	..	0
6R7G	6.3	3.4	....	....	70	....	..	0
6C5G	6.3	5.0	....	....	155	....	....	0
6N6G	6.3	....	....	325	320	....	....	0
6N6G	6.3	....	....	325	320	....	....	0
6N6G	6.3	....	....	325	300	....	....	0
5Y3	5.0	....	....	....	....	....	....	0
6G5	6.3	0	....	....	250	....	....	0

POINT TO POINT RESISTANCES

6K7G
Heater 0
Shell 0
Heater .... .5 ohms
Cathode .... 1,000 ohms
Suppressor 0
Screen to B+ .... 30,000 ohms
Plate to B+ .... 1.35-1.1-.7 ohms
Screen .... 100,000 ohms
Control Grid .... 700,000 ohms
Screen to Ground .... 100,000 ohms

6A8G
Heater 0
Shell 0
Heater .... .5 ohms
†Cathode .... 400 ohms
Oscillator Grid .... 50,400 ohms
Anode Grid to B+ .... 20,000 ohms
Screen to Gnd. .... 100,000 ohms
Screen to B+ .... 30,000 ohms
Plate to B+ .... 15 ohms
Control Grid .... 5.-.9-.2 ohms

6K7G
Heater 0
Shell 0
Heater .... .5 ohms
Cathode .... 1,000 ohms
Suppressor 0
Screen to B+ .... 100,000 ohms
Plate to B+ .... 1,000 ohms
Control Grid .... 700,000 ohms

†Sensitivity Control Turned to extreme right.

6K7G
Heater 0
Shell 0
Heater .... .5 ohms
Cathode .... 1,000 ohms
Suppressor 0
Screen to B+ .... 100,000 ohms
Plate to B+ .... 1,000 ohms
Control Grid .... 700,000 ohms

6R7G
Heater 0
Shell 0
Heater .... .5 ohms
Cathode .... 10,000 ohms
Diode .... 100,000 ohms
Diode .... 360,000 ohms
Plate to B+ .... 250,000 ohms
*Control Grid .... 500,000 ohms

6C5G
Heater 0
Shell 0
Heater .... .5 ohms
Cathode .... 2,000 ohms
Plate to B+ .... 25,000 ohms
Control Grid .... 250,000 ohms

6N6G
Heater 0
Shell 0
Heater .... .5 ohms
Cathode 0

*Volume control turned to extreme right.

Screen to B+ 0
Plate to B+ .... 250 ohms
Control Grid .... 2,500 ohms

6N6G—Push Pull
Heater 0
Shell 0
Heater .... .5 ohms
Cathode 0
Screen to B+ 0
Plate to B+ .... 250 ohms
Control Grid .... 2,500 ohms

6N6G—Single
Heater 0
Shell 0
Heater .... .5 ohms
Cathode 0
Screen to B+ 0
Plate to B+ .... 450 ohms
Control Grid .... 50,000 ohms

5Z3
Filament to Gnd. .... 5,000 ohms
Filament to B+ .... 2,090 ohms
Plate .... 65 ohms
Plate .... 65 ohms

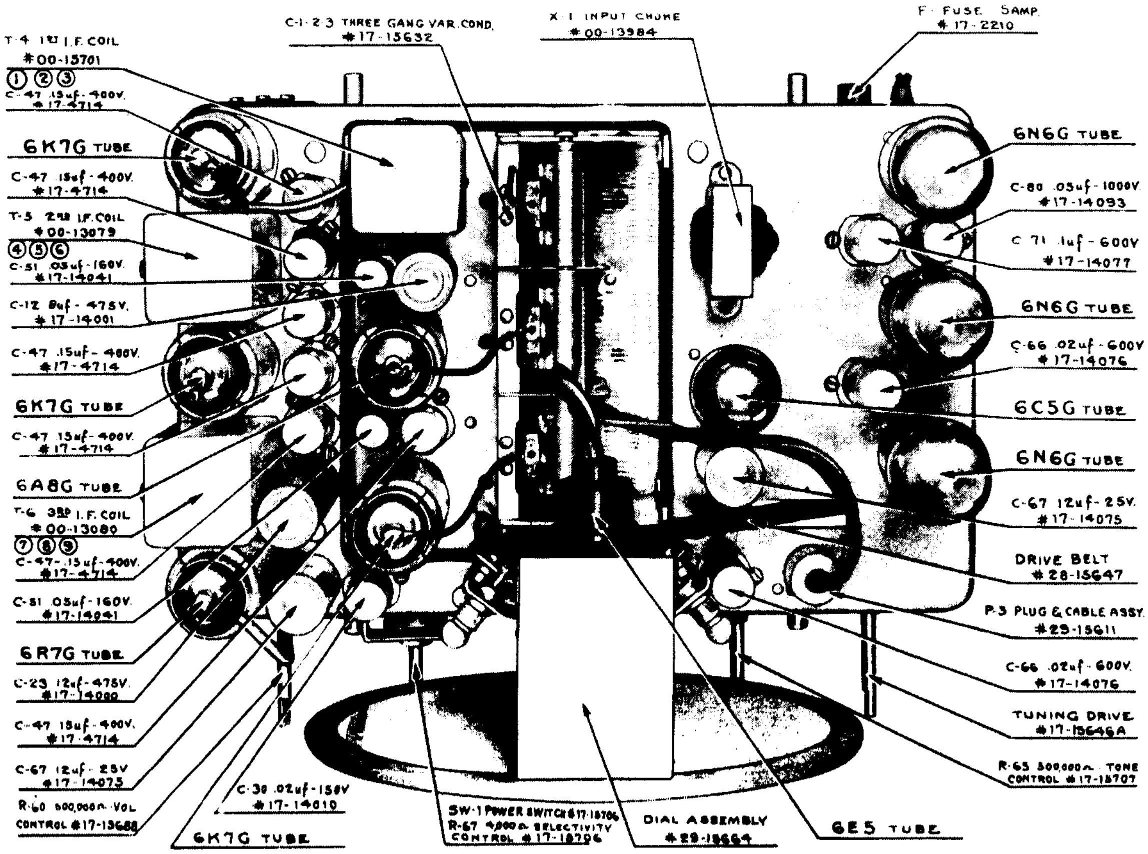
6G5
Heater 0
Heater .... .5 ohms
Cathode 0
Control Grid .... 600,000 ohms
Target to B+ 0
Plate to B+ .... 1,000,000 ohms

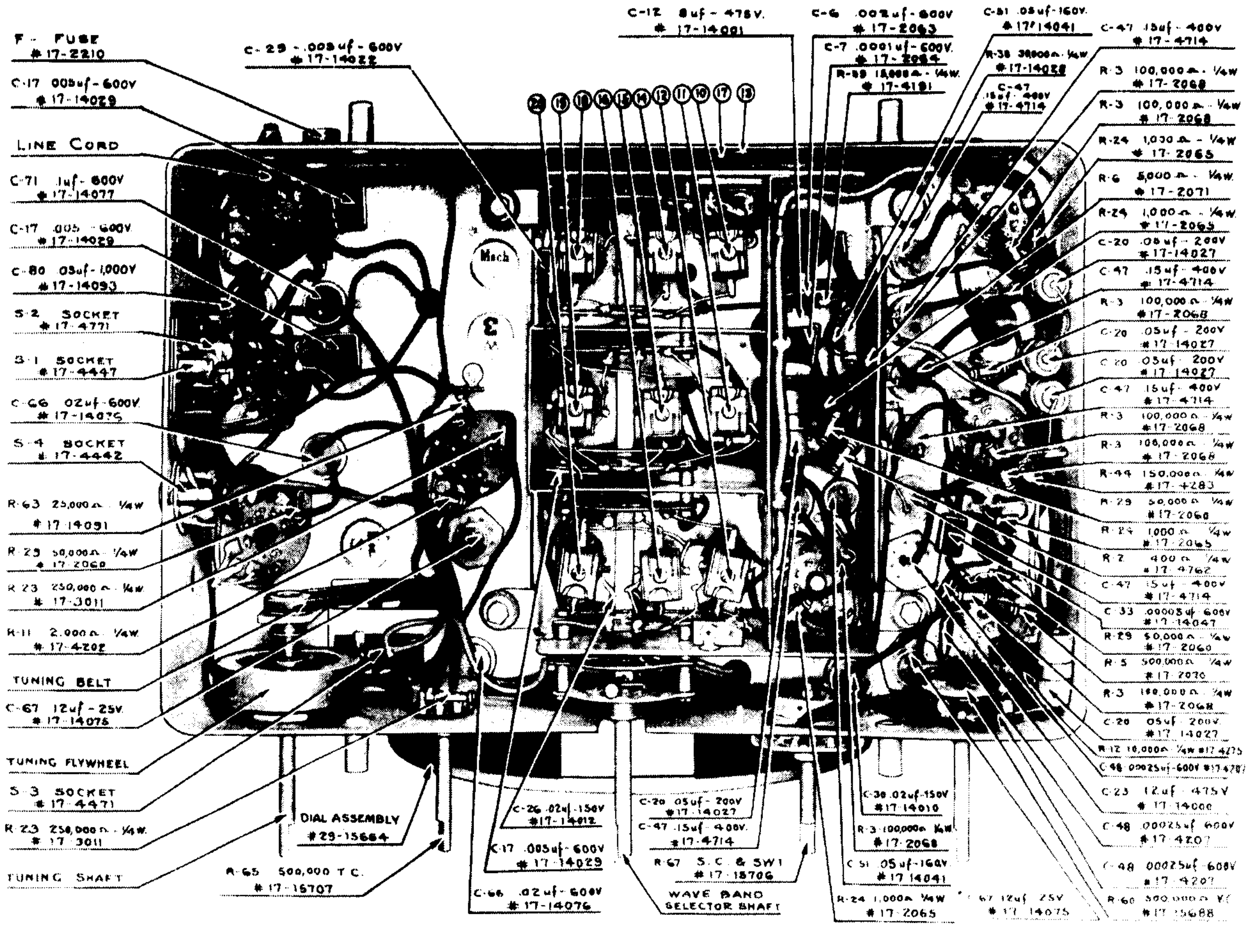
COIL, TRANSFORMER AND SPEAKER RESISTANCES

A Band Ant. Pri. .... 20. ohms
A Band Ant. Sec. .... 5. ohms
A Band R. F. Pri. .... 1.35 ohms
A Band R. F. Sec. .... 5. ohms
A Band Osc. Pri. .... 2.0 ohms
A Band Osc. Sec. .... 7. ohms
B Band Ant. Pri. .... 1. ohms
B Band Ant. Sec. .... .45 ohms
B Band R. F. Pri. .... 1.1 ohms
B Band R. F. Sec. .... .9 ohms
B Band Osc. Pri. .... 1.2 ohms
B Band Osc. Sec. .... .75 ohms
C Band Ant. Pri. .... .75 ohms
C Band Ant. Sec. .... .15 ohms
C Band R. F. Pri. .... .9 ohms
C Band R. F. Sec. .... .2 ohms
C Band Osc. Pri. .... .5 ohms
C Band Osc. Sec. .... .25 ohms
1st I. F. Trans. Pri. .... 8.2 ohms
1st I. F. Trans. Sec. .... 14.2 ohms
2nd I. F. Trans. Pri. .... 8.2 ohms
2nd I. F. Trans. Sec. .... 14.2 ohms
3rd I. F. Trans. Pri. .... 13.0 ohms
3rd I. F. Trans. Sec. .... 13.0 ohms
Audio Input Impedance .... 2,500-0-2,500 ohms
Power Transformer 110 V. Pri. .... 2.2 ohms
Power Transformer 6 V. Sec. .... .5 ohms
Power Transformer 5 V. Sec. .... .15 ohms
Power Transformer Hi. V. Sec. .... 65-0-65 ohms
Output Transformer (12" Speaker) Pri. .. 250-0-250 ohms
Output Transformer (12" Speaker) Sec. .... 1.3 ohms
Output Transformer (6" Speaker) Pri. .... 450 ohms
Output Transformer (6" Speaker) Sec. .... .8 ohms
6" Speaker Voice Coil .... .6 ohms
6" Speaker Field .... 140-0-1,600 ohms
12" Speaker Voice Coil .... .4 ohms
12" Speaker Field .... 250 ohms

NOBLITT-SPARKS INDUSTRIES, Inc.

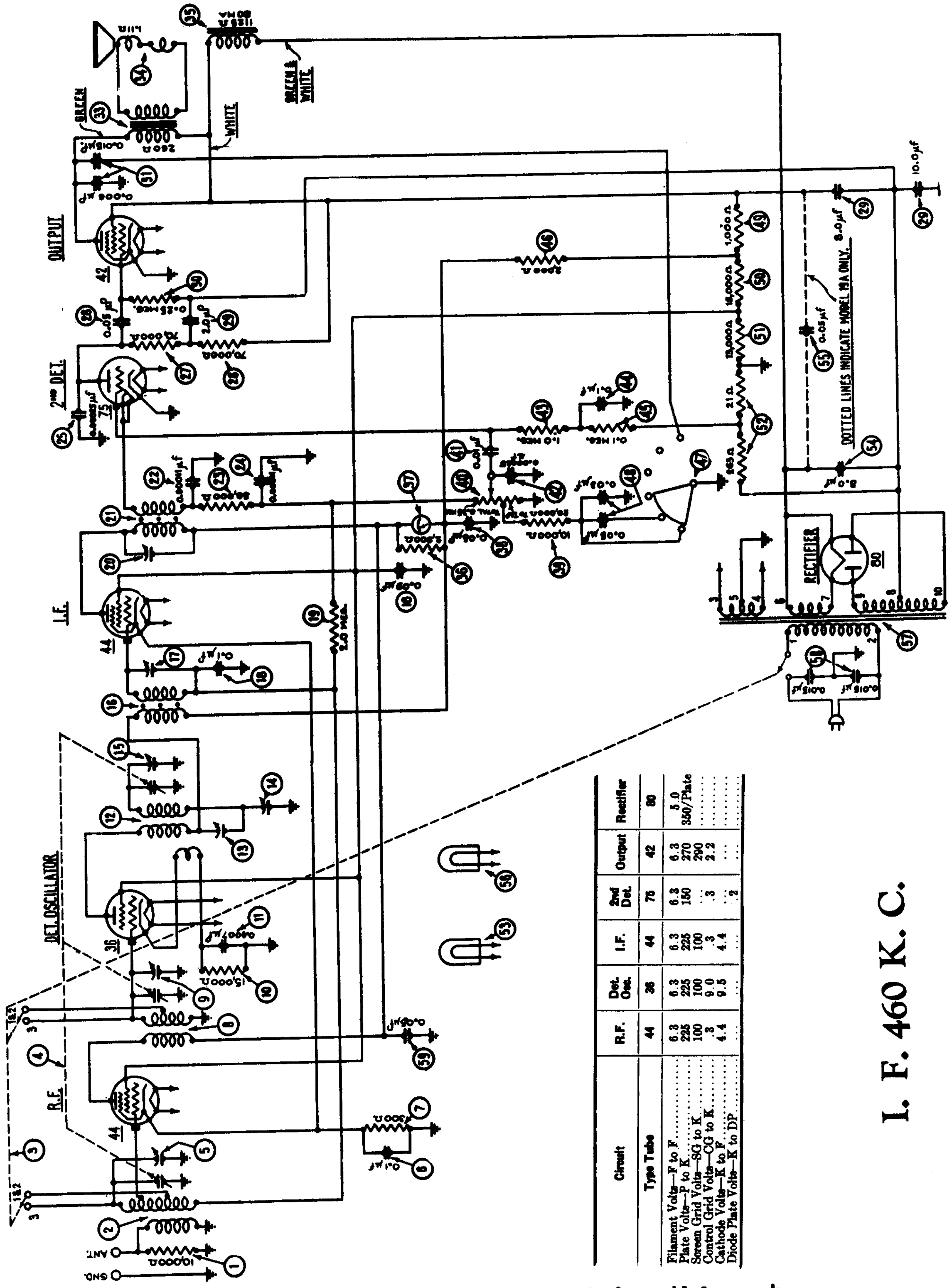
MODEL 1127





PHILCO RADIO & TELEVISION CORPORATION

MODEL 19 "CODE 128"



Circuit	R.F.	Det. Osc.	I.F.	2nd Det.	Output	Rectifier
Type Tube	44	36	44	75	42	80
Filament Volts—F to F	6.3	6.3	6.3	6.3	6.3	5.0
Plate Volts—P to K	225	225	225	150	270	350/Plate
Screen Grid Volts—SG to K	100	100	100	...	290	...
Control Grid Volts—CG to K	.3	9.0	.3	.3	2.2	...
Cathode Volts—K to F	4.4	9.5	4.4	...	...	...
Diode Plate Volts—K to DP	...	...	...	.2	...	...

I. F. 460 K. C.

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-611

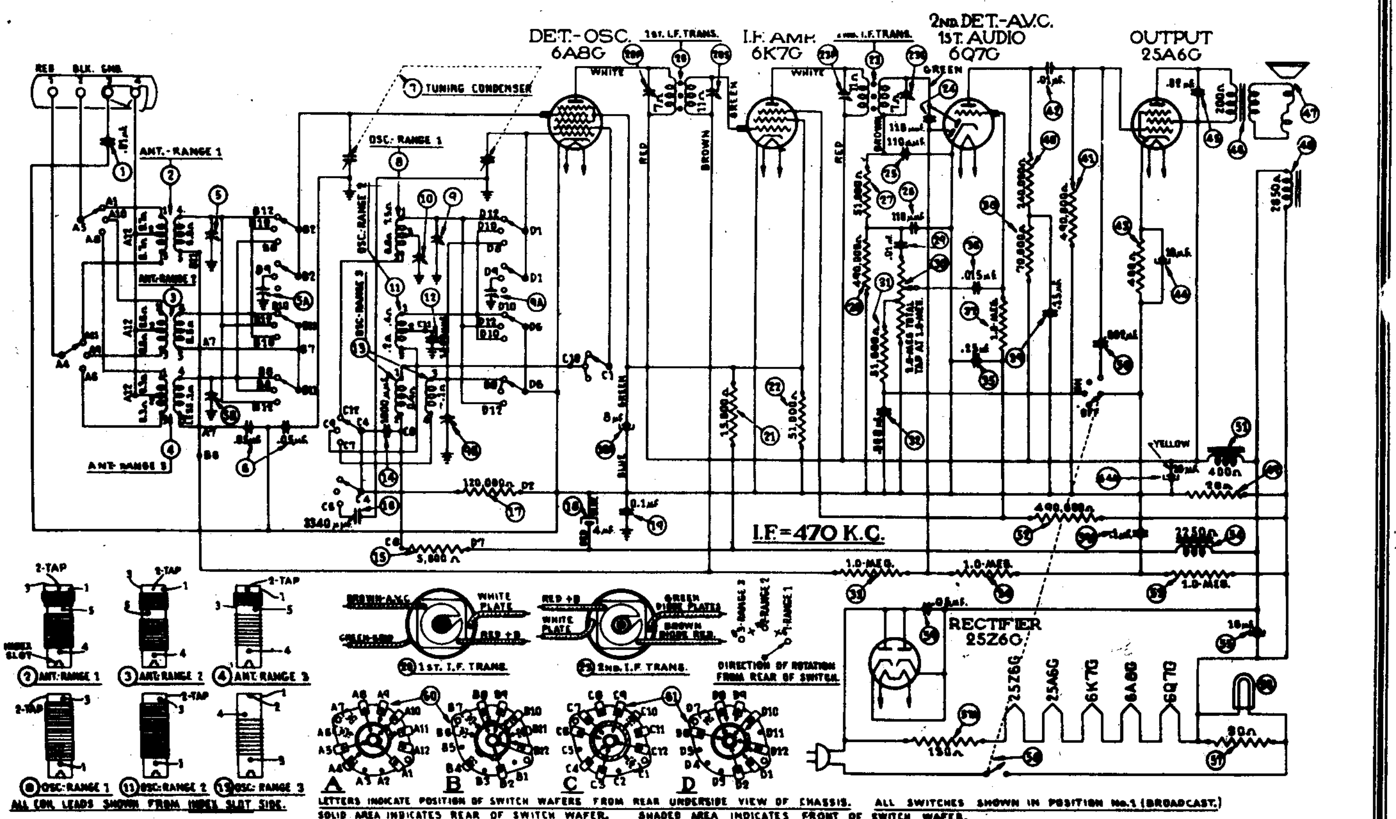


Fig. 5—Schematic Diagram

Replacement Parts—Model 37-611

Schem. No.	Description	Part No.	List Price
1	Condenser .01 mfd. tubular	30-4145	$0.20
2	Antenna Transformer (Range 1)	32-2108	.80
3	Antenna Transformer (Range 2)	32-2119	.65
4	Antenna Transformer (Range 3)	32-2109	.75
5	Compensator (3 sections)	31-6092	.60
6	Condenser (.05 mfd. dual tubular)	30-4394	.35
7	Tuning Condenser	31-1821	3.50
8	Oscillator Transformer (Range 1)	32-2120	.65
9	Compensator (3 sections Osc.)	31-6092	.60
10	Compensator (Osc. series 580 K.C.)	31-6056	.55
11	Oscillator Transformer (Range 2)	32-2121	.40
12	Condenser (1650 mmfd.)	31-6096	.40
13	Oscillator Transformer (Range 3)	32-2110	.75
14	Condenser (1000 mmfd. tubular)	30-4453	.20
15	Resister (5000 ohms ½ watt)	33-250339	.20
16	Condenser (3500 mmfd.)	31-6097	.50
17	Resistor (120000 ohms ½ watt)	33-412339	.20
18	Electrolytic Condenser (4-8 mfd.)	30-2157	
19	Condenser (.01 mfd. tubular)	30-4122	.20
20	1st I. F. Transformer Assembly	32-2100	1.50
21	Resistor (15000 ohms ½ watt)	33-315339	.20
22	Resistor (51000 ohms ½ watt)	33-351339	.20
23	2nd I. F. Transformer Assembly	32-2102	1.50
24	Condenser (110 mmfd. mica)	30-1031	.20
25	Condenser (110 mmfd. mica)	30-1031	.20
26	Condenser (110 mmfd. mica)	30-1031	.20
27	Resistor (51000 ohms ½ watt)	33-351339	.20
28	Resistor (490000 ohms ½ watt)	33-449339	.20
29	Condenser (.01 mfd. tubular)	30-4124	.25
30	Volume Control	33-5158	1.00
31	Resistor (51000 ohms ½ watt)	33-351339	.20
32	Condenser (.006 mfd. tubular)	30-4112	.20
33	Resistor (1.0 megohm ½ watt)	33-510339	.20
34	Resistor (1.0 megohm ½ watt)	33-510339	.20
35	Condenser (.25 mfd. tubular)	30-4446	.25
36	Condenser (.015 mfd. tubular)	30-4358	.20
37	Resistor (1.0 megohms ½ watt)	33-510339	.20
38	Resistor (70000 ohms ½ watt)	33-370339	.20
39	Condenser (.15 mfd. dual bakelite)	4989-DU	.40
40	Resistor (240000 ohms ½ watt)	33-424339	.20
41	Resistor (490000 ohms ½ watt)	33-449339	.20
42	Condenser (.01 mfd. bakelite)	3903-SU	.25
43	Resistor (400 ohms wirewound)	33-3122	.25

Schem. No.	Description	Part No.	List Price
44	Electrolytic Condenser (10-20 mfd.)	30-2166	
45	Condenser (.02 mfd. tubular)	30-4113	$0.20
46	Output Transformer HS-2, S-15	32-7395	1.10
47	Cone Voice Coil HS-2	36-3627	1.00
	Cone Voice Coil S-15	36-3157	.80
48	Field Coil HS-2	36-3519	2.80
	Field Coil S-15	36-3519	2.80
49	Resistor (20 ohms Flexible)	33-3043	.25
50	Condenser (.002 mfd. tubular)	30-4177	.25
51	Choke	32-7668	1.20
52	Resistor (490000 ohms ½ watt)	33-449339	.20
53	Resistor (1.0 megohm ½ watt)	33-510339	.20
54	Choke	32-7667	1.60
55	Electrolytic Condenser (16 mfd.)	30-2124	.75
56	Pilot Lamp		
57	Resistor (30-130 ohms wirewound)	33-3292	.60
58	Tone Control & Power Switch	42-1224	.75
59	Condenser (.05 mfd. tubular)	30-4020	.20
60	Range Switch (Ant.)	42-1200	1.20
61	Range Switch (Osc.)	42-1246	1.20
	Pilot Lamp Assembly	38-7910	
	Switch Index Plate & Shaft	42-1173	.50
	Dial	27-5203	.50
	Hub	28-7187	.12
	Clamp	28-2837	.10
	Set Screw	W-1641	.02
	Dial Gear	28-7185	.10
	Drive Gear & Hub Assembly	31-1884	.25
	Thrust Spring	28-8611	.01
	Thrust Washer	28-3976	.30 C
	C Washer	28-3904	.01
	Mask	27-5198	.30
	Mask Arm & Link Assembly	31-1866	.35
	Mask Guide & Pilot Lamp Bracket	38-7844	.15
	Mask Washer	27-8318	.50 C
	Ind. Bracket & Lens Assembly	38-7912	.30
	Scale Guard	27-8324	.02
	Volume Control Shaft	38-8059	
	Shaft Spring	28-4117	.40 C
	Retaining Clip	28-4394	.01
	Tube Socket (7 Prong)	27-6057	.11
	Tube Socket (8 Prong)	27-6058	.11
	Tube Shield	28-2726	.10

Schem. No.	Description	Part No.	List Price
	Shield Base	28-3898	$0.03
	Mtg. Grommet R. F. Unit	27-4317	.04
	Mtg. Sleeve R. F. Unit	28-2257	.01
	Mtg Screw R. F. Unit	W-729	.45 C
	Mtg. Washer R. F. Unit	28-3927	.01
	Mtg. Washer Felt R. F. Unit	27-7807	.50 C
	Mtg. Rubber Tuning Condenser	27-4325	.02
	Mtg. Transformer Plate	28-3806	.02
	Spacer	27-8228	.01
	Screw	W-1635	.30 C
	Rubber Washer	5189	.03
	Rubber Bushing	27-4360	.04
	Chassis Mtg. Screw	W-1495	1.50 C
	Washer	28-2089	.50 C
	Knob Tuning Control	27-4330	10
	Knob Vernier	27-4331	.10
	Knob Tone Volume	27-4332	.10
	Knob Range Switch	27-4326	.10
	Bottom Shield Plate	28-4234	
	Snap Fasteners	28-4279	.75 C
	Bottom Shield Plate T Cabinet	28-4358	
	Bezel Plate & Frame	40-4939	.75
	Gasket	27-8311	.01
	Screw	W-1644	.50 C
	Glass	27-8298	.05
	A. C. Cable	L-2183	.40
	Speaker Cable	L-2218	
	Speaker S-15 ("B", "T", "F" Cabinets)	36-1173	5.75
	Speaker HS-2 ("J" cabinet)	36-1255	
	"B" CABINET		
	Baffle Silk Assembly	40-5968	.30
	"F" CABINET		
	Baffle Silk Assembly	40-5937	.75
	"J" CABINET		
	Baffle Silk Assembly	40-5971	.80
	"T" CABINET		
	Baffle Silk Assembly	40-5969	.30

Figures in black type indicate circled figures in Base View.

Prices Subject to Change without Notice

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-611

Electrical Specifications

Type Circuit: Superheterodyne, for alternating or direct current; Pentode Output and Built-in Connection for the PHILCO High-Efficiency Aerial.

Power Supply: 115 volts, alternating or direct current.

Power Consumption: 55 watts.

Philco Tubes Used: 6A8G, 6K7G, 6Q7G, 25A6G, 25Z6G.

Frequency Ranges:—Range 1—530 to 1720 K.C.; Range 2—2.3 to 7.4 M.C.; Range 3—7.35 to 22 M.C.

Intermediate Frequency: 470 K.C.

Speakers: S-15—"B", "F", "T" Cabinets. HS-2—"J" Cabinet.

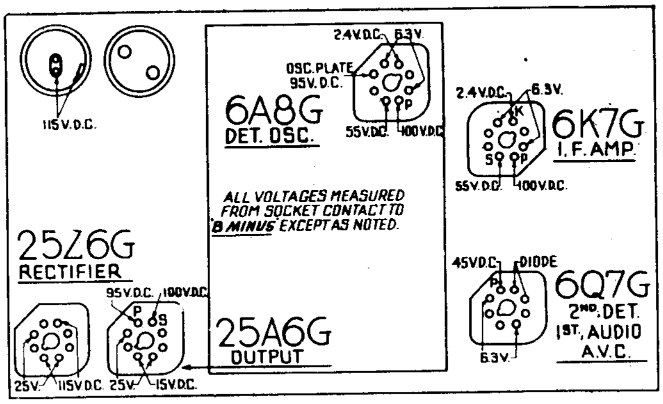


Fig. 1—Socket Voltages—Underside of Chassis View

The voltages indicated by arrows were measured with a **Philco 025 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

Alignment of Compensators

To accurately adjust this receiver, precision test equipment is necessary. A signal generator such as the **Philco Model 088 Signal Generator,** covering from 110 to 20,000 K.C. is recommended to adjust the compensators at the various frequencies specified. A visual indication of the receiver output is also necessary to obtain correct adjustment of the compensators. **Philco Model 025 Circuit Tester** contains a sensitive output meter and is recommended for these adjustments. Philco Fibre Handle Screw-driver No. 27-7059 and Tuning Condenser Part No. 45-2325 complete the necessary equipment for these adjustments. The locations of the various compensators are shown in Figs. 2 and 3.

The following procedure must be observed in adjusting the compensators:—

DIAL ADJUSTMENT—In order to adjust this receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, rotate the tuning condenser control to the extreme counter-clockwise position (maximum capacity). Loosen the set screw of dial hub, then turn dial until the glowing indicator is centered between the index lines of dial scale. Now tighten the dial hub set screw in this position.

OUTPUT METER—The 025 Output Meter is connected to the plate and cathode terminals of the (25A6G) tube. Adjust the meter to use the (0-30) volt scale.

INTERMEDIATE FREQUENCY CIRCUIT

Frequency 470 K. C.

1. Connect the 088 Signal Generator output lead through a .1 mfd. condenser to the control grid of the 6A8G, and the ground connection of output lead to the chassis.

2. The tuning range switch is set in position No. 1 (Broadcast). Rotate the tuning condenser of the receiver to the maximum capacity position (counter-clockwise), and adjust the signal generator for 470 K. C.

3. Adjust compensators (**23S**) 2nd I. F. Sec., (**23P**) 2nd I. F. Pri., (**20S**) 1st I. F. Sec. and (**20P**) 1st I. F. Pri. for maximum reading on the output meter.

RADIO FREQUENCY CIRCUIT

Tuning Range—7.3 to 22.0 M. C.

1. Remove the signal generator output lead from the grid of the 6A8G tube and connect it with the .1 mfd. condenser to terminal No. 1 on the aerial input panel and the generator ground lead to terminal No. 3, rear of chassis. Terminals 2 and 3 must be connected by the shorting link provided on the panel.

2. Set the range switch in position 3. Turn the receiver and signal generator dials to 18 M. C. Now adjust compensator (**9B**) by turning the screw (clockwise) to the maximum capacity position, then slowly turning it (counter-clockwise) until a second peak signal is reached on the output meter. The first peak from maximum capacity is the image signal and must not be used. If the above procedure is correctly performed, the image signal will be found at 17.06 M. C., by advancing signal generator attenuator and turning receiver dial to this frequency mark on the scale.

3. The antenna compensator (**5B**) is now adjusted by connecting a variable condenser of approximately 350 mmfd., Philco Part No. 45-2325, across the oscillator section of the gang condenser and ground. Leaving the signal generator and receiver dials at 18 M. C. tune the added condenser from the maximum capacity point until the second harmonic of the receiver oscillator beats against the signal from the generator thereby bringing in the signal. The antenna compensator (**5B**) is then adjusted for maximum output. Now remove the external condenser and readjust compensator (**9B**) as given in paragraph 2 above.

Tuning Range: 2.3 to 7.4 Megacycles.

1. Turn the range switch to position No. 2 (Police). Rotate the signal generator and receiver dials to 7.0 M. C. Then adjust compensator (**9A**) for maximum output. Now turn the signal generator and receiver dials to 6.0 M. C. and adjust compensator (**5A**) for maximum reading on output meter.

Tuning Range: 530 to 1720 Kilocycles.

1. Set the range switch in position No. 1 (Broadcast). Rotate the signal generator and receiver dials to 1600 K. C. Now adjust compensators (**9**) Osc., and (**5**) Ant. for maximum output.

2. Rotate the signal generator and receiver dials to 580 K. C. Compensator (**10**) Osc. series is now adjusted for maximum output as follows:

First tune compensator (10) for maximum output, then vary the tuning condenser of the receiver for maximum output about the 580 K. C. dial mark. Now turn the compensator (10) slightly to the right or left and vary the receiver tuning condenser for maximum output. If the output reading increases, turn compensator (10) in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

3. Readjust compensator (**9**) for maximum output, by turning signal generator and receiver dials to 1600 K. C.

4. Turn the signal generator and receiver dials to 1500 K. C. and adjust compensator (**5**) Ant. for maximum output.

NOTE: See page 237 before servicing this set.

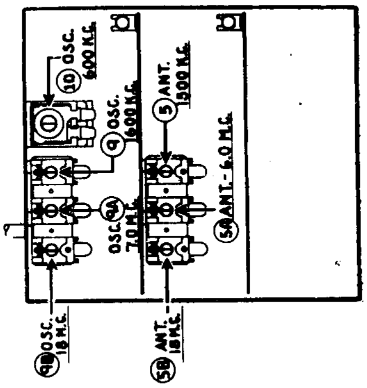


Fig. 3—R. F. Compensators

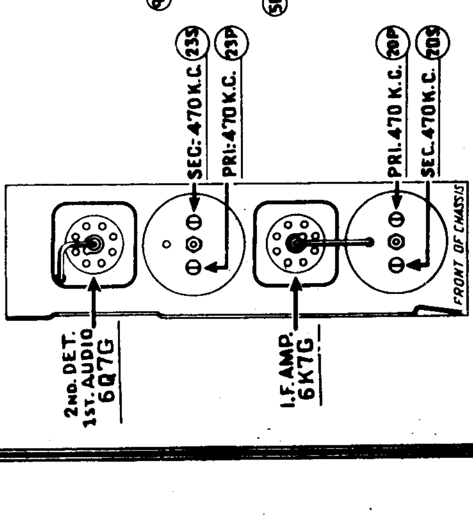


Fig. 2—I. F. Compensators

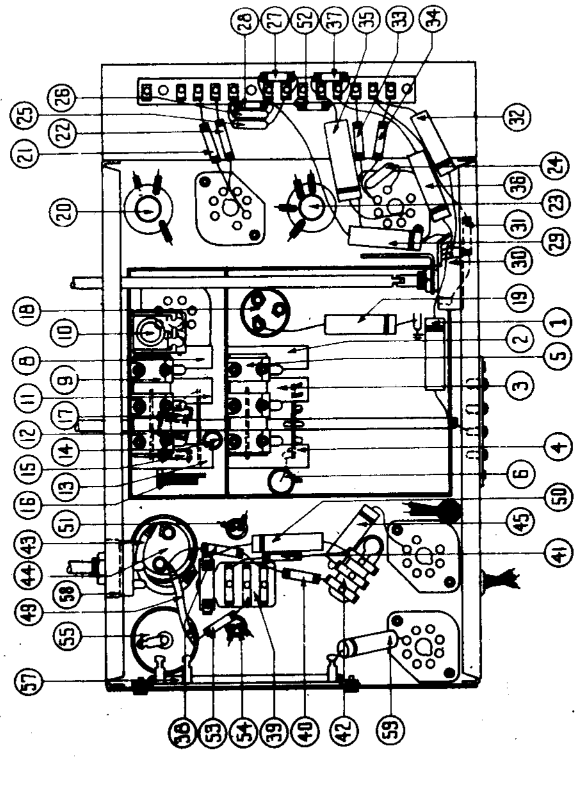


Fig. 4—View of Parts from Underside of Chassis

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-623

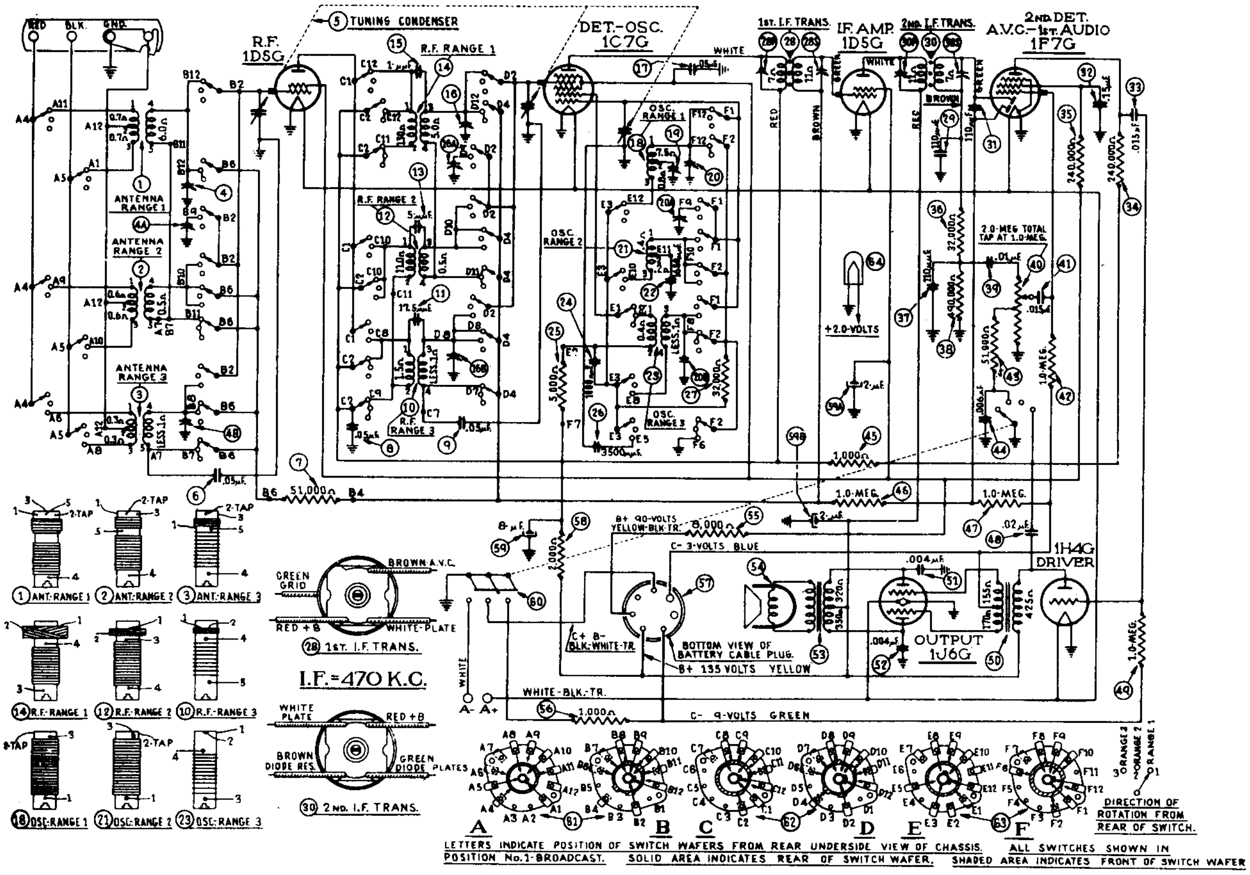


Fig. 5—Schematic Diagram

Replacement Parts—Model 37-623

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (530-1720 K.C.)	32-2108	$0.80
2	Antenna Transformer (2.3 to 7.4 M.C.)	32-2119	.65
3	Antenna Transformer (7.35 to 22 M.C.)	32-2109	.75
4	Compensator (Three Sections)	31-6092	.60
5	Tuning Condenser	31-1818	4.50
6	Condenser (.05 mfd. Tubular)	30-4020	.20
7	Resistor (51,00 ohms, ½ watt)	33-351339	.20
8	Condenser (.05 mfd. Tubular)	30-4020	.20
9	Condenser (.05 mfd. Tubular)	30-4020	.20
10	R. F. Transformer (7.35 to 22 M.C.)	32-2126	.55
11	Condenser (17.5 mmfd. Mica)	30-1079	
12	R. F. Transformer (2.3 to 7.4 M.C.)	32-2106	.65
13	Condenser (5 mmfd. Mica	30-1080	
14	R. F. Transformer (530-1720 K.C.)	32-2105	.75
15	Condenser (Twist wire and lug)	38-7878	
16	Compensator (Three section)	31-1621	
17	Condenser (.05 mfd. Tubular)	30-4020	.20
18	Oscillator Transformer (530-1720 K.C.)	32-2120	.65
19	Compensator (580 K.C.)	31-6056	.55
20	Compensator (Three section)	31-6092	.60
21	Oscillator Transformer (2.3 to 7.4 M.C.)	32-2121	.40
22	Condenser (1650 mmfd.)	31-6096	.40
23	Oscillator Transformer (7.35 to 22 M.C.)	32-2110	.75
24	Condenser (1,000 mmfd. Mica)	30-4453	.20
25	Resistor (5,000 ohms, ½ watt)	33-250393	.20
26	Condenser (3,500 mmfd. Semifixed)	31-6097	.50
27	Resistor (32,000 ohms, ½ watt)	33-332339	.20
28	First I. F. Transformer	32-2100	1.50
29	Condenser (110 mmfd. Mica)	30-1031	.20
30	Second I. F. Transformer	32-2102	1.50
31	Condenser (110 mmfd. Mica)	30-1041	.20
32	Condenser (.15 mfd. Bakelite)	6287SG	.35
33	Condenser (.015 mfd. Tubular)	30-4226	.20
34	Resistor (240,000 ohms, ½ watt)	33-424339	.20
35	Resistor (240,000 ohms, ½ watt)	33-424339	.20
36	Resistor (32,000 ohms, ½ watt)	33-332339	.20
37	Condenser (110 mmfd. Mica)	30-1031	.20
38	Resistor (490,000 ohms, ½ watt)	33-449339	.20
39	Condenser (.01 mfd. Tubular)	30-4124	.25
40	Volume Control	33-5158	1.00
41	Condenser (.015 mfd. Tubular)	30-4358	.20
42	Resistor (1 megohm, ½ watt)	33-510339	.20
43	Resistor (51,000 ohms, ½ watt)	33-351339	.20
44	Condenser (.006 mfd. Tubular)	30-4125	.20

Schem. No.	Description	Part No.	List Price
45	Resistor (1,000 ohms, ½ watt)	33-210339	$0.20
46	Resistor (1 megohm, ½ watt)	33-510339	.20
47	Resistor (1 megohm, ½ watt)	33-510339	.20
48	Condenser (.02 mfd. Tubular)	30-4113	.20
49	Resistor (1 megohm, ½ watt)	33-510339	.20
50	Audio Input Transformer	32-7637	2.00
51	Condenser (.004 mfd. Tubular)	30-4456	.20
52	Condenser (.004 mfd. Tubular)	30-4456	.20
53	Output Transformer	32-7638	1.60
54	Cone and Voice Coil Assembly KR-17	36-3540	.80
	Cone and Voice Coil Assembly HR-12	36-3557	1.20
55	Resistor (8,000 ohm, ½ watt)	33-280339	.20
56	Resistor (1,000 ohms, ½ watt)	33-210339	.20
57	Cable Battery	41-3198	1.40
58	Resistor (2,000 ohms, ½ watt)	33-220339	.20
59	Electrolytic Condenser (2, 2, 8 mfd.)	30-2161	1.60
60	Power and Tone Control Switch	42-1207	1.20
61	Range Switch (ANT)	42-1200	1.20
62	Range Switch (R.F.)	42-1245	1.20
63	Range Switch (Osc.)	42-1246	1.20
	Pilot Lamp Assembly	38-7875	.45
	Pilot Lamp	34-2150	.22
	Vernier Drive Assembly	31-1871	.75
	Dial	27-5214	.40
	Dial Hub	28-7187	.12
	Dial Clamp	28-2837	.10
	Dial Guard	27-8324	.02
	Set Screw	W-1641	.02
	Gear (Dial)	28-7185	.10
	Thrust Spring	28-8611	.01
	Thrust Washer	28-3976	.30/C
	C Washer	28-3904	.01
	Gear (Drive)	31-1884	.25
	Mask	27-5198	.30
	Mask Arm and Assembly	31-1940	
	Shaft Coupling (Mask)	31-1941	
	Felt Washers	27-8399	
	Washer	27-8318	.50/C
	Snap Fastener	28-4279	.75/C
	Indicator Bracket and Lens Assembly	38-7912	.30
	Mask Guide and Lamp Support	38-7844	.15
	Shaft and Index Plate (Range Switch)	42-1173	.50
	Shaft (Volume Control)	38-8059	
	Retaining Clip (Vol. Shaft)	28-4394	.01

Schem. No.	Description	Part No.	List Price
	Spring (Vol. Shaft)	28-4117	$0.40/C
	Socket (8 prong)	27-6058	.11
	Socket (7 prong)	27-6057	.11
	Shield Tube	28-2726	.10
	Base Tube Shield	28-3898	.03
	Grommet Mtg. R. F. Unit	27-4317	.04
	Sleeve Mtg. R. F. Unit	28-2257	.01
	Screw Mtg. R. F. Unit	W-729	.45/C
	Washer Mtg. R. F. Unit	28-3927	.01
	Washer Mtg. R. F. Unit	27-8339	.40/C
	Rubber Mtg. Tuning Condenser	27-4325	.02
	Mtg. Plate (Trans.)	28-3808	.02
	Mtg. Spacer (Trans.)	27-8228	.01
	Mtg. Screw (Trans.)	W-1635	30/C
	Terminal Panel I. F. Unit	38-7703	.25
	Cable Speaker	41-3207	.30
	Mtg. Bolt (Chassis)	W-1495	1.50/C
	Mtg. Rubbers	5189	.03
	Mtg. Bushing	27-4360	
	Knob	27-4330	.10
	Knob	27-4331	.10
	Knob	27-4326	.10
	Knob	27-4332	.10
	"B" Battery	41-8007	
	"A" Battery (Wet)	172R	
	"A" Battery (Dry)	41-8011	
	Ballast Lamp	1FI	
	Bezel Plate and Frame	40-5939	.75
	Gasket	27-8311	.01
	Glass	27-8298	.05
	Ring	28-3967	.35
	Screws	W-1644	,50/C
	B CABINET		
	Baffle and Silk Assembly	40-5970	
	Speaker—KR17	36-1248	10.00
	J CABINET		
	Speaker—HR12	36-1250	11.00
	Baffle and Silk Assembly	40-5971	.80
	Speaker	36-1250	11.00
	Speaker Ring	27-8016	
	Speaker Bolts	W-1693	

Figures in black type indicate circled figures in Base View.

Prices Subject to Change without Notice

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-623

Electrical Specifications

Type of Circuit: Superheterodyne; battery operated; with class "B" output, the Philco Automatic Aerial Tuning System and built in connections for the Philco High Efficiency Aerial.

Batteries Required: "A"—Philco 172-R two volt storage battery or a dry "A" battery **Philco Part** No. 41-8011. If a dry "A" battery is used, a ballast lamp PHILCO type 1F1 must be inserted in the socket provided in the dry "A" battery. This lamp acts as a voltage regulator, and maintains a constant potential of two volts on the filaments of the receiver tubes.

"BC" Philco battery Part No. 41-8007 is used to supply B and C voltage. This battery contains a socket into which the receiver battery cable plug is inserted.

Current Drain: A Battery, 720 M.A.; B Battery, 21 M.A.

Philco Tubes Used: R. F. Amp. 1D5G, Det.—Osc. 1C7G, I. F. Amp. 1D5G, 2nd Det. A. V. C.; 1st audio; 1F7G, Driver 1H4G, Output 1J6G.

Frequency Ranges: Range 1—530 to 1720 K. C.; Range 2—2.3 to 7.4 M. C.; Range 3—7.35 to 22 M. C.

Intermediate Frequency: 470 K. C.

Speakers: KR-17-"B" Cabinet; HR-12-"J" Cabinet.

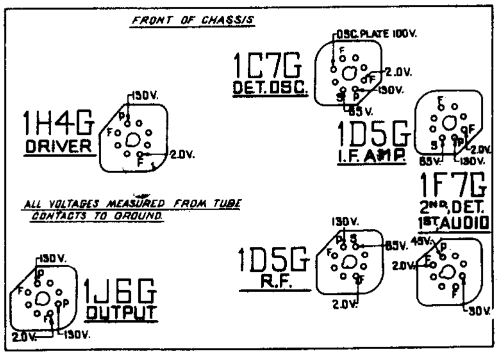


Fig. 1—Socket Voltages Underside of Chassis View

The voltages indicated by arrows were measured with a **Philco 025 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position.

Alignment of the Compensators

To accurately adjust this receiver, precision test equipment is necessary. A signal generator such as the **Philco Model 088** Signal Generator, covering from 110 to 20,000 K. C. is recommended for use in adjusting the compensators at the various frequencies specified. A visual indication of the receiver output is also necessary to obtain correct adjustment of the compensators. **Philco Model 025** Circuit Tester contains a sensitive output meter and is recommended for these adjustments.

Philco Fibre Handle Screw-Driver No. 27-7059 and Variable Condenser Part No. 45-2325 complete the necessary equipment for these adjustments. The locations of the various compensators are shown in Figs. 2 and 3.

The following procedure must be observed in adjusting the compensators:—

DIAL ADJUSTMENT—The tuning condenser is set at the maximum capacity position, by turning the tuning knob counter-clockwise. Loosen the set screw of dial hub and set dial, with Glowing Indicator centered between the first and second index lines at the low frequency end of the broadcast scale.

OUTPUT METER—The 025 Output Meter is connected between one of the plate prongs of the 1J6G tube and the chassis. Then adjust the meter to use the (0-30) volt scale.

INTERMEDIATE FREQUENCY CIRCUIT

Frequency 470 K. C.

1. Connect the 088 Signal Generator output lead, through a .1 mfd. condenser to the control grid of the 1C7G tube, and the ground connection of the output lead to the chassis.
2. Set the range switch in position No. 1 (Broadcast). Rotate the tuning condenser of the receiver to approximately 580 K. C. Then adjust the signal generator for 470 K. C.
3. Adjust compensators (30S), (30P), (28S), and (28P) for maximum output, see Fig. 2.

RADIO FREQUENCY CIRCUIT

Tuning Range (7.35 to 22 M. C.)

1. Remove the signal generator output lead from the grid of the 1C7G, and connect it through the .1 mfd. condenser to terminal No. 1 on the aerial input panel. Connect the generator ground lead to terminal No. 3. Terminals 2 and 3 of the aerial input panel must be shorted with the connector link provided on the panel during the following adjustments.
2. Set the range switch in position No. 3 (extreme clockwise). Turn the signal generator and receiver dials to 20 M. C.
3. Now adjust compensator (20B) by turning the screw (clockwise) to the maximum capacity position, then slowly turn it counter-clockwise until a second maximum peak is reached on the output meter. The first peak from maximum capacity is the image signal and the receiver must not be adjusted to it. **NOTE:** In adjusting some receivers only one peak will be observed, therefore tune the compensator to maximum on this peak. If the above procedure is correctly performed, the image signal will be found at 19.060 M. C., by advancing the signal generator input, and turning the receiver dial to this frequency mark on the scale.
4. Leaving the signal generator and receiver dials at 20 M. C. the antenna and R. F. compensators (4B) and (16B) are now adjusted, by connecting a variable condenser (Philco Part No. 45-2325) across the oscillator compensator (20B) contact (first contact from the left side of the receiver facing rear underside view of the chassis) and ground. Now tune the added condenser until the second harmonic of the receiver oscillator beats against the signal from the generator, resulting in a maximum indication on the output meter. **NOTE:** It may be necessary to increase the signal generator output to obtain a signal of sufficient strength for reading on the output meter. Compensators (4B) and (16B) are now adjusted for maximum output. After these adjustments, remove the external condenser and readjust compensator (20B) as given in paragraph 3 above.

Tuning Range 2.3 to 7.4 M. C.

1. Turn the range switch to position No. 2 (middle range). Rotate the signal generator and receiver dials to 7.0 M. C. Then adjust compensator (20A) for maximum output.
2. Now turn the signal generator and receiver dials to 6 M. C. and adjust compensators (4A) Ant., and (16A) R. F. for maximum output.

Tuning Range 530 to 1720 K. C.

1. Turn the range switch to position No. 1 (Broadcast). Set the 088 signal generator indicator and the receiver dial to 1600 K. C.

   Now adjust compensators (20) osc., (4) ant. and (16) R. F. for maximum output.
2. The low frequency end of this range is now adjusted as follows: Turn the signal generator and receiver dials to 580 K. C. Now tune compensator (19) for maximum output, then vary the tuning condenser of the receiver for maximum output about the 580 K. C. dial mark. Turn compensator (19) slightly to the right or left and vary the receiver turning condenser for maximum output. If the output reading increases, turn compensator (19) in the same direction a trifle more and again vary the tuning condenser for maximum output. This procedure of first setting the compensator, and then varying the tuning condenser, is continued until there is no further gain in the output reading. When a decrease in output is noted turn the compensator in the opposite direction.
3. Set the signal generator and receiver dials as given in Paragraph 1 above and adjust compensator (20) for maximum output.
4. Now turn the signal generator and receiver dials to 1500 K. C. and adjust compensators (4) ant. and (16) R. F. for maximum output.

NOTE: See page 237 before servicing this set.

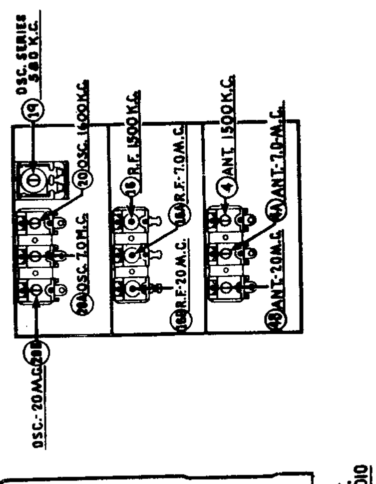


Fig. 3—R. F. Compensators, Under Side of Chassis

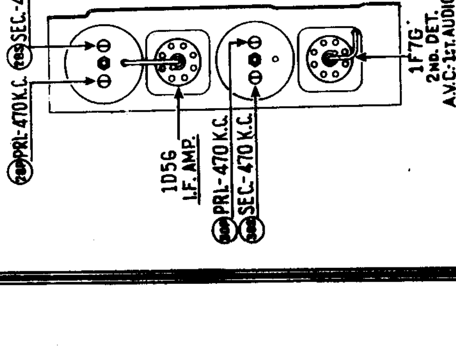


Fig. 2—I. F. Compensators, Top of Chassis

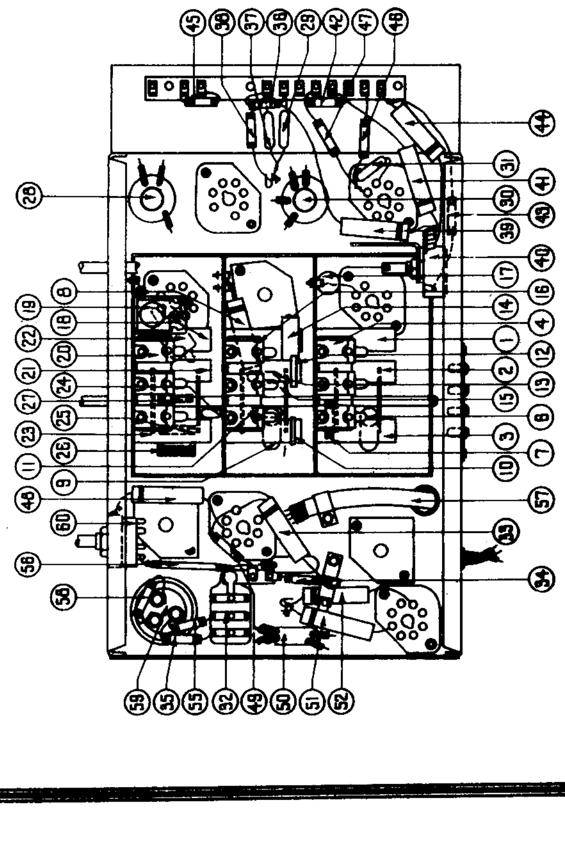


Fig. 4—Parts Location, Under Side of Chassis

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-630

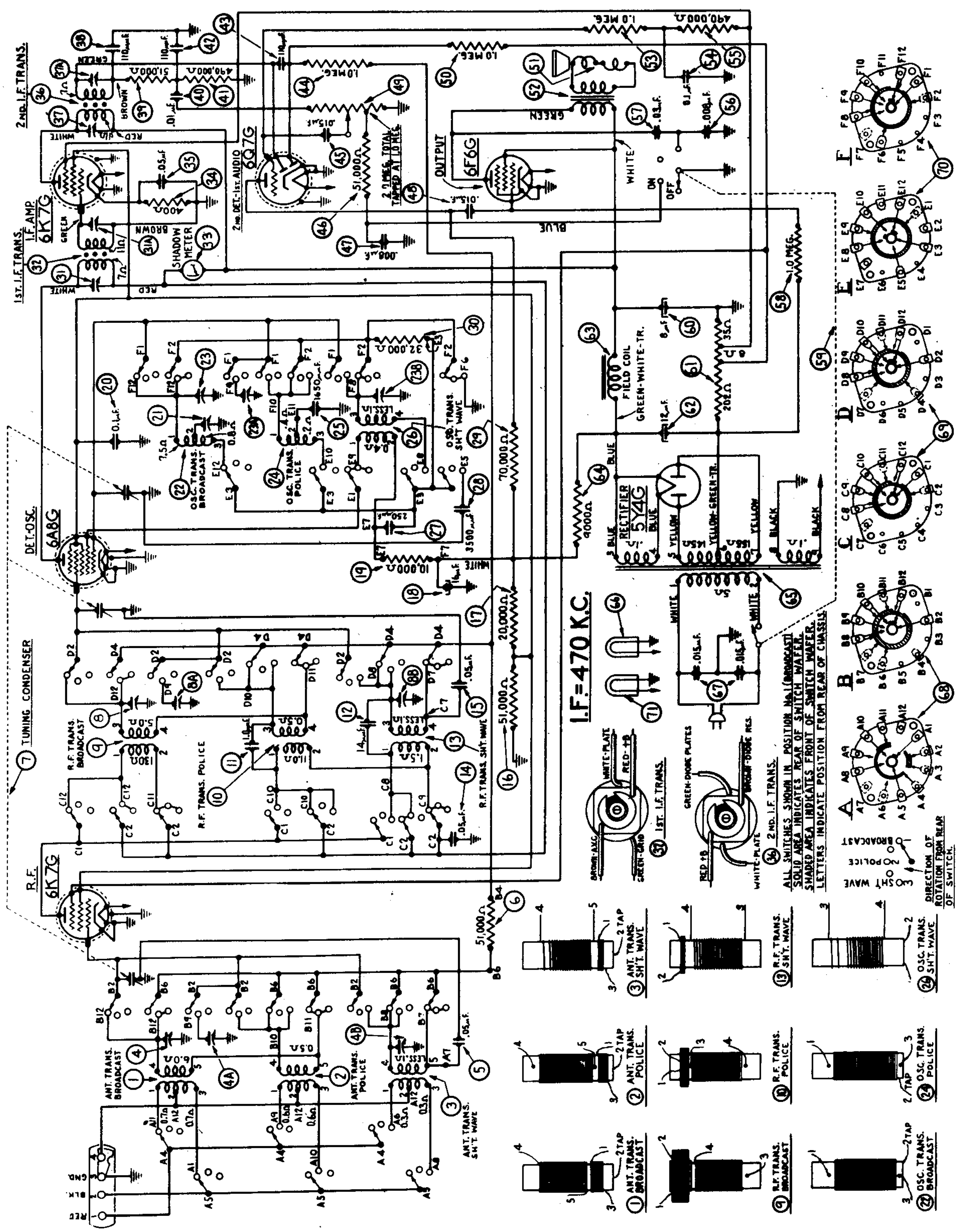


Fig. 5—Schematic Diagram

NOTE: See page 237 before servicing this set.

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MODEL 37-630

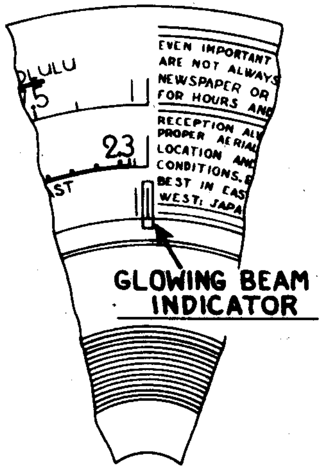


Fig. 2—Dial Calibration

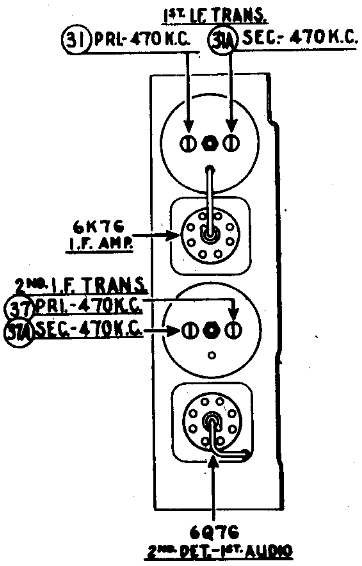


Fig. 3—Locations of I. F. Compensators

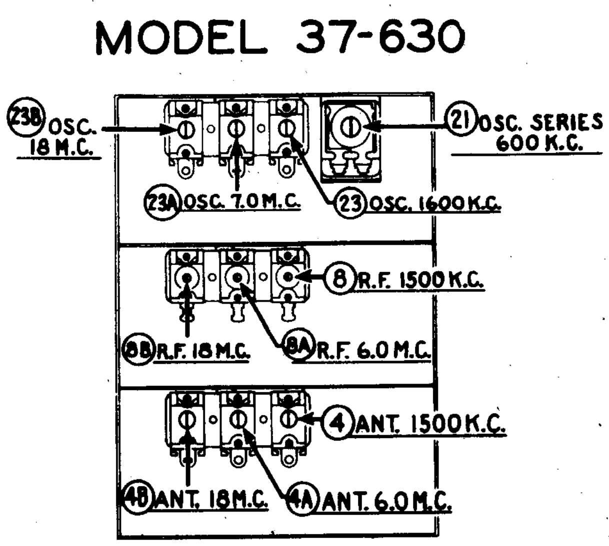


Fig. 4—Locations of R. F. Compensators

Alignment of the Compensators

The accurate adjustment of the various compensating condensers is vital to the proper functioning of this receiver. There are four compensating condensers in the I. F. Circuit, four in the Oscillator Circuit, three in the R. F. Amplifier Circuit and three in the Antenna Circuit. Incorrect adjustment will cause loss of sensitivity, unsatisfactory tone, and poor selectivity.

To accurately adjust this receiver, precision test equipment is necessary. A signal generator such as the PHILCO MODEL 088 SIGNAL GENERATOR, covering from 110 to 20,000 K. C. is recommended for adjusting the compensators at the various frequencies specified. A visual indication of the receiver output is also necessary to obtain correct adjustment of the compensators. PHILCO MODEL 025 CIRCUIT TESTER contains a sensitive output meter and is recommended for these adjustments.

Philco Fibre Handle Screw-driver No. 27-7059 completes the necessary equipment for these adjustments. The locations of the various compensators are shown in Figs. 3 and 4.

The following procedure must be observed in adjusting the compensators:—

Dial Calibration—In order to adjust this receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, rotate the tuning condenser control to the extreme counter-clockwise position (maximum capacity). Loosen the screw of dial hub, then turn dial until the glowing indicator is centered on the first index line of dial scale (see Fig. 2). Now tighten the dial hub set screw in this position.

Shadow Meter Adjustment—Remove aerial and allow tubes to warm up. Then adjust shadow meter as follows:

1 Move the Shadow meter coil backwards and forwards, until the shadow is within one-eighth of an inch of each side of the screen.
2 Remove the Rectifier tube from its socket, and rotate the shadow meter coil for minimum shadow width.
3 Replace the Rectifier tube. The shadow should then return to maximum width or within one-eighth of an inch of each side of the screen. If the shadow does not return to maximum width, operations 1 and 2 should be continued until it does.

Output Meter—The 025 Output Meter is connected to the plate and cathode terminals of the (6F6G) tube. Adjust the meter to use the (0-30) Volt Scale.

During the I. F. and R. F. adjustments, the signal generator output should be maintained at the lowest possible level that will give an indication on the output meter.

INTERMEDIATE FREQUENCY CIRCUIT

Frequency 470 K. C.

1 Connect the 088 Signal Generator output lead, through a .1 mfd. condenser, to the control grid of the 6A8G tube; and the ground connection of the output lead to the chassis.
2 Set the range switch in position No. 1 (Broadcast), then rotate the tuning condenser of the receiver to the maximum capacity position (counter-clockwise), and adjust the signal generator for 470 K. C.
3 Adjust compensators (37)a 2nd I. F. Sec., (37) 2nd I. F. Pri., (31)a 1st I. F. Sec., and (31) 1st I. F. Pri. for maximum reading on output meter.

RADIO FREQUENCY CIRCUIT

Tuning Range—7.3 to 22.0 M. C.

1 Remove the signal generator output lead from the grid of 6A8G tube, and connect it through a .1 mfd. condenser to terminal No. 1 on aerial input panel, and the generator ground lead to terminal No. 3, rear of chassis.
(a) Terminals 2 and 3 of aerial input panel must be connected with connector link provided on the panel, during these adjustments.
2 Set the tuning range switch in position No. 3 (Short Wave). Turn the signal generator and receiver dials to 18 M. C. and adjust compensators (23)b Osc., (8)b R. F. and (4)b Ant. for maximum output.
(a) The adjustment of the Radio Frequency compensator on the high frequency range causes a slight detuning of the oscillator circuit. In order to overcome this detuning effect, connect a variable condenser of approximately 350 mmfd., having a good vernier drive, across the oscillator section of the tuning condenser. Leaving the signal generator and receiver dials at 18 M. C., tune the added condenser so that the second harmonic of the receiver oscillator will beat against the signal from the 088 signal generator bringing in the signal. The antenna and R. F. compensators (4)b and (8)b should then be adjusted to give maximum output. Now remove the external condenser and turn compensator (23)b to maximum capacity (clockwise) then without moving signal generator or receiver tuning condenser, back off compensator (23)b (counter-clockwise) until a second peak is reached on the output meter. The first peak is caused by tuning to the image frequency signal and must not be used.

Tuning Range 2.3 to 7.4 M. C.

1 Turn the range switch to position No. 2 (police). Rotate the signal generator and receiver dials to 7.0 M. C. Then adjust compensator (23)a for maximum output. Now turn the signal generator and receiver dials to 6.0 M. C. and adjust compensators (8)a R. F. and (4)a Ant. for maximum reading on the output meter.

Tuning Range 530 to 1720 K. C.

1 Set the range switch in position No. 1 (Broadcast). Set the 088 Signal Generator indicator at 800 K. C. and the receiver dial at 1600 K. C.
(a) In adjusting the receiver at 1600 K. C. the second harmonic of 800 K. C., to which the signal generator is tuned, is used. The second harmonic of 800 K. C. is 1600 K. C. Now adjust compensators (23) Osc., (8) R. F. and (4) Ant. for maximum reading on output meter.
2 The low frequency end of the range is now tuned by turning the signal generator and receiver dials to 600 K. C. and adjusting compensator (21) Osc. Series—(see Note (a) below)—for maximum reading on output meter.
(a) While compensator (21) is being adjusted, the tuning condenser must be rolled for maximum output. This is accomplished as follows:—First tune compensator (21) for maximum output. Then vary the tuning condenser for maximum output at 600 K. C. Now retune compensator (21), and again vary the tuning condenser back and forth at 600 K. C. for maximum output. This operation of first turning the compensator then the tuning condenser is continued until maximum output is obtained at the 600 K. C. frequency.
3 After the low frequency (600 K. C.) end of the range is adjusted, the 1600 K. C. end is readjusted, as given in Paragraph (1) above, to correct any variation that the low frequency series compensator may have caused in the alignment of the high frequency end.
4 Now turn the signal generator and receiver dials to 1500 K. C. and readjust compensators (4) Ant., and (8) R. F., for maximum output.

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-630

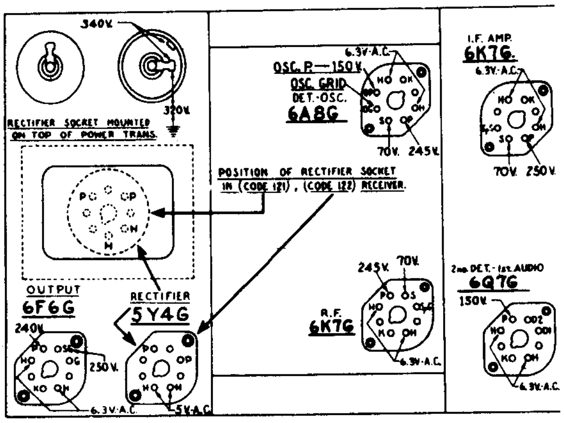
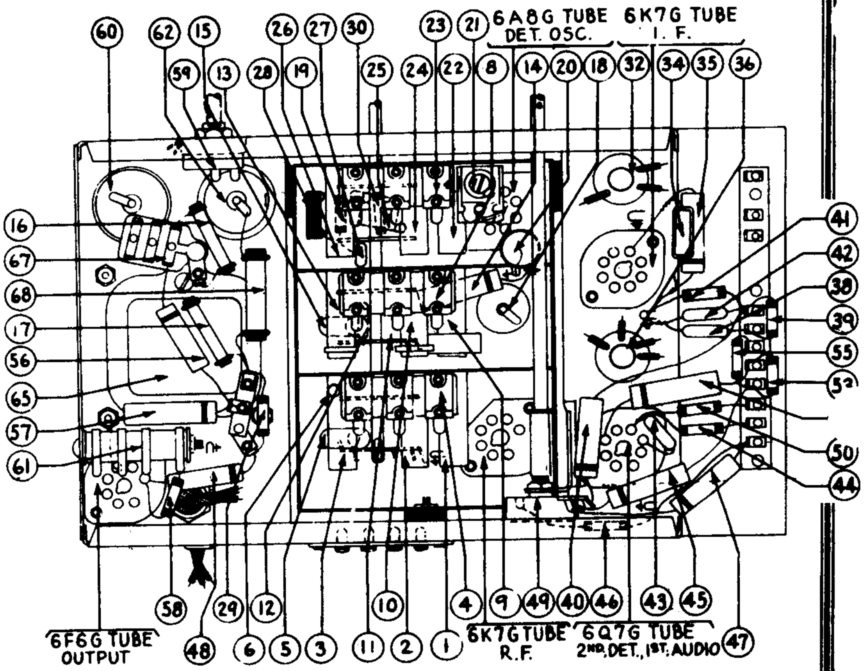


Fig. 1. Socket Voltages
Measured from Socket Contact to Ground
Underside of Chassis View

The voltages indicated by arrows were measured with a **Philco 025 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum. Range Switch in broadcast position. Line voltage 115 A.C.



NOTE: See page 237 before servicing this set.

Schematic No.	Description	Part No.	List Price
1	Antenna Transformer (Broadcast)	32-2108	$0.80
2	Antenna Transformer (Police)	32-2119	.65
3	Antenna Transformer (S. W.)	32-2109	.75
4	Compensator Ant. 1500 K. C.	31-6092	.60
5	Condenser (.05 mfd. Tubular)	30-4020	.20
6	Resistor (51000 ohms ½ watt)	33-351339	.20
7	Tuning Condenser	31-1818	4.50
8	Compensator (R. F. 1500 K.C.)	31-6092	.60
9	R. F. Transformer (Broadcast)	32-2105	.75
10	R. F. Transformer (Police)	32-2106	.65
11	Condenser (1.0 mmfd.)		
12	Condenser (14 mmfd. Mica)	30-1073	.20
13	R. F. Transformer (S. W.)	32-2126	.55
14	Condenser (.05 mfd. Tubular)	30-4123	.20
15	Condenser (.05 mfd. Tubular)	30-4020	.20
16	Resistor (51000 ohms 1 watt)	33-351439	.20
17	Resistor (20000 ohms 1 watt)	33-320439	.20
18	Electrolytic Condenser (16 mfd.)	30-2118	1.65
19	Resistor (10000 ohms ½ watt)	33-310339	.20
20	Condenser (.1 mfd. Tubular)	30-4170	.25
21	Compensator (Osc. 600 K.C.)	31-6056	.55
22	Osc. Transformer (Broadcast)	32-2120	.65
23	Compensator (Osc. 1600 K.C.)	31-6092	.60
24	Osc. Transformer (Police)	32-2121	.40
25	Condenser (1650 mmfd. Semi-fixed)	31-6096	.40
26	Osc. Transformer (S.W.)	32-2110	.75
27	Condenser (250 mmfd. Mica)	30-1032	.25
28	Condenser (3500 mmfd. Semi-fixed)	31-6097	.50
29	Resistor (70000 ohms ½ watt)	33-370339	.20
30	Resistor (32000 ohms ½ watt)	33-332339	.20
31	Compensator (1st I. F. Pri. 470 K.C.)	Part of 39	
32	1st I. F. Transformer	32-2100	1.50
33	Shadowmeter	45-2189	2.50
34	Resistor (400 ohm Bakelite)	33-1211	.20
35	Condenser (.05 mfd. Tubular)	30-4020	.20
36	2nd I. F. Transformer	32-2102	1.50
37	Compensator (2nd I. F. Pri. 470 K.C.)	Part of 42	
38	Condenser (110 mmfd. Mica)	30-1031	.20
39	Resistor (51000 ohms ½ watt)	33-351339	.20
40	Condenser (.01 mfd. Tubular)	30-4124	.25
41	Resistor (490000 ohms ½ watt)	33-449339	.20
42	Condenser (110 mmfd. Mica)	30-1031	.20
43	Condenser (110 mmfd. Mica)	30-1031	.20
44	Resistor (1 megohm ½ watt)	33-510339	.20
45	Condenser (.015 mfd. Tubular)	30-4358	.20
46	Resistor (51000 ohms, ½ watt)	33-351339	.20
47	Condenser (.006 mfd. Tubular)	30-4112	.20
48	Condenser (.015 mfd. Tubular)	30-4226	.20
49	Volume Control	33-5158	1.00
50	Resistor (1 meghom ½ watt)	33-510339	.20
51	Voice Coil and Cone, H24 Speaker	02625	1.20
	Voice Coil and Cone, K38 Speaker	36-3174	.80
52	Output Transformer, H24	2580	1.00
	Output Transformer, K38	2580	1.00
53	Resistor (1 megohm ½ watt)	33-510339	.20
54	Condenser (0.1 mfd. Tubular)	30-4122	.20
55	Resistor (490000 ohms ½ watt)	33-449339	.20
56	Condenser (.008 mfd. Tubular)	30-4112	.20
57	Condenser (.03 mfd. Tubular)	30-4380	.20
58	Resistor (1 megohm ½ watt)	33-510339	.20
59	Tone Control and A. C. Switch	42-1182	.75
60	Electrolytic Condenser (8 mfd.)	30-2024	1.10
61	Bias Resistor	33-3277	.20
62	Electrolytic Condenser (12 mfd.)	30-2117	1.20
63	Field Coil Assembly, H24 Speaker	36-3665	
	Field Coil Assembly, K38 Speaker	36-3718-01	
64	Resistor (9000 ohms, 2 watt)	33-290539	.30
65	Power Transformer (115 Volt 50-60 cycle) Code 121	32-7583	4.50
	Power Transformer (115 Volt 25-40 cycle) Code 121	32-7584	6.50
	Power Transformer (115 Volt 50-60 cycle) Code 122	32-7626	4.25
	Power Transformer (115 Volt 50-60 cycle) Code 122	32-7627	

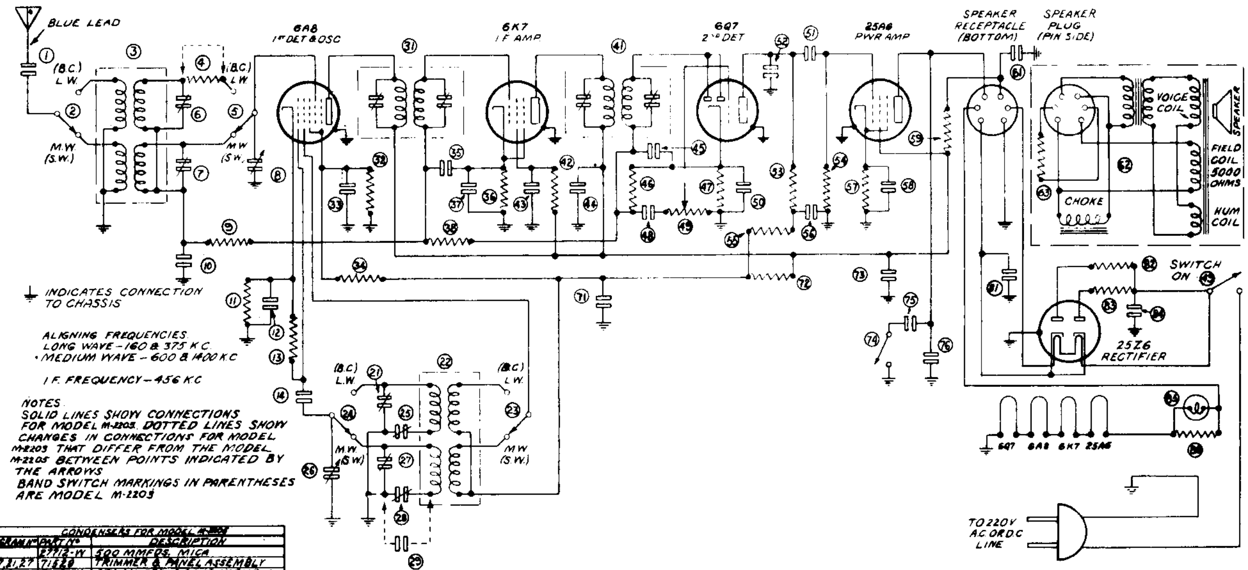
Figures in black type indicate circled figures in Base View.

Schematic No.	Description	Part No.	List Price
66	Pilot Lamp	34-2039	$0.15
67	Condenser (.015-.015 mfd. Double Bakelite)	3793 DG	.40
68	Wave Switen Antenna	42-1170	1.10
69	Wave Switch R. F.	42-1171	1.00
70	Wave Switch Osc.	42-1172	1.10
	Wave Switch Indexing Plate & Shaft	42-1173	.50
	Pilot Lamp Assembly	38-7706	.35
	Dial	27-5203	.50
	Dial Hub	28-7187	.12
	Dial Clamp	28-2837	.10
	Dial Hub Set Screw	W-1641	.02
	Dial Gear	28-7185	.10
	Dial Guard	27-8324	.02
	Thrust Spring	28-8611	.01
	Thrust Washer	28-3976	Per C .30
	"C" Washer	28-3904	.01
	Drive Gear	31-1884	.25
	Vernier Drive	31-1871	.75
	Mask	27-5198	.30
	Mask Arm Assembly	31-1866	.35
	Mask Guide on Lamp Bracket Support	28-7844	.15
	Mask Washer	27-8318	Per C .50
	Dial Screen Assem	38-7912	.30
	Spring	28-8624	Per C .50
	Lens	27-8310	.02
	Volume Control Shaft	28-6499	.10
	Volume Control Shaft Spring	28-4117	Per C .40
	Retaining Clips	28-8610	.03
	Washer	28-4186	Per C .75
	Socket 8 prong	27-6058	.11
	Socket 7 prong	27-6057	.11
	Tube Shield	28-2726	.10
	Tube Shield Base	28-3898	.03
	I. F. Shield	38-7763	.20
	Terminal Panel I. F. Unit	38-7703	.25
	Washer I. F. Unit	28-4001	Per C .25
	Wiring Panel	38-6306	.03
	Wiring Panel Power Unit	38-5864	.02
	Grommet Mtg. Tuning Condenser	27-4325	.02
	Grommet R. F. Unit	27-4317	.04
	Sleeve Mtg. R. F. Unit	28-2257	.01
	Spacer Mtg. R. F. Unit	27-8339	Per C .40
	Screw Mtg. R. F. Unit	W-729	Per C .45
	Washer Mtg. R. F. Unit	28-3927	.01
	Insulator Mtg. Electrolytic Condenser	27-7194	.01
	Bracket Mtg. Electrolytic Condenser	6440	.05
	Antenna Panel	38-7714	.15
	Speaker Cable	L-2181	.25
	A. C. Cord	L-2183	.40
	Knobs Tuning	27-4330	.10
	Knobs Tuning Vernier	27-4331	.10
	Knobs Wave Switch	27-4326	.10
	Knobs Tone & Volume	27-4332	.10
	Shadowmeter Lamp Shield	28-2917	.02
	Shadowmeter Mtg. Spring	28-8623	
	MODEL T CABINET		
	Besel Frame & Plate Assembly	40-5937	
	Besel Frame Gasket	27-8311	
	Besel Frame Rubber	5198	.01
	Besel Frame Glass	27-8298	.05
	Besel Frame Ring	28-3967	.35
	Speaker K-38	36-1262	
	Baffle & Silk Assembly	40-5973	
	MODEL X CABINET		
	Besel Frame & Plate Assembly	40-5945	
	Besel Frame Gasket	27-8312	
	Besel Frame Glass	27-8299	
	Besel Frame Ring	28-3987	
	Speaker H-24	36-1224	
	Baffle and Silk Assembly	40-5972	

Prices Subject to Change Without Notice

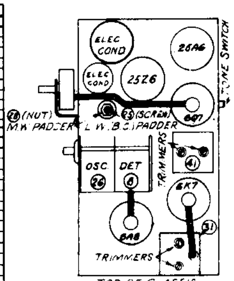
PILOT RADIO CORPORATION

MODELS M-2203 & M-2205



CONDENSERS FOR MODEL M-2205		
DIAGRAM Nº	PART Nº	DESCRIPTION
1	27712-W	500 MMFDS. MICA
6,7,21,27	71520	TRIMMER & PANEL ASSEMBLY
8,26	71181-C	405 MMFDS. 2 GANG VARIABLE
10,35	22055-H	.02 MFD. 200 V. PAPER
12	22055-I	.05 MFD. 200 V. PAPER
14	27723-0	50 MMFDS. MICA
25	72355-H	DUAL PADDER 20-80 MMFDS.
28		300-600 MMFDS.
33,43	22055-P	.05 MFD. 400 V. PAPER
36	22055-L	.1 MFD. 400 V. PAPER
44	22055-AE	.25 MFD. 400 V. PAPER
45,52	27701-W	250 MMFDS. MICA
48,51	22055-A	.01 MFD. 600 V. PAPER
50,58	22481	10 MFDS. 25 V. ELECTROLYTIC
61		12 MFDS.
73	78594	4 MFDS. ELECTROLYTIC-250 V.
81		16 MFDS.
71	78595	4 MFDS. 250 V. ELECTROLYTIC
75	22055-Y	.03 MFD. 1000 V. PAPER
76,84	22055-U	.01 MFD. 1000 V. PAPER
87	22055-M	.1 MFD. 200 V. PAPER
CONDENSERS FOR MODEL M-2203		
SAME AS FOR MODEL 2205 WITH FOLLOWING CHANGES:		
25	71503-E	SINGLE PADDER 300-600 MMFDS.
29	27734-W	6000 MMFDS. MICA (REPLACES 28)
MISCELLANEOUS LIST FOR MODEL M-2203		
SAME AS FOR MODEL 2205 WITH FOLLOWING CHANGES:		
3	71169	ANTENNA COIL ASSEMBLY
22	71170	OSCILLATOR COIL ASSEMBLY

MISCELLANEOUS LIST FOR MODEL M-2205		
DIAGRAM Nº	PART Nº	DESCRIPTION
2,5,23,24	72352	BAND SWITCH
3	71173	ANTENNA COIL ASSEMBLY
22	71174	OSCILLATOR COIL ASSEMBLY
31	73082-A	1ST I.F. TRANSFORMER
41	73010	2ND I.F. TRANSFORMER ASSY
62	78699	8" SPKR. CHOKE & RESISTOR ASSY
74	72049	TONE CONTROL SWITCH
85	72151	DIAL LAMP 6.3 V. .15 AMP.
RESISTORS FOR MODEL M-2205		
DIAGRAM Nº	PART Nº	DESCRIPTION
4	13080	50 OHMS 1/4 WATT
9	13031	100,000 OHMS 1/4 WATT
11,36	13115	400 OHMS 1/4 WATT
13,55	13164	50,000 OHMS 1/4 WATT
32	13075	15000 OHMS 1/2 WATT
34	13149	6,000 OHMS 1/4 WATT
38	13001	1 MEGOHM 1/4 WATT
42	13116	12,000 OHMS 1/4 WATT
46	13147	300,000 OHMS 1/4 WATT
49	71211	750,000 OHMS VOL. CONTROL & SW
54	13024	500,000 OHMS 1/4 WATT
57	13192	440 OHMS 1 WATT
59	78610	2500 OHMS 3 WATTS WIRE
63	78708	485 OHMS 55 WATTS WIRE
72	13133	3000 OHMS 1/4 WATT
82,83	13077	100 OHMS 1/2 WATT
86	13184	40 OHMS 1 WATT WIRE
47	13193	4500 OHMS 1/2 WATT
53	13043	150,000 OHMS 1/2 WATT
RESISTORS FOR MODEL M-2203		
SAME AS FOR MODEL M-2205 EXCEPT 9 IS NOT USED		



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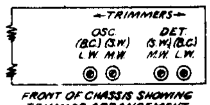


FRONT OF CHASSIS SHOWING TRIMMER ARRANGEMENT

SERVICE DATA

Line Voltage: 220 volts, A.C. or D.C.
Power Consumption: 45 watts.
Undistorted Power Output: 2 watts.
Intermediate Frequency: 456 kc.
Tube Functions: 6A8 electron emission control, oscillator-detector.
6K7 I.F. amplifier.
6Q7 detector.—amplifier.
25A6 Class A power pentode.
25Z6 rectifier.

Voltages: Read tube socket voltages with meter having resistance of at least 1,000 ohms per volt. All voltages measured to chassis.

	Osc.-Det.	I.F.	Det. Amp.	Aud. Output	Recti-fier
Tube	6A8	6K7	6Q7	25A6	25Z6
Plate	130	130	50*	180	—
Cathode	2.5	3.5	1	17.	210.
Screen	60	100	—	130	—
Filament	6.3	6.3	6.3	25.	25.

*Voltage measured through plate resistor.
Speaker field voltage, 210 volts.
Anode grid of 6A8, 100 volts.

REALIGNMENT: Should the receiver require realignment, the outlined procedure below should be followed. In the service information sheet, the location and function of the various alignment capacitors are clearly illustrated. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the speaker.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7 tube in the I.F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I.F. alignment capacitors are located at the top of the shielded I.F. Transformers. Rotate the adjusting screw of each capacitor on I.F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator leads from the type 6K7 I.F. Amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8 tube.

Now rotate each adjustment screw on I.F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I.F. Amplifier, it is essential to repeat the alignment process in both I.F. units with the external oscillator leads connected across the control grid of the 6A8 tube.

BROADCAST ALIGNMENT: After the I.F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads with a .0002 mfd. condenser in the antenna lead. Set the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1400 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response. Adjust the signal section trimmer in the same manner.

Next adjust the 600 kc. padder condenser. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1400 kc. trimmer adjustment, following in every detail the procedure previously described.

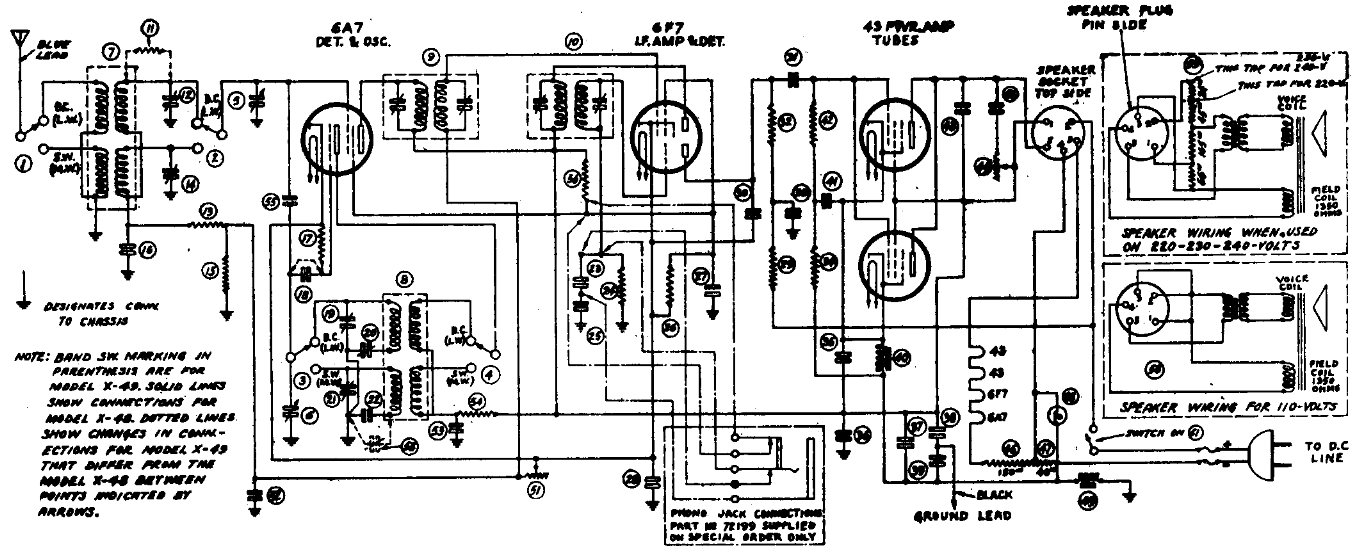
SHORT-WAVE ALIGNMENT: The procedure in aligning the short-wave bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. The alignment frequency is 16.8 Meters—(17,800 kc.) Turn the Band Switch to the right. Tune the external oscillator to 16.8 meters. Tune the receiver so that the dial pointer is in a position co-incidental with the 16.8 meter indication on the dial scale. Adjust the short wave oscillator trimmer for maximum response. Next adjust the signal circuit trimmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain.

THE LONG WAVE ALIGNMENT: Procedure in the Model 2205 is similar to the Broadcast section of that receiver. Align at 375 kc. Adjust the padder at 160 kc.

Should it be necessary to remove the band switch assembly, it is advisable to realign the receiver after reinstalling.

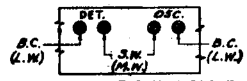
PILOT RADIO CORPORATION

MODELS X 48 & X 49



NOTES: DOT & DASH LINES SHOW CONNECTIONS FOR PHONO JACK BETWEEN POINTS INDICATED BY ARROWS

ALIGNING FREQUENCIES: MODEL X-48 BC. 600 & 1400 K.C. S.W. 18 MC. MODEL X-49 L.W. 160 & 375 K.C. M.W. 600 & 1400 K.C.

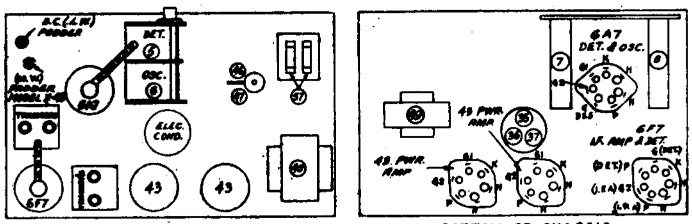


FRONT OF CHASSIS SHOWING TRIMMER ARRANGEMENT

Diagram No.	Part No.	Model X-48 Condensers — Description
12,14,19,21	71579	Trimmer & Panel Ass'y.
5,6	71646	400 mmfds. 2 gang variable
[illegible]	22065-M	.1 mfd. 200-V. paper
26,53	22065-C	.05 mfd. 600-V. paper
46	22065-V	.02 mfd. 1000-V. paper
36,39	22065-L	.1 mfd. 400-V. paper
25,41	22065-F	.25 mfd. 200-V. paper
33	22065-M	.1 mfd. 600-V. paper
43	22065-V	.01 mfd. 1000-V. paper
30	27726-W	.0002 mfds. mica
22	27734-W	.006 mfds. mica
18	28016-W	.0001 mfds. mica
55	71525-B	Neutralizing ass'y. (as reqd)
20	71503-A	Single padder 250-500 mmfds.
34,35,37	71600	4-4-4 mfds. 150-V. elect.
		Model X-48 Resistors
50	13126	25,000 ohms ½ watt
32	13171	250,000 ohms ¼ watt
13,24	13031	100,000 ohms ¼ watt
17,23,28	13164	15,000 ohms ¼ watt
44	13075	20,000 ohms ¼ watt
15	13028	1,000 ohms ¼ watt
42	13024	500,000 ohms ¼ watt
29	13001	1 meg. ohm ¼ watt
46,47	70633	150 ohms tapped at 40 ohms 20 watts
31	72262	Volume control & switch 3000 ohms (150 ohm arm)
40	70657	Tone control 10,000 ohm

Diagram No.	Part No.	Model X-48 Miscellaneous — Description
1,2,3,4	71172-B	Band switch
7	71169	Antenna coil assembly
8	71170	Oscillator coil assembly
9	70936	1st I.F. coil assembly
10	70937	2nd I.F. coil assembly
54	40001	Speaker 6 inch
58	70566	Speaker & resistor assem.
48	71382	Dial lamp 6.3 V. .25 amp
57	70069-D	Fuse .75 amp
49	71635	Power choke 300 ohm 10 henries
40	42007-B	Filter choke 450 ohm

Diagram No.	Part No.	Model X-49 same as X-48 except as follows — Description
56, 20	71577-F	Dual padder (250-500 mmfds.; 15-70 mmfds.)
7	71173	Antenna coil assembly
8	71174	Oscillator coil assembly
11	13080	50 ohm ¼ watt resistor
55	71525-B	Not used
18	28016-W	Not used
20	71503-A	Not used
22	27734-W	Not used



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I. F. ALIGNMENT: When aligning the intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The tuning condenser should be set at maximum capacity. Connect the antenna lead of the external oscillator to the control grid of the type 6F7 tube in the I. F. Amplifier stage through a 0.1 mfd. fixed condenser. Connect the ground lead of the external oscillator to the receiver ground clip. The I. F. alignment capacitors are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator leads from the type 6F7 I. F. Amplifier tube and connect it in the same manner to the control grid at the top of the type 6A7 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. Amplifier, it is essential to repeat the alignment process in both I. F. units with the external oscillator leads connected across the control grid of the 6A7 tube.

BROADCAST ALIGNMENT: After the I. F. Amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads, this time with a .0002 mfd. condenser in the antenna lead. Adjust the tuning control pointer at the 1400 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response. Adjust the signal section trimmer in the same manner.

Next adjust the 600 kc. padder condenser. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1400 kc. trimmer adjustment, following in every detail the procedure previously described.

SHORT-WAVE ALIGNMENT: The procedure in aligning the short-wave bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. A 400 ohm resistor should be inserted in the antenna lead. The alignment frequency is 16.8 Meters—(17,800 kc.).

Turn the Band Switch to the right. Tune the external oscillator to 16.8 meters. Tune the receiver so that the dial pointer is in a position coincidental with the 16.8 meter indication on the dial scale. Adjust the short wave oscillator trimmer for maximum response. Next adjust the signal circuit trimmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain.

VOLTAGES MEASURED AT TUBE SOCKETS

	6A7 Det., Osc.	6F7 Amp., Det.	43 Output	43 Output
Plate	125 (110)	125 (110)	175 (95)	175 (95)
Screen	45 (45)	45 (45)	135 (110)	135 (110)
Cathode	10 (8)	10 (8)	21* (16)*	21* (16)*
Filament	6.3 (6.3)	6.3 (6.3)	25 (25)	25 (25)

Speaker field volts—105 (105) volts.

Anode grid of 6A7—110 (80) volts.

Triode plate of 6F7—95 (70) volts.

Note: Values are given for 220-volt line. For 110-volt line use values in parentheses.

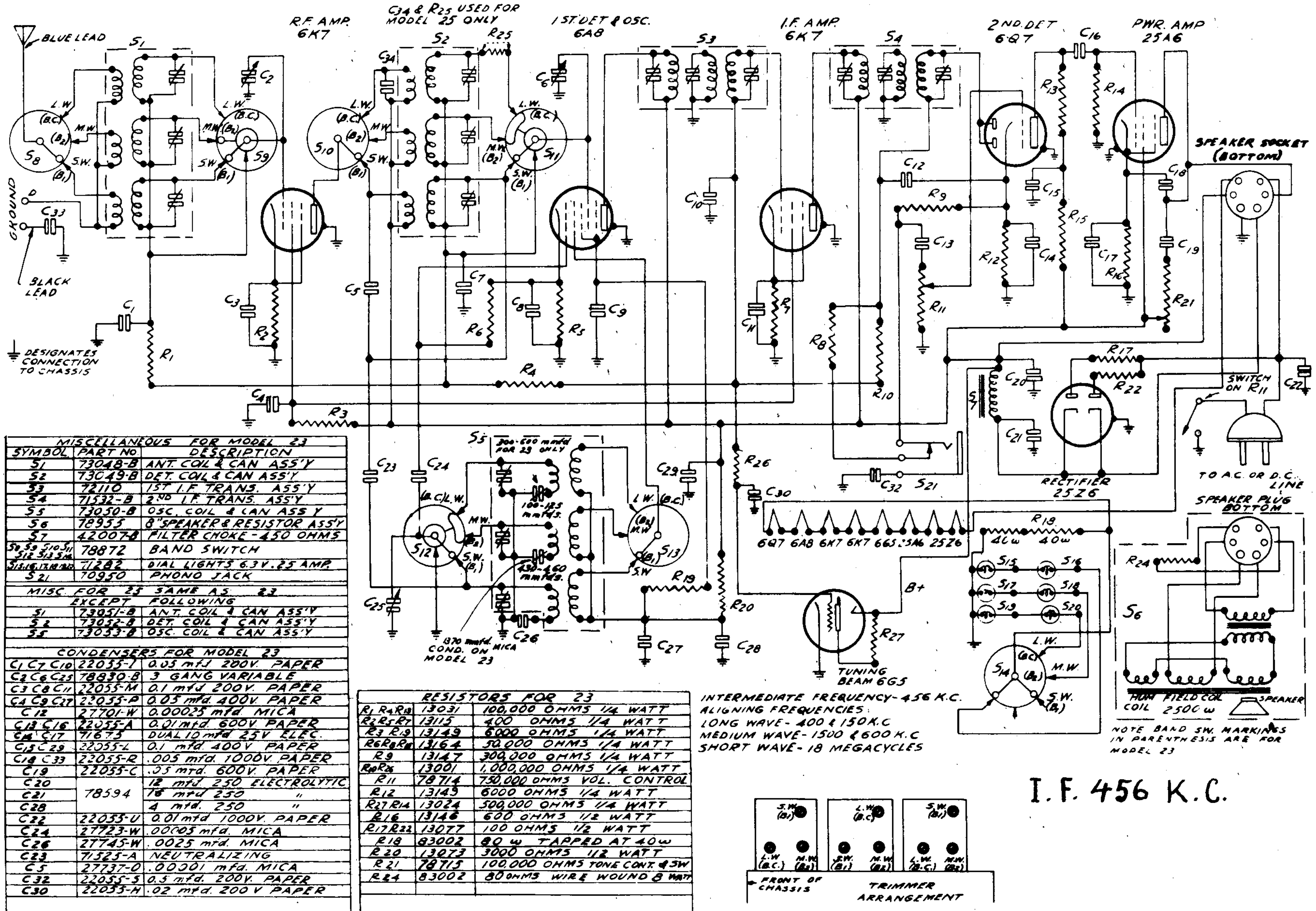
* Measured across choke No. 40

Note: All measurements made with volt meter of at least 1,000 ohms per volt.

Note: All measured to chassis frame.

PILOT RADIO CORPORATION

MODELS 23-23P-25-25P

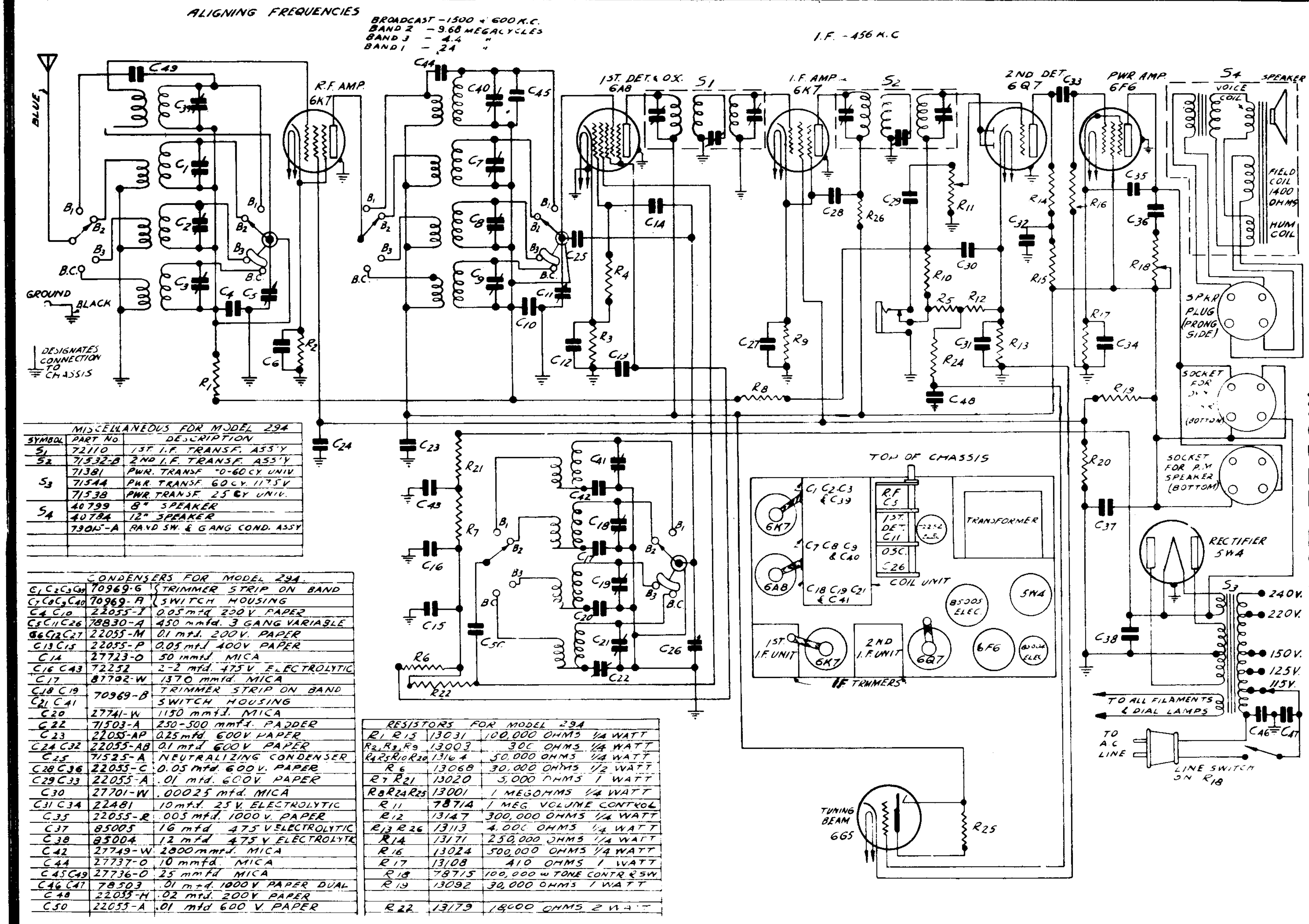


MISCELLANEOUS FOR MODEL 23		
SYMBOL	PART NO.	DESCRIPTION
S1	73048-B	ANT. COIL & CAN ASS'Y
S2	73049-B	DET. COIL & CAN ASS'Y
S3	72110	1ST I.F. TRANS. ASS'Y
S4	71532-B	2ND I.F. TRANS. ASS'Y
S5	73050-B	OSC. COIL & CAN ASS'Y
S6	78955	8" SPEAKER & RESISTOR ASS'Y
S7	42007-B	FILTER CHOKE - 450 OHMS
S8 S9 S10 S11 S12 S13 S14	78872	BAND SWITCH
S15,16,17,18,19,20	71282	DIAL LIGHTS 6.3 V. .25 AMP.
S21	70950	PHONO JACK
MISC. FOR 25 SAME AS 23 EXCEPT FOLLOWING		
S1	73051-B	ANT. COIL & CAN ASS'Y
S2	73052-B	DET. COIL & CAN ASS'Y
S5	73053-B	OSC. COIL & CAN ASS'Y

CONDENSERS FOR MODEL 23		
C1 C7 C10	22055-J	0.05 mfd. 200V. PAPER
C2 C6 C25	78830-B	3 GANG VARIABLE
C3 C8 C11	22055-M	0.1 mfd 200V. PAPER
C4 C9 C27	22055-P	0.05 mfd. 400V. PAPER
C12	27701-W	0.00025 mfd. MICA
C13 C16	22055-A	0.01 mfd. 600V. PAPER
C14 C17	71675	DUAL 10 mfd 25V ELEC.
C15 C29	22055-L	0.1 mfd. 400V PAPER
C18 C33	22055-R	.005 mfd. 1000V. PAPER
C19	22055-C	.05 mfd. 600V. PAPER
C20	78594	12 mfd. 250 ELECTROLYTIC
C21		16 mfd 250 "
C28		4 mfd. 250 "
C22	22055-U	0.01 mfd 1000V. PAPER
C24	27723-W	.00005 mfd. MICA
C26	27745-W	.0025 mfd. MICA
C23	71525-A	NEUTRALIZING
C5	27737-O	.00001 mfd. MICA
C32	22055-S	0.5 mfd. 200V. PAPER
C30	22055-H	.02 mfd. 200 V PAPER
CONDENSERS FOR MODEL 25 SAME AS FOR 23 EXCEPT FOLLOWING		
C34	27701-W	.00025 mfd. MICA

RESISTORS FOR 23		
R1 R4 R13	13031	100,000 OHMS 1/4 WATT
R2 R5 R7	13115	400 OHMS 1/4 WATT
R3 R19	13149	6000 OHMS 1/4 WATT
R6 R8 R15	13164	50,000 OHMS 1/4 WATT
R9	13147	300,000 OHMS 1/4 WATT
R10 R26	13001	1,000,000 OHMS 1/4 WATT
R11	78714	750,000 OHMS VOL. CONTROL
R12	13149	6000 OHMS 1/4 WATT
R27 R14	13024	500,000 OHMS 1/4 WATT
R16	13146	600 OHMS 1/2 WATT
R17 R22	13077	100 OHMS 1/2 WATT
R18	83002	80 w TAPPED AT 40 w
R20	13073	3000 OHMS 1/2 WATT
R21	78715	100,000 OHMS TONE CONT. & SW.
R24	83002	80 OHMS WIRE WOUND 8 WATT
RESISTORS FOR 25 SAME AS 23 EXCEPT FOLLOWING		
R25	13029	250 OHMS 1/4 WATT

PILOT RADIO CORPORATION
MODEL 294



MISCELLANEOUS FOR MODEL 294		
SYMBOL	PART No.	DESCRIPTION
S_1	72110	1ST. I.F. TRANSF. ASS'Y
S_2	71532-B	2ND I.F. TRANSF. ASS'Y
S_3	71381	PWR. TRANSF. 50-60 CY. UNIV.
	71544	PWR. TRANSF. 60 CY. 117.5 V
	71538	PWR. TRANSF. 25 CY. UNIV.
S_4	40799	8" SPEAKER
	40784	12" SPEAKER
	79015-A	BAND SW. & GANG COND. ASSY

CONDENSERS FOR MODEL 294.		
$C_1 C_2 C_3 C_{39}$	70969-G	TRIMMER STRIP ON BAND
$C_7 C_8 C_9 C_{40}$	70969-A	SWITCH HOUSING
$C_4 C_{10}$	22055-I	0.05 mfd 200 V PAPER
$C_5 C_{11} C_{26}$	78830-A	450 mmfd. 3 GANG VARIABLE
$C_6 C_{12} C_{27}$	22055-M	0.1 mfd. 200 V. PAPER
$C_{13} C_{15}$	22055-P	0.05 mfd 400 V PAPER
C_{14}	27723-O	50 mmfd. MICA
$C_{16} C_{43}$	72252	2-2 mfd. 475 V ELECTROLYTIC
C_{17}	87702-W	1370 mmfd. MICA
$C_{18} C_{19}$	70969-B	TRIMMER STRIP ON BAND
$C_{21} C_{41}$		SWITCH HOUSING
C_{20}	27741-W	1150 mmfd. MICA
C_{22}	71503-A	250-500 mmfd. PADDER
C_{23}	22055-AP	0.25 mfd. 600 V PAPER
$C_{24} C_{32}$	22055-AB	0.1 mfd 600 V PAPER
C_{25}	71525-A	NEUTRALIZING CONDENSER
$C_{28} C_{36}$	22055-C	0.05 mfd. 600 V. PAPER
$C_{29} C_{33}$	22055-A	.01 mfd. 600 V. PAPER
C_{30}	27701-W	.00025 mfd. MICA
$C_{31} C_{34}$	22481	10 mfd. 25 V. ELECTROLYTIC
C_{35}	22055-R	.005 mfd. 1000 v. PAPER
C_{37}	85005	16 mfd 475 V ELECTROLYTIC
C_{38}	85004	12 mfd 475 V ELECTROLYTIC
C_{42}	27749-W	2800 mmfd. MICA
C_{44}	27737-O	10 mmfd. MICA
$C_{45} C_{49}$	27736-O	25 mmfd MICA
$C_{46} C_{47}$	78503	.01 mfd. 1000 V PAPER DUAL
C_{48}	22055-H	.02 mfd. 200 V PAPER
C_{50}	22055-A	.01 mfd 600 V. PAPER

RESISTORS FOR MODEL 294		
$R_1 R_{15}$	13031	100,000 OHMS 1/4 WATT
R_2, R_3, R_9	13003	300 OHMS 1/4 WATT
$R_4 R_5 R_{10} R_{20}$	13164	50,000 OHMS 1/4 WATT
R_6	13068	30,000 OHMS 1/2 WATT
$R_7 R_{21}$	13020	5,000 OHMS 1 WATT
$R_8 R_{24} R_{25}$	13001	1 MEGOHMS 1/4 WATT
R_{11}	78714	1 MEG. VOLUME CONTROL
R_{12}	13147	300,000 OHMS 1/4 WATT
$R_{13} R_{26}$	13113	4,000 OHMS 1/4 WATT
R_{14}	13171	250,000 OHMS 1/4 WATT
R_{16}	13024	500,000 OHMS 1/4 WATT
R_{17}	13108	410 OHMS 1 WATT
R_{18}	78715	100,000 w TONE CONTR. & SW.
R_{19}	13092	30,000 OHMS 1 WATT
R_{22}	13179	18000 OHMS 2 WATT

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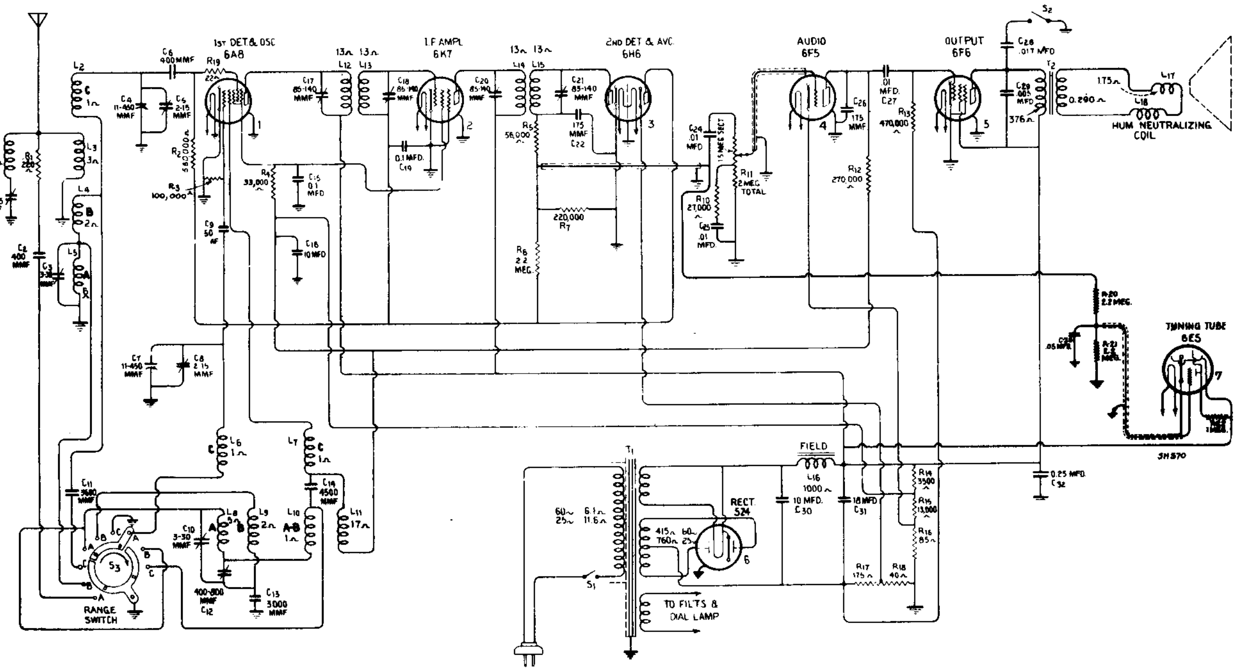
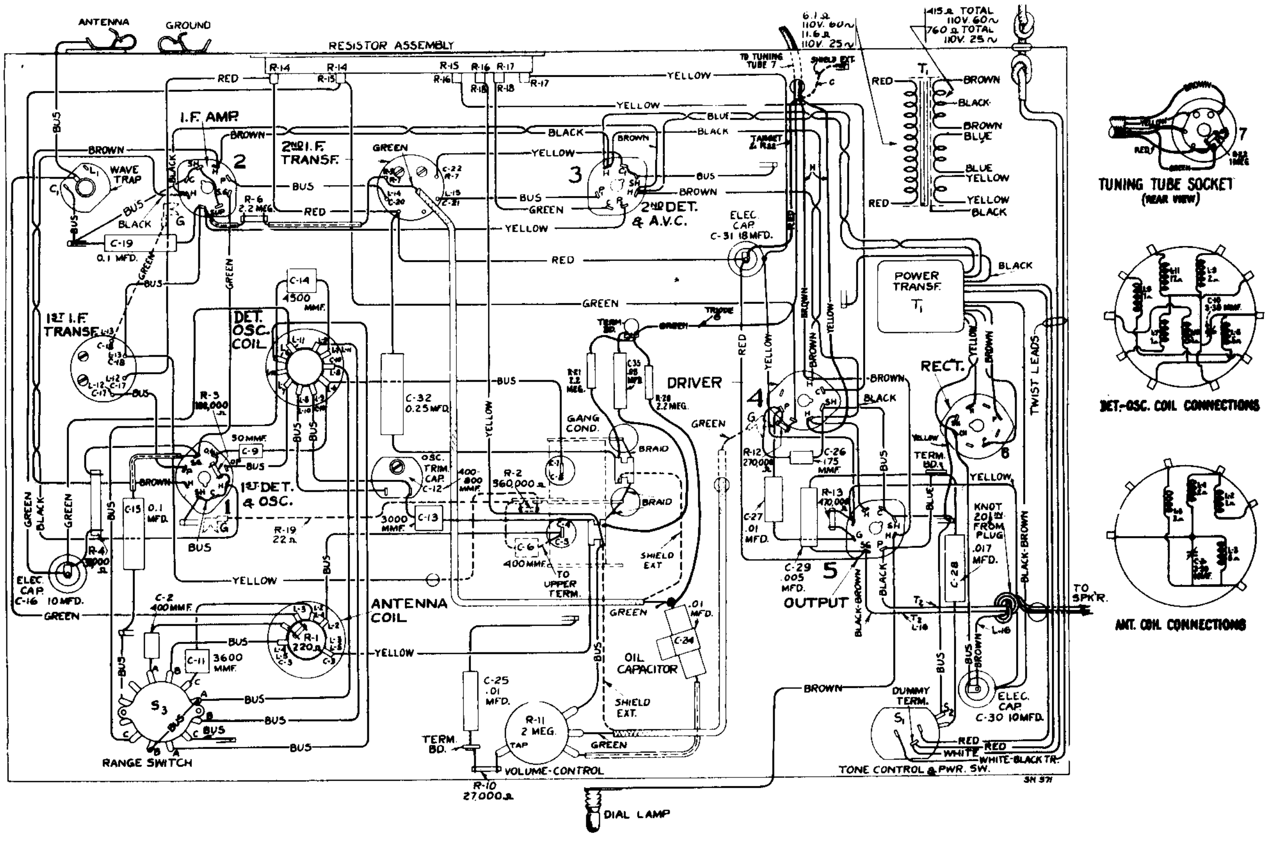
MODELS T7-12 & C7-14



Schematic Circuit Diagram

I.F. 460 K.C.



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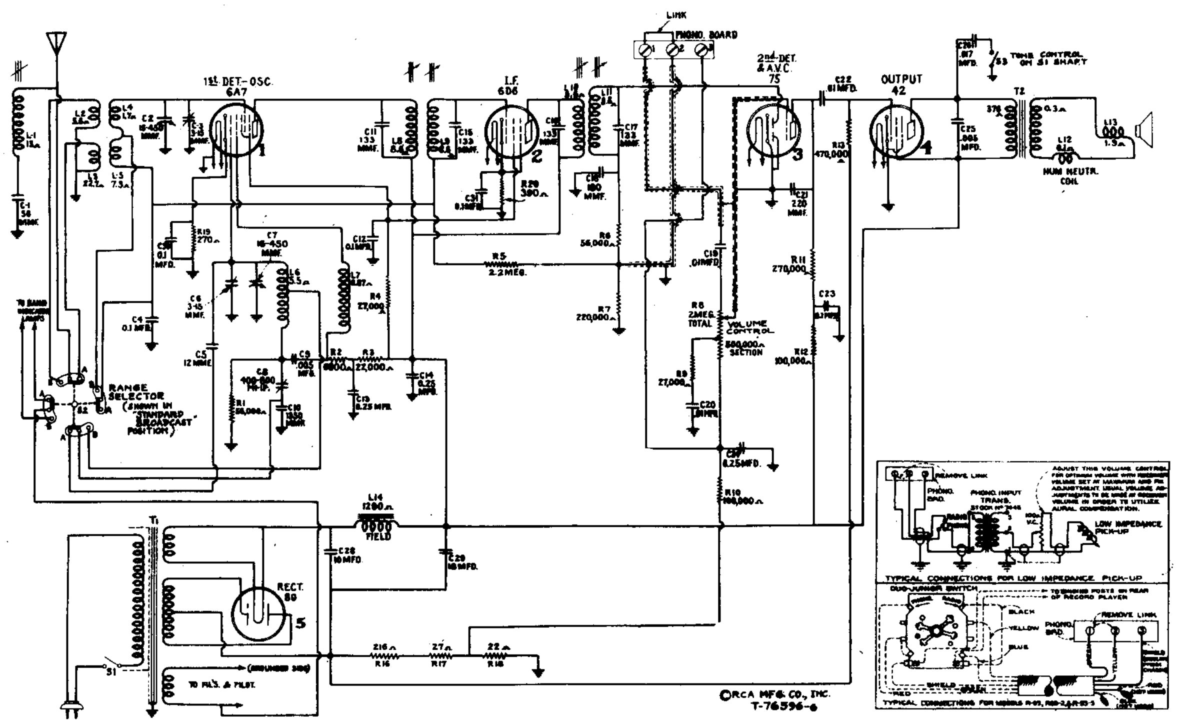
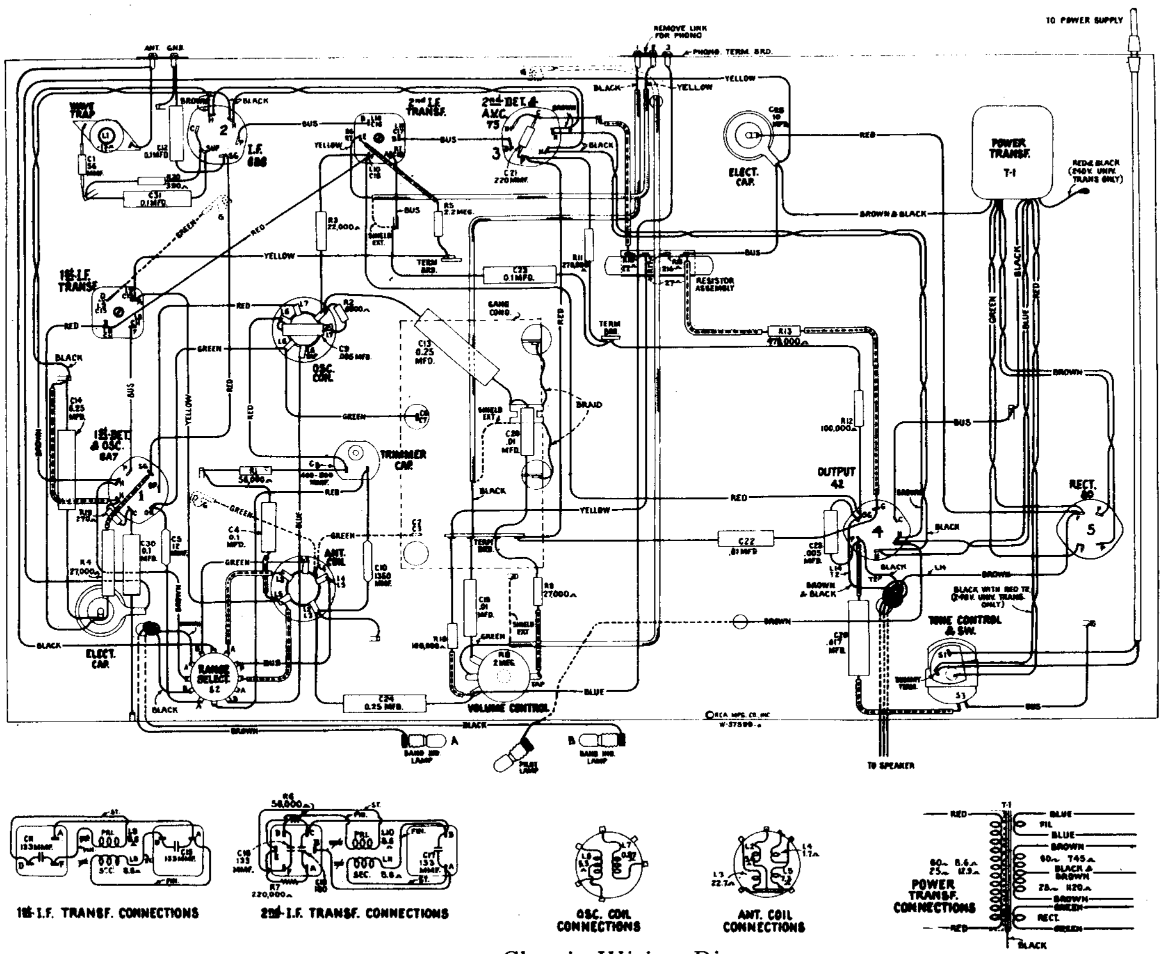
MODEL 5T



Schematic Circuit Diagram

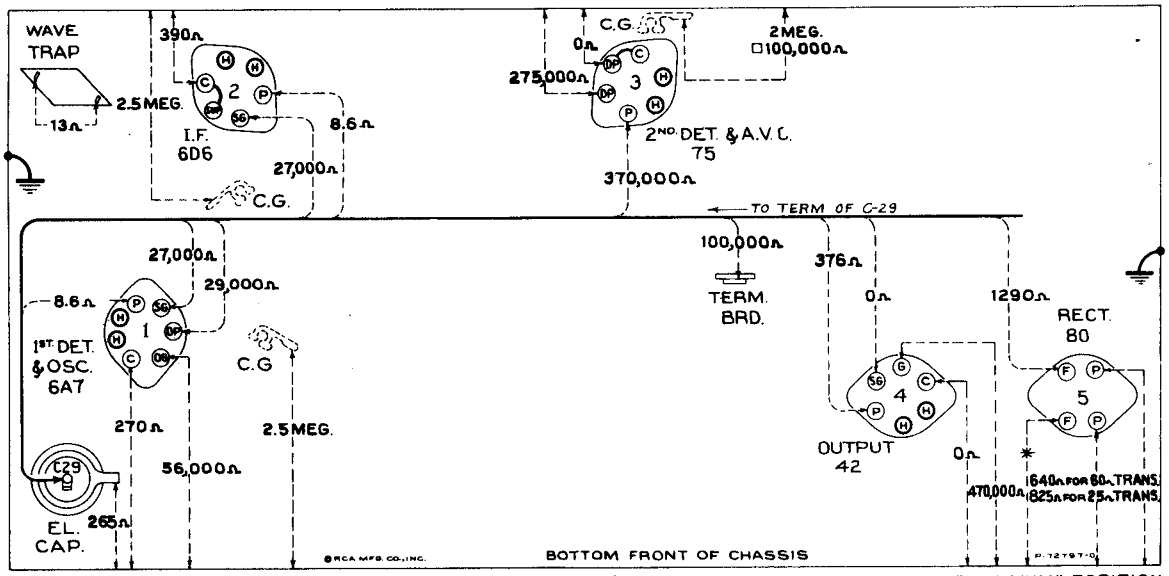


Chassis Wiring Diagram

I.F. 460 K.C.

RCA MANUFACTURING COMPANY, Inc.

MODEL 5T



*OPEN CIRCUIT (LEAKAGE OF ELECTROLYTIC CONDENSERS ONLY) □ VOLUME CONTROL AT "MINIMUM" POSITION

Figure 4—Resistance Diagram

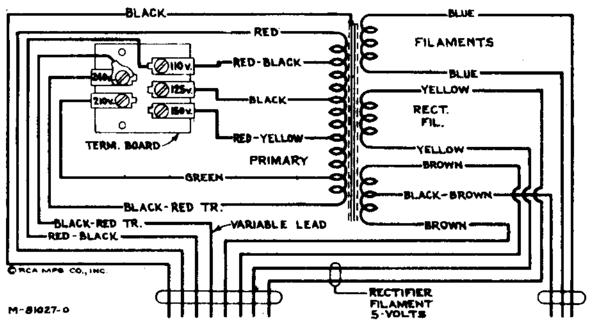
Power supply disconnected—Radiotrons in sockets—Tuning condenser in full mesh—Volume control maximum

Resistance Measurement

The resistance values shown between Radiotron socket contacts, grid caps, resistors, terminals, and receiver chassis ground, on figure 4, have been carefully selected so as to facilitate a rapid continuity check of the circuits. The use of this diagram in conjunction with the Schematic Circuit Diagram, figure 1, and Chassis Wiring Diagram, figure 2, will permit the location of certain troubles which might otherwise be difficult to ascertain. Each value as specified should hold within ±20%. Variations in excess of this limit will usually be indicative of trouble in circuit under test. Resistance values were measured with the Radiotrons in sockets; tuning condenser in full mesh, and volume control set at maximum except where otherwise noted. In all cases of measuring the resistance between points of the circuit and ground, it will be necessary to connect the negative terminal of the resistance meter to chassis-ground. If the polarity of the resistance meter is not known, it may be readily ascertained by connecting a d-c voltmeter of indicated polarity across the terminals of the device.

Phonograph Attachment

A terminal board is provided for connecting a phonograph into the audio amplifying circuit. Typical



Primary Resistance—24.5 ohms Total
Secondary Resistance—760 ohms Total

Figure 5—Universal Transformer

methods of connecting a low-impedance pick-up, or the RCA Victor Models R-93, R-93-2, and R-93S phonographs are shown on the schematic diagram

Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers

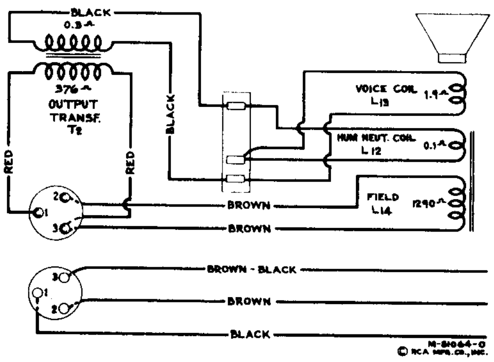


Figure 6—Loudspeaker Wiring

after first removing the front paper dust cover. This may be removed either permanently by cutting it away with a sharp knife, or by softening its cement with a very light application of acetone using care not to allow the acetone to flow down into the air gap. The dust cover may be cemented back in place with ambroid upon completion of adjustment.

RCA MANUFACTURING COMPANY, Inc.

MODEL 5T

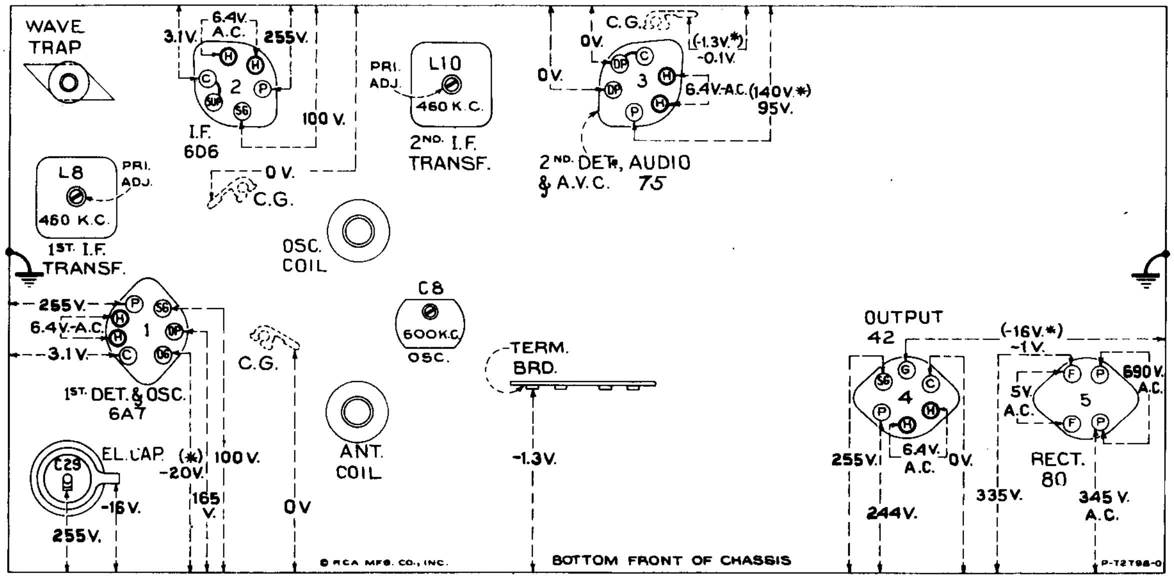


Figure 7—Radiotron Socket Voltages, Coil and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc. ("Standard broadcast")—No signal being received—Volume control minimum

Radiotron Socket Voltages

Note: *Two voltage values are shown for some readings. The higher value shown in parenthesis with asterisk (*) indicates operating conditions without voltmeter loading. The lower value is the actual measured voltage and differs from the higher value because of the additional loading of the voltmeter through the high series circuit resistance.*

The voltage values indicated from the Radiotron socket contacts, grid caps, resistors, and terminals to receiver chassis ground on figure 7 will assist in locating cause for faulty operation. Each value as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. These voltages were measured with receiver tuned to approximately 1,000 kc., no signal being received and volume control set at minimum. To duplicate the conditions under which the voltages were measured requires a 1,000 ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the voltage to be measured. A-C voltages were measured with a corresponding a-c meter.

FREQUENCY RANGES
"Standard broadcast" (A).......... 540-1,820 kc.
"Short wave" (B)................1,820-6,600 kc.

ALIGNMENT FREQUENCIES
"Standard broadcast" (A)...................... 600 kc. (osc.), 1,700 kc. (osc., ant.)
"Short wave" (B)..................None required

Intermediate Frequency..........................460 kc.

RADIOTRON COMPLEMENT
(1) RCA-6A7...............First Det.—Oscillator
(2) RCA-6D6.............Intermediate Amplifier
(3) RCA-75....Second Det., A-F Amp. and A.V.C.
(4) RCA-42..............Audio Power Amplifier
(5) RCA-80..................Full-Wave Rectifier

Pilot Lamps (3)..........................Mazda No. 46, 6.3 volts, 0.25 amperes

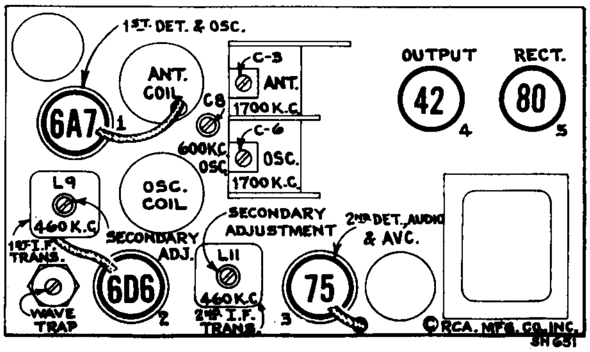


Figure 3—Radiotron, Coil, and Trimmer Locations

Wave-Trap Adjustment

Attach the output of the test oscillator to the receiver "Antenna" terminal through a **200 mmfd. (important)** capacitor. The ground connections remain connected together. Leave the test oscillator adjusted to **460 kc.** and range selector in "Short wave" position as before. Then adjust the wave-trap screw to the point which causes maximum suppression of the **460 kc.** signal.

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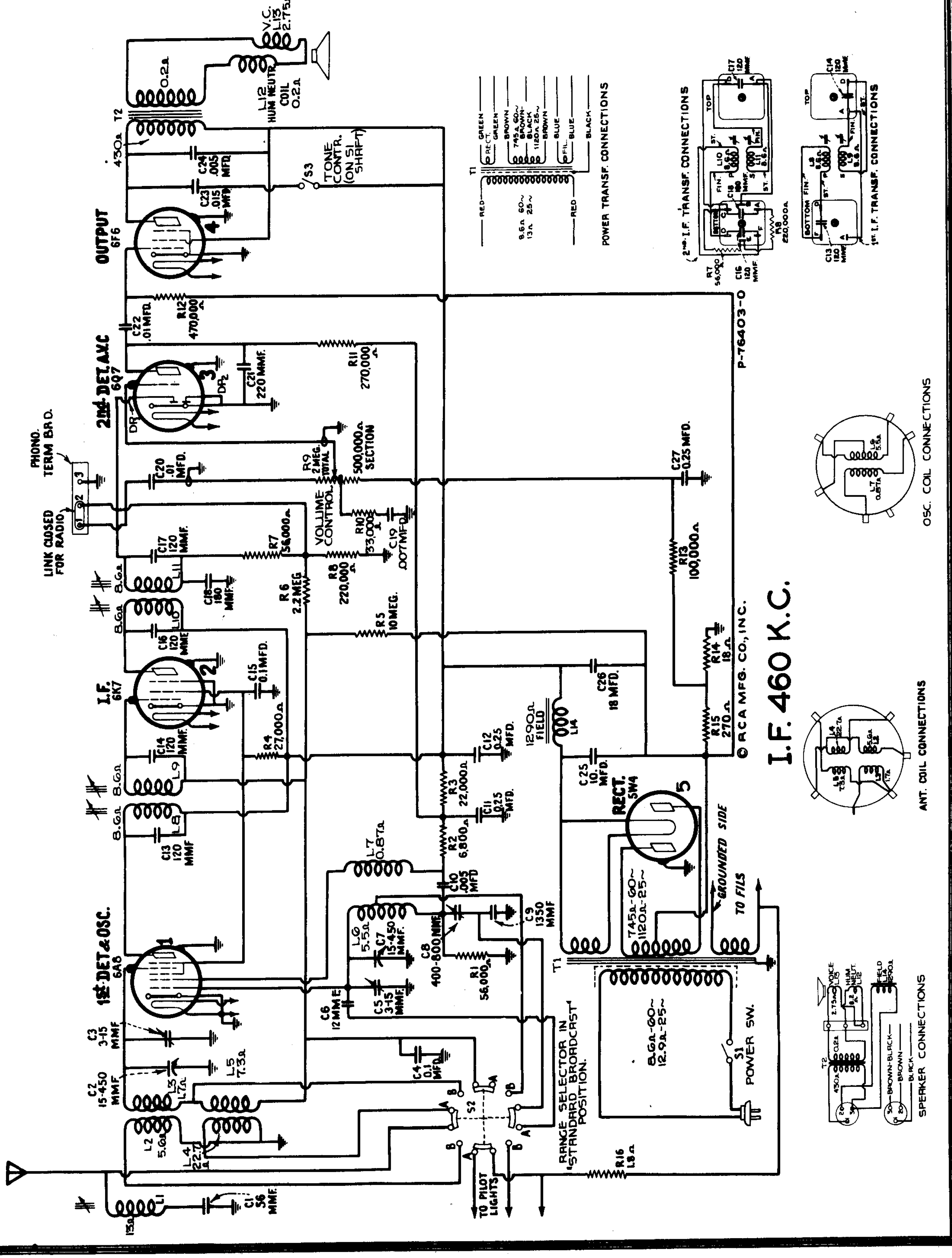
MODELS 5T6-5T7 & 5T8



RCA MANUFACTURING COMPANY, Inc.
MODELS 5T6-5T7 & 5T8

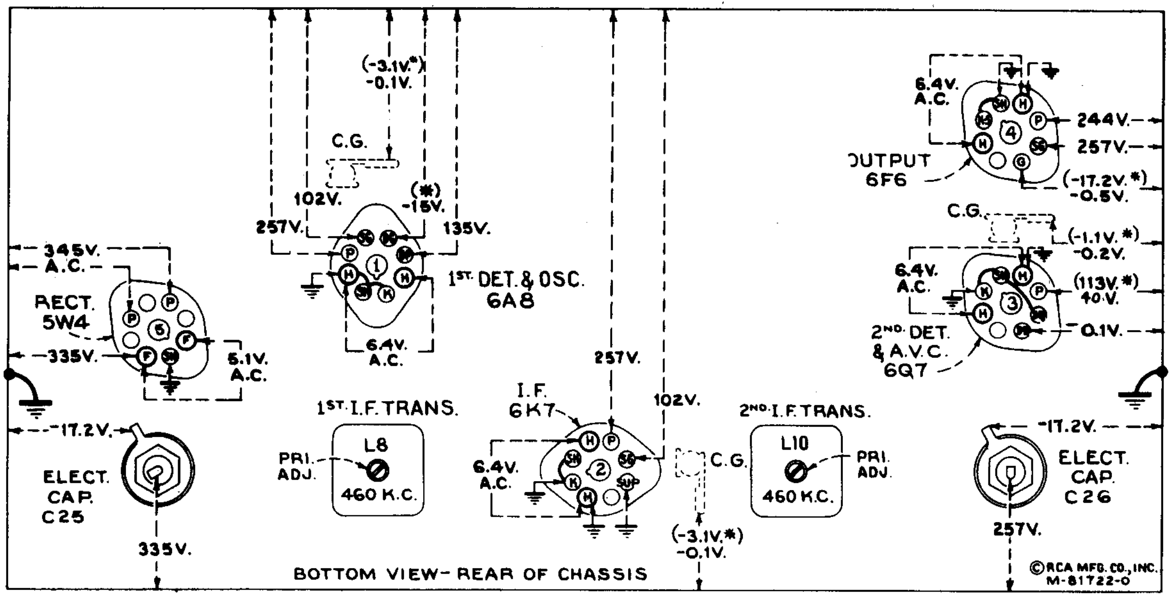


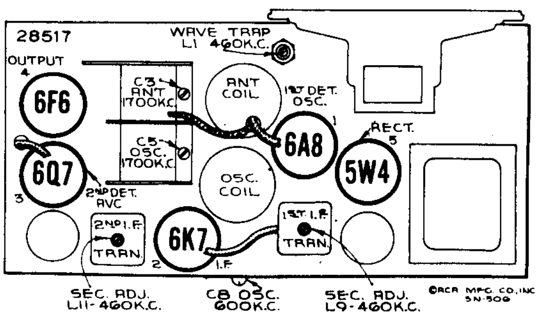
Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard broadcast")— No signal being received—Volume control minimum

Radiotron Socket Voltages

***Note:** Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.*

The voltage values indicated from the Radiotron socket contacts, grid caps, resistors, and terminals to receiver chassis ground on figure 4 will assist in locating cause of faulty operation. Each value as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.



Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals Under Conditions Similar to Those of Voltage Measurements

(1) RCA-6A8—1st Det.—Osc. .... 11.7 ma.
(2) RCA-6K7—I. F. Amp. .... 9.4 ma.
(3) RCA-6Q7—2nd Det., A.V.C. and A. F. ... 0.3 ma.
(4) RCA-6F6—Power Amp. .... 39.6 ma.
(5) RCA-5W4—Rectifier. .... 61.0 ma.*

* Cannot be measured at socket.

Order of Alignment	Test Oscillator: Connection to Receiver	Test Oscillator: Dummy Antenna	Test Oscillator: Frequency Setting	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain	Adjustment Location
1	6K7 i-f Grid Cap	.001 Mfd.	460 kc	No signal 550-750 kc	2nd i-f Trans.	L11 and L10	Max. (peak)	Figs. 1-4
2	6A8 Det. Grid Cap	.001 Mfd.	460 kc	No signal 550-750 kc	1st i-f Trans.	L9 and L8	Max. (peak)	Figs. 1-4
3	Ant. Post	200 Mmfd.	460 kc	No signal S. W. Band	Wave Trap	L1	Minimum Output	Fig. 1
4	Ant. Post	200 Mmfd.	600 kc	600 kc	L-F Osc.	C8	Max. (peak)	Fig. 1
5	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	H-F Osc.	C5	Max. (peak)	Fig. 1
6	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	Ant.	C3	Max. (peak)	Fig. 1
7	Ant. Post	200 Mmfd.	600 kc	Rock thru 600 kc	L-F Osc.	C8	Max. (peak)	Fig. 1
8	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	H-F Osc.	C5	Max. (peak)	Fig. 1
9	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	Ant.	C3	Max. (peak)	Fig. 1

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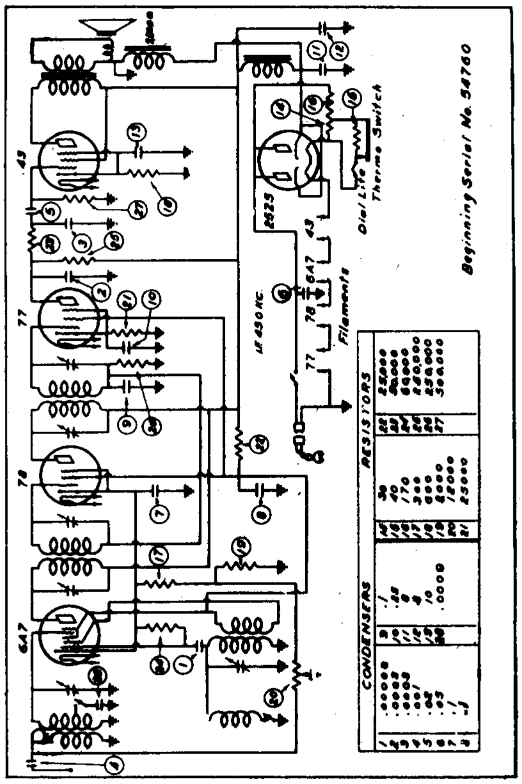
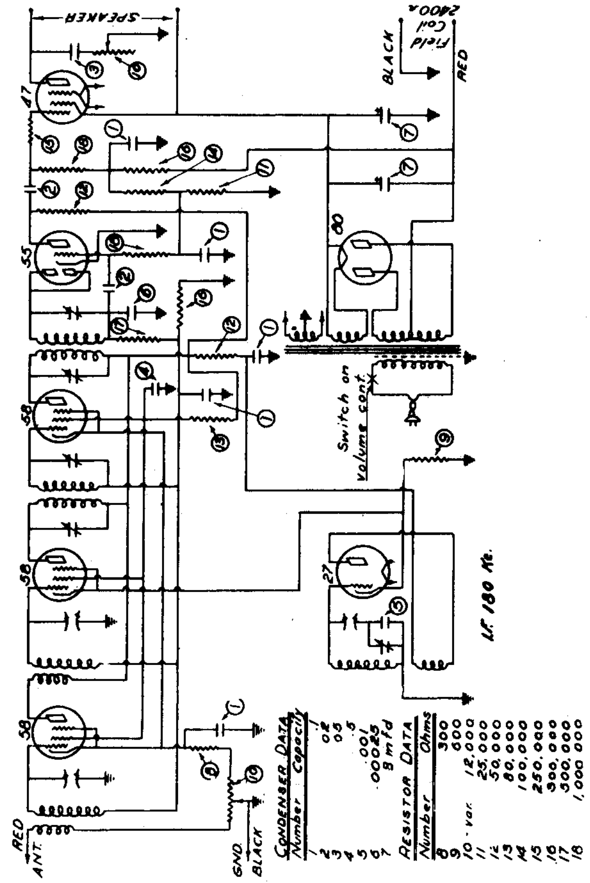
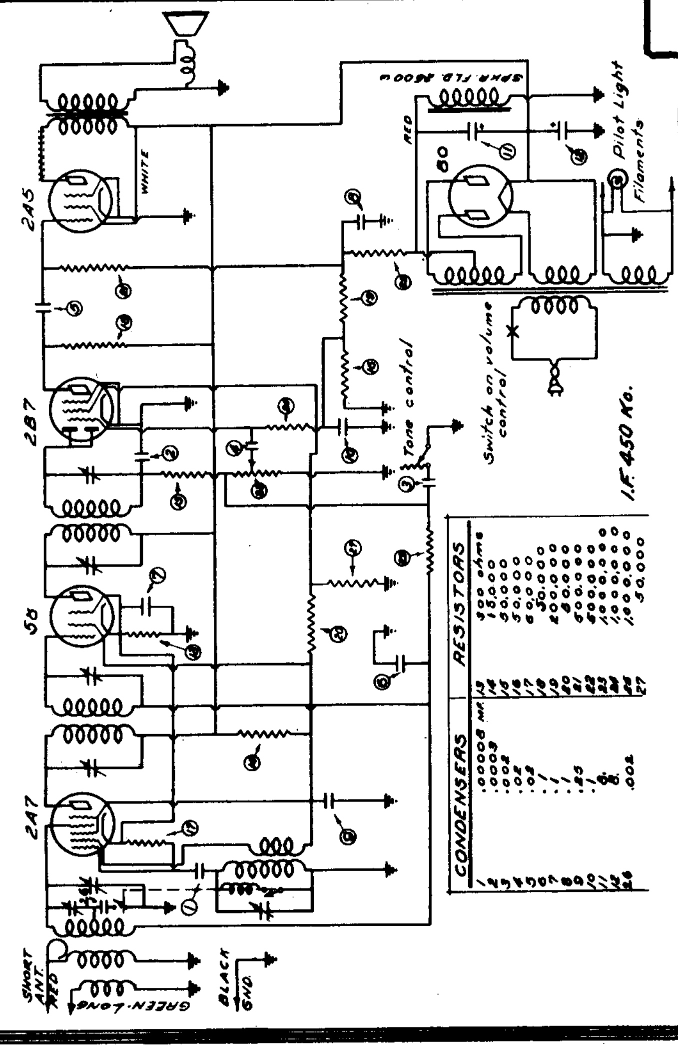


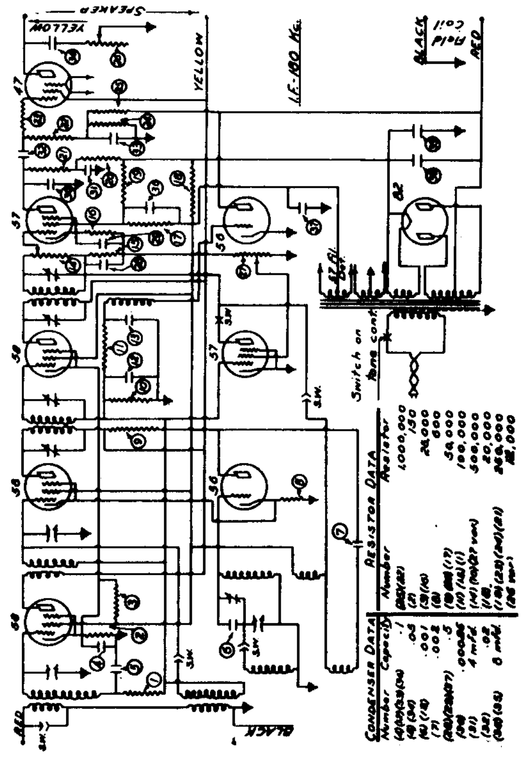
Model 26 - 1935 (REVISED)



Model 15C



Model 21-4



Model 15-3

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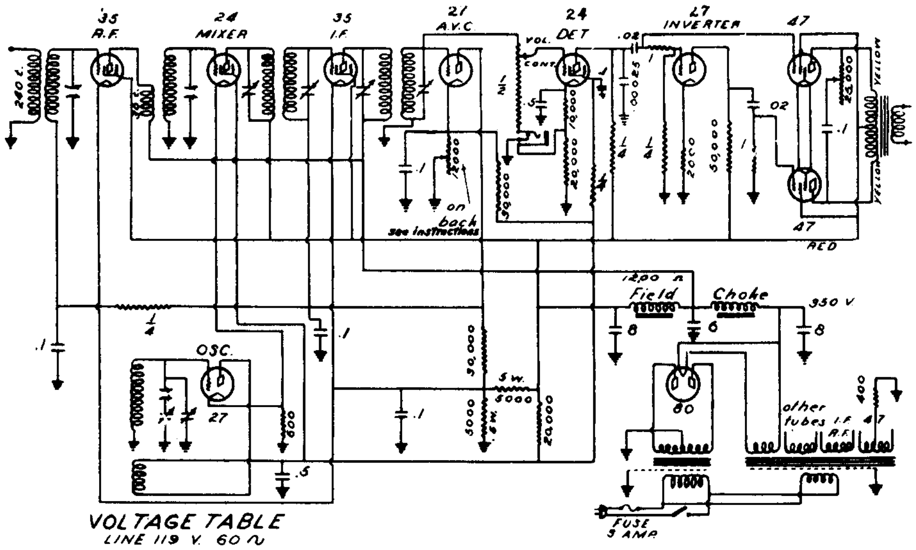
MODEL 19



VOLTAGE TABLE
LINE 119 V. 60 ~

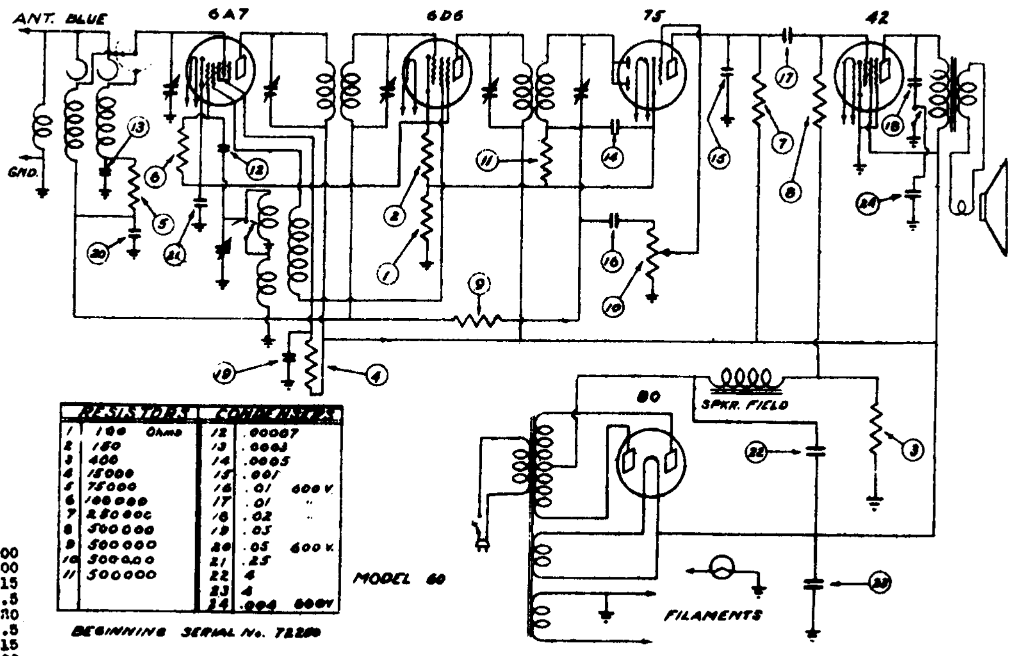
TUBE	POSITION	FIL.V.	GRID. V.	PLATE V.	S.G.V.
35	R.F.	2.4	3-30	176	75
24	MIXER	2.4	5	225	66
27	OSC.	2.4	5	65	X
35	I.F.	2.4	3-30	175	75
27	A.V.C.	24	15	135	X
24	DET.	2.4	5-	120	66
27	INVERTER	2.4	5	80	X
47	POWER	2.5	16	205	215
80	RECTIFIER	4.8			

SPEAKER LEADS
RED - Field and center tap trans.
BLUE - Field
YELLOW - Primary of transformer

I.F. 180 Kc

MODEL 60

6A7 - Pentagrid converter
6D6 - Triple grid super control amplifier
75 - Double diode high-mu triode
42 - Power Amplifier
80 - Full wave rectifier -
Type 50, 6-8 volt dial lamps



RESISTORS		CONDENSERS	
1	100 Ohms	12	.00007
2	150	13	.0003
3	400	14	.0005
4	15000	15	.001
5	75000	16	.01 600 V.
6	100000	17	.01 "
7	250000	18	.02 "
8	500000	19	.05
9	500000	20	.05 600 V.
10	500000	21	.25
11	500000	22	4
		23	4
		24	.004 600V

MODEL 60

BEGINNING SERIAL No. 72280

I.F. PEAK 450 K.C.

VOLTAGE READINGS FOR SERVICE WORK FOLLOW:

A.C. Voltages

Line	120
Filaments	6
Filament rectifier	4.5

D.C. Voltages (No signal)
From ground to:

80	Rectifier filament	200
42	Plate	200
42	screen grid	215
42	Grid bias supply	16.5
75	Plate	130
75	Cathode	1.5
6D6	Plate	215
6D6	Screen grid	100
6D6	Cathode	4.5
6A7	Plate	215
6A7	Screen grid	100
6A7	Cathode	4.5
6A7	Oscillator anode	100

Readings with 1000 Ohm per volt meter.

The antenna and mixer coils are located adjacent to the variable condenser while the oscillator coil is located under the condenser. The short-wave coils are mounted near the broadcast oscillator coil. Trimmers for the oscillator and mixer circuits are on the variable condenser. The first I.F. transformer is in the shield at the rear of the chassis while the second I.F. transformer is below the chassis. The I.F. frequency is 450 K.C.

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MODEL 64

This is a six tube superheterodyne receiver with metal tubes and short wave coverage. It is designed to operate from 110 to 125 volts, 50 or 60 cycle, alternating current power supply

INSTALLATION:

An antenna of from twenty-five to one hundred feet in length should be connected to the blue wire extending from the back of the set. The antenna and lead-in should be kept clear of all metal objects such as pipes and wires, and should be run in as straight a line as possible. An indoor antenna may be used to receive local stations or when the receiver is used in an isolated wooden building. Superior performance on short waves will result from the use of a well constructed doublet antenna or short wave antenna system. Such antennae are available on the market in kit form with complete instructions for their installation.

A good ground is essential for clearest reception. Connect the black wire to a steam or water pipe. The pipe should be scraped clean before attaching the wire.

CONTROLS:

The knob on the left is the volume control and also operates the ON and OFF switch in the extreme left position. The tone control knob is below the volume control. When turned to the left, the higher audio frequencies are suppressed and static and interfering noises are reduced. The selector knob is on the right.

The outer circle of figures on the dial is the calibration for the broadcast range which extends from 540 to 1715 kilocycles. The short wave range is indicated on the inner circle figures. This range is from 4.5 to 13 megacycles, and includes the principal American and foreign short wave bands, as well as aircraft and amateur bands. The short wave broadcast bands are indicated by the heavy bars on the scale with the corresponding wave length opposite.

The range change switch is located below the selector knob. This is a three-position switch. When in the center, or white, position, the broadcast range is covered. When turned to the left, or red, position, the short wave range is covered. Turning the switch to the right allows police calls to be received from police stations operating on the higher frequency police bands. This position is indicated by green dot. These stations may be tuned in from 1500 to 1600 on the dial. Police calls from stations operating on the lower frequency police band may be tuned in from 1600 to 1700 on the dial with the range switch in the central or standard broadcast position. Police stations operate intermittently to suit their own particular needs and are not on the air continuously as are the broadcast stations.

I.F. PEAK 450 K.C.

OPERATION:

With the line cord connected, turn the volume control to the right. The dial should light up brightly. Allow about one-half minute for the tubes to warm up and slowly turn the selector knob until the desired program is heard. If too loud, reduce the volume by turning the volume control to the left. For best quality, the selector should be adjusted to the center of the range on the dial within which the station is heard and the volume adjusted with the volume control only.

SERVICE DATA:

The following tubes are used in the receiver:

- 6A8 - Pentagrid converter
- 6K7 - Triple grid super control amplifier
- 6H6 - Diode detector
- 6F5 - Audio amplifier
- 6F6 - Power amplifier pentode
- 5Z4 - Full wave rectifier
- Type 50, 6-8 volt dial lamps

The antenna and mixer coils are located adjacent to the variable condenser, while the oscillator coils are mounted below the chassis floor. The trimmer for the short-wave section of the mixer coil is located on top of the coil form. The oscillator series padding condenser for the broadcast range is mounted at the right end of the chassis. The I.F. transformers are located within the two shield cans; trimmers for adjusting these are located in the tops of the shield cans. In removing the chassis from the cabinet, pry off the knobs with a wooden screwdriver where set screw knobs are not used.

The I. F. frequency is 450 K. C.

VOLTAGE READINGS FOR SERVICE WORK FOLLOW:

A. C. VOLTAGES:

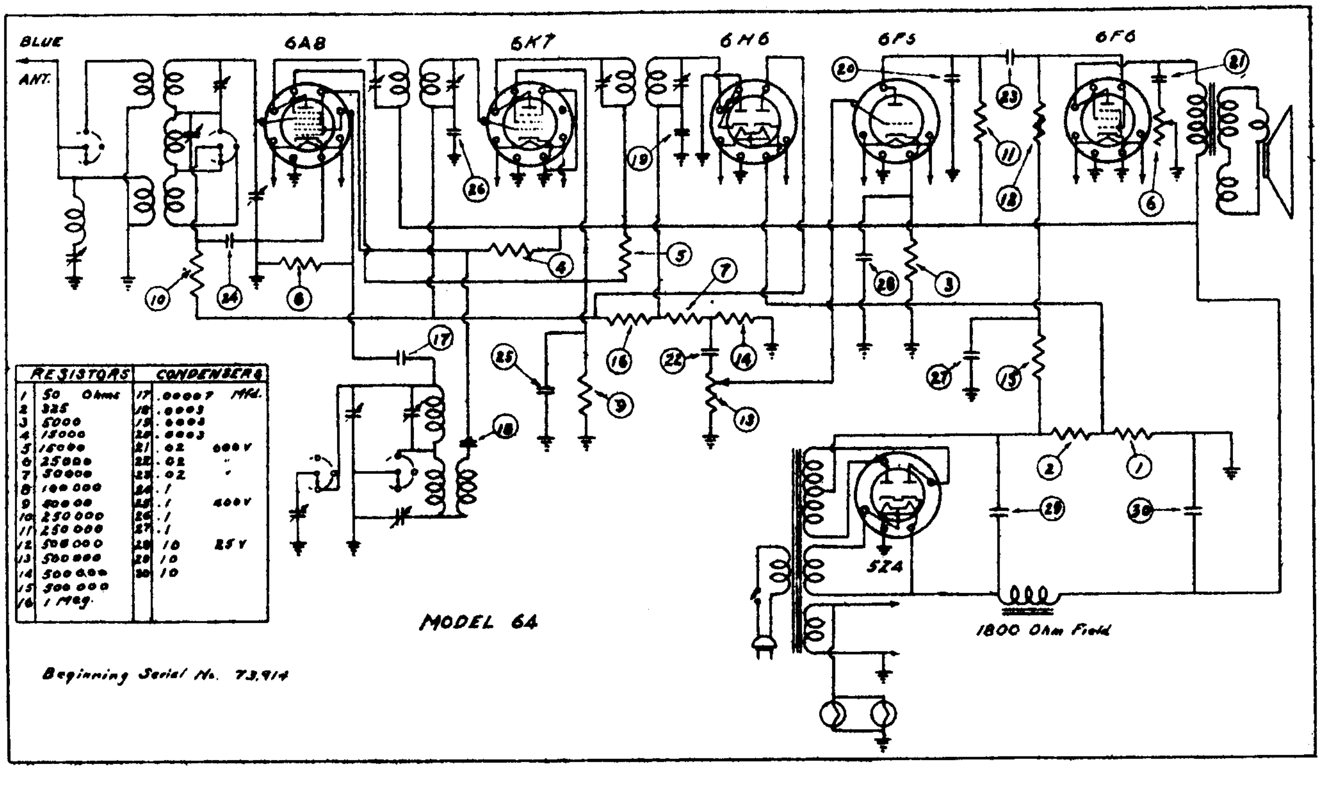
Line	120 volts
Filaments, 6A8, 6K7, 6H6, 6F5, 6F6	5.9 "
Filament, 5Z4	4.5 "

D. C. VOLTAGES: (No signal)

From ground to·

5Z4 Rectifier filament	345 volts
6F6 Plate	230 "
6F6 Screen Grid	240 "
6F6 Grid bias supply	19 "
6F5 Plate	115 "
6F5 Cathode	1.5 "
6K7 Plate	240 "
6K7 Screen Grid	120 "
6K7 Grid bias supply	3 "
6A8 Amplifier plate	240 "
6A8 Oscillator plate	180 "
6A8 Screen Grid	120 "
6A8 Grid bias supply	3 "

Readings taken with 1000-Ohm per volt meter.



RESISTORS		CONDENSERS	
1	50 Ohms	17	.00007 Mfd.
2	325	18	.0003
3	5000	19	.0005
4	15000	20	.0003
5	15000	21	.02 600 V
6	25000	22	.02 "
7	50000	23	.02 "
8	100 000	24	.1
9	40000	25	.1 400 V
10	250 000	26	.1
11	250 000	27	.1
12	500 000	28	10 25 V
13	500 000	29	10
14	500 000	30	10
15	500 000		
16	1 Meg.		

REMLER COMPANY, Ltd.

MODEL 71 8TUBE SUPERHETRODYNE

MODEL 71

This is a eight tube all-wave receiver with metal tubes. It is designed to operate from a 110 to 125 Volt, 50 or 60 cycle power supply.

INSTALLATION:

When a standard antenna is used, the length should be from 25 to 100 feet. Connect to the blue wire extending from the back of the receiver. The antenna and lead-in should be kept clear of all metal objects, such as pipes and wires, and should be run in as straight a line as possible. An indoor antenna may be used to receive local stations or when the receiver is used in an isolated wooden building. Superior performance on short waves will result from the use of a well constructed doubletantenna, or short wave antenna system. Such antennas are available on the market in kit form with complete instructions for their installation.

A good ground is essential for clearest reception. Connect the black wire to a steam or water pipe. The pipe should be scraped clean before attaching the wire.

CONTROLS:

The knob on the upper left is the volume control and also operates the ON and OFF switch in the extreme left position. The tone control is below the volume control. When turned to the left, the higher audio frequencies are suppressed and static and interfering noises are reduced. The selector knob is on the right.

The upper scale of figures on the dial is the calibration for the broadcast range which extends from 540 to 1715 kilocycles. The medium wave range is indicated by the Middle scale of figures which are colored green. This range covers from 1.7 megacycles to 5.7 megacycles and includes amateur, police, and aircraft bands The lower scale is the short-wave range and extends from 5.7 to 18 megacycles. The various foreign and American short-wave broadcast bands are included on this range and are denoted by the inscriptions on the scale.

OPERATION:

With the line cord connected, turn the volume control to the right. The dial should light up brightly. Allow about one-half minute for the tubes to warm up and slowly turn the selector knob until the desired program is heard. If too loud, reduce the volume by turning the volume control to the left. For best quality, the selector should be adjusted to the center of the range on the dial within which the station is heard and the volume adjusted with the volume control only.

SHORT-WAVE RECEPTION:

Read carefully the attached sheet on short-wave reception before attempting to tune in short-wave stations.

I.F. 450 K.C.

SERVICE DATA:

The following tubes are used in this receiver:
6K7 R.F. Amplifier
6L7 - Mixer
6C5 - Oscillator
6K7 - I. F. Amplifier
6H6 - Diode detector
6K7 - A. F. Amplifier
6F6 - Power Amplifier
5Z4 - Full-wave rectifier
Type 46, 6-8 volt dial lamps

The R.F. Mixer and oscillator coils are located in the square shields on the right end of the chassis. Trimmers for these circuits are mounted along the end of the chassis in the following order from front to rear:- R.F. short wave, mixer short wave, oscillator short wave, oscillator medium wave, oscillator broadcast. The R.F. broadcast and the mixer broadcast trimmers are mounted on the S.W. switch assembly.

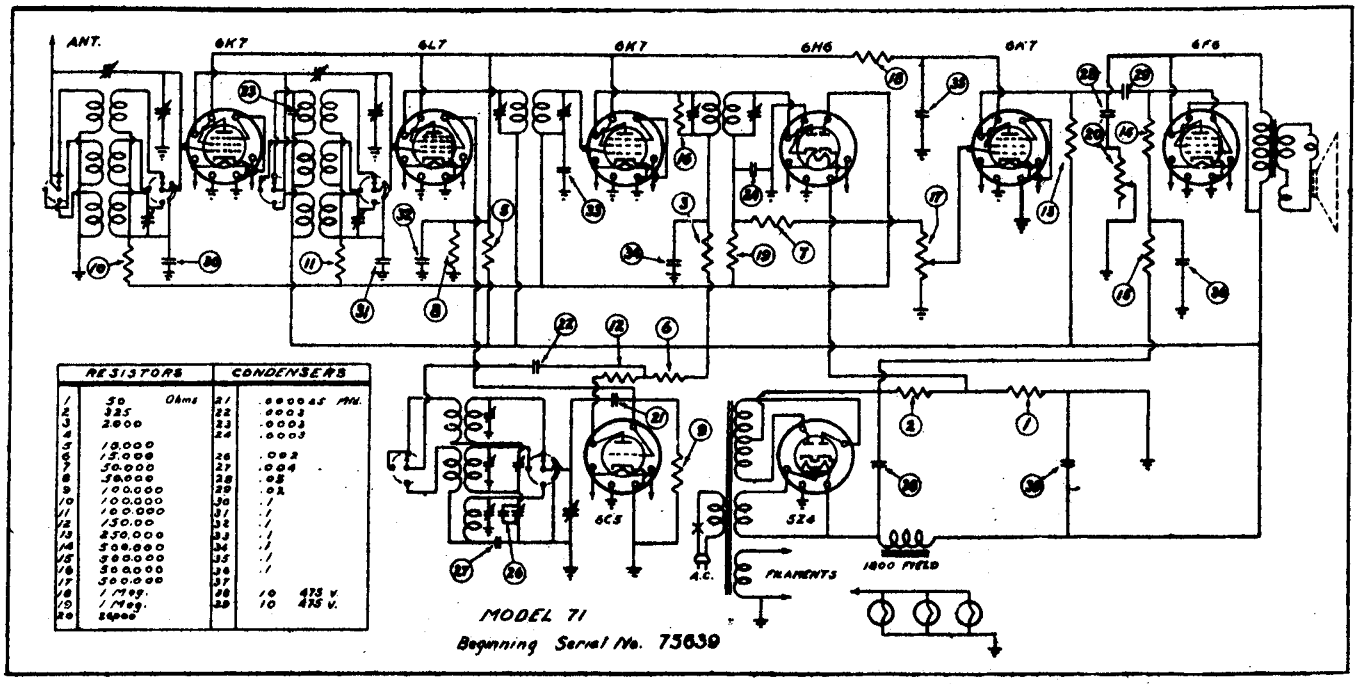
Oscillator pads are located on the back of the chassis. The broadcast pad is nearest the end of the chassis and the medium wave next.

Trimmers for the I.F. transformers are adjustable thru holes in the I.F. transformer shield cans. The I.F. frequency is 450 K.C.

VOLTAGE READINGS FOR SERVICE WORK FOLLOW:

A. C. Voltages	
Line	120 volts
Heater 5Z4 Rectifier	5.25 "
Other heaters	6.1 "
D. C. Voltages (no signal)	
From ground to:	
5Z4 Rectifier	370 "
6F6 Plate	240 "
6F6 Screen	258 "
6F6 Bias Supply	-21.5 "
6K7 Audio Plate	80 "
6K7 " Screen	20 "
6K7 I.F. Plate	244 "
6K7 I.F. Screen	100 "
6K7 I.F. Grid bias	-3 "
6L7 Mixer Plate	252 "
6L7 Mixer Screen	100 "
6L7 Mixer Grid bias	-3 "
6K7 R.F. Plate	258 "
6K7 R.F. Screen	100 "
6K7 R.F. Grid bias	-3 "
6C5 Oscillator plate	180

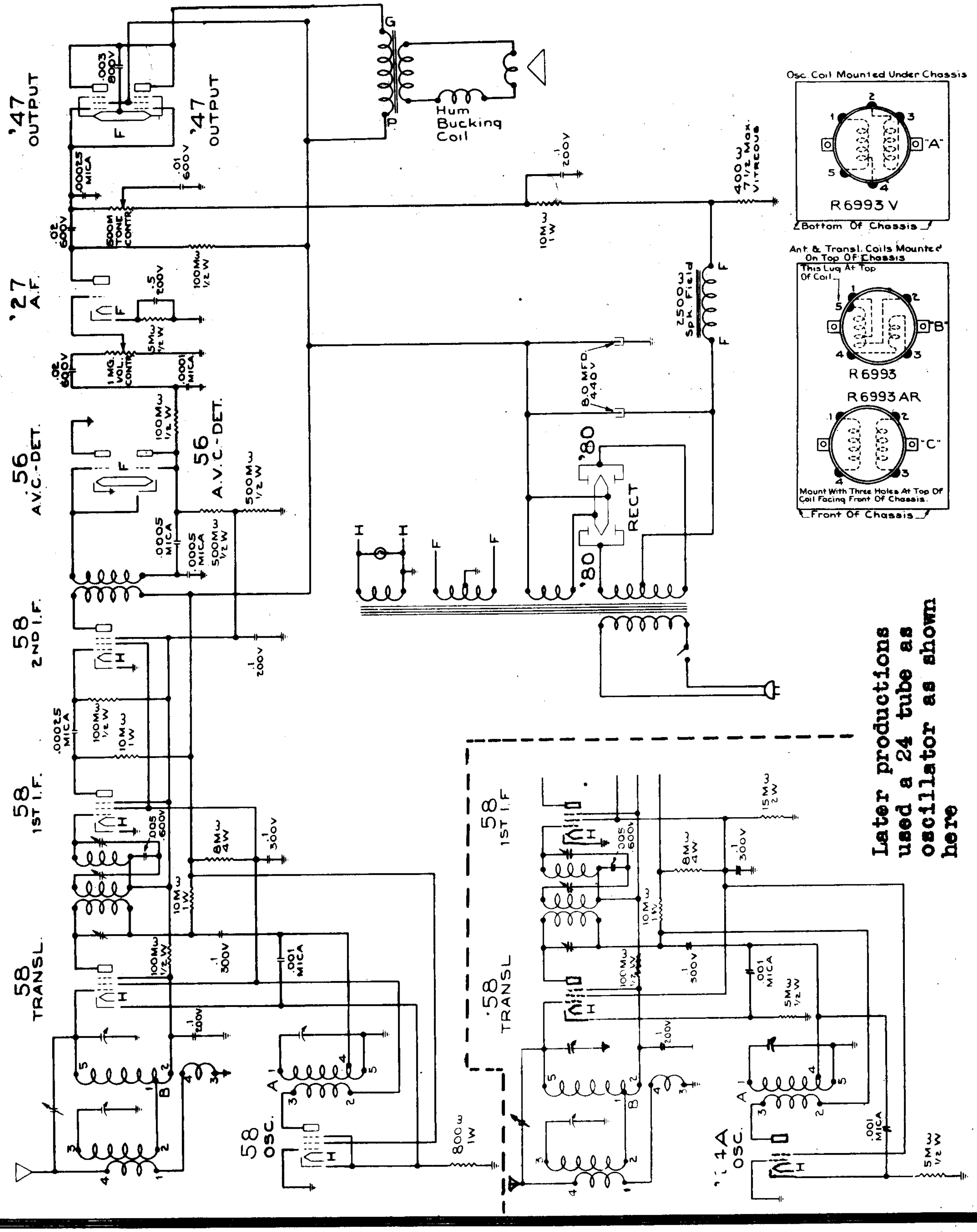
Readings taken with 1000 ohm per volt meter.



RESISTORS		CONDENSERS	
1	50 Ohms	21	.000045 Mf.
2	325	22	.0003
3	2.000	23	.0003
4		24	.0003
5	10.000		
6	15.000	26	.002
7	50.000	27	.004
8	50.000	28	.05
9	100.000	29	.02
10	100.000	30	.1
11	100.000	31	.1
12	150.00	32	.1
13	250.000	33	.1
14	500.000	34	.1
15	500.000	35	.1
16	500.000	36	.1
17	500.000	37	
18	1 Meg.	38	10 475 V.
19	1 Meg.	39	10 475 V.
20	24000		

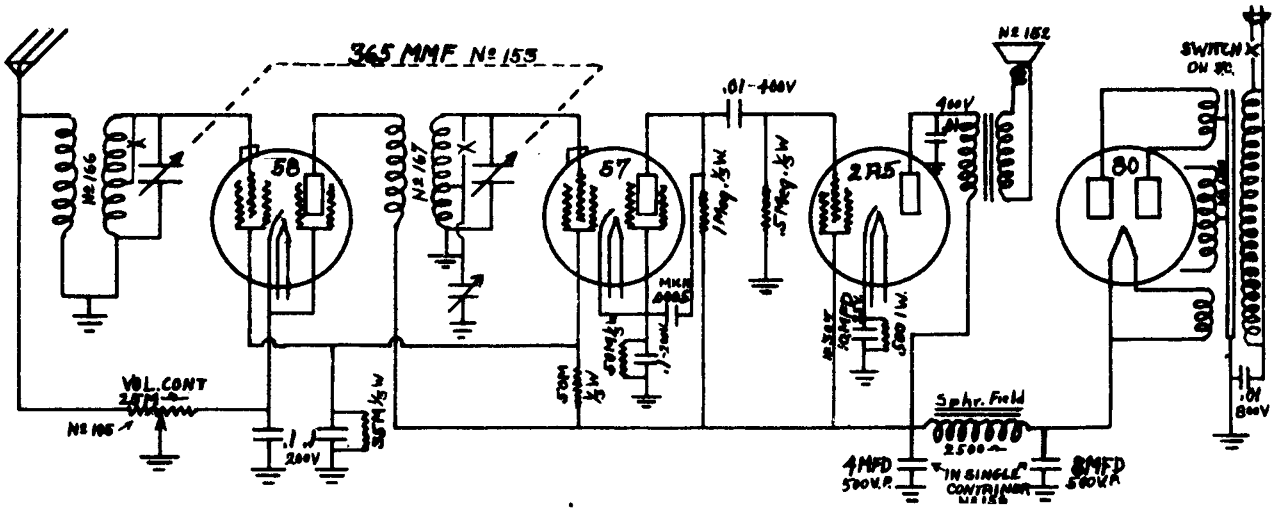
SEARS, ROEBUCK & CO.

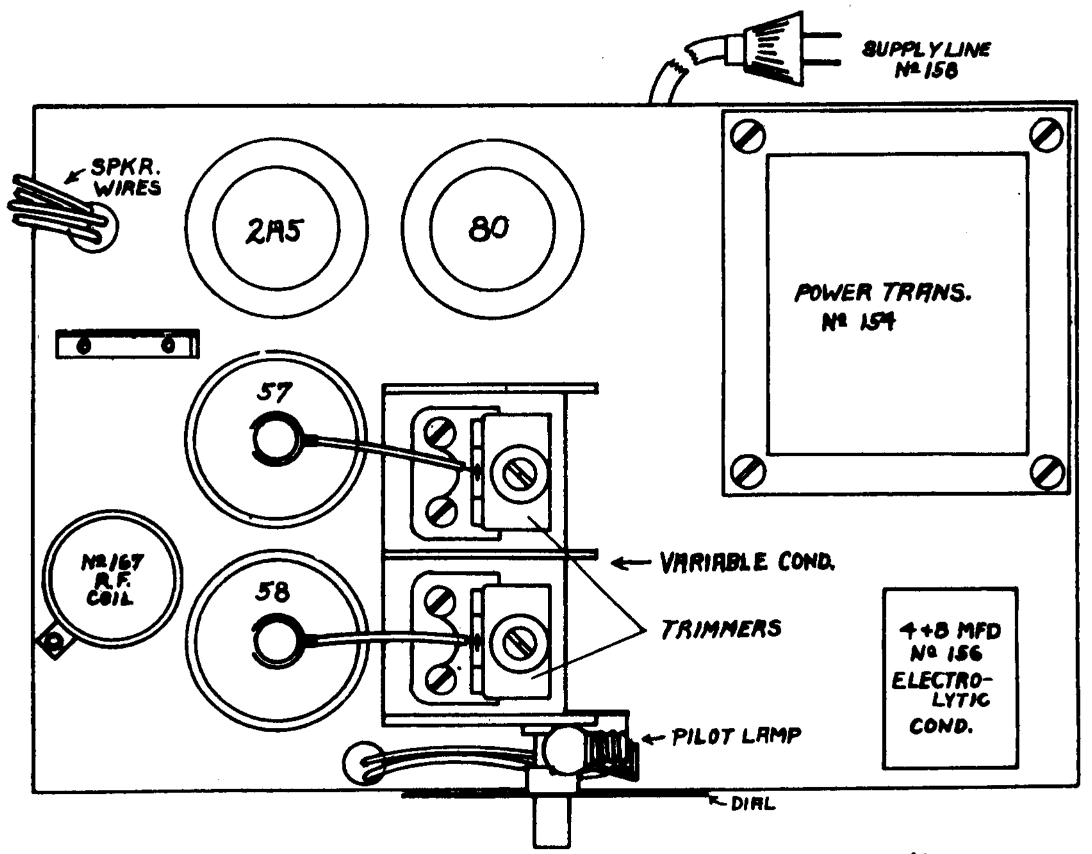
MODEL 1670



SEARS, ROEBUCK & CO.

MODEL 1800





SOCKET VOLTAGES — MODEL 504

TYPE	POSITION	EK	EG1	EG2	EG3	EP	EF
58	RF	1.5	0	1.5	85	250	2.5
57	DET	4.5	0	4.5	85	30	2.5
2A5	PWR	16	4	0	240	230	2.5

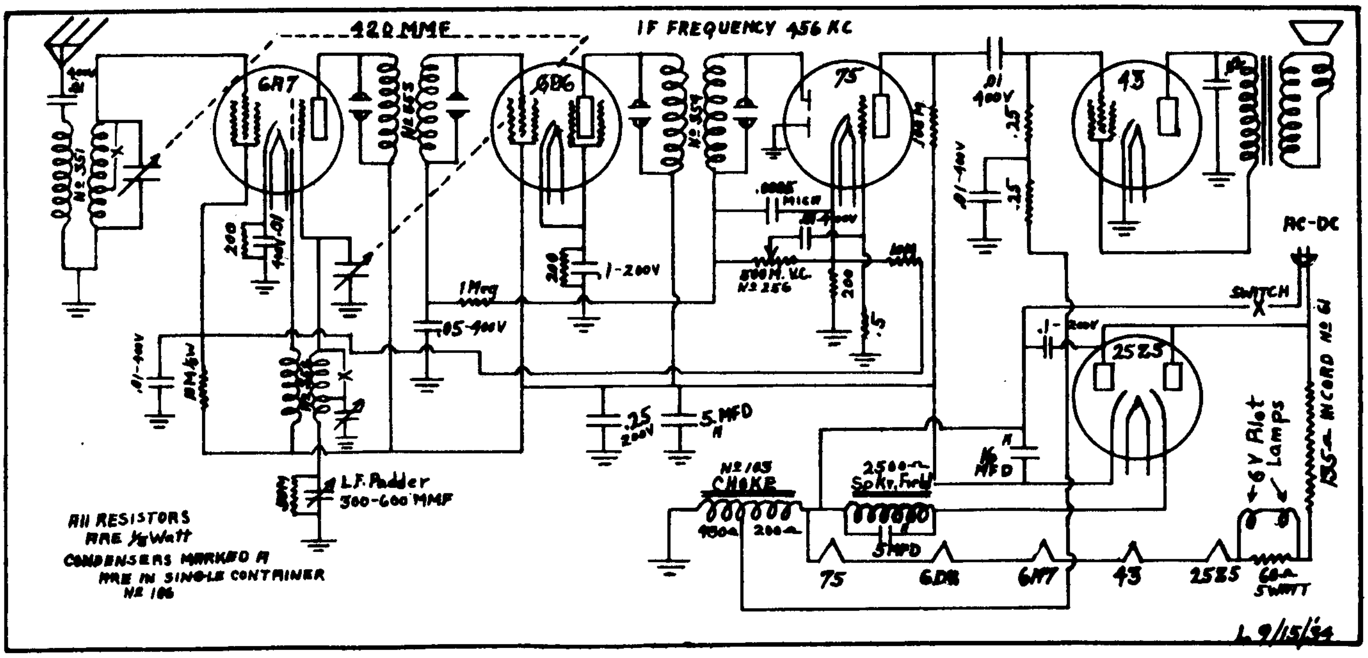
Line Voltage 115 V. Antenna and Ground disconnected

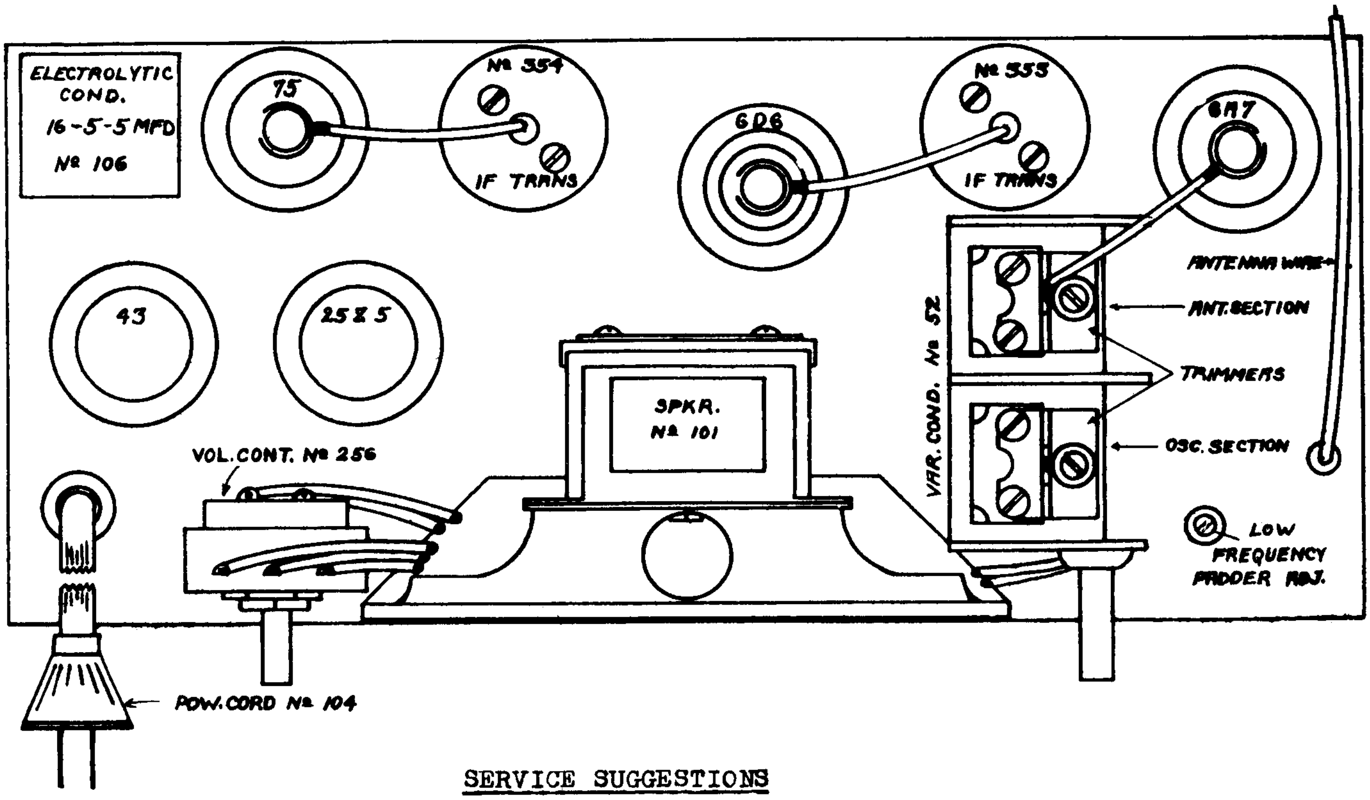
F _ Filament K - Cathode G1 - Control Grid
G2 - Suppressor Grid G3 - Screen Grid P - Plate

All measurements taken from points indicated to ground with 1000 ohms per volt D. C. Meter (except filaments).

SEARS, ROEBUCK & CO.

MODELS 1801 & 1801A





SERVICE SUGGESTIONS

NOTE: Supply cord of set gets warm while operating set, this is normal. Do not become alarmed.

Make sure that all tubes are pushed firmly in their proper sockets.

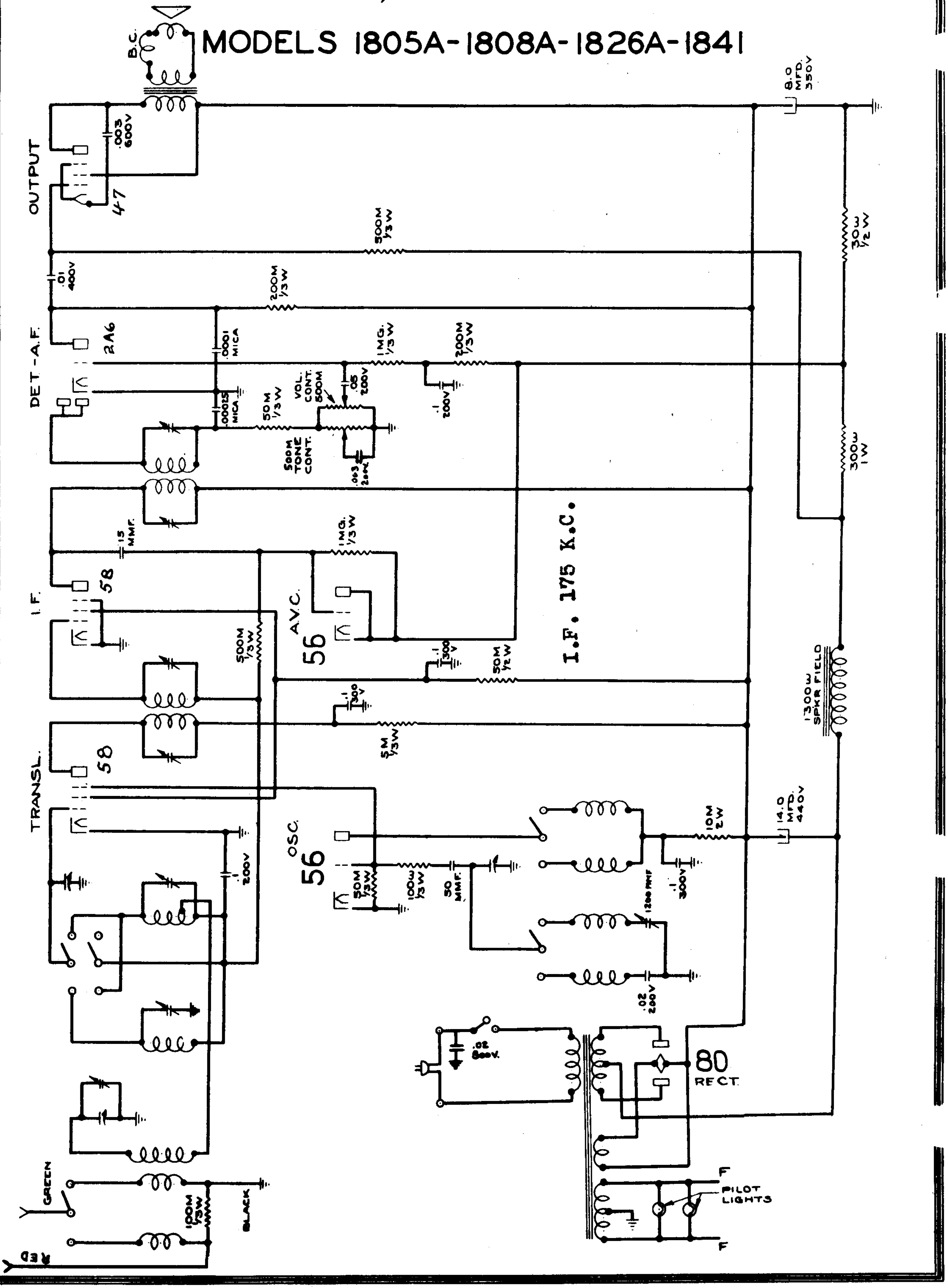
Unreel antenna supplied with set, to full length and place along floor or drop out of window, if an outdoor antenna is used, make sure connection to set antenna (brown wire) is good.

DO NOT ATTACH A GROUND WIRE TO SET

If necessary to service chassis, under no circumstances remove the chassis without first removing plug from receptacle.

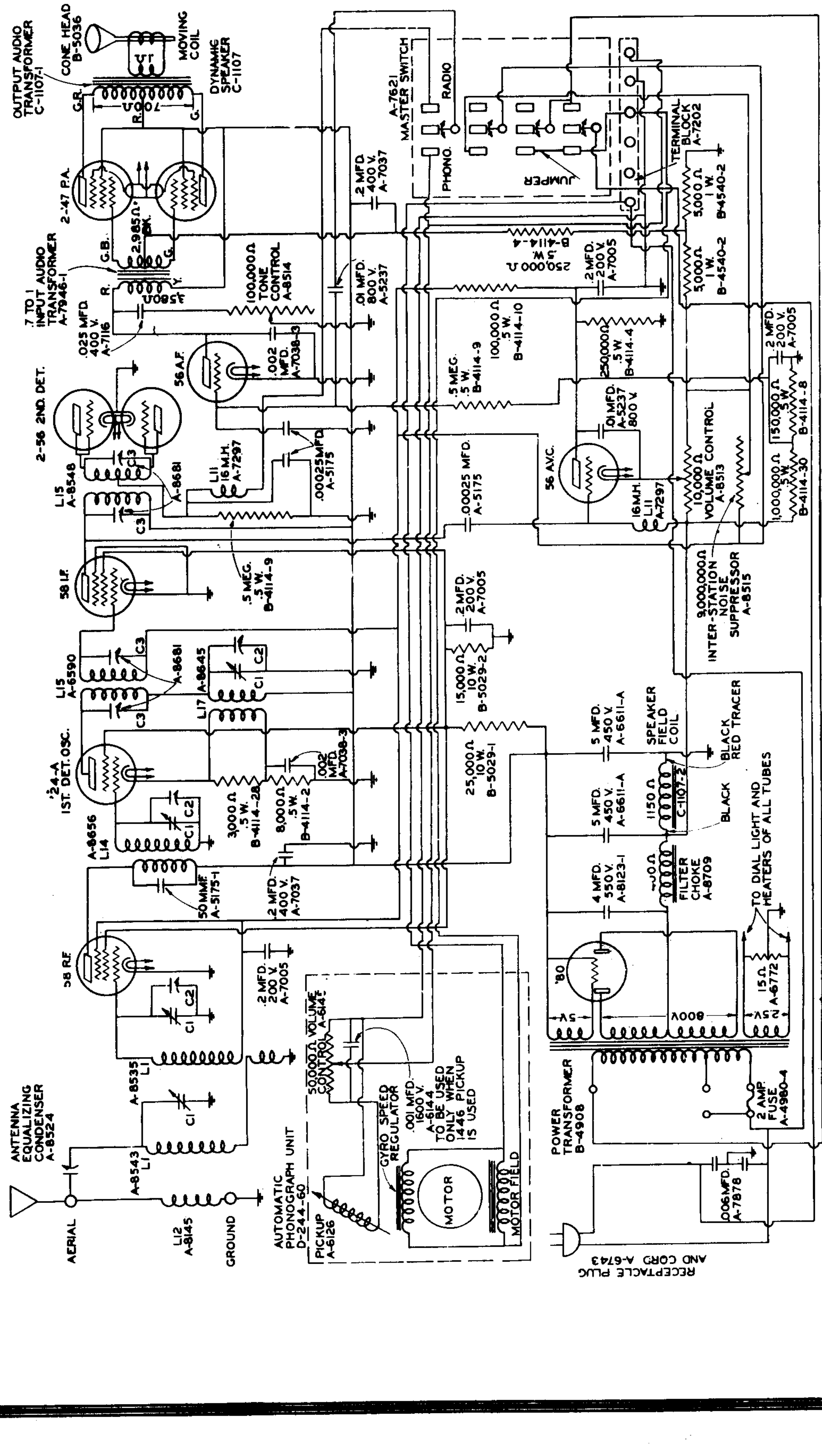
SEARS, ROEBUCK & CO.

MODELS 1805A-1808A-1826A-1841



SPARKS-WITHINGTON COMPANY

MODEL 30C



C1 VARIABLE CONDENSER
C2 EQUALIZING CONDENSER
C3 ADJUSTABLE CONDENSER
L1 TUNING COIL
L11 DETECTOR PLATE CHOKE COIL
L12 ANTENNA CHOKE COIL
L14 R.F. TRANSFORMER
L15 I.F. TRANSFORMER
L17 OSCILLATOR COIL

VOLTAGE ANALYSIS

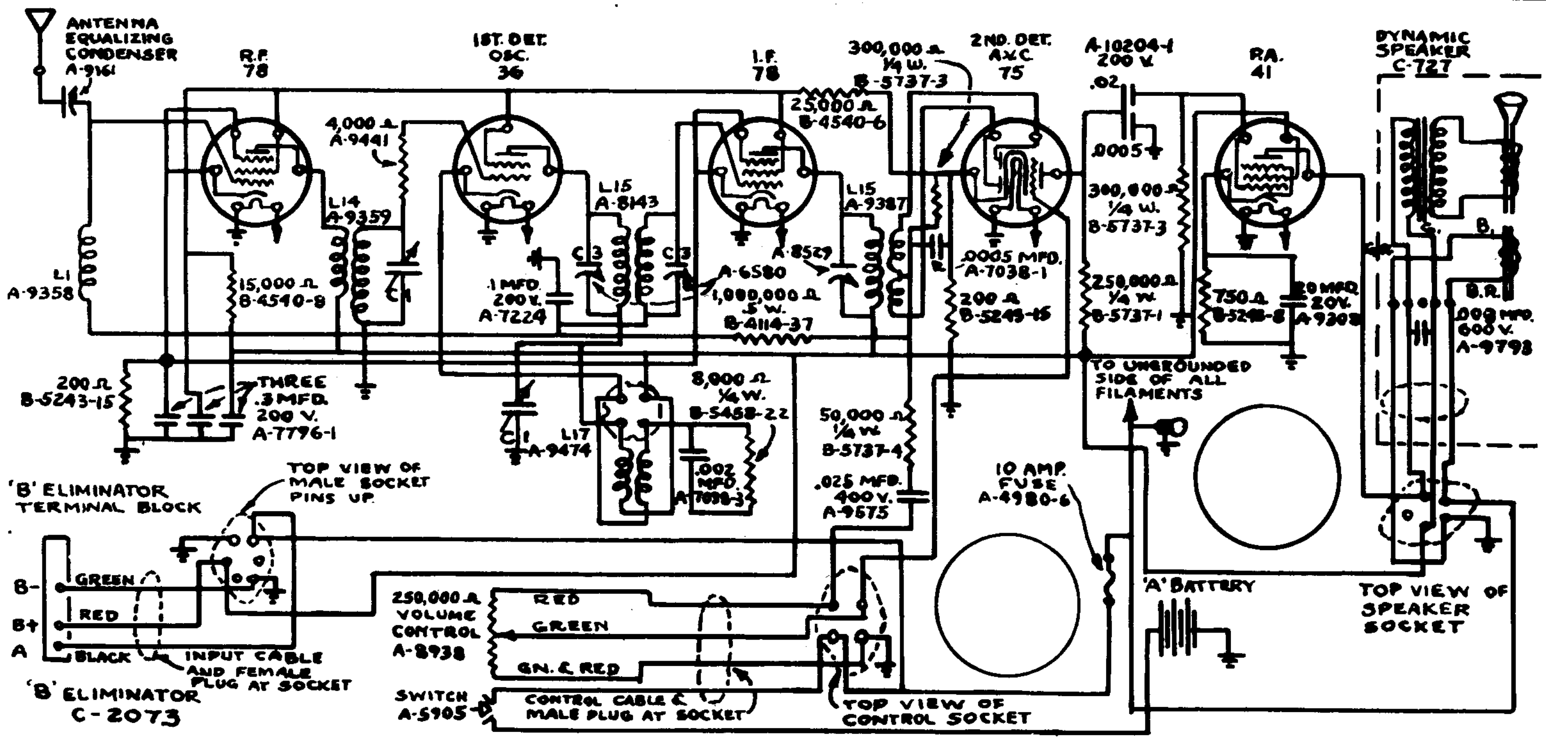
Line Voltage 115—Position of Voltage Compensator 100-115—Position of Volume Control Full

Tube	Location	Heater or Filament	Plate	Control Grid —	Screen Grid +	Plate Current M. A.
58	R. F. Stage	2.2—2.5	260—305	1.9—2.5	70—88	4.5—8.0
'24	1st Det.-Osc.	2.2—2.5	260—305	5—9	70—88	0.8—1.4
58	I. F. Stage	2.2—2.5	260—305	1.9—2.5	70—88	4.5—8.0
56	2nd Det.	2.2—2.5	*	*	——	*
56	2nd Det.	2.2—2.5	*	*	——	*
56	A. F. Stage	2.2—2.5	245—285	10—14	——	4.5—8.0
56	AVC	2.2—2.5	35—50	40—50	——	Zero
'47	Power Stage	2.2—2.5	250—295	19—25	260—305	18—25
'47	Power Stage	2.2—2.5	250—295	19—25	260—305	18—25
'80	Rectifier	4.2—5.0	360—440	——	——	33-45 per Plate

* Present only when signal is applied.

SPARKS-WITHINGTON COMPANY

MODEL 44P



VOLTAGE-RESISTANCE CHART

Condition of "A" Battery - Good

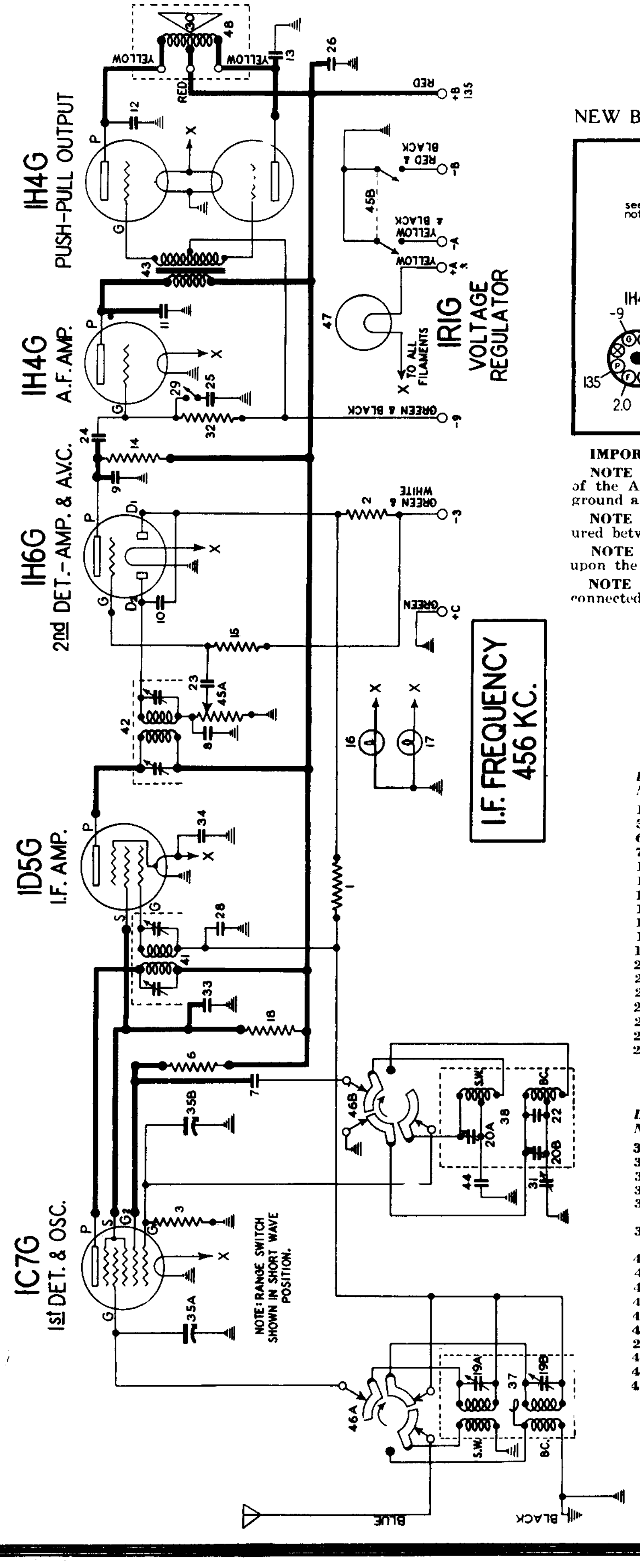
Position of Volume Control - Full with Antenna Disconnected

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Grid Cap
78	R-F Amplifier	Volts	6	200	100	3	3	0	-	0
		Ohms	0	40000	25000	200	200	0	-	1 meg.
36	1st. Det-Oscillator	Volts	6	180	90	0	0	-	-	0
		Ohms	0	40000	25000	8000	0	-	-	3500
78	I-F Amplifier	Volts	6	200	100	3	3	0	-	0
		Ohms	0	40000	25000	200	200	0	-	1 meg.
75	2nd. Det-A. V. C.	Volts	6	75	0	50	0	0	-	0
		Ohms	0	250000	250000	250000	200	0	-	200000
42	Power Amplifier	Volts	6	225	225	0	0	0	-	-
		Ohms	0	40000	40000	275000	750	0	-	-

Note: Voltage and resistance readings are for schematic diagram shown on back of sheet. Allow 15% - or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 2.

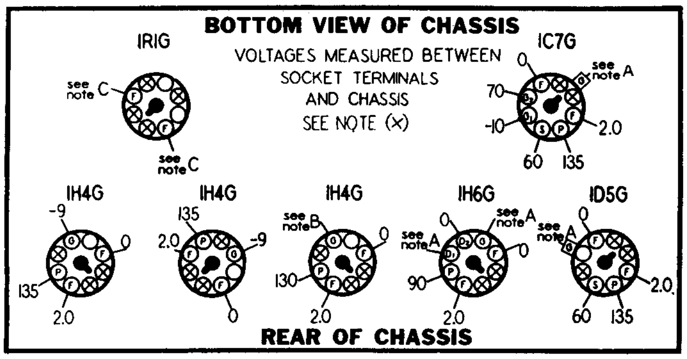
STEWART-WARNER CORPORATION

MODELS R-161-D & 1611-D TO 1619-D



SOCKET VOLTAGES

NEW BATTERIES — DIAL TUNED TO 530 KC.



IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The grid bias for the 1C7G, 1D5G, 1H6G, and the delay voltage of the A.V.C. diode of the 1H6G is —3.0 volts measured between chassis ground and the green and white battery cable wire.

NOTE B: The grid bias of the 1H4G audio amplifier is —9.0 volts measured between chassis ground and the green and black battery cable wire.

NOTE C: This voltage will vary between 2.0 and 3.0 volts, depending upon the terminal voltage of the A battery.

NOTE (X): These terminals indicate tube pins which are not internally connected to any element.

Diagram Number	*Part Number*	*Description*	*List Price*
1, 2	83072	510,000 ohm ¼ watt carbon resistor	$0.12
3	83080	51,000 ohm ¼ watt carbon resistor	.12
6	83286	21,000 ohm ¼ watt carbon resistor	.12
7, 8, 9	83539	260 mmfd. mica condenser	.20
10	83783	110 mmfd. mica condenser	.20
11, 12, 13	83784	.0011 mfd. mica condenser	.25
14	84198	110,000 ohm ¼ watt carbon resistor	.12
15, 32	84235	1.1 megohm ¼ watt carbon resistor	.12
16, 17	84515	Dial lamps 2 volt .06 ampere	.25
18	84553	26,000 ohm ¼ watt carbon resistor	.20
19A, 19B, 20A, 20B	85087	Dual trimmer condenser	.35
22	85454	11 mmfd. Mica Condenser	.15
23, 24	88026	.02 mfd. 400 volt paper condenser	.25
25	88029	.004 mfd. 400 volt paper condenser	.25
26	88046	1 mfd. 150 volt paper condenser	.25
28	88189	.05 mfd. 200 volt paper condenser	.25
29	89331	Tone control switch	.75

Diagram Number	*Part Number*	*Description*	*List Price*
30	88437	Diaphragm for R-234D Speaker	$1.00
31	88478	Variable padding condenser	.38
33, 34	88990	.5 mfd. 150 volt paper condenser	.35
35A, 35B	89205	Gang Condenser	4.00
37	89207	Antenna coil & shield (B.C. & S.W.) with trimmers	1.90
38	89209	Oscillator coil & shield (B.C. & S.W.) with trimmers	3.00
41	89226	1st I.F. transformer & shield	2.50
42	89227	2nd I.F. transformer & shield	2.50
43	89228	Push pull input audio transformer	3.50
44	89275	.002 mfd. mica condenser	.40
45A, 45B	89330	Volume control 500,000 ohm / Off-on switch	1.20
29	89331	Tone control switch	.75
46A, 46B	89334	Range switch	1.40
47		1R1G Voltage regulator tube	1.50
48	R-234-D	6 inch Magnetic speaker	5.75

STEWART-WARNER CORPORATION

MODELS R-161-D & 1611-D TO 1619-D

CALIBRATION AND ALIGNMENT

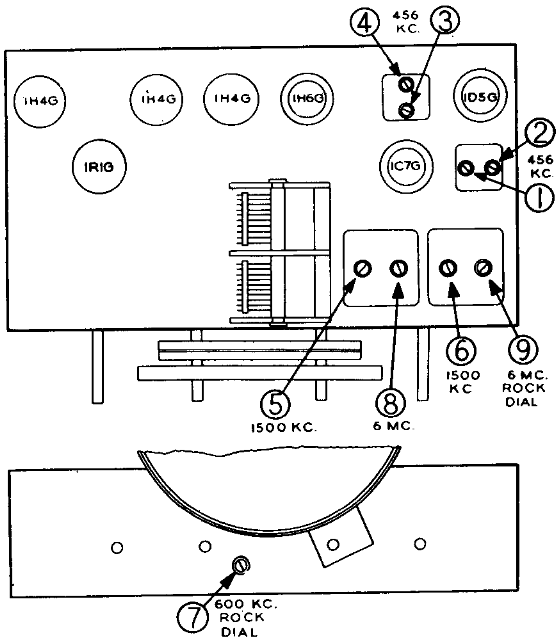
ALIGNING EQUIPMENT: For proper alignment, an output meter and an accurately calibrated oscillator with a tuning range from 175 KC. to 6 MC. are required.

Connect the output meter across the plates of the output tubes. Convenient points to make the plate connections are the yellow wires on the speaker terminal strip.

ALIGNING THE I.F. AMPLIFIER: Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (clockwise position).

Connect the test oscillator output leads to the 1C7G control grid and chassis with a .1 mfd. condenser in series with the oscillator output. Set the oscillator to exactly 456 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

Adjust the four I.F. trimmers, Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.



TRIMMER LOCATIONS

Trimmer Number		Alignment Frequency
1-2-3-4	1st and 2nd I.F. transformer trimmers	456 KC.
5	Broadcast oscillator shunt trimmer	1500 KC.
6	Broadcast antenna shunt trimmer	1500 KC.
7	Broadcast oscillator series padder	600 KC.
8	Short wave oscillator shunt trimmer	6 MC.
9	Short wave antenna shunt trimmer	6 MC.

BROADCAST BAND CALIBRATION AND ALIGNMENT: With the gang condenser in full mesh, the dial pointer should be on the yellow horizontal line below 530 KC. on the dial scale.

Leave the range switch in the clockwise position. Connect a 400 or 500 ohm carbon resistor in series with the oscillator output and the receiver antenna lead (blue wire in the back of the chassis). Connect the grounded oscillator output wire to the receiver ground lead (black wire in back of chassis).

Adjust the test oscillator to exactly 1500 KC. Tune in the 1500 KC. oscillator signal or a station above 1300 KC. on the dial and determine whether the dial calibration is correct at the high frequency end of the dial. If the calibration is correct, do not adjust the broadcast oscillator shunt trimmer No. 5. If the calibration is incorrect, adjust trimmer No. 5 to give proper calibration.

Carefully tune the receiver to the 1500 KC. oscillator signal and adjust trimmer No. 6 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 7 for maximum output. Then try to increase the output meter reading by detuning No. 7 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though the dial may be slightly off calibration at 600 KC.

Repeat the adjustment of Nos. 5 and 6 at 1500 KC.

SHORT WAVE BAND CALIBRATION AND ALIGNMENT: Turn the range switch to the short wave band (maximum counter-clockwise position).

Adjust the test oscillator to exactly 6.0 MC.

Tune in the 6 MC. oscillator signal at or near 6 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 6 MC. If it is, do not adjust the short wave band oscillator shunt trimmer No. 8. If the calibration is incorrect, set the dial pointer to 6 MC. on the dial, and adjust the oscillator shunt trimmer No. 8 until the oscillator signal comes in at this point. If there are two peaks, the proper one is that with the trimmer screw farthest out.

Carefully tune the receiver to the signal and adjust trimmer No. 9 for maximum output. Then try to increase the output by detuning No. 9 slightly and retuning the receiver. Continue detuning No. 9 and retuning the receiver until the output meter deflection is a maximum.

USE OF BALLAST PLUG

The Model R-161-D radio chassis is designed to operate with either a large 3 volt dry cell or a 2¼ volt Eveready Air Cell. This is possible because the 1R1G tube maintains the proper filament voltage for any battery voltage between 2 and 3 volts. The receiver is also designed to operate from a 2 volt storage cell. However, if this is done it is desirable to omit the 1R1G voltage regulator and insert a special plug in the 1R1G socket which carries our part number 89588 and has a list price of $0.30.

USE OF B AND C BATTERY PACK

To convert the R-161-D chassis for operation with a plug-in B and C battery unit such as the Burgess No. G90 D6, a special cable terminating in a plug that fits the socket of the B and C pack must be substituted for the regular cable. This special cable carries our part number 89487 and has a list price of $1.40. The color codes of the old and new cables are identical. There is no green C plus wire on the new cable since the connection is made in the B and C unit.

TUNING DRIVE AND DIAL PARTS

Part Number	Description	List Price
13923	Spring washer for tuning drive shaft	$0.05
81068	Dial drive cord—per ft.	.05
81069	Dial cord tension spring	.10
88564	Dial pointer & stud assembly	.12
88956	Dial escutcheon with glass	1.65
89174	Dial bracket and ring assembly	1.20
89175	Drive shaft	.10
89176	Retaining ring for tuning drive shaft	.02
89283	Dial lamp socket	.10
89285	Dial background	.12
89298	Dial drum and bushing assembly	.60
89300	Dial scale	1.80
89489	Dial lamp shield	.12
89799	Dial scale retaining clip	.02

MISCELLANEOUS PARTS

Part Number	Description	List Price
67032	Felt washer for back of knob—per C	$0.35
67590	Flat steel mounting washer	.01
84428	Chassis mounting bushing (rubber)	.03
84493	No. 10 x 1¼ chassis mounting screw	.02
84805	Felt washer (used with chassis mtg. screw)	.01
88161	Tube shield	.08
88164	Tube shield cap—slotted	.06
88165	Tube shield cap—plain	.06
88436	Diaphragm gasket for R-234-D speaker	.15
88958	No. 2 x ⅜ R.H.W. Screw for escutcheon	.01
89347	Battery cable (for R-1611-D)	.90
89461	Knob—for range, tone, tuning & volume control	.25
89487	Battery cable & plug (complete) (special used with B & C Battery Pack)	1.40
89588	Ballast tube plug (used in place of 1R1G tube with 2 volt battery)	.30

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODEL 127 A.C.-D.C.

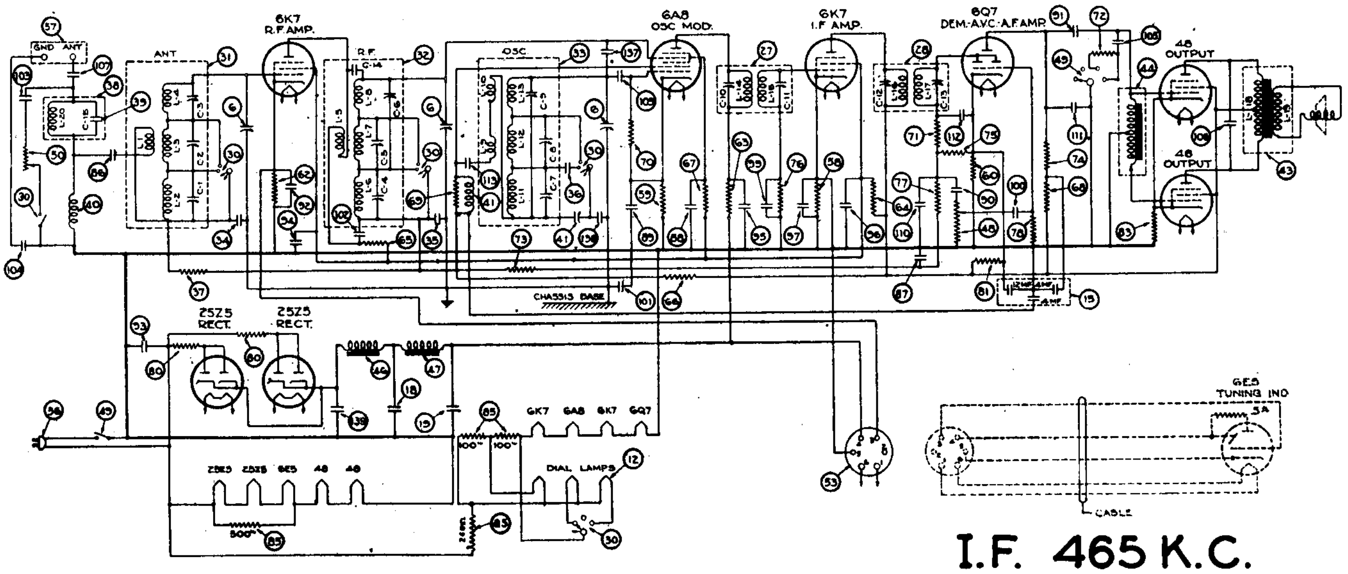


Fig. 3. Schematic Circuit of Receiver.

REPLACEMENT PARTS

Item Number	Piece Number	Part
5	26848	Dial Assembly
6	26414	Gang Tuning Capacitor Assembly
7	26850	Lamp Socket Assembly
9	26059	Bracket (Chassis Spacer)
12	26287	Pilot Lamp
15	26164	Electrolytic Capacitor Assembly, 4 Mf., 150 Volts; 4 Mf., 150 Volts; 12 Mf., 25 Volts
18	26162	Electrolytic Capacitor, 25 Mf.
19	26162	Electrolytic Capacitor, 25 Mf.
27	26141	1st I. F. Transformer
28	25506	2nd I. F. Transformer
30	26864	Range Switch
31	25510	Coil Assembly, Antenna
32	25511	Coil Assembly, R. F.
33	25512	Coil Assembly, Oscillator
34	25488	Capacitor, .002 Mf.
35	25527	Capacitor, .0027 Mf.
36	25490	Capacitor, .0038 Mf.
37	26383	Resistor, Type "EI", .1 Megohm
38	25513	Coil Assembly (Wave Trap)
39	25488	Capacitor, .002 Mf.
40	25814	Coil Assembly, R. F. Choke, 5 Millihenrys
41	26047	Capacitor, Oscillator Series Aligner
43	26857	Transformer, Audio Output
44	26865	Transformer, Audio Input
46	26859	Choke Assembly (Filter of Rectifier)
47	26861	Choke Assembly (Filter of Rectifier)
48	26114	Potentiometer (Volume Control)
49	26271	Switch ("Off-On" and Tone Control)
50	26095	Potentiometer, Sensitivity Control
51	26499	Knob (For Sensitivity Control)
53	22974	Socket, 6 Prong
55	25539	Socket, 8 Prong
56	24268	Cord, Power Supply
58	26324	Resistor, Type "E", 180 Ohms
59	26326	Resistor, Type "E", 270 Ohms
60	26327	Resistor, Type "E", 330 Ohms
62	26331	Resistor, Type "E", 680 Ohms
63	26333	Resistor, Type "E", 1000 Ohms
64	26333	Resistor, Type "E", 1000 Ohms
65	26345	Resistor, Type "E", 10,000 Ohms
66	26333	Resistor, Type "E", 1000 Ohms
67	26345	Resistor, Type "E", 10,000 Ohms
68	26345	Resistor, Type "E", 10,000 Ohms
69	26350	Resistor, Type "E", 27,000 Ohms
70	26353	Resistor, Type "E", 47,000 Ohms
71	26353	Resistor, Type "E", 47,000 Ohms
72	26353	Resistor, Type "E", 47,000 Ohms
73	26357	Resistor, Type "E", .1 Megohm
75	26365	Resistor, Type "E", .47 Megohm
76	26365	Resistor, Type "E", .47 Megohm
77	26369	Resistor, Type "E", 1 Megohm
78	26373	Resistor, Type "E", 2.2 Megohms
80	25911	Resistor, Type "B", 50 Ohms
81	26408	Resistor, Type "C", 27,000 Ohms
83	26870	Resistor, Flexible, 155 Ohms
85	26871	Resistor, "B" Voltage Divider
86	25150	Capacitor Assembly, .02 Mf.
87	25150	Capacitor Assembly, .02 Mf.
88	25150	Capacitor Assembly, .02 Mf.
89	25150	Capacitor Assembly, .02 Mf.
90	25150	Capacitor Assembly, .02 Mf.
91	25150	Capacitor Assembly, .02 Mf.
92	25150	Capacitor Assembly, .02 Mf.
93	25150	Capacitor Assembly, .02 M
94	24402	Capacitor Assembly, .1 Mf
95	24402	Capacitor Assembly, .1 Mf
96	24402	Capacitor Assembly, .1 Mf.
97	24402	Capacitor Assembly, .1 Mf.
99	24405	Capacitor Assembly, .04 Mf.
100	24405	Capacitor Assembly, .04 Mf.
101	25389	Capacitor Assembly, .2 Mf.
102	25481	Capacitor Assembly, .002 Mf.
103	25149	Capacitor Assembly, .01 Mf.
104	25149	Capacitor Assembly, .01 Mf.
105	26151	Capacitor Assembly, .005 Mf.
106	25149	Capacitor Assembly, .01 Mf.
107	25533	Capacitor Assembly, .006 Mf.
109	24559	Capacitor, Type "O", 100 Mmf.
110	24559	Capacitor, Type "O", 100 Mmf.
111	24559	Capacitor, Type "O", 100 Mmf.
112	24559	Capacitor, Type "O", 100 Mmf
113	25487	Capacitor, Type "W", .001 Mf.
137	26417	Capacitor (Gimmick)
138	25489	Capacitor, .00125 Mf.
139	27014	Electrolytic Capacitor, 40 Mf.

MISCELLANEOUS PARTS

Piece Number	Part
26491	Plug (For Tri-Focal Tuning Unit Cable)
26365	Resistor, Type "E", .47 Megohm (Used at Socket of No. 6E5 Tube)
26302	Knob (For Volume Control).
26385	Knob (For Range Switch)
26384	Knob (For Off-On-Tone Control)
26305	Knob (For Large Portion of Tuning Shaft)
26306	Knob (For Vernier Portion of Tuning Shaft)

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODEL 127 A.C.-D.C.

Intermediate Frequency Amplifier Adjustments

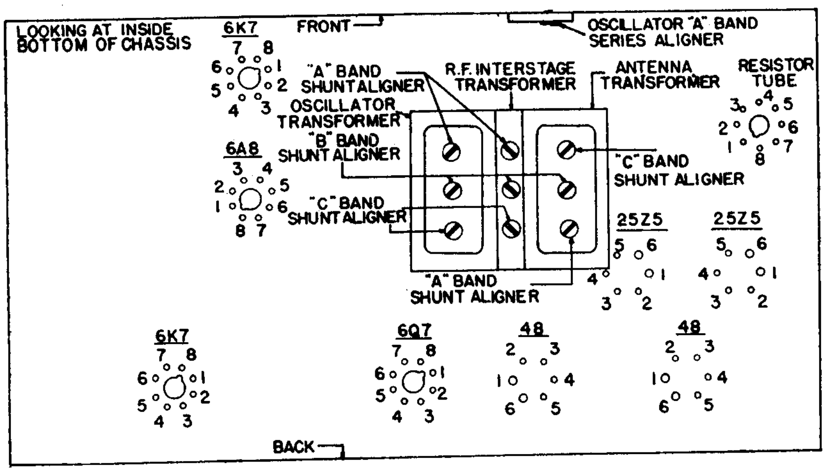
The intermediate frequency used in these receivers is 465 kilocycles. In making these I. F. circuit adjustments always align in the following order:

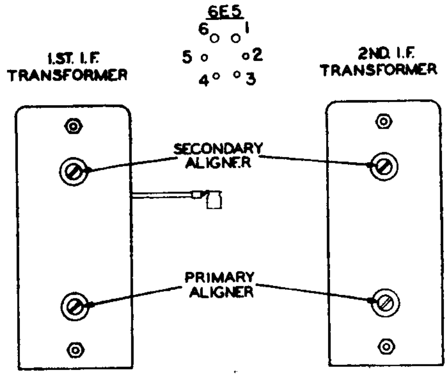
1. Secondary of 2nd I. F. Transformer (Capacitor C-13).
2. Primary of 2nd I. F. Transformer (Capacitor C-12).
3. Secondary of 1st I. F. Transformer (Capacitor C-11).
4. Primary of 1st I. F. Transformer (Capacitor C-10).

Radio Frequency Adjustments

The adjustments of the aligning capacitors used in the radio frequency circuits in this receiver should be very carefully made in the following order and at the frequencies specified below:

1. Oscillator's "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-9).
2. R. F. Interstage "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-6).
3. Antenna "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-3).
4. Oscillator's "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-8).
5. R. F. Interstage "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-5).
6. Antenna "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-2).
7. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-7).
8. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
9. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).
10. Oscillator's "A" Band Series Aligner at 0.6 Megacycles (Capacitor, Item No. 41).
11. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-7).
12. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
13. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).





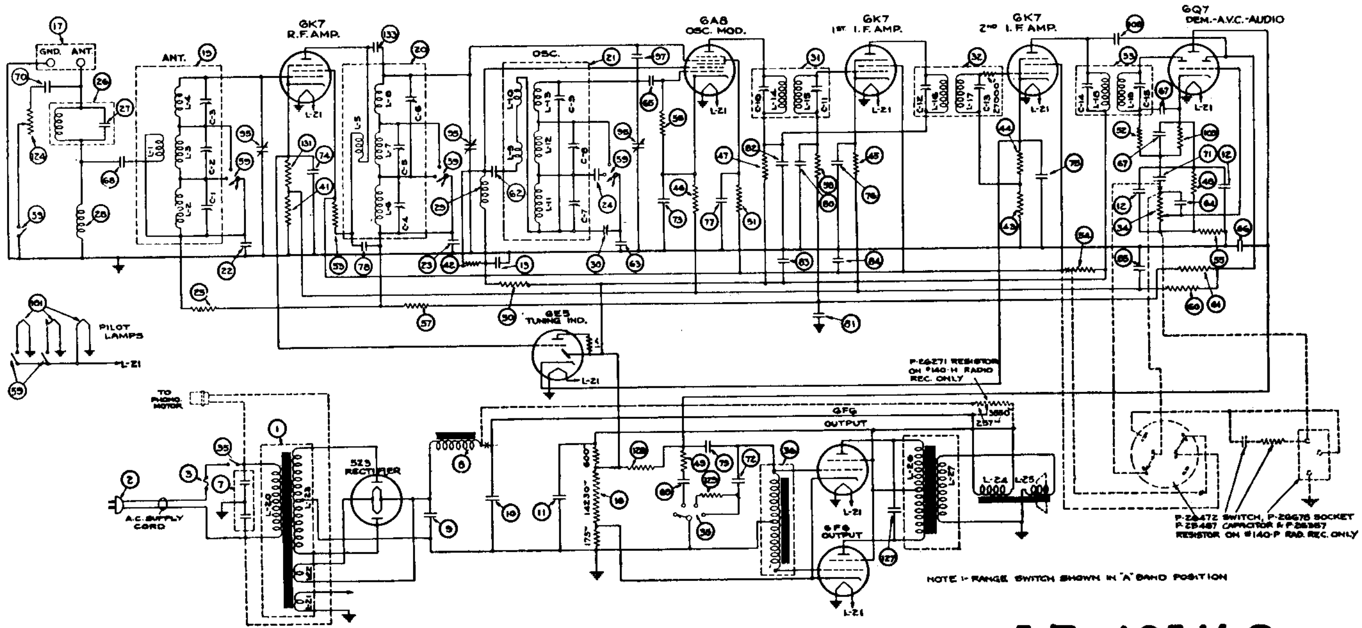
Tube	Circuit	Cap	Terminals of Sockets								Heater Voltages Between Heater Terminals	
			1	2	3	4	5	6	7	8	Socket Terminal Numbers	Volts
6K7	R. F. Amp.	0	0	*18*	+33	+88	+4	0	*24*	+4	2-7	*6*
6A8	Mod.—Osc.	0	0	*18*	+95	+60	—7	+95	*12*	+1.5	2-7	*6*
6K7	I. F. Amp.	0	0	*6*	+99	+88	+2	0	*12*	+2.2	2-7	*6*
6Q7	Dem.—A.V.C.—Audio Amp.	0	0	0	+50*	0	0	+88	*6*	+1	2-7	*6*
48	Audio Output	—	*61*	+106	+106	0	+17	*31*	—	—	1-6	*30*
48	Audio Output	—	*0*	+106	+106	0	+17	*30*	—	—	1-6	*30*
6E5	Tuning Ind.	—	*61*	+0.5	+3.9	+99	+2.2	*67*	—	—	1-6	*6*
25Z5	Rectifier	—	*95*	*116*	+112	+116	*114*	*70*	—	—	1-6	*25*
25Z5	Rectifier	—	*120*	*116*	+112	+112	*116*	*95*	—	—	1-6	*25*
Resistor	Voltage Divider	—	*37*	*65*	*37*	—	*120*	—	*25*	*32*	—	—

Voltage across pilot lamps—*12* volts.

A. C. voltages are indicated by italics; when the receiver is operated from a D.C. power supply, D.C. voltages will be obtained in place of the A.C. voltages.
Receiver tuned to 1000 kc., no signal.

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODEL 140 SERIES



REPLACEMENT PARTS

I.F. 465 K.C.

Item Number	Piece Number	Part
1	25434	Power Transformer (50 to 60 Cycles Chassis)
1	25435	Power Transformer (25 to 60 Cycles Chassis)
2	24268	Cord (A. C. Power Supply)
3	23150	Fuse (2 Amperes)
7	21535	Capacitor Assembly (2—.01 Capacitors)
8	26260	Choke Assembly (Rectifier Filter)
9	22757	Electrolytic Capacitor (50 to 60 Cycles Chassis)
9	26510	Electrolytic Capacitor (25 to 60 Cycles Chassis)
10	22789	Electrolytic Capacitor (50 to 60 Cycles Chassis)
10	26511	Electrolytic Capacitor (25 to 60 Cycles Chassis)
11	25458	Electrolytic Capacitor, 16 Mf.
12	26048	Electrolytic Capacitor, Dual, 10 Mf.
13	25788	Electrolytic Capacitor, 1 Mf.
14	26059	Bracket (Chassis Spacer)
16	25437	Resistor, "B" Voltage Divider
19	25510	Coil Assembly, Antenna
20	25511	Coil Assembly, R. F.
21	25512	Coil Assembly, Oscillator
22	25488	Capacitor, .002 Mf.
23	25527	Capacitor, .0027 Mf.
24	25490	Capacitor, .0038 Mf.
25	26383	Resistor, Type "EI", .1 Megohm
26	25513	Coil Assembly, Wave Trap
27	25488	Capacitor, .002 Mf.
28	25814	Coil Assembly, R. F. Choke Coil
29	25814	Coil Assembly, R. F. Choke Coil
30	26047	Oscillator Series Aligning Capacitor
31	26266	1st I. F. Transformer Assembly
32	26269	2nd I. F. Transformer Assembly
33	26270	3rd I. F. Transformer Assembly
34	26114	Potentiometer (Volume Control)
35	26404	Switch ("Off-On" and Tone Control)
36	26272	Transformer Assembly, Audio
37	26274	Transformer Assembly, Output
38	22988	Socket, 4 Prong
39	23517	Socket, 7 Prong
40	25539	Socket, 8 Prong
41	26324	Resistor, Type "E", 180 Ohms
42	26350	Resistor, Type "E", 27,000 Ohms
43	26328	Resistor, Type "E", 390 Ohms
44	26329	Resistor, Type "E", 470 Ohms
45	26329	Resistor, Type "E", 470 Ohms
46	26330	Resistor, Type "E", 560 Ohms
47	26330	Resistor, Type "E", 560 Ohms
48	26340	Resistor, Type "E", 3,900 Ohms
49	26350	Resistor, Type "E", 27,000 Ohms

Item Number	Piece Number	Part
50	26350	Resistor, Type "E", 27,000 Ohms
51	26345	Resistor, Type "E", 10,000 Ohms
52	26345	Resistor, Type "E", 10,000 Ohms
53	26345	Resistor, Type "E", 10,000 Ohms
54	25526	Resistor, Type "E", 15,000 Ohms
55	26353	Resistor, Type "E", 47,000 Ohms
56	26353	Resistor, Type "E", 47,000 Ohms
57	26357	Resistor, Type "E", .1 Megohm
58	26357	Resistor, Type "E", .1 Megohm
59	26264	Range Switch
60	26369	Resistor, Type "E", 1 Megohm
61	26369	Resistor, Type "E", 1 Megohm
62	25487	Capacitor, .001 Mf.
63	25489	Capacitor, .00125 Mf.
64	24166	Capacitor, 25 Mmf.
65	24559	Capacitor, 100 Mmf.
66	24559	Capacitor, 100 Mmf.
67	26512	Capacitor, 2—100 Mmf.
68	25150	Capacitor Assembly, .02 Mf.
69	25149	Capacitor Assembly, .01 Mf.
70	25149	Capacitor Assembly, .01 Mf.
71	25150	Capacitor Assembly, .02 Mf.
72	25150	Capacitor Assembly, .02 Mf.
73	25150	Capacitor Assembly, .02 Mf.
74	25150	Capacitor Assembly, .02 Mf.
75	25483	Capacitor Assembly, .1 Mf.
76	25483	Capacitor Assembly, .1 Mf.
77	25483	Capacitor Assembly, .1 Mf.
78	25481	Capacitor Assembly, .002 Mf.
79	24405	Capacitor Assembly, .04 Mf.
80	24405	Capacitor Assembly, .04 Mf.
81	24405	Capacitor Assembly, .04 Mf.
82	24994	Capacitor Assembly, .05 Mf.
83	24994	Capacitor Assembly, .05 Mf.
84	24994	Capacitor Assembly, .05 Mf.
85	24994	Capacitor Assembly, .05 Mf.
95	26276	Gang Tuning Capacitor
97	26417	Capacitor Assembly (Gimmick)
101	26287	Pilot Lamp
108	24560	Capacitor, 50 Mmf.
109	26362	Resistor, Type "E", 270,000 Ohms
124	26095	Potentiometer (Sensitivity Control)
126	26499	Knob (For Sensitivity Control)
127	24461	Capacitor, .004 Mf.
128	26357	Resistor, Type "E", .1 Megohm
129	26341	Resistor, Type "E", 4700 Ohms
131	26329	Resistor, Type "E", 470 Ohms

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODEL 140 SERIES

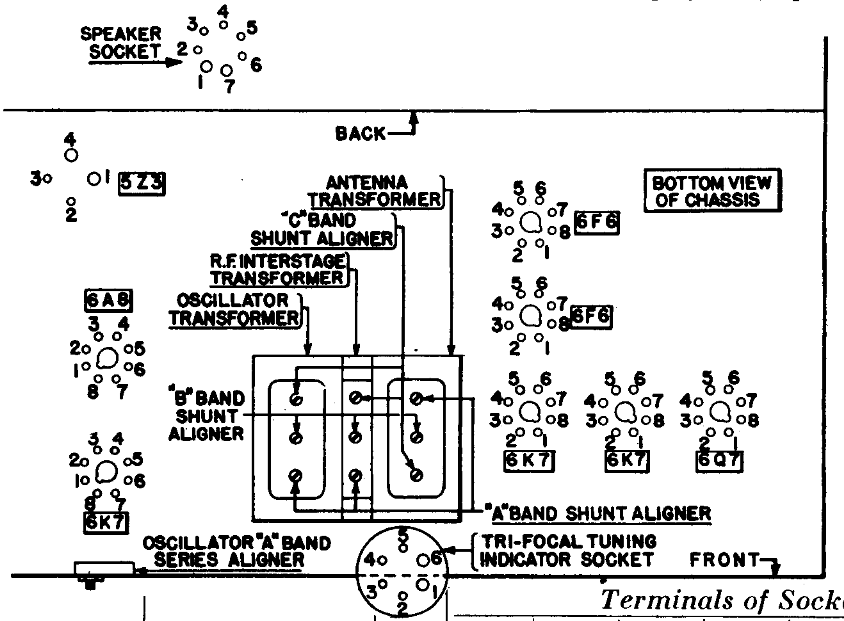
Adjustments

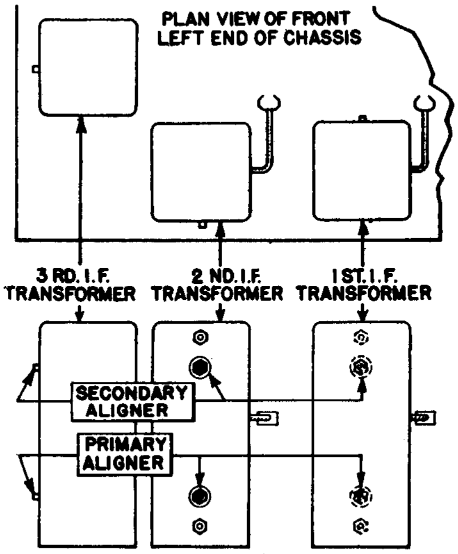
The intermediate frequency used in these receivers is 465 kilocycles. In making these I. F. circuit adjustments always align in the following order:

1. Secondary of 3rd I. F. Transformer (Capacitor C-15).
2. Primary of 3rd I. F. Transformer (Capacitor C-14).
3. Secondary of 2nd I. F. Transformer (Capacitor C-13).
4. Primary of 2nd I. F. Transformer (Capacitor C-12).
5. Secondary of 1st I. F. Transformer (Capacitor C-11).
6. Primary of 1st I. F. Transformer (Capacitor C-10).

The adjustments of the aligning capacitors used in the radio frequency circuits in this receiver should be very carefully made in the following order and at the frequencies specified below:

1. Oscillator's "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-9).
2. R. F. Interstage "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-6).
3. Antenna "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-3).
4. Oscillator's "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-8).
5. R. F. Interstage "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-5).
6. Antenna "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-2).
7. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-7).
8. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
9. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).
10. Oscillator's "A" Band Series Aligner at 0.6 Megacycles (Capacitor (30)).
11. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-7).
12. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
13. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).

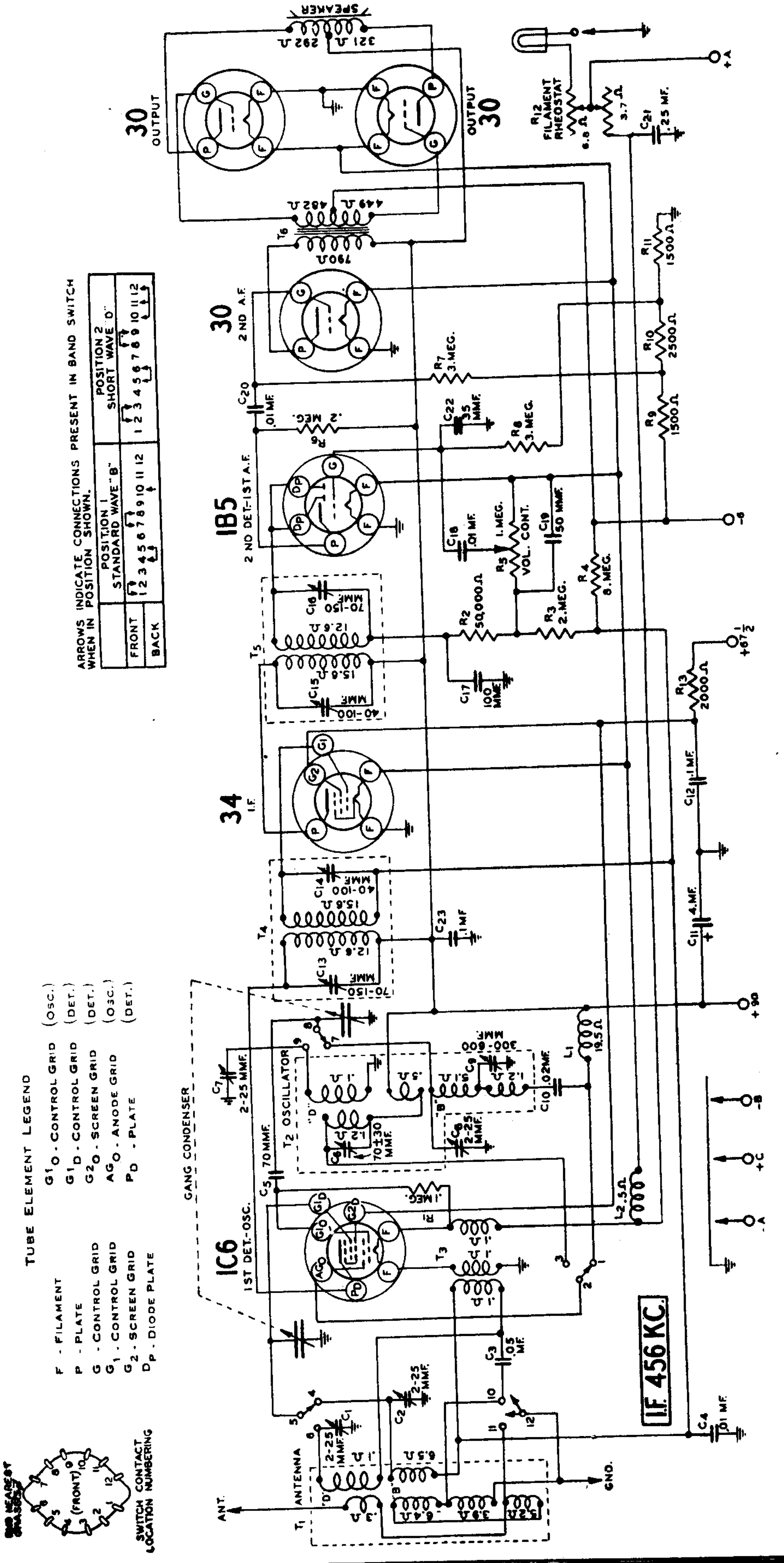


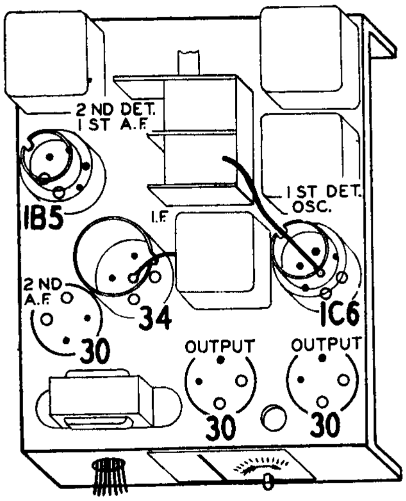


Tube	Circuit	Cap	Terminals of Sockets 1	2	3	4	5	6	7	8	Heater Voltages Between Heater Terminals: Socket Terminal Numbers	Volts
6K7	R. F. Amp.	0	0	0	+ 52	+ 93	+ 6	—	*6.3*	+ 6	2-7	*6.3*
6A8	Mod.-Osc.	0	0	0	+242	+ 69	—0.7	+150	*6.3*	+6.9	2-7	*6.3*
6K7	1st I. F. Amp.	0	0	0	+242	+ 90	+6.2	+3.5	*6.3*	+6.2	2-7	*6.3*
6K7	2nd I. F. Amp.	0	0	0	+242	+ 90	+5.6	+2.6	*6.3*	+5.6	2-7	*6.3*
6Q7	Dem.—A. V. C.— Audio Amp.	0	0	0	+148	0	+20*	+3.5	*6.3*	+ 23	2-7	*6.3*
6F6	Audio Output		0	0	+258	+265	0	—	*6.3*	+ 17	2-7	*6.3*
5Z3	Rectifier		+445	*400*	*400*	+445	—	—	—	—	1-4	*4.8*
6E5	Tuning Indicator		*6.3*	+0.6	+ 6	+240	+5.6	0	—	—	1-6	*6.3*
Speaker Socket			+262	0	0	+445	+445	—	+425			

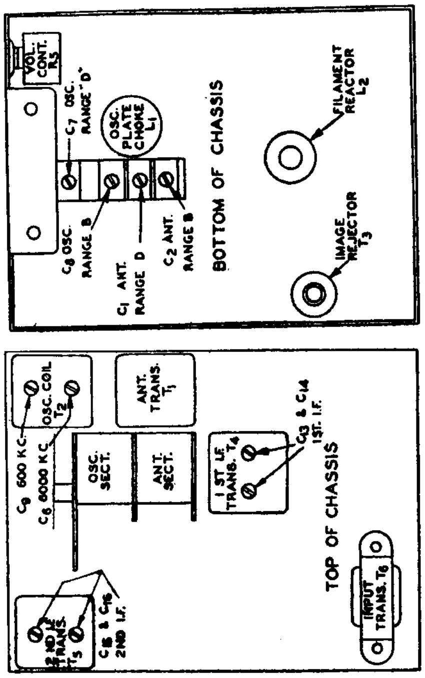
Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.

WELLS GARDNER & CO.
MODEL 6G SERIES





Tube Arrangement



Location of Trimmers

VOLTAGES AT SOCKETS

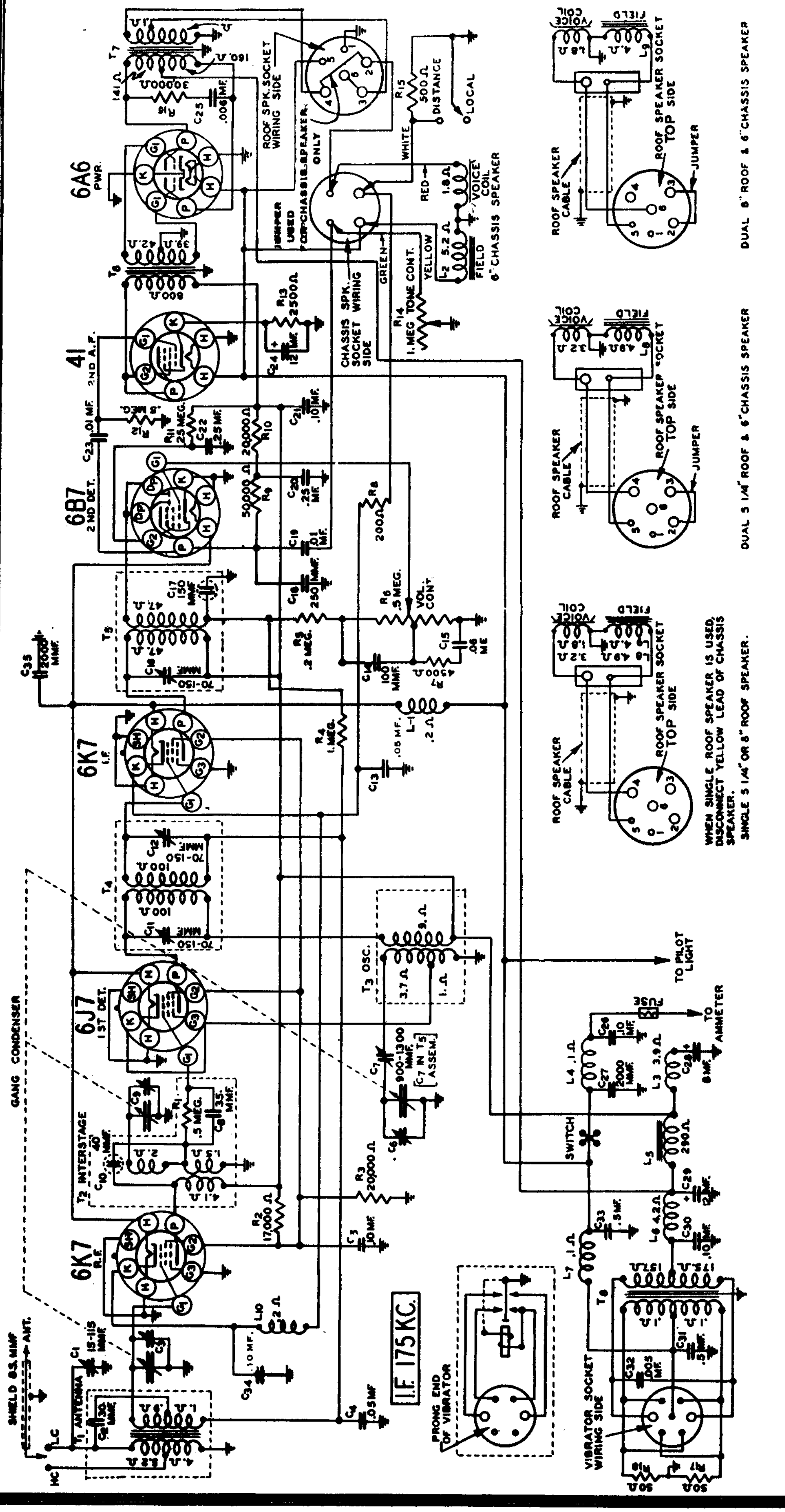
Volume Control at Maximum Antenna Shorted to Ground
Band Switch in Standard Wave Position

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Grid to Ground
1C6	1st Det.-Osc.	2.0	90 90(1)	60	6(2)
34	I.F.	2.0	90	60	6(2)
1B5	2nd Det.-1st A.F.	2.0	30(3)		1.5(4)
30	2nd A.F.	2.0	90		4.0(5)
30	Power	2.0	90		6

(1) Anode Grid to ground.
(2) As read at "C" Battery.
(3) As read with 500,000 ohm meter.
(4) As read from negative end of R11 to ground.
(5) As read from negative end of R10 to ground.

WELLS GARDNER & CO.

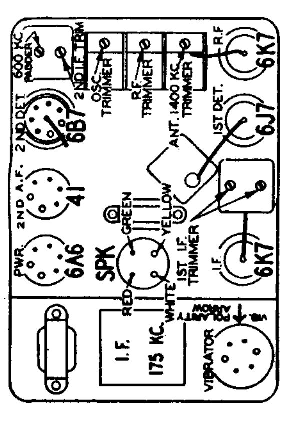
MODEL 6K SERIES



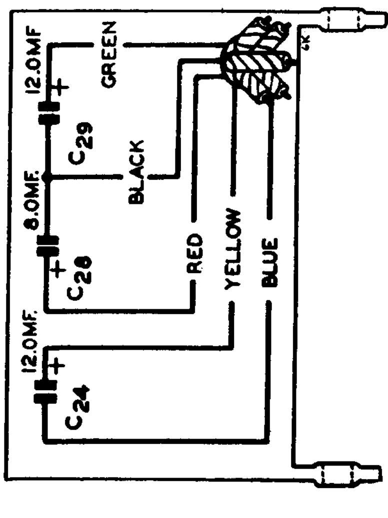
VOLTAGES AT SOCKETS

Antenna Plug Withdrawn L-D Switch in Distant Position
Battery 6.2 Volts under Load

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground
6K7	R.F.	5.6	260	110	3
6J7	1st Det.	5.6	260	110	
6K7	I.F.	5.6	260	110	3
6B7	2nd Det.	5.6	55	50	
41	2nd A.F.	5.7	255	255	30
6A6	Pwr.	5.7	275		



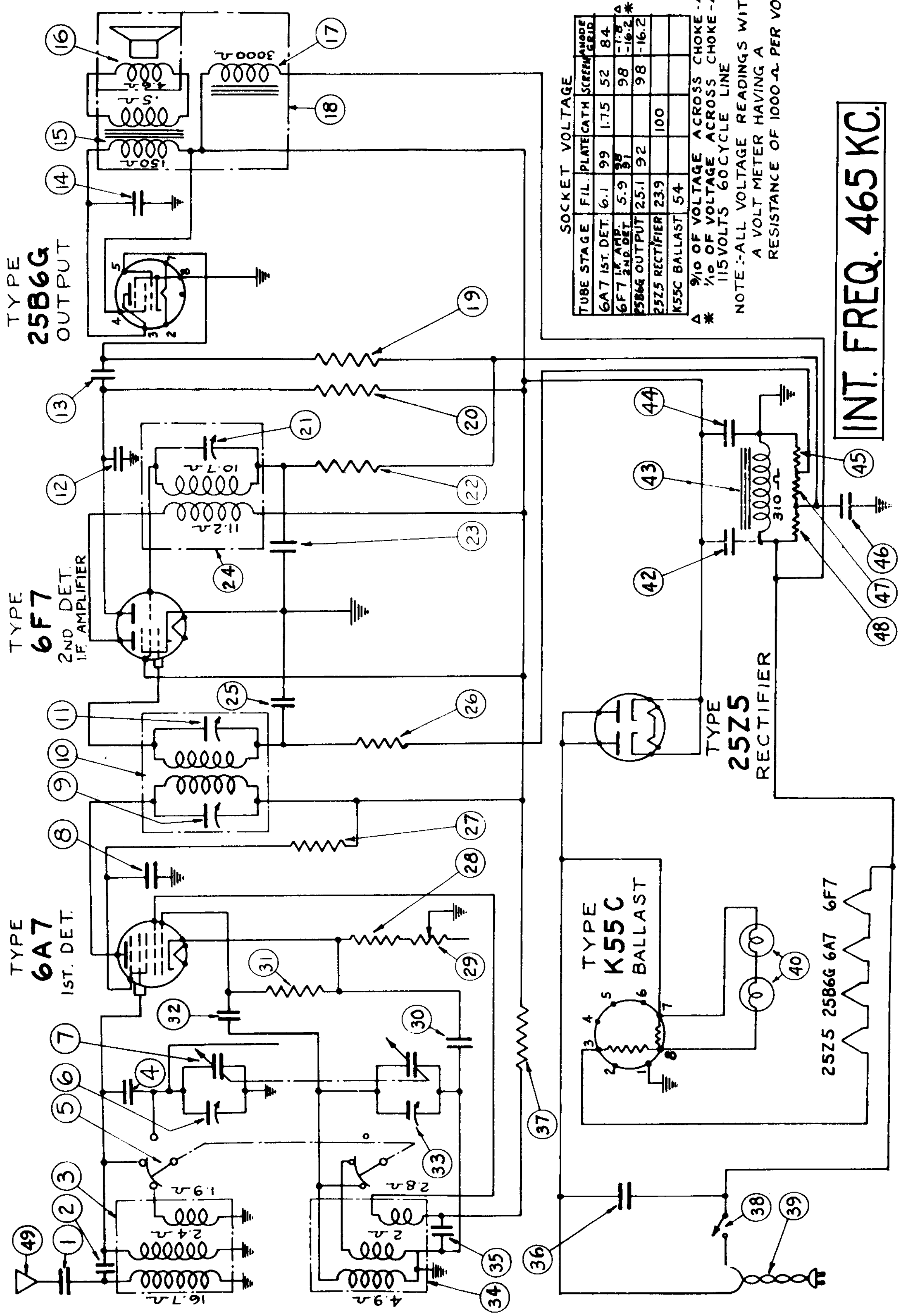
Location of Tubes and Vibrator



Condenser Block.

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODEL WR-102A



SOCKET VOLTAGE

TUBE STAGE	FIL.	PLATE	CATH	SCREEN	ANODE GRID
6A7 1ST. DET.	6.1	99	1.75	52	84
6F7 I.F. AMP. 2ND. DET.	5.9	98 91		98	-1.8 Δ -16.2 ✱
25B6G OUTPUT	25.1	92		98	-16.2
25Z5 RECTIFIER	23.9		100		
K55C BALLAST	54				

Δ 9/10 OF VOLTAGE ACROSS CHOKE -43
✱ 1/10 OF VOLTAGE ACROSS CHOKE -43
115 VOLTS 60 CYCLE LINE

NOTE:- ALL VOLTAGE READINGS WITH A VOLT METER HAVING A RESISTANCE OF 1000 Ω PER VOLT

INT. FREQ. 465 KC.

WESTINGHOUSE ELECTRIC SUPPLY COMPANY
MODEL WR-102A

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes --- 1 #6A7,1 #6F7,1 #25B6G,1 #25Z5,1 #K55C (Ballast) - Total 5
Power Supply Characteristics ------------ 105 to 125 volts, 50 to 60 cycle A.C. or D.C.
Power Consumption -- 48 Watts
Tuning Range -- 530 to 1525 KC., 1500 to 3000 KC.
Maximum Output -- 1.5 Watts
Maximum Undistorted Output -- 1 Watt
Line-Up Frequencies -- I.F. 465 KC., 1400 KC.

GENERAL DESCRIPTION

This model is a five-tube, A.C.-D.C., superheterodyne receiver whose circuits consist of a combined first detector-oscillator, a stage of intermediate frequency amplification, a second detector, a power output stage and a rectifier.

LINE-UP CAPACITOR ADJUSTMENTS

To align this model, it is essential to use a high grade modulated oscillator and sensitive output meter. The R.F. signal fed into the receiver must be very weak or it will cause the receiver to overload, making correct alignment impossible. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low signal.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures #1 and #2 and should be carefully studied before the actual work is started.

I.F. ADJUSTMENT (465 KC.)

NOTE: The signal generator or alignment oscillator should have no external ground connection of the low potential side of its output, either to ground or to the power line and the low potential output terminal may be connected to the frame of the receiver. An external ground of the receiver frame will result in a loud hum making alignment impossible.

1. Connect the output meter across the voice coil of speaker.

2. Set volume control at maximum.

3. Set the test oscillator to 465 KC., and apply test signal to the grid of the 6F7 tube through a 0.5 mfd. condenser.

4. Adjust second I.F. alignment condenser #21 to maximum output.

5. Apply the test signal to the grid of the 6A7 first detector-oscillator tube.

6. Adjust alignment condensers #9 and #11 to maximum output.

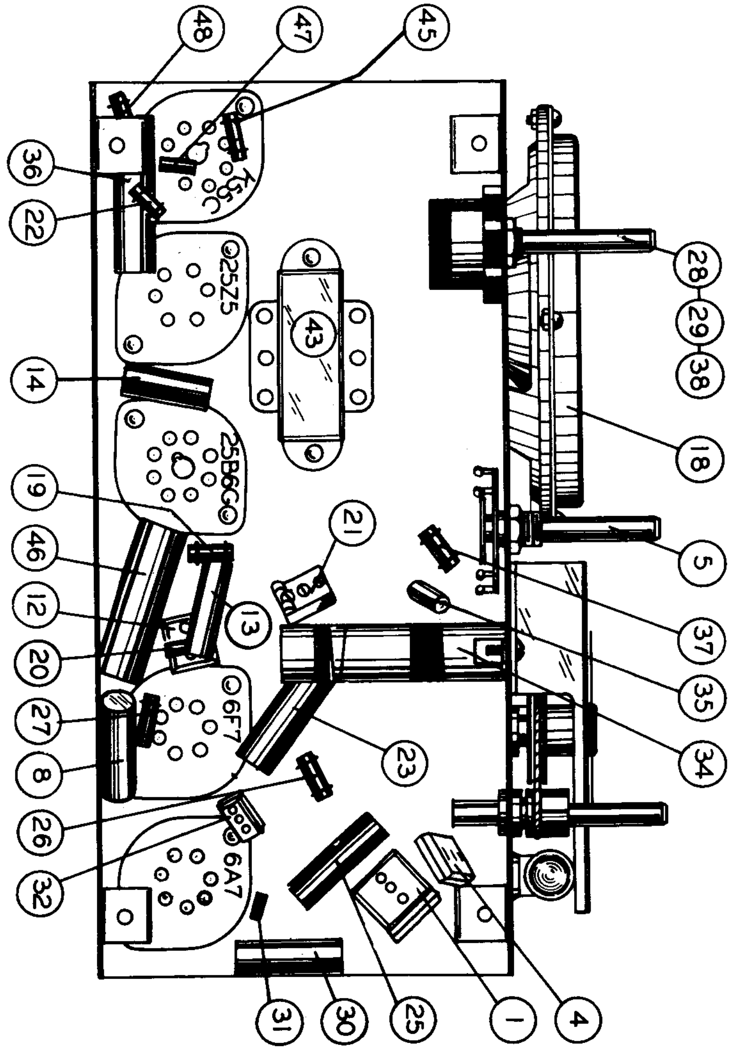
OSCILLATOR AND R.F. ADJUSTMENT

1. Set the test oscillator and dial indicator to 1500 KC., and apply the test signal to the antenna of the receiver through an 85 mmf. condenser.

2. Adjust the oscillator and antenna alignment condensers #33 and #6 to maximum output.

3. Check sensitivity over scale.

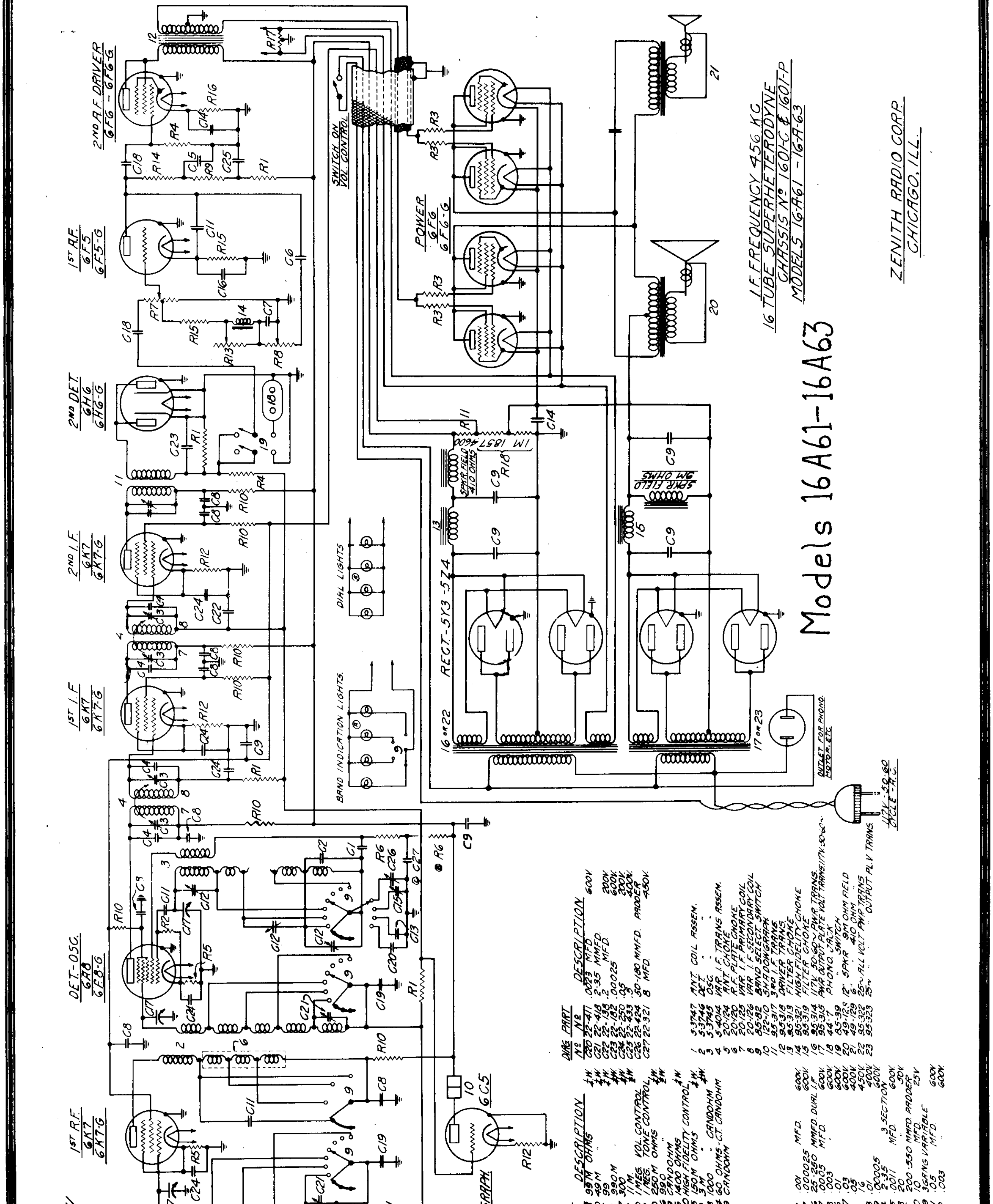
4. Check sensitivity on short-wave band.



Dia. #	Part #	Description of Parts	List Price
1	SA 103775	.001 mfd. mica condenser	$ .20
2	CS 9546	5 mmf. mica condenser	.20
3	RC 95197	Preselector coil	1.50
4	CM 9522	.00048 mfd. mica condenser	.20
5	SW 9545	Wave-change switch	.45
6		Trimmer condenser - part of CG 9547	
7	CG 9547	2-gang tuning condenser	2.50
8	CW 2-05	.05 mfd., 200 V. condenser	.15
9		35-130 mmf. trimmer condenser - part of IC 9596	
10	IC 9596	1st I.F. coil	2.50
11		35-135 mmf. trimmer condenser - part of IC 9596	
12	SA 103775	.001 mfd. mica condenser	.20
13	CW 4-005	.005 mfd., 400 V. condenser	.15
14	CW 4-005	.005 mfd., 400 V. condenser	.15
15	TR 9588	Output transformer	1.00
16	DM 9512	Diaphragm and voice coil	1.50
17		Field coil - part of SK 9548	
18	SK 9546	Speaker	3.75
19	RE 9545	1/2 meg., 1/8 W. resistor	.10
20	RE 95112	1/4 meg., 1/2 W. resistor	.10
21		30-60 mmf. trimmer condenser - part of IC 9568	
22	RE 9530	1 meg., 1/8 W. resistor	.10
23	CW 2-10	.1 mfd., 200 V. condenser	.15
24	IC 9568	2nd I.F. coil	1.25
25	CW 2-05	.05 mfd., 200 V. condenser	.15
26	RE 9572	1/2 meg., 1/4 W. resistor	.15
27	RE 9569	30,000 ohm, 1/8 W. resistor	.10
28		350 ohm resistance - part of VR 9531	
29	VR 9531	10,000 ohm volume control	.90
30	CW 4-005	.005 mfd., 400 V. condenser	.15
31	RE 9524	50,000 ohm, 1/8 W. resistor	.10
32	CM 9513	.0001 mfd. mica condenser	.10
33		Trimmer condenser - part of CG 9547	
34	RC 95166	Oscillator coil	.70
35	CW 4-005	.005 mfd., 400 V. condenser	.15
36	CW 2-10	.1 mfd., 200 V. condenser	.15
37	RE 9527	5000 ohm, 1/8 W. resistor	.10
38		Switch - part of VR 9531	
39	CB 9512	Line cable	.50
40	LP 9516	Dial light - 6.3 V., .15 amp.	.20
42	CE 9553	40 mfd., 150 V., electrolytic condenser	.80
43	SA 105311	Choke coil assembly	.95
44	CE 9534	16 mfd., 150 V. electrolytic condenser	.70
45	RE 9545	1/2 meg., 1/8 W. resistor	.10
46	CW 2-25	.25 mfd., 200 V. condenser	.20
47	RE 95119	4 meg., 1/2 W. resistor	.10
48	RE 9545	1/2 meg., 1/8 W. resistor	.10
49	KL 105344	Antenna cable	.20

ZENITH RADIO CORPORATION

MODELS 16A61 & 16A63 "CHASSIS 1601C & 1601P"



DIAG. No.	PART No.	DESCRIPTION	
R1	63-278	99M OHMS	¼W.
R2	63-280	49M "	¼W.
R3	63-417	99	¼W.
R4	63-293	990M "	¼W.
R5	63-357	300	¼W.
R6	63-373	11M.	½W.
R7	63-450	1 MEG. VOL. CONTROL	
R8	63-451	1 MEG. TONE CONTROL	
R9	63-400	250M OHMS	¼W.
R10	63-466	990 "	½W.
R11	63-479	CANDOHM	
R12	63-416	1400 OHMS	¼W.
R13	63-480	HIGH FIDELITY CONTROL	
R14	63-325	150M OHMS	¼W.
R15	63-279	3M "	¼W.
R16	63-478	1000 - CANDOHM	
R17	63-404	60 OHMS - C.T. CANDOHM	
R18	63-389	CANDOHM	

DIAG. No.	PART No.	DESCRIPTION	
C1	22-82	.001 MFD.	600V.
C2	22-127	.000025	600V.
C3	22-436	25-250 MMFD. DUAL I.F.	
C4	22-447	.0005 MFD.	600V.
C5	22-368	.003 "	600V.
C6	22-196	.01	600V.
C7	22-287	.03	600V.
C8	22-212	.05	400V.
C9	22-361	16	450V.
C10	22-243	.01	400V.
C11	22-289	.00005	600V.
C12	22-324	2-35 3 SECTION	
C13	22-345	.0011 MFD.	600V.
C14	22-438	20 "	50V.
C15	22-205	200-550 MMFD. PADDER	
C16	22-420	10 MFD.	25V
C17	22-409	3 GANG VARIABLE	
C18	22-171	.05 MFD.	600V.
C19	22-410	.003 "	600V.
C20	22-411	.0023 MFD.	600V.
C21	22-418	2-35 MMFD.	
C22	22-138	.2 MFD.	200V.
C23	22-182	.00025	600V.
C24	22-250	.05	200V.
C25	22-433	.5	400V.
C26	22-424	50-180 MMFD. PADDER	
C27	22-321	8 MFD.	450V.

DIAG. No.	PART No.	DESCRIPTION
1	5-3747	ANT. COIL ASSEM.
2	5-3746	DET. " "
3	5-3745	OSC. " "
4	5-4014	VAR. I.F. TRANS. ASSEM.
5	20-124	ANT. CHOKE
6	20-120	R.F. PLATE CHOKE
7	20-125	VAR. I.F. PRIMARY COIL
8	20-126	VAR. I.F. SECONDARY COIL
9	85-82	BAND SELECT. SWITCH
10	122-10	SHADOWGRAPH
11	95-317	3RD I.F. TRANS.
12	95-318	DRIVER TRANS.
13	95-313	FILTER CHOKE
14	95-321	HIGH FIDELITY CHOKE
15	95-319	FILTER CHOKE
16	95-314	117V. 50-60~ PWR. TRANS.
17	95-315	PWR. OUTPUT PLATE VOLT. TRANS. 117V. 50-60~
18	44-7	PHONO. JACK
19	85-39	" SWITCH
20	49-128	12" SPKR. 9M OHM FIELD
21	49-129	6" " 410 OHM "
22	95-322	25~ ALL VOLT PWR. TRANS.
23	95-323	25~ " " OUTPUT PL. V. TRANS.

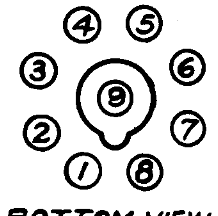
ZENITH RADIO CORPORATION

MODELS 16A61 and 16A63 "Stratosphere"

MODELS 16A61 & 16A63 "CHASSIS 1601C & 1601P"

Socket Voltages

TUBE	POSITION	1	2	3	4	5	6	7	8	9
6K7	R.F.	0	3AC	280	100	3.5	-	3AC	3.5	0
6A8	1st Det.& Osc.	0	3AC	280	100	.4	125	3AC	3.5	0
6K7	1st I.F.	0	3AC	280	100	6.5	-	3AC	6.5	0
6K7	2nd I.F.	0	3AC	280	100	6.5	-	3AC	6.5	0
6H6	2nd Det.	0	3AC	-.2	0	-.2	-	3AC	0	-
6F5	1st Audio	0	3AC	-	3	-	-	3AC	1	0
6F6	2nd Audio Driver	0	3AC	280	280	0	-	3AC	25	-
6C5	Shadowgraph Amp.	0	3AC	280	-	0	-	3AC	11	-
6F6	(4 tubes) Power	0		370	370	0	-		35	-
5Y3	Rectifier Top Chassis	0	390	-	320AC	-	320AC	-	390	-
5Y3	Rectifier Lower Chassis	0	360	-	300AC	-	300AC	-	360	-



BOTTOM VIEW OF SOCKET

Line Voltage 115   Antenna and Ground Disconnected

Voltages measured from point indicated to ground, using a 1000 ohm per volt meter, except heaters (2 - 7)

Alignment

1. The diagram on page shows position of major components and aligning adjustments. It should be studied carefully before any attempt is made to adjust the various circuits.

2. Set service oscillator to 456 KC, and connect to the grid of the 6A8 tube. The grid cap should not be removed from the tube as this will remove bias. Tune the I.F. transformers for maximum output. Alignment should always be made with the service oscillator set to as low an output as will give a satisfactory indication on the output meter.

3. Connect the service oscillator to the antenna and ground post. With the band switch in the broadcast position, set the dial pointer to 1700 kilocycles, and adjust the oscillator trimmer on the gang condenser for a maximum output. Align the R.F. and detector condenser trimmers, also located on the gang condenser, for a maximum output.

4. Set the dial pointer to 600 kilocycles, and adjust the B.C. padder meanwhile rocking the gang condenser back and forth across 600 kilocycles until the padder setting for maximum output is obtained.. It may be necessary to go back and make a slight correction of the trimmer at 1700 kilocycles after the padder adjustment is completed.

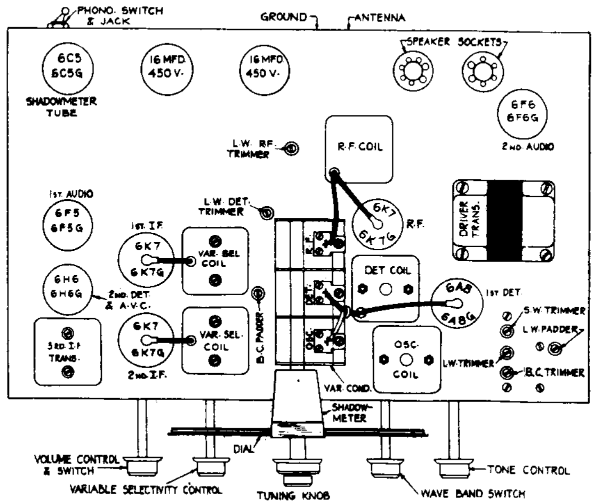
5. Turn the band switch for the "B" band. Rock the gang back and forth across the 6 megacycle readings, meanwhile adjusting the oscillator trimmer on the gang condenser until maximum output is obtained. It will always be found that the dial reading for 6 megacycles is very close to this point. The service oscillator, of course, should be set at 6 megacycles.

6. Align "D" band (7-22.5 megacycles) next by setting service oscillator and dial indicator to 18 megacycles, and rocking indicator slowly over that point while adjusting the S.W. Trimmer to maximum output.

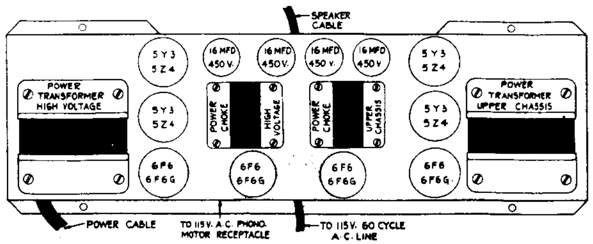
7. Set back to 1700 K.C. Readjust oscillator circuit this time using broadcast trimmer on chassis base.

8. Set band switch to "C" band (long wave) and peak at 350 K.C. with L.W.,R.F.-Det. and Oscillator trimmers. Turn dial indicator and service oscillator to 180 K.C., and adjust long wave padder while slowly rocking dial indicator.

9. Repeat operation #2.

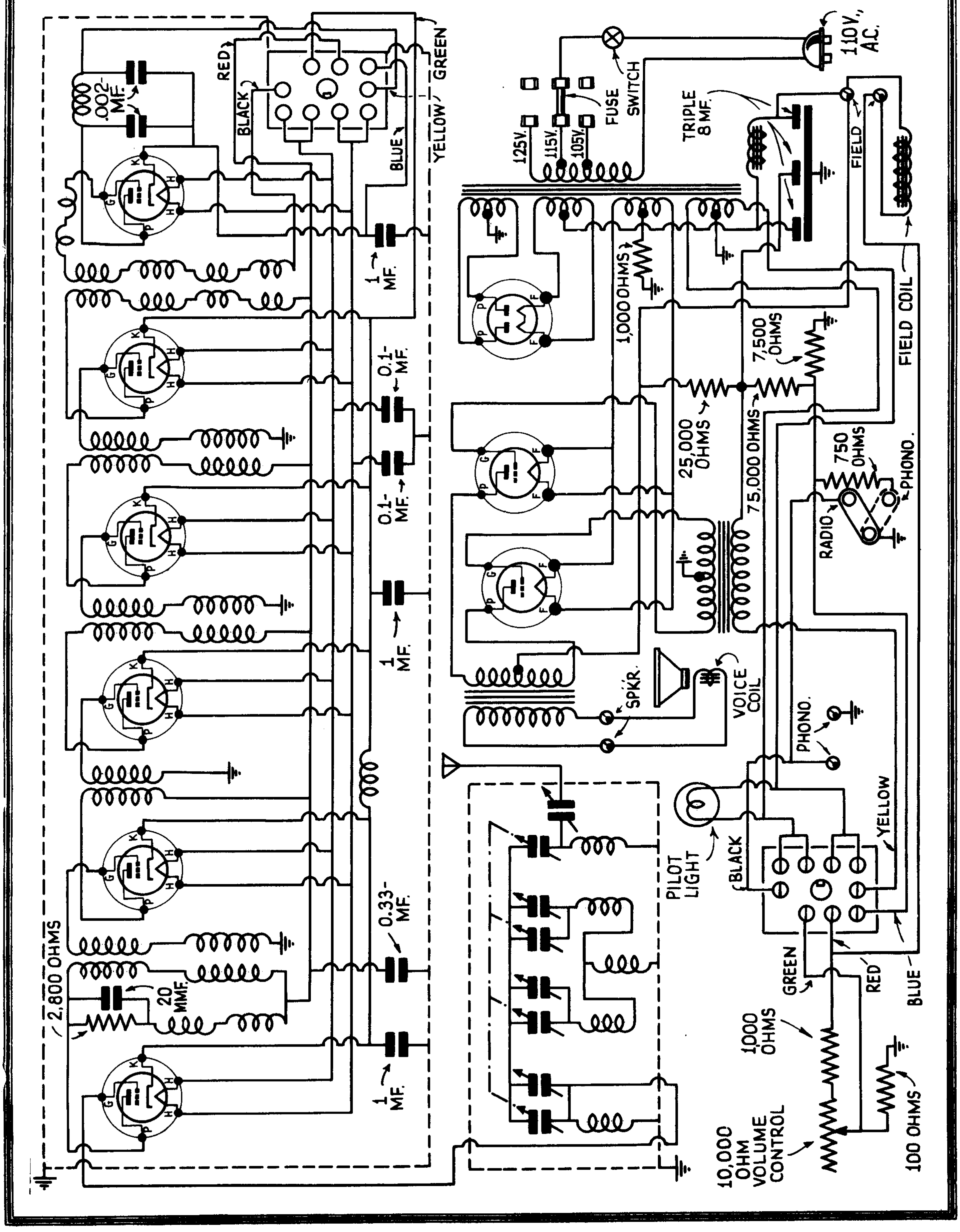


Receiver Chassis Drawing



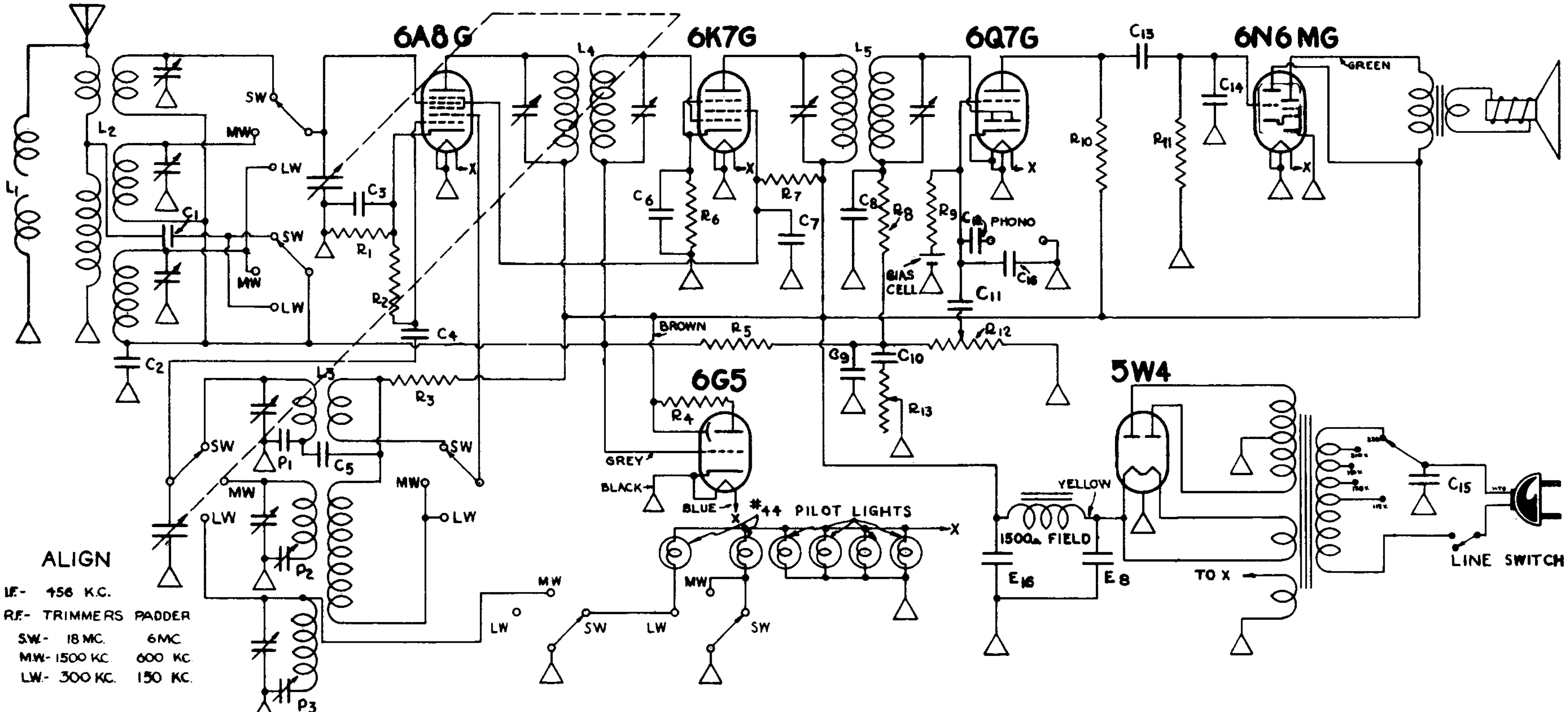
Power Pack Chassis Drawing .

A.C. DAYTON CO.
MODEL AC-99



AIR-KING PRODUCTS COMPANY, INC.

MODEL 6F



R1	-	300 ohm	½	watt
R2	-	50,000	" ½	"
R3	-	20,000	" ½	"
R4	-	1,000,000	" ½	"
R5	-	3,000,000	" ½	"
R6	-	500	" ½	"
R7	-	25,000	" 2	"
R8	-	50,000	" ½	"
R9	-	1,000,000	" ½	"
R10	-	300,000	" ½	"
R11	-	500,000	" ½	"
R12	-	450,000	" vol. control	
R 13	-	400,000	" tone control	

L1 - 456 KC wave trap
L2 - 3 band antenna coil
L3 - 3 band oscillator coil
L4 - 456 KC INPUT I. F.
L5 - 456 KC OUTPUT I. F.

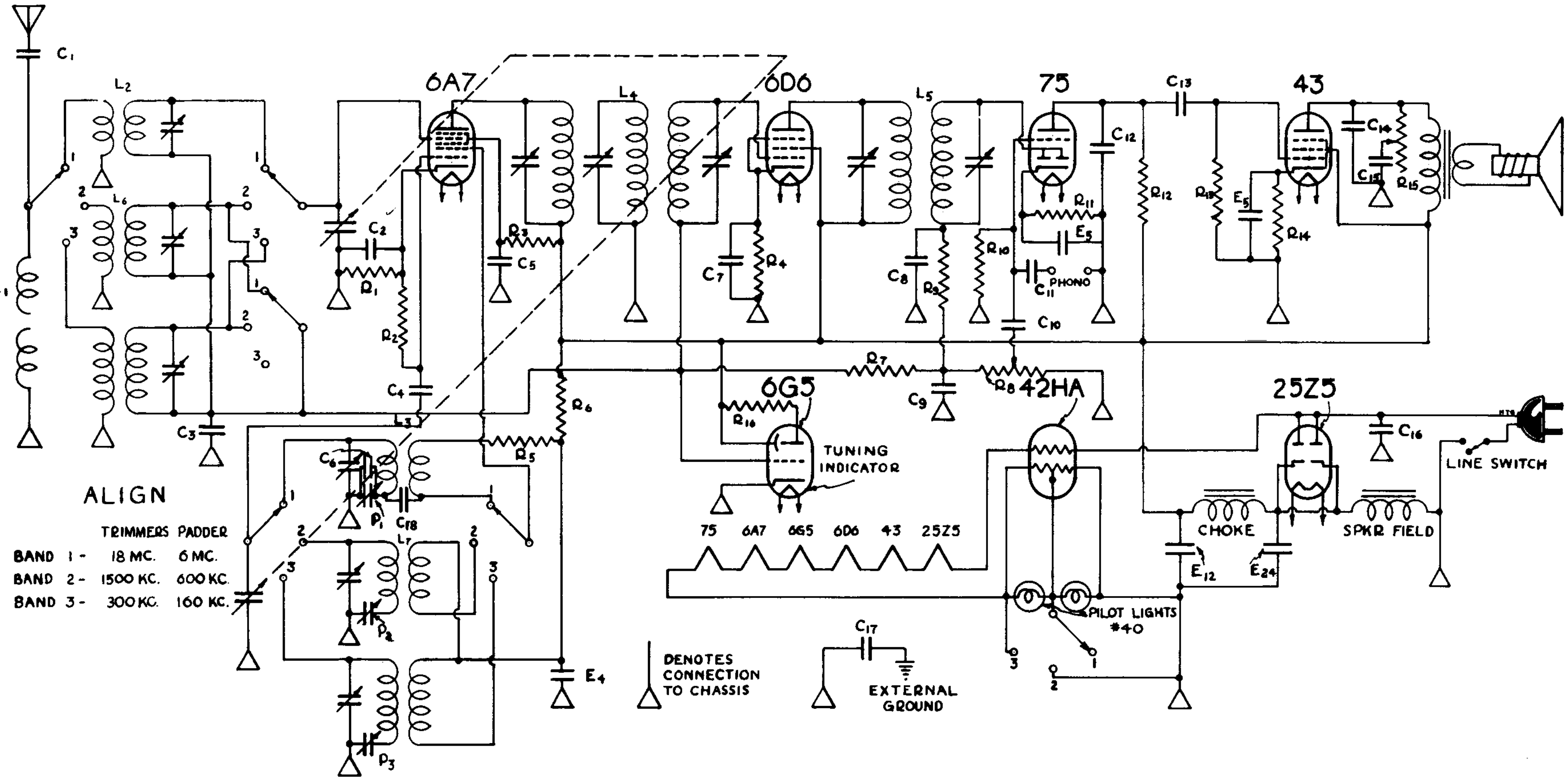
P1 - .0048 mmf.
P2 - 550 mmf.
P3 - 300 mmf.

E8 - 8 mfd. - 450 V.
E16 - 16 mfd. - 300 V.

C1	.00025	mica
C2	.05	400 V.
C3	.1	200 V.
C4	.0001	mica
C5	.02	400 V.
C6	.1	200 V.
C7	.1	200 V.
C8	.0001	mica
C9	.0001	mica
C10	.005	400 V.
C11	.02	400 V.
C12	.1	200 V.
C13	.02	400 V.
C14	.0005	mica
C15	.02	400 V.
C16	.0001	mica

AIR-KING PRODUCTS COMPANY, INC.

MODELS 72 & 73



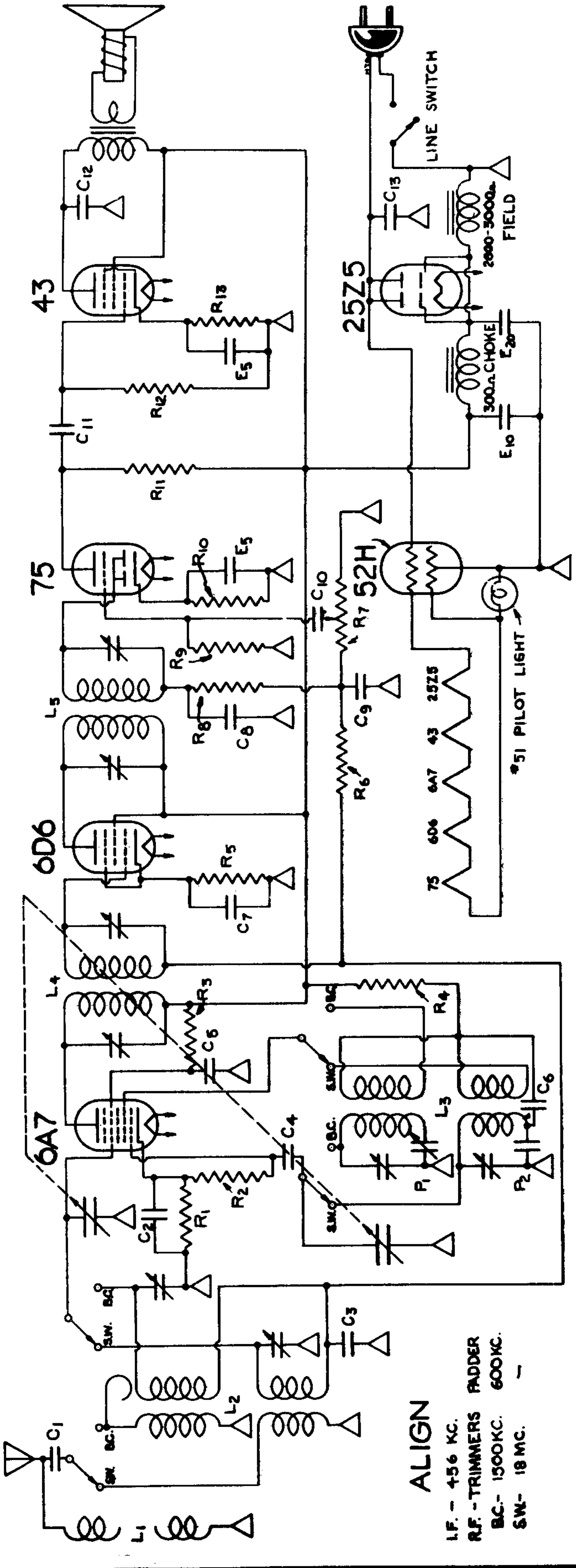
R 1	- 250	ohms	1/4 watt
R 2	- 50,000	"	1/4 "
R 3	- 35,000	"	1/4 "
R 4	- 500	"	1/4 "
R 5	- 4,500	"	1/4 "
R 6	- 4,500	"	1/4 "
R 7	-3,000,000	"	1/4 "
R 8	- 500,000	"	vol. cont.
R 9	- 50,000	"	1/4 watt
R 10	- 750,000	"	1/4 "
R 11	- 4,500	"	1/4 "
R 12	- 500,000	"	1/4 "
R 13	- 750,000	"	1/4 "
R 14	- 650	"	1 "
R 15	- 500,000	"	Tone cont.
R 16	-1,000,000	"	1/4 watt

P 1 & C 6	- .0035 max.
P 2	- .0006
P 3	- .0002
E 5	- 5 mfd. - 25 v.
E 5	- 5 mfd. - 25 v.
E 4	- 4 mfd. - 150 v.
E 12	- 12 mfd. - 150 v.
E 24	- 24 mfd. - 150 v.
L 1	- 456 KC wave trap
L 2	- Short wave antenna coil
L 3	- Short wave oscillator coil
L 4	- Triple tuned 456 KC I.F.
L 5	- Double tuned 456 KC I.F.
L 6	- Comb. middle & longwave ant. coil
L 7	- Comb. " " " osc. "

C 1	- .005	- 600 v.
C 2	- .1	- 200 v.
C 3	- .05	- 400 v.
C 4	- .0001	- mica
C 5	- .05	- 400 v.
C 7	- .1	- 200 v.
C 8	- .0001	- mica
C 9	- .0001	- mica
C 10	- .02	- 400 v.
C 11	- .1	- 200 v.
C 12	- .0001	- mica
C 13	- .02	- 400 v.
C 14	- .005	- 600 v.
C 15	- .02	- 400 v.
C 16	- .05	- 400 v.
C 17	- .05	- 400 v.
C 18	- .02	- 400 v.

AIR-KING PRODUCTS COMPANY, INC.

MODEL 260



ALIGN
I.F. - 456 KC.
R.F. - TRIMMERS PADDER
B.C. - 1500KC. 600KC.
S.W. - 18 MC. -

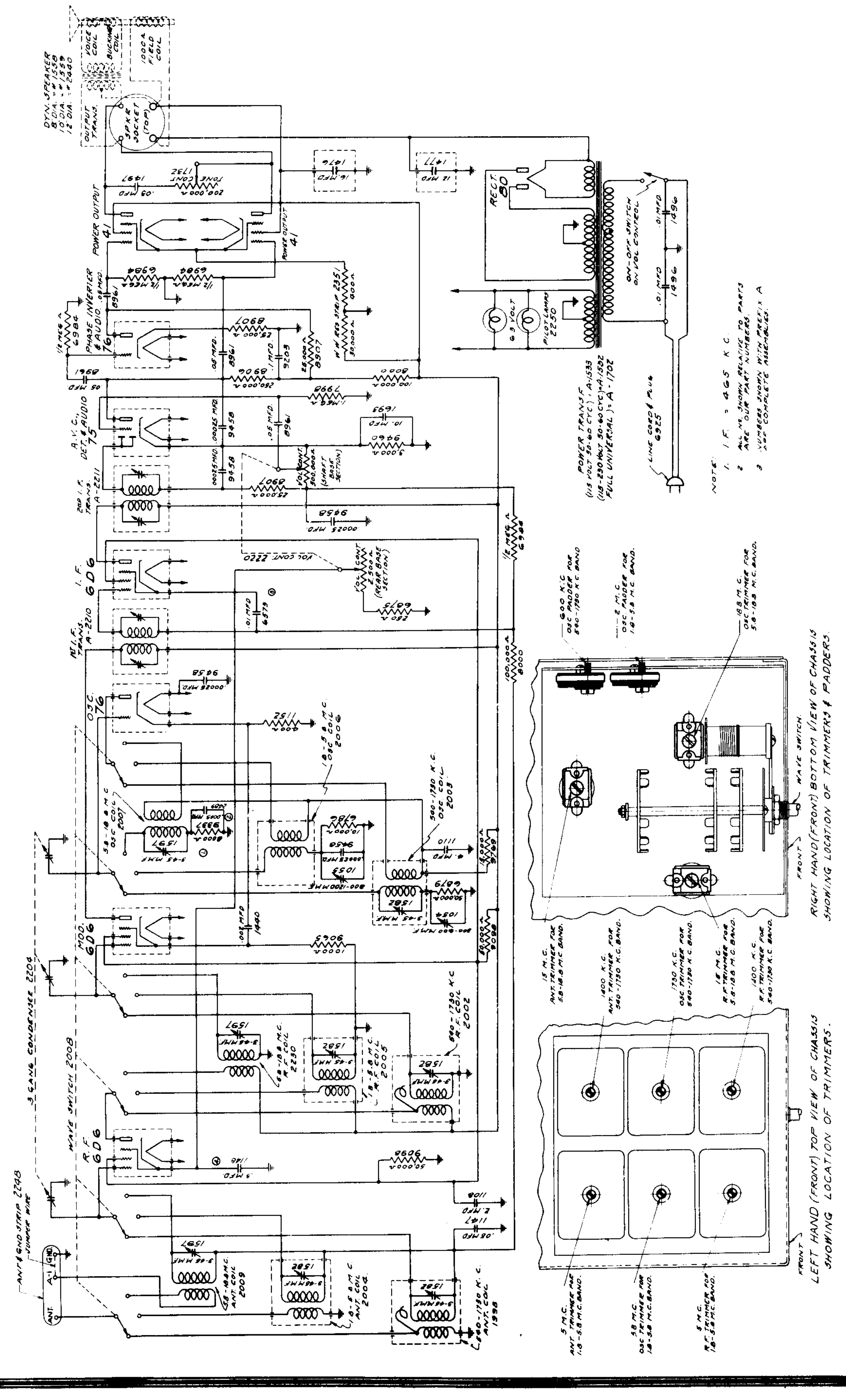
R 1 -	250 ohm	½ watt
R 2 -	50,000 "	½ "
R 3 -	35,000 "	½ "
R 4 -	1000 "	½ "
R 5 -	500 "	½ "
R 6 -	3,000,000 "	½ "
R 7 -	500,000 "	vol. cont.
R 8 -	50,000 "	½ watt
R 9 -	750,000 "	½ "
R 10 -	4,500 "	½ "
R 11 -	500,000 "	½ "
R 12 -	750,000 "	½ "
R 13 -	650 "	½ "

L 1 -	456 KC Wave Trap.
L 2 -	2 band antenna coil.
L 3 -	2 band oscillator coil.
L 4 -	456 KC input I.F.
L 5 -	456 KC output I.F.
P 1 -	500 mmfd.
P 2 -	.0054 mfd.
E 5 -	5 mfd. - 35 V.
E 5 -	5 mfd. - 35 V.
E 10 -	10 mfd.- 150 V.
E 20 -	20 mfd.- 150 V.

C 1 -	.005	- 600 V.
C 2 -	.1	- 200 V.
C 3 -	.05	- 400 V.
C 4 -	.0001	- Mica
C 5 -	.1	- 200 V.
C 6 -	.02	- 400 V.
C 7 -	.1	- 200 V.
C 8 -	.0001	- Mica
C 9 -	.0001	- Mica
C 10 -	.02	- 400 V.
C 11 -	.02	- 400 V.
C 12 -	.01	- 600 V.
C 13 -	.05	- 400 V.

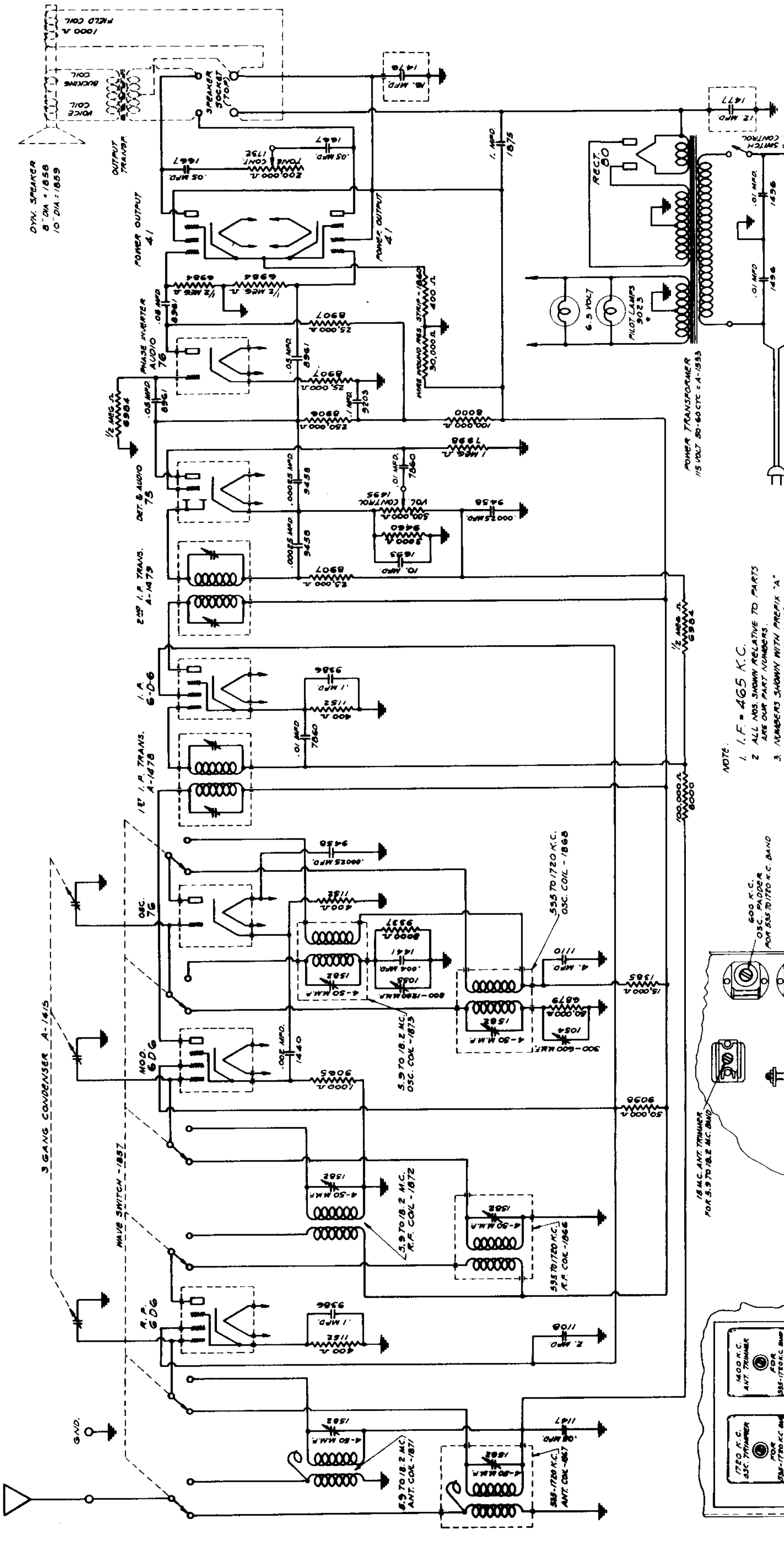
ALLIED RADIO CORPORATION

MODELS H-9865 & H-9867



ALLIED RADIO CORPORATION

MODELS G-9895 & G-9896

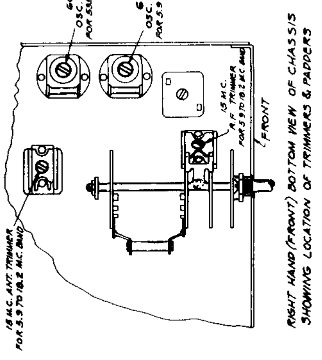


NOTE:
1. I.F. = 465 K.C.
2. ALL NOS. SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.

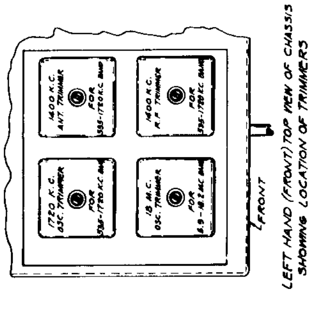
VOLTAGE TABLE

TUBE		FILAMENT	PLATE	SCREEN	CATHODE
6D6	1st Det.	6	230	75	4.5
6D6	Radio Frequency	6	230	75	2.8
76	Oscillator	6	112		3.5
6D6	I.F. Amplifier	6	230	75	2.8
75	2nd Det. & AVC	6	60*		1.2
76	Audio Phase Inverter	6	115		6
41	Output	6	225	230	17
41	Output	6	225	230	17
80	Rectifier	4.8	80 M.A. total drain		

* Triode plate comparative voltage only. Read all voltages from socket to chassis.



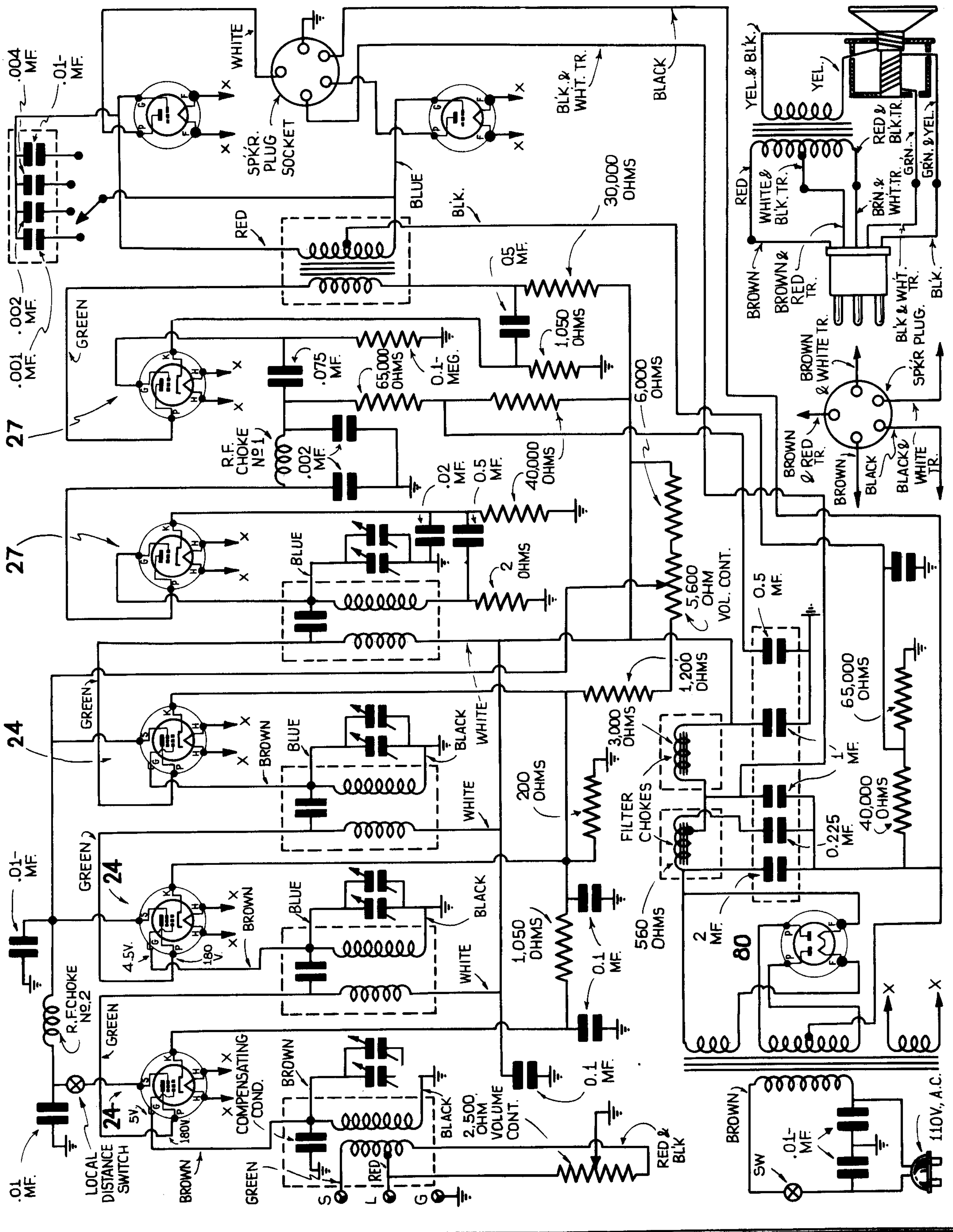
RIGHT HAND (FRONT) BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS & PADDERS



LEFT HAND (FRONT) TOP VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS

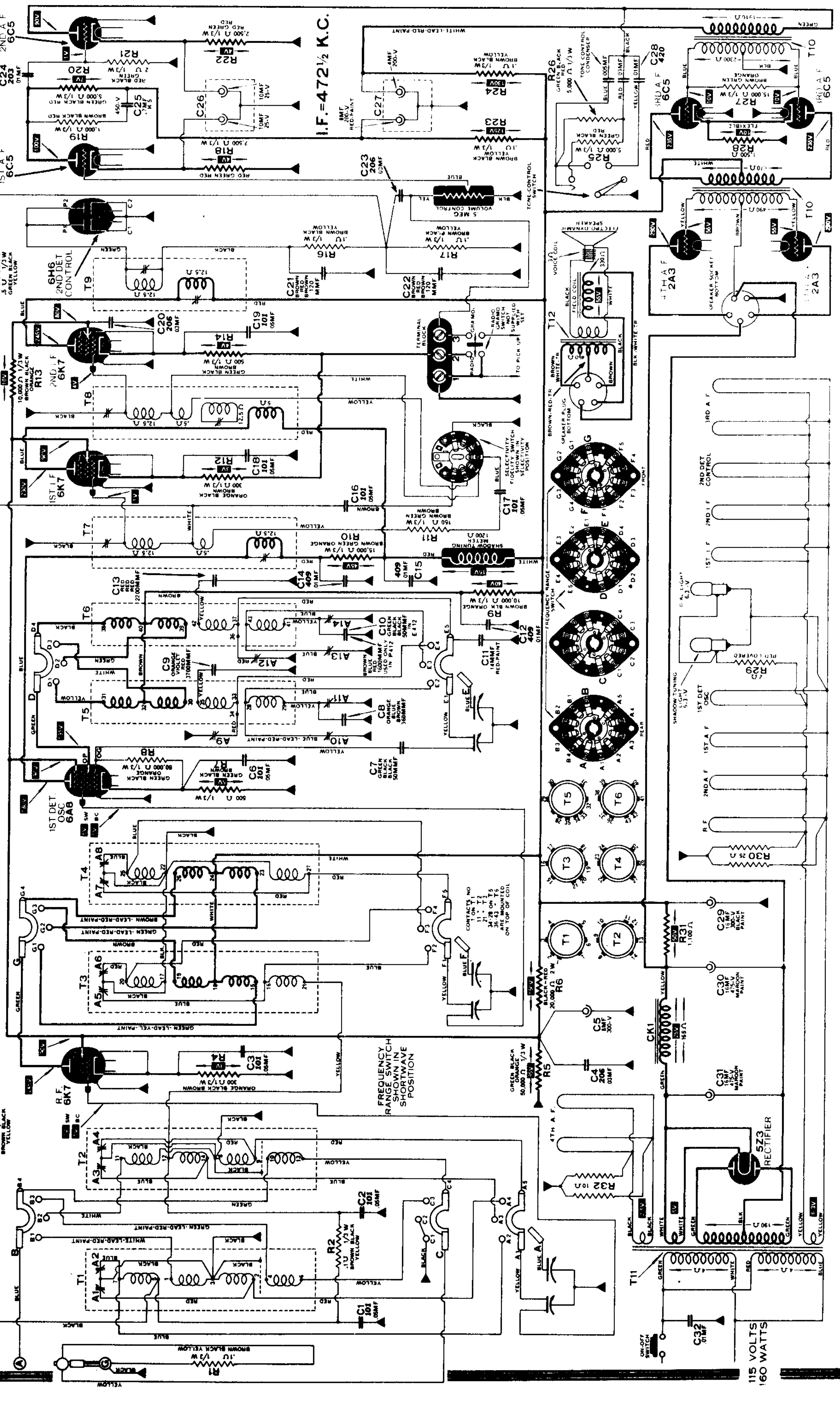
ATWATER KENT MFG. CO.

MODELS P & 76



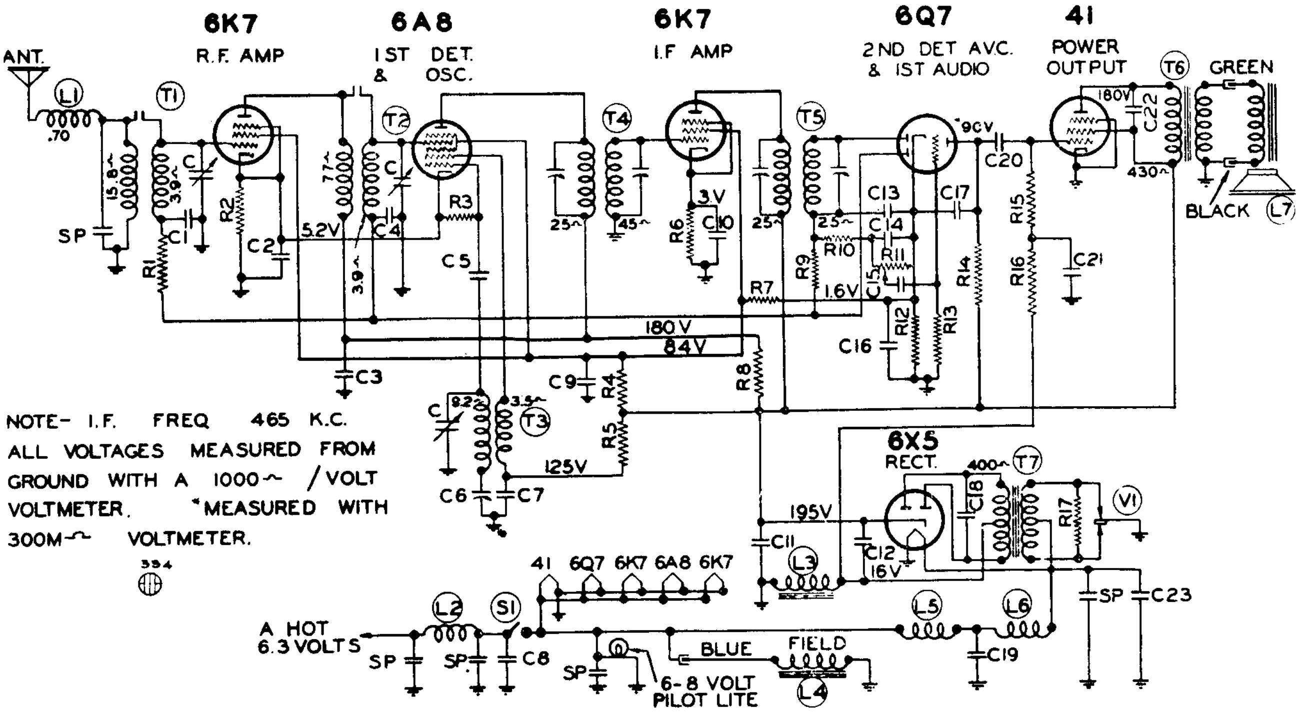
ATWATER KENT MFG. CO.

MODELS P412 AND E412



BELMONT RADIO CORPORATION

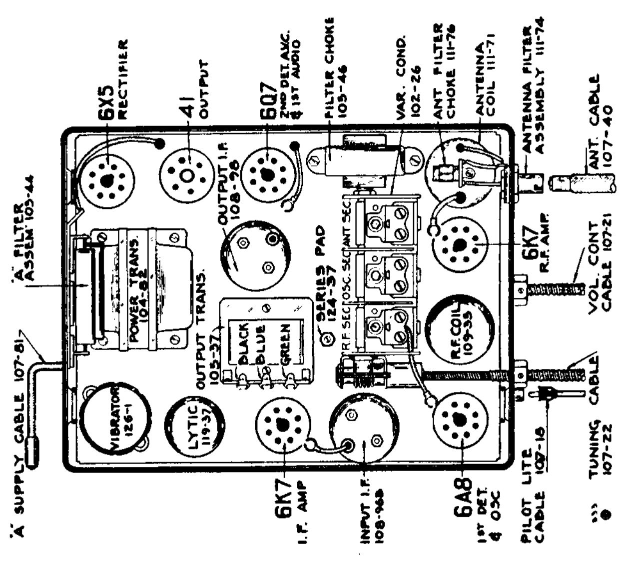
MODELS D-743&661 SERIES A



No.	Part No.	Description
		CONDENSERS
C	102-26	3 Gang Variable Condenser
C1	100-63	.05 x 200v. 50 - 10%
C2	100-63	.1 x 200v. 50 - 10%
C3	100-13	.05 x 400v. 25%
C4	100-22	.05 x 200v. 25%
C5	129-12	.00025 Mica - 20%
C6	124-37	Series Pad
C7	100-20	.1 x 200 v. 25%
C8	100-31	.5 x 120 v. 10 50%
C9	100-62	.25 x 200 v. 50 - 10%
C10	100-20	.1 x 200 v. 25%
C11	119-37	8 mfd. lytic 300 wv.
C12	119-37	4 mfd. lytic 300 wv.
C13	129-5	.0001 Mica 20%
C14	129-5	.0001 Mica 20%
C15	100-11	.01 x 400 v. 25%
C16	100-11	.01 x 400 v. 25%
C17	129-5	.0001 Mica 20%
C18	100-58	.005 x 1200 v. 20 - 10%
C19	100-31	.5 x 120 v. - 10 50%
C20	100-11	.01 x 400 v. 25%
C21	100-62	.25 x 200 v. 50 - 10%
C22	100-54	.006 x 600 v. 25%
C23	100-31	.5 x 120 v. - 10 50%
SP		Spark Plate

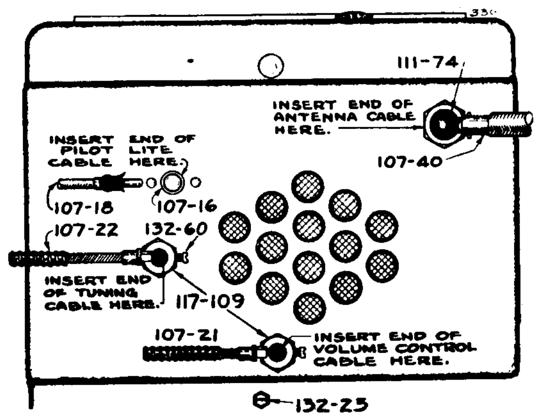
C1, C2 in same block
C11 and C12 in same block
C9 and C21 in same block

No.	Part No.	Description
		RESISTORS
R1	130-20	100M - 1/3 w. - 20%
R2	130-54	500 ohm - 1/3 w. - 20%
R3	130-12A	50M ohm - 1/3 w. insulated 20%
R4	130-165	15M ohm - 1 w. - 20%
R5	130-131A	20M ohm - 1/2 w. - insulated - 10%
R6	130-24	400 ohm - 1/3 w. - 20%
R7	130-139A	40M ohm - 1/3 w. Insulated - 20%
R8	130-31A	1500 ohm - 1/3 w. insulated - 20%
R9	130-19	1 megohm - 1/3 w. - 20%
R10	130-52	50M ohm - 1/3 w. - 20%
R11	101-41	500M ohm - Volume Control
R12	130-153	700 ohm - 1/3 w. - 20%
R13	130-19	1 megohm - 1/3 w - 20%
R14	130-11A	250M - 1/3 w. Insulated - 20%
R15	130-5A	300M ohm - 1/3 w. insulated - 20%
R16	130-11A	250M ohm - 1/3 w. insulated - 20%
R17	130-84	200 ohm - 1/3 w. insulated - 20%
		PARTS
T1	111-71	Antenna Coil Complete
T2	109-35	R.F. Coil Complete
T3	110-57	Oscillator Coil Complete
T4	108-96B	Input I.F. Complete
T5	108-98	Output I. F. Complete
T6	105-37	Output Transformer
T7	104-82	Power Transformer
L1	111-76	Antenna Filter Choke
L2	105-26	"A" Choke
L3	105-46	"B" Filter Choke, 335 ohm
L4		Speaker Field, 4 ohm
L5	105-24	"A" Choke
L6	105-19	"A" Choke
L7	114-59	Dynamic Speaker
S1		Switch on Volume Control
V1	126-1	Vibrator

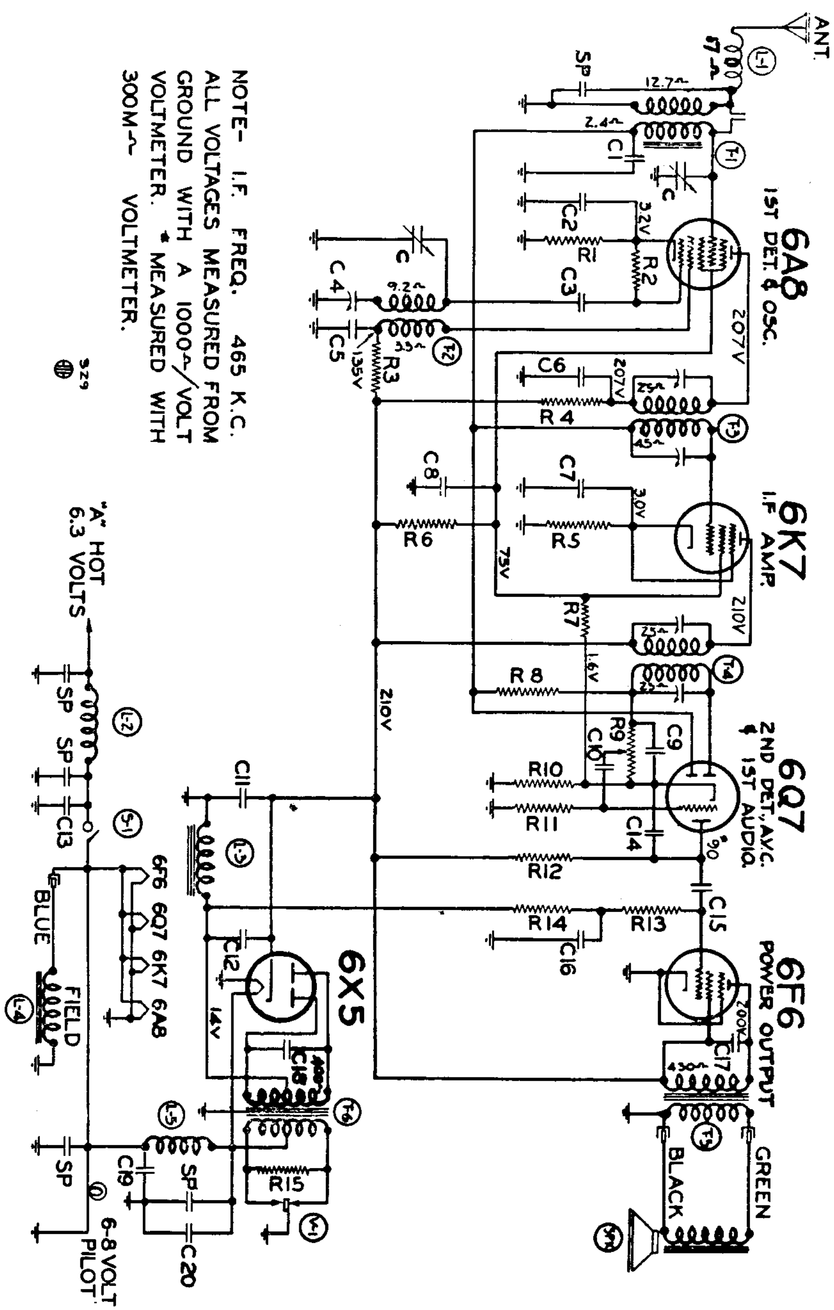


DIAL ADJUSTMENT

Tune set to some station of a known frequency (between 800 and 1200 K.C.), hold selector knob, then remove pilot light assembly from back of remote head and with a screw driver adjust the slotted screw through this opening and in this way adjust the dial pointer to the correct frequency setting.



BELMONT RADIO CORPORATION
MODELS 567 & D-734



NOTE- I.F. FREQ. 465 K.C.
ALL VOLTAGES MEASURED FROM GROUND WITH A 1000Ω/VOLT VOLTMETER. * MEASURED WITH 300MΩ VOLTMETER.

No.	Part No.	Description
		CONDENSERS
C	102-27	2 Gang Variable Condenser
C1	100-59	.05 x 200 25%
C2	116-21	.05 x 200 (Yellow lead) 20%
C3	129-12	.00025 Mica 20%
C4	124-37	Series Pad 350 mmf. w. v.
C5	116-21	.1 x 400 (Red lead) 20%
C6	116-21	.1 x 400 (Green lead) 20%
C7	116-21	.05 x 200 (Black lead) 20%
C8	100-60	.25 x 200 25%
C9	129-12	.00025 Mica 20%
C10	100-55	.01 x 400 25%
C11	119-33	8 mfd. Lytic 300 w. v.
C12	119-33	4 mfd. Lytic 300 w. v.
C13	100-31	.5 x 120 10 - 50%
C14	129-5	.0001 Ceramicon 20%
C15	100-11	.01 x 400 25%
C16	100-60	.25 x 200 25%
C17	100-54	.006 x 600 v. 25%
C18	100-58	.005 x 1200 - 20 - 10%
C19	100-31	.5 x 120 10 - 50%
C20	100-31	.5 x 120 10 - 50%
		4 Spark Plates
		C2, C5, C6 and C7 in same block
		C11, C12 in same block
		C8, C16 in same block
		RESISTORS
R1	103-54	500 ohm—1/3 w.—20%
R2	130-162	50M ohm—1/3 w.—20%
R3	130-164	30M ohm—½ w.—20%
R4	130-137	1500 ohm—1/3 w.—20%
R5	130-24	400 ohm—1/3 w.—20%
R6	130-30	25M ohm—1 w.—20%
R7	130-139	40M ohm—1/3 w.—20%
R8	130-142	1 meg ohm—1/3 w.—20%
R9	101-41	500 M ohm Volume Control
R10	130-153	700 ohm—1/3 w.—20%
R11	130-19	1 meg ohm—1/3 w.—20%
R12	130-141	250M ohm—1/3 w.—20%
R13	130-5	300M ohm—1/3 w.—20%
R14	130-11	250M ohm—1/3 w.—20%
R15	130-84	200 ohm—1/3 w.—20%
		PARTS
T1	111-70	Antenna Coil Complete
T2	110-57	Oscillator Coil Complete
T3	108-96	Input I.F. Complete
T4	108-95	Output I.F. Complete
T5	105-37	Output Transformer
T6	104-82	Power Transformer
L1	111-76	Antenna filter choke
L2	105-26	"A" Choke
L3	105-39	"B" Filter choke (335 ohms)
L4	114-59	Speaker field—4 ohm
L5	105-19	"A" Choke
Spkr.	114-59	Speaker
S1		Switch on Volume Control
V1	126-1	Vibrator

SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good. If fuse blows out frequently and insulating sleeve has been properly placed over fuse, the trouble is probably in the vibrator, it should be replaced. Do not attempt to make any adjustments on the vibrators.

ALIGNING INSTRUCTIONS

All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment, unless it becomes necessary to replace a coil or transformer, or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustment is necessary and only after voltages, tubes and condensers have been checked and found to be normal. To properly re-align this receiver a test oscillator, as well as an output meter, must be used.

DUMMY ANTENNAS

The dummy antennas referred to in the following instructions are:

"I.F. Dummy" —A .5 mfd. condenser connected in series with the test oscillator output lead.

"Broadcast Dummy"—A 175 mmfd. condenser connected in series with the output lead of the test oscillator.

RESONANCE INDICATOR

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 6F6 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

I.F. ALIGNMENT: (465 K.C.)

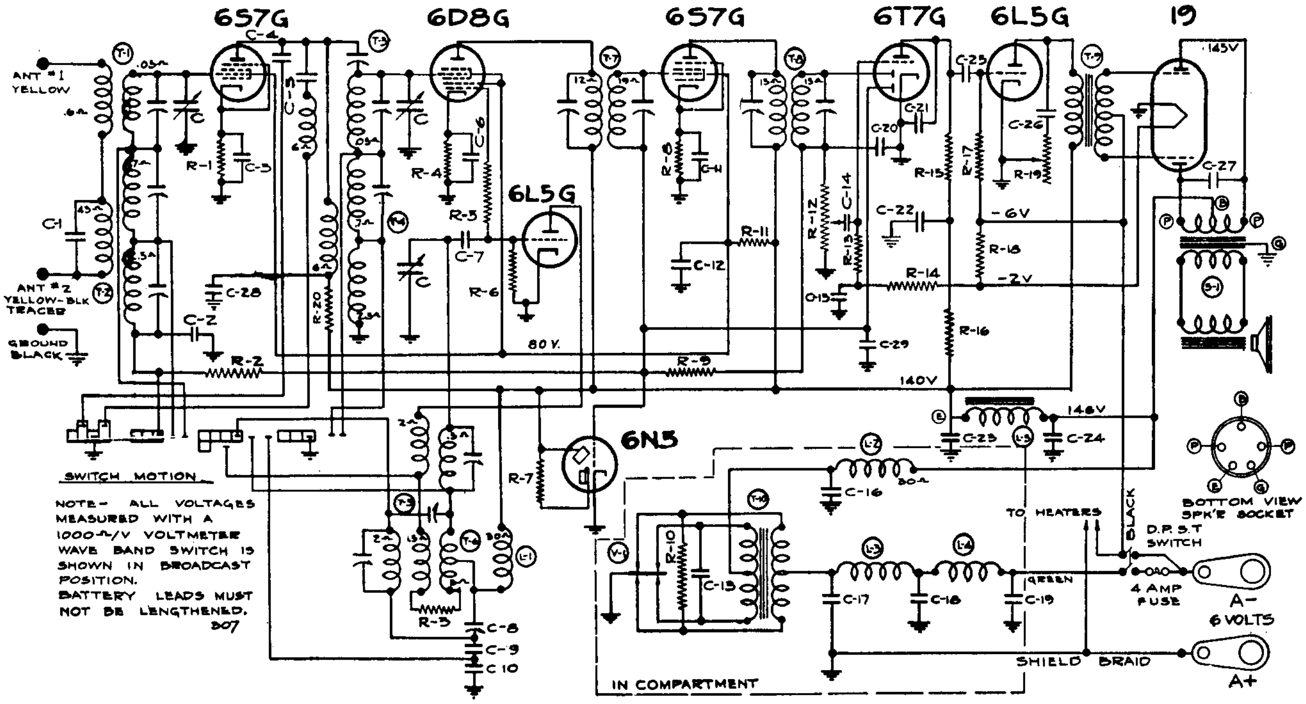
1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 465 K.C. in series with I.F. dummy antenna, to grid of 6K7 I.F. tube.
2. Adjust trimmer condensers of output I.F. transformer No. 108-95 to resonance with oscillator.
3. Move test oscillator connection to grid of 6A8 tube and adjust trimmer condensers of input I.F. transformer No. 108-96 to resonance with oscillator. See top view for location of these transformers. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver.

BROADCAST ALIGNMENT

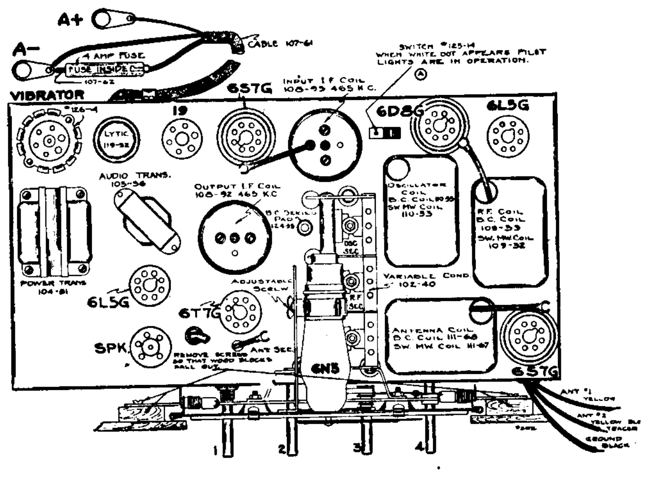
1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. in series with broadcast dummy to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance. (This adjustment is on the section of the gang condenser nearest to the drive—see top view, Fig. 2).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust antenna trimmer to resonance (see top view, Fig. 2).
4. Re-set test oscillator to 600 K.C. and rotate variable condenser to 600 K.C. Adjust series pad rocking gang condenser to and fro at the same time adjusting series pad for maximum gain. This adjustment is accessible from the top of chassis (see top view).
5. Go back and check 1400 K.C. If adjustment is made here, check 600 K.C. again.
6. Check for sensitivity at 1000 K.C. by setting test oscillator to this frequency and picking up the signal by rotating variable condenser. Under no circumstances bend plates of variable condenser sections to correct tracking.

BELMONT RADIO CORPORATION

MODEL 804 SERIES "A"



No.	Part No.	Description	
		CONDENSERS	
C	102-40	Variable Condenser	
C1	129-5	.0001 Mica—MO—O—20%	
C2	100-9	.05 x 200 v.—25%	
C3	100-9	.05 x 200 v.—25%	
C4	129-72	.0004 Mica—MT—W—5%	
C5	129-38	.00005 Mica—MO—O—10%	
C6	100-9	.05 x 200 v.—25%	
C7	129-38	.00005 Mica—MO—O—10%	
C8	124-35	J.S. Series Pad	
C9	129-70	.004 Mica MW—J—2½%	
C10	129-71	.002—Mica MW—W—2½%	
C11	100-20	.1 x 200v.—25%	
C12	100-20	.1 x 200v.—25%	
C13	100-34	.005 x 1200 v.—10%	
C14	100-11	.01 x 400 v.—25%	
C15	100-11	.01 x 400 v.—25%	
C16	100-14	.1 x 200 v.—25%	
C17	100-56	.5 x 200 v.—50%—10%	
C18	100-56	.5 x 200 v.—50%—10%	
C19	100-25	.002 x 600 v.—25%	
C20	129-5	.0001 Mica MO—O—20%	
C21	129-2	.0005 Mica MT—O—20%	
C22	100-20	.1 x 200 v.—25%	
C23	119-32	4. mfd. 200 w. v. Lytic	
C24	119-32	8. mfd. 200 w. v. Lytic	
C25	100-11	.01 x 400 v.—25%	
C26	100-26	.02 x 400 v.—25%	
C27	100-25	.002 x 600 v.—25%	
C28	100-50	.25 x 200 v.—20%	
C29	100-22	.05 x 200 v.—25%	
		RESISTORS	
R1	130-140	1200 ohm	1/3 w.—20%
R2	130-20	100M	1/3 w.—20%
R3	130-27	50	1/3 w.—20%
R4	130-54	500 ohm	1/3 w.—20%
R5	130-27	50	1/3 w.—20%
R6	130-2	75 M	1/3 w.—20%
R7		½ meg	(in m. e. socket)
R8	130-140	1200 ohm	1/3 w.—20%
R9	130-38	2 meg	1/3 w.—20%
R10	130-84	200 ohm	1/3 w.—20%
R11	130-157	12M	½ w.—10%
R12	101-66	500M	Volume Control
R13	130-19	1 meg	1/3 w.—20%
R14	130-19	1 meg	1/3 w.—20%
R15	130-20	100M	1/3 w.—20%
R16	130-20	100M	1/3 w.—20%
R17	130-4	3 meg	1/3 w.—20%
R18	130-158	16 ohm	1 w.—Insulated
R19	101-67	100M	Tone Control
R20	130-85	3 M	1/3 w.—20%
		PARTS	
T1	111-67	S.W. M.W. Ant. Coil	
T2	111-68	B.C. Antenna Coil	
T3	109-32	S.W. M. W. R.F. Coil	
T4	109-33	B.C. R.F. Coil	
T5	110-53	S.W. M.W. Osc. Coil	
T6	110-55	B.C. Osc. Coil	
T7	108-93	Input I.F. Coil	
T8	108-92	Output I.F. Coil	
T9	105-36	Audio Input Transformer	
T10	104-81	Power Transformer	
S1	114-64	P.M. Dynamic Spkr. 8"	
L-1	123-3	Osc. "B" Choke	
L-2	123-3	R.F. "B" Choke	
L-3	105-19	"A" Choke	
L-4	105-19	"A" Choke	
L-5	105-30	"B" Filter Choke	
V-1	126-4	Vibrator	



Vol. Control On-Off Switch — Tone Control — Tuning Control — Band Switch

FIG. 1—TOP VIEW

TUBES:

The tube complement of this chassis consists of the following octal base glass tubes which are interchangeable with metal tubes.

The type and function of each tube is as follows:

1—Type 6S7G Remote cut-off pentode R.F. amplifier.
1—Type 6D8G Pentagrid first detector.
1—Type 6L5G Oscillator.
1—Type 6S7G Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6T7G duplex diode triode second detector, A.V.C. and audio.
1—Type 6L5G Driver Amplifier.
1—Type 19 Class "B" Push-Pull Output Amplifier.
1—Type 6N5 Cathode Ray Tuning Indicator.

BELMONT RADIO CORPORATION

MODELS 804 SERIES A

What To Do If Reception Is Poor, or Radio Will Not Operate

TUBES:

See that all tubes are in their proper places. Tubes are very fragile and are the most frequent cause of a radio set not playing. Take your tubes to the nearest dealer and have them tested for you.

FUSE:

In case of difficulty, the fuse contained in the metal fuse receptacle should be checked. A 4 ampere Type 3AG fuse (Part No. 131-79) should be used.

ANTENNA AND GROUND

Check over all connections to be sure that they are all clean and tight. Make sure that the antenna is not rubbing against a metal eavestrough or against trees.

BATTERY:

Check over battery connections and see that they are tight and clean, and that it is connected properly.

Care and Maintenance

ANTENNA AND GROUND:

Periodic inspection of the antenna and ground system is recommended, to be sure that all connections are clean and tight, and that the antenna is well insulated from the ground at all points.

TUBES:

The tubes in the radio should be checked occasionally, either by taking them out and having them tested or by obtaining a new set of tubes and inserting them in the sockets, one at a time, noting any difference in performance.

Make certain that all tubes are firmly inserted in their proper sockets and that connections to the caps at the top of the tubes are as shown on illustration. If new tubes are available, insert as explained above.

STORAGE "A" BATTERY:

The storage "A" battery, you will notice that when it is new, **does not have its full rated life**—this is characteristic of new storage batteries. They reach their maximum capacity after being charged and discharged several times in service. The proper care of a storage battery will enable you to receive several years of good service. Neglect will ruin it very quickly. Check frequently to see that the water level is about one-half inch above the plates. Add only pure distilled water, as often as needed. A little too much water will do no harm. Too little is very harmful to the battery.

Do not let the battery become completely discharged, but if it should, have it charged again as soon as possible. A battery can be ruined very quickly by permitting it to lie around unused, in a fully discharged condition.

Keep the top of the battery clean and dry and grease the terminals occasionally with a little vaseline.

In testing your battery use only a hydrometer. These indicators measure the specific gravity of the electrolyte. Do not, under any circumstances, use so-called "magic" charging powders or liquids, or you may completely ruin your battery.

CHARGING THE STORAGE BATTERY:

This receiver draws approximately 2.1 amperes with dial lights off and 2.4 amperes with dial lights on from a fully charged storage battery and charging the battery will depend on the capacity of the battery used and the number of hours the receiver is operated. If a storage battery of 100 ampere hours capacity or larger is used, charging will not be necessary as frequently as if a smaller capacity battery is used.

CAUTION:

Never turn the receiver on when a charger is connected across the battery terminals. It is advisable to disconnect the receiver battery cable from the storage battery terminals when the battery is put on charge.

Service Data for Service Men

DESCRIPTION:

TUBES:

The tube complement of this chassis consists of the following octal base glass tubes which are interchangeable with metal tubes.

The type and function of each tube is as follows:

1—Type 6S7G Remote cut-off pentode R.F. amplifier.
1—Type 6D8G Pentagrid first detector.
1—Type 6L5G Oscillator.
1—Type 6S7G Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6T7G duplex diode triode second detector, A.V.C. and audio.
1—Type 6L5G Driver Amplifier.
1—Type 19 Class "B" Push-Pull Output Amplifier.
1—Type 6N5 Cathode Ray Tuning Indicator.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good. Do not attempt to make any adjustments on the vibrator.

ALIGNING INSTRUCTIONS:

CAUTION: No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as run down battery, defective tubes, poor installations, open or grounded antenna systems, defective condensers and resistors.

In order to properly align this chassis, an oscillator (generator) is necessary.

All adjustments should be made with a non-metallic screw driver.

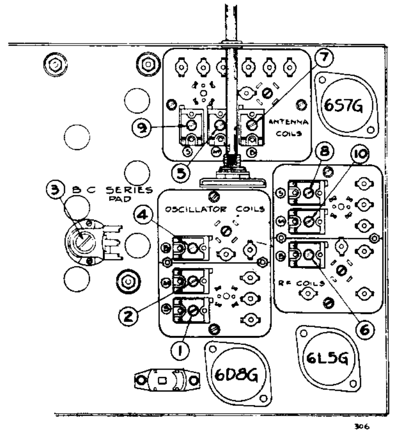


FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the two plate terminals of the type 19 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3"

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.
Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.
Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-92 Output I.F. Transformer
Part No. 108-93 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 108-92) to resonance.

Service Data for Service Men (Cont.)

   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6S7G to grid cap to 6D8G and adjust input I.F. transformer (No. 108-93) to resonance.

SHORT WAVE BAND ALIGNMENT:

5.35 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 18 megacycles and connected in series with "Dummy 3" to the antenna and ground posts, make the following adjustments:
   (a) Move dial pointer to 18 megacycles and adjust short wave oscillator trimmer (adjustment number 1) to resonance.
   (b) Re-set external oscillator to 17 megacycles and pick up signal by rotating variable condenser and adjust short wave R.F. trimmer (adjustment number 8), and short wave antenna trimmer (adjustment number 9), to resonance.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 6 megacycles for band coverage and sensitivity.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental on the receiver dial. As an example of this a fundamental 18.3 megacycle signal can be tuned in not only at 18.3 on the dial but also at approximately 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:

1690 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5.5 megacycles and connected in series with "Dummy 3" to the antenna and ground posts make the following adjustments:
   (a) Move dial pointer to 5.5 megacycles and adjust middle wave oscillator trimmer (adjustment number 2) to resonance.
   (b) Re-set external oscillator to 5 megacycles and pick up signal by rotating variable condenser and adjust middle wave R.F. trimmer (adjustment number 10), and middle wave antenna trimmer (adjustment number 5), to resonance.
   (c) Re-set external oscillator and check sensitivity at 1700 kilocycles.

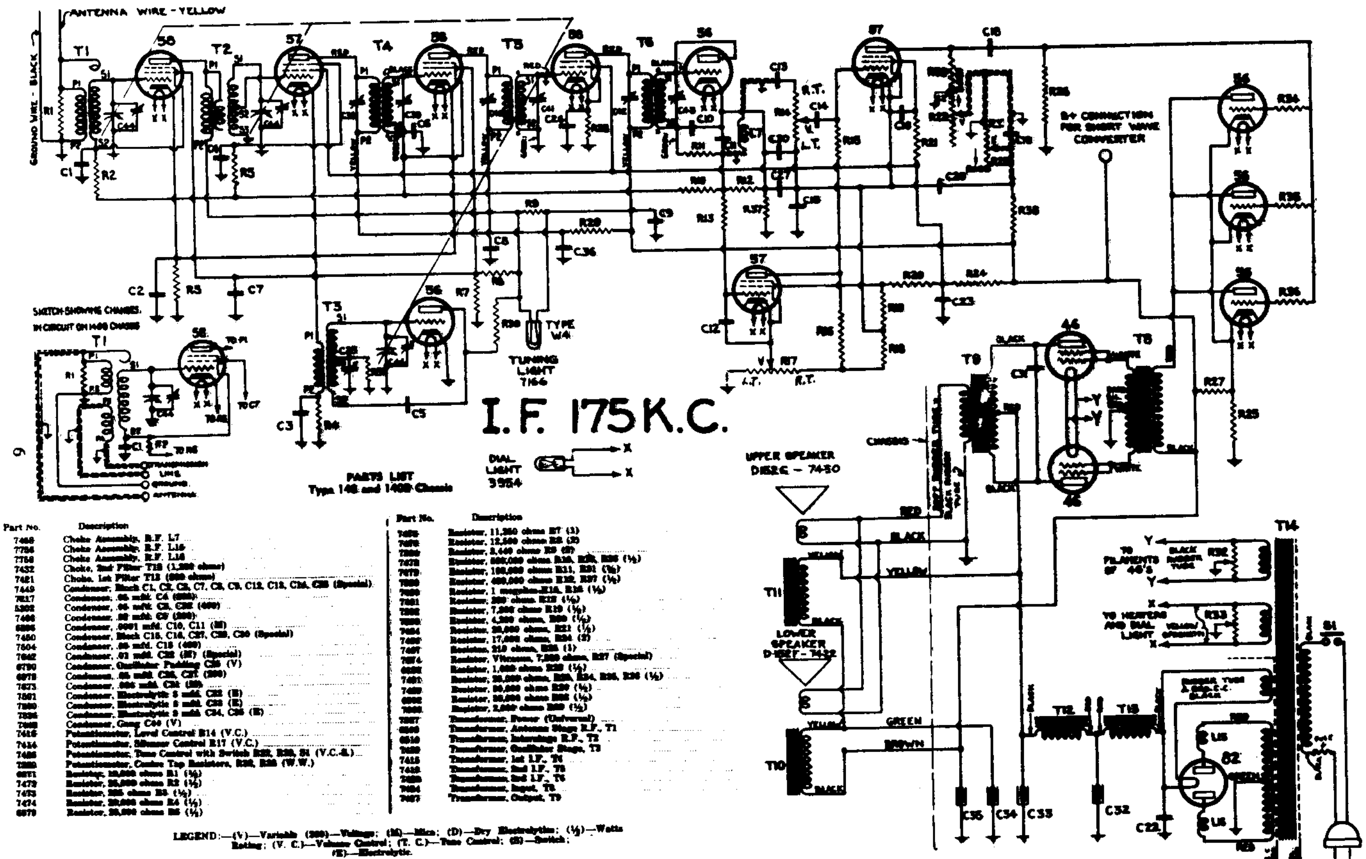
BROADCAST BAND ALIGNMENT:

540 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Du...my 2" to antenna and ground posts, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 4; see bottom view of coil assembly, Fig. 3)
   (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast R.F. trimmer (adjustment number 6) and broadcast antenna trmmer (adjustment number 7), to resonance.
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 3), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

CANADIAN RADIO CORP.

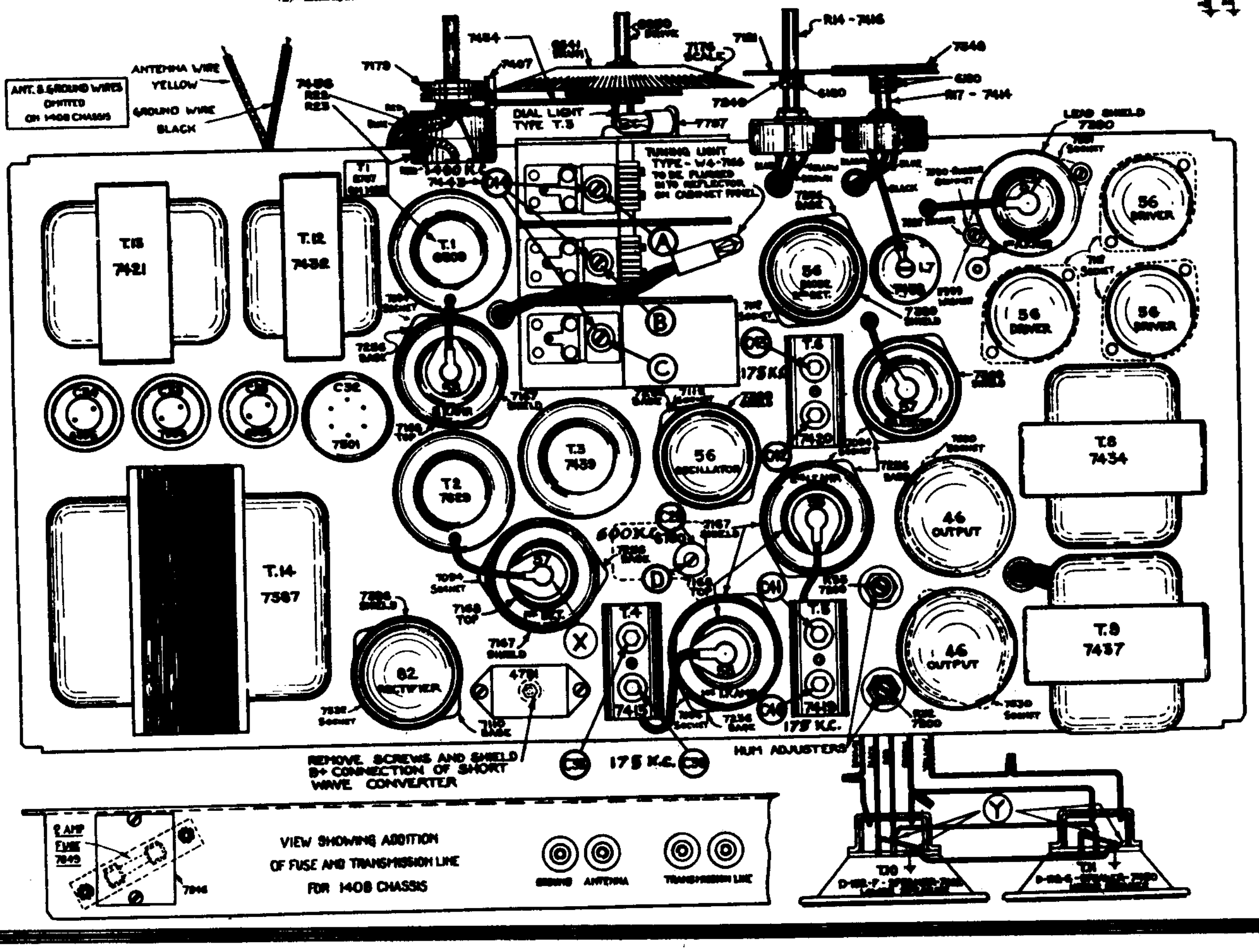
MODELS BALMORAL-CONCERTO-Z-140A & 140B



PARTS LIST
Type 140 and 140B Chassis

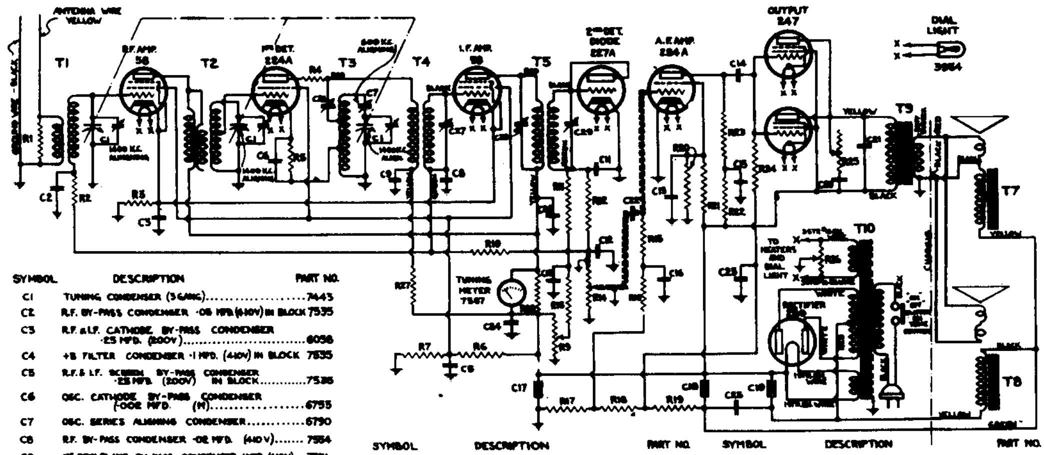
Part No.	Description
7468	Choke Assembly, R.F. L7
[illegible]	Choke Assembly, R.F. L15
[illegible]	Choke Assembly, R.F. L16
7432	Choke, 2nd Filter T13 (1,200 ohms)
7421	Choke, 1st Filter T12 (800 ohms)
7449	Condenser, Block C1, C2, C3, C7, C8, C9, C12, C13, C24, C25 (Special)
7817	Condenser, .05 mfd. C4 (600)
5302	Condenser, .05 mfd. C5, C22 (400)
[illegible]	Condenser, .02 mfd. C7 (200)
[illegible]	Condenser, .0001 mfd. C10, C11 (M)
7450	Condenser, Block C15, C16, C27, C29, C30 (Special)
7504	Condenser, .05 mfd. C18 (400)
7642	Condenser, .01 mfd. C22 (M) (Special)
6790	Condenser, Oscillator Padding C26 (V)
[illegible]	Condenser, .05 mfd. C26, C27 (200)
7573	Condenser, .006 mfd. C31 (M)
7501	Condenser, Electrolytic 8 mfd. C32 (E)
[illegible]	Condenser, Electrolytic 8 mfd. C33 (E)
[illegible]	Condenser, Electrolytic 8 mfd. C34, C35 (E)
[illegible]	Condenser, Gang C40 (V)
7416	Potentiometer, Level Control R14 (V.C.)
7414	Potentiometer, Silencer Control R17 (V.C.)
7486	Potentiometer, Tone Control with Switch R22, R28, S1 (V.C.-S.)
[illegible]	Potentiometer, Centre Tap Resistors, R32, R33 (W.W.)
[illegible]	Resistor, 10,000 ohms R1 (½)
7472	Resistor, 25,000 ohms R2 (½)
7473	Resistor, 325 ohms R3 (½)
7474	Resistor, 20,000 ohms R4 (½)
[illegible]	Resistor, 25,000 ohms R5 (½)
[illegible]	Resistor, 11,250 ohms R7 (1)
[illegible]	Resistor, 12,500 ohms R8 (2)
[illegible]	Resistor, 2,440 ohms R9 (2)
[illegible]	Resistor, 500,000 ohms R10, R28, R35 (½)
7479	Resistor, 100,000 ohms R11, R31 (½)
[illegible]	Resistor, 400,000 ohms R12, R37 (½)
[illegible]	Resistor, 1 megohm R15, R16 (½)
7481	Resistor, 250 ohms R18 (½)
[illegible]	Resistor, 7,200 ohms R19 (½)
[illegible]	Resistor, 4,300 ohms, R20 (½)
7484	Resistor, 20,000 ohms, R21 (½)
[illegible]	Resistor, 17,000 ohms, R24 (2)
7487	Resistor, 210 ohms, R25 (1)
7874	Resistor, Vitreous, 7,500 ohms, R27 (Special)
[illegible]	Resistor, 1,000 ohms R29 (½)
7491	Resistor, 25,000 ohms, R33, R34, R35, R36 (½)
[illegible]	Resistor, 50,000 ohms R39 (½)
[illegible]	Resistor, 25,000 ohms R38 (½)
[illegible]	Resistor, 2,000 ohms R30 (½)
7387	Transformer, Power (Universal)
[illegible]	Transformer, Antenna Stage R.F., T1
6510	Transformer, Interstage R.F., T2
[illegible]	Transformer, Oscillator Stage, T3
7415	Transformer, 1st I.F., T4
[illegible]	Transformer, 2nd I.F., T5
[illegible]	Transformer, 3rd I.F., T6
7434	Transformer, Input, T8
7437	Transformer, Output, T9

LEGEND:—(V)—Variable (200)—Voltage; (M)—Mica; (D)—Dry Electrolytic; (½)—Watts Rating; (V. C.)—Volume Control; (T. C.)—Tone Control; (S)—Switch; (E)—Electrolytic.



CANADIAN RADIO CORP.

MODELS BELMONT-MINERVA 8/33 & S-80



I.F.
175 K.C.

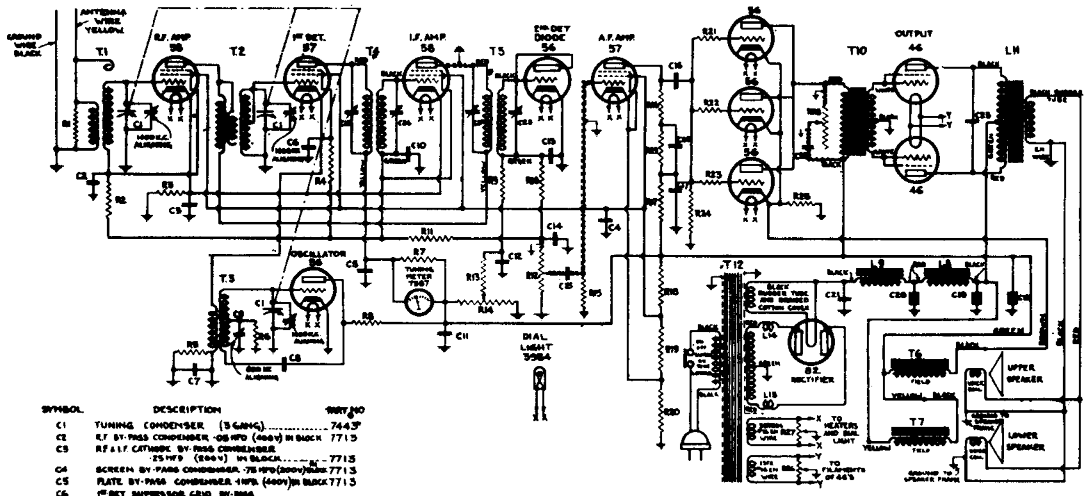
SYMBOL	DESCRIPTION	PART NO.
C1	TUNING CONDENSER (3 GANG)	7443
C2	R.F. BY-PASS CONDENSER ·05 MFD (410V) IN BLOCK	7535
C3	R.F. & I.F. CATHODE BY-PASS CONDENSER ·25 MFD. (200V)	6058
C4	+B FILTER CONDENSER ·1 MFD. (410V) IN BLOCK	7535
C5	R.F. & I.F. SCREEN BY-PASS CONDENSER ·25 MFD. (200V) IN BLOCK	7536
C6	OSC. CATHODE BY-PASS CONDENSER ·002 MFD. (M)	6755
C7	OSC. SERIES ALIGNING CONDENSER	6790
C8	R.F. BY-PASS CONDENSER ·02 MFD. (410V)	7554
C9	1st DET. PLATE BY-PASS CONDENSER ·1 MFD. (410V)	7551
C10	SILENCER FILTER CONDENSER ·05 MFD. (410V)	7586
C11	2nd DETECTOR R.F. BY-PASS ·00025 MFD. (M)	6556
C12	A.V.C.-R.F. BY-PASS CONDENSER ·0001 MFD. (M)	6556
C13	1st AUDIO SCREEN FILTER CONDENSER ·25 MFD. (200 V) IN BLOCK	7586
C14	A.F. COUPLING CONDENSER ·05 MFD. (410V)	7556
C15	1st AUDIO PLATE FILTER CONDENSER ·25 MFD. (410 V) IN BLOCK	7535
C16	1st AUDIO GRID FILTER CONDENSER ·1 MFD. (200V) IN BLOCK	7585
C17	ELECTROLYTIC FILTER CONDENSER 8 MFD. (435 V)	6547
C18	ELECTROLYTIC FILTER CONDENSER 8 MFD. (435 V)	7547
C19	ELECTROLYTIC FILTER CONDENSER 8 MFD. (435 V)	6305
C20	TONE CONTROL CONDENSER ·2 to ·18 MFD. (400V)	7535
C21	AUDIO OUTPUT CONDENSER ·006 TO ·0075 MFD. (400 V)	6848
C22	A.F. COUPLING CONDENSER ·05 MFD. (410 V)	7556
C23	AUDIO OUTPUT GRID FILTER CONDENSER ·2 MFD (200 V) IN BLOCK	7585
C24	R.F. & I.F. PLATE BY-PASS CONDENSER ·05 MFD. (410V) IN BLOCK	7586
C25	B SUPPLY FILTER CONDENSER ·3 MFD (200V)	7764
C26	I.F. ALIGNING CONDENSER (PART OF T4)	7106
C27	I.F. ALIGNING CONDENSER (PART OF T4)	7106
C28	I.F. ALIGNING CONDENSER (PART OF T5)	7071
C29	I.F. ALIGNING CONDENSER (PART OF T5)	7071

SYMBOL	DESCRIPTION	PART NO.
R1	ANTENNA RESISTOR 10,000 ohms (½ W)	6811
R2	R.F. FILTER RESISTOR 100,000 ohms (½ W)	7219
R3	R.F. & I.F. MIN. BIAS RESISTOR 270 ohms (½ W)	7588
R4	OSC. PLATE RESISTOR 800 to 900 ohms (½ W)	7274
R5	OSC. BIAS RESISTOR 8,900 ohms (½ W)	7816
R6	VOLTAGE DIVIDING RESISTOR 14,500 ohms (1 W)	7560
R7	VOLTAGE DIVIDING RESISTOR 12,500 ohms (1 W)	7561
R9	SILENCER CONTROL 500,000 ohms (VAR. C)	7276
R10	A.V.C. FILTER RESISTOR 350,000 ohms (½ W)	7562
R11	SILENCER RESISTOR 1,000,000 ohms To 1,250,000 ohms (½ W)	7563
R12	A.V.C. RESISTOR 100,000 ohms (½ W)	7219
R13	SILENCER RESISTOR 250,000 ohms (½ W)	7196
R14	LEVEL CONTROL 500,000 ohms (VAR. C)	6887
R15	1st AUDIO GRID LEAK RESISTOR 1,500,000 ohms (½ W)	7564
R16	1st AUDIO GRID FILTER RESISTOR 500,000 ohms (½ W)	7142
R17	VOLTAGE DIVIDING RESISTOR (BIAS) 24,000 ohms (½ W)	7565
R18	VOLTAGE DIVIDING RESISTOR (BIAS) 76,000 ohms (½ W)	7566
R19	VOLTAGE DIVIDING RESISTOR (BIAS) 180,000 ohms (½ W)	7807

(200V) INDICATES VOLTAGE RATING OF CONDENSER
(M) INDICATES MICA CONDENSER
(W.W) INDICATES WIRE WOUND RESISTOR
(VAR.C) INDICATES VARIABLE CARBON RESISTOR
(½ W) INDICATES RATING IN WATTS OF RESISTOR

SYMBOL	DESCRIPTION	PART NO.
R20	1st AUDIO SCREEN BLEEDER RESISTOR 50,000 ohms (½ W)	7145
R21	1st AUDIO SCREEN FILTER RESISTOR 150,000 ohms (½ W)	7567
R22	1st AUDIO PLATE FILTER RESISTOR 35,000 ohms (½ W)	6902
R23	1st AUDIO PLATE FILTER RESISTOR 55,000 ohms (½ W)	7568
R24	OUTPUT GRID RESISTOR 250,000 ohms (½ W)	7198
R25	TONE CONTROL 50,000 ohms (VAR. C)	
R26	HUM ADJ. VARIABLE CENTER TAP 20 ohms (W.W)	7200
R27	1st DET. PLATE FILTER RESISTOR 10,000 ohms (½ W)	7569
R28	TUNING METER SHUNT RESISTOR 780 ohms (½ W)	7570
T1	ANTENNA R.F. TRANSFORMER	7550
T2	INTERSTAGE R.F. TRANSFORMER	7550
T3	OSCILLATOR R.F. TRANSFORMER	6980
T4	FIRST I.F. TRANSFORMER	7106
T5	SECOND I.F. TRANSFORMER	7071
T7	D-164-D SPEAKER (UPPER)	7467
T8	D-182-E SPEAKER (LOWER)	6986
T9	A.F. OUTPUT TRANSFORMER	7153
T10	POWER TRANSFORMER	7162

MODELS MINERVA 12/33A.C. & S120



I.F.
175 K.C.

SYMBOL	DESCRIPTION	PART NO
C1	TUNING CONDENSER (3 GANG)	7443
C2	R.F. BY-PASS CONDENSER ·05 MFD (400V) IN BLOCK	7713
C3	R.F. & I.F. CATHODE BY-PASS CONDENSER ·25 MFD (200V) IN BLOCK	7713
C4	SCREEN BY-PASS CONDENSER ·75 MFD (200V) IN BLOCK	7713
C5	PLATE BY-PASS CONDENSER ·1 MFD. (400V) IN BLOCK	7713
C6	1st DET. SUPPRESSOR GRID BY-PASS ·05 MFD. (400V)	7504
C7	1st DET. CATHODE BY-PASS COND. ·05 MFD (200V) IN BLOCK	7713
C8	OSC. COUPLING CONDENSER ·00035 MFD. (M)	7216
C9	OSC. SERIES ALIGNING CONDENSER	6790
C10	R.F. "I" BY-PASS CONDENSER ·01 MFD (400V)	7756
C11	R.F. I.F. & OSC. PLATE FILTER CONDENSER ·05 MFD. (400V)	7713
C12	SILENCER FILTER CONDENSER ·05 MFD (400V) IN BLOCK	7713
C13	2nd DET. R.F. BY-PASS CONDENSER ·00025 MFD. (M)	6555
C14	A.V.C. BY-PASS CONDENSER ·0001 MFD. (M)	6556
C15	A.F. COUPLING CONDENSER ·05 MFD (400V)	7504
C16	A.F. COUPLING CONDENSER ·05 MFD. (400V)	7504
C17	1st AUDIO PLATE FILTER CONDENSER 1 MFD. (380V)	5068
C18	ELECTROLYTIC FILTER CONDENSER 8 MFD. (435)	7547
C19	ELECTROLYTIC FILTER CONDENSER 8 MFD. (435)	7547
C20	ELECTROLYTIC FILTER CONDENSER 8 MFD. (435)	6305
C21	HIGH VOLTAGE FILTER CONDENSER ·01 MFD (M) (IN A CAN)	7642
C22	TONE CONTROL CONDENSER ·06 MFD (400V)	7737
C23	AUDIO OUTPUT CONDENSER ·0066 MFD. (M)(in can)	7723
C24	1st AUDIO PLATE FILTER CONDENSER ·05 MFD (200V)	7713
C25	I.F. ALIGNING CONDENSER (PART OF T4)	7742
C26	I.F. ALIGNING CONDENSER (PART OF T4)	7742
C27	I.F. ALIGNING CONDENSER (PART OF T5)	7702
C28	I.F. ALIGNING CONDENSER (PART OF T5)	7702

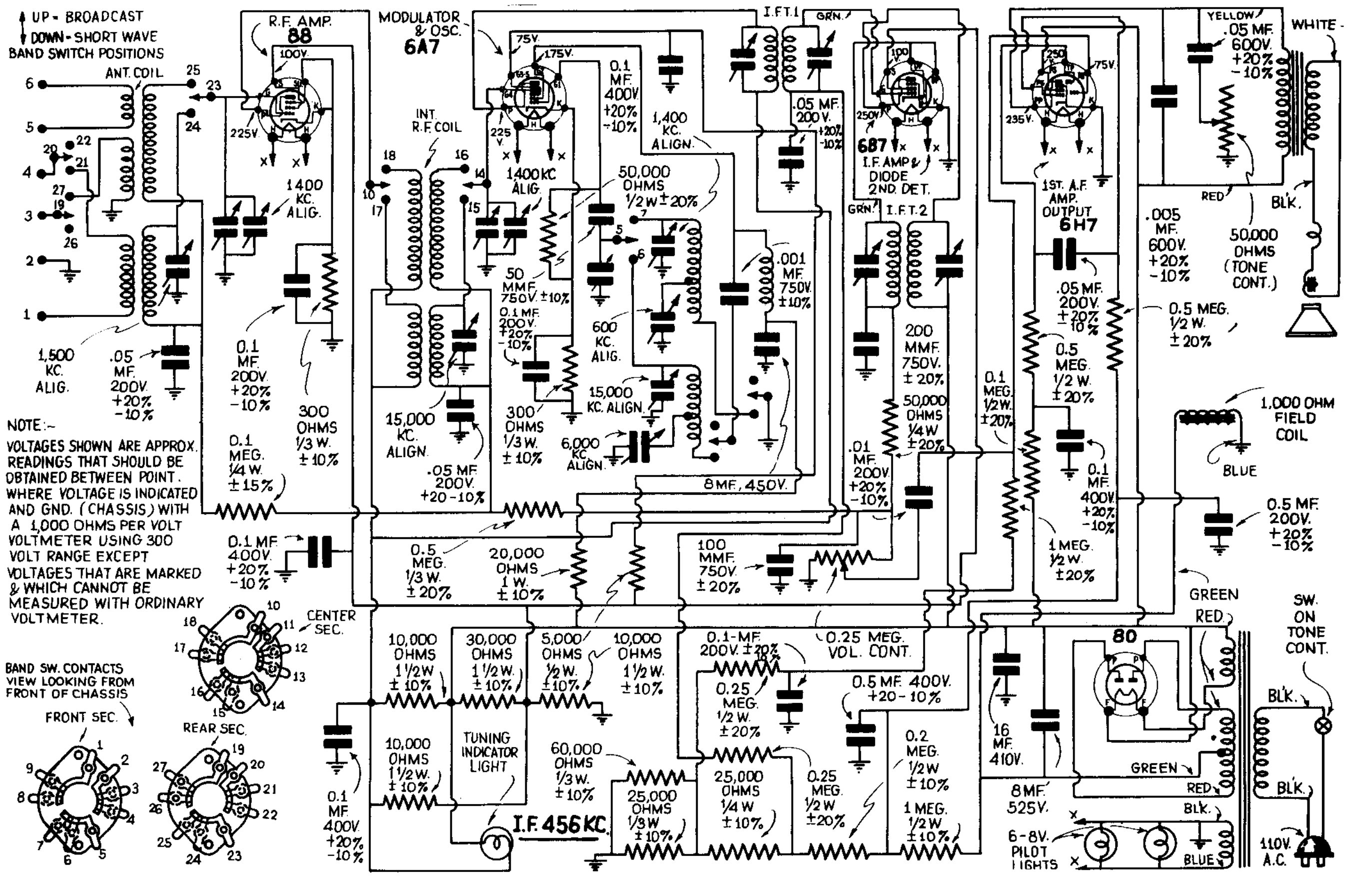
SYMBOL	DESCRIPTION	PART NO
R1	ANTENNA RESISTOR 10,000 ohms (½ W)	6071
R2	R.F. FILTER RESISTOR 25,000 ohms (½ W)	7187
R3	R.F. & I.F. MIN. BIAS RESISTOR 147 ohms (½ W)	7730
R4	1st DET. SUPPRESSOR GRID FILTER RESISTOR 25,000 ohms (½ W)	7187
R5	1st DET. CATHODE BIAS RESISTOR 20,000 ohms (½ W)	7484
R6	OSC. GRID LEAK RESISTOR 100,000 ohms (½ W)	7781
R7	TUNING METER SHUNT RESISTOR 600 ohms (½ W)	7825
R8	OSC. PLATE FILTER RESISTOR 50,000 ohms (½ W)	7489
R9	SILENCER RESISTOR 1,000,000 ohms TO 1,250,000 ohms (½ W)	7563
R10	A.V.C. RESISTOR 100,000 ohms (½ W)	7479
R11	A.V.C. FILTER RESISTOR 400,000 ohms (½ W)	7589
R12	LEVEL CONTROL 500,000 ohms (VAR C)	7416
R13	SILENCER RESISTOR 500,000 ohms (½ W)	7478
R14	SILENCER CONTROL 500,000 ohms (VAR. C)	7278
R15	1st AUDIO GRID LEAK RESISTOR 1000,000 ohms (½ W)	7441
R16	1st AUDIO PLATE FILTER RESISTOR 31,000 ohms (½ W)	7752
R17	1st AUDIO PLATE FILTER RESISTOR 35,000 ohms (½ W)	7733
R18	VOLTAGE DIVIDING RESISTOR 5,730 ohms } VITREOUS ENAMEL (W W)	7726
R19	VOLTAGE DIVIDING RESISTOR 3,990 ohms } VITREOUS ENAMEL (W W)	7726
R20	VOLTAGE DIVIDING RESISTOR 100 ohms } VITREOUS ENAMEL (W W)	7726
R21	DRIVER GRID RESISTOR 25,000 ohms (½ W)	7491
R22	DRIVER GRID RESISTOR 25,000 ohms (½ W)	7491
R23	DRIVER GRID RESISTOR 25,000 ohms (½ W)	7491
R24	DRIVER GRID LEAK RESISTOR 500,000 ohms (½ W)	7478
R25	DRIVER CATHODE BIAS RESISTOR 807 ohms (1 W)	7734

SYMBOL	DESCRIPTION	PART NO
R26	HUM ADJUSTER 20 ohm VARIABLE CENTER TAP (W.W)	7200
R27	HUM ADJUSTER 20 ohm VARIABLE CENTER TAP (W.W)	7200
R28	TONE CONTROL 50,000 ohms (VAR. C.)	7720
R29	1st AUDIO PLATE FILTER RESISTOR 12000 ohms (½ W)	7735
T1	ANTENNA R.F. TRANSFORMER	6509
T2	INTERSTAGE R.F. TRANSFORMER	6510
T3	OSCILLATOR R.F. TRANSFORMER	7061
T4	FIRST I.F. TRANSFORMER	7742
T5	SECOND I.F. TRANSFORMER	7702
T6	D-152-J SPEAKER (UPPER)	7744
T7	D-182-G SPEAKER (LOWER)	7430
L8	SECOND FILTER CHOKE	7432
L9	FIRST FILTER CHOKE	7421
T10	DRIVER TRANSFORMER	7716
T11	OUTPUT TRANSFORMER	7693
T12	POWER TRANSFORMER	7687
L13	82 R.F. CHOKE #1	7756
L14	82 R.F. CHOKE #2	7756

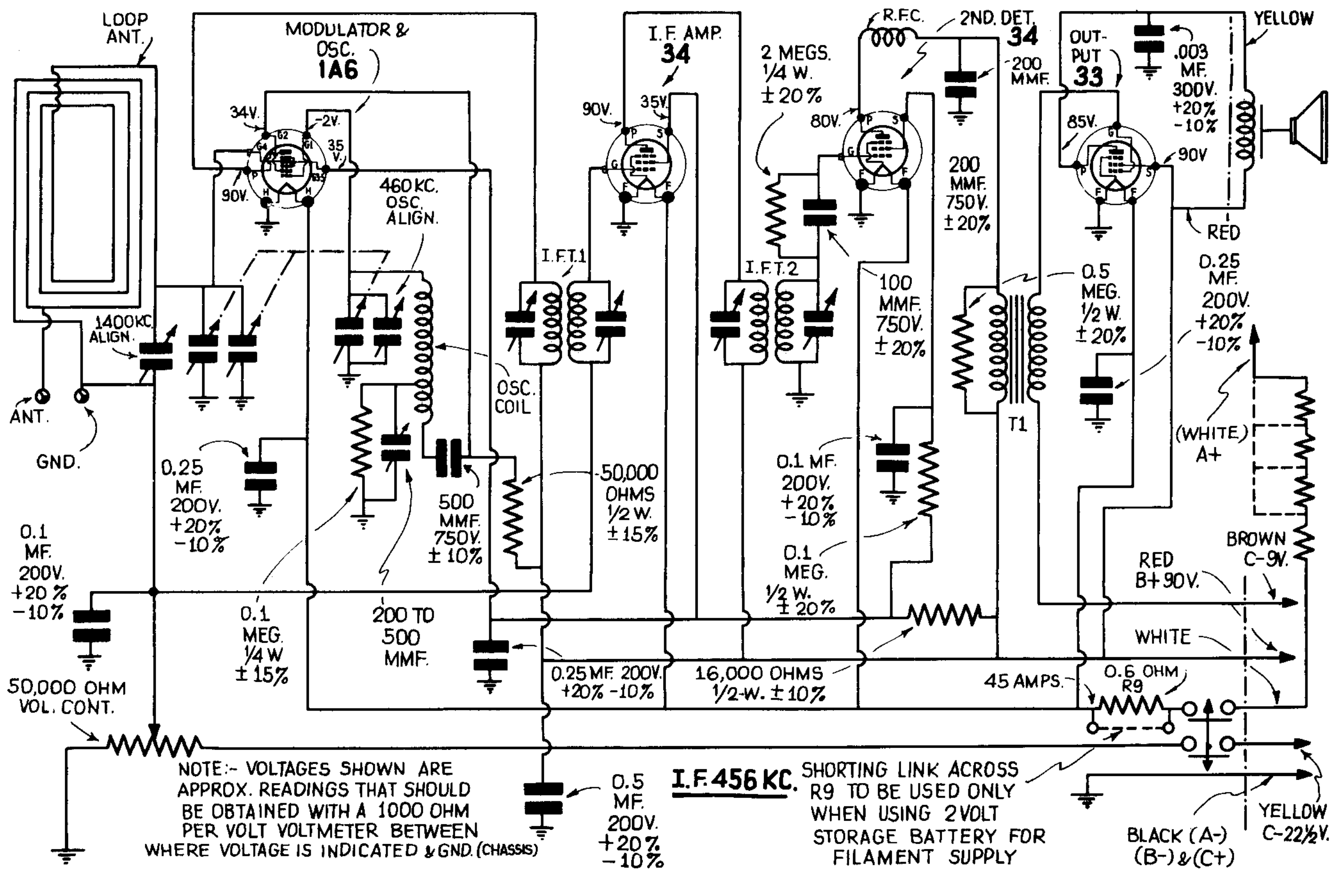
(VAR C) INDICATES VARIABLE CARBON RESISTOR

CANADIAN RADIO CORP.

MODELS REALM & D-5525

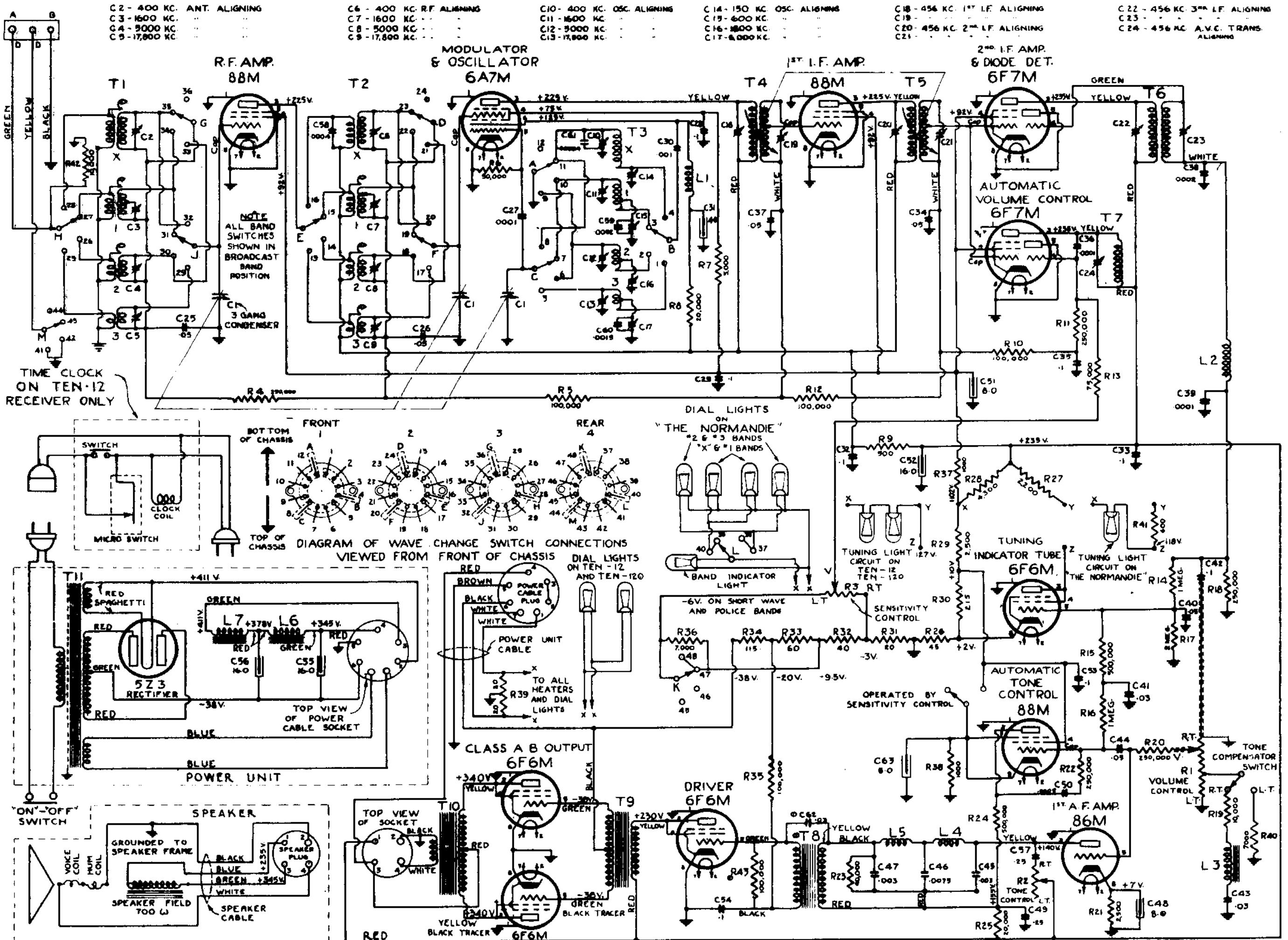


MODELS KING-R-5441 & 4443



CANADIAN RADIO CORP.

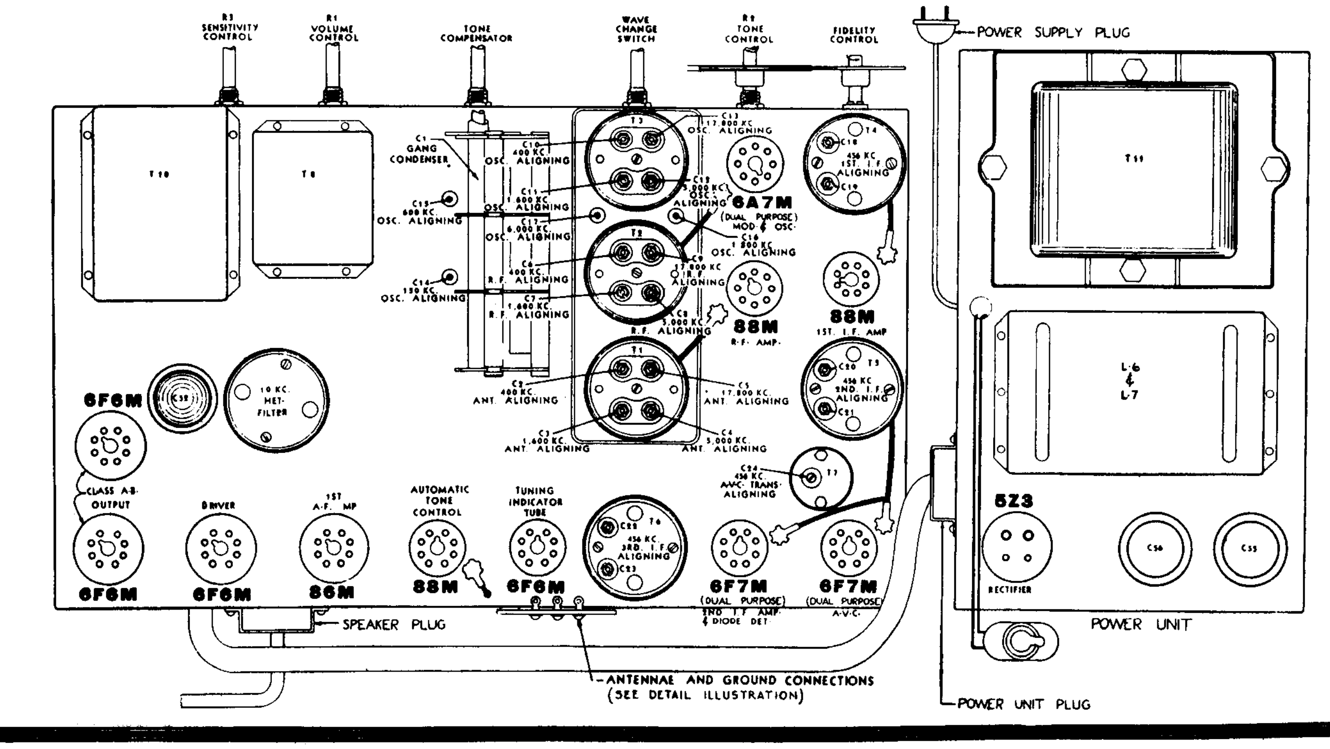
MODELS TEN-12-TEN-120-20-50 & NORMANDIE



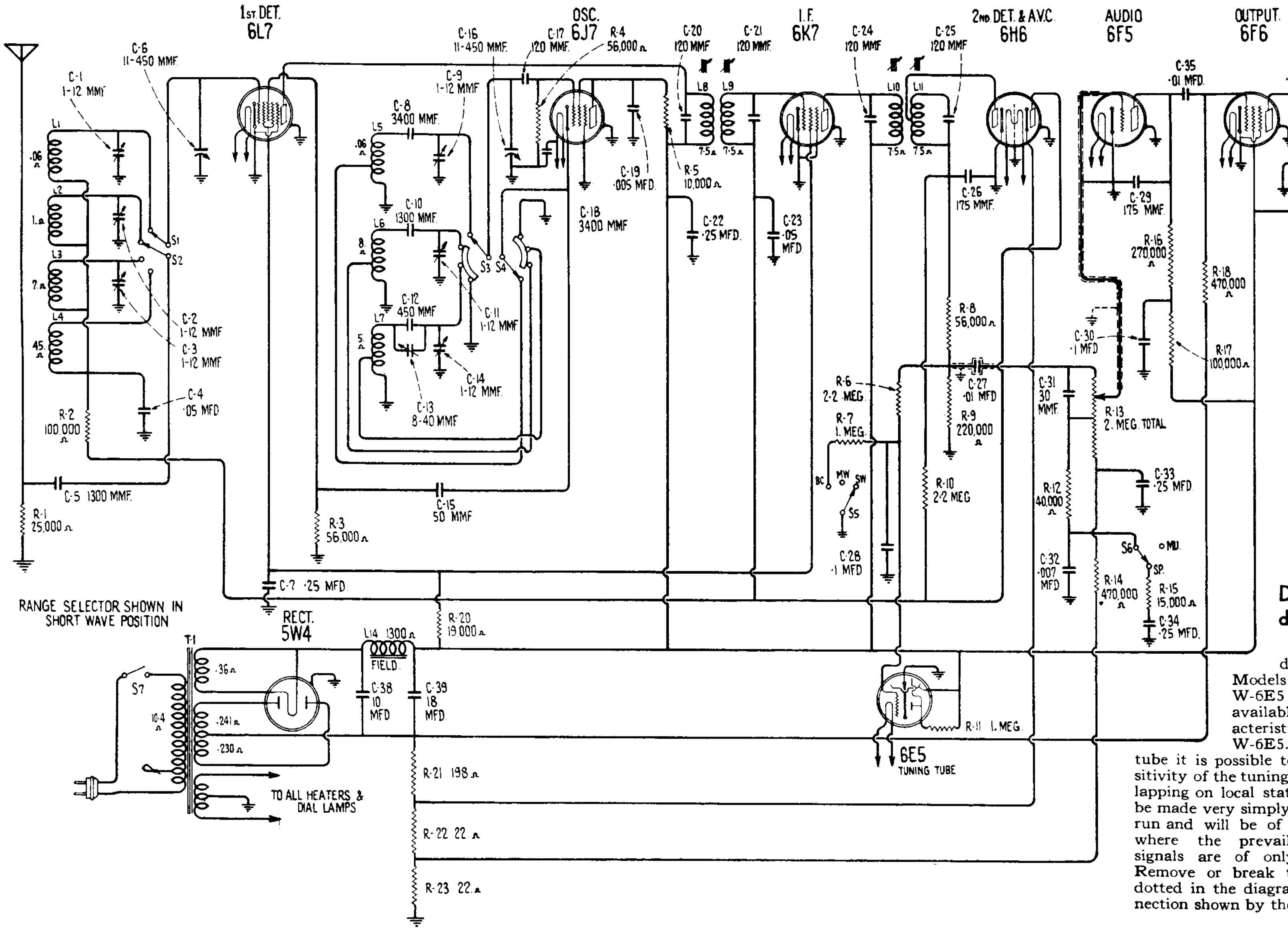
VOLTAGES SHOWN ARE APPROX. READINGS THAT SHOULD BE OBTAINED WITH A 1000 OHMS PER VOLT VOLTMETER ON 300V. RANGE BETWEEN POINTS WHERE VOLTAGE IS INDICATED AND GROUND (CHASSIS) WITH SENSITIVITY CONTROL SET FOR MAX. SENSITIVITY (NO SIGNAL INPUT) LINE VOLTAGE - 115 VOLTS.

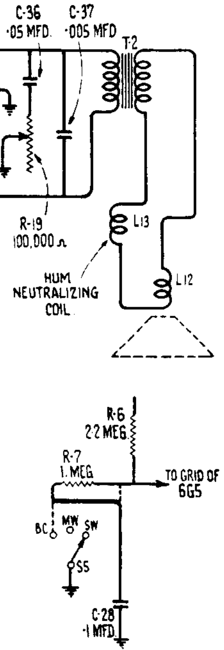
NOTE - FIXED RESISTANCES HAVE VALUES SHOWN IN OHMS. FIXED CONDENSERS HAVE VALUES SHOWN IN MICROFARADS.

⊙ WITH TRANS. NO.s 4990 & 4644, C62 USED, R43 NOT USED. WITH TRANS. NO 4905, R43 USED, C62 NOT USED.



CANADIAN WESTINGHOUSE COMPANY Limited
MODELS 813A-813X & 813Y





Detail of Later Production Using W-6G5

Since the first production run of the W-813 Models was commenced the W-6E5 tube has been made available with improved characteristics as compared to the W-6E5. With the W-6G5 tube it is possible to secure increased sensitivity of the tuning indicator without overlapping on local stations. This change can be made very simply on the first production run and will be of advantage in districts where the prevailing broadcast range signals are of only moderate strength. Remove or break the connections shown dotted in the diagram and make the connection shown by the heavy black line.

Schematic Circuit Diagram

Note--On later production the heater winding is grounded at one side instead of at centre. Grounded point is terminal **No. 7** on **6J7 socket.** Two line filter condensers are used (**H36176 0.02 Mfd.**) also; one from **each** side of line transformer to ground.

CANADIAN WESTINGHOUSE COMPANY Limited

MODELS 813A-813X & 813Y

The various diagrams of this model contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles, such as R3, L2, C1, etc., are provided for reference between the illustrations and the Replacement Parts List. The coils, reactors, and transformer windings are rated in terms of their d-c resistances only. Ratings of less than one ohm are generally omitted.

Alignment Procedure

There are seven alignment trimmers provided in the antenna transformer and oscillator coil tuned circuits. The i-f transformer adjustments are made by means of screws attached to molded magnetite cores. All of these circuits have been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions or altered during servicing. Loss of sensitivity, improper tone quality, and poor selectivity are the usual indications of improper alignment.

The correct performance of this receiver can only be obtained when the aligning has been done with adequate and reliable apparatus. It is not necessary to use a frequency modulated oscillator and cathode ray oscillograph to align this receiver. Those service men that have this equipment will probably prefer to use it and for their convenience we have indicated on the socket voltage diagram the proper connection point for the cathode ray vertical amplifier input terminal.

A special tool (See H-29643 in parts list) is available for adjusting the I.F. trimmers. This tool has at one end a socket screw driver which aids in locating the head of the I.F. trimmer screw, and will not slip off the screw. It is recommended that two of these tools be used simultaneously, particularly when a Cathode Ray Oscillograph is being used for alignment purposes. With the chassis standing on one end, and both primary and secondary I.F. trimmer screws accessible, much more rapid work can be done by simultaneously adjusting the primary and secondary I.F. trimmers.

A test oscillator is required as a source of the specified alignment frequencies. Visual indication of receiver output during the adjustment is necessary and should be accomplished by the use of an indicator or meter.

The procedure outlined below should be followed in adjusting the various trimmer capacitors and molded cores:

I-F Core Adjustments:

The four adjustment screws (attached to molded magnetite cores) of the two i-f transformers are located one on top and one on bottom of each i-f transformer. Each circuit must be aligned to a basic frequency of 460 kc. To do this, attach the output indicator across the loudspeaker voice coil.

Connect the output of the test oscillator to the control grid of the W-6L7 through a .05 mfd. capacitor. Connect the test oscillator ground terminal to the ground terminal of the receiver chassis. Tune the oscillator to 460 kc. Advance the receiver volume control to its full-on position and adjust the receiver tuning control to a point, within its range, where no interference is encountered either from local broadcast stations or from the heterodyne oscillator. Increase the output of the test oscillator until a slight indication is present on the output indicator. Adjust the two magnetite core screws of the second i-f transformer to produce maximum (peak) indicated receiver output. Then adjust the two magnetite core screws of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. During these adjustments, regulate the test oscillator output so that the indication is always as low as possible. By doing so, broadness of tuning due to a.v.c. action will be avoided. It is advisable to repeat the adjustment of all i-f magnetite core screws to assure that the interaction between them has not disturbed the original adjustment.

Broadcast Trimmer Adjustments:

Calibrate the tuning dial by setting the pointer to the angle of the border line of the dial immediately below the 530 kc. calibration point, with the two-gang tuning condenser in full mesh. The output indicator should be left connected to the system. Connect the test oscillator to antenna and ground terminals of the chassis through a 200 mmfd. condenser. Adjust the test oscillator to 1500 kc. and set the receiver tuning control to a dial reading of 1500 kc. Leave the volume control of the receiver at its maximum position. Make sure that the Range Selector is at its broadcast position. Regulate the output of the test oscillator until a slight indication is perceptible at the receiver output. Then adjust the two 1500 kc. trimmers (see diagram) of the oscillator and antenna transformer coils so that each produces maximum (peak) receiver ouput. After this maximum has been accurately obtained, shift the test oscillator to 600 kc. Tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then, adjust the receiver 600 kc. series trimmer, C16, simultaneously rocking the tuning control backward and forward through the signal until maximum receiver output results from these combined operations. The adjustment at 1,500 kc. should then be repeated to correct for any change which may have been caused by the oscillator series trimmer adjustment.

"Medium Wave" Trimmer Adjustments

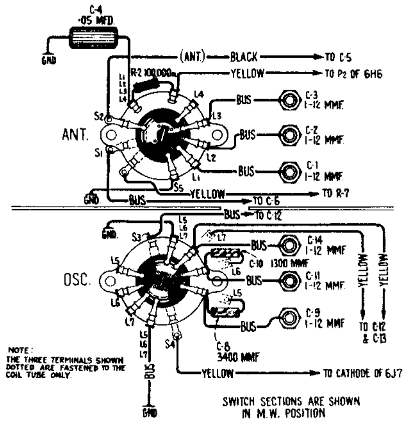
Use the same equipment and layout as for broadcast trimmer adjustment. Place receiver range selector to its "medium wave" position with the receiver dial pointer set to 5000 kc. Tune the test oscillator to 5000 kc.; adjust the two air dielectric trimmers (see diagram) for maximum output. Two peaks may be found on the oscillator trimmer. The peak obtained with minimum capacity (plunger nearly out) should be used.

"Short Wave" Trimmer Adjustments

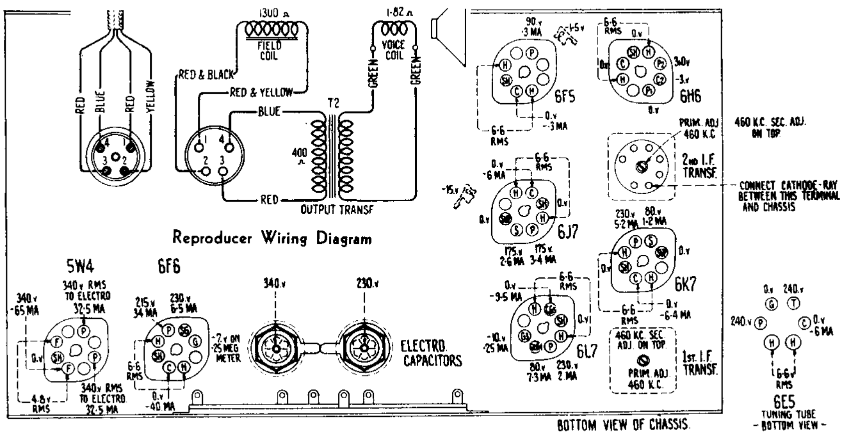
Leave the equipment set up the same as for the broadcast trimmer adjustment except that the output of the test oscillator to the antenna terminal of the receiver should be connected through a 400 ohm resistor. Set the receiver range selector to its "short wave" position and dial pointer to 17,000 kc. Tune the test oscillator to 17,000 kc. Adjust the oscillator 17,000 kc. trimmer (see diagram) for maximum output. Two peaks may be found. The peak with minimum capacity (plunger nearly out) should be used. Adjust the antenna 17,000 kc. trimmer until maximum output is reached, while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacity (plunger nearly in) should be used. Check the image frequency by changing the receiver dial setting to 16,080 kc. The test oscillator signal should be faintly received at this position, indicating that the adjustment of the oscillator 17,000 kc. trimmer has been correctly made. No adjustment should be made while checking for this image signal.

Loudspeaker:

The reproducer centering adjustment will be obvious if the field coil shield is removed. One screw in the centre of the back of the reproducer holds the shield in place. Two screws hold the voice coil centering spider in place and must of course be loosened while adjustment is being made.



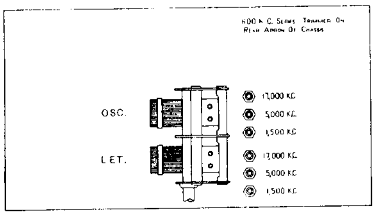
Range Selector Diagram



Radiotron Socket Voltages and I.F. Trimmer Locations

SOCKET METER READINGS

The meter readings given in the diagram are taken with the antenna and ground binding posts short circuited and with 120 volts line. All readings are actual operating conditions and in some cases it will be necessary to allow for meter resistance. All D.C. voltage readings are taken with respect to the chassis frame. All readings are given for normal operation. If readings are taken with a set analyser circuits that are not intended to oscillate, may oscillate, thus increasing plate or screen voltages and decreasing plate or screen current. The set analyser cable may also cause the oscillator radiotron to cease oscillating, thus increasing current and decreasing voltage



R.F. Alignment Points

When adjusting the Air Dielectric R.F. trimmers, it is necessary to use a special tool (See H-29644 in parts list) to slacken the lock nut on the trimmer, previous to the adjustment, and to tighten it again after the adjustment. Another special tool (See H-29643 in parts list) is available for making the actual adjustment to the trimmer. The adjustment should be made upward or downward on the plunger with a twisting motion. The special tool designed by the Canadian Westinghouse Company for this purpose is double ended; one end having a pin for the R.F. adjustments, the other end is a special socket screw driver for use in making I.F. adjustments.

CANADIAN WESTINGHOUSE MODELS 813A, 813X and 813Y

Radio Replacement Parts — **Use only Genuine Canadiadian Westinghouse Parts**

CARBON RESISTORS

For Price and Discount Refer to Special Service Manual RS-150

Key No.	Part No.	Ohms	Watts
R5	H-25408	10,000 Insulated	½
R15	H-27714	15,000	½
R1	H 32354	25,000	½
R12	H-22426	40,000	½
R3 R4 R8	H-33484	56,000 Insulated	½
R2 R17	H-30561	100,000 Insulated	½
R9	H-33508	220,000 Insulated	½
R16	H-34458	270,000 Insulated	½
R14 R18	H-34416	470,000 Insulated	½
R7	H-30177	1.0 Meg. Insulated	½
R11	H-34547	1.0 Meg. Insulated	¼
R8	H-33488	2.2 Meg. Insulated	½

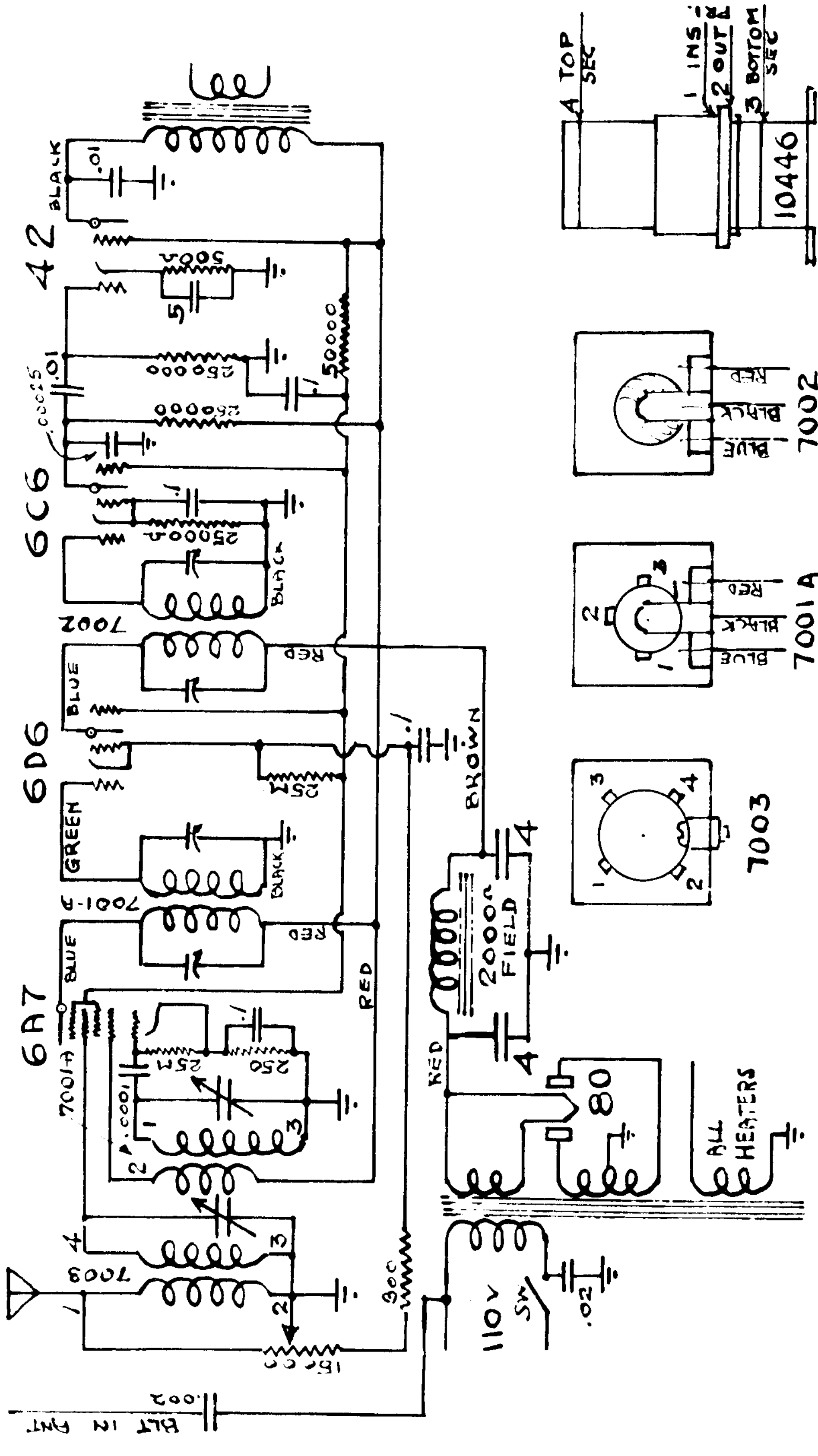
TUBULAR CONDENSERS

For Price and Discount See Special Service Manual RS-150

Key No.	Part No.	DESCRIPTION	
C7 C22 C33 C34	H-27683	0.25 Mfd. 400 Volt	
C28, C30,	K-7020	0.1 Mfd. 400 Volt	
C4, C23	K-5302	0.05 Mfd 400 Volt	
C36	H-34463	0.05 Mfd. 800 Volt	
C35	H-34461	0.01 Mfd. 400 Volt	
C27	H-32982	0.01 Mfd ·Shielded 400 Volt	
C19, C37	K-69030-G-1	0.005 Mfd. 800 Volt	
C32	H-34537	0.007 Mfd. 400 Volt	
MOULDED CAPACITORS			List
C31	K-73154-15	30 Mmfd.	.30
C15	K-73170-7	50 Mmfd.	.30
C17 C20 C21 C24 C25	H-34476	120 Mmfd.	.30
C26 C29	H-34368	175 Mmfd.	.30
C12	H-36096	450 Mmfd.	.30
C5 C10	H-36067	1300 Mmfd.	.35
C8 C18	H-34423	3400 Mmfd.	.75

CHAMPION RADIO

MODEL 52A

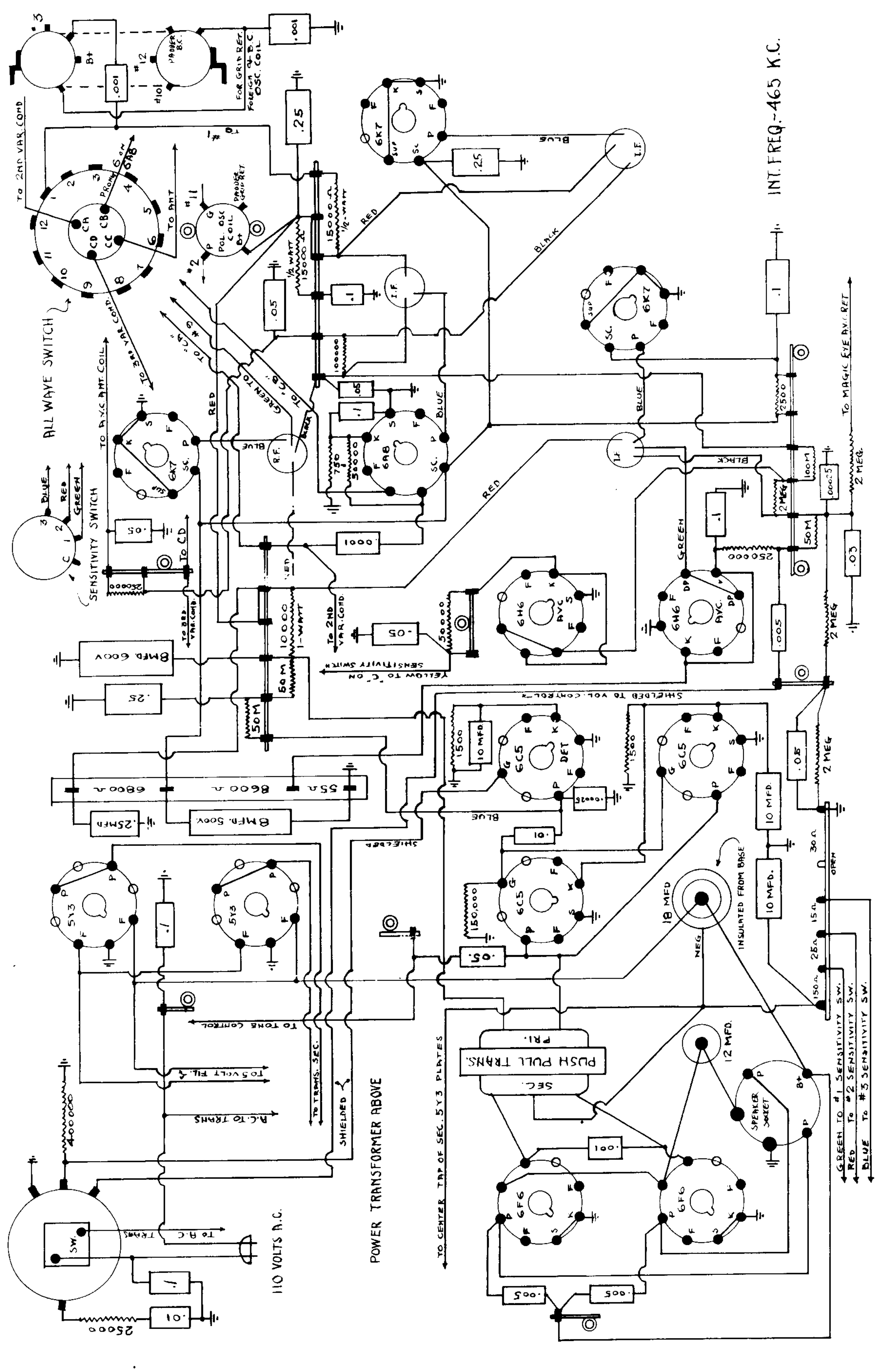


NOTE - EARLY MODELS USED 2½ VOLT TRANSFORMER AND 2A7, 58, 57, AND 2A5 TUBES

NOTE - WHERE UNSHIELDED ANT. COIL IS USED NUMBER 10446 REPLACES 7003

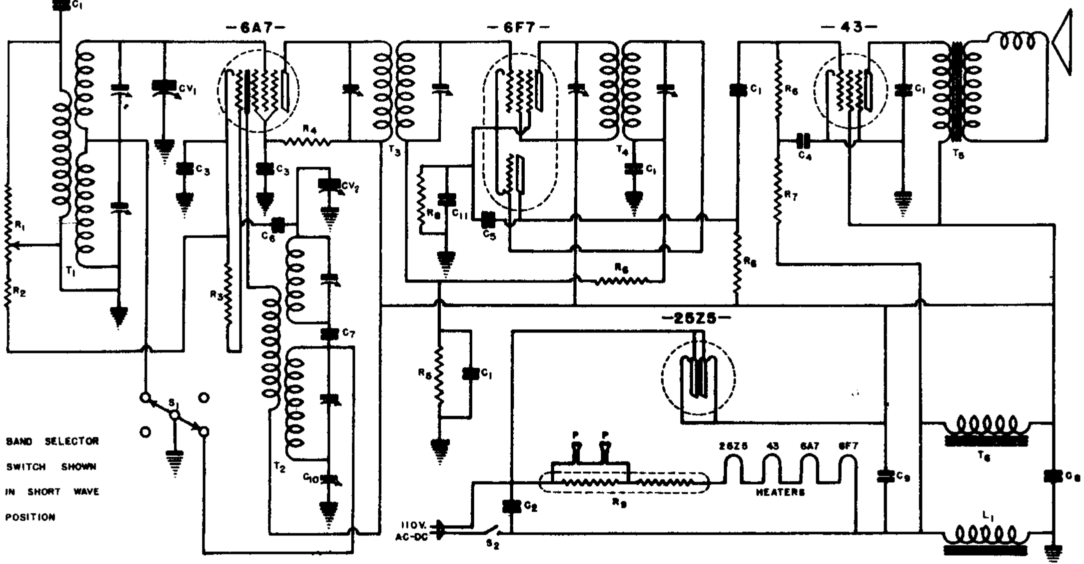
CHAMPION RADIO

MODEL 1437



CLIMAX RADIO & TELEVISION CO., Inc.

5 TUBE EXTENDED SKIP-BAND SUPERHETERODYNE RECEIVER —AC-DC TYPE—
MODEL G



BAND SELECTOR SWITCH SHOWN IN SHORT WAVE POSITION

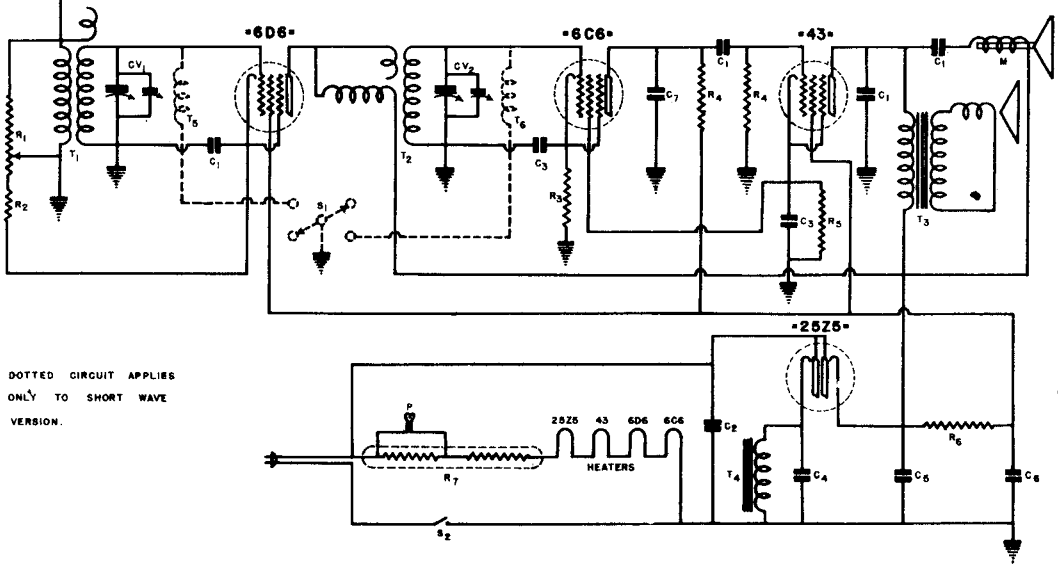
LEGEND	OUR PART NO.	DESCRIPTION
R_1	2013	10,000 OHM VOLUME CONTROL
R_2	—	275 OHM Minimum on Volume Control
R_3	113	50,000 OHM 1/2 WATT CARBON RESISTOR
R_4	109	10,000 OHM 1/2 WATT CARBON RESISTOR
R_5	126	2 MEGOHM 1/2 WATT CARBON RESISTOR
R_6	117	.5 MEGOHM 1/2 WATT CARBON RESISTOR
R_7	116	.25 MEGOHM 1/2 WATT CARBON RESISTOR
R_8	136	400 OHM 1/2 WATT CARBON RESISTOR
R_9	2904	L-55-C BALLAST TUBE
CV_1 CV_2	612	2 GANG VARIABLE CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD. 400V. TUBULAR CONDENSER
C_2	210	.1 MFD. 400V. TUBULAR CONDENSER
C_3	203	.1 MFD. 200V. TUBULAR CONDENSER
C_4	204	.25MFD. 200V. TUBULAR CONDENSER
C_5	401	.00025 MFD. MICA CONDENSER
C_6	400	.0001 MFD. MICA CONDENSER
C_7	411	.00128 MFD. MICA CONDENSER
C_8	314	10 MFD. 150V. ELECTROLYTIC CONDENSER
C_9	311	20 MFD. 150V. ELECTROLYTIC CONDENSER
C_{10}	502	5 PLATE PADDING CONDENSER
C_{11}	212	.05 MFD. 200V. TUBULAR CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
T_1	1217	ANTENNA COIL
T_2	1406	OSCILLATOR COIL
T_3	1503	456 KC I.F. TRANSFORMER
T_4	1506	456 KC DIODE COUPLING TRANSFORMER
T_5	IN 900	SPEAKER OUTPUT TRANSFORMER
T_6	IN 900	2500 OHM SPEAKER FIELD
L_1	1100	IRON CORE FILTER CHOKE
S_1	1914	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
P	2902	MAZDA • 46 PILOT LIGHT

I.F.
456 K.C.

5 TUBE TRF TWIN SPEAKER RECEIVER — AC-DC TYPE —
MODEL R



DOTTED CIRCUIT APPLIES ONLY TO SHORT WAVE VERSION.

LEGEND	OUR PART NO.	DESCRIPTION
R_1	2006	10,000 . OHM VOLUME CONTROL
R_2	—	275 OHM (Minimum on Volume Control)
R_3	111	25,000 OHM 1/2 WATT CARBON RESISTOR
R_4	117	500,000 OHM 1/2 WATT CARBON RESISTOR
R_5	104	600 OHM 1/2 WATT CARBON RESISTOR
R_6	106	5000 OHM 1/2 WATT CARBON RESISTOR
R_7	2903	L-55-B BALLAST TUBE
P	2902	MAZDA # 46 PILOT LIGHT

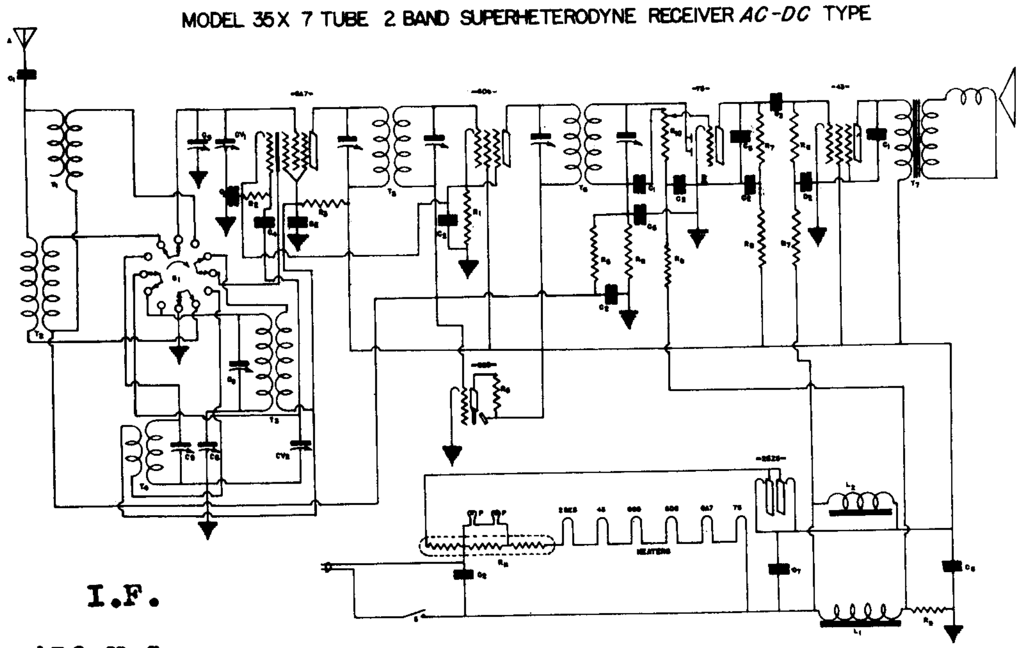
LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	610	2 GANG VARIABLE CONDENSER
C_1	211	.01 MFD. 400V. TUBULAR CONDENSER
C_2	210	.1 MFD. 400V. TUBULAR CONDENSER
C_3	IN 316	5MFD. 25W.V. ELECTROLYTIC CONDENSER
C_4	IN 316	4MFD. 150W.V. ELECTROLYTIC CONDENSER
C_5	IN 316	14MFD. 150W.V. ELECTROLYTIC CONDENSER
C_6	IN 316	8MFD. 150W.V. ELECTROLYTIC CONDENSER
C_7	401	.00025 MFD. MICA CONDENSER
M	900	MAGNETIC SPEAKER

LEGEND	OUR PART NO.	DESCRIPTION
S_1	1914	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
T_1	1200	ANTENNA COIL
T_2	1300	RF COIL
T_3	IN 810	SPEAKER OUTPUT TRANSFORMER
T_4	IN 810	2500 OHM SPEAKER FIELD
T_5	1612	SHORT WAVE ANTENNA SHUNT
T_6	1612	SHORT WAVE RF SHUNT

I.F.
456 K.C.

CLIMAX RADIO & TELEVISION CO., Inc.

MODEL 35X 7 TUBE 2 BAND SUPERHETERODYNE RECEIVER AC-DC TYPE



I.F.

456 K.C.

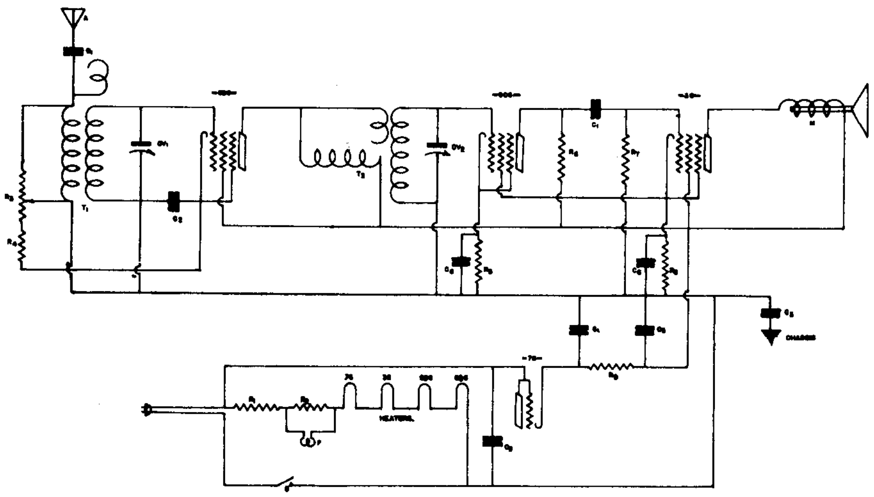
LEGEND	OUR PART NO.	DESCRIPTION
CV1 CV2	600	2 GANG VARIABLE CONDENSER.
C1	211	.01 MFD. 400 VOLT TUBULAR CONDENSER.
C2	[illegible]	.1 MFD. 200 VOLT TUBULAR CONDENSER.
C3	206	.05 MFD. 400 VOLT TUBULAR CONDENSER.
C4	400	.0001 MFD. MICA CONDENSER.
C5	401	.00025 MFD. MICA CONDENSER.
C6	1000	400 MMFD. CONDENSER.

LEGEND	OUR PART NO.	DESCRIPTION
C7	311	20 MFD. 250 VOLT PEAK ELECTROLYTIC CONDENSER.
C8	312	16 MFD. 250 VOLT PEAK ELECTROLYTIC CONDENSER.
C9	[illegible]	30 MMFD. CONDENSER.
R1	103	300 OHM 1/2 WATT CARBON RESISTOR.
R2	113	50,000 OHM 1/2 WATT CARBON RESISTOR
R3	106	[illegible] OHM 1/2 WATT CARBON RESISTOR.
R11	127	L-40-C2 BALLAST TUBE.

LEGEND	OUR PART NO.	DESCRIPTION
R5	119	1 MEGOHM 1/2 WATT CARBON RESISTOR.
R6	117	1/2 MEGOHM 1/2 WATT CARBON RESISTOR.
R7	118	1/4 MEGOHM 1/2 WATT CARBON RESISTOR.
R8	115	100,000 OHM 1/2 WATT CARBON RESISTOR.
R9	120	50 OHM 1/2 WATT CARBON RESISTOR.
R10	2000	500,000 OHM VOLUME CONTROL.
S1	1005	BAND SELECTOR SWITCH

LEGEND	OUR PART NO.	DESCRIPTION
T1-T2 T3-T4	1005	SKIP BAND TRANSLATOR UNIT.
T5	1000	HIGH G. I.F. TRANSFORMER.
T6	1002	DIODE I.F. TRANSFORMER.
T7	[illegible]	8" DYNAMIC SPEAKER TRANSFORMER.
L1	[illegible]	HIGH OHM FILTER CHOKE.
L2	604	SPEAKER FIELD (2000 OHM)
P	2002	MAZDA #46 PILOT LIGHT.

MODEL 7 4 TUBE RECEIVER AC-DC TYPE.



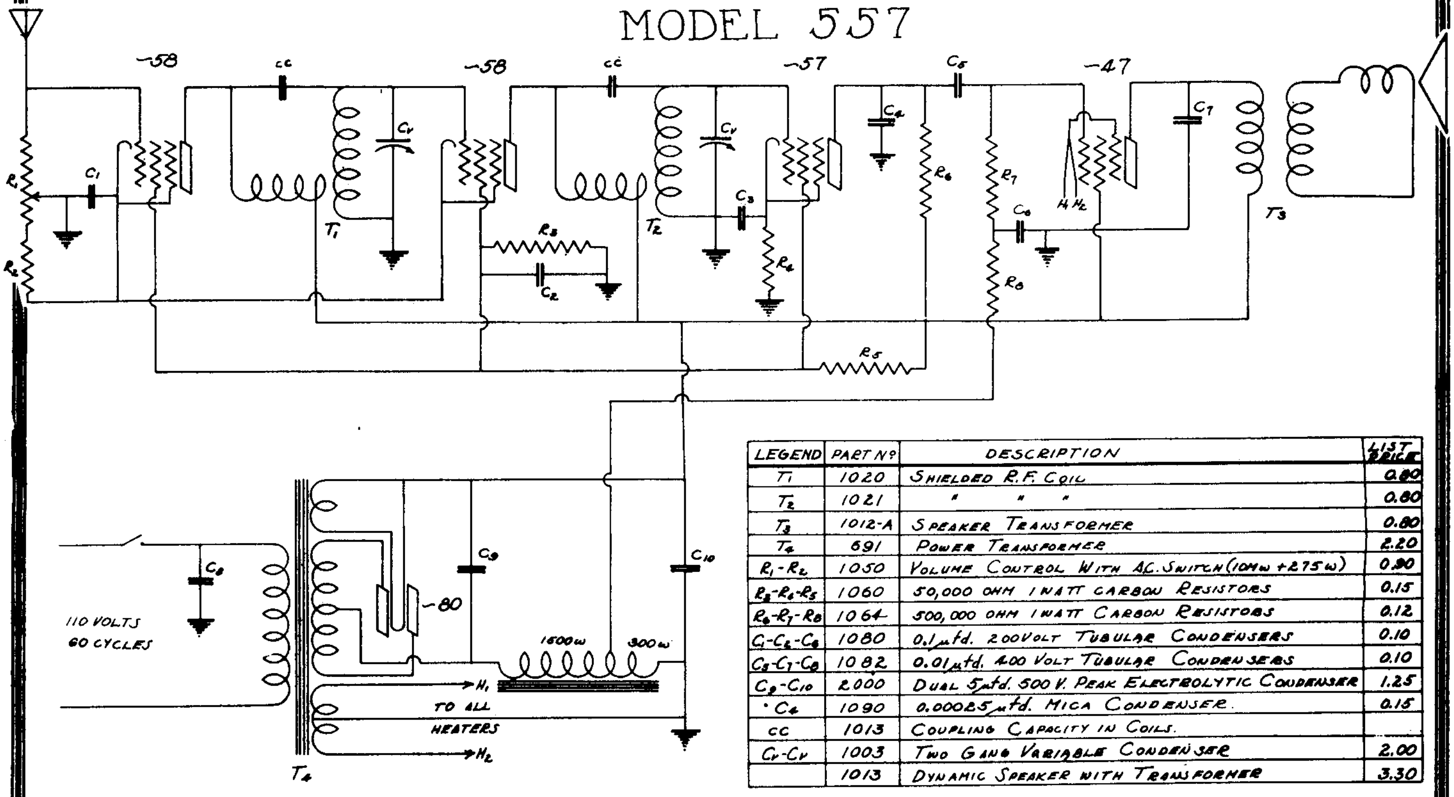
LEGEND	OUR PART NO.	DESCRIPTION
R1	[illegible]	250 OHM LINE CORD AND PLUG.
R2	132	300 OHM 1 WATT CARBON RESISTOR.
R3-R4	[illegible]	10,000 OHM VOLUME CONTROL (275 OHM MIN)
R5	111	25,000 OHM 1/2 WATT CARBON RESISTOR.
R6	119	1 MEGOHM 1/2 WATT CARBON RESISTOR.
R7	117	1/2 MEGOHM 1/2 WATT CARBON RESISTOR.
R8	104	2,000 OHM 1/2 WATT CARBON RESISTOR
C1	211	.01 MFD. 400 VOLT TUBULAR CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
C2	206	.05 MFD. 400 VOLT TUBULAR CONDENSER.
C3	[illegible]	.1 MFD. 200 VOLT TUBULAR CONDENSER
C4	[illegible]	14 MFD. 150 VOLT WET ELECTROLYTIC CONDENSER.
C5	[illegible]	8 MFD. 150 VOLT WET ELECTROLYTIC CONDENSER.
C6	[illegible]	8 MFD. 25 VOLT WET ELECTROLYTIC CONDENSER.
CV1 CV2	600	TWO GANG VARIABLE CONDENSER.
P	2002	MAZDA #46 PILOT LIGHT
S	—	LINE SWITCH ON VOLUME CONTROL.

LEGEND	OUR PART NO.	DESCRIPTION
M	900	MAGNETIC SPEAKER 6" DIAM.
A	[illegible]	30 FEET INDOOR AERIAL
T1	[illegible]	ANTENNA TRANSFORMER
T2	[illegible]	INTERSTAGE R.F. TRANSFORMER
R9	[illegible]	3000 OHM 1/2 WATT CARBON RESISTOR

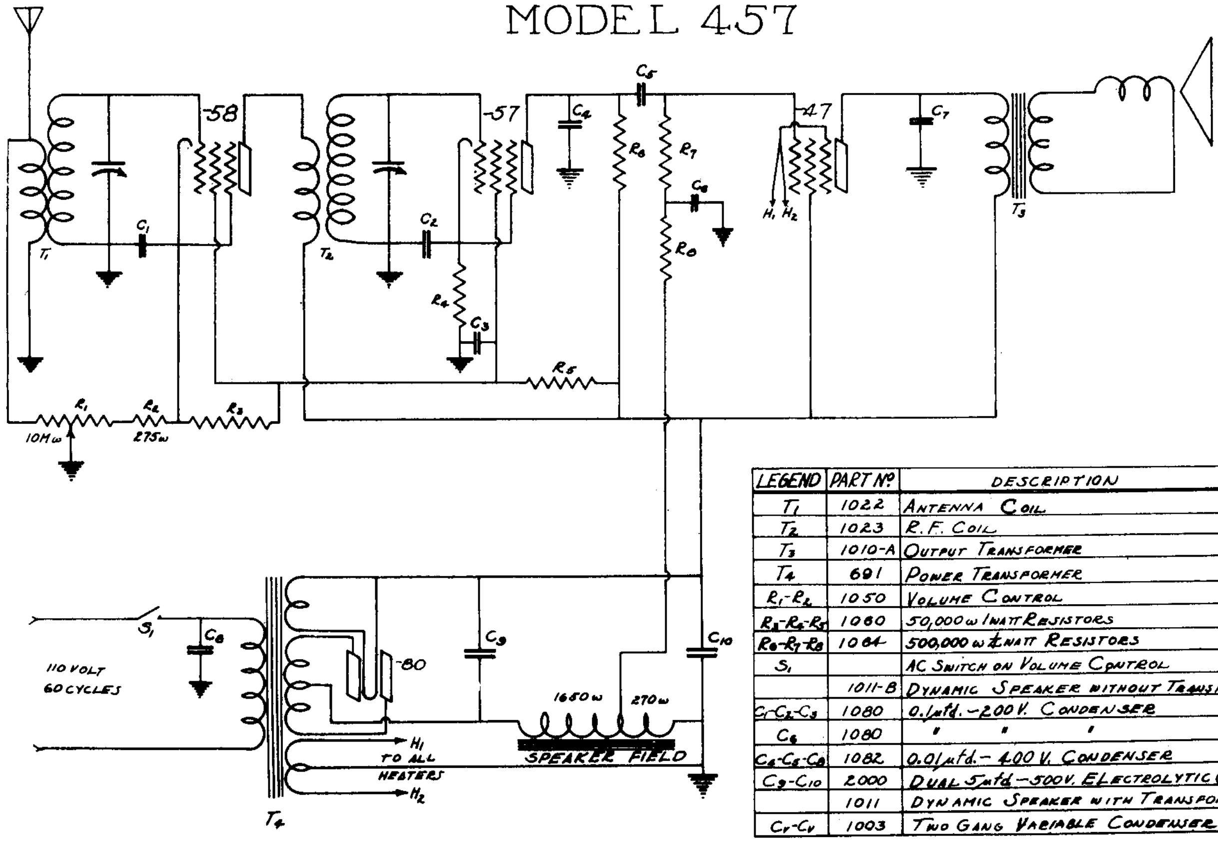
CLIMAX RADIO & TELEVISION CO., Inc.

MODEL 557



LEGEND	PART Nº	DESCRIPTION	LIST PRICE
T_1	1020	SHIELDED R.F. COIL	0.80
T_2	1021	" " "	0.80
T_3	1012-A	SPEAKER TRANSFORMER	0.80
T_4	691	POWER TRANSFORMER	2.20
R_1-R_2	1050	VOLUME CONTROL WITH A.C. SWITCH (10Mω + 275ω)	0.90
R_3-R_4-R_5	1060	50,000 OHM 1 WATT CARBON RESISTORS	0.15
R_6-R_7-R_8	1064	500,000 OHM 1 WATT CARBON RESISTORS	0.12
C_1-C_2-C_3	1080	0.1 μfd. 200 VOLT TUBULAR CONDENSERS	0.10
C_5-C_7-C_8	1082	0.01 μfd. 400 VOLT TUBULAR CONDENSERS	0.10
C_9-C_{10}	2000	DUAL 5 μfd. 500 V. PEAK ELECTROLYTIC CONDENSER	1.25
· C_4	1090	0.00025 μfd. MICA CONDENSER.	0.15
CC	1013	COUPLING CAPACITY IN COILS.	
C_v-C_v	1003	TWO GANG VARIABLE CONDENSER	2.00
	1013	DYNAMIC SPEAKER WITH TRANSFORMER	3.30

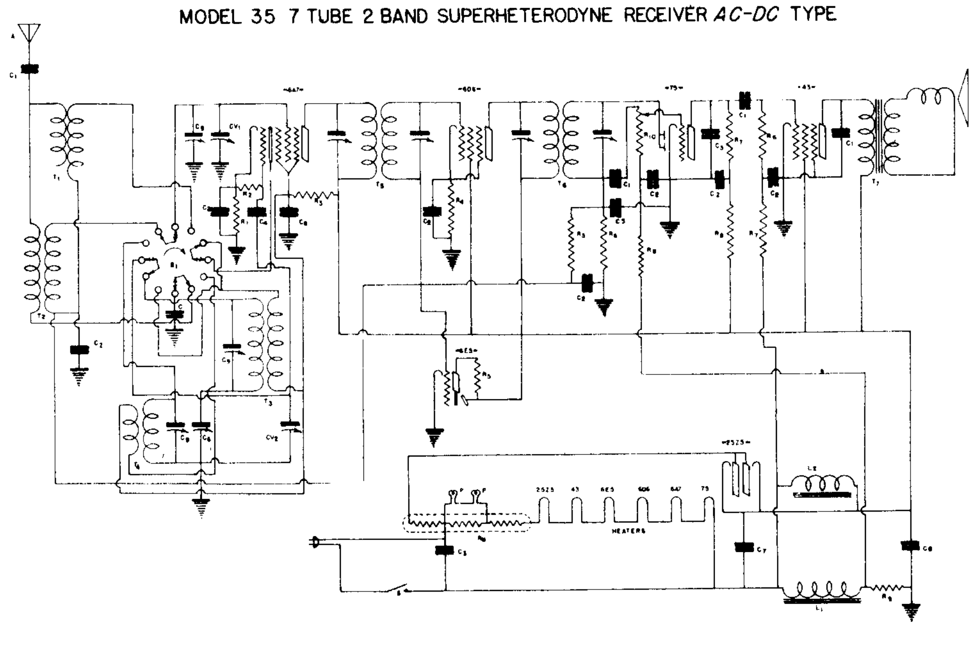
MODEL 457



LEGEND	PART Nº	DESCRIPTION	LIST PRICE
T_1	1022	ANTENNA COIL	0.50
T_2	1023	R.F. COIL	0.50
T_3	1010-A	OUTPUT TRANSFORMER	0.60
T_4	691	POWER TRANSFORMER	2.20
R_1-R_2	1050	VOLUME CONTROL	0.90
R_3-R_4-R_5	1060	50,000ω 1 WATT RESISTORS	0.15
R_6-R_7-R_8	1064	500,000ω ½ WATT RESISTORS	0.12
S_1		AC SWITCH ON VOLUME CONTROL	NOT SOLD SEPARATELY
	1011-B	DYNAMIC SPEAKER WITHOUT TRANSFORMER	2.50
C_1-C_2-C_3	1080	0.1 μfd. - 200 V. CONDENSER	0.10
C_6	1080	" " "	0.10
C_4-C_5-C_8	1082	0.01 μfd. - 400 V. CONDENSER	0.10
C_9-C_{10}	2000	DUAL 5 μfd. - 500 V. ELECTROLYTIC COND.	1.25
	1011	DYNAMIC SPEAKER WITH TRANSFORMER	3.00
C_v-C_v	1003	TWO GANG VARIABLE CONDENSER	2.00

CLIMAX RADIO & TELEVISION CO., Inc.

MODEL 35 7 TUBE 2 BAND SUPERHETERODYNE RECEIVER *AC-DC* TYPE



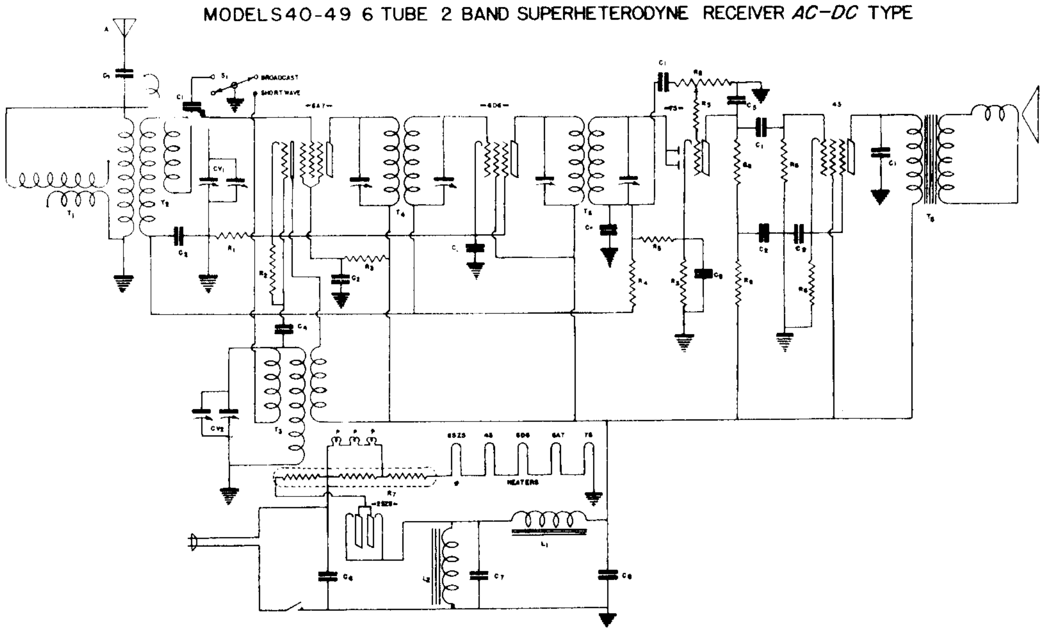
LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	608	2 GANG VARIABLE CONDENSER
C_1	211	.01 MFD. 400 VOLT TUBULAR CONDENSER
C_2	203	1 MFD. 200 VOLT TUBULAR CONDENSER
C_3	206	.05 MFD. 400 VOLT TUBULAR CONDENSER
C_4	400	.0001 MFD. MICA CONDENSER
C_5	401	.00025 MFD. MICA CONDENSER
C_6	IR 1603	480 MMFD. CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
C_7	311	20 MFD. 220 VOLT PEAK ELECTROLYTIC CONDENSER
C_8	312	10 MFD. 220 VOLT PEAK ELECTROLYTIC CONDENSER
C_9	IR 1603	30 MMFD. CONDENSER
R_1	103	250 OHM WATT CARBON RESISTOR
R_2	113	50,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	101	150 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_3	108	5000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR

LEGEND	OUR PART NO.	DESCRIPTION
R_5	119	1 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_6	117	$\frac{1}{2}$ MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	116	$\frac{1}{4}$ MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_8	115	100,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_9	130	30 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_{10}	2000	500,000 OHM VOLUME CONTROL
R_{11}	127	L-55-S2 BALLAST TUBE
S_1	1900	BAND SELECTOR SWITCH

LEGEND	OUR PART NO.	DESCRIPTION
T_1-T_2 T_3-T_4	1603	SKIP BAND TRANSLATOR UNIT
T_5	1500	HIGH G I F TRANSFORMER
T_6	1502	DIODE I. F. TRANSFORMER
T_7	804A	5" DYNAMIC SPEAKER TRANSFORMER
L_1	1100	IRON CORE FILTER CHOKE
L_2	804	SPEAKER FIELD (2500 OHM)
P	2902	MAZDA # 46 PILOT LIGHT

MODELS 40-49 6 TUBE 2 BAND SUPERHETERODYNE RECEIVER *AC-DC* TYPE

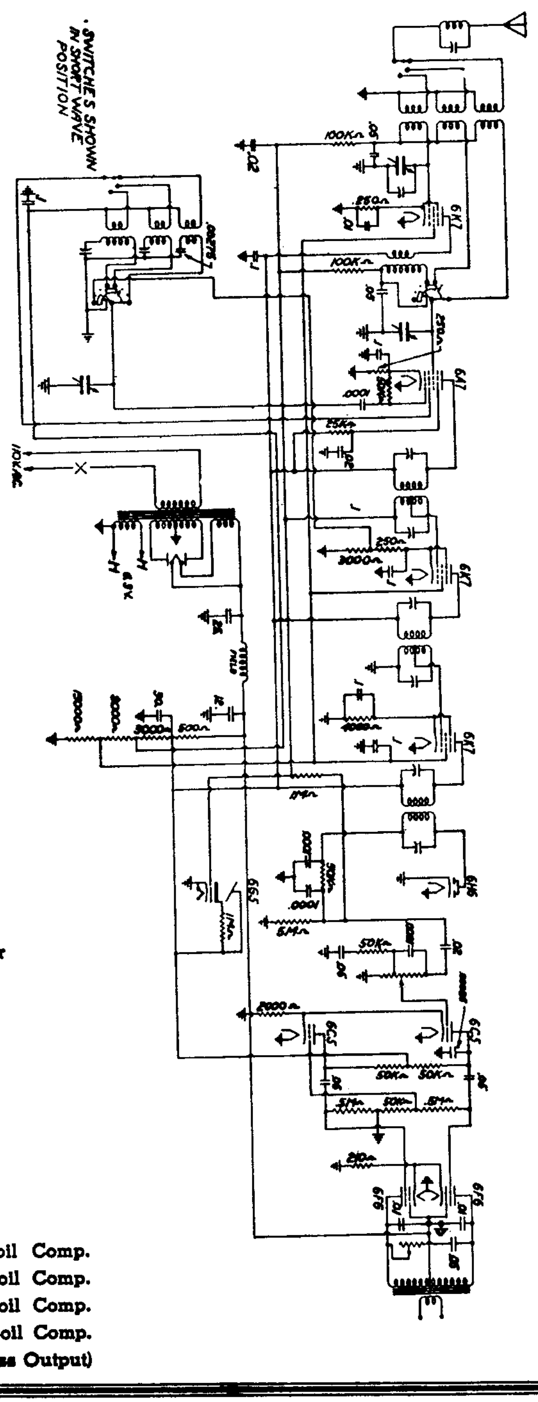


LEGEND	OUR PART NO.	DESCRIPTION
R_1	103	250 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_2	113	50,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_3	108	5000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	119	1 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_5	117	$\frac{1}{2}$ MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_6	104	500 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	128	L-49-S3 BALLAST TUBE
S_1	1902	BAND SELECTOR SWITCH
R_8	116	$\frac{1}{4}$ MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR

LEGEND	OUR PART NO.	DESCRIPTION
L_2	804	2500 OHM SPEAKER FIELD
CV_1 CV_2	604	2 GANG VARIABLE CONDENSER
C_1	211	.01 MFD. 400 VOLT TUBULAR CONDENSER
C_2	203	.1 MFD. 200 VOLT TUBULAR CONDENSER
C_3	204	.25 MFD. 200 VOLT TUBULAR CONDENSER
C_4	400	.0001 MFD. MICA CONDENSER
C_5	401	.00025 MFD. MICA CONDENSER
C_6	206	.05 MFD. 400 VOLT TUBULAR CONDENSER
R_9	115	100,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR

LEGEND	OUR PART NO.	DESCRIPTION
C_7	IR 306	20 MFD. 200 W. VOLT ELECTROLYTIC CONDENSER
C_8	IR 306	10 MFD. 200 W. VOLT ELECTROLYTIC CONDENSER
C_9	IR 306	10 MFD. 25 W. VOLT ELECTROLYTIC CONDENSER
T_1	1601	ANTENNA WAVE TRAP
T_2-T_3	1600	TRANSLATOR COIL
T_4	1600	HIGH GAIN I.F. TRANSFORMER
T_6	804A	5" DYNAMIC SPEAKER TRANSFORMER
P	2906	MAZDA # 46 PILOT LIGHT
T_5	1502	DIODE I.F. TRANSFORMER

CONTINENTAL RADIO & TELEVISION CORP.
MODEL AM7SERIES



ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator which will cover the frequencies of 456, 600, 1400, 1800, 4000, 6000, and 14,000 KC and an output meter which is to be connection across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1C6) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all five I.F. trimmers to peak or maximum reading on the output meter. As there are two stages of I.F. in this receiver, there will be consequently three I.F. transformers to align.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .001 md. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the broadcast oscillator trimmer to peak. (See drawing for location.) After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak. The front condenser section tunes the pre-amplifier stage. Then adjust the Broalcast Band R. F. trimmer to peak. This trimmer aligns the grid or input circuit of the 6A8 tube. (See drawing for position of Broadcast R. F. trimmer). Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the B. C. oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the R.F. section. (For location of B.C. padding condenser see drawing.) Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band.

FOREIGN BAND ALIGNMENT The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers marked and illustrated in the drawing as S.W. oscillator and S.W. trimmer. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. Set the receiver pointer to 14,000 KC (also test oscillator).

Then proceed to adjust these two trimmers for peak at 14,000 KC (adjust oscillator trimmer first) and as the inherent design of the circuit has been expressly developed for simplicity in servicing, only these two adjustments are necessary for aligning this band. NOTE: Always start this procedure by having the oscillator coil trimmer loose (out all the way), and the antenna coil trimmer fairly tight (in all the way); otherwise it is possible to make a false alignment on the image frequency. In order to prevent alignment on the image frequency, it is suggested that the following check be made: Readjust the pointer to 13,100 KC where the image frequency should be found. If properly aligned, the image frequency will be found to be weaker. If, however, the signal at 13,100 KC is found to be stronger than the signal at 14,000 KC, it signifies that alignment was incorrectly made on the image frequency.

POLICE BAND In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with a .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment.

Set the receiver pointer to 4000 KC (also test oscillator) and adjust the Police Band oscillator circuit trimmer to peak.

After this has been carefully done, the next step is to adjust the Police Band antenna trimmer to peak.

Now reset the dial pointer and the test oscillator to 1800 KC in preparation for adjusting the police band padding condenser.

Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated, but is the easiest way to correctly adjust the oscillator to the R.F. or antenna section. Return to 4000 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made 1800 KC.

If it is found that in returning to 4000 KC the pointer is accurately on scale, no further adjustment should be necessary (in this recheck). If the pointer is found off scale, it may be corrected and put on scale by readjustment of the police band oscillator trimmer. Alignment of the pointer can only be corrected by adjustment of the oscillator trimmer.

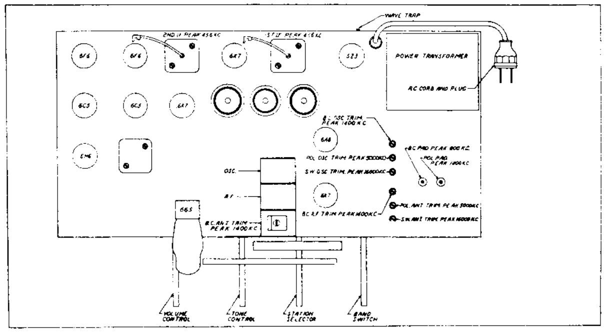
IMPORTANT: The Police Band Oscillator Trimmer, Police Band Antenna Trimmer and Police Band Padding Trimmer are the only three adjustments required in aligning this band.

WAVE TRAP ADJUSTMENT At the rear of the chassis near the Antenna and Ground posts is an adjustment screw connected to a trap circuit for elimination of code interference when operating on the broadcast band. If code interference is encountered adjustment of this screw will filter it out. It is to be used only if such interference is experienced in broadcast reception. It's use prevents code transmitters operating on a frequency around 456 K. C. from being received by the I. F. amplifier which is tuned to 456 K. C.

SERVICE DATA FOR ALL BANDS

If it is suspected that the oscillator has stopped but is doubtful due to the presence of the usual amount of noise level, it is suggested that the oscillator plate voltage be checked. To ascertain whether the tube is oscillating, ground the oscillator grid of the 6A8 (short stator and rotor plates of oscillator section on gang condenser). If oscillating properly, grounding the grid will cause an appreciable drop in oscillator voltage. Grounding or shorting the stator and grid components should be accomplished by grounding the stator mounting nut to the frame of the condenser with a screw-driver or any metallic conductor.

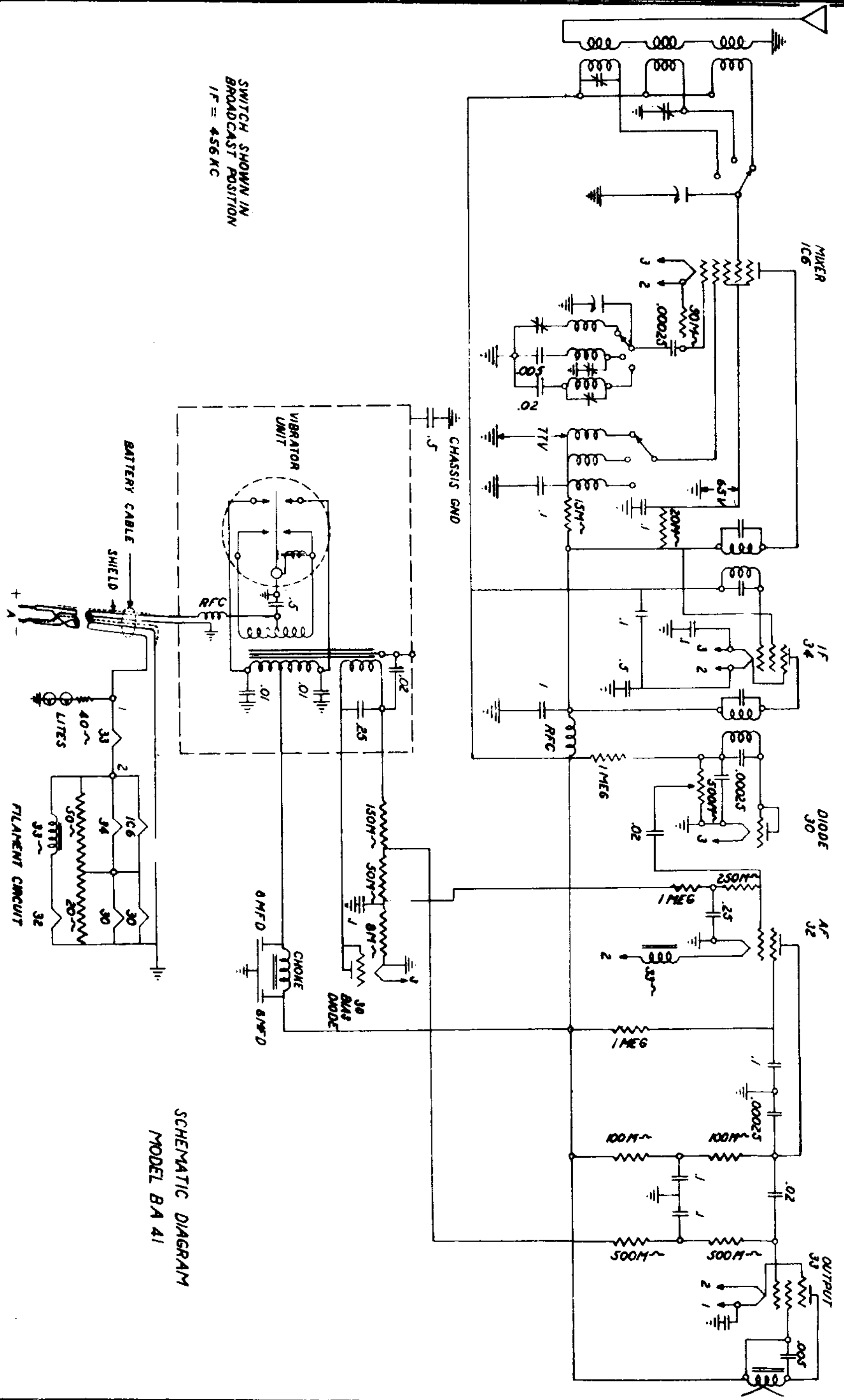
Do not wedge a screw-driver between the plates for this is liable to permanently warp the plates and thus prevent the oscillator section of the gang condenser from tracking probably.



P 124	Pilot Light
P1185	Output Audio Transformer
P1038	Knob Large
P1040	Knob Small
P1047	Broadcast Interstage Coil
P1046	Broadcast Antenna Coil
P1162	Wave Trap Coil
P1150	Power Transformer
P 176	AC Cord and Plug
P1149	1st I.F. Transformer
P1151	2nd I.F. Transformer
P1152	Double Tuned I.F. Transformer
P1129	3 Gang Variable Condenser
P1146	Tilt Dial Complete
P 907	Escutcheon Plate and Glass
P 490	6H6 Tube Socket
P 493	6F6 Tube Socket
P 522	6C5 Tube Socket
P 489	6K7 Tube Socket
P 488	6A8 Tube Socket
P1153	5Z3 Tube Socket
P1041	6G5 Tube Socket
P 945	Speaker Socket
P 873	Speaker Plug
P1157	Gang Candohm Resistor
P1158	Volume Control and Switch
P1159	Tone Control
P1135	Wave Switch
P1160	6 Gang Trimmer Condenser
P 617	500 Mmfd. Padding Condenser
P1139	1500 Mmfd. Padding Condenser
P1145	Straight Dial Complete
P1166	Volume Control and Switch (S. Dial)
P1167	Tone Control (S. Dial)
P1143	Wave Switch (S. Dial)
P906	Escutcheon Plate (S. Dial)
P1154	30 Mfd. 300 V. Electrolytic Con.
P1155	12 Mfd. 300 V. Electrolytic Con.
P1156	25 Mfd. 450 V. Electrolytic Con.
P 142	.10-200 V. Condenser
P 276	.10-400 V. Condenser
P 334	.05-400 V. Condenser
P 143	.02-400 V. Condenser
P 671	.01-200 V. Condenser
P 335	.01-600 V. Condenser
P1055	.00275 Mica 5% Condenser
P 480	.0001 Mica Condenser
P 137	500,000 ¼ Watt Resistor
P 147	50,000 ¼ Watt Resistor
P 278	1,000 ¼ Watt Resistor
P 162	1 Meg. ¼ Watt Resistor
P 756	2,000 ¼ Watt Resistor
P1169	15,000 1 Watt Resistor
P 136	250 ¼ Watt Resistor
P 280	100,000 ¼ Watt Resistor
P1186	600 ¼ Watt Resistor
G1187	Short Wave Antenna Coil Comp.
G1188	Short Wave Oscillator Coil Comp.
G1189	Middle Band Antenna Coil Comp.
G1190	Middle Band Oscillator Coil Comp.
G1195	12" Speaker Complete (Less Output)

CONTINENTAL RADIO & TELEVISION CORP.

MODEL BA41 AUTO SET



SCHEMATIC DIAGRAM
MODEL BA 41

ALIGNMENT DATA

The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 3000 and 10,000 K. C. and an output meter to be connected across the speaker terminals.

If possible all alignment should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

I.F. ALIGNMENT Adjust the test oscillator to 1400 K.C. and connect the output to the antenna wire through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 K.C. and adjust the rear gang condenser trimmer to peak. This adjusts the receiver on scale. Then adjust the front or R.F. trimmer to peak.

Next rest the dial pointer on the receiver and test oscillator to 600 K.C. Slowly increase or decrease the oscillator padding condenser, and at the same time continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the R.F. section. The padding condenser is located on the left hand end of the chassis.

Return to 1400 K.C. and again go over the adjustment at that frequency to be sure they have not been thrown out of adjustment.

SHORT WAVE BANDS

The foreign band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coil located next to the gang condenser. Set the test oscillator to 10 megacycles or 31 meters.

The police and aviation band can be adjusted from a signal set at 3,000 K.C. or 300 on the dial. The oscillator trimmer is located underneath the chassis and the R.F. trimmer is between the 6A7 tube and the wave change switch.

The gang condenser trimmers are not to be used for alignment of either of the short wave bands.

SERVICE HINTS

VIBRATOR Vibrator noise may be due to the following: a discharged "A" battery, high resistance connections on battery terminals, a defective vibrator or a loose cover on the vibrator can.

The vibrator unit is a plug-in type and can be removed for replacement very easily. This unit should last a very long time as current through the contact points is very small.

Never leave the power switch turned on when the "A" battery is too low to make the receiver function as this is liable to seriously injure the vibrator or vibrator transformer. Never remove any of the tubes when the power switch is turned on as they are connected in a series parallel circuit.

MICROPHONICS The two volt type of tubes used in this receiver are ordinarily more microphonic than heater types. They can be detected by touching each tube with the finger tips. Another source might be caused by the dial glass touching the front or escutcheon plate.

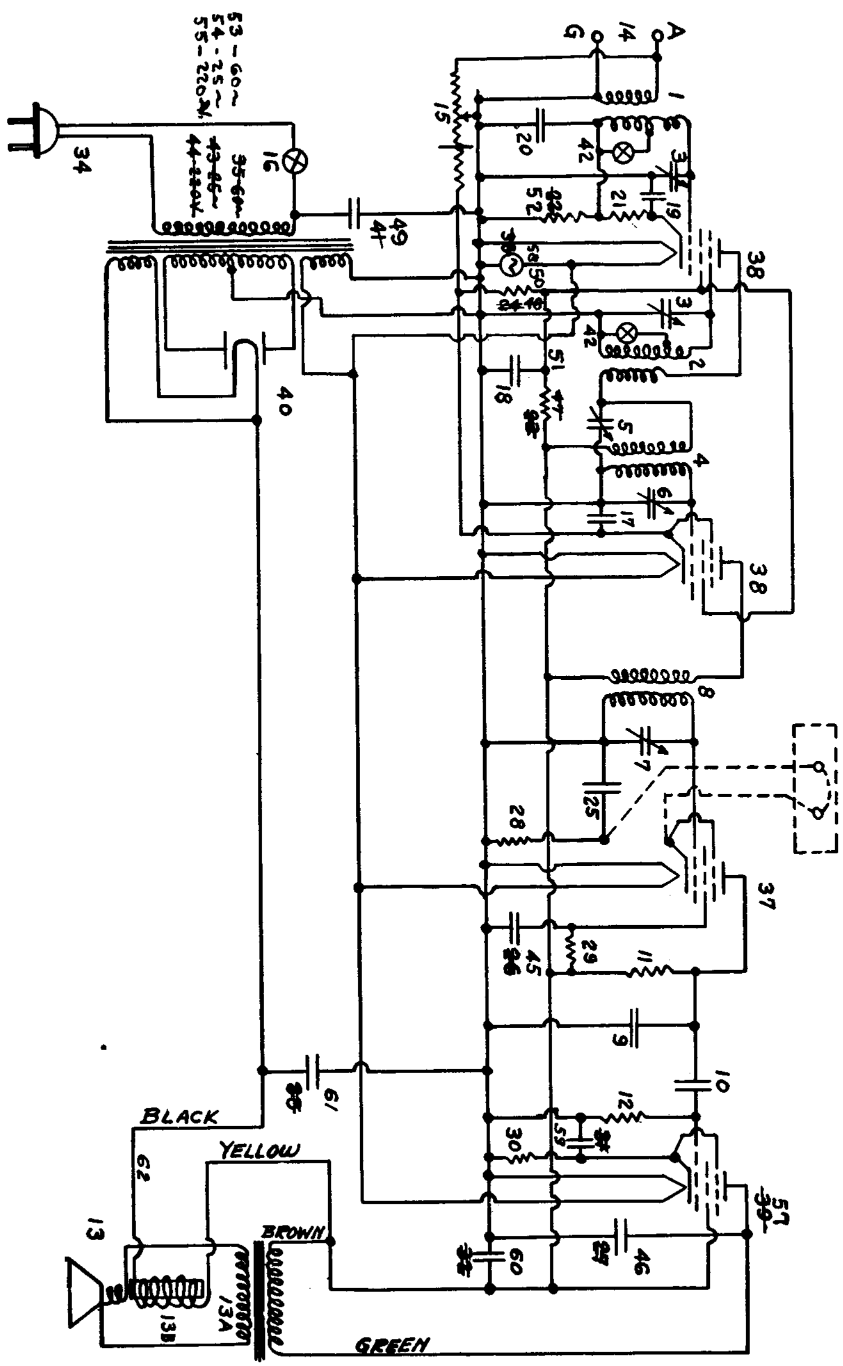
LOW VOLUME This trouble may be caused by weak or defective tubes (replace with set of tubes known to be in good condition); antenna disconnected from the receiver; open antenna coil or open or shorted by-pass condensers.

Some localities remote from broadcasting stations may require an extra long antenna of about two hundred feet.

LOW VOLTAGE Low voltage may be caused by a low battery, a defective vibrator, corroded battery terminal or shorted by-pass condensers. Increasing the length of battery leads might cause low voltage and vibrator noise.

THE CROSLEY RADIO CORPORATION

MODEL 167 SERIES 2



Model 167

Specifications

Model 167 is a five tube dual band superheterodyne designed for operation from A. C. electric circuits. The intermediate frequency is 456 kc.

Tubes and Voltage Limits

The following are the tubes and voltages measured from tube contact to chassis with the receiver in operating condition, the volume control on **full**, but with no signal to the antenna circuit. **The** line voltage should be 117.5 volts (235 volts for 220 volt receivers). All voltages, except filament, are measured with a 250 volt (1000 ohm per volt) D. C. voltmeter. Filament voltages are measured with a low range A. C. voltmeter.

Tube	Position	Voltages: Plate	Screen Grid	Supp. Grid	Cathode	Filament
58	Oscillator modulator	267	150	0	35	2.4
58	I. F. Amplifier	267	150	3.5	3.5	2.4
58	Detector	150	48	6.5	6.5	2.4
2A5	Output	250	267		21.5	2.4
80	Rectifier	340				4.7

Voltage limits are plus or minus ten percent of the values given.

PARTS LIST—MODEL 167

INSTRUCTIONS FOR ORDERING—Give part number, description of part, and serial number of receiver on which part is to be used. If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipped on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject to the usual trade discounts, and are subject to change without notice.

* Figures in 2nd last column refer to parts shown in diagram.

Qty.	Part No.	Description	*	List Price Each
1	G20-24995	Antenna coil	1	.65
1	G17-24996	Oscillator coil	2	.80
2	W-25025	Coil shield		.10
1	G7-25444	First I. F. transformer	4	.60
1	G7-25445	Second I. F. transformer	8	.60
2	W-25024	I. F. Transformer shield		.10
4	W-25200	Coil Socket		.05
4	W-21451	Retaining ring		.05
2	W-24860	Insulating washer		.05
1	W-30414	Wave-change switch		.40
1	W-27425	Variable condenser assem.	3	2.75
1	G1-27812	Dial light socket		.20
1	G5-25050	Dial Assembly		.40
1	G2-25948	I. F. condenser blade (1st I. F. primary)	5	.30
1	W-25006	I. F. condenser blade (1st I. F. secondary)	6	.05
1	W-27548	I. F. condenser blade (2nd I. F. secondary)	7	.05
2	W-25446	Bakelite washer (large)		.05
2	W-25584	Mica insulator		.05
2	R-80	4-36x⅜ R. H. M. screw		.05
2	W-26069A	Adjusting nut		.05
2	W-24865	Metal washer		.05
2	W-25450	Insulating washer		.05
2	W-25007	Insulating washer		.05
2	O-4	No. 4 Flat washer		.05
2	M-20	Rivet		.05
1	W-20264	A. G. Terminal strip	14	.15
1	G23-27456	Socket -57	37	.10
2	G24-27456	Socket -58	38	.10
1	G43-27456	Socket -2A5 or	57	.10
1	G25-27456	Socket -42	39	.10
1	G6-27456	Socket -80	40	.10
3	W-26010	Tube shield base		.05
3	B-26009	Tube shield		.10
1	B-21491	AC cable	34	.25
1	W-31009	Speaker cable	62	.25
1	W-26573	Vol. Control & switch	15-16	1.00

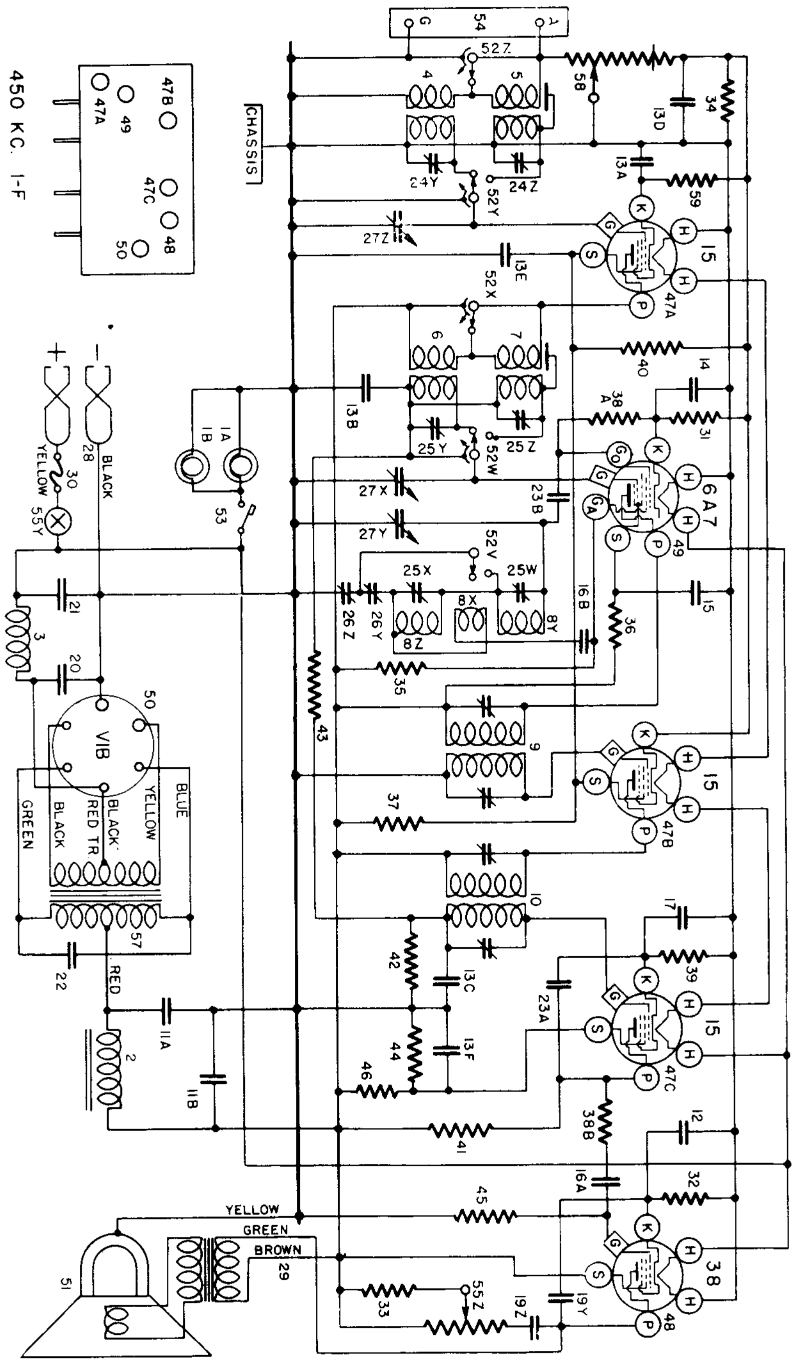
Qty.	Part No.	Description	*	List Price Each
3	G1-23472	Knobs		.10
1	W-27478	Escutcheon		.15
3	S-27	Escutcheon screws		.05
1	B-28478	Back		.25
1	W-23880	Thumb screw for back		.05
		POWER TRANSFORMERS		
1	G11-23559	Power Trans. (100 volt, 60 cy.) (-42 output)	35	2.25
1	G12-23559	Power trans. (110 volt, 25 cy.) (-42 output)	43	3.00
1	G13-23559	Power trans. (220 volt, 25 cy.) (-42 output)	44	3.00
1	G20-23559	Power trans (110 volt, 60 cy.) (-2A5 output)	53	2.75
1	G21-23559	Power trans. (110 volt, 25 cy.) (-2A5 output)	54	4.25
1	G22-23559	Power trans. (220 volt, 25 cy.) (-2A5 output)	55	4.25
		FILTER & BYPASS CONDENSERS		
1	W-25537	Condenser .03 -.0006 Mfd.	9-10	.30
2	W-25438	Condenser .1 - 1 Mfd.	17-18	
			19-20	
1	W-24784	Condenser .25 Mfd.	25	.20
1	W-29089	Condenser .02 -.016 Mfd.	45-46	.25
1	W-29591	Condenser .0005 Mfd.	49	.20
1	W-29150A	Condenser 6.-7.-8. Mfd. or	59-60	
			61	2.90
1	W-27488	Condenser 6.-8. Mfd.	31-32	1.10
1	W-23701	Condenser 7. Mfd.	33	.80
		RESISTORS		
1	W-21455	Resistor 300,000 ohm	11	.15
1	W-23785	Resistor 500,000 ohm	12	.15
1	W-21453	Resistor 40,000 ohm	28	.15
1	W-23907	Resistor 750 ohm	30	.20
1	W-25937	Resistor 275 ohm	21	.15
1	W-30137	Resistor 3,500 ohm	52	.20
1	W-27120	Resistor 25,000-8500 ohm	50-51	.40
1	W-26577	Resistor 3 Megohm	29	.15

SPEAKER PARTS

	Magnavox 335—3M Spec. 715	Magnavox 335—3M Spec. 1602	Jensen 335—3J Spec. 3452	Rola 335—3R Spec. F-5-A	Crosley 335—3C			
1	27452	30675	30658	30955	G2-29529	Cone Assem.	13	2.50
1	27658	30676	30659	30580	W-29764	Field Coil	13B	1.10
1	27660	30677	30660	30956	G2-29535	Transformer	13A	1.25

THE CROSLEY RADIO CORPORATION

MODEL 546



450 KC. I-F

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	K	Ga	Go
15	R-F Amplifier	2.0	180	96	2.6	—	—
6A7	Oscillator-Modulator	6.0	180	84	3.8	130	Neg
15	I-F Amplifier	2.0	180	96	2.6	—	—
15	Detector	2.0	90	13	3.8	—	—
38	Output	6.0	170	180	14.5	—	—

Power consumption approximately 2.2 amperes at 6.0 volts.
Power Output approximately .7 watt.

PARTS LIST—MODEL 546

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description	Item No.	Part No.	Description
1AB	W —37922	Dial Bulb		W —34223	Fuse Cover Insulator
	G3 —37965	Dial Light Socket Assembly		W — 4072	Thumb Screw (Cover)
2	G27 —24628	Filter Choke	31	W —21964	Resistor 165 Ohm ½W. Flexible
3	G16 —28067	R-F Filter Choke	32	W —21452	Resistor 1100 Ohm ¾W. Flexible
4	G114—32000	Ant Coil—B-C-B	33	W —27503	Resistor 1400 Ohm ¾W. Flexible
5	G115—32000	Ant Coil—H-F-B	34	W —23013	Resistor 2000 Ohm 1¼W. Flexible
6	G81 —32001	R-F Coil—B-C-B	35	W —37485	Resistor 15,000 Ohm ½W. Car.
7	G82 —32001	R-F Coil—H-F-B	36	—33390	Resistor 30,000 Ohm ¼W. Car.
8	G104—32002	Double Osc Coil.	37	—37472	Resistor 50,000 Ohm ¼W. Car.
9	G109—32004	1st I-F Assembly	38A	—21237A	Resistor 60,000 Ohm ¼W. Car.
10	G110—32004	2nd I-F Assembly	38B	—21237A	Resistor 60,000 Ohm ¼W. Car.
11A	W —36057	Condenser 40 Mfd. 300 V. Electrolytic	39	—36761	Resistor 40,000 Ohm ¼W. Ins.
11B	W —36057	Condenser 40 Mfd. 300 V. Electrolytic	40	—23403	Resistor 150,000 Ohm ¼W. Car.
12	W —41195	Condenser 12 Mfd. 25 V. Electrolytic	41	—35930	Resistor 200,000 Ohm ¼W. Ins.
13A	W —35936	Condenser .05 Mfd. 200 V.	42	—23785	Resistor 500,000 Ohm ¼W. Car.
To			43	—21454	Resistor 1 Megohm ¼W. Car.
13E	W —35936	Condenser .05 Mfd. 200 V.	44	—35602	Resistor 1 Megohm ¼W. Ins.
14	W —32380	Condenser .05 Mfd. 200 V.	45	—37245	Resistor 1.5 Megohm ¼W. Car.
15	W —30488	Condenser .02 Mfd. 400 V.	46	—36688	Resistor 3 Megohm ¼W. Ins.
16A	W —34647	Condenser .006 Mfd. 400 V.	47A	G88 —28807	Socket Type 15
16B	W —34647	Condenser .006 Mfd. 400 V.	47B	G88 —28807	Socket Type 15
17	W —34712	Condenser .25 Mfd. 160 V.	47C	G88 —28807	Socket Type 15
18	W —24049B	Condenser .1 Mfd. 200 V.	48	G15 —28807	Socket Type 38
19Z	W —25537A	Condenser .03 Mfd. 400 V.	49	G47 —28807	Socket Type 6A7
19Y		Condenser .001 Mfd. 400 V.	50	G92 —28807	Socket Type V1B.
20	W —37174	Condenser .5 Mfd. 160 V.		W —27981A	Tube Shield Base
21	W —37190	Condenser .02 Mfd. 160 V.		W —40911	Tube Shield
22	W —37214	Condenser .001 Mfd. 1000 V.	51	—33PJ-3	Speaker Spec. R-6000 D-1 (Table)
23A	G2 —34002	Condenser .0001 Mfd. (Molded		—41434	Cone Assy. for Above Speaker
23B	G2 —34002	Condenser .0001 Mfd. (Molded		—41454	Output Transformer for Above Speaker
24	W —37986	2 Section Shunt Trimmer Condenser		—41458	Mtg. Ring (Cardboard) for Above Cone
25	W —41247	4 Section Shunt Trimmer Condenser		—43PJ-3	Speaker Spec. R-8000 B-3 (Console)
26	—41288	2 Section Osc. Series Trimmer		—41452	Cone Assy. for Above Speaker
27	G23 —33001	3 Section Var. Tuning Condenser		—41459	Mtg.-Ring (Cardboard) for Above Cone
	C —41321	Dial (Glass)		—41456	Output Transformer for Above Speaker
	W —40804	Dial Glass Cushion	52	B —41253A	Band Selector Switch
	B —40818B	Pointer Disc	53	W —41068A	Dial Light Switch
	W —40486	Pointer Disc Screw	54	G10 —26719	Ant. & Grd. Terminal Assembly
	W —41314	Shaft Assembly (Sprocket etc.)	55Z	—32908	Tone Control
	B —41316	Support Bracket (Bearing)	55Y		On-off Switch
	B —41315	Sprocket Assembly (Driver)	56	—37216	Vibrator
	W —40909	Spring Washer (Shaft)	57	G11 —32769	Power Transformer
	W —31840A	Snap Spring (Shaft)	58	—41252	Volume Control (10,000 Ohm)
	W —41317	Lower glass Support Bracket	59	W —35467	Resistor 220 Ohm ½W. Flexible
	W —41318	Upper glass Support Bracket R-H		—34903	Battery Clip (+) (Pos.)
	W —41319	Upper glass Support Bracket L-H		—34904	Battery Clip (−) (Neg.)
	W —41320	Drive Chain		B —40839	Escutcheon
	W —41743	Chain Take up Spring		W —28760B	Escutcheon Pin
28	MG25—37103	Battery Cable Assembly		W —41221	Upper Knob (1) Dial Light
29	G9 —35696	Speaker Cable		W —41222	Lower Knob (1) Station Select.
30	W —37624	Fuse (4 Amp.)		W —41366A	Knob (1) Band Select.
	G2 —33339	Fuse Panel Assembly		W —41224	Knob (2) V. C. & T. C
	W —33310A	Fuse Cover			

THE CROSLEY RADIO CORPORATION

MODEL 636

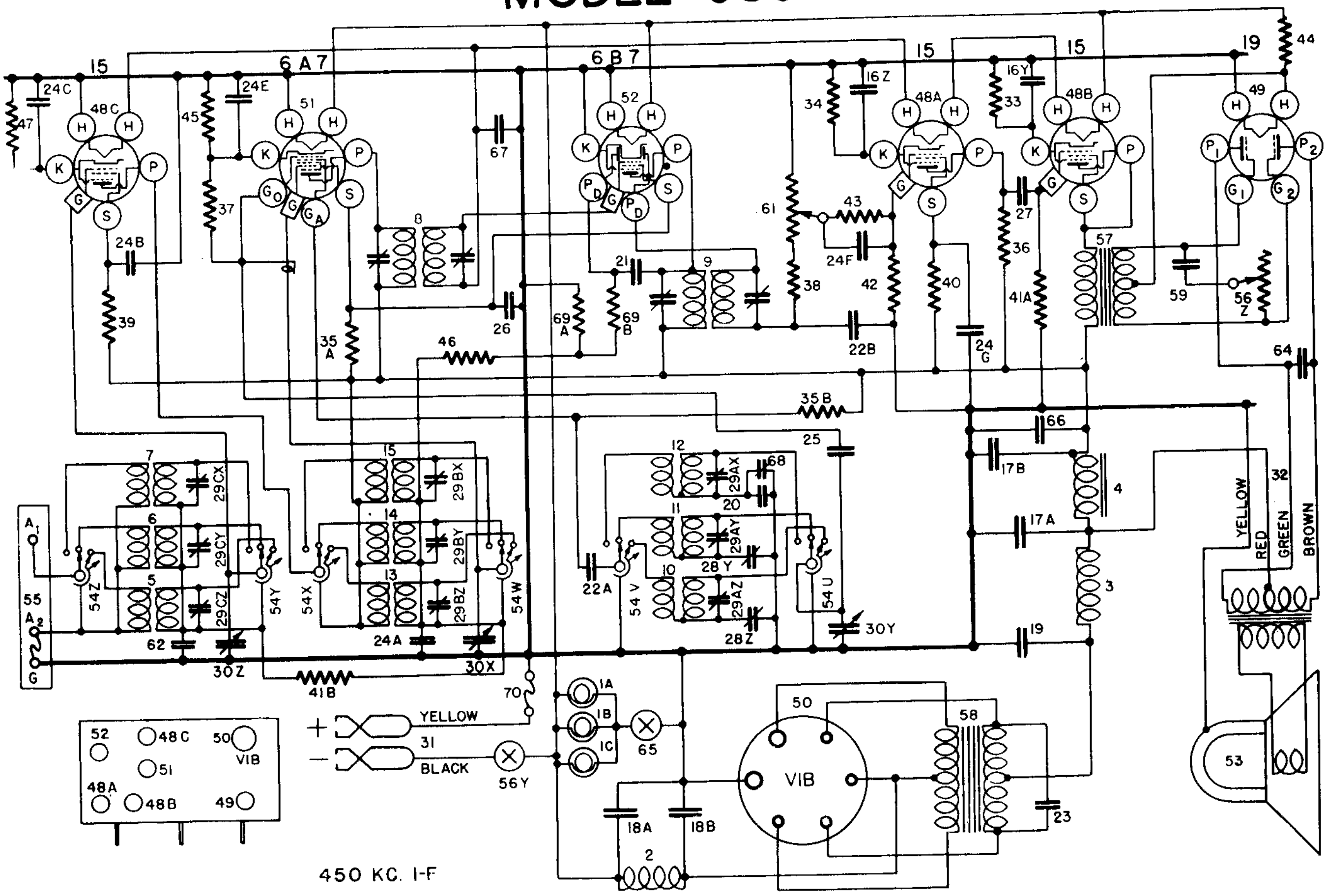


FIG. 1—WIRING DIAGRAM—MODEL 636

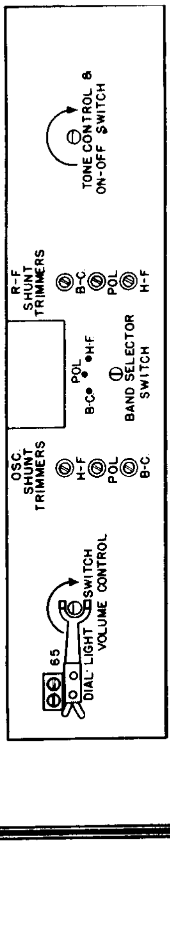


Fig. 4. Front View 636

PARTS LIST—MODEL 636

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1ABC	W —37922	Dial Light
	G3 —37965	Dial Light Bracket Assembly
2	G18 — 28067	Choke—L-F. "A" Filter
3	G1 —24234	Choke—H-F. "B" Filter
4	G44 —24628	Choke—L-F. "B" Filter
5	G110—32000	Ant. Coil B-C-B.
6	G111—32000	Ant. Coil Pol.-B.
7	G112—32000	Ant. Coil H-F-B.
8	G106—32004	1st. I-F Assembly
9	G105—32004	2nd I-F Assembly
10	G98 —32002	Osc. Coil B-C-B.
11	G99 —32002	Osc. Coil Pol.-B.
12	G107—32002	Osc. Coil H-F-B.
13	G76 —32001	R-F. Coil B-C-B.
14	G77 —32001	R-F. Coil Pol.-B
15	G78 —32001	R-F. Coil H-F-B.
16Z, 16Y	W —37778	Condenser 12. Mf. 25 V., 12. Mf. 25 V. Electrolytic
17A	W —36057	Condenser 40. Mf. 300 V. Electrolytic
17B	W —36057	Condenser 40. Mf. 300 V. Electrolytic
18A	W —38433	Condenser .5 Mf. 160 V. Tubular
18B	W —38433	Condenser .5 Mf. 160 V. Tubular
19	W —37173	Condenser .25 Mf. 300 V. Tubular
20	G3 —34000	Condenser .002200 Mica.
21	G2 —34002	Condenser .0001 Molded
22A	G1 —34002	Condenser .00025 Molded
22B	G1 —34002	Condenser .00025 Molded
23	W —37214	Condenser .001 Mf. 1000 V. Oil Sealed
24A	W — 36541	Condenser .02 Mf. 160 V.
To		
24G	W —36541	Condenser .02 Mf. 160 V.
25	W —35139	Condenser .004 Mf. 400 V.
26	W — 22688	Condenser .1 Mf. 400 V.
27	W —32780	Condenser .05 Mf. 400 V.
28	—37874	Double Osc. Series Trimmer
29	W —35951A	3 Section Shunt Trimmer Cond. Assy.
30	G50 —33002	3 Section Var. Tuning Condenser
	MG43—41118	Dial Assembly Complete
	D —41629	Dial
	—41135	Mask
	—40185	Long Hand
	—41145	Short Hand
	—41157	Drive Belt
	—40537	Coupling Unit
	—40486	Pointer Screw
	—40538	Indicator Control Cable
31	MG21—41118	Battery Cable & Clips
	—34903	Pos. (+) Clip
	—34904	Neg. (—) Clip
32	G8 —35696	Speaker Cable
33	—38428	Resistor 4500 Ohm ¼W. Ins.
34	—36317	Resistor 10,000 Ohm ¼W. Ins.
35A	—37485	Resistor 15,000 Ohm ½W. Car.
35B	—37485	Resistor 15, 000 Ohm ½W. Car.
36	—33390	Resistor 30,000 Ohm ¼W. Car.
37	—40757	Resistor 50,000 Ohm ¼W. Ins.
38	—35929	Resistor 150,000 Ohm ¼W. Ins.
39	—34020	Resistor 250,000 Ohm ¼W. Ins.
40	—36321	Resistor 400,000 Ohm ¼W. Ins.
41A	—36322	Resistor 500,000 Ohm ¼W. Ins.
41B	—36322	Resistor 500,000 Ohm ¼W. Ins.
42	—36688	Resistor 3 Megohm ¼W. Ins..
43	26578	Resistor 5 Megohm ¼W. Car.
44	W — 41202	Resistor 15 Ohm 1. W. Flexible
45	W —21965	Resistor 375 Ohm 1. W. Flexible
46	W —36176	Resistor 1.3 Megohm ¼W. Ins.
47	W —35581	Resistor 1000 Ohm ¾W. Flexible
48A	G88 —28807	Socket Type 15
48B	G88 —28807	Socket Type 15
48C	G88 —28807	Socket Type 15
49	G44 —28807	Socket Type 19
50	G92 —28807	Socket Type V1B
51	G47 —28807	Socket Type 6A7
52	G48 — 28807	Socket Type 6B7
	W —37981A	Tube Shield Base
	W 40911	Tube Shield
53	—42PJ-4	Speaker Spec. R-8000 B1
	—41452	Speaker Cone Assy. (Mtg. Ring 41459)
	— 41455	Speaker Output Transformer for Above Speaker
54	C —40910	Band Selector Switch
55	G27 26719	Ant. & Gnd. Terminal Assembly
56Z, 56Y	41627	Tone Control, On-off Switch
57	G47 —24628	Audio Transformer
58	G4 —31618	Power Transformer
59	W —28621	Condenser .02 Mf. 200 V.
60	W 37215	Vibrator
	W 37225	Vibrator Cover
	W —33312A	Vibrator Sleeve
61	—37967	Volume Control 1 Megohm.
62	W —28621	Condenser .02 Mf. 200 V.
64	W —25435	Condenser .003 Mf. 400 V.
65	W —41068A	Dial Light Switch
66	G8 —34000	Condenser .0015 Mf. Mica
67	W —24049B	Condenser .1 Mf. 200 V.
68	—41369	H-F. Osc. Series Trimmer
69A	—35602	Resistor 1. Megohm Ins.
69B	—35602	Resistor 1. Megohm Ins.
70	W —31103	10 Amp. Fuse
	W —33310A	Fuse Cover
	W —34223	Cover Insulator
	G2 —33339	Fuse Panel Assembly
	W — 4072	Thumb Screw
	C —37894	Escutcheon Ring
	B —37896A	Escutcheon Retaining Ring
	W —40365	Escutcheon Felt
	B —37898	Escutcheon Glass
	B —41659	Escutcheon Glass Retaining Ring
	W —40192B	Tail Knob (1)
	W —41605	Knob (2)
	W —41221	Upper V. C. & Dial Light Switch
	W —41222	Lower V. C. & Dial Light Switch

THE CROSLEY RADIO CORPORATION

MODEL 636

MODEL 636

SPECIFICATIONS

The Crosley Model 636 is a six-tube superheterodyne receiver designed for operation from a six-volt storage battery. It contains a completely shielded, built-in power supply unit which employs a self-rectifying type vibrator.

The tuning range of this receiver is from 540 to 18000 kilocycles and is divided into three bands as follows:

BLUE 540-1800 Kc. or 555-167 Meters (American Broadcast Band)
RED 1.8-6.0 Mc. or 167-50 Meters (Police and Amateur Band)
GREEN 6.0-18.0 Mc. or 50-17 Meters (High Frequency or Short Wave Band)

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and the chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with the volume control full on and no signal input. The filament voltages should be measured with an accurate low range D-C voltmeter (approximately 0 to 10 volts). Voltage limits may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	G	K	Ga	Go
15	R-F Amplifier	2.0	180	105	—	1.5	—	—
6A7	Oscillator-Mod.	6.0	180	95	—	3.5	120	-8.0
6B7	I-F Amp.-Diode Det.	6.0	180	95	—	3.0	—	—
15	A-F Amplifier	2.0	130	80	—	—	—	—
15	Audio Driver	2.0	180	—	—	—	—	—
19	Twin Output	2.0	180	—	—	—	—	—

"A" Battery Drain Approximately 2.8 Amperes at 6.0 Volts.
Power Output Approximately 2 Watts.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to P1 and the other terminal to P2 of the 19 Output tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier To 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A7 tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR OUTPUT LEAD AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Turn the band selector switch to the right (High Frequency Band).

(d) Set the signal generator to 450 kilocycles.

(e) Adjust the trimmers located on top of the 2nd I-F transformer for maximum output. Fig. 2.

(f) Adjust the trimmers located on top of the 1st I-F transformer for maximum output.

(g) Repeat operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R.F Amplifier.

When aligning the R-F amplifier the output lead from the signal generator is connected to the antenna ("A-1") terminal of the receiver through a .00025 mfd. condenser.

Each band should first be shunt aligned and then series aligned. The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated for each adjustment.

Adjust the "OSC", "R-F" and "ANT" shunt trimmers in the order given for maximum output. Tune the station selector to the signal generator for maximum output and then check the adjustments of the "R-F" and "ANT" trimmers in the order given. Do not readjust the "OSC" trimmer. NOTE: When aligning the High Frequency Band care must be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator approximately ten times and try to tune-in the signal at both the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles below the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct position.

To adjust the "series" trimmers (Illus. Nos. 68, 28Z and 28Y top view, Fig. 2) set the signal generator to the frequency indicated and then tune-in this signal with the station selector for maximum output. Adjust the "series" trimmer while rocking the tuning condenser back and forth slightly, until no further improvement in output can be obtained.

SIGNAL INPUT FREQUENCIES

		Shunt Alignment	Series Alignment
BLUE	(American Broadcast)	1700 Kc.	600 Kc.
RED	Police and Amateur)	6.0 Mc.	2.0 Mc.
GREEN	(High Frequency)	18.0 Mc.	6.0 Mc.

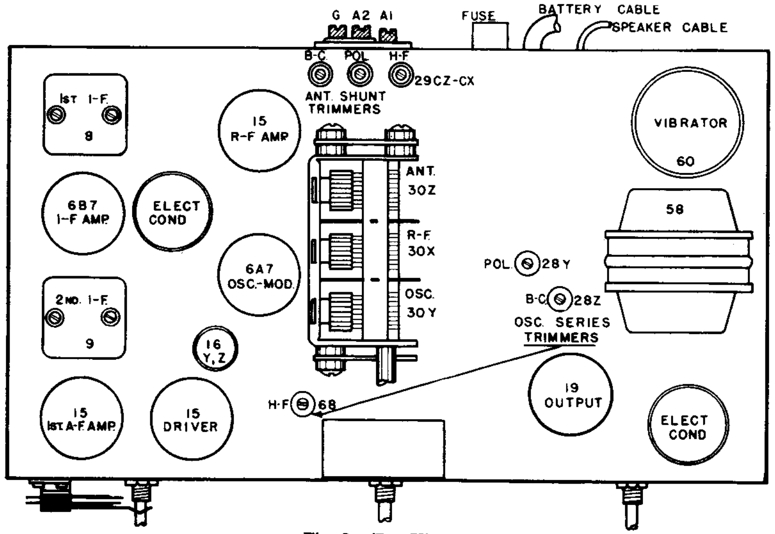


Fig. 2. Top View 636

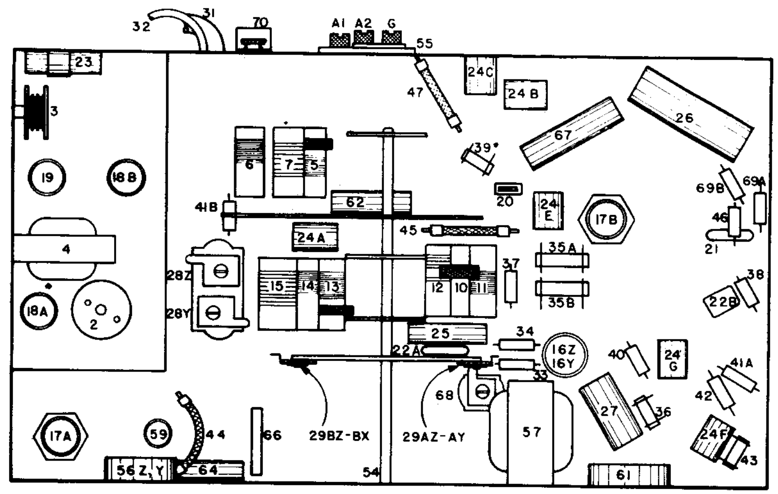
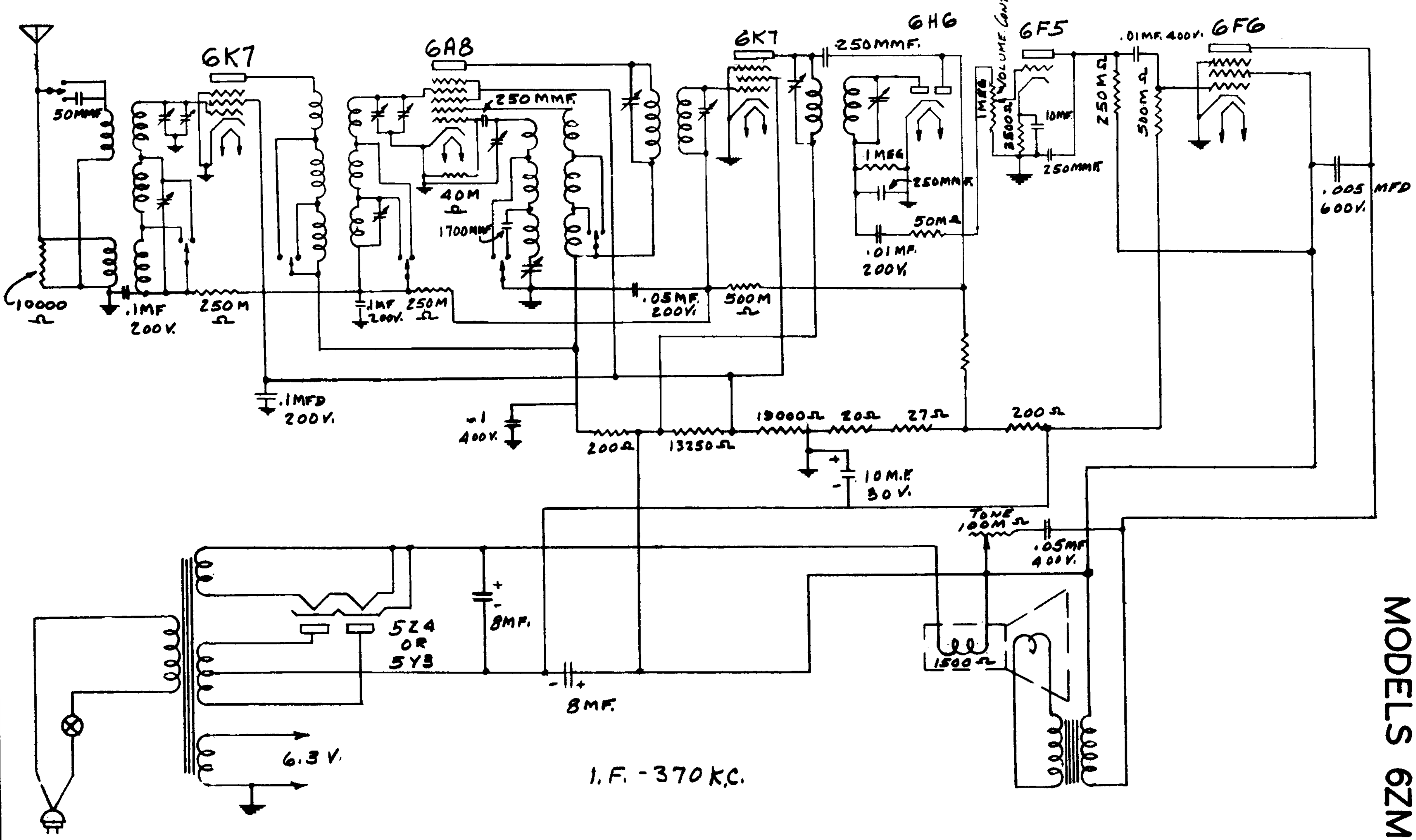


Fig. 3. Bottom View 636

DETROLA RADIO AND TELEVISION CORPORATION

MODELS 6ZM & 7ZM



RF Alignment

1. Couple Oscillator to antenna terminal, leaving band switch in broadcast position; set dial pointer and test oscillator to 1400 kc; adjust oscillator trimmer located on top of tuning condenser for maximum output.

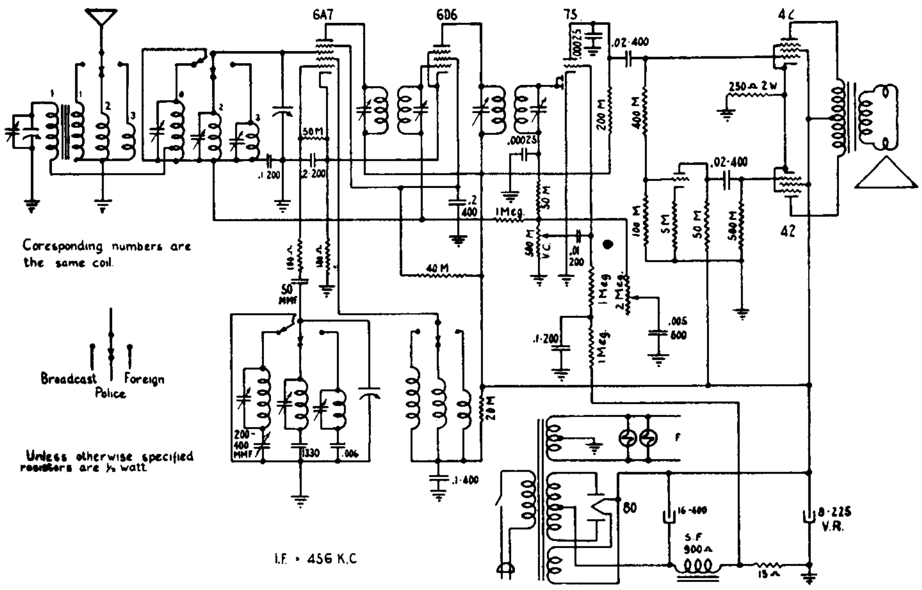
2. Turn band switch to "F" band and set dial pointer and test oscillator to 15 mc. Adjust antenna and R.F. trimmers located on top of tuning condenser for maximum output.

3. Reset band switch to broadcast position and set dial pointer and test oscillator to 140 kc; adjust antenna and R.F. trimmers located on top of antenna and R.F. coils for maximum output.

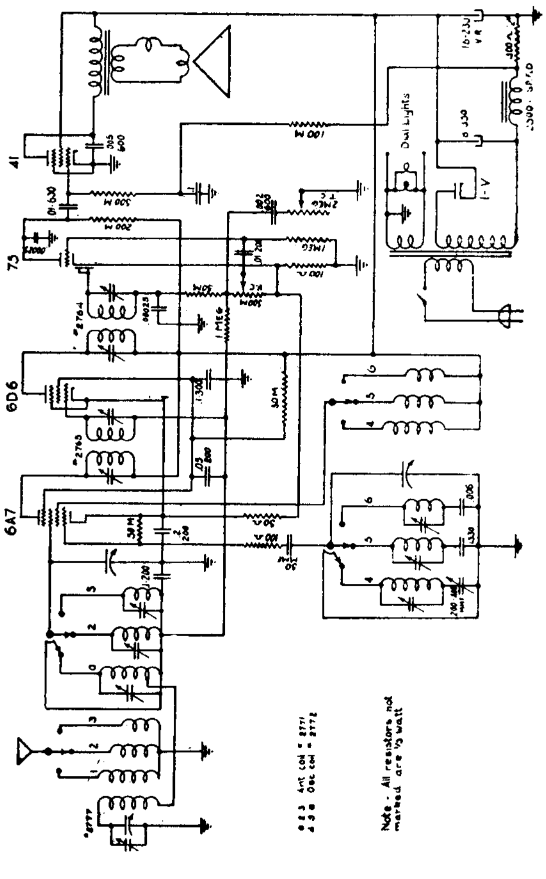
4. Set dial pointer and test oscillator to 600 kc. Adjust padding condenser located in bottom of chassis, near 6A8G tube socket for maximum output. Reset dial pointer and test oscillator to 1400 kc and readjust oscillator trimmer located on top of tuning condenser for maximum output. This completes all adjustments.

DETROLA RADIO AND TELEVISION CORPORATION

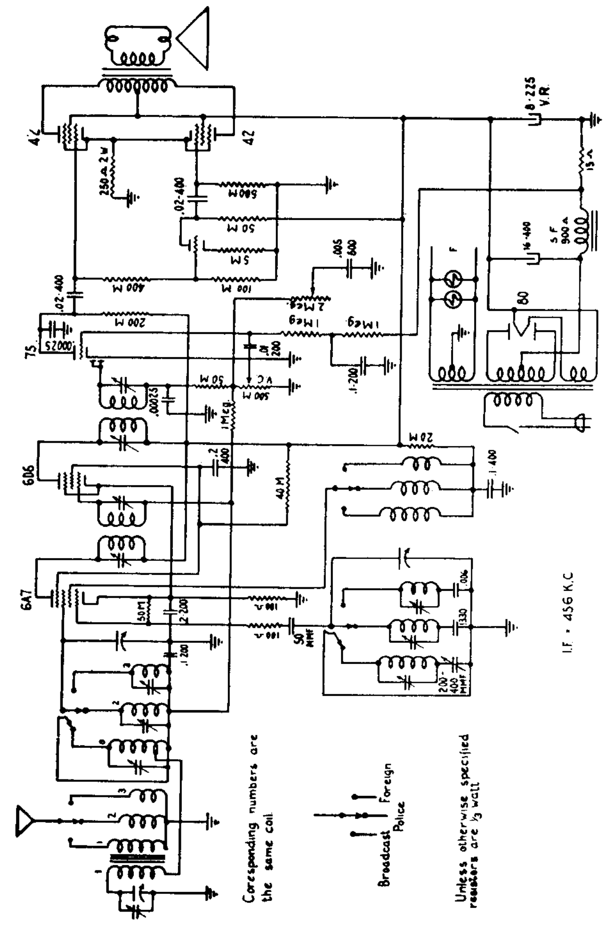
MODEL 147



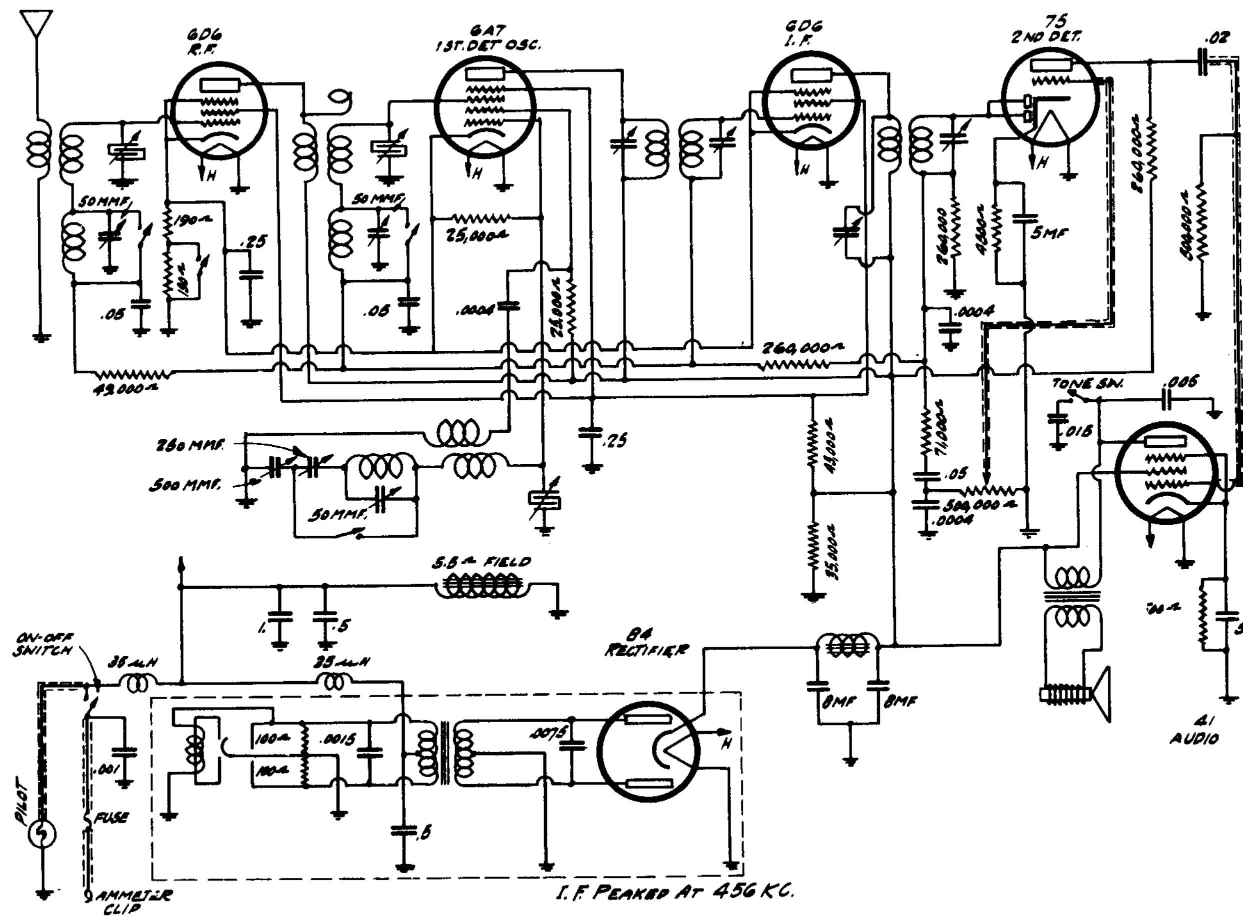
MODEL 139



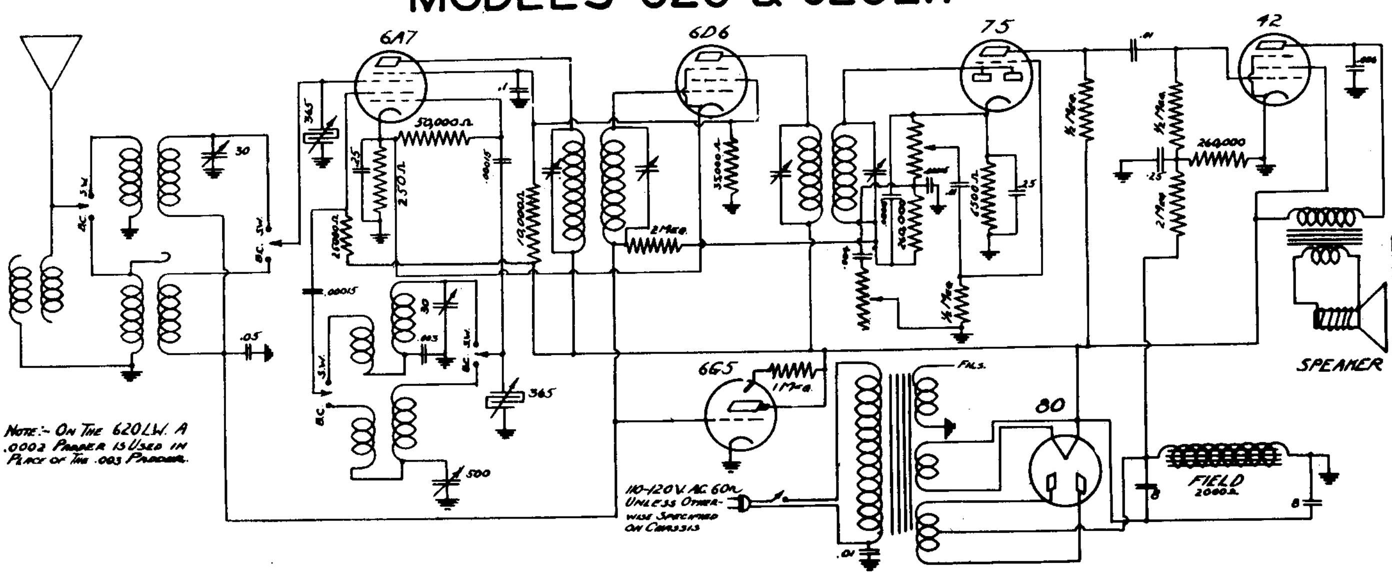
MODEL 127



DeWALD RADIO
MODEL 607



MODELS 620 & 620LW



SERVICE NOTES

I.F. ALIGNMENT - Intermediate Frequency Peaked At 456 K.C. Connect Test Osc. To Grid of 6A7 And Chassis. Short Circuit Stator of Front Section of Var. Cond. During This Operation. Then Peak I.F. Trimmers For Minimum Signal.

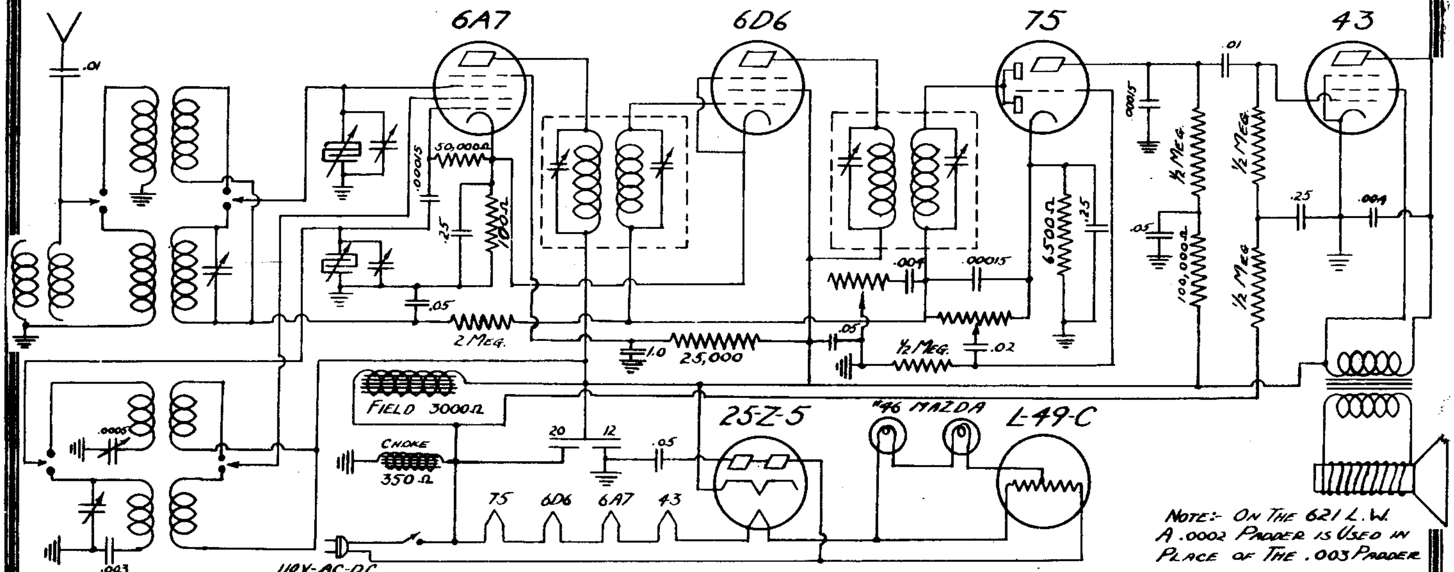
R.F. ALIGNMENT - Remove Short From Stator of Var. Cond. Turn Wave Band Switch To Broadcast. Connect Test Osc. To Antenna And Chassis Set Test Oscil. And Radio Dial To 1500 K.C. And Peak Var. Cond. Trimmers For Max. Signal. Set Test Oscil. At 600 K.C. And Adjust Padder Cond. on Top of Chassis For Max Signal. During This Operation The Var. Cond. Must Be Rocked. Readjust 1500 K.C.

SHORT WAVE ALIGNMENT - Turn W. B. Switch To Short Wave Set Test Oscil. And Radio Dial To 15 Megacycles And Peak Trimmers Near Center of Chassis For Max. Signal. Low Frequency Setting is Automatically Taken Care of By Short Wave Coils Which Are Carefully Matched For This Setting By A Fixed Calibrated Padder.

L.W. ALIGNMENT - Turn W.B. Switch To L.W. Set Osc. And Radio At 300 KC And Peak The L.W. Trimmers Then Set Osc. And Radio To 175 K.C. And Adjust Padder Cond. Recheck 300 K.C.

DeWALD RADIO

MODELS 621 & 621LW



NOTE:- ON THE 621 L.W. A .0002 PADDER IS USED IN PLACE OF THE .003 PADDER

SERVICE NOTES

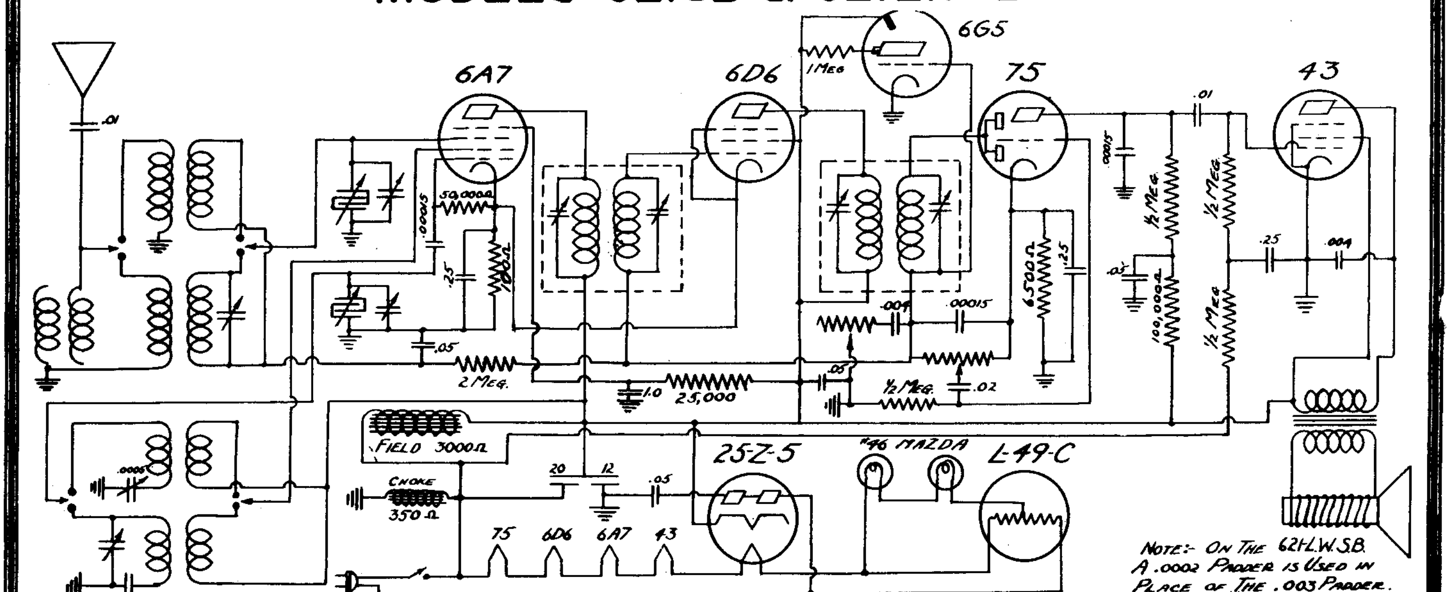
I.F. ALIGNMENT- INTERMEDIATE FREQUENCY PEAKED AT 456 K.C. CONNECT TEST OSCILLATOR TO GRID OF 6A7 AND CHASSIS. SHORT CIRCUIT STATOR OF FRONT SECTION OF VAR. COND. DURING THIS OPERATION. THEN PEAK I.F. TRIMMERS FOR MAXIMUM SIGNAL.

R.F. ALIGNMENT- REMOVE SHORT FROM STATOR OF VAR. COND. TURN WAVE BAND SWITCH TO BROADCAST. CONNECT TEST OSCILLATOR TO ANTENNA AND CHASSIS. SET TEST OSCILLATOR AND RADIO DIAL TO 1500 K.C. AND PEAK VAR. COND. TRIMMERS FOR MAXIMUM SIGNAL. SET TEST OSCIL. AT 600 KC. AND ADJUST PADDER CONDENSER ON TOP OF CHASSIS FOR MAX. SIGNAL. DURING THIS OPERATION THE VAR. COND. MUST BE ROCKED. READJUST 1500 K.C.

SHORT WAVE ALIGNMENT- TURN W.B. SWITCH TO SHORT WAVE. SET TEST OSC. AND RADIO DIAL TO 15 MEGACYCLES AND PEAK TRIMMERS NEAR CENTER OF CHASSIS FOR MAX. SIGNAL. LOW FREQ. SETTING IS AUTOMATICALLY TAKEN CARE OF BY SHORT WAVE COILS WHICH ARE CAREFULLY MATCHED FOR THIS SETTING BY A FIXED CALIBRATED PADDER.

L.W. ALIGNMENT- TURN W.B. SWITCH TO L.W. SET OSC. AND RADIO AT 300 KC. AND PEAK THE L.W. TRIMMERS. THEN SET OSC AND RADIO TO 175 K.C. AND ADJUST PADDER COND. RECHECK 300 KC.

MODELS 621SB & 621LWSB



NOTE:- ON THE 621 L.W.S.B. A .0002 PADDER IS USED IN PLACE OF THE .003 PADDER.

SERVICE NOTES

I.F. ALIGNMENT- INTERMEDIATE FREQUENCY PEAKED AT 456 K.C. CONNECT TEST OSCILLATOR TO GRID OF 6A7 AND CHASSIS. SHORT CIRCUIT STATOR OF FRONT SECTION OF VAR. COND. DURING THIS OPERATION. THEN PEAK I.F. TRIMMERS FOR MAXIMUM SIGNAL.

R.F. ALIGNMENT- REMOVE SHORT FROM STATOR OF VAR. COND. TURN WAVE BAND SWITCH TO BROADCAST. CONNECT TEST OSCILLATOR TO ANTENNA AND CHASSIS. SET TEST OSCILLATOR AND RADIO DIAL TO 1500 K.C. AND PEAK VAR. COND. TRIMMERS FOR MAXIMUM SIGNAL. SET TEST OSCIL. AT 600 KC. AND ADJUST PADDER CONDENSER ON TOP OF CHASSIS FOR MAX. SIGNAL. DURING THIS OPERATION THE VAR. COND. MUST BE ROCKED. READJUST 1500 K.C.

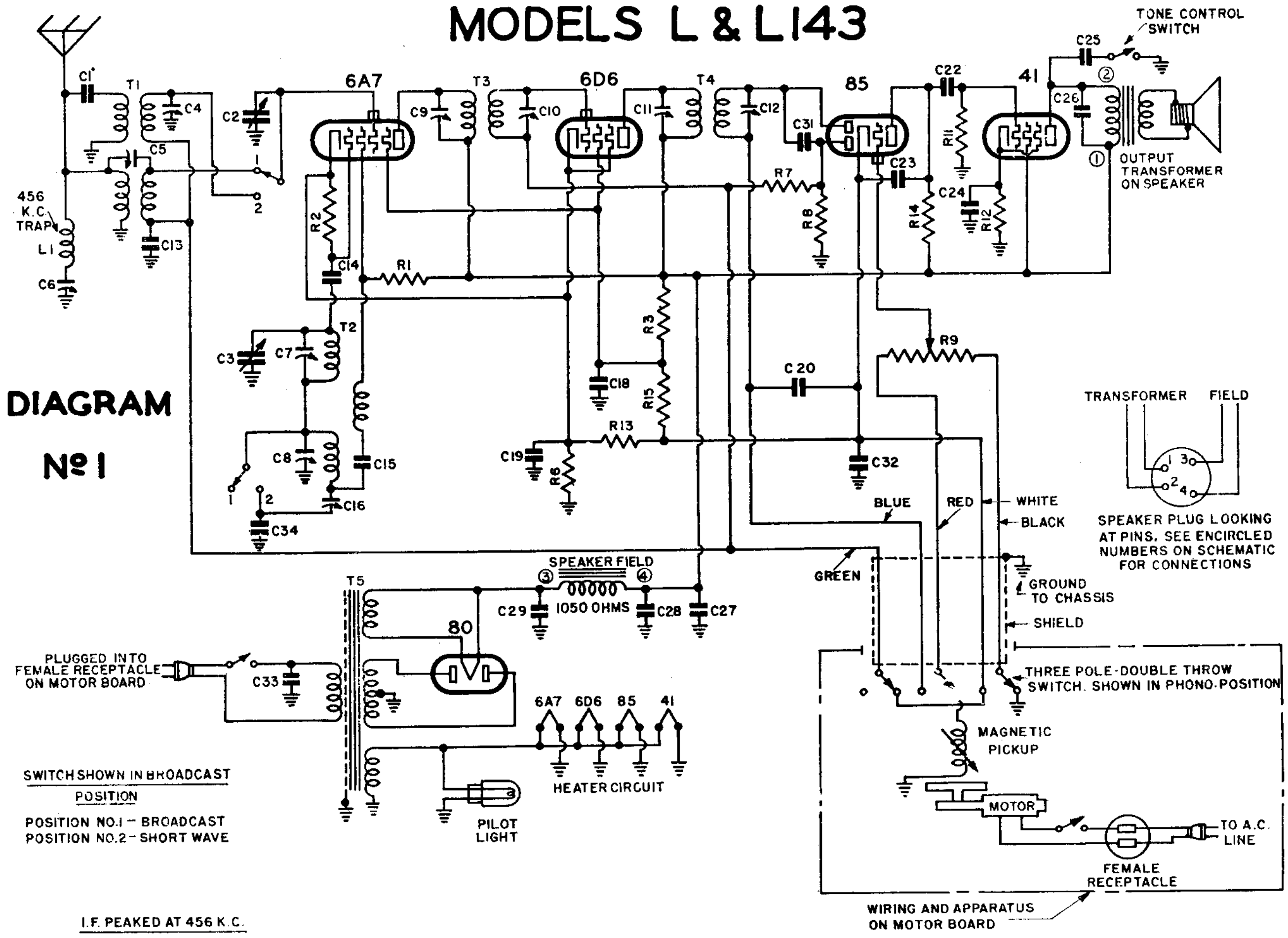
SHORT WAVE ALIGNMENT- TURN W.B. SWITCH TO SHORT WAVE. SET TEST OSC. AND RADIO DIAL TO 15 MEGACYCLES AND PEAK TRIMMERS NEAR CENTER OF CHASSIS FOR MAX. SIGNAL. LOW FREQ. SETTING IS AUTOMATICALLY TAKEN CARE OF BY SHORT WAVE COILS WHICH ARE CAREFULLY MATCHED FOR THIS SETTING BY A FIXED CALIBRATED PADDER.

L.W. ALIGNMENT- TURN W.B. SWITCH TO L.W. SET OSC. AND RADIO AT 300 KC. AND PEAK THE L.W. TRIMMERS. THEN SET OSC AND RADIO TO 175 K.C. AND ADJUST PADDER COND. RECHECK 300 KC.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS L & L143

DIAGRAM Nº 1



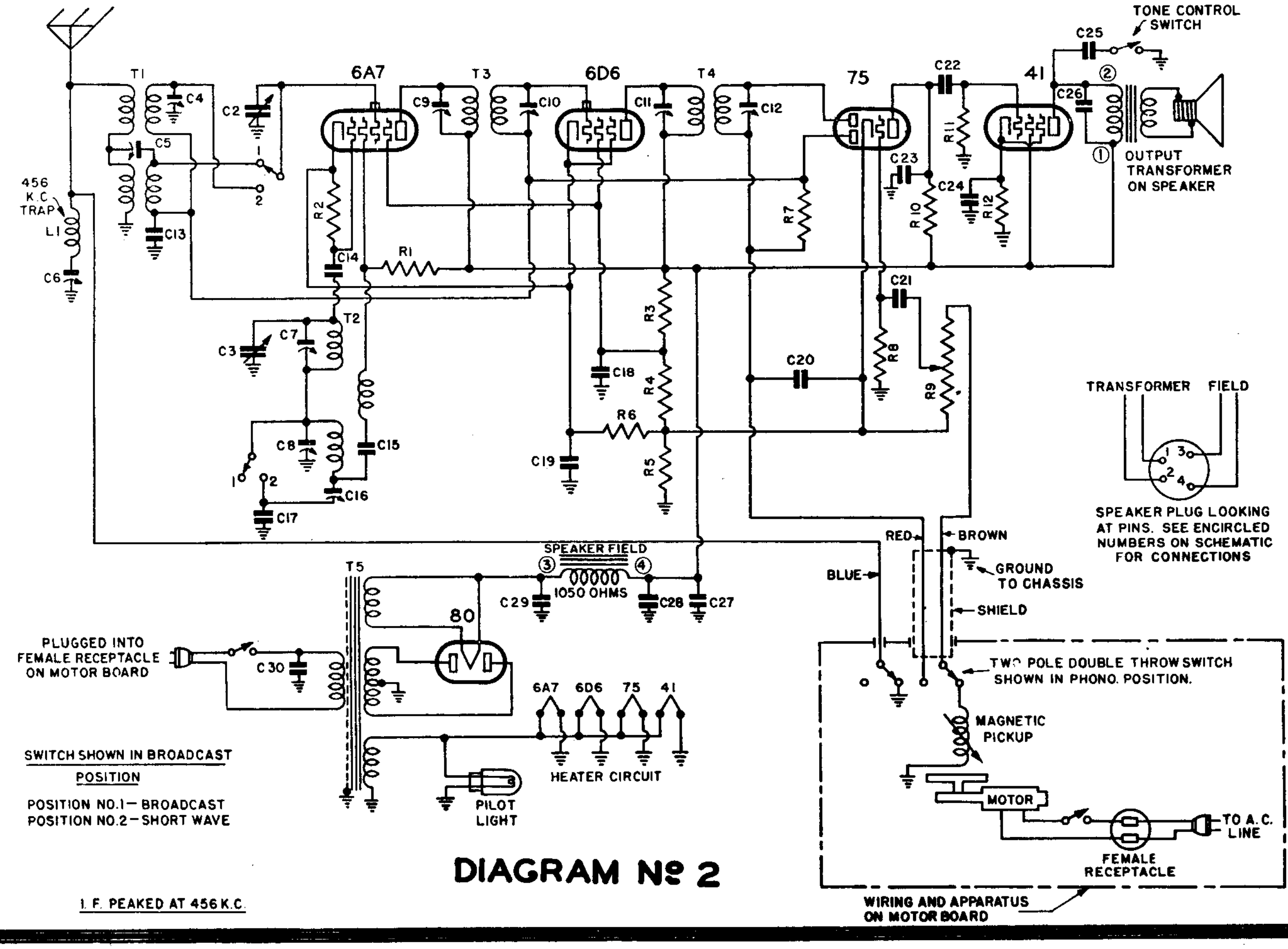


DIAGRAM Nº 2

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS L & L143

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600 and 6000 kc should be used.
An output meter should be used across the voice coil or output transformer for observing maximum response.
If the circuit is at all disturbed, both the broadcast and short-wave bands must be realigned.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The second i-f is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of the cans.

The 456 kc wave trap is located on top of the chassis deck between the 6A7 tube and the first i-f transformer.

The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the 6A7 tube) with the screw adjustment accessible through a hole in the top of the chassis.

The antenna coils for the broadcast and short-wave bands are wound on one form and mounted underneath the chassis deck directly behind the adjustable padding condenser. The trimmers for these coils are also accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the short-wave antenna trimmer. The trimmer farthest from the front of the chassis is the broadcast antenna trimmer.

The oscillator coils for the broadcast and short-wave bands are wound on one form and mounted underneath the chassis deck near the variable condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is for the short-wave oscillator coil and the trimmer farthest from the front is for the broadcast oscillator coil.

I-f and Wave-trap Alignment

Rotate the wave-band switch to the broadcast position, clockwise. Set the variable condenser at the minimum capacity position and feed 456 kc to the grid cap of the 6A7 tube. Adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna lead and adjust the wave-trap trimmer (mounted on wave-trap) for *minimum response*. (See paragraph 7 under General Notes.)

Short-wave Alignment (Alignment of the short-wave band should precede broadcast alignment)

Use a 400 ohm dummy antenna (a 400 ohm resistor in series with the test oscillator antenna lead) in aligning the short-wave coils. Rotate the wave-band switch to the short-wave position (counter-clockwise) and set the dial pointer exactly at 6 megacycles. Feed 6000 kc and adjust the short-wave oscillator trimmer (closest to front beside the variable condenser) for maximum response and then adjust the antenna trimmer (left side of top of chassis, closest to front). Be very careful to choose the minimum capacity peak on the oscillator trimmer. (See General Instructions below.)

Broadcast Alignment

Use a standard dummy antenna in aligning the broadcast coils. (A .0002 condenser may be used as a substitute.) Rotate the wave-band switch to the broadcast position, clockwise. Set the dial pointer at 600 and feed 600 kc. Adjust the broadcast series padder (in corner near 6A7 tube) for maximum response. Move the dial pointer to 1600 and feed 1600 kc. Adjust the broadcast oscillator trimmer (farthest from front beside the variable condenser) for maximum response and then adjust the broadcast antenna trimmer (farthest from front at left side of chassis). Return pointer to 600, feed 600 kc and readjust the broadcast series padder, rocking the variable condenser (rotate the variable condenser shaft back and forth through a small arc) for maximum response.

GENERAL INSTRUCTIONS

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Always use as weak a test signal as possible during alignment.

Tube Data

The tube complement is as follows:
- 1—6A7, oscillator-modulator
- 1—6D6, i-f amplifier
- †1—75, diode detector, a.v.c., a-f amplifier
- 1—41, power output pentode
- 1—80, full-wave rectifier.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis). Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	255	90	3.5	170	6.3 a.c.
6D6	255	90	3.5	—	6.3 a.c.
†75	120	—	1.8	—	6.3 a.c.
41	240	255	15.0	—	6.3 a.c.

B plus at filament of 80 tube—325 volts.
Voltage across speaker field—70 volts.

†Receivers bearing serial numbers below 895,962 used a type 85 second detector. The voltage readings at the 85 socket are as follows: Plate 37, Cathode 5.5, Fil. 6.3 a.c.

REPLACEMENT PARTS LIST

*Item Schematic No. 1	*Item Schematic No. 2	Part No.	DESCRIPTION	List Price ea. Effective as of Aug. 1st, 1936 PRICE
L1	L1	MMT-149	456 kc adjustable wave-trap	$ .50
T1	‡T1	2NT-226	Two-band antenna coil	1.65
T2	T2	2NT-227	Two-band oscillator coil	1.35
T3	T3	2NT-230	456 first i-f transformer	1.35
T4	T4	2NT-231	456 kc second i-f transformer	1.35
T5	T5	2NT-233	Power transformer	4.05
R1	R1	LR-60	20,000 ohm 1/4 watt carbon resistor	.16
R2	R2	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R3	R3	BR-12	25,000 ohm 1 watt carbon resistor	.16
—	R4	3LR-265	40,000 ohm 1/2 watt carbon resistor	.16
—	R5	3ER-262	75 ohm 1/2 watt wire-wound resistor	.16
R6	R6	IIR-130	150 ohm 1/2 watt wire-wound resistor	.16
R7, R8	R7, R8	KR-57	1 megohm 1/4 watt carbon resistor	.16
R9	R9	2NR-214D	Volume control with line switch—250,000 ohm	1.20
—	R10	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R11	R11	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R12	R12	CCR-118	450 ohm 1 watt wire-wound resistor	.16
R13	—	FFR-126	500 ohm 1/2 watt wire-wound resistor	.16
R14	—	KR-54	100,000 ohm 1/4 watt carbon resistor	.16
R15	—	2NR-217	40,000 ohm 1 watt carbon resistor	.16
C1	‡—	AAC-106A	0.00005 mf mica condenser	.20
C2, C3	C2, C3	3EC-284	Two-gang variable condenser	3.65
†C4, C5	†C4, C5	—	Trimmer, part of 2NT-226 coil assembly.	
†C6	†C6	—	Trimmer, part of MMT-149 wave-trap assembly.	
†C7, C8	†C7, C8	—	Trimmer, part of 2NT-227 oscillator coil assembly.	
†C9, C10	†C9, C10	—	Trimmer, part of 2NT-230, first i-f transformer assembly.	
†C11, C12	†C11, C12	—	Trimmer, part of 2NT-231 second i-f transformer assembly.	
C13, C18	C13, C18	BC-12	0.05 mf, 200 volt tubular condenser	.20
C15	C15	KC-58	0.01 mf, 400 volt tubular condenser	.20
C16	C16	2NC-231	Single adjustable padding condenser—Range 300 to 600 mmf	.50
—	‡C17	3LC-327	0.0018 mf mica condenser	.30
C19	C19	BC-13	0.25 mf, 200 volt tubular condenser	.20
C20, C31	C20	AC-7A	0.00025 mf mica condenser	.20
—	C21	CCC-127	0.01 mf, 200 volt tubular condenser	.20
C22	C22	LC-65	0.02 mf, 400 volt tubular condenser	.20
C23	C23	IC-47	0.0005 mf mica condenser	.20
C24	C24	IC-43A	5 mf, 25 volt tubular dry electrolytic condenser	.90
C25	C25	2TC-189	0.015 mf, 1000 volt tubular condenser	.20
C26	C26	ZC-115	0.006 mf, 1000 volt tubular condenser	.20
C27	C27	EEC-132	0.1 mf, 400 volt tubular condenser	.20
C28	C28	2NC-247	16 mf, 405 volt wet electrolytic condenser	1.20
C29	C29	2NC-246	16 mf, 450 volt wet electrolytic condenser	1.20
—	C30	3LC-297A	0.01 mf, 400 volt molded type paper condenser	.20
C32	—	AC-6	0.1 mf, 200 volt tubular condenser	.20
C33	—	3LC-297	0.01 mf, 250 volt a.c. tubular condenser in metal container	.30
C34	—	2NC-230	0.00135 mf mica condenser	.30
		2NS-122	6½" dynamic speaker	5.60
		TTS-111K	Wave-band switch	.60
		2TS-145E	Tone control switch	.35
		XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
		2NZ-364	Dial face	.75
		3CZ-336A	Dial drive belt	.10
		3CZ-337	Dial drive shaft and pulley	.10
		3CZ-339	Idler pulley	.05
		3CZ-340	Idler pulley spring	.05
		3CZ-341	Condenser shaft pulley	.10
		3FZ-353	Dial pointer	.10
		3CZ-350	Escutcheon with crystal	1.05
		3LPM-2	Phonograph motor with speed indicator and accessories	27.25
		3LPM-3	Phonograph motor complete with accessories	23.45
		3GZ-429	Magnetic pick-up (high impedance type)	19.50
		3GZ-429A	Magnetic pick-up (high impedance type) with pick-up rest, part No. 3GZ-422	14.95
		3LS-232	On-off switch for phonograph motor	.70
		3LS-211	Phono-Radio switch	1.00
		3LM-253	Phonograph needle cup	.20
		3LM-255	Phonograph needle cup cover	.15

When ordering replacement parts specify part numbers.

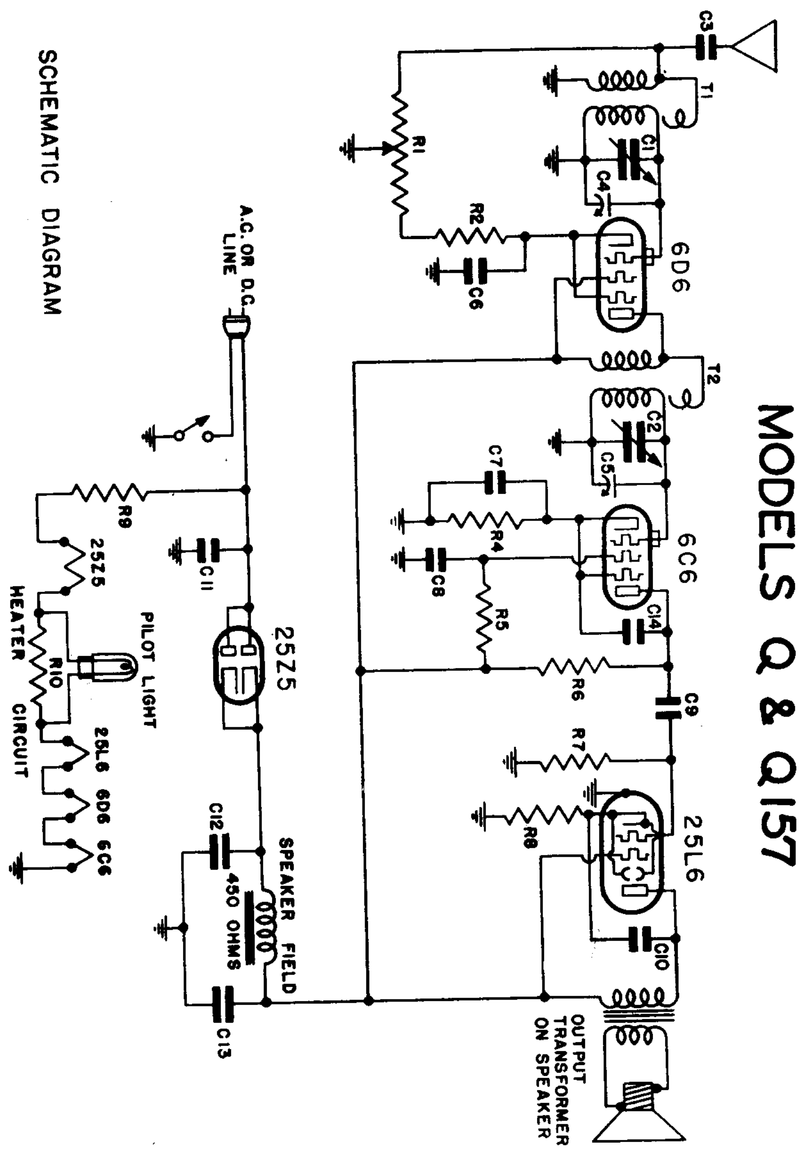
*Item number locates the article on the schematic diagram.
†These condensers are part of coil assemblies and will not be supplied separately.
‡See Production Changes, paragraph 3.

PRODUCTION CHANGES

1. Schematic No. 1 applies to receivers bearing serial numbers below 895,962.
2. Schematic No. 2 applies to receivers bearing serial numbers above 895,962.
3. In receivers bearing serial numbers below 961,900:
   a. The two primaries of the antenna coil, T1, were in parallel from antenna to ground and a 0.00005 mf mica condenser was in series with the antenna lead and the short-wave primary.
   b. C17 was an 0.00135 mf mica condenser.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS Q & Q157



SCHEMATIC DIAGRAM

TUBE DATA

The tube complement is as follows:
1—6D6, r-f amplifier.
1—6C6, biased detector.
1—25L6, beam power output.
1—25Z5, dual half-wave rectifier.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with volume control turned on full and no signal. The line voltage for these readings was 117.5 volts, 60 cycles, a-c.

Tube	*Plate*	*Screen*	*Cathode*	*Fil.*
6D6	100	100	2.8	6.3
6C6	30	15	1.4	6.3
25L6	93	100	5.7	25.0

Voltage across speaker field—30 volts.
25Z5 cathode to ground—130 volts.

ALIGNMENT PROCEDURE

An oscillator with a frequency of 1400 kc. is required.

Use as weak a test signal as possible. An output meter should be used across the voice coil or output transformer for observing maximum response.

Rotate variable condenser to the maximum capacity position and set the pointer at the next calibration mark above 55. Then rotate the variable condenser until the pointer is at 140 and feed 1400 kc to the antenna through a standard dummy antenna (a .0001 mf mica condenser may be used as a substitute), adjust both trimmer condensers on the variable condenser for maximum response.

REPLACEMENT PARTS

*ITEM	PART NO.	DESCRIPTION	List Price ea. Effective as of May 1st, 1937 (Subject to change without notice) PRICE
T1	2VT-241B	Broadcast antenna coil	$ .60
T2	3QT-344	Broadcast detector coil	.55
R1	2VR-219D	Volume control—75,000 ohms	1.00
R2	3RR-276	310 ohm ½ watt wire-wound molded resistor	.16
R4	OR-73	250,000 ohm ¼ watt carbon resistor	.16
R5	HR-42	2 megohm ¼ watt carbon resistor	.16
R6	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R7	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R8	3QR-297	110 ohm ½ watt wire-wound resistor	.16
R9		185 ohm 17 watt resistor in line cord (see KKW-46A below)	
R10	2DR-213	40 ohm metal clad wire-wound resistor	.30
C1, C2	3QC-332	Two gang variable condenser	2.45
C3	NNC-199	0.001 mf roll type condenser	.20
†C4, C5		Trimmer part of variable condenser	
C6, C8	AC-6	0.1 mf, 200 volt roll type condenser	.20
C7	BC-13	0.25 mf, 200 volt roll type condenser	.20
C9	LC-65	0.02 mf, 400 volt roll type condenser	.20
C10	EC-23	0.03 mf, 400 volt roll type condenser	.20
C11	2VC-242A	0.1 mf, 400 volt molded type paper condenser	.20
C12, C13	3QC-338	Dual 16 mf, 100 volt dry electrolytic condenser	1.05
C14	EC-24A	0.0001 mf mica condenser	.20
	3QS-257A	5" dynamic speaker	4.85
	XL-9	Pilot light, 6.3 volt .25 amp., Mazda No. 46	.20
	KKW-46A	Line cord with built-in resistor (R9)	1.05
	3QZ-527	Condenser pulley	.15
	3QZ-528	Pointer pulley	.10
	3RZ-484	Drive cord	.02
	3RZ-519	Drive cord spring	.02
	3QZ-530	Dial pointer	.20
	3QZ-525	Wire screen grille	.35

*Item number locates the article on the schematic diagram.
†These trimmers cannot be supplied separately.

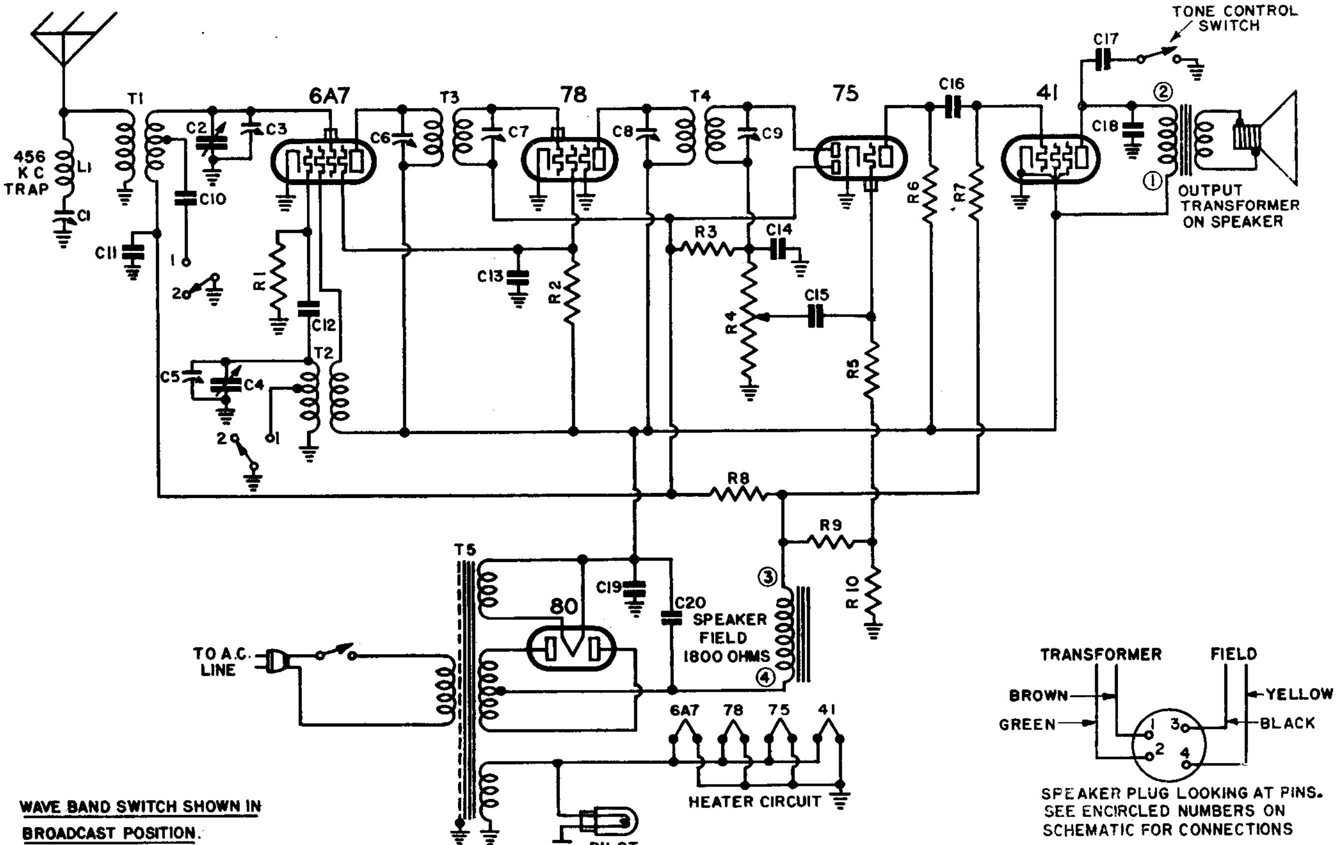
WHEN ORDERING REPLACEMENT PARTS SPECIFY PART NUMBERS

PRODUCTION CHANGES

1. In receivers bearing serial numbers below 1,200,686 the speaker was part No. 3QS-257.
2. In receivers bearing serial numbers below 1,203,000
   a) C10 was returned to B plus instead of the 25L6 cathode as shown on the schematic diagram.
   b) A 250,0)0 ohm ¼ watt carbon resistor was connected from the cathode of the 6D6 to B plus.
   c) C14 was returned to ground instead of the 6C6 cathode as shown on the schematic diagram.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS R-R152-R153-R156-R158



WAVE BAND SWITCH SHOWN IN BROADCAST POSITION.
POSITION NO. 1 – POLICE
POSITION NO. 2 – BROADCAST

I.F. PEAKED AT 456 K C

*Item	Part No.	DESCRIPTION	List Price ea. Effective as of Dec. 3rd, 1936 (Subject to change without notice) PRICE
L1	MMT-149A	456 kc wave-trap	$ .60
T1	3RT-318	Two-band antenna coil	.85
T2	3RT-319A	Two-band oscillator coil	.80
T3	3RT-320	456 kc first i-f transformer	1.10
T4	3RT-321	456 kc second i-f transformer	1.10
T5	3RT-322	Power transformer	3.20
R1	KR-53U	50,000 ohm 1/4 watt carbon resistor	.16
R2	3LR-265U	40,000 ohm 1/2 watt carbon resistor	.16
R3	NNR-220U	3 megohm 1/4 watt carbon resistor	.16
R4	3FR-256A	Volume control with switch—500,000 ohms	1.00
R5	3RR-274U	5 megohm 1/4 watt carbon resistor	.16
R6	KR-55U	250,000 ohm 1/4 watt carbon resistor	.16
R7	KR-56U	500,000 ohm 1/4 watt carbon resistor	.16
R8	3RR-275U	10 megohm 1/4 watt carbon resistor	.16
R9	3RR-276	310 ohm 1/2 watt wire-wound resistor	.16
R10	3RR-266	23 ohm 1/2 watt wire-wound resistor	.16
†C1		Trimmer, part of 456 kc wave-trap assembly.	
C2, C5	3RC-317	Two-gang variable condenser	2.40
‡C3, C4		Trimmers, part of variable condenser.	
†C6, C7		Trimmers, part of first i-f transformer assembly.	
†C8, C9		Trimmers, part of second i-f transformer assembly.	
C10	AAC-114	0.001 mf mica condenser	.20
C11, C13	BC-12	0.05 mf, 200 volt tubular condenser	.20
C12	AAC-106A	0.00005 mf mica condenser	.20
C14	IC-47A	0.0005 mf mica condenser	.20
C15, C18	HC-34	0.006 mf, 600 volt tubular condenser	.20
C16	KC-58	0.01 mf, 400 volt tubular condenser	.20
C17	QQC-173	0.015 mf, 600 volt tubular condenser	.20
C19, C20	3RC-318	Dual 5 mf, 300 volt dry electrolytic condenser	1.00
	3RS-230	5" dynamic speaker	4.55
	3RS-248A	6" dynamic speaker	4.85
	3RS-231	Wave-band switch	.35
	2TS-145F	Tone control switch	.35
	3RM-270	Pointer shaft bearing plate	.05
	3RM-269	Dial plate	.20
	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
	3RB-38	Pilot light socket	.10
	3RZ-477	Dial face	.75
	3RZ-478	Condenser pulley	.15
	3RZ-479	Pointer pulley	.15
	3RZ-480	Drive cord spring	.02
	3FZ-353	Dial pointer	.10
	3CZ-350	Bronze escutcheon with crystal	1.05
	3CZ-350A	Brass escutcheon with crystal	1.05

When ordering replacement parts specify part numbers.

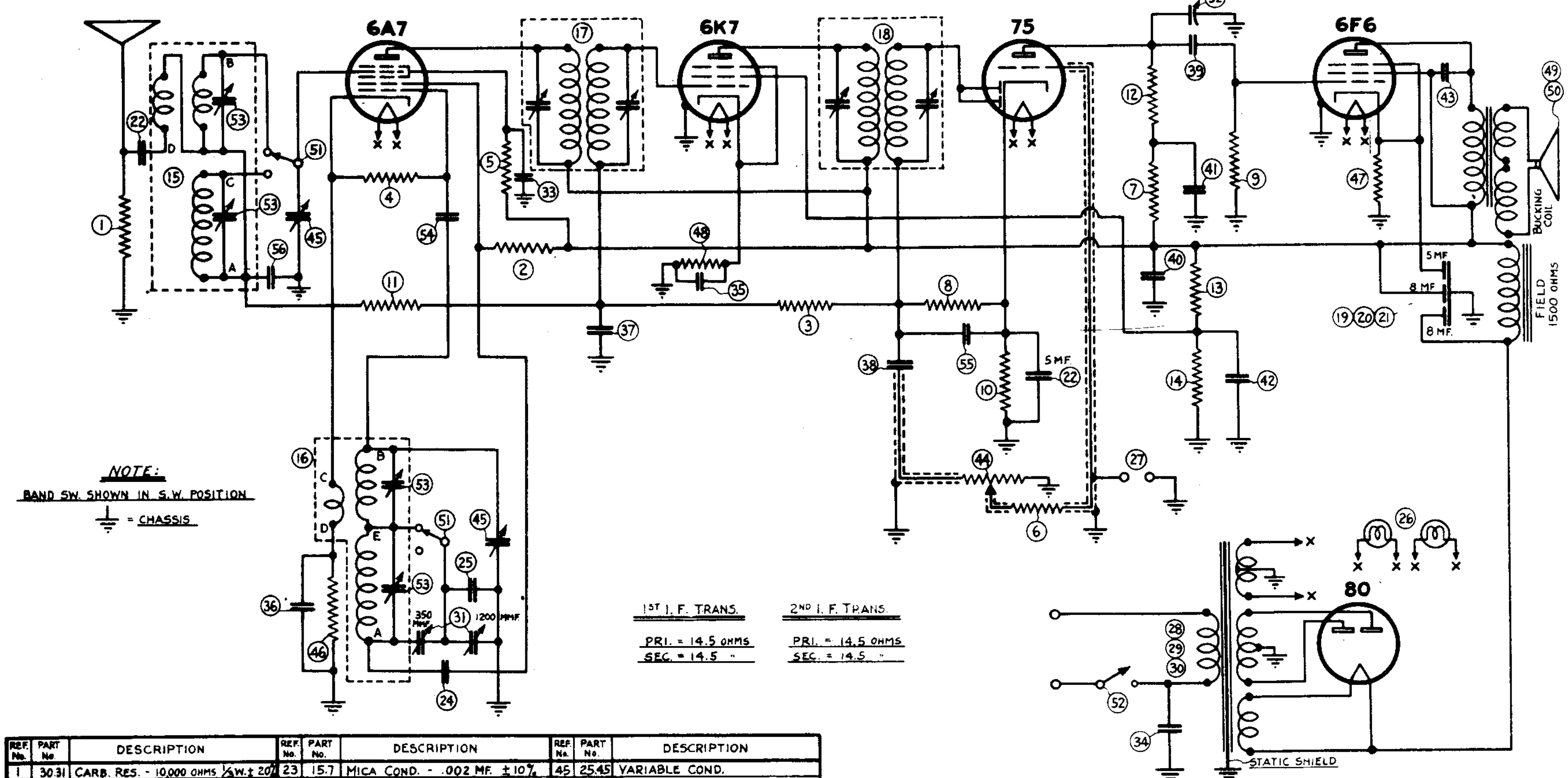
*Item number locates the article on the schematic diagram.
†These trimmers are part of coil assemblies and can not be supplied separately.
‡These trimmers are part of variable condenser and can not be supplied separately.

PRODUCTION CHANGES

On early receivers the oscillator coil was part number 3RT-319. When replacing this coil with the new coil, part number 3RT-319A, it will be necessary to remove the short length of shielding over the white lead (lead from wave-band switch to tap on coil).

FADA RADIO & ELECTRIC CO.

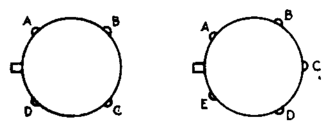
MODEL 150A



NOTE: BAND SW. SHOWN IN S.W. POSITION

= CHASSIS

1ST I. F. TRANS.	2ND I. F. TRANS.
PRI. = 14.5 OHMS	PRI. = 14.5 OHMS
SEC. = 14.5 "	SEC. = 14.5 "



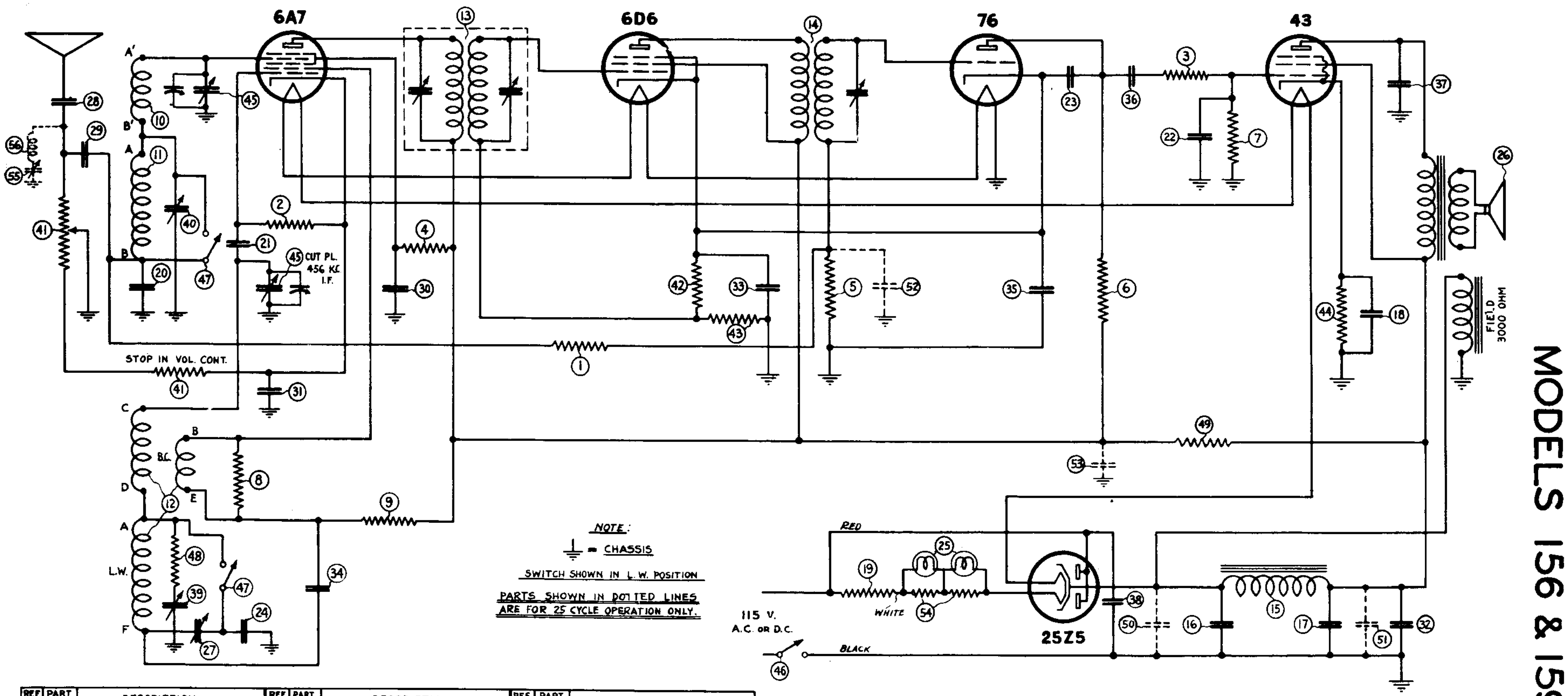
ANTENNA COIL	OSCILLATOR COIL
A-B = .025 OHMS	A-E = 4.04 OHMS
A-C = 4.64 "	B-E = .025 "
A-D = .295 "	C-D = .32 "

I.F. = 456 KC.

REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	30.31	CARB. RES. - 10,000 OHMS 1/2 W. ± 20%	23	15.7	MICA COND. - .002 MF. ± 10%	45	25.45	VARIABLE COND.
2	30.31	" " 10,000 " " "	24	15.7	" " .002 " "	46	30.45	CARB. RES. - 250 OHMS 1/4 W. ± 10%
3	30.22	" " 1 MEG. " "	25	15.22	" " .004 " "	47	30.46	" " 500 " 1/2 W. "
4	30.3	" " 50,000 " " 10	26	120.3	PILOT LIGHTS 6-8 V. .15 A.	48	30.48	" " 350 " 1/4 W. "
5	30.26	" " 50,000 " " 20	27	125.1	PHONO JACK	49	105.4	SPEAKER - (150 TA)
6	30.26	" " 50,000 " " "	28	40.29	POWER TRANS. - 115 V. 50-60~	50	105.27	" (150 CA)
7	30.26	" " 50,000 " " "	29	40.30	" " 25~	51	45.21	BAND SW.
8	30.23	" " 500,000 " " "	30	40.31	" " TAPPED PRI.	52		ON-OFF SW. ON VOL. CONT.
9	30.23	" " 500,000 " " "	31	25.43	PADDING COND. - 350 - 1200 MMF.	53		MIN. ADJ. ON COILS
10	30.12	" " 4,000 " " 10	32	55.5	TONE CONT.	54	15.3	MICA COND. .0001 MF. ± 10%
11	30.20	" " 250,000 " " 20	33	10.7	TUBULAR COND. - .05 MF. - 400 V.	55	15.1	" " .00025 " "
12	30.20	" " 250,000 " " "	34	10.7	" " .05 " "	56	15.6	" " .0025 " 3
13	30.13	" " 20,000 " 1 10	35	10.5	" " .05 " 200			
14	30.14	" " 50,000 " 1/2 10	36	10.5	" " .05 " "			
15	4579	ANTENNA COIL	37	10.5	" " .05 " "			
16	4581	OSCILLATOR COIL	38	10.4	" " .01 " "			
17	8879	1ST I.F. COIL	39	10.10	" " .01 " 400			
18	8880	2ND I.F. COIL	40	10.9	" " .1 " "			
19	20.33C	ELECTRO. COND. BLOCK - 8 MF. 450 W.V.	41	10.9	" " .1 " "			
20	20.33C	" " " 8 " " "	42	10.9	" " .1 " "			
21	20.33C	" " " 5 " 25 "	43	10.3	" " .006 " "			
22	20.33C	" " " 5 " " "	44	50.14	VOLUME CONT. - 1 MEG.			

FADA RADIO & ELECTRIC CO.

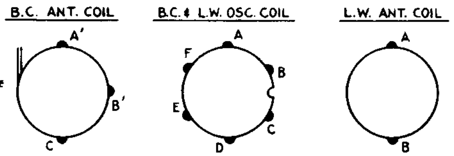
MODELS 156 & 159



NOTE:
⏚ = CHASSIS
SWITCH SHOWN IN L.W. POSITION
PARTS SHOWN IN DOTTED LINES ARE FOR 25 CYCLE OPERATION ONLY.

REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	30.20	CARB. RES. -250,000 OHM 1/3W. ±20%	23	15.2	MICA COND. -.0005 MFD. ± 10%	45	25.11	VARIABLE COND.
2	30.3	" " 50,000 " " " " 10%	24	1547	" " .0011 " " 3%	46		ON-OFF SW. ON VOLUME CONT.
3	30.3	" " 50,000 " " " " "	25	120.1	PILOT LIGHTS 6-8 V. .25 A.	47	45.8	BAND SWITCH
4	30.21	" " 30,000 " " " " 20%	26	105.21	SPEAKER - 3000 OHM	48	30.42	CARB. RES. -500 OHM - 1/3W ± 10%
5	30.22	" " 1 MEG " " " " "	27	25.41	PADDING COND. - 400 MMF.	49	30.30	CARB " 1,400 " - 1/3W. ± 10%
6	30.23	" " 500,000 " " " " "	28	10.18	TUBULAR COND. -.002 MMF. 200 V.	50	20.25	TUBULAR ELECTRO. COND. - 8 MF. - 100 W.V.
7	30.23	" " 500,000 " " " " "	29	10.18	" " .002 " " "	51	20.25	" " " 8 " " "
8	30.1	" " 5,000 " " " " 10%	30	10.5	" " .05 " " "	52	10.2	" COND. - .1 MF. - 200 V.
9	30.1	" " 5,000 " " " " "	31	10.5	" " .05 " " "	53	10.8	" " .25 " " "
10	4574	BROADCAST ANTENNA COIL	32	10.5	" " .05 " " "	54	115.13	PILOT LT. SHUNTING RES. -25-25 OHMS
11	4576	LONG WAVE " "	33	10.1	" " .35 " " "	55	25.50	TRIMMING COND. - 150 MMF.
12	4575	B.C. & L.W. OSCILLATOR "	34	10.4	" " .01 " " "	56	4697	WAVE TRAP COIL
13	7B79	D.T. I.F. COIL	35	10.4	" " .01 " " "			
14	4336	S.T. I.F. "	36	10.4	" " .01 " " "			
15	40.16	CHOKE COIL - 300 OHM	37	10.4	" " .01 " " "			
16	20.28	ELECTRO. COND. BLOCK - 16 MFD. 100 W.V.	38	10.7	" " .05 " 400 "			
17	20.28	" " " 16 " " "	39	25.38	TRIMMER - 10-60 MMF.			
18	20.28	" " " " 25 " "	40	25.14	" 3-30 "			
19	70.4	LINE RES. CORD - 140 OHMS	41	50.6	VOLUME CONT. - 10,000 OHM WITH 450 OHM STOP			
20	15.5	MICA COND. - .002 MFD. ± 3%	42	3045	WIRE RES. - 250 OHM - 1/4 ± 10%			
21	15.3	.0001 " " 10%	43	30.48	" " 350 " " "			
22	15.3	.0001 " " "	44	30.47	" " 625 " 1/2 "			

Ref. Nos. 49–53: FOR 25 CYCLE OPERATION ONLY
Ref. Nos. 55–56: OPTIONAL EQUIPMENT

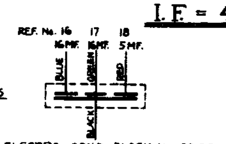


A'-B' = 4.9 OHMS

A-F = 13.4 OHMS
B-E = 1.8 "
C-D = 6.7 "

A-B = 18.5 OHMS

I.F. = 456 K.C.



ELECTRO. COND. BLOCK No. 20.28

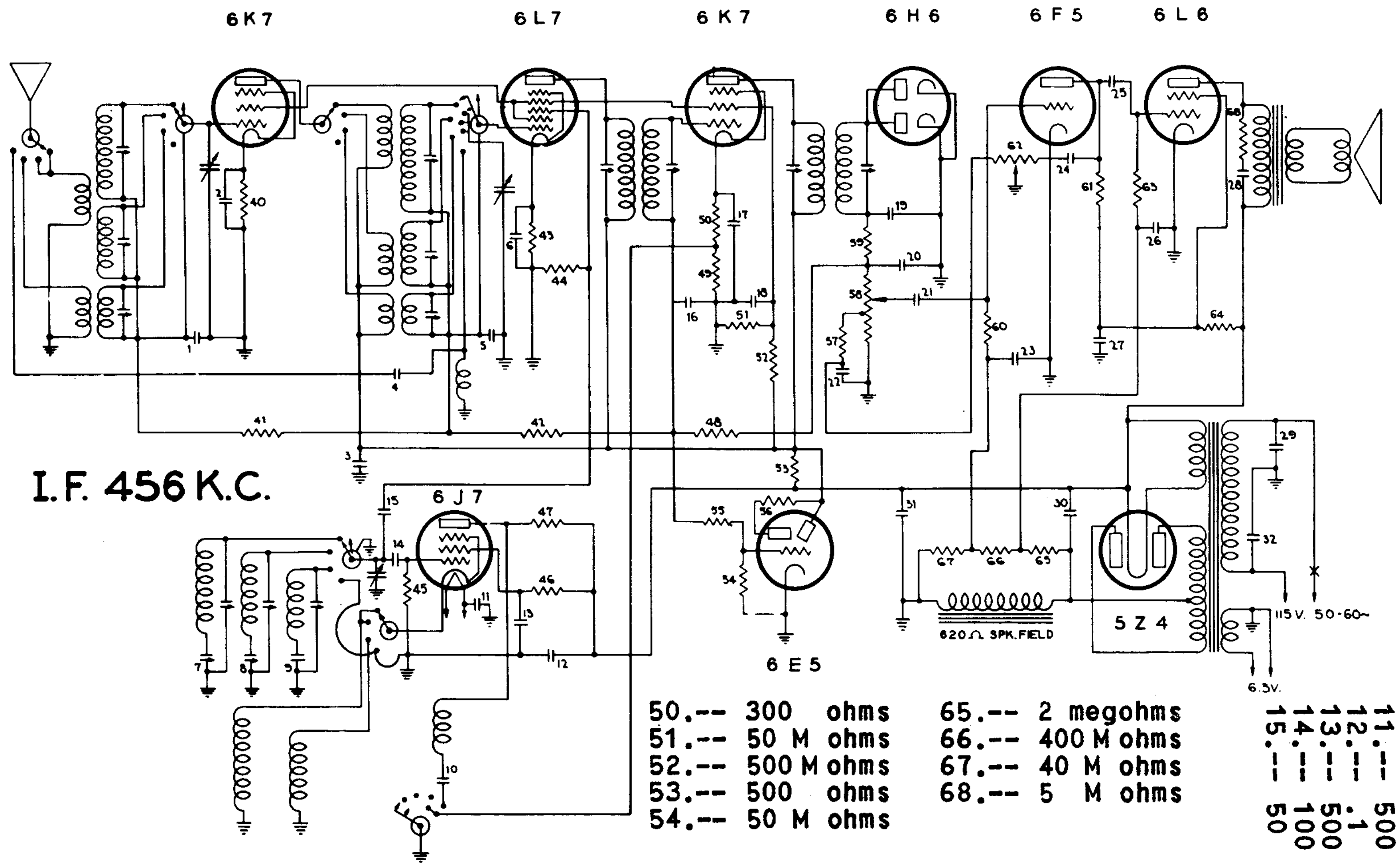
1ST I.F. TRANS.
PRI. = 16 OHMS
SEC. = 15.5 "

2ND I.F. TRANS.
PRI. = 24.5 OHMS
SEC. = 24.5 "

NOTE:
REF No. 19: - UP TO & INCL. CHASSIS SERIAL No. 30648, THIS WAS PART No. 115.7 (LINE RESISTOR 140-38-38 OHMS)

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODELS 91-91T4-91C4 & 91C5



I.F. 456 K.C.

40.--	300 M ohms	55.--	1 megohm
41.--	50 M ohms	56.--	1 megohm
42.--	500 M ohms	57.--	3 M ohms
43.--	500 ohms	58.--	500 M ohms
44.--	50 M ohms	59.--	50 M ohms
45.--	50 M ohms	60.--	500 M ohms
46.--	2 M ohms	61.--	250 M ohms
47.--	10 M ohms	62.--	500 M ohms
48.--	1 megohm	63.--	250 M ohms
49.--	2 M ohms	64.--	10 M ohms

50.--	300 ohms	65.--	2 megohms
51.--	50 M ohms	66.--	400 M ohms
52.--	500 M ohms	67.--	40 M ohms
53.--	500 ohms	68.--	5 M ohms
54.--	50 M ohms		

1.--	.05 mfd.	16.--	.05 mfd.
2.--	.05 mfd.	17.--	.05 mfd.
3.--	.1 mfd.	18.--	.1 mfd.
4.--	100 mfd.	19.--	100 mmfd.
5.--	.05 mfd.	20.--	100 mmfd.
6.--	.05 mfd.	21.--	.01 mfd.
7.--	750 mmfd.	22.--	.1 mfd.
8.--	1800 mmfd.	23.--	.25 mfd.
9.--	.004 mfd.	24.--	.03 mfd.
10.--	200 mmfd.	25.--	.01 mfd.

11.--	500 mmfd.	26.--	.25 mfd.
12.--	.1 mfd.	27.--	4 mfd.
13.--	500 mmfd.	28.--	.02 mfd.
14.--	100 mmfd.	29.--	.01 mfd.
15.--	50 mmfd.	30.--	16 mfd.
		31.--	30 mfd.
		32.--	.01 mfd.

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODELS 91-91T4-91C4 & 91C5

6K7 TUBE

OHMS	VOLTS	VOLTS	OHMS
50M	130	3.6	300
60M	250	0	2 MEG
.5	6.3	0	0
0	0	3.6	300

6L7 TUBE

OHMS	VOLTS	VOLTS	OHMS
50M	130	-.3	50M
60M	250	0	2 MEG
.5	6.3	0	0
0	0	5.5	500

6J7 TUBE

OHMS	VOLTS	VOLTS	OHMS
60M	300	0	0
70M	175	-2.2	50M
0	0	6.3	.5
0	0	0	1

6K7 TUBE

OHMS	VOLTS	VOLTS	OHMS
50M	130	8.5	2300
60M	250	0	1 MEG.
0	0	6.3	.5
0	0	8.5	2300

6H6 TUBE

OHMS	VOLTS	VOLTS	OHMS
0	0	-.35	500M
500M	-.35		
.5	6.3	0	0
0	0	0	0

6F5 TUBE

OHMS	VOLTS	VOLTS	OHMS
300M	120		
		.2	500M
.5	6.3	0	0
0	0		

6L6 TUBE

OHMS	VOLTS	VOLTS	OHMS
70M	265	-.1	750M
60M	275		
.5	6.3	0	0
0	0	0	0

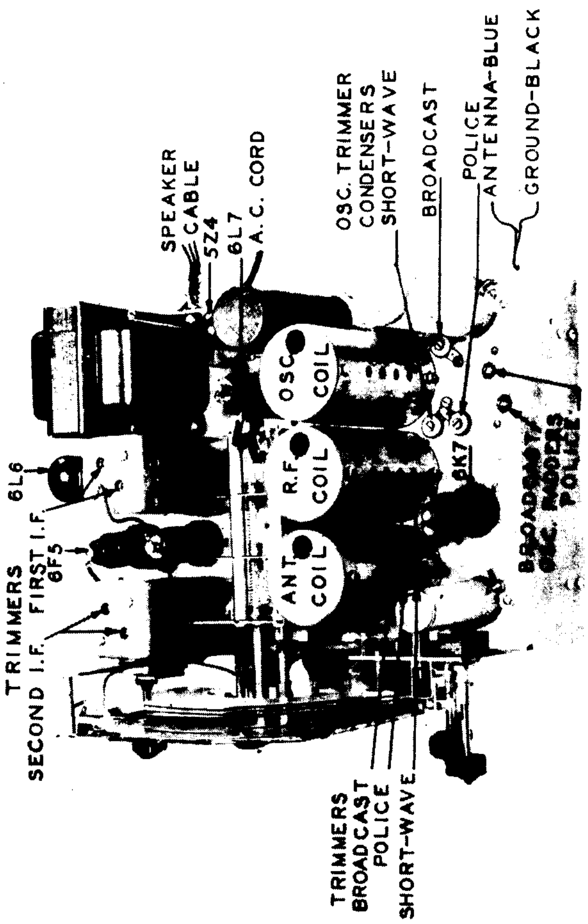
5Z4 TUBE

OHMS	VOLTS	VOLTS	OHMS
660	-90		
		-90	660
60M	310		
0	0	310	60M

6E5 TUBE

OHMS	VOLTS	VOLTS	OHMS
1 MEG	-.1	250	60M
1 MEG	6.5	0	0
.5	6.3	0	0

VOLTAGE AND RESISTANCE TABLE



LOCATION OF TRIMMERS

COLOR CODES

FIRST I. F. TRANSFORMER

Plate	Blue
"B" Plus	Red
Grid Return	Black
Grid (Top)	Green

SECOND I. F. TRANSFORMER

Plate	Blue
"B" Plus	Red
Diode Return	Black
Diodes	Green

STANDARD RMA

RESISTOR AND CONDENSER COLOR CODE

0 Black	2 Red	4 Yellow	6 Blue	8 Grey
1 Brown	3 Orange	5 Green	7 Purple	9 White

RESISTORS

The BODY COLOR represents the FIRST FIGURE of the resistance value
The END COLOR represents the SECOND FIGURE of the resistance value
The DOT COLOR represents the NUMBER OF CIPHERS following the First two figures

MICA CONDENSERS

(Capacity in Micro-Microfarads)

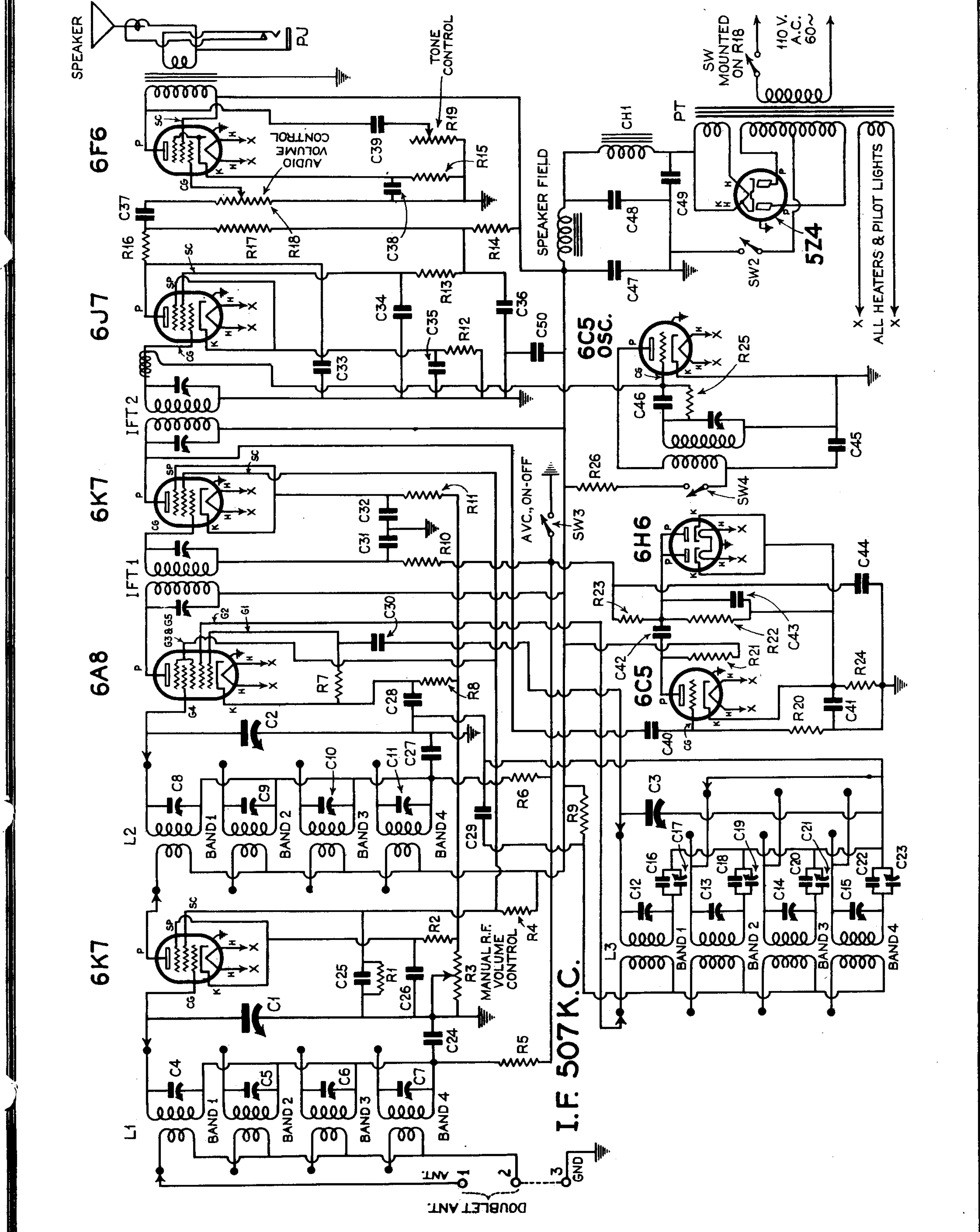
The FIRST DOT on the condenser represents the FIRST FIGURE of the capacity
The SECOND DOT on the condenser represents the SECOND FIGURE of the capacity
The THIRD DOT on the condenser represents the NUMBER OF CIPHERS following the first two figures.
The colors on the condensers should be read from left to right with the condenser in an upright position.

POWER TRANSFORMER

Lead Color	Voltage
Black	115 Volt Primary
Green	6.3 Volt Filament
Yellow	5.0 Volt Filament
Red	High Voltage Sec.
Red & White	High Voltage C.T.

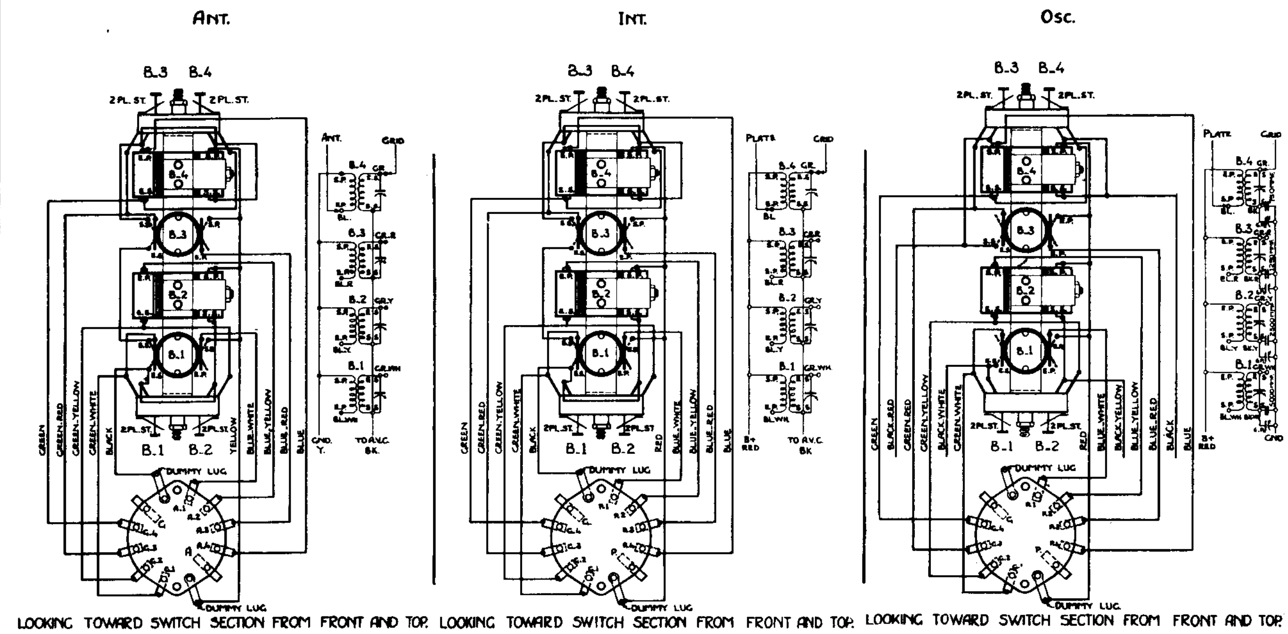
FEDERATED PURCHASER INC.

MODEL CD-9 COMMUNICATIONS RECEIVER



FEDERATED PURCHASER INC.

MODEL CD-9 COMMUNICATIONS RECEIVER



Coil and Switch Connections

ACRATEST
CD-9 ALL METAL TUBE
COMMUNICATIONS RECEIVER

PADS	FREQ. COVERAGE
B.1 - 5000MMF.	B.1-18-9.5 MEGACYCLES
B.2 - 2500MMF.	B.2-10-5.5 "
B.3 - 1250MMF.	B.3-6-3 "
B.4 - 750MMF.	B.4-3.2-1.7 "

I.F. = 507 KC

PARTS LIST

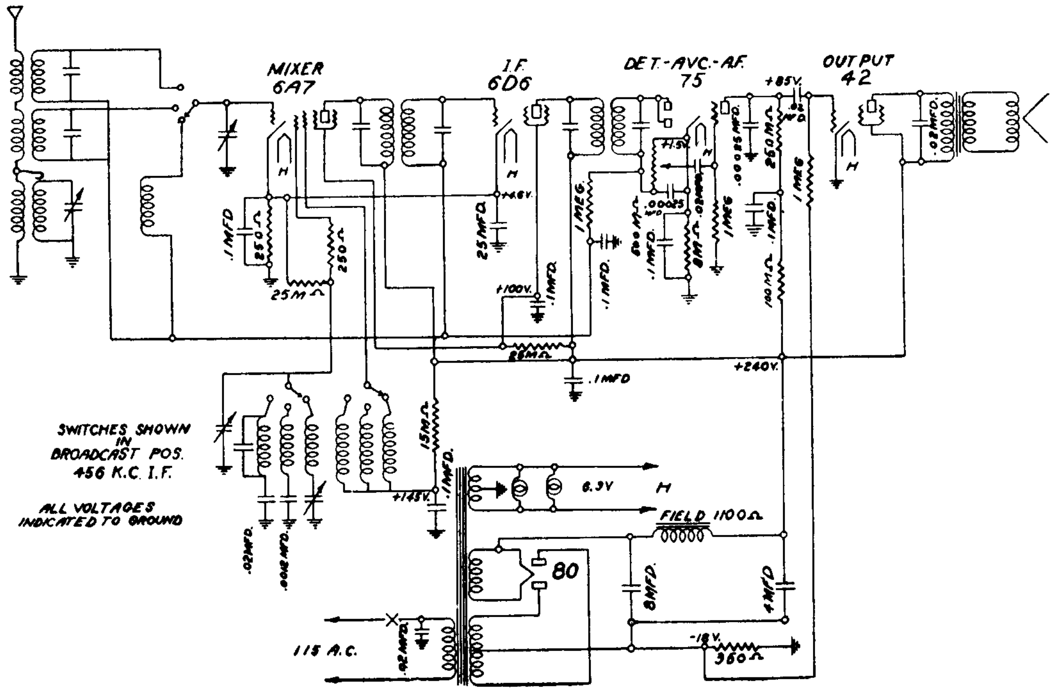
Quantity	Part	Designation
1	Acratest 3 gang .00015 mfd. tuning unit	C_1, C_2, C_3
1	Acratest 4" Dial	
2	6 volt pilot lights for dial	
1	Acratest Four S.W. Band Assembly	L_1, L_2, L_3
1	" 507 KC IF Transformer top grid	IF_1
1	" 507 KC Heterodyne Oscillator	OSC
1	" 507 KC IF Transformer bottom grid	IF_2
1	" Power Transformer #436	PT
1	" Choke #139	CHI
2	" Octal sockets marked 6K7	
1	" " " " 6A8	
1	" " " " 6F6	
2	" " " " 6C5	
1	" " " " 5Z4	
1	" " " " 6H6	
1	" " " " 6J7	
1	" 500,000 ohm pot with switch	R_{18}, SW
1	" 50,000 " "	R_{19}
1	" 15,000 " "	R_3
3	" Single Pole, Single throw Toggle Switches	SW_2, SW_3, SW_4
1	" Three contact terminal strip	1, 2, 3
1	" Closed circuit phone jack	PJ
1	" Speaker with 1,800 ohm Field 7,000 ohm VC Trans.	SPKR
1	" Special Chassis and Cabinet	
1	" Power Cord and Plug	
4	" Small bar knobs	
4	" Metal tube grid caps	
3	Rubber Condenser mountings	
	Push Back Wire	
	P.K. Screws for case	
1	Acratest 30,000 ohms .5 watt Resistor	R_1
3	" 400 ohms .5 watt Resistor	R_2, R_8, R_{11}
1	" 15,000 ohms .5 watt Resistor	R_9
1	" 20,000 ohms 1.0 watt Resistor	R_4
6	" 100,000 ohms .5 watt Resistor	R_{26}, R_5, R_6, R_{10}, R_{21}, R_{25}
3	" 50,000 ohms .5 watt Resistor	R_7, R_{14}, R_{16}
2	" 1 megohm .5 watt Resistor	R_{20}, R_{23}
1	" 1.5 megohm .5 " "	R_{13}
1	" 3,000 ohms .5 " "	R_{12}
1	" 400 ohms 2.0 " "	R_{15}
1	" 250,000 ohms .5 " "	R_{17}
1	" .5 megohm .5 " "	R_{22}
1	" 2,500 ohms .5 " "	R_{24}
NOTE: -	Condensers C_4 to C_{23} inclusive are part of L_1, L_2, L_3, assembly and are properly mounted and wired in place. They are roughly tuned to proper value.	
8	Acratest Tubular Condenser .1 mfd. 200 WV	C_{24}, C_{26}, C_{27}, C_{28}, C_{31}, C_{32}, C_{41}, C_{44}
5	" " " .1 mfd. 400 WV	C_{25}, C_{29}, C_{34}, C_{45}, C_{50}
1	" " " .5 mfd. 400 WV	C_{36}
1	" " " .05 mfd. 400 WV	C_{39}
1	" " " .01 mfd. 400 WV	C_{37}
1	" Wet Electrolytic 8 mfd. 400 WV	C_{49}
1	" Dual Dry Electrolytic 8-8 400 WV	C_{47}, C_{48}
2	Acratest Tubular Electrolytic 25 mfd. 25 WV	C_{35}, C_{38}
3	" Mica Condenser .0001 mfd.	C_{30}, C_{40}
1	" " " .001 mfd.	C_{33}
1	" " " .0002 mfd.	C_{42}
1	" " " .002 mfd.	C_{43}

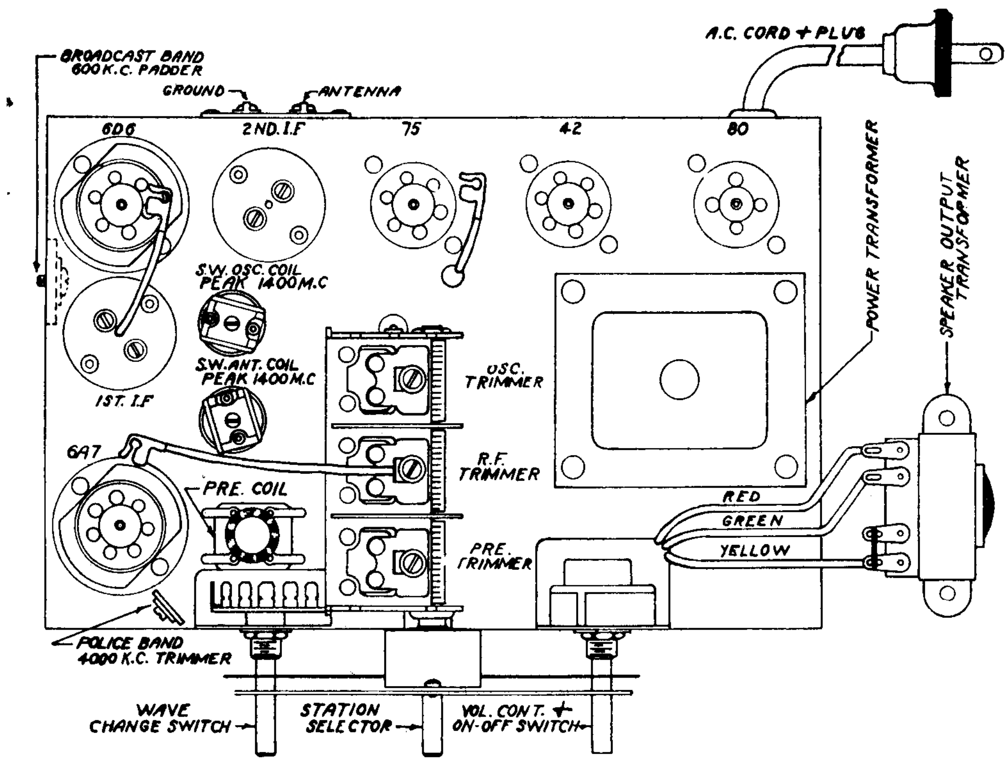
TUBES REQUIRED

2	6K7	R.F. Pentodes
1	6J7	2nd Detector
2	6C5	Beat Note Oscillator and AVC Amplifier
1	6H6	AVC Voltage Rectifier Tube
1	6F6	Output Pentode
1	5Z4	Rectifier
1	6A8	R.F. Amplifier Mixer Tube

FEDERATED PURCHASER INC.

MODELS 7B REVISED & 7C

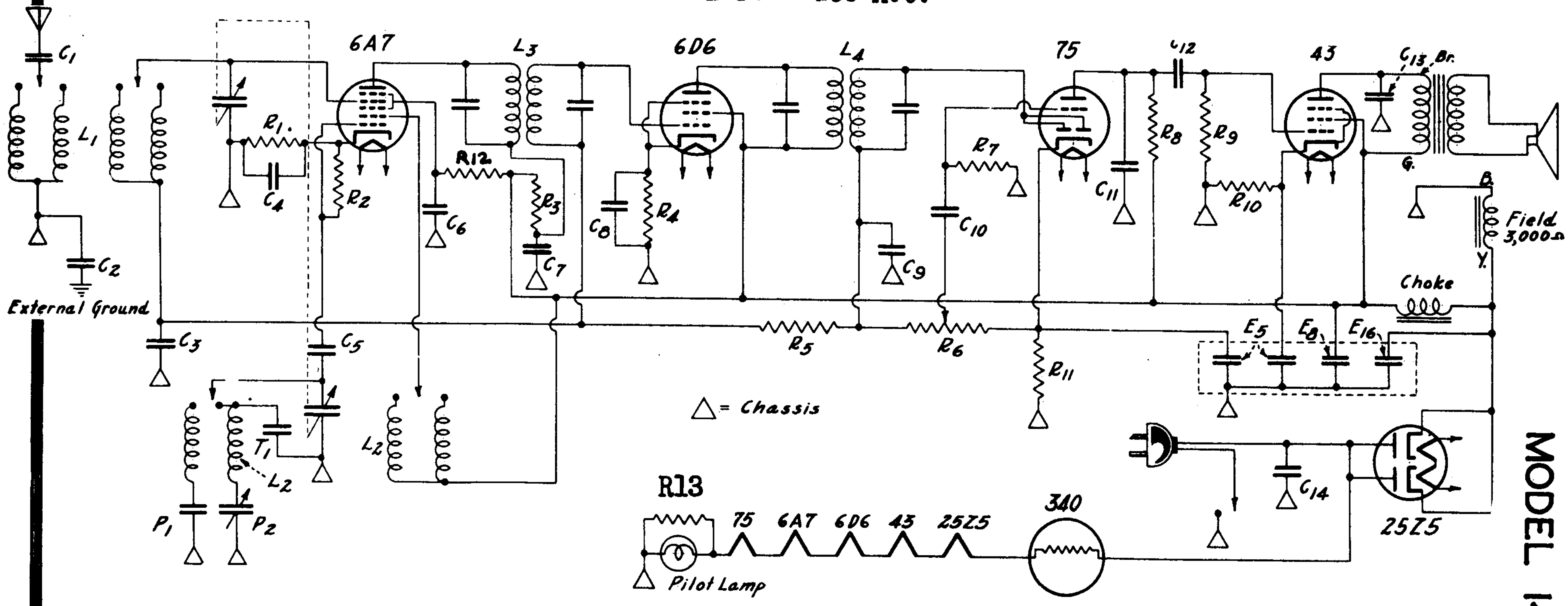




FEDERATED PURCHASER INC.

MODEL 14B

I.F. - 456 K.C.



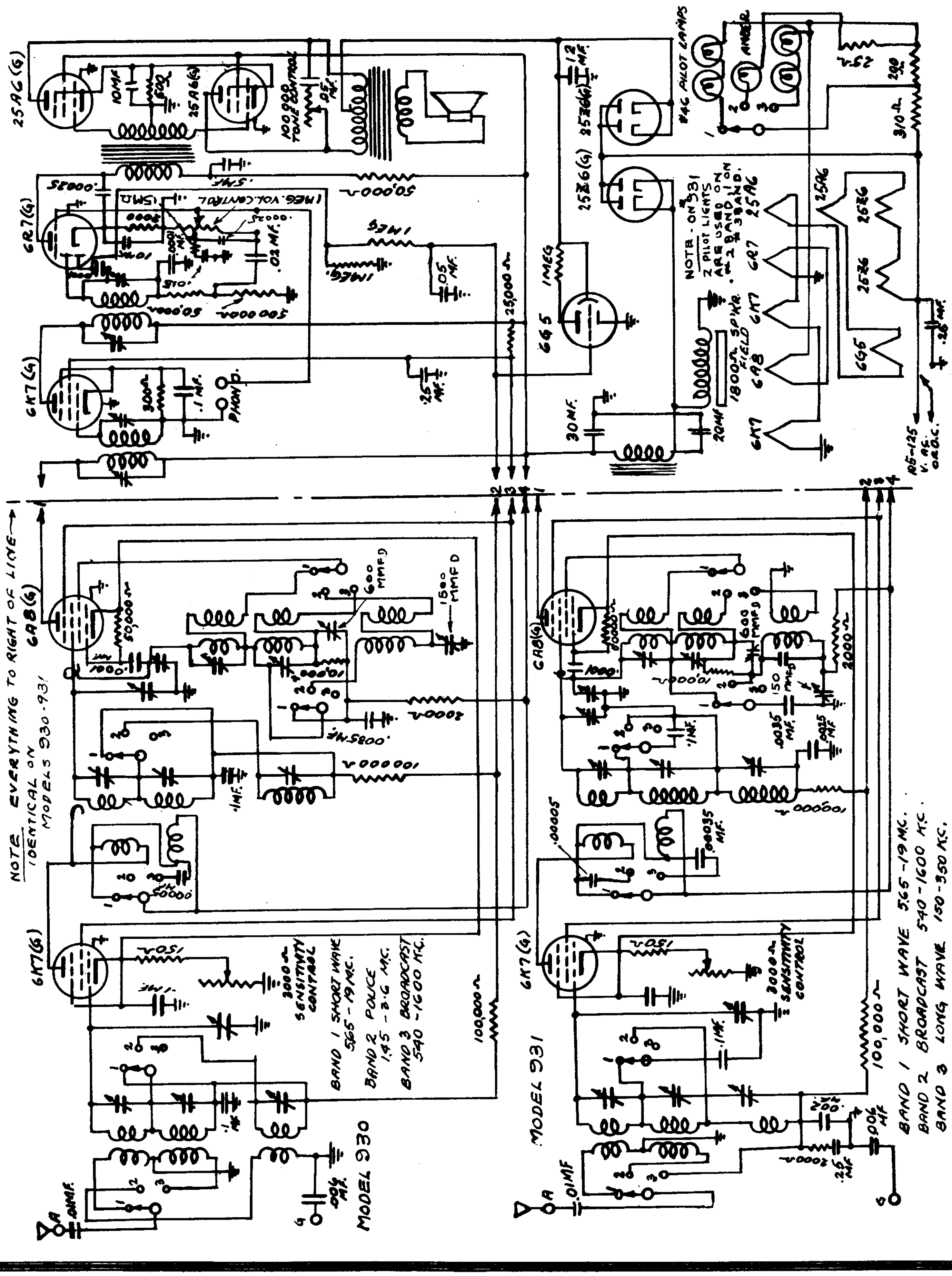
R 1 -	300 ohm		
R 2 -	35,000 "		
R 3 -	7,500 "		
R 4 -	750 "		
R 5 -	3,000,000 "		
R 6 -	500,000 "	vol. cont.	
R 7 -	750,000 "		
R 8 -	500,000 "		
R 9 -	750,000 "		
R 10 -	650 "		
R 11 -	7,500 "		
R 12 -	35,000 "		
R 13-	25 "		

L 1 -	comb. antenna coil.
L 2 -	comb. oscillator coil.
L 3 -	input I.F.
L 4 -	output I.F.
P 1 -	.003 mica
P 2 -	260-500 padder.
T 1 -	3-30 mmfd. trimmer.
E 5 -	5 mfd. - 25 v.
E 8 -	8 mfd. - 150 v.
E 16 -	16 mfd. - 150 v.

C 1 -	.005	- 400 v.
C 2 -	.05	- 400 v.
C 3 -	.05	- 400 v.
C 4 -	.1	- 200 v.
C 5 -	.0001	- mica
C 6 -	.1	- 200 v.
C 7 -	.1	- 200 v.
C 8 -	.1	- 200 v.
C 9 -	.0005	- mica
C 10 -	.02	- 400 v.
C 11 -	.00025	- mica
C 12 -	.02	- 400 v.
C 13 -	.005	- 400 v.
C 14 -	.05	- 400 v.

GAROD RADIO CORPORATION

MODELS 930-931-930D-931D-930KC & 931 KC



GAROD RADIO CORPORATION

MODELS 930-931-931D-930D-930KC & 931KC

Realignment of this receiver should not be attempted unless all other possible causes of faulty operation have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave-bands and an output meter for indicating the effect of adjustments are required.

It is important to remember that in receivers of this kind which are equipped with automatic volume control it is necessary to use the minimum possible signal from the signal generator; otherwise the A.V.C. action will tend to nullify the variations in output as the trimmers are adjusted.

I.F. ADJUSTMENT - The signal generator is set at 456 kc. and is connected to the grid of the first detector (6A8). With the oscillator section of the tuning condenser short-circuited and the receiver volume control at its maximum position, the i.f. trimmers are adjusted for maximum output. These trimmers may be found on tops of the i.f. transformer shield cans.

MODEL 930

18 MEGACYCLE ADJUSTMENT - The high side of the signal generator is connected to the antenna lead of the receiver and the low side to the ground lead. The receiver and the signal are both tuned to a frequency of 18 mc. with the selector switch in position for band no. 1. The oscillator trimmer condenser is adjusted so that the 18 mc signal is tuned in exactly at the 18 mc calibration point, with the volume control on full and the signal generator adjusted for minimum input. The antenna preselector and first detector trimmers are than adjusted in the order named for maximum output. These trimmers are located on the sides of the shield cans and are opposite the lower openings. This is the only adjustment on band #1.

1500 K.C. ADJUSTMENT - With the band selector switch in position for operation on band no. 3. and the receiver and signal generator both set at 1500 K.C. the procedure outlined above is repeated. The oscillator trimmer is found on the rear coil can, and is opposite the lower opening. The antenna preselector and interstage coil trimmers are located in the same positions on the corresponding shield cans.

The signal generator is set at 600 K.C. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 1500 K.C. adjustment should then be rechecked. The 600 K.C. Padder is located as indicated in the sketch.

3 MC ADJUSTMENT - The band selector switch is set in position for operation on the no. 2. band. The receiver and signal generator are both set at 3 M.C. and the procedure outlined above is repeated. The oscillator trimmer is found on the police band coil located under the chassis and is towards the rear. The other trimmers for this band are located in similar positions on the corresponding coils.

The signal generator is set at 1.7 M.C. and the signal tuned in on the dial. The padder condenser for the police band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 3 M.C. adjustment should then be rechecked. The 1.7 M.C. padder is located as indicated.

MODEL 931

Model 931 is the same as Model 930 except that the Long Wave band is substituted for the Police Band. Alignment procedure is identical for the Short Wave and Broadcast Bands. The Long Wave Band is aligned as follows:

300 KC. ADJUSTMENT - The band selector switch is set in position for operation on band no. 3. The receiver and generator are both tuned to 340 kc. and the procedure outlined above is repeated. The oscillator trimmer is located under the chassis and is mounted on the rear coil.

The signal generator is set at 150 kc. and the signal is tuned in on the dial. The padder condenser for this band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 300 kc. adjustment should then be rechecked. The 150 kc. padder is located as indicated.

MODEL 930 - 931

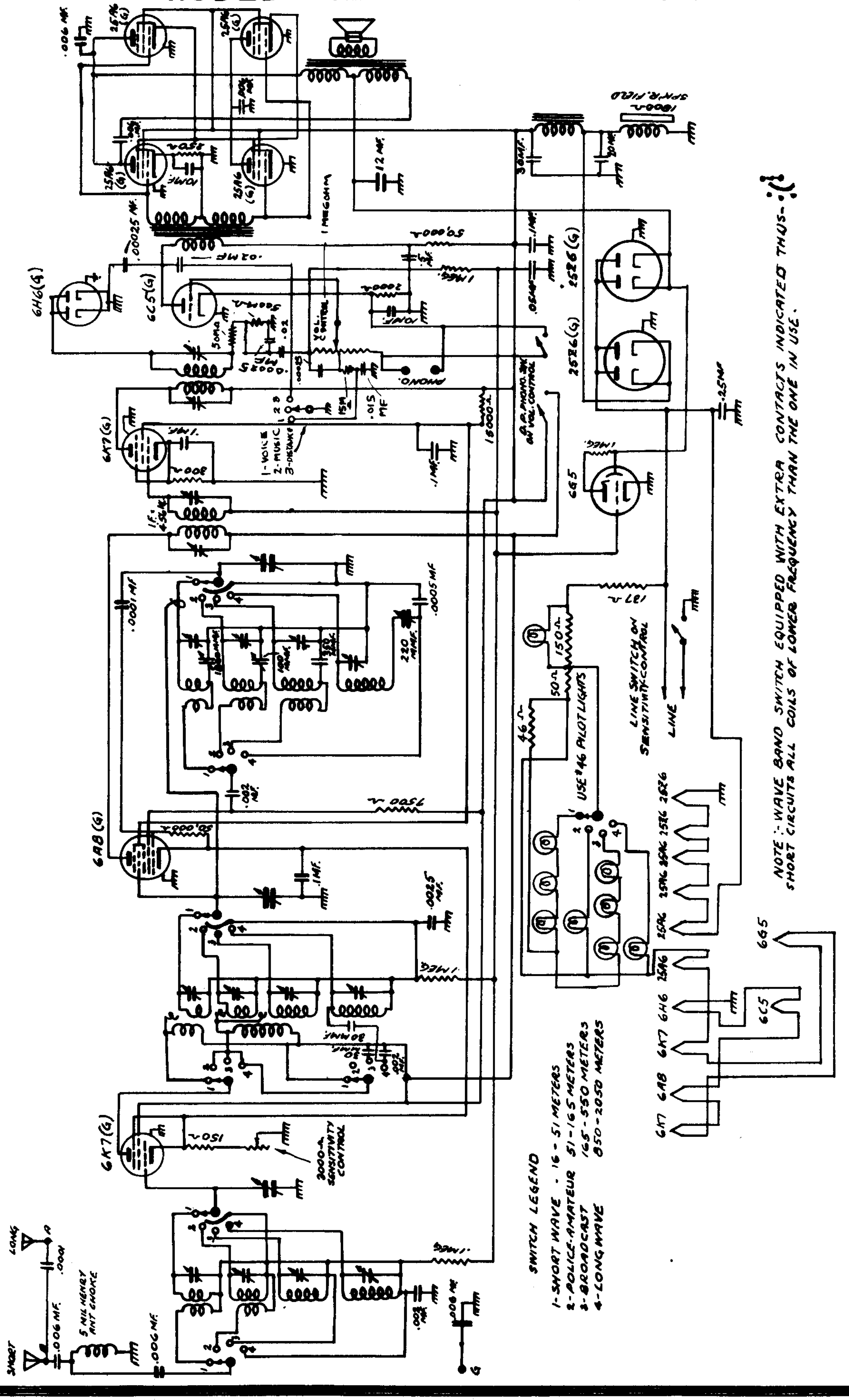
TUBE	FUNCTION	HEATER	PLATE	SC. GR.	CATH		OSC. PL.
					Volts	Curr.	
6K7 (G)	R.F. Amp.	6.3	120	50	1.3	3.5	
6A8 (G)	Det. Osc.	6.3	120	50	1.3	5.5	100
6K7 (G)	I.F. Amp.	6.3	120	50	1.2	4	
6R7 (G)	Diode Det. & 1st Audio Amp	6.3	60		2.	1.6	
25A6 (G)(2)	Audio Output	25.	125	120	19.	20.	
25Z6(G)	Rectifier (B+ for RF Amp)	25.			125.	80.	
25Z6	Rectifier (B+ for output tube plates)	25.			128.	35.	

All voltages except filament, are measured from socket terminals to chassis and with a 1000 Ohms per volt voltmeter. The set must be in operation and the sensitivity control in its maximum clockwise position. Wave band switch in the broadcast position.

Filament voltages are taken from filament prong to filament prong at tube socket and measured with a high impedance AC voltmeter. (Rectifier Type)

GARROD RADIO CORPORATION

MODELS 1240-1240E & 1240LC



GAROD RADIO CORPORATION

MODELS 1240-1240E & 1240LC

Realignment of this receiver should not be attempted unless all other possible causes of faulty operation have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave-bands and an output meter for indicating the effect of adjustments are required.

It is important to remember that in receivers of this kind which are equipped with automatic volume control it is necessary to use the minimum possible signal from the signal generator; otherwise the A.V.C. action will tend to nullify the variations in output as the trimmers are adjusted.

I.F.ADJUSTMENT - The signal generator is set at 456 kc. and is connected to the grid of the first detector (6A8). With the oscillator section of the tuning condenser short-circuited and the receiver volume control at its maximum position, the i.f. trimmers are adjusted for maximum output. These trimmers may be found on the tops of the I.F. Transformers.

18 MEGACYCLE ADJUSTMENT - The high side of the signal generator is connected to the antenna lead of the receiver and the low side to the ground lead. The receiver and the signal are both tuned to a frequency of 18 mc. with the selector switch in position for band no. 1. The oscillator trimmer condenser is adjusted so that the 18 mc. signal is tuned in exactly at the 18 mc. calibration point, with the volume control on full and the signal generator adjusted for minimum input. The antenna preselector and interstage trimmers are then adjusted in the order named for maximum output. These trimmers are located as indicated in the bottom view of the chassis.

6 MEGACYCLE ADJUSTMENT - The signal generator is set at 6 megacycle and the signal tuned in on the dial. The short wave padding condenser is adjusted for maximum output, while the gang condenser is rocked slightly to the right and left. The 18 megacycle adjustment should then be rechecked.

5 MC. ADJUSTMENT - With the band selector switch in position for operation on band no. 2. and the receiver and signal generator both set at 5 mc. the procedure outlined above is repeated.

The signal generator is set at 1.8 mc. and the signal tuned in on the dial. The police band padder condenser is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 5 mc. adjustment should then be rechecked.

1500 KC. ADJUSTMENT - The band selector switch is set in position for operation on the no. 3. band. The receiver and signal generator are both set at 1500 kc. and the procedure outlined above is repeated.

The signal generator is set at 600 kc. and the signal tuned in on the dial. The broadcast padder condenser is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 1500 kc. adjustment should then be rechecked.

300 KC. ADJUSTMENT - The band selector switch is set in position for operation on band no. 4. The receiver and generator are both tuned to 300 kc. and the procedure outlined above is repeated.

The signal generator is set at 150 kc. and the signal is tuned in on the dial. The long wave padder condenser is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 300 kc. adjustment should then be rechecked.

MODEL 1240

TUBE	FUNCTION	HEATER	PLATE	SC. GR	CATH V	CATH I	OSC. PL
6K7 (G)	RF Amp.	6.3	100	100	1.75	8.0	
6A8 (G)	1st Det. & Osc.	6.3	100	55	1.75	5.5	80
6K7 (G)	IF Amp.	6.3	100	55	1.25	4.0	
6H6 (G)	Diode detector	6.3	0		0		
6C5 (G)	1st Audio Amp.	6.3	60		1.5	.75	
25A6 (G)	(4) Audio Output	25	120	100	20	15.	
25Z6	Rectifier for Set	25			107	87.	
25Z6	Rectifier for Output Plates	25			125	60.	

All voltages except filament, are measured from socket terminals to chassis and with a 1000 Ohms per volt voltmeter. The set must be in operation and the sensitivity control in its maximum clockwise position.

Filament voltages are taken from filament prong to filament prong at tube socket and measured with a high impedance AC voltmeter. (Rectifier Type)

Visual tuning is obtained by means of the 6G5 cathode-ray tuning indicator, Resonance is indicated when the darkened area of the tube is narrowest, that is, when the green illuminated area is greatest.

TONE CONTROL: A three position switch is provided, the positions of which are as follows: Left - Voice; Middle - Music; Right - Distance. Of course, this does not mean that Music cannot be heard on the Voice position or vice-versa, but these positions will generally give the most satisfactory results when operated in this way.

SHORT WAVE RECEPTION: Short wave reception from great distances can very often be obtained, when reception on the broadcast band is impossible during bad atmospheric conditions. There are however a number of points to be remembered.

GENERAL ELECTRIC COMPANY

MODEL A-205

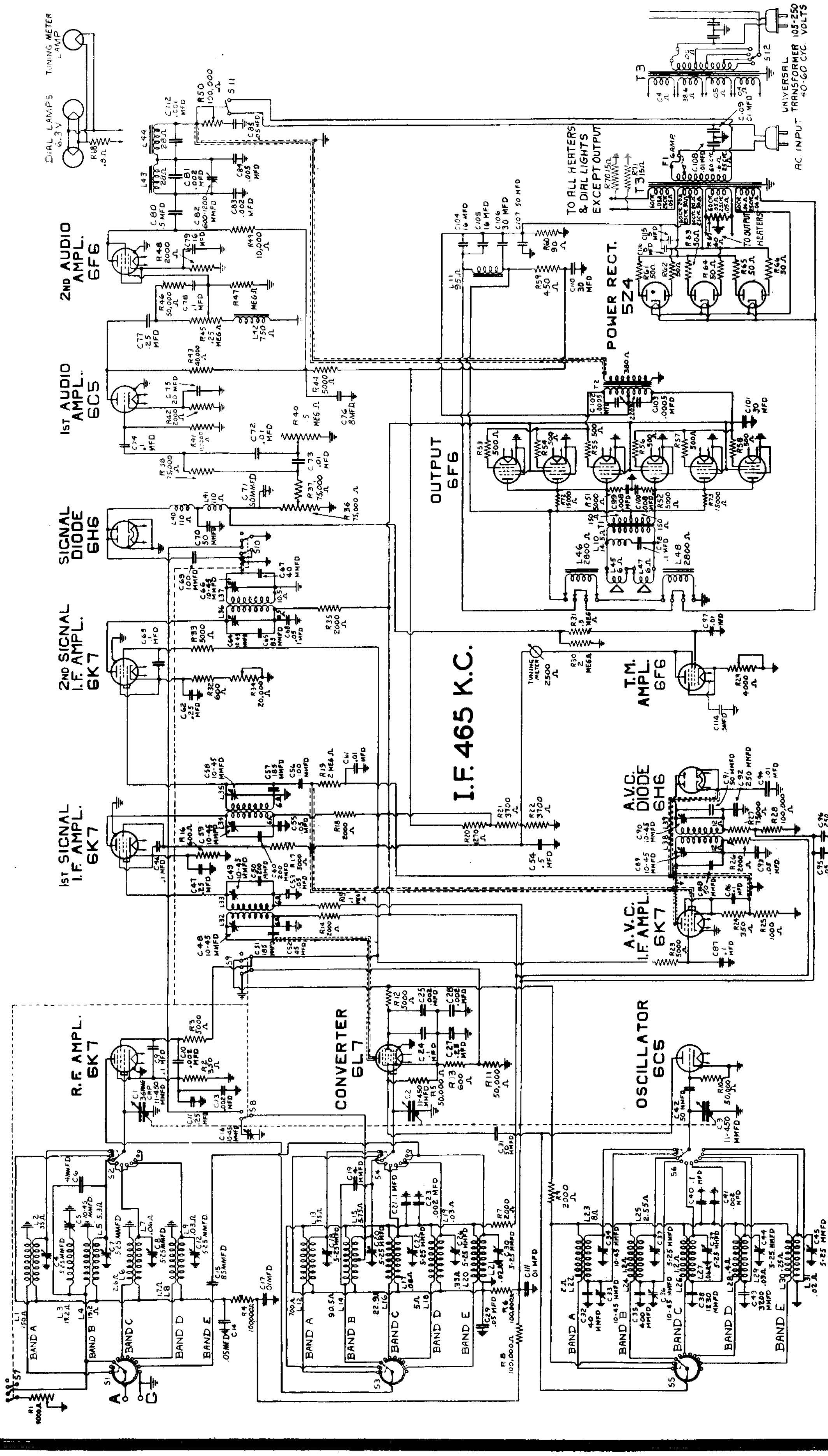


Fig. 2. Model A-205 Schematic Circuit Diagram

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MODEL A-205

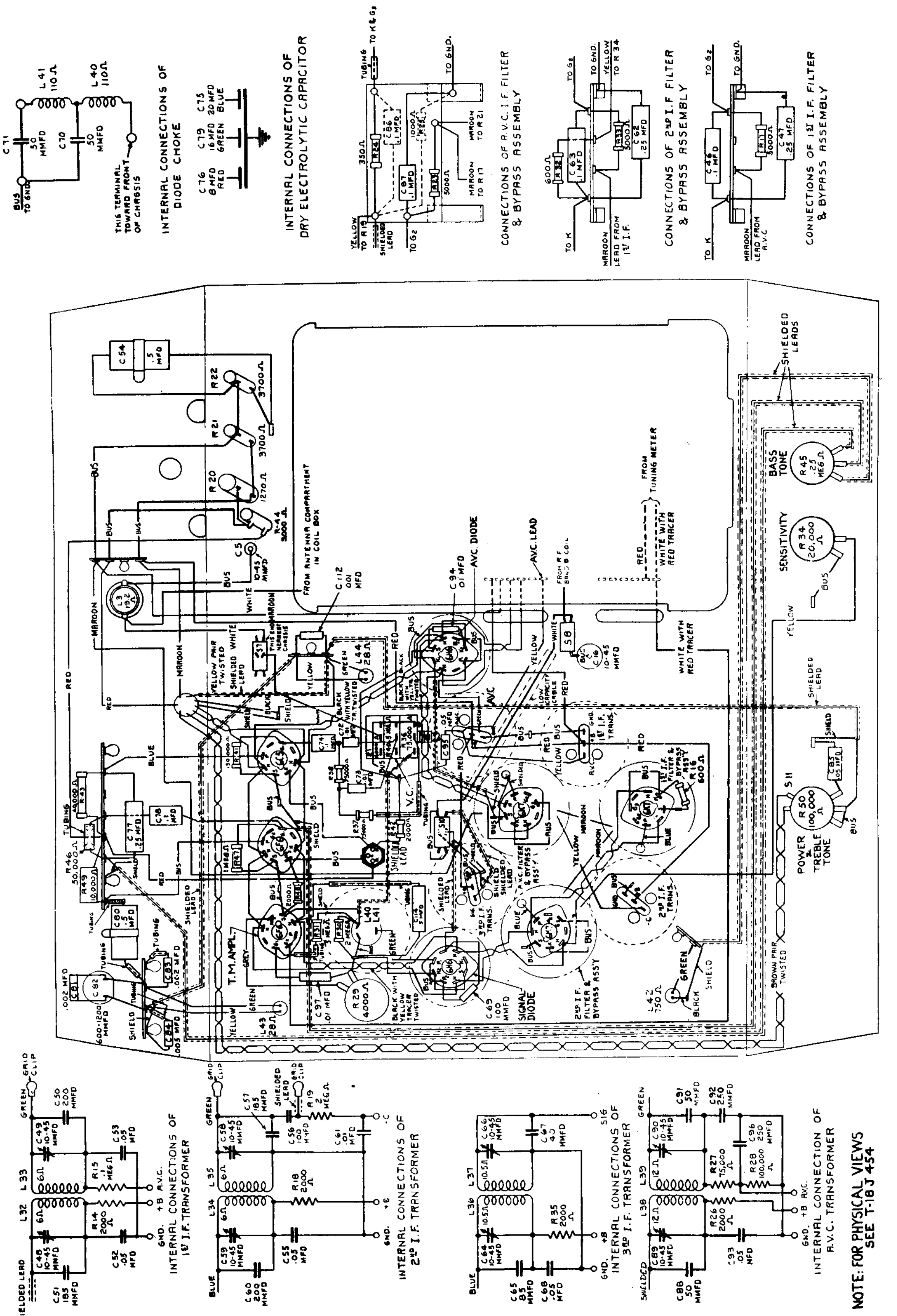

Fig. 1. Model A-205 Chassis Wiring Diagram

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MODELS A-205 & A-208

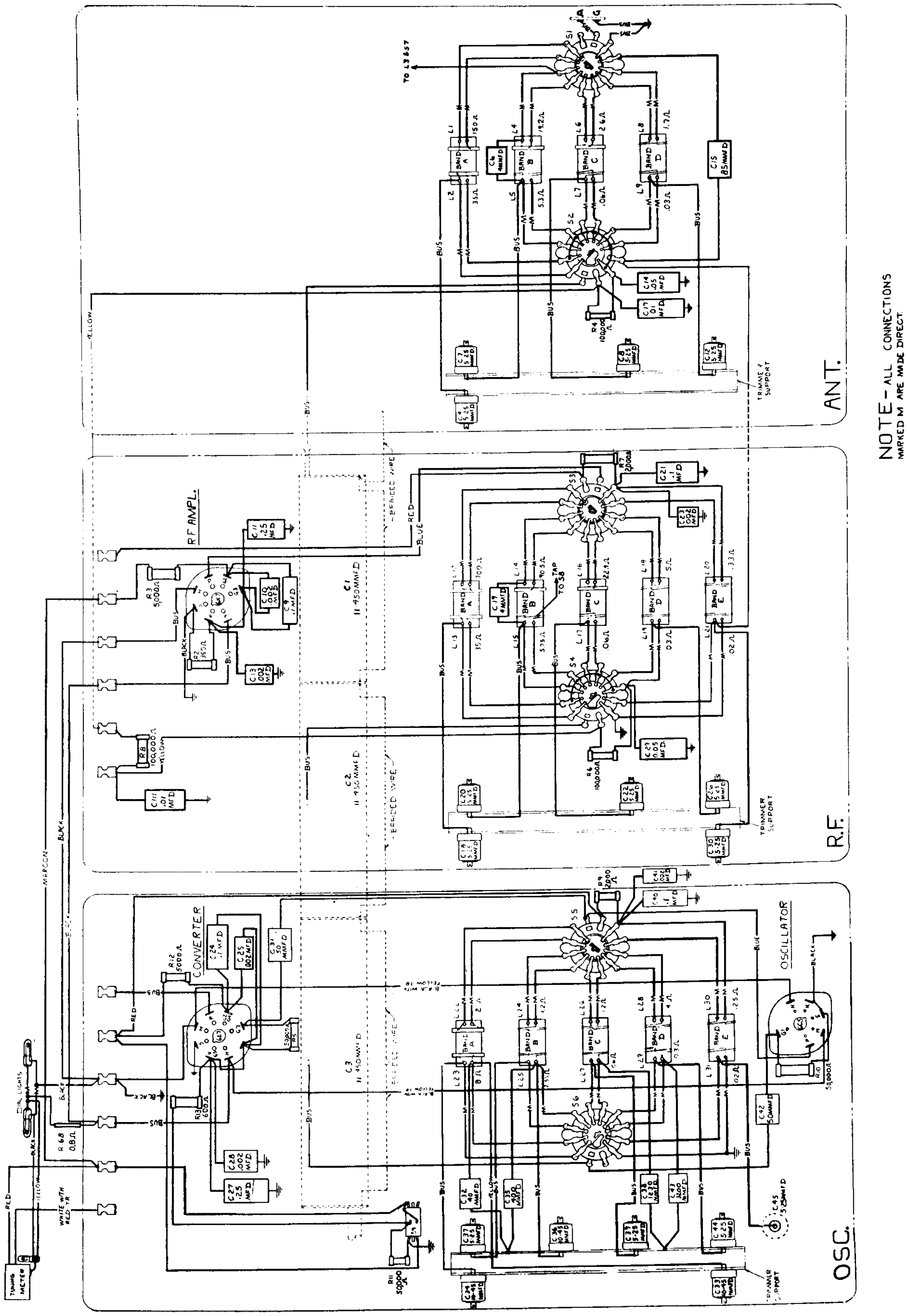

Fig. 6. Sentry Box Wiring Diagram

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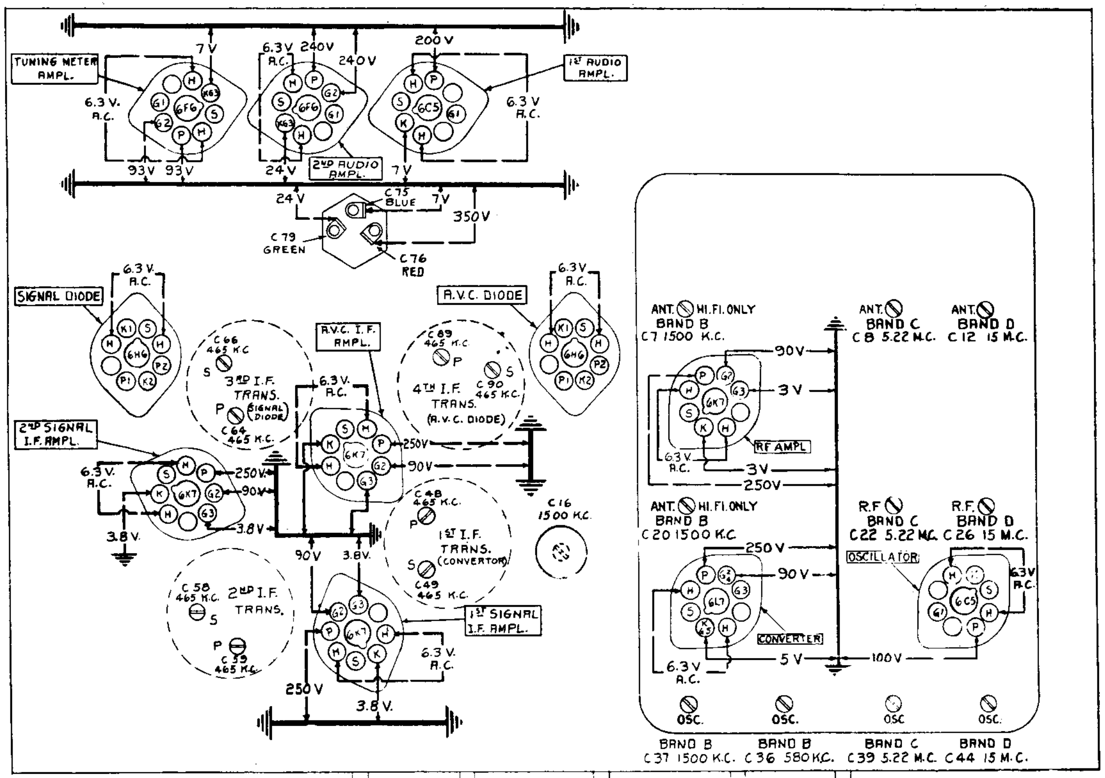
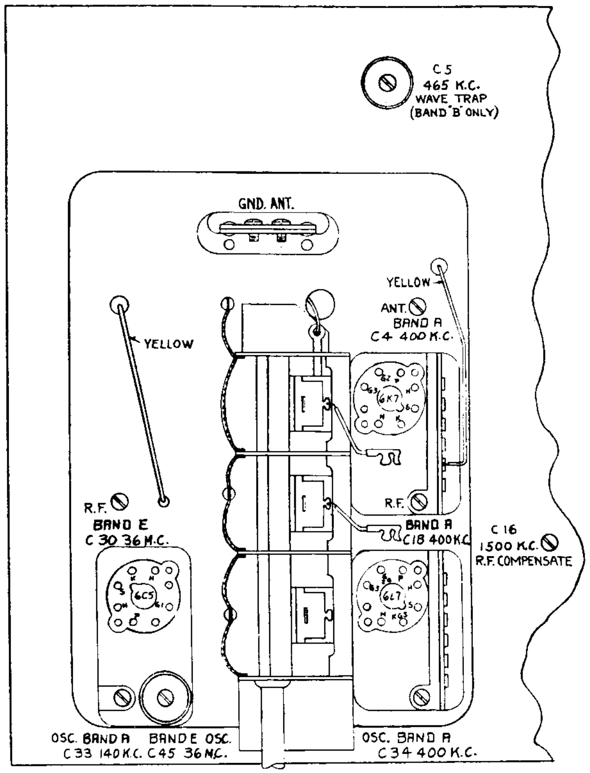
MODELS A-205 & A-208



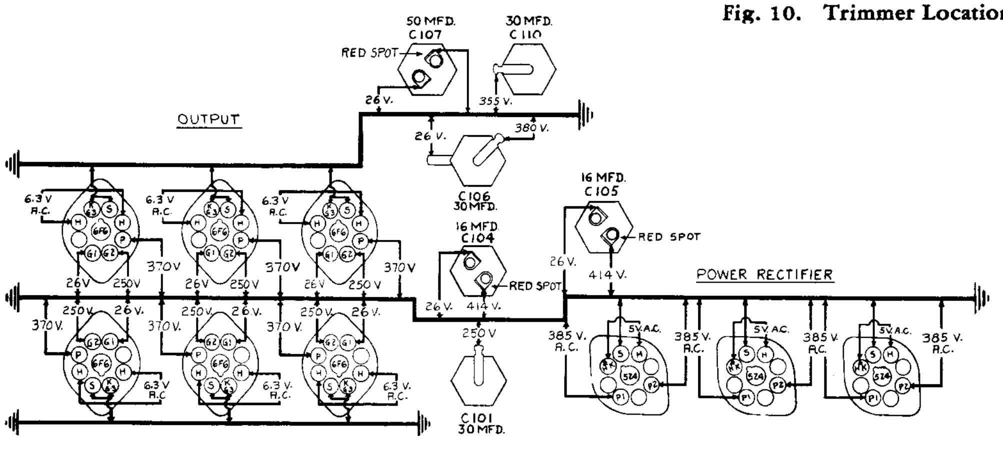
FRONT

VIEWED FROM UNDER SIDE OF CHASSIS



TOP VIEW OF SENTRY BOX

Fig. 10. Trimmer Locations and Socket Voltages



BACK

VIEWED FROM UNDER SIDE OF CHASSIS

Fig. 9. Filter Cap. and Socket Voltages. S.P.U.

Phonograph, Model A-208 Only

The record-reproducing facilities consist of a low impedance magnetic pick-up with its associated inertia-type tone arm, and the compensated volume control, audio amplifier and loud-speaker of the receiver. In changing from radio reception to phonograph reproduction the radio-phono switch simultaneously disconnects the 6H6 diode from the volume control, connects the secondary of the phonograph input transformer across this control, and renders the radio frequency amplifier inoperative by inserting a high resistance in the cathode circuit of the 6A8 converter and oscillator tube.

The turntable assembly consists of the perfected automatic record changer, which is simple and foolproof in operation. A separate motor switch is provided to permit starting and stopping the phonograph motor independently without operating the radio-phono switch.

GENERAL ELECTRIC COMPANY
MODELS A-205 & A-208

ALIGNMENT PROCEDURE

Alignment Frequencies

I.F.	Band "A"	Band "B"	Band "C"	Band "D"	Band "E"
465 KC	145 KC	580 KC	5220 KC	15,000 KC	36,000 KC
	400 KC	1500 KC			

In order to align this receiver properly, it is necessary to have available the following test equipment:

1. A modulated test oscillator with the above alignment frequencies available. In case 36,000 KC (36 MC) is not directly available, the second harmonic of 18,000 KC usually will be found strong enough for alignment purposes. The test oscillator calibration points for all alignment frequencies should be checked at the time of using. A reliable check by the zero beat method may be obtained against known controlled frequencies such as broadcast station frequencies and their harmonics.
2. An output indicator, such as a high resistance a-c voltmeter with a maximum scale reading of 3 to 5 volts, or a neon lamp indicator.
3. An alignment tool consisting of an insulating shaft with a small screw-driver blade.
4. A tuning wand.

The location of all trimmer capacitors is shown in Fig. 10. *It should be noted that on "Permaliner" trimmer capacitors, used throughout this receiver, clockwise rotation of the adjusting screw decreases capacity, while counterclockwise rotation increases capacity.*

If the phonograph cable is disconnected from the chassis on Model A-208, it is necessary to connect terminals 1 and 2 together before the receiver will operate.

NOTE: To remove the chassis from Model A-208 it is necessary to take off the front right curved panel of the cabinet. The screws holding this panel are accessible from the front upon opening the right-hand record compartment door.

1. I.F. Alignment Adjustments

The I.F. Alignment adjustment is not easily made without oscillograph equipment. Moreover, the AVC channel alignment requires removal of the chassis from the cabinet and removal of the base shield. (Removal of the base shield does not, however, affect any of the circuits.) There is also the danger that the frequency of the test oscillator will be much farther from 465 kc than the receiver's I.F. peak, even after long service. Unless the test oscillator frequency can be given a precision check at the time of using, it is better not to shift the I.F. peak frequency of the receiver at all, unless bad alignment is definitely indicated.

Each of the three I.F. transformers has two air-dielectric "Permaliner" trimmer capacitors. The secondary of the converter I.F. transformer delivers signal to two separate I.F. channels, the signal channel and the A.V.C. channel, which must be aligned independently.

Signal I.F. Channel

Set the frequency band switch of the receiver to Band "B." Short-circuit the antenna and ground terminals, tune the receiver to some point above 1500 KC so that no signal is heard, and ground the chassis.

Connect the test oscillator output between the connected grid clip of the 6L7 converter tube and the receiver chassis. Connect the output indicator across the cone coil of the loud-speaker. Turn on the receiver and set the volume and sensitivity controls to maximum (extreme clockwise position). Place the test oscillator in operation and set the test oscillator dial to 465 KC. Reduce the input from the test oscillator until only a slight output registers on the output indicator across the speaker cone coil. The input should be kept at such a low level that a temporary removal of the 6H6 A.V.C. rectifier tube makes no appreciable difference in output.

Before touching the receiver trimmers, adjust the *test oscillator* for maximum response. Note the exact setting of the test oscillator dial so it may be duplicated if necessary. This setting is likely to be very close to 465 KC and should be used for the I.F. adjustment following, unless bad misalignment is definitely evident, in which case the most accurate known test oscillator setting may be used. Trimmer locations are shown in Fig. 4.

Alignment adjustments should be made in the following sequence:

1. 3rd I.F. Transformer (Signal Diode)

Remove the test oscillator connection from the grid of the 6L7 tube and attach it to the connected grid clip of the 6K7 2nd signal I.F. amplifier tube. Adjust each of the two 3rd signal I.F. trimmers in turn. There is some interaction between two trimmers of the same transformer, so that these alternate adjustments should be repeated several times until a maximum output is obtained. Do not touch these trimmers again.

2. 2nd I.F. Transformer

Remove the test oscillator connection from the grid of the 2nd signal I.F. tube and attach it to the connected grid clip of the 6K7 1st I.F. amplifier tube. Adjust each of the two 2nd I.F. transformer trimmers alternately several times until a maximum output is obtained. Do not touch these trimmers again.

3. 1st I.F. Transformer (Converter)

After the alignment of the 2nd signal I.F. transformer is finished, restore the test oscillator connection to the grid clip of the 6L7 converter tube. Adjust each of the two converter (1st) I.F. trimmers alternately several times until a maximum output is obtained. Do not touch these trimmers again.

4. 4th I.F. Transformer (A.V.C. Diode)

After alignment of the 3rd I.F. transformer, 2nd I.F. transformer and converter transformer is completed, remove the output meter from the cone coil. Then remove the test oscillator connection from the grid of the 6L7 tube and attach it to the connected grid clip of the 6K7 A.V.C. I.F. amplifier.

Next remove the guard over the terminal boards on the "Sentry Box." Connect a high resistance voltmeter (this meter should have at least 1000 ohms per volt resistance and should be used on the 100-volt position or higher), to the yellow A.V.C. lead (See Fig. 1) on the R.F. compartment terminal strip and the chassis. The A.V.C. rectifier tube has delay bias voltage which should be removed by connecting its cathodes to the chassis. Then adjust each of the two A.V.C. I.F. trimmers alternately several times until a maximum output is obtained on the voltmeter. The peak, however, being rather broad, when properly trimmed, may be somewhat difficult to obtain. Do not touch the A.V.C. I.F. trimmers again.

Restore all original connections; this completes the I.F. alignment.

2. R.F. "Sentry Box" Alignment Adjustments

Bands "A" and "B" each require four trimmer adjustments, while Bands "C" and "D" each require three, and Band "E" only two. Take re to adjust only the trimmers under test. Connect the test oscillator to the antenna and ground terminals and place the receiver in operation with the output indicator across the speaker cone coil. A standard "dummy antenna," for connection between the test oscillator and the receiver antenna terminal, is a capacitor of 250 mmfd. (Stock No. RC258) in series with a resistor of 200 ohms; a condenser at least *must* be used, having some such small value of capacitance. Before any alignment the position of the pointer should be checked. This position should be at the extreme left-hand scale mark on the Band "B" scale for maximum capacitance position of the main tuning condenser (plates fully engaged).

The Oscillator, Converter Input and Antenna Compartments of the Sentry Box are conveniently referred to as "OSC", "R.F." and "ANT", respectively, thereafter. Before making any adjustments, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal from the test oscillator to the receiver, at the alignment frequencies only, and inserting a "Tuning Wand" into the coil involved. The "Tuning Wand" consists of a rod of insulating material having a ring of non-magnetic metal attached to one end, and a small core of finely divided iron compacted into the opposite end. By inserting the metal ring into the center of a particular coil through the openings provided in the "Sentry Box" compartment shields, the inductance of that coil is lowered, increasing its resonant frequency. If the circuits are in exact alignment, inserting either end of the tuning wand in any coil will result in a decrease in output. When an increase in signal is obtained with the iron-filled end of the wand, a decrease in resonant frequency of that circuit by increasing its trimmer capacity is indicated. When an increase in signal is obtained with the metal ring, a decrease in trimmer capacity is indicated.

CHANGES INDICATED BY WAND

Wand	Signal	Trimmer adjustment required
Metal Ring Iron Filings	Decrease Decrease	None
Metal Ring Iron Filings	Increase Decrease	Decrease Capacity
Metal Ring Iron Filings	Decrease Increase	Increase Capacity

Band "A" (140-410 KC)

Band "A" (140-410 KC)

Set the band change switch to the position where the scale indicates the above range. This will be at the extreme counterclockwise position of the band change switch knob. Be sure the center control knob is in the high-selectivity position.

Tune the test oscillator to 400 KC, set the pointer at 400 KC on the receiver, and adjust the Band "A" OSC, R.F. and ANT trimmers for maximum output. To reduce noise pick-up it is advisable to turn the sensitivity control to minimum sensitivity (counterclockwise) position. If necessary, reduce input from the test oscillator so that the signal reaching the speaker is kept at a low or moderate level.

Next tune the oscillator to 145 KC. Keep slowly rocking the tuning knob through the point of resonance, at the same time adjusting the 145 KC padding trimmer, until the highest peak of output is secured.

"Noise" alignment may be substituted when the preceding adjustment is nearly finished, in cases where there is a steady output of very loud pick-up noise at the lower end of the scale. With the pointer at 145 KC on the receiver and the test oscillator removed, simply adjust the 145 KC padding trimmer only until a peak in the noise output is obtained. This should result in the same trimmer setting as in the preceding paragraph.

The interaction between the trimmer adjustments at each end of the scale makes it necessary to repeat the adjustments alternately until both are correct. This may require two or three adjustments each. *The last adjustment* must always be made at the high frequency end of the scale. This completes the adjustment of this band; do not touch these trimmers again.

Band "B" (530-1660 KC)

Set the band change switch to the position where the scale indicates the above range. Turn the hi-fidelity switch to the *hi-fidelity* position. Make sure the test oscillator output is quite high. Tune the test oscillator to 1500 KC, set the pointer at 1500 KC on the receiver dial, and adjust the Band "B" R.F. and ANT trimmers for maximum output, reducing input to maintain a low or moderate signal.

Now reduce the test oscillator output and without changing the receiver or test oscillator frequencies, throw the high fidelity switch to the high selectivity position. At this point adjust the Band "B" OSC trimmer for maximum output. Adjust the compensating Band "B" R.F. trimming, which is on top of the chassis between the 1st I.F. transformer (converter) and the Sentry Box, for maximum output.

Next tune the oscillator to 580 KC. Keep slowly rocking the tuning knob through the resonance point, at the same time adjusting the Band "B" padding trimmer for maximum output.

The interaction between the trimmer adjustments at each end of the scale make it necessary to repeat the adjustments alternately until both are correct. This may require two or three adjustments each. The last adjustment must always be made at the high frequency end of the scale. This completes the adjustments of this band.

Band "C" (1.58-5.4 MC)

Set the band change switch to the position where the scale indicates the above range. Be sure the center control knob is in high selectivity position.

Tune the test oscillator to 5.22 MC, set the pointer at 5.22 MC on the receiver, and adjust the Band "C" OSC trimmer for maximum output, reducing input to maintain a low or moderate signal.

Check for the image signal which should be received at about 4.3 MC on the receiver dial. It may be necessary to increase the input to the receiver from the test oscillator for this check.

Retune the receiver to the correct scale reading 5.22 MC to secure the previous response. Adjust the RF and ANT trimmers now also for maximum output. This completes the alignment of Band "C"; do not touch these trimmers again.

Band "D" (5.3-18.3 MC)

Set the band change switch to the position where the scale indicates the above range. This position should occasionally be readjusted during subsequent trimmer adjustment, since it is possible to get some signals through on the higher frequencies when the switch position is not exactly in position.

Tune the test oscillator to 15 MC, set the pointer at 15 MC on the receiver, and adjust the OSC trimmer for maximum output, leaving it at the *first* peak obtained when increasing it from minimum capacitance by counterclockwise rotation.

Check for the image signal which should be received at about 14.1 MC on the receiver dial. It may be necessary to increase the input to the receiver from the test oscillator for this check.

Reduce the capacitance of the RF trimmer to minimum. Reset the main tuning knob to secure the previous response at 15 MC and, while slowly rocking the knob through this resonance point, increase the RF trimmer capacitance until a maximum response is obtained.

Carefully holding the main tuning knob on the peak of resonance at 15 MC, adjust the ANT trimmer for maximum output. This completes the alignment of Band "D"; do not touch these trimmers again.

Band "E" (16-41 MC)

Set the band change switch to the position where the scale indicates the above range. This position should occasionally be readjusted during subsequent trimmer adjustment, since it is possible to get some signals through on the higher frequencies when the switch position is not exactly in position.

Tune the test oscillator to 36 MC, set the pointer at 36 MC on the receiver, and adjust the OSC trimmer for maximum output, leaving it at the *first* peak obtained when increasing it from minimum capacitance by counterclockwise rotation.

Check for the image signal which should be received at about 35.1 MC on the receiver dial. It may be necessary to increase the input to the receiver from the test oscillator for this check.

Reduce the capacitance of the RF trimmer to minimum. Reset the main tuning knob to secure the previous response at 36 MC and while slowly rocking the knob through this resonance point, increase the RF trimmer capacitance until a maximum response is obtained. There is no ANT trimmer to adjust.

This completes the alignment of Band "E"; do not touch these trimmers again.

Adjustment of Wave Trap

To adjust the 465 KC Wave Trap set the dial scale for Band "B," increase the output of the test oscillator and adjust it to 465 KC, leaving it connected to the ANT and GND posts of the receiver. Now adjust the 465 KC trimmer (C5) which is mounted on top of the chassis immediately behind the "Sentry Box," to *minimum* output. This completes this alignment; do not adjust this trimmer again.

Adjustment of 10 Kc Trap

Obtain an audio oscillator; tune it to 10 KC; connect its output to the signal diode plate. This can be done by removing the signal diode and connecting to either of its plates by means of a test prod. Now adjust the trimmer (C82) on the back skirt of the chassis for minimum output in the cone coil. This completes this adjustment. Do not disturb it again.

Dual Unit Speaker

If, for any reason, it is necessary to disconnect one or both of the speaker units the speaker wiring diagram (see Fig. 5 and 7) should be carefully followed upon reconnecting either unit. It is important that both the field coil and voice coil of each be connected properly in order that the voice coils operate in phase.

VISUAL ALIGNMENT OF I.F.

In order to realize to full advantage the performance built into a receiver of this class at the factory, circuit alignment using cathode-ray oscilloscope equipment is much to be preferred. The oscilloscopic method is particularly advantageous in aligning the I.F. tuned circuits.

For visual alignment it is necessary to vary the frequency of an unmodulated test oscillator signal over a range extending on both sides of the peak frequency. This variation must take place in synchronism with the horizontal traverse of the cathode-ray beam on its screen. The frequency modulator must therefore, provide means for synchronizing the periodic test frequency variation with the cathode-ray horizontal deflection circuit. The test oscillator may advantageously have facilities for audio-frequency amplitude modulation of a fixed radio frequency test signal, as well as for frequency modulation, but audio modulation is not required for visual I.F. alignment.

Instead of an output meter across the speaker cone coil, the vertical plates of the cathode-ray tube are connected across the load resistor of one of the diode rectifiers of the receiver. With the frequency modulator in operation in conjunction with the test oscillator, the resonance curve of the circuit under test will then be shown on the screen.

Preliminary Procedure

In order to properly connect the oscilloscope for visual alignment, it is necessary to remove the base pan shield from the bottom of the receiver chassis. After this is done a preliminary alignment should be made as outlined under I.F. Alignment Procedure using the oscilloscope as an output meter. To do this connect the vertical plates of the oscilloscope across the receiver volume control (R36) and turn off the horizontal sweep entirely, using only the vertical deflection as an indication of output. In carrying out this preliminary alignment the test oscillator sweep mechanism is not used.

Final Visual Adjustments

Connect the test oscillator output to the control grid of the 6L7 converter tube and place the sweep mechanism in operation. Turn on the horizontal sweep of the oscilloscope and synchronize it correctly with the test oscillator sweep mechanism. Now adjust the *test oscillator* so that the two I.F. response curves are coincident as nearly as possible. This gives a setting for the test-oscillator frequency which must not be changed throughout the rest of the procedure.

To align the signal I.F. and converter I.F. transformers connect the test oscillator as described in I.F. alignment beginning on page 15 and adjust the corresponding transformer trimmers so as to cause the resulting I.F. response curves to be coincident and as high as possible.

After alignment of the signal and converter I.F. transformers has been completed, the vertical plates of the oscilloscope should be connected to the yellow A.V.C. lead and the chassis. Connect the test oscillator output to the grid of the A.V.C. 6K7 I.F. amp. and ground the cathode of the A.V.C. diode. Adjust the A.V.C. I.F. trimmers so that the response curves are coincident and of maximum height. This completes the I.F. alignment.

GENERAL ELECTRIC COMPANY
MODELS A-205 & A-208

Visual R.F. alignment may be carried out in the same general manner as above by applying a suitable frequency-modulated signal between the antenna and ground terminals of the receiver and connecting the cathode-ray vertical deflecting plates across the receiver volume control.

METHOD OF SERVICE PROCEDURE—SENTRY BOX

The "Sentry Box" assembly includes the tuning condenser and dial mechanism as well as the coil and switch compartments. The complete unit may be dismounted from the chassis by removing the side-fastening bolts, unscrewing the dial mechanism anchoring nut and unsoldering the leads to the chassis from the terminal strips.

In order to remove the coil shield cans it is necessary to take out the frequency band switch shaft. With the "Sentry Box" dismounted from the chassis the dial gears may be disengaged and the switch shaft removed merely by lifting the reduction drive end of the dial assembly, allowing the switch shaft gear to pass the dial scale cap shaft. With the "Sentry Box" mounted in place, removal of the switch shaft requires removing the dial scale gear and cap shaft.

Each compartment shield can houses a bracket assembly comprising the coils, band switch and other component parts associated with that particular circuit. With the band

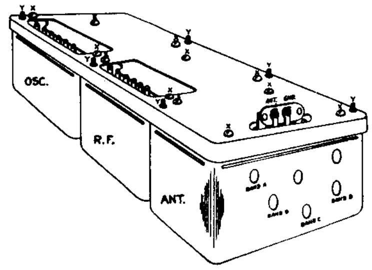


Fig. 11. "Sentry Box" Coil Locations and Assembly

switch shaft out, any shield can be easily removed by unscrewing the two mounting stud nuts ("Y," Fig. 11).

In most cases, coils or Permaliner trimmer capacitors may be replaced merely by removing their particular shield can. It is an easy matter, however, to remove each complete bracket assembly by taking out the mounting bolts ("X," Fig. 11) and unsoldering the bus or braid connections to the tuning condenser. In the case of the R.F. or oscillator units it will also be necessary to unsolder the external leads to the respective terminal boards of these units.

Permaliner trimmers are replaced by unsoldering the bus lead from the trimmer terminal, and then unsoldering the Permaliner case from its mounting cup. The latter operation may require the use of two soldering irons.

Coils are replaceable by merely unsoldering the coil lugs from the switch lugs. If it is necessary to replace a section of the band switch, however, it will be found expedient to remove the complete bracket and coil assembly for easy access to the switch lugs.

ADJUSTMENT OF DIAL MECHANISM

The dial mechanism is rigidly mounted at one end to the tuning condenser frame by two removable screws, and anchored to the chassis deck at the other end by a rubber-cushioned nut. The dial pointer, station selector knob, and tuning condenser drive drum are interconnected by means of the drive cord and drive cable; the frequency band switch and cylindrical scale by the switch shaft and the scale gears. The precision tuning indicator assembly is mounted independently by two screws to the tuning condenser frame. The tuning meter is fastened to the dial mechanism mounting plate with two other screws.

1. *Position of Drum on Condenser Shaft*

With set screws (5) loosened and tuning condenser plates fully engaged, place the drum in the position shown in Fig. 12. The drum should be located on the tuning condenser shaft so as to be in line with the drive cord pulleys (1/16 in. from the dial mechanism mounting bracket) and so that, with condenser plates fully engaged, guide (50) occupies the position shown in Fig. 12.

2. *Removing and Replacing Scale*

Pry out fastener (40) and remove the scale by lowering the fastener end below the mounting ear. Take the scale out of cap assembly (29). Replace by placing tabs of caps (29) and (30) in slots of scale. Replace fastener (40).

3. *Removing and Replacing Band Switch Shaft*

To remove the band switch shaft with the "Sentry Box" assembled in place, the dial scale cap and gear must be removed. This is done by removing the cylindrical scale as in paragraph 2. Then loosen set screws (9) and remove cap (29), spring (7), and gear (8).

When replacing the switch shaft, note that the shaft will fit the switch gang slots in only one position; turn the shaft before inserting so that the locating button will pass through the keyed side of the slots. Note also that the brass bearing just behind the switch shaft gear determines the forward position of the gear. Insert the bushing just far enough into the index plate hub so that the shaft gear meshes snugly with the scale gear; then tighten the set screw.

AUTOMATIC RECORD EJECTOR

The record-changing mechanism is designed to be simple and fool-proof. Under normal operating conditions, service difficulties should be negligible. Occasionally, however, certain adjustments may be required. These adjustments are illustrated and explained in Fig. 13.

It is important when servicing the automatic mechanism, to have it placed on a level support. It is also important to refrain from forcing the mechanism if there is a tendency to bind or jam, since bent levers and possibly broken parts may result.

The tip of the record ejector is adjustable in relation to the turntable spindle, the two being exactly coaxial when properly adjusted. To align the tip, remove the rubber silencer of the ejector assembly, loosen ejector tip retaining nut and

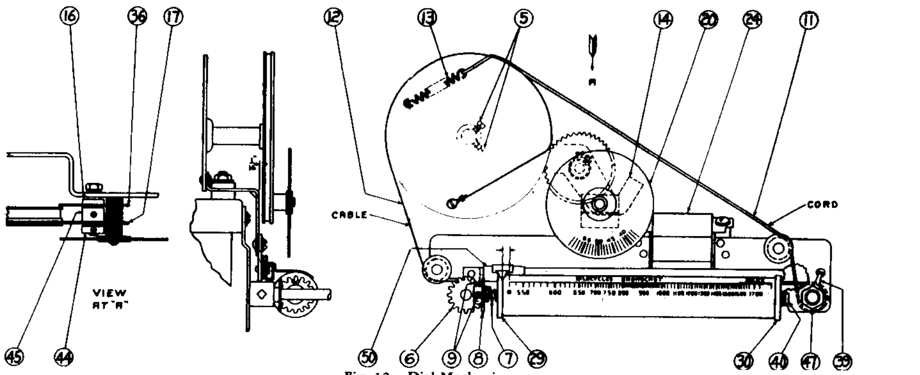


Fig. 12. Dial Mechanism

slide the tip assembly to the position where it is in true line with the axis of the turntable spindle. This adjustment may be simplified by placing several records on the turntable, depressing the spindle through the top record hole and lining up the ejector tip in the spindle hole of the record.

To insure that the ejector tip rotates freely, apply a slight amount of oil to the shank of the tip at the point where it is in contact with the ball bearing.

MAGNETIC PICKUP

The pickup used in the phonograph unit is of an improved design, having several variations from the usual type of pickup. The magnetic assembly is one rigid piece. The horseshoe magnet is solidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and provides a damping effect on the movement of the armature. A neutralizing coil is mounted in the magnet assembly in such manner that it balances out hum induced by stray magnetic fields but does not affect the audio signal. The frequency response is uniform over a wide range.

Service operations which may be necessary on the pickup are as follows:

Centering Armature

Refer to Fig. 14 showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, *i.e.*, exactly centered. Whenever this centering adjustment has been disturbed, the screws A, B, and C should be loosened and the armature clamp adjusted to the

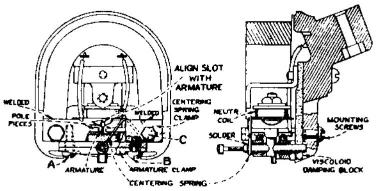


Fig. 14. Details of Pickup

point where the vertical axis of the armature is at right angles to the horizontal axis of the pole pieces, and centered between them. This centering operation may be facilitated by inserting a small rod or nail into the armature needle hole, using it as a lever to test the angular movement of the armature. The limitations of the movement in each direction will be caused by the armature striking the pole pieces. The proper adjustment is obtained when there is equal angular displacement of the armature and adjustment rod or nail to each side of the vertical axis of the magnet and coil assembly. The screws A and B should then be secured, observing care not to disturb the adjustment of the armature clamp. Then place the pickup in a vise and secure the centering spring-clamp by means of the screw C, allowing the centering spring to remain in the position at which the armature is exactly centered between the pole pieces. With a little practice, the correct adjustment of the armature may be readily obtained. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other such foreign materials which would obstruct the movement of the pickup armature.

4. *Locating Scale*

Loosen the two gear set screws (9). Rotate the scale backward until there is slight tension on spring (7) with the pointer indicating on the Band "A" scale. With the frequency band switch in the Band "A" position, place gear (8) in mesh with the gear on part (6) and tighten the two set screws (9).

5. *Replacing Drive Cord and Drive Cable*

The position of the dial scale pointer with respect to the tuning condenser drum is held fixed by a special metal braid cable (12) connecting the drum with guide (50). Tension is maintained on the cable through the drum spring (13) and drive cord (11). To replace either the drive cable or the drive cord, remove the dial scale for convenient access to guide (50). Unhook spring (13) from its drum tab to release tension. Unhook the cable or cord from guide (50) and unwind from the pulleys and drum. To replace the cable or cord, rethread to agree with Fig. 12, and rehook drum spring (13) as shown.

6. *Replacing Reduction Drive*

To replace the reduction drive, unhook spring (13), loosening the drive cord. Unscrew nut (47) and remove drive. Replace with new drive and rehook drive cord.

7. *Setting Scale Pointer*

The scale pointer is soldered to the slider (50). To set the pointer mechanically, turn the tuning condenser rotor so that the plates are fully engaged, and solder the pointer to indicate a point 3/32 in. to the left of the extreme left-hand mark on the Band "B" scale.

8. *Replacing Dial Lamps*

The dial lamp sockets are easily accessible by lifting them clear of the dial mechanism. Lamps may then be replaced in their sockets. After replacing lamps, slide the socket clip back onto the mounting bracket. Be sure the sockets are quite clear of other metal parts. The tuning meter lamp is easily replaced by merely unscrewing it from its socket at the rear of the meter.

9. *Replacing Tuning Meter*

In case of damage to, or defect within, the tuning meter (24), the meter should be replaced rather than an attempt made to repair it. The meter is replaceable as a unit by removing its two mounting screws and unsoldering the meter leads and meter lamp leads.

10. *Precision Tuning Indicator*

The precision tuning indicator dial and gear assembly is illustrated at the left of Fig. 12. This assembly is removable as a unit by removing the two mounting screws which fasten its bracket (14) to the tuning condenser frame. The dial and pinion assembly (20) is held on its shaft by a small horseshoe spring washer which should be pried off to replace this assembly. The drive gear (17) and backlash gear (36) may be removed by loosening the set screws on collars (44) and (45), which hold them in place.

When replacing the complete precision tuning assembly, the tuning condenser plates should be fully disengaged. Refasten the assembly to the tuning condenser frame, but before tightening the mounting screws, and before meshing the drum gear sector with the precision dial drive gear, place an initial tension on the backlash spring (16) by rotating the precision dial about two revolutions clockwise from the position in which the spring holds it when unwound. Maintaining this tension on the backlash spring, mesh the gears.

PHONOGRAPH SERVICE DATA
Model A-208 Only
Replacing Transformer

When installing a new phonograph input transformer, T4, first make all connections without screwing the new transformer to the cabinet. Then, with the power on and the Phono-Radio switch turned to Phono, rotate the transformer until the position is found in which hum is reduced to a minimum. The transformer should then be mounted permanently in this position.

Damping Block

The viscoloid block which is attached to the back end of the armature shank serves as a mechanical filter to eliminate undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, it may be done by removing the armature and viscoloid assembly from the mechanism and taking off the old vis-

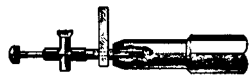
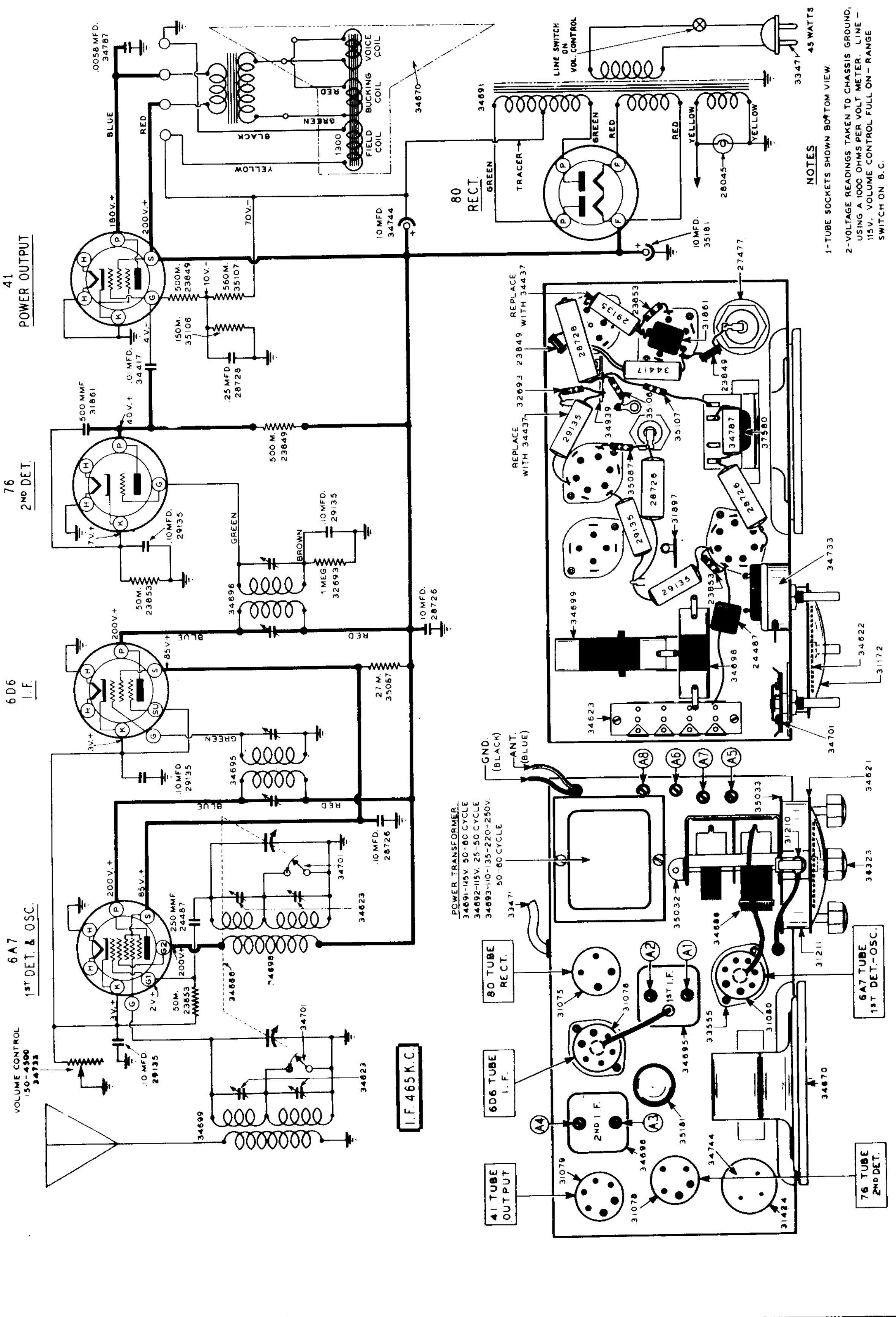


Fig. 15. Special Soldering-iron Tip

coloid block. The surface of the armature which is in contact with the viscoloid should be thoroughly cleaned with fine emery cloth and then inserted into the new block so that it occupies the same position as it did originally. Make certain that the block is in correct vertical alignment with the armature. The hole in the new viscoloid block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the viscoloid aligned on the armature, heat should be applied to the armature (viscoloid side) so that the viscoloid block will fuse at the point of contact and become rigidly attached to the armature. A special-tip soldering iron constructed as shown in Fig. 15 will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block and cause a small bulge on both sides. The pickup should then be carefully reassembled and the armature centered as previously explained.

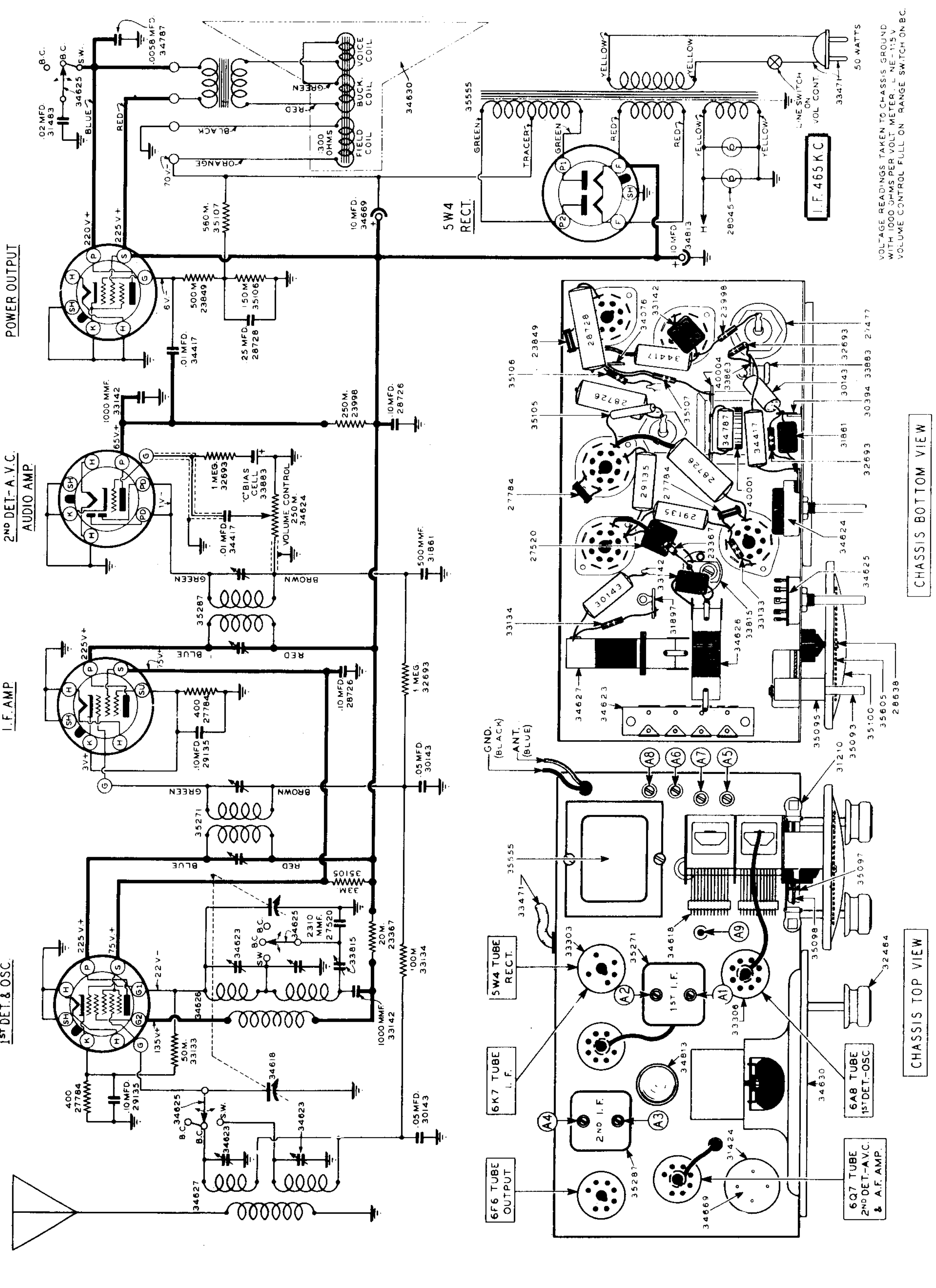
GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 5H & 532



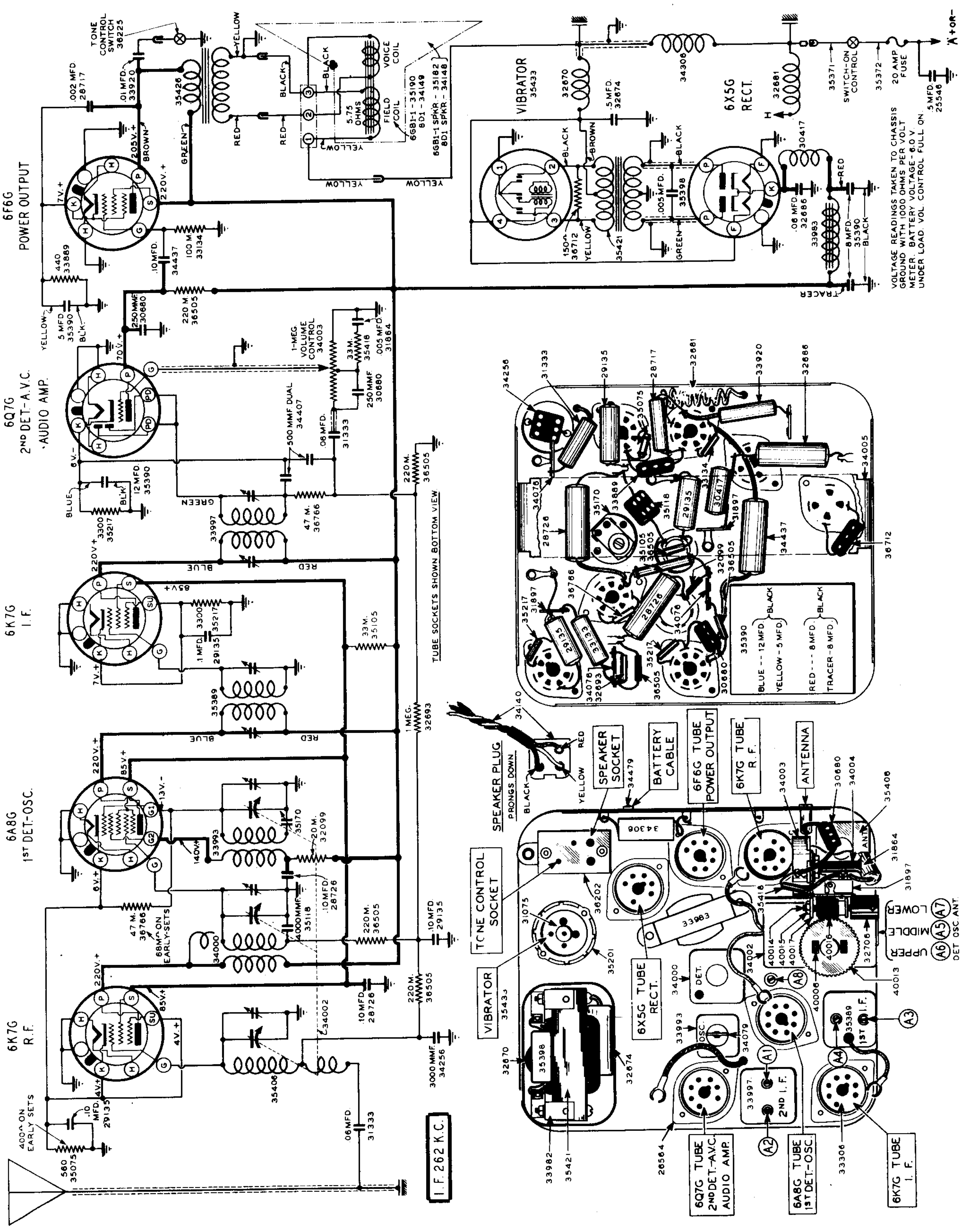
GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 5J & 542



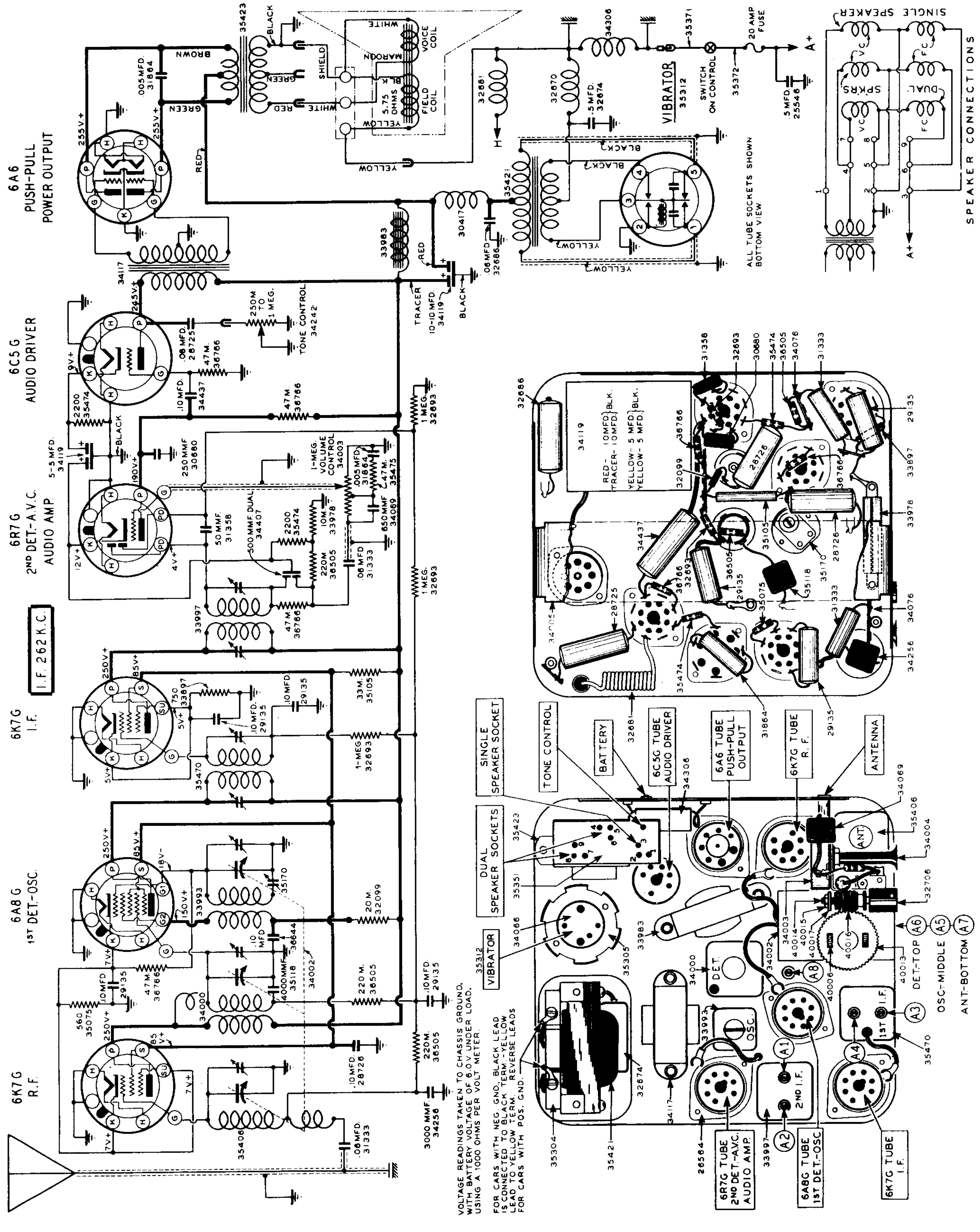
GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 614 & 618



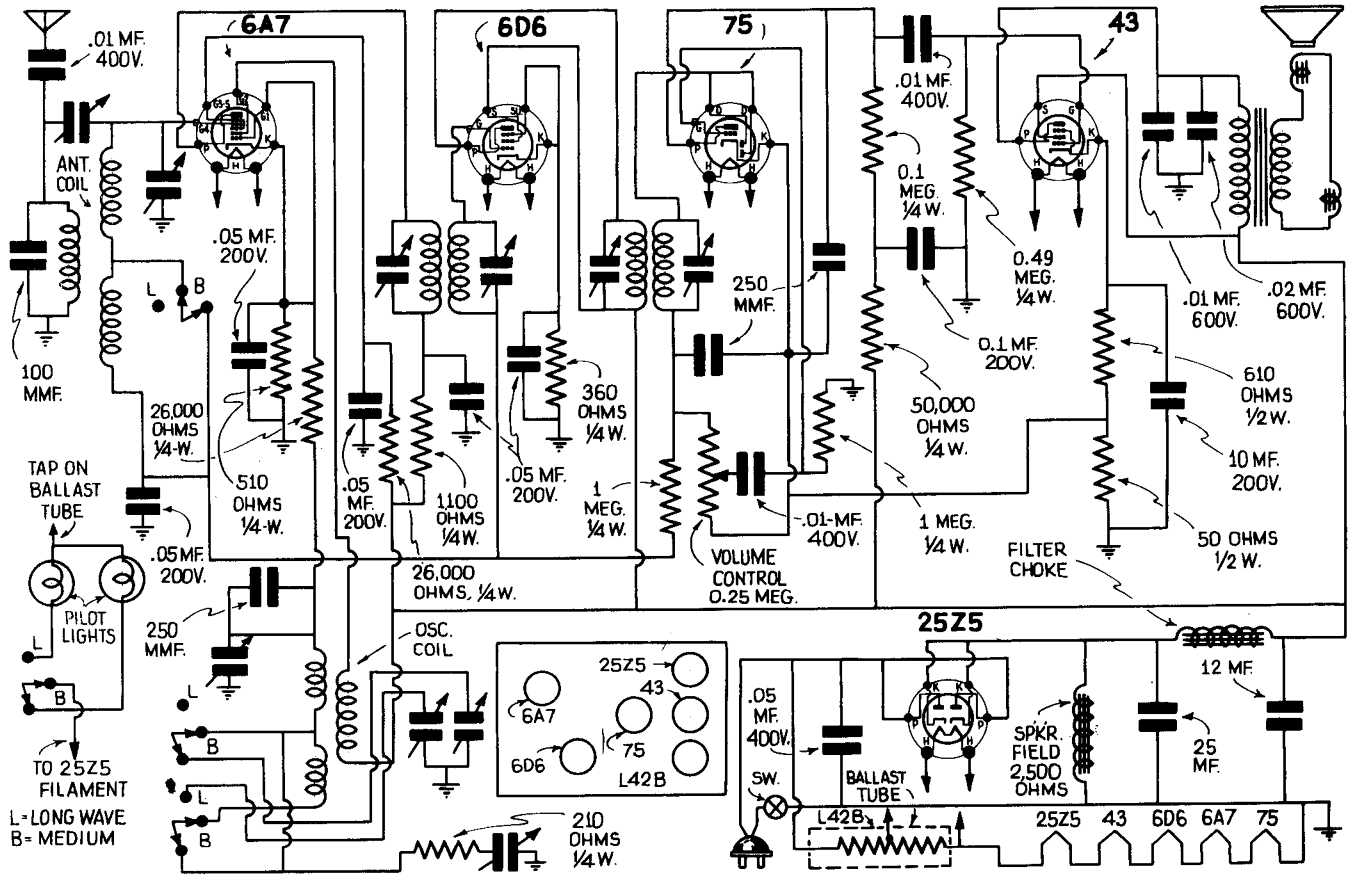
GENERAL HOUSEHOLD UTILITIES COMPANY

MODEL 625

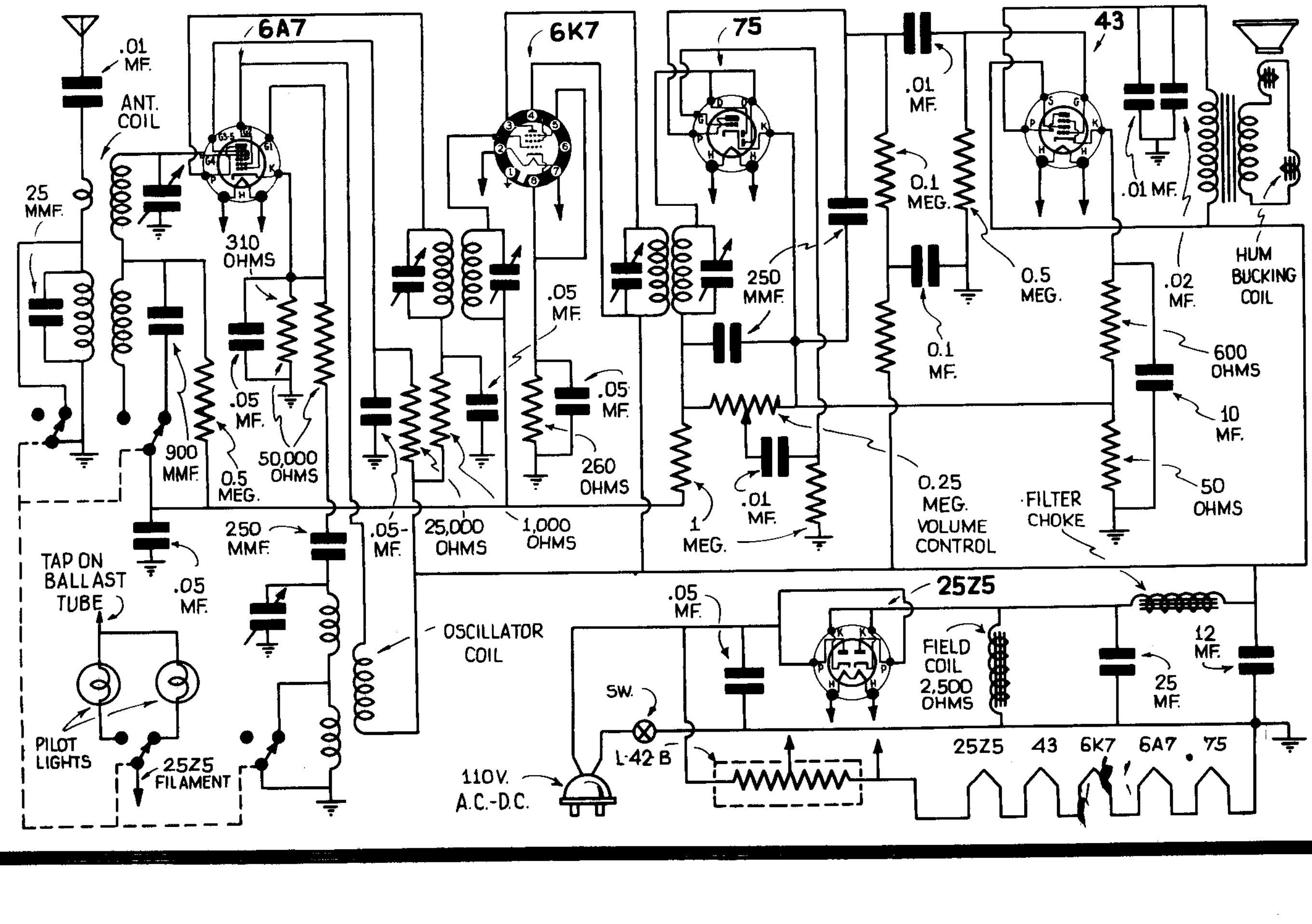


HALSON RADIO MFG. COMPANY

MODEL 50RL

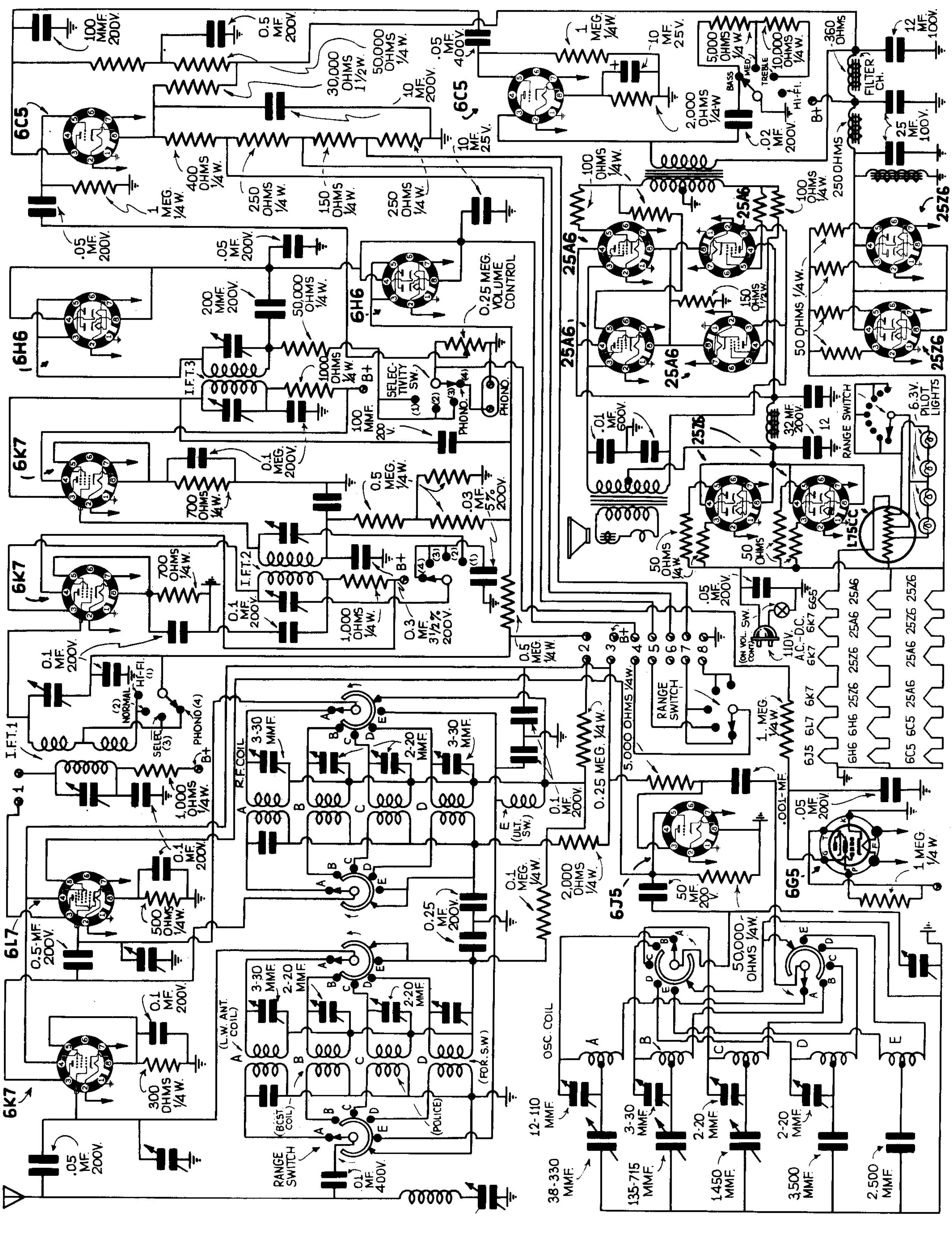


MODEL 50R



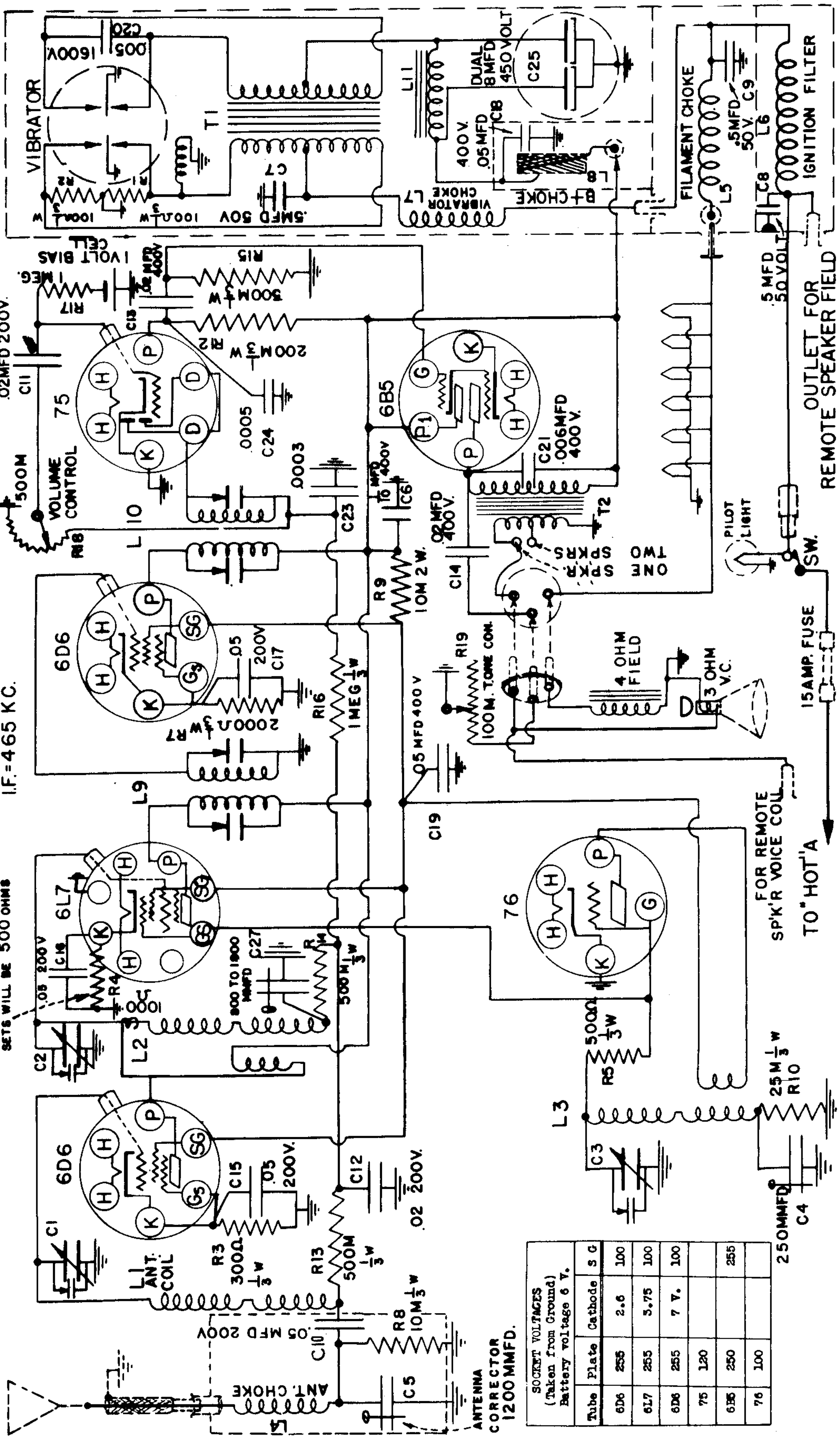
HALSON RADIO MFG. COMPANY

MODEL 1900



HOWARD RADIO COMPANY

MODEL HA-6 SERIES 2



SOCKET VOLTAGES (Taken from Ground) Battery voltage 6 V.

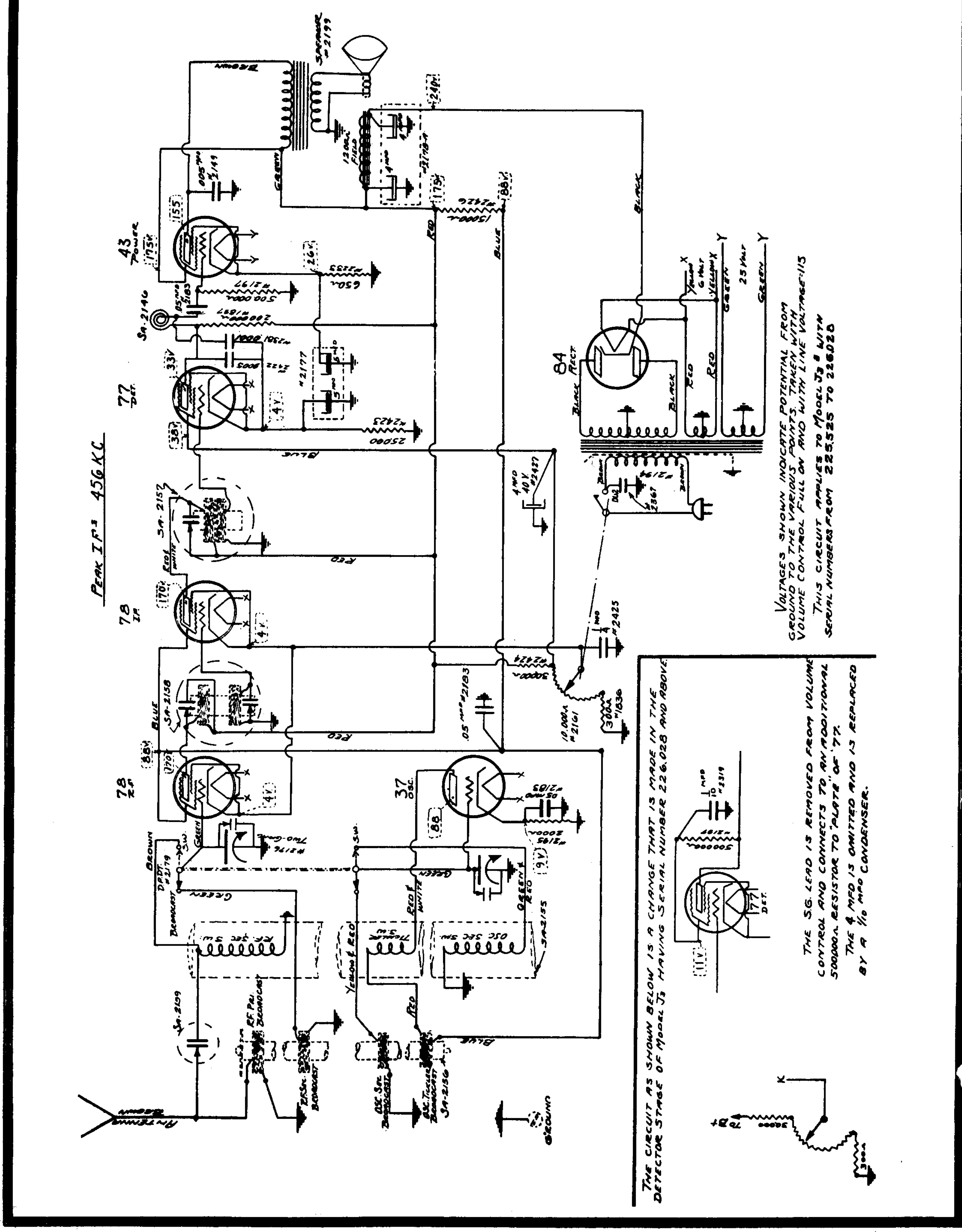
Tube	Plate	Cathode	S G
6D6	255	2.6	100
6L7	255	3.75	100
6D6	255	7 V.	100
75	120		
6B5	250		255
76	100		

ALIGNMENT PROCEDURE

BAND RANGE	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (in order shown)	MICRO-VOLTS
I.F. Stages	540 KC	465 KC	.1 Mfd.	Trans Grid	C31 C32 C33 C34	1000
Regular	1400 KC	1400 KC	.0002	Ant. Lead	C35 C36 C37	2
Regular	600 KC	600 KC	.0002	Ant. Lead	C4 C5 C27	2

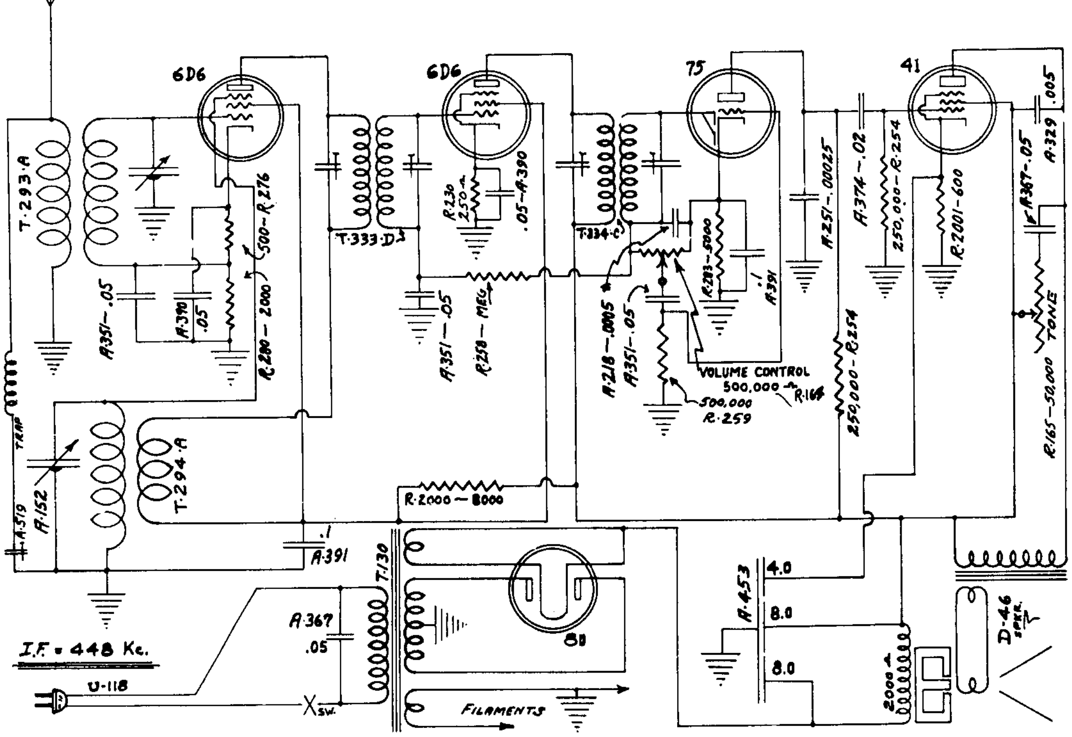
HOWARD RADIO COMPANY

MODEL J-3



INTERNATIONAL RADIO CORP.

MODEL 35



ALIGNMENT

The standard type of output meter should be used to indicate signal strength. It should be connected from the plate of the 41 to ground. Tone control should be turned "high". The signal from the signal generator *must be kept at a very low level.*

ESSENTIAL DATA: The intermediate frequency employed is 448 Kc. The oscillator frequency is 448 kilocycles higher than the signal frequency. Aligning should be done on the following frequencies: 1,400, 1,000, and 600 Kc.

INTERMEDIATES: To align the I.F. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. Adjust the first I.F. transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second I.F. transformer. If adjustments are not made accurately, selectivity will be poor and I.F. oscillation may result. Finally, adjust the trimmer on the tuned wave trap for minimum meter reading.

BROADCAST BAND: Turn the dial to 1400 Kc. and feed a *very weak* 1400 Kc. modulated signal from your signal generator to the antenna. Adjust the Broadcast oscillator trimmer for maximum reading. Then peak Broadcast antenna trimmer to this oscillator setting.

There is no adjustable padder condenser in this model so resonance on lower frequencies is accomplished by bending plates on tuning condensers.

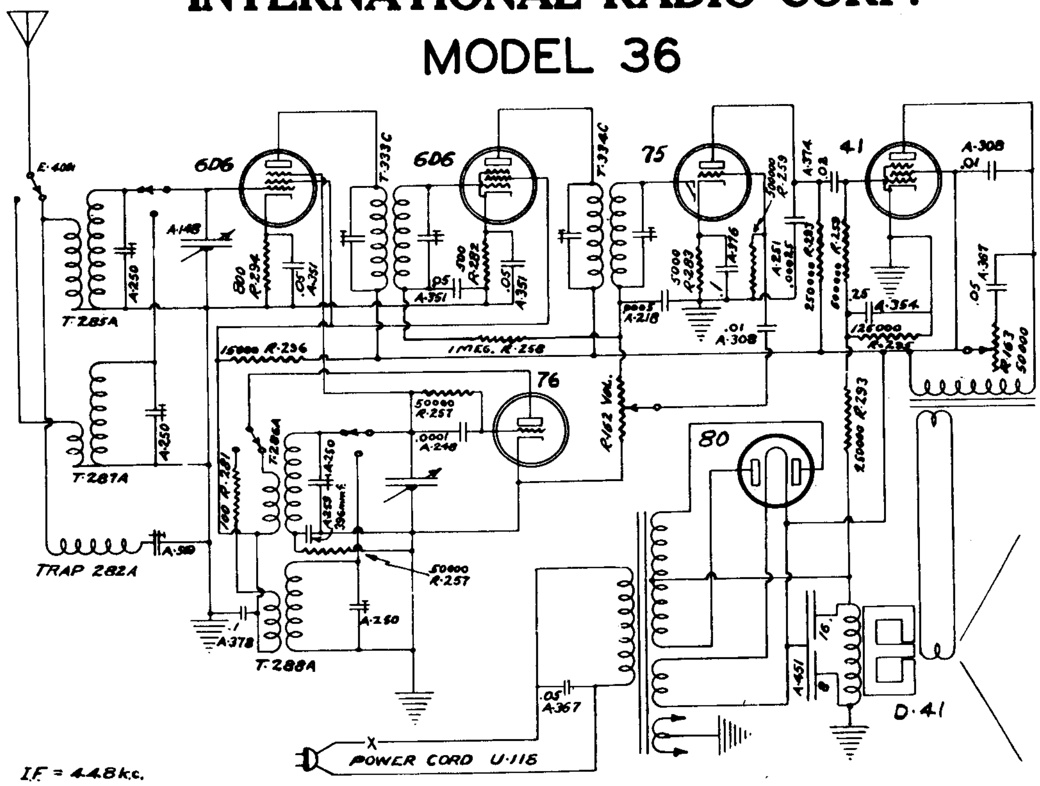
AVERAGE SOCKET VOLTAGES

Tube	Position	Ek	Eg_3	Eg_2	Ep
6D6	Det-Osc.	18	0	110	110
6D6	I.F.	1.7*	1.7*	110	180
75	2nd Det. A.V.C.—A.F.	1*	—	—	90
41	Output	10	—	180	170
80	Rectifier	—	—	—	250 A.C.

Line 118 volts 10% variation allowable. Measurements made from tube prongs to circuit ground and made with 1,000 ohms per volt instrument on 500 volt scale, except figures with * which are on 5 volt.

INTERNATIONAL RADIO CORP.

MODEL 36



ALIGNMENT

The standard type of output meter should be used to indicate signal strength. It should be connected from the plate of the 41 to ground. Tone control should be turned "high." The signal from the signal generator must be kept at a very low level.

ESSENTIAL DATA: The intermediate frequency employed is 448 Kc. On both bands the oscillator frequency is 448 kilocycles higher than the signal frequency. Aligning should be done on the following frequencies: Broadcast band, 1400 and 600 Kc.; Short wave band 15 megacycles and 8 megacycles

The four trimmers on the bottom of the chassis are, reading from the side of the chassis by switch toward the center, Short wave antenna, Broadcast antenna, Short wave oscillator and Broadcast oscillator.

INTERMEDIATES: To align the I.F. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. Adjust the first I.F. transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second I.F. transformer. If adjustments are not made accurately, selectivity will be poor and I.F. oscillation may result. Finally, adjust the trimmer on the tuned wave trap for minimum meter reading.

BROADCAST BAND: Place the band change switch on Broadcast position. Turn the dial to 1400 Kc. and feed a very weak 1400 Kc. modulated signal from your signal generator to the antenna. Adjust the Broadcast oscillator trimmer for maximum reading. Then peak Broadcast antenna trimmer to this oscillator setting.

Turn dial and signal generator to 600 Kc. and rock the padder into correct adjustment. This is accomplished by very slowly adjusting the padder condenser and at the same time turning the dial slightly back and forth across 600 Kc. until an adjustment is obtained producing maximum output. Go back to 1400 Kc. and readjust the oscillator trimmer slightly if necessary. Then recheck padder at 600 Kc.

AVERAGE SOCKET VOLTAGES

Tube	Position	E_k	E_{g_3}	E_{g_2}	E_p
76	Oscillator	0	-	-	100
6D6	Detector	4	0	100	230
6D6	I.F.	4.5	4.5	100	230
75	2nd Det. A.V.C.-A.F.	1	-	-	100
41	Output	0	-	230	225
80	Rectifier	-	-	-	118 AC

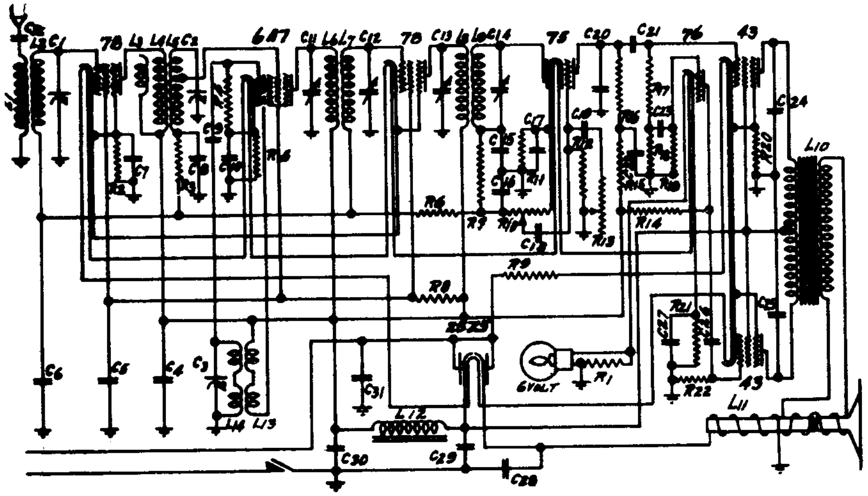
SHORT WAVE BAND: Place the band change switch on the Short Wave position. Turn the dial to 15 megacycles and feed a very weak 15 megacycle modulated signal from your signal generator to the antenna. Adjust the S.W. oscillator trimmer for maximum reading on the output meter. This trimmer should not be touched again when checking alignment on other frequencies. Then peak S.W. antenna trimmer to this oscillator setting.

Instead of bending condenser plates at 8 megacycles alignment is accomplished by spreading or crowding turns on the S.W. detector coil. If much crowding or spreading is necessary it is advisable to go back and recheck at 15 megacycles.

Line 118 volts 10% variation allowable. Measurements made from tube prongs to circuit ground and made with 1000 ohms per volt instrument on 250 volt scale.

LAFAYETTE RADIO MFG. CO.

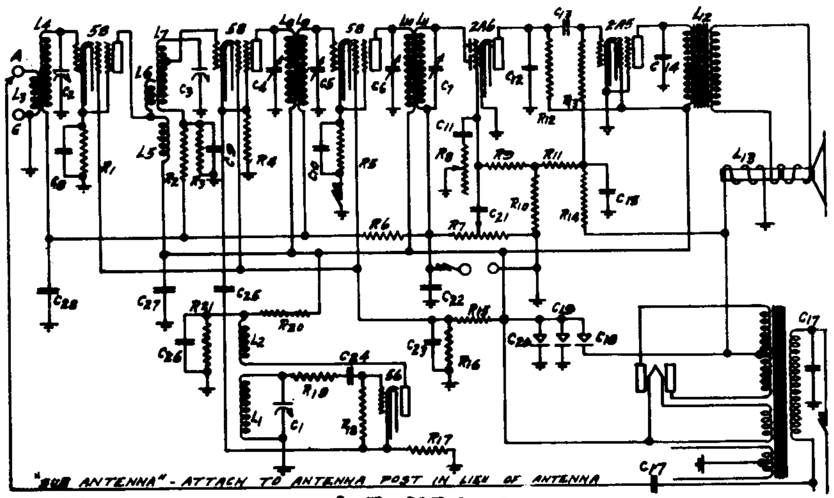
MODEL AM 8



I.F. 175 K.C.

CODE	PART NO.	RESISTORS
R1	1309	13 Ohm Pilot Light Shunt Resistor
R2	1062	250 Ohm R.F. and I.F. Cathode Resistor
R3	923	100,000 Ohm A.V.C. Network Resistor
R4	921	40,000 Ohm Oscillator Grid Leak Resistor
R5	1062	250 Ohm 6A7 Cathode Resistor
R6	926	1 Megohm A.V.C. Network Resistor
R7	898	50,000 Ohm A.V.C. Network Filter Resistor
R8	941	20,000 Ohm 78 & 6A7 Screen Feed Resistor
R9	1119	36 Ohm Filament Series Resistor
R10	1316	500,000 Ohm Volume Control
R11	919	5,000 Ohm 75 Cathode Resistor
R12	925	500,000 Ohm 75 Grid Lead Resistor
R13	1317	250,000 Ohm Tone Control
R14	924	250,000 Ohm 76 Plate Resistor
R15	923	100,000 Ohm 75 Plate Filter Resistor
R16	924	250,000 Ohm 75 Plate Resistor
R17	925	500,000 Ohm 43 Grid Leak Resistor
R18	922	75,000 Ohm Push-pull Network Resistor
R19	925	500,000 Ohm 76 Grid Leak Resistor
R20	1062	250 Ohm 43 Cathode & Screen Resistor
R21	920	10,000 Ohm 76 Cathode Resistor
R22	925	500,000 Ohm 43 Grid Leak Resistor
		CONDENSERS
C1	833	371 MMFD. Preselector Section of 3 Gang Condenser
C2	833	371 MMFD. Preselector Section of 3 Gang Condenser
C3	833	336 MMFD. Oscillator Section of 3 Gang Condenser
C4	266	1. MFD. B Supply By-pass Condenser
C5	272	.1 MFD. Screen By-pass Condenser
C6	272	.1 MFD. A.V.C. By-pass Condenser
C7	272	.1 MFD. R.F. & I.F. Cathode By-pass Condenser
C8	272	.1 MFD. First Detector By-pass Condenser
C9	268	.00025 MFD. Oscillator Coupling Condenser
C10	272	.1 MFD. 6A7 Cathode By-pass Condenser
C11	1104	70-200 MMFD. First I.F. Primary Trimmer Condenser
C12	1105	70-200 MMFD. First I.F. Secondary Trimmer Condenser
C13	1106	70-200 MMFD. Second I.F. Primary Trimmer Condenser
C14	1107	70-200 Second I.F. Secondary Trimmer Condenser
C15	339	.0001 MFD. Diode Filter Condenser
C16	339	.0001 MFD. Diode Filter Condenser
C17	272	.1 MFD. 75 Cathode By-pass Condenser
C18	269	.01 MFD. Volume Control Condenser
C19	269	.01 MFD. Tone Control Condenser
C20	265	.001 MFD. 75 Plate Filter Condenser
C21	269	.01 MFD. Audio Feed Condenser
C22	272	.1 MFD. 75 Hum Filter Condenser
C23	269	.01 MFD. Inverter Feed Condenser
C24	343	.004 MFD. Output Plate Filter Condenser
C25	343	.004 MFD. Output Plate Filter Condenser
C26	269	.01 MFD. Push-pull Coupling Condenser
C27	272	.1 MFD. 76 Cathode By-pass Condenser
C28	1295	4 MFD. Field Supply Filter Condenser
C29	1295	10 MFD. Push-pull Plate Supply Filter Condenser
C29	1065	19 MFD. Push-pull Plate Supply Filter Condenser
C30	1295	4 MFD. B Supply Filter Condenser
C31	272	.1 MFD. Power Line By-pass Condenser
		INDUCTANCES
L1	1138	Preselector Primary 450 Turns #36 S.S.E.
L2	1138	Preselector Secondary 144 Turns #36 D.C.C.
L3	1213	Detector Primary Condenser Winding 32 Turns #36 S.S.E.
L4	1213	Detector Primary 450 Turns #36 S.S.E.
L5	1213	Detector Secondary 91 and 108 Turns #36 D.C.C.
L6	1101	8,000 Microhenry First I.F. Primary 175 K.C.
L7	1101	8,000 Microhenry First I.F. Secondary
L8	1101	8,000 Microhenry Second I.F. Primary 175 K.C.
L9	1101	8,000 Microhenry Second I.F. Secondary
L10		43 Push-pull Output Transformer
L11		2,500 Ohm Speaker Field
L12	940	20 Henry Filter Choke
L13	1111	Oscillator Primary 35 Turns & 15 Turns #36 S. S.E.
L14	1111	Oscillator Secondary 72 Turns & 50 Turns #36 D.C.C.

MODEL A 20

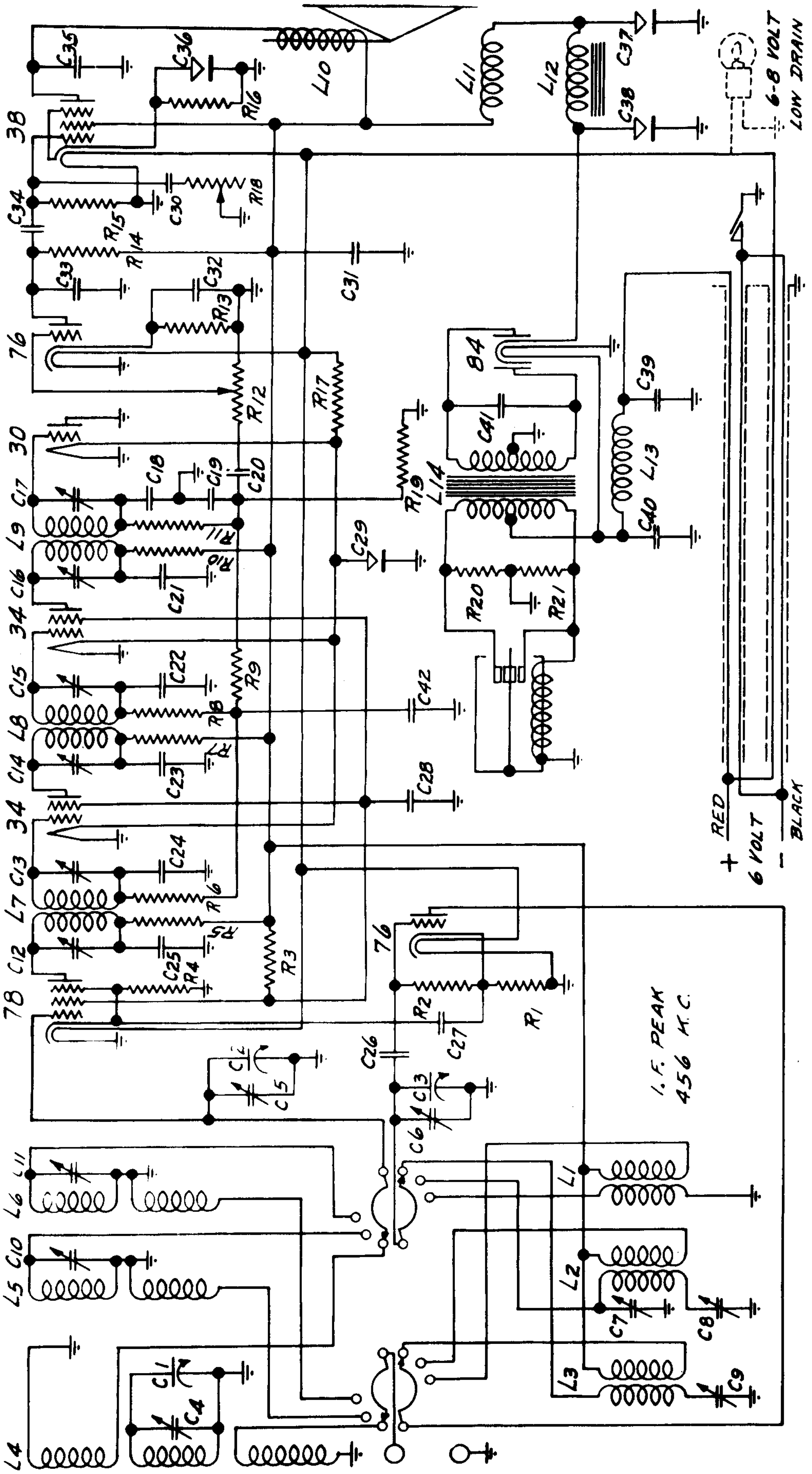


I.F. 175 K.C.

CODE	PART NO.	RESISTORS
R1	1061	150 Ohm First Preselector Cathode Resistor
R2	926	500,000 Ohm First Detector Grid Feed Resistor
R3	924	250,000 Ohm First Detector Grid Stablizer Resistor
R4	1144	2,000 Ohm First Detector Cathode Resistor
R5	1061	150 Ohm First I.F. Cathode Resistor
R6	925	1 Megohm A.V.C. Network Resistor
R7	555	500,000 Ohm Volume Control and A.C. Switch
R8	554	250,000 Ohm Tone Control
R9	925	500,000 Ohm Second Detector Grid Resistor
R10	944	10,000 Ohm Grid Bias Network Resistor
R11	923	100,000 Ohm Grid Bias Network Resistor
R12	923	100,000 Ohm Second Detector Plate Resistor
R13	923	100,000 Ohm Output Grid Resistor
R14	1835	700,000 Ohm Grid Bias Network Resistor
R15	357	20,000 Ohm Screen Feed Resistor (Type E)
R16	921	40,000 Ohm Screen Stablizer Resistor
R17	1065	1,000 Ohm Oscillator Cathode Resistor
R18	923	100,000 Ohm Oscillator Grid Resistor
R19	1065	1,000 Ohm Oscillator Grid Suppressor Resistor
R20	357	20,000 Ohm Oscillator Plate Resistor (Type E)
R21	921	40,000 Ohm Oscillator Plate Stablizer Resistor
		CONDENSERS
C1	833	336 MMFD. Oscillator Section of 3 Gang Condenser
C2	833	371 MMFD. First Preselector Section of 3 Gang Condenser
C3	833	371 MMFD. Second Preselector Section of 3 Gang Condenser
C4	238	75 - 150 MMFD. First I.F. Primary Trimmer
C5	239	75 - 150 MMFD. First I.F. Secondary Trimmer
C6	238	75 - 150 MMFD. Second I.F. Primary Trimmer
C7	239	75 - 150 MMFD. Second I.F. Secondary Trimmer
C8	272	.1 MFD. First R.F. Cathode Condensers 200 V.D.C. Paper
C9	272	.1 MFD. First Detector Grid Isolation Condenser
C10	272	.1 MFD. First I.F. Cathode Condenser
C11	269	.01 MFD. Tone Control Condenser
C12	265	.001 MFD. Second Detector Plate Filter Condenser
C13	269	.01 MFD. Audio Feed Condenser
C14	343	.004 MFD. Output Plate Filter Condenser
C15	267	.5 MFD. C Bias By-pass Condenser
C16	269	.01 MFD. Power Line By-pass Condenser
C17	307	.0005 MFD. Subantenna Condenser
C18	533	4 MFD. Electrolytic Filter Condenser 500 Volt
C19	533	4 MFD. Electrolytic Filter Condenser 500 Volt
C20	721	8 MFD. Electrolytic Filter Condenser
C21	269	.01 MFD. First Detector Grid Feed Condenser
C22	307	.0005 MFD. A.V.C. Feed Filter Condenser
C23	272	.1 MFD. Screen Grid By-pass Condenser 200 V. D.C. Paper
C24	339	.0001 MFD. Oscillator Grid Feed Condenser
C25	269	.01 MFD. Oscillator Coupling Condenser
C26	272	.1 MFD. Oscillator Plate By-pass Condenser
C27	266	1. MFD. B Supply By-pass Condenser-300 V. D.C. Paper
C28	272	.1 MFD. R.F. & I.F. Grid Isolation Condenser 200 V. D.C. Paper
		INDUCTANCES
L1		Oscillator Secondary 83 Turns #32 P.E.
L2	549	Oscillator Plate 20 Turns #36 P.E.
L3		First Preselector Primary 175 Turns #36 U.W. S.S.E.
L4	792	First Preselector Secondary 118 Turns #32 P.E.
L5		Second Preselector Primary U.W. 425 Turns #36 P.E.
L6	793	Second Preselector Tertiary 5 Turns #36
L7		Second Preselector Secondary 118 Turns #32 P.E.
L8		First I.F. Primary 6,000 Microhenries
L9	260	First I.F. Secondary 6,000 Microhenries
L10		Second I.F. Primary 6,000 Microhenries
L11	260	Second I.F. Secondary 6,000 Microhenries
L12		Output Transformer
L13		2,500 Ohm Speaker Field

LAFAYETTE RADIO MFG. CO.

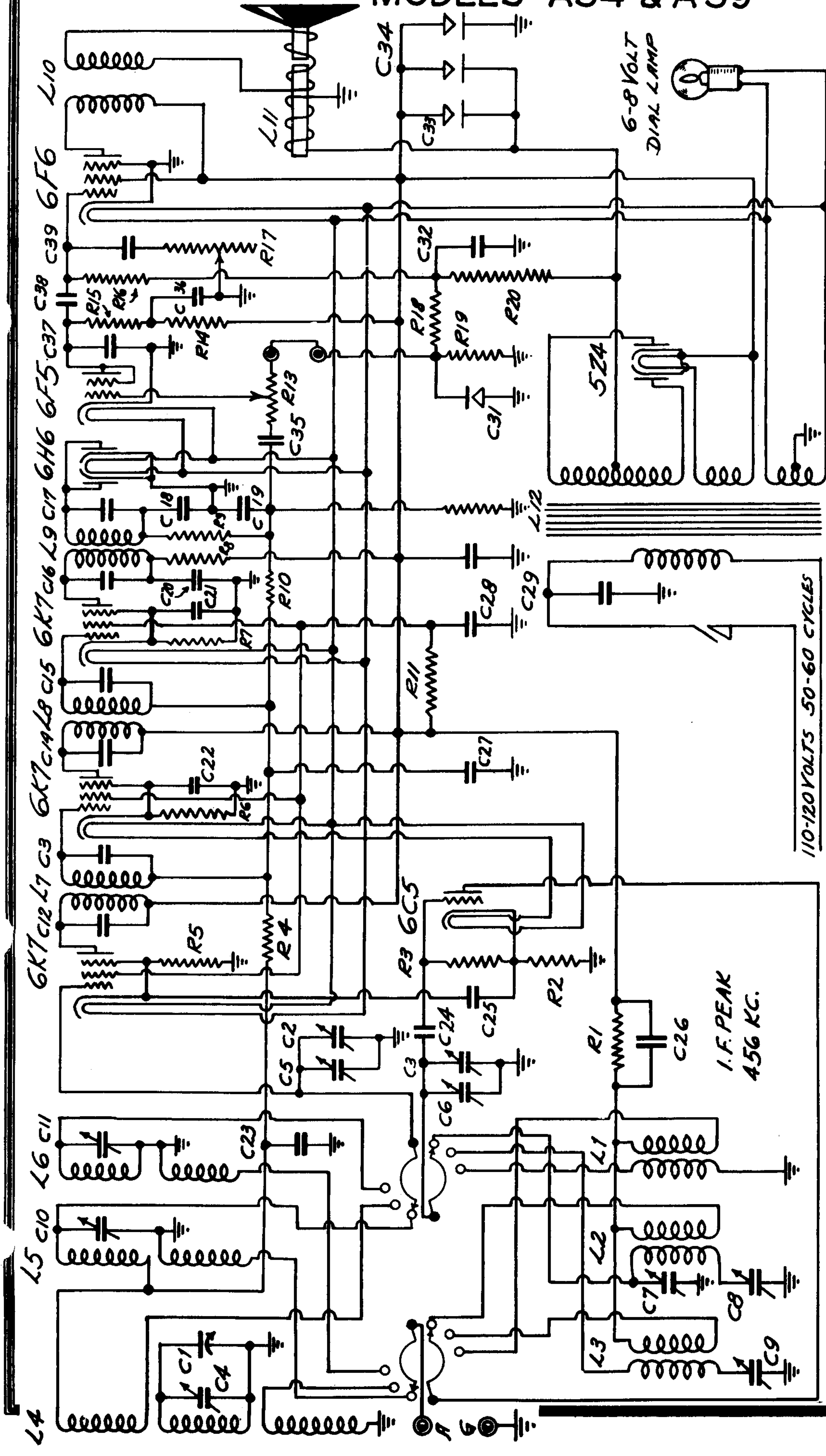
MODELS A54 & A55



WAVE TRAP ADJUSTMENT - The rear section of the gang tuning condenser is part of the image frequency **wave** trap. This is always tuned to a frequency of 912 kc. above that of the preselector circuit. Tracking is accomplished by adjusting the trimmer on the top of the rear section of the gang tuning condenser. This adjustment must be made with the signal generator set at 2312 kc. **A** strong signal from the signal generator is necessary. **With** the receiver set at 1400 kc. the trimmer should be adjusted for **MINIMUM** response.

LAFAYETTE RADIO MFG. CO.

MODELS A34 & A39



The rear section of the tuning gang condenser is part of the image frequency trap. This trap is always tuned to a frequency of 912 kc. (twice the intermediate frequency) above that of the preselector circuit. It is aligned by means of the rear trimmer of the condenser gang. The receiver is tuned to 1400 kc. and the volume control set at maximum. The signal generator should be set at 2312 kc. and adjusted for a strong signal. The output is connected between the antenna and ground posts of the receiver. The trap trimmer should then be adjusted for <u>minimum</u> receiver output.

ADJUSTMENT OF 456 K.C. I. F. TRAP

LAFAYETTE RADIO MFG. CO.

MODELS A54 & A55

R1	53-1062	250 Ohm Oscillator Cathode Resistor
R2	53-941	20,000 " " Grid "
R3	53-941	20,000 " R.F. and I.F. Screen "
R4	53-1144	2,000 " First Detector Cathode"
R5	53-919	5,000 " " " Plate Isolation Resistor
R6	53-923	100,000 " " I.F. Grid Isolation Resistor
R7	53-919	5,000 " " I.F. Plate " "
R8	53-923	100,000 " Second I.F. Grid " "
R9	53-926	1 Meg. Ohm A.V.C. Network Resistor
R10	53-919	5,000 " Second I.F. Plate Isolation Resistor
R11	53-898	50,000 " Diode Filter Resistor
R12	19-1291	500,000 " Volume Control & Switch
R13	53-920	10,000 " First Audio Cathode Resistor
R14	53-923	100,000 " " " Plate "
R15	53-925	500,000 " Output Grid Resistor
R16	53-2003	2,000 " " Cathode "
R17		20 " I.F. & Second Det. Filament Series Resis.
R18	19-1317	250,000 " Tone Control
R19	53-925	500,000 " Diode Load Resistor
R20	53-1061	150 " Vibrator Filter Resistor
R21	53-1061	150 " " " "

C1	77-1581	16-366 MMFD. First Preselector Section of 3 Gang Cond.
C2	77-1581	16-366 " Second Preselector Section of 3 Gang Cond.
C3	77-1581	16-366 " Oscillator Section of 3 Gang Condenser
C4	77-1581	Broadcast First Preselector Trimmer on C1
C5	77-1581	" Second " " " C2
C6	77-1581	" Oscillator Trimmer on C3
C7	78-1588	3-30 MMFD. Police Band Osci. Parallel Trimmer
C8	78-1572	1600 " " " Series "
C9	78-1572	600 " Broadcast Oscillator " "
C10	78-1588	3-30 " Police Band Preselector Trimmer
C11	78-1588	3-30 " Foreign " " "
C12	78-1561	70-120 MMFD. First I.F. Primary Trimmer
C13	78-1561	70-120 " " " Secondary "
C14	78-1561	70-120 " Second " Primary "
C15	78-1561	70-120 " Second " Secondary "
C16	78-1561	70-120 " Third " Primary "
C17	78-1561	70-120 " Third " Secondary "
C18	76-2001	.0001 Mfd. Mica Diode Filter Condenser
C19	76-2001	.0001 " " " " " "
C20	75-2003	.01 Mfd. 400 Volt Audio Feed Condenser
C21	75-2003	.01 " 400 " Second I.F. Plate Isolation Cond.
C22	75-2003	.01 " 400 " " " Grid " "
C23	75-2003	.01 " 400 " First " Plate " "
C24	75-2003	.01 " 400 " " " Grid " "
C25	75-2003	.01 " 400 " First Det. Plate Isolation Condenser
C26	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C27	75-2003	.01 Mfd. 400 Volt Oscillator Coupling Condenser
C28	75-2011	.5 " 200 " Screen By-Pass Condenser
C29	18-928	25 " 25 " Dry Electrolytic Condenser
C30	75-2003	.01 " 400 " Tone Control Condenser
C31	75-2013	1. Mfd. 400 " B. Supply By-Pass Condenser
C32	75-2011	.5 Mfd. 200 Volt First Audio Cathode By-Pass
C33	76-662	.002 Mfd. Mica First Audio Plate Filter
C34	75-2003	.01 Mfd. 400 Volt Audio Feed Condenser
C35	75-2001	.002 " 600 " Output Plate Filter
C36	18-928	25 " 25 " Dry Electrolytic Condenser
C37	18-1327	6. Mfd. 250 " " " "
C38	18-1327	6. " 350 " " " "
C39	75-2011	.5 " 200 " Eliminator Supply Filter Cond.
C40	75-2011	.5 " 200 " " " " "
C41	75-1325	.015 Mfd. 1000 Volt Wave Form Condenser
C42	75-2005	.1 Mfd. 200 Volt A.V.C. Network By-Pass Condenser

MODELS A34 & A39

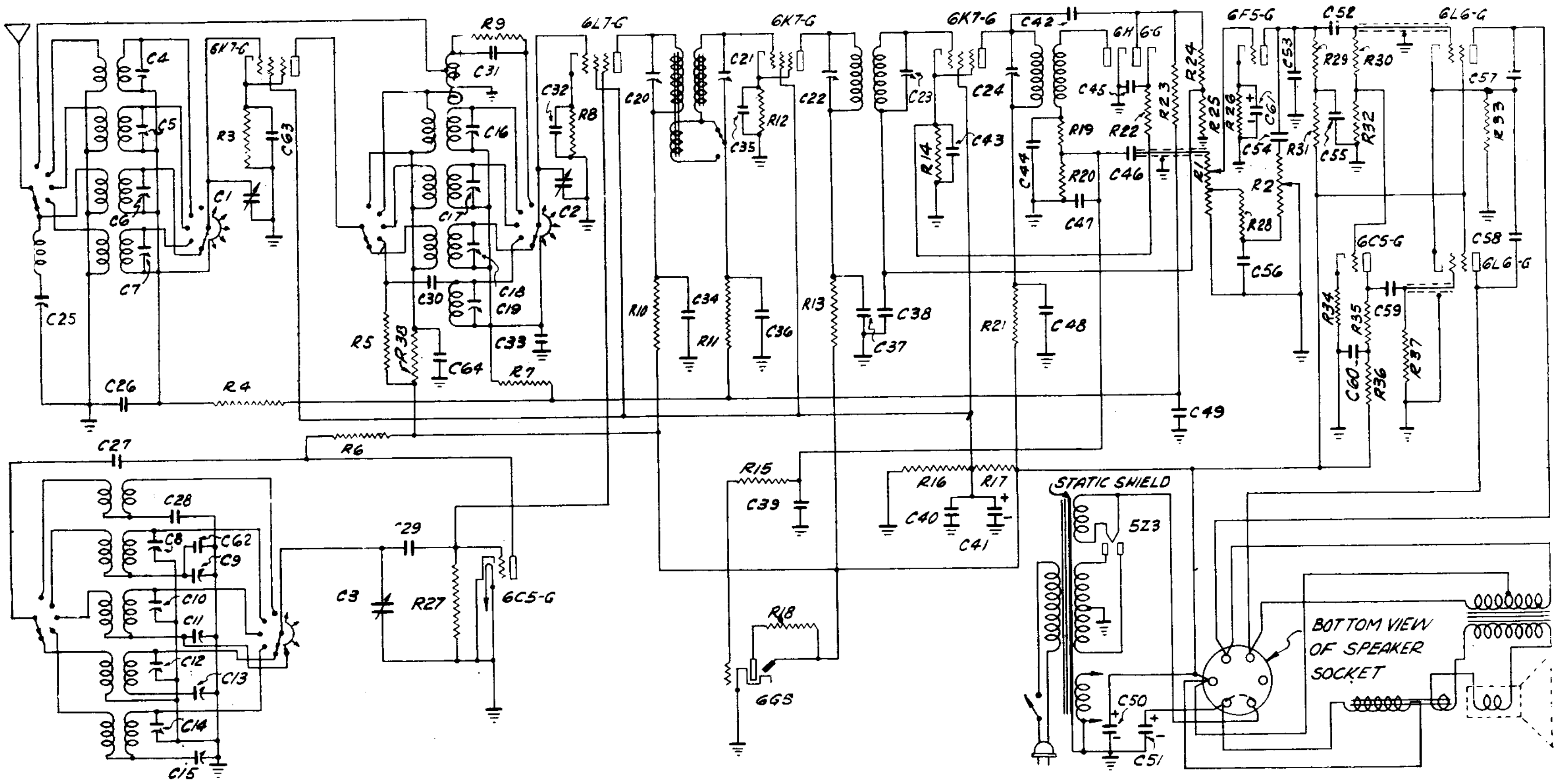
R1	53-277	10,000 Ohm Oscillator Plate Resistor
R2	53-1062	250 " " Cathode "
R3	53-941	20,000 " " Grid "
R4	53-923	100,000 " A.V.C. Network Resistor.
R5	53-1144	2,000 " First Detector Cathode Resistor
R6	53-1063	500 " " I.F. " "
R7	53-1063	500 " Second " " "
R8	53-919	5,000 " " " Plate Isolation Resistor
R9	53-898	50,000 " Diode Filter Resistor
R10	53-926	1 Megohm A.V.C. Network "
R11	53-494	75,000 Ohm Screen Resistor
R12	53-925	500,000 " Diode Load Resistor
R13	19-1291	500,000 " Volume Control & Switch
R14	53-923	100,000 " First Audio Plate Hum Resistor
R15	53-924	250,000 " " " " Resistor
R16	53-925	500,000 " Output Grid Resistor
R17	19-1317	250,000 " Tone Control
R18	53-924	250,000 " C Bias Network Resistor
R19	53-1042	25,000 " C " " "
R20	53-926	1 Megohm C Bias Network Resistor

C1	77-1581	16-366 MMFD. First Preselector Section of 3 Gang Cond.
C2	77-1581	16-366 " Second Preselector " " " "
C3	77-1581	16-366 " Oscillator Section of 3 Gang Condenser
C4	77-1581	First Preselector Trimmer on C1
C5	77-1581	Second " " on C2
C6	77-1581	Oscillator Trimmer on C3
C7	78-1588	3-30 MMFD. Long Wave Oscillator Parallel Trimmer
C8	78-1572	1600 " " " " Series "
C9	78-1572	600 " Broadcast " " "
C10	78-1588	3-30 " Long Wave Preselector Trimmer
C11	78-1588	3-30 " Foreign Wave " "
C12	78-1561	70-120 MMFD. First I.F. Primary "
C13	78-1561	70-120 " " " Secondary "
C14	78-1561	70-120 " Second " Primary "
C15	78-1561	70-120 " " " Secondary "
C16	78-1561	70-120 " Third " Primary "
C17	78-1561	70-120 " " " Secondary "
C18	76-2001	.0001 Mfd. Mica Diode Filter Condenser
C19	76-2001	.001 " " " " "
C20	75-2003	.01 " 400 Volt Second I.F. Plate Isolation Cond.
C21	75-2005	.1 Mfd. 200 Volt " " Cathode By-Pass "
C22	75-2005	.1 " " " First I.F. Cathode By-Pass Conden.
C23	75-2005	.1 " " " A.V.C. Network By-Pass Condenser
C24	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C25	75-2003	.01 Mfd. 400 Volt Oscillator Coupling Condenser
C26	75-2003	.01 " " " " Plate Isolation Condenser
C27	75-2005	.1 Mfd. 200 Volt A.V.C. Network By-Pass Condenser
C28	75-2007	.1 " 400 " Screen By-Pass Condenser
C29	75-2003	.01 " 400 " Power Line By-Pass Condenser
C30	75-2013	1. Mfd. 400 Volt B Supply By-Pass Condenser
C31	18-928	25 " 30 Volt C Bias Network Condenser
C32	75-2008	.2 " 200 " C " " "
C33	18-2004	4 " 450 W.V. Dry Electrolytic Condenser
C34	18-2003	4-4 " Dry Electrolytic Condenser
C35	75-2003	.01 Mfd. 400 Volt Audio Feed Condenser
C36	75-2007	.1 " 400 " 6F5 Plate Hum Filter
C37	76-265	.001 " Mica 6F5 Plate By-Pass Condenser
C38	75-2003	.01 " 400 Volt Audio Feed Condenser
C39	75-2003	.01 " 400 Volt Tone Control Condenser

MAJESTIC RADIO & TELEVISION COMPANY

MODEL 1250

SCHEMATIC WIRING DIAGRAM



I.F. 456 K.C.

VOLTAGE CHART							
Position	Tube	Ef	Ek	Eg Screen	Eg Suppressor	Ep Triode	Ep Pentode
R. F. Amplifier	6 K7G	6.3	3.5	85.0	Tied to Cathode		278.0
1st I. F. Amplifier	6 K7G	6.3	5.0	85.0	Tied to Cathode		275.0
Converter	6 L7G	6.3	3.5				275.0
Oscillator	6 C5G	6.3				100.0	
2nd I. F. Amplifier	6 K7G	6.3	5.0	85.0	Tied to Cathode		275.0
Detector A.V.C.	6 H6G	6.3	2.5				
1st Audio	6 F5G	6.3	1.5			200.0	
Phase Inverter	6 C5G	6.3	3.5			75.0	
Audio Output	6 L6G	6.3	22.0	280.0			275.0
Audio Output	6 L6G	6.3	22.0	280.0			275.0
Rectifier	5 Z3	5 0					

MAJESTIC RADIO & TELEVISION COMPANY

MODEL 1250

ALIGNMENT PROCEDURE

Correct alignment is of extreme importance in all-wave receivers. The receivers are properly aligned at the factory with precision equipment and realignment should not be attempted by the service technician until all other causes of faulty operation are corrected.

In order to properly realign the receiver the following equipment is necessary:

1. A signal generator which will provide an accurately calibrated signal at any frequency from 456 kilocycles to 18 megacycles. The generator should have adjustable signal output.
2. An output audio voltmeter of the low voltage type to be connected across the moving coil of the speaker. This should be capable of providing a readable deflection for relatively low output levels to avoid the effects of overload.
3. An insulated or non-metallic screw driver for the adjustment of trimmers.

I. F. ALIGNMENT 456 KC

1. Connect the output meter (low scale) across the loud speaker voice coil. Turn the wave band switch to extreme clockwise position (broadcast band). Turn the volume control to maximum position. Rotate the hi-fidelity switch to the counter-clockwise position and the volume control to the "treble" or clockwise position.
2. Connect the test oscillator ground to chassis and the "hot" lead from the oscillator to the grid of the 6L7 converter tube through a series .1 mfd. condenser. Set test oscillator to 456.0 KC.
3. Adjust I. F. alignment screw of 3rd I. F. assembly, at rear of chassis, to maximum output, reducing output of test oscillator to keep meter reading on scale as alignment proceeds.
4. Adjust I. F. alignment screws of 2nd I. F. transformer adjacent to 3rd I. F. transformer, for maximum output as described above.
5. Adjust alignment screws of 1st I. F. transformer, near front of chassis, for maximum output as described above.
6. Re-adjust alignment screws of all three transformers to make sure of accurate alignment. Always use lowest possible output of test oscillator to preclude the possibility of the automatic volume control action confusing correct alignment.

WAVE TRAP ADJUSTMENT

1. With test oscillator still set at 456.0 KC remove series condenser from grid of 6L7 converter tube and substitute a 200 mfd. condenser in its place.
2. Connect test oscillator lead to antenna post of receiver.
3. Keep variable condenser at maximum capacity position with wave band switch in broadcast position.
4. Raise output of test oscillator until a half scale meter deflection is obtained.
5. Adjust trimmer No. C-25 (located on chassis) until the meter reading is at the minimum deflection (toward zero).

BROADCAST BAND—535-1720 KC

1. Set test oscillator to 1600 KC. Connect oscillator to receive through a 200 mmfd. condenser.
2. Rotate wave band switch to full clockwise direction.
3. Set dial scale to 1600 KC, and adjust trimmer C-19 to a resonance.
4. Adjust trimmer C-18 for maximum response.
5. Adjust trimmer C-6 for maximum response.
6. Set test oscillator to 600 KC.
7. Set dial scale to 600 KC and adjust padding condenser C-13 for maximum response "rocking" gang condenser while adjustment is made, to obtain proper resonance.
8. Repeat the adjustments at 1600 KC to obtain greater accuracy.

WEATHER BAND—140-410 KC

1. Set test oscillator to 400 KC. Use 200 mmfd. condenser in series with oscillator lead.
2. Rotate wave band switch one position in counter-clockwise direction.
3. Set dial scale to 400 KC and adjust trimmer C-14 to a resonance.
4. Adjust trimmer C-19 to a mixmum response.
5. Adjust trimmer C-7 to a maximum response.
6. Set test oscillator to 160 KC.
7. Set dial scale to 160 KC and adjust padding condenser C-15 to maximum response, "rocking" gang condenser while adjustment is made, to obtain proper resonance.

POLICE BAND—1.7-5.8 Megacycles

1. Set test oscillator to 5.5 megacycles, (400 ohm resistor in series with oscillator lead).
2. Rotate wave band switch counter-clockwise one position.
3. Set dial scale to 5.5 megacycles, and adjust C-10 to a resonance. The resonance obtained with the trimmer in the low capacity direction, being the correct one.
4. Adjust trimmer C-17 to a maximum response, "rocking" gang condenser while adjustment is made, to obtain proper resonance.
5. Adjust trimmer C-5 to a maximum response, "rocking" gang condenser while adjustment is made, to obtain proper resonance.
6. Set test oscillator to 2.0 megacycles.
7. Set dial scale to 2.0 megacycles, and adjust padding condenser C-11 for maximum response, "rocking" gang condenser while adjustment is made, to obtain proper resonance.
8. Repeat the adjustments at 5.5 megacycles to obtain greater accuracy.

FOREIGN BAND—5.6-18.0 Megacycles

1. With test oscillator connected to the antenna and ground terminals through a 400 ohm resistor, set oscillator at 16.0 megacycles.
2. Rotate the wave band switch to the 4th position in the counter-clockwise position. Set dial scale to 16.0 megacycles.
3. Adjust oscillator trimmer C-8 to a resonance. There will possibly be two resonant points noticed. The one obtained with the trimmer out in the minimum capacity direction, is the correct one.
4. Adjust trimmer C-16 to maximum response, "rocking" the gang condenser back and forth a degree or two to obtain proper resonance.
5. Adjust trimmer C-4 to maximum response, "rocking" gang condenser while trimming to obtain proper resonance.
6. Set test oscillator to 6.0 megacycles.
7. Set dial scale to 6.0 megacycles, and adjust padding condenser C-9 until a maximum response is obtained, "rocking" the gang condenser while adjustment is made to obtain proper resonance.
8. Return to 16.0 megacycles and check adjustment of C-8, C-16, and C-4 to make certain that the adjustment of C-9 has not disturbed their adjustments.

ULTRA HIGH FREQUENCY BAND 16.5-42.0 Megacycles

The alignment of this band is fixed at the factory and does not have any adjustments to be made in the field.

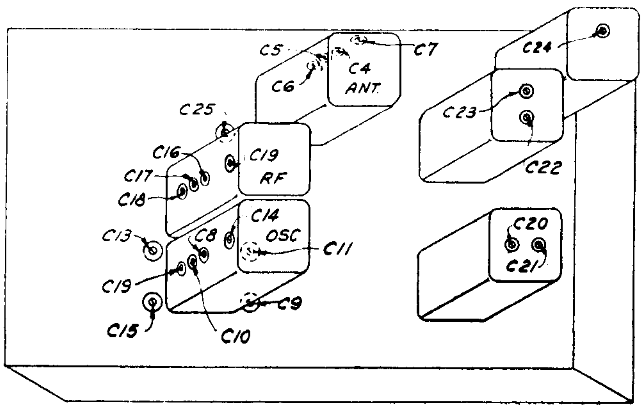


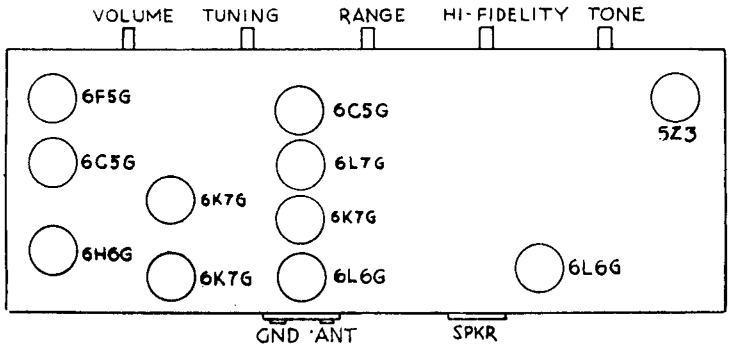
Fig. 2 Location of Trimmers

MAJESTIC RADIO & TELEVISION COMPANY

REPLACEMENT PARTS MODEL 1250

State serial number of receiver when ordering parts.

SCHEMATIC LOCATION	PART. NO.	DESCRIPTION
	15089	Bulb Pilot Light (edgelight)
	16589	Bulb Pilot Light Frosted (travelite)
C1 C2 C3	C-16543-2	Condenser Variable Gang
C4 C5 C6	A-16552	Condenser Trimmer 5-50 Mmfd. (triple strip)
C7 C14 C19	A-16667-2	Condenser Trimmer 8-80 Mmfd. (bakelite base)
C16 C17 C18	A-16552	Condenser Trimmer 3-30 Mmfd. (triple strip)
C8 C10 C12	A-16552	Condenser Trmimer 3-30 Mmfd. (triple strip)
C13	B-16603	Condenser Padder 300-700 Mmfd.
C9	B-16604	Condenser Padder 1000-3000 Mmfd.
C11	B-16605	Condenser Padder 600-1800 Mmfd.
C11	B-16606	Condenser Padder 100-300 Mmfd.
C25	B-16786	Condenser Padder 20-55 Mmfd.
C20 C21	B-16610-2	Condenser Trimmer (part of 1st I. F. assembly)
C22 C23	B-16611-3	Condenser Trimmer (part of 2nd I. F. assembly)
C24	B-16612-3	Condenser Trimmer (part of 3rd I. F. assembly)
C50 C51	B-16613-2	Condenser Dry Electrolytic Dual 12 Mfd. 350 V.
C41 C61	B-16614-3	Condenser Tubular Dry Electrolytic Dual 8-10 Mfd. 200-12 V.
C44 C47	15918	Condenser Mica 100 Mmfd. 20% type O
C29	15919	Condenser Mica 50 Mmfd. 10% Type O
C53	15928	Condenser Mica 250 Mmfd. 20% Type O
C42	15929	Condenser Mica 50 Mmfd. 20% Type O
C62	15932	Condenser Mica 17500 Mmfd. 5% Type W
C54	15933	Condenser Mica 4000 Mmfd. 20% Type W
C28 C31	15935	Condenser Mica 650 Mmfd. 20% Type W
C30	15938	Condenser Mica 10 Mmfd. 20% Type G
C26 C33 C49	15752	Condenser Tubular .05 Mfd. 200 volts
C63 C32 C35 C43	15752	Condenser Tubular .05 Mfd. 200 volts
C45 C38 C36	15752	Condenser Tubular .05 Mfd. 200 volts
C46 C57 C58	15753	Condenser Tubular .002 Mfd. 600 volts
C34 C64	15756	Condenser Tubular .05 Mfd. 400 volts
C40 C48 C37	15757	Condenser Tubular .1 Mfd. 400 volts
C55 C60 C52 C59	15760	Condenser Tubular .02 Mfd. 400 volts
C39	15763	Condenser Tubular .01 Mfd. 200 volts
C56	15772	Condenser Tubular .02 Mfd. 200 volts
C27	15774	Condenser Tubular .002 Mfd. 400 volts
R1	B-16565-2	Control Volume with 110 switch
R2	B-16566-2	Control Tone
	A-16541-2	Control High Fidelity
	16890	Coil Antenna in Shield
	16891	Coil Detector in Shield
	16892	Coil Oscillator in Shield
	A-16596	Knob (tune and high fidelity)
	A-16598	Knob (volume and tone)
	A-16597	Knob (band switch)
R28 R19	15510	Resistor Carbon 20,000 +-20% ¼ watt
R35 R5	15511	Resistor Carbon 50,000 +-20% ¼ watt
R25 R29	15512	Resistor Carbon 250,000 +-20% ¼ watt
R16	15560	Resistor Carbon 25,000 +-10% ½ watt
R7 R4 R31 R36 R11	15515	Resistor Carbon 100,000 +-20% ¼ watt
R23 R15	15517	Resistor Carbon 1 meg. +-20% ¼ watt
R9 R20 R24	15520	Resistor Carbon 500,000 +-20% ¼ watt
R22	15531	Resistor Carbon 10,000 +-20% ¼ watt
R3 R8	15533	Resistor Carbon 600 +-10% ¼ watt
R27	15552	Resistor Carbon 30,000 +-20% ¼ watt
R32	15557	Resistor Carbon 20,000 +-10% ¼ watt
R6	15514	Resistor Carbon 25,000 +-20% ½ watt
R30	15561	Resistor Carbon 150,000 +-10% ¼ watt
R10 R13 R21 R38	15564	Resistor Carbon 1,500 +-20% ¼ watt
R26	15565	Resistor Carbon 4,000 +-10% ¼ watt
R37	15605	Resistor Carbon 100,000 +-10% ¼ watt
R34	15611	Resistor Carbon 3,000 +-10% ¼ watt
R17	15618	Resistor Carbon 20,000 +-10% 2 watt
R14	15566	Resistor Carbon 2,000 +-10% ¼ watt
R12	15576	Resistor Carbon 5000-2 +-10% ¼ watt
R33	A-16785	Resistor Candohm 220 ohm 3 watt
	15248	Socket Speaker
	B-16637-2	Socket 6G5 with leads
	C-16581-2	Speaker 15"
	B-16610-2	Transformer 1st I. F.
	B-16611-3	Transformer 2nd I. F.
	B-16612-3	Transformer 3rd I. F.
	C-16578-4	Transformer Power 110 v. 50-60 cycle
	A-16701	Trap Wave
	A-1954	Washer Felt (large)
	A-1955	Washer Felt (small)
	17304	Drive and Indicator Assembly
	17303	Dial Glass
	17161	Dial Glass Backing
	17384	Escutcheon No. 4 with Indicator Lens
	A-17114	Socket Pilot Light, Edgelight R. H.
	A-17115	Socket Pilot Light, Edgelight L. H
	A-17168	Socket Pilot Light, Travelite

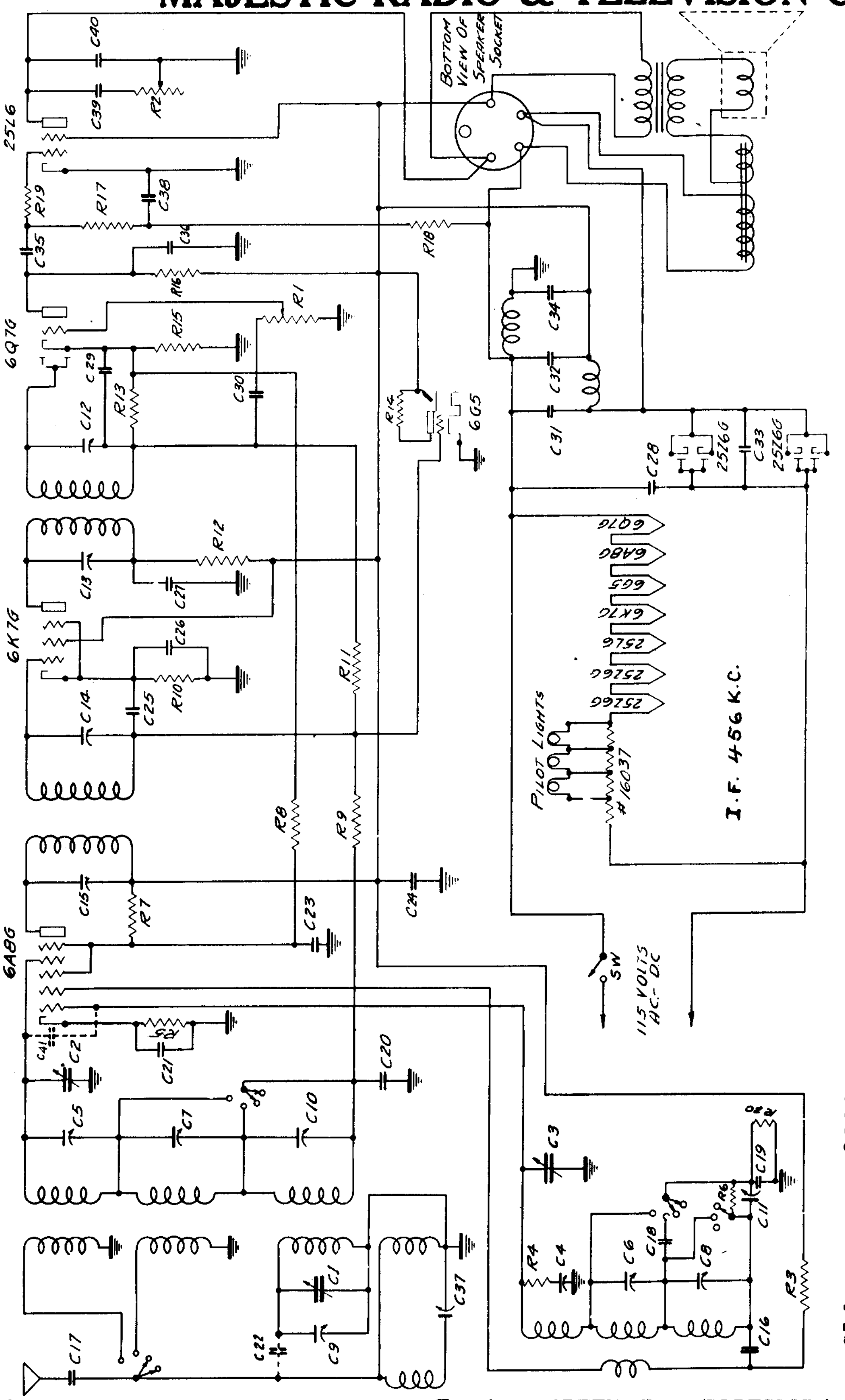


REPLACING DIAL LIGHTS

Three 6.3 volt dial lamps are used. Two lamps are clipped to the top of the dial in a position easily reached for replacement. The third dial lamp is in the traveling indicator. To replace this lamp: tune receiver to approximately 600 kilocycles, turn off the receiver and pull light and socket out of its housing.

MAJESTIC RADIO & TELEVISION COMPANY

MODEL 800



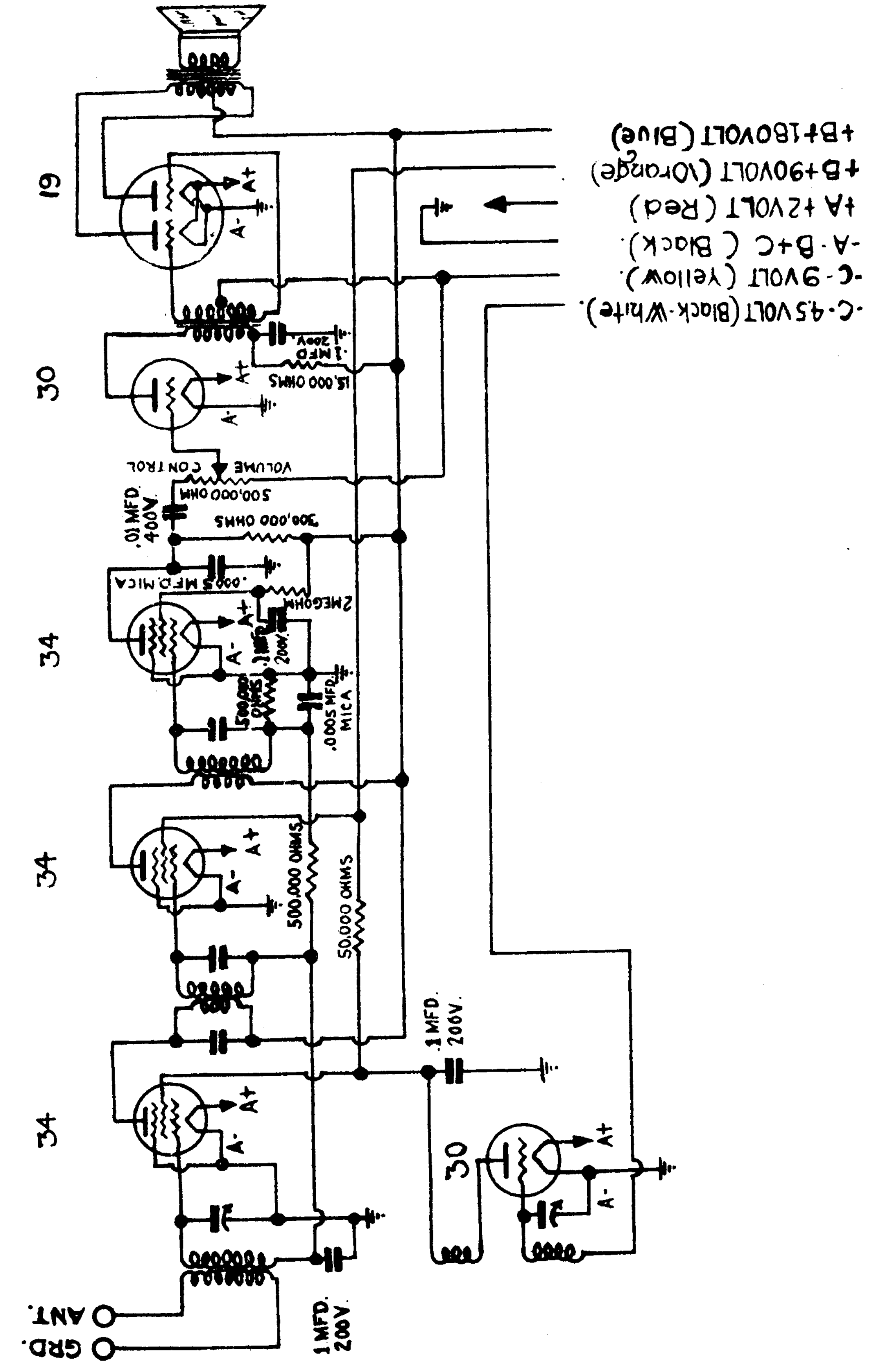
C16	2000 Mmf.	C33	.01 Mf. 400 V.	R7	12,500 Ohms
C17	.001 Mf.	C34	.25 " 150 V.	R8	20,000 "
C18	1750 Mmf.	C36	100 Mmf.	R9 R19	100,000 "
C19	4300 "	C37	20-55 "	R11	1 Megohm
C20 C24 C25	.05 Mf.	C38	.25 Mf. 200 V.	R12	1,000 Ohms
C26 C27	.05 "	C40	.02 " 400 V.	R13 R14	500,000 "
C21 C23	.1 "	R1	Vol. Control 1 Megohm	R15	500 "
C28 C39	.1 "	R2	Tone " 15,000 Ohms	R16	150,000 "
C29	250 Mmf.	R3	10,000 Ohms	R17	300,000 "
C30 C35	.02 Mf.	R4	2 "	R18	200,000 "
C31	40 Mf. 150 V.	R5 R10	600 "		
C32	40 " 150 V.	R6 R20	25,000 "		

POSITION	TUBE	Ef	Ek	Eg SCREEN	Ep SUPPRESSOR	Ep OSC.	Ep PENTODE
Converter	6A8G	6.3	2.4	54.0		85	110
I. F. Amplifier	6K7G	6.3	3.8	110.0	3.8		104
Det. AVC	6Q7G	6.3	.95				57 "C"
Power Output	25L6	25	"B"	110.0			103
Rectifier	(2) 25L6G	25					110
Tuning Eye	6G5	6.3	"O"				110
Ballast	A-16037	"A"					

All voltage shown on chart measured to chassis, with receiver connected to 117 volt 60 cycle line. Cathode, screen, suppressor and plate voltages when operating from 117 volt D. C. line will be 10 percent lower.
"A" Pin No. 3 to No. 7—17.0 volts a.c.
"B" 8 volts measured across 2nd filter choke
"C" Measured with 250,000 voltmeter.

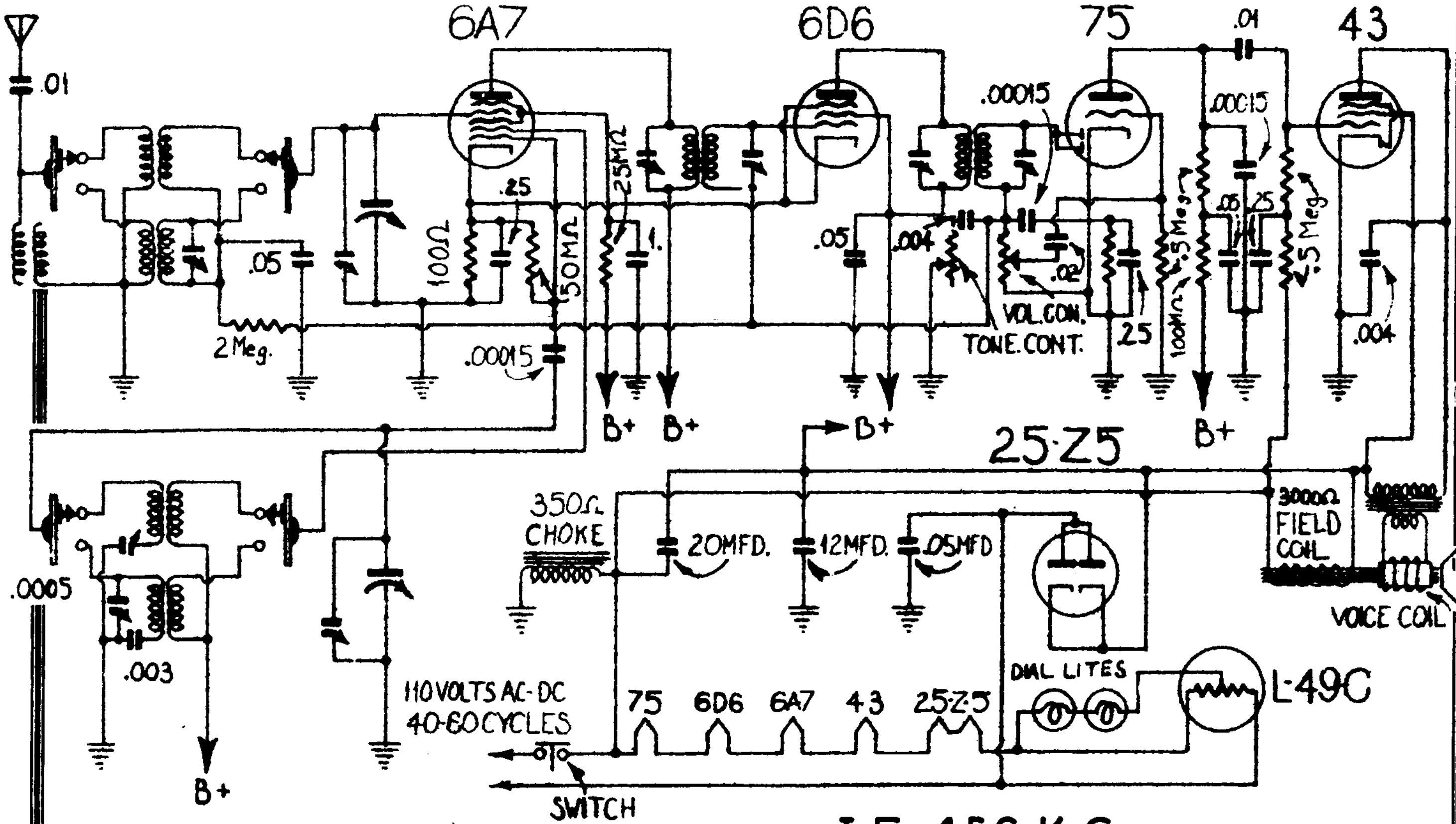
MIDWEST RADIO CORP.

MODEL 6-TUBE BATTERY SET

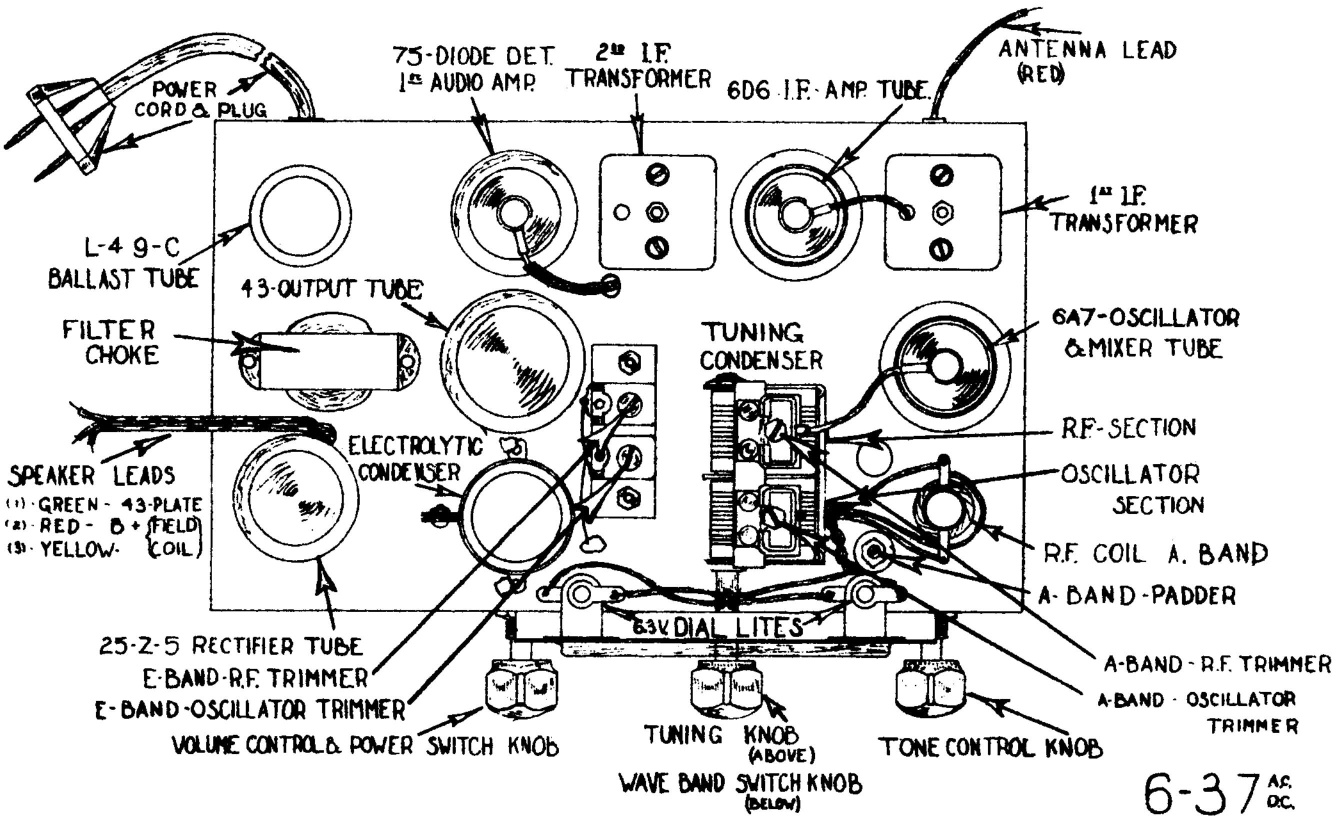


MIDWEST RADIO CORP.

MODEL 6-37 A.C.-D.C.



I.F. 456 K.C.



6-37 AC. DC.

MIDWEST RADIO CORP.

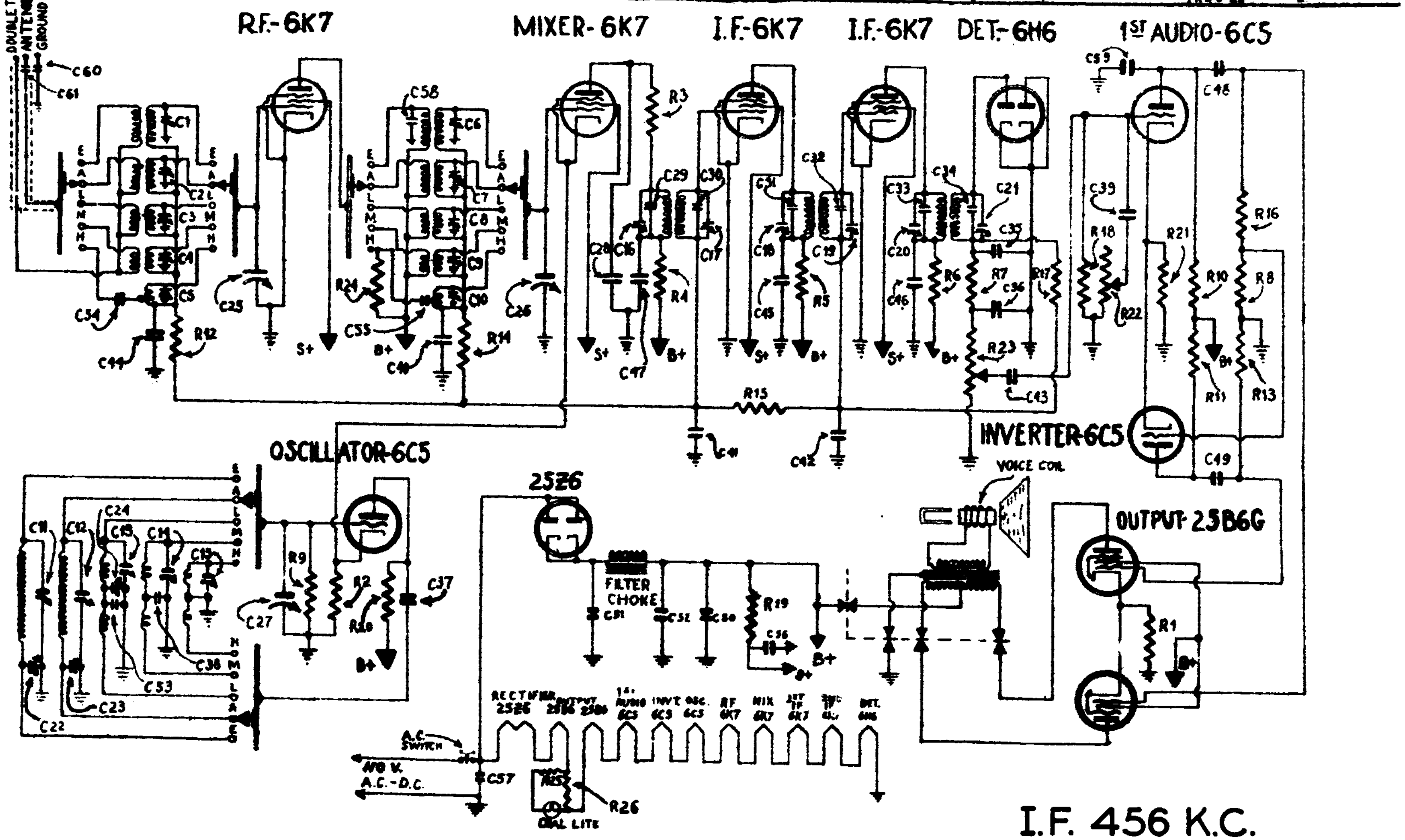
MODEL 11-37 A.C.–D.C.

CONDENSERS

C1	35 MMFD. TRIMMERS	C13	35 MMFD. TRIMMERS	C25	365 MMFD. TUNING COND.	C37	2,000 MMFD. MICA	C49	.05 MFD. 400 VOLT
C2	" "	C14	" "	C26	" " " "	C38	3,000 MMFD. "	C50	.25 MFD. "
C3	" "	C15	" "	C27	" " " "	C39	.02 MFD. 200 VOLT	C51	24 MFD. 500 VOLT WET ELEC
C4	" "	C16	I.F. "	C28	10 MMFD. MICA	C40	.05 MFD. "	C52	40 MFD. 350 VOLT " "
C5	" "	C17	" "	C29	75 MMFD. "	C41	" "	C53	750 MMFD. MICA
C6	" "	C18	" "	C30	" "	C42	" "	C54	100 MMFD. "
C7	" "	C19	" "	C31	" "	C43	" "	C55	" "
C8	" "	C20	" "	C32	" "	C44	" "	C56	.25 MFD. 400 VOLT
C9	" "	C21	" "	C33	" "	C45	" 400 VOLT	C57	.05 MFD. "
C10	" "	C22	70 MMFD. PADDER	C34	" "	C46	" "	C58	500 MMFD. MICA
C11	" "	C23	350 MMFD. "	C35	250 MMFD. MICA } DUAL	C47	" "	C59	250 " " "
C12	" "	C24	" "	C36	250 MMFD. MICA } DUAL	C48	" "	C60	.01 MMFD. 200 VOLT
								C61	.01 " " " "

RESISTORS

R1	350 OHMS 2 WATT FLEX.	R13	500,000-OHMS .25 WATT
R2	500-OHMS .25 WATT	R14	" "
R3	5,000-OHMS "	R15	50,000-OHMS "
R4	" "	R16	" "
R5	" "	R17	500,000 OHM "
R6	" "	R18	3 MEGOHM
R7	25,000-OHMS "	R19	50,000-OHMS .5 WATT
R8	40,000-OHMS "	R20	15,000-OHMS 2 WATT
R9	100,000 OHMS "	R21	2,500-OHMS "
R10	" "	R22	500,000-OHM TONE CONT
R11	" "	R23	500,000-OHM VOL. CONT.
R12	500,000-OHMS "	R24	25,000-OHMS .5 WATT
		R25	21 OHMS 1 WATT
		R26	21 " 2 "



I.F. 456 K.C.

MIDWEST RADIO CORP.

MODEL 11-37 A.C.-D.C.

INSTRUCTIONS FOR ALIGNING THE MIDWEST 37 MODEL
11 TUBE AC-DC RECEIVER

A good signal generator with accurate frequency calibration and an output meter are required. An intermediate frequency of 456 k.c. is used.

(1) Set the signal generator to 456 k.c. and connect it from the mixer grid to ground.

(2) Remove the oscillator tube from the receiver.

(3) Connect the output tube meter from the plate of the output tube to positive B.

(4) Using a moderately weak signal approximately 40 microvolts, align the three I.F. transformers to maximum gain.

This completes the alignment of the I.F. amplifier.

Insert the oscillator tube. Replace Mixer Grid load. Connect the signal generator from antenna to ground.

(1) Set the wave change switch to the "E" band.

(2) Set the signal generator to 325 k.c.

(3) Adjust the "E" oscillator trimmer to maximum gain, then adjust the "E" band R.F. and the "E" band mixer trimmers for maximum gain.

(4) Reset the signal generator to 135 k.c. and rotate the receiver dial to 135 k.c.

(5) Adjust the "E" band padder for maximum signal.

(6) Repeat the adjustment of trimmers and padders until the adjustment of one does not effect the adjustment of the other.

This completes the alignment of the "E" band.

(1) Set the wave change switch to the "A" band.

(2) Set the signal generator to 1490 k.c.

(3) Adjust the "A" oscillator trimmer to maximum gain, then adjust the "A" band R F and the "A" band mixer trimmers for maximum gain.

(4) Reset the signal generator to 550 k.c. and rotate the receiver dial to 550 k.c.

(5) Adjust the "A" band padder for maximum signal.

(6) Repeat the adjustment of trimmers and padders until the adjustment of one does not effect the adjustment of the other.

This completes the alignment of the "A" band.

(1) Set the wave change switch to the "L" band.

(2) Set the signal generator to 3.8 m.c.

(3) Adjust the "L" Oscillator trimmer to maximum gain, then adjust the "L" band R.F. and the "L" band mixer trimmers for maximum.

(4) Reset the signal generator to 1.6 m.c. and rotate the receiver dial to 1.6 m.c.

(5) Adjust the "L" band padder for maximum signal.

(6) Repeat the adjustment of trimmers and padders until the adjustment of one does not effect the adjustment of the other.

This completes the alignment of the "L" band.

(1) Set the wave change switch to the "M" band.

(2) Set the signal generator to 11.5 m.c.

(3) Adjust the "M" oscillator trimmer to maximum gain, then adjust the "M" band R.F and the "M" band mixer trimmers for maximum gain.

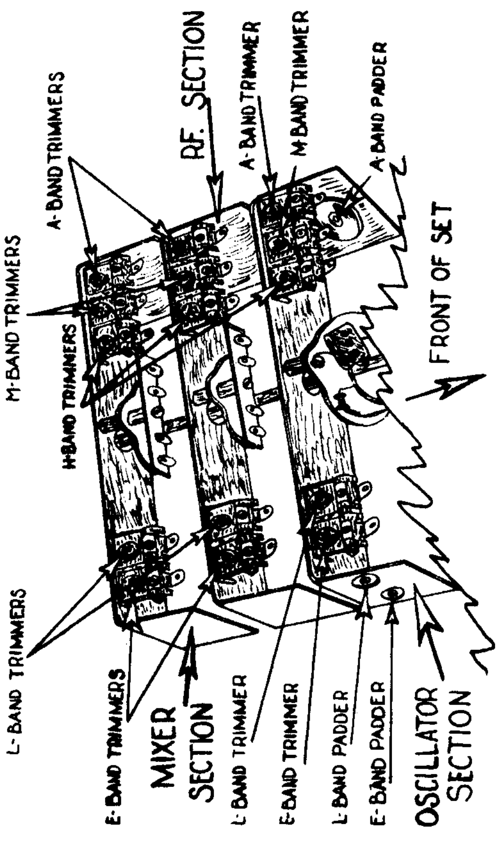
This completes the alignment of the "M" band

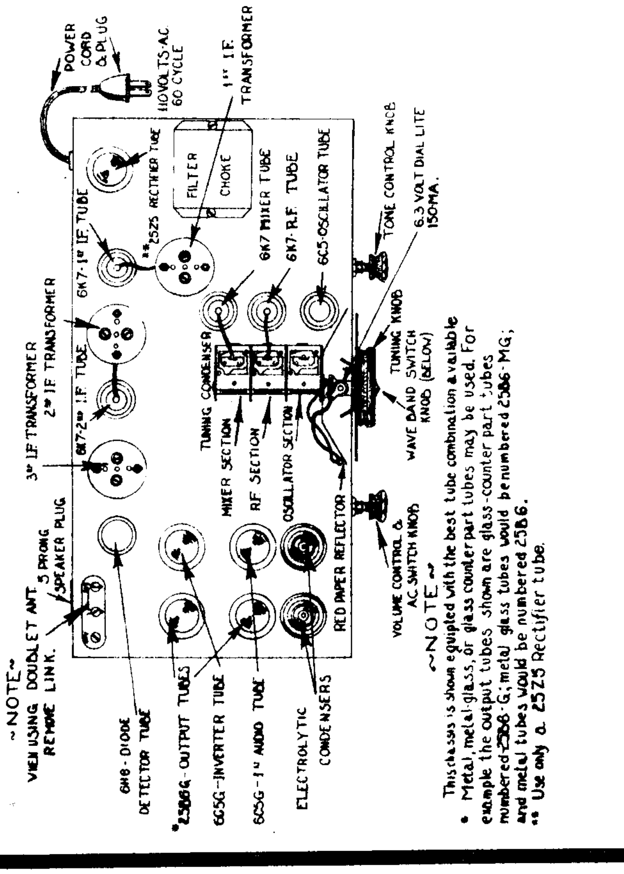
(1) Set the wave change switch to the "H" band.

(2) Set the signal generator to 28 m.c.

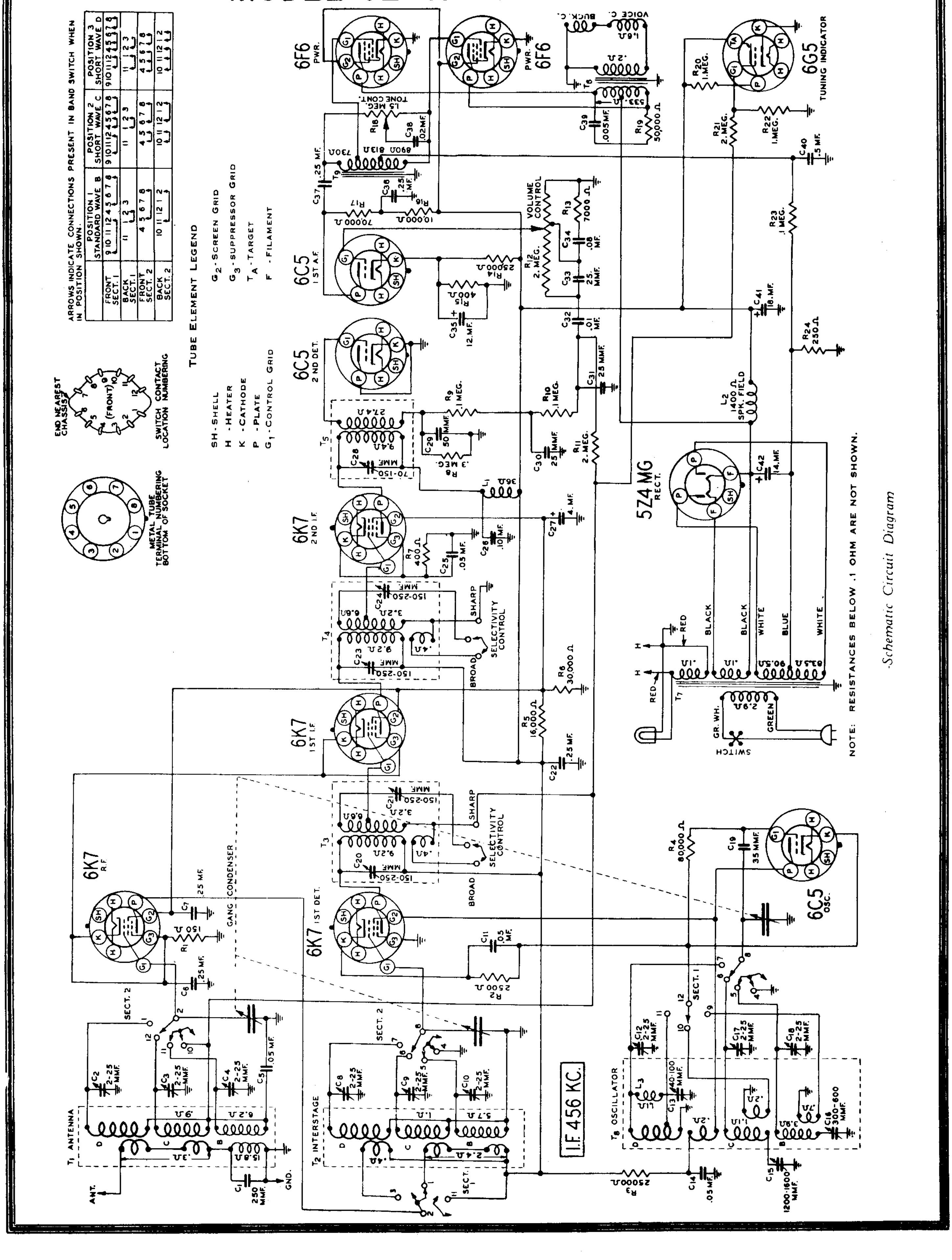
(3) Adjust the "H" band oscillator trimmer to maximum gain then adjust the "H" band R.F. and the "H" band mixer trimmers for maximum gain.

This completes the alignment of the "H" band.



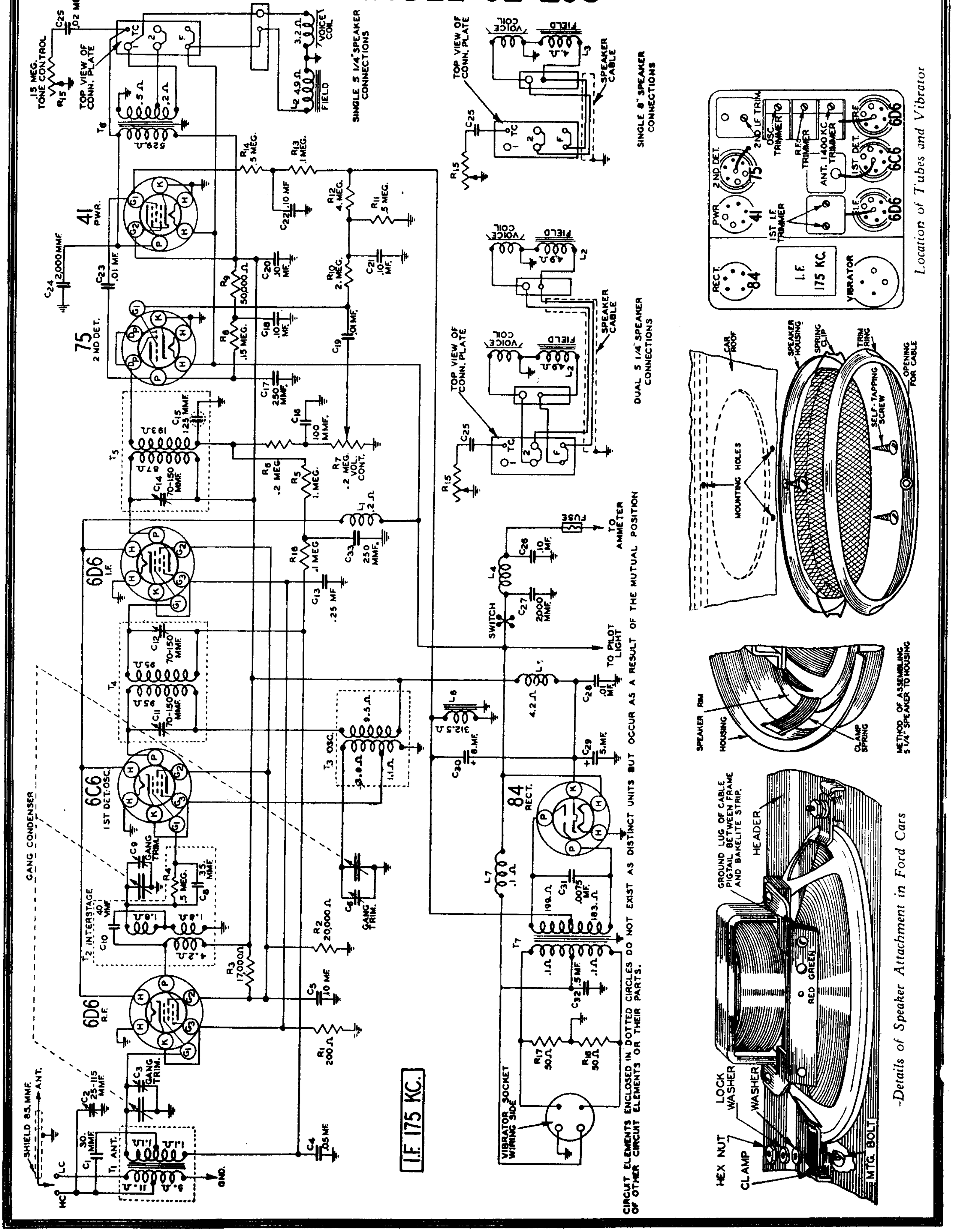


MONTGOMERY WARD & CO.
MODEL 62-261-62-311 & 62-411



Schematic Circuit Diagram

MONTGOMERY WARD & CO.
MODEL 62-263

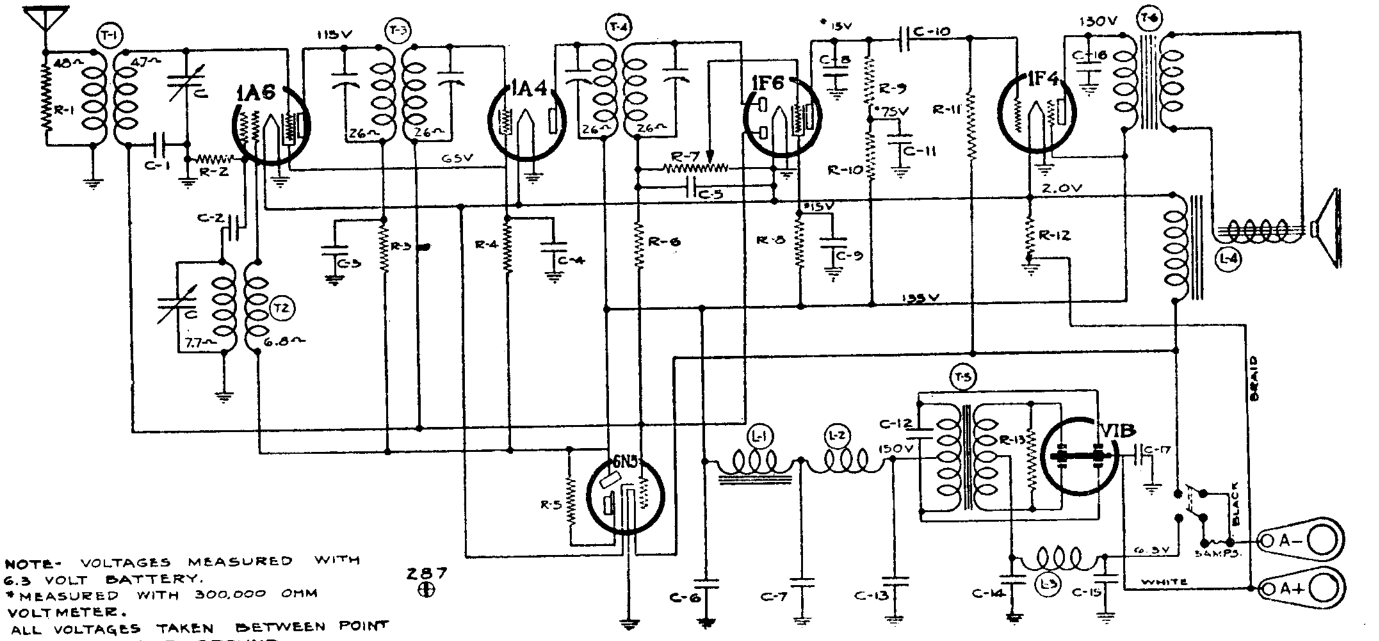


CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.

Location of Tubes and Vibrator

Details of Speaker Attachment in Ford Cars

MONTGOMERY WARD & CO.
MODEL 62-264



NOTE- VOLTAGES MEASURED WITH 6.3 VOLT BATTERY.
*MEASURED WITH 300,000 OHM VOLTMETER.
ALL VOLTAGES TAKEN BETWEEN POINT INDICATED AND GROUND.

No.	Part No.	Description
		Condensers
C1	100-22	.05x200 v.
C2	129-21	.0002 Mica
C3	100-9	.05x200 v.
C4	100-20	.1x200 v.
C5	129-12	.00025 Mica
C6	119-31	5.0x200 v. lytic
C7	119-31	5.0x200 v. lytic
C8	.29-5	.0001 Mica
C9	100-20	.1x200 v.
C10	100-26	.02x400 v.
C11	100-9	.05x200 v.
C12	100-34	.005x1200 v.
C13	100-20	.1x200 v.
C14	100-40	.5x200 v.
C15	100-40	.5x200 v.
C16	100-19	.006x600 v.
C17	100-35	.5x200 v.
		RESISTORS
R1	130-132	10M ohm—1/3 W. Insulated
R2	130-12	50M ohm—1/3 W.
R3	130-17	10M ohm—1/3 W.
R4	130-133	15M ohm—½ W.
R5	130-110	1 megohm—1/10 W.
R6	130-4	3 megohm—1/3 W.
R7	101-64	1 megohm—Volume Control
R8	130-134	1 megohm—1/3 W. Insulated
R9	130-100	150M ohm—1/3 W.
R10	130-135	150M ohm—1/3 W. Insulated
R11	130-37	750M ohm—1/3 W.
R12	106-32	3.5 ohm—½ W.
R13	130-136	200 ohm Insulated—1/2 W.
		MISCELLANEOUS PARTS
T1	111-58	Antenna Coil
T2	110-51	Oscillator Coil
T3	108-89	Input I. F.
T4	108-90	Output I. F.
T5	104-79	Power Transformer
T6	114-55	Output transformer (see speaker)
L1	105-34	Filter Choke
L2	105-35	R. F. "B" Choke
L3	105-19	Choke
I.4	114-55	4.6 ohm speaker field

ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low battery voltage, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. Remove the knobs and the two bolts which are used to fasten the chassis.

All adjustments should be made with a non-metallic screw driver.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 1F4 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1" and "Dummy 2."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I. F. TRANSFORMERS: (465 K.C.)

Part No. 108-90. Output I.F. Transformer
Part No. 108-89. Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view—Fig. 1, page 2).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to minimum capacity position, make the following adjustments:

   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 1A4 tube, and adjust the output I.F. transformer No. 108-90 to resonance.

   (b) Move oscillator output clip from grid of 1A4 to grid cap of 1A6 and adjust input I.F. transformer (No. 108-89) to resonance.

   (c) With oscillator still connected to 1A6, readjust output I.F. transformer (108-90) if necessary.

R. F. ALIGNMENT: (535-1720 K.C.)

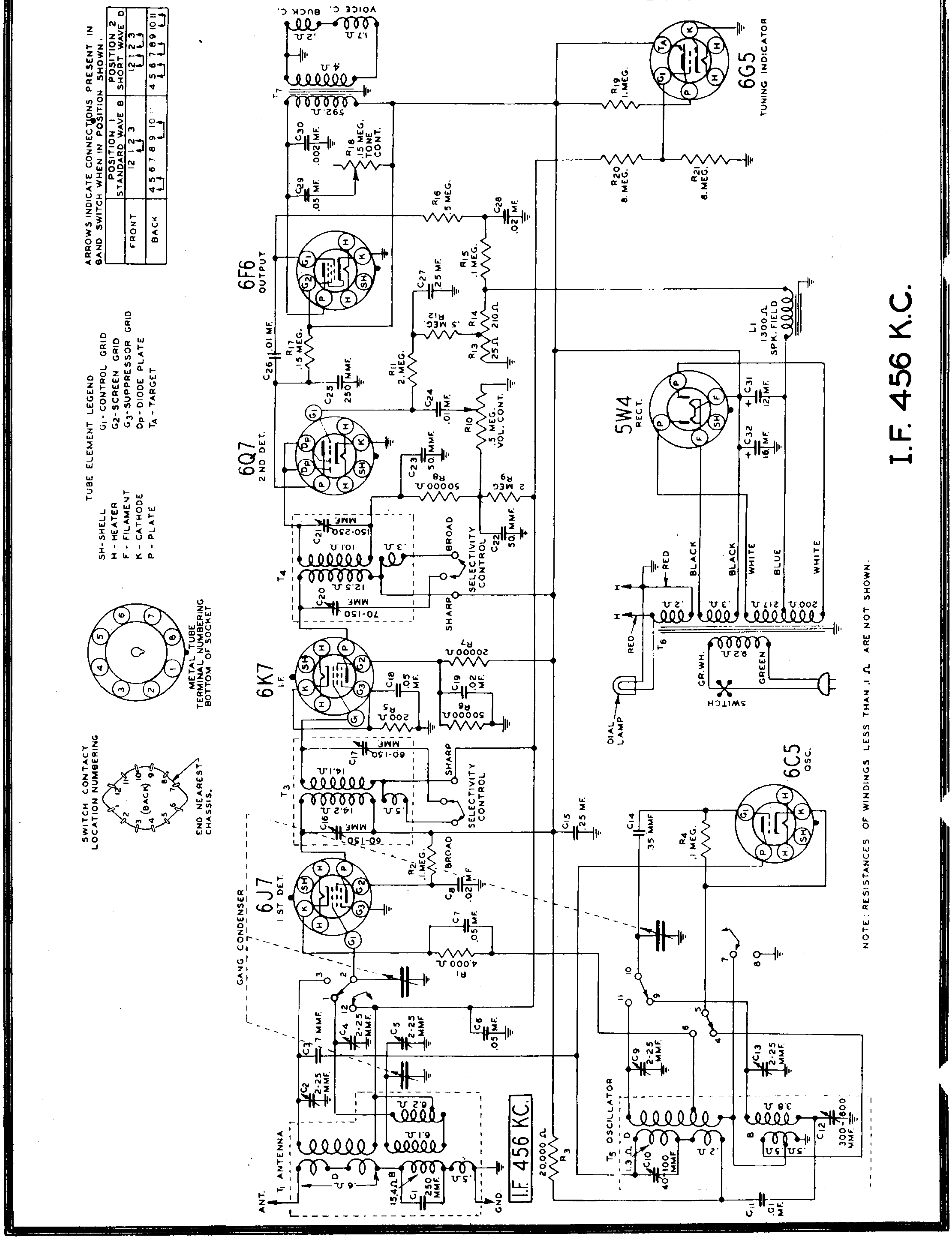
1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with "Dummy 2", to tan antenna and black ground leads and make the following adjustments:

   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer (rear section of gang condenser).

   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance (front section of gang condenser).

   (c) Check sensitivity at 600 and 1000 kilocycles.

MONTGOMERY WARD & CO.
MODELS 62-267 & 62-277



PHILCO RADIO & TELEVISION CORPORATION
MODEL 37-116 CODES 121 & 122

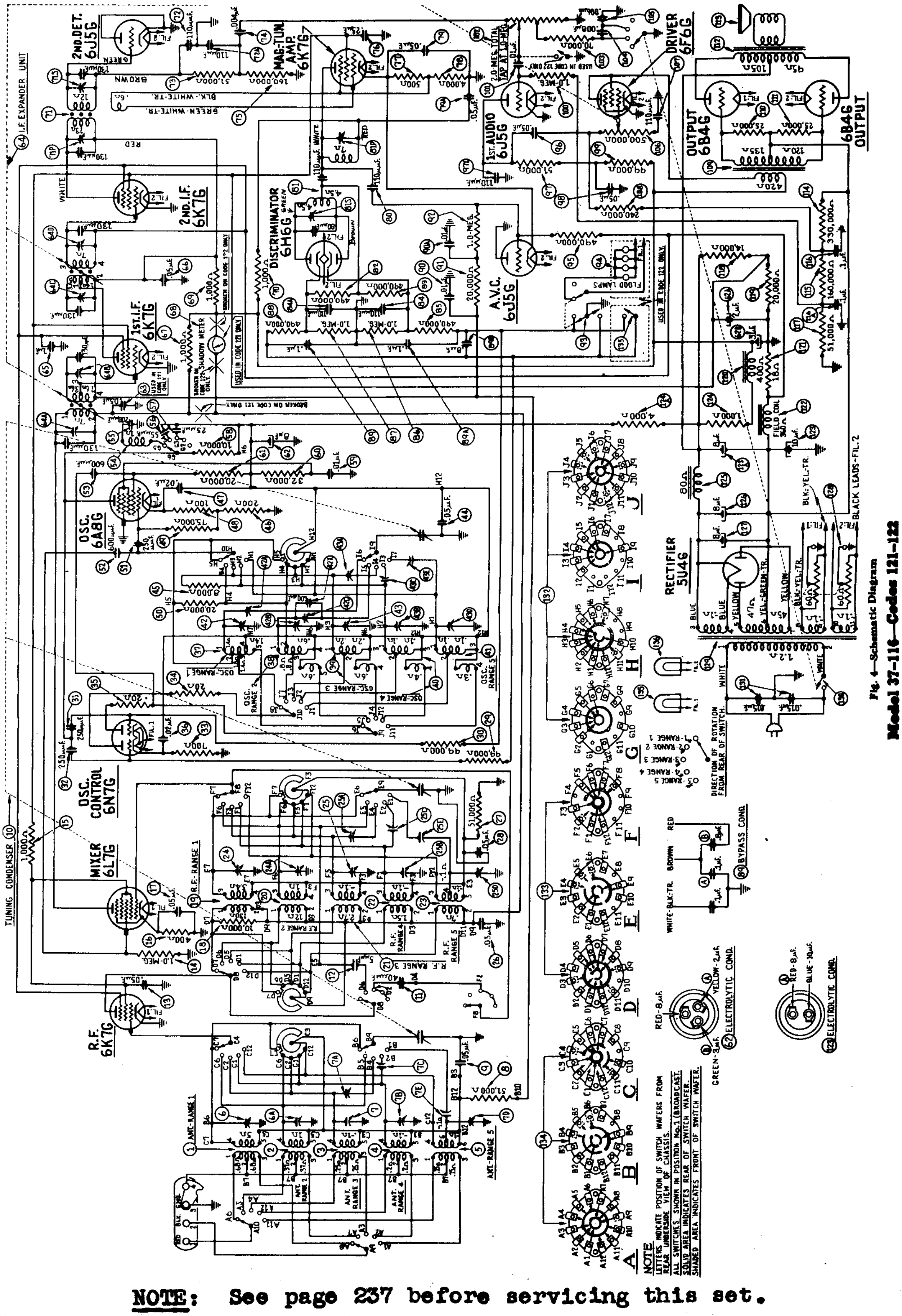


Fig. 4—Schematic Diagram
Model 37-116—Codes 121-122

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-116 CODES 121 & 122

Alignment of the Compensators

To accurately adjust this receiver, precision test equipment is necessary. A signal generator such as the PHILCO MODEL 088 SIGNAL GENERATOR, covering from 110 to 20,000 K. C. is recommended for adjusting the compensators at the various frequencies specified. A visual indication of the receiver output is also necessary to obtain correct adjustment of the compensators. PHILCO MODEL 025 CIRCUIT TESTER contains a sensitive output meter and is recommended for these adjustments.

Philco Fibre Handle Screw-driver No. 27-7059 completes the necessary equipment for these adjustments. The locations of the various compensators are shown in Figs. 7 and 8.

NOTE—The receiver should be allowed to heat for at least 15 minutes before adjusting the compensators.

OUTPUT METER

The 025 Output Meter is connected to the plate and cathode terminals of the 6F6G tube. Adjust the meter to use the (0-30) Volt Scale.

DIAL CALIBRATION

In order to adjust this receiver correctly the dial must be aligned to track properly with the tuning condenser. To do this proceed as follows:

1. Loosen the set screws on the shaft coupling of the tuning condenser. Then turn the tuning condenser until the plates are in the maximum capacity position. Now set the glowing beam indicator on the index line at the low frequency end of the broadcast band. With dial and tuning condenser in this position tighten set screws.

2. Turn the tuning condenser control until the indicator is on the first division from the index line.

3. With the dial in this position, loosen the shaft coupling set screws. Then turn the dial until the indicator is again on the index line. Tighten the set screws in this position.

NOTE: Be careful when turning the dial that the position of the tuning condenser is not disturbed.

INTERMEDIATE FREQUENCY CIRCUIT

Frequency 470 K. C.

1. Connect the 088 Signal Generator output lead in series with a .1 mfd. condenser to the grid of the 6L7G tube, and the ground connection of the output lead to the chassis.

2. Set the receiver volume control in the maximum position. Turn the fidelity-selectivity control clockwise; magnetic tuning control in the "off" position (counter-clockwise); range switch in position No. 1 (Broadcast); tuning condenser to approximately 580 K. C., and adjust the signal generator for 470 K. C.

3. Now adjust compensators (64B) 1st I.F. Sec., (64A) 1st I.F. Pri., (64D) 2nd I.F. Sec., (64C) 2nd I.F. Pri., (71S) 3rd I.F. Sec., and (71P) 3rd I.F. Pri. for maximum output.

4. Turn the fidelity-selectivity control to the expanded position (counter-clockwise). The intermediate frequency curve is now checked for symmetry as follows: Slowly shift the signal generator dial between 460 K. C. and 480 K. C. As the dial is turned two peaks will be indicated on the output meter—one about 465 K. C., and the other about 475 K. C. These peaks should give the same deflection or reading on the output meter. If they are unequal, compensator (71S) must be readjusted slightly to the right or left—depending on which peak gives the lowest reading—until they are equalized.

Each time the compensator is set in another position, rotate the signal generator dial through 460 to 480 K. C. and note the reading of each peak on the output meter. If the peaks become more equal when compensator (71S) is turned to the left, continue in this direction until they are equal. If they become more unequal turn the compensator to the right. Continue this adjustment in either direction until the peaks equalize.

5. After adjusting the third I.F. transformer, turn the fidelity-selectivity control clockwise (selective position) and adjust the attenuator of the signal generator for maximum output. Now tune the primary compensator (81P) of the magnetic tuning transformer for minimum output.

RADIO FREQUENCY CIRCUIT

Tuning Range 11.5-18.2 M. C.

1. The signal generator output lead with the .1 mfd. condenser, is connected to terminal No. 1 on the aerial input panel (rear of chassis) and the generator ground lead to terminal No. 3. Terminals 2 and 3 must be connected with the shorting link provided on the panel.

2. Set the magnetic tuning control in the "off" position, and the fidelity-selectivity control in the extreme clockwise position. Set the range switch in position No. 5 (11.5 to 18.2 M. C.) Turn the receiver and signal generator dials to 18 M. C. and adjust the generator attenuator for a readable indication on the output meter. Now adjust compensator (43D) by turning the screw (clockwise) to the maximum capacity position, then slowly turn it counter-clockwise until a second maximum peak is reached on the output meter. The first peak from maximum capacity is the image signal and the receiver *must not* be adjusted to this signal. On some receivers, however, only one peak will be found, therefore, adjust compensator (43D) to this peak. If the above procedure is correctly performed, the image signal will be found at 17.060 M. C. by advancing the signal generator input, and turning the receiver dial to this frequency mark on the scale.

3. Leaving the signal generator and receiver dials at 18 M. C. the antenna and R. F. compensators (7D) and (25D) are now adjusted by connecting a variable condenser (Philco Part No. 45-2325) across the oscillator compensator (43D) contact (first contact from the left side of the receiver facing rear underside view of the chassis) and ground. Now tune the added condenser until the second harmonic of the receiver oscillator beats against the signal from the generator, resulting in a maximum indication on the output meter. Note: It may be necessary to increase the signal generator output to obtain a signal of sufficient strength for reading on the output meter. Compensators (7D) and (25D) are now adjusted for maximum output. After these adjustments, remove the external condenser and readjust compensator (43D) as given in paragraph 2 above.

4. Turn the signal generator and receiver dials to 12 M. C. and adjust compensators (43E), (25E) and (7E) for maximum output.

5. Readjust compensator (43D) as given in paragraph 2 above, for maximum output.

6. Readjust compensators (7D), (25D) and (43D) as given in paragraph 3 above. This readjustment is to correct any variation that the low frequency compensator may have caused in the high end of this range.

Tuning Range (7.35-11.6 M. C.)

1. Turn selector switch to Range 4. Set the signal generator and receiver dials to 11.0 M. C. Now adjust compensator (43B) for maximum output. Check for image at 10.06 M. C.

2. Leaving signal generator and receiver dial turned to 11.0 M. C., connect the external variable condenser across the oscillator compensator (43B) contact (third contact from left side of the receiver facing rear underside view of chassis) and ground. Tune the added condenser for maximum output, then adjust compensators (7B) and (25B) for maximum output. Remove the added condenser and adjust (43B) for maximum.

3. Turn the signal generator and receiver dials to 7.5 M. C. and adjust compensators (43C), (25C) and (7C) for maximum output.

4. Readjust compensator (43B) as given in paragraph 1 above.

5. Readjust compensators (7B), (25B) and (43B) as given in paragraph 2 above.

Tuning Range (4.7 to 7.4 M. C.)

1. Turn selector switch to range 3. Set the signal generator and receiver dials for 7.0 M. C. and adjust compensators (43), (25) and (7) for maximum output.

2. Rotate the signal generators and receiver dials to 5.0 M. C., then adjust compensators (43A), (25A) and (7A) for maximum output.

3. Readjust compensators (43), (25) and (7) on the 7.0 M. C. signal.

Tuning Range (1.58 to 4.75 M. C.)

1. Turn the selector switch to range 2. Set the signal generator and receiver dials to 4.5 M. C. Now adjust compensators (42B), (24A) and (6A) for maximum output.

2. Rotate the signal generator and receiver dials to 1.7 M. C. Compensator (42C) Osc. series is now adjusted for maximum output as follows:

First tune compensator (42C) for maximum output, then vary the tuning condenser of the receiver for maximum output about the 1.7 M.C. dial mark. Now turn compensator (42C) slightly to the right or left and vary the receiver tuning condenser for maximum output. If the output reading increases, turn compensator (42C) in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

3. Readjust compensators (42B), (24A) and (6A) for maximum output as given in paragraph 1 above.

Tuning Range (530 to 1600 K. C.)

1. Set selector switch in range 1. Rotate the signal generator and receiver dial to 1500 K. C. Adjust compensators (42), (24) and (6) for maximum output.

2. Turn the signal generator and receiver dials to 580 K. C. Compensator (42A) Osc. series is now adjusted, using the same procedure as given in paragraph 2 under Tuning Range (1.58 to 4.75 M. C.). The only difference in the two adjustments is the frequency and compensator used.

3. Readjust compensator (42) on 1500 K. C. and compensators (24) and (6) on a 1400 K. C. signal.

ADJUSTMENT OF THE MAGNETIC TUNING CONTROL

1. Leave the selector switch in position 1. Set the fidelity-selectivity control in the "selective" position (clockwise). Magnetic tuning in the "out" position. Turn the signal generator and dial to 1000 K. C., then adjust the receiver tuning condenser for maximum output.

NOTE: It is very important to accurately adjust the receiver tuning condenser, also, adjust the signal generator attenuator to maximum output.

2. Turn the (Magnetic Tuning Control) to the "on" position (clockwise). Compensator (81S) Sec. of magnetic tuning transformer is now adjusted for maximum output. If the indicator of the output meter goes off scale, turn the volume control of the receiver toward the minimum position until a readable indication is obtained.

3. The above adjustment is now checked for accuracy, by turning the magnetic tuning control "off". When this is done there should be no change in the tone of the receiver signal. If a change of tone or a hiss develops, it indicates a shift in frequency and the adjustment must be made again.

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-116 CODES 121 & 122

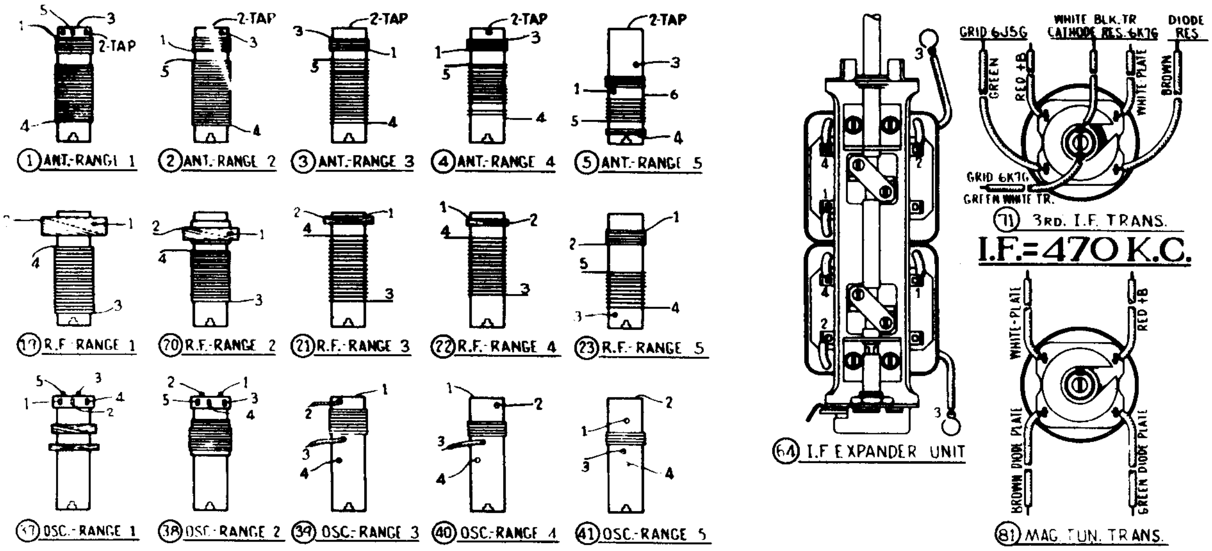


Fig. 5—Coil Wiring

The numbers on the coil leads correspond to those shown on the schematic diagram. For example: On Antenna transformer (1) lead No. 1 is connected to range switch wafer contact A6.

HUM ADJUSTMENT

With Volume control at minimum volume position, adjust Potentiometer (128) on power unit for minimum hum.

SHADOWMETER ADJUSTMENT

Code 121

Remove aerial and allow tubes to warm up. Then adjust shadow meter as follows:

1. Move the shadow meter coil backwards and forwards, until the opposite edges of the shadow are ⅛ of an inch from each end of the shadow screen, measuring along the bottom edge of the screen. Adjustment of the shadow meter light bracket may be necessary for perfect centering.
2. Remove the rectifier tube from its socket, and rotate coil until shadow reaches minimum width. This width must not exceed ⅛ of an inch.
3. Replace the 5U4G rectifier tube in its socket. The shadow should then widen to not more than ⅛ inch or less than 1/16 inch from each side of the screen measuring along the bottom edge. If these limits are not obtained readjust the shadow meter as given in paragraphs 1 and 2 until they are reached.

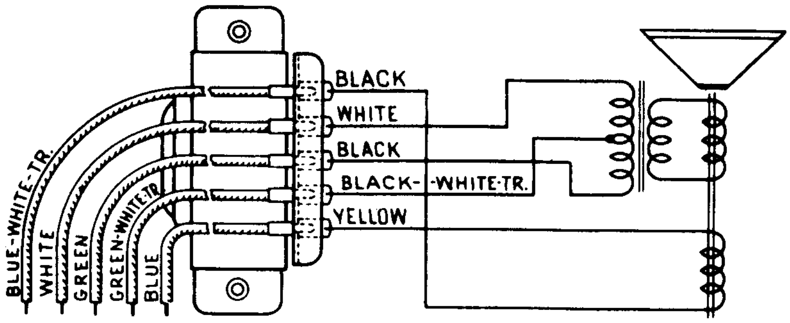


Fig. 6—Speaker Wiring

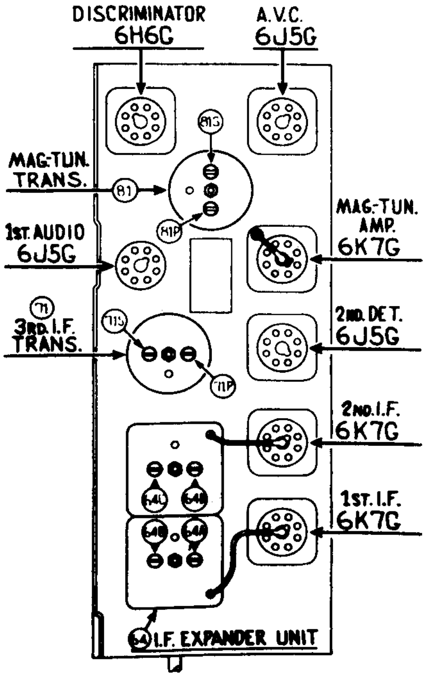


Fig. 7—Locations of I.F. Compensators Top of I.F. Unit

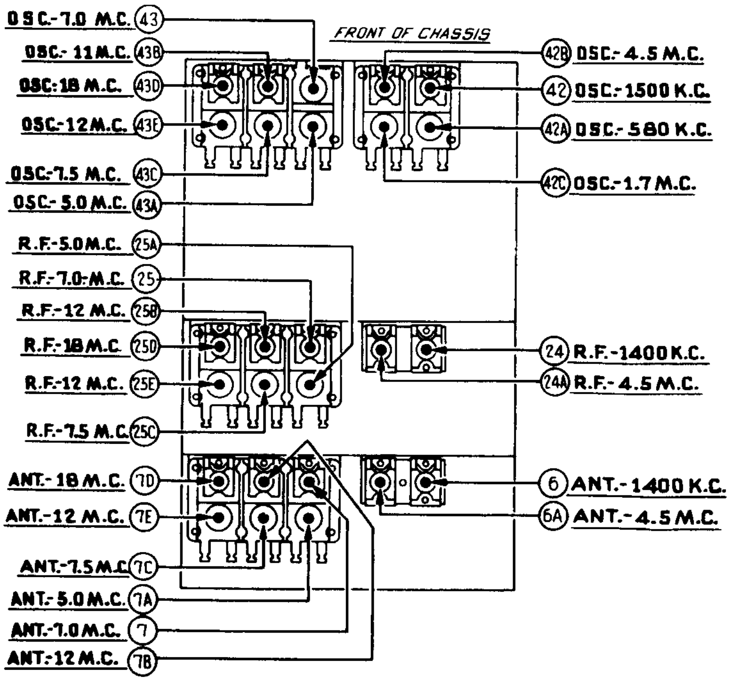


Fig. 8—Locations of R.F. Compensators Underside of Chassis View

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-116 CODES 121 & 122

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2108	$0.80
2	Antenna Transformer (Range 2)	32-2146	.80
3	Antenna Transformer (Range 3)	32-2183	.60
4	Antenna Transformer (Range 4)	32-2185	.70
5	Antenna Transformer (Range 5)	32-2175	.80
6	Compensator, 2 Gang	31-6093	.40
7	Compensator (6 Sections)	31-6112	1.40
8	Resistor (51000 ohms ½ watt)	33-351339	.20
9	Condenser (.05 mfd. Tubular)	30-4020	.20
10	Tuning Condenser	31-1892	3.75
11	Condenser (40 mmfd.)	30-1076	....
12	Condenser (5 mmfd.)	30-1077	....
13	Condenser (.05 mfd. Tubular)	30-4123	.20
14	Resistor (1. megohm, ½ watt)	33-510339	.20
15	Resistor (1000 ohms, ½ watt)	33-210339	.20
16	Resistor (400 ohms wirewound)	33-3016	.20
17	Condenser (.05 mfd. Tubular)	30-4444	.20
18	Resistor (10000 ohms, ½ watt)	33-310339	.20
19	R. F. Transformer (Range 1)	32-2105	.75
20	R. F. Transformer (Range 2)	32-2147	.60
21	R. F. Transformer (Range 3)	32-2177	.60
22	R. F. Transformer (Range 4)	32-2178	.60
23	R. F. Transformer (Range 5)	32-2176	.70
24	R. F. Compensator (2 Section)	31-6093	.40
25	R. F. Compensator (6 Section)	31-6113	1.40
26	Condenser (.05 mfd. Tubular)	30-4123	.20
27	Resistor (51000 ohms, ½ watt)	33-351339	.20
28	Condenser (.05 mfd. Tubular)	30-4020	.20
29	Resistor (99000 ohms, ½ watt)	33-399339	.20
30	Resistor (99000 ohms, ½ watt)	33-399339	.20
31	Condenser (250 mmfd. Mica)	30-1032	.25
32	Condenser (250 mmfd. Mica)	30-1032	.25
33	Resistor (700 ohms Wirewound)	33-170339	.20
34	Resistor (20 ohms, ½ watt)	33-020339	.20
35	Resistor (20 ohms, ½ watt)	33-020339	.20
36	Condenser (.02 mfd. Tubular)	30-4481	...
37	Oscillator Transformer (Range 1)	32-2191	.80
38	Oscillator Transformer (Range 2)	32-2194	.80
39	Oscillator Transformer (Range 3)	32-2197	.50
40	Oscillator Transformer (Range 4)	32-2198	.50
41	Oscillator Transformer (Range 5)	32-2199	.50
42	Compensator Oscillator (4 Section)	31-6124	1.00
42X	Condenser (600 mmfd.)	30-1049	....
43	Compensator Oscillator (6 Section)	31-6117	1.20
44	Condenser (.05 mfd. Tubular)	30-4123	.20
45	Resistor (8000 ohms, ½ watt)	33-280339	.20
46	Resistor (200 ohms Wirewound)	7217	.20
47	Condenser (.02 mfd. Tubular)	30-4481	.20
48	Resistor (100 ohms Wirewound)	33-3023	.25
49	Resistor (75000 ohms, ½ watt)	33-375339	.20
50	Resistor (20000 ohms, ½ watt)	33-320339	.20
51	Condenser (250 mmfd. Mica)	30-1032	.25
52	Condenser (600 mmfd. Mica)	30-1049	.25
53	Condenser (600 mmfd. Mica)	30-1049	.25
54	Coil (Osc. Plate)	32-2242	.25
55	Condenser (200 mmfd. Mica)	30-1047	.25
56	Condenser (55 mmfd. Mica)	30-1045	.20
57	Condenser (25 mmfd. Mica)	30-1067	.20
58	Resistor (10000 ohms, ½ watt)	33-310339	.20
59	Condenser (.01 mfd. Tubular)	30-4169	.25
60	Resistor (32000 ohms, ½ watt)	33-332339	.20
61	Resistor (20000 ohms, ½ watt)	33-320339	.20
62	Electrolytic Condenser (2, 3, 8 mfd.)	30-2169	1.60
63	Condenser (.05 mfd. Tubular—Code 121 only)	30-4123	....
64	Expander Unit	38-7929	....
65	Condenser (.1 mfd. Bakelite)	4989BG	.35
66	Condenser (.05 mfd. Tubular)	30-4123	.20
67	Resistor (1000 ohms, ½ watt)	33-210339	.20
68	Shadowmeter	45-2189	....
69	Resistor (1000 ohms, ½ watt)	33-210339	.20
70	Resistor (1000 ohms, ½ watt)	33-210339	.20
71	Third I. F. Transformer	32-2215	....
72	Condenser (110 mmfd. Dual Bakelite)	8035DG	.25
73	Resistor (51000 ohms, ½ watt)	33-351339	.20
74	Condenser (.004 mfd. Tubular)	30-4185	.25
75	Resistor (160,000 ohms, ½ watt)	33-416339	.20
76	Condenser (.25 mfd. Tubular)	30-4134	.25
77	Resistor (500 ohms, ½ watt)	33-150339	.20
78	Resistor (4000 ohms, ½ watt)	33-240339	.20
79	Condenser (.05 mfd. Dual Bakelite)	3615DG	.40
80	Condenser (110 mmfd. Mica)	30-1031	.20
81	Magnet Tuning Transformer	32-2217	....
82	Resistor (490,000 ohms, ½ watt)	33-449339	.20
83	Resistor (490,000 ohms, ½ watt)	33-449339	.20
84	Condenser (110 mmfd. Dual Bakelite)	8035DG	.25
85	Resistor (490,000 ohms, ½ watt)	33-449339	.20
86	Resistor (1 meg. ohm, ½ watt)	33-510339	.20
87	Resistor (1 meg. ohm, ½ watt)	33-510339	.20
88	Resistor (490,000 ohms, ½ watt)	33-449339	.20
89	Condenser (Three section .1, .1, .8 mfd.)?	30-4466	1.40
90	Condenser (.01 mfd. Dual Bakelite)	3903DG	.30
91	Resistor (20,000 ohms, ½ watt)	33-320339	.20
92	Resistor (1.0 meg., ½ watt)	33-510339	.20
93	Switch (Mag. Tuning)	42-1216	.75
94	Flood Lamp (Code 122)	34-2039	....
95	Resistor (490,000 ohms, ½ watt)	33-449000	.20
96	Condenser (.05 mfd. Tubular)	30-4123	.20
97	Resistor (51,000 ohms, ½ watt)	33-351339	.20
97X	Condenser (110 mmfd. Mica)	30-1031	....
98	Condenser (.05 mfd. Tubular)	30-4123	.20
99	Resistor (90,000 ohms, ½ watt)	33-399339	.20
100	Resistor (1 meg., ½ watt)	33-510339	.20
101	Condenser (.01 mfd. Tubular)	30-4124	.25
102	Volume Control	33-5158	1.00
103	Resistor (70,000 ohms, ½ watt)	33-370339	.20
104	Condenser (.008 mfd. Tubular)	30-4112	.20
105	Condenser (.006 mfd. Tubular)	30-4445	.20
106	Potentiometer (Expander unit)	33-5172	....
107	Condenser (100 mmfd. Mica)	30-1035	....
108	Resistor (240,000 ohms, ½ watt)	33-424339	.20
109	Input Audio Transformer	32-7057	3.50
110	Resistor (25,000 ohms, ½ watt)	33-325339	.20
111	Resistor (25,000 ohms, ½ watt)	33-325339	.20
112	Output Transformer	32-7717	2.00
113	Cone and Voice Coil	36-3647	2.25
114	Resistor (330,000 ohms, ½ watt)	33-433339	.20
115	Resistor (160,000 ohms, ½ watt)	33-416339	.20
116	Condenser (.1 mfd. Dual Bakelite)	4989DG	.40
117	Resistor (51,000 ohms, ½ watt)	33-351339	.20
118	Resistor (14,000 ohms, ½ watt)	33-3291	....
119	Resistor (20000 ohms, 1 watt)	33-320439	$0.20
120	Choke (Filter)	32-7491	.95
121	Resistor (18 ohms, ½ watt)	33-020439	.20
122	Field Coil (W. Speaker)	36-3788	....
123	Electrolytic Condenser (8 and 10 mfd.)	30-2123	1.60
124	Resistor (1000 and 4000 ohms)	33-3289	.50
125	Choke (Filter)	32-7056	2.20
126	Electrolytic Condenser (8 mfd.)	30-2026	1.05
127	Electrolytic Condenser (8 mfd.)	30-2026	1.05
128	Potentiometer (Dual 60 ohms)	33-5176	....
129	Power Transformer 115 Volts, 60 Cycle	32-7688	7.50
	Power Transformer 115 Volts, 25 to 40 Cycle	32-7689	....
	Power Transformer, 220 Volts	32-7690	....
130	Power and Tone Switch	42-1196	.75
131	Condenser (.015 mfd. Dual Bakelite)	4989DG	.40
132	Range Switch (Osc)	42-1217	2.00
133	Range Switch (R. F.)	42-1212	1.60
134	Range Switch (Ant.)	42-1211	1.60
135	Pilot Lamp (Codes 121-122)	34-2039	.15
136	Shadowmeter Lamp (Code 121 only)	34-2039	.15

Figures in black type indicate circled figures in Base View.

USED ON CODES 121-122

Description	Part No.	List Price
Dial Screen Holder Assembly	31-1900	.30
Coupling Assembly (Tuning Condenser)	31-1907	....
Screw	W-650	....
Set Screw	W-644	....
Brace (Drive Mtg.)	28-4119	.05
Volume Control Shaft	38-8061	....
Retaining Clip	28-4394	....
Spring	28-4117	Per C .40
Shaft & Index Plate (Range Switch)	42-1208	.50
Socket (8 Prong)	27-6058	.11
Socket (7 Prong)	27-6057	.11
Socket (Power Transformer)	27-6061	....
Tube Shield	28-2726	.10
Tube Shield Base	28-3898	.03
Tube Shield (6N7G)	8005	.10
Tube Shield Base (6N7G)	8004	.03
Mtg. Grommet (R. F. Unit)	27-4317	.04
Mtg. Sleeve (R. F. Unit)	28-2257	.01
Mtg. Screw (R. F. Unit)	W-729	Per C .45
Mtg. Spacer (R. F. Unit) Code 121	27-8339	Per C .40
Mtg. Spacer (R. F. Unit) Code 122	27-7807	....
Mtg. Washer	28-3927	.01
Mtg. Rubber Tuning Condenser	27-4325	....
Mtg. Spring Shadowmeter	28-8623	Per C .70
Mtg. Plate (R. F. Transformer)	28-3808	.02
Mtg. Spacer (R. F. Transformer)	27-8228	.01
Mtg. Screw (R. F. Transformer)	W-1635	Per C .30
Terminal Panel Antenna	38-7714	.15
Terminal Cover (Speaker)	36-3872	.15
Knob	27-4330	.10
Knob	27-4331	.10
Knob	27-4332	.10
Knob	27-4326	.10
Cable (Speaker)	41-3220	.50
A. C. Plug and Cord	L-2288	....
Fuses	45-2046	....
Chassis Mtg. Rubber	3558	....
Rubber Bushing (Small)	27-4359	....
Rubber Bushing (Large)	27-4360	....
Speaker, W	36-1219	....
Speaker, Felt	27-8498	....
Acoustic Clarifier (Type K)	36-1155	....
Bottom Shield	38-8142	....
Snap Fasteners	28-4279	....
Pilot Lamp Assembly	38-7900	.40

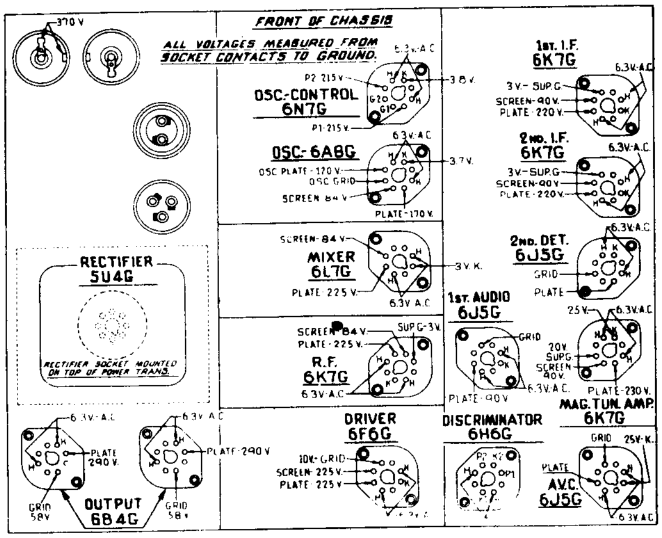


Fig. 2—Socket Voltages, Measured from Underside of Chassis

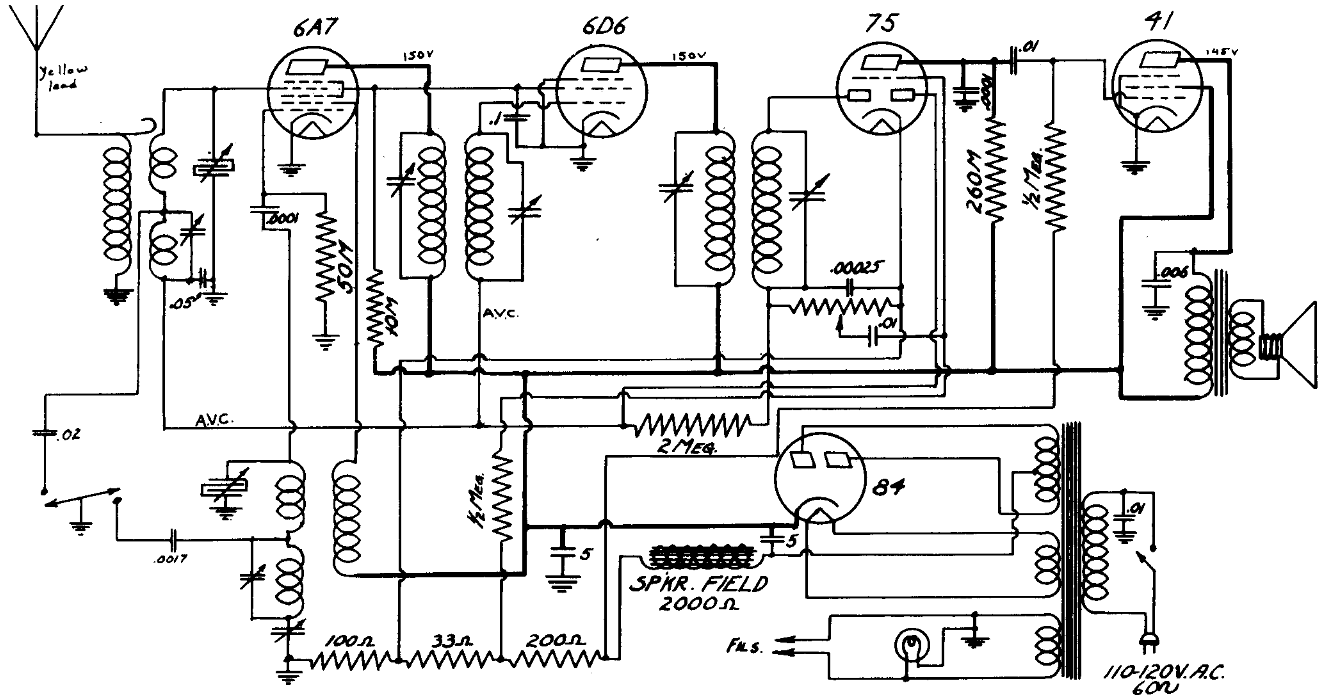
The voltages indicated by arrows were measured with a **Philco 025 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

Prices Subject to Change without Notice.

NOTE: See page 237 before servicing this set.

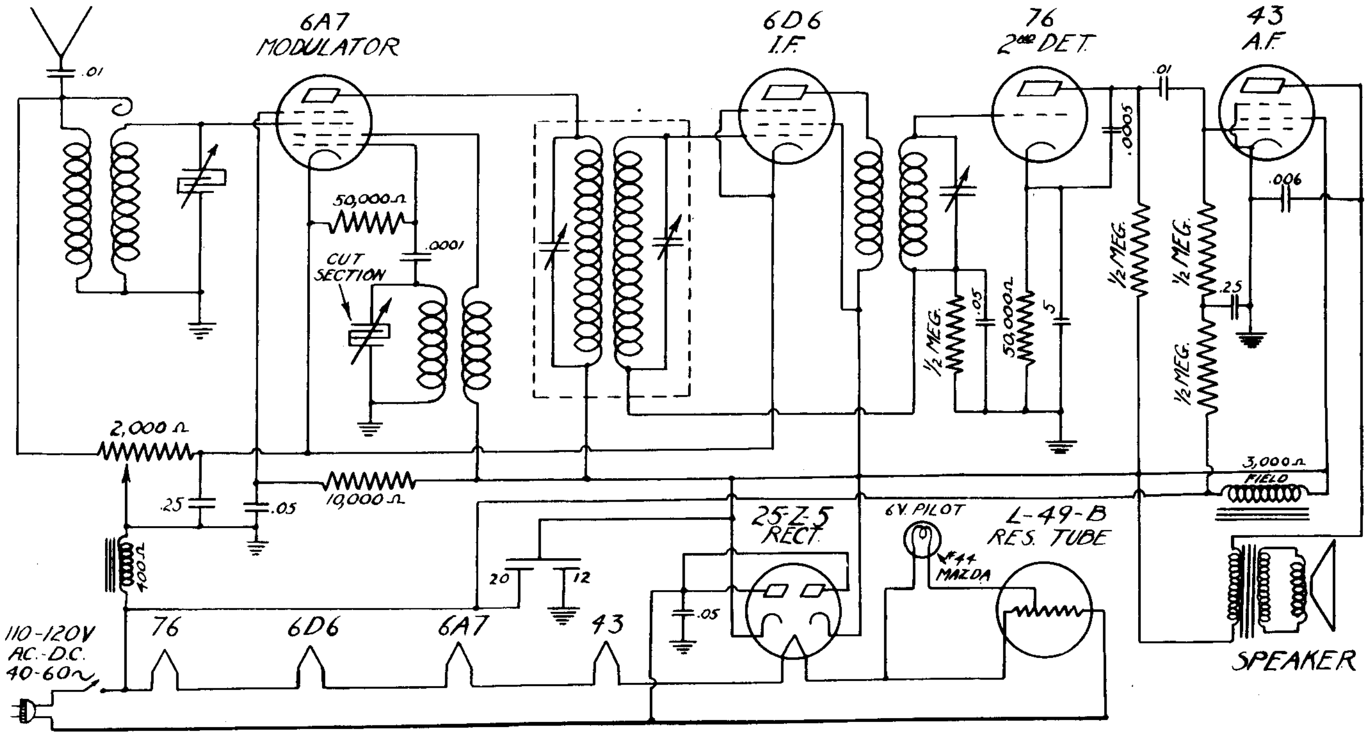
PIERCE AIRO, Inc.

MODELS 529 & 529LW



I.F. 456 K.C.

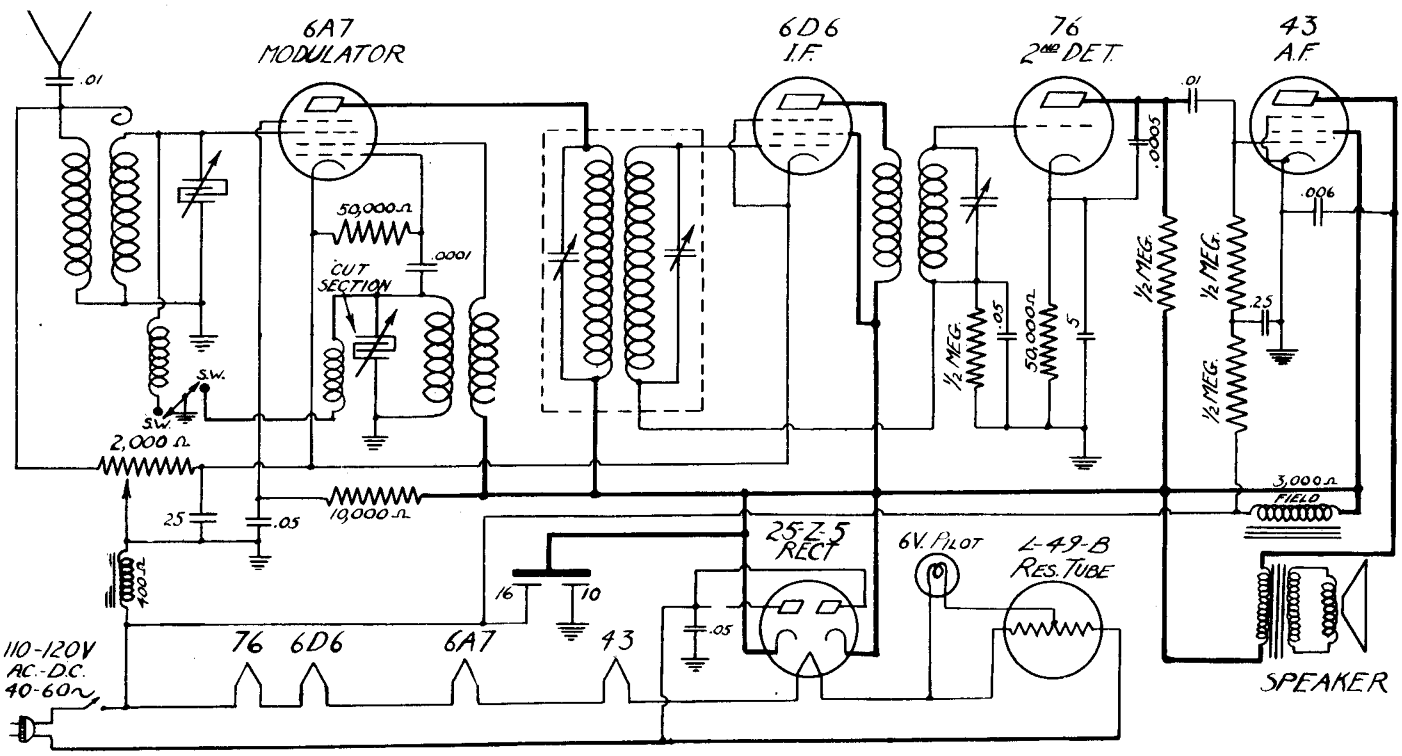
MODEL 622



TO CALIBRATE:—CONNECT TEST OSCILLATOR TO GRID OF 6A7 AND CHASSIS SHORT SET OSCILLATOR STATOR. PEAK I.F TRANSFORMER AND 2ND DET. TO 456 KC. NEXT CONNECT TEST OSCILLATOR TO ANT. AND CHASSIS REMOVE STATOR SHORT AND SET TEST OSCILLATOR AND REC. DIAL AT 1500KC. PEAK VAR. COND. TRIMMERS.

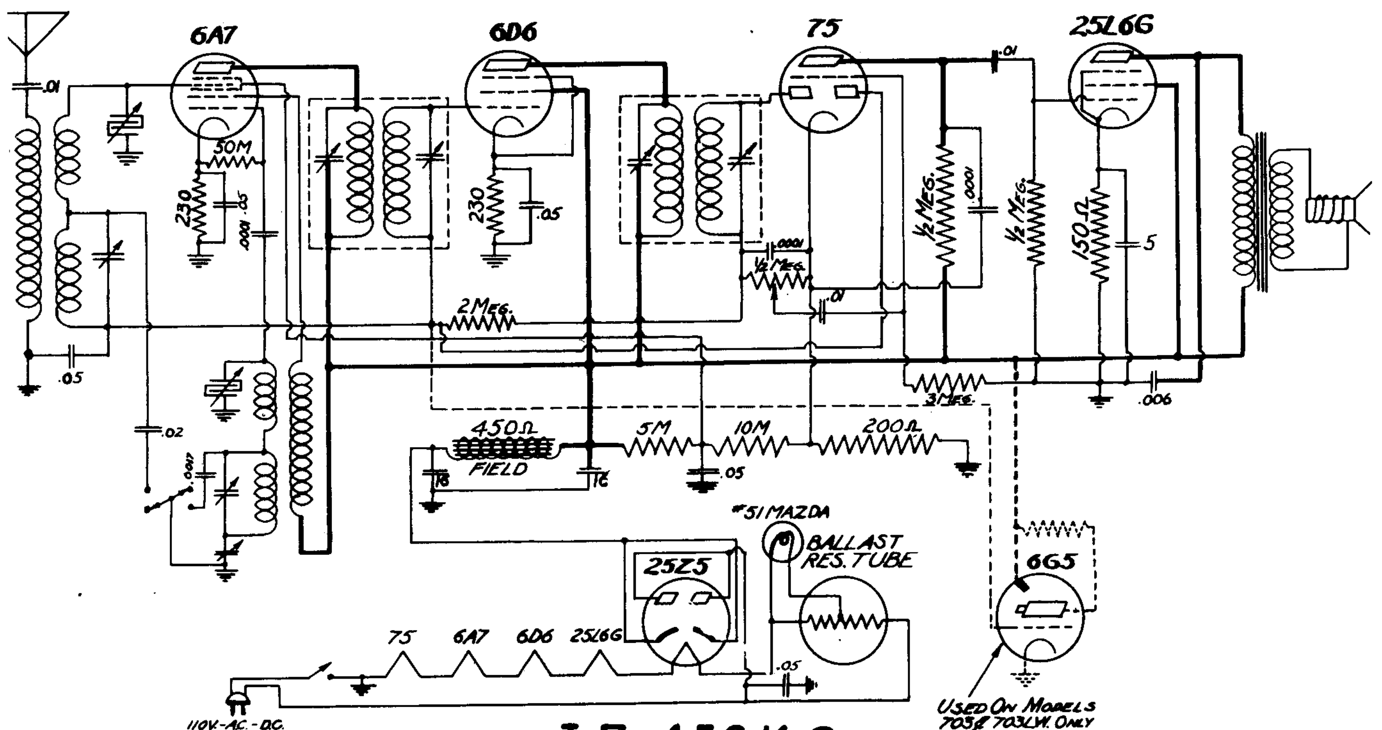
PIERCE AIRO, Inc.

MODEL 626



To Calibrate:—Connect Test Oscillator To Grid of 6A7 And Chassis. Short Set Oscillator Stator. Peak I.F. Transformer And 2ND Det. To 456 KC. Next Connect Test Oscillator To Ant. And Chassis Remove Stator Short And Set Test Oscillator And Rec. Dial at 1500 KC. Peak Var. Cond. Trimmers.

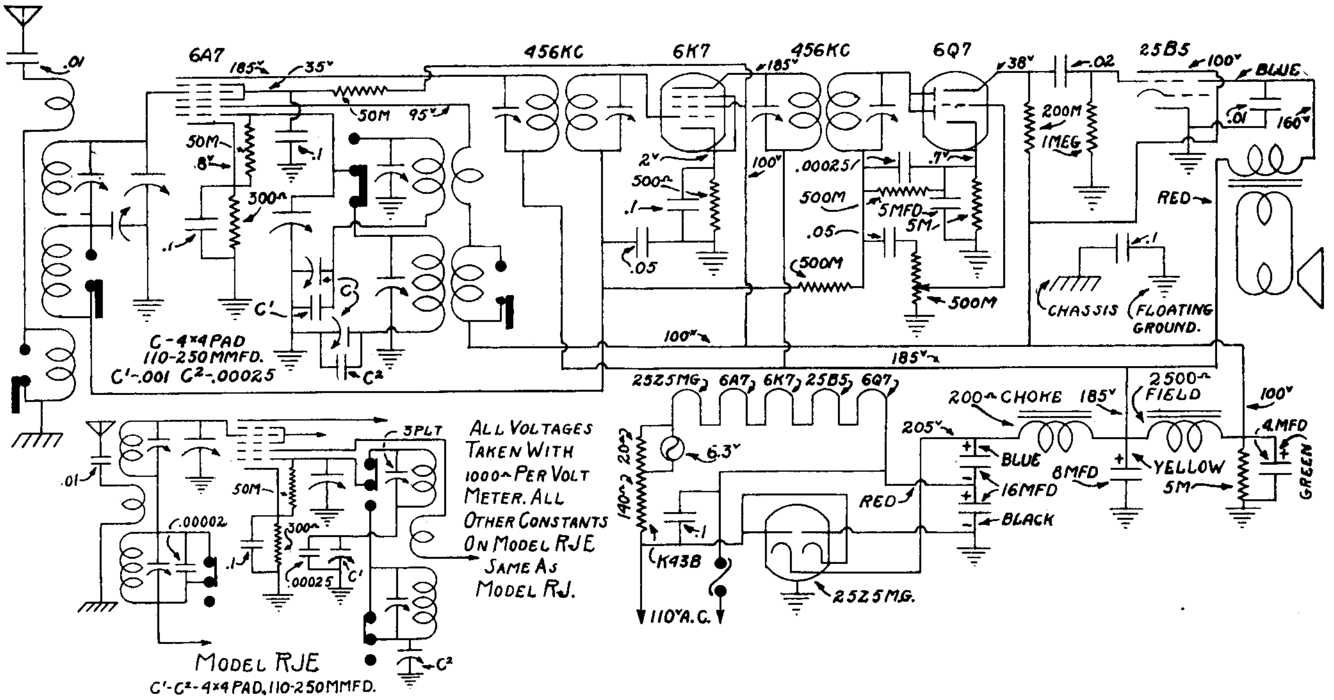
MODELS 629-629LW-703 & 703LW



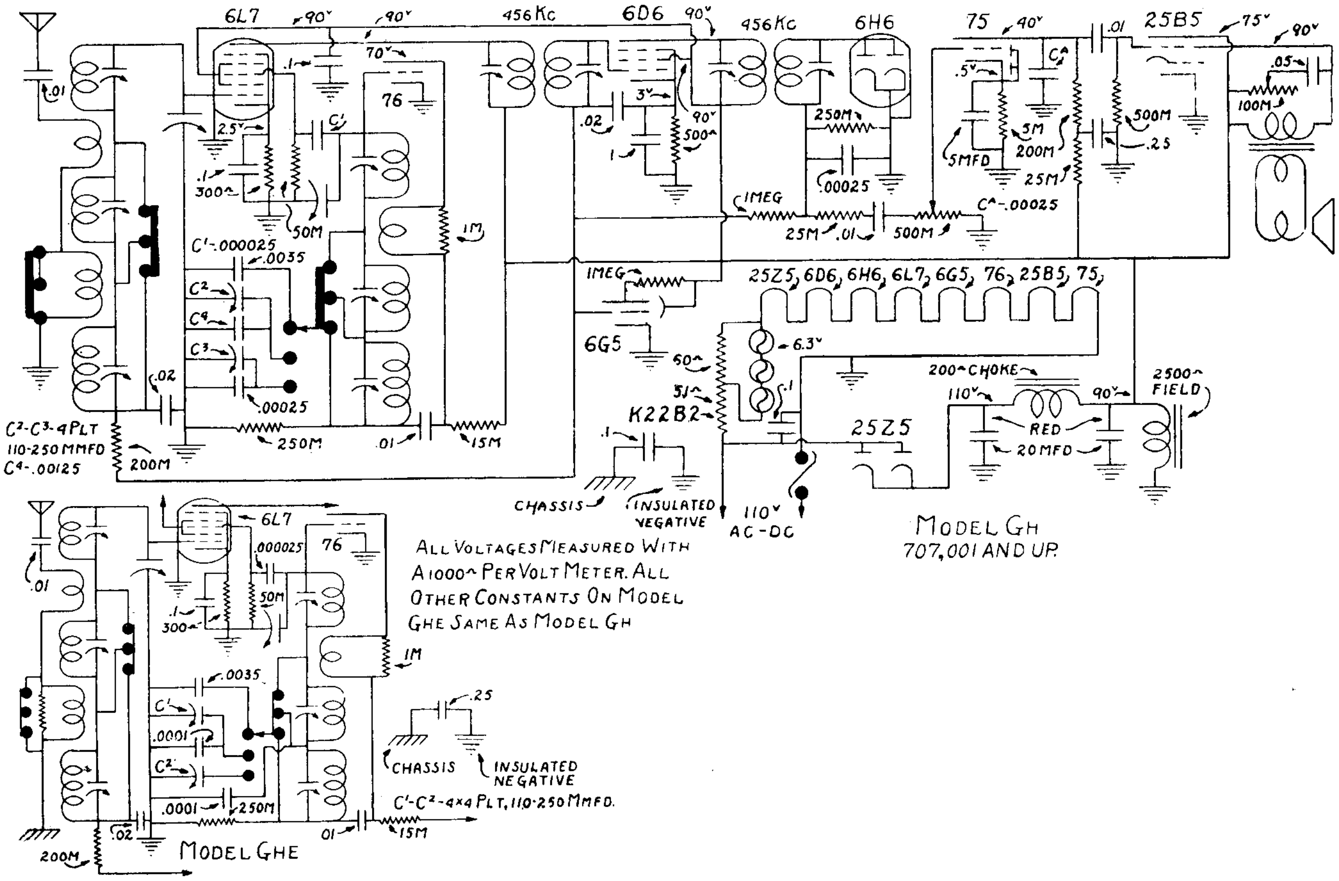
I.F. 456 K.C.

PILGRIM ELECTRIC CORPORATION

MODELS RJ "SERIAL 300,001 UP"-RJE

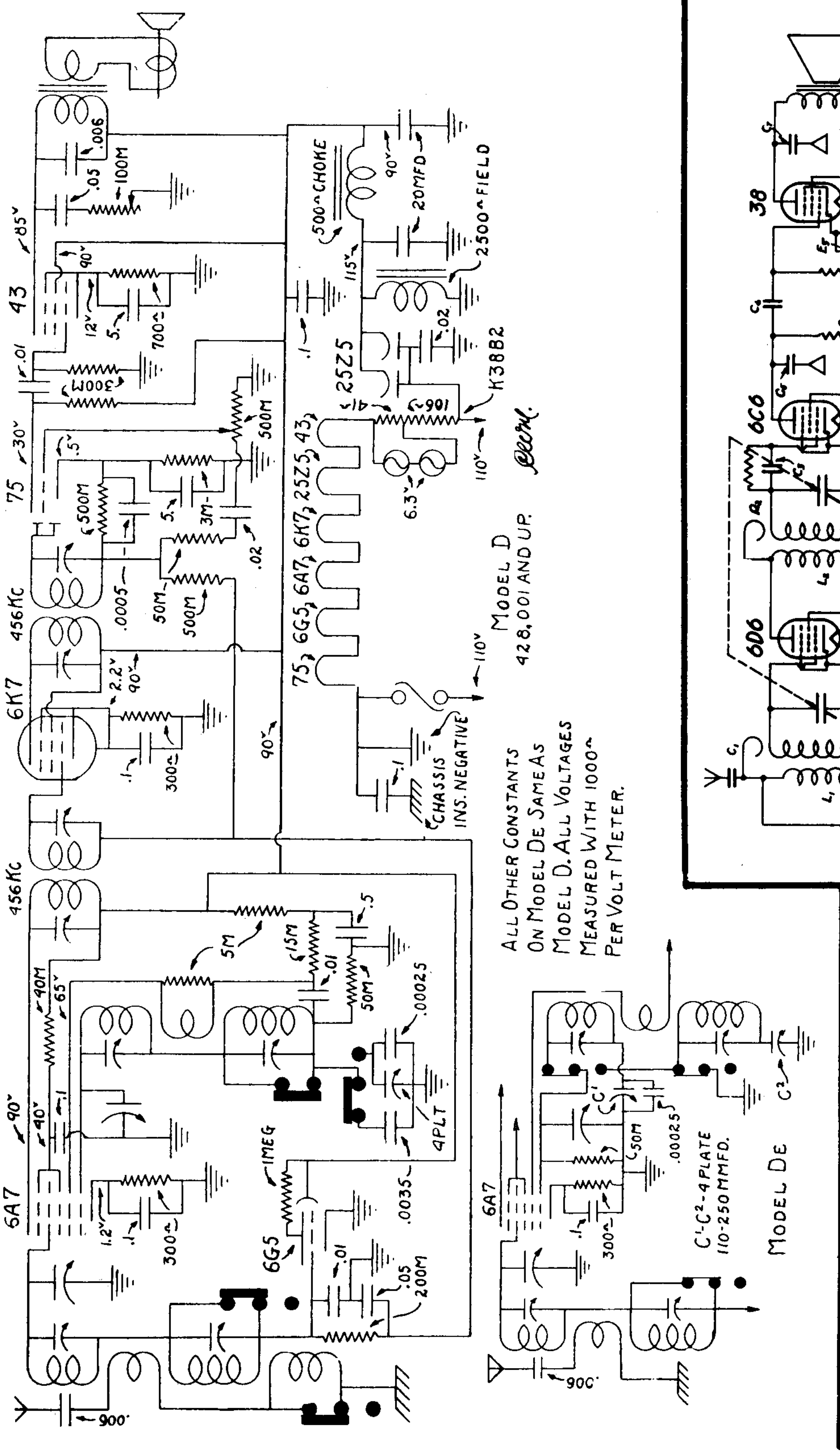


MODELS GH "SERIAL 707,001 UP"-GHE

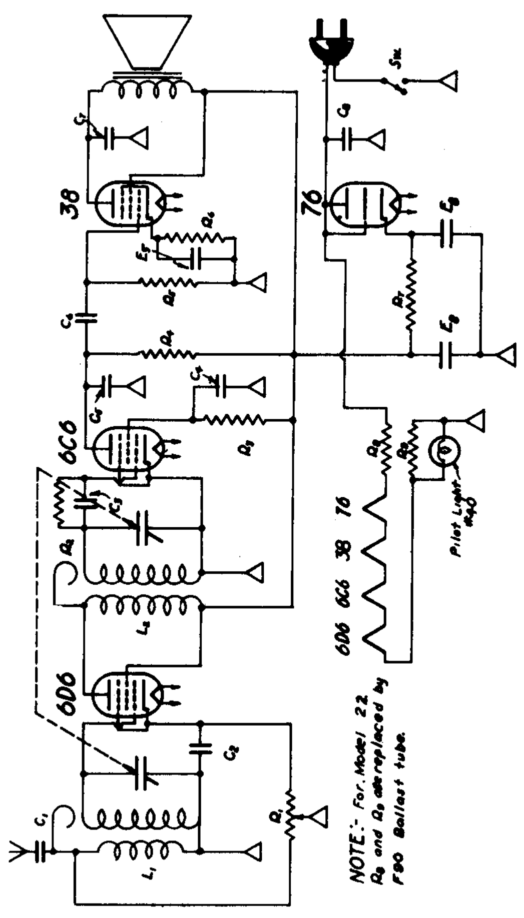


PILGRIM ELECTRIC CORPORATION

MODELS D "SERIAL 428,001 UP"- DE



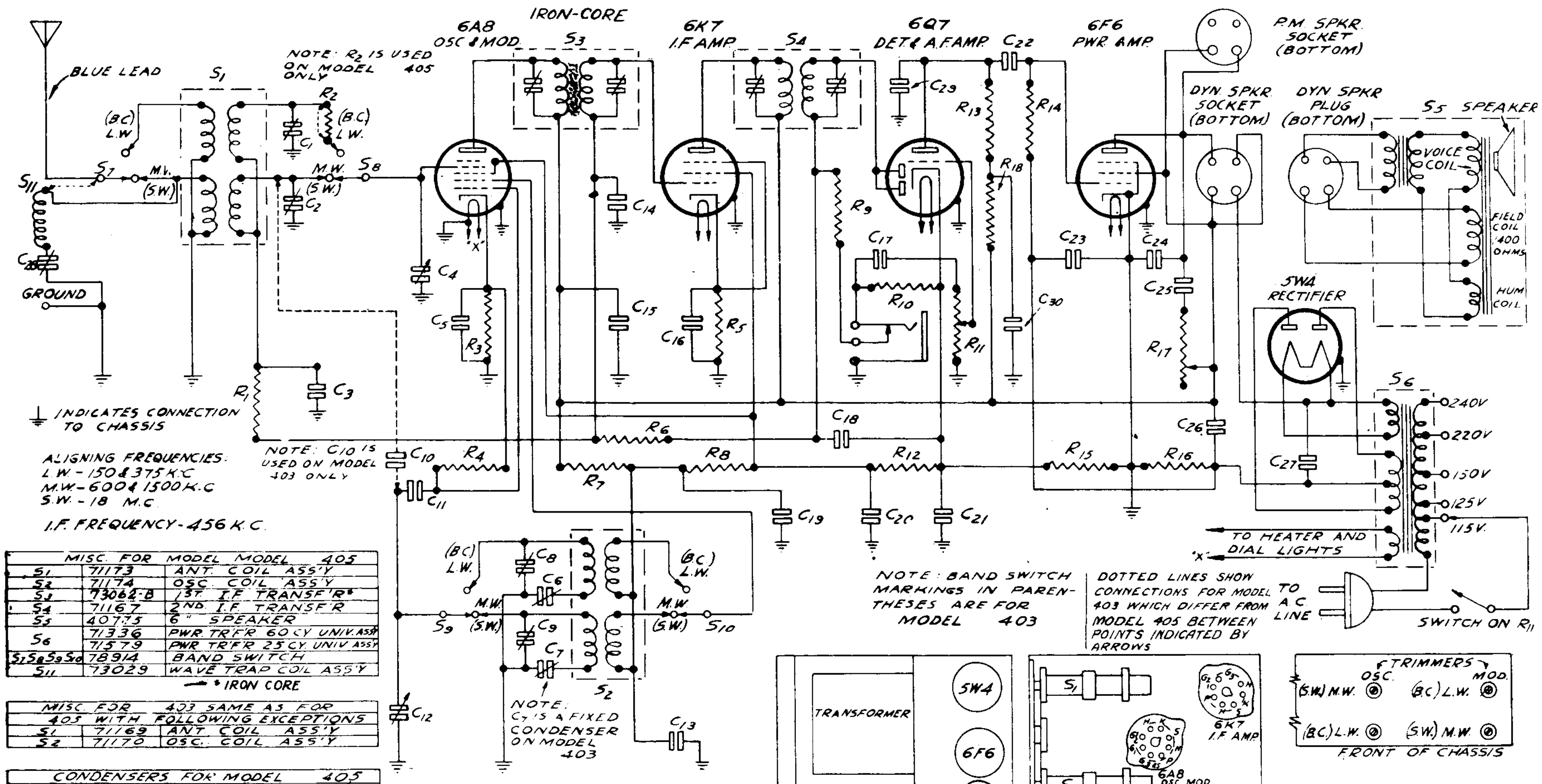
MODEL 210 A.C.-D.C.



R 1 - 25,000 ohm vol. cont.	E 5 - 8 mfd. - 25V.
R 2 - 3,000,000 " ½ watt.	E 8 - 8 mfd. - 150 V.
R 3 - 6,000,000 " ½ watt.	E 9 - 8 mfd. - 150 V.
R 4 - 1,000,000 " ½ "	
R 5 - 750,000 " ½ "	L 1 - Antenna Coil.
R 6 - 1,000 " ½ "	L 2 - R. F. Coil
R 7 - 800 " 1 "	
R 8 - 375 " in line cord	C 1 - .005 - 400 V.
R 9 - 25 " 2 watt	C 2 - .1 - 200 V.
	C 3 - .005 - 400 V.
	C 4 - .1 - 200 V.
	C 5 - .0001 - Mica
	C 6 - .02 - 400 V
	C 7 - .006 - 400 V
	C 8 - .05 - 400 V

PILOT RADIO CORPORATION

MODELS 403 & 405



MISC. FOR MODEL	MODEL	405
S1	71173	ANT. COIL ASS'Y
S2	71174	OSC. COIL ASS'Y
S3	73062-B	1ST. I.F. TRANSF'R*
S4	71167	2ND. I.F. TRANSF'R
S5	40775	6" SPEAKER
S6	71336	PWR. TR'F'R. 60 CY. UNIV. ASS'Y
	71579	PWR. TR'F'R. 25 CY. UNIV. ASS'Y
S7 S8 S9 S10	78914	BAND SWITCH
S11	73029	WAVE TRAP COIL ASS'Y

* IRON CORE

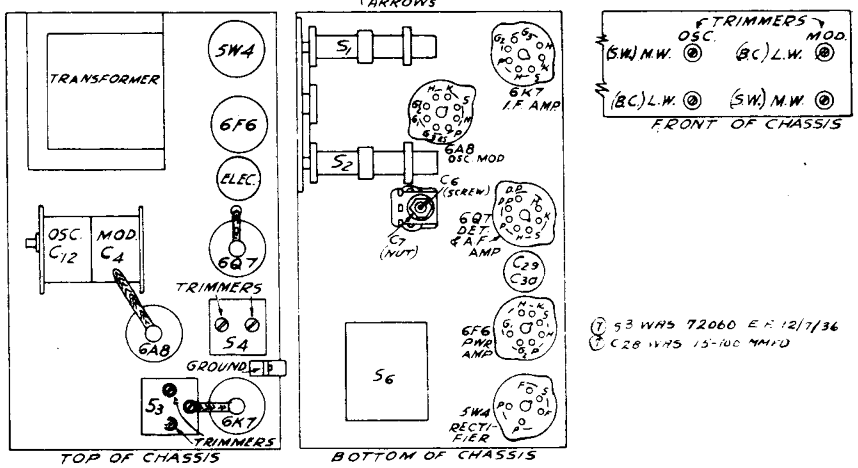
MISC. FOR 403 SAME AS FOR 405 WITH FOLLOWING EXCEPTIONS		
S1	71169	ANT. COIL ASS'Y
S2	71170	OSC. COIL ASS'Y

CONDENSERS FOR MODEL 405		
C1 C2 C8 C9	72363B	TRIMMER
C3 C14	22055-I	.05 mfd. 200V. PAPER
C4 C12	78851	405 mmfd 2 GANG VAR.
C5 C16	22055-M	.1 mfd 200 V. PAPER
C6 C7	72355-H	PADDER 20-80 & 300-600 mmfd
C11	27723-W	50 mmfd. MICA
C13	22055-C	.05 mfd. 600 V. PAPER
C15 C30	22055AB	.1 mfd 600 V. PAPER
C17 C22	22055-A	.01 mfd 600 V. PAPER
C18 C29	27701-W	250 mmf. MICA
C19	72353	ELEC 4 mfd 475 V.
C20	22055-P	.05 mfd 400 V. PAPER
C21	22055-F	.25 mfd 200 V PAPER
C23	22055-S	.5 mfd 200 V. PAPER
C24	22055-R	.005 mfd 1000 V. PAPER
C25	22055-AF	.05 mfd. 1000 V. PAPER
C26 C27	71045-A	ELEC. 8-8 mfd. 475 V.
C28	71503-F	TRIMMER 35-100 mmfd.

CONDENSERS FOR 403 SAME AS FOR 405 WITH FOLLOWING EXCEPTIONS		
C6	71503-A	PADDER 250-500 mmf1.
C7	27734-W	6000 mmfd MICA
C10	71525-A	NEUTRALIZING ASS'Y

RESISTORS FOR MODEL 405		
R1 R18	13031	100,000 OHMS 1/4 WATT
R2	13080	50 OHMS 1/4 WATT
R3 R5	13115	400 OHMS 1/4 WATT
R4 R9	13164	50,000 OHMS 1/4 WATT
R6	13001	1 MEGOHM 1/4 WATT
R7	13073	3,000 OHMS 1/2 WATT
R8	13129	15,000 OHMS 1 WATT
R10	13147	300,000 OHMS 1/4 WATT
R11	78845	750,000 OHMS VOL. CONT. & SW.
R12	13148	30,000 OHMS 1/4 WATT
* R13	13171	250,000 OHMS 1/4 WATT
R15	13130	420 OHMS 1/4 WATT
R16	13059	250 OHMS 1 WATT
R17	78846	100,000 OHMS TONE CONT.
* R14	13024	500,000 OHMS 1/4 WATT

RESISTORS FOR 403 SAME AS FOR 405 WITH FOLLOWING EXCEPTIONS		
R2	13080	NOT USED FOR 403



(1) S3 WAS 72060 E.F. 12/7/36
(2) C28 WAS 15-100 MMFD

PILOT RADIO CORPORATION

MODELS 403 & 405

SERVICE INFORMATION FOR PILOT MODELS 403 AND 405

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the knobs and felt washers from the controls on the front panel, and loosen the set screw on the tuning knob.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet and pull chassis out.

REALIGNMENT: If the receiver requires alignment, the procedure outlined below should be followed. In the schematic diagram sheet, the location and function of the various alignment capacitors are clearly illustrated. For best results, an external modulated oscillator with adequate frequency range and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. When aligning the receiver on all positions, the volume control and the tone control should be turned to the maximum clockwise position. Connect the antenna lead of the external oscillator to the control grid of the 6K7 tube in the I. F. Amplifier through a .1 mfd. fixed condenser. Connect the ground lead of the external oscillator to the chassis. The I. F. alignment trimmers are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. Following this, connect the external oscillator leads to the control grid of the 6A8 tube. Adjust each trimmer on I. F. Unit No. 1 for maximum gain.

During these operations, use the least possible input to prevent broadening of the reasonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in all I. F. Units, with the external oscillator leads connected to the control grid of the 6A8 tube.

WAVE TRAP ADJUSTMENT: With the oscillator still set at 456 kc., connect the oscillator to the antenna and ground. Then adjust the wave trap condenser to minimum deflection on the output meter.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground through a .0002 mfd. condenser. Leave the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Tune the external oscillator to 1500 kc. Adjust the broadcast band oscillator trimmer to maximum response.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located in the center of the chassis on the under side. Set the external oscillator at 600 kc. Rock the receiver tuning control around the resonance position, and at the same time adjust the padder condenser for the highest peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

The alignment frequencies are as follows:

Longwave Band	—800 meters	(375 kc.)
Broadcast Band	—200 meters	(1,500 kc.)
Band 1	—16.7 meters	(18,000 kc.)

BAND 1: Align Band 1 in a similar manner using a 400-ohm non-inductive resistor in place of the .0002 mfd. condenser. The alignment frequency is 18,000 kc. (16.7 meters).

The alignment of Band 1 requires greater care due to the higher frequencies covered by this band. Rotate the tuning condenser of the receiver until the dial pointer is co-incidental with the 18,000 kc. indication on the dial scale. Adjust the oscillator trimmer condenser for maximum sensitivity. Proceed next to align the detector section. In doing this it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonant peak.

THE LONG WAVE ALIGNMENT procedure in the Model 405 is similar to that of the broadcast. Turn the Band Switch to the Long Wave position. The alignment frequency is 375 kc. Adjust the padder condenser at 150 kc. Use a .0002 mfd. condenser in the antenna lead from the external oscillator.

REMOVAL OF BAND SELECTOR SWITCH ASSEMBLY: Should it be necessary to remove the switch assembly, it is advisable to realign the receiver after reinstalling it.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

RECEIVER DESCRIPTION

Operating Voltages—115, 125, 150, 220, 240 volts, Alternating Current.
Frequency Rating—50 to 60 cycles.
Power Consumption—60 watts.
Tubes—1 type 6A8, 1 type 6K7, 1 type 6Q7, 1 type 6F6, 1 type 5W4.
Undistorted Power Output—3 watts.

Intermediate Frequency—456 kc.
Tube Functions—
- **Type 6A8: Electron emission control oscillator-detector.**
- **Type 6K7: I. F. amplifier.**
- **Type 6Q7: Duo-diode detector amplifier.**
- **Type 6F6: Class "A" power pentode.**
- **Type 5W4: Full-wave rectifier for power supply.**

VOLTAGES

The D. C. Voltages measured at the tube sockets of the set should be read with a high resistance voltmeter of at least 1000 ohms per volt.

	OSC. DET. Type 6A8	I. F. Type 6K7	DIODE DET. Type 6Q7	POWER PENTODE Type 6F6	RECTIFIER Type 5W4
Plate	230	230	105*	205	
Cathode	4.	3.5	1.3		320
Screen	85	85		230	
Filament	6.3	6.3	6.3	6.3	5.

***Voltages measured through 250,000 ohm plate resistor.**
Speaker field voltage 90 volts. All plate voltages measured to cathode.
All screen voltages measured to cathode.
All cathode voltages measured to chassis frame.

RCA MANUFACTURING COMPANY, Inc.

MODEL R99 2ND PRODUCTION
HIGH FIDELITY ELECTROLA

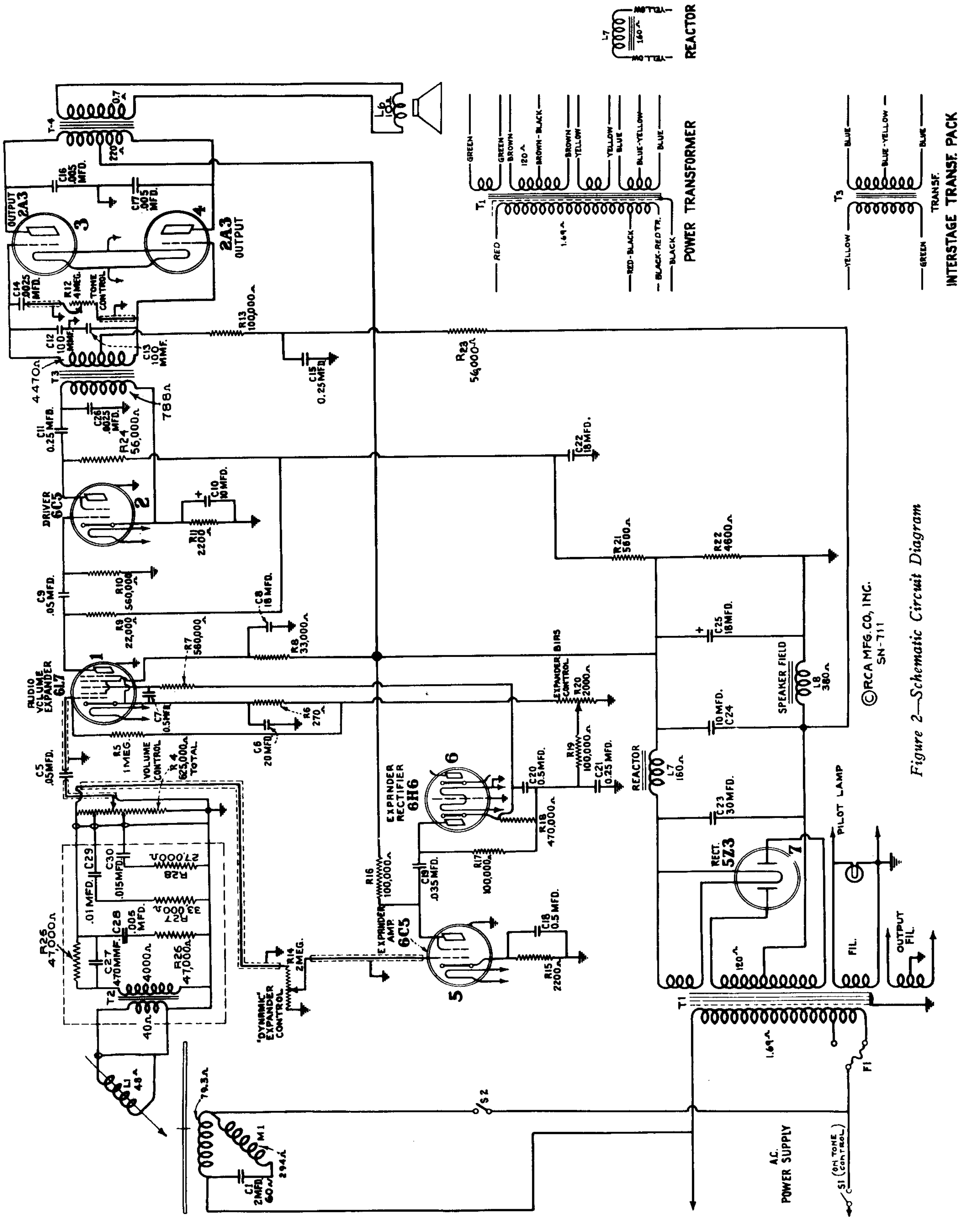


Figure 2—Schematic Circuit Diagram

RCA MANUFACTURING COMPANY, Inc.

RCA VICTOR MODEL R-99 (Second Production)
HIGH-FIDELITY ELECTROLA

TECHNICAL INFORMATION AND SERVICE DATA

The RCA Victor Model R-99 (second production) is identical to the original model except for slight modifications. These modifications are as follows: new design of input transformer T2, compensation pack, and volume control R4; RCA-6L7 audio volume expander tube grid resistor R5 changed in value from 330,000-ohm to 1 meg.; a 56,000-ohm resistor R24 is used in place of the former plate reactor L5; new design of interstage transformer T3; capacitors C12 and C13 have changed in value from 270 mmfd. to 100 mmfd.; change in power cable; and a slight re-arrangement of parts. Model R-99 (second production) may be identified by reference to the assembly wiring diagram figure 1 where it may be seen that the input transformer T2 and the compensation pack are built in one unit ("input pack") with cable connections to the pickup and to the volume control. In the original model the input transformer and the compensation pack were constructed as separate units with a cable connection between them. Model R-99 (second production) amplifier chassis may be identified by the 56,000-ohm resistor R24 which is connected between the RCA-6C5 audio-driver tube plate terminal and an adjacent terminal board.

Service data for Model R-99 (first production) is directly applicable to the instrument except for the data contained herein.

Cathode Current Reading—RCA-6C5 driver tube—2.8 ma.

Resistance Measurements (Referring to figure 5 Service data for Model R-99 first production)—Resistance from grid "G" of RCA-6C5 control amplifier tube to chassis should be, with "Dynamic" expander control positions,—"Min" 0-ohm —"Center" 0.5 meg.—"Max" 50,000-ohm; from grid cap of RCA-6L7 audio volume expander tube to chassis should be 1-meg; and from plate "P" of RCA-6C5 driver tube to center terminal of capacitor C24 should be 62,000-ohms.

Voltage Measurements (Referring to figure 7 Service Data for Model R-99 first production)—Voltage values from diode plate "P_2" and the diode cathode "C_2" of the RCA-6H6 Diode tube to chassis should be (7.3V.*), 0.35V; from plate "P" and from cathode "C" of the RCA-6C5 driver tube to chassis should be 145V. and 4.8V. respectively.

Dynamic Amplifier Adjustments

It is essential that the correct voltages and currents exist at the RCA-6L7 audio expander stage in order that the expanding function may take place in the proper manner. A screw driver adjustment is accordingly provided to regulate the RCA-6L7 control grid No. 3 to the correct operating value. Two methods of adjustment are applicable. Either method requires a normal voltage of 300-volts across the filter output (resistor R22). The one to be preferred (a) requires the use of the **RCA Stock No. 9633 Beat Frequency Oscillator** or the equivalent, a 100-ohm resistor, a 200-ohm resistor, and a 1,000-ohm-per-volt a-c voltmeter (rectifier-type) having a "low" range of 1.0 volt and a "high" range of 250 volts or greater. The less accurate method (b) requires the use of a **RCA Stock No. 12353 Split Plate Adapter**, and a suitable d-c milliammeter. **CAUTION: Before using either method, be sure that power-supply fuse is in proper position for the line voltage.**

(a) Preferred Method.—Turn power switch (left front) off. Connect the 200-ohm and the 100-ohm resistors in series between the beat-frequency oscillator terminals (upper "250" and "CT") with the 100-ohm resistor connected to "CT". Calibrate the beat-frequency oscillator, adjust it to 1,000 cycles and reduce its output. Connect the 1,000-ohm-per-volt a-c voltmeter (1-volt range) to the beat-frequency oscillator terminals (upper "250" and "CT"). Remove the "M" plug from the "F" receptacle on the shielded cable running between the "input pack" and the "volume control" (see figure 1). Connect beat-frequency oscillator terminal "CT" to the shield on the "M" plug. Connect the junction of the 200-ohm and the 100-ohm resistors to the small pin (marked blue on diagram) on the "M" plug.

Adjust beat-frequency oscillator output until the voltmeter reads exactly 1.0 volt. Remove the voltmeter leads from the beat-frequency oscillator terminals without disturbing any of the oscillator adjustments. Place the voltmeter to its 250-volt or greater range and connect it between the plate prongs of the two RCA-2A3 power-output tubes. Connections to the tube prongs may be made by stripping approximately ½ inch of insulation from the ends of two short leads of rubber-covered wire, wrapping one bare end around each plate prong (being careful not to allow the bare ends to short on the chassis when the tubes are placed in their sockets), and connecting the voltmeter to these leads. CAUTION: **Do not touch these plate connections after the power is turned on since the potential at these points is rather high and carelessness might result in a serious shock.**

Set the expander "Dynamic" control (center front) to its extreme counter-clockwise position. Set the phonograph volume control (right front) to its extreme clockwise position. Turn on power switch (left front) and rotate this control to its extreme clockwise position, allowing it to remain in this position for all adjustments. Allow a few minutes for the instrument to become stabilized. Adjust the expander bias control R20, on rear apron of amplifier (see figure 1), until the voltmeter reads 195 volts. Turn phonograph volume control to extreme counter-clockwise position.

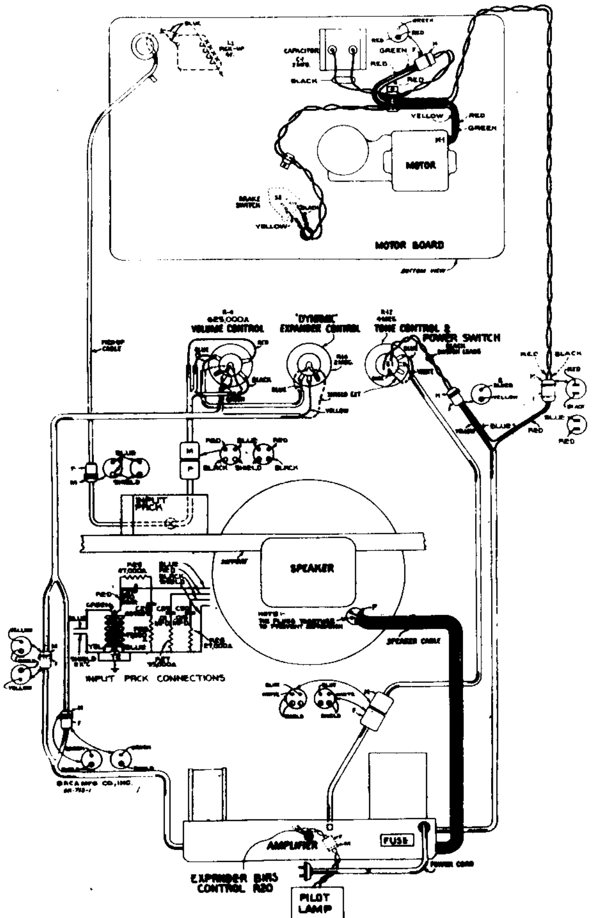


Figure 1—Assembly Wiring

RCA MANUFACTURING COMPANY, Inc.

MODEL RE-40-P

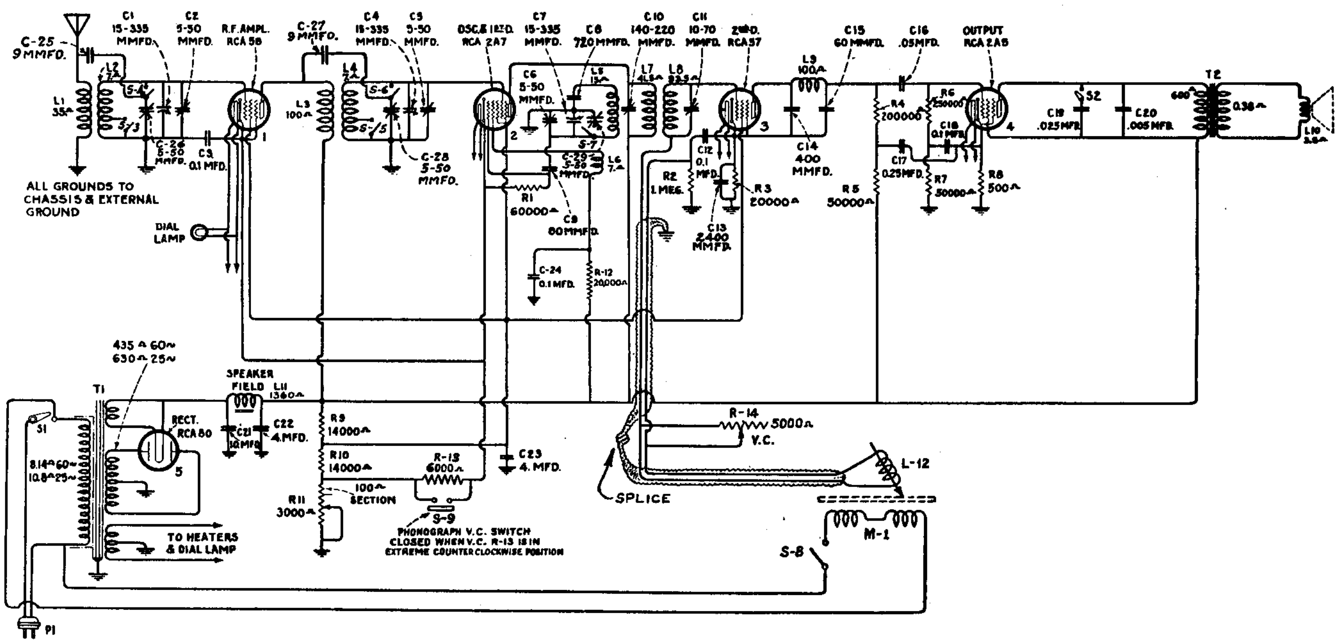


Figure A—Schematic Circuit

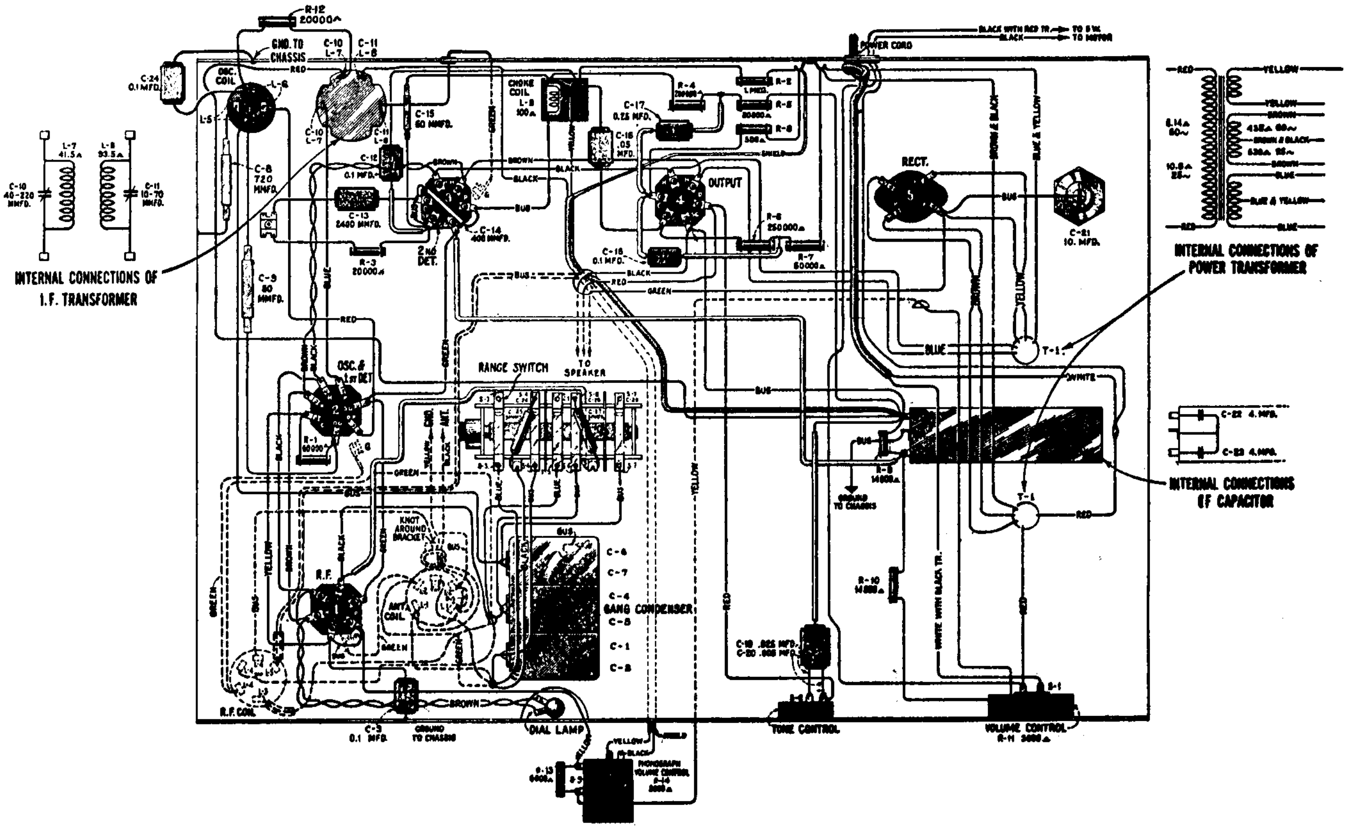


Figure B—Wiring Diagram

RCA MANUFACTURING COMPANY, Inc.

MODEL RE-40-P

Voltage Rating......115 Volts
Frequency Rating...........25–40 Cycles and 50–60 Cycles
Power Consumption...................60 Cycles, 95 Watts
Number and Types of Radiotrons...............1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total 5
Undistorted Output............................1.75 Watts
Frequency Range.................540 K. C. to 1500 K. C. and 1400 K. C. to 2800 K. C.

This combination radio-phonograph instrument uses a five-tube Super-Heterodyne receiver incorporating a dynamic loudspeaker, two-point tone control, single heater type Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

The standard RCA Victor two speed motor board equipment is used and the entire assembly enclosed in a table type cabinet.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure B shows the assembly wiring, Figure C the schematic diagram and Figure D the chassis wiring diagram. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer using two tuned circuits, a second detector, an output tube and a rectifier.

Line-up Capacitor Adjustment

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 1400 K. C., and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1400 K. C. This is done with the Range Switch at the broadcast position. A similar manner is used as that of the I. F., except that the oscillator is set at 1400 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

Service data for the magnetic pickup is included below.

RADIOTRON SOCKET VOLTAGES
115 Volt A. C. Line
MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

SERVICE DATA ON MAGNETIC PICKUP

This magnetic pickup is of a new design that results in excellent reproduction. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists of essentially a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature.

REPLACING MAGNET COIL, PIVOT RUBBERS, OR ARMATURE

In order to replace a defective magnet coil or hardened pivot rubbers, it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws.

(d) Remove screws A and B, Figure A, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered.

(f) The mechanism should now be reassembled except for the magnet which must be magnetized. After being magnetized the mechanism—with the pole pieces upward, should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change polarity.

(g) After reassembling to the mechanism, the entire assembly should be fastened to the back plate by means of the two screws provided, making sure support is down against pads on back. At the same time, the metal dust cover must be placed in position.

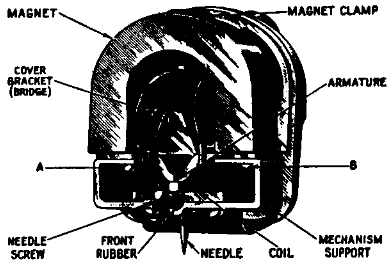


Figure A—View of Pickup showing parts

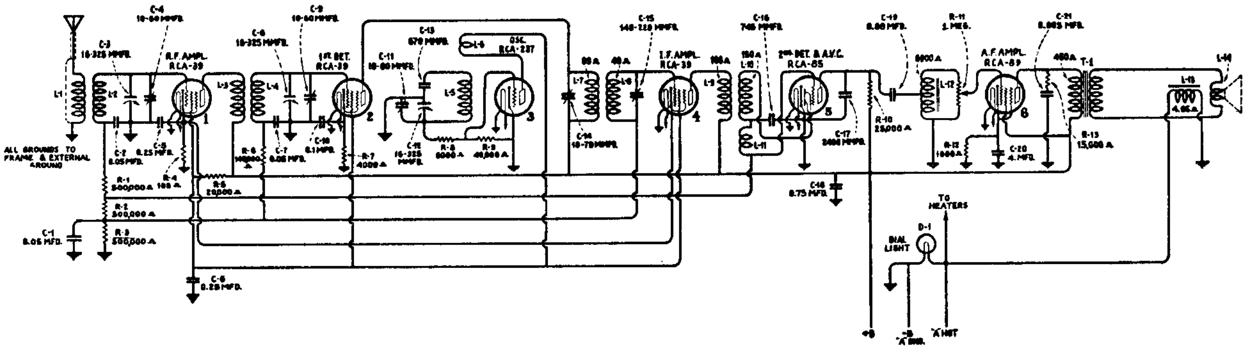
(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure A), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

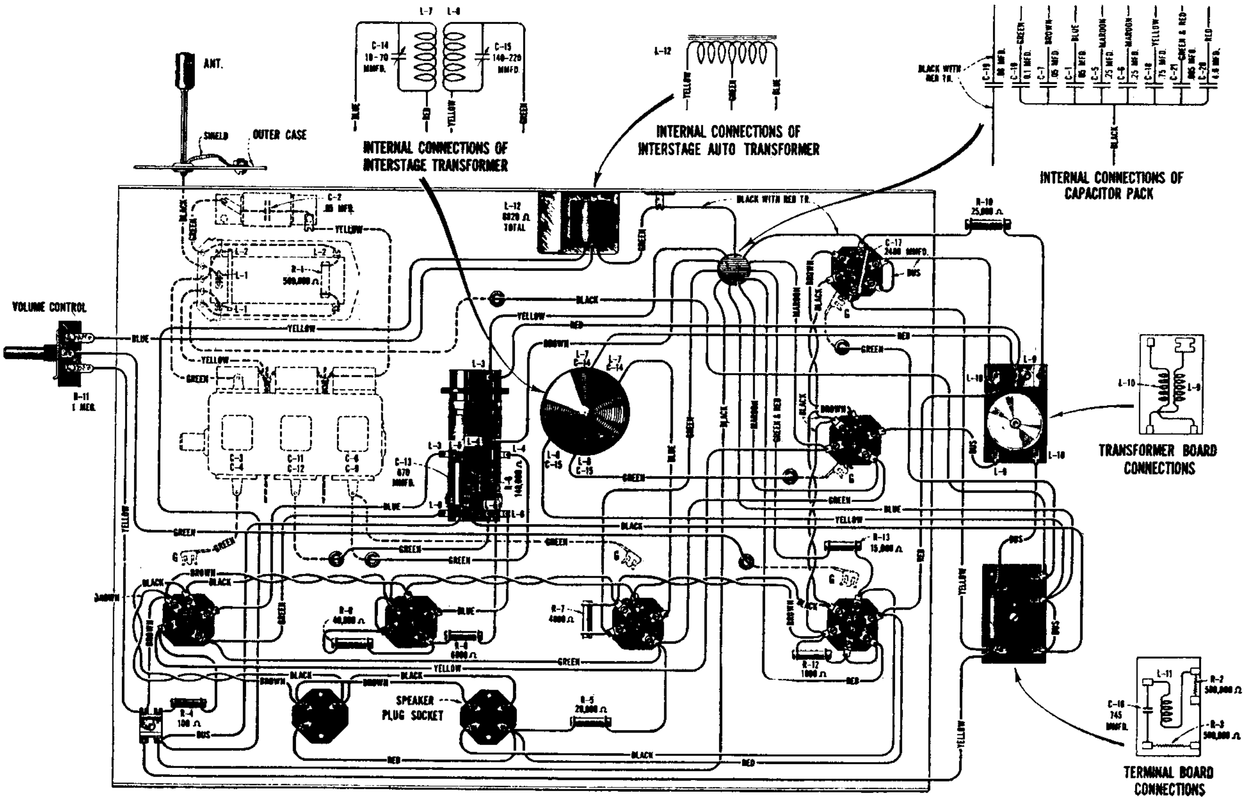
Only rosin core solder should be used for any soldering in conjunction with the pickup. However, if great care to wipe clean and use as small amount as possible is exercised, paste or liquid flux may be used for soldering the end of the spring.

RCA MANUFACTURING COMPANY, Inc.

MODEL M-32 AUTO SET



I.F. 175 K.C.



RADIOTRON SOCKET VOLTAGES

Radiotron No.	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid Volts	Cathode or Filament to Plate Volts	Plate Current M. A.	Filament or Heater Volts
1. R.F. RCA-39	0.9	71	177	4.5	5.2
2. 1st Det. RCA-39	6.0	67	172	1.35	5.2
3. Osc. RCA-37	—	—	72	5.5	5.2
4. I.F. RCA-39	0.9	71	177	4.5	5.2
5. 2nd Det. and A.V.C. RCA-85	—	—	175	4.5	5.2
6. PWR. RCA-89	18	178	160	18.0	5.2

Voltages are those at which Radiotrons are operating and with no signal impressed on input.

OTHER IMPORTANT VOLTAGES

Battery Voltage....................................6.0 Volts
Input to Dynamotor..................................5.75 Volts
Battery Drain.......................................6.5 Amperes
Output from Dynamotor.................178 Volts at 34.5 M.A.
Loudspeaker Field Drain...........................1.35 Amperes

RCA MANUFACTURING COMPANY, Inc.

MODEL CRD-9 ELECTRIC PHONOGRAPH

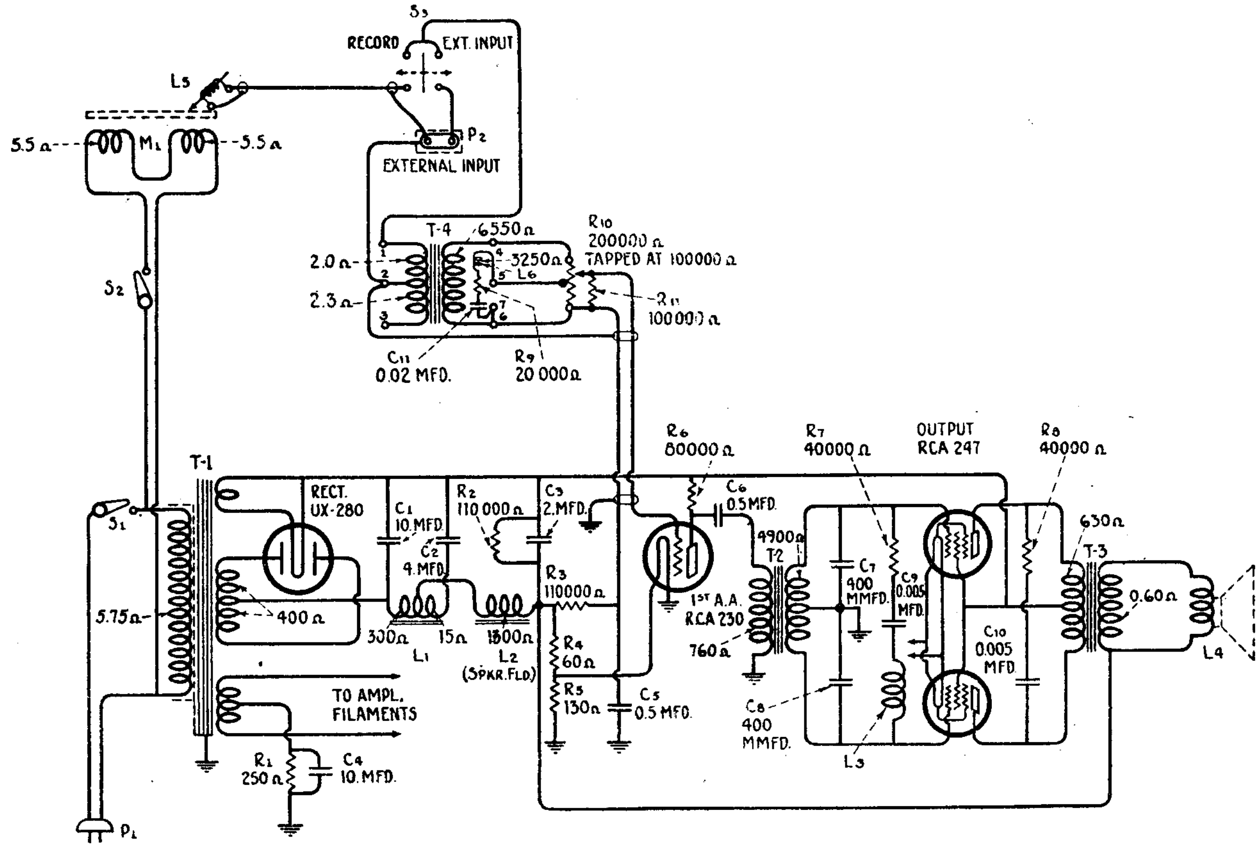


Figure A—Schematic Circuit

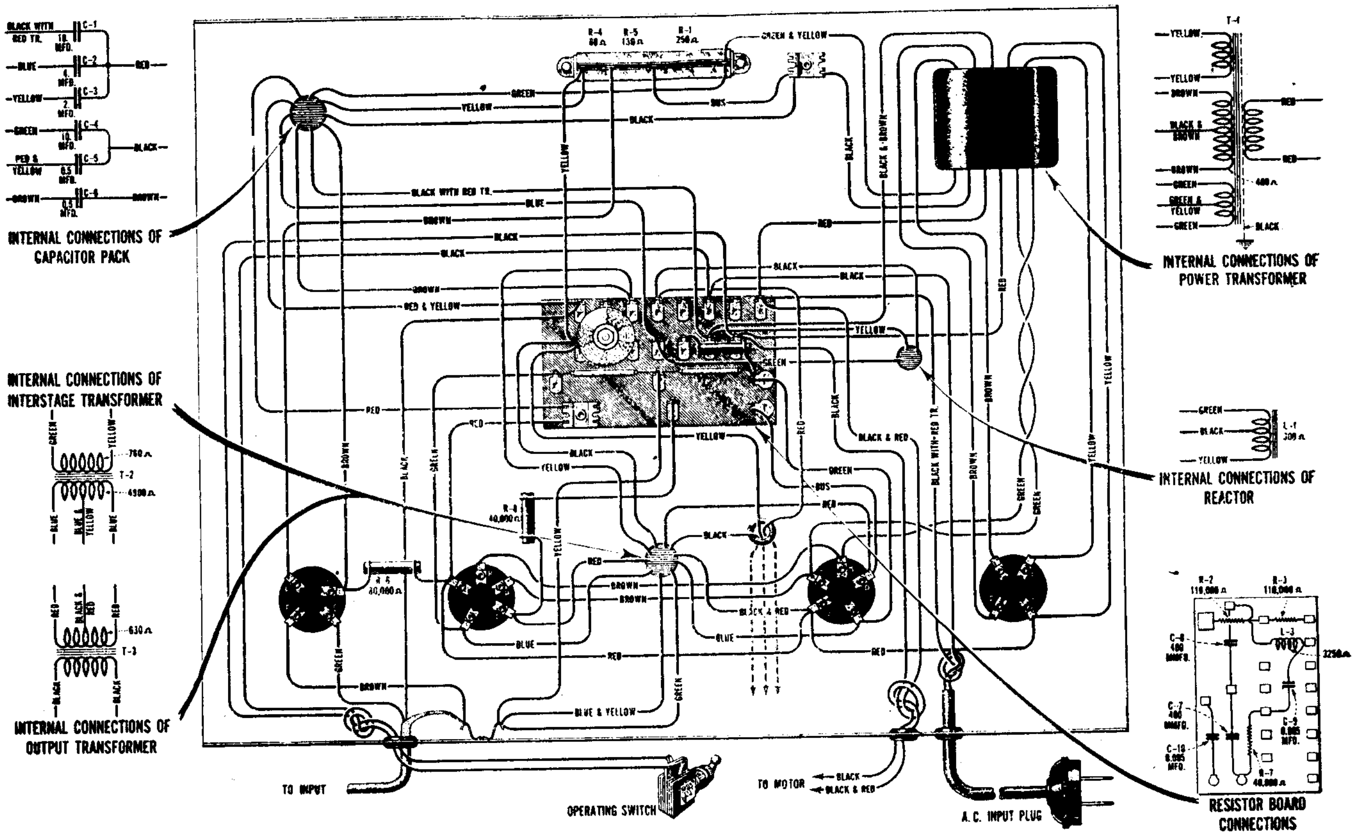
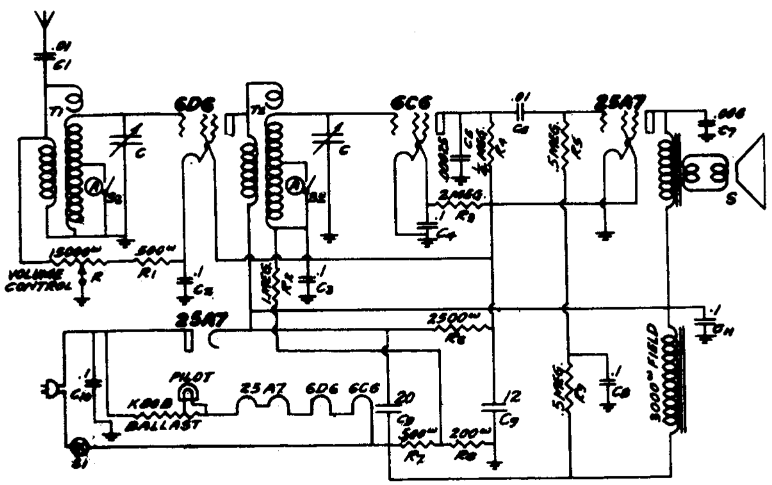
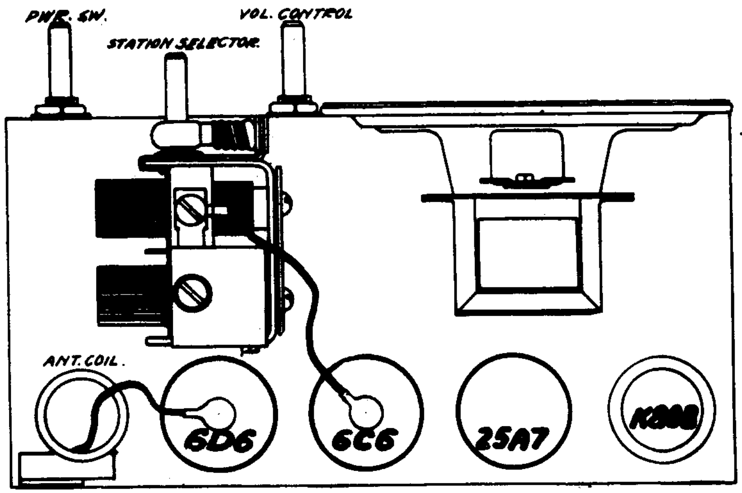


Figure B—Amplifier Wiring

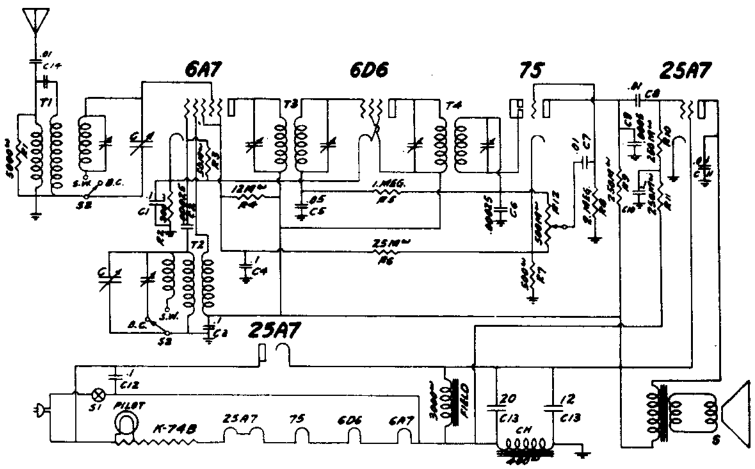
RADOLEK COMPANY

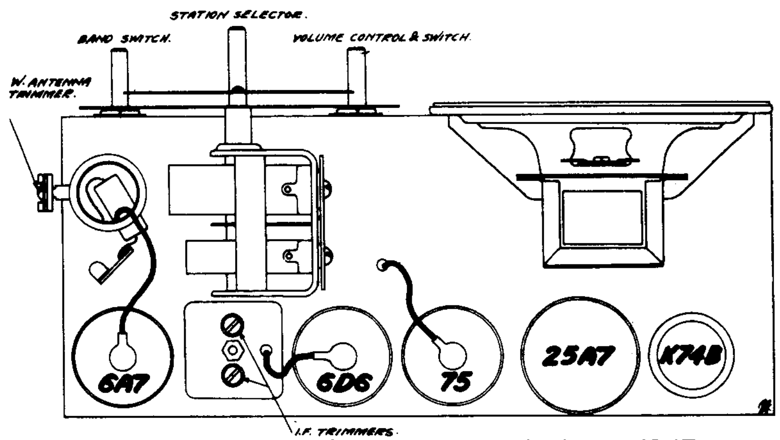
MODEL K-16,700





MODEL K-16,701

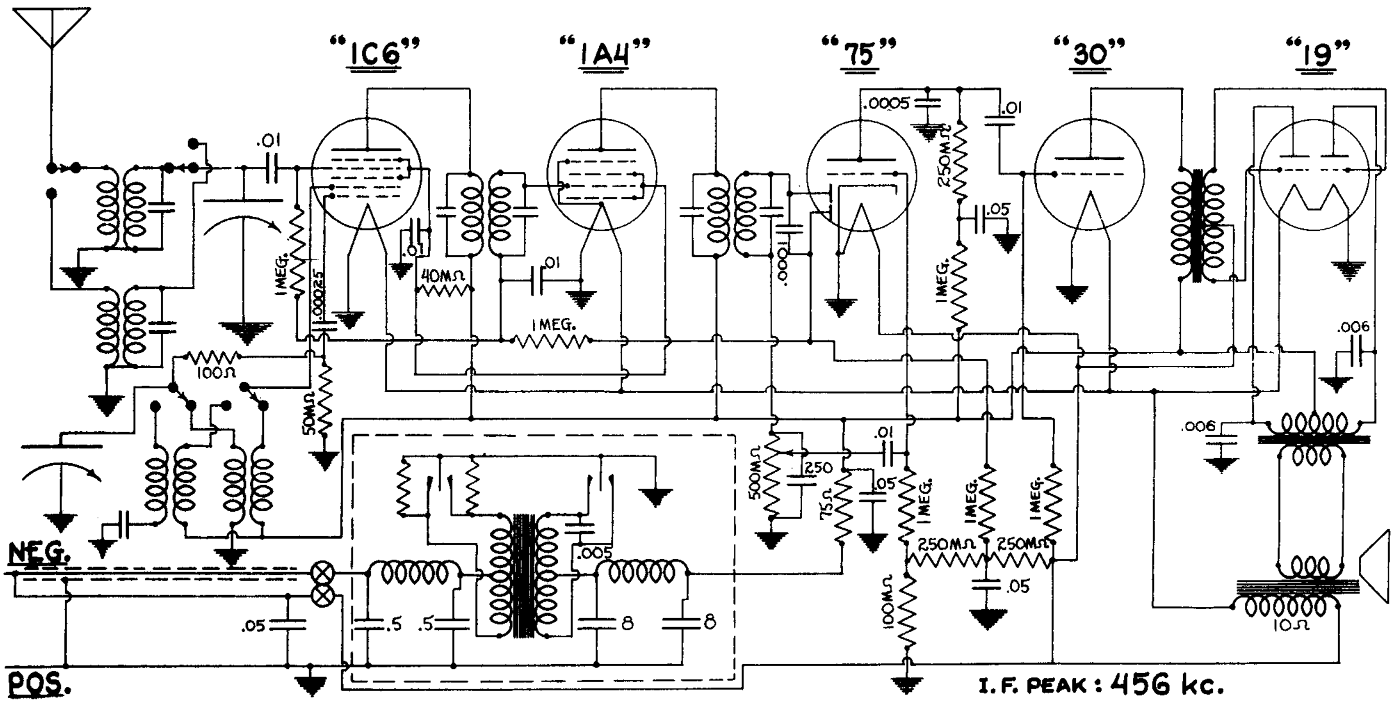




TUBE LAYOUT

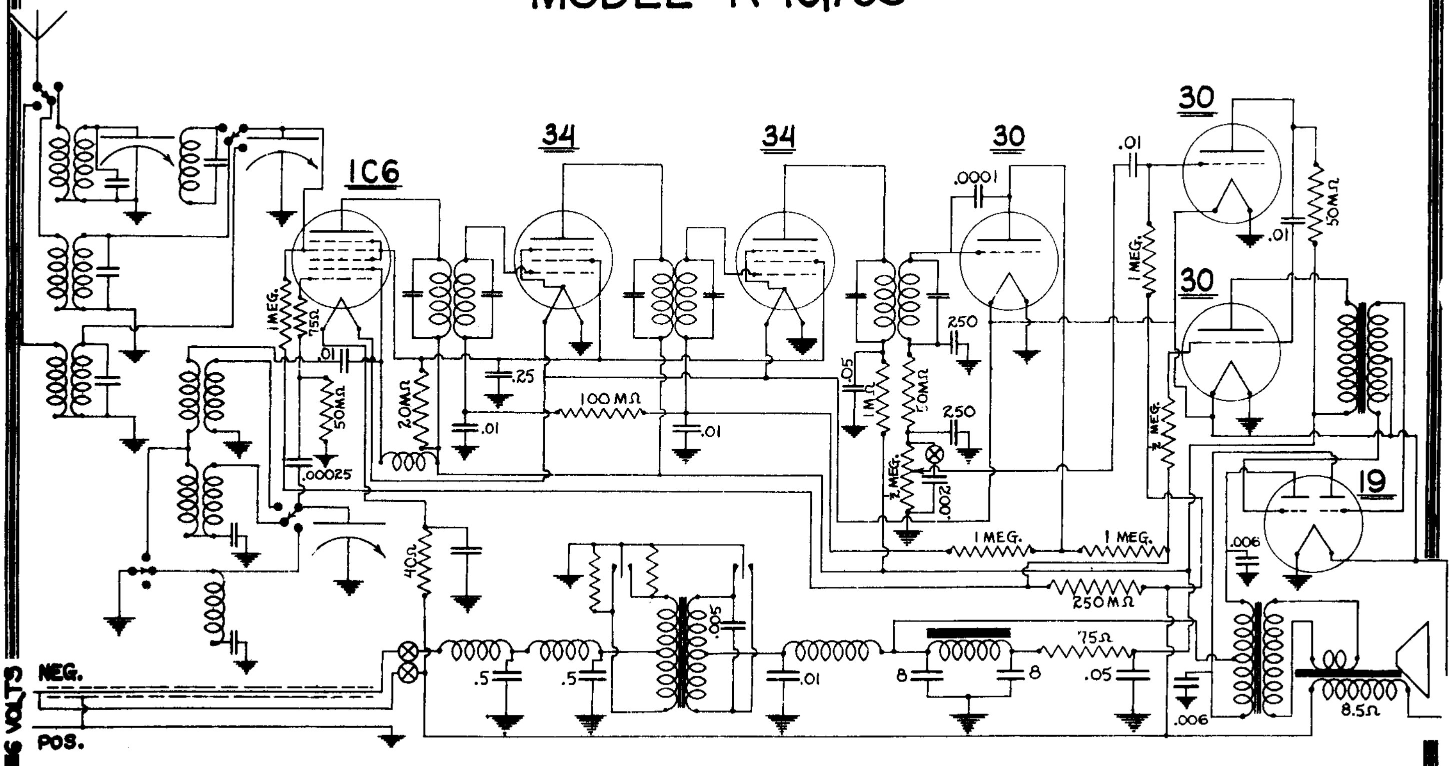
RADOLEK COMPANY

MODEL K-16,702



I. F. PEAK : 456 kc.

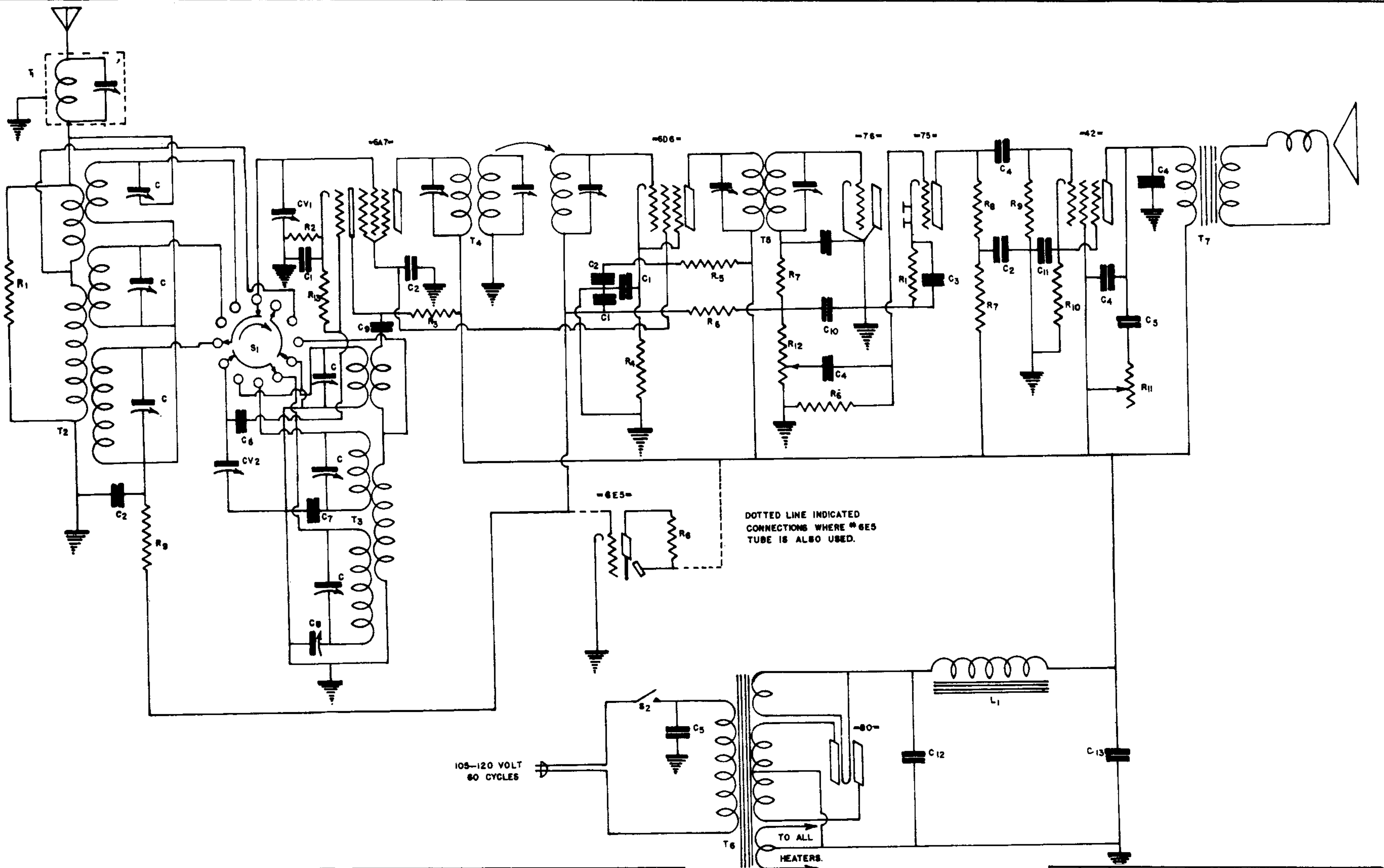
MODEL K-16,703



I.F. 456 K.C.

RADOLEK COMPANY

MODEL K-16,706



LEGEND	OUR PART NO.	DESCRIPTION
R_1	108	5,000 OHM ¼ WATT CARBON RESISTOR
R_2	103	250 OHM ¼ WATT CARBON RESISTOR
R_3	109	10,000 OHM ¼ WATT CARBON RESISTOR
R_4	101	150 OHM ¼ WATT CARBON RESISTOR
R_5	112	25,000 OHM ½ WATT CARBON RESISTOR
R_6	119	1 MEGOHM ¼ WATT CARBON RESISTOR
R_7	113	50,000 OHM ¼ WATT CARBON RESISTOR
R_8	116	¼ MEGOHM ¼ WATT CARBON RESISTOR

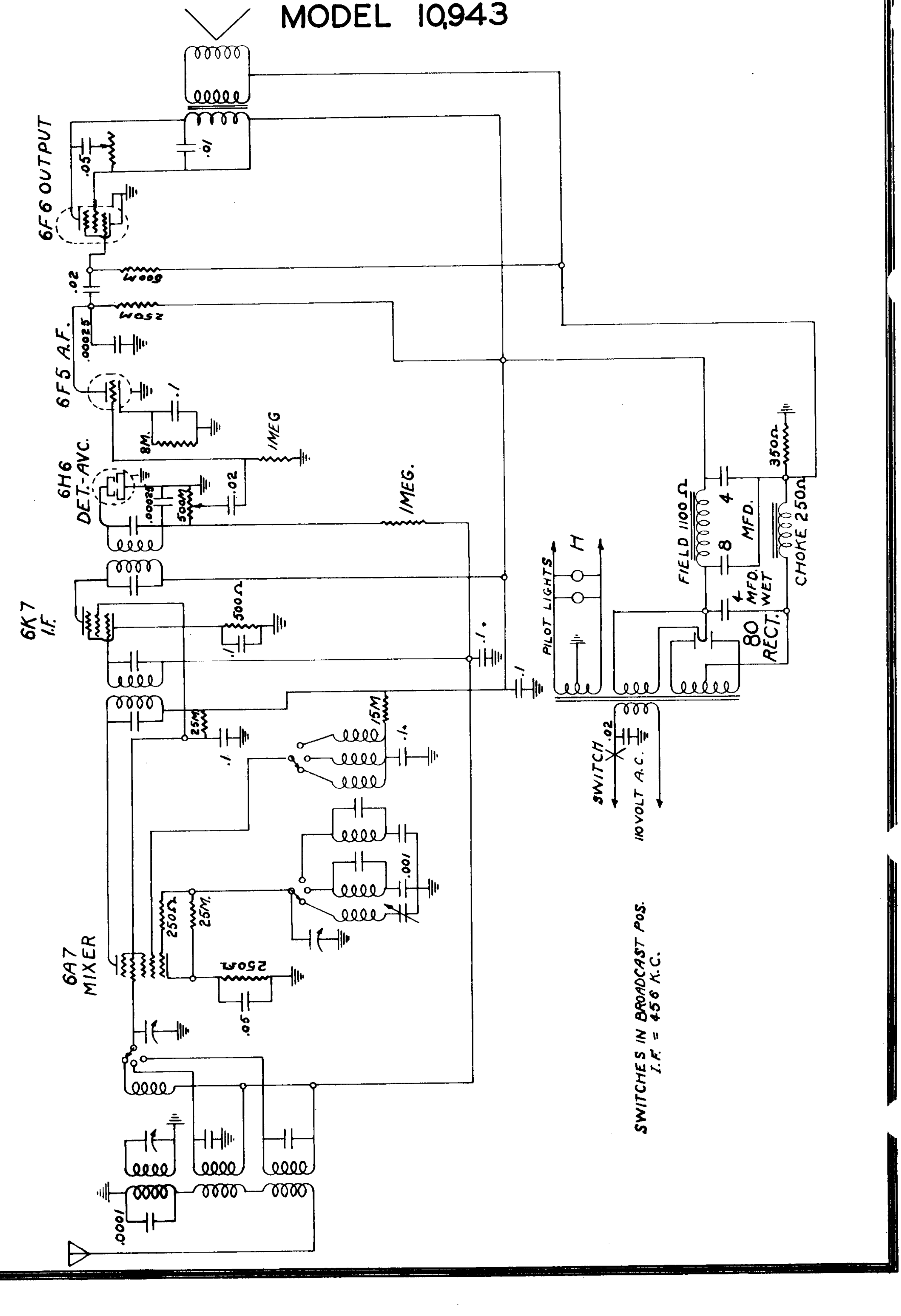
LEGEND	OUR PART NO.	DESCRIPTION
R_9	117	½ MEGOHM ¼ WATT CARBON RESISTOR
R_{10}	122	420 OHM 2 WATT CARBON RESISTOR
R_{11}	2008	TONE CONTROL
R_{12}	2007	500,000 OHM VOLUME CONTROL
R_{13}	111	30,000 OHM ¼ WATT CARBON RESISTOR
CV_1 CV_2	608	TWO GANG VARIABLE CONDENSER
C	501	30 MMFD. MAX. TRIPLE CONDENSER
C_1	203	.1 MFD. 200 VOLT TUBULAR CONDENSER
C_2	210	.1 MFD. 400 VOLT TUBULAR CONDENSER

LEGEND	PART NO.	DESCRIPTION
C_3	204	.25 MFD. 200 VOLT TUBULAR CONDENSER
C_4	201	.01 MFD. 600 VOLT TUBULAR CONDENSER
C_5	206	.05 MFD. 400 VOLT TUBULAR CONDENSER
C_6	400	.0001 MFD. MICA CONDENSER
C_7	404	.002 MFD. MICA CONDENSER
C_8	502	5 PLATE PADDING CONDENSER
C_9	403	.001 MFD. MICA CONDENSER
C_{11-12} -13.	302	10 MFD. 35 VOLT— 10 MFD. AND 4 MFD. 500 VOLT ELECTROLYTIC CONDENSER
C_{10}	401	.00025 MFD. MICA CONDENSER.

LEGEND	OUR PART NO.	DESCRIPTION
T_1	1602	SERIES WAVE TRAP
T_2	1203	3 BAND ANTENNA COIL
T_3	1403	3 BAND OSCILLATOR COIL
T_4	1504	TRIPLE TUNE I. F. TRANSFORMER
T_5	1503	DIODE I. F. TRANSFORMER
T_6	1000	POWER TRANSFORMER
T_7	8504	DYNAMIC SPEAKER TRANSFORMER
L_1	650	1600 OHM SPEAKER FIELD
S_1	1905	BAND SELECTOR SWITCH

RADOLEK COMPANY

MODEL 10,943



REMLER COMPANY, Ltd.

MODELS 140 & 170 NORCO

NORCO
MODELS 140 and 170

GENERAL DESCRIPTION:

This radio receiver employs the tuned radio frequency circuit and utilizes four tubes.

INSTALLATION:

The receiver is designed for operation from an alternating current(A.C.) power supply of 110-125 Volts, 50 or 60 cycles.

An indoor type antenna connected to the blue lead may be used to receive local stations. In rural locations or when more distant reception is required, an outdoor antenna up to a hundred feet in length is recommended.

OPERATION:

The knob on the left controls the volume and operates the ON and OFF switch at the extreme left position. The knob on the right is the station selector. The dial is calibrated in kilocycles. Police calls may be tuned in over the portion of the dial marked POLICE. These stations operate intermittently to suit their particular needs and are not operated continuously as are the broadcast stations.

SERVICE DATA:

The antenna-R.F. coil is located in back of the variable condenser (above the condenser on Model 140) and is trimmed by the trimmer on the rear section of the variable condenser. The detector coil is mounted under the chassis and is trimmed by the front trimmer section.

TUBES:

Type 6D6 Triple grid super control amplifier
" 76 Detector
" 42 Power Amplifier
" 80 Rectifier
" T46 Pilot lamp

A.C. VOLTAGES:

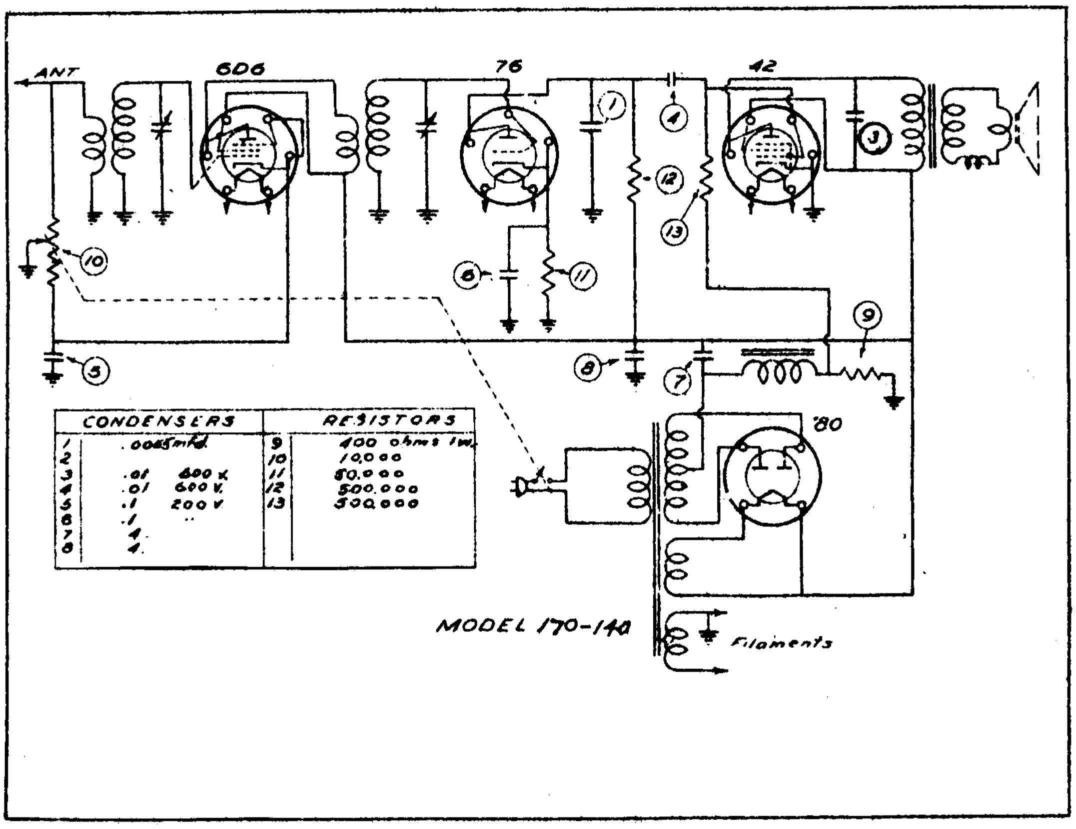
Line		120 Volts
Filaments:		
	6D6, 76, 42	6.3
	80	5.3

D.C. VOLTAGES: Full volume No signal

From chassis to:

80	Rectifier filament	175 Volts
6D6	Plate	175
6D6	Screen	175
6D6	Cathode	5
76	Plate	25
76	Cathode	2.5
42	Plate	170
42	Screen	175
42	Grid bias supply	12

Voltages read with 1000 ohm per volt meter.



CONDENSERS			RESISTORS	
1	.0045 mfd.		9	400 ohms 1w.
2			10	10,000
3	.01	600 V.	11	50.000
4	.01	600 V.	12	500.000
5	.1	200 V.	13	500.000
6	.1	"		
7	4.			
8	4.			

MODEL 170-140

REMLER COMPANY, Ltd.

MODEL 178 NORCO

MODEL 178 NORCO

GENERAL DESCRIPTION:

This radio receiver employs the superheterodyne circuit and utilizes five tubes.

INSTALLATION:

The receiver is designed for operation from an alternating current (A.C.) power supply of 110-125 volts, 50 or 60 cycles.

An indoor type antenna connected to the blue lead may be used to receive local stations. In rural locations or when more distant reception is required, an outdoor antenna up to a hundred feet in length is recommended.

OPERATION:

The knob on the left controls the volume and operates the "ON" and "OFF" switch at the extreme left position. The knob on the right is the station selector. The dial is calibrated in kilocycles. Police calls may be tuned in over the portion of the dial marked "POLICE". These stations operate intermittently to suit their particular needs and are not operated continuously as are the broadcast stations.

SERVICE DATA

The antenna-R.F. coil is located over the variable condenser and is trimmed by the trimmer on the rear section of the variable condenser. The oscillator coil is mounted under the chassis and is trimmed by the front section. The I.F. transformers and trimmers are mounted under the chassis. The I.F. frequency is 450 K. C.

TUBES

Type 6A7 Converter
" 6K7 I.F. Amplifier
" 76 Detector
" 42 Power Amplifier Pentode
" 80 Rectifier
" T46 Dial Lamp

A.C. VOLTAGES

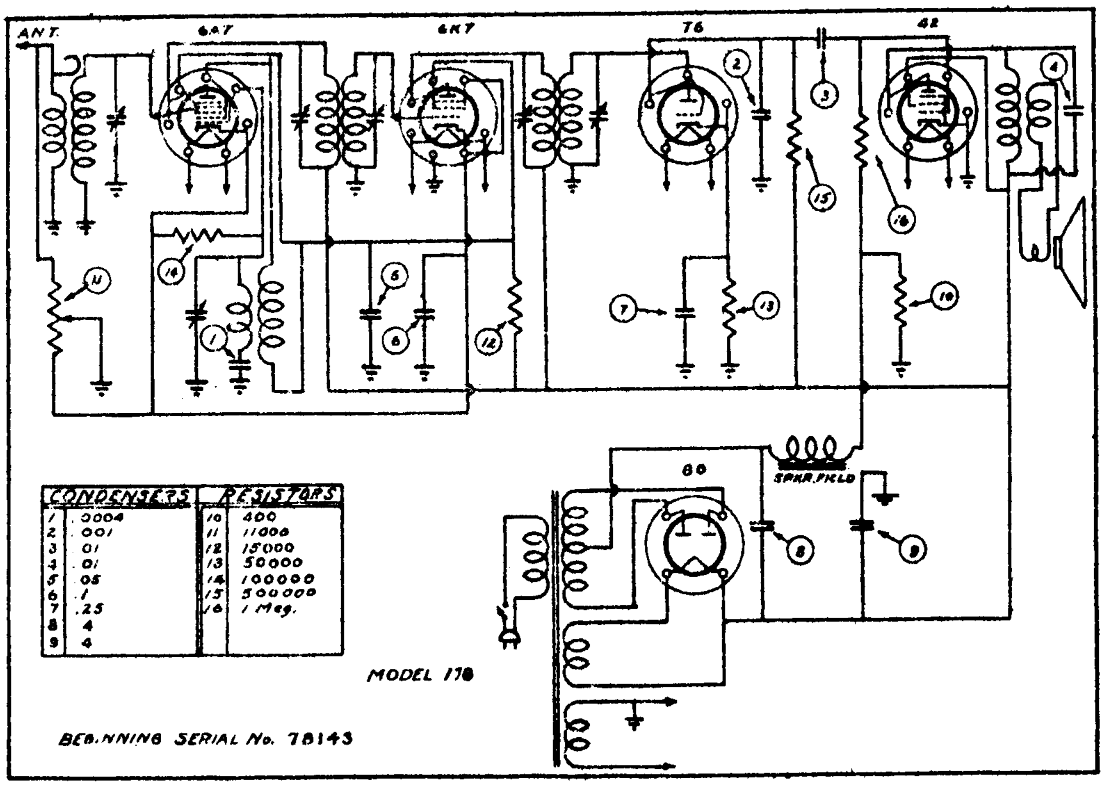
Line	120 Volts
Filaments:	
6A7, 6K7, 76, 42	6 "
80	5 "

D.C. VOLTAGES

No signal, full volume

From chassis to-		
6A7	Plate	240 Volts
6A7	Screen	75
6A7	Osc. Plate	75
6A7	Cathode	3.8
6K7	Plate	240
6K7	Screen	75
6K7	Cathode	3.8
76	Plate	65
76	Cathode	2
42	Plate	230
42	Screen	240
42	Grid	-18

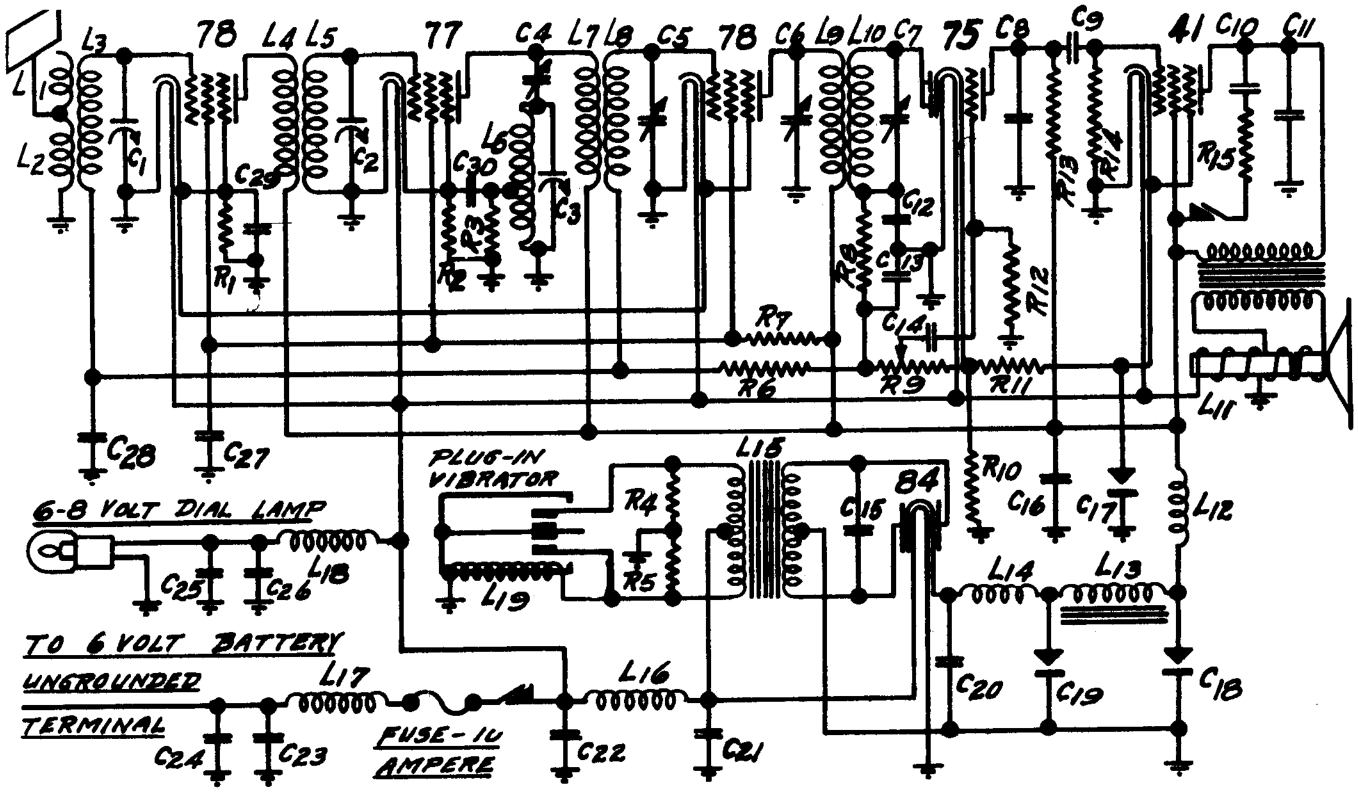
Voltages read with 1000-ohm per volt meter.



CONDENSERS		RESISTORS	
1	.0004	10	400
2	.001	11	11000
3	.01	12	15000
4	.01	13	50000
5	.05	14	100000
6	.1	15	500000
7	.25	16	1 Meg.
8	4		
9	4		

REPUBLIC INDUSTRIES

MODEL R.M. 6

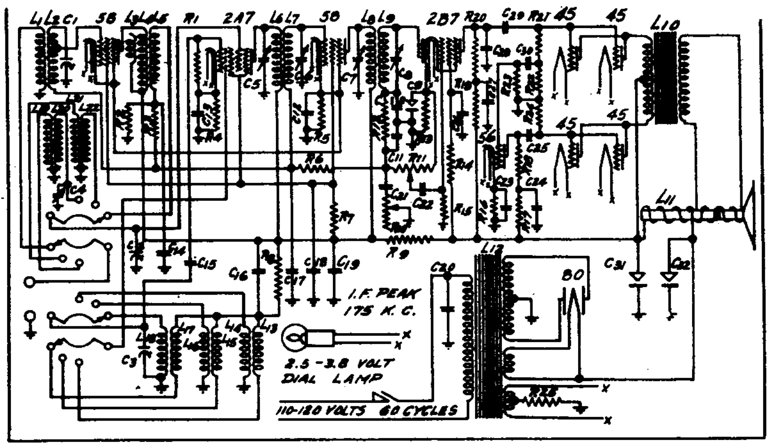


I.F. 175 K.C.

Code	Part No.	Name
		RESISTORS
R1	1062	250 Ohm R.F. & I.F. Cathode Resistor
R2	919	5,000 Ohm Composite Oscillator & First Detector Cathode Resistor
R3	919	5,000 Ohm Oscillator Feed Back Regulating Resistor
R4	1061	150 Ohm Vibrator Filter Resistor
R5	1061	150 Ohm Vibrator Filter Resistor
R6	926	1 Megohm A. V. C. Network Resistor
R7	921	40,000 Ohm Screen Resistor
R8	898	50,000 Ohm Diode Filter Resistor
R9	1291	500,000 Ohm Volume Control & Switch
R10	1060	75 Ohm 75 Cathode Resistor
R11	1426	750 Ohm C Bias Network Resistor
R12	925	500,000 Ohm 75 Grid Resistor
R13	923	100,000 Ohm 75 Plate Load Resistor
R14	925	500,000 Ohm 41 Grid Resistor
R15	920	10,000 Ohm Tone Control Series Resistor.
		CONDENSERS
C1	1456	371 MMFD. Preselector Section of 3 Gang Condenser
C2	1456	331 MMFD. Preselector Section of 3 Gang Condenser
C3	1456	336 MMFD. Oscillator Section of 3 Gang Condenser
C4	1423	75 - 150 MMFD. First I. F. Primary Trimmer
C5	1422	75 - 150 MMFD. First I.F. Secondary Trimmer
C6	1059	75 - 150 MMFD. Second I.F. Primary Trimmer
C7	1057	75 - 150 MMFD. Second I.F. Secondary Trimmer
C8	265	.001 MFD. Mica, 75 Plate Filter Condenser
C9	269	.01 MFD. 400 Volt, Audio Feed Condenser
C10	183	.2 MFD. 200 Volt, Tone Control Condenser
C11	343	.004 MFD. 600 Volt, 41 Plate Filter Condenser
C12	339	.0001 MFD. Mica, Diode Filter Condenser
C13	339	.0001 MFD. Mica Diode Filter Condenser
C14	269	.01 MFD. 400 Volt, Volume Control Coupling Condenser
C15	1325	.015 MFD. 1,000 Volt, B Transformer Secondary Wave Form Cond.
C16	266	1. MFD. 300 Volt, B Supply By-pass Condenser
C17	928	25 MFD. 25 Volt Electrolytic, C Bias Bypass Condenser
C18	1327	6 MFD. 250 Volt Electrolytic, B Filter Condenser
C19	1327	6 MFD. 350 Volt Electrolytic, B Filter Condenser
C20	1326	.1 MFD. 400 Volt, B Supply R.F. Filter Condenser
C21	267	.5 MFD. 200 Volt, Third Position A Supply Bypass
C22	267	.5 MFD. 200 Volt, Second Position A Supply Bypass
C23	267	.5 MFD. 200 Volt, First Position A Supply Bypass
C24	662	.002 MFD. Mica, A Supply Filter Condenser
C25	662	.002 MFD. Mica, Pilot Light Filter Condenser
C26	272	.1 MFD. 200 Volt, Pilot Light Bypass Condenser
C27	272	.1 MFD. 200 Volt, Screen Bypass Condenser
C28	272	.1 MFD. 200 Volt, A.V.C. Bypass Condenser
C29	272	.1 MFD. 200 Volt, 78 Cathode Bypass Condenser
C30	265	.001 MFD. Mica, Oscillator Coupling Condenser
L1	1427	Preselector Capacitive Winding 5 Turns #36 S.S.E.
L2	1427	Preselector Primary 450 Turns #36 S.S.E.
L3	1427	Preselector Secondary 150 Turns #36 D.C.C.
L4	1428	Detector Primary 750 Turns #36 S.S.E.
L5	1428	Detector Secondary 156 Turns #36 D.C.C.
L6	974	Oscillator Coil 104 Turns #36 S.S.E. Tapped 15 Turns
L7	974	6,000 Microhenries First I.F. Primary
L8	974	6,000 Microhenries First I.F. Secondary
L9	260	6,000 Microhenries Second I.F. Primary

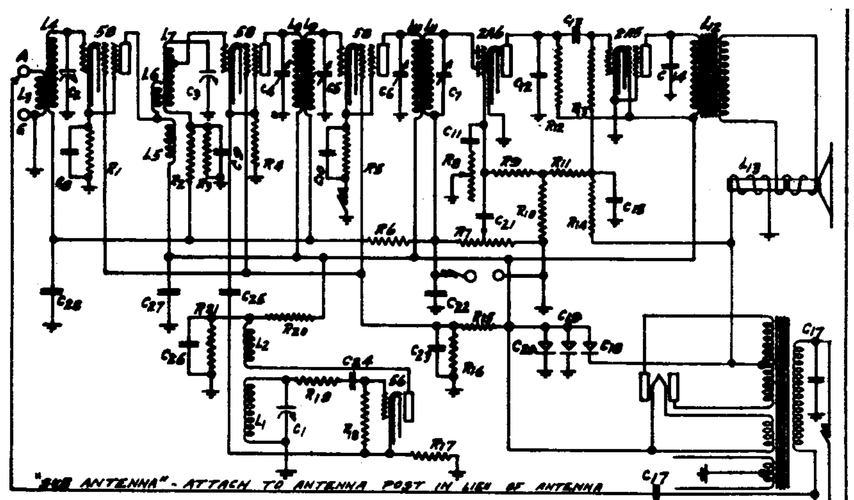
REPUBLIC INDUSTRIES

MODEL WA-10



CODE	PART NO.	RESISTORS
R1	53-898	50,000 Ohm Oscillator Grid
R2	53-925	500,000 Ohm A.V.C. Network
R3	53-923	100,000 Ohm A.V.C. Network
R4	53-1062	250 Ohm 2A7 Cathode
R5	53-1061	150 Ohm R.F. & I.F. Cathode
R6	53-926	1 Meg Ohm A.V.C. Network
R7	53-195	25,000 Ohm 2A7 & 58's Screens 1 Watt
R8	53-920	10,000 Ohm Oscillator Plate
R9	53-1420	2,500 R.F. & I.F. Plate Series
R10	19-1317	250,000 Ohm Tone Control
R11	19-1291	500,000 Ohm Volume Control & Switch
R12	53-898	50,000 Ohm Diode Network
R13	53-1065	1,000 Ohm 2B7 Cathode
R14	53-926	1 Megohm 2B7 Screen
R15	53-925	500,000 Ohm 2B7 Grid Leak
R16	53-1144	2,000 Ohm 56 Cathode
R17	53-923	100,000 Ohm 56 Hum Filter
R18	53-923	100,000 Ohm 56 Plate
R19	53-924	250,000 Ohm 2B7 Hum Filter
R20	53-923	100,000 Ohm 2B7 Plate
R21	53-925	500,000 Ohm First Position Output Grid Leak
R22	53-921	100,000 Ohm Push-Pull Network
R23	53-925	500,000 Ohm 56 Grid Leak
R24	53-925	500,000 Ohm Second Position Output Grid Leak
R25	53-1419	650 Ohm 45 Cathode Bias
		CONDENSERS
C1	77-833	371 MMFD. Preselector Section of 3 Gang
C2	77-033	371 MMFD. Preselector Section of 3 Gang
C3	77-833	336 MMFD. Oscillator Section of 3 Gang
C4	78-972	2 Plate F.B. Preselector Trimmer
C5	78-1104	75-150 MMFD. First I.F. Primary Trimmer
C6	78-1105	75-150 MMFD. First I.F. Secondary Trimmer
C7	78-1106	75-150 MMFD. Second I.F. Primary Trimmer
C8	78-1107	75-150 MMFD. Second I.F. Secondary Trimmer
C9	18-928	25 Mfd. 25 Volt Electrolytic 2B7 Cathode
C10	76-339	.0001 Mfd. Mica Diode Filter
C11	76-339	.0001 Mfd. Mica Diode Filter
C12	75-267A	.5 MFD. 200 Volt R.F. & I.F. Cathode By-Pass
C13	75-272A	.1 MFD. 200 Volt 2A7 Cathode By-Pass
C14	75-272A	.1 MFD. 200 Volt 2A7 Grid Isolation Condenser
C15	76-264	.00005 MFD, Oscillator Coupling
C16	75-272A	.1 MFD. 200 Volt Oscillator By-Pass
C17	75-272A	.1 MFD. 200 Volt A.V.C. Network By-Pass
C18	75-1326A	.1 MFD. 400 Volt 2A7 & 58's Screen By-Pass
C19	75-266	1 MFD. 400 Volt B Supply By-Pass
C22	75-269A	.01 MFD. 400 Volt 2B7 Grid Feed Condenser
C23	75-272A	.1 MFD. 200 Volt 56 Cathode By-Pass
C24	75-1326A	.1 MFD. 400 Volt 56 Plate Hum Filter
C25	75-269A	.01 MFD. 400 Volt Push-Pull Audio Feed
C26	75-272A	.1 MFD. 200 Volt 2B7 Screen By-Pass
C27	75-569A	.2 MFD. 400 Volt 2B7 Plate By-Pass
C28	75-265	.001 MFD. Mica 2B7 Plate Filter
C29	75-269A	.01 MFD. 400 Volt Audio Feed
C30	75-269A	.01 MFD. 400 Volt Push-Pull Audio Feed
C31	18-721	8 MFD. Dry Electrolytic Condenser
C32	18-721	8 MFD. Dry Electrolytic Condenser
		INDUCTANCES
L1	17-1552	Broadcast Preselector Primary 450 Turns #36 S.S.E.
L2	17-1552	Broadcast Preselector Secondary 91 & 108 Turns #36 D.C.C.
L3	17-1554	Broadcast Detector Cond. Winding 32 Turns #36 S.S.E.
L4	17-1554	Broadcast Detector Primary 450 Turns #36 S.S.E.
L5	17-1554	Broadcast Detector Secondary 144 Turns #36 D.C.C.
L6	17-1101	8000 Microhenry First I.F. Primary 175 K.C.
L7	17-1101	8000 Microhenry First I.F. Secondary
L8	17-1101	8000 Microhenry Second I.F. Primary
L9	17-1101	8000 Microhenry Second I.F. Secondary
L10	64-1415	45 Parallel Push-Pull Output Transformer
L11	64-1415	500 Ohm Speaker Field
L12	80-1333	Power Transformer (Unless Special)
L13	17-1444	Foreign Band Oscillator Primary 9½ Turns #36 D.C.C.
L14	17-1444	Foreign Band Oscillator Secondary 8½ Turns #24 S.S.C.
L15	17-1567	Police Band Oscillator Primary 15 Turns #36 S.S.E.
L16	17-1567	Police Band Oscillator Secondary 42 Turns #36 D.C.C.
L17	17-1616	Broadcast Oscillator Primary 50 Turns #36 S.S.E.
L18	17-1616	Broadcast Oscillator Secondary 90 Turns #36 D.C.C.
L19	17-1525	Foreign Band Preselector Primary 16 Turns #32 P.E.
L20	17-1525	Foreign Band Preselector Secondary 8½ Turns #24 S.S.C.

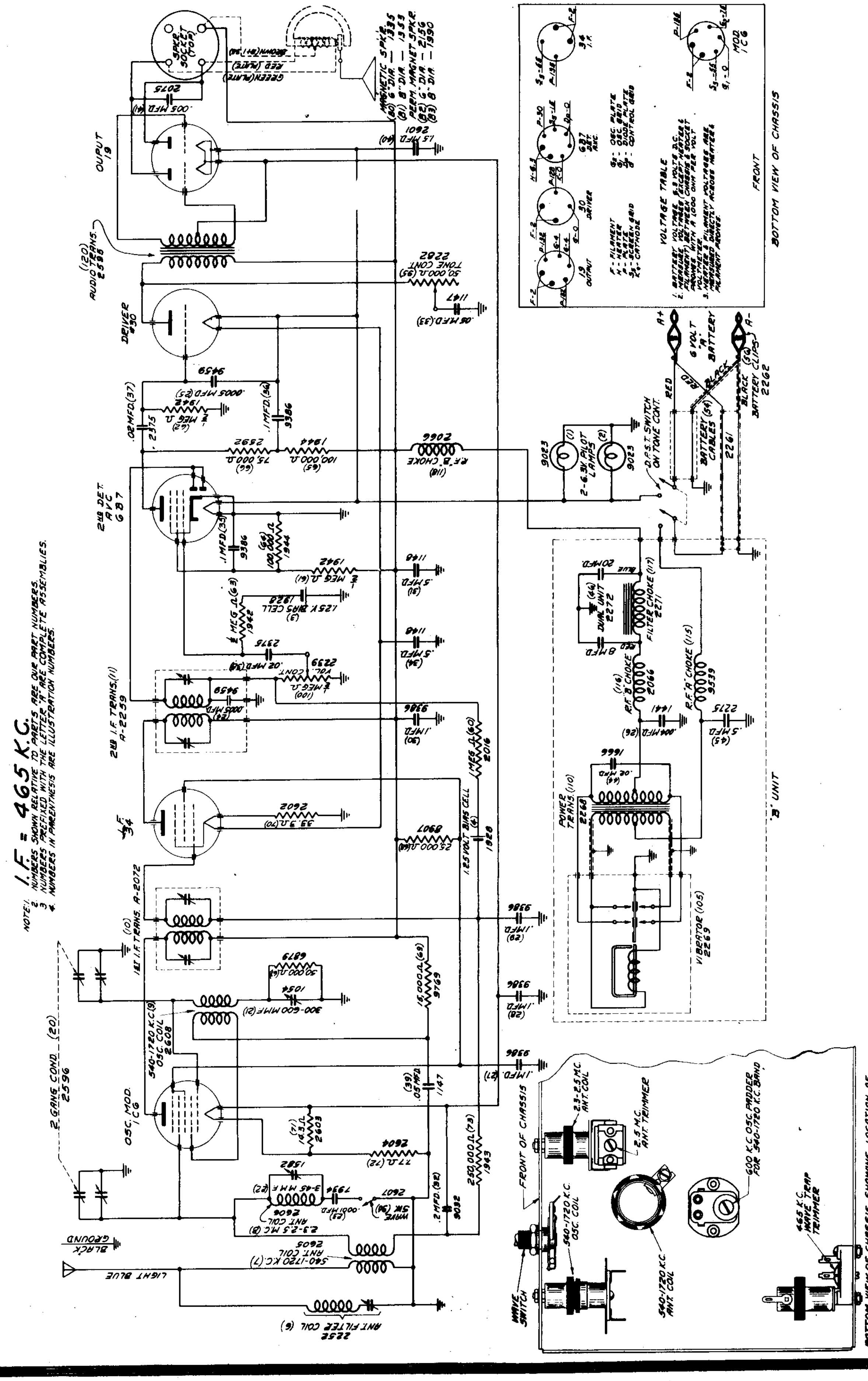
MODEL MASTER



CODE	PART NO.	RESISTORS
R1	1061	150 Ohm First Preselector Cathode Resistor
R2	926	500,000 Ohm First Detector Grid Feed Resistor
R3	924	250,000 Ohm First Detector Grid Stablizer Resistor
R4	1144	2,000 Ohm First Detector Cathode Resistor
R5	1061	150 Ohm First I.F. Cathode Resistor
R6	925	1 Megohm A.V.C. Network Resistor
R7	535	500,000 Ohm Volume Control and A.C. Switch
R8	534	250,000 Ohm Tone Control
R9	925	500,000 Ohm Second Detector Grid Resistor
R10	944	10,000 Ohm Grid Bias Network Resistor
R11	923	100,000 Ohm Grid Bias Network Resistor
R12	923	100,000 Ohm Second Detector Plate Resistor
R13	923	100,000 Ohm Output Grid Resistor
R14	1235	700,000 Ohm Grid Bias Network Resistor
R15	337	20,000 Ohm Screen Feed Resistor (Type E)
R16	921	40,000 Ohm Screen Stablizer Resistor
R17	1065	1,000 Ohm Oscillator Cathode Resistor
R18	923	100,000 Ohm Oscillator Grid Resistor
R19	1065	1,000 Ohm Oscillator Grid Suppressor Resistor
R20	337	20,000 Ohm Oscillator Plate Resistor (Type E)
R21	921	40,000 Ohm Oscillator Plate Stablizer Resistor
		CONDENSERS
C1	833	336 MMFD. Oscillator Section of 3 Gang Condenser
C2	833	371 MMFD. First Preselector Section of 3 Gang Condenser
C3	833	371 MMFD. Second Preselector Section of 3 Gang Condenser
C4	238	75 - 150 MMFD. First I.F. Primary Trimmer
C5	239	75 - 150 MMFD. First I.F. Secondary Trimmer
C6	238	75 - 150 MMFD. Second I.F. Primary Trimmer
C7	239	75 - 150 MMFD. Second I.F. Second-
C10	272	.1 MFD. First I.F. Cathode Condenser
C11	269	.01 MFD. Tone Control Condenser
C12	265	.001 MFD. Second Detector Plate Filter Condenser
C13	269	.01 MFD. Audio Feed Condenser
C14	343	.004 MFD. Output Plate Filter Condenser
C15	267	.5 MFD. C Bias By-pass Condenser
C16	269	.01 MFD. Power Line By-pass Condenser
C17	307	.0005 MFD. Subantenna Condenser
C18	533	4 MFD. Electrolytic Filter Condenser 500 Volt
C19	533	4 MFD. Electrolytic Filter Condenser 500 Volt
C20	721	8 MFD. Electrolytic Filter Condenser
C21	269	.01 MFD. First Detector Grid Feed Condenser
C22	307	.0005 MFD. A.V.C. Feed Filter Condenser
C23	272	.1 MFD. Screen Grid By-pass Condenser 200 V. D.C. Paper
C24	339	.0001 MFD. Oscillator Grid Feed Condenser
C25	269	.01 MFD. Oscillator Coupling Condenser
C26	272	.1 MFD. Oscillator Plate By-pass Condenser
C27	266	1. MFD. B Supply By-pass Condenser-300 V. D.C. Paper
C28	272	.1 MFD. R.F. & I.F. Grid Isolation Condenser 200 V. D.C. Paper
		INDUCTANCES
L1		Oscillator Secondary 83 Turns #32 P.E.
L2	549	Oscillator Plate 20 Turns #36 P.E.
L3		First Preselector Primary 175 Turns #36 U.W. S.S.E.
L4	792	First Preselector Secondary 118 Turns #32 P.E.
L5		Second Preselector Primary U.W. 425 Turns #36 P.E.
L6	793	Second Preselector Tertiary 5 Turns #36
L7		Second Preselector Secondary 118 Turns #32 P.E.
L8		First I.F. Primary 6,000 Microhenries
L9	260	First I.F. Secondary 6,000 Microhenries
L10		Second I.F. Primary 6,000 Microhenries

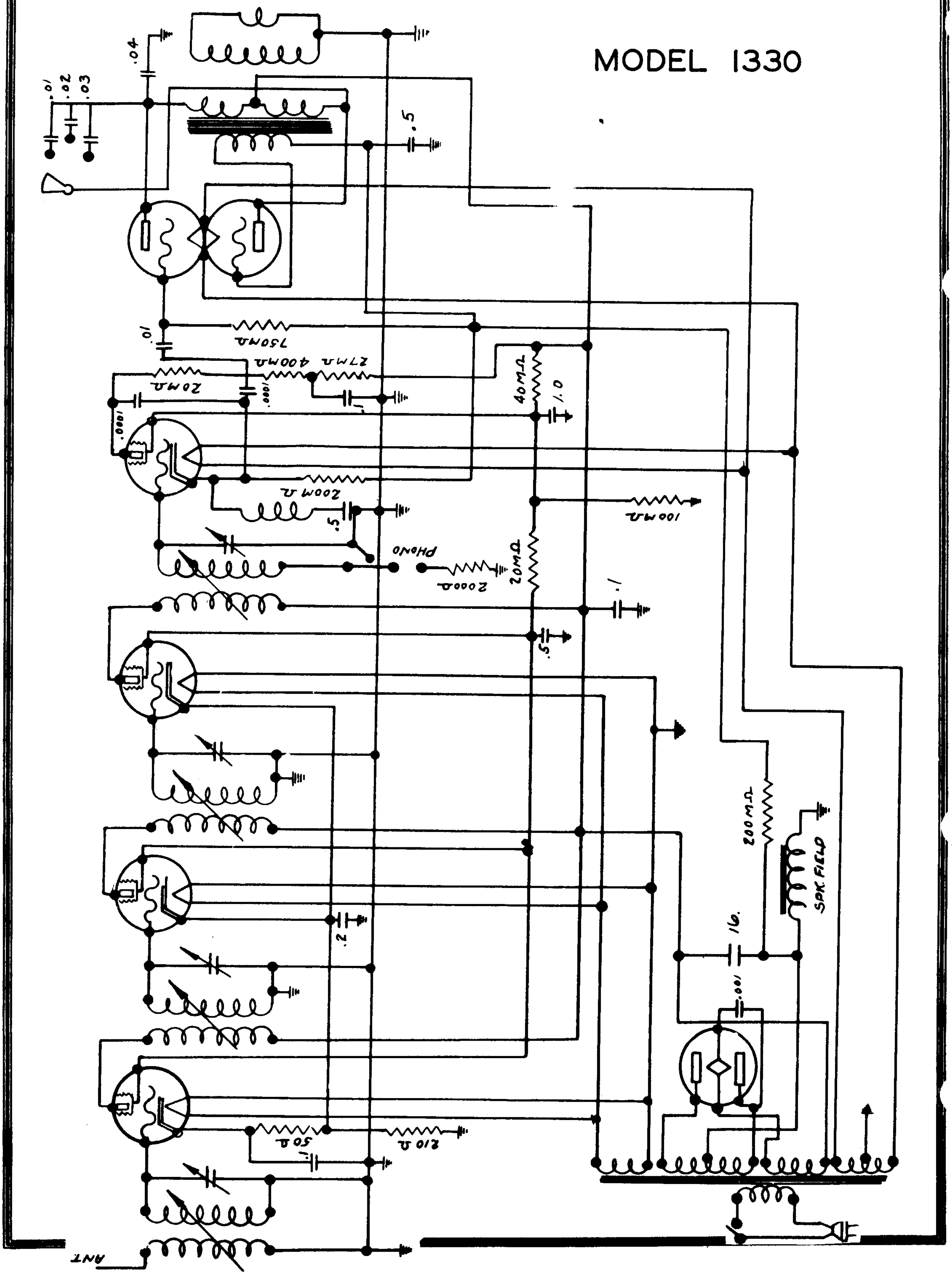
SEARS, ROEBUCK & CO.

MODEL 49B



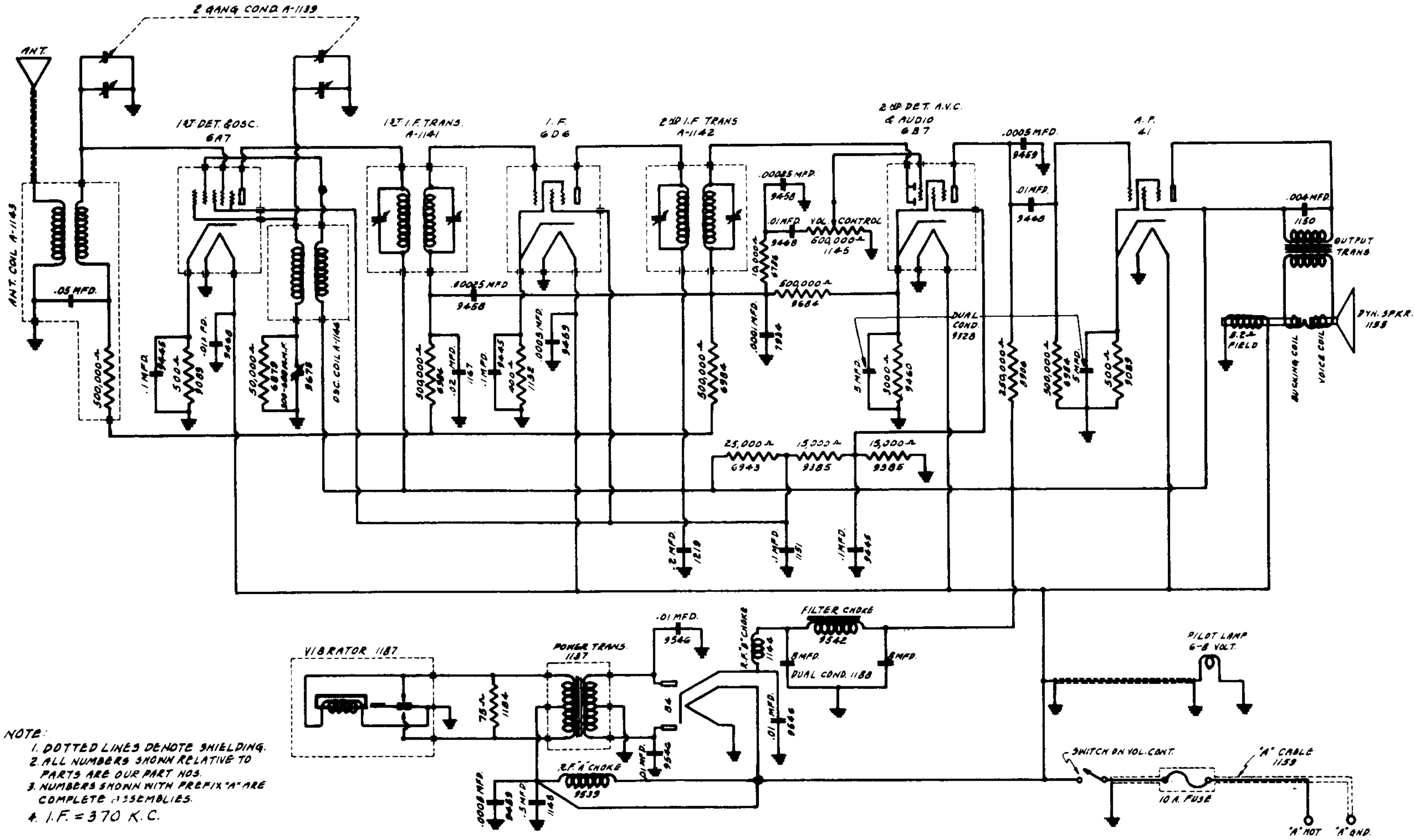
SEARS, ROEBUCK & CO.

MODEL 1330



SEARS, ROEBUCK & CO.

MODEL 1861



NOTE:
1. DOTTED LINES DENOTE SHIELDING.
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NOS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.
4. I.F. = 370 K.C.

VOLTAGE TABLE

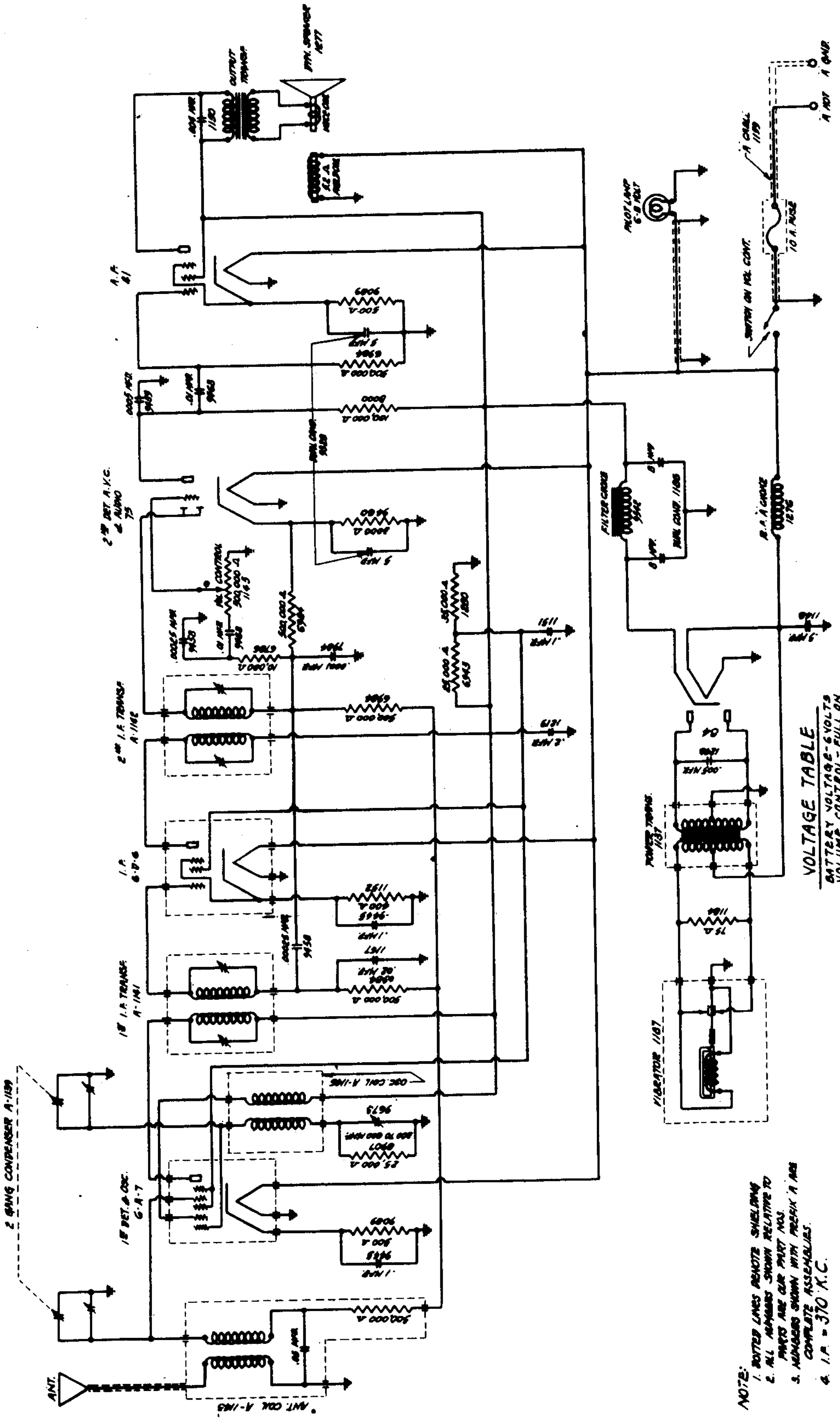
Battery Voltage - 6 Volt
Volume Control - Full on

TYPE OF TUBE	POSITION OF TUBE	FIL. VOLTS	PLATE VOLTS	CATHODE VOLTS	SCREEN VOLTS	GRID NO.1	GRID NO. 2.	GRID NO. 3 & 5
6A7	Modulator & Oscillator	6	220	3	80	5	220	80
6D6	I. F. Amplifier	6	220	2.5	80			
6B7	Second Detector Diode AVC & 1st Audio Triode	6	35##	3.	40			
41	Output	6	215	13	220			
84	Rectifier	6	460-AC	230				

Triode Plate. Comparative voltage only. The voltmeter is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

SEARS, ROEBUCK & CO.

MODEL 1861 "REVISED"



VOLTAGE TABLE

BATTERY VOLTAGE - 6 VOLTS
VOLUME CONTROL - FULL ON

TYPE OF TUBE	OPERATION OF TUBE	FIL. VOLTS	PLATE VOLTS	CATHODE VOLTS	SCREEN VOLTS	GRID NO. 1	GRID NO. 2	GRID NO. 3 & 5
6A7	MODULATOR & OSC.	6	240	5.0	90	2.5	240	90
6D6	I.F. AMPLIFIER	6	240	3.5	90			
75	2ND DET. A.V.C. & 1ST AUDIO	6	140X	1.5				
41	OUTPUT	6	210	15.0	240			
84	RECTIFIER	6	180 A.C.	240				

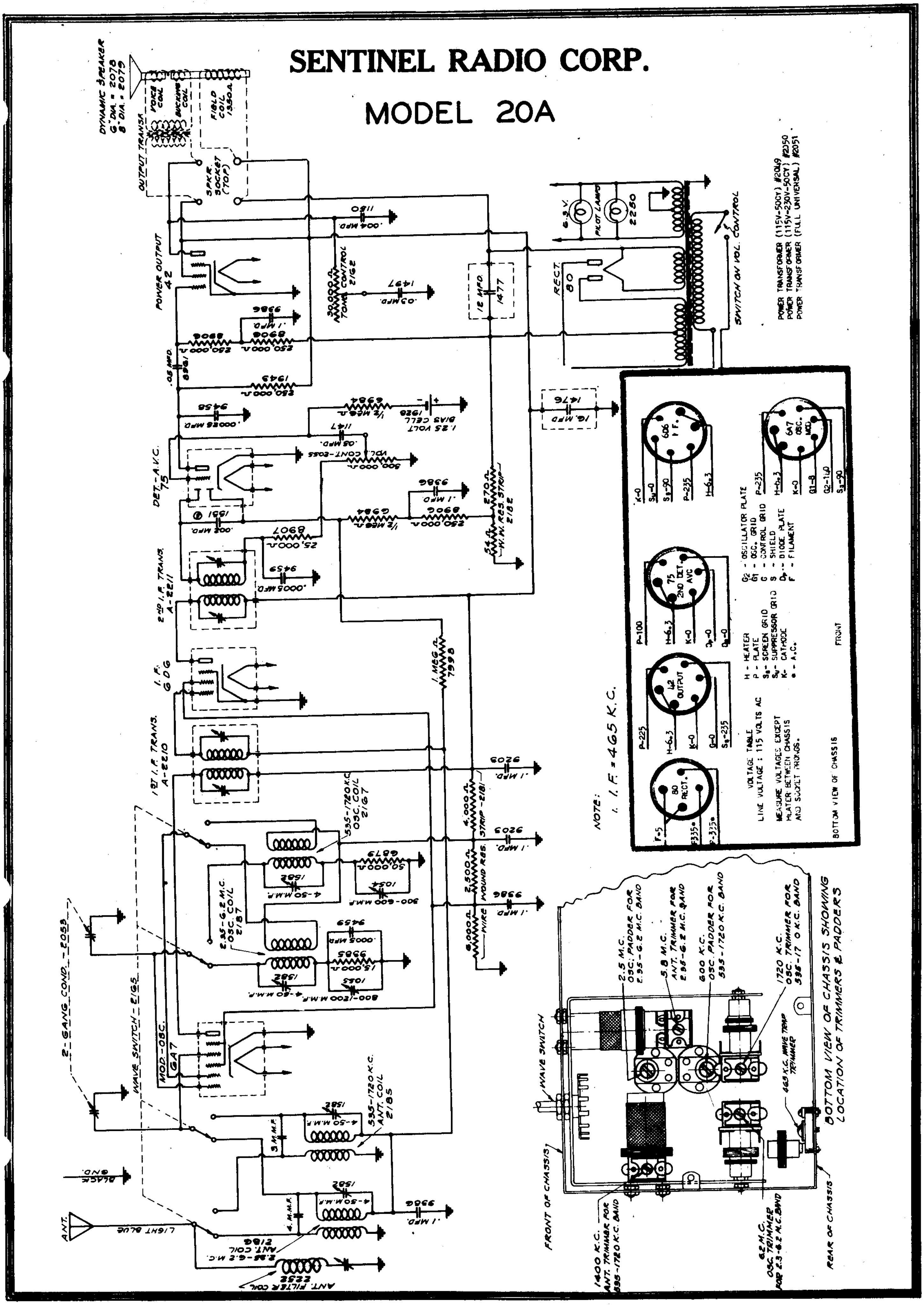
X - TRIODE PLATE

READ VOLTAGES FROM SOCKET TO CHASSIS

NOTE:
1. DOTTED LINES DENOTE SHIELDING
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NOS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.
4. I.F. = 370 K.C.

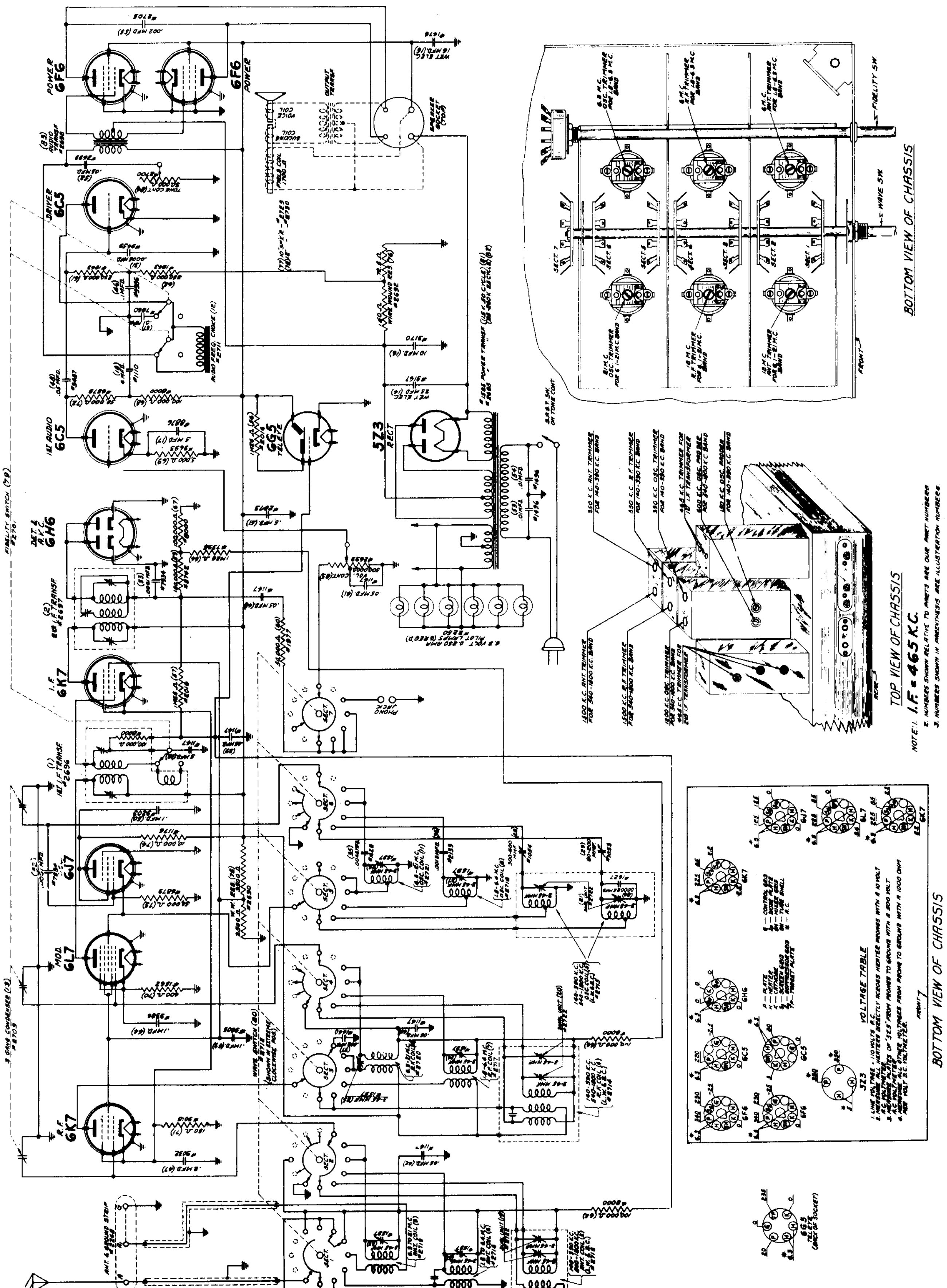
SENTINEL RADIO CORP.

MODEL 20A



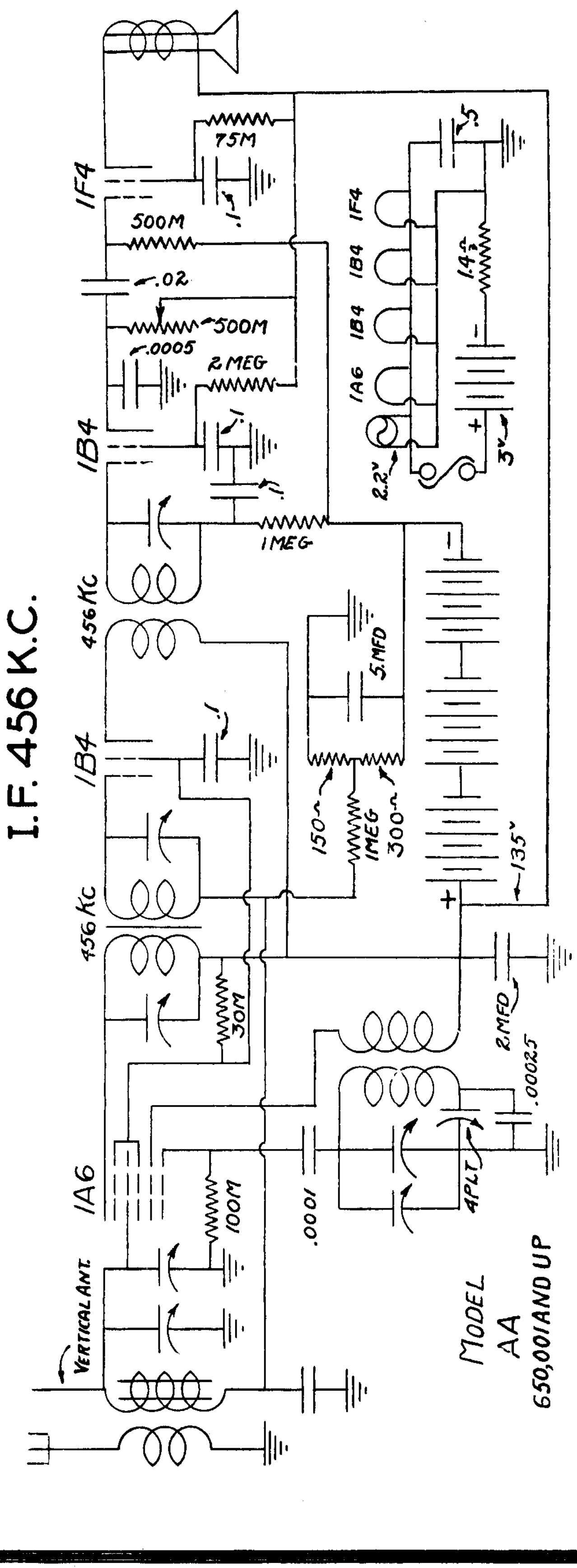
SENTINEL RADIO CORP.

MODEL 47AE

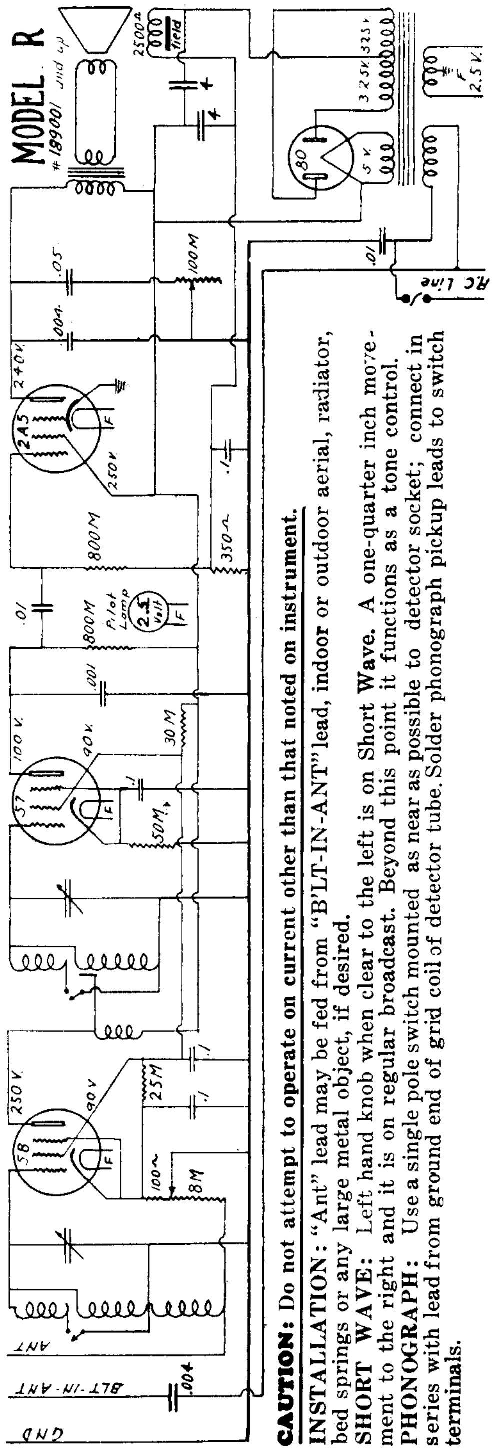


THE SIMPLEX RADIO CO.

MODEL AA "SERIAL 650,001 UP"



MODEL R "SERIAL 189,001 UP"



CAUTION: Do not attempt to operate on current other than that noted on instrument.

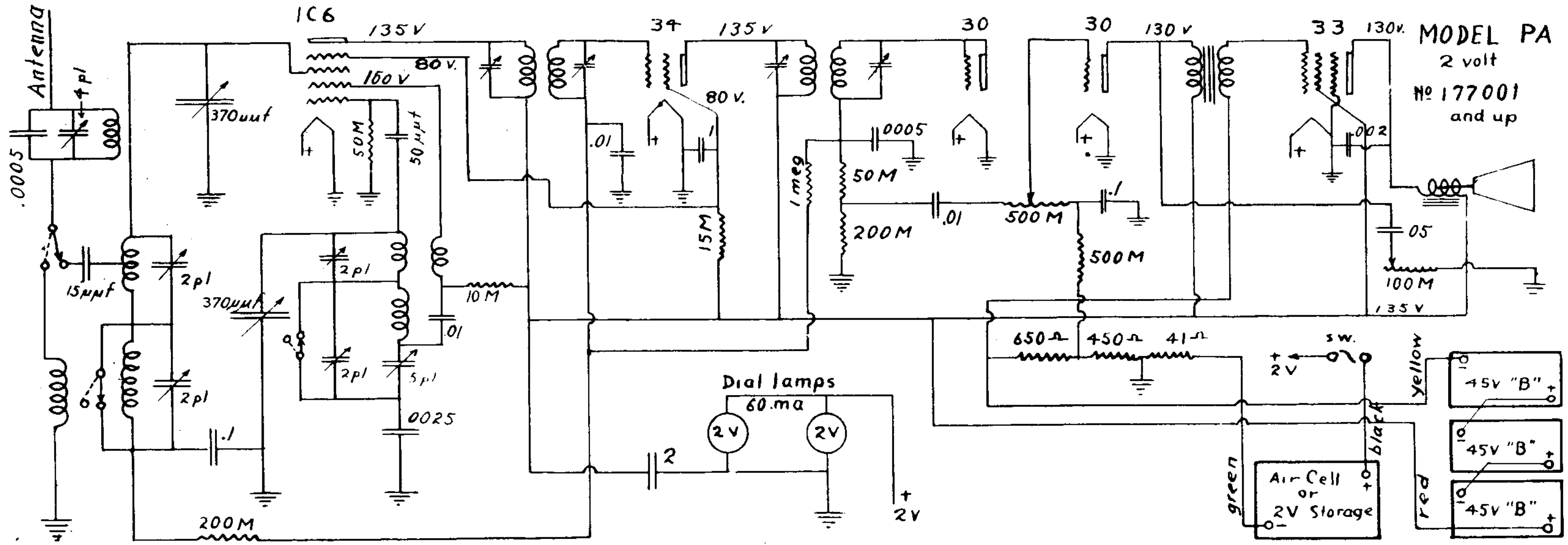
INSTALLATION: "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or outdoor aerial, radiator, bed springs or any large metal object, if desired.

SHORT WAVE: Left hand knob when clear to the left is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket; connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to switch terminals.

THE SIMPLEX RADIO CO.

MODEL PA "SERIAL 177,001 UP"



MODEL PA DUAL-BAND

CAUTION—Use a 2-volt "air-cell" or a 2-volt storage battery for "A" battery, connecting the "green" lead to "A" minus and the "black" lead to "A" positive. Use three blocks of "B" battery of 45 volts each connected in series so as to give 135 volts total. Connect the "yellow" lead to the minus end and the "red" lead to the positive or plus end of the series. If "A" leads are accidentally connected to "B" battery the tubes will be burned out.

INSTALLATION—A good aerial, 25 to 50 feet long, well away from surrounding metal structures and power lines, is essential for best results. Power noise interferes especially with short-wave reception. If the set is located where power noise is prevalent it may be necessary to install an aerial high above the street and use a "transposition" lead-in to the set. A good ground connection (water pipe or equivalent) will also contribute to quieter reception.

CONTROL KNOBS—The left hand knob is, initially, the power switch and thereafter, tone control. The second knob from the left is band selector switch. The third knob from the left is tuning control. The right hand knob is volume control.

OPERATION—After the set has been properly installed by the attachment of suitable aerial and ground connections and the attachment cord properly connected, the left hand knob is turned to the right and a few seconds allowed for the tubes to reach operating temperature. The second knob from the left is then set to the position desired (left for standard broadcast and right for short-wave). The volume control is turned full to the right and then the tuning knob turned slowly until the desired station is heard. Note that sections of the short-wave dial are marked with groups of countries that may be tuned in at the points indicated.

SERVICE NOTES—If the radio fails to operate when unpacked, or stops working after a few days, proceed as follows: (1) Have the tubes checked. (2) Remove the chassis from the cabinet and check for loose connections. (3) Have a competent "Radio Service Man" check over entirely. Do not return unless you have made the above tests. This set left the factory carefully inspected.

The intermediate stages are carefully phased to 456 KC at the factory. Should rephasing be necessary attach the output lead from a 456 KC test oscillator to the grid cap of the 1C6 tube, keep the signal to a very low audible value and carefully adjust the screws in the top of each of the two tall cans to loudest volume. If an output meter is available it should be used across the two black leads at the speaker transformer. An oscillator covering a frequency from 550 KC to 16 MC should be used to rephase the R. F. and the oscillator output is attached to the aerial lead of the set. At all times keep the oscillator signal turned down to a low point of audibility. Trim the short-wave band first, then the broadcast band, setting the dial pointer to a frequency near the high frequency end of the scale in each case. The short-wave oscillator trimmer is located directly across the large (oscillator) coil looking at the under side of the set and the R. F. short-wave trimmer at the right hand end of this coil. The broadcast band is next trimmed at the high frequency end of the broadcast scale, applying a signal from the oscillator corresponding to the dial setting and adjust the porcelain base trimmer at center of chassis until the signal is heard at the correct location on dial.

NOTE—Should it be necessary to write to the factory for parts or information, always give the serial number of the set as stamped on the back of the chassis.

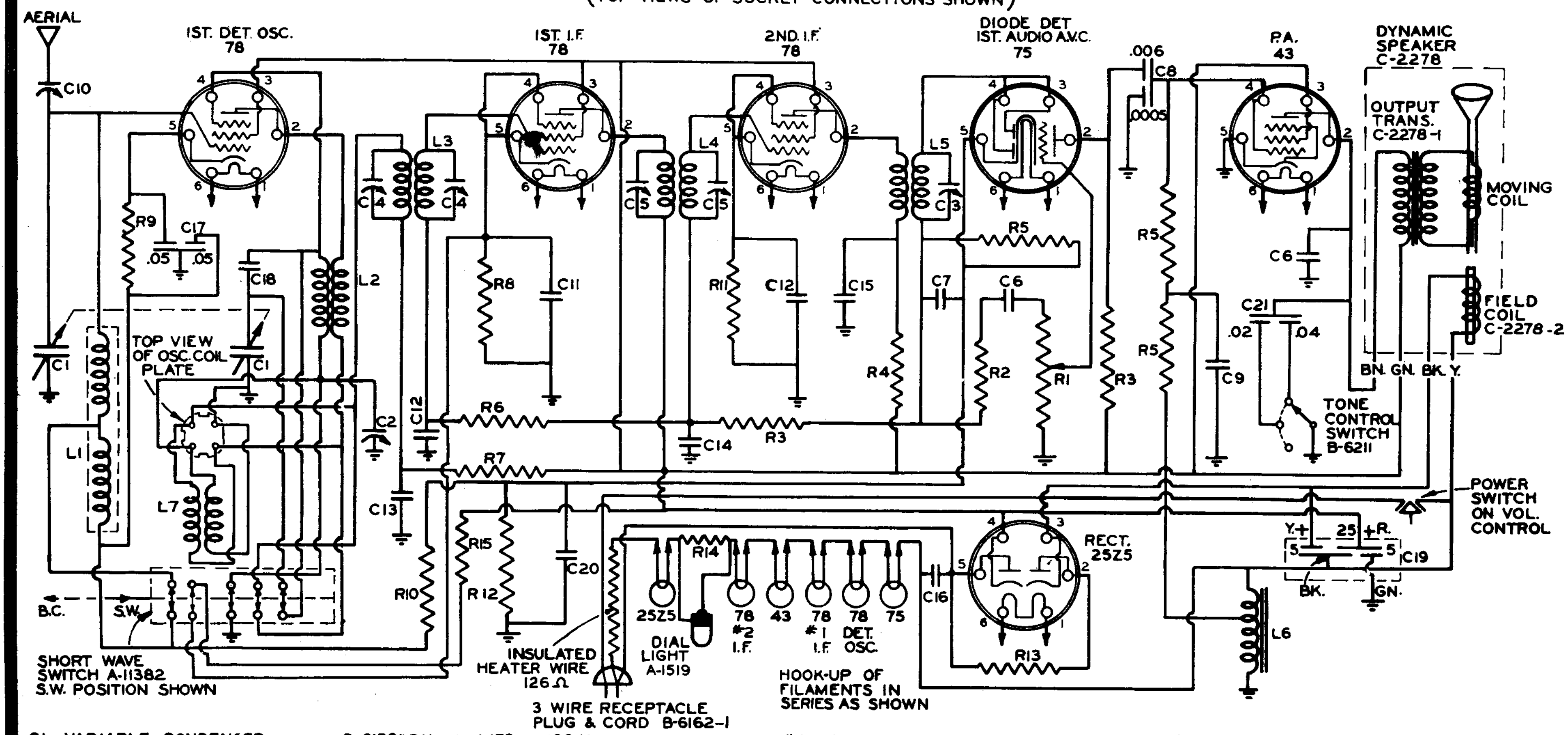
PHONOGRAPH—Install a single pole double throw toggle switch in rear flange of chassis near right-hand end. Disconnect .01 mfd condenser from volume control and connect to one side of switch, connect volume control to center terminal of switch, connect one side of phonograph pickup to other side of switch and remaining pickup terminal to remaining outside volume control terminal.

SHORT WAVE TIPS—In listening for short-wave broadcast DON'T forget to consider the difference in time between the location of the broadcaster and the receiver. DON'T expect to hear a station because it is on the air, as many things govern short-wave reception. DON'T get discouraged if reception is poor one night; it may be fine the next. DON'T expect stations to tune broadly; most stations tune sharply. DON'T tune below 10,000 kilocycles (above 30 meters) for distant stations in daylight. DON'T expect to find stations on all parts of the dial. Short-wave stations are widely separated, except in a few instances. DON'T skim over the dial. It requires some knowledge of tuning to get good results. Tune very slowly. DON'T pass up any weak signal, as it may often be brought in stronger by careful tuning.

SPARKS-WITHINGTON COMPANY

SPARTON MODELS 65 AND 66 SUPERHETERODYNE A.C.-D.C. INTERMEDIATE FREQUENCY 456 K.C.

(TOP VIEWS OF SOCKET CONNECTIONS SHOWN)



C1	VARIABLE CONDENSER	B-6153
C2	B.C. OSCILLATOR TRIMMER	A-10972
C3	ADJUSTABLE CONDENSER	A-10973
C4	ADJUSTABLE CONDENSER	A-10977
C5	ADJUSTABLE CONDENSER	A-11034
C6	.006 MFD. 400 V.	A-11130-4
C7	.0005 MFD. MOLDED	A-11095-1
C8	.006-.0005 MFD. 400 V.	A-11092-2
C9	.5 MFD. 100 V.	A-11130-2
C10	ANTENNA TRIMMER	A-11071

C11	.1 MFD. 100 V.	A-11086-1
C12	.05 MFD. 100 V.	A-11086-2
C13	.05 MFD. 200 V.	A-11087-1
C14	.1 MFD. 100 V.	A-11089-1
C15	.05 MFD. 200 V.	A-11086-3
C16	.025 MFD. 400 V.	A-11086-4
C17	.05-.05 MFD. 100 V.	A-11092-1
C18	.0005 MFD. MOLDED	A-9578-14
C19	5-25-5 MFD. ELECTROLYTIC	A-11093
C20	.1 MFD. 100 V.	A-11130-1
C21	.04-.02 MFD 200 V.	A-9612-1

R1	250,000 Ω	VOL. CONTROL	A-11069
R2	50,000 Ω	.25 W.	B-5458-27
R3	500,000 Ω	.25 W.	B-5458-28
R4	3,000 Ω	.25 W.	B-5458-19
R5	300,000 Ω	.25 W.	B-5458-29
R6	100,000 Ω	.25 W.	B-5458-30
R7	15,000 Ω	.5 W.	B-4114-23
R8	1,700 Ω	.25 W.	B-5458-15
R9	290 Ω	WIREWOUND	B-5243-36
R10	2,200 Ω	WIREWOUND	B-5243-13
R11	230 Ω	WIREWOUND	B-5243-34
R12	100 Ω	WIREWOUND	B-5243-37
R13	50 Ω	2 W.	B-6061-2
R14	25 Ω	WIREWOUND	A-9647
R15	60,000 Ω	.25 W.	B-5458-33

L1	PRE-SELECTOR COIL	A-11045
L2	FOREIGN BAND OSC. COIL	A-11047
L3	#1 I.F. TRANSFORMER	A-11039
L4	#2 I.F. TRANSFORMER	A-11040
L5	#3 I.F. TRANSFORMER	A-11041
L6	CHOKE COIL	A-11038
L7	BROADCAST OSC. COIL	A-11068

NOTE: Late Model 65 and 66 chassis have an adjustable condenser C3 connected across the primary of No. 3 I. F. Transformer L5. Part No. of C3 Adjustable Condenser is changed from A-10973 to A-11474. Also Resistor R11 is changed to .25 watt 2200 ohms (B-5458-1) and Resistor R15 is changed to .25 watt 50,000 ohms (B-5458-31). Also Part No. of No. 3 I. F. Transformer L5 is changed from A-11041 to A-11535.

SPARKS-WITHINGTON COMPANY

SPARTON MODELS 65, 66.

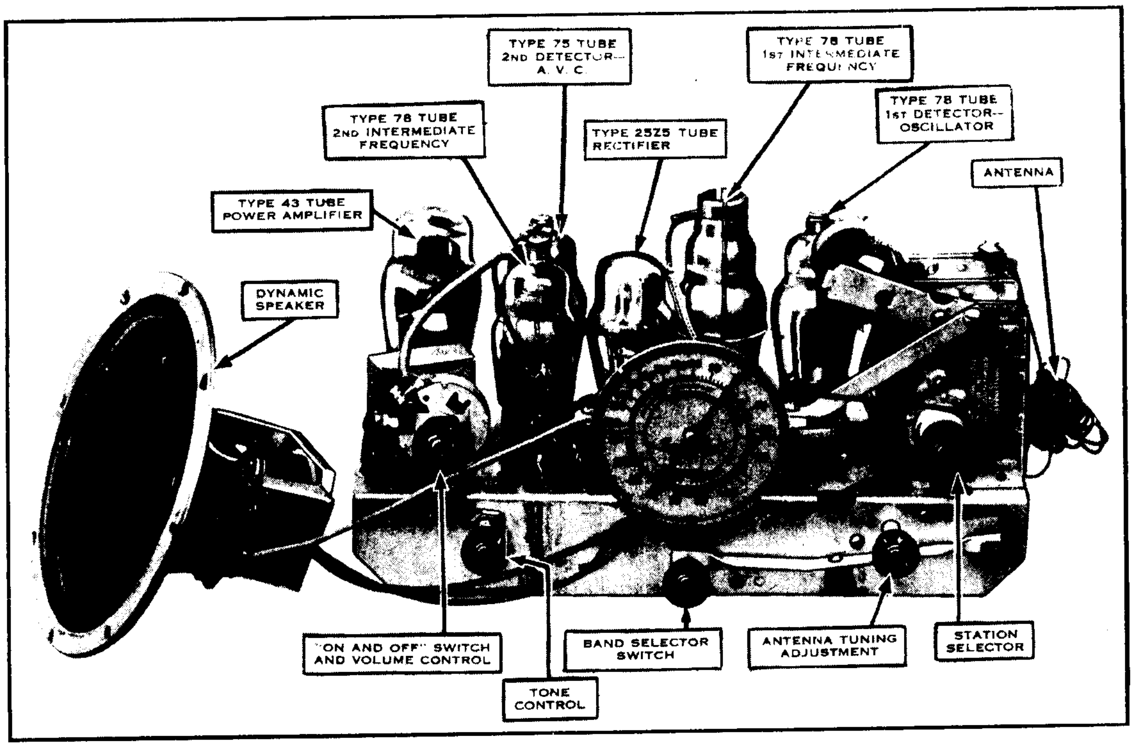
VOLTAGE-RESISTANCE CHART

Line Supply — A. C.
Line Voltage — 119

Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Short-Wave

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)							
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Grid Cap
78	1st Detector-Oscillator	Volts	29	80	105	0	17.5	29	17.5
		Ohms	700	*	*	0	2500	700	2400
78	1st I-F Amplifier	Volts	29	105	105	7.5	7.5	29	0
		Ohms	700	*	*	1700	1700	700	800,000
78	2nd I-F Amplifier	Volts	29	75	105	2.7	2.7	29	0
		Ohms	700	*	350,000	250	250	700	800,000
75	2nd Det.-A.V.C.	Volts	29	**	**	**	.64	29	0
		Ohms	700	500,000	500,000	500,000	100	700	250,000
43	Power Amplifier	Volts	29	95	105	**	**	29	—
		Ohms	700	*	*	750,000	0	700	—
25Z5	Rectifier	Volts	29	28	105	74	30	29	—
		Ohms	700	800	*	3000	800	700	—

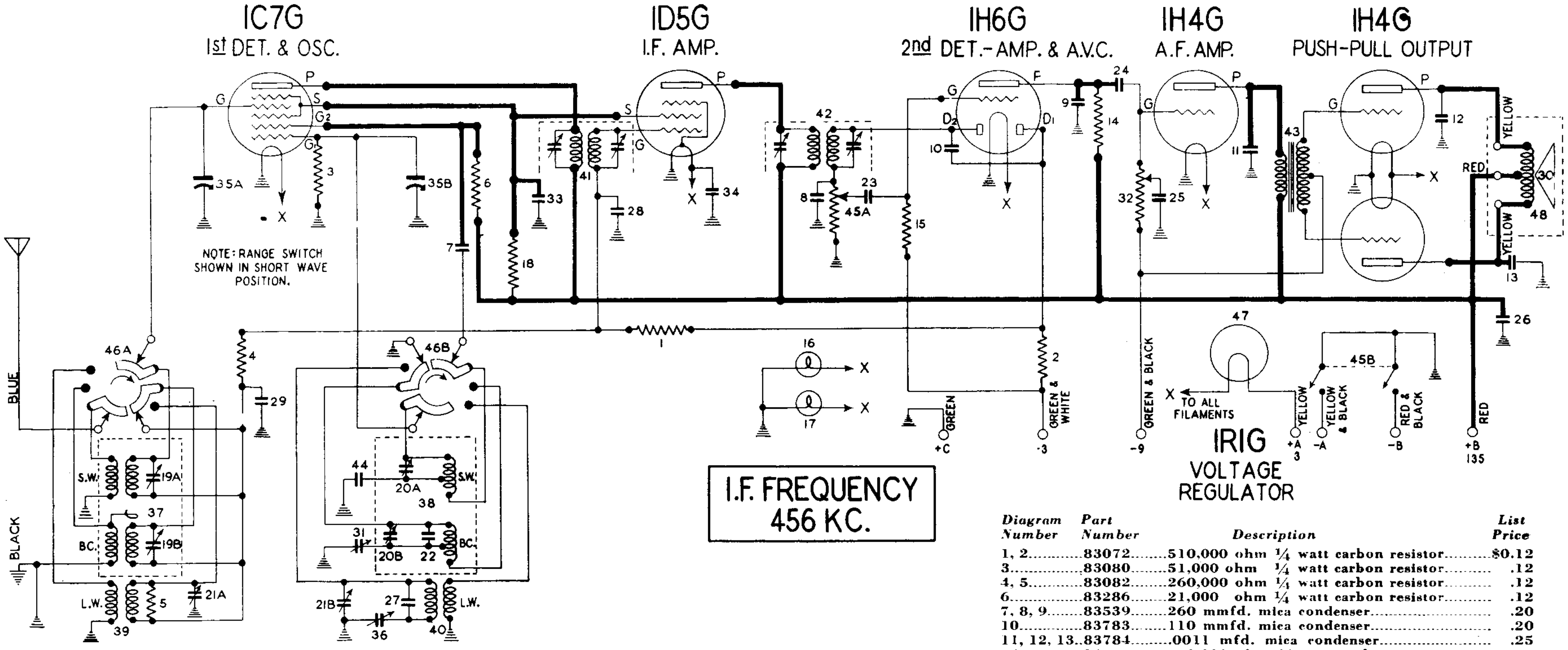
NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.
*Zero, provided correct meter polarity is used. **Cannot be measured with Weston No. 665, Type 1.



MODELS 65 AND 66 CHASSIS

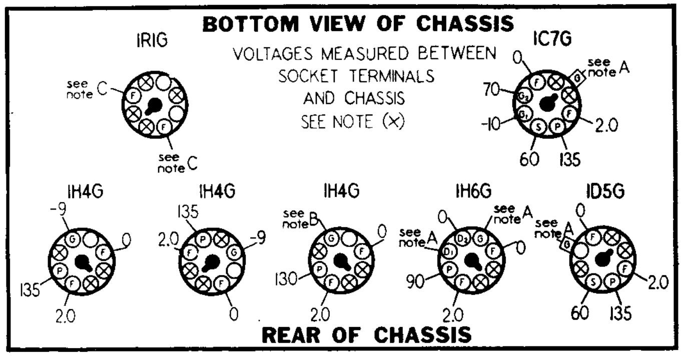
STEWART-WARNER CORPORATION

MODELS R-162-D & 1621-D TO 1629-D



NEW BATTERIES

DIAL TUNED TO 530 KC.



IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The grid bias for the 1C7G, 1D5G, 1H6G, and the delay voltage of the A.V.C. diode of the 1H6G is —3.0 volts measured between chassis ground and the green and white battery cable wire.

NOTE B: The grid bias of the 1H4G audio amplifier is —9.0 volts measured between chassis ground and the green and black battery cable wire.

NOTE C: This voltage will vary between 2.0 and 3.0 volts, depending upon the terminal voltage of the A battery.

NOTE (X): These terminals indicate tube pins which are not internally connected to any element.

Diagram Number	*Part Number*	*Description*	*List Price*
1, 2	83072	510,000 ohm ¼ watt carbon resistor	$0.12
3	83080	51,000 ohm ¼ watt carbon resistor	.12
4, 5	83082	260,000 ohm ¼ watt carbon resistor	.12
6	83286	21,000 ohm ¼ watt carbon resistor	.12
7, 8, 9	83539	260 mmfd. mica condenser	.20
10	83783	110 mmfd. mica condenser	.20
11, 12, 13	83784	.0011 mfd. mica condenser	.25
14	84198	110,000 ohm ¼ watt carbon resistor	.12
15	84235	1.1 megohm ¼ watt carbon resistor	.12
16, 17	84515	Dial lamp 2 volt .06 ampere	.25
19A, 19B; 20A, 20B; 21A, 21B	85087	Dual trimmer condenser	.35
22	85454	11 mmfd. Mica Condenser	.15
23, 24	88026	.02 mfd. 400 volt paper condenser	.25
25	88030	.01 mfd. 400 volt paper condenser	.25
26	88046	.1 mfd. 150 volt paper condenser	.25
27	88173	50 mmfd. Mica Condenser	.20
28, 29	88189	.05 mfd. 200 volt paper condenser	.25
30	88437	Speaker diaphragm for R-234-D Speaker	1.00
	88459	Speaker diaphragm for R-235-D speaker	1.20
31	88478	Variable padding condenser	$0.38
32	88488	Tone control—500,000 ohm	.80
33, 34	88990	.5 mfd. 150 volt paper condenser	.35
35A, 35B	89205	Gang Condenser	4.00
36	89206	Variable padding condenser	.45
37	89207	Antenna coil & shield (B.C. & S.W.) with trimmers	1.90
38	89209	Oscillator coil & shield (B.C. & S.W.) with trimmers	3.00
39	89211	Antenna coil (L.W.)	1.40
40	89212	Oscillator coil (L.W.)	1.00
41	89226	1st I.F. transformer & shield	2.50
42	89227	2nd I.F. transformer & sheild	2.50
43	89228	Push pull input audio transformer	3.50
44	89275	.002 mfd. mica condenser	.40
45A, 45B	89330	Volume control 500,000 ohm; Off-on line switch	1.20
46A, 46B	89357	Range Switch	1.50
47		1R1G Voltage regulator tube	1.50
48		R-234-D....6 inch Magnetic speaker	5.75
		R-235-D....8 inch Magnetic speaker	6.50

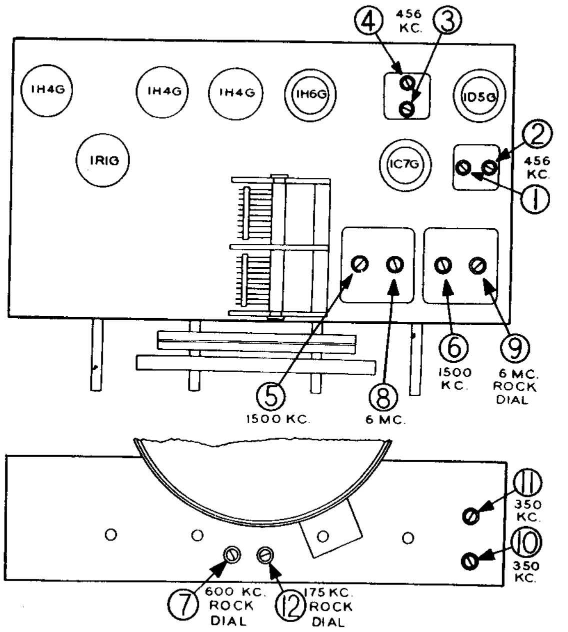
STEWART-WARNER CORPORATION

MODELS R-162-D & 1621-D TO 1629-D

ALIGNING THE I.F. AMPLIFIER: Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (center position).

Connect the test oscillator output leads to the 1C7G control grid and chassis with a .1 mfd. condenser in series with the oscillator output. Set the oscillator to exactly 456 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

Adjust the four I.F. trimmers, Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.



TRIMMER LOCATIONS

Trimmer Number		Alignment Frequency
1-2-3-4	1st and 2nd I.F. transformer trimmers	456 KC.
5	Broadcast oscillator shunt trimmer	1500 KC.
6	Broadcast antenna shunt trimmer	1500 KC.
7	Broadcast oscillator series padder	600 KC.
8	Short wave oscillator shunt trimmer	6 MC.
9	Short wave antenna shunt trimmer	6 MC.
10	Long wave oscillator shunt trimmer	350 KC.
11	Long wave antenna shunt trimmer	350 KC.
12	Long wave oscillator series padder	175 KC.

BROADCAST BAND CALIBRATION AND ALIGNMENT: With the gang condenser in full mesh, the dial pointer should be on the yellow horizontal line below 530 KC. on the dial scale.

Leave the range switch in the center position. Connect a 400 or 500 ohm carbon resistor in series with the oscillator output and the receiver antenna lead (blue wire in the back of the chassis). Connect the grounded oscillator output wire to the receiver ground lead (black wire in back of chassis).

Adjust the test oscillator to exactly 1500 KC. Tune in the 1500 KC. oscillator signal or a station above 1300 KC. on the dial and determine whether the dial calibration is correct at the high frequency end of the dial. If the calibration is correct, do not adjust the broadcast oscillator shunt trimmer No 5. If the calibration is incorrect, adjust trimmer No. 5 to give proper calibration.

Carefully tune the receiver to the 1500 KC. oscillator signal and adjust trimmer No. 6 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 7 for maximum output. Then try to increase the output meter reading by detuning No. 7 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though the dial may be slightly off calibration at 600 KC.

Repeat the adjustment of Nos. 5 and 6 at 1500 KC.

Turn the range switch to the short wave band (maximum counter-clockwise position).

Adjust the test oscillator to exactly 6.0 MC.

Tune in the 6 MC. oscillator signal at or near 6 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 6 MC. If it is, do not adjust the short wave band oscillator shunt trimmer No. 8. If the calibration is incorrect, set the dial pointer to 6 MC. on the dial, and adjust the oscillator shunt trimmer No. 8 until the oscillator signal comes in at this point. If there are two peaks, the proper one is that with the trimmer screw farthest out.

Carefully tune the receiver to the signal and adjust trimmer No. 9 for maximum output. Then try to increase the output by detuning No. 9 slightly and retuning the receiver. Continue detuning No. 9 and retuning the receiver until the output meter deflection is a maximum.

LONG WAVE BAND CALIBRATION AND ALIGNMENT: Turn the range switch to the long wave band position (maximum clockwise position) and adjust the test oscillator to exactly 350 KC.

Tune in the oscillator signal at or near 350 KC. on the receiver dial to determine whether the dial calibration is correct at this point. If it is, do not adjust trimmer No. 10. If the calibration is incorrect, set the receiver dial pointer to 350 KC. and adjust trimmer No. 10 for maximum output.

Carefully tune the receiver to the signal, then adjust trimmer No. 11 for maximum output.

Adjust the test oscillator to 175 KC. and tune in the signal at or near 175 KC. on the receiver dial. Adjust padder No. 12 for maximum output, then try to increase the output by detuning padder No. 12 and retuning the receiver dial.

Repeat the adjustment of trimmers Nos. 10 and 11 at 350 KC.

USE OF BALLAST PLUG

The Model R-162-D radio chassis is designed to operate with either a large 3 volt dry cell or a 2¼ volt Eveready Air Cell. This is possible because the 1R1G tube maintains the proper filament voltage for any battery voltage between 2 and 3 volts. The receiver is also designed to operate from a 2 volt storage cell. However, if this is done it is desirable to omit the 1R1G voltage regulator and insert a special plug in the 1R1G socket which carries our part number 89588 and has a list price of $0.30.

USE OF B AND C BATTERY PACK

To convert the R-162-D chassis for operation with a plug-in B and C battery unit such as the Burgess No. G90 D6, a special cable terminating in a plug that fits the socket of the B and C pack must be substituted for the regular cable. This special cable carries our part number 89487 and has a list price of $1.40. The color codes of the old and new cables are identical. There is no green C plus wire on the new cable since the connection is made in the B and C unit.

TUNING DRIVE AND DIAL PARTS

Part Number	Description	List Price
13923	Spring washer for tuning drive shaft	$0.05
81068	Dial drive cord—per ft.	.05
81069	Dial cord tension spring	.10
88564	Dial pointer & stud assembly	.12
88956	Dial escutcheon with glass	1.65
89174	Dial bracket and ring assembly	1.20
89175	Drive shaft	.10
89176	Retaining ring for tuning drive shaft	.02
89283	Dial lamp socket	.10
89285	Dial background	.12
89298	Dial drum and bushing assembly	.60
89353	Dial scale	1.80
89489	Dial lamp shield	.12
89799	Dial scale retaining clip	.02

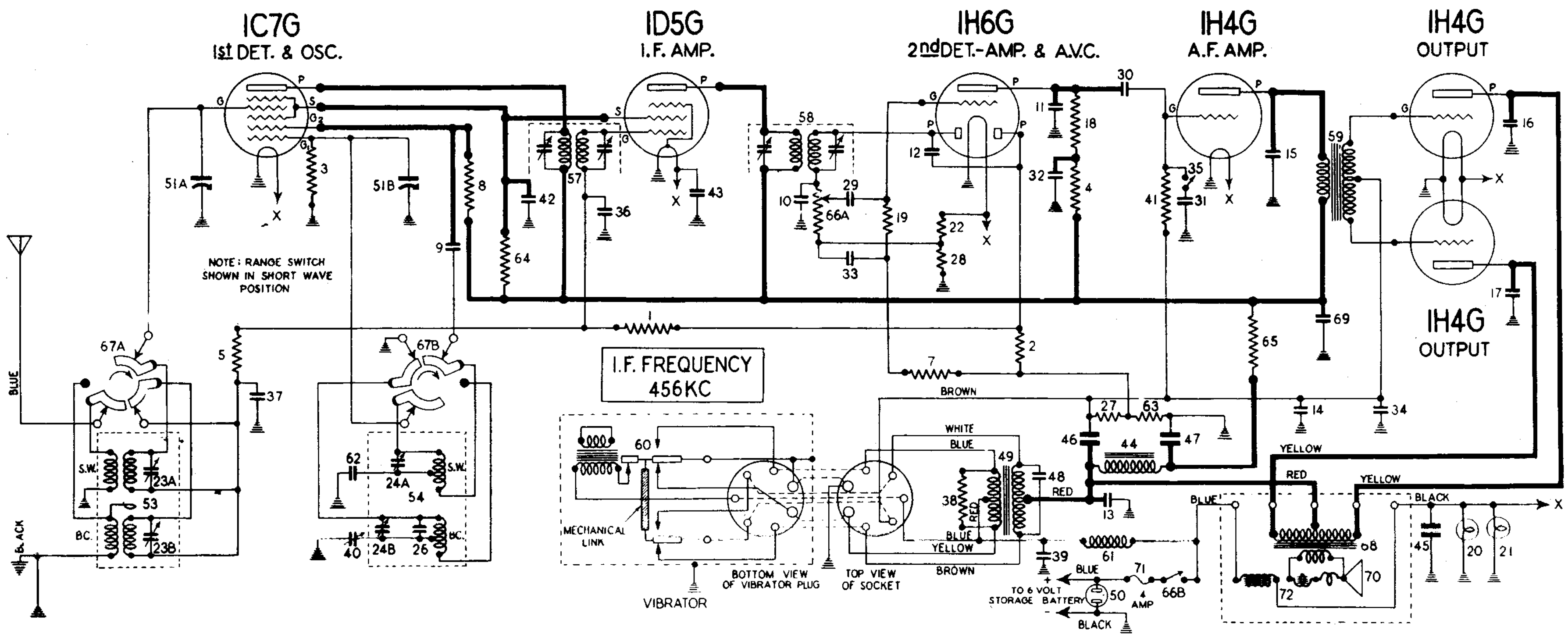
MISCELLANEOUS PARTS

Part Number	Description	List Price
67032	Felt washer for knob, per C	$0.35
67590	Flat steel mounting washer	.01
84428	Chassis mounting bushing (rubber)	.03
84493	No. 10 x 1¼ chassis mounting screw	.02
84805	Felt washer (used with chassis mtg. screw)	.01
88161	Tube shield	.08
88164	Tube shield cap—slotted	.06
88165	Tube shield cap—plain	.06
88436	Diaphragm gasket for R-234-D speaker	.15
88958	No. 2 x ⅜ R.H.W. Screw for escutcheon	.01
89347	Battery cable (for R-1621-D)	.90
89460	Knob—for range switch	.30
89461	Knob—for range, tone, tuning & volume control	.25
89487	B & C battery cable and plug, complete (special used with B & C battery pack)	1.40
89504	Battery cable (for R-1625-D)	.80
89588	Ballast tube plug (used in place of 1R1G tube with 2 volt battery)	.30

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STEWART-WARNER CORPORATION

MODELS R-163-D & 1631-D TO 1639-D



MODEL R-163-D PARTS LIST

Diagram Number	Part Number	Description	List Price
1, 2	83072	510,000 ohm ¼ watt carbon resistor	$0.12
3, 4	83080	51,000 ohm ¼ watt carbon resistor	.12
5, 6, 7	83082	260,000 ohm ¼ watt carbon resistor	.12
8	83286	21,000 ohm ¼ watt carbon resistor	.12
9, 10, 11	83539	260 mmfd. mica condenser	.20
12	83783	110 mmfd. mica condenser	.20
13, 14, 15, 16, 17	83784	.0011 mfd. mica condenser	.25
18	84198	110,000 ohm ¼ watt carbon resistor	.12
19-41	84235	1.1 megohm ¼ watt carbon resistor	.12
20, 21	84515	Dial lamp 2 Volt .06 ampere	.25
22	84888	300 ohm ½ watt wirewound resistor	.15
23A, 23B, 24A, 24B	85087	Dual trimmer	.35
26	85454	11 mmfd. mica condenser	.15
27	85691	500 ohm ½ watt wirewound resistor	.20
28	88009	200 ohm ½ watt wirewound resistor	.15
29, 30	88026	.02 mfd. 400 volt paper condenser	.25
31	88029	.004 mfd. 400 volt paper condenser	.25
32, 33	88046	.1 mfd. 150 volt paper condenser	.25
34	88170	10 mfd. 25 volt electrolytic condenser	.80
35	89331	Tone control switch	.75
36	88189	.05 mfd. 200 volt paper condenser	.25
38	88204	210 ohm ½ watt carbon resistor	.15
39	88285	1.25 mfd. 150 volt paper condenser	.80
40	88478	Variable padding condenser	.38
41	84235	1.1 megohm ¼ watt carbon resistor	.12
42, 43	88990	.5 mfd. 150 volt paper condenser	.35
44	89117	Filter choke	1.35
45	89145	100 mfd. 12 volt electrolytic condenser	.85
46, 47	89147	8 mfd. 250 volt electrolytic condenser	.90
48	89153	.005 mfd. 1500 volt paper condenser	$0.40
49	89164	Power transformer (6 volt primary)	3.60
50	89170	Reading lamp plug receptacle	.15
51A, 51B	89205	Gang condenser	4.00
53	89207	Antenna coil & shield Assembly (B.C. & S.W.) with trimmers	1.90
54	89209	Oscillator Coil & Shield Assembly (B.C. & S.W.) with trimmers	3.00
57	89226	1st I.F. transformer & shield assembly	2.50
58	89227	2nd I.F. transformer & shield assembly	2.50
59	89228	Push Pull input transformer	3.50
60	89272	Vibrator	5.00
61	89273	"A" choke assembly	.30
62	89275	.002 mfd. mica condenser	.40
63	89276	140 ohm ½ watt wirewound resistor	.12
64	89277	35,000 ohm ½ watt carbon resistor	.15
65	89278	1100 ohm ¼ watt carbon resistor	.35
35	89331	Tone control switch	.75
66A, 66B	89332	Volume control 500,000 ohm off on switch	1.20
67A, 67B	89334	Range Switch	1.40
68	89401	Output transformer for R257D & R258D speakers	2.60
69	89421	1 mfd. 200 volt paper condenser	.25
70	89428	Diaphragm, voice coil and spider assembly for R257D speaker. For R258D speaker—order complete	1.75
71	89828	4 ampere 25 volt fuse	.05
72	R257D	6" Dynamic Speaker	6.75
72	R258D	8" Dynamic Speaker	8.00

STEWART-WARNER CORPORATION

MODELS R-163-D & 1631-D TO 1639-D

CALIBRATION AND ALIGNMENT

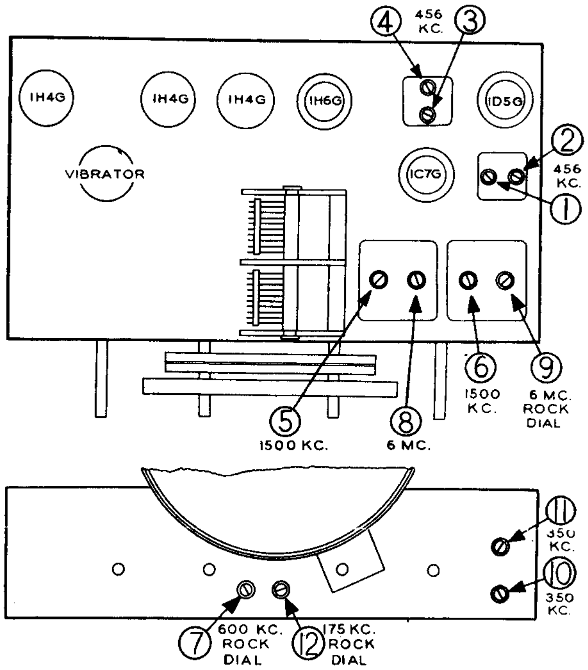
ALIGNING EQUIPMENT: For proper alignment, an output meter and an accurately calibrated oscillator with a tuning range from 175 KC. to 6 MC. are required.

Connect the output meter across the plates of the output tubes. Convenient points to make the plate connections are the yellow wires on the speaker terminal strip.

ALIGNING THE I.F. AMPLIFIER: Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (center position).

Connect the test oscillator output leads to the 1C7G control grid and chassis with a .1 mfd. condenser in series with the oscillator output. Set the oscillator to exactly 456 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

Adjust the four I.F. trimmers, Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.



TRIMMER LOCATIONS

Trimmer Number		Alignment Frequency
1-2-3-4	1st and 2nd I.F. transformer trimmers	456 KC.
5	Broadcast oscillator shunt trimmer	1500 KC.
6	Broadcast antenna shunt trimmer	1500 KC.
7	Broadcast oscillator series padder	600 KC.
8	Short wave oscillator shunt trimmer	6 MC.
9	Short wave antenna shunt trimmer	6 MC.
10	Long wave oscillator shunt trimmer	350 KC.
11	Long wave antenna shunt trimmer	350 KC.
12	Long wave oscillator series padder	175 KC.

BROADCAST BAND CALIBRATION AND ALIGNMENT: With the gang condenser in full mesh, the dial pointer should be on the yellow horizontal line below 530 KC. on the dial scale.

Leave the range switch in the center position. Connect a 400 or 500 ohm carbon resistor in series with the oscillator output and the receiver antenna lead (blue wire in the back of the chassis). Connect the grounded oscillator output wire to the receiver ground lead (black wire in back of chassis).

Adjust the test oscillator to exactly 1500 KC. Tune in the 1500 KC. oscillator signal or a station above 1300 KC. on the dial and determine whether the dial calibration is correct at the high frequency end of the dial. If the calibration is correct, do not adjust the broadcast oscillator shunt trimmer No. 5. If the calibration is incorrect, adjust trimmer No. 5 to give proper calibration.

Carefully tune the receiver to the 1500 KC. oscillator signal and adjust trimmer No. 6 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 7 for maximum output. Then try to increase the output meter reading by detuning No. 7 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though the dial may be slightly off calibration at 600 KC.

Repeat the adjustment of Nos. 5 and 6 at 1500 KC.

SHORT WAVE BAND CALIBRATION AND ALIGNMENT: Turn the range switch to the short wave band (maximum counter-clockwise position).

Adjust the test oscillator to exactly 6.0 MC.

Tune in the 6 MC. oscillator signal at or near 6 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 6 MC. If it is, do not adjust the short wave band oscillator shunt trimmer No. 8. If the calibration is incorrect, set the dial pointer to 6 MC. on the dial, and adjust the oscillator shunt trimmer No. 8 until the oscillator signal comes in at this point. If there are two peaks, the proper one is that with the trimmer screw farthest out.

Carefully tune the receiver to the signal and adjust trimmer No 9 for maximum output. Then try to increase the output by detuning No. 9 slightly and retuning the receiver. Continue detuning No. 9 and retuning the receiver until the output meter deflection is a maximum.

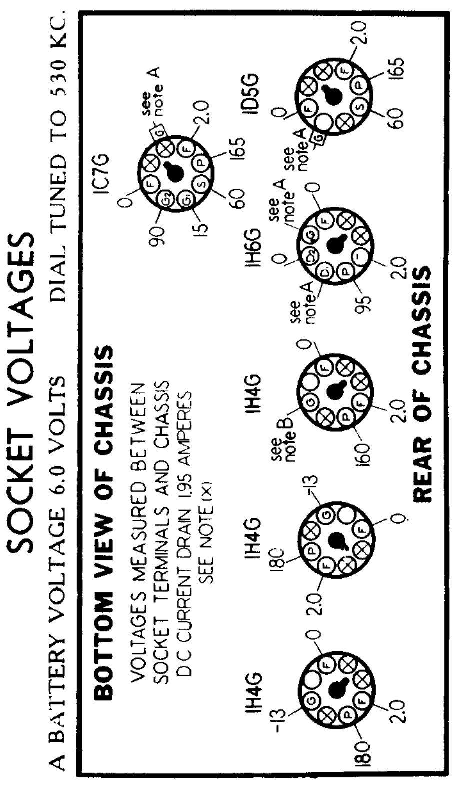
LONG WAVE BAND CALIBRATION AND ALIGNMENT: Turn the range switch to the long wave band position (maximum clockwise position) and adjust the test oscillator to exactly 350 KC.

Tune in the oscillator signal at or near 350 KC. on the receiver dial to determine whether the dial calibration is correct at this point. If it is, do not adjust trimmer No. 10. If the calibration is incorrect, set the receiver dial pointer to 350 KC. and adjust trimmer No. 10 for maximum output.

Carefully tune the receiver to the signal, then adjust trimmer No. 11 for maximum output.

Adjust the test oscillator to 175 KC. and tune in the signal at or near 175 KC. on the receiver dial. Adjust padder No. 12 for maximum output, then try to increase the output by detuning padder No. 12 and retuning the receiver dial.

Repeat the adjustment of trimmers Nos. 10 and 11 at 350 KC.



IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The grid bias for the 1C7G, 1D5G, 1H6G and the A.V.C. delay voltage for one diode of the 1H6G is —2.7 volts measured across resistor 63.

NOTE B: The grid bias on the 1H4G 1st audio and output tubes is -13.0 volts measured across resistors 27 and 63.

NOTE (X): These terminals indicate tube pins which are not internally connected to any element.

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODEL 150

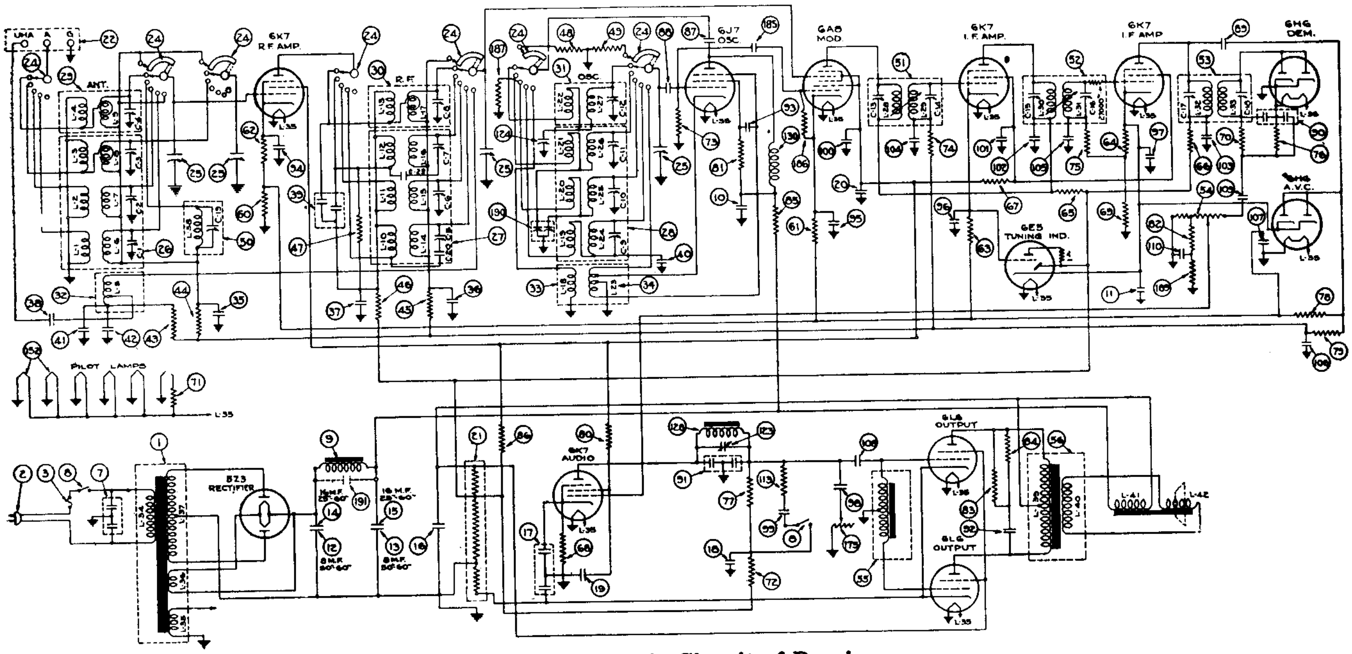


Fig. 2. Schematic Circuit of Receiver.

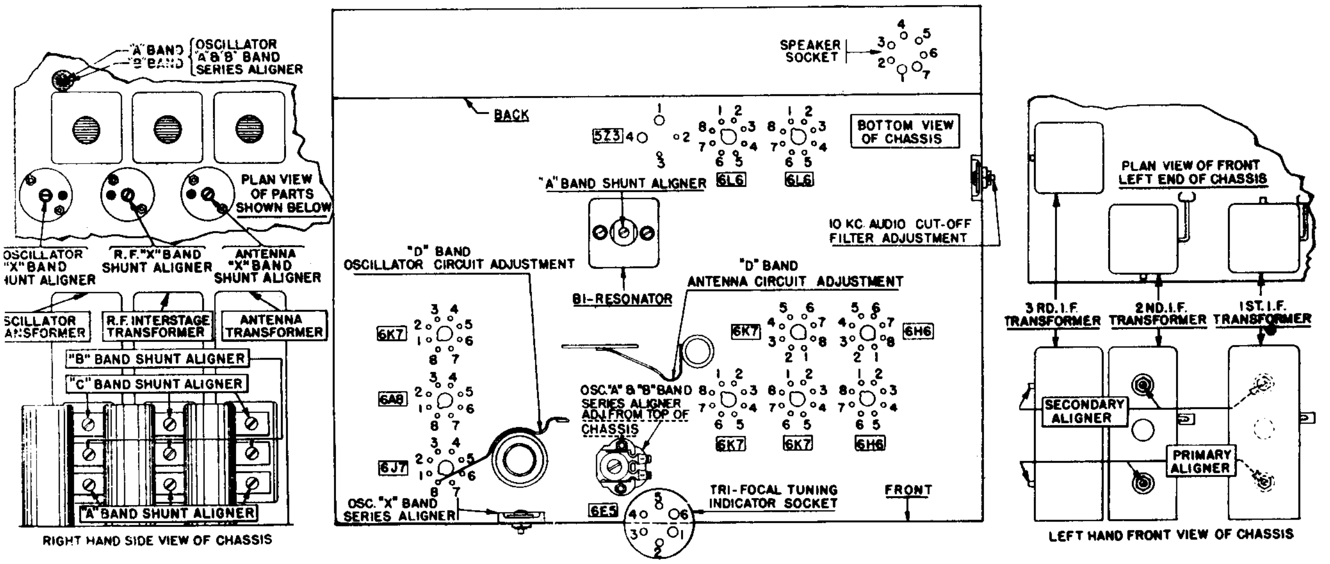


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

The No. 150 Receiver is a twelve tube, "Adjustable High Fidelity" receiver employing metal tubes, including the new "Beam" power tubes. There are five tuning ranges in this receiver, one of which is the Ultra-Short Wave range. This range is also referred to as the Ultra-High Frequency (U. H. F.) range and also as the "D" band. This receiver uses a Carpinchoe high fidelity dynamic speaker, and has incorporated in it the exclusive "Patent Applied For", Stromberg-Carlson "Tri-Focal" tuning system and the exclusive Stromberg-Carlson Acoustical Laboratories' revolutionary new development, the "Acoustical Labyrinth". This new device extends the bass response, provides reproduction only from the front of the cabinet, and eliminates all cabinet resonance. Audio reproduction is further improved in this receiver by employing sound diffusing vanes in front of the loud speaker opening which distribute the higher pitched tones, thereby providing excellent reproduction in all parts of the room by spreading out these directional frequencies.

Maximum selectivity between adjacent stations located in the standard broadcast band is obtained by the use of an additional tuned radio frequency ("Bi-resonator") circuit. When either the "X", "B", "C", or "D" ranges are in operation, this additional tuned radio frequency circuit is automatically cut out of the receiver circuit. Adjustable high fidelity is obtained from this receiver by means of the variable band width, intermediate frequency transformers which are used in the two intermediate amplifier stages.

The various tubes are used in this receiver as follows: One No. 6K7 tube is used in the R. F. Amplifier, one No. 6K7 is used in the First I. F. Amplifier, another No. 6K7 is used in the Second I. F. Amplifier, and the remaining No. 6K7 tube is used in the Audio Amplifier. The No. 6A8 tube is used as a Modulator tube, and the No. 6J7 tube is used as the Oscillator tube. One No. 6H6 tube is used as the Demodulator tube, and the other No. 6H6 tube is used as the Automatic Volume Control tube. The two No. 6L6 tubes are used in the Audio Power Output Stage. The No. 6E5 tube is used as the indicator of the Tri-Focal Tuning System

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODEL 150

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on this receiver, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, this alignment procedure should be carefully followed.

In making any alignment adjustments always adjust the signal generator's output to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal.

Figure 1 shows the location of all the aligning capacitors used in this receiver.

Intermediate Frequency Amplifier Adjustments

Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed.

Operate the range switch of the receiver to the "A" range position. Set the tuning dial at its extreme low frequency position, and operate the "Tone-Fidelity" control knob so that the receiver is adjusted for the standard fidelity position as indicated by the fidelity indicator located on the front panel of the receiver. **Never attempt to align the I. F. circuits of this receiver with the "Tone-Fidelity" control set at any position other than the standard fidelity.** The I. F. circuits may then be checked for alignment by adjusting the aligning capacitors in the exact order as follows:

1. Secondary of 3rd I. F. Trans. (Capacitor C-18).
2. Primary of 3rd I. F. Trans. (Capacitor C-17).
3. Secondary of 2nd I. F. Trans. (Capacitor C-16).
4. Primary of 2nd I. F. Trans. (Capacitor C-15).
5. Secondary of 1st I. F. Trans. (Capacitor C-14).
6. Primary of 1st I. F. Trans. (Capacitor C-13).

Radio Frequency Adjustments

The alignment of the radio frequency circuits for the various ranges in this receiver should be very carefully made in the order and at the frequencies specified.

It will be noted that no instructions are given for aligning the receiver at other than two frequencies for any range. Each receiver is given an exacting check for "tracking" at various frequencies in each range before leaving the factory. It is felt by the manufacturers that should any receiver through accident require a check on the "tracking", it should be returned to the factory, where this may be easily and accurately done.

Alignment of Long-Wave-Weather Range (Also Referred to as "X" Band) Circuits

1. Oscillator's "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-12).
2. R. F. Interstage "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-8).
3. Antenna "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-4).
4. Oscillator "X" Band Series Aligning Capacitor at 150 Kilocycles (Capacitor Item 124). When operation No. 4 has been completed repeat operations 1, 2, and 3 again and in the exact order given.

Alignment of Standard Broadcast Range (Also Referred to as "A" Band) Circuits

1. Oscillator's "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-11).
2. R. F. Interstage "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-7).
3. Antenna "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-3).
4. "A" Band, R. F. Bi-resonator Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-19).
5. Oscillator "A" Band Series Aligning Capacitor at 600 Kilocycles (Capacitor with screw adjustment. Item 190). When operation No. 5 has been completed repeat operations 1, 2, 3, and 4 again and in the exact order given.

Alignment of Amateur, Police, and Aircraft Range (Also Referred to as "B" Band) Circuits

1. Oscillator's "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-10).
2. R. F. Interstage "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-6).
3. Antenna "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-2).
4. Oscillator "B" Band Series Aligning Capacitor at 1.8 Megacycles (Capacitor with nut adjustment. Item 190). When operation No. 4 has been completed repeat operations 1, 2, and 3 again and in the exact order given.

Alignment of Short-Wave-Foreign Range (Also Referred to as "C" Band) Circuits

1. Oscillator's "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-9).
2. R. F. Interstage "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-5).
3. Antenna "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-1).

Alignment of Ultra Short-Wave Range (Also Referred to as "D" Band) Circuits

1. The only adjustment which it is necessary to make for bringing the "D" Band Oscillator's circuit into alignment is accomplished by bending the ground loop (shown in Figure 1 as "D" Band Oscillator Circuit Adjustment) either closer to the coil or farther away from the coil. This adjustment should be made with the signal generator set to a frequency of 20 megacycles.
2. The only adjustment which it is necessary to make for bringing the "D" Band Antenna's Circuit into alignment is accomplished by bending the grid lead loop (shown in Figure 1 as "D" Band Antenna Circuit Adjustment) so as to form either a smaller or larger loop. This adjustment should also be made with the signal generator set to a frequency of 20 megacycles.

Adjustment of 10 Kilocycle Audio Cut-Off Filter

The adjustment of this filter is correctly made at the factory and no additional adjustment is required.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1 shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: O-2.5, O-10, O-100, O-250, O-500, O-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

Tube	Circuit	Cap	Terminals of Sockets								Heater Voltages Between Heater Terminals	
			1	2	3	4	5	6	7	8	Socket Terminal Numbers	Volts
6K7	R. F. Amp.	0	0	0	+210	+ 95	+6.5	—	*6.3*	+6.5	2-7	*6.3*
6A8	Modulator	0	0	0	+210	+ 95	— 35	+ 95	*6.3*	+5.5	2-7	*6.3*
6J7	Oscillator	—65	0	0	+200	+125	0	—	*6.3*	0	2-7	*6.3*
6K7	1st I. F. Amp.	0	0	0	+210	+ 95	+ 7	+ 4	*6.3*	+ 7	2-7	*6.3*
6K7	2nd I. F. Amp.	0	0	0	+210	+ 95	+ 6	+2.5	*6.3*	+ 6	2-7	*6.3*
6H6	Demodulator	—	0	0	— .3	0	— .3	+ 4	*6.3*	0	2-7	*6.3*
6H6	A. V. C.	—	0	0	0	+ 6	0	0	*6.3*	+ 6	2-7	*6.3*
6K7	Audio Amp.	0	0	0	+135*	+ .2	+ .7	—	*6.3*	+ .7	2-7	*6.3*
6L6's	Audio Output	—	0	0	+360	+235	0	—	*6.3*	+ 15	2-7	*6.3*
6E5	Tuning Ind.	—	*6.3*	+.6	+6.6	+215	+ 6	*0*	—	—	1-6	*6.3*
5Z3	Rectifier	—	+380	*390*	*390*	+380	—	—	—	—	1-4	*4.8*
Speaker		—	+365	0	0	+375	+375	—	+235	—		

Voltage across vernier dial pilot lamp—*5.3* volts

Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.

Item Number	Piece Number	Part
1	26685	Power Transformer (50 to 60 Cycles Chassis)
1	26686	Power Transformer (25 to 60 Cycles Chassis)
2	24268	Cord (Power Supply)
3	23234	Fuse, 2½ Amperes
7	21535	Capacitor Assembly (2—.01 Mf. Capacitors)
8	26061	Switch ("Off-On" and Bass Control)
9	26704	Choke Assembly (Filter of Rectifier)
10	25783	Electrolytic Capacitor, 1 Mf., 450 Volts
11	24207	Electrolytic Capacitor, 12 Mf., 25 Volts
12	22757	Electrolytic Capacitor, 8 Mf., 500 Volts
13	22757	Electrolytic Capacitor, 8 Mf., 500 Volts
14	26510	Electrolytic Capacitor, 16 Mf., 500 Volts
15	26510	Electrolytic Capacitor, 16 Mf., 500 Volts
16	26773	Electrolytic Capacitor, 16 Mf., 350 Volts
17	25498	Electrolytic Capacitor (2—10 Mf.), 25 Volts
18	24580	Electrolytic Capacitor, 4 Mf., 450 Volts
19	26693	Electrolytic Capacitor, 4 Mf., 350 Volts
20	26693	Electrolytic Capacitor, 4 Mf., 350 Volts
21	26736	Resistor, "B" Voltage Divider
24	26746	Range Switch Assembly
25	26444	Gang Tuning Capacitor Assembly
26	26446	Coil Assembly, Antenna ("A", "B" and "C" Ranges)
27	26447	Coil Assembly, R. F. ("A", "B" and "C" Ranges)
28	26448	Coil Assembly, Oscillator ("A", "B" and "C" Ranges)
29	26507	Coil Assembly, Antenna ("X" Range)
30	26508	Coil Assembly, R. F. ("X" Range)
31	26509	Coil Assembly, Oscillator ("X" Range)
32	26758	Coil Assembly, Antenna ("D" Range)
33	26787	Oscillator Primary Coil ("D" Range)
34	26785	Oscillator Secondary Coil ("D" Range)
35	24405	Capacitor Assembly, .04 Mf.
36	24405	Capacitor Assembly, .04 Mf.
37	24994	Capacitor Assembly, .05 Mf.
39	26513	Capacitor (3—200 Mmf.)
40	26944	Capacitor, .004 Mf.
41	24637	Capacitor, .0017 Mf.
42	24637	Capacitor, .0017 Mf.
43	26357	Resistor, Type "E", .1 Megohm
44	26357	Resistor, Type "E", .1 Megohm
45	26357	Resistor, Type "E", .1 Megohm
46	26333	Resistor, Type "E", 1000 Ohms
47	26353	Resistor, Type "E", 47,000 Ohms
48	26321	Resistor, Type "E", 100 Ohms
49	26321	Resistor, Type "E", 100 Ohms
50	26474	Coil Assembly (Bi-Resonator)
51	26481	1st I. F. Transformer
52	26482	2nd I. F. Transformer
53	26243	3rd I. F. Transformer
54	26077	Potentiometer (Volume Control)
55	26700	Transformer Assembly, Audio Input
56	26702	Transformer Assembly, Audio Output
57	22968	Socket, 4 Prong
58	23517	Socket, 7 Prong
59	25539	Socket, 8 Prong
60	26324	Resistor, Type "E", 180 Ohms
61	26326	Resistor, Type "E", 270 Ohms
62	26328	Resistor, Type "E", 390 Ohms
63	26330	Resistor, Type "E", 560 Ohms
64	26330	Resistor, Type "E", 560 Ohms
65	26330	Resistor, Type "E", 560 Ohms
66	26333	Resistor, Type "E", 1000 Ohms
67	26333	Resistor, Type "E", 1000 Ohms
68	26338	Resistor, Type "E", 2700 Ohms
69	26328	Resistor, Type "E", 390 Ohms
70	26345	Resistor, Type "E", 10,000 Ohms
71	26780	Resistor, Flexible, 3.5 Ohms (Pilot Lamp)
72	26353	Resistor, Type "E", 47,000 Ohms
73	26353	Resistor, Type "E", 47,000 Ohms
74	26357	Resistor, Type "E", .1 Megohm
75	26357	Resistor, Type "E", .1 Megohm
76	26357	Resistor, Type "E", .1 Megohm
77	26357	Resistor, Type "E", .1 Megohm
78	26360	Resistor, Type "E", 1 Megohm
79	26360	Resistor, Type "E", 1 Megohm
80	26360	Resistor, Type "E", 1 Megohm
81	26349	Resistor, Type "E", 22,000 Ohms
82	26341	Resistor, Type "E", 4700 Ohms
83	26775	Resistor, Type "F", 20,000 Ohms
84	26775	Resistor, Type "F", 20,000 Ohms
85	26776	Resistor, Type "F", 12,000 Ohms
86	25526	Resistor, Type "F", 15,000 Ohms
87	25487	Capacitor, Type "W", .001 Mf.
88	24560	Capacitor, Type "O", 50 Mmf.
89	24560	Capacitor, Type "O", 50 Mmf.
90	26512	Capacitor, Type "W", 2—100 Mmf.
91	26512	Capacitor, Type "W", 2—100 Mmf.
92	25535	Capacitor, Type 3L, .005 Mf.
93	25535	Capacitor, Type 3L, .005 Mf.
94	24402	Capacitor Assembly, .1 Mf.
95	24402	Capacitor Assembly, .1 Mf.
96	24402	Capacitor Assembly, .1 Mf.
97	24402	Capacitor Assembly, .1 Mf.
98	25149	Capacitor Assembly, .01 Mf.
99	25149	Capacitor Assembly, .01 Mf.
100	24994	Capacitor Assembly, .05 Mf.
101	24994	Capacitor Assembly, .05 Mf.
102	24994	Capacitor Assembly, .05 Mf.
103	24994	Capacitor Assembly, .05 Mf.
104	24405	Capacitor Assembly, .04 Mf.
105	24405	Capacitor Assembly, .04 Mf.
106	24405	Capacitor Assembly, .04 Mf.
107	24405	Capacitor Assembly, .04 Mf.
108	24405	Capacitor Assembly, .04 Mf.
109	24405	Capacitor Assembly, .04 Mf.
110	24405	Capacitor Assembly, .04 Mf.
113	26349	Resistor, Type "E", 22,000 Ohms
123	26568	Adjustable Capacitor (High Frequency Cut-Off Filter)
124	26569	Capacitor (Oscillator Series Aligner, "X" Range)
125	26485	Potentiometer and Bracket Assembly (Tone Control and High Fidelity)
128	26515	Coil Assembly (High Frequency Cut Off Filter)
130	25814	Choke Assembly, 5 Millihenrys
132	26519	Drive Disc Assembly
133	26570	Dial Bracket Assembly
134	26584	Bar Assembly (Pulley)
135	26211	Pulley
136	26518	Gear Assembly
137	26220	Drive Shaft Assembly
138	26520	Dial Assembly (Secondary)
139	26694	Dial Assembly (Main)
140	26672	Drive Cord Assembly (Volume Indicator Disc)
141	26683	Cord Assembly (Dial Elevator)
142	26226	Spring
143	26556	Volume Indicator Disc Assembly
144	26698	Fidelity Indicator Disc Assembly
145	26572	Bracket Assembly
146	26682	Reel Assembly (Range Switch)
147	26667	Reel Assembly (Tone-Fidelity Control)
148	26666	Reel Assembly (Volume Control)
149	26550	Front Dial Plate Assembly
150	26147	Lamp Socket
151	26257	Lamp Shades
152	26287	Pilot Lamp
155	26497	Cable Assembly, Tri-Focal Indicator
156	26692	Lamp Socket Assembly
175	26439	Potentiometer
176	26673	Drive Cord Assembly (Fidelity Indicator Disc)
185	24560	Capacitor, Type "O", 50 Mmf.
186	26357	Resistor, Type "E", .1 Megohm
187	26341	Resistor, Type "E", 4700 Ohms
189	26345	Resistor, Type "E", 10,000 Ohms
190	26564	Capacitor Assembly, Oscillator Series Aligner ("A" and "B" Ranges)
191	22776	Capacitor Assembly, .3 Mf.

MISCELLANEOUS PARTS

Piece Number	Part
26250	Cone Assembly (For P-26170 Speaker)
26048	Plug (For Loud Speaker Cable)
26360	Resistor, Type "E", 1 Megohm (Used at Socket of No. 6E5 Tube)
26302	Knob (For "Volume" Control)
26290	Knob (For "Tone-Fidelity" Control)
26306	Knob (For "Stations" Selector Control Shaft)
26306	Knob (For "Vernier" Stations Selector Control Shaft)
26301	Knob (For "Range" Switch)
26300	Knob (For "Off-On-Bass" Control)

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODELS 160L-160LB-160P-160PB

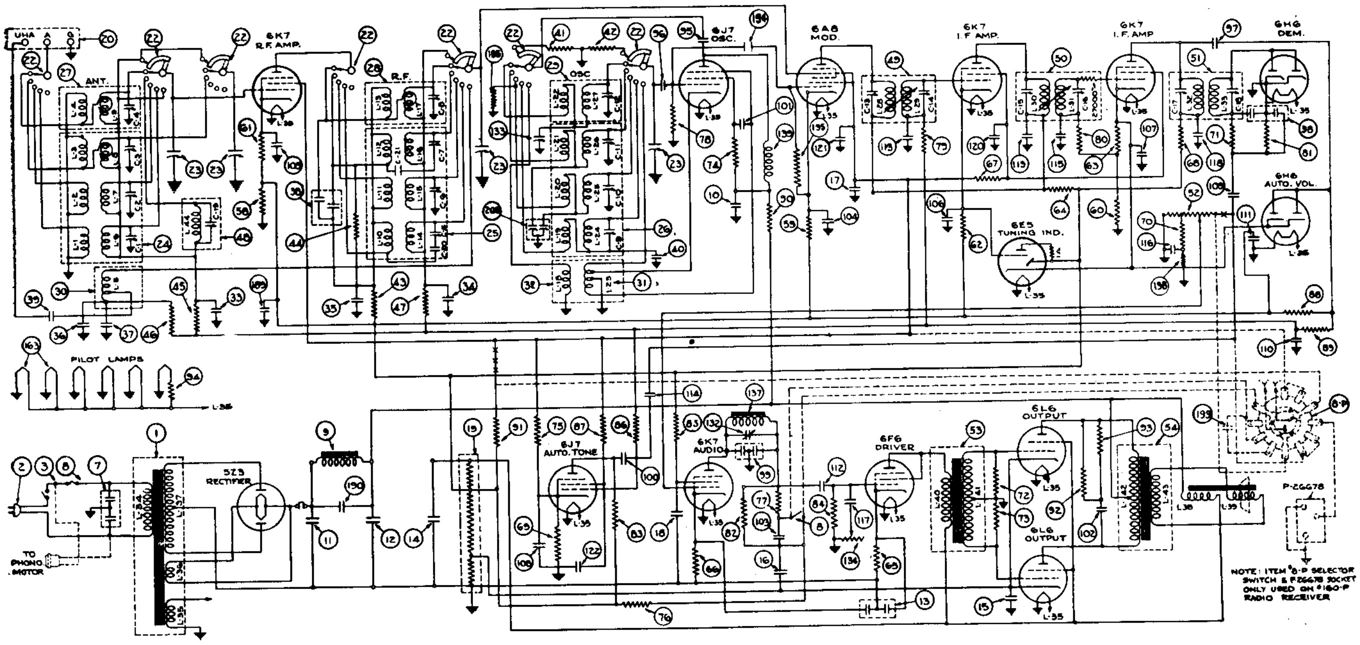


Fig. 2. Schematic Circuit of Receiver.

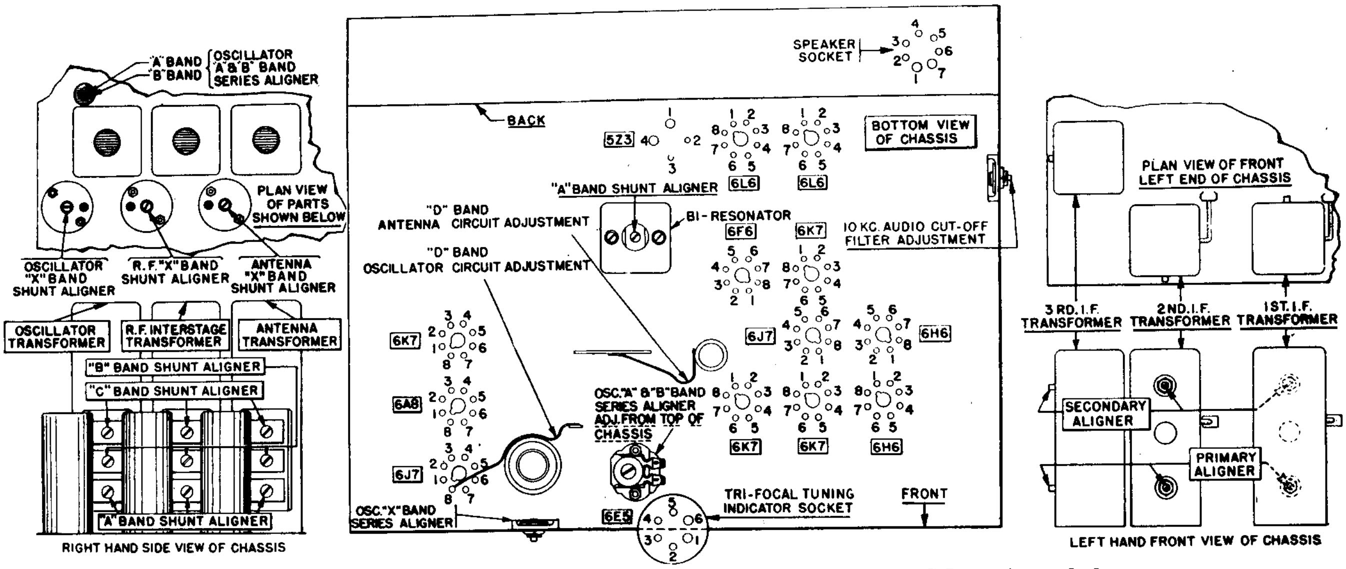


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

ELECTRICAL SPECIFICATIONS

Type of Circuit .... Superheterodyne

Tuning Ranges .... X—145 to 370 Kc.; A—530 to 1700 Kc.; B—1700 to 5600 Kc.; C—5600 to 18,000 Kc.; D—18,000 to 60,000 Kc.

Number and Types of Tubes..4 No. 6K7, 1 No. 6A8, 2 No. 6J7, 2 No. 6H6, 1 No. 6F6, 2 No. 6L6, 1 No. 6E5, 1 No. 5Z3

Power Supply Voltage .... 105 to 125 Volts

Power Supply Frequency .... 25 to 60 Cycles and 50 to 60 Cycles

Input Power Rating—

No. 160-L .... 170 Watts

No. 160-P .... 214 Watts

Frequency of Intermediate Amplifier .... 465 Kilocycles

APPARATUS SPECIFICATIONS

No. 160-L .... 50 to 60 Cycles; P-26637 Chassis Assembly; P-26170 Loud Speaker

No. 160-LB .... 25 to 60 Cycles; P-26638 Chassis Assembly; P-26170 Loud Speaker

No. 160-P .... 60 Cycles Only; P-26639 Chassis Assembly; P-26170 Loud Speaker; P-26728 Phonograph Unit

No. 160-PB .... 25 Cycles Only; P-26640 Chassis Assembly; P-26170 Loud Speaker; P-26729 Phonograph Unit

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODELS 160L-160LB-160P-160PB

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on this receiver, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, this alignment procedure should be carefully followed.

In making any alignment adjustments always adjust the signal generator's output to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal.

Figure 1 shows the location of all the aligning capacitors used in this receiver.

Intermediate Frequency Amplifier Adjustments

Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed.

Operate the range switch of the receiver to the "A" range position. Set the tuning dial at its extreme low frequency position, and operate the "Tone-Fidelity" control knob so that the receiver is adjusted for the standard fidelity position as indicated by the fidelity indicator located on the front panel of the receiver. **Never attempt to align the I. F. circuits of this receiver with the "Tone-Fidelity" control set at any position other than the standard fidelity.** The I. F. circuits may then be checked for alignment by adjusting the aligning capacitors in the exact order as follows:

1. Secondary of 3rd I. F. Trans. (Capacitor C-18).
2. Primary of 3rd I. F. Trans. (Capacitor C-17).
3. Secondary of 2nd I. F. Trans. (Capacitor C-16).
4. Primary of 2nd I. F. Trans. (Capacitor C-15).
5. Secondary of 1st I. F. Trans. (Capacitor C-14).
6. Primary of 1st I. F. Trans. (Capacitor C-13).

Radio Frequency Adjustments

The alignment of the radio frequency circuits for the various ranges in this receiver should be very carefully made in the order and at the frequencies specified.

It will be noted that no instructions are given for aligning the receiver at other than two frequencies for any range. Each receiver is given an exacting check for "tracking" at various frequencies in each range before leaving the factory. It is felt by the manufacturers that should any receiver through accident require a check on the "tracking", it should be returned to the factory, where this may be easily and accurately done.

Alignment of Long-Wave-Weather Range (Also Referred to as "X" Band) Circuits

1. Oscillator's "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-12).
2. R. F. Interstage "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-8).
3. Antenna "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-4).
4. Oscillator "X" Band Series Aligning Capacitor at 150 Kilocycles (Capacitor Item 133). When operation No. 4 has been completed repeat operations 1, 2, and 3 again and in the exact order given.

Alignment of Standard Broadcast Range (Also Referred to as "A" Band) Circuits

1. Oscillator's "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-11).
2. R. F. Interstage "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-7).
3. Antenna "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-3).
4. "A" Band, R. F. Bi-resonator Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-19).
5. Oscillator "A" Band Series Aligning Capacitor at 600Kilocycles (Capacitor with screw adjustment. Item 200). When operation No. 5 has been completed repeat operations 1, 2, 3, and 4 again and in the exact order given.

Alignment of Amateur, Police, and Aircraft Range (Also Referred to as "B" Band) Circuits

1. Oscillator's "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-10).
2. R. F. Interstage "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-6).
3. Antenna "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-2).
4. Oscillator "B" Band Series Aligning Capacitor at 1.8 Megacycles (Capacitor with nut adjustment. Item 200). When operation No. 4 has been completed repeat operations 1, 2, and 3 again and in the exact order given.

Alignment of Short-Wave-Foreign Range (Also Referred to as "C" Band) Circuits

1. Oscillator's "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-9).
2. R. F. Interstage "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-5).
3. Antenna "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-1).

Alignment of Ultra Short-Wave Range (Also Referred to as "D" Band) Circuits

1. The only adjustment which it is necessary to make for bringing the "D" Band Oscillator's circuit into alignment is accomplished by bending the ground loop (shown in Figure 1 as "D" Band Oscillator Circuit Adjustment) either closer to the coil or farther away from the coil. This adjustment should be made with the signal generator set to a frequency of 20 megacycles.
2. The only adjustment which it is necessary to make for bringing the "D" Band Antenna's Circuit into alignment is accomplished by bending the grid lead loop (shown in Figure 1 as "D" Band Antenna Circuit Adjustment) so as to form either a smaller or larger loop. This adjustment should also be made with the signal generator set to a frequency of 20 megacycles.

Adjustment of 10 Kilocycle Audio Cut-Off Filter

The adjustment of this filter is correctly made at the factory and no additional adjustment is required.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1 shows the terminal layouts of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

			TERMINALS OF SOCKETS								*Heater Voltages Between Heater Terminals*	
TUBE	*CIRCUIT*	*CAP*	1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6K7	R. F. Amp.	0	0	0	+230	+82	+5.2	—	*6.2*	+5.2	2-7	*6.2*
6A8	Modulator	0	0	0	+230	+82	—40	+80	*6.2*	0	2-7	*6.2*
6J7	Oscillator	—75	0	0	+225	+125	0	0	*6.2*	0	2-7	*6.2*
6K7	1st I. F. Amp.	0	0	0	+230	+76	+5.3	+3	*6.2*	+5.3	2-7	*6.2*
6K7	2nd I. F. Amp.	0	0	0	+230	+76	+5.2	+2.2	*6.2*	+5.2	2-7	*6.2*
6H6	Demodulator	—	0	0	—.25	0	—.25	+3	*6.2*	0	2-7	*6.2*
6H6	A. V. C.	—	0	0	0	+5	0	0	*6.2*	+5	2-7	*6.2*
6J7	Auto. Tone Cont.	0	0	0	+40*	+20	+2.3	0	*6.2*	+2.3	2-7	*6.2*
6K7	1st Audio Amp.	0	0	0	+170*	+15*	+0.6	+78	*6.2*	+0.6	2-7	*6.2*
6F6	2nd Audio Amp.	—	0	0	+235	+235	0	—	*6.2*	+19	2-7	*6.2*
6L6's	Audio Output	—	0	0	+400	+250	0	0	*6.2*	+20	2-7	*6.2*
6E5	Tuning Ind.	—	*6.2*	+10*	+5	+230	+4.8	0			1-6	*6.2*
5Z3	Rectifier	—	+410	*400*	*400*	+410					1-4	*4.8*

Voltage across vernier dial pilot lamp 5.3 volts. Receiver tuned to 1000 Kc., no signal.
A. C. voltages are indicated by italics.

Item Number	Piece Number	Part
1	26687	Power Transformer (50 to 60 Cycles Chassis)
1	26686	Power Transformer (25 to 60 Cycles Chassis)
2	24268	Cord (Power Supply)
3	23234	Fuse, 2½ Amperes
7	21535	Capacitor Assembly (2—.01 Mf. Capacitors)
8	26061	Switch ("Off-On" and Bass Control)
9	26704	Choke Assembly (Filter of Rectifier)
10	25788	Electrolytic Capacitor, 1 Mf., 450 Volts
11	22757	Electrolytic Capacitor, 8Mf., 500 Volts (50 to 60 Cycles Chassis)
11	26510	Electrolytic Capacitor, 16 Mf., 500 Volts (25 to 60 Cycles Chassis)
12	22757	Electrolytic Capacitor, 8 Mf., 500 Volts (50 to 60 Cycles Chassis)
12	26510	Electrolytic Capacitor, 16 Mf., 500 Volts (25 to 60 Cycles Chassis)
13	25498	Electrolytic Capacitor, (2—10 Mf.) 25 Volts
14	26773	Electrolytic Capacitor, 16 Mf., 350 Volts
15	26772	Electrolytic Capacitor, 12 Mf., 35 Volts
16	24580	Electrolytic Capacitor, 4 Mf., 450 Volts
17	26693	Electrolytic Capacitor, 4 Mf., 350 Volts
18	26693	Electrolytic Capacitor, 4 Mf., 350 Volts
19	26737	Resistor, "B" Voltage Divider
22	26746	Range Switch Assembly
23	26444	Gang Tuning Capacitor Assembly
24	26446	Coil Assembly, Antenna ("A", "B" and "C" Ranges)
25	26447	Coil Assembly, R. F. ("A", "B" and "C" Ranges)
26	26448	Coil Assembly, Oscillator ("A", "B" and "C" Ranges)
27	26507	Coil Assembly, Antenna ("X" Range)
28	26508	Coil Assembly, R. F. ("X" Range)
29	26509	Coil Assembly, Oscillator ("X" Range)
30	26756	Coil Assembly, Antenna ("D" Range)
31	26765	Oscillator Secondary Coil ("D" Range)
32	26787	Oscillator Primary Coil ("D" Range)
33	24405	Capacitor Assembly, .04 Mf.
34	24405	Capacitor Assembly, .04 Mf.
35	24994	Capacitor Assembly, .05 Mf.
36	24637	Capacitor, Type "W", .0017 Mf.
37	24637	Capacitor, Type "W", .0017 Mf.
38	26513	Capacitor (2—300 Mmf.)
39	24559	Capacitor, Type "O", 100 Mmf.
40	26944	Capacitor, Type "W", .004 Mf.
41	26321	Resistor, Type "F", 100 Ohms
42	26321	Resistor, Type "E", 100 Ohms
43	26333	Resistor, Type "E", 1000 Ohms
44	26355	Resistor, Type "E", 47,000 Ohms
45	26357	Resistor, Type "E", .1 Megohm
46	26357	Resistor, Type "E", .1 Megohm
47	26357	Resistor, Type "E", .1 Megohm
48	26474	Coil Assembly (Bi-Resonator)
49	26481	1st I. F. Transformer
50	26482	2nd I. F. Transformer
51	26243	3rd I. F. Transformer
52	26077	Potentiometer (Volume Control)
53	26706	Transformer Assembly, Audio Input
54	26706	Transformer Assembly, Audio Output
55	22988	Socket, 4 Prong
56	23517	Socket, 5 Prong
57	25539	Socket, 8 Prong
58	26324	Resistor, Type "E", 180 Ohms
59	26326	Resistor, Type "E", 270 Ohms
60	26328	Resistor, Type "E", 390 Ohms
61	26328	Resistor, Type "E", 390 Ohms
62	26330	Resistor, Type "E", 560 Ohms
63	26330	Resistor, Type "E", 560 Ohms
64	26330	Resistor, Type "E", 560 Ohms
65	26333	Resistor, Type "E", 1000 Ohms
66	26338	Resistor, Type "E", 2700 Ohms
67	26333	Resistor, Type "E", 1000 Ohms
68	26333	Resistor, Type "E", 1000 Ohms
69	26331	Resistor, Type "E", 680 Ohms
70	26341	Resistor, Type "E", 4700 Ohms
71	26345	Resistor, Type "E", 10,000 Ohms
72	26345	Resistor, Type "E", 10,000 Ohms
73	26345	Resistor, Type "E", 10,000 Ohms
74	26349	Resistor, Type "E", 22,000 Ohms
75	26350	Resistor, Type "E", 27,000 Ohms
76	26353	Resistor, Type "E", 47,000 Ohms
77	26356	Resistor, Type "E", 82,000 Ohms
78	26353	Resistor, Type "E", 47,000 Ohms
79	26357	Resistor, Type "E", .1 Megohm
80	26357	Resistor, Type "E", .1 Megohm
81	26357	Resistor, Type "E", .1 Megohm
82	26362	Resistor, Type "E", .27 Megohm
83	26365	Resistor, Type "E", .47 Megohm
84	26365	Resistor, Type "E", .47 Megohm
85	26369	Resistor, Type "E", 1 Megohm
86	26369	Resistor, Type "E", 1 Megohm
87	26369	Resistor, Type "E", 1 Megohm
88	26369	Resistor, Type "E", 1 Megohm
89	26369	Resistor, Type "E", 1 Megohm
90	26776	Resistor, Type "F", 12,000 Ohms
91	25526	Resistor, Type "F", 15,000 Ohms
92	26775	Resistor, Type "F", 20,000 Ohms
93	26775	Resistor, Type "F", 20,000 Ohms
94	26780	Resistor, Flexible, 3.5 Ohms (Pilot Lamp)
95	25487	Capacitor, Type "W", .001 Mf.
96	24560	Capacitor, Type "O", 50 Mmf.
97	24560	Capacitor, Type "O", 50 Mmf.
98	26513	Capacitor, Type "W", 2—100 Mmf.
99	26512	Capacitor, Type "W", 2—100 Mmf.
100	24559	Capacitor, Type "O", 100 Mmf.
101	25585	Capacitor, Type 3L, .008 Mf.
102	26932	Capacitor Assembly, .006 Mf.
103	24461	Capacitor, Type "J", .004 Mf.
104	24402	Capacitor Assembly, .1 Mf.
105	24402	Capacitor Assembly, .1 Mf.
106	24402	Capacitor Assembly, .1 Mf.
107	24402	Capacitor Assembly, .1 Mf.
108	24402	Capacitor Assembly, .1 Mf.
109	24405	Capacitor Assembly, .04 Mf.
110	24405	Capacitor Assembly, .04 Mf.
111	24405	Capacitor Assembly, .04 Mf.
112	24405	Capacitor Assembly, .04 Mf.
113	24405	Capacitor Assembly, .04 Mf.
114	24405	Capacitor Assembly, .04 Mf.
115	24405	Capacitor Assembly, .04 Mf.
116	25149	Capacitor Assembly, .01 Mf.
117	25149	Capacitor Assembly, .01 Mf.
118	24994	Capacitor Assembly, .05 Mf.
119	24994	Capacitor Assembly, .05 Mf.
120	24994	Capacitor Assembly, .05 Mf.
121	24994	Capacitor Assembly, .05 Mf.
122	24994	Capacitor Assembly, .05 Mf.
132	26568	Adjustable Capacitor (High Frequency Cut-Off Filter)
133	26569	Capacitor (Oscillator Series Aligner, "X" Range)
134	26485	Potentiometer and Bracket Assembly (Tone Control and High Fidelity)
137	26515	Coil Assembly (High Frequency Cut-Off Filter)
138	26497	Cable Assembly, Tri-Focal Indicator
139	25814	Choke Assembly, 5 Millihenrys
140	26519	Drive Disc Assembly
141	26570	Dial Bracket Assembly
142	26534	Bar. Assembly (Pulley)
143	26211	Pulley
144	26518	Gear Assembly
145	26220	Drive Shaft Assembly
146	26520	Dial Assembly (Vernier)
147	26694	Dial Assembly (Main)
148	26672	Drive Cord Assembly (Volume Indicator Disc)
149	26673	Drive Cord Assembly (Fidelity Indicator Disc)
150	26683	Cord Assembly (Dial Elevator)
151	26226	Spring
152	26555	Volume Indicator Disc Assembly
153	26698	Fidelity Indicator Disc Assembly
154	26572	Bracket Assembly
155	26682	Reel Assembly (Range Switch)
156	26667	Reel Assembly (Tone-Fidelity Control)
157	26666	Reel Assembly (Volume Control)
160	26580	Front Dial Plate Assembly
161	26147	Lamp Socket
162	26237	Lamp Shades
163	26287	Pilot Lamp
166	26692	Lamp Socket Assembly
189	24207	Electrolytic Capacitor, 12 Mf., 25 Volts
194	24560	Capacitor, Type "O", 50 Mmf.
195	26357	Resistor, Type "E", .1 Megohm
196	26341	Resistor, Type "E", 4700 Ohms
198	26345	Resistor, Type "E", 10,000 Ohms
199	27020	Capacitor Assembly, .015 Mf.
200	26364	Capacitor Assembly, Series Aligners ("A" and "B" Ranges)

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODELS 160L-160LB-160P-160PB

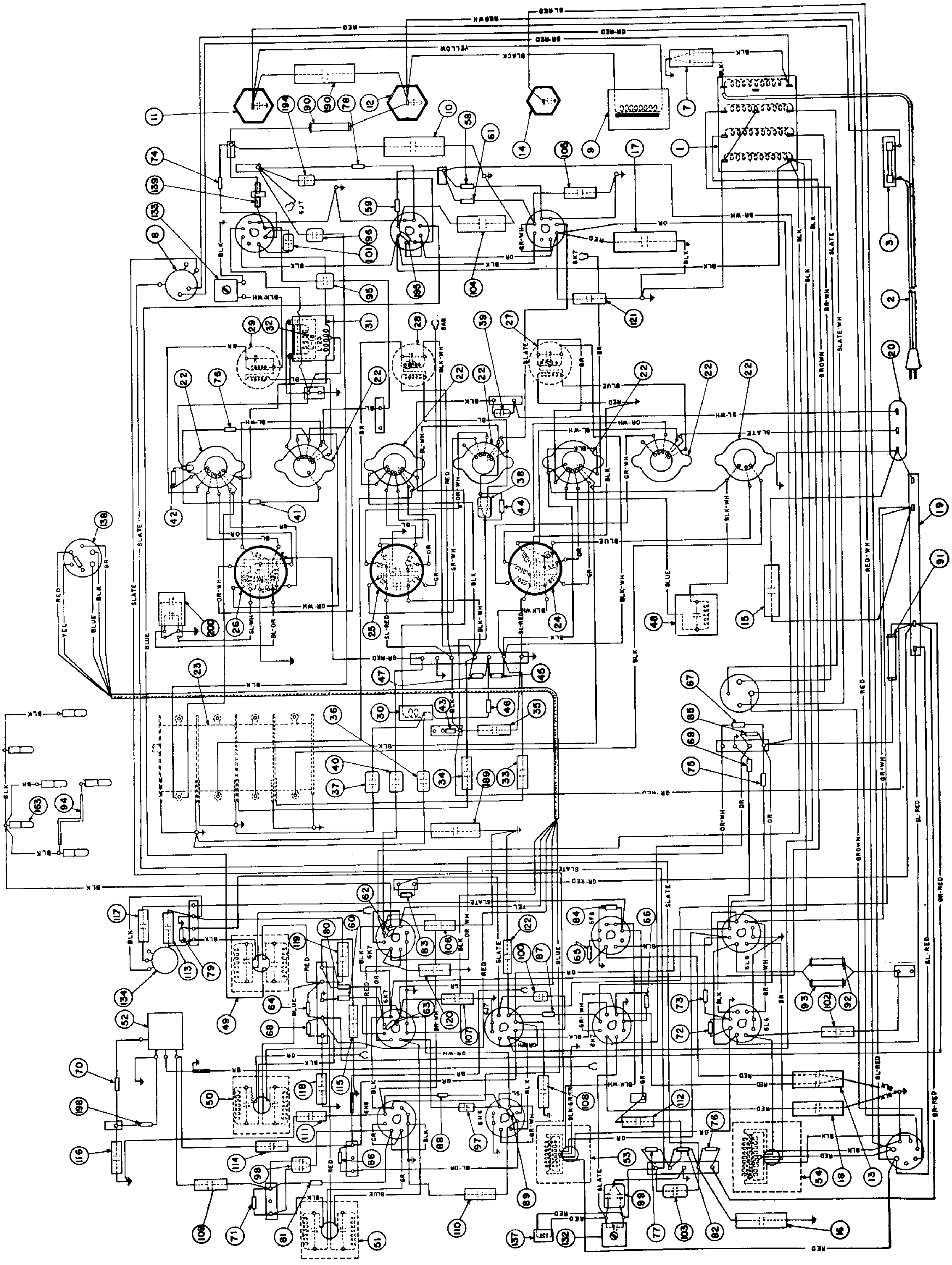


Fig. 3. Wiring Diagram of Chassis.

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODELS 180L & 180LB

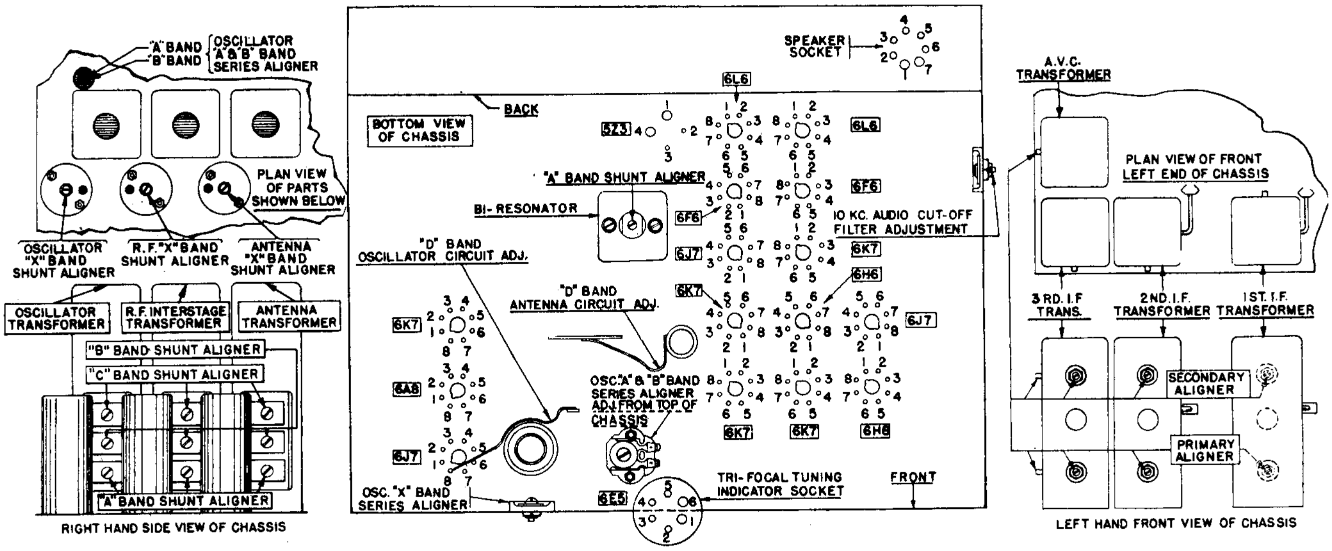


Fig. 2. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

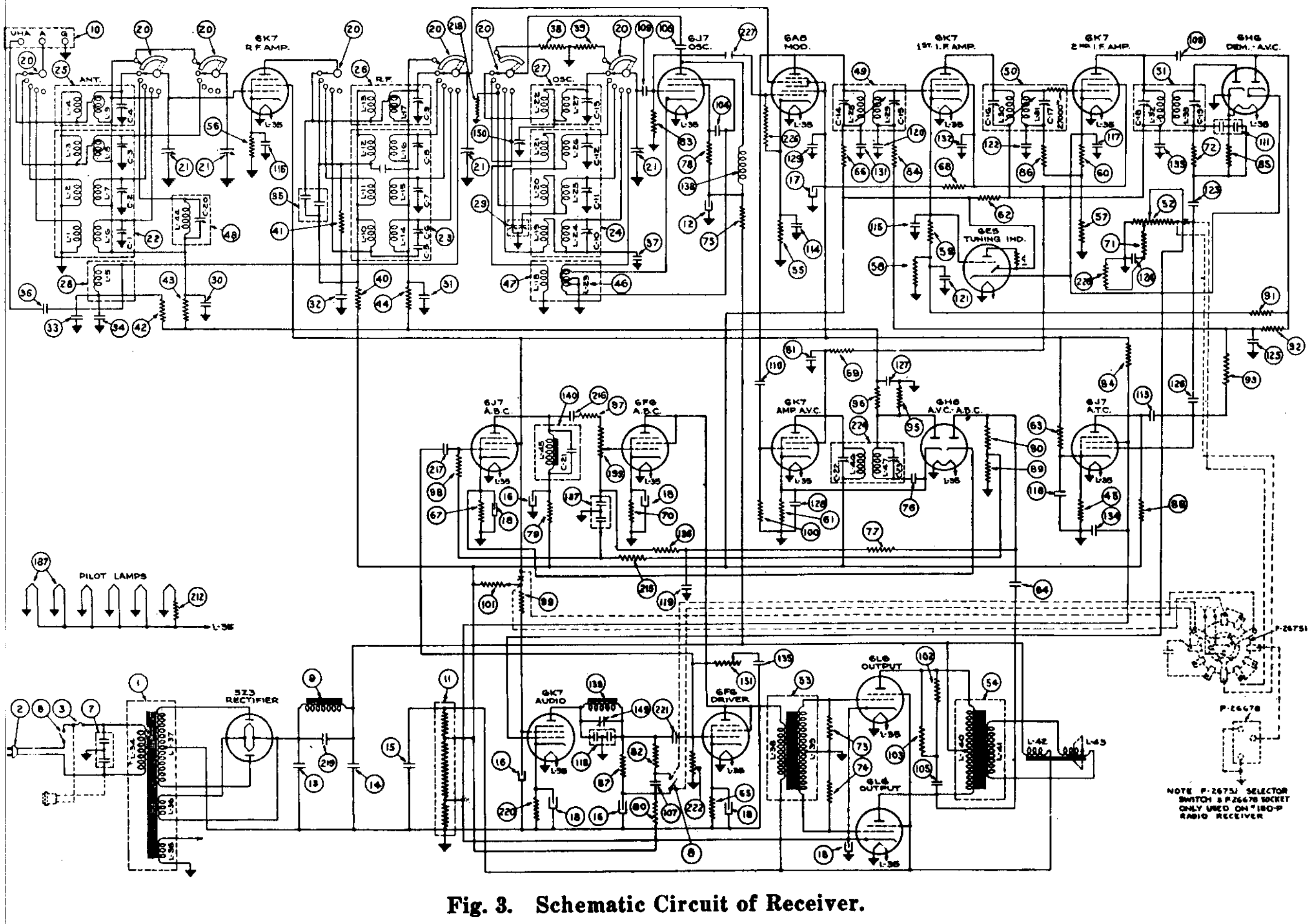


Fig. 3. Schematic Circuit of Receiver.

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODELS 180L & 180LB

Intermediate Frequency Amplifier Adjustments

Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed.

Operate the range switch of the receiver to the "A" range position. Set the tuning dial at its extreme low frequency position, and operate the "Tone-Fidelity" control knob so that the receiver is adjusted for the standard fidelity position as indicated by the fidelity indicator located on the front panel of the receiver. **Never attempt to align the I. F. circuits of this receiver with the "Tone-Fidelity" control set at any position other than the standard fidelity.** The I. F. circuits may then be checked for alignment by adjusting the aligning capacitors in the exact order as follows:

1. Secondary of 3rd I. F. Trans. (Capacitor C-19).
2. Primary of 3rd I. F. Trans. (Capacitor C-18).
3. Secondary of 2nd I. F. Trans. (Capacitor C-17).
4. Primary of 2nd I. F. Trans. (Capacitor C-16).
5. Secondary of 1st I. F. Trans. (Capacitor C-15).
6. Primary of 1st I. F. Trans. (Capacitor C-14).

Radio Frequency Adjustments

The alignment of the radio frequency circuits for the various ranges in this receiver should be very carefully made in the order and at the frequencies specified.

It will be noted that no instructions are given for aligning the receiver at other than two frequencies for any range. Each receiver is given an exacting check for "tracking" at various frequencies in each range before leaving the factory. It is felt by the manufacturers that should any receiver through accident require a check on the "tracking", it should be returned to the factory, where this may be easily and accurately done.

Alignment of Long-Wave-Weather Range (Also Referred to as "X" Band) Circuits

1. Oscillator's "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-13).
2. R. F. Interstage "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-9).
3. Antenna "X" Band Shunt Aligning Capacitor at 350 Kilocycles (Capacitor C-4).
4. Oscillator "X" Band Series Aligning Capacitor at 150 Kilocycles (Capacitor Item 150). When operation No. 4 has been completed repeat operations 1, 2, and 3 again and in the exact order given.

Alignment of Standard Broadcast Range (Also Referred to as "A" Band) Circuits

1. Oscillator's "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-12).
2. R. F. Interstage "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-8).
3. Antenna "A" Band Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-3).
4. "A" Band, R. F. Bi-resonator Shunt Aligning Capacitor at 1500 Kilocycles (Capacitor C-20).
5. Oscillator "A" Band Series Aligning Capacitor at 600 Kilocycles (Capacitor with screw adjustment. Item 29). When operation No. 5 has been completed repeat operations 1, 2, 3, and 4 again and in the exact order given.

Alignment of Amateur, Police, and Aircraft Range (Also Referred to as "B" Band) Circuits

1. Oscillator's "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-11).
2. R. F. Interstage "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-7).
3. Antenna "B" Band Shunt Aligning Capacitor at 5 Megacycles (Capacitor C-2).
4. Oscillator "B" Band Series Aligning Capacitor at 1.8 Megacycles (Capacitor with nut adjustment. Item 29). When operation No. 4 has been completed repeat operations 1, 2, and 3 again and in the exact order given.

Alignment of Short-Wave-Foreign Range (Also Referred to as "C" Band) Circuits

1. Oscillator's "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-10).
2. R. F. Interstage "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-6).
3. Antenna "C" Band Shunt Aligning Capacitor at 16 Megacycles (Capacitor C-1).

Alignment of Ultra Short-Wave Range (Also Referred to as "D" Band) Circuits

1. The only adjustment which it is necessary to make for bringing the "D" Band Oscillator's circuit into alignment is accomplished by bending the ground loop (shown in Figure 2 as "D" Band Oscillator Circuit Adjustment) either closer to the coil or farther away from the coil. This adjustment should be made with the signal generator set to a frequency of 20 megacycles.
2. The only adjustment which it is necessary to make for bringing the "D" Band Antenna's Circuit into alignment is accomplished by bending the grid lead loop (shown in Figure 2 as "D" Band Antenna Circuit Adjustment) so as to form either a smaller or larger loop. This adjustment should also be made with the signal generator set to a frequency of 20 megacycles.

Alignment of the Amplified Automatic Volume Control Circuit

The alignment adjustments for this circuit should only be made after the circuits of the intermediate and radio frequency amplifiers have been aligned. Never align the amplified automatic volume control circuits until the intermediate and radio frequency circuits have been aligned. In making the alignment adjustment of this circuit, a strong signal, preferably obtained from a standard signal generator, should be tuned in on the receiver. The strength of this signal should be on the order of approximately 2000 microvolts. When this signal is accurately tuned in, the aligning capacitor C-23 and C-22 should be adjusted to the position where a minimum value of signal is obtained from the output of the receiver. These two adjustments should be made in the order given.

			Terminals of Sockets								*Heater Voltages Between Heater Terminals*	
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6K7	R. F. Amp.	0	0	0	+237	+96	+2.7	—	*6.2*	+2.7	2-7	*6.2*
6A8	Modulator	0	0	0	+242	+96	—42	+1.6	*6.2*	+1.6	2-7	*6.2*
6J7	Oscillator	—73	0	0	+212	+120	0	0	*6.2*	0	2-7	*6.2*
6K7	1st I. F. Amp.	0	0	0	+240	+90	+6.5	+4	*6.2*	+6.5	2-7	*6.2*
6K7	2nd I. F. Amp.	0	0	0	+237	+90	+5.5	+2.1	*6.2*	+5.5	2-7	*6.2*
6H6	Dem.—A. V. C.	—	0	0	0	0	0	0	*6.2*	+5.5	2-7	*6.2*
6H6	Amp. A. V. C. and Auto. Bass Control	—	0	0	0	+2.6	0	0	*6.2*	+2.8	2-7	*6.2*
6K7	Amp. A. V. C.	0	0	0	+242	+88	+2.8	+90	*6.2*	+2.8	2-7	*6.2*
6J7	Auto. Bass Control	0	0	0	+93	+93	+2.6	0	*6.2*	+2.6	2-7	*6.2*
6J7	Auto Tone Control	0	0	0	+65*	+15*	+2.3	0	*6.2*	+2.3	2-7	*6.2*
6F6	Auto Bass Control	—	0	0	+235	+235	0	—	*6.2*	+19	2-7	*6.2*
6K7	1st Audio Amp.	0	0	0	+130	+15*	+.7	—	*6.2*	+.7	2-7	*6.2*
6F6	Audio Driver	—	0	0	+232	+232	0	0	*6.2*	+22	2-7	*6.2*
6L6's	Audio Output	—	0	0	+405	+255	0	0	*6.2*	+21	2-7	*6.2*
6E5	Tuning Ind.	—	*6.2*	+.6	+6.5	+242	+5.5	0	—	—	1-6	*6.2*
5Z3	Rectifier	—	+415	*400*	*400*	+415	—	—	—	—	1-4	*4.7*
Speaker		—	+405	0	0	+415	+415	0	+255			

Voltage across vernier dial pilot lamp—*5.3 volts.*
Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.

Item Number	Piece Number	Part
1	26782	Power Transformer (50 to 60 Cycles Chassis)
1	26783	Power Transformer (25 to 60 Cycles Chassis)
3	23234	Fuse, 2¼ Amperes
4	21084	Fuse Block Assembly
7	21535	Capacitor Assembly (2—.01 Mf. Capacitors)
8	26061	Switch ("Off-On" and Bass Control)
9	26704	Choke Assembly (Filter of Rectifier)
11	26792	Resistor, "B" Voltage Divider
12	25788	Electrolytic Capacitor, 1 Mf., 450 Volts
13	22757	Electrolytic Capacitor, 8 Mf., 500 Volts (50 to 60 Cycles Chassis)
13	26510	Electrolytic Capacitor, 16 Mf., 500 Volts (25 to 60 Cycles Chassis)
14	22757	Electrolytic Capacitor, 8 Mf., 500 Volts (50 to 60 Cycles Chassis)
14	26510	Electrolytic Capacitor, 16 Mf., 500 Volts (25 to 60 Cycles Chassis)
15	26773	Electrolytic Capacitor, 16 Mf., 350 Volts
16	22759	Capacitor Assembly, (3—4 Mf.)
17	26693	Electrolytic Capacitor, 4 Mf., 350 Volts
18	26797	Capacitor Assembly, 2—12 Mf., 2—10 Mf. 1—30 Mf.
20	26746	Range Switch Assembly
21	26444	Gang Tuning Capacitor Assembly
22	26446	Coil Assembly, Antenna ("A", "B" and "C" Ranges)
23	26447	Coil Assembly, R. F. ("A", "B", and "C" Ranges)
24	26448	Coil Assembly, Oscillator ("A", "B" and "C" Ranges)
25	26507	Coil Assembly, Antenna ("X" Range)
26	26508	Coil Assembly, R. F. ("X" Range)
27	26509	Coil Assembly, Oscillator ("X" Range)
28	26758	Coil Assembly, Antenna ("D" Range)
29	26564	Capacitor Assembly, Series Aligners ("A" and "B" Ranges)
30	24405	Capacitor Assembly, .04 Mf.
31	24405	Capacitor Assembly, .04 Mf.
32	24094	Capacitor Assembly, .05 Mf.
33	24637	Capacitor, Type "W", .0017 Mf.
34	24637	Capacitor, Type "W", .0017 Mf.
35	26513	Capacitor Assembly, (2—200 Mmf.)
36	24559	Capacitor, Type "O", 100 Mmf.
37	26944	Capacitor, Type "W", .004 Mf.
38	26321	Resistor, Type "E", 100 Ohms
39	26321	Resistor, Type "E", 100 Ohms
40	26333	Resistor, Type "E", 1000 Ohms
41	26353	Resistor, Type "E", 47,000 Ohms
42	26357	Resistor, Type "E", .1 Megohm
43	26357	Resistor, Type "E", .1 Megohm
44	26357	Resistor, Type "E", .1 Megohm
45	26331	Resistor, Type "E", 680 Ohms
46	26765	Oscillator Secondary Coil ("D" Range)
47	26787	Oscillator Primary Coil ("D" Range)
48	26474	Coil Assembly (Bi-Resonator)
49	26481	1st I. F. Transformer
50	26482	2nd I. F. Transformer
51	26243	3rd I. F. Transformer
52	26077	Potentiometer (Volume Control)
53	26706	Transformer Assembly, Audio Input
54	26706	Transformer Assembly, Audio Output
55	26326	Resistor, Type "E", 270 Ohms
56	26328	Resistor, Type "E", 390 Ohms
57	26328	Resistor, Type "E", 390 Ohms
58	26332	Resistor, Type "E", 820 Ohms
59	26330	Resistor, Type "E", 560 Ohms
60	26330	Resistor, Type "E", 560 Ohms
61	26330	Resistor, Type "E", 560 Ohms
62	26330	Resistor, Type "E", 560 Ohms
63	21593	Resistor, Type "C", 30,000 Ohms
64	26932	Capacitor Assembly, .006 Mf.
65	26332	Resistor, Type "E", 820 Ohms
66	26333	Resistor, Type "E", 1000 Ohms
67	26333	Resistor, Type "E", 1000 Ohms
68	26333	Resistor, Type "E", 1000 Ohms
69	26333	Resistor, Type "E", 1000 Ohms
70	26337	Resistor, Type "E", 2200 Ohms
71	26341	Resistor, Type "E", 4700 Ohms
72	26345	Resistor, Type "E", 10,000 Ohms
73	26345	Resistor, Type "E", 10,000 Ohms
74	26345	Resistor, Type "E", 10,000 Ohms
75	26776	Resistor, Type "F", 12,000 Ohms
76	25150	Capacitor, .02 Mf.
77	26365	Resistor, Type "E", 470,000 Ohms
78	26349	Resistor, Type "E", 22,000 Ohms
79	26353	Resistor, Type "E", 47,000 Ohms
80	26353	Resistor, Type "E", 47,000 Ohms
81	24994	Capacitor Assembly, .05 Mf.
82	26356	Resistor, Type "E", 82,000 Ohms
83	26353	Resistor, Type "E", 47,000 Ohms
84	26357	Resistor, Type "E", .1 Megohm
85	26357	Resistor, Type "E", .1 Megohm
86	26357	Resistor, Type "E", .1 Megohm
87	26362	Resistor, Type "E", .27 Megohm
88	26365	Resistor, Type "E", .47 Megohm
89	26365	Resistor, Type "E", .47 Megohm
90	26365	Resistor, Type "E", .47 Megohm
91	26369	Resistor, Type "E", 1 Megohm
92	26369	Resistor, Type "E", 1 Megohm
93	26369	Resistor, Type "E", 1 Megohm
94	26369	Resistor, Type "E", 1 Megohm
95	26369	Resistor, Type "E", 1 Megohm
96	26369	Resistor, Type "E", 1 Megohm
97	26369	Resistor, Type "E", 1 Megohm
98	26369	Resistor, Type "E", 1 Megohm
99	26369	Resistor, Type "E", 1 Megohm
100	26373	Resistor, Type "E", 2.2 Megohm
101	26062	Resistor, Type "F", 10,000 Ohms
102	26775	Resistor, Type "F", 20,000 Ohms
103	26775	Resistor, Type "F", 20,000 Ohms
104	25535	Capacitor, Type 3L, .008 Mf.
105	26932	Capacitor Assembly, .006 Mf.
106	25487	Capacitor, Type "W", .001 Mf.
107	25487	Capacitor, Type "W", .001 Mf.
108	24560	Capacitor, Type "O", 50 Mmf.
109	24560	Capacitor, Type "O", 50 Mmf.
110	24560	Capacitor, Type "O", 50 Mmf.
111	26512	Capacitor, Type "W", 2—100 Mmf.
112	26512	Capacitor, Type "W", 2—100 Mmf.
113	24559	Capacitor, Type "O", 100 Mmf.
114	24402	Capacitor Assembly, .1 Mf.
115	24402	Capacitor Assembly, .1 Mf.
116	24402	Capacitor Assembly, .1 Mf.
117	24402	Capacitor Assembly, .1 Mf.
118	24402	Capacitor Assembly, .1 Mf.
119	24402	Capacitor Assembly, .1 Mf.
120	24405	Capacitor Assembly, .04 Mf.
121	24405	Capacitor Assembly, .04 Mf.
122	24405	Capacitor Assembly, .04 Mf.
123	24405	Capacitor Assembly, .04 Mf.
124	24405	Capacitor Assembly, .04 Mf.
125	24405	Capacitor Assembly, .04 Mf.
126	24405	Capacitor Assembly, .04 Mf.
127	24405	Capacitor Assembly, .04 Mf.
128	24405	Capacitor Assembly, .04 Mf.
129	24994	Capacitor Assembly, .05 Mf.
131	24994	Capacitor Assembly, .05 Mf.
132	24994	Capacitor Assembly, .05 Mf.
133	24994	Capacitor Assembly, .05 Mf.
134	24994	Capacitor Assembly, .05 Mf.
135	25149	Capacitor Assembly, .01 Mf.
136	26365	Resistor, Type "E", 470,000 Ohms
137	23101	Capacitor Assembly, 2—.5 Mf.
138	25814	Choke Assembly, 5 Millihenrys
139	26515	Coil Assembly (High Frequency Cut-Off Filter)
140	26794	Filter Assembly (Auto. Bass Control)
149	26568	Adjustable Capacitor (High Frequency Cut-Off Filter)
150	26569	Capacitor (Oscillator Series Aligner, "X" Range)
151	26485	Potentiometer and Bracket Assembly (Tone Control and High Fidelity)
154	26497	Cable Assembly, Tri-Focal Tuning Indicator
155	22963	Socket, 4 Prong
156	23517	Socket, 5 Prong
157	25539	Socket, 8 Prong
164	26519	Drive Disc Assembly
165	26570	Dial Bracket Assembly
167	26211	Pulley
168	26518	Gear Assembly
169	26220	Drive Shaft Assembly
170	26520	Dial Assembly (Vernier)
171	26694	Dial Assembly (Main)
172	26672	Drive Cord Assembly (Volume Indicator Disc)
173	26673	Drive Cord Assembly (Fidelity Indicator Disc)
174	26683	Cord Assembly (Dial Elevator)

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODELS 180L & 180LB

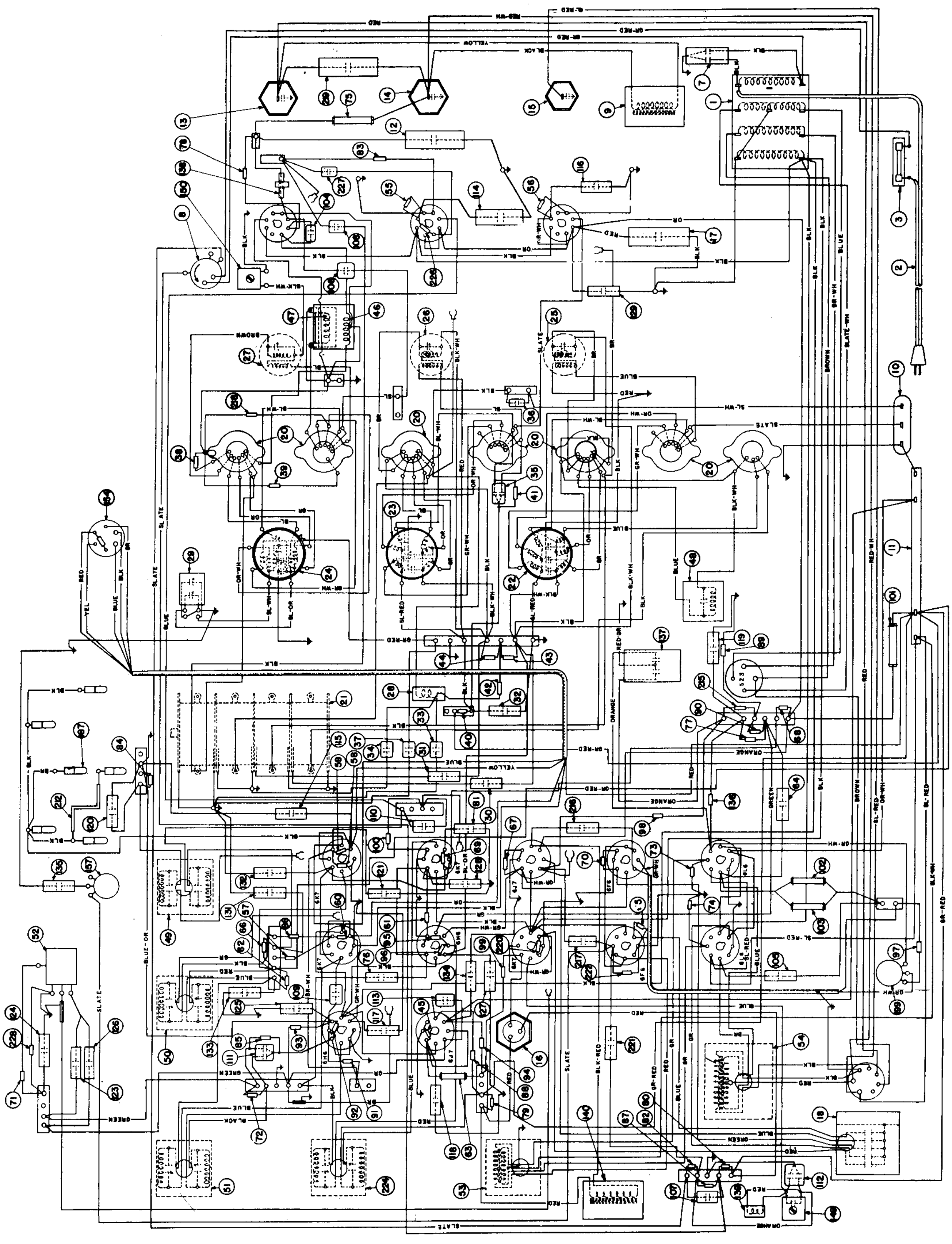
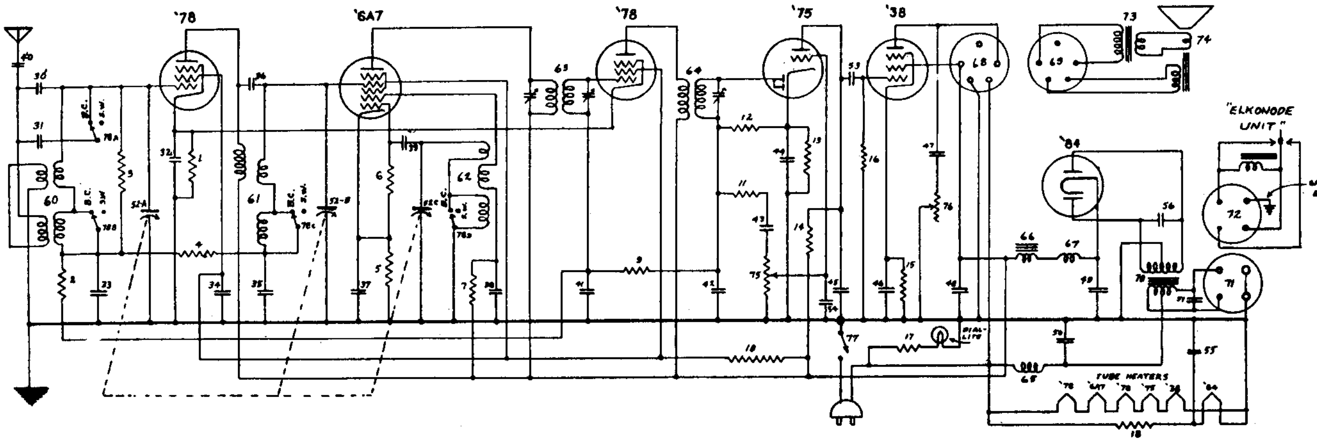


Fig. 4. Wiring Diagram of Chassis.

L. TATRO PRODUCTS CORP.

MODELS C625 & D625



ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.	ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.	ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.
1	2L-17A	800 ohms 1/2 watt		30		Part of item 60		56	3L-42H	.006 mfd 1600 v.	
2	2L-49	250M ohms 1/4 watt		31	5L-1	.00005 mfd mica		57			
3	2L-44	100M ohms 1/4 watt		32	3L-18	.10 mfd 400 v.		58			
4	2L-49	250M ohms 1/4 watt		33	3L-17	.05 mfd 400 v.		59			
5	2L-13	400 ohms 1/4 watt		34	3L-18	.10 mfd 400 v.		60	8L-5	Antenna coil	
6	2L-37	50M ohms 1/4 watt		35	3L-17	.05 mfd 400 v.		61	8L-6	Interstage coil	
7	2L-31	20M ohms 1/4 watt		36		Part of item 61		62	8L-7	Oscillator coil	
8				37	3L-18	.10 mfd 400 v.		63	8L-8	1st IF trans. 175 KC.	
9	2L-49	250M ohms 1/4 watt		38	3L-18	.10 mfd 400 v.		64	8L-9	2nd IF trans. 175 KC.	
10	2L-35	35M ohms 1/4 watt		39	5L-2	.0001 mfd mica		65	8L-4	RF choke	
11	2L-44	100M ohms 1/4 watt		40	3L-16	.02 mfd 400 v.		66	9L-11	AF choke	
12	2L-49	250M ohms 1/4 watt		41	3L-17	.05 mfd 400 v.		67	8L-10	RF choke (universal)	
13	2L-24	5000 ohms 1/4 watt		42	3L-23	.0005 mfd 600 v.		68	13L-6	5 P. spkr socket	
14	2L-53	500M ohms 1/4 watt		43	3L-16	.02 mfd 400 v.		69		speaker plug	
15	2L-19A	1500 ohms 1/2 watt		44	4L-5	10 mfd 6v. electr.		70	9L-2	power transformer	
16	2L-57	1 Megohm 1/4 watt		45	3L-23	.0005 mfd 600 v.		71	13L-1	4 P. Elkonode socket	
17	1L-13V	200 ohms 10 watt		46	4L-11	10 mfd 25 v.		72	15L-2	Elkonode type 51.	
18	1L-90	50 ohms 20 watt		47	3L-17	.05 mfd 400 v.		73		Out. trans. with item 74	
19				48	4L-3	8 mfd 450 v. electr.		74	18L-4	Dynamic speaker .	
20				49	4L-3	8 mfd 450 v. electr.		75	10L-1	volume control	
21				50	3L-50	1 mfd s 200 v.		76	10L-11	tone control	
22				51	3L-9H	.25 mfd 200 v.		77		switch with item 75.	
23				52	7L-2	3 gang variable cond.		78	16L-1	CCT Selector sw. 4PDT.	
24				53	3L-17	.05 mfd 400 v.		79			
25				54	3L-23	.0005 mfd 600 v.		80			
26				55	3L-18	.10 mfd 400 v.		81			

I. F.
177.5
K. C.

L. TATRO PRODUCTS CORPORATION
DECORAH IOWA
MODEL C & D CIRCUIT DIAGRAM
DRAWN BY J.E.B.
CHECKED BY C.A.H.
APPROVED BY C.A.H. 12-10-34
DRAWING Nº 3A4

Note: The circuit selector switch wave range designations in the diagram above are reversed, the short wave position should be to the left, and the broadcast position to the right.

Model C & D is an efficient all electric 32 volt 6 tube superheterodyne receiver covering 2 wave ranges and requires no batteries. The thirty-two volt current from the light plant is converted by means of a vibrator, transformer, and rectifier tube to the high voltage necessary for B & C supply. The 75, two 78's, 6A7 and 38 tube filaments are connected in series. Failure of one filament in this series will therefore cause the other four tubes in the string to become inoperative. The 84 tube is fed thru a separate resistor so that failure of its filament may be located immediately.

If all the tubes light and the receiver fails to function, make sure the 'Elkonode' vibrator is operating, and check for defective tubes by substitution in a normally operating receiver. Other suspected faulty parts may also be checked by the substitution method.

Drawing Number 3A4 shows the complete circuit diagram with itemized parts list. In ordering replacement parts always use the part numbers shown to facilitate filling orders and to avoid mistakes and delay.

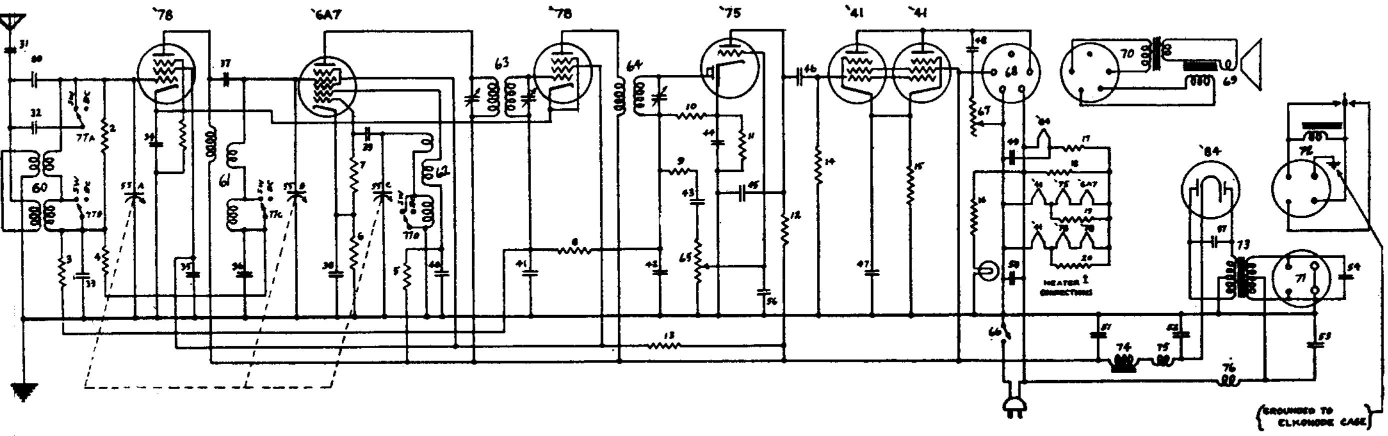
Tube socket voltage readings:

Tube	Use	(a) cathode	(b) screen	(b) plate
'78	RF ampl.	6.0 v.	88.0 v.	210 v.
'6A7	1st det.	3.0 v.	88.0 v.	210.v.
				*155 v.
'78	IF ampl.	6.0 v.	88.0 v.	210 v.
'75	2nd det.	1.05 v.	(none)	52 v.
'38	Output.	22.0 v.	210 v.	202 v.

(a) measured with a voltmeter having a resistance of 30,000 ohms.
(b) measured with a voltmeter having a resistance of 300,000 ohms.
(*) '6A7 anode grid voltage.
All measurements made from point indicated to chassis.

No adjustments are to be made to any trimmer condensers, either I.F. or R.F. without the aid of a correctly calibrated signal generator of reliable make used in conjunction with a high resistance output meter connected from plate to screen of the type 38 output tube. The normal I. F. frequency is 177.5 KC.

L. TATRO PRODUCTS CORP.
MODEL F 725



ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.	ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.	ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.
1	2L-17A	800 ohms 1/2 watt		30		part of item no. 60		59			
2	2L-44	100M ohms 1/4 watt		31	3L-16	.02 mfd 400 v.		60	8L-5	Antenna coil	
3	2L-49	250M Ohms 1/4 watt		32	5L-1	.00005 mfd mica cond.		61	8L-6	Interstage coil	
4	2L-49	250M ohms 1/4 watt		33	3L-17	.05 mfd 400 v.		62	8L-7	Oscillator coil	
5	2L-31	20M ohms 1/4 watt		34	3L-18	.10 mfd 400 v.		63	8L-8	1st IF transformer 175 KC.	
6	2L-13	400 ohms 1/4 watt		35	3L-18	.10 mfd 400 v.		64	8L-9	2nd IF transformer 175 KC.	
7	2L-37	50M ohms 1/4 watt		36	3L-17	.05 mfd 400 v.		65	10L-1	volume control	
8	2L-49	250M ohms 1/4 watt		37		part of item no. 61		66		switch with item no. 65	
9	2L-44	100M ohms 1/4 watt		38	3L-18	.10 mfd 400 v.		67	10L-11	tone control	
10	2L-49	250M ohms 1/4 watt		39	5L-2	.0001 mfd mica cond.		68	13L-6	5 prong speaker socket	
11	2L-24	5000 ohms 1/4 watt		40	3L-18	.10 mfd 400 v.		69	18L-5	Dynamic speaker	
12	2L-53	500M ohms 1/4 watt		41	3L-17	.05 mfd 400 v.		70		Out. trans & plug with #69	
13	2L-35	36M ohms 1/4 watt		42	3L-23	.0005 mfd 600 v.		71	13L-1	4 prong socket.	
14	2L-57	1 megohm 1/4 watt		43	3L-16	.02 mfd 400 v.		72	15L-2	Elkonode type 51	
15	2L-14A	450 ohms 1/2 watt		44	4L-5	10 mfd 6 v. electrolytic.		73	9L-2	Power transformer	
16	1L-13F	200 ohms 10 watt		45	3L-23	.0005 mfd 600 v.		74	9L-11	A.F. choke	
17	1L-15F	13.8 ohms 10 watt		46	3L-17	.05 mfd 400 v.		75	8L-10	R.F. choke (universal)	
18	1L-7F	44.0 ohms 10 watt		47	4L-11	10 mfd 25 v. electrolytic.		76	8L-4	R.F. choke	
19	1L-11F	125 ohms 10 watt		48	3L-17	.05 mfd 400 v.		77	16L-1	Cct. selector switch 4PDT	
20	1L-11F	125 ohms 10 watt		49	3L-18	.10 mfd 400 v.		78			
21				50	4L-14	20 mfd 40 v. N.P. electr.		79			
22				51	4L-4	16 mfd 450 v. electrolytic.		80			
23				52	4L-3	8 mfd 450 v. electrolytic.		81			
24				53	3L-50	1.0 mfd S 200 v.		82			
25				54	3L-9b	.25 mfd 200 v.		83			
26				55	7L-2	Three gang variable cond.		84			
27				56	3L-23	.0005 mfd 600 v.		85			
28				57	3L-42b	.005 mfd 1600 v.		86			
29				58				87			

I.F. 177.5 K.C.

L TATRO PRODUCTS CORPORATION DECORAH IOWA	
MODEL F CIRCUIT DIAGRAM	
DRAWN BY CHECKED BY APPROVED BY	DRAWING No 3A5

The Model F is a DeLuxe 7 tube 32 volt receiver of the superheterodyne type covering two wave ranges. It operates from a 32 volt source without the use of B or C batteries. High voltage B supply current is obtained by means of an efficient vibrator used in conjunction with a transformer and rectifier tube. There are two series filament circuits which are connected in parallel, this combination in turn being in series with the type 84 tube with appropriate series and shunt resistors. Failure of any one tube filament will cause the other tube filaments to operate at incorrect voltages, and operation of the receiver with any tube removed is not recommended.

If all the tubes light and the receiver fails to function, make sure the 'Elkonodé' vibrator is operating, and check for defective tubes by substitution in a normally operating receiver. Other suspected faulty parts may also be checked by the substitution method.

Drawing Number 3A5 shows the complete circuit diagram with itemized parts list. In ordering replacement parts always use the part numbers shown to facilitate filling orders and to avoid mistakes and delay.

Tube socket voltage readings:

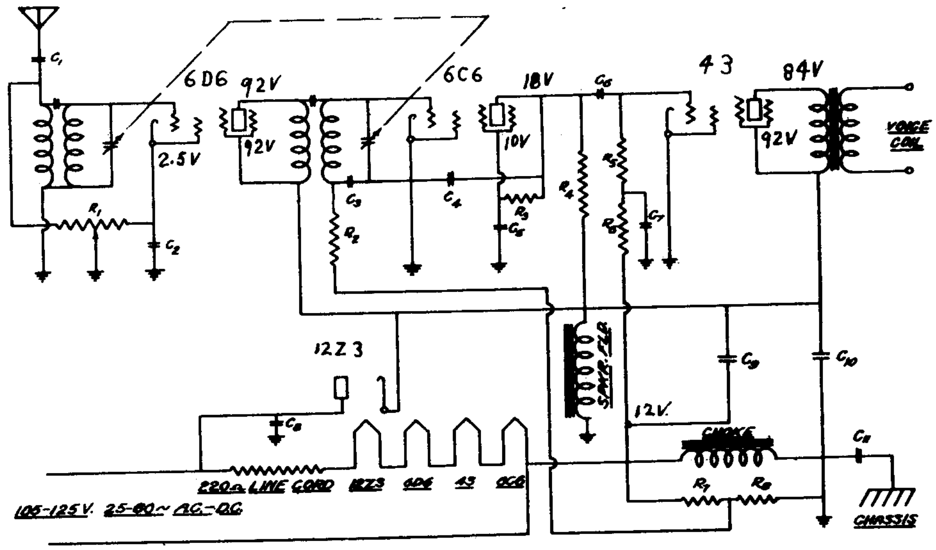
Tube	Use	(a) cathode	(b) screen	(b) plate
'78	RF ampl.	4.5 v.	73.0 v.	190 v.
'6A7	1st det.	2.5 v.	73.0 v.	190 v.
				*130 v.
'78	IF ampl.	4.5 v.	73.0 v.	190 v.
'75	2nd det.	0.9 v.	(none)	48 v.
(2) '41's	Output	16.0 v.	190 v.	187 v.

(a) measured with a voltmeter having a resistance of 30,000 ohms.
(b) measured with a voltmeter having a resistance of 300,000 ohms.
(*) '6A7 anode grid voltage.
All measurements made from point indicated to chassis.

No adjustments are to be made to any trimmer condensers, either I.F. or R.F. without the aid of a correctly calibrated signal generator of reliable make used in conjunction with a high resistance output meter connected from plate to screen of the two type 41 output tubes. The normal I.F. frequency is 177.5 KC.

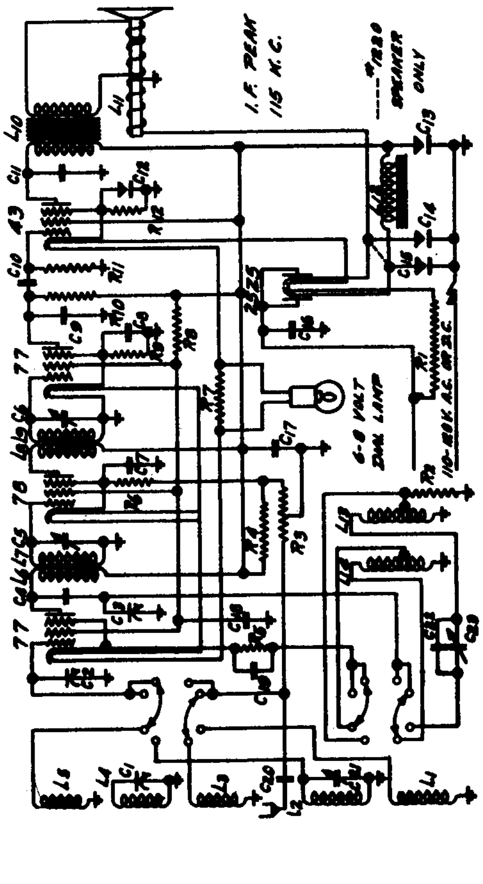
TRANSFORMER CORP. OF AMERICA

MODEL TC-30



CIRCUIT DATA			
R.	Ω.	C.	MFD.
1.	15M. W.W.	1.	.0005
2.	1Meg.	2.	.1
3.	1Meg.	3.	.25
4.	500M.	4.	.0005
5.	500M.	5.	.1
6.	500M.	6.	.01
7.	1Meg.	7.	.25
8.	100M.	8.	.1
		9.	16.
10-31-33.		10.	12.
		11.	.1
Drwn By		Chk'd. By	

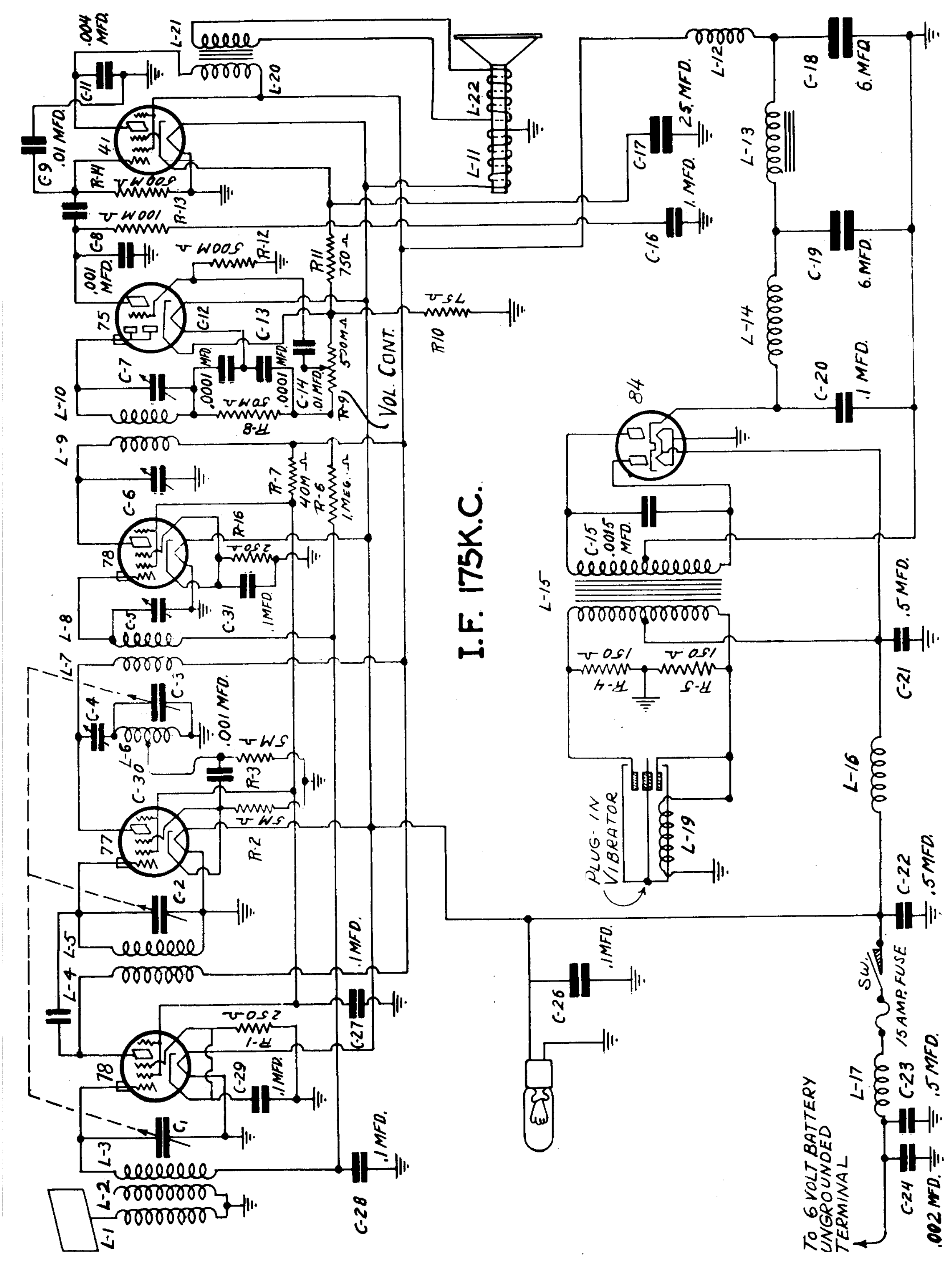
MODEL- TC-52



CODE	PART NO.	RESISTORS
R1	1125	150 Ohm Resistor in Power Cord A.P.
R2	1063	500 Ohm Long Wave Oscillator Resistor
R3	1296	10,000 Ohm Volume Control & Switch
R4	922	75,000 Ohm I.F. Cathode Resistor
R5	919	5,000 Ohm Oscillator Feed Resistor
R6	1063	500 Ohm I.F. Cathode Bias Resistor
R7	1306	20 Ohm Pilot Light Shunt Resistor
R8	921	40,000 Ohm R.F. & I.F. Screen Feed Resistor
R9	941	20,000 Ohm Second Detector Cathode Bias Resistor
R10	924	250,000 Ohm Second Detector Plate Load Resistor
R11	925	500,000 Ohm 43 Grid Bias Resistor
R12	1063	500 Ohm 43 Cathode Bias Resistor
		CONDENSERS
C1	852	371 MMFD. First Preselector Section of 3 Gang
C2	853	371 MMFD. Second Preselector Section of 3 Gang
C3	853	356 MMFD. Oscillator Section of 3 Gang
C4	264	.00005 MFD. Oscillator Plate Feed Condenser
C5	1521	75-150 MMFD. First I.F. Trimmer
C6	1525	75-150 MMFD. Second I.F. Trimmer
C7	272A	.1 MFD. 200 Volt I.F. Cathode By-Pass
C8	188A	.2 MFD. 200 Volt Second Detector Cathode By-Pass
C9	662	.002 MFD. Mica Second Detector Plate Filter
C10	269A	.01 MFD. 400 Audio Feed Condenser
C11	269A	.01 MFD. 400 Volt Output Plate Filter
C12	926	25 MFD. 25 Volt 43 Cathode By-Pass
C13	1295	4 MFD. 150 W.V. Dry Electrolytic
C14	1295	4 MFD. 150 W.V. Dry Electrolytic
C15	1295	10 MFD. 150 W.V. Dry Electrolytic
C16	272A	.1 MFD. 200 Volt Line By-Pass Condenser
C17	267A	.5 MFD. 200 Volt B. Supply By-Pass Condenser
C18	272A	.1 MFD. 200 Volt R.F. & I.F. Screen By-Pass
C19	265	.001 MFD. Mica Oscillator Coupling Condenser
C20	265	.001 MFD. Mica Antenna Series Condenser
C21	972	2 Plate L.W. Preselector Trimmer
C22	339	2-.0001 MFD. Mica L.W. Oscillator Series Condenser
C23	1522	75-100 MMFD. L.W. Oscillator Series Trimmer
		INDUCTANCES
L1	1475	L.W. Preselector Primary 800 Turns #36 S.S.E.
L2	1475	Long-Wave Preselector Secondary 490 Turns #36 S.S.E.
L3	847	Broadcast Preselector Primary 178 Turns #36 S.S.E.
L4	847	Broadcast First Secondary 133 Turns #36 S.S.E.
L5	847	Broadcast Second Secondary 126 Turns #36 S.S.E.
L6	1470	Microhenry First I.F. Primary
L7	1470	25,000 Microhenry First I.F. Secondary
L8	1473	25,000 Microhenry Second I.F. Primary
L9	1473	25,000 Microhenry Second I.F. Secondary
L10		#43 Output Transformer 917 Rola 1220 Quam
L11		3000 Ohm Speaker Field 917 Rola 1220 Quam
L12	940	20 Henry Choke
L13	1476	L.W. Oscillator 380 Turns #36 S.S.E. Tapped 20 Turns
L14	1470	Broadcast Oscillator 106 Turns #36 S.S.E. Tapped 30 Turns

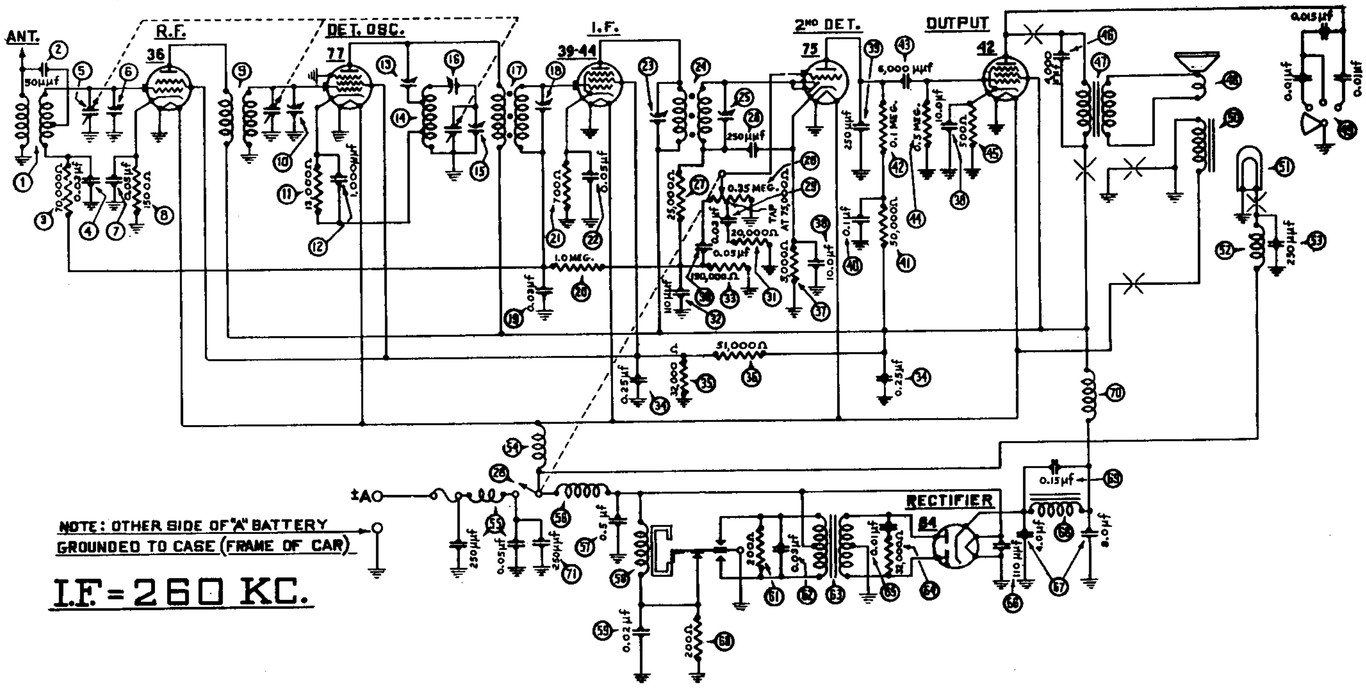
TRANSFORMER CORP. OF AMERICA

MODELS A60-AM20-TC50

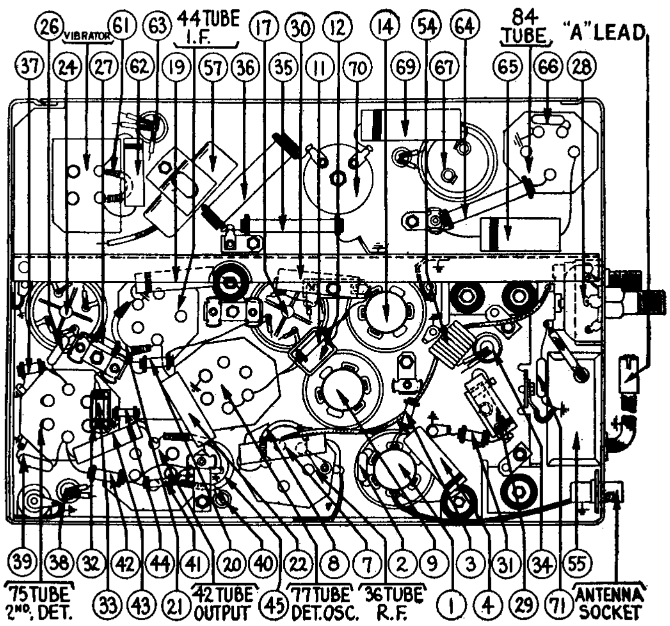


TRANSITONE AUTOMOBILE RADIO CORP.

MODEL CT-2, CODE PJ "PLYMOUTH", CODE SF "DESOTO", CODES C6, CZ "CHRYSLER"



Parts List - CT-2 Chrysler De Luxe Custom Built Radio



(1) Antenna Transformer.....32-1535
(2) Condenser (50 mmfd.).....30-1029
(3) Resistor (70,000 ohms).....33-1115
(4) Condenser (.03 mfd.).......30-4025
*(5) Tuning Condenser.........31-1425
*(6) 1st Padder (on tun. cond.).........
(7) Condenser (.05 mfd.).......30-4020
(8) Resistor (1500 ohms).......33-3047
(9) R. F. Transformer.........32-1536
*(10) 2nd Padder (on tun. cond.).........
(11) Resistor (11,000 ohms)....33-1194
(12) Condenser (1000 mmfd.)..30-1007
(13) Padder (Pri. 1st I. F. Tran.).........
(14) Oscillator Transformer....32-1537
*(15) 3rd Padder (on tun. cond.).........
*(16) 4th Padder (on tun. cond.).........
(17) First I. F. Transformer....32-1538
(18) Padder (Sec. 1st I. F. Tran.).........
(19) Condenser (.03 mfd.).......30-4025
(20) Resistor (1 meg.)..........33-1096
(21) Resistor (700 ohms)....... 6443
(22) Condenser (.05 mfd.).......30-4020
(23) Padder (Pri. 2nd I. F. Tran.).........
(24) Second I. F. Transformer..32-1449
(25) Padder (Sec. 2nd I. F. Tran.).........
(26) Condenser (250 mmfd.)...30-1032
(27) Resistor (25,000 ohms)....33-1161
(28) Vol. Con. & Switch Assm...33-5088
(29) Condenser (.03 mfd.).......30-4025
(30) Condenser (.05 mfd.).......30-4020
(31) Resistor (20,000 ohms)....33-1130
(32) Condenser (110 mmfd.)...30-1031
(33) Resistor (190,000 ohms)...33-1116
(34) Condenser (.25-.25 mfd.)..30-4231
(35) Resistor (32,000 ohms).... 3525
(36) Resistor (51,000 ohms)..... 5868
(37) Resistor (5,000 ohms)..... 6096
(38) Condenser (10-10 mfd.)...30-2076
(39) Condenser (250 mmfd.)...30-1032
(40) Condenser (.1 mfd.).......30-4170
(41) Resistor (50,000 ohms).... 6098
(42) Resistor (.1 meg.)......... 6099
(43) Condenser (6000 mmfd.)..30-4125
(44) Resistor (.5 meg.).......... 6097
(45) Resistor (500 ohms).......33-3031
(46) Condenser (4000 mmfd.)..30-4185
(47) Output Transformer....... 2598
(48) Cone & Voice Coil.........36-3159
*(49) Tone Control..............30-4138
(50) Field Coil Assembly....... 02795
(51) Pilot Lamp..................34-2036
(52) Choke.......................32-1374
(53) Condenser (250 mmfd.)...30-1032
(54) "A" Choke..................32-1374
(55) Interference Filter.........32-1534
(56) Vibrator Choke.............32-1563
(57) Condenser (.5 mfd.).......30-4015
(58) Vibrator....................38-5036
(59) Condenser (.02 mfd.).......30-4039
(60) Resistor (200 ohms)....... 7217
(61) Resistor (200 ohms)....... 7217
(62) Condenser (.03 mfd.).......30-4025
(63) Power Transformer........32-7315
(64) Resistor (32,000 ohms).... 3525
(65) Condenser (.01 mfd.).......30-4051
(66) Condenser (110 mmfd.)...30-1031
(67) Filter Cond. (4-8 mfd.)...30-2107
(68) "B" Choke..................32-7254
(69) Condenser (.15 mfd.).......30-4191
(70) R. F. Choke................32-1530
(71) Condenser (250 mmfd.)...30-1032
*Ground Clip.................28-2488
Spark Plug Resistor.........33-1015
Distributor Resistor.........33-1113
Interference Cond. (1 mfd.) 4522
Interference Cond. (½ mfd.)30-4007
*"T" Bolt (Set Mtg.).......28-6161
*Nut (Set Mtg.)........... W518
Fuse........................ 7227
Fuse Insulator.............27-7729
*Antenna Lead.............38-6355
*"A" Lead..................38-6551
*"U" Clamp (Control Mtg.)29-1705
*Nut (Control Mtg.)....... W317A
Glass.......................27-7325
*Face Assembly (Chrysler).28-2500
*Face Assembly (Plymouth)28-2498
*Face Assembly (Dodge)...28-2496
*Face Assembly (DeSoto)...28-2497
*Pointer (Chrysler)..........28-2503
*Pointer (Plymouth).........28-2505
*Pointer (Dodge)............28-2506
*Pointer (DeSoto)...........28-2504
*Knob (Chrysler)............27-4163
*Knob (Plymouth Economy)27-4156
*Knob (Plymouth DeLuxe).27-4159
*Knob (Dodge).............27-4155
*Knob (DeSoto)............27-4153
*Flex. Shaft (Tun.) (Dodge).28-8319
*Flex. Shaft (Vol.) (Dodge).28-8320
*Flex. Shaft (Tun.) (Plym., DeSoto, Chrysler)......28-8317
*Flex. Shaft (Vol.) (Plym., DeSoto, Chrysler)......28-8318

NOTE: The items marked with an asterisk are rarely required for service and will not generally be carried in stock by the local Philco Transitone service station. In case these parts are needed and they cannot be secured locally, they should be ordered by Part Number, C. O. D. from the nearest factory branch.

TRANSITONE AUTOMOBILE RADIO CORP.

MODEL CT5 CODES C1-C2 & C3 "CHRYSLER AIRFLOW" CODE SG "DESOTO AIRFLOW"

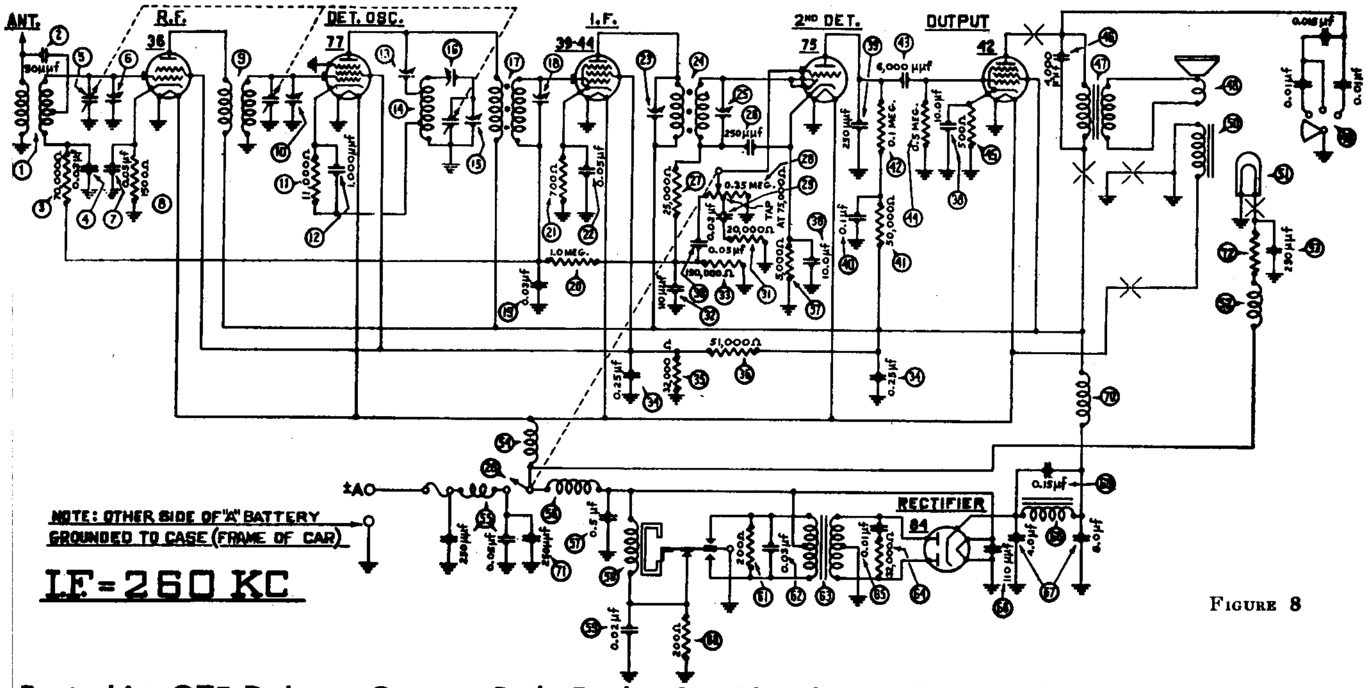


FIGURE 8

Parts List-CT5-DeLuxe Custom-Built Radio for Chrysler Airflow-Codes C-1, C-2 and C-3.

(1) Antenna Transformer.....32-1535
(2) Condenser (50 mmfd.)....30-1029
(3) Resistor (70,000 ohms)....33-1115
(4) Condenser (.03 mfd.)......30-4025
*(5) Tuning Condenser........31-1425
*(6) 1st Padder (on tun. cond.)........
(7) Condenser (.05 mfd.)......30-4020
(8) Resistor (1500 ohms)......33-3047
(9) R. F. Transformer........32-1536
*(10) 2nd Padder (on tun. cond.)........
(11) Resistor (11,000 ohms)....33-1194
(12) Condenser (1000 mmfd.)...30-1007
(13) Padder (Pri. 1st I. F. Tran.).......
(14) Oscillator Transformer....32-1537
*(15) 3rd Padder (on tun. cond.)........
*(16) 4th Padder (on tun. cond.)........
(17) First I. F. Transformer....32-1538
(18) Padder (Sec. 1st I. F. Tran.).......
(19) Condenser (.03 mfd.)......30-4025
(20) Resistor (1 meg.).........33-1096
(21) Resistor (700 ohms)....... 6443
(22) Condenser (.05 mfd.)......30-4020
(23) Padder (Pri. 2nd I. F. Tran.)......
(24) Second I. F. Transformer..32-1449
(25) Padder (Sec. 2nd I. F. Tran.)......
(26) Condenser (250 mmfd.)....30-1032
(27) Resistor (25,000 ohms)....33-1161
(28) Vol. Con. & Switch Assm...33-5088
(29) Condenser (.03 mfd.)......30-4025
(30) Condenser (.05 mfd.)......30-4020
(31) Resistor (20,000 ohms)....33-1130
(32) Condenser (110 mmfd.)....30-1031
(33) Resistor (190,000 ohms)...33-1116
(34) Condenser (.25-.25 mfd.)..30-4231
(35) Resistor (32,000 ohms).... 3525
(36) Resistor (51,000 ohms).... 5868
(37) Resistor (5,000 ohms)..... 6096
(38) Condenser (10-10 mfd.)....30-2076
(39) Condenser (250 mmfd.)....30-1032
(40) Condenser (.1 mfd.).......30-4170
(41) Resistor (50,000 ohms).... 6098
(42) Resistor (.1 meg.)......... 6099
(43) Condenser (6000 mmfd.)...30-4125
(44) Resistor .5 meg.).......... 6097
(45) Resistor ((500 ohms)......33-3031
(46) Condenser (4000 mmfd.)...30-4185
(47) Output Transformer...... 2598
(48) Cone & Voice Coil.........36-3159
*(49) Tone Control............30-4127
(50) Field Coil Assembly....... 02795
(51) Pilot Lamp...............34-2040
(52) Choke...................32-1374
(53) Condenser (250 mmfd.)....30-1032
(54) "A" Choke...............32-1374
(55) Interference Filter........32-1534
(56) Vibrator Choke...........32-1503
(57) Condenser (.5 mfd.).......30-4015
(58) Vibrator.................38-5036
(59) Condenser (.02 mfd.)......30-4039
(60) Resistor (200 ohms)....... 7217
(61) Resistor (200 ohms)....... 7217
(62) Condenser (.03 mfd.)......30-4025
(63) Power Transformer.......32-7315
(64) Resistor (32,000 ohms).... 3525
(65) Condenser (.01 mfd.)......30-4051
(66) Condenser (110 mmfd.)....30-1031
(67) Filter Cond. (4-8 mfd.)....30-2107
(68) "B" Choke...............32-7254
(69) Condenser (.15 mfd.)......30-4191
(70) R. F. Choke..............32-1530
(71) Condenser (250 mmfd.)... 30-1032
(72) Antenna Choke 32-1382
*Ground Clip.............28-2488
Spark Plug Resistor.......33-1015
Distributor Resistor.......33-1113
Interference Cond. (1 mfd.) 4522
Interference Cond. (½ mfd.)30-4007
Fuse.................... 7227
Fuse Insulator...........27-7131
*Antenna Lead...........38-6355
*"A" Lead...............38-6552
*"U" Clamp (Control Mtg.).29-1808

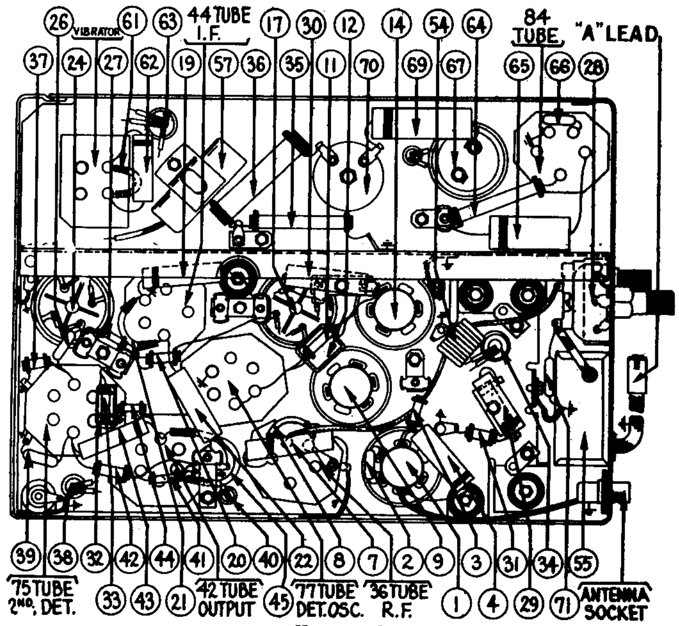


FIGURE 9

*Nut (Control Mtg.)....... W98A
*Glove Box Door Brkt. (Upper)..............29-2621
*Glove Box Door Brkt. (Lower R. H.)..........29-2622
*Glove Box Door Brkt. (Lower L. H.)..........29-2623
*Bolt (Set Mtg. Front).....W1441B
*Bolt (Set Mtg. Rear)......W1353B
*Nut (Set Mtg. Front)...... W98B
*Nut (Set Mtg. Rear)...... W317B
*Scale Assembly..........42-5263
*Knob...................27-4161
*Flex. Shaft (Tun.)........28-8324
*Flex. Shaft (Vol.).........28-8325
*Speaker Cable...........41-3126
*Speaker Mtg. Brkt. (R.H.).36-3428
*Speaker Mtg. Brkt. (L.H.).29-2587
*Speaker Mtg. Brkt. (Rear).36-3429
*Screw (Speaker Mtg.).... W99B
*Screw (Speaker Mtg.)..... W285B
*Nut (Speaker Mtg.)....... W98B

NOTE: An Antenna Choke (72) Part No. 32-1382 has been added to the Receiver. This is connected in series with the Antenna Lead and Antenna Transformer (1) and Condenser (2).

NOTE: The items marked with an asterisk are rarely required for service and will not generally be carried in stock by the local Philco Transitone service station. In case these parts are needed and they cannot be secured locally, they should be ordered by Part Number, C. O. D. from the nearest factory branch.

TRANSITONE AUTOMOBILE RADIO CORP.

MODEL CT-11 "CHRYSLER"

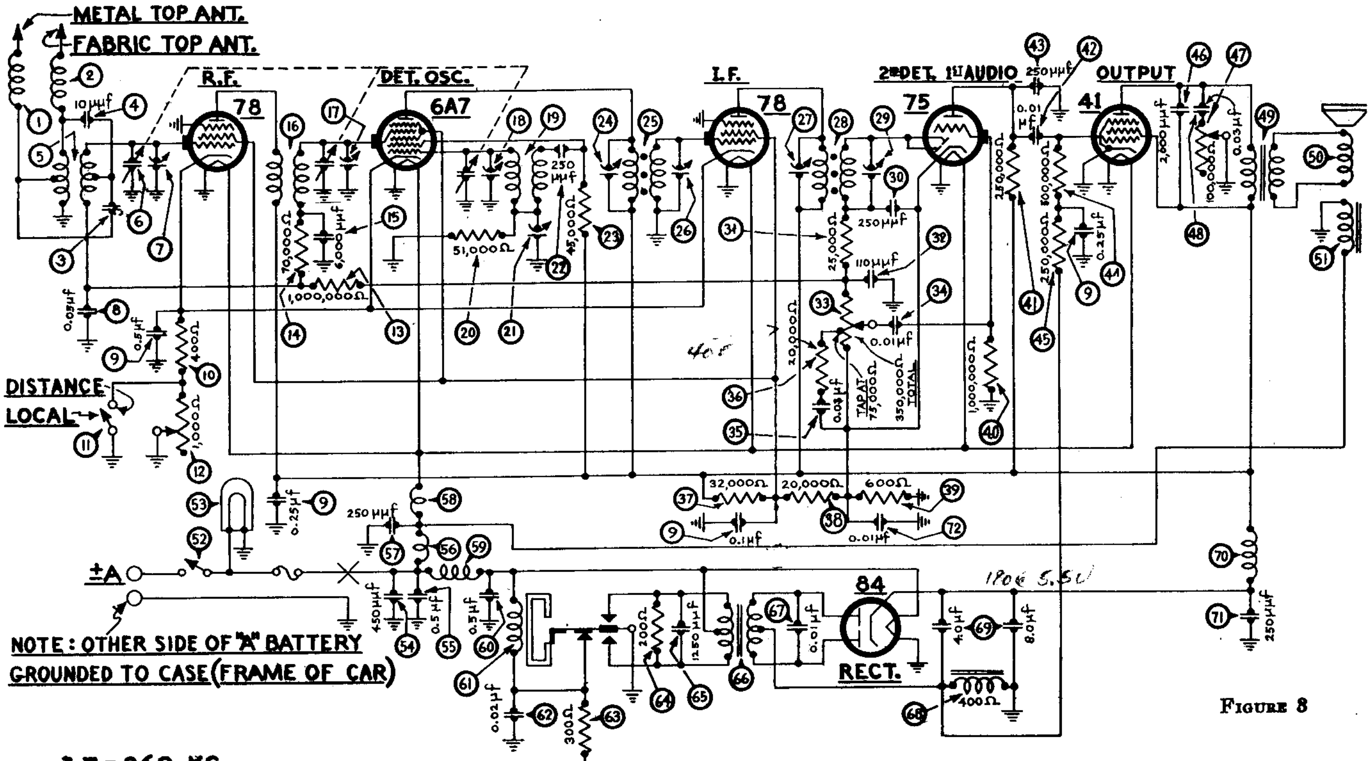


FIGURE 8

I.F. = 260 KC.

Parts List — CT-11 Chrysler De Luxe Custom-Built Radio

No.	Description	Part No.
1	Antenna Choke	38-7210
2	Antenna Choke	38-7210
3	Condenser (70 mmfd.)	30-1068
4	Condenser (10 mmfd.)	30-1065
5	Antenna Transformer	32-1925
6	Tuning Condenser	31-1674
7	First Padder (on tun. cond.)	....
8	Condenser (.05 mfd.)	30-4020
9	Condenser (.1-.25-.25-.5 mfd.)	30-4374
10	Resistor (400 ohms)	33-1211
11	Sensitivity Control Switch	42-1140
12	Sensitivity Control	33-5129
13	Resistor (1,000,000 ohms)	33-1096
14	Resistor (70,000 ohms)	33-1115
15	Condenser (6000 mmfd.)	30-4125
16	R. F. Transformer	32-1926
17	Second Padder (on tun. cond.)	....
18	Third Padder (on tun. cond.)	....
19	Oscillator Transformer	32-1927
20	20Resistor (51,000 ohms)	6098
21	Low Frequency Padder	31-6056
22	Condenser (250 mmfd.)	30-1032
23	Resistor (45,000 ohms)	5256
24	Padder (pri. 1st I. F. trans.)	....
25	First I. F. Transformer	32-1928
26	Padder (Sec. 1st I. F. trans.)	....
27	Padder (Pri. 2nd I. F. trans.)	....
28	Second I. F. Transformer	32-1929
29	Padder (Sec. 2nd I. F. trans.)	....
30	Condenser (250 mmfd.)	30-1032
31	Resistor (25,000 ohms)	33-1013
32	Condenser (110 mmfd.)	30-1031
33	Volume Control (350,000 ohms)	33-5121
34	Condenser (.01 mfd.)	30-4124
35	Condenser (.03 mfd.)	30-4025
36	Resistor (20,000 ohms)	33-1178
37	Resistor (32,000 ohms)	3525
38	Resistor (20,000 ohms)	6650
39	Resistor (600 ohms)	33-1212
40	Resistor (1,000,000 ohms)	33-1096
41	Resistor (250,000 ohms)	33-1097
42	Condenser (.01 mfd.)	30-4145
43	Condenser (250 mmfd.)	30-1032
44	Resistor (500,000 ohms)	6097
45	Resistor (250,000 ohms)	33-1097
46	Condenser (2000 mmfd.)	30-4177
47	Tone Control	33-5141
48	Condenser (.03 mfd.)	30-4380
49	Output Transformer	2598
50	Cone & Voice Coil	36-3159
51	Field Coil Assembly	02795
52	On and Off Switch	42-5408
53	Pilot Lamp	34-2039
54	Condenser (450 mmfd.)	31-6065
55	Condenser (.5 mfd.)	30-4047
56	"A" Choke	32-1644
57	Condenser (250 mmfd.)	30-1032
58	Choke	32-1930
59	Vibrator Choke	32-1933
60	Condenser (.5 mfd.)	30-4047
61	Vibrator	38-5036
62	Condenser (.02 mfd.)	30-4039
63	Resistor (300 ohms)	33-3130
64	Resistor (200 ohms)	33-1210
65	Condenser (1250 mmfd.)	5886
66	Power Transformer	32-7482
67	Condenser (.01 mfd.)	30-4381
68	Filter Choke	32-7491
69	Filter Condenser (4-8 mfd.)	30-2134
70	R. F. Choke	32-193'
71	Condenser (250 mmfd.)	30-1032
72	Condenser (.01 mfd.)	30-4124
	Four Hole Socket	27-6044
	Five Hole Socket	27-6035
	Six Hole Socket	27-6036
	Seven Hole Socket	27-6037
	Designation Plate	28-3290
	Spark Plug Resistor	33-1015
	Distributor Resistor	33-1113
	Interference Condenser (.5 mfd.)	30-4007
	Interference Condenser (1 mfd.)	4522
	Receiver Housing	38-1568
	Carriage Bolt (Set Mtg.)	W825B
	Nut (Set Mtg.)	W98A
	Washer (Set Mtg.)	4486
	Bracket (Set Mtg.)	29-3086
	Clamp (Control Mtg.) Plymouth and DeSoto Deluxe	29-3300
	Clamp (Control Mtg.) Dodge	29-3281
	Clamp (Control Mtg.) DeSoto Custom	29-3323
	Clamp (Control Mtg.) Chrysler	29-3280
	Nut (Clamp Mtg.)	W317A
	Fuse	7227
	Fuse Insulator	27-7131
	Control Stud	28-6145
	Pilot Lamp Assembly	38-7213
	Tuning Control Shaft	28-8439
	Volume Control Shaft	28-8440
	Tone Control Shaft	28-8441
	Drum Assembly (Chrysler)	42-5437
	Drum Assembly (DeSoto DeLuxe)	42-5436

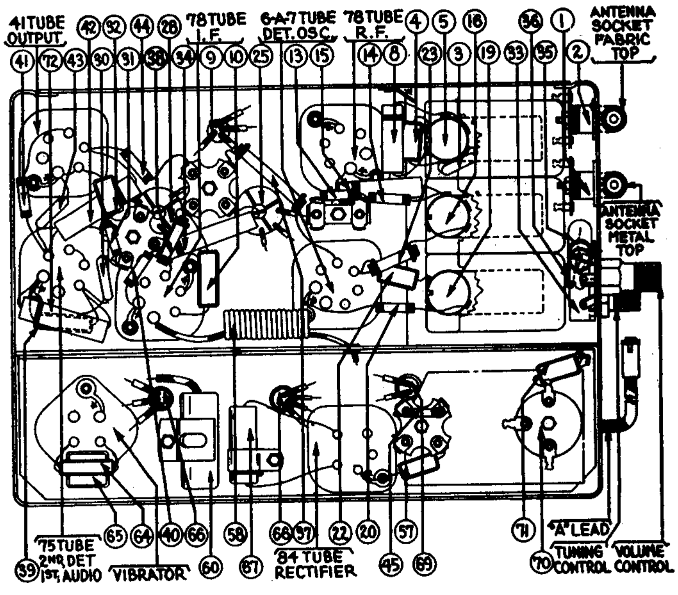


FIGURE 4

No.	Description	Part No.
	Drum Assembly DeSoto Custom	42-5505
	Drum Assembly (Dodge)	42-5435
	Drum Assembly (Plymouth)	42-5407
	Tuning and Volume Knob (Plymouth P-1)	27-4263
	Tuning and Volume Knob (Plymouth P-2)	27-4233
	Tuning and Volume Knob (Dodge)	27-4246
	Tuning and Volume Knob (Chrysler C-7)	27-4235
	Tuning and Volume Knob (Chrysler C-8)	27-4234
	Tuning and Volume Knob (DeSoto)	27-4248
	Tone Control Knob (Plymouth P-1)	27-4264
	Tone Control Knob (Plymouth P-2)	27-4227
	Tone Control Knob (Dodge)	27-4245
	Tone Control Knob (Chrysler C-7)	27-4229
	Tone Control Knob (Chrysler C-8)	27-4228
	Tone Control Knob (DeSoto)	27-4242
	Shield Loom Assembly	38-7295

TRANSITONE AUTOMOBILE RADIO CORP.

MODEL CT-11 "CHRYSLER"

I. F. Transformers and Padders Model CT11

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Fig. 2).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

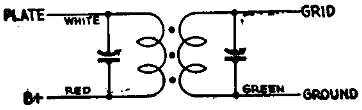


FIGURE 1

If replacements are ever necessary, replace the entire coil assembly, 32-1928 for the first I. F. stage and 32-1929 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube. Adjust the signal generator to 1600 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser.

Turn the tuning condenser plates out of mesh as far as they will go. With the tuning condenser in this position, adjust the high frequency padder (18) and the R. F. padder (17) until the maximum reading is obtained on the output meter. This is the true setting for 1600 K. C., 160 on the dial scale.

LOW FREQUENCY — Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and adjust the signal generator to the 580 K. C. Roll the tuning condenser and adjust the low frequency padder screw (21) for maximum reading on the output meter.

HIGH FREQUENCY RE-ADJUSTMENT — Turn the tuning condenser plates out of mesh as far as they will go and adjust the signal generator to 1600 K. C. Then adjust the high frequency padder (18) again for maximum reading on the output meter.

Model CT11 Adjustments

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments to the Model CT-11 are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

The sensitivity switch must be in the "distance" position. The tone control should be turned to the brilliant position.

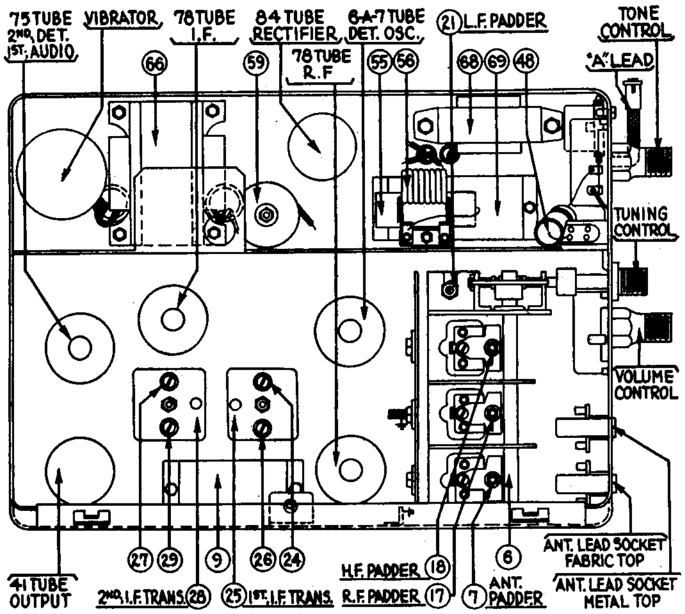


FIGURE 2

Procedure

I. F. — Adjust the signal generator to exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser.

Adjust the secondary screw padder (29) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (27) for maximum reading. (See Fig. 2 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser. Adjust the secondary screw padder (26) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (24) for maximum reading. (See Figure 2 for location of padders).

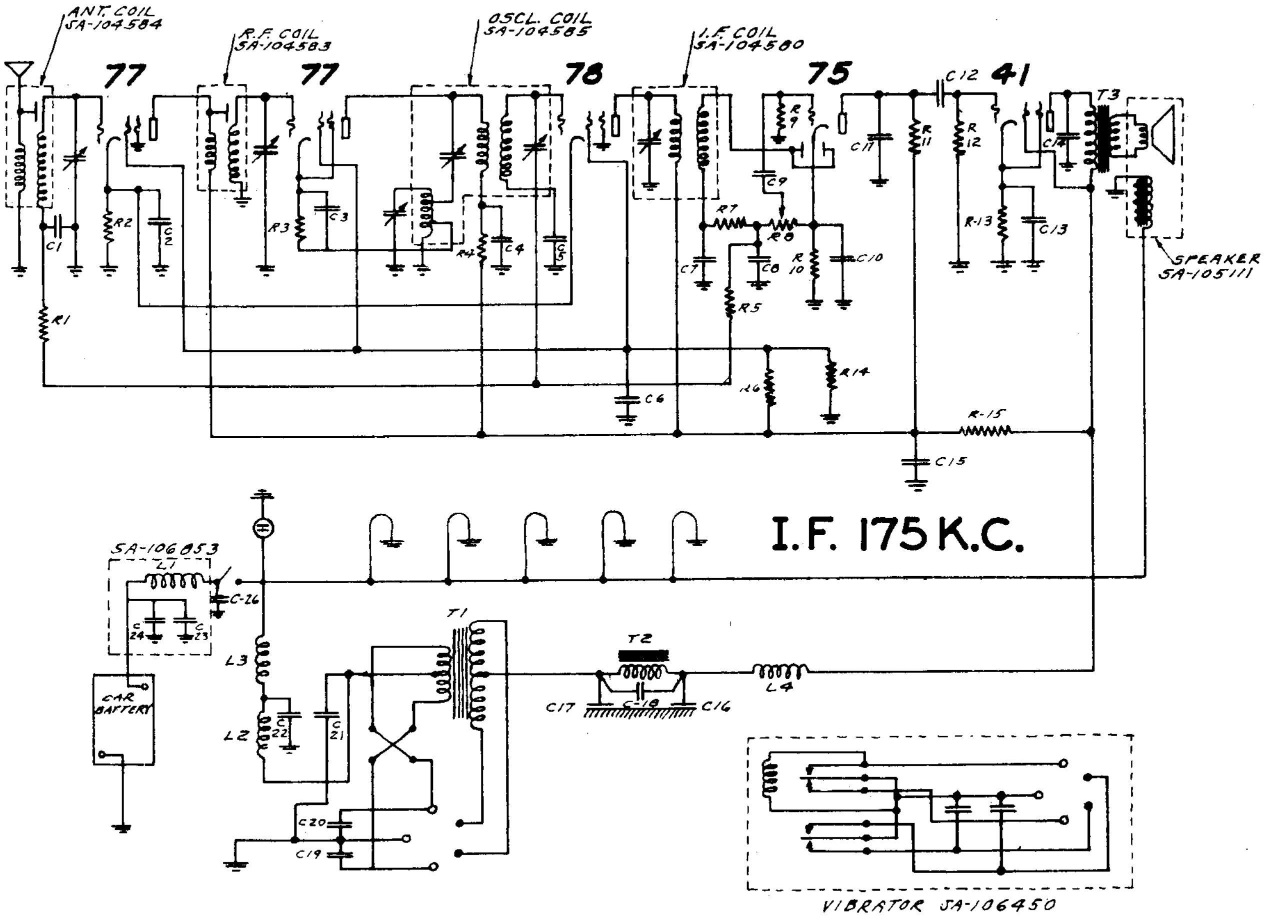
ANTENNA —Connect the generator lead to the antenna cable assembly (made up of Part No. L1915 loom and 40 inches of 16 strand No. 30 wire), using a 110 mmfd. condenser in series between the two leads. Plug the cable into the antenna socket marked "fabric top."

Turn the tuning condenser to 1400 K. C. and set the generator for 1400 K. C. Adjust the padders (17) and (7) for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. The signal generator output lead should be connected to a wire placed near the car antenna but not connected to it.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator has been used, the Receiver will be adjusted properly.

UNITED AMERICAN BOSCH CORPORATION
MODELS 45A & 45C AUTO RADIO

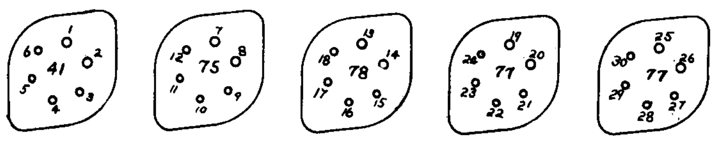


R-1 100,000 ohms 1/4 watt
R-2 750 ohms 1/4 watt
R-3 7500 ohms 1/4 watt
R-4 2000 ohms 1/4 watt
R-5 1/2 meg. 1/4 watt
R-6 40,000 ohms 1/4 watt
R-7 50,000 ohms 1/4 watt
R-8 1/2 meg. Volume Control
R-9 1 meg. 1/4 watt
R-10 5,000 ohms 1/4 watt
R-11 1/4 meg. 1/4 watt
R-12 1/2 meg. 1/4 watt
R-13 600 ohms 1/2 watt
R-14 75,000 ohms 1/4 watt
R-15 4,000 ohms 1 watt
R-16 ---
R-17 ---
R-19 ---
R-20 ---
C-1 .05 - 2 ply
C-2 .25 - 2 ply
C-3 .002 - 4 ply
C-4 .05 - 3 ply
C-5 .05 - 2 ply
C-6 .05 - 3 ply
C-7 .0001 mfd. mica
C-8 .0001 mfd. mica
C-9 .005 - 3 ply
C-10 .25 - 2 ply
C-11 .003 - 4 ply
C-12 .005 - 3 ply
C-13 10 mfd. electrolytic
C-14 .005 - 3 ply
C-15 .05 - 3 ply
C-16 8 mfd. electrolytic
C-17 8 mfd. electrolytic
C-18 .1 mfd. - 2 ply
C-19 .05 mfd. - 2 ply
C-20 .05 mfd. - 2 ply
C-21 .5 mfd. 200 V. in can
C-22 .5 mfd. 200 V. in can
C-23 .5 mfd. mica
C-24 .001 mfd. mica
C-25 ---
C-26 .0001 mica
L-1 R.F. Choke coil
L-2 Choke coil
L-3 R.F. Choke coil
L-4 R.F. Choke coil
T-1 Power Transformer
T-2 Choke coil
T-3 Output Transformer

VOLTAGE CHART

Voltages read from ground to following points with Weston Model 564 Voltohmmeter (six volt storage battery used).

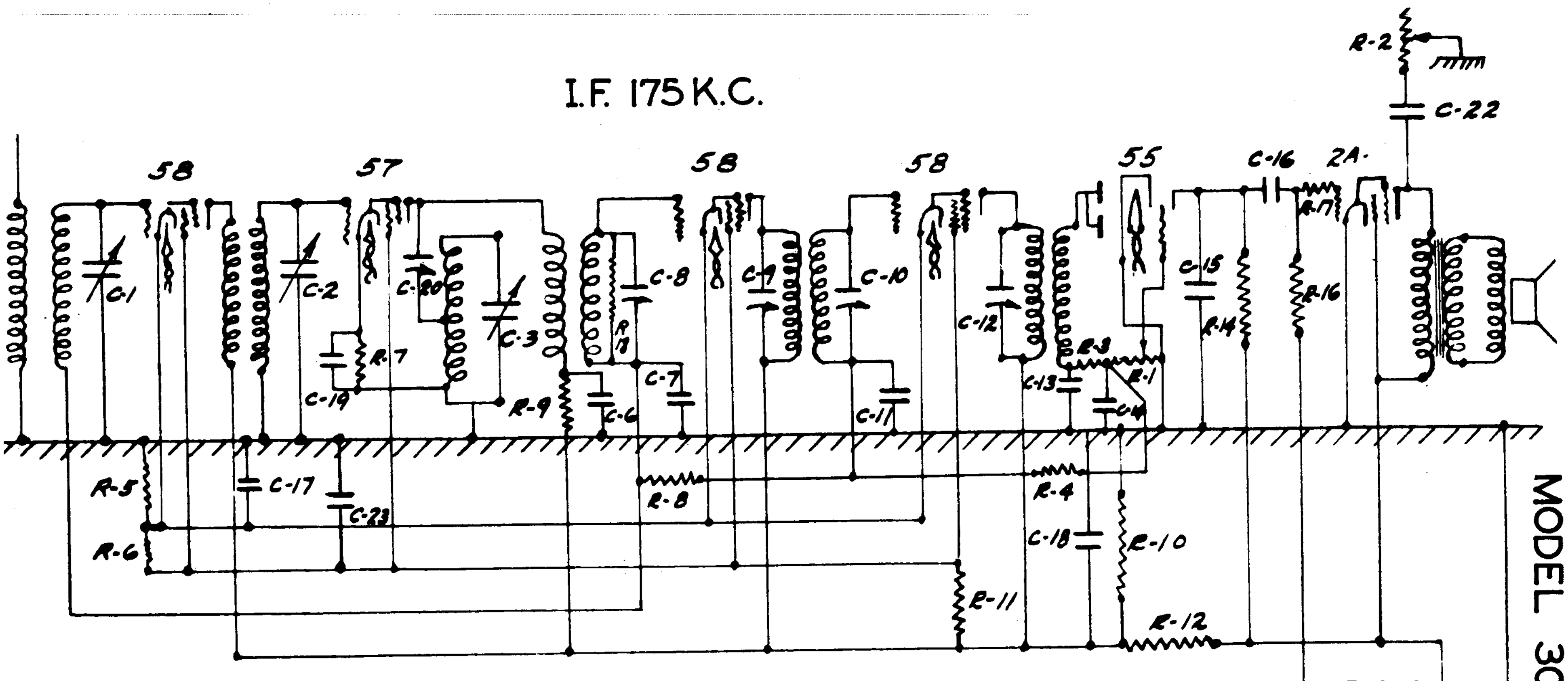
2 - 5.5 V.	8 - 5.5 V.	14 - 5.5 V.	20 - 5.5 V.	26 - 5.5 V.
3 - 178 V.	9 - 112 V.	15 - 155 V.	21 - 155 V.	27 - 155 V.
4 - 187 V.	12 - 1.1 V.	16 - 62 V.	22 - 62 V.	28 - 62 V.
6 - 1.3 V.		18 - 3.5 V.	24 - 42 V.	30 - 3.5 V.

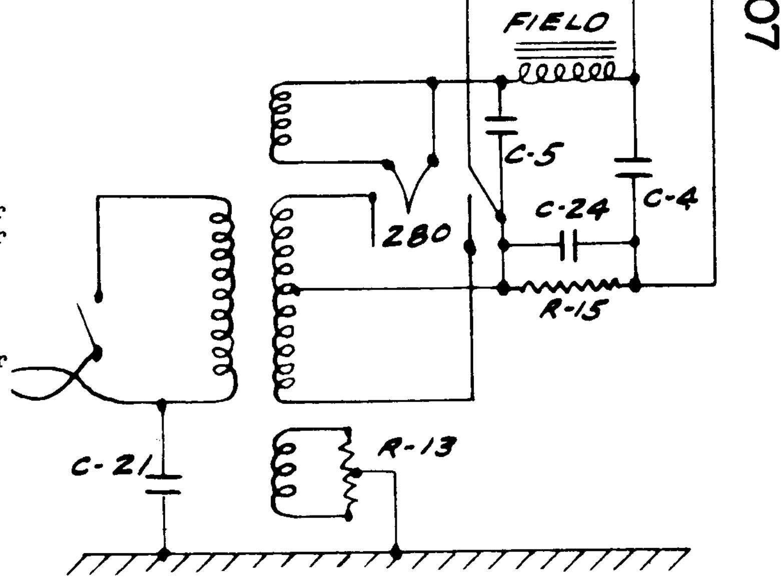


BOTTOM VIEW

UNITED AMERICAN BOSCH CORPORATION

MODEL 307



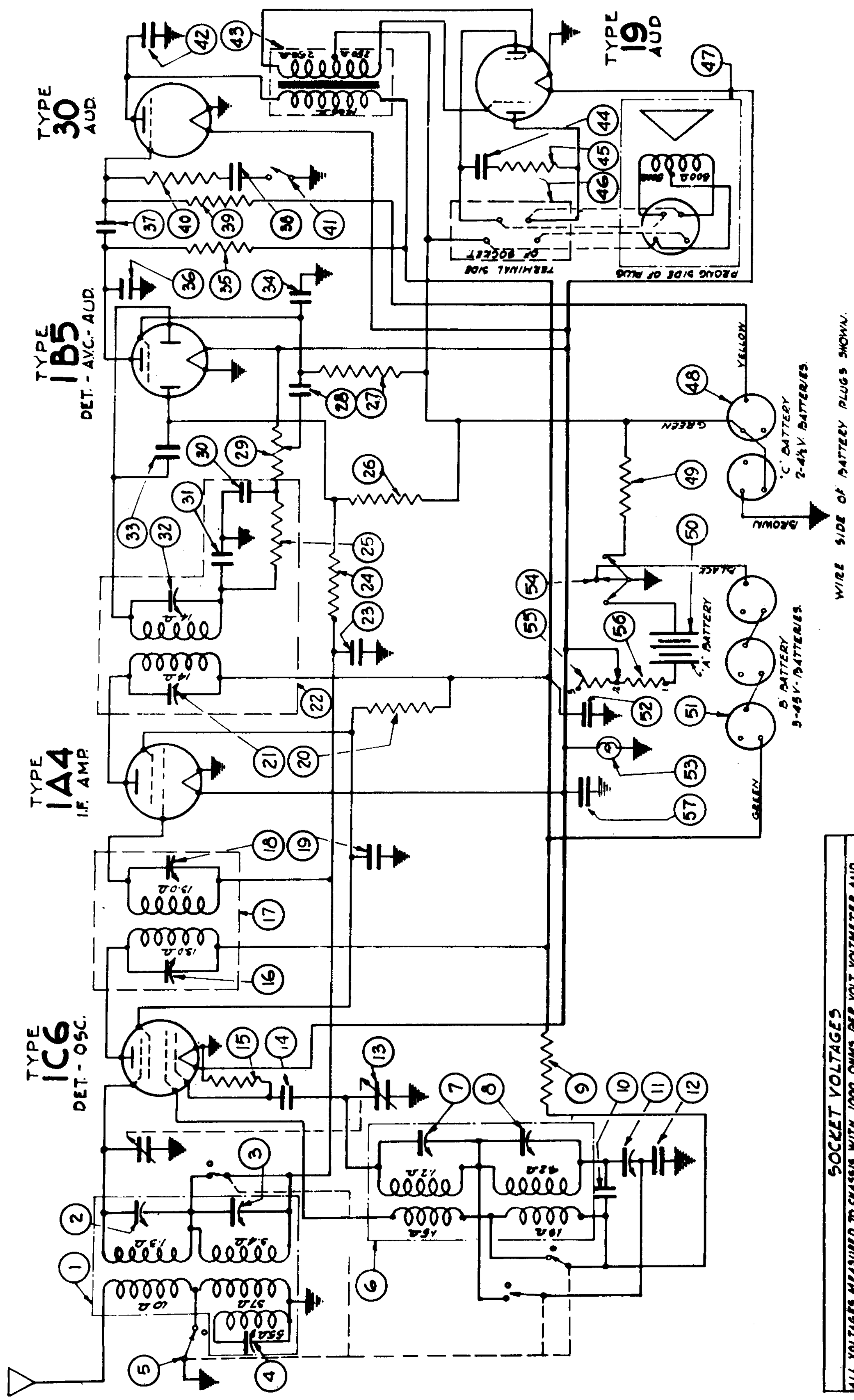


R	1	SA 104437	500,000 ohm volume
R	2	SA 104443	550,000 ohm tone
R	3	SA 100512	50,000 ohm,
R	4	SA 100194	500,000 ohm
R	5	SA 99583	500 ohm,
R	6	SA 101722	30,000 ohm,
R	7	SA 104824	7,500 ohm,
R	8	SA 100815	1 meg.,
R	9	SA 100823	2,000 ohm,
R	10	SA 99957	40,000 ohm,
R	11	SA 101404	15,000 ohm,
R	12	SA 105161	3,500 ohm,
R	13	SA 99412	5 ohm
R	14	SA 100727	100,000 ohm,
R	15	SA 102564	350 ohm,
R	16	SA 100194	500,000 ohm,
R	17	SA 100727	100,000 ohm,
R	18	SA 105274	20,000 ohm,

C	4)	SA 105165	4 mfd. filter condenser
C	5)		8 mfd. filter condenser
C	6		.01 mfd., 400 V. cond. - part of SA 104459
C	7		.05 mfd., 200 V. cond. - part of SA 104459
C	14	SA 101143	100 mmfd. mica condenser
C	15	SA 99781	250 mmfd. mica condenser
C	16	SA 103659	.005 mfd., 400 V. cond.
C	17		.25 mfd., 200 V. cond. - part of SA 104459
C	18	SA 102496	.25 mfd., 400 V. cond.
C	19	SA 100198	.002 mfd. mica condenser
C	20		140-220 mmfd. osc. trimmer condenser - part of SA 105108
C	21	SA 103695	.01 mfd., 600 V. cond.
C	22	SA 102492	.05 mfd., 400 V. cond.
C	23		.25 mfd., 200 V. cond. - part of SA 104459
C	24	SA 105165	20 mfd. elec. condenser

UNITED AMERICAN BOSCH CORPORATION

MODEL 601



INT FREQ 465KC.

SOCKET VOLTAGES					
ALL VOLTAGES MEASURED TO CHASSIS WITH 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION					
TUBE	STAGE	FIL.	PLATE	SCREEN	BIAS.
1C6	DET. - OSC.	2.0	135 PLATE 112 OSC.	70	3.0
1A4	I.F. - AMP.	2.0	135	70	3.0
1B5	DET.-AVC.-AUD.	2.0	40	—	3.0
30	AUD.	2.0	130	—	7.5
19	AUD.	2.0	133	—	3.0

UNITED AMERICAN BOSCH CORPORATION

MODEL 601

GENERAL DESCRIPTION

This model is a five-tube, two band, battery operated superheterodyne receiver whose circuits employ the following tubes: a type 1C6 as a combined first detector-oscillator, a type 1A4 as an intermediate frequency amplifier, a type 1B5 as a combined second detector - A.V.C. - first audio amplifier, a type 30 as an audio amplifier, and a type 19 as a class "B" output amplifier.

SPEAKER ADJUSTMENT

This speaker has been carefully adjusted at the factory and should not require any further attention, as this design has been found to be very stable in maintaining its adjustment. However, if for any reason an adjustment is needed, it may be done by turning the screw, located nearer the speaker magnet, in either direction. Do not touch the other screw as this should always remain tight.

LINE-UP CAPACITOR ADJUSTMENTS

To align the chassis, it is essential to use a high grade modulated oscillator, the output of which can be continuously adjusted to assure freedom from tube overload as individual circuits are brought into alignment.

This model uses an improved type of magnetic speaker, the windings of which are directly in the plate circuit of the output tube. The windings are of high impedance and necessitate care in the use of the output meter when aligning the chassis.

When an output meter of low resistance is connected across the windings of this type of speaker, the power output is materially reduced. For this reason, it is necessary to use an output meter of high sensitivity and a resistance of at least 4000 ohms.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers.

I.F. ADJUSTMENTS (465 KC.)

1. Connect the receiver to the batteries by plugging the "B" battery plugs and "C" battery plugs in their respective batteries. Connect the short wire coming from the rear of the receiver to the terminal marked for the type of "A" supply you are to use. Connect the "A" battery with the red lead to the positive terminal and the black lead to the negative terminal.

2. Set the volume control to the maximum position, the tone control to the treble position, the wave change switch on the broadcast band and the dial indicator to approximately 600 KC.

3. Set the test oscillator to 465 KC. and apply the test signal to the grid of the type 1A4 tube, through a 0.5 mfd. blocking condenser, and adjust the I.F. trimmer condensers #21 and #32 to maximum output.

4. Apply the test signal to the grid of the type 1C6 first detector-oscillator tube and adjust the I.F. trimmer condensers #16 and #18 to maximum output.

5. Apply the test signal to the antenna lead of the receiver and adjust the wave trap trimmer condenser #4 to minimum output.

BROADCAST BAND ADJUSTMENTS

1. Set the test oscillator and dial indicator to 1600 KC. and apply the test signal to the antenna of the receiver through a .0002 mfd. condenser.

2. Adjust the broadcast oscillator trimmer condenser #8 to maximum output.

3. Adjust the Broadcast preselector trimmer #3 to maximum output.

4. Set the test oscillator and dial indicator to 600 KC. and adjust the oscillator series condenser #11 to maximum output at the same time rocking the variable condenser.

5. Return the test oscillator and dial indicator to 1600 KC. and check the adjustment of trimmer condensers #8 and #3 for accuracy.

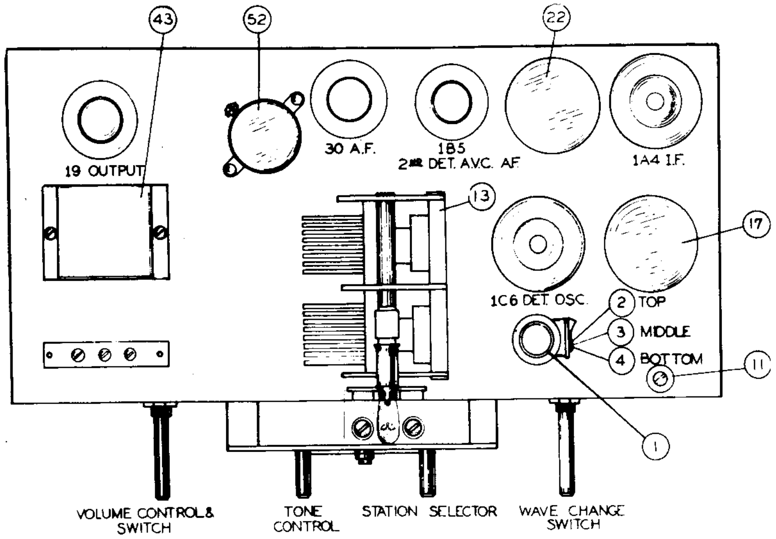
SHORT WAVE BAND ADJUSTMENTS

1. Set the wave change switch to the short-wave band position.

2. Set the test oscillator and dial indicator to 6000 KC. and adjust the short-wave trimmer condenser #7 to maximum output.

3. Adjust the short-wave preselector trimmer condenser #2 to maximum output.

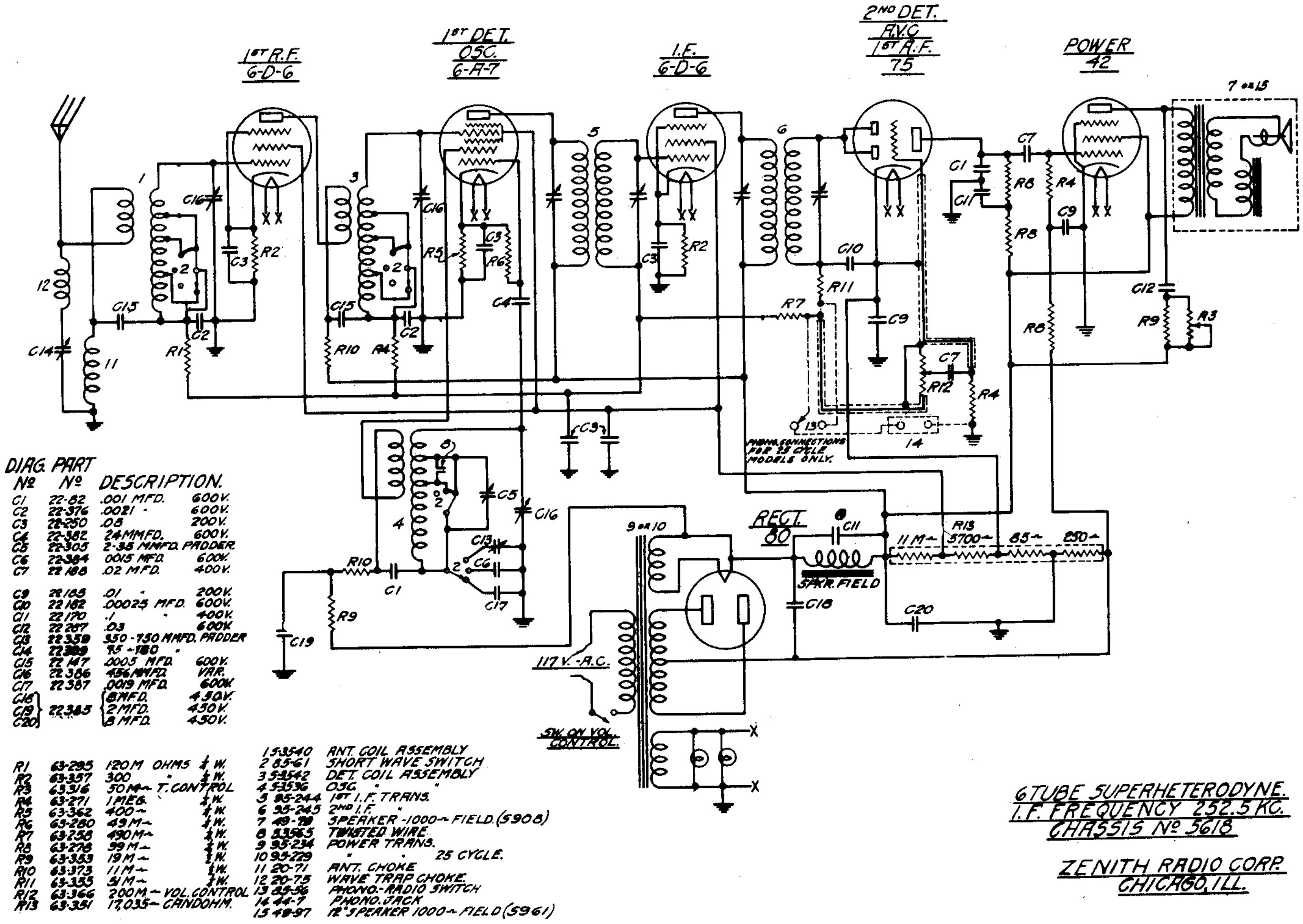
4. Check the receiver over the short-wave band for sensitivity and calibration.



Dia. #	Part #	Description of Parts	List Price
1	RC 95237	Antenna coil assembly	$ 2.25
2		4-25 mmf. trimmer condenser - part of RC 95237	
3		1.5-10 mmf. trimmer condenser - part of RC 95237	
4		30-60 mmf. trimmer condenser - part of RC 95237	
5	SW 9559	Wave change switch	.65
6	RC 95238	Oscillator coil assembly	1.60
7		10-35 mmf. trimmer condenser - part of RC 95238	
8		4-25 mmf. trimmer condenser - part of RC 95238	
9	SA 105249	5,000 ohm, 1/4 W. resistor	.15
10	CW 4-02	.02 mfd., 400 V. condenser	.15
11	CS 9560	350-700 mmf. oscillator series condenser	.35
12	CM 9526	.0012 mfd. mica condenser	.20
13	CG 9552	Variable condenser (2 gang)	2.75
14	CM 9513	.100 mmf. mica condenser	.10
15	RE 9575	50,000 ohm, 1/4 W. resistor	.15
16		30-100 mmf. trimmer condenser - part of IC 9579	
17	IC 9579	First I.F. coil (465 KC.)	2.00
18		30-100 mmf. trimmer condenser - part of IC 9579	
19	CW 2-05	.05 mfd., 200 V. condenser	.15
20	SA 105254	15,000 ohm, 1/4 W. resistor	.15
21		30-100 mmf. trimmer condenser - part of IC 9574	
22	IC 9574	Second I.F. coil (465 KC.)	1.75
23	CW 2-05	.05 mfd., 200 V. condenser	.15
24	RE 9530	1 meg., 1/8 W. resistor	.10
25	RE 9524	50,000 ohm, 1/4 W. resistor	.10
26	RE 9530	1 meg., 1/8 W. resistor	.10
27	RE 9574	1 meg., 1/4 W. resistor	.15
28	CW 4-02	.02 mfd., 400 V. condenser	.15
29	VR 9538	.5 meg. volume control	.95
30		100 mmf. mica condenser - part of IC 9574	
31		100 mmf. mica condenser - part of IC 9574	
32		30-100 mmf. trimmer condenser - part of IC 9574	
33	CM 9513	100 mmf. mica condenser	.10
34	CM 9513	100 mmf. mica condenser	.10
35	RE 9585	250,000 ohm, 1/4 W. resistor	.15
36	CM 9513	100 mmf. mica condenser	.10
37	CW 4-02	.02 mfd., 400 V. condenser	.15
38	CW 4-005	.005 mfd., 400 V. condenser	.15
39	RE 9572	500,000 ohm, 1/4 W. resistor	.15
40	SA 105272	10,000 ohm, 1/4 W. resistor	.15
41	SW 9558	Tone control switch	.40
42	CW 6-005	.005 mfd., 600 V. condenser	.15
43	TR 9570	Audio transformer	2.00
44	CW 4-01	.01 mfd., 400 V. condenser	.15
45	SA 105274	20,000 ohm, 1/4 W. resistor	.15
46	SA 107257	Speaker socket	.10
47	SK 9540	Speaker	6.00
48	PG 9514	"C" battery plug	.10
49	SA 105267	1000 ohm, 1/4 W. resistor	.15
50	DM 9519	Speaker diaphragm	1.25
51	PG 958	"B" battery plug	.10
52	CE 9542	8 mfd., 200 V. electrolytic condenser	1.25
53	LP 9518	Dial lamp, 2 V., .06 amp.	.30
54		On-off switch - part of VR 9538	
55	RE 9591	0.94 ohm resistor	.15
56	RE 9592	0.42 ohm resistor	.15
57	CW 2-50	.5 mfd., 200 V. condenser	.25

ZENITH RADIO CORPORATION

MODELS S908-S909 & S961 CHASSIS 5618



Chassis 5618

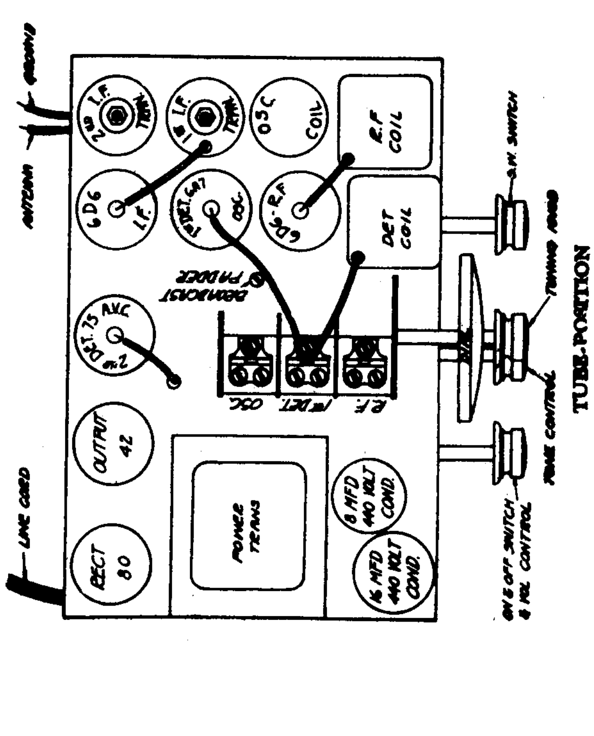
TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6D6	R.F.	5.6	2.4	0	70	2.4	200
6A7	1st.Det.	5.6	3	0	70	-	250
	Osc.			3.6	-	-	230
6D6	I.F.	5.6	2.6	0	70	2.6	250
75	2nd.Det. 1st Audio	5.6	1.4	0	-	-	148
42	PWR.	5.6	0	-.6	250	-	250
80	RECT.	4.6	-	-	-	-	-

Line Voltage 112 — Antenna and Ground Disconnected

All measurements taken from point indicated to ground, using a 1000 ohm per volt D.C. meter (except heaters). F - filament; K - cathode; g1 - control grid; g2 - screen grid; g3 - suppressor grid; p - plate.

Alignment

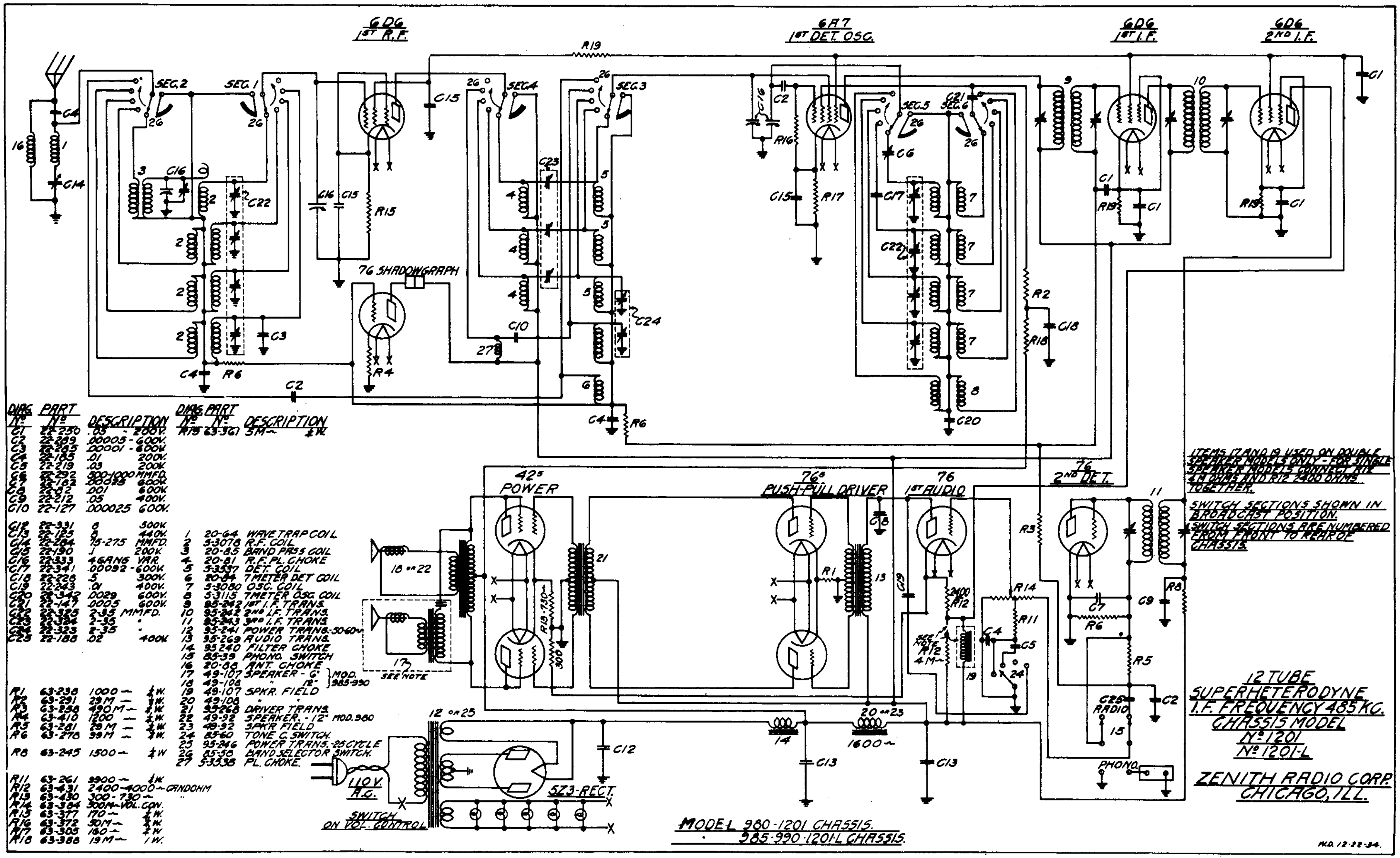
1. Balance intermediate transformers at 252.5 K.C. with oscillator connected to grid of first detector and ground.
2. Adjust wave trap padder (located underneath chassis at rear right side) for <u>weakest</u> signal with 252.5 K.C. oscillator connected to aerial and ground.
3. Turn wave band switch clockwise to the highest frequency band. Connect 17,500 K.C. oscillator to aerial and ground. Balance oscillator trimmer on three-gang condenser for correct dial reading at this frequency.
4. Turn wave band switch counter-clockwise to standard broadcast position. Adjust broadcast oscillator trimmer (located underneath chassis at right center) for correct dial reading at 1400 K.C. and balance R.F. and 1st detector trimmers on three-gang condenser for loudest signal.
5. Adjust oscillator padder (located next to oscillator section of gang on top of chassis) while rocking pointer back and forth past 600 K.C. for combination giving maximum output.
6. Recheck 1400 K.C.



TUBE-POSITION

ZENITH RADIO CORPORATION

MODELS 980-985 & 990 "CHASSIS 1201 & 1201L"



DIAG. Nº	PART Nº	DESCRIPTION	
C1	22-250	.03 -	200V.
C2	22-289	.00005 -	600V.
C3	22-285	.00001 -	600V.
C4	22-185	.01	200V.
C5	22-219	.03	200V.
C6	22-292	500-1000	MMFD.
C7	22-162	.00025	600V.
C8	22-82	.001	600V.
C9	22-212	.05	400V.
C10	22-127	.000025	600V.
C12	22-331	8	500V.
C13	22-125	8	440V.
C14	22-284	15-275	MMFD.
C15	22-190	.1	200V.
C16	22-333	4 GANG	VAR.
C17	22-341	.00092 -	600V.
C18	22-226	.5	300V.
C19	22-243	.01	400V.
C20	22-342	.0029	600V.
C21	22-147	.0005	600V.
C22	22-325	2-35 MMFD.	
C23	22-324	2-35	"
C24	22-323	2-35	"
C25	22-188	.02	400V.
R1	63-236	1000 ~	¼W.
R2	63-291	29M ~	¼W.
R3	63-258	490M ~	¼W.
R4	63-410	1200 ~	¼W.
R5	63-281	29M ~	¼W.
R6	63-278	99M ~	¼W.
R8	63-245	1500 ~	¼W
R11	63-261	9900 ~	¼W.
R12	63-431	2400-4000 ~ CANDOHM	
R13	63-430	300-730 ~	"
R14	63-384	300M ~ VOL. CON.	
R15	63-377	170 ~	¼W.
R16	63-372	30M ~	¼W.
R17	63-305	160 ~	2W.
R18	63-388	19M ~	1W.
R19	63-361	5M ~	½W.

DIAG. Nº	PART Nº	DESCRIPTION
1	20-64	WAVETRAP COIL
2	5-3078	R.F. COIL
3	20-85	BAND PASS COIL
4	20-81	R.F. PL. CHOKE
5	5-3537	DET. COIL
6	20-84	7 METER DET COIL
7	5-3080	OSC. COIL
8	5-3115	7 METER OSC. COIL
9	95-242	1ST I.F. TRANS.
10	95-242	2ND I.F. TRANS.
11	95-243	3RD I.F. TRANS.
12	95-241	POWER TRANS.-50-60~
13	95-269	AUDIO TRANS.
14	95-240	FILTER CHOKE
15	85-39	PHONO. SWITCH
16	20-88	ANT. CHOKE
17	49-107	SPEAKER - 6" } MOD. 985-990
18	49-108	" 12" } MOD. 985-990
19	49-107	SPKR. FIELD
20	49-108	" "
21	95-268	DRIVER TRANS.
22	49-92	SPEAKER. - 12" MOD. 980
23	49-92	SPKR FIELD
24	85-60	TONE C. SWITCH.
25	95-246	POWER TRANS.-25 CYCLE
26	85-58	BAND SELECTOR SWITCH.
27	5-3538	PL. CHOKE.

ZENITH RADIO CORPORATION

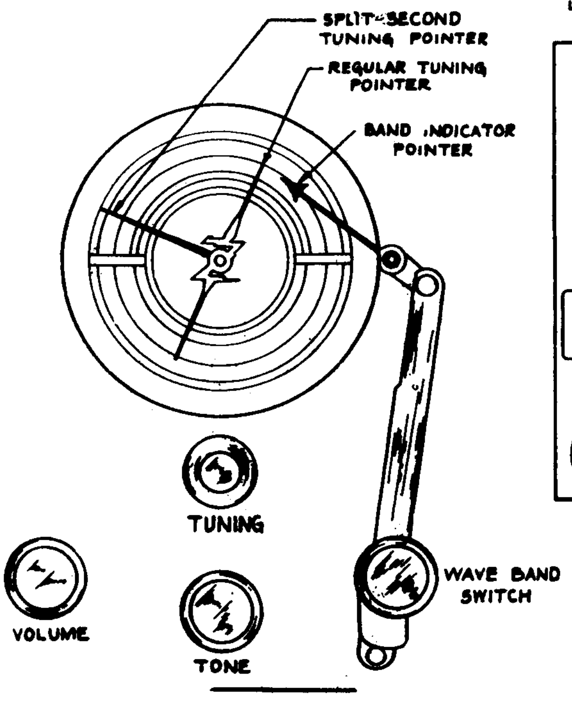
MODELS 980-985 & 990 "CHASSIS 1201 & 1201L"

Socket Voltages

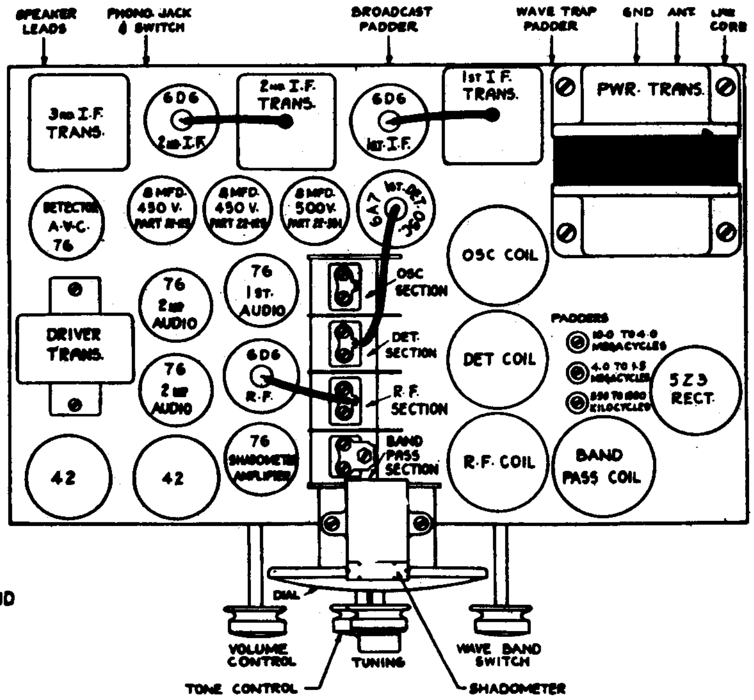
TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6D6	R.F.	5.8	1	0	78	1	220
6A7	1st Det.	5.8	1.5	0	86	-	220
	Osc.			-10	-	-	220
6D6	1st I.F.	5.8	7	0	86	7	220
6D6	2nd I.F.	5.8	7	0	86	7	220
76	2nd Det.	5.8	0	0	-	-	0
76	Shadow-meter AMP.	5.8	10	0	-	-	210
76	1st Aud.	5.8	11	0	-	-	210
76	P.P. Driver	5.8	11	0	-	-	220
76	P.P. Driver	5.8	11	0	-	-	220
42	PWR.	5.8	26	0	260	-	260
42	PWR.	5.8	26	0	260	-	260
5Z3	RECT.	4.8	-	-	-	-	-

Line Voltage 110 Volts   Antenna and Ground Disconnected.

f - filament; k - cathode; g1 - control grid; g2 - screen grid; g3 - suppresso grid; p - plate.



Control Panel



TUBE POSITION

ZENITH RADIO CORPORATION

Service Bulletin

ZENITH RADIO

MODELS 980-985-990

Chassis 1201 - 1201 L

SERVICE NOTES

Dial Slips or Binds. Tighten lugs on planetary drive. See that both pointers are free. Make sure gang is squarely lined up with dial.

Off Calibration. Check for loose set screws on dial assembly to condenser shaft. Black pointer may be loose on shaft. Check alignment as outlined in Alignment Procedure.

Poor Tone. Defective tubes in audio. One side of push-pull circuit faulty. Check audio and output transformers. See A.V.C. blocking.

Insensitive. Out of alignment, weak tubes or defective by-pass condenser.

Shadowgraph Inoperative. Weak 76 tube, burnt out shadowgraph, open resistor in 76 plate circuit.

Distortion at Medium Volume. Defective 75 tube, defective volume control. Separate green volume control-lead and speaker-lead close to grid of 42 tube.

Insensitive on Any Short Wave Band. Check alignment, make sure R.F. circuit is not aligned to image frequency. Change 6A7 tube. Change position of fixed condensers adjacent to rear section of wave change switch. Location of these condensers in relation to each other and their distance from the chassis will affect dial calibration and sensitivity.

Stops Oscillating Around 9 M.C. Change 6A7 tube, leakage in 50 Mmfd. or .0029 Mfd. condenser.

A.V.C. Blocks. Shorted resistor on antenna choke. C-14 padder shorted. Grounded R.F. grid circuit.

Oscillates on Broadcast. Check alignment. Push brown wire away from 6A7 socket. Grounded cathode on 1st I.F. or grounded to 600 K.C. padder. Check for open by-pass condenser.

Noisy. Shorting plates in gang condenser. Poor contact in band switch. Loose shields or shield bases. Static shields may be touching leads under gang condenser.

Overheats. Check pilot light and heater circuits for partial short or ground.

Hum on D and E Bands. Antenna lead too close to AC line or 5Z3 socket short in 6D6 in R.F. socket.

Flutters. Rearrange leads adjacent to 6A7 socket. Open antenna coil. Push yellow band pass lead away from detector trimmer assembly and yellow choke leads. Replace 6D6 in R.F. socket.

Oscillates on Short Wave Bands. Make sure brown R.F. grid return lead is pushed away from 6A7 socket. Check for ground on any A.V.C. lead. Open by-pass condenser.

Tone Control Inoperative. Loose ground lug on 63-430 candohm. Defective condensers in tone control circuit.

Whistles. Rearrange leads in audio circuits. Speaker wires couple with 1st I.F.

Warning. The wiring to the switch is a part of the tuned circuit on the "E" band. Do not change the position of any leads.

Alignment

The diagram on page 2 shows position of major components and aligning adjustments. It should be studied carefully before any attempt is made to adjust the various circuits. The Clough-Brengle type is the only commercial service oscillator found practical for this work.

Separate coils are used for each band. Mounted on the coils are individual trimmers that align each band, independent of the other bands.

Connect 485 K.C. service oscillator to grid of 6A7 and chassis ground. Adjust I.F. trimmers on rear of I.F. transformers for strongest signal.

Connect 485 K.C. service oscillator to antenna and ground. Turn dial to 540 K.C. on broadcast band and adjust wave trap trimmer on right rear side of chassis for weakest signal.

Broadcast - "A" Band

Set service oscillator at 1400 K.C., remaining attached to antenna ground posts. Turn dial to same point and adjust #1 trimmer (top one on oscillator coil) to resonance. Adjust #1 R.F. trimmer (top one on R.F. coil); #1 detector trimmer (through hole in chassis base) and band pass trimmer (top front section of gang) all to resonance.

Set service oscillator at 600 K.C. Adjust padder (located in center rear of chassis) for correct dial reading.

Recheck 1400 K.C. alignment.

"B" Band

Set service oscillator at 4 M.C. (still attached to antenna and ground) and adjust trimmer #2 (2nd from top) on oscillator coil for correct dial reading. Adjust #2 R.F. trimmer (2nd from top on R.F. coil) and #2 detector trimmer (center hole through chassis) to resonance.

"C" Band

Loosen #3 detector trimmer (top one on detector coil). Set service oscillator at 10.5 M.C. Adjust #3 oscillator trimmer (third from top on oscillator coil) for correct dial reading. Adjust #3 R.F. trimmer (third from top of R.F. coil) and #3 detector trimmer (rear one through hole in top of chassis). Adjust #3 detector trimmer on coil to resonance.

"D" Band

Tighten #4 detector trimmer (bottom one on detector coil). Set service oscillator at 21 M.C. Adjust #4 oscillator trimmer (bottom one on oscillator coil) for correct dial reading. Adjust #4 R.F. trimmer (lower one on R.F. coil) and #4 detector trimmer (lower one on detector coil) to resonance.

It is very easy to mistake the image frequency for the fundamental on this band. Rotate dial and if shadowmeter narrows at any point, especially at 15 M.C., the band should be rebalanced.

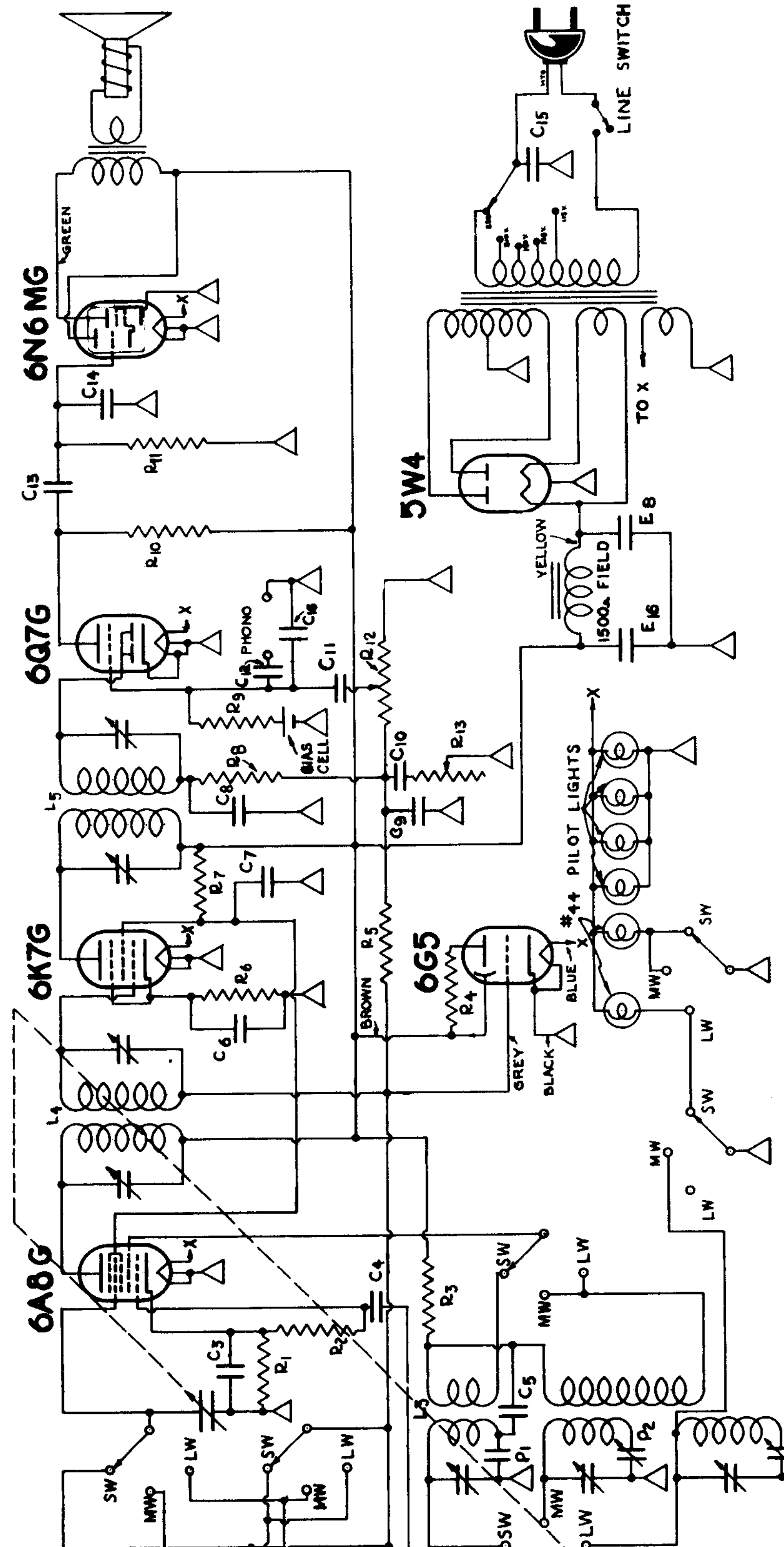
"E" Band

There are no adjustments to be made on this band.

MODELS 980-985 & 990 "CHASSIS 1201 & 1201L"

AIR-KING PRODUCTS COMPANY, INC.

MODEL 76 LONG WAVE



ALIGN

I.F.- 456 K.C.		
R.F.-	TRIMMERS	PADDER
SW.-	18 MC.	6MC.
MW.-	1500 KC.	600 KC.
LW.-	300 KC	150 KC.

R1	-	300 ohm ½ watt	
R2	-	50,000 " ½ "	
R3	-	20,000 " ½ "	
R4	-	1,000,000 " ½ "	
R5	-	3,000,000 " ½ "	
R6	-	500 " ½ "	
R7	-	25,000 " 2 "	
R8	-	50,000 " ½ "	
R9	-	1,000,000 " ½ "	
R10	-	300,000 " ½ "	
R11	-	500,000 " ½ "	
R12	-	450,000 " vol. control	
R 13	-	400,000 " tone control	

L1 - 456 KC wave trap
L2 - 3 band antenna coil
L3 - 3 band oscillator coil
L4 - 456 KC INPUT I. F.
L5 - 456 KC OUTPUT I. F.

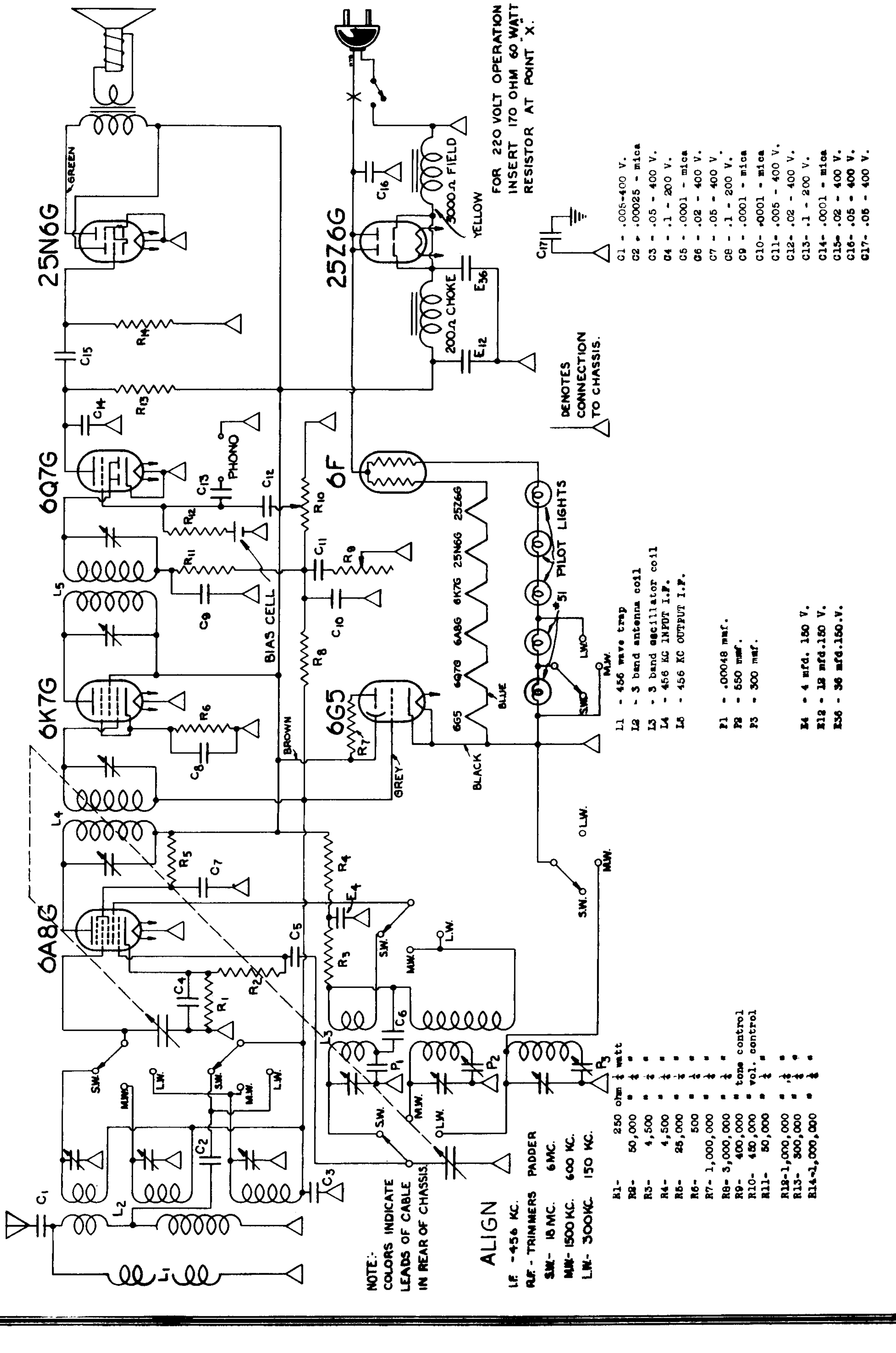
P1 - .0048 mmf.
P2 - 550 mmf.
P3 - 300 mmf.

E8 - 8 mfd. - 450 V.
E16 - 16 mfd. - 300 V.

C1 -	.00025	- mica
C2 -	.05	- 400 V.
C3 -	.1	- 200 V.
C4 -	.0001	- mica
C5 -	.02	- 400 V.
C6 -	.1	- 200 V.
C7 -	.1	- 200 V.
C8 -	.0001	- mica
C9 -	.0001	- mica
C10-	.005	- 400 V.
C11-	.02	- 400 V.
C12-	.1	- 200 V.
C13-	.02	- 400 V.
C14-	.0005	- mica
C15-	.02	- 400 V.
C16-	.0001	- mica

AIR-KING PRODUCTS COMPANY, INC.

MODEL 77 LONG WAVE



ALIGN

I.F. -456 KC.

R.F. - TRIMMERS	PADDER
S.W. - 18 MC.	6 MC.
M.W. - 1500 KC.	600 KC.
L.W. - 300 KC.	150 KC.

R1- 250 ohm ½ watt
R2- 50,000 " ½ "
R3- 4,500 " ½ "
R4- 4,500 " ½ "
R5- 25,000 " ½ "
R6- 500 " ½ "
R7- 1,000,000 " ½ "
R8- 3,000,000 " ½ "
R9- 400,000 " tone control
R10- 450,000 " vol. control
R11- 50,000 " ½ "
R12-1,000,000 " ½ "
R13- 300,000 " ½ "
R14-1,000,000 " ½ "

L1 - 456 wave trap
L2 - 3 band antenna coil
L3 - 3 band oscillator coil
L4 - 456 KC INPUT I.F.
L5 - 456 KC OUTPUT I.F.

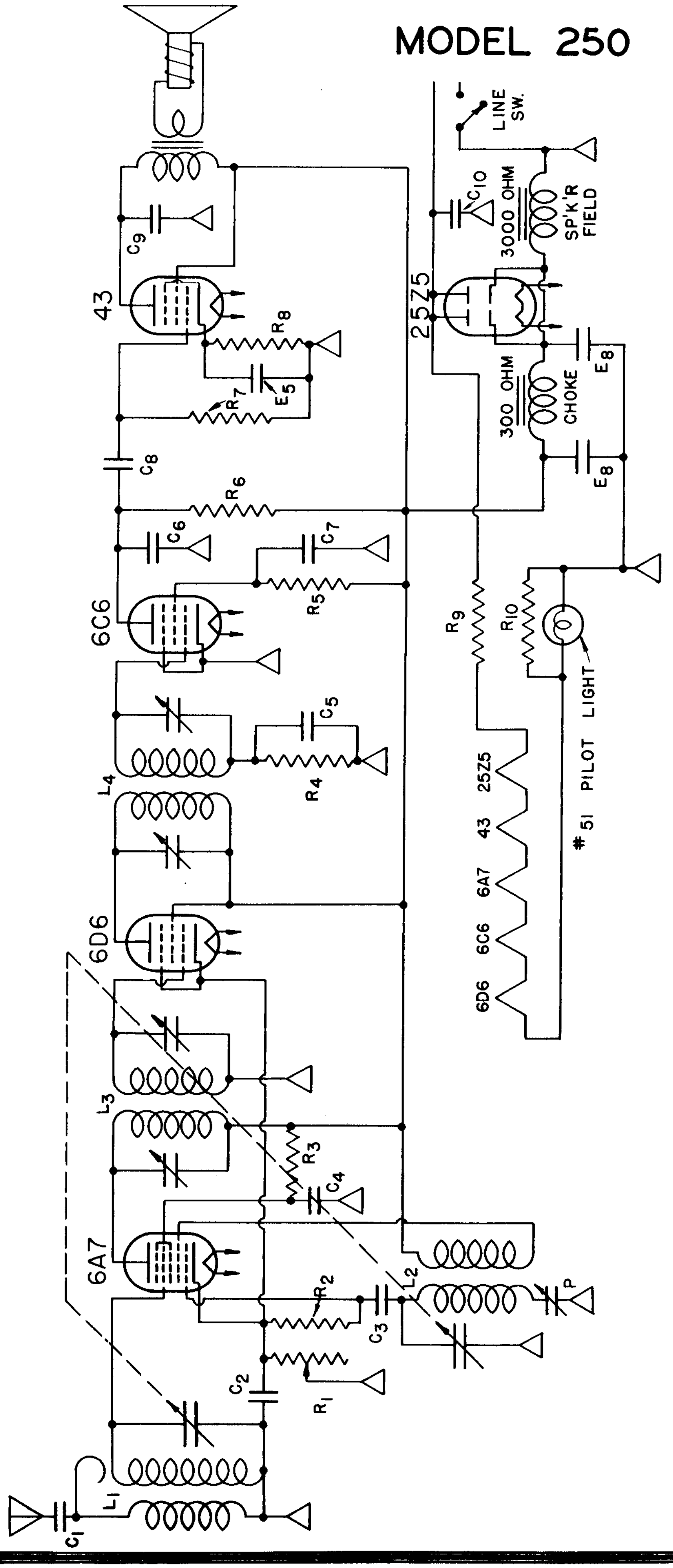
P1 - .00048 mmf.
P2 - 550 mmf.
P3 - 300 mmf.

E4 - 4 mfd. 150 V.
E12 - 12 mfd. 150 V.
E36 - 36 mfd. 150 V.

C1 - .005-400 V.
C2 - .00025 - mica
C3 - .05 - 400 V.
C4 - .1 - 200 V.
C5 - .0001 - mica
C6 - .02 - 400 V.
C7 - .05 - 400 V.
C8 - .1 - 200 V.
C9 - .0001 - mica
C10- .0001 - mica
C11- .005 - 400 V.
C12- .02 - 400 V.
C13- .1 - 200 V.
C14- .0001 - mica
C15- .02 - 400 V.
C16- .05 - 400 V.
C17- .05 - 400 V.

AIR-KING PRODUCTS COMPANY, INC.

MODEL 250



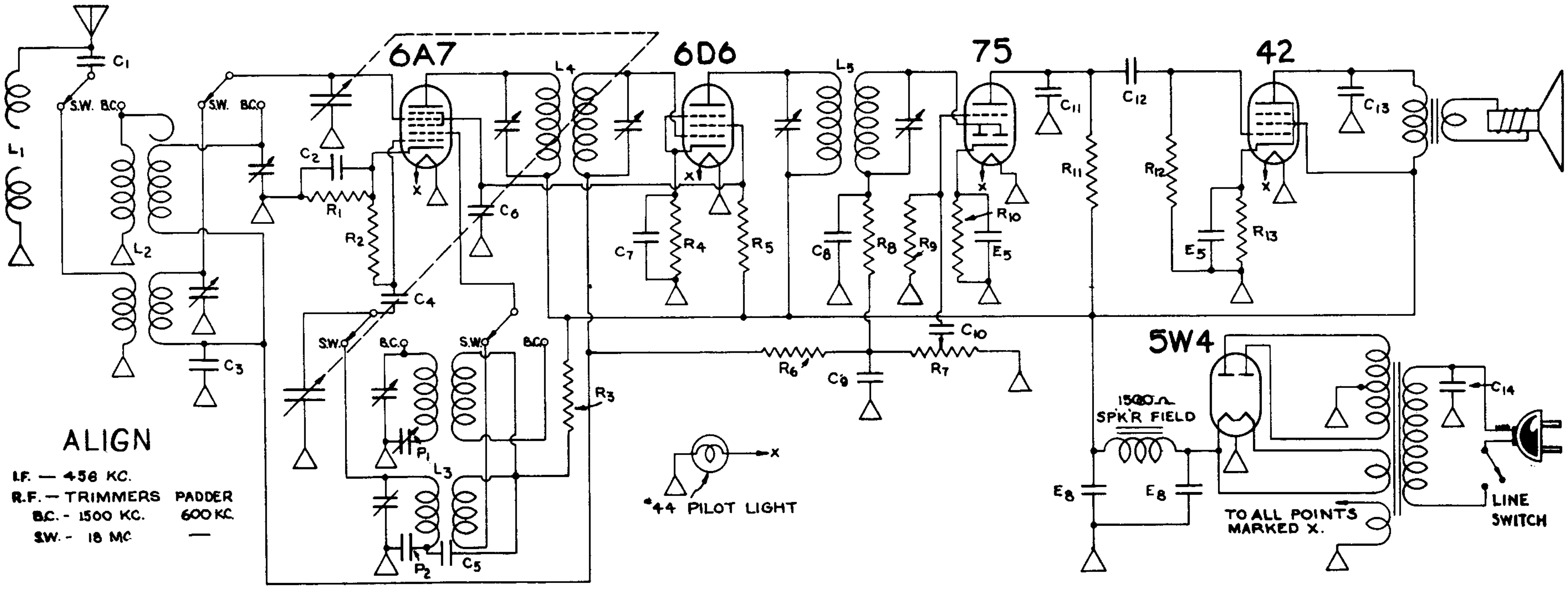
C_1	-	.005	400 V
C_2	-	.1	200 V.
C_3	-	.0001	MICA
C_4	-	.05	200 V.
C_5	-	.005	400 V.
C_6	-	.0001	MICA
C_7	-	.1	200 V.
C_8	-	.02	400 V.
C_9	-	.01	400 V.
C_{10}	-	.05	200 V.

L_1	-	ANTENNA COIL
L_2	-	OSCILLATOR COIL
L_3	-	456 KC. INPUT I.F.
L_4	-	456 KC. OUTPUT I.F.
P	-	500 MMF. MAX.
E_5	-	5 MFD. 25 V.
E_8	-	8 " 150 V.
E_8	-	8 " 150 V.

R_1	-	7,500	OHM	VOL. CONTROL
R_2	-	50,000	"	1/4 WATT
R_3	-	35,000	"	" "
R_4	-	6,000,000	"	" "
R_5	-	6,000,000	"	" "
R_6	-	1,000,000	"	" "
R_7	-	750,000	"	" "
R_8	-	650	"	1/2 "
R_9	-	143	"	IN LINE CORD
R_{10}	-	31	"	3 WATT

AIR-KING PRODUCTS COMPANY, INC.

MODEL 261



R 1 -	250 ohm ½ watt
R 2 -	50,000 " ½ "
R 3 -	20,000 " ½ "
R 4 -	500 " ½ "
R 5 -	20,000 " ½ "
R 6 -	3,000,000 " ½ "
R 7 -	500,000 " Vol.Cont.
R 8 -	50,000 " ½ watt
R 9 -	750,000 " ½ "
R 10 -	2,000 " ½ "
R 11 -	500,000 " ½ "
R 12 -	750,000 " ½ "
R 13 -	400 " ½ "

L 1 - 456 KC wave trap
L 2 - 2 band Antenna coil
L 3 - 2 band Oscillator coil
L 4 - 456 KC Input I.F.
L 5 - 456 KC Output I.F.

P 1 - 500 Mmf.
P 2 - .0054 mfd.

E 5 - 5 mfd. - 35 V.
E 5 - 5 mfd. - 35 V.
E 8 - 8 mfd. -250 V.
E 8 - 8 mfd. -250 V.

C 1 -	.005	- 600 V.
C 2 -	.1	- 200 V.
C 3 -	.05	- 400 V.
C 4 -	.0001	- mica
C 5 -	.02	- 400 V.
C 6 -	.1	- 200 V.
C 7 -	.1	- 200 V.
C 8 -	.0001	- mica
C 9 -	.0001	- mica
C 10 -	.02	- 400 V.
C 11 -	.0001	- mica
C 12 -	.02	- 400 V.
C 13 -	.005	- 600 V.
C 14 -	.05	- 200 V.

AMERICAN TELEVISION & RADIO CO.

INVERTER SERVICE

The ATR Inverter is exceedingly simple and fool-proof in operation and has only one moving part, the vibrator, which plugs in just as easily as a radio tube and is more or less the "heart" of the Inverter and is usually responsible for erratic operation, low voltage, and the blowing of fuses.

LOW OUTPUT VOLTAGE may also be due to the input supply voltage being too low or to the improper setting of the voltage regulator which permits the correct output voltage for different loads. The "Low," "Medium," and "High" positions for the voltage regulator represent approximately 1/4, 1/2, and 3/4 of the total output capacity of the Inverter. The output voltage, when connected to the load being operated, should be measured with a voltmeter to make certain that excessive A.C. voltage is not being applied; where there is any doubt, be certain to set the voltage regulator at the **lowest** satisfactory position.

BLOWING OF FUSES is the most common complaint and is usually due to improperly operating the Inverter, particularly the type 110, which must be turned on **first** before the load is turned on. This practice must be carefully adhered to. If the Inverter is being properly operated and persists in blowing fuses then, most likely, readjustment of the vibrator contacts will be found necessary; this procedure is explained below. If after careful adjustment of the vibrator, the Inverter blows fuses with no load connected to it, remove the vibrator unit and turn the Inverter "on" to determine whether or not one of the primary condensers is shorted. The primary condensers are a dual unit which is located in the sealed compartment at the back of the Inverter and are connected across the vibrator contacts to prevent arcing and are most important: check this dual condenser for "shorts" and "opens"; either one of these two faults would cause the fuse to blow. The first would result in a blown fuse without the vibrator in position and with the Inverter turned "on"; whereas, the second fault, an open, would cause the fuse to blow only with the vibrator operating. Of course, the blowing of fuses can also be caused by an open or shorted secondary of the transformer or by open or shorted secondary condensers; these are not at all common and are merely mentioned as possible sources of trouble. **CAUTION:** In conducting the above tests, it is very important that the Inverter be fused at all times with the correct fuse; otherwise, both the virbrator and transformer will be burned and damaged beyond repair. A 5 ampere fuse rated at 25 volts is usually used for all the Inverters except the type 6 and 12 which require a 15 ampere fuse.

ADJUSTMENT OF VIBRATOR

To remove vibrator from Inverter, simply slip off the back portion of the Inverter cabinet which is fastened by two sheet metal screws, one screw is on the top of the cabinet (second flanged cover) and the other screw is on the bottom side of the Inverter in the same position. Be very careful not to damage leads connecting back cover portion to transformer.

Each different type Inverter has its respective vibrator and it is suggested that whenever possible, the vibrator unit be returned to the factory for adjustment if such is needed. However, the following information will suffice for adjusting and servicing vibrators in the field:

Before removing the screws from the vibrator can, note the prong relationship with the seam of the can; then remove the screws and withdraw the vibrator unit noting its exact position with the seam of the can: in an operating position, the armature of the vibrator is in a vertical plane.

Note the contact adjustment screws, contact clearance, and clearance between the end of the armature and pole pieces of the magnet.

OLD STYLE VIBRATOR HAVING ZINC BASE: In operation, the armature is first drawn toward the zinc base of the unit and then vibrates back and forth, with the armature swinging in front of the magnet with a clearance of approximately .010". It is very important that the armature should not come too close to the magnet to strike it or that iron filings should be allowed to be attracted to the magnet which, of course, would interfere with the free swinging of the armature. In a normal stationary position, the armature should be approximately 1/16" above the corner of the magnet.

Also, with the armature resting in a stationary position, none of the contacts should be touching each other and should be quite clean. In the case of the type 6, 12, and 32 vibrators, spacings between contacts on both sides of the armature should be approximately .006". In the case of the type 110 to type 220 vibrators, it is very important that the contact clearance on the side of the armature closest to the base be .006" and that the opposite contact clearance (the one farthest from the zinc base) be about .001". Handle the adjustment screws and nuts carefully.

NEW STYLE VIBRATOR HAVING STEEL BASE: In operation, the armature is first drawn toward the magnet away from the steel base and then vibrates back and forth, with the armature swinging in front of the magnet with a clearance of approximately .010". It is very important that the armature should not come too close to the magnet to strike it or that iron filings should be allowed to be attracted to the magnet which, of course, would interfere with the free swinging of the armature. In a normal stationary position, the armature should be approximately 3/32" below the cross strip of the magnet.

Also, with the armature resting in a stationary position, none of the contacts should be touching each other and should be quite clean. In the case of the type 32 and 50 vibrators, spacings between contacts on both sides of the armatures should be approximately .006". In the case of types 6 and 12 and 110 to 220 vibrators, it is very important (especially with types 110 to 220) that the contact clearance on the side of the armature closest to the base be not more than .001" and that the opposite contact clearance (the one farthest from the steel base) be about .008" to .010". Handle the adjustment screws and nuts very carefully.

After all adjustments have been very carefully made, the vibrator unit should be returned to its housing in exactly the same position it was originally in.

INTERFERENCE ON RADIO OPERATION

First of all, be sure that the Inverter which you have is equipped with a built-in radio filter or with an external filter unit.

It is absolutely essential for satisfactory radio operation to have a good outside aerial and ground attached to the radio set; the grounding of the radio chassis is most important and should not be overlooked. The aerial lead-in and radio set should be kept as far from the Inverter and its supply cable as is practical.

Make certain that the interference present is being caused by the Inverter and not by some outside

AMERICAN TELEVISION & RADIO CO.
INVERTER SERVICE

source or the D.C. supply system: such as the charging system for 32-volt plants and the 110-volt D.C. line generators.

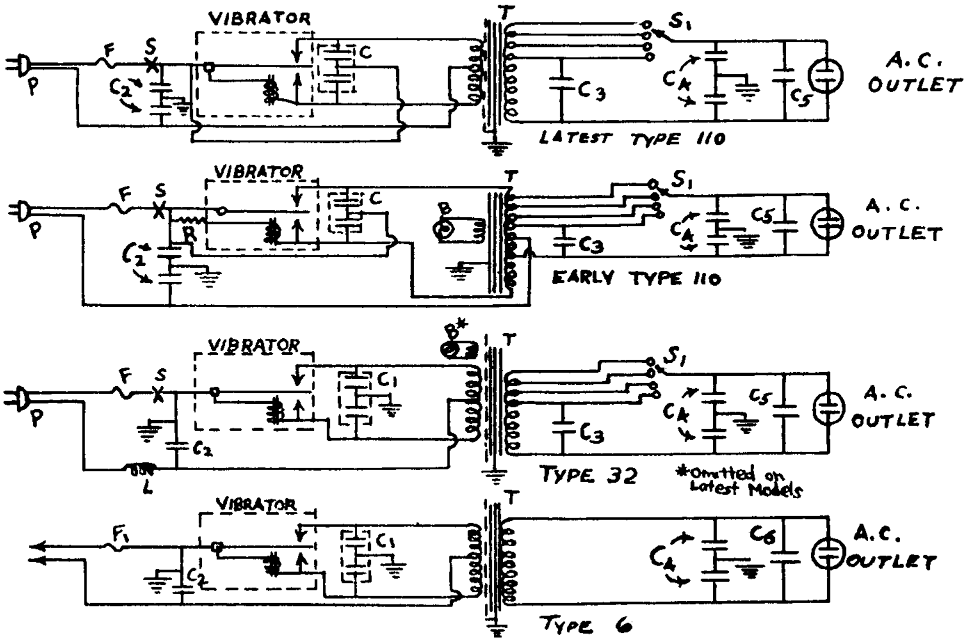
Should the 32-volt charger (the generator and ignition system) be causing interference, it will be necessary, in order to minimize or eliminate it, to place a 1 MFD 200-volt condenser across the generator output and also suppressors in the high tension leads of the ignition system.

In some of the early type 32 Inverters, grounding the side of the fuse nearest the receptacle directly to the rivet holding the bakelite strip results in a considerable reduction in interference; this connection should not be more than a fraction of an inch long. Also, the placing of R. F. chokes in both sides of the input line and A.C. output of the Inverter may prove helpful for all the early type Inverters.

Hum in radio receivers can usually be eliminated by reversing the plug in the Inverter receptacle, or, the Inverter plug in the supply receptacle.

Although out of place here, it may be well to mention that mechanical noises heard when the Inverter (early types) is "on," which is not the normal operation of the vibrator, is caused by the electro-magnetic attractions of the cabinet to the core of the transformer. These noises can be easily eliminated by inserting pieces of cardboard between the transformer core and top and bottom of the cabinet.

WIRING DIAGRAMS OF ATR INVERTERS
(Showing fundamental circuits only)



NOTE:

Circuit diagrams of other ATR Inverters are quite similar to the above standard types; that is, type 12 is similar to that for type 6; type 50 is similar to type 32; and types 90, 150, and 220 are similar to type 110.

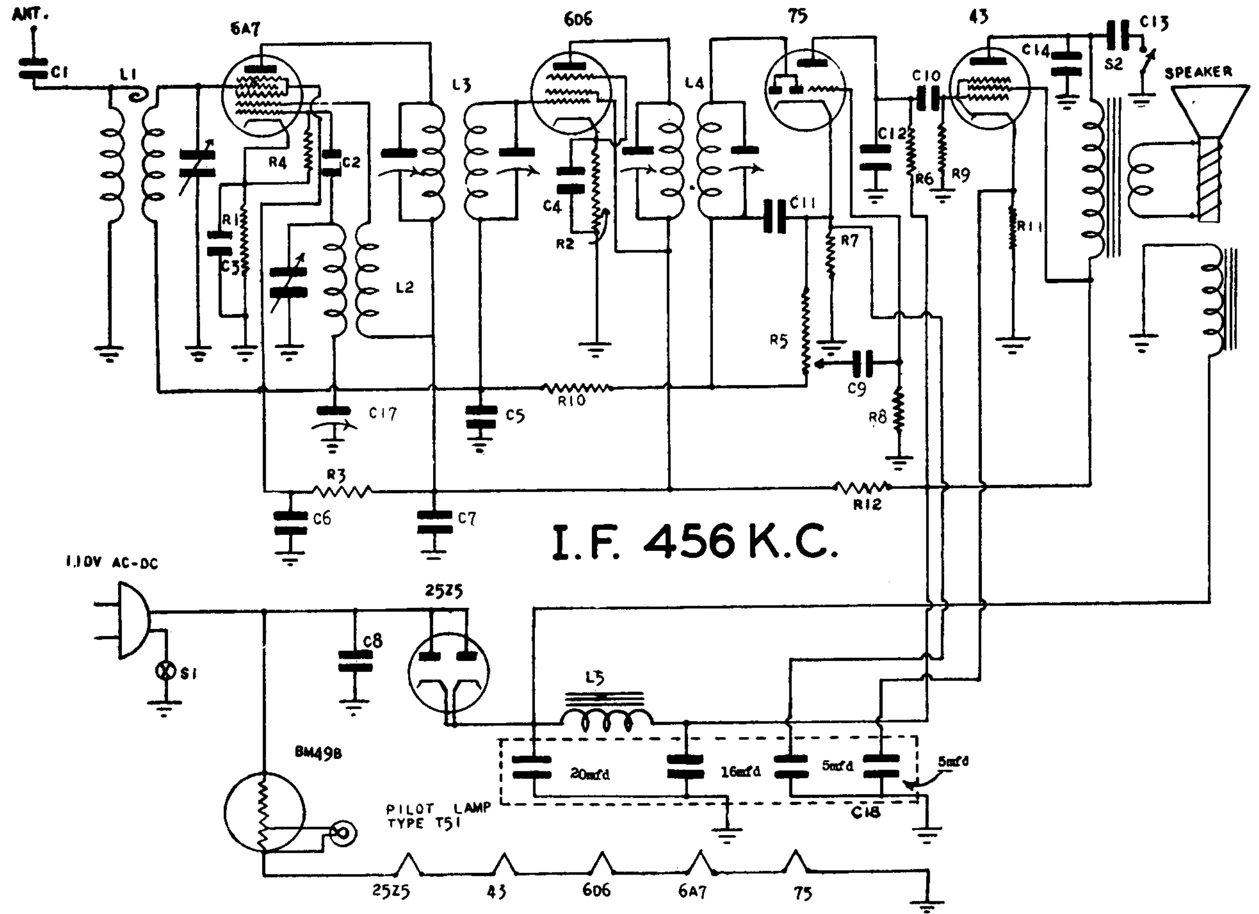
All values and ratings are plainly marked on the different parts.

REPLACEMENT PARTS PRICE LIST
When ordering replacement parts, be sure to specify type and serial number of Inverter.

Part	Description	List
	Any Type Vibrator	$4.95
	Vibrator Exchange Price	2.50
B	Pilot Bulb, 6 V.	.18
C	Condenser, .5-.5 MFD	1.95
C1	Condenser, 4.0-4. MFD	2.45
C2	Condenser, .5 MFD	.32
C3	Condenser, .1 MFD	.24
C4	Condenser, .1-.1 MFD	.43
C5	Condenser, .1 MFD	.24
C6	Condenser, .25 MFD	.42

Part	Description	List
F	Fuse Mounting	$0.29
	Fuse, 5 or 15 amp.	.05
L	R. F. Choke	.45
P	All-Rubber Cord and Plug	.98
S	Toggle Switch	.50
S1	Tap Switch	1.05
T	Transformer	6.75
	A.C. Outlet	.25

AUTOMATIC RADIO MFG. CO., Inc.
MODEL B-30 SERIES I



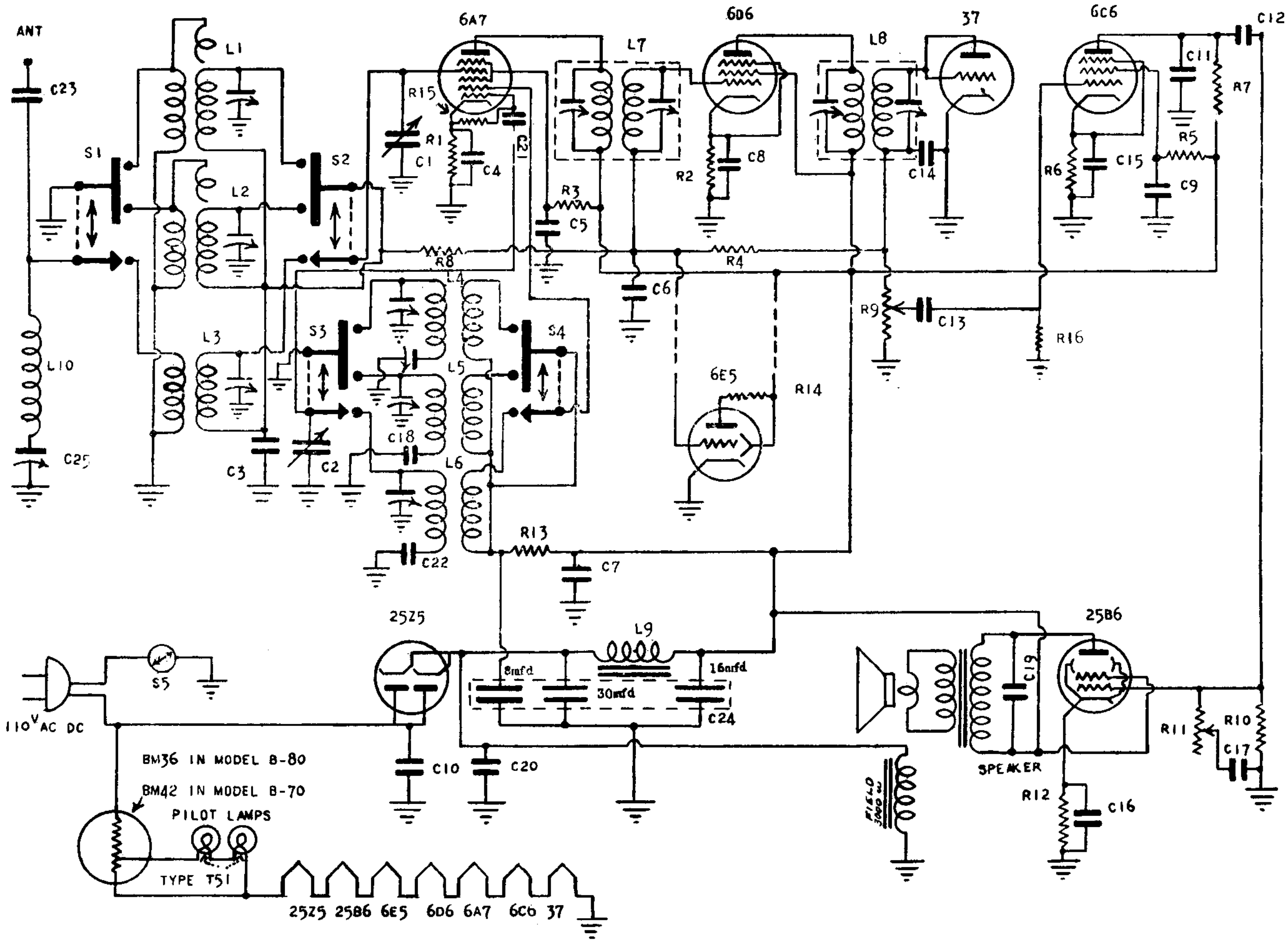
SCHEMATIC LOCATION	DESCRIPTION	PART NO.	LIST PRICE
L1	Antenna Coil	BA110	$ .50
L2	Oscillator Coil	BO110	.40
L3	1st IF Coil	LC110	.80
L4	2nd IF Coil	LC112	.80
L5	Filter Choke—300w	C1588	.80
——	Speaker	SD1	3.50
C1	Fixed Condensor — .002mfd—600v	——	.20
C2	Mica " — .0001mfd	——	.20
C3, C4, C5, C6, C7, C8	Fixed " — .1mfd—200v	——	.20
C9, C10	Fixed " — .01mfd—400v	——	.20
C11, C12	Mica " — .0002mfd	——	.20
C13	Fixed " — .02mfd—600v	——	.25
C14	Fixed " — .006mfd—600v	——	.20
C17	Variable Padder — 200-600mfd	——	.40
C18	Electrolytic Condensor Block	CE15	1.60
S1	Line Switch (On Volume Control)	——	——
S2	Tone Control Switch	S12	.40
R1, R2	Resistor — 250 ohms—¼ watt	——	.20
R3	Resistor — 25,000 ohms—¼ watt	——	.15
R4	Resistor — 50,000 ohms—¼ watt	——	.15
R5	Volume Control — 500,000 ohms	RV18	.80
R6	Resistor — 500,000 ohms—¼ watt	——	.15
R7	Resistor — 5,000 ohms—¼ watt	——	.15
R8, R9, R10	Resistor — 1 megohm—¼ watt	——	.15
R11	Resistor — 750 ohms—½ watt	——	.20
R12	Resistor — 30 ohms—¼ watt	——	.20

I. F. Alignment. Connect a signal generator set at 456kc to the 6A7 input and connect an output meter to the speaker output. Using a weak signal tune the two I. F. condensers on the first I. F. coil and the two I. F. condensers on the output I. F. coil for maximum response.

R. F. Alignment. Connect the signal generator set at 1400kc to the antenna lead using a dummy antenna of 200mmf. Tune the set by means of the dial to 1400kc position. Adjust oscillator trimmer for this frequency. Pad at 600kc. Recheck 1400 kc and trim antenna stage for maximum response. Repeating the alignment may result in improved sensitivity.

AUTOMATIC RADIO MFG. CO., Inc.

MODELS B-70 & B-80 SERIES I



SCHEMATIC LOCATION	DESCRIPTION	PART NO.	LIST PRICE
L1	Antenna Coil Band A	BA115	$0.60
L2	" " " B	PA115	.60
L3	" " " C	SA115	.60
L4	Oscillator Coil Band A	BO115	.60
L5	" " " B	PO115	.55
L6	" " " C	SO115	.55
L7	1st I.F. Coil	LC110	.80
L8	2nd I.F. Coil	LC112	.80
L9	Filter Choke	C1583	.85
L10	Antenna Wave Trap	LC50	1.00
—	Speaker	SD18	4.25
S1, S2, S3, S4	Band Switch	S10	1.50
S5	Line Switch (On Vol. Control)	—	—
C1, C2	Tuning Condenser	CV24	1.80
C3, C4, C5, C6, C7 C8, C9, C10	Fixed " .1mfd—200v	—	.20
C11, C14	Mica " 200mmfd	—	.20
C12, C13	Fixed " .02mfd—600v	—	.20
C15, C16	Fixed " 5mfd—35v	—	.40
C17	Fixed " .0015mfd—600v	—	.20
C18	Mica " 1400mmfd	—	.25
C19, C20	Fixed " .006mfd—600v	—	.20
C21	Mica " 100mmfd	—	.20
C22	Fixed " 4500mmfd—200v	—	.25
C23	Fixed " .002mfd—600v	—	.20
C24	Electrolytic Condenser Block	CE11	1.20
C25	Trimmer Condenser 3-30mmfd	—	.20
R1, R2	Resistors 250 ohms—¼ Watt	—	.20
R3	" 25,000 ohms—¼ Watt	—	.20
R4	" 2 megohms—¼ Watt	—	.20
R5, R14	" 1 megohm—¼ Watt	—	.15
R6	" 2,500 ohms—¼ Watt	—	.20
R7, R8	" 250,000 ohms—¼ Watt	—	.15
R9	Volume Control 250,000 ohms	RV24	.80
R10	Resistors 500,000 ohms—¼ Watt	—	.15
R11	Tone Control 500,000 ohms	RV17	.70
R12	Resistors 300 ohms—1 Watt	—	.25
R13	" 7,500 ohms—¼ Watt	—	.20
R15	" 50,000 ohms—¼ Watt	—	.15
R16	" 2 megohms—¼ Watt	—	.20

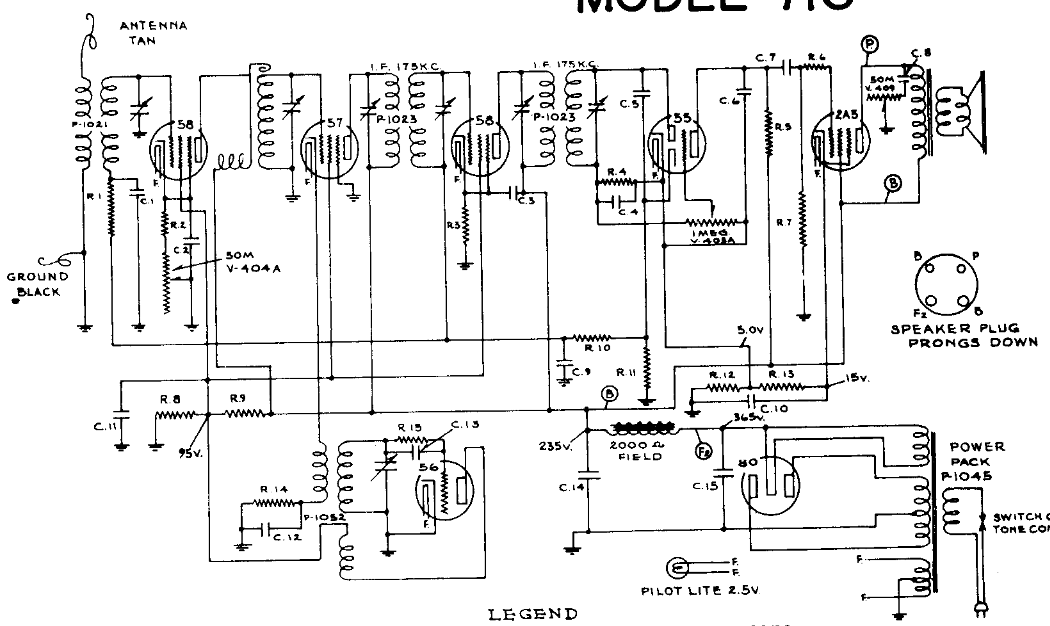
ALIGNMENT PROCEDURE

I. F. Alignment. Connect a signal generator set at 456kc to the 6A7 input and connect an output meter to the speaker output. Using a weak signal tune the two I. F. condensers on the composite coil and the two I. F. condensers on the output I. F. coil for maximum response.

R. F. Alignment. Connect the signal generator set at 1400kc to the antenna lead using a dummy antenna of 200mmf. Tune the set by means of the dial to 1400kc position. Adjust oscillator trimmer for this frequency. Pad at 600kc. Recheck 1400kc and trim antenna stage for maximum response. Repeating the alignment may result in improved sensitivity. Introduce a 456kc signal into the antenna lead and adjust Trap Condenser (C25) for minimum response.

I.F. 456 K.C.

BELMONT RADIO CORPORATION
MODEL 71C



LEGEND

RESISTORS

Nº	VALUE	Nº	VALUE
R.1:-	500M	R.9:-	15M *
R.2:-	400	R.10:-	1MEG
R.3:-	400	R.11:-	500M
R.4:-	500M	R.12:-	150 *
R.5:-	250M	R.13:-	300 *
R.6:-	100M	R.14:-	10M
R.7:-	500M	R.15:-	250M
R.8:-	25M *		

NUMBERS PREFIXED BY "P" OR "V" ARE PARTS.
* R.8, R.9, R.12 & R.13 IN ONE UNIT P-1049
* C.10, C.14, & C.15 " " " P-1047

CONDENSERS

Nº	VALUE	Nº	VALUE
C.1:-	.05	C.9:-	.05
C.2:-	.05	C.10:-	12.0MF *
C.3:-	.05	C.11:-	.05
C.4:-	500MMF.	C.12:-	.05
C.5:-	500MMF.	C.13:-	500MMF.
C.6:-	500MMF.	C.14:-	4.0MF. *
C.7:-	.02	C.15:-	8.0MF. *
C.8:-	.1		

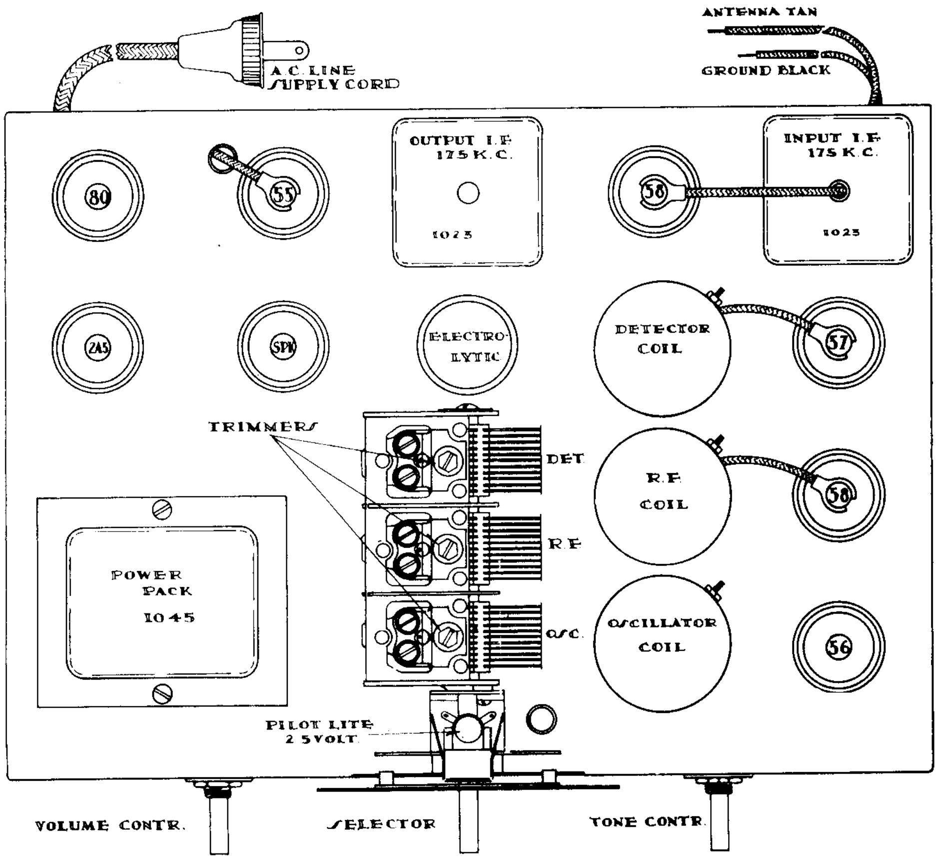
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL, WITH 119 VOLTS A.C. LINE.

SERVICE NOTES

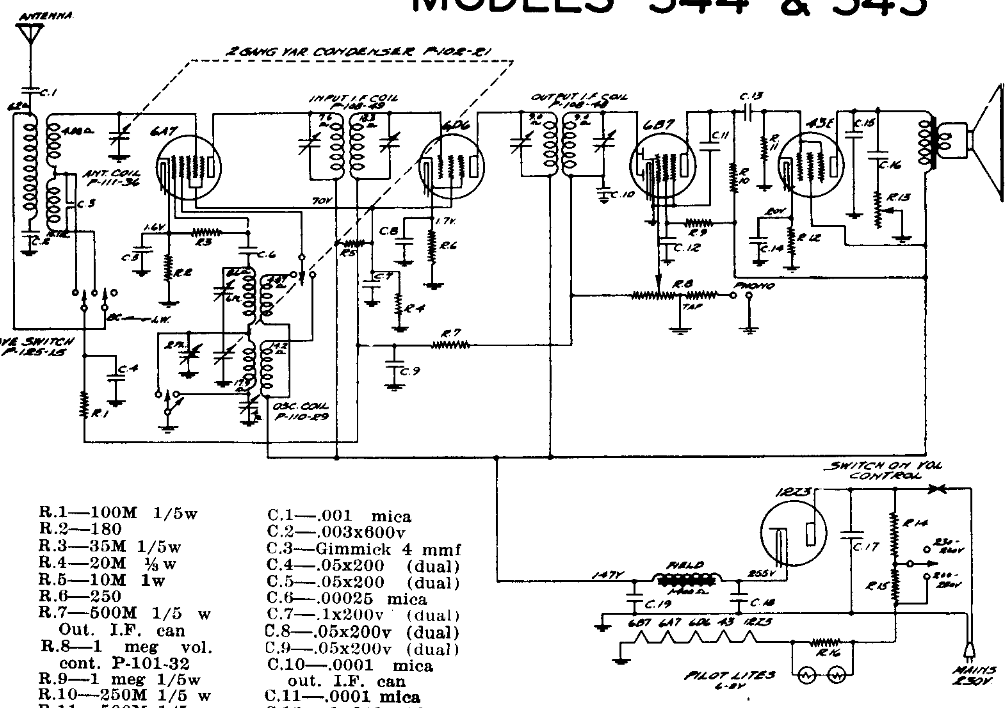
Should it be at any time necessary to rebalance this set, the correct procedure is as follows:

To peak I.F. transformers connect oscillator (set at 175 KC) to grid of 57 first detector and (Black) ground wire. Adjust four trimmers from bottom of chassis (one nut and one screw on each transformer trimmer) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer).

Connect an oscillator in series with a 200 MMFD condenser to the Tan (Antenna) wire and Black (ground) wire, with the oscillator set at 1720 KC and the variable condenser at its minimum position (extreme right of its rotation) adjust trimmer of oscillator (front) section of variable condenser to resonance. Set oscillator to 1400 KC and rotate variable condenser until signal is tuned in, then adjust ANT. and R.F. trimmers (center and rear sections of condenser) to resonance. Check output at 1200, 1000, 800, and 600 Kilocycles, bend plates of center and rear sections of variable condenser only if necessary.



BELMONT RADIO CORPORATION
MODELS 544 & 545



R.1—100M 1/5w
R.2—180
R.3—35M 1/5w
R.4—20M ⅓w
R.5—10M 1w
R.6—250
R.7—500M 1/5 w Out. I.F. can
R.8—1 meg vol. cont. P-101-32
R.9—1 meg 1/5w
R.10—250M 1/5 w
R.11—500M 1/5w
R.12—500 1w
R.13—50M tone cont. P-101-31
R.14—524
R.15—117
R.16—60

C.1—.001 mica
C.2—.003x600v
C.3—Gimmick 4 mmf
C.4—.05x200 (dual)
C.5—.05x200 (dual)
C.6—.00025 mica
C.7—.1x200v (dual)
C.8—.05x200v (dual)
C.9—.05x200v (dual)
C.10—.0001 mica out. I.F. can
C.11—.0001 mica
C.12—.1x200v (dual)
C.13—.01x400v
C.14—4 mfd. x25v
C.15—.016x400v
C.16—.05x400v
C.17—.1x400v
C.18—10 mfd. x250v
C.19—8 mfd. x200v

Voltages taken from points indicated to chassis ground.

Volume control on full.
Numbers prefixed by letter "P" are part nos.

NOTE:

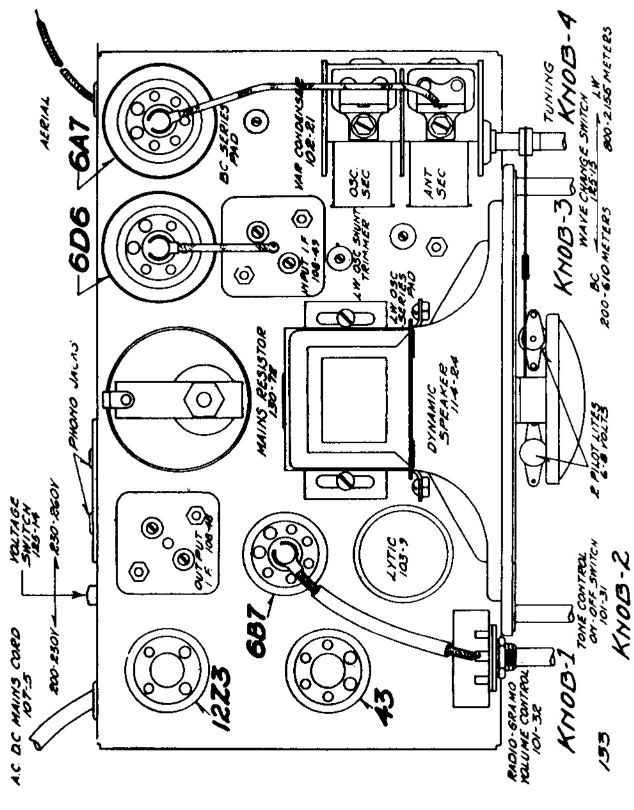
C.4 and C.5 in one unit—P-118-7
C.8 and C.9 in one unit—P-118-7
C.14, C.18 and C.19 in one unit—P-103-9
R.2, R.6 and R.16 in one unit—P-106-23
R.14 and R.15 in one unit—P-130-72
C.7 and C.12 in one unit—P-118-1

Serial No. 5G132551A and up.

NOTE:—Buffer Resistor (106-24) of 300 Ohms added in series with cathode of 12Z3 not shown on diagram.

TEST FREQUENCIES:

	Meters	Kilocycles
Long Wave	2000	150
	857	350
	800	375
I.F.	645.1	465
Broadcast	545	550
	214.3	1400
	200	1500



NOTE:—Above diagram of Model 544-545 exactly the same except speaker is mounted in cabinet and dial is mounted on bracket secured to chassis.

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a voltmeter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

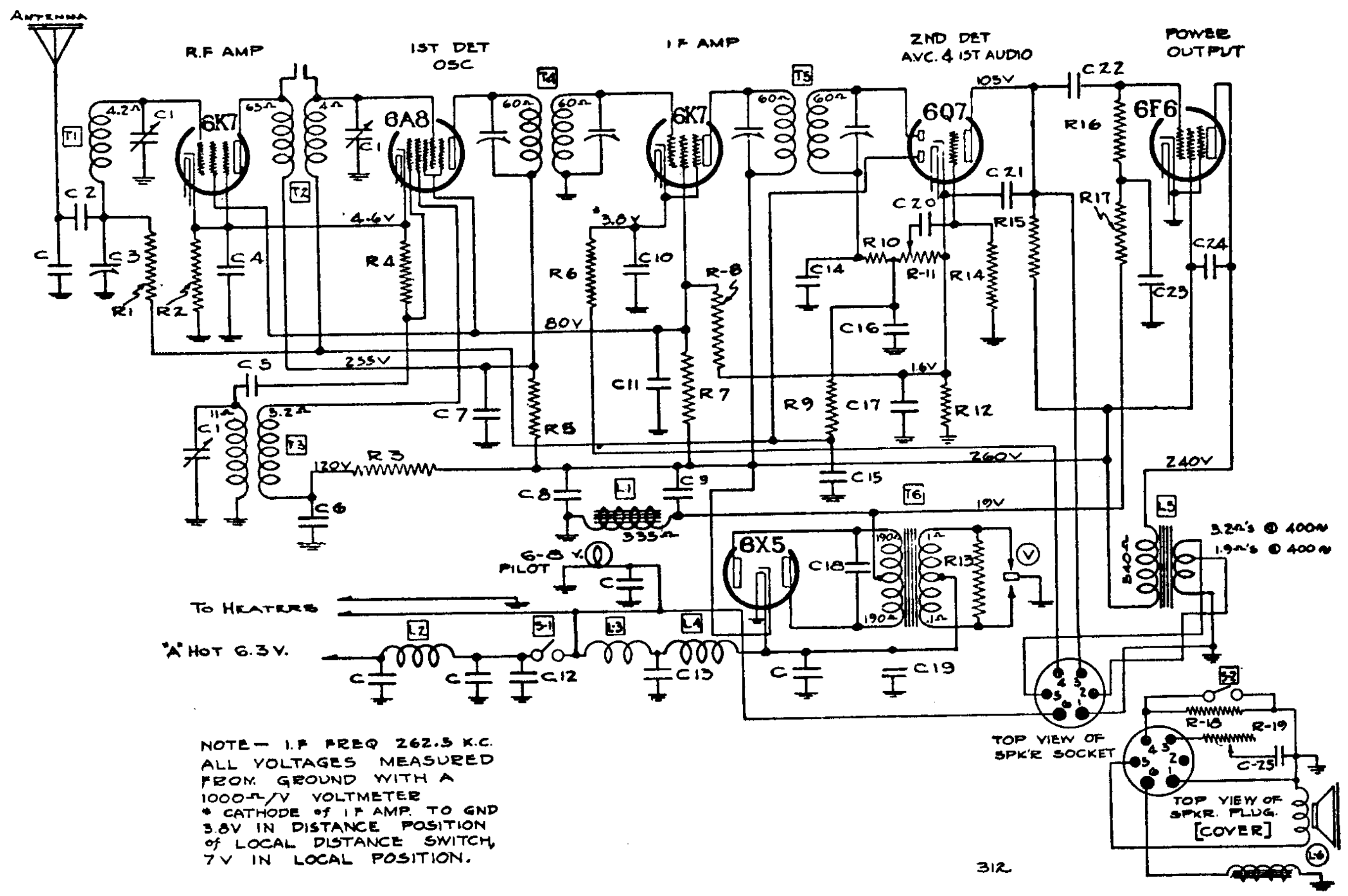
IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND EFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages should be measured with the switch in the high voltage position with 230 volts, A.C. or D.C., on the line. In case it is impossible to secure the exact mains voltage, suitable allowances should be made.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

BELMONT RADIO CORPORATION
MODEL 667



No.	Part No.	Description
		CONDENSERS
C		Spark Plate
C1	102-45	3 Gang Condenser
C2	129-73	.002 Mica - MW-W - 10%
C3	124-36	Series Pad
C4	116-20	.1 x 200 v. - 20%
C5	129-12	.00025 Mica - MT - 20%
C6	116-19	.1 x 400 - 20%
C7	116-19	.1 x 400 - 20%
C8	119-34	8. mfd. - 350 W v.
C9	119-34	4 mfd. 350 W v.
C10	116-19	.05 x 200 v. - 20%
C11	116-20	.25 x 200 v. - 20%
C12	100-31	.5 x 120 v. - 10-50% - Braid leads
C13	100-31	.5 x 120 v. - 10-50%
C14	129-5	.0001 Ceramicon - 20%
C15	116-19	.05 x 200 v. - 20%
C16	129-5	.0001 Ceramicon - 20%
C17	116-20	.02 x 200 - 20%
C18	100-36	.01 x 1400 v. - 20% - 10% "A"
C19	100-31	.5 x 120 v. - 10% - 50%
C20	116-20	.02 x 200 - 20%
C21	129-5	.0001 Ceramicon - 20%
C22	100-55	.01 x 400 - 25%
C23	100-48	.25 x 200 - 20%
C24	100-54	.006 x 600 - 25%
C25	100-11	.01 x 400 - 25%

C4, C11, C17, C20 All in Block 116-20
C7, C6, C10, C15 All in Block 116-19

RESISTORS

R1	130-141	250M ohm - 1/3 w. Insulated
R2	130-54	500 ohm - 1/3 w.
R3	130-138	50M ohm - 1/2 w. Insulated
R4	130-52	50M ohm - 1/3 w.
R5	130-137	1500 ohm - 1/3 w. Insulated
R6	130-154	1000 ohm - 1/3 w. Insulated
R7	130-143	30M ohm - 1.2 w.
R8	130-139	40M ohm - 1/3 w. Insulated
R9	130-19	1 meg - 1/3 w.
R10	130-162	50M ohm - 1/3 w. Insulated
R11	101-73	250M ohm - Volume Control
R12	130-153	700 ohm - 1/3 w.
R13	130-84	200 ohm - 1/3 w.
R14	130-19	1 meg ohm - 1/3 w.
R15	130-11	250M ohm - 1/3 w.
R16	130-5	300M ohm - 1/3 w.
R17	130-11	250M ohm - 1/3 w.
R18	130-161	4000 ohm - 1/3 w. Insulated
R19	101-45	Tone Control 1 Meg ohm.

PARTS

T1	111-73	Antenna Coil Complete
T2	109-36	R.F. Coil Complete
T3	110-59	Oscillator Coil Complete
T4	108-101	I.F. Input
T5	108-102	I.F. Output
T6	104-83	Power Transformer
L1	105-39	Filter Choke (335 ohms)
L2	105-26	"A" Choke
L3	105-24	"A" Choke
L4	105-19	"A" Choke
L5	105-40	Output transformer
L6	114-62	Speaker. Dynamic
S1		Switch on Volume Control
S2	125-28	Sensitivity switch.

PILOT LAMP AND FUSE

PILOT LAMP—A 6-8 volt automobile type lamp is used (Bulb No. 116-13 Bulb).

Fuse—A15 ampere automobile fuse is used. CAUTION: BE SURE THE FUSE SHIELD IS ON THE FUSE BEFORE THE LATTER IS INSERTED IN THE RECEPTACLE.

DIAL ADJUSTMENT

Tune set to some station of a known frequency (between 800 and 1200 K.C.), hold selector knob, then remove pilot light assembly from back of remote head and with a screw driver adjust the slotted screw through this opening and in this way adjust the dial pointer to the correct frequency setting.

BELMONT RADIO CORPORATION
MODEL 667

SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good. If fuse blows out frequently and insulating sleeve has been properly placed over fuse, the trouble is probably in the vibrator, it should be replaced. Do not attempt to make any adjustments on the vibrators.

ALIGNING INSTRUCTIONS

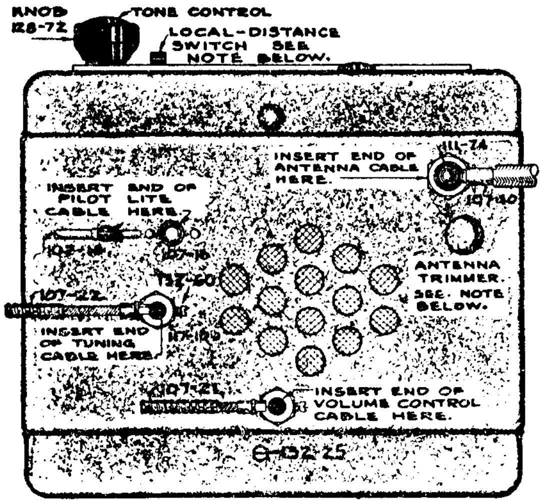
All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment, unless it becomes necessary to replace a coil or transformer, or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustment is necessary and only after voltages, tubes and condensers have been checked and found to be normal. To properly re-align this receiver, a test oscillator, as well as an output meter, must be used.

DUMMY ANTENNAS

The dummy antennas referred to in the following instructions are:

"I.F. Dummy" —A .5 mfd. condenser connected in series with the test oscillator output lead.

"Broadcast Dummy"—A 175 mmfd. condenser connected in series with the output lead of the test oscillator.



LOCAL — DISTANCE SWITCH

This switch is located on the chassis cover.

Local—While driving in the city or close to broadcasting stations, it is best to turn the knob to the "local" position for least noise.

Distance—When driving in the country or when listening to distant stations, best results are obtained with the knob turned to the "distance" position. In this position the sensitivity is at a maximum.

ADJUST ANTENNA TRIMMER:

Tune in a weak signal at approximately 600 K. C. with volume control about three-fourths on. Remove cinch button and adjust trimmer screw until maximum output is obtained.

RESONANCE INDICATOR

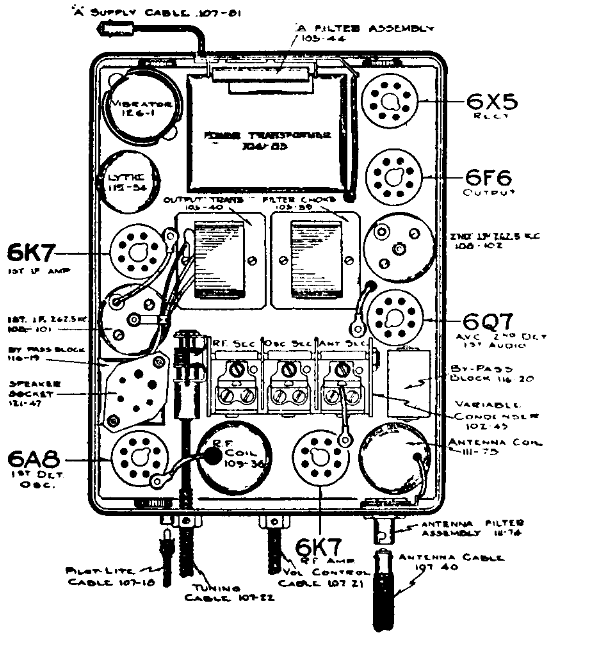
Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 6F6 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

I.F. ALIGNMENT: (262.5 K.C.)

1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 262.5 K.C. in series with I.F. dummy antenna, to grid of 6K7 I.F. tube.
2. Adjust trimmer condensers of output I.F. transformer No. 108-102 to resonance with oscillator.
3. Move test oscillator connection to grid of 6A8 tube and adjust trimmer condensers of input I.F. transformer No. 108-101 to resonance with oscillator. See top view for location of these transformers. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver.

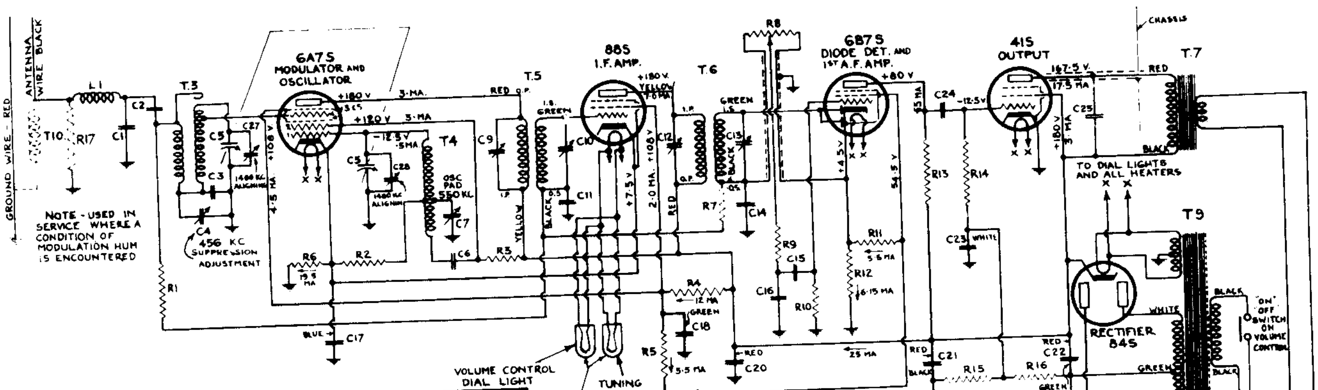
BROADCAST ALIGNMENT

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1530 K.C. in series with broadcast dummy to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance. (This adjustment is on the middle section of the three-gang condenser—see top view, Fig. 2).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. and antenna trimmers to resonance (see top view, Fig. 2).
4. Re-set test oscillator to 600 K.C. and rotate variable condenser to 600 K.C. Adjust series pad in the antenna circuit, rocking gang condenser to and fro at the same time adjusting series pad for maximum gain. This pad is mounted on the side of the antenna can.
5. Go back and check 1400 K.C. If adjustment is made here, check 600 K.C. again.
6. Check for sensitivity at 1000 K.C. by setting test oscillator to this frequency and picking up the signal by rotating variable condenser. Under no circumstances bend plates **of variable condenser sections to correct tracking.**



CANADIAN RADIO CORP.

MODELS CRESCENDO & 504F



ITEM	VALUE	LIMITS	REMARKS	PART Nº
R1	5000 ω	±10%	1/2 W CARBON	504-27
R2	40,000 ω	±15%	1/2 W "	502-46
R3	20,000 ω	±15%	1/2 W "	502-47
R4	6,000 ω	±10%	1 W "	504-21
R5	9,700 ω	±10%	1/4 W "	504-22
R6	385 ω	±10%	1/2 W "	504-28
R7	1,000,000 ω	±15%	1/2 W "	504-29
R8	500,000 ω		LEVEL CONT. (CARBON)	504-15
R9	100,000 ω	±20%	1/2 W CARBON	504-20
R10	1,000,000 ω	±20%	1/2 W. "	504-51
R11	9,100 ω	±10%	1/2 W. "	504-23
R12	730 ω	±10%	1/2 W. "	504-24
R13	150,000 ω	±15%	1/2 W. "	504-30
R14	400,000 ω	±15%	1/2 W "	502-52
R15	120,000 ω	±5%	1/2 W "	502-58
R16	500,000 ω	±5%	1/2 W "	502-57
R17	25,000 ω	±20%	1/4 W "	506-56

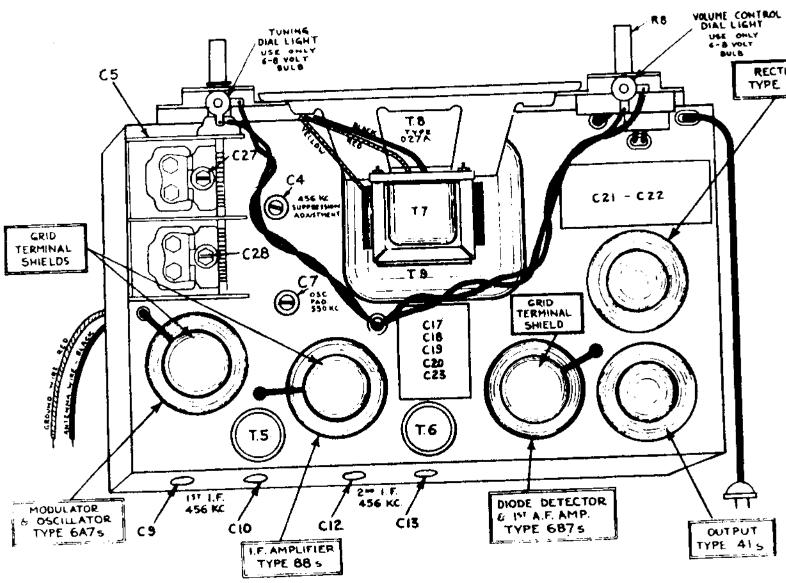
ITEM	VALUE	LIMITS	REMARKS	PART Nº
C1	.00025 MFD	±5%	MICA	504-25
C2	.02 MFD	±10%	3 PAPER (.0005") 400V	502-48
C3	.005 MFD	±5%	3 PAPER (.0005") 400V	504-81
C4	1900 TO 3800 MMFD		I.F. SUPRESSOR	505-75
C5	.00041 MFD		2 GANG TUNING COND.	502-23
C6	.0001 MFD	±10%	MICA	6556
C7	.00041 MFD		VAR. OSC. PADDING	50 76
C8				
C9	10 TO 50 MMFD	VAR.	I.F. TUNING	505-44
C10	10 TO 50 MMFD	VAR.	I.F. TUNING	503-44
C11	.05 MFD	±20%	2 PAPER (.0005") 200V	6873
C12	10 TO 50 MMFD	VAR.	I.F. TUNING	503-44
C13	10 TO 50 MMFD	VAR.	I.F. TUNING	503-44
C14	.00025 MFD	±10%	MICA	6555
C15	.02 MFD	±10%	3 PAPER (.0005") 400V	502-48
C16	.00025 MFD	±10%	MICA	6553
C17	.25 MFD	±10%	2 PAPER (.0004") 100V	504-9
C18	.1 MFD	±10%	2 PAPER (.0005") 200V	504-9
C19	.1 MFD	±10%	2 PAPER (.0005") 200V	504-9
C20	.1 MFD.	±10%	3 PAPER (.0004") 300V	504-9
C21	12 MFD. 300V	+75% -10%	DRY ELECTROLYTIC	502-34
C22	8 MFD. 350V.	+25% -10%	" "	502-34
C23	.2 MFD	±10%	2 PAPER (.0004") 100V	504-9
C24	.02 MFD	±10%	3 PAPER (.0005") 400V	502-48
C25	.015 MFD	+20% -10%	3 P. (.0005") 400V	504-86
C27	VARIABLE		R.F. ALIGNING (1400 KC.)	PART OF
C28	VARIABLE		R.F. ALIGNING (1400 KC.)	502-23

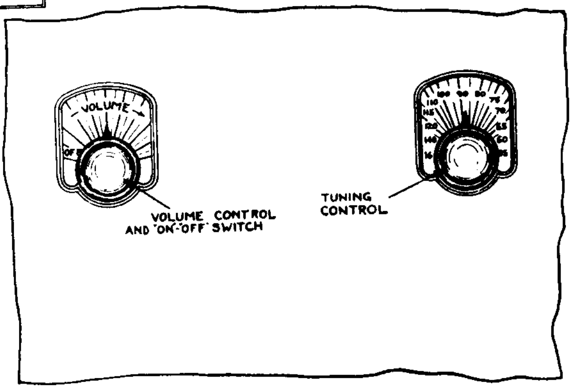
NOTE -. CONDENSERS C17, C18, C19, C20, C23. ARE ALL IN SAME CONTAINER

ALSO - C21 - C22 ARE IN SAME CONTAINER

ITEM	DESCRIPTION	PART Nº
T3	R.F. TRANS. ANTENNA STAGE	504-11
T4	OSCILLATOR COIL	504-87
T5	1ST I.F. TRANSFORMER	502-17
T6	2ND I.F. TRANSFORMER	504-14
T7	OUTPUT TRANS. ON SPEAKER	27-9
T8	D15 MIDGET SPEAKER	27-1
T9	POWER TRANSFORMER	502-12
T10	R.F. CHOKE (SEE NOTE)	7370
L1	ANTENNA CHOKE	504-88

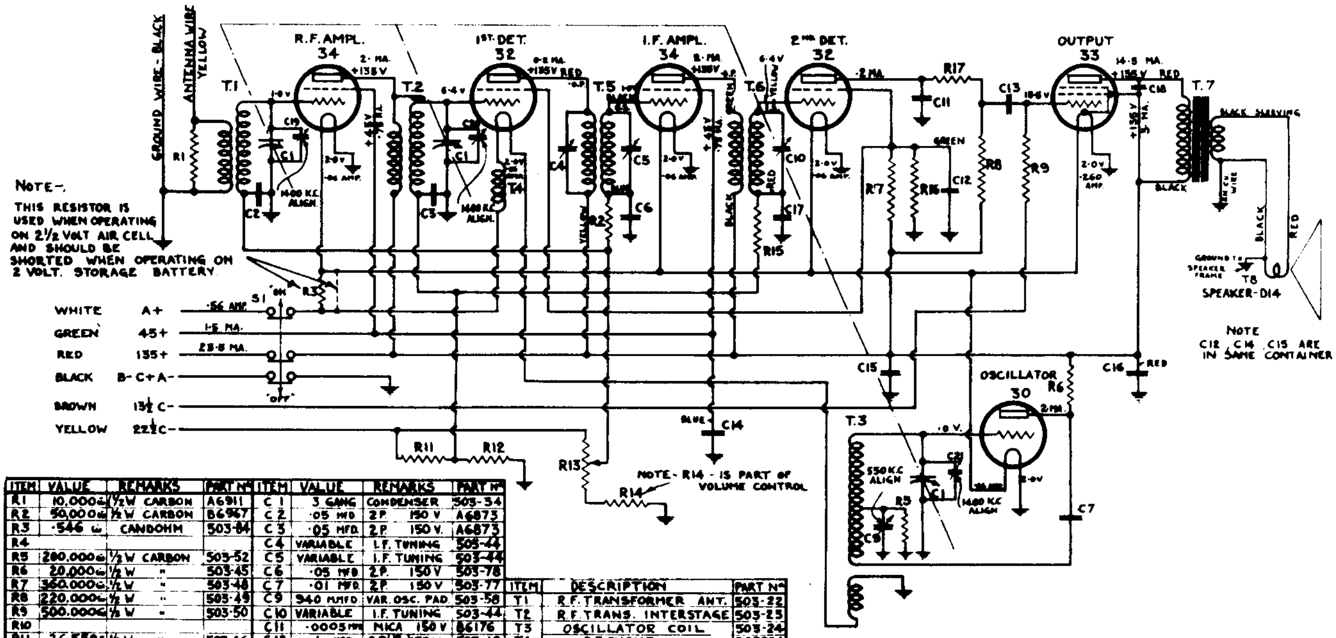
I.F. 456 K.C.





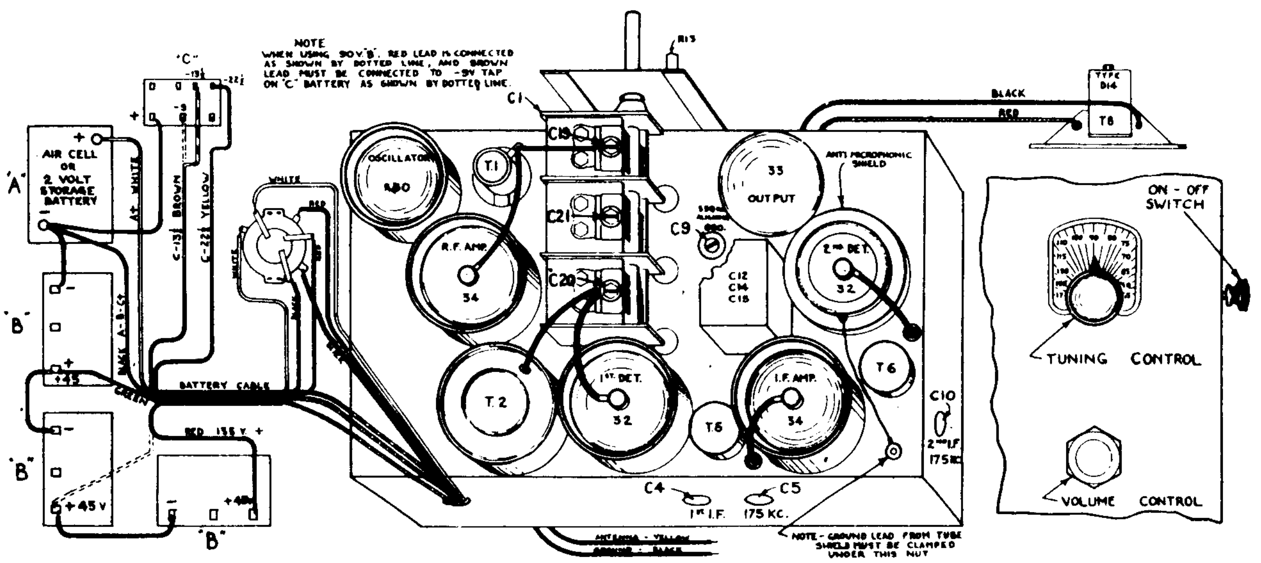
CANADIAN RADIO CORP.

MODELS HARMONY, OVERTURE & 503



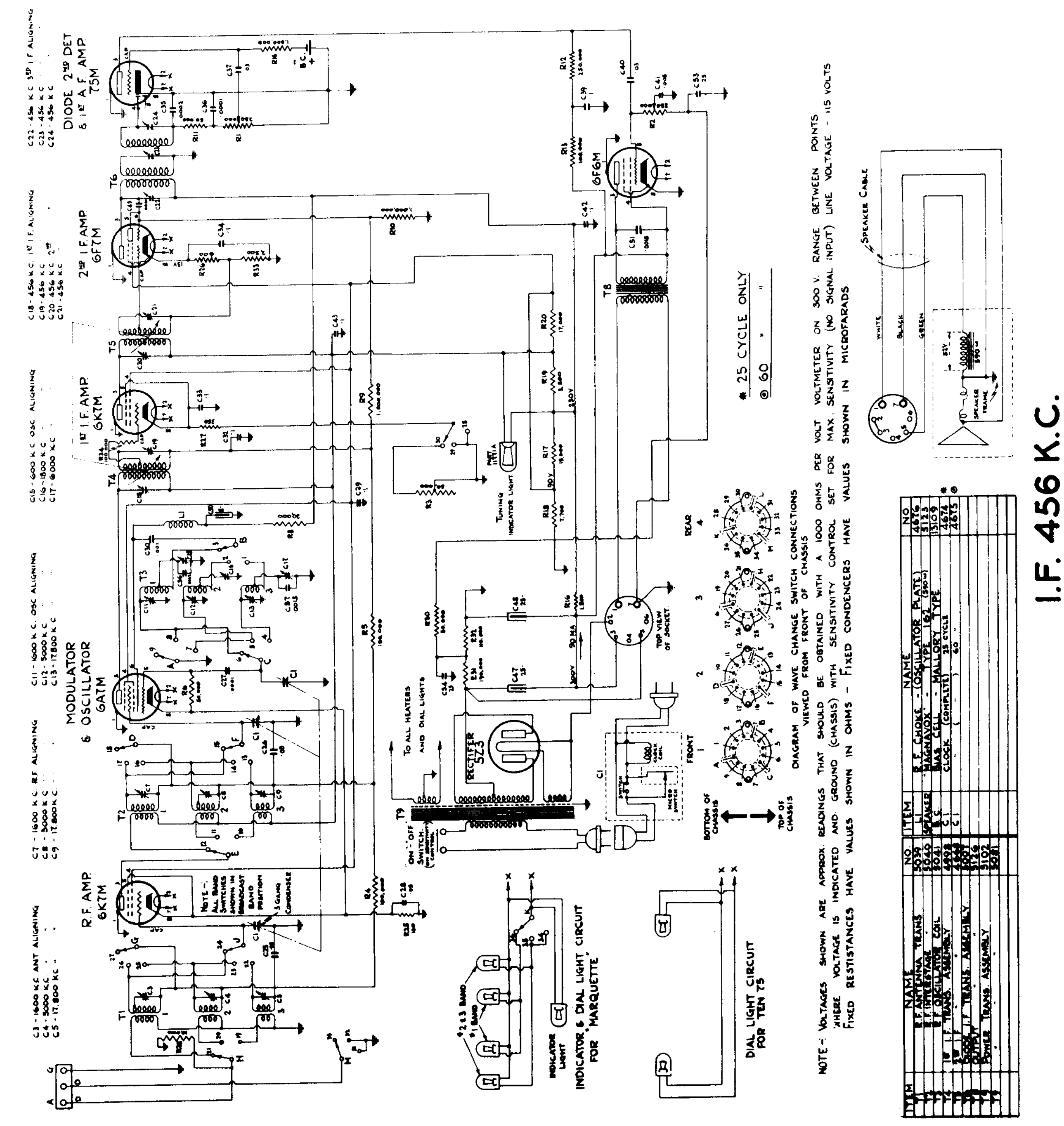
ITEM	VALUE	REMARKS	PART Nº	ITEM	VALUE	REMARKS	PART Nº	ITEM	DESCRIPTION	PART Nº
R1	10,000Ω	½W CARBON	A6911	C1	3 GANG	CONDENSER	503-34			
R2	50,000Ω	½W CARBON	B6967	C2	·05 MFD	2P. 150 V	A6873			
R3	·546 Ω	CANDOHM	503-84	C3	·05 MFD.	2P. 150 V.	A6873			
R4				C4	VARIABLE	I.F. TUNING	503-44			
R5	200,000Ω	½W CARBON	503-52	C5	VARIABLE	I.F. TUNING	503-44			
R6	20,000Ω	½W "	503-45	C6	·05 MFD	2P. 150V	503-78			
R7	360,000Ω	½W "	503-48	C7	·01 MFD	2P. 150 V	503-77	ITEM	DESCRIPTION	PART Nº
R8	220,000Ω	½W "	503-49	C9	940 MMFD	VAR. OSC. PAD	503-58	T1	R.F. TRANSFORMER ANT.	503-22
R9	500,000Ω	½W "	503-50	C10	VARIABLE	I.F. TUNING	503-44	T2	R.F. TRANS. INTERSTAGE	503-23
R10				C11	·0005 MFD	MICA 150 V	B6176	T3	OSCILLATOR COIL	503-24
R11	26,550Ω	½W "	503-46	C12	·1 MFD.	2P. 150 V	503-10	T4	R.F. CHOKE	B6999A
R12	10,550Ω	½W "	503-47	C13	·05 MFD	2P. 160 V	503-78	T5	1ST I.F. TRANSFORMER	503-25
R13	21,500Ω	VOLUME CONTROL	503-64	C14	·1 MFD.	2P. 150 V	503-10	T6	2ND I.F. TRANSFORMER	503-26
R14	1,000Ω	in VOL. CONTROL	503-64	C15	·05 MFD	2P. 150 V	503-10	T7	OUTPUT TRANSFORMER	503-33
R15	50,000Ω	½W CARBON	B6967	C16	16· MFD.	DRY ELECT. 150V	503-57			
R16	500,000Ω	½W "	503-51	C17	·05 MFD.	2P. 150 V	503-78	T8	SPEAKER - PERM. MAGNET D14	14-1
R17	10,000Ω	½W "	A6911	C18	·004-·0055 MFD	2P. 200 V	A7026			
				C19	VARIABLE	R.F. ALIGNING	ON GANG			
				C20	"	" " "	COND.	S-1	MULTI POLE "ON"-"OFF" SWITCH	503-15
				C21	"	" " "	503-34			

I.F. 175 K.C.



CANADIAN RADIO CORP.

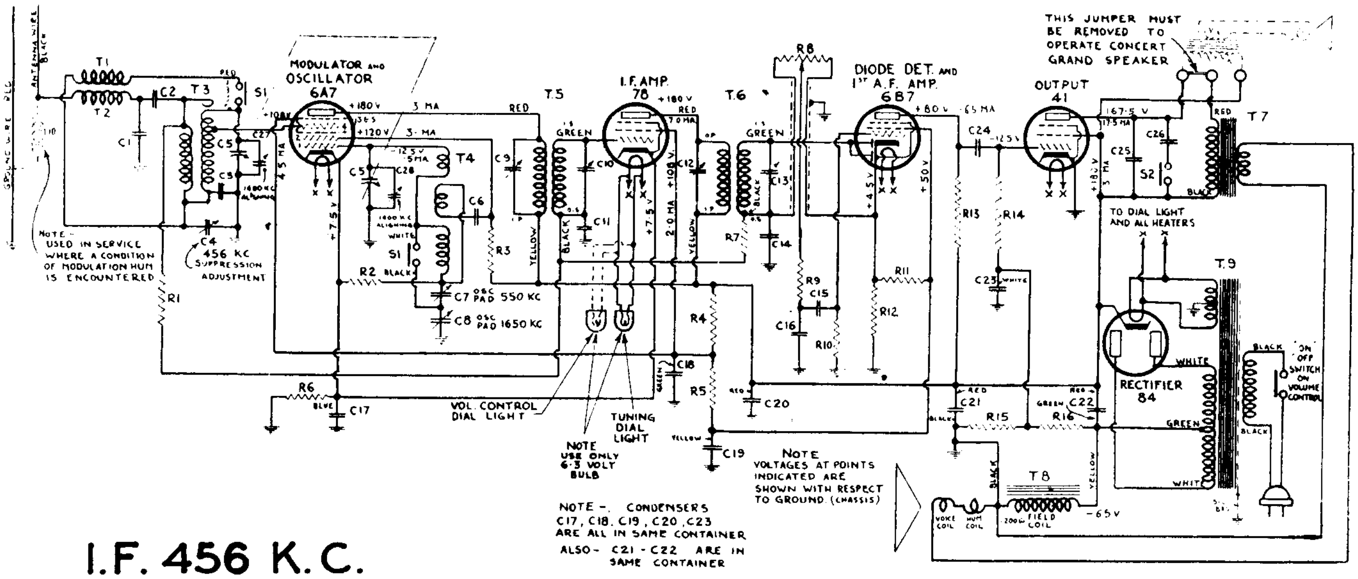
MODELS MARQUETTE -33-33B-34-34B-60-60B-75-76



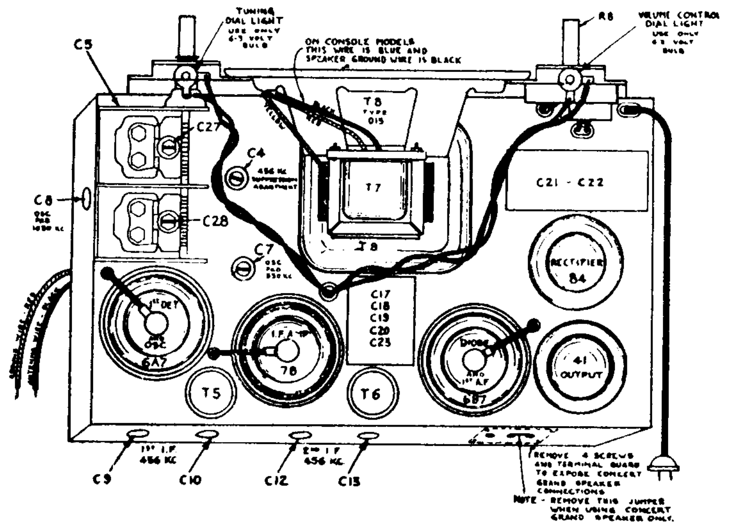
ITEM	NAME	NO.	ITEM	NAME	NO.
T1	R.F. ANTENNA TRANS.	5039	L1	R.F. CHOKE - (OSCILLATOR PLATE)	4676
T2	R.F. INTERSTAGE "	5040	SPEAKER	"MAGNAVOX" TYPE 162 (590Ω)	5123
T3	R.F. OSCILLATOR COIL	5041	B.C.	BIAS CELL - MALLORY TYPE	5109
T4	1ST I.F. TRANS. ASSEMBLY	4998	C1	CLOCK (COMPLETE) 25 CYCLE *	4674
T5	2ND I.F. " "	[illegible]	C1	" (") 60 " @	4675
T6	DIODE I.F. TRANS. ASSEMBLY	[illegible]			
T7	OUTPUT " "	5126			
T8	POWER TRANS. ASSEMBLY	5102			
T9	" " "	5081			

CANADIAN RADIO CORP.

MODELS NEW ETUDE - NEW BROCK & 504



I.F. 456 K.C.



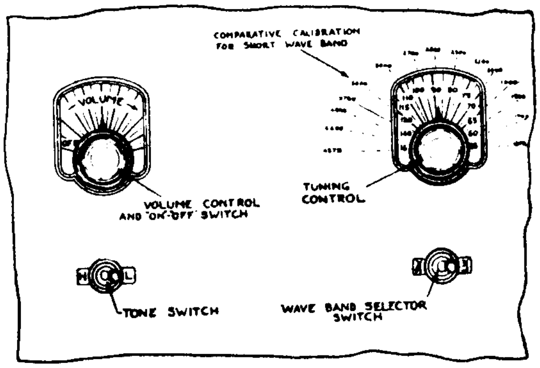


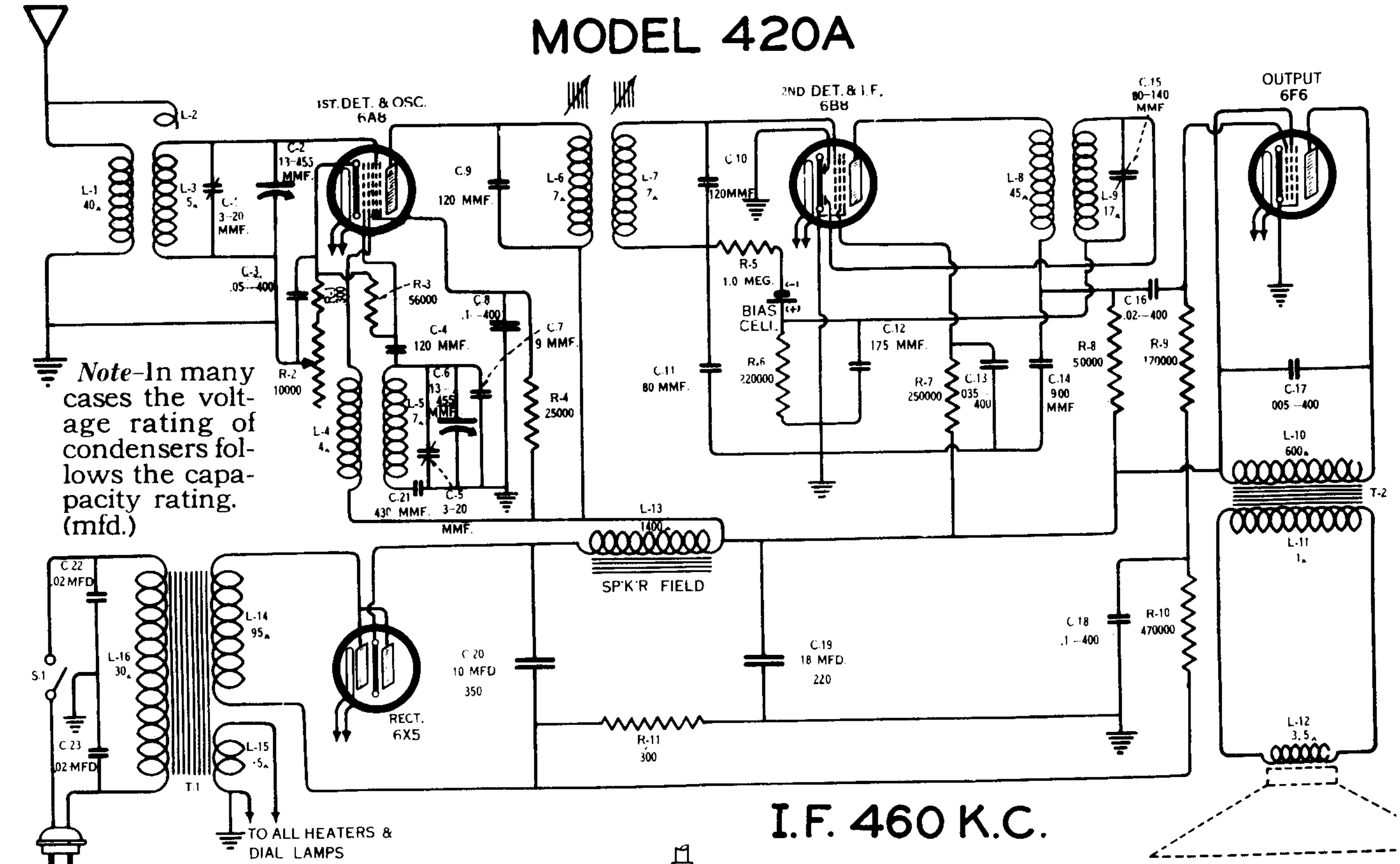
ILLUSTRATION 2

Symbol	Part No.	Description
C1	504-25	Condenser, .00025 Mfd. (M)
C2	502-48	Condenser, .02 Mfd. (400)
C3	504-26	Condenser, .0055 Mfd. (400)
C4	503-58	Condenser, R. F. Suppression (V)
C5	502-23	Condenser, Tuning (V)
C6	6556	Condenser, .0001 Mfd. (M)
C7	503-58	Condenser, Oscillator Align. (V)
C8	503-58	Condenser, Oscillator Align. (V)
C9	503-44	Condenser, I. F. Align. (V)
C10	503-44	Condenser, I. F. Align. (V)
C11	6873	Condenser, .05 Mfd. (200)
C12	503-44	Condenser, I. F. Align. (V)
C13	503-44	Condenser, I. F. Align. (V)
C14	6555	Condenser, .00025 Mfd. (M)
C15	502-48	Condenser, .02 Mfd. (400)
C16	6555	Condenser, .00025 Mfd. (M)
C17		Condenser, .25 Mfd. (200)
C18	504-9	Condenser, .1 Mfd. (200)
C19		Condenser, .1 Mfd. (200)
C20		Condenser, .1 Mfd. (400)
C21	502-34	Condenser, 12 Mfd. (300)
C22		Condenser, 8 Mfd. (350)
C23	504-9	Condenser, .2 Mfd. (200)
C24	502-48	Condenser, .02 Mfd. (400)
C25	502-49	Condenser, .01 Mfd. (400)
C26	504-19	Condenser, .012 Mfd. (400)
C27	502-23	
C28		
R1	504-27	Resistor, 5,000 ohms (½)

Symbol	Part No.	Description
R2	502-46	Resistor, 40,000 ohms (½)
R3	502-47	Resistor, 20,000 ohms (½)
R4	504-21	Resistor, 6,000 ohms (1)
R5	504-22	Resistor, 9,700 ohms (½)
R6	504-28	Resistor, 385 ohms (½)
R7	504-29	Resistor, 1,000,000 ohms (½)
R8	504-15	Potentiometer, 500,000 ohms (V.C.) (S)
R9	504-20	Resistor, 100,000 ohms (½)
R10	504-51	Resistor, 1,000,000 ohms (½)
R11	504-23	Resistor, 9,100 ohms (½)
R12	504-24	Resistor, 730 ohms (½)
R13	504-30	Resistor, 150,000 ohms (½)
R14	502-52	Resistor, 400,000 ohms (½)
R15	502-58	Resistor, 120,000 ohms (½)
R16	502-57	Resistor, 500,000 ohms (½)
S1	504-31	Switch, Band Selector
S2	504-32	Switch, Tone Control
T1	504-13	Transformer, Antenna (S. W.)
T2		
T3	504-11	Transformer, Antenna (L. W.)
T4	504-12	Transformer, Oscillator
T5	502-17	Transformer, 1st I. F.
T6	504-14	Transformer, 2nd I. F.
T7	16-10	Transformer, Output Console
	15-10	Transformer, Output Compact
T8	15-1	See Speaker
T9	502-12	Transformer, Power
T10	6170	Choke, R. F.
	16-1	Speaker, D16 (Console)
	16-5	Speaker, D16 Cone, Voice Coil Assembly
	16-12	Speaker, D16 Field Coil, 1,280 ohms
	15-22	Speaker, D16, Hum Coil
	15-1	Speaker, D15 (Compact)
	15-19	Speaker, D15, Cone, Voice Coil Assemlby
	15-4	Speaker, D15, Field Coil, 1,280 ohms
	15-22	Speaker, D15, Hum Coil

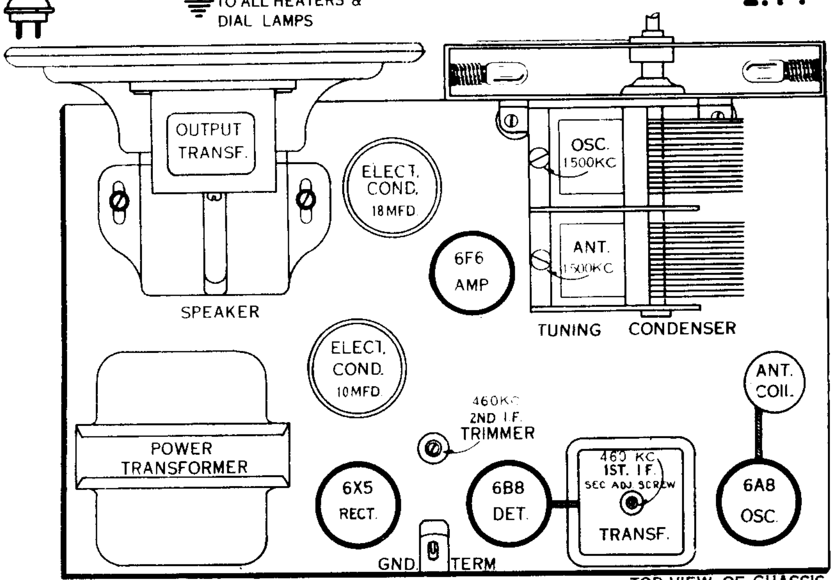
CANADIAN WESTINGHOUSE COMPANY Limited

MODEL 420A



Note—In many cases the voltage rating of condensers follows the capacity rating. (mfd.)

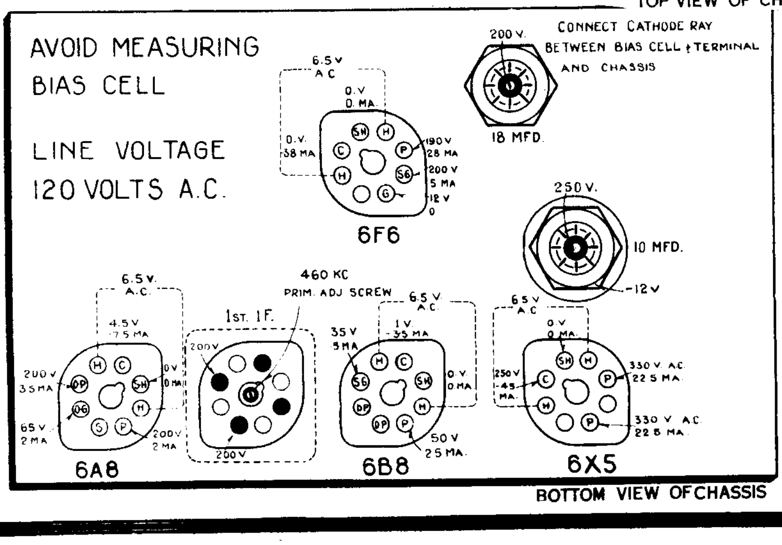
I.F. 460 K.C.



TOP VIEW OF CHASSIS

Radiotron Socket Voltages and I.F. Trimmer Locations

The meter readings given in the diagram are taken with the antenna and ground binding posts short circuited and with 120 volts line. All readings are actual operating conditions and in some cases it will be necessary to allow for meter resistance. All D.C. voltage readings are taken with respect to the chassis frame. All readings are given for normal operation. If readings are taken with a set analyser circuits that are not intended to oscillate, may oscillate, thus increasing plate or screen voltages and decreasing plate or screen current. The set analyser cable may also cause the oscillator radiotron to cease oscillating, thus increasing current and decreasing voltage.



BOTTOM VIEW OF CHASSIS

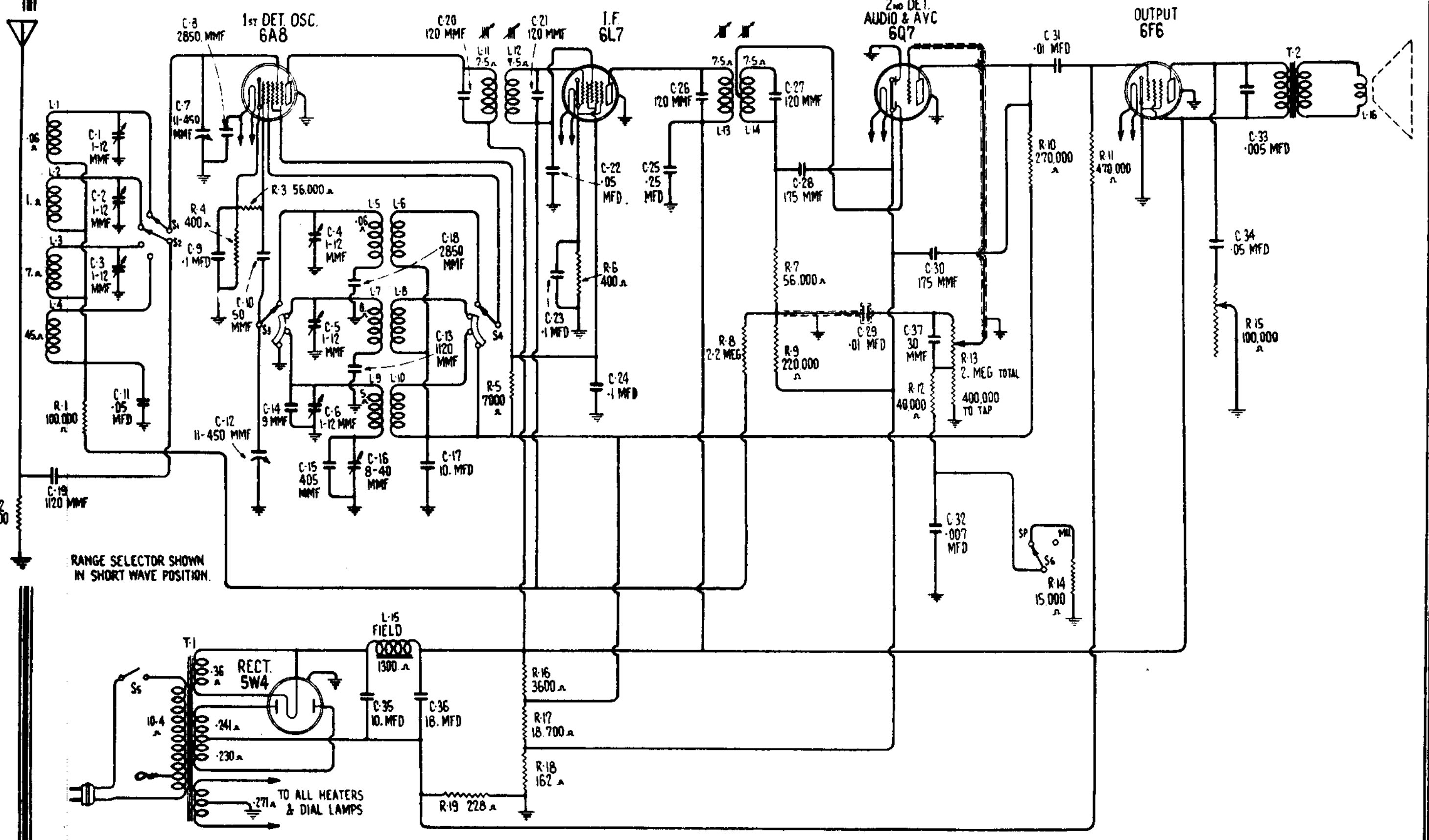
CAUTION—Do not attempt to measure voltage on the control grid of the W-6B8 with any conventional voltmeter as paralysis of the "C-bias" cell will result.

Check "C" cell by noting whether plate current is abnormally high on W-6B8.

A further check on the C bias cell, particularly if it is suspected that the control grid lead has been grounded, is to connect a 1½ volt battery between the control grid cap of one of the tubes on the C cell circuit and the chassis frame. The negative of the battery should be connected to control grid, positive to chassis frame. This connection should be momentarily made only, and if the C cell had been weakened before, it will now be found to be recharged and ordinarily will not need to be replaced.

CANADIAN WESTINGHOUSE COMPANY Limited

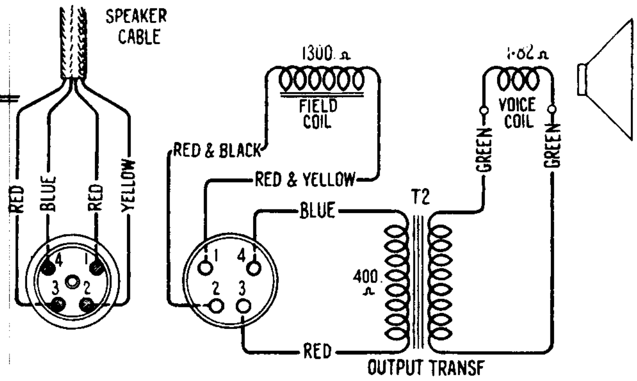
MODELS 511A-511X & 511Y



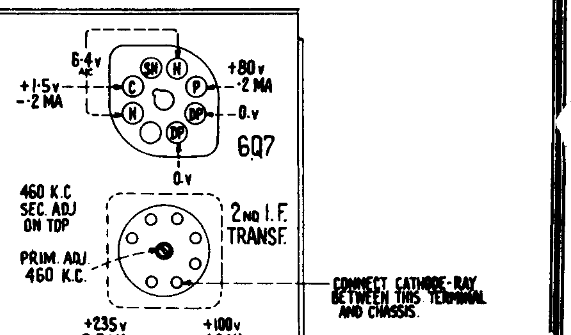
Schematic Circuit Diagram

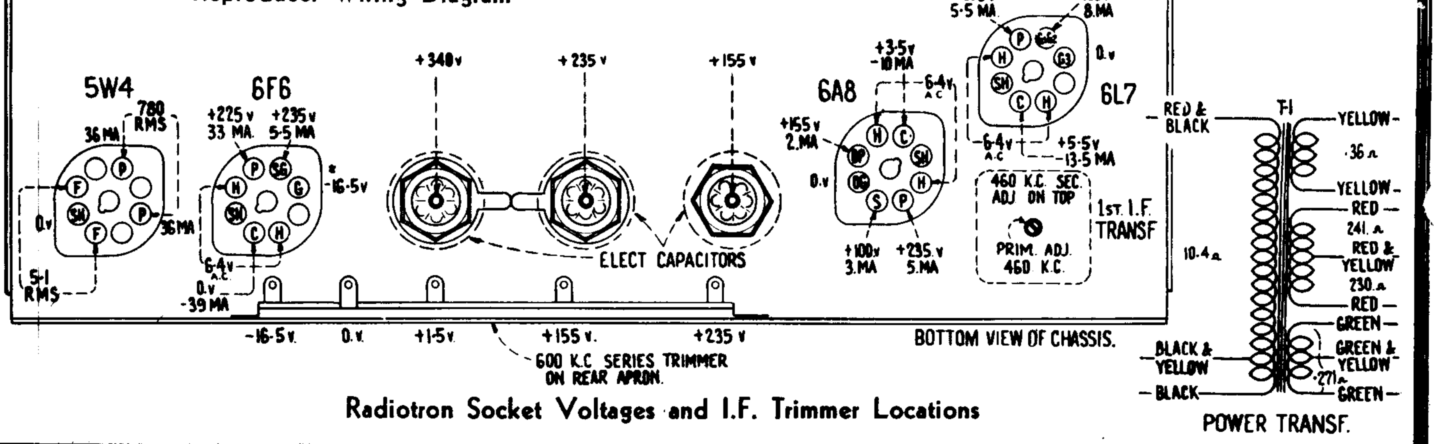
R2 was 1.0 Meg. on early production. On later production, also, two line filter condensers H36176 0.02 Mfd. were added; one from each side of line transformer primary to ground.

I.F. 460 K.C.



Reproducer Wiring Diagram

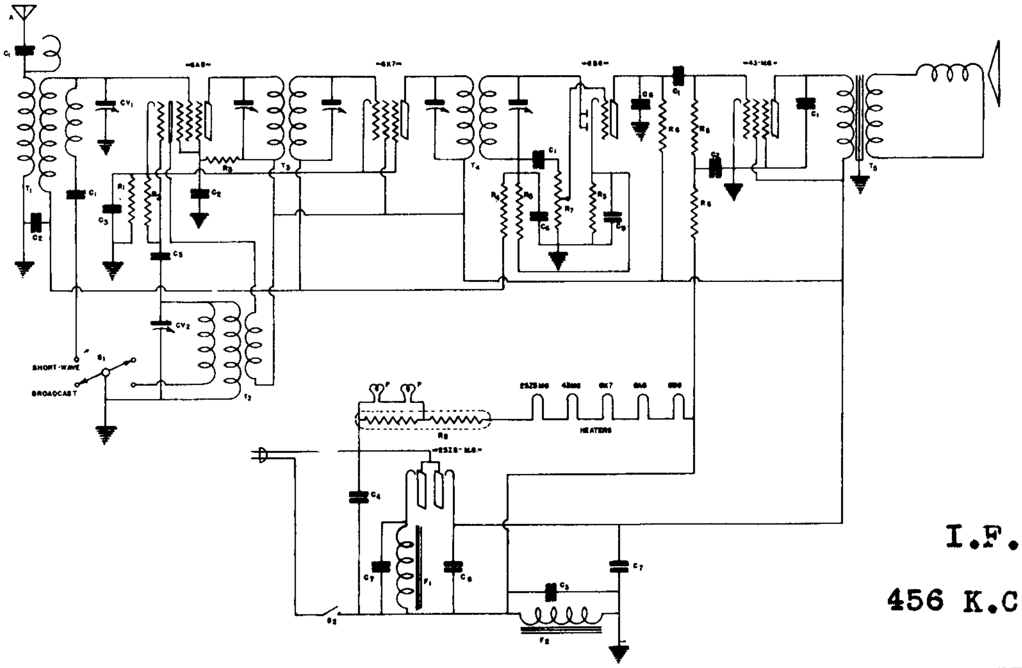




Radiotron Socket Voltages and I.F. Trimmer Locations

CLIMAX RADIO & TELEVISION CO., Inc.

MODEL ABX 6 TUBE 2 BAND SUPERHETERODYNE RECEIVER *AC-DC* TYPE



I.F.

456 K.C.

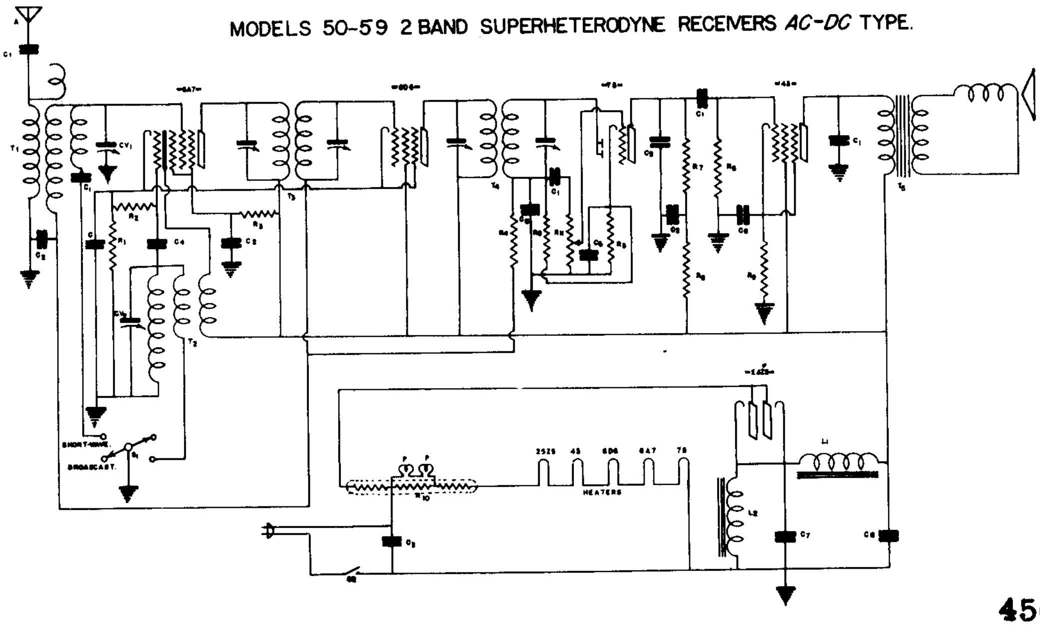
LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	604	2 BAND VARIABLE CONDENSER
C_1	201	.01 MFD. 400 VOLT TUBULAR CONDENSER
C_2	203	.1 MFD. 200 VOLT TUBULAR CONDENSER
C_3	204	.25 MFD. 200 VOLT TUBULAR CONDENSER
C_4	206	.03 MFD. 400 VOLT TUBULAR CONDENSER
C_5	400	.0001 MFD. MICA CONDENSER
C_6	401	.00025 MFD. MICA CONDENSER
C_7	308	4 MFD. 150 W. VOLT ELECTROLYTIC CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
C_8	1N 306	30 MFD. 150 W. VOLT ELECTROLYTIC CONDENSER
C_9	1N 306	10 MFD. 25 W. VOLT ELECTROLYTIC CONDENSER.
R_1	105	250 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_2	113	50,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_3	108	5000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	119	1 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_5	117	$\frac{1}{2}$ MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_6	116	$\frac{1}{4}$ MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR

LEGEND	OUR PART NO.	DESCRIPTION
R_7	2007	500,000 OHM VOLUME CONTROL
R_8	—	50A2 M.G. BALLAST TUBE
A	1606	20 FEET INDOOR AERIAL
T_1 T_2	1600	TRANSLATOR COIL
T_3	1800	HIGH Q I.F. TRANSFORMER
T_5	801-A	5" DYNAMIC SPEAKER TRANSFORMER.
T_4	1808	DIOXDE COUPLING TRANSFORMER.
S_1	1902	BAND SELECTOR SWITCH

LEGEND	OUR PART NO.	DESCRIPTION
S_2	—	LINE SWITCH ON VOLUME CONTROL
P	2901	MAZDA #40 PILOT LIGHT
F_1	804	2500 OHM SPEAKER FIELD.
F_2	1106	FILTER CHOKE

MODELS 50-59 2 BAND SUPERHETERODYNE RECEIVERS *AC-DC* TYPE.



I.F.

456 K.C.

LEGEND	OUR PART NO.	DESCRIPTION
C_1	201	.01 MFD. 400 VOLT TUBULAR CONDENSER
C_2	203	.1 MFD. 200 VOLT TUBULAR CONDENSER
C	204	.25 MFD. 200 VOLT TUBULAR CONDENSER
C_4	400	.0001 MFD. MICA CONDENSER
C_5	401	.00025 MFD. MICA CONDENSER
C_3	206	.05 MFD. 400 VOLT TUBULAR CONDENSER
C_6	1N 306	10 MFD. 25 VOLT PEAK ELECTROLYTIC CONDENSER
C_7'	1N 306	30 MFD. 120 VOLT PEAK ELECTROLYTIC CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
C_8	1N 306	10 MFD. 200 VOLT ELECTROLYTIC CONDENSER
R_2	113	50,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_1	105	250 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_3	108	5,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	119	1 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_5	117	$\frac{1}{2}$ MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_H	2007	$\frac{1}{2}$ MEGOHM VOLUME CONTROL
R_7	116	250,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR

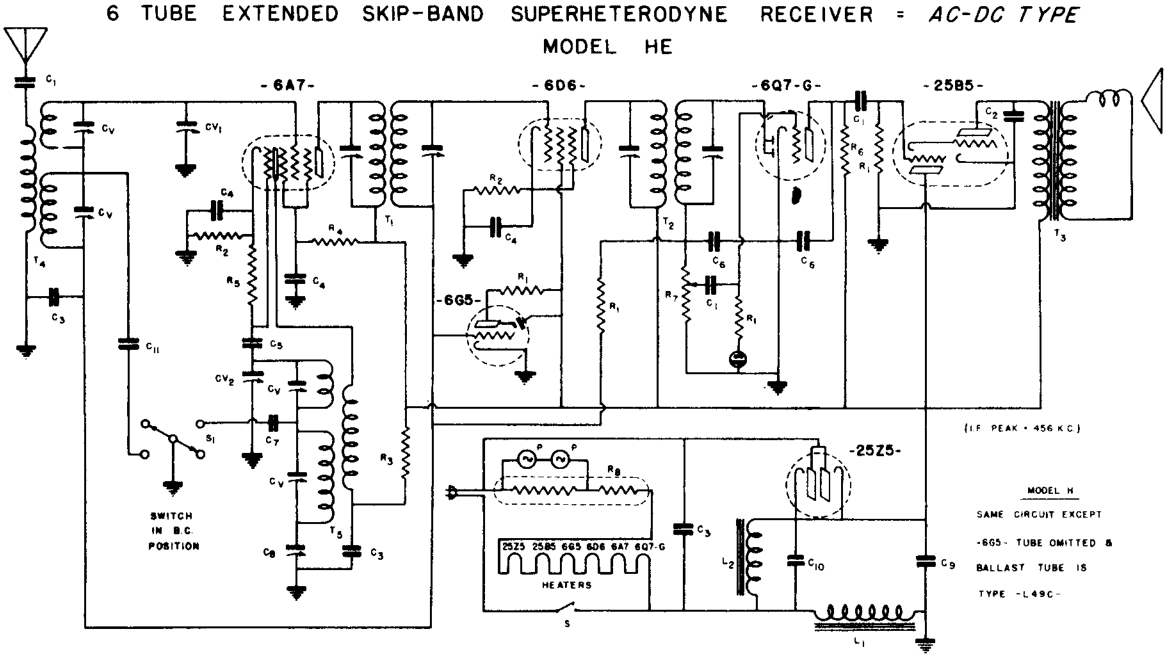
LEGEND	OUR PART NO.	DESCRIPTION
R_8	118	100,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_9	104	500 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_{10}	127	L-55-52 BALLAST TUBE
S_1	1902	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
A	1606	20 FEET INDOOR AERIAL
T_1-T_2	1600	TRANSLATOR COIL (ONE UNIT)
T_3	1800	HIGH Q I.F. TRANSFORMER

LEGEND	OUR PART NO.	DESCRIPTION
T_4	1802	DIODE I.F. TRANSFORMER.
T_5	801-A	6" DYNAMIC SPEAKER TRANSFORMER
L_1	801	2500 OHM SPEAKER FIELD
L_2	1100	IRON CORE FILTER CHOKE
P		MAZDA #46 PILOT LIGHT.

CLIMAX RADIO & TELEVISION CO., Inc.

6 TUBE EXTENDED SKIP-BAND SUPERHETERODYNE RECEIVER = *AC-DC TYPE*

MODEL HE



LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD-400V TUBULAR CONDENSER
C_2	206	.05 MFD-400V TUBULAR CONDENSER
C_3	210	.1 MFD-400V TUBULAR CONDENSER
C_4	205	.1 MFD-200V TUBULAR CONDENSER
C_5	400	.0001 MICA CONDENSER
C_6	401	.00025 MICA CONDENSER
C_7	411	.00125 MICA CONDENSER
C_8	507	5 PLATE PADDING CONDENSER
C_9	314	10 MFD 150 W.V. ELECTROLYTIC COND.
C_{10}	311	20 MFD 150 W.V. ELECTROLYTIC COND.

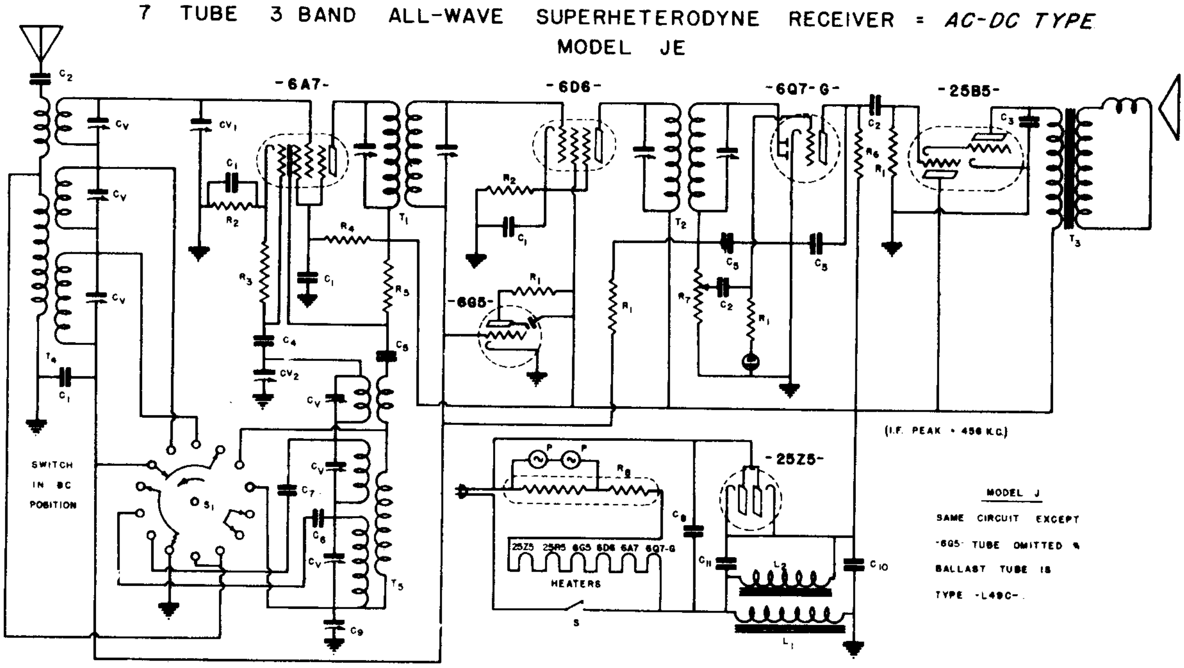
LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	612	2 GANG VARIABLE CONDENSER
R_1	119	1 MEGOHM ½ WATT CARBON RESISTOR
R_2	103	250 OHMS ½ WATT CARBON RESISTOR
R_3	109	10,000 OHMS ½ WATT CARBON RESISTOR
R_4	111	25,000 OHMS ½ WATT CARBON RESISTOR
R_5	113	50,000 OHMS ½ WATT CARBON RESISTOR
R_6	116	250,000 OHMS ½ WATT CARBON RESISTOR
R_7	2009	50,000 OHMS VOLUME CONTROL & SWITCH
R_8	2905	L-49-C BALLAST TUBE (MODEL H)
R_8	2906	L-42-C BALLAST TUBE (MODEL HE)
C	212	.05 MFD - 200 V TUBULAR CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
T_1	1503	1st. I.F. TRANSFORMER
T_2	1506	DIODE I.F. TRANSFORMER (2500 OHMS)
T_3	IN 805	SPEAKER OUTPUT TRANSFORMER
T_4	1210	ANTENNA COIL
T_5	1404	OSCILLATOR COIL
L_1	1101	CHOKE
L_2	IN 805	SPEAKER FIELD (2500 OHMS)
S_1	1914	BAND SELECTOR SWITCH
S	—	SWITCH ON TONE CONTROL
P	2902	MAZDA #46 PILOT LIGHT

I.F.
456 K.C.

7 TUBE 3 BAND ALL-WAVE SUPERHETERODYNE RECEIVER = *AC-DC TYPE*

MODEL JE



LEGEND	OUR PART NO.	DESCRIPTION
C_1	203	.1 MFD -200V TUBULAR CONDENSER
C_2	211	.01 MFD-400V TUBULAR CONDENSER
C_3	206	.05 MFD-400V TUBULAR CONDENSER
C_4	400	.0001 MICA CONDENSER
C_5	401	.00025 MICA CONDENSER
C_6	410	.0018 MICA CONDENSER
C_7	413	.0046 MICA CONDENSER
C_8	210	.1 MFD 400V. TUBULAR CONDENSER
C_V	IN 801	3-30 MMFD TRIMMER CONDENSER
C_9	507	5 PLATE PADDING CONDENSER
T_4	1214	3 BAND ANTENNA COIL

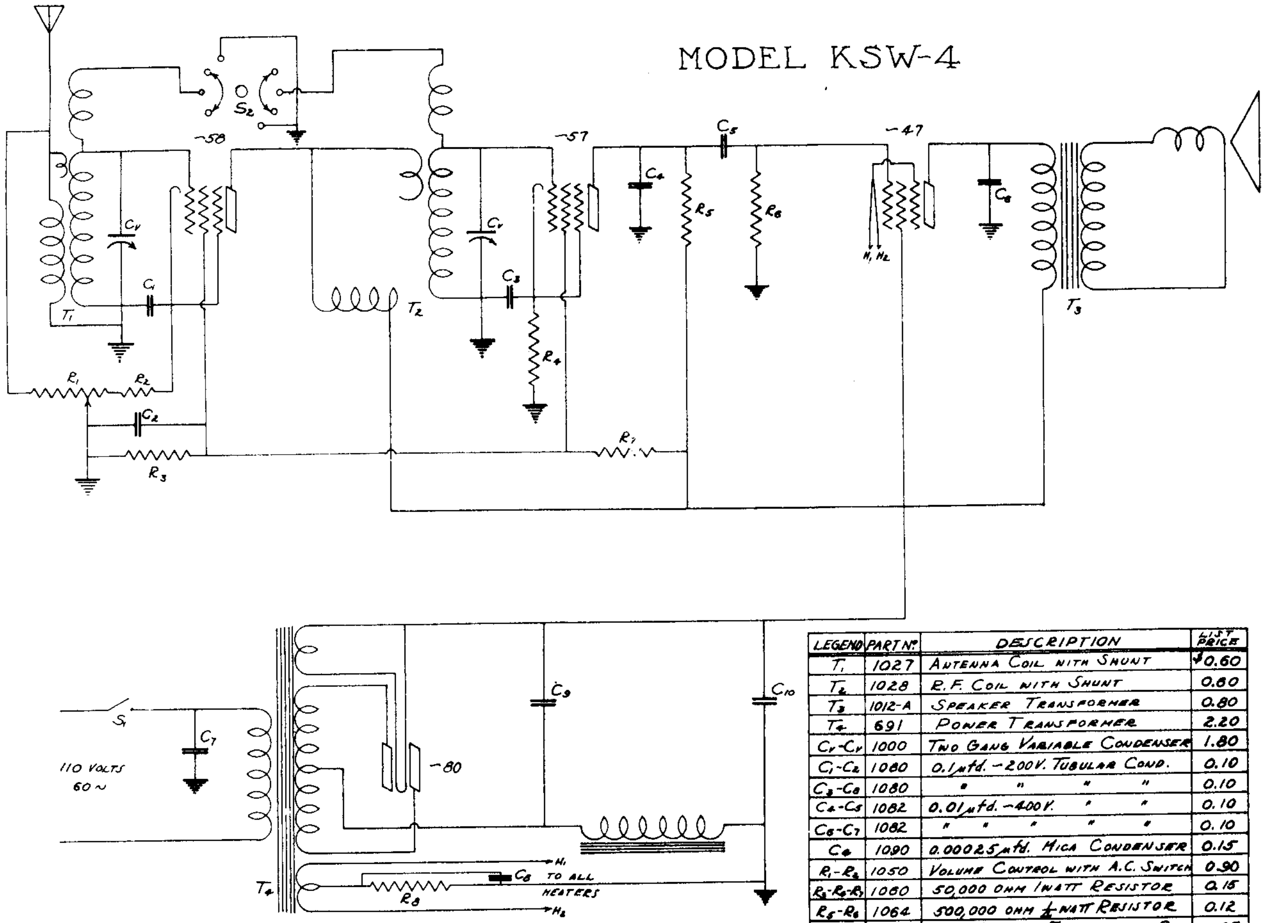
LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	612	2 GANG VARIABLE CONDENSER
C_{10}	314	10 MFD. 150 W.V. ELECTROLYTIC COND.
C_{11}	311	20 MFD. 150 W.V. ELECTROLYTIC COND.
R_1	119	1 MEGOHM ½ WATT CARBON RESISTOR
R_2	103	250 OHMS ½ WATT CARBON RESISTOR
R_3	113	50,000 OHMS ½ WATT CARBON RESISTOR
R_4	111	25,000 OHMS ½ WATT CARBON RESISTOR
R_5	109	10,000 OHMS ½ WATT CARBON RESISTOR
R_6	116	250,000 OHMS ½ WATT CARBON RESISTOR
R_7	2008	500,000 OHM VOLUME CONTROL & SWITCH

LEGEND	OUR PART NO.	DESCRIPTION
R_8	2905	L-49-C BALLAST TUBE (MODEL J)
R_8	2906	L-42-C BALLAST TUBE (MODEL JE)
T_1	1503	1st. I.F. TRANSFORMER
T_2	1506	DIODE I.F. TRANSFORMER
T_3	IN 805	SPEAKER FIELD (2500 OHMS)
L_1	1101	CHOKE
L_2	IN 805	SPEAKER FIELD (2500 OHMS)
S_1	1915	3 BAND SELECTOR SWITCH
S	—	SWITCH ON TONE CONTROL
P	2902	MAZDA #46 PILOT LIGHT
T_5	1405	3 BAND OSCILLATOR COIL

I.F.
456 K.C.

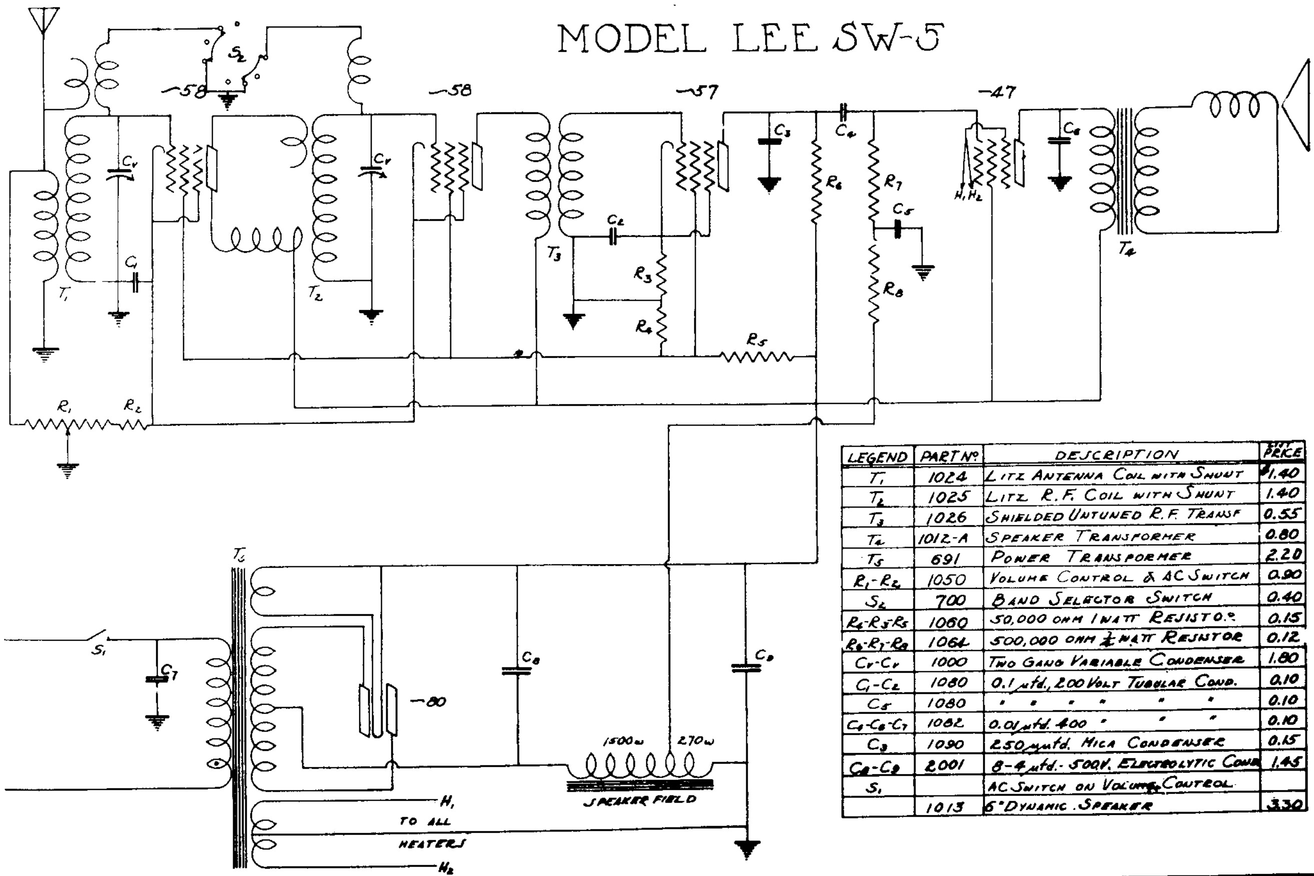
CLIMAX RADIO & TELEVISION CO., Inc.

MODEL KSW-4



LEGEND	PART Nº	DESCRIPTION	LIST PRICE
T_1	1027	ANTENNA COIL WITH SHUNT	$0.60
T_2	1028	R.F. COIL WITH SHUNT	0.60
T_3	1012-A	SPEAKER TRANSFORMER	0.80
T_4	691	POWER TRANSFORMER	2.20
C_V-C_V	1000	TWO GANG VARIABLE CONDENSER	1.80
C_1-C_2	1080	0.1 mfd. - 200V. TUBULAR COND.	0.10
C_3-C_8	1080	" " " "	0.10
C_4-C_5	1082	0.01 mfd. - 400V. " "	0.10
C_6-C_7	1082	" " " " "	0.10
C_4	1090	0.00025 mfd. MICA CONDENSER	0.15
R_1-R_2	1050	VOLUME CONTROL WITH A.C. SWITCH	0.90
R_3-R_4-R_7	1060	50,000 OHM 1 WATT RESISTOR	0.15
R_5-R_6	1064	500,000 OHM ¼ WATT RESISTOR	0.12
C_9-C_{10}	2001	8-4 mfd. 500V. ELECTROLYTIC COND.	1.45
S_2	700	SELECTOR SWITCH	0.40
	1012	DYNAMIC SPEAKER COMPLETE	3.00

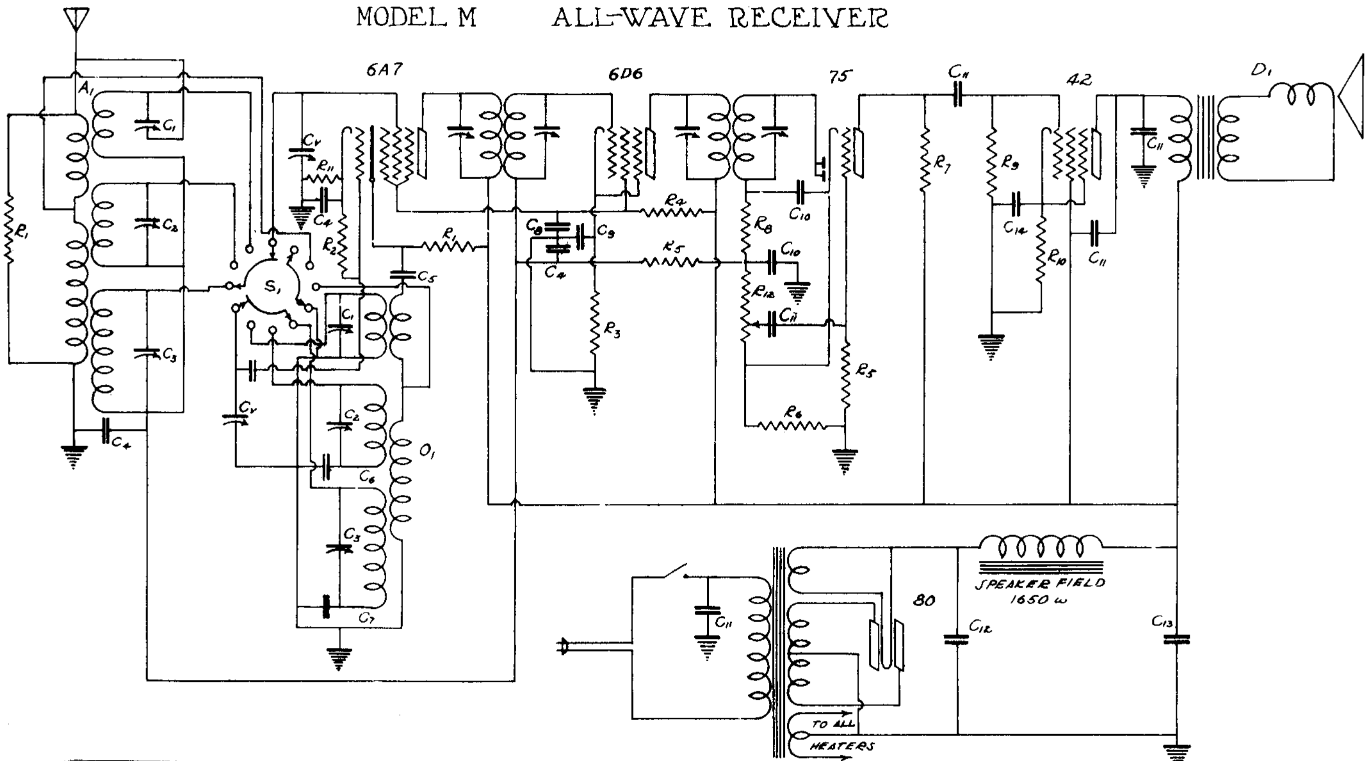
MODEL LEE SW-5



LEGEND	PART Nº	DESCRIPTION	LIST PRICE
T_1	1024	LITZ ANTENNA COIL WITH SHUNT	$1.40
T_2	1025	LITZ R.F. COIL WITH SHUNT	1.40
T_3	1026	SHIELDED UNTUNED R.F. TRANSF	0.55
T_4	1012-A	SPEAKER TRANSFORMER	0.80
T_5	691	POWER TRANSFORMER	2.20
R_1-R_2	1050	VOLUME CONTROL & AC SWITCH	0.90
S_2	700	BAND SELECTOR SWITCH	0.40
R_4-R_3-R_5	1060	50,000 OHM 1 WATT RESISTOR	0.15
R_6-R_7-R_8	1064	500,000 OHM ¼ WATT RESISTOR	0.12
C_V-C_V	1000	TWO GANG VARIABLE CONDENSER	1.80
C_1-C_2	1080	0.1 mfd., 200 VOLT TUBULAR COND.	0.10
C_5	1080	" " " " " "	0.10
C_4-C_6-C_7	1082	0.01 mfd. 400 " " "	0.10
C_3	1090	250 mmfd. MICA CONDENSER	0.15
C_8-C_9	2001	8-4 mfd.- 500V. ELECTROLYTIC COND.	1.45
S_1		AC SWITCH ON VOLUME CONTROL	
	1013	6" DYNAMIC SPEAKER	3.30

CLIMAX RADIO & TELEVISION CO., Inc.

MODEL M ALL-WAVE RECEIVER



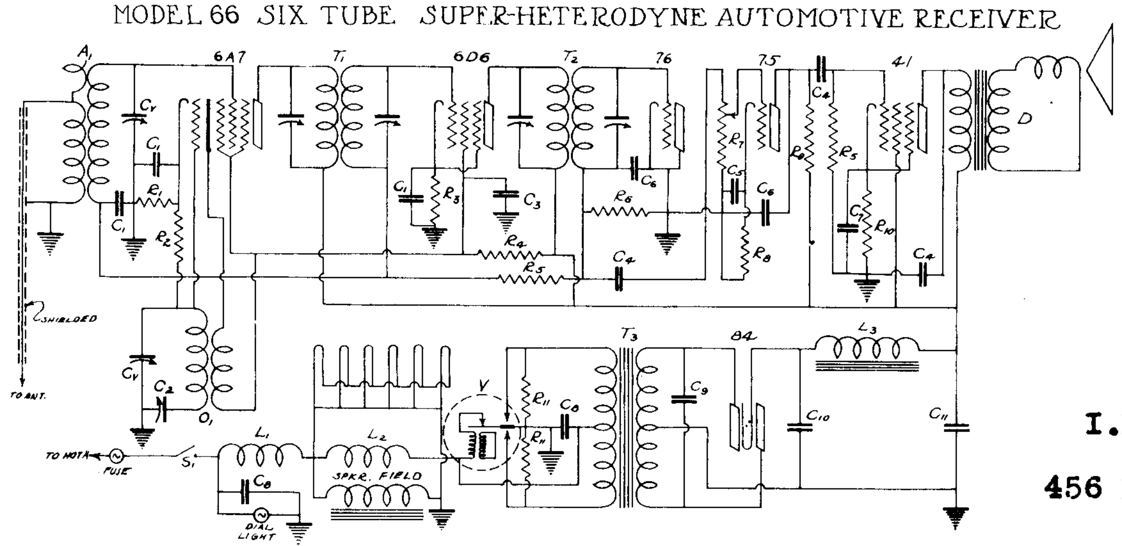
LEGEND	PART No	DESCRIPTION
R_1	1072	10,000 ω ¼ WATT RESISTOR
R_2	1071	50,000 ω " " "
R_3	1068	150 ω " " "
R_4	1063-A	25,000 ω 1 WATT RESISTOR
R_5	1062	1 MEGOHM ¼ WATT RESISTOR
R_6	1069	4,500 ω ¼ WATT RESISTOR
R_7	1068	250,000 ω ¼ WATT RESISTOR
R_8	1063	25,000 ω " " "
R_9	1061	500,000 ω " " "
R_{10}	1090	450 ω 1 WATT RESISTOR

LEGEND	PART No	DESCRIPTION
R_{11}	1067	250 ω ¼ WATT RESISTOR
R_{12}	1057	500,000 ω VOLUME CONTROL & A.C. SWITCH ATTACHED.
C_1	3001	TRIPLE TRIMMER. MIN.
C_2	3001	CAPACITY EACH SECTION =
C_3	3001	5 μμfds. - MAXIMUM 30 μμfds.
C_4	1080	0.1 μfd. 200V. TUBULAR COND.
C_5	1093	.001 μfd MICA CONDENSER
C_6	1094	.002 μfd. ±3% MICA CONDENSER
C_7	1095	5 PLATE PADDING COND.
C_8	1085	0.1 μfd. 400V. TUBULAR COND.

LEGEND	PART No	DESCRIPTION
C_9	1008	2 GANG VAR. COND. (420 μμfd.)
C_{10}	1090	250 μμfd. MICA CONDENSER
C_{11}	1082	.01 μfd. 400 V. TUBULAR COND.
C_{12}	2016	8 μfd. 500V. ELECT. COND.
C_{13}	2016	4 μfd. " " "
C_{14}	2016	10 μfd. 35V. " "
A_1	500	ALL-WAVE ANTENNA COIL
O_1	501	ALL-WAVE OSCILLATOR COIL
D_1	1012	6" DYNAMIC SPEAKER
S_1	712	BAND SELECTOR SWITCH

I.F. 456 K.C.

MODEL 66 SIX TUBE SUPER-HETERODYNE AUTOMOTIVE RECEIVER



LEGEND	PART No	DESCRIPTION
C_V	998	GEARED 2GG. VAR. COND
C_1	1080	.1 μfd. 200V. TUB. COND.
C_2	1095	5 PLATE MICA VAR. COND.
C_3	1085	.1 μfd. 400V. TUB. COND.
C_4	1082	.01 μfd. 400V. TUB. COND.
C_5	2031	5 μfd. 35V. ELECT. COND.
C_6	1090	250 μμfd. MICA COND.
C_7	1095	.25 μfd. 200 V. TUB. COND.
C_8	1061	.5 μfd. 200V. TUB. COND.

LEGEND	PART No	DESCRIPTION
C_9	1060	.01 μfd. 1000V. TUB. COND.
C_{10}	2031	8 μfd. 350V. ELECT. COND.
C_{11}	2031	4 μfd. 350V. ELECT. COND.
R_1	1067	250 ω ¼ WATT RESISTOR
R_2	1071	50,000 ω ¼ WATT RESISTOR
R_3	1068	150 ω ¼ WATT RESISTOR
R_4	1072-A	10,000 ω ½ WATT RESISTOR
R_5	1062	1 MEG. ¼ WATT RESISTOR
R_6	1081	½ MEG. ¼ WATT RESISTOR

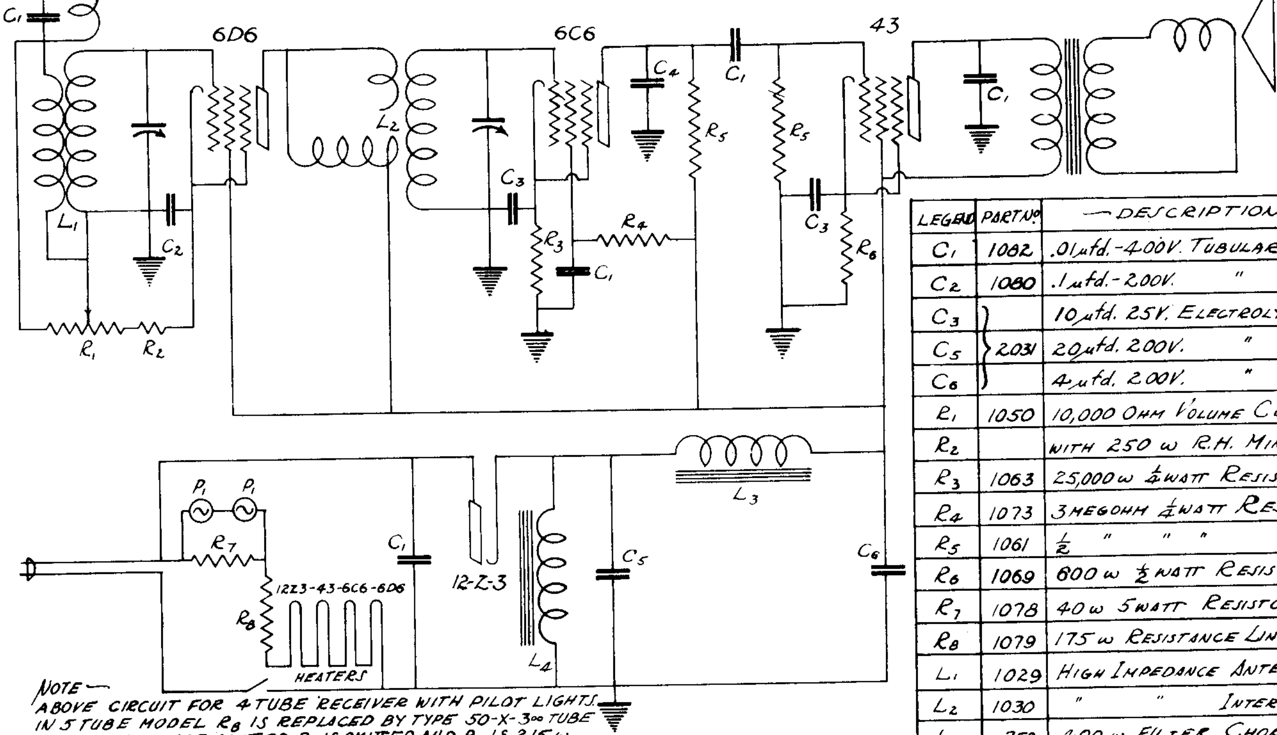
LEGEND	PART No	DESCRIPTION
R_7	1049	500,000 ω VOL. CONTROL
R_8	1069	4,500 ω ¼ WATT RESISTOR
R_9	1068	½ MEG. ¼ WATT RESISTOR
R_{10}	1069-A	600 ω ½ WATT RESISTOR
R_{11}	1081-A	50 ω ½ WATT RESISTOR
A_1	505	SHIELDED ANTENNA COIL
O_1	506	SHIELDED OSC. COIL
T_2	507	2ND I.F. TRANSFORMER
T_1	508	1ST I.F. TRANSFORMER

LEGEND	PART No	DESCRIPTION
T_3	681	BUZZER TRANSFORMER
D	1020	DYNAMIC SPEAKER
V	801	PLUG-IN VIBRATOR
L_1	509	R.F. "A" CHOKE
L_2	510	R.F. "A" CHOKE
	209	REMOTE CONTROL HEAD
	51	DIAL LAMP
	107	10 AMPERE FUSE

I.F. 456 K.C.

CLIMAX RADIO & TELEVISION CO., Inc.

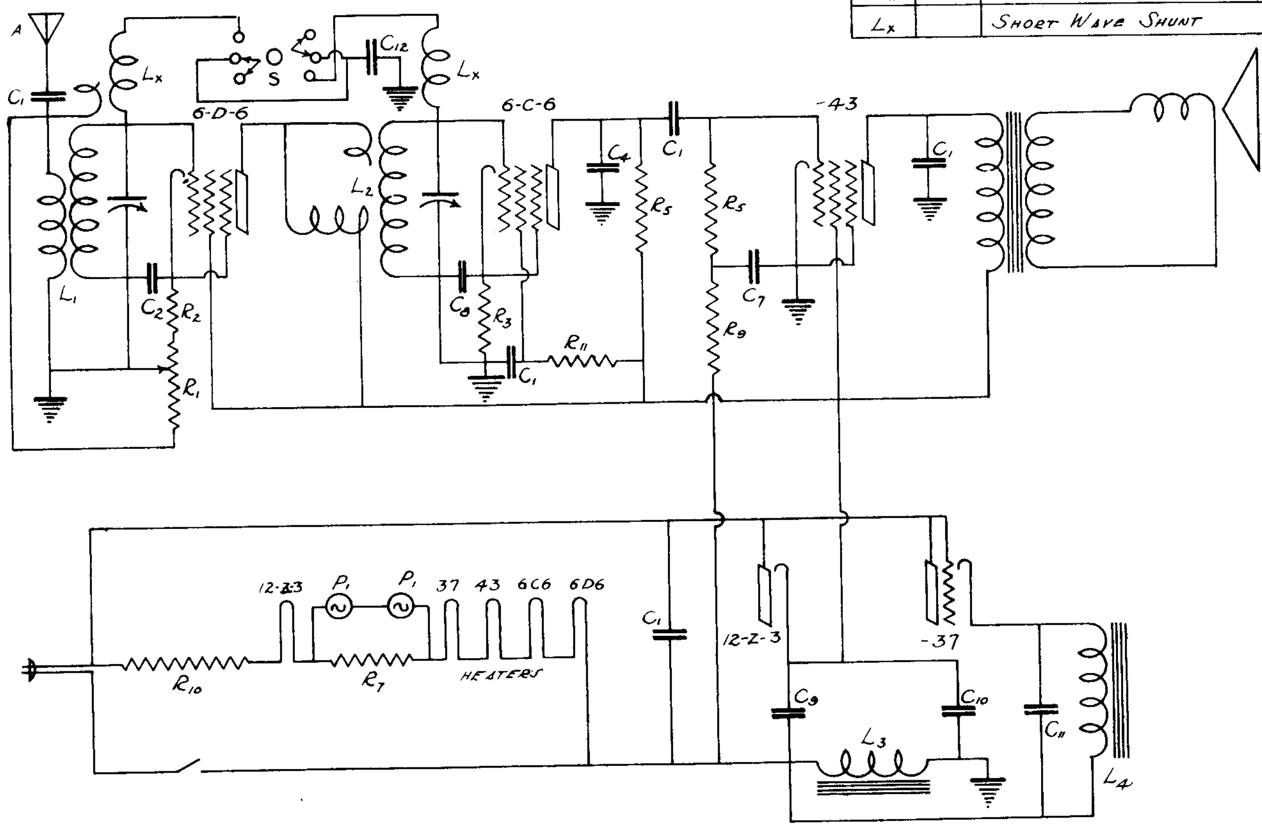
4 TUBE AC-DC RECEIVER



NOTE —
ABOVE CIRCUIT FOR 4 TUBE RECEIVER WITH PILOT LIGHTS.
IN 5 TUBE MODEL R_8 IS REPLACED BY TYPE 50-X-300 TUBE
IF PILOT LIGHTS ARE OMITTED, R_7 IS OMITTED AND R_8 IS 215 ω.

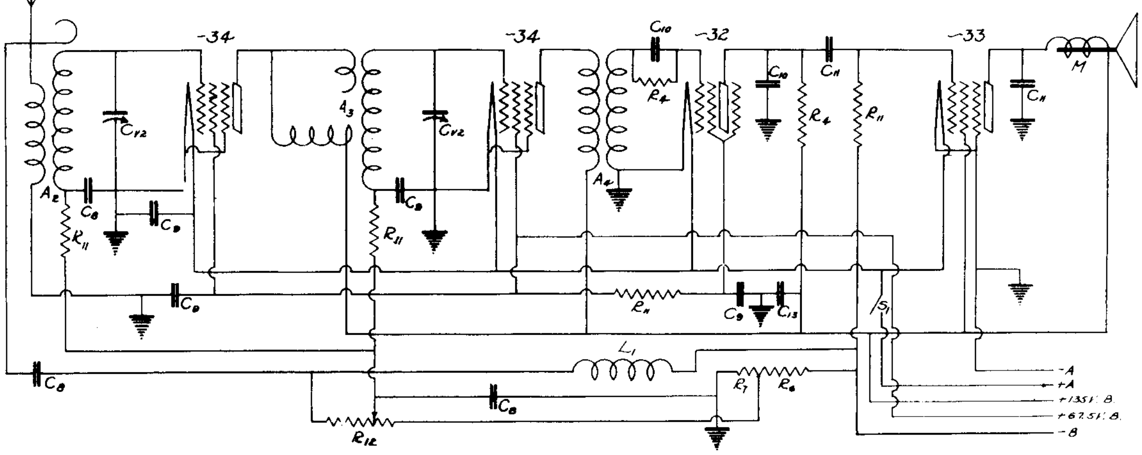
LEGEND	PART No.	— DESCRIPTION —
C_1	1082	.01 μfd.-400V. TUBULAR COND.
C_2	1080	.1 μfd.-200V. " "
C_3	2031	10 μfd. 25V. ELECTROLYTIC COND.
C_5	2031	20 μfd. 200V. " "
C_6	2031	4 μfd. 200V. " "
R_1	1050	10,000 OHM VOLUME CONTROL
R_2		WITH 250 ω R.H. MINIMUM.
R_3	1063	25,000 ω ¼ WATT RESISTOR
R_4	1073	3 MEGOHM ¼ WATT RESISTOR
R_5	1061	½ " " " "
R_6	1069	600 ω ½ WATT RESISTOR
R_7	1078	40 ω 5 WATT RESISTOR
R_8	1079	175 ω RESISTANCE LINE CORD
L_1	1029	HIGH IMPEDANCE ANTENNA COIL
L_2	1030	" " INTERSTAGE "
L_3	750	400 ω FILTER CHOKE
$C_{8\text{-}9\text{-}10\text{-}11}$	2027	10 μfd.-25V.; 12-4-8 μfd 200V. EL.COND.
C_4	1090	250 μμfd. MICA CONDENSER
C_7	1095	.25 μfd.-200V. TUBULAR COND.
R_9	1068	250,000 ω ¼ WATT RESISTOR
R_{10}	1065	150 ω RESISTANCE LINE CORD
R_{11}	1074	6 MEG. ¼ WATT RESISTOR
L_x		SHORT WAVE SHUNT

5 TUBE AC-DC RECEIVER



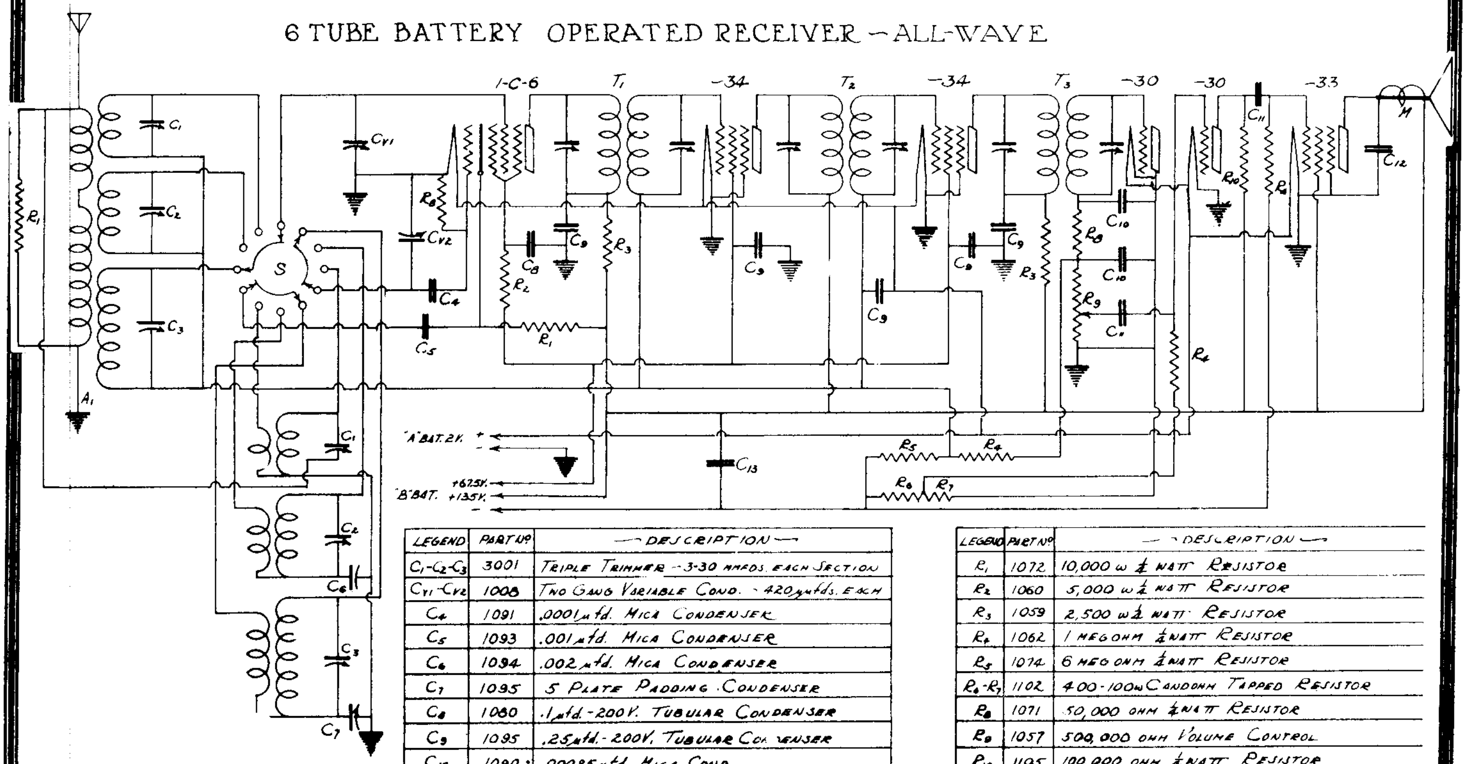
CLIMAX RADIO & TELEVISION CO., Inc.

4 TUBE BATTERY OPERATED BROADCAST RECEIVER



NOTE:- The list of parts shown below refer to both diagrams on this page.

6 TUBE BATTERY OPERATED RECEIVER - ALL-WAVE



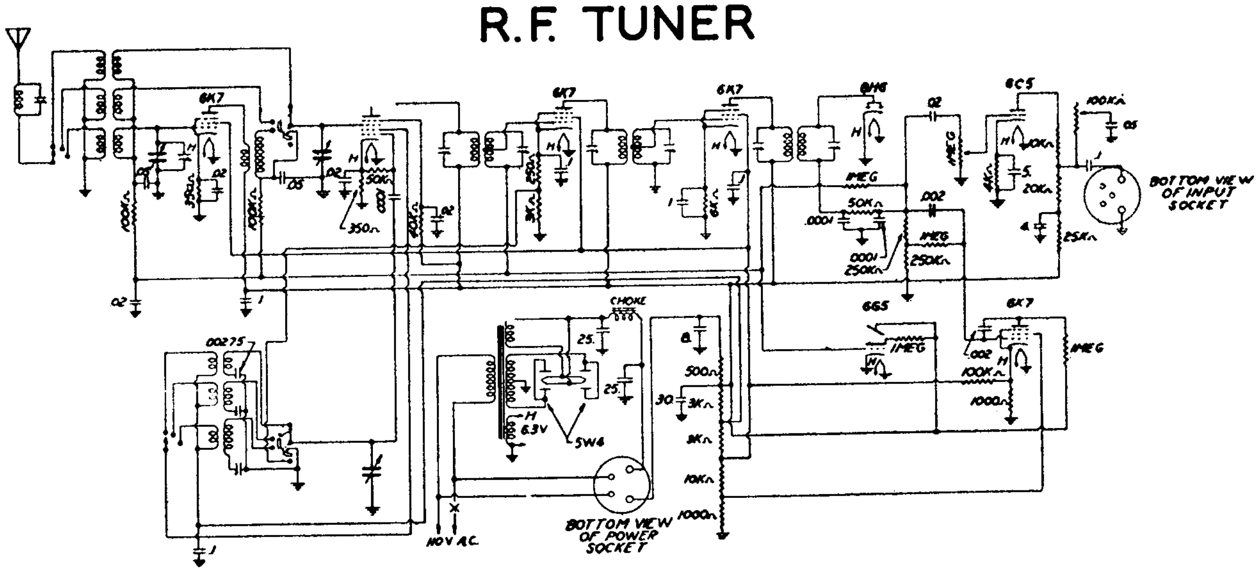
LEGEND	PART Nº	—DESCRIPTION—
C_1-C_2-C_3	3001	Triple Trimmer - 3-30 mmfds. each Section
C_{V1}-C_{V2}	1008	Two Gang Variable Cond. - 420 µµfds. each
C_4	1091	.0001 µfd. Mica Condenser
C_5	1093	.001 µfd. Mica Condenser
C_6	1094	.002 µfd. Mica Condenser
C_7	1095	5 Plate Padding Condenser
C_8	1080	.1 µfd.-200V. Tubular Condenser
C_9	1095	.25 µfd.-200V. Tubular Condenser
C_{10}	1090	.00025 µfd. Mica Cond
C_{11}	1082	.01 µfd.-400V. Tubular Condenser
C_{12}	1079	.005 µfd.-400V. Tubular Condenser
C_{13}	2037	10 µfd.-200V. Electrolytic Condenser
T_1-T_2	509	High Gain I.F. Transformers (456 K.C.)
A_2	601	Broadcast Antenna Coil
A_3	602	Broadcast Interstage Coil
A_4	603	Shielded Untuned Interstage Coil
L_1	604	Antenna Isolating Choke

LEGEND	PART Nº	—DESCRIPTION—
R_1	1072	10,000 ω ¼ watt Resistor
R_2	1060	5,000 ω ¼ watt Resistor
R_3	1059	2,500 ω ¼ watt Resistor
R_4	1062	1 megohm ¼ watt Resistor
R_5	1074	6 meg ohm ¼ watt Resistor
R_6-R_7	1102	400-100 ω Candohm Tapped Resistor
R_8	1071	50,000 ohm ¼ watt Resistor
R_9	1057	500,000 ohm Volume Control
R_{10}	1105	100,000 ohm ¼ watt Resistor
A_1	500	Three Band Antenna Coil
O_1	502	Three Band Oscillator Coil
S	713	Selector Switch (3 Pole - 3 Position)
T_3	510	Diode Coupling I.F. Transformer
R_{11}	1081	500,000 ω ¼ watt Resistor
R_{12}	1050	10,000 ω Volume Control
C_{V2}-C_{V2}	1007	Two Gang Variable Condenser
S_1	715	Battery Switch

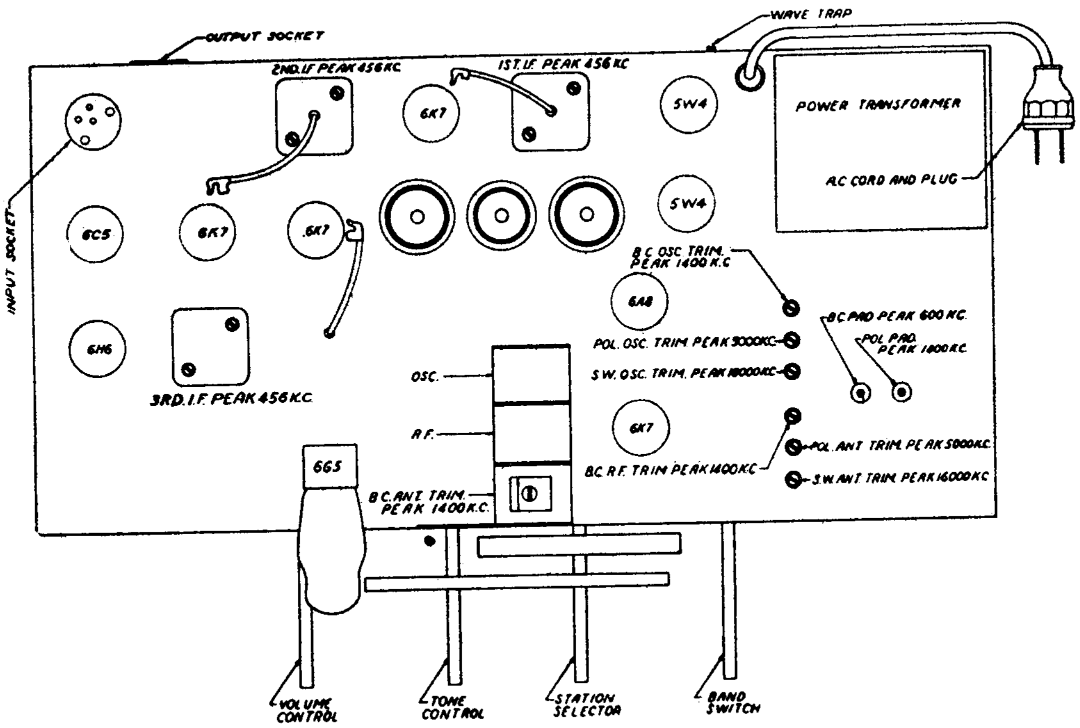
I.F. 456 K.C.

CONTINENTAL RADIO & TELEVISION CORP.

MODEL AM8 SERIES
R.F. TUNER

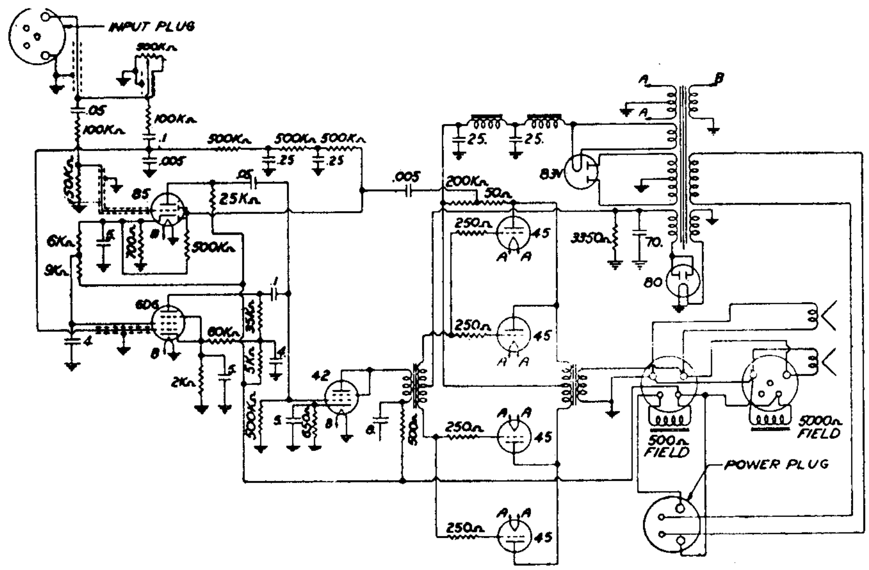


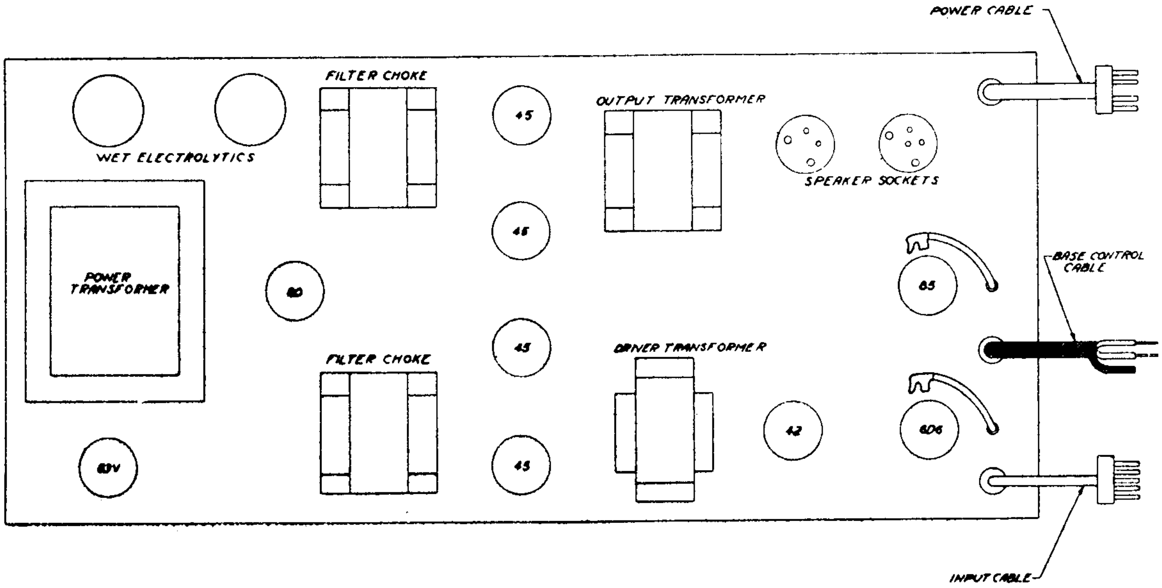
I.F. 456 K.C.



The dial is calibrated with each band covering 340 degrees of tuning scale length and are each concentric with the center of the dial face. The innermost scale is calibrated for standard broadcasts covering from 550 to 1700 K.C. (175 to 545 meters). The second band from the center covers the intermediate short wave length broadcasts of Police, Amateur, Aircraft and ships and extends from 1700 to 5400 K.C. (55 to 180 meters). The third band covers all of the principle short wave channels for reception from countries all over the world. This band carries a calibration of from 5.5 to 18 megacycles (16.4 to 55 meters.) This short wave scale is the one which includes the five internationally assigned bands—the 19, 25, 31, 39, and 49 meter channels.

CONTINENTAL RADIO & TELEVISION CORP.
MODEL AM8 SERIES
A.F. AMPLIFIER





Amplifier Unit Parts AM8

P 194 Tube Shields
P 492 80 Tube Socket
P 535 42 Tube Socket
P 536 6D6 Tube Socket
P 873 4 Prong Speaker Plug
P 945 4 Prong Speaker Socket
P1199 Output Audio Transformer
P1200 Power Transformer
P1201 Input Audio Transformer
P1202 Filter Choke
P1203 Filter Choke
P1204 85 Tube Socket
P1206 83 Tube Socket
P1207 45 Tube Socket
P1211 Bass Tone Control
P1212 5 Prong Speaker Socket
P1213 5 Prong Speaker Plug
P1221 Base Control Cable
P1222 Power Cable
P1223 Input Cable
P1040B Knob
P 141 .25-200 V Condenser
P1208 70 Mfd. 100 V Electrolytic Con.
P 304 5 Mfd. 25 V Electrolytic Con.
P 950 4-8 Mfd. 450 V Electrolytic Con.
P1156 25 Mfd. 450 V Electrolytic Con.
P 136 250 Ohm Resis. ¼ Watt Resis.
P 137 500,000 Ohm Resis. ¼ Watt Resis.
P 165 25,000 Ohm Resis. 1 Watt Resis.
P 167 10,000 Ohm Resis. ¼ Watt Resis.
P 418 150,000 Ohm Resis. ¼ Watt Resis.
P1215 35,000 Ohm Resis. 1 Watt Resis.
P1216 5,000 Ohm Resis. ¼ Watt Resis.
P1230 60,000 Ohm Resis. 2 Watt Resis.
P1218 2,000 Ohm Resis. ¼ Watt Resis.
P1219 500 Ohm Resis. ½ Watt Resis.
P1220 200,000 Ohm Resis. ¼ Watt Resis.
P1209 Candohm Resistor
P1210 Gang Candohm Resistor

CONTINENTAL RADIO & TELEVISION CORP.

MODEL AM8 SERIES

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator which will cover the frequencies of 456, 600, 1400, 1800, 4000, 6000, and 14,000 KC and an output meter which is to be connection across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A8) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all five I.F. trimmers to peak or maximum reading on the output meter. As there are two stages of I.F. in this receiver, there will be consequently three I.F. transformers to align.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .001 md. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the broadcast oscillator trimmer to peak. (See drawing for location.) After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak. The front condenser section tunes the pre-amplifier stage. Then adjust the Broalcast Band R. F. trimmer to peak. This trimmer aligns the grid or input circuit of the 6A8 tube. (See drawing for position of Broadcast R. F. trimmer). Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the B. C. oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the R.F. section. (For location of B.C. padding condenser see drawing.) Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band.

FOREIGN BAND ALIGNMENT The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers marked and illustrated in the drawing as S.W. oscillator and S.W. trimmer. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. Set the receiver pointer to 14,000 KC (also test oscillator).

Then proceed to adjust these two trimmers for peak at 14,000 KC (adjust oscillator trimmer first) and as the inherent design of the circuit has been expressly developed for simplicity in servicing, only these two adjustments are necessary for aligning this band. NOTE: Always start this procedure by having the oscillator coil trimmer loose (out all the way), and the antenna coil trimmer fairly tight (in all the way); otherwise it is possible to make a false alignment on the image frequency. In order to prevent alignment on the image frequency, it is suggested that the following check be made: Readjust the pointer to 13,100 KC where the image frequency should be found. If properly aligned, the image frequency will be found to be weaker. If, however, the signal at 13,100 KC is found to be stronger than the signal at 14,000 KC, it signifies that alignment was incorrectly made on the image frequency.

POLICE BAND In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with a .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment.

Set the receiver pointer to 4000 KC (also test oscillator) and adjust the Police Band oscillator circuit trimmer to peak.

After this has been carefully done, the next step is to adjust the Police Band antenna trimmer to peak.

Now reset the dial pointer and the test oscillator to 1800 KC in preparation for adjusting the police band padding condenser.

Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated, but is the easiest way to correctly adjust the oscillator to the R.F. or antenna section. Return to 4000 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made 1800 KC.

If it is found that in returning to 4000 KC the pointer is accurately on scale, no further adjustment should be necessary (in this recheck). If the pointer is found off scale, it may be corrected and put on scale by readjustment of the police band oscillator trimmer. Alignment of the pointer can only be corrected by adjustment of the oscillator trimmer.

IMPORTANT: The Police Band Oscillator Trimmer, Police Band Antenna Trimmer Police Band Padding Trimmer are the only three adjustments required in aligning this band.

WAVE TRAP ADJUSTMENT At the rear of the chassis near the Antenna and Ground posts is an adjustment screw connected to a trap circuit for elimination of code interference when operating on the broadcast band. If code interference is encountered adjustment of this screw will filter it out. It is to be used only if such interference is experienced in broadcast reception. It's use prevents code transmitters operating on a frequency around 456 K. C. from being received by the I. F. amplifier which is tuned to 456 K. C.

SERVICE DATA FOR ALL BANDS

If it is suspected that the oscillator has stopped but is doubtful due to the presence of the usual amount of noise level, it is suggested that the oscillator plate voltage be checked. To ascertain whether the tube is oscillating, ground the oscillator grid of the 6A8 (short stator and rotor plates of oscillator section on gang condenser). If oscillating properly, grounding the grid will cause an appreciable drop in oscillator voltage. Grounding or shorting the stator and grid components should be accomplished by grounding the stator mounting nut to the frame of the condenser with a screw-driver or any metallic conductor.

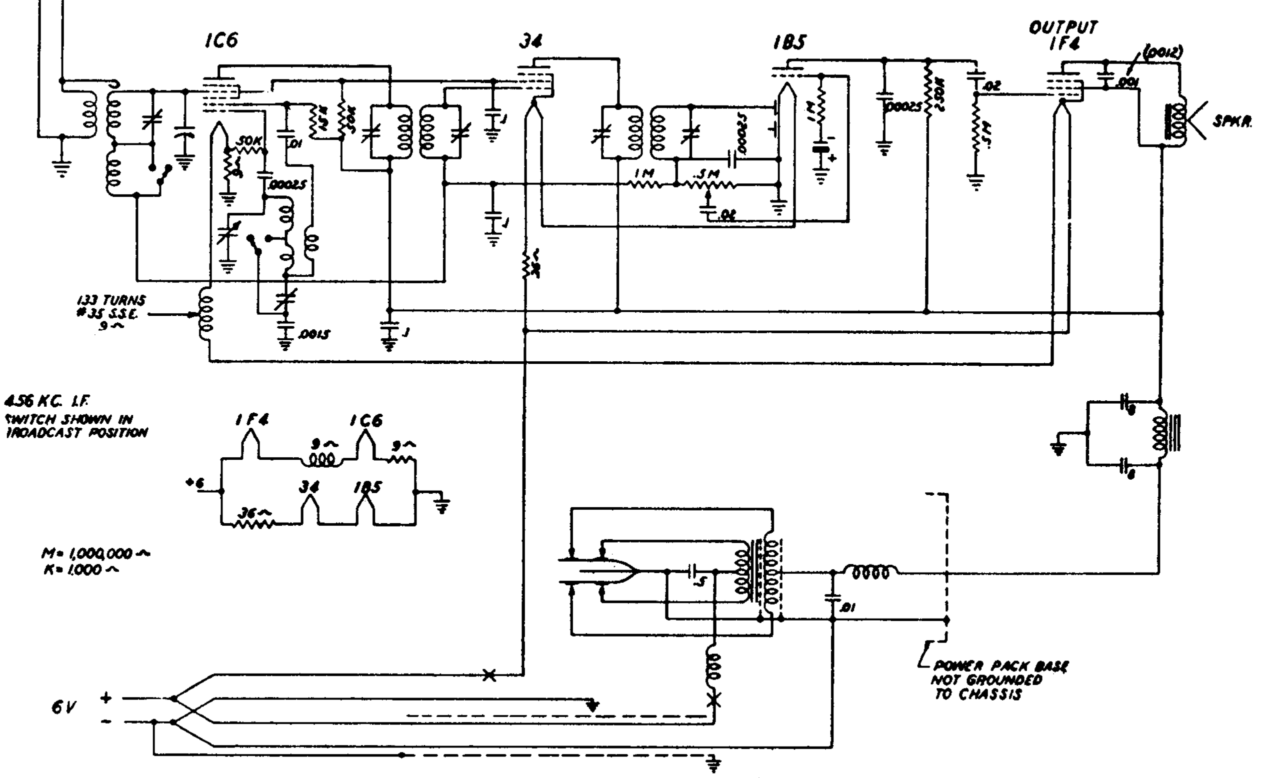
Do not wedge a screw-driver between the plates for this is liable to permanently warp the plates and thus prevent the oscillator section of the gang condenser from tracking probably.

M8 19 TUBE RADIO SET

Part No.	DESCRIPTION	Part No.	DESCRIPTION	Part No.	Description
P 124	Pilot Light	P1191	Gang Candohm Resistor	P 276	.10-400 V. Condenser
P1029	Output Audio Transformer	P1158	Volume Control with Switch	P 143	.02-400 V. Condenser
P1038	Large Knob	P1159	Tone Control	P1193	.002-400 V. Condenser
P1040	Small Knob	P1135	Wave Switch	P1194	.005-400 V. Condenser
P1047	Broadcast Interstage Coil	P1160	6 Gang Trimmer Condenser	P1055	.00275 Mica Condenser + 5%
P1048	Broadcast Antenna Coil	P 617	500 Mmfd. Padding Condenser	P 480	.0001 Mica Condenser
P1162	Wave Trap Coil	P1139	1500 Mmfd. Padding Condenser	P1114	2 Megohm ¼ Watt Resistor
P1172	Power Transformer	G1187	Short Wave Antenna Coil Complete	P162A	1 Megohm Insulated ¼ Watt Resistor
P 176	AC Cord and Plug	G1188	Short Wave Oscillator Coil Comp.	P1192	1,500 Ohm ¼ Watt Resistor
P1149	1st I.F. Transformer	G1189	Middle Band Antenna Coil Comp.	P 417	50,000 Ohm ¼ Watt Resistor
P1151	2nd I.F. Transformer	G1190	Middle Band Oscillator Coil Comp.	P 278	1,000 Ohm ¼ Watt Resistor
P1152	Double Tuned I.F. Transformer	P1145	Straight Dial Complete	P 162	1 Meg. Ohm ¼ Watt Resistor
P1129	3 Gang Variable Condenser	P1166	Volume Control with Switch (S. Dial)	P 136	250 Ohm ¼ Watt Resistor
P1146	Tilt Dial Complete	P1167	Tone Control (S. Dial)	P 280	100,000 Ohm ¼ Watt Resistor
P 907	Escutcheon Plate	P1143	Wave Switch (S. Dial)	P1186	600 Ohm ¼ Watt Resistor
P 490	6H6 Tube Socket	P 906	Escutcheon Plate and Glass (S. Dial)	P 757	4,000 Ohm ¼ Watt Resistor
P 944	5W4 Tube Socket	P1154	30 Mfd. 300 V. Electrolytic Con.	P1169	15,000 Ohm 1 Watt Resistor
P 489	6K7 Tube Socket	P1155	12 Mfd. 300 V. Electrolytic Con.	P 810	350 Ohm ¼ Watt Resistor
P 488	6A8 Tube Socket	P1043	4 Mfd. 300 V. Electrolytic Con.	P 167	10,000 Ohm ¼ Watt Resistor
P1041	6G5 Tube Socket	P1156	25 Mfd. 450 V. Electrolytic Con.	P 419	20,000 Ohm ¼ Watt Resistor
P1032	Input Audio Transformer	P 304	5 Mfd. 30 V. Electrolytic Con.	P 166	25,000 Ohm ¼ Watt Resistor
P 945	Speaker Socket	P 334	.05-400 V. Condenser		
P 873	Speaker Plug	P 142	.10-200 V. Condenser		

CONTINENTAL RADIO & TELEVISION CORP.

MODEL B3 SERIES



GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, and 6000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, the Short Wave Band may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tubes through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the ouput meter.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna lead (Blue) through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the rear gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak.

Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R.F. section. The padding condenser is located on the right hand end of the chassis

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Band.

SHORT WAVE BAND There is only one adjustment to be made in the alignment of the Short Wave Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary.

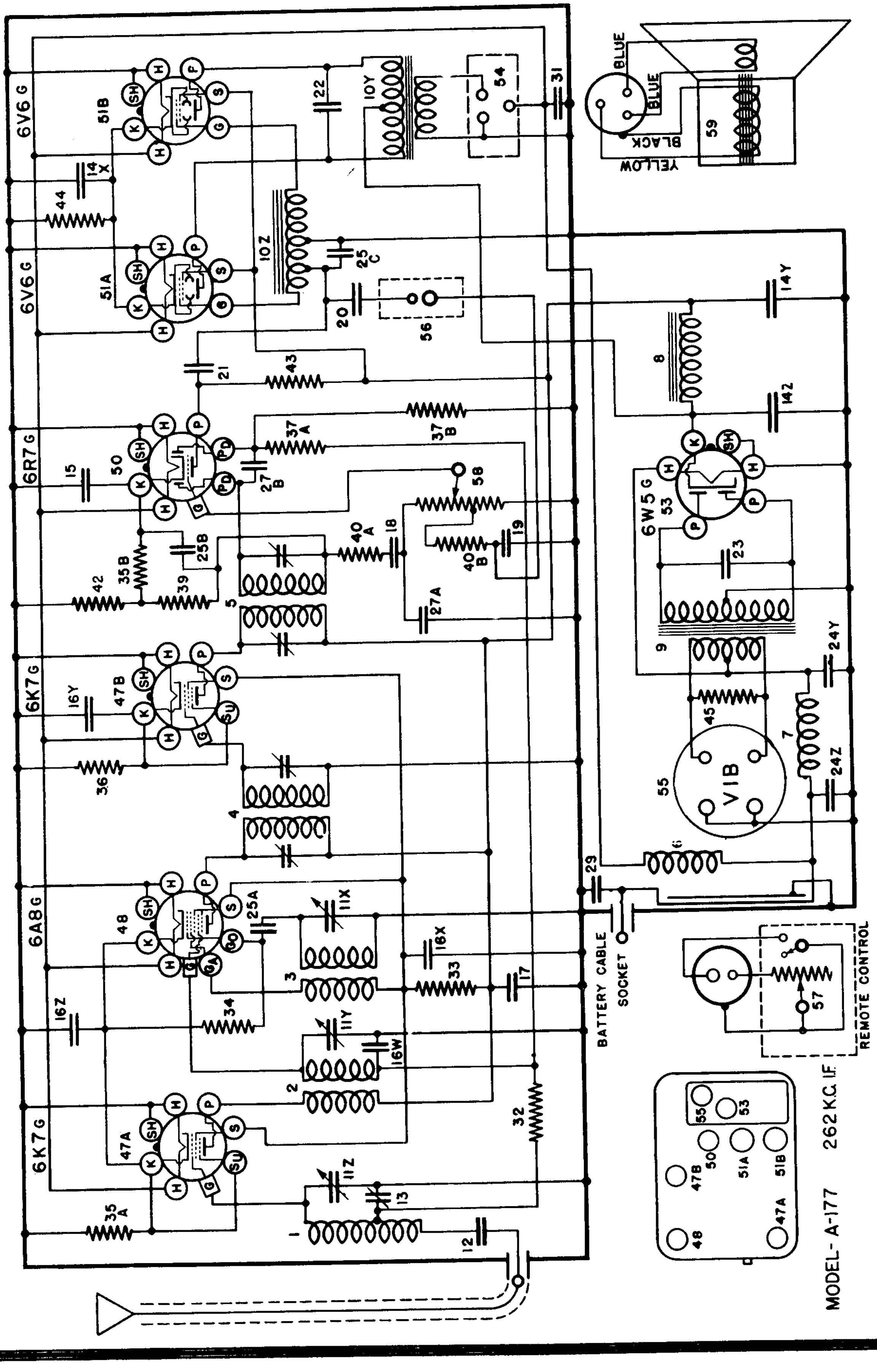
Set the dial pointer to 6000 KC (also the test oscillator) and adjust the antenna and antenna trimmer to resonance. The short wave band coils are under the chassis and are located at the right front corner along side of wave band switch.

IMPORTANT: This is the only adjustment necessary for the Short Wave Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Short Wave Band, otherwise the Broadcast Band will be thrown out of alignment.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 6000 KC.

THE CROSLEY RADIO CORPORATION

MODEL A-177



THE CROSLEY RADIO CORPORATION
MODEL A-177

SPECIFICATIONS

The Crosley Model A-177 auto radio is a dual unit, seven-tube superheterodyne receiver. The power supply unit is built into a completely shielded compartment and is an integral part of the receiver chassis.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and the receiver chassis. Voltage readings taken with a 1000 ohm per volt, 500 volt voltmeter (except filaments) with receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range D-C voltmeter (approximately 0 to 10 volts). Voltage limits may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	Su	K	Ga	Go
6K7G	R-F Amplifier	6.0	225	90	4.0	4.0	—	—
6A8G	Osc.-Modulator	6.0	225	90	—	4.0	90	−18
6K7G	I-F Amplifier	6.0	225	90	3.2	3.2	—	—
6R7G	Diode Det. & 1st A-F Amplifier	6.0	170	—	—	7.0	—	—
6V6G	(2) Output	6.0	240	225	—	13.0	—	—
6W5G	Rectifier	6.0	—	—	—	250	—	—

Power output approximately 9 watts.
Battery drain approximately 10 amperes at 6.0 volts.

ALIGNMENT PROCEDURE

All the circuits in this reeceiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to the plate (P) terminals of the 6V6G output tubes. Be sure the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

NOTE: The receiver chassis should be in its case and a speaker similar to one used with the receiver should be connected to the chassis before making any adjustments. It is also advisable to use a spare control unit for making adjustments of the volume control and tuning condenser. A standard control unit with short cables (6″ to 8″) makes a very convenient and useful tool. If it is desired to shorten a pair of long cables it will be absolutely necessary to heavily tin the cables before cutting them.

1. Tuning I-F Amplifier To 262 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd., or larger, condenser to the top cap of the 6A8G Osc-Mod. tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the receiver chassis frame. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Adjust the station selector so that the rotor plates of the tuning condenser are completely in mesh.

(c) Turn the volume control full on.

(d) Leave the Fidelity Control cable disconnected from the chassis as this automatically sets the Fidelity Control in the TREBLE position and the Bass Compensation control in the OFF position.

(e) Set the signal generator to 262 kilocycles.

(f) Adjust both trimmers located on the 2nd I-F transformer for maximum output. (Fig. 2).

(g) Adjust both trimmers located on the 1st I-F transformer for maximum output.

(h) Repeat operations (f) and (g) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier

(a) Connect the output lead from the signal generator through a .00025 mfd. condenser to the "ANT" connection of the receiver.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer on the "OSC" section of the tuning condenser for maximum output.

(e) Adjust the trimmer on the "R-F" section of the tuning condenser for maximum output.

(f) Adjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

(g) Readjust the station selector for maximum output. DO NOT READJUST THE OSC. TRIMMER.

(h) Repeat operations (e) and (f) for more accurate adjustments.

3. Adjusting Antenna Compensating Condenser.

(a) Set the signal generator to 600 kilocycles.

(b) Tune in the 600 kilocycle signal with the station selector for maximum output.

(c) Adjust the antenna compensating condenser, Illustration No. 13, Fig. 3, for maximum output.

(d) Repeat operations (b) and (c) alternately until no further improvement can be obtained.

(e) Set the signal generator to 1400 kilocycles again.

(f) Tune-in the 1400 kilocycle signal with the station selector for maximum output.

(g) Readjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

It will be necessary to adjust the antenna compensating condenser to the car antenna after the receiver has beeen installed in the car.

(a) After the installation is complete, tune-in a WEAK station between 55 and 65 on the dial.

(b) Adjust the antenna compensating condenser for maximum volume in the speaker.

THE CROSLEY RADIO CORPORATION
MODEL A-17

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1	G134—32000	Ant. Coil (only)
2	G93 —32001	R-F Coil (only)
	W —38995	Coil Shield
	W —32912	Wood Spacer (Coil)
3	G134—32002	Osc. Coil
4	G38 —32005	1st I-F Assembly
5	G39 —32005	2nd I-F Assembly
6	G15 —32977	Choke—Motor Noise
7	G20 —28067	Choke—"A" Filter
8	G75 —24628	Choke—"B" Filter
9	G14 —32769	Power Transformer
10	G1 —50063	Input and Output Unit Complete
10Z	G6 —38557	Input Transformer Coil
10Y	G3 —38884	Output Transformer Coil
	W —50062	Copper Shield Slug
11	G57 —33002	3 Section Var. Tuning Cond.
	W —38899A	Var. Cond. Connection
12	W —50039	Condenser .003 Mf. 160 V.
13	W —50054A	Ant. Series Trimmer Cond.
14Z		Condenser 8 Mf. 350 V.—Red
14Y	W —50076A	Condenser 8 Mf. 350 V.—Blue
14X		Condenser 12 Mf. 25 V.—Yellow
15	W —38430	Condenser 4 Mf. 10 V.
16Z		Condenser .05 Mf. 160 V.—Green
16Y		Condenser .05 Mf. 160 V.—Green
16X	W —50075	Condenser .05 Mf. 160 V.—Green
16W		Condenser .05 Mf. 160 V.—Green
17	W —32780B	Condenser .05 Mf. 400 V.
18	W —50064	Condenser .01 Mf. 160 V.
19	W —50084	Condenser .003 Mf. 160 V.
20	W —50065	Condenser .03 Mf. 160 V.
21	W —50066	Condenser .15 Mf. 400 V.
22	W —25435	Condenser .003 Mf. 400 V.
23	W —50068A	Condenser .006 Mf. 1000V.
24Z	W —38990	Condenser .5 Mf. 160 V.
24Y		Condenser .5 Mf. 160 V.
25	G1 —34002	Condenser .00025 Mf. Molded
26	G1 —34002	Condenser .00025 Mf. Molded
27	G2 —34002	Condenser .0001 Mf. Molded
28	G1 —34002	Condenser .00025 Mf. Molded
29	W —50105	Condenser .1 Mf. 160 V.
30	G2 —34002	Condenser .0001 Mf. Molded
31	G3 —34002	Condenser .0005 Mf. Molded
32	—35601	Resistor 300,000 Ohm ¼W.
33	—37377	Resistor 20,000 Ohm 1W.
34	—35928	Resistor 60,000 Ohm ¼W.
35	—38916	Resistor 350 Ohm ½W.
36	—38918	Resistor 600 Ohm ½W.
37	—35602	Resistor 1 Megohm ¼W.
38	—35602	Resistor 1 Megohm ¼W.
39	—35929	Resistor 150,000 Ohm ¼W.
40	—35600	Resistor 100,000 Ohm ¼W.
41	—38916	Resistor 350 Ohm ½W.
42	—36316	Resistor 2700 Ohm ¼W.
43	—36760	Resistor 20,000 Ohm ¼W.
44	W —22172A	Resistor 220 Ohm 1½W. Flex.
45	—38977	Resistor 220 Ohm ½W.

Item No.	Part No.	Description
46	—35600	Resistor 100,000 Ohm ¼W.
47AB	G151—36400	Socket Type 6K7
48	G156—36400	Socket Type 6A8
49	NONE	
50	G164—36400	Socket Type 6R7
51AB	G176—36400	Socket Type 6V6
52	NONE	
53	G177—36400	Socket Type 6W5
54	W —38993	Socket 3 Prong Speaker
55	G105—28807	Socket Vibrator
56	W —50083	Socket 2 Prong—T. C. & B. Comp.
	G6 —38000	Vibrator
57	See Remote	Control Head, etc.
58	—50056	Volume Control 2 Meg. Tap 1 Meg.
59	424G8 "M"	Speaker—Header Assembly
	43613 "M"	Speaker Unit only—Spec. 1-D-896
	—43463	Cone Assembly
	—40305	Field Coil
	W —43606A	Cable and Plug
	—38911	Case—Speaker
	—40781	Baffle Gasket
	—38912	Screen and Grille Assembly
	W —50014	Clamp—Elec. Cond.
	W —50002	Stud—Sync. Mtg.
	W —38873	Clip—Vib. Ground
	W —41010	Clamp—Condenser
	W —50083	Socket—Tone Control
	B —50052	Emblem
	N —2	Nut—Emblem Mtg.
	W —38455B	Template and Spacer, Case Mtg.
	— 6213	Nut—Hex Mtg.
	W —32957	Washer—Shakeproof Mtg.
	W —32956A	Stud—Case Mtg.
	—32783	Lead—24" Ant. Connector
	W —38038D	Suppressor, Distributor
	W —29754C	Condenser—Gen. and Amm.
	B —50085	Control Head and Cables—Remote
	W —50061	Tone Control
	—50095	Flexible Cable (Vol. Cont.)
	—50096	Flexible Cable (Cond. Drive)
	W —50092	Cable and Plug (Tone Cont.)
	—50098	Lead to Ammeter with Clip
	—50097	Lead to Ammeter, part of Fuse Container
	—50099	"A" Lead to Set
	W —43567	Bulb, Dial Light

SPEAKER MOUNTING PARTS

Item No.	Part No.	Description
	W —34840B	Stud—Mtg.
	W —12388	Nut—Hex Mtg.
	MG4 —38869	Muffler
	W —38964	Gasket—Muffler
	—42253	Screw—Muffler Mtg.
	W —50074	Spacer, Speaker—used only when impossible to use Muffler

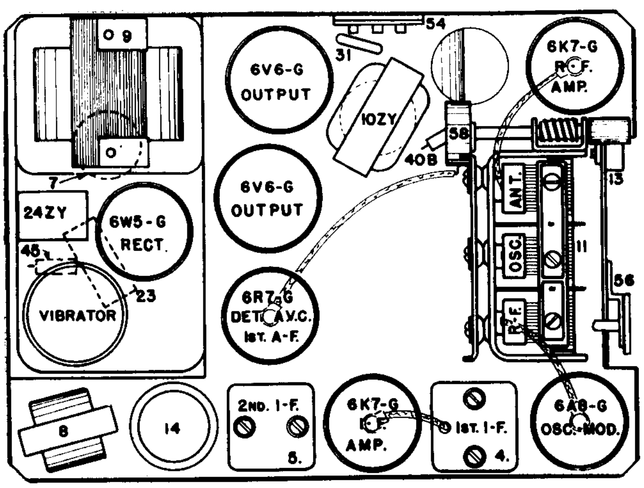


Fig. 2 Top View A-177

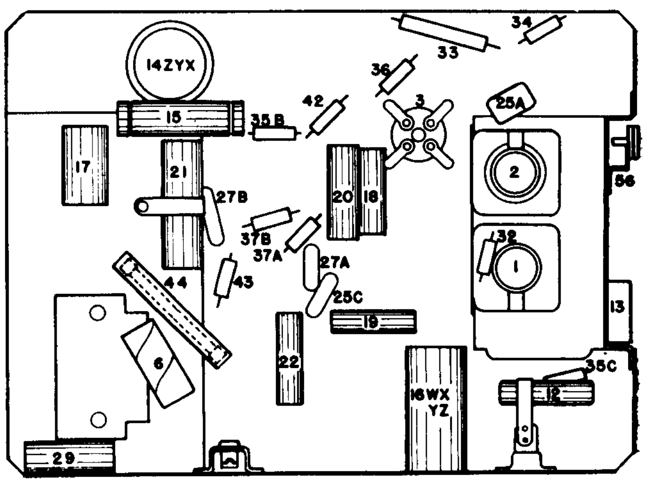
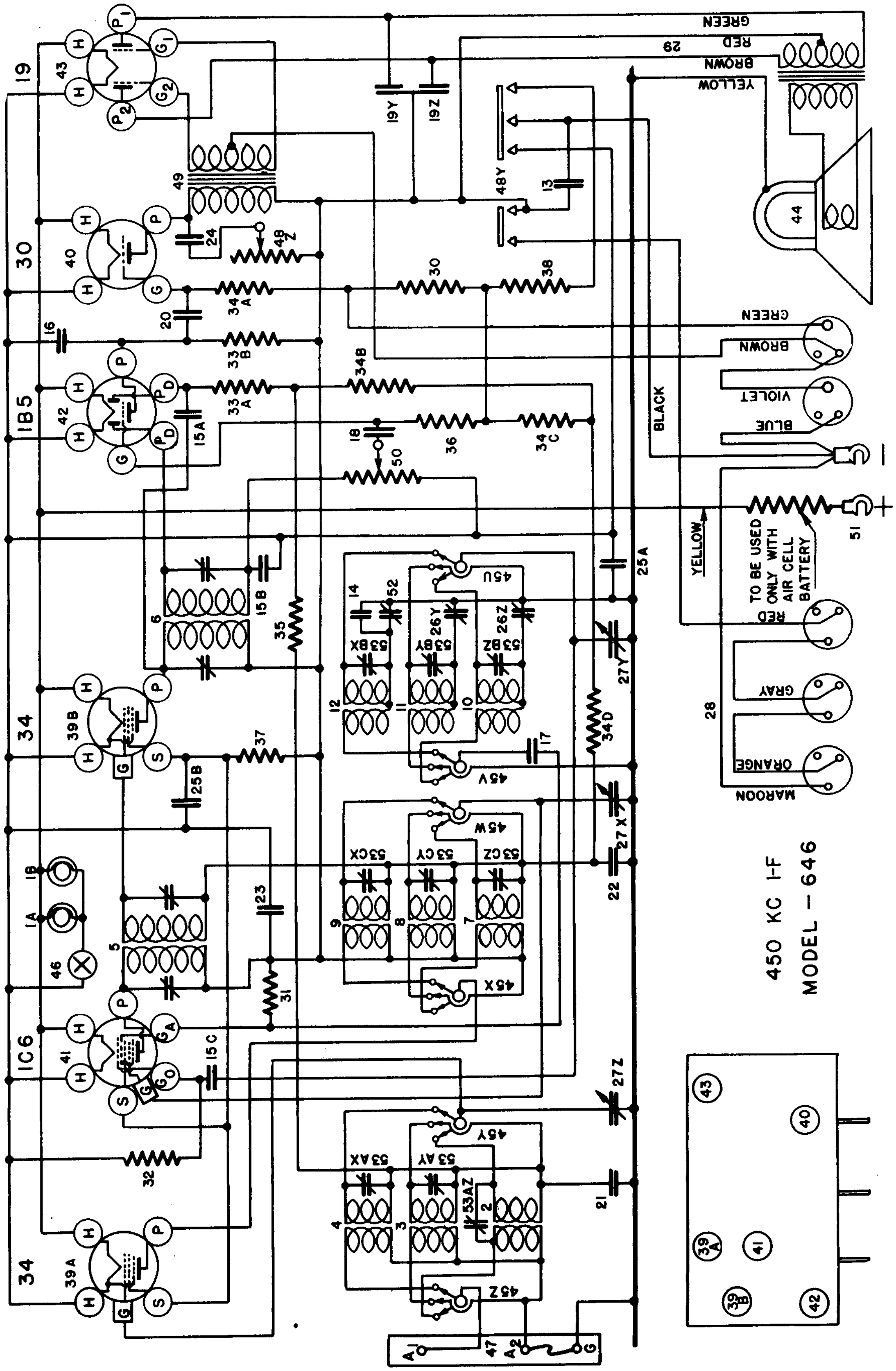


Fig. 3 Bottom View A-177

THE CROSLEY RADIO CORPORATION

MODEL 646



THE CROSLEY RADIO CORPORATION
MODEL 646

SPECIFICATIONS

The Crosley Model 646 radio is a six-tube superheterodyne receiver designed for operation from batteries. The method of connecting the battery cable is shown on the Wiring Diagram, Fig. 1. The batteries required are: one two volt storage battery or air cell battery, three plug-in type 45 volt "B" batteries and two plug-in type 4½ volt "C" batteries.

The tuning range of the receiver is from 540-18000 kilocycles and is divided into three bands as follows:

BLUE 540-1800 Kc. (555-167 Meters) American Broadcast Band.

RED 1.8-6.0 Megacycles (167-50 Meters) Police and Amateurs.

GREEN 6.0-18 Megacycles (50-17 Meters) High Frequency Band.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and the negative side of the "A" battery circuit. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with receiver in operating condition and the volume control full on and no signal input. The filament voltages should be measured with an accurate low range D.C. voltmeter (Approximately 0 to 10 volts). Voltage limits may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Where Used	H	P	S	G	Ga	Go
34	R-F Amplifier	2.0	135	65	0	—	—
1C6	Osc-Modulator	2.0	135	65	0	70	-2 to -10
34	I-F Amplifier	2.0	135	65	0	—	—
1B5	Diode & A-F Amp.	2.0	90	—	0	—	—
30	Driver	2.0	132	—	-9	—	—
19	Output	2.0	130	—	-4.5	—	—

Power output approximately 1.6 watts.
"A" battery drain approximately .62 amperes at 2 Votls.
"B" battery drain approximately 12 to 30 milliamperes depending on setting of Volume Control.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the two terminals of the output meter to the two plates of the 19 Output tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. or larger, condenser to the top cap of the 1C6 Osc-Mod tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON).

(c) Turn the band selector switch to the "H-F" position.

(d) Set the signal generator to 450 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F transformer for maximum output. Fig. 2.

(f) Adjust both trimmers located on top of the 1st I-F transformer for maximum output.

(g) Check operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

When aligning the R-F amplifier the output lead from the signal generator is connected to the "ANT" (A1) terminal of the receiver through a .00025 mfd. condenser.

Each band should first be shunt aligned and then series aligned. The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated for each adjustment.

Adjust the "OSC," "R-F" (Fig. 4), and "ANT" (Fig. 2), shunt trimmers in the order given, for maximum output. Tune the station selector to the generator signal for maximum output and then check the adjustments of the "R-F" and "ANT" trimmers in the order given. Do not readjust the "OSC" trimmer. NOTE: When aligning the High Frequency Band care must be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator approximately ten times and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles below the correct frequency.

To adjust the "series" trimmers, Illus. Nos. 52, 26Z and 26Y—Fig. 2, set the signal generator to the frequency indicated and then tune-in the signal with the station selector for maximum output. While adjusting each "series" trimmer rock the tuning condenser back and forth slightly, until no further improvement in output can be obtained.

	Shunt Alignment	Series Alignment
American Broadcast Band (BLUE)	1700 Kilocycles	600 Kilocycles
Police and Amateur Band (RED)	6000 Kilocycles	
High Frequency Band (GREEN)	18 Megacycles	

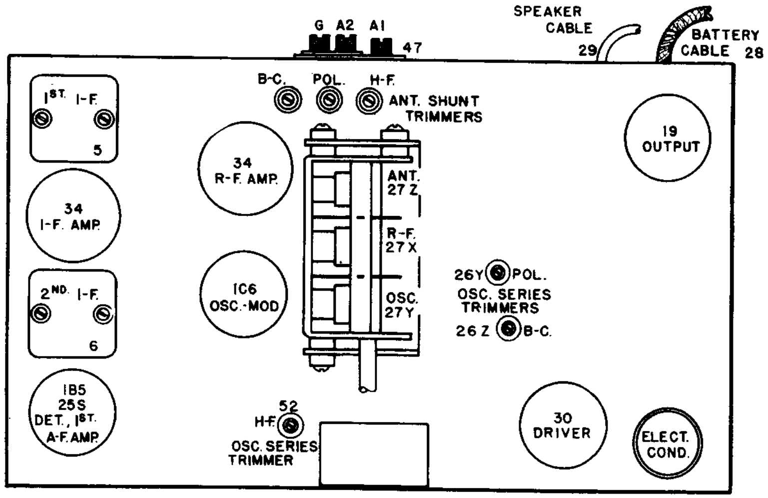


Fig. 2 Top View 646

PARTS LIST—MODEL 646

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1A	W —37188	Dial Light
1B	W —37188	Dial Light
	G6 —27134	Light Bracket Assembly
2	G110—32000	Ant. Coil—B-C-B.
3	G111—32000	Ant. Coil—Pol-B.
4	G112—32000	Ant. Coil—H-F-B.
5	G111—32004	1st I-F Assembly
6	G46 —32004	2nd I-F Assembly
7	G98 —32002	Osc. Coil —B-C-B.
8	G99 —32002	Osc. Coil—Pol-B.
9	G100—32002	Osc. Coil—H-F-B.
10	G76 —32001	R-F Coil—B-C-B.
11	G77 —32001	R-F Coil—Pol.-B
12	G78 —32001	R-F Coil—H-F-B.
13	W —37628	Condenser 30 Mfd. 200 V. Electrolytic
14	G5 —34007	Condenser 2757 Mmfd. Mica.
15A, 15B, 15C	G2 —34002	Condenser Molded .0001 Mfd.
16	G3 —34002	Condenser Molded .0005 Mfd.
17	W —35139	Condenser Tubular .004 Mfd. 400 V.
18	W —28619	Condenser Tubular .006 Mfd. 200 V.
19Z, 19Y	W —31158	Condenser Tubular .006 Mfd. 400 V.; Condenser Tubular .006 Mfd. 400 V.
20	W —28621	Condenser Tubular .02 Mfd. 200 V.
21	W —32379	Condenser Tubular .02 Mfd. 200 V.
22	W —36541	Condenser Tubular .02 Mfd. 160 V.
23	W —30488	Condenser Tubular .02 Mfd. 400 V.
24	W —23615	Condenser Tubular .05 Mfd. 400 V.
25A	W —29910A	Condenser Tubular .25 Mfd. 200 V.
25B	W —29910A	Condenser Tubular .25 Mfd. 200 V.
26Z, 26Y	—37874	B-C Osc. Series Trimmer; Pol. Osc. Series Trimmer
27	G50 —33002	3 Section Var. Tuning Condenser
	—40903B	Dial Drive Unit
	C —41220	Dial Glass
	—41586	Pointer Disc.
	—41582	Drive Cable
	—41584	Coupling Unit
	—41587	Pointer Disc. Screw
28	C —37106C	Battery Supply Cable Assembly

Item No.	Part No.	Description
29	G8 —35696	Speaker Cable
30	—27121	Resistor 5000 Ohm ¼W.
31	—33390	Resistor 30000 Ohm ¼W.
32	—36761	Resistor 40000 Ohm ¼W.
33A	—35928	Resistor 60000 Ohm ¼W.
33B	—35928	Resistor 60000 Ohm ¼W.
34A	—36322	Resistor 500000 Ohm ¼W.
34B	—36322	Resistor 500000 Ohm ¼W.
34C	—36322	Resistor 500000 Ohm ¼W.
34D	—36322	Resistor 500000 Ohm ¼W.
35	—35927	Resistor 2 Megohm ¼W.
36	—36688	Resistor 3 Megohm ¼W.
37	—37377	Resistor 20000 Ohm 1W.
38	W —22180	Resistor 1650 Ohm 1¼W. Flex.
39A	G31 —28807	Socket Type 34
39B	G31 —28807	Socket Type 34
40	G9 —28807	Socket Type 30
41	G84 —28807	Socket Type 1C6
42	G91 —28807	Socket Type 1B5
43	G44 —28807	Socket Type 19
	W —26974B	Tube Shield
	W —26973B	Tube Shield Base
44	—41123	Speaker 42 P.J.4
45Z to 45U	C —40910	Band Selector Switch
46	W —41068A	Switch, Dial Light
47	G27 —26719	Ant. & Grd. Terminal Assembly
48Y, 48Z	—41368	Battery Switch; Tone Control
49	G26 —24628	Audio Transformer
50	—37967	Volume Control
51	G3 —23300	Resistor .372 Ohm (Air Cell)
52	—41369	Condenser H-F-Osc. Series Trimmer
53	W —35951	3 Section Shunt Trimmer Assembly
	B —40839	Escutcheon
	W —28760A	Escutcheon Pin
	W —41221	Knob, Station Selector
	W —41222	Knob, Dial Light
	W —40192B	Knob, Band Selector, Sw.
	W —41224	Knob, V. C. & T. C.

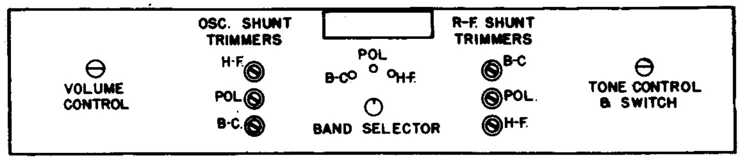
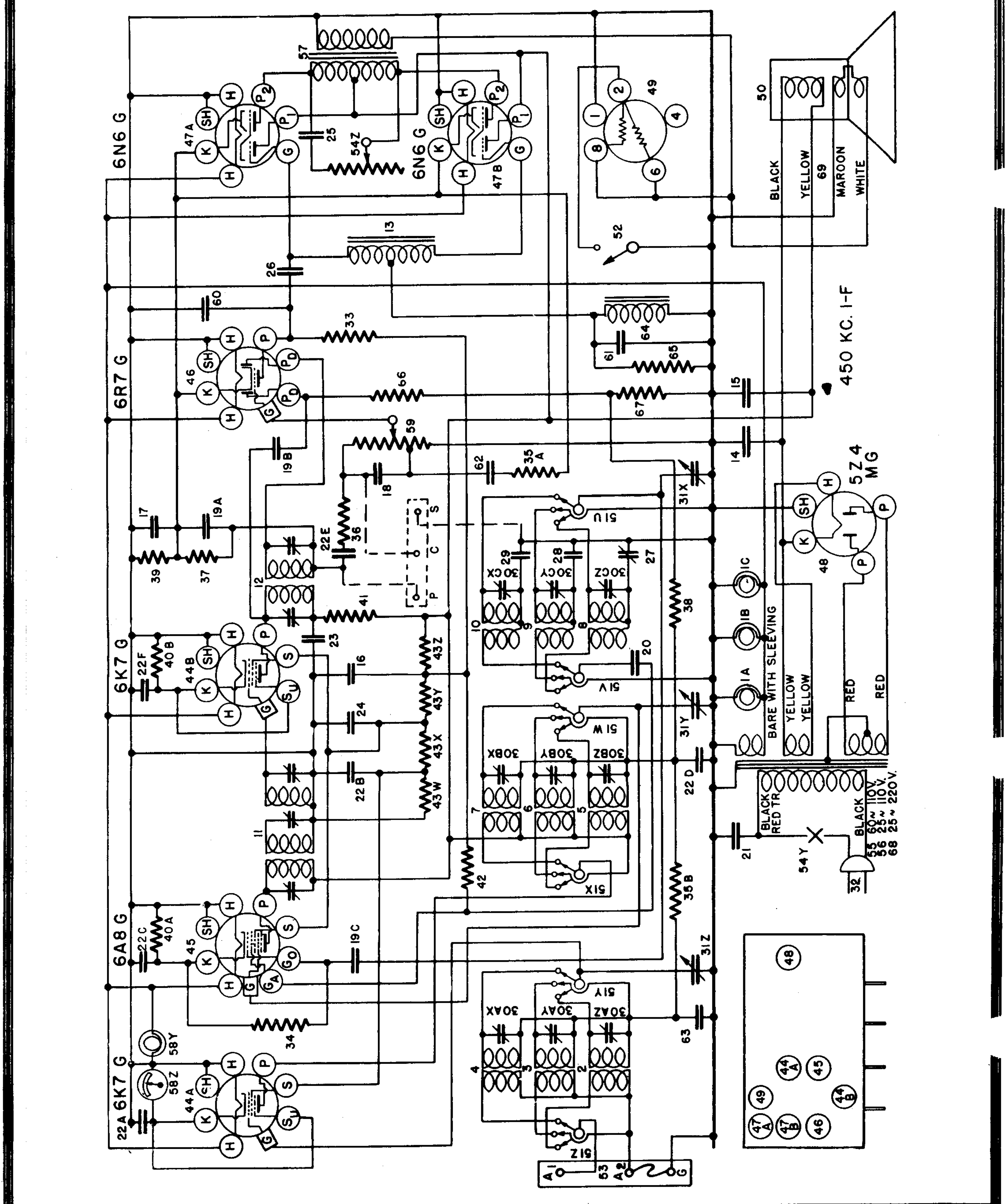


Fig. 4 Front View 646

THE CROSLEY RADIO CORPORATION

MODEL 816



THE CROSLEY RADIO CORPORATION
MODEL 816

SPECIFICATIONS

The Crosley Model 816 radio is an eight-tube superheterodyne receiver and uses either glass or metal tubes, except the Phantom Conductor (Auto-Expressionator) tube which is always glass and the 5Z4 rectifier which should always be the MG type. NOTE: If glass tubes are replaced with metal tubes or metal tubes replaced with glass tubes it will be necessary to completely re-align the circuits of the receiver because of the difference in inter-electrode capacities. Chassis are available either with a standard 110 Volt—60 Cycle, 110 Volt—25 Cycle or 220 Volt—25 Cycle Power Transformer.

The tuning range of the receiver is from 540 to 19000 Kilocycles and is divided into three bands as follows:

BLUE	540-1900 Kc. or 555-158 Meters	(Standard American Broadcast)
RED	1.9- 6.5 Mc. or 158- 46 Meters	(Police and Amateurs)
GREEN	6.0-19.0 Mc. or 50- 16 Meters	(High Frequency)

PANTOM CONDUCTOR (Auto Expressionator)

The Phantom Conductor tube, Illustration No. 49, is connected across the voice coil of the speaker. When operating its resistance varies so as to increase the volume of loud tones, thus giving a wider volume range to reproduced music which tends to compensate for the electrical limitations of broadcasting equipment.

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt, 500 volt D. C. voltmeter (except filaments) with the receiver in operating condition and no signal input. The filaments should be measured with an accurate low range A. C. voltmeter. Readings may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	P_2	S	Su	G	K	Ga	Go
6K7	R-F Amplifier	6.3	245	—	100	4.0	0	4.0	—	—
6A8	Osc-Modulator	6.3	245	—	130	—	0	4.5	150	-5 to -30
6K7	I-F Amplifier	6.3	230	—	130	4.0	0	4.0	—	—
6R7	Diode Detector & A-F Amplifier	6.3	130	—	—	—	0	4.0	—	—
6N6	(2) Output	6.3	245	230	—	—	0	4.0	—	—
5Z4MG	Rectifier	5.0	345	—	—	—	—	—	—	—
W-41187	Phantom Conductor Tube—All Voltages Variable									

Voltage drop across speaker field 100 volts.
Power Output approximately 8 watts.
Power Consumption approximately 115 watts.
All readings taken on 117.5 volt power supply.

PHONOGRAPH PICKUP

Chassis equipped with a 25 cycle power transformer also have three terminals on the back for connecting a phonograph pickup. These terminals are marked P C S and the pickup is connected through a double pole single throw switch to these terminals as shown in Fig. 7.

ALIGNMENT PROCEDURE

This is a High Fidelity receiver and in order to secure maximum performance the alignment of its circuits should be done with precision instruments.

Tuning I-F Amplifier to 450 Kilocycles.

The I-F amplifier employs two triple-tuned I-F transformers and under no condition should their trimmer condensers be readjusted just to determine if they are properly tuned. Fig. 5 shows the selectivity curve of a receiver whose I-F amplifier was slightly mis-tuned while Fig. 6 shows a curve made from actual measurements of a receiver which was properly aligned with the use of an oscilloscope. (See Note 3

1. Conventional Method—

(a) Connect one terminal of the output meter to P2 of one of the 6N6 Output tubes and the other terminal through a .1 mf., or larger, condenser—Not Electrolytic—to P2 of the other Output tube.

(b) Connect the output of the signal generator through a .02 mf. condenser, to the top cap of the 6K7 I-F Amp. tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the GND. terminal of the receiver chassis. KEEP THE GENERATOR OUTPUT LEAD AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(c) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. Turn the volume control knob to the right (ON), turn the tone control knob to the left (TREBLE), and turn the Phantom Control Switch to the left (OFF).

(d) Set the signal generator to 450 Kilocycles.

(e) Adjust the trimmer condensers on the top of the 2nd. I-F transformer for maximum output. Fig. 2 (Item 12).

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

(f) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 Osc.-Mod. tube, leaving the tube's grid clip in place.

(g) Close the middle trimmer condenser on the 1st. I-F transformer (Tert. Fig. 4) so that it is moderately tight. (DO NOT FORCE ADJUSTING SCREW).

(h) Adjust the top (Sec) and then the bottom (Pri) trimmers of the 1st. I-F transformer for maximum output.

(i) Transfer the lead of the signal generator from the 6A8 tube to the "ANT" terminal of the receiver and increase the output of the signal generator if necessary.

(j) Check the adjustment of the bottom (Pri) trimmer of the 1st. I-F transformer. Then adjust the middle trimmer by opening until maximum output is obtained. DO NOT READJUST TOP OR BOTTOM TRIMMERS AFTER THE MIDDLE TRIMMER HAS BEEN ADJUSTED.

2. Oscilloscope Method.

(a) Connect the output of the signal generator through a .02 mf. condenser to the top cap of the 6K7 I-F amplifier tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the receiver chassis. KEEP THE GENERATOR OUTPUT LEAD AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Connect the vertical plates of the cathode ray oscilloscope to the receiver as follows: The binding post marked "GND" should be connected to the receiver chassis and the other binding post should be connected to the plate terminal of the 6R7 tube. (Be sure the oscilloscope is protected from D. C. by connecting a condenser, 0.1 to .05 mf., in series with the lead to the plate of the 6R7 tube).

(c) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. The exact setting should be at a position where no broadcast signal will be received. Turn the volume control to the right (ON), turn the tone control to the left (TREBLE) and turn the Phantom Conductor switch to the left (OFF).

(d) Set the signal generator to 450 kilocycles. See Instructions supplied with signal generator and oscilloscope.

(e) Adjust the trimmer condensers located on top of the 2nd. I-F transformer for maximum amplitude and symmetry of the selectivity curve on the resonance line (R).

NOTE: Keep the signal generator output as low as possible in order to prevent AVC action in the receiver.

(f) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 oscillator-modulator tube, leaving the tube's grid clip in place.

(g) Close the middle trimmer (TERT) of the 1st. I-F transformer so that it is moderately tight. (Do not force adjustment screw).

(h) Increase the output of the signal generator and adjust the top trimmer (Sec) of the 1st. I-F transformer for maximum symmetry and amplitude.

(i) Adjust the bottom trimmer (Pri) of the 1st. I-F transformer for maximum amplitude.

(j) Reduce the output of the signal generator and adjust the middle trimmer of the 1st. I-F transformer for maximum symmetry and amplitude.

Aligning R-F Amplifier.

The R-F amplifier can best be aligned in the conventional manner, using a modulated signal generator and output meter.

When aligning the R-F amplifier the output lead of the signal generator is connected to the antenna terminal of the receiver. For the BLUE and RED bands a .00025 mf. condenser must be in series with the output lead of the signal generator and for the high-frequency band a 400 Ohm carbon resistor should be used in place of the condenser.

Each band should be shunt aligned and then series aligned, where provision is made for series alignment (BLUE band). The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated (c) for each adjustment.

(a) Adjust the "Osc.," "R-F" (Fig. 4) and "Ant." (Fig. 2) shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check the adjustments of the "R-F" and "Ant." trimmers in the order given. DO NOT READJUST THE "OSC" TRIMMER.

NOTE: When shunt aligning the RED and GREEN bands care must be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 900 Kilocycles less than the fundamental frequency. To check on this, increase the output of the signal generator ten times or more and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 Kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct position.

(b) To align the B-C "OSC" series trimmert, Illus. 27, Fig. 4, set the signal generator to 600 Kilocycles and then tune-in this signal with the station selector for maximum output. While the series trimmer is being adjusted rotate the station selector back and forth slightly until no further improvement in output can be obtained.

(C) SIGNAL INPUT FREQUENCIES

		Shunt Aligned	Series Aligned
American Broadcast	(BLUE	1700 Kc.	600 Kc.
Pol. & Amateur	(RED)	6000 Kc.	
High-Frequency	(GREEN)	18000 Kc.	

NOTE 3: The high frequency oscillator on this receiver is neutralized by the addition of some small capacity coupling between the oscillator grid and the R-F grid of the 6A8 tube. This is accomplished by loosely wrapping a piece of insulated hook-up wire around the R-F grid lug and connecting it to the oscillator grid lug on the band selector switch.

It is necessary on some sets to adjust or even remove this coupling, in which case the wire should be unwrapped and threaded through the extra hole in the grid end of the R-F coil.

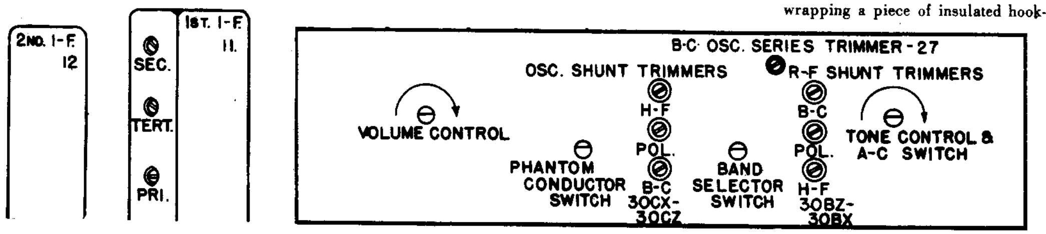


Fig. 4. Front View 816

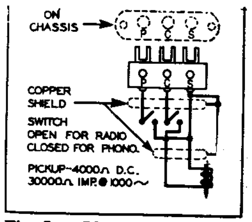


Fig. 7. Phonograph Pickup

THE CROSLEY RADIO CORPORATION

MODEL 816

PARTS LIST—MODEL 816

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1ABC	W --37922	Dial Light
	G3 —37965	Dial Light Socket Assembly
	W —40570	Dial Light Shield (2)
2	G110—32000	Ant. Coil—B-C-B.
3	G111—32000	Ant. Coil—Pol-B.
4	G112—32000	Ant. Coil—H-F-B.
5	G76 —32001	R-F. Coil—B-C-B.
6	G83 —32001	R-F. Coil—Pol-B.
7	G84 —32001	R-F. Coil—H-F-B.
8	G98 —32002	Osc. Coil—B-C-B.
9	G99 —32002	Osc. Coil—Pol-B.
10	G107—32002	Osc. Coil—H-F-B.
11	G112—32004	1st I-F Assembly
12	G114—32004	2nd I-F Assembly
13	G12 —29535	A-F Driver Choke
14	W —36055	Condenser, 35 Mfd. 400 V. Electrolytic
15	W --41080	Condenser, 12 Mfd. 200 V. Electrolytic
16	W --41081	Condenser, 16 Mfd. 250 V. Electrolytic
17	W --41558	Condenser, 50 Mfd. 25 V. Electrolytic
18	G6 --34002	Condenser, .000025 Mfd. Molded
19A	G2 —34002	Condenser, .0001 Mfd. Molded
19B	G2 —34002	Condenser, .0001 Mfd. Molded
19C	G2 —34002	Condenser, .0001 Mfd. Molded
20	W —35139	Condenser, .004 Mfd. 400 V.
21	W —30805	Condenser, .01 Mfd. 400 V.
22A	W —36541	Condenser, .02 Mfd. 200 V.
to	W —36541	Condenser, .02 Mfd. 200 V.
22F	W —36541	Condenser, .02 Mfd. 200 V.
23	W —30488	Condenser, .02 Mfd. 400 V.
24	W —35936	Condenser, .05 Mfd. 200 V.
25	W —23615	Condenser, .05 Mfd. 400 V.
26	W —29910A	Condenser, .25 Mfd. 200 V.
27	—40769	B-C Osc. Series Trimmer Condenser
28	G7 —34000	Pol. Osc. Series Fixed Cond. (1450 Mmfd.)
29	G20 —34000	H-F Osc. Series Fixed Cond. (4910 Mmfd.)
30	W —35951	3 Section Shunt Trimmer Cond. Assy.
31	G52 —33002	3 Section Var. Tuning Condenser
	MG-22—41475	Dial Drive Assembly Complete
	C —41501	Dial
	—41136A	Dial Mask
	—40485	Long Hand
	—41145	Short Hand
	W —40486	Hand Mtg. Screw
	—41157	Driver Belt
32	B —33906	Power Cord & Plug
33	—24990	Resistor, 25,000 Ohm ¼W. Carbon
34	—21237A	Resistor, 60,000 Ohm ¼W. Carbon
35A	—35600	Resistor, 100,000 Ohm ¼W. Insulated
35B	—35600	Resistor, 100,000 Ohm ¼W. Insulated
36	—23403	Resistor, 150,000 Ohm ¼W. Carbon

Item No.	Part No.	Description
37	—36321	Resistor, 400,000 Ohm ¼W. Insulated
38	—37245	Resistor, 1.5 Megohm ¼W. Carbon
39	W —24537	Resistor, 60 Ohm ½W. Flexible
40A	W —28589	Resistor, 350 Ohm ½W. Flexible
40B	W —28589	Resistor, 350 Ohm ¼W. Flexible
41	W —23013	Resistor, 2,000 Ohm 1¼W. Flexible
42	W —37987	Resistor, 15,000 Ohm 1W. Wire Wound
43Z		1000 Ohm Candohm
43Y	W —41484	7000 Ohm Candohm
43X		3500 Ohm Candohm
43W		15000 Ohm Candohm
44A	G151—36400	Socket Type 6K7
44B	G151—36400	Socket Type 6K7
45	G156—36400	Socket Type 6A8
46	G164—36400	Socket Type 6R7
47A	G165—36400	Socket Type 6N6
47B	G165—36400	Socket Type 6N6
48	G154—36400	Socket Type 5Z4
49	G167—36400	Socket Type 5 Prong (W41187 tube)
	W —27981A	Tube Shield Base
	W —40911	Tube Shield
50		Speaker 542 CJ 4
51	C —40910	Band Selector Switch
52	W —41486	Phantom Control Switch
53	G26 —26719	Ant. & Grid Terminal Assembly
54Z	—37966	Tone Control
54Y		A-C Switch
55	—41506	Power Transformer 110 V. 60 Cy.
	—41507	Power Transformer 110 V. 25 Cy.
	—41508	Power Transformer 220 V. 25 Cy.
57	G53 —24628	Audio Output Transformer
58Z	W —41259	Tuning Meter
58Y	W —41464	Tuning Meter Bulb
59	—41301	Volume Control 3 Megohm tap 1 Meg.
60	G1 —34002	Condenser .00025 Mfd. Molded
61	W —27216	Condenser .05 Mfd. 200 V.
62	W —34713	Condenser .006 Mfd. 160 V.
63	W —32379	Condenser .02 Mfd. 200 V.
64	G13 —29535	Compensator Choke
65	—22196	Resistor 20,000 Ohm ¼W. Carbon
66	—35930	Resistor 200,000 Ohm ¼W. Insulate
67	—23785	Resistor 500,000 Ohm ¼W. Cabron
	C —37894	Escutcheon
	G —37896A	Escutcheon Retaining Spring
	B —37898	Glass Lens (Bezel)
	B —37897	Lens Retaining Spring
	W —37339	Knob (3)
	W —40192B	Knob (2)
	W —36117	Rubber Mtg. Foot

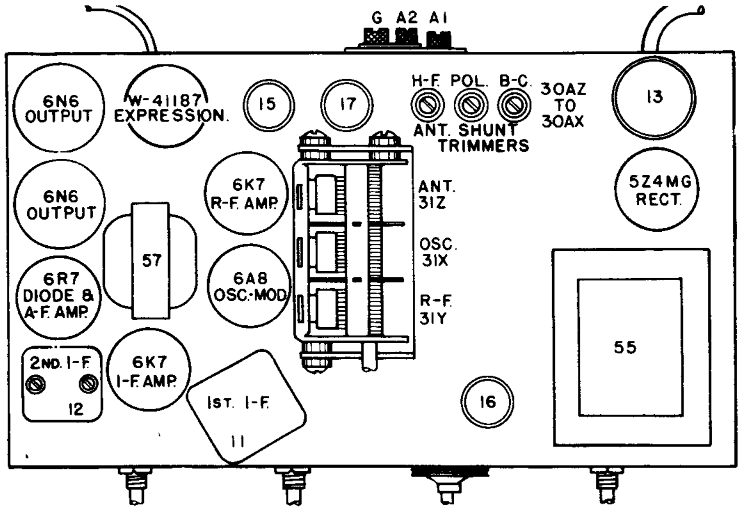


Fig. 2. Top View 816

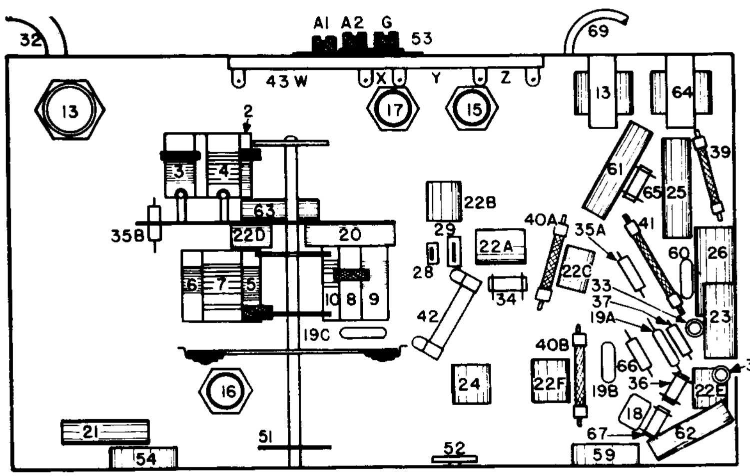


Fig. 3. Bottom View 816

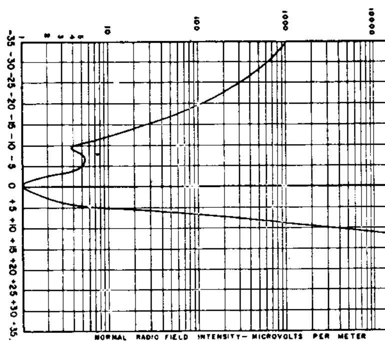


Fig. 5

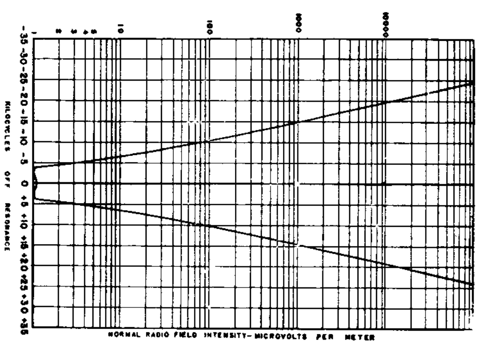
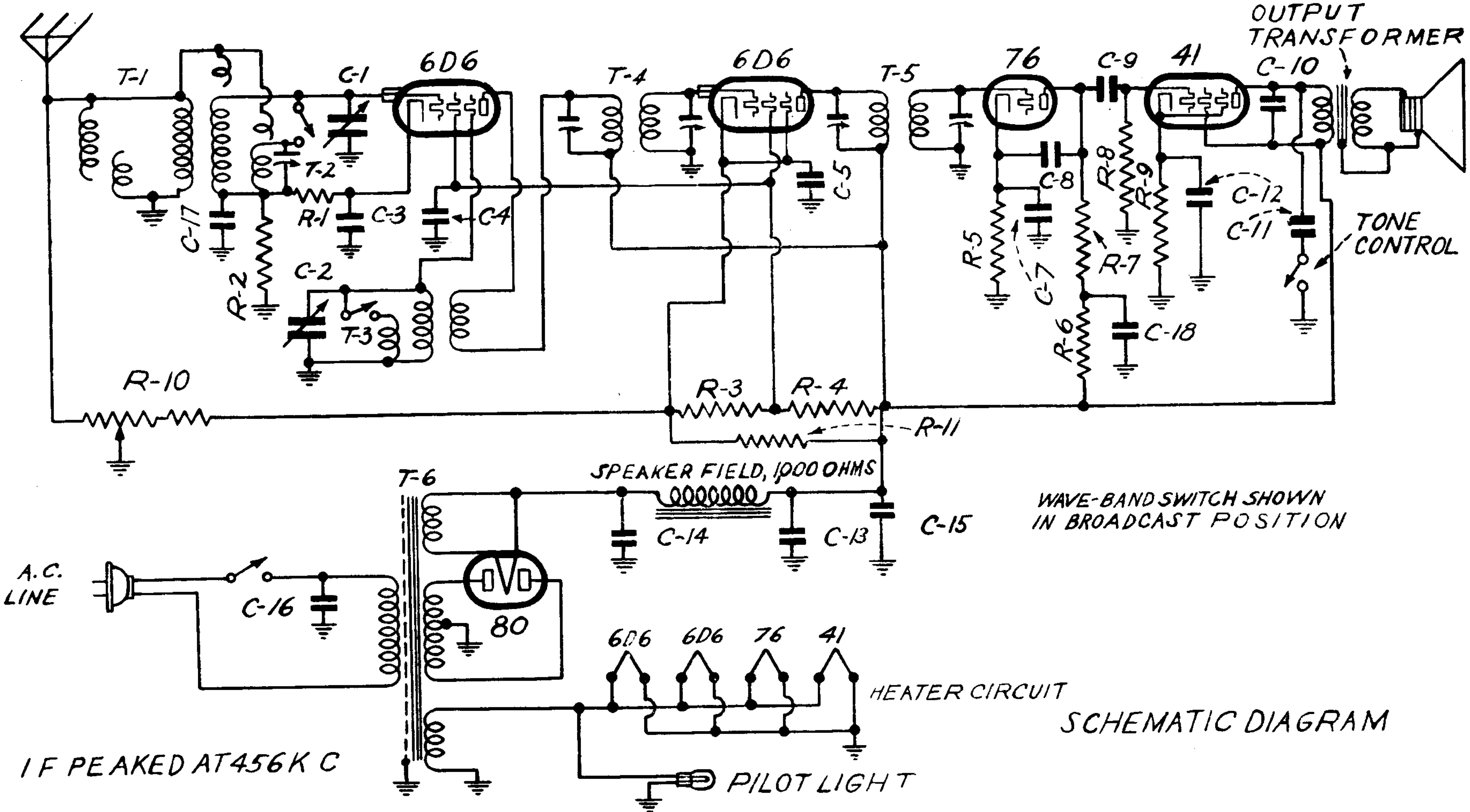


Fig. 6

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS K116, K121 & K123



R1	TTR-175	300 ohm 1/4 watt wire-wound resistor
R2	TTR-201	3,000 ohm 1/4 watt carbon resistor
R3	GR-31	20,000 ohm 1 watt carbon resistor
R4	2TR-225	12,000 ohm 2 watt carbon resistor
R5	KR-53	50,000 ohm 1/4 watt carbon resistor
R6	OR-73	25,000 ohm 1/4 watt carbon resistor
R7	KR-55	250,000 ohm 1/4 watt carbon resistor
R8	KR-56	500,000 ohm 1/4 watt carbon resistor
R9	TTR-174	410 ohm 1 watt wire-wound resistor
R10	TTR-159F	Volume control with line switch—5,000 ohms (This volume control has 200 ohm bias stop)
R11	2TR-233	50,000 ohm 2 watt carbon resistor
C1, C2	3KC-287	Two gang variable condenser
C3, C17	TTC-176	Dual 0.02 mf, 400 volt tubular condenser
C4	FC-29	0.02 mf, 200 volt tubular condenser
C5, C7	AC-6	0.1 mf, 200 volt tubular condenser
C8	AAC-114	0.001 mf mica condenser
C9	EC-23	0.03 mf, 400 volt tubular condenser
C10	HC-34	0.006 mf, 600 volt tubular condenser
C11	2TC-189	0.015 mf, 1000 V.
C12, C13, C14	TTC-159	12 mf, 25 V.; 6 mf, 400 V.; 8 mf, 400 V.; respectively.
C15	EEC-132	0.1 mf, 400 V.
C16	3LC-297	0.01 mf, 250 V.
C18	IC-46	0.5 mf, 400 V.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS K116, K121 & K123

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The second i-f is the one directly behind the variable condenser. Part no. TTT-173 is a composite broadcast oscillator coil and first i-f transformer.

The broadcast antenna coil is mounted underneath the chassis deck, directly below the variable condenser. The short-wave oscillator coil is mounted on the right-hand wall of the chassis. The short-wave antenna coil is located underneath the chassis deck near the oscillator coil. The trimmer for this short-wave antenna coil is mounted on the coil tubing.

I-f Alignment

Rotate the wave-band switch to the broadcast position, clockwise, and swing the variable condenser to the maximum capacity position. Feed 456 kc to the stator of the front (antenna) section of the variable condenser. Adjust the four i-f trimmers (at tops of i-f cans) for maximum response.

Broadcast Alignment (Use a .0002 mf condenser as a dummy antenna.)

With the wave-band switch in the broadcast position, set the dial pointer at 1425. Feed 1425 kc to the antenna and adjust first the oscillator trimmer (rear) and then the antenna trimmer (front) on the variable condenser for maximum response.

Short-wave Alignment

Rotate the wave-band switch to the short-wave position, counter-clockwise. Feed 2500 kc through the antenna and rotate the variable condenser in the vicinity of the 2500 mark until this signal is picked up. Adjust the short-wave antenna trimmer (at the top of the small coil beneath the chassis deck) for maximum response on this signal.

GENERAL NOTES

1. The receiver should never be turned on with either the speaker plug or the 41 tube out of its respective socket, since the rapid rise in rectifier voltage will damage the electrolytic condenser.
2. The color coding of the leads of the composite first i-f transformer and oscillator coil, part no. TTT-173, is as follows:
   B plus—red
   Plate—blue
   I-f and oscillator grid return—black
   Suppressor grid—green with white tracer
   I-f grid—green
3. The color coding of the leads of the second i-f transformer, part no. TTT-176A, is as follows:
   Grid—green
   Grid return—black
   Plate—blue
   B plus—red
4. The color coding of the leads on the power transformer is as follows:
   Primary—two green leads.
   High voltage secondary—two black leads.
   High voltage secondary center-tap—yellow lead.
   6.3 volt secondary—two heavy blue leads.
   5 volt secondary—two heavy red leads.
5. With a few exceptions, the color coding of the general wiring is as follows:
   Plate—blue
   B plus—red
   Screen—brown
   Cathode—white or yellow
   Grid—green
   Filament and ground—black.
6. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.
7. It is not necessary to remove the chassis from the cabinet to replace the pilot light. Simply slip the push-on bracket off the dial and unscrew the bulb.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

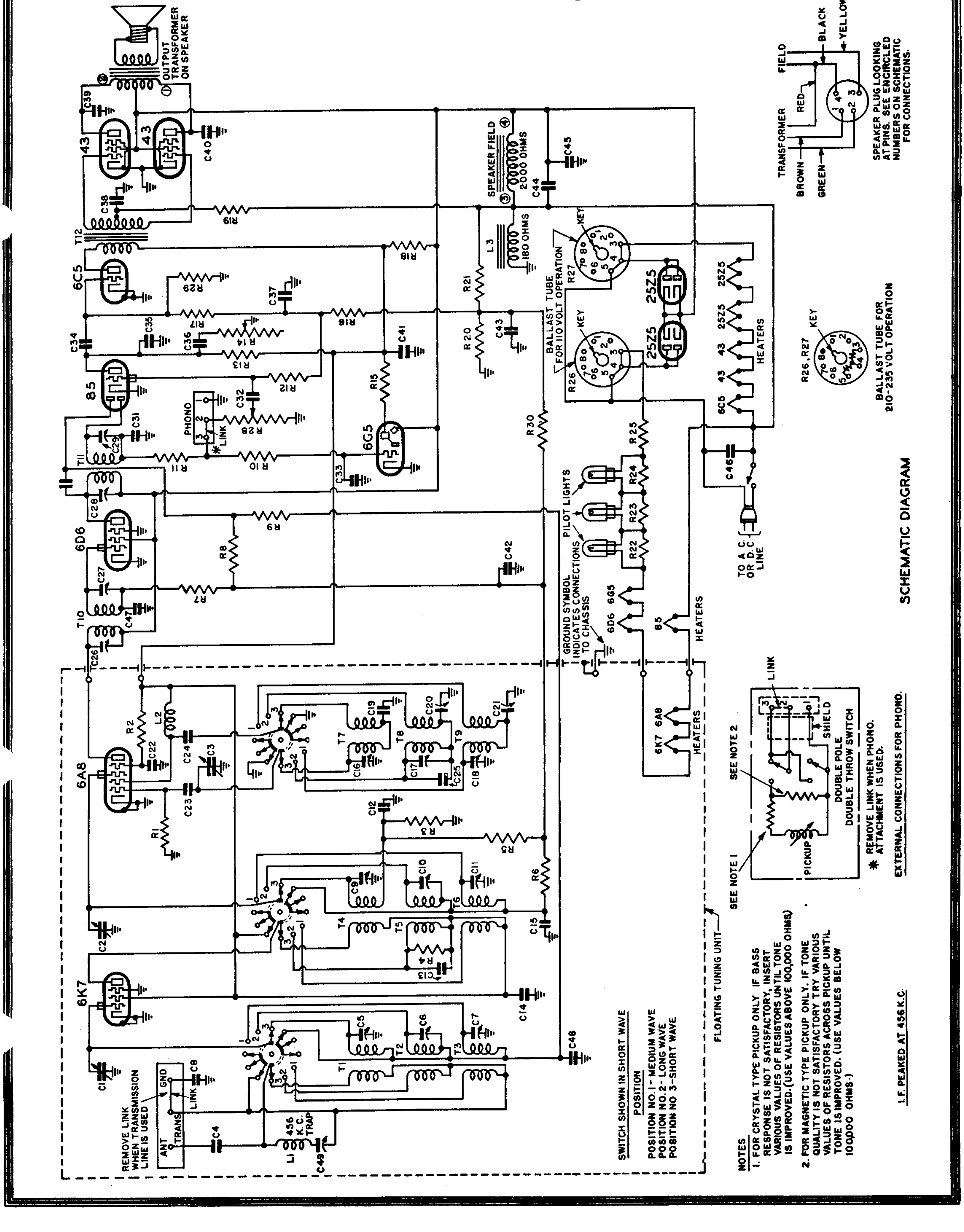
Tube	*Plate*	*Screen*	*Cathode*	*Fil.*
6D6 (in front right-hand corner)	242	130	21.5	6.3 a.c.
6D6 (i-f)	242	130	4.0	6.3 a.c.
76	100	—	9.8	6.3 a.c.
41	216	242	13.5	6.3 a.c.

B plus at filament of 80 tube—305 volts.

Voltage across speaker field—60 volts.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS M, M-134, M-136, M-138, M-139, M-140. M-142 & M-146



EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS M, M-134, M-136, M-138, M-139, M-140, M-142 & M-146

PRODUCTION CHANGES

C5 and C9 trimmers were supplied separately and later incorporated as part of the short-wave antenna and detector coil assemblies, going directly across the coil secondaries instead of to ground.

In later receivers trimmers C6 and C10 have their rotors returned to ground and not to a.v.c., as shown on the schematic.

ADJUSTMENTS

An oscillator with frequencies of 150, 345, 456, 600, 1600 and 16000 kc should be used.

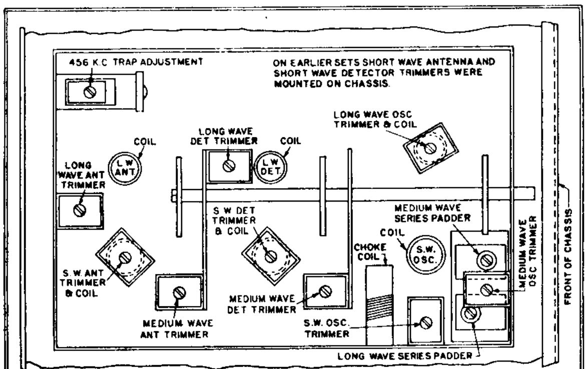
An output meter should be used across the voice coil or speaker output transformer for observing maximum response.

Use a standard dummy antenna for aligning any of the three bands. A .0002 mf condenser may be used for the medium-wave band and the long-wave band dummy antenna and a 400 ohm non-inductive resistor for the short-wave dummy antenna.

Always use as weak a test signal as possible when aligning the receiver.

The i-f transformers are located on the extreme left side of the chassis. The transformer nearest the front of the chassis is the first i-f transformer. The four trimmers for the i-f adjustment are available through holes in the tops of the cans.

The medium-wave, long-wave and short-wave coils are all located on the tuner unit. The tuner unit is the separate chassis section floated on rubber and mounted in center of chassis. The location of the trimmers for the coils is shown in the illustration at the right. The three coils for the medium-wave band are in separate cans on top of the tuner unit.



BOTTOM VIEW OF TUNER UNIT LOOKING AT TRIMMERS

I-f Alignment

Set the wave-band switch at the medium-wave (clockwise) position and the variable condenser at the minimum capacity position. Feed 456 kc to the grid cap of the 6A8 tube. Adjust the four i-f trimmers carefully for maximum response. Feed 456 kc through a dummy antenna into the antenna terminal and adjust the 456 kc wave-trap for *minimum response.* (See General Notes.)

Medium-Wave Alignment

Both pointers on the dial should coincide vertically at 890 kc. For adjustment, the gold pointer may be slipped around its shaft. With the wave-band switch at the medium-wave (clockwise) position, set the pointer at 60, feed 600 kc through the antenna (using a standard dummy antenna), and adjust the medium-wave series padder for maximum response. Move pointer to 160, feed 1600 kc to the antenna and adjust the oscillator trimmer for maximum response, then adjust detector and antenna trimmers. Reset the pointer to 60, feed 600 kc to antenna and rock the variable condenser (rotate the condenser back and forth through a small arc) while resetting the oscillator padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary, return to 600 and repeat entire procedure.

Long-Wave Alignment

Set the wave-band switch at the long-wave (central) position and the pointer to 150. Feed 150 kc through a standard dummy antenna to the antenna terminal and adjust the long-wave series padder for maximum response. Move the pointer to 345, feed 345 kc and adjust the long-wave oscillator trimmer, then the r-f trimmer and then the antenna trimmer for maximum response. Return to 150 kc and re-adjust the long-wave series padder for maximum response. Return to 345 kc and re-adjust all three trimmers. Return again to 150 and check the alignment. Repeat the entire procedure until no appreciable re-adjustment is required.

Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move pointer to 16, feed 16000 kc to antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator for maximum response. If two peaks are obtained choose minimum capacity peak. Then adjust the detector and antenna trimmers for maximum response. If two peaks are obtained choose the maximum capacity peak.

GENERAL INSTRUCTIONS

The set's oscillator is higher in frequency than the signal on all three bands. Images, therefore, should be observed on the low-frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmer and maximum capacity peaks on antenna and r-f trimmers. The last motion in adjusting trimmers should always be a tightening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a source of noise, frequency drift and microphonism.

In aligning antenna trimmers on the high-frequency signals there is usually a tendency for the oscillator to drift, due to interlocking. To compensate for this always keep re-tuning the variable condenser as you align.

Replacements should be made with genuine Emerson parts for best results.

8AZ-367	Band-spread pointer	.15
3AZ-406	Dial escutcheon with crystal	1.65
3AZ-322B	Electron Ray socket and cable	.85
3AZ-407	Electron Ray escutcheon	.20

See index for Complete List of Parts

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS M, M-134, M-136, M-138, M-139, M-140, M-142 & M-146

Voltage rating	105-125 volts, a.c. or d.c. (with ballast tubes part no. 3MZ-419). 210-250 volts, a.c. or d.c. (with ballast tubes part no. 3MR-253).
Current drain	0.7 amps.
Frequency ranges	140 to 375 kc, 540 to 1800 kc, 5.5 to 18.0 megacycles.

GENERAL NOTES

1. An electrical phonograph pick-up may be connected to this receiver for playing records. Connections to the receiver may be made at the "phono" terminal strip which is located on the rear wall of the receiver chassis. A double-pole, double throw-switch is necessary in addition to the phonograph pick-up and motor. The receiver volume control may be used to control the phonograph volume. Remove the link connecting two of the terminals on the phono strip. The switch should be wired to the pick-up and terminal strip so that in the phonograph position the switch should short terminals 1 and 3 and at the same time connect the high side of the pick-up to a lead from terminal 2. (The ground side of the pick-up may be permanently wired to terminal 1.) When the switch is in the radio position terminals 2 and 3 should be shorted together and the pick-up disconnected from terminal 2. A matching input transformer must be used if the pick-up is of the low impedance type. If the phonograph be permanently disconnected, the small connecting link must be replaced across terminals 2 and 3. (See schematic diagram.)
2. The receiver should never be turned on with the speaker plug out of its socket, since the rapid rise in rectifier voltage would damage the electrolytic condenser.
3. Pilot lights may be replaced by slipping the push-on sockets off the dial and unscrewing the bulbs. It is not necessary to remove either the dial or chassis from cabinet.
4. In replacing chassis in cabinet do not tighten mounting screws so much that chassis will not float freely, and do not allow any part of the dial assembly to touch the cabinet. Do not push control knobs on so far that they touch the cabinet front panel. If these precautions are not observed the receiver may become microphonic.
5. One side of the power line is connected to the chassis through the filter choke L3 (see schematic). Under no condition, therefore, should a ground wire be allowed to come in contact with any metal part of the receiver.
6. The tuning indicator (6G5 tube) is mounted in the cabinet above the dial on all the console type receivers, and in the speaker compartment on the table type receivers. On the table type receivers it is necessary to remove the speaker from the baffle, in order to remove the tuning indicator tube assembly. The color coding of the tuning indicator tube cable is as follows:

   Shield—cathode — Black—filament
   Blue—plate — Green—grid.
   Red—target
7. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. The Emerson All-Wave Antenna is especially designed for high efficiency and reduction of noise on all three frequency ranges. Complete instructions for the installation of this antenna are supplied with each kit.
8. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraph station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
9. The receivers for 105-125 volt operation may be easily converted for 210-250 volt operation by substituting ballast tubes part no. 3MR-253 for ballast tubes part no. 3MZ-419.

TUBE DATA

The tube complement is as follows:

- 1—6K7—R-f amplifier (on tuner unit)
- 1—6A8—Pentagrid modulator-oscillator (on tuner unit)
- 1—6D6—I-f amplifier
- 1—85—Second detector, a.v.c., and a-f amplifier
- 1—6C5—A-f amplifier
- 2—43—Push-pull pentode output
- 1—6G5—Electron Ray tuning indicator
- 2—25Z5—Half-wave rectifiers
- 2—3MZ-419—Ballast tubes for 105-125 volt operation
- 2—3MR-253—Ballast tubes for 210-250 volt operation

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground, with no signal, volume control turned on full, and variable condenser at maximum capacity position. The line voltage for these readings was as indicated in the headings below.

	Line voltage—117.5 volts, 60 cycles, a.c. Using ballast tubes part no. 3MZ-419				Line voltage—235 volts, 60 cycles, a.c. Using ballast tubes part no. 3MR-253			
Tube	*Plate*	*Screen*	*Osc. Plate*	*Fil.*	*Plate*	*Screen*	*Osc. Plate*	*Fil.*
6K7	85	85	—	7.5	100	100	—	7
6A8	100	40	85	7.5	125	50	100	7
6D6	100	100	—	7.5	125	125	—	7
85	25	—	—	7.5	30	—	—	7
6C5	85	—	—	7.5	100	—	—	7
43	90	100	—	28.0	115	125	—	28
43	90	100	—	28.0	115	125	—	28

Line voltage—117.5 volts:

Voltage from 25Z5 cathode to chassis—100 volts.
Voltage across choke (soldering lug on electrolytic in corner to chassis)—16 volts.
Filament of 6G5 (black lead to black lead)—7 volts.
Target voltage of 6G5 (red lead to chassis)—100 volts.

Line voltage—235 volts:

Voltage from 25Z5 cathode to chassis—125 volts.
Voltage across choke (soldering lug on electrolytic in corner to chassis)—20 volts.
Filament of 6G5 (black lead to black lead—7 volts.
Target voltage of 6G5 (red lead to chassis)—125 volts.

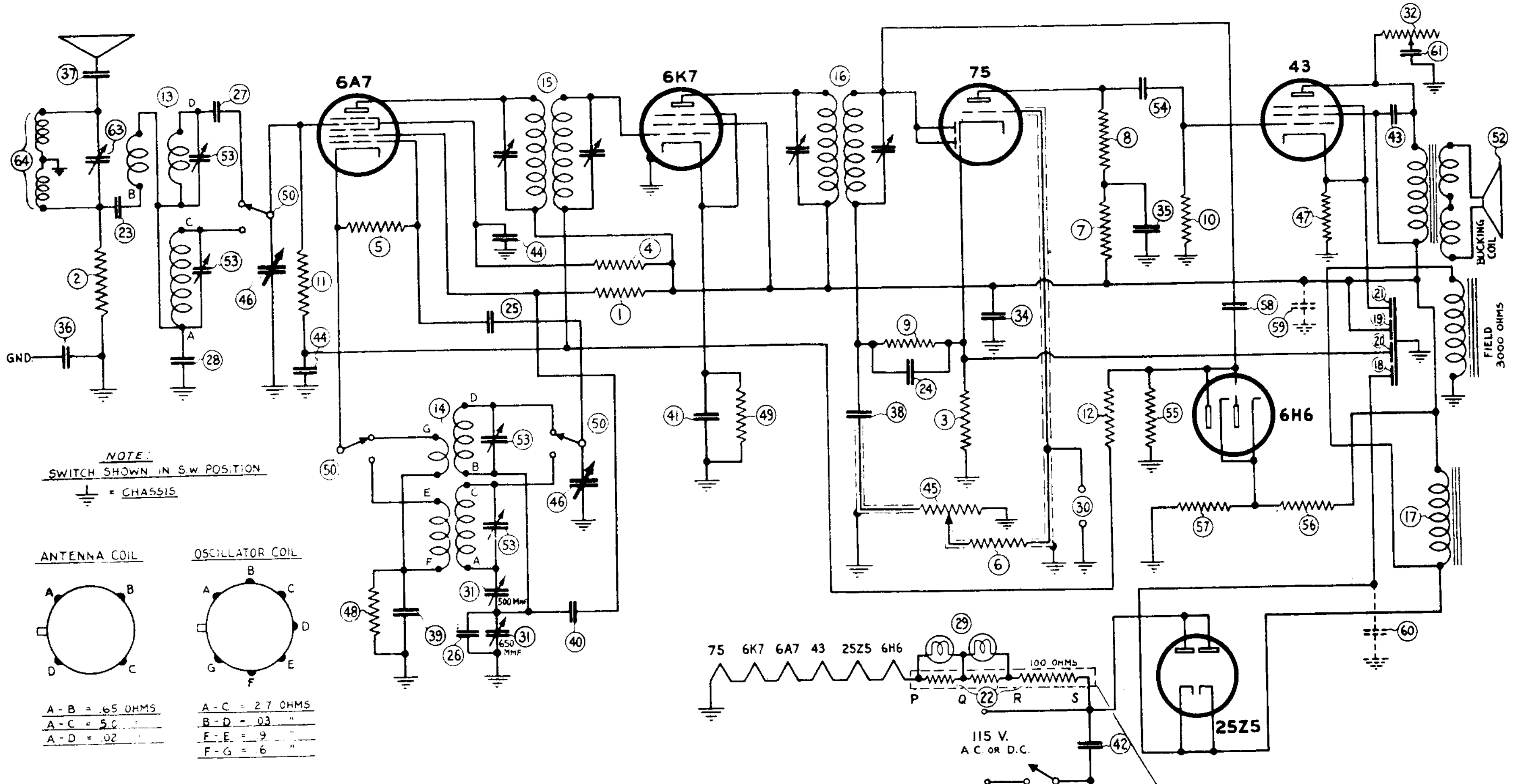
EMERSON RADIO AND PHONOGRAPH CORPORATION
MODELS M, M-134, M-136, M-138, M-139, M-140, M-142 & M-146

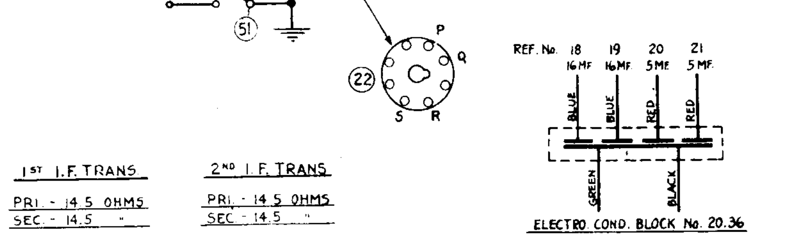
*Item	Part No.	DESCRIPTION	PRICE
L1	2PT-283	456 kc wave-trap	$ .60
L2	3ET-299	R-f choke—5 millihenries	.55
L3	3MT-300	Iron-core filter choke	2.00
T1	3AT-257	Short-wave antenna coil	.60
T4	3AT-258	Short-wave detector coil	.70
T7	3AT-259	Short-wave oscillator coil	.50
T2	3MT-301	Long-wave antenna coil	1.05
T5	3MT-302	Long-wave detector coil	1.05
T8	3MT-303	Long-wave oscillator coil	.95
T3	3AT-251	Medium-wave antenna coil	.95
T6	3AT-252	Medium-wave detector coil	.95
T9	3AT-353	Medium-wave oscillator coil	.75
T10	3BT-269A	456 kc first i-f transformer	2.00
T11	3AT-261	456 kc second i-f transformer	1.90
T12	3AT-263	Audio input transformer	2.55
R1, R11	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R2	LR-60	20,000 ohm 1/4 watt carbon resistor	.16
R3, R5, R9, R10	KR-57	1 megohm 1/4 watt carbon resistor	.16
R4	GR-85	2,000 ohm 1/4 watt carbon resistor	.16
R6, R7, R15, R29	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R8, R12, R17, R30	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R13, R16, R21	KR-54	100,000 ohm 1/4 watt carbon resistor	.16
R14	3MR-252	Tone control—250,000 ohms	.75
R18	IIR-131	1,000 ohm 1/2 watt wire-wound resistor	.16
R19	OR-73	25,000 ohm 1/4 watt carbon resistor	.16
R20	ZZR-196	30,000 ohm 1/4 watt carbon resistor	.16
R22, R23, R24, R25	3MR-254	Wire-wound metal clad filament resistor	.60
		R22—40 ohms; R23—40 ohms; R24—40 ohms; R25—195 ohms.	
	3MZ-419	Ballast tube for 105-125 volt operation	.40
R26, R27	3MR-253	Ballast tube for 210-250 volt operation	1.10
R28	3MR-251	Volume control—100,000 ohms	.80
C1, C2, C3	3AC-276	Three-gang variable condenser	7.40
C4, C24	AAC-114	0.001 mf mica condenser	.20
C5, C6, C7, C9, C10, C11, C16, C18	3AC-278	1.5 to 12 mmf trimmer condenser (see **Production Changes**)	.15
C8	KC-58	0.01 mf, 400 volt tubular condenser	.20
C12, C33, C42, C47	BC-12	0.05 mf, 200 volt tubular condenser	.20
C13, C23	EC-24A	0.0001 mf mica condenser	.20
C14, C22	AC-6	0.1 mf, 200 volt tubular condenser	.20
C15, C48	NNC-158	0.05 mf, 200 volt tubular condenser with mounting strap	.20
C17		Trimmer, part of long-wave oscillator coil.	
C19	XXC-197	0.0038 mf mica condenser	.35
C20, C21	3MC-295	Dual adjustable padding condenser	.60
		C20—100 to 200 mmf C21—250 to 550 mmf.	
C25	AAC-106A	0.00005 mf mica condenser	.20
C26, C27		Trimmer, part of first i-f transformer.	
C28, C29		Trimmer, part of second i-f transformer.	
C30	IIC-133A	0.000025 mf mica condenser	.20
C31, C35	AC-7A	0.00025 mf mica condenser	.20
C32, C34	LC-64	0.05 mf, 400 volt tubular condenser	.20
C36	QQC-173	0.015 mf, 600 volt tubular condenser	.20
C37, C43	BBC-131	0.9 mf, 200 volt tubular condenser	.50
C38	3AC-256	5 mf, 50 volt tubular dry electrolytic condenser	.80
C39, C40	TTC-177	0.01 mf, 600 volt tubular condenser	.20
C41	3MC-292	8 mf, 150 volt wet electrolytic condenser	.85
C44	3MC-290	50 mf, 200 volt wet electrolytic condenser	1.45
C45	3MC-291	50 mf, 150 volt wet electrolytic condenser	1.30
C46	3MC-293	0.1 mf, 400 volt a.c. tubular condenser	.30
†C49		Trimmer, part of wave-trap assembly.	
	3AS-190	8" dynamic speaker	8.50
	3AS-167	12" dynamic speaker	11.35
	3AS-166	Wave-band switch	2.25
	3BS-226	On-off switch	.55
	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
	3AD-41	Dial plate with band-indicator mechanism	2.20
	3MZ-422	Dial face	1.30
	3AZ-369	Idler pulley	.05
	3AZ-370	Idler pulley spring	.05
	3AZ-371	Dial drive belt	.20
	3AZ-414	Planetary dial drive (for two-knob assembly)	1.85
	3AZ-366	Frequency-indicating pointer	.10

*Item number locates the article on the schematic diagram.
†These trimmers are part of coil assemblies and can not be supplied separately.

FADA RADIO AND ELECTRIC COMPANY

MODEL 172



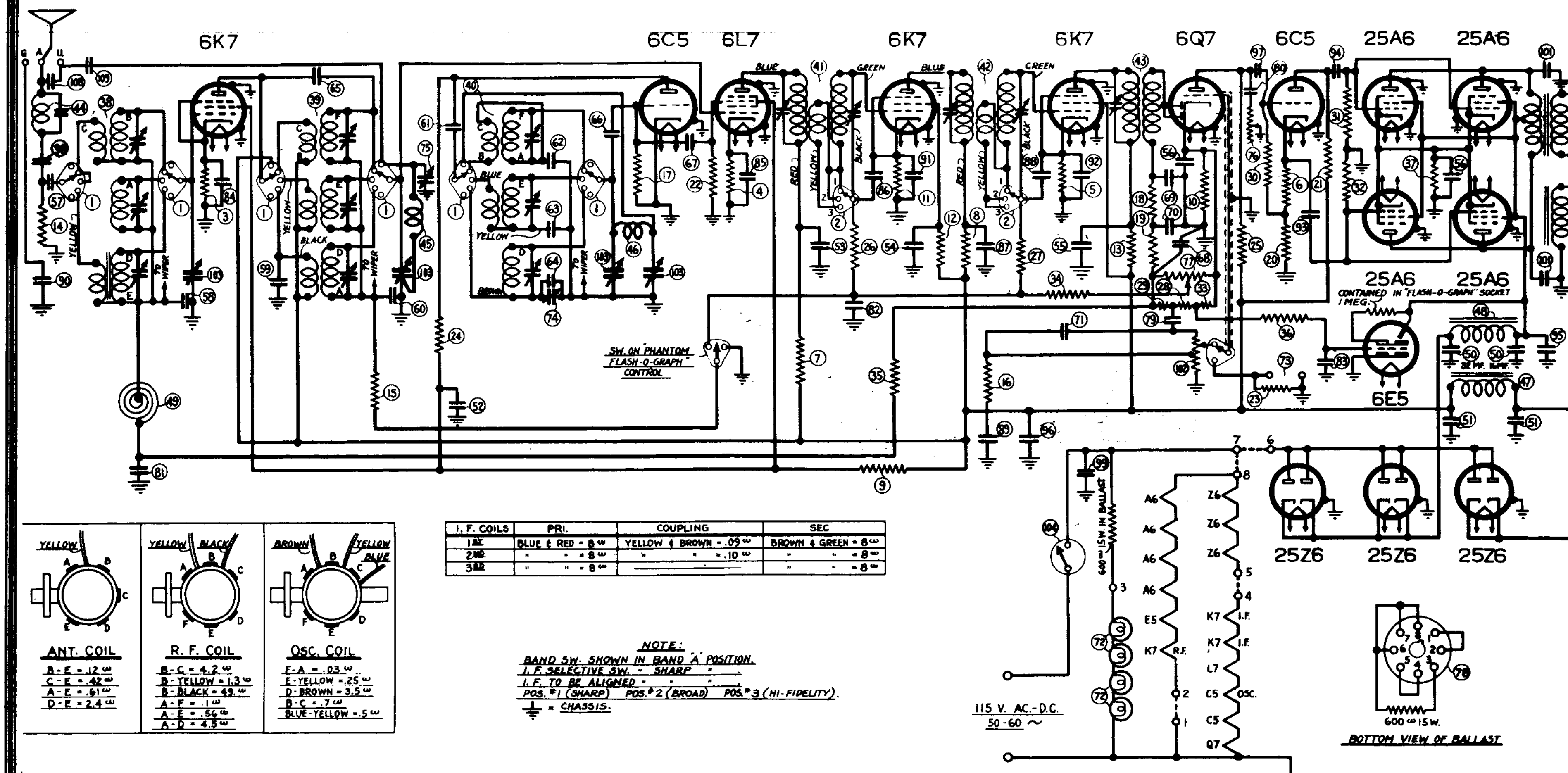


I.F. = 456 K.C.

REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION
1	30.1	CARB. RES. - 5,000 OHMS - 1/3 W ± 10%	23	15.2	MICA COND. - .0005 MF. ± 10%	45	50.1	VOLUME CONTROL - 1/2 MEG.
2	30.31	" " 10,000 " " " 20%	24	15.2	" " .0005 " "	46	25.53	VARIABLE COND
3	30.31	" " 10,000 " " " "	25	15.3	" " .0001 " "	47	30.47	CARB. RES. - 625 OHMS - 1/2 W ± 10%
4	30.7	" " 15,000 " " " 10%	26	15.19	" " .0015 " "	48	30.48	" " 350 " 1/4 " "
5	30.3	" " 50,000 " " " "	27	15.5	" " .002 " 3%	49	30.45	" " 250 " " "
6	30.26	" " 50,000 " " " 20%	28	15.6	" " .0025 " "	50	45.1	BAND SWITCH
7	30.26	" " 50,000 " " " "	29	120.1	PILOT LIGHTS 6.8 V. .25 A.	51		ON-OFF SW ON VOL CONT (45)
8	30.20	" " 250,000 " " " "	30	125.1	PHONO JACK	52	105.1	SPEAKER - 3,000 OHMS
9	30.23	" " 500,000 " " " "	31	25.1	PADDING COND - 650 - 500 MMF.	53		MIN. ADJ. ON COILS
10	30.23	" " 500,000 " " " "	32	55.10	TONE CONTROL - 200,000 OHMS	54	10.4	TUBULAR COND. - .01 MF. - 200 V
11	30.22	" " 1 MEG " " "	33			55	30.5	CARB. RES. - 500,000 OHMS - 1/3 W. ± 10%
12	30.22	" " 1 " " " "	34	10.2	TUBULAR COND. .1 MF 200 WV.	56	30.4	" " 250,000 " " " "
13	2026	ANTENNA COIL	35	10.2	" " .1 " " "	57	30.2	" " 10,000 " " " "
14	3116	OSCILLATOR "	36	10.3	" " .006 " 400 "	58	15.3	MICA COND. - .0001 MF. ± 10%
15	3879	1ST I.F. "	37	10.4	" " .01 " 200 "	59	20.25	TUBULAR ELECTRO. COND. - 8 MF 100 W.V. } FOR 25 CYCLE OPERATION ONLY
16	3880	2ND I.F. "	38	10.4	" " .01 " " "	60	20.25	" " " 8 " " "
17	40.1	CHOKE " 300 OHMS	39	10.5	" " .05 " " "	61	10.5	TUBULAR COND. - .05 MF. 200 W.V.
18	20.36A	ELECTRO. COND. BLOCK - 16 MF. - 100 WV	40	10.5	" " .05 " " "	62		
19	20.36A	" " " 16 " 100 "	41	10.5	" " .05 " " "	63	25.8	TRIMMING COND. - 500 MMF.
20	20.36A	" " " 5 " 25 "	42	10.7	" " .05 " 400 "	64	5005	WAVE TRAP COIL
21	20.36A	" " " 5 " 25 "	43	10.10	" " .01 " 400 "			
22	BK42D	BALLAST TUBE - 15 - 15 - 100 OHMS	44	10.6	" " DUAL .05 " 200 "			

FADA RADIO AND ELECTRIC COMPANY

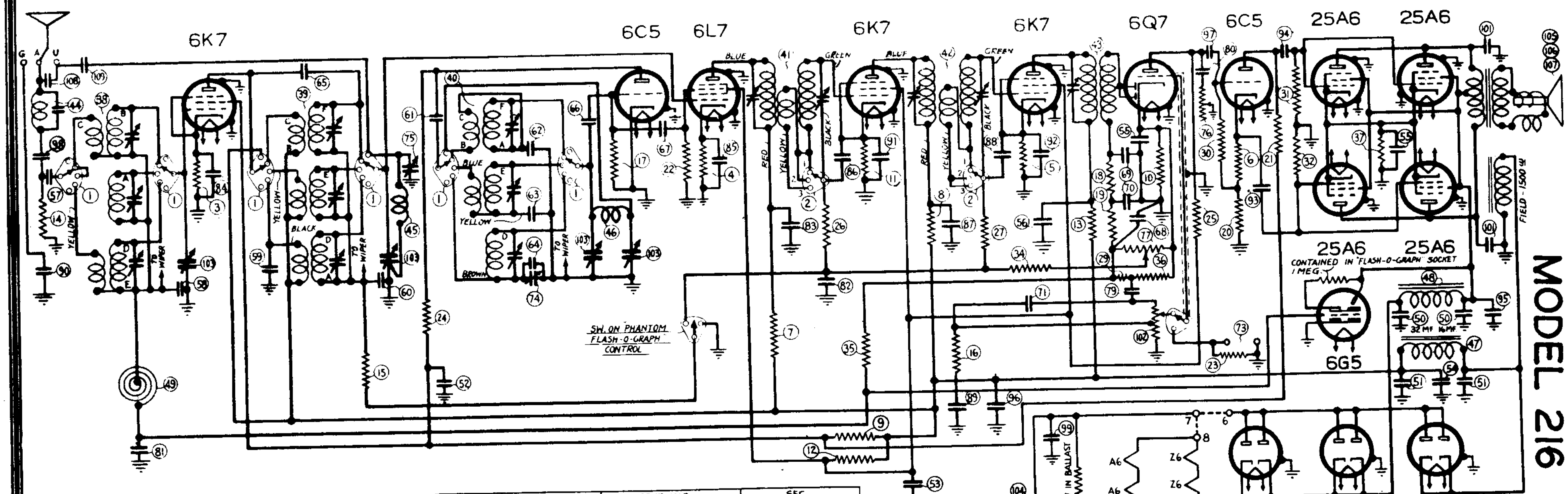
MODEL 216 SERIAL Nº 60,182 INCLUSIVE

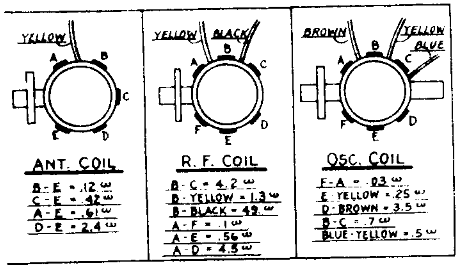


REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	45.36	BAND SW.	25	30.40	CARB. RES. - 150,000 OHMS 1/3 W. ± 10%	49	3216	COIL - R.F. CHOKE - 2.3 MH.	73	125.1	PHONO. JACK	97	10.10	TUBULAR COND. - .01 MF. 400 V.
2	45.32A	SELECTIVITY SW.	26	30.20	" " 250,000 " " " " 20	50	20.47	ELECTRO. COND. - 32-16 MF. 100 W.V.	74	25.40	PADDING COND. - 140 MMF.	98	10.10	" " .01 " 400 "
3	30.45	CARB. RES. - 250 OHMS 1/3 W. ± 10%	27	30.20	" " 250,000 " " " " "	51	20.52	" " 24-24 " 100 "	75	25.49	" " 70 "	99	10.9	" " .1 " 400 "
4	30.48	" " 350 " " " " "	28	30.62	" " 400,000 " " " " 10	52	20.25	" " 8 MF. 100 W.V. TUB.	76	55.13	TONE CONTROL - 1/2 MEG.	100		
5	30.15	" " 2,000 " " " " "	29	30.5	" " 500,000 " " " " "	53	20.53	" " 2 " 100 " "	77	50.24	FLASH-O-GRAPH CONTROL - 1 MEG.	101	10.17	" DUAL " .001 " 600 "
6	30.15	" " 2,000 " " " " "	30	30.23	" " 500,000 " " " " 20	54	20.53	" " 2 " 100 " "	78	115.19	BALLAST RES. - 600 ω 15 W.	102	50.25	VOLUME CONTROL - 1 MEG. TAPPED AT [illegible]
7	30.64	" " 2,000 " " " " 20	31	30.23	" " 500,000 " " " " "	55	20.53	" " 2 " 100 " "	79	10.4	TUBULAR COND. - .01 MF. 200 V.	103	25.63	VARIABLE COND.
8	30.64	" " 2,000 " " " " "	32	30.23	" " 500,000 " " " " "	56	20.44	" " 10-10 " 25 " "	80	10.4	" " .01 " 200 "	104	45.37	ON - OFF SW. (LINE)
9	30.12	" " 4,000 " " " " 10	33	30.67	" " 600,000 " " " " 10	57	15.2	MICA COND. - .0005 MF. ± 10%	81	10.26	" " .02 " 200 "	105	105.52	SPEAKER - 1500 ω (MODEL 216T)
10	30.65	" " 4400 " " " " "	34	30.28	" " 2,000,000 " " " " 20	58	15.5	" " .002 " " 3	82	10.26	" " .02 " 200 "	106	105.53	" " (" 216C)
11	30.1	" " 5,000 " " " " "	35	30.28	" " 2,000,000 " " " " "	59	15.61	" " 35 MMF. " 5	83	10.26	" " .02 " 200 "	107	105.54	" " (" 216CK)
12	30.36	" " 5,000 " " " " 20	36	30.28	" " 2,000,000 " " " " "	60	15.6	" " .0025 MF. " 3	84	10.5	" " .05 " 200 "	108	15.9	MICA COND. - 10 MMF. ± 10%
13	30.36	" " 5,000 " " " " "	37	30.74	" " 230 " 2 " " 10	61	15.7	" " .002 " 10	85	10.5	" " .05 " 200 "	109	15.9	" " 10 " " "
14	30.31	" " 10,000 " " " " "	38	35.15	COIL - ANT.	62	15.32	" " .0056 " 5	86	10.5	" " .05 " 200 "	110		
15	30.31	" " 10,000 " " " " "	39	35.16	" R.F.	63	15.69	" " .0018 " 3	87	10.5	" " .05 " 200 "	111		
16	30.58	" " 20,000 " " " " 10	40	35.31	" OSC.	64	15.66	" " .0005 " 5	88	10.5	" " .05 " 200 "	112		
17	30.11	" " 25,000 " " " " "	41	35.25	" 1ST I.F.	65	15.16	" " 3 MMF. ± 1/2 MMF.	89	10.5	" " .05 " 200 "	113		
18	30.11	" " 25,000 " " " " "	42	35.26	" 2ND I.F.	66	15.10	" " 50 " " 10%	90	10.3	" " .006 " 400 "	114		
19	30.11	" " 25,000 " " " " "	43	35.27	" 3RD I.F.	67	15.10	" " 50 " " "	91	10.2	" " .1 " 200 "	115		
20	30.59	" " 27,000 " " " " "	44	35.6	" WAVE TRAP	68	15.3	" " .0001 MF. " "	92	10.2	" " .1 " 200 "	116		
21	30.10	" " 30,000 " " " " "	45	35.28	" U.H.F. ANT.	69	15.3	" " .0001 " " "	93	10.2	" " .1 " 200 "	117		
22	30.3	" " 50,000 " " " " "	46	35.29	" " OSC.	70	15.3	" " .0001 " " "	94	10.2	" " .1 " 200 "	118		
23	30.23	" " 500,000 " " " " 20	47	40.1	" CHOKE - 330 ω	71	15.3	" " .0001 " " "	95	10.2	" " .1 " 200 "	119		
24	30.1	" " 5,000 " " " " 10	48	40.52	" " 100 ω	72	120.3	PILOT LTS. - 6-8 V. .15 A.	96	10.2	" " .1 " 200 "	120		

THIS SCHEMATIC APPLIES TO CHASSIS UP TO SERIAL No 60,182 INCLUSIVE.

FADA RADIO AND ELECTRIC COMPANY
MODEL 216 SERIAL № 60,183 UP





I. F. COILS	PRI.	COUPLING	SEC
1ST	BLUE & RED = 8 Ω	YELLOW & BROWN = .09 Ω	BROWN & GREEN = 8 Ω
2ND	" " = 8 Ω	" " = .10 Ω	" " = 8 Ω
3RD	" " = 8 Ω		" " = 8 Ω

NOTE:
BAND SW. SHOWN IN BAND "A" POSITION.
I. F. SELECTIVE SW. - SHARP "
I. F. TO BE ALIGNED - " "
POS. #1 (SHARP) POS. #2 (BROAD) POS. #3 (HI-FIDELITY).
⏚ = CHASSIS.

THIS SCHEMATIC APPLIES TO CHASSIS WITH SERIAL NO. 60183 AND UP.

REF. No.	PART No.	DESCRIPTION
1	45.36	BAND SW.
2	45.32A	SELECTIVITY SW
3	30.45	CARB. RES. - 250 OHMS 1/3W. ± 10%
4	30.48	" " 350 " " " " "
5	30.15	" " 2,000 " " " " "
6	30.15	" " 2,000 " " " " -
7	30.64	" " 2,000 " " " " 20
8	30.64	" " 2,000 " " " " "
9	30.12	" " 4,000 " " " " 10
10	30.65	" " 4,400 " " " " -
11	30.1	" " 5,000 " " " " "
12	30.2	" " 10,000 " " " " 10
13	30.36	" " 5,000 " " " " 20
14	30.31	" " 10,000 " " " " "
15	30.31	" " 10,000 " " " " "
16	30.58	" " 20,000 " " " " 10
17	30.11	" " 25,000 " " " " "
18	30.11	" " 25,000 " " " " "
19	30.11	" " 25,000 " " " " "
20	30.59	" " 27,000 " " " " "
21	30.10	" " 30,000 " " " " "
22	30.3	" " 50,000 " " " " "
23	30.23	" " 500,000 " " " " 20
24	30.1	" " 5000 " " " " 10

REF. No.	PART No.	DESCRIPTION
25	30.40	CARB RES. - 150,000 OHMS 1/3W. ± 10%
26	30.20	" " 250,000 " " " " 20
27	30.20	" " 250,000 " " " " "
28		
29	30.5	" " 500,000 " " " " 10
30	30.23	" " 500,000 " " " " 20
31	30.23	" " 500,000 " " " " "
32	30.23	" " 500,000 " " " " "
33		
34	30.28	" " 2,000,000 " " " " 20
35	30.28	" " 2,000,000 " " " " "
36	30.6	" " 1,000,000 " " " " -
37	30.74	" " 230 " 2 " " 10
38	35.15	COIL - ANT.
39	35.16	" R.F.
40	35.31	" OSC
41	35.25	" 1ST I.F.
42	35.26	" 2ND I.F
43	35.27	" 3RD I.F.
44	35.6	" WAVE TRAP
45	35.28	" U.H.F ANT.
46	35.29	" " OSC.
47	40.1	" CHOKE - 330 Ω
48	40.52	" " 100 Ω

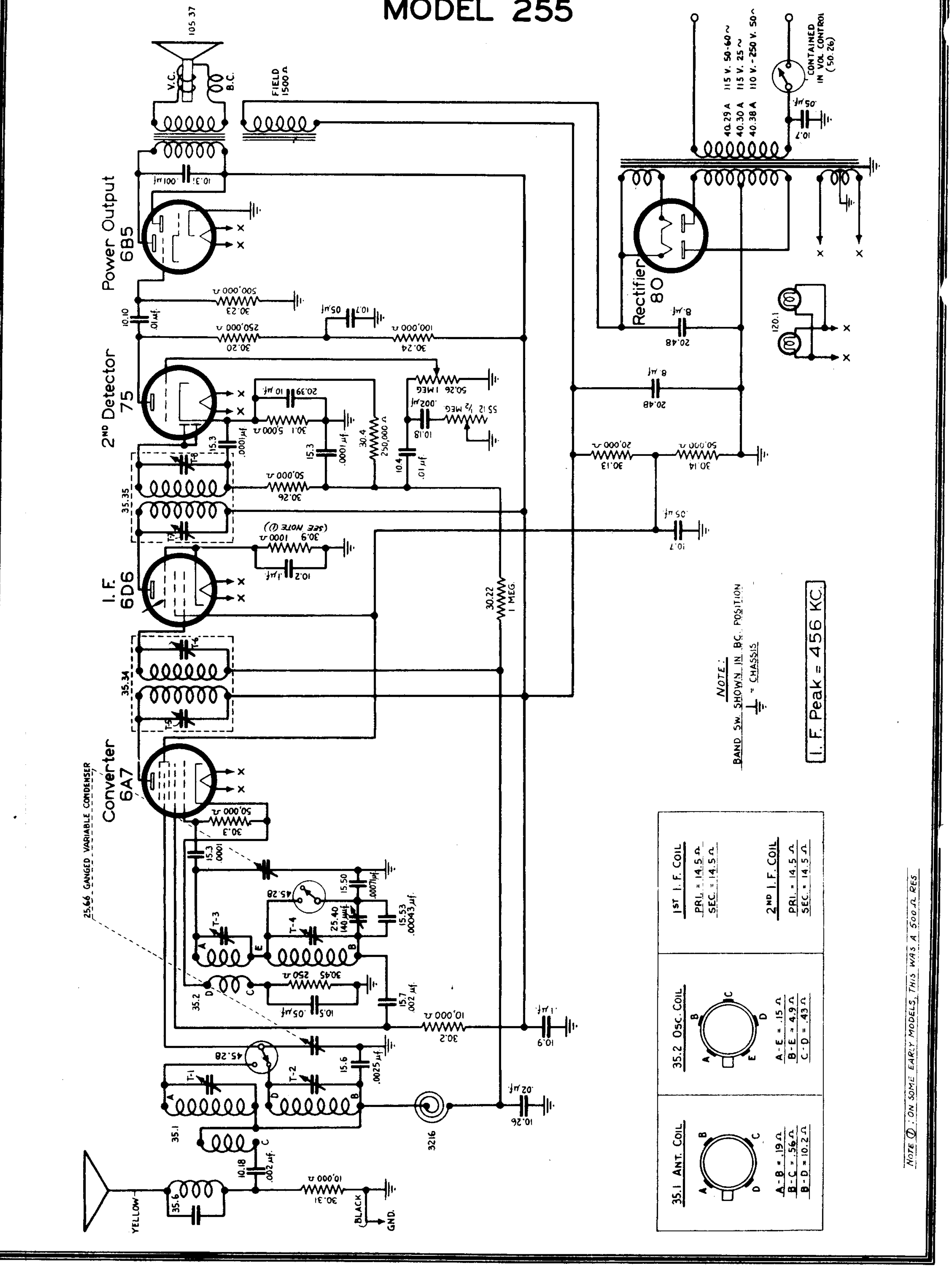
REF. No.	PART No.	DESCRIPTION
49		COIL - R.F. CHOKE - MH
50	20.47	ELECTRO. COND - 32-16 MF. 100 W.V.
51	20.52	" " 24-24 " 100 "
52	20.25	" " 8 MF. 100 W.V. TUB.
53	20.25	" " 8 " 100 " "
54	20.27	" " 16 " 100 " "
55	20.44	" " 10-10 " 25 " "
56	10.5	TUBULAR COND. - .05 MF. 200 V.
57	15.2	MICA COND. - .0005 MF ± 10%
58	15.5	" " .002 " " 3
59	15.61	" " 35 MMF. " 5
60	15.6	" " .0025 MF. " 3
61	15.7	" " .002 " 10
62	15.32	" " .0056 " 5
63	15.69	" " .0018 " 3
64	15.66	" " .0005 " 5
65	15.16	" " 3 MMF. ± 1/2 MMF
66	15.10	" " 50 " " 10%
67	15.10	" " 50 " " "
68	15.3	" " .0001 MF " "
69	15.3	" " .0001 " " "
70	15.3	" " .0001 " " "
71	15.3	" " .0001 " " "
72	120.3	PILOT LTS. - 6-8 V. .15 A.

REF. No.	PART No.	DESCRIPTION
73	125.1	PHONO JACK
74	25.40	PADDING COND. - 140 MMF
75	25.49	" " 70 "
76	55.13	TONE CONTROL - 1/2 MEG
77	50.24	FLASH-O-GRAPH CONTROL - 1 MEG.
78	115.19	BALLAST RES. - 600 Ω 15 W
79	10.4	TUBULAR COND. - .01 MF. 200 V.
80	10.4	" " .01 " 200 "
81	10.26	" " .02 " 200 "
82	10.26	" " .02 " 200 "
83	10.5	" " .05 " 200 "
84	10.5	" " .05 " 200 "
85	10.5	" " .05 " 200 "
86	10.5	" " .05 " 200 "
87	10.5	" " .05 " 200 -
88	10.5	" " .05 " 200 "
89	10.5	" " .05 " 200 "
90	10.3	" " .006 " 400 "
91	10.2	" " .1 " 200 "
92	10.2	" " .1 " 200 "
93	10.2	" " .1 " 200
94	10.2	" " .1 " 200
95	10.2	" " .1 " 200 "
96	10.2	" " .1 " 200 "

REF. No.	PART No.	DESCRIPTION
97	10.10	TUBULAR COND. - .01 MF. 400 V.
98	10.10	" " .01 " 400 "
99	10.9	" " .1 " 400 "
100		
101	10.17	" DUAL " .001 " 600 "
102	50.25	VOLUME CONTROL - 1 MEG TAPPED AT 50,000 Ω
103	25.63	VARIABLE COND.
104	45.37	ON-OFF SW. (LINE)
105	105.52	SPEAKER - 1500 Ω (MODEL 216T)
106	105.53	" " (" 216C)
107	105.54	" " (" 216CK)
108	15.9	MICA COND. - 10 MMF. ± 10%
109	15.9	" " 10 " " "
110		
111		
112		
113		
114		
115		
116		
117		
118		
119		
120		

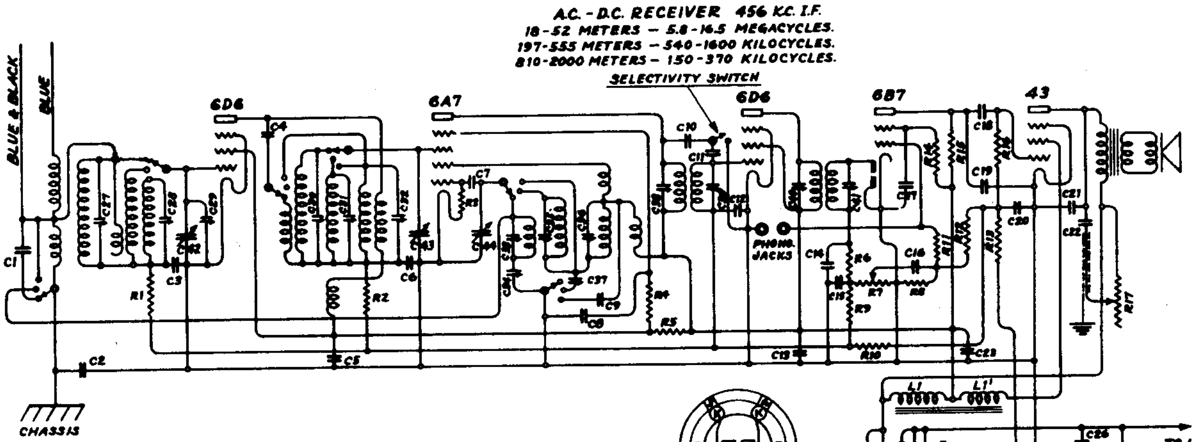
FADA RADIO AND ELECTRIC COMPANY

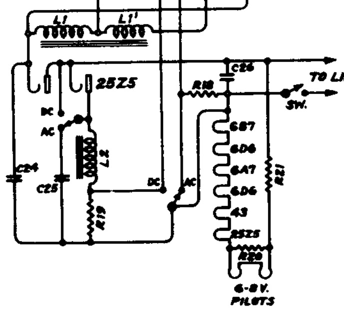
MODEL 255



FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODELS 62, 6210 & 6244





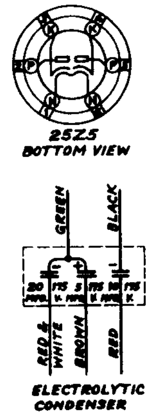


TABLE OF VALUES

C1-1000 MMFD.	C15-200 MMFD.	R1-1000 OHMS	R15-250 M OHMS
C2-.1 MFD.	C16-.05 MFD.	R2-2 MEGOHMS	R16-250 M OHMS
C3-.05 MFD.	C17-.1 MFD.	R3-25 M OHMS	R17-50 M OHMS T.C.
C4-500 MMFD.	C18-.01 MFD.	R4-25 M OHMS	R18-300 OHMS
C5-.1 MFD.	C19-100 MMFD.	R5-300 OHMS	R19-350 OHMS
C6-.05 MFD.	C20-.25 MFD.	R6-20 M OHMS	R20-40 OHMS
C7-50 MMFD.	C21-.006 MFD.	R7-250 M OHMS V.C.	R21-75 OHMS
C8-.1 MFD.	C22-.05 MFD.	R8-1 MEGOHM	
C9-.004 MFD.	C23-10 MFD.	R9-1 MEGOHM	
C10-5 MMFD.	C24-20 MFD.	R10-5 MEGOHMS	L1-350 OHMS
C11-5 MMFD.	C25-5 MFD.	R11-50 M OHMS	L1'-15 OHMS
C12-.05 MFD.	C26-.05 MFD.	R12-5 MEGOHMS	L2-2000 OHMS SPEAKER FIELD.
C13-.1 MFD.		R13-100 M OHMS	
C14-100 MMFD.		R14-1 MEGOHM	

ALIGNMENT PROCEDURE

General: To insure the performance the model 62 is capable of delivering the following instructions should be carefully studied before any adjustments are undertaken.

Proper adjustment of the various tuned circuits will only be possible through the use of a reliable all wave, service oscillator and an output meter.

The output meter should be connected across the secondary of the output transformers. The voice coil need not be disconnected but a larger meter indication will be obtained, on a given signal, when the voice coil is disconnected.

All adjustments should be made with the volume control "full on". Any desired variations in signal strength should be obtained by adjusting the output of the service oscillator.

IMPORTANT: It is necessary to use a small condenser, about 250 Mmfd. (.00025 Mfd.) in series with each of the service oscillator leads so it will not be damaged when connected to the set.

I. F. ALIGNMENT

General: All intermediate frequency alignments must be made with the band selector switch on the center position. The 197 to 555 meter band.

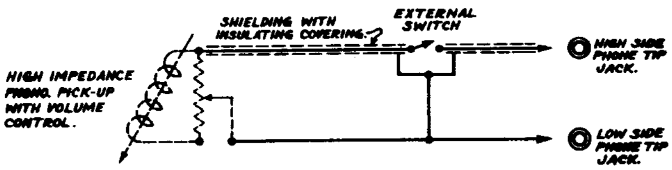
1. Supply a 456 kilocycle signal, from an accurate service oscillator, to the grid of the 6A7 tube.

2. Adjust the grid and plate circuit trimmer condensers, of the first I. F. transformer, from maximum output with minimum input from the service oscillator. The first I. F. transformer is located at the rear center of the chassis.

3. Adjust the grid and plate circuit trimmer condensers of the second I. F. transformer for maximum output with minimum input from the service oscillator. The second I. F. transformer is located at the left of the gang condenser on the front of the chassis.

OSCILLATOR, R.F. and ANTENNA ALIGNMENT

General: The adjustment condensers, or trimmers, for the antenna, R. F., and oscillator stages are located in the same shields that house the coils for these stages. These coils are contained in the three large round shield cans located at the right of the gang condenser on the chassis. Three holes are located in the side of each of these cans, through each of which a trimmer adjusting screw is accessible. The center trimmer adjusting screw on the antenna coil is not used. When adjusting the antenna stage on the 197 to 555 meter band the trimmer located on the front section of the gang condenser should be used.



RECOMMENDED PHONO CONNECTIONS.

On each coil can the upper screw is for the 810 to 2000 meter band, the center screw is for the 197 to 555 meter band, and the lower screw is for the 19 to 52 meter band.

The first shield, from the front of the chassis, contains the antenna coils and trimmers, the second or center shield contains the R. F. coils and trimmers, and the third or rear shield contains the oscillator coils and trimmers.

An alignment jig is available for use in aligning the various bands on the model 62. The part number of this jig is given in the parts list. It may be obtained through any Fairbanks-Morse Radio Agency.

The bands must be aligned in the following order: The 197 to 555 meter band first, the 810 to 2000 meter band second, and the 19 to 52 meter band third.

Padding Condensers: A dual padding or low frequency adjusting condenser is located on the left rear of the chassis. The adjustment nut and screw are accessible through a hole in the chassis. The Hexagon nut is the adjustment for the 197 to 555 meter band. The center screw is the adjustment for the 810 to 2000 meter band.

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODELS 62, 6210 & 6244

197 to 555 Meter Band:

1. Place the alignment jig on the front of the chassis. Turn the gang condenser all the way out of mesh. Supply a 187 meter (1600 kilocycle) signal to the antenna of the set. Adjust the oscillator trimmer condenser for maximum output with minimum input from the service oscillator.

2. Turn the gang condenser to 220 meters. Supply a 220 meter signal (1360 kilocycles) to the antenna of the set. Adjust the R. F. trimmer condenser for maximum output with minimum input from the service oscillator.

3. Adjust the antenna trimmer condenser for maximum output with minimum input from the service oscillator. This trimmer is located on the front section of the gang condenser.

4. Supply a 500 meter (600 kilocycle) signal to the antenna of the set. Tune the gang condenser to 500 meters. Adjust the low frequency padding condenser for maximum output with minimum input from the service oscillator. The gang condenser should be tuned back and forth, across the signal, while this adjustment is being made. to insure the peak of greatest intensity.

810 to 2000 Meter Band:

1. Supply an 800 meter (375 kilocycle) signal to the antenna of the set. Turn the gang condenser all the way out of mesh. Adjust the oscillator trimmer for maximum output with minimum input from the service oscillator.

2. Supply a 900 meter (333 kilocycle) signal to the antenna of the set. Tune the gang condenser to 900 meters. Adjust the R. F. trimmer condenser for maximum output with minimum input from the service oscillator.

3. Adjust the antenna trimmer for maximum output with minimum input from the service oscillator.

4. Supply an 1800 meter (167 kilocycle) signal to the antenna of the set. Tune the gang condenser to 1800 meters. Adjust the low frequency padding condenser for maximum output with minimum input from the service oscillator. The gang condenser should be tuned back and forth, across the signal, while this adjustment is being made to insure the peak of greatest intensity.

19 to 52 Meter Band:

1. Supply an 18.7 meter (16 megacycle) signal to the antenna of the set. Turn the gang condenser all the way out of mesh. Adjust the oscillator trimmer condenser for maximum output with minimum input from the service oscillator.

2. Supply a 22 meter (13.6 megacycle) signal to the antenna of the set. Tune the gang condenser to 22 meters. Adjust the R. F. trimmer condenser for maximum output with minimum input from the service oscillator.

3. Adjust the antenna trimmer condenser for maximum output with minimum input from the service oscillator.

DIAL CALIBRATION IN CABINET

After the set has been aligned in accordance with the foregoing instructions the dial readings will be approximately correct on all frequencies. When the chassis has been bolted down in the cabinet any differences in calibration can be adjusted by loosening the set screw in the travelite disc hub and turning the travelite disc until the reading is correct and then tightening the set screw.

SUGGESTED SERVICE PROCEDURE

If the set does not operate properly, test all tubes in a reliable tube tester. If no tube tester is available replace the tubes in the set, one by one, with tubes known to be good. A noisy tube can usually be located by sharply tapping each of the tubes in the set, the bad tube will cause a harsh noise in the speaker. If, after replacing any defective tubes, the set is still inoperative a careful voltage and resistance analysis should be made, this will usually give a clue to the difficulty.

MEASURED VOLTAGES

Model 62

Line Voltage 110 Volts AC or DC

Tube	AC or DC	Plate *	Screen	Grid	Osc. Plate	Osc. Grid
6D6 R.F.	AC DC	100 80	100 80	-- --		
6A7 Det.Osc.	AC DC	105 85	50 40	-- --	105 85	-5 to 10 -5 to 10
6D6 I.F.	AC DC	105 85	105 85	-- --		
6B7 A.F.	AC DC	25 20	25 20	-- --		
43 A.F.	AC DC	105 85	105 85	-10 -10		
25Z5 Rect.	AC	From P5 to P2 90 V.D.C. From P5 to K3 200 V.D.C. From P2 to K3 115 V.D.C.			See schematic diagram for reference points	

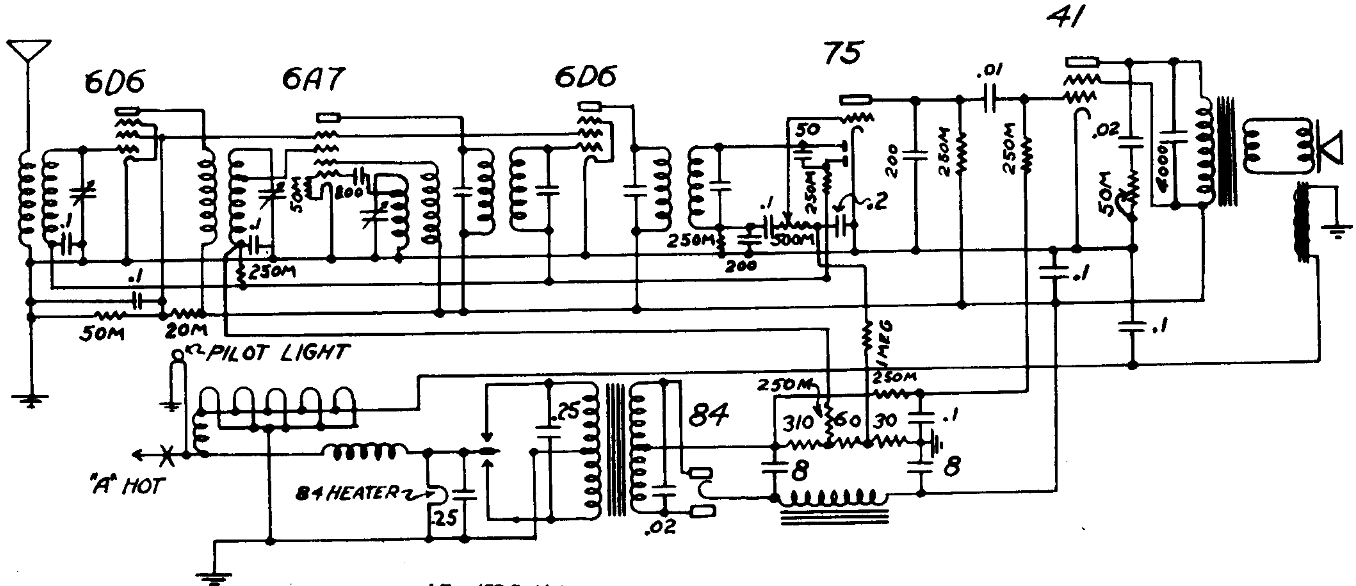
All measurements made from cathode with 1000 ohms per volt meter. 300 volt scale.

PARTS LIST

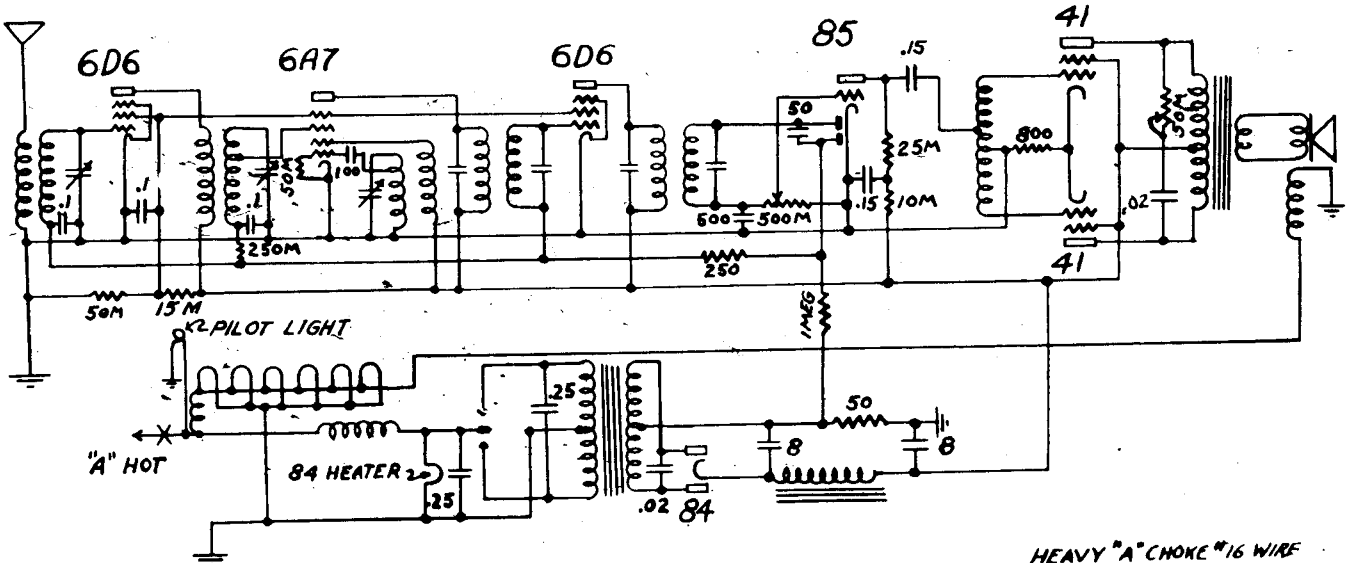
Part Number	Description	List Price
A-14715	I. F. Transformer, First	$ 2.00
A-14716	I. F. Transformer, Second	2.00
A-14853	Coil Assembly in Can, Antenna	3.00
A-14854	Coil Assembly in Can, Oscillator	3.00
A-14855	Coil Assembly in Can, R. F.	3.00
14851	Choke Coil, Iron Core, Tapped	2.50
14728	Dial Assembly complete	2.50
14729	Dial Drive Roller (small)	.25
14730	Dial Drive Spring	.25
14731	Dial Drive Shaft	.50
14856	Dial Scale, Calibrated	.75
14704	Dial Face, extruded celluloid	.50
14404	Dial Escutcheon	1.00
14720	Pilot Lamp 6-8 Volt Tubular	.10
14849	Pilot Lamp Leads, 2 Conductor Tinsel	.25
K-868	Knob, Inlaid Wood	.20
K-551	Knob, Black Bakelite	.20
X-7220	Screw, Chassis Mounting, 10-24 x 7/8"	.05
X-7228	Screw, Decorative Head, 8-32 x 1"	.05
P-625	Tip Jack with washers	.10
S-5907	Socket, Speaker	.10
S-5918	Socket, 6D6	.10
S-5919	Socket, 6A7	.10
S-5920	Socket, 6B7	.10
S-5922	Socket, 43	.10
S-5923	Socket, 25Z5	.10
S-5819	Shield Base, Vacuum Tube	.05
S-5820	Shield, Vacuum Tube	.15
S-5821	Shield Cap, Vacuum Tube	.05
R-5009	Terminal Strip, Common, Metal Clad	.15
SW-5102	Switch, Selectivity	.30
14852	Switch, Band Selector	3.50
14862	Switch, AC-DC	1.25
14557	Power Cord and Plug, 110-120 Volt	2.00
14864	Adapter Cord and Plugs, 220-240 Volt	1.50
V-6507	Tone Control and Switch, 50,000 ohms	1.20
V-6508	Volume Control, 250,000 ohms	.80
R-846	Resistor, 300 ohms 1/4 watt	.20
R-1116	Resistor, 25,000 ohms 1/4 watt	.20
R-1146	Resistor, 50,000 ohms 1/4 watt	.20
R-1191	Resistor, 100,000 ohms 1/4 watt	.20
R-1236	Resistor, 250,000 ohms 1/4 watt	.20
R-1296	Resistor, 1 Megohm 1/4 watt	.20
R-1311	Resistor, 2 Megohm 1/4 watt	.20
R-1331	Resistor, 5 Megohm 1/4 watt	.20
R-1446	Resistor, 300 ohms 1/2 watt	.20
R-1451	Resistor, 350 ohms 1/2 watt	.20
R-1491	Resistor, 1000 ohms 1/2 watt	.20
R-1701	Resistor, 20,000 ohms 1/2 watt	.20
R-1716	Resistor, 25,000 ohms 1/2 watt	.20
R-5010	Resistor, 75 and 40 ohms, metal clad	.50
14702	Condenser, Variable, 3 gang	4.50
C-212	Condenser, trimmer strip, 3 gang	.60
EL-23	Condenser, Dry Electrolytic	2.25
EC-7	Condenser, .25 Mfd., 300 volt, Tubular	.30
EC-5	Condenser, .1 Mfd., 300 volt, Tubular	.25
EC-2	Condenser, .01 Mfd., 400 volt Tubular	.20
EC-4	Condenser, .05 Mfd., 400 volt, Tubular	.20
EC-26	Condenser, .05 Mfd., 300 volt, Tubular	.20
EC-12	Condenser, .006 Mfd., 400 volt, Tubular	.20
C-310	Condenser, 50 Mmfd., Moulded	.20
C-307	Condenser, 100 Mmfd., Moulded	.20
C-305	Condenser, 200 Mmfd., Moulded	.20
C-313	Condenser, .001 Mfd., Moulded	.25
C-320	Condenser, .004 Mfd., Moulded	.25
14863	Alignment Jig	2.25
T-688	Alignment Tool, Insulated	1.50
14857	Dynamic Speaker, 6 Inch, 2000 ohm Field	8.00
14865	Dynamic Speaker, 8 inch, 2000 ohm Field	12.00

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODEL 346



MODEL 347



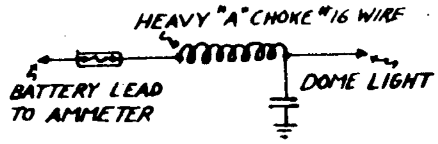


DIAGRAM #1

In case of antenna pick-up, use heavy "A" choke and condenser as in diagram No. 1.

In case of chassis pick-up, separate primary and high tension ignition wires, shield and ground the shield at both ends.

In Chevrolets, it is sometimes necessary to shield the floorboards on the right hand side and ground with floorboard screws.

In Ford V8 shield primary and "A" lead to generator separately and ground shields to spark plug housing brackets as in diagram No. 2.

In case of floating power, bond center bolt on AudiolA set to motor block.

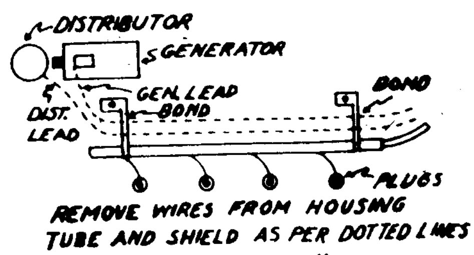


DIAGRAM #2

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODELS 346 & 347

CONTROL CABLES (Flexible Shafts)

The tuning control cable has an insulated male coupling at one end and a solid brass male coupling at the other.

The switch and volume control cable has an insulated male coupling at one end and a slotted, or female solid brass coupling at the other.

Insert the insulated male coupling of the volume control cable into the volume control bushing on the cover of the receiver (this is the bottom one, the one that is nearest to the edge of the cover).

Push the end of the cable in as far as it will go and then withdraw *the sheath only* about one thirty-second of an inch and tighten the bushing set screw.

Repeat the operation with the tuning control cable.

Be certain that the *insulated* male couplings are inserted in the bushings at the receiver.

Be certain that the insulating sleeve is in place over the slotted tuning condenser shaft and over the volume control shaft.

CONTROL HEAD

Adjust the control cables to the control head in the same manner as they were adjusted at the set.

Locate control head on the steering post at a position where the flexible shafts will have no sharp bends. Keep the flexible shafts from moving by fastening them to the post or where they cross the instrument panel.

Clips are furnished for fastening pilot light cable to flexible shafts.

These control cables should turn freely at all times and particular attention must be given to see that the gang condenser tuning control cable turns with complete freedom and has not less than one thirty-second of an inch end play.

SETTING OF DIAL

Tune the receiver to a weak station of known frequency at some point near the center of the broadcast band and then, holding the tuning knob firmly, adjust the pointer screw in center of back plate of dial head to the number corresponding to the frequency of the station selected.

TESTING PROCEDURE

If the receiver does not operate,—check the fuse and replace with 15 amp. fuse if necessary.

If vibrator does not operate, tap gently. A particle of dirt or dust may have lodged between contacts. When vibrator operates and set will not play, check tubes in the order named: 6A7; 75; 41; 6D6; 84. If a tube tester is not available, tap the tube with finger. Loose or broken elements will rattle and can be heard through the speaker. Replace with good tubes if this test indicates tubes are not satisfactory.

If set is weak, check tubes and voltages.

If set is still weak, check alignment as shown in alignment procedure.

VOLTAGE CHART

The following chart gives the voltages and plate currents of all the tubes when the set is in operating condition, but with no signal being received. A thousand ohm-per-volt meter of the 0-250 volt type is used for all voltage readings.

Type of Tube	Function	Heater Voltage	Plate to Ground	Screen to Ground	Grid to Ground	Normal Plate M.A.
6D6	R. F.	6.1	230	100	1b	5
6A7	1st Det.		230			2.5
	and Osc.	6.1	230a	100	1b	5.5a
6D6	I. F.	6.1	230	100	1b	5
75	2nd Det.					
	1st Audio	6.1	120			.3
41	Output	6.1	215	230	10c	15

a. Oscillator anode grid.
b. Actual "no signal" bias is 3 volts which is measured at bias voltage divider resistor.
c. Actual bias is 18 volts which is measured at bias voltage divider resistor.

Total screen current drain is 5 milliamperes.

ALIGNMENT PROCEDURE (See Plate A)

Should the adjustment of the oscillator trimmer of the gang condenser be disturbed in relation to the other trimmers of the gang, readjustment will be necessary. Don't attempt to do this by ear or on a station, — use an oscillator and output meter. Set the gang condenser to minimum capacity with the dial pointer exactly on 1600 K. C. Then turn the pointer to 1200 K. C.

1. With the test oscillator at 1200 K. C., adjust oscillator trimmer to maximum output with minimum signal from oscillator, with volume control of set on full. Adjust antenna and R. F. trimmers in the same way. The gang will then track properly throughout its range if plates have not been tampered with and the I. F. frequency is exactly 177½ as it is when the set leaves the factory. If gang still does not track, see paragraph No. 2.

2. To realign I. F. transformers a source of 177½ K. C. modulated R. F. and an output meter are necessary. Connect the input to grid of 6A7 through a very small capacity, — not larger than 50 MMF. Short out oscillator section of gang, — begin with first I. F. transformer and then align the second one. The center screw will peak the grid side and the Hex nut takes care of the plate circuit. Be very particular to get the highest possible reading on all trimmers. Then go over the whole process again to be sure you have the maximum sensitivity, otherwise, the set will be weak and tune broadly

HOWLING

If the set has a tendency to howl on a strong signal the gang condenser is binding in some way. It should be free to float on the rubber mounting. Please particularly note that when the drive cable is pushed too tight against the gang condenser, it will howl on all stations.

Remove the tuning control cable from the bushing on the receiver. By looking through the hole in the bushing, see that the condenser shaft is lined up with this hole.

The bakelite tube flexible shaft couplings MUST fit freely over the tuning condenser and volume control shafts. Proper attention to these details during installation will eliminate any tendency toward howling.

HASH AT 600 TO 550 K. C.

Poor ground on antenna shield.
No ammeter condenser.

OSCILLATION

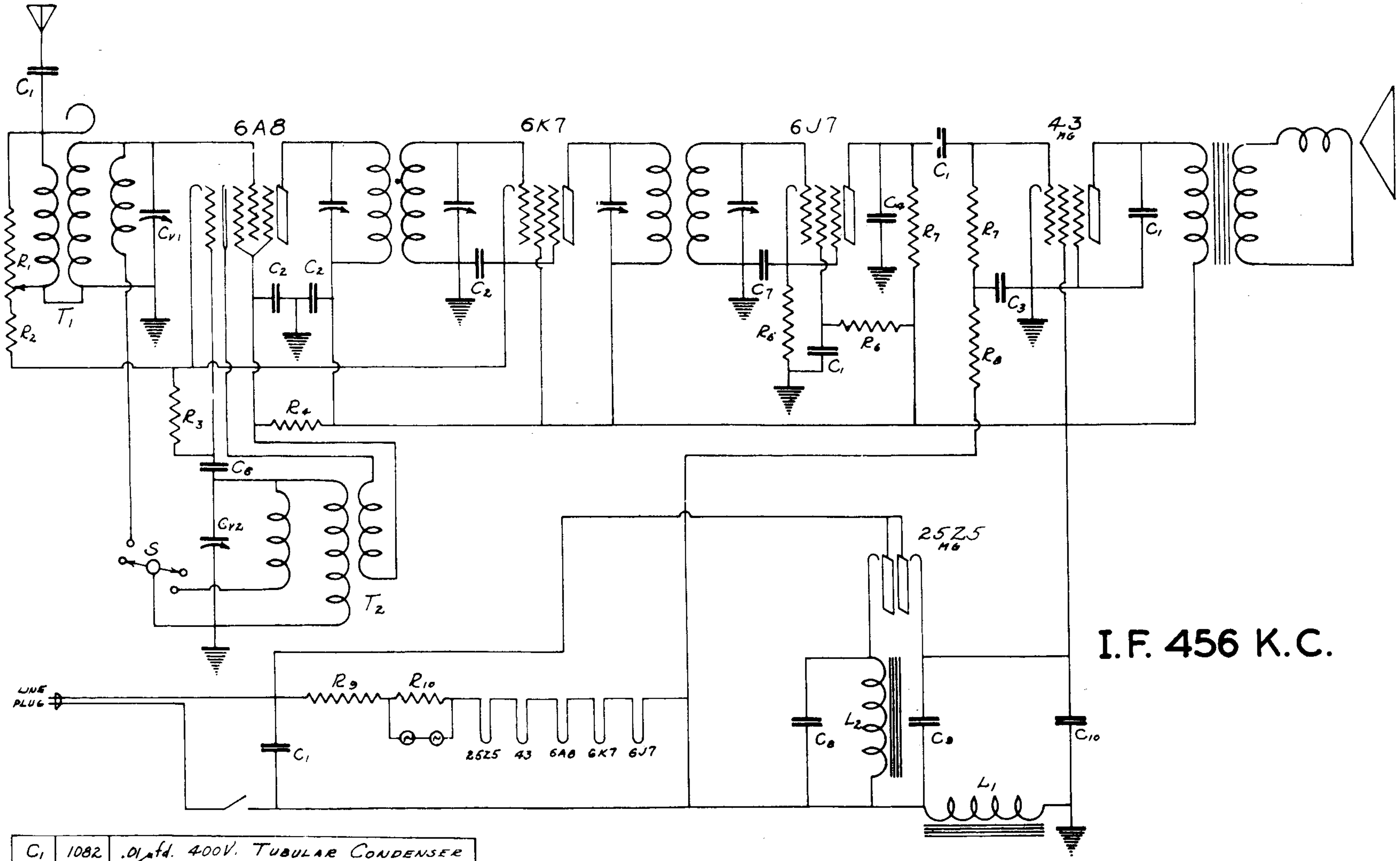
This will rarely occur except on extremely sensitive sets. It can be stopped by moving the green grid wire (on 6A7 tube) away from the antenna section of gang. It should come up behind the center section of the gang condenser.

When the wiring under the chassis has been tampered with, the blue plate wire from 2nd I. F. should be moved back as shown on plate B.

When the chassis is removed from case it will oscillate all over the band unless grounded.

FEDERATED PURCHASER INC.

MODEL 13-B ACRATONE



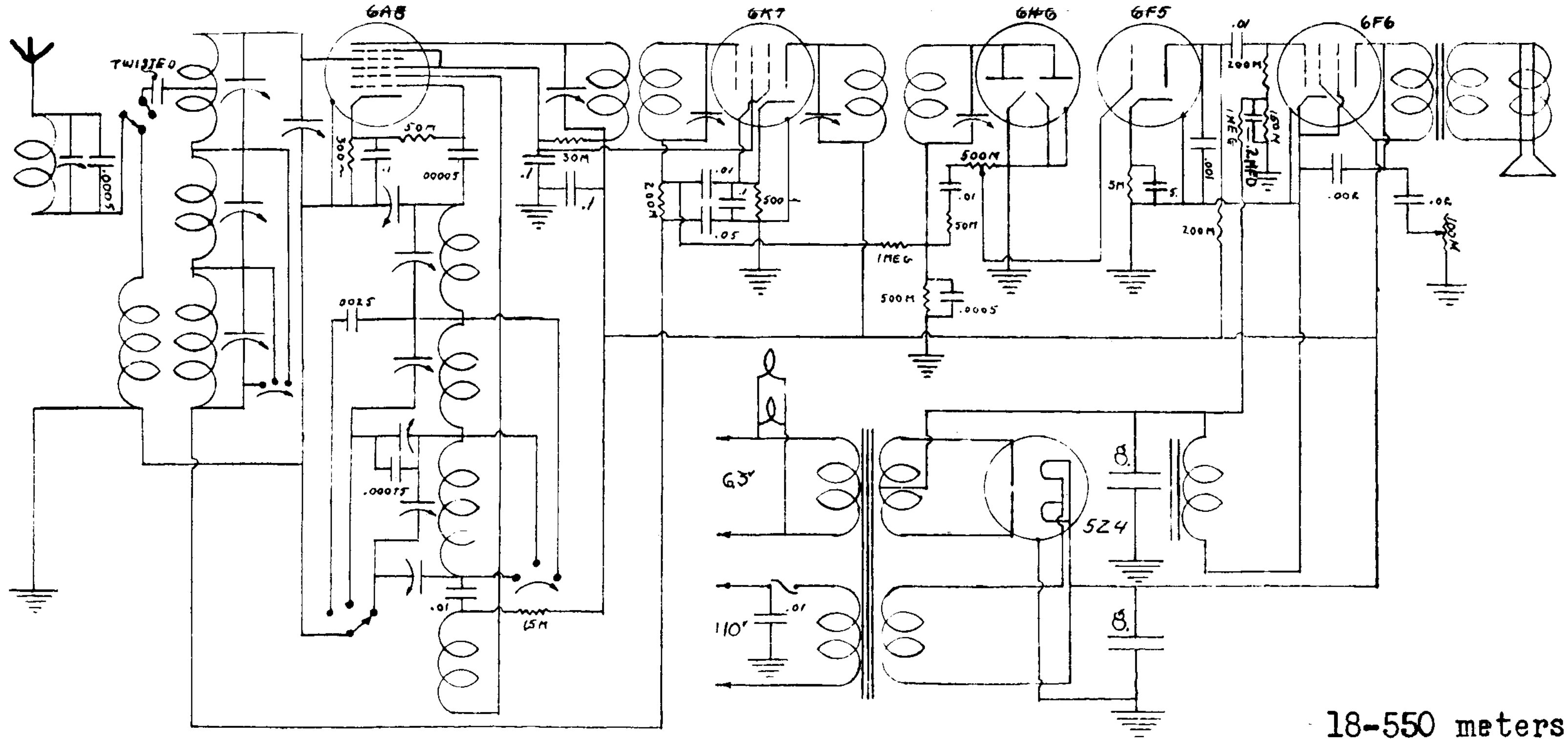
C_1	1082	.01 mfd. 400V. Tubular Condenser
C_2	1080	.1 mfd. 200V. " "
C_3	1095	.25 mfd. 200V. " "
C_4	1090	.00025 mfd. Mica Condenser
C_6	1091	.0001 mfd. " "
$C_{7-8-9-10}$	2027	5 mfd, 25V. 8 mfd. - 12 mfd. - 4 mfd. - 200V
R_{1-2}	1059	10,000 ohm Volume Control, 250 w R.H.
R_3	1071	50,000 ohm Carbon Resistor. 1/3 watt
R_4	1060	5000 " " " " "
R_5	1063	25,000 " " " " "

R_6	1073	3 meg ohm " " " "
R_7	1061	1/2 " " " " "
R_8	1063	250,000 ohm " " " "
R_9	1029	110 ohm Resistor Cord
R_{10}	1078	40 ohm Candohm Resistor
T_{1-2}	471	Translator Coil
S	759	Short Wave Switch
L_1	750	400 ohm, 10 hy., 40 M.A. Filter Choke

FEDERATED PURCHASER INC.

MODELS 21B-22B-23B

I.F. 456 K.C.



18-550 meters

CAUTION: Do not attempt to operate on current other than that noted on the instrument.

INSTALLATION: A good aerial, 25 to 50 feet long, well away from surrounding metal structures and power lines, is essential for best results.

CONTROL KNOBS: The left hand knob is, initially, the power switch, and thereafter, tone control. The second knob from the left is band selector switch. The third knob from the left is tuning control. The right hand knob is volume control. If DC models fail to operate, reverse power supply plug.

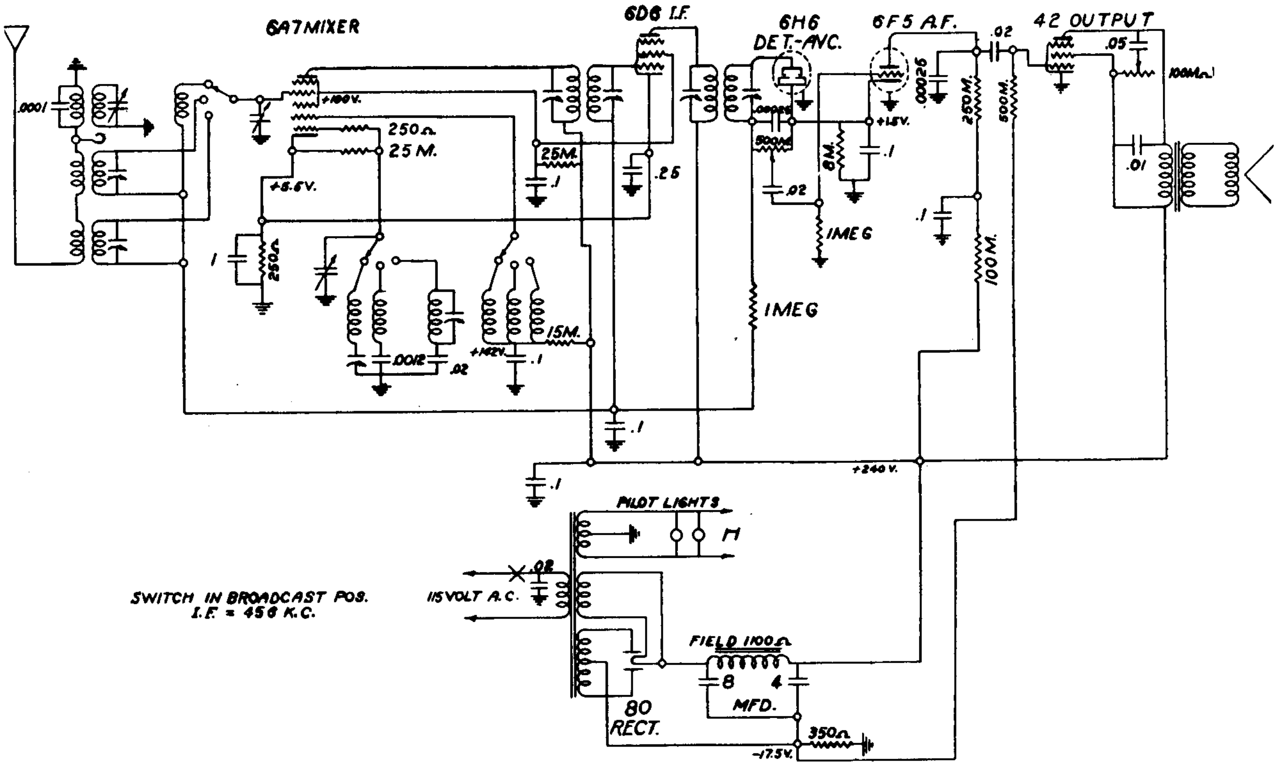
SERVICE NOTES: If the radio fails to operate when unpacked, or stops working after a few days, proceed as follows: (1) Have the tubes checked. (2) Remove the chassis from the cabinet and check for loose connections. (3) Have a competent "Radio Service Man" check over entirely. This set left the factory carefully inspected. Should rephasing be necessary, attach the output lead from a 456 KC test oscillator to the grid cap of the converter tube, keep the signal to a very low audible value and carefully adjust the two trimmer screws in the top of I. F. coils to loudest volume. If an output meter is available it should be used across the voice coil leads at the speaker transformer. An oscillator covering a frequency from 550 KC to 16 megacycles should be used to rephase the R. F. The test oscillator output is attached to the aerial lead of the set. At all times keep the oscillator signal turned down to a low point of audibility. Trim the short-wave band first, next the intermediate band, and then the broadcast band, to a frequency near the high frequency end of the dial in each case. Looking at underside of chassis with controls toward front the trimmers on oscillator coil from right to left are short-wave, intermediate and broadcast, respectively. The trimmers for the R. F. are in can on topside of chassis and are in the same order with short-wave closest to base. The porcelain base trimmer in the center of chassis is the intermediate band padding condenser, and the porcelain base trimmer closest to front is for broadcast. These are adjusted to set the low frequency ends of the intermediate and broadcast bands to correct location on the dial.

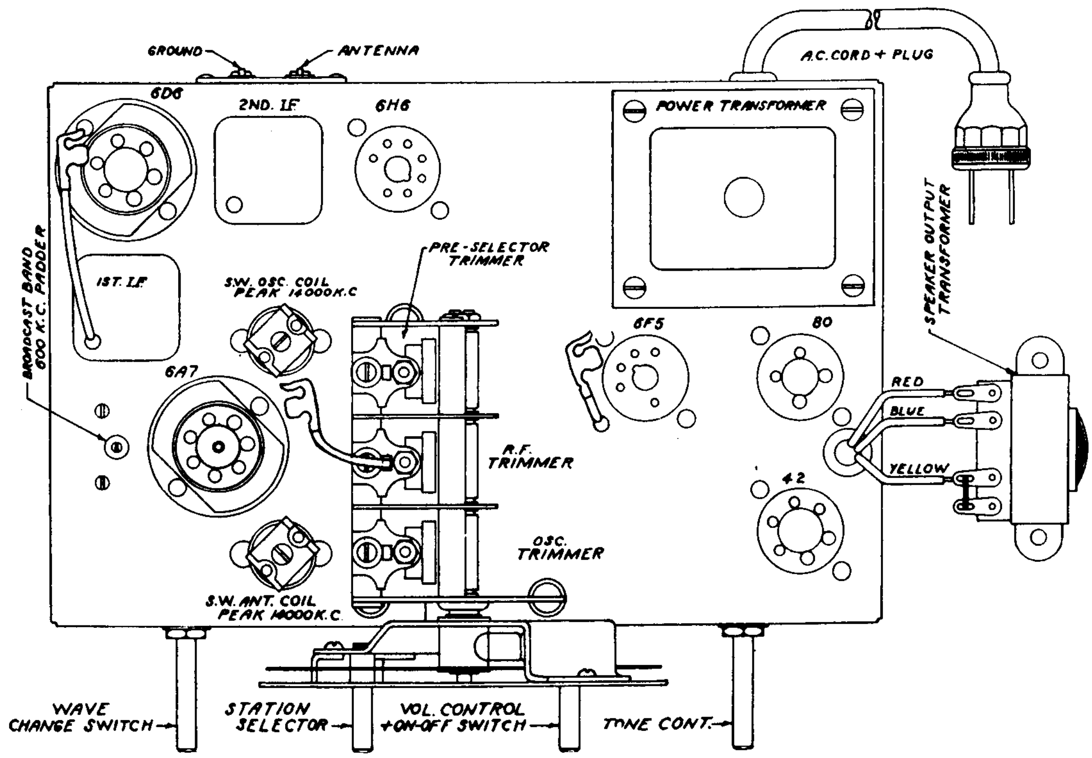
NOTE: On E Models (European) the three-plate bakelite trimmer connected from porcelain trimmer to band switch is the long wave trimmer. The trimmer on the left of oscillator coil is turned tight and should not need adjustment. The porcelain trimmer in center of chassis is long wave, and the one closest to front is broadcast. These two padding condensers are adjusted to set the low frequency ends of the broadcast and long wave bands to correct location on the dial.

PHONOGRAPH: Install a single pole double-throw toggle switch near the 75 tube, disconnect the .01 mfd. condenser from the volume control and connect to one side of switch, connect the volume control to center terminal of the switch, connect one side of the phonograph pickup to remaining side of the switch and the other side of the pickup to "B" minus.

FEDERATED PURCHASER INC.

MODELS 34C & 58D





This receiver is designed to operate over three tuning ranges. The broadcast range which extends from 540 to 1700 Kilocycles (KC) (175 to 550 meters), Police and Aviation Band which extends from 1700 to 5000 Kilocycles (KC) (52 to 175 Meters) and the International Short Wave Band which extends from 5800 to 15,200 Kilocycles (KC) (18.5 to 52 meters). This short wave range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

FEDERATED PURCHASER INC.

MODELS 34C & 58D

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tubes (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the rear gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the center and front trimmers of the gang condenser to peak. The center gang section tunes the R.F. or grid coil of the 6A7 tube and the front condenser section tunes the pre-selector stage circuit.

Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R.F. section. The padding condenser is located on the left hand side of the chassis, directly to the left of the 6A7 tube and in front of the first I.F. transformer.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Bands.

FOREIGN BAND The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coil located on the top of the chassis. Set the test oscillator to 14,000 KC. The oscillator coil is located near the 1st I.F. Transformer and the antenna or R.F. coil is located directly in front of the Short Wave oscillator coil and about midway between the 1st I.F. Transformer and the 6A7 tube. These two trimmers should be adjusted for peak at 14,000 KC and as the inherent design of the circuit has been expressly designed for simplicity in servicing, no other adjustments are necessary for aligning this band. **Note:** Always start this procedure by having the oscillator coil trimmer loose (out all the way), and the antenna coil trimmer fairly tight (in all the way); otherwise it is possible to make a false alignment on the image frequency.

Important: Do not attempt any adjustment of the gang condenser trimmers in aligning the Foreign Band as this will throw the Broadcast Band out of alignment.

POLICE BAND There is only one adjustment to be made in the alignment of the Police Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary.

Set the dial pointer to 4000 KC (also the test oscillator) and adjust the antenna coil trimmer to resonance. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment. The two police band coils are under the chassis and the antenna coil trimmer is mounted on the end of the antenna coil.

Important: This is the only adjustment necessary for the Police Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Police Band, otherwise the Broadcast Band will be thrown out of alignment.

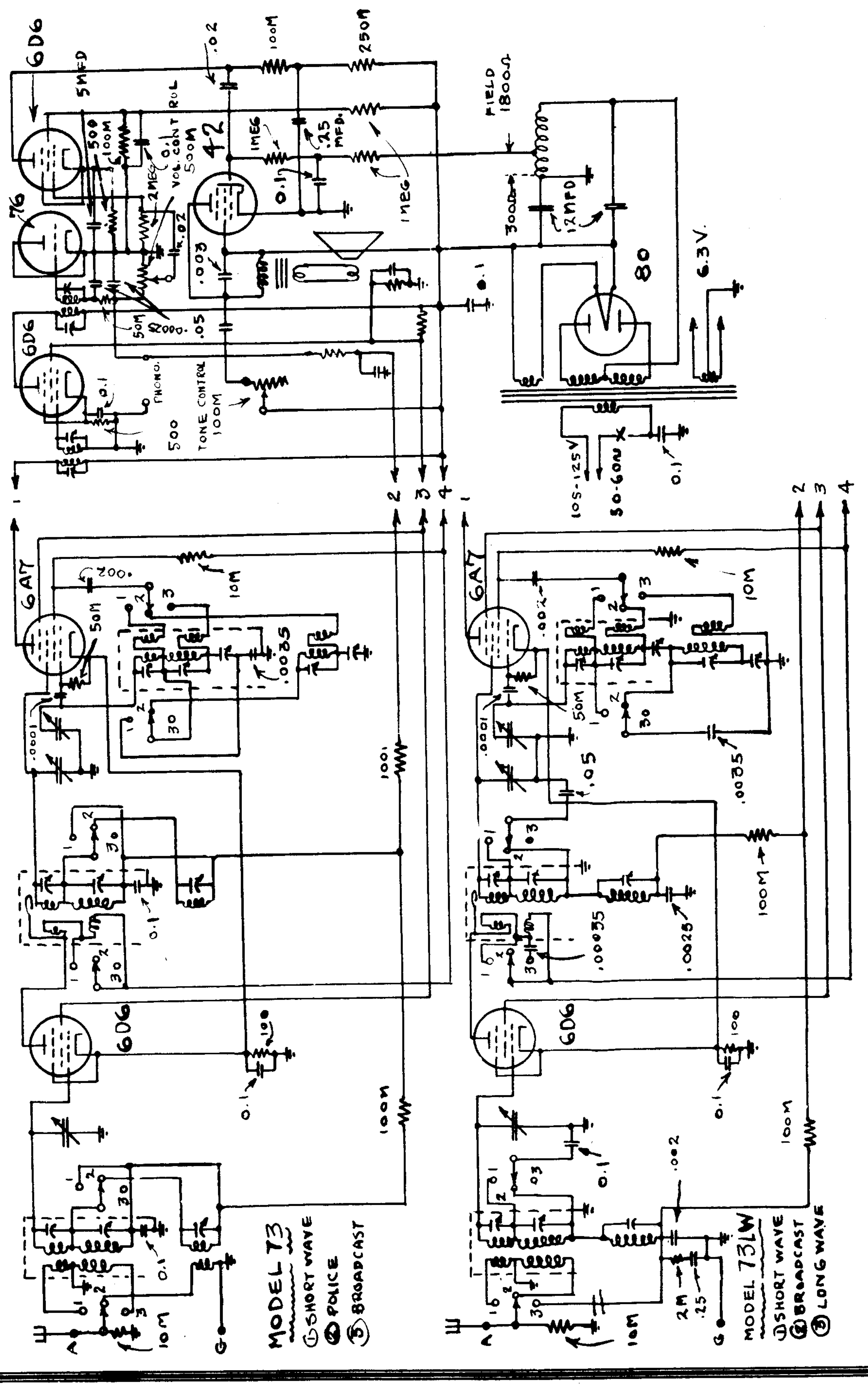
PARTS LIST

Part No.	Description
P160	Elect. Condenser
P170	350 Ohm Resistor
P630	Volume Control & "On-Off" Switch
P629	Wave Change Switch
P633	Tone Control
P173	Oscillator Coil
P176	A.C. Plug & Cord
P306	Power Transformer
P685	3 Gang Condenser
P189	1st I.F. Transformer
P190	2nd I.F. Transformer
P193	Pre-Selector Coil
G560	Short Wave Antenna Coil
G561	Short Wave Oscillator Coil
P617	Padding Condenser
G562	Police Band Antenna Coil
G563	Police Band Oscillator Coil
P136	250 Ohm ¼ Watt Resistor
P168	8,000 Ohm ¼ Watt Resistor
P258	15,000 Ohm ¼ Watt Resistor
P166	25,000 Ohm ¼ Watt Resistor
P165	25,000 Ohm 1 Watt Resistor
P280	100,000 Ohm ¼ Watt Resistor
P139	250,000 Ohm ¼ Watt Resistor

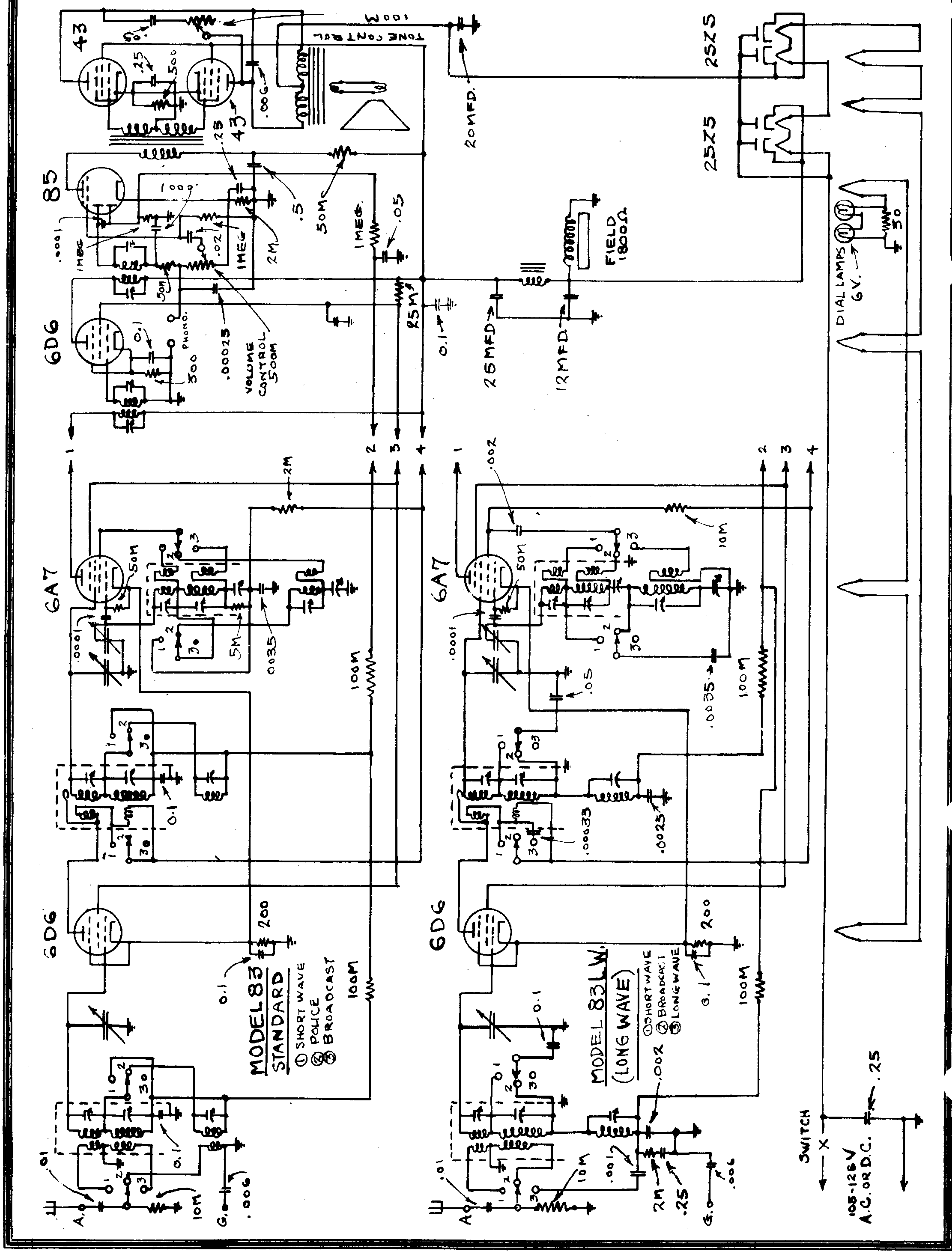
Part No.	Description
P137	500,000 Ohm ¼ Watt Resistor
P162	1 Megohm ¼ Watt Resistor
P143	.02 Mfd. 400 Volt Condenser
P142	.1 Mfd. 200 Volt Condenser
P276	.1 Mfd. 400 Volt Condenser
P141	.25 Mfd. 200 Volt Condenser
P147	.00025 Mica Condenser
P148	.05 Mfd. 200 Volt Condenser
P334	.05 Mfd. 400 Volt Condenser
P335	.01 Mfd. 600 Volt Condenser
P478	.0012 Mfd. 200 Volt Condenser
P182	Speaker Output Transformer
G573	8" Speaker Cone Only
P705	8% Speaker Field Coil
G564 A	8" Spider & Voice Coil Unit—Complete
G725	8" Dynamic Speaker with B.C.
P631	Dial & Scale—Complete
P639	Dial Glass
P124	Pilot Light
P634	Knob

GARÖD RADIO CORPORATION

MODELS 73 & 73LW

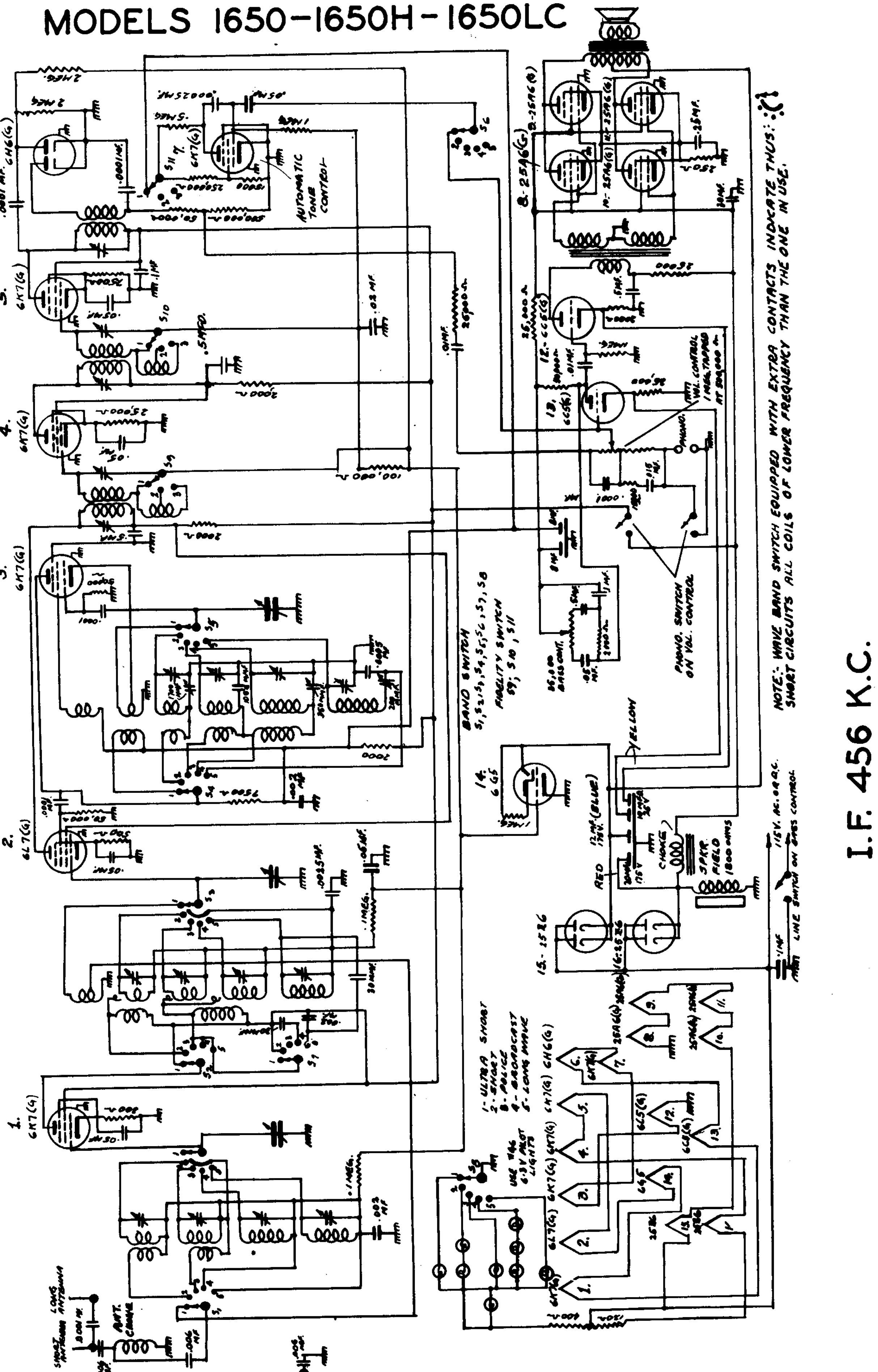


GAROD RADIO CORPORATION
MODELS 83 & 83LW



GAROD RADIO CORPORATION

MODELS 1650-1650H-1650LC



GAROD RADIO CORPORATION

MODELS 1650-1650H-1650LC

It is important to remember that in receivers of this kind which are equipped with automatic volume control it is necessary to use the minimum possible signal from the signal generator; otherwise the avc action will tend to nullify the variations in output as the trimmers are adjusted. A surer method is to make the avc tube inoperative. This may be done by shorting return of RF trimmers to ground.

I.F. ADJUSTMENT: The signal generator is set at 456 kc. and is connected to the grid of the first detector (6L7). With the oscillator section of the tuning condenser short-circuited and the receiver volume control at its maximum position, the i.f. trimmers are adjusted for maximum output. These trimmers may be found on the tops of the I.F. transformers.

18 MEGACYCLE ADJUSTMENT: The high side of the signal generator is connected to the antenna lead of the receiver and the low side to the ground lead. The receiver and the signal are both tuned to a frequency of 18 mc. with the selector switch in position for band no. 2 (Short Wave). The oscillator trimmer condenser is adjusted so that the 18 mc. signal is tuned in exactly at the 18 mc. calibration point, with the volume control on full and the signal generator adjusted for minimum input. The antenna preselector and interstage trimmers are then adjusted in the order named for maximum output. These trimmers are located as indicated in the bottom view of the chassis.

6 MEGACYCLE ADJUSTMENT: The signal generator is set at 6 megacycles and the signal tuned in on the dial. The Short Wave padding condenser is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left.

5 MC. ADJUSTMENT: With the band selector switch in position for operation on band no. 3 (Police) and the receiver and signal generator both set at 5 mc. the procedure outlined above is repeated.

The signal generator is set at 1.8 mc. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 5 mc. adjustment should then be rechecked.

1500 KC. ADJUSTMENT: The band selector switch is set in position for operation on the no. 4 band. (Broadcast). The receiver and signal generator are both set at 1500 kc. and the procedure outlined above is repeated.

The signal generator is set at 600 kc. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 1500 kc. adjustment should then be rechecked.

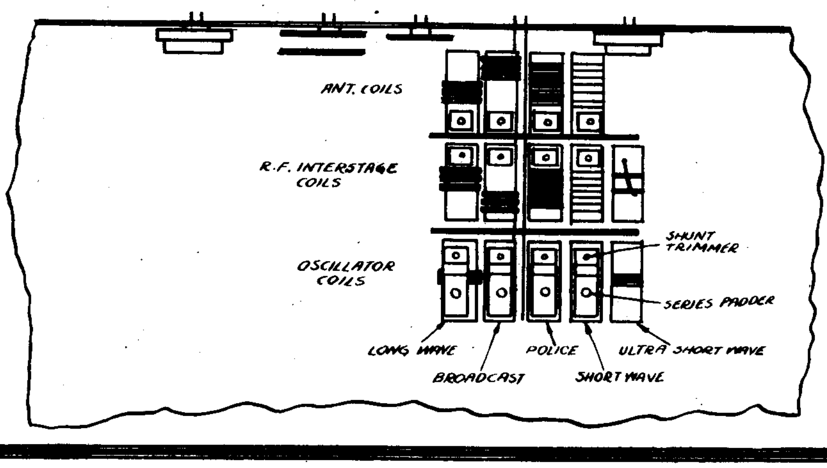
300 KC. ADJUSTMENT: The band selector switch is set in position for operation on band no. 5. The receiver and generator are both tuned to 300 kc. and the procedure outlined above is repeated.

The signal generator is set at 150 kc. and the signal is tuned in on the dial. The Long Wave padder condenser is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 300 kc. adjustment should then be rechecked.

TUBE.	FUNCTION	HEATER	PLATE	SC. GRID.	CATH. V.	CATH. I.MA.
6K7(G)	R.F. Amp.	6.3	100	100	2	6.7
6L7(G)	Converter	6.3	95	95	2.5	5.0
6K7(G)	Oscillator	6.3	80	100	0	4
6K7(G)	Ist I.F. Amp.	6.3	95	95	12	5
6K7(G)	2nd I.F. Amp.	6.3	100	100	6	1
6H6(G)	Diode Det. & A.V.C.	6.3	0		0	
6C5(G)	1st Audio Amp.	6.3	30		1.5	0.3
6C5(G)	2nd Audio Amp.	6.3	60		1.5	0.75
25A6(G)(4)	Audio Output	25.	120	10C	30	15
25Z6(G)	Rectifier For Set	25.			107	87
25Z6(G)	Rectifier For Output Plates	25.			125	60
6K7(G)	Automatic Tone Control	6.3	50	5	0	1

All voltages except filament, are measured from socket terminals to chassis and with a 1000 Ohms per volt voltmeter. The set must be in operation and the sensitivity control in its maximum clockwise position.

Filament voltages are taken from filament prong to filament prong at tube socket and measured with a low impedance AC voltmeter.



GENERAL ELECTRIC COMPANY

MODEL A-208

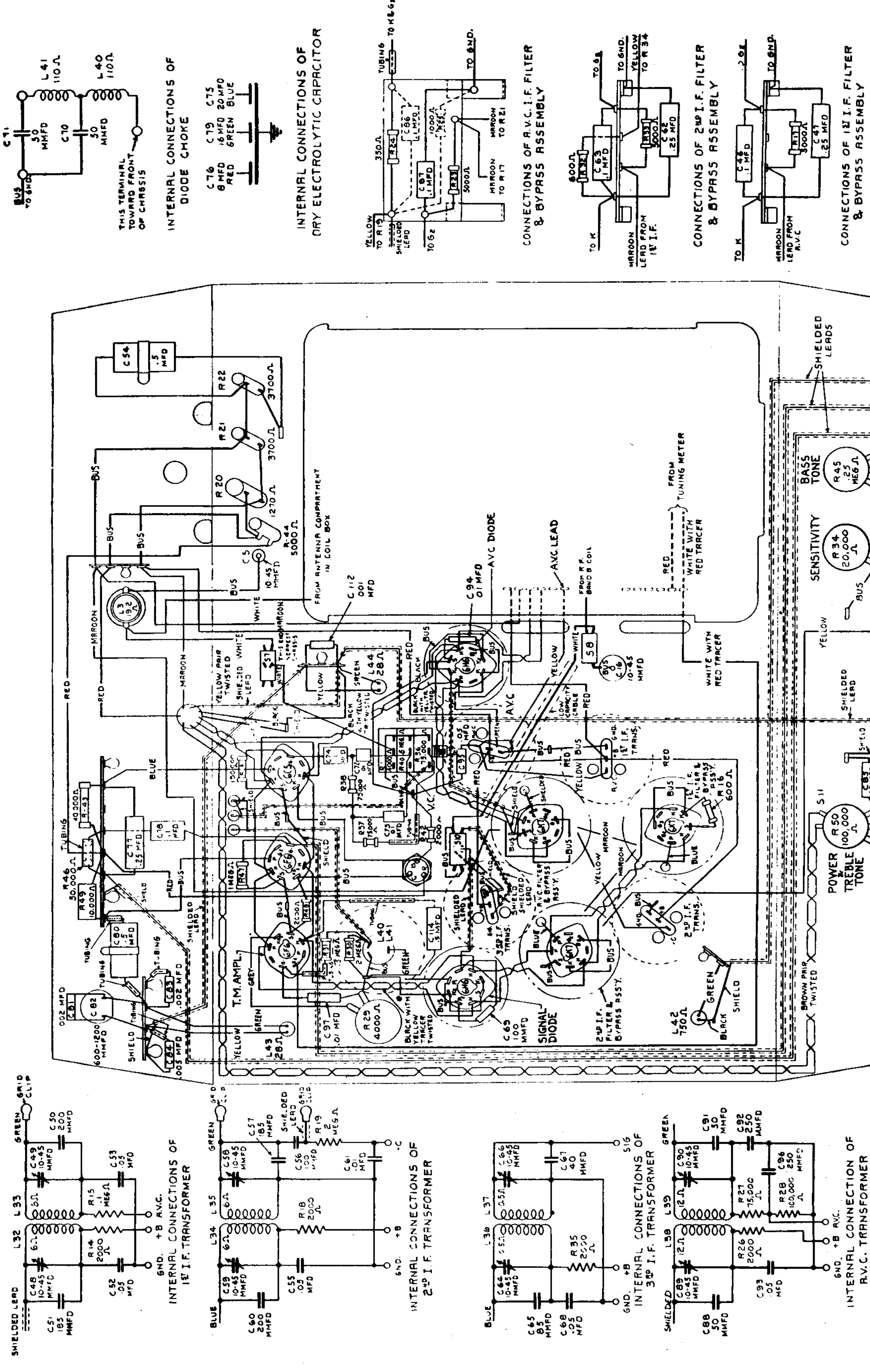


Fig. 4. Model A-208 Chassis Wiring Diagram

NOTE: FOR PHYSICAL VIEWS SEE T-18J454

NOTE: See Page 499 Volume VI for Schematic Diagram

GENERAL ELECTRIC COMPANY

MODEL A-208

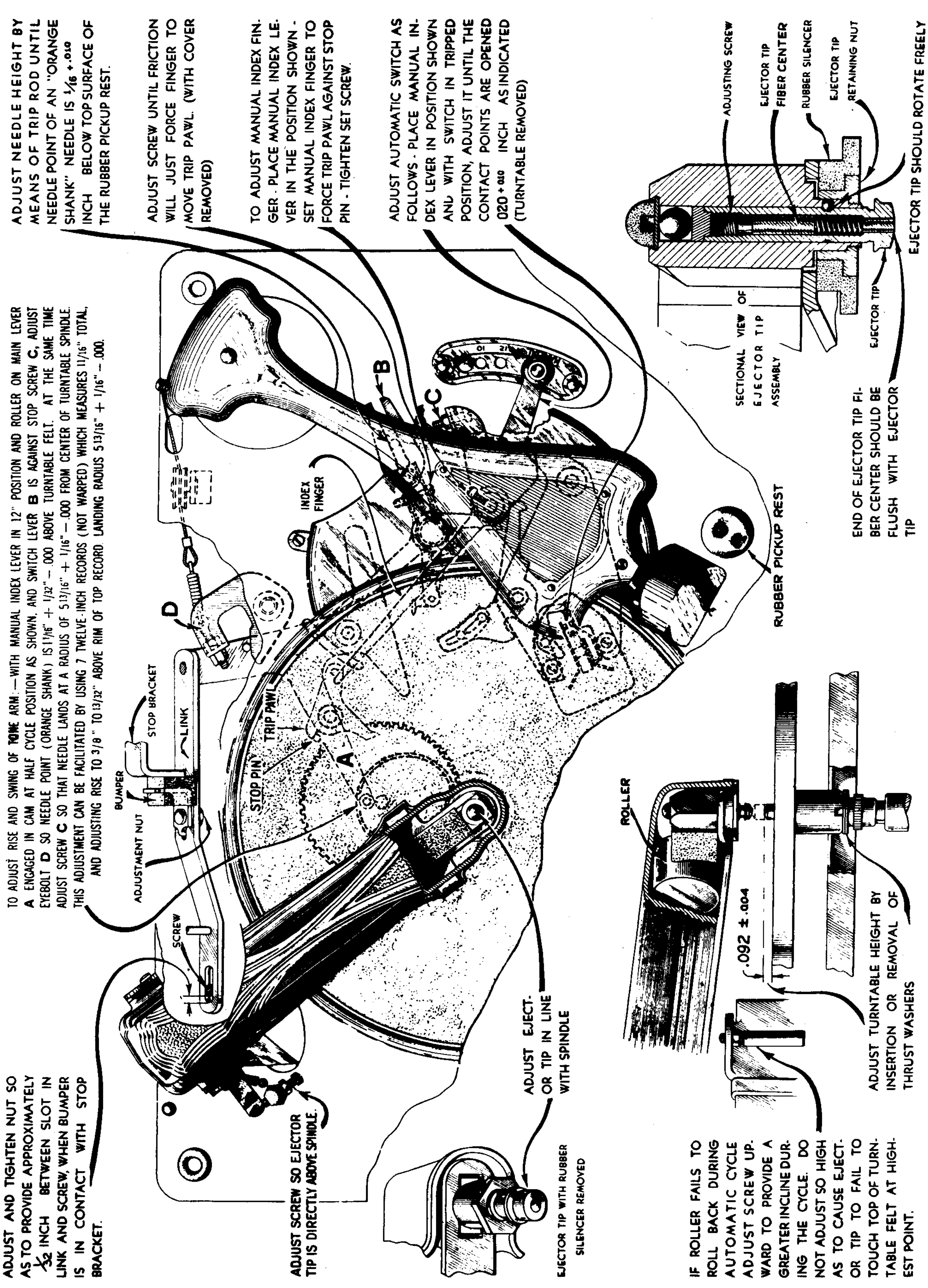
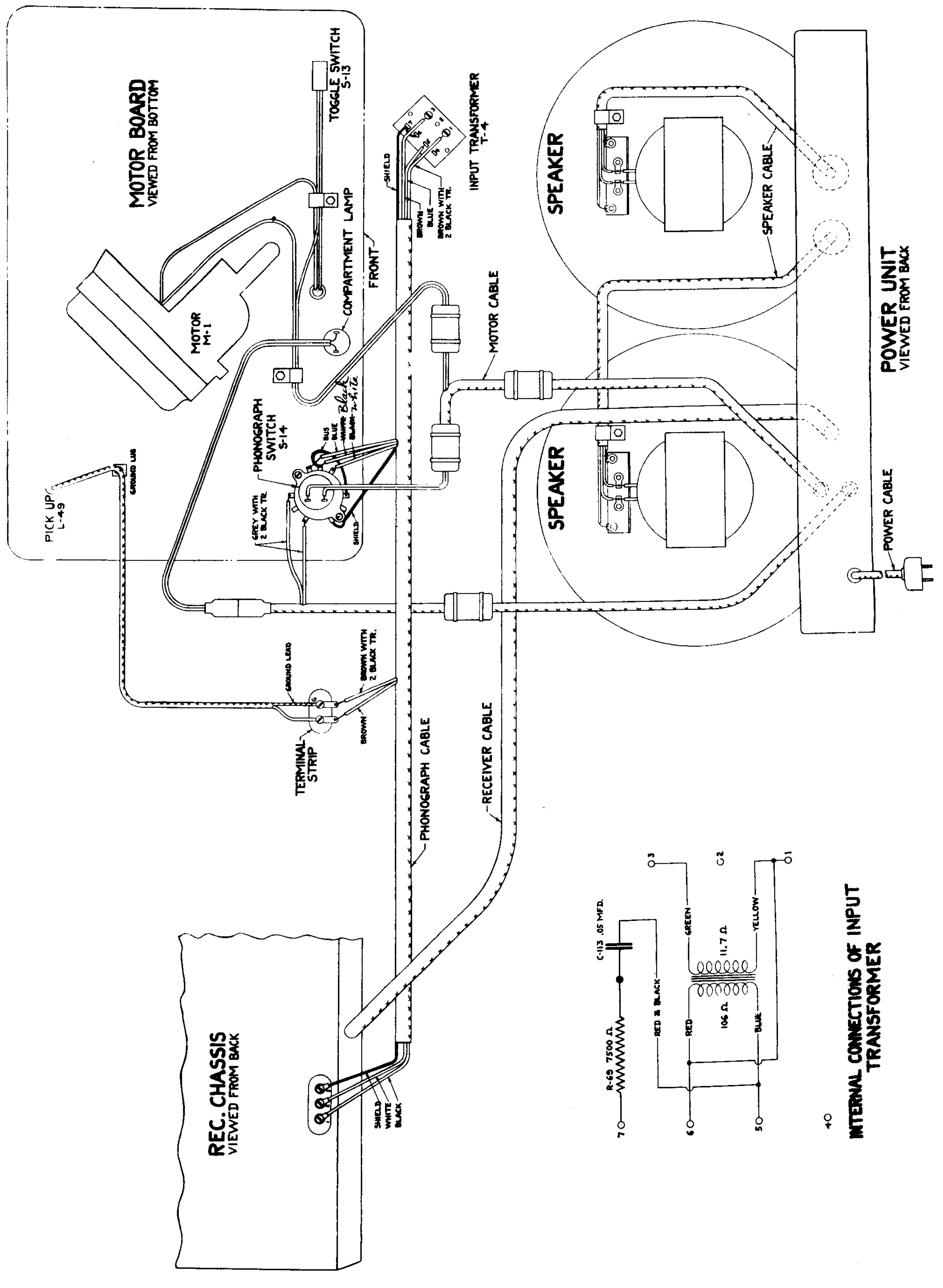


Fig. 13. Automatic Record-changer Adjustments

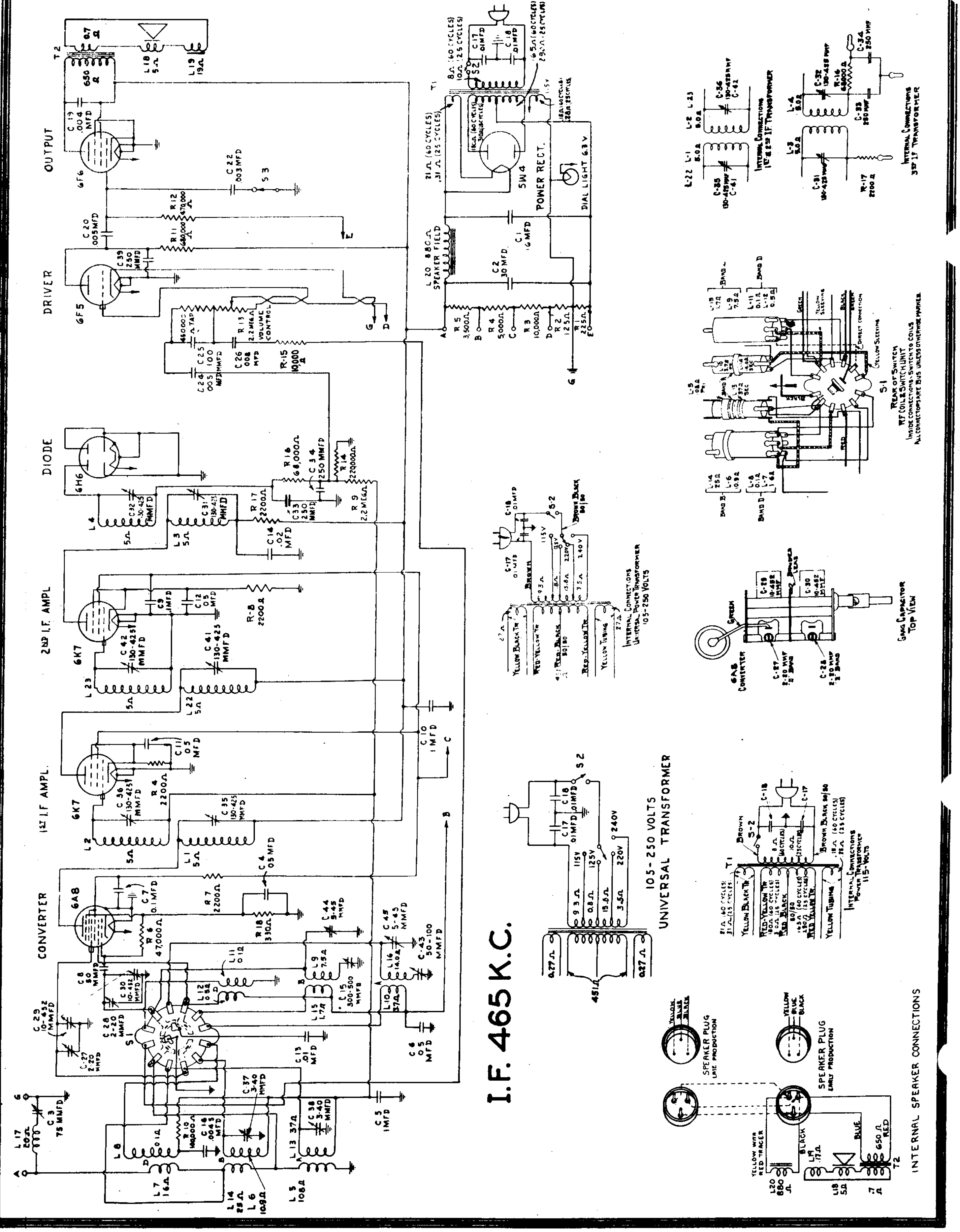
GENERAL ELECTRIC COMPANY

MODEL A-208



GENERAL ELECTRIC COMPANY

MODELS E-71W & E-72W



GENERAL ELECTRIC COMPANY
MODELS E-71W & E-72W

ALIGNMENT PROCEDURE

1. I. F. Alignment

Set the frequency band switch of the receiver to Band "B," short-circuit the antenna and ground terminals and tune the receiver to some point where no signal is heard. Set the volume control at its maximum position and ground the chassis.

The I. F. amplifier is tuned to 465 kc.; set the test oscillator dial at this frequency. Connect the test oscillator output between the converter tube (6A8) control grid and chassis. Connect the output meter across the cone coil of the speaker and adjust the test oscillator output control so that, with the receiver volume control at maximum, a small deflection is observed on the output meter. During both I. F. and R. F. alignment, the test oscillator signal should be maintained at the lowest level that will give a good readable output indication.

Adjust the secondary trimmer of the third I. F. transformer until a maximum output reading is obtained. Maintain a small deflection on the output meter throughout alignment by adjusting the test oscillator output. Next, adjust the primary trimmer of the third I. F. transformer for maximum output. Continue this procedure, adjusting the secondary and primary trimmers, respectively, of the second I. F. transformer. The secondary trimmer of the first I. F. transformer may then be adjusted and, lastly, the primary trimmer of the first I. F. transformer. After completing this procedure, repeat it a second time for final alignment. The I. F. alignment will then be complete.

I. F. Wave Trap Alignment

After completion of the I. F. alignment, with the test oscillator still set on 465 kc., apply this frequency to the antenna post of the receiver through a dummy antenna. This dummy antenna consists of a 400-ohm resistor in series with a 250-mmfd. capacitor and should be connected in series between the test oscillator output and the receiver antenna post. With the 465-kc. signal applied to the receiver antenna post, adjust the I. F. Wave Trap trimmer for *minimum* output indication.

2. R. F. Alignment

First of all, check the position of the dial pointer. To do this, rotate the gang condenser to the maximum capacity position, i.e., plates fully meshed. While in this position, align the pointer with the last black line on the scale by loosening the dial drum set screws and rotating the drum on the gang shaft. Make sure the antenna and ground terminals of the receiver are not short-circuited and connect to them the output of the test oscillator, preferably using the dummy antenna described above between the test oscillator and the receiver antenna terminal. Connect the output indicator across the speaker cone coil.

"D" Band (5.6-18.0 mc.)

Because of the R. F. circuit used in this receiver, the "D" band must be aligned first. Set the frequency band switch to the "D" band position by rotating it to its most clockwise position. Tune the test oscillator to 18,000 kc. (18 mc.) and set the dial pointer on the receiver at this frequency. Adjust the "D" band oscillator trimmer, located on the front section of the gang condenser, for maximum output. (NOTE.—The oscillator operates on the *low* frequency side of the incoming signal; therefore adjust the trimmer until the second oscillator peak is reached as the trimmer is *increased* in capacity. A check for the correctness of this adjustment may be made by rotating the gang to the 17,070 kc. calibration mark. If, with increased input from the test oscillator, no signal is detected, the correct oscillator peak has been used.) Keep the receiver volume control at its extreme clockwise position and adjust the test oscillator output to maintain a small reading on the output indicator. When the optimum adjustment on the oscillator trimmer has been obtained, adjust the "D" band antenna trimmer on the rear section of the gang for maximum output while rocking the tuning condenser through the signal

"B" Band (540-1600 kc.)

Set the frequency band switch to the broadcast position. Rotate the gang condenser until the dial pointer indicates the 1500 kc. calibration point, and adjust the test oscillator to this frequency. The "B" band trimmers are located underneath the chassis. Adjust the broadcast oscillator trimmer for maximum output. This trimmer is the one nearest the volume control. When the oscillator has been peaked, adjust the antenna trimmer for maximum output. Here again, as pointed out previously, it is necessary to maintain a small R. F. input from the test oscillator to avoid erratic action of the output indicator due to automatic volume control action.

Now set the test oscillator at 580 kc. and tune the receiver to that frequency. Slowly, rocking the tuning condenser back and forth through the signal, adjust the 580-kc. padding capacitor for maximum output. When this has been done, return to 1500 kc. on the receiver and test oscillator and recheck the alignment at that frequency for maximum output. The broadcast band should now be in alignment.

"A" Band (140-410 kc.)

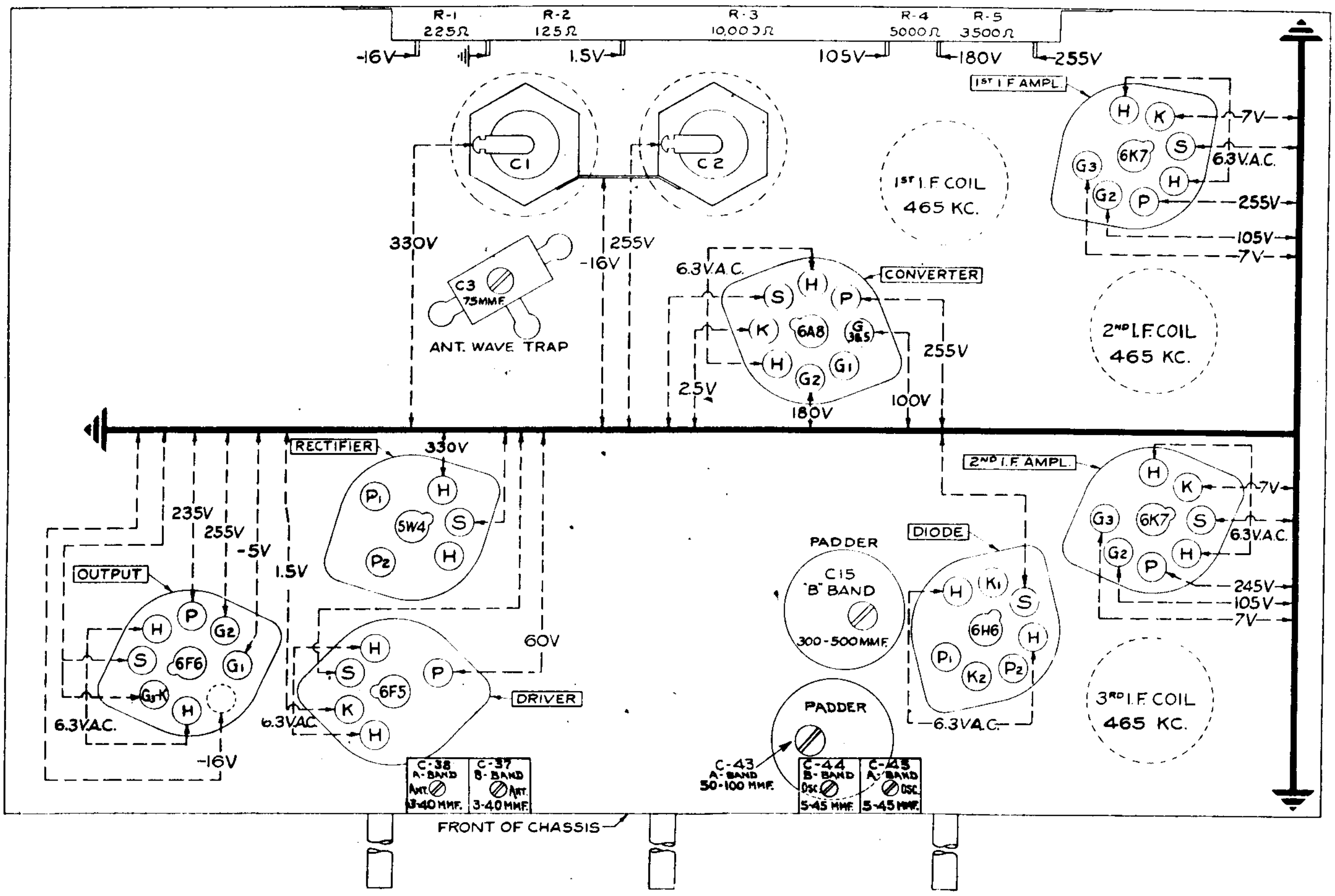
Set the test oscillator for operation at 400 kc. and connect its output to the antenna terminal of the receiver through the dummy antenna described under I. F. Wave Trap Alignment. Tune the receiver until the pointer is at 400 on the scale. Set the tone control for minimum high response and reduce the volume control setting so as to avoid excessive noise response. Adjust the Band "A" oscillator and antenna trimmers respectively (see Fig. 3) to give maximum deflection on the output meter. Maintain the test oscillator at the lowest level which will give an easily readable output indication.

Now set the test oscillator at 145 kc. and tune the receiver to resonance with this signal. Adjust the 145-kc. padding capacitor, rocking the tuning condenser back and forth through resonance as the padding capacitor is adjusted and note the deflection of the output meter each time the receiver is tuned in this manner. Leave the padding capacitor at the setting which gives greatest deflection.

Retune the receiver to 400 kc. and set the test oscillator for this frequency. Check the alignment by again adjusting the Band "A" oscillator and antenna trimmers for maximum deflection on the output meter.

GENERAL ELECTRIC COMPANY

MODELS E-71W & E-72W



VIEWED FROM UNDERSIDE OF CHASSIS

Fig. 3. Trimmer Location and Socket Voltage

SOCKET VOLTAGES

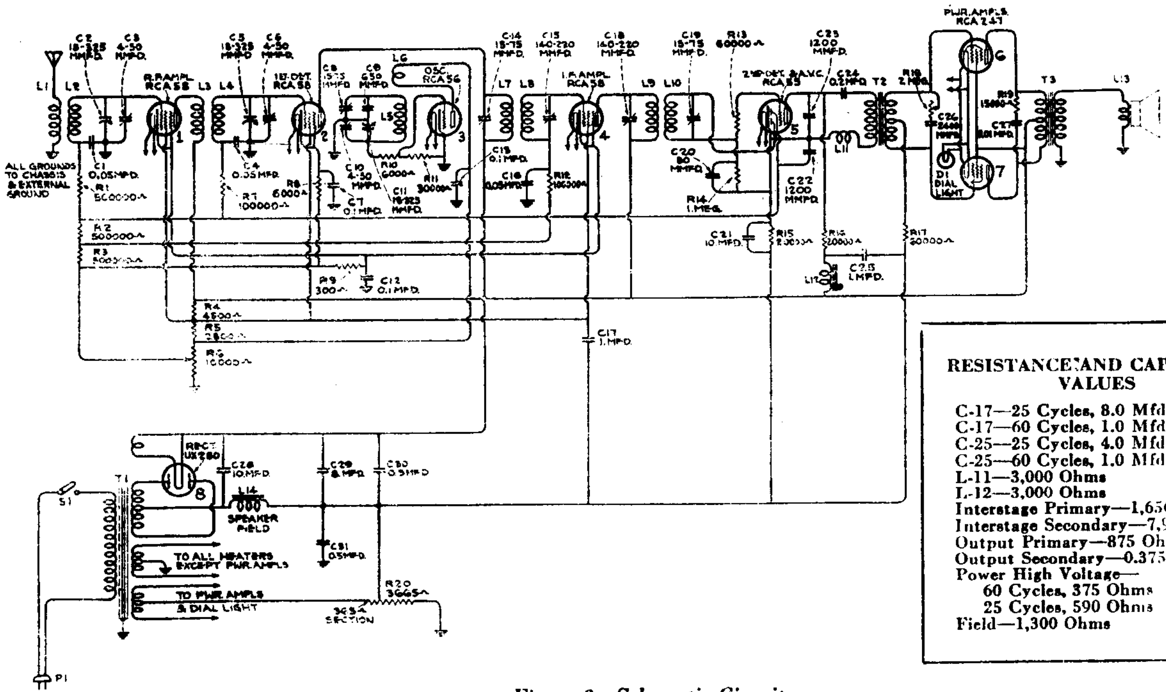
Tube No.		Cathode to Ground Volts D.C.	Screen Grid to Ground Volts D.C.	Plate to Ground Volts D.C.	Cathode Current M.A.	Heater Volts A.C.
6A8	Oscillator	2.5	. . .	180	12.0	6.3
	Converter	. . .	100	255		
6K7 1st I. F. Amp.		7.0	105	255	9.0	6.3
6K7 2nd I. F. Amp.		7.0	105	245	9.0	6.3
6H6 Detector & AVC.		. . .	. . .	. . .	. . .	6.3
6F5 Audio Amplifier		1.5	. . .	* 60	0.3	6.3
6F6 Output		. . .	255	235	36.0	6.3
5W4 Power Rectifier		300 D.C.	. . .	650/325 R.M.S.	70.0	5.0

Measured at 115 volts supply. No signal input. Volume control maximum. Voltmeter 1000 ohms per volt; measurements taken on highest scale giving accurate readable deflection.

* Supply voltage minus drop in load resistor.

GENERAL ELECTRIC COMPANY

MODEL J-83



RESISTANCE AND CAPACITOR VALUES

C-17—25 Cycles, 8.0 Mfd.
C-17—60 Cycles, 1.0 Mfd.
C-25—25 Cycles, 4.0 Mfd.
C-25—60 Cycles, 1.0 Mfd.
L-11—3,000 Ohms
L-12—3,000 Ohms
Interstage Primary—1,650 Ohms
Interstage Secondary—7,900 Ohms
Output Primary—875 Ohms
Output Secondary—0.375 Ohm
Power High Voltage—
60 Cycles, 375 Ohms
25 Cycles, 590 Ohms
Field—1,300 Ohms

Figure 3—Schematic Circuit

I.F. 175 K.C.

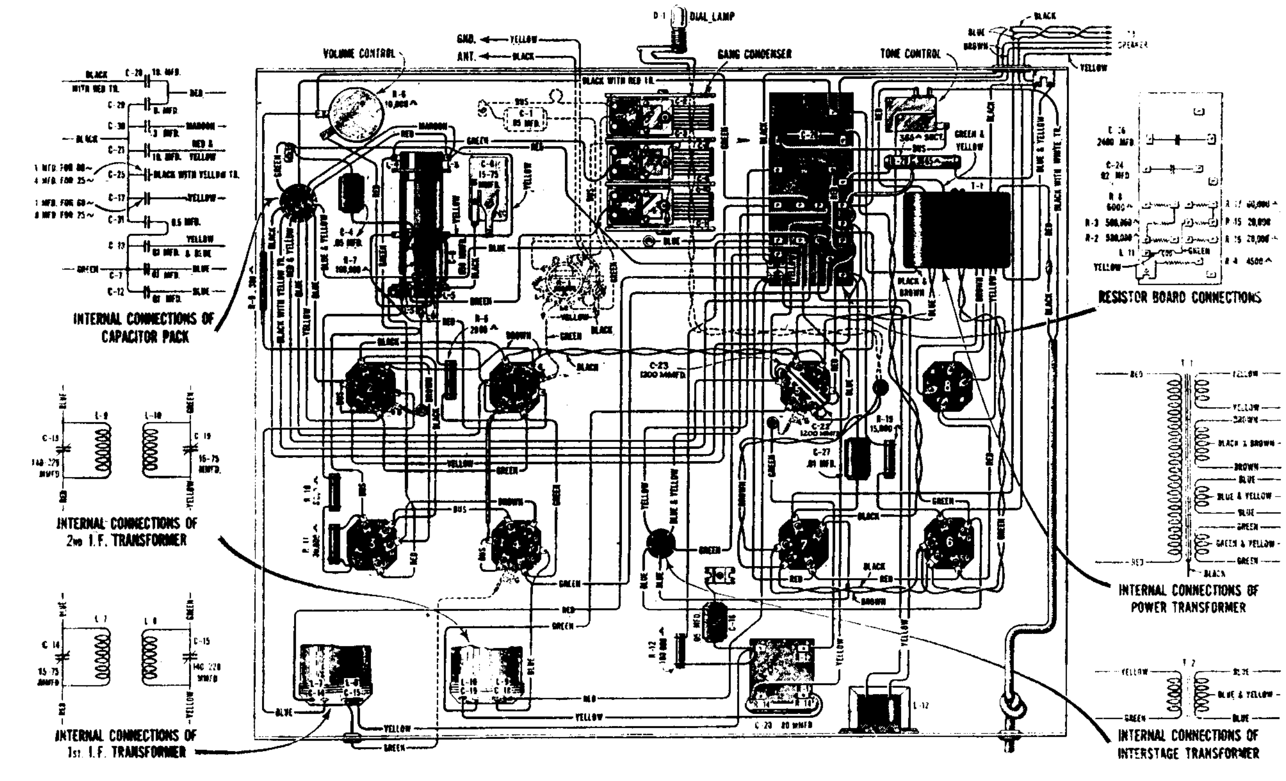


Figure 4—Chassis Wiring Diagram

GENERAL ELECTRIC COMPANY

MODEL J-83

Electrical Specifications

Voltage Rating............................105–125 Volts
Power Consumption..........................100 Watts
Type and Number of Radiotrons..3 RCA-58, 1 RCA-56, 1 RCA-55, 2 RCA-247, 1 UX-280—Total, 8
Type of Circuit......................Super-Heterodyne with A. V. C., tone control and push-pull Pentode Output
Undistorted Output............................3 Watts
R. F. and Oscillator Alignment Frequency 600 K. C. and 1400 K. C.
Intermediate Frequency.......................175 K. C.

This receiver is an eight tube Super-Heterodyne incorporating Automatic volume control, tone control and Push-Pull Pentode Output. Service Data will be found to be similar to that of other Super-Heterodyne receivers incorporating similar features.

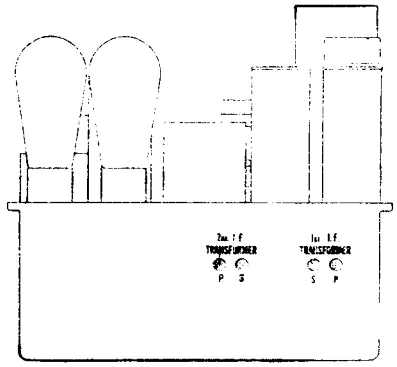


Figure 5—I. F. Alignment Location

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from the rear of the chassis. See Figure 5 for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 7065 and an output meter.
(b) Remove the oscillator tube and connect a ground to the chassis.
(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a *slight deflection* is obtained in the output meter.
(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screwdriver such as Stock No. 7065 and an output meter.

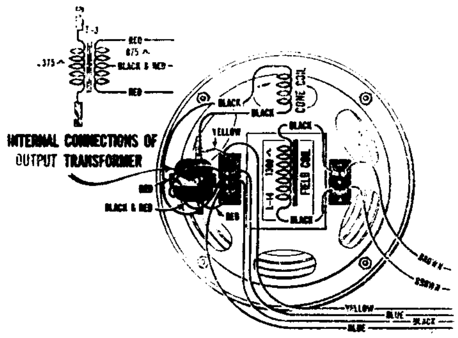


Figure 6—Loudspeaker Wiring

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.
(c) Adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.
(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.
(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

120 Volts, 60 Cycles A. C. Line—V. C. At Maximum and No Signal

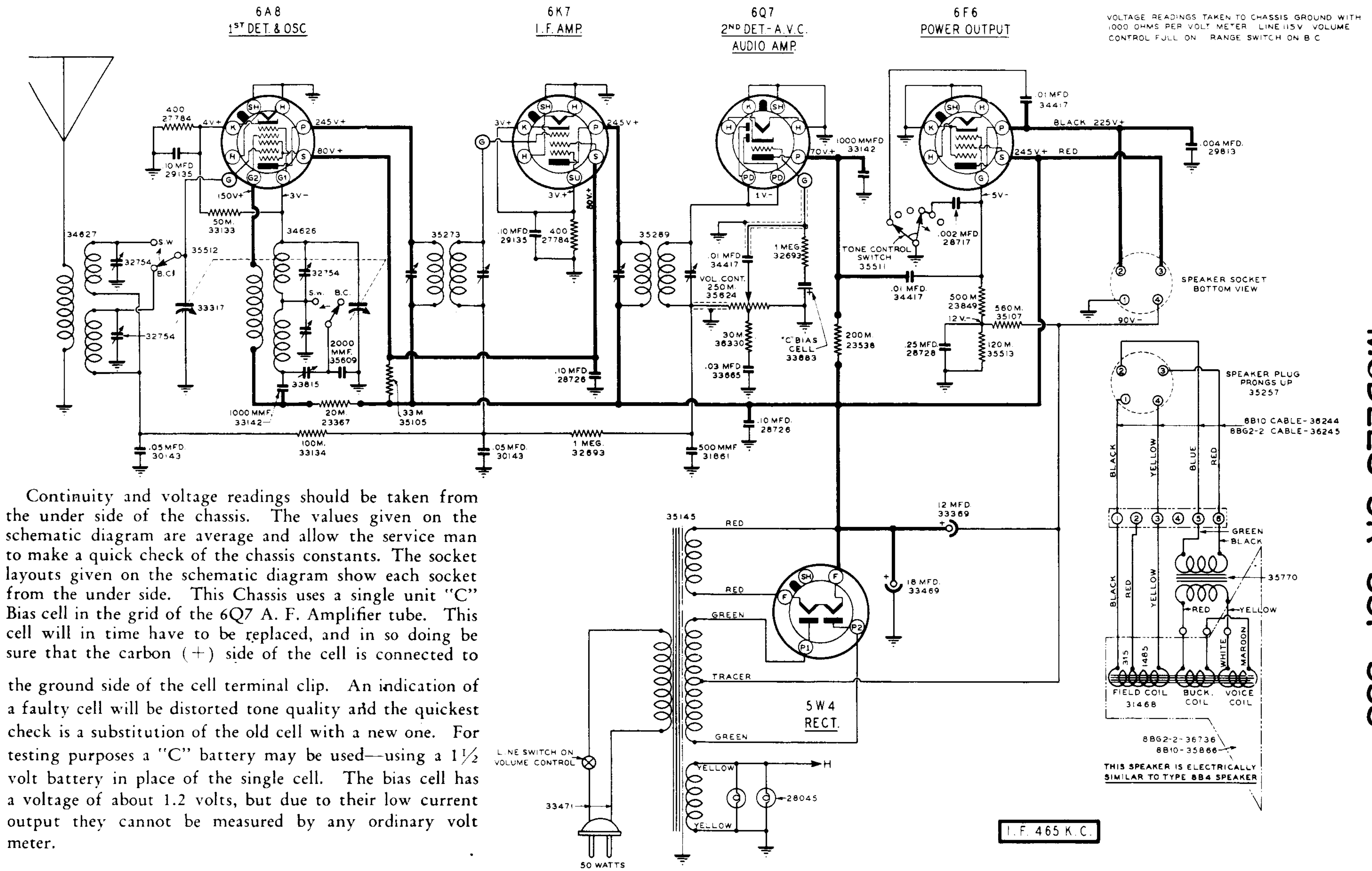
Radiotron No.	Control Grid to Filament or Cathode Volts	Screen Grid to Filament or Cathode Volts	Plate to Filament or Cathode Volts	Plate Current M. A.	Heater or Filament Volts
1. R. F. RCA-58	4.5	100	165	6.0	2.37
2. 1st Det. RCA-58	11.0	95	155	1.5	2.37
3. Osc. RCA-56	—	—	70	4.5	2.37
4. I. F. RCA-58	4.5	100	165	6.0	2.37
5. 2nd Det. RCA-55 and A.V.C.	—	—	55	4.7	2.37
6. PWR. RCA-247	19	235	225	20	2.37
7. PWR. RCA-247	19	235	225	20	2.37

OTHER IMPORTANT VOLTAGES

2nd Detector and A.V.C. Cathode to Low Side of Field . 105 Volts
Chassis to Low Side of Field .... 90 Volts
Voltage Across Field .... 120 Volts
Rectifier... 370 Volts R.M.S. Each Plate—80 M.A. Each Plate

GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 5K-551-553



Continuity and voltage readings should be taken from the under side of the chassis. The values given on the schematic diagram are average and allow the service man to make a quick check of the chassis constants. The socket layouts given on the schematic diagram show each socket from the under side. This Chassis uses a single unit "C" Bias cell in the grid of the 6Q7 A. F. Amplifier tube. This cell will in time have to be replaced, and in so doing be sure that the carbon (+) side of the cell is connected to the ground side of the cell terminal clip. An indication of a faulty cell will be distorted tone quality and the quickest check is a substitution of the old cell with a new one. For testing purposes a "C" battery may be used—using a 1½ volt battery in place of the single cell. The bias cell has a voltage of about 1.2 volts, but due to their low current output they cannot be measured by any ordinary volt meter.

The Grunow 5K Chassis is a Five Metal tube, 115 V. 50-60 cycles A. C., two band receiver with A. V. C., Tone Control and a "Band spread" dial. The tubes used are: 1-6A8 1st Detector and Oscillator, 1-6K7 I. F. Amplifier, 1-6Q7 2nd Detector, A. V. C. and 1st Audio Amplifier, 1-6F6 Power Output tube and a 5W4 Rectifier tube.

The frequency range is divided into two bands or divisions, one covering the band of 540 to 1760 K. C. and the other from 2.3 to 6.5 megacycles.

GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 5K-551-553

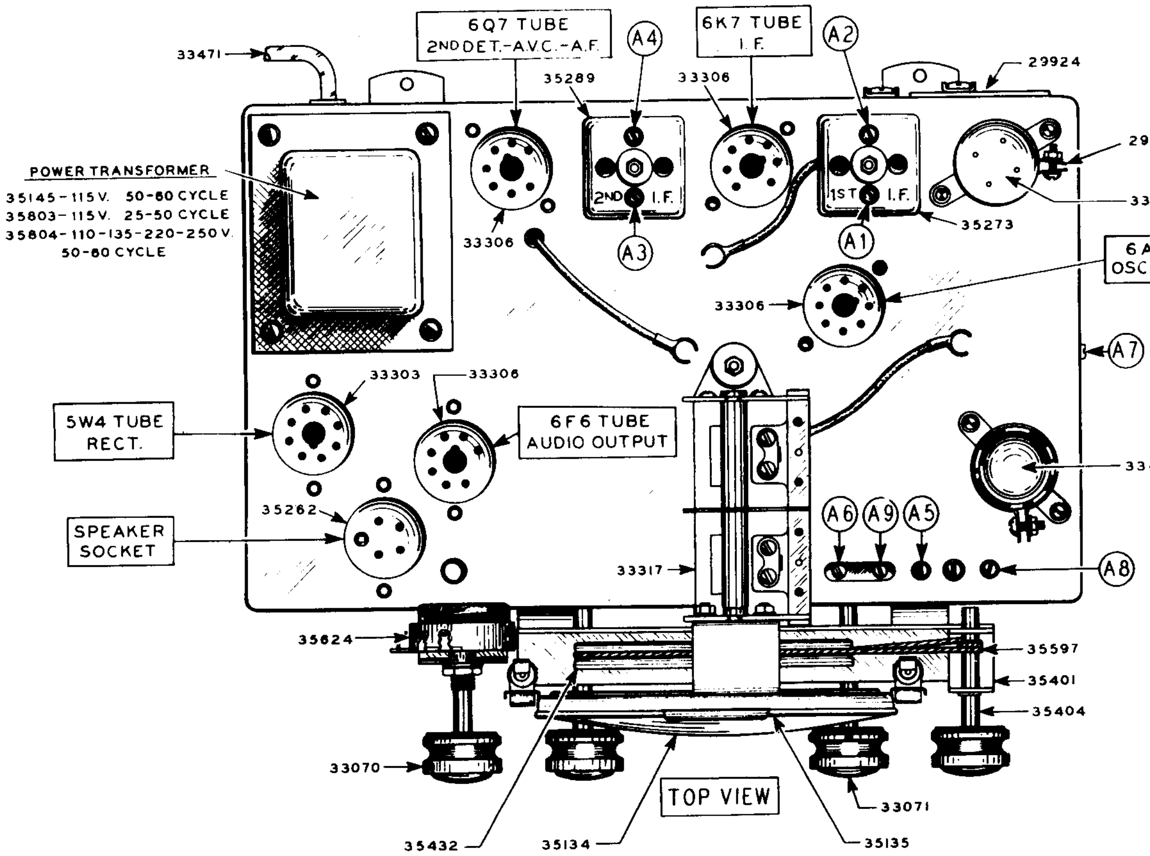


FIG. 1

CIRCUIT ALIGNMENT PROCEDURE

Do not attempt to align the 5K Chassis without the proper equipment. Alignment condensers are shown in the accompanying illustrations and are numbered in order of procedure—I. F. Condensers on top of the I. F. Transformers.

1. EQUIPMENT:

(A) Test Oscillator.
A modulated Oscillator capable of producing signals at the I. F., Broadcast and Short-Wave frequencies is necessary for alignment of the 5K Chassis.

(B) Insulated Screw Driver—(all bakelite or fibre) about 6" long.

(C) Output Meter.
This may be any of the standard Output Meters, but should be sufficiently sensitive to provide a good deflection at low signal strength.

(D) Coupling Means.
Coupling Condensers of 200 mmf. .05 mfd., and a 400 Ohm resistor should be used when coupling oscillator to receiver during alignment as specified in the procedure.

(E) The Receiver should be aligned in a location free from local interference (interference caused by motors—flashers—automobile ignition, etc.) as high frequency disturbances will cause difficulties when the short wave section is being adjusted. (A screen room is to be recommended.)

2. DIAL SETTING:

Turn dial knob until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

3. I. F. ALIGNMENT:

(A) Connect signal lead of test oscillator to grid of 6A8 (1st detector tube) through .05 mfd. condenser. Connect the ground lead to the chassis.

(B) Set dial pointer to 1500 K. C. and range switch on "Broadcast" position.

(C) Place test Oscillator in operation at 465 K. C. Turn receiver volume control to maximum.

(D) Attenuate test Oscillator output to lowest value, consistent with obtaining a readable indication on output meter.

(E) Adjust four I. F. Trimmers, (A1-A2-A3-A4) located on the I. F. Transformers on top of Chassis (Fig. 1) until maximum output is obtained. During alignment maintain as low a value of signal as will allow obtaining of accurate adjustment.

4. 1500 K. C. ALIGNMENT:

(A) Connect signal lead of test Oscillator through 200 mmf. Condenser to Antenna binding post on Chassis.

(B) Connect the test Oscillator ground lead to the ground post of Chassis.

(C) Place test oscillator in operation at 1500 K.C.

(D) Turn dial pointer to 1500 K.C.

(E) Adjust broadcast oscillator trimmer (A5) to maximum output.

(F) Adjust 1st Det. Trimmer (A6) to maximum output.

5. 600 K.C. ALIGNMENT:

(A) Place test oscillator in operation at 600 K.C.

(B) Tune in signal to maximum (this point does not have to be exactly at 600 K.C. dial setting.)

(C) Adjust the 600 K.C. Padding Condenser (A7) in direction of signal increases. At same time rock the tuning condenser back and forth through resonance while adjusting padding condenser until maximum output is obtained.

6. 6.0 M.C. ALIGNMENT

(A) Connect signal lead of test oscillator through 400 Ohm Resistor to Antenna binding post of Chassis.

(B) Connect the ground lead to ground terminal of Chassis.

(C) Set range Switch to "Short Wave" position and turn dial pointer to 6.0 M.C.

(D) Place test Oscillator in operation at 6.0 M.C.

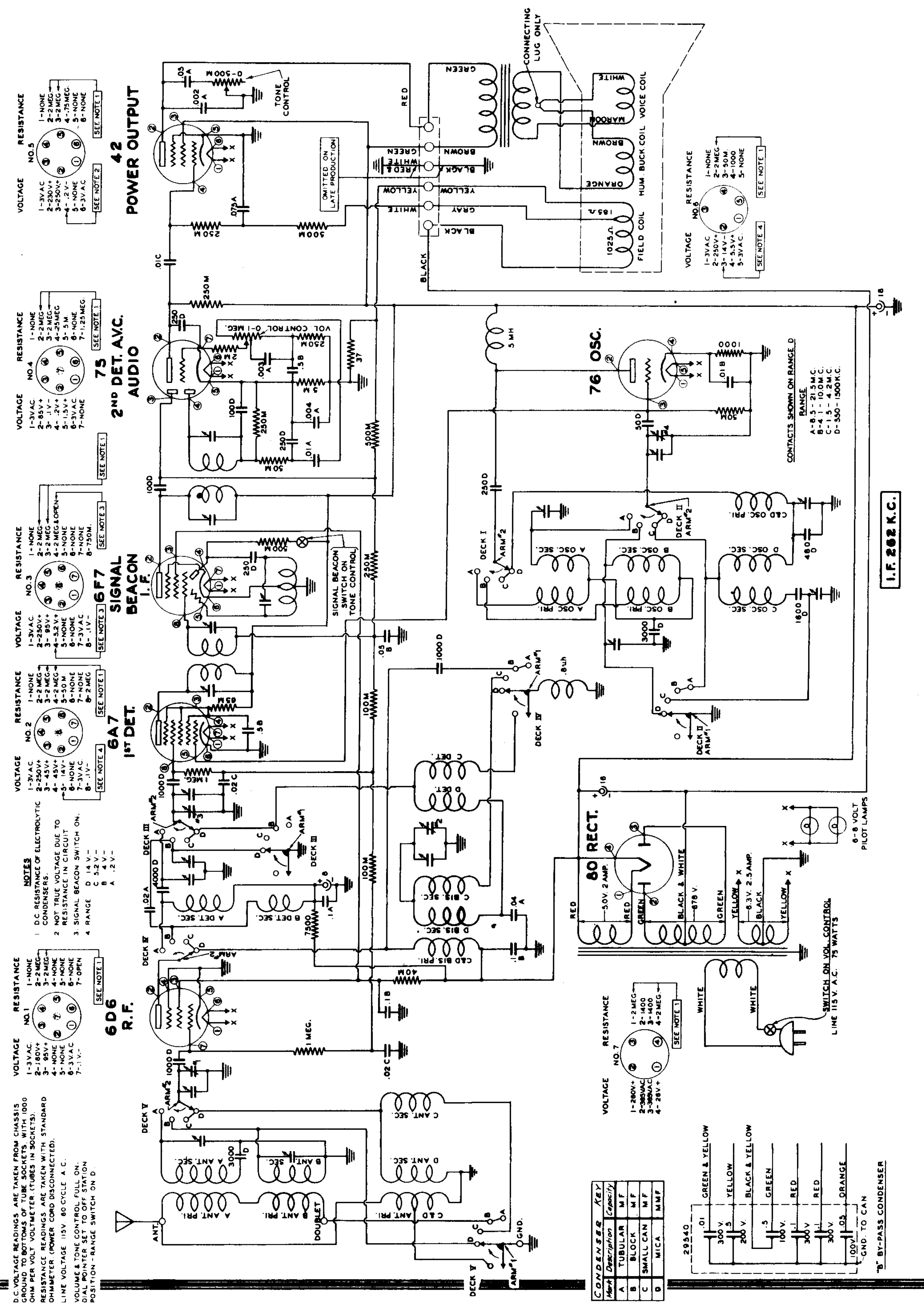
(E) Adjust set oscillator Trimmer (A8) to maximum output.

(F) Adjust Detector Trimmer (A9) to maximum output.

(G) When aligning A8 and A9 rock tuning condenser through resonance to maximum output.

GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 7B-7BX-7BW-7BZ-750-751-752-753



GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 7B-7BX-7BW-7BZ-750-751-752-753

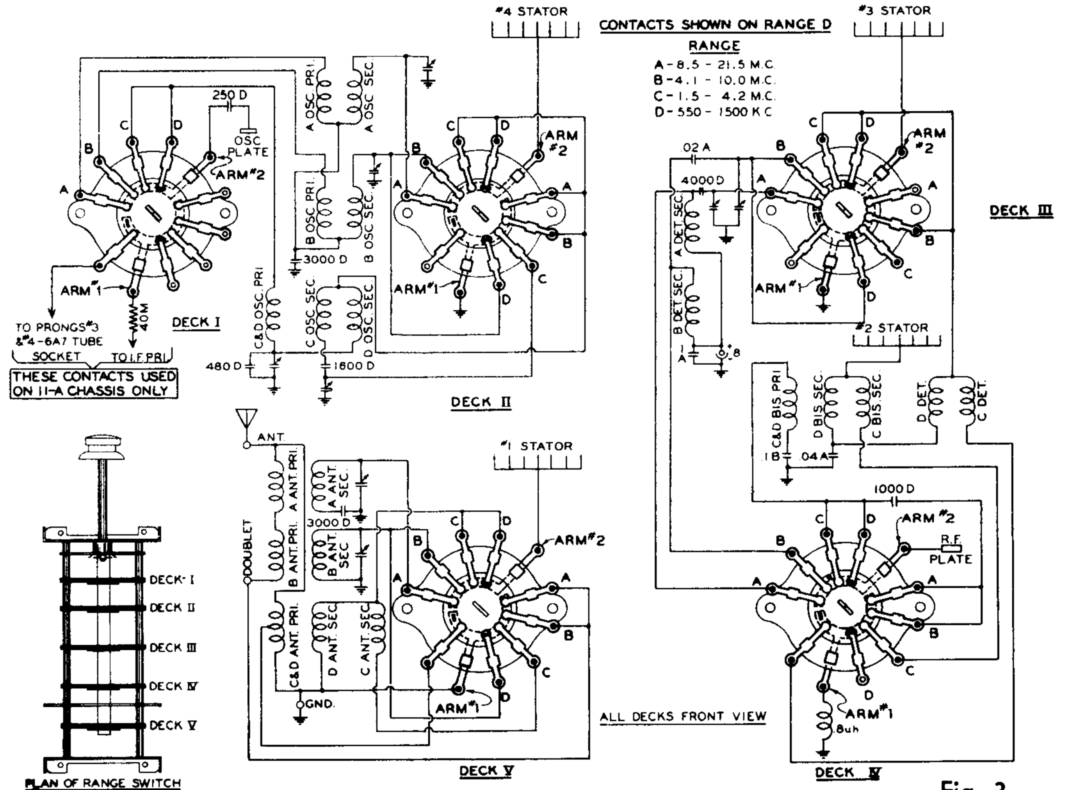
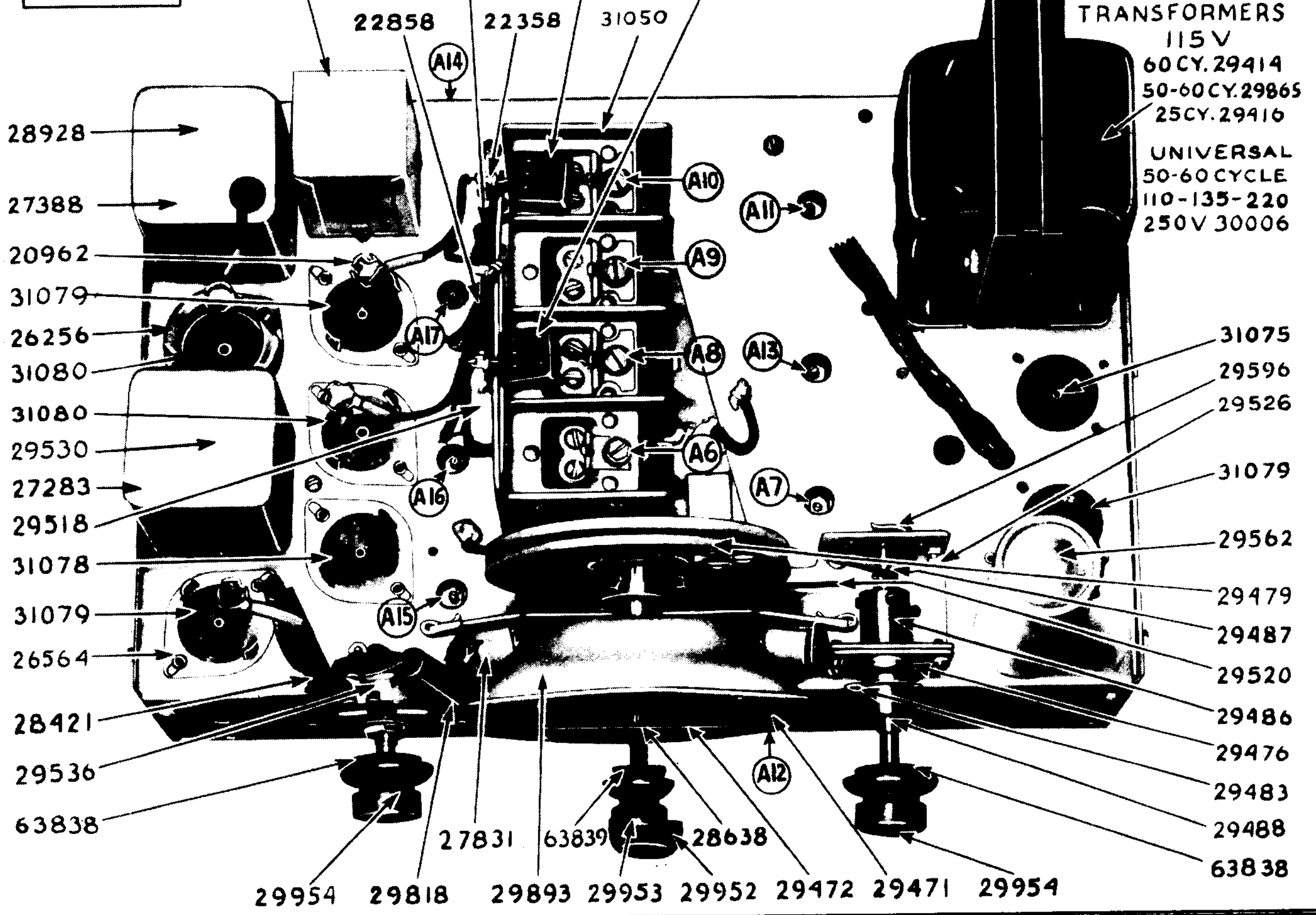


Fig. 3

SCHEMATIC DIAGRAM OF RANGE SWITCH AND COIL ASSEMBLY ON CHASSIS 7-B & 11-A.
GENERAL HOUSEHOLD UTILITIES CO. RADIO SERVICE DEPARTMENT.

FIGURE 4



GENERAL HOUSEHOLD UTILITIES COMPANY
MODELS 7B-7BX-7BW-7BZ-750-751-752-753

FIGURE 5

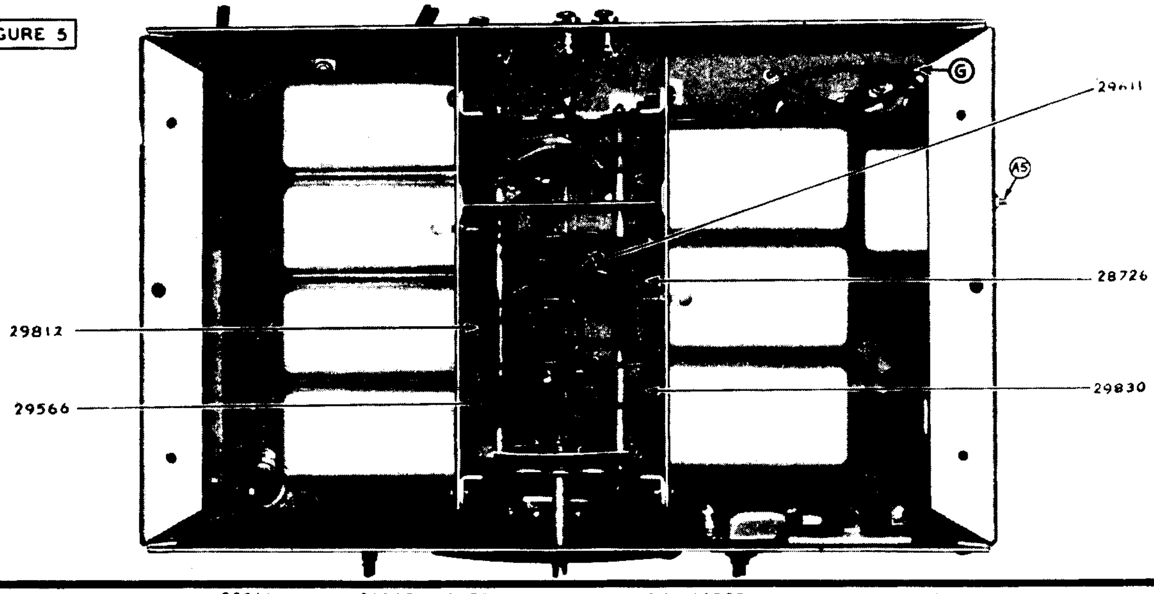


FIGURE 6

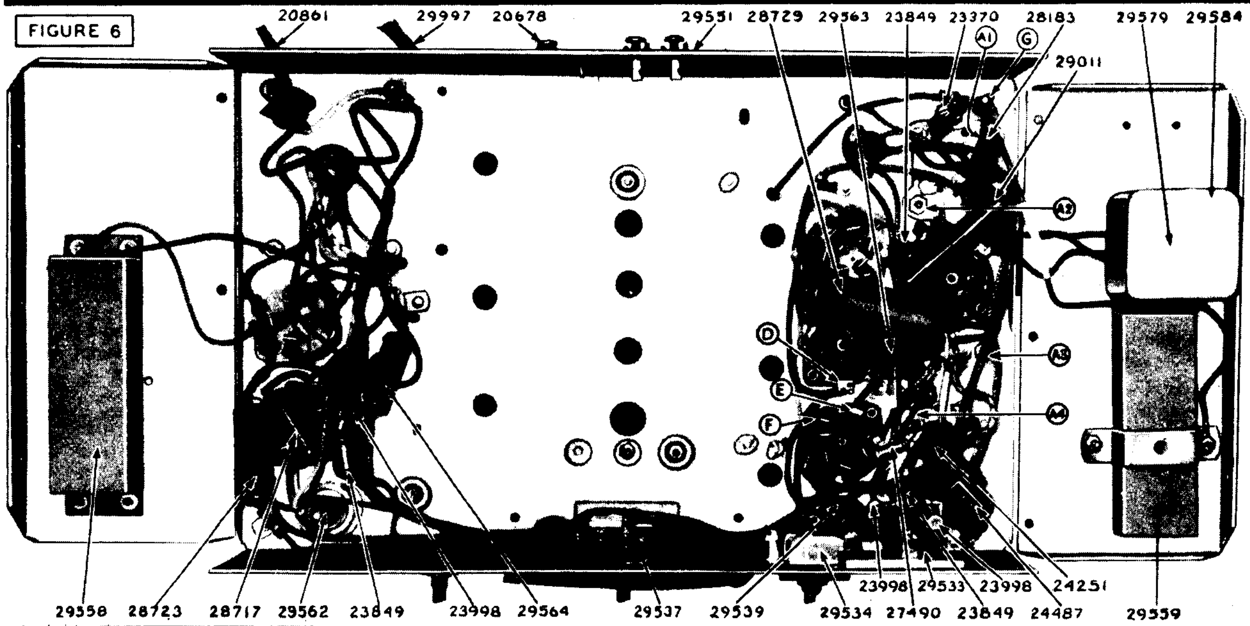
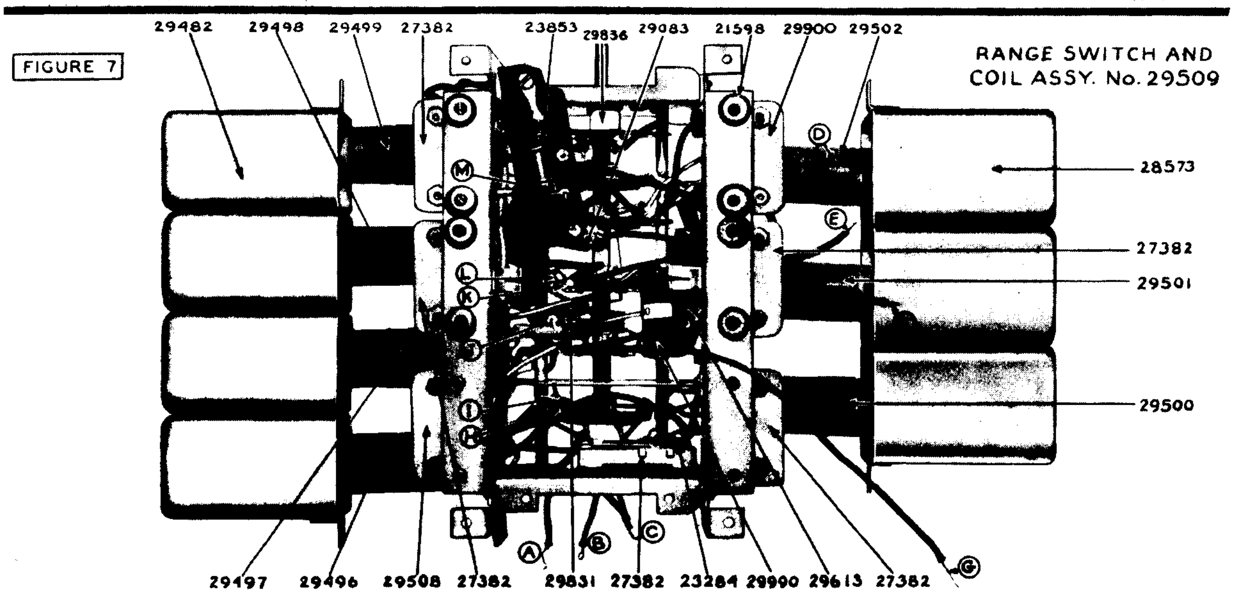


FIGURE 7

RANGE SWITCH AND COIL ASSY. No. 29509



GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 7B-7BX-7BW-7BZ-750-751-752-753

ALIGNMENT PROCEDURE

Do not attempt to align the 7B Chassis without the proper equipment. Alignment condensers are shown in the accompanying illustrations and are numbered in order of procedure.

1. EQUIPMENT.

A—Test Oscillator.

A modulated oscillator capable of producing signals at 262 K.C.—600 K.C.—1400 K.C.—3700 K.C.—10 M.C. and 20 M.C. is necessary for alignment of the 7B chassis.

B—Insulated screw driver—(All bakelite or fibre) about 6" long.

C—Output Meter.

This may be any of the standard output meters on the market but should be sufficiently sensitive to provide a good deflection at low signal strength, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

D—Coupling Means.

Coupling Condensers of 200 mmf., .25 Mfd., and a 400 Ohm resistor should be used when coupling oscillator to receiver during alignment as specified in the following paragraphs.

E—The receiver should be aligned in a location free from local interference (man made static)—as high frequency disturbances will cause difficulties when the short wave section is being adjusted. (A screen room is to be recommended).

2. DIAL SETTING.

Turn dial knob until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

3. I. F. ALIGNMENT.

Connect signal lead of test oscillator to grid of the 6A7—(1st Detector Tube) through .25 Mfd. Condenser. Connect the ground lead to the Chassis.

A—Set Dial pointer to 1400 K.C. and range switch on position D

B—Place test Oscillator in operation at 262 K.C. Turn receiver volume control and tone control to maximum.*

C—Attenuate test oscillator output to lowest valve consistent with obtaining a readable indication on output meter.

D—Adjust four I. F. Trimmers, A1-A2-A3-A4 Fig. 6, located on under side of chassis, until maximum output is obtained. During alignment, maintain as low a value of signal as will allow obtaining of accurate adjustment.

E—Turn the tone control counter clockwise until the Signal Beacon switch snaps on.

F—Adjust Signal Beacon trimmer, A5, Fig. 5, which is located on left hand face of Chassis to zero beat with the 262 K.C. incoming signal.

4. 3700 K.C. ALIGNMENT.

A—Connect signal lead of test oscillator through 200 Mmf condenser to Antenna binding post.

B—Connect the test oscillator ground lead to the ground post of Chassis.

C—Turn range switch to range "C" and set dial pointer to 3700 K.C.

D—Align Set Oscillator or front trimmer A6, Fig. 4, on variable condenser. It may be necessary to approximate adjustment of the other three trimmers on variable condenser to obtain sufficient sensitivity to make 3700 K.C. adjustment.

5. 1400 K.C. ALIGNMENT.

A—Place test oscillator in operation at 1400 K.C.

B—Turn dial pointer to 1400 K.C.

C—Turn Range Switch to range D.

D—Adjust 1400 K.C. padding condenser, A7, Fig. 4, which is the first of three located on top of Chassis on the right hand side as you face it.

E—Adjust 1st Det. Trimmer A8, Fig. 4, which is the second from front on top of variable condenser.

F—Adjust Bi-selector trimmer A9, Fig. 4, which is the third from front on top of variable condenser.

G—Adjust Antenna Trimmer A10, Fig. 4 which is the fourth from the front on top of variable condenser.

6.—600 K.C. ALIGNMENT

A—Place test oscillator in operation at 600 K.C.

B—Tune in signal to maximum (this point does not have to be exactly at 600 K.C. dial setting).

C—Adjust the 600 K.C. Padding Condenser A11, Fig. 4, (which is on top of Chassis on right hand side third from front as you face Chassis), in direction of signal increases. At same time rock the tuning condenser back and forth through resonance while adjusting padding condenser until maximum output is obtained.

7. 10 M.C. ALIGNMENT.

A—Connect signal lead of test oscillator through 400 Ohm resistor to Antenna binding post of Chassis.

B—Connect the ground lead to ground terminal of Chassis.

C—Set Range Switch to Range "B" and turn dial pointer to 10 M.C.

D—Place test oscillator in operation at 10 M. C.

E—Adjust set oscillator trimmer A12, Fig. 4, (located on front face of chassis).

F—Adjust detector trimmer A13, Fig. 4, (located on right hand side on top of Chassis second from front).

G—Adjust antenna trimmer A14, Fig. 4, (located on rear face of Chassis).

8. 20 M.C. ALIGNMENT.

A—Set Range Switch on Range A.

B—Place Test Oscillator in operation at 20 M.C.

C—Turn Dial Pointer to 20 M.C.

D—Adjust Set Oscillator trimmer A15, Fig. 4, (located on top of Chassis on left of gang condenser, first from front).

E—Adjust Detector trimmer A16, Fig. 4, (located second from front on top of Chassis on left hand side).

F—Adjust Antenna trimmer A17, Fig. 4, (located third from front on top of Chassis on left hand side).

SERVICE DATA

The range switch and coil assembly is made up in a unit and may be removed for inspection or repair. (Fig. 7). The removal of this assembly necessitates the unsoldering of 13 wire leads. These leads and the positions to which they are connected are marked on the illustrations with letters. The leads A-B-C on the Coil Assembly (Fig. 7) are attached to the points marked A-B-C on the Chassis Assembly (Fig. 5). The leads marked D-E-F-G on the Coil Assembly (Fig. 7) are attached to the points of corresponding letters on the Chassis Assembly (Fig. 6). Leads H-I-J-K-L-M on Coil Assembly are connected as follows:

Lead "H" connects the ground side of the short wave antenna transformer (Red) to the rotor ground of the variable condenser.

Lead "I" connects Arm 2 of Deck 5 to the No. 1 stator of the variable condenser.

Lead "J" is the shielded lead connecting the bi-selector transformer to the No. 2 stator of the variable condenser.

Lead "K' connects Arm 2 of Deck 3 to the No. 3 stator of the variable condenser.

Lead "L" connects the switch assembly ground to the varible condenser rotor ground.

Lead "M" connects Arm 2 of Deck 2 with No. 4 stator of the variable condenser.
Care should be exercised in making these connections. (A soldering iron with a bent point should be used in this operation).

Continuity and voltage readings should be taken from the underside of the Chassis. The values given on the schematic diagram are average and allow the service man to make a quick check of the chassis constants. The socket layouts given on the schematic diagram show each socket from the underside.

The Range Switch

In servicing the 7-B Receiver, consider the radio frequency end as four different and distinct radios:

One working from 550 to 1500 k.c. (D Range)
One working from 1500 to 4200 k.c. (C Range)
One working from 4100 to 10,000 k.c. (B Range)
One working from 8500 to 21,500 k.c. (A Range)

These four radios are put into operation as desired by means of the Range Switch.

When on position "A" the short wave coils covering the range from 8,500 to 21,500 k.c. are connected into the three tuned circuits of the receiver, one coil as an R.F. Transformer, one as the Detector Coupler, and one as the Oscillator Transformer.

On position "B" the 4100 to 10,000 k.c. coils are put into operation.

On "C" position, the 1500 to 4200 k.c. coils are shunted across the 550 to 1500 k.c. coils in such a manner as to lower the total inductance of the combined coils and reduce the losses caused by open end coils.

On both the "C" and "D" positions, four coil sets are put into the circuit and the receiver operates as a four tuned circuit radio. On all four ranges the receiver works af maximum sensitivity and selectivity. All coils and condensers are of such construction that atmospheric and temperature changes have minimum effect.

Each circuit is completely shielded from each other, and the complete range switch and coil assembly may be removed for inspection or repair.

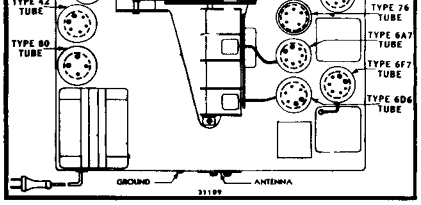


Fig. '

GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 7B-7BX-7BW-7BZ-750-751-752-753

CHASSIS TYPE 7B

Receiver Model	Speaker Model
750	8A4—8C2
751	10A3
752	10A3
753	10A3

Chassis 7B —115 volt 60 cycle
Chassis 7BX—115 volt 25-50 cycle

Power Consumption 75 watts.

Chassis 7BW 115 volt 50-60 cycle
Chassis 7BZ {110—135—220—250 volt {50-60 cycle
Tubes—1-6D6, 1-6A7, 1-6F7, 1-75, 1-42, 1-76, 1-80

The following characteristics apply to the Grunow Radio —Chassis Type 7B:

This model is a 7 tube Super-Heterodyne All Wave (540 to 21,500 KC) Receiver using 1-6D6 tube as an R. F. Amplifier, 1-6A7 tube as a 1st Detector or mixer—being electronicly coupled to a 76 oscillator tube. 1-6F7 tube the pentode section of which is used as an I.F. amplifier with a frequency of 262 K.C. and the Triode section being used as a Signal Beacon or beat oscillator. Plate Voltage of the Signal Beacon being applied by closing the switch on the tone control. A 75 tube (double diode—high mu Triode) is used as a diode detector or signal rectifier, delayed automatic volume control (AVC) and high-gain audio amplifier. The 42 output tube is a power amplifier pentode and is capable of producing large power output with a relatively small input signal. This tube receives its bias through the voltage drop produced in the tapped speaker field. The rectifier tube is an 80, the output of which is well filtered through the choke action of the speaker field and the 16 and 18 mfd. electrolytic condensers.

The broadcast section of the receiver consists of the following 4 tuned circuits: R.F. input, bi-selector, mixer input and oscillator. These circuits are tuned with a 4-gang variable condenser of rugged construction.

The short wave section of the receiver consists of 3 tuned circuits, the bi-selector being cut out to prevent losses when the receiver is working at the higher frequencies.

The Signal Beacon is a beat oscillator using the triode section of the 6F7 tube, and is a feature of the 7B Chassis. When this section of the tube is brought into operation it acts as a local oscillator and beats against the incoming signal. The presence of a station's signal will be indicated by a high pitched "whistle", becoming lower in pitch as a "resonance", or exact tuning, is approached. The Signal Beacon note becomes very low and finally reaches zero; at this point the receiver is said to be tuned to "zero beat", which indicates that it is tuned exactly to the station. The Signal Beacon is also used to receive telegraph or continuous wave signals.

The remainder of the circuit is typical and has been designed along the lines of what is considered the best engineering practice to date. Parts are all oversize and of the finest quality.

PARTS AND PRICE LIST

PART NUMBERS ARE GIVEN ON THE ILLUSTRATION AND THE NUMBERS ARE BROUGHT DOWN IN NUMERICAL ORDER FOR CONVENIENCE.

Part No.	Description	No. used	List Price
20678	Ground Terminal	1	$ .02
20861	Attachment Cord	1	.35
20962	Grid Cap only	4	.02
21598	Rubber Grommet	20	.02
22858	Resistor, 1 Megohm, Carbon, 1/4 watt	3	.20
23284	Bakelite Washer, Trim. Condensers	13	.20
23370	Resistor, 100,000 ohm Carbon, 1/4 watt	3	.20
23849	Resistor, 500,000 ohm Carbon, 1/4 watt	3	.20
23853	Resistor, 50,000 ohm Carbon, 1/4 watt	2	.20
23998	Resistor, 250,000 ohm Carbon, 1/4 watt	4	.20
24251	Condenser, 100 Mmf. Mica	1	.15
24487	Condenser, 250 Mmf. Mica	2	.20
26256	Tube Shield Base, Tubular Type	5	.05
26564	Tube Shield Base, Goat Type	4	.05
26898	Tube Shield (Goat)—76	1	.05
27033	Insulated Terminal, Double	1	.05
27283	2nd I. F. Transformer Shield	1	.35
27382	Trimmer Condenser Assembly	5	.35
27388	1st I. F. Transformer Shield	1	.30
27455	Tube Shield (Tubular)—76	1	.15
27490	Resistor, 1,000 ohm Carbon	1	.20
27801	Rubber Grommet	3	.05
27802	Cup Washer	6	.02
27831	Pilot Lamp Socket, Insulated	2	.15
28045	Pilot Lamp, 6-8 Volt	2	.15
28183	Resistor, 7500 ohm Carbon, 1 watt	1	.20
28421	Resistor, 2000 ohm Carbon, 1/4 watt	1	.20
28573	Short Wave Coil Shield	1	.75
28638	Dial Pointer Screw	1	.02
28717	Condenser, .002 Mfd., 700 Volt, Tubular	1	.25
28723	Condenser, .05 Mfd. 400 Volt Tubular	1	.25
28726	Condenser, .1 Mfd., 400 Volt, Tubular	1	.25
28928	1st I. F. Transformer (includes 27388)	1	2.90
29011	Resistor, 40,000 ohm Carbon, 1 watt	1	.20
29074	Condenser, 250-100 Mmf. Mica	1	.30
29083	Condenser, 50 Mmf. Mica	1	.20
29087	Tube Shield (Goat) 6A7, 6F7, 75	3	.10
29414	Power Transformer, 115 Volt, 60 cycles only	1	6.00
29537	Tone Control, 0-500,000 Ohm	1	$ 1.15
29539	Oscillator Plate Choke	1	.60
29540	Bypass Condenser Block	1	2.50
29551	Antenna and Doublet Binding Post Assembly	1	.10
29552	Escutcheon Window	1	.15
29553	Window Retaining Ring	1	.10
29554	Escutcheon	1	.60
29558	Condenser, 16 Mfd., 450 Volt Dry Electrolytic	1	1.90
29559	See 31052		
29562	Condenser, 18 Mfd., 300 Volt Wet Electrolytic	1	1.25
29563	Resistor, 65,000 ohm Carbon, 1/2 watt	1	.20
29564	Condenser, .075 Mfd., 100 V Tubular	1	.30
29566	Condenser, 1600 Mmf. Mica	2	.30
29575	Tube Shield (Goat)	1	.10
29579	Signal Beacon Assembly	1	2.25
29580	Signal Beacon Trimmer Condenser	1	.75
29582	Signal Beacon Coil Assembly	1	1.25
29584	Signal Beacon Shield	1	.30
29596	Drive Leaf Spring	2	.05
29611	Coupling Inductance Coil	1	.25
29612	Escutcheon Retaining Spring	1	.20
29613	Condenser, 4,000 Mmf. Mica	1	.50
29616	Insulated Terminal—Single	1	.10
29617	Insulated Terminal—Double	1	.15
29812	Condenser, .04 Mfd., 500 V Tubular	1	.30
29813	Condenser, .004 Mfd., 700 V Tubular	1	.25
29818	Condenser, .003 Mfd., 700 V Tubular	1	.25
29830	Condenser, 3,000 Mmf., Mica	2	.40
29831	Condenser, 1,000 Mmf. Mica	3	.30
29832	Tube Shield Body	4	.15
29836	—Trimmer Condenser Assembly	1	.25
29850	Drive Drum Assembly	1	1.10
29865	Power Transformer, 115 Volt, 50-60 cycles only	1	7.00

Part No.	Description	No. used	List Price
29416	Power Transformer, 115 Volt, 25 to 50 cycles only	1	$ 7.25
29453	Condensers .01 Mfd., 400 V Tubular	1	.25
29471	Dial Chart for General Instrument Condenser only—see 30033	1	.50
29472	Dial Pointer	1	.05
29476	Ball Race	1	.10
29482	Broadcast Coil Shield Assembly	1	.80
29483	Drive Shaft Stop Spring	1	.05
29485	Drive Shaft Thrust Spring	1	.05
29486	Drive Sleeve	1	.50
29487	Drive Shaft—inner	1	.50
29488	Drive Shaft—outer	1	.75
29496	Antenna Transformer, Broadcast	1	1.75
29497	Bi-Selector Transformer, Broadcast	1	1.50
29498	1st Detector Transformer, Broadcast	1	1.25
29499	Oscillator Transformer, Broadcast	1	1.50
29500	Antenna Transformer, Short Wave (Red)	1	1.75
29501	1st Detector Transformer, Short Wave (Black)	1	1.25
29502	Oscillator Transformer, Short Wave (Green)	1	1.50
29508	Trimmer Condenser Assembly — includes 29989	1	.75
29509	Range Switch and Coil Assembly	1	26.50
29515	Resistor Panel Assembly — includes 29518	1	1.25
29518	Condenser, .02-.02 Mfd. (small can)	1	.75
29520	Drive Cable with Eyelets	1	.10
29521	Ball Bearing, 3/16"	1	.01
29522	Ball Bearing, 11/32"	4	.02
29523	Condenser Mounting Bearing	1	.10
29524	Cable Tension Spring	1	.10
29526	Condenser Mounting Bracket Ass'bly	1	.60
29530	2nd I. F. Transformer Assembly	1	3.10
29533	Resistor, 5000-37 Ohm, Candohm	1	.40
29534	Condenser, .01 Mfd. (small can)	1	.60
29536	Volume Control, 0-1 Megohm	1	1.30
29893	Reflector Assembly	1	$ .50
29900	Trimmer Condenser Assembly	1	.50
29948	Insulated Terminal—Single	2	.10
29949	Insulated Terminal—Double	1	.10
29952	Knob—Range Switch	1	.30
29953	Knob—Tone Control	1	.20
29954	Knob—Selector or Volume Control	2	.20
29957	Decalcomania, "A, B, C, D"	1	.10
29989	Condenser, 480 Mmf. Mica	1	.30
29990	Condenser, .02 Mfd. 400 V Tubular	1	.20
29997	Speaker Cable	1	.95
30006	Power Transformer, 110-135-220-250 Volt, 50-60 cycles	1	7.50
30030	Rubber Chassis Washer, Upper (Black)	3	.05
30031	Rubber Chassis Washer, Upper (Red)	1	.05
30032	Rubber Chassis Washer, Lower	4	.02
30033	Dial Chart, for Reliance Condenser only	1	.50
30034	Tuning Condenser, 4 Gang, Reliance	1	7.50
31050	Tuning Condenser, 4 Gang, General Instrument	1	7.50
31052	Condenser, 8 Mfd., 350 Volt Dry Electrolytic	1	1.25
31075	Tube Socket—4 Prong	1	.10
31078	Tube Socket—5 Prong	1	.10
31079	Tube Socket—6 Prong	3	.15
31080	Tube Socket—7 Prong	2	.15
31215	Tube Shield Cap	4	.10
62578	Chassis Mounting Screw	4	.02
62582	Chassis Shipping Screw	2	.02
63001	Drive Drum Set Screw	2	.02
63011	Drive Sleeve Set Screw	2	.01
63838	Felt Knob Washer, 15/16" Dia.	2	.01
63839	Felt Knob Washer, 3/4" Dia.	2	.01
63863	Chassis Mounting Steel Washer	4	.01

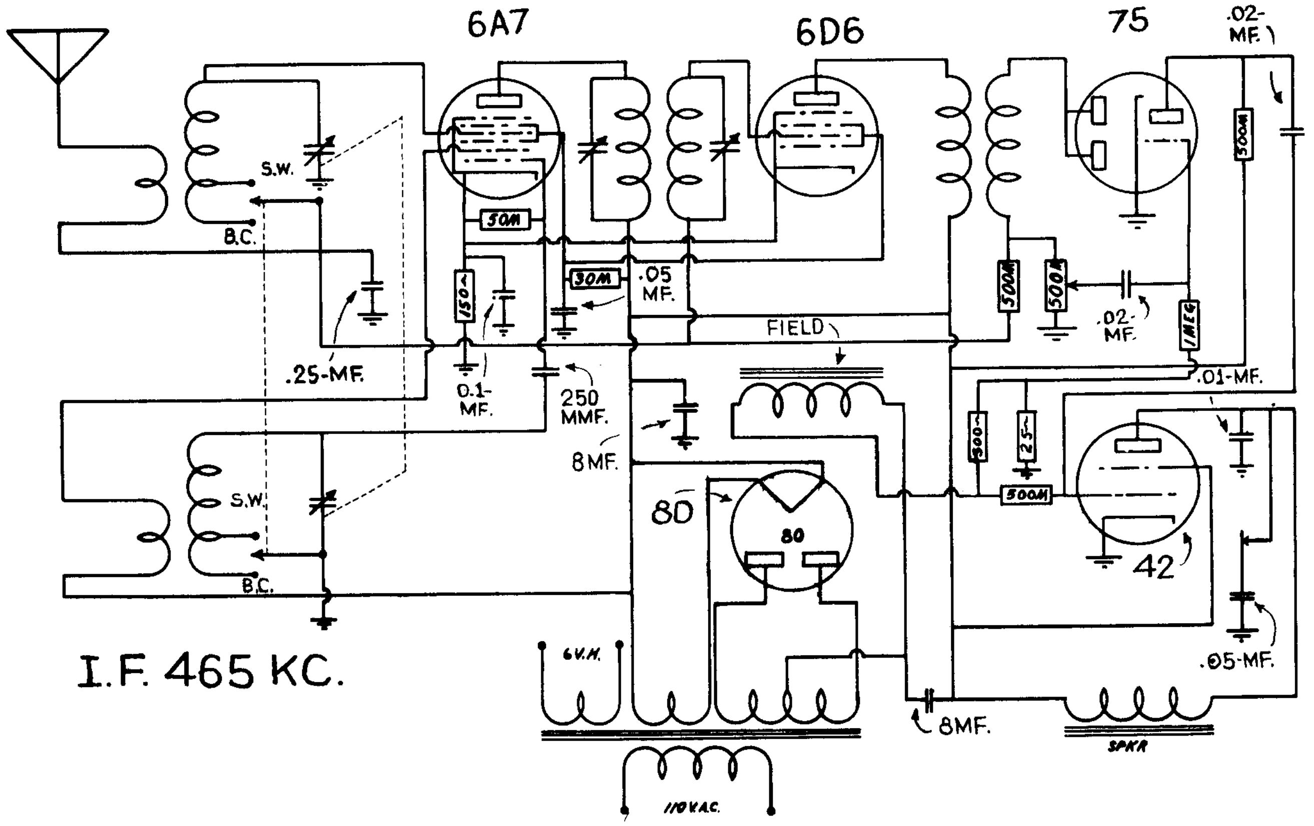
SPEAKER PARTS

Part No.	Description	List Price
	TYPE 10A3—USED ON MODEL No. 751-752-753	
20010	Speaker Pot & Pole Piece Assembly	$ 1.15
20041	Speaker Pot Clamp	.10
20045	Terminal Strip Cover	.15
20047	Terminal Strip	.10
27240	Cone Gasket	.10
27591	Output Transformer	1.75
28755	Cone & Voice Assembly	3.30
29964	Field Coil Assembly	3.30
29678	Speaker Complete	11.50
	TYPE 8A4—USED ON MODEL No. 750	
20003	Speaker pot & pole piece assembly	.80
20040	Speaker Pot Clamp	.10
20045	Terminal Strip Cover	.15
20047	Terminal Strip	.10
29242	Field Coil Assembly	2.20

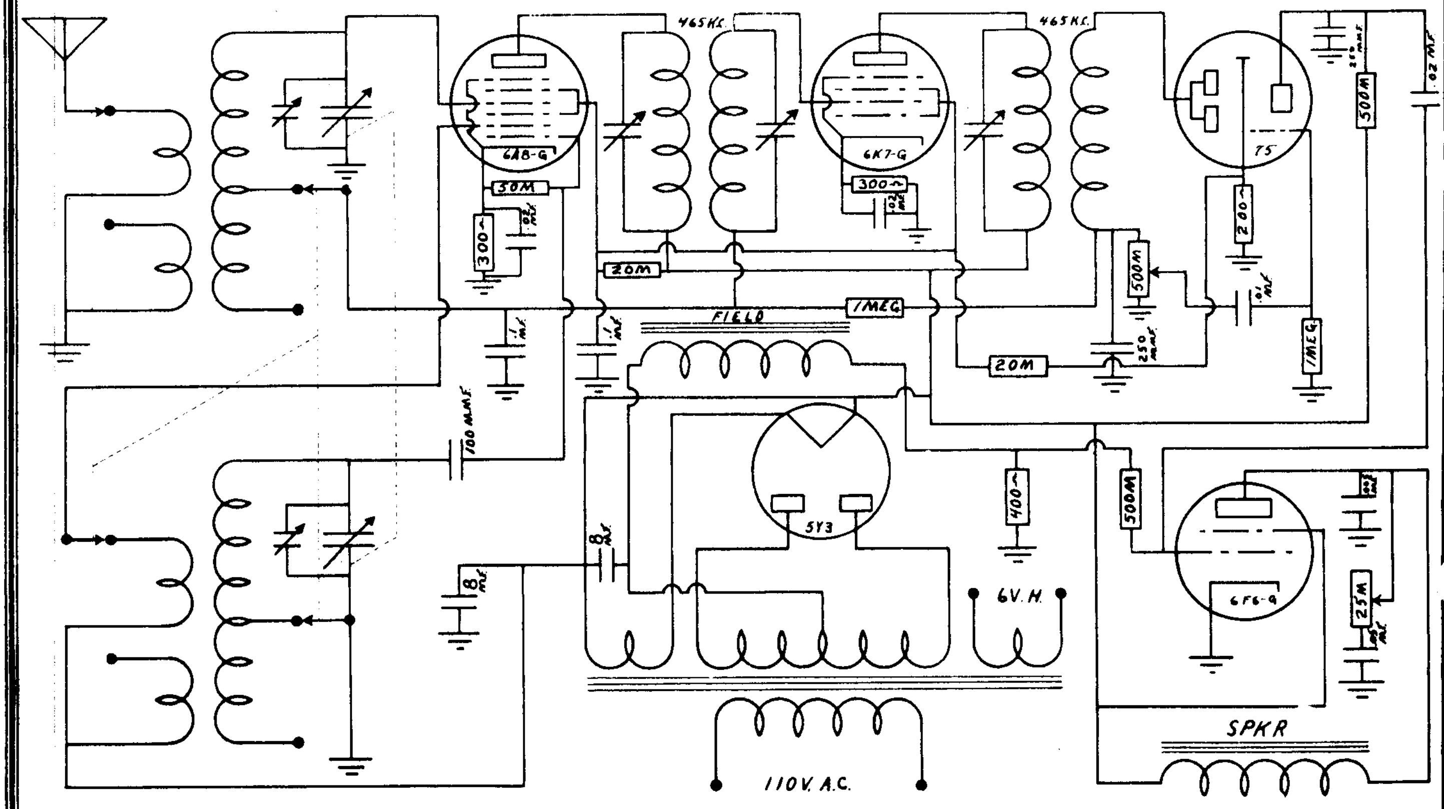
Part No.	Description	List Price
29673	Speaker Complete	10.00
29705	Cone Mounting Gasket	$ .10
29732	Output Transformer	1.75
30058	Spider Clamp Ring	.25
31309	Cone & Voice Coil Assembly	3.10
	TYPE 8C2—USED ON MODEL No. 750	
20040	Speaker Pot Clamp	.10
20045	Terminal Strip Cover	.15
20047	Terminal Strip	.10
29677	Speaker Complete	10.00
29697	Speaker Field Coil Assembly	2.50
29699	Speaker Pot & Pole Piece	1.20
29705	Cone Mounting Gasket	.10
29732	Output Transformer	1.75
30058	Spider Clamp Ring	.25
31309	—Cone & Voice Assembly	3.10

HERBERT H. HORN RADIO MFG. CO.

MODEL 51

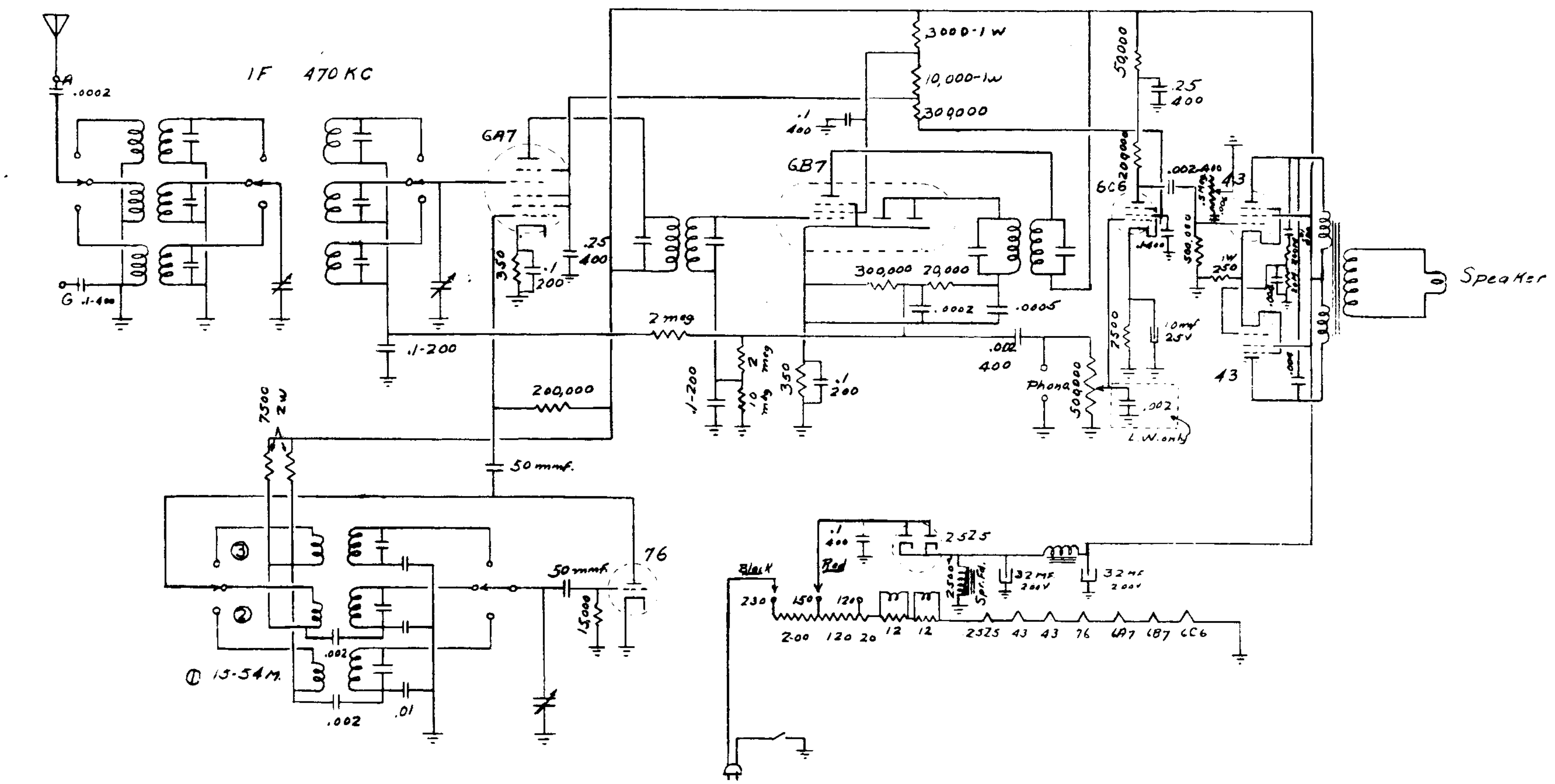


MODEL 52



I. C. A. EXPORT CORP.

MODELS 62SW & 63AW



Range	Series Pad	Parallel Pad
1) 15-54 M	.01	30 MMF
2) 45-140	.001	Omitted on Long Wave Rec.
3) 190-560	500 MMF	30 MMF
800-2000	140 MMF	70 MMF On Long Wave Receiver Only

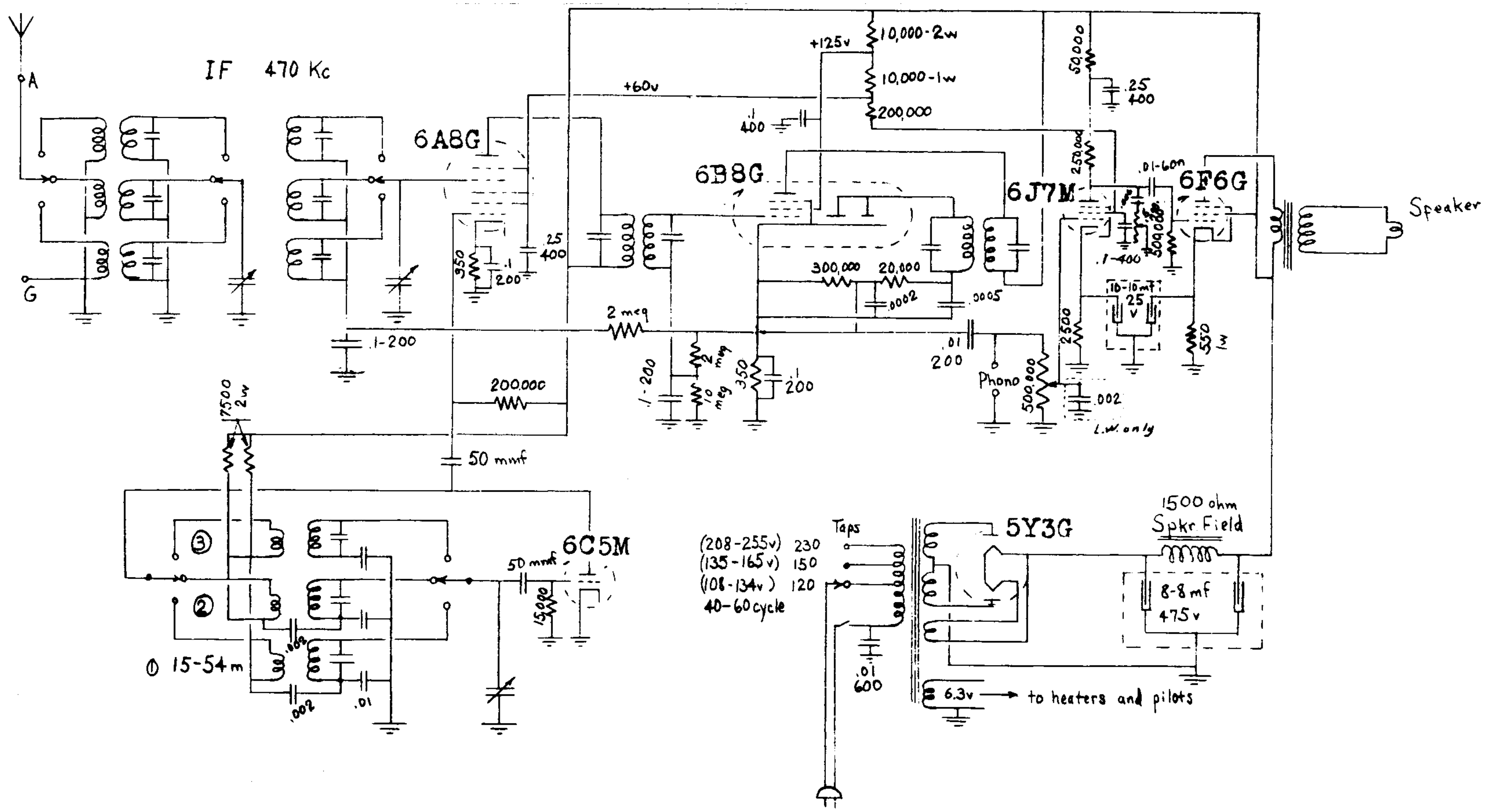
Line Voltage	Top Line Lead (Black) on	Rectifier (Red) Lead
108-134	120	120
135-165	150	150
208-255	230	150

RANGES

Model 62SW - 2 Band - 15- 570 M.
Model 63AW - 3 Band - 15-2000 M.

I. C. A. EXPORT CORP.

MODELS 66SW & 67AW



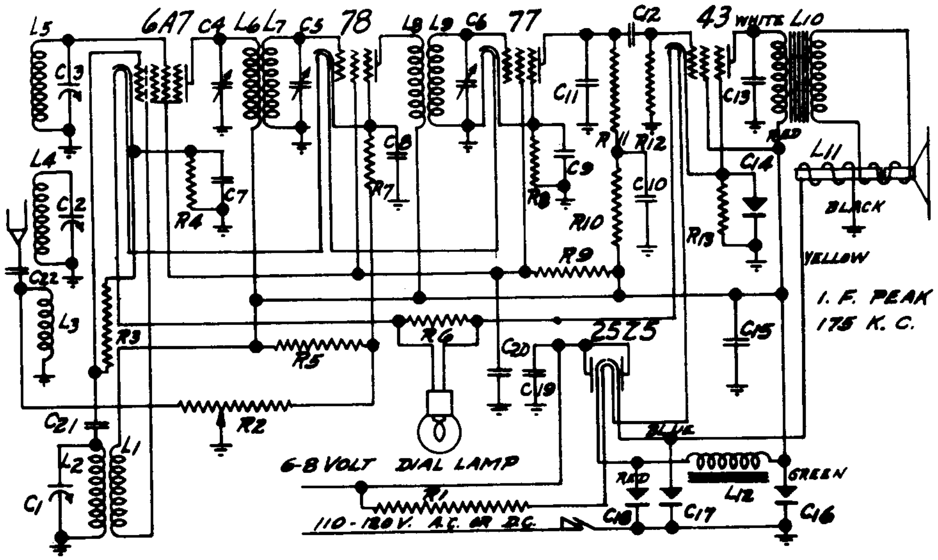
Range	Series Pad	Parallel Pad
15-54 M.	.01	30 MMF
45-140	.001	Omitted on Long Wave Receivers
190-560	500 MMF	30 MMF
800-2000	140 MMF	70 MMF - On Long Wave Receivers Only

RANGES

Model 66SW - 2 Band - 15- 570 M.
Model 67AW - 3 Band - 15-2000 M.

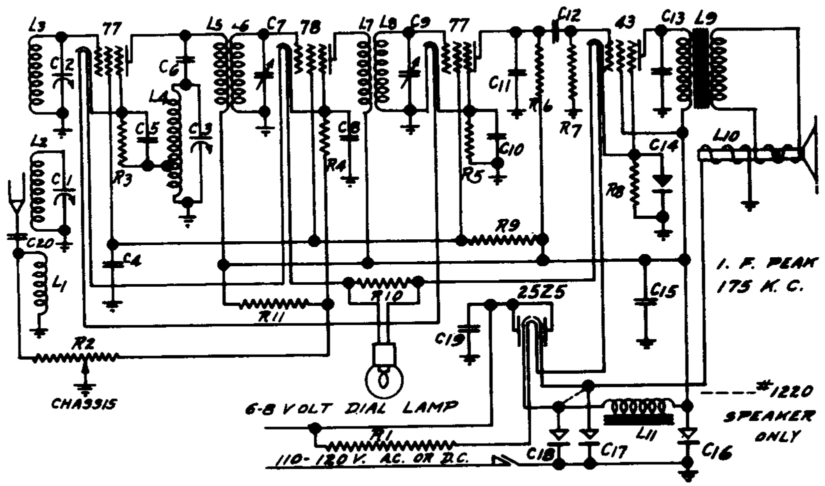
LAFAYETTE RADIO MFG. CO.

MODEL A-77



CODE	PART NO.	RESISTORS
R1	20-1125	130 Ohm Resistor in Power Cord
R2	19-1296	10,000 Ohm Volume Control & Switch
R3	53-898	50,000 Ohm Resistor Oscillator Grid
R4	53-1062	250 Ohm Resistor 6A7 Cathode
R5	53-922	75,000 Ohm Resistor I.F.Cathode Feed
R6	53-1308	20 Ohm Resistor Pilot Light Shunt
R7	53-1063	500 Ohm Resistor I.F.Cathode
R8	53-941	20,000 Ohm Resistor Second Detector Cathode
R9	53-921	40,000 Ohm Resistor Screen Feed
R10	53-923	100,000 Ohm 77 Plate Hum Resistor
R11	53-924	250,000 Ohm Resistor 77 Plate
R12	53-925	500,000 Ohm Resistor Output Grid
R13	53-1063	500 Ohm Resistor Output Cathode
		CONDENSERS
C1	77-833	336 MMFD. Oscillator Section of 3 Gang
C2	77-833	371 MMFD. Preselector Section of 3 Gang
C3	77-833	371 MMFD. Preselector Section of 3 Gang
C4	78-2008	First I.F. Primary Trimmer
C5	78-2007	First I.F. Secondary Trimmer
C6	78-788	Second I.F. Trimmer
C7	75-272A	.1 Mfd. 200 Volt 6A7 Cathode By-Pass
C8	75-272A	.1 Mfd. 200 Volt 78 Cathode By-Pass
C9	75-267A	5. Mfd. 200 Volt 77 Cathode By-Pass
C10	75-272A	.1 Mfd. 200 Volt 77 Plate Hum Filter
C11	76-265	.001 Mfd. Mica 77 Plate By-Pass
C12	75-269A	.01 Mfd. 400 Volt Audio Feed Condenser
C13	75-343A	.004 Mfd. Paper Output Plate By-Pass
C14	18-928	25 Mfd. 25 Volt Output Cathode
C15	75-267A	.5 Mfd. 200 Volt B Supply By-Pass
C16	18-1085	4 Mfd. 150 Volt Dry Electrolytic Condenser
C17	18-1085	4 Mfd. 150 Volt Dry Electrolytic Condenser
C18	18-1085	10 Mfd. 150 Volt Dry Electrolytic Condenser
C19	75-272A	.1 Mfd. 200 Volt 110 Volt Line By-Pass
C20	75-272A	.1 Mfd. 200 Volt Screen By-Pass
C21	76-264	.00005 Mfd. Mica Oscillator Grid Condenser
C22	76-265	.001 Mfd. Mica Antenna Series Condenser
		INDUCTANCES
L1	17-2021	Oscillator Coil Primary
L2	17-2021	Oscillator Coil Secondary
L3	17-2019	Preselector Coil Primary
L4	17-2019	Preselector Coil First Secondary
L5	17-2019	Preselector Coil Second Secondary
L6	17-2024	First I.F. Transformer Primary
L7	17-2024	First I.F. Transformer Secondary
L8	17-2023	Second I.F. Transformer Primary
L9	17-2023	Second I.F. Transformer Secondary
L10	64-1260	Output Transformer For #43 Tube
L11	64-1260	3000 Ohm Speaker Field
L12	14-940	20 Henry Choke

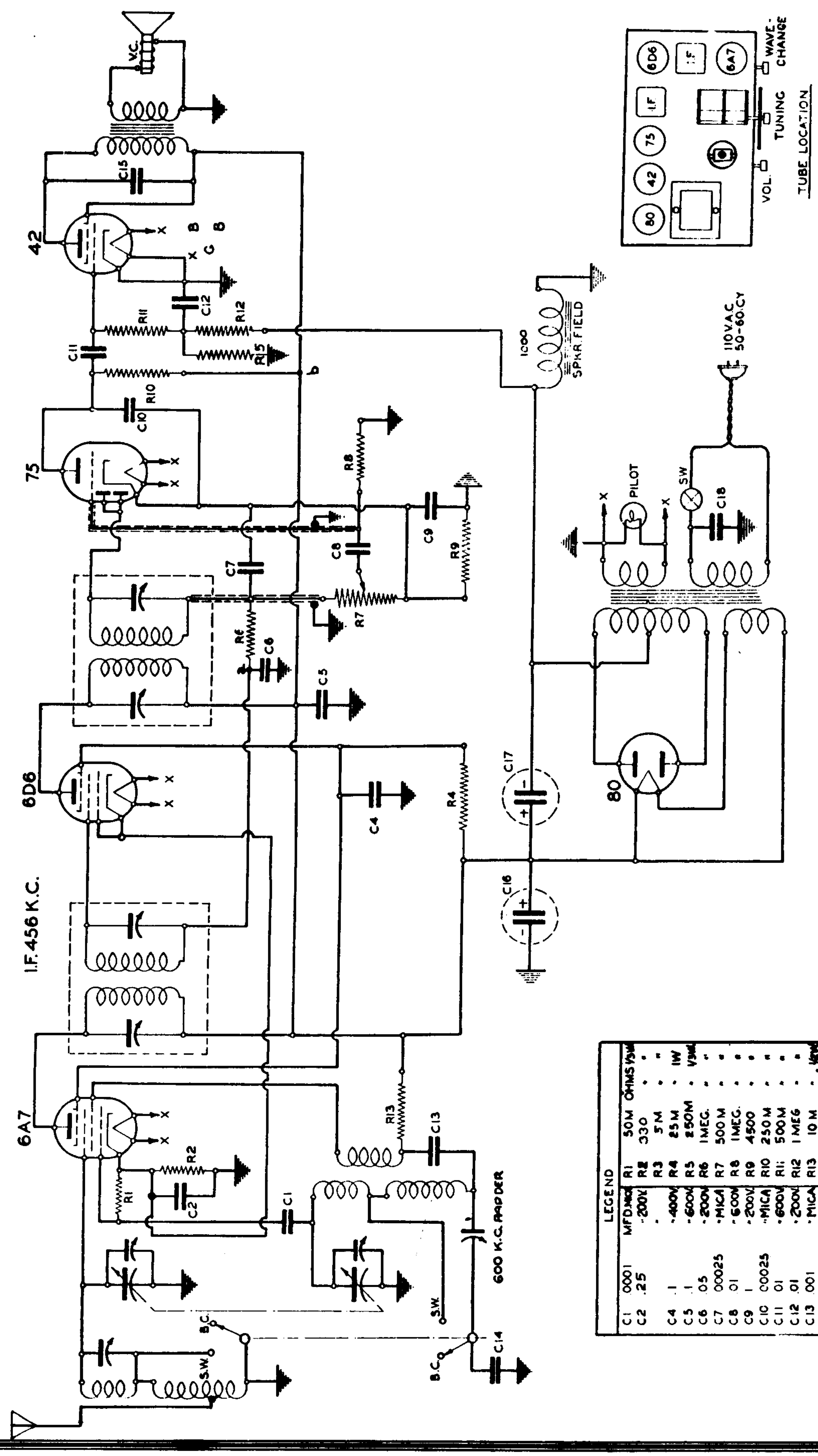
MODEL A-15



CODE	PART NO.	RESISTORS
R1	1125	130 Ohm Resistor in Power Cord
R2	1296	10,000 Ohm Volume Control & Switch
R3	919	5,000 Ohm Resistor First Detector & Osc. Cathode
R4	1063	500 Ohm Resistor I.F. Cathode
R5	941	20,000 Ohm Resistor Second Detector Cathode
R6	924	250,000 Ohm Resistor Second Detector Plate
R7	925	500,000 Ohm Resistor Output Grid Bias
R8	1063	500 Ohm Resistor Output Cathode
R9	921	40,000 Ohm Resistor Screen Feed
R10	308	20 Ohm Resistor Pilot light shunt
R11	922	75,000 Ohm Resistor I.F. Cathode Feed
		CONDENSERS
C1	833	371 MMFD. Preselector Section of 3 Gang Condenser
C2	833	371 MMFD. Preselector Section of 3 Gang Condenser
C3	833	336 MMFD. Oscillator Section of 3 Gang Condenser
C4	272A	.1 Mfd. 200 Volt Screen By-Pass Condenser
C5	265	.001 Mfd. Mica First Detector & Oscillator Cathode
C6	264	.00005 Mfd. Mica Oscillator Coupling Condenser
C7	938	75-150 MMFD. First I.F. Trimmer Condenser
C8	272A	.1 Mfd. 200 Volt I.F. Cathode By-Pass Condenser
C9	849	75-150 MMFD. Second I.F. Trimmer Condenser
C10	183A	.2 Mfd. 200 Volt Second Detector Cathode By-Pass Condenser
C11	265	.001 Mfd. Mica Second Detector Plate Filter Condenser
C12	269A	.01 Mfd. 400 Volt Audio Feed Condenser
C13	662	.002 Mfd. Mica Output Plate Filter Condenser
C14	928	25 Mfd. 25 Volt C Bias By-Pass Condenser
C15	267-A	.5 Mfd. 200 Volt B Supply By-Pass Condenser
C16	1085	4 Mfd. 150 Volt Dry Electrolytic Condenser
C17	1085	4 Mfd. 150 Volt Dry Electrolytic Condenser
C18	1085	11 Mfd. 150 Volt Dry Electrolytic Condenser
C19	272A	.1 Mfd. 200 Volt Line By-Pass Condenser
C20	265	.001 Mfd. Antenna Series Condenser
		INDUCTANCES
L1	844	Preselector Primary 178 turns #36 S.S.E.
L2	844	Preselector First Secondary 133 turns #36 S.S.E.
L3	844	Preselector Second Secondary 128 turns #36 S.S.E.
L4	935	Oscillator Coil 98 turns #36 S.S.E. tapped at 15 T.
L5	935	First I.F. Primary 650 turns #36 S.S.E.
L6	935	First I.F. Secondary 650 turns #36 S.S.E.
L7	1172	Second I.F. Primary 650 turns #38 S.S.E.
L8	1172	Second I.F. Secondary 650 turns #38 S.S.E.
L9	917	Single #43 Output Transformer
L10	917	3000 Ohm speaker Field
L11	940	20 Henry Choke

LAFAYETTE RADIO MFG. CO.

MODEL D-13



LEGEND

C1	.0001	MFD. MICA	R1	50M	OHMS	1/2W
C2	.25	" 200V	R2	330	"	"
		"	R3	5M	"	"
C4	.1	" 400V	R4	25M	"	1W
C5	.1	" 600V	R5	250M	"	1/2W
C6	.05	" 200V	R6	1MEG.	"	"
C7	.00025	" MICA	R7	500M	"	"
C8	.01	" 600V	R8	1MEG.	"	"
C9	.1	" 200V	R9	4500	"	"
C10	.00025	" MICA	R10	250M	"	"
C11	.01	" 600V	R11	500M	"	"
C12	.01	" 200V	R12	1MEG	"	"
C13	.001	" MICA	R13	10M	"	1/2W
C14	.002	" MICA				
C15	.004	" 600V				
C16	8	" 450V				
C17	8	" 450V				
C18	.1	" 400V				

I.F. 456 K.C.

LAFAYETTE RADIO MFG. CO.

MODEL D-13

SERVICE INSTRUCTIONS

In case of faulty operation of the receiver, first make sure that the antenna and ground are in good condition and properly attached to the receiver. Then determine if any of the tubes are faulty. In case of trouble within the receiver itself, the circuit diagram shown on the opposite page will be useful to the service man in locating and correcting the trouble.

I. F. Alignment:

Connect a test oscillator or signal generator through a .1 mfd. condenser to the grid of the 6A7 tube and set the oscillator to 456 KC. Use an output meter connected to the speaker if possible, to obtain the most accurate adjustments. Peak each I.F. stage to maximum response, reducing the output of the oscillator as far as possible for final adjustments.

R. F. Alignment:

With the test oscillator set to 1720 KC and connected to the antenna wire of the receiver through a .00025 mfd condenser, switch the receiver to the broadcast band and set the pointer at the end of travel on the right (at the 1700 KC end). Adjust the rear trimmer on the top of the variable condenser, for maximum gain. Then set the test oscillator at 1400 KC and tune in this signal on the receiver as though tuning a station. If an adjustment at this point is necessary on your set, you will have a trimmer condenser to adjust on top of the variable condenser at the front; this is adjusted for maximum gain.

Now adjust the test oscillator to 600 KC and tune in this signal. Adjust the padder condenser (which is adjusted through the right hand end of the chassis) in the following manner: turn the dial slowly and repeatedly back and forth across the signal while adjusting the padder. Adjust for maximum gain.

Now switch the receiver to short wave. With the test oscillator set at 6 megacycles, tune in this signal on the receiver. Then adjust the short wave trimmer (which is located on top of the coil above the chassis) for maximum gain.

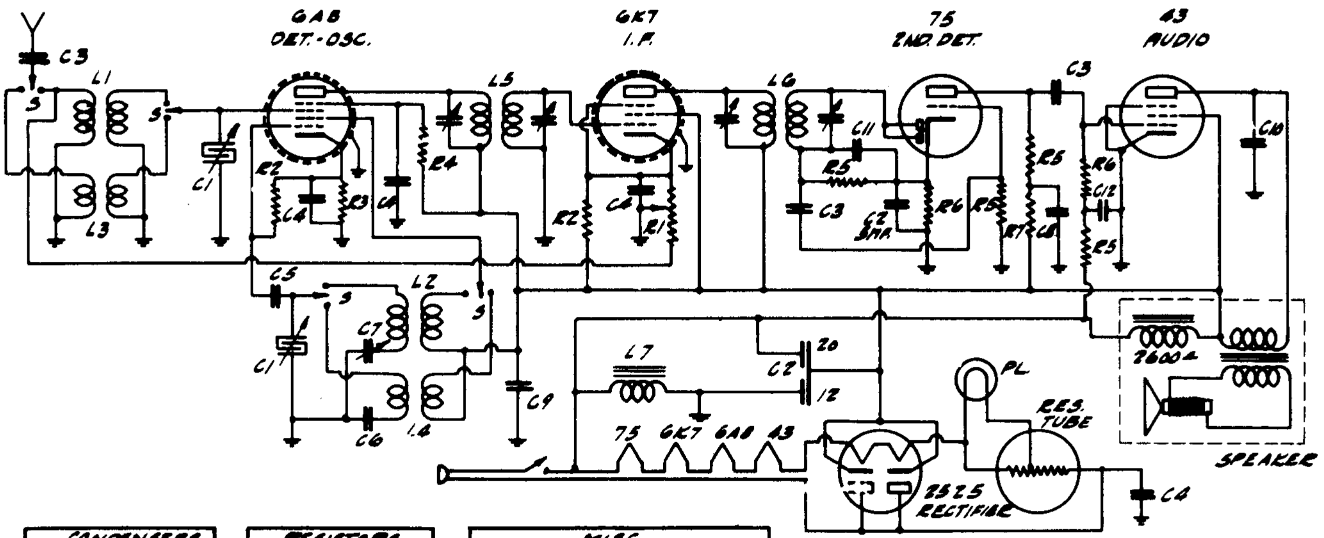
The frequency range covered by this receiver is as follows: Broadcast band 540 KC to 1700 KC. Short-wave band 2.1 megacycles to 6.4 megacycles. These ranges are selected by turning the range switch knob. Turning this knob to the left switches to the broadcast band; to the right switches to the short wave band.

1924	2 gang condenser	$1.72
8036	Power Transformer	2.20
2443	Volume Control	.75
6922	Switch	.52
1154	Antenna Coil	.48
1155	Oscillator Coil	.40
1123	1st I. F.	.88
1124	2nd I. F.	.88
1846	Filter Condenser	1.36
243	Pilot Lite Bracket	.08
8901	No. 40 Pilot Lite	.18
6850	4 Prong Socket	.10
6852	6 Prong Socket ....Each	.10
6853	7 Prong Socket	.10
2006	Padder	.28
2052	Trimmer	.10
7104	Tube Shield Base } Per Set	.12
7105	Tube Shield }	
1500	.001—20%	.14
1501	.0001—20%	.10
1509D	.002—5%	.20
1504	.00025—20%	.12
6016	5 M. 1/3 20% Resistor	.06
6017	1 Meg. 1/3 W 20% Resistor	.06
6018	½ Meg. 1/3 W 20% Resistor	.06
6024	¼ Meg. 1/3 W 20% Resistor	.06
6025	50 M. 1/3 W 20% Resistor	.06
6058	330 Ohms 1/3 W 10% Resistor	.08
6057	4500 Ohms 1/3 W 20% Resistor	.06
6059	190 M. 1/3 W 5% Resistor	.08
6060	600 M. 1/3 W 5% Resistor	.08
6105	10 M. ½ W 20% Resistor	.08
6117	25 M. ½ W 20% Resistor	.08
1600	.1—200 V Bypass Condenser	.12
1601	.1—400 V. Bypass Condenser	.12
1628	.01—200 V. Bypass Condenser	.12
1604	.01—600 V. Bypass Condenser	.14
1614	.25—200 V. Bypass Condenser	.16
1622	.05—200 V. Bypass Condenser	.12
1602	.1—600 V. Bypass Condenser	.15
1651	.004—600 V. Bypass Condenser	.12
	Dial (order by name and description)	1.64
7946A	Speaker	3.16
5218	Knobs	.12

TUBES
80
42
75
6A7
6D6

LAFAYETTE RADIO MFG. CO.

MODEL J-19



CONDENSERS		
SYM.	MFD.	NO.
C1	VAR. C.	2264
C2	20-12.5	2296
C3	.02	2191
C4	.05	2046
C5	.0001	2123
C6	.0028	2253
C7	PADDER	2229
C8	.1-200V.	2022
C9	.1-400V.	2188
C10	.006	2007
C11	.00035	2233
C12	.25	2053

RESISTORS		
SYM.	OHMS	NO.
R1	VOL. CON.	8474
R2	50,000	3269
R3	240	3252
R4	25,000	3228
R5	.5 MEG.	3161
R6	6,500	3319
R7	67,000	3321

MISC.		
SYM.	NAME	NO.
L1	B.C. ANT. COIL	1358
L2	B.C. OSC. COIL	1357
L3	S.W. ANT. COIL	1250
L4	S.W. OSC. COIL	1249
L5	DUAL TUNED I.F.	1355
L6	2ND DET. I.F.	1356
L7	B CHOKE 400Ω	1328
PL	PILOT LITE 6-8 V	8019
R1	VOL. CONT. & SWITCH	8474
	SPEAKER	7172
S1	WAVE BAND SW.	8475
	LINE CORD	8496

I.F. 456 K.C.

VOLTAGE

This receiver is designed to operate on 110-120 Volts, 40-60 cycles, alternating current, or 110-120 Volts direct current. When operated on D.C. it isnecessary that the line plug be inserted to obtain the correct polarity. If no reception is heard approximately one minute after set has been tuned on, reverse line cord plug in outlet.

SERVICE NOTES

INT. FREQ. ALIGNMENT. Intermediate frequency peaked at 456 KC. Connect test oscillator to grid of 6A7 and chassis. (Ground stator of front section of variable condenser during this operation.)

R. F. ALIGNMENT

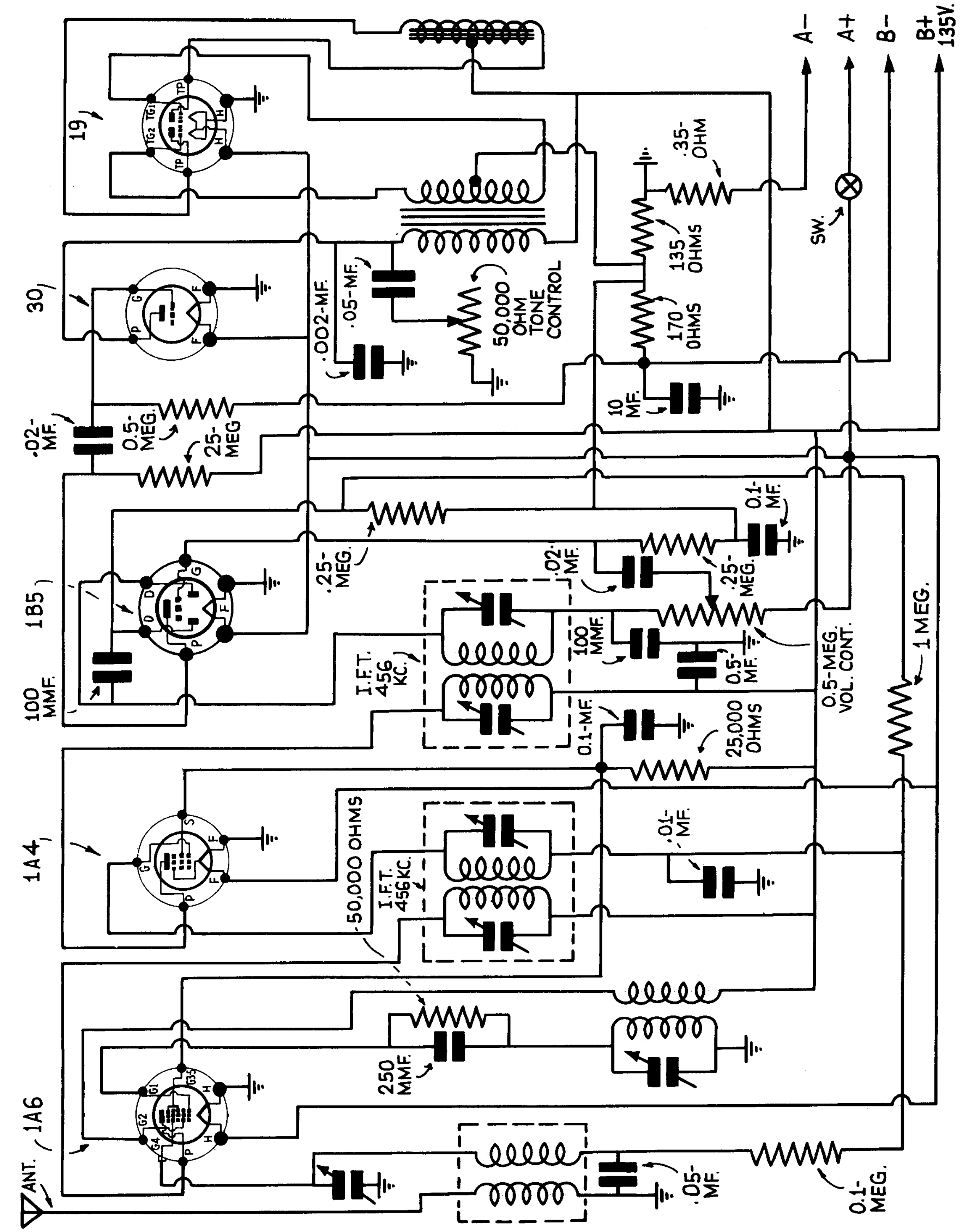
Connect test oscillator to antenna and chassis and set dial to 1500 KC and peak variable condensers. For low frequency adjustment set dial at 600 KC. and repeak padding condenser on front of chassis, rocking variable condenser at the same time. Short Wave Calibration is automatically taken care of by repeaking at 1500 KC. The short wave coils are matched carefully for this setting. A fixed Calibrated padder automatically peaks the short waves for the low frequency setting.

LIST PRICES OF REPLACEMENT PARTS

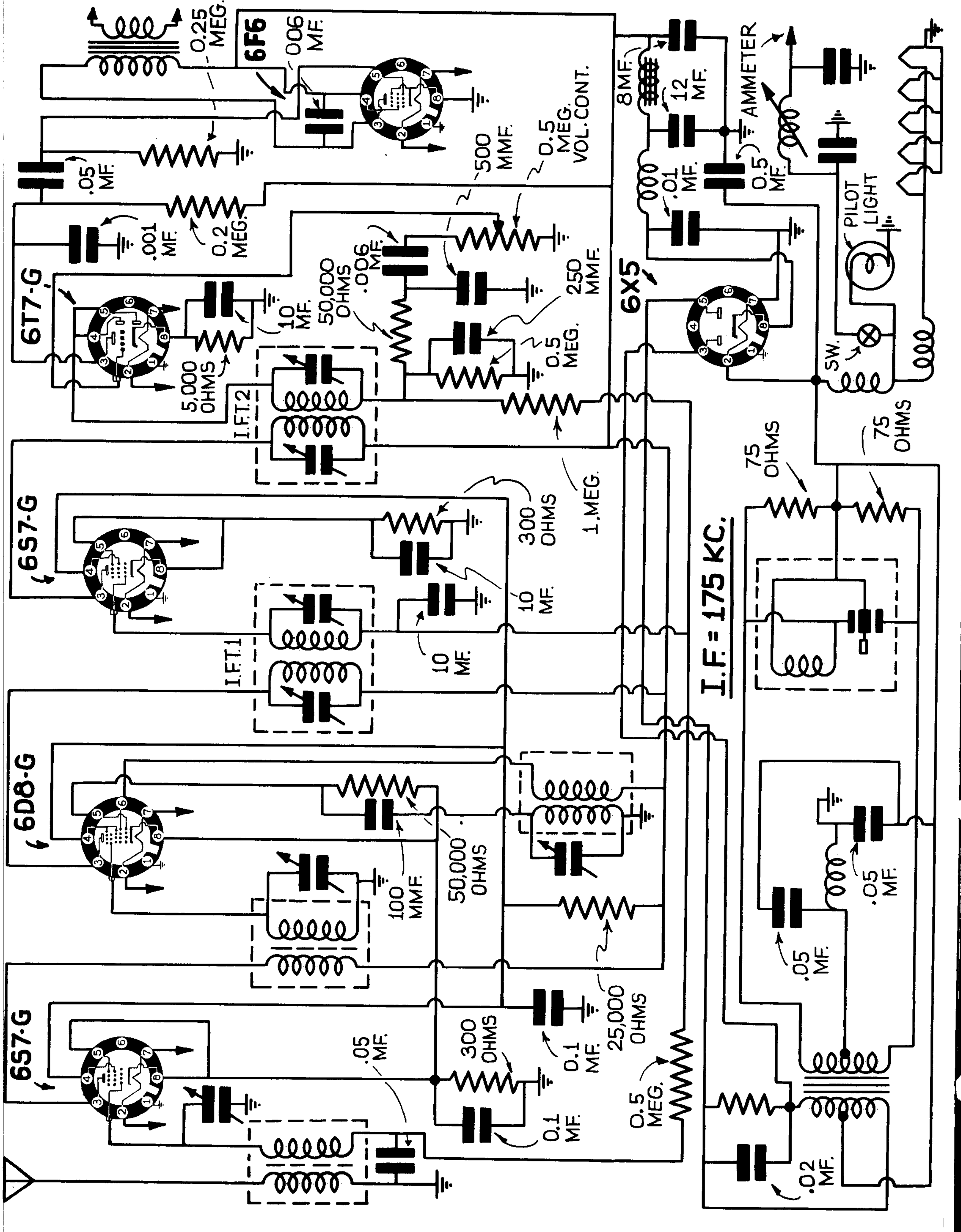
PART NUMBER		LIST PRICE
1328	B Choke	.75
1358	B. C. Ant. Coil	.60
1357	B.C. Oscillator Coil	.55
1250	S.W. Antenna Coil	.55
1249	S.W. Oscillator Coil	.55
1355	I.F. Transformer	1.40
1356	2nd Det. Transformer	1.40
2264	Variable Condenser	2.45
2296	Comb. Electrolytic	1.40
2007	.006 Tubular Cond.	.35
2191	.02 " "	.35
2188	.1 " "	.35
2046	.05 " "	.35
2123	.0001 " "	.40
2253	.0028 Mica Condenser	.45
2233	.00035 " "	.35
2033	.25 Mica Condenser	.40
2229	Padding Condenser	.45
7172	Spea ker	4.25
8496	Line Cord	.35
8474	Volume Control	1.05
8475	Wave Band Switch	.65
8512	Knobs	.20

LAUREHK RADIO MFG. CO.

MODEL "MUSIQUE" 5-TUBE BATTERY SUPERHETRODYNE



LAUREHK RADIO MFG. CO.
MODEL MUSIQUE 6-TUBE AUTO SET



MIDWEST RADIO CORP.

MODEL 14-37 INTERMEDIATE

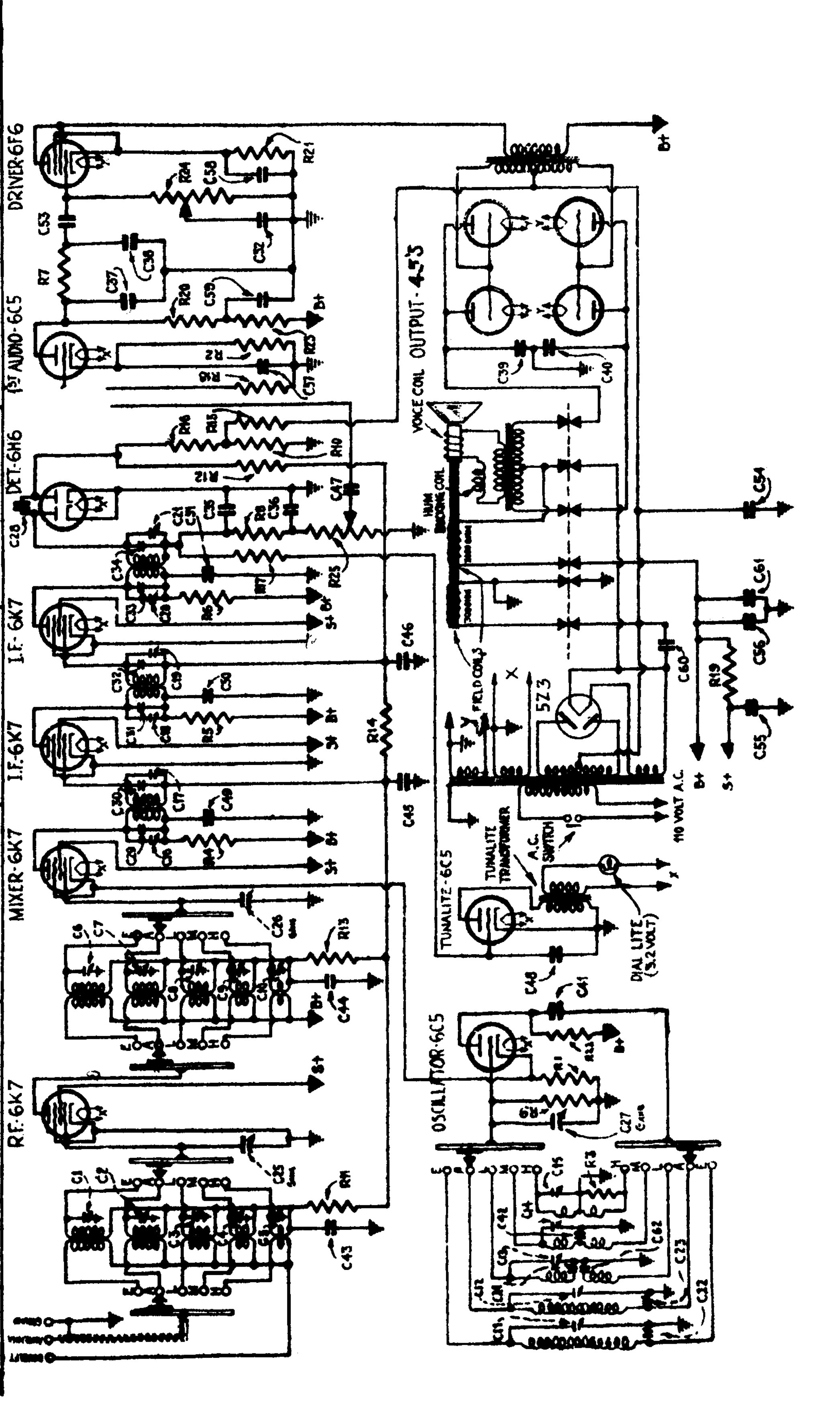
CONDENSERS

C1	35 MMFD. TRIMMER
C2	" "
C3	" "
C4	" "
C5	" "
C6	" "
C7	" "
C8	" "
C9	" "
C10	" "
C11	" "
C12	" "
C13	" "
C14	35 MMFD. TRIMMERS
C15	" "
C16	I.F. "
C17	" "
C18	" "
C19	" "
C20	" "
C21	" "
C22	70 MMFD. PADDER
C23	350 " "
C24	700
C25	365 MMFD. TUNING COND.
C26	" " " "
C27	365 MMFD. TUNING COND.
C28	50 MMFD. MICA
C29	75 " "
C30	" " "
C31	" " "
C32	" " "
C33	" " "
C34	" " "
C35	100 " "
C36	" " "
C37	250 " "
C38	" " "
C39	" " "
C40	250 MMFD. MICA
C41	2000 " "
C42	3000 " "
C43	.05 MFD. 200 VOLT
C44	" " " "
C45	" " " "
C46	" " " "
C47	" " " "
C48	" " " "
C49	" " 400 "
C50	" " " "
C51	" " " "
C52	" " " "
C53	.25 MFD. 400 VOLT
C54	" " " "
C55	" " " "
C56	" " " "
C57	25. MFD. 25 VOLT DRY
C58	" " " "
C59	1. " 300 "
C60	16. " 450 " WET
C61	20. " " "
C62	750 MMFD MICA

(C57–C61: ELECTROLYTIC CONDENSERS)

RESISTORS

R1	500 OHMS .25 WATT
R2	1,500 " " "
R3	2,000 " " "
R4	3,000 " " "
R5	" " " "
R6	" " " "
R7	10,000 " " "
R8	25,000 " " "
R9	100,000 " " "
R10	" " " "
R11	200,000 " " "
R12	500,000 " " "
R13	
R14	500,000 OHMS .25 WATT
R15	1 MEGOHM " "
R16	" " "
R17	3 " " "
R18	" " "
R19	50,000 OHMS .5
R20	" " "
R21	2,500 " 1.
R22	15,000 " "
R23	" " "
R24	500,000 OHM TONE CONTROL
R25	" " VOLUME "



MIDWEST RADIO CORP.

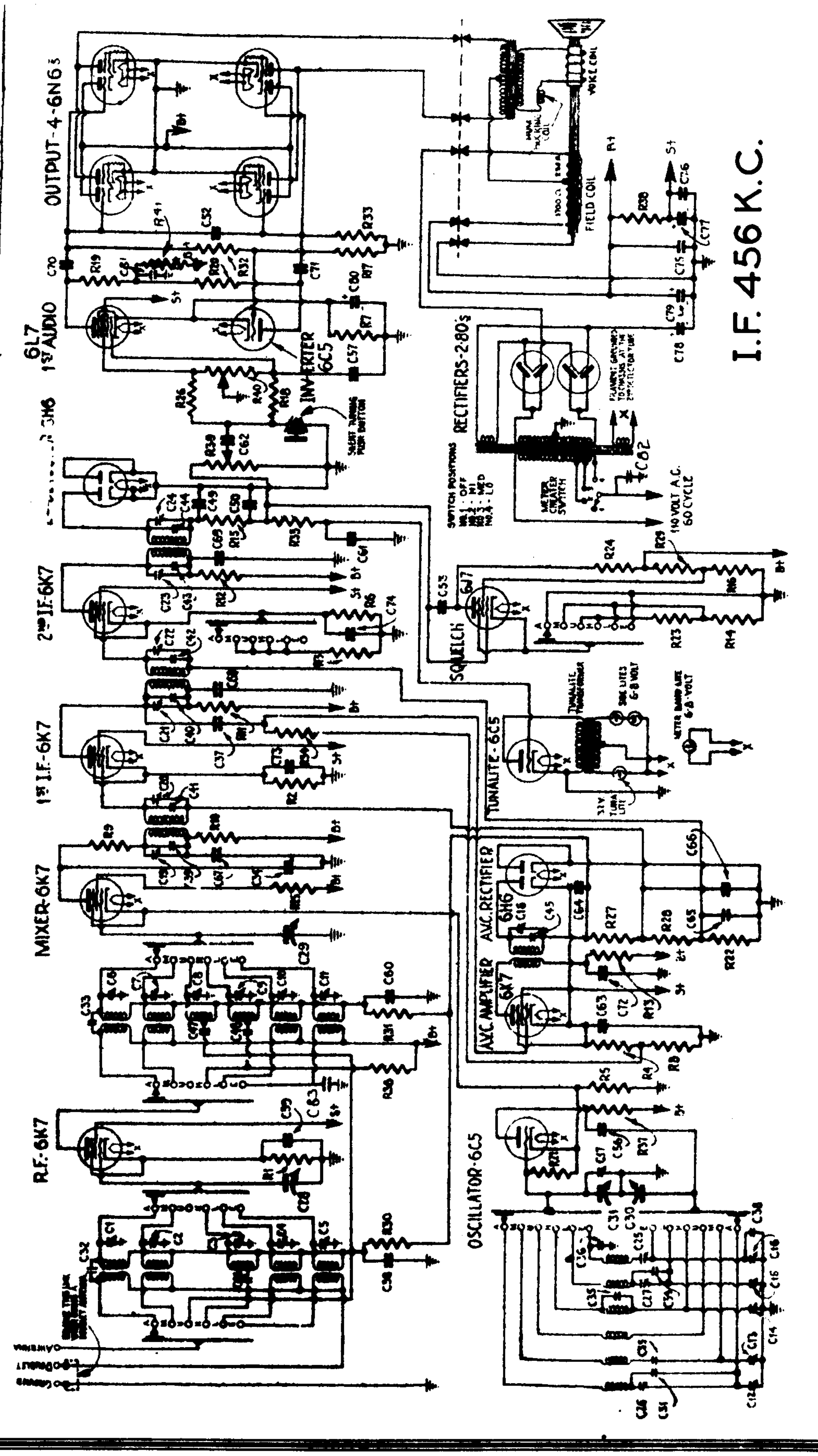
MODEL 18-37

CONDENSERS

C1 35 MMFD. TRIMMER
C2 " "
C3 " "
C4 " "
C5 " "
C6 " "
C7 " "
C8 " "
C9 " "
C10 " "
C11 " "
C12 " "
C13 " "
C14 " "
C15 " "
C16 " "
C17 " "
C18 " "
C19 I.F. TRIMMER
C20 " "
C21 " "
C22 " "
C23 " "
C24 " "
C25 70 MMFD. PADDER
C26 " "
C27 350 MMFD. "
C28 365 MMFD. TUNING COND
C29 " " "
C30 " " "
C31 " " "
C32 5 MMFD. MICA
C33 " "
C34 10 MMFD. "
C35 " "
C36 " "
C37 25 MMFD. MICA
C38 " "
C39 75 MMFD. "
C40 " "
C41 100 MMFD. "
C42 " "
C43 " "
C44 " "
C45 " "
C46 " "
C47 " "
C48 " "
C49 " "
C50 " "
C51 200 MMFD. "
C52 250 MMFD. "
C53 " "
C54 350 MMFD. "
C55 2000 MMFD. MICA
C56 " "
C57 .02 MFD. 200 VOLT
C58 .05 MFD. "
C59 " "
C60 " "
C61 " "
C62 " "
C63 " "
C64 " "
C65 " "
C66 " "
C67 .05 MFD. 400 VOLT
C68 " "
C69 " "
C70 " "
C71 " "
C72 " "
C73 .25 MFD. 200 VOLT
C74 " "
C75 .25 MFD. 400 VOLT
C76 " "
C77 20. MFD. 175 V. WET ELECTROLYTIC
C78 25. MFD. 500 V. " "
C79 40. MFD. 350 V. " "
C80 60 MFD. 10 V. " "
C81 - .25 MFD - 400 V
C82 - .05 MFD - 400 V
C83 - 500 MMFD - MICA.

RESISTORS

R1 350 OHMS WIRE WOUND
R2 " "
R3 " "
R4 " "
R5 500 OHM .25 WATT
R6 1,000 OHM "
R7 " "
R8 2,000 OHM "
R9 5,000 OHM "
R10 " "
R11 " "
R12 " "
R13 " "
R14 " "
R15 25,000 OHM "
R16 " "
R17 40,000 OHM "
R18 100,000 OHM "
R19 100,000 OHM .25 WATT
R20 " "
R21 " "
R22 " "
R23 " "
R24 " "
R25 200,000 OHM "
R26 " "
R27 " "
R28 " "
R29 " "
R30 500,000 OHM "
R31 " "
R32 " "
R33 " "
R34 1 MEGOHM "
R35 3 MEGOHM "
R36 25,000 OHM .5 WATT
R37 50,000 OHM .5 WATT
R38 " "
R39 500,000 OHM VOLUME CONTROL
R40 " TONE
R41 25,000 - OHM - ¼ W.



I.F. 456 K.C.

MONTGOMERY WARD & CO.
MODEL 62-271

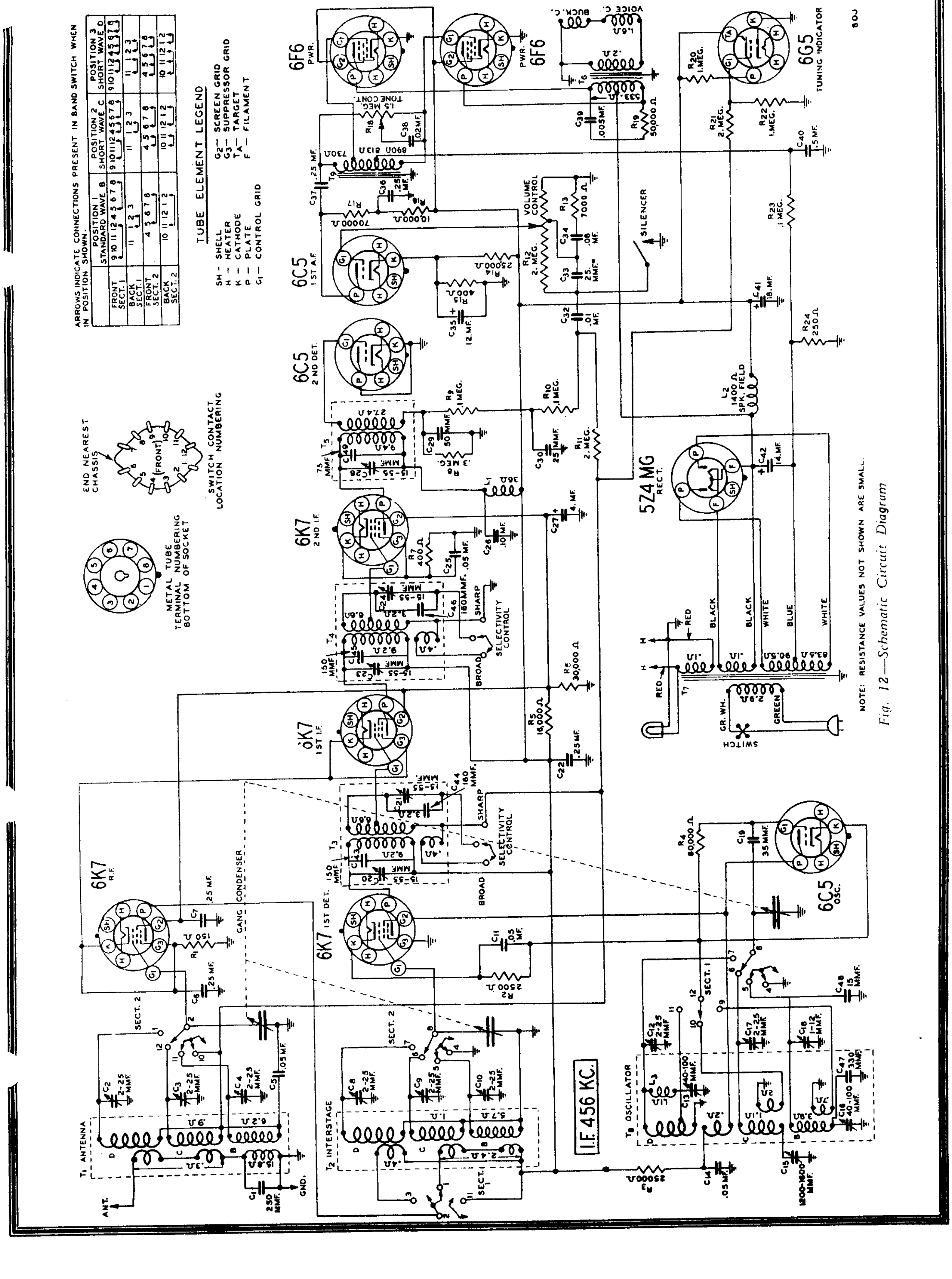


Fig. 12—Schematic Circuit Diagram

MONTGOMERY WARD & CO.

MODEL 62-271

In Fig. 12 is shown the schematic circuit diagram of the radio. Values of the condensers and resistors used are given. In the following paragraphs is given the complete aligning procedure. If a station is tuned in with the selectivity control in the broad position and this control is then turned to the sharp position, the station may disappear. This is not an indication that the receiver is out of alignment. If additional service information is required, write to us for a complete service manual.

Alignment Procedure

Correct alignment is extremely important in connection with all wave radios. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 1800, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

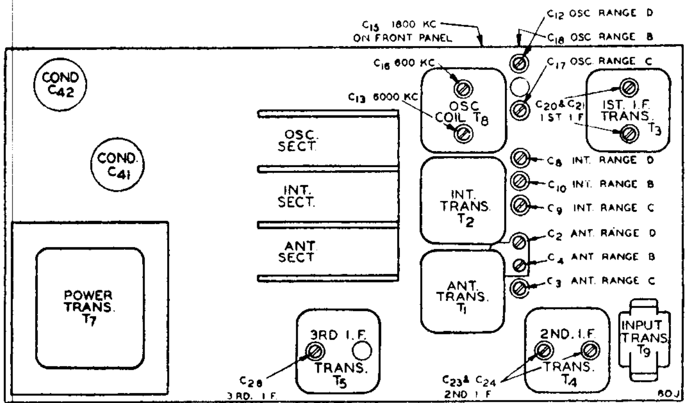


Fig. 11—Location of Trimmers

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 11.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C18) until maximum output is obtained. The location of this trimmer is shown in Fig. 11.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Turn the calibration screw (under color filter—See Fig. 10) until the 1500 KC mark on the dial scale is at the vertical red line on the screen.

Adjust the interstage Range B trimmer (C10) and antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 11 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The

MONTGOMERY WARD & CO.
MODEL 62-271

image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C17) until maximum output is obtained. See Fig. 11 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C9) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 1800 KC trimmer until the peak of greatest intensity is obtained. See Fig 11 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C12) until maximum output is obtained. See Fig. 11 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C8) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage and antenna Range D trimmers, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

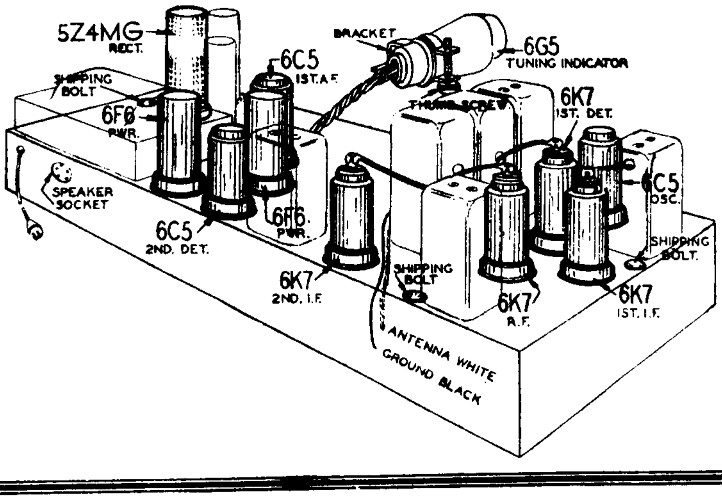
6000 KC Adjustment

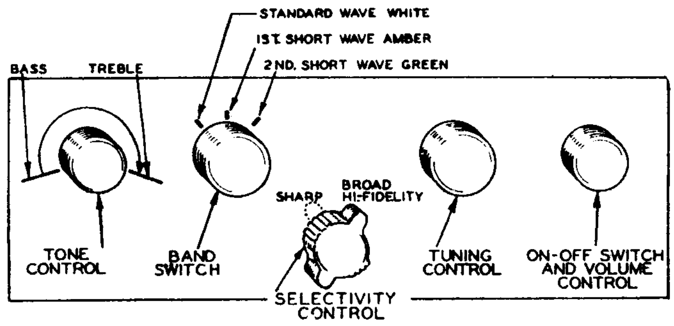
Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 11 for location of this trimmer.

BAND	DIAL COLOR	FREQUENCY RANGE
Standard Wave	White	528 to 1730 KC. (Kilocycles)
1st Short Wave	Amber	1.71 to 5.8 MC. (Megacycles)
2nd Short Wave	Green	5.75 to 18.3 MC. (Megacycles)





Arrangement of Controls

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MODEL 62-271

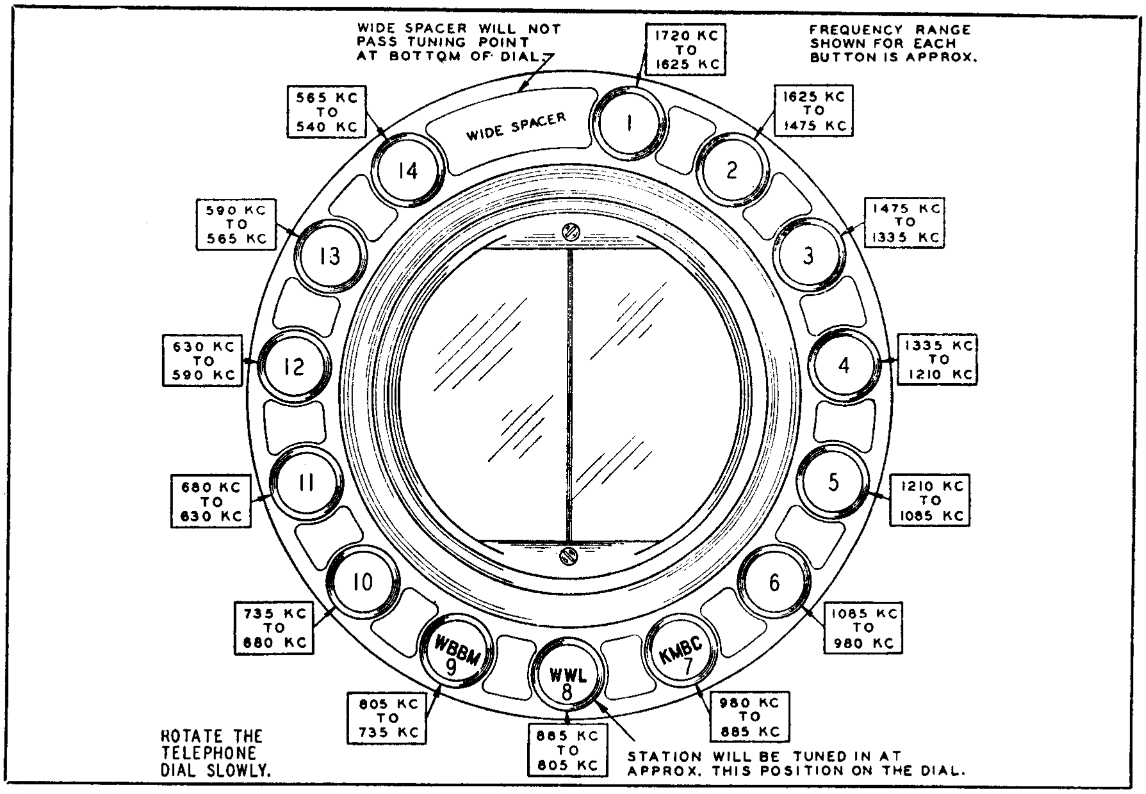

Fig. 3—Telephone Dial Station Buttons

Setting the Telephone Dial Stations

Selecting the Stations to be Set

There are 14 buttons on the telephone dial by means of which 14 stations may be set.

Make a list of your favorite stations, those which you tune in regularly. Put down the frequencies of these stations. There may be 3, 5, 8 or any number up to and including 14 in this list.

If 2 (or more) of the stations in the list you have selected fall within the frequency range of one button, only one of them may be set on the telephone dial. The other station must be tuned in with the regular tuning knob.

Frequencies Covered by Each Button

In Fig. 3 are shown the telephone dial buttons. Each one is given a number so that it may be readily referred to.

The ***approximate*** frequency range of each button is shown in the rectangle. By approximate is meant that the range of the button may, on occasion, be 10 KC or 20 KC greater or less than the limits as shown. Any station within the ***actual*** range of a button may be set. Station WBBM, for example, with a frequency of 770 KC, falls within the frequency range of button No. 9 and can, therefore, be set on this button.

Although one frequency, for example 980 KC, is shown as the end of the range of two adjacent buttons, in this case 6 and 7, as a rule, it is possible to tune in a station of this frequency only on one of the two buttons. The proper button to use must be determined by trying both of them.

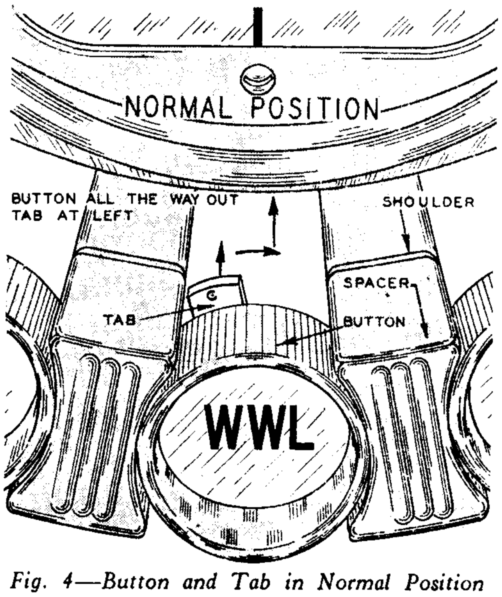

Fig. 4—Button and Tab in Normal Position

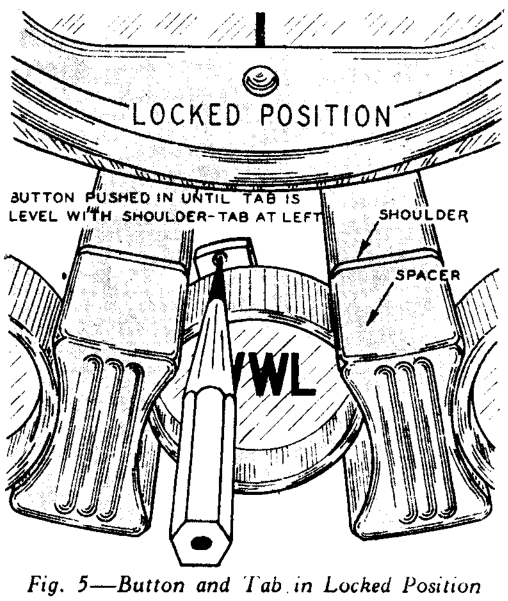

Fig. 5—Button and Tab in Locked Position

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MODEL 62-271

Procedure for Setting the Telephone Dial Buttons

COMPLETE PROCEDURE	CONDENSED PROCEDURE
1 — The selectivity control (See Fig. 2) should be in the sharp position.	— Turn selectivity control to sharp.
2 — Select one of the stations from the list you have made out and carefully tune in this station with the tuning knob in the usual way using the tuning eye as a guide.	— Tune in station to be set.
3 — The button nearest the bottom center of the dial will be the proper one for the station which is tuned in. In Fig. 3 button No. 8 is the correct one for station WWL.	— Determine the proper button.
4 — The procedure necessary to set a button is simple and the steps are illustrated in Figs. 4 to 7. The normal position of the button and tab is shown in Fig. 4. Depress the button with the finger to the locked position, or until the tab is level with the shoulder of the spacer—See Fig. 5. While the button is thus depressed the tab may be easily moved to the right either with the fingers or with the point of a hard lead pencil inserted into the hole in the tab. It is then in the unlocked position—See Fig. 6. If the tab does not move to the right easily, push the button in or out slightly from the position shown until the groove is found.	— Push button to locked position and move tab to the right.
5 — IMPORTANT—The dial must not be turned during steps 4, 5 and 6, otherwise the station will be detuned. Hold the tuning knob (See Fig. 2) with the hand not used for setting the button, to be sure the dial does not turn, and then proceed with the instructions in the next paragraph. After the tab is to the right, the button should be grasped with the thumb and forefinger as shown in Fig. 7. Push the button all of the way in to the setting position and turn the *button* in either direction until it locks into place. A click will be heard and (with the button still pushed in) it will be impossible to turn the button further in either direction without turning the dial. After the click is heard, the button should be slowly released. When new, the buttons may be stiff and may not turn easily. NOTE: Occasionally one or more of the buttons on the dial may be set at the right point for a station when the radio is shipped from the factory. If this is the case, the click will not be heard and the button cannot be turned after it is pushed in to the setting position, indicating that it is already correctly locked in place.	— Push button to setting position and turn button until it locks in place. Release button slowly.
6 — Push the button one-half way in. It will then be in *the unlocked position*—See Fig. 6. (Do not push it all the way in to the setting position). Move the tab to the left with finger or pencil to the locked position—See Fig. 5. Then release the button; it will return to the normal position—See Fig. 4.	— Push button to unlocked position and move tab to the left. Release button.
7 — Punch the correct station disc from the sheet supplied and push the disc into the bottom of the button. It will fit into place at the bottom. It should be so pushed in that when the button is at the bottom of the dial the wording will be horizontal—See Fig. 3.	— Insert correct station disc.
8 — Push one of the clear celluloid discs into the bottom of the button over the station disc. See next page for additional information.	— Insert clear celluloid disc.

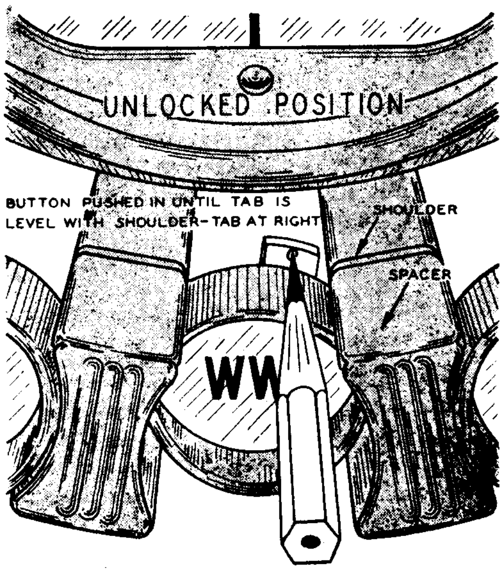


Fig. 6—Button and Tab in Unlocked Position

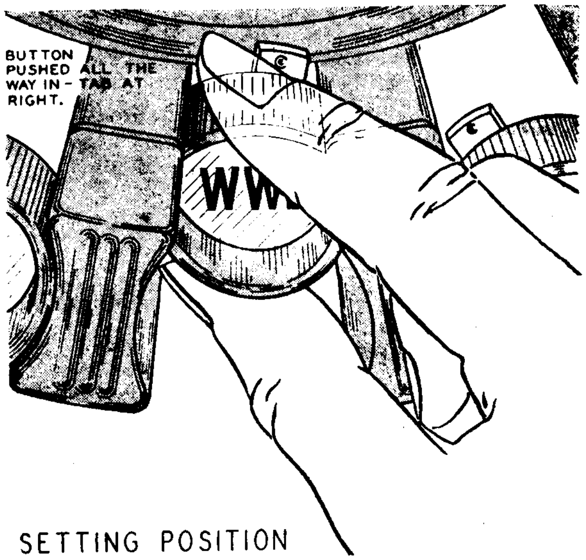


Fig. 7—Button and Tab in Setting Position

MONTGOMERY WARD & CO.

MODEL 62-271

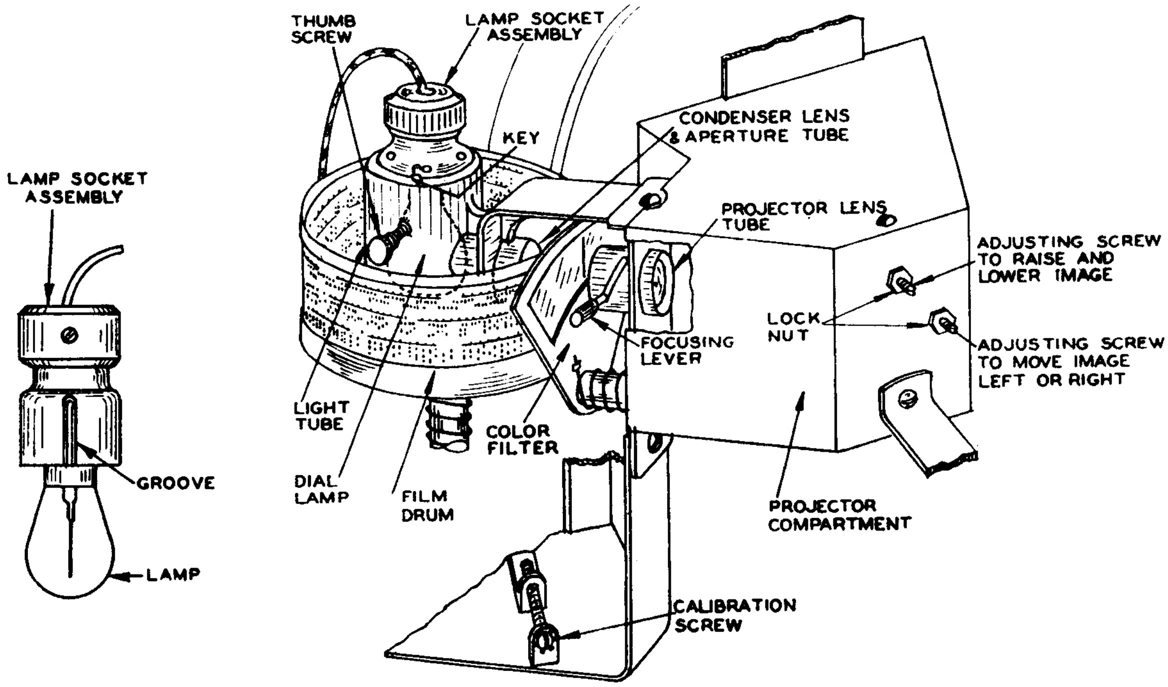


Fig. 10—Details of Movie Dial

Dial Calibration

The radio is properly calibrated if, when a station is correctly tuned in, the vertical red line on the screen crosses the call letters of that station. If the red line is found to be on one side of the call letters of a large number of stations on the standard wave band (the same side in each case), the dial is out of calibration.

To re-calibrate, carefully tune in the signal of one of the larger nearby stations in accordance with the instructions under "Tuning in a Signal." Choose a station which is near the center of the dial, as for example, a 1000 KC station. Turn the calibration screw (see Fig. 10) until the vertical red line on the screen is at the center of the call letters of that station.

The dial will then be properly calibrated and this adjustment should not be changed unless re-calibration again becomes necessary. It should be remembered that after calibration a few stations will be tuned in when the vertical red line is near the end of the call letters and city of a station. That is because of slight variations in the film.

Movie Dial

The movie dial is a new and exclusive Wards feature. (Patent applied for.) The letters appearing on the screen are projected onto the glass screen from a film mounted on a drum, plainly visible from the rear of the cabinet.

On the standard wave band (white color) the call letters and location of the principal broadcast stations in the United States are shown in their proper position. The line along the lower edge shows the frequency scale and is marked in kilocycles.

Three groups of station call letters, separated by thin horizontal lines, will be observed on the screen. These represent Eastern, Central and Western stations, and are so marked at the side of the glass screen. When the call letters of more than one station are intersected by the vertical red line on the screen, the station tuned in will usually be the one in the section of the country in which the listener is located.

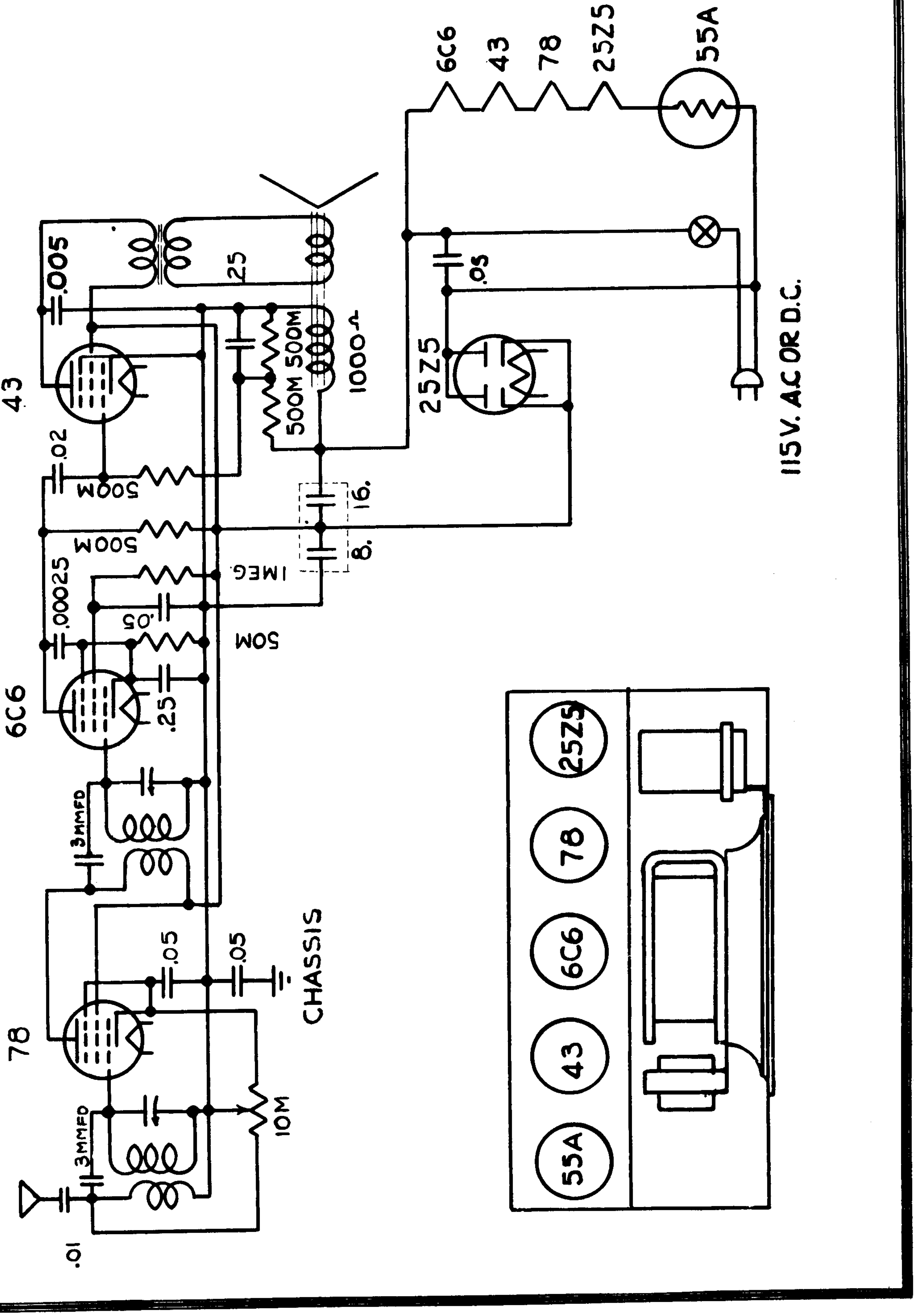
Since there are a great many broadcast stations operating in this country it is impossible to list every one, and only the larger and more powerful stations are shown. Local stations which you may be able to receive and which are not marked on the screen can be readily identified by the kilocycle scale.

On the first short wave band (amber color) and the second short wave band (green color) are shown the call letters and the location of the principal transmitting stations, as well as the leading broadcast services such as Police, Air Craft and Amateurs. These stations and services are shown at their proper location on the film and if weather and other conditions are favorable, can be tuned in.

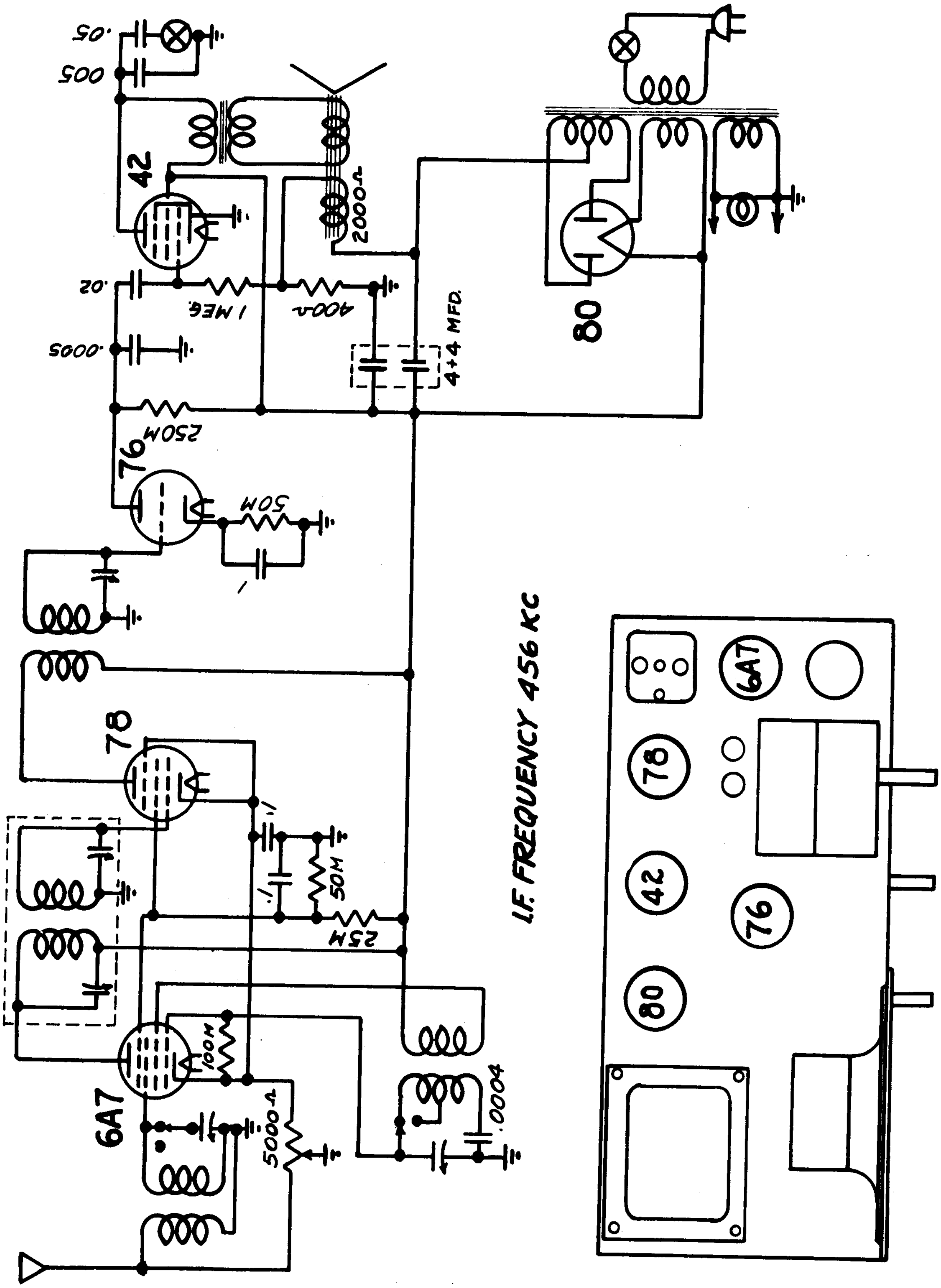
Cathode Ray Tuning Eye Tube

To Remove the Tube—Be sure the radio is turned off. Pull off the tube socket and swing the upper part of the tube bracket away from the cabinet panel. Then loosen the thumb screw until the tube can be removed. To re-insert the tube reverse the above procedure. When placing the socket on the tube, match up the tube prongs with the holes in the socket and push the socket on.

PACIFIC RADIO CORPORATION
MODEL 27



PACIFIC RADIO CORPORATION
MODELS 45-456-456-D & 456-N



I.F. FREQUENCY 456 KC

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-660

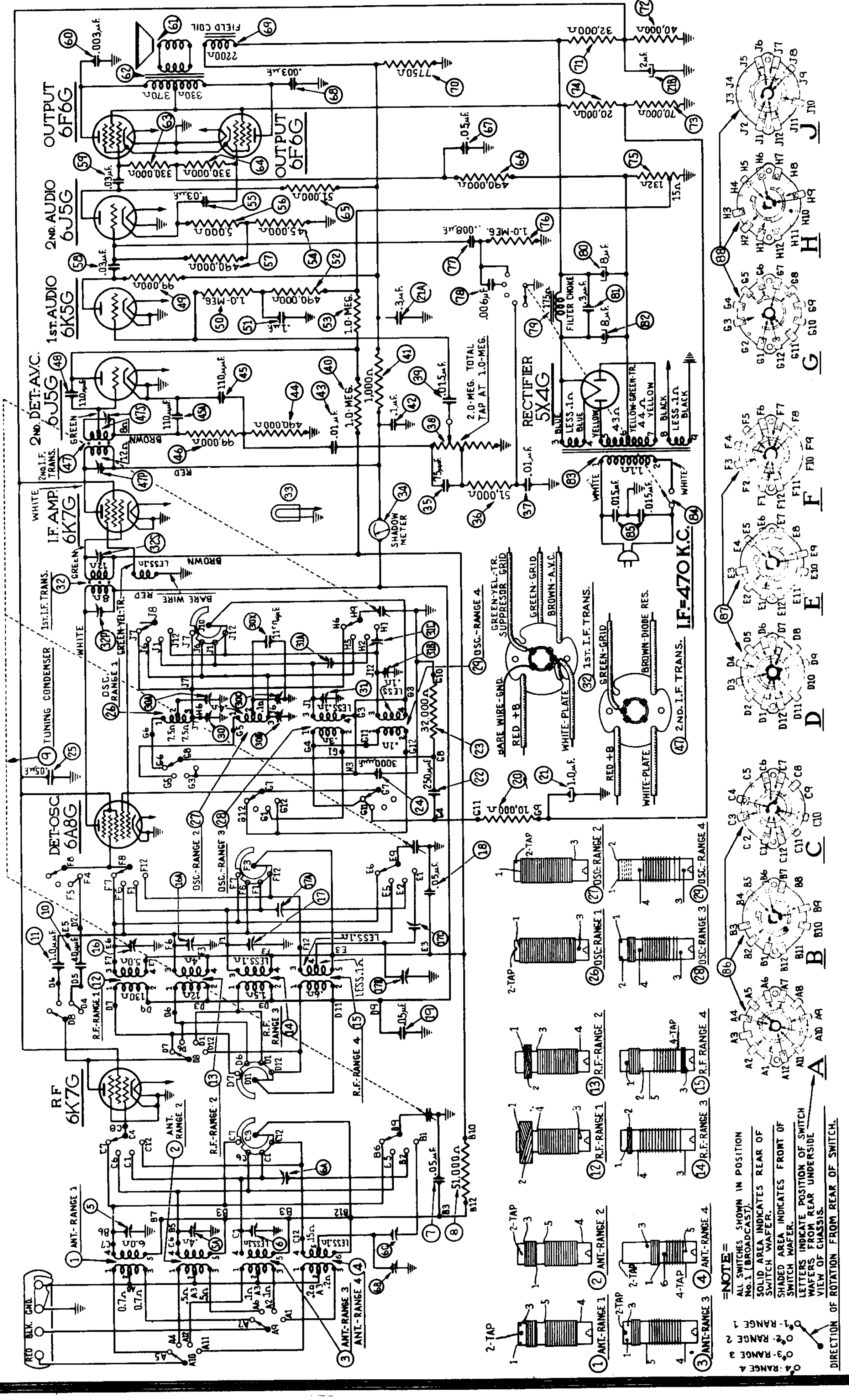


Fig. 2—Schematic Diagram

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-660

Alignment of Compensators

To accurately adjust this receiver, precision test equipment is necessary. A signal generator such as the PHILCO MODEL 088 SIGNAL GENERATOR, covering from 110 to 20,000 K. C. is recommended to adjust the compensators at the various frequencies specified. A visual indication of the receiver output is also necessary to obtain correct adjustment of the compensators. PHILCO MODEL 025 CIRCUIT TESTER contains a sensitive output meter and is recommended for these adjustments.

Philco Fibre Handle Screw-driver No. 27-7059 completes the necessary equipment for these adjustments. The locations of the various compensators are shown in Figs.

The following procedure must be observed in adjusting the compensators:

DIAL CALIBRATION—In order to adjust this receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this rotate the tuning control to the extreme counter-clockwise position (maximum capacity). Loosen the set screw of the dial hub, then turn dial until the glowing indicator is centered between the first and second index lines of dial scale (see Fig. 4). Now tighten the dial hub set screw in this position.

SHADOW METER ADJUSTMENT—Remove aerial and allow tubes to warm up. Then adjust shadow meter as follows:

1. Move the shadow meter coil backwards and forwards, until the opposite edges of the shadow are 1/8 of an inch from each end of the shadow screen, measuring along the bottom edge of the screen. Adjustment of the shadow meter light bracket may be necessary for perfect centering.
2. Remove the rectifier tube from its socket, and rotate coil until shadow reaches minimum width. This width must not exceed 3/32 of an inch.
3. Replace the 5X4G rectifier tube in its socket. The shadow should then widen to not more than 3/16 inch or less than 1/16 inch from each side of the screen measuring along the bottom edge. If these limits are not obtained readjust the shadow meter as given in paragraphs 1 and 2 until they are reached.

OUTPUT METER—The 025 Output Meter is connected between the plate and cathode prongs of one of the 6F6G tubes. The meter is adjusted to use the (0-30) volt scale.

INTERMEDIATE FREQUENCY CIRCUIT

Frequency 470 K. C.

1. Connect the 088 Signal Generator output lead through a .1 mfd. condenser to the control grid of the 6A8G tube and the ground connection of the output lead to the chassis. Turn the Volume Control to maximum volume position.
2. Set the range switch in position No. 1 (Broadcast), then rotate the tuning condenser of the receiver to approximately 580 K. C. and adjust the signal generator for 470 K. C.
3. Adjust compensators (47)s 2nd I.F. sec., (47)p 2nd I.F. Pri., (43)s 1st I.F. Sec. and (43)p 1st I.F. Pri. for maximum reading on the output meter.

RADIO FREQUENCY CIRCUIT

Tuning Range—11.5 to 18.2 M. C.

1. Remove the signal generator output lead from the grid of the 6A8G tube and connect it with the .1 mfd. condenser to terminal No. 1 on aerial input panel and the generator ground lead to terminal No. 3, rear of chassis. Terminals 2 and 3 must be connected with the shorting link provided on the panel.
2. Set the range switch in position 4. Turn the receiver and signal generator dials to 18 M. C. Now adjust compensator (31)b by turning the screw (clockwise) to the maximum capacity position, then slowly turning it (counter-clockwise) until a second peak signal is reached on the output meter. The first peak from maximum capacity is the image signal and must not be used. NOTE—In adjusting some receivers only one peak will be observed, therefore, tune the compensator to maximum on this peak. If the above procedure is correctly performed, the image signal will be found at 17.06 M. C., by advancing signal generator attenuator and turning receiver dial to this frequency mark on the dial.
3. The antenna and R.F. compensators (6)b and (17)b are now adjusted by connecting a variable condenser of approximately 350 mmfd.—having a good vernier drive—across the oscillator compensator (31)b contact (first contact from left side of the receiver facing rear underside view of chassis) and ground. Leaving the signal generator and receiver dials at 18 M. C., tune the added condenser from the maximum capacity point until the second harmonic of the receiver oscillator beats against the signal from the generator thereby bringing in the signal. The antenna and R.F. compensators (6)b and (17)b are then adjusted for maximum output. Now remove the external condenser and readjust compensator (31)b as given in paragraph 2 above.
4. Turn signal generator and receiver dials to 12 M. C. and adjust compensator (31)c for maximum output. Then adjust compensators (17)c and (6)c for maximum output.
5. Now turn signal generator and receiver dials to 18 M. C. and readjust compensators (31)b Osc., (6)b Ant. and (17)b R.F. as given in paragraphs 2 and 3 above.

Tuning Range (7.35) to (11.6) M. C.

1. Set range switch in position 3. Rotate signal generator and receiver dials to 11 M. C. Now adjust compensator (31) by turning the screw (clockwise) to the maximum capacity position, then slowly turn it (counter-clockwise) until a second peak signal is reached on the output meter. The first peak from maximum capacity is the image signal and must not be used. NOTE—In adjusting some receivers only one peak will be observed, therefore, tune the compensator to maximum on this peak. If the above procedure is correctly performed, the image signal will be found at 10.06 M. C. by advancing the signal generator attenuator and turning receiver dial to this frequency mark on the dial.
2. Using the 11 M. C. signal, compensators (17) R.F. and (6) Ant. are adjusted by using the procedure given in paragraph 3, under tuning range (11.5) to (18.2) M. C., with the exception, that the external condenser is connected from compensator (31) contact to ground. This contact is the third one from left side of the receiver facing rear underside view of chassis. Also use a 11. M. C. signal.
3. Readjust compensator (31) Osc. as given in paragraph 1 above.
4. Turn signal generator and receiver dial to 7.5 M. C. and adjust compensators (31)a Osc. series (17)a R.F. and (6)a Ant. for maximum output.
5. Due to the slight interaction of the high and low frequency compensators of this range, compensators (31) osc., (17) R.F. and (6) Ant. are readjusted using procedure in paragraphs 1 and 2 above.

Tuning Range 2.3 to 7.4 M. C.

1. Set range switch in Position 2. Turn signal generator and receiver dials to 7.0 M. C. Now adjust compensators (30)b Osc., (16)a R.F. and (5)a Ant. for maximum output.
2. Turn signal generator and receiver dials to 2.35 M. C. Compensator (30)c is now adjusted for maximum as follows:

First tune compensator (30)c for maximum output. Then vary the tuning condenser for maximum output about the 2.35 dial mark. Now retune compensator (30)c, and again vary the tuning condensers back and forth about the 2.35 dial mark for maximum output. This operation of first tuning the compensator, then the tuning condenser is continued until maximum output is obtained at or about the 2.35 dial mark.

If the signal generator is not accurately calibrated the maximum point on the dial of the receiver may fall slightly above or below the dial mark.

3. Turn the signal generator and receiver dials to 7.0 M. C. and readjust compensator (30)b for maximum output. Then turn signal generator and receiver dials to 6.0 M. C. and adjust compensators (16)a R.F. and (5)a Ant. for maximum output.

Tuning Range 530 to 1720 K. C.

1. Set range switch in position No. 1 (Broadcast). Rotate signal generator and receiver dials to 1600 K. C. Now adjust compensators (30) Osc., (16) R.F. and (5) Ant. for maximum output.
2. Tune signal generator and receiver dials to 580 K. C. Compensator (30)a Osc. series is then adjusted for maximum output as given in paragraph 2 under tuning range 2.3 to 7.4 M. C., the only difference in the procedure being in the frequency used.
3. Readjust compensator (30) for maximum output, by turning signal generator and receiver dials to 1600 K. C.
4. Turn signal generator and receiver dials to 1500 K. C. and adjust compensators (16) R.F. and (5) Ant. for maximum output.

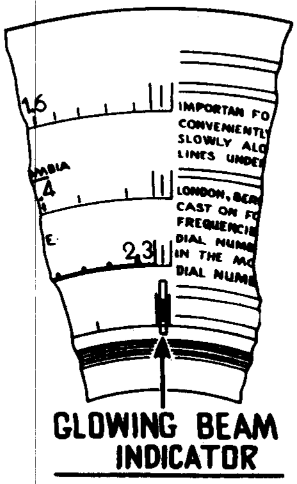


Fig. 4—Dial Calibration

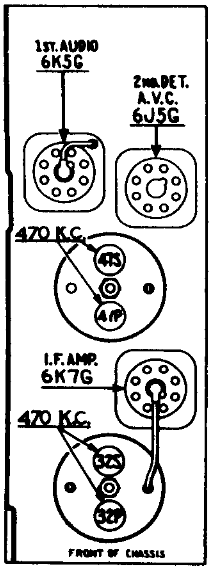


Fig. 5—Locations of I.F. Compensators Top of Chassis

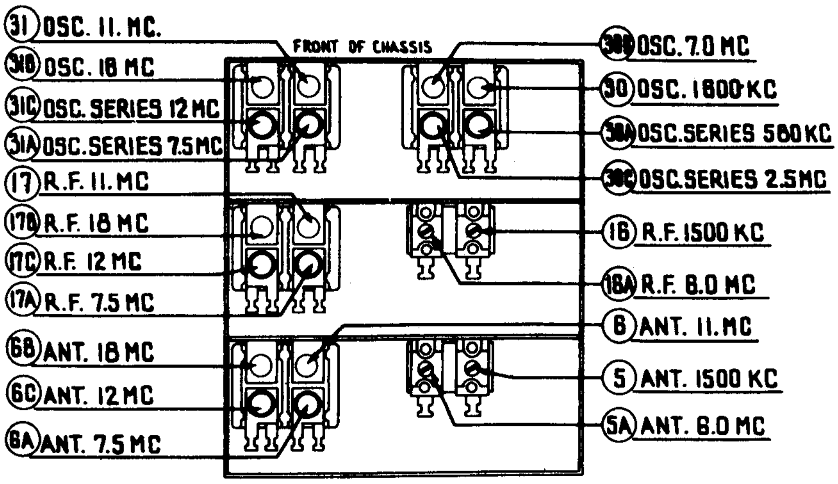


Fig. 6—Locations of R.F. Compensators Underside of Chassis

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-660

SERVICE DATA

Model 37-660 is a 9 tube superheterodyne receiver designed for operation on alternating current. It has four tuning ranges, covering standard broadcast and short-wave frequencies. The chassis is constructed in four basic assembly units, concentrating the R.F., I.F., Audio and Power circuits in individual units.

The circuit includes the PHILCO Foreign Tuning System—controlled by the range switch—providing maximum sensitivity and noise-reduction, when used with the Philco High-Efficiency Aerial; automatic bass compensation in the volume control circuit; shadow tuning; automatic volume control, and a push-pull pentode output circuit.

AERIAL CONNECTIONS

The red and black leads of the High-Efficiency Aerial "transmission line" are connected to terminals 1 and 2 respectively, of the terminal panel provided on the rear of the chassis. Connect the jumper on the terminal panel across terminals 3 and 4.

If a temporary aerial is used, the jumper should be across terminals 2 and 3. The aerial connects to terminal 1 and the ground lead to terminal 3. A good ground connection is desirable in all installations.

REPLACING DIAL

To replace the dial, remove the clamp holding the dial to the hub, by turning clamp counter-clockwise, using the two holes provided on the clamp for this purpose.

REMOVING MASK ARM & LINK ASSEMBLY

First remove dial, then loosen set screw of dial hub and remove the hub and felt washer from the shaft. Now loosen screws holding indicator bracket and lens assembly, and move bracket forward about ½ inch. The assembly may now be removed by loosening set screw of range switch arm, then pull arm off of range switch shaft.

REMOVING SWITCH & COIL ASSEMBLIES OF R.F. UNIT

To replace any part in the switch and coil assemblies of the R.F. Unit, each assembly can be removed separately as follows:

First remove the tuning dial, mask and arm assembly. Remove the center mounting screw on the rear of the R.F. Unit. Then lift the rear of the unit and push forward until the rubber mounting grommets, on each side of the unit, clear the mounting slots. The unit is then lifted far enough from the chassis for removal of the two screws holding the selector switch indexing plate and shaft (front of unit). Then pull shaft straight out from the unit. Also, remove the volume control shaft by releasing the retaining clip, inside the chassis, from the shaft.

IMPORTANT—When selector switch shaft is replaced, care should be taken to have all wafer rotors in the same position, so that the key on the switch shaft will slide freely into the notched hole in each wafer rotor. NEVER force shaft into rotors.

Servicing Stages—It is necessary to unsolder some connecting leads in order to release the stage for servicing. If all the following connections are unfastened the stage will be entirely released. Ordinarily only one or two leads need be loosened in order to change coils, replace coupling condensers, or replace switch sections.

ANTENNA ASSEMBLY—Rear Section

1. Unsolder the wires which connect the antenna panel and I.F. Unit to the range switch and assembly shield plate ground leads.
2. Unsolder the two leads from the gang condenser terminal panel which connect to the range switch. Also lead of tubular condenser (7) at the ground lug on the R.F. Unit.
3. Remove screw holding shield plate to the unit base. This screw is located in the right hand corner of the shield plate, facing the rear underside of the chassis. The assembly can then be removed.

R.F. ASSEMBLY—Middle Section

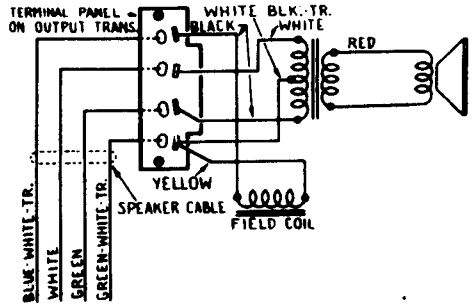
1. Unsolder the wires from the I.F. Unit and the 6K7G plate contact in R.F. Unit which connects to the range switch: Then remove ground leads of shield plate.
2. Unsolder the leads from the gang condenser terminal panels and the lead of tubular condenser (18) at the ground lug on R.F. Unit base.
3. Remove the screw holding shield plate to the unit base. This screw is located in the right hand corner of the shield plate facing the rear underside of the chassis. Then pull assembly straight out.

OSCILLATOR ASSEMBLY—Front Section

1. The oscillator assembly can be removed by unscrewing the two screws located on each side of the R.F. Unit.
2. Unsolder the wires connecting range switch to bakelite condenser (78) in the power unit, electrolytic condenser (21) in the R.F. Unit and OSC plate contact on the 6A8G socket.
3. Remove the leads from the gang condenser terminal panels and the lead of Mica condenser (24) at the ground lug on R.F. Unit base.

Electrical Specifications

Power Supply: 115 V.
Frequency: 50-60 cycle.
For 25 to 40 cycle operation, use the Power transformer marked with asterisk in the parts list.
Consumption: 130 Watts.
Intermediate Frequency: 470 K. C.
Output: 10 Watts.
Philco Tubes: 6K7G—R.F. Amplifier; 6A8G—Oscillator and first detector; 6K7G—I.F. Amplifier; 6J5G—2nd detector, A.V.C.; 6K5G—1st Audio; 6J5G Phase Inverter; 2-6F6G—Output; 5Y4G—Rectifier.
Tuning Ranges: Range 1—530 to 1720 K. C.; Range 2—2.3 to 7.4 M. C.; Range 3—7.35 to 11.6 M. C.; Range 4—11.5 to 18.2 M. C.
Speakers: X cabinet—H-27; B cabinet—K-36.



Speaker Wiring for Types K-36 and H-27

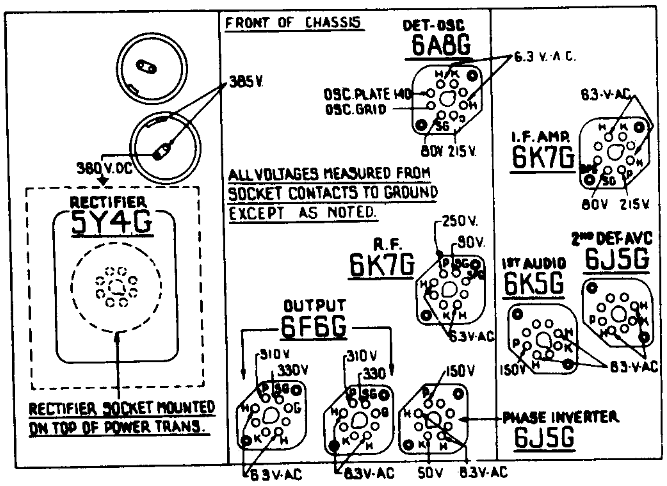


Fig. 1—Socket Voltages—Underside of Chassis View

The voltages indicated by arrows were measured with a **Philco #025 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-660

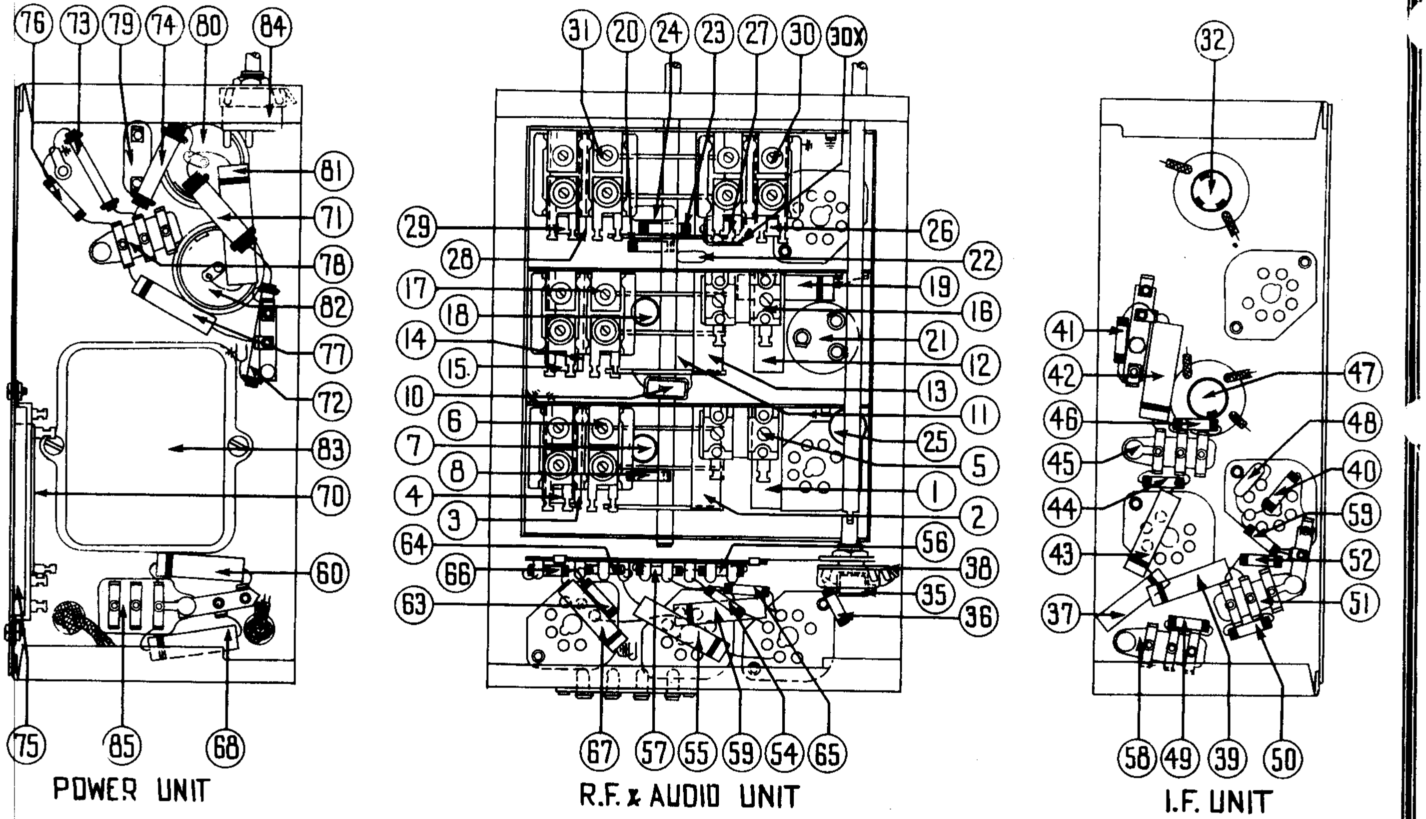


Fig. 3—Parts Locations—Underside View of Chassis.

NOTE:

See page 237 before servicing this set.

Replacement Parts—Model 37-660

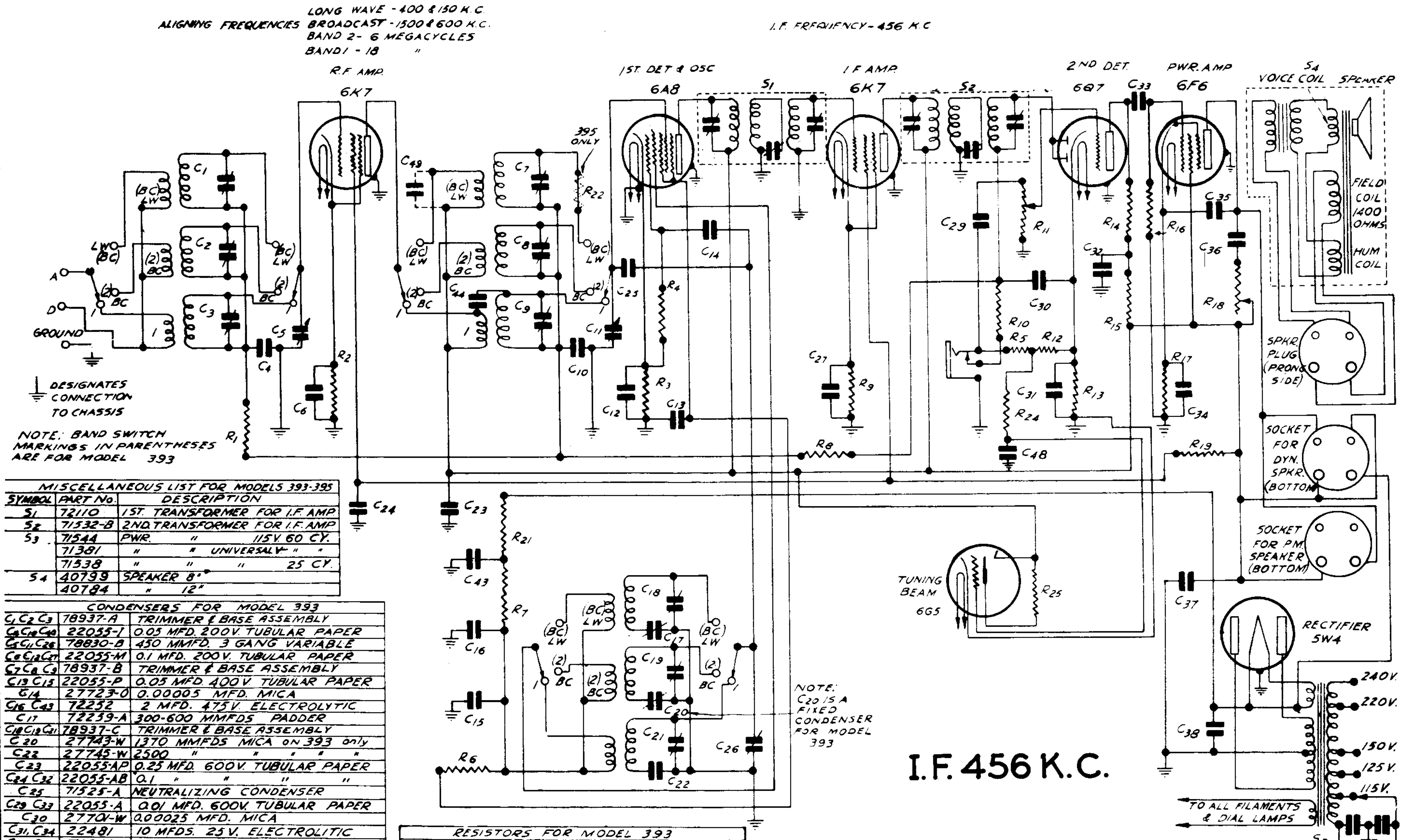
Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (530 to 1720 K.C.)	32-2108	$0.80
2	Antenna Transformer (2.3 to 7.4 M.C.)	32-2119	.65
3	Antenna Transformer (7.35 to 11.6 M.C.)	32-2185	.70
4	Antenna Transformer (11.5 to 18.2 M.C.)	32-2175	.80
5	Compensator (Two sections) brown dot	31-6120	
6	Compensator (Four sections) brown dot	31-6105	
7	Condenser (.05 mfd. tubular)	30-4020	.20
8	Resistor (51000 ohms, ½ watt)	33-351339	.20
9	Tuning Condenser	31-1855	4.50
10	Condenser (40 mmfd. mica)	30-1076	.20
11	Condenser twisted wire & lugs		
12	R.F. Transformer (530 to 1720 K.C.)	32-2105	.75
13	R.F. Transformer (2.3 to 7.4 M.C.)	32-2106	.65
14	R.F. Transformer (7.3 to 11.6 M.C.)	32-2178	.60
15	R.F. Transformer (11.5 to 18.2 M.C.)	32-2176	.70
16	Compensator (Two sections) brown dot	31-6120	
17	Compensator (Four sections) red dot	31-6106	
18	Condenser (.05 mfd. tubular)	30-4020	.20
19	Condenser (.05 mfd. tubular)	30-4123	.20
20	Resistor (10000 ohms, ½ watt)	33-310339	.20
21	Electrolytic Condenser (three sections 1, 2, 3 mfd.)	30-2122	1.85
22	Condenser (250 mmfd. mica)	30-1032	.25
23	Resistor (32000 ohms, ½ watt)	33-332339	.20
24	Condenser (.003 mfd. mica)	30-1028	.45
25	Condenser (.05 mfd. tubular)	30-4123	.20
26	Oscillator Transformer (530 to 1720 K.C.)	32-2120	.65
27	Oscillator Transformer (2.3 to 7.4 M.C.)	32-2121	.40
28	Oscillator Transformer (7.3 to 11.6 M.C.)	32-2186	.70
29	Oscillator Transformer (11.5 to 18.2 M.C.)	32-2182	.70
30	Compensator (Four sections) yellow dot	31-6108	
30x	Condenser (1150 mmf)	30-1081	
31	Compensator (Four sections) brown dot	31-6105	
32	1st I.F. Transformer	32-2169	
33	Pilot Lamp Shadowmeter	34-2039	.15
34	Shadowmeter	45-2189	2.50
35	Condenser (75 mmfd. mica)	30-1053	.20
36	Resistor (51000 ohms, ½ watt)	33-351339	.20
37	Condenser (.006 mfd. tubular)	30-4125	.20
38	Volume Control	33-5158	1.00
39	Condenser (.015 mfd. tubular)	30-4358	.20
40	Resistor (1 megohm, ½ watt)	33-510339	.30
41	Resistor (1000 ohms, ½ watt)	33-210339	.20
42	Condenser (.1 mfd. tubular)	30-4170	.25
43	Condenser (.01 mfd. tubular)	30-4124	.25
44	Resistor (490000 ohms, ½ watt)	33-449339	.20
45	Condenser (110 mmfd. twin bakelite)	8035-DG	.25
46	Resistor (99000 ohms, ½ watt)	33-399339	$0.20
47	2nd I.F. Transformer	32-2171	
48	Condenser (110 mmfd. mica)	30-1031	.20
49	Resistor (99000 ohms, ½ watt)	33-399339	.20
50	Resistor (1 megohm, ½ watt)	33-510339	.30
51	Condenser (.1 mfd. bakelite)	4989-SG	.35
52	Resistor (490000 ohms, ½ watt)	33-449339	.20
53	Resistor (1 megohm, ½ watt)	33-510339	.30
54	Resistor (45000 ohm, ½ watt)	33-345339	.20
55	Condenser (.03 mfd. tubular)	30-4380	.20
56	Resistor (5000 ohms, ½ watt)	33-250339	.20
57	Resistor (490000 ohms, ½ watt)	33-449339	.20
58	Condenser (.03 mfd. bakelite)	8318-SU	.35
59	Condenser (.03 mfd. tubular)	30-4380	.20
60	Condenser (.003 mfd. tubular)	30-4469	
61	Cone & Voice Coil (H-27)	02625	1.20
	Cone & Voice Coil (K-36)	36-3020	
62	Output Transformer (H-27, K-36)	32-7634	1.50
63	Resistor (330000 ohms, ½ watt)	33-433339	.20
64	Resistor (330000 ohms, ½ watt)	33-433339	.20
65	Resistor (51000 ohms, ½ watt)	33-351339	.20
66	Resistor (490000 ohms, ½ watt)	33-449339	.20
67	Condenser (.05 mfd. tubular)	30-4444	.20
68	Condenser (.003 mfd. tubular)	30-4469	
69	Field Coil (H-27, K-36)	36-3673	
70	Resistor (7750 ohms, wirewound)	33-3279	
71	Resistor (32000 ohms, 2 watts)	33-332539	
72	Resistor (40000 ohms, 1 watt)	33-340339	
73	Resistor (70000 ohms, 1 watt)	33-370439	.20
74	Resistor (20000 ohms, 2 watt)	33-320539	
75	Bias Resistor (Wirewound)	33-3278	
76	Resistor (1 megohm, ½ watt)	33-510339	.20
77	Condenser (.008 mfd. tubular)	30-4112	.20
78	Condenser (.006 mfd. bakelite)	7625-SU	.25
79	Filter Choke	32-7115	1.80
80	Electrolytic Condenser 8 uf	30-2026	1.05
81	Condenser (.3 mfd. tubular)	30-4465	
82	Electrolytic Condenser 8 uf	30-2026	1.05
83	Power Transformer (115 V., 50-60 Cycles)	32-7615	
*	Power Transformer (115 V., 25-40 Cycles)	32-7616	
84	Tone Control & AC Switch	42-1184	.75
85	Condenser (.015 Twin Bakelite)	3793-DG	.40
86	Antenna Range Switch	42-1202	1.50
87	R.F. Range Switch	42-1203	1.50
88	Oscillator Range Switch	42-1204	1.50
	Switch Indexing Plate & Shaft	42-1186	
	Dial	27-5209	.55
	Hub	28-7187	.12
	Clamp	28-2837	.10
	Screw Set	W-1641	
	Dial Gear	28-7185	$0.10
	Drive Gear	31-1884	.25
	Thrust Spring	28-8611	.01
	Thrust Washer	28-3976	.30 C
	C Washer	28-3904	.01
	Vernier Drive Assem.	31-1871	
	Mask	27-5240	
	Mask Arm & Link Assembly	31-1887	
	Mask Washer	27-8318	.50 C
	Mask Guide Bracket	38-7876	
	Screen & Lens Holder Assembly	31-1900	
	Pilot Lamp Assembly	38-7706	.35
	Shadow Meter Lamp Shield	28-2917	.02
	Shadow Meter Mtg. Spring	28-8623	.70 C
	Socket, 7 Prong	27-6057	.11
	Socket, 8 Prong	27-6052	
	Tube Shield	28-2726	.10
	Tube Shield Base	28-3898	.03
	Volume Control Shaft	28-6500	.12
	Retaining Clips	28-8610	.03
	Washer (Volume Control)	28-4186	.75 C
	Washer Volume Control (Spring)	4436	1.50 C
	Spring	28-4117	.40 C
	Grommet Mtg. R.F. Unit	27-4317	.04
	Sleeve Mtg. R.F. Unit	28-2257	.01
	Screw Mtg. R.F. Unit	W-729	.45 (
	Washer	28-3927	.01
	Mtg. Rubber Tuning Condenser	27-4325	.02
	Speaker Cable	41-3202	
	A. C. Cord	L-2183	.40
	Terminal Panel Ant.	38-7714	.15
	Knob Assembly	27-4330	.10
	Knob Assembly	27-4331	.10
	Knob Assembly	27-4332	.10
	Knob Assembly	27-4326	.10
	"B" CABINET		
	Speaker K-36	36-1233	
	Bezel Frame & Plate Assembly	40-5946	
	Gasket	27-8312	.01
	Glass	27-8299	.06
	Ring	28-3987	.40
	"X" CABINET		
	Speaker H-27	36-1240	
	Screw Mtg. Speaker	W-709	
	Bezel Frame & Plate Assembly	40-5948	
	Glass	27-8300	.06
	Ring	28-3988	.45
	Gasket	27-8313	.01
	Bottom Shield Plate	28-4031	.45

Figures in black type indicate circled figures in Base View.

Prices Subject to Change without Notice

PILOT RADIO CORPORATION

MODELS 393 & 395



MISCELLANEOUS LIST FOR MODELS 393-395		
SYMBOL	PART No.	DESCRIPTION
S_1	72110	1ST. TRANSFORMER FOR I.F. AMP.
S_2	71532-B	2ND. TRANSFORMER FOR I.F. AMP.
S_3	71544	PWR. " 115V. 60 CY.
	71381	" " UNIVERSAL " "
	71538	" " " 25 CY.
S_4	40799	SPEAKER 8"
	40784	" 12"

CONDENSERS FOR MODEL 393		
$C_1 C_2 C_3$	78937-A	TRIMMER & BASE ASSEMBLY
$C_4 C_{10} C_{40}$	22055-1	0.05 MFD. 200V. TUBULAR PAPER
$C_5 C_{11} C_{26}$	78830-B	450 MMFD. 3 GANG VARIABLE
$C_6 C_{12} C_{27}$	22055-M	0.1 MFD. 200V. TUBULAR PAPER
$C_7 C_8 C_9$	78937-B	TRIMMER & BASE ASSEMBLY
$C_{13} C_{15}$	22055-P	0.05 MFD. 400V. TUBULAR PAPER
C_{14}	27723-0	0.00005 MFD. MICA
$C_{16} C_{43}$	72252	2 MFD. 475V. ELECTROLYTIC
C_{17}	72239-A	300-600 MMFDS. PADDER
$C_{18} C_{19} C_{21}$	78937-C	TRIMMER & BASE ASSEMBLY
C_{20}	27743-W	1370 MMFDS. MICA ON 393 only
C_{22}	27745-W	2500 " " " " "
C_{23}	22055-AP	0.25 MFD. 600V. TUBULAR PAPER
$C_{24} C_{32}$	22055-AB	0.1 " " " "
C_{25}	71525-A	NEUTRALIZING CONDENSER
$C_{29} C_{33}$	22055-A	0.01 MFD. 600V. TUBULAR PAPER
C_{30}	27701-W	0.00025 MFD. MICA
C_{31}, C_{34}	22481	10 MFDS. 25V. ELECTROLITIC
$C_{37} C_{38}$	71045	8 " 475V. "
C_{35}	22055-AR	0.003 MFD. 1000V. TUBULAR PAPER
C_{36}	22055-C	0.05 " 600 " "
C_{44}	27737-0	10 MMFD. MICA
$C_{46} C_{47}$	78503	DUAL .01 MFD. 1000V. PAPER

CONDENSERS FOR MODEL 395		
SAME AS FOR 393 EXCEPT ONES GIVEN BELOW:		
C_{22}	27745-W	2500 MMFDS. MICA
$C_{17} C_{20}$	78692-G	DUAL PADDER 430-460 & 100-125 MMFDS.
C_{35}	22055AR	0.003 MFD. 1000V. TUBULAR PAPER
C_{49}	27701-W	0.00025 MFD. MICA
RESISTORS FOR MODEL 395		
SAME AS FOR 393, WITH ADDED ONES BELOW:		
R_{22}	13029	250 OHMS 1/4 WATT CARBON

RESISTORS FOR MODEL 393		
SYMBOL	PART No.	DESCRIPTION
$R_1 R_5 R_{15}$	13031	100,000 OHMS 1/4 WATT CARB.
$R_2 R_3$	13115	400 " " " "
$R_4 R_{10}$	13164	50,000 " " " "
R_6	13068	30,000 " 1/2 " "
$R_7 R_{21}$	13053	10,000 " 1 " "
$R_8 R_{24} R_{25}$	13001	1 MEGOHM 1/4 " "
R_{11}	78714	1 MEGOHM VOLUME CONTROL
R_{12}	13147	300,000 OHMS 1/4 WATT CARB.
R_{13}	13113	4,000 " " " "
R_{14}	13171	250,000 " " " "
R_{16}	13024	500,000 " " " "
R_{17}	13108	410 " 1 " "
R_{18}	78715	100,000 " TONE CONTROL & SW.
R_{19}	13092	30,000 " 1 WATT CARBON
R_9	13131	600 " 1/4 " "

NOTE: DOTTED LINES SHOW CONNECTIONS FOR MODEL 395 WHICH DIFFER FROM MODEL 393

I.F. 456 K.C.

Range, Model 395
16 - 555 m. (18,800 - 540 kc.)
731 - 2140 m. (410 - 140 kc.)

Range, Model 393
16 - 555 m. (18,800 - 540 kc.)

PILOT RADIO CORPORATION

SERVICE INFORMATION FOR PILOT MODELS 393 AND 395

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

Remove the tuning beam plug from the socket at the front of the chassis.

REALIGNMENT: Should the receiver require re-alignment, the procedure outlined below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

The location of the R. F. alignment trimmer condensers is at the right end of the chassis underneath the deck.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6K7 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. Units.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Insert a 200 mmf. condenser in series with the antenna lead. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located in the lower rear section of the band switch, under the chassis. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT WAVE-BANDS:— The procedure in aligning the short wave-bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. Insert a 400 ohm non-inductive resistor in series with the antenna lead. The alignment frequencies are as follows:

Band 2: 50 Meters—(6,000 kc.)
Band 1: 16.6 Meters—(18,000 kc.)

When aligning Band 2, set the Band Selector Switch in the position marked "Band 2". Set the tuning control pointer at 50 meters. Adjust the oscillator alignment capacitor on Band 2 for maximum output. Next adjust the interstage and antenna section alignment capacitors for maximum output.

To align Band 1, set the Band Selector Switch in the position marked "Band 1". Set the tuning control pointer at the 16.6 meter mark. Set the external oscillator at 16.6 meters. Adjust the oscillator section alignment capacitor on Band 1 for maximum output.

Proceed next to align the interstage section of Band 1. In doing this, it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonance peak. Next align the antenna section for maximum sensitivity.

LONG WAVE MODEL 395

The above alignment positions refer to the Model 393 only, which is calibrated in frequency. The alignment points for the Model 395, which is calibrated in meters only, is as follows:

Long Wave	Align at 750 meters.
	Pad at 2,000 meters.
Broadcast	Align at 200 meters.
	Pad at 500 meters.
Band 1	Align at 17 meters.

The Long Wave alignment procedure is similar to that for the Broadcast. A 200 mmf. condenser should be used in series with the antenna lead in aligning this band.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

RCA MANUFACTURING COMPANY, Inc.

MODEL 5TI

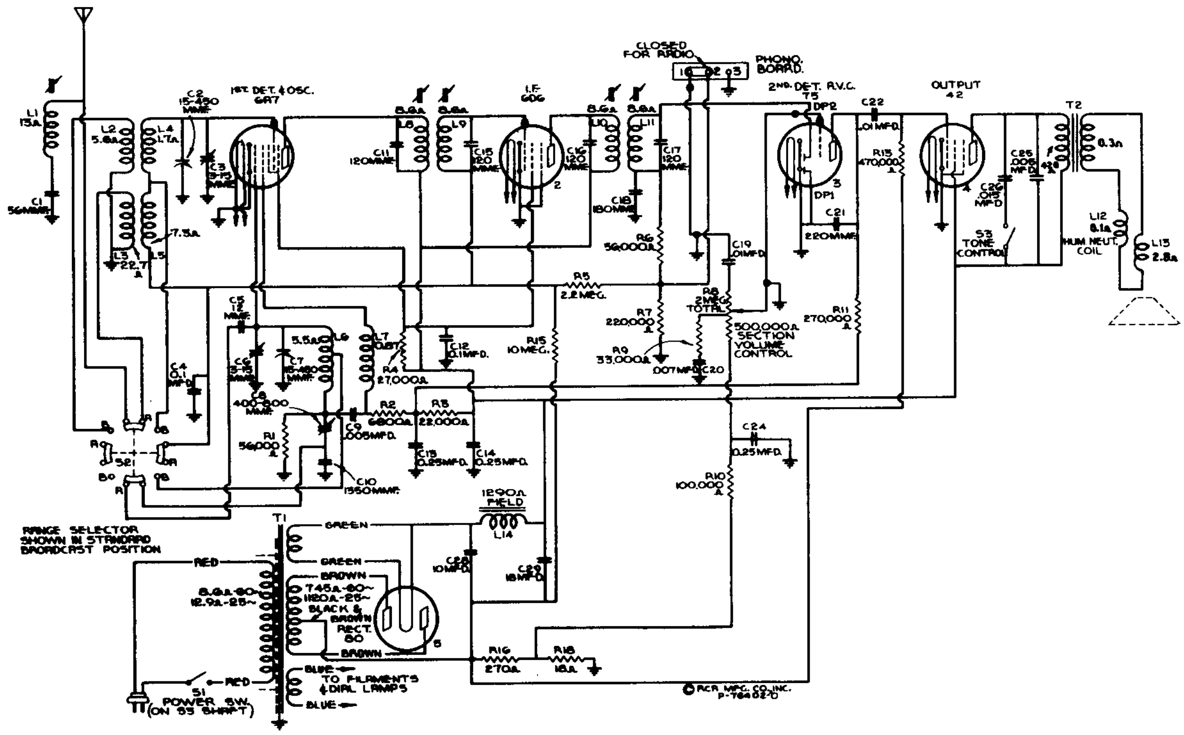


Figure 2—Schematic Circuit Diagram

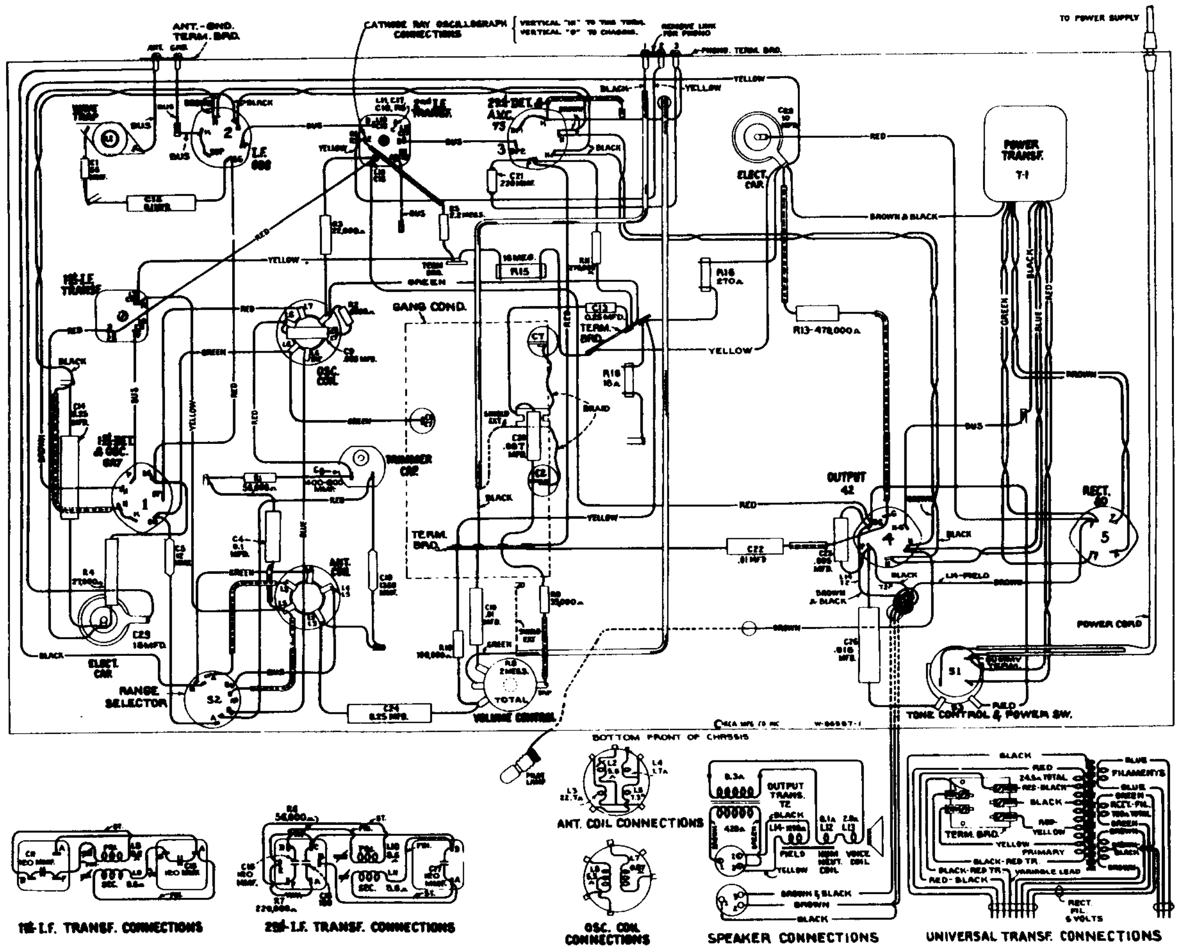


Figure 3—Chassis Wiring Diagram

RCA MANUFACTURING COMPANY, Inc.

MODEL 5T1

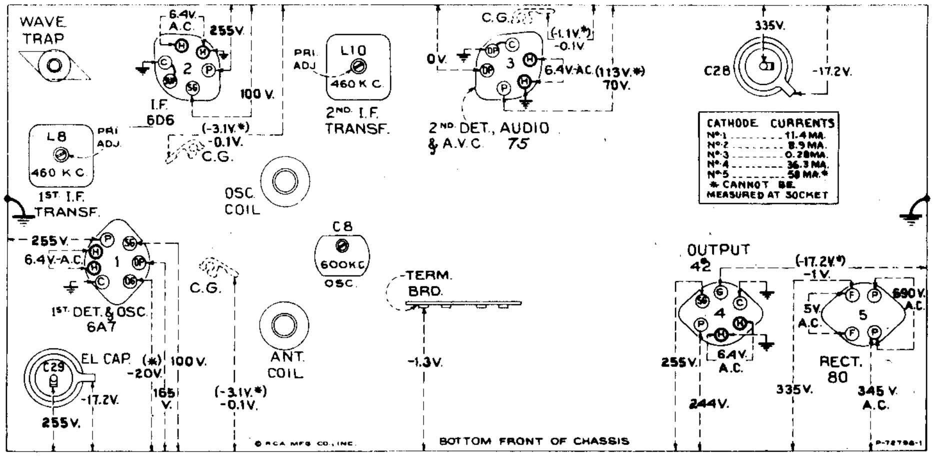


Figure 4—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard Broadcast")—No signal being received—Volume control minimum

***Note:** Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.*

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the extreme low-frequency end calibration mark on the "Standard broadcast" dial scale with the two-gang tuning condenser in full-mesh position.

Perform alignment in proper order tabulated below, starting with No. 1 and following all operations across, then No. 2, etc.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figure 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal is received from a station or the local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting				
1	6D6 i-f Grid Cap	.001 Mfd.	460 kc	No signal 550-750 kc	2nd i-f Trans.	L10 and L11	Max. (peak)
2	6A7 Det. Grid Cap	.001 Mfd.	460 kc	No signal 550-750 kc	1st i-f Trans.	L8 and L9	Max. (peak)
3	Ant. Post	200 Mmfd.	460 kc	No signal S. W. Band	Wave Trap	L1	Minimum Output
4	Ant. Post	200 Mmfd.	600 kc	600 kc	L-F Osc.	C8	Max. (peak)
5	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	H-F Osc.	C6	Max. (peak)
6	Ant. Post	200 Mmfd.	600 kc	Rock thru 600 kc	L-F Osc.	C8	Max. (peak)
7	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	H-F Osc.	C6	Max. (peak)
8	Ant. Post	200 Mmfd.	1,700 kc	1,700 kc	Ant.	C3	Max. (peak)

RCA MANUFACTURING COMPANY, Inc.

MODELS 5X, 5X3 & 5X4

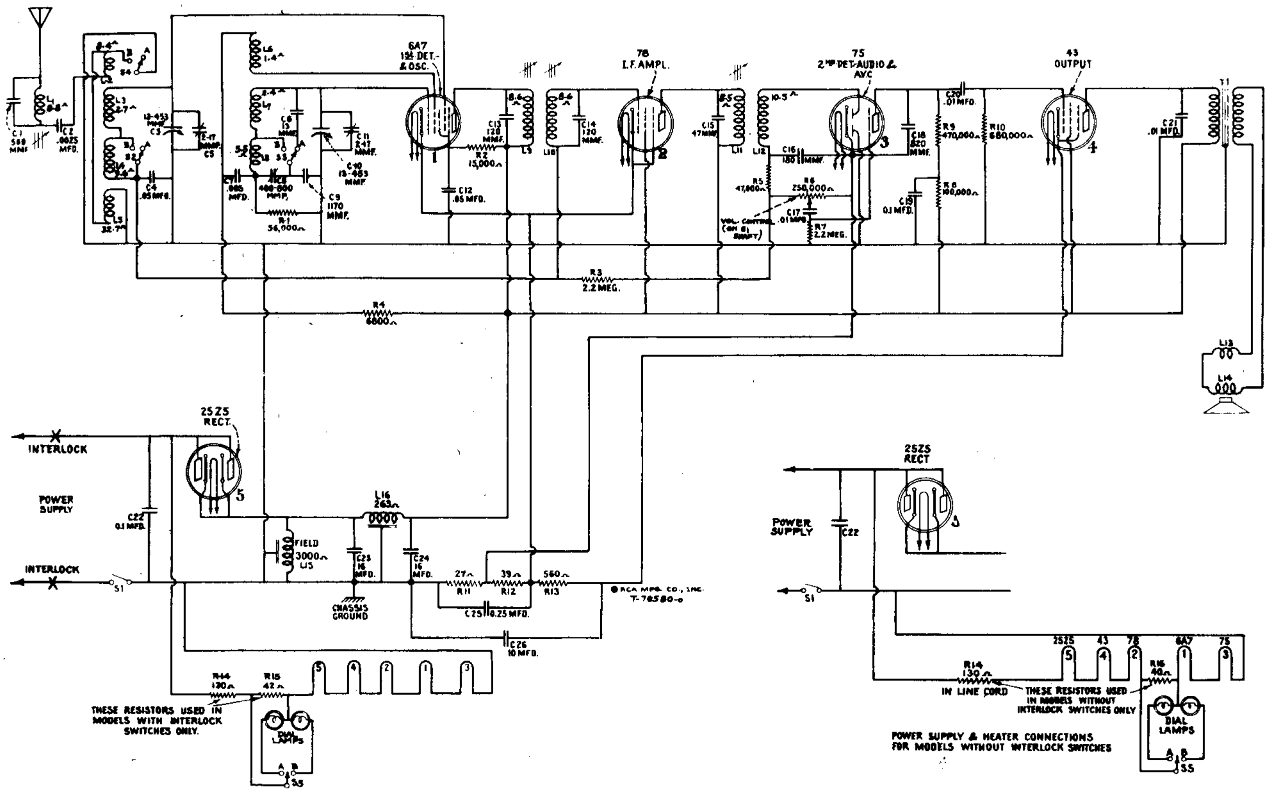


Figure 1—Schematic Circuit Diagram

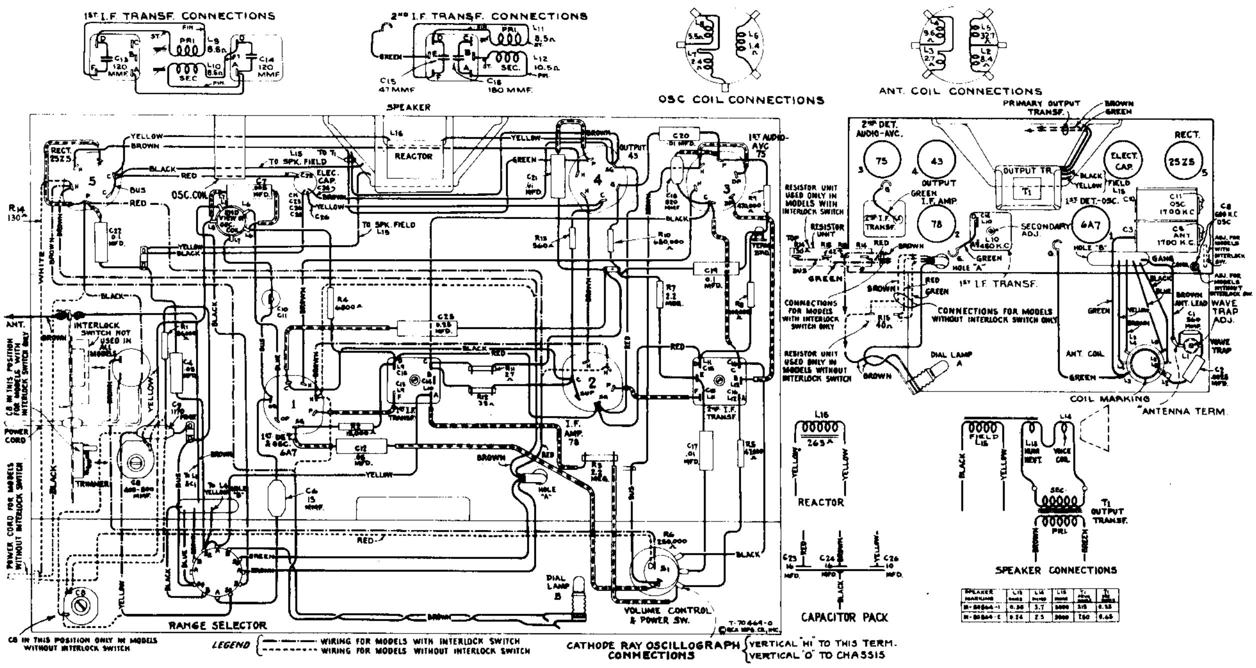


Figure 2—Chassis Wiring Diagram, Radiotron, Coil, and Trimmer Locations

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MODELS 5X, 5X3 & 5X4

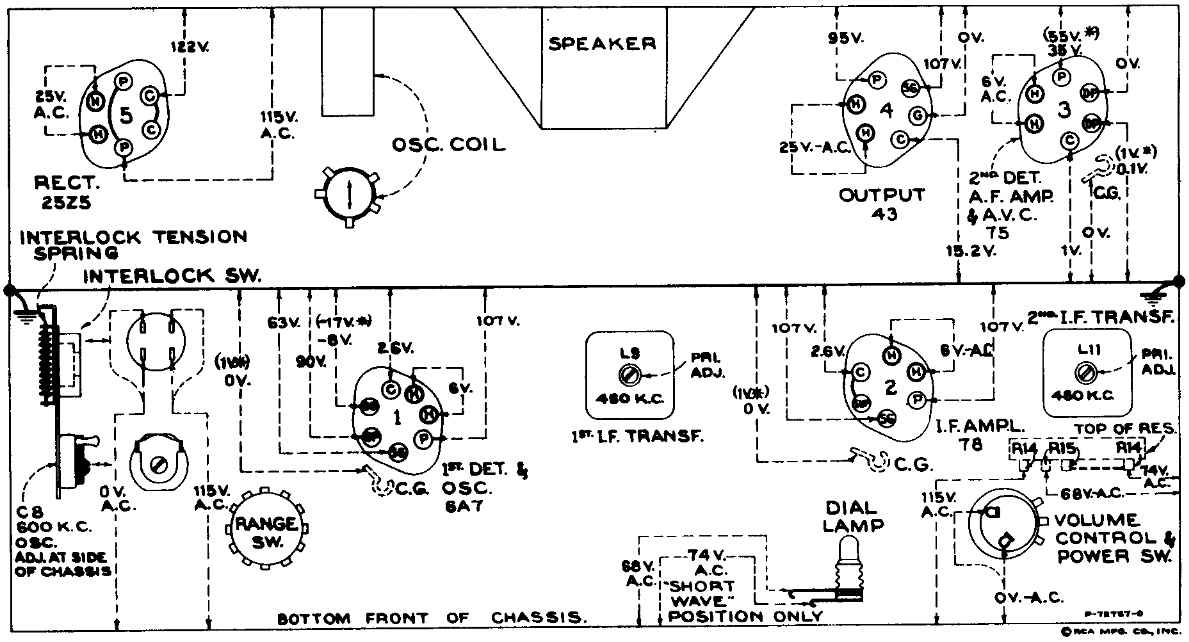

Figure 5—Radiotron Socket Voltages and Trimmer Locations

Measured at 115 volts, 60-cycle supply—For 115-volt d-c supply approximately 10% lower
Tuned to approximately 1,000 kc. ("Standard broadcast" range)—No signal being received—
Volume control setting optional

Radiotron Socket Voltages

The voltage values indicated from the Radiotron socket contacts, grid caps, resistors and terminals to receiver chassis ground on figure 5 will assist in locating cause for faulty operation. Each value as specified should hold within ± 20% when the receiver is normally operative at its rated line voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. These voltages were measured with set tuned to approximately 1,000 kc. ("Standard broadcast" range); no signal being received and volume control setting optional. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50 and 250 volts. Use nearest range above voltage to be measured. A-C voltages were measured with a corresponding a-c meter.

Caution: *Certain tests (e. g. alignment and voltage measurement) require operation of receiver with the chassis removed from the cabinet. To permit such operation on models using interlock switch, it will be necessary to hold the interlock switch (see figure 5) closed either by inserting a screwdriver, rod, or pencil through the small interlock hole at rear of chassis, or by temporarily unhooking the interlock tension spring and pushing the interlock bar towards the front of the chassis.* ***Avoid external grounding of receiver or associated equipment*** *since the power supply is connected to the receiver chassis. Carelessness may cause serious damage to equipment.* ***Replace interlock tension spring upon completion of test.***

Alignment Procedure

There are three alignment trimmers provided in the antenna coil and oscillator coil tuned circuits. The i-f transformer adjustments are made by means of three screws attached to molded magnetite cores. Re-adjustment may occasionally occur from continued extremes of climate, tampering, purported alteration for services, or after repairs have been made to the r-f or i-f tuned circuits. Improper alignment usually causes the impairment of sensitivity, selectivity, and tone quality. Such conditions will usually exist simultaneously.

In re-adjusting the tuned circuits, it is important to apply a definite procedure and to use adequate and reliable test equipment. A standard test oscillator, such as the **RCA Stock No. 9595** will be required as the source of the signal at the specified alignment frequencies. Visual indication of the receiver output during alignment is also necessary to accurately show when the correct point of adjustment is reached. The **RCA Stock No. 4317 Neon Output Indicator** is especially suitable for this use.

The procedure outlined below should be followed in adjusting the various trimming capacitors and molded magnetite cores:

I-F Core Adjustments

The three adjustment screws (one on top and one on bottom of first i-f transformer and one on bottom of second i-f transformer) are located as shown by figures 2 and 5. Each circuit must be aligned to a basic frequency of **460 kc.** To do this attach the output indicator across the loudspeaker voice coil or across the output transformer primary. Connect the output of the test oscillator through a **.05 mfd.** capacitor to the RCA-6A7 control grid, the ground of the test oscillator being connected to the receiver chassis through a **.05 mfd.** capacitor. Set the test oscillator to **460 kc.** Set the range selector to "Short-

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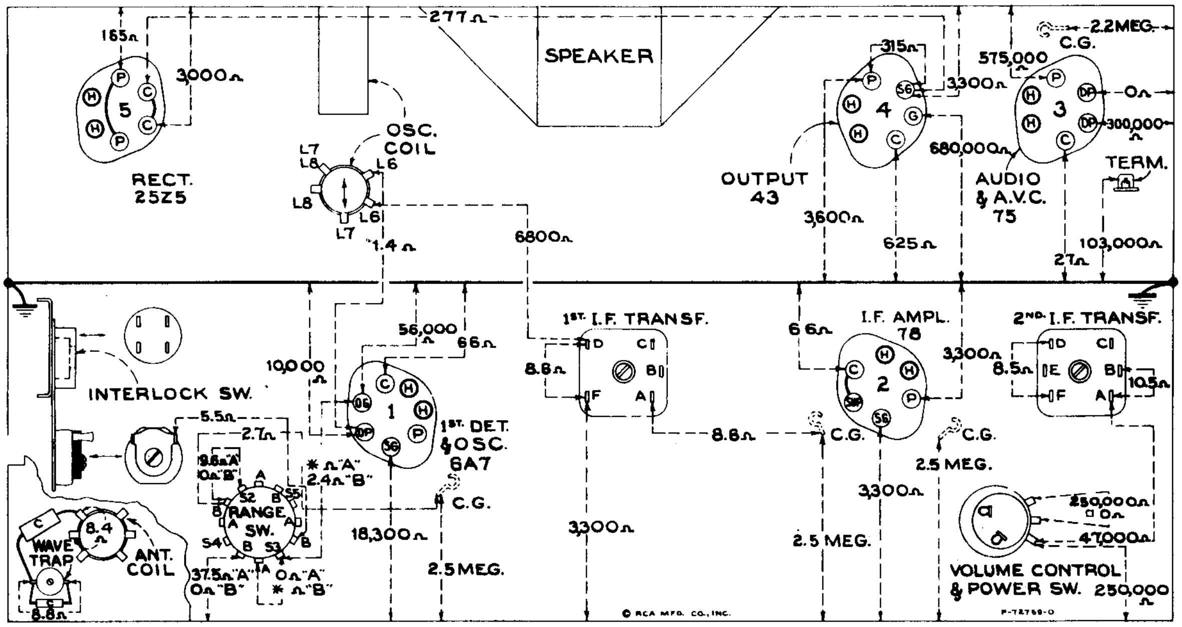
RCA MANUFACTURING COMPANY, Inc.

MODELS 5X, 5X3 & 5X4



NOTE:-
□ VOLUME CONTROL-"MIN." POSITION.
* OPEN CIRCUIT (LEAKAGE OF ELECTROLYTIC CAPACITORS ONLY).
"A" RANGE SW. IN "STANDARD BROADCAST" POSITION.
"B" RANGE SW. IN "SHORT WAVE" POSITION.

Figure 4—Resistance Diagram

Power supply disconnected—Radiotrons in sockets—Tuning condenser in full mesh
Range selector "Standard broadcast"—Volume control maximum

Resistance Measurements

The resistance values shown between Radiotron socket contacts, grid caps, resistors, terminals, and receiver chassis ground, on figure 4 have been carefully selected so as to facilitate a rapid check of the circuit for defective parts, bad joints, etc. The use of this diagram in conjunction with the Schematic Circuit Diagram, figure 1, and the Chassis Wiring Diagram, figure 2, will permit the location of certain troubles which would otherwise be difficult to ascertain. Each value as specified should hold within ± 20%. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. Resistance values were measured with the Radiotrons in sockets, power supply disconnected, tuning condenser in full mesh, and volume control set at maximum except where otherwise noted. In all cases of measuring the resistance between points of the circuit and ground, it will be necessary to connect the negative (–) terminal of the resistance meter to the chassis ground. If the polarity of the resistance meter is not known, it may be readily ascertained by connecting a d-c voltmeter of indicated polarity across the terminals of the device.

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wave" position. Advance the receiver volume control to its full-on position and adjust the receiver tuning control to a point within its range where no interference is encountered either from local broadcast stations or heterodyne oscillator. Increase the output of the test oscillator until a slight indication is apparent on the output indicator.

Adjust the bottom core screw of the second i-f transformer to produce maximum (peak) indicated receiver output. Then adjust the two core screws of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device.

During these adjustments regulate the test oscillator output so the indication is always as low as possible. By doing so, broadness of tuning due to a.v.c. action will be avoided. It is advisable to repeat the adjustment of all i-f core screws to assure that the interaction between them has not disturbed the original adjustment.

Wave-Trap Adjustment

Attach the output of the test oscillator to the "Antenna Terminal" (see wave-trap, top view chassis, figure 2) through an **80 mmfd.** capacitor, the ground connection of the test oscillator and receiver chassis being connected through capacitor as before. **Receiver "Antenna Wire" should be reeled up for this and the following r-f adjustments.**

Leave the test oscillator adjusted to **460 kc.** and range selector in "Short wave" position as before. Then adjust the wave-trap trimmer to the point which causes **maximum suppression** of the **460 kc.** signal.

R-F Trimmer Adjustments

Roughly calibrate the tuning dial by setting the pointer to the bottom horizontal line at the low fre-

RCA MANUFACTURING COMPANY, Inc.

MODELS 5X, 5X3 & 5X4

quency end of the broadcast scale with the two-gang tuning condenser at its maximum capacity. The output indicator should be left connected to the output system. The connections for the test oscillator remain the same as for "Wave-trap" adjustment. Volume control should be in maximum position. Make sure range selector is set to "Standard broadcast."

Set oscillator and antenna trimming capacitors **C11** and **C5**, respectively, to a position near minimum capacitance (plates near out). Adjust the test oscillator to **1,700 kc.**

Tune the receiver to pick up this signal (near **1,700 kc.** on dial) for maximum response disregarding dial reading. Always keep test oscillator output as low as is possible and still obtain visual indication. Adjust trimming capacitors **C11** and **C5** so that each produces maximum (peak) receiver output, re-adjusting receiver tuning slightly if necessary, but using the minimum trimming capacitance possible to obtain peaks. Adjust the dial pointer (without disturbing gang tuning condenser) to a dial reading of **1,700 kc.**

Shift the test oscillator to **600 kc.** Tune the receiver to receive the signal disregarding the dial reading at which it is best received. Then adjust the oscillator series capacitor, **C8**, simultaneously rocking the tuning control backward and forward through the signal until maximum receiver output results from these combined operations. The adjustment at **1,700 kc.** should then be repeated to correct for any change which may have been caused by the oscillator series trimming capacitor adjustment.

Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed either permanently by cutting it away with a sharp knife, or by softening its cement with a very light application of acetone using care not to allow the acetone to flow down into the air gap. The dust cover may be cemented back in place with ambroid upon completion of adjustment.

Frequency Ranges
"Standard Broadcast" (A)......... 540-1,800 kc.
"Short Wave" (B)................1,800-6,500 kc.

Alignment Frequencies
"Standard Broadcast" (A)
600 kc. (osc.); 1,700 kc. (osc. and ant.)
"Short Wave" (B)................None required

Intermediate Frequency..460 kc.

A range selector switch, consisting of S2, S3, S4, and S5, is used to connect the various sections of these coil systems and to illuminate the proper dial scale for the band in operation. The coils are tuned by a variable two-section gang condenser having trimming capacitors in shunt with each section. A series trimming capacitor is also associated with the "Standard broadcast" oscillator coil.

The intermediate frequency amplifier system consists of an RCA-78 in a transformer coupled circuit. This stage operates at a basic frequency of 460 kc. Adjustable magnetite cores are provided for adjusting inductance of the input i-f transformer (primary and secondary) and the output transformer (primary) windings.

Detector and A. V. C.

The modulated signal, as obtained from the output of the i-f stage is detected by one of the diodes in the RCA-75 tube. The audio frequency component, secured by this process, is transferred from the movable arm of the volume control R6 through coupling capacitor C17 to the control grid of the RCA-75 for voltage amplification. The d-c voltage which results from detection of the signal is used for automatic volume control. This voltage which develops across resistor R6 is applied as automatic control grid bias to the first-detector and i-f tube through a suitable resistance filter circuit.

Audio System

The audio frequency component, mentioned under "Detection and a.v.c.," transferred to the control grid of the RCA-75, is amplified in the tube and then coupled to the control grid of the power output tube RCA-43 through capacitor C20. The output of the power amplifier is transformer coupled into the dynamic loudspeaker.

Rectifier

The plate, grid, cathode and the loudspeaker field voltages required for the operation of this receiver are supplied by the RCA-25Z5 tube operating as a half-wave rectifier.

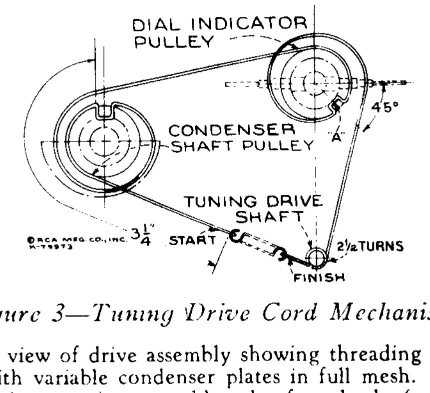
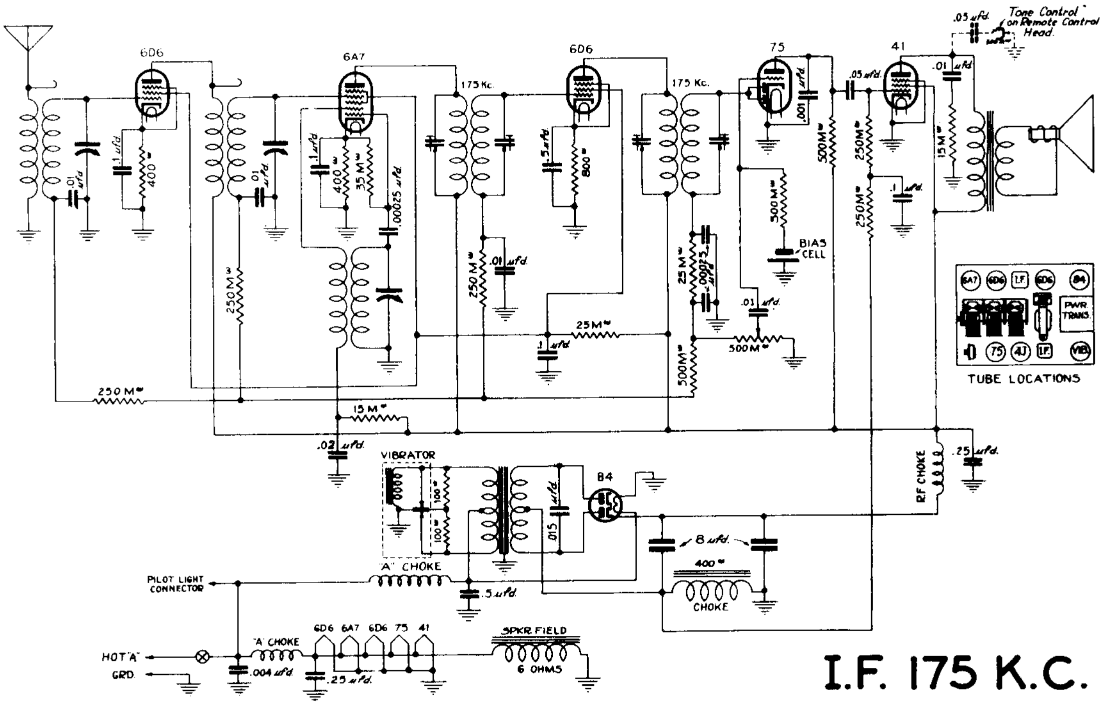


Figure 3—Tuning Drive Cord Mechanism

Rear view of drive assembly showing threading of drive cord with variable condenser plates in full mesh. To perform this operation, unsolder the four leads (connected between antenna coil and range selector switch) from the range selector switch, unsolder antenna lead-in wire from wave-trap terminal, unsolder lead from rear section of gang tuning condenser, and remove the four screws which secure the tuning drive frame to the chassis proper. This frame with gang tuning condenser still attached may now be easily removed for the threading operation. The relative position of the parts and method of threading are shown on the above diagram. In case the cord is too long for proper tension, it may be effectively shortened by first releasing finish end of cord, inserting a match or other shim under the cord at point "A" and then re-hooking the end of the cord to the tension spring. Replace drive assembly and re-solder leads.

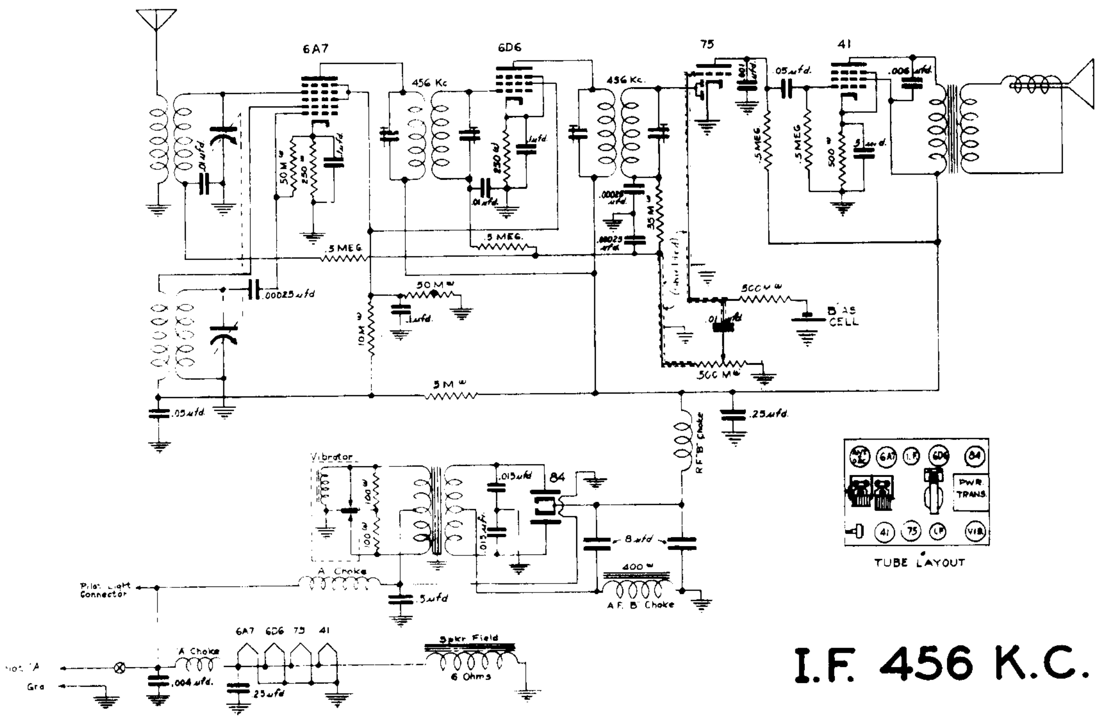
RADOLEK COMPANY

MODEL 10,150



I.F. 175 K.C.

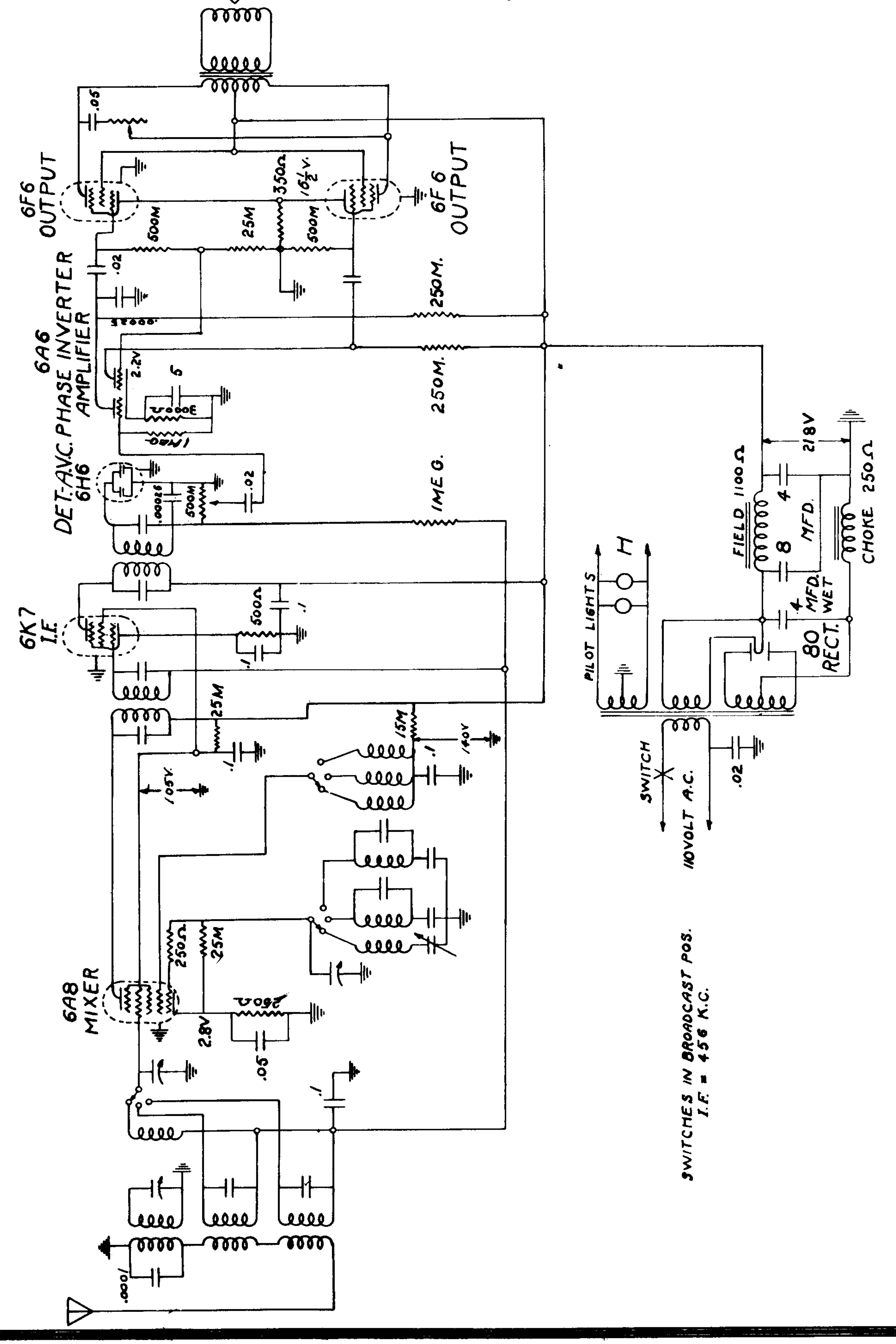
MODEL 10,153



I.F. 456 K.C.

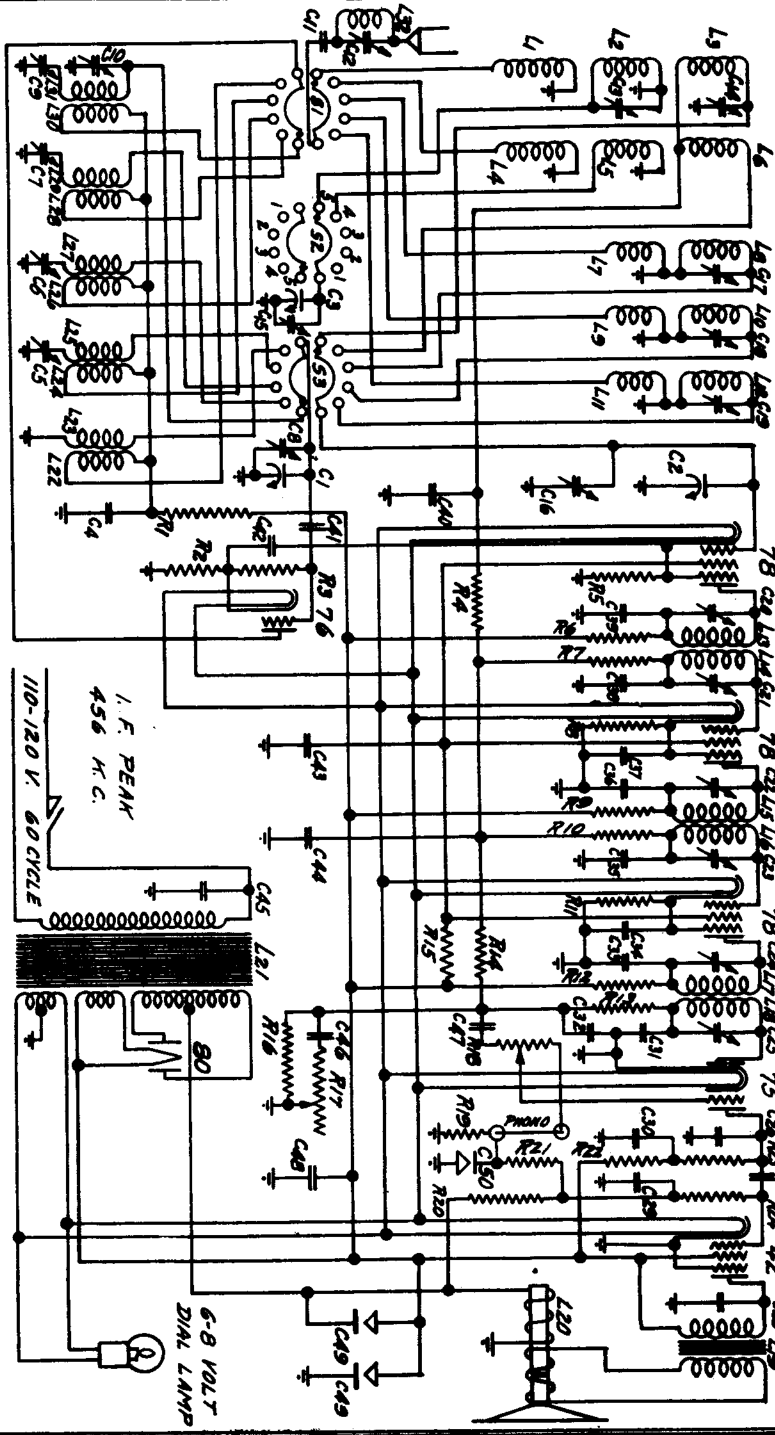
RADOLEK COMPANY

MODEL 10,942



REPUBLIC INDUSTRIES

MODEL 311



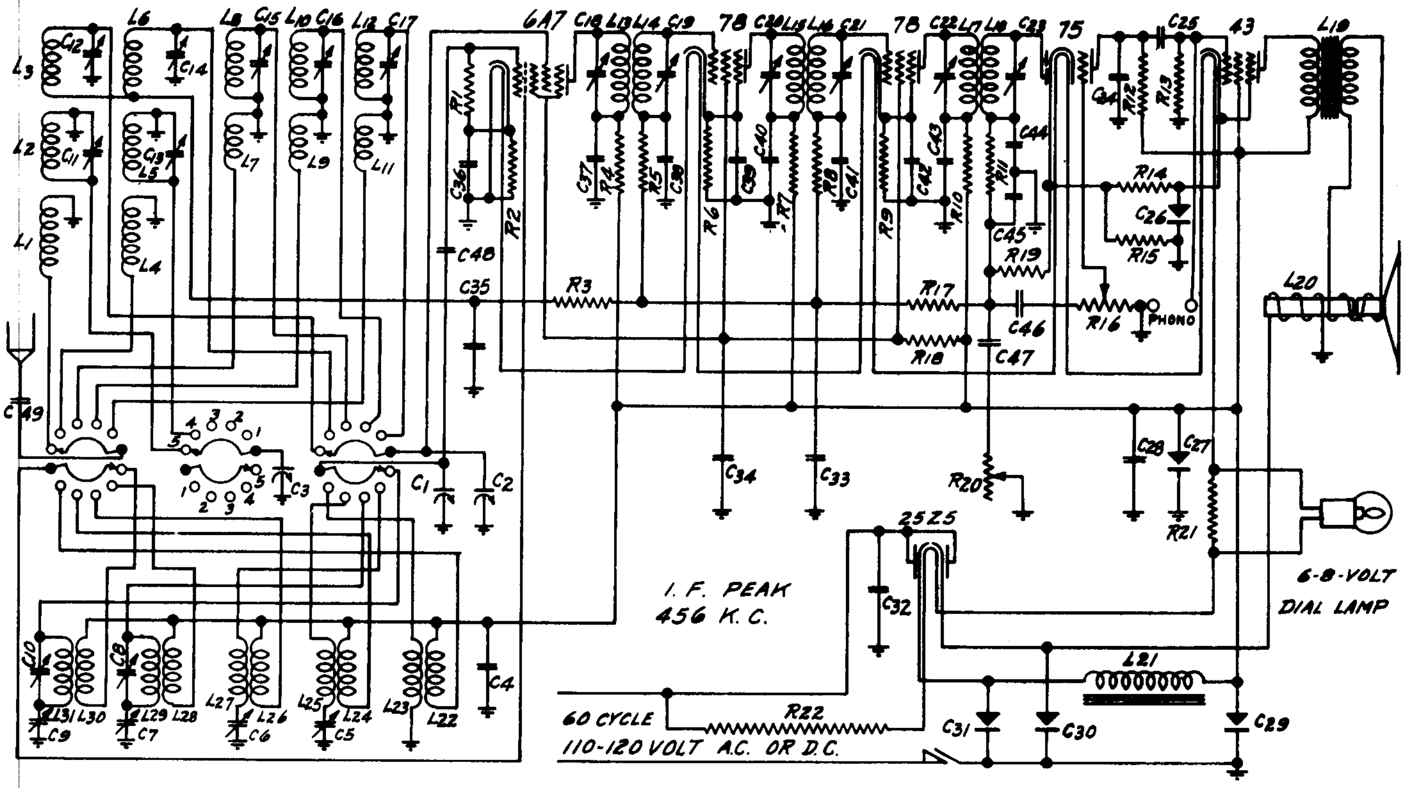
CODE NO.	PART NO.	RESISTORS
R1	53-277	10,000 Ohm Oscillator Feed Resistor - Type J
R2	53-1062	250 Ohm Oscillator Cathode Resistor
R3	53-941	20,000 Ohm Oscillator Grid Resistor
R4	53-923	100,000 Ohm A.V.C. Network Resistor
R5	53-1144	2,000 Ohm First Detector Cathode Resistor
R6	53-919	5,000 Ohm First Detector Plate Isolation
R7	53-923	100,000 Ohm First I.F. Grid Isolation
R8	53-1063	500 Ohm First I.F. Cathode Resistor
R9	53-919	5,000 Ohm First I.F. Plate Isolation
R10	53-923	100,000 Ohm Second I.F. Grid Isolation
R11	53-1063	500 Ohm Second I.F. Cathode Resistor
R12	53-919	5,000 Ohm Second I.F. Plate Isolation
R13	53-898	50,000 Ohm Diode Filter Resistor
R14	53-926	1 Meg Ohm A.V.C. Network Resistor
R15	53-921	40,000 Ohm R.F. & I.F. Screen Feed Resistor
R16	53-925	500,000 Ohm A.V.C. Load Resistor
R17	19-1317	250,000 Ohm Tone Control
R18	19-1291	500,000 Ohm Volume Control & Switch
R19	53-919	5,000 Ohm C Bias Network Resistor
R20	53-926	1 Meg Ohm C Bias Network Resistor
R21	53-922	75,000 Ohm C Bias Network Resistor
R22	53-923	100,000 Ohm 75 Plate Hum Resistor
R23	53-924	250,000 Ohm 75 Plate Resistor
R24	53-925	500,000 Ohm 42 Grid Resistor

CODE NO.	PART NO.	CONDENSERS
C1	77-1581	16-366 MMFD. First Section of 3 Gang Condenser
C2	77-1581	16-366 MMFD. Second Section of 3 Gang Condenser
C3	77-1581	16-366 MMFD. Third Section of 3 Gang Condenser
C4	75-272A	.1 Mfd. 200 Volt Oscillator Feed By-Pass Condenser
C5	78-1572	1600 MMFD. No. 2 Band Oscillator Reciprocal Trimmer
C6	78-1572	600 MMFD. No. 3 Band Oscillator Reciprocal Trimmer
C7	78-1569	450 MMFD. No. 4 Band Oscillator Reciprocal Trimmer
C8	77-1581	No. 4 Band Oscillator Parallel Trimmer on C-1
C9	78-1569	140 MMFD. No. 5 Band Oscillator Reciprocal Trimmer
C10	78-1588	3-30 MMFD. No. 5 Band Oscillator Parallel Trimmer
C11	75-269A	.01 Mfd. 400 Volt Antenna Series Condenser
C12		900 MMFD. Wave Trap Trimmer
C13	78-1588	3-30 MMFD. No. 5 Band First Preselector Trimmer
C14	78-1588	3-30 MMFD. No. 5 Band Second Preselector Trimmer
C15	77-1581	No. 4 Band First Preselector Trimmer on C-3
C16	77-1581	No. 4 Band Second Preselector Trimmer on C-2
C17	78-1588	3-30 MMFD. No. 3 Band Preselector Trimmer
C18	78-1588	3-30 MMFD. No. 4 Band Preselector Trimmer
C19	78-1588	3-30 MMFD. No. 5 Band Preselector Trimmer
C20	78-1561	70-120 MMFD. First I.F. Primary Trimmer
C21	78-1561	70-120 MMFD. First I.F. Secondary Trimmer
C22	78-1561	70-120 MMFD. Second I.F. Primary Trimmer
C23	78-1561	70-120 MMFD. Second I.F. Secondary Trimmer
C24	78-1561	70-120 MMFD. Third I.F. Primary Trimmer
C25	78-1561	70-120 MMFD. Third I.F. Secondary Trimmer
C26	76-265	.001 Mfd. Mica 75 Plate Filter Condenser
C27	75-269A	.01 Mfd. 400 Volt Audio Feed Condenser
C28	75-1132	.002 Mfd. 600 Volt 42 Plate Filter Condenser
C29	75-183A	.2 Mfd. 200 Volt C Bias Network Condenser
C30	75-1326A	.1 Mfd. 400 Volt 75 Plate Hum Filter Condenser
C31	76-339	.0001 Mfd. Mica Diode Filter Condenser
C32	76-339	.0001 Mfd. Mica Diode Filter Condenser
C33	75-269A	.01 Mfd. 400 Volt Second I.F. Plate Isolation Condenser
C34	75-272A	.1 Mfd. 200 Volt Second I.F. Cathode By-Pass Condenser
C35	75-269A	.01 Mfd. 400 Volt Second I.F. Grid Isolation Condenser
C36	75-269A	.01 Mfd. 400 Volt First I.F. Plate Isolation Condenser
C37	75-272A	.1 Mfd. 200 Volt First I.F. Cathode By-Pass Condenser
C38	75-269A	.01 Mfd. 400 Volt First I.F. Grid Isolation Condenser
C39	75-269A	.01 Mfd. 400 Volt First Detector Plate Isolation Condenser
C40	75-272A	.1 Mfd. 200 Volt A.V.C. Network By-Pass Condenser
C41	76-264	.00005 Mfd. Mica Oscillator Coupling Condenser
C42	75-269-A	.01 Mfd. 400 Volt Oscillator Feed Condenser
C43	75-267A	.5 Mfd. 200 Volt R.F. & I.F. Screen By-Pass Condenser
C44	75-272A	.1 Mfd. 200 Volt A.V.C. Network By-Pass Condenser
C45	75-269A	.01 Mfd. 400 Volt 110 Line By-Pass Condenser
C46	75-269A	.01 Mfd. 400 Volt Tone Control Condenser
C47	75-269A	.01 Mfd. 400 Volt Audio Feed Condenser
C48	75-266	1. Mfd. 400 Volt B Supply By-Pass Condenser
C49	18-1129	4-4 Mfd. 450 Volt Electrolytic Filter Condenser
C50	18-928	25 Mfd. 25 Volt Electrolytic Condenser

CODE NO.	PART NO.	INDUCTANCES
L1	17-1661	No. 5 Band Preselector Primary
L2	17-1661	No. 5 Band Preselector First Secondary
L3	17-1661	No. 5 Band Preselector Second Secondary
L4	17-2003	No. 4 Band Preselector Primary
L5	17-2003	No. 4 Band Preselector First Secondary
L6	17-2003	No. 4 Band Preselector Second Secondary
L7	17-1668	No. 3 Band Preselector Primary
L8	17-1668	No. 3 Band Preselector Secondary
L9	17-1666	No. 2 Band Preselector Primary
L10	17-1666	No. 2 Band Preselector Secondary
L11	17-1664	No. 1 Band Preselector Primary
L12	17-1664	No. 1 Band Preselector Secondary
L13	17-2010	First I.F. Primary
L14	17-2010	First I.F. Secondary
L15	17-2010	Second I.F. Primary
L16	17-2010	Second I.F. Secondary
L17	17-2010	Third I.F. Primary
L18	17-2010	Third I.F. Secondary
L19	64-364	Single 42 Output Transformer
L20	64-364	2500 Ohm Speaker Field
L21	80-1675	Power Transformer
L22	17-1663	No. 1 Band Oscillator Primary
L23	17-1663	No. 1 Band Oscillator Secondary
L24	17-1665	No. 2 Band Oscillator Primary
L25	17-1665	No. 2 Band Oscillator Secondary
L26	17-1667	No. 3 Band Oscillator Primary
L27	17-1667	No. 3 Band Oscillator Secondary
L28	17-1645	No. 4 Band Oscillator Primary
L29	17-1645	No. 4 Band Oscillator Secondary
L30	17-1647	No. 5 Band Oscillator Primary
L31	17-1647	No. 5 Band Oscillator Secondary
L32	37-2001	Wave Trap Assembly
	71-2001	5 Band Preselector Unit Assembly
	68-2003	First I.F. Transformer Assembly
	68-2003	Second I.F. Transformer Assembly
	68-2004	Third I.F. Transformer Assembly
S1	66-1579	Rear Panel of Wave Band Switch
S2	66-1579	Center Panel of Wave Band Switch
S3	66-1579	Front Panel of Wave Band Switch

REPUBLIC INDUSTRIES

MODEL 316



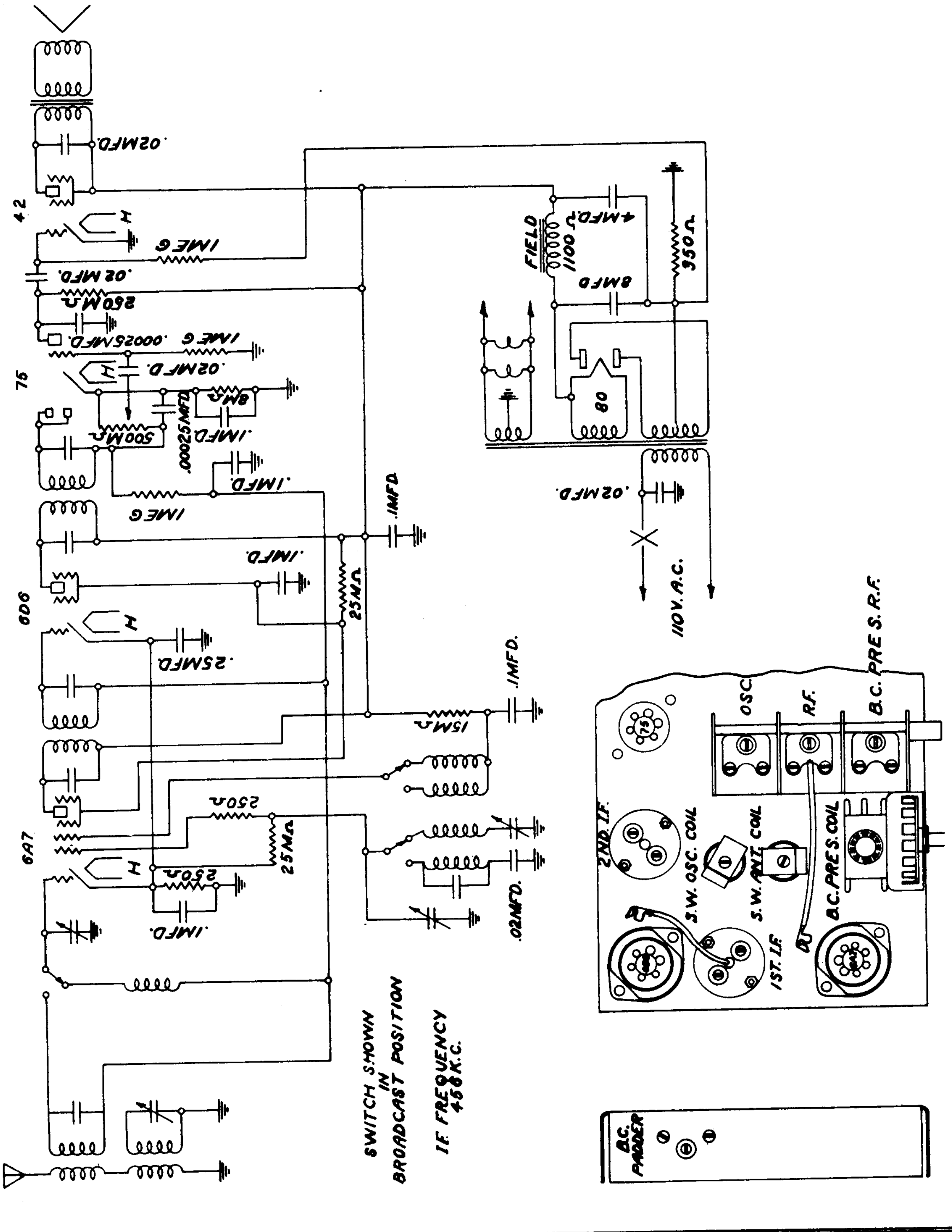
CODE	PART NO.	RESISTORS
R1	941	20,000 Ohm Oscillator Grid Resistor
R2	1062	250 Ohm Oscillator Cathode Resistor
R3	923	100,000 Ohm A.V.C. Network Resistor
R4	919	5,000 Ohm 6A7 Plate Isolation Resistor
R5	923	100,000 Ohm First I.F. Grid Isolation Resistor
R6	1063	500 Ohm First I.F. Cathode Resistor
R7	919	5,000 Ohm First I.F. Plate Isolation Resistor
R8	923	100,000 Ohm Second I.F. Grid Isolation Resistor
R9	1063	500 Ohm Second I.F. Cathode Resistor
R10	919	5,000 Ohm Second I.F. Plate Isolation Resistor
R11	898	50,000 Ohm Diode Plate Filter Resistor
R12	923	100,000 Ohm 75 Plate Load Resistor
R13	925	500,000 Ohm 43 Grid Resistor
R14	1063	500 Ohm 43 Cathode Resistor
R15	1122	40 Ohm 75 Cathode Resistor
R16	1291	500,000 Ohm Volume Control & Switch
R17	926	1 Megohm A.V.C. Network Resistor
R18	919	5,000 Ohm R.F. & I.F. Screen Feed Resistor
R19	925	500,000 Ohm A.V.C. Load Resistor
R20	1317	250,000 Ohm Tone Control
R21	1308	20 Ohm Pilot Light Shunt Resistor
R22	1125	130 Ohm Resistor in Power Cord

CODE	PART NO.	CONDENSERS
C1	1581	16-366 MMFD. First Section of 3 Gang Condenser
C2	1581	16-366 MMFD. Second Section of 3 Gang Condenser
C3	1581	16-366 MMFD. Third Section of 3 Gang Condenser
C4	272A	.1 MFD. 200 Volt Oscillator Feed By-Pass Condenser
C5	1572	1600 MMFD. No. 2 Band Oscillator Reciprocal Trimmer
C6	1572	600 MMFD. No. 3 Band Oscillator Reciprocal Trimmer
C7	1569	450 MMFD. No. 4 Band Oscillator Reciprocal Trimmer
C8	1581	No. 4 Band Oscillator Parallel Trimmer on C1
C9	1569	140 MMFD. No. 5 Band Oscillator Reciprocal Trimmer
C10	1588	3-30 MMFD. No. 5 Band Oscillator Parallel Trimmer
C11	1588	3-30 MMFD. No. 5 Band First Preselector Trimmer
C12	1588	3-30 MMFD. No. 5 Band Second Preselector Trimmer
C13	1581	No. 4 Band First Preselector Trimmer on C3
C14	1581	No. 4 Band Second Preselector Trimmer on C2
C15	1588	3-30 MMFD. No. 3 Band Preselector Trimmer
C16	1588	3-30 MMFD. No. 2 Band Preselector Trimmer
C17	1588	3-30 MMFD. No. 1 Band Preselector Trimmer
C18	1561	70-120 MMFD. First I.F. Primary Trimmer
C19	1561	70-120 MMFD. First I.F. Secondary Trimmer
C20	1561	70-120 MMFD. Second I.F. Primary Trimmer
C21	1561	70-120 MMFD. Second I.F. Secondary Trimmer
C22	1561	70-120 MMFD. Third I.F. Primary Trimmer
C23	1561	70-120 MMFD. Third I.F. Secondary Trimmer
C24	265	.001 Mfd. Mica 75 Plate Filter Condenser
C25	269A	.01 Mfd. 400 Volt Audio Feed Condenser
C26	928	25 Mfd. 25 Volt Dry Electrolytic Condenser
C27	1379	4 Mfd. 375 Volt Dry Electrolytic Condenser
C28	266	1 Mfd. 400 Volt B Supply By-Pass Condenser
C29	1295	4 Mfd. 150 Volt Dry Electrolytic Condenser
C30	1295	4 Mfd. 150 Volt Dry Electrolytic Condenser
C31	1295	10 Mfd. 150 Volt Dry Electrolytic Condenser
C32	272A	.1 Mfd. 200 Volt Line By-Pass Condenser
C33	272A	.1 Mfd. 200 Volt A.V.C. Network By-Pass Condenser
C34	267A	.5 Mfd. 200 Volt Screen By-Pass Condenser
C35	269A	.01 Mfd. 400 Volt A.V.C. Network By-Pass Condenser
C36	272A	.1 Mfd. 200 Volt 6A7 Cathode By-Pass Condenser
C37	269A	.01 Mfd. 400 Volt 6A7 Plate Isolation Condenser
C38	269A	.01 Mfd. 400 Volt First I.F. Grid Isolation Condenser
C39	272A	.1 Mfd. 200 Volt First I.F. Cathode By-Pass Condenser
C40	269A	.01 Mfd. 400 Volt First I.F. Plate Isolation Condenser
C41	269A	.01 Mfd. 400 Volt Second I.F. Grid Isolation Condenser
C42	272A	.1 Mfd. 200 Volt Second I.F. Cathode By-Pass Condenser
C43	269A	.01 Mfd. 400 Volt Second I.F. Plate Isolation Condenser
C44	339	.0001 Mfd. Mica Diode Filter Condenser
C45	339	.0001 Mfd. Mica Diode Filter Condenser
C46	269A	.01 Mfd. 400 Volt 75 Grid Feed Condenser
C47	269A	.01 Mfd. 400 Volt Tone Control Condenser
C48	268	.00025 Mfd. Mica Oscillator Coupling Condenser
C49	268	.00025 Mfd. Mica Antenna Series Condenser

CODE	PART NO.	INDUCTANCES
L1	1661	No. 5 Band Preselector Primary
L2	1661	No. 5 Band Preselector First Secondary
L3	1661	No. 5 Band Preselector Second Secondary
L4	1481	No. 4 Band Preselector Primary
L5	1481	No. 4 Band Preselector First Secondary
L6	1481	No. 4 Band Preselector Second Secondary
L7	1668	No. 3 Band Preselector Primary
L8	1668	No. 3 Band Preselector Secondary
L9	1666	No. 2 Band Preselector Primary
L10	1666	No. 2 Band Preselector Secondary
L11	1664	No. 1 Band Preselector Primary
L12	1664	No. 1 Band Preselector Secondary
L13	1633	First I.F. Primary
L14	1633	First I.F. Secondary
L15	1633	Second I.F. Primary
L16	1633	Second I.F. Secondary
L17	1633	Third I.F. Primary
L18	1633	Third I.F. Secondary
L19	1653	Single 43 Output Transformer
L20	1653	3000 Ohm Speaker Field
L21	940	20 Henry Filter Choke
L22	1663	No. 1 Band Oscillator Primary
L23	1663	No. 1 Band Oscillator Secondary
L24	1665	No. 2 Band Oscillator Primary
L25	1665	No. 2 Band Oscillator Secondary
L26	1667	No. 3 Band Oscillator Primary
L27	1667	No. 3 Band Oscillator Secondary
L28	1645	No. 4 Band Oscillator Primary
L29	1645	No. 4 Band Oscillator Secondary
L30	1647	No. 5 Band Oscillator Primary
L31	1647	No. 5 Band Oscillator Secondary

SEARS, ROEBUCK & CO.

MODELS 1907, 1939 & 1957



SEARS, ROEBUCK & CO.

MODELS 1907, 1939 & 1957

The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 6000 and 14,000 K.C. and output meter to be connected across the primary or secondary of the output transformers. If possible, all alignment should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

I. F. ALIGNMENT: Adjust the test oscillator to 456 K.C. and connect the output to the grid of the first detector tubes (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I. F. trimmers to peak or maximum reading on the output meter.

R. F. ALIGNMENT: Adjust the oscillator to 1400 K. C. and connect the output to the antenna post through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 K. C. and adjust the rear gang condenser trimmer to peak. Next re-set the dial pointer on the receiver and the test oscillator to 600 K. C. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R. F. section. The padding condenser is located on the left-hand end of the chassis. Return to 1400 K. C. and again go over the adjustments at that frequency to be sure they have not been thrown out of adjustment.

SHORT WAVE BANDS

The foreign band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coil located on the top of the chassis. Set the test oscillator to 14 megacycles. The oscillator coil is located near the 1st I. F. transformer.

The gang condenser trimmers are not to be used for alignment of the short wave band.

SERVICE HINTS

LOW VOLUME: This may be caused by weak or defective tubes (replace with set of tubes known to be in good condition), antenna disconnected from the receiver , open antenna coil, open or shorted by-pass condensers, or defective wave change switch.

LOW VOLTAGE: Low voltage may be caused by a defective 80 rectifier, low line voltage, a defective power transformer, or shorted by-pass condensers.

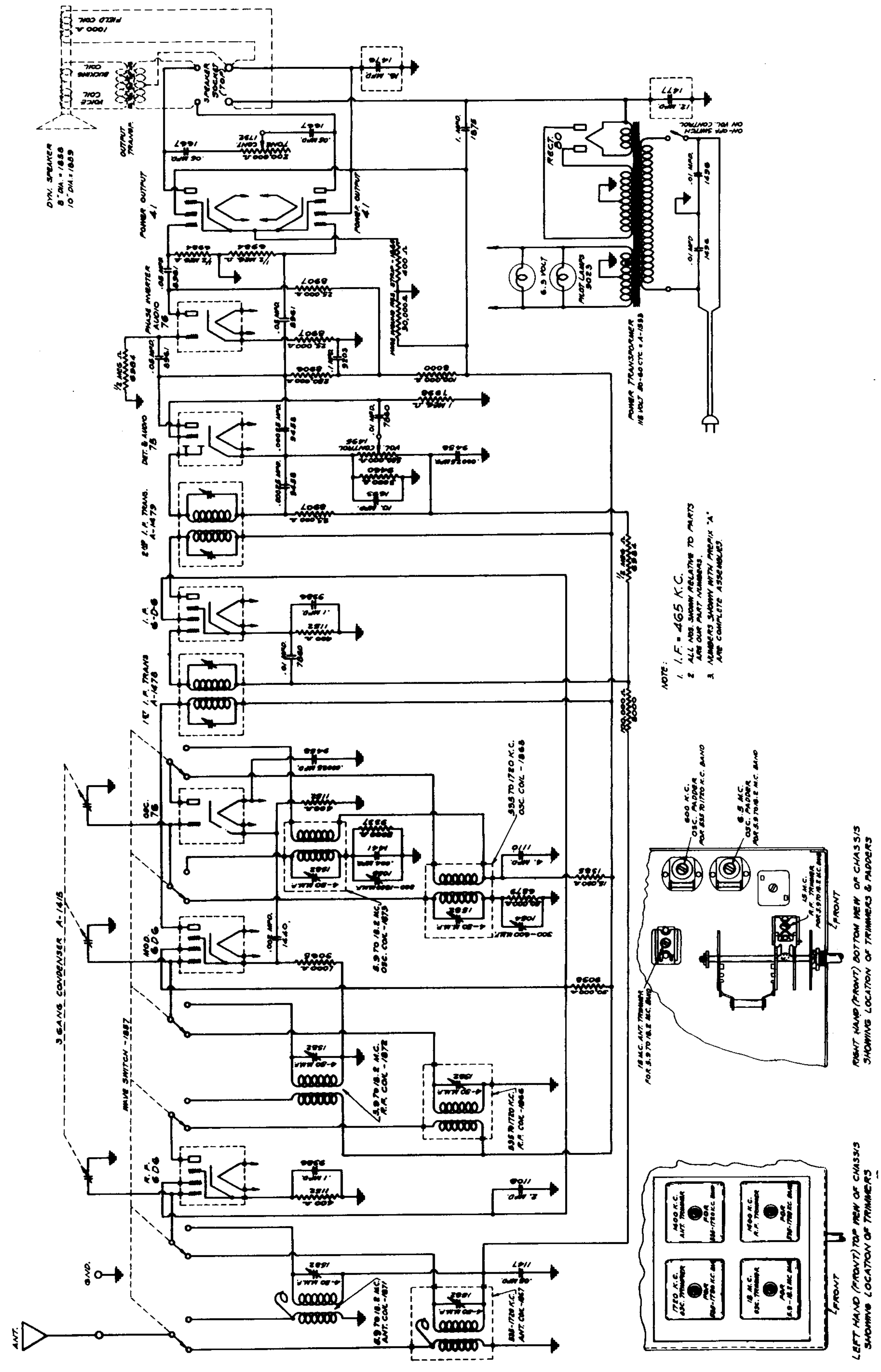
HUM: Excessive hum may be caused by a defective 80 tube, open filter condenser, or open audio grid lead.

DISTORTED REPRODUCTION: This may be caused by a defective 75 or 42 tube or a ground or open in the automatic volume control circuit. Check all circuits with an ohmmeter or continuity tester.

OSCILLATION: Most trouble from oscillation is due to open by-pass or defective filter condenser. The grid lead on the 75 tube may also cause a howl if it runs too close to the 42 tube.

SENTINEL RADIO CORP.

MODEL 6A



SENTINEL RADIO CORP.

MODEL 6A

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the test oscillator output to the control grid of the 6D6 modulator tube. Leave the grid cap disconnected and connect a 1 meg ohm resistor from the modulator grid to the chassis base. Connect the ground side of the test oscillator to the receiver ground.

2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).

3. Align the first intermediate transformer by turning one of the trimmer screws accessible through holes in the top of the transformer shields up and down (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screw of the same transformer for maximum sensitivity.

4. Adjust the other intermediate transformer in the same manner as the first IF transformer.

TO ALIGN THE VARIABLE CONDENSER:

It is important when aligning the gang condenser, padding and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The coils located on the top of the chassis which have trimmer condensers mounted on them and the padding and trimmer condensers located underneath the chassis will be referred to by their function as indicated on the circuit diagram.

1. Connect the high output side of the test oscillator through a .00025 Mfd. condenser to the set antenna lead and the ground to the set ground.

2. Place the band selector switch for operation on the 18.2 to 5.9 megacycle band, tune the receiver dial, and set the test oscillator frequency to EXACTLY 18 MEGACYCLES. THEN TUNE IN THE 18 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 18 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer two peaks, the fundamental and the image peak, will be noticed. CARE MUST BE TAKEN SO THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 18 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 18 megacycles always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 18 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 17 megacycles. Vary the receiver dial slightly to the right and left of 17 megacycles, and if the fundamental peak was used in aligning at 18 megacycles the test oscillator signal will be heard at approximately 17 megacycles on the receiver dial. If it is not possible to receive the signal then the fundemental peak was not used and the 18 megecycle oscillator trimmer must be properly readjusted.

3. Leave the band selector switch for operation on the 18.2 to 5.9 megacycle band, tune the receiver dial and the test oscillator frequency to approximately 15 megacycles. Then, while rocking the gang condenser slightly to the right and left adjust the 15 megacycle antenna and R1 trimmer for maximum sensitivity.

4. With the band selector switch set for operation on the 5.9 to 18.2 megacycle band, tune the receiver dial, and set the test oscillator frequency to approximately 6.5 megacycles. While rocking the gang condenser slightly to the right and left adjust the 6.5 megacycle oscillator padder condenser for maximum 6.5 megacycle signal sensitivity.

5. Set the band selector switch for operation on the 535 to 1720 kilocycle band, turn the gang condenser to MINIMUM capacity, and set the test oscillator frequency to EXACTLY 1720 KILOCYCLES. BRING IN THIS 1720 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 1720 KILOCYCLE OSCILLATOR TRIMMER.

6. With the band selector switch adjusted for operation on the 535 to 1720 kilocycle band tune the receiver dial and set the test oscillator frequency to EXACTLY 1400 KILOCYCLES. Adjust the 1400 kilocycle antenna and RF trimmers for maximum 1400 kilocycle sensitivity.

7. Leave the band selector switch for operation on the 1720 to 535 kilocycle band, tune the receiver dial, and set the test oscillator frequency to approximately 600 kilocycles. Then, while rocking the gang condenser slightly to the right and left adjust the 600 kilocycle oscillator padder for maximum 600 kilocycle signal sensitivity.

This completes the alignment and it is recommended that all the adjustments be gone over again, as generally it will be found that improved results can be obtained if this is done. Assuming that all tubes and component parts of the set are okeh, then extreme inaccuracies in the dial calibration, low sensitivity, and poor selectivity are indications that the alignment procedure has not been followed.

VOLTAGE TABLE

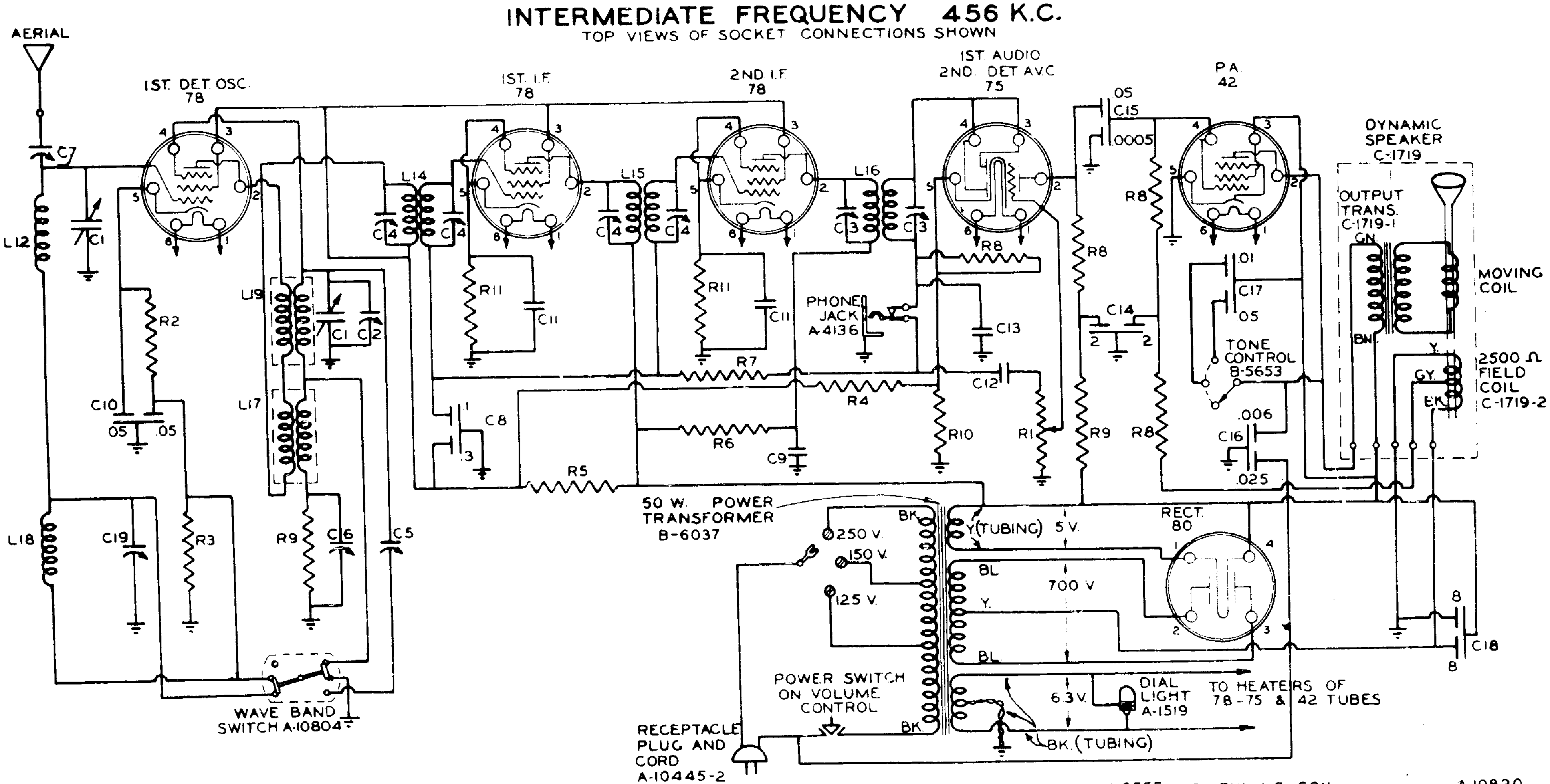
Line Voltage - 115
Volume Control - Full on
Wave Band - Broadcast

TUBE		FILAMENT	PLATE	SCREEN	CATHODE
6D6	First Detector	6	230	75	4.5
6D6	Radio Frequency	6	230	75	2.8
76	Oscillator	6	112		3.5
6D6	I. F. Amplifier	6	230	75	2.8
75	Second Detector & AVC	6	60*		1.2
76	Audio Phase Inverter	6	115		6
41	Output	6	225	230	17
41	Output	6	225	230	17
80	Rectifier	4.8	80 M.A. total drain		

* Triode plate comparative voltage only.
Read all voltages from socket to chassis.

SPARKS-WITHINGTON COMPANY

MODELS 73-AX & 73-BX



C1	VARIABLE CONDENSER	B-5650
C2	EQUALIZING CONDENSER	I.F. 456 K.C.
C3	ADJUSTING CONDENSER	A-10948
C4	ADJUSTING CONDENSER	A-10814
C5	L.W. OSC. TRIMMER	A-7809-2
C6	L.W. OSC. PADDER	A-7809-5
C7	B.C. ANT. TRIMMER	A-9617-2
C8	.3-.1 MFD. 200 V.	A-9921
C9	.2 MFD. 400 V.	A-10015
C10	.05-.05 MFD. 200 V.	A-9573
C11	.025 MFD. 200 V.	A-9575
C12	.006 MFD. 200 V.	A-9916
C13	.0005 MFD. MOLDED	A-9578
C14	2-.2 MFD. 400 V.	A-9963
C15	.05-.0005 MFD. 400 V.	A-10108
C16	.025-.006 MFD. 400 V.	A-9574
C17	.01-.05 MFD. 400 V.	A-9918
C18	8-8 MFD. ELECTROLYTIC	A-9754
C19	L.W. ANT. TRIMMER	A-7809-2

R1	250,000 Ω	VOL. CONTROL	A-9755
R2	500 Ω	WIRE WOUND	B-5243-32
R3	2,200 Ω	1/4 WATT	B-5458-1
R4	20,000 Ω	1 WATT	B-4540-3
R5	10,000 Ω	3 WATTS	B-4539-3
R6	2,800 Ω	1/2 WATT	B-4114-41
R7	500,000 Ω	1/4 WATT	B-5458-12
R8	250,000 Ω	1/4 WATT	B-5737-1
R9	100,000 Ω	1/4 WATT	B-5737-2
R10	200 Ω	WIREWOUND	B-5243-15
R11	300 Ω	WIREWOUND	B-5243-7

L12	TUNING COIL	A-10820
L14	NO. 1 I.F. TRANSFORMER	A-10823
L15	NO. 2 I.F. TRANSFORMER	A-10824
L16	NO. 3 I.F. TRANSFORMER	A-10825
L17	L.W. OSCILLATOR COIL	A-10821
L18	L.W. R.F. COIL	A-10822
L19	OSCILLATOR COIL	A-10816

SPARKS-WITHINGTON COMPANY

MODELS 73-AX & 73-BX

A. ALIGNMENT OF INTERMEDIATE-FREQUENCY STAGES.

(1) Turn on receiver and test oscillator, and allow both to operate several minutes before attempting to align any condensers.

(2) Connect "antenna" of test oscillator to grid cap of Type 78 first detector-oscillator tube and "ground" of test oscillator to chassis frame of receiver.

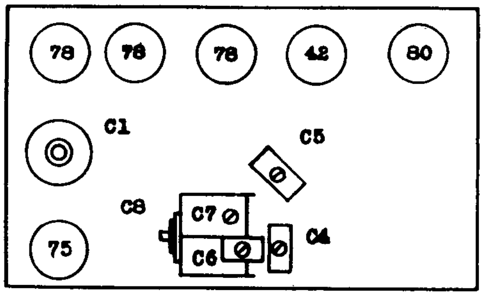
(3) Turn the band selector switch to the "broadcast" position and adjust the tone control completely to the left so that the "brilliant" tone is obtained.

(4) Adjust condenser C_4 (see Fig.) so that the adjusting nut is screwed all the way down and then turned back one-quarter turn.

(5) Adjust condenser C_5 so that the nut is turned about one-half way down.

(6) The dial pointer should point to the last line on the scale past 550 meters when the variable condenser rotor plates are completely meshed with the stator plates. If the dial pointer reads incorrectly it may be reset by first loosening the set-screws on the hub of the dial scale, holding the rotor plates fully in mesh and moving the dial scale until the last line on the scale past 550 meters is opposite the pointer on the escutcheon.

(7) Turn the condenser rotor plates all the way out and with the test oscillator adjusted for generating a signal of 456 kilocycles (657.8 meters) adjust condensers C_1, C_2, and C_3.



TOP VIEW

B. ALIGNMENT OF BROADCAST BAND AND LONG-WAVE BAND.

(1) Disconnect "antenna" lead of test oscillator from grid cap of first detector-oscillator tube and connect to the antenna terminal of the chassis.

(2) Tune the test oscillator and receiver to a wave-length of 200 meters (1500 kilocycles) and adjust condensers C_6 and C_7.

CAUTION: Extreme care should be taken in the preceding step so that the condensers are not adjusted to any other signal except the 200 meter wave-length of the signal generator or test oscillator.

(3) Turn the band selector switch to the "long-wave" position.

(4) Tune the test oscillator and receiver to 1,000 meters (300 kilocycles) and adjust condenser C_4.

(5) Adjust condenser C_8 (mounted on the side of the variable condensers) for maximum deflection of the output meter with the test oscillator adjusted for 1,000 meters.

(6) Tune the test oscillator and receiver to 1740 meters (172.5 kilocycles) and adjust condenser C_5 for maximum deflection of the output meter regardless of the dial setting.

(7) Repeat steps 5 and 6 until the adjustment of condenser C_5 does not affect the adjustment made in Step 5 (1,000 meters).

(8) Tune test oscillator and receiver for a wave length of 2,000 meters (150 kilocycles) and check for operation of the receiver.

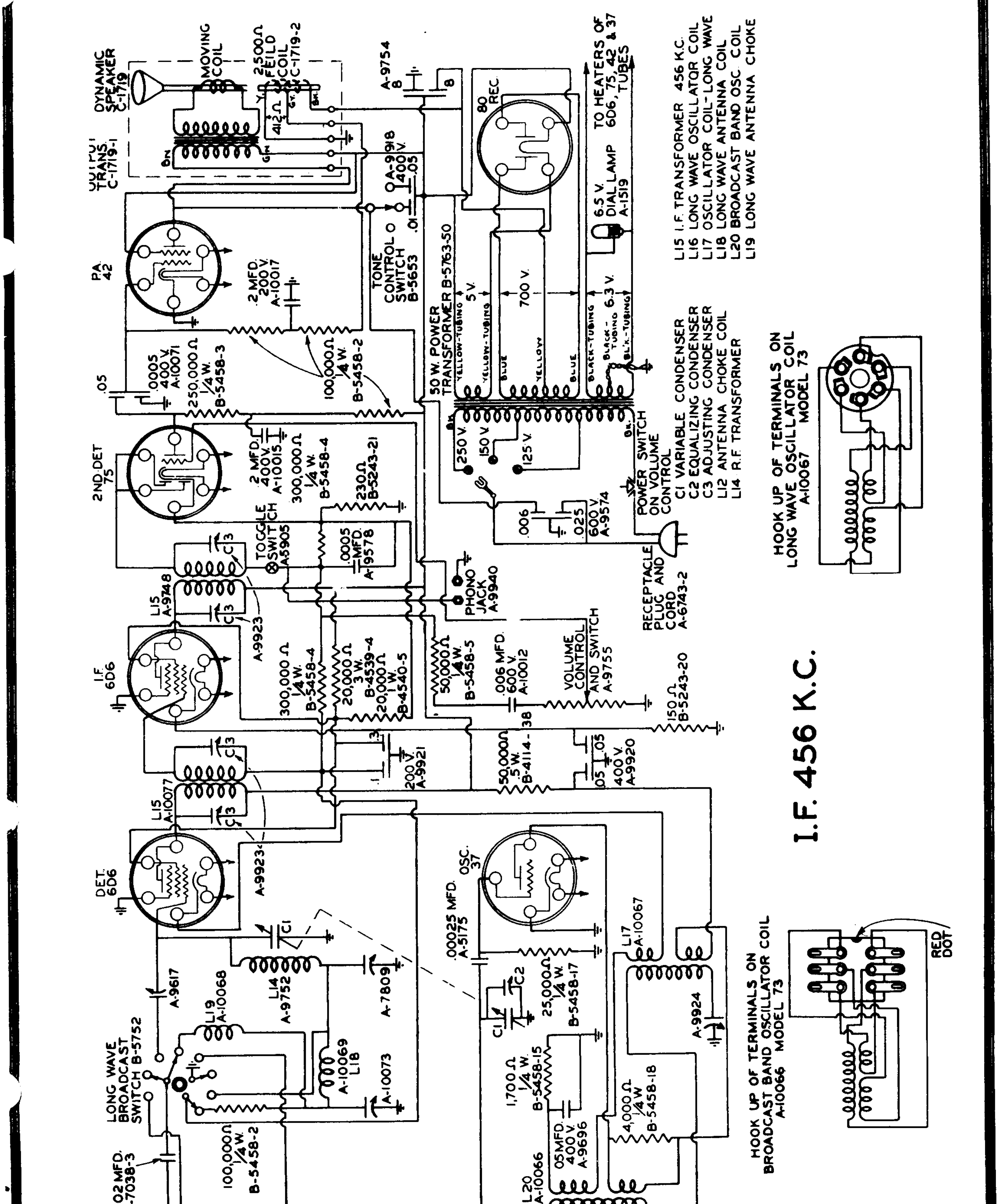
(9) Turn band selector switch back to "broadcast" position and tune test oscillator and receiver to 500 meters (600 kilocycles) and readjust condenser C_1 for maximum deflection of the output meter.

(10) Tune test oscillator and receiver to 200 meters (1500 kilocycles) and check for calibration and operation of the receiver. Repeat this procedure at 333 meters (900 kilocycles) and 500 meters (600 kilocycles.)

NOTE: Slight readjustments of the condenser C_6 will be required after the receiver is connected to the antenna with which it is to be used. This condenser should be adjusted by tuning in a weak distant station between 200 and 250 meters, and adjusting the condenser to a point of maximum volume. Once adjusted, it need not be changed unless the antenna system is altered. This adjustment ideally matches the receiver to operate on any antenna.

SPARKS-WITHINGTON COMPANY

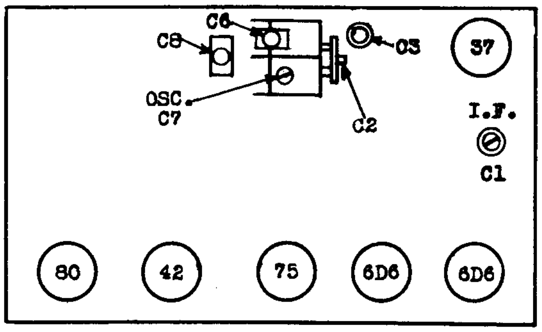
MODEL 73



SPARKS-WITHINGTON COMPANY
MODEL 73

A. ALIGNMENT OF INTERMEDIATE-FREQUENCY STAGES.

(1) Turn on receiver and test oscillator, and allow both to operate several minutes before attempting to align any condensers.



(2) Connect "antenna" of test oscillator to grid cap of Type 6D6 first detector tube and "ground" of test oscillator to chassis frame of receiver.

NOTE: It is advisable to read carefully the operating instructions included with the test oscillator.

(3) Turn the band selector switch to the "broadcast" position and adjust the tone control completely to the left so that the "brilliant" tone is obtained Connect the black lead and the black and red tracer lead to chassis.

(4) Adjust condenser C_4 so that the adjusting nut is screwed all the way down and then turned back one-quarter turn.

(5) Adjust condenser C_5 so that the nut is turned about one-half way down.

(6) The dial pointer should point to the last line on the scale past 550 meters when the variable condenser rotor plates are completely meshed with the stator plates. If the dial pointer reads incorrectly it may be reset by first loosening the set-screws on the hub of the dial scale, holding the rotor plates fully in mesh and moving the dial scale until the last line on the scale past 550 meters is opposite the pointer on the escutcheon.

(7) Turn the condenser rotor plates all the way out and with the test oscillator adjusted for generating a signal of 456 kilocycles (657.8 meters) adjust I.F. trimmers for maximum output.

B. ADJUSTING 456 KC REJECTOR CIRCUIT.

(1) Connect oscillator antenna lead to yellow wire (antenna) of set and ground of oscillator to chassis.

(2) Tune test oscillator to 456 KC.

(3) With volume control on full position adjust wave trap condenser C_2 for <u>minimum</u> output.

C. ALIGNMENT OF BROADCAST BAND AND LONG-WAVE BAND.

(1) Disconnect "antenna" lead of test oscillator from grid cap of first detector tube and connect to the antenna terminal of the chassis.

(2) Tune the test oscillator and receiver to a wave-length of 200 meters (1500 kilocycles) and adjust condensers C_6 and C_7.

CAUTION: Extreme care should be taken in the preceding step so that the condensers are not adjusted to any other signal except the 200 meter wave-length of the signal generator or test oscillator.

(3) Turn the band selector switch to the "long-wave" position.

(4) Tune the test oscillator and receiver to 1,000 meters (300 kilocycles) and adjust condenser C_4.

(5) Adjust condenser C_8 and C_4 for maximum deflection of the output meter with the test oscillator adjusted for 1,000 meters.

(6) Tune the test oscillator and receiver to 1740 meters (172.5 kilocycles) and adjust condenser C_5 for maximum deflection of the output meter regardless of the dial setting.

(7) Repeat steps 5 and 6 until the adjustment of condenser C_5 does not affect the adjustment made in Step 5 (1,000 meters).

(8) Tune test oscillator and receiver for a wave length of 2,000 meters (150 kilocycles) and check for operation of the receiver.

(9) Turn band selector switch back to "broadcast" position and tune test oscillator and receiver to 500 meters (600 kilocycles) and readjust condenser C_1 for maximum deflection of the output meter.

(10) Tune test oscillator and receiver to 200 meters (1500 kilocycles) and check for calibration and operation of the receiver. Repeat this procedure at 333 meters (900 kilocycles) and 500 meters (600 kilocycles).

NOTE: Slight readjustments of the condenser C_6 will be required after the receiver is connected to the antenna with which it is to be used. This condenser should be adjusted by tuning in a weak distant station between 200 and 250 meters, and adjusting the condenser to a point of maximum volume. Once adjusted, it need not be changed unless the antenna system is altered. This adjustment ideally matches the receiver to operate on any antenna.

STEWART-WARNER CORPORATION

MODELS R-164-D "CHASSIS," 1641-D TO 1649-D

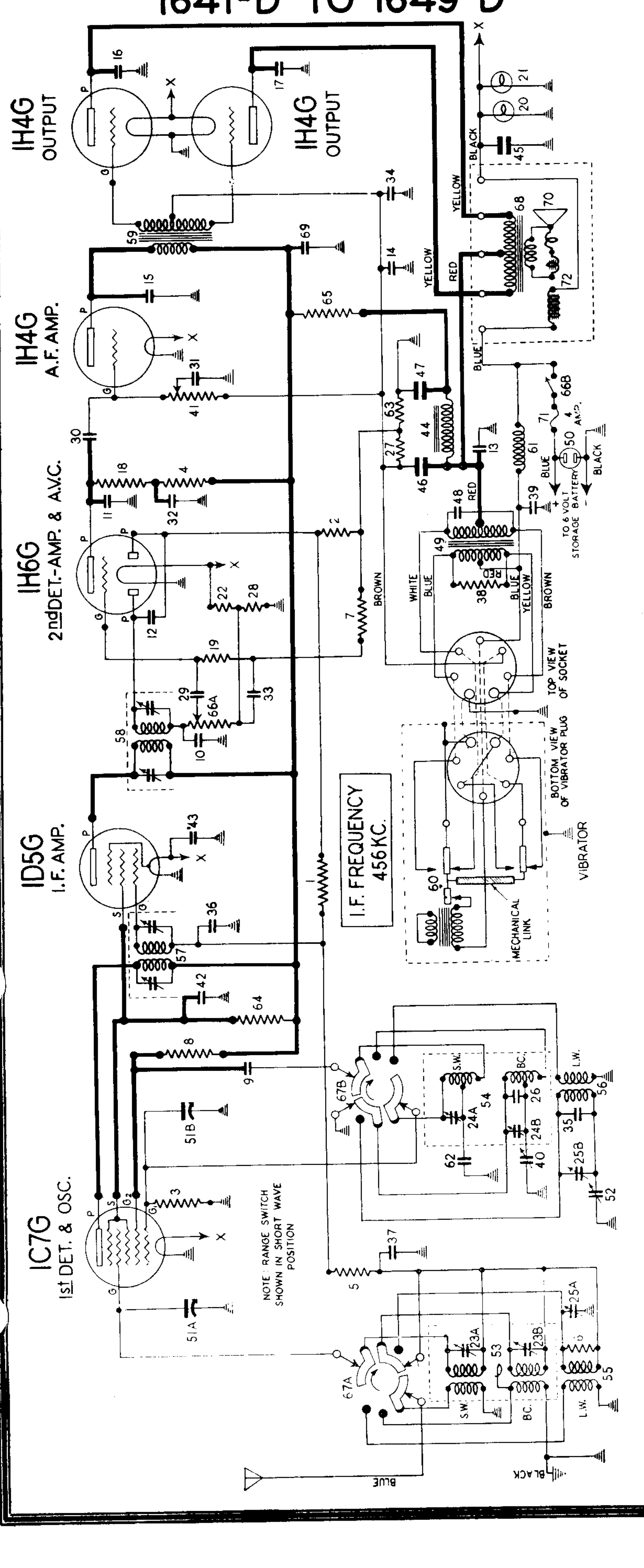
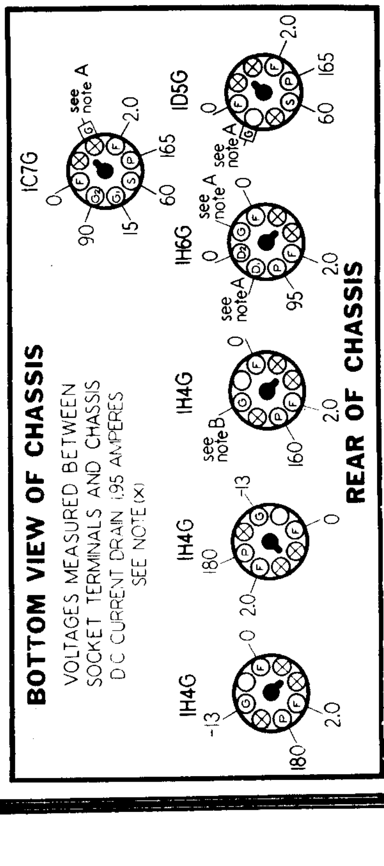


Diagram Number	Part Number	Description	List Price
1, 2	83072	510,000 ohm ¼ watt carbon resistor	$0.12
3, 4	83080	51,000 ohm ¼ watt carbon resistor	.12
5, 6, 7	83082	260,000 ohm ¼ watt carbon resistor	.12
8	83286	21,000 ohm ¼ watt carbon resistor	.12
9, 10, 11	83539	260 mmfd. mica condenser	.20
12	83783	110 mmfd. mica condenser	.20
13, 14, 15, 16, 17	83784	.0011 mfd. mica condenser	.25
18	84198	110,000 ohm ¼ watt carbon resistor	.12
19	84235	1.1 megohm ¼ watt carbon resistor	.12
20, 21	84515	Dial lamp 2 Volt .06 ampere	.25
22	84888	300 ohm ½ watt wirewound resistor	.15
23A, 23B, 24A, 24B, 25A, 25B	85087	Dual trimmer	.35
26	85454	11 mmfd. mica condenser	.15
27	85691	500 ohm ½ watt wirewound resistor	.20
28	88009	200 ohm ½ watt wirewound resistor	.15
29, 30	88026	.02 mfd. 400 volt paper condenser	.25
31	88030	.01 mfd. 400 volt paper condenser	.25
32, 33	88046	.1 mfd. 150 volt paper condenser	.25
34	88170	10 mfd. 25 volt electrolytic condenser	.80
35	88173	50 mmfd. mica condenser	.20
36, 37	88189	.05 mfd. 200 volt paper condenser	.25
38	88204	210 ohm ½ watt carbon resistor	.15
39	88285	1.25 mfd. 150 volt paper condenser	.80
40	88478	Variable padding condenser	.38
41	88488	Tone Control—500,000 ohms	.80
42, 43	88990	.5 mfd. 150 volt paper condenser	.35
44	89117	Filter choke	1.35
45	89145	100 mfd. 12 volt electrolytic condenser	.85
46, 47	89147	8 mfd. 250 volt electrolytic condenser	.90
48	89153	.005 mfd. 1500 volt paper condenser	$0.40
49	89164	Power transformer (6 volt primary)	3.60
50	89170	Reading lamp plug receptacle	.15
51A & 51B	89205	Gang condenser	4.00
52	89206	Variable Padding condenser	.45
53	89207	Antenna coil & shield Assembly (B.C. & S.W.) with trimmers	1.90
54	89209	Oscillator Coil & Shield Assembly (B.C. & S.W.) with trimmers	3.00
55	89211	Antenna coil assembly (L.W.)	1.40
56	89212	Oscillator coil assembly (L.W.)	1.00
57	89226	1st I.F. transformer & shield assembly	2.50
58	89227	2nd I.F. transformer & shield assembly	2.50
59	89228	Push Pull input transformer	3.50
60	89272	Vibrator	5.00
61	89273	"A" choke assembly	.30
62	89275	.002 mfd. mica condenser	40
63	89276	140 ohm ½ watt wirewound resistor	.12
64	89277	35,000 ohm ½ watt carbon resistor	.15
65	89278	1100 ohm ¼ watt carbon resistor	.35
66A, 66B	89332	Volume control 500,000 ohm off on switch	1.20
67A & 67B	89357	Range switch	1.50
68	89401	Output transformer for R257D & R258D speakers	2.60
69	89421	1 mfd. 200 volt paper condenser	.25
70	89128	Diaphragm, voice coil and spider assembly for R257D speaker. For R258D* speaker—order complete	1.75
71	89828	4 ampere 25 volt fuse	.05
72	R257D	6" Dynamic Speaker	6.75
72	R258D	8" Dynamic Speaker	8.00

SOCKET VOLTAGES

A BATTERY VOLTAGE 6.0 VOLTS DIAL TUNED TO 530 KC.



IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The grid bias for the 1C7G, 1D5G, 1H6G and the A.V.C. delay voltage for one diode of the 1H6G is —2.7 volts measured across resistor 63.

NOTE B: The grid bias on the 1H4G 1st audio tube is —13.0 volts measured across resistors 27 and 63.

NOTE (X): These terminals indicate tube pins which are not internally connected to any element.

STEWART-WARNER CORPORATION

MODELS R-164-D CHASSIS, 1641-D TO 1649-D

CALIBRATION AND ALIGNMENT

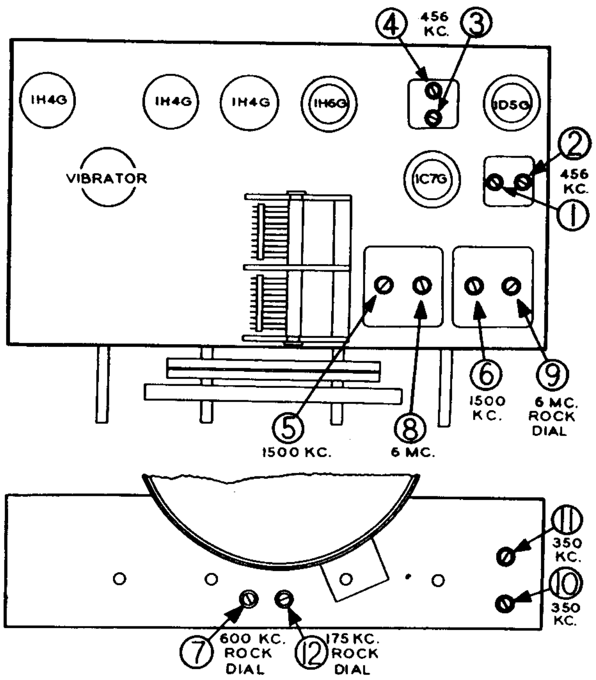
ALIGNING EQUIPMENT: For proper alignment, an output meter and an accurately calibrated oscillator with a tuning range from 175 KC. to 6 MC. are required.

Connect the output meter across the plates of the output tubes. Convenient points to make the plate connections are the yellow wires on the speaker terminal strip.

ALIGNING THE I.F. AMPLIFIER: Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (center position).

Connect the test oscillator output leads to the 1C7G control grid and chassis with a .1 mfd. condenser in series with the oscillator output. Set the oscillator to exactly 456 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

Adjust the four I.F. trimmers, Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.



TRIMMER LOCATIONS

Trimmer Number		Alignment Frequency
1-2-3-4	1st and 2nd I.F. transformer trimmers	456 KC.
5	Broadcast oscillator shunt trimmer	1500 KC.
6	Broadcast antenna shunt trimmer	1500 KC.
7	Broadcast oscillator series padder	600 KC.
8	Short wave oscillator shunt trimmer	6 MC.
9	Short wave antenna shunt trimmer	6 MC.
10	Long wave oscillator shunt trimmer	350 KC.
11	Long wave antenna shunt trimmer	350 KC.
12	Long wave oscillator series padder	175 KC.

BROADCAST BAND CALIBRATION AND ALIGNMENT: With the gang condenser in full mesh, the dial pointer should be on the yellow horizontal line below 530 KC. on the dial scale.

Leave the range switch in the center position. Connect a 400 or 500 ohm carbon resistor in series with the oscillator output and the receiver antenna lead (blue wire in the back of the chassis). Connect the grounded oscillator output wire to the receiver ground lead (black wire in back of chassis).

Adjust the test oscillator to exactly 1500 KC. Tune in the 1500 KC. oscillator signal or a station above 1300 KC. on the dial and determine whether the dial calibration is correct at the high frequency end of the dial. If the calibration is correct, do not adjust the broadcast oscillator shunt trimmer No. 5. If the calibration is incorrect, adjust trimmer No. 5 to give proper calibration.

Carefully tune the receiver to the 1500 KC. oscillator signal and adjust trimmer No. 6 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 7 for maximum output. Then try to increase the output meter reading by detuning No. 7 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though the dial may be slightly off calibration at 600 KC.

Repeat the adjustment of Nos. 5 and 6 at 1500 KC.

SHORT WAVE BAND CALIBRATION AND ALIGNMENT: Turn the range switch to the short wave band (maximum counter-clockwise position).

Adjust the test oscillator to exactly 6.0 MC.

Tune in the 6 MC. oscillator signal at or near 6 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 6 MC. If it is, do not adjust the short wave band oscillator shunt trimmer No. 8. If the calibration is incorrect, set the dial pointer to 6 MC. on the dial, and adjust the oscillator shunt trimmer No. 8 until the oscillator signal comes in at this point. If there are two peaks, the proper one is that with the trimmer screw farthest out.

Carefully tune the receiver to the signal and adjust trimmer No. 9 for maximum output. Then try to increase the output by detuning No. 9 slightly and retuning the receiver. Continue detuning No. 9 and retuning the receiver until the output meter deflection is a maximum.

LONG WAVE BAND CALIBRATION AND ALIGNMENT: Turn the range switch to the long wave band position (maximum clockwise position) and adjust the test oscillator to exactly 350 KC.

Tune in the oscillator signal at or near 350 KC. on the receiver dial to determine whether the dial calibration is correct at this point. If it is, do not adjust trimmer No. 10. If the calibration is incorrect, set the receiver dial pointer to 350 KC. and adjust trimmer No. 10 for maximum output.

Carefully tune the receiver to the signal, then adjust trimmer No. 11 for maximum output.

Adjust the test oscillator to 175 KC. and tune in the signal at or near 175 KC. on the receiver dial. Adjust padder No. 12 for maximum output, then try to increase the output by detuning padder No. 12 and retuning the receiver dial.

Repeat the adjustment of trimmers Nos. 10 and 11 at 350 KC.

PROPER SIZE OF FUSE

The early production of this model was equipped with 3-ampere fuses. If one of these blow out, and if there is nothing wrong in the set to cause it to blow, replace with a 4-ampere fuse.

MISCELLANEOUS PARTS

Part Number	Description	List Price
67032	Felt washer for back of knobs, per C	$0.35
67590	Flat steel mounting washer	.01
83319	Fuse Insulator	.02
83512	Speaker diaphragm gasket for R257D speaker	.08
84428	Chassis mounting bushing (rubber)	.03
84493	No. 10 x 1¼ chassis mounting screw	.02
84805	Felt washer (used with chassis mtg. screw)	.01
88161	Tube shield	.08
88164	Tube shield cap—slotted	.06
88165	Tube shield cap—plain	.06
88249	"A" lead with cap (short section of battery cable)	.05
88571	Vibrator shield assembly	.25
89169	Vibrator socket shield (under chassis)	.25
89437	"A" battery clip	.20
89438	"A" battery cable, clips and fuse holder	1.65
89460	Knob—for range switch	.30
89461	Knob—tone, tuning and volume controls	.25

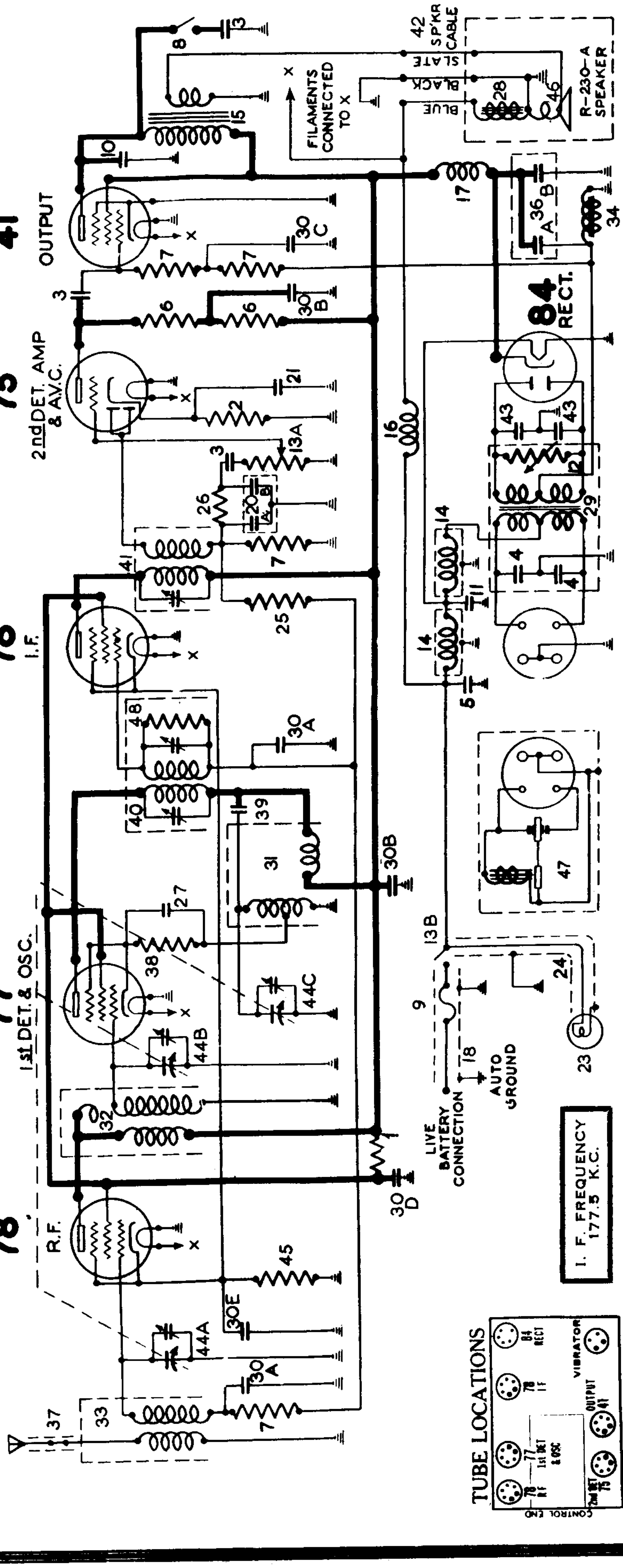
TUNING DRIVE AND DIAL PARTS

Part Number	Description	List Price
13923	Spring washer for tuning drive shaft	$0.05
81068	Dial drive cord, per ft.	.05
81069	Dial cord tension spring	.10
88564	Pointer & stud assembly	.12
88956	Escutcheon with glass	1.65
89174	Dial bracket & ring assembly	1.20
89175	Drive shaft	.10
89176	Retaining ring for tuning drive shaft	.02
89283	Dial lamp socket	.10
89285	Dial background	.12
89298	Drum & bushing assembly	.60
89353	Dial scale	1.80
89489	Dial lamp shield	.12
89799	Dial scale retaining clip	.02

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STEWART-WARNER CORPORATION

MODEL 1312 AUTO RADIO

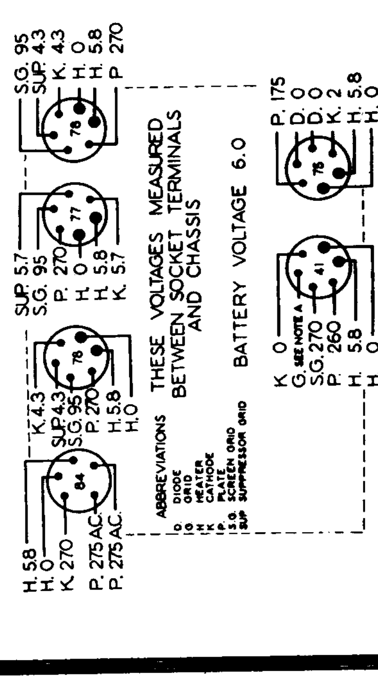


Diag. No.	Part No.	Description	List Price
1	66023	60,000 ohm 1 watt carbon resistor	$0.25
2	67580	6,000 ohm ¼ watt carbon resistor	.25
3	83007	.02 mfd. 600 volt paper condenser	.35
4	83058	.25 mfd. 100 volt paper condenser	.35
5	83063	.5 mfd. 100 volt paper condenser	.45
6	83080	51,000 ohm ¼ watt carbon resistor	.20
7	83082	260,000 ohm ¼ watt carbon resistor	.20
8	83179	Tone control switch	.30
9	83207	15 ampere fuse	.05
10	83706	.006 mfd. 600 volt paper condenser	.35
11	83714	1.5 mfd. 100 volt shielded condenser	.80
12	83725	Special Globar resistor	.45
14	83730	Vibrator R.F. Choke	.25
15	83731	Output transformer	2.00
16	83742	Filament R.F. choke	.16
13A, 13B	83728	500,000 ohm volume control; Line Switch	1.20
17	83770	"B" supply R.F. choke	.40
18	83777	Battery lead and fuse housing	.50
20	83785	Dual .0005 mfd. molded mica condenser	.32
21	83803	12 mfd. 25 volt dry electrolytic condenser	.80
23	84058	6 - 8 volt dial light bulb	.15
24	84099	Dial light cable	.35
25	84235	1.1 megohm carbon resistor	.20
26	84238	11,000 ohm ¼ watt carbon resistor	.20
27	84282	.001 mfd. molded mica condenser	.25
28	84791	Field coil and housing (R-230A only) (Part 85118 for R-232A)	2.50
29	84798	Power transformer	3.50

Diag. No.	Part No.	Description	List Price
30A, 30B, 30C, 30D, 30E	84806	.05 mfd. 300 volt paper cond. (green-white); .1 mfd. 400 v. paper cond. (red or red-white); .25 mfd. 100 volt paper cond. (green lead); .25 mfd. 300 volt paper cond. (white lead); .5 mfd. 100 volt paper cond. (orange lead)	2.50
31	84814	Oscillator (O) coil and shield assembly	1.50
32	84822	R.F. (B) coil and shield assembly	1.50
33	84825	Antenna (A) coil and shield assembly	1.40
34	84827	"B" supply filter choke	1.25
36A, 36B	84829	4 mfd.—400 volt dry electrolytic condenser; 8 mfd.—400 volt dry electrolytic condenser	2.50
37	84831	Antenna lead and plug	.10
38	85051	8000 ohm ¼ watt carbon resistor	.20
39	84833	.00007 mfd. molded mica condenser	.20
40	84838	1st. I.F. transformer assembly	2.75
41	84842	2nd. I.F. transformer assembly	2.60
42	84845	Speaker cable	.50
43	84850	.03 mfd. 750 volt paper condenser	.25
44A, 44B, 44C	84866	Three gang variable condenser with mounting plate and shaft coupling	6.00
45	84888	300 ohm. ½ watt flexible wire resistor	.20
46	84891	Diaphragm, voice coil, and shell assembly (R-230A only) (Part 85119 for R-232A)	2.10
47	84905	Vibrator	5.00
48	83072	510,000 ohms ¼ watt resistor	.20
38	85051	8000 ohm ¼ watt carbon resistor	.20
28	85118	Field coil and housing (R-232A only)	2.50
46	85119	Diaphragm. and shell assembly (R-232A only)	2.10

SOCKET VOLTAGES

BOTTOM VIEW OF CHASSIS



IMPORTANT: Use high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon range of meter. Make allowances for battery voltage variations.

NOTE A: The actual bias on the grid of the 41 tube is —23 volts which must be measured from chassis to the ungrounded filter choke terminal. Due to the high resistance of the grid leak, the voltmeter will show only about —1 volt at the grid.

STEWART-WARNER CORPORATION

MODEL 1312 AUTO RADIO

CIRCUIT DESCRIPTION

In the R-131 Chassis, the incoming signal is tuned and amplified in the 78 R.F. stage. Further amplification and frequency conversion to 177.5 KC. take place in the 77 combination first detector and oscillator tube.

The 177.5 KC. signal is amplified in the I.F. stage, using a 78 type tube, and then rectified in the diode section of the 75 second detector tube. The rectified current produces a modulated D.C. voltage across the diode load resistor No. 7. The audio component of this voltage appears across the 500,000 ohm volume control. Any part or all of this audio signal may be impressed on the triode section of the 75 tube where amplification takes place.

The modulated drop across resistor No. 7 is filtered and applied to the grids of the 78 R.F. and I.F. tubes to provide A.V.C.

POWER SUPPLY PROTECTIVE RESISTOR

The filter system and the rectifier tube are protected against breakdown during the warming-up period by the Globar resistor connected across the high voltage secondary of the power transformer (No. 12 in the circuit diagram). This resistor drops rapidly in resistance as the voltage across it rises, so that it acts as a load on the power transformer during the warm-up period and keeps the voltage below the danger point until the tubes are heated and take their normal current. Because of its unique voltage characteristics, the Globar resistor cannot be tested with an ordinary ohmmeter, since it will show a resistance of several megohms.

CALIBRATION AND ALIGNMENT

A good modulated oscillator and a sensitive output meter are necessary for proper calibration and alignment of the R.F. and I.F. stages of this receiver. The output of the oscillator must be adjustable to give a very weak signal which will not actuate the A.V.C. of the receiver. The output meter must be sensitive enough to give sufficient reading with such a weak signal.

The output meter should be connected from the 41 plate to ground through a .25 mfd. condenser or across the voice coil, depending upon its sensitivity. A convenient point to connect the 41 plate is the terminal of the tone control switch.

During all calibration and alignment adjustments, keep the volume control full on.

I. F. ALIGNMENT

The I.F. trimmers are located on the top of the I.F. transformers which may be reached by removing the front cover. The modulated oscillator should be set to exactly 177.5 K.C. and connected from the 77 control grid to ground. Adjust the oscillator output to give about half-scale reading of the output meter. Tune the set to make certain that no station or signal is tuned in since this would affect the output meter reading. Adjust all three I.F. trimmers to give maximum output reading.

In adjusting the I.F. transformer trimmers, it is desirable to use a bakelite screw driver or one having only a small metal tip. After the I.F. trimmers have been aligned once, go back and repeat the procedure, since any adjustment of one will affect the others to some extent.

DIAL CALIBRATION

The dial of the Auto Radio is calibrated in kilocycles, except that the last two zeros have been omitted. Inasmuch as changes in the position of the flexible shafts may cause the calibration to vary, the dial can be calibrated as follows:

Tune in a station of known frequency between 800 and 1100 K.C. Insert a screw driver in the slotted shaft on the rear of the control head. Hold the tuning control knob so that the station remains tuned in properly and by turning the screw driver adjust the dial pointer so that it indicates the station frequency.

If the set is badly out of calibration such that it calibrates correctly at one part of the dial but not at another, it is necessary to adjust the oscillator shunt trimmer as explained below.

The gang condenser trimmers can be reached by removing the back cover. Connect a .00025 mfd. mica condenser in series with the output of the test oscillator and the aerial lead of the receiver. This condenser is absolutely necessary to secure proper alignment of the antenna stage.

Set the test oscillator to exactly 600 K.C. Tune the radio set to maximum volume. Calibrate the dial at the low frequency end by setting the pointer to read exactly 6.0 (600 K.C.).

Set the test oscillator to exactly 1400 K.C. Turn the tuning knob until the dial pointer indicates 14.0 (1400 K.C.) and then adjust the oscillator shunt trimmer (third one from shaft end of the variable condenser) until the signal is received with maximum output. Then adjust the other two gang condenser trimmers as directed under R.F. alignment.

R. F. ALIGNMENT

With the test oscillator set to approximately 1400 K.C., tune the set very carefully for maximum output.

Adjust the output of the oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading.

MISCELLANEOUS PARTS NOT SHOWN ON DIAGRAM

Part No.	Description	List Price
12606	Receiver mtg. nut (5/16—18 hex.)	$0.02
81346	1 lug terminal strip	.04
83144	15,000 ohm spark plug suppressor	.35
83145	10,000 ohm distributor suppressor	.35
83242	No. 8 x 1/4" self tapping screws (dark finish for mtg. back cover and casing brackets)	.02
83319	Fuse insulating tube	.02
83624	No. 8 x 1/4" self tapping screw (Cad. plate. for mtg. power transformer)	.01
83711	8 lug terminal strip	.12
83719	Front cover mtg. spade bolt (8-32)	.01
83720	4 lug terminal strip	.08
83721	Battery lead plug rubber grommet	.02
83727	Back cover	.90
83737	Front cover knurled nuts	.06
83771	Receiver mounting stud	.08
83772	Receiver mounting dash support washer	.04
83806	Speaker grill cloth	.12
83892	Variable condenser shaft coupling	.10
83893	Volume control shaft guide bushing	.05
83904	Generator condenser	.70
84869	Case assembly, less covers	3.75
84893	Front cover and speaker grill cloth	1.00
84941	Aluminum vibrator shield assembly	.50

REMOTE CONTROL HEAD PARTS

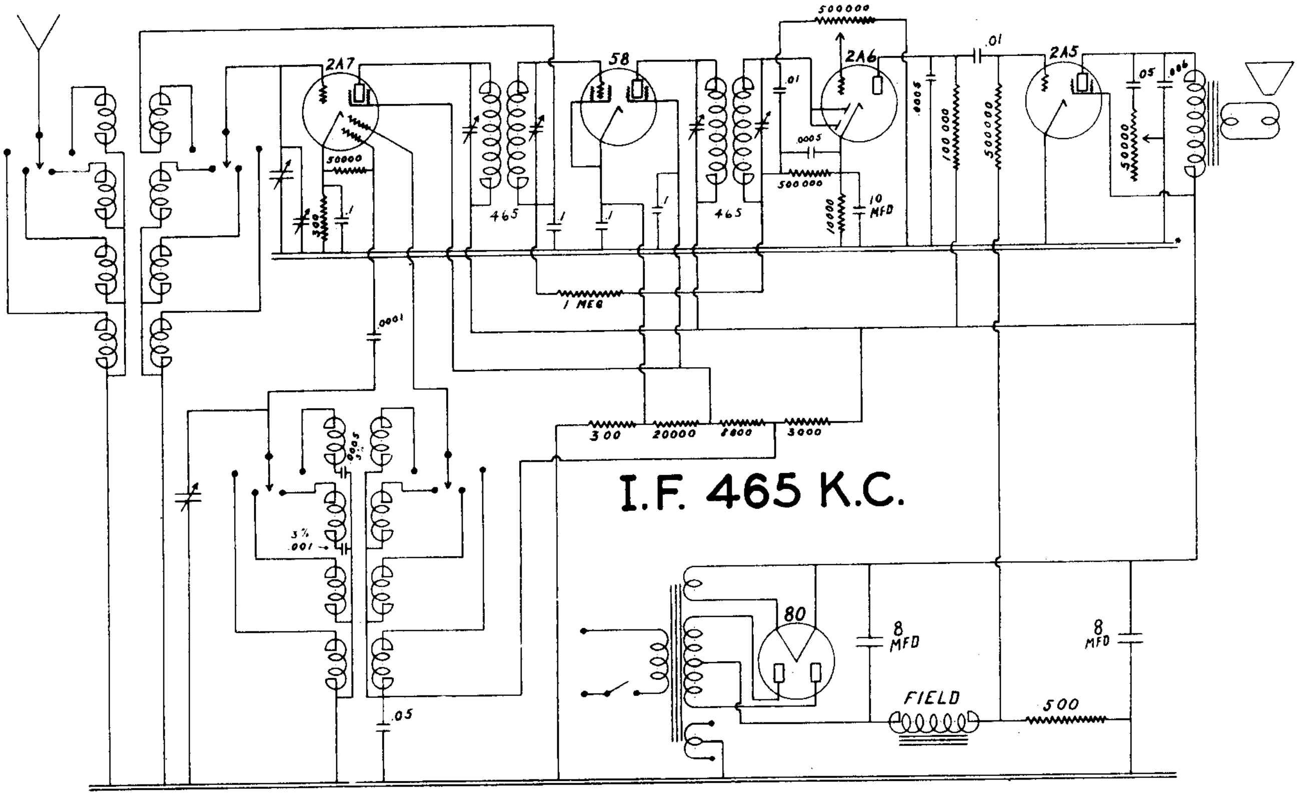
Part No.	Description	List Price
15214	Long mtg. strap screw (10/32 x 1 1/4" R.H.M.S.)	.01
84059	Case screw (4-40 x 3/16") Per hundred	.80
84060	Flexible casing set screw	.02
84067	Steering post mtg. bracket	.25
84068	Steering post mtg. strap	.15
84075	Bezel and glass	.50
84076	Dial light button and socket	.25
84106	Volume control knob	.25
84309	Instrument panel mounting accessories	.15
84854	Complete accessories for installation	5.00

FLEXIBLE SHAFTS

Part No.	Description	List Price
84871	Tuning shaft, 24 inches long	1.50
84873	Volume control shaft, 24 inches long	1.50
84882	Tuning shaft, 36 inches long	2.00
84883	Volume control shaft, 36 inches long	2.00
84886	Tuning shaft, 30 inches long	2.00
84887	Volume control shaft, 30 inches long	2.00

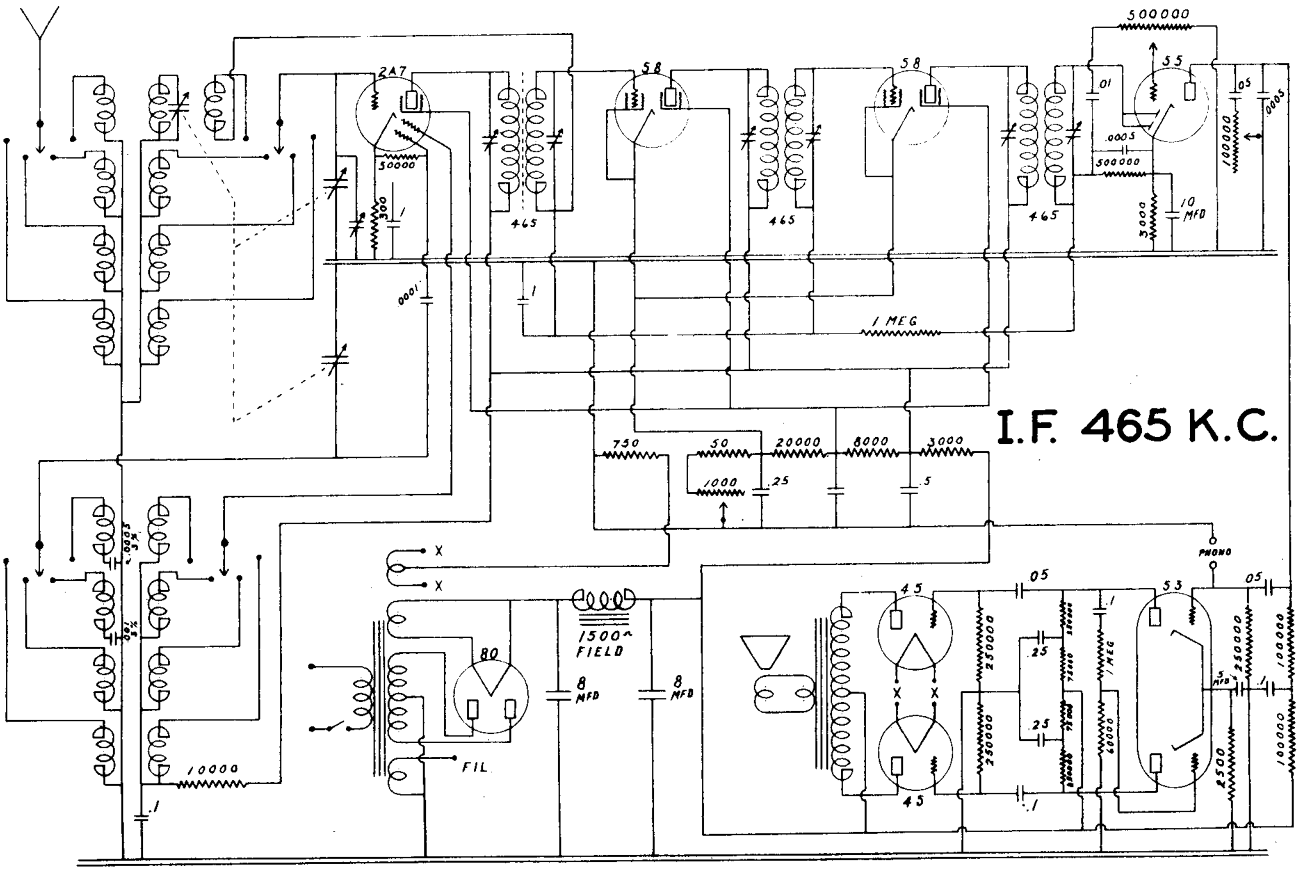
TROY RADIO MANUFACTURING CO.

MODEL 54



4 BANDS 15-550 METERS

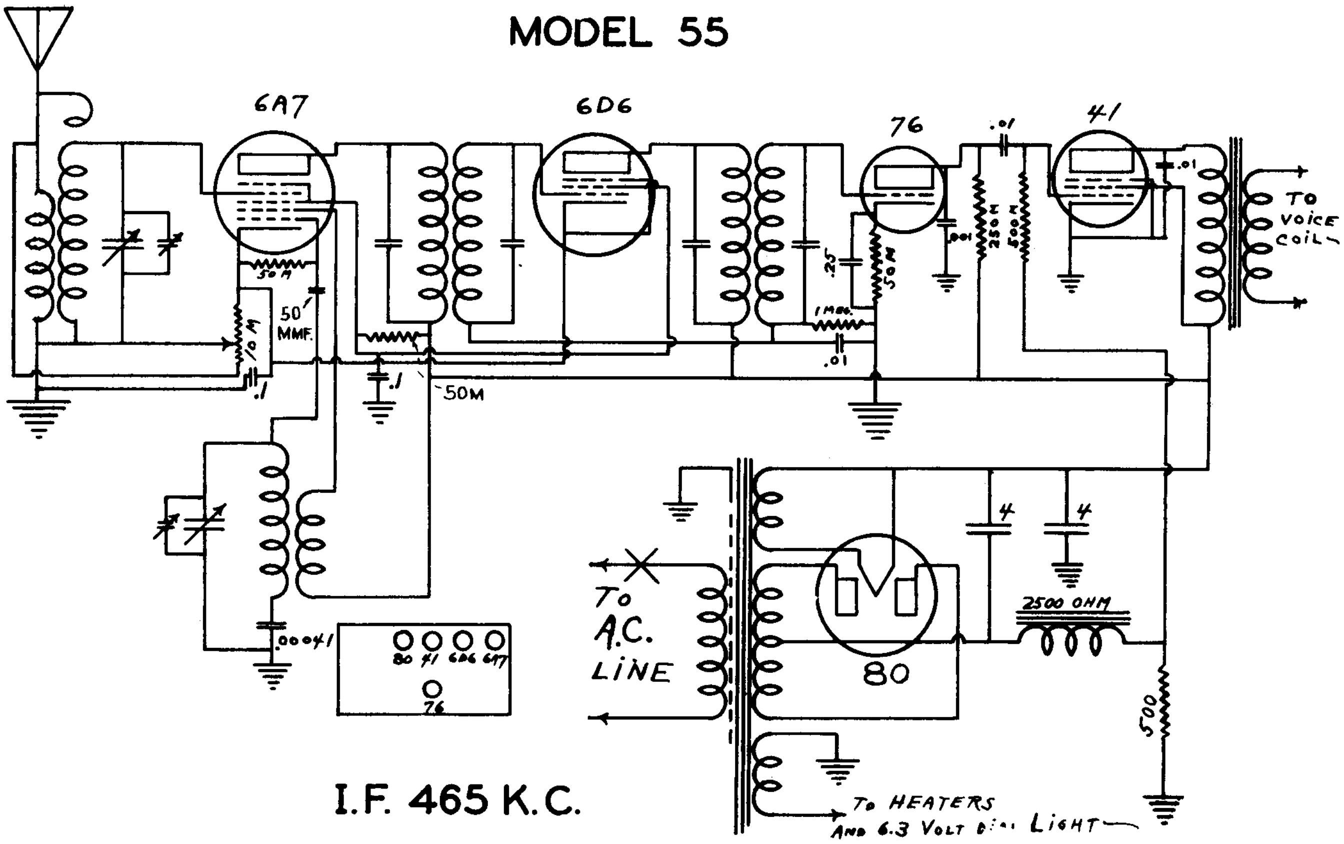
MODEL 84



4 BANDS 15-550 METERS

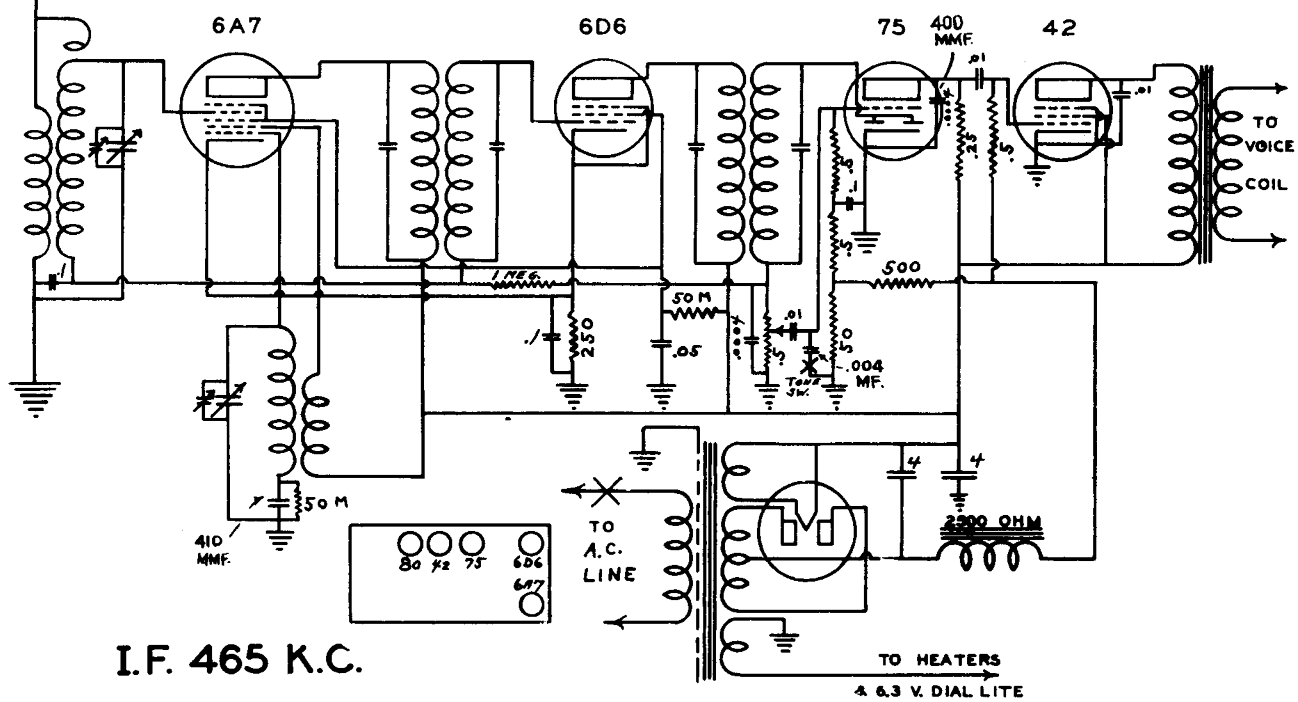
TROY RADIO MANUFACTURING CO.

MODEL 55



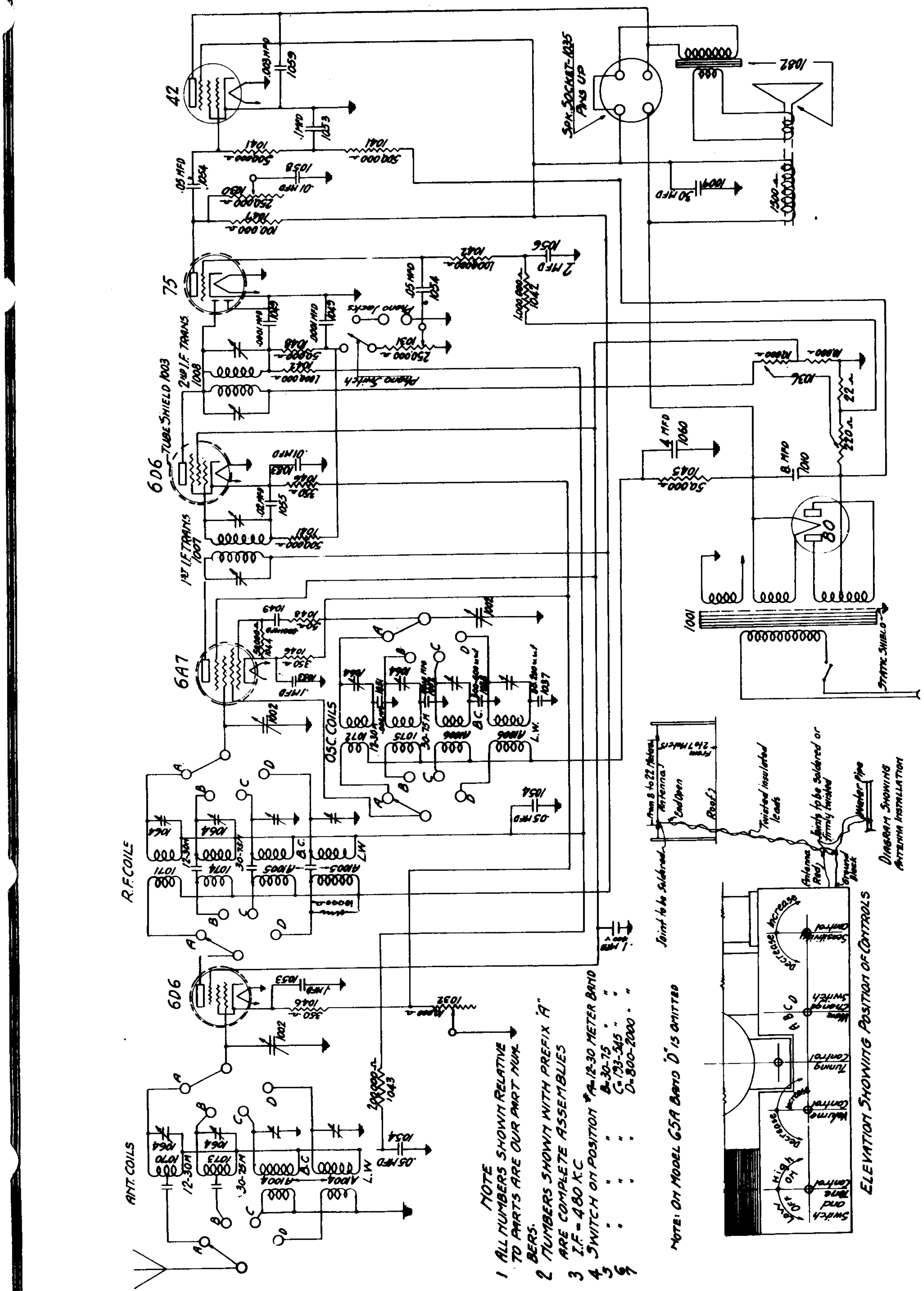
I.F. 465 K.C.

MODEL 57



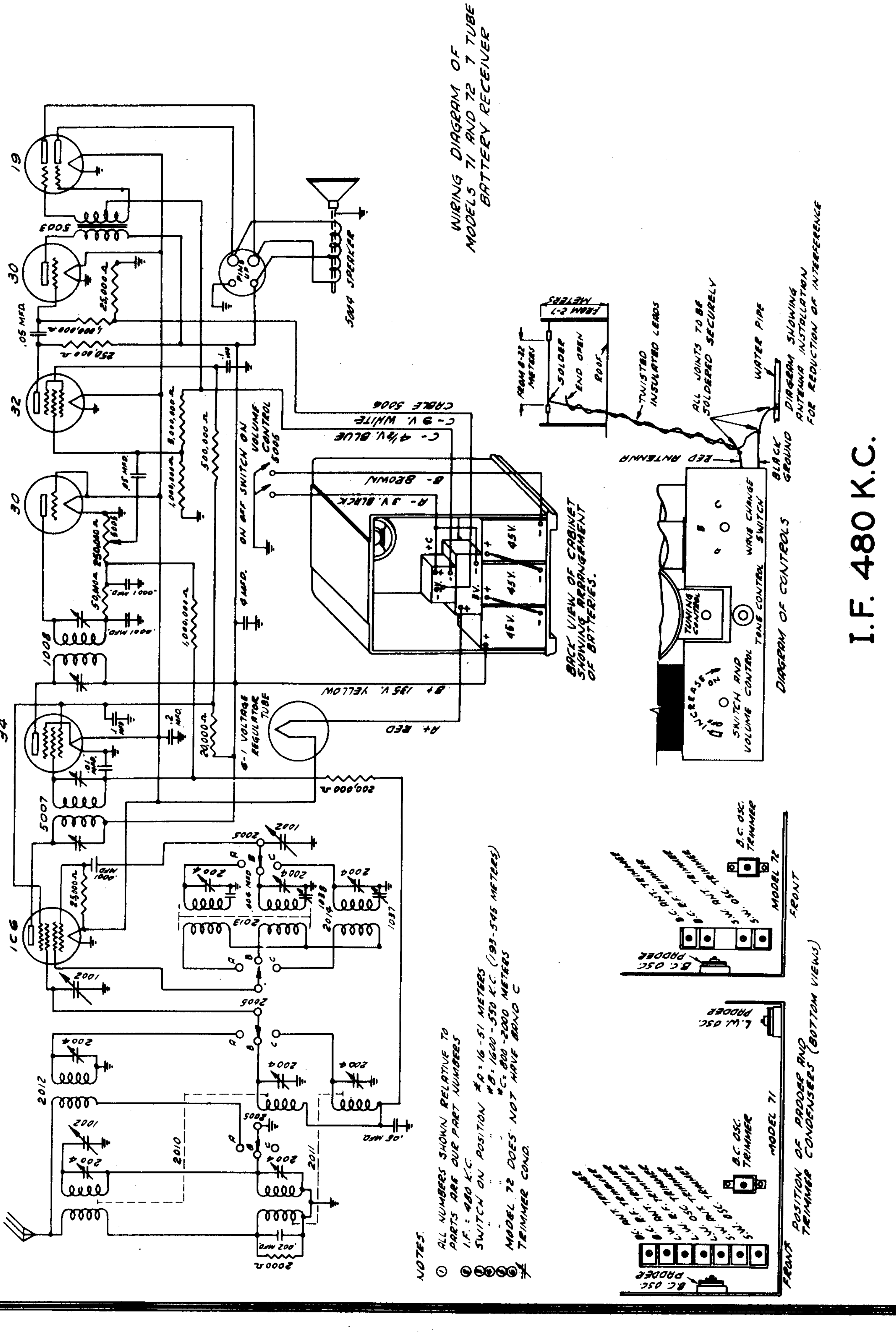
I.F. 465 K.C.

ULTRAMAR MANUFACTURING CORPORATION
MODELS 65A & 66A



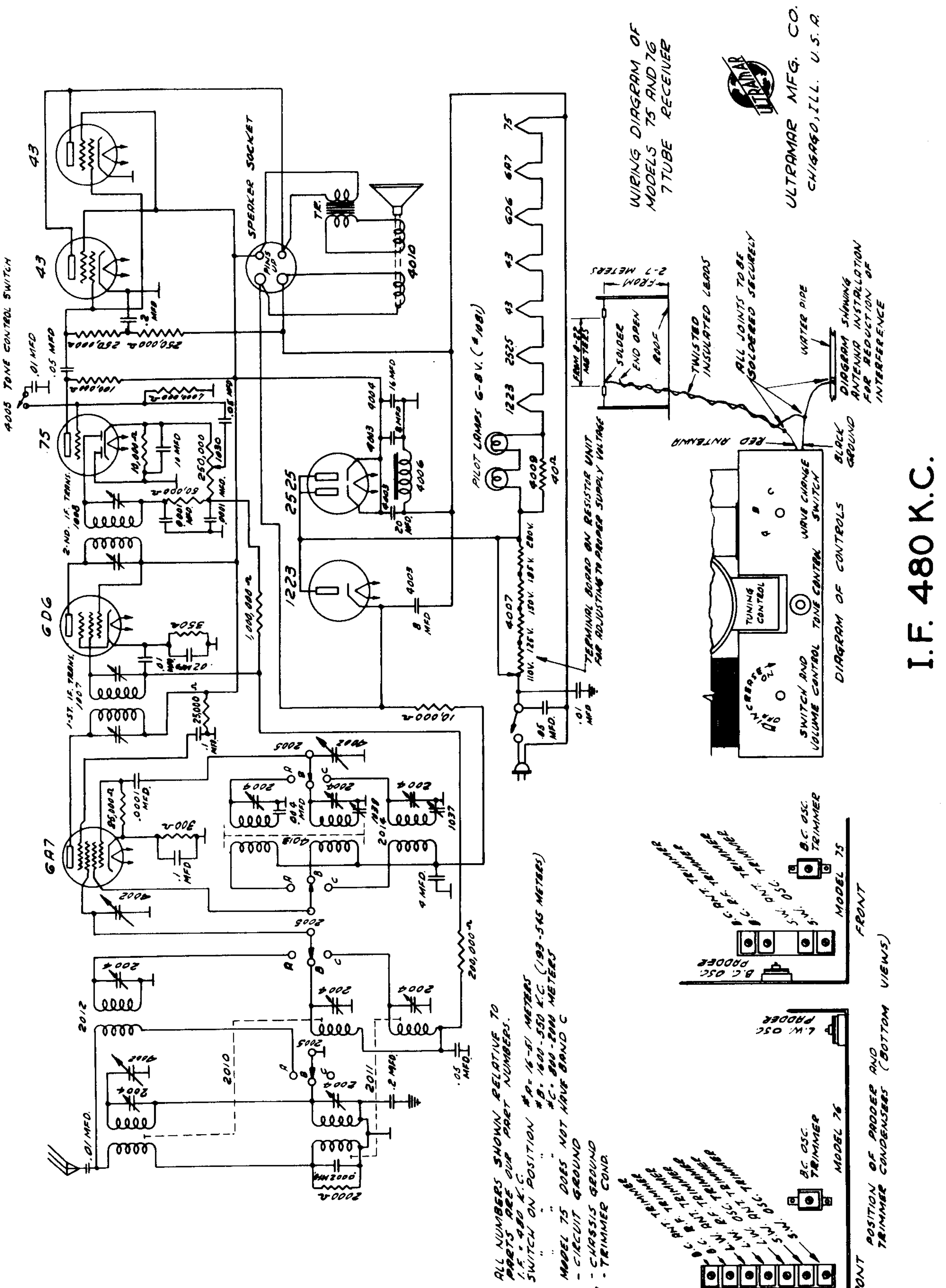
ULTRAMAR MANUFACTURING CORPORATION

MODELS 71 & 72



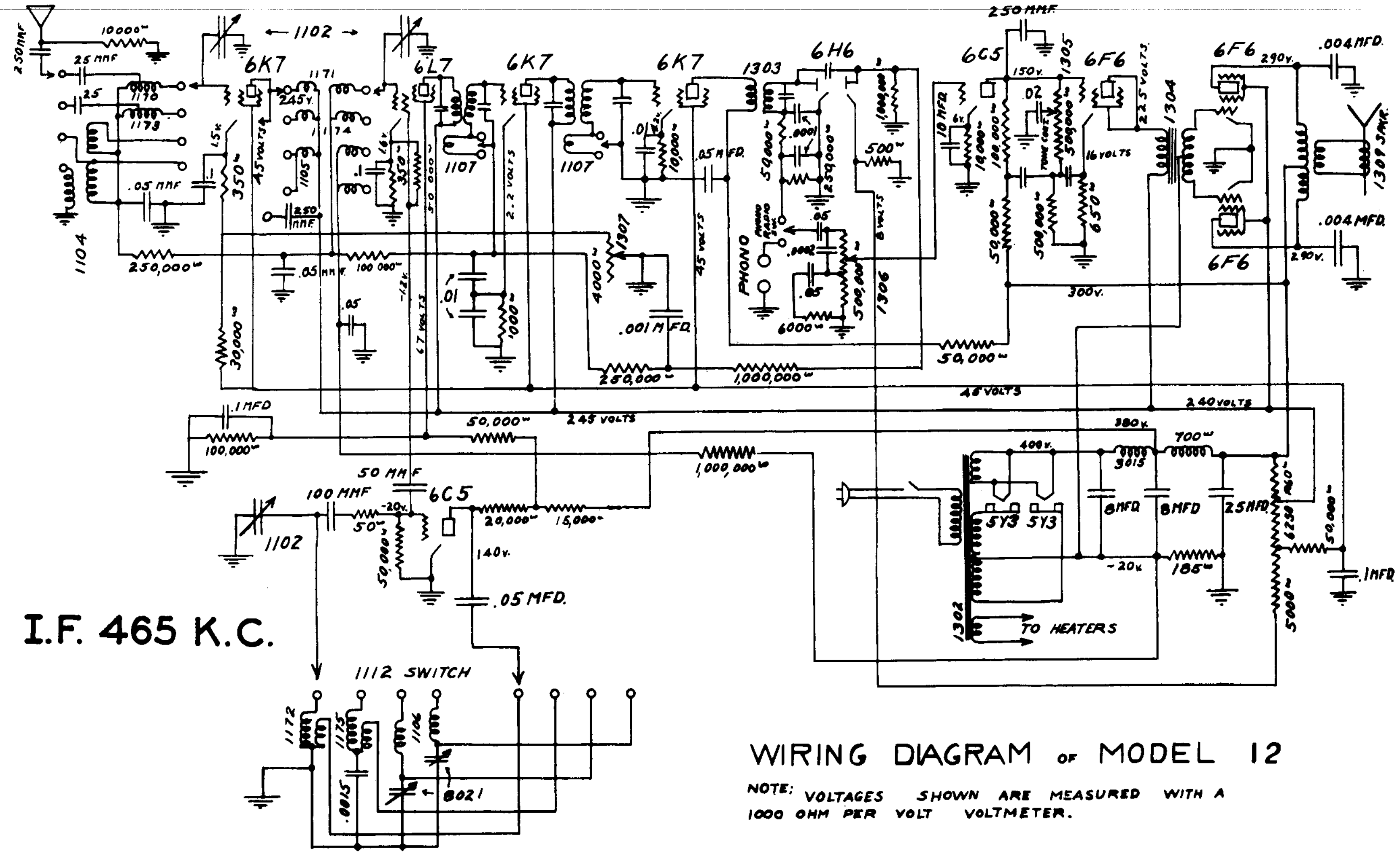
ULTRAMAR MANUFACTURING CORPORATION

MODELS 75 & 76



ULTRAMAR MANUFACTURING CORPORATION

MODEL 120



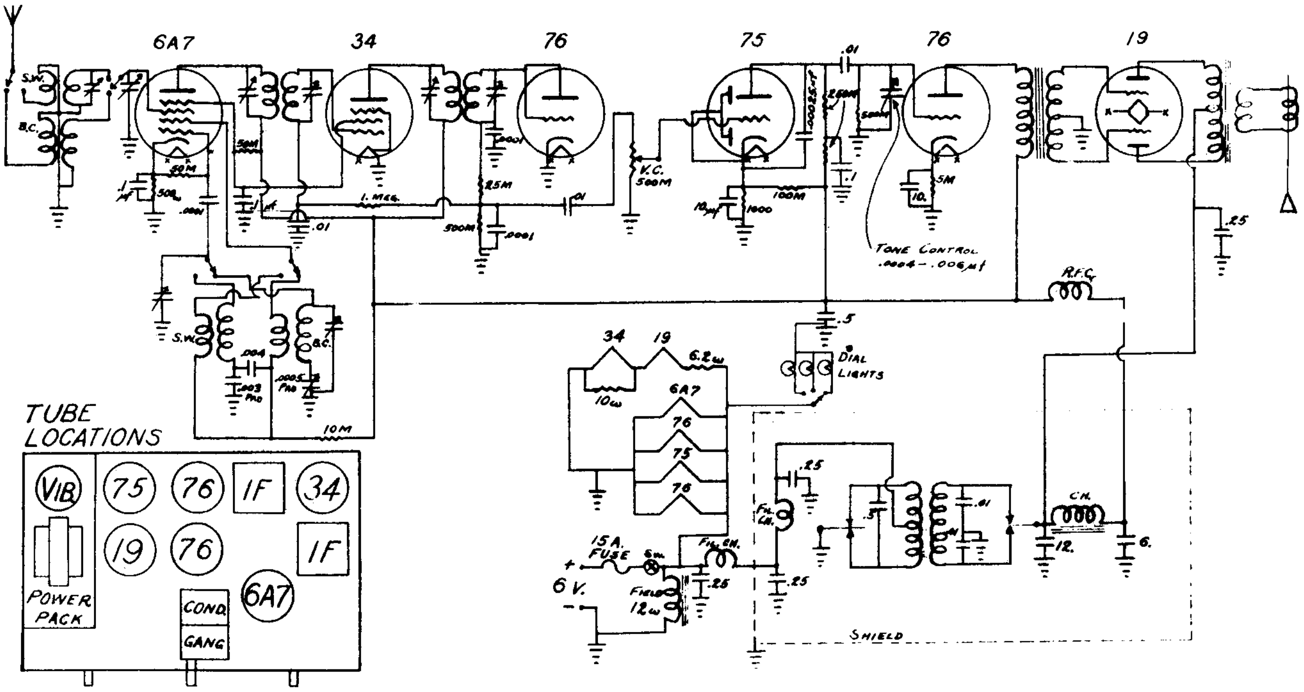
WIRING DIAGRAM OF MODEL 12

NOTE: VOLTAGES SHOWN ARE MEASURED WITH A 1000 OHM PER VOLT VOLTMETER.

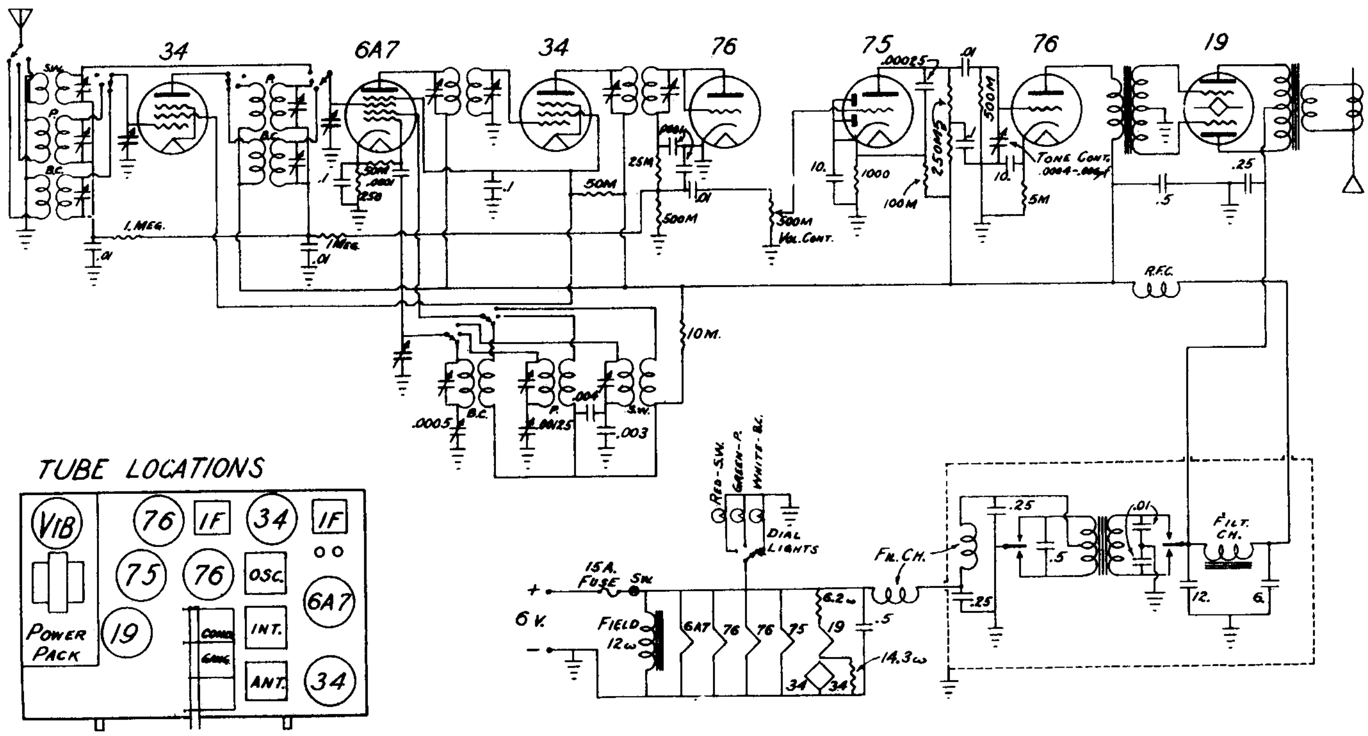
1302	. . .	Universal Transformer
1104	. . .	B.C. & L.W. Antenna Coil
1105	. . .	B.C. & L.W. R.F. Coil
1106	. . .	B.C. & L.W. Oscillator Coil
1303	. . .	Single tuned I.F. Transformer
1107	. . .	Iron Core I.F. Transformer
		8 MFD-500 V. wet electrolytic condenser
		8 MFD-450 V. wet electrolytic condenser
		25 MFD-450 V. wet electrolytic condenser
1108	. . .	6-1/2 inch Dial Assembly
802-4	. . .	4 Band Bandspread Scale
3015	. . .	Filter Choke
1102	. . .	3 Gang Geared Condenser
1304	. . .	Push-Pull Transformer
Condensers		2/10-400 volts cub condenser
		1/10-400 volts cub condenser
		1/10-200 volts cub condenser
		.05-400 volts cub condenser
		.01-400 volts cub condenser
		.004-800 volts cub condenser
		.02-400 volts cub condenser
		.0015 mica condenser
		.0001 mica condenser
		.00025 mica condenser
		50 M.M.F. mica condenser
		.002 M.F.D. mica condenser
		25 M.M.F. mica condenser
		3 M.F.D.-450 V. dry electrolytic condenser
		10 M.F.D.-25 V. dry electrolytic condenser
Resistors		1 megohm 1/3 watt resistor
		500,000 ohms 1/3 watt resistor
		250,000 ohms 1/3 watt resistor
		100,000 ohms 1/3 watt resistor
		50,000 ohms 1/3 watt resistor
		6,000 ohms 1/3 watt resistor
		1,500 ohms 1/3 watt resistor
		500 ohms 1/3 watt resistor
		350 ohms 1/3 watt resistor
		50 ohms 1/3 watt resistor
		50,000 ohms 1 watt resistor
		30,000 ohm 1 watt resistor
		20,000 ohm 1 watt resistor
1064	. . .	Isolantite Trimmers
1170	. . .	H.F. Antenna Coil
1171	. . .	H.F. R.F. Coil
1172	. . .	H.F. Oscillator Coil
1173	. . .	S.W. Antenna Coil
1174	. . .	S.W. R.F. Coil
1175	. . .	S.W. Oscillator Coil
1087	. . .	6 Volt Pilot Lamps
1112	. . .	3 Gang Switch
1305	. . .	Tone Control & D.P.D.T. Switch
1306	. . .	Volume Control 500,000 ohms
1307	. . .	Sensitivity control & switch
1034	. . .	S.P.D.T. Toggle Switch
1308	. . .	Ohmite voltage divider
8021	. . .	Dual Padder Condenser
1113	. . .	Band Indicator
1309	. . .	12 inch Dynamic Speaker

UNIVERSAL BATTERY COMPANY

MODEL 6TUBE 6VOLT SUPERHET

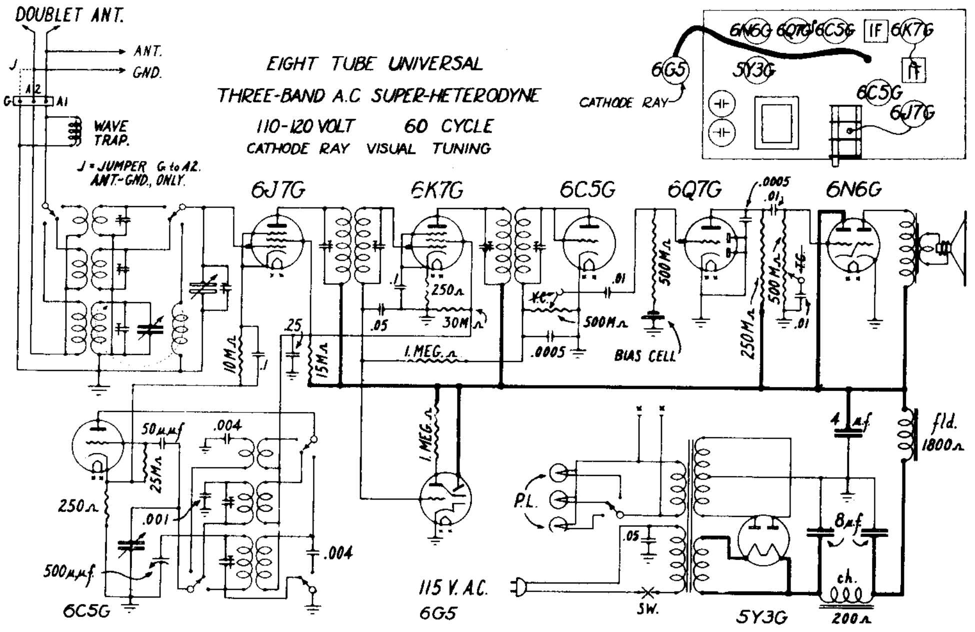


MODEL 7TUBE 6VOLT SUPERHET

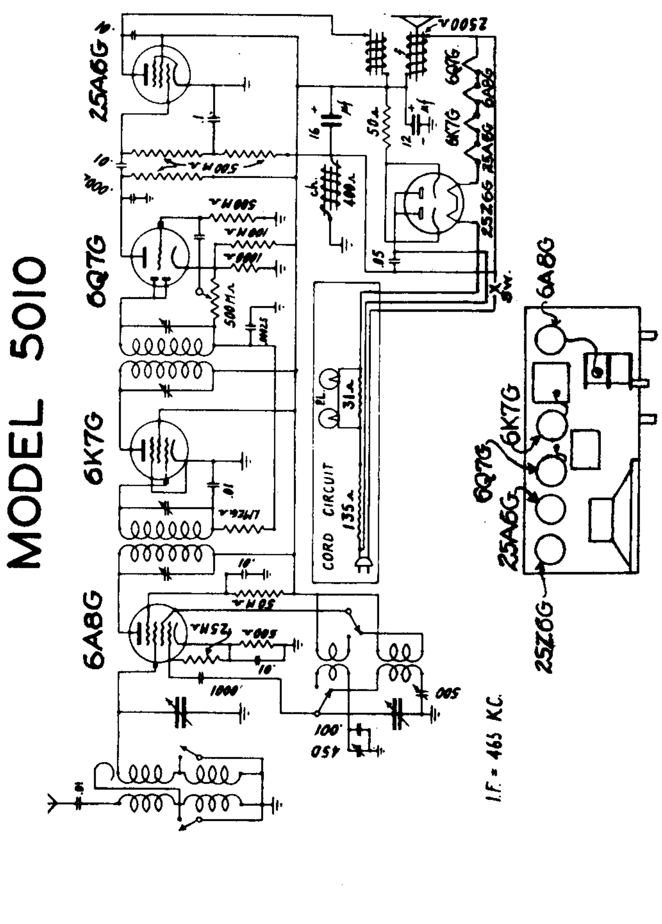


UNIVERSAL BATTERY COMPANY

MODELS 8210 & 8410

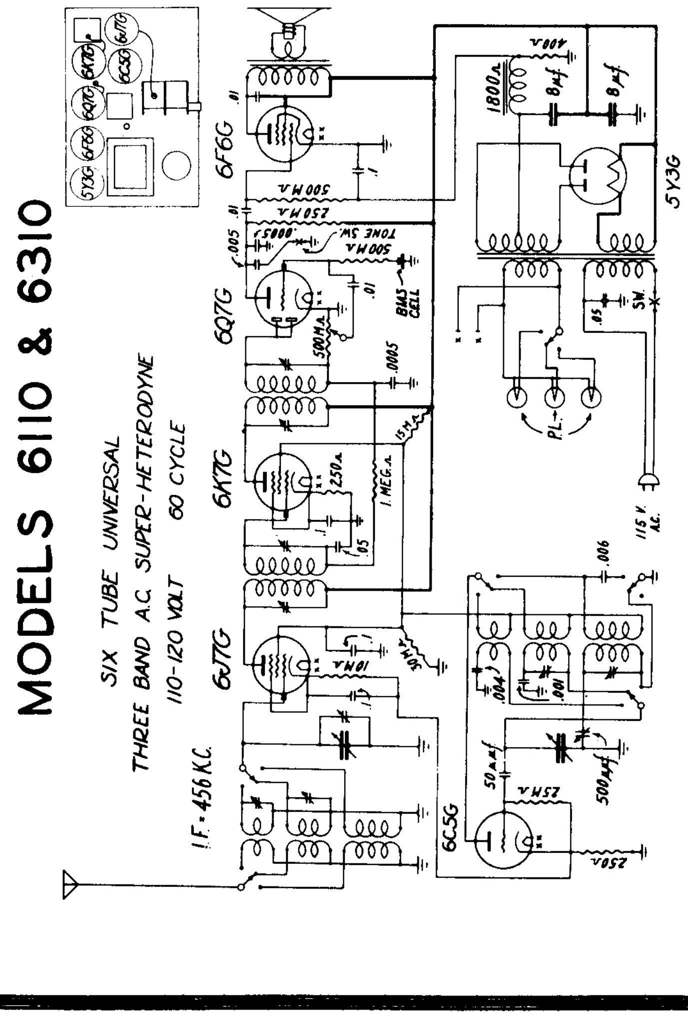


MODEL 5010



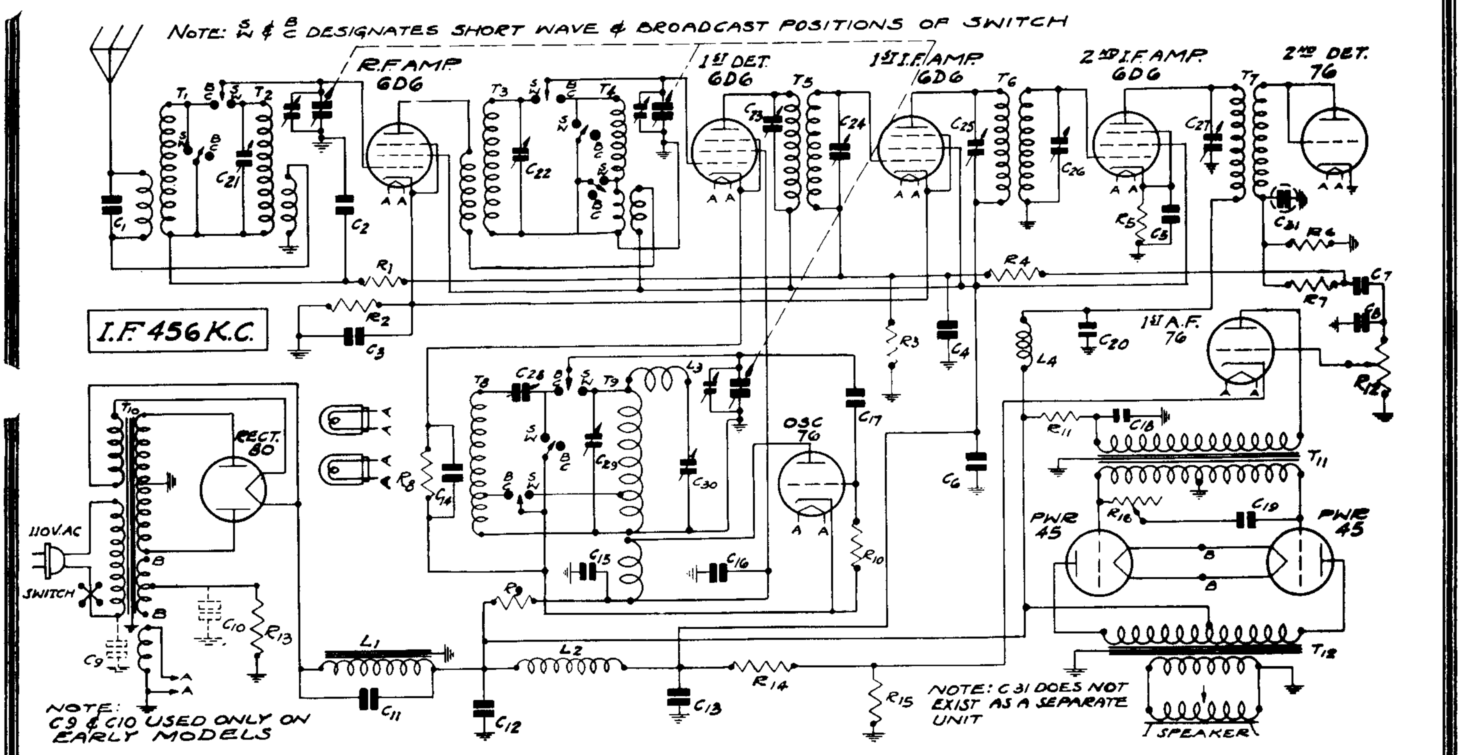
MODELS 6110 & 6310

SIX TUBE UNIVERSAL
THREE BAND A.C. SUPER-HETERODYNE
110-120 VOLT 60 CYCLE



WELLS-GARDNER & CO.

MODEL OC SERIES

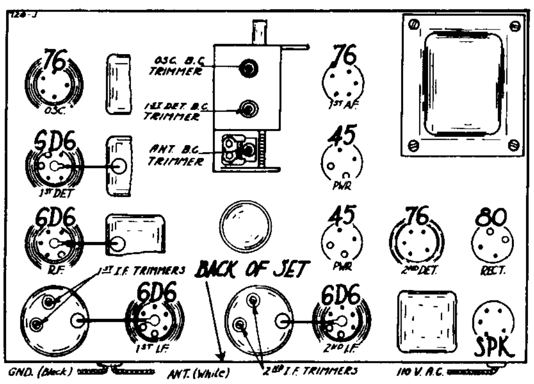


Voltages at Sockets

LINE VOLTAGE — 115

ANTENNA SHORTED TO GROUND

Type of Tube	Function	Across Fila. or Heater	Plate to Cath.	Screen to Cath.	Cath. to Ground	Normal Plate M. A.
6D6	R. F.	6.3	95	95	2.8	7.0
6D6	1st Det.	6.3	88	95	9.2	2.9
76	Osc.	6.3	110	—	—	5.0
6D6	1st I. F.	6.3	95	95	2.8	7.0
6D6	2nd I. F.	6.3	300	95	3.3	6.0
76	2nd Det.	6.3	—	—	—	—
76	1st Audio	6.3	160	—	9.0	4.0
45	Output	2.5	245	—	48.0	30.0
80	Rectifier	5.0	890 V. A. C. pl. to pl.			58.0 per plate



I.F. 456 K.C.

CONDENSERS

Part No.	Code	Capacity	Volts	Type	List Price
P-80919	C1	250 mmfd.		Moulded	$ .20
P-80862	C2	.05 mfd.	200V.	Tubular	.15
P-80888	C3	.25 mfd.	200V.	Tubular	.25
P-80862	C4	.05 mfd.	200V.	Tubular	.15
P-80862	C5	.05 mfd.	200V.	Tubular	$ .15
P-80888	C6	.25 mfd.	200V.	Tubular	.25
P-80862	C7	.05 mfd.	200V.	Tubular	.15
P-81005	C8	35 mmfd.	600V.	Moulded	.15
*P-80997	C9	.01 mfd.	600V.	Condenser in metal can	.50
*P-80888	C10	.25 mfd.	200V.	Tubular	.25
P-80985	C11	.15 mfd.	200V.	Tubular	.55
P-81039	C12	16.0 mfd.	400V.	Wet Electrolytic	1.75
P-81018	C13	6.0 mfd.	150V.	Dry Electrolytic	1.95
	C16	2.0 mfd.	300V.		
	C18	2.0 mfd.	300V.		
P-80862	C14	.05 mfd.	200V.	Tubular	.15
P-80864	C15	.10 mfd.	200V.	Tubular	.20
P-81005	C17	35 mmfd.	600V.	Moulded	.15
P-80863	C19	.004 mfd.	600V.	Tubular	.15
P-81041	C20	.10 mfd.	400V.	Tubular	.25
P-2102	C21	3-40 mmfd.		Ant. S.W. Trimmer	.15
P-2102	C22	3-40 mmfd.		1st Det. S.W. Trimmer	.15
P-2103	C23	200± 50 mmfd.		Dual Trimmer	
	C24	200± 50 mmfd.		Part of I.F. Assem.	
P-2103	C25	200± 50 mmfd.		Dual Trimmer	
	C26	200± 50 mmfd.		Part of I.F. Assem.	
P-1685	C27	70± 30 mmfd.		3rd I.F. Coil Trimmer	.35
P-2112	C28	300-500 mmfd.		600 K.C. Trimmer	.45
P-2102	C29	3-40 mmfd.		Osc. S.W. Trimmer	.15
P-1685	C30	70± 30 mmfd.		6000 K.C. Trimmer	.35
P-81027		Three Gang Condenser			3.35

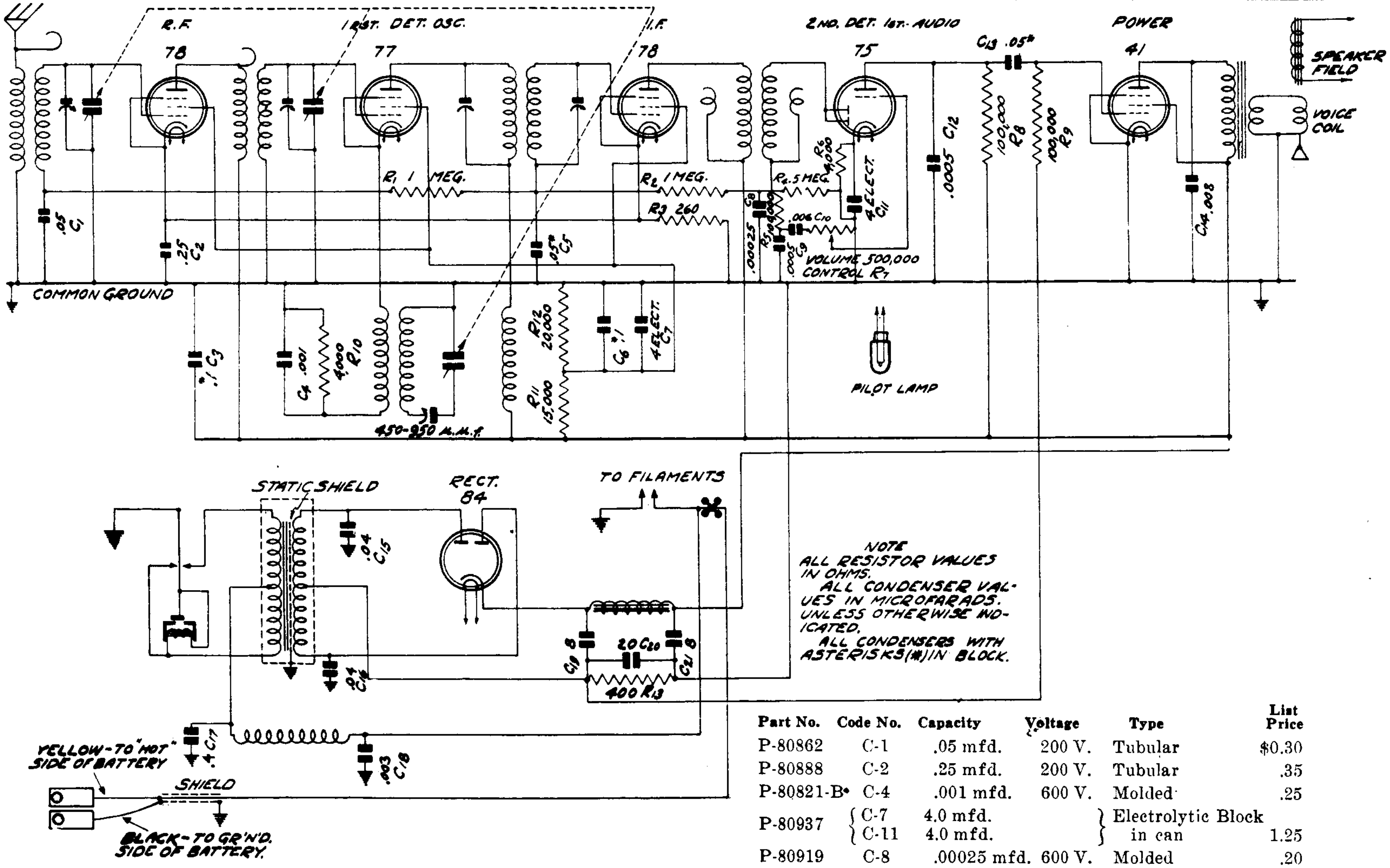
RESISTORS

Part No.	Code	Resistance	Watts	Type	List Price
P-A95204	R1	200,000 ohm	.2	Carbon	$ .15
P-98023	R2	150 ohm	.5	Flex. Wire Wound	.15
P-A95105	R3	1 megohm	.2	Carbon	.15
P-A95205	R4	2 megohm	.2	Carbon	.15
P-98024	R5	400 ohm	.5	Flex. Wire Wound	.15
P-A94304	R6	300,000 ohm	.2	Carbon	.15
P-A95104	R7	100,000 ohm	.2	Carbon	.15
P-A94252	R8	2,500 ohm	.2	Carbon	.15
P-98022	R9	30,000 ohm	2.0	Carbon	.30
P-A95104	R10	100,000 ohm	.2	Carbon	.15
P-C94303	R11	30,000 ohm	1.0	Carbon	.15
P-96005	R12	2 megohm		Volume Control and Switch	1.25
P-98006	R13	780 ohm	3.0	Armored Wire Wound	.65
	R14	6000 ohm	1.4		
	R15	460 ohm	.2		
P-97003	R16	3 megohm		Tone Control	.80

*Used in Early Models only.

WELLS-GARDNER & CO.

MODEL V6Z2 AUTO SET



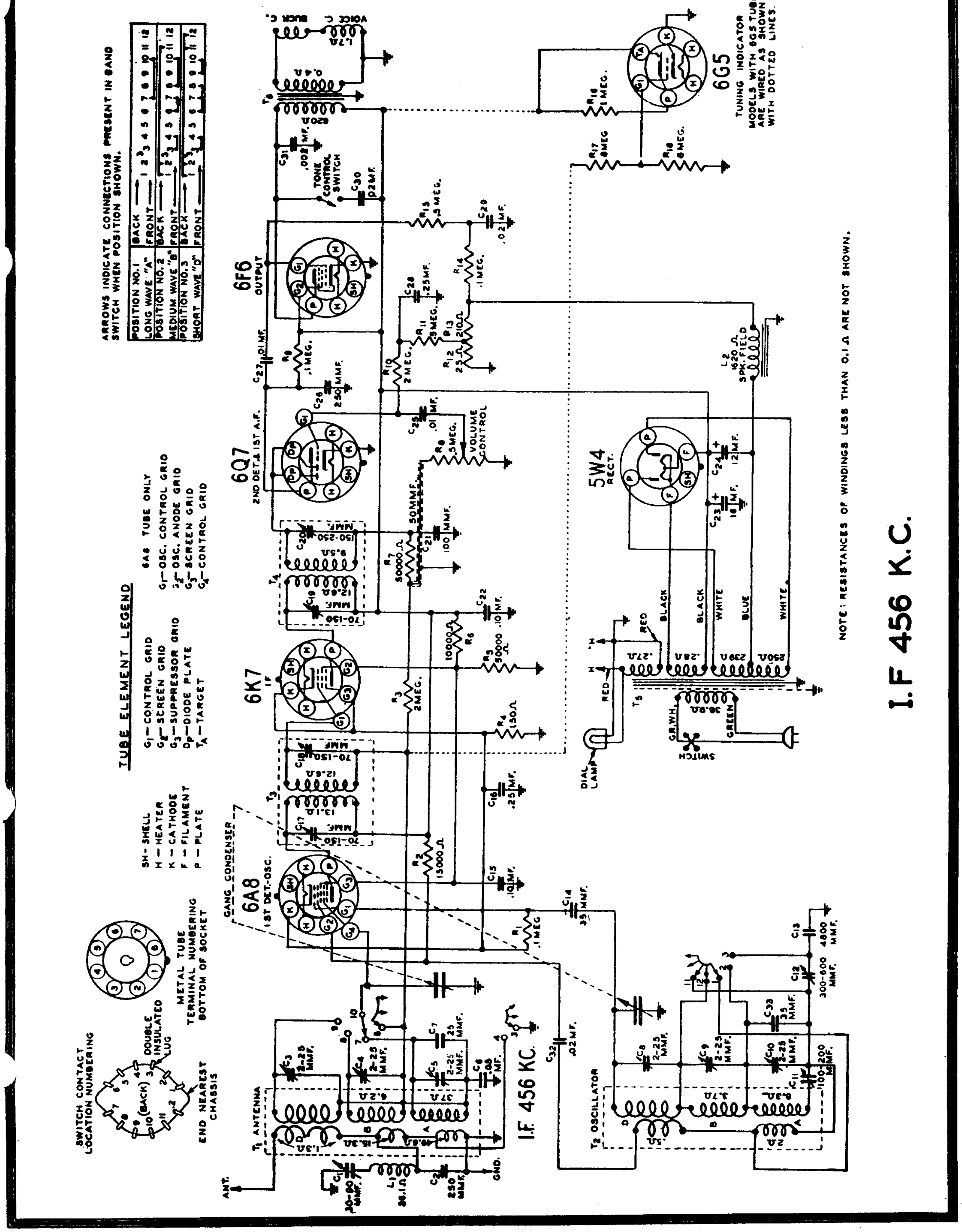
I.F. 262 K.C.

Part No.	Code No.	Resistance
P-A95105	R-1	1 Megohm
P-A95105	R-2	1 Megohm
P-B94261	R-3	260 ohm
P-A95504	R-4	.5 Megohm
P-A95104	R-5	100,000 ohm
P-A94402	R-6	4,000 ohm
P-A91061	R-7	0-500,000 ohm
P-A95104	R-8	100,000 ohm
P-A95104	R-9	100,000 ohm
P-A9440[illegible]	R-10	4,000 ohm
P-B94153	R-11	15,000 ohm
P-B94203	R-12	20,000 ohm
P-C94401	R-13	400 ohm

Part No.	Code No.	Capacity	Voltage	Type	List Price
P-80862	C-1	.05 mfd.	200 V.	Tubular	$0.30
P-80888	C-2	.25 mfd.	200 V.	Tubular	.35
P-80821-B*	C-4	.001 mfd.	600 V.	Molded	.25
P-80937	C-7 C-11	4.0 mfd. 4.0 mfd.		Electrolytic Block in can	1.25
P-80919	C-8	.00025 mfd.	600 V.	Molded	.20
P-80945	C-9	.0005 mfd.	600 V.	Molded	.15
P-80898	C-10	.006 mfd.	600 V.	Tubular	15
P-80945	C-12	.0005 mfd.	600 V.	Molded	.15
P-80966	C-14	.008 mfd.	600 V.	Tubular	20
P-80963	C-15 C-16	.04 mfd. .04 mfd.	400 V. 400 V.	Dual Tubular	.30
P-80960	C-17	.4 mfd.	15 V.	In Metal Can	.50
P-80959	C-18	.003 mfd.	600 V.	Molded	.35
P-80956	C-19 C-20 C-21	8.0 mfd. 20.0 mfd. 8.0 mfd.	225 V. 25 V. 225 V.	Electrolytic Block in Can	2.25
P-80955	C-3 C-5 C-6 C-13	.1 mfd. .05 mfd. .1 mfd. .05 mfd.	300 V. 200 V. 200 V. 300 V.	Bypass Block in Can	1.35

WELLS-GARDNER & CO.

MODELS 5F & 5FL



WELLS-GARDNER & CO.

MODELS 5F & 5FL

Correct alignment is extremely important in connection with multi-band radios. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 380, 350, 165, 1730, 1500, 600, 18,300 and 15,000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. **Be sure to align the radio in the order as given below.**

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (medium wave band).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator, and adjust the I.F. wave trap trimmer (C1) for minimum output. The location of this trimmer is shown in Fig. 3.

Range D Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15000 KC. The signal will then be heard at 15000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15000 less 912 KC, or 14088 KC. It may be necessary to increase the input signal to hear the image.

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (short wave band).

For this and **all** subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range D trimmer (C8) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the antenna Range D trimmer (C3) to maximum.

When adjusting the antenna Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the medium wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

Adjust the oscillator Range B trimmer (C9) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the screw of the large pointer and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

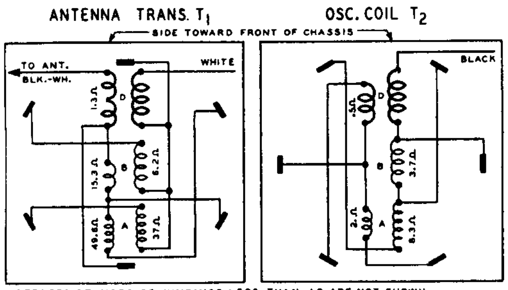
Adjust the antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.



NOTE: RESISTANCES OF WINDINGS LESS THAN .1Ω ARE NOT SHOWN

R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer (C12) until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range A Alignment

380 KC Adjustment

Set the signal generator for 380 KC.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range A position (long wave band).

Adjust the oscillator Range A trimmer (C10) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

350 KC Adjustment

Set the signal generator for 350 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the antenna Range A trimmer (C5) to maximum.

Do not change the setting of the oscillator Range A trimmer.

165 KC Adjustment

Set the signal generator for 165 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 165 KC trimmer (C11) until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

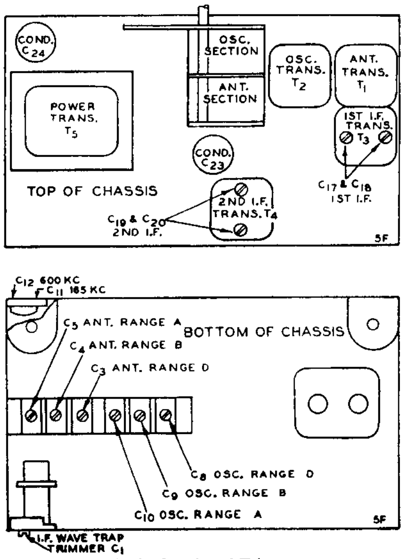


Fig. 3—Location of Trimmers

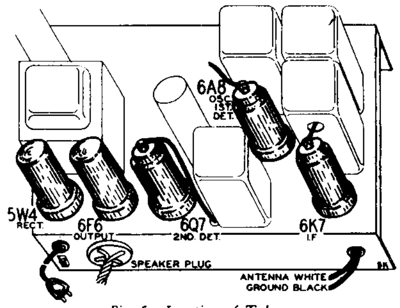


Fig. 5—Location of Tubes

Voltage Chart

The voltage readings are taken with a voltmeter having a resistance of 1000 ohms per volt.

The standard metal tube socket terminal numbering system (bottom of socket) is shown in Fig. 6. On the schematic circuit diagram, Fig. 2, is a list giving the complete names of the tube elements and the corresponding symbols as used on the sockets on the schematic.

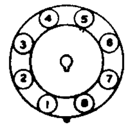


Fig. 6—Metal Tube Terminal numbering (bottom of socket)

VOLTAGES AT SOCKETS

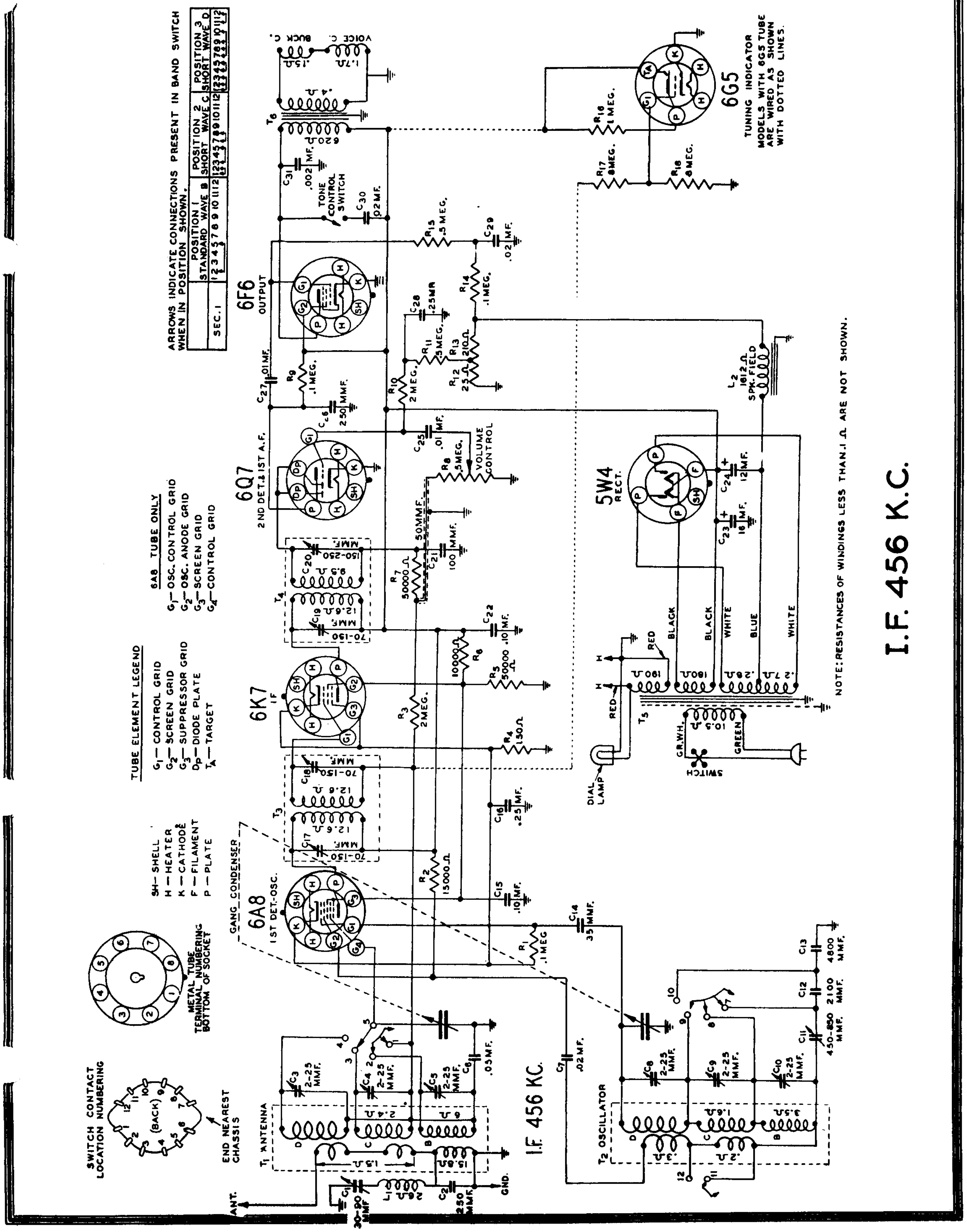
Line Voltage: 115 — Volume Control: Maximum — Antenna Shorted to Ground

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6A8	1st Det.-Osc.	0	6.3[1]	200	110		160	6.3[1]	3
6K7	I.F.	0	6.3[1]	200	110	3		6.3[1]	3
6Q7	2nd Det.	0	6.3[1]	110	0	0		6.3[1]	0[2]
6F6	Output	0	6.3[1]	185	200	12.5[3]		6.3[1]	0
5W4	Rectifier	0	5.1[4]		620[5]		620[5]		5.1[4]
6G5	Tuning Indicator	Plate to Ground 25		Target to Ground 200		Cathode to Ground 0		Across Heater 6.3 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.5 volts) as read across resistor R12.
(3) Read across resistor R12 and R13.
(4) A.C. voltage as read across heater terminals 2 and 8.
(5) A.C. voltage read across terminals 4 and 6.

WELLS-GARDNER & CO.

MODELS 5K & 5KL



WELLS-GARDNER & CO.
MODELS 5K & 5KL

Correct alignment is extremely important in connection with all wave radios. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 18,300 and 15,000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. **Be sure to align the radio in the order as given below.**

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator, and adjust the I.F. wave trap trimmer (C1) for minimum output. The location of this trimmer is shown in Fig. 3.

Range D Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (2nd short wave band).

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range D trimmer (C8) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the antenna Range D trimmer (C3) to maximum.

When adjusting the antenna Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

Range C Alignment

5800 KC Adjustment

Set the signal generator for 5800 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (1st short wave band).

Adjust the oscillator Range C trimmer (C9) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the antenna Range C trimmer (C4) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

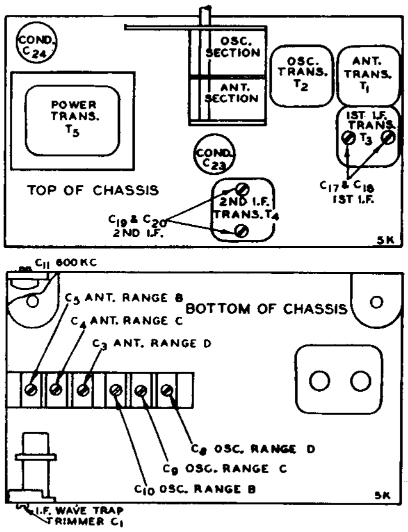


Fig. 3—Location of Trimmers

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

Adjust the oscillator Range B trimmer (C10) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the screw of the large pointer and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

Adjust the antenna Range B trimmer (C5) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer (C11) until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

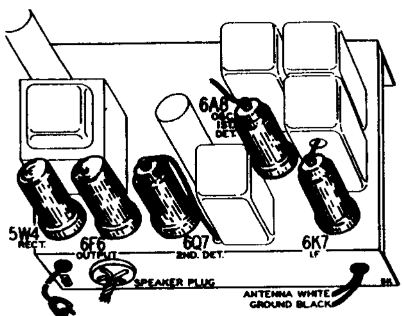
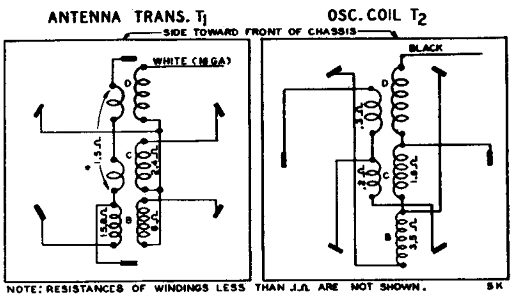


Fig. 5—Location of Tubes



-R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance

Voltage Chart

The voltage readings are taken with a voltmeter having a resistance of 1000 ohms per volt.

The standard metal tube socket terminal numbering system (bottom of socket) is shown in Fig. 6. On the schematic circuit diagram, Fig. 2, is a list giving the complete names of the tube elements and the corresponding symbols as used on the sockets on the schematic.

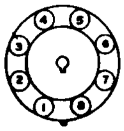


Fig. 6—Metal Tube Terminal numbering (bottom of socket)

VOLTAGES AT SOCKETS

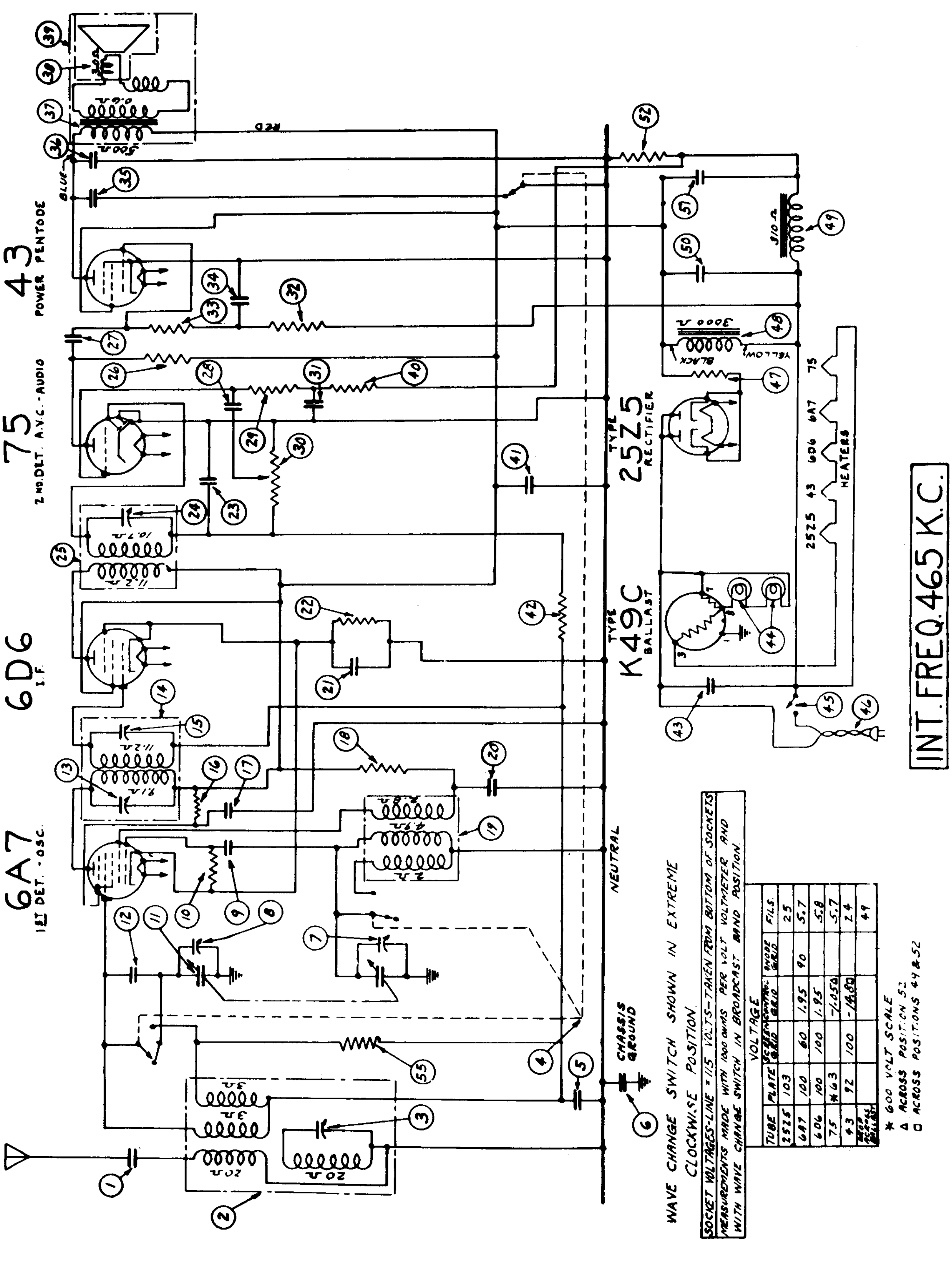
Line Voltage: 115 | Volume Control: Maximum | Antenna Shorted to Ground

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise Indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6A8	1st Det.-Osc.	0	6.3[1]	200	110		160	6.3[1]	3
6K7	I.F.	0	6.3[1]	200	110	3		6.3[1]	3
6Q7	2nd Det.	0	6.3[1]	110	0	0		6.3[1]	0[2]
6F6	Output	0	6.3[1]	185	200	12.5[3]		6.3[1]	0
5W4	Rectifier	0	5.1[4]		620[5]		620[5]		5.1[4]
6G5	Tuning Indicator ...	Plate to Ground 18		Target to Ground 200		Cathode to Ground 0		Across Heater 6.3 A.C.	

[1] A.C. voltage as read across heater terminals 2 and 7.
[2] Bias (1.5 volts) as read across resistor R12.
[3] Read across resistor R12 and R13.
[4] A.C. voltage as read across heater terminals 2 and 8.
[5] A.C. voltage read across terminals 4 and 6.

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODEL WR-103



WAVE CHANGE SWITCH SHOWN IN EXTREME CLOCKWISE POSITION.

SOCKET VOLTAGES-LINE = 115 VOLTS-TAKEN FROM BOTTOM OF SOCKETS

MEASUREMENTS MADE WITH 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION.

	VOLTAGE				
TUBE	PLATE	SCREEN GRID	CONTROL GRID	ANODE GRID	FILS.
2525	103				25
6A7	100	60	1.95	90	5.7
6D6	100	100	1.95		5.8
75	* 63		-1.05 △		5.7
43	92	100	-14.8 □		24
DROP ACROSS BALLAST					49

* 600 VOLT SCALE

△ ACROSS POSITION 52

□ ACROSS POSITIONS 49 & 52

WESTINGHOUSE ELECTRIC SUPPLY COMPANY
MODELS WR-103 & WR-103A

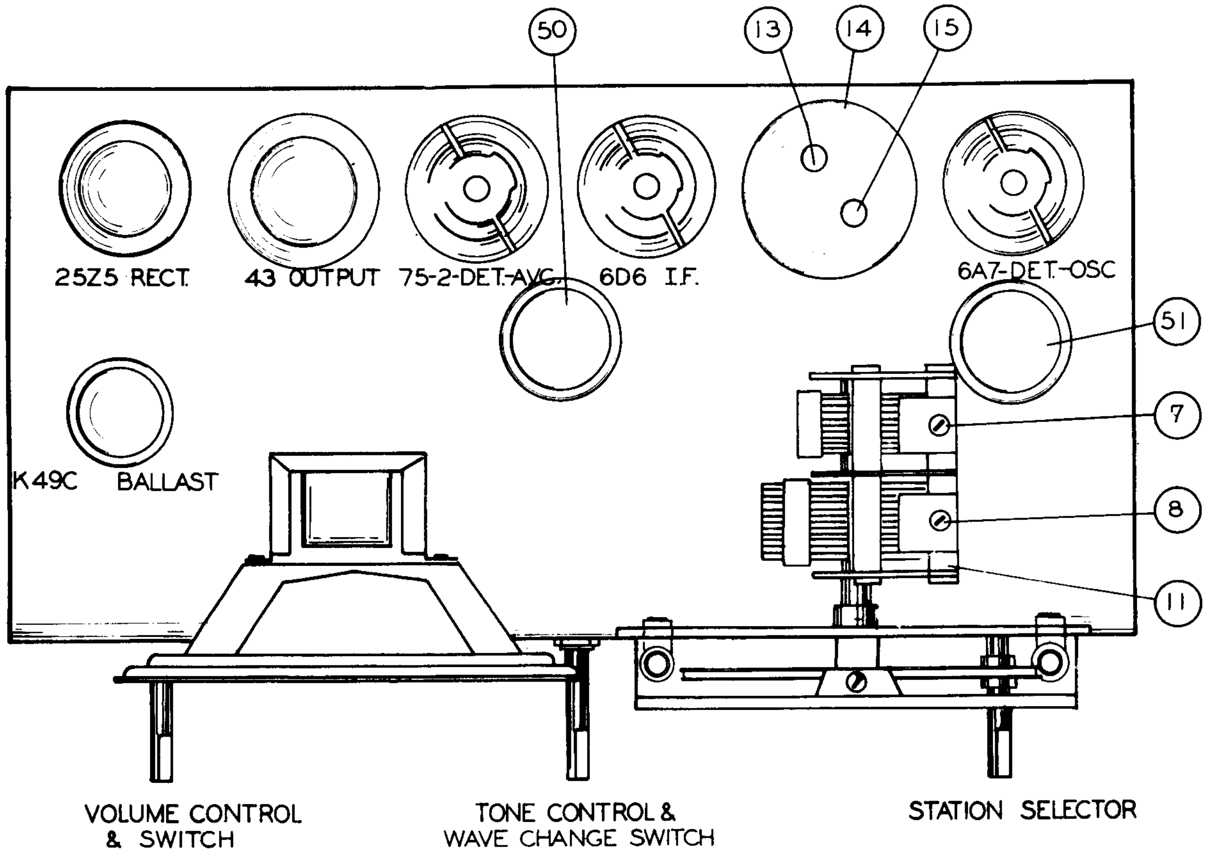


Figure No. 1

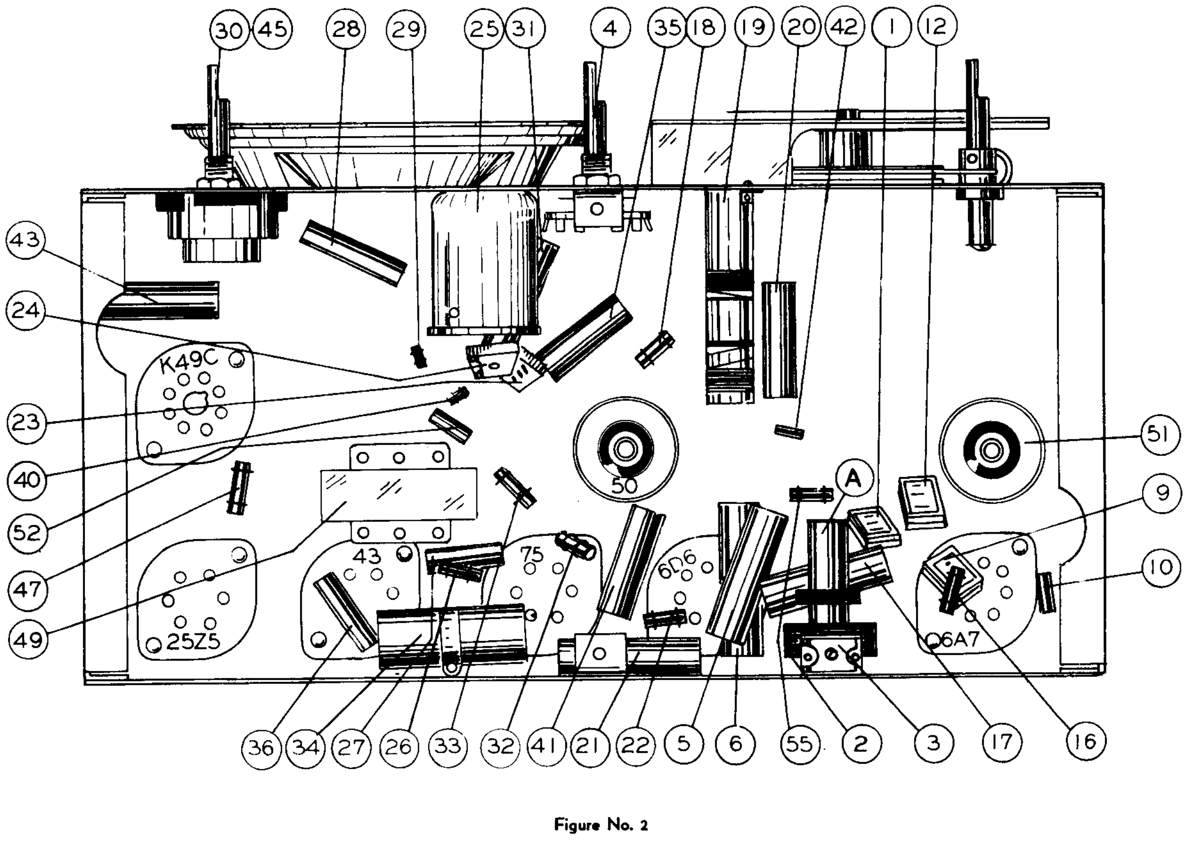


Figure No. 2

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

WESTINGHOUSE RADIO MODELS WR-103 and WR-103A WESTINGHOUSE RADIO MODELS WR-103 and WR-103A

Six-Tube, Superheterodyne Receiver

SERVICE NOTES

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ..... 1 #6A7, 1 #6D6, 1 #75, 1 #43, 1 #25Z5, 1 #K49C - Total 6
Power Supply .... 105 to 125 volt, D.C., or 105 to 125 volt, 50 to 60 cycle A.C.
Power Consumption .... 47 Watts
Tuning Ranges .... 540 to 1550 and 1500 to 3200 KC.
Maximum Output .... .75 Watt
Maximum Undistorted Output .... 1 Watt
Line-Up Frequencies .... I.F. 465 KC., 1400 KC.

GENERAL DESCRIPTION

This model is a six-tube, A.C.-D.C., two-band superheterodyne receiver whose circuit comprises a combined first detector-oscillator, an intermediate frequency amplifier, a combined second detector, A.V.C. and first audio amplifier, a power pentode output stage and a rectifier with its associated filter circuit, plus a ballast tube.

This model is designed to work over two bands, the Broadcast Band extending from 540 to 1550 KC., and a Police Band which extends from 1500 to 3200 KC.

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver, it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment.

A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figs. #1 and #2 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 KC.)

1. Set volume control on full, the wave-change switch on the Broadcast (treble position) and the dial indicator at approximately 600 KC.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 KC., and adjust its output to produce a measurable reading on output meter when test signal is applied to the grid of the 6D6 I.F. tube through a .5 mfd. blocking condenser.
4. Adjust #24 (see Fig. #2) to maximum output, reducing output of test oscillator as required.
5. Apply test signal to grid of 6A7 first detector-oscillator tube and adjust #13 and #15 (Fig. #1) to maximum output.
6. With test signal still on the grid of 6F7 tube, repeat the above adjustments for greatest sensitivity.
7. Apply strong 465 KC. signal to the antenna and adjust trap coil trimmer #3 to a minimum output.

ADJUSTMENT OF BROADCAST BAND

1. Apply test signal on grid of 6A7 tube and set the test oscillator to 1400 KC.
2. Turn the gang condenser to its maximum position. Adjust dial indicator until either end is directly over the long horizontal lines on the dial scale. Then set dial indicator to 1400 KC.
3. Adjust trimmer #7 to maximum output.
4. Apply test signal to antenna of set through a .0002 mfd. condenser and adjust trimmer #8 to maximum output.

ADJUSTMENT OF POLICE BAND

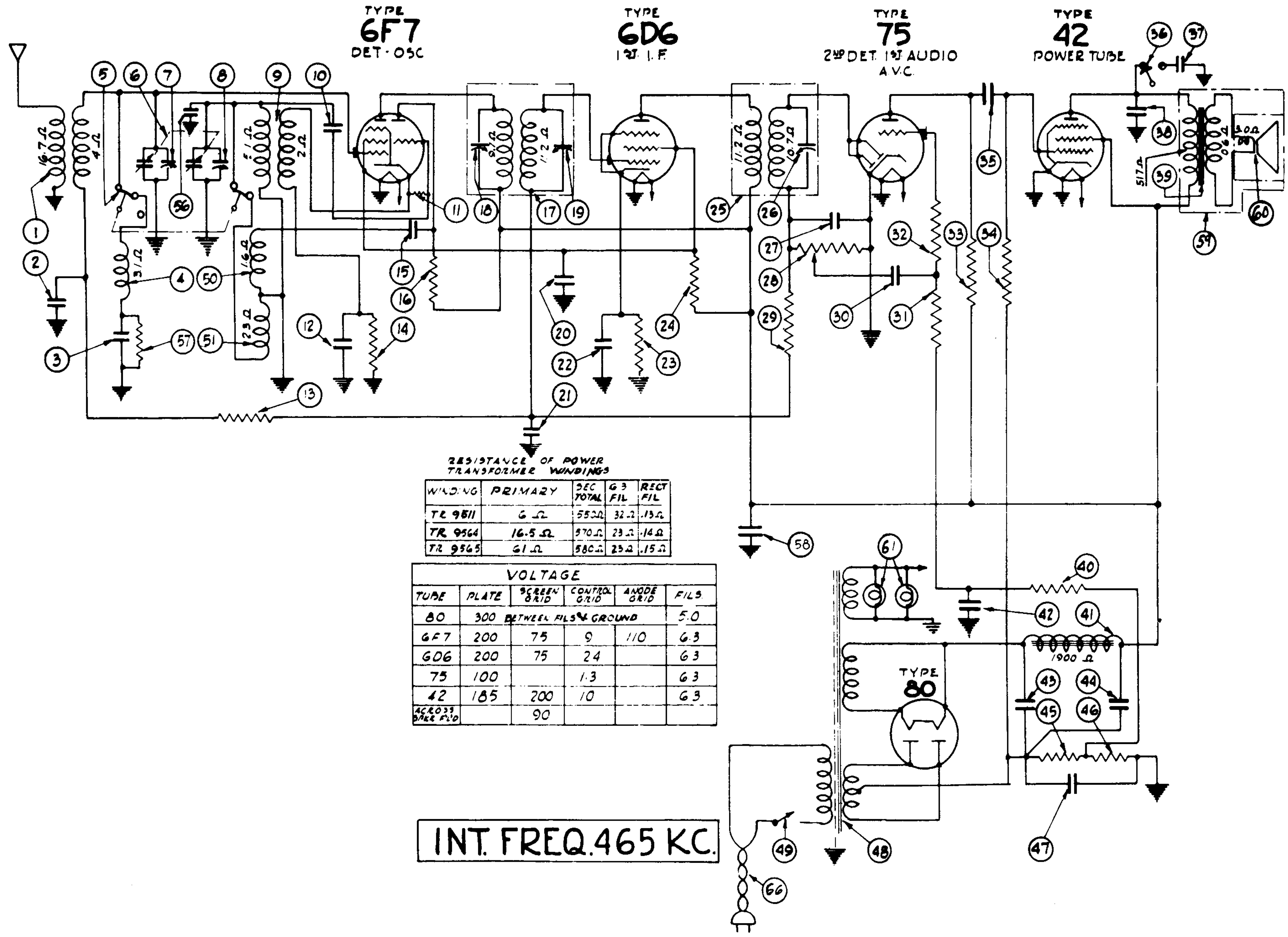
When adjustments as outlined under the Broadcast Band are completed, the Police Band requires no adjustment unless the coil has been changed. In this event, set test oscillator and station indicator to 1700 KC., and apply test signal to antenna lead. The Police Band winding is indicated by "A" in Fig. #2. Adjust the position of this winding by sliding it back and forth on the coil until maximum output is indicated on the output meter. This winding should then be secured in place by applying a thin coat of coil cement.

SERVICE PARTS LIST

Dia. #	Part #	Description of Parts	List Price
1	CM 9519	.0005 mfd. mica condenser	$ .20
2	RC 95165	Antenna coil assembly	1.50
3		30-60 mmf. trimmer condenser - part of RC 95165	
4	SW 9562	Wave-change switch	.75
5	CW 2-10	.1 mfd., 200 V. condenser	.15
6	CW 6-10	.1 mfd., 600 V. condenser	.20
7		Trimmer condenser - part of CG 9547	
8		Trimmer condenser - part of CG 9547	
9	SA 106417	.0001 mfd. mica condenser	.20
10	RE 9581	50,000 ohm, 1/4 W. resistor	.15
11	CG 9547	Variable condenser - 2 gang	2.50
12	CM 9522	.00048 mfd. mica condenser	.20
13		35-130 mmf. trimmer condenser - part of IC 9586	
14	IC 9586	First I.F. coil - 465 KC.	2.00
15		35-130 mmf. trimmer condenser - part of IC 9586	
16	RE 9536	20,000 ohm, 1/4 W. resistor	.10
17	CW 2-10	.1 mfd., 200 V. condenser	.15
18	SA 105249	5000 ohm, 1/4 W. resistor	.15
19	RC 95166	Oscillator coil assembly	.70
20	CW 2-10	.1 mfd., 200 V. condenser	.15
21	CW 2-10	.1 mfd., 200 V. condenser	.15
22	RE 9570	180 ohm, 1/8 W. resistor	.10
23	CM 9519	.0005 mfd. mica condenser	.20
24		30-60 mmf. trimmer condenser - part of IC 9595	
25	IC 9595	Second I.F. coil - 465 KC.	1.60
26	SA 105279	.25 meg., 1/4 W. resistor	.15
27	CW 4-005	.005 mfd., 400 V. condenser	.15
28	CW 4-005	.005 mfd., 400 V. condenser	.15
29	RE 9572	500,000 ohm, 1/4 W. resistor	.15
30	VR 957	.5 meg. volume control	1.25
31	CW 2-10	.1 mfd., 200 V. condenser	.15
32	RE 9572	.5 meg., 1/4 W. resistor	.15
33	RE 9572	.5 meg., 1/4 W. resistor	.15
34	CW 9525	.1 mfd., 100 V. condenser	.40
35	CW 2-05	.05 mfd., 200 V. condenser	.15
36	CW 4-005	.005 mfd., 400 V. condenser	.15
37	TR 9583	Output transformer	1.25
38	DM 9514	Diaphragm and voice coil assembly	1.15
39	SK 9544	Speaker	4.50
40	RE 9572	.5 meg., 1/4 W. resistor	.15
41	CW 2-10	.1 mfd., 200 V. condenser	.15
42	RE 9572	.5 meg., 1/4 W. resistor	.15
43	CW 2-10	.1 mfd., 200 V. condenser	.15
44	LP 9516	Dial lamp, 6.3 V., .15 amp.	.20
45		On-off switch - part of VR 957	
46	CB 9512	Line cable	.50
47	RE 9564	25 ohm, 1/2 W. resistor	.20
48		Field coil	
49	SA 105311	Choke coil assembly	.95
50	CE 9545	20 mfd., 150 V. electrolytic condenser	.85
51	CE 9546	12 mfd., 150 V. electrolytic condenser	.85
52	RE 9566	25 ohm, 1/4 W. resistor	.15
55	SA 105277	75,000 ohm, 1/4 W. resistor	.15

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODEL WR-209



RESISTANCE OF POWER TRANSFORMER WINDINGS

WINDING	PRIMARY	SEC TOTAL	G 3 FIL	RECT FIL
TR 9511	6 Ω	550 Ω	32 Ω	.13 Ω
TR 9564	16.5 Ω	570 Ω	23 Ω	.14 Ω
TR 9565	61 Ω	580 Ω	23 Ω	.15 Ω

VOLTAGE					
TUBE	PLATE	SCREEN GRID	CONTROL GRID	ANODE GRID	FILS.
80	300 BETWEEN FILS & GROUND				5.0
6F7	200	75	9	110	6.3
6D6	200	75	24		6.3
75	100		1.3		6.3
42	185	200	10		6.3
ACROSS SPKR FLD		90			

INT. FREQ. 465 KC.

WESTINGHOUSE ELECTRIC SUPPLY COMPANY
MODEL WR-209

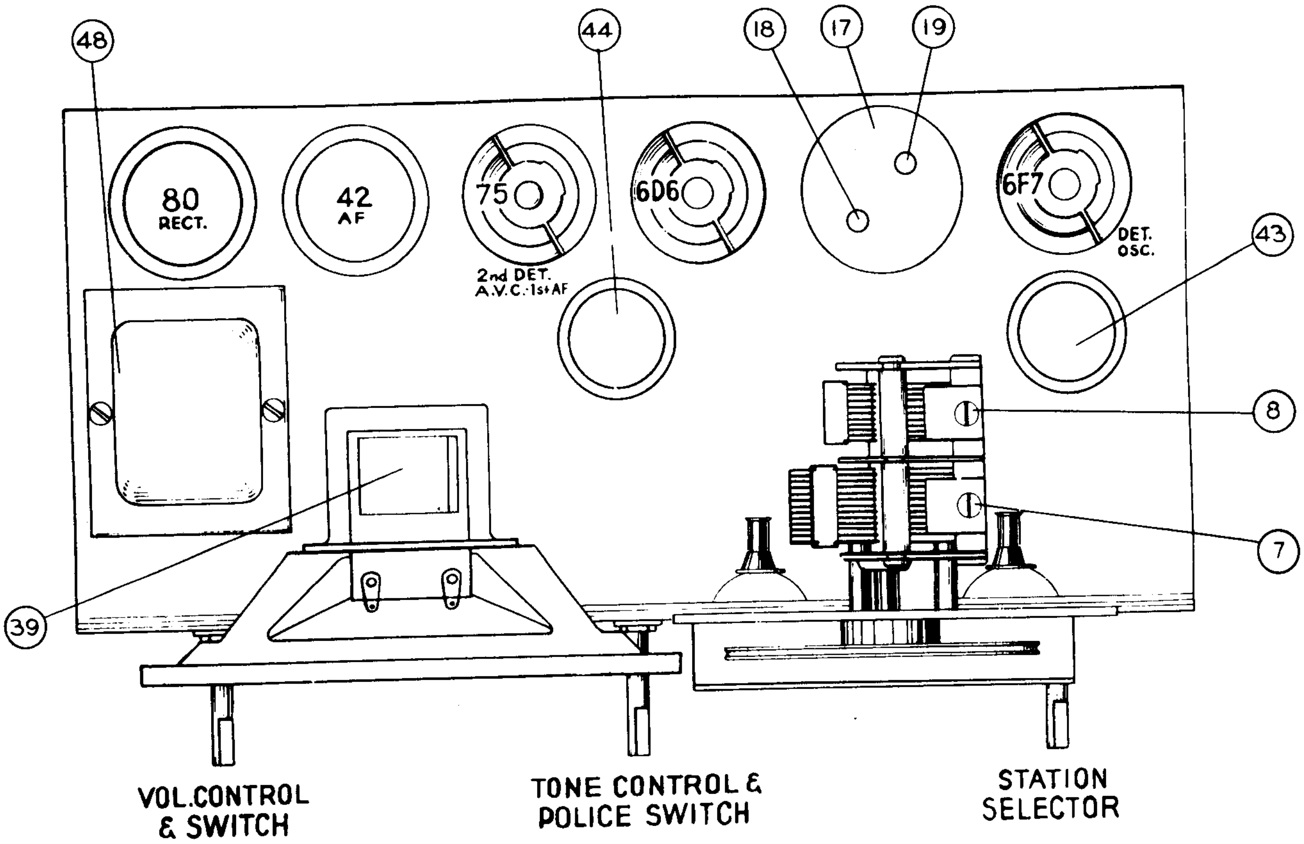


Figure No. 1

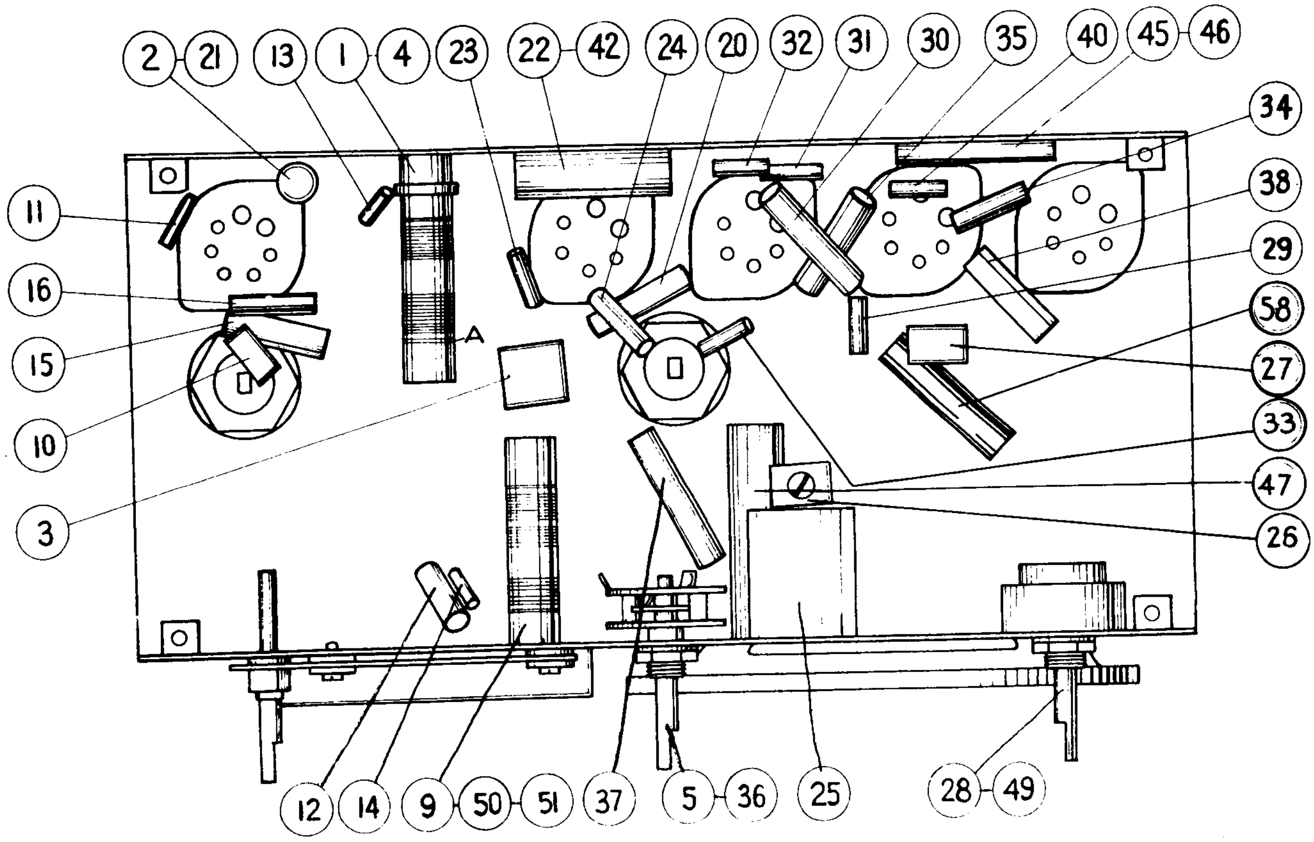


Figure No. 2

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

WESTINGHOUSE RADIO MODEL WR-209

Five-Tube, Superheterodyne Receiver

SERVICE NOTES

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ---------------- 1 #6F7, 1 #6D6, 1 #75, 1 #42, 1 #80 - Total 5
Power Supply ---------------------------------- 105 to 125 volts, 50 to 60 cycles A.C.
Power Consumption -- 46 Watts
Tuning Ranges ------------------------------ 540 to 1500 K.C. and 1500 to 3200 K.C.
Maximum Undistorted Output -- 1.5 Watts
Maximum Output -- 2.8 Watts
Line-Up Frequencies ------------------------------ I.F. 465 K.C., 1400 K.C.

GENERAL DESCRIPTION

This model is a five-tube, A.C., two-band superheterodyne receiver whose circuit comprises a combined first detector-oscillator an intermediate frequency amplifier, a combined second detector, A.V.C. and first audio amplifier, a power pentode output stage and a rectifier with its associated filter circuit and power transformer.

This model is designed to work over two bands, the broadcast band extending from 540 to 1500 K.C. and a police band which extends from 1400 to 3200 K.C.

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment.

A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Fig. #1 and #2 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 K.C.)

1. Set volume control on full, turn tone control knob to the right hand position. Set wave-change switch on the broadcast position and the dial indicator at approximately 600 K.C.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 K.C. and adjust its output to produce a measurable reading on output meter when test signal is applied to the grid of the 6D6 I.F. tube thru a .5 mfd. blocking condenser.
4. Adjust #26 (see Fig. #2) to maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 6F7 first detector-oscillator tube and adjust #18 and #19 (Fig. #1) to maximum output.
6. With test signal still on the grid of 6F7 tube, repeat the above adjustments for greatest sensitivity.

ADJUSTMENT OF BROADCAST BAND

1. Leave test signal on grid of 6F7 tube and set the test oscillator to1400 K.C.
2. Turn the gang condenser to its maximum position. Adjust dial indicator until either end is directly over the long horizontal lines on the dial scale. Then set dial indicator to 1400 K.C.
3. Adjust trimmer #8 to maximum output.
4. Apply test signal to antenna of set thru a .0002 mfd. condenser and adjust trimmer #7 to maximum output.

ADJUSTMENT OF POLICE BAND

When adjustments as outlined under the broadcast band are completed, the police band requires no adjustment unless the coil had been changed. In this event, set test oscillator and station indicator to 1700 K.C. and apply test signal to antenna lead. The police band winding is indicated by "A" in Fig. #2. Adjust the position of this winding by sliding it back and forth on the core until maximum output is indicated on the output meter. This winding should then be secured in place by applying a thin coat of coil cement.

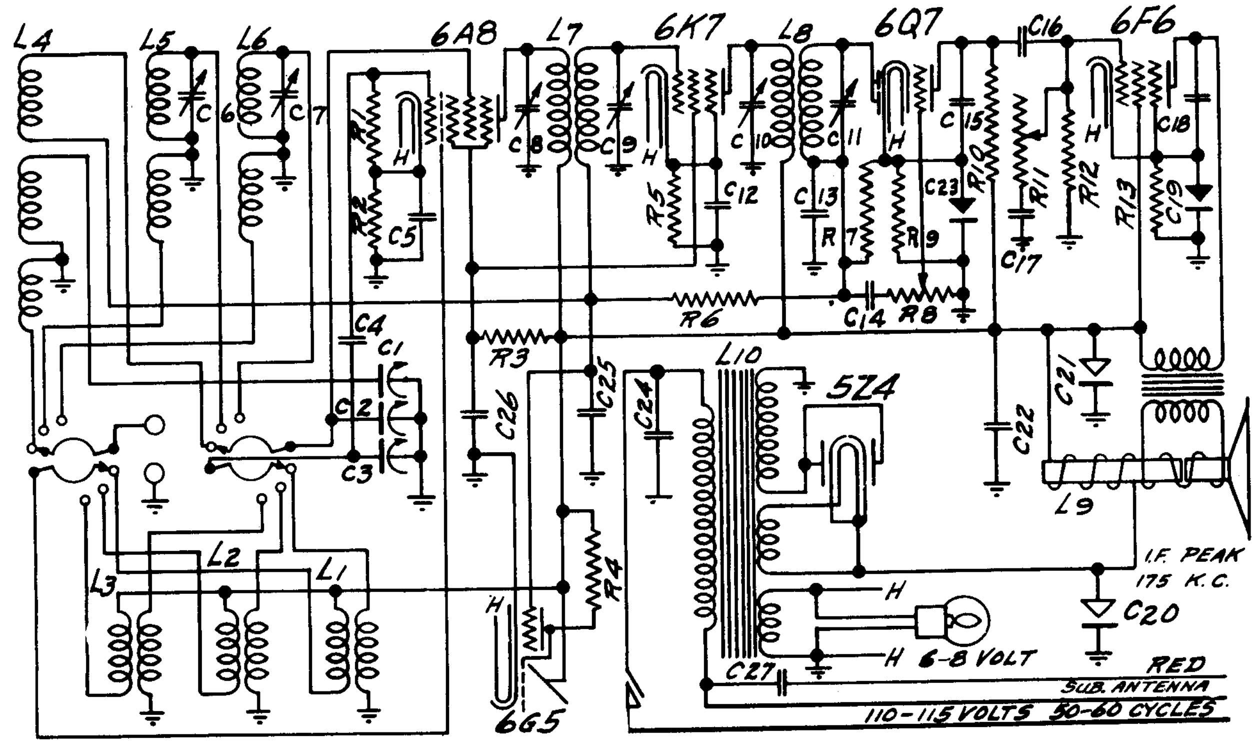
WESTINGHOUSE RADIO MODEL WR-209

SERVICE PARTS LIST

Dia. #	Part #	Description of Parts	List Price
1	RC 9588	Antenna coil assembly	$ 1.10
2		.05 mfd., 200 V. condenser - part of SA 105327 (dual).	.30
3	CM 958	400 mmfd. mica condenser	.20
4		Police pre-selector coil - part of RC 9588	
5	SW 9519	Switch assembly	.85
6	CG 9522	Variable gang condenser	2.45
7		Trimmer condenser - part of CG 9522	
8		Trimmer condenser - part of CG 9522	
9	RC 9589	Oscillator coil assembly	.95
10	SA 106417	100 mmfd. mica condenser	.20
11	SA 105276	50,000 ohm, 1/4 W. resistor	.15
12	CW 2-05	.05 mfd., 200 V. condenser	.15
13	SA 105279	250,000 ohm, 1/4 W. resistor	.15
14	SA 105269	1800 ohm, 1/4 W. resistor	.15
15	CW 4-01	.01 mfd., 400 V. condenser	.15
16	SA 100197	25,000 ohm, 1/2 W. resistor	.15
17	IC 9532	1st I.F. transformer (465 KC.)	1.75
18		I.F. trimmer condenser - part of IC 9532	
19		I.F. trimmer condenser - part of IC 9532	
20	CW 4-10	.1 mfd., 400 V. condenser	.15
21		.05 mfd., 200 V. condenser - part of SA 105327 (dual).	.30
22		.05 mfd., 200 V. condenser - part of SA 105327 (dual).	.30
23	SA 105264	500 ohm, 1/4 W. resistor	.15
24	SA 101163	75,000 ohm, 1/2 W. resistor	.15
25	IC 9533	2nd I.F. transformer (465 KC.)	1.10
26		I.F. trimmer condenser - part of IC 9533	
27	SA 106417	100 mmfd. mica condenser	.20
28	VR 957	Volume control and line switch - (500,000 ohm)	1.25
29	SA 105281	1 meg., 1/4 W. resistor	.15
30	CW 4-02	.02 mfd. 400 V. condenser	.15
31	SA 105281	1 meg., 1/4 W. resistor	.15
32	SA 105278	100,000 ohm, 1/4 W. resistor	.15
33	SA 105279	250,000 ohm, 1/4 W. resistor	.15
34	SA 100195	250,000 ohm, 1/2 W. resistor	.15
35	CW 4-02	.02 mfd. 400 V. condenser	.15
36	SW 9519	Tone control switch	.85
37	CW 4-02	.02 mfd. 400 V. condenser	.15
38	CW 4-005	.005 mfd. 400 V. condenser	.15
39	SA 107357	Speaker output transformer	1.25
40	SA 105276	50,000 ohm, 1/4 W. resistor	.15
41	SA 107358	Speaker field coil - (1900 ohm)	1.75
42		.05 mfd. 200 V. condenser - part of 105327 (dual)	.30
43	CE 9512	12 mfd. electrolytic condenser (450 V.)	1.25
44	CE 9511	8 mfd. electrolytic condenser (300 V.)	.95
45	RE 9513	320 ohm resistor	.25
46		30 ohm resistor - part of RE 9513	
47	CE 958	10 mfd. electrolytic condenser	.65
48	TR 9511	Power transformer 105-125 V., 50-60 cycles	3.50
49		Line switch - part of VR 957	
50		Oscillator feed back coil - part of RC 9589	
51		Police oscillator coil - part of RC 9589	
56	SA 108043	.00001 mfd. mica condenser	.20
57	SA 105272	10,000 ohm, 1/4 W. resistor	.15
58	CW 4-05	.05 mfd., 400 V. condenser	.15
59	SK 9536	Speaker	6.00
60	SA 106617	Diaphragm and voice coil	1.15
61	LP 951	Dial lamp	.20
66	CB 9512	Line cable and plug	.50

WILCOX-GAY CORPORATION

MODELS A-18, A-19, 6F6 & 6FB6



I.F. 175 K.C.

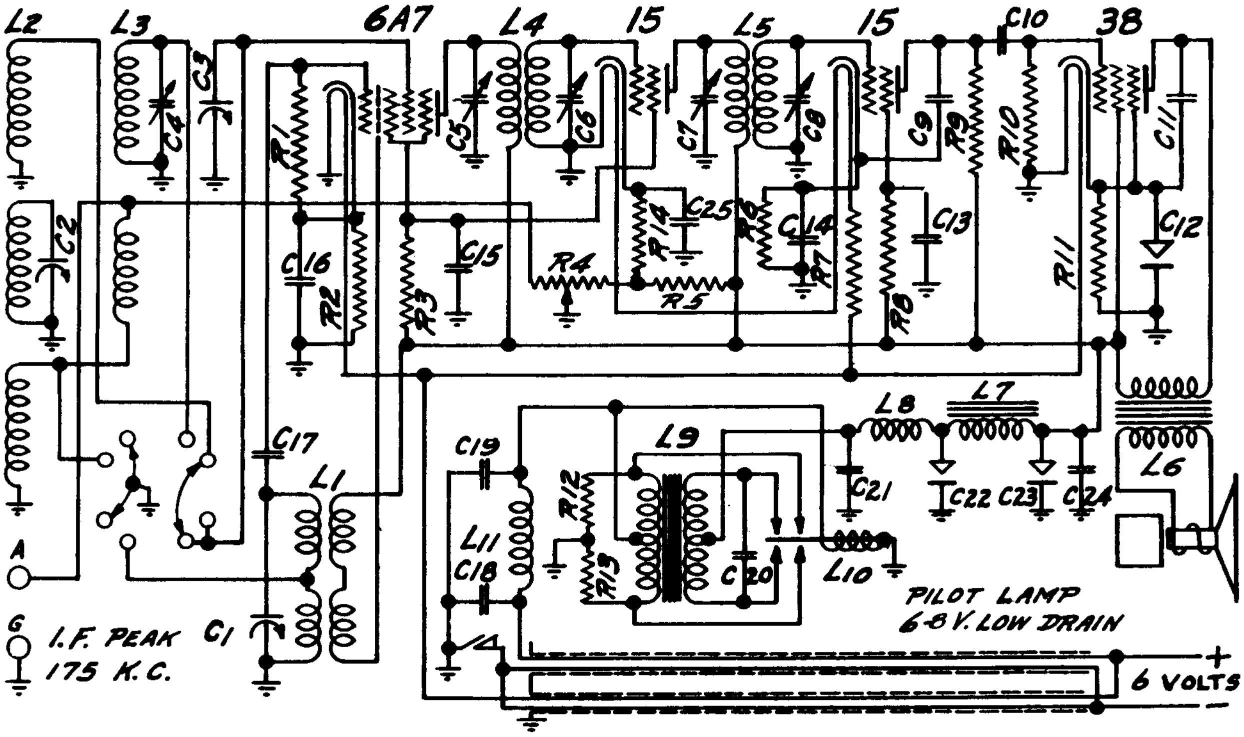
CODE	PART NO.	RESISTORS
R1	53-898	50,000 Ohm Oscillator Grid Resistor
R2	53-1062	250 Ohm Oscillator Cathode Resistor
R3	53-898	50,000 Ohm R.F. & I.F. Screen Resistor
R4	53-926	1 Meg Ohm 6G5 Triode Plate Resistor
R5	53-1063	500 Ohm I.F. Cathode Resistor
R6	53-926	1 Meg Ohm A.V.C. Network Resistor
R7	53-925	500,000 Ohm Diode Load Resistor
R8	19-131	500,000 Ohm Volume Control 19-2006 on Model 6FB6
R9	53-919	5,000 Ohm 6Q7 Cathode Resistor
R10	53-924	250,000 Ohm 6Q7 Plate Resistor
R11	19-1317	250,000 Ohm Tone Control
R12	53-925	500,000 Ohm 6F6 Grid Resistor
R13	53-1063	500 Ohm 6F6 Cathode Resistor

		CONDENSERS
C1	77-833	366 MMFD. Preselector Section of 3 Gang
C2	77-833	366 MMFD. Preselector Section of 3 Gang
C3	77-833-	328 MMFD. Oscillator Section of 3 Gang
C4	76-2002	.00005 Mfd. Mica Osc. Grid Condenser
C5	75-2005	.1 Mfd. 200 Volt Paper 6A8 Cathode Cond.
C6	78-1587	3-30 MMFD. Police Band Pres. Trimmer Cond.
C7	78-1587	3-30 MMFD. Foreign Band Pres. Trimmer Cond.
C8	78-2008	First I.F. Primary Trimmer Condenser
C9	78-2011	First I.F. Secondary Trimmer Condenser
C10	78-2008	Second I.F. Primary Trimmer Condenser
C11	78-2013	Second I.F. Secondary Trimmer Condenser
C12	75-2005	.1 Mfd. 200 Volt Paper 6K7 Cathode Cond.
C13	76-307	.0005 Mfd. Diode Filter Condenser
C14	75-2005	.1 Mfd. 200 Volt Paper Audio Feed Cond.
C15	76-265	.001 Mfd. Mica 6Q7 Plate Filter Cond.
C16	75-2005	.1 Mfd. 200 Volt Paper Audio Feed Cond.
C17	75-2003	.01 Mfd. 400 Volt Tone Control Cond.
C18	75-2001	.002 Mfd. 600 Volt Paper 6F6 Plate Filter Cond.
C19	18-928	25 Mfd. 25 Volt Dry Electrolytic Condenser
C20	18-2005	12 Mfd. 325 W.V. Electrolytic Condenser
C21	18-2006	16 Mfd. 250 W.V. Electrolytic Condenser
C22	75-2012	.5 Mfd. 400 Volt Paper B Supply By-Pass Cond.
C23	18-928	25 Mfd. 25 Volt Elect. 6Q7 Cathode By-Pass Cond.
C24	75-2003	.01 Mfd. 400 Volt Paper Line By-Pass Cond.
C25	75-2005	.1 Mfd. 200 Volt Paper A.V.C. Network By-Pass Cond.
C26	75-2005	.1 Mfd. 200 V. Paper R.F. & I.F. Screen By-Pass Cond.
C27	75-2003	.01 Mfd. 400 Volt Paper Sub. Antenna Cond.

		INDUCTANCES
L1	17-2106	Broadcast Oscillator Coil Assembly
L2	17-2105	Police Band Oscillator Coil Assembly
L3	17-2096	Foreign Band Oscillator Coil Assembly
L4	17-2100	Broadcast Preselector Coil Assembly
L5	17-2104	Police Band Preselector Coil Assembly
L6	17-2096	Foreign Band Preselector Coil Assembly
L7	68-2026	First I.F. Transformer Assembly
L8	68-2024	Second I.F. Transformer Assembly
L9	64-2030	12" Speaker 1500 Ohm Field, 6F6 Trans.
	64-2022	8" Speaker, 1500 Ohm Field, 6F6 Trans.
L10	80-2017	Power Transformer

WILCOX-GAY CORPORATION

MODELS A-24, A-25 & 6J4



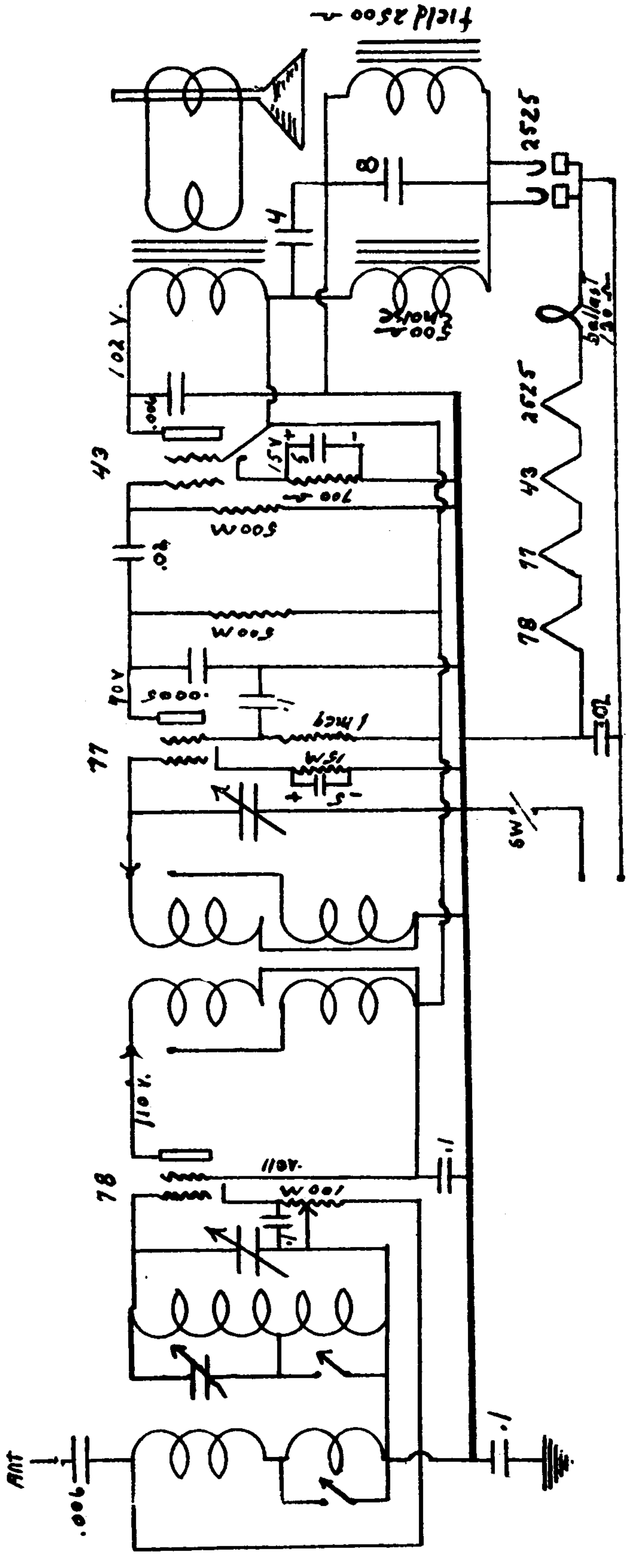
I.F. 175 K.C.

CODE	PART NO.	RESISTORS
R1	53-898	50,000 Ohm Oscillator Grid Resistor
R2	53-1062	250 Ohm Oscillator Cathode Resistor
R3	53-898	50,000 Ohm Osc. & I.F. Screen Resistor
R4	19-1296	10,000 Ohm Volume Control & Off-on Switch
R5	53-922	75,000 Ohm I.F. Bias Network Resistor
R6	53-898	50,000 Ohm Second Det. Cathode Resistor
R7	53-2012	9.09 Ohm I.F. & Second Det. Filament Res.
R8	53-2008	10 Meg Ohm Second Detector Screen Resistor
R9	53-926	1 Meg Ohm Second Detector Plate Resistor
R10	53-925	500,000 Ohm Output Grid Resistor
R11	53-1065	1,000 Ohm Output Cathode Resistor
R12	53-1061	150 Ohm B Primary Regulator Resistor
R13	53-1061	150 Ohm B Primary Regulator Resistor
R14	53-1063	500 Ohm I.F. Cathode Resistor

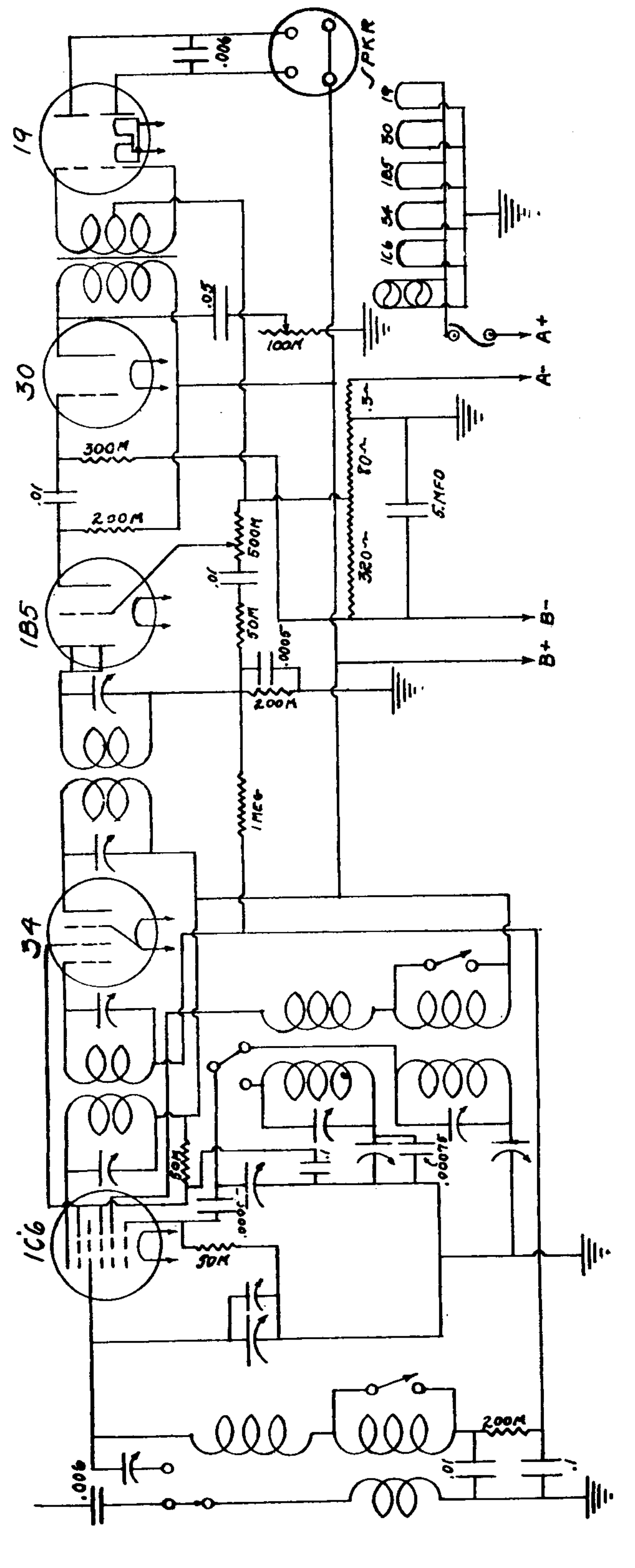
CODE	PART NO.	CONDENSERS
C1	77-833	16-328 MMFD. Osc. Section of 3 Gang Condenser
C2	77-833	16-366 MMFD. Pres. Section of 3 Gang Condenser
C3	77-833	16-366 MMFD. Pres. Section of 3 Gang Condenser
C4	78-2010	3-30 MMFD. Police Band Pres. Trimmer Condenser
C5	78-2011	First I.F. Primary Trimmer Condenser
C6	78-2008	First I.F. Secondary Trimmer Condenser
C7	78-2011	Second I.F. Primary Trimmer Condenser
C8	78-2008	Second I.F. Secondary Trimmer Condenser
C9	76-265	.001 Mfd. Mica Second Det. Plate Filter Cond.
C10	75-2003	.01 Mfd. 400 V. Paper Audio Feed Condenser
C11	75-2001	.002 Mfd. 600 V. Paper Output Plate Filter Cond.
C12	18-928	25 Mfd. 25 V. Dry Electrolytic Output Cathode Cond.
C13	75-2005	.1 Mfd. 200 V. Paper Second Det. Screen By-Pass Cond.
C14	75-2005	.1 Mfd. 200 V. Paper Second Det. Cathode By-Pass Cond.
C15	75-2005	.1 Mfd. 200 V. Paper Osc. & I.F. Screen By-Pass Cond.
C16	75-2005	.1 Mfd. 200 V. Paper Osc. Cathode By-Pass Condenser
C17	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C18	75-2011	.5 Mfd. 200 V. Paper B Unit Supply Filter Condenser
C19	75-2011	.5 Mfd. 200 V. Paper B Unit Supply Filter Condenser
C20	75-1325	.015 Mfd. 1000 V. Oil B Secondary Wave Form Cond.
C21	75-2007	.1 Mfd. 400 V. Paper B Supply Filter Condenser
C22	18-2006	16 Mfd. 250 W.V. Wet Electrolytic B Filter Cond.
C23	18-2006	16 Mfd. 250 W.V. Wet Electrolytic B Filter Cond.
C24	75-2013	1. Mfd. 400 V. Paper B Supply By-Pass Condenser
C25	75-2005	.1 Mfd. 200 V. I.F. Cathode By-Pass Condenser

ZEPHYR RADIO CO.

MODEL C A.C.–D.C.
SERIAL № 750,001 UP



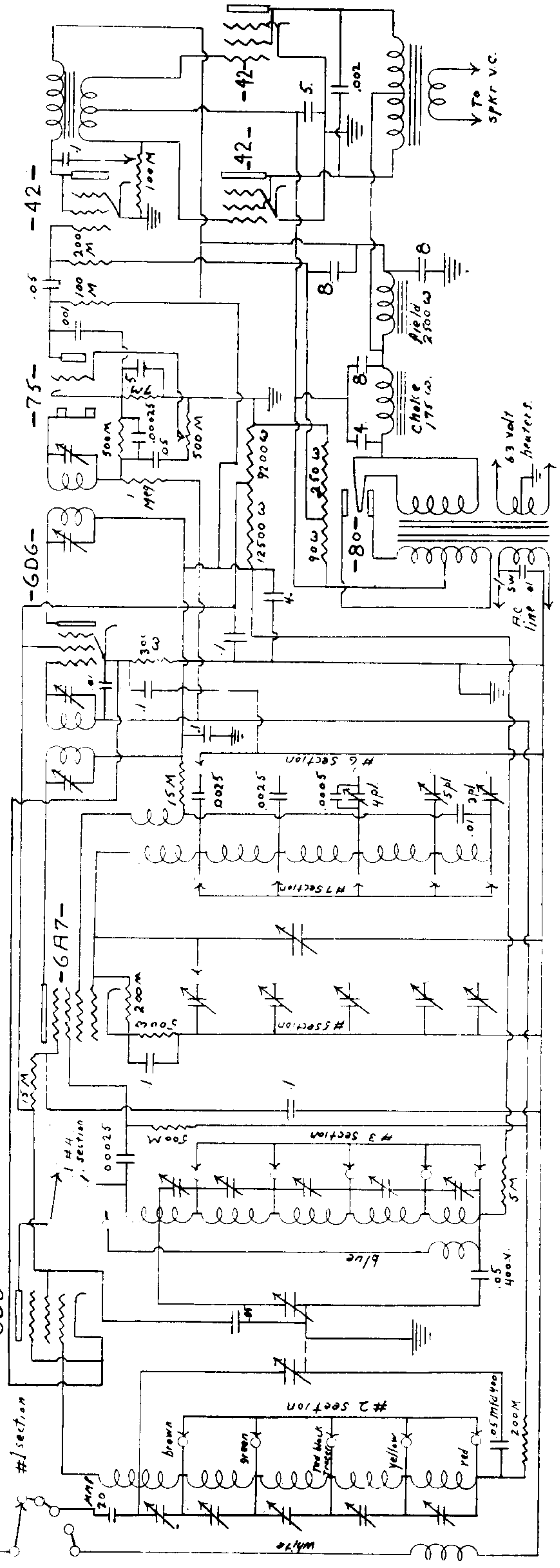
MODEL 5DA 2VOLT SET
SERIAL № 455,001 UP



ZEPHYR RADIO CO.

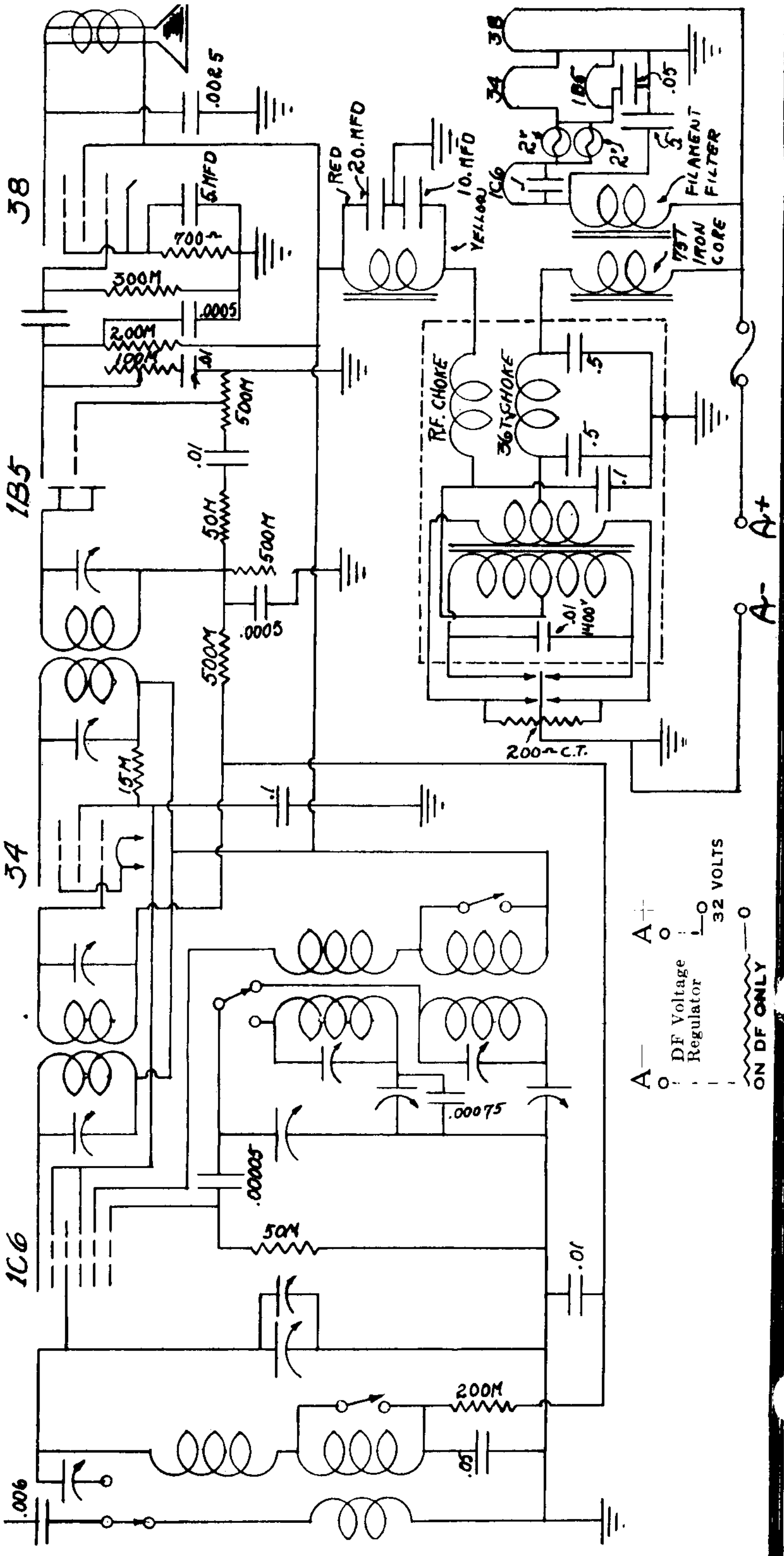
MODEL 8J

SERIAL Nº 765,001 UP



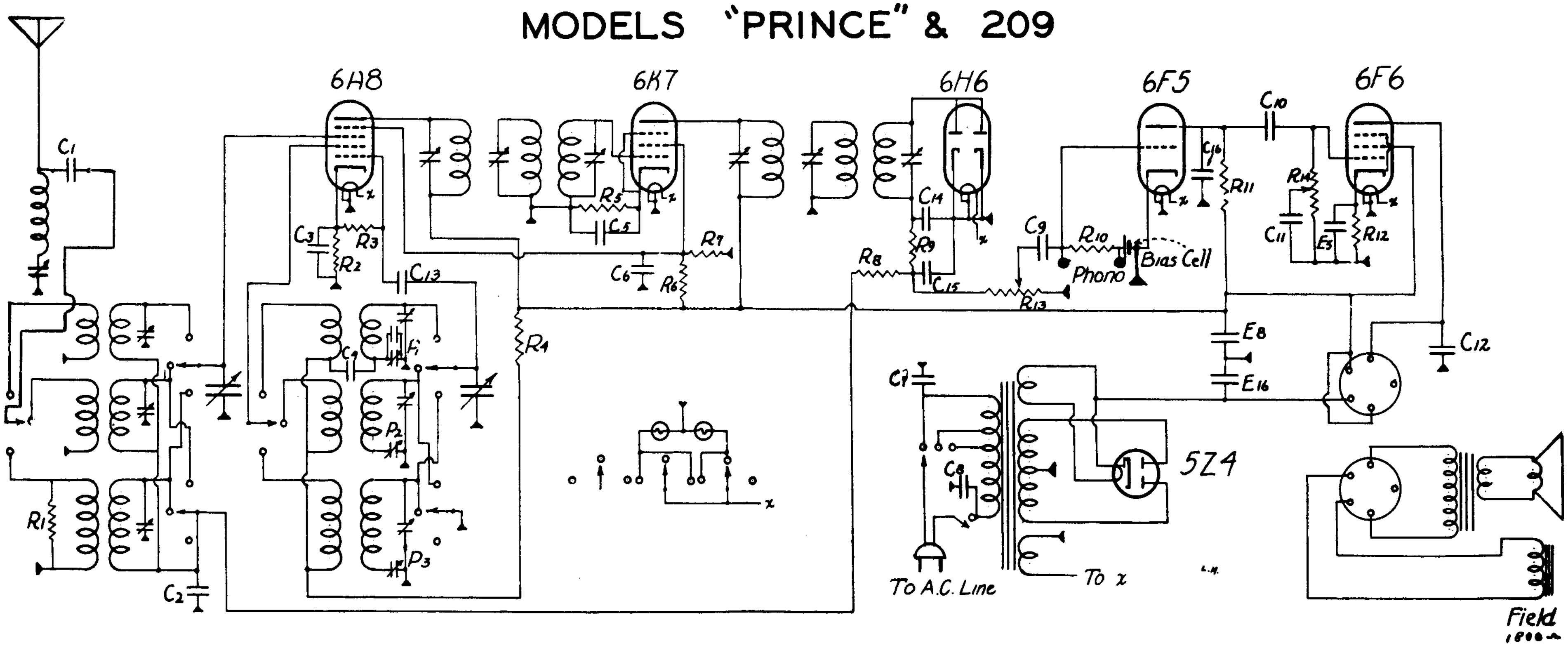
MODELS DB & DF

SERIAL Nº 755,001 UP



AIR-KING PRODUCTS COMPANY, INC.

MODELS "PRINCE" & 209



R 1 -	15,000	ohms	- 1/4 w.
R 2 -	300	"	- "
R 3 -	50,000	"	- "
R 4 -	20,000	"	- 1/2 w.
R 5 -	400	"	- 1/4 w.
R 6 -	25,000	"	- 2 w.
R 7 -	40,000	"	- 1/2 w.
R 8 -	1,000,000	"	- 1/4 w.
R 9 -	60,000	"	- "
R 10 -	1,000,000	"	- "
R 11 -	500,000	"	- "
R 12 -	400	"	- 1 w.
R 13 -	500,000	"	- vol. cont.
R 14 -	500,000	"	- tone cont.

C 1 -	.005	- 600 v.
C 2 -	.05	- 400 v.
C 3 -	.1	- 200 v.
C 4 -	.02	- 400 v.
C 5 -	.1	- 200 v.
C 6 -	.1	- 200 v.
C 7 -	.05	- 400 v.
C 8 -	.05	- 400 v.
C 9 -	.02	- 400 v.
C 10 -	.02	- 400 v.
C 11 -	.005	- 600 v.
C 12 -	.005	- 600 v.
C 13 -	.000085	- mica
C 14 -	.0001	- mica
C 15 -	.0001	- mica
C 16 -	.0001	- mica

P 1 -	.0027	max.
P 2 -	.0005	max.
P 3 -	.00015	max.

E 5 -	5 mfd.	- 35 v.
E 8 -	8 mfd.	- 400 v.
E 16 -	16 mfd.	- 450 v.

INSTRUCTIONS MODEL 209 6T AC 3 BAND SUPERHETERODYNE RECEIVER

ANTENNA AND GROUND CONNECTIONS. An antenna from 50 to 100 feet long is recommended. A good ground wire is absolutely essential on this receiver.

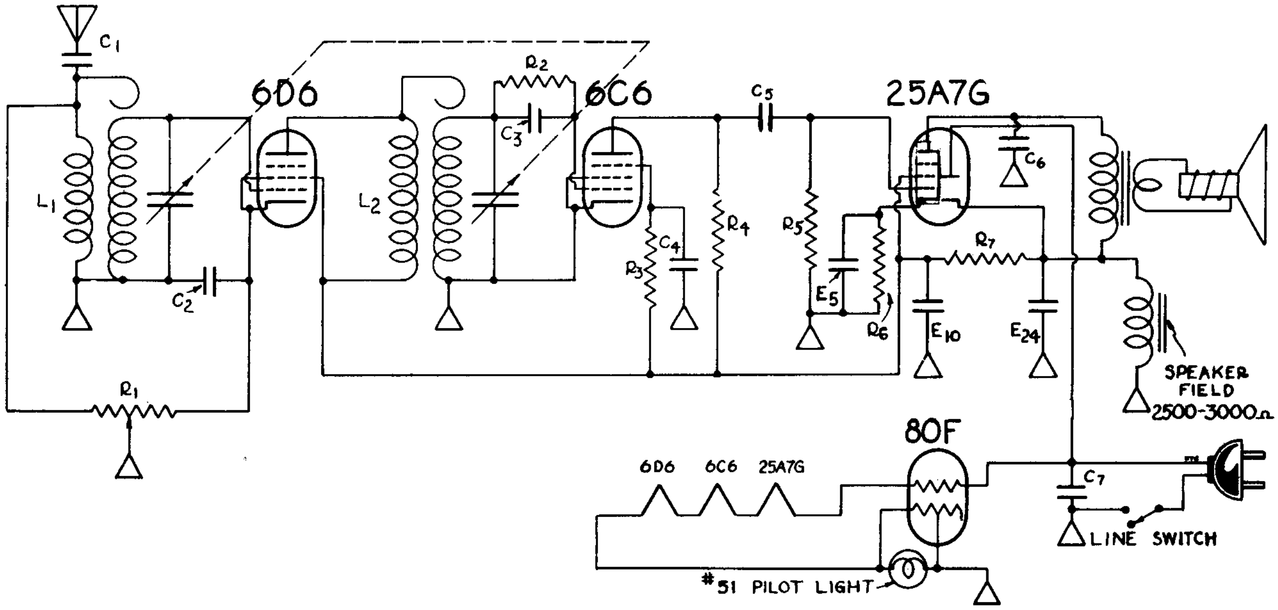
POWER SUPPLY. This receiver is designed to operate from the 115-135 or 220 A.C. 50 cycle lines. The voltage change is accomplished by removing the cover from the power transformer and connecting the flexible lead to the desired voltage terminal.

LOCATION OF CONTROLS. The knob on the lower right is the on-off switch and the tone control. The knob on the lower left is the volume control and the knob directly below the selector knob is the wave change switch.

OPERATION. Turn station selector knob to secure desired stations. When tuning in a set, set tuning control carefully to maximum station volume, then adjust volume to desired level with volume control knob.

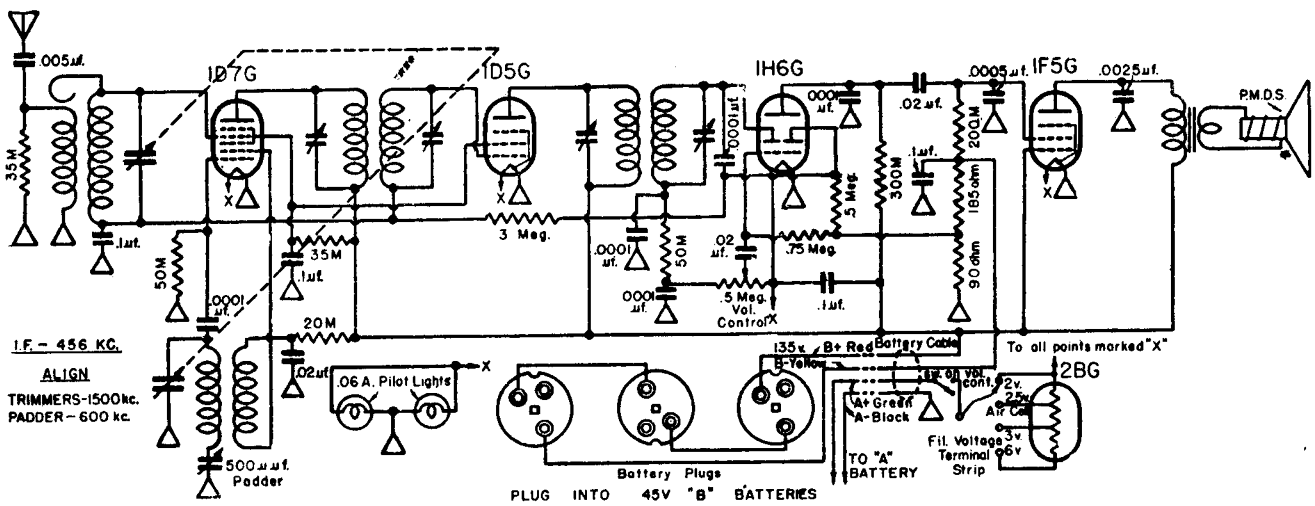
AIR-KING PRODUCTS COMPANY, INC.

MODEL 214



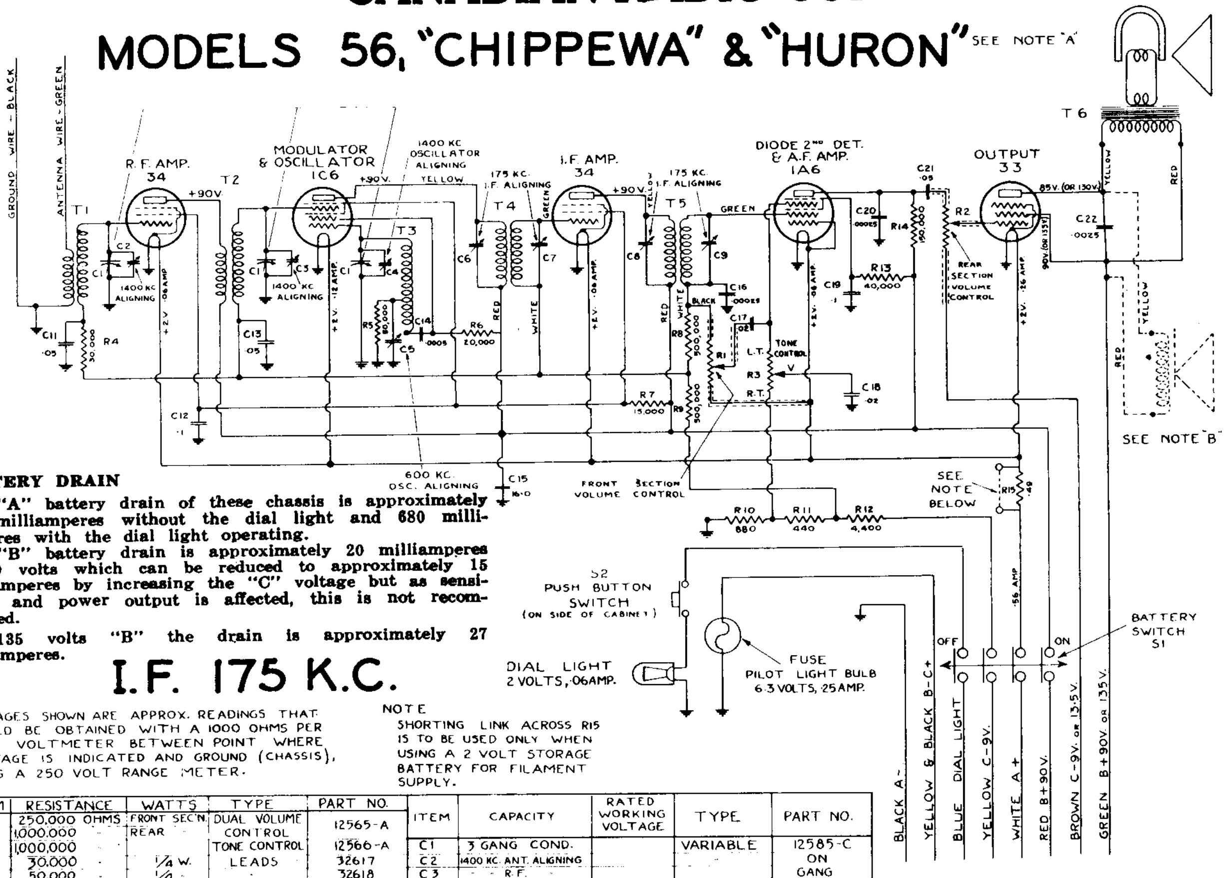
C1 - .005 - 400 V.	E5 - 5 mfd. - 25 V.	R1 - 25,000 ohm volume control
C2 - .1 - 200 V.	E10 - 10 mfd. - 150 V.	R2 - 3,000,000 " 1/4 watt
C3 - .005 - 400 V.	E24 - 24 mfd. - 150 V.	R3 - 6,000,000 " 1/4 "
C4 - .1 - 200 V.		R4 - 1,000,000 " 1/4 "
C5 - .02 - 400 V.	L1 - Antenna Coil	R5 - 750,000 " 1/4 "
C6 - .005 - 400 V.	L2 - R. F. Coil	R6 - 720 " 1/2 "
C7 - .05 - 400 V.		R7 - 4,000 " 1/2 "

MODELS 730 & 731



CANADIAN RADIO CORP.

MODELS 56, "CHIPPEWA" & "HURON" SEE NOTE "A"



BATTERY DRAIN

The "A" battery drain of these chassis is approximately 500 milliamperes without the dial light and 680 milliamperes with the dial light operating.

The "B" battery drain is approximately 20 milliamperes at 90 volts which can be reduced to approximately 15 milliamperes by increasing the "C" voltage but as sensitivity and power output is affected, this is not recommended.

At 135 volts "B" the drain is approximately 27 milliamperes.

I.F. 175 K.C.

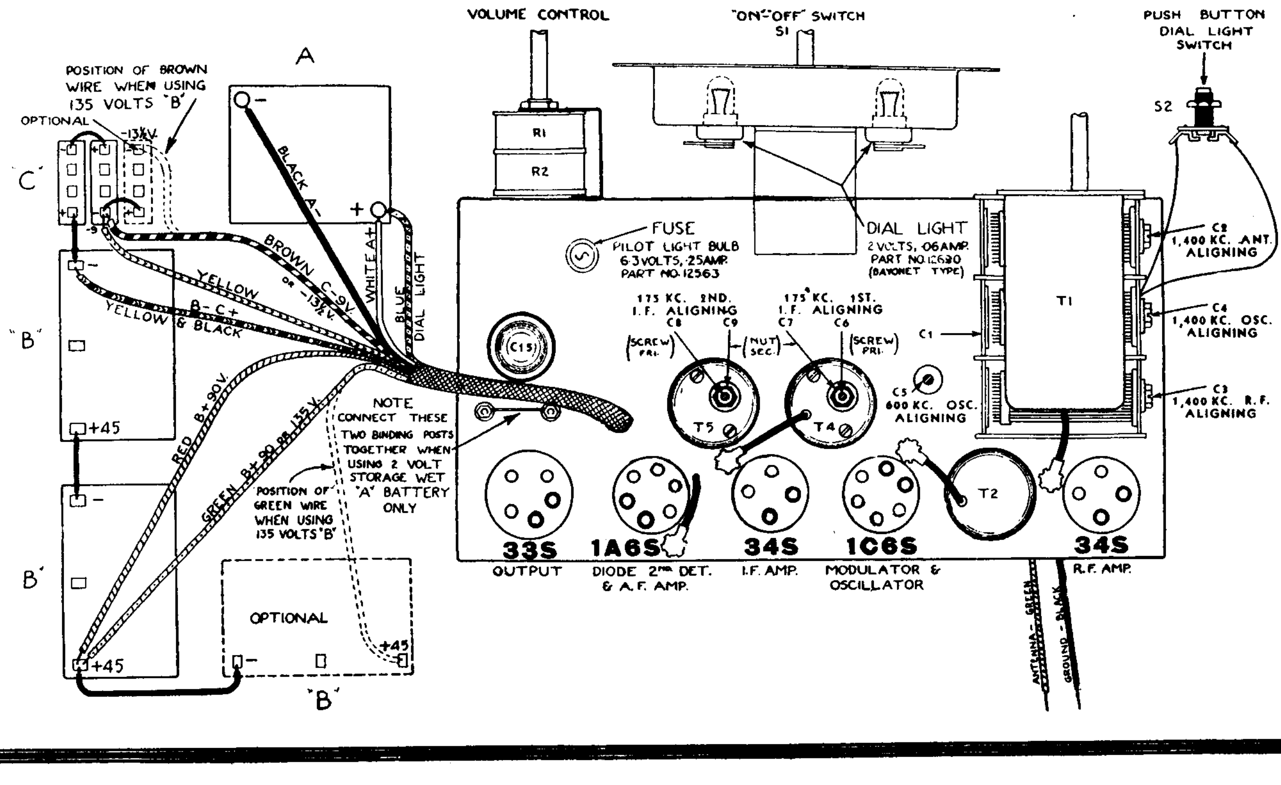
NOTE
VOLTAGES SHOWN ARE APPROX. READINGS THAT SHOULD BE OBTAINED WITH A 1000 OHMS PER VOLT VOLTMETER BETWEEN POINT WHERE VOLTAGE IS INDICATED AND GROUND (CHASSIS), USING A 250 VOLT RANGE METER.

NOTE
SHORTING LINK ACROSS R15 IS TO BE USED ONLY WHEN USING A 2 VOLT STORAGE BATTERY FOR FILAMENT SUPPLY.

ITEM	RESISTANCE	WATTS	TYPE	PART NO.
R1	250,000 OHMS	FRONT SEC'N.	DUAL VOLUME	12565-A
R2	1,000,000 "	REAR	CONTROL	
R3	1,000,000 "		TONE CONTROL	12566-A
R4	30,000 "	1/4 W.	LEADS	32617
R5	50,000 "	1/4 "	"	32618
R6	20,000 "	1/4 "	"	32616
R7	15,000 "	1/2 "	"	21033
R8	500,000 "	1/2 "	LUGS	33709
R9	500,000 "	1/2 "	"	33709
R10	880 "	1/4 "	LEADS	32614
R11	440 "	1/4 "	"	32613
R12	4,400 "	1/4 "	"	32615
R13	40,000 "	1/2 "	LUGS	33746
R14	150,000 "	1/2 "		33725
R15	·49 "		CANDOHM	38204

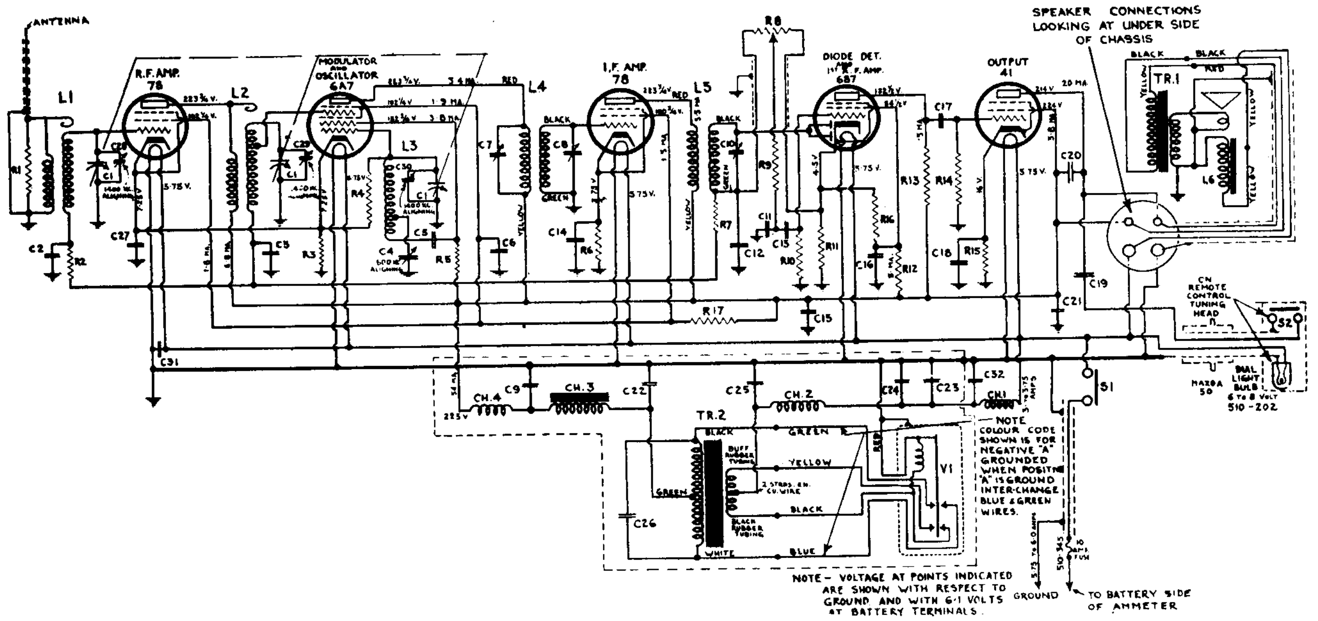
ITEM	CAPACITY	RATED WORKING VOLTAGE	TYPE	PART NO.
C1	3 GANG COND.		VARIABLE	12585-C ON GANG CONDENSER
C2	1400 KC. ANT. ALIGNING		"	
C3	" " R.F. "		"	
C4	" " OSC "		"	
C5	600 KC. "		"	
C6	175 KC. I.F. "		"	IN 1ST I.F. TRANS.
C7	" " "		"	" " "
C8	" " "		"	IN 2ND " "
C9	" " "		"	" " "
C11	·05 MFD.	200 V.	TUBULAR	38102
C12	·1 "	200 V.	"	38106
C13	·05 "	200 V.	"	38102
C14	·0005 "	750 V.	MICA	34110
C15	16·0 "	150 V.	WET ELEC.	11511
C16	·00025 "	750 V.	MICA	34106
C17	·02 "	400 V.	TUBULAR	38104
C18	·02 "	200 V.	"	38130
C19	·1 "	200 V.	"	38106
C20	·00025 "	750 V.	MICA	37903
C21	·05 "	400 V.	TUBULAR	38105
C22	·0025 "	750 V.	MICA	34109

ITEM	DESCRIPTION	PART NO.
T1	ANTENNA TRANS. ASSEM.	4910-A
T2	R.F. INTERSTAGE " "	4909-A
T3	OSCILLATOR COIL "	4041-A
T4	1ST I.F. TRANS. ASSEM.	4038-A
T5	2ND " " "	4040-A
T6	OUTPUT TRANS.	4770-A
S1	BATTERY SWITCH	12567-A
S2	PUSH BUTTON SWITCH	4802-A
SPEAKER	ON CONSOLE MODELS B515, "HURON" & "HARROW" - P.M. 254 WITH OUTPUT TRANS.	4808-A
SPEAKER	ON MANTEL MODELS B510, "CHIPPAWA" & "ETON" - 8" "BEST", MAGNETIC	11623-C

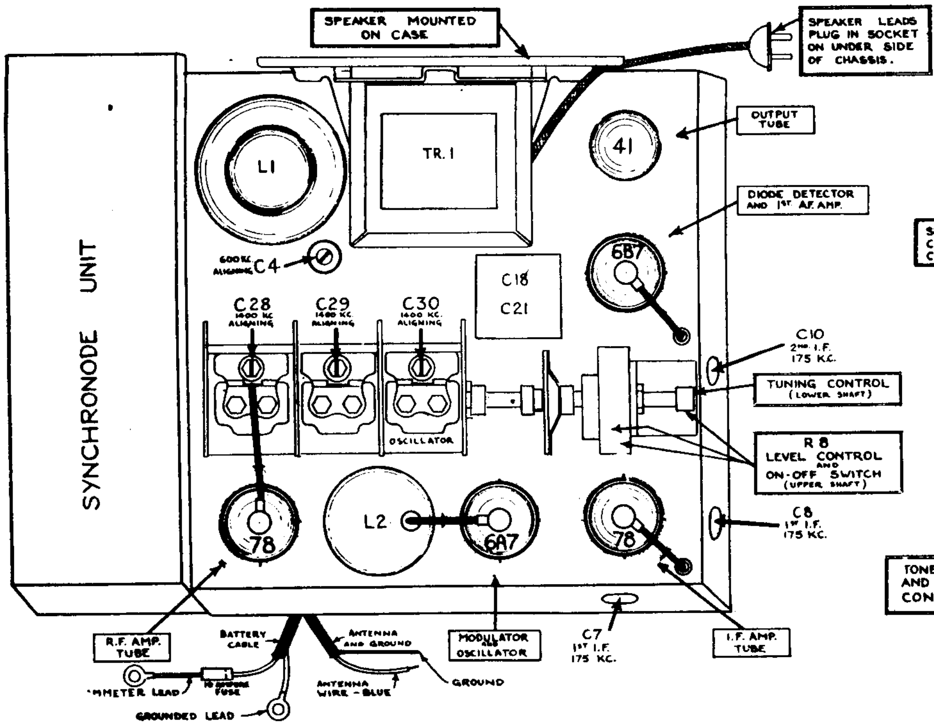


CANADIAN RADIO CORP.

MODEL 918



I.F. 175 K.C.



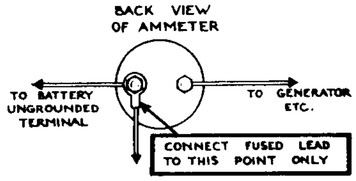
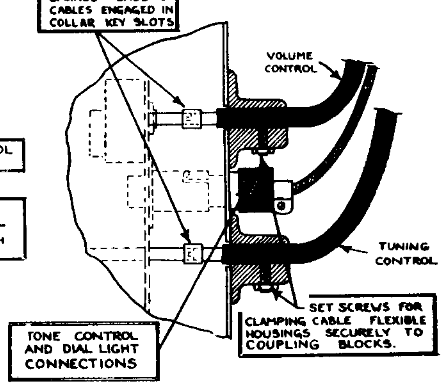


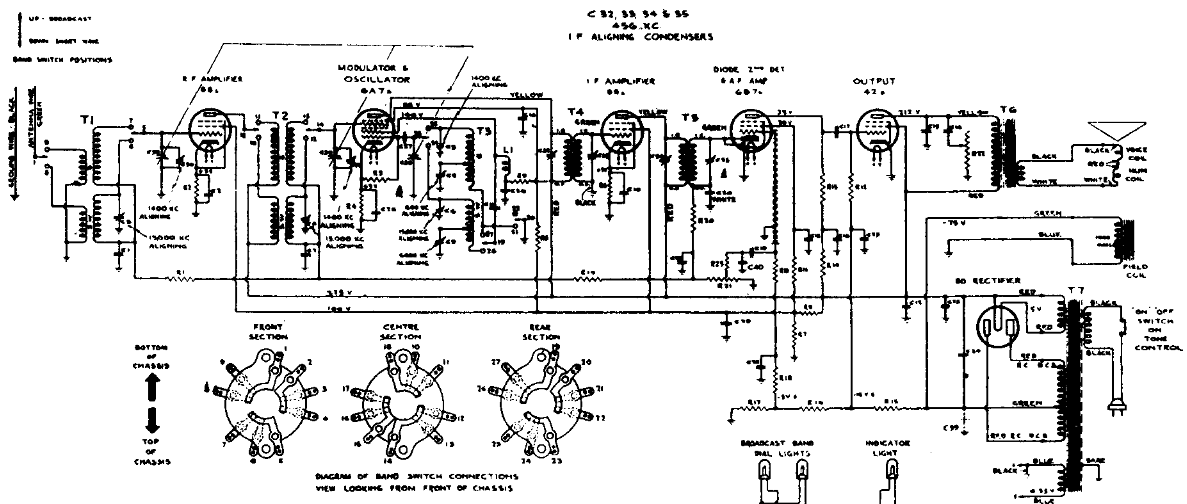
Figure 5



NOTE—All tubes are seal shielded. The R.F. and I.F. tubes are 88s.

CANADIAN RADIO CORP.

MODELS 2621 & 2622

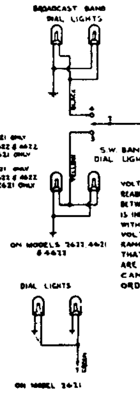


ITEMS MARKED ● ARE ON 1st RELEASE ONLY
ITEMS MARKED ■ ARE ON 2nd RELEASE ONLY

ITEM	CAPACITY	LIMITS	RATED WORKING VOLTAGE	REMARKS	PART NO.
C1	.05 MFD.	± [illegible] %	200	TUBULAR	38102
C2	.1 "	± [illegible] %	200	"	38106
C3	15000 KC ANT. ALIGN.			IN ANT. TRANS. ASSY	
C4	15000 KC R.F. ALIGN.			IN R.F. TRANS. ASSY	
C5	1400 KC OSC. ALIGN.			IN OSC. COIL ASSY	
C6	15000 KC OSC. ALIGN.				4087
C7	.05 MFD	± [illegible] %	200	TUBULAR	38102
C8	600 KC OSC. ALIGN.				4038
C9	6000 KC OSC. ALIGN.				4167
C10	.05 MFD	± [illegible] %	200	"	38102
C11	.001 "	± 10 %	750	MICA	34113
C12	.1 "	± [illegible] %	400	TUBULAR	[illegible]
C13	.005 "	± [illegible] %	600	"	[illegible]
C14	.05 "	± [illegible] %	600	"	[illegible]
C15	.1 "	± [illegible] %	400	"	[illegible]
C16	.1 "	± [illegible] %	400	"	[illegible]
C17	.05 "	± [illegible] %	400	"	38105
C18	.1 "	± [illegible] %	400	"	38106
C19	.05 "	± [illegible] %	400	"	38102
C20	.0002 "	± 20 %	750	MICA	34103
C21	.0001 "	± 10 %	750	"	34104
C22	.1 "	± [illegible] %	200	TUBULAR	38106
C23	.5 "	± [illegible] %	200	"	38108
C24	[illegible] "	± [illegible] %	525 (PEAK)	DRY ELECTROLYTIC	39001
C25	[illegible] "	± [illegible] %	500 (PEAK)	DOUBLE	39003
C26	[illegible] "	± [illegible] %	500 (PEAK)	DRY ELECTROLYTIC	
C27	16 "	± [illegible]	450 (PEAK)	DRY ELECTROLYTIC	39004
C28	[illegible] "	± [illegible] %	525 (PEAK)	DRY ELECTROLYTIC	39001
C29	.00005 "	± 10 %	750	MICA	34114
C30	.1 "	± 10 %	200	TUBULAR	38106
C31	.1 "	± 10 %	200	"	38106
C32	456 KC I.F. ALIGNING			IN 1st I.F. TRANS.	
C33	456 KC I.F. ALIGNING			IN 1st I.F. TRANS.	
C34	456 KC I.F. ALIGNING			IN 2nd I.F. TRANS.	
C35	456 KC I.F. ALIGNING			IN 2nd I.F. TRANS.	
C36	1400 KC ANT. ALIGN.			PART OF GANG COND.	
C37	1400 KC R.F. ALIGN.			PART OF GANG COND.	
C38	3 GANG COND.				11457
C39	.04 MFD	± 15 %	400	TUBULAR	38127
C40	.001	± 10 %	750	"	34113

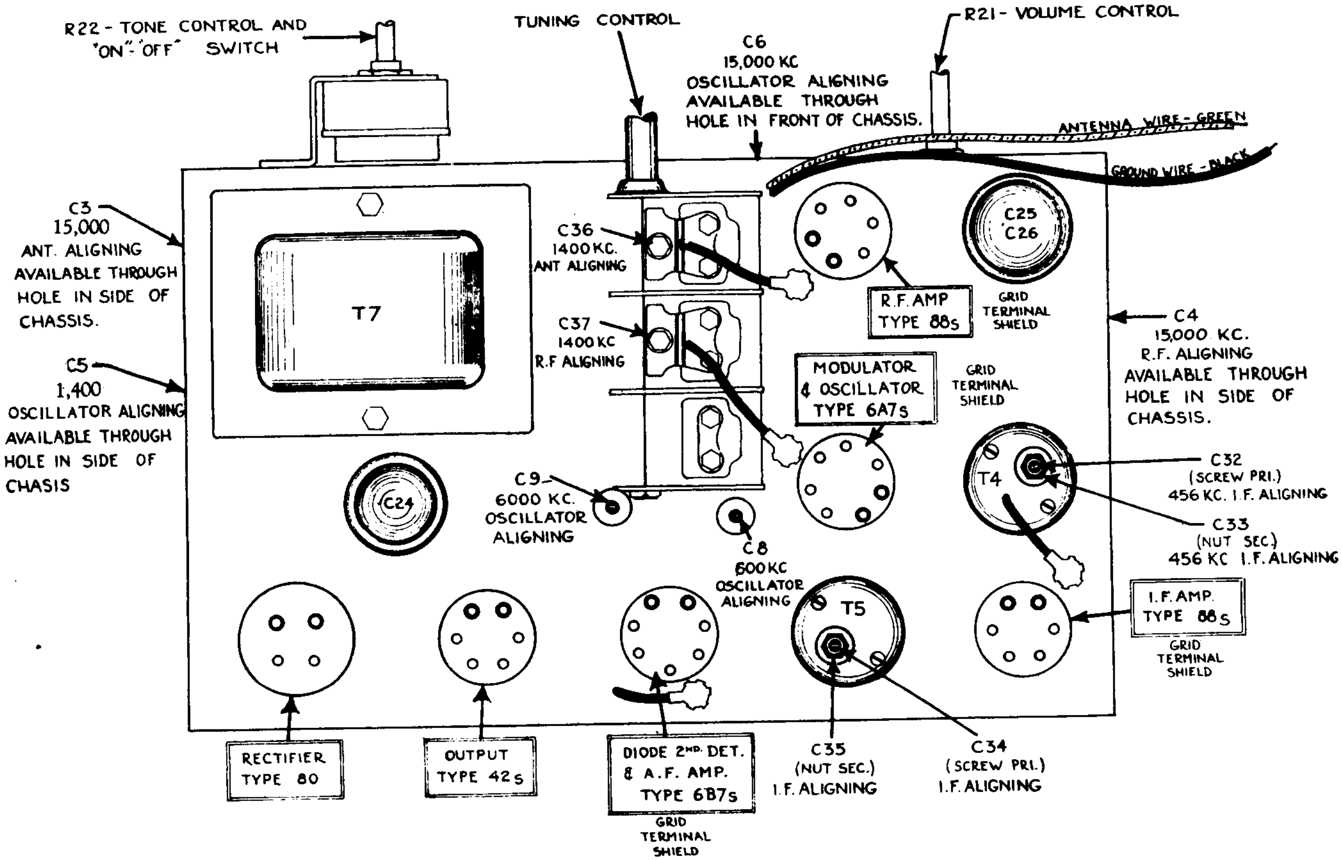
ITEM	DESCRIPTION	PART NO	
T1	ANTENNA TRANS. ASSY.	4258	
T2	INTERSTAGE R.F. TRANS. ASSY.	4259	
T3	OSCILLATOR COIL ASSY.	4260	
T4	1st I.F. TRANSFORMER ASSY.	4271	
T5	2nd I.F. TRANSFORMER ASSY.	4272	
T6	OUTPUT TRANS. ASSY.	4251	ON MODEL 4621 ONLY
T6	OUTPUT TRANS. ASSY.	[illegible]	ON MODELS 2622 & 4622
T6	OUTPUT TRANS. ASSY.	[illegible]	ON MODEL 2621 ONLY
T7	POWER TRANS. ASSY.	[illegible]	
	SPEAKER (MODEL [illegible])	[illegible]	ON MODEL 4621 ONLY
	SPEAKER (MODEL [illegible])	[illegible]	ON MODELS 2622 & 4622
	SPEAKER (MODEL [illegible])	[illegible]	ON MODEL 2621 ONLY

ITEM	RESISTANCE	LIMITS	WATTS	REMARKS	PART NO.
R1	100000 OHMS	± 15 %	1/2 W	CARBON	32404
[illegible]	[illegible]	[illegible]	[illegible]	"	[illegible]
[illegible]	[illegible]			VOL. CONTROL	[illegible]
[illegible]	[illegible]			TONE CONTROL	[illegible]
[illegible]	50000	± 20 %	1/2	CARBON	[illegible]



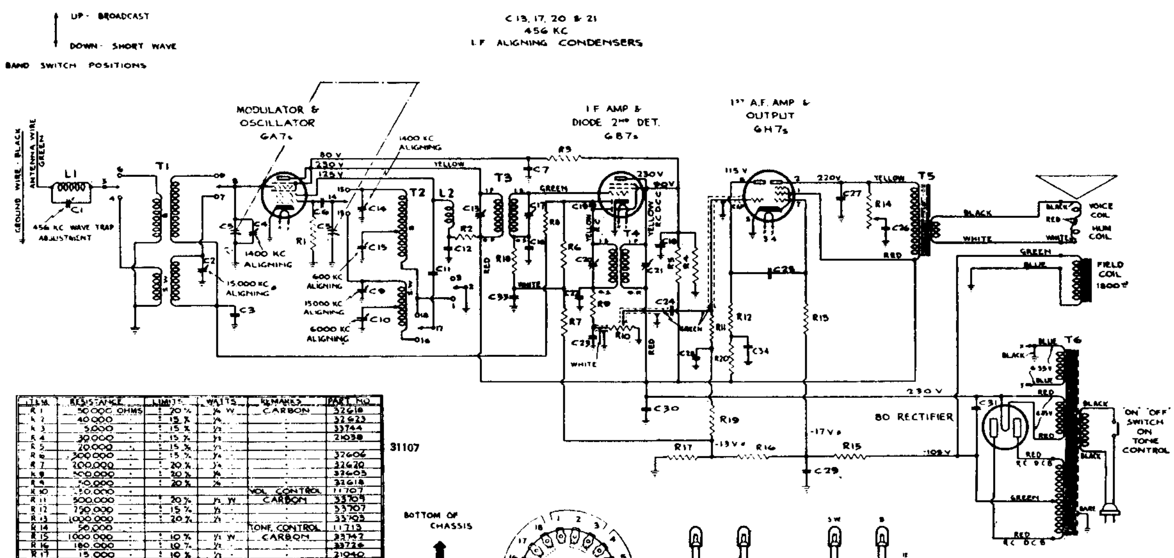
VOLTAGES SHOWN ARE APPROX READINGS THAT SHOULD BE OBTAINED BETWEEN POINT WHERE VOLTAGE IS INDICATED AND GROUND (CHASSIS) WITH A 1000 OHMS PER VOLT VOLTMETER, USING 250 VOLT RANGE EXCEPT VOLTAGES THAT ARE MARKED * WHICH ARE ACTUAL VOLTAGES AND CANNOT BE MEASURED WITH ORDINARY VOLTMETER.

I.F. 456 K.C.



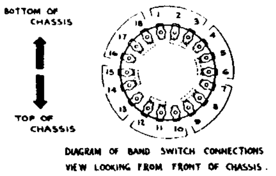
CANADIAN RADIO CORP.

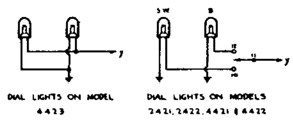
MODELS 4421, 4422, 4423 & 4424



ITEM	RESISTANCE	LIMITS	WATTS	REMARKS	PART NO.
R 1	50,000 OHMS	± 20 %	¼ W	CARBON	32618
R 2	40,000 "	± 15 %	¼ "	"	32623
R 3	5,000 "	± 15 %	½ "	"	33744
R 4	30,000 "	± 15 %	½ "	"	21038
R 5	20,000 "	± 15 %	½ "	"	
R 6	300,000 "	± 15 %	¼ "	"	32606
R 7	200,000 "	± 20 %	¼ "	"	32620
R 8	500,000 "	± 20 %	¼ "	"	32605
R 9	50,000 "	± 20 %	¼ "	"	32618
R 10	250,000 "			VOL. CONTROL	11707
R 11	500,000 "	± 20 %	½ W	CARBON	33709
R 12	750,000 "	± 15 %	½ "	"	33707
R 13	1,000,000 "	± 20 %	½ "	"	33703
R 14	50,000 "			TONE CONTROL	11713
R 15	1000,000 "	± 10 %	½ W	CARBON	33742
R 16	100,000 "	± 10 %	½ "	"	33726
R 17	15,000 "	± 10 %	½ "	"	21040
R 18	250,000 "	± 15 %	¼ "	"	32609
R 19	250,000 "	± 20 %	½ "	"	33729
R 20	50,000 "	± 20 %	¼ "	"	32618

ITEM	CAPACITY	LIMITS	RATED WORKING VOLTAGE	REMARKS	PART NO.
C 1	456 KC WAVE TRAP			IN WAVE TRAP ASSY	
C 2	15,000 KC ANT ALIGN			IN ANT TRANS ASSY	
C 3	.03 MFD	± [illegible] %	200	TUBULAR	38109
C 4	1400 KC ANT ALIGN			PART OF GANG COND	
C 5	2 GANG CONDENSER				11819
C 6	.00005 MFD	± 10 %	750	MICA	34114
C 7	.1 "	± [illegible] %	400	TUBULAR	38121
C 8					
C 9	15,000 KC OSC ALIGN				4082
C 10	6000 KC OSC ALIGN				4167
C 11	.001 MFD	± 10 %	750	MICA	34113
C 12	8 "	± [illegible] %	500 PEAK	DOUBLE DRY ELECTROLYTIC	39005
C 30	8 "	± [illegible] %	500 PEAK		
C 13	456 KC I.F. ALIGN			IN 1ST I.F. TRANS	
C 14	1400 KC OSC ALIGN			IN OSC COIL ASSY	
C 15	600 KC OSC ALIGN				4036
C 16	.03 MFD	± [illegible] %	200	TUBULAR	38109
C 17	456 KC I.F. ALIGN.			IN 1ST I.F. TRANS	
C 18	.5 MFD	± [illegible] %	400	TUBULAR	38120
C 19	.01 "	± [illegible] %	200	"	38101
C 20	456 KC I.F. ALIGN			IN 2ND I.F. TRANS	
C 21	456 KC I.F. ALIGN			IN 2ND I.F. TRANS	
C 22	.0002 MFD	± 20 %	750	MICA	34103
C 23	.0001 "	± 20 %	750	"	34104
C 24	.01 "	± [illegible] %	200	TUBULAR	38101
C 25	.03 "	± [illegible] %	400	"	38112
C 26	.05 "	± [illegible] %	600	"	38111
C 27	.008 "	± [illegible] %	600	"	38110
C 28	.1 "	± [illegible] %	200	"	38106
C 29	.25 "	± [illegible] %	200	"	38107
C 31	8 "	± [illegible] %	525 PEAK	DRY ELECTROLYTIC	39001
C 32					
C 33	.03 MFD	± [illegible] %	200	TUBULAR	38109
C 34	.1 MFD	± [illegible] %	400	"	38121



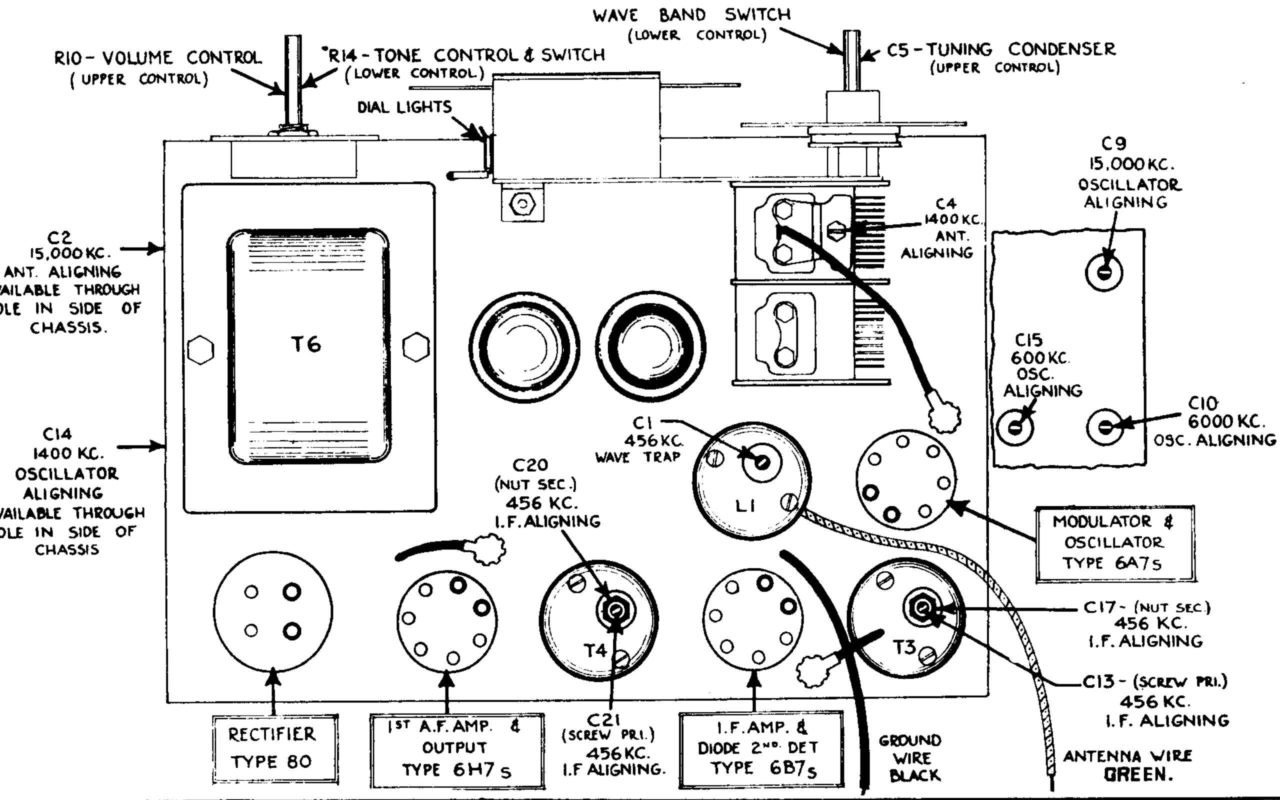


VOLTAGES SHOWN ARE APPROX. READINGS THAT SHOULD BE OBTAINED BETWEEN POINT WHERE VOLTAGE IS INDICATED AND GROUND (CHASSIS), WITH A 1000 OHMS PER VOLT VOLTMETER, USING 250 VOLT RANGE. EXCEPT VOLTAGES THAT ARE MARKED * WHICH ARE ACTUAL VOLTAGES AND CANNOT BE MEASURED WITH ORDINARY VOLTMETER.

ITEM	DESCRIPTION	PART NO.	
T1	ANTENNA TRANS ASSY	4258	
T2	OSCILLATOR TRANS ASSY	4260	
T3	1ST I.F. TRANS ASSY	4339	
T4	2ND I.F. TRANS ASSY	4341	
T5	OUTPUT TRANS ASSY	4249	ON MODELS 2421 & 4421
T5	OUTPUT TRANS ASSY	4251	ON MODELS 2422 & 4422
T6	POWER TRANS ASSY	4334	
	K-G SPEAKER ASSY	4181	ON MODELS 2421 & 4421
	D-15 SPEAKER ASSY	4193	ON MODELS 2422 & 4422
L1	WAVE TRAP	3986	
L2	OSCILLATOR PLATE CHOKE	4136	

I.F. 456 K.C.

Schematic Diagram—Types 4421, 4422, 4423 and 4424 Chassis



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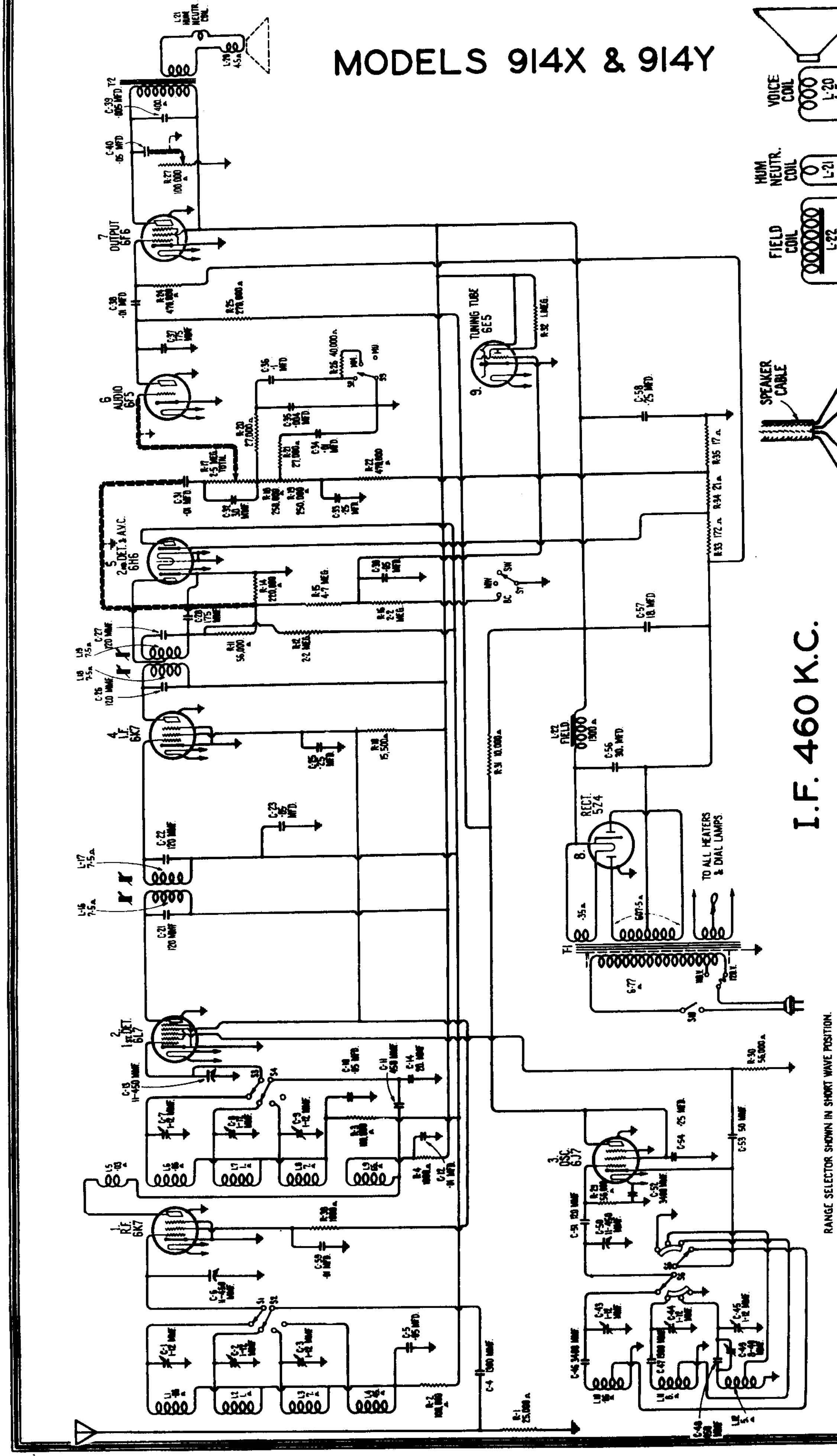
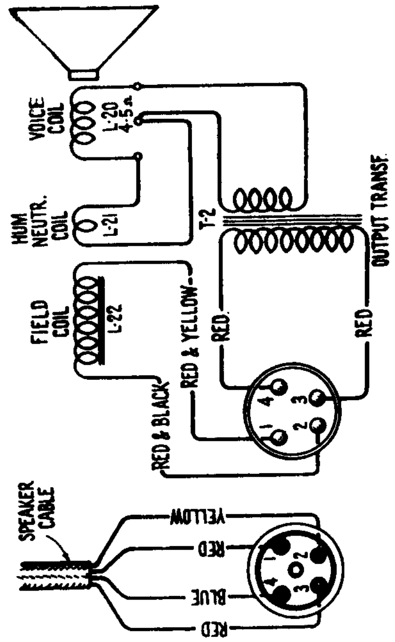
MODELS 914X & 914Y





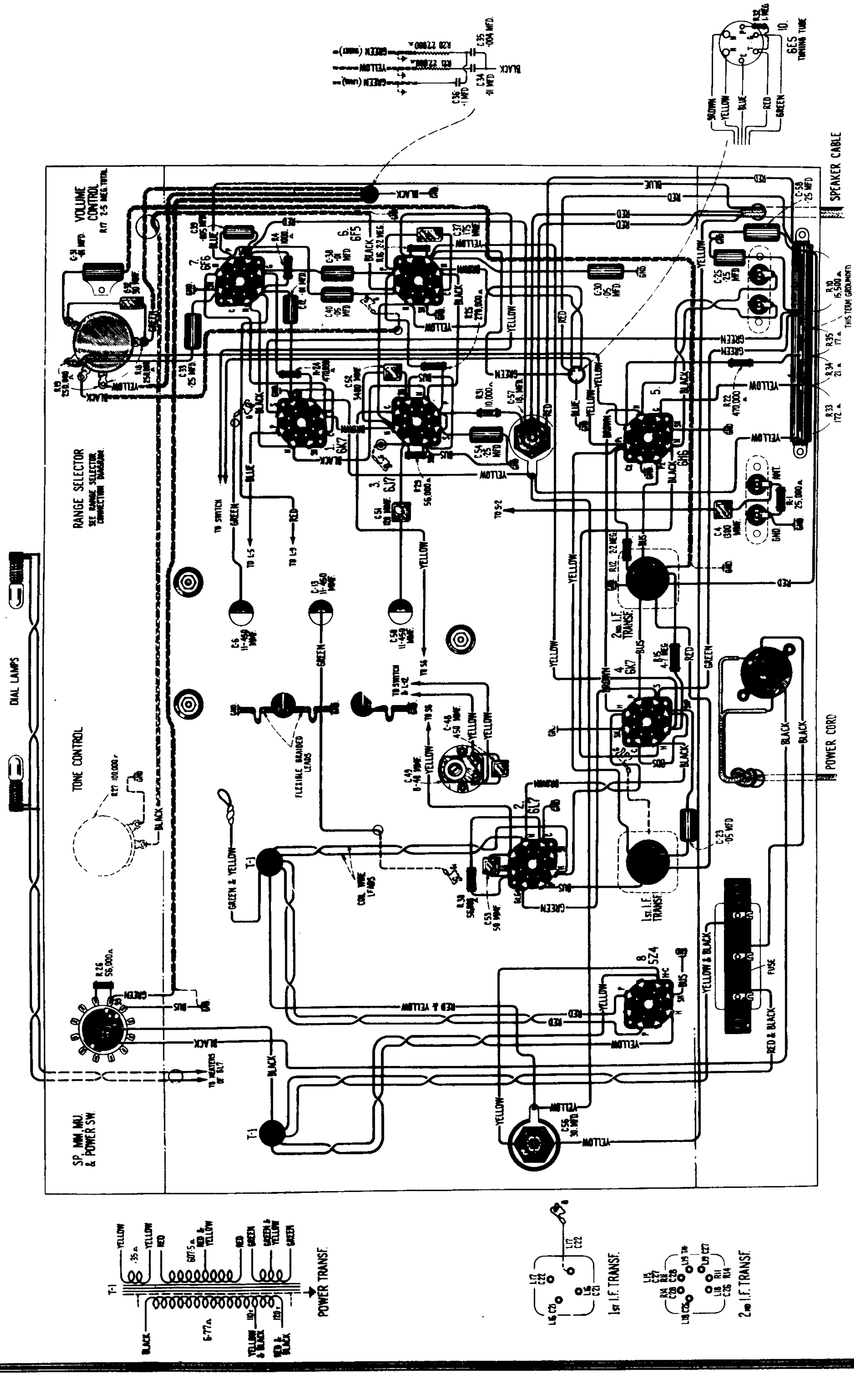
I.F. 460 K.C.

Schematic Circuit Diagram and Reproducer Wiring Diagram

Notes:— 1. On early production the heater winding was grounded at centre instead of at contact No. 2 on the W-6H6 socket. 2. The lower end of tone control R27 was to positive plate supply terminal instead of to chassis frame. The wiring diagram is up-to-date.

CANADIAN WESTINGHOUSE COMPANY Limited

MODELS 914X & 914Y

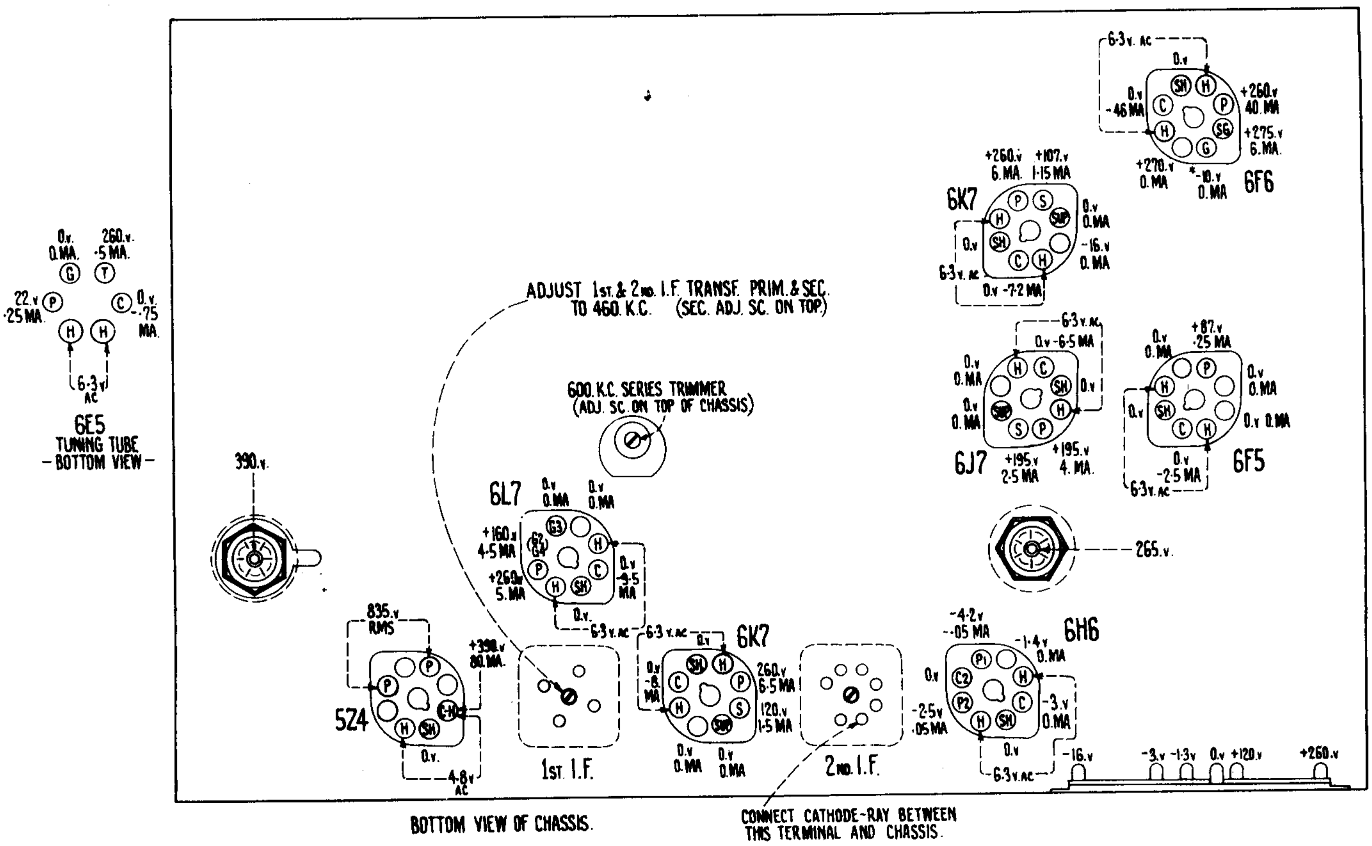


WIRING DIAGRAM

See notes under Schematic Circuit Diagram

CANADIAN WESTINGHOUSE COMPANY Limited

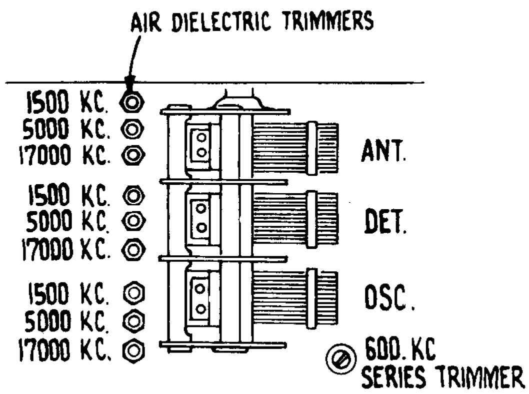
MODELS 914X & 914Y



Radiotron Socket Voltages and I.F. Trimmer Locations

The meter readings given in the diagram are taken with the antenna and ground binding posts short circuited and with 120 volts line. All readings are actual operating conditions and in some cases it will be necessary to allow for meter resistance. All D.C. voltage readings are taken with respect to the chassis frame. All readings are given for normal operation. If readings are taken with a set analyser circuits that are not intended to oscillate, may oscillate, thus increasing plate or screen voltages and decreasing plate or screen current. The set analyser cable may also cause the oscillator radiotron to cease oscillating, thus increasing current and decreasing voltage.

In some cases the socket contacts of "blank" radiotron pins are used as terminals for chassis parts. The voltages shown above on such contacts are circuit voltages, not radiotron voltages.



R.F. Alignment Points

When adjusting the Air Dielectric R.F. trimmers, it is necessary to use a special tool (See H-29644 in parts list) to slacken the lock nut on the trimmer, previous to the adjustment, and to tighten it again after the adjustment. Another special tool (See H-29643 in parts list) is available for making the actual adjustment to the trimmer. The adjustment should be made upward or downward on the plunger with a twisting motion. The special tool designed by the Canadian Westinghouse Company for this purpose is double ended; one end having a pin for the R.F. adjustments, the other end is a special socket screw driver for use in making I.F. adjustments.

	Frequency Ranges	*Alignment Frequencies*
Broadcast (BC)	530–1720 kc.	600 kc. (osc.,) 1500 kc. (osc., ant. det.)
Medium Wave (MW)	1720–5500 kc.	5000 kc. (osc. ant. det.)
Short Wave (SW)	5500–18000 kc.	17000 kc. (osc. ant. det.)
Intermediate Frequency		460 kc.

Radiotron Complement:

(1)	W-6K7	R.F. Amplifier
(2)	W-6L7	First Det.
(3)	W-6J7	Oscillator
(4)	W-6K7	I.F. Amplifier
(5)	W-6H6	Second Det.—A.V.C.
(6)	W-6F5	First A.F. Stage
(7)	W-6F6	Power Output
(8)	W-5W4	Full-wave Rectifier
(9)	W-6E5	Tuning Indicator

CANADIAN WESTINGHOUSE COMPANY Limited

MODELS 914X & 914Y

SERVICE DATA

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles, such as R3, L2, C1, etc., are provided for reference between the illustrations and the Replacement Parts List. The coils, reactors, and transformer windings are rated in terms of their d-c resistances only. Ratings of less than one ohm are generally omitted.

Alignment Procedure

There are ten alignment trimmers provided in the R.F., first detector and oscillator tuned circuits. The four i-f transformer adjustments are made by means of screws attached to molded magnetite cores. All of these circuits have been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions or altered during servicing. Loss of sensitivity, improper tone quality, and poor selectivity are the usual indications of improper alignment.

The correct performance of this receiver can only be obtained when the aligning has been done with adequate and reliable apparatus. It is not absolutely necessary to use a frequency modulated oscillator and cathode ray oscillograph to align this receiver. Those service men that have this equipment will probably prefer to use it and for their convenience we have indicated on the socket voltage diagram the proper connection point for the cathode ray vertical amplifier input terminal.

A special tool (See H-29643 in parts list) is available for adjusting the I.F. trimmers. This tool has at one end a socket screw driver which aids in locating the head of the I.F. trimmer screw, and will not slip off the screw. It is recommended that two of these tools be used simultaneously, particularly when a Cathode Ray Oscillograph is being used for alignment purposes. With the chassis standing on one end, and both primary and secondary I.F. trimmer screws accessible, much more rapid work can be done by simultaneously adjusting the primary and secondary I.F. trimmers.

A test oscillator is required as a source of the specified alignment frequencies. Visual indication of receiver output during the adjustment is necessary and should be accomplished by the use of an indicator or meter.

The procedure outlined below should be followed in adjusting the various trimmer capacitors and molded cores:

WHEN ALIGNING THE R.F. CIRCUITS, THE CHASSIS BOTTOM SHIELD MUST BE IN PLACE ON THE CHASSIS AND SECURELY FASTENED WITH ALL OF THE RETAINING SCREWS. IF THE CHASSIS BOTTOM PLATE IS REMOVED, COIL SHIELDING WILL BE INCOMPLETE AND THE R.F. CIRCUIT WILL OSCILLATE. WHEN ADJUSTING I.F. CORES WITH THE CHASSIS BOTTOM PLATE REMOVED OR DOING TROUBLE SHOOTING ON THE CHASSIS, OSCILLATION MAY BE PREVENTED BY USING A SHORT LENGTH OF WIRE WITH TWO CLIPS TO CONNECT TOGETHER THE PARTITION SHIELDS BETWEEN THE ANTENNA AND DETECTOR COILS, AND BETWEEN THE DETECTOR AND OSCILLATOR COILS.

I.F. ADJUSTMENTS USING CATHODE RAY EQUIPMENT

1. Set up the Cathode Ray Equipment in the manner recommended by the manufacturer of the equipment. The frequency modulated oscillator should be connected to the control grid cap of the W-6K7 I.F. radiotron (with grid lead in place), through a .001 Mfd. capacitor. The grounded side of the test oscillator output should be connected to the receiver chassis frame. The cathode ray oscillograph vertical terminals should be connected to points indicated on the radiotron socket voltage diagram.

2. Place the receiver in operating condition. The antenna and ground terminal should be short circuited and if necessary the gang condenser adjusted so that no stray signals are fed into the I.F. amplifier during the adjustment.

Adjust the test oscillator to supply a 460 Kc. audio-modulated signal. Increase the output of the test oscillator until a deflection is noticeable on the oscillograph screen. The figures obtained represent several waves of the detected signal, the amplitude of which may be observed as an indication of output. Cause the wave-image formed to be spread completely across the screen by adjusting the "Horizontal gain" control. The image should be synchronized and made to remain motionless by adjusting the proper oscillograph controls.

3. Adjust the two magnetite core screws of the second I.F. transformer (see radiotron socket voltage and I.F. terminal location diagram) to produce maximum vertical deflection of the oscillograph image. This adjustment places the transformer in exact resonance with the 460 Kc. signal.

4. Set up the cathode ray and test oscillator equipment in the standard manner to provide a frequency modulated signal and a "double trace" image.

5. Adjust the frequency of the test oscillator until the two traces move together and overlap with their highest points exactly coinciding.

6. Now readjust the two magnetite core screws on the second I.F. transformer so as to cause the two traces on the oscillograph screen to coincide throughout their lengths and have maximum amplitude.

7. Without altering the adjustments of the apparatus, shift the "Ant." output of the test oscillator to the input of the I.F. system; i.e., to the grid cap of the W-6L7 first detector (with grid lead in place) through the .001 mfd. capacitor. Regulate the test oscillator output so that the amplitude of the oscillograph image is approximately the same as used for adjustment (6) above.

8. The two first I.F. transformer magnetite core screws should then be adjusted so as to cause the forward and reverse waves to become coincident throughout their lengths and have maximum amplitude.

I.F. ADJUSTMENT WITHOUT CATHODE RAY EQUIPMENT

In most cases provided the I.F. transformers have not been very badly put out of adjustment, it is possible to secure reasonably good results by alignment with a simple 460 K.C. audio modulated oscillator and standard output indicator. The adjustment should be made in a similar manner described for the cathode ray equipment, but of, course, the I.F. cores should be adjusted for maximum output indication only. The adjustments must be done in the order given and must be done carefully.

R.F. ADJUSTMENT

Before attempting R.F. alignment it is necessary to set the pointer in the correct position with relation to the gang condenser plates. This is done by setting the pointer to the angle of the border line of the dial immediately below the 530 K.C. calibration point, with the gang tuning condenser in full mesh.

"Broadcast" Trimmer Adjustments.

The output indicator should be left connected to the system. Connect the test oscillator to antenna and ground terminals of the chassis through a 200 mmfd. condenser. Adjust the test oscillator to 1500 kc. and set the receiver tuning control to a dial reading of 1500 kc. Leave the volume control of the receiver at its maximum position. Make sure that the Range Selector is at its broadcast position. and the high fidelity switch in the counter clockwise position. Regulate the output of the test oscillator until a slight indication is perceptible at the receiver output. Then adjust the three 1500 kc. trimmers (see diagram) of the oscillator and antenna transformer coils so that each produces maximum (peak) receiver output. After this maximum has been accurately obtained, shift the test oscillator to 600 kc. Tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then, adjust the receiver 600 kc. series trimmer, simultaneously rocking the tuning control backward and forward through the signal until maximum receiver output results from these combined operations. The adjustment at 1,500 kc. should then be repeated to correct for any change which may have been caused by the oscillator series trimmer adjustment.

"Medium Wave" Trimmer Adjustment:

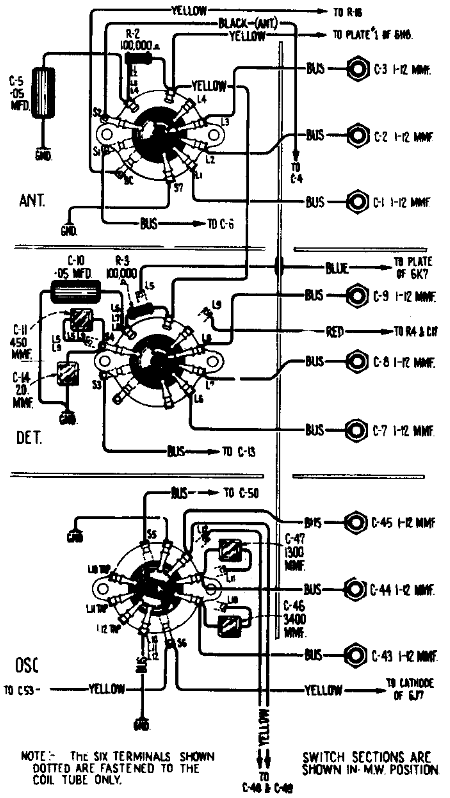
Use same equipment and layout as for "broadcast" alignment. Place the receiver range selector switch to its "medium wave" position with the dial pointer set at 5000 Kc. Tune the test oscillator to 5000 Kc. Adjust the oscillator 5,000 Kc. air-trimmer to produce maximum output. Two peaks may be found with this circuit; the peak with minimum capacitance (plunger nearly out) should be used. Tighten locknut. Adjust the detector 5000 Kc. air-trimmer for maximum output while slightly rocking the gang condenser. Two peaks may be found with this circuit; the peak with maximum capacitance (plunger nearly in) should be used. Tighten locknut. Adjust antenna 5000 Kc. air-trimmer to produce maximum output. Tighten locknut.

"Short-Wave" Trimmer Adjustments

Connect the "ANT" output of the test oscillator to the antenna terminal of the receiver through a 400 ohm resistor. Set the receiver range selector switch to its "short wave" position and its dial pointer to 17000 Kc. Adjust the test oscillator to 17000 Kc. Adjust oscillator 17000 Kc. trimmer until maximum output is reached. Two peaks may be found with this circuit. The peak with minimum capacitance (plunger nearly out) should be used. Tighten locknut. Adjust detector 17000 Kc. trimmer until maximum output is reached while slightly rocking the gang condenser. Two peaks may be found with this circuit; the peak with maximum capacitance (plunger nearly in) should be used. Tighten locknut. Adjust antenna 17000 Kc. trimmer until maximum output is reached, while slightly rocking the gang condenser. Two peaks may be found with this circuit; the peak with maximum capacitance (plunger nearly in) should be used. Tighten locknut. Check the image frequency by changing the receiver dial setting to 16,080 Kc. the image signal should be received at this position, indicating that the adjustments have been correctly made. No adjustments should be made while checking for the image signal.

LOUDSPEAKER

The reproducer centering adjustment will be obvious if the field coil shield is removed. One screw in the centre of the back of the reproducer holds the shield in place. Two screws hold the voice coil centering spider in place and must of course be loosened while adjustment is being made.



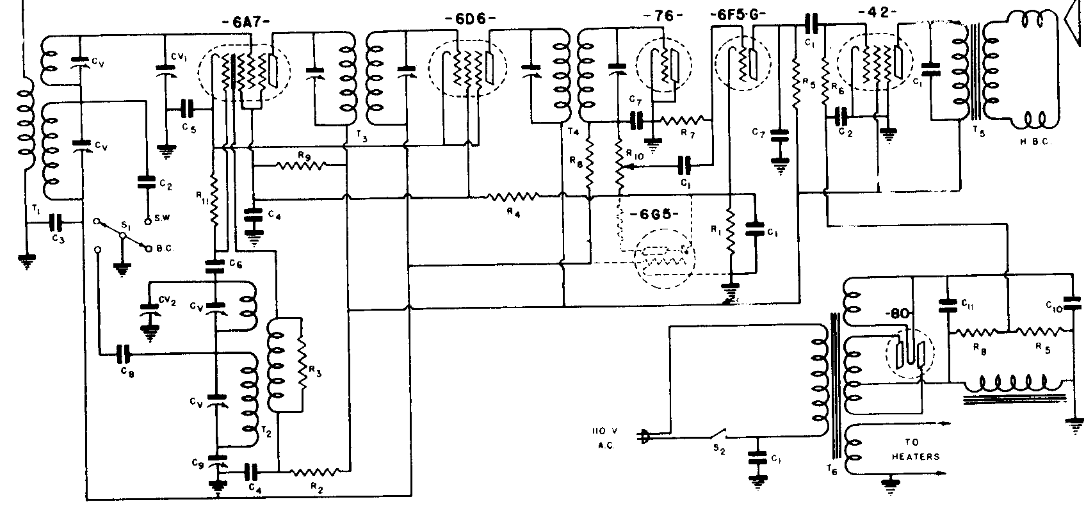
Range Selector Wiring Diagram

CLIMAX RADIO & TELEVISION CO., Inc.

MODELS AC 60 - AC 64 - AC 64-B

MODELS AC 61 - AC 65 (WITHOUT 6G5 TUBE)

7 (OR 6) TUBE TWO BAND AC RECEIVER



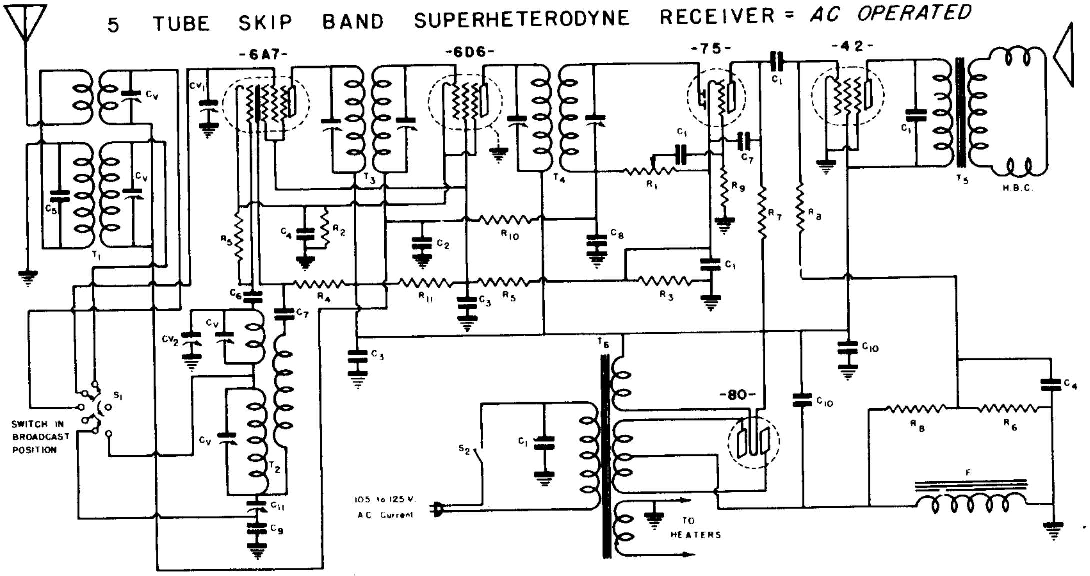
LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD 400 V. TUBULAR CONDENSER
C_2	212	.05 MFD 200 V. TUBULAR CONDENSER
C_3	203	.1 MFD 200V. TUBULAR CONDENSER
C_4	210	.1 MFD 400 V. TUBULAR CONDENSER
C_5	204	.25 MFD 200V. TUBULAR CONDENSER
C_6	400	.0001 MICA CONDENSER
C_7	401	.00025 MICA CONDENSER
C_8	411	.00128 MICA CONDENSER
C_9	507	5 PLATE PADDING CONDENSER
C_V	500	5-30 MFD TRIMMER CONDENSER

LEGEND	OUR PART NO	DESCRIPTION
CV_{1-2}	612-A	2 GANG VARIABLE CONDENSER
C_{10}	IN 323	4 MFD 600 P.V. ELECTROLYTIC COND.
C_{11}	IN 323	8 MFD 600 P.V. ELECTROLYTIC COND.
T_1	1210	ANTENNA COIL
T_2	1404	OSCILLATOR COIL
T_3	1507	OUTPUT I F TRANSFORMER
T_4	1503	INPUT I F TRANSFORMER
T_5	IN 811	SPEAKER TRANSFORMER
S_1	1914	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
F	IN 811	1600 OHM SPEAKER FIELD

LEGEND	OUR PART NO.	DESCRIPTION
R_1	139	400 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_2	109	10,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_3	111	25,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	113	50,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_5	116	250,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_6	141	350,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	117	500,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_8	119	1 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_9	112	25,000 OHM 1 WATT CARBON RESISTOR
R_{10}	2009	500,000 OHM VOLUME CONTROL
R_{11}	103	250 OHM $\frac{1}{4}$ WATT CARBON RESISTOR

MODEL AD

5 TUBE SKIP BAND SUPERHETERODYNE RECEIVER = *AC OPERATED*



LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD.-400 V. TUBULAR CONDENSER
C_2	203	.1 MFD.-200 V. TUBULAR CONDENSER
C_3	210	.1 MFD.-400V. TUBULAR CONDENSER
C_4	204	.25 MFD. 200V TUBULAR CONDENSER
C_5	412	.00005 MFD. MICA CONDENSER
C_6	400	.0001 MFD MICA CONDENSER
C_7	401	.00025 MFD. MICA CONDENSER
C_8	402	.0005 MFD. MICA CONDENSER
C_9	410	.0018 MFD. MICA CONDENSER
C_{10}	317	8MFD. 450 W.V. WET ELECTROLYTIC COND
C_{11}	507	5 PLATE PADDING CONDENSER

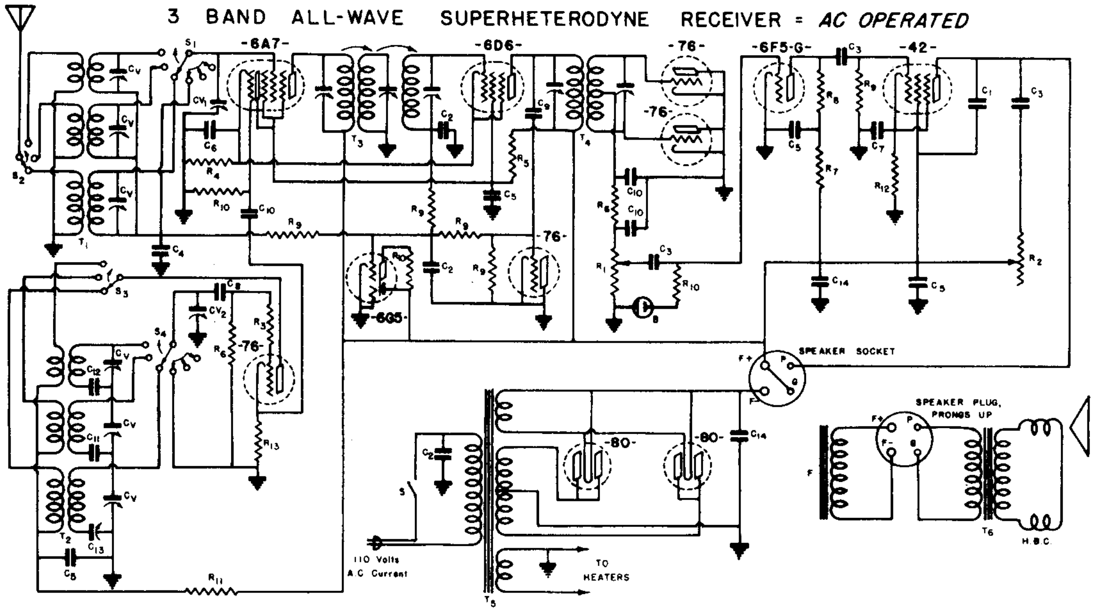
LEGEND	OUR PART NO.	DESCRIPTION
CV_{1-2}	612-A	2 GANG VARIABLE CONDENSER
C_V	500	5-30 MMFD. TRIMMER CONDENSER
T_1	1225	B.C. & SKIP BAND ANTENNA COIL
T_2	1412	B.C. & SKIP BAND OSCILLATOR COIL
T_3	1503	INPUT I F TRANSFORMER
T_4	1507	DIODE I F TRANSFORMER
T_5	IN 811	SPEAKER TRANSFORMER
T_6	1014	POWER TRANSFORMER
F	IN 811	SPEAKER FIELD (1600 OHMS)
S_1	1920	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL

LEGEND	OUR PART NO.	DESCRIPTION
R_1	2009	500,000 OHM VOLUME CONTROL
R_2	103	250 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_3	139	400 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	109	10,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_5	113	50,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_6	115	100,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	116	250,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_8	145	400,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_9	117	500,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_{10}	119	1 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_{11}	146	25,000 OHM 1 WATT CARBON RESIST.

CLIMAX RADIO & TELEVISION CO., Inc.

MODEL JL

3 BAND ALL-WAVE SUPERHETERODYNE RECEIVER = *AC OPERATED*



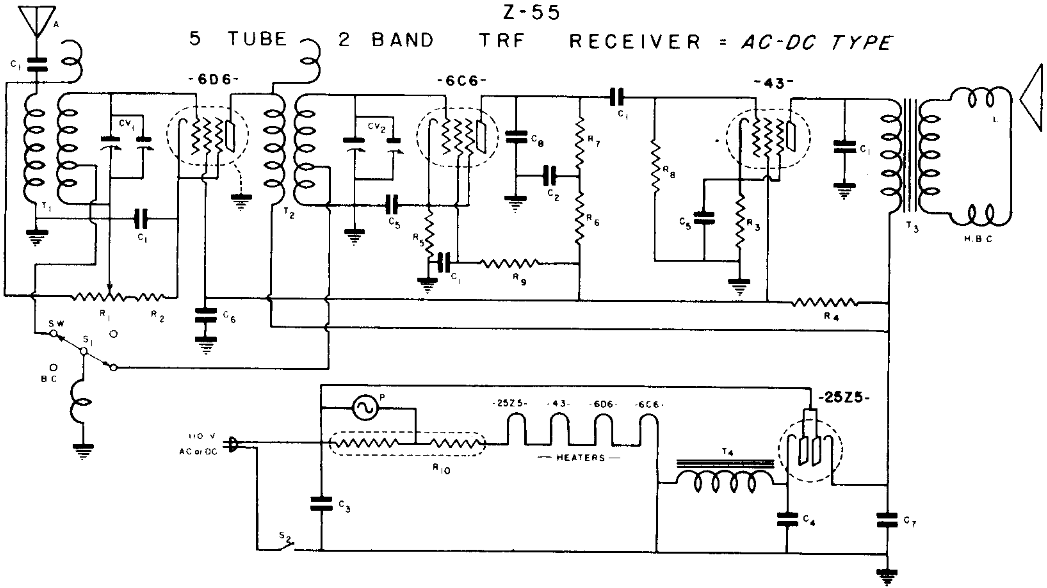
LEGEND	OUR PART NO.	DESCRIPTION
C_1	213	.005 MFD.-600 V. TUBULAR CONDENSER
C_2	211	.01 MFD.-400 V. TUBULAR CONDENSER
C_3	212	.05 MFD.-400 V. TUBULAR CONDENSER
C_4	203	.1 MFD. 200 V. TUBULAR CONDENSER
C_5	210	.1 MFD.-400 V. TUBULAR CONDENSER
C_6	205	.25 MFD. 200 V. TUBULAR CONDENSER
C_7	304	10 MFD. 35 V. DRY ELECTROLYTIC TUB. COND
C_8	412	.00005 MFD. MICA CONDENSER
C_9	400	.0001 MFD. MICA CONDENSER
C_{10}	401	.00025 MFD. MICA CONDENSER
C_{11}	410	.0018 MFD. MICA CONDENSER
C_{12}	413	.0038 MFD. MICA CONDENSER
C_{13}	IN 1404	5 PLATE PADDING CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
C_{14}	317	8 MFD. 450 W.V. WET ELECTROLYTIC COND
CV_{1-2}	611	2 GANG VARIABLE CONDENSER
C_V	500	5-30 MMFD. TRIMMER CONDENSER
R_1	2011	500,000 OHM VOLUME CONTROL
R_2	2012	75,000 OHM TONE CONTROL & SWITCH
R_3	101	150 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_4	103	250 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_5	111	25,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_6	113	50,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_7	115	100,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_8	116	250,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_9	117	500,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_{13}	105	1,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR

LEGEND	OUR PART NO.	DESCRIPTION
R_{10}	119	1 MEGOHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_{11}	146	25,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_{12}	135	420 OHM 1 WATT WIRE WOUND RESISTOR
T_1	1215	SHIELDED 3 BAND ANTENNA COIL
T_2	1404	SHIELDED 3 BAND OSCILLATOR COIL
T_3	1508	TRIPLE TUNE I.F. TRANSFORMER
T_4	1510	DIODE I.F. TRANSFORMER
T_5	1015	POWER TRANSFORMER
T_6	IN 875	SPEAKER TRANSFORMER
$S_{1-2-3-4}$	1913	2 GANG BAND SWITCH
S	—	LINE SWITCH ON TONE CONTROL
F	IN 875	1600 OHM SPEAKER FIELD
B	3000	BIAS CELL

Z-55

5 TUBE 2 BAND TRF RECEIVER = *AC-DC TYPE*



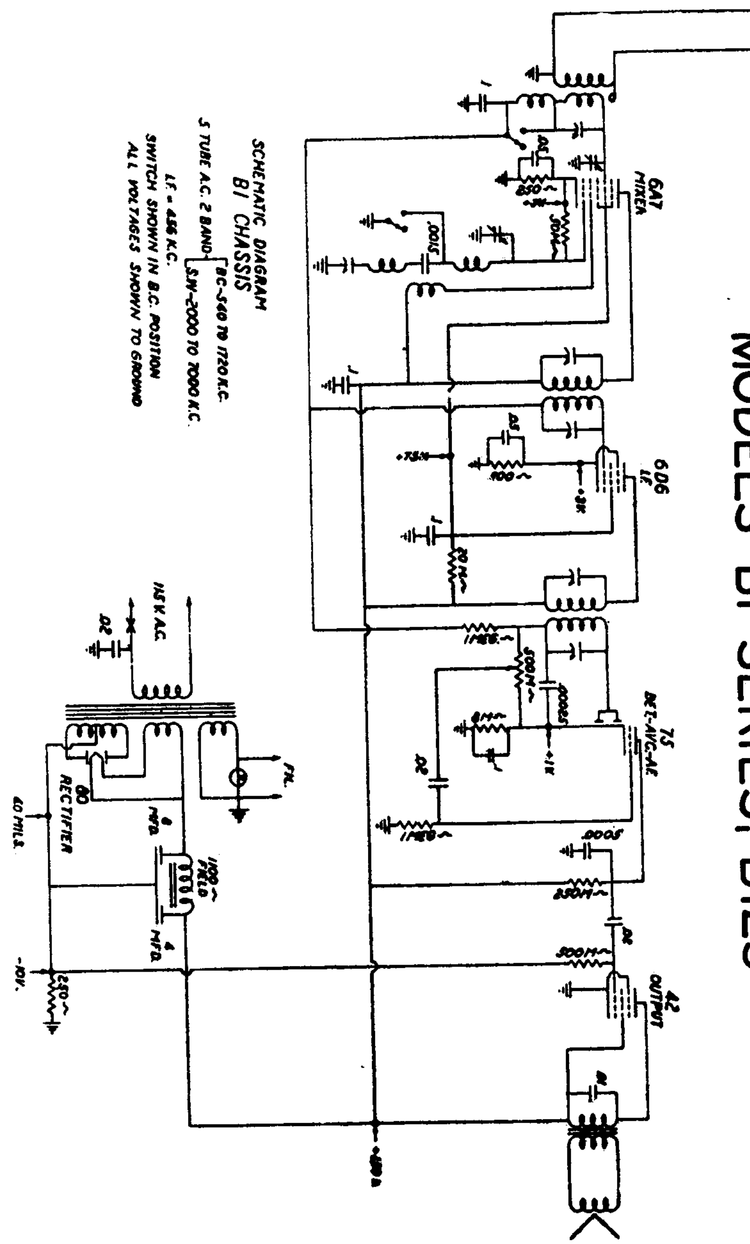
LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD 400 V. TUBULAR CONDENSER
C_2	216	.018 MFD 400 V. TUBULAR CONDENSER
C_3	210	.1 MFD 400 V TUBULAR CONDENSER
C_4	IN 316	4 MFD 175 W.V. ELECTROLYTIC COND.
C_5	IN 316	5 MFD 25 W.V. ELECTROLYTIC COND.
C_6	IN 316	8 MFD 150 W.V. ELECTROLYTIC COND.
C_7	IN 316	14 MFD 175 W.V. ELECTROLYTIC COND.
C_8	401	.00025 MICA CONDENSER
CV_{1-2}	617-A	2 GANG VARIABLE CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
R_1	2016	10,000 OHM VOLUME CONTROL
R_2	—	450 OHM (Minimum on Volume Control)
R_3	104	600 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	108	5,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_5	111	25,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_6	142	51,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	116	250,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_8	117	500,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_9	120	3 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_{10}	2903	L-55-B BALLAST TUBE

LEGEND	OUR PART NO.	DESCRIPTION
T_1	1219	BC & SW ANTENNA COIL
T_2	1313	BC & SW RF COIL
T_3	IN 808	SPEAKER OUTPUT TRANSFORMER
T_4	IN 808	SPEAKER FIELD (2500 ohms)
S_1	1919	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
P	2902	MAZDA #46 PILOT LIGHT
A	2400	INDOOR ANTENNA HANK
L	808	5" DYNAMIC SPEAKER

CONTINENTAL RADIO & TELEVISION CORP.

MODELS B1 SERIES, B125



SCHEMATIC DIAGRAM
B1 CHASSIS
5 TUBE A.C. 2 BAND — BC-540 TO 1720 K.C. / S.W.-2000 TO 7000 K.C.
I.F. = 456 K.C.
SWITCH SHOWN IN B.C. POSITION
ALL VOLTAGES SHOWN TO GROUND

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, and 6000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, the Short Wave Band may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tubes (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the ouput meter.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna lead (Blue) through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the rear gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak.

Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R.F. section. The padding condenser is located on the right hand end of the chassis

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Band.

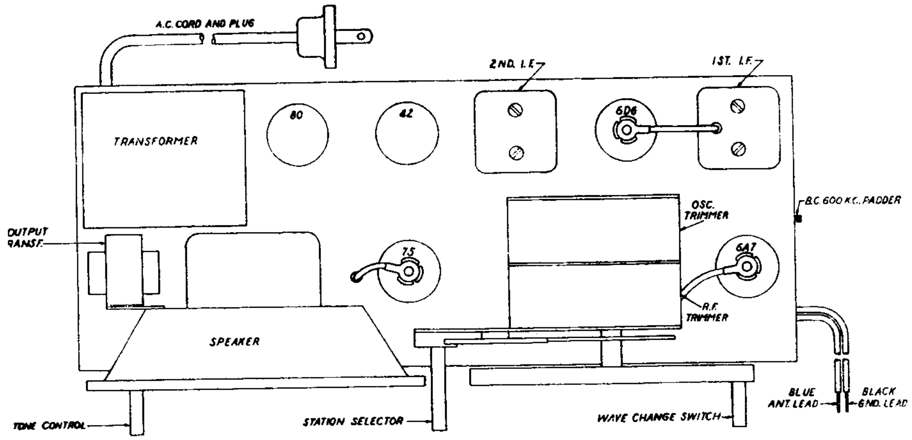
SHORT WAVE BAND There is only one adjustment to be made in the alignment of the Short Wave Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary.

Set the dial pointer to 600 KC (also the test oscillator) and adjust the antenna and antenna trimmer to resonance. The short wave band coils are under the chassis and are located at the right front corner along side of wave band switch.

IMPORTANT: This is the only adjustment necessary for the Short Wave Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Short Wave Band, otherwise the Broadcast Band will be thrown out of alignment.

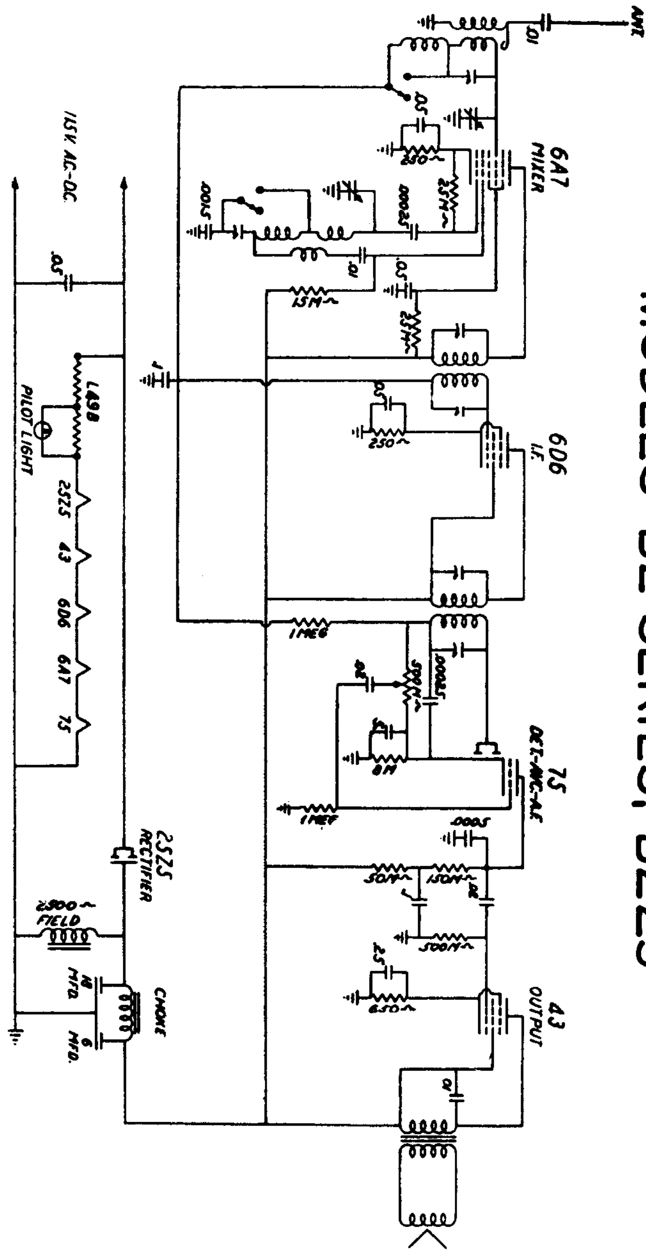
Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 6000 KC.

This completes the correct sequence of operations Band, and MUST ALWAYS BE DONE BEFORE attempting to align the Short Wave Band.



CONTINENTAL RADIO & TELEVISION CORP.

MODELS B2 SERIES, B225



6 TUBE AC-DC. 2 BAND — BC.-540 TO 1720 KC. / S.W. 2000 TO 7000 KC

IF = 456 KC.

SWITCH SHOWN IN B.C. POSITION

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, and 6000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, the Short Wave Band may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tubes (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the ouput meter.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna lead (Blue) through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the rear gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak.

Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R.F. section. The padding condenser is located on the right hand end of the chassis near the 6A7 tube.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Band.

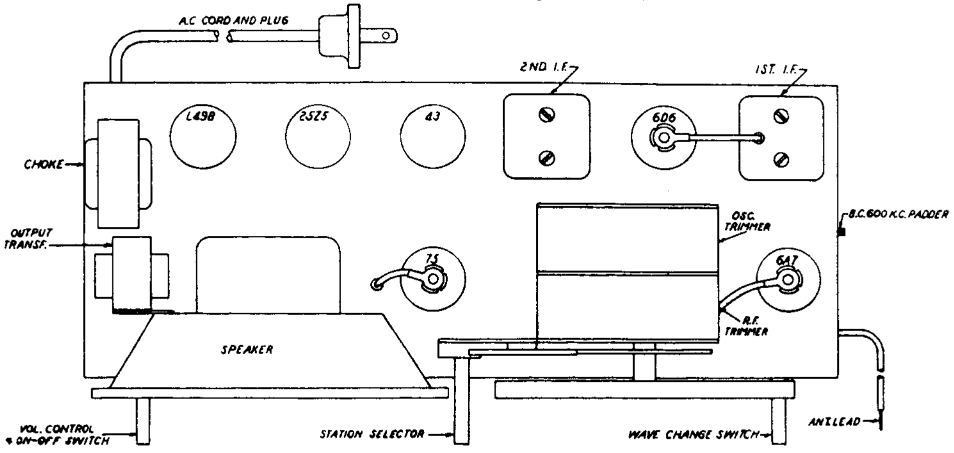
SHORT WAVE BAND There is only one adjustment to be made in the alignment of the Short Wave Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary.

Set the dial pointer to 600 KC (also the test oscillator) and adjust the antenna and antenna trimmer to resonance. The short wave band coils are under the chassis and are located at the right front corner along side of wave band switch.

IMPORTANT: This is the only adjustment necessary for the Short Wave Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Short Wave Band, otherwise the Broadcast Band will be thrown out of alignment.

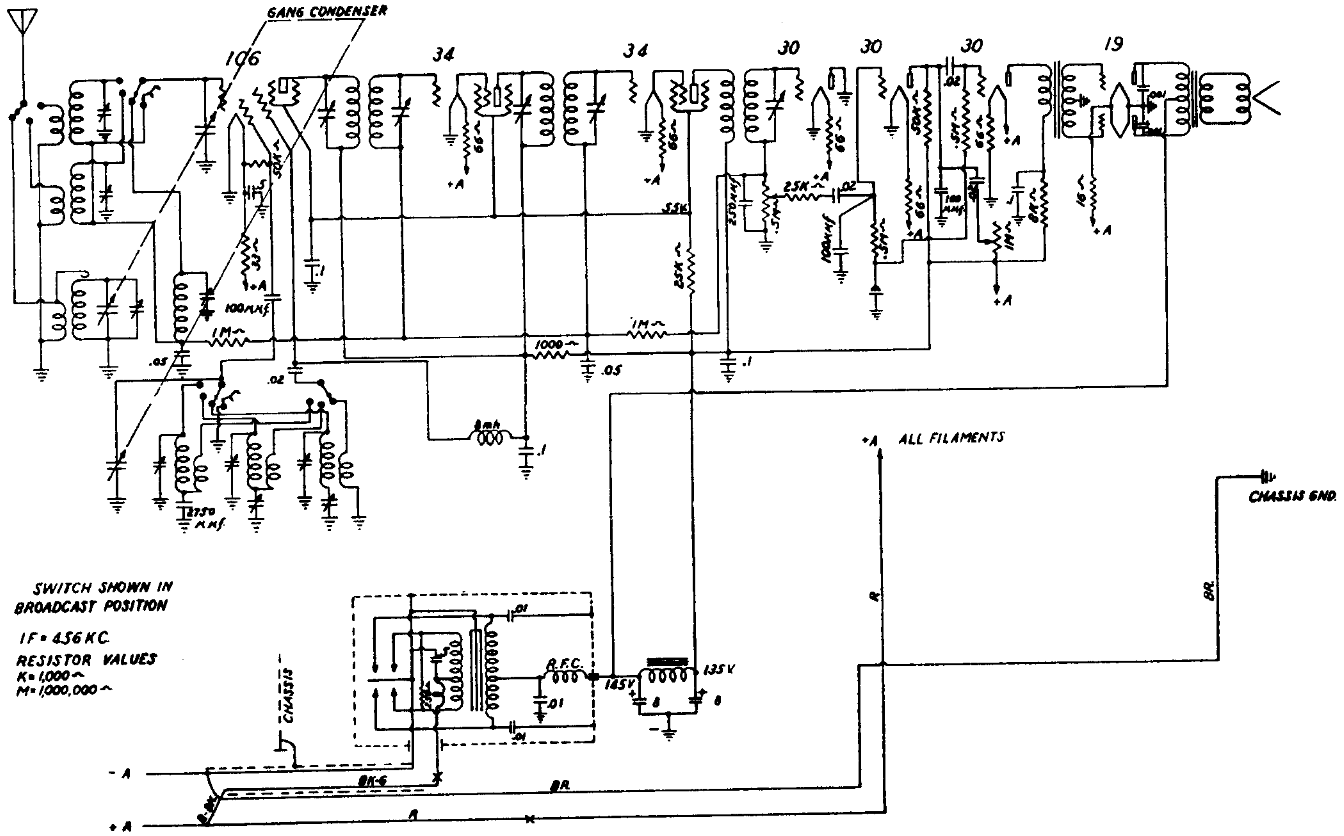
Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 6000 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and MUST ALWAYS BE DONE BEFORE attempting to align the Short Wave Band.

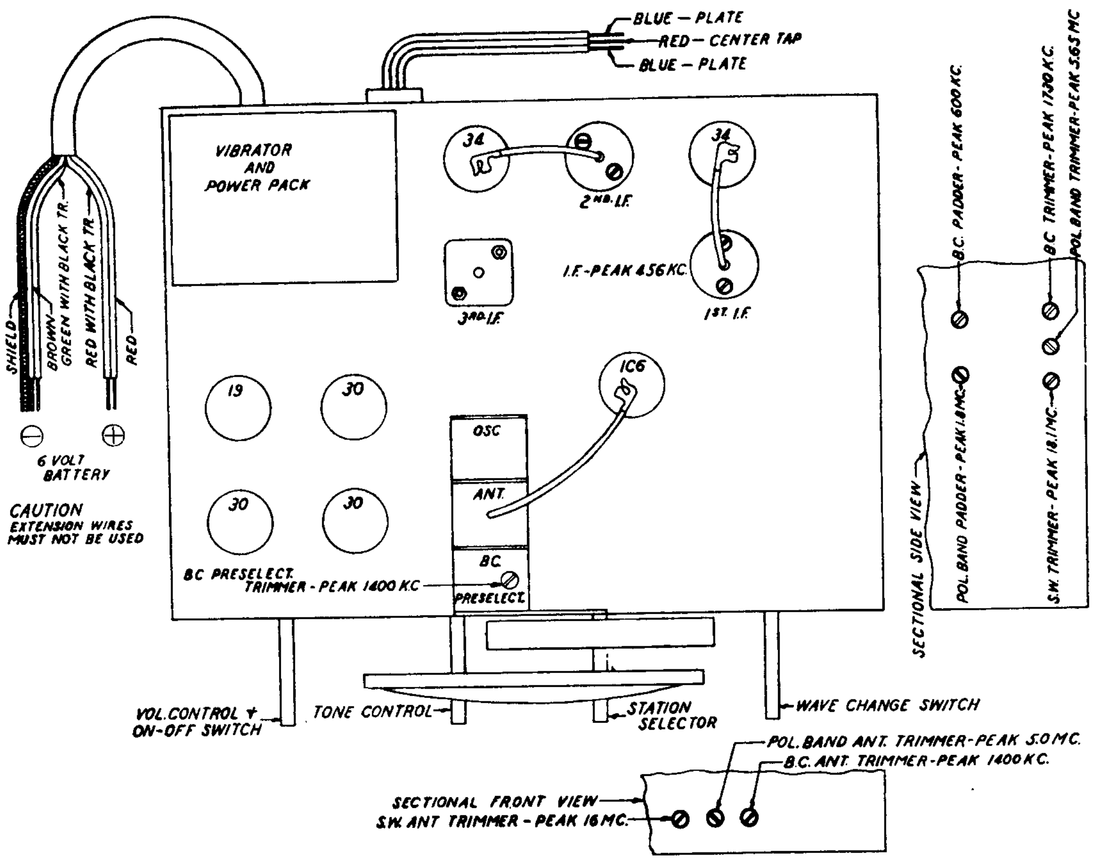


CONTINENTAL RADIO & TELEVISION CORP.

MODEL M5 SERIES



I.F. 456 K.C.



CONTINENTAL RADIO & TELEVISION CORP.

MODEL M5 SERIES

ALIGNMENT DATA AND SERVICING

GENERAL DATA

The alignment of this receiver requires the use of a test oscillator which will cover the frequencies of 456, 600, 1400, 1800, 4000, 6000, and 14,000 KC and an output meter which is to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE

The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT

Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1C6) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all five I.F. trimmers to peak or maximum reading on the output meter. As there are two stages of I.F. in this receiver, there will be consequently three I.F. transformers to align. The I.F. transformer nearest the type (30) diode detector has only one trimmer, (single tuned) and should be the first adjustment. Next adjust the center I.F. transformer, which has two trimmers (double tuned) for maximum output; then adjust the two trimmers on the input I.F. transformer (double tuned) for peak.

BROADCAST BAND ALIGNMENT

Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the broadcast oscillator trimmer to peak. (See drawing for location.) After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak. The front condenser section tunes the preselector circuit. Then adjust the Broadcast Band R. F. trimmer to peak. This trimmer aligns the grid or input circuit of the 1C6 tube, (See drawing for position of Broadcast R. F. trimmer). Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the B. C. oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the R.F. section. (For location of B.C. padding condenser see drawing.) Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band.

FOREIGN BAND ALIGNMENT

The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers marked and illustrated in the drawing as S.W. oscillator and S.W. trimmer. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. Set the receiver pointer to 14,000 KC (also test oscillator).

Then proceed to adjust these two trimmers for peak at 14,000 KC (adjust oscillator trimmer first) and as the inherent design of the circuit has been expressly developed for simplicity in servicing, no other adjustments are necessary for aligning this band.

Note: Always start this procedure by having the oscillator coil trimmer loose (out all the way), and the antenna coil trimmer fairly tight (in all the way); otherwise it is possible to make a false alignment on the image frequency. In order to prevent alignment on the image frequency, it is suggested that the following check be made: Readjust the pointer to 13,100 KC where the image frequency should be found. If properly aligned, the image frequency will be found to be weaker. If, however, the signal at 13,100 KC is found to be stronger than the signal at 14,000 KC, it signifies that alignment was incorrectly made on the image frequency.

POLICE BAND

In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with a .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment.

Set the receiver pointer to 4000 KC (also test oscillator) and adjust the Police Band oscillator circuit trimmer to peak.

After this has been carefully done, the next step is to adjust the Police Band antenna trimmer to peak.

Now reset the dial pointer and the test oscillator to 1800 KC in preparation for adjusting the police band padding condenser.

Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated, but is the easiest way to correctly adjust the oscillator to the R.F. or antenna section. Return to 4000 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made 1800 KC.

If it is found that in returning to 4000 KC the pointer is accurately on scale, no further adjustment should be necessary (in this recheck). If the pointer is found off scale, it may be corrected and put on scale by readjustment of the police band oscillator trimmer. Alignment of the pointer can only be corrected by adjustment of the oscillator trimmer.

Important: The adjustment, the Police Band Oscillator Trimmer, Police Band Antenna Trimmers and Police Band Padding Trimmers are the only three adjustments required in aligning this band.

SERVICE DATA FOR ALL BANDS

If it is suspected that the oscillator has stopped but is doubtful due to the presence of the usual amount of noise level, it is suggested that the oscillator plate voltage be checked. To ascertain whether the tube is oscillating, ground the oscillator grid of the 1C6 (short stator and rotor plates of oscillator section on gang condenser). If oscillating properly, grounding the grid will cause an appreciable drop in oscillator voltage.

BATTERY CONNECTIONS

At the rear of the receiver there will be found extending from the left end of the chassis, the battery connecting cable. Observation will show that 5 wires are brought out from the braided cable. The **red** and **red with black tracer** wires are joined together and should **both** be securely fastened to the positive (+) terminal of the 6 volt storage battery. The other 3 wires which are **brown, black with green tracer** and **Metallic shield lead** are also joined together and should be securely connected to the negative (—) post of the battery.

Note: It is extremely important that only the best possible means of obtaining a secure connection to the battery terminals be employed. If a battery with automobile terminal posts is used, the **large** post is the positive (+) post; the **smaller post** is the **negative** (—) terminal. It is suggested, when using a battery with auto type posts that large heavy lead covered battery clips be used in making connections. Make sure that **all wires** are firmly connected to clips (solder if possible). Also see that the jaw teeth of the clips are clean, and firmly bite into the post. It is very important that the battery posts and battery clip teeth be cleaned at frequent intervals to assure maintaining good connections. Corrosion may be readily removed by cleaning with a solution of 3 tablespoons of bicarbonate of soda (baking soda) and one cup of water. This solution neutralizes the acid coating that causes the corrosion and leaves a protective condition that retards further corrosion. It is important that this solution does not in any way enter the interior of the battery.

THE CROSLEY RADIO CORPORATION

MODELS 506 & C-516

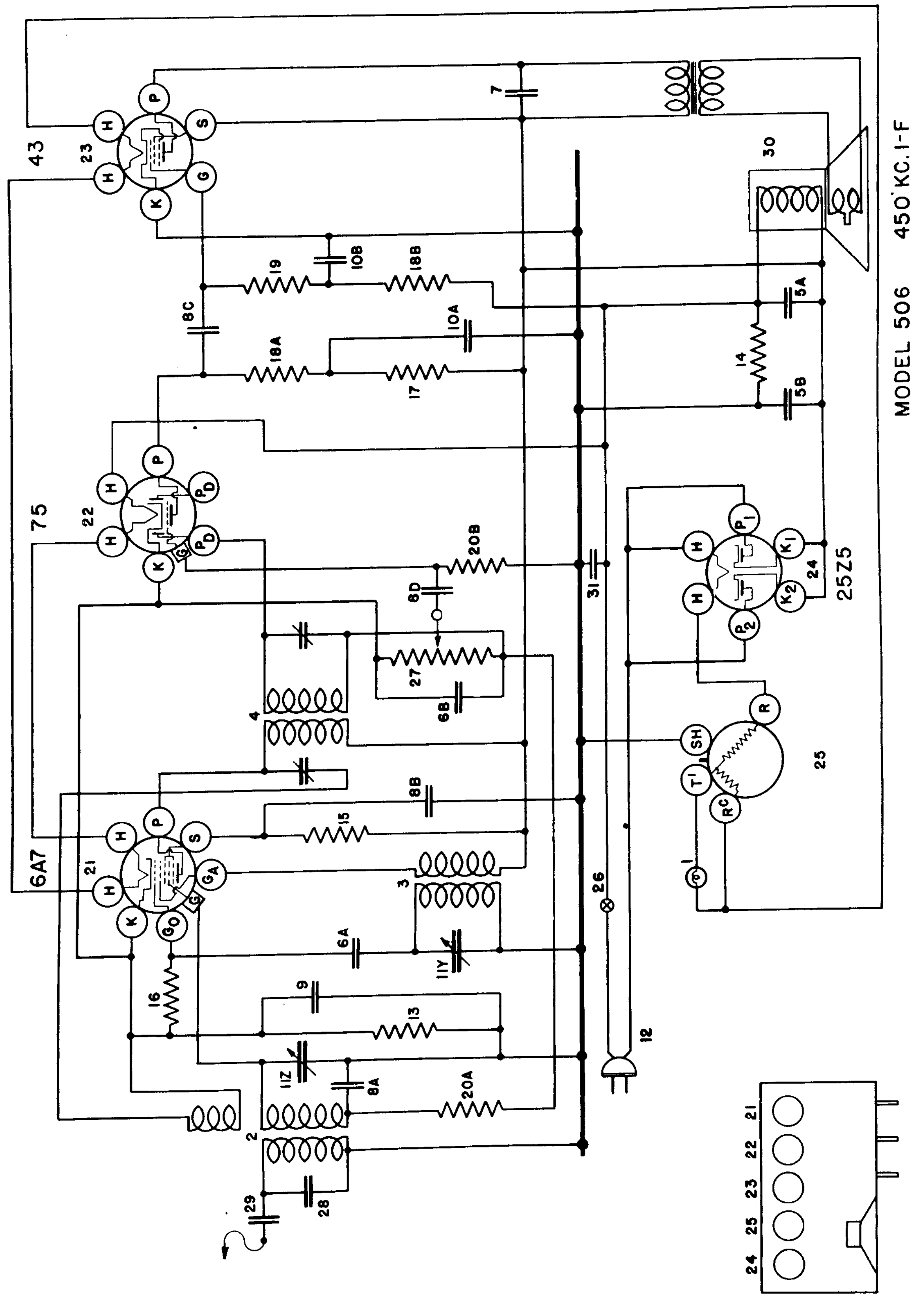


FIG. 1—WIRING DIAGRAM—MODEL 506

THE CROSLEY RADIO CORPORATION

MODELS 506 & C-516

ALIGNMENT PROCEDURE

The chassis of this receiver is connected through a resistor to one side of the power supply and for this reason all test equipment should be thoroughly isolated in order that the power supply will not be short circuited while attempting to align the receiver.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 93 Output tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 condenser to the top cap of the 6A7 Oscillator-Modulator tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator direct to the receiver chassis **but do not run a wire direct to ground.** KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh and turn the volume control to the right (ON).

(c) Set the signal generator to 450 kilocycles.

(d) Adjust the I-F trimmer condensers for maximum reading on the output meter.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

(a) Connect the output lead from the signal generator through a .00025 mfd. condenser to the antenna lead on the chassis.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer located on the "OSC" section of the condenser gang for maximum output.

(e) Adjust the trimmer located on the "ANT" section of the condenser gang for maximum output.

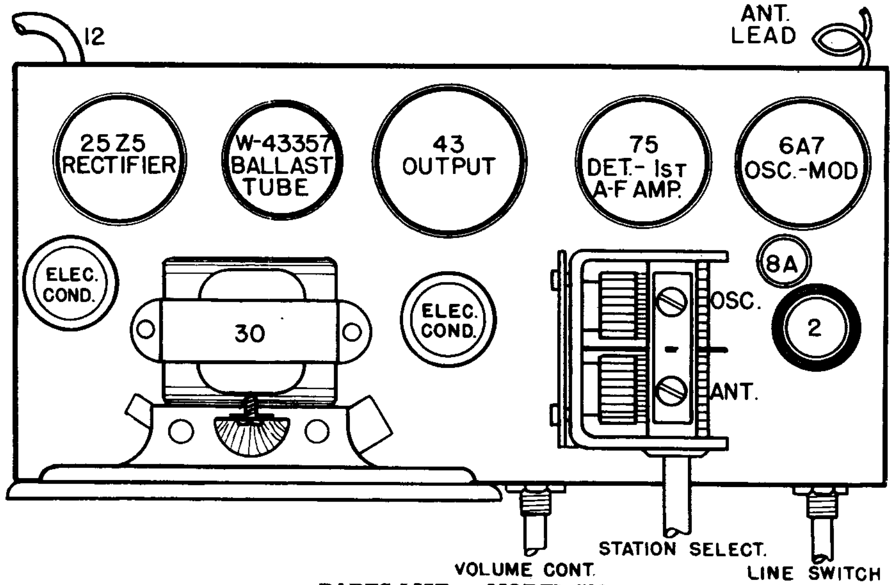
(f) Readjust the station selector slightly for maximum output.

(g) Repeat operation (e) for more accurate adjustment.

The tuning range of the receiver is approximately from 540 to 1725 kilocycles (555 to 173 meters).

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and B—. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with volume control full on and no signal input. The filament voltages should be measured with an accurate low range voltmeter. Voltage limits may vary plus or minus 10% of values given.



PARTS LIST — MODEL 506

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1	W —4099B	Dial Light Bulb
	G6 —27134	Socket Assy. Dial Light
2	G129—32000	Ant. Coil
3	G129—32002	Osc. Coil
4	G137—32001	I-F. Assy.
	W —36140	I-F. Trimmer Cond. (only)
	LW —43337	I-F. Coil (only)
5AB	W —43280	Condenser, 25 Mf. 150 V.
6AB	G1 —34002	Condenser, .00025 Mf. 200 V.
7	W —34647	Condenser, .006 Mf. 400 V.
8ABCD	W —28621	Condenser, .02 Mf. 200 V.
9	W —37988	Condenser, .017 Mf. 200 V.
10AB	W —29910A	Condenser, .25 Mf. 200 V.
11	G28 —33001	2 Gang Var. Tuning Cond.
12	B —27885A	Power Cord and Plug
13	W —35467	Resistor, 275 Ohm ½W. Flex.
14	W —23907	Resistor, 750 Ohm 1½W. Flex
15	—36761	Resistor, 40,000 Ohm ¼W.
16	—35928	Resistor, 60,000 Ohm ¼W.
17	—35600	Resistor, 100,000 Ohm ¼W.
18AB	—35601	Resistor, 300,000 Ohm ¼W.
19	—36322	Resistor, 500,000 Ohm ¼W.
20AB	—35927	Resistor, 2 Megohm ¼W.
21	G47 —28807	Socket Type 6A7
22	G41 —28807	Socket Type 75
23	G30 —28807	Socket Type 43
24	G51 —28807	Socket Type 25Z5
25	G170—34600	Socket Type W-43357
	W —28632	Tube Shield
26	—43339	Line Switch
27	—43340	Volume Control, 1 Meg.
28	G5 —34002	Condenser, .00005 Mf. 200 V
29	W —30325A	Condenser, .003 Mf. 200 V.
30	255BL6Q	Speaker - Spec. 23393
	—43464	Cone Assy. (above Spk.)
	—43465	Output Trans. (above Spk.)
	—43466	Mtg. Ring, Cone (above Spk
	—6DD	Cabinet
	D —43302	Dial
	W —43321	Pointer Knob
	W —43320	Knob—V. C. & Sw.
31	W —23615	Condenser, .05 Mfd. 400 V.

TUBE SOCKET VOLTAGE READINGS

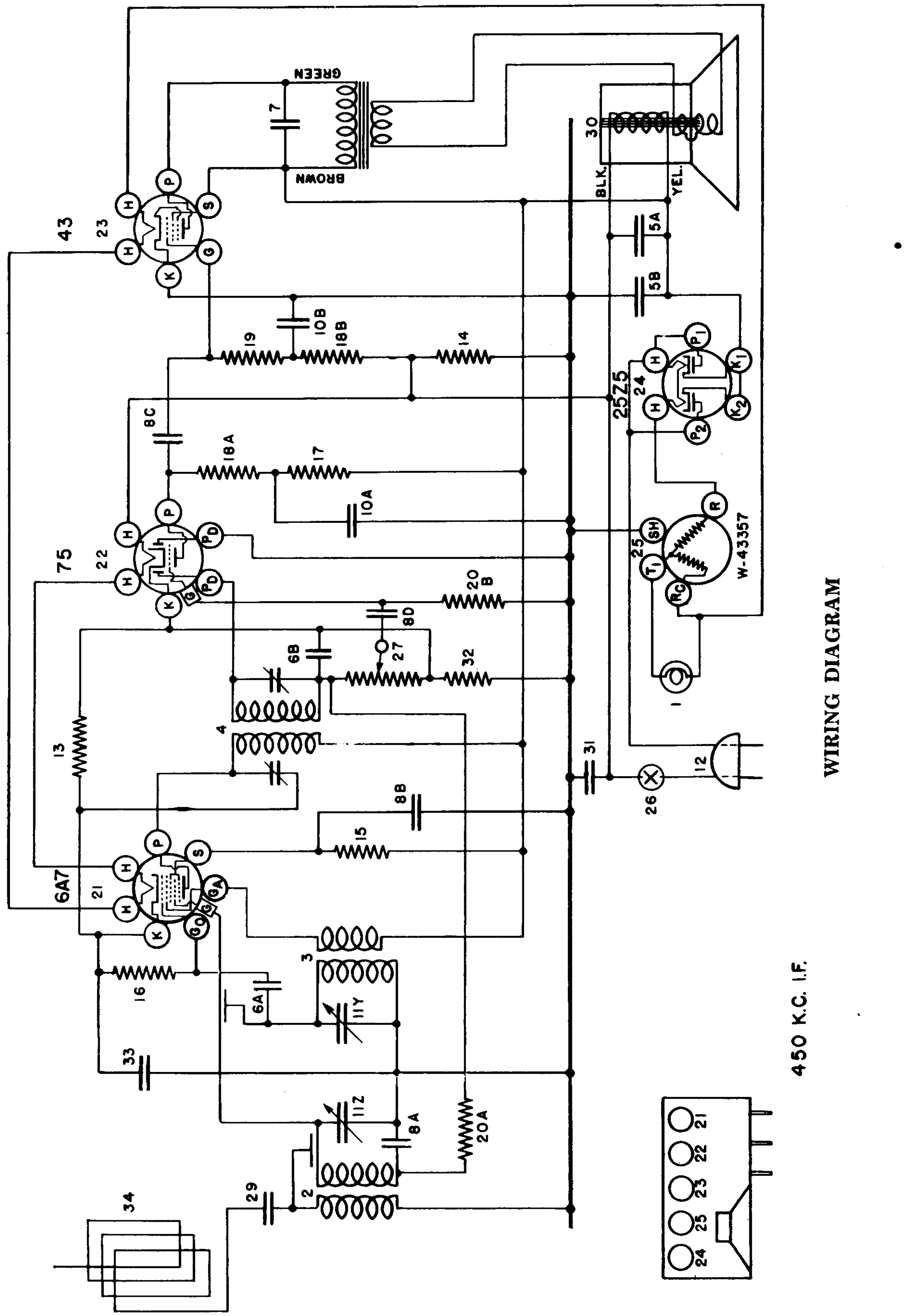
Tube	Function	H	P	S	K	Ga	Go	G
6A7	Oscillator-Mod.	6.5	100	40	1	100	-20	—
75	Det. & A-F Amp.	6.5	11	—	1	—	—	—
43	Output	25.0	95	100	0	—	—	-20
25Z5	Rectifier	25.0	—	—	100	—	—	—

W—43357 Ballast Tube.

Power output approximately 1 watt.
Power consumption approximately 50 watts.
Voltage drop across speaker field 120 volts.
All readings taken on 117.5 volt A. C. power supply.
All readings except filaments will be approximately 15% lower on 117.5 volts D. C.

THE CROSLEY RADIO CORPORATION

MODELS 506 & C-516 ABOVE SERIAL No. 1,308,741



WIRING DIAGRAM

THE CROSLEY RADIO CORPORATION

MODELS 506 & C-516 ABOVE SERIAL № 1,308,741

ALIGNMENT PROCEDURE

The chassis of this receiver is connected through a resistor to one side of the power supply and for this reason all test equipment should be thoroughly isolated in order that the power supply will not be short circuited while attempting to align the receiver.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 43 Output tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 condenser to the top cap of the 6A7 Oscillator-Modulator tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator direct to the receiver chassis **but do not run a wire direct to ground.** KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh and turn the volume control to the right (ON).

(c) Set the signal generator to 450 kilocycles.

(d) Adjust the I-F trimmer condensers for maximum reading on the output meter.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

(a) Connect the output lead of the signal generator through a .00005 mf. condenser to the **junction of the antenna and antenna blocking condenser** (Items 34 and 29)

(b) Set the signal generator to 1725 kilocycles.

(c) Open gang all the way (minimum capacity).

(d) Adjust the trimmer located on the "Osc" section of the gang for maximum output.

(e) Set signal generator to 1400 Kc.

(f) Tune station selector to 1400 kc. signal.

(g) Adjust the trimmer located on the "Ant" section of the gang for maximum output.

(h) Repeat e, f, and g for more accurate adjustment.

The tuning range of the receiver is approximately from 540 to 1725 kilocycles (555 to 173 meters).

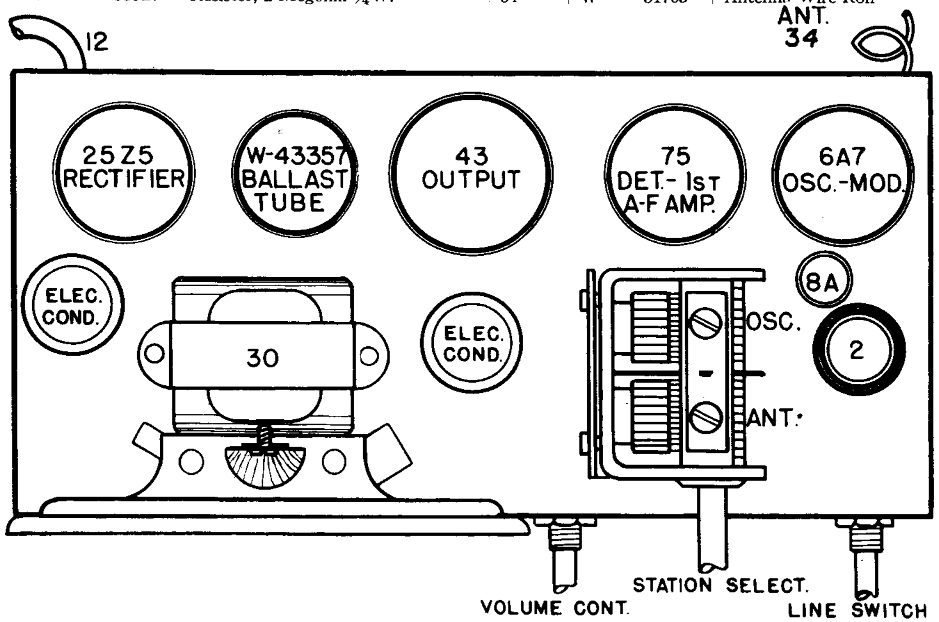
TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and B—. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with volume control full on and no signal input. The filament voltages should be measured with an accurate low range voltmeter. Voltage limits may vary plus or minus 10% of values given.

PARTS LIST

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description	Item No.	Part No.	Description
1	W —4099B	Dial Light Bulb	21	G47 —28807	Socket Type 6A7
	G6 —27134	Socket Assembly Dial Light	22	G41 —28807	Socket Type 75
2	G135—32000	Ant. Coil	23	G30 —28807	Socket Type 43
3	G135—32002	Osc. Coil	24	G51 —28807	Socket Type 25Z5
4	G143—32004	I-F Assembly	25	G170—34600	Socket Type W-43357
	W —36140	I-F Trimmer Cond. (only)		W —28632	Tube Shield
5AB	W —43280	Condenser, 25 Mf. 150 V.	26	—43339	Line Switch
6AB	G1 —34002	Condenser, .00025 Mf. 200 V.	27	—43340	Volume Control, 1 Meg.
7	W —34647	Condenser, .006 Mf. 400 V.	28		NONE
8ABCD	W —28621	Condenser, .02 Mf. 200 V.	29	W —30325A	Condenser, .003 Mf. 200 V.
9		NONE	30	255BL6Q	Speaker - Spec. 23393
10AB	W —29910A	Condenser, 25 Mf. 200 V.		—43464	Cone Assembly (above Speaker)
11	G32 —33001	2 Gang Var. Tuning Cond.		—43465	Output Trans. (above Speaker)
12	B —27885A	Power Cord and Plug		—43466	Mtg. Ring, Cone (above Speaker)
13	W —35467	Resistor, 275 Ohm ½W. Flex.		—6DD	Cabinet
14	W —23907	Resistor, 750 Ohm 1½W. Flex.		D —43302	Dial
15	—36761	Resistor, 40,000 Ohm ¼W.		W —43321	Pointer Knob
16	—35928	Resistor, 60,000 Ohm ¼W.		W —43320	Knob—V. C. and Sw.
17	—35600	Resistor, 100,000 Ohm ¼W.	31	W —23615	Condenser, .05 Mfd. 400 V.
18AB	—35601	Resistor, 300,000 Ohm ¼W.	32	W —21964	Resistor, 165 Ohm ½W. Flex.
19	—36322	Resistor, 500,000 Ohm ¼W.	33	W —43627	Condenser, .009 Mfd. 160 V.
20AB	—35927	Resistor, 2 Megohm ¼W.	34	W —31765	Antenna Wire Roll



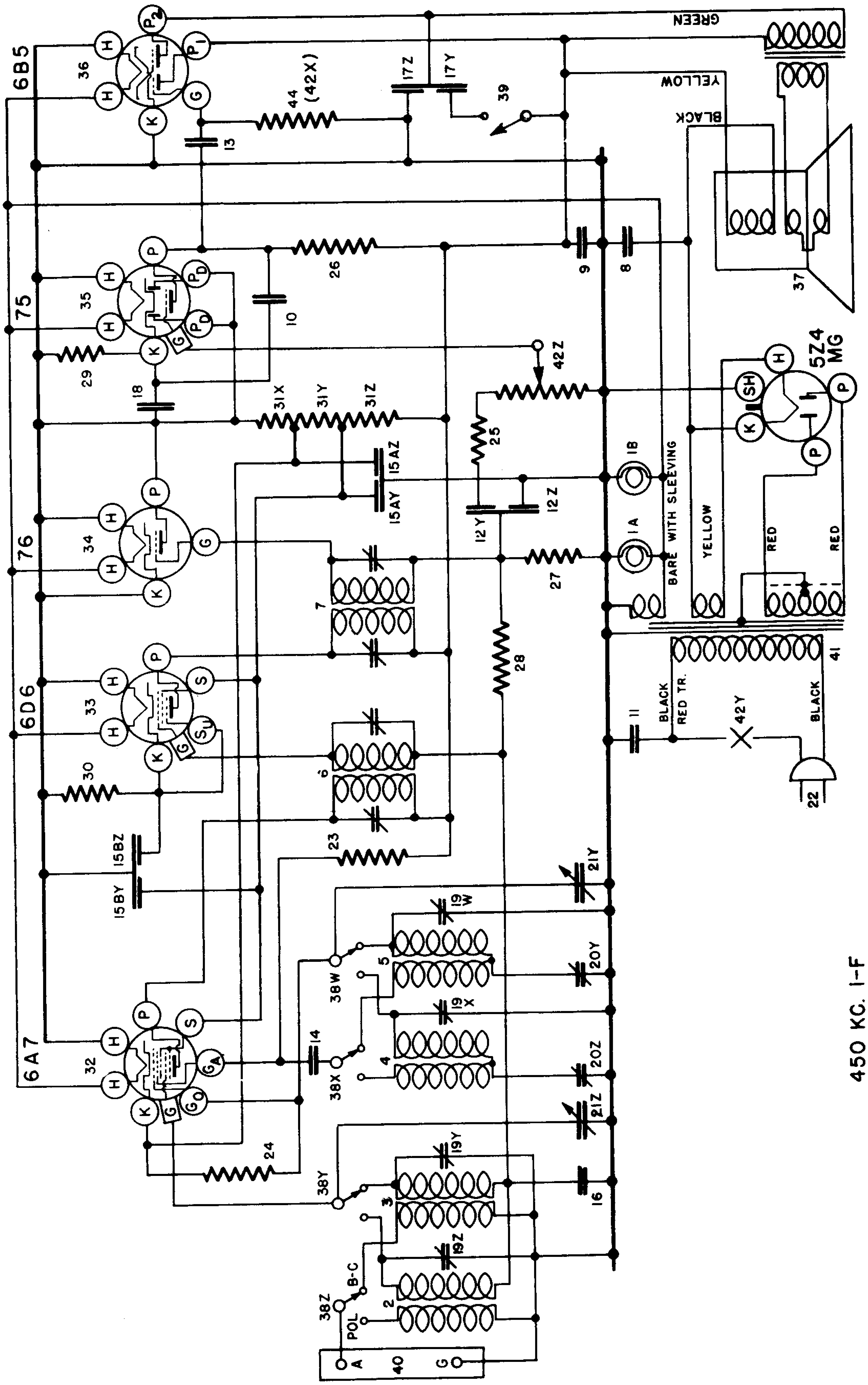
TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	K	Ga	Go	G
6A7	Oscillator-Mod.	6.5	100	40	1	100	-20	—
75	Det. & A-F Amp.	6.5	11	—	1	—	—	—
43	Output	25.0	95	100	0	—	—	-20
25Z5	Rectifier	25.0	---	—	100	—	—	—

W—43357 Ballast Tube.
Power output approximately 1 watt.
Power consumption approximately 50 watts.
Voltage drop across speaker field 112 volts.
All readings taken on 117.5 volt A. C. power supply.
All readings except filaments will be approximately 15% lower on 117.5 volts D. C.

THE CROSLEY RADIO CORPORATION

MODELS 629, 644, 666 & 5666



450 KC. I-F

FIG. 1.—WIRING DIAGRAM—MODELS 666 AND 5666

THE CROSLEY RADIO CORPORATION

MODELS 629, 644, 666 & 5666

The frequency ranges covered are from 540 to 1710 kilocycles in the broadcast band and from 2350 to approximately 7500 kilocycles in the high frequency band.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt, 500 volt D.C. voltmeter (except filaments) with receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A-C voltmeter (Approximately 0 to 10 volts). Voltage limits may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Where Used	H	P	P2	S	Su	K	Ga	Go
6A7	Osc-Mod	6.3	235	—	128	—	6.2	154	—5 to —20
6D6	I. F. Amp.	6.3	235	—	128	5.2	5.2	—	—
76	Dector	6.3	0	—	—	—	0	—	—
75	A.F.Amp.&AVC	6.3	[illegible]	—	—	—	2	—	—
6B5	Output	6.3	235	222	-	—	0	—	—
5Y3	Rectifier	5.0	--	—	—	—	335	—	—

Power Output Approximately 4 Watts.
Power Consumption Approximately 68 Watts at 117.5 Volts.
Voltage Drop Across Speaker Field Approximately 95 Volts.

ALIGNMENT PROCEDURE

Connect the output meter to P. and P2 of the 6B5 Output Tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger--not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A7 tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Turn the band selector switch to the right (High Frequency).

(d) Set the signal generator to 450 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F Transformer for maximum output. (Fig. 2).

(f) Adjust both trimmers located on top of the 1st I-F Transformer for maximum output.

(g) Check operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

(a) When aligning the R-F Amplifier the output lead from the signal generator should be connected through a dummy antenna to the "ANT" terminal of the receiver. For the broadcast band the dummy antenna should be a .00025 mfd. condenser and for the high frequency band this condenser should be replaced by a 400 ohm (Non Inductive) carbon resistor.

Each band should be shunt aligned, series aligned and then shunt aligned again in the order given. The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated below for each adjustment.

Adjust the "OSC" and "ANT" shunt trimmers (Shunt alignment. See Fig. 3) in the order given for maximum output. Tune the station selector to the generator signal for maximum output and then check the adjustment of the "ANT" trimmer. NOTE: When aligning the high frequency band care should be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator approximately 10 times and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles below the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct dial setting.

To adjust the "series" trimmers (Fig. 3) set the signal generator to the frequency indicated below and then tune-in this signal with the station selector for maximum output. Adjust the series trimmer while rocking the tuning condenser back and forth slightly, until no further improvement in output can be obtained.

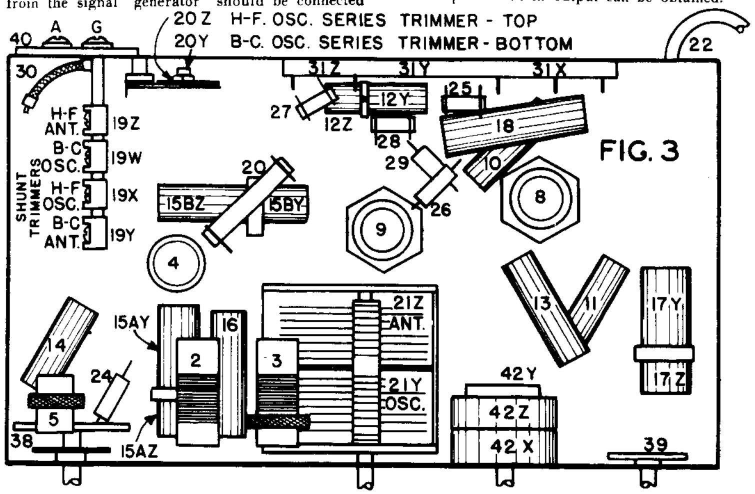


FIG. 3

(b) Signal Generator Frequencies.

	Shunt Alignment	Series Alignment
Broadcast Band	1400 Kc.	600 Kc.
High Frequency Band	6000 Kc.	1500 Kc.

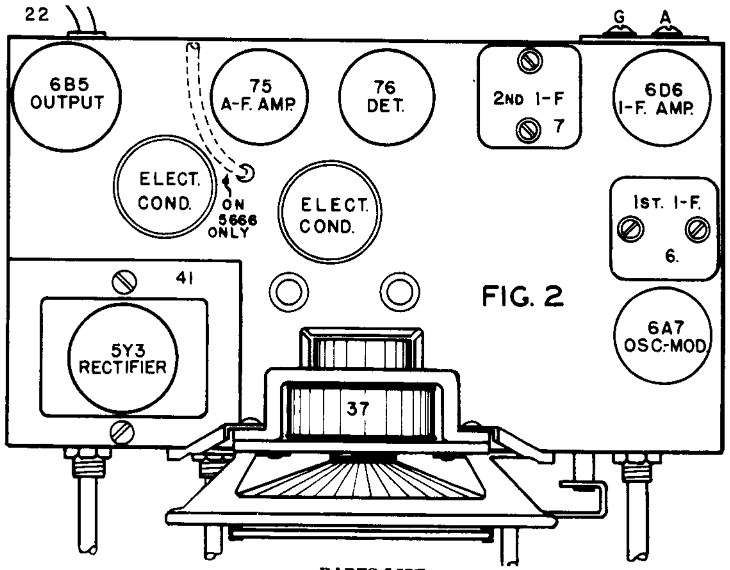


FIG. 2

PARTS LIST

Figures in first column refer to parts in Diagrams.

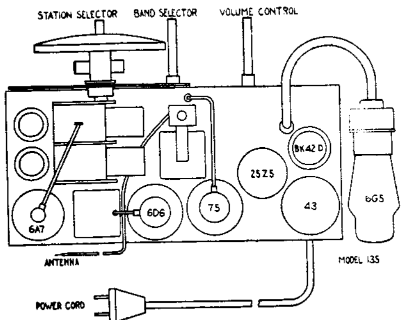
Item No.	Part No.	Name	
1	W —37922	6-8 V. Bulb, Dial Light	
	G3 —37965	Socket Assy., Dial Light	
2	G82 —32000	Coil Antenna—2350—7000 Kc.	
3	G81 —32000	Coil Antenna—540—1725 Kc.	
4	G 65—32002	Coil—2350—7000 Kc., Osc.	
5	G 66—32002	Coil— 540—1725 Kc., Osc.	
6	G118—32004	Coil—Assy., 1st I-F.	
7	G 72—32004	Coil—Assy., 2nd I-F.	
8	W —36055	Cond. 35 Mf. 400 V.	
9	W —36057	Cond. 40 Mf. 300V.	
10	W —30270	Cond. .001 Mf. 400V.	
11	W —30805	Cond. .01 Mf. 400V.	
12Z, 12Y	W —30322-A	Cond. .00017 Mf.; Cond. .006 Mf.	
13	W —23615	Cond. .05 Mf. 400V.	
14	W —23191-A	Cond. .01 Mf. 400V.	
15 AZ, 15 AY	W —28623	Cond. .02 Mf. 400V.; Cond. .02 Mf. 400V.	
15 BZ, 15 BY	W —28623	Cond. .02 Mf. 400V.; Cond. .02 Mf. 400V.	
16	W —27216	Cond. .05 Mf. 200V.	
17 Z, 17 Y	W —31052	Cond. .004 Mf. 400V.; Cond. .05 Mf. 400V.	
18	W —37732	Cond. .3 Mf. 160V.	
19	W —37241	Cond. 4 Section Trimmer	
20	G 31—33006	Cond. Series Trimmers	
21	G 17—33001	Cond. Var. Tuning	
	W —41736	Drive Unit, 8Pt. Disc. Assy.	Model 666 —Only
	W —41897	Dial-Calibrated Glass	Model 666 —Only
	W —41737	Mtg. Brkt. Dial Glass R.H.	Model 666 —Only
	W —41738	Mtg. Brkt., Dial Glass, L.H.	Model 666 —Only
	W —41739	Drive Unit	Model 5666 Only
	B —42617	Dial (Calibrated)	Model 5666 Only
	MG-14—41980	DialGlass, Mtg. Brkt. R.H.	Model 5666 Only
	W —40798	DialGlass, Mtg. Brkt., L.H.	Model 5666 Only
	W —40797-A	DialGlass Retaining Brkt.	Model 5666 Only
	W —42629	Pointer—Dial	
	W —40795	Shaft—Pointer	
	W —40909	Washer (Spring) Shaft	
	W —41611	Ring-Shaft, Retaining	
	B —42374-A	Mask (Metal) Dial	
22	B —33906-A	Cord & Plug—Power	
23	— 5370-A	Resistor, 20,000 Ohm 1W	
24	—35928	Resistor, 60,000 Ohm ¼W	

Item No.	Part No.	Name
25	—21875	Resistor, 100,000 Ohm. ¼W
26	—35929-C	Resistor, 150,000 Ohm. ¼W
27	—33344	Resstor, 400,000 Ohm. ¼W
28	—37245-C	Resistor, 1.5 Megohm ¼W
29	—36316	Resistor, 2.700 Ohm. ¼W
30	W —28106	Resistor, 500 Ohm. ½W. Flex.
31Z, 31Y, 31X	W —37246	Resistor, 1,000 Ohm; Resistor, 2,000 Ohm; Resistor, 185-185 Ohm — Candohm
32	G47 —28807	Socket—Type 6A7
33	G75 —28807	Socket—Type 6D6
34	G80 —28807	Socket—Type 76
35	G41 —28807	Socket—Type 75
36	G90 —28807	Socket—Type 6B5
	W —27981	Base—Tube Shield
	W —40911	Shield—Tube
37	244—BL—9	Speaker, "B" Spec. 50A-2
	—42928	Cone Assy., For above Speaker
	—41473	Output Trans., For above Speaker
	632—CJ—3	Speaker, "M" Spec. 1-D-610
	—42879	Cone Assy., For above Speaker
	—42880	Field Coil, For above Speaker
	—42881	Output Trans., For above Speaker
38	—37247	Switch, Band Sel.
39	W—36184-A	Switch, Tone Con.
40	G1 —26719	Terminal Board, Ant. & Grid
41	—41978	Transformer, 110V.—60 Cy. Power
42Z, 42Y, 42X	—37395	Volume Control (3 Meg.) 1st A-F Grid; Line Switch; Volume Control (1 Meg.) Output Grid
43	NONE	
44	—35601	Resistor, 300,000 Ohm ¼ W. Output Grid to Grd.*
	B —40590	Escutcheon, (666)
	W —42345	Escutcheon, (5666)
	D —28	Escutcheon Mtg. Screws
	W —37339	Knob, (2) V.C.&S.S.
	W —37341	Knob, (2) T. C. & B. S. W.
	—36297	Volume Control, 3 Meg.*
	AG	Cabinet Model 666
	MA	Cabinet Model 5666

*May be used in place of Dual Volume Control.

DETROLA RADIO AND TELEVISION CORPORATION

MODEL 135



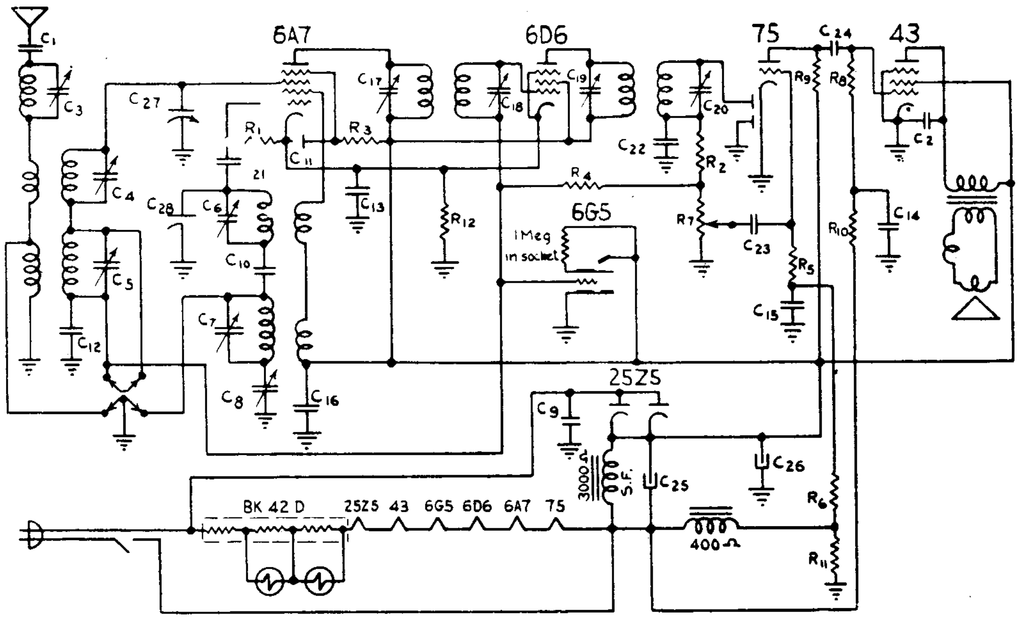
I. F. 456 K.C.

TUBE LAYOUT CHART — MODEL 135

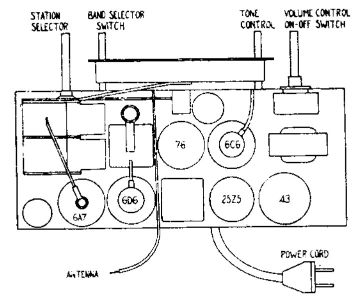
Tubes must be in proper sockets and connected as shown.

- C1, C2 .005 - 600 v.
- C3 180 mmf. trimmer
- C4, C5, C6, C7, 1 - 10 mmf. trimmer
- C8 350 mmf. padder
- C9 .02 - 600
- C10 1150 mmf. mica
- C11, C12 .05 - 200
- C13, C14, C15, C16 .1 - 200 v.
- C17, C18, C19, C20 100 - 125 trimmer
- C21 50 mmf. mica
- C22 250 mmf. mica
- C23, C24 .01 - 600 v.
- C25 16 mfd. 150 v.
- C26 24 mfd. 150 v.
- C27, C28 variable air
- R1, R2, 50M 1/3 w.
- R3 20M 1/3 w.
- R4, R5, R6 1 meg. 1/3 w
- R7 500M volume control and switch
- R8 500M 1/3 w.
- R9 200M 1/3 w.
- R10 300M 1/3 w.
- R11 20 ohms. 1/2 w.
- R12 100 ohms. 1/3 w.

When ordering replacement parts, give symbol, description, and model number of set. For example: "C14.1 - 200 Volt Condenser, Model 135."



MODEL 140



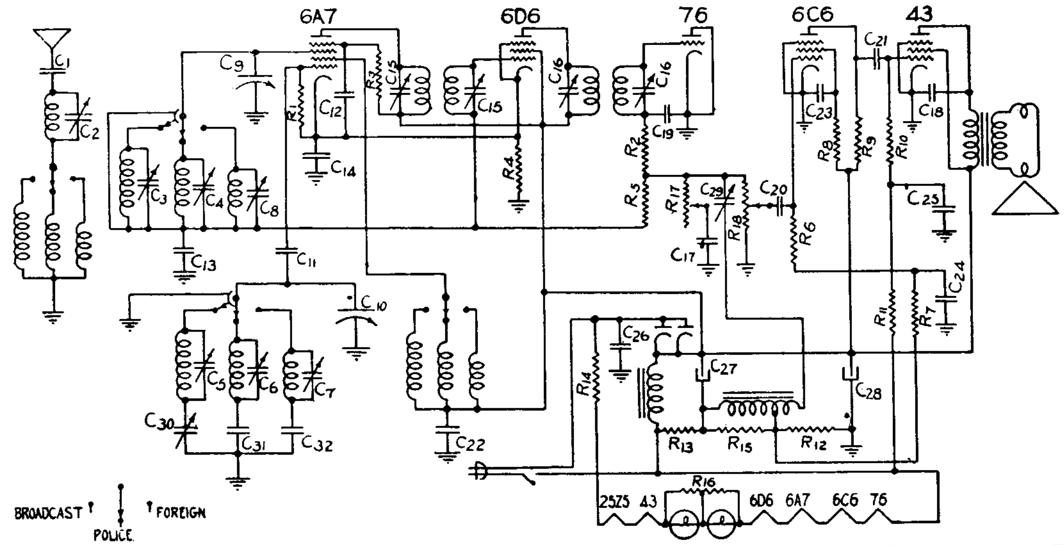
I.F. 456 K.C.

TUBE LAYOUT CHART — MODEL 140

Tubes must be in proper sockets and connected as shown.

- C1 .005 600 v.
- C2 180 mmf. trimmer
- C3, C4, C5, C6, C7, 1 to 10 mmf. trimmer
- C8 3 to 35 mmf. trimmer
- C9, C-10 350 mmf. air variable
- C11 50 mmf. mica
- C12, C13, .05-200 v.
- C14 .2 200
- C15, C16 120 mmf. trimmer
- C17, C18 .003 600 v.
- C19 250 mmf. mica
- C20 .01 200 v.
- C21 .01 400 v.
- C22, C23, C24 .1 200 v.
- C25 .2 200 v.
- C26 .02 600 v.
- C27 16 mfd. 150 v. wet electrolytic
- C28 24 mfd. 150 v. wet electrolytic
- C29 3 to 35 mmf. trimmer
- C30 220 to 550 mmf. padder
- C31 1330 mmf. padder
- C32 3850 mmf. padder
- R1, R2 50M ohms
- R3 20M ohms
- R4 200 ohms
- R5, R6, R7, R8 1 megohm
- R9 250M ohms
- R10 500M ohms
- R11 300M ohms
- R12, R13 35 ohms
- R14 100 ohms line cord
- R15 10M ohms
- R16 45 ohms center tapped
- R17 2 megohms tone control
- R18 500M ohms vol. control

When ordering replacement parts, give symbol, description, and model number of set. For example: "C22, .1 - 200 Volt Condenser, Model 140."



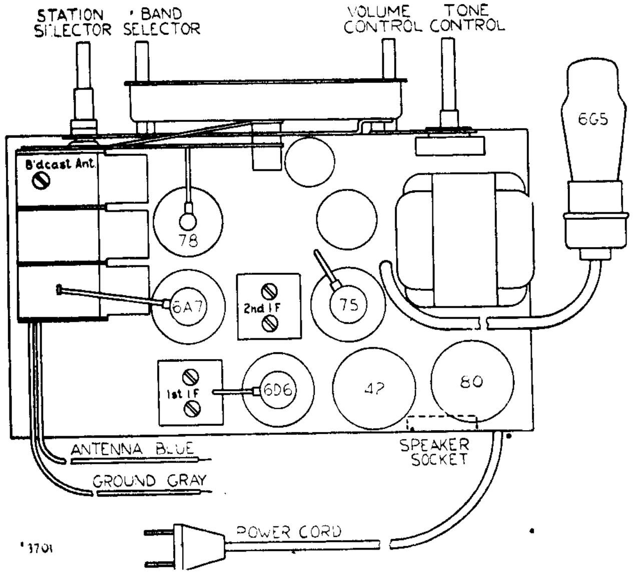
DETROLA RADIO AND TELEVISION CORPORATION

MODEL DETROLA 146E

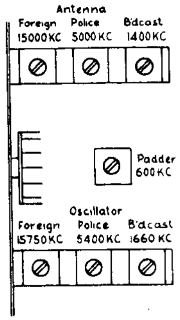
The I.F. frequency of this receiver is 456 K.C. For realignment, use the following procedure.

It is necessary to use an accurately calibrated signal generator. Couple the signal generator to the grid of the 6A7 tube with a tenth microfarad condenser in series with the "high" lead of the signal generator. Connect the ground side of the signal generator to the chassis. Set the signal generator to 456 K.C. Be sure the wave switch of the set is in the broadcast position and the volume control set at maximum. Attenuate the signal generator so that the signal is just audible in the speaker. If an ouput meter is used, it should be connected across the voice coil terminals of the speaker. Use ½ volt as standard output.

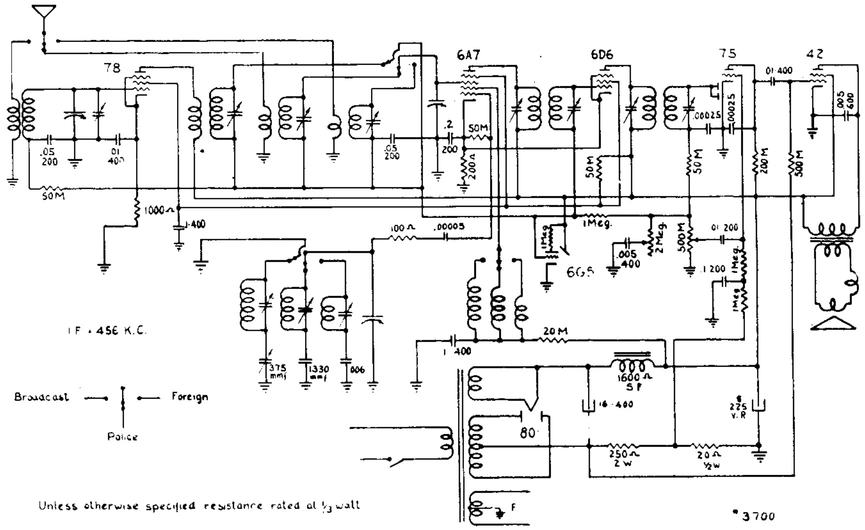
Adjust the 2nd I.F. transformer first. Each screw should be adjusted for maximum output. After number two I.F. has been adjusted, number one I.F. should be adjusted for maximum output. After both transformers have been adjusted, it is necessary to recheck No. 2 transformer and then recheck No. 1.



*3701



TRIMMER ADJUSTMENT



Unless otherwise specified resistance rated at ⅓ watt

*3700

RF. (See above diagram for location of trimmers.) Using 200 mmf condenser in series with the generator, feed 1660 kc to antenna lead and adjust broadcast oscillator trimmer for top frequency. Set generator to 1400 kc, tune receiver and adjust the *two* antenna trimmers. Set generator to 600 kc, tune receiver to signal and adjust padder. The tuning condenser should be rocked back and forth through the signal while the padder is being set in order to secure perfect alinement.

Using 400 ohm resistor in series with generator, set band selector in center position, set generator to 5400 kc and adjust oscillator trimmer for top frequency. Set generator to 5000 kc, tune receiver to signal and adjust antenna trimmer

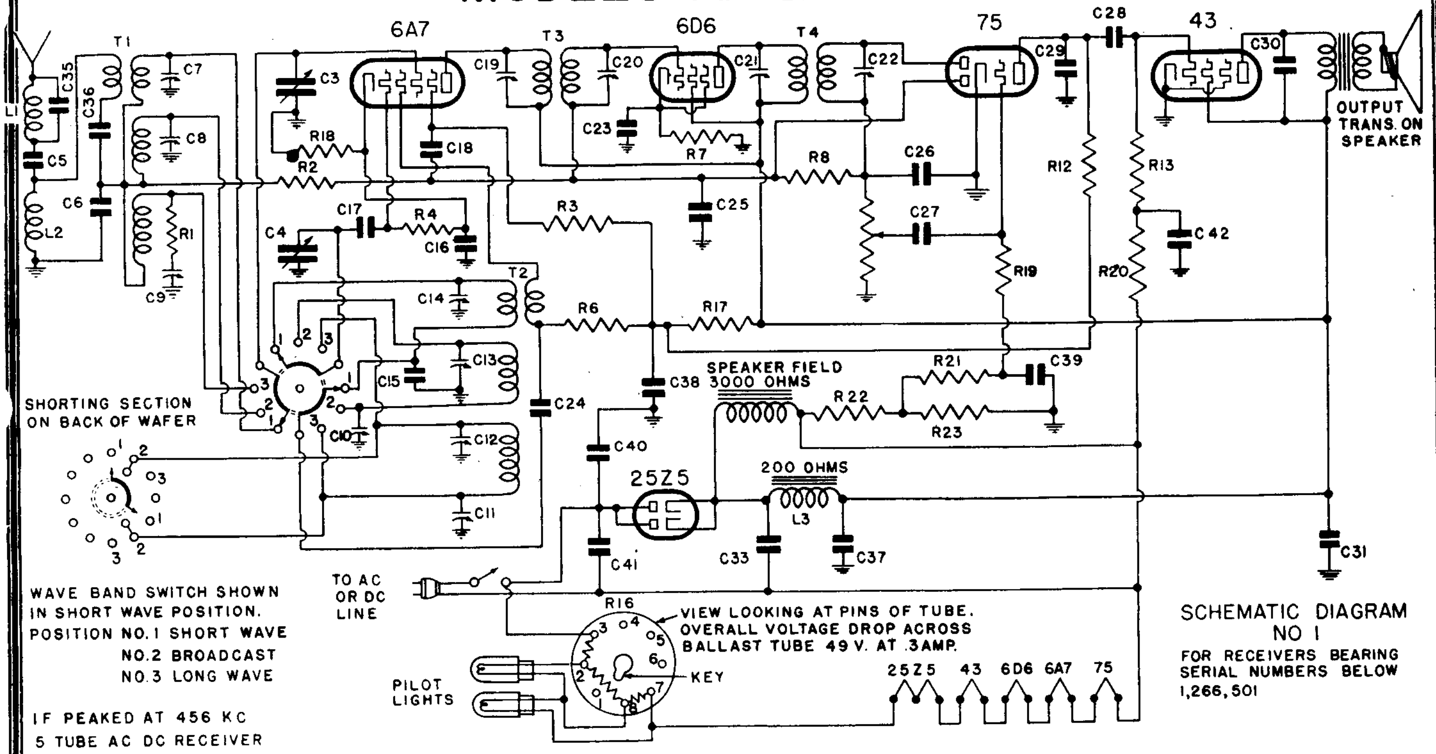
Turn band selector to extreme clockwise position. Using 400 ohm resistor in series with generator, set oscillator top frequency for 15,750 kc—screw trimmer down tight, then unscrew to *second* peak. Set generator to 15,000 kc, tune receiver to signal and adjust antenna trimmer—Screw trimmer down tight, then unscrew to *first* peak, rocking the tuning condenser back and forth through the signal while the adjustment is being made. **Above procedure for alinement at 15,000 kc must be followed exactly to insure proper tracking. A dead spot at about 12,000 kc will result if antenna and oscillator circuits are not set in proper relation to each other.**

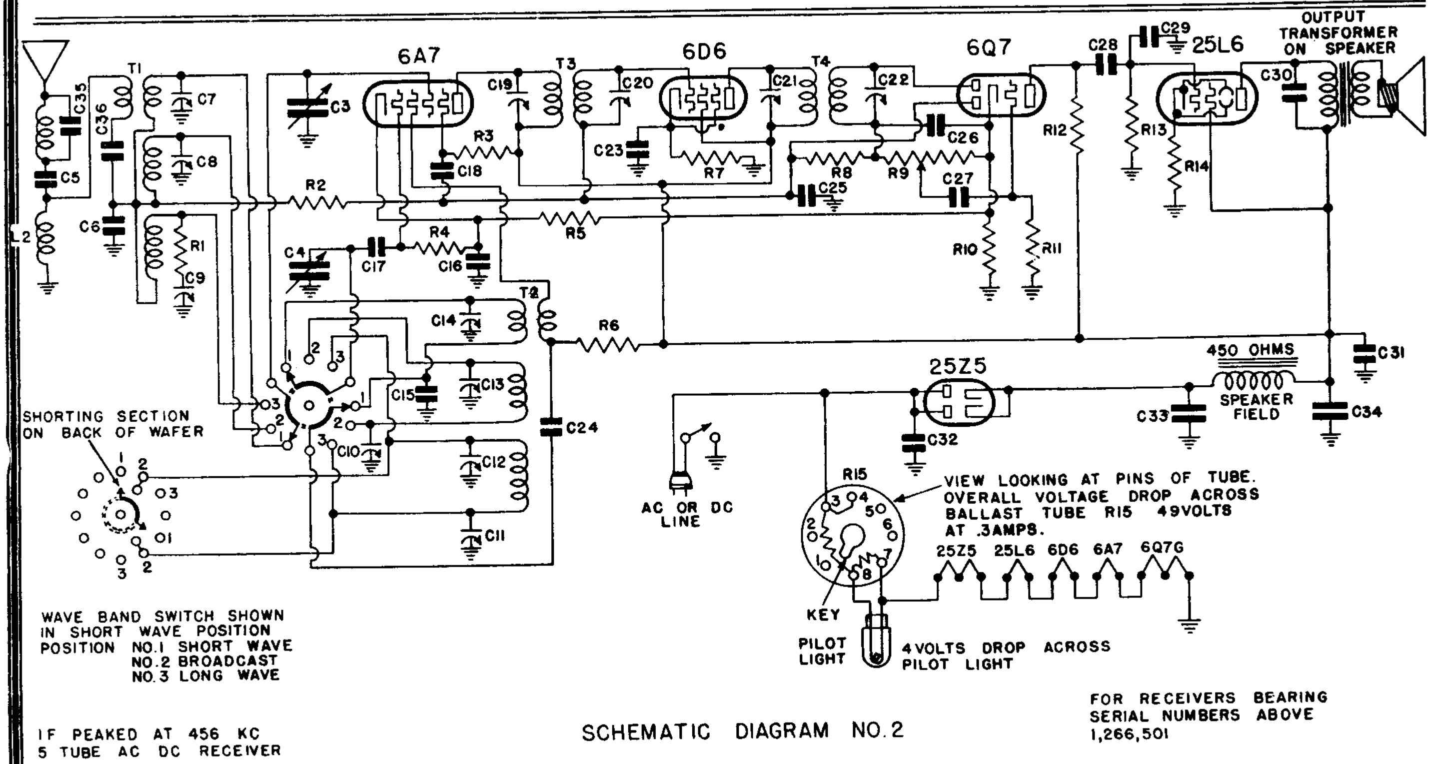
PARTS LIST

Part No.	Req.	Description
2560	1	Condenser, Padding
3157	1	Condenser, Trimmer
2597	4	Condenser, Trimmer, 1-10
1611	1	Condenser, Trimmer, 5-35
1286	1	Condenser, Mica, .00025
2780	1	Condenser, Mica, .00005
2741	1	Condenser, Mica, 1330 MMF
580	2	Condenser, .05, 200 V.
572	1	Condenser, .1, 200 V.
575	2	Condenser, .1, 400 V.
568	1	Condenser, .01, 400 V.
565	2	Condenser, .01, 200 V.
2782	2	Condenser, .005, 600 V.
2792	1	Condenser, .2, 200 V.
2793	1	Condenser, .006, 600 V.
624	2	Resistor 1/3 W., 1 Meg.
2731	1	Resistor, 1/3 W., 500 M.
2730	1	Resistor, 1/3 W., 200 M.
631	3	Resistor, 1/3 W., 50 M.
617	1	Resistor, 1/3 W., 20 M.
3353	1	Resistor, 2 W., 250 Ohms
3456	1	Resistor, 1 W., 50 M.
2605	2	Resistor, 1/3 W., 200 Ohms
2689	1	Resistor, 1/3 W., 100 Ohms
2965	1	Resistor, 1/2 W., 20 Ohms
2908	1	Spring, Drive Cable
3374	1	Indicator
2378	1	Pointer
2726	1	Control, Vol. & Switch
2737	1	Control, Tone
2724	1	Switch, Band
2837	1	Coil, Antenna
2772	1	Coil, Oscillator
2777	1	Coil, B. C. Antenna
1732	1	AC Cord
2163		Cable, Drive, Approx. 20"
3453	1	Transformer, Power
3351	1	Condenser, Elec., 8 MF.
3344	1	Transformer, 1st I. F.
3345	1	Transformer, 2nd I. F.
3375	1	Condenser, Elec., 16 MF.
3700		Schematic Diagram
3701		Tube Sticker
3459	1	Speaker
4007	1	Escrutcheon
4212	1	Book, Instruction

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS AA & AA-131





Tube Data

The tube complement for receivers bearing serial numbers **below** 1,266,501 is as follows:

1—6A7 pentagrid oscillator-modulator
1—6D6 first i-f amplifier
1—75 diode detector, a.v.c., audio amplifier
1—43 pentode power output
1—25Z5 dual half-wave rectifier
1—3CR-241 ballast tube.

The tube complement for receivers bearing serial numbers **above** 1,266,501 is as follows:

1—6A7 pentagrid oscillator-modulator
1—6D6 first i-f amplifier
1—6Q7 diode detector, a.v.c., audio amplifier
1—25L6 beam power output
1—25Z5 dual half-wave rectifier
1—2UR-224 ballast tube.

NOTE—Except when otherwise specified all octal base tubes may be replaced with either metal or octal base glass tubes.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS AA & AA-131

ADJUSTMENTS

An oscillator with frequencies of 150, 350, 456, 600, 1500 and 15,000 kc should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Use a standard dummy antenna when aligning either the long-wave or medium-wave bands. A .0002 mf condenser may be used as a substitute. When aligning the short-wave band use a 400 ohm dummy antenna (a 400 ohm resistor in series with antenna lead).

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion is adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Always use as weak a test signal as possible during alignment.

Location of Coils and Trimmers

The antenna coils for the three bands are wound on one form and mounted underneath the chassis deck to the right of the variable condenser. The trimmers for these coils are accessible through three holes in the top of the chassis. The trimmer farthest from the front of the chassis is for the long-wave antenna coil. The trimmer closest to the front of the chassis is for the medium-wave antenna coil, and the central trimmer is for the short-wave antenna coil.

The oscillator coils for the three bands are wound on one form and mounted on the inside of the rear chassis wall. The trimmers for these coils are accessible through holes in the rear chassis wall. The trimmer farthest from the end of the chassis is for the long-wave oscillator coil. The trimmer nearest the end of the chassis is for the medium-wave oscillator coil, and the central trimmer is for the short-wave oscillator coil.

The two i-f transformers are in oblong coil cans located on the top of the chassis. The first i-f transformer is the one behind the variable condenser. The trimmers for these transformers are accessible through holes in the tops of the cans.

The series padding condensers for the long-wave and medium-wave bands are located on the rear chassis wall below the 6A7 tube.

I-f Alignment

Rotate the wave-band switch to the medium-wave (central) position and set the variable condenser to minimum. Feed 456 kc to the grid cap of the 6A7 tube through a .02 mf paper condenser, (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response.

Long-Wave Alignment

With the wave-band switch at long-wave (clockwise) position set the dial pointer at 15 and feed 150 kc to antenna. Adjust the long-wave series padder (hex nut on dual padder) for maximum response. Move pointer to 35 and feed 350 kc to antenna. Adjust the long-wave oscillator trimmer then the long-wave antenna trimmer for maximum response. Reset pointer to 15, feed 150 kc and rock (rotate back and forth through a small arc) the variable condenser while adjusting long-wave series padder for maximum response. Reset pointer to 35, feed 350 kc and check alignment. If readjustment is necessary return to 150 kc and repeat entire procedure.

Medium-Wave Alignment

Set switch at medium-wave (central) position and dial pointer at 60. Feed 600 kc to antenna and adjust medium-wave series padder (slotted screw on dual padder) for maximum response. Move pointer to 150, feed 1500 kc and adjust medium-wave oscillator trimmer and then the medium-wave antenna trimmer for maximum response. Reset pointer to 60, feed 600 kc and rock variable condenser while readjusting medium-wave series padder for maximum response. Reset pointer to 150, feed 1500 kc and check alignment. If readjustment is necessary return to 600 and repeat entire procedure.

Short-Wave Alignment

Set wave-band switch at short-wave (counter-clockwise) position. Set pointer at 15, feed 15 megacycles to antenna and adjust short-wave oscillator trimmer and then short-wave antenna trimmer for maximum response.

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f portion of the circuit, the receiver should be carefully re-aligned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor is in a special metal tube at the rear of the chassis. This tube will become quite hot under normal operating conditions. For voltage drop specifications, see below.
4. The power supply for this receiver may be either a.c. or d.c. The standard line voltage rating is 105 to 125 volts. With special external line ballast resistors this receiver may be operated on higher voltages.
5. When operating the receiver on d.c. it may be necessary to reverse the line plug to obtain the correct polarity.
6. The two i-f transformers are held to the chassis by snap-on fasteners. To remove an i-f, unsolder all the leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.
7. The color coding of the i-f transformer leads is as follows:

   Grid—green — Plate—blue
   Grid return—black — B plus—red
8. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. For reductions of noise and achievement of high efficiency on all frequency ranges the Emerson All-Wave High-Fidelity Antenna, Model W-78, and the Emerson All-Wave Antenna System, Model W-89, are recommended. Instructions for the installation of these antennas are supplied with each kit.

   In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

The following are voltages for receivers bearing serial numbers *below* 1,266,501:

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	96	35	0.6	57	6.3
6D6	96	78	2	—	6.3
75	35	—	0	—	6.3
43	85	96	0	—	24

Voltage across speaker field—125
Voltage across filter choke—11.1

The bias for the 75 and 43 is developed across resistors R22 and R23 (see schematic diagram). The voltage across R22 is 11 volts and the voltage across R23 is 1 volt.

The voltage drop across the ballast resistor (R16—see schematic) is 49 volts between pins 3 and 7.

The following are voltages for receivers bearing serial numbers *above* 1,266,501:

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	100	42	1.6	75	6.3
6D6	100	100	3.6	—	6.3
6Q7	36	—	0.8	—	6.3
25L6	95	100	6.7	—	24

Voltage across speaker field—27.5

The voltage drop across the ballast resistor (R15—see schematic) is 49 volts between pins 3 and 7.

REPLACEMENT PARTS LIST

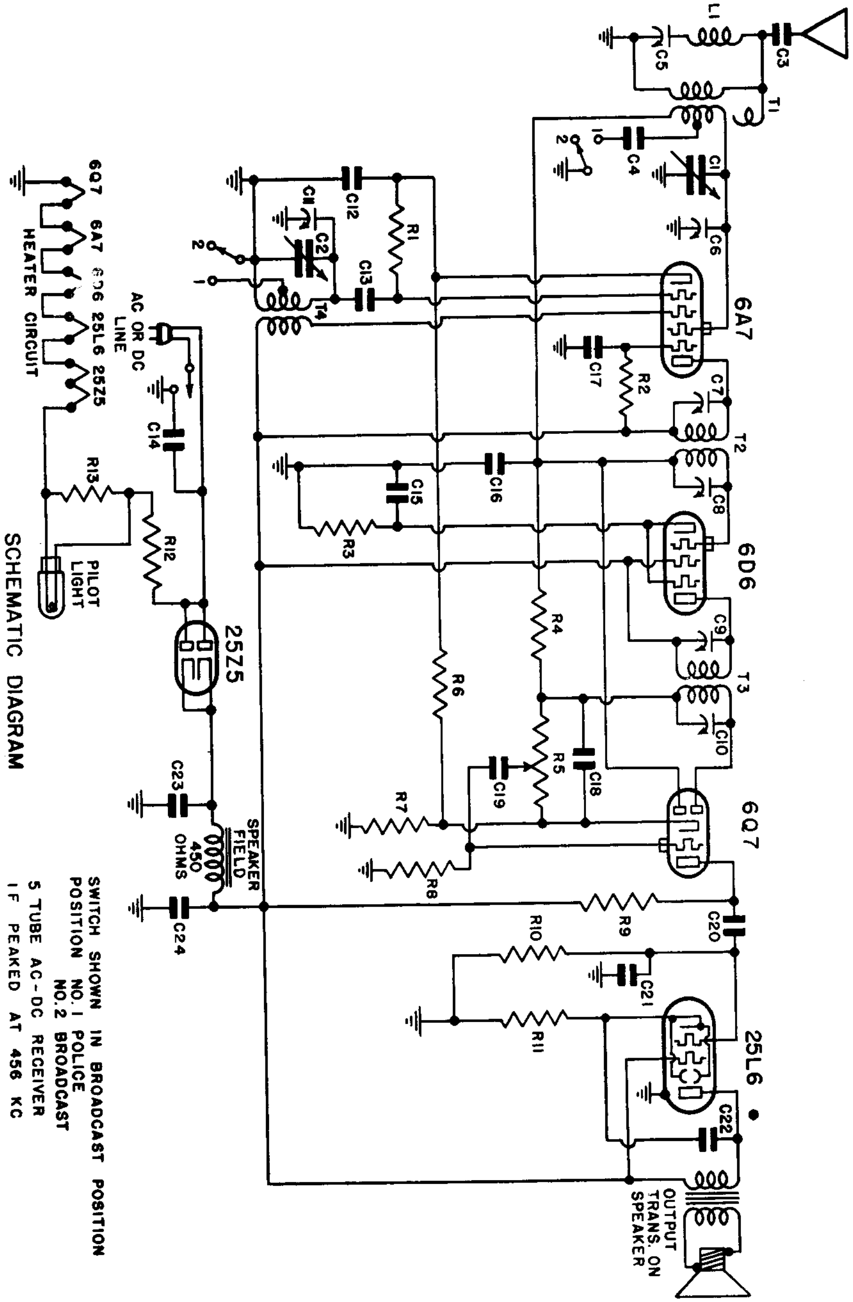
NOTE: Schematic No. 1 applies to receivers bearing serial numbers below 1,266,501. Schematic No. 2 applies to receivers bearing serial numbers above 1,266,501.

*Item Schematic No. 1	*Item Schematic No. 2	Part No.	DESCRIPTION	PRICE List Price ea. Effective as of July 15, 1937 (Subject to change without notice)
L1	L1	2ZT-268	456 kc wave-trap	$ .75
L2	L2	3ET-299	R-f choke	.55
L3	——	2CT-207	Iron-core filter choke	.90
T1	T1	3ET-297	Three-band antenna coil	2.05
T2	T2	3ET-298	Three-band oscillator coil	1.90
T3	T3	3CT-274	Double-tuned 456 kc first i-f transformer	1.50
T4	T4	3CT-275	Double-tuned 456 kc second i-f transformer	1.35
R1	R1	TTR-201	3,000 ohm 1/4 watt carbon resistor	.16
R2, R12, R21	R2, R12	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R3	R3	3ER-263	60,000 ohm 1/4 watt carbon resistor	.16
R4	R4	KR-54	100,000 ohm 1/4 watt carbon resistor	.16
——	R5	3RR-276	310 ohm 1/2 watt wire-wound resistor	.16
R6	R6	LR-60	20,000 ohm 1/4 watt carbon resistor	.16
——	R7	3CR-295	410 ohm 1/2 watt wire-wound resistor	.16
R8	R8, R11	KR-57	1 megohm 1/4 watt carbon resistor	.16
R9	R9	2NR-214C	Volume control with on-off switch—250,000 ohms	1.20
——	R10	3CR-294	240 ohm 1/2 watt wire-wound resistor	.16
R13, R19	R13	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
——	R14	3FR-293	140 ohm 1/2 watt wire-wound resistor	.16
——	R15	2UR-224	Plug-in type ballast resistor	.80
R16	——	3CR-241	Plug-in type ballast resistor	.80
R17	——	LR-64	5,000 ohm 1/4 watt carbon resistor	.16
R18	——	AAR-119	300 ohm 1/2 watt wire-wound resistor	.16
R20	——	OR-73	25,000 ohm 1/4 watt carbon resistor	.16
R22	——	3CR-261	230 ohm 1 watt wire-wound resistor	.16
R23	——	3CR-242	20 ohm 1/2 watt wire-wound resistor	.16
C1, C2	——	3CC-275	Two-gang variable condenser	3.65
——	C3, C4	3CC-275A	Two-gang variable condenser	3.90
C5, C24 C27 C36	C5, C24 C27 C36	FC-29	0.02 mf, 200 volt tubular condenser	.20
C6	C6	2ZC-253	0.0025 mf mica condenser	.30
†C7, C8, C9	†C7, C8, C9	——	Trimmer, part of antenna coil assembly.	
C10, C11	C10, C11	2ZC-257	Dual adjustable padding condenser: C10-250 to 500 mmf, C11-100 to 200 mmf.	.65
†C12, C13, C14	†C12, C13, C14	——	Trimmer, part of oscillator coil assembly.	
C15	C15	3EC-286	0.0024 mf mica condenser	.30
C16, C23, C31 C39	C16, C23, C31	AC-6	0.1 mf, 200 volt tubular condenser	.20
C17	C17	AAC-106A	0.00005 mf mica condenser	.20
C18, C40	C18	KC-58	0.01 mf, 400 volt tubular condenser	.20
†C19, C20 C21, C22	†C19, C20 C21, C22		Trimmer, part of i-f coil assembly.	
C25	C25	BC-12	0.05 mf, 200 volt tubular condenser	.20
C26, C29	C26, C29	AC-7A	0.00025 mf mica condenser	.20
C28, C42	C28	LC-65	0.02 mf, 400 volt tubular condenser	.20
C30	C30	QQC-173	0.015 mf, 600 volt tubular condenser	.20
——	C32	3EC-326A	0.05 mf, 400 volt molded paper condenser	.20
C33, C37	C33	3CC-261	20 mf, 150 volt wet electrolytic condenser	.90
——	C34	3CC-337	40 mf, 150 volt wet electrolytic condenser	.90
C35	C35	——	.0015 mf mica condenser, part of wave-trap assembly.	
C38	——	YC-98A	4 mf, 150 volt tubular dry electrolytic condenser	1.05
C41	——	EEC-132	0.1 mf, 400 volt tubular condenser	.20
		3ES-218	Wave-band switch	1.10
		3CS-254	6 1/2" dynamic speaker for receivers using 25L6 output tube	5.25
		3CS-171	6 1/2" dynamic speaker for receivers using 43 output tube	5.25
		XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
		4AZ-533	Dial face	.75
		3CZ-336A	Dial drive belt	.10
		3CZ-337	Dial drive shaft and pulley	.10
		3CZ-339	Idler pulley	.05
		3CZ-340	Idler pulley spring	.05
		3CZ-341	Condenser shaft pulley	.10
		‡3FZ-353	Dial pointer (screw-on type)	.10
		‡4MZ-588	Dial pointer (push-on type)	.25
		3CZ-350	Escutcheon with crystal	1.05

*Item number locates the article on the schematic diagram.
†These trimmers are part of the coil assembly and can not be supplied separately.
‡When ordering pointer specify if screw-on or push-on type.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS AD-108, AD-110 & AD-125



SCHEMATIC DIAGRAM

Item	Part No.	DESCRIPTION	PRICE
L1	4DT-343	456 kc adjustable wave-trap	$ .60
T1	3RT-318	Two-band antenna coil	.85
T2	3RT-320B	456 kc first i-f transformer	1.10
T3	4DT-362	456 kc second i-f transformer	1.10
T4	3RT-319A	Two-band oscillator coil	.80
C1, C2	4DC-344	Two-gang variable condenser	2.95
C3	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C4	AAC-114	0.001 mf, mica condenser	.20
C5		Trimmer, part of 456 kc wave-trap.	
C6, C11		Trimmer, part of variable condenser.	
C7, C8, C9, C10		Trimmer, part of i-f coil assembly.	
C12, C15, C17	AC-6	0.1 mf, 200 volt tubular condenser	.20
C13	AAC-106A	0.00005 mf mica condenser	.20
C14	2VC-242A	0.1 mf, 400 volt molded paper condenser	.20
C16	BC-12	0.05 mf, 200 volt tubular condenser	.20
C18, C21	NC-70A	0.0002 mf mica condenser	.20
C19	CCC-127	0.01 mf, 200 volt tubular condenser	.20
C20	LC-65	0.02 mf, 400 volt tubular condenser	.20
C22	4DC-349	0.04 mf, 400 volt tubular condenser	.20
C23, C24	4DC-345	Dual 16 mf, 150 volt tubular dry electrolytic condenser	1.50
R1	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R2	ZZR-196	30,000 ohm 1/4 watt carbon resistor	.16
R3	3CR-295	410 ohm 1/2 watt wire-wound resistor	.16
R4, R8	HR-42	2 megohm 1/4 watt carbon resistor	.16
R5	2DR-169A	Volume control with line switch—500,000 ohm	1.20
R6, R7	3CR-294	240 ohm 1/2 watt wire-wound resistor	.16
R9	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R10	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R11	3FR-293	140 ohm, 1/2 watt wire-wound resistor	.16
R12		145 ohm, 15 watt resistor wire in line cord.	
R13	2DR-213	40 ohm wire-wound metal clad resistor	.30

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	100	50	2.3	100	6.3
6D6	100	100	3.5	—	6.3
6Q7	43	—	1.2	—	6.3
25L6	92	100	6.5	—	25.0

Voltage at 25Z5 cathode—128 volts.

Voltage across speaker field—28 volts.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck beside the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis in the right hand front corner. The trimmers are accessible through holes in the top of the chassis directly in front of the first i-f transformer.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 456 kc wave-trap is mounted on the metal strip at the rear of the chassis directly behind the variable condenser. The trimmer for the 456 kc wave-trap is mounted on the coil and is accessible from the bottom of the chassis.

I-f and Wave-trap Alignment

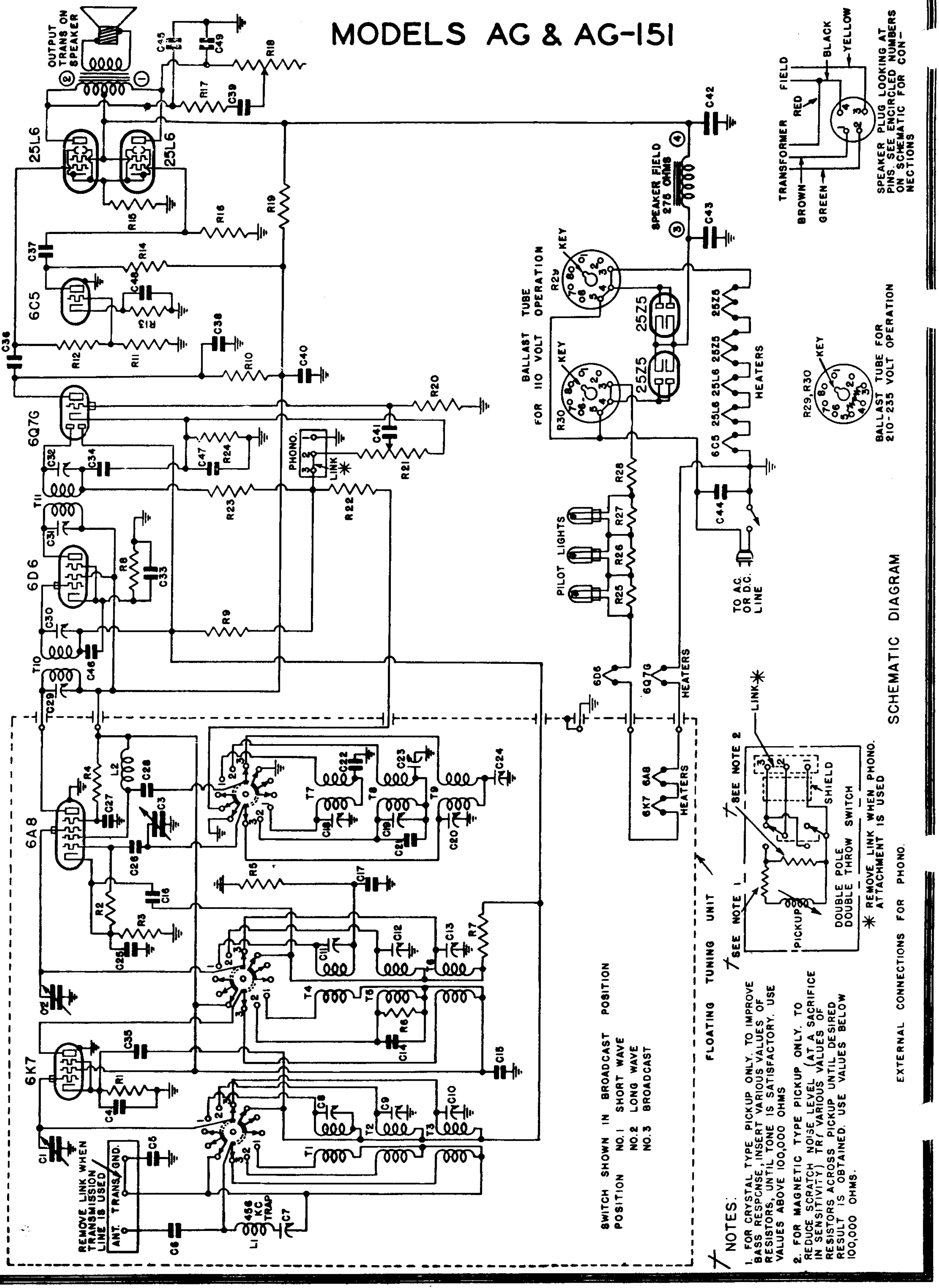
Rotate the wave-band switch (located at the rear of the chassis) to the broadcast position, clockwise, and swing the variable condenser to the minimum capacity position. Feed 456 kc to the grid-cap of the 6A7 tube and adjust the four i-f trimmers for maximum response. Feed 456 kc through a dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead and adjust the wave-trap trimmer for *minimum* response. (See General Notes, paragraph No. 7.)

R-f Alignment

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1400 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response. The police band is self-tracking and does not require any adjustment.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS AG & AG-151



EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS AG & AG-151

ADJUSTMENTS

An oscillator with frequencies of 150, 345, 456, 600, 1600 and 16000 kc should be used.

An output meter should be used across the voice coil or speaker output transformer for observing maximum response.

Use a standard dummy antenna for aligning any of the three bands. A .0002 mf condenser may be used for the medium-wave band and the long-wave band dummy antenna and a 400 ohm non-inductive resistor for the short-wave dummy antenna.

Always use as weak a test signal as possible when aligning the receiver.

The set's oscillator is higher in frequency than the signal on all three bands. Images, therefore, should be observed on the low-frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmer and maximum capacity peaks on antenna and r-f trimmers. The last motion in adjusting trimmers should always be a tightening one.

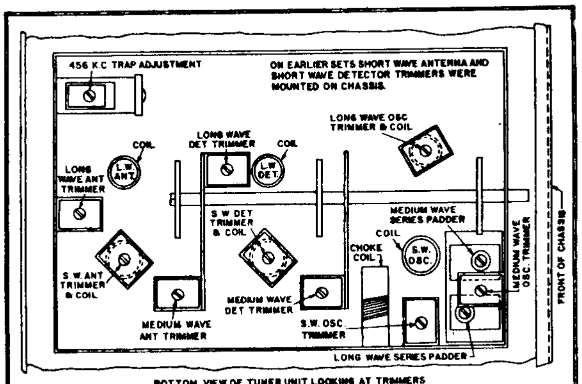
Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a source of noise, frequency drift and microphonism.

In aligning antenna trimmers on the high-frequency signals there is usually a tendency for the oscillator to drift, due to interlocking. To compensate for this always keep re-tuning the variable condenser as you align.

Location of Coils and Trimmer Adjustments

The i-f transformers are located on the extreme left side of the chassis. The transformer nearest the front of the chassis is the first i-f transformer. The four trimmers for the i-f adjustment are available through holes in the tops of the cans.

The medium-wave, long-wave and short-wave coils are all located on the tuner unit. The tuner unit is the separate chassis section floated on rubber and mounted in center of chassis. The location of the trimmers for the coils is shown in the illustration at the right. The three coils for the medium-wave band are in separate cans on top of the tuner unit.



BOTTOM VIEW OF TUNER UNIT LOOKING AT TRIMMERS

I-f Alignment

Set the wave-band switch at the medium-wave (clockwise) position and the variable condenser at the minimum capacity position. Feed 456 kc to the grid cap of the 6A8 tube. Adjust the four i-f trimmers carefully for maximum response. Feed 456 kc through a dummy antenna into the antenna terminal and adjust the 456 kc wave-trap for *minimum response.* (See General Notes.)

Medium-Wave Alignment

Both pointers on the dial should coincide vertically at 890 kc. For adjustment, the gold pointer may be slipped around its shaft. With the wave-band switch at the medium-wave (clockwise) position, set the pointer at 60, feed 600 kc through the antenna (using a standard dummy antenna), and adjust the medium-wave series padder for maximum response. Move pointer to 160, feed 1600 kc to the antenna and adjust the oscillator trimmer for maximum response, then adjust detector and antenna trimmers. Reset the pointer to 60, feed 600 kc to antenna and rock the variable condenser (rotate the condenser back and forth through a small arc) while resetting the oscillator padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary, return to 600 and repeat entire procedure.

Long-Wave Alignment

Set the wave-band switch at the long-wave (central) position and the pointer to 150. Feed 150 kc through a standard dummy antenna to the antenna terminal and adjust the long-wave series padder for maximum response. Move the pointer to 345, feed 345 kc and adjust the long-wave oscillator trimmer, then the r-f trimmer and then the antenna trimmer for maximum response. Return to 150 kc and re-adjust the long-wave series padder for maximum response. Return to 345 kc and re-adjust all three trimmers. Return again to 150 and check the alignment. Repeat the entire procedure until no appreciable re-adjustment is required.

Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move pointer to 16, feed 16000 kc to antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator for maximum response. If two peaks are obtained choose minimum capacity peak. Then adjust the detector and antenna trimmers for maximum response. If two peaks are obtained choose the maximum capacity peak.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground, with no signal, volume control turned on full, and variable condenser at minimum capacity position. The line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Osc. Plate*	*Cathode*	*Fil.*
6K7	80	80	—	2.6	6.3
6A8	80	42	80	0	6.3
6D6	80	80	—	3.0	6.3
6Q7G	37	—	—	0.8	6.3
6C5	42	—	—	2.0	6.3
25L6	93	100	—	7.0	25.0
25L6	93	100	—	7.0	25.0
25Z5	—	—	—	105	25.0
25Z5	—	—	—	105	25.0

Voltage across speaker field—82.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS AG-AG-151

1. An electrical phonograph pick-up may be connected to this receiver for playing records. Connections to the receiver may be made at the "phono" terminal strip which is located on the rear wall of the receiver chassis. A double-pole, double throw-switch is necessary in addition to the phonograph pick-up and motor. The receiver volume control may be used to control the phonograph volume. Remove the link connecting two of the terminals on the phono strip. The switch should be wired to the pick-up and terminal strip so that in the phonograph position the switch should short terminals 1 and 3 and at the same time connect the high side of the pick-up to a lead from terminal 2. (The ground side of the pick-up may be permanently wired to terminal 1.) When the switch is in the radio position terminals 2 and 3 should be shorted together and the pick-up disconnected from terminal 2. A matching input transformer must be used if the pick-up is of the low impedance type. If the phonograph be permanently disconnected, the small connecting link must be replaced across terminals 2 and 3. (See schematic diagram.)
2. The receiver should never be turned on with the speaker plug out of its socket, since the rapid rise in rectifier voltage would damage the electrolytic condenser.
3. Pilot lights may be replaced by slipping the push-on sockets off the dial and unscrewing the bulbs. It is not necessary to remove either the dial or chassis from cabinet.
4. In replacing chassis in cabinet do not tighten mounting screws so much that chassis will not float freely, and do not allow any part of the dial assembly to touch the cabinet. Do not push control knobs on so far that they touch the cabinet front panel. If these precautions are not observed the receiver may become microphonic.
5. One side of the power line is connected to the chassis. Under no condition, therefore, should a ground wire be allowed to come in contact with any metal part of the receiver.
6. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. For reduction of noise and achievement of high efficiency on all frequency ranges the Emerson All-Wave High Fidelity Antenna, Model W-78, or the Emerson All-Wave Antenna System, Model W-89, are recommended. Complete instructions for the installation of these antennas are supplied with each kit.
7. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
8. The receiver for 105-125 volt operation may be easily converted for 210-250 volt operation by substituting ballast tubes part no 3MR-253 for ballast tubes part no. 3MZ-419.

Voltage rating .... 105-125 volts, a.c. or d.c. (with ballast tubes part no. 3MZ-419).
210-250 volts, a.c. or d.c. (with ballast tubes part no. 3MR-253).

Current drain .... 0.7 amps.

Frequency ranges .... 140 to 375 kc, 540 to 1800 kc, 5.5 to 18.0 megacycles.

REPLACEMENT PARTS

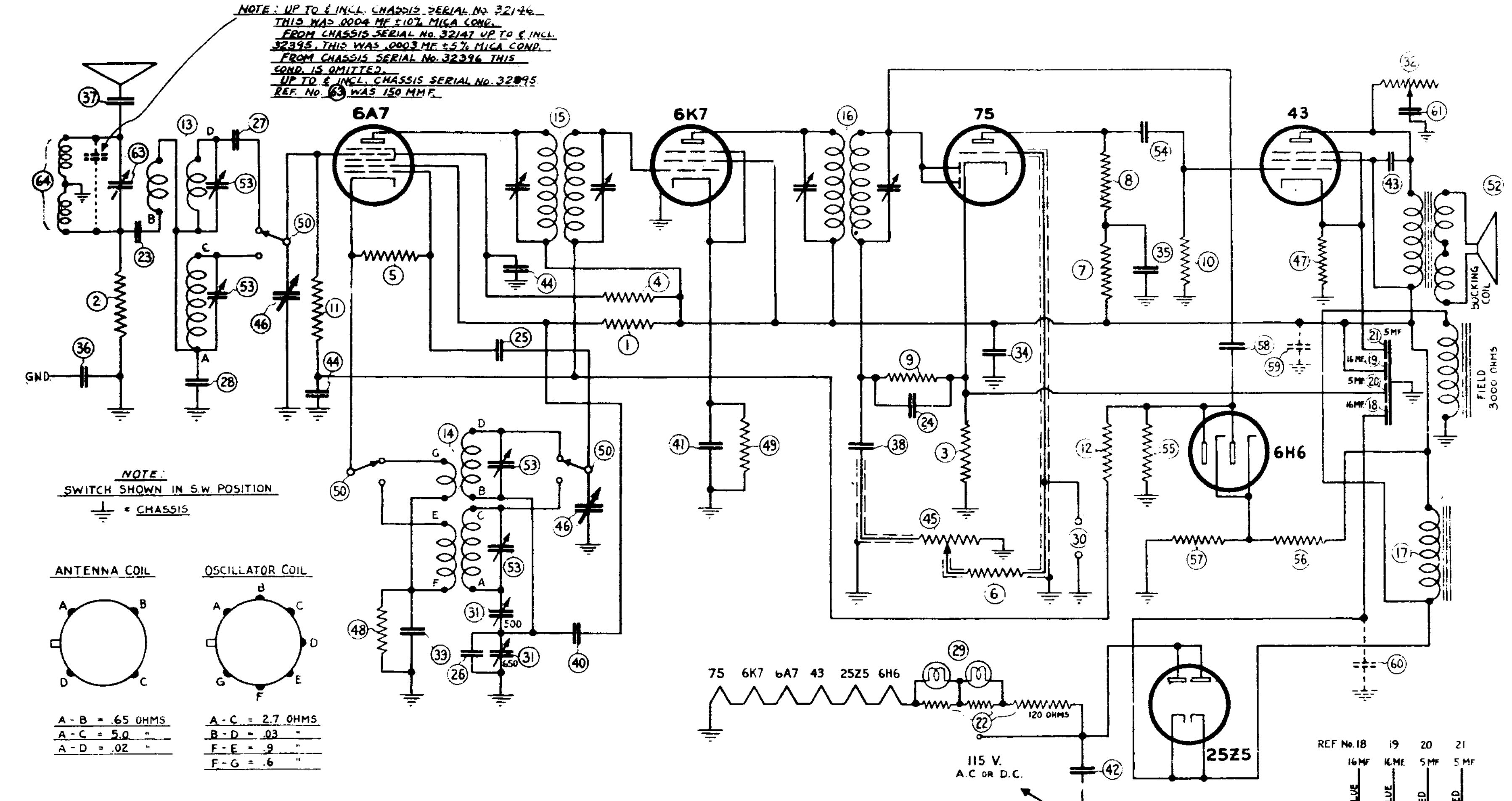
*Item	Part No.	DESCRIPTION	List Price ea. Effective as of JULY 1st, 1937 (Subject to change without notice) PRICE
L1	2PT-283	Adjustable 456 kc wave-trap	$ .60
L2	3ET-299	R-f choke wound on wooden dowel	.55
T1	3AT-257	Short-wave antenna coil	.60
T2	3MT-301	Long-wave antenna coil	1.05
T3	3AT-251	Broadcast antenna coil	.95
T4	3AT-258	Short-wave detector coil	.70
T5	3MT-302	Long-wave detector coil	1.05
T6	3AT-252	Broadcast detector coil	.95
T7	3AT-259	Short-wave oscillator coil	.50
T8	3MT-303	Long-wave oscillator coil	.95
T9	3AT-253	Broadcast oscillator coil	.75
T10	3BT-269A	Double-tuned 456 kc first i-f transformer	2.00
T11	3AT-261	Double-tuned 456 kc second i-f transformer	1.90
R1, R8	3CR-295	410 ohm ½ watt wire-wound molded resistor	.16
R2, R14	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3	4ER-286	510 ohm ½ watt wire-wound molded resistor	.16
R4, R23	LR-60	20,000 ohm ¼ watt carbon resistor	.16
R5	KR-57	1 megohm ¼ watt carbon resistor	.16
R6	GR-85	2,000 ohm ¼ watt carbon resistor	.16
R7, R9, R20	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R10	LLR-152	150,000 ohm ¼ watt carbon resistor	.16
R11	OR-73	25,000 ohm ¼ watt carbon resistor	.16
R12, R16	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R13	LR-64	5,000 ohm ¼ watt carbon resistor	.16
R15	4GR-300	75 ohm ½ watt wire-wound molded resistor	.16
R17	PR-79	1,000 ohm ¼ watt carbon resistor	.16
R18	3MR-251	Tone control—100,000 ohms	.80
R19	IIR-131	1,000 ohm ½ watt wire-wound molded resistor	.16
R21	3MR-252	Volume control—250,000 ohms	.75
R22	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R24	LR-64	5,000 ohm ¼ watt carbon resistor	.16
R25, R26, R27, R28	3MR-254	315 ohm wire-wound tapped resistor R25—40 ohms; R26—40 ohms; R27—40 ohms; R28—195 ohms	.60
R29, R30	3MZ-419	Ballast tube for 105-125 volt operation	.40
	or 3MR-253	Ballast tube for 210-250 volt operation	1.10
C1, C2, C3	3AC-276	Three-gang variable condenser	7.40
C4, C17, C41, C46	BC-12	0.05 mf, 200 volt roll type condenser	.20
C5	KC-58	0.01 mf, 400 volt roll type condenser	.20
C6, C28	AAC-114	0.001 mf mica condenser	.20
†C7		Trimmer, part of 456 kc wave-trap.	
C8, C9, C10, C11, C12, C13, C14, C26	3AC-278	Mica trimmer, range—1½ to 12 mmf	.15
C38	EC-24A	0.0001 mf mica condenser	.20
C15, C25, C27, C33, C35	AC-6	0.1 mf, 200 volt roll type condenser	.20
C16	NNC-158	0.05 mf, 200 volt roll type condenser	.20
†C18, C19, C20		Trimmer, part of oscillator coil.	
C21	AAC-106A	0.00005 mf mica condenser	.20
C22	XXC-197	0.0038 mf mica condenser	.35
C23, C24	3MC-295	Dual adjustable padding condenser C23—100 to 200 mmf C24—250 to 550 mmf	.60
†C29, C30		Trimmer, part of 456 kc first i-f transformer.	
†C31, C32		Trimmer, part of 456 kc second i-f transformer.	
C34	AC-7A	0.00025 mf mica condenser	.20
C36, C37, C39	LC-64	0.05 mf, 400 volt roll type condenser	.20
C40	3MC-292	8 mf, 150 volt wet electrolytic condenser	.85
C42	3MC-291	50 mf, 150 volt wet electrolytic condenser	1.30
C43	3MC-290	50 mf, 200 volt wet electrolytic condenser	1.45
C44	3MC-293	0.1 mf, 400 volt a.c. roll type condenser	.30
C45, C49	HC-34	0.006 mf, 600 volt roll type condenser	.20
C47, C48	KKC-145	Dual 5 mf, 25 volt electrolytic condenser	1.35
	4GS-260	8" dynamic speaker	7.85
	3AS-166	Wave-band switch	2.25
	3BS-226	On-off switch	.55
	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
	3AD-41	Dial assembly with band-indicator mechanism	2.20
	3MZ-422	Dial face	1.30
	3AZ-369	Idler pulley	.05
	3AZ-370	Idler pulley spring	.05

*Item number locates the article on the schematic diagram.

†These trimmers cannot be supplied separately.

FADA RADIO AND ELECTRIC COMPANY

MODELS 167



REF No. 18 19 20 21

16 MF 16 MF 5 MF 5 MF

BLUE BLUE RED RED

GREEN BLACK

ELECTRO. COND. BLOCK No. 20.36

REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION
1	30.1	CARB RES. - 5,000 OHMS - 1/3 W ±10%	23	15.2	MICA COND - .0005 MF. ± 10%	45	50.1	VOLUME CONTROL - 1/2 MEG.
2	30.31	" " 10,000 " " " 20%	24	15.2	" " .0005 " "	46	25.53	VARIABLE COND.
3	30.31	" " 10,000 " " " "	25	15.3	" " .0001 " "	47	30.47	CARB. RES. - 625 OHMS - 1/2 W ± 10%
4	30.7	" " 15,000 " " " 10%	26	15.19	" " .0015 " "	48	30.48	" " 350 " 1/4 " "
5	30.3	" " 50,000 " " " "	27	15.5	" " .002 " 3%	49	30.45	" " 250 " " "
6	30.26	" " 50,000 " " " 20%	28	15.6	" " .0025 " "	50	45.1	BAND SWITCH
7	30.26	" " 50,000 " " " "	29	120.1	PILOT LIGHTS 6.8 V. .25 A.	51		ON-OFF SW ON VOL CONT. (45)
8	30.20	" " 250,000 " " " "	30	125.1	PHONO JACK	52	105.1	SPEAKER - 3,000 OHMS
9	30.23	" " 500,000 " " " "	31	25.1	PADDING COND. - 650 - 500 MMF	53		MIN. ADJ. ON COILS
10	30.23	" " 500,000 " " " "	32	55.10	TONE CONTROL - 200,000 OHMS	54	10.4	TUBULAR COND - .01 MF. - 200 V
11	30.22	" " 1 MEG " " "	33			55	30.5	CARB. RES. - 500,000 OHMS - 1/3 W. ± 10%
12	30.22	" " 1 " " " "	34	10.2	TUBULAR COND. .1 MF. 200 WV	56	30.4	" " 250,000 " " " "
13	2026	ANTENNA COIL	35	10.2	" " .1 " " "	57	30.2	" " 10,000 " " " "
14	3116	OSCILLATOR "	36	10.3	" " .006 " 400 "	58	15.3	MICA COND. - .0001 MF. ± 10%
15	3B79	1ST I. F. "	37	10.4	" " .01 " 200 "	59	20.25	TUBULAR ELECTRO. COND. - 8 MF 100 W.V. } FOR 25 CYCLE OPERATION ONLY
16	3B80	2ND I. F. "	38	10.4	" " .01 " " "	60	20.25	" " " 8 " " " }
17	40.1	CHOKE " 300 OHMS	39	10.5	" " .05 " " "	61	10.5	TUBULAR COND. .05 MF. 200 W.V.
18	20.36	ELECTRO. COND. BLOCK - 16 MF. - 100 WV	40	10.5	" " .05 " " "	62		
19	20.36	" " " 16 " 100 "	41	10.5	" " .05 " " "	63	25.8	TRIMMING COND. - 500 MMF.
20	20.36	" " " 5 " 25 "	42	10.7	" " .05 " 400 "	64	5005	WAVE TRAP COIL
21	20.36	" " " 5 " 25 "	43	10.10	" " .01 " 400 "			
22	115.1	LINE RESISTOR - 120 - 38 - 38 OHMS	44	10.6	" " DUAL .05 " 200 "			

1ST I. F. TRANS.
PRI. - 14.5 OHMS
SEC. - 14.5 "

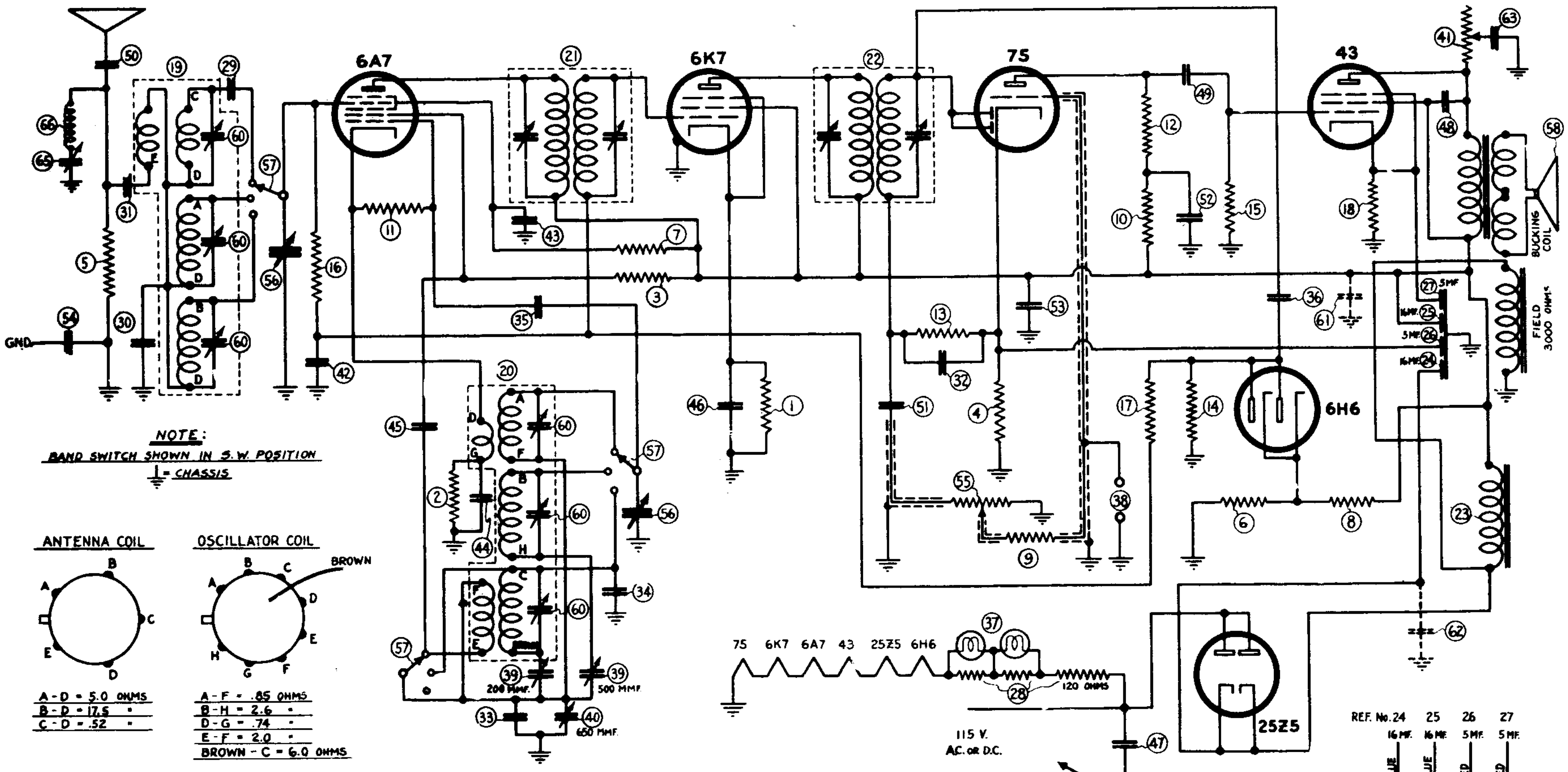
2ND I. F. TRANS.
PRI. - 14.5 OHMS
SEC. - 14.5 "

I. F. = 456 K.C.

NOTE: REF. NOS. 62, 63 & 64 ADDED
REF. No. 56 WAS 50,000 OHMS 1/3 W. ± 10%.

FADA RADIO AND ELECTRIC COMPANY

MODEL 168



1ST I.F. TRANS.
PRI. - 14.5 OHMS
SEC. - 14.5 "

2ND I.F. TRANS.
PRI. - 14.5 OHMS
SEC. - 14.5 "

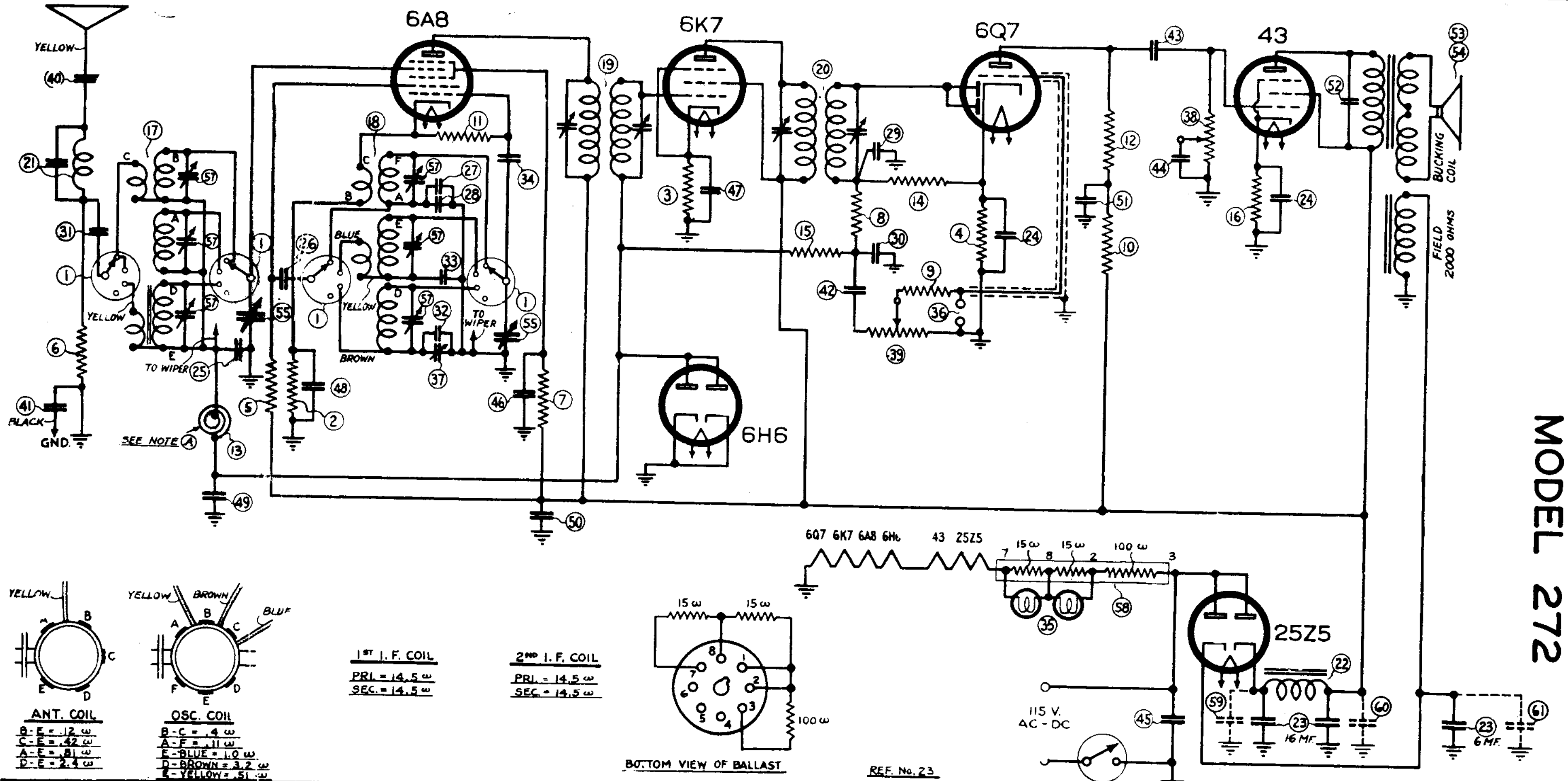
I.F. = 456 KC.

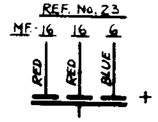
NOTE:
REF. No. 8 WAS 50,000 OHMS 1/3 W. ± 20%
" " 6 " 10,000 " 1/3 W " 20%

REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.		DESCRIPTION
1	30.45	CARB. RES. - 250 OHMS 1/3 W ±10%	23	40.18	CHOKE COIL - 300 OHMS	45	10.5	TUBULAR COND. - .05 MF. 200 V.
2	30.48	" " 350 " " "	24	20.36	ELECTRO. COND. - 16 MMF. 100 W.V.	46	10.5	" " .05 " 200 "
3	30.2	" " 10,000 " " "	25	20.36	" " 16 " 100 "	47	10.7	" " .05 " 400 "
4	30.2	" " 10,000 " " "	26	20.36	" " 5 " 25 "	48	10.10	" " .01 " 400 "
5	30.31	" " 10,000 " " 20	27	20.36	" " 5 " 25 "	49	10.4	" " .01 " 200 "
6	30.2	" " 10,000 " " 10	28	115.1	LINE RES. - 120-38-38 OHMS	50	10.4	" " .01 " 200 "
7	30.7	" " 15,000 " " "	29	15.5	MICA COND. - .002 MF. ± 3%	51	10.4	" " .01 " 200 "
8	30.4	" " 250,000 " " "	30	15.6	" " .0025 " "	52	10.2	" " .1 " 200 "
9	30.26	" " 50,000 " " "	31	15.7	" " .002 " 10	53	10.2	" " .1 " 200 "
10	30.26	" " 50,000 " " "	32	15.2	" " .0005 " "	54	10.3	" " .006 " 400 "
11	30.8	" " 100,000 " " 10	33	15.4	" " .001 " "	55	50.1	VOLUME CONT. - 1/2 MEG.
12	30.20	" " 250,000 " " 20	34	15.8	" " .00004 " 5	56	25.53	VARIABLE COND.
13	30.23	" " 500,000 " " "	35	15.3	" " .0001 " 10	57	45.2	BAND SW.
14	30.23	" " 500,000 " " "	36	15.3	" " .0001 " "	58	105.1	SPEAKER
15	30.23	" " 500,000 " " "	37	120.1	PILOT LIGHTS 6.8 V. .25 A.	59		ON-OFF SW. ON VOL. CONT.
16	30.22	" " 1 MEG. " "	38	125.1	PHONO JACK	60		MIN. ADJ. ON COILS
17	30.22	" " 1 " " "	39	25.3	PADDING COND. - 200-500 MMF.	61	20.25	TUBULAR ELECTRO. COND - 8 MF. 100 W.V. (FOR 25 CYCLE OPERATION ONLY)
18	30.47	" " 625 " " 10	40	25.4	" " 650 " "	62	20.25	" " " 8 " 100 " (FOR 25 CYCLE OPERATION ONLY)
19	2031A	ANT. COIL	41	55.10	TONE CONT. - 200,000 OHMS	63	10.5	" COND. - .05 MF. 200 V.
20	3421	OSC. "	42	10.5	TUBULAR COND. - .05 MF. 200 V.	64		
21	3879	1ST I.F. "	43	10.5	" " .05 " 200 "	65	25.50	TRIMMING COND. - 150 MMF.
22	3880	2ND " "	44	10.5	" " .05 " 200 "	66	4697	WAVE TRAP COIL

FADA RADIO AND ELECTRIC COMPANY

MODEL 272





ELECTRO. COND. BLOCK
PART No. 20.46

I. F. = 456 KC.

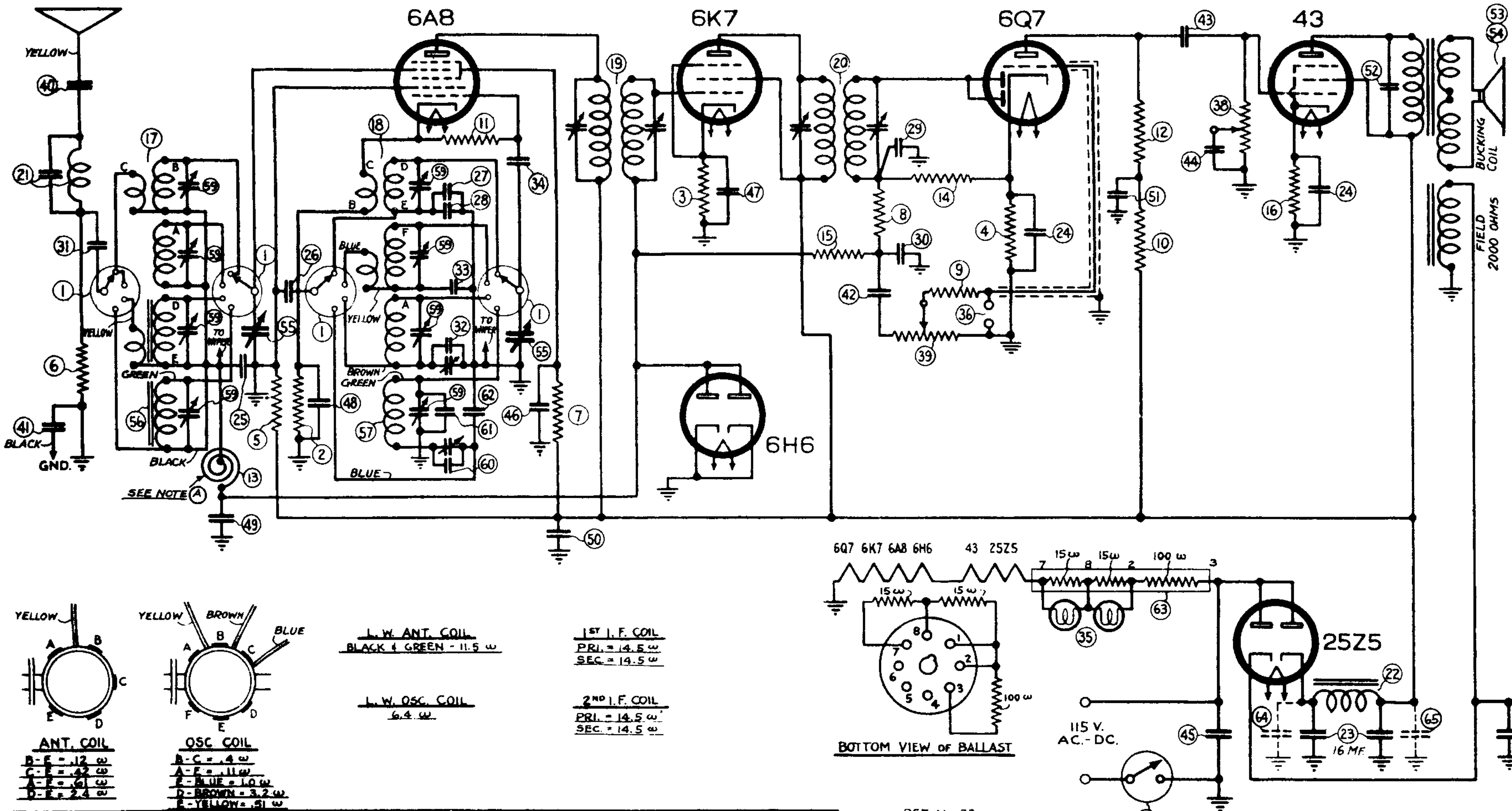
NOTE:
BAND SW. SHOWN IN S.W. POSITION
⏚ = CHASSIS
(59)(60)(61) FOR USE WITH 25 CYCLE OPERATION ONLY

NOTE (A) - ON SOME EARLY MODELS, A 250,000 OHM CARB. RES. WAS USED IN PLACE OF THIS CHOKE.

REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION
1	45.35	BAND SWITCH	23	20.46	ELECTRO. COND. - 16 16-6 MF 100 W.V.	45	10.7	TUBULAR COND. - .05 MF. 400 V.
2	30.45	CARB. RES. - 250 OHMS 1/3 W. ± 10 %	24	20.44	" DUAL " 10-10 " 25 "	46	10.5	" " .05 " 200 "
3	30.48	" " 350 " " "	25	15.5	MICA COND. - .002 MF. ± 3%	47	10.5	" " .05 " 200 "
4	30.65	" " 4,400 " " "	26	15.7	" " .002 " 10.	48	10.5	" " .05 " 200 "
5	30.1	" " 5,000 " " "	27	15.21	" " .003 " 5	49	10.5	" " .05 " 200 "
6	30.2	" " 10,000 " " "	28	15.62	" " .004 " "	50	10.5	" " .05 " 200 "
7	30.7	" " 15,000 " " "	29	15.3	" " .0001 " 10	51	10.8	" " .25 " 200 "
8	30.26	" " 50,000 " " 20	30	15.3	" " .0001 " "	52	10.13	" " .002 " 400 "
9	30.26	" " 50,000 " " "	31	15.2	" " .0005 " "	53	105.47	SPEAKER (MODELS 272B & 272T)
10	30.26	" " 50,000 " " "	32	15.52	" " .00026 " 5	54	105.48	" (MODEL 272C)
11	30.8	" " 100,000 " " 10	33	15.63	" " .00093 " 3	55	25.65	VARIABLE COND.
12	30.66	" " 150,000 " " 20	34	15.10	" " 50 MMF. 10	56		ON-OFF SW. ON VOL. CONT.
13	3216	CHOKE COIL - 2.3 MH.	35	120.1	PILOT LT'S. 6-8 V. .25 A.	57		MIN. ADJ. ON COILS
14	30.20	CARB. RES. 250,000 OHMS 1/3 W ± 20%	36	125.1	PHONO JACK	58	BK420	BALLAST RES. - 15-15-100 ω
15	30.28	" " 2,000,000 " " "	37	25.49	PADDING COND. - 70 MMF.	59	20.25	ELECTRO. COND. - 8 MF. 100 W.V.
16	30.47	" " 625 " 1/2 W 10	38	55.12	TONE CONTROL - 1/2 MEG.	60	20.25	" " 8 " 100 "
17	35.15	ANTENNA COIL	39	50.26	VOLUME " 1 " WITH ON-OFF SW.	61	20.25	" " 8 " 100 "
18	35.17	OSCILLATOR "	40	10.4	TUBULAR COND. - .01 MF. 200 V.			
19	35.23	1ST I.F. "	41	10.4	" " .01 " 200 "			
20	35.24	2ND I.F. "	42	10.4	" " .01 " 200 "			
21	35.6	WAVE TRAP	43	10.4	" " .01 " 200 "			
22	40.1	CHOKE COIL	44	10.4	" " .01 " 200 "			

FADA RADIO AND ELECTRIC COMPANY

MODEL 273



REF. No. 23
MF. 16 16 6
RED RED BLUE
ELECTRO COND. BLOCK
PART No. 20.46

I. F. = 456 KC.

NOTE:
BAND SW. SHOWN IN S. W. POSITION
⏚ = CHASSIS
(64)(65)(66) FOR USE WITH 25 CYCLE OPERATION ONLY

NOTE (A) - ON SOME EARLY MODELS, A 250,000 OHM RES. WAS USED IN PLACE OF THIS CHOKE.

REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION
1	45.35	BAND SWITCH	23	20.46	ELECTRO. COND. - 16-16-6 MF 100 W.V.	45	10.7	TUBULAR COND. - .05 MF 400 V.
2	30.45	CARB. RES. - 250 OHMS 1/3 W ± 10%	24	20.44	" DUAL " 10-10 " 25 "	46	10.5	" " .05 " 200 "
3	30.48	" " 350 " " "	25	15.5	MICA COND. - .002 MF ± 3%	47	10.5	" " .05 " 200 "
4	30.65	" " 4400 " " "	26	15.7	" " .002 " 10	48	10.5	" " .05 " 200 "
5	30.1	" " 5,000 " " "	27	15.21	" " .003 " 5	49	10.5	" " .05 " 200 "
6	30.2	" " 10,000 " " "	28	15.62	" " .004 " "	50	10.5	" " .05 " 200 "
7	30.7	" " 15,000 " " "	29	15.3	" " .0001 " 10	51	10.8	" " .25 " 200 "
8	30.26	" " 50,000 " " 20	30	15.3	" " .0001 " "	52	10.13	" " .002 " 400 "
9	30.26	" " 50,000 " " "	31	15.2	" " .0005 " "	53	105.47	SPEAKER (MODELS 272 B & 272 T)
10	30.26	" " 50,000 " " "	32	15.52	" " .00026 " 5	54	105.48	" (MODEL 272 C)
11	30.8	" " 100,000 " " 10	33	15.63	" " .00093 " 3	55	25.65	VARIABLE COND.
12	30.66	" " 150,000 " " 20	34	15.10	50 MMF. 10	56	35.20	L. W. ANT. COIL
13	5409	CHOKE COIL - 20. MH.	35	120.1	PILOT LTS. 6-8 V. .25 A	57	35.22	" OSC. "
14	30.20	CARB. RES. 250,000 OHMS 1/3 W ± 20	36	125.1	PHONO. JACK	58		ON-OFF SW. ON VOL. CONT.
15	30.28	" " 2,000,000 " " "	37	25.49	PADDING COND. - 70 MMF.	59		MIN. ADJ. ON COILS
16	30.47	" " 625 " 1/2 W. 10	38	55.12	TONE CONTROL - 1/2 MEG.	60	15.58	MICA COND. - .00018 MF. ± 5%
17	35.15	ANTENNA COIL	39	50.26	VOLUME " 1 " WITH ON-OFF SW.	61	15.10	" " 50 MMF. ± 10%
18	35.17	OSCILLATOR "	40	10.4	TUBULAR COND. - .01 MF. 200 V.	62	15.2	" " .0005 MF. ± "
19	35.23	1ST I. F. "	41	10.4	" " .01 " 200 "	63	BK42D	BALLAST RES. - 15-15-100 ω
20	35.24	2ND I. F. "	42	10.4	" " .01 " 200 "	64	20.25	ELECTRO. COND. - 8 MF. 100 W.V.
21	35.6	WAVE TRAP	43	10.4	" " .01 " 200 "	65	20.25	" " 8 " 100 "
22	40.1	CHOKE COIL	44	10.4	" " .01 " 200 "	66	20.25	" " 8 " 100 "

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODELS 4A & 4B

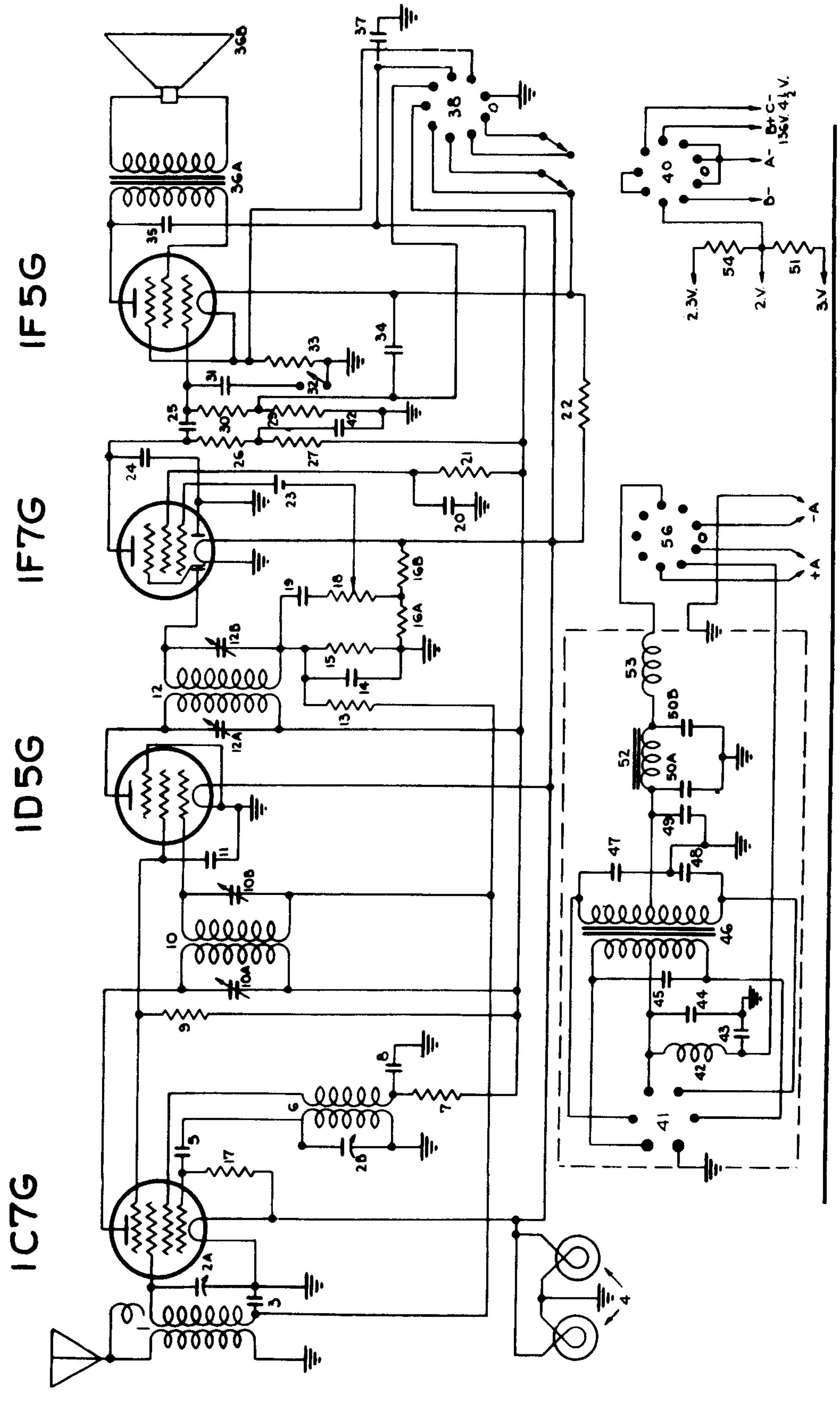


FIGURE 2
SCHEMATIC WIRING DIAGRAM, MODELS 4A AND 4B
Showing Power Pack and Battery Connections. Values of Component Parts May Be Found by Checking the Numbers Shown Against Corresponding Reference Numbers on the Parts List,

I. F. 456 K.C.

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODELS 4A & 4B

ALIGNMENT

Alignment procedure is given below in chart form (Figure 4). Make adjustments in the order given. Any low range AC voltmeter, preferably about 0-15 volts, may be used for an output meter. It should be connected from the plate of the 1F5G tube to ground with a .1 mfd. condenser in series with one of the leads. The volume control should be set at maximum during the alignment and the output from the signal generator should be decreased as the meter hand tends to go off scale. If too strong a signal is used and the volume control is used to keep the hand on scale, the A.V.C. will operate and inaccurate alignment will result.

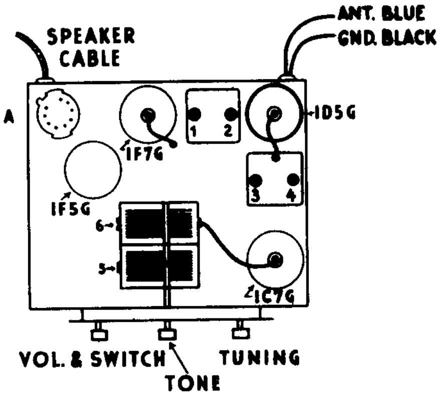


FIGURE 3
TOP VIEW OF 4A AND 4B CHASSIS

No.	Connect Generator To	Dummy	Generator Frequency	Band Switch Setting	Dial Setting	Stage	Trimmer No.	AFC Switch	Adjust For	Special Instrs.
1	Grid of 1C7G	.1 mfd. Condenser	456 KC		550 KC	2nd IF	1		Max.	
2	Grid of 1C7G	.1 mfd. Condenser	456 KC		550 KC	2nd IF	2		Max.	
3	Grid of 1C7G	.1 mfd. Condenser	456 KC		550 KC	1st IF	3		Max.	
4	Grid of 1C7G	.1 mfd. Condenser	456 KC		550 KC	1st IF	4		Max.	
5	Antenna Lead	200 mmfd. Cond. Mica	1500 KC		1500 KC	Osc.	5		Max.	
6	Antenna Lead	200 mmfd. Cond. Mica	1500 KC		1500 KC	Det.	6		Max.	

FIGURE 4
ALIGNMENT PROCEDURE CHART

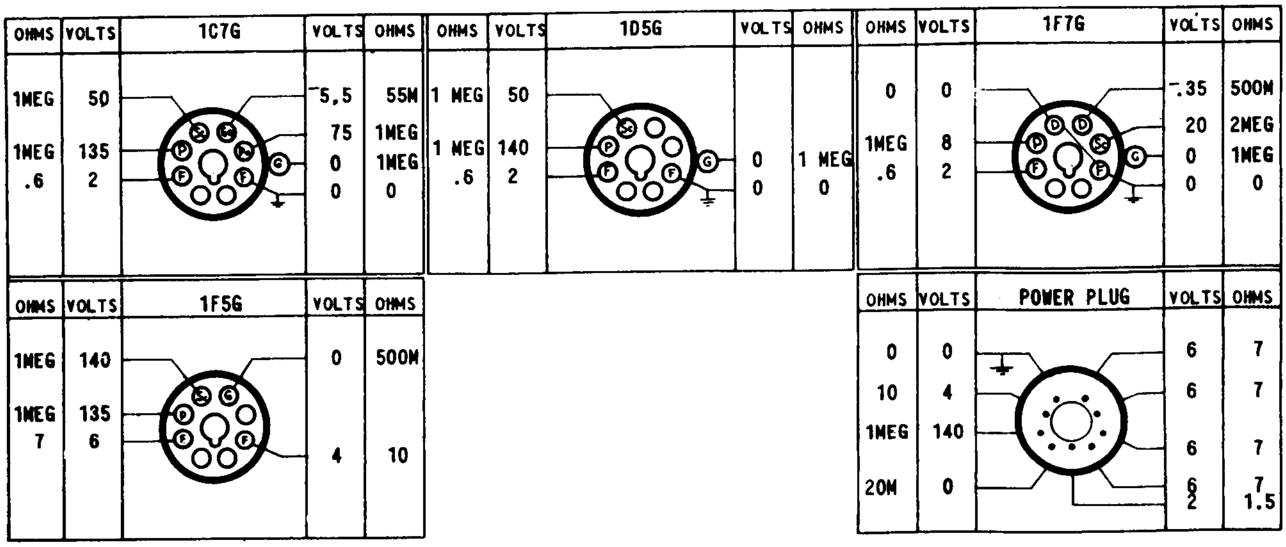


FIGURE 5
VOLTAGE AND RESISTANCE ANALYSIS CHART MODEL 4B

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODELS 4A & 4B

The model 4A-4B chassis employs a superhetrodyne circuit with automatic volume control (Figure 2). The receiver operates equally well on a six-volt storage battery or on any of the conventional A, B and C battery arrangements (Figure 1). New high-gain, octal-base tubes are used (Figures 3 and 5), making possible a receiver of high sensitivity with low battery drain.

On six-volt operation the current consumption is only approximately 1.3 amperes. As a two-volt receiver the "A" and "B" currents are approximately .55 amperes and 20 milliamperes respectively.

In order to make interchangeability as simple as possible, a nine-prong socket and plug power connection is employed (Figure 2). Only part of these prongs are used on either battery arrangement. A careful study of the circuit diagram should be made before any attempt is made to replace defective parts in the receiver, since the purpose of the various connections may not be readily apparent from a chassis inspection alone.

"B" AND "C" BATTERIES

Four Standard Battery Plugs will be found on the battery cable. Three of these are identical to each other and are to be plugged into the Standard Receptacles on the three "B" batteries. The remaining plug, the one with one large prong, should be plugged into the "C" battery.

DO NOT ALLOW THE "A" BATTERY LEADS TO COME IN CONTACT WITH ANY OF THE "B" BATTERY TERMINALS. IF THIS HAPPENS, THE TUBES, RECEIVER AND BATTERIES MAY BE SERIOUSLY DAMAGED.

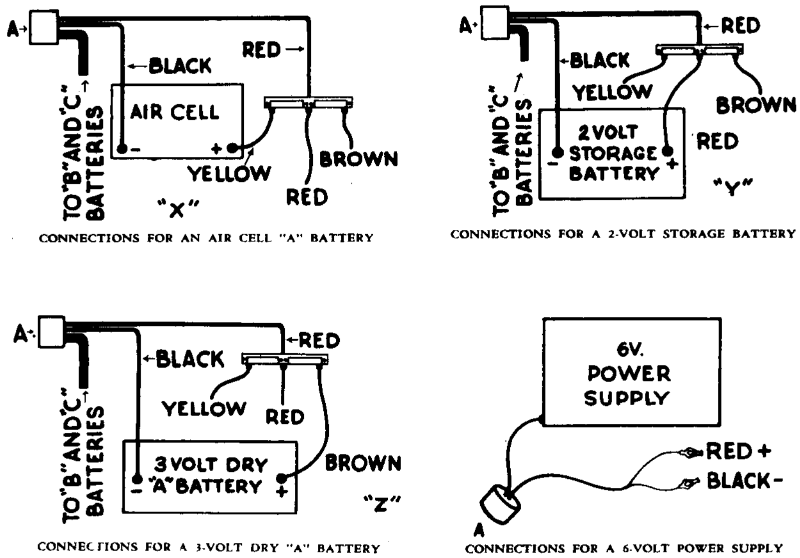


FIGURE 1

BATTERY AND POWER SUPPLY CONNECTIONS

PARTS LIST MODELS 4A AND 4B

Part Number	Reference Figure 2	Description	List Price
800-1	23	Bias Cell	$ .20
40-2		Cabinet—Console (C1B)	
41-1		Cabinet—Table (T5-B)	
480-1	40	Cable—Battery (4A) with plugs	2.00
480-2	56	Cable Assembly—Battery (4B)	1.50
501-1	1	Coil Assembly—Antenna	1.20
503-1	6	Coil Assembly—Oscillator	.90
202-1	2 A & B	Condenser—Tuning (2 gang)	2.50
250-8	35	Condenser—.003-600 Paper	.18
250-11	31	Condenser—.006-600 Paper	.18
250-12	19, 25	Condenser—.01-400 Paper	.18
250-39	28, 20	Condenser—.05-200 Paper	.18
250-21	11, 8, 3	Condenser—.1-200 Paper	.18
250-27	37	Condenser—.25-200 Paper	.20
250-40	34	Condenser—.5-150 Paper	.25
260-10	24, 14	Condenser—.00025 Mica	.18
260-18	5	Condenser—.001 Mica	.18
340-1	18	Control—Volume and Switch	1.00
381-1	32	Control—Switch—Tone	.35
64-1		Crystal—Pyralin	.50
150-1		Dial Drive Bushing—Brass	.15
151-1		Dial Drive Shaft—Steel	.15
7476-1		Dial Drive Spring Washer	.02
7475-1		Dial Drive "C" Washer	.01
611-1		Dial Reflector	.60
465-1		Dial Light Socket (Screw Type)	.10
805-1	4	Dial Light—2V—60 Ma.	.25
125-1		Dial Drive Pulley	.30
8036-1		Dial Drive Cord	.05
127-1		Dial Cord Spring	.03
601-1		Dial Scale—Celluloid	.60
7381-1		Dial Scale Split Rivets Doz.	.05
602-1		Dial Pointer (Push on)	.10
801-5		Grid Clips—Tube	.02
700-2		Grommets—½" Rubber	.01
700-1		Grommets—Rubber	.02
70-1		Knob—Bakelite	.15
460-1	38	Receptacle for Battery Cable	.25

Part Number	Reference Figure 2	Description	List Price
335-1	33	Resistor—.33 ohm ½ watt	$ .15
336-1	16 A & B	Resistor—50-100 ohms Tapped	.25
335-2	54	Resistor—.53 ohms ½ watt	.25
335-3	51	Resistor—1.65 ohms ½ watt	.25
338-1	22	Resistor—11 ohms 2 watt	.25
301-21	29, 7	Resistor—22,000 ohms ½ watt	.15
301-22	9	Resistor—33,000 ohms ½ watt	.15
301-23	17	Resistor—47,000 ohms ½ watt	.15
301-25	27	Resistor—100,000 ohms ½ watt	.15
301-27	26	Resistor—220,000 ohms ½ watt	.15
301-29	15, 30	Resistor—470,000 ohms ½ watt	.15
301-31	13, 21	Resistor—1 megohm ½ watt	.15
7129-1		Screw—Speaker Mounting Doz.	.18
7245-40		Screw—Chassis Mtg., 8-32x¼ Doz.	.20
7245-31		Screw—Chassis Assembly Doz.	.08
111-2		Shield Assembly—Tube	.15
455-1		Sockets—Octal Base Tube	.15
22-2	36 A & B	Speaker—8" P. M. Dynamic	6.50
22-1	36 A & B	Speaker—6" P. M. Dynamic	5.50
470-3		Terminal Strip—3 lug	.06
470-11		Terminal Strip—Bias Cell	.15
550-1	10	Transformer—Input I. F.	1.50
550-2	12	Transformer—Output I. F.	1.50
7471-4		Washer—Chassis Mounting Doz.	.08
7477-1		Washer (Felt) for Knob Doz.	.05

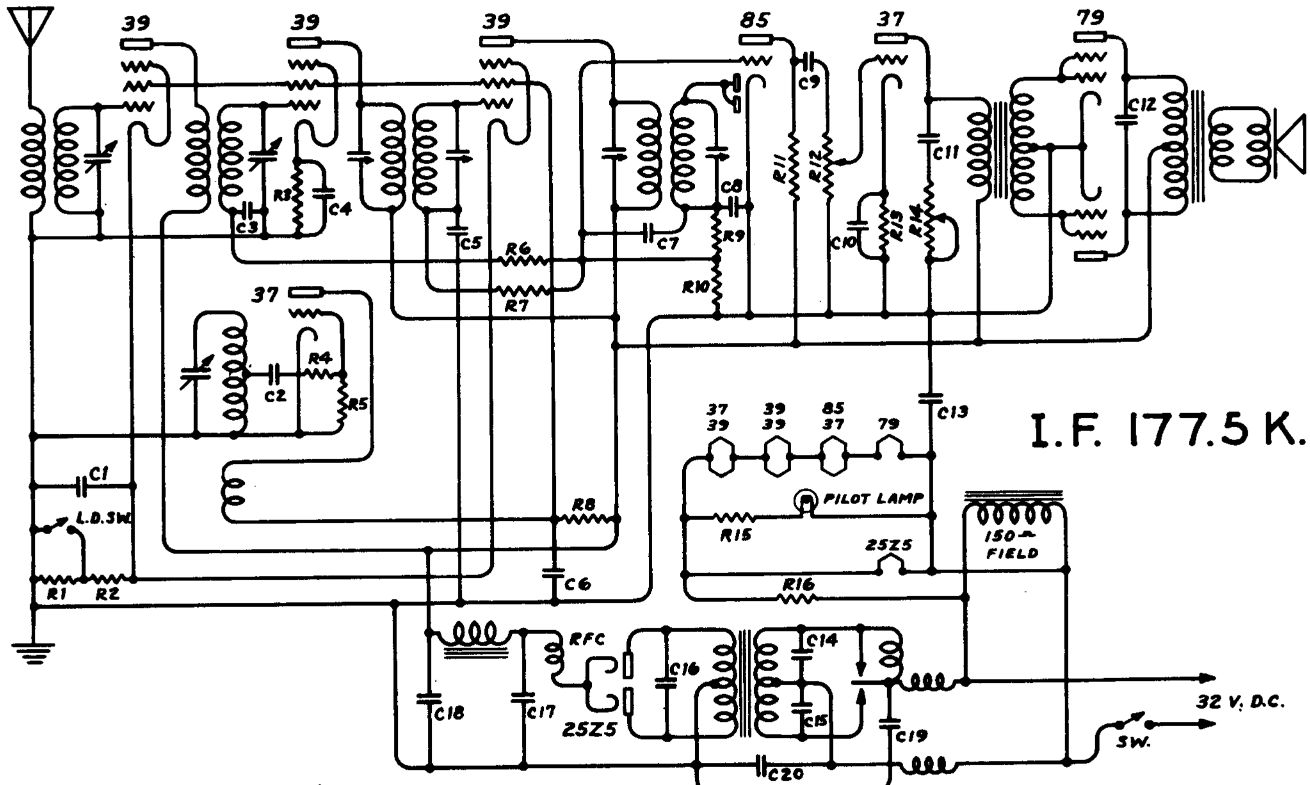
POWER PACK PARTS MODEL 4B

Part Number	Reference Figure 2	Description	List Price
420-1	52	Choke—Iron Core	1.50
425-1	42	Choke Assembly "A"	.30
425-2	53	Choke Assembly "B"	.40
803-1		Clips for Cable "A"	.15
231-1	50 A & B	Cond.—Elec., 8-8 200 V.	1.50
250-40	43, 44, 45	Condenser—.5-150 Paper	.25
250-22	49	Condenser—.1-400 Paper	.20
250-41	47, 48	Condenser—.01-1200 Paper	.20
7530-3		Rivets for Socket Doz.	.05
451-3		Socket—6-prong (Vibrator)	.15
470-2		Terminal Strip—2 lug	.05
405-1	46	Transformer	3.00
806-1	41	Vibrator—6-prong Sync.	4.00

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODELS 816 & 840 32VOLT SET



I.F. 177.5 K.C.

TABLE OF VALUES

C1-.25 MFD.	C11-.05 MFD.	R1-1500 OHMS	R11-50 M OHMS
C2-500 MMFD.	C12-.01 MFD.	R2-300 OHMS	R12-500 M OHMS
C3-.1 MFD.	C13-.1 MFD.	R3-2000 OHMS	R13-2000 OHMS
C4-.05 MFD.	C14-.25 MFD.	R4-5000 OHMS	R14-50 M OHMS
C5-.1 MFD.	C15-.25 MFD.	R5-50 M OHMS	R15-100 OHMS
C6-.25 MFD.	C16-.01 MFD.	R6-1 MEGOHM	R16-10 OHMS
C7-.05 MFD.	C17-8. MFD.	R7-1 MEGOHM	
C8-500 MMFD.	C18-8. MFD.	R8-5000 OHMS	
C9-.02 MFD.	C19-.5 MFD.	R9-250 M OHMS	
C10-5. MFD.	C20-.5 MFD.	R10-250 M OHMS	

32 VOLTS D.C. RECEIVER

VOLTAGES

Tolerances of about 10% plus or minus are allowable on the following list of measured voltages. In the event all voltages are low try replacing the 25Z5 rectifier tube or vibrator. All measurements are made to ground except on filament voltage.

TUBE		PLATE	GRID	SCREEN	CATHODE	HEATER
39	1st Det.	205	0	120	12.5	6.3
39	R. F.	205	0	120	5	6.3
39	I. F.	205	0	120	5	6.3
37	Osc.	120	0	-	0	6.3
37	A. F.	185	0	-	12.5	6.3
85	2nd Det.	45	0	-	0	6.3
79	A. F.	205 each	0 each	-	0	6.3
25Z5	Rect.	-	-	-	-	-

ALIGNMENT PROCEDURE

If the set is weak or broad it is possibly out of alignment and the following adjustments should be made.

1. A 177.5 kilocycle signal, from a good service oscillator, should be supplied to the grid of the 39 first detector tube thru a small condenser. The trimmers on the first and second I. F. transformers should be adjusted for maximum output with minimum input from the service oscillator. The first I. F. transformer is located at the left of the chassis and the second I. F. at the right of the chassis, viewed from the front. These trimmers may be reached from the bottom of the chassis.

2. Supply a 1500 kilocycle signal to the antenna of the set. Tune the dial to 1500 kilocycles. Adjust the trimmer on the oscillator section of the gang condenser (the rear section) for maximum output with minimum input from the service oscillator.

3. Adjust the trimmers on the R. F. and first detector sections of the gang condenser for maximum output with minimum input from the service oscillator.

VIBRATOR NOISE PICKUP

In the event vibrator noise pickup is present the various ground connections on the set should be carefully checked. Special attention should be given the grounds on the large, fin type, separator shield on top of the chassis, and on the center fin of the gang condenser. In the event all grounds are satisfactory and noise is still present try placing the antenna lead as far as possible from the vibrator can. In some cases it is helpful to place an eight or ten inch shield over the antenna lead and ground the end of this shield on the chassis at the point where the antenna lead enters. In some cases it is helpful to use an additional ground on the large separator shield at a point even with the center section of the gang condenser.

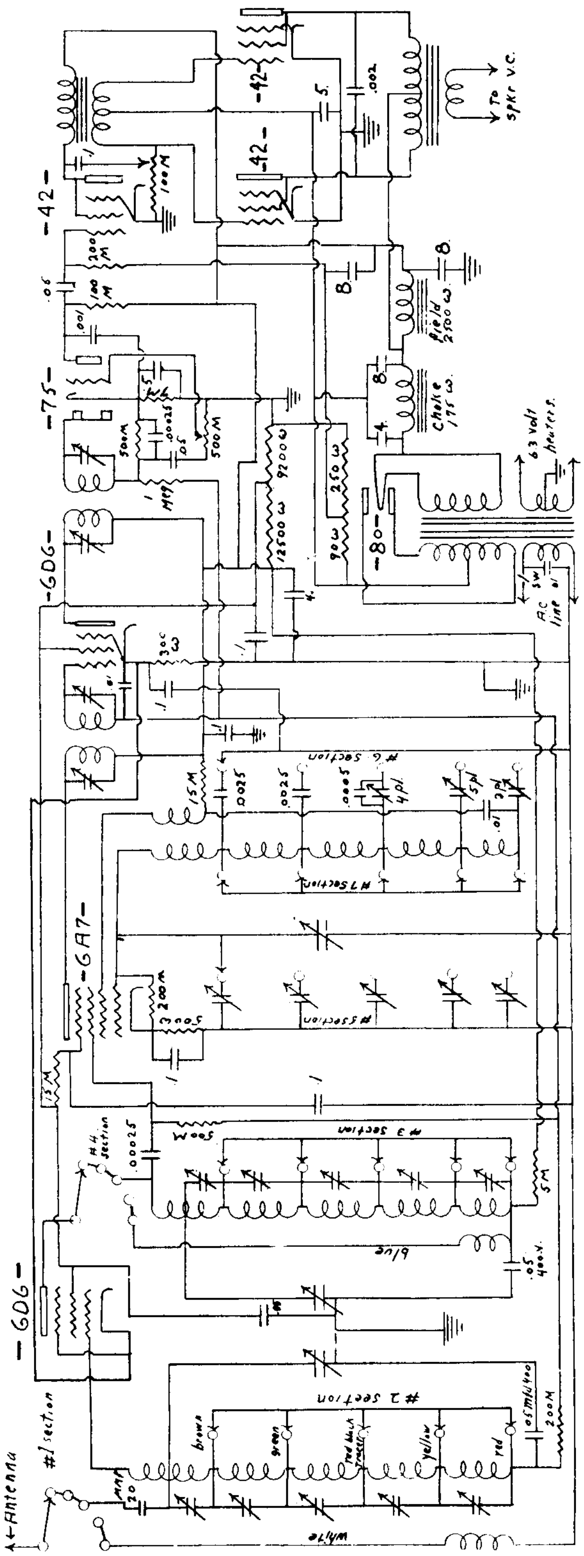
HOWL AND VIBRATION

Howl is usually due to a defective tube. This may be checked by replacing the tubes in the receiver one by one. The type 37 oscillator and the type 37 first audio tube should be checked first. Do not, under any condition, remove a tube from the receiver without first turning the set off.

Excessive vibration, after the set has warmed up, is usually due to a loose part or screw. A careful checkup will usually reveal the source of trouble. On early models excessive mechanical vibration may be eliminated by replacing vibrator or by mounting vibrator on sponge rubber.

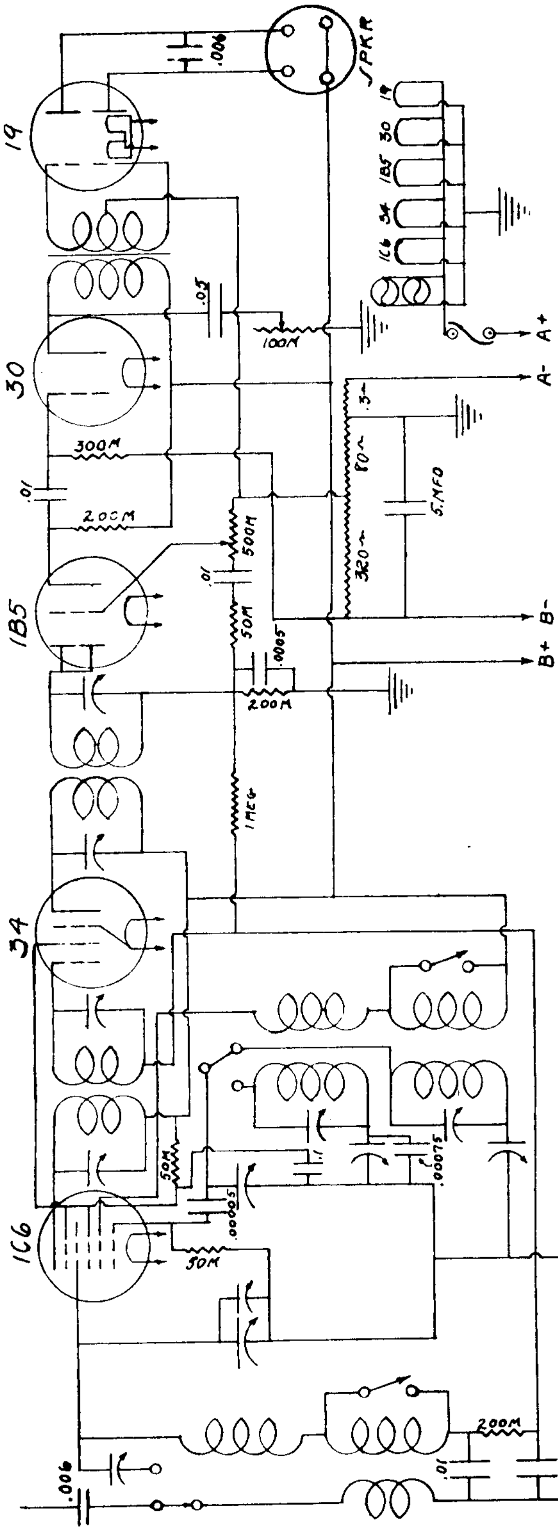
FEDERATED PURCHASER INC.

ACRATONE MODELS 18B, 19B & 20B



I.F. - 456 k.c. Operates on 110-125 volts, 50/60 cycles A.C. 13-2000 meters

ACRATONE MODELS 169B & 169D

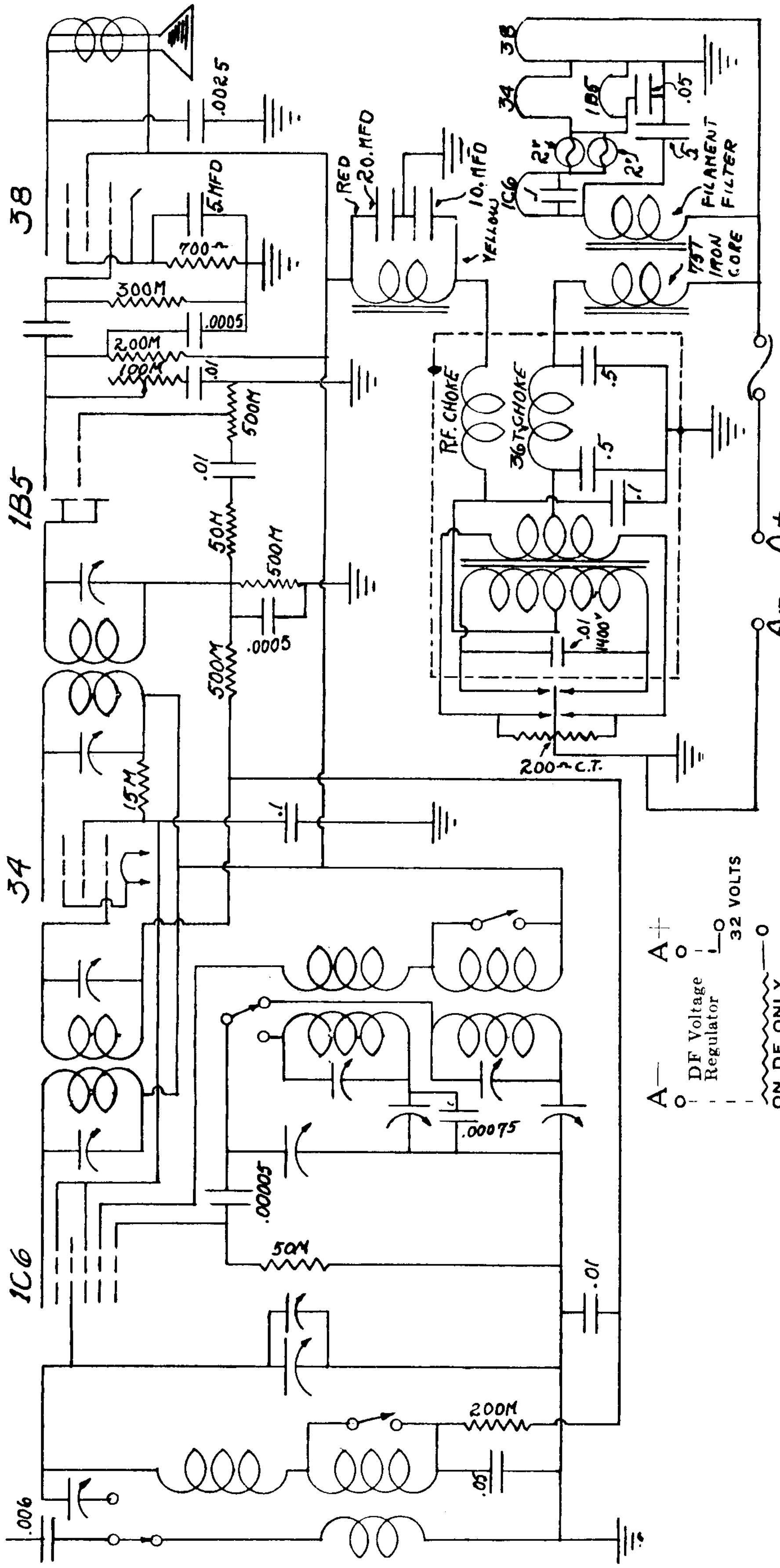


13-55 meters
200-550 meters

I.F. - 456 k.c.

Requires: 2 volts "A"
135 volts "B"

FEDERATED PURCHASER INC.
ACRATONE MODELS 167B & 167D



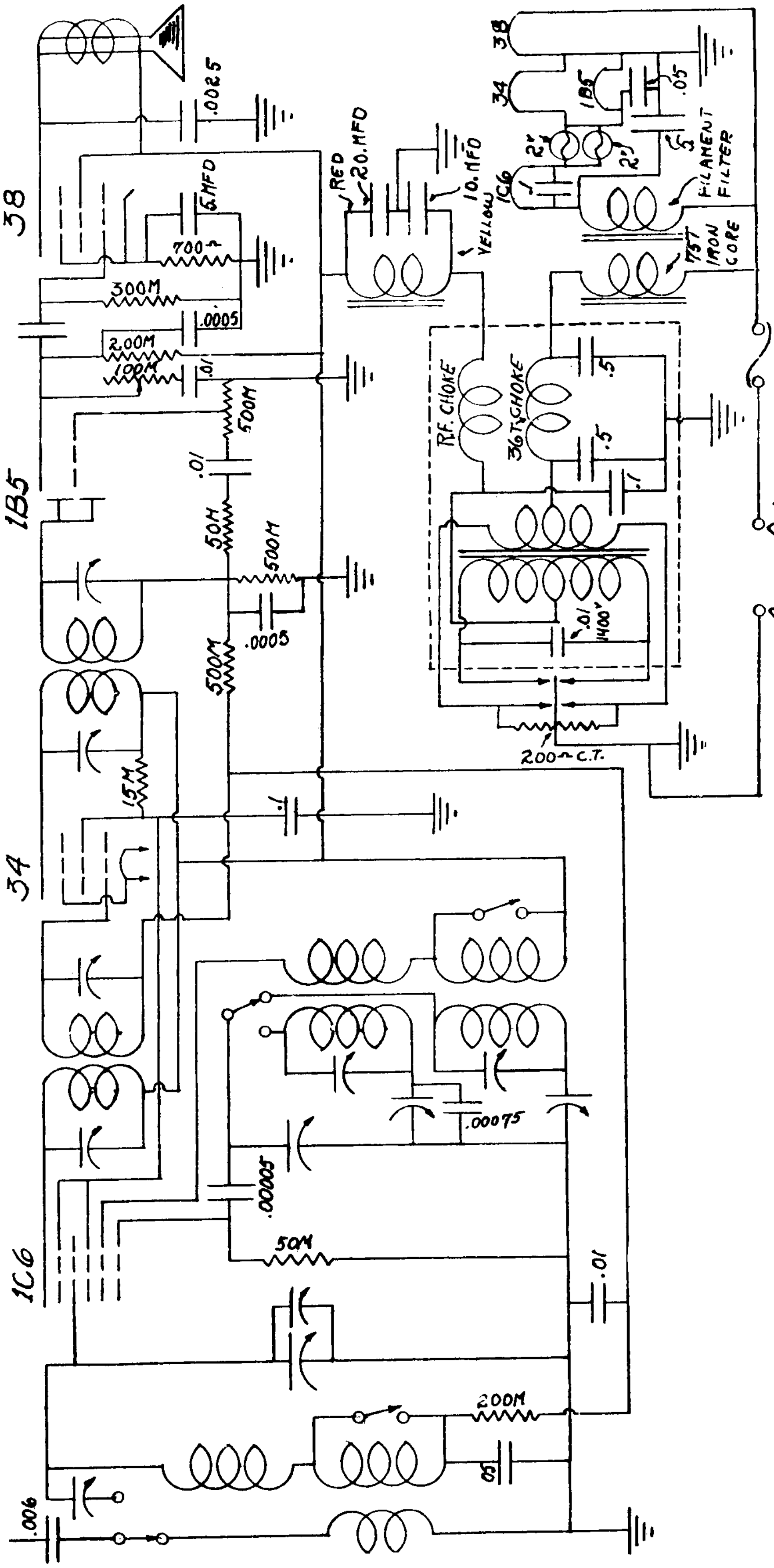
13-55 meters
200-550 meters

I.F. - 456 k.c.

Operates from 32 volt
Delco or other systems.

FEDERATED PURCHASER INC.

ACRATONE MODELS 168B & 168D



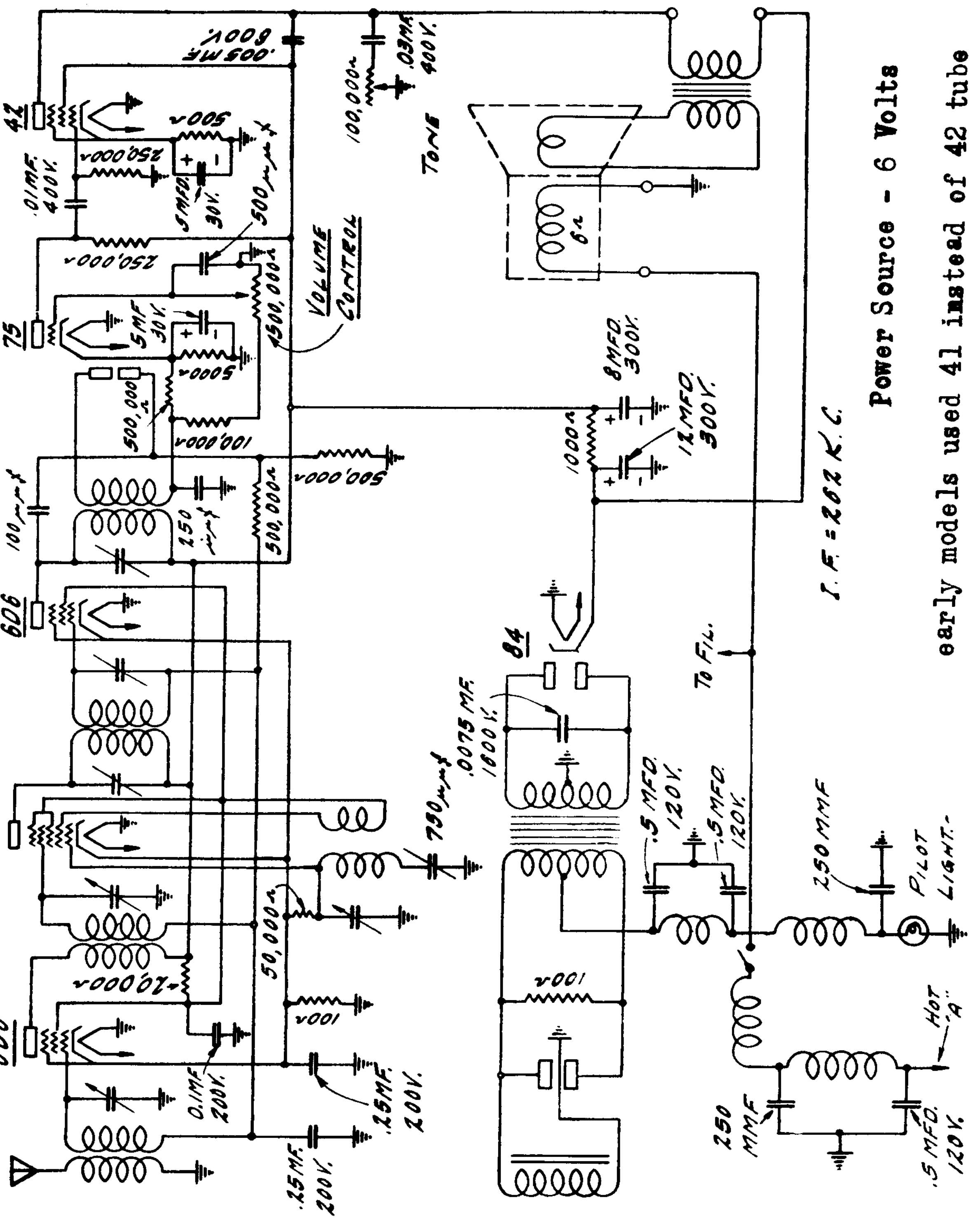
13-55 meters
200-550 meters

I.F. - 456 k.c.

Operates from 6 volt battery source only.

FEDERATED PURCHASER INC.

ACRATONE MODEL 260B



GAROD RADIO CORPORATION

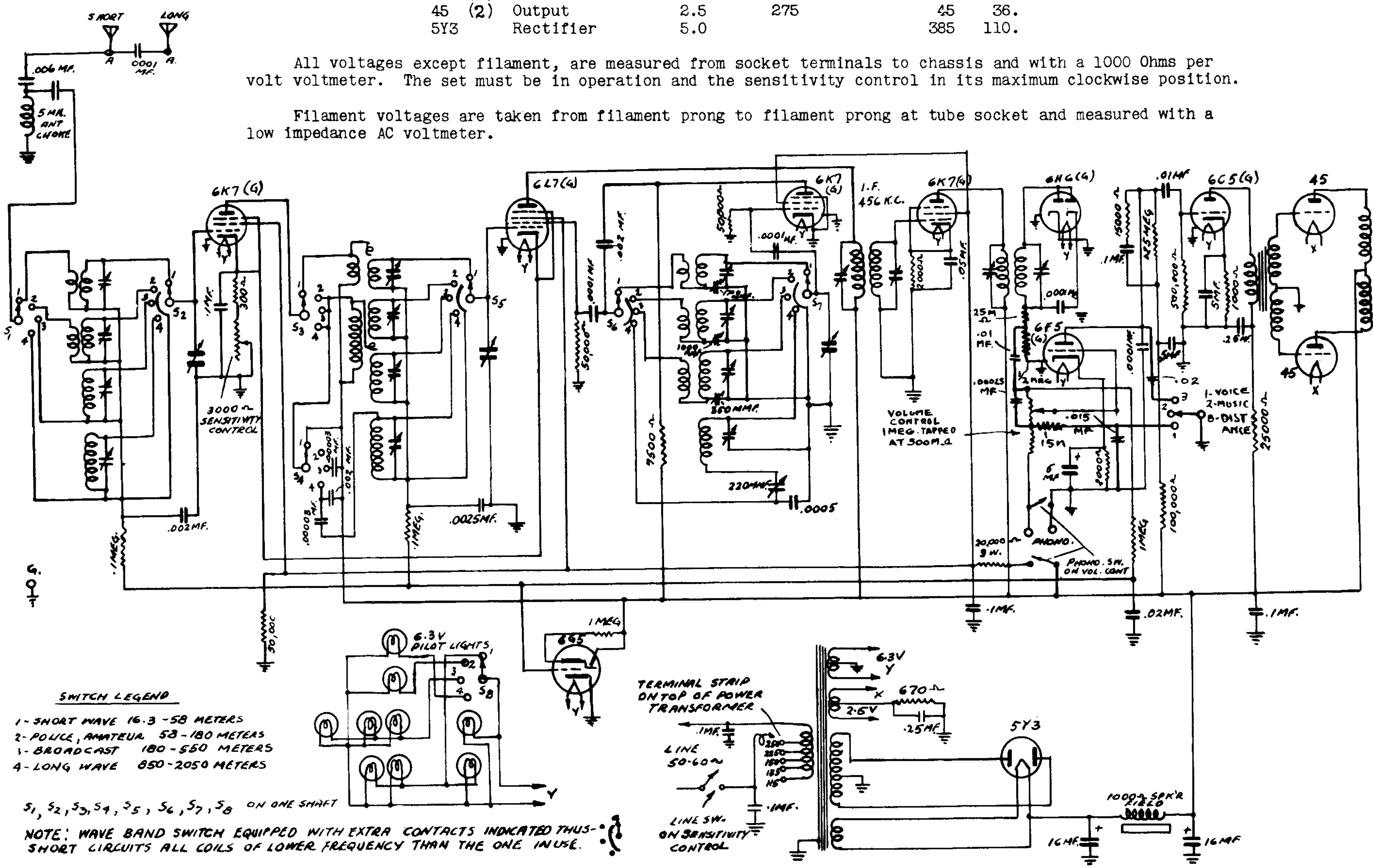
MODELS 4110, 4110E & 4110KC

I.F. 456 K.C.

TUBE		FUNCTION	HEATER	PLATE	SC. GR.	CATH V	CATH I
6K7	(G)	RF Amp.	6.3	275	90	2	9.0
6K7	(G)	Oscillator	6.3	240	90	0	8.0
6L7	(G)	Converter	6.3	275	90	2	5.0
6K7	(G)	1st IF	6.3	275	90	4	4.5
6H6	(G)	Diode	6.3	0		0	
6F5	(G)	1st Audio	6.3	90		1	.3
6C5	(G)	2nd Audio	6.3	200		8	3.0
45	(2)	Output	2.5	275		45	36.
5Y3		Rectifier	5.0			385	110.

All voltages except filament, are measured from socket terminals to chassis and with a 1000 Ohms per volt voltmeter. The set must be in operation and the sensitivity control in its maximum clockwise position.

Filament voltages are taken from filament prong to filament prong at tube socket and measured with a low impedance AC voltmeter.



GAROD RADIO CORPORATION

MODELS 4110, 4110E & 4110K.C

ALIGNMENT PROCEDURE

Realignment of this receiver should not be attempted unless all other possible causes of faulty operation have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave-bands and an output meter for indicating the effect of adjustments are required.

It is important to remember that in receivers of this kind which are equipped with automatic volume control it is necessary to use the minimum possible signal from the signal generator; otherwise the A.V.C. action will tend to nullify the variations in output as the trimmers are adjusted.

I.F. ADJUSTMENT - The signal generator is set at 456 kc. and is connected to the grid of the first detector (6A8). With the oscillator section of the tuning condenser short-circuited and the receiver volume control at its maximum position, the i.f. trimmers are adjusted for maximum output. These trimmers may be found on the tops of the I.F. Transformers.

18 MEGACYCLE ADJUSTMENT - The high side of the signal generator is connected to the antenna lead of the receiver and the low side to the ground lead. The receiver and the signal are both tuned to a frequency of 18 mc. with the selector switch in position for band no. 1. The oscillator trimmer condenser is adjusted so that the 18 mc. signal is tuned in exactly at the 18 mc. calibration point, with the volume control on full and the signal generator adjusted for minimum input. The antenna preselector and interstage trimmers are then adjusted in the order named for maximum output. These trimmers are located as indicated in the bottom view of the chassis.

6 MEGACYCLE ADJUSTMENT - The signal generator is set at 6 megacycle and the signal tuned in on the dial. The short wave padding condenser is adjusted for maximum output, while the gang condenser is rocked slightly to the right and left. The 18 megacycle adjustment should then be rechecked.

5 MC. ADJUSTMENT - With the band selector switch in position for operation on band no. 2. and the receiver and signal generator both set at 5 mc. the procedure outlined above is repeated.

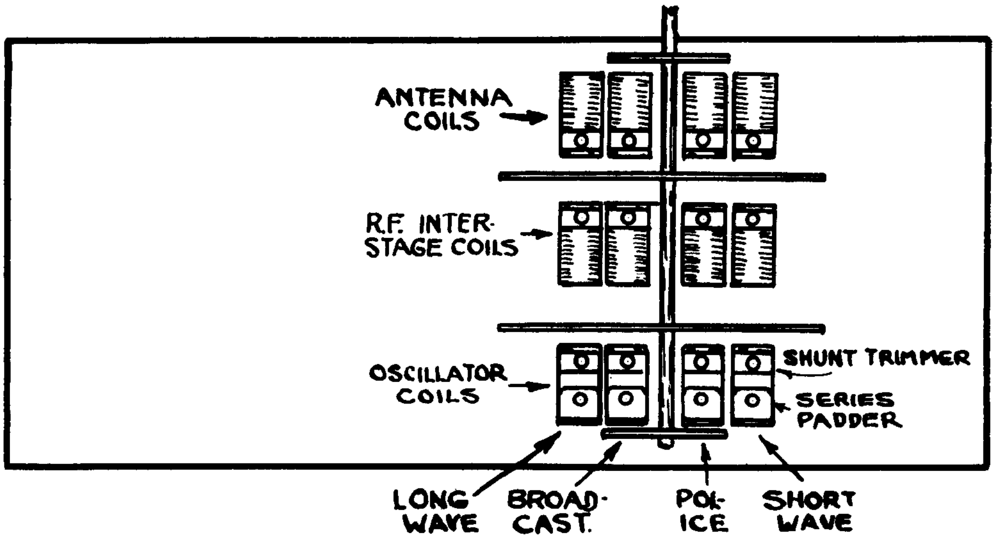
The signal generator is set at 1.8 mc. and the signal tuned in on the dial. The police band padder condenser is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 5 mc. adjustment should then be rechecked.

1500 KC. ADJUSTMENT - The band selector switch is set in position for operation on the no. 3. band. The receiver and signal generator are both set at 1500 kc. and the procedure outlined above is repeated.

The signal generator is set at 600 kc. and the signal tuned in on the dial. The broadcast padder condenser is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 1500 kc. adjustment should then be rechecked.

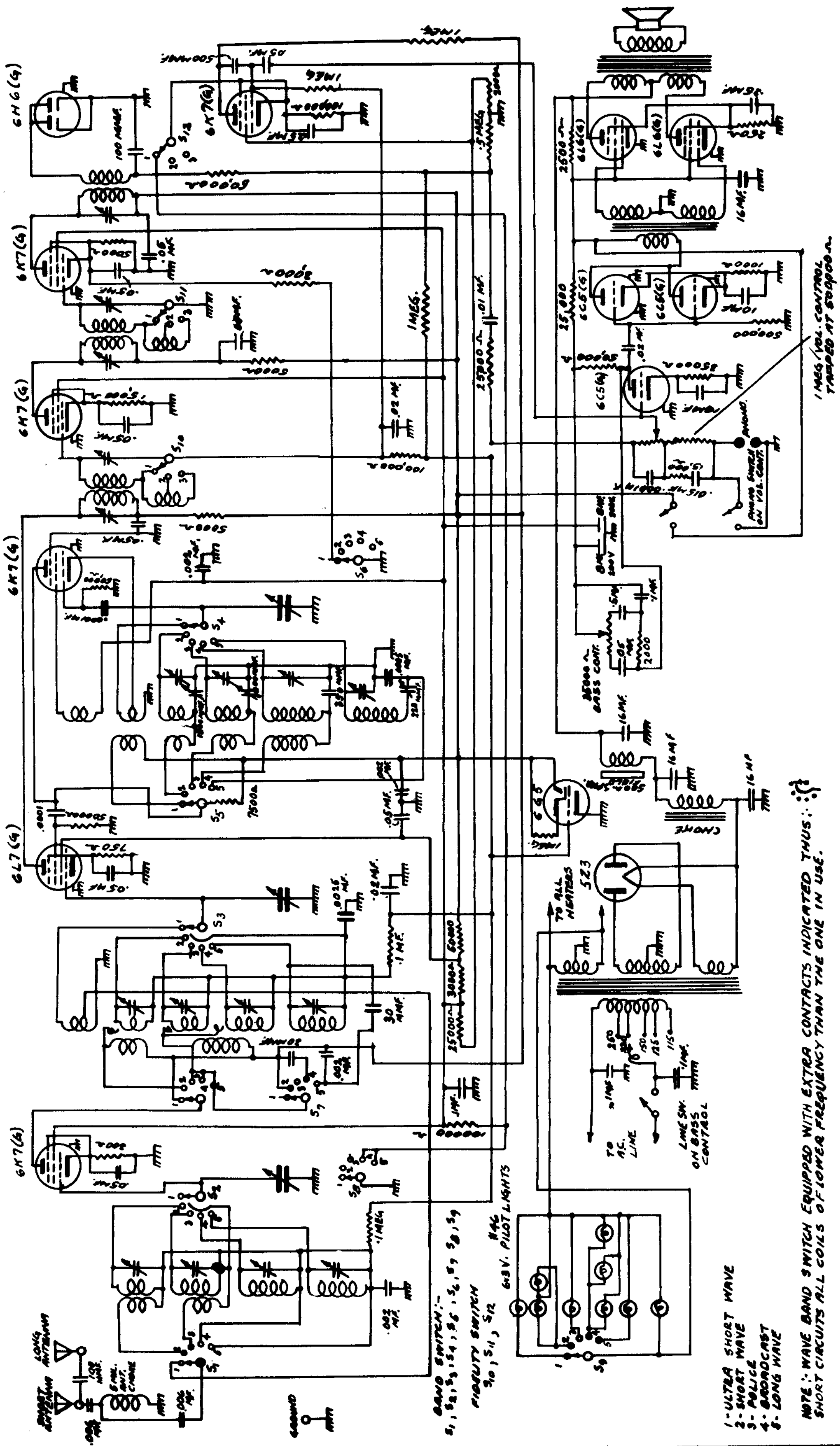
300 KC. ADJUSTMENT - The band selector switch is set in position for operation on band no. 4. The receiver and generator are both tuned to 300 kc. and the procedure outlined above is repeated.

The signal generator is set at 150 kc. and the signal is tuned in on the dial. The long wave padder condenser is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 300 kc. adjustment should then be rechecked.



GAROD RADIO CORPORATION

MODELS 5140, 5140H & 5140LC



I.F. 456 K.C.

GAROD RADIO CORPORATION

MODELS 5140, 5140H & 5140LC

Realignment of this receiver should not be attempted unless all other possible causes of faulty operation have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave-bands and an output meter for indicating the effect of adjustments are required.

It is important to remember that in receivers of this kind which are equipped with automatic volume control it is necessary to use the minimum possible signal from the signal generator; otherwise the avc action will tend to nullify the variations in output as the trimmers are adjusted. A surer method is to make the avc tube inoperative. This may be done by shorting return of RF trimmers to ground.

I.F. ADJUSTMENT: The signal generator is set at 456 kc. and is connected to the grid of the first detector (6L7). With the oscillator section of the tuning condenser short-circuited and the receiver volume control at its maximum position, the i.f. trimmers are adjusted for maximum output. These trimmers may be found on the tops of the I.F. transformers.

18 MEGACYCLE ADJUSTMENT: The high side of the signal generator is connected to the antenna lead of the receiver and the low side to the ground lead. The receiver and the signal are both tuned to a frequency of 18 mc. with the selector switch in position for band no. 2 (Short Wave). The oscillator trimmer condenser is adjusted so that the 18 mc. signal is tuned in exactly at the 18 mc. calibration point, with the volume control on full and the signal generator adjusted for minimum input. The antenna preselector and interstage trimmers are then adjusted in the order named for maximum output. These trimmers are located as indicated in the bottom view of the chassis.

6 MEGACYCLE ADJUSTMENT: The signal generator is set at 6 megacycles and the signal tuned in on the dial. The Short Wave padding condenser is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left.

5 MC. ADJUSTMENT: With the band selector switch in position for operation on band no. 3 (Police) and the receiver and signal generator both set at 5 mc. the procedure outlined above is repeated.

The signal generator is set at 1.8 mc. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 5 mc. adjustment should then be rechecked.

1500 KC. ADJUSTMENT: The band selector switch is set in position for operation on the no. 4 band. (Broadcast). The receiver and signal generator are both set at 1500 kc. and the procedure outlined above is repeated.

The signal generator is set at 600 kc. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 1500 kc. adjustment should then be rechecked.

300 KC. ADJUSTMENT: The band selector switch is set in position for operation on band no. 5. The receiver and generator are both tuned to 300 kc. and the procedure outlined above is repeated.

The signal generator is set at 150 kc. and the signal is tuned in on the dial. The Long Wave padder condenser is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 300 kc. adjustment should then be rechecked.

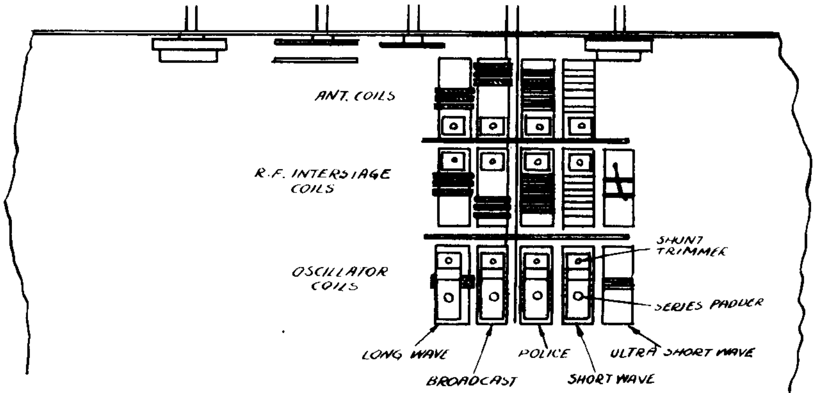
MODEL 5140

TUBE	FUNCTION	HEATER	PLATE	SC. GRID.	CATH. V	CATH. I
6K7(G)	R F Amp.	6.3	245	120	2.5	8
6L6(G)	Converter	6.3	225	160	6	8
6K7(G)	Osc.	6.3	170	120	0	10
6K7(G)	1st I F	6.3	235	120	15	.6
6K7(G)	2nd I F	6.3	235	120	10	1.3
6H6(G)	Diode det.	6.3	0		0	
6C5(G)	1st Audio	6.3	180		10	.3
6C5(G)(2)	Driver	6.3	235		8	4
6L6(G)(2)	Audio Output	6.3	325	245	20	40
5X4G	Rectifier	5.0			430	120
6K7(G)	Automatic Tone Control (wsc)	6.3	40	8	10	.2

All voltages except filament measured with 1,000 Ohms per volt meter from socket to chassis with band switch in broadcast position, and fidelity switch in selective position.

Filament voltages are taken across filament prongs at tube socket and measured with a low impedance AC Voltmeter.

Line -- 115 volts



GENERAL ELECTRIC COMPANY

MODEL E115

SYMBOL	DESCRIPTION
C1	3 GANG TUNING CAPACITOR 10-450 MMF
C2	PAPER CAP. 0.0045 MF
C3	PAPER CAP. 0.01 MF
C4	PAPER CAP. 2 MF
C5	"B" R.F.TRIMMER 3-40 MMF
C6	"D" ANT.TRIMMER 3-40 MMF
C7	PAPER CAP. 0.05 MF
C8	PAPER CAP. 0.05 MF
C9	"B" ANT.TRIMMER 3-35 MMF
C10	"D" OSC.TRIMMER 2-20 MMF
C11	"B" OSC.TRIMMER 5-45 MMF
C12	PAPER CAP. 0.05 MF
C13	MICA CAP. 1170 MMF
C14	"B" PAD. TRIMMER 350 - 550 MMF
C15	MICA CAP. 50 MMF
C16	PAPER CAP. 0.05 MF
C17	PAPER CAP. 0.05 MF
C18	1st I.F. SEC.TRIMMER
C19	1st I.F. PRI.TRIMMER
C20	PAPER CAP. 0.02 MF
C21	PAPER CAP. 0.05 MF
C22	2nd I.F. SEC.TRIMMER
C23	2nd I.F. PRI.TRIMMER
C24	PAPER CAP. 0.1 MF
C25	PAPER CAP. 0.10 MF
C26	PAPER CAP. 0.05 MF
C27	PAPER CAP. 0.05 MF
C28	3rd I.F. SEC.TRIMMER
C29	3rd I.F. PRI.TRIMMER
C30	MICA CAP. 250 MMF
C31	MICA CAP. 250 MMF
C32	PAPER CAP. 0.005 MF
C33	MICA CAP. 150 MMF
C34	PAPER CAP. 0.003 MF
C35	MICA CAP. 500 MMF
C36	PAPER CAP. 0.05 MF
C37	PAPER CAP. 0.05 MF
C38	PAPER CAP. 0.0015 MF
C39	PAPER CAP. 0.01 MF
C40	PAPER CAP. 0.003 MF
C41	DRY ELECTROLYTIC CAP. 18 MF
C42	WET ELECTROLYTIC CAP. 10 MF
C43	DRY ELECTROLYTIC CAP. 4 MF
C44	DRY ELECTROLYTIC CAP. 10 MF
C45	PAPER CAP. 0.01 MF
C46	PAPER CAP. 0.01 MF
L1	"D" ANTENNA COIL
L2	"B" & "C" ANTENNA COIL
L3	"B" RF INTERSTAGE TRANSFORMER
L4	"D" OSC. COIL
L5	"B" & "C" OSC. COIL
L6	1st IF TRANSFORMER ASSEMBLY
L7	2nd IF TRANSFORMER ASSEMBLY
L8	3rd IF TRANSFORMER ASSEMBLY
L9	FIELD COIL 460Ω (COLD)

SYMBOL	DESCRIPTION
R1	CARBON RESISTOR 47,000 Ω 1/4W
R2	CARBON RESISTOR 47,000 Ω 1/4W
R3	CARBON RESISTOR 47,000 Ω 1/4W
R4	CARBON RESISTOR 47,000 Ω 1/4W
R5	CARBON RESISTOR 180 Ω 1/4W
R6	CARBON RESISTOR 4,700 Ω 1/4W
R7	CARBON RESISTOR 390 Ω 1/4W
R8	CARBON RESISTOR 2,200 Ω 1/4W
R9	CARBON RESISTOR 4,700 Ω 1/4W
R10	CARBON RESISTOR 68,000 Ω 1/4W
R11	CARBON RESISTOR 220,000 Ω 1/4W
R12	CARBON RESISTOR 47,000 Ω 1/4W
R13	VOLUME CONTROL 2 MEG TAP AT 1/2 MEG
R14	CARBON RESISTOR 1,800 Ω 1/4W
R15	CARBON RESISTOR 68,000 Ω 1/4W
R16	CARBON RESISTOR 68,000 Ω 1/4W
R17	CARBON RESISTOR 330,000 Ω 1/4W
R18	RESISTOR 210 Ω 1.68W
R19	CARBON RESISTOR 24,000 Ω 1/4W
R20	CARBON RESISTOR 330,000 Ω 1/4W
R21	CARBON RESISTOR 1.0 MEG 1/4W
R22	RESISTOR 750 Ω 1.3W
R23	RESISTOR 2,800 Ω 1.65W
R24	RESISTOR 6,400 Ω 1.37W
R25	CARBON RESISTOR 15,000 Ω 1W
R26	FLEXIBLE RESISTOR 19 Ω 4W
R27	CARBON RESISTOR 12,000 Ω 1/2W
S1	BAND CHANGE SWITCH
S2	TONE CONTROL SWITCH
S3	POWER SWITCH
T1	POWER TRANSFORMER [60 ~, 25-60 ~, 40-60 ~]
T2	TUNING REACTOR [60 ~, 25 ~]
T3	OUTPUT TRANSFORMER (ON SPEAKER)
V1	6A8 TUBE
V2	6K7 TUBE
V3	6K7 TUBE
V4	6H6 TUBE
V5	6C5 TUBE
V6	6F6 TUBE
V7	6F6 TUBE
V8	6C5 TUBE
V9	5W4 TUBE
V10	5W4 TUBE
V11	6K7 TUBE
P1	ANTENNA-GROUND TERMINAL BOARD
P2	PILOT LIGHT, GREEN, 6.3V, .15A
P3	PILOT LIGHT, RED, 6.3V, .15A
P4	POWER CORD & PLUG

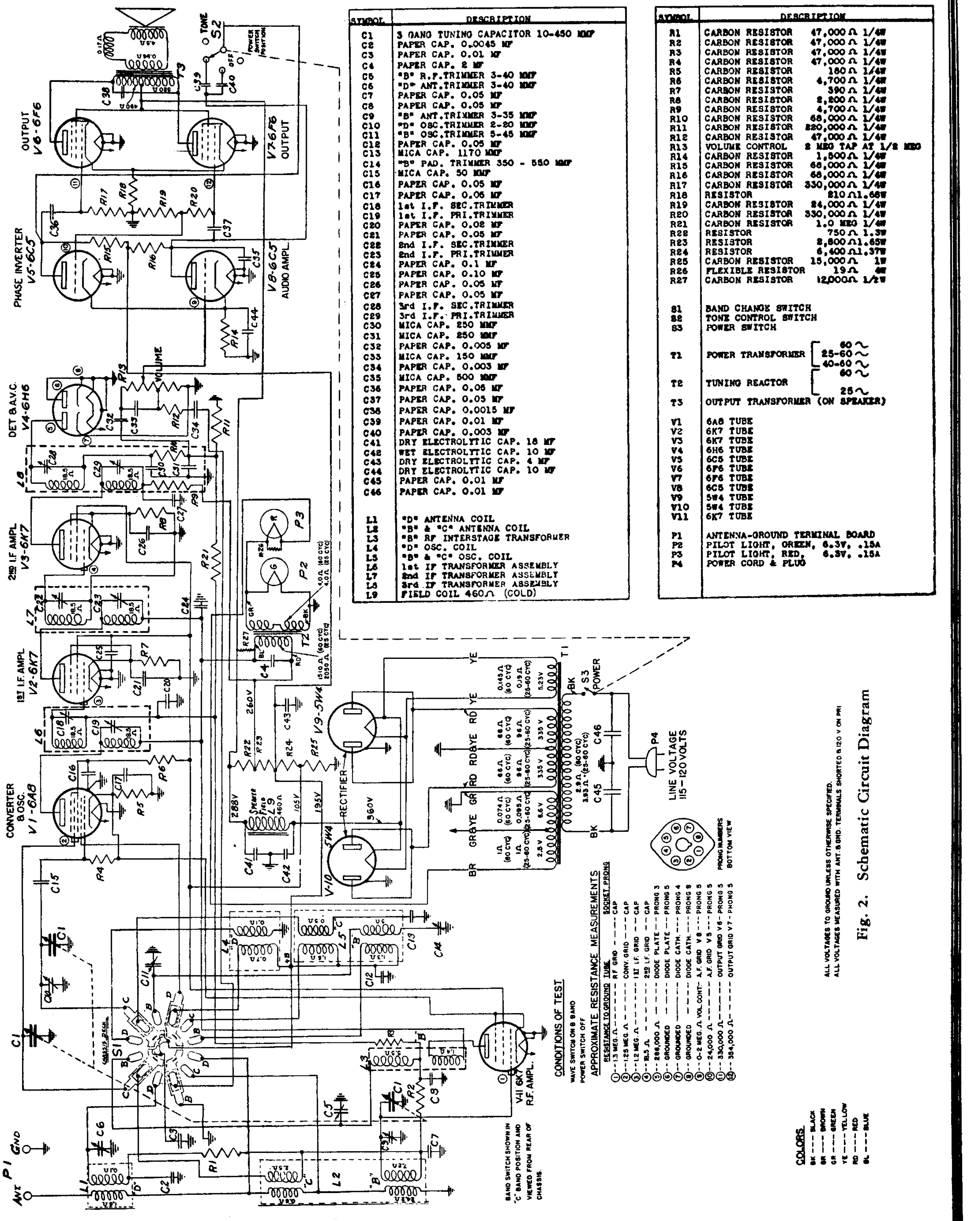


Fig. 2. Schematic Circuit Diagram

GENERAL ELECTRIC COMPANY

MODEL E115

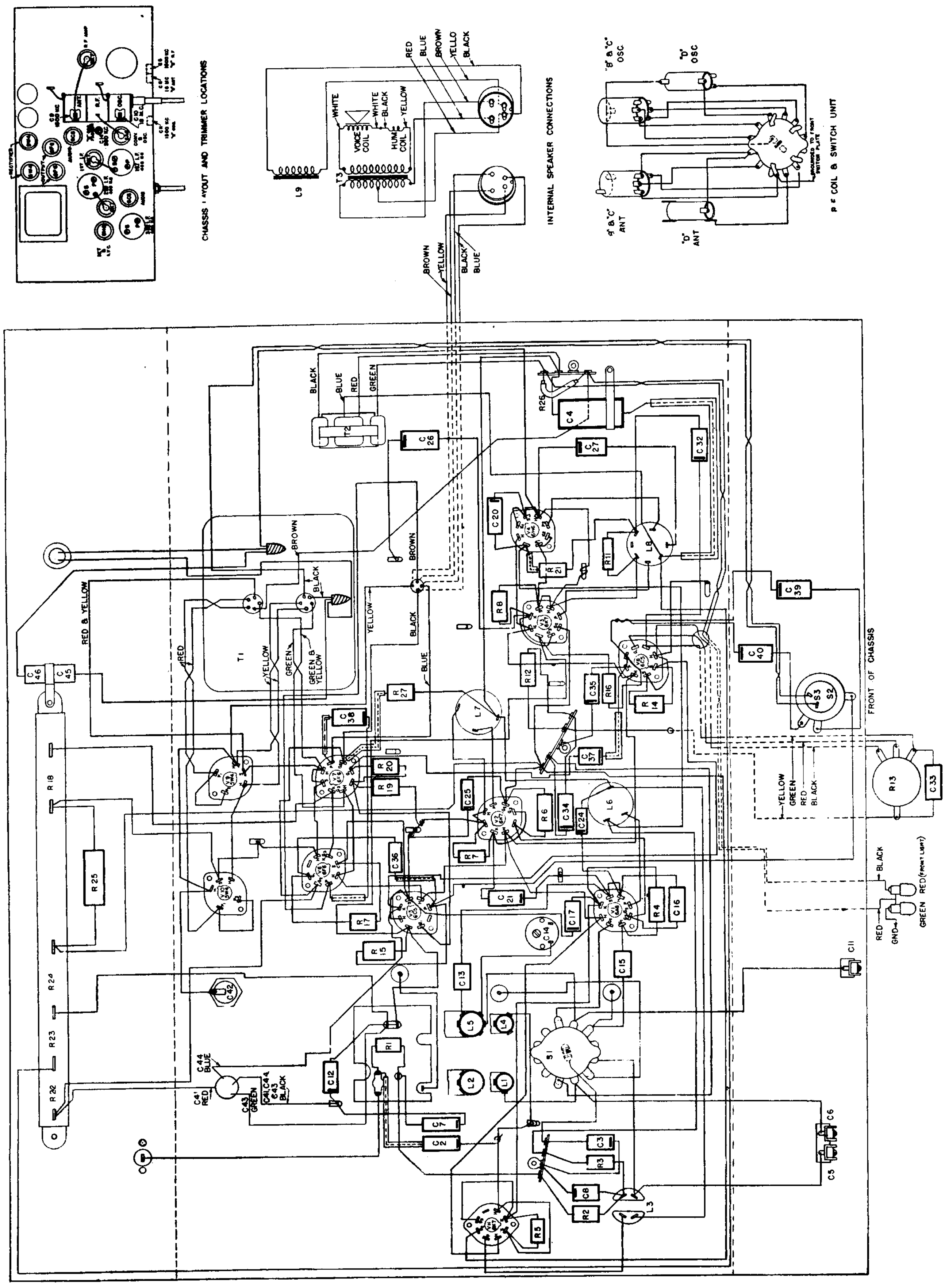


Fig. 3. Chassis Wiring Diagram

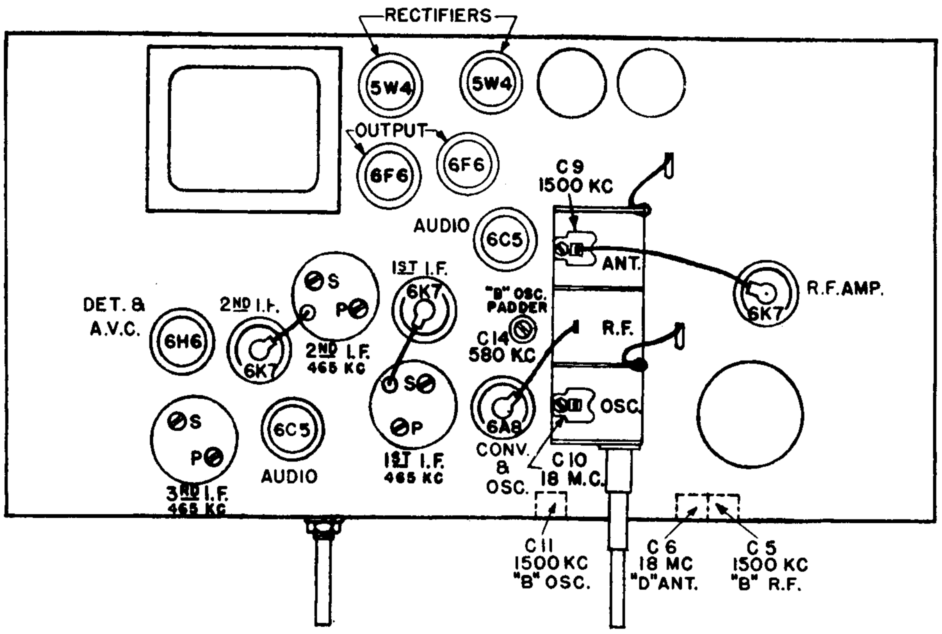
GENERAL ELECTRIC COMPANY

MODEL E115

ALIGNMENT PROCEDURE

IF ALIGNMENT WITH OSCILLOSCOPE

	Band Switch Setting	Input Frequency	Point of Input	Dummy Ant.	Trimmer	Remarks
1	Band "B"	465 K.C. Sweep	1st IF Grid	.05 MFD or Larger	3rd IF Sec. (C-28) 3rd IF Pri. (C-29)	Gang condenser plates closed—connect audio input of oscilloscope to ground and to the junction of R-21, R-11—adjust for a single symmetrical curve of maximum amplitude.
2	Band "B"	465 K.C. Sweep	1st IF Grid	.05 MFD or Larger	2nd IF Sec. (C-22) 2nd IF Pri. (C-23)	
3	Band "B"	465 K.C. Sweep	Converter Grid	.05 MFD or Larger	1st IF Sec. (C-18) 1st IF Pri. (C-19)	
			IF ALIGNMENT WITH OUTPUT METER			
1	Band "B"	465 K.C. with 400-cycle modulation	1st IF Grid	.05 MFD or Larger	3rd IF Sec. (C-28) 3rd IF Pri. (C-29)	Gang condenser plates closed—connect output meter across Voice Coil—keep input signal low and volume control on as far as possible. Adjust all trimmers for maximum output.
2	Band "B"	465 K.C. with 400-cycle modulation	1st IF Grid	.05 MFD or Larger	2nd IF Sec. (C-22) 2nd IF Sec. (C-23)	
3	Band "B"	465 K.C. with 400-cycle modulation	Converter Grid	.05 MFD or Larger	1st IF Sec. (C-18) 1st IF Pri. (C-19)	
			RF ALIGNMENT			
1	Band "B"					Close gang plates—adjust pointer to first line at left end of tuning scale.
2	Band "D"	18 M.C. with 400-cycle modulation	Antenna Post	250 MMF 400 ohms in Series	Oscillator (C-10) Antenna (C-6)	Connect output meter across voice coil—tone control on "Bass" position—set osc. trimmer. Rock gang condenser when adjusting the antenna trimmer.
3	Band "C"	No adjustments necessary				
4	Band "B"	1500 K.C. with 400-cycle modulation	Antenna Post	250 MMF 400 ohms in Series	Oscillator (C-11) RF (C-5) Ant. (C-9)	Peak trimmers for max. output with a low input signal.
5	Band "B"	580 K.C. with 400-cycle modulation	Antenna Post	250 MMF 400 ohms in Series	Osc. Padder (C-14)	Adjust for maximum output in vicinity of 580 KC while rocking the gang.
6	Band "B"	1500 K.C. with 400-cycle modulation	Antenna Post	250 MMF 400 ohms in series	Oscillator (C-11)	



GENERAL ELECTRIC COMPANY

MODEL E115

SERVICE DATA

Physical Specifications

Height . . . . 41 inches
Width . . . . 27½ inches
Depth . . . . 13½ inches
Weight packed . . . . 68 lb

Tuning Control Drive Ratio

Fast tuning . . . . 8 to 1
Vernier tuning . . . . 40 to 1

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	115–120	60	120
C	115–120	25–60	120

Tuning Frequency Range

Band "B" . . . . 540- 1660 K.C.
Band "C" . . . . 1600- 6000 K.C.
Band "D" . . . . 5400-18000 K.C.

Intermediate Frequency . . . . 465 K.C.

Electrical Power Output

Undistorted . . . . 5 watts
Maximum . . . . 9 watts

Loud Speaker—Electrodynamic

Cone diameter . . . . 12 inches
Voice coil impedance—5.5 ohms at 400 cycles

Tubes

R.F. Amplifier . . . . 6K7 Triple grid Super Control Amplifier
Converter & Oscillator. 6A8 Pentagrid Converter
1st I.F. Amplifier . . . . . 6K7 Triple Grid Super Control Amplifier
2nd I.F. Amplifier . . . . . 6K7 Triple Grid Super Control Amplifier
Detector A.V.C. . . . . . . 6H6 Twin diode
Phase Inverter . . . . 6C5 Detector Amplifier Triode
1st Audio . . . . 6C5 Detector Amplifier Triode
Push-pull output . . . . . . 6F6 Power Amplifier Pentodes (2)
Rectifiers . . . . 5W4 Rectifiers (2)
Dial Lamps . . . . . . 6.3 V.–0.15 A. (1 red and 1 green)

GENERAL INFORMATION

The model E-115 is a three-band superheterodyne employing eleven G.E. Metal Tubes described above. It incorporates two stages of I.F., push-pull output, three-point tone control, and a high and low note compensated volume control. Full wave rectification is obtained from two 5W4's connected as half-wave rectifiers. L1 is the "D" band antenna coil. L2 is the "B" and "C" band antenna coil. The rear section of the gang condenser, L3, and a 6K7 tube are the essential elements of an R.F. stage, used only in the "B" band. L4 and L5 are the oscillator coils for the "D," "B" and "C" bands respectively. The antenna secondary and oscillator plate coils on the next lower frequency band to the one in use are shunted out by the wave switch contacts which are connected to C3 and B+.

Colorama Tuning

This receiver is equipped with a novel tuning device which indicates the point of exact resonance by the color of the dial illumination. When no signal is tuned-in, the dial illumination is red, but as the receiver is tuned, a smooth change to green occurs. Powerful stations will produce the darkest green color. Weak stations may only change the dial illumination to pink. The point at which any station is exactly in tune is indicated by the greatest color change obtainable.

The colored light is produced by a red and a green pilot bulb mounted behind the dial scale. These are controlled by a saturable reactor in a circuit which is shown in the schematic diagram, Fig. 2. The two bulbs are placed in series across one of the secondaries on the power transformer. In shunt with the green bulb is a reactor whose impedance is varied by a d-c coil wound on the same core. The plate current of the AVC controlled tubes flows through the d-c coil. At a condition of no-signal, the bias on the AVC controlled tubes is at minimum and their plate current is at maximum causing saturation of the reactor, which in turn shunts out and nearly extinguishes the green bulb. This causes most of the a-c supply voltage to be impressed across the RED bulb and its parallel resistor. At no signal, then, the dial is deepest red. When a station is tuned-in, the above conditions are reversed and the GREEN bulb is illuminated brightly. The impedance of the reactor changes in exact relationship with the incoming signal resulting in a smooth change from red to green or from green to red.

Phase Inverter

A 6C5, used as a phase-inverter, makes it possible to use push-pull output without the use of an inter-stage transformer. The audio signal from the volume control is impressed on the grid of the 6C5 audio amplifier. A portion of the 6C5 output is taken from a tap on one of the 6F6 grid resistors, and impressed on the grid of the phase inverter. (The ratio of R-19 and R-20 is chosen so that the excitation on the grid of the phase inverter is equal to that applied to the grid of the 6C5 audio amplifier.) Thus, the input signal to one of the 6F6's passes through two tubes while the input to the other 6F6 passes through one tube. As a result, the excitation on the 6F6 grids is 180 degrees out of phase, which is the requirement for push-pull operation.

To realize all the performance built into these receivers at the factory, alignment using cathode ray equipment is to be preferred.

On the "D" band (5400 to 18,000 K.C.), the oscillator operates on the *LOW* frequency side of the incoming signal; therefore, adjust the oscillator trimmer until the second peak is reached as the trimmer is *INCREASED* in capacity. When the correct adjustment is made, it will be possible to tune the image of any signal on the "D" band 930 K.C. *HIGHER* than the signal if the input is sufficiently high. Example: The image of 15 M.C. should be heard at 15,970 K.C.

The alignment procedure is given in table form on page 3. The "Dummy Antenna" is the capacitor or capacitor and resistor used in series with the signal generator antenna lead.

ADJUSTMENT OF DIAL MECHANISM

The dial mechanism (Fig. 4) is mounted to the chassis by means of two brackets and four self-tapping screws. Motion is imparted to the gang condenser rotor through a series of pulleys and an interconnecting cable to the dial pointer slider which is supported on a rail above the dial scale.

To Replace Drive Cable

Rotate the drive drum (14) counter-clockwise until the gang condenser plates are fully open. Place the end of the cable having an eyelet in slot (A). Thread the cable as shown in Fig. 4, making certain that the cable passes *over* the pin (B) and runs along the *correct* grooves, the looped end hooking over the tension spring (16). Check the position of the drive wheel (14) on the condenser shaft to make sure that the cable coming off the right-hand idler pulley lines up with the groove in the drive pulley. Also, as the condenser plates become fully meshed, the drive wheel (14) should just meet the bushing (D) of the reduction drive unit (13). With the drive wheel in this position, place the pointer on the rail (E) and, with the tip of the pointer (11) on the extreme left-hand dial scale division of Broadcast band, crimp the pointer tab on the drive cable.

To Adjust Pointer or Scale Calibration

Three positions of the dial pointer cable are provided on the drive drum (14) to adjust the dial pointer up or down scale. The position shown in Fig. 4 with the cable over pin (B) is the medium position. Changing the cable to the position between pins (B) and (C) moves the pointer *down* scale. The position below the pin (C) moves the pointer *up* scale from the medium position. With the gang plates closed, set the pointer at the extreme left-hand dial scale marking on the Broadcast band.

To Replace Scale

Remove the band change cable (12) by unhooking it from the fork (F) on bracket (3). Remove the end support bracket (8) held by a single self-tapping screw and withdraw the scale assembly from its housing. Replace the end caps (5) and (6) on the new scale and reassemble. Before reattaching the band change cable to the fork (F) the tension spring (7) should be given two full turns to provide proper tension for the cable.

To Ajdust Rotation of Scale

The bracket arm (3) may be moved up or down by means of the set screw to give the correct position of the scale divisions with respect to the dial pointer. The pointer tip should slightly overlap the scale divisions.

To Change Dial Lamps

Lift the lamp bracket (17) from the housing (20) to which it is clipped. With the lamp bracket laid back horizontally, the lamps may be replaced.

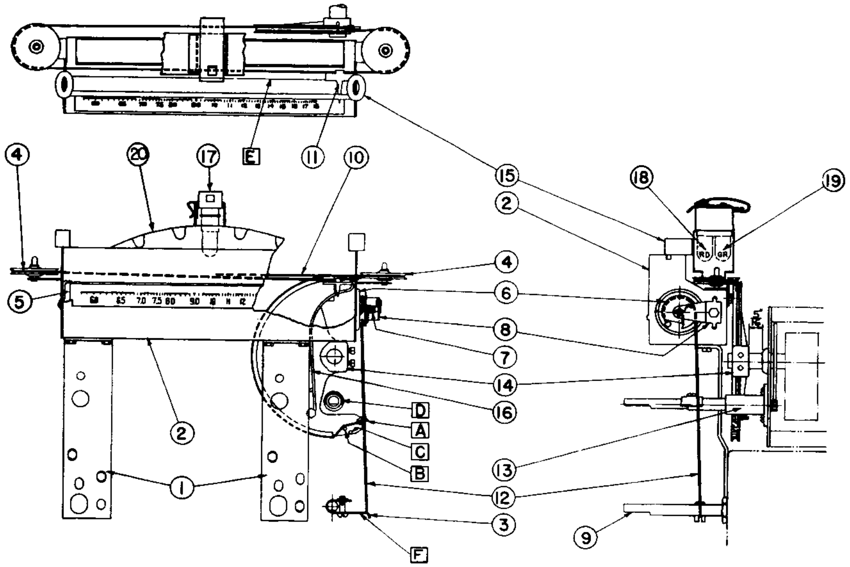


Fig. 4. Dial Mechanism

SOCKET VOLTAGES

Tube		Cathode to Ground Volts DC	Screen Grid to Ground Volts DC	Plate to Ground Volts DC	Cathode Current M.A.	Heater Volts A.C.
6A8	Oscillator	....	......	190	10.0	6.3
	Converter	3.2	93	235		
6K7 1st I.F.		3.0	103	235	8.5	6.3
6K7 2nd I.F.		6.8	103	235	3.1	6.3
6H6 Det. AVC		....	....	....	....	6.3
6C5 1st A.F.		6.4	....	95	1.3	6.3
6F6's Output		18	280	260	42	6.3
6C5 Inverter		6.4	....	95	1.3	6.3
5W4's Rectifiers		Fil. to gnd. 340	....	335 A-c EACH	65 EACH	5.0
6K7 R.F.		3.0	103	235	8.5	6.3

AC line voltage 117—no signal input—1000 ohms per volt meter—dial pointer at 530 K.C.

GENERAL ELECTRIC COMPANY

MODEL J87A

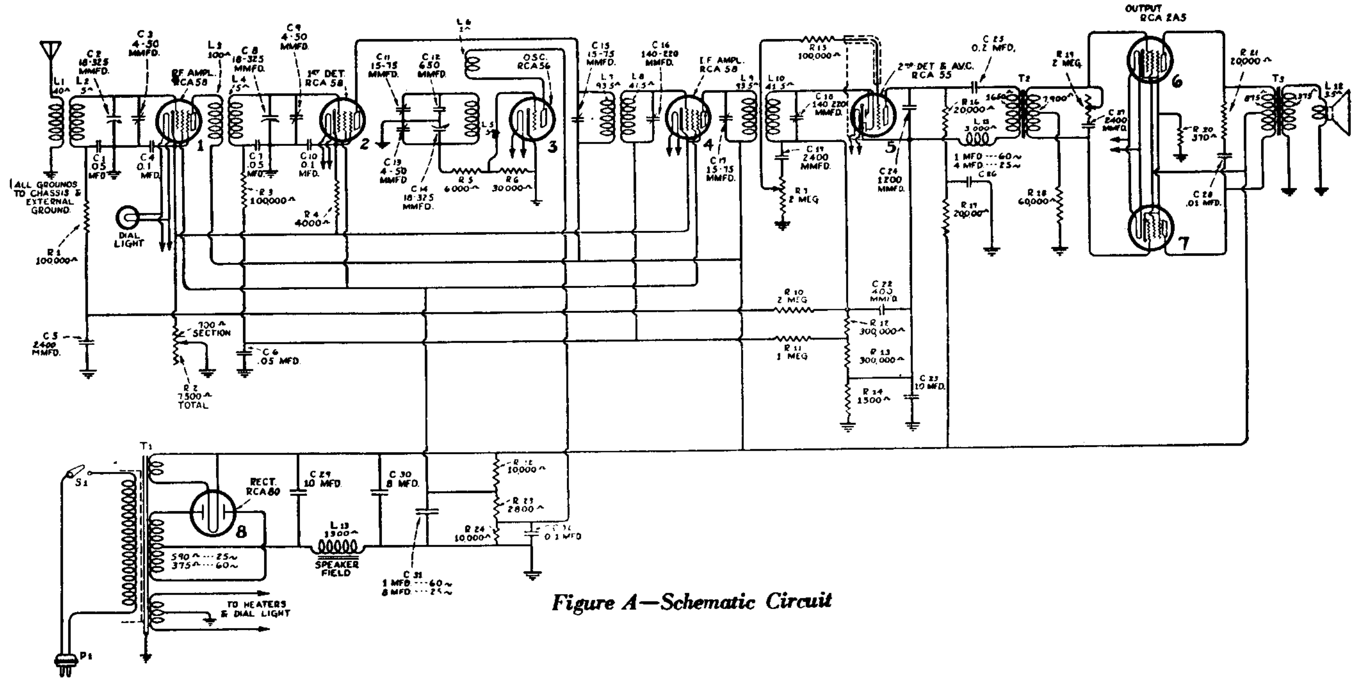


Figure A—Schematic Circuit

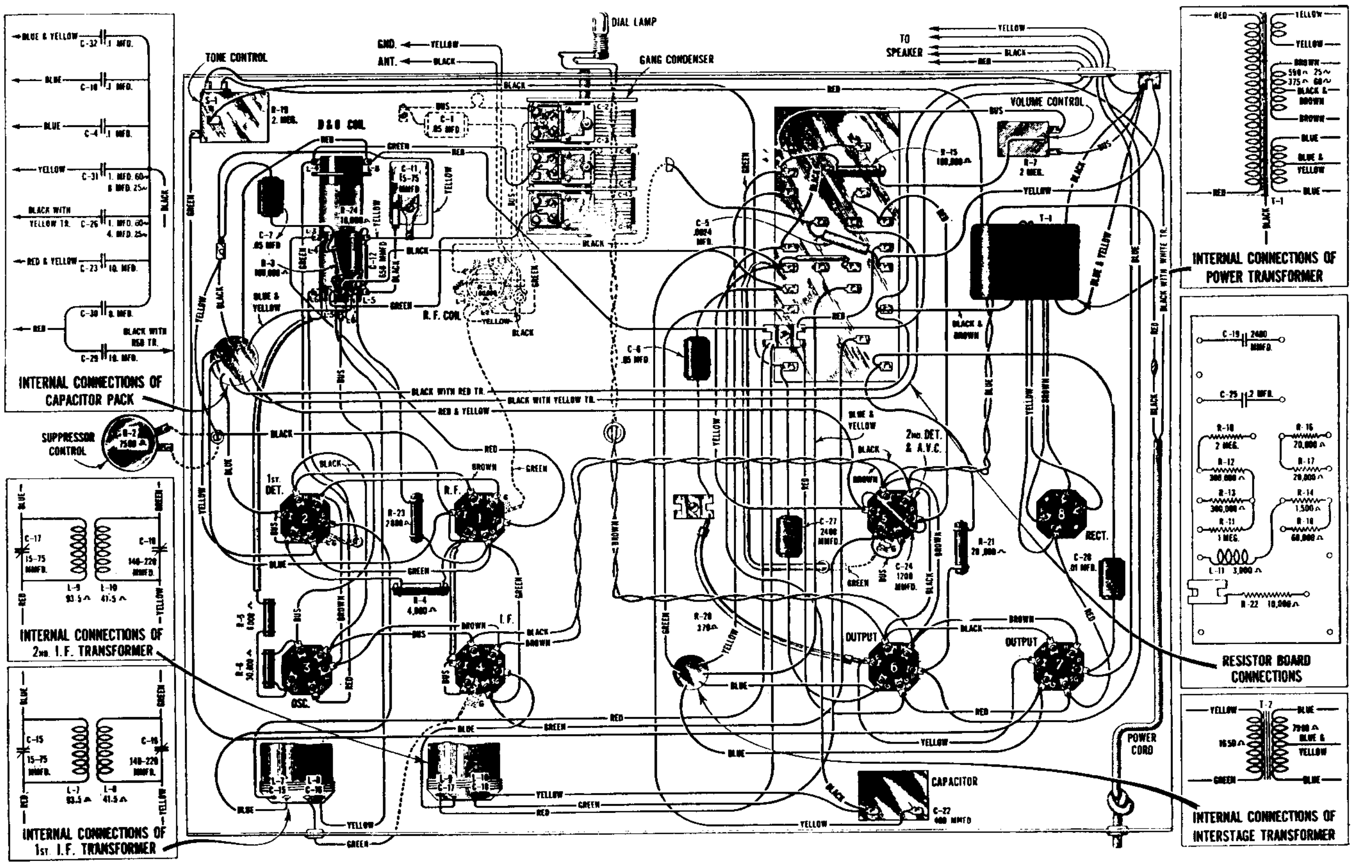


Figure B—Chassis Wiring Diagram

GENERAL ELECTRIC COMPANY

MODEL J87A

SERVICE DATA

Electrical Specifications

Voltage Rating............................105–125 Volts
Power Consumption..........................100 Watts
Type and Number of Radiotrons..3 RCA-58, 1 RCA-56, 1 RCA-55, 2 RCA-2A5, 1 UX-280—Total, 8
Type of Circuit..Super-Heterodyne with A.V.C., tone control and push-pull Universal Output Tubes
Undistorted Output............................3 Watts
R. F. and Oscillator Alignment Frequency 600 K. C., and 1400 K. C.
Intermediate Frequency.......................175 K. C.

This receiver is an eight tube Super-Heterodyne incorporating Automatic volume control, tone control and Universal Output tubes operated as a push-pull pentode stage. Service Data will be found to be similar to that of other Super-Heterodyne receivers incorporating similar features.

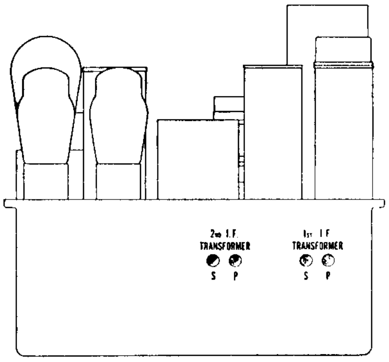


Figure C—I. F. Alignment Location

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C., and the adjustment screws are accessible from the rear of the chassis. See Figure C for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 7065 and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis.

(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screwdriver such as Stock No. 7065 and an output meter.

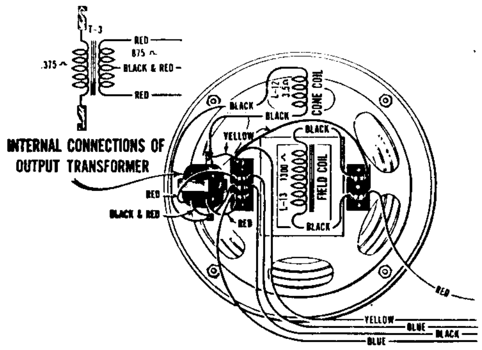


Figure D—Loudspeaker Wiring

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three line-up capacitors, accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

120 Volts, 60 Cycles A. C. Line—V. C. at Maximum and No Signal

Radiotron No.	Control Grid to Cathode, Volts	Screen Grid to Filament or Cathode, Volts	Plate to Filament or Cathode, Volts	Plate Current, M. A.	Heater or Filament, Volts
1. R. F. RCA-58	4.0	100	240	6.0	2.4
2. 1st Det. RCA-58	10.0	90	230	2.0	2.4
3. Osc. RCA-56	—	—	75	4.5	2.4
4. I. F. RCA-58	4.0	100	240	6.0	2.4
5. 2nd Det. RCA-55 and A.V.C.	5.8	—	100	4.0	2.4
6. PWR. RCA-2A5	19.0	230	220	20.0	2.4
7. PWR. RCA-2A5	19.0	230	220	20.0	2.4
Rectifier—370 Volts R.M.S. Each Plate					

GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 5L, 555 & 572

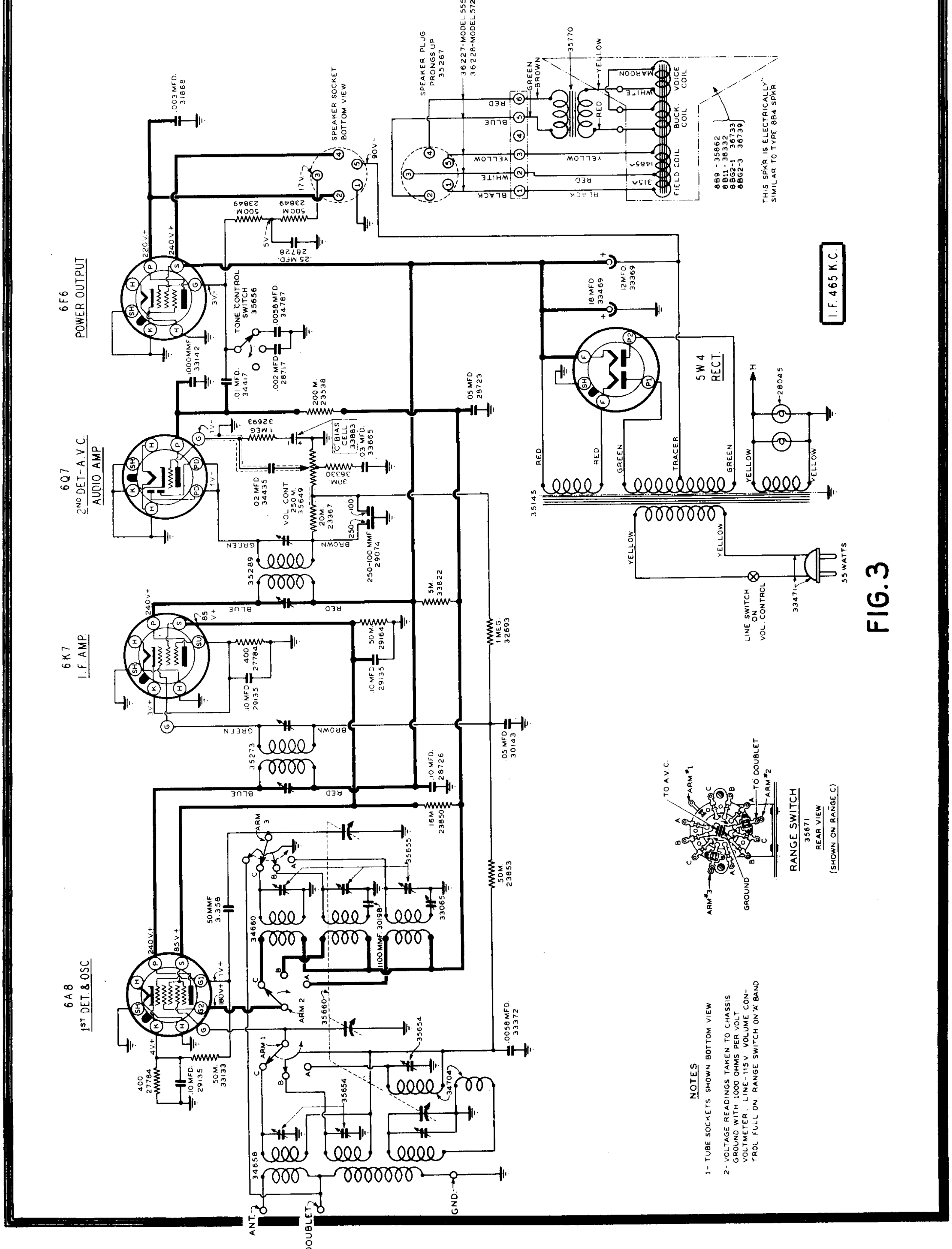


FIG. 3

GENERAL HOUSEHOLD UTILITIES COMPANY
MODELS 5L, 555 & 572

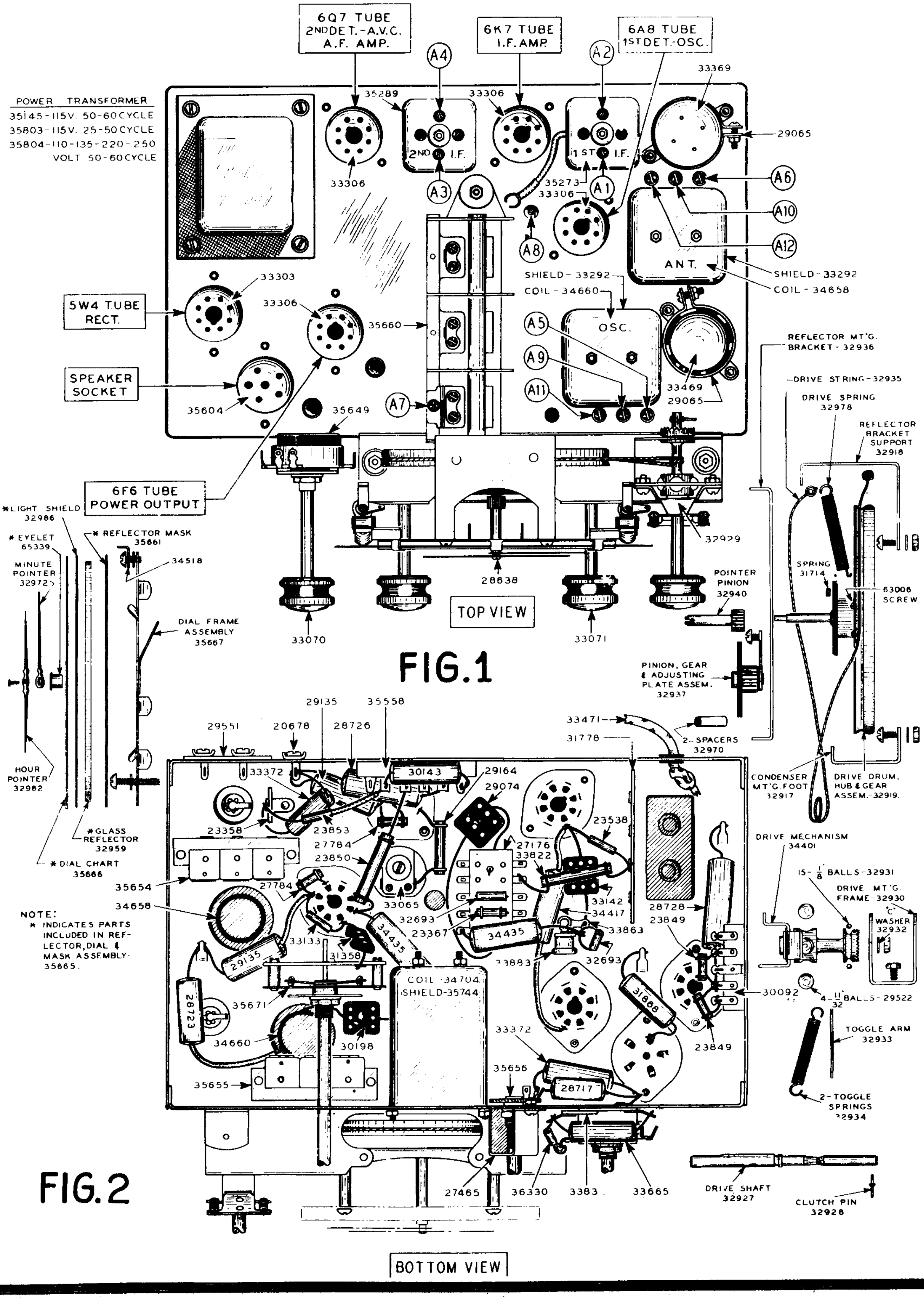


FIG.1

FIG.2

GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 5L, 555 & 572

The Grunow 5L Chassis is a Five Metal tube, 115 V. 50-60 cycles A. C., three band receiver with A. V. C., Tone Control and a "Band spread" dial. The tubes used are: 1-6A8 1st Detector and Oscillator, 1-6K7 I. F. Amplifier, 1-6Q7 2nd Detector, A. V. C. and 1st Audio Amplifier, 1-6F6 Power Output tube and a 5W4 Rectifier tube.

The frequency range is divided into three bands or divisions, one covering the band of 550 to 1750 K. C. (A), one the band from 1750 to 550 K. C. (B) and the other from 5.5 to 18.20 megacycles (C).

SERVICE DATA

Continuity and voltage readings should be taken from the underside of the chassis. The values given on the schematic diagram are average and allow the serviceman to make a quick check of the chassis constants. The socket layouts given on the schematic diagram show each socket from the underside. This Chassis uses a single unit "C" Bias cell in the grid of the 6Q7 A. F. Amplifier tube. This cell will in time have to be replaced, and in so doing be sure that the carbon (+) side of the cell is connected to the ground side of the cell terminal clip. An indication of the faulty cell will be distorted tone quality and the quickest check is a substitution of the old cell with a new one. For testing purposes a "C" battery may be used—using a 1½ volt battery in place of the single cell. The bias cell has a voltage of about 1.2 volts but due to their low current output they cannot be measured by any ordinary volt meter.

ALIGNMENT PROCEDURE

Do not attempt to align the 5L Chassis without the proper equipment. Alignment condensers are shown in the accompanying illustrations and are numbered in order of procedure—I. F. Condensers on top of the I. F. Transformers.

1. EQUIPMENT:

(A) Test Oscillator.

A modulated Oscillator capable of producing signals at the I. F., Broadcast and Short-Wave frequencies is necessary for alignment of the 5L Chassis.

(B) Insulated Screw Driver—(all bakelite or fibre) about 6" long.

(C) Output Meter.

This may be any of the standard Output Meters, but should be sufficiently sensitive to provide a good deflection at low signal strength.

(D) Coupling Means.

Coupling Condensers of 200 mmf., .05 mfd., and a 400 ohm resistor should be used when coupling oscillator to receiver during alignment as specified in the procedure.

(E) The Receiver should be aligned in a location free from local interference (interference caused by motors—flashers—automobile ignition, etc.) as high frequency disturbances will cause difficulties when the short wave section is being adjusted. (A screen room is to be recommended.)

2. DIAL SETTING:

Turn dial knob until condensers are fully meshed. The dial pointer (Hour Hand) should be on the horizontal line of the dial, pointing to 9 and 3 o'clock. The minute hand should be at 12 o'clock or in a vertical position.

3. I. F. ALIGNMENT:

(A) Connect signal lead of test oscillator to grid of 6A8 (1st detector tube) through .05 mfd. condenser. Connect the ground lead to the chassis.

(B) Set dial pointer to 1500 K. C. and range switch on "A" position.

(C) Place test Oscillator in operation at 465 K. C. Turn receiver volume control to maximum.

(D) Attenuate test Oscillator output to lowest value, consistent with obtaining a readable indication on output meter.

(E) Adjust four I.F. Trimmers, (A1, A2, A3, A4) located on the I. F. Transformers on top of Chassis (Fig. 1) until maximum output is obtained. During alignment maintain as low a value of signal as will allow obtaining of accurate adjustment.

4. 1500 K. C. ALIGNMENT:

(A) Connect signal lead of test Oscillator through 200 mmf. Condenser to Antenna binding post on Chassis.

(B) Connect the test Oscillator ground lead to the ground post of Chassis.

(C) Place test oscillator in operation at 1500 K. C.

(D) Turn dial pointer to 1500 K. C.

(E) Adjust broadcast oscillator trimmer (A5) to maximum output.

(F) Adjust 1st Detector Trimmer (A6) to maximum output.

(G) Adjust Antenna Trimmer (A7) to maximum output.

5. 600 K. C. ALIGNMENT:

(A) Place test oscillator in operation at 600 K.C.

(B) Tune in signal to maximum (this point does not have to be exactly at 600 K. C. dial setting.)

(C) Adjust the 600 K. C. Padding Condenser (A8) in direction of signal increases. At same time rock the tuning condenser back and forth through resonance while adjusting padding condenser until maximum output is obtained.

6. 5000 K. C. ALIGNMENT:

(A) Set Range Switch to "B" position.

(B) Place test Oscillators in operation at 5000 K. C.

(C) Turn Dial Pointer to 5000 K. C.

(D) Adjust Set Oscillator Trimmer (A9) to maximum output.

(E) Adjust Detector Trimmer (A10) to maximum output.

7. 18 M. C. ALIGNMENT:

(A) Connect signal lead of test oscillator through 400 Ohm Resistor to Antenna binding post of Chassis.

(B) Connect the ground lead to ground terminal of Chassis.

(C) Set Range Switch to "C" position and turn dial pointer to 18 M. C.

(D) Place test Oscillator in operation at 18 M. C.

(E) Adjust set oscillator Trimmer (A11) to maximum output.

(F) Adjust Detector Trimmer (A12) to maximum output.

(G) On the 18 M. C. Oscillator Alignment it will be noted that there are two settings at which the signal will be received. Use the lower of the images for alignment point that is the setting giving most capacity or the point at which the trimmer screw is farthest in.

PARTS

Part No.	Description	No. Used	Price
20678	Ground Terminal	1	$ .02
23358	Vertical Terminal Assembly	1	.05
23367	Resistor—20 M—Ohm ¼ Watt	1	.15
23538	Resistor 200 M—Ohm ¼ Watt	1	.15
23849	Resistor 500 M—Ohm ¼ Watt	2	.15
23850	Resistor 16 M—Ohm 1 Watt	1	$ .20
23853	Resistor 50 M—Ohm ¼ Watt	1	.15
27176	Terminal Strip—10 Lug	1	.20
27422	Washer—Electrolytic Insulating	1	.02
27465	Bracket—Tone Control	1	.10
27784	Resistor—400 Ohm ¼ Watt	2	.15
27831	Socket—Pilot Light	2	.15
28045	Lamp—Pilot Light	2	.15
28638	Pointer Screw	1	.02
28717	Condenser—Tub. .002 Mfd.—700 Volts	1	.25
28723	Condenser—(Replace with 34436)		
28726	Condenser—(Replace with No. 34437)		
28728	Condenser—Tub. .25 Mfd.—200 Volts	1	.35
28793	Junction Box Connector Assembly (5 LZ Chassis only)	1	1.00
29065	Clamp—Electrolytic	2	.05
29074	Condenser—Mica—Dual 100 & 200 Mmfd	1	.30
29135	Condenser—(Replace with No. 34437)		
29164	Resistor—50 M—Ohm ½ Watt	1	.15
29209	Clamp—Speaker Cable	1	.02
29522	11/32" Ball—(Drive)	4	.02
29551	Binding Post—Antenna	1	.10
30090	Bracket—Volume Control	1	.10
30092	Terminal Strip—5 Lug	1	.10
30104	Grommet—Rubber—Trimmer Mounting	2	.02
30143	Condenser—(replace with No. 34436)		
30198	Condenser—Mica—1100 Mmfd	1	.25
31358	Condenser—Mica—50 Mmfd	1	.20
31424	Shield—Electrolytic Condenser Insulating	1	.10
31637	Mounting Stud (Condenser)	3	.02
31714	Spring—(Gear Tension)	2	.05
31739	Mounting Washer—Rubber	6	.02
31778	Terminal Strip—4 Lug	1	.10
31868	Condenser—Tub.—.003 Mfd.—700 Volts	1	.25
32464	Knob—(572) (Range Sw. & Tone Control)	2	.20
32465	Knob—(572) (Vol. & Sta. Selector)	2	.20
32693	Resistor—1 Megohm ⅓ Watt	2	.15
32858	Mounting Foot—Chassis	4	.25
32916	Mounting Foot—Condenser Rear	1	.05
32917	Mounting Foot—Condenser Front	1	.05
32918	Bracket—Reflector Support	1	.10
32919	Drive Drum, Hub & Gear Assembly	1	.75
32922	Drive Assembly	1	2.20
32927	Drive Shaft	1	.40
32928	Clutch Pin	1	.05
32929	Bracket—Fulcrum	1	.10
32930	Mounting Frame (Drive)	1	.05
32931	⅛" Ball-Drive	15	.01
32932	"C" Washer—Drive	1	.01
32933	Toggle—Arm	1	.05
33934	Toggle Spring	2	.05
32935	Drive String & Eyelet	1	.10
32936	Bracket—Reflector	1	.05
32937	Pinion Gear & Adjusting Plate	1	.70
32940	Pointer Pinion	1	.20
32959	Reflector—Dial (Glass)	1	1.40
32970	Spacer	2	.03
32972	Minute Pointer	1	.10
32978	Drive Spring	1	.10
32982	Hour—Pointer	1	.10
32986	Shield—Light	1	.10
33065	Condenser—Oscillator Padder	1	.40
33070	Knob (555) (Vol. & Sta. Selector)	2	.20
33071	Knob (555) (Range Sw. & Tone Cont.)	2	.20
33072	Escutcheon—Cabinet	1	.65
33073	Spring Escutcheon Retainer	1	.20
33074	Window	1	.20
33075	Ring—Window Retainer	1	.10
33076	Gasket—Window	1	.10
33078	Shipping Block (Fibre)	2	.05
33133	Resistor 50M—Ohm ¼ Watt	1	.15
33142	Condenser—Mica 1000 Mmfd	1	.20
33287	Bracket—Range Switch	1	.05
33292	Shield—Antenna & Oscillator Coil	2	.35
33303	Socket—5 prong tube (5W4)	1	.15
33306	Socket—8 prong—Universal	4	.15
33368	Terminal—Electrolytic Spade Lug	1	.02
33369	Condenser—Electrolytic—12 Mfd. (450 V.)	1	1.20
33372	Condenser—Tub.—.0058 Mfd. 700 Volts	2	.25
33469	Condenser—Electrolytic—18 Mfd. (300 Volts)	1	.90
33471	Line Cord & Plug	1	.40
33659	Cover, Light Shield	1	.10
33665	Condenser—Tub.—.03 Mfd. 200 Volts	1	.25
33822	Resistor—5M Ohm—1 Watt	1	.20
33834	Terminal Strip—1 Lug (Volume Control Bracket)	1	.10
33863	Mounting Strip—Grid Bias Cell	1	.15
33883	Grid Bias Cell	1	.25
34401	Drive Mechanism	1	1.00
34417	Condenser—Tub.—.01 Mfd. 500 Volts	1	.35
34435	Condenser—Tub.—.02 Mfd. 400 Volts	2	.35
34436	Condenser—Tub.—.05 Mfd. 400 Volts	2	.35
34437	Condenser—Tub.—.10 Mfd. 400 Volts	4	.35
34518	Reflector Bracket	2	.05
34536	"J" Bolt	2	.03
34538	Shipping Block—Wood	2	.05
34658	Coil—Antenna	1	1.00
34660	Coil—Oscillator	1	$ 1.25
34704	Coil—Pre-selector	1	1.10
34787	Condenser—Replace with No. 33372		
35145	Power Transformer—115 V. 50/60 cycle	1	5.00
35273	Coil & Shield—1st I. F.	1	1.75
35289	Coil & Shield—2nd I. F.	1	1.75
35516	Mounting Foot—Condenser Support	2	.10
35558	Terminal Strip—6 Lug	1	.10
35604	Socket—5 Prong (Speaker)	1	.15
35606	Decalcomania—(A-B-C)	1	.10
35607	Decalcomania—(H-M-L)	1	.10
35626	Clamp—Speaker Cable Plug	1	.05
35649	Volume Control	1	1.25
35654	3 Gang Trimmer—Antenna	1	.45
35655	3 Gang Trimmer—Oscillator	1	.45
35656	Tone Control Switch	1	.60
35660	Condenser—3 Gang Variable	1	4.00
35666	Dial Chart—Pyralin	1	.60
35661	Reflector Mask	1	.05
35665	Reflector Dial & Mask Assembly	1	2.15
35667	Dial Frame Assembly	1	.30
35671	Range Switch	1	1.50
35744	Shield—Pre-Selector Coil	1	.35
35803	Power Transformer—115 Volts—25/50 Cycle	1	8.50
35804	Power Transformer—115 Volts to 250 Volts (Universal)	1	8.50
35854	Grid Cap	2	.01
36330	Resistor—30 M Ohm—⅓ Watt	1	.15
61134	1" x No. 8-32 R.H.M. Screw (Red Head)	2	.01
61207	1" x No. 8-32 H.H.M. Screw (Chassis Mtg.)	4	.01
62587	¼" x 8-32—H.H.S.T. Screw (Plug)	1	.01
63006	¼" x No. 10 Set Screw (Condenser Hub)	2	.01
63838	Felt Washer (Knob)	4	.01
63863	Flat Washer—(Chassis Mtg.)	6	.01
63886	Flat Washer (Chassis Mtg.)	2	.01
63902	Flat Washer (Condenser Tuning Drive)	3	.01
63928	Black Felt Washer	1	.01
65339	Eyelet (Dial)	1	.02

SPEAKER PARTS

MODEL No. 572 8BG2-1 SPEAKER

29038	Gasket—Cone	1	$ .10
33202	Terminal Strip Assembly	1	.20
33203	Terminal Strip Cover	1	.10
33204	Terminal Strip Insulator	1	.05
35186	Terminal Strip Assembly (Cone)	1	.10
35267	Speaker Plug Assembly	1	.25
35770	Output Transformer	1	1.75
36912	Cone & Voice Coil Assembly	1	1.00
36228	Speaker Cable & Plug	1	.55
36733	8BG2-1 Speaker Complete	1	10.00

MODEL No. 555—TYPE 8B11 SPEAKER

28844	Yoke & Pole Piece	1	$1.25
29038	Gasket—Cone	1	.10
29041	Basket & Front Plate Assembly	1	1.00
31468	Field Coil	1	3.00
31355	Cone & Voice Coil Assembly	1	1.00
33202	Terminal Strip	1	.20
33203	Terminal Strip Cover	1	.10
33204	Terminal Strip Insulator	1	.05
35267	Speaker Plug	1	.25
35770	Output Transformer	1	1.75
36227	Speaker Cable & Plug	1	.55
36341	8-B-11 Speaker Complete	1	10.00
63882	Flat Washer	2	.02

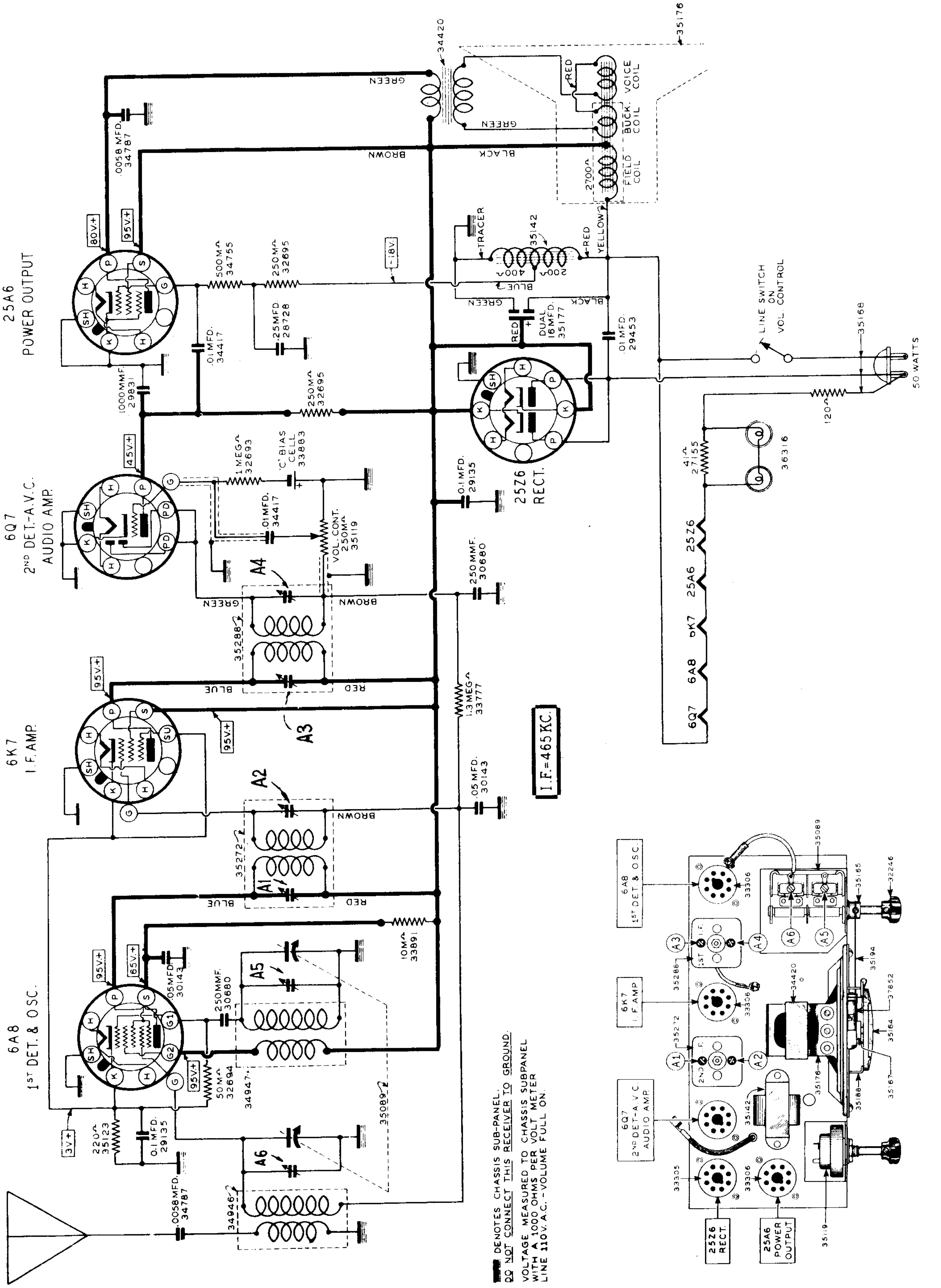
MODEL No. 572—TYPE 8B9 SPEAKER

28844	Yoke & Pole Piece	1	$1.20
29038	Gasket—Cone	1	.10
29041	Basket & Front Plate	1	1.00
31468	Field Coil	1	3.00
33202	Terminal Strip	1	.20
33203	Terminal Strip Cover	1	.10
33204	Terminal Strip Insulator	1	.05
35267	Speaker Plug	1	.25
35770	Output Transformer	1	1.75
35862	8-B-9 Speaker Complete	1	10.00
36228	Speaker Cable & Plug	1	.55

TYPE 8BG2-3 SPEAKER

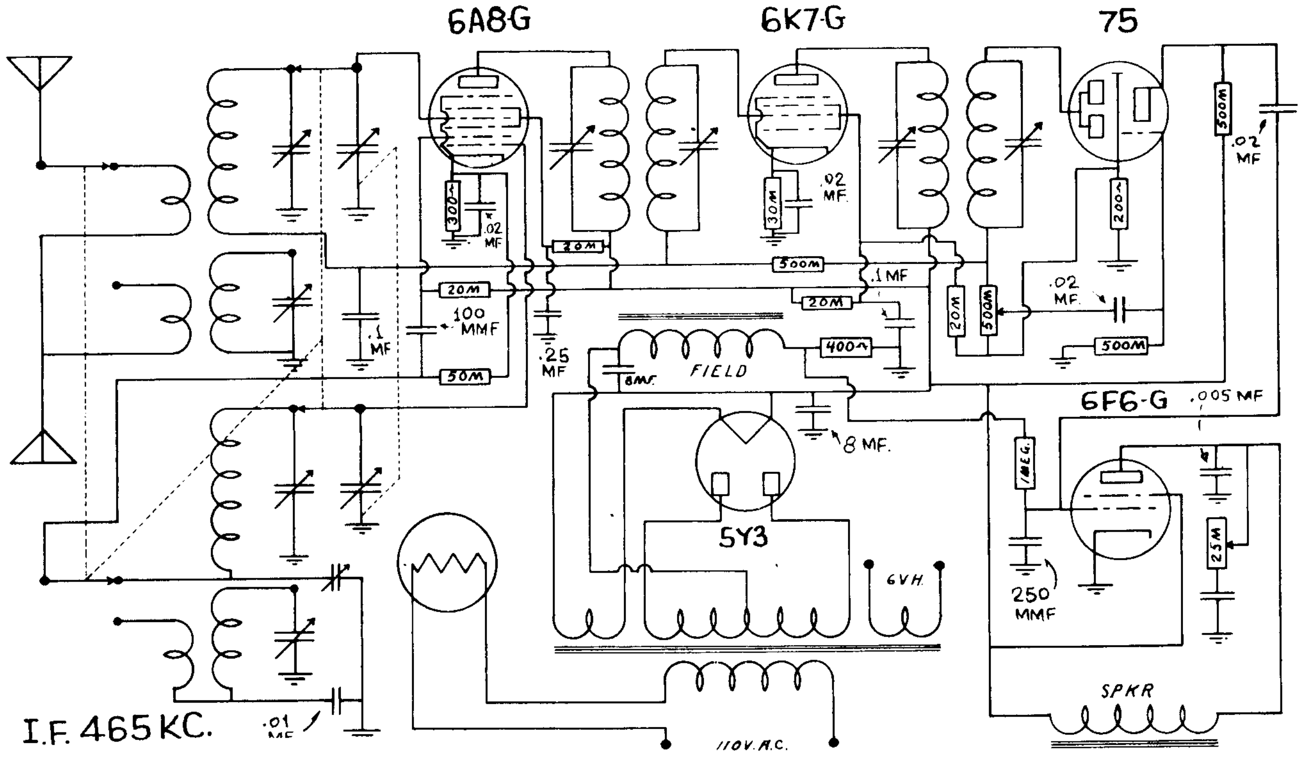
29038	Cone Gasket	1	$ .10
33202	Terminal Strip	1	.20
33203	Cover (Terminal Strip)	1	.10
33204	Insulator (Terminal Strip)	1	.05
35186	Terminal Strip (Cone)	1	.10
35267	Plug Assembly	1	.25
35770	Output Transformer	1	1.75
36227	Cable & Plug Assembly	1	.55
36739	8-BG2-3 Speaker Complete	1	10.00
36912	Cone & Voice Coil Assembly	1	1.00

GENERAL HOUSEHOLD UTILITIES COMPANY
MODELS 5M & 590

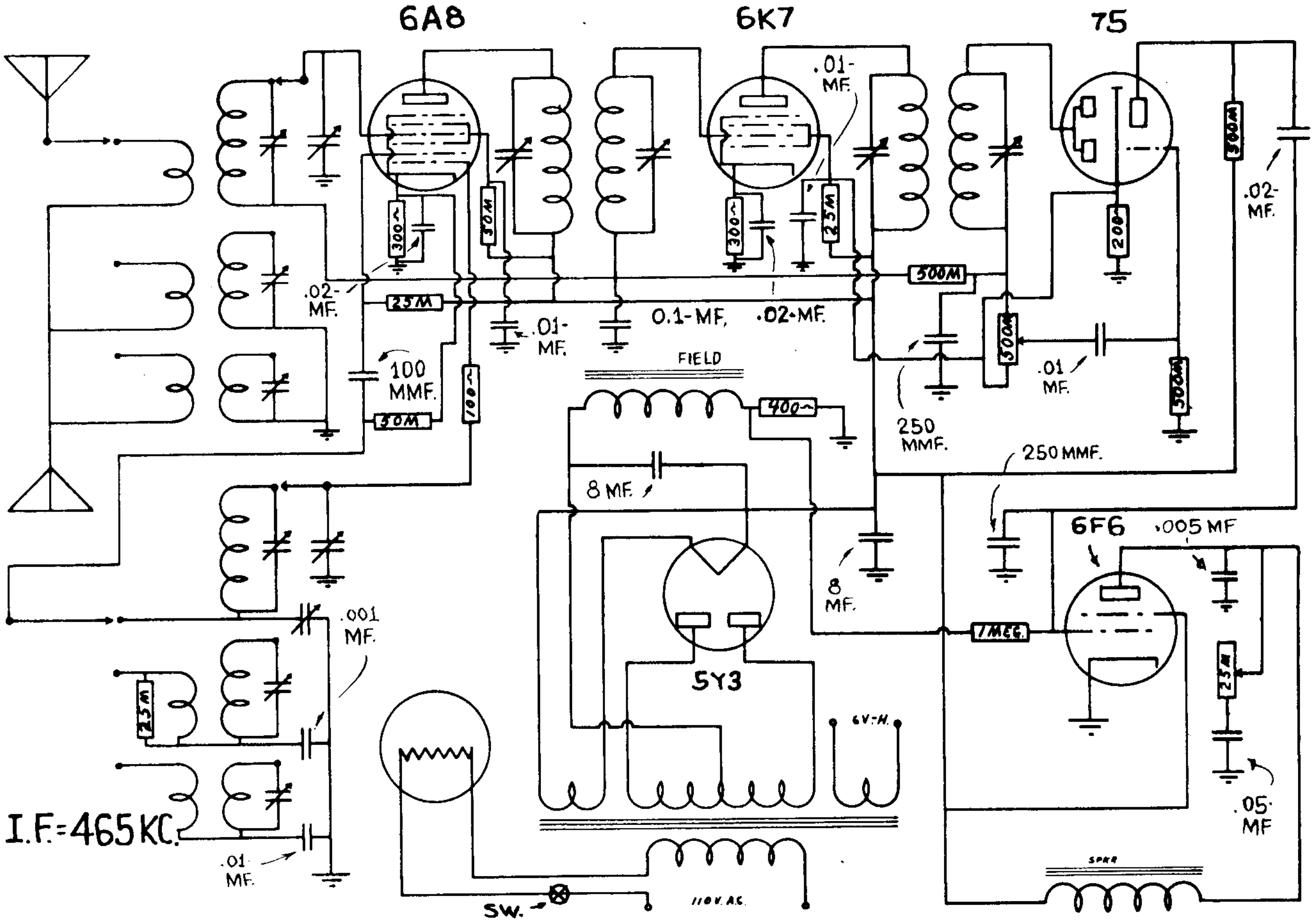


HERBERT H. HORN RADIO MFG. CO.

MODEL 62

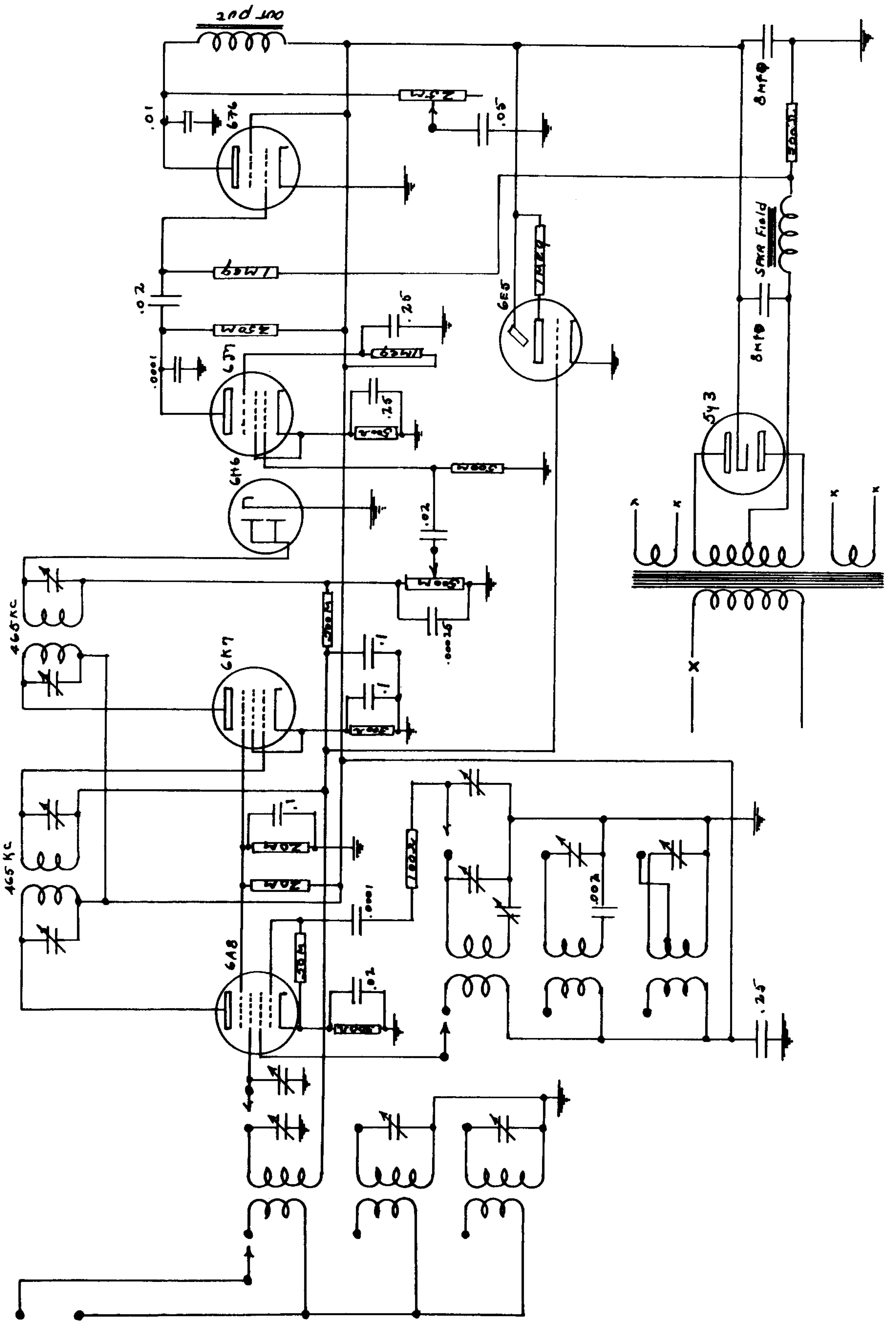


MODEL 63



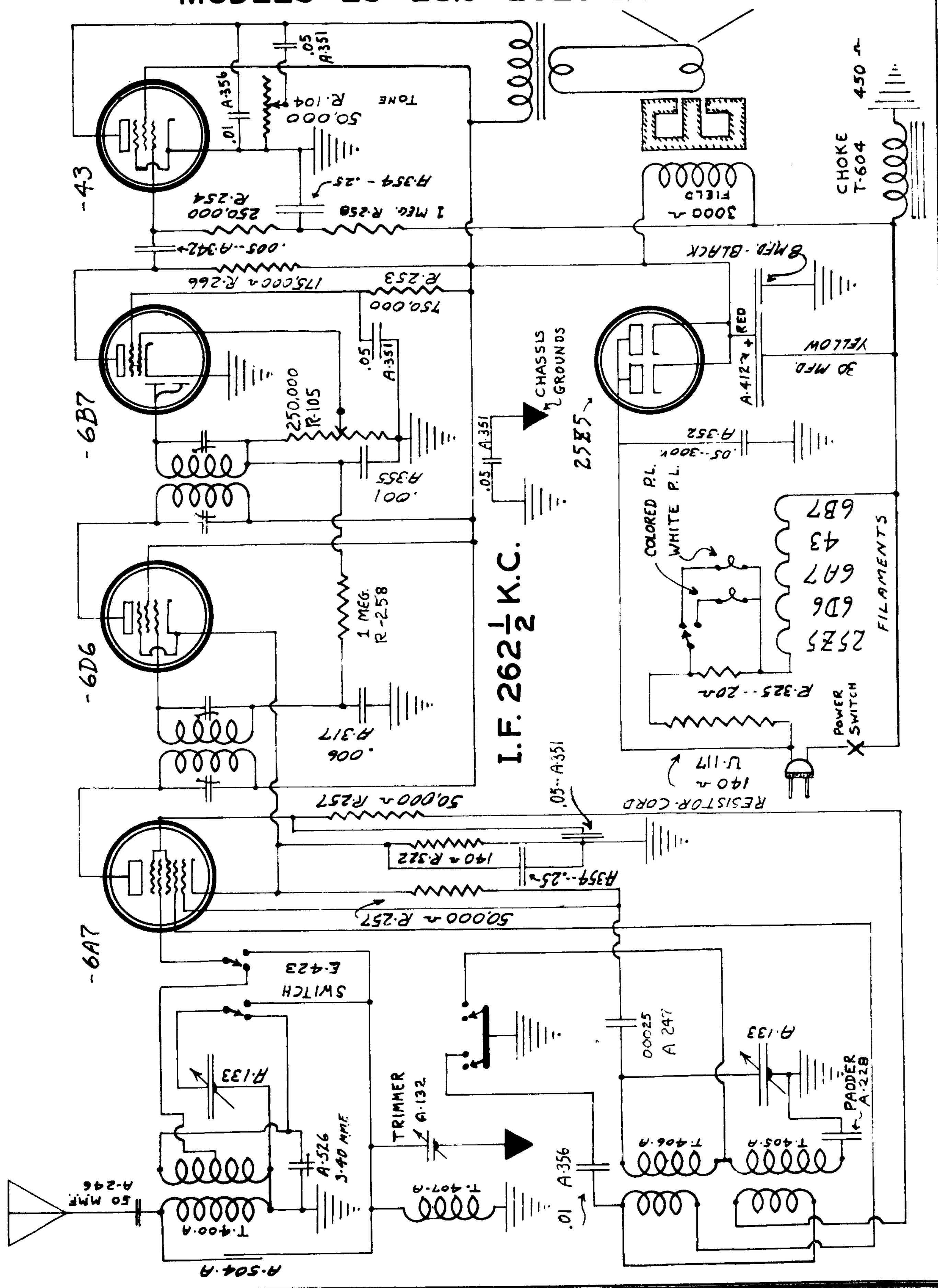
HERBERT H. HORN RADIO MFG. CO.

MODEL 76



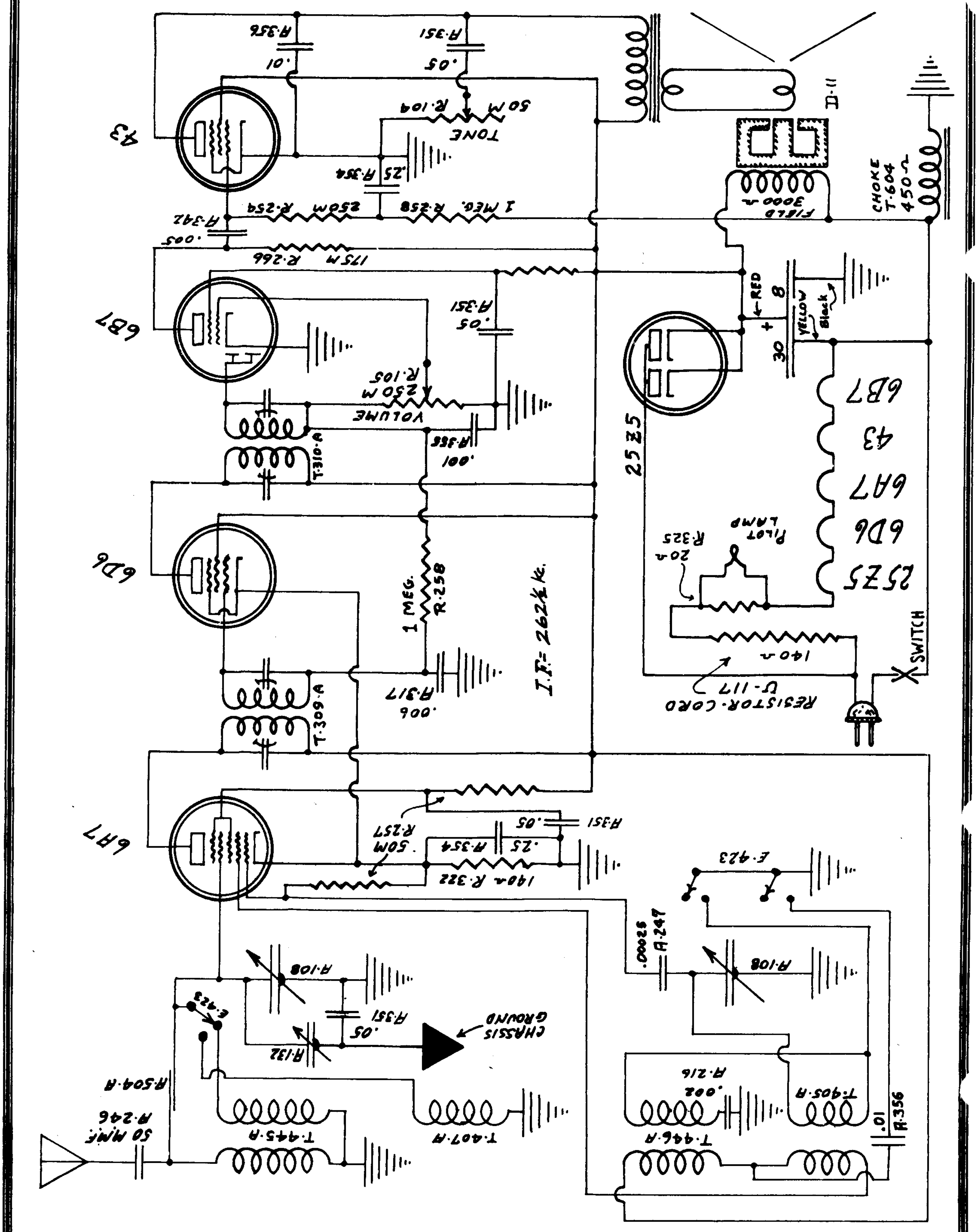
I.F. 456K.C.

INTERNATIONAL RADIO CORP.
MODELS ES-ES19-ES20 & ES30



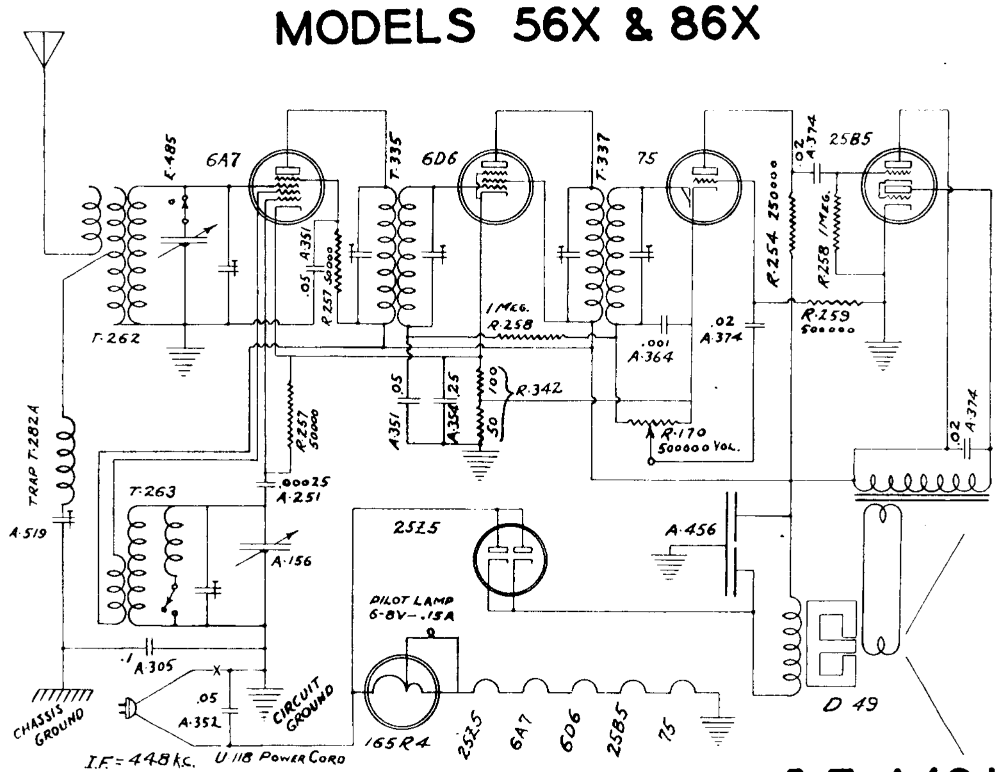
INTERNATIONAL RADIO CORP.

MODEL ES25



INTERNATIONAL RADIO CORP.

MODELS 56X & 86X



I.F. 448 K.C.

ALIGNMENT

ESSENTIAL DATA: The intermediate frequency employed is 448 Kc.

The standard type of output meter should be used to indicate signal strength. It should be connected from the output plate of the 25B5 tube to ground.

Poor sensitivity may be an indication of incorrectly adjusted I.F. trimmers.

Aligning of Broadcast band should be done on 1400, 1000 and 600 kilocycles.

INTERMEDIATES: To align the I.F. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. Adjust the first I.F. transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second I.F. transformer. If adjustments are not made accurately, selectivity will be poor and I.F. oscillation may result. Finally, adjust the trimmer in the tuned wave trap for *minimum meter reading.*

BROADCAST BAND: Place the band change switch on the Broadcast position. Turn the dial to 1400 Kc. and feed a very weak 1400 Kc. modulated signal from your signal generator to the antenna. Adjust the broadcast oscillator trimmer and detector trimmer (on condenser gang) for maximum reading.

There is no adjustable padder condenser in this model so resonance on lower frequencies is accomplished by bending plates on tuning condensers.

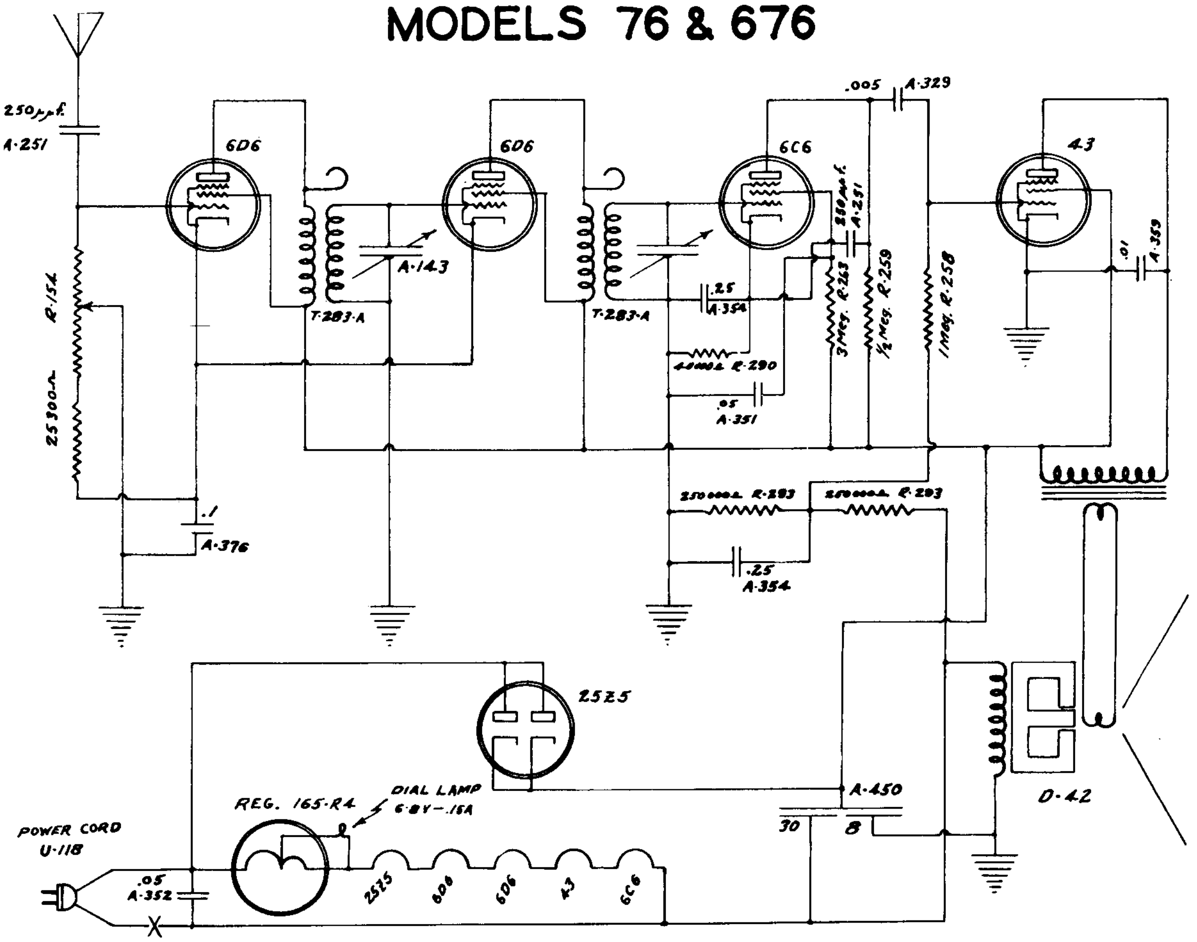
SHORT WAVE BAND: No alignment necessary.

AVERAGE SOCKET VOLTAGES

Tube	Position	Ek	Eg_9	Eg_3	Eg_2	Ep	Ep input
6A7	Det-Osc	2.5	35	0	100	100	—
6D6	I.F.	2.5	--	2.5	100	100	—
75	2nd Det. A.V.C.-A.F.	1	—	—	—	50	—
25B5	Output	0	—	—	—	90	100
25Z5	Rectifier	100	—	—	—	115 AC	—

Line 118 volts—volume control full on. 10% variation allowable.

INTERNATIONAL RADIO CORP.
MODELS 76 & 676



Part No.	Description	List price
A-143	Two gang tuning condenser	$1.50
A-251	250 mmf. mica condenser	.20
A-329	.005 mfd., 600 v. paper condenser	.15
A-351	.05 mfd., 200 v. paper condenser	.15
A-352	.05 mfd., 300 v. paper condenser	.15
A-354	.25 mfd., 25 v. paper condenser	.20
A-359	.01 mfd., 400 v. paper condenser	.15
A-376	.1 mfd., 25 v. paper condenser	.15
A-450	Electrolytic filter condenser	1.15
D-42	Dynamic speaker	3.00
E-111M	Knobs (Model 676)	.10
E-162	Knobs (Model 76)	.10
E-287	Dial window	.20
E-288	Dial pointer	.05
E-2003	Dial scale	.15
E-481	Special pilot lamp, 6-8v,.15 amp.	.15
E-499	Pilot lamp socket	.10
G-114	Dial drive spring	.05

Part No.	Description	List Price
H-18	25Z5 tube socket	$ .10
H-19	6D6 tube socket	.10
H-21	43 tube socket	.10
H-41	6C6 tube socket	.10
H-58	165R4 tube socket	.10
R-154	Volume control and power switch	.65
R-258	1 megohm carbon resistor	.20
R-259	500M ohm carbon resistor	.20
R-263	3 megohm carbon resistor	.20
R-290	40M ohm carbon resistor	.20
R-293	250M ohm carbon resistor	.20
S-119	Goat tube shield	.10
S-201	Tuning condenser shield plate	.10
T-283A	R. F. coil	1.00
U-118	Power cord and plug	.30
WL-20	Antenna wire	.10
X-369	Cabinet (Model 76)	5.00
X-370	Cabinet (Model 676)	5.00

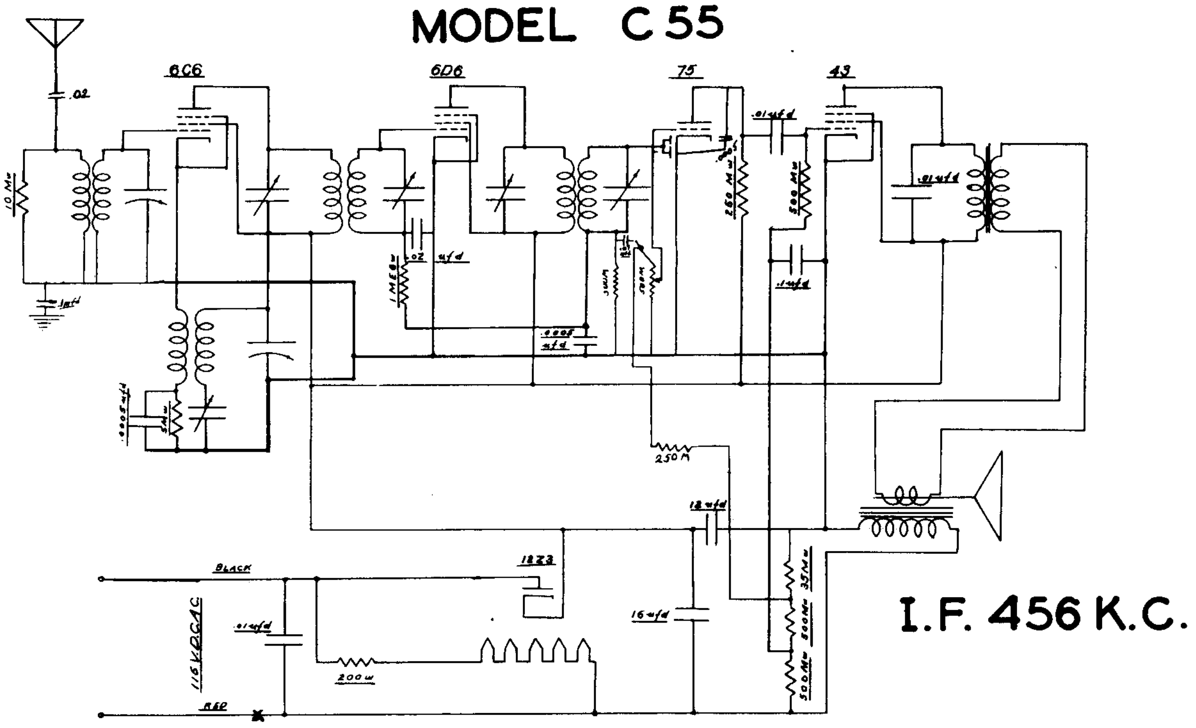
AVERAGE SOCKET VOLTAGES

Tube	Position	E_K	E_{G3}	E_{G2}	E_P
6D6	Untuned R. F.	4	4	100	100
6D6	Tuned R. F.	4	4	100	100
6C6	Detector	2*	2*	5	20
43	Output	0	-	100	92
25Z5	Rectifier	100	-	-	115 A. C.

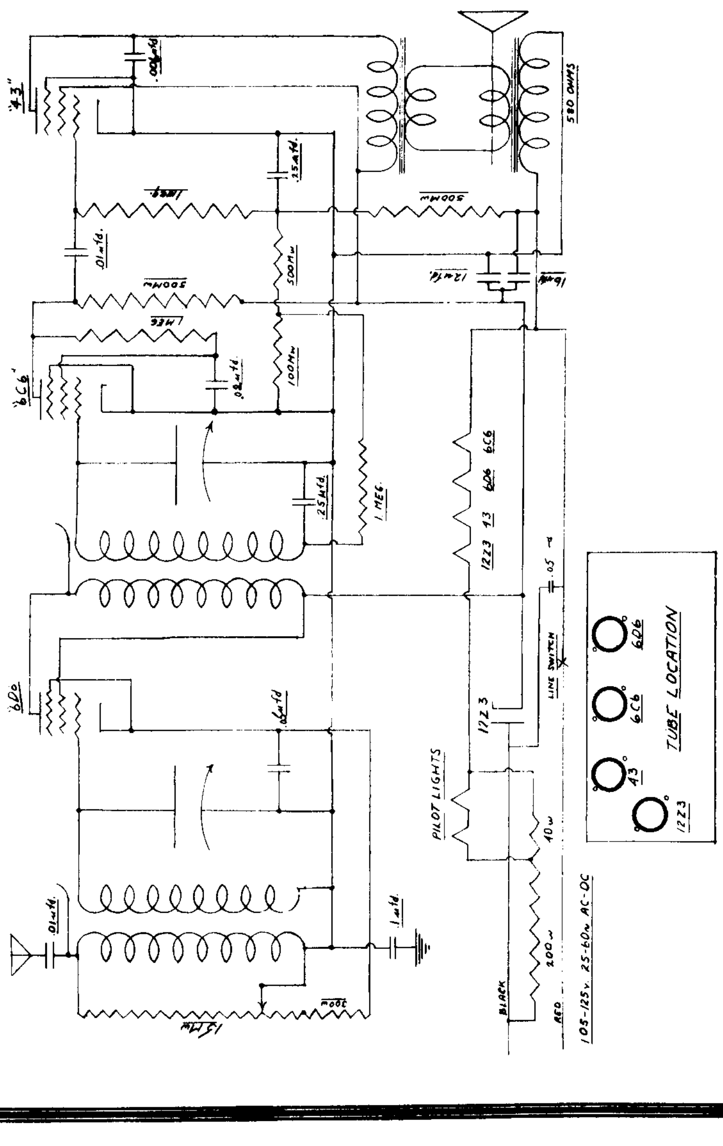
Line 118 volts. Volume control full on. 10% variation allowable. Measurements made from tube prongs to ground with 1000 ohms per volt instrument on 250 volt scale except figures with * which are on 50 volt scale.

LAFAYETTE RADIO MFG. CO.

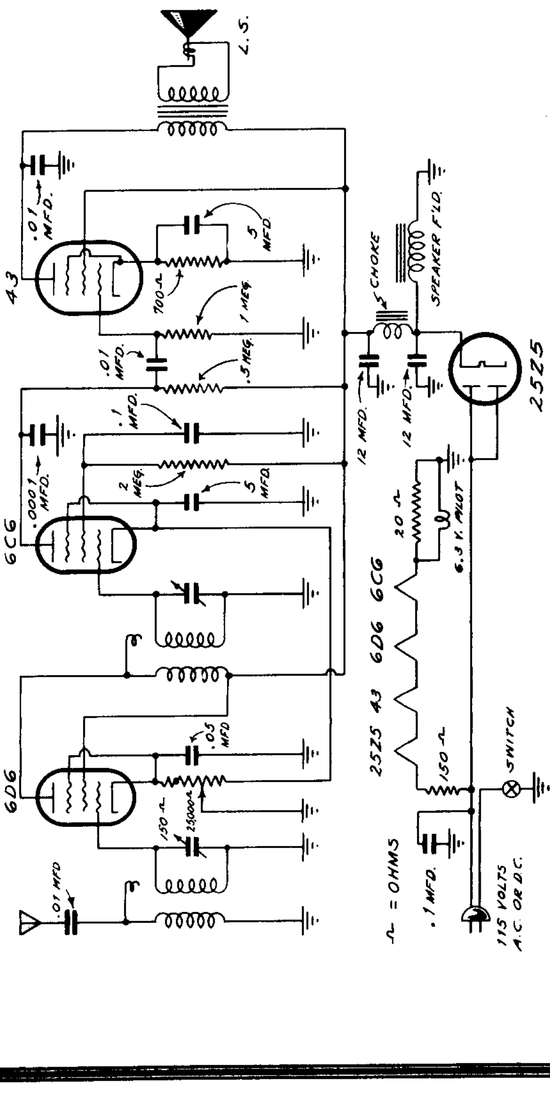
MODEL C55



MODEL C35

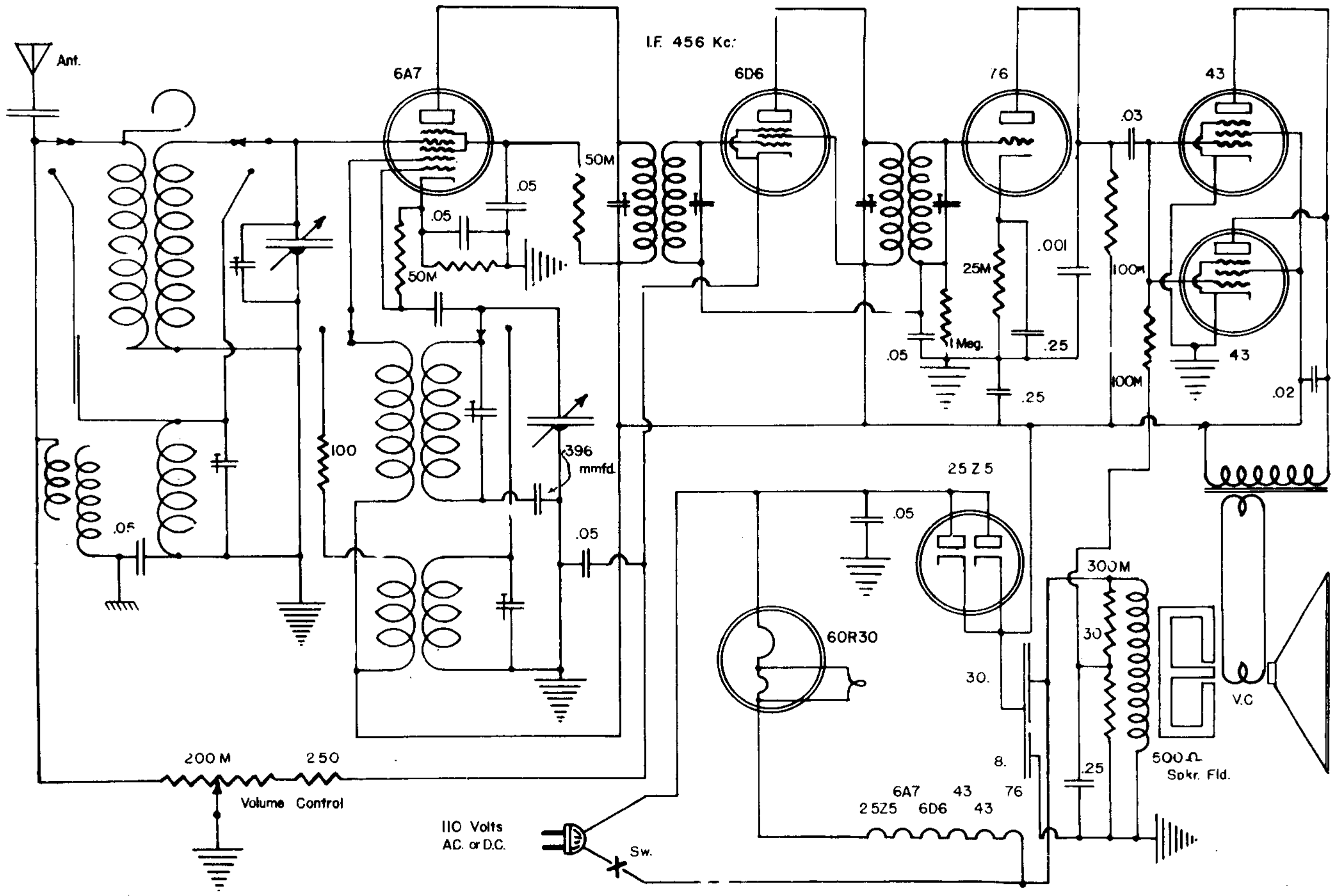


MODEL J10

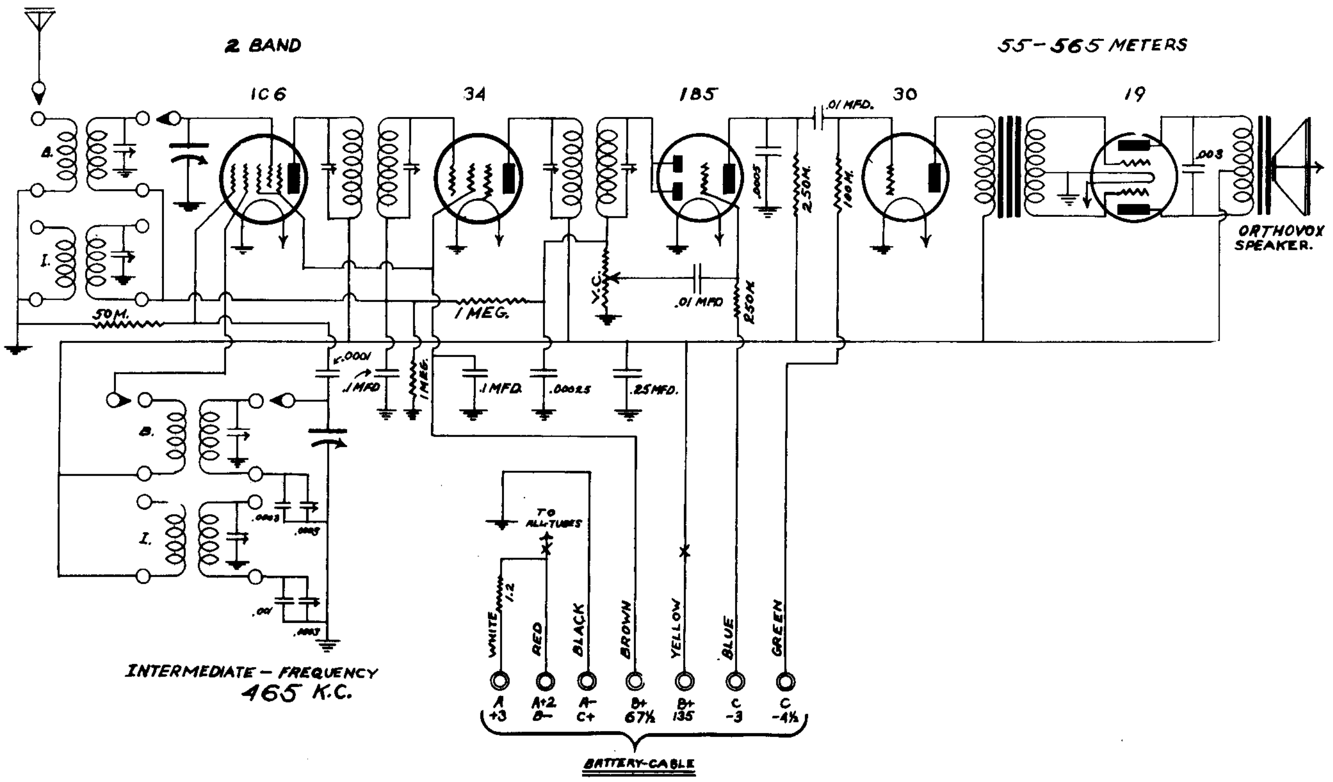


LAFAYETTE RADIO MFG. CO.

MODEL JB3

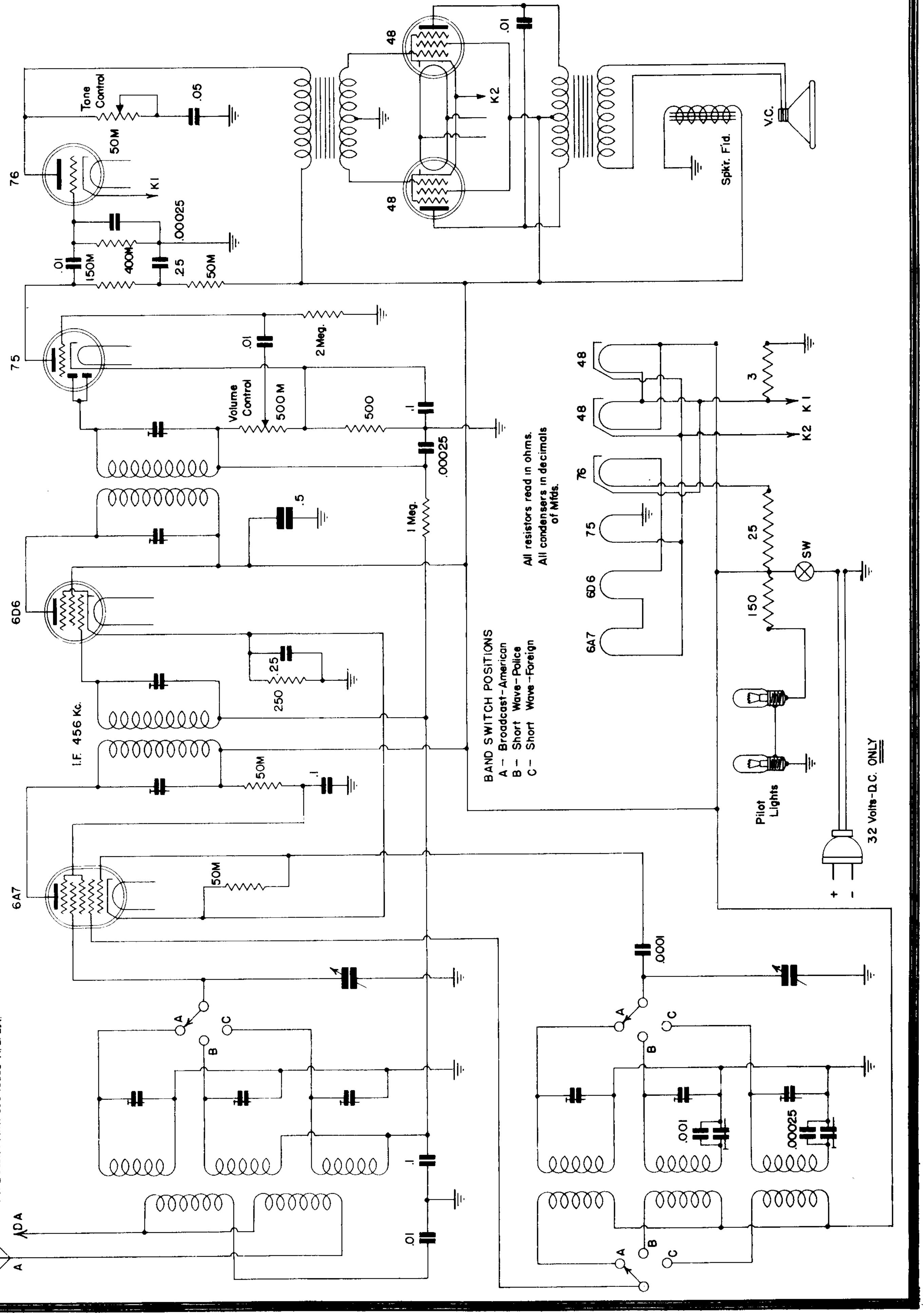


MODEL M43



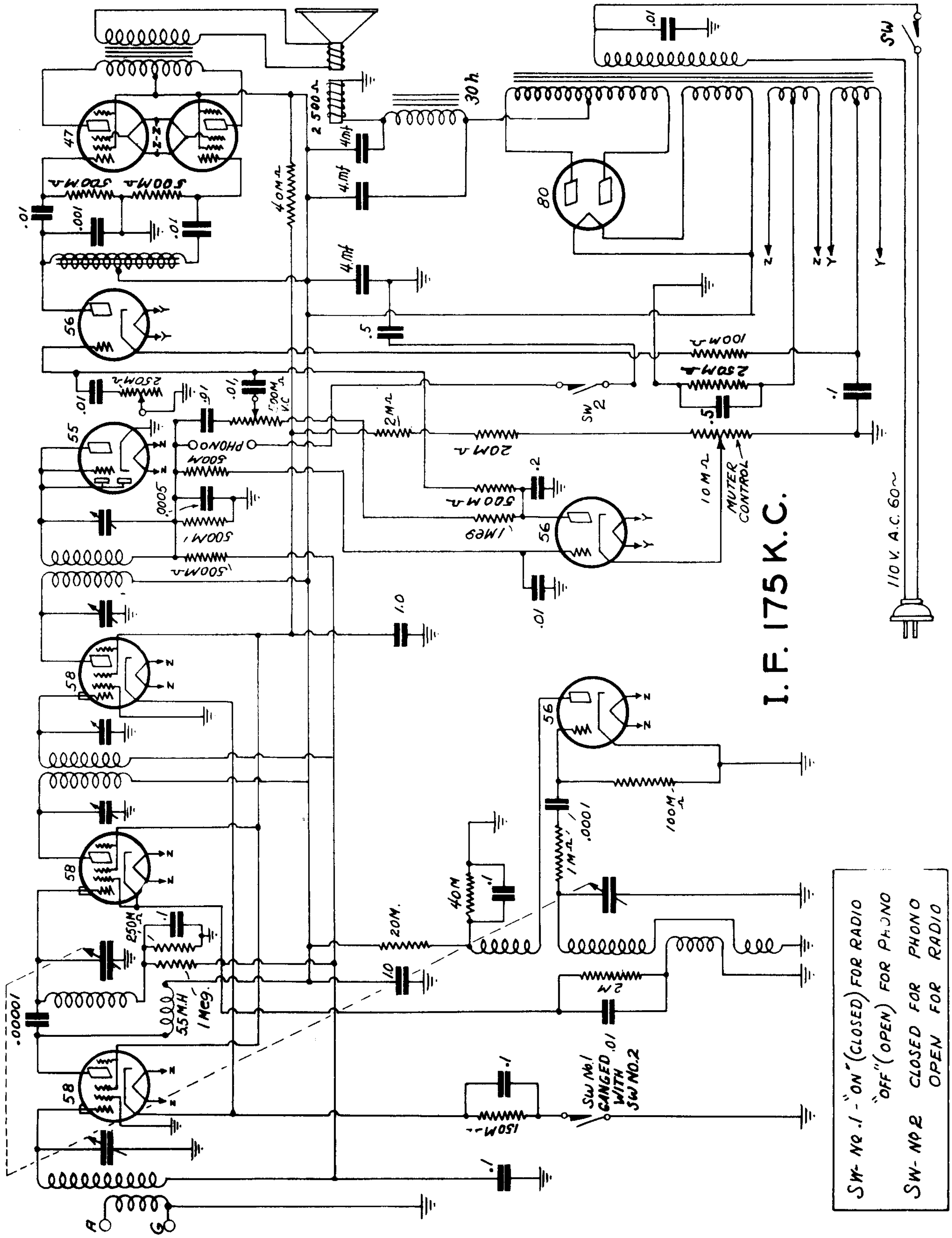
LAFAYETTE RADIO MFG. CO.

MODEL M31

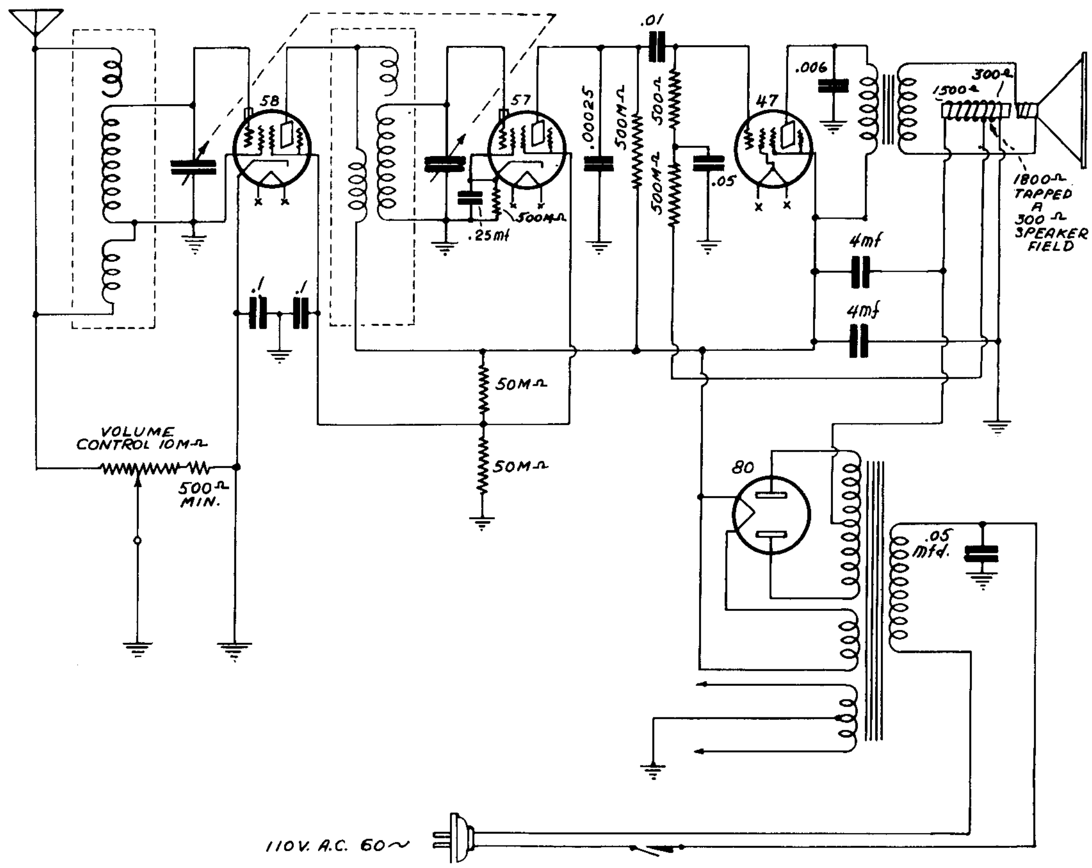


LAFAYETTE RADIO MFG. CO.

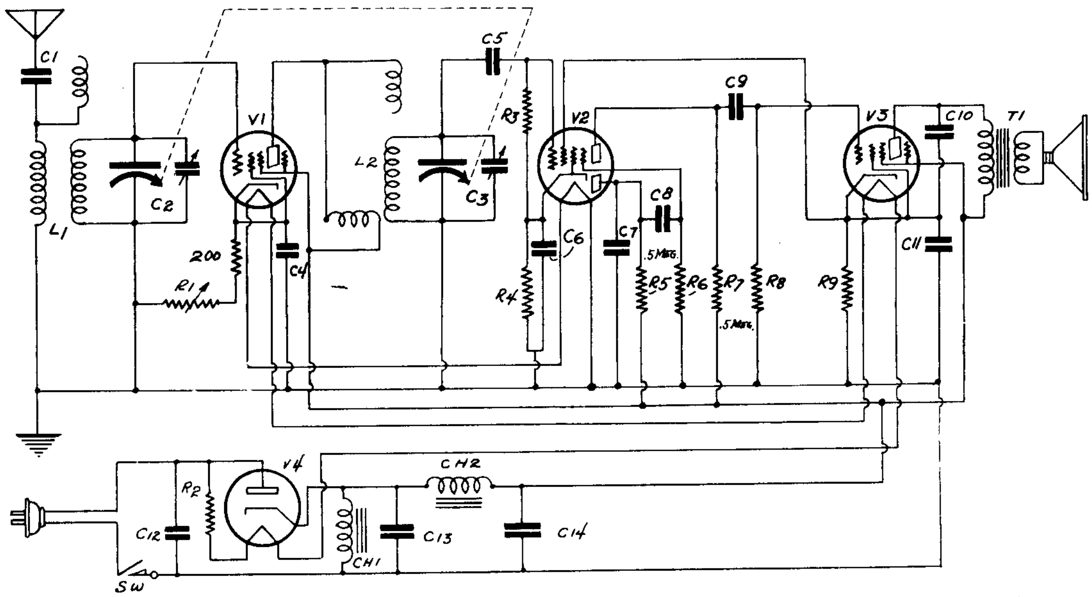
MODEL M65



LAFAYETTE RADIO MFG. CO.
MODELS R71 & 4TUBE TREASURE CHEST



TRUTEST MODEL SL 71



V1	78 TUBE
V2	6-F-7 TUBE
V3	43 TUBE
V4	12-Z-3 TUBE
C-1	.002 mfd. COND.
C2-3	365 mf. VAR. COND.
C4-12	.05 mfd COND.
C5	.00005 mfd COND.

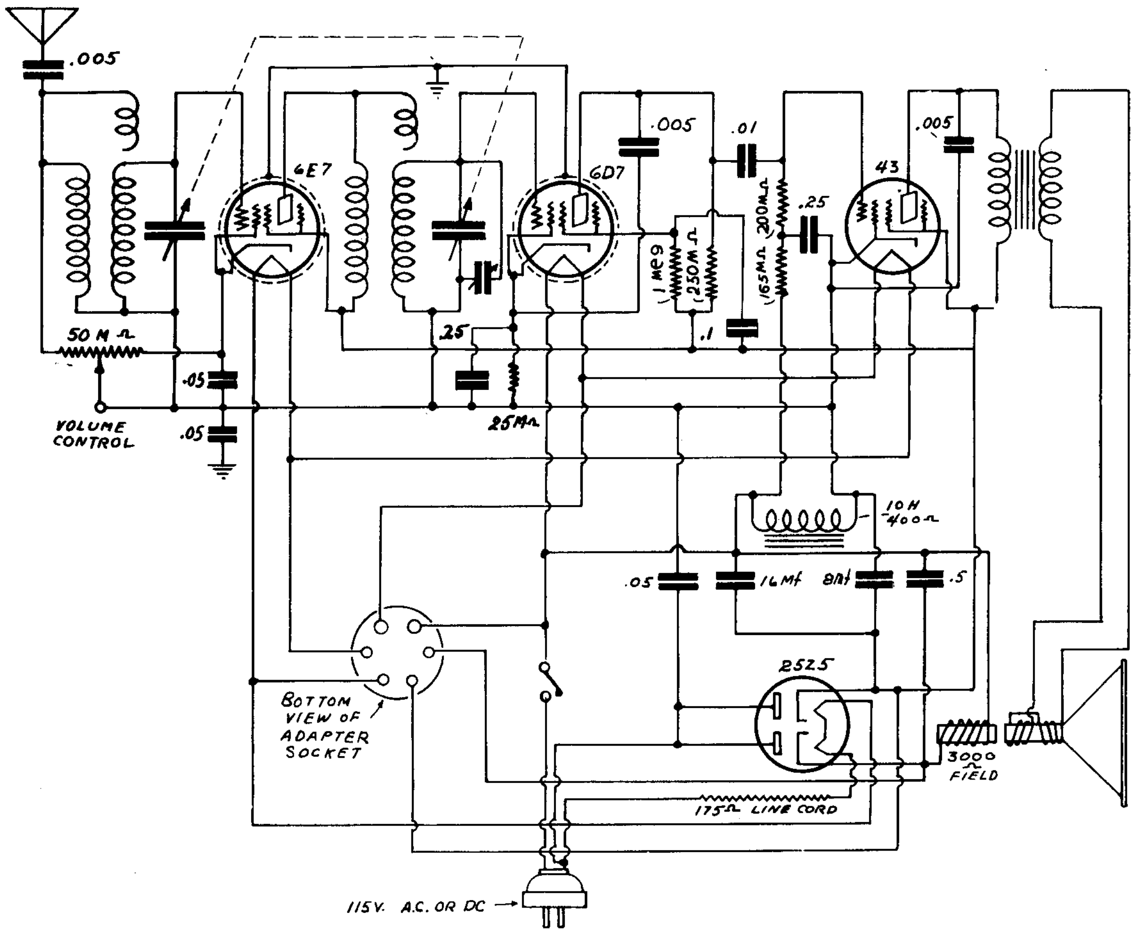
C6-11	10 mfd. COND'S.
C7	.0005 mfd. COND. — IN
C8-9-10	.01 mfd. COND'S. — ONE
C-13	12 mfd. COND. — BLOCK
C-14	8 mfd. COND.
R-1	200 M ohm VOL. CONTROL
R-2	230 ohms IN LINE CORD.
R-3	2 Meg. RESISTOR
R-4	5M ohm RESISTOR

R6-8	1 Meg. RESISTOR
R-9	700 ohm RESISTOR
L-1	ANTENNA COIL
L-2	R-F COIL
CH1	3000 ohm SPEAKER FIELD
CH2	200 ohm CHOKE
T-1	SPEAKER TRANSFORMER
SW	SWITCH ON VOL. CONTROL

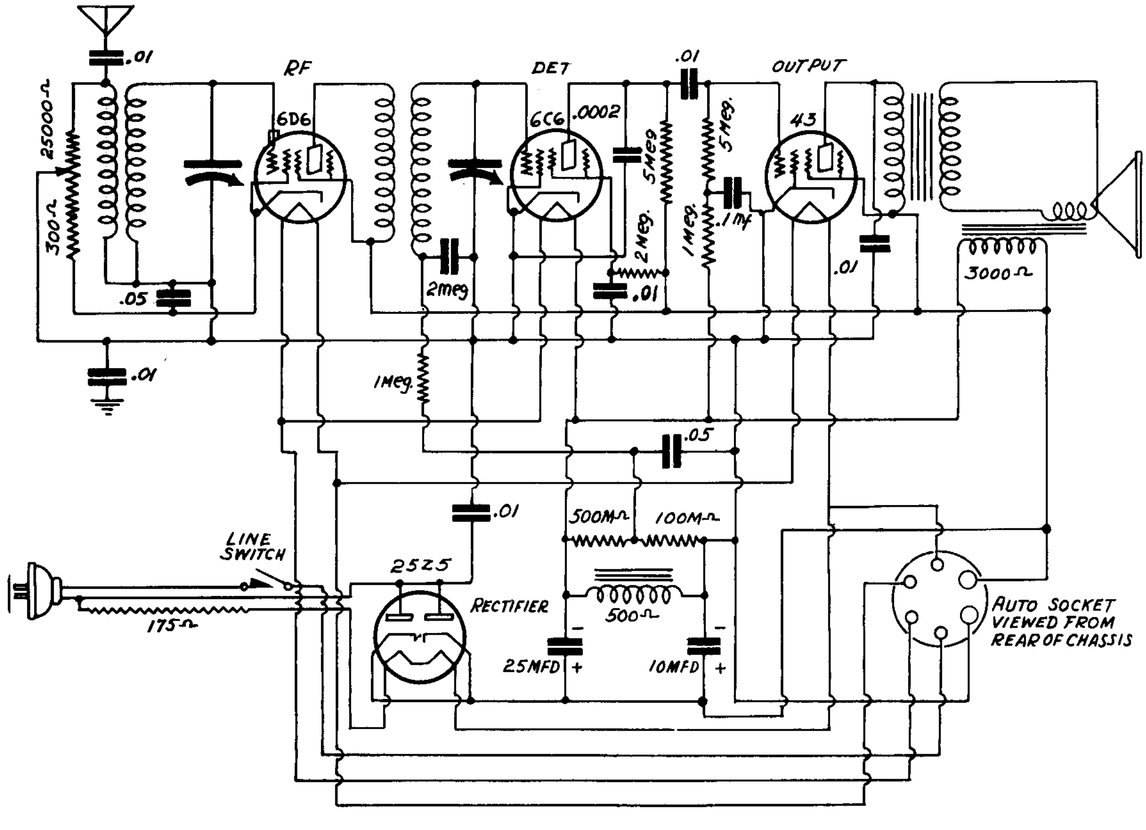
To Align the Receiver :- Uncoil Antenna wire and adjust trimmers at any high frequency station preferably 15000 k.c.

LAFAYETTE RADIO MFG. CO.

MODEL T21 EARLY

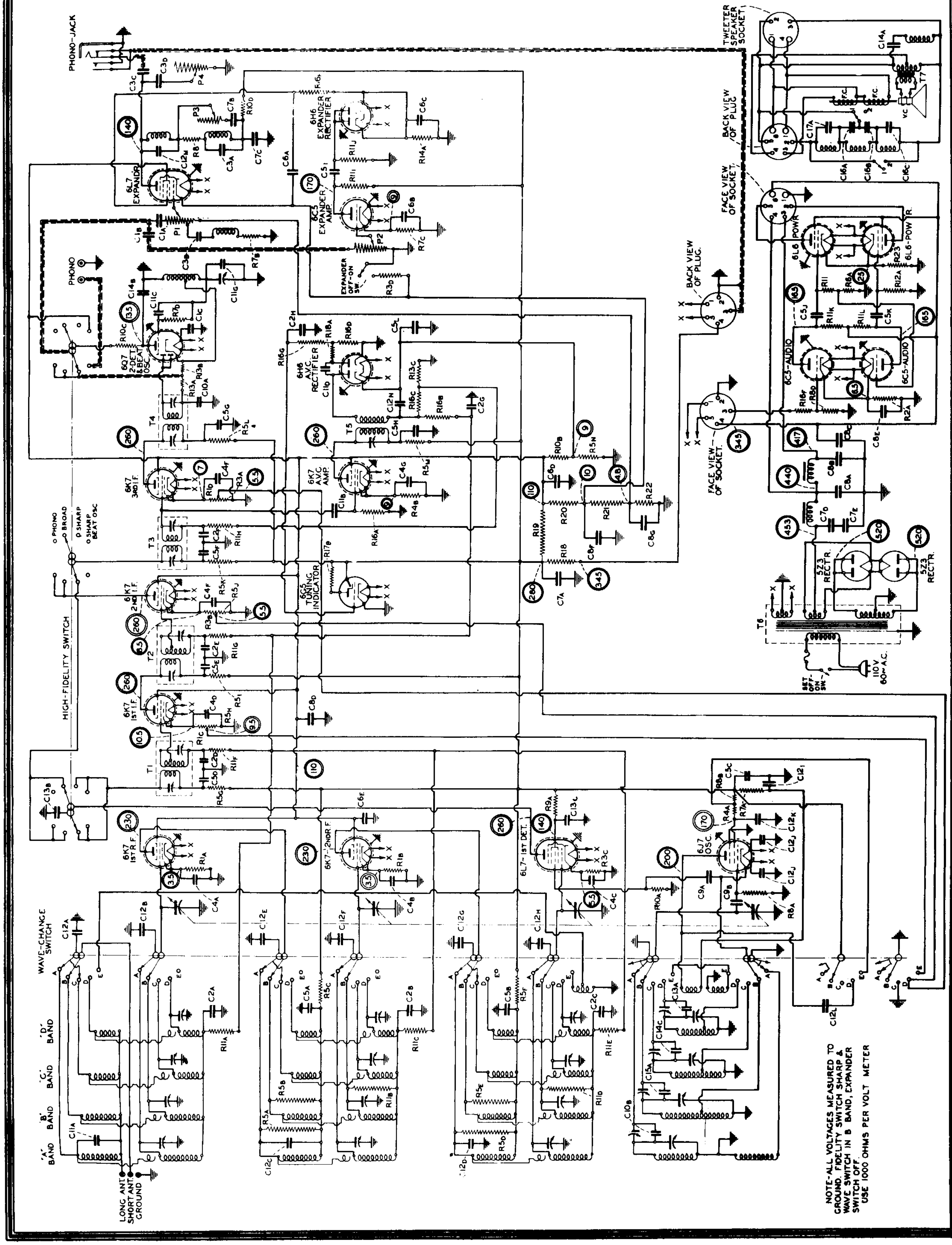


MODEL T21 LATE



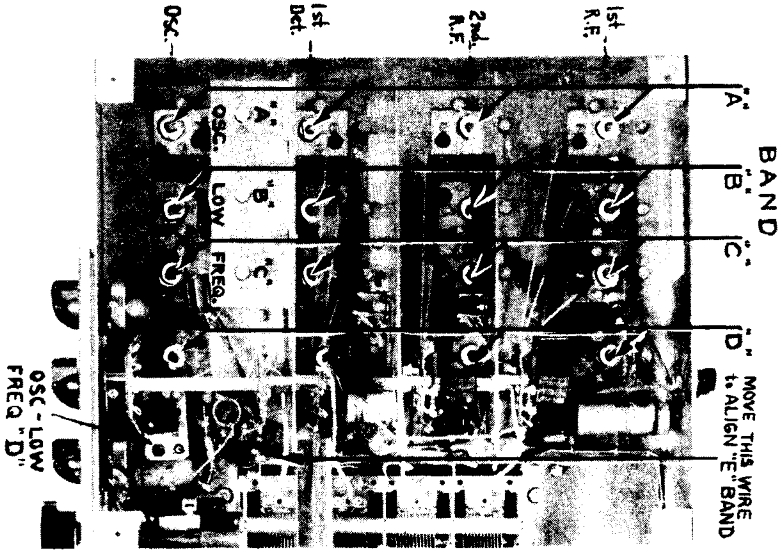
McMURDO SILVER INC.

MASTERPIECE V MODEL



McMURDO SILVER INC.

MASTERPIECE V MODEL



C1 (a,b,c) .01 mfd. 400 V.	R1 (a to d) 350 ohm ½ W.
C2 (a to h) .05 mfd. 200 V.	R2 (a) 2000 ohm ½ W.
C3 (a to d) .025 mfd. 600 V.	R3 (a to d) 1000 ohm ½ W.
C4 (a to g) .1 mfd. 200 V.	R4 (a,b) 3000 ohm ½ W.
C5 (a to l) .1 mfd. 400 V.	R5 (a to n) 5000 ohm ½ W.
C6 (a to e) .5 mfd. 200 V.	R6 (a) 9000 ohm ½ W.
C7 (a to e) .5 mfd. 400 V.	R7 (a) 15000 ohm 2 W.
C8 (a) 16 mfd. 475 V. elect.	R7 (b,c,d) 15000 ohm ½ W.
C8 (b) 25 mfd. 475 V. "	R8 (a to d) 30000 ohm ½ W.
C8 (c) 25 mfd. 300 V. "	R9 (a) 40000 ohm ½ W.
C8 (d) 8 mfd. 150 V.	R10 (a to d) 50000 ohm ½ W.
C8 (e,f,g) 20 mfd. 25 V.	R11 (a to m) 100 M. ½ W.
C9 (a,b) 50 mmfd. Mica	R12 (a) 109 M.
C10 (a,b) 100 mmfd. Mica	R13 (a,b,c) 200,000 ohm ½ W.
C11 (a to g) 250 mmfd. Mica	R14 (a) 250 M. ½ W.
C12 (a to m) 500 mfd. Mica	R16 (a to g) ½ meg.
C12 (n) 500 mfd.	R17 (b) 1 meg. ½ W.
C13 (a,b,c) .003 mfd.	R18 (a) 750 ohms 10 W.
C14 (a,b,c) 1000 mmfd.	R19 5000 ohm 20 W.
C15 (a) 400 mmfd.	R20 5000 ohm 20 W.
C16 (a,b,c) .006 mfd.	R21 4000 ohm 1 W.
C17 (a) .002 mfd.	R22 350 ohm 1 W.
	R23 250 ohm 10 W.

ALIGNMENT

I.F. AMPLIFIER

All I.F. transformers are aligned for a band pass effect, and may not be realigned without a cathode ray oscilloscope for visual examination of the response curve. In brief, THE I.F. SHOULD NEVER BE TOUCHED, for they CANNOT be aligned by ear or output meter.

If the I.F. amplifier must be re-aligned, this MUST be done with a 465 K.C. "wobulated" oscillator and cathode ray oscillograph. The oscillator is connected between the 2nd I.F. grid and ground, FIDELITY knob set "HI.FI." and 3rd and 4th I.F. trimmers adjusted to provide a flat-topped selectivity curve on the cathode ray screen 15 K.C. wide between peaks. This done, the FIDELITY knob is set "SHARP," the test oscillator connected from 1st detector grid to ground, and the 1st and 2nd I.F. trimmers ONLY adjusted to give a selectivity curve 3 K.C. wide across its peak. In each case, the "high" lead from oscilloscope is connected to the join between R13a and R13b in the diagram, with a 10 mh. R.F. choke in this "high" lead. The 2nd lead from the oscilloscope connects to the tuner chassis.

A.V.C. alignment is made, AFTER I.F. alignment, by increasing test oscillator signal to 7,000 to 10,000 microvolts and adjusting the "A.V.C." trimmer ONLY for MINIMUM output meter deflection.

The beat oscillator may be aligned by ear with FIDELITY knob set at "B. OSC." to give the desired beat note upon a received carrier. For telephone reception it should be adjusted for zero beat with properly tuned carrier, while for single signal code reception it should be offset or adjusted for 800 to 1,000 cycle beat note after a modulated carrier has been accurately tuned in. This will result in a very considerable reduction in the "other side" or 2nd audio beat note, which is desirable for telegraph reception.

R.F. ALIGNMENT

At the left of the photo all trimmers are labeled for bands A, B, C, D and E, and for 1st and 2nd R.F. stages, 1st detector and oscillator. All high frequency trimmers should be aligned upon test signals at frequencies specified below with the main tuning dial set to these frequencies:

A. 350 K.C.
B. 1400 K.C.
C. 5000 K.C.
D. 16,000 K.C.

After the above high frequency alignment the low frequency oscillator trimmers must be set. This is done on the following test frequencies:

A. 175 K.C.
B. 600 K.C.
C. 2000 K.C.
D. 6000 K.C.

In this low frequency oscillator alignment, ONLY the oscillator low frequency trimmers are adjusted. The method involves, for an example applicable to all 4 bands, tuning in on band B a 600 K.C. signal with the tuning dial set at 600 K.C. and then adjusting the B low frequency oscillator trimmer at the same time that the tuning dial is rocked very slightly around its 600 K.C. setting in order to obtain the maximum output meter deflection. In this low frequency alignment, dial calibration is of secondary importance, and the alignment is intended to permit of accurate tracking between the UNTOUCHED R.F. and the varied oscillator circuit by means of the low frequency oscillator trimmer adjustment in conjunction with dial rocking to bring all 4 circuits into track. After the above low frequency oscillator alignment, high frequency alignment should be rechecked for the above bands.

Band E has no trimmers. It is aligned by movement of its labeled oscillator grid lead, toward or from nearby metal shielding, at 60,000 K.C.

All above alignment instructions will require the use of an insulated screw driver or one having a very short metal shank, particularly in D and E band alignment where the insulated screw driver is practically essential.

Voltage check data is found in sufficient amount to indicate voltages to be anticipated at different points in the circuit directly upon the diagram herewith. All voltage measurements must be made with a high resistance voltmeter and should be within plus or minus 10% of specified values.

MIDWEST RADIO CORP.

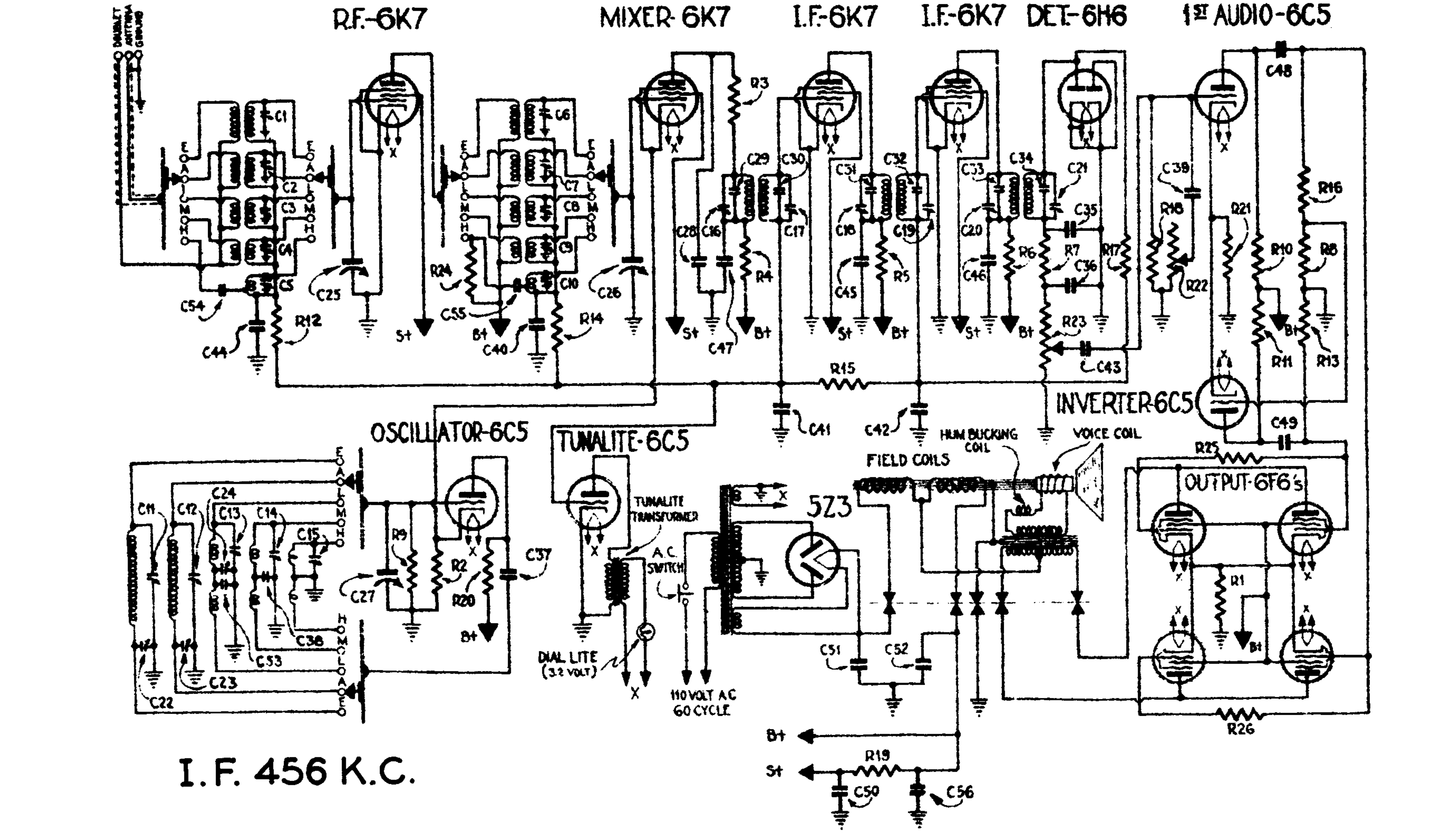
MODEL 14-37A A.C. SUPERHET.

CONDENSERS

C1	35 MMFD. TRIMMERS	C13	35 MMFD. TRIMMERS	C25	365 MMFD. TUNING COND.	C37	2000 MMFD. MICA	C49	.05 MFD. 400 VOLT
C2	" "	C14	" "	C26	" " " "	C38	3000 MMFD. "	C50	.25 MFD. "
C3	" "	C15	" "	C27	" " " "	C39	.01 MFD. 200 VOLT	C51	24 MFD. 500 VOLT WET ELEC
C4	" "	C16	I.F. "	C28	10 MMFD. MICA	C40	.05 MFD. "	C52	40 MFD. 350 VOLT " "
C5	" "	C17	" "	C29	75 MMFD. "	C41	" "	C53	750 MMFD. MICA
C6	" "	C18	" "	C30	100 MMFD. "	C42	" "	C54	100 MMFD. "
C7	" "	C19	" "	C31	" "	C43	" "	C55	" "
C8	" "	C20	" "	C32	" "	C44	" "	C56	.25 MFD. 400 VOLT
C9	" "	C21	" "	C33	" "	C45	" 400 VOLT		
C10	" "	C22	70 MMFD. PADDER	C34	" "	C46	" "		
C11	" "	C23	350 MMFD. "	C35	250 MMFD. MICA } DUAL	C47	" "	R26	200 OHM 1. WATT
C12	" "	C24	" "	C36	250 MMFD. MICA } DUAL	C48	" "	R25	" "

RESISTORS

R1	350 OHMS 2. WATT FLEX.	R13	500,000 OHMS .25 WATT
R2	500 OHMS .25 WATT	R14	500,000 OHMS "
R3	5,000 OHMS "	R15	" "
R4	" "	R16	" "
R5	" "	R17	1 MEGOHM "
R6	" "	R18	3 MEGOHM "
R7	25,000 OHMS "	R19	50,000 OHMS .5 WATT
R8	40,000 OHMS "	R20	15,000 OHMS 1. WATT
R9	100,000 OHMS "	R21	2500 OHMS 1. WATT
R10	" "	R22	500,000 OHMS TONE CONT.
R11	" "	R23	500,000 OHMS VOL. CONT.
R12	500,000 OHMS "	R24	25,000 OHMS .5 WATT



I.F. 456 K.C.

MIDWEST RADIO CORP.

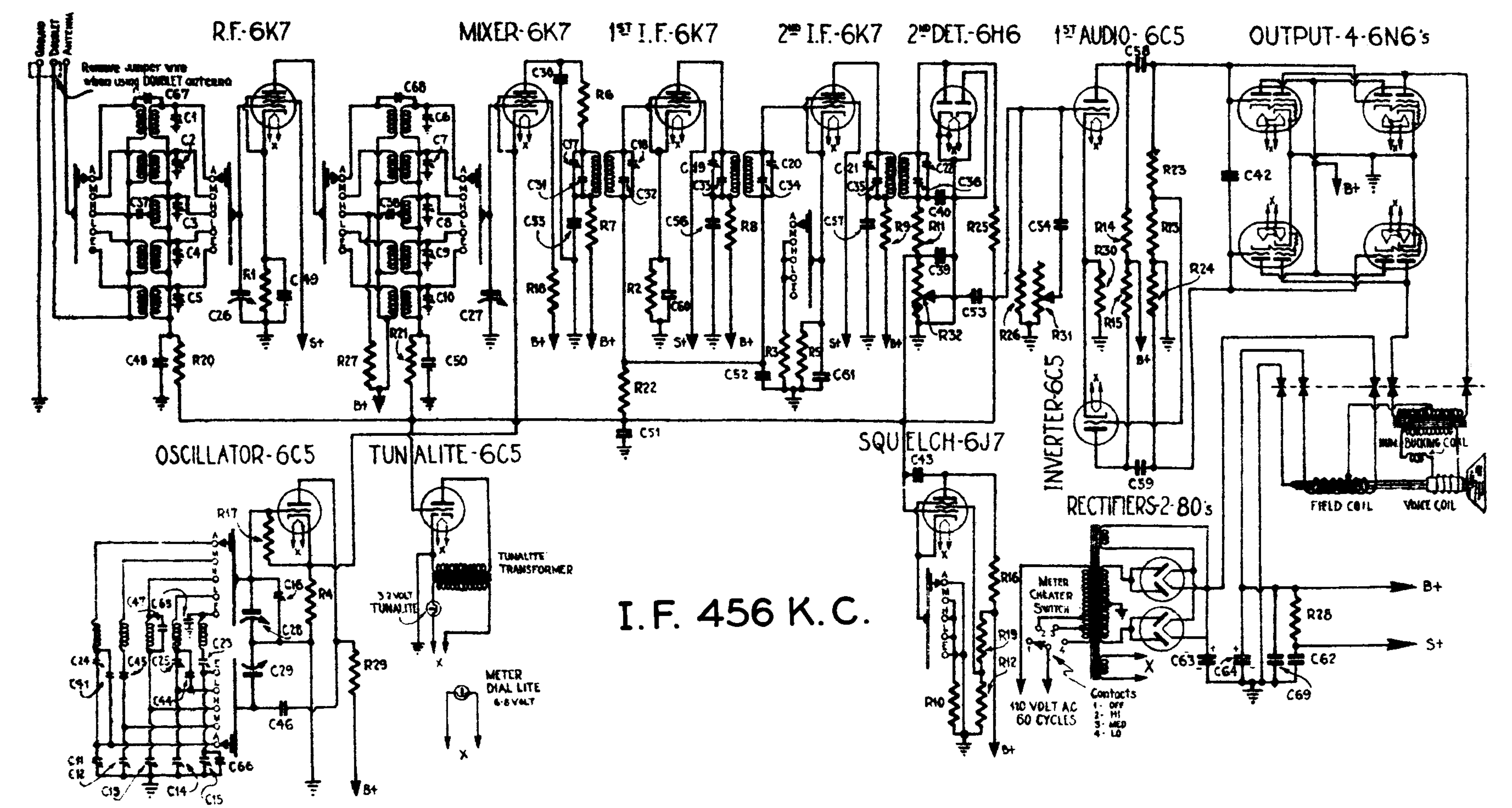
MODEL 16-37 A.C. SUPERHET.

CONDENSERS

C1	35 MMFD.	TRIMMERS	C19	I.F.	TRIMMERS	C37	100 MMFD.	MICA	C55	.05 MFD. 400 VOLT
C2	"	"	C20	"	"	C38	"	"	C56	" "
C3	"	"	C21	"	"	C39	"	"	C57	" "
C4	"	"	C22	"	"	C40	"	"	C58	" "
C5	"	"	C23	70 MMFD.	PADDER	C41	200 MMFD.	"	C59	" "
C6	"	"	C24	"	"	C42	250 MMFD.	"	C60	.25 MFD. 200 VOLT
C7	"	"	C25	350 MMFD	"	C43	"	"	C61	" "
C8	"	"	C26	365 MMFD.	TUNING CONDENSER	C44	350 MMFD.	"	C62	" 400 VOLT
C9	"	"	C27	"	" "	C45	2000 MMFD.	"	C63	25. MFD. 500 VOLT WET ELECTROLYTIC
C10	"	"	C28	"	" "	C46	2000 MMFD.	"	C64	40. MFD. 350 VOLT " "
C11	"	"	C29	"	" "	C47	10 MMFD.	"	C65	10 MMFD MICA
C12	"	"	C30	10 MMFD	MICA	C48	.05 MFD.	200 VOLT	C66	25 MMFD. "
C13	"	"	C31	75 MMFD.	"	C49	"	"	C67	5 MMFD. "
C14	"	"	C32	100 MMFD.	"	C50	"	"	C68	" "
C15	"	"	C33	"	"	C51	"	"	C69	.25 MFD. 400V.
C16	"	"	C34	"	"	C52	"	"		
C17	I.F.	TRIMMERS	C35	"	"	C53	"	"		
C18	"	"	C36	"	"	C54	.01 MFD.	"		

RESISTORS

R1	350 OHMS	WIRE WOUND	R19	200,000 OHMS	.25 WATT
R2	"	"	R20	500,000 OHMS	"
R3	"	"	R21	"	"
R4	500 OHMS	.25 WATT	R22	"	"
R5	1000 OHMS	"	R23	"	"
R6	5,000 OHMS	"	R24	"	"
R7	"	"	R25	1 MEGOHM	"
R8	"	"	R26	3 MEGOHM	"
R9	"	"	R27	25,000 OHMS	.5 WATT
R10	"	"	R28	50,000 OHMS	.5 WATT
R11	25,000 OHMS	"	R29	"	"
R12	"	"	R30	2,500 OHMS	1. WATT
R13	40,000 OHMS	"	R31	500,000 OHM TONE CONTROL	
R14	100,000 OHMS	"	R32	500,000 OHM VOLUME CONTROL	
R15	"	"			
R16	"	"			
R17	"	"			
R18	200,000 OHMS	"			



MONTGOMERY WARD & CO.

MODEL 62-293

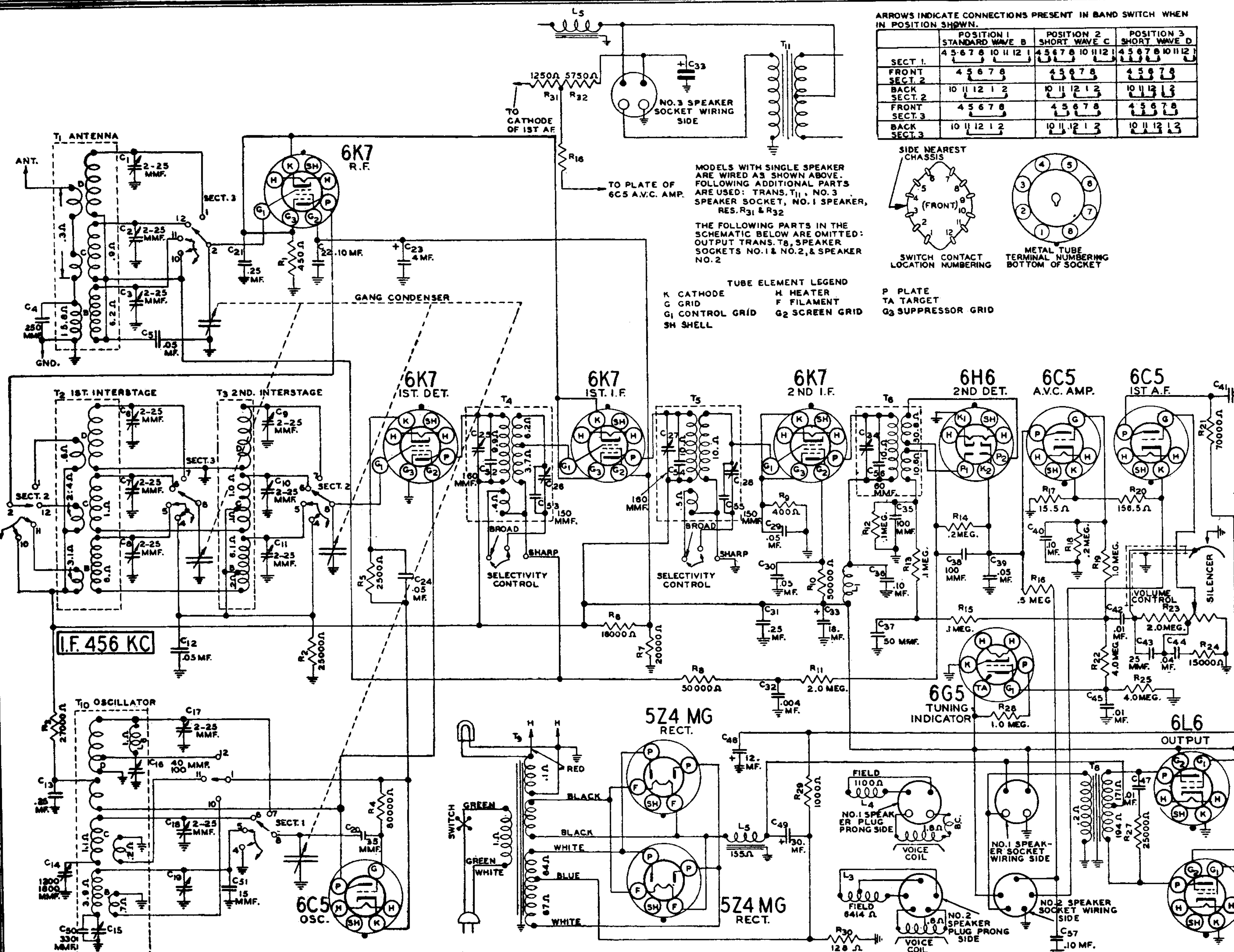


Fig. 12—Schematic Circuit Diagram

NOTE: RESISTANCES OF WINDINGS LESS THAN .1 Ω ARE NOT SHOWN.

MONTGOMERY WARD & CO.

MODEL 62-293

For data on Adjustment of Movie Dial, see model 62-271 on page 682.

For data on Setting Telephone Dial Buttons, see model 62-271 on page 681.

For data on Setting Telephone Dial Stations, see model 62-271 on page 680.

BAND	DIAL COLOR	FREQUENCY RANGE
Standard Wave	White	528 to 1730 KC. (Kilocycles)
1st Short Wave	Amber	1.71 to 5.8 MC. (Megacycles)
2nd Short Wave	Green	5.75 to 18.3 MC. (Megacycles)

Service Data

In Fig. 12 is shown the schematic circuit diagram of the radio. Values of the condensers and resistors used are given. In the following paragraphs is given the complete aligning procedure. If a station is tuned in with the selectivity control in the broad position and this control is then turned to the sharp position, the station may disappear. This is not an indication that the receiver is out of alignment. If additional service information is required, write to us for a complete service manual.

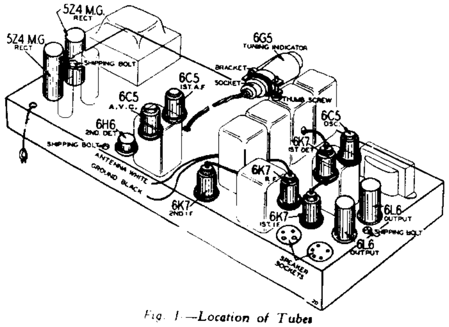


Fig. 1—Location of Tubes

Alignment Procedure

Correct alignment is extremely important in connection with all wave radios. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 1800, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

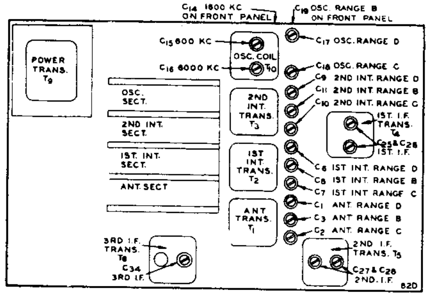


Fig. 11—Location of Trimmers

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 11.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C19) until maximum output is obtained. The location of this trimmer is shown in Fig. 11.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Turn the calibration screw (under color filter—See Fig. 10) until the 1500 KC mark on the dial scale is at the vertical red line on the screen.

Adjust the 1st and 2nd interstage Range B trimmers (C8 and C11) and antenna Range B trimmer (C3) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 11 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C18) until maximum output is obtained. See Fig. 11 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range C trimmers (C7 and C10) and antenna Range C trimmer (C2) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 1800 KC trimmer until the peak of greatest intensity is obtained. See Fig. 11 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C17) until maximum output is obtained. See Fig. 11 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range D trimmers (C6 and C9) and antenna Range D trimmer (C1) to maximum.

When adjusting the 2nd interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

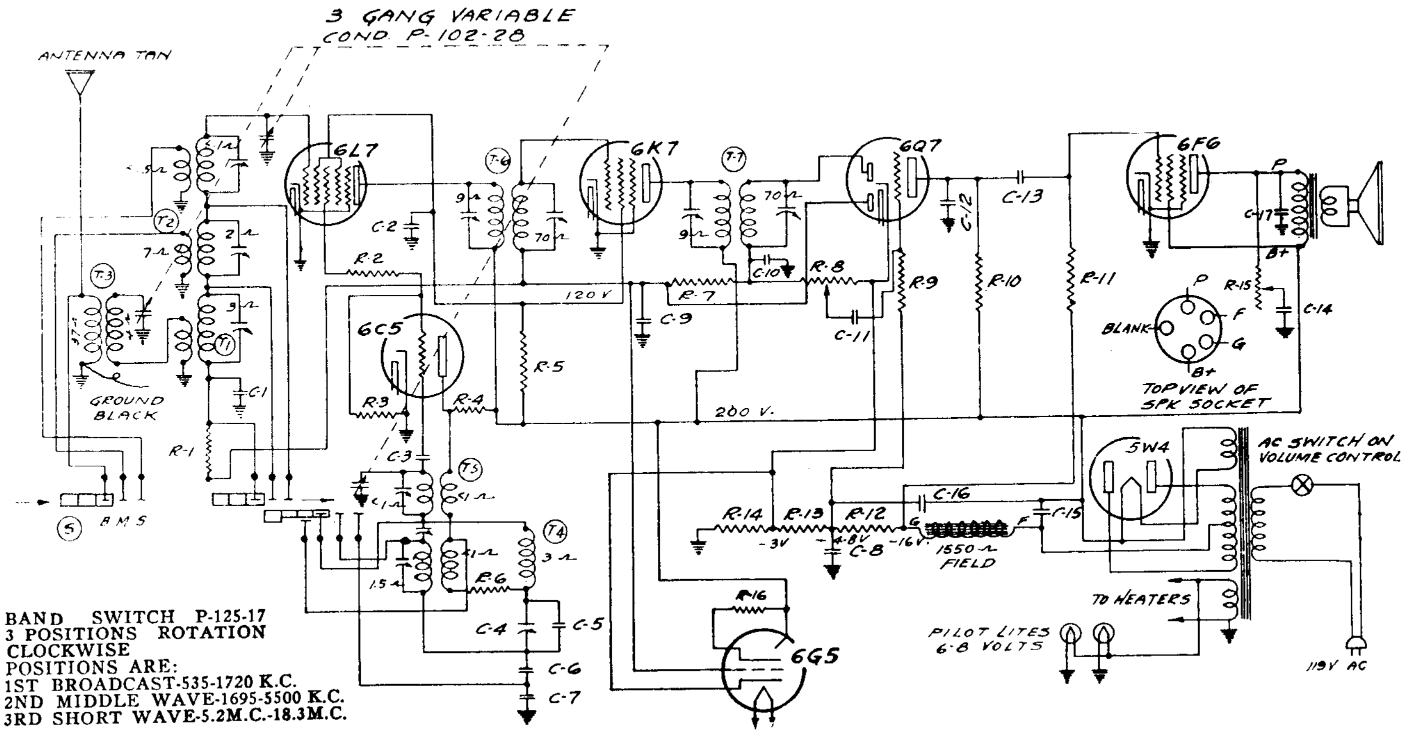
Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 11 for location of this trimmer.

MONTGOMERY WARD & CO.

MODEL 62-307 & 62-407



BAND SWITCH P-125-17
3 POSITIONS ROTATION CLOCKWISE
POSITIONS ARE:
1ST BROADCAST-535-1720 K.C.
2ND MIDDLE WAVE-1695-5500 K.C.
3RD SHORT WAVE-5.2M.C.-18.3M.C.

Power Transformer 50-60 Cycle P-104-52 25 Cycle P 104-53
Universal 25 Cycle P-104-54
Universal 40 Cycle P-104-55

I.F. 465K.C.

LIST OF REPAIR PARTS (Serial No. 6E249976 and up)

Use Only Genuine Factory Replacement Parts

Part No.	Schematic Reference	Description	No. Used In Set	Selling Price Ea.
		CONDENSERS		
BE 100-11	C-11: C-13	.01 x 400 Volt Tubular	2	$0.09
BE 100-20	C-2: C-8	.1 x 200 Volt Tubular	2	.11
BE 100-22	C-1: C-9	.05 x 200 Volt Tubular	2	.10
BE 100-25	C-17	.002 x 600 Volt Tubular	1	.09
BE 100-27	C-14	.025 x 600 Volt Tubular	1	.10
BE 103-6	C-15	8 Mfd. x 350 Volt Electrolytic	1	.50
BE 103-7	C-16	8 Mfd. x 300 Volt Electrolytic	1	.44
BE 129-2	C-12	.0005 Mica—Type MT—20%	1	.09
BE 129-12	C-10	.00025 Mica—Type MT—20%	1	.12
BE 129-39	C-3	.00005 Mica—Type MT—20%	1	.12
BE 129-54	C-7	.003 Mica—Type MW—2½%	1	.25
BE 129-55	C-6	.0034 Mica—Type MW—2½%	1	.25
BE 129-56	C-5	.00055 Mica—Type MT—10%	1	.10
		RESISTORS		
BE 106-26	R-12: R-13: R-14	(R-12, 220 Ohm) (R-13, 32 Ohm) (R-14, 52 Ohm) Metal Clad Resistor	1	.24
BE 130-4	R-9	3 Meg Ohm—⅓ Watt—20%—100 Volt Carbon	1	.08
BE 130-12	B-3	50M Ohm—⅓ Watt—20%— 20 Volt Carbon	1	.08
BE 130-19	R-7	1 Meg Ohm—⅓ Watt—20%—100 Volt Carbon	1	.08
BE 130-20	R-1	100M Ohm—⅓ Watt—20%— 50 Volt Carbon	1	.08
BE 130-27	R-6	50 Ohm—⅓ Watt—20%— 3 Volt Carbon	1	.10
BE 130-102	R-11	500M Ohm—⅓ Watt—10%— 50 Volt Carbon	1	.10
BE 130-103	R-10	100M Ohm—⅓ Watt—10%— 50 Volt Carbon	1	.10
BE 130-104	R-4: R-5	9M Ohm— 1 Watt—20%—100 Volt Carbon	2	.10
BE 130-105	R-2	150 Ohm—⅓ Watt—20%— 10 Volt Carbon	1	.10
BE 130-110	R-16	1 Meg Ohm—1/10 Watt—10%—100 Volt Carbon	1	.08
		COILS		
BE 108-73	T-7	Output I.F. Coil Assem. Comp. with Can.	1	.90
BE 108-74	T-6	Input I.F. Coil Assem. Comp. with Can.	1	.90
BE 110-38	T-4	Broadcast Oscillator Coil Assem. Comp. with Can.	1	.35
BE 110-39	T-5	Mid Wave and Short Wave Oscillator Assem. less Can.	1	.75
BE 111-49	T-1	Broadcast Antenna Coil Assem. Comp. with Can.	1	.40
BE 111-50	T-2	Mid Wave and Short Wave Antenna Coil Assem. less Can.	1	.80
BE 111-51	T-3	Broadcast Preselector Coil Assembly	1	.35
		SOCKETS		
BE 121-8		Five Prong Socket—Marked "SPKR"	1	.08
BE 121-12		Seven Prong Socket—Marked "6K7"	1	.10
BE 121-14		Seven Prong Socket—Marked "6F6"	1	.10
BE 121-15		Five Prong Socket—Marked "5W4"	1	.08
BE 121-17		Six Prong Socket—Marked "6C5"	1	.09
BE 121-18		Seven Prong Socket—Marked "6L7"	1	.10
BE 121-26		Seven Prong Socket—Marked "6Q7"	1	.10
		SPEAKER		
BE 114-45		Eight Inch Dynamic		3.60
		TRANSFORMERS		
BE 104-52		Power Transformer, 50/60 Cycle	1	2.00
BE 104-53		Power Transformer, 25 Cycle	1	2.50
BE 104-54		Universal Power Transformer, 25 Cycle Primary	1	2.50
BE 104-55		Universal Power Transformer, 40 Cycle Primary	1	3.00
		MISCELLANEOUS		
BE 101-46	R-8	Volume Control and Switch (1 Meg Ohm)	1	$0.60
BE 101-58	R-15	Tone Control 50M Ohm	1	.30

Part No.	Schematic Reference	Description	No. Used In Set	Selling Price Ea.
BE 102-28		Three Gang Variable Condenser	1	2.50
BE 107-5		Line Cord and Plug	1	.30
BE 115-35		Antenna, Oscillator, Shield	2	.12
BE 124-28	C-4	J-S Series Pad 3 Pl. (80-225)	1	.16
BE 125-17	S	Band Switch	1	.35
128-44		"Volume" Knob with Spring	1	.08
128-46		"Band Switch" Knob with Spring	1	.08
128-47		"Tuning" Knob with Spring	1	.08

CATHODE RAY TUNING INDICATOR PARTS

Part No.	Description	No. Used In Set	Selling Price Ea.
BE 107-35	Cable and Socket Assembly	1	$0.40
BE 112-158	Metal Oval Escutcheon	1	.15
BE 117-57	Holder and Clamp	1	.15
BE 130-110	1 Meg Ohm—1/10 Watt—10%—100 Volt Carbon	1	.08

DIAL PARTS LIST

Part No.	Description	No. Used In Set	Selling Price Ea.
	ASSEMBLIES		
BE 117-41	Drive Bracket including: 1—No. 117-19—Tuning Shaft Bushing	1	$0.06
BE 117-66	Switch Disc and Link Assembly, including: 1—No. 117-12 —Switch Arm 1—No. 117-35 —Bushing with Screws 1—No. 117-40B—Switch Link 3—No. 131-26 —Spring Washers 3—No. 162-5 —Rivets 1—No. 112-144—Switch Disc—Inc. Red Tape	1	.12
	DIAL PARTS ONLY		
BE 112-125	Drive Belt	1	.10
BE 112-143	Oval Eschutcheon complete with Celluloid Crystal	1	.50
BE 112-148A	Dial Scale complete with Fastener, Pointer Disc, and Screw	1	.24
BE 112-147	Tuning Shaft	1	.06
BE 112-151	Pointer complete with Screw	1	.02
BE 112-156	Pilot Light Assembly	2	.06
BE 116-13	6.8 Volt T-51 Pilot Light	2	.08
BE 117-20A	Tuning Shaft Pulley	1	.03
BE 117-38	Stud, for take-up Spring	1	.03
BE 117-39	Pulley, for take-up Spring	1	.02
BE 120-14	Take-up Spring	1	.02
BE 134-9	Horse Shoe Washer	1	.01
BE 134-40	Rubber Grommet	2	.02

Note: Speakers cannot be ordered, defective speakers must be repaired.
All resistors and mica condensers are RMA color coded — specify value and/or resistor or condenser (per schematic diagram) and model number.
Mica condensers are coded with an additional dot indicating tolerance:

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More than—20%	None

When ordering parts, always specify part and model number as well as serial number of chassis.
When ordering condensers, specify part number, tolerance and/or schematic reference number.

MONTGOMERY WARD & CO.

MODELS 62-307 & 62-407

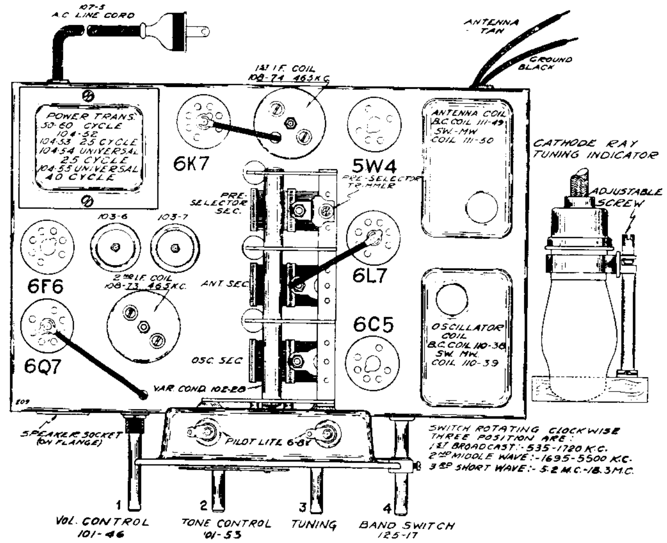


FIG. 1—TOP VIEW

BAND	DIAL SCALE	FREQUENCY RANGE
Broadcast	Outer Scale—Blue	535 to 1720 K.C. (Kilocycles)
Middle Wave	Center Scale—Green	1695 to 5500 K.C. (Kilocycles)
Short Wave	Inner Scale —Buff	5.2 to 18.3 M.C. (Megacycles)

Service Data

DESCRIPTION:

TUBES:

The tube complement of this chassis consists of the latest metal type tubes.

The type and function of each tube is as follows:
1—Type 6L7 Pentagrid Mixer, First Detector.
1—Type 6C5 Oscillator.
1—Type 6K7 Remote Cut-Off Pentode, I. F. Amplifier (465 K.C.)
1—Type 6Q7 Duplex Diode Triode Second Detector, A.V.C. and First Audio.
1—Type 6F6 Pentode Output Amplifier.
1—Type 5W4 High Vacuum Rectifier.
1—Type 6G5 Cathode-Ray Tuning Eye.
(Note:—6G5 available in all glass only.)

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 108, 125, 150, 220 and 250 volts (see parts list) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with 119 volts on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

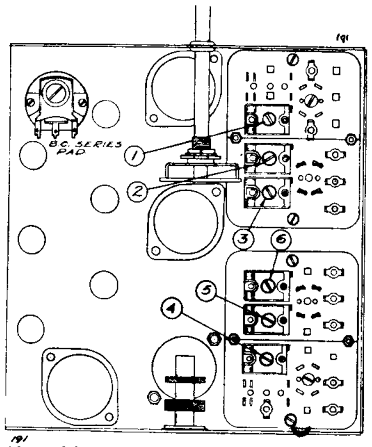


FIG. 3—BOTTOM VIEW SHOWING TRIMMERS

ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. Remove the knobs and the four bolts which are used to fasten the chassis.

All adjustments should be made with a non-metallic screw driver.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 6F6 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-73 Output I.F. Transformer
Part No. 108-74 Input I.F. Transformer
These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-73) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6L7 and adjust input I.F. transformer (No. 108-74) to resonance.
   (c) With oscillator still connected to 6L7, readjust output I.F. transformer (108-73) if necessary.

BROADCAST BAND ALIGNMENT:
535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance (Adjustment number 1; see bottom view of coil assembly, Fig. 3).
   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis; Fig. 1, for location of this adjustment).
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. Under no circumstances bend plates of variable condenser sections to correct tracking.

SHORT WAVE BAND ALIGNMENT:
5.2 to 18.3 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment number 3) and short wave antenna (Adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.3 megacycles for band coverage.

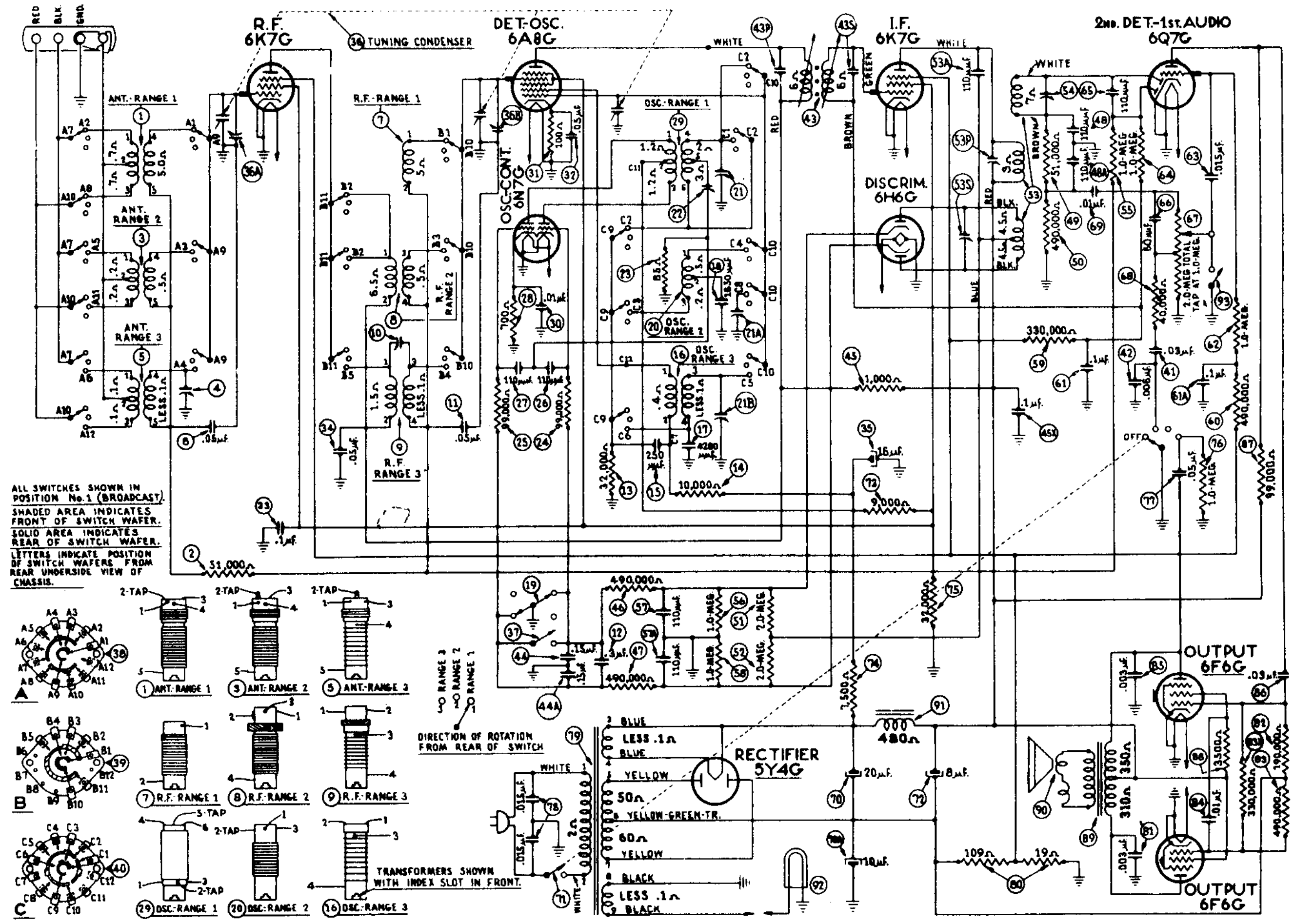
NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental on the receiver dial. As an example of this a fundamental 18.3 megacycle can be tuned in not only at 18.3 on the dial, but also at approximately 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:
1695 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (adjustment number 2) and middle wave antenna (adjustment number 5) to resonance.
   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 5400 kilocycles and 1700 kilocycles for band coverage.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-9



Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2378	$1.60
2	Resistor (51,000 ohms, ½ watt)	33-351339	.20
3	Antenna Transformer (Range 2)	32-2381	1.20
4	Compensator (Single)	31-6161	.30
5	Antenna Transformer (Range 3)	32-2384	1.20
6	Condenser (.05 mfd. tubular)	30-4444	.20
7	R. F. Transformer (Range 1)	32-2379	.40
8	R. F. Transformer (Range 2)	32-2382	1.00
9	R. F. Transformer (Range 3)	32-2385	1.20
10	Compensator (Single)	31-6160	.30
11	Condenser (.05 mfd. tubular)	30-4020	.20
12	Condenser (.15 double bakelite both sections used)	6287-DU	.40
13	Resistor (32,000 ohms, ½ watt)	33-332339	.20
14	Resistor (10,000 ohms, ½ watt)	33-310339	.20
15	Condenser (250 mmfd. mica)	30-1032	.25
16	Oscillator Transformer (Range 3)	32-2386	
17	Condenser (3500 mmfd.)	31-6156	.60
18	Condenser (1650 mmfd.)	31-6155	.40
19	Switch (Magnetic Tuning, manual)	42-1281	
20	Oscillator Transformer (Range 2)	32-2383	.70
21	Compensator (Three section)	31-6170	.75
22	Compensator (Osc. series)	31-6151	.40
23	Resistor (85 ohms, ½ watt)	33-085339	.20
24	Resistor (99,000 ohms, ½ watt)	33-399339	.20
25	Resistor (99,000 ohms, ½ watt)	33-399339	.20
26	Condenser (110 mmfd. mica)	30-1031	.20
27	Condenser (110 mmfd. mica)	30-1031	.20
28	Resistor (700 ohms, ½ watt)	33-170339	.20
29	Osc. Transformer (Range 1)	32-2373	1.60
30	Condenser (.01 mfd. tubular)	30-4479	.20
31	Resistor (100 ohms, ½ watt)	33-110339	.20
32	Condenser (.05 mfd. tubular)	30-4020	.20
33	Condenser (.1 mfd. tubular)	30-4455	
34	Condenser (.05 mfd. tubular)	30-4123	.20
35	Electrolytic Condenser (16 mfd.)	30-2118	1.65
36	Tuning Condenser	31-1963	4.00
37	Magnetic Tuning Switch (Automatic Dial)	45-2330	1.20
38	Range Switch (Ant.)	42-1282	.75
39	Range Switch (R. F.)	42-1283	.75
40	Range Switch (Osc.)	42-1284	
41	Condenser (.03 mfd. tubular)	30-4449	.20
42	Condenser (.006 mfd. tubular)	30-4445	.20
43	1st I. F. Transformer	32-2449	2.20
44	Condenser (.15 dual bakelite)	6287-DG	.40
45	Resistor (1000 ohms, ½ watt)	33-210339	.20
46	Resistor (490,000 ohms, ½ watt)	33-449339	.20
47	Resistor (490,000 ohms, ½ watt)	33-449339	.20
48	Condenser (110 mmfd. dual bakelite)	8035-DG	.2[illegible]
49	Resistor (51,000 ohms, ½ watt)	33-351339	.20
50	Resistor (490,000 ohms, ½ watt)	33-449339	.20

Schem. No.	Description	Part No.	List Price
51	Resistor (2 megohm, ½ watt)	33-520339	$0.20
52	Resistor (2 megohm, ½ watt)	33-520339	.20
53	2nd I. F. Transformer (Discrim)	32-2376	3.30
54	Compensator	31-6147	.40
55	Resistor (1 megohm, ½ watt)	33-510339	.20
56	Resistor (1 megohm, ½ watt)	33-510339	.20
57	Condenser (110 mmfd. dual bakelite)	8035-DG	.25
58	Resistor (1 megohm, ½ watt)	33-510339	.20
59	Resistor (330,000 ohms, ½ watt)	33-433339	.20
60	Resistor (490,000 ohms, ½ watt)	33-449339	.20
61	Condenser (.1 mfd. dual bakelite)	4989-DG	.40
62	Resistor (1 megohm, ½ watt)	33-510339	.20
63	Condenser (.015 mfd. tubular)	30-4358	.20
64	Resistor (1 megohm, ½ watt)	33-510339	.20
65	Condenser (110 mmfd. mica)	30-1031	.20
66	Condenser (60 mfd. mica)	30-1040	.20
67	Volume Control	33-5158	1.00
68	Resistor (40,000 ohms, ½ watt)	33-340339	.20
69	Condenser (.01 mfd. tubular)	30-4479	.20
70	Electrolytic Condenser (10, 20 mfd.)	30-2183	2.00
71	Tone Control and A. C. Switch	42-1267	.75
72	Electrolytic Condenser (8 mfd.)	30-2024	1.10
73	Resistor (9,000 ohms, 2 watt)	33-290539	.30
74	Resistor (7,500 ohms, 3 watt)	33-275639	.30
75	Resistor (32,000 ohms, ½ watt)	33-332339	20
76	Resistor (1 megohm, ½ watt)	33-510339	.20
77	Condenser (.05 mfd. bakelite)	8326-SU	.35
78	Condenser (.015 mfd. dual bakelite)	3793-DG	.40
79	Power Transformer (115 A. C., 50 to 60 cycles)	32-7606	6.25
	(115 A. C., 25 to 40 cycles)	32-7607	9.00
80	Resistor Bias (128 ohms)	33-3280	.30
81	Condenser (.003 mfd. tubular)	30-4469	.20
82	Resistor (190,000 ohms, ½ watt)	33-419339	.20
83X	Resistor (330,000 ohms, ½ watt)	33-433339	.20
83	Resistor (490,000 ohms, ½ watt)	33-449339	.20
84	Condenser (.01 mfd. tubular)	30-4169	.20
85	Condenser (.01 mfd. tubular)	30-4469	.20
86	Condenser (.03 mfd. bakelite)	8318-SU	.35
87	Resistor (99,000 ohms, ½ watt)	33-399339	.20
88	Resistor (3500 ohms, ½ watt)	33-235339	.20
89	Output Transformer (H-30)	32-7754	1.50
90	Cone and Voice Coil (H-30)	36-3801	1.20
91	Field Coil (H-30)	36-3687	4.00
92	Pilot Lamp	34-2039	.07
93	Ring and Arm Insulated (Audio shorting switch)	28-4110	.15
	Ring and Contact (Audio shorting switch)	45-2350	.15
	Washer Flat Fibre	27-8361	.01
	Washer Flat Fibre	27-8351	.01
	Collar Fibre	27-[illegible]	

Schem. No.	Description	Part No.	List Price
	Automatic Dial (complete)	31-1960	$25.00
	Brace	28-4119	.05
	Cable (A. C.)	L-2183	.40
	Cable (speaker)	41-3258	.50
	Coupling (Tuning Condenser)	31-1961	.80
	Coupling (Range Switch)	28-7198	.15
	Clip (Volume Shaft)	28-4394	.01
	Control Screws (Station Index)	31-1898	.15
	Dial	27-5283	
	Dial Escutcheon Assembly	45-2324	.40
	Gear "Front" (Dial Assembly)	45-2347	.60
	Gear "Rear" (Dial Assembly)	45-2348	.60
	Guide (Mask)	28-4118	.25
	Handle (Dial)	45-2389	.50
	Hub Assembly (Handle)	45-2344	.50
	Housing (Control Screws)	28-7196	1.00
	Mask and Link Assembly	45-2401	
	Plate (Drive Mtg. Assembly)	45-2349	
	Pilot Lamp Assembly	38-7706	.35
	Reflector Ring	28-4630	.25
	Ring (Retaining Mask Assembly)	28-7195	.20
	Rubber (Chassis Mtg.)	27-4116	.08
	Rubber Spacer (Chassis Mtg.)	27-4360	.04
	Screen Holder Assembly	31-1968	
	Shield (Chassis Bottom)	28-4626	.30
	Shield (Tube—Square)	28-2726	.10
	Shield (Tube—Round)	8005	.10
	Shaft (Volume Control)	38-8285	
	Shaft and Plate (Range Switch)	42-1287	.50
	Spring (Volume Shaft)	28-4117	.40 C
	Socket (7 prong)	27-6057	.11
	Socket (8 prong)	27-6058	.11
	Socket (Rectifier)	27-6052	.11
	Spacer (Wood)	27-2116	.05
	Terminal Panel (Ant.)	38-7714	.15
	Vernier Drive	45-2342	2.40
	Washer (Dial Scale)	27-8398	.01

CABINET PARTS

Description	Part No.	List Price
Baffle Speaker	16304	
Bezel Assembly	40-5980	
Bezel Gasket	27-8517	.05
Plate (Fibre)	27-7497	.01
Silk	44-1190	
Speaker H-30	36-1295	
Washer	28-2089	.50 C
Knob (Range Switch)	27-4326	.10
Knob (Tuning)	27-4330	.10
Knob (Tuning Vernier)	27-4331	.10
Knob (Tone and Volume)	27-4332	.10

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-9

Electrical Specifications

Type of Circuit: Superheterodyne, with magnetic tuning control on the broadcast range, and a push-pull pentode audio output circuit.

Dial Mechanism: Philco Automatic Dial Tuning System.

Power Supply: Voltage	Frequency Cycles	Consumption
115	50 to 60	110 watts
115	25 to 40	110 watts

Intermediate Frequency: 470 K. C.

Undistorted Output: 5 watts.

Philco Tubes Used: Nine. Two 6K7G; one 6A8G; one 6N7G; one 6H6G; one 6Q7G; two 6F6G, and one 5Y4G.

Tuning Ranges: Three. Range 1—530 to 1720 K. C.; Range 2—2.3 to 7.4 M. C.; Range 3—7.35 to 22 M. C.

Tone Control: 3 positions.

Speaker: H-30.

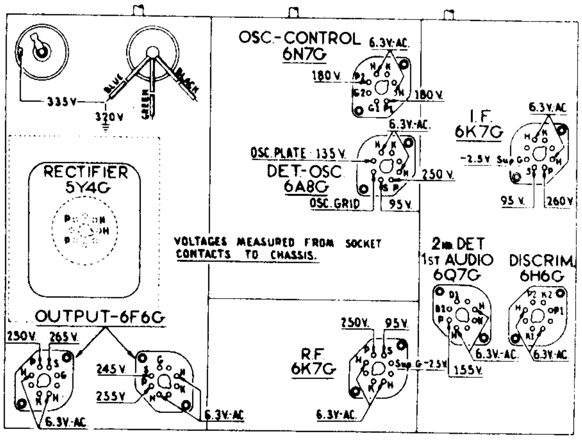


Fig. 1—Receiver Socket Voltages

The voltages indicated by arrows were measured with a Philco 025 Circuit Tester which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator; **Philco Model 088** (fundamental frequency 110 to 20,000 K. C.) is the correct instrument for this purpose; (2) Output meter; **Philco Model 025** Circuit Tester incorporates a sensitive output meter and is recommended; (3) Fibre handle screw-driver (Philco Part No. 27-7059); (4) Special variable condenser (Philco Part No. 45-2325).

OUTPUT METER: The 025 Output Meter is connected to the plate and cathode terminals of one of the (6F6G) tubes. Adjust the meter to use the (0-30) volt scale.

INTERMEDIATE FREQUENCY CIRCUIT

1. Set controls as follows:
   - a. Magnetic Tuning "off" (19)
   - b. Bass compensation minimum
   - c. Volume control maximum (67)
   - d. Receiver Dial 580 K. C.
   - e. Signal Generator 470 K. C
   - f. Range switch position 1

2. Adjust the I. F. compensators for maximum with signal generator output lead connected through a .1 mfd. condenser to the grid of the tubes as follows:

Input Point	Compensators in Order
6A8G—1st Det.	(54) (53P) (43S) (43P)

RADIO FREQUENCY CIRCUIT

Tuning Range 530 to 1720 K. C.

1. Connect the signal generator output lead through a .1 mfd. condenser to terminal 1 and the generator ground to terminal 3 on aerial input panel. Terminals 2 and 3 must be connected with the shorting link provided on the aerial panel.

2. Other controls set as given under intermediate frequency circuit, with the exception of those as follows:

Adjust compensators for maximum output as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
1	1600 K. C.	1600 K. C.	(21) (36B) (36A)
1	580 K. C.	580 K. C.	(22) Roll gang through signal when padding this compensator
1	1600 K. C.	1600 K. C.	(21)
1	1500 K. C.	1500 K. C.	(36A) (36B)

Tuning Range 2.3 to 7.4 M. C.

Adjust compensators for maximum output as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
2	6 M. C.	6 M. C.	(21A)

Tuning Range 7.35 to 22 M. C.

Adjust compensators for maximum output as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
3	18 M. C.	18 M. C.	(21B) Check image at 17.06 M. C.
3	18 M. C.	18 M. C.	(10) (4) Use shunt condenser on (21B) or rock gang through signal when padding compensator No. 10
3	18 M. C.	18 M. C.	(21B)

MAGNETIC TUNING ADJUSTMENT—Set the range switch in position one (530 to 1720 K. C.) and the magnetic tuning switch in the "out" position. Now turn the signal generator and receiver dial to any frequency in the Broadcast band. The receiver dial must be adjusted very accurately for maximum output.

Set the magnetic tuning control in the "on" position (clockwise) Compensator (53S) of the magnetic tuning transformer is now adjusted for maximum output.

The above adjustment is now checked for accuracy, by turning the magnetic tuning control "off" and "on." When this is done, there should be no change in the tone of the received signal. If a change of tone or hiss develops, it indicates a shift in frequency and the adjustment must be made again.

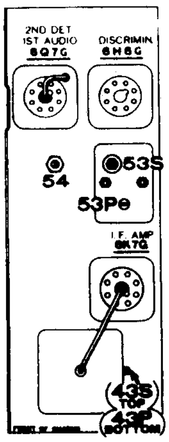


Fig. 2—I. F. Compensators

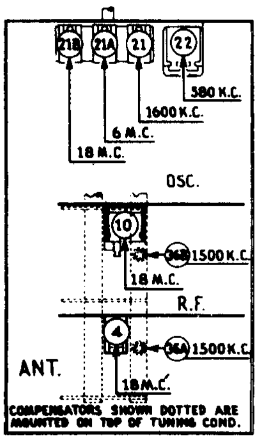


Fig. 3—R. F. Compensators

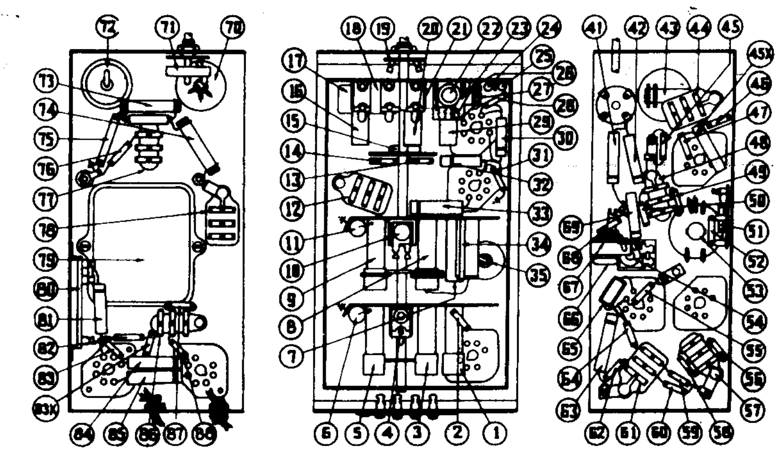


Fig. 4—Part Locations, Underside of Chassis

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-34

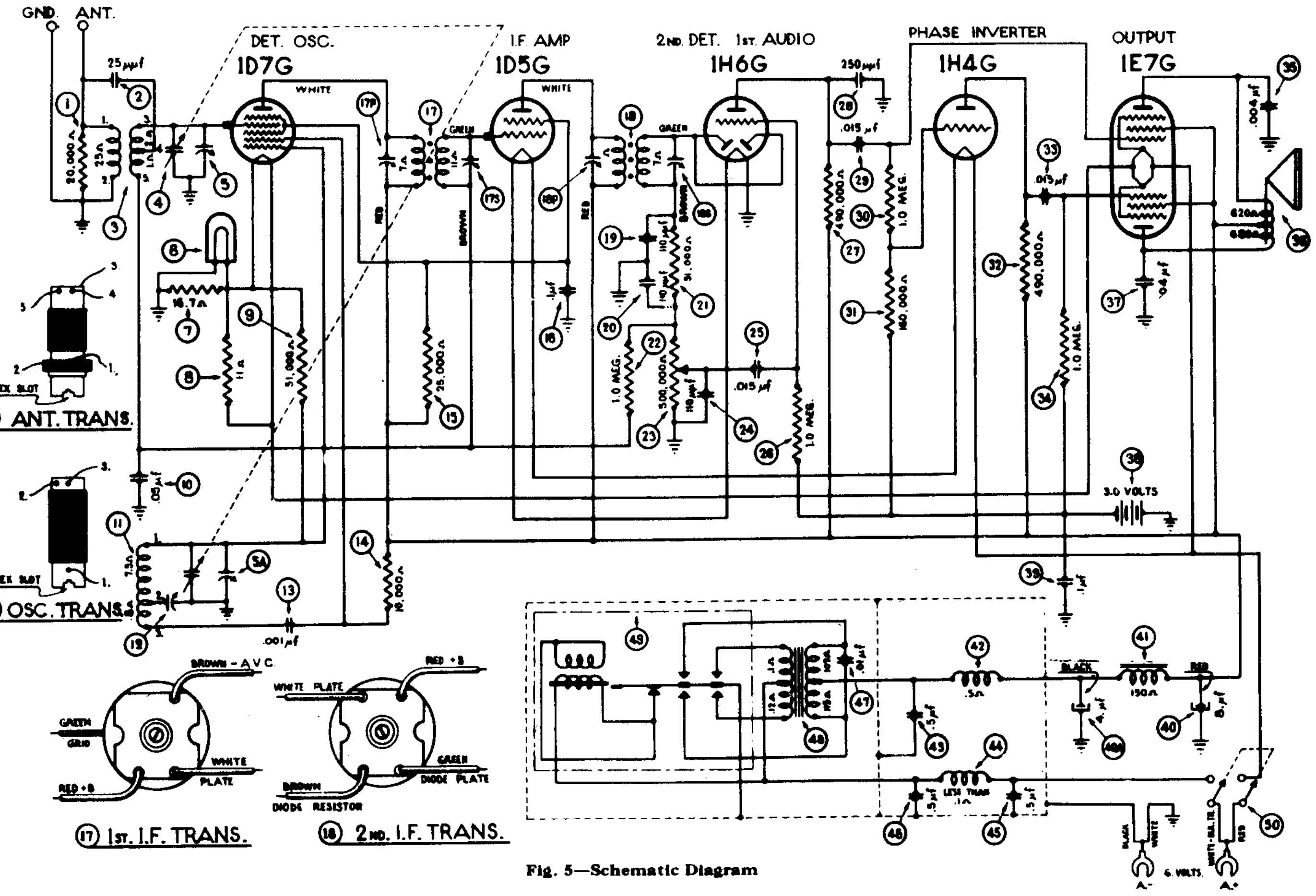


Fig. 5—Schematic Diagram

Replacement Parts—Model 37-34

Schem. No.	Description	Part No.	List Price
1	Resistor (20000 ohms ½ watt)	33-320339	$0.20
2	Condenser (25 mmfd. Mica)	30-1067	.20
3	Antenna Transformer	32-2159	1.60
4	Tuning Condenser	31-1828	3.50
5	Compensator (Two section)	31-6145	.50
6	Pilot Lamp	34-2150	.22
7	Resistor (16 ohms flexible)	33-3298	.20
8	Resistor (11 ohms flexible)	33-3297	.20
9	Resistor (51000 ohms, ½ watt)	33-351339	.20
10	Condenser (.05 mfd. tubular)	30-4020	.20
11	Oscillator Transformer	32-2120	1.00
12	Compensator (Osc. 580 K.C.)	04000S	.35
13	Condenser (.001 mfd. tubular)	30-4453	.20
14	Resistor (10000 ohms, ½ watt)	33-310339	.20
15	Resistor (25000 ohms, ½ watt)	33-325339	.20
16	Condenser (.1 mfd. tubular)	30-4122	.20
17	1st I. F. Transformer	32-2100	1.80
18	2nd I. F. Transformer	32-2102	1.80
19	Condenser (110 mmfd. Mica)	30-1031	.20
20	Condenser (110 mmfd. Mica)	30-1031	.20
21	Resistor (51000 ohms ½ watt)	33-351339	.20
22	Resistor (1 megohm ½ watt)	33-510339	.20
23	Volume Control	33-5157	1.00
24	Condenser (110 mmfd. Mica)	30-1031	.20
25	Condenser (.015 mfd. tubular)	30-4358	.20
26	Resistor (1 megohm ½ watt)	33-510339	.20
27	Resistor (490000 ohms ½ watt)	33-449339	.20
28	Condenser (250 mmfd. Mica)	30-1032	.25
29	Condenser (.015 mfd. tubular)	3793SU	.20
30	Resistor (1.0 megohm ½ watt)	33-510339	.20
31	Resistor (160000 ohms ½ watt)	33-416339	.20
32	Resistor (490000 ohms ½ watt)	33-449339	$0.20
33	Condenser (.015 mfd. tubular)	30-4226	.20
34	Resistor (1 megohm ½ watt)	33-510339	.20
35	Condenser (.004 mfd. tubular)	30-4456	.20
36	Cone	45-2315	1.20
37	Condenser (.004 mfd. tubular)	30-4456	.20
38	Bias Cell	41-8009	.30
39	Condenser (.1 mfd. tubular)	30-4122	.20
40	Electrolytic Condenser (4-8 mfd.)	30-2160	2.00
41	Filter Choke	32-7543	1.35
42	B Filter Choke	32-1932	.25
43	Condenser (.5 mfd. metal case)	30-4296	.60
44	"A" Choke	32-1954	.40
45	Condenser (.5 mfd. metal case)	30-4296	.60
46	Condenser (.5 mfd. metal case)	30-4296	.60
47	Condenser (.01 mfd. tubular)	30-4381	.25
48	Power Transformer	32-7682	2.20
49	Vibrator Unit	41-3222	5.25
50	Power Switch	42-1221	.45
	Vernier Drive Assembly	31-1863	
	Pilot Lamp Assembly	38-7875	.45
	Bezel Assembly	40-5987	.30
	Dial	27-5252	.10
	Hub	28-7152	.10
	Clamp	28-2837	.10
	Set Screw	W-1506 Per C	2.00
	Screen and Bracket Assembly	31-1878	.25
	Knob Dial	27-4321	.10
	Knob (Volume and Power)	27-4332	.10
	Volume Control Shaft	38-8058	.12
	Shaft Retaining Clip	28-4394	.01
	Shaft Spring	28-4117 Per C	$0.40
	Bias Cell Panel	38-7275	.20
	Terminal Panel (R. F. Unit)	38-7963	.05
	Terminal Panel (I. F. Unit)	38-7703	.25
	Terminal Panel (Antenna)	38-7871	.10
	Socket (8 prong)	27-6058	.11
	Socket (7 prong)	27-6057	.11
	Socket (Power Unit)	27-6036	.11
	Shield (Tube)	28-2726	.10
	Shield (I. F. Transformer)	38-7763	.20
	Shield Base	28-3898	.03
	Shield (Vibrator)	38-8022	.25
	Mtg. Grommet (R. F. Unit)	27-4317	.04
	Mtg. Sleeve (R. F. Unit)	28-2257	.01
	Mtg. Washer (R. F. Unit)	W-4436	
	Mtg. Screw (R. F. Unit)	W-729 Per C	.45
	Mtg. Plate (R. F. Coil)	28-3808	.02
	Mtg. Spacer (R. F. Coil)	27-8228	.01
	Mtg. Screw (R. F. Coil)	W-1635 Per C	.30
	Mtg. Rubber Chassis	5189	.03
	Mtg. Bushing (Chassis)	27-4359	.02
	Rubber Cushion—Vibrator Unit	27-4287	.05
	Battery Cable	41-3204	1.20
	Speaker Cable	41-3229	30
	Speaker L2B	36-1256	6.50
	Battery 6 Volt Storage	116-R	
	Baffle and Silk Assembly (B Cabinet)	40-5935	.40
	Baffle and Silk Assembly (F Cabinet)	40-5933	.75

Figures in black type indicate circled figures in Base View.

Prices Subject to Change without Notice

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-34

Electrical Specifications

Type of Circuit: Superheterodyne, with Push-Pull Pe tode Audio Output, using a vibrator unit operated by a 6 volt storage battery for supplying "B" power to the receiver.

Power Supply: 6 volt storage battery Philco Type 116-R.

Current Drain: 1.3 Amps.

Philco Tubes Used: 1D7G, Det.-Osc.; 1D5G, I.F. Amp.; 1H6G, 2nd Det. 1st Audio; 1H4G, Phase Inverter; 1E7G Output.

Frequency Range: 530—1720 K.C.

Intermediate Frequency: 470 K.C.

Speaker: Permanent Magnet Model L2B.

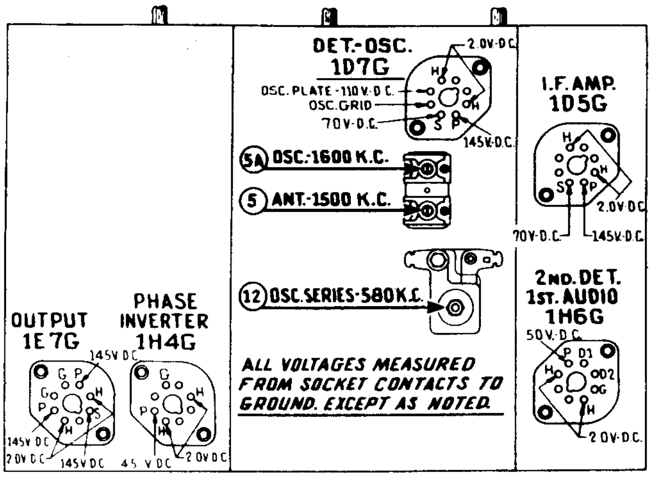


Fig. 1—Socket Voltages and R. F. Compensators

The voltages indicated by arrows were measured with a **Philco 025 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, Storage Battery fully charged.

Aligning Compensators

To accurately adjust this receiver precision test equipment is necessary. A signal generator such as the **Philco Model 088**, covering from 110 to 20,000 K.C. is recommended for adjusting the various compensators at the frequencies specified. A visual indication of the receiver output is also necessary. **Philco Model 025 Circuit Tester** contains a sensitive output meter and is recommended for this purpose.

Philco fibre handle screw-driver **No. 27-7059** and wrench **Part No. 3164** complete the equipment necessary for the following adjustments. The locations of the various compensators are shown in Figs. 1 and 2.

OUTPUT METER—The 025 Output Meter is connected between one of the plate contacts of the 1E7G tube and ground. Adjust the meter to use the (0-30) volt scale.

DIAL ADJUSTMENT—The tuning condenser is set at the maximum capacity position, by turning the knob clockwise. Loosen the set screw of dial hub and set dial, with Glowing Indicator centered between the first and second index lines at the low frequency end of the scale.

INTERMEDIATE FREQUENCY CIRCUIT

1. Connect the 088 Signal Generator output lead through a .1 mfd. condenser to the grid of the 1D7G tube and the generator ground lead to the chassis. Set the generator for 470 K.C. and turn the receiver dial to approximately 580 K.C.
2. Now adjust compensators 18S, 18P, 17S, and 17P for maximum output.

RADIO FREQUENCY CIRCUIT

1. Remove the signal generator output lead from the 1D7G tube and connect it through a 200 mmfd condenser to the receiver aerial post.
2. Set the 088 Signal Generator indicator and the receiver dial to 1600 K.C.
3. Now adjust compensators 5A and 5 for maximum output.
4. The low frequency end of the tuning scale is now adjusted as follows: Set the signal generator at and turn the receiver dial to 580 K.C. Now adjust compensator 12 for maximum output, then vary the tuning condenser of the receiver for maximum output about the 580 K.C. dial mark. Now turn compensator 12 slightly to the right or left and again vary the receiver tuning condenser for maximum output. If the output reading increases, turn compensator 12 in the same direction a trifle more, and vary the tuning condenser again for maximum output. If a decrease in output is noted turn the compensator 12 in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in the output reading.
5. Set the signal generator and receiver dials as given in Paragraph 2 above and adjust compensator 5A for maximum output.
6. Rotate the signal generator and receiver dials to 1500 K.C. and adjust compensator 5 for maximum output.

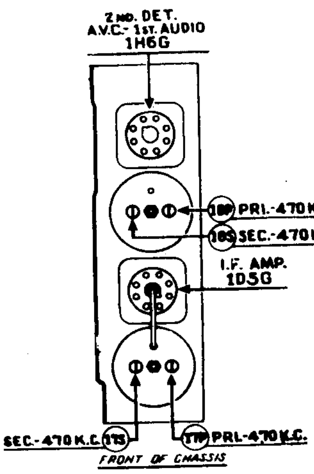


Fig. 2—I. F. Compensators

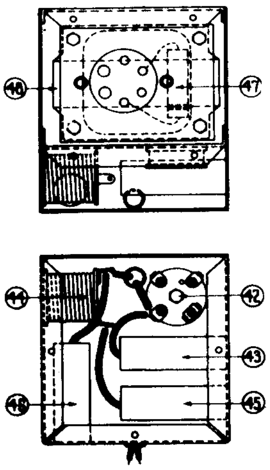


Fig. 3—Power Unit

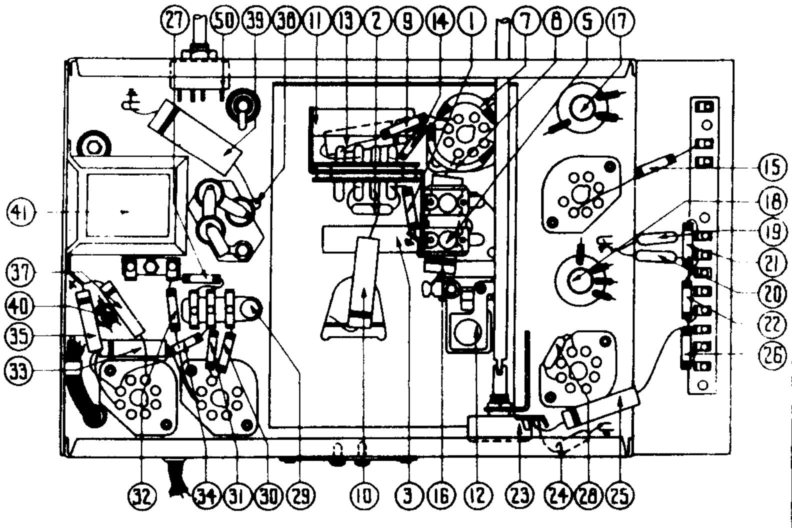


Fig. 4—Parts Locations—underside of chassis

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-62

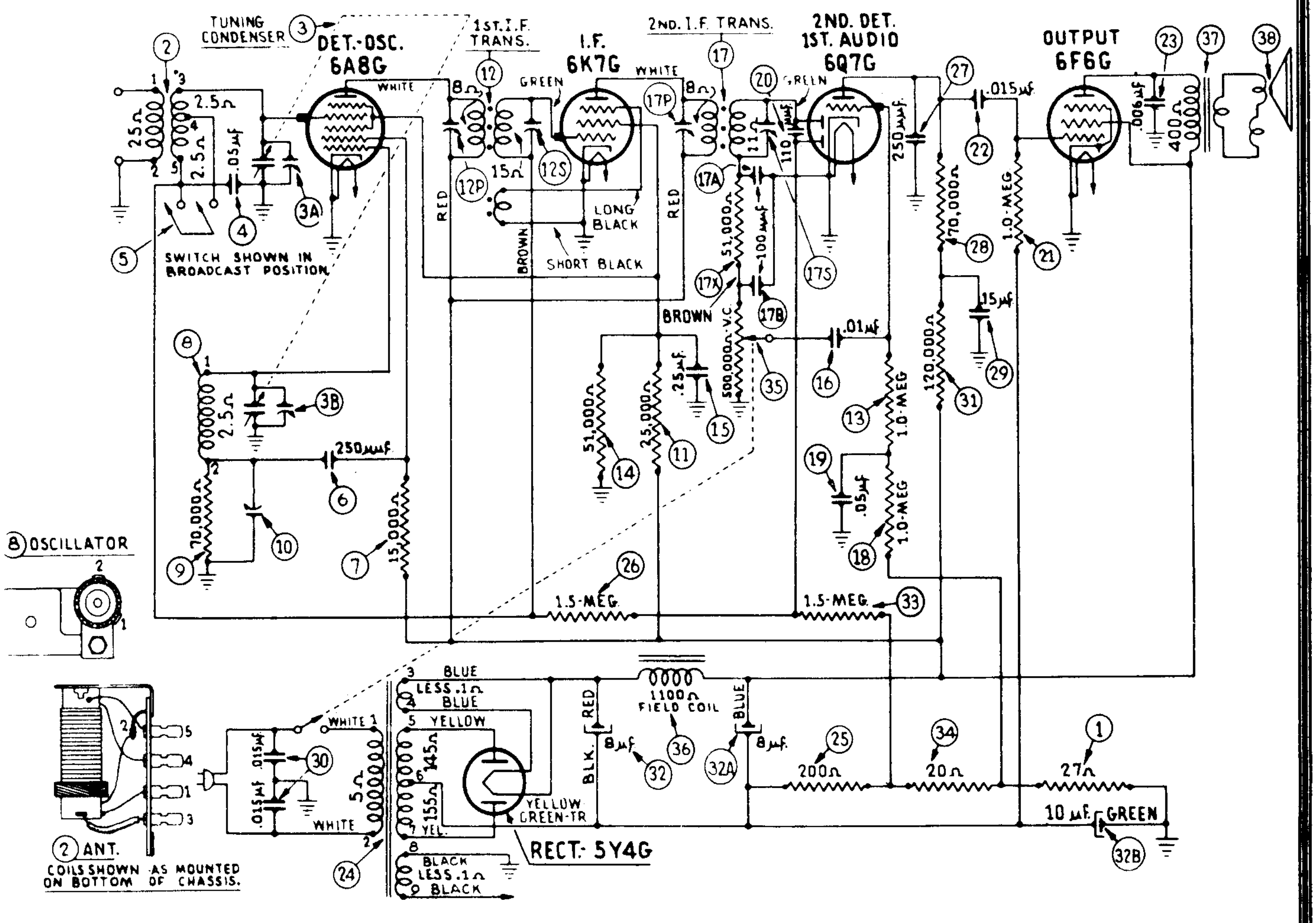


Fig. 4. Schematic Diagram—Model 37-62

Replacement Parts—Model 37-62

Schem. No.	Description	Part No.	List Price
1	Resistor (27 ohms ½ watt)	33-027339	$0.20
2	Ant. Transformer	32-2446	
3	Tuning Condenser	31-1989	
4	Condenser (.05 mfd. Tubular)	30-4020	.20
5	Range Switch	42-1299	.60
6	Condenser (250 mmfd. mica)	30-1032	.25
7	Resistor (15000 ohms ½ watt)	33-315339	.20
8	Osc. Transformer	32-2330	
9	Resistor (70000 ohms ½ watt)	33-370339	.20
10	Compensator (Osc. series)	31-6150	
11	Resistor (25000 ohms 1 watt)	33-325439	.20
12	1st I. F. Trans.	32-2311	1.80
13	Resistor (1 megohm ½ watt)	33-510339	.20
14	Resistor (51000 ohms 1 watt)	33-351439	.20
15	Condenser (.25 mfd. tubular)	30-4134	.25
16	Condenser (.01 mfd. Bakelite)	3903SU	.25
17*	2nd I. F. Trans.	32-2460	
17X	Resistor (51000 ohms ½ watt, in I. F. Transformer)	33-351339	.20
18	Resistor (1 megohm ½ watt)	33-510339	.20
19	Condenser (.05 mfd. Tubular)	30-4020	.20
20	Condenser (110 mmfd. mica)	30-1031	.20
21	Resistor (1 megohm ½ watt)	33-510339	.20
22	Condenser (.015 mfd. Bakelite)	3793SU	.35
23	Condenser (.006 mfd. Tubular)	30-4504	
24	Power Transformer (115 volts, 60 cycle)	32-7626	$4.25
	Power Transformer (115 volts, 25 to 40 cycle)	32-7627	5.50
	Power Transformer (110/220 A. C. 50 to 60 cycle)	32-7628	5.25
25	Resistor (200 ohms, ½ watt)	33-1210	.20
26	Resistor (1.5 megohm ½ watt)	33-515339	.20
27	Condenser (250 mmfd. mica)	30-1032	.25
28	Resistor (70000 ohms ½ watt)	33-370339	.20
29	Condenser (.15 mfd. Tubular)	30-4505	
30	Condenser (.015 mfd. Dual Bakelite)	3793DG	.40
31	Resistor (120000 ohms ½ watt)	33-412339	.20
32	Elect. Condenser (8, 8, 10 mfds.)	30-2192	1.80
33	Resistor (1.5 megohms ½ watt)	33-515339	.20
34	Resistor (20 ohms ½ watt)	33-020339	.20
35	Volume Control and A. C. Switch	33-5198	
36	Field Coil Assembly	36-3039	2.75
37	Output Transformer	32-7019	.90
38	Speaker Cone Assembly	36-3157	1.00
	Dial	27-5287	.40
	Hub	28-7152	.10
	Clamp	28-2837	.10
	Dial Screen Assembly	38-8382	.30
	Cable (Speaker)	L-2633	.20
	Cover Speaker Terminals	36-3025	$0.08
	Cord (AC)	L-2183	.40
	Knob	27-4321	.10
	Knob	27-4332	.10
	Mtg. Rubber (Chassis, 4 required)	27-4116	.08
	Mtg. Fibre Plate (Chassis, 4 required)	27-7497	.01
	Mtg. Washer (Chassis, 4 required)	28-2089	1.50 C
	Mtg. Bolt (Chassis, 4 required)	W-1358	2.60 C
	Mtg. Rubber (Chassis, 4 required)	5189	.03
	Panel (Ant. Coil)	38-8533	
	Pilot Lamp Assembly	38-8534	.30
	Shield (Tube)	28-2726	.10
	Socket (8 Prong)	27-6058	.11
	Socket (7 Prong)	27-6057	.11
	Spacer Mtg. Ant. Coil	27-8228	.01
	Screw Mtg. Ant. Coil	W-1635	.30 C
	Speaker	36-1009	5.75
	Vernier Drive Kit	45-2426	

CABINET PARTS

Schem. No.	Description	Part No.	List Price
	Baffle & Silk	40-6090	.30
	Bezel	28-3899	.25
	Screw (Bezel)	W-1664	.50 C
	Screw (Speaker Mtg.)	W-1604	.50 C

*Two condensers 17A and 17B are part of Padder inside of I. F. Transformer 17.

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-62

Electrical Specifications

Type of Circuit: Superheterodyne, with pentode audio output Circuit.

Power Supply:

Voltage	Frequency	Connection
115	50 to 60 cycles	60 watts
115	25 to 40 cycles	60 watts

Intermediate Frequency: 470 K. C.

Undistorted Output: 3 watts.

Philco Tubes Used: Five; one 6A8G, one 6F6G, one 6K7G, one 5Y4G, one 6Q7G.

Tuning Ranges: Two; Range 1—530 to 1720 K. C. Range 2—2.3 to 2.5 M. C.

Speaker: S-7.

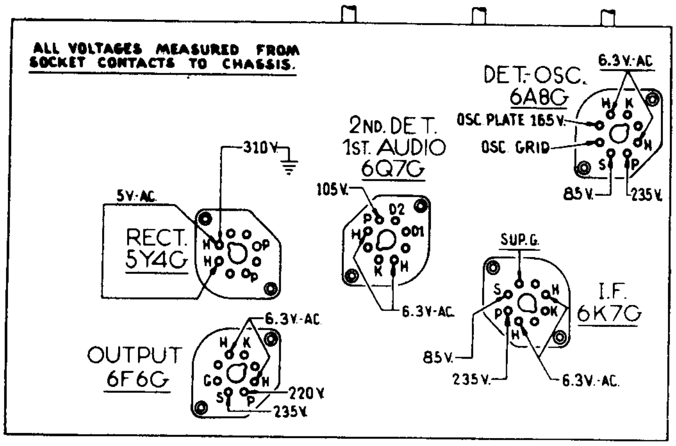


Fig. 1. View of Sockets from Underside Chassis

The voltages indicated by arrows were measured with a **Philco 025 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

Alignment of Compensators

Equipment Required: (1) Signal Generator; Philco Model 088 (fundamental frequency 110 to 20000 K. C.) is the correct instrument for this purpose; (2) output meter. **Philco Model (025) Circuit Tester** incorporates a Sensitive output meter and is recommended; (3) Fibre handle screwdriver (Philco Part No. 27-7059); (4) Fibre wrench Part No. 3164.

Dial Calibration: Set the tuning condenser at the maximum capacity position. Loosen the set screw of the dial hub and set dial, with the glowing indicator centered between the first and second index lines, at the low frequency end of the broadcast scale. Tighten set screw in this position.

Output Meter: The 025 Output Meter is connected to the plate and cathode terminals of the (6F6G) tube. Adjust the meter to use the (0-30) Volt Scale.

INTERMEDIATE FREQUENCY CIRCUIT

1. Set controls as follows:
   a. Volume control maximum
   b. Receiver Dial 580 K. C.
   c. Signal generator 470 K. C.
   d. Range Switch Broadcast position

2. Connect the signal generator output lead through a .1 mfd. condenser to the 6A8G Grid and adjust the Compensators as follows for maximum output (17S), (17P), (12S), and (12P).

RADIO FREQUENCY CIRCUIT

Tuning Range: 520 to 1720 K. C.

1. Connect the signal generator output lead through a 200 mmfd. condenser to the ant. terminal of the receiver and the generator ground to the chassis. Set the range switch in the broadcast position.

2. Adjust compensators as follows for maximum output.

Signal generator	Receiver dial	Compensators in order
1600 K. C.	1600 K. C.	(3B), (3A)
580 K. C.	580 K. C.	(10) Note A
1600 K. C.	1600 K. C.	(3B), (3A)

No adjustments are required for Range 2 as Range 1 adjustments compensate for this circuit.

Note A—First tune compensator (10) for maximum output, then vary the tuning condenser of the receiver for maximum output about the 580 K. C. dial mark. Now turn compensator (10) slightly to the right or left and vary the receiver tuning condenser for maximum output. If the out reading increases, turn compensator (10) in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

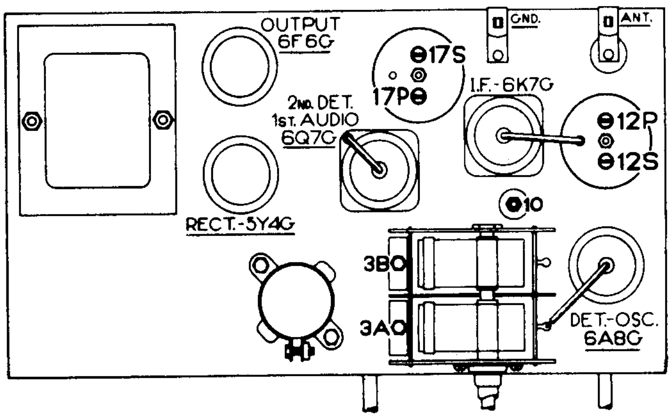


Fig. 2. Locations of R. F. & I. F. Compensators

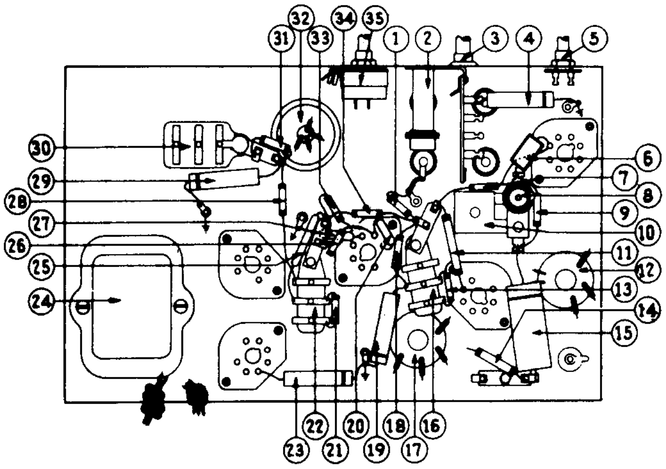
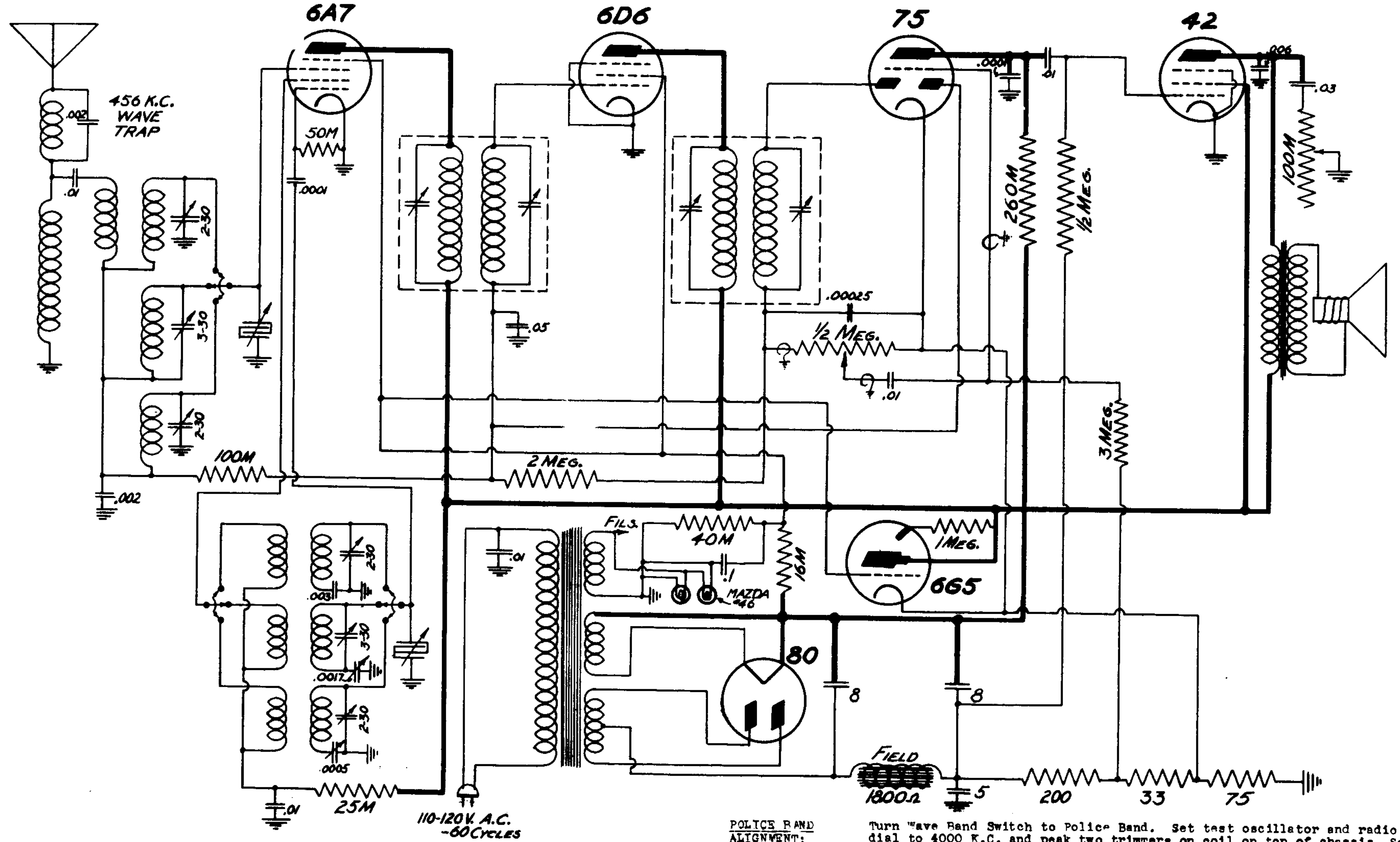


Fig. 3. Parts locations, Underside of chassis view

NOTE: See page 237 before servicing this set.

PIERCE AIRO, Inc.

MODELS 635 & 635LW



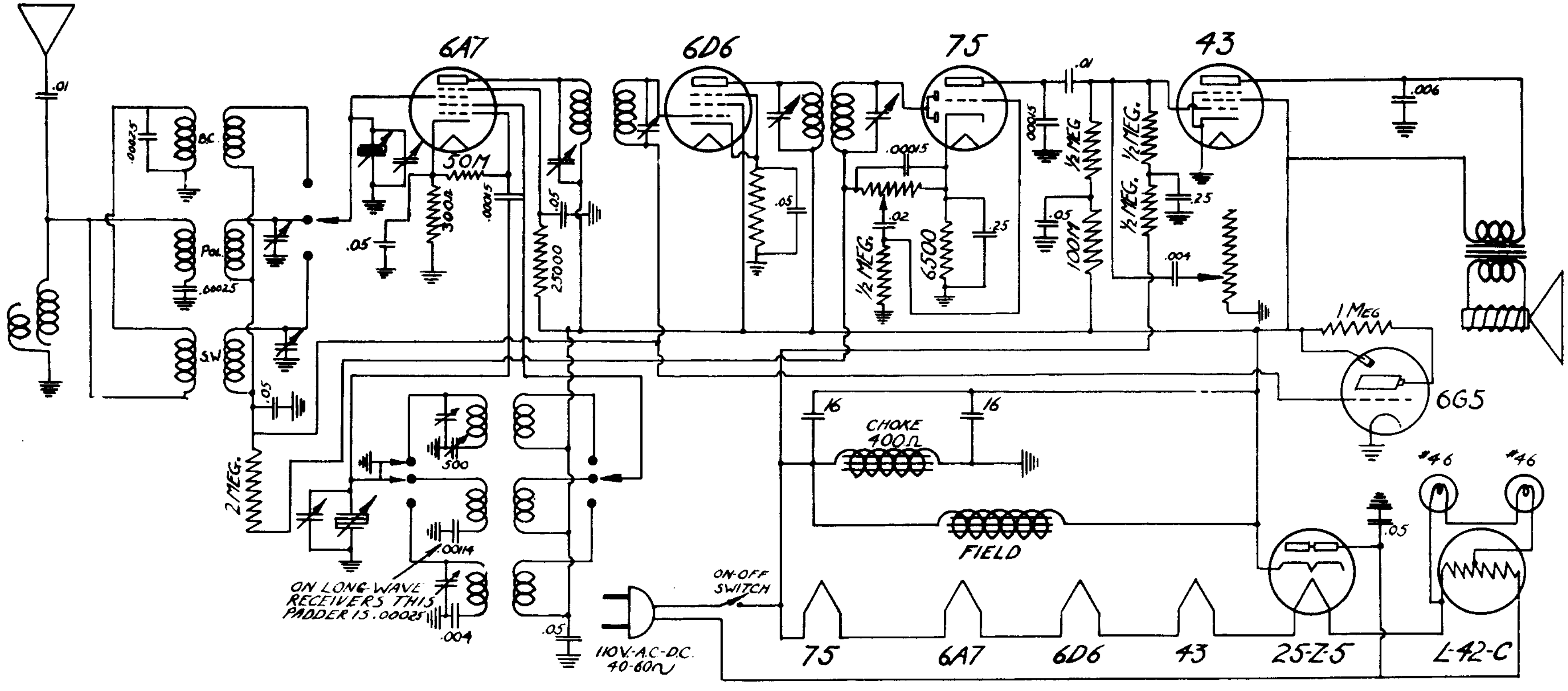
I. F. ALIGNMENT: Intermediate frequency peaked at 456 K.C. Connect test oscillator to grid of 6A7 and chassis. Short circuit stator of front section of variable condenser during this operation. Then peak I.F. trimmers for maximum signal.

R. F. ALIGNMENT: Remove short from stator of variable condenser. Turn Wave Band Switch to Broadcast. Connect test oscillator to antenna and chassis. Set test oscillator and radio dial to 1500 K.C. and peak two trimmers underneath chassis, (toward rear) for maximum signal. Set test oscillator at 600 K.C. and adjust padder condenser (nut side) in front of chassis for maximum signal. During this operation, the variable condenser must be rocked. Readjust 1500 K.C.

POLICE BAND ALIGNMENT: Turn Wave Band Switch to Police Band. Set test oscillator and radio dial to 4000 K.C. and peak two trimmers on coil on top of chassis. Set test oscillator and radio to 1700 K.C. and adjust padder (screw side) for maximum signal. The variable condenser must be rocked during the operation. If receiver has long waves instead of police band, calibrate same trimming condenser as on Police Band, but set oscillator and receiver at 300 K.C. for alignment.

SHORT WAVE ALIGNMENT: Turn wave band switch to short wave. Set test oscillator and radio dial to 15 Megacycles and peak trimmers on bottom of chassis (toward front) for maximum signal. Low frequency setting is automatically taken care of by short wave coils which are carefully matched for this setting by a fixed calibrated padder.

PIERCE AIRO, Inc.
MODELS 700 & 700LW



SERVICE NOTES

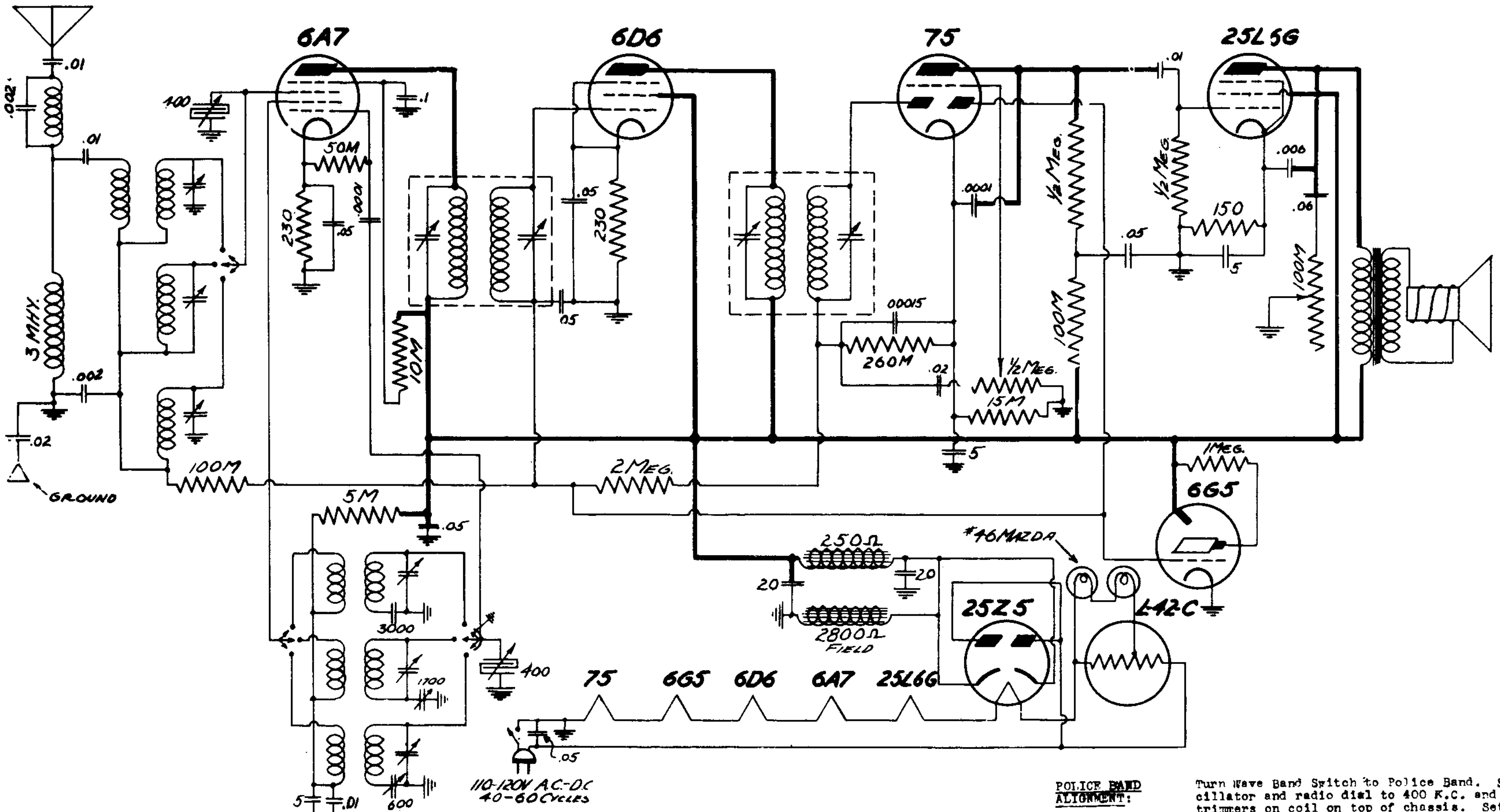
I.F. ALIGNMENT- Intermediate Frequency Peaked At 456 K.C. Connect Test Oscillator To Grid of 6A7 And Chassis. Short Circuit Stator of Front Section of Variable Condenser During This Operation. Then Peak I.F. Trimmers For Maximum Signal.

R.F. ALIGNMENT- Remove Short From Stator of Variable Condenser. Turn Wave Band Switch To Broadcast. Connect Test Oscillator To Antenna And Chassis. Set Test Oscillator And Radio Dial To 1500 K.C. And Peak Var. Cond. Trimmers For Maximum Signal. Set Test Oscil. at 600 K.C. And Adjust Padder Condenser in Front of Chassis For Max. Signal. During This Operation The Var. Cond. Must Be Rocked. Readjust 1500 K.C.

POLICE BAND ALIGNMENT- Turn Wave Band Switch To Police Band Set Test Osc. And Radio Dial To 4000 K.C. And Peak 2 Trimmers Near Front Of Chassis For Max. Sig. The Low Freq. Setting is Automatically Adjusted By A Fixed Calibrated Padder. If Receiver Has Long Waves Instead of Police Band Calibrate Same Trimming Cond. As on Police Band But Set Oscillator And Receiver At 300 K.C. For Alignment.

SHORT WAVE ALIGNMENT- Turn W.B. Switch To Short Wave. Set Test Osc. And Radio Dial To 15 Megacycles And Peak Trimmers Near Center of Chassis For Max. Sig. Low Freq. Setting is Automatically Taken Care Of By Short Wave Coils Which Are Carefully Matched For This Setting By A Fixed Calibrated Padder.

PIERCE AIRO, Inc.
MODELS 700A & 700ALW



I. F. ALIGNMENT: Intermediate frequency peaked at 456 K. C. Connect test oscillator to grid of 6A7 and chassis. Short circuit stator of front section of variable condenser during this operation. Then peak I.F. trimmers for maximum signal.

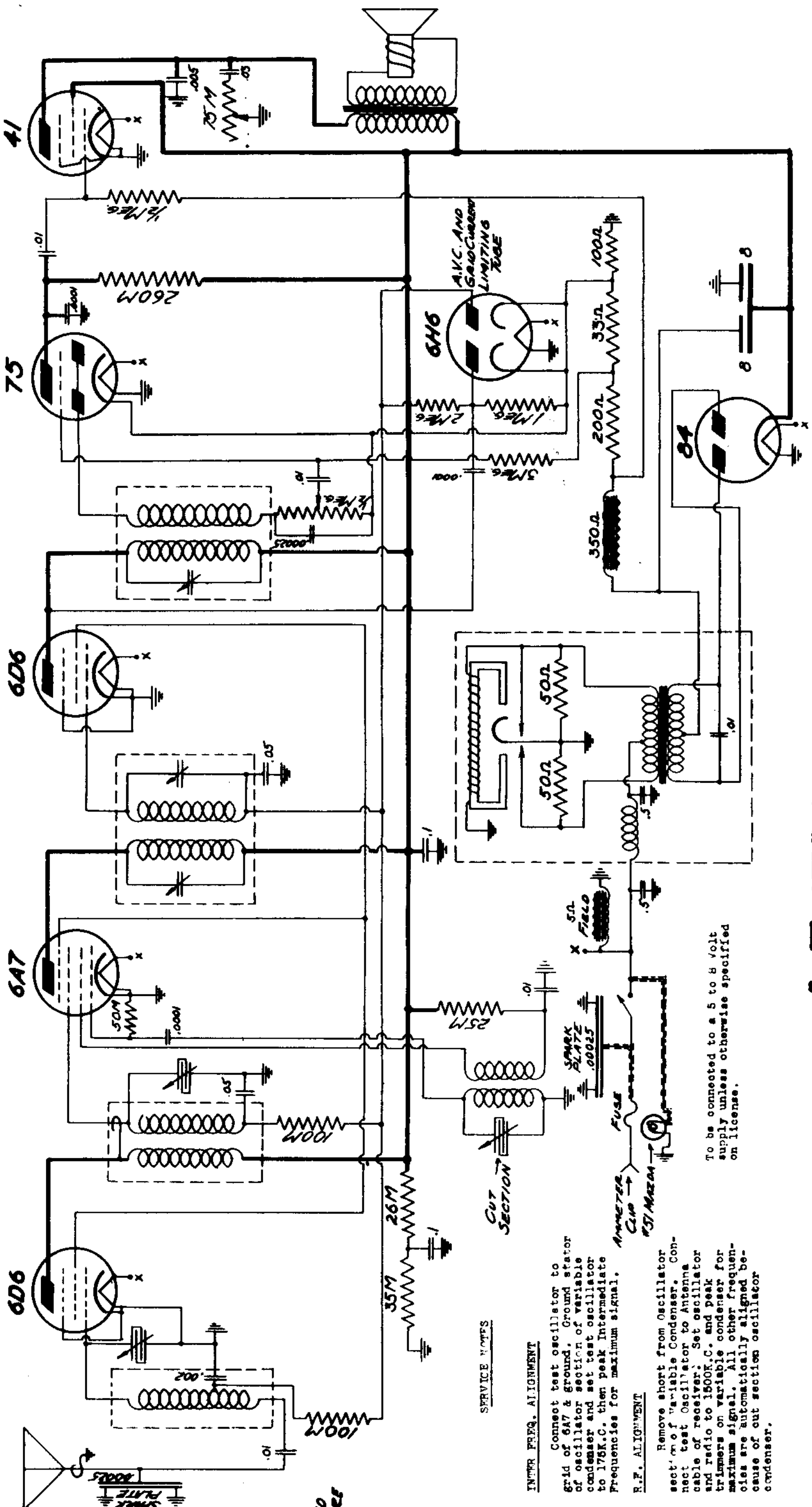
R. F. ALIGNMENT: Remove short from stator of variable condenser. Turn Wave Band Switch to Broadcast. Connect test oscillator to antenna and chassis. Set test oscillator and radio dial to 1500 K.C. and peak two trimmers underneath chassis, (toward rear) for maximum signal. Set test oscillator at 600 K.C. and adjust padder condenser (nut side) in front of chassis for maximum signal. During this operation, the variable condenser must be rocked. Readjust 1500 K. C.

POLICE BAND ALIGNMENT: Turn Wave Band Switch to Police Band. Set test oscillator and radio dial to 400 K.C. and peak two trimmers on coil on top of chassis. Set test oscillator and radio to 1700 K.C. and adjust padder (screw side) for maximum signal. The variable condenser must be rocked during the operation. If receiver has long waves instead of police band, calibrate same trimming condenser as on Police Band, but set oscillator and receiver at 300 K.C. for alignment.

SHORT WAVE ALIGNMENT: Turn Wave band switch to short wave. Set test oscillator and radio dial to 15 Megacycles and peak trimmers on bottom of chassis (toward front) for maximum signal. Low frequency setting is automatically taken care of by short wave coils which are carefully matched for this setting by a fixed calibrated padder.

PIERCE AIRO, Inc.

MODEL 702 AUTO RADIO



To be connected to a 5 to 8 volt supply unless otherwise specified on license.

SERVICE NOTES

INTER FREQ. ALIGNMENT

Connect test oscillator to grid of 6A7 & ground. Ground stator of oscillator section of variable condenser and set test oscillator to 175K.C. then peak Intermediate Frequencies for maximum signal.

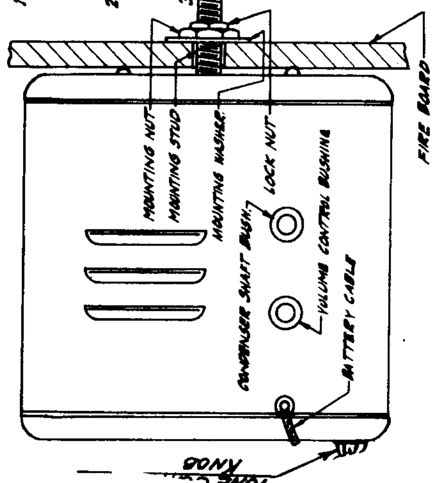
R.F. ALIGNMENT

Remove short from Oscillator section of variable Condenser. Connect test Oscillator to Antenna cable of receiver. Set oscillator and radio to 1500K.C. and peak trimmers on variable condenser for maximum signal. All other frequencies are automatically aligned because of cut section oscillator condenser.

MOUNTING INSTRUCTIONS

1-SCREW UNSLOTTED END OF MOUNTING BOLT TIGHTLY (UP TO THE NICKS) INTO LARGE THREADED HOLE IN REAR OF RECEIVER CASE.
2-DETERMINE LOCATION OF RECEIVER AND DRILL 1/2 INCH HOLE IN FIRE BOARD TO PASS THE MOUNTING BOLT.
3-SCREW ON THE MOUNTING NUT SO THAT RECEIVER IS HELD FIRMLY IN PLACE. SCREW ON LOCK NUT FIRMLY OVER MOUNTING NUT.

PILOT LAMP: MAZDA #51, 6-8 VOLTS



TO REPLACE VIBRATOR TURN TENSION SPRING TO THE LEFT 90° THEN WITH A SLIGHT UPWARD PULL VIBRATOR CAN BE REMOVED. AFTER THE VIBRATOR HAS BEEN REPLACED MAKE CERTAIN THAT TENSION SPRING IS RETURNED TO NORMAL POSITION.

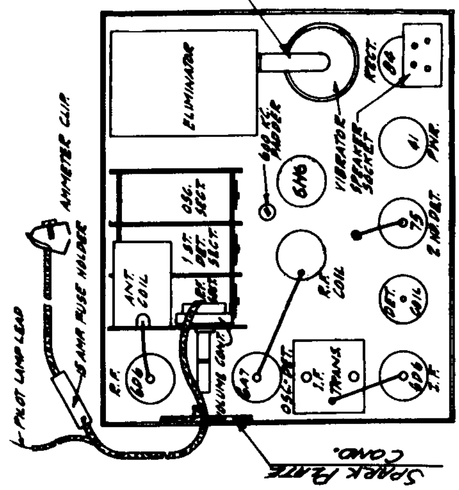


FIG. 1

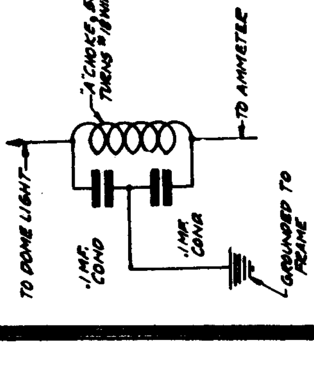
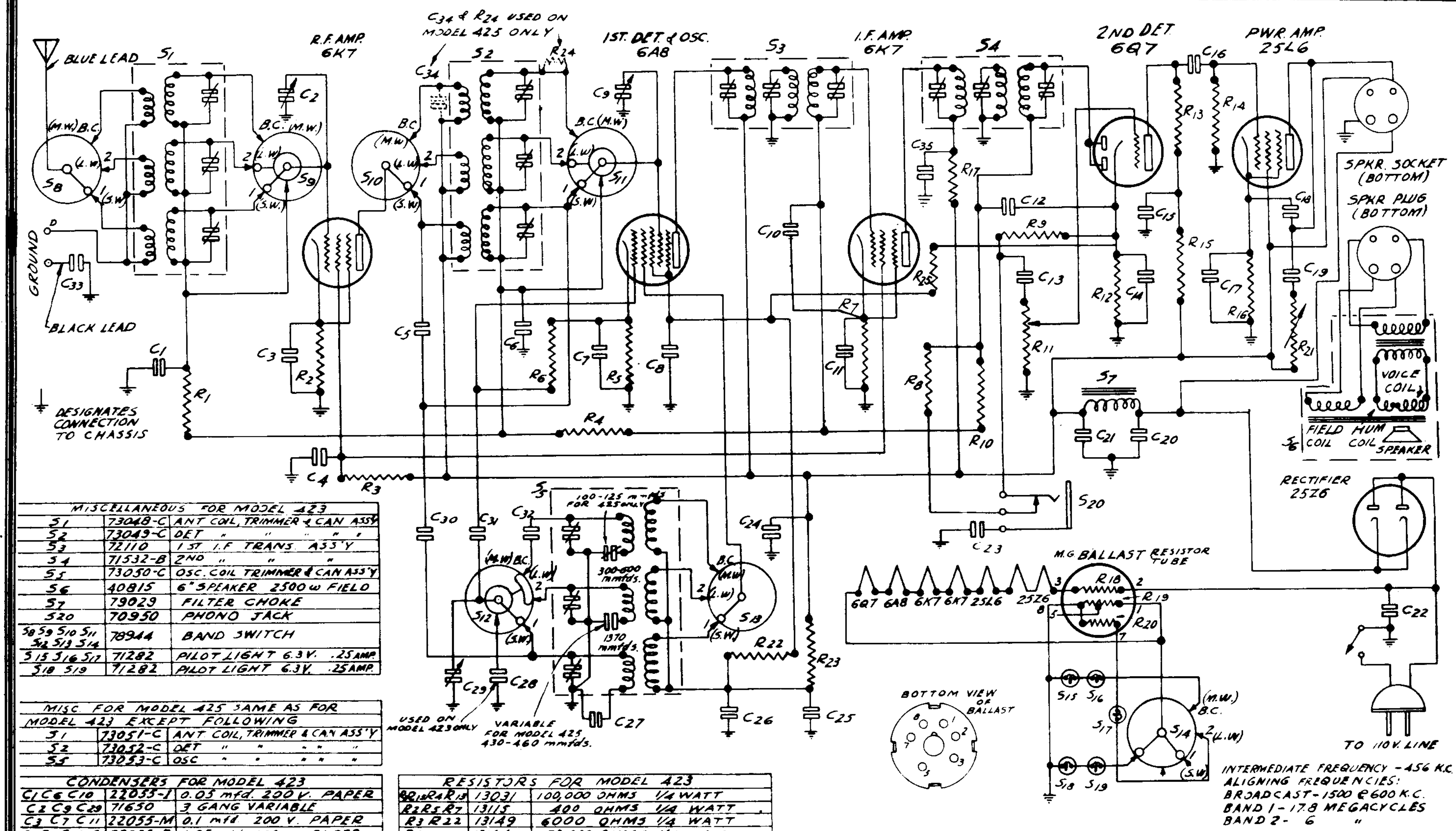


FIG. 3

8. Dome Light Wire: If dome light wire is radiating it may be necessary to shield this wire. A single .5mfd. condenser or a double condenser and choke as shown in fig. #3 connected at the point where the dome light wire enters the upright post will clear up this trouble.

PILOT RADIO CORPORATION
MODELS 420 SERIES, 423 & 425



MISCELLANEOUS FOR MODEL 423		
S1	73048-C	ANT COIL, TRIMMER & CAN ASS'Y
S2	73049-C	DET " " " " "
S3	72110	1ST I.F. TRANS. ASS'Y
S4	71532-B	2ND " " "
S5	73050-C	OSC. COIL TRIMMER & CAN ASS'Y
S6	40815	6" SPEAKER 2500 ω FIELD
S7	79029	FILTER CHOKE
S20	70950	PHONO JACK
S8 S9 S10 S11 S12 S13 S14	78944	BAND SWITCH
S15 S16 S17	71282	PILOT LIGHT 6.3V. .25 AMP.
S18 S19	71282	PILOT LIGHT 6.3V. .25 AMP.

MISC. FOR MODEL 425 SAME AS FOR MODEL 423 EXCEPT FOLLOWING		
S1	73051-C	ANT. COIL, TRIMMER & CAN ASS'Y
S2	73052-C	DET " " " " "
S5	73053-C	OSC " " " " "

CONDENSERS FOR MODEL 423		
C1 C6 C10	22055-I	0.05 mfd. 200 V. PAPER
C2 C9 C29	71650	3 GANG VARIABLE
C3 C7 C11	22055-M	0.1 mfd 200 V. PAPER
C4 C19 C8 C26 C35	22055-P	0.05 mfd 400 V PAPER
C5	27737-O	10 mmfds. MICA
C12	27701-W	.00025 mfd. MICA
C13 C16	22055-A	.01 mfd. 600 V. PAPER
C14 C17	71675	10-10 mfd. 25 V. ELECTRO.
C15 C24	22055-L	0.1 mfd. 400 VOLT PAPER
C18 C33	22055-R	0.005 mfd. 1000 V PAPER
C20 C21 C25	71676	16-20-8 mfd. 150 V. ELECT
C23	22055-S	.5 mfd. 200 V PAPER
C27	27745-W	.0025 mfd. MICA
C28 C32	22055-W	.01 mfd. 400 V. PAPER
C30	71525-A	NEUTRALIZING
C31	27723-W	.00005 mfd. MICA
C22	22055-U	.01 mfd. 1000 V.

CONDENSERS FOR MODEL 425 SAME AS FOR MODEL 423 EXCEPT FOLLOWING		
C34	27701-W	.00025 mfd. MICA

RESISTORS FOR MODEL 423		
R1 R13 R4 R15	13031	100,000 OHMS 1/4 WATT
R2 R5 R7	13115	400 OHMS 1/4 WATT
R3 R22	13149	6000 OHMS 1/4 WATT
R6	13164	50,000 OHMS 1/4 WATT
R9 R8	13043	150,000 OHMS 1/4 WATT
R10	13001	1 MEGOHM 1/4 WATT
R11	78986	750,000 OHMS VOL. CONTROL
R17	13149	6000 OHMS 1/4 WATT
R14	13024	500,000 OHMS 1/4 WATT
R16	13055	150 OHMS 1/2 WATT
R12	13003	300 OHMS 1/4 WATT
R18	81963	100 OHMS
R19		80 OHMS TAPPED AT 40 OHMS
R20		25 OHMS
R21	78987	100,000 OHMS TONE CONT. & SW.
R23	13073	3,000 OHMS 1/2 WATT
R25	13116	12,000 OHMS 1/4 WATT

RESISTORS FOR MODEL 425 SAME AS FOR MODEL 423 EXCEPT FOLLOWING		
R24	13029	250 OHMS 1/4 WATT

I.F. 456 K.C.

Range, Model 425
16 - 555 m. (18,800 - 540 kc)
731 - 2140 m. (410 - 140 kc.)

Range, Model 423
16 - 555 m. (18,800 - 540 kc)

PILOT RADIO CORPORATION

MODELS 420 SERIES, 423 & 425

SERVICE INFORMATION FOR PILOT MODELS 423 AND 425

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob.

Remove the speaker plug from the cable socket.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require re-alignment, the procedure outlined below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket.

The R. F. alignment trimmer condensers are mounted on the side of the R. F. shields.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6K7 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. Units.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Insert a 200 mmf. condenser in series with the antenna lead. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located on the top of the oscillator coil. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT WAVE-BANDS:— The procedure in aligning the short wave-bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. Insert a 400 ohm non-inductive resistor in series with the antenna lead. The alignment frequencies are as follows:

Band 2: 50 Meters—(6,000 kc.)
Band 1: 16.6 Meters—(18,000 kc.)

When aligning Band 2, set the Band Selector Switch in the position marked "Band 2". Set the tuning control pointer at 50 meters. Adjust the oscillator alignment capacitor on Band 2 for maximum output. Next adjust the interstage and antenna section alignment capacitors for maximum output.

To align Band 1, set the Band Selector Switch in the position marked "Band 1" Set the tuning control pointer at the 16.6 meter mark. Set the external oscillator at 16.6 meters. Adjust the oscillator section alignment capacitor on Band 1 for maximum output.

Proceed next to align the interstage section of Band 1. In doing this, it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonance peak. Next align the antenna section for maximum sensitivity.

LONG WAVE MODEL 425

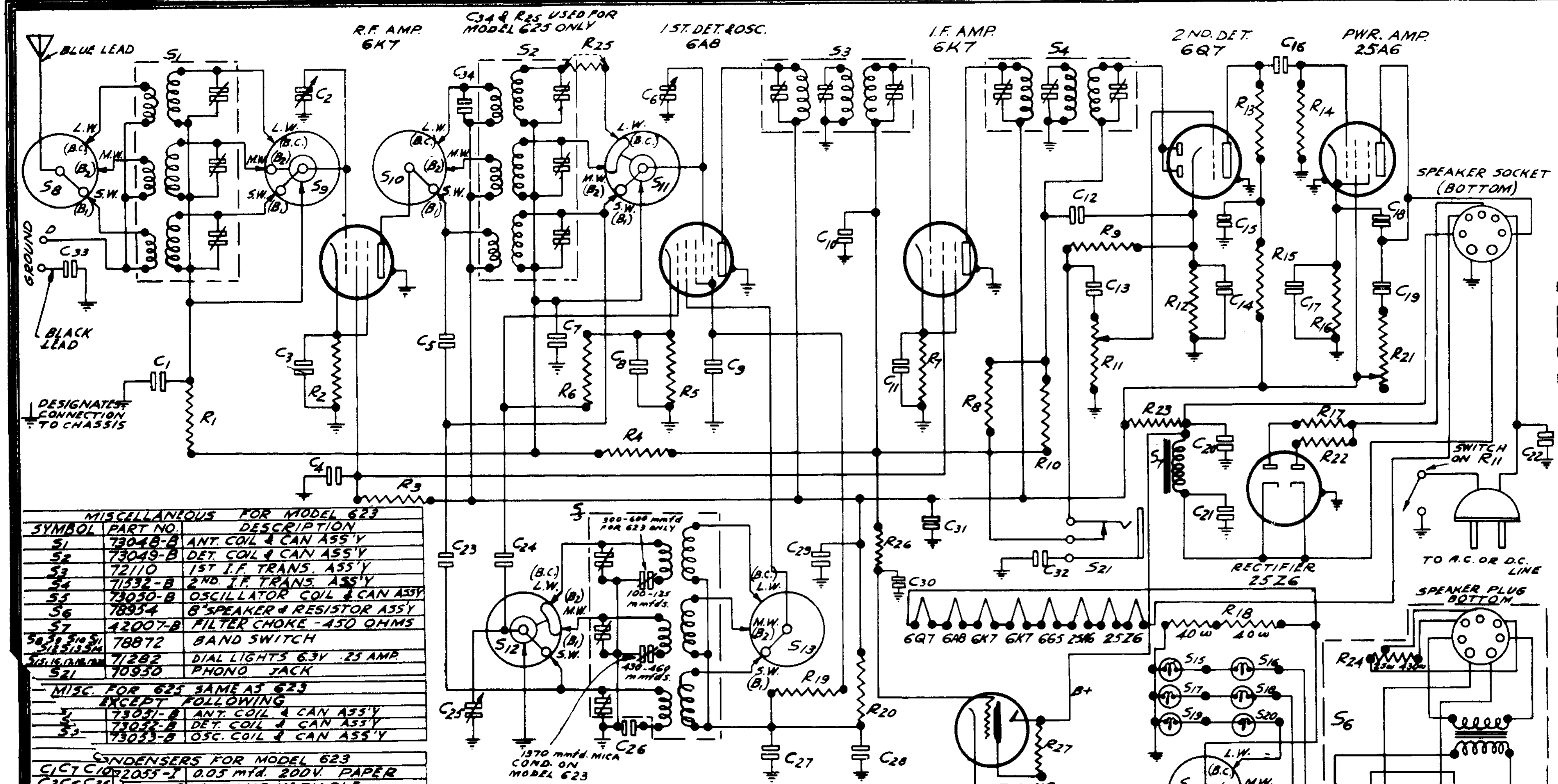
The above alignment positions refer to the Model 423 only, which is calibrated in frequency. The alignment points for the Model 425, which is calibrated in meters only, is as follows:

Long Wave	Align at 750 meters.
	Pad at 2,000 meters.
Broadcast	Align at 200 meters.
	Pad at 500 meters.
Band 1	Align at 17 meters.

The Long Wave alignment procedure is similar to that for the Broadcast. A 200 mmf. condenser should be used in series with the antenna lead in aligning this band.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

PILOT RADIO CORPORATION



MISCELLANEOUS FOR MODEL 623		
SYMBOL	PART NO.	DESCRIPTION
S_1	73048-B	ANT. COIL & CAN ASS'Y
S_2	73049-B	DET. COIL & CAN ASS'Y
S_3	72110	1ST I.F. TRANS. ASS'Y
S_4	71532-B	2ND. I.F. TRANS. ASS'Y
S_5	73050-B	OSCILLATOR COIL & CAN ASS'Y
S_6	78954	8" SPEAKER & RESISTOR ASS'Y
S_7	42007-B	FILTER CHOKE - 450 OHMS
S_8 S_9 S_{10} S_{11} S_{12} S_{13} S_{14}	78872	BAND SWITCH
$S_{15,16,17,18,19,20}$	71282	DIAL LIGHTS 6.3V .25 AMP.
S_{21}	70950	PHONO JACK
MISC. FOR 625 SAME AS 623 EXCEPT FOLLOWING		
S_1	73051-B	ANT. COIL & CAN ASS'Y
S_2	73052-B	DET. COIL & CAN ASS'Y
S_5	73053-B	OSC. COIL & CAN ASS'Y

CONDENSERS FOR MODEL 623		
C_1 C_7 C_{10}	22055-I	0.05 mfd. 200V. PAPER
C_2 C_6 C_{25}	73830-B	3 GANG VARIABLE
C_3 C_8 C_{11}	22055-M	0.1 mfd. 200 V. PAPER
C_4 C_9 C_{27}	22055-P	0.05 mfd. 400 V. PAPER
C_{12}	27770-W	0.00025 mfd. MICA
C_{13} C_{16}	22055-A	0.01 mfd 600V. PAPER
C_{14} C_{17}	71675	DUAL 10 mfd. 25V ELEC.
C_{15} C_{29}	22055-L	0.1 mfd. 400 V. PAPER
C_{18} C_{33}	22055-R	.005 mfd. 1000V. PAPER
C_{19}	22055-C	.05 mfd. 600 V. PAPER
C_{20}	78594	12 mfd. 250 ELECTROLYTIC
C_{21}		16 mfd. 250 "
C_{28}		4 mfd. 250 "
C_{22}	22055-U	0.01 mfd. 1000V. PAPER
C_{24}	27723-W	.00005 mfd. MICA
C_{26}	27745-W	.0025 mfd. MICA
C_{23}	71525-A	NEUTRALIZING
C_5	27737-O	.00001 mfd. MICA
C_{32}	22055-S	0.5 mfd. 200V. PAPER
C_{31}	78595	4 mfd. 250 V. ELEC.
C_{30}	22055-H	.02 mfd. 200 V. PAPER
CONDENSERS FOR MODEL 625 SAME AS FOR 623 EXCEPT FOLLOWING		
C_{34}	27701-W	.00025 mfd. MICA

RESISTORS FOR 623		
R_1 R_4 R_{13}	13031	100,000 OHMS 1/4 WATT
R_2 R_5 R_7	13115	400 OHMS 1/4 WATT
R_3 R_{19}	13149	6000 OHMS 1/4 WATT
R_6 R_8 R_{15}	13164	50,000 OHMS 1/4 WATT
R_9	13147	300,000 OHMS 1/4 WATT
R_{10} R_{26} R_{27}	13001	1,000,000 OHMS 1/4 WATT
R_{11}	78714	750,000 ω VOL. CONTROL
R_{12}	13149	6000 OHMS 1/4 WATT
R_{14}	13024	500,000 OHMS 1/4 WATT
R_{16}	13192	440 OHMS 1 WATT
R_{17} R_{22}	13077	100 OHMS 1/2 WATT
R_{18}	83002	80 OHMS TAPPED AT 40 ω
R_{20}	13073	3000 OHMS 1/2 WATT
R_{21}	78715	100,000 OHMS TONE CONT. & SW.
R_{23}	78610	2500 OHMS 3 WATTS WIRE W'D
R_{24}	83010	455 ω TAPPED AT 25 ω " "
RESISTORS FOR 625 SAME AS 623 EXCEPT FOLLOWING		
R_{25}	13029	250 OHMS 1/4 WATT

INTERMEDIATE FREQUENCY - 456 K.C.
ALIGNING FREQUENCIES:
LONG WAVE - 400 & 150 K.C.
MEDIUM WAVE - 1500 & 600 K.C.
SHORT WAVE - 18 MEGACYCLES

BAND SW. MARKINGS IN PARENTHESIS ARE FOR MODEL 623

Range, Model 625
16 - 555 m. (18,800 - 540 kc.)
731 - 2140 m. (410 - 140 kc.)

Range, Model 623
16 - 555 m. (18,800 - 540 kc.)

220-240 V. AC-DC

MODELS 620 SERIES, 623 & 625

PILOT RADIO CORPORATION

MODELS 620SERIES, 623 & 625

SERVICE INFORMATION FOR PILOT MODELS 623 AND 625

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

Remove the tuning beam plug from the socket at the front of the chassis.

REALIGNMENT: Should the receiver require re-alignment, the procedure outlined below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

The R. F. alignment trimmer condensers are mounted on the side of the coil shields.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6K7 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6K7 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. Units.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Insert a 200 mmf. condenser in series with the antenna lead. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located on the top of the oscillator coil. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT WAVE-BANDS:— The procedure in aligning the short wave-bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. Insert a 400 ohm non-inductive resistor in series with the antenna lead. The alignment frequencies are as follows:

Band 2: 50 Meters—(6,000 kc.)
Band 1: 16.6 Meters—(18,000 kc.)

When aligning Band 2, set the Band Selector Switch in the position marked "Band 2". Set the tuning control pointer at 50 meters. Adjust the oscillator alignment capacitor on Band 2 for maximum output. Next adjust the interstage and antenna section alignment capacitors for maximum output.

To align Band 1, set the Band Selector Switch in the position marked "Band 1". Set the tuning control pointer at the 16.6 meter mark. Set the external oscillator at 16.6 meters. Adjust the oscillator section alignment capacitor on Band 1 for maximum output.

Proceed next to align the interstage section of Band 1. In doing this, it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonance peak. Next align the antenna section for maximum sensitivity.

LONG WAVE MODEL 625

The above alignment positions refer to the Model 623 only, which is calibrated in frequency. The alignment points for the Model 625, which is calibrated in meters only, is as follows:

Long Wave	Align at 750 meters.
	Pad at 2,000 meters.
Broadcast	Align at 200 meters.
	Pad at 500 meters.
Band 1	Align at 17 meters.

The Long Wave alignment procedure is similar to that for the Broadcast. A 200 mmf. condenser should be used in series with the antenna lead in aligning this band.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

RCA MANUFACTURING COMPANY, Inc.

MODEL 5X2

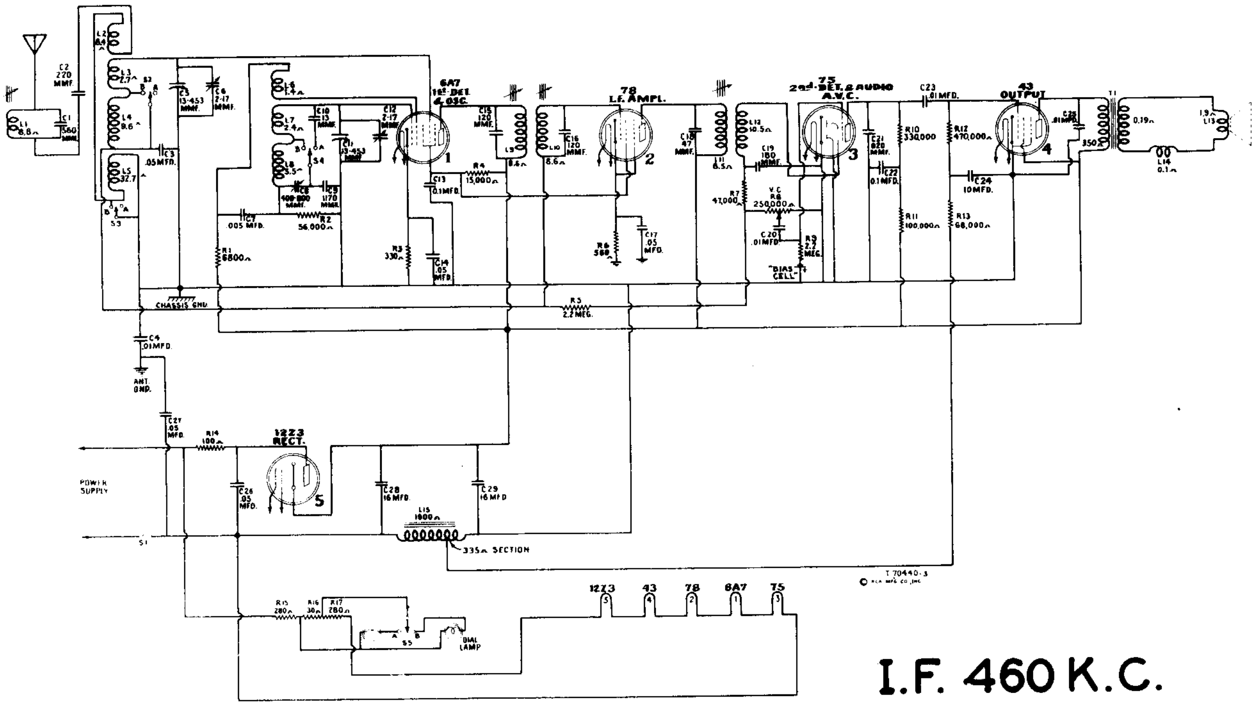


Figure 1—Schematic Circuit Diagram

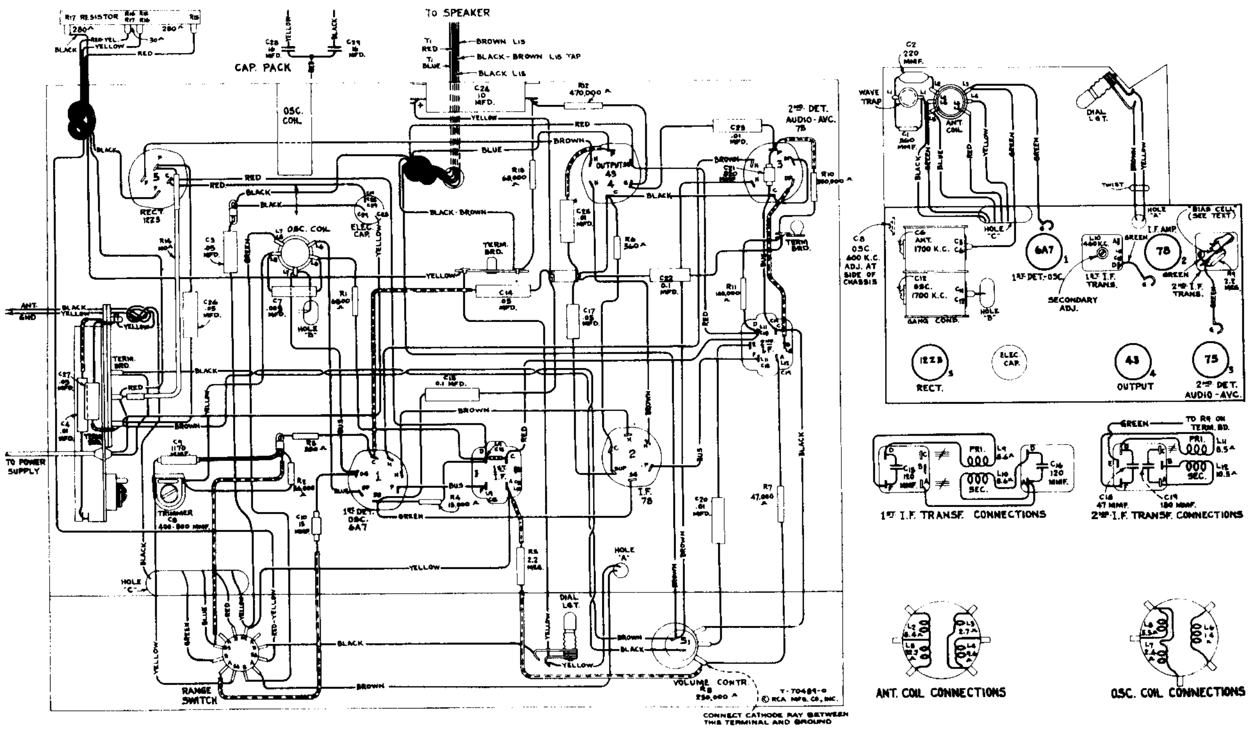
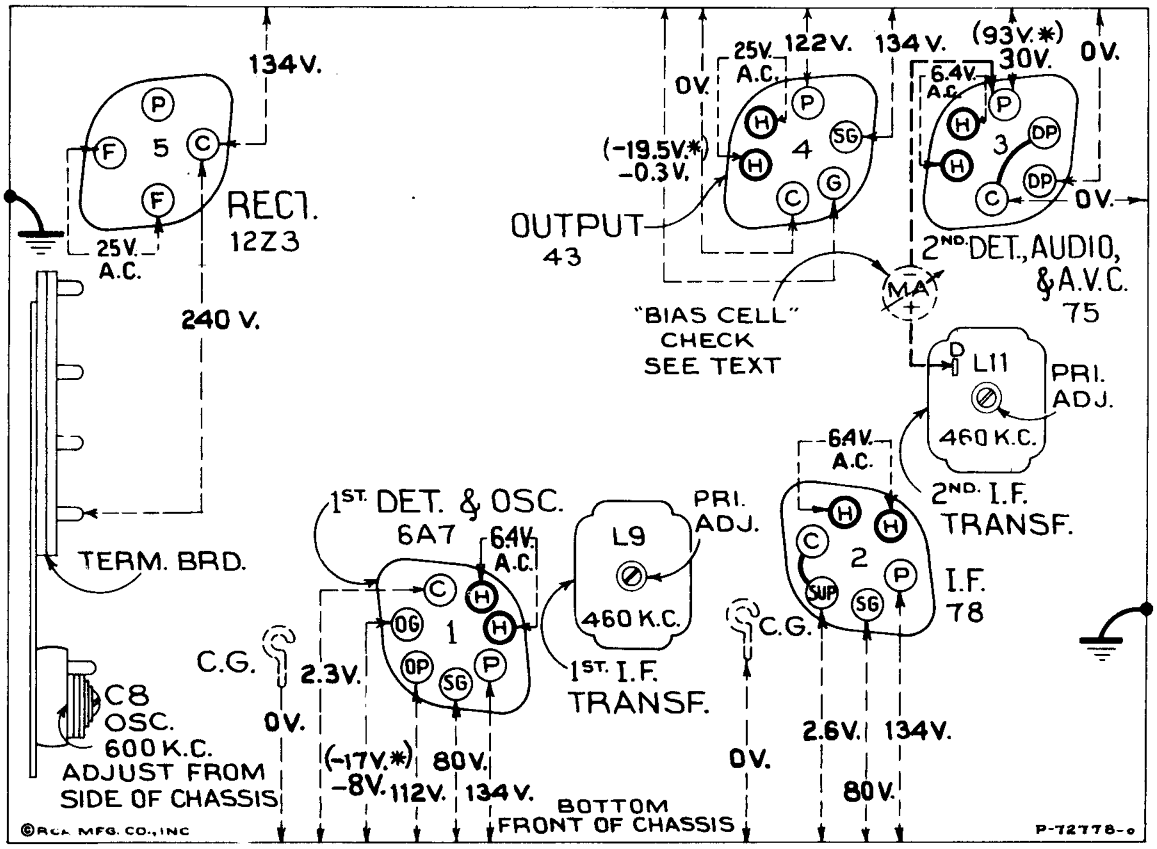


Figure 2—Chassis Wiring Diagram, Radiotron, Coil, and Trimmer Locations

RCA MANUFACTURING COMPANY, Inc.

MODEL 5X2



CAUTION: NEVER CONNECT VOLTMETER TO CONTROL GRID OF TUBE No. 3 (RCA-75)-SEE TEXT.

Figure 6—Radiotron Socket Voltages and Trimmer Locations

Measured at 230 volts, 60 cycle supply—For 230 volt D-C approximately 10% lower
Tuned to approximately 1,000 kc. ("Standard broadcast" position)—No signal being received—
Volume control setting optional

Radiotron Socket Voltages

Note: *Two voltage values are shown for some readings. The higher value shown in parenthesis with asterisk (*) indicates operating conditions without voltmeter loading. The lower value is the actual measured voltage and differs from the higher value because of the additional loading of the voltmeter through the high series circuit resistance.*

CAUTION: The voltage between the RCA-75 control grid and ground should never be measured. All ordinary meters will paralyze the "Bias Cell," see figures 1 and 2, in this circuit for a period of approximately one to two hours. To check "Bias Cell," connect 0-1 M.A. milliameter as shown on figure 6. A satisfactory cell should give a steady reading on the meter between 0.3 and 0.65 M.A. when used with a good RCA-75 tube.

The voltage values indicated from the Radiotron socket contacts, grid caps, resistors and terminals to receiver chassis ground on figure 6 will assist in locating cause for faulty operation. Each value as specified should hold within ± 20% when the receiver is normally operative at its rated line voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. These voltages were measured with set tuned to approximately 1,000 kc. ("Standard broadcast" range); no signal being received and volume control setting optional. To duplicate the conditions under which the voltages were measured requires a 1,000 ohm-per-volt d-c meter, having ranges of 10, 50 and 250 volts. Voltages between 0 and 10 read on 10-volt scale, between 10 and 50 on 50-volt scale, and between 50 and 250 on 250-volt scale. A-C voltages were measured with a corresponding a-c meter.

Detector and A.V.C.

The modulated signal, as obtained from the output of the i-f stage, is detected by one of the diodes in the RCA-75 tube. The audio frequency component, secured by this process, is transferred from the movable arm of the volume control R8 through coupling capacitor C20 to the control grid of the RCA-75 for voltage amplification. The d-c voltage which results from detection of the signal is used for automatic volume control. This voltage which develops across resistor R8 is applied as automatic control grid bias to the first-detector and i-f tube through a suitable resistance filter circuit.

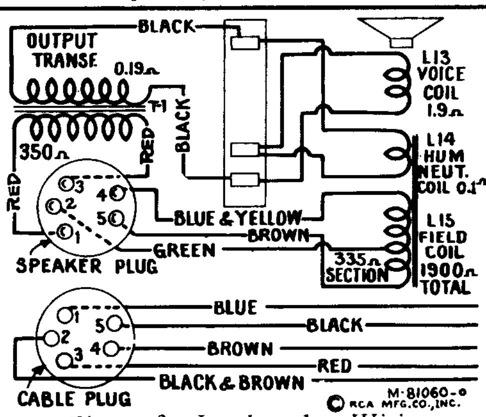
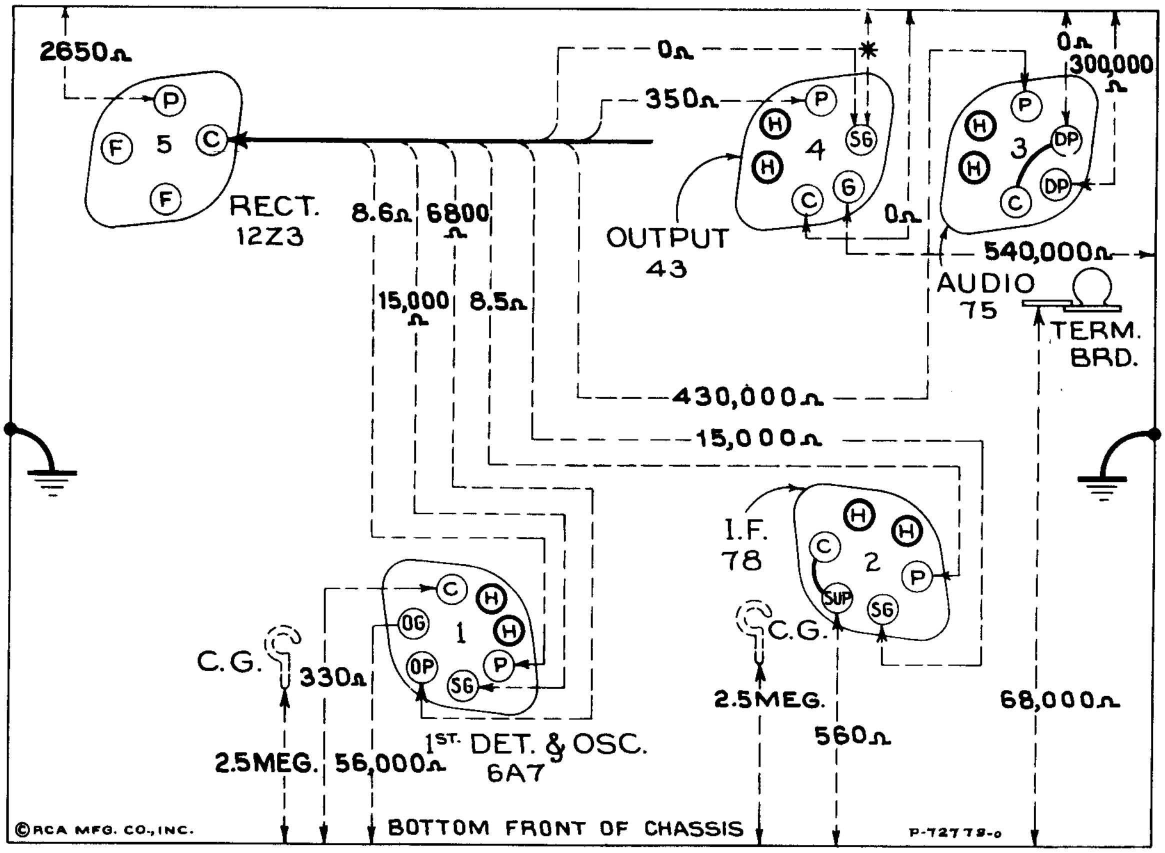


Figure 3—Loudspeaker Wiring

RCA MANUFACTURING COMPANY, Inc.
MODEL 5X2



CAUTION: REMOVE BIAS CELL BEFORE MAKING RESISTANCE MEASUREMENTS.
NOTE: * OPEN CIRCUIT (LEAKAGE ELECTROLYTIC CAPACITORS ONLY).

Figure 5—Resistance Diagram

Power supply disconnected—Tuning condenser in full mesh—Volume control at maximum
Radiotrons in sockets

Resistance Measurement

CAUTION: The "Bias Cell," see figures 1 and 2, should be carefully removed before any resistance measurements are made. Do not allow the spring contact clips to short-circuit "Bias Cell" during its removal or insertion.

The resistance values shown between Radiotron socket contacts, grid caps, resistors, terminals, and receiver chassis ground, on figure 5 have been carefully selected so as to facilitate a rapid check of the circuit for defective parts, bad joints, etc. The use of this diagram in conjunction with the Schematic Circuit Diagram, figure 1, and the Chassis Wiring Diagram, figure 2, will permit the location of certain troubles which would otherwise be difficult to ascertain. Each value as specified should hold within ± 20%. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. Resistance values were measured with the Radiotrons in sockets; power supply disconnected; tuning condenser in full mesh, and volume control set at maximum except where otherwise noted. In all cases of measuring the resistance between points of the circuit and ground, it will be necessary to connect the negative (–) terminal of the resistance meter to the chassis ground. If the polarity of the resistance meter is not known, it may be readily ascertained by connecting a d-c voltmeter of indicated polarity across the terminals of the device.

Electrical Specifications

Frequency Ranges
"Standard broadcast" .... 540-1,800 kc.
"Short-wave" .... 1,800-6,500 kc.

Alignment Frequencies
"Standard broadcast" ...... 600 kc. (osc.); 1,700 kc. (osc. and ant.)
"Short-wave" .... None Required

Intermediate Frequency .... 460 kc.

Radiotron Complement
(1) RCA-6A7 .... First Detector–Oscillator
(2) RCA-78 .... Intermediate Amplifier
(3) RCA-75 ..... Second Detector, A-F, and A.V.C.
(4) RCA-43 .... Power Output
(5) RCA-12Z3 .... Rectifier

Power Supply
200-250 volts, 50-100 cycles .... 120 watts
200-250 volts, D-C .... 110 watts

Power Output
Undistorted .... 0.9 watts A-C, 0.7 watts D-C
Maximum .... 2 watts A-C, 1.6 watts D-C

Loudspeaker
Type .... Electrodynamic
Voice Coil Impedance .... 2.2 ohms at 400 cycles

Pilot Lamps (2) .... Mazda No. 40, 6.3 volts, 0.15 amperes

RCA MANUFACTURING COMPANY, Inc.

MODEL 5X2

SERVICE DATA

CAUTION: Certain tests (e.g. alignment and voltage measurement) require operation of receiver with chassis removed from cabinet. Avoid external grounding of receiver chassis or associated equipment since the power supply is now connected to receiver chassis through the speaker field. Carelessness may cause serious damage to equipment.

Alignment Procedure

There are three alignment trimmers provided in the antenna coil and oscillator coil tuned circuits. The i-f transformer adjustments are made by means of three screws attached to molded magnetite cores.

Improper alignment usually causes the impairment of sensitivity, selectivity, and tone quality. Such conditions will usually exist simultaneously.

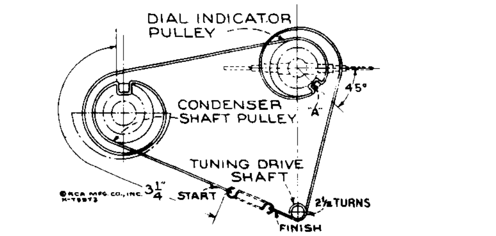


Figure 4—Tuning Drive Cord Mechanism

Rear view of drive assembly showing threading of drive cord with variable condenser plates in full mesh. To perform this operation, unsolder the four leads (connected between antenna coil and range selector switch) from the range selector switch, unsolder antenna lead-in wire from wave-trap terminal, unsolder lead from rear section of gang tuning condenser, and remove the four screws which secure the tuning drive frame to the chassis proper. This frame with gang tuning condenser still attached may now be easily removed for the threading operation. The relative position of the parts and method of threading are shown on the above diagram. In case the cord is too long for proper tension, it may be effectively shortened by first releasing finish end of cord, inserting a match or other shim under the cord at point "A" and then re-hooking the end of the cord to the tension spring. Replace drive assembly and re-solder leads.

In re-adjusting the tuned circuits, it is important to apply a definite procedure and to use adequate and reliable test equipment. A standard test oscillator, such as the **RCA Stock No. 9595** will be required as the source of the signal at the specified alignment frequencies. Visual indication of the receiver output during alignment is also necessary to accurately show when the correct point of adjustment is reached. The **RCA Stock No. 4317 Neon Output Indicator** is especially suitable for this use.

The procedure outlined below should be followed in adjusting the various trimming capacitors and molded magnetite cores.

I-F Core Adjustments

The three adjustment screws (one on top and one on bottom of first i-f transformer and one on bottom of second i-f transformer) are located as shown by figures 2 and 6. Each circuit must be aligned to a basic frequency of **460 kc.** To do this attach the output indicator across the loudspeaker voice coil or across the output transformer primary. Connect the output of the test oscillator through a **.05 mfd.** capacitor to the RCA-6A7 control grid, the ground of the test oscillator being connected to the receiver external yellow ground lead. Set the test oscillator to **460 kc.** Place the range selector in "Short wave" position. Advance the receiver volume control to its full-on position and adjust the receiver tuning control to a point within its range where no interference is encountered either from local broadcast stations or heterodyne oscillator. Increase the output of the test oscillator until a slight indication is apparent on the output indicator.

Adjust the bottom magnetite core screw of the second i-f transformer to produce maximum (peak) indicated receiver output. Then adjust the two magnetite core screws of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device.

During these adjustments regulate the test oscillator output so the indication is always as low as possible. By doing so, broadness of tuning due to A.V.C. action will be avoided. It is advisable to repeat the adjustment of all i-f magnetite core screws to assure that the interaction between them has not disturbed the original adjustment.

Wave-Trap Adjustment

Attach the output of the test oscillator to the black antenna lead through a **200 mmfd.** capacitor, the ground connection of the test oscillator and receiver being connected as before.

Leave the test oscillator adjusted to **460 kc.,** and range selector in "Short wave" position as before. Then adjust the wave-trap trimmer to the point which causes maximum suppression of the **460 kc.** signal.

R-F Trimmer Adjustments

Roughly calibrate the tuning dial by setting the pointer to the bottom horizontal line at the low frequency end of the broadcast scale with the two-gang tuning condenser at its maximum capacity. The output indicator should be left connected to the output system. The connections for the test oscillator remain the same as for "Wave-trap" adjustment. Volume control should be in maximum position. Set range selector to "Standard broadcast" position.

Set oscillator and antenna trimming capacitors **C12** and C6, respectively, to a position near minimum capacitance (plates near out). Adjust the test oscillator to 1,700 kc.

Tune the receiver to pick up this signal (near **1,700 kc.** on dial) for maximum response disregarding dial reading. Always keep test oscillator output as low as is possible and still obtain visual indication. Adjust trimming capacitors **C12** and **C6** so that each produces maximum (peak) receiver output, re-adjusting receiver tuning slightly if necessary, but using the minimum trimming capacitance possible to obtain peaks. Adjust the dial pointer (without disturbing gang tuning condenser) to a dial reading of **1,700 kc.** Shift the test oscillator to **600 kc.** Tune the receiver to receive the signal disregarding the dial reading at which it is best received. Then adjust the oscillator series capacitor, **C8,** simultaneously rocking the tuning control backward and forward through the signal until maximum receiver output results from these combined operations. The adjustment at **1,700 kc.** should then be repeated to correct for any change which may have been caused by the oscillator series trimming capacitor adjustment.

Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed either permanently by cutting it away with a sharp knife, or by softening its cement with a very light application of acetone using care not to allow the acetone to flow down into the air gap The dust cover may be cemented back in place with ambroid upon completion of adjustment.

Circuit Arrangement

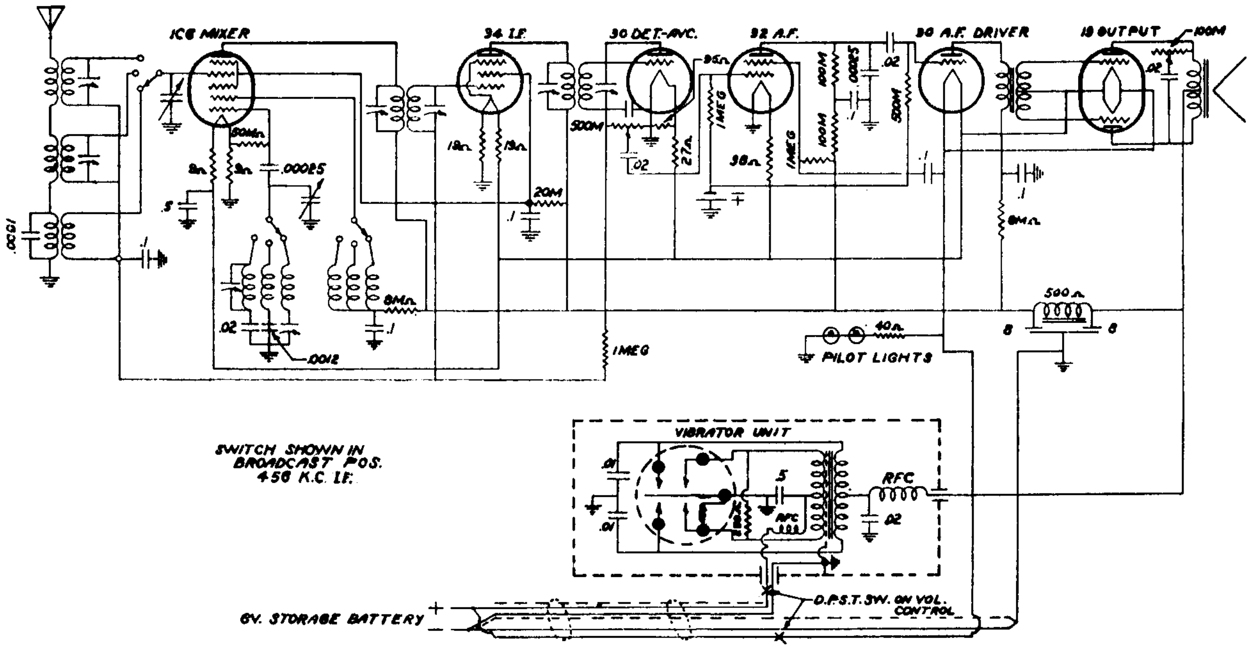
The conventional superheterodyne type of circuit, consisting of a combined first-detector–oscillator stage, a single i-f stage, a diode-detector automatic-volume-control stage, an audio voltage amplifier stage, an audio power output stage, and a half-wave rectifier power supply stage, is used.

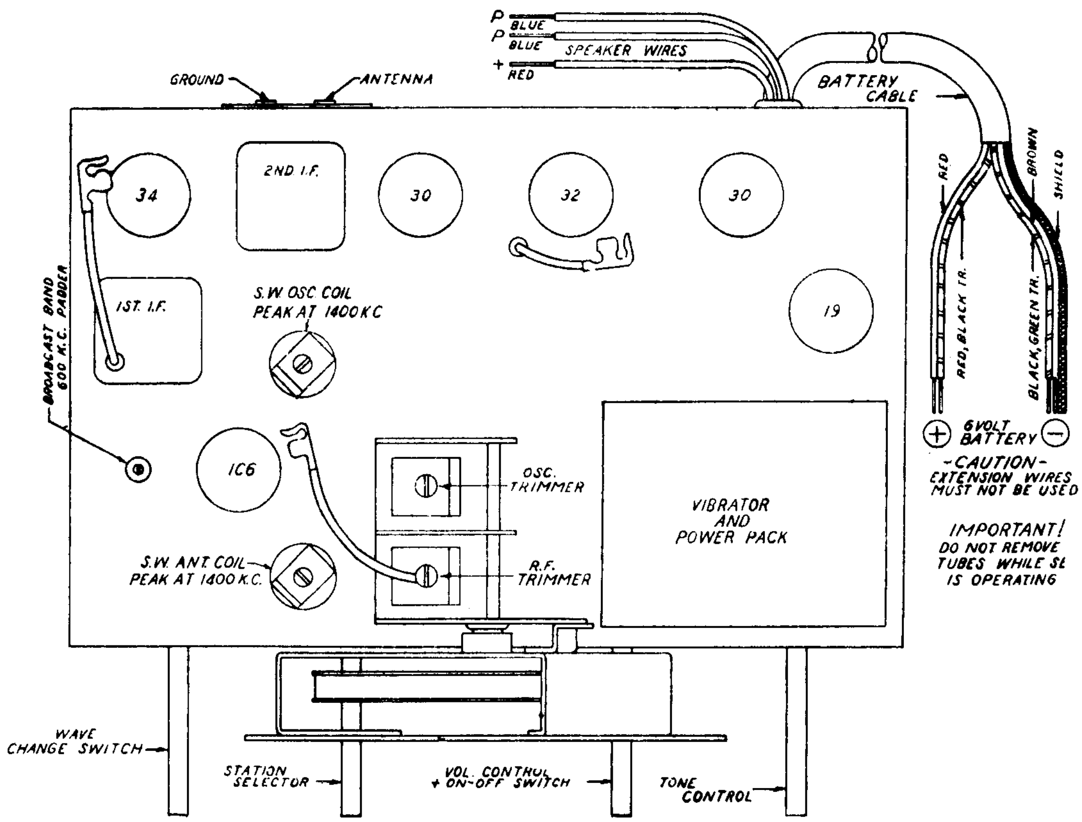
Tuned Circuits

The antenna coil system consists of two series-connected primary and two series-connected secondary windings to provide the two ranges of tuning. The oscillator coil is similarly wound on a single form. A multi-pole range selector switch, consisting of S2, S3, S4, and S5, is used to connect the various sections of these coil systems and to illuminate the proper tuning dial scale for the band in operation. The coils are tuned by a variable two-section gang condenser having trimming capacitors in shunt with each section. A series trimming capacitor is also associated with the "Standard broadcast" oscillator coil.

The intermediate frequency amplifier system consists of an RCA-78 in a transformer coupled circuit. This stage operates at a basic frequency of **460 kc** Adjustable magnetite cores are provided for adjusting inductance of the input i-f transformer (primary and secondary) and the output transformer (primary) windings.

RADOLEK COMPANY
MODEL K16743





This receiver is designed to operate over three tuning ranges. The broadcast range which extends from 545 to 1715 Kilocycles (KC) (175 to 550 meters), Police and Aviation Band which extends from 1715 to 5350 Kilocycles (KC) (56 to 175 Meters) and the International Short Wave Band which extends from 5760 to 16200 Kilocycles (KC) (18.5 to 52 meters). This short wave range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

RADOLEK COMPANY
MODEL K16743

ALIGNMENT DATA AND SERVICING

GENERAL DATA

The alignment of this receiver requires the use of a test oscillator which will cover the frequencies of 456, 600, 1400, 1800, 4000, 6000, and 14,000 KC and an output meter which is to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE

The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT

Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1C6) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the rear gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak. The front condenser section tunes the RF or grid circuit of the 1C6 tube. Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the R.F. section. The padding condenser is located on the left hand side of the chassis, directly to the left of the 1C6 tube and in front of the first I.F. transformer. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Bands.

FOREIGN BAND ALIGNMENT

The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coils located on the top of the chassis. Set the test oscillator to 14,000 KC. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. The oscillator coil is located near the 1st I.F. Transformer and the antenna or R.F. coil is located directly in front of the Short Wave oscillator coil and alongside the front section of the gang condenser. These two trimmers should be adjusted for peak at 14,000 KC and as the inherent design of the circuit has been expressly developed for simplicity in servicing, no other adjustments are necessary for aligning this band. **Note:** Always start this procedure by having the oscillator coil trimmer loose (out all the way), and the antenna coil trimmer fairly tight (in all the way); otherwise it is possible to make a false alignment on the image frequency. In order to prevent alignment on the image frequency, it is suggested that the following check be made: Readjust the pointer to 13,100 KC where the image frequency should be found. If properly aligned, the image frequency will be found to be weaker. If, however, the signal at 13,100 KC is found to be stronger than the signal at 14,000 KC, it signifies that alignment was incorrectly made on the image frequency.

IMPORTANT: Do not attempt any adjustment of the gang condenser trimmers in aligning the Foreign Band as this will throw the Broadcast Band out of alignment.

POLICE BAND ALIGNMENT

There is only one adjustment to be made in the alignment of the Police Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary. Set the dial pointer to 4000 KC (also the test oscillator) and adjust the antenna coil trimmer to resonance. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment. The two police band coils are under the chassis and the antenna coil trimmer is mounted on the end of the antenna coil. **Important:** This is the only adjustment necessary for the Police Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Police Band, otherwise the Broadcast Band will be thrown out of alignment.

SERVICE DATA FOR ALL BANDS

If it is suspected that the oscillator has stopped but is doubtful due to the presence of the usual amount of noise level, it is suggested that the oscillator plate voltage be checked. To ascertain whether the tube is oscillating, ground the oscillator grid of the 1C6 (short stator and rotor plates of oscillator section on gang condenser). If oscillating properly, grounding the grid will cause an appreciable drop in oscillator voltage.

REASONS FOR UNSATISFACTORY OPERATION

FAILURE TO OPERATE

1. Check connections from battery cable to storage battery. If connections are reversed, set will not operate. Proper instructions for connecting the battery are given on the first page.
2. Check all tubes. Have them tested by meter equipped to test the type of tubes used in this receiver.
3. Check tube shields for good ground connections. Check grid caps for good connection. See that grid caps and tube shields are not shorted to each other (touching).
4. Reversed connections on Antenna and ground terminals. Try both ways for best results.
5. Oscillator tube (1C6) not oscillating.
6. Vibrator unit not securely in socket.

HUM

A minimum amount of hum, equivalent to A.C. receivers, may be present. Excessive hum may be traced to the following causes:

1. Omitting the use of a ground or a poor ground connection.
2. Vibrator unit not securely fitted in socket.
3. Antenna picking up interference from high tension power lines.
4. Weak or rundown battery. Battery with defective cell.
5. Poor battery connections.
6. Extending or lengthening battery leads cause an enormous increase in "hum." The battery cable attached to the receiver is of special design and its ends **must** be connected directly to the battery terminals. **(See battery connection data on first page.)**

HOWLS AND SQUEALS

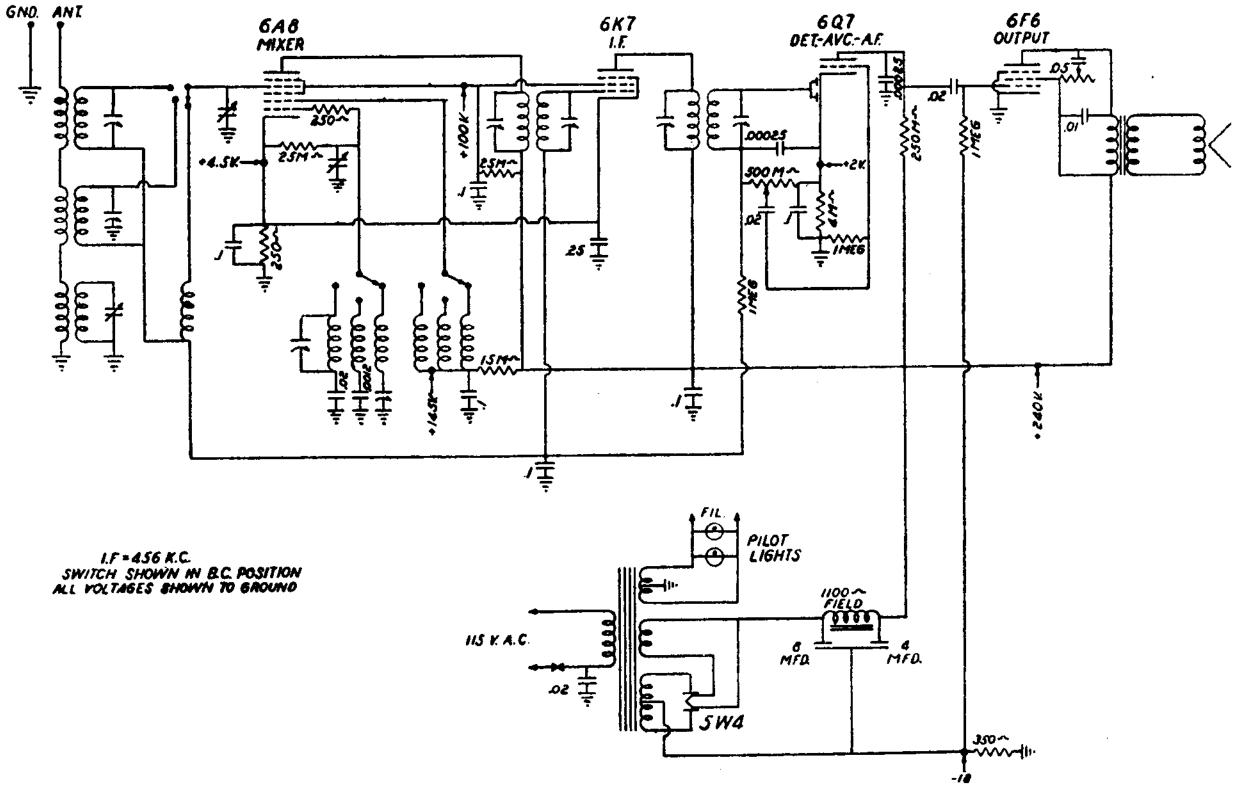
1. Omitting the use of a ground or poor ground connections.
2. Speaker leads placed near the (32) tube. These leads should be kept away from this locality. Speaker leads should be kept along the end of chassis and front corner of cabinet.
3. Check shield on (34) tube for good connection to chassis.

WINDCHARGERS

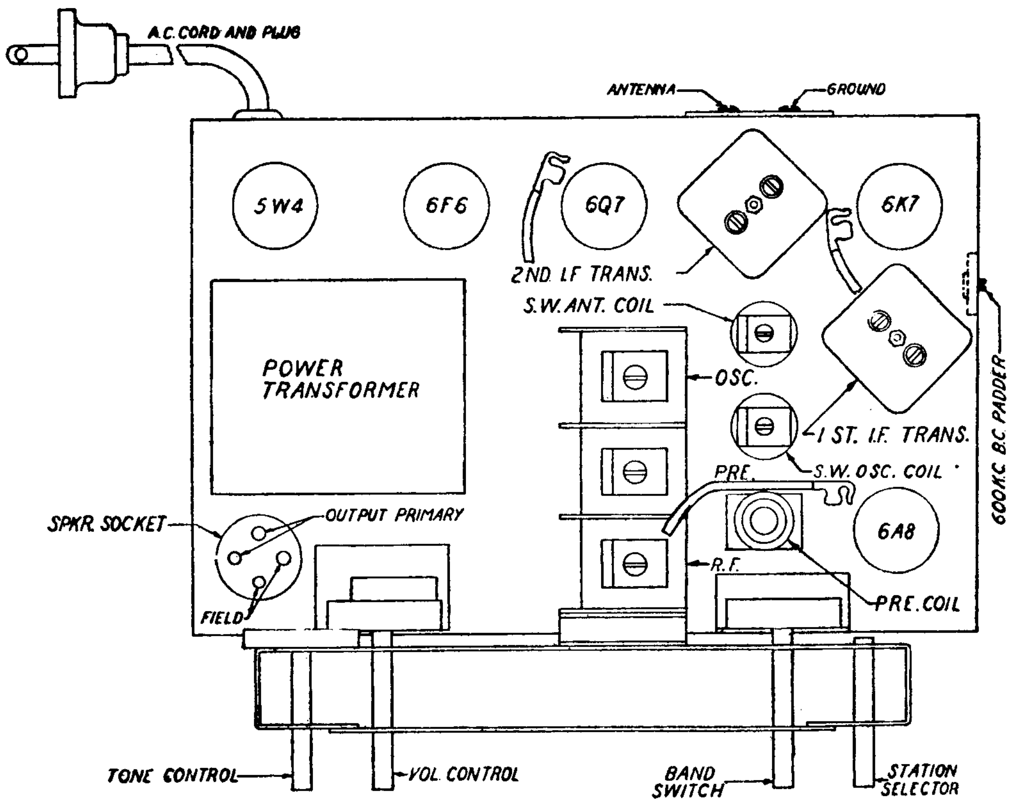
There are many types of windchargers now on the market which may be used to advantage for greater economy of receiver operation. Such chargers will pay for themselves over a period of time; by saving the cost of battery recharging; removing the inconvenience of taking the battery to a charging station; non-operation of the receiver during the charging period.

IMPORTANT NOTE: The battery must never be charged while set is in operation. If a windcharger is used, it should always be disconnected from the battery when the receiver is being used. An inexpensive single pole switch can be used for disconnecting the windcharger from the battery. This will increase the life of the tubes and give additional economy to the use of the receiver.

RADOLEK COMPANY
MODEL K16747

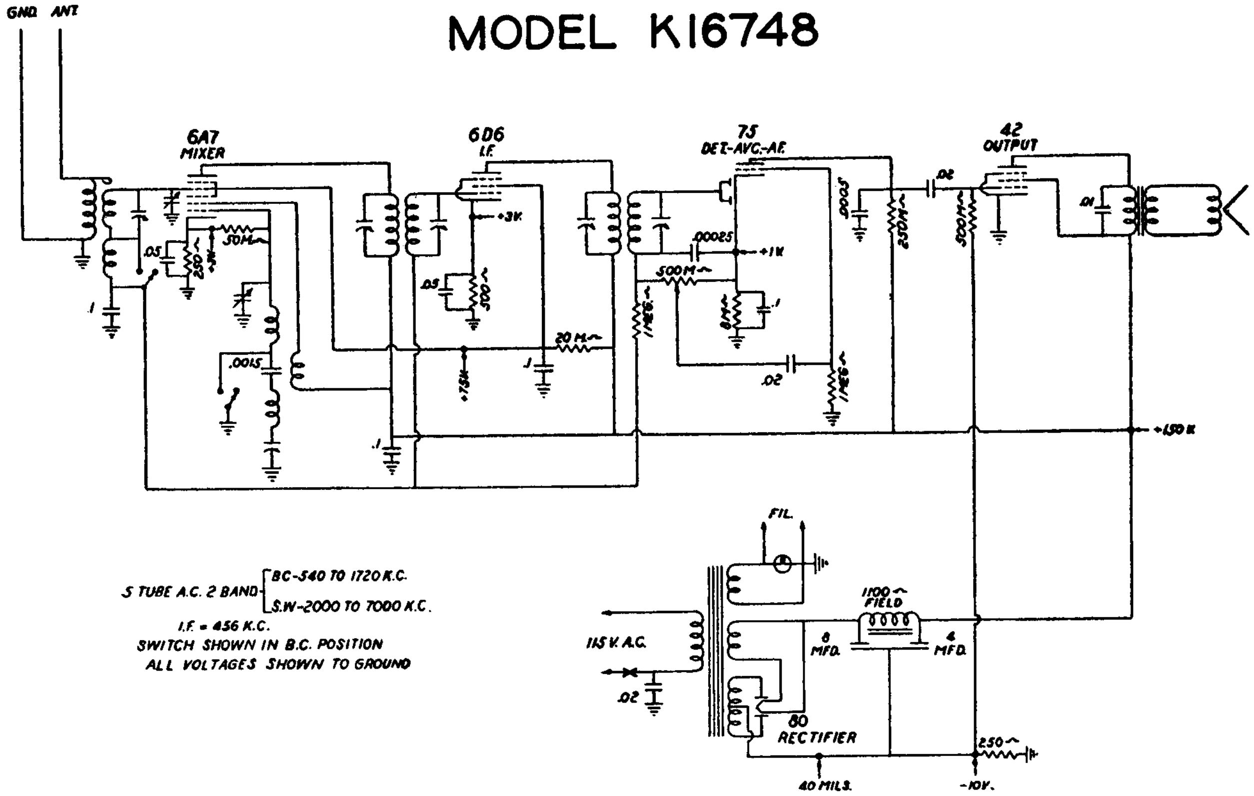


This receiver is designed to operate over three tuning ranges. The broadcast range which extends from 545 to 1715 Kilocycles (KC) (175 to 550 meters), Police and Aviation Band which extends from 1715 to 5350 Kilocycles (KC) (56 to 175 Meters) and the International Short Wave Band which extends from 5760 to 16200 Kilocycles (KC) (18.5 to 52 meters). This short wave range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.



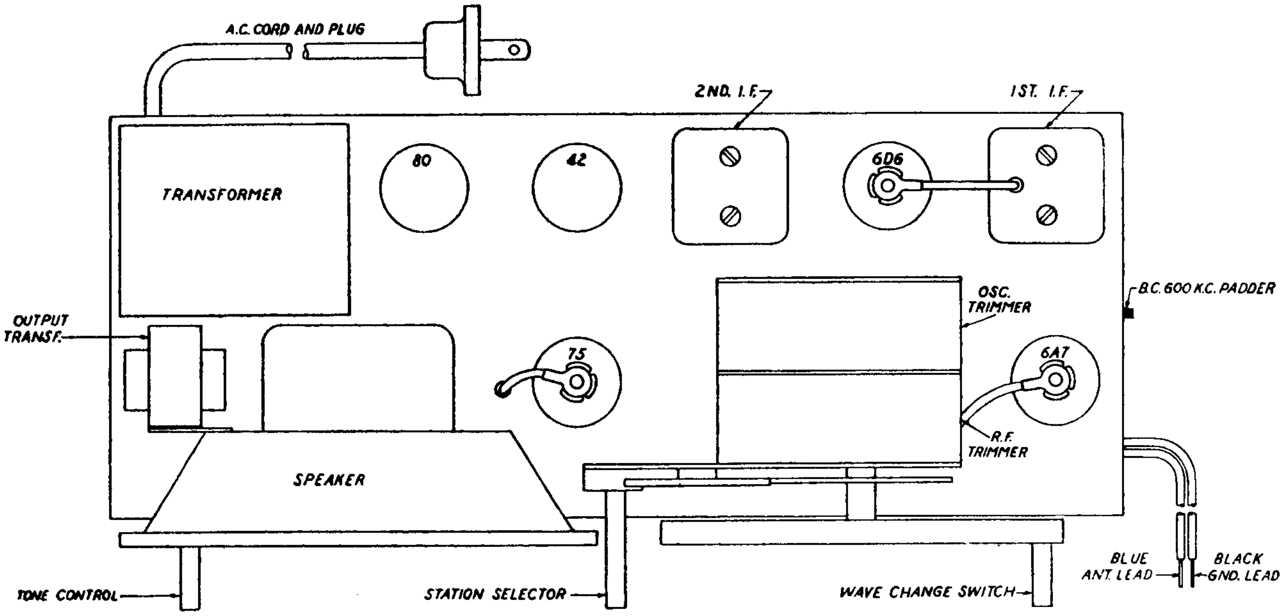
RADOLEK COMPANY

MODEL K16748



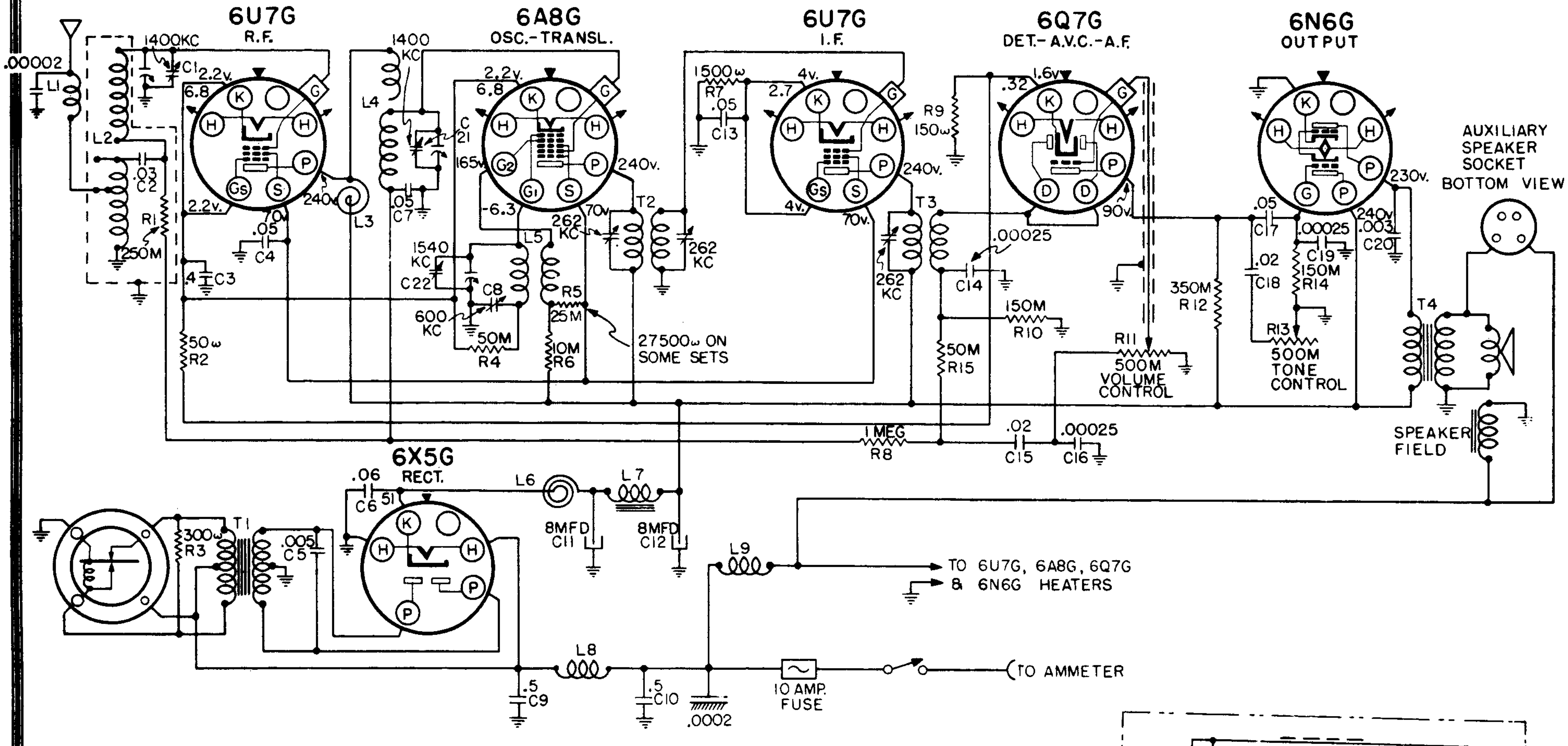
This receiver is designed to operate over two tuning ranges. Upper band which covers the broadcast range, extends from 545 to 1750 kilocycles (175 to 550 meters), lower band which covers Police, Aviation, and the International 49 Meter Foreign Band.

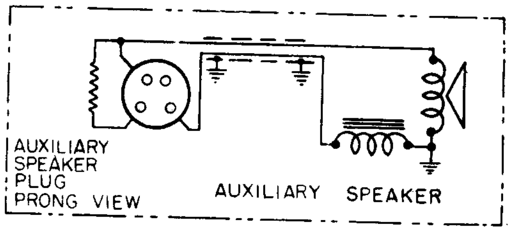
I.F. 456 K.C.



SEARS, ROEBUCK & CO.

MODEL 4600





TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.
FIGURES AT CATHODES INDICATE CATHODE CURRENT IN MILLIAMPERES

I.F. 262 K.C.

SEARS, ROEBUCK & CO.
MODEL 4600

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . Across loud speaker voice coil

Output meter reading to indicate 1 watt . . . . 1.34 volts

Average sensitivity in microvolts for 1 watt output . . . . See chart below

Generator ground lead connection . . . . Receiver chassis

Dummy antenna value to be in series with generator output . . . . See chart below

Connection of generator output lead . . . . See chart below

Generator modulation . . . . .30%, 400 cycles

Position of Volume Control . . . . Fully on

Position of Tone Control . . . . Fully clockwise (treble)

Position of Antenna Tap . . . . #1 hole

The Chassis must be in its case although the covers may be removed during the alignment procedure.

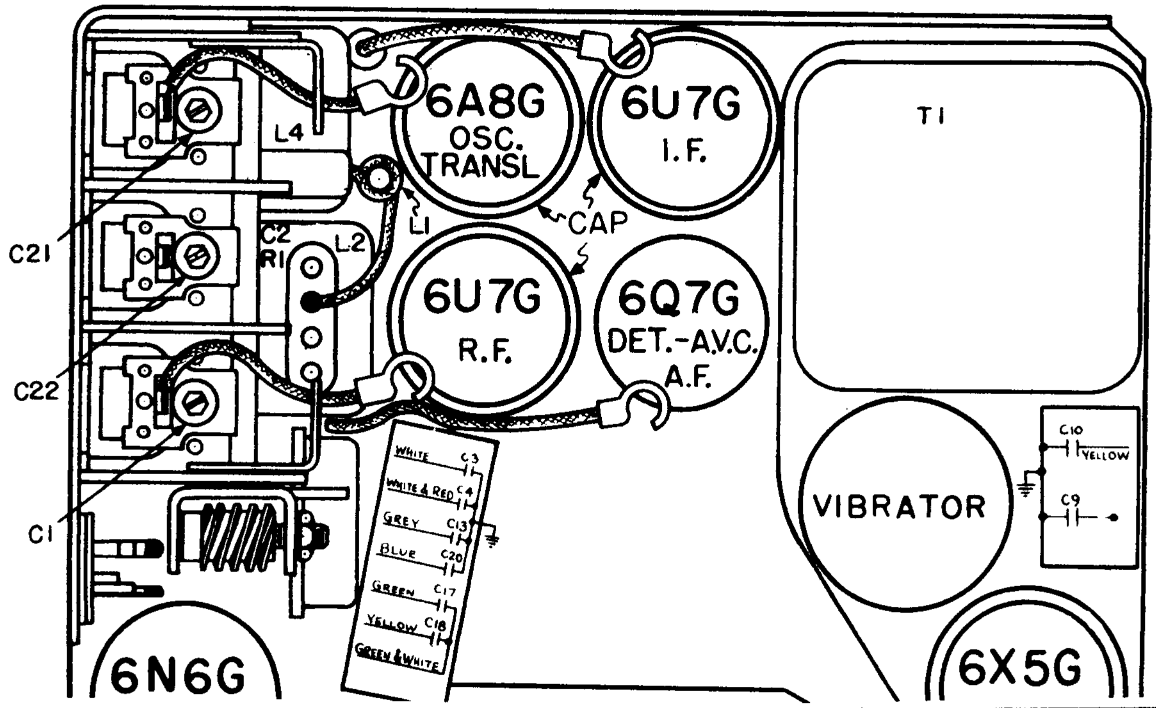
POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	262 kc	.1 mfd.	6A8G Grid	T3,T2	IF	600
Fully Open	1540 kc	.0002 mfd.	Antenna Conn.	C23	Osc. Trim.	1
1400 kc	1400 kc	.0002 mfd.	Antenna Conn.	C1,C21	Ant. Transl.	1
600 kc (rock)	600 kc	.0002 mfd.	Antenna Conn.	C8	Padder	2

IMPORTANT ALIGNMENT NOTES

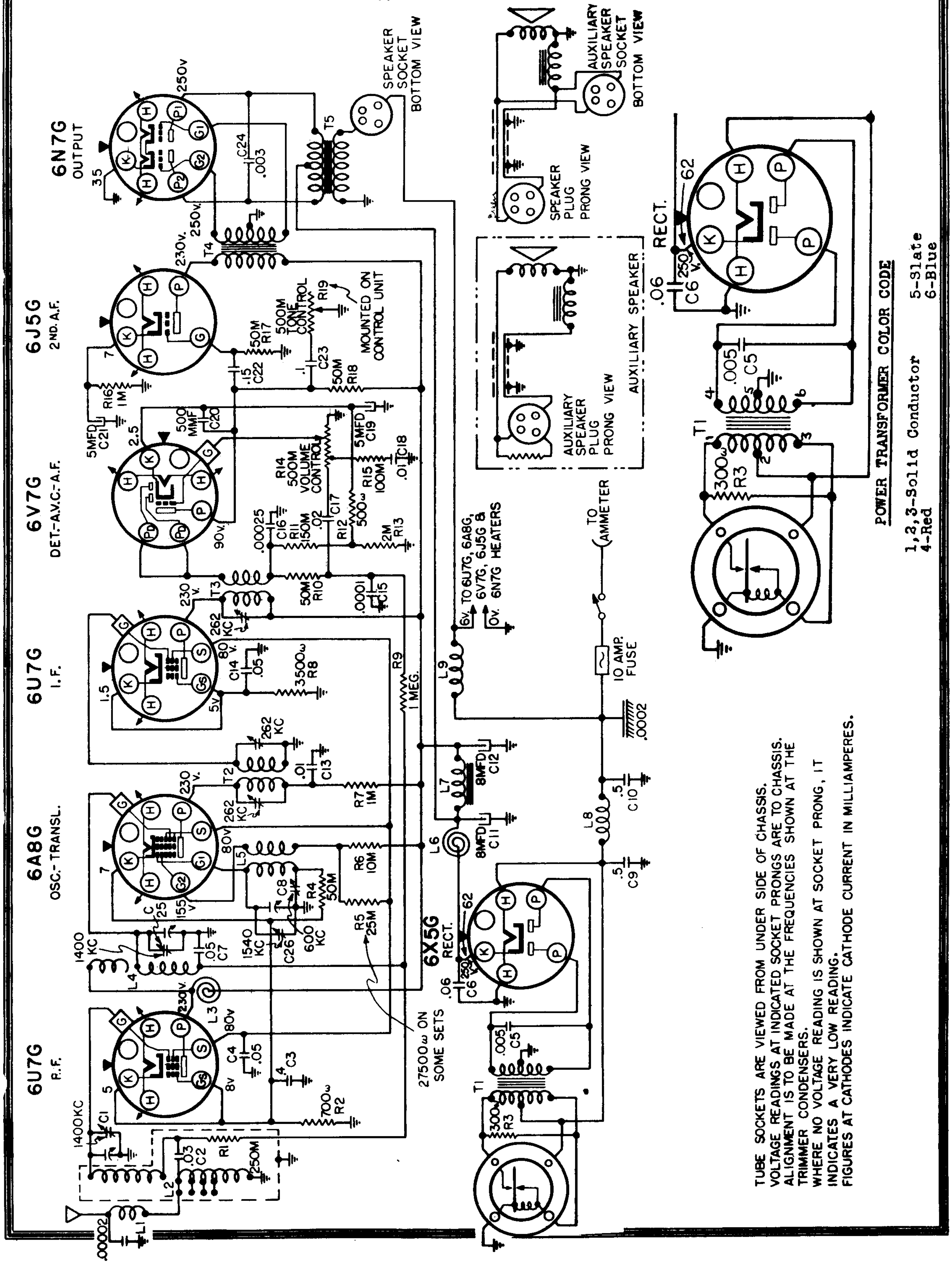
The variable should be rocked back and forth a degree or two while making the 600 kc adjustment.

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.



SEARS, ROEBUCK & CO.
MODEL 4601



SEARS, ROEBUCK & CO.

MODEL 4601

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . Across loud speaker voice coil

Output meter reading to indicate 1 watt . . . . 1.05 volts

Average sensitivity in microvolts for 1 watt output . . . . See chart below

Generator ground lead connection . . . . Receiver chassis

Dummy antenna value to be in series with generator output . . . . See chart below

Connection of generator output lead . . . . See chart below

Generator modulation . . . . 30%, 400 cycles

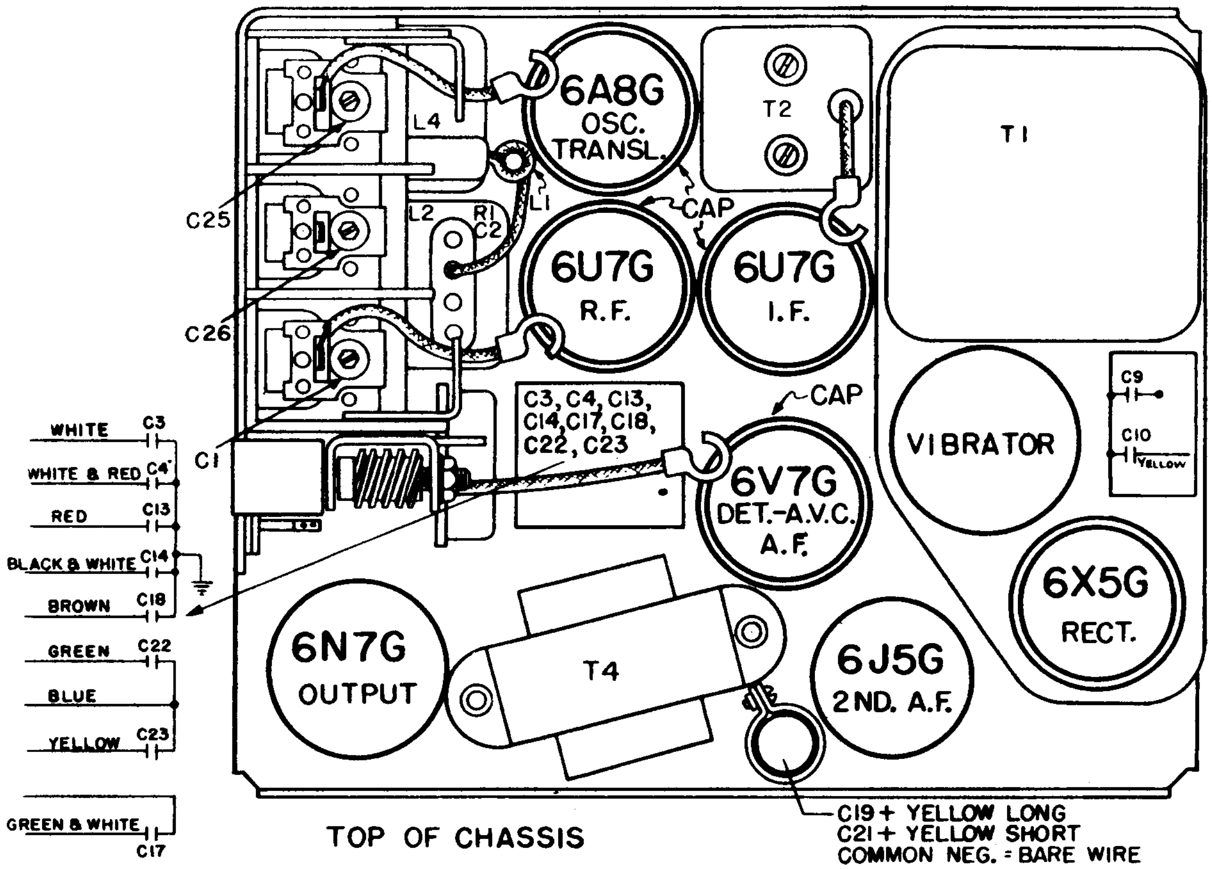
Position of Volume Control . . . . Fully on

Position of Tone Control . . . . Fully clockwise (treble)

Position of Antenna Tap . . . . #3 hole

The Chassis must be in its case although the covers may be removed during the alignment procedure.

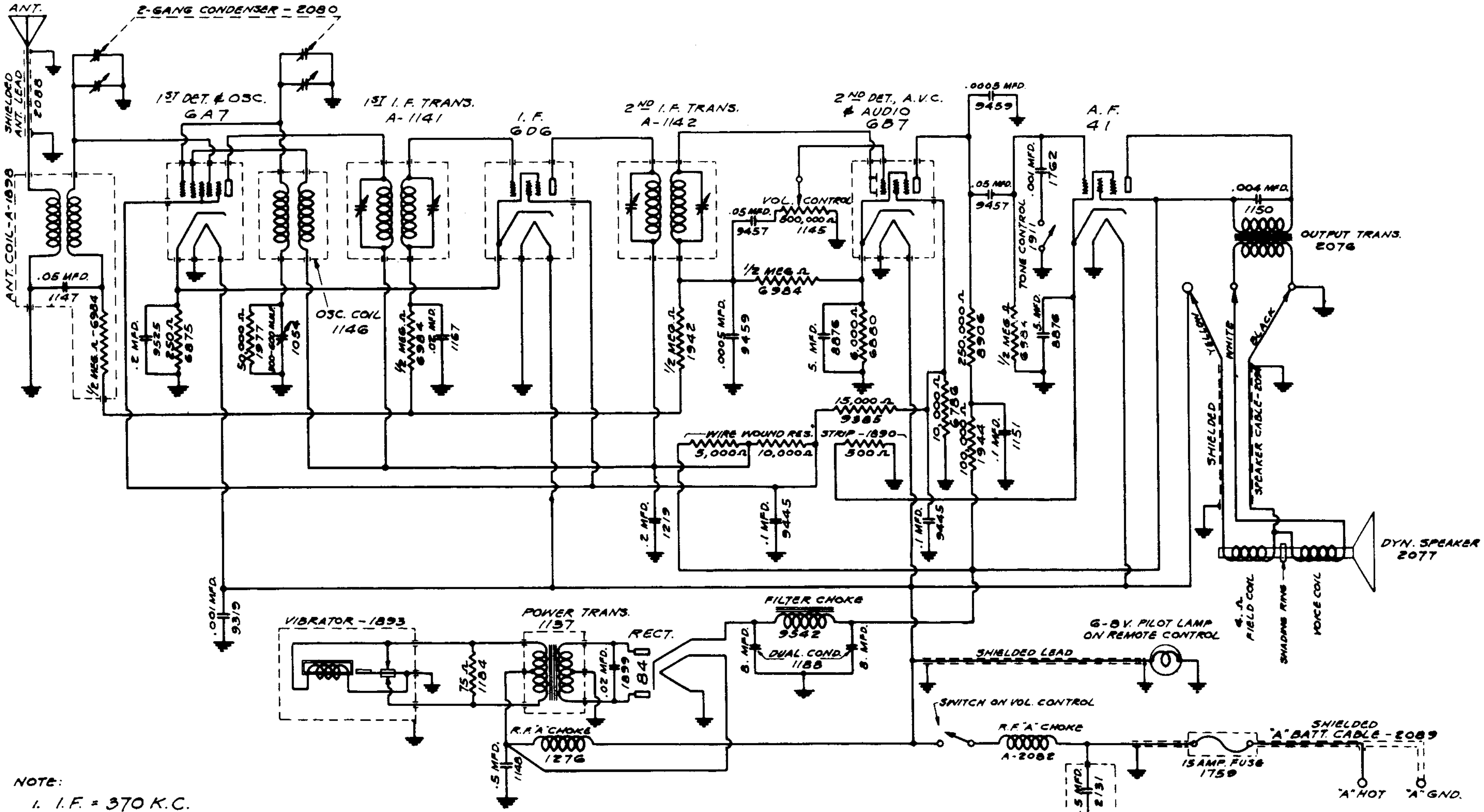
POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	363 kc	.1 mfd.	6A8G Grid	T3,T2	IF	600
Fully Open	1540 kc	.0003 mfd.	Antenna Conn.	C36	Osc. Trim.	1
1400 kc	1400 kc	.0003 mfd.	Antenna Conn.	C1,C35	Ant. Transl.	1
600 kc (rock)	600 kc	.0003 mfd.	Antenna Conn.	C8	Padder	3



TOP OF CHASSIS

SENTINEL RADIO CORP.

MODELS 10M & 10MF



NOTE:
1. I.F. = 370 K.C.
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.

VOLTAGE TABLE

TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	PLATE VOLTS	CATHODE VOLTS	SCREEN VOLTS	GRID NO. 1	GRID NO. 3 & 5
6A7	OSCILLATOR AND MODULATOR	6	180	3.6		180	75
6D6	INTERMEDIATE FREQUENCY	6	180	3.6	75		
6B7	2ND DETECTOR DIODE & AVC	6	32*	1.9	30*		
41	OUTPUT	6	220	15	230		
84	RECTIFIER	6		230			

* COMPARATIVE VOLTAGE ONLY. READ ALL VOLTAGES FROM SOCKET TO CHASSIS. TOTAL "A" CURRENT 5.9 AMPERES.

SENTINEL RADIO CORP.

MODELS 10M & 10MF

ALIGNMENT PROCEDURE: FOR PROPERLY ALIGNING EITHER THE INTERMEDIATE TRANSFORMER OR THE VARIABLE CONDENSER IT IS NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR BE USED WITH SOME TYPE OF OUTPUT MEASURING DEVICE.

INTERMEDIATE ALIGNMENT:

1. ATTACH THE HIGH SIDE OF THE TEST OSCILLATOR OUTPUT TO THE CONTROL GRID OF THE 6A7 TUBE, LEAVING THE CONTROL GRID DISCONNECTED. CONNECT A 1 MEGOHM RESISTOR FROM THE CONTROL GRID TO CHASSIS. CONNECT THE GROUND SIDE OF THE OSCILLATOR TO THE RECEIVER CHASSIS.

2. SET THE TEST OSCILLATOR FREQUENCY AT 370 KILOCYCLES (THIS MUST BE ACCURATE) AND ADJUST THE OUTPUT OF THE OSCILLATOR SO THAT A CONVENIENT READING IS OBTAINED ON THE OUTPUT METER.

3. ALIGN THE FIRST INTERMEDIATE TRANSFORMER BY TURNING ONE OF THE TRIMMER SCREWS UP AND DOWN UNTIL MAXIMUM READING IS OBTAINED ON THE OUTPUT METER, AND THEN ADJUST THE OTHER TRIMMER SCREW OF THE INTERMEDIATE FOR MAXIMUM SENSITIVITY.

4. ADJUST THE SECOND INTERMEDIATE TRANSFORMER IN THE SAME MANNER.

NOTE: TWO TYPES OF INTERMEDIATE TRANSFORMER TRIMMERS HAVE BEEN USED IN THIS MODEL RECEIVER. ONE TYPE HAS TWO PARALLEL HOLES IN THE TOP OF THE SHIELD, ONE FOR EACH TRIMMER. THE OTHER TYPE HAS A BRASS HEX NUT FOR ADJUSTING ONE INTERMEDIATE TRIMMER, THE OTHER INTERMEDIATE TRIMMER BEING ADJUSTED WITH THE TRIMMER SCREW LOCATED INSIDE OF THE BRASS HEX NUT. REGARDLESS OF WHICH TYPE TRIMMER IS USED, THE PROCEDURE IS THE SAME.

TO ALIGN THE VARIABLE CONDENSER: IT IS NECESSARY TO REMOVE THE RECEIVER CHASSIS FROM THE SET HOUSING TO ALIGN THE VARIABLE GANG CONDENSER AND PADDING CONDENSER. TO DO THIS REMOVE THE 12 MACHINE SCREWS LOCATED AROUND THE EDGE OF THE FRONT COVER OF THE SET HOUSING AND THE SINGLE MACHINE SCREW UNDERNEATH THE HOUSING, AFTER WHICH THE CHASSIS MAY BE PULLED OUT OF THE SET HOUSING BY GRASPING THE RECEIVER METAL FRONT PANEL AND PULLING OUTWARD.

1. PROPERLY CONNECT THE REMOTE CONTROL HEAD AND SHAFTS AND ADJUST THE DIAL NEEDLE ON THE DIAL FACE FROM THE BACK SO THAT THE DIAL CALIBRATION IS CORRECT.

2. CONNECT THE HIGH OUTPUT SIDE OF THE TEST OSCILLATOR TO THE ANTENNA AND THE GROUND TO THE RECEIVER CHASSIS.

3. TUNE THE RECEIVER DIAL AND SET THE TEST OSCILLATOR FREQUENCY TO EXACTLY 1400 KILOCYCLES. BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER LOCATED ON TOP OF THE OSCILLATOR SECTION (FRONT SECTION) OF THE GANG CONDENSER. NEXT ADJUST THE ANTENNA SECTION (REAR SECTION) FOR MAXIMUM 1400 KILOCYCLE SIGNAL SENSITIVITY.

4. TUNE THE RECEIVER DIAL AND SET THE TEST OSCILLATOR FREQUENCY TO APPROXIMATELY 600 KILOCYCLES AND WHILE ROCKING THE GANG CONDENSER SLIGHTLY TO THE RIGHT AND LEFT ADJUST THE 600 KILOCYCLE PADDING CONDENSER, WHICH IS LOCATED ON AND ACCESSIBLE THROUGH THE HOLE IN THE LEFT HAND SIDE OF THE CHASSIS, FOR MAXIMUM OUTPUT.

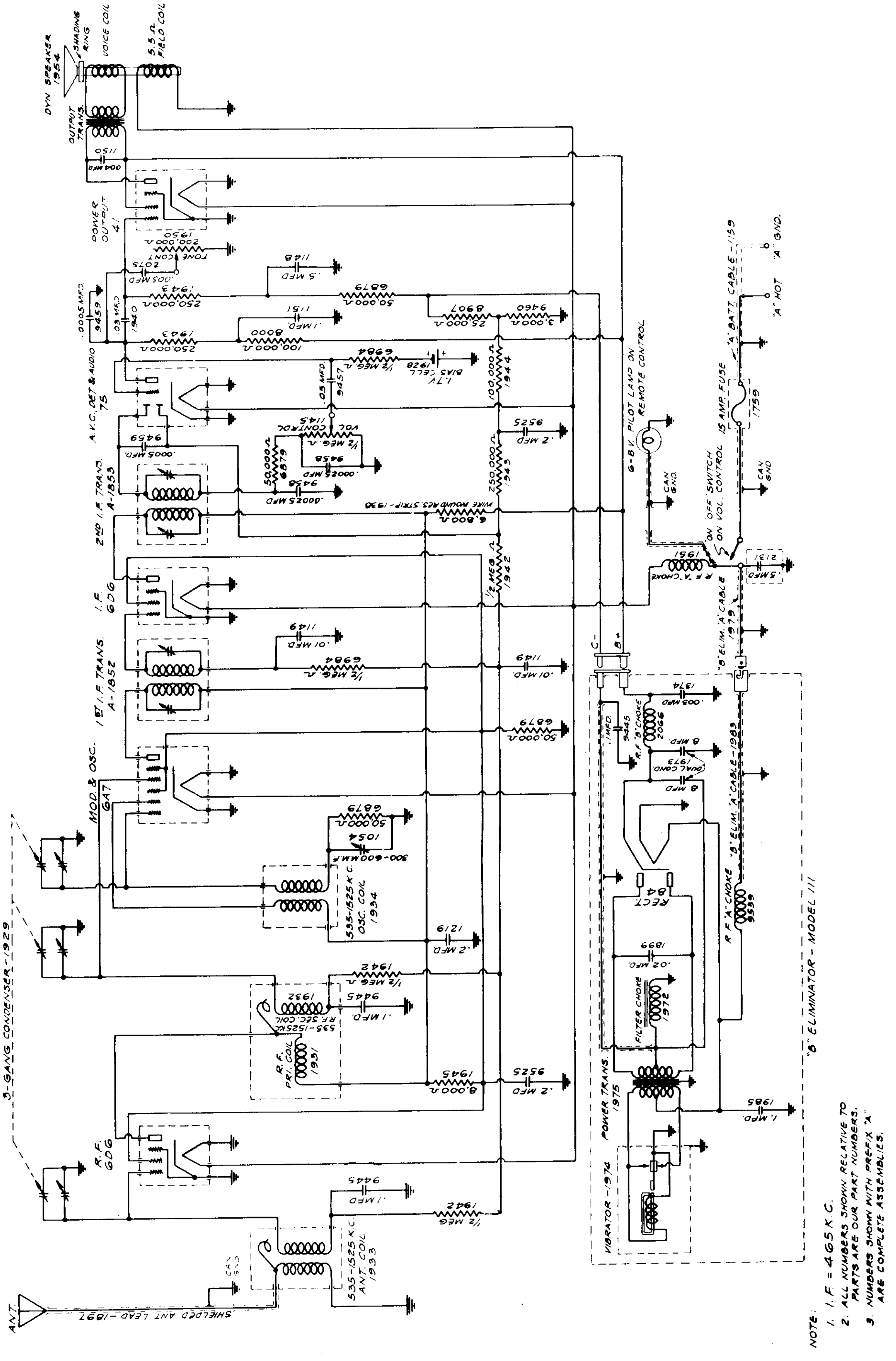
RECEIVERS SHIPPED TO CERTAIN SECTIONS OF THE COUNTRY THAT HAVE LOCAL AEROPLANE BEACON STATIONS BROADCASTING ON A FREQUENCY OF APPROXIMATELY 370 KILOCYCLES HAVE A COMBINATION WAVE TRAP AND ANTENNA COIL TO ELIMINATE INTERFERENCE FROM THESE BEACON STATIONS. ALL RECEIVERS EQUIPPED WITH THE COMBINATION WAVE TRAP AND ANTENNA COIL CAN BE IDENTIFIED BY THE LETTER "T" MARKED ON THE CHASSIS. THE STANDARD COIL AND THE COMBINATION WAVE TRAP AND ANTENNA COIL ARE INTERCHANGEABLE. THE STANDARD ANTENNA COIL IS PART #1898, AND THE COMBINATION ANTENNA COIL AND WAVE TRAP IS PART #1898T.

PART NUMBER		LIST PRICE
1898	ANTENNA COIL	$1.87
1146	OSCILLATOR COIL	1.07
1141	FIRST I.F. TRANSFORMER (370 K.C.)	2.17
1142	SECOND I.F. TRANSFORMER (370 K.C.)	2.17
2080	TWO GANG CONDENSER	3.40
1054	PADDING CONDENSER	.55
2077	SPEAKER ONLY	5.00
2077A	SPEAKER WITH BAFFLE, RING AND CABLE LESS TRANSFORMER	8.00
2076	SPEAKER TRANSFORMER	1.25
2094	THREE CONDUCTOR SPEAKER CABLE	1.50
2097	SPEAKER BAFFLE	1.80
2126	SPEAKER METAL RING	.50
2086	SPEAKER TERMINAL JACKS	.18
1145	VOLUME CONTROL	1.16
1911	TONE CONTROL SWITCH	.55
2088	ANTENNA LEAD	.35
2089	"A" BATTERY CABLE WITH FUSE	1.10
1759	15 AMPERE FUSE	.10
1137	POWER TRANSFORMER	3.00
1893	VIBRATOR	5.50
1188	2 x 8 MFD. DRY ELECTROLYTIC CONDENSER	2.85
8876	5 MFD. DRY ELECTROLYTIC CONDENSER	.77
9598	.5 MFD. DOME LIGHT FILTER CONDENSER	.55
9542	FILTER CHOKE	.85
1184	R.F. "A" CHOKE	.40
1276	R.F. "A" CHOKE	.40
2131	5 MFD. SHIELDED CONDENSER	.55
1890	WIRE WOUND RESISTOR STRIP	.60
1184	75 OHM 1 WATT FLEXIBLE WIRE WOUND RESISTOR	.19
6984	500,000 OHM 1/3 WATT RESISTOR	.19
1944	100,000 OHM 1/3 WATT RESISTOR	.19
6880	6,000 OHM 1/3 WATT RESISTOR	.19
6875	250 OHM 1/3 WATT RESISTOR	$ .19
1942	500,000 OHM 1/3 WATT RESISTOR	.19
6786	10,000 OHM 1/3 WATT RESISTOR	.19
9385	15,000 OHM 1/3 WATT RESISTOR	.19
8906	250,000 OHM 1/3 WATT RESISTOR	.19
1977	50,000 OHM 1/3 WATT RESISTOR	.19
1899	.02 MFD. 1200 VOLT CONDENSER	.45
9319	.001 MFD. MICA CONDENSER	.21
9459	.0005 MFD. MICA CONDENSER	.21
9525	.2 MFD. 200 VOLT CONDENSER	.24
1219	.2 MFD. 400 VOLT CONDENSER	.27
9445	.1 MFD. 200 VOLT CONDENSER	.18
1151	.1 MFD. 400 VOLT CONDENSER	.20
1167	.02 MFD. 200 VOLT CONDENSER	.18
9457	.05 MFD. 400 VOLT CONDENSER	.19
1150	.004 MFD. 600 VOLT CONDENSER	.18
1148	.5 MFD. 200 VOLT CONDENSER	.55
1762	.001 MFD. 400 VOLT CONDENSER	.17
1147	.05 MFD. 200 VOLT CONDENSER	.19
2086	RECEIVER HOUSING	2.75
2090	REMOTE CONTROL HEAD	4.25
2091	REMOTE CONTROL ASH TRAY MOUNTING PLATE KIT	1.11
2012	18" TUNING CONTROL DRIVE CABLE	1.43
2012	18" VOLUME CONTROL DRIVE CABLE	1.43
2013	24" TUNING CONTROL DRIVE CABLE	1.75
2013	24" VOLUME CONTROL DRIVE CABLE	1.75
2014	32" TUNING CONTROL DRIVE CABLE	2.05
2014	32" VOLUME CONTROL DRIVE CABLE	2.05
1460	6.3 VOLT PILOT LIGHT	.19
2092	MOUNTING BLOCK (WOOD)	.21
7776	CARRIAGE BOLT AND NUT	.10
7716	STEEL WASHER	.10
2037B	.5 MFD. GENERATOR CONDENSER	.40
1898T	COMBINATION WAVE TRAP AND ANTENNA COIL	2.25

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

SENTINEL RADIO CORP.

MODEL 11M



SENTINEL RADIO CORP.

MODEL 11M

IGNITION NOISE: ELECTRICAL AND IGNITION INTERFERENCE CREATED BY THE SPARK PLUGS, HIGH TENSION COIL, DISTRIBUTOR, AND GENERATOR CAN BE MINIMIZED IN MOST INSTALLATIONS TO A POINT WHERE RADIO RECEPTION IS NOT IMPAIRED BY JUST INSTALLING THE DISTRIBUTOR SUPPRESSOR, GENERATOR AND AMMETER CONDENSERS SUPPLIED. IT WILL GENERALLY BE FOUND THAT WHATEVER IGNITION NOISE IS PRESENT AFTER INSTALLING THE DISTRIBUTOR SUPPRESSOR AND GENERATOR CONDENSER IS BEING PICKED UP BY THE ANTENNA. OFTEN THE INTERFERENCE IS FED INTO THE ROOF TYPE ANTENNA THROUGH THE DOME LIGHT WIRING, AND IN UNDERCAR AERIALS BY THE TAIL LIGHT WIRE (SEE "UNDERCAR AERIAL" PARAGRAPH). TO DETERMINE IF THESE WIRES ARE THE CAUSE OF THE ANTENNA PICKING UP THE INTERFERENCE, TRY BYPASSING THE LEAD AT THE POINT WHERE IT CONNECTS EITHER TO THE AMMETER OR THE LIGHTING SWITCH TERMINAL BLOCK TO THE CAR FRAME WITH ONE OF THE CONDENSERS SUPPLIED. IF THIS IS NOT EFFECTIVE WITH THE ROOF TYPE ANTENNA TRY BYPASSING THE DOME LIGHT LEAD AS NEAR AS POSSIBLE TO THE POINT WHERE IT ENTERS THE FRONT CORNER BODY POST. WHENEVER A NOTICEABLE REDUCTION IN IGNITION NOISE IS MADE, PERMANENTLY CONNECT THE CONDENSER AT THE POINT WHERE THIS REDUCTION WAS OBTAINED. IF THE IGNITION NOISE AFTER BYPASSING THE LIGHT LEAD STILL INTERFERES WITH RADIO RECEPTION, PROCEED AS FOLLOWS:

1. CONNECT THE "A" BATTERY LEADS DIRECT TO THE 6 VOLT STORAGE BATTERY POSTS INSTEAD OF THE AMMETER OR TERMINAL BLOCK.

2. PLACE A PIECE OF COPPER SCREENING SUFFICIENTLY LARGE TO COVER ALL OF THE FRONT FLOOR UP TO THE BULKHEAD UNDERNEATH THE FRONT FLOOR MAT, GROUNDING IT IN SEVERAL PLACES TO THE FRAME OF THE CAR.

3. BYPASSING THE IGNITION SWITCH, LOW TENSION SIDE OF THE DISTRIBUTOR COIL, CIGAR LIGHTER, ETC. MAY BE HELPFUL.

4. IF THE LOW TENSION WIRE BETWEEN THE IGNITION COIL AND DISTRIBUTOR RUN PARALLEL OR IN THE SAME HOUSING WITH THE HIGH TENSION LEAD, REMOVE IT OR SHIELD THE HIGH TENSION LEAD WITH A METAL SHIELD SIMILAR TO THE TYPE USED IN SHIELDING THE ANTENNA LEAD, GROUNDING THE SHIELDING AT SEVERAL POINTS TO THE FRAME OF THE CAR OR MOTOR.

5. ALL METAL TUBES AND RODS SUCH AS GAS AND OIL LINES, THROTTLE AND SPARK CONTROL CABLES, SPEEDOMETER CABLES, FREE WHEELING CABLES, ETC. THAT PASS THROUGH THE BULKHEAD SHOULD BE BONDED TO THE MOTOR WITH A HEAVY COPPER BRAIDED SHIELDING. THE SHIELDING SHOULD BE MADE AS SHORT AS POSSIBLE AND MUST BE SOLDERED TO THE METAL TUBES OR RODS, ETC., AND GROUNDED BY FASTENING IT TO THE MOTOR SIDE OF THE BULKHEAD, THE FRAME OF THE CAR, OR MOTOR.

6. REMOVE ROTOR FROM THE DISTRIBUTOR AND PEEN THE ROTOR CONTACT SO THAT THERE IS A CLEARANCE OF ONLY .004 INCHES BETWEEN THE ROTOR AND DISTRIBUTOR HEAD CONTACTS.

IN VERY RARE INSTANCES IT MAY BE FOUND THAT EVEN AFTER FOLLOWING THE ABOVE SUGGESTIONS THAT THE IGNITION INTERFERENCE IS STILL EXCESSIVE, IN WHICH EVENT IT MAY BE ADVISABLE TO INSTALL SPARK PLUG SUPPRESSORS ON EACH SPARK PLUG (SEE GENERAL INSTALLATION OF RECEIVER AND ACCESSORIES DRAWING).

ALIGNMENT PROCEDURE: FOR PROPERLY ALIGNING EITHER THE INTERMEDIATE TRANSFORMERS OR THE VARIABLE CONDENSER IT IS NECESSARY THAT AN ACCURATELY CALIBRATED OSCILLATOR BE USED WITH SOME TYPE OF OUTPUT MEASURING DEVICE.

INTERMEDIATE ALIGNMENT:

1. CONNECT THE HIGH SIDE OF THE OSCILLATOR OUTPUT TO THE CONTROL GRID OF THE 6A7 TUBE LEAVING THE CONTROL GRID CAP DISCONNECTED, AND ATTACH A 1 MEG OHM RESISTOR FROM GRID TO GROUND. CONNECT THE GROUND SIDE OF THE OSCILLATOR TO THE RECEIVER CHASSIS.

2. SET THE OSCILLATOR FREQUENCY AT 465 KILOCYCLES (THIS MUST BE ACCURATE) AND ADJUST THE OUTPUT OF THE OSCILLATOR SO THAT A CONVENIENT READING IS OBTAINED ON THE OUTPUT METER.

3. ALIGN THE FIRST INTERMEDIATE TRANSFORMER BY TURNING ONE OF THE TRIMMER SCREWS UP AND DOWN UNTIL MAXIMUM READING IS OBTAINED ON THE OUTPUT METER, AND THEN ADJUST THE OTHER TRIMMER SCREW OF THE INTERMEDIATE TRANSFORMER FOR MAXIMUM SENSITIVITY.

4. ADJUST THE SECOND INTERMEDIATE TRANSFORMER IN THE SAME MANNER.

NOTE: TWO TYPES OF INTERMEDIATE TRANSFORMER TRIMMERS HAVE BEEN USED IN THIS MODEL RECEIVER. ONE TYPE HAS TWO PARALLEL HOLES IN THE TOP OF THE SHIELD, ONE FOR EACH TRIMMER. THE OTHER TYPE HAS A BRASS HEX NUT FOR ADJUSTING ONE INTERMEDIATE TRIMMER, THE OTHER INTERMEDIATE TRIMMER BEING ADJUSTED WITH THE TRIMMER SCREW LOCATED INSIDE OF THE BRASS HEXNUT. REGARDLESS OF WHICH TYPE TRIMMER IS USED THE PROCEDURE IS THE SAME.

TO ALIGN THE VARIABLE CONDENSER: IT IS NECESSARY TO REMOVE THE RECEIVER CHASSIS FROM THE SET HOUSING TO ALIGN THE GANG AND PADDING CONDENSERS.

1. PROPERLY CONNECT THE REMOTE CONTROL HEAD AND SHAFTS AND ADJUST THE DIAL NEEDLE ON THE DIAL FACE SO THAT THE DIAL CALIBRATION IS CORRECT.

2. CONNECT THE HIGH OUTPUT SIDE OF THE OSCILLATOR TO THE ANTENNA AND THE GROUND TO THE RECEIVER CHASSIS.

3. TUNE THE RECEIVER TO EXACTLY 1400 KILOCYCLES ON THE DIAL AND ADJUST THE OSCILLATOR TO THIS FREQUENCY. <u>BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE OSCILLATOR SECTION GANG CONDENSER TRIMMER.</u> LOOKING AT THE TOP OF THE GANG CONDENSER AND READING FROM FRONT TO REAR, THE TRIMMER CONDENSERS ARE: R. F., OSCILLATOR, AND ANTENNA SECTIONS. NEXT, ADJUST THE R. F. AND ANTENNA SECTIONS OF THE GANG CONDENSER FOR MAXIMUM SENSITIVITY.

4. TUNE THE RECEIVER TO APPROXIMATELY 600 KILOCYCLES ON THE DIAL AND SET THE OSCILLATOR TO THIS FREQUENCY. THEN ADJUST THE 600 KILOCYCLE PADDING CONDENSER, WHICH IS LOCATED ON AN ACCESSIBLE THROUGH THE HOLE IN THE LEFT SIDE OF THE CHASSIS FOR MAXIMUM OUTPUT. ALWAYS ROCK THE CONDENSER SLIGHTLY TO THE RIGHT AND LEFT WHEN MAKING THIS ADJUSTMENT USING THE POSITION OF GREATEST OUTPUT.

VOLTAGE TABLE

TYPE OF TUBE	POSITION OF TUBE	FILAMENT VOLTS	PLATE VOLTS	SCREEN VOLTS	GRID NO. 1	GRID NO. 3 AND 5
6D6	RADIO FREQUENCY	6	125		2	100
6A7	OSCILLATOR AND MODULATOR	6	125	60		
6D6	INTERMEDIATE FREQUENCY	6	125	60		
75	2ND DETECTOR DIODE & AVC	6	75*			
41	OUTPUT	6	200	210		
84	RECTIFIER	6				

TOTAL "B" DRAIN 40 M.A.
TOTAL "A" DRAIN 5½-6 AMP.

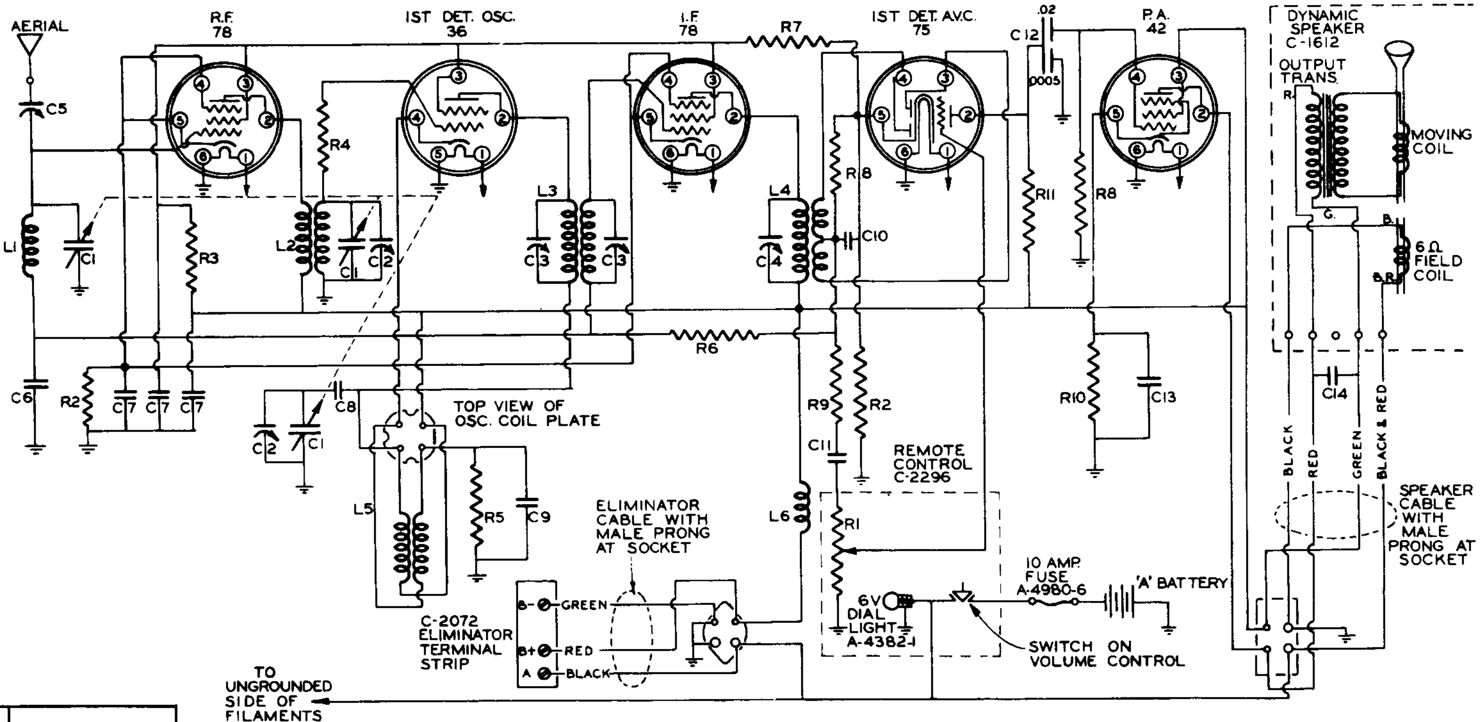
READ ALL VOLTAGES FROM SOCKET PRONG TO CHASSIS UNLESS OTHERWISE SPECIFIED.

* TRIODE PLATE COMPARATIVE VOLTAGE ONLY.

SPARKS-WITHINGTON COMPANY

MODEL 46P

C1	VARIABLE CONDENSER	B-6263
C2	EQUALIZING CONDENSER	
C3	NO. 1 I.F. TRIMMER	A-6580
C4	NO. 2 I.F. TRIMMER	A-8529
C5	ANTENNA TRIMMER	A-9161
C6	.1 MFD. 200 V.	A-7224
C7	.3 MFD 200 V.	A-7796-1
C8	.0017 MFD. MOLDED	A-7038-4
C9	.002 MFD. MOLDED	A-7038-3
C10	.0005 MFD. MOLDED	A-7038-1
C11	.025 MFD. 400 V.	A-9575
C12	.02-.0005 MFD. 200 V.	A-10204-1
C13	20 MFD. 20 V.	A-9308
C14	.003 MFD. 600 V.	A-9793
R1	250,000 Ω V.C.& SWITCH	A-10216-1
R2	200 Ω WIREWOUND	B-5243-15
R3	15,000 Ω 1 W.	B-4540-8
R4	1,000 Ω WIREWOUND	B-5243-6
R5	8,000 Ω .25 W.	B-5458-22
R6	1,000,000 Ω .5 W.	B-4114-37
R7	25,000 Ω 1 W.	B-4540-6
R8	300,000 Ω .25 W.	B-5737-3
R9	50,000 Ω .25 W.	B-5737-4
R10	750 Ω WIREWOUND	B-5243-8
R11	250,000 Ω .25 W.	B-5737-1
L1	NO. 1 R.F. COIL	A-11540
L2	NO. 2 R.F. COIL	A-11541
L3	NO. 1 I.F. TRANS.	A-8143
L4	NO. 2 I.F. TRANS.	A-9387
L5	OSCILLATOR COIL	A-11539
L6	CATHODE CHOKE	A-7209



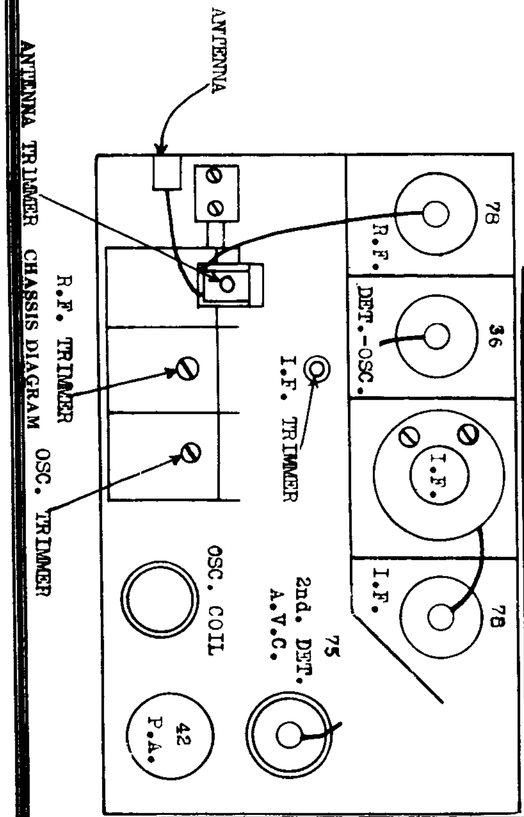
I.F. 172.5K.C.

VOLTAGE-RESISTANCE CHART

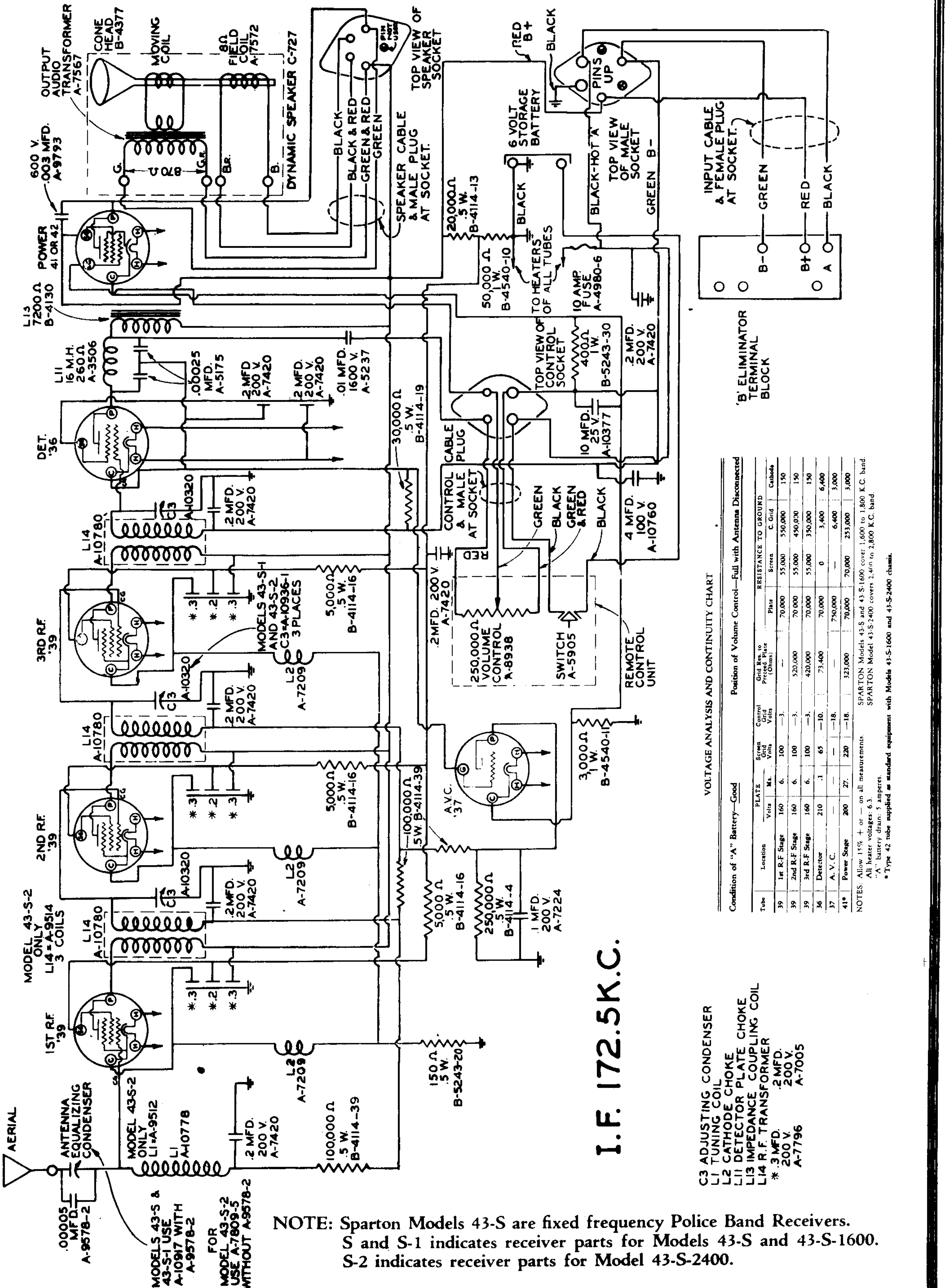
Condition of "A" Battery: Good — Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Grid Cap
78	R-F Amplifier	Volts	6	200	100	3	3	0	-	0
		Ohms	0	40000	25000	200	200	0	-	1 meg.
36	1st. Det-Oscillator	Volts	6	180	90	0	0	-	-	0
		Ohms	0	40000	25000	8000	0	-	-	3500
78	I-F Amplifier	Volts	6	200	100	3	3	0	-	0
		Ohms	0	40000	25000	200	200	0	-	1 meg.
75	2nd. Det- A.V.C.	Volts	6	75	0	50	0	0	-	0
		Ohms	0	250000	250000	250000	200	0	-	200000
42	Power Amplifier	Volts	6	225	225	0	0	0	-	-
		Ohms	0	40000	40000	275000	750	0	-	-

Note: Voltage and resistance readings are for schematic diagram shown on back of sheet. Allow 15% - or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 2.



SPARKS-WITHINGTON COMPANY
MODELS 43-S, 43-S-1600 & 43-S-2400



VOLTAGE ANALYSIS AND CONTINUITY CHART

Condition of "A" Battery—Good   Position of Volume Control—Full with Antenna Disconnected

Tube	Location	Plate Volts	Plate Ma.	Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	Resistance to Ground: Plate	Screen	C. Grid	Cathode
39	1st R-F Stage	160	6.	100	—3.	—	70,000	55,000	550,000	150
39	2nd R-F Stage	160	6.	100	—3.	520,000	70 000	55,000	450,000	150
39	3rd R-F Stage	160	6.	100	—3.	420,000	70,000	55,000	350,000	150
36	Detector	210	.1	65	—10.	73,400	70,000	0	3,400	6,400
37	A. V. C.	—	—	—	—18.	—	750,000	—	6,400	3,000
41*	Power Stage	200	27.	220	—18.	323,000	70,000	70,000	253,000	3,000

NOTES: Allow 15% + or — on all measurements.
All heater voltages: 6.3.
"A" battery drain: 5 amperes.
* Type 42 tube supplied as standard equipment with Models 43-S-1600 and 43-S-2400 chassis.

SPARTON Models 43-S and 43-S-1600 cover 1,600 to 1,800 K.C. band.
SPARTON Model 43-S-2400 covers 2,400 to 2,800 K.C. band.

C3 ADJUSTING CONDENSER
L1 TUNING COIL
L2 CATHODE CHOKE
L11 DETECTOR PLATE CHOKE
L13 IMPEDANCE COUPLING COIL
L14 R.F. TRANSFORMER
* .3 MFD. 200 V. A-7796   .2 MFD. 200 V. A-7005

NOTE: Sparton Models 43-S are fixed frequency Police Band Receivers.
S and S-1 indicates receiver parts for Models 43-S and 43-S-1600.
S-2 indicates receiver parts for Model 43-S-2400.

SPARKS-WITHINGTON COMPANY

MODELS 43-S, 43-S-1600, 43-S-2400, 44-P & 46-P

A. ALIGNING THE INTERMEDIATE FREQUENCY ADJUSTABLE CONDENSERS.

1. Connect the aerial terminal of the oscillator to the control grid terminal (terminal on top of tube) of the first detector-oscillator tube, and the ground terminal to the ground connection of the receiver and tune oscillator to 172.5 K.C.

2. Turn the volume control on full.

3. Turn the attenuator or volume control on the oscillator to the position where the oscillator is heard faintly. If the oscillator is not heard at all, even with the control full on, the condensers of the stage requiring adjustment should be manipulated until it is heard at the loudest. The control should then be reduced so that only a faint sound from the oscillator is audible.

4. All intermediate frequency adjustable condensers should be adjusted if the adjustment of one is necessary. When adjustment of the stage that requires such has been made, the other stages should be adjusted in rotation. Each pair of condensers should be adjusted before proceeding to the next.

5. Correct alignment is obtained when reduction of the oscillator output and readjustment of the condensers is continued until maximum deflection of the output meter is obtained with a minimum of oscillator input. The numerical value of the deflection on the output meter scale is of no consequence, for the object is to set the output of the oscillator at a certain value and adjust the condenser until maximum deflection is obtained. If the meter goes off scale or does not give a large enough reading, adjust the oscillator accordingly.

6. It may be necessary to repeat the entire adjustment once or twice, to be sure the adjustments are correct.

B. ALIGNING THE OSCILLATOR EQUALIZING CONDENSER.

1. Connect the crystal controlled oscillator (adjusted to 172.5 kilocycles) to the antenna and ground connections of the receiver.

2. Align the oscillator equalizing condenser to a frequency of 2200 K.C. on Model 46-P.

NOTE: ON MODEL 44-P ALIGN OSCILLATOR TRIMMER TO THE FREQUENCY FOR WHICH THE SET IS DESIGNED.

C. ALIGNING THE R. F. ADJUSTABLE CONDENSERS.

1. Turn the volume control on full and the tone and static control all the way to the left or to the position where low tone is obtained

2. Set oscillator for the frequency for which the set is designed.

NOTE: ON MODEL 46-P SET OSCILLATOR FOR A FREQUENCY OF 2200 K.C.

3. Adjust R.F. trimmers for maximum output.

D. ALIGNING THE ANTENNA EQUALIZING CONDENSER.

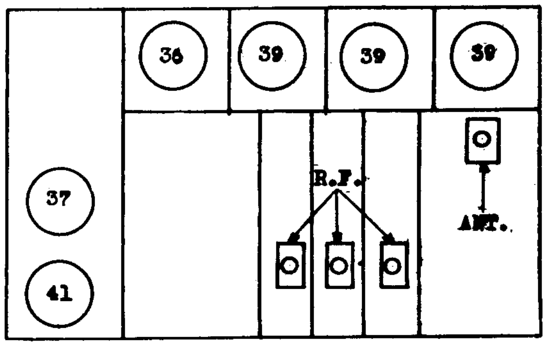
The antenna equalizing condenser should always be adjusted when the receiver is installed and with the regular aerial and ground connected. It is the purpose of this condenser to resonate the first tuned circuit with the antenna system to which the receiver is connected, thereby providing a maximum transfer of energy. The procedure of adjustment is as follows:

1. Tune in the desired signal and turn volume control on full position.

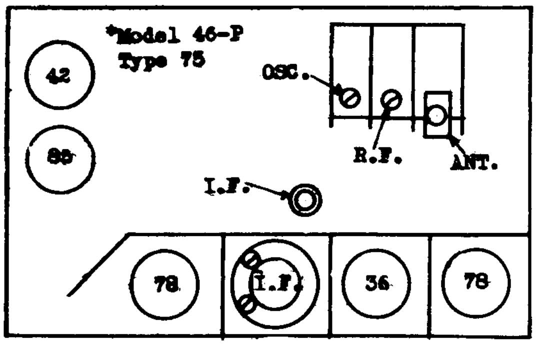
NOTE: ON MODEL 46-P TUNE IN A SIGNAL AT APPROXIMATELY 2200 K.C.

2. Next, with a hex-socket insulated wrench, turn the hex-nut on the condenser or the screw in the condenser with an insulated handle screw driver to the position where the volume from the station "tuned-in" or the oscillator signal is the loudest. Once made, this adjustment need not be changed unless the antenna system is altered, the receiver is moved from one location to another, or the other condensers are re-adjusted.

NOTE: When antenna equalizing condenser is adjusted on oscillator signal, adjustment will not hold true when receiver is connected to aerial; this condenser must be aligned to antenna system.



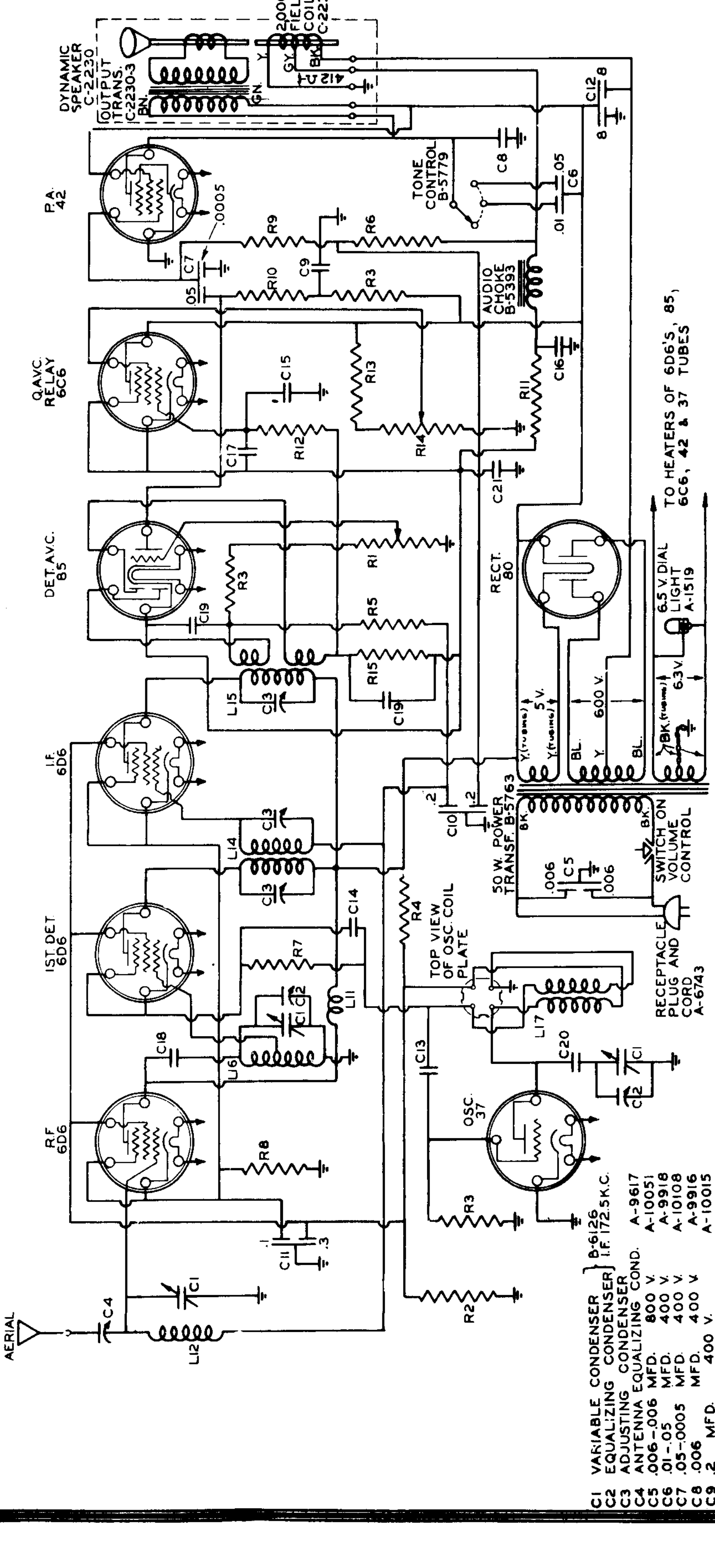
MODELS
43-S
43-S-1600
43-S-2400



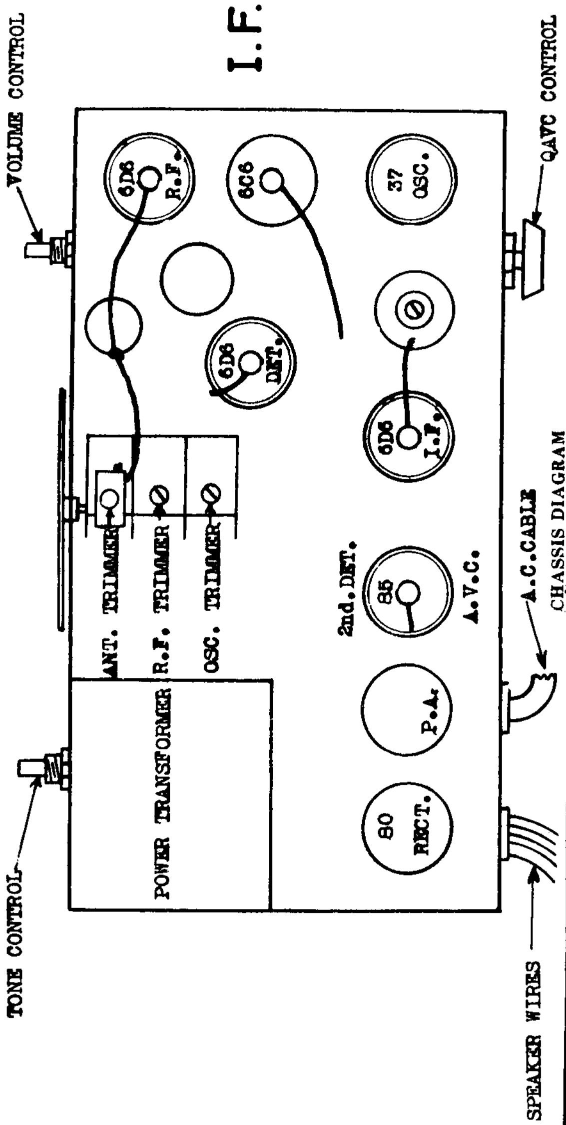
MODELS
44-P
46-P

SPARKS-WITHINGTON COMPANY

MODEL 72-PQ



I.F. 172.5K.C.

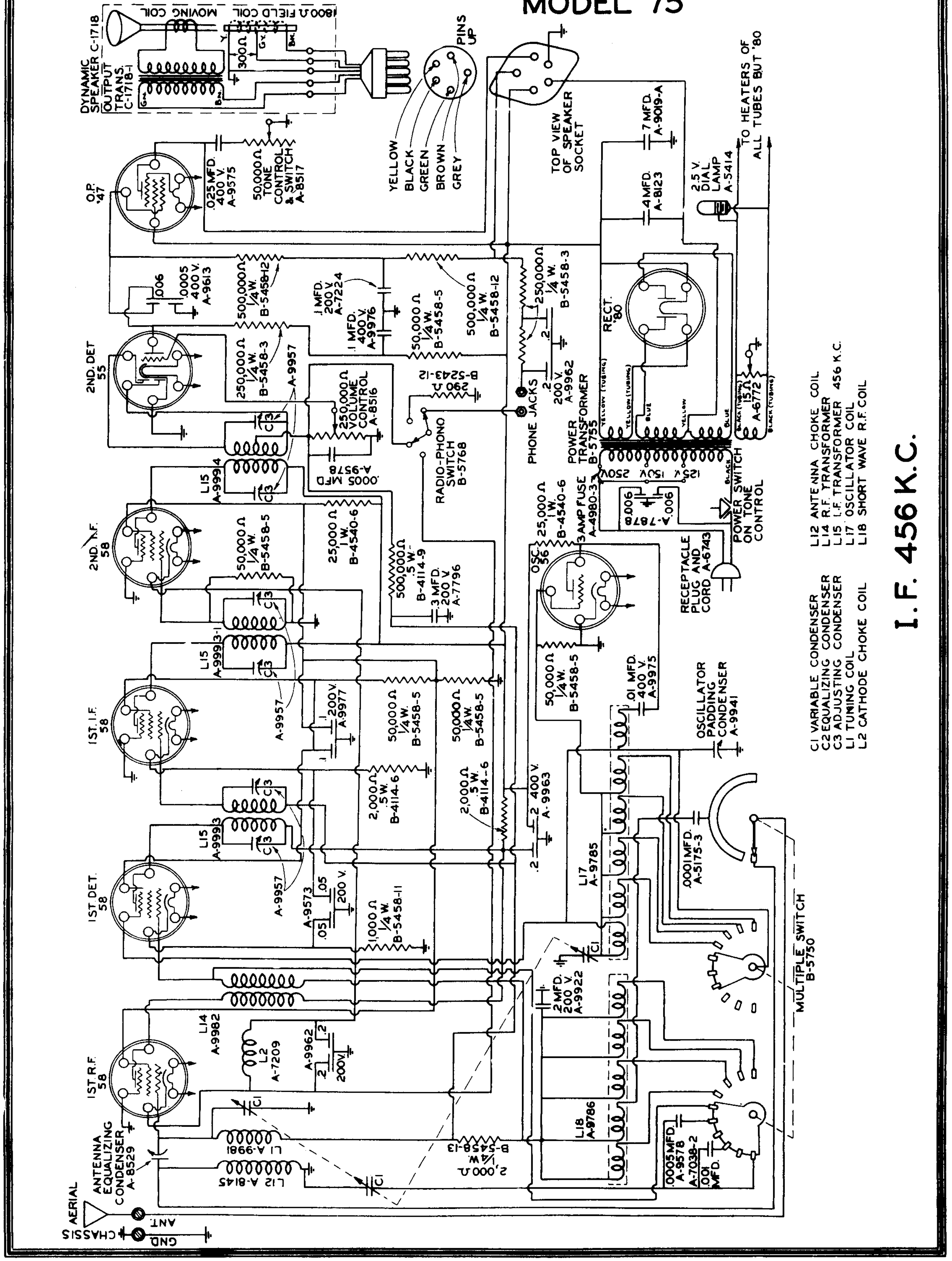


CHASSIS DIAGRAM

C1	VARIABLE CONDENSER	B-6126
C2	EQUALIZING CONDENSER	I.F. 172.5K.C.
C3	ADJUSTING CONDENSER	
C4	ANTENNA EQUALIZING COND.	A-9617
C5	.006-.006 MFD. 800 V.	A-10051
C6	.01-.05 MFD. 400 V.	A-9918
C7	.05-.0005 MFD. 400 V.	A-10108
C8	.006 MFD. 400 V.	A-9916
C9	.2 MFD. 400 V.	A-10015
C10	.2-.2 MFD. 200 V.	A-9962
C11	.1-.3 MFD. 200 V.	A-9921
C12	8-8 MFD. ELECTROLYTIC	A-9754
C13	.00025 MFD. MOLDED	A-5175
C14	.002 MFD. MOLDED	A-9578-1
C15	.01 MFD. 400 V.	A-9611
C16	10 MFD. 25 V.	A-10377
C17	.05 MFD. 200 V.	A-10205
C18	.00025 MFD. MOLDED	A-10954-1
C19	.0005 MFD. MOLDED	A-10954-2
C20	.00175 MFD. MOLDED	A-7038-4
C21	.3 MFD. 200 V.	A-7796
R1	250,000 Ω VOL. CONTROL & SWITCH	A-10031
R2	20,000 Ω 1. WATT	B-4540-4
R3	50,000 Ω .25 WATT	B-5458-5
R4	10,000 Ω 10 WATT	B-5029-3
R5	500,000 Ω .25 WATT	B-5458-12
R6	250,000 Ω .25 WATT	B-5458-3
R7	5,000 Ω .25 WATT	B-5458-16
R8	150 Ω WIRE WOUND	B-5243-20
R9	250,000 Ω .25 WATT	B-5737-1
R10	500,000 Ω .25 WATT	B-5458-24
R11	45,000 Ω .25 WATT	B-5458-25
R12	2,000,000 Ω .25 WATT	B-5458-26
R13	30,000 Ω .5 WATT	B-4114-19
R14	50,000 Ω 'Q' CONTROL	A-10953
R15	1,000,000 Ω .25 WATT	B-5737-6
L11	16 M.H. CHOKE	A-3506
L12	NO. 1 R.F. COIL	A-10957
L14	NO. 1 I.F. TRANSFORMER	A-10049
L15	NO. 2 I.F. TRANSFORMER	A-10955
L16	NO. 2 R.F. COIL	A-10958
L17	OSCILLATOR COIL	A-10956

SPARKS-WITHINGTON COMPANY

MODEL 75



SPARKS-WITHINGTON COMPANY

MODEL 72-PQ

VOLTAGE-RESISTANCE CHART

Line Voltage: 115 volts
Position of "Q" Control: Full
Position of Volume Control: Full with Antenna Disconnected
Position of Tone Control: Brilliant

Tube	Function	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS)			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode*
6D6	R-F Amplifier	250	8.	100	-3	-	30000	20000	1,500,000	150
6D6	1st. Detector	250	*	100	*	30000	30000	20000	0	5000
37	Oscillator	100*	*	-	*	80000	20000	0	50000	0
6D6	I-F Amplifier	250	8.	100	-3	1,500,000	30000	20000	1,500,000	150
85	Diode Detector - A.V.C.	0	0	-	-	330000‡	300000	-	-	45500
	Triode A-F Amplifier	22	1.6	-	0	280000	580000	-	250000	
6C6	Q.A.V.C.	0	0	0	-	-	30000	0	3,000,000	45500
42	Power Amplifier	240	20.	250	-11**	1,800,000	30000	30000	350000	0
80	Rectifier	450†	26.***	-	-	600#	2300	-	-	30000##

Notes: Allow 15% + or - on all measurements. All heater voltages 6.3 except 80 Rectifier: 5.0 volts.
* Cannot be measured with test kit and adapter without causing oscillator to cease functioning; thus the omitted readings are of no value.
** Using 300,000 ohm voltmeter.
*** Per plate.
† As read on 800 volt scale of A-C meter in Jewell 444 Set Analyzer.
\# Plate to plate on 80 Rectifier.
\## Filament on 80 Rectifier to ground.
‡ Diode plates to I-F plate.

MODEL 75

VOLTAGE ANALYSIS AND CONTINUITY CHART

Line Voltage 115
Position of Voltage Compensator 125
Position of Tone Control—Full
Position of Volume Control—Full with Antenna Disconnected
Position of Band Selector Switch—Broadcast
Position of Radio-Phonograph Switch—Radio

Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS)			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode
58	R-F Stage	250	6.0	110	—4.	—	77,000	50,000	750,000	290
58	1st Det.	240	1.5*	50	—2.*	825,000	77,000	100,000	750,000	1,000
56	Osc. Stage	110*	*	—	*	150,000[1]	100,000	—	50,000	0
58	1st I-F Stage	250	1.0	50	—3.	825,000[2]	75,000	100,000	750,000	2,000
58	2nd I-F Stage	250	6.0	100	—4.	75,000	75,000	50,000	0	290
55	Diode Det.-A.V.C.	—	—	—	0	325,000[3]	250,000	—	—	0
	Triode A-F	25	0.7	—	0	—	250,000	—	250,000	
47	Power Stage	250	22.	240	—8.**	1,300,000	75,000	75,000	1,000,000	0
80	Rectifier	440†	32‡	—	—	—	1,100	—	—	7,500[4]

NOTES: Allow 15% + or — on all measurements. All heater voltages: 2.5, except 80 Rectifier: 5.0 volts.

* Cannot be measured with test kit and adapter without causing oscillator to cease functioning; thus the omitted readings are of no value.

** Using 300,000 ohm voltmeter.

† As read on 800 volt scale of A-C meter in Jewell 444 Set Analyzer.

‡ Per plate.

[1] Grid to plate of Oscillator.

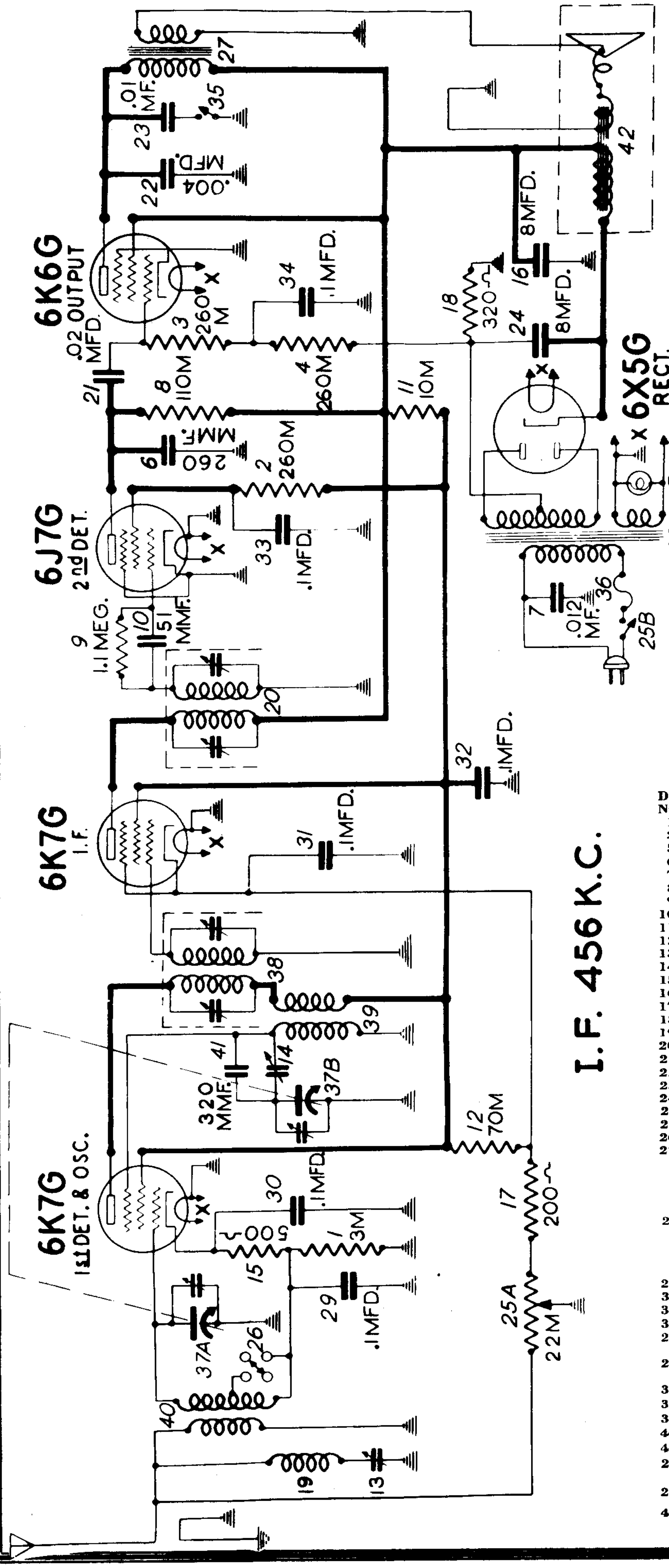
[2] 1st I-F grid to 1st Detector plate.

[3] Diode plates to 2nd I-F plate.

[4] Filament on 80 Rectifier to ground.

STEWART-WARNER CORPORATION

MODELS R-167-S, R-168 & 1671 TO 1689



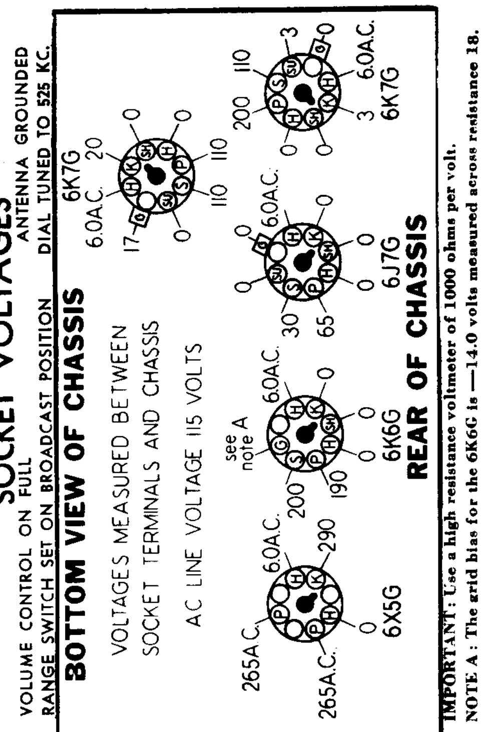


Diagram Number	Part Number	Description	List Price
1	71657	3000 ohm ¼ watt carbon resistor	$ .25
2-3-4	83082	260,000 ohm ¼ watt carbon resistor	.12
5	83278	Pilot lamp, No. 40, 6-8 volts	.15
6	83539	260 mmfd. mica condenser	.20
7	83976	.012 mfd. 1000 V. shielded condenser	.40
8	84198	110,000 ohm ¼ watt carbon resistor	.12
9	84235	1.1 megohm ¼ watt carbon resistor	.12
10	85061	51 mmfd. mica condenser	.15
11	85064	10,000 ohm 1 watt carbon resistor	.20
12	85266	70,000 ohm ¼ watt carbon resistor	.20
13	85285	456 KC. wave trap trimmer	.40
14	85285	Variable padding condenser	.40
15	85691	500 ohm ½ watt wire wound resistor	.20
16	88007	8 mfd. 250 V. electrolytic condenser	1.00
17	88009	200 ohm ½ watt wire wound resistor	.15
18	88010	320 ohm 1½ watt wire wo'd resistor	.15
19	88014	456 KC. wave trap coil	.50
20	88017	2nd I.F. transformer	2.00
21	88026	.02 mfd. 400 V. paper condenser	.25
22	89826	.004 mfd. 750 V. paper condenser	.24
23	88030	.01 mfd. 400 V. paper condenser	.25
24	88033	8 mfd. 350 V. electrolytic condenser	1.10
25-A 25-B	88036	Volume control (22,000 ohm) A.C. line switch	1.25
26	88037	Range switch	.60
27	88040	Output transformer (R-246-A or R-265-A speaker)	1.50
28	88044	Power transformer, 115 V. 60 cycle (167AS, 168A)	$4.20
	88138	Power transformer, 115 V. 25 cycle (167BS, 168B)	5.50
	89251	Power transformer, 220 V. 50 cycle (167KS)	3.75
	89756	Power transformer, 105 to 250 V., 50 to 133 cycles (167WS)	7.00
29-30-31 32-33-34	88046	1 mfd. 150 V. paper condenser	.25
35	88054	Tone control switch	.30
36	88055	Fuse, ¾ ampere	.12
28	88138	Power transformer, 115 V. 25 cycle (167BS, 168B)	5.50
28	89251	Power transformer, 220 V. 50 cycle (167KS)	3.75
37-A to B	89500	Two gang condenser	3.25
38	89575	1st I.F. transformer	2.25
39	89576	Oscillator coil assembly	.75
40	89581	Antenna coil assembly	1.00
41	89587	320 mmfd. mica condenser	.24
28	89756	Power transformer, 105 to 250 V., 50 to 133 cycles (167WS)	7.00
22	89826	.004 mfd. 750 V. paper condenser	.24
42	R-246-A	5″ dynamic speaker (R-167)	4.50
	R-265-A	8″ dynamic speaker (R168)	5.80

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STEWART-WARNER CORPORATION

MODELS R-167-S, R-168 & 1671 TO 1689

CIRCUIT DESCRIPTION

The R-167-S and R-168 chassis are identical with the exception of the size and location of the speaker and the physical location of a few other parts. The R-167-S, which is used in the table model cabinet, has a 5 inch speaker mounted on the chassis and the variable condenser, dial and the control shafts are located on the right side of the chassis. The R-168 is used in the console with a separate 8 inch speaker while the variable condenser, dial, and shafts are in the center of the chassis.

These receivers use a superheterodyne circuit which employs five glass tubes with octal bases. The intermediate frequency is 456 KC. The tuning range of this chassis includes, in addition to the standard broadcast band, the two police radio bands. The 2500 KC. police band can be tuned in around 1600 KC. on the broadcast dial with the range switch in the short-wave position (counter clockwise).

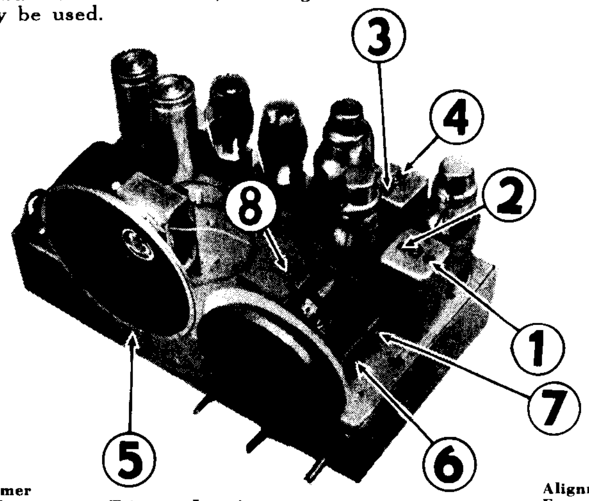
The volume control is double acting. It simultaneously changes the antenna signal input and the I. F. stage bias. Because of the sensitivity of this receiver, and due to the fact that it does not have A. V. C., it requires an antenna that is shorter than usual. The short antenna is particularly necessary where interference from powerful local stations is encountered, and where difficulty is experienced in properly controlling the volume.

When tuning on the short wave band, local broadcast stations can be heard in the background at their regular positions on the dial. This is a normal condition, and is due to the tapped coil method of tuning the antenna coil secondary to the short wave band. No aligning adjustments are required on the short wave band.

A wave trap is connected across the primary of the antenna coil to reduce code interference from stations with a frequency near 456 KC.

ALIGNING EQUIPMENT

For proper alignment of this receiver, an output meter and a high grade modulated service oscillator are essential. The oscillator should be capable of generating the frequencies of 456 KC., 600 KC. and 1400 KC. The test oscillator calibration should be checked, using broadcast station signals as standards. For trimmer adjustment, it is advisable to use an all bakelite screwdriver, although one with a small metal tip may be used.



Trimmer Number	Trimmer Location	Alignment Frequency
1, 2, 3, 4	I.F. Trimmers	456 KC.
5	Wave trap trimmer	456 KC.
6	Oscillator shunt trimmer	1400 KC.
7	Antenna trimmer	1400 KC.
8	Oscillator padding trimmer	600 KC.

ALIGNING THE I.F. CIRCUIT

1. (a) Connect the output meter in series with a .25 mfd. condenser between the plate of the 6K6G tube and ground, or across the voice coil, depending on the type of meter.

(b) Turn the volume control to the maximum volume position. (Note: The volume control should be kept in this position throughout the entire alignment procedure.) Ground the antenna lead to the chassis.

(c) Turn the range switch to the right (clockwise) to the broadcast position.

(d) Adjust the test oscillator to exactly 456 KC. and connect its output in series with a .1 mfd. condenser to the control grid of the 6K7G first detector tube and the chassis.

(e) Align I. F. trimmers No. 1, 2, 3 and 4 for maximu output as indicated on the output meter. No inward or side ward pressure should be applied to the alignment tool, or the condenser may spring back to a different setting as soon as the tool is removed.

(f) Repeat all I. F. trimmer adjustments since the changing of each trimmer may affect the others.

456 KC. WAVE TRAP ADJUSTMENT

2. (a) Disconnect the antenna lead from ground.

(b) Connect the test oscillator output in series with a .00025 mfd. condenser to the antenna lead, and connect the test oscillator ground lead to the receiver chassis. Ground the chassis.

(c) Without changing the test oscillator from the frequency setting used in aligning the I. F. stage, adjust trimmer No. 5 for **MINIMUM** output. Increase the test oscillator output as a minimum is reached, in order to obtain a clearly defined setting of the trimmer. NOTE: If code interference transmitted on a frequency slightly different than 456 KC. is troublesome, the wave trap should be adjusted for **MINIMUM** output with the test oscillator set to the same frequency as the signal that is causing interference.

DIAL CALIBRATION

3. (a) The dial pointer should indicate 530 KC. with the gang condenser in full mesh.

(b) Adjust the test oscillator to exactly 1400 KC.

(c) Tune in a broadcast station with a known frequency of about 1300 to 1400 KC. to determine whether the dial calibration is correct at the high frequency end of the dial. If no such station can be heard, tune in the 1400 KC. oscillator signal to check calibration.

(d) If the calibration is correct, do not adjust trimmer No. 6 (oscillator shunt trimmer). If the calibration is not correct, adjust trimmer No. 6 to give proper calibration at the high frequency end of the dial.

ALIGNMENT

4. (a) With the test oscillator set at 1400 KC. tune the receiver to the signal for maximum output.

(b) Adjust trimmer No. 7 for maximum output. Do not touch trimmer No. 6 as this will change the calibration.

(c) Adjust the test oscillator to exactly 600 KC. and tune the receiver to the signal. Adjust trimmer No. 8 for maximum output. Then try to increase the output by detuning the trimmer and retuning the receiver dial. If this reduces the output, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the dial until a maximum output meter deflection is secured. This operation is commonly known as "rocking." The object of this adjustment is to find the combination of trimmer adjustment and tuning condenser position which gives the maximum output. This adjustment should not be changed regardless of whether the dial reads exactly 600 KC. or slightly off 600 KC. for maximum output.

(d) Check the adjustment of trimmers No. 6 and 7 at 1400 KC.

No trimmers are provided for alignment on the short wave band.

TUNING DRIVE AND DIAL PARTS

Part Number	Description	List Price
13923	Spring washer for drive shaft	$ .05
88106	Dial gasket	.01
89361	Dial frame and bracket assembly	.25
89365	Driven disc and bearing assembly	.36
89378	Drive disc and shaft assembly	.30
89386	Dial glass	.15
89400	Dial scale	.50
89453	Pointer and stud assembly	.05
89613	Escutcheon	.55

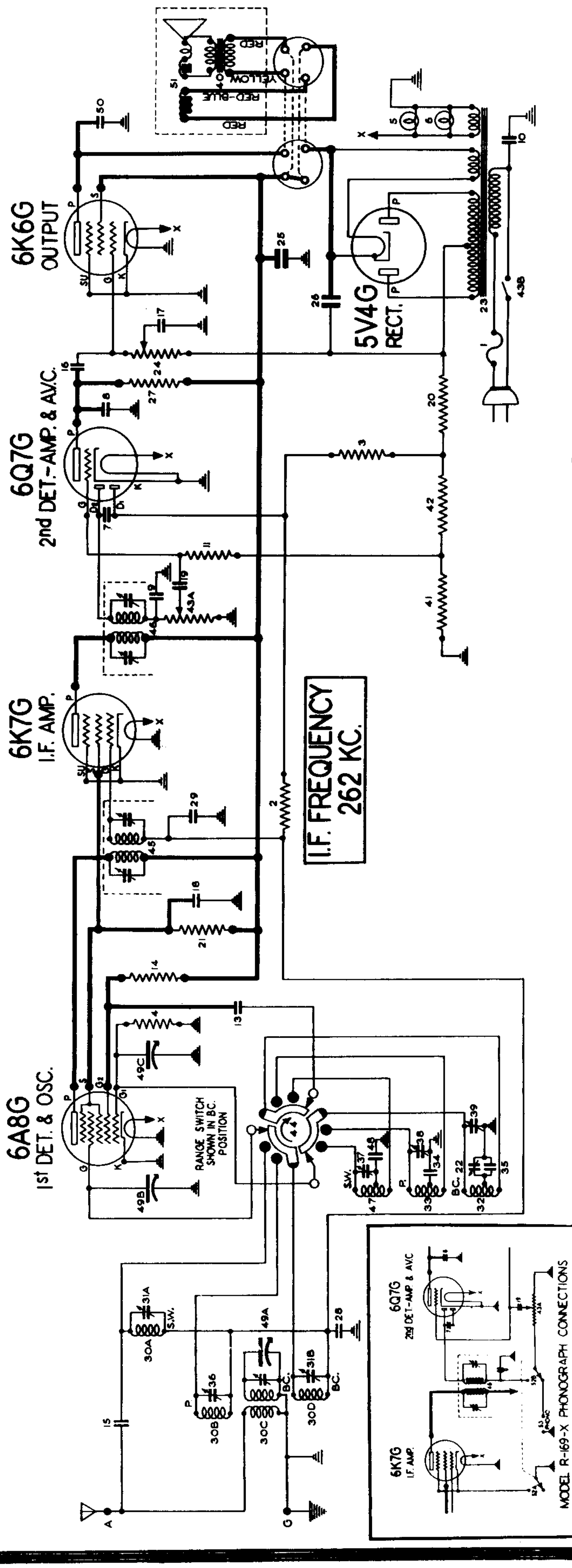
MISCELLANEOUS PARTS

Part Number	Description	List Price
67590	Flat steel washer	$0.01
83552	No. 10x⅞ S.H.H. screw	.03
84805	Felt washer for knob	.01
88056	Fuse mounting	.15
88057	Fuse cover	.08
88115	Knob (push on)	.20
88161	Tube shield section	.08
88164	Tube shield cap	.06
89363	Light bracket assembly	.16
89381	Bearing drive for dial shaft	.05
89627	No. 2 x ¼ oval head wood screw	.01

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

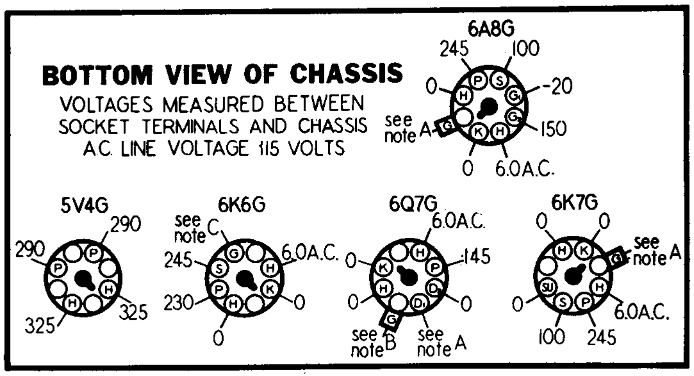
STEWART-WARNER CORPORATION

MODELS R-169 & 1691 TO 1695



SOCKET VOLTAGES

VOLUME CONTROL ON FULL — ANTENNA GROUNDED
RANGE SWITCH SET ON BROADCAST POSITION — DIAL TUNED TO 530 KC.



IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The grid bias for the 6A8G, 6K7G, and the anode voltage of the A.V.C. section of the 6Q7G is —3 volts measured across resistors 11 and 42.

NOTE B: The grid bias for the audio section of the 6Q7G is —2 volts measured across resistor 41.

NOTE C: The grid bias for the 6K6G output tube is —18 volts measured across resistors 41, 42 and 20.

Diagram Number	Part Number	Description	List Price
1	38841	Fuse—1 ampere	$0.10
2-3	83072	510,000 ohm 1/4 watt carbon resistor	.12
4	83080	51,000 ohm 1/4 watt carbon resistor	.12
5-6	83278	Dial lamps	.15
7-8	83539	260 mmfd. Mica condenser	.20
9	83783	110 mmfd. Mica condenser	.20
10	83976	.012 mfd.—1000 volt shielded condenser	.40
11	84235	1.1 megohm 1/4 watt carbon resistor	.12
13	85061	51 mmfd. Mica condenser	.15
14	85442	21,000 ohm 1/2 watt carbon resistor	.15
15	85454	11 mmfd. Mica condenser	.15
16	88026	.02 mfd. 400 volt paper condenser	.25
17	88030	.01 mfd. 400 volt paper condenser	.25
18	88046	.1 mfd. 150 volt paper condenser	.25
19	88189	.05 mfd. 200 volt paper condenser	.25
20	88462	270 ohm 1 watt wire wound resistor	.15
21	88464	26,000 ohm 1 watt carbon resistor	.15
22	88478	Variable padding condenser	.38
23	88481	Power transformer (115 volt, 50-60 cy.)	5.00
24	88488	Tone control—500,000 ohm	.80
49A to C	88493	Gang Condenser	5.40
25	88511	16 mfd. 300 volt electrolytic condenser	1.10
26	88512	16 mfd. 400 volt electrolytic condenser	1.10
27	88532	210,000 ohm 1/4 watt carbon resistor	.12
28, 29	88534	.05 mfd. 150 volt condenser (low loss)	.25
40	88633	Output transformer for R-267-A spkr.	1.75
30A to D	88648	Antenna & preselector coil assembly	2.30
31A-31B	88654	Dual trimmer condenser	.30
32	88660	Oscillator coil (Broadcast)	.60
33	88665	Oscillator coil (Police)	.58
34	88681	.00255 mfd. Mica condenser	$0.30
35	88686	200 mmfd. Mica condenser	.14
36-37 38-39	88688	Trimmer condenser	.12
40	88912	Output transformer for R-247-A spkr.	2.00
40	88633	Output transformer for R-267-A spkr.	1.75
41	88920	35 ohm 1/2 watt wire wound resistor	.12
42	89116	20 ohm 1/2 watt wire wound resistor	.12
43A 43B	89606	Volume Control—250,000 ohm / A.C. Line Switch	1.20
44	89607	Range switch	1.25
45	89608	1st I.F. transformer	2.40
46	89609	2nd I.F. transformer	2.25
47	89615	Oscillator coil (short wave)	.75
48	89635	.00495 mfd. Mica condenser	.50
49A to C	88493	Gang condenser	5.40
	89658	262 KC. wave trap (spl. for service only)	1.50
50	89826	.004 mfd. 750 volt paper condenser	.24
51	R-247-A	8 inch dynamic speaker	9.00
51	R-267-A	6 inch dynamic speaker	7.50

MODEL R-169-X PARTS

52A & B	84404	Phonograph toggle switch	$1.10
1	88055	Fuse, 3/4 amp., used for line voltages of 200 to 240 volts	.12
23	89216	Power transformer (110-240 volts, 25-133 cycles)	11.50
53	89709	Phonograph terminal strip	.15

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STEWART-WARNER CORPORATION

MODELS R-169 & 1691 TO 1695

CALIBRATION AND ALIGNMENT

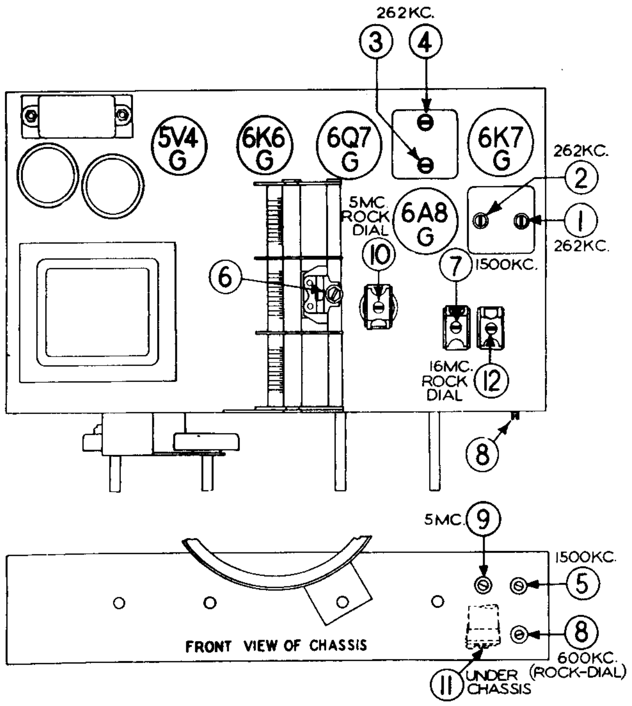
ALIGNING EQUIPMENT: For proper alignment, an output meter and an accurately calibrated oscillator with a tuning range from 262 KC. to 16 MC. are required.

Connect the output meter from the plate of the output tube to chassis. A convenient point to make the plate connection is to the yellow wire on the speaker socket.

ALIGNING THE I. F. AMPLIFIER: Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (fully clockwise).

Connect the test oscillator output leads to the 6A8 control grid and chassis with a .1 mfd. condenser in series with the oscillator output. Set the oscillator to exactly 262 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

Adjust the four I.F. trimmers, Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.



TRIMMER LOCATIONS

Trimmer Number		Alignment Frequency
1.	2nd I.F. transformer trimmer	262 KC.
2.	2nd I.F. transformer trimmer	262 KC.
3.	1st I.F. transformer trimmer	262 KC.
4.	1st I.F. transformer trimmer	262 KC.
5.	Broadcast oscillator shunt trimmer	1500 KC.
6.	Broadcast antenna shunt trimmer	1500 KC.
7.	Broadcast detector shunt trimmer	1500 KC.
8.	Broadcast oscillator series padder	600 KC.
9.	Police oscillator shunt trimmer	5 MC.
10.	Police antenna shunt trimmer	5 MC.
11.	Short wave oscillator shunt trimmer	16 MC.
12.	Short wave antenna shunt trimmer	16 MC.

BROADCAST BAND CALIBRATION AND ALIGNMENT

With the gang condenser in full mesh, the dial pointer should be on the white horizontal line below 530 KC. on the dial scale. If it does not, hold the dial gear and turn the pointer to the correct position.

Turn the range switch to the extreme clockwise position and connect the test oscillator output to the A and G terminals of the receiver with a 400 ohm carbon resistor in series with the A terminal and the oscillator output.

Adjust the test oscillator to exactly 1500 KC.

Tune in the 1500 KC. oscillator signal or a station above 1300 KC. on the dial and determine whether the dial calibration is correct at the high frequency end of the dial. If the calibration is correct, do not adjust the broadcast oscillator shunt trimmer No. 5. If the calibration is incorrect, adjust trimmer No. 5 to give proper calibration.

Carefully tune the receiver to the signal and adjust trimmers Nos. 6 and 7 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 8 for maximum output. Then try to increase the output meter reading by detuning No. 8 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though the dial may be slightly off calibration at 600 KC.

POLICE BAND CALIBRATION AND ALIGNMENT

Turn the range switch to the center position. Adjust the test oscillator to exactly 5.0 MC. Tune in the 5 MC. oscillator signal at or near 5 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 5 MC. If it is, do not adjust police band oscillator shunt trimmer No. 9. If the calibration is incorrect, set the dial pointer to 5 MC. on the dial, and adjust the oscillator shunt trimmer No. 9 until the oscillator signal comes in at this point. If there are two peaks, the proper one is that with the trimmer screw farthest out.

Carefully tune the receiver to the signal and adjust trimmer No. 10 for maximum output. Then try to increase the output by detuning No. 10 slightly and retuning the receiver dial. Continue detuning No. 10 and retuning the dial until the output meter deflection is a maximum.

SHORT WAVE BAND CALIBRATION AND ALIGNMENT

Turn the range switch to the extreme counter-clockwise position. Set the test oscillator to 16 MC. Tune in the 16 MC. oscillator signal at 16 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 16 MC. If it is, do not adjust the short wave band oscillator shunt trimmer No. 11. If the calibration is incorrect, set the receiver dial pointer exactly at 16 MC. and adjust the oscillator shunt trimmer No. 11 until the oscillator signal comes in at this point.

Check to see that it has been adjusted to the proper peak by tuning the receiver to approximately 15.5 MC. A repeat signal should be heard at this point. If none is present, even with greatly increased oscillator output, retune the receiver to 16 MC. and adjust trimmer No. 11 to the proper peak with the trimmer screw farther **out.**

Carefully tune the receiver to the signal and adjust trimmer No. 12 to a peak. Then try to increase the output by detuning the trimmer slightly and retuning the dial until a maximum output meter deflection is secured. Check the adjustment by tuning the receiver to the image at about 15.5 MC. The image should be much weaker than the 16 MC. signal. If the signal at 15.5 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 12 is not set to the proper peak. Turn the trimmer in a turn or so, then readjust as above.

TUNING DRIVE AND DIAL PARTS

Part Number	Description	List Price
88564	Pointer and stud assembly	$0.12
88743	Dial drive shaft	.15
88744	Dial drive shaft retainer spring	.05
88745	Dial ring and bracket assembly (for edge lighting)	.90
88748	Dial disc and bushing assembly	.30
88956	Escutcheon with glass	1.65
89283	Dial lamp socket	.10
89284	Dial lamp shield	.02
89285	Dial background	.12
89600	Dial scale	1.90
89799	Dial scale retaining clip	.02

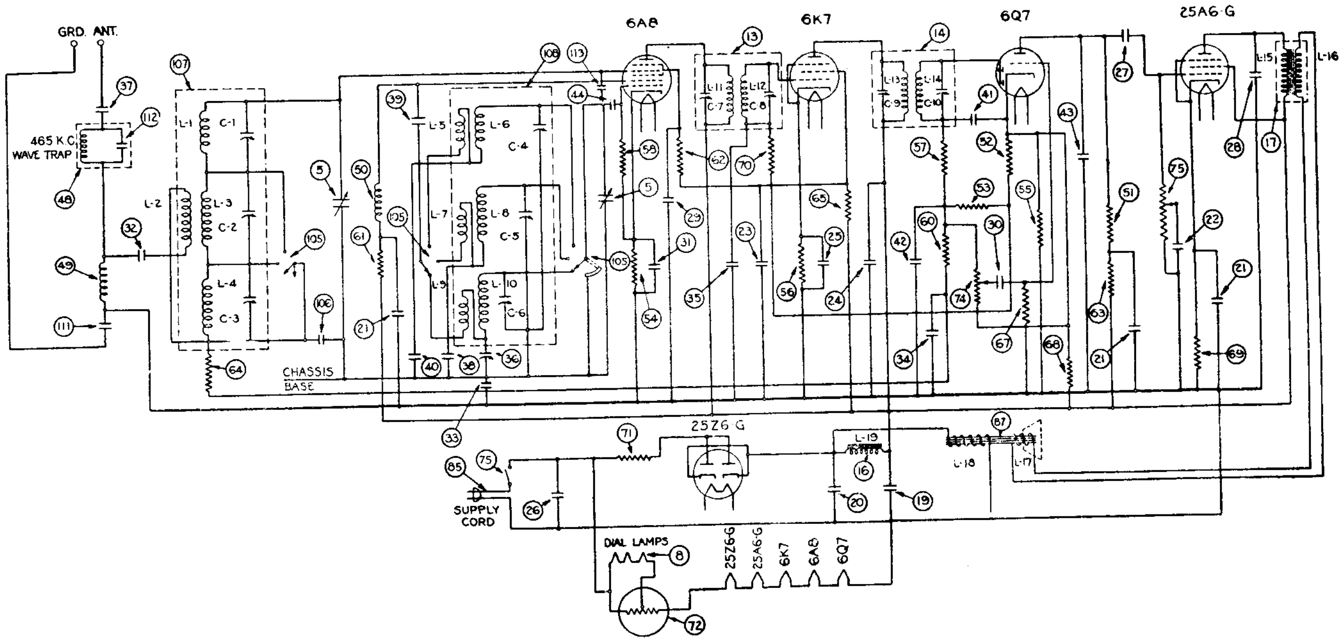
MISCELLANEOUS PARTS

Part Number	Description	List Price
67032	Felt washer for back of knob—per C	$0.35
67568	Embossed washer for 88512 electrolytic condenser	.05
67590	Flat steel mounting washer	.01
84428	Rubber mounting bushing for chassis	.03
84493	No. 10 x 1¼ chassis mounting screw	.02
84805	Felt washer (used with mounting screw)	.01
84981	Tube shield (plain section)	.08
84982	Tube shield (slotted section)	.08
84983	Spring ring for tube shields	.03
85785	Terminal strip (antenna and ground)	.15
88056	Fuse mounting strip	.08
88057	Fuse cover	.08
88631	Speaker cable plug	.06
88675	Speaker socket	.15
88822	Speaker mounting screw for 1691A (ornamental head)	.02
88958	No. 2 x ⅜ R.H.W. escutcheon screw	.01
88983	Knob (for tone, tuning and volume control)	.15
88984	Knob (for range switch)	.20

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODEL 225 A.C.-D.C. SET



I.F. 456 K.C.

REPLACEMENT PARTS

Item Number	Piece Number	Part
2	25998	Bracket Assembly
5	26057	Gang Tuning Capacitor Assembly
6	27289	Dial Assembly
8	26287	Dial Lamp
13	26121	1st I. F. Transformer
14	25506	2nd I. F. Transformer
16	26133	Choke Assembly (Filter of Rectifier)
17	26135	Transformer, Audio Output
19	26162	Electrolytic Capacitor, 25 Mf.
20	27014	Electrolytic Capacitor, 40 Mf.
21	26164	Electrolytic Capacitor Assembly, 4 Mf., 150 Volts; 4 Mf., 150 Volts; 12 Mf., 25 Volts
22	26151	Capacitor Assembly, .005 Mf.
23	25483	Capacitor Assembly, .1 Mf.
24	25483	Capacitor Assembly, .1 Mf.
25	25483	Capacitor Assembly, .1 Mf.
26	25150	Capacitor Assembly, .02 Mf.
27	25150	Capacitor Assembly, .02 Mf.
28	25150	Capacitor Assembly, .02 Mf.
29	25150	Capacitor Assembly, .02 Mf.
30	25150	Capacitor Assembly, .02 Mf.
31	25150	Capacitor Assembly, .02 Mf.
32	25150	Capacitor Assembly, .02 Mf.
33	25389	Capacitor Assembly, .2 Mf.
34	24405	Capacitor Assembly, .04 Mf.
35	24405	Capacitor Assembly, .04 Mf.
36	26747	Capacitor, Oscillator Series Aligner
37	26778	Capacitor, Type "W", .005 Mf.
38	26727	Capacitor, Type "W", .001 Mf.
39	25487	Capacitor, Type "W", .001 Mf.
40	25489	Capacitor, Type "W", .00125 Mf.
41	25504	Capacitor, Type "2", 100 Mmf.
42	25504	Capacitor, Type "2", 100 Mmf.
43	25504	Capacitor, Type "2", 100 Mmf.
44	24559	Capacitor, Type "O", 100 Mmf.
48	25513	Coil Assembly, Wave Trap
49	25814	Coil Assembly, R. F. Choke, 5 Millihenrys
50	25814	Coil Assembly, R. F. Choke, 5 Millihenrys
51	26362	Resistor, Type "E", .27 Megohm
52	26362	Resistor, Type "E", .27 Megohm
53	26362	Resistor, Type "E". .27 Megohm

Item Number	Piece Number	Part
54	26326	Resistor, Type "E", 270 Ohms
55	26327	Resistor, Type "E", 330 Ohms
56	26327	Resistor, Type "E", 330 Ohms
57	26353	Resistor, Type "E", 47,000 Ohms
58	26353	Resistor, Type "E", 47,000 Ohms
60	26369	Resistor, Type "E", 1 Megohm
61	26345	Resistor, Type "E", 10,000 Ohms
62	26345	Resistor, Type "E", 10,000 Ohms
63	26345	Resistor, Type "E", 10,000 Ohms
64	26357	Resistor, Type "E", .1 Megohm
65	26333	Resistor, Type "E", 1,000 Ohms
67	26373	Resistor, Type "E", 2.2 Megohms
68	26408	Resistor, Type "C", 27,000 Ohms
69	26330	Resistor, Type "E", 560 Ohms
70	26365	Resistor, Type "E", .47 Megohm
71	25911	Resistor, Type "B", 50 Ohms
72	27287	Resistor (Tube Type), 120 Plus 108 Ohms, Voltage Divider
74	26114	Potentiometer (Volume Control)
75	27311	Potentiometer (Off-On-Switch and Tone Control)
77	25539	Tube Socket, 8 Prong
85	24268	Cord, Power Supply
87	26053	Speaker Assembly
105	26172	Range Switch
106	25488	Capacitor, .002 Mf.
107	26113	Coil Assembly, Antenna
108	26157	Coil Assembly, Oscillator
109	27310	Dial Lamp Socket Assembly
111	25149	Capacitor Assembly, .01 Mf
112	25488	Capacitor, .002 Mf.
113	26417	Capacitor (Gimmick)

MISCELLANEOUS PARTS

Piece Number	Part
26096	Cone Assembly (For P-26053 Speaker)
26296	Knob (Used on Volume, "Off-on-Tone" and Station Selector Controls) 3 Required for Each Receiver
27351	Knob (For Range Switch) 1 Required

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODEL 225 A.C.-D.C. SET

ELECTRICAL SPECIFICATIONS

Type of Circuit.................. Superheterodyne
Tuning Ranges.................. A—540 to 1500 Kc.; B—1450 to 3500 Kc.; C—5600 to 18,000 Kc.
Number and Types of Tubes.................. 1 No. 6A8, 1 No. 6K7, 1 No. 6Q7, 1 No. 25A6-G, 1 No. 25Z6-G
Voltage Rating.................. 105 to 125 Volts
Power Frequency (For AC Operation).................. 50-60 Cycles
Input Power Rating.................. 50 Watts
Intermediate Frequency.................. 465 Kilocycles

APPARATUS SPECIFICATIONS

No. 225 Receiver.......... 50 to 60 Cycles (For AC Operation).......... P-27285 Chassis Assembly

CIRCUIT DESCRIPTION

This triple range, superheterodyne receiver has five tubes and may be operated on a power supply circuit of either alternating or direct current at the voltages and frequency (for A. C. operation) specified above.

The various tubes are used in this receiver as follows: One No. 6A8 tube functions as both Oscillator and Modulator; one No. 6K7 tube is used in the I. F. Amplifier; the No. 6Q7 tube is used as the Demodulator, A. V. C., and Audio Amplifier tube. The No. 25A6-G tube is used in the Audio Power Output stage, and the No. 25Z6-G tube is used as the Rectifier tube for the receiver "B" voltage supply. In addition to these tubes a voltage divider resistance tube of the plug-in type is used.

NORMAL VOLTAGE READINGS

These voltage readings are obtained by measuring between the various tube socket contacts and the heavy bus wire with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. The heavy bus wire, which is the negative side of the grid and plate voltages, is plainly marked on the schematic and wiring diagram shown on pages three and five. Figure 1 shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, A. C. Allowance should be made for the difference when the line voltage is higher or lower.

IMPORTANT—If the receiver is operated from a direct current power supply circuit, the various voltages measured will be slightly lower than those listed in the table for A. C. operation. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

When the receiver is being operated from an alternating current power supply circuit, it will be necessary to have a high resistance A. C. voltmeter for checking the A. C. voltages.

Tube	Circuit	Cap	Terminals of Sockets								Heater Voltages Between Heater Terminals	
			1	2	3	4	5	6	7	8	Socket Terminal Numbers	Volts
6A8	Mod.—Osc.	0	0	*13*	+97	+65	—7	+59	*6*	+1.5	2–7	*6.4*
6K7	I. F. Amp.	0	0	*12.8*	+94	+85	+2.5	—	*19*	+2.5	2–7	*6.4*
6Q7	Dem.—A.V.C.—Audio	0	0	0	+40	0	0	—	*6*	+1	2–7	*6*
25A6-G	Audio Output	—	0	*45*	+93	+99	0	—	*19*	+14	2–7	*26*
25Z6-G	Rectifier	—	0	*73*	*115*	+105	*115*	—	*47*	+105	2–7	*26*
Resistor	Voltage Divider	—	—	—	*73*	*120*	—	—	*120*	*107*		
Voltage across pilot lamps—*13* volts												

A. C. voltages are indicated by italics; when the receiver is operated from a D. C. power supply, D. C. voltages will be obtained in place of the A. C. voltages.
Receiver tuned to 1000 kc., no signal.

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers and ordinarily no re-adjustments are necessary. However, should it become necessary to make any readjustments, this alignment procedure should be carefully followed.

In making any alignment adjustments always adjust the signal generator's output to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal.

Figure 1 shows the location of all the aligning capacitors used in this receiver. In making any alignment adjustments on this receiver it will not be necessary to remove the chassis from the cabinet. The aligning capacitors for the intermediate circuits of the receiver are easily accessible from the rear of the receiver, and the aligning capacitors for the radio frequency circuits are easily accessible through the apertures located in the bottom of the cabinet (see Figure 2). To reach these aligning capacitors for the radio frequency circuits, simply turn the receiver cabinet upside-down. When making any alignment adjustments on this receiver, it is recommended that the Stromberg-Carlson, P-24608 Insulated Screwdriver be used in order to obtain accurate adjustments.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 465 kilocycles. In making these I. F. circuit adjustments always align in the following order:

1. Secondary of 2nd I. F. Transformer (Capacitor C-10).
2. Primary of 2nd I. F. Transformer (Capacitor C-9).
3. Secondary of 1st I. F. Transformer (Capacitor C-8).
4. Primary of 1st I. F. Transformer (Capacitor C-7).

Radio Frequency Adjustments

The adjustments of the aligning capacitors used in the radio frequency circuits in this receiver should be very carefully made in the following order and at the frequencies specified below:

1. Oscillator's "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-4).
2. Antenna "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-1).
3. Oscillator's "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-5).
4. Antenna "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-2).
5. Oscillator's "A" Band Shunt Aligner at 1400 Kilocycles (Capacitor C-6).
6. Antenna "A" Band Shunt Aligner at 1400 Kilocycles (Capacitor C-3).
7. Oscillator's "A" Band Series Aligner at 600 Kilocycles (Capacitor (36)).
8. Oscillator's "A" Band Shunt Aligner at 1400 Kilocycles (Capacitor C-6).
9. Antenna "A" Band Shunt Aligner at 1400 Kilocycles (Capacitor C-3).

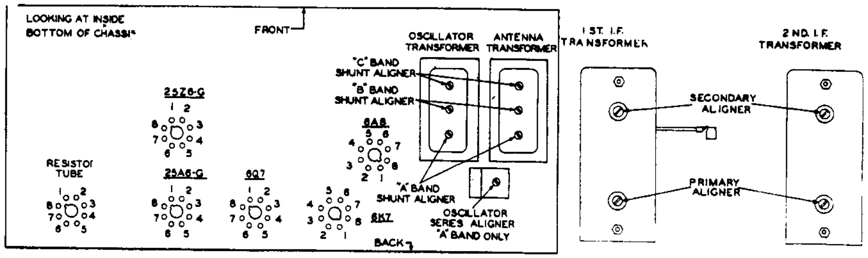


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

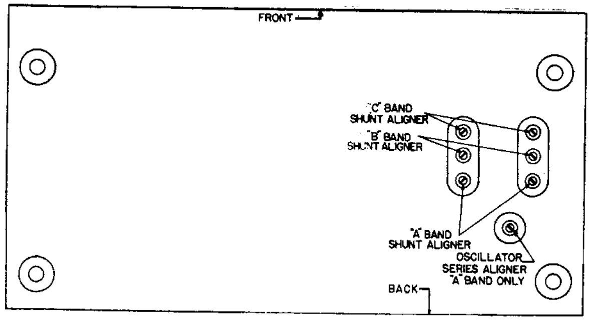


Fig. 2. Bottom View of Cabinet Showing Adjusting Screws for R. F. Aligning Capacitors.

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODEL 225 A.C.-D.C. SET

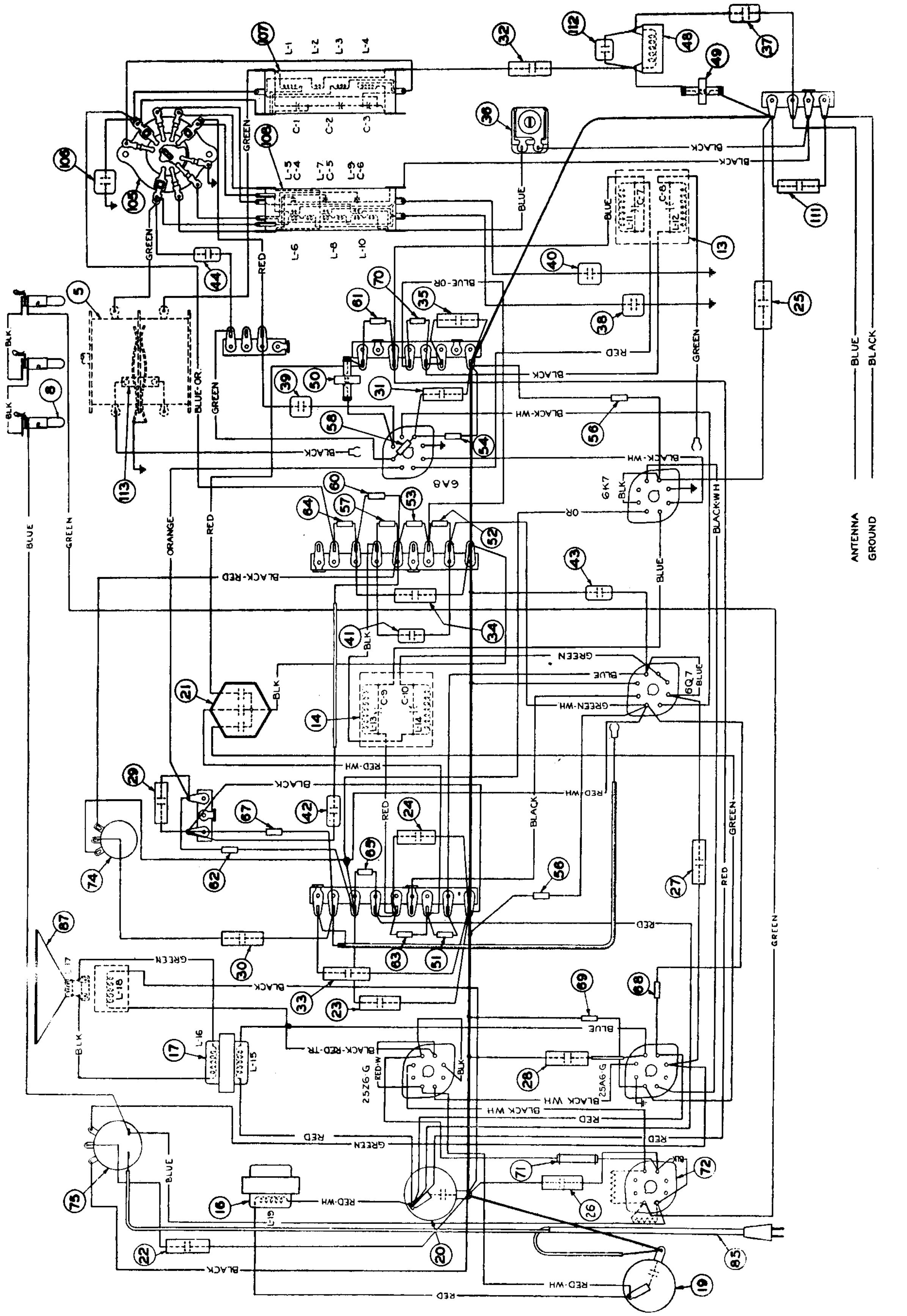


Fig. 4. Chassis Assembly.

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODEL 225 A.C.-D.C. SET

Continuity Test Chart For #225 Receivers.

1. Test for power supply cord. From power plug terminals to negative bus wire on chassis, one terminal should read "O", the other terminal should read "S".

2. After making test of power supply cord, connect a jumper wire from negative bus wire on chassis to chassis base and short terminals on power cord plug together for all other tests.

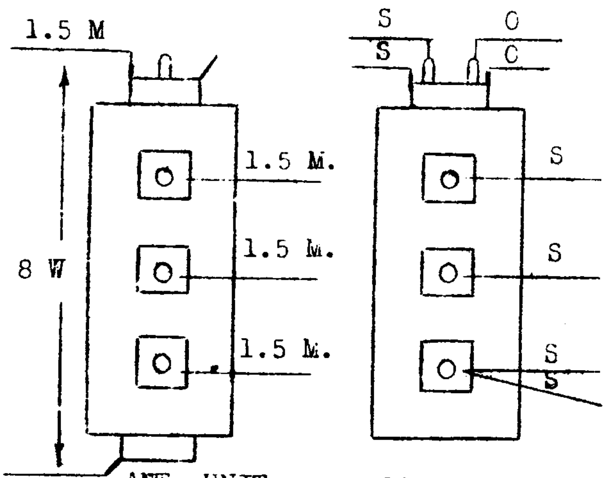
Tube	CIRCUIT	CAP.	TERMINALS OF SOCKETS							
			1	2	3	4	5	6	7	8
6-A-8	MOD. & OSC.	1.7 M.	S	0	2000^W	12,000^W	50,000^W	11,000^W	0	270
6-K-7	I.F. AMP.	700,000^W	S	0	1800^W	2800^W	300^W	0	0	300^W
6-Q-7	DEM. A.V.C. AUDIO	2 M.	S	S	300,000^W	460,000^W	460,000^W	300,000^W	0	300^W
25-A6-G	AUDIO OUTPUT		0	0	2000^W	2000^W	0	0	0	600^W
25-Z-6-G	RECTIFIER		0	0	50^W	1500^W	50^W	0	0	1500^W
Res. Tube	HEATER		0	0	0	S	0	0	*	0

Other Tests Not Shown On Chart
.005 Capacitor (Green-Black-Red) on wave trap to chassis base should read 90^W

Ant. Terminal to chassis base "O"
Grd. Terminal to chassis base "O"
Vol. Control Arm (Center terminal) Clockwise 400,000^W
Vol. Control Arm (Center terminal) Counter Clockwise "S"

NOTES:
Terminals 4 & 6 on Rectifier Socket should be read with line switch closed.

x Terminal 7 on Res. Tube should read "S" with line sw. closed. "O" with line sw. open.



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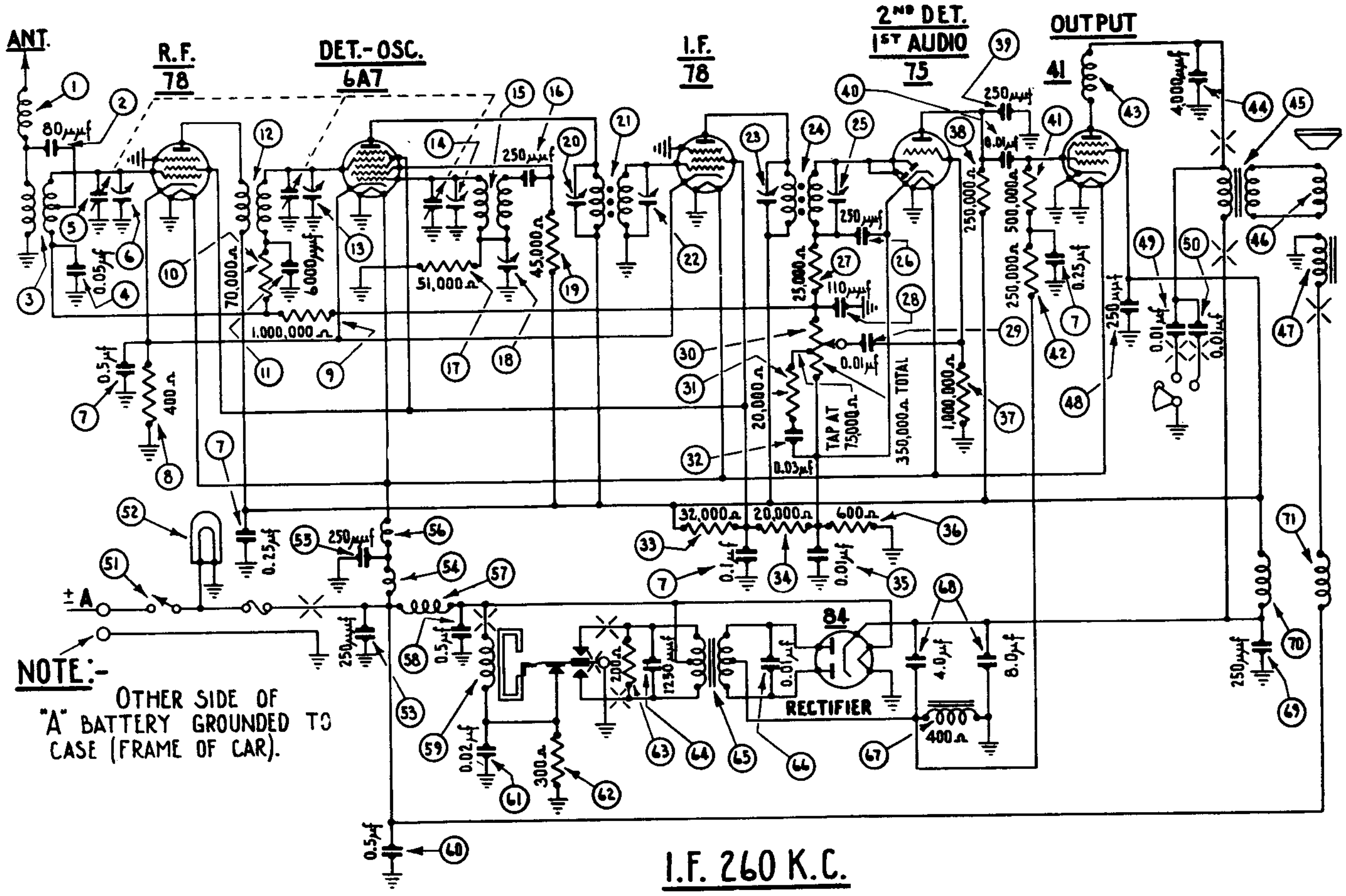
TRANSITONE AUTOMOBILE RADIO CORP.

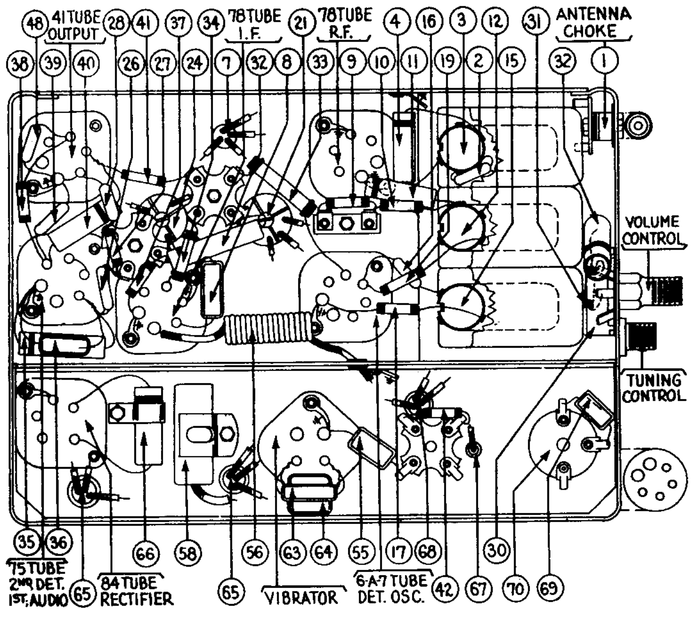
MODEL LT14X3 "LINCOLN"



I.F. 260 K.C.

MODEL LT14X3 PARTS LIST

No.	Description	Part No.
1	Antenna Choke	38-7210
2	Condenser (80 mmfd.)	30-1066
3	Antenna Transformer	32-1975
4	Condenser (.05 mfd.)	30-4444
5	Tuning Condenser	31-1674
6	First Padder (on tun. cond.)	
7	Condenser (.1-.25-.25-.5 mfd.	30-4374
8	Resistor (400 ohms)	33-1211
9	Resistor (1,000,000 ohms)	33-510344
10	Resistor (70,000 ohms)	33-370334
11	Condenser (6000 mmfd.)	30-4445
12	R. F. Transformer	32-1926
13	Second Padder (on tun. cond).	
14	Third Padder (on tun. cond.)	
15	Oscillator Transformer	32-1927
16	Condenser (250 mmfd.)	30-1032
17	Resistor (51,000 ohms)	33-351344
18	Low Frequency Padder	31-6056
19	Resistor (45,000 ohms)	33-345344
20	Padder (Pri. 1st I.F. transf.)	
21	First I. F. Transformer	32-1928
22	Padder (Sec. 1st I. F. Transf.)	
23	Padder (Pri. 2nd I. F. Transf.)	
24	Second I. F. Transformer	32-1929
25	Padder (Sec. 2nd I. F. transf.)	
26	Condenser (250 mfd.)	30-1032
27	Resistor (25,000 ohms)	33-325344
28	Condenser (110 mmfd.)	30-1031
29	Condenser (.01 mfd.)	30-4124
30	Volume Control (350,000 ohms)	33-5139
31	Resistor (20,000 ohms)	33-320334
32	Condenser (.03 mfd.)	30-4449
33	Resistor (32,000 ohms)	33-332434
34	Resistor (20,000 ohms)	33-320334
35	Condenser (.01 mfd.)	30-4124
36	Resistor (600 ohms)	33-1212
37	Resistor (1,000,000 ohms)	33-510344
38	Resistor (250,000 ohms)	33-424344
39	Condenser (250 mmfd.)	30-1032
40	Condenser (.01 mfd.)	30-4145
41	Resistor (500,000 ohms)	33-449344
42	Resistor (250,000 ohms)	33-424344
43	Choke	32-1382
44	Condenser (4000 mmfd.)	30-4185
45	Output Transformer	2598
46	Cone and Voice Coil	36-3159
47	Field Coil Assembly	02795
48	Condenser (250 mmfd.)	30-1032
49	Condenser (.01 mfd.)	30-4051
50	Condenser (.01 mfd.)	30-4051
51	On and Off Switch	42-5423
52	Pilot Lamp	34-2039
53	Condenser (250 mmfd.)	30-1032
54	"A" Choke	32-1644
55	Condenser (250 mmfd.)	30-1032
56	Filament Choke	32-1930
57	Vibrator Choke	32-1933
58	Condenser (.5 mfd.)	30-4047
59	Vibrator	38-5036
60	Condenser (.5 mfd.)	30-4047
61	Condenser (.02 mfd.)	30-4039
62	Resistor (300 ohms)	33-3130
63	Resistor (200 ohms)	33-1210
64	Condenser (1250 mmfd.)	5886
65	Power Transformer	32-7488
66	Condenser (.01 mfd.)	30-4381
67	"B" Filter Choke	32-7491
68	Condenser (4-8 mfd.)	38-7693
69	Condenser (250 mmfd.)	30-1032
70	"B" Choke	32-1932
71	"A" Choke	32-1464
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Tone Control Knob	27-4208
	Face Assembly	28-3786
	Glass	27-7757
	Glass Gasket	27-8206
	Tuning and Volume Shaft	28-8497
	Pointer	28-3505
	Pilot Lamp Assembly	38-7217
	Antenna Shielded Loom	L-1963
	Fuse Lead	38-6595
	Interference Condenser	30-4007
	Interference Condenser	30-4381



No.	Description	Part No.	No.	Description	Part No.
	Interference Condenser	30-4307		Wing Nut (control mtg.)	W-1321
	Interference Condenser	30-4387		Screw (Rec. mtg.)	W-1614
	Interference Condenser	30-4404		Plate (Rec. mtg.)	29-3734
	Fuse	7227		Stud (Speaker mtg.)	28-6037
	Fuse Insulator	27-7729		Washer (Speaker mtg.)	4486
	Clamp (control mtg.)	29-2699		Nut (Speaker mtg.)	W-55A

TRANSITONE AUTOMOBILE RADIO CORP.
MODEL FT6 "FORD"

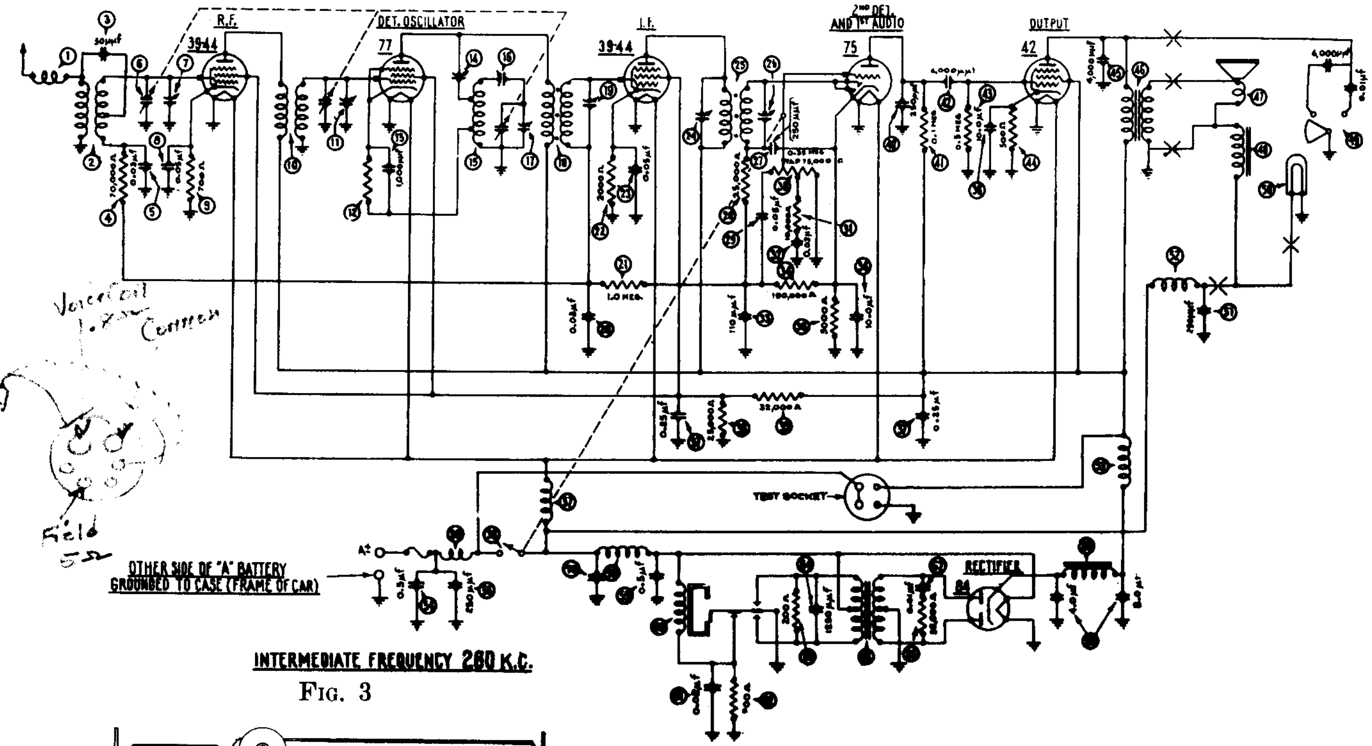


FIG. 3

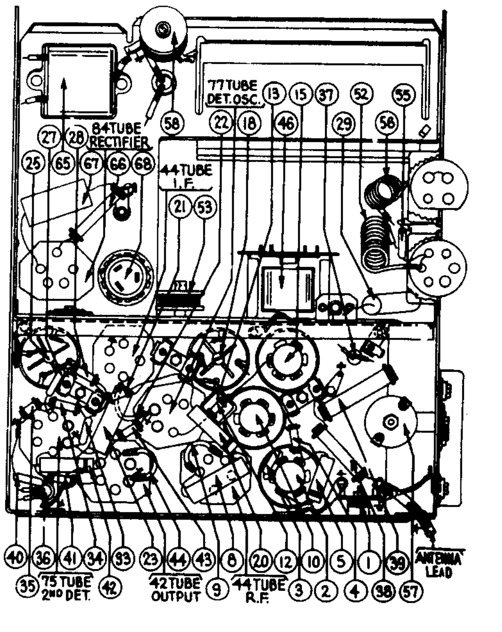


FIG. 4

With the tuning condenser in this position, adjust the high-frequency padder (17) until the maximum reading is obtained in the output meter. This is the true setting for 1580 K.C., 158 on the dial scale. Adjust condensers (11) and (7) in the same manner.

Remove the paper and turn the tuning condenser plates in mesh to approximately 60 on the scale, and adjust the signal generator to 600 K.C. Roll the tuning condenser and adjust the series padder (16) for the maximum meter reading.

Readjust the padder (17) at 1580 K.C.

Tune the gang to 1400 K.C. and adjust padders (11) and (7) to maximum.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the receiver will be adjusted properly.

MODEL FT-6 PARTS LIST

No. Shown on Schematic	Description	Part No.	No. Shown on Schematic	Description	Part No.
1	Antenna Choke	32-1372	47	Cone and Voice Coil	02861
2	Antenna Transformer	32-1535	48	Field Coil Assembly	36-3097
3	Condenser (50 mmfd.)	30-1029	49	Tone Control	30-4243
4	Resistor (70,000 ohms)	33-1115	50	Pilot Lamp	34-2039
5	Condenser (.03 mfd.)	30-4025	51	Condenser (250 mmfd.)	30-1032
6	Tuning Condenser	31-1459	52	Choke	32-1374
7	1st Padder (on tun. cond.)		53	R. F. Choke	32-1078
8	Condenser (.05 mfd.)	30-4020	54	Condenser (.5 mfd.)	30-4018
9	Resistor (700 ohms)	6443	55	Condenser (250 mmfd.)	30-1032
10	R. F. Transformer	32-1536	56	"A" Choke	32-1374
11	2nd Padder (on tun. cond.)		57	"A" Choke	32-1368
12	Resistor (11,000 ohms)	33-1194	58	Vibrator Choke	32-1367
13	Condenser (1000 mmfd.)	30-1007	59	Condenser (.5 mfd.)	30-4227
14	Padder (Pri. 1st I. F. Trans.)		60	Vibrator	38-5036
15	Oscillator Transformer	32-1537	61	Condenser (.02 mfd.)	30-4039
16	3rd Padder (on tun. cond.)		62	Resistor (200 ohms)	7217
17	4th Padder (on tun. cond.)		63	Resistor (200 ohms)	7217
18	First I. F. Transformer	32-1329	64	Condenser (1250 mmfd.)	5886
19	Padder (Sec. 1st I. F. Trans.)		65	Power Transformer	32-7232
20	Condenser (.03 mfd.)	30-4025	66	Resistor (32,000 ohms)	3525
21	Resistor (1.0 meg.)	33-1096	67	Condenser (,01 mfd.)	30-4051
22	Resistor (2000 ohms)	33-3048	68	Filter Condenser (4-8 mfd.)	30-2030
23	Condenser (.05 mfd.)	30-4020	69	"B" Choke	32-7233
24	Padder (Pri. 2nd I. F. Trans.)		70	Condenser (110 mmfd.)	30-1031
25	Second I. F. Transformer	32-1237		4-prong Socket	27-6006
26	Padder (Sec. 2nd I. F. Trans.)			5-prong Socket	27-6014
27	Condenser (250 mmfd.)	30-1032		6-prong Socket	27-6020
28	Resistor (25,000 ohms)	33-1013		Spark Plug Resistor	33-1015
29	Condenser (.05 mfd.)	30-4020		Spark Plug Terminal	28-6179
30	Vol. Con. & Switch Assm.	33-5067		Interference Cond. (Gen.)	30-4181
31	Resistor (10,000 ohms)	33-1000		Interference Cond. (Dist.)	30-4176
32	Condenser (.03 mfd.)	30-4025		Face Assembly	42-5302
33	Condenser (110 mmfd.)	30-1031		Glass for Control	27-7757
34	Resistor (190,000 ohms)	33-1116		Knobs	27-4171
35	Resistor (5000 ohms)	6096		Pointer	28-2605
36	Condenser (10-10 mfd.)	30-2076		Flexible Shaft (Tuning)	28-8331
37	Condenser (.25-.25 mfd.)	30-4126		Flexible Shaft (Volume)	28-8332
38	Resistor (25,000 ohms)	3656		Ammeter Cable	38-5749
39	Resistor (32,000 ohms)	3525		Fuse	7227
40	Condenser (250 mmfd.)	30-1032		Fuse Insulator	27-7131
41	Resistor (.1 meg.)	6099		Antenna Lead	L1741
42	Condenser (6000 mmfd.)	30-4125		"T" Bolt (set mounting)	28-8161
43	Resistor (.5 meg.)	6097		Nut (set mounting)	W518A
44	Resistor (500 ohms)	33-3031		Speaker Cable	41-3125
45	Condenser (4000 mmfd.)	30-4185		Tow Strap	36-3432
46	Output Transformer	32-7347		"U" Clamp Control Mtg.	29-2699

TRANSITONE AUTOMOBILE RADIO CORP.

MODEL LT14X3 "LINCOLN"

I. F. Transformers and Padders
Model LT14X3

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Fig. 2).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

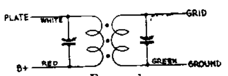


FIGURE 1

If replacements are ever necessary, replace the entire coil assembly, 32-1928 for the first I. F. stage and 32-1929 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

Model LT14X3 Adjustments

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments to the Model LT14X3 are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER. — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

The tone control should be turned to the brilliant position.

Remove the cover from the Receiver. The antenna lead must be disconnected.

I. F. — Adjust the signal generator to exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser.

Adjust the secondary screw padder (25) on the second I. F transformer for maximum reading on the output meter. Then adjust the primary screw padder (23) for maximum reading. (See Fig. 2 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser. Adjust the secondary screw padder (22) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (20) for maximum reading. (See Figure 2 for location of padders).

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube. Adjust the signal generator to 1600 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser.

Turn the tuning condenser plates out of mesh as far as they will go. With the tuning condenser in this position, adjust the high frequency padder (14) and the R. F. padder (13) until the maximum reading is obtained on the output meter. This is the true setting for 1600 K. C., 160 on the dial scale.

LOW FREQUENCY — Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and adjust the signal generator to 580 K. C. Roll the tuning condenser and adjust the low frequency padder (18) for maximum reading on the output meter.

HIGH FREQUENCY RE-ADJUSTMENT — Turn the tuning condenser plates out of mesh as far as they will go and adjust the signal generator to 1600 K. C. Then adjust the high frequency padder (14) again for maximum reading on the output meter.

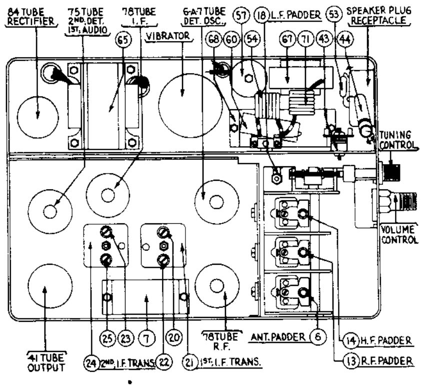


FIGURE 2

ANTENNA — Connect the generator lead to the antenna cable assembly (made up of Part No. L1963 loom, 1-27-7133 terminal and 64 inches of 16 strand No. 30 wire), using a 530 mmfd. condenser in series between the two leads. Plug the cable into the antenna socket.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders (13) and (6) for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator has been used, the Receiver will be adjusted properly.

MODEL FT6 "FORD"

The new Ford auto radio incorporates new advanced principles of circuit and tube design. A totally new idea in sound distribution and musical fidelity is built into a dynamic speaker located above the occupants' heads in the header-bar of the car. Other features of the set are two-unit construction with separate speaker, highly developed Automatic Volume Control, illuminated custom-built instrument panel control, mounting in the ash receptacle opening.

The Receiver is mounted directly above the steering column out of sight and out of the way.

I. F. TRANSFORMER AND PADDERS

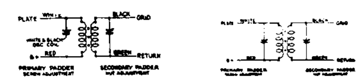
The padders are placed in the top of the shield can one above the other.

The I. F. transformers are assembled complete with padding condensers.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1329 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.



1st I. F. Transformer 32-1329

2nd I. F. Transformer 32-1237

FIG. 1

MODEL FT-6 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to re-adjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The PHILCO Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and set up for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the cover from the Receiver and disconnect the grid clip from the 77 tube. (For location see Fig. 2.)

Set up the signal generator and adjust it to exactly 260 K.C. Connect the generator lead to the grid cap of the 77 tube, and ground the shield to the Receiver housing.

Connect one lead from the output meter to the plate of the 42 tube and the other lead to the receiver housing. The Receiver volume control must be turned to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The primary screw padders (34) and (14) must be screwed all the way in. (Figs. 2 and 3.) The secondary nut padders (36) and (16) must then be adjusted. These padders should be adjusted for maximum reading on the output meter.

The screw padders (24) and (14) must be adjusted next.

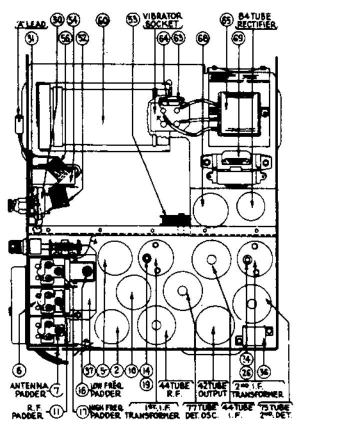


FIG. 2

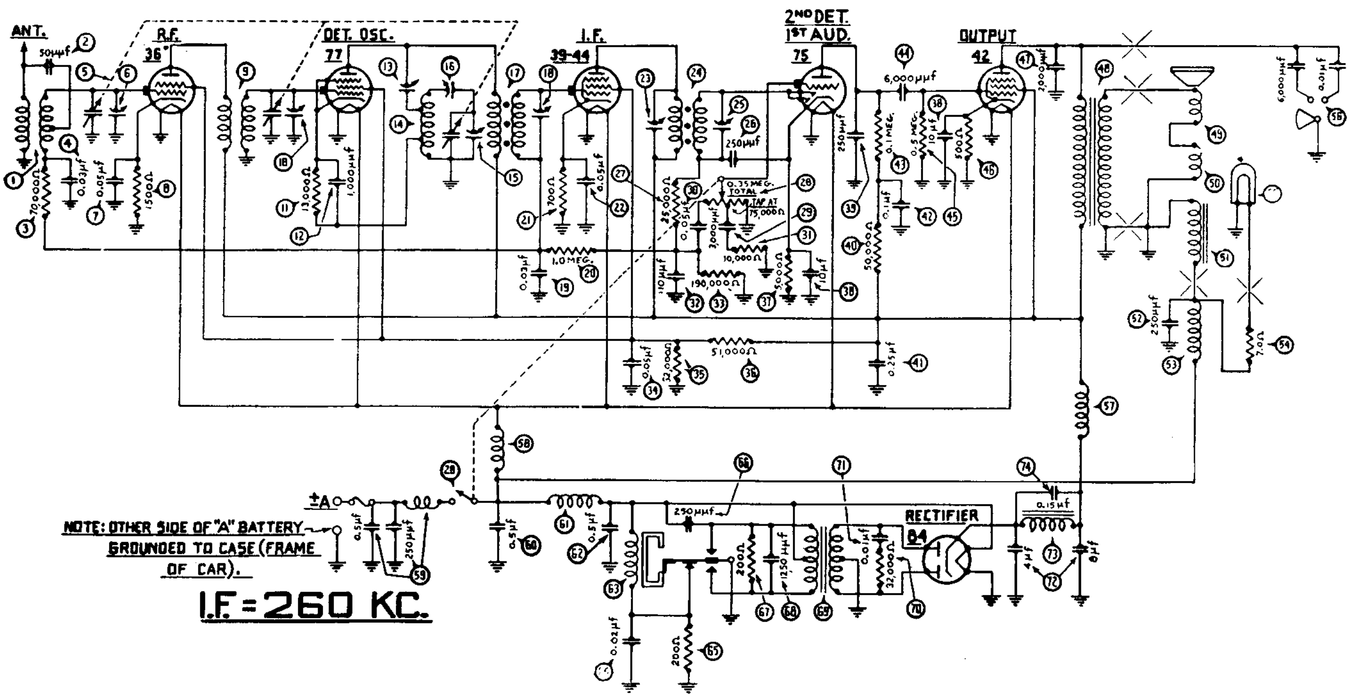
Adjust the screw on each padder for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable. Turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

After padding the I. F. stages, remove the generator lead from the 77 tube and reconnect the grid clip to the 77 tube. Adjust the generator to 1580 K.C. and then connect the generator lead to the antenna lead. Ground the shield to the receiver housing.

Using a piece of paper approximately .006 inch in thickness, place it under the heel of the tuning condenser between the stator and rotor plates and turn the tuning condenser until the rotor plates strike this paper.

TRANSITONE AUTOMOBILE RADIO CORP.

MODEL MT3 "PIERCE ARROW"



Pierce-Arrow Philco De Luxe Model MT-3 PARTS LIST

1. Antenna Transformer.....32-1535
2. Condenser (50 mmfd.)....30-1029
3. Resistor (70,000 ohms)....33-1115
4. Condenser (.03 mfd.)......30-4025
5. *Tuning Condenser........31-1419
6. 1st Padder (on tun. cond.).......
7. Condenser (.05 mfd.)......30-4020
8. Resistor (1500 ohms).....33-3047
9. R. F. Transformer........32-1536
10. 2nd Padder (on tun. cond.).......
11. Resistor (11,000 ohms)....33-1194
12. Condenser (1000 mmfd.)... 5215
13. Padder (Pri. 1st I. F. Tran.).......
14. Oscillator Transformer....32-1537
15. 3rd Padder (on tun. cond.).......
16. 4th Padder (on tun. cond.).......
17. 1st I. F. Transformer.....32-1538
18. Padder (Sec. 1st I. F. Tran.).......
19. Condenser (.03 mfd.)......30-4025
20. Resistor (1 meg.).........33-1171
21. Resistor (700 ohms)....... 6443
22. Condenser (.05 mfd.)......30-4020
23. Padder (Pri. 2nd I. F. Tran.)......
24. 2nd I. F. Transformer.....32-1449
25. Padder (Sec. 2nd I. F. Tran.)......
26. Condenser (250 mmfd.)....30-1032
27. Resistor (25,000 ohms)....33-1161
28. Vol. Con. & Switch Assm...38-6297
29. Condenser (3000 mmfd.)...30-4042
30. Condenser (.05 mfd.)......30-4020
31. Resistor (10,000 ohms)....33-1000
32. Condenser (110 mmfd.)....30-1031
33. Resistor (190,000 ohms)...33-1116
34. Condenser (.05 mfd.)......30-4020
35. Resistor (32,000 ohms).... 3525
36. Resistor (51,000 ohms).... 5868
37. Resistor (5000 ohms)......33-1155
38. Condenser (10-10 mfd.)....30-2106
39. Condenser (250 mmfd.)....30-1032
40. Resistor (50,000 ohms)....33-1163
41. Condenser (.25 mfd.)...... 04360
42. Condenser (.1 mfd.).......30-4170
43. Resistor (.1 meg.)......... 609(
44. Condenser (6000 mmfd.)...30-4125
45. Resistor (.5 meg.)......... 6097
46. Resistor (500 ohms).......33-3031
47. Condenser (2000 mmfd.)...30-4177
48. Output Transformer......32-7318
49. *Cone & Voice Coil.........45-2062
50. *Bucking Coil.............45-2066
51. *Field Coil...............45-2065
52. Condenser (250 mmfd.)....30-1032
53. Choke...................32-1374
54. Resistor (7 ohms)........33-3035
55. Pilot Lamp..............34-2040
56. Tone Control............30-4243
57. Choke...................32-1539
58. "A" Choke...............32-1282
59. Interference Filter.......32-1544
60. Condenser (.5 mfd.)......30-4210
61. Vibrator Choke...........32-1281
62. Condenser (.5 mfd.)......30-4047
63. Vibrator................38-5036
64. Condenser (.02 mfd.)......30-4039
65. Resistor (200 ohms)....... 7217
66. Condenser (250 mmfd.)....30-1032
67. Resistor (200 ohms)....... 7217
68. Condenser (1250 mmfd.)... 5886
69. Power Transformer.......32-7216
70. Resistor (32,000 ohms).... 3525
71. Condenser (.01 mfd.)......30-4051
72. Filter Cond. (4-8 mfd.)....30-2105
73. Filter Choke.............32-7215
74. Condenser (.15 mfd.)......30-4191
75. Antenna Choke...........32-1372

Spark Plug Resistor.......33-1015
Distributor Resistor....... 4851
Interference Condenser....30-4007

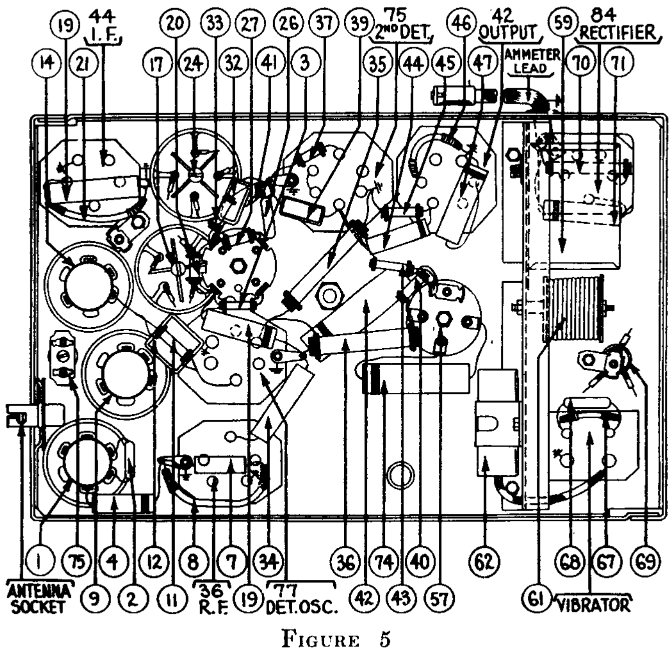


FIGURE 5

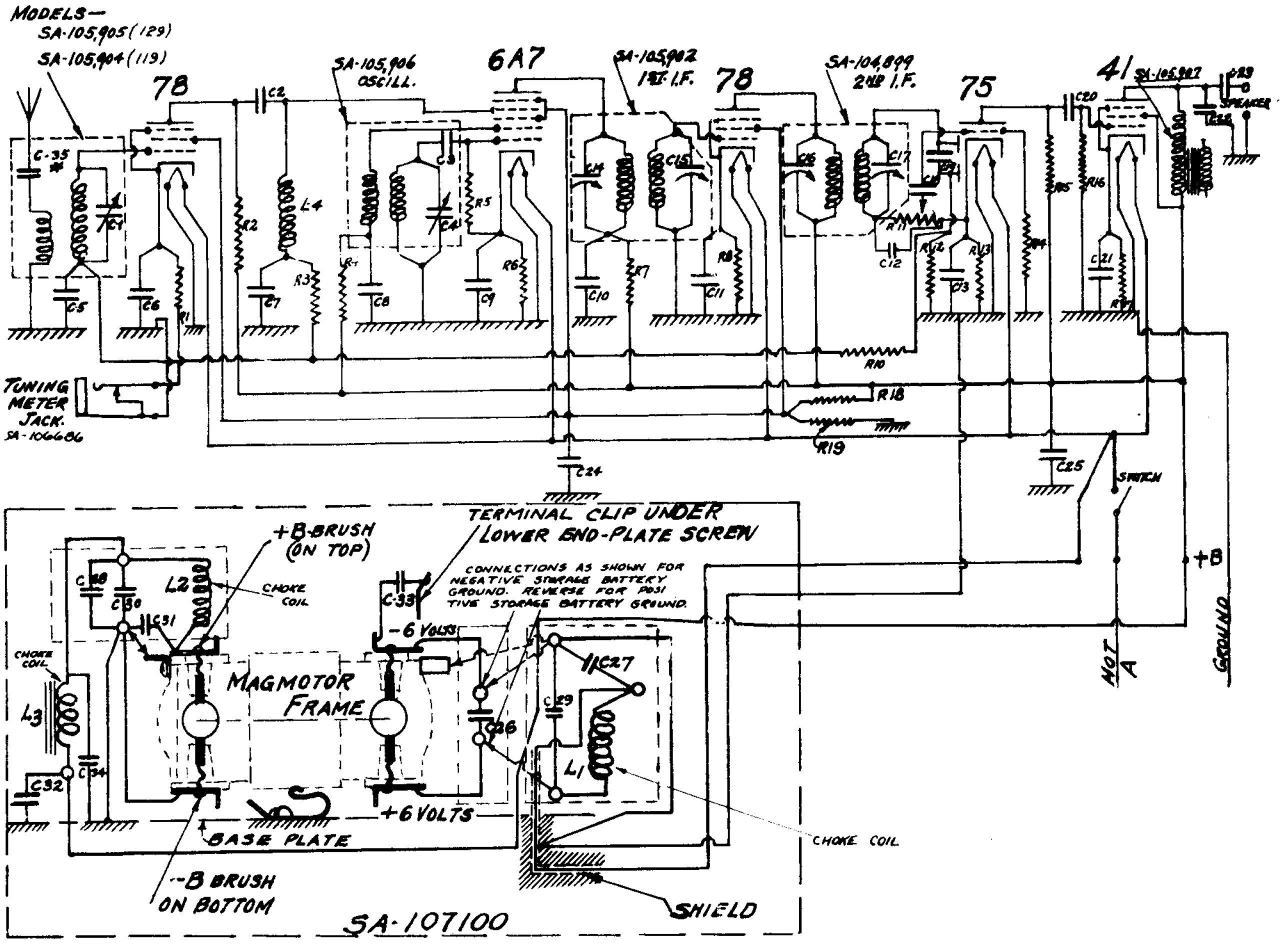
4-prong Socket..........27-6006
5-prong Socket..........27-6014
6-prong Socket..........27-6020
Antenna Lead...........38-5131
*Ammeter Lead..........38-6545
Stud....................28-6036
Nuts (set mtg.).......... W55A

*Flexible Shaft...........28-8341
*Dial...................27-5084
Knob...................27-4098
Knob (tone control)....... 03064
*Speaker Cable (speaker end) 36-3350
*Tow-Strap..............36-3403

An Antenna Choke, Part No. 32-1372 (75) on the Parts List and Base View has been added. This is connected in series with the Antenna Lead and the Antenna Transformer (1) and Condenser (2)

NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Phila., Chicago, or San Francisco.

UNITED AMERICAN BOSCH CORPORATION
MODELS 119-129 MOTORCYCLE POLICE RADIO



INTERMEDIATE FREQUENCY 456 KC.

R-1 300 ohms 1/4 watt
R-2 20,000 ohms 1/2 watt
R-3 100,000 ohms 1/4 watt
R-4 20,000 ohms 1/4 watt
R-5 100,000 ohms 1/4 watt
R-6 300 ohms 1/4 watt
R-7 2000 ohms 1/4 watt
R-8 300 ohms 1/4 watt
R-9 -----
R-10 .5 meg. 1/4 watt
R-11 .5 meg. volume control
R-12 2 meg. 1/4 watt
R-13 5000 ohms 1/4 watt
R-14 1 meg. 1/4 watt
R-15 .25 meg. 1/4 watt
R-16 .5 meg. 1/4 watt
R-17 750 ohms 1/4 watt
R-18 10,000 ohms 1/2 watt
R-19 100,000 ohms 1/2 watt

C-1 70-140 mmf air
C-2 .0001 mfd. mica
C-3 .0001 mfd. mica
C-4 70-140 mmf air
C-5 .05 - 2 ply
C-6 .05 - 2 ply
C-7 .05 - 2 ply
C-8 .05 - 2 ply
C-9 .05 - 2 ply
C-10 .05 - 2 ply
C-11 .05 - 2 ply
C-12 .0001 mfd mica
C-13 5 mfd electrolytic
C-14 7-80 mmf mica
C-15 7-80 mmf mica
C-16 7-80 mmf mica
C-17 7-80 mmf mica
C-18 .005 mfd. 3 ply
C-19 .0001 mfd. mica
C-20 .005 mfd. 3 ply
C-21 5 mfd. electrolytic

C-22 .005 - 3 ply
C-23 .25 mfd. 3 ply
C-24 .25 mfd. 2 ply
C-25 .25 mfd. 3 ply
C-26 .0001 mfd.
C-27 .001 mfd.
C-28 .05 mfd. 3 ply
C-29 .1 mfd. 2 ply
C-30 .001 mfd.
C-31 .001 mfd.
C-32 4.0 mfd.
C-33 .001 mfd.
C-34 4.0 mfd.
C-35 .0004 mfd. mica

L-1 -----
L-2 .15 milli-henry
L-3 200 ohms D.C.
L-4 Choke coil

UNITED AMERICAN BOSCH CORPORATION

MODELS 119-129 MOTORCYCLE POLICE RADIO

TUNING

The receiver as delivered will be tuned to the station frequency requested. Due to unavoidable differences between the frequency adjustment made at the factory and that of the station, it will be necessary to re-align the tuning condensers slightly. One of the following methods of procedure should be followed depending on whether or not a tuning meter is available. The method of tuning using a tuning meter is preferable since more accurate adjustment is possible.

A. With Tuning Meter: With the receiver installed on the motorcycle and turned on, plug the tuning meter into the jack provided for the purpose. If the station desired is not heard, drive the motorcycle (with the radio set in operation), toward the broadcasting station. When the station is heard stop the motorcycle and proceed as follows:

(1) Remove both small circular cover plates from the top of the receiver housing, thus exposing the tuning adjustment screws.

(2) Loosen the brass lock nuts (which can be seen through the two holes), using a 7/16" socket wrench. This operation must be observed or damage will be done to the tuning condensers when alignment is attempted with a screw driver.

(3) Insert a screw driver into the slot in the shaft of the left hand condenser (when the receiver is in such a position that the volume control is toward the operator), and adjust this condenser until maximum deflection of the tuning meter in the direction indicated by the arrow on the dial is obtained for the station being heard.

(4) Repeat operation "3" with the right hand condenser.

(5) Lock the condensers with the 7/16" socket wrench and replace the circular cover plates.

B. Without Tuning Meter: With the receiver installed on the motorcycle and turned on, drive the machine toward the broadcasting station. When the station is heard faintly, stop the motorcycle and proceed as follows:

(1) Remove both small circular cover plates from the top of the receiver housing, thus exposing the tuning adjustment screws.

(2) Loosen the brass lock nuts (which can be seen through the two holes), using a 7/16" socket wrench. This operation must be observed or damage will be done to the tuning condensers when alignment is attempted with a screw driver.

(3) Insert a screw driver into the slot in the shaft of the left hand condenser (when the receiver is in such a position that the volume control knob is toward the operator), and adjust this condenser until the station is heard loudest.

(4) Reduce the volume with the volume control.

(5) Repeat operations "3" and "4" with the right hand condenser.

(6) Lock the condensers with the 7/16" socket wrench and replace the circular cover plates.

Alignment by the above operations will be approximate only. To obtain the exact alignment required for successful operation, proceed as follows:

Drive the motorcycle with the receiver operating at maximum volume to a "dead" spot, or to a place sufficiently remote from the transmitter to produce a weak signal. In such a location repeat operations "1", "2", "3", "5" and "6" under "B". Under no circumstances should the volume of the signal be reduced by adjusting the volume control knob. Keep the volume control in its maximum position. Do not neglect to lock the condensers with the socket wrench after alignment and before replacing the cover plates.

When these tuning operations have been properly executed, the receiver installation on the motorcycle is then ready for suppression of ignition interference and subsequently ready for service.

UNITED AMERICAN BOSCH CORPORATION

MODELS 119-129 MOTORCYCLE POLICE RADIO

IGNITION NOISE SUPPRESSION

Shielded ignition cable, spark plug suppressors, spark plug shields, and bypass condensers are furnished as auxiliary equipment with the Models 119 and 129 receivers. These items are necessary for the suppression of ignition interference.

In attempting to suppress ignition interference, the following must be observed:

(1) Damp the oscillations at the spark plugs and across distributor caps by putting resistors (suppressors) in the cables at these points.

(2) Prevent the cables, spark plugs, etc., from radiating to the antenna by enclosing them in grounded metal shields.

(3) Minimize the effect of auxiliary or secondary radiating systems by a judicious choice of grounding points and by making ground connections in the proper way. A ground connection for high frequency currents cannot be made by running wires between the cable shield to be grounded and the engine block or the frame of the machine. The cable shield to be grounded must be brought down against the surfaces of the frame and clamped or soldered in place as required by the circumstances. The choice of ground points is commonly accomplished by trial and error-experience with the phenomena governing such circuits being extremely helpful.

Before proceeding with the work of suppressing ignition noise, the ignition system of the motorcycle should be checked thoroughly to make certain that all high-tension leads make good connections at their terminals, that the spacing of the spark plug electrodes is the minimum amount consistent with good motor performance, that the gap between the distributor electrode and the rotor electrode is a minimum, that all leaky high-tension cables are replaced, etc.

The specific procedure for suppressing ignition noise with either two or four cylinder motorcycles and with either battery or magneto ignition is as stated below:

A. Two-Cylinder Motorcycle - Battery Ignition:

(1) Install suppressor in series with each spark plug lead as close as possible to the spark plug.

(2) Replace each spark plug lead with a shielded cable.

(3) Connect .5 mfd. bypass condenser from the generator to ground.

(4) Disconnect the lead between coil and breaker and replace with a shielded lead running directly from the coil to the breaker (length approximately 10").

(5) Ground the housing of the ignition coil to the frame.

(6) Install a spark plug shield on each spark plug whenever possible.

B. Two-Cylinder Motorcycle - Magneto Ignition:

(1) Install suppressor in series with each spark plug lead as close as possible to the spark plug.

(2) Replace each spark plug lead with a shielded cable.

(3) Connect .5 mfd. bypass condenser from the generator to ground.

(4) Install a spark plug shield on each spark plug whenever possible.

C. Four-Cylinder Motorcycle - Battery Ignition:

(1) Install suppressor in series with each spark plug lead as close as possible to the spark plug.

(2) Install suppressor in series with the lead to the center contact of the distributor as close as possible to the distributor.

(3) Replace each spark plug lead with a shielded cable.

(4) Ground the spark plug cables in the tube which carries them over the motor.

(5) Connect .5 mfd. bypass condenser from the generator to ground.

CONTINUED ON NEXT PAGE

UNITED AMERICAN BOSCH CORPORATION
MODELS 119-129 MOTORCYCLE POLICE RADIO
CONTINUED FROM PRECEDING PAGE

(6) Install a spark plug shield on each spark plug.

(7) Connect .5 mfd. bypass condenser from the "hot" side of the ignition coil to ground.

D. Four-Cylinder Motorcycle - Magneto Ignition:

(1) Install suppressor in series with each spark plug lead as close as possible to the spark plug.

(2) Replace each spark plug lead with a shielded cable.

(3) Ground the spark plug cables in the tube which carries them over the motor.

(4) Connect .5 mfd. bypass condenser from the generator to ground.

(5) Install a spark plug shield on each spark plug.

ELECTRICAL CHARACTERISTICS

Frequency range:	Model 119 - 1500 to 1800 kilocycles Model 129 - 2250 to 2500 kilocycles
Sensitivity:	Designed to be adequate for special nature of police radio service.
Maximum output:	1.3 watts.
Intermediate frequency:	456 kilocycles.
Total battery drain:	4.5 amperes at 6.0 volts.

OPERATING VOLTAGES AND TUBE COMPLEMENT

Tube Type	Tube Function	Plate Voltage	Screen Voltage	Voltage Cathode to Ground	Heater Voltage
78	R.F. Amp.	45	95	2.3	6.0
6A7	Det., Osc.	170	95	2.3	6.0
78	I.F. Amp.	175	95	2.3	6.0
75	Det.,A.V.C., A.F. Amp.	73		0.6	6.0
41	A.F. Amp.	165	175	13	6.0

NOTE: The above readings were taken from the various socket points to ground using a Weston Model 663 volt-ohmmeter which has a resistance as a voltmeter of 1000 ohms per volt full scale. For meters of other ratings, these voltages may not be as indicated.

"B" POWER SUPPLY UNIT

The "B" power for operation of the receiver is supplied by the American-Bosch magmotor. This magmotor unit is turned on and off simultaneously with the receiver and receives its energy from the storage battery of the motorcycle.

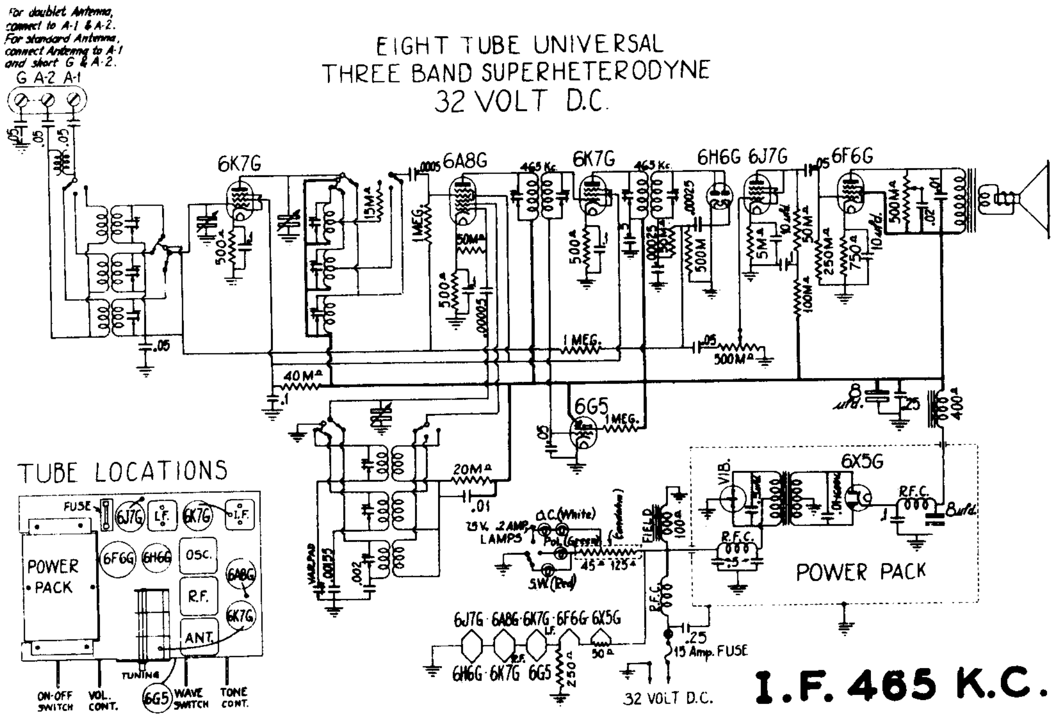
The magmotor is essentially a dynamotor, the armature having two windings, one to supply the driving force for rotating the armature and the other for generating the desired "B" power. The armature is fitted with a commutator at each end. The brushes which contact the commutators look alike, but the material of those operating at the 6-volt end is quite different from that of those operating at the high voltage end. If, for any reason, the brush holders are removed from the frame, they must be returned to their original positions when re-assembled. Failure to do this will cause shortened commutator life and improper operation of the magmotor unit.

The magmotor is provided with a permanent magnet, rather than field coils, for excitation. This makes possible the extreme compactness of the unit and also conserves the battery energy. Should it be necessary to remove the magnet during service operations, some marking should be made on adjacent sides of the frame and magnet so that the magnet can be returned to its original position and not inverted. If it is assembled in an inverted position, the polarity of the output will be reversed and the radio receiver will not function. A large soft iron "keeper" should be placed across the poles of the magnet when it is removed in order to conserve the magnetism. It is well to remagnetize the magnet after re-assembling the magmotor in order that it may give completely satisfactory service. If the magnet is not remagnetized, the output of the magmotor will be reduced.

UNIVERSAL BATTERY COMPANY

MODELS 8232 & 8332

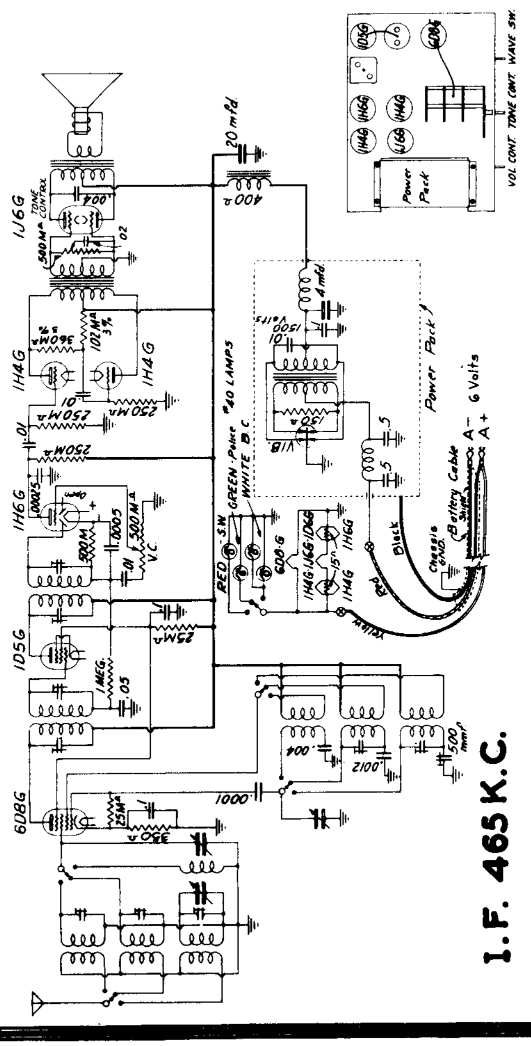
EIGHT TUBE UNIVERSAL
THREE BAND SUPERHETERODYNE
32 VOLT D.C.



I.F. 465 K.C.

MODEL 61A6

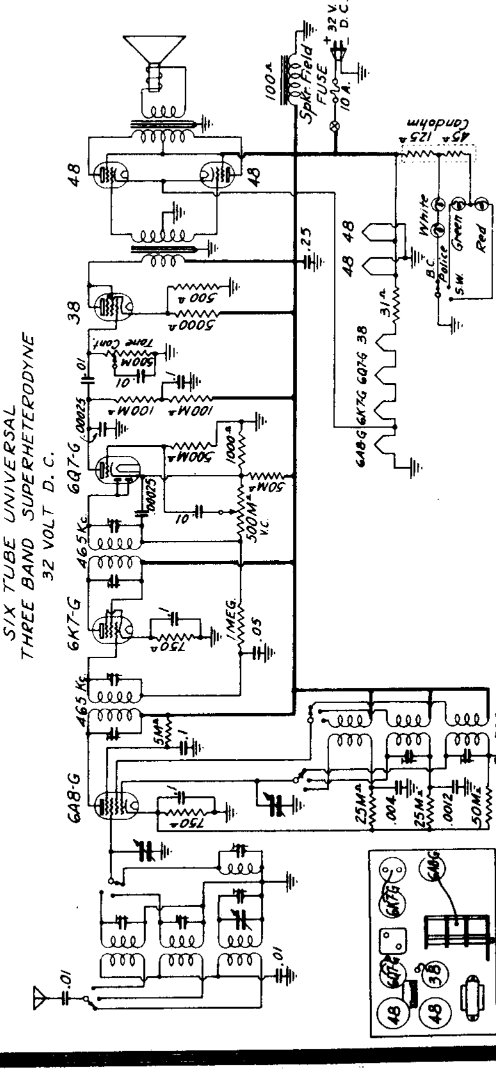
SIX TUBE UNIVERSAL
THREE BAND 6 VOLT SUPERHETERODYNE



I.F. 465 K.C.

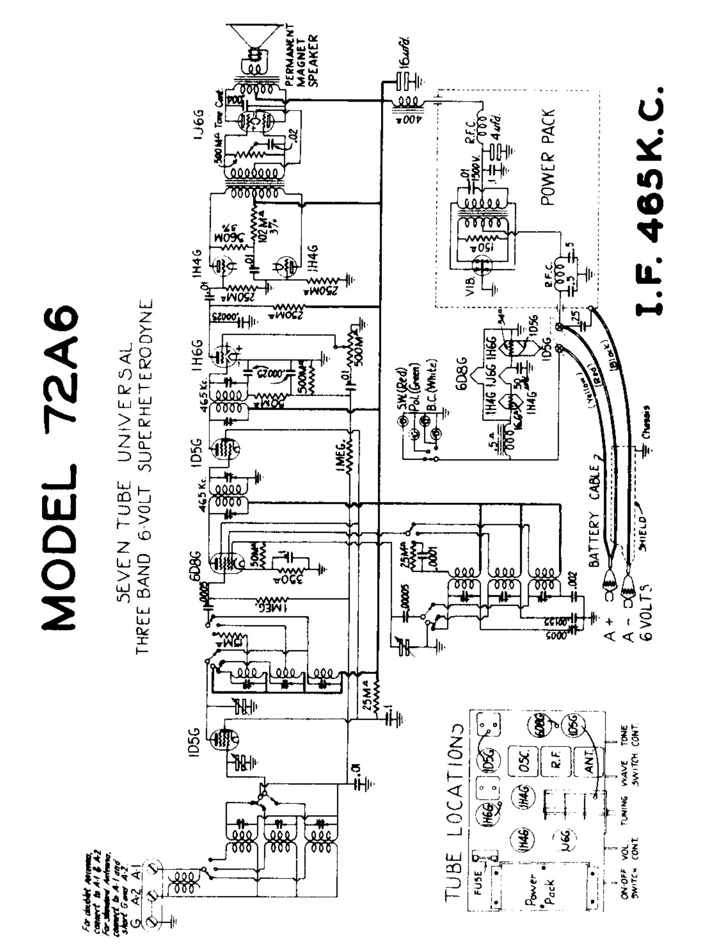
MODEL 6132

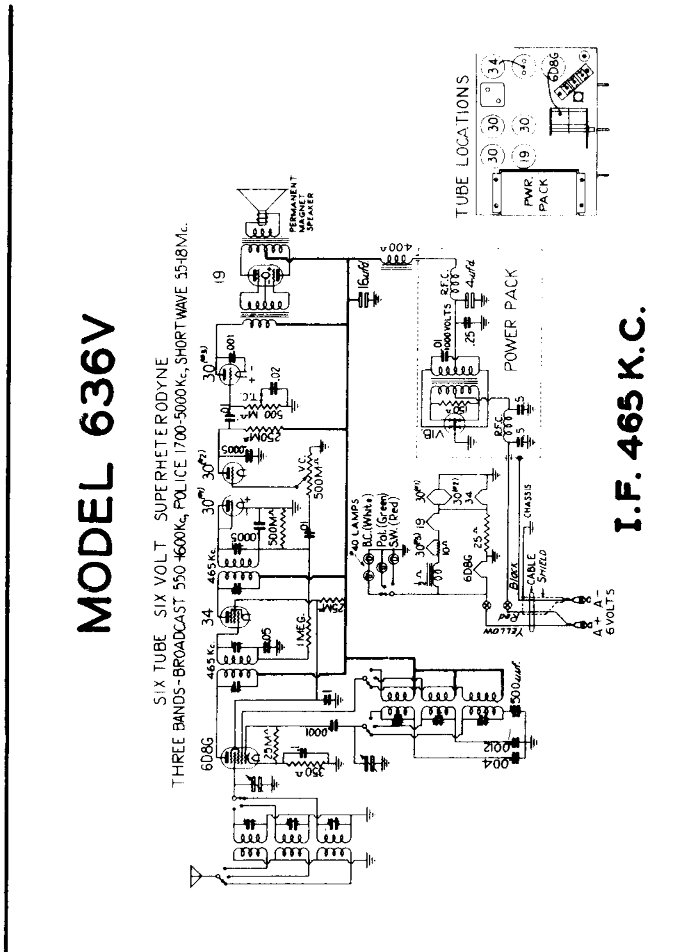
SIX TUBE UNIVERSAL
THREE BAND SUPERHETERODYNE
32 VOLT D.C.

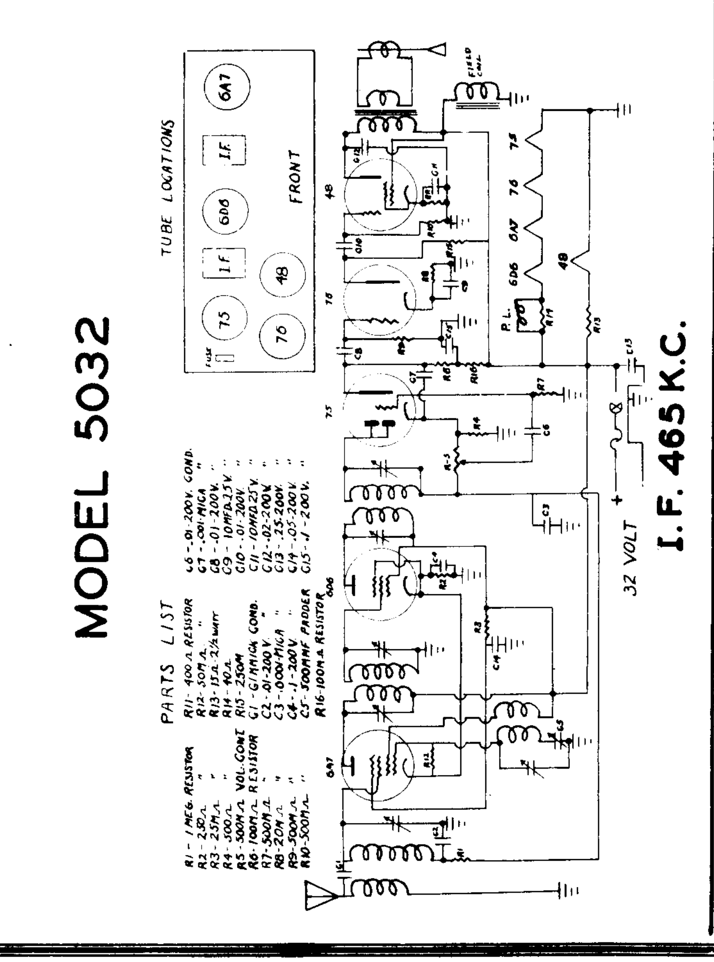


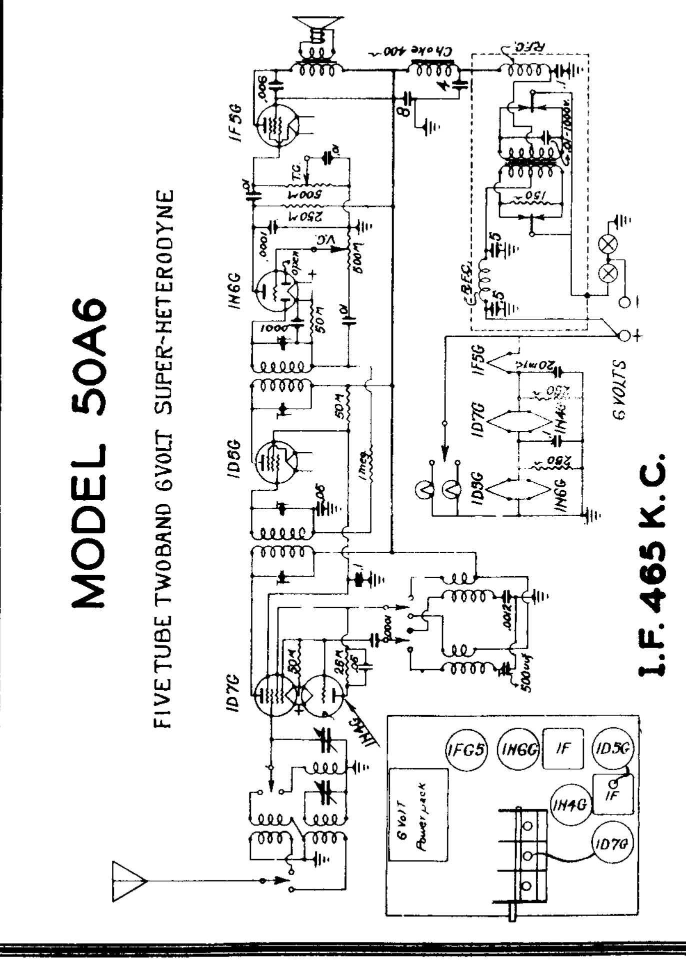
I.F. 465 K.C.

UNIVERSAL BATTERY COMPANY



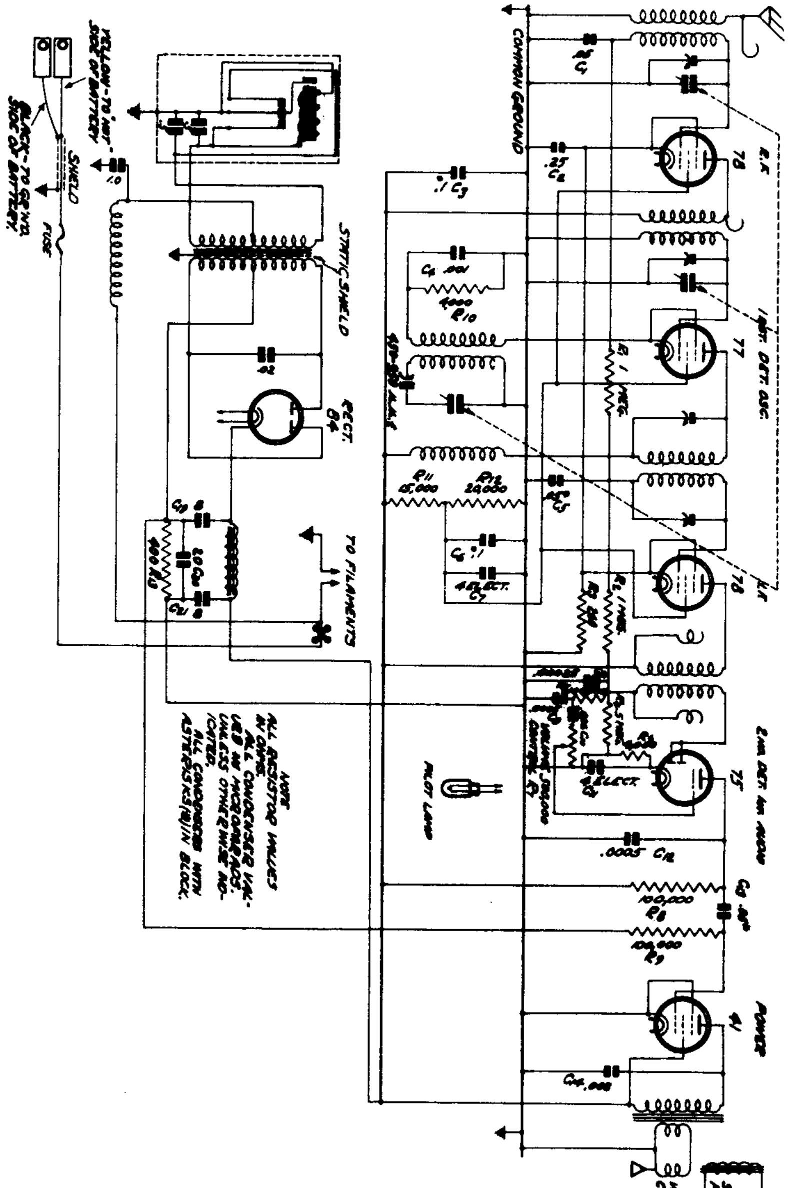






WELLS-GARDNER & CO.

MODEL Z6Z1 SERIES AUTO SET



(1) Cathode to Ground
(2) Subject to Variation
(3) Triode Plate to Cathode
(4) Read Across 400-Ohm Resistor, R13

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262 K.C., the intermediate frequency and an output indicating meter are desirable.

First set the signal generator at approximately 262 K.C. Connect the antenna lead from the generator to the control grid of the I.F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A.V.C. action. Note from Fig. 10 that the second I.F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262 K.C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Then adjust the two intermediate frequency condensers for maximum output. One of the I.F. condenser screws is reached through the hole on the top of the 1st I.F. assembly can. The other I.F. condenser screw is reached from the bottom of the sub-panel through a hole at the bottom of this assembly.

Now set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the generator is, in this instance, connected to the antenna lead of the receiver. Connect the flexible drive shaft to the chassis if it has been disconnected. As explained previously, the dial scale should be at the low frequency end stop when the rotor is completely in mesh. Then turn the station selector knob until the dial scale is at 1400 K.C.

Then adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first.

Next, set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached through a hole in the back wall of the sub-panel.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this settin at the same time adjusting the 600 K.C. trimmer ew until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

Voltages at Sockets

In the following chart are given the voltages at the sockets with all the tubes in, all units connected, and the set in operating condition, but with no signal being received. The antenna should be grounded.

A thousand ohm-per-volt meter of 0-250 volt range is required for the plate and screen voltages.

Lower ranges will be necessary for the grid and heater voltages. It is not absolutely necessary to have a high resistance meter for the heater or "A" battery reading.

These voltages will vary with variations in receivers, tubes, test equipment used, and "B" eliminator output voltage.

Type of Tube	Function	Across Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
78	R. F.	6.1	182	80	3.(1)	7.0
77	1st Det. and Osc.	6.1	178	77	5.(2)	1.3(2)
78	I. F.	6.1	182	80	3.(1)	7.0
75	2nd Det. 1st Audio	6.1	70(3)		1.4(1)	.35
41	Output	6.1	172.5	176.5	12.5(4)	16.0
84	Rect.	6.1	205			17.5 per plate

WELLS-GARDNER & CO.

MODEL 6J SERIES "A" ISSUE

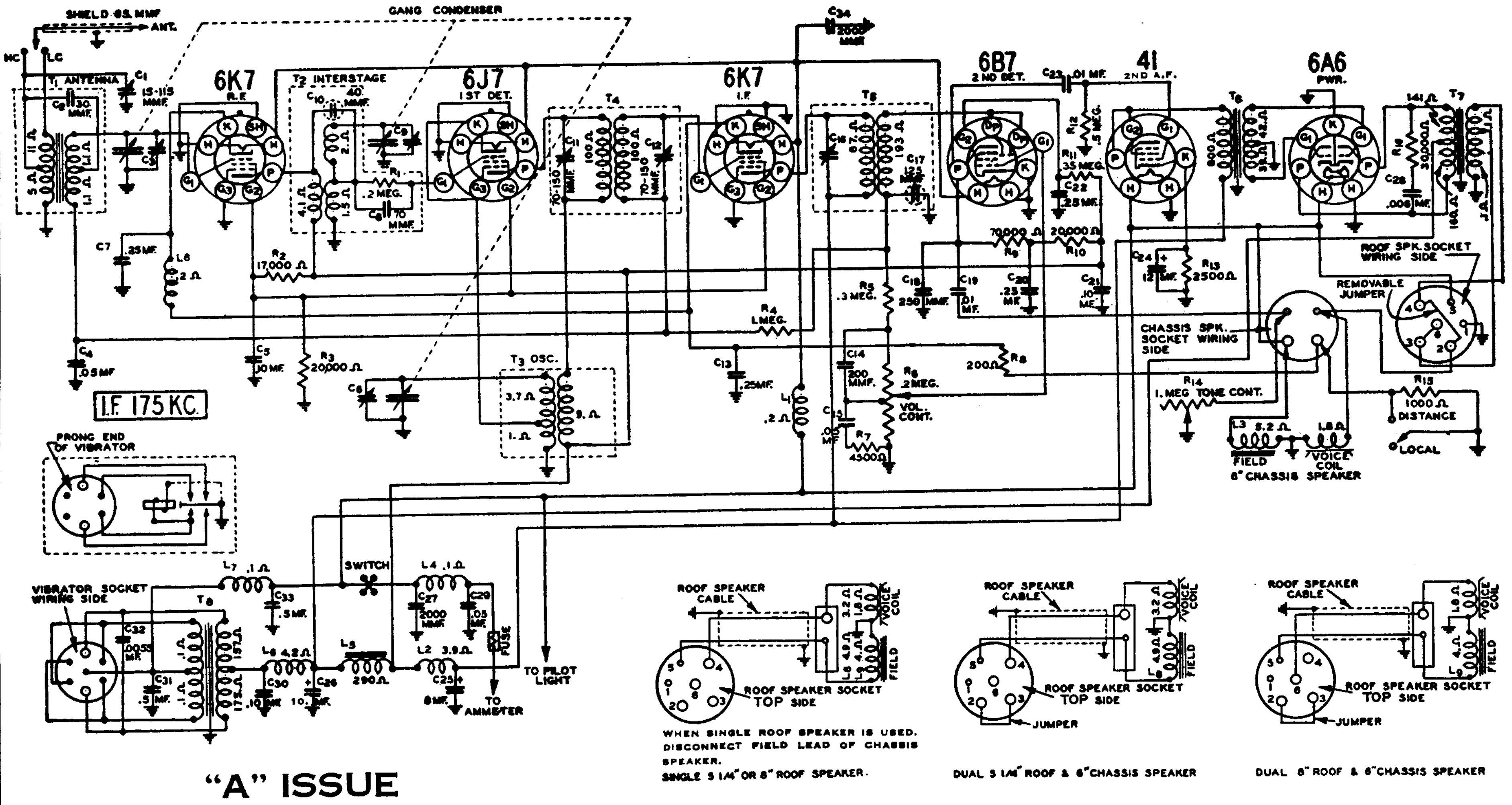


Fig. 1—Schematic Circuit Diagram ("A" Issue)

Power Consumption - - 8.25 Amperes at 6.3 Volts
7.0 Amperes with P.M. Speaker

Power Output - 6 Watts Undistorted at 6.3 Volts

Sensitivity - - 0.8 Microvolts at 1 Watt Output
(LD switch in distance position)

Selectivity - - 43 KC Broad at 1000 Times Signal

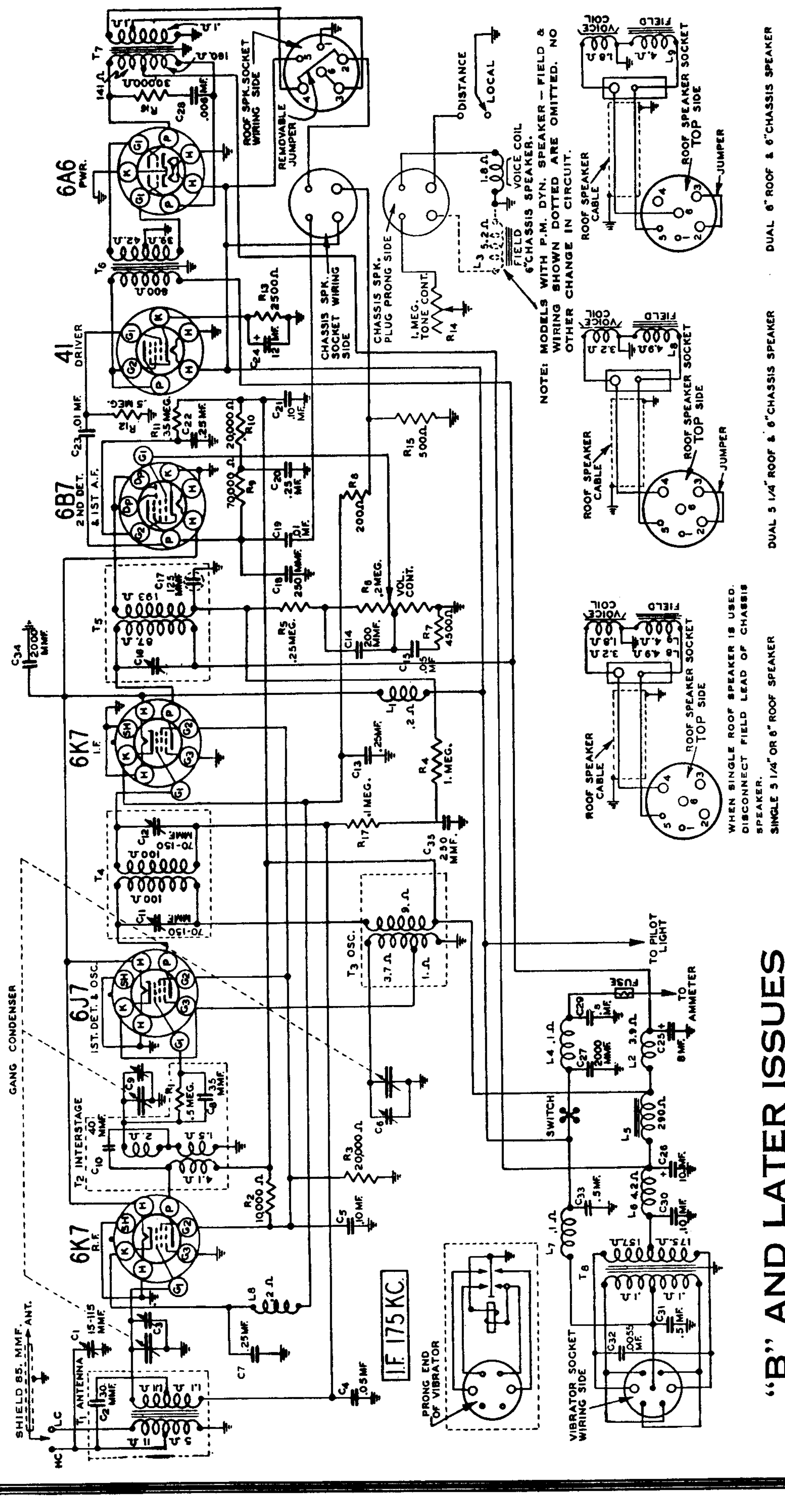
Tuning Frequency Range - - - 530 to 1581 KC

Intermediate Frequency - - - - - - 175 KC

Speaker - - - - - - - - 6 Inch Dynamic

WELLS-GARDNER & CO.

MODEL 6J SERIES "B" & LATER ISSUES



"B" AND LATER ISSUES

Fig. 2—Schematic Circuit Diagram ("B" and Later Issues)

WELLS-GARDNER & CO.

MODEL 6J SERIES

Alignment and Calibration

Misalignment of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the standard wave band. The radios are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

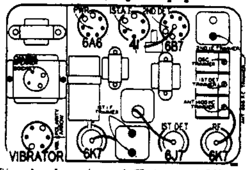


Fig. 3—Location of Tubes and Vibrator

A signal generator that will provide accurately calibrated signals over the standard wave band and at the intermediate frequency and an output meter are required for indicating the effect of adjustments.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the output of the signal generator through a .05 mf. condenser to the stator of the 1st detector section of the tuning condenser. (See Fig. 3 for location of this section.)

Connect the ground lead of the signal generator to the chassis. The chassis should be in the case.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers is shown in Fig. 3.

1581 KC Adjustment

Set the signal generator for 1581 KC.

Turn the rotor of the tuning condenser to the full open position.

Insert the antenna plug with the mark on the high capacity (HC) side. Connect the shielded antenna lead from the chassis through a 120 mmf. condenser to the antenna post of the signal generator.

For this and all subsequent adjustments, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 3 for location of this trimmer.

1400 KC Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st detector and antenna 1400 KC trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Tune in this signal and adjust the 600 KC antenna trimmer to maximum. (See Fig. 5 for location of this trimmer).

After the alignment procedure is completed, the antenna plug may be withdrawn and reinserted on the LC side if a low capacity (70 mmf.) car antenna is used.

Adjusting Antenna 600 KC Trimmer

After the radio is installed and the car antenna is connected, it will be necessary to readjust the antenna trimmer. Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained. See Fig. 5 for location of this trimmer.

Calibrating the Radio

To calibrate the radio, tune in a station of known frequency. At the back of the control head is the calibration screw. Remove the pilot lamp assembly. Hold the tuning knob. Insert a fine blade screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received.

A very short insulated screwdriver will be helpful.

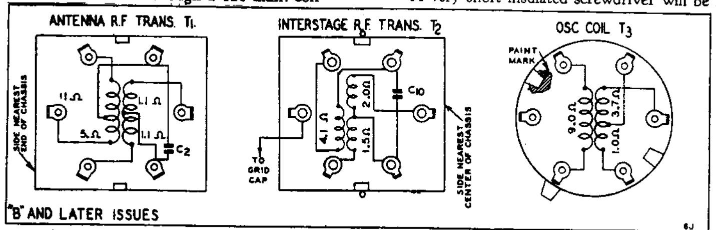


Fig. 4—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

Inserting Antenna Plug

IMPORTANT—The antenna plug can be inserted in two ways depending on whether the antenna is of high or low capacity.

If the total capacity of the antenna and shielded lead is approximately 200 mmf., which would be the case in a running board or ordinary roof antenna (not metal roof), insert the antenna plug with the mark on the HC side—See Fig. 5.

If the total capacity of the antenna and shielded lead is approximately 70 mmf., such as may be the case if a "fish pole" antenna is used, insert the antenna plug with the mark on the LC side.

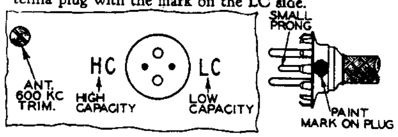


Fig. 5—Antenna Plug Insertion

The 1936 Chrysler Motors cars (except Plymouth—but including Chrysler, Dodge and DeSoto) have a steel roof, separated from the body proper, which is used as an antenna. The capacity of these antennas is about 1500 mmf. If this radio is installed in these cars, it will be necessary to use a running board or "fish pole" antenna.

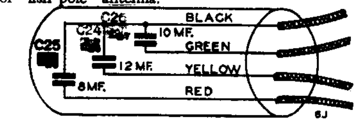


Fig. 6—Electrolytic Condenser Internal Connections

Most 1937 General Motors cars are equipped with an antenna built into the running board which is insulated from the body proper.

If a running board or under-car antenna is used, it must be one which is covered with a suitable insulation, to prevent short circuiting in wet weather.

VOLTAGES AT SOCKETS ("A" ISSUE)

Battery—6.3 Volts Under Load — L-D Switch in Distance Position

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground
6K7	R.F.	5.8	270	120	2.0
6J7	1st Det. and Osc.	5.8	268	120	0
6K7	I.F.	5.8	270	120	2.0
6B7	2nd Det. & 1st A.F.	5.8	70(1)	50(1)	0
41	2nd A.F.	6.0	260	260	28
6A6	Power	6.0	275		0

(1) As read with 1000 ohm per volt meter—500 volt scale.

VOLTAGES AT SOCKETS ("B" AND LATER ISSUES)

Battery—6.3 Volts Under Load — L-D Switch in Distance Position

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground
6K7	R.F.	5.8	250	132	3.6
6J7	1st Det. and Osc.	5.8	250	132	0
6K7	I.F.	5.8	250	132	3.6
6B7	2nd Det. & 1st A.F.	5.8	45(1)	45(1)	0
41	2nd A.F.	6.0	240	240	26
6A6	Power	6.0	262		0

(1) As read with 1000 ohm per volt meter—500 volt scale.

Changes in Later Models

The "B" and later issues of this series have changes incorporated in them as explained in this article. The issue letter is a large letter stamped on the chassis base.

The "B" and later issue models are different from the "A" issue models in the following respects: The antenna, interstage and oscillator assemblies have been redesigned; condensers C13, 21, 22, and 32 have been changed to a different type with a new part number; the value of condenser C8 has been changed from 70 mmf. to 35 mmf.; condenser C35, 250 mmf., has been added to the circuit. On radios with the letter "C" stamped on the chassis base, the 7 mmf. condenser used as an oscillator padder on early models has been removed.

The circuit connections of the "B" and later issues have been changed at the following points: R1 and C8 in the interstage coil are now connected to one side of the secondary coil instead of to the midpoint of the secondary winding; R4 in the AVC line is now connected in series with R17 with a condenser C35 connected at the junction of the two resistors; R15 is shown connected on the chassis side of the speaker socket, while on early models this resistor was shown connected on the speaker side of this socket. At that time it was mounted on the local-distance switch.

Some of the later models use a P.M. dynamic speaker. The connections for both types of speakers are shown in the "B" and Later Issues schematic diagram.

When ordering parts, therefore, it is important that the issue letter on the chassis be noted and the correct part number as shown in the parts list be specified.

Circuit

This model is a 6 tube automobile radio covering the standard wave band. It has a tuning range as shown in the specifications above. The signal is fed through an antenna transformer with tuned secondary into a 6K7 tube which functions as an R.F. amplifier. A connection is provided in the primary of the antenna transformer for installations in cars in which a low capacity antenna is used.

The output of the R.F. tube is fed through another R.F. transformer with tuned secondary into a 6J7 tube which functions as the first detector and oscillator. The oscillating circuit is tuned by the oscillator section of the gang condenser and is always resonant at a frequency 175 KC above the frequency to which the R.F. circuits are tuned.

One stage of I.F. amplification is employed using a 6K7 tube. The primary and secondary of the first I.F. transformer and the primary of the second I.F. transformer are tuned by small trimmer condensers.

A local-distance switch is employed to reduce the sensitivity for city driving. When the switch is in the local position, resistor R15 is in series with R.F. and I.F. bias resistor R8, causing a reduction in sensitivity. When the switch is in the distance position, resistor R15 is short circuited and full sensitivity is obtained.

A 6B7 duo diode-pentode tube functions as a diode 2nd detector, AVC tube and a one-stage audio amplifier. AVC voltage is applied to the control grid circuits of the 6K7 R.F. and I.F. tubes. The manual volume control varies the audio voltage applied to the grid of the 6B7 tube.

Resistance coupling is used between the 1st audio stage and the 2nd audio stage which employs a 41 tube. The latter is transformer coupled to the output stage which uses a 6A6 tube. This tube is a Class "B" power amplifier and combines 2 triodes in one envelope. A dynamic reproducer is used.

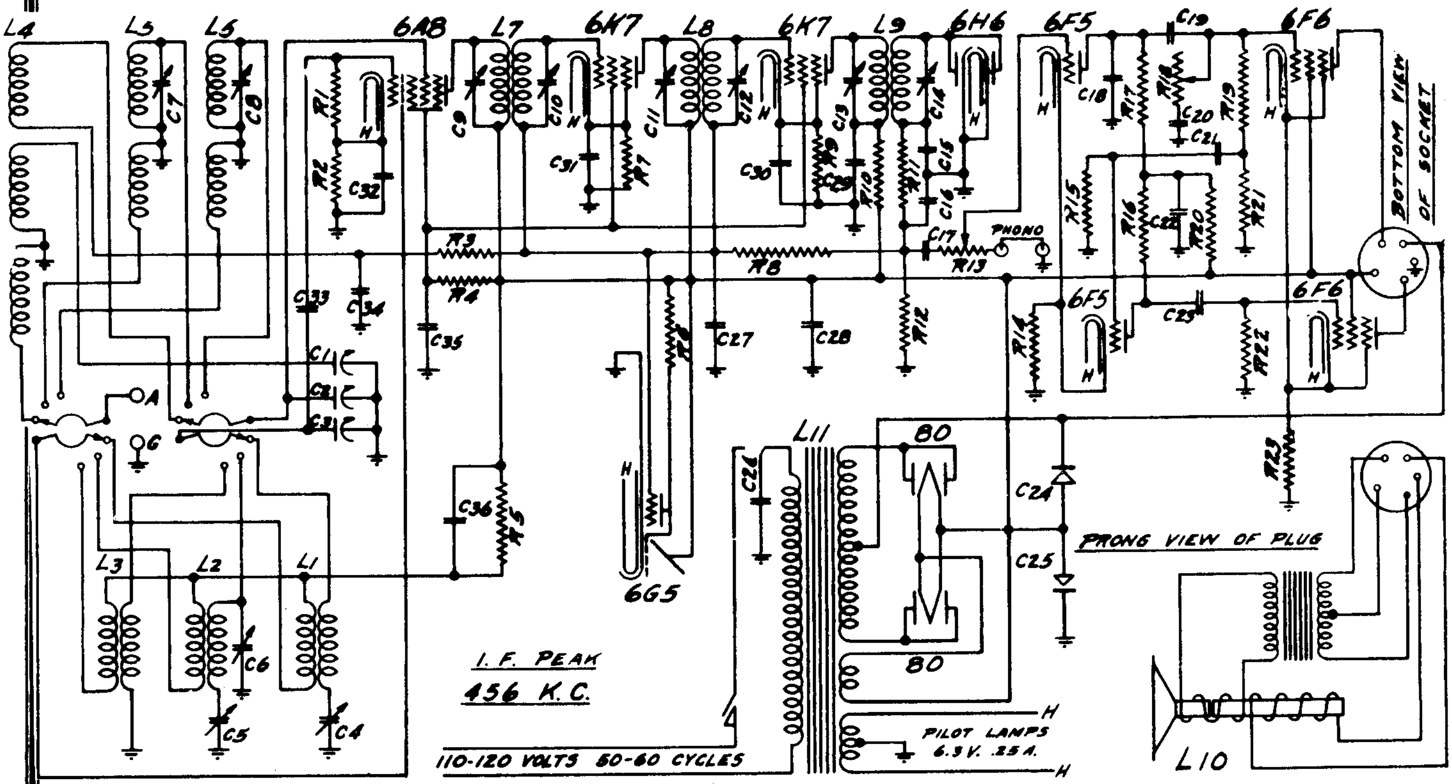
Provision is made for single roof speaker and dual speaker (chassis and roof) connections. The electrical connections for the different speaker installations are shown in the schematic and explained more fully in the article on that subject in this manual. When single chassis or roof speakers are used the entire output transformer secondary is connected to the speaker voice coil. When dual 5¼ inch roof and 6 inch chassis speakers are used, the 5¼ inch speaker voice coil is across the entire output tranformer secondary and the 6 inch speaker voice coil is connected to the tap on this secondary. When dual 8 inch roof and 6 inch chassis speakers are used, the voice coils of both speakers are connected to the output transformer secondary tap.

A synchronous type vibrator is used in the power unit. This vibrator interrupts the current through the primary of the power transformer and also rectifies the current in the secondary circuit.

Polarity in inserting the vibrator must be observed. It can be inserted in two ways, and the correct method depends on which terminal of the car storage battery is grounded. Full instructions are on the vibrator.

WILCOX-GAY CORPORATION

MODELS A26 & 6T11



CODE	PART NO.	RESISTORS
R1	53-898	50,000 Ohm Oscillator Grid Resistor
R2	53-1062	250 Ohm Oscillator Cathode Resistor
R3	53-923	100,000 Ohm A.V.C. Network Resistor
R4	53-195	25,000 Ohm R.F. & I.F. Screen Resistor
R5	53-941	20,000 Ohm Oscillator Plate Resistor
R6	53-926	1 Meg Ohm 6G5 Triode Plate Resistor
R7	53-1063	500 Ohm First I.F. Cathode Resistor
R8	53-926	1 Meg Ohm A.V.C. Network Resistor
R9	53-1063	500 Ohm Second I.F. Cathode Resistor
R10	53-919	5,000 Ohm Second I.F. Plate Isolation Res.
R11	53-898	50,000 Ohm Diode Filter Resistor
R12	53-925	500,000 Ohm Diode Load Resistor
R13	19-1291	500,000 Ohm Volume Control & Switch
R14	53-1144	2,000 Ohm 6F5's.Cathode Resistor
R15	53-925	500,000 Ohm Inverter Grid Resistor
R16	53-924	250,000 Ohm Inverter Plate Resistor
R17	53-924	250,000 Ohm First Audio Plate Resistor
R18	19-1317	250,000 Ohm Tone Control
R19	53-925	500,000 Ohm First Position 6F6 Grid Res.
R20	53-923	100,000 Ohm 6F5's Plate Hum Resistor
R21	53-920	10,000 Ohm Push-Pull Network Resistor
R22	53-925	500,000 Ohm Second Position 6F6 Grid Res.
R23	53-2011	250 Ohm 6F6's Cathode Resistor

CONDENSERS

C1	77-1581	16-366 MMFD. Preselector Section of 3 Gang
C2	77-1581	16-366 MMFD. Preselector Section of 3 Gang
C3	77-1581	16-366 MMFD. Oscillator Section of 3 Gang
C4	78-1572	600 MMFD. Broadcast Osc. Series Trimmer
C5	78-1572	1600 MMFD. Police Band Osc. Series Trimmer
C6	78-1588	3-30 MMFD. Police Band Osc. Parallel Trimmer
C7	78-1588	3-30 MMFD. Police Band Preselector Trimmer
C8	78-1588	3-30 MMFD. Foreign Band Preselector Trimmer
C9	78-2016	70-120 MMFD. First I.F. Primary Trimmer
C10	78-2016	70-120 MMFD. First I.F. Secondary Trimmer
C11	78-2016	70-120 MMFD. Second I. F. Primary Trimmer
C12	78-2016	70-120 MMFD. Second I. F. Secondary Trimmer

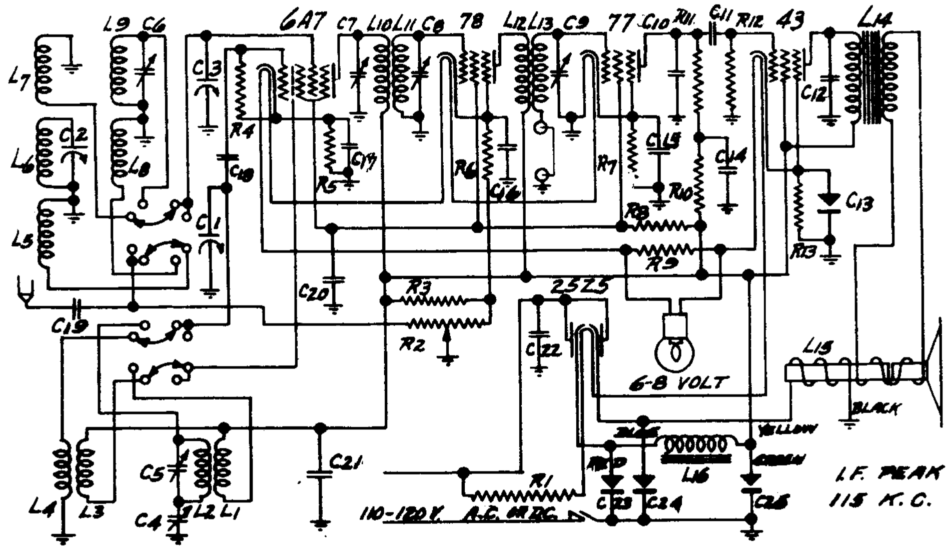
CODE	PART NO.	CONDENSERS (Cont'd.)
C13	78-2016	70-120 MMFD. Third I. F. Primary Trimmer
C14	78-2016	70-120 MMFD. Third I. F. Secondary Trimmer
C15	76-2001	.0001 Mfd. Diode Filter Condenser
C16	76-2001	.0001 Mfd. Diode Filter Condenser
C17	75-2003	.01 Mfd. 400 V. Paper Audio Feed Condenser
C18	76-265	.001 Mfd. Mica First Audio Plate Filter Cond.
C19	75-2005	.1 Mfd. 200 V. Paper Audio Feed Condenser
C20	75-2003	.01 Mfd. 400 V. Paper Tone Control Condenser
C21	75-2005	.1 Mfd. 200 V. Paper Inverter Feed Condenser
C22	75-2011	.5 Mfd. 200 V. Paper 6F5's Plate Hum Cond.
C23	75-2005	.1 Mfd. 200 V. Paper Audio Feed Condenser
C24	18-721	8 Mfd. 450 V. Dry Electrolytic Filter Cond.
C25	18-2005	12 Mfd. 325 V. Wet Electrolytic Filter Cond.
C26	75-2003	.01 Mfd. 400 V. Paper Line By-Pass Condenser
C27	75-2005	.1 Mfd. 200 V. Paper A.V.C. Network By-Pass Cond.
C28	75-2013	1. Mfd. 400 V. Paper B Supply By-Pass Condenser
C29	75-2003	.01 Mfd. 400 V. Paper Second I. F. Plate Isolation
C30	75-2005	.1 Mfd. 200 V. Paper Second I. F. Cathode By-Pass
C31	75-2005	.1 Mfd. 200 V. Paper First I. F. Cathode By-Pass
C32	75-2005	.1 Mfd. 200 V. Paper First Det. Cathode By-Pass
C33	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C34	75-2005	.1 Mfd. 200 V. Paper A.V.C. Network By-Pass
C35	75-2013	1. Mfd. 400 V. Paper R.F. & I.F. Screen By-Pass
C36	75-2003	.01 Mfd. 400 V. Paper Osc. Plate Isolation Cond.

INDUCTANCES

L1	17-2111	Broadcast Oscillator Coil Assembly
L2	17-2105	Police Band Oscillator Coil Assembly
L3	17-2095	Foreign Band Oscillator Coil Assembly
L4	17-2100	Broadcast Preselector Coil Assembly
L5	17-2104	Police Band Preselector Coil Assembly
L6	17-2096	Foreign Band Preselector Coil Assembly
L7	68-2019	First I. F. Transformer Assembly
L8	68-2033	Second I. F. Transformer Assembly
L9	68-2032	Third I. F. Transformer Assembly
L10	64-2039	Speaker, 1000 Ohm Field Push-Pull Output Trans. for 2 - 6F6's.
L1.	80-2019	Power Transformer

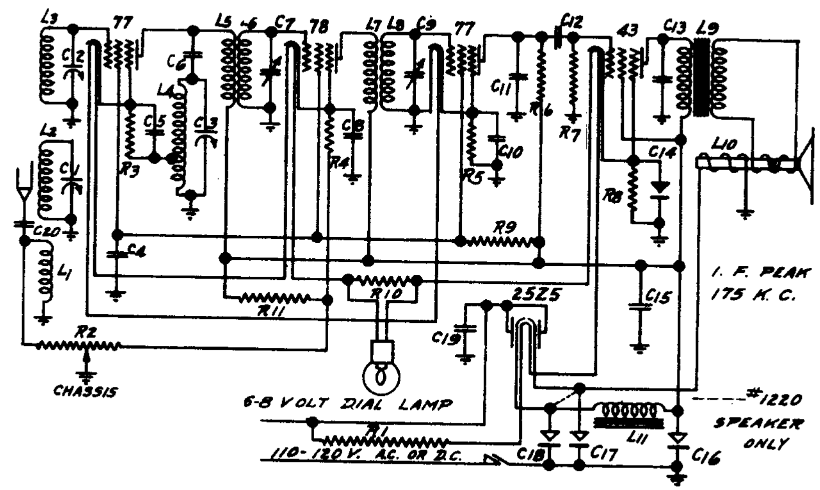
WILCOX-GAY CORPORATION

MODELS 3JG5 & 3JD5



CODE	PART NO.	RESISTORS
R1	20-1125	130 Ohm Resistor in Power Cord
R2	19-1296	10,000 Ohm Volume Control & Switch
R3	53-922	75,000 Ohm Resistor I.F. Cathode Feed
R4	53-898	50,000 Ohm Resistor Oscillator Grid
R5	53-[illegible]2	250 Ohm Resistor 6A7 Cathode
R6	53-1063	500 Ohm Resistor I.F. Cathode
R7	53-941	20,000 Ohm Resistor Second Detector or Cathode
R8	53-921	40,000 Ohm Resistor Screen Feed
R9	53-1308	20 Ohm Resistor Pilot Light Shunt
R10	53-923	100,000 Ohm 77 Plate Hum Resistor
R11	53-924	250,000 Ohm Resistor 77 Plate
R12	53-925	500,000 Ohm Resistor Output Grid
R13	53-1063	500 Ohm Resistor Output Cathode
		CONDENSERS
C1	77-833	336 MMFD. Oscillator Section of 3 Gang
C2	77-833	371 MMFD. Preselector Section of 3 Gang
C3	77-833	371 MMFD. Preselector Section of 3 Gang
C4	78-2006	Long Wave Oscillator Series Trimmer
C5	78-1597	Long Wave Oscillator Parallel Trimmer
C6	78-1597	Long Wave Preselector Trimmer
C7	78-993	First I.F. Primary Trimmer
C8	78-994	First I.F. Secondary Trimmer
C9	78-788	Second I.F. Trimmer
C10	76-265	.001 Mfd. Mica 77 Plate By-Pass
C11	75-269A	.01 Mfd. 400 Volt Audio Feed Condenser
C12	75-343A	.004 Mfd. Paper Output Plate By-Pass
C13	18-928	25 Mfd. 25 Volt Output Cathode
C14	75-272A	.1 Mfd. 200 Volt 77 Plate Hum Filter
C15	75-267A	5. Mfd. 200 Volt 77 Cathode By-Pass
C16	75-272A	.1 Mfd. 200 Volt 78 Cathode By-Pass
C17	75-272A	.1 Mfd. 200 Volt 6A7 Cathode By-Pass
C18	76-264	.00005 Mfd. Mica Oscillator Grid Condenser
C19	76-265	.001 Mfd. Mica Antenna Series Condenser
C20	75-272A	.1 Mfd. 200 Volt Screen By-Pass
C21	75-267A	.5 Mfd. 200 Volt B Supply By-Pass
C22	75-272A	.1 Mfd. 200 Volt 110 Volt Line By-Pass
C23	18-1085	10 Mfd. 150 Volt Dry Electrolytic Cond.
C24	18-1085	4 Mfd. 150 Volt Dry Electrolytic Cond.
C25	18-1085	4 Mfd. 150 Volt Dry Electrolytic Cond.
		INDUCTANCES
L1	17-2013	Long Wave Oscillator Primary
L2	17-2013	Long Wave Oscillator Secondary
L3	17-2013	Broadcast Oscillator Primary
L4	17-2013	Broadcast Oscillator Secondary
L5	17-2015	Broadcast Preselector Primary
L6	17-2015	Broadcast Preselector First Secondary
L7	17-2015	Broadcast Preselector Second Secondary
L8	17-2015	Long Wave Preselector Primary
L9	17-2015	Long Wave Preselector Secondary
L10	17-999	First I.F. Trans. Primary
L11	17-999	First I.F. Trans. Secondary
L12	17-2032	Second I.F. Trans. Primary
L13	17-2032	Second I.F. Trans. Secondary
L14	64-1260	Single 43 Output Trans.
L15	64-1260	3000 Ohm Speaker Field
L16	14-940	20 Henry Filter Choke

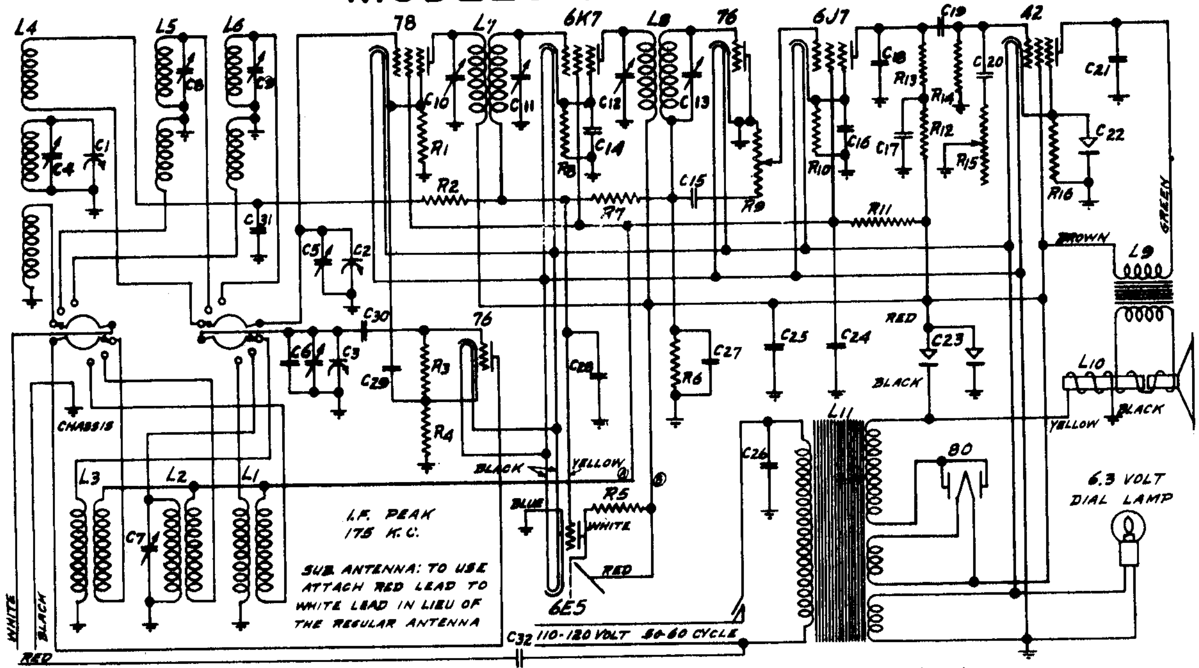
MODEL 3KE5



CODE	PART NO.	RESISTORS
R1	1125	130 Ohm Resistor in Power Cord
R2	1296	10,000 Ohm Volume Control & Switch
R3	919	5,000 Ohm Resistor First Detector & Osc. Cathode
R4	1063	500 Ohm Resistor I.F. Cathode
R5	941	20,000 Ohm Resistor Second Detector Cathode
R6	924	250,000 Ohm Resistor Second Detector Plate
R7	925	500,000 Ohm Resistor Output Grid Bias
R8	1063	500 Ohm Resistor Output Cathode
R9	921	40,000 Ohm Resistor Screen Feed
R10	308	20 Ohm Resistor Pilot light shunt
R11	922	75,000 Ohm Resistor I.F. Cathode Feed
		CONDENSERS
C1	833	371 MMFD. Preselector Section of 3 Gang Condenser
C2	833	371 MMFD. Preselector Section of 3 Gang Condenser
C3	833	336 MMFD. Oscillator Section of 3 Gang Condenser
C4	272A	.1 Mfd. 200 Volt Screen By-Pass Condenser
C5	265	.001 Mfd. Mica First Detector & Oscillator Cathode
C6	264	.00005 Mfd. Mica Oscillator Coupling Condenser
C7	938	75-150 MMFD. First I.F. Trimmer Condenser
C8	272A	.1 Mfd. 200 Volt I.F. Cathode By-Pass Condenser
C9	849	75-150 MMFD. Second I.F. Trimmer Condenser
C10	183A	.2 Mfd. 200 Volt Second Detector Cathode By-Pass Condenser
C11	265	.001 Mfd. Mica Second Detector Plate Filter Condenser
C12	269A	.01 Mfd. 400 Volt Audio Feed Condenser
C13	662	.002 Mfd. Mica Output Plate Filter Condenser
C14	928	25 Mfd. 25 Volt C Bias By-Pass Condenser
C15	267-A	.5 Mfd. 200 Volt B Supply By-Pass Condenser
C16	1085	4 Mfd. 150 Volt Dry Electrolytic Condenser
C17	1085	4 Mfd. 150 Volt Dry Electrolytic Condenser
C18	1085	11 Mfd. 150 Volt Dry Electrolytic Condenser
C19	272A	.1 Mfd. 200 Volt Line By-Pass Condenser
C20	265	.001 Mfd. Antenna Series Condenser
		INDUCTANCES
L1	844	Preselector Primary 178 turns #36 S.S.E.
L2	844	Preselector First Secondary 133 turns #36 S.S.E.
L3	844	Preselector Second Secondary 128 turns #36 S.S.E.
L4	935	Oscillator Coil 98 turns #36 S.S.E. tapped at 15 T.
L5	935	First I.F. Primary 650 turns #36 S.S.E.
L6	935	First I.F. Secondary 650 turns #36 S.S.E.
L7	1172	Second I.F. Primary 650 turns #38 S.S.E.
L8	1172	Second I.F. Secondary 650 turns #38 S.S.E.
L9	917	Single #43 Output Transformer
L10	917	3000 Ohm speaker Field
L11	940	20 Henry Choke

WILCOX-GAY CORPORATION

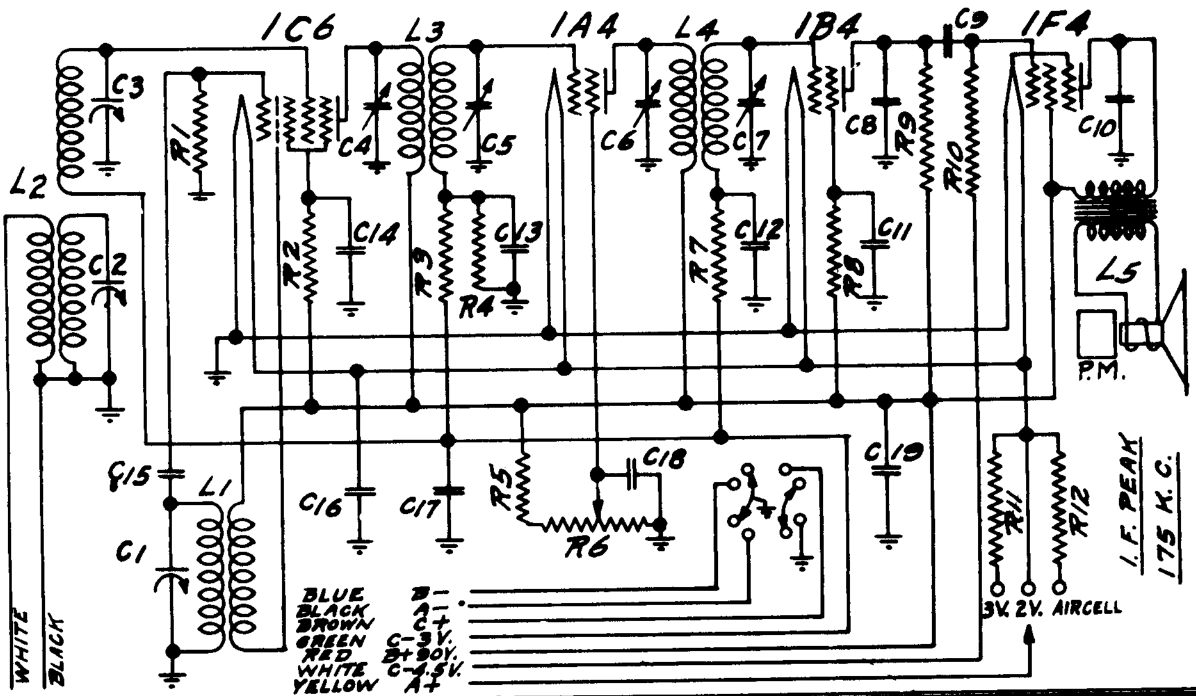
MODELS 6BB8 & A20



CODE	PART NO.	RESISTORS
R1	53-1065	1,000 Ohm First Detector Cathode Resistor
R2	53-923	100,000 Ohm A.V.C. Network Resistor
R3	53-941	20,000 Ohm Oscillator Grid Resistor
R4	53-1062	250 Ohm Oscillator Cathode Resistor
R5	53-926	1 Meg Ohm 6E5 Triode Plate Resistor
R6	53-925	500,000 Ohm Diode Load Resistor
R7	53-926	1 Meg Ohm A.V.C. Network Resistor
R8	53-1062	250 Ohm I.F. Amplifier Cathode Resistor
R9	19-1291	500,000 Ohm Volume Control & Switch
R10	53-920	10,000 Ohm First Audio Cathode Resistor
R11	53-280	5,000 Ohm Screen Resistor
R12	53-923	100,000 Ohm First Audio Plate Hum Resistor
R13	53-924	250,000 Ohm First Audio Plate Resistor
R14	53-925	500,000 Ohm Output Grid Resistor
R15	19-1317	250,000 Ohm Tone Control
R16	53-1426	750 Ohm Output Cathode Resistor
		CONDENSERS
C1	77-833	16-366 MMFD. Preselector Section of 3 Gang
C2	77-833	16-366 MMFD. Preselector Section of 3 Gang
C3	77-833	16-328 MMFD. Oscillator Section of 3 Gang
C4	77-833	First Preselector Trimmer on C1
C5	77-833	Second Preselector Trimmer on C2
C6	77-833	Oscillator Trimmer on C3
C7	78-1588	3-30 MMFD. Police Band Oscillator Trimmer
C8	78-1588	3-30 MMFD. Police Band Preselector Trimmer
C9	78-1588	3-30 MMFD. Foreign Band
C10	78-2006	First I.F. Primary Trimmer Condenser
C11	78-2011	First I.F. Secondary Trimmer Condenser
C12	78-2006	Second I.F. Primary Trimmer Condenser
C13	78-2013	Second I.F. Secondary Trimmer Condenser
C14	75-2005	.1 Mfd. 200 Volt I.F. Cathode By-Pass Cond.

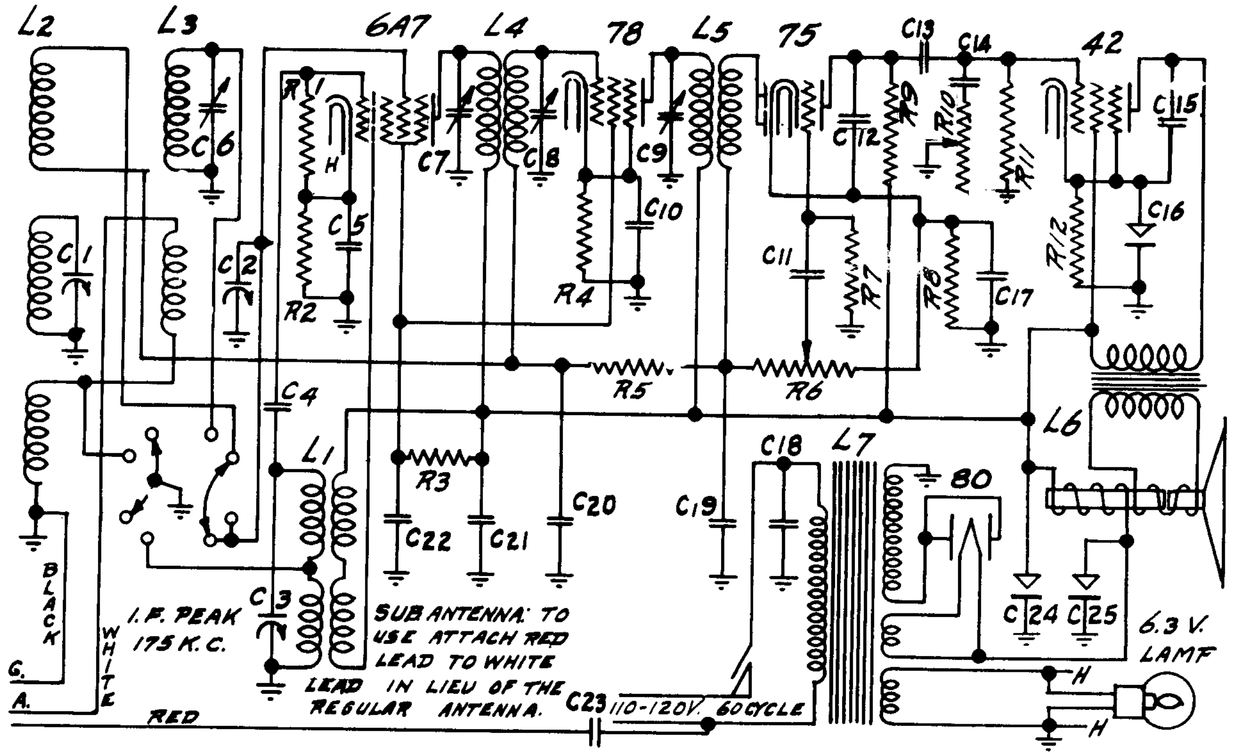
CODE	PART NO.	CONDENSERS (Cont.)
C15	75-2003	.01 Mfd. 400 Volt Audio Feed Condenser
C16	75-2011	.5 Mfd. 200 Volt First Audio Cathode By-Pass
C17	75-2006	.1 Mfd. 200 Volt First Audio Plate Hum Filter
C18	76-265	.001 Mfd. Mica First Audio Plate By-Pass Cond.
C19	75-2003	.01 Mfd. 400 Volt Audio Feed Condenser
C20	75-2003	.01 Mfd. 400 Volt Tone Control Condenser
C21	75-2001	.002 Mfd. 600 Volt Output Plate By-Pass Cond.
C22	18-926	.25 Mfd. 25 Volt Dry Electrolytic Condenser
C23	18-2002	4-4 Mfd. 450 W.V. Dry Electrolytic Condenser
C24	75-2005	.1 Mfd. 200 Volt Screen By-Pass Condenser
C25	75-2013	1. Mfd. 400 Volt B Supply By-Pass Condenser
C26	75-2003	.01 Mfd. 400 Volt Line By-Pass Condenser
C27	76-307	.0005 Mfd. Mica Diode Filter Condenser
C28	75-2005	.1 Mfd. 200 Volt A.V.C. Network By-Pass Cond.
C29	75-2003	.01 Mfd. 400 Volt Oscillator Coupling Cond.
C30	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C31	75-2003	.01 Mfd. 400 Volt A.V.C. Network By-Pass Cond.
C32	75-2003	.01 Mfd. 400 Volt Sub Antenna Condenser
		INDUCTANCES
L1	17-2077	Foreign Band Oscillator Coil Assembly
L2	17-1667	Police Band Oscillator Coil Assembly
L3	17-2050	Broadcast Oscillator Coil Assembly
L4	17-2052	Broadcast Preselector Coil Assembly
L5	17-1666	Police Band Preselector Coil Assembly
L6	17-2078	Foreign Band Preselector Coil Assembly
L7	68-2026	First I.F. Trans. Assembly
L8	68-2024	Second I.F. Trans. Assembly
L9	64-2025	Speaker With #42 Output Trans.
L10	64-2025	Speaker With 2500 Ohm Field
L11	80-2010	Power Transformer (Unless Special)

MODELS 6P4, A22 & A23



WILCOX-GAY CORPORATION

MODELS 7A5-7AB5-7AC5-A27 & A28



CODE	PART NO.	RESISTORS
R1	53-898	50,000 Ohm 6A7 Grid Resistor
R2	53-1062	250 Ohm 6A7 Cathode Resistor
R3	53-1042	25,000 Ohm 6A7 & 78 Screen Resistor
R4	53-1063	500 Ohm 78 Cathode Resistor
R5	53-926	1 Meg Ohm A.V.C. Network Resistor
R6	19-1291	500,000 Ohm Volume Control & Switch
R7	53-925	500,000 Ohm 75 Grid Resistor
R8	53-919	3,000 Ohm 75 Cathode Resistor
R9	53-924	250,000 Ohm 75 Plate Resistor
R10	19-1317	250,000 Ohm Tone Control
R11	53-925	500,000 Ohm 42 Grid Resistor
R12	53-1063	500 Ohm 42 Cathode Resistor

		INDUCTANCES
L1	17-2101	Oscillator Coil Assembly
L2	17-2100	Preselector Coil Assembly
L3	17-2103	Police Band Preselector Coil Assembly
L4	68-2012	First I.F. Transformer Assembly
L5	17-2102	Second I.F. Transformer Coil Assembly
L6	64-2021	5" Speaker, 1500 Ohm field 42 Tube Transformer
L7	80-2009	Power Transformer for 110-120 V. 60 Cycle

CODE	PART NO.	CONDENSERS
C1	77-833	366 MMFD. Preselector Section of 3 Gang
C2	77-833	366 MMFD. Preselector Section of 3 Gang
C3	77-833	328 MMFD. Oscillator Section of 3 Gang
C4	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C5	75-2005	.1 Mfd. 200 V. Paper 6A7 Cathode By-Pass Cond.
C6	78-2010	3-30 MMFD. Police Band Preselector Trimmer Cond
C7	78-2008	First I.F. Primary Trimmer Condenser
C8	78-2011	First I.F. Secondary Trimmer Condenser
C9	78-2009	Second I.F. Trimmer Condenser
C10	75-2003	.1 Mfd. 200 V. Paper 78 Cathode By-Pass Cond.
C11	75-2003	.01 Mfd. 400 V. Paper Audio Feed Condenser
C12	76-662	.002 Mfd. Mica 75 Plate Filter Condenser
C13	75-2003	.01 Mfd. 400 V. Paper Audio Feed Condenser
C14	75-2003	.01 Mfd. 400 V. Paper Tone Control Condenser
C15	75-2001	.002 Mfd. 600 V. Paper 42 Plate Filter Cond.
C16	18-928	25 Mfd. 25 V. Dry Electrolytic Condenser
C17	75-2005	.1 Mfd. 200 V. Paper 75 Cathode By-Pass Cond.
C18	75-2003	.01 Mfd. 400 V. Paper Line By-Pass Condenser
C19	76-307	.0005 Mfd. Mica Diode Filter Condenser
C20	75-2005	.1 Mfd. 200 V. Paper A.V.C. Network By-Pass Cond.
C21	75-2011	.5 Mfd. 200 V. Paper B Supply By-Pass Condenser
C22	75-2005	.1 Mfd. 200 V. Paper 6A7 & 78 Screen By-Pass Cond.
C23	75-2003	.01 Mfd. 400 V. Paper Sub-Antenna Condenser
C24	18-2006	16 Mfd. 250 W.V. Electrolytic Condenser
C25	18-2005	12 Mfd. 325 W.V. Electrolytic Condenser

PARTS LIST MODELS 6P4, A22 & A23

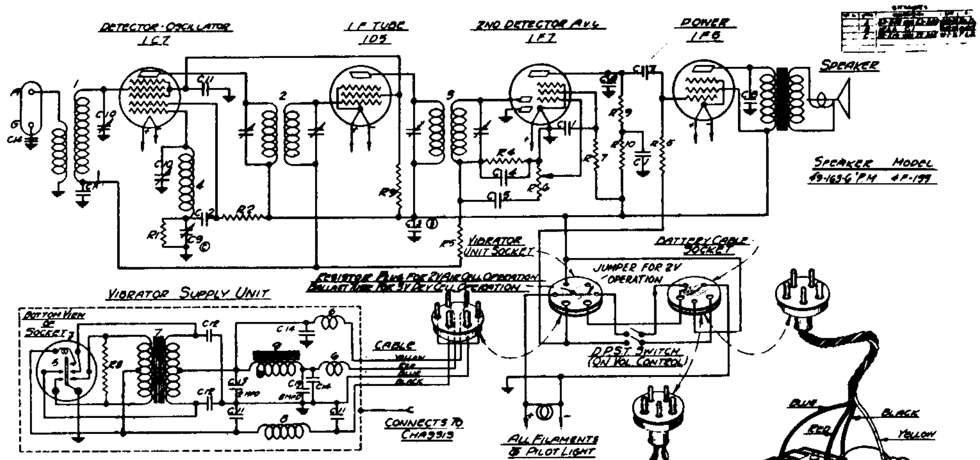
CODE	PART NO.	RESISTORS
R1	53-898	50,000 Ohm Oscillator Grid Resistor
R2	53-920	10,000 Ohm 1C6 Screen Resistor
R3	53-923	100,000 Ohm 1A4 Grid Isolation Resistor
R4	53-898	50,000 Ohm 1A4 Grid Resistor
R5	53-1042	25,000 Ohm 1A4 Screen Resistor
R6	19-1315	500,000 Ohm Volume Control
R7	53-923	100,000 Ohm 1B4 Grid Isolation Resistor
R8	53-925	500,000 Ohm 1B4 Screen Resistor
R9	53-924	250,000 Ohm 1B4 Plate Resistor
R10	53-925	500,000 Ohm 1F4 Grid Resistor
R11	53-2010	2.5 Ohm Filament Series Resistor
R12	53-2009	1.0 Ohm Filament Series Resistor

		INDUCTANCES
L1	17-2111	Oscillator Coil Assembly
L2	17-2100	Preselector Coil Assembly
L3	68-2012	First I.F. Transformer Assembly
L4	68-2030	Second I.F. Transformer Assembly
L5	64-2036	Permanent Magnet Dynamic Speaker - Output Trans. 1F4 Tube

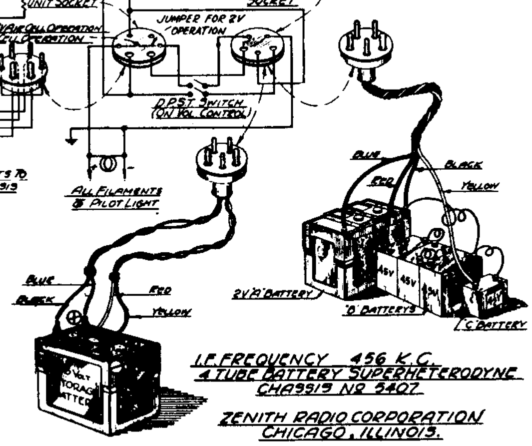
CODE	PART NO.	CONDENSERS
C1	77-833	Oscillator Section of 3 Gang Condenser
C2	77-833	First Preselector Section of 3 Gang Condenser
C3	77-833	Second Preselector Section of 3 Gang Condenser
C4	78-2008	First I.F. Primary Trimmer Condenser
C5	78-2011	First I.F. Secondary Trimmer Condenser
C6	78-2008	Second I.F. Primary Trimmer Condenser
C7	78-2011	Second I.F. Secondary Trimmer Condenser
C8	76-662	.002 Mfd. Mica Second Det. Plate Filter Cond.
C9	75-2003	.01 Mfd. 400 V. Paper Audio Feed Condenser
C10	75-2001	.002 Mfd. 600 V. Paper Output Plate Filter Cond.
C11	75-2005	.1 Mfd. 200 V. Paper Second Detector Screen By-Pass
C12	75-2005	.1 Mfd. 200 V. Paper 1B4 Grid Isolation By-Pass
C13	75-2005	.1 Mfd. 200 V. Paper 1A4 Grid Isolation By-Pass
C14	75-2005	.1 Mfd. 200 V. Paper 1C6 Screen By-Pass Condenser
C15	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C16	75-2013	1. Mfd. 400 V. Paper Filament By-Pass Condenser
C17	75-2005	.1 Mfd. 200 V. Paper A.V.C. Network By-Pass Cond.
C18	75-2005	.1 Mfd. 200 V. Paper 1A4 Screen By-Pass Cond.
C19	75-2011	.5 Mfd. 200 V. Paper B+ By-Pass Condenser

ZENITH RADIO CORPORATION

MODELS 4-F-193 & 5407



Diag No	Part No	Description		Diag No	Part No	Description
C1	22-250	.05 MFD	200V	1	94712	Antenna Coil Assem
C2	406	.0012 MFD	600V	2	[illegible]	1st I.F. Transformer
C3	350	(B) 25 MFD.	200V	3	[illegible]	2nd I.F. Transformer
C4	289	50 MMFD	600V	4	S4662	Oscillator Coil Assem
C5	827	.02 MFD	200V	5	90-8	Vibrator
C6	182	.00025	600V	6	[illegible]	R.F. Choke
C7	188	.02 MFD	400V	7	[illegible]	Power Transformer
C8	229	.006 MFD	600V	8	[illegible]	R.F. Choke Assembly
C9	319	200-350 MMFD Padder		9	[illegible]	Filter Choke
C10	408	2 Gang Variable				
C11	[illegible]	8 MFD	200V			
C12	455	.01 MFD (Tubular)	600V			
C13	[illegible]	2-8 MFD Dry Elec.	250V			
C14	263	.01 MFD (Tubular)	400V			
R1	[illegible]	40 M Ohm	1/4 W			
R2	961	5 M Ohm	1/4 W			
R3	59[illegible]	40 M Ohm	1/4 W			
R4	481	400 M Ohm	1/4 W			
R5	293	990 M Ohm	1/4 W			
R6	548	1 Megohm Vol. Cont & Sw				
R7	441	1 Megohm	1/4 W			
R8	594	200 Ohm	1/2 W			
R9	400	250 M Ohm	1/4 W			
R10	278	99 M Ohm	1/4 W			

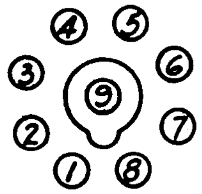


I.F. FREQUENCY 456 K.C.
4 TUBE BATTERY SUPERHETERODYNE
CHASSIS NO 5407

ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS.

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
1C7	1st Det. Osc.	0	2	128	48	—2	112	0	0	0
1D5	I.F.	0	2	126	48	—	—	0	0	0
1F7	2nd Det. A.V.C.	0	2	27	0	0	9	0	0	0
1F5	Power	0	2	122	126	0	—	0	0	—



BOTTOM VIEW OF SOCKET

All voltages measured with a 1000 ohm per volt D.C. meter and using the Zenith 6 V Economy Pack—Antenna and ground disconnected.

Battery Voltage—6.3 V.

Battery Drain—.98 amp.

ALIGNMENT

(1) Connect the output leads of the signal generator to the grid of the first detector and receiver ground lead. Also connect an output meter across the speaker leads.

(2) Set the signal generator at 456 K.C. and carefully adjust the four I.F. trimmers to the point giving the greatest output reading. These I.F. transformers are of a very high gain, selective type, and the adjustments should be repeated several times for greatest accuracy.

(3) Change the signal generator leads to the antenna and ground terminals of the receiver.

(4) Set the signal generator at 1400 K.C. Set the pointer on the receiver dial at the same frequency. First adjust the oscillator and then the detector trimmers on the gang condenser to the point giving the maximum reading on the output meter, using as small a signal from the generator as possible so as to prevent the A.V.C. action from affecting the output readings.

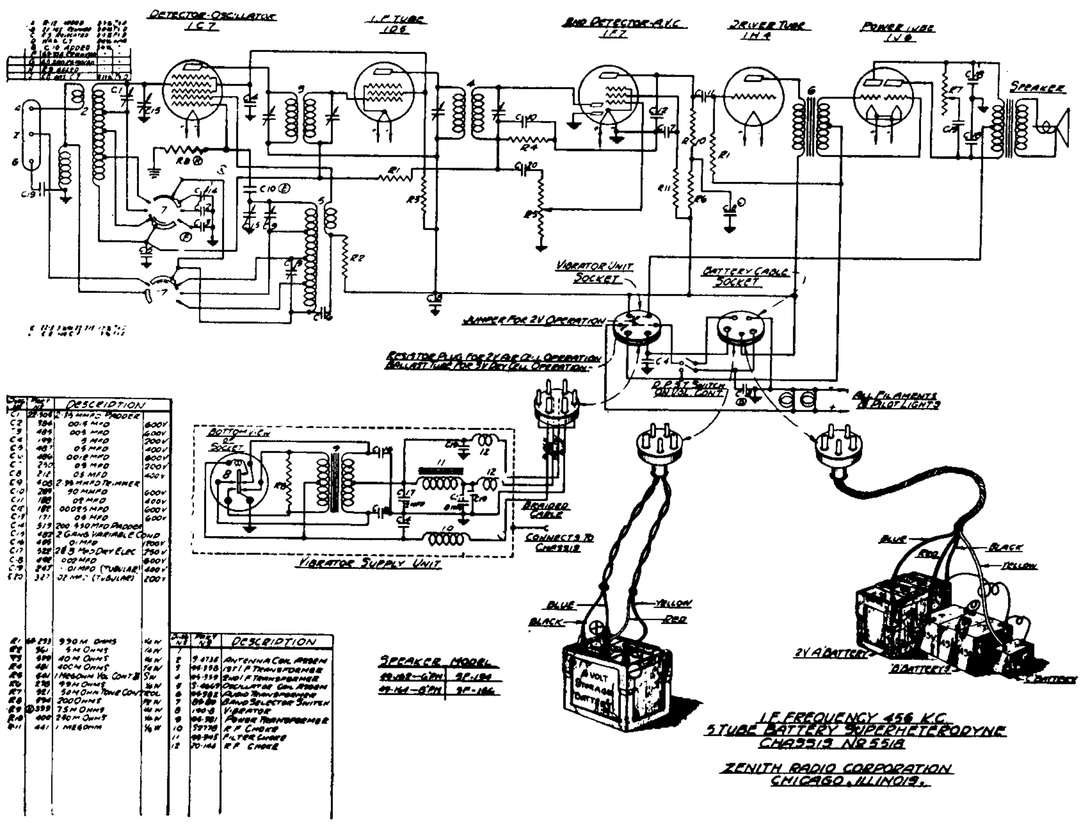
(5) Reset the signal generator to 600 K.C.

(6) Slowly rock the pointer past 600 K.C. on dial meanwhile adjusting the osc. padder (located in rear of gang condenser) to the combination giving the greatest output reading.

(7) Repeat operation No. 4.

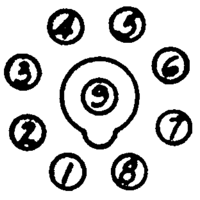
ZENITH RADIO CORPORATION

MODELS 5-F-134, 5-F-166 & 5518



SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
1C7	1st Det. Osc.	0	2	130	53	0	115	0	0	0
1D5	I.F.	0	2	130	53	—	—	0	0	0
1F7	2nd Det. A.V.C.	0	2	24	0	0	15	0	0	0
1H4	Driver	0	2	120	—	0	—	0	0	—
1J6	Power	0	2	143	—1	—1	143	0	0	—



BOTTOM VIEW OF SOCKET

All voltages measured with a 1000 ohm per volt D.C. meter and using the Zenith 6 V Economy Pack—Antenna and ground disconnected.

Battery Voltage—6.3 V.

Battery Drain—1.1 ampere

ALIGNMENT PROCEDURE

(1) Connect the output leads of the signal generator to grid of the first detector and receiver chassis. Also connect an output meter across the speaker transformer leads.

(2) Set the signal generator at 456 K.C. and carefully adjust the four I.F. trimmers to the point giving the highest reading on the output meter. The I. F transformers are of a very high gain, selective type, and these adjustments should be repeated several times in order to secure maximum accuracy.

All adjustments should be made using as weak an output from the signal generator as possible in order to prevent the A.V.C. action from affecting the output readings.

(3) Change the signal generator leads to the antenna and ground terminals of the receiver.

(4) Set signal generator at 5 M.C. Switch receiver to band B and adjust osc. trimmer on gang for correct dial reading.

(5) Set signal generator at 1400 K.C. Switch receiver to band A and adjust broadcast trimmer (located at front of chassis—see diagram below) for correct dial reading. Also adjust antenna trimmer on gang to resonance.

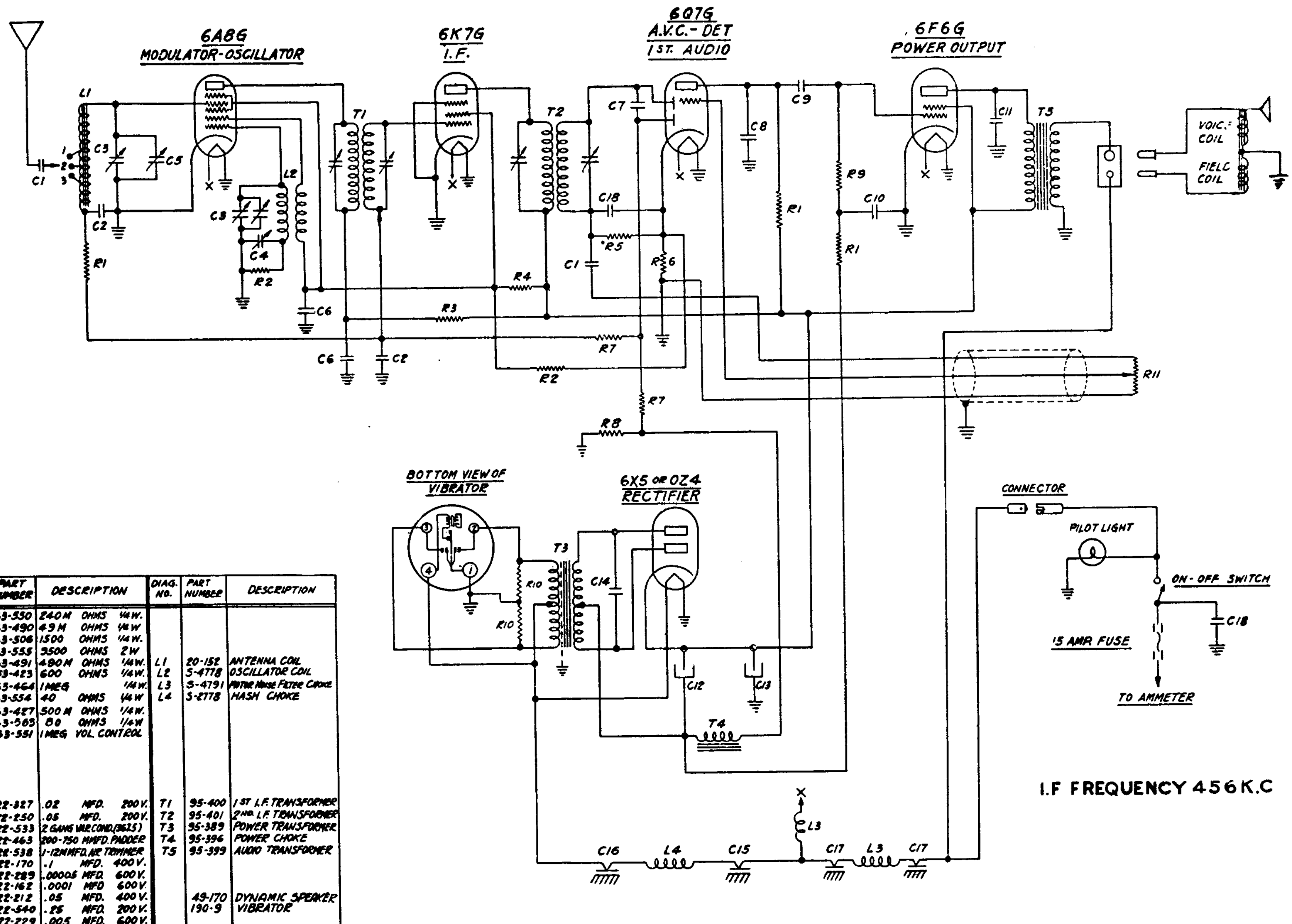
(6) Set signal generator at 18 M.C.—Switch receiver to band C and adjust the short wave trimmer while rocking the pointer past 18 M.C. on the dial to the combination giving the greatest output.

(7) Set signal generator at 600 K.C.—Switch receiver to band A and rock pointer past 600 on dial while adjusting the broadcast padder (located adjacent to gang condenser) to combination giving the greatest output reading.

(8) Readjust broadcast and ant. trimmers at 1400 K.C. (Same as No. 5).

ZENITH RADIO CORPORATION

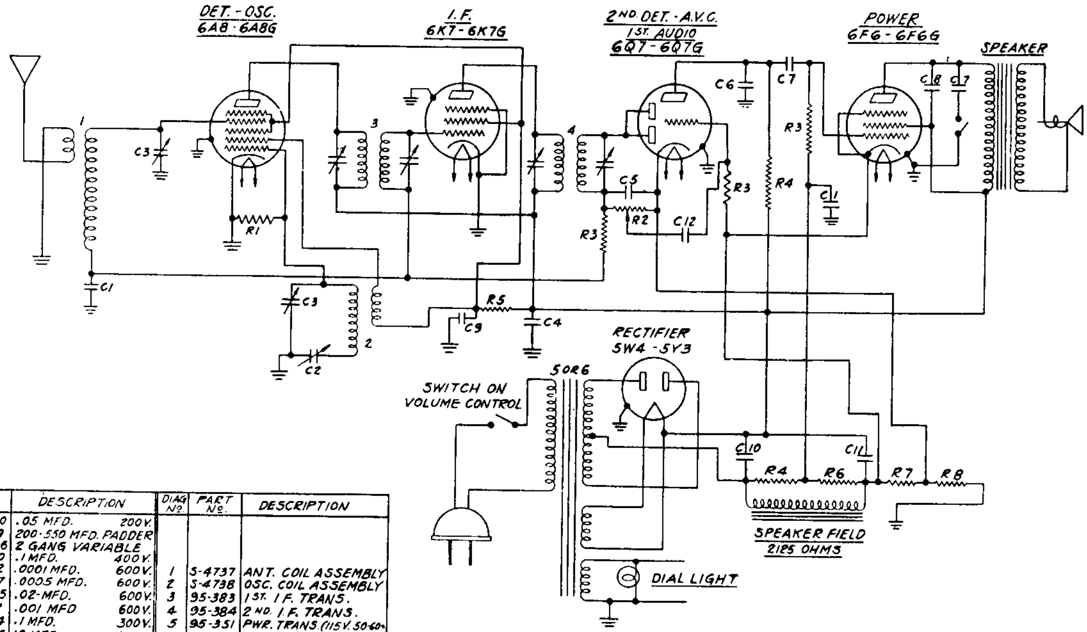
MODELS 5-M-191 & 5520



DIAG. NO.	PART NUMBER	DESCRIPTION	DIAG. NO.	PART NUMBER	DESCRIPTION
R1	63-550	240M OHMS 1/4 W.			
R2	63-490	49 M OHMS 1/4 W			
R3	63-506	1500 OHMS 1/4 W.			
R4	63-555	3500 OHMS 2 W			
R5	63-491	490 M OHMS 1/4 W.	L1	20-152	ANTENNA COIL
R6	63-423	600 OHMS 1/4 W.	L2	S-4778	OSCILLATOR COIL
R7	63-464	1 MEG 1/4 W.	L3	S-4791	MOTOR NOISE FILTER CHOKE
R8	63-554	40 OHMS 1/4 W	L4	S-2778	HASH CHOKE
R9	63-427	500 M OHMS 1/4 W.			
R10	63-563	80 OHMS 1/4 W			
R11	63-551	1 MEG VOL. CONTROL			
C1	22-327	.02 MFD. 200 V.	T1	95-400	1ST I.F. TRANSFORMER
C2	22-250	.05 MFD. 200 V.	T2	95-401	2ND I.F. TRANSFORMER
C3	22-533	2 GANG VAR. COND. (3625)	T3	95-389	POWER TRANSFORMER
C4	22-463	200-750 MMFD. PADDER	T4	95-396	POWER CHOKE
C5	22-538	1-12 MMFD. AIR TRIMMER	T5	95-399	AUDIO TRANSFORMER
C6	22-170	.1 MFD. 400 V.			
C7	22-289	.00005 MFD. 600 V.			
C8	22-162	.0001 MFD 600 V.			
C9	22-212	.05 MFD. 400 V.		49-170	DYNAMIC SPEAKER
C10	22-540	.25 MFD. 200 V.		190-9	VIBRATOR
C11	22-229	.005 MFD. 600 V.			
C12	22-528	4 MFD. 350 V.			
C13	22-528	8 MFD. 350 V.			
C14	22-535	.008 MFD. 1400 V.			
C15	22-468	.5 MFD. 200 V.			
C16	22-530	.5 MFD. 200 V.			
C17		250 MMFD. LO-REACT.			
C18	22-182	.00025 MFD. 600 V.			

ZENITH RADIO CORPORATION

MODELS 5-R-123, 5-R-135, 5-R-165 & 5519



DIAG No.	PART No.	DESCRIPTION	DIAG No.	PART No.	DESCRIPTION
C1	22-250	.05 MFD. 200V.			
C2	22-519	200-550 MFD. PADDER			
C3	22-406	2 GANG VARIABLE			
C4	22-170	.1 MFD. 400V.			
C5	22-162	.0001 MFD. 600V.	1	S-4737	ANT. COIL ASSEMBLY
C6	22-147	.0005 MFD. 600V.	2	S-4738	OSC. COIL ASSEMBLY
C7	22-435	.02-MFD. 600V.	3	95-383	1ST. I.F. TRANS.
C8	22-82	.001 MFD 600V.	4	95-384	2ND. I.F. TRANS.
C9	22-224	.1 MFD. 300V.	5	95-351	PWR. TRANS. (115V. 50-60~
C10	22-505	12 MFD. 325V.	6	95-387	PWR TRANS. 25~ (ALL VOLTAGE
C11	22-506	16 MFD. 250V.	7		
C12	22-327	.02 MFD. 200V.			
R1	63-280	49M OHMS 1/4 W.			
R2	63-547	400M VOL. CONTROL			
R3	63-293	990M OHMS 1/4 W.			
R4	63-258	490M OHMS 1/4 W.			
R5	63-545	12.5M OHMS 1 W.			
R6	63-376	190M OHMS 1/4 W.			
R7	63-546	80 OHMS 1/4 W.			
R8	63-246	150 OHMS 1/4 W.			

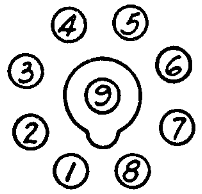
MODEL No.	SPEAKER No.	SIZE
5-R-123	49-115	5"
5-R-135	49-152	8"
5-R-165	49-144	10"

I.F. FREQUENCY 456 K.C.
5 TUBE SUPERHETERODYNE
CHASSIS No. 5519

ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8G	1st Det. Osc.	0	0	220	102	—5	97	6.1AC	0	0
6K7G	I. F.	0	0	220	102	0	—	6.1AC	0	0
6Q7G	2nd Det. A. V. C.	0	0	54	—3	—3	—	6.1AC	—.3	0
6F6G	Power	0	0	210	225	—4	—	6.1AC	—5	—
5Y3	Rect.	0	225	—	305AC	—	305AC	—	225	—



BOTTOM VIEW OF SOCKET

Line voltage 115 V. Antenna and ground disconnected. All voltages measured from point indicated to ground, using a 1000 ohm per volt meter.

ALIGNMENT PROCEDURE

(1) Connect the output leads of the signal generator to the grid of the first detector and receiver ground lead. Also connect an output meter across the speaker leads.

(2) Set the signal generator at 456 K.C. and carefully adjust the four I.F. trimmers to the point giving the greatest output reading. These I.F. transformers are of a very high gain, selectivity type, and the adjustments should be repeated several times for greatest accuracy.

(3) Change the signal generator leads to the antenna and ground leads of the receiver.

(4) Set the signal generator at 1400 K.C. Set the pointer on the receiver dial at the same frequency. First adjust the oscillator and then the detector trimmers on the gang condenser to the point giving the maximum reading on the output meter, using as small a signal from the generator as possible so as to prevent the A.V.C. action from affecting the output readings.

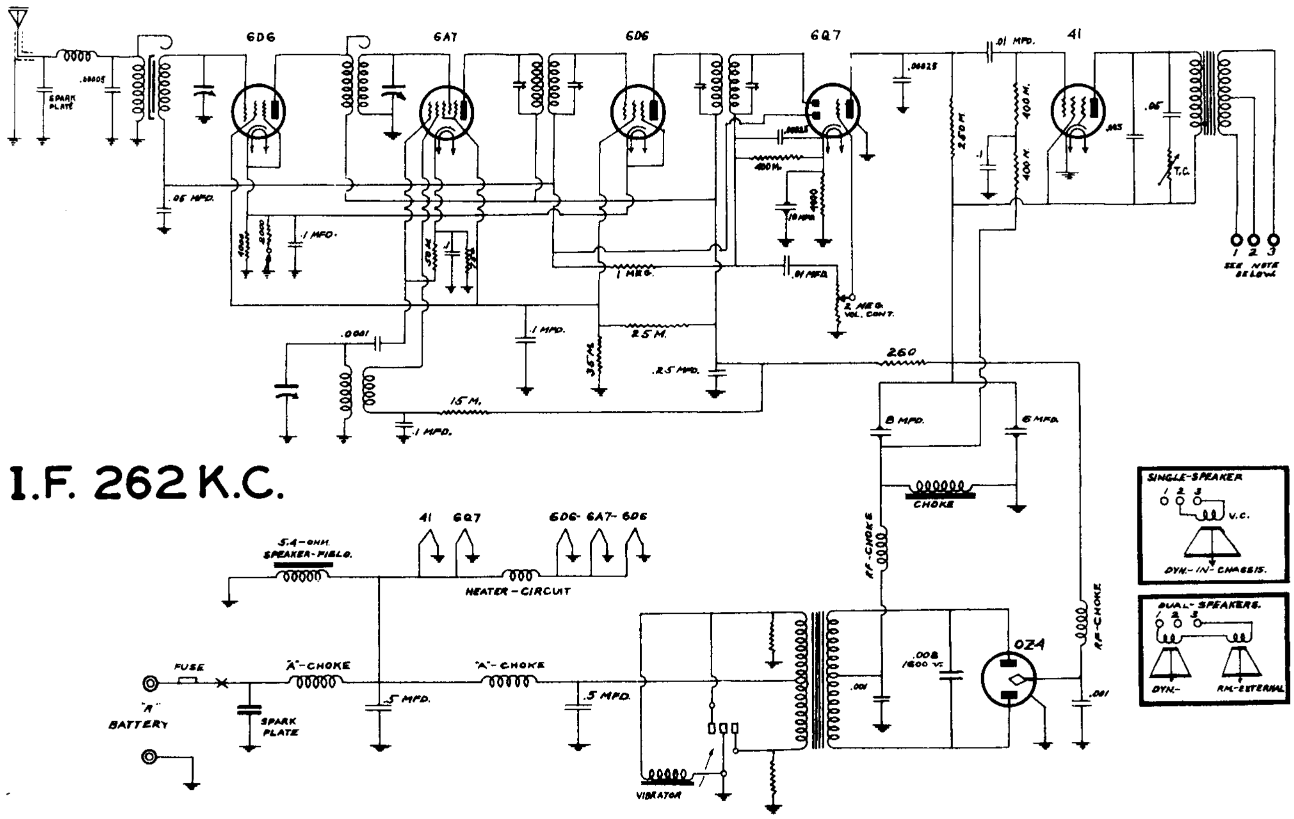
(5) Reset the signal generator to 600 K.C.

(6) Slowly rock the pointer past 600 K.C. on dial meanwhile adjusting the osc. padder (located beneath dial on front of chassis) to the combination giving the greatest output reading.

(7) Repeat operation No. 4.

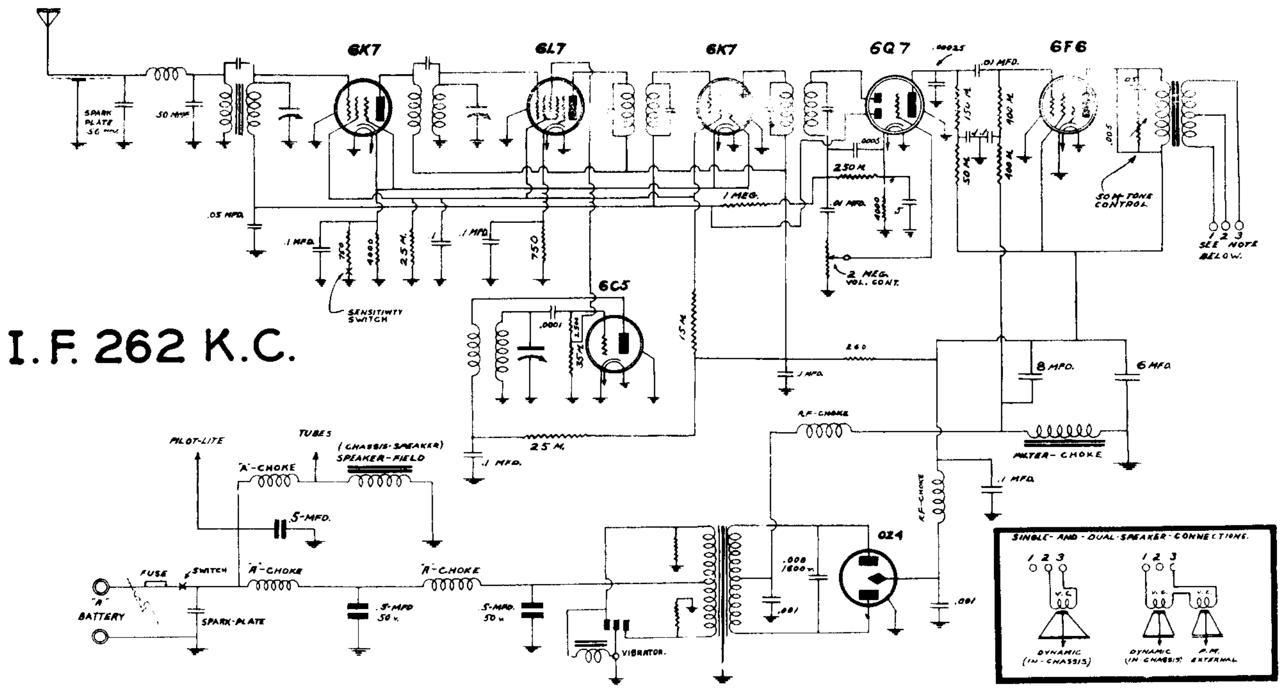
ZEPHYR RADIO CO.

MODEL 3M7 AUTO RADIO



I.F. 262 K.C.

MODEL 3M8 AUTO RADIO



I.F. 262 K.C.

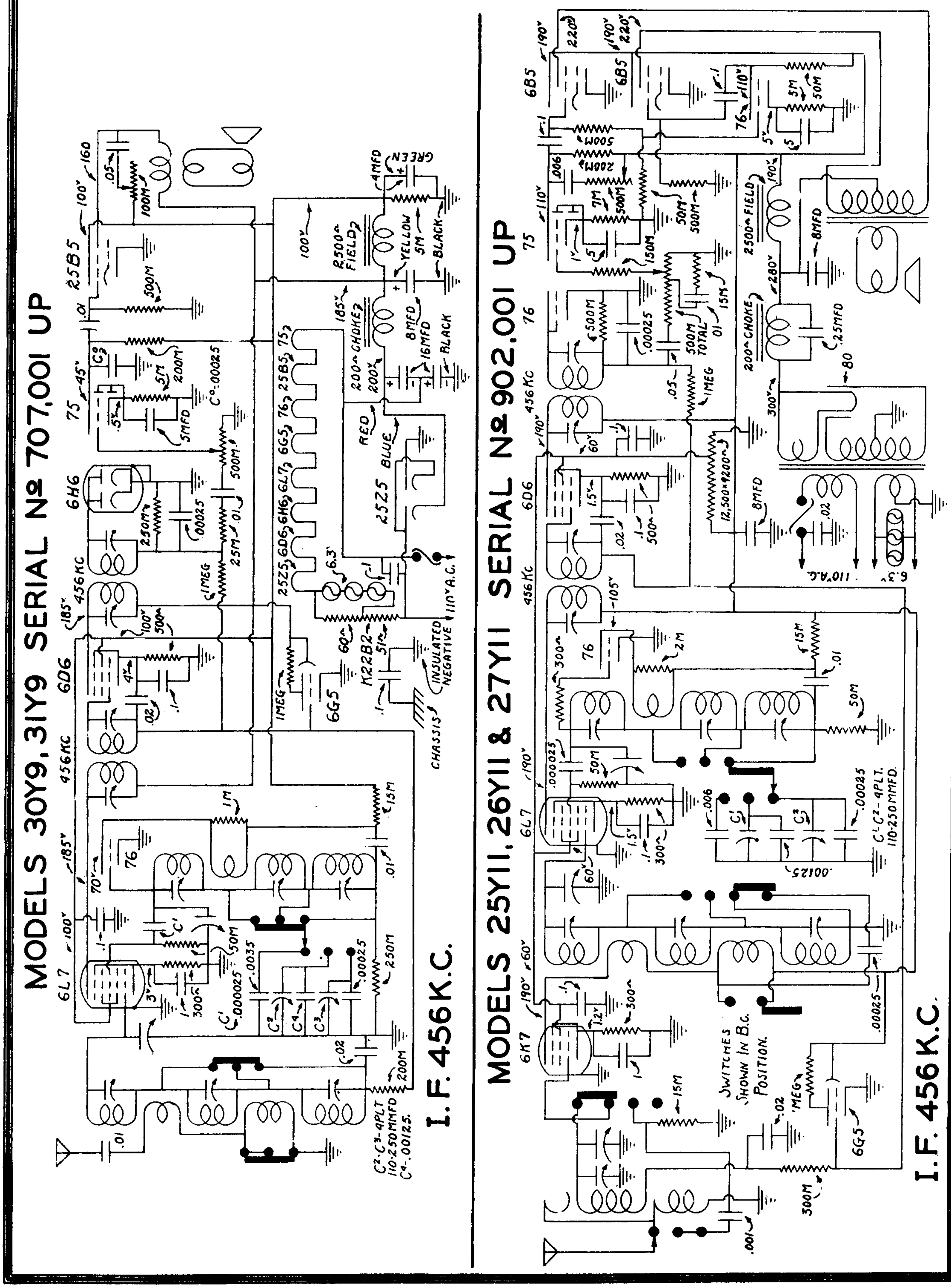
ZEPHYR RADIO CO.

MODELS 30Y9, 31Y9 SERIAL № 707,001 UP

I.F. 456 K.C.

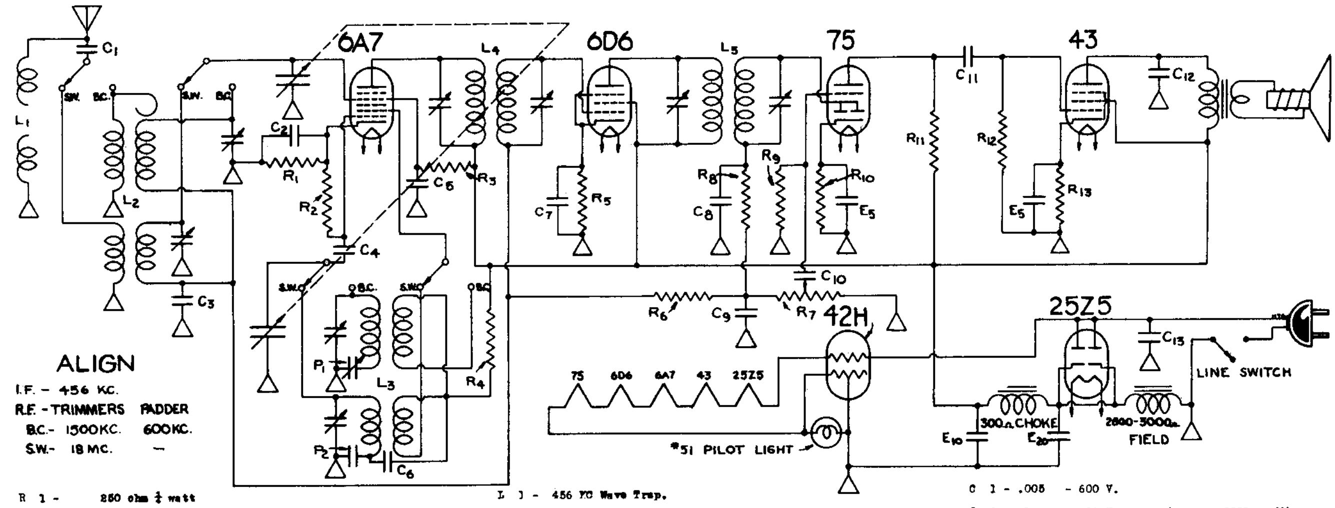
MODELS 25Y11, 26Y11 & 27Y11 SERIAL № 902,001 UP

I.F. 456 K.C.



AIR-KING PRODUCTS COMPANY, INC.

MODEL 260

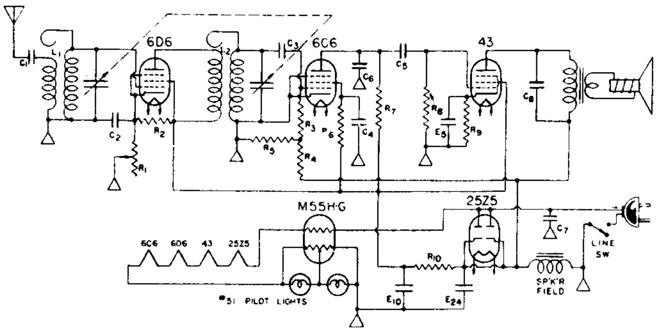


ALIGN
I.F. - 456 KC.
R.F. - TRIMMERS PADDER
B.C. - 1500KC. 600KC.
S.W. - 18 MC. —

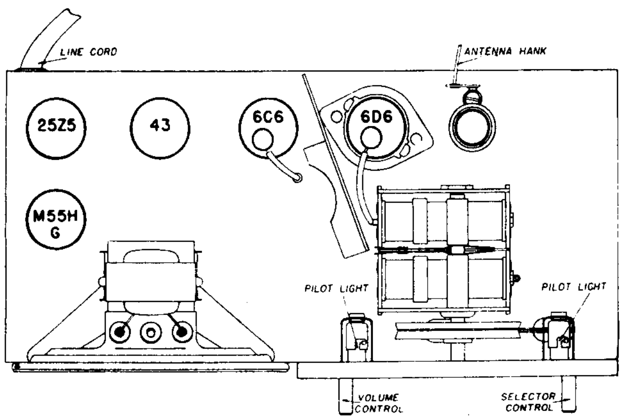
R 1 - 250 ohm ½ watt	R 8 - 50,000 " ½ watt	L 1 - 456 KC Wave Trap.
R 2 - 50,000 " ½ "	R 9 - 750,000 " ½ "	L 2 - 2 band antenna coil.
R 3 - 35,000 " ½ "	R 10 - 4,500 " ½ "	L 3 - 2 band oscillator coil.
R 4 - 1000 " ½ "	R 11 - 500,000 " ½ "	L 4 - 456 KC input I.F.
R 5 - 500 " ½ "	R 12 - 750,000 " ½ "	L 5 - 456 KC output I.F.
R 6 - 3,000,000 " ½ "	R 13 - 650 " ½ "	P 1 - 500 mmfd.
R 7 - 500,000 " vol. cont.		P 2 - .0054 mfd.

E 5 - 5 mfd. - 35 V.	C 1 - .005 - 600 V.	C 8 - .0001 - Mica
E 5 - 5 mfd. - 35 V.	C 2 - .1 - 200 V.	C 9 - .0001 - Mica
E 10 - 10 mfd. - 150 V.	C 3 - .05 - 400 V.	C 10 - .02 - 400 V.
E 20 - 20 mfd. - 150 V.	C 4 - .0001 - Mica	C 11 - .02 - 400 V.
	C 5 - .1 - 200 V.	C 12 - .01 - 600 V.
	C 6 - .02 - 400 V.	C 13 - .05 - 400 V.
	C 7 - .1 - 200 V.	

MODEL 700



TUBE SOCKET LOCATIONS



R_1 - 25,000 OHM VOL CONTROL	L_1 - ANTENNA COIL	C_1 - .005 - 400 V
R_2 - 35,000 " ¼ WATT	L_2 - R F COIL	C_2 - .02 - 200 V
R_3 - 6,000,000 " " "		C_3 - .005 - 400 V
R_4 - 1,000,000 " " "		C_4 - .02 - 200 V
R_5 - 2,700 " " "	E_{10} - 10 MFD 150 V	C_5 - .02 - 200 V
R_6 - 6,000,000 " " "	E_{24} - 24 " 150 V	C_6 - .00025 - MICA
R_7 - 1,000,000 " " "	E_5 - 5 " 25 V	C_7 - .1 - 400 V
R_8 - 500,000 " " "		C_8 - .005 - 400 V
R_9 - 650 " ½ "		
R_{10} - 4,500 " " "		

ALIGN AT 1500 KC

REPLACEMENT PARTS

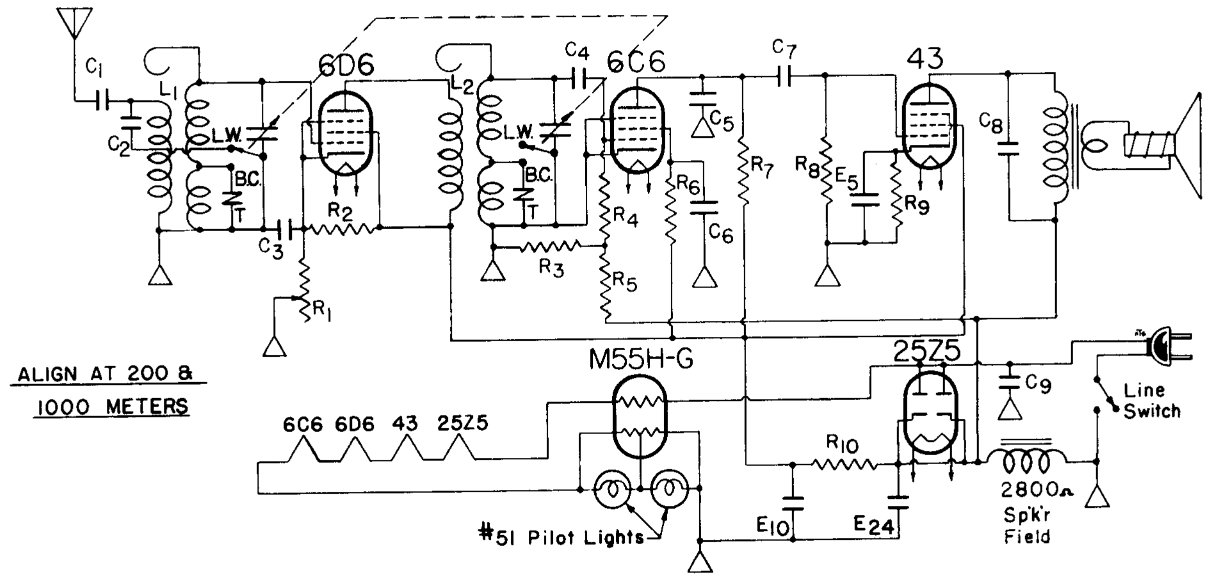
Stock No.	Description	List Price
700	Cabinet	$2.75
1004	Knob	.06
1030	Pointer	.06
1031	Celluloid dial face	.15
S-2280	Dynamic 5" speaker	2.28
1032	Variable Condenser	1.45
1033	Dial scale	.10
1034	Line cord	.21
700A	Volume control	.57
170A	Antenna coil	.28
170B	R F coil	.28
1010	6D6, 6C6, 43 or 25Z5 sockets (each)	.07
1035	M55HG socket	.09
1011	Tube shield (base, clip & shield)	.08

Stock No.	Description	List Price
1013	.02 — 200 volt cond.	.09
1012	.1 — 400 volt. cond.	.09
1014	.005 — 400 volt cond.	.09
919-91	24-10-5 electrolytic	.75
1016	4500 ohm resis. 1/2W	.06
1017	650 ohm resis. 1/2W	.06
1021	6 meg. ohm ¼ watt resis.	.06
1022	2700 ohm ¼ watt resis.	.06
1023	35000 ohm ¼ watt resis.	.06
1028	Antenna hank	.15
1037	Pilot light	.10
1038	Pilot light socket	.10
1039	Dial cord	.15
1042	Dial shaft, bushing & nut	.15

Prices subject to change without notice.

AIR-KING PRODUCTS COMPANY, INC.

MODEL 700LW



R_1 -	25,000	ohm	vol. control	
R_2 -	35,000	"	$\frac{1}{4}$	watt
R_3 -	2,700	"	"	"
R_4 -	6,000,000	"	"	"
R_5 -	1,000,000	"	"	"
R_6 -	6,000,000	"	"	"
R_7 -	1,000,000	"	"	"
R_8 -	500,000	"	"	"
R_9 -	650	"	$\frac{1}{2}$	"
R_{10} -	4,500	"	"	"

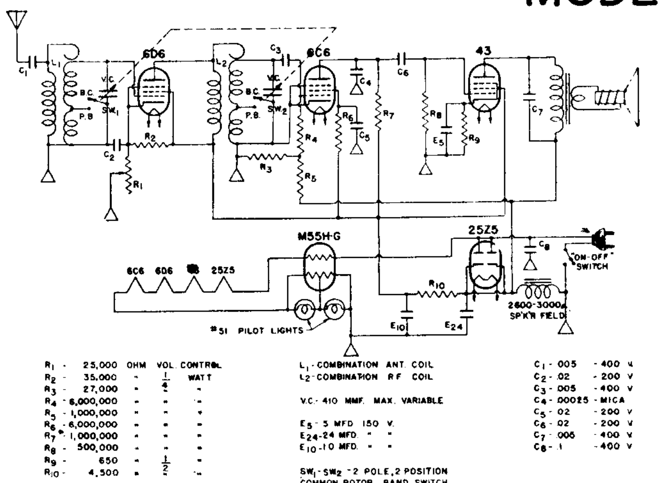
L_1 - Comb. Antenna Coil
L_2 - Comb. R.F. Coil

E_{24} - 24 mfd. 150 v.
E_{10} - 10 " "
E_5 - 5 " 25 v.

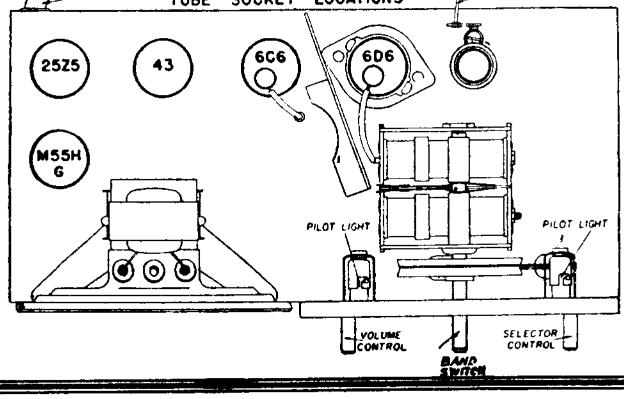
T - 3-35 mmf. Trimmer

C_1	- .005	- 400 v.
C_2	- .00345	- mica
C_3	- .02	- 200 v.
C_4	- .005	- 400 v.
C_5	- .00025	- mica
C_6	- .02	- 200 v.
C_7	- .02	- 200 v.
C_8	- .005	- 400 v.
C_9	- .1	- 400 v.

MODEL 705



TUBE SOCKET LOCATIONS



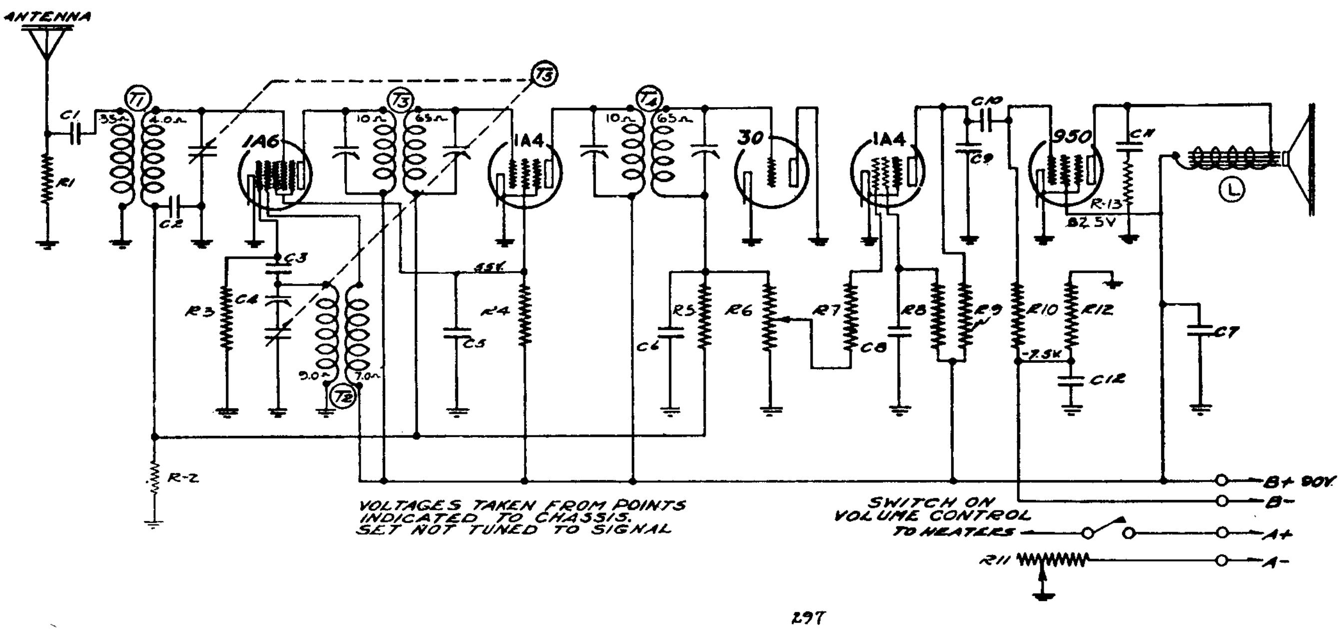
REPLACEMENT PARTS

Stock No.	Description	List Price
705	Cabinet	$2.75
1004	Knob	.06
1030	Pointer	.06
1031	Celluloid dial face	.20
S-2280	Dynamic 5" speaker	2.28
1032	Variable Condenser	1.45
1033	Dial scale	.10
1034	Line cord	.21
700A	Volume control	.60
705A	Antenna coil	.42
705B	R F coil	.42
1010	6D6, 6C6, 43 or 25Z5 sockets sockets (each)	.09
1035	M55HG socket	.09
1013	.02 — 200 volt cond.	.09
1039	Dial cord	.15
1011A	Tube shield (base, clip and shield)	.10
1054	Wave band switch	.30
1012	.1 — 400 volt. cond.	.09
1014	.005 — 400 volt cond.	.09
919-91	24-10-5 electrolytic	.75
1016	4500 ohm resis. 1/2W	.06
1017	650 ohm resis. 1/2W	.06
1021	6 meg. ohm ¼ watt resis.	.06
1022	2700 ohm ¼ watt resis.	.06
1023	35000 ohm ¼ watt resis.	.06
1028	Antenna hank	.15
1037	Pilot light	.10
1038	Pilot light socket	.10

Prices subject to change without notice.

BELMONT RADIO CORPORATION

MODEL 523



No.	Part No.	Description
		RESISTORS
R1	130-17	10M Ohm - 1/3 W. - 20% - Carbon
R2	130-38	2 meg " - 1/3 W. - 20% - Carbon
R3	130-52	50M " - 1/3 W. - 20% - Carbon
R4	130-17	10M " - 1/3 W. - 20% - Carbon
R5	130-38	2 meg " - 1/3 W. - 20% - Carbon
R6	101-69	1 meg " - Volume Control - and Switch
R7	130-52	50M " - 1/3 W. - 20% - Carbon
R8	130-19	1 meg " - 1/3 W. - 20% - Carbon
R9	130-9	200M ohm 1/3 W. - 20% - Carbon
R10	130-19	1 meg " - 1/3 W. - 20% - Carbon
R11	101-44	4.75 " - Rheostat
R12	130-93	450 " - 1/3 W. - 10% - Carbon
R13	130-52	50M " - 1/3 W. - 20% - Carbon
		CONDENSERS
C1	100-11	.01 x 400 v. - 25%
C2	100-22	.05 x 200 v. - 25%
C3	129-12	.00025 Mica - MT - 20%
C4	124-14	Series Pad
C5	100-9	.05 x 200 v. - 25%
C6	129-5	.0001 Mica - MT - 20%
C7	100-48	.25 x 200 v.
C8	100-9	.05 x 200 v. - 25%
C9	129-2	.0005 Mica - MT - 20%
C10	100-11	.01 x 400 v. - 25%
C11	100-11	.01 x 400 v. - 25%
C12	119-22	10.0 mfd. x 25 v. - Working Voltage
		PARTS
T1	111-46	Antenna Coil
T2	110-36	Oscillator Coil
T3	108-67	Input I. F. Coil - 46 kc.
T4	108-68	Output I. F. Coil - 465 kc.
T5	102-42	Two Gang Condenser
L	114-71	Eight Inch Magnetic Speaker

LIST OF REPAIR PARTS

Use only genuine factory replacement parts

Part No.	DESCRIPTION	No. Used In Set	Selling Price Ea.
	CONDENSERS		
100-48	.25 Mfd. x 200 Volt Tubular - with Bracket	1	.25
100-9	.05 Mfd. x 200 Volt Tubular	2	.25
100-11	.01 Mfd. x 400 Volt Tubular	3	.25
100-22	.05 Mfd. x 200 Volt Tubular	1	.25
119-22	10 Mfd. x 25 Volt Electrolytic	1	.50
129-2	.0005 Mica - Type MT - 20%	1	.25
129-5	.0001 Mica - Type MT - 20%	1	.25
129-12	.00025 Mica - Type MT - 20%	1	.25
	RESISTORS		
130-9	200M Ohm - 1/3 Watt - 20% - 20 Volts - Carbon	1	.20
130-17	10M Ohm - 1/3 Watt - 20% - 20 Volts - Carbon	2	.20
130-19	1 Meg. Ohm - 1/3 Watt - 20% - 100 Volts - Carbon	2	.20
130-38	2 Meg. Ohm - 1/3 Watt - 20% - 100 Volts - Carbon	2	.20
130-52	50M Ohm - 1/3 Watt - 20% - 10 Volts - Carbon	3	.20
130-93	450 Ohm - 1/3 Watt - 10% - 10 Volts - Carbon	1	.20
	COILS		
108-67	Input I.F. Coil Assembly - Complete with Can	1	1.50
108-68	Output I.F. Coil Assembly - Complete with Can	1	1.50
110-36	Oscillator Coil Assembly - Complete - Less Can	1	.50
111-46	Antenna Coil Assembly Complete with Can	1	1.00
	SOCKETS		
121-6	Six Prong Socket - Marked "1A6"	1	.15
121-8	Five Prong Socket - Marked "950"	1	.10
121-9	Four Prong Socket - Marked "1A4"	2	.10
121-9	Four Prong Socket - Marked "30"	1	.10
	SPEAKER		
114-52	Eight Inch Magnetic Speaker		6.00
	MISCELLANEOUS		
101-44	Filament Rheostat (4.75 Ohm)	1	.40
101-69	Volume Control and Switch (1 Meg Ohm)	1	1.25
102-42	Two Gang Variable Condenser	1	2.50
112-99	Rheostat Label	1	.20
113-34	Ant. Gnd. Strip	1	.15
115-22	Tube Shield (Type 1A4 Tube)	1	.15
124-14	Series Pad	1	.35
128-51	Wood Knob (Spring Type)	2	.15
131-12	Bakelite Knob - with Arrow	1	.15
	DIAL PARTS LIST		
117-98	Dial Housing Including 117-19 Bushing		.30
112-147	Tuning Shaft Including 117-86 Pulley		.10
112-199	Dial Drum Including 117-84 Bushing and Set Screw		.20
120-62	Take-Up Coil Spring		.03
120-9	Black Irish Linen String		.05
112-212	Dial Scale		.40
131-43	Cinch Buttons for Fastening Scale		.03
112-151	Dial Pointer with 132-19 Screw and 117-62 Washer		.05
112-143	Oval Escutcheon Complete with Crystal		.85

Tubes are coded and guaranteed by the tube manufacturer.

Prompter service can be rendered on adjustments if defective tubes are returned direct to the tube manufacturer rather than through our factory.

Note: We cannot supply speaker cones or coils only. We can replace a damaged speaker for $2.00 net, if defective speaker is returned.

All resistors and mica condensers are RMA color coded—specify value and/or resistor or condenser (per schematic diagram) and model number. Mica condensers are coded with an additional dot indicating tolerance:

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None

When ordering condensers, specify part number, model and/or capacitor (per schematic diagram) and model number.

When ordering parts, always specify part and model number as well as serial number of chassis.

All prices quoted are list and are subject to the usual trade discounts. Shipments are F. O. B. our Factory. When remitting in advance, please include postage.

Prices subject to change without notice.

BELMONT RADIO CORPORATION

MODEL 523

WHAT TO DO IF RECEPTION IS POOR, OR RECEIVER WILL NOT OPERATE

TUBES

See that all tubes are in their proper places. Tubes are very fragile and are the most frequent cause of a radio set not playing. Take your tubes to your dealer and have him test them for you.

BATTERIES

Look over all battery connections and see that they are all tight and clean. Take them to the nearest dealer where you can have them tested.

ANTENNA AND GROUND

Check over all connections to be sure that they are all clean and tight. Make sure that the antenna is not rubbing against a metal eavestrough or against trees.

HOWLING

See if the bolts holding the chassis to the cabinet have been removed. These bolts will be found underneath the cabinet.

STATION INTERFERENCE AND WHISTLING

As you use your radio you will notice that the sound from most stations comes clear, but that with a few there is a continuous background noise or whistling. This is no fault of the radio—but is caused by two or more stations operating on practically the same wave length or frequency, and occurs with all radios, no matter how selective they may be.

Interference is caused by the fact that there are more broadcasting stations than broadcasting channels. On some channels there are several stations operating at the same time. This condition is particularly noticeable in the shorter wave lengths (higher frequencies) which is one reason why all radio sets are noisy on the lower portion of the dial. Usually, noisy stations are small and of local range. Better reception can usually be obtained by turning to another portion of the dial.

FADING

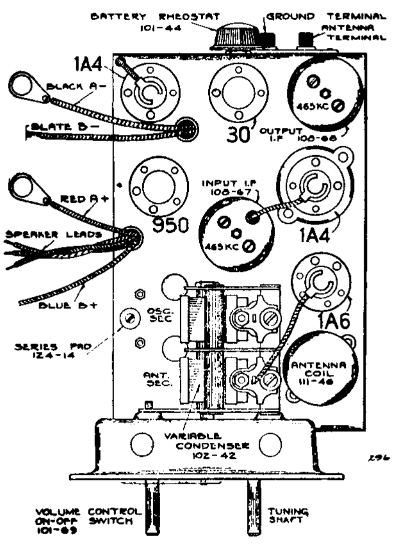
There is one curious and confusing condition known as "fading" which you will probably encounter from time to time when receiving distant stations.

A program may be tuned in loud and clear. Then without any change in the adjustment of the set, the music will begin to fade, gradually becoming weaker and weaker until it may die out altogether. Then it may increase again in volume until the program is once more loud and clear. All of this can happen in one or two minutes and may occur only once or twice in an evening. On the other hand it might happen many times.

Fading is much more noticeable on some nights than others and is more pronounced with certain stations.

The cause of fading is not definitely known. If you are bothered by it the only thing to do is wait for the program to strengthen or turn to another station.

TOP VIEW MODEL 523



GROUND

Although the radio will operate without a ground wire a good ground is absolutely necessary for proper operation. The ground wire should be attached to a metal pipe driven into the ground or to the metal jacket on a water pump. Be sure that the connection is clean at the point where the wire connects to the metal. If necessary use a file to insure a clean contact and if possible solder the wire to the metal. Remember that a poor connection to either the aerial or the ground will make the receiver very noisy.

BATTERIES REQUIRED

The following batteries are needed.

2........45 volt "B" Batteries.

1........3 Volt Dry "A" Battery or 2 Volt Storage Battery.

IMPORTANT

This radio must be used with a good aerial and ground. Unless you are careful to make all connections clean and tight the set will not operate properly.

CARE AND MAINTENANCE

There are no adjustments of any kind to be made on the chassis or speaker. There is nothing to get out of order and no attention to these items is required.

TUBES

The tubes in the receiver should be checked occasionally, either by taking them out and having them tested or by obtaining a new set of tubes and inserting them in the sockets, one at a time, noting any difference in performance.

ANTENNA AND GROUND

Periodic inspection of the antenna and ground system is recommended, to be sure that all connections are clean and tight, and that the antenna is well insulated from the ground at all points.

DRY "A" BATTERY

The long life dry "A" battery will need very little attention other than to keep the top of the battery clean and to see that the connections to the terminals are clean and tight at all times.

At all times, whether in use or not, endeavor to have the battery in a cool dry place.

Be careful not to leave your set turned on over night — it discharges the battery very quickly.

STORAGE "A" BATTERY

If your set uses a storage "A" battery, you will notice that when the battery is new *it does not have its full rated life* — this is characteristic of new storage batteries. They reach their maximum capacity after being charged and discharged several times in service.

The proper care of a storage battery will enable you to receive several years of good service. Neglect will ruin it very quickly. Check frequently to see that the water level is about one-half inch above the plates. Add only pure distilled water, as often as needed. A little too much water will do no harm. Too little is very harmful to the battery.

Do not let the battery become completely discharged, but if it should, have it charged again as soon as possible. A battery can be ruined very quickly by permitting it to lie around unused, in a fully discharged condition.

Keep the top of the battery clean and dry and grease the terminals occasionally with a little vaseline.

In testing your battery use only the indicator on your battery or a hydrometer. These indicators measure the specific gravity of the electrolyte. Do not, under any circumstances, use so-called "magic" charging powders or liquids, or you may completely ruin your battery.

When you have your battery recharged at a charging station tell the operator that the battery must not be charged at a faster rate than 5 amperes. If the battery is charged above this it will take the charge too quickly and will not hold it when put into service again. If this precaution is not followed you will have to have your battery charged much more often than necessary.

"B" BATTERIES

Whether in service or not, endeavor to keep the batteries in a cool dry place.

The top of the batteries should be wiped off occasionally with a dry cloth and the connections should be checked to see that they are clean and tight.

Most of the newer types of radio sets are designed to use less battery current when the set is operated at low volume and to use maximum battery current only when large volume is desired. For this reason you will obtain longer life from your "B" batteries by not operating your set louder than is necessary.

Be careful not to leave your set turned on over night. The long drain uses a lot of current and gives the batteries no chance to recuperate. Remember also that the life of your "B" batteries will depend upon the number of hours each day that you use your set. Turning the set off when it is not needed saves the batteries accordingly.

SERVICE DATA FOR PROFESSIONAL SERVICE MEN

DESCRIPTION

TUBES:

The tube complement of this chassis is as follows:

1 Type 1A6—first detector oscillator.
1 Type 1A4—I.F. amplifier. 465 K. C
1 Type 30—second detector. A. V. C.
1 Type 1A4—audio.
1 Type 950—output.

SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram, are measured with a new set of batteries.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

ALIGNING INSTRUCTIONS

CAUTION: No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as run down batteries, defective tubes, poor installations, open or grounded antenna systems, defective condensers and resistors.

In order to properly align this chassis, an oscillator (generator) is necessary.

All adjustments should be made with a non-metallic screw driver.

ALIGNING I.F. TRANSFORMERS: (465 K.C.)

1. With volume control full on and with variable condenser at its minimum capacity position, plates entirely out of mesh, and with external oscillator set at 465 K.C. connected in series with a .1 mfd. condenser, to the grid of the 1A6 tube (cap at top of tube), adjust I.F. transformers, parts number 108-67 and 108-68, to resonance. Both of these transformers have two (2) adjustments each, they are accessible from the tops of the cans (for location see top view).

   Use as a resonance indicator an output meter connected across the outside terminals of the speaker or by means of an adapter to the plate and screen of the type 950 output tube. Maximum deflection of the volt meter indicates resonance.

   Use only enough signal to get a readily readable output.

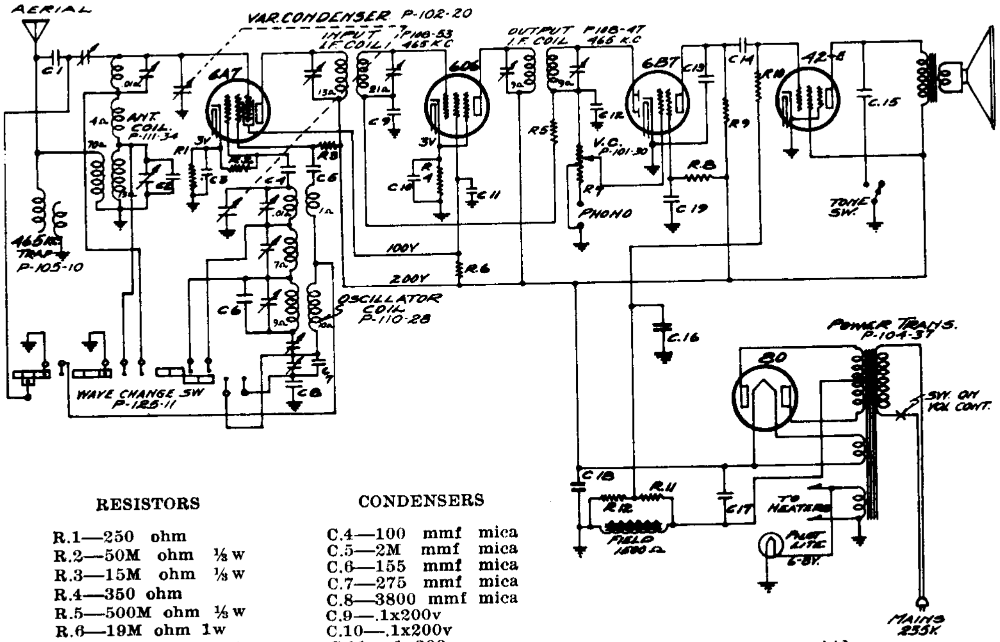
   A low range output meter or the low scale of a multi-range meter should be used.

BROADCAST BAND ALIGNMENT:

1. Set external oscillator to 1720 K.C. and connect it in series with a 200 mmfd. condenser to the antenna and ground posts.
   (a) With variable condenser in its minimum capacity position, plates entirely out of mesh, adjust oscillator trimmer (rear section of variable condenser) to resonance.
   (b) Re-set external oscillator to 1400 K.C. Rotate variable condenser, pick up signal and adjust antenna trimmer (front section of variable condenser) to resonance.
   (c) Re-set external oscillator to 600 K.C., move dial pointer to 600 K.C., and adjust series pad, part number 124-14 (see top view), to resonance. While making this adjustment, slowly rock variable condenser to and fro until maximum output is obtained.
   (d) Check for sensitivity at 1400, 1000, 600 K.C. DO NOT BEND PLATES.

BELMONT RADIO CORPORATION

MODEL 555



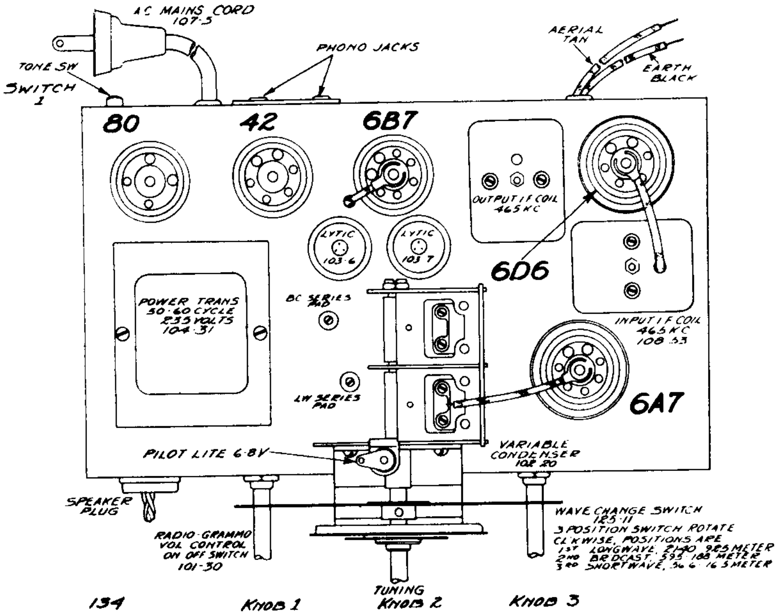
142

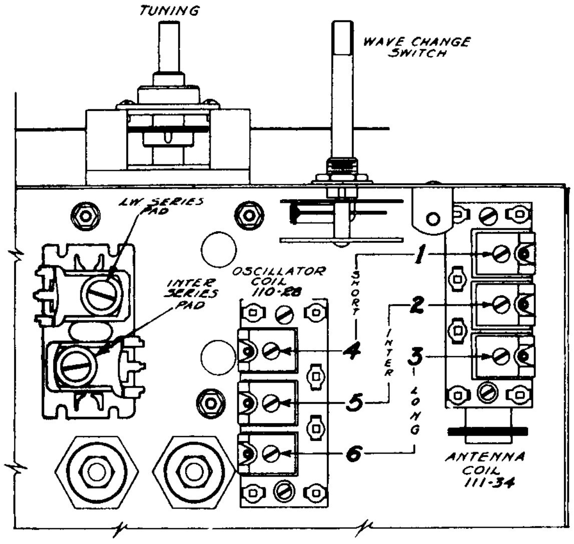
RESISTORS	CONDENSERS
R.1—250 ohm	C.4—100 mmf mica
R.2—50M ohm ⅓ w	C.5—2M mmf mica
R.3—15M ohm ⅓ w	C.6—155 mmf mica
R.4—350 ohm	C.7—275 mmf mica
R.5—500M ohm ⅓ w	C.8—3800 mmf mica
R.6—19M ohm 1w	C.9—.1x200v
R.7—1 meg vol. cont.	C.10—.1x200v
R.8—1 meg ⅓ w	C.11—.1x200v
R.9—250M ohm ⅓ w	C.12—250 mmf mica
R.10—500M ohm ⅓ w	C.13—250 mmf mica
R.11—800M ohm ⅓ w	C.14—.02x400v
R.12—201M ohm ⅓ w	C.15—.025x400v
C.1—20 mmf mica	C.16—.1x200v
C.2—35 mmf mica	C.17—8.0x350v P-103-6
C.3—.1x200v	C.18—8.0x300v P-103-7
	C.19—.1x200v

NOTE:
C.9 & C.11 in one unit P-118-1
C.10 & C.19 in one unit P-118-1
Voltages taken from points indicated to chassis ground
Vol. control on full.
Numbers prefixed by letter "P" are part Nos.

Tuning Range

16.5 — 56.6 meters
188 — 595 meters
925 — 2140 meters





141

BELMONT RADIO CORPORATION

MODEL 555

DESCRIPTION

Tubes:

The Tube complement of this chassis is as follows:

1 Type 6A7—pentagrid converter.

1 Type 6D6—remote cut-off pentode as I.F. amplifier.

1 Type 6B7—duplex diode pentode as diode detector, A.V.C and A.F.

1 Type 42E—pentode output tube.

1 Type 80—high vacuum rectifier.

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a voltmeter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on circuit diagram.

All voltages are measured with 235 volts 50-100 cycles on the primary of the power transformer.

Resistance of coils and transformer windings are indicated in ohms on schematic circuit diagram.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 108, 125, 150, 220 and 250 volts (see illustrations) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 235 volt primaries, not universals.

Should the receiver be equipped with a special transformer, connect primary tap on voltage terminal which corresponds as nearly as possible to the actual line voltage. If an exact agreement cannot be secured, suitable allowances of other measured voltages must be made.

ALIGNING INSTRUCTIONS—SERIES A

Description of various dummy antennas used and referred to in these instructions:

(1) I.F. Dummy—Consists of a .1 mfd. condenser connected in series with the external oscillator

(2) Broadcast Dummy—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator

(3) Intermediate and Short Wave Dummy—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 42E output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range volt meter should be used.

TEST FREQUENCIES

	Wave Length Meters	Frequency Kilocycles
Long Wave	2000	150
	923	325
I.F.	645.1	465
Broadcast	500	600
	300	1000
	214.3	1400
Short Wave	50.0	6000
	16.7	18000

ALIGNMENT:

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the three bolts by which it is fastened and the speaker plug which you will find on the front flange of the chassis panel.

ALIGNING I. F. TRANSFORMERS:

1. With volume control full on, the extreme right of its rotation, and with wave changing switch in the broadcast position, center of its rotation, and with variable condenser at its minimum capacity position, plates entirely out of mesh, adjust the I.F. transformers (two adjustments at the top of parts number 108-47 and 108-53—see top view).

(a) Connect external oscillator which has been adjusted to 645.1 meters in series with I.F. dummy antenna, to the control grid cap of the type 6D6 tube and chassis ground. Adjust output I.F. transformer, part number 108-47, to resonance.

(b) Move generator output clip from grid of 6D6 to grid cap of 6A7 tube and align input I.F. transformer, part number 108-53.

(c) With generator connected to grid of type 6A7 tube, re-adjust output I.F. transformer, part number 108-47, to resonance.

BROADCAST BAND ALIGNMENT:

(188-595 meters)

1 With wave changing switch in the broadcast position, center of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with broadcast dummy antenna to tan antenna and black ground leads and make the following adjustments:

(a) With external oscillator set at 187.5 meters, adjust oscillator trimmer to resonance, for location of this adjustment, number 5, see diagram.

(b) Re-set external oscillator to 214.3 meters, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. For location of this adjustment, number 2, see diagram.

(c) Re-set external oscillator to 500 meters and adjust series pad to resonance, rotate condenser and move dial pointer to 500 meters by gently rocking condenser to and fro. Pick up oscillator signal while adjusting series pad to resonance, maximum deflection on an output meter. This adjustment is accessible from the top of the chassis and is located between variable condenser and power transformer, rear hole see top view—part number 124-19.

(d) Check for tracking and sensitivity at 300 meters.

SHORT WAVE BAND ALIGNMENT:

(16.5-56.6 meters)

1. Set wave changing switch to short wave position, extreme right of its rotation, set dial pointer to 16.7 meters.

(a) With external oscillator adjusted to 16.7 meters and connected in series with short wave dummy antenna to tan antenna and black ground leads, adjust the oscillator short wave trimmer until generator signal is picked up. For location of this adjustment, number 4, see diagram.

(b) Adjust short wave antenna trimmer to resonance. For location of this adjustment, number 1, see diagram.

(c) Re-set external oscillator to 50 meters, rotate condenser, move dial pointer to 50 meters, and check for tracking and sensitivity. Do not bend plates. **Note: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall at a higher wave length.**

LONG WAVE BAND ALIGNMENT:

(925-2140 Meters)

1. With wave changing switch in long wave position (extreme left of its rotation) and with variable condenser in its minimum capacity position (plates entirely out of mesh), make the following adjustments:

(a) With external oscillator set at 923 meters and connected in series with "Dummy 2" to the tan antenna lead, adjust rear trimmer of oscillator coil (adjustment No. 6, see diagram) until oscillator signal is picked up.

(b) Adjust rear trimmer of antenna coil to resonance with oscillator (adjustment No. 3, see diagram).

(c) Re-set external oscillator to 2000 meters and rotate variable condenser (move pointer) and pick up oscillator signal, adjust L.W. pad (front adjustment accessible from top of chassis and located between variable condenser and power transformer) to resonance. While making this adjustment, slowly rock variable condenser to and fro until maximum output is obtained.

SERVICE NOTES:

To check for open by-pass condensers, shunt each condenser with another of similar capacity and of the same voltage rating, which is known to be good, until the defective unit is located. Open by-pass condensers frequently cause oscillation and distorted tone. Defective and shorted electrolytic filter condensers cause excessive hum, motor-boating, low volume and a reduction in all D.C. voltages. Open or shorted electrolytic and by-pass condensers (across bias resistor of type 42E tube) will cause low volume and distorted tone.

Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. The drive may be disassembled to replace the compression spring (part number 112-31) by removing the two screws which fasten it to the dial bracket. Before re-assembling all parts should be carefully cleaned and a small amount of vaseline applied to the ball bearings. All other dial parts are hardened and should cause no trouble.

REPAIR PARTS LIST

Part No.	DESCRIPTION
	CONDENSERS
100-19	.006 x 600 Volt Tubular
100-20	.1 x 200 Volt Tubular
100-26	.02 x 400 Volt Tubular
100-27	.025 x 400 Volt Tubular
103-6	8 Mfd. x 350 Volt Electrolytic
103-7	8 Mfd. x 300 Volt Electrolytic
118-1	.1 - .1 x 200 Volt Dual Tubular
129-3	.00002 Mica—Type MT —20%
129-5	.0001 Mica—Type MT —20%
129-6	.002 Mica—Type MW—20%
129-12	.00025 Mica—Type MT —20%
129-29	.0038 Mica—Type MW—2½%
129-33	.000275 Mica—Type MT — 5%
129-35	.000035 Mica—Type MT —10%
129-46	.000155 Mica—Type MT — 5%
	RESISTORS
130-3	500M Ohm—⅓ Watt— 50 Volt—20% Carbon
130-8	201M Ohm—⅓ Watt— 50 Volt—10% Carbon
130-11	250M Ohm—⅓ Watt— 50 Volt—20% Carbon
130-19	1Meg Ohm—⅓ Watt— 50 Volt—20% Carbon
130-32	250 Ohm—⅓ Watt— 10 Volt—20% Wire Wound
130-34	19M Ohm— 1 Watt—100 Volt—20% Carbon
130-46	800M Ohm—⅓ Watt— 50 Volt—10% Carbon
130-52	50M Ohm—⅓ Watt— 50 Volt—20% Carbon
130-73	15M Ohm—⅓ Watt— 50 Volt—20% Carbon
130-74	350 Ohm—⅓ Watt— 10 Volt—20% Wire Wound
	COILS
105-10	Wave Trap Coil Complete
108-47	Output I.F. Transformer Complete with Can
108-53	Input I.F. Transformer Complete with Can
110-28	Oscillator Coil Complete
111-34	Antenna Coil Complete
	TRANSFORMERS
104-31	50/60 Cycle—235 Volt Primary
104-37	40 Cycle—235 Volt Primary
104-38	25 Cycle—235 Volt Primary
104-39	Universal—40 Cycle Primary
104-40	Universal—25 Cycle Primary
	SPEAKERS
114-15	Six Inch Dynamic Speaker
	MISCELLANEOUS
101-30	Volume Control and Switch
102-20	Two Gang Variable Condenser
107-5	Line Cord & Plug
112-15	Glass Dial Crystal Only
112-19	Dial Drive Disc Complete
112-16	Dial Pointer
112-26	Planetary Drive Complete
112-40	Pilot Light Bracket
112-62	Drive Bracket Assembly Complete with Ring
112-66	Bakelite Escutcheon with Glass Complete
112-75	Compression Spring Only
112-98	Dial Scale
115-22	Tube Shield
116-5	Pilot Light Bulb, 6-8 Volt, T-50
124-19	J-6-4D Dual Padder
125-11	Wave Change Switch
131-2	Bakelite Knob
131-8	Springs for Bakelite Knob
134-22	Felt Washer (Under Knob)
135-14	Dial Pointer Screw
143-1	Tone Switch
171-2	Phono-jack Assembly

All resistors and mica condensers are RMA color coded—specify value and/or resistor or condenser (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More than 20%	None

When ordering condensers, specify part number, model and/or capacitor (per schematic diagram) and model number.

When ordering parts, always specify part and model number as well as serial number of chassis.

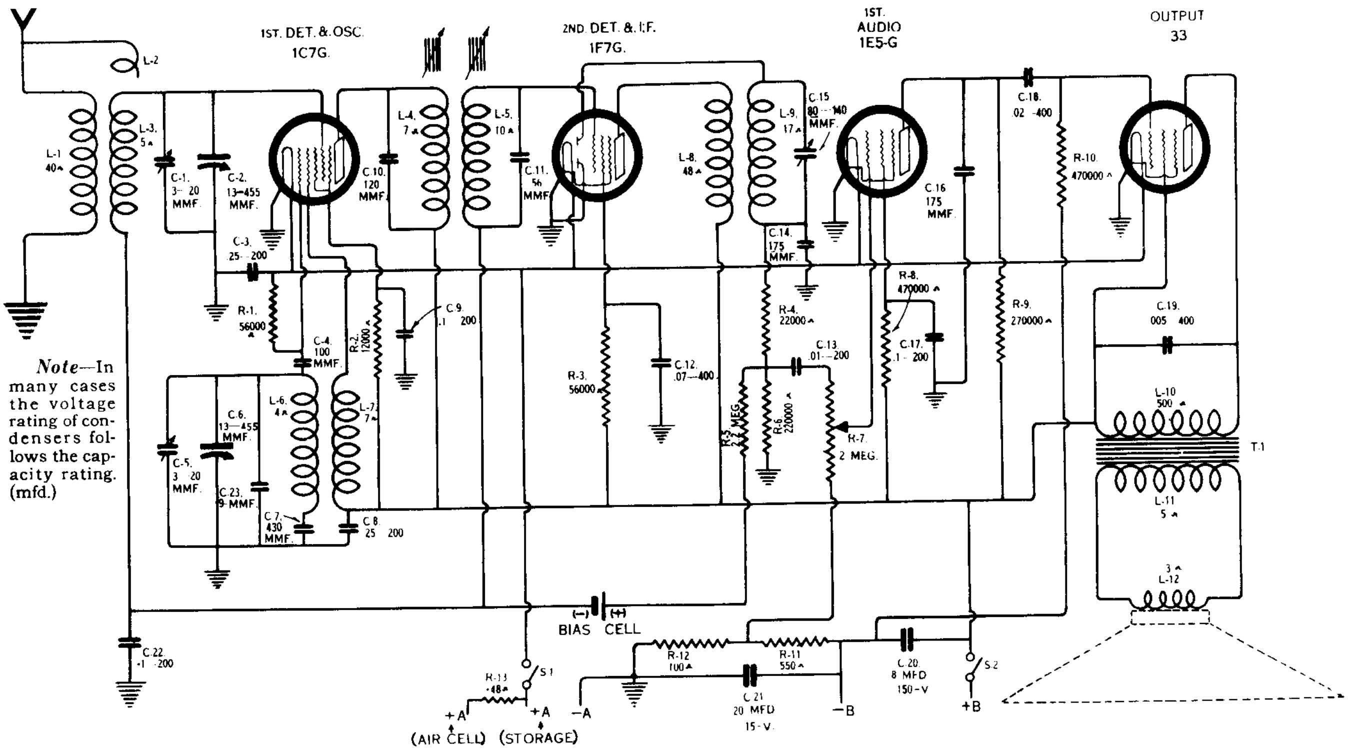
WHEN ORDERING SPEAKER PARTS: CONES, FIELD COILS, OUTPUT TRANSFORMERS SPECIFY PART NUMBER OF SPEAKER AND MAKE.

Note—On some chassis part 108-53 was in error marked 108-38.

Part 108-53 is the correct number for this input I. F. transformer.

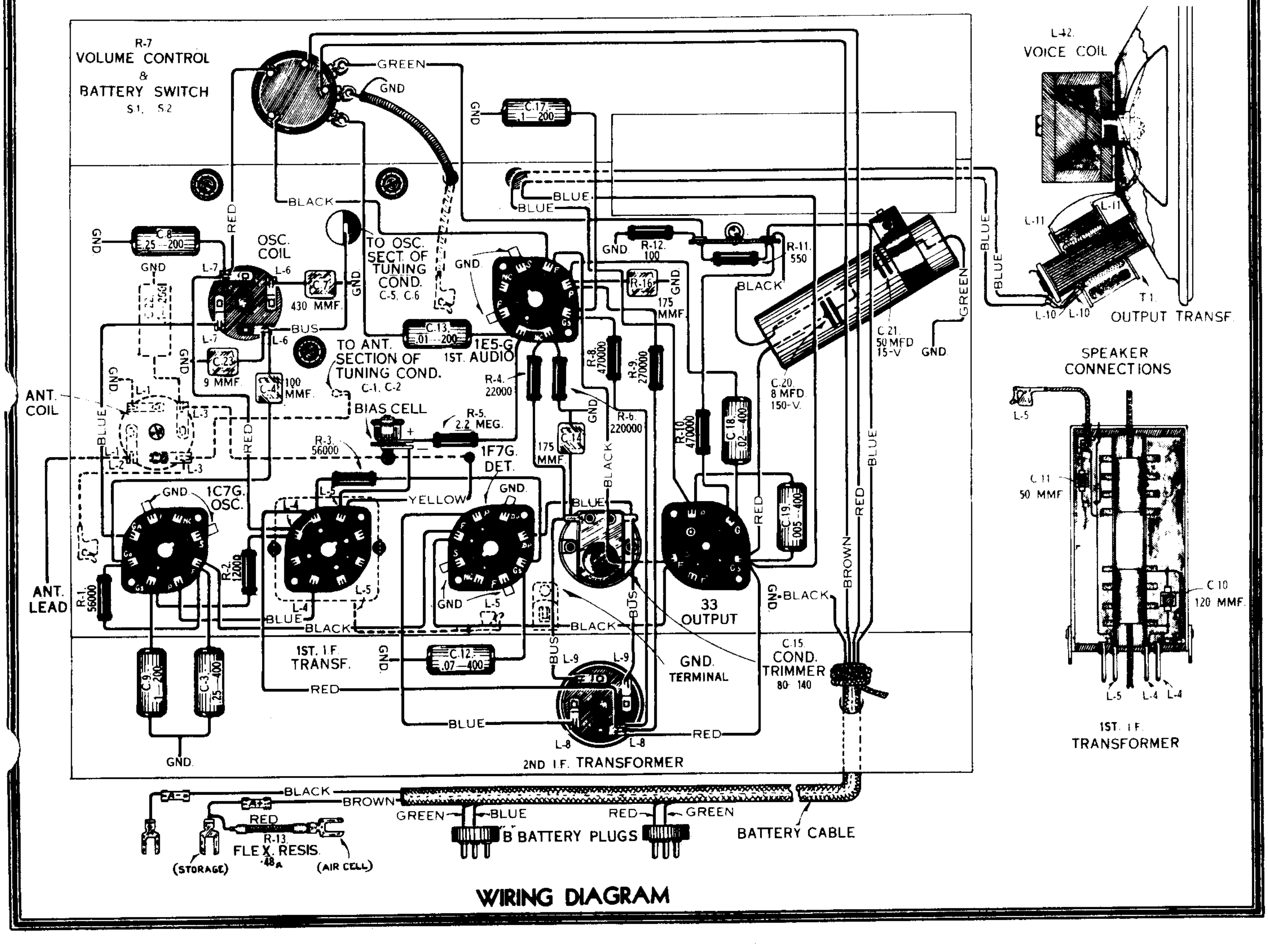
CANADIAN WESTINGHOUSE COMPANY Limited

MODEL B-428A



Note—In many cases the voltage rating of condensers follows the capacity rating. (mfd.)

SCHEMATIC CIRCUIT DIAGRAM



WIRING DIAGRAM

CANADIAN WESTINGHOUSE COMPANY Limited

MODEL B-428A

"A" Battery—1 plug-in 2½ volt Air-cell Eveready A-600 (or equivalent) or 1 2.0 volt storage battery.

"B" Battery—2 45 volt, heavy duty plug-in type.

"C" Battery—(Audio)—None required.

Battery Current—"A"=500 milliamperes; "B"=14 milliamperes.

Cabinet Dimensions—7½" x 14½" x 8½".

Shipping Weight—13 lbs.

Controls—Upper Knob: Station Selector. Lower Knob: Operating Switch and Volume Control.

Station Selector Drive Ratio .... 5½:1 (planetary type).

Number and types of radiotrons—1-W-1C7G; 1-W-E5G; 1-W-1F7G; 1-W33. Total 4.

Undistorted output .... 0.2 Watt
Frequency range .... 530 K.C. to 1720 K.C.

This Receiver is a 4 tube superheterodyne incorporating such features as wide broadcast range, Alnico dynamic speaker, one "iron core" I.F. transformer, one "air core" I.F. transformer, automatic volume control "Cell" type "C" bias, unexcelled battery economy, special circuit for securing audio "C" bias without the use of a "C" battery and the inherent sensitivity, selectivity and tone quality of the superheterodyne circuit.

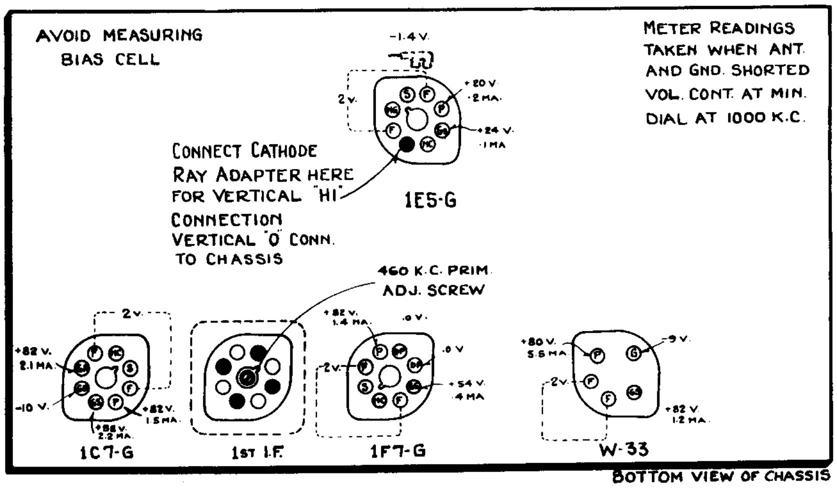
The following description of the circuit includes several new design features which are incorporated in this receiver. The first tube (Radiotron W-1C7G) is used as a combined first detector and oscillator. Separate tuned circuits are provided for each function. The second tube (Radiotron W-1F7G) is used as an I.F. amplifier with one diode plate acting as detector and A.V.C.

The I.F. transformer feeding the control grid of the W-1F7G is tuned by fixed primary and secondary condensers and adjusted by movement of the two "iron cores." The use of the "iron core" I.F. transformer results in considerably improved sensitivity, selectivity and stability of adjustment.

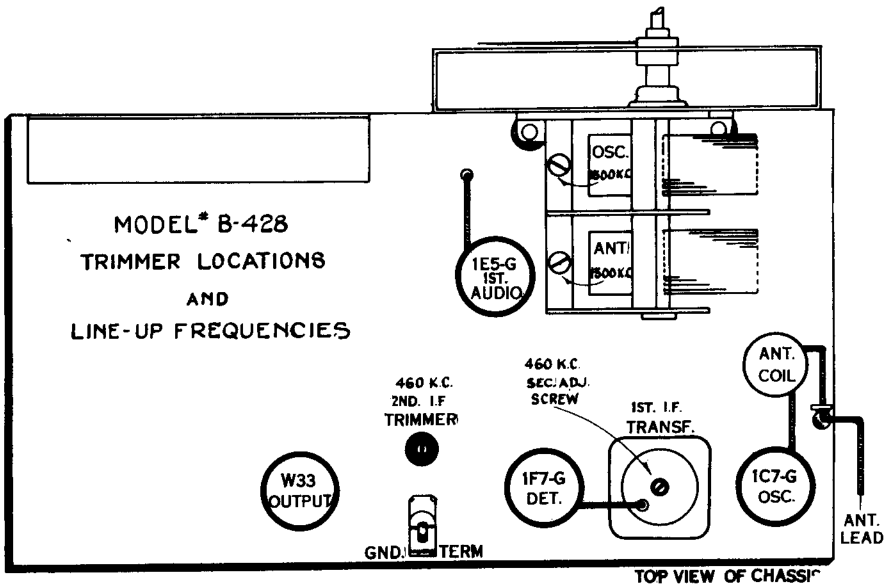
The I.F. transformer feeding the diode detector and A.V.C. circuit is an "air core" transformer with the secondary only tuned by an adjustable trimmer capacitor.

The volume control is used to control the amount of audio voltage applied to the control grid of the Radiotron W-1E5G first audio stage which is resistance-capacitance, coupled in the usual manner to the Radiotron W-33 pentode output stage.

The line up adjustment is made in the usual way to the adjustment screws shown in the trimmer location diagram. When making adjustment the test oscillator frequency and receiver dial setting should correspond to the indicated line up frequency. When making I.F. adjustment the oscillator should be connected to the W-1C7G control grid through a .001 mfd. condenser and ground, with the antenna wire grounded.



BOTTOM VIEW OF CHASSIS



TOP VIEW OF CHASSIS

RADIOTRON SOCKET VOLTAGES AND TRIMMER LOCATIONS

Caution—Do not attempt to measure voltages on the control grids of the W-1C7G or W-1F7G with any conventional voltmeter as paralysis of the "C-bias" cell will result.

Check "C" cell by noting whether plate current is abnormally high on tubes biased by cells.

A further check on the C bias cell, particularly if it is suspected that the control grid leads have been grounded, is to connect a 1½ volt C battery between the control grid cap of one of the tubes on the C cell circuit and the chassis frame. The negative of the C battery should be connected to control grid, positive to chassis frame. This connection should be momentarily made only, and if the C cell had been weakened before, it will now be found to be recharged and ordinarily will not need to be replaced.

All voltages are measured with respect to chassis frame, with all batteries at normal voltage — tuned to approximately 1000 K.C. — no signal being received.

CANADIAN WESTINGHOUSE COMPANY Limited

MODEL B-428A

Radio Replacement Parts

Key No.	Part No.	DESCRIPTION	List Price
L1, L2, L3	H-36254	Coil—Antenna Coil Assembly	$1.50
L6, L7	H-36134	Coil—Oscillator Coil Assembly	1.30
L4, L5, C10, C11	H-37812	Transformer—First I.F. ("Iron Core")	2.50
L8. L9	H-36256	Transformer—Second I.F. ("Air Core")	1.50
R7, S1, S2	H-37865	Volume Control—(2 Meg.) with D.P.S.T. Operating Switch	1.50
C20, C21	H-37849	Capacitor—Dry Electrolytic Assembly—8 mfd. 150V., 20 mfd. 15V.	1.40
C1, C2, C5, C6	H-36208	Capacitor—Two Gang Tuning Condenser with Vernier Drive	On Application
	H-36131	Vernier Drive Assembly including Ball Race, 3 Balls and Vernier Shaft.	.75
C15	H-36262	Capacitor—Trimmer—80-140 mmfd.	.40
	H-37835	Dial Scale	.40
	H-33432	Control Knob	.25
	H-33433	Control Knob with White Dot	.25
	H-33436	Spring for Control Knob—pkge. of 5	.20
	H-34441	Socket—5 Contact	.20
	H-33478	Socket—Standard Octal	.25
	H-36320	Dial Pointer with Bushing (paint black before using)	.30
	G-991-A	Goat Tube Shield	.20
	H-33492	Control Grid Clip—Small—pkge. of 5	.30
	D-593969-1	Spiral Shield (for Control Grid Lead of W-1E5-G)	.20
	Cat. 60'23	Bias Cell Mounting	.15
	K-79677-1	Bias Cell (Pkge. of 5)	1.20
	H-38140	Battery Cable—with plug connectors and markers	1.60
	Cat. 30-3B	3 Prong "B" Battery Plug	.05
	H-20617	Spade Terminal (for battery cable)—pkge. of 10	.10
	Cat. 48	Cable Marker +A—pkge. of 5	.15
	Cat. 17	Cable Marker −A—pkge. of 5	.15
R13	C-6201-2	Flexible Resistor—Red 0.48 ohms, ¼ watt	.20
	Cat. 3-C	Fahenstock Ground Clip—pkge. of 10	.20
	H-29586	Retaining Ring (for 2nd I.F. Coil)	.05
	H-37863	Reproducer Assembly complete	10.00
L12	H-37872	Reproducer Cone Assembly	1.60
T1	H-37873	Output Transformer	2.00
	H-37826	Mantel Cabinet	On Application
	H-36323	Dial Crystal	.30
	C-7109-1	"Westinghouse" Transfer	.10

CARBON RESISTORS

Part No.	Ohms	Watts	Key No.
H-37869	100 (insulated)	½	R12
H-33381	560	½	R11
H-25356	12,000	½	R2
H-37822	22,000 (insulated)	½	R4
H-33484	56,000 (insulated)	½	R1, R3
H-33508	220,000 (insulated)	½	R6
H-34458	270,000 (insulated)	½	R9
H-34416	470,000	½	R8, R10
H-33488	2.2 Meg. (insulated)	½	R5

MICA CAPACITORS

Part No.	Mmfd.	Key No.	List Price
H-29607	9	C23	$0.30
K-77952-501	56	C11	.35
H-34367	100	C4	.30
K-77952-502	120	C10	.35
H-34477	175	C14. C16	.30
Use H-34472	425	C7	.30

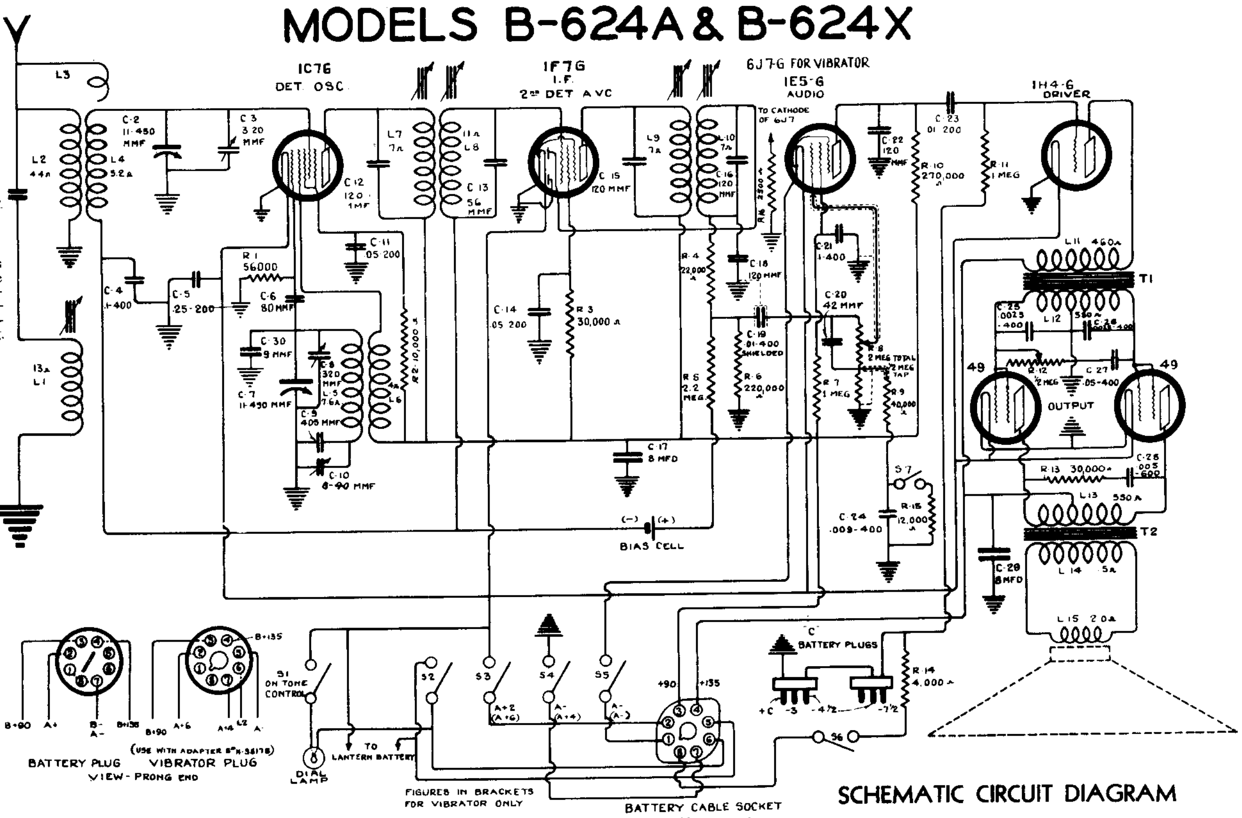
TUBULAR CAPACITORS

Part No.	Description	Key No.
H-29601	0.005 mfd. 400	C19
H-34461	0.01 mfd. 400	C13
H-32989	0.02 mfd. 400	C18
Use H-36188	0.05 mfd. 400	C12
K-7020	0.1 mfd. 400	C9, C17, C22
K-6134	0.25 mfd. 200	C3, C8

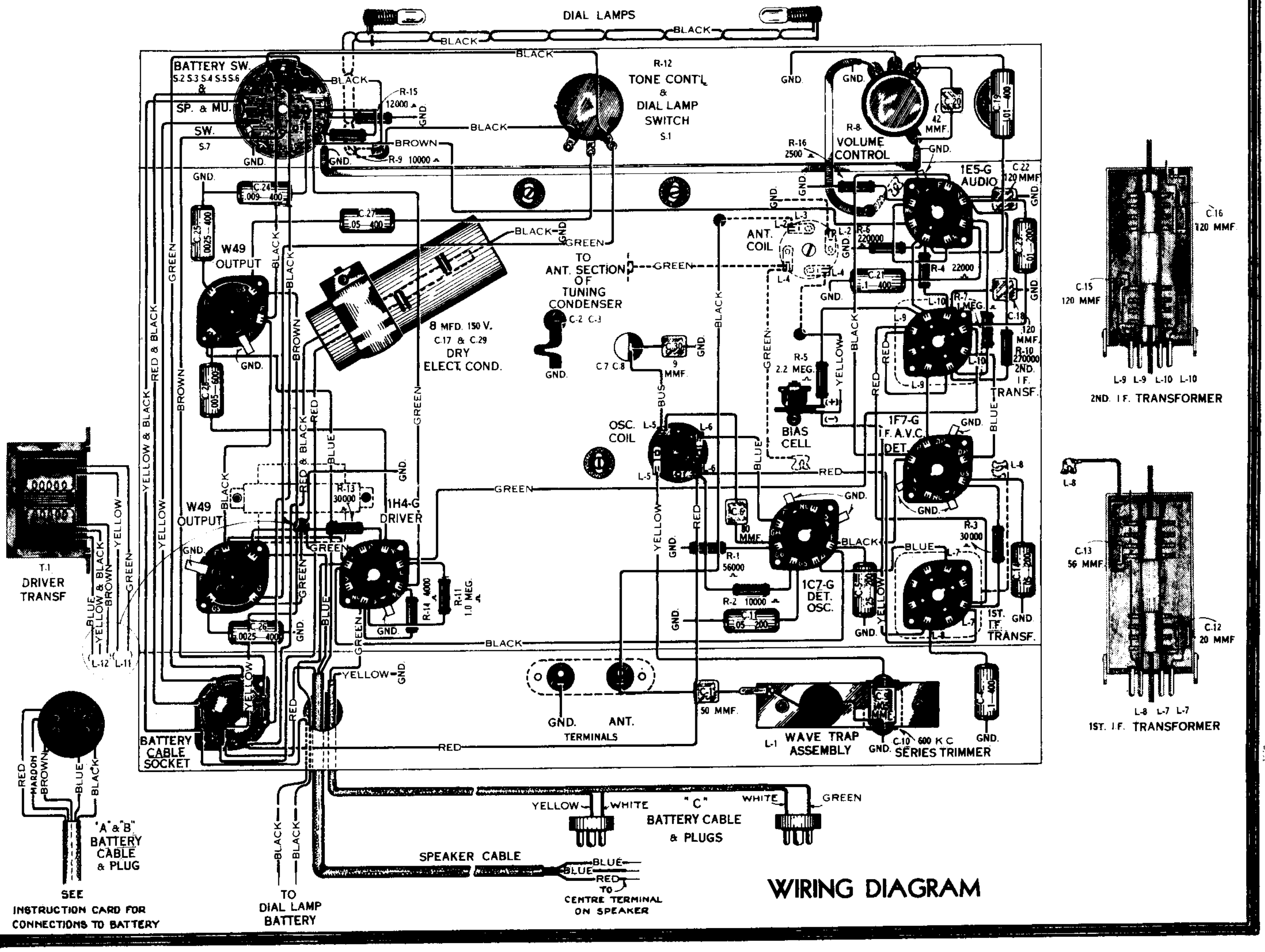
CANADIAN WESTINGHOUSE COMPANY Limited

MODELS B-624A & B-624X

Note—In many cases the voltage rating of condensers follows the capacity rating. (mfd.)



SCHEMATIC CIRCUIT DIAGRAM



WIRING DIAGRAM

CANADIAN WESTINGHOUSE COMPANY Limited

MODELS B-624A & B-624X

"A" Battery—1-2½ volt Air-cell Eveready A-600 (or equivalent) or 1-2.0 volt storage battery.
"B" Battery—2 (or 3) 45 volt, heavy duty plug-in type.
"C" Battery—(Audio)—1 (or 2) 4½ volt plug-in type such as Eveready 771 or Burgess 536.
Pilot Lamp Battery—Eveready 409 or Burgess 1042.
Battery Current—"A"=540 milliamperes; "B"=14.5 milliamperes. (Average at 90 volts.)
Cabinet Dimensions—B-624A, 11" x 22¾" x 9"; B-624X, 39" x 22" x 11¼".
Shipping Weight—B-624A, 28 lbs.; B-624X, 58 lbs.
Controls—(1) Off-Speech-Music Switch, (2) Station Selector, (3) Treble Tone Control and Dial Light Switch, (4) Volume Control.
Station Selector Drive Ratio 18:1
Number and types of radiotrons—(1)-W-1C7G; (1)-W-1F7G; (1)-W-E5G; (1)-W-1H4; (2)-W-49. Total 6.
Pilot Lamps (2)—Mazda No. 40, 6.3 V., 0.15 Amp.
Undistorted output ..... 0.5 Watt
Frequency range ..... 530 K.C. to 1720 K.C.

These receivers are 6 tube superheterodynes incorporating such features as wide broadcast range, Alnico dynamic speaker, "iron core" I.F. transformers, bass and treble tone controls, automatic volume control, "Cell" type "C" bias, unexcelled battery economy, plug-in batteries, compensated manual volume control, class B output circuit, dust-proof loudspeaker, wave trap and the inherent sensitivity, selectivity and tone quality of the superheterodyne circuit.

The following description of the circuit includes several new design features which are incorporated in this receiver. The first tube (Radiotron W-1C7G) is used as a combined first detector and oscillator. Separate tuned circuits are provided for each function. The second tube (Radiotron W-1F7G) is used as an I.F. amplifier with one diode plate acting as detector and A.V.C..

The audio frequency voltage appearing across the diode load resistor of the W-1F7G Radiotron is coupled to an acoustically tapered and compensated volume control. The moving tap of the volume control is connected to the control grid of the W-1E5G first audio amplifier Radiotron, which is in turn resistance-capacitance coupled to a W-1H4G driver Radiotron.

The output of the driver stage is transformer-coupled to the Class B, push-pull output stage which uses two W-49 Radiotrons.

The treble tone control consists of a variable resistance in series with a fixed capacity connected across the secondary of the driver transformer.

The amount of bass response is controlled by the speech-music switch S7. When this switch-pole S7 is closed, the amount of compensation on the volume control is decreased—thus reducing the bass response at low and moderate volume.

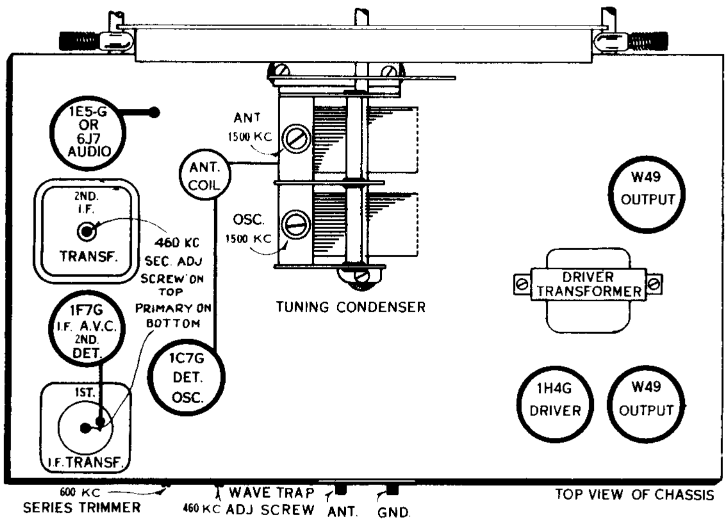
The line up adjustment is made in the usual way to the adjustment screws shown in the trimmer location diagram. When making adjustment the test oscillator frequency and receiver dial setting should correspond to the indicated line up frequency. When making I.F. adjustment the oscillator should be connected to the W-1C7G control grid through a .001 mfd. condenser and ground, with the antenna trminal grounded.

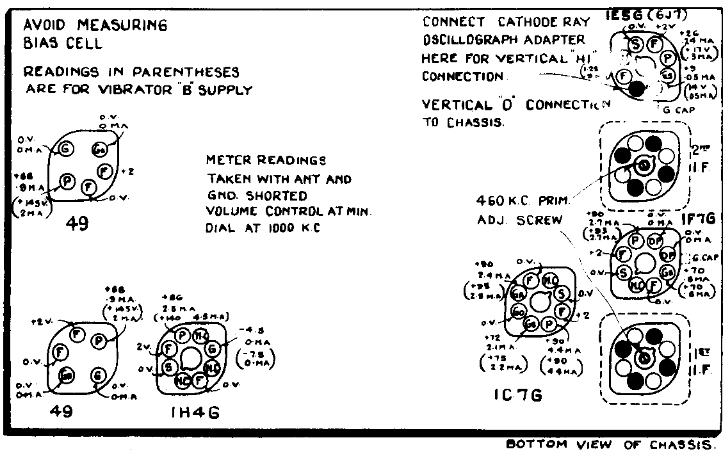
Use With Vibrator "B" Supply

These receivers may be used with Westinghouse Style No. H-36133 vibrator "B" supply if a 6.0 volt storage battery is available. The necessary changes are very simple. Follow the instructions given with the vibrator "B" supply, noting also the following points:

The W-1E5G tube must be removed and a W-6J7G radiotron substituted. No Pilot Lamp Battery is required.

Refer to schematic circuit diagram in this leaflet and note the internal connection of the vibrator plug. When vibrator H-36133 is used with Model B-624, it is necessary to connect together pins No. 1 and No. 5, on the diagram. This may be done by dissembling the vibrator plug and soldering a jumper in place. It will be more convenient, however, to use a special adapter, Style No. H-38178. (See parts list.)





Socket Voltage and Trimmer Locations

For service data (or operating instructions) on vibrator "B" supply H-36133, see radio service manual, section RS-170.

Caution — Do not attempt to measure voltages on the control grids of the W-1C7G or W-1F7G with any conventional voltmeter as paralysis of the "C-bias" cell will result.

Check "C" cell by noting whether plate current is abnormally high on tubes biased by cells.

A further check on the C bias cell, particularly if it is suspected that the control grid leads have been grounded, is to connect a 1½ volt C battery between the control grid cap of one of the tubes on the C cell circuit and the chassis frame. The negative of the C battery should be connected to control grid, positive to chassis frame. This connection should be momentarily made only, and if the C cell had been weakened before, it will now be found to be recharged and ordinarily will not need to be replaced.

All voltages are operating voltages with respect to chassis frame, with all batteries at normal voltage —tuned to approximately 1000 K.C. —no signal being received. Due allowance must be made for current

CANADIAN WESTINGHOUSE COMPANY Limited
MODELS B-624A & B-624X

Key No.	Part No.	DESCRIPTION	List Price
L2, L3, L4	H-36254	Coil—Antenna Coil Assembly	$1.50
L5, L6	H-36134	Coil—Oscillator Coil Assembly	1.30
L7, L8, C12, C13	H-37812	Transformer—First I.F. ("Iron Core")	2.50
L9, L10, C15, C16	H-37813	Transformer—Second I.F. ("Iron Core")	2.50
R8	H-36266	Volume Control—(2 Meg. with Tap at .5 Meg.)	1.20
R12, S1	H-36344	Tone Control, 0.5 Megohm and Dial Lamp Switch	1.20
S2, S3, S4, S5, S6, S7	H-36075	Off-Speech-Music Switch	1.00
C17, C29	H-37895	Capacitor—Dry Electrolytic Assembly (Dual) 8 mfd. 150V.	1.75
C2, C3, C7, C8	H-36269	Capacitor—Two Gang Tuning Condenser	On Application
	H-36151	Drive Shaft Assembly	.60
	H-36149	Drive Disc	.50
C10, L1	H-36274	Trimmer (8-40 mmfd.) and Wave Trap Assembly	1.00
	H-36345	Dial Scale	1.00
	D-569229 It. 6	Mask for rear of dial	.60
	D-569229 It. 1	Dial Frame complete with Pilot Light Brackets	2.10
	D-569229 It. 3	Clamp (to hold Dial Scale)	.50 pr.
	K-79864-2	Rubber Channels for Dial Scale—Pkge. of 10	.25
	H-36197	Chassis Cushion complete with Mounting Screw and Washer—Pkge. of 5	.40
	H-33432	Control Knob	.25
	H-33433	Control Knob with White Dot	.25
	H-33436	Spring for Control Knob—Pkge. of 5	.20
	H-34441	Socket—5 Contact	.20
	H-33478	Socket—Standard Octal	.25
	Amp. S.P.-8	Socket—Octal Base for Cable Plug	.50
	H-22354	Socket—Pilot Lamp	.20
	H-36321	Dial Pointer with Bushing	.30
	G-991-A	Goat Tube Shield	.20
	H-33492	Control Grid Clip—Small—Pkge. of 5	.30
	Cat. 60423	Bias Cell Mounting	.15
	K-79677-1	Bias Cell—Pkge. of 5	1.20
	H-36298	Battery Cable—with plug connectors and markers—B-624A	1.60
	D-585560	Battery Cable—with plug connectors and markers—B-624X	1.60
	H-36301	"C" Battery Cable—with plug connectors	1.10
	H-37906	Insulating Piece with Contacts for Dial Lamp Battery	.60
	Cat. 30-3B	3 Prong "B" Battery Plug	.05
	Cat. 30-3C	3 Prong "C" Battery Plug	.05
	Cat. 7-E	Battery Cable Plug Complete	.30
	H-36097	"C" Battery Shorting Receptacle	.05
	H-36098	"B" Battery Shorting Receptacle	.05
	H-20617	Spade Terminal (for battery cable)—Pkge. of 10	.10
	Cat. 48	Cable Marker +A—Pkge. of 5	.15
	Cat. 17	Cable Marker −A—Pkge. of 5	.15
	C-6201-5	Flexible Resistor—Brown 0.4 ohms, 1/4 watt—B-624A	.20
	C-6201-6	Flexible Resistor—Orange 0.45 ohms, 1/4 watt—B-624X	.20
	H-34487	Antenna—Ground Terminal Board	.20
L15, T2	H-37886	Reproducer Assembly complete—B-624A	10.00
L15	H-37881	Reproducer Cone Assembly—B-624A	1.50
T2	H-37885	Output Transformer—B-624A or B-624X	2.00
L15, T2	H-37887	Reproducer Assembly Complete—B-624X	12.00
L15, T2	H-37882	Reproducer Cone Assembly—B-624X	1.60
	H-36348	Mantel Cabinet—B-624A	On Application
	H-36326	Console Cabinet—B-624X	On Application
	H-36331	Dial Crystal	.50
	C-7117-1	"Volume" Transfer	.10
	C-7117-2	"Tone" Transfer	.10
	C-7117-3	"Off-Speech-Music" Transfer	.10
	H-38178	Vibrator Adapter	.75
	H-38179	Cathode Ray Oscillograph Adapter	(Net) .75

CARBON RESISTORS

Part No.	Ohms	Watts	Key No.
H-27708	2,500	1/2	R16
H-27705	4,000	1/2	R14
H-25408	10,000	1/2	R2
H-25356	12,000	1/2	R15
H-37822	22,000	1/2	R4
H-30598	30,000	1/2	R3, R13
H-22426	40,000	1/2	R9
H-33484	56,000 (insulated)	1/2	R1
H-33508	220,000 (insulated)	1/2	R6
H-34458	270,000 (insulated)	1/2	R10
H-30177	1.0 Meg. (insulated)	1/2	R7, R11
H-33488	2.2 Meg. (insulated)	1/2	R5

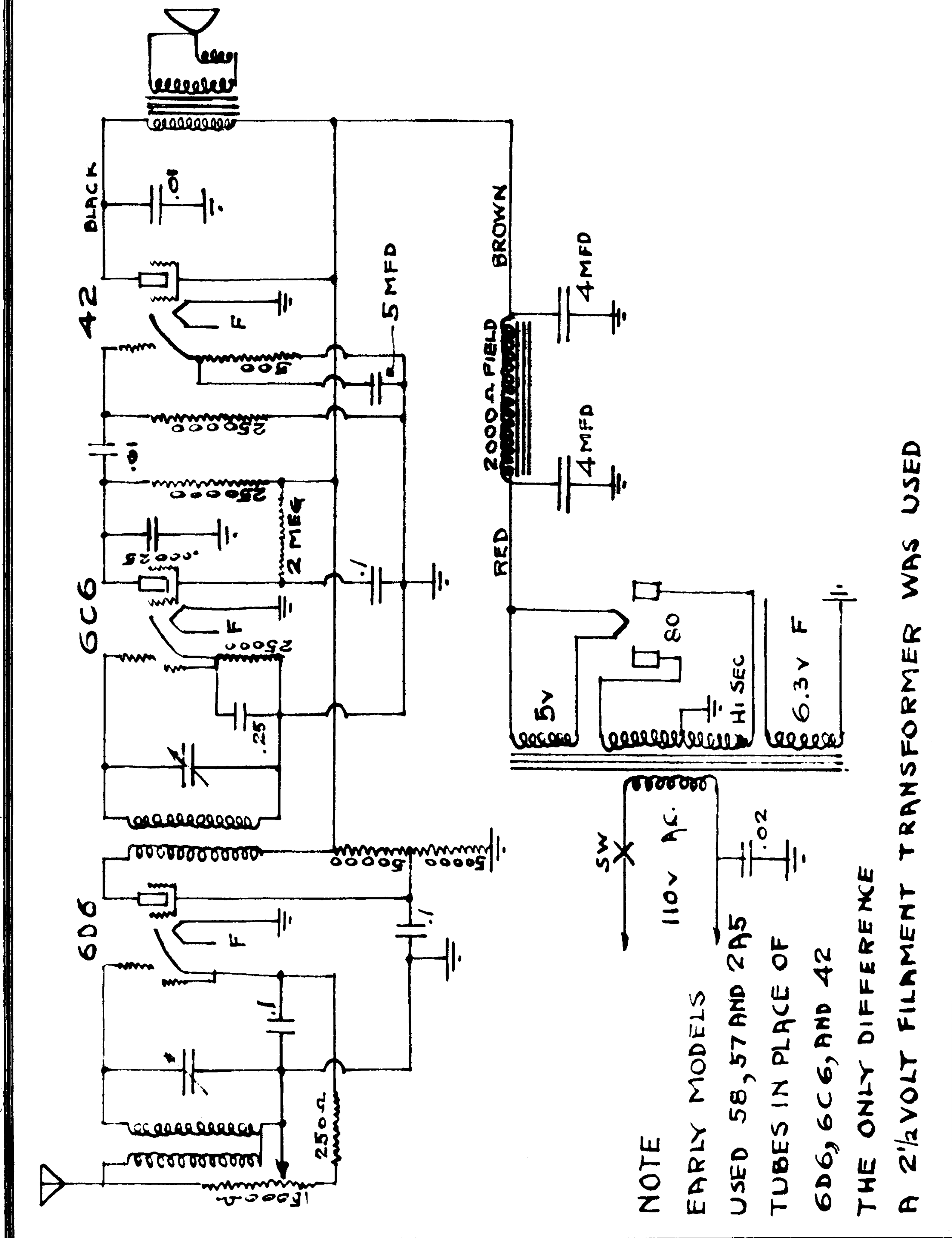
MICA CAPACITORS

Part No.	Mmfd.	Key No.	List Price
H-29697	9	C30	$0.30
H-37862	42	C20	.30
H-34479	50	C1	.30
H-32997	80	C6	.30
K-77952-502	120	C12, C13, C15, C16	.35
H-34476	120	C18, C22	.30
H-36094 (low loss)	405	C9	.30

TUBULAR CAPACITORS

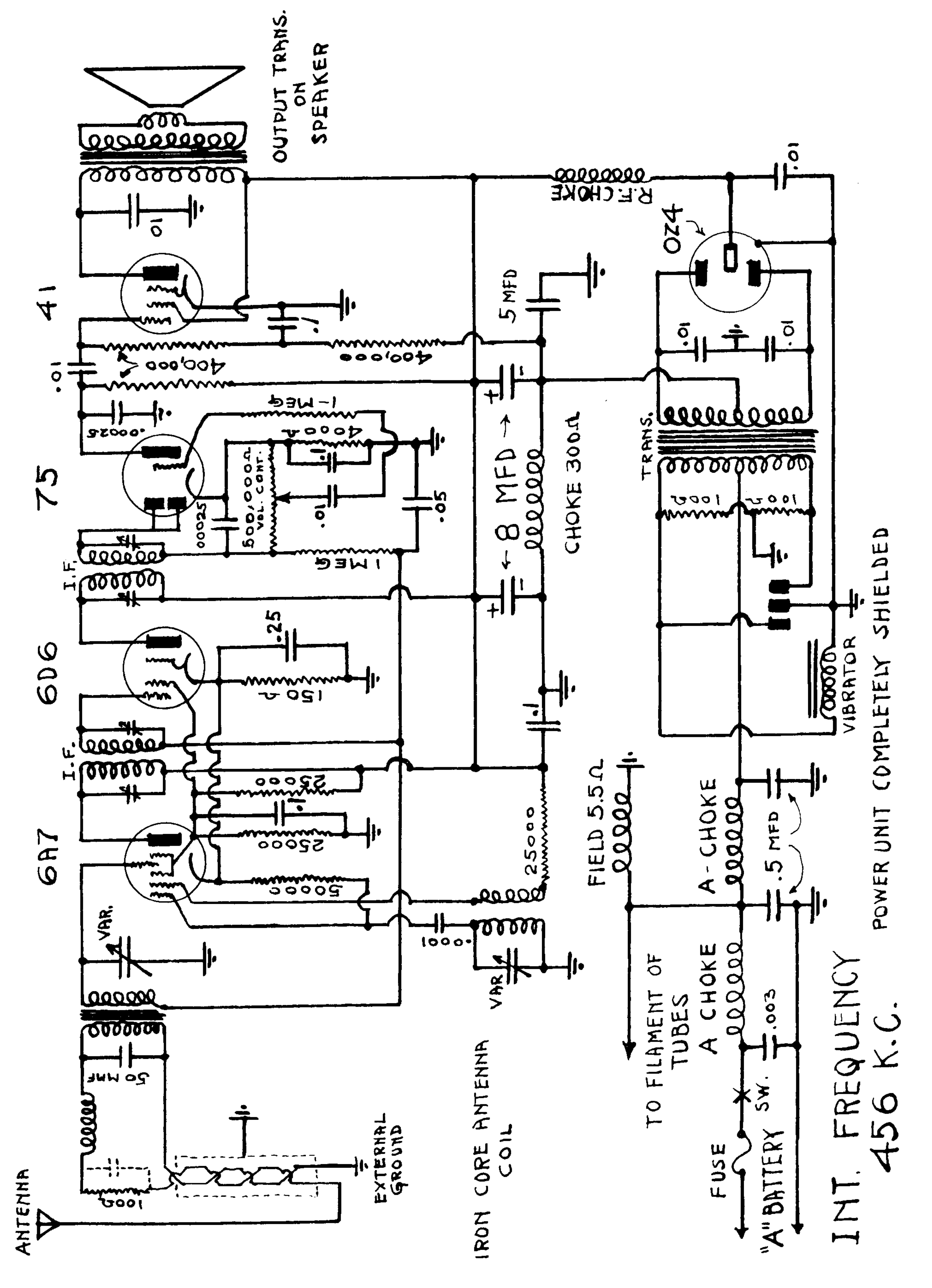
Part No.	Mfd.	Volts	Key No.
H-34486	0.0025	400	C25, C26
H-37833	0.005	800	C28
H-36174	0.009	400	C24
H-32982	0.01 Shielded	400	C19
H-34461	0.01	400	C23
H-36188	0.05	400	C11, C14, C27
H-34464	0.1	400	C4, C21
H-34559	0.25	200	C5

CHAMPION RADIO
MODEL 42



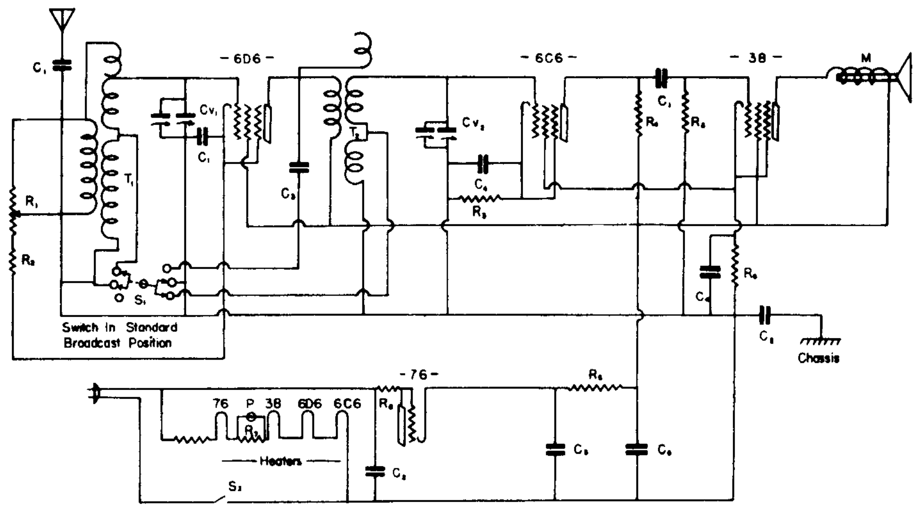
CHAMPION RADIO

MODEL 501-5 TUBE AUTO RADIO



CLIMAX RADIO & TELEVISION CO., Inc.

MODEL 7B TWO BAND RECEIVER - AC DC TYPE

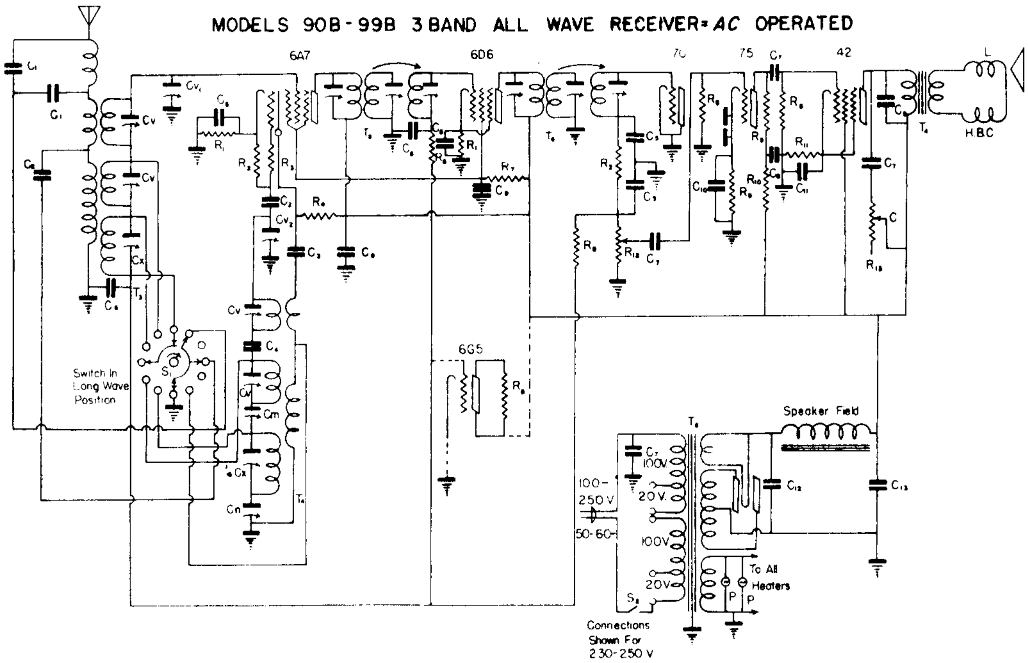


LEGEND	PART NO.	DESCRIPTION
C_1	211	.01 mfd. 400 Volt Tubular Condenser
C_2	203	.1 mfd. 200 Volt Tubular Condenser
C_3	405	.0004 mfd. Mica Condenser
C_4	313	5 mfd. 25 W.V. Electrolytic Condenser
C_5	313	14 mfd. 150 W.V. Electrolytic Condenser
C_6	313	8 mfd. 150 W.V. Electrolytic Condenser
Cv_1, Cv_2	610	Two Gang Variable Condenser

LEGEND	PART NO.	DESCRIPTION
L	1806	280 Ohm Line Cord
M	900	5 BC Magnetic Speaker
P	2902	Mazda 46 Pilot Light
R_1R_2	2010	10,000 Ohm Volume Control With 275
		Ohm Minimum
R_3	111	25,000 Ohm 1/4 Watt Carbon Resistor
R_4	119	1 Megohm 1/4 Watt Carbon Resistor

LEGEND	PART NO.	DESCRIPTION
R_6	117	1/4 Megohm 1/4 Watt Carbon Resistor
R_7	132	100 Ohm 1 Watt Wire Wound Resistor
R_8	134	2,000 Ohm 1/4 Watt Carbon Resistor
S_1	1909	2 Pole 2 Position Selector Switch
R_9	135	420 Ohms 1 Watt Wire Wound Resistor
T_1	1208	BC And Longwave Ant. Coil
T_2	1307	BC And Longwave R.F. Coil

MODELS 90B-99B 3 BAND ALL WAVE RECEIVER - AC OPERATED



LEGEND	PART NO.	DESCRIPTION
C_1	402	.0005 mfd. Mica Condenser
C_2	400	.0001 mfd. Mica Condenser
C_3	403	.001 mfd. Mica Condenser
C_4	407	.006 mfd. Mica Condenser
C_5	401	.00025 mfd. Mica Condenser
C_6	203	.1 mfd. 200 V. Tubular Condenser
C_7	206	.05 mfd. 400 V. Tubular Condenser
C_8	211	.01 mfd. 400 V. Tubular Condenser
C_9	210	.1 mfd. 400 V. Tubular Condenser
C_{10}	204	.25 mfd. 200 V. Tubular Condenser
C_{11}	302	10 mfd. 25 W.V. Electrolytic Condenser

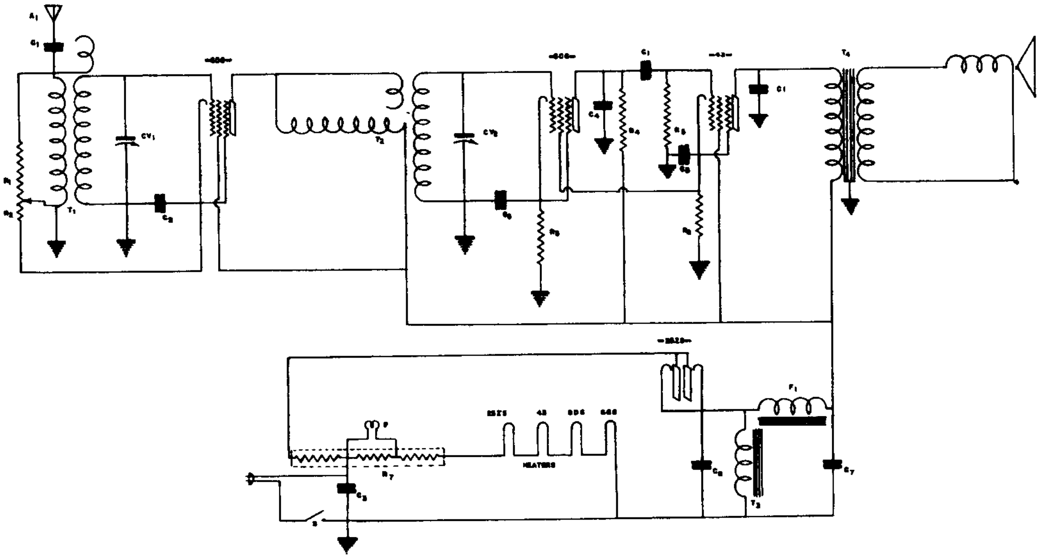
LEGEND	PART NO.	DESCRIPTION
C_{12}	302	10 mfd. 450 W.V. Electrolytic Condenser
C_{13}	302	6 mfd. 350 W.V. Electrolytic Condenser
Cv	504	3-30 MMFD. Trimmer Condenser
Cx	504	30-80 MMFD. Trimmer Condenser
Cm	503	600 MMFD. Trimmer Condenser
Cn	503	300 MMFD. Trimmer Condenser
Cv, Cv	608	2 Gang Variable Condenser
R_1	136	410 Ohms 1/4 Watt Carbon Resistor
R_2	113	50,000 Ohms 1/4 Watt Carbon Resistor
R_3	101	150 Ohms 1/4 Watt Carbon Resistor
R_4	109	10,000 Ohms 1/4 Watt Carbon Resistor

LEGEND	PART NO.	DESCRIPTION
R_5	116	250,000 Ohms 1/4 Watt Carbon Resistor
R_6	117	500,000 Ohms 1/4 Watt Carbon Resistor
R_7	112	25,000 Ohms 1/4 Watt Carbon Resistor
R_8	119	One Megohm 1/4 Watt Carbon Resistor
R_9	108	5,000 Ohms 1/4 Watt Carbon Resistor
R_{10}	115	100,000 Ohms 1/4 Watt Carbon Resistor
R_{11}	135	420 Ohms 1 Watt Wire Wound Resistor
R_{12}	2007A	500,000 Ohms Volume Control
S_2		With A C Switch
R_{13}	[illegible]	75,000 Ohms Tone Control
R_{14}	103	250 Ohms [illegible] Watt Carbon Resistor

LEGEND	PART NO.	DESCRIPTION
T_2	1607	Low Pass Filter Inductance
T_3	1207	Long Wave 3 Band Ant. Coil
T_4	1401	Long Wave 3 Band Osc. Coil
T_5	1504	Triple Tuned High-gain I.F. Transformer
T_6	1505	Triple Tuned Diode Coupling I.F.
		Transformer
T_7	8504	Dynamic Speaker Out Put Transformer
T_8	1005	100-250 Volt, 50-60~ Universal
		Type Power Transformer
L	850	6 1/2" Dynamic Speaker
P	2903	#46 Pilot Light

CLIMAX RADIO & TELEVISION CO., Inc.

MODELS-10-19 BROADCAST RECEIVERS-AC-DC- TYPE.



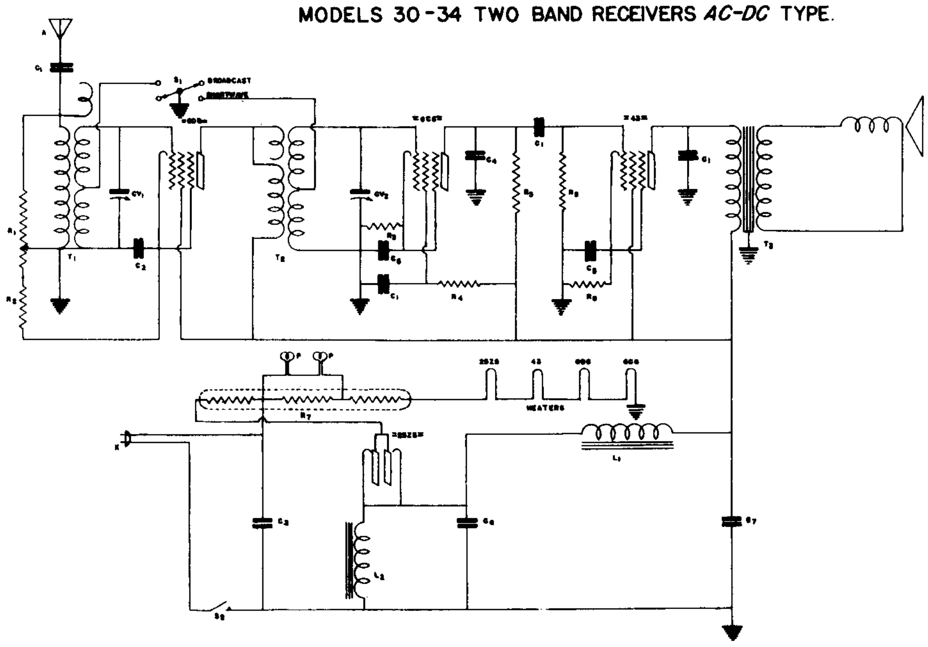
LEGEND	OUR PART NO.	DESCRIPTION
R1 R2	[illegible]	10,000 OHM VOLUME CONTROL 275 OHM MIN.
R3	111	25,000 OHM 1/4 WATT CARBON RESISTOR
R4	113	1 MEGOHM 1/4 WATT CARBON RESISTOR
R5	117	1/2 MEGOHM 1/4 WATT CARBON RESISTOR
R6	104	600 OHM 1/4 WATT CARBON RESISTOR
R7	126	L-55 — S1 BALLAST TUBE

LEGEND	OUR PART NO.	DESCRIPTION
C1	[illegible]	.01 MFD. 400 VOLT TUBULAR CONDENSER
C2	203	.1 MFD. 200 VOLT TUBULAR CONDENSER
C3	206	.05 MFD. 400 VOLT TUBULAR CONDENSER
C4	401	.0005 MFD. MICA CONDENSER
C5	1N 500	5 MFD. 25 VOLT ELECTROLYTIC CONDENSER
C6	1N 300	14 MFD. 200 VOLT ELECTROLYTIC CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
C7	1N 300	8 MFD. 200 VOLT ELECTROLYTIC CONDENSER
T1	1204	ANTENNA TRANSFORMER
T2	1304	INTERSTAGE R.F. TRANSFORMER
T3	1100	CHOKE COIL
T4	[illegible]	5" DYNAMIC SPEAKER TRANSFORMER
F1	800	2500 OHM SPEAKER FIELD

LEGEND	OUR PART NO.	DESCRIPTION
P	2002	MAZDA #46 PILOT LIGHT
S	—	AC SWITCH ON VOLUME CONTROL
A	1000	20 FEET INDOOR ANTENNA
CV1 CV2	807	TWO GANG VARIABLE CONDENSER

MODELS 30-34 TWO BAND RECEIVERS *AC-DC* TYPE.



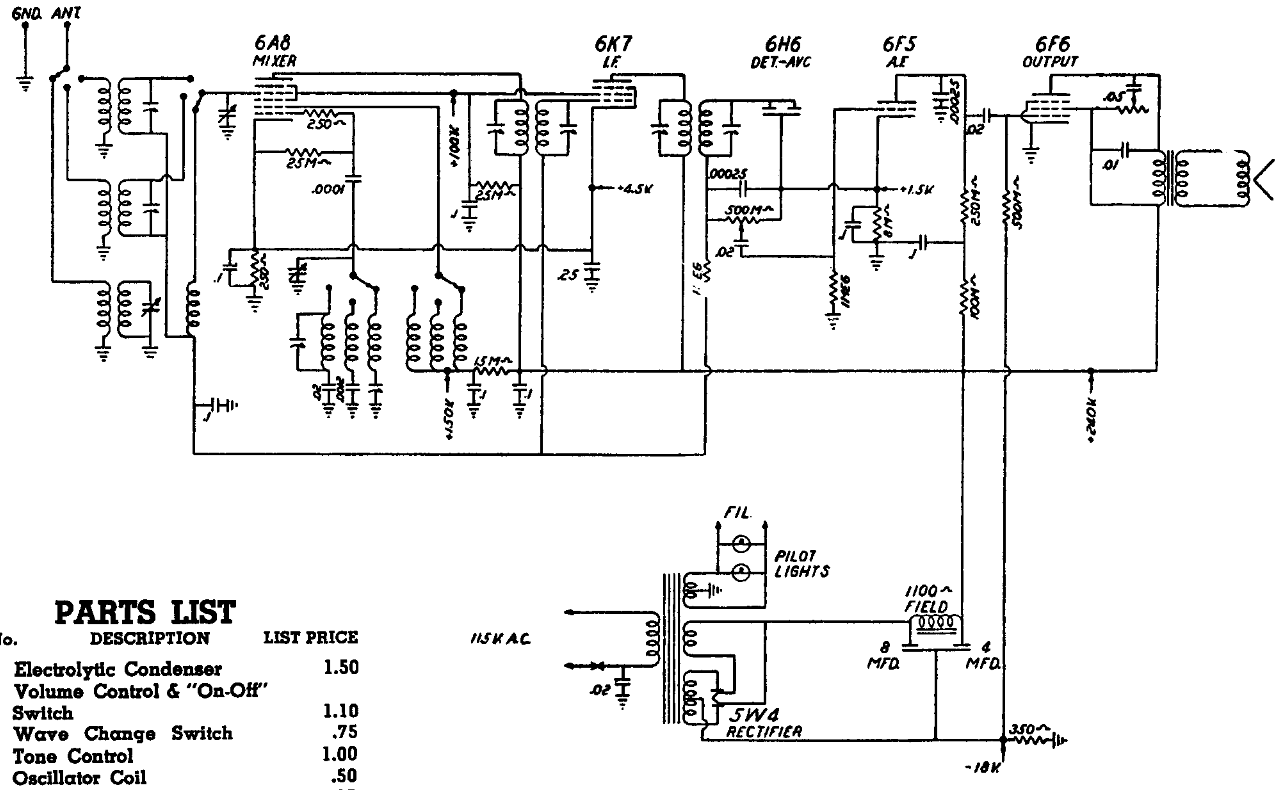
LEGEND	OUR PART NO.	DESCRIPTION
R1-R2	[illegible]	1000 OHM VOLUME CONTROL (275 OHM MIN.)
R3	111	25,000 OHM 1/4 WATT CARBON RESISTOR
R4	120	3 MEGOHM 1/4 WATT CARBON RESISTOR
R5	117	1/2 MEGOHM 1/2 WATT CARBON RESISTOR
R6	104	600 OHM 1/4 WATT CARBON RESISTOR
R7	127	L-55-S2 BALLAST TUBE
C1	211	.01 MFD. 400 VOLT TUBULAR CONDENSER
C	205	.1 MFD. 200 VOLT TUBULAR CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
C3	206	.05 MFD. 400 VOLT TUBULAR CONDENSER
C4	401	.0005 MFD. MICA CONDENSER
C5	1N 500	10 MFD. 35 VOLT PEAK ELECTROLYTIC CONDENSER
C6	1N 300	20 MFD. 250 VOLT PEAK ELECTROLYTIC CONDENSER
C7	1N 300	10 MFD. 250 VOLT PEAK ELECTROLYTIC CONDENSER
T1	1206	TWO BAND ANTENNA TRANSFORMER
T2	1006	TWO BAND INTERSTAGE TRANSFORMER
L2	804	SPEAKER FIELD (2500 OHM)

LEGEND	OUR PART NO.	DESCRIPTION
T3	[illegible]	5" DYNAMIC SPEAKER TRANSFORMER
L1	900	IRON CORE FILTER CHOKE
A	1000	20 FEET INDOOR AERIAL
P	2002	MAZDA #46 POLIT LIGHT
S1	1002	BAND SELECTOR SWITCH
S	—	LINE SWITCH ON VOLUME CONTROL
CV1 CV2	801	TWO GANG VARIABLE CONDENSER
K	1000	RUBBER COVERED LINE CORD

CONTINENTAL RADIO & TELEVISION CORP.

MODELS Z3 & Z344

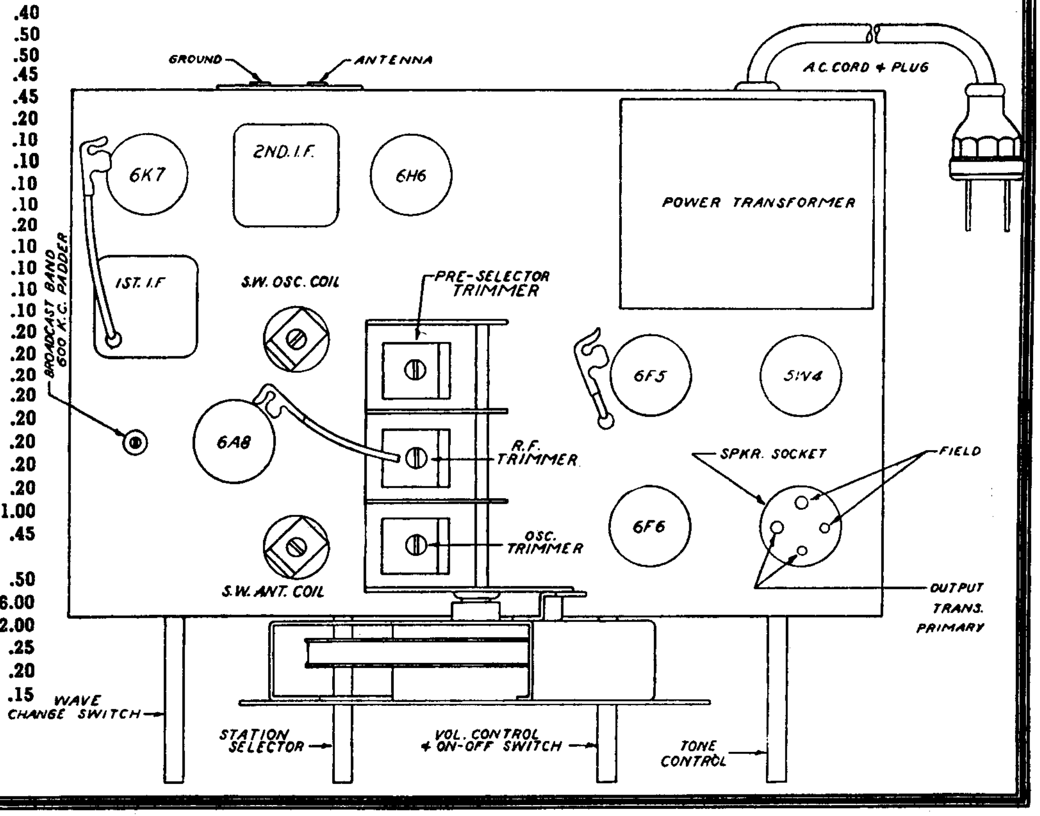


I.F. 456 K.C.

SWITCHES SHOWN IN B.C. POSITION
ALL VOLTAGES SHOWN TO GROUND

PARTS LIST

Part No.	DESCRIPTION	LIST PRICE
P950	Electrolytic Condenser	1.50
P934	Volume Control & "On-Off" Switch	1.10
P994	Wave Change Switch	.75
P995	Tone Control	1.00
P173	Oscillator Coil	.50
P176	A. C. Plug & Cord	.35
P990	Power Transformer	4.00
P987	3 Gang Condenser	4.00
P189	1st I. F. Transformer	1.20
P190	2nd I. F. Transformer	1.20
P678	Pre-Selector Coil	.85
P617	Padding Condenser	.40
G560	Short Wave Antenna Coil	.50
G561	Short Wave Oscillator Coil	.50
G562	Police Band Antenna Coil	.45
G563	Police Band Oscillator Coil	.45
P170	350 Ohm Resistor	.20
P136	250 Ohm ¼ Watt Resistor	.10
P168	8,000 Ohm ¼ Watt Resistor	.10
P258	15,000 Ohm ¼ Watt Resistor	.10
P166	25,000 Ohm ¼ Watt Resistor	.10
P165	25,000 Ohm 1 Watt Resistor	.20
P280	100,000 Ohm ¼ Watt Resistor	.10
P139	250,000 Ohm ¼ Watt Resistor	.10
P137	500,000 Ohm ¼ Watt Resistor	.10
P162	1 Megohm ¼ Watt Resistor	.10
P143	.02 Mfd. 400 Volt Condenser	.20
P142	.1 Mfd. 200 Volt Condenser	.20
P276	.1 Mfd. 400 Volt Condenser	.20
P141	.25 Mfd. 200 Volt Condenser	.20
P147	.00025 Mica Condenser	.20
P334	.05 Mfd. 400 Volt Condenser	.20
P335	.01 Mfd. 600 Volt Condenser	.20
P478	.0012 Mfd. 200 Volt Condenser	.20
P182	Speaker Output Transformer	1.00
G573	8 Speaker Cone Only	.45
G564A	8" Spider & Voice Coil Unit Complete	.50
G725	8 Dynamic Speaker with B. C.	6.00
G965	Dial & Scale-Complete	2.00
P938	Dial Glass	.25
P124	Pilot Light	.20
P634	Knob	.15



CONTINENTAL RADIO & TELEVISION CORP.

MODELS Z3 & Z344

This receiver is designed to operate over three tuning ranges. The broadcast range which extends from 545 to 1715 Kilocycles (KC) (175 to 550 meters), Police and Aviation Band which extends from 1715 to 5350 Kilocycles (KC) (56 to 175 Meters) and the International Short Wave Band which extends from 5760 to 16200 Kilocycles (KC) (18.5 to 52 meters). This short wave range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1800, 4000, 6000, and 14,000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tubes (6L7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all six I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the rear gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the center and front trimmers of the gang condenser to peak. The front gang section tunes the R.F. or grid coil of the 6A8 tube and the center condenser section tunes the pre-selector stage circuit.

Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R.F. section. The padding condenser is located on the right hand end of the chassis near the 6K7 tube.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Bands.

FOREIGN BAND The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coil located on the top of the chassis. Set the test oscillator to 14,000 KC. The oscillator coil is located near the 1st I.F. Transformer and the antenna or R.F. coil is located directly in front of the Short Wave oscillator coil and about midway between the 1st I.F. Transformer and the 6A7 tube. These two trimmers should be adjusted for peak at 14,000 KC and as the inherent design of the circuit has been expressly designed for simplicity in servicing, no other adjustments are necessary for aligning this band. **Note:** Always start this procedure by having the oscillator coil trimmer loose (out all the way), and the antenna coil trimmer fairly tight (in all the way); otherwise it is possible to make a false alignment on the image frequency.

Important: Do not attempt any adjustment of the gang condenser trimmers in aligning the Foreign Band as this will throw the Broadcast Band out of alignment.

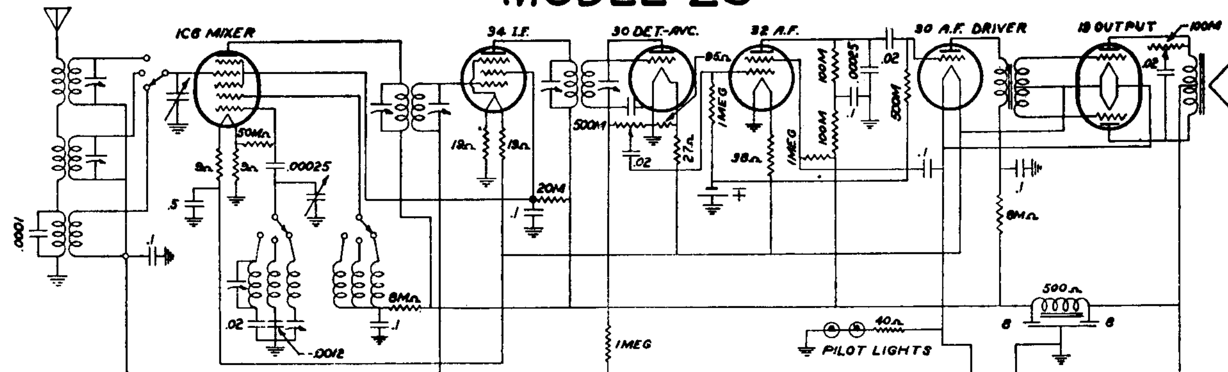
POLICE BAND There is only one adjustment to be made in the alignment of the Police Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary.

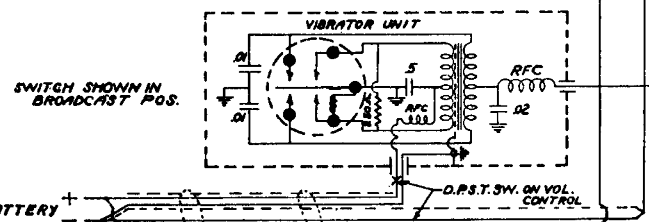
Set the dial pointer to 4000 KC (also the test oscillator) and adjust the antenna coil trimmer to resonance. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment. The two police band coils are under the chassis and the antenna coil trimmer is mounted on the end of the antenna coil.

Important: This is the only adjustment necessary for the Police Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Police Band, otherwise the Broadcast Band will be thrown out of alignment.

CONTINENTAL RADIO & TELEVISION CORP.

MODEL Z5



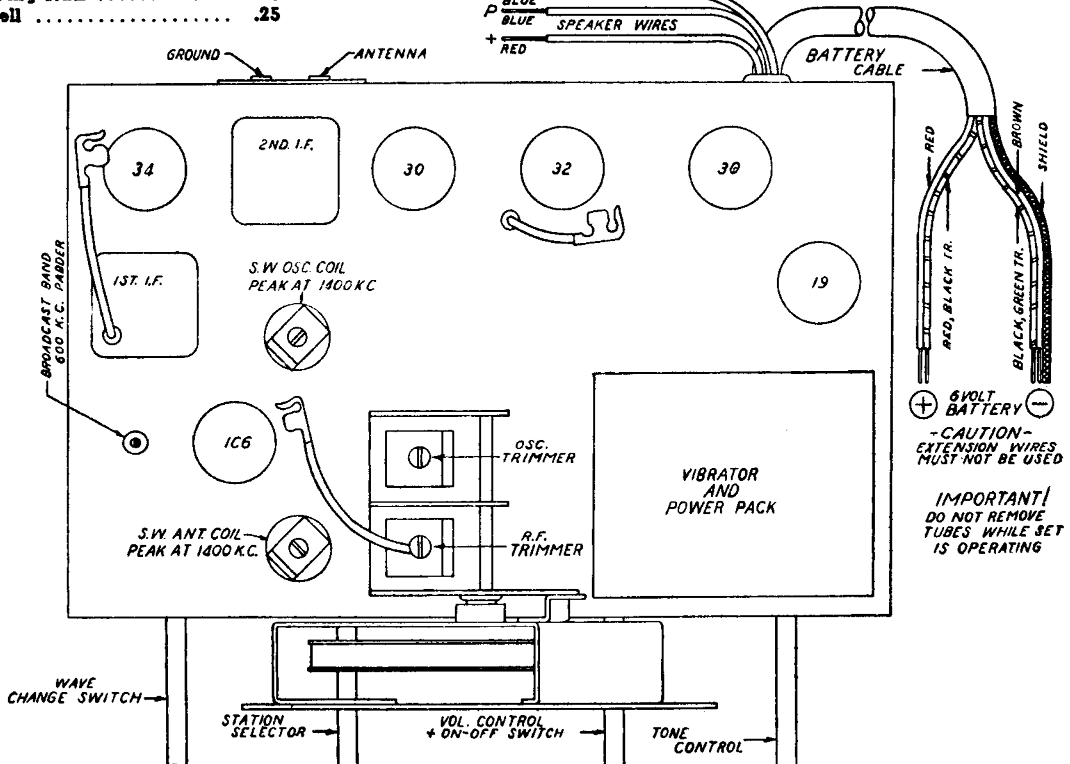


I.F. 456 K.C.

Part No.	DESCRIPTION	LIST PRICE
P173	Oscillator Coil	.50
P189	1st I. F. Transformer	1.20
P190	2nd I. F. Transformer	1.20
P194	Tube Shield	.10
P298	Antenna & Ground Post	.15
P382	Antenna Coil	.75
P392	Battery Cord	.75
P958	Dual 8-Electrolytic Condenser	2.00
P402	Vibrator Unit	5.00
P406	Vibrator Socket	.15
P411	Filter Choke 500-ohm	.75
P422	40-Ohm Candohm Resister	.20
P446	Pilot Light 2V.-06-M.A.	.35
P452	Tube Shield	.15
P854	R. F. Choke	.50
P457	A. Choke	.50
P932	Pilot Light Bracket	.15
P970	2-Gang Condenser	2.75
P544	Trimmer Condenser	.15
P617	Padding Condenser	.40
G865	Dial & Scale Complete	3.00
P634	Knob	.25
P937	Escutcheon Plate	.60
P938	Convex Glass	.20
P939	Glass Retainer Ring	.15
P941	Escutcheon Ring	.20
P961	Volume Control with Switch	1.10
P962	Tone Control	.70
P684	6/32 Wing Nuts	.10
P688	Bias Cell	.25

Part No.	Description	List Price
P551	Type 30 Socket	.15
P553	Type 34 Socket	.15
P554	Type 1C6 Socket	.15
P689	Bias Cell Panel	.15
P719	Input Transformer	1.50
G999	Power Unit Complete with Vibrator	12.00
P954	Power Transformer	2.00
P777	Candohm 19-9-Ohm Resistor	.30
P778	Candohm Gang Resistor	.50
P933	Wave Switch	.85
G560	Short Wave Antenna Coil	.50
G561	Short Wave Oscillator Coil	.50
G562	Police Band Antenna Coil	.45
G563	Police Band Oscillator Coil	.45
P975	6" Per. Magnet Spkr.	7.00
P980	8" Perm. Mag. Spkr.	7.50

Part No.	Description	List Price
P555	Type 32 Socket	.15
P687	Type 19 Socket	.15
P136	250 Ohm ¼ Watt Resistor	.10
P137	500,000 Ohm ¼ Watt Resistor	.10
P162	1-Megohm ¼ Watt Resistor	.10
P168	8,000 Ohm ¼ Watt Resistor	.10
P280	100,000 Ohm ¼ Watt Resistor	.10
P417	50,000 Ohm ¼ Watt Resistor	.10
P419	20,000 Ohm ¼ Watt Resistor	.10
P142	.1-MFD-200V Condenser	.15
P143	.02-MFD-400V Condenser	.20
P147	.00025-Mica-20% Condenser	.20
P335	.01-MFD-600V Condenser	.15
P395	.5-10V Condenser	.35
P478	.0012-MFD-200V Condenser	.20
P480	.0001 Mica Condenser	.15
P672	.001 Mica Condenser	.20



CONTINENTAL RADIO & TELEVISION CORP.

MODEL Z5

This receiver is designed to operate over three tuning ranges. The broadcast range which extends from 545 to 1715 Kilocycles (KC) (175 to 550 meters), Police and Aviation Band which extends from 1715 to 5350 Kilocycles (KC) (56 to 175 Meters) and the International Short Wave Band which extends from 5760 to 16200 Kilocycles (KC) (18.5 to 52 meters). This short wave range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

REASONS FOR UNSATISFACTORY OPERATION

FAILURE TO OPERATE 1. Check connections from battery cable to storage battery. If connections are reversed, set will not operate. Proper instructions for connecting the battery are given on the first page.
2. Check all tubes. Have them tested by meter equipped to test the type of tubes used in this receiver.
3. Check tube shields for good ground connections. Check grid caps for good connection. See that grid caps and tube shields are not shorted to each other (touching).
4. Reversed connections on Antenna and ground terminals. Try both ways for best results.
5. Oscillator tube (1C6) not oscillating.
6. Vibrator unit not securely in socket.

HUM A minimum amount of hum, equivalent to A.C. receivers, may be present. Excessive hum may be traced to the following causes:
1. Omitting the use of a ground or a poor ground connection.
2. Vibrator unit not securely fitted in socket.
3. Antenna picking up interference from high tension power lines.
4. Weak or rundown battery. Battery with defective cell.
5. Poor battery connections.
6. Extending or lengthening battery leads cause an enormous increase in "hum." The battery cable attached to the receiver is of special design and its ends **must** be connected directly to the battery terminals. **(See battery connection data on first page.)**

HOWLS AND SQUEALS 1. Omitting the use of a ground or poor ground connections.
2. Speaker leads placed near the (32) tube. These leads should be kept away from this locality. Speaker leads should be kept along the end of chassis and front corner of cabinet.
3. Check shield on (34) tube for good connection to chassis.

WINDCHARGERS

There are many types of windchargers now on the market which may be used to advantage for greater economy of receiver operation. **Such chargers will pay for themselves over a period of time; by saving the cost of battery recharging; removing the inconvenience of taking the battery to a charging station; non-operation of the receiver during the charging period.**
IMPORTANT NOTE: The battery must never be charged while set is in operation. If a windcharger is used, it should always be disconnected from the battery when the receiver is being used. An inexpensive single pole switch can be used for disconnecting the windcharger from the battery. This will increase the life of the tubes and give additional economy to the use of the receiver.

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator which will cover the frequencies of 456, 600, 1400, 1800, 4000, 6000, and 14,000 KC and an output meter which is to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1C6) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the rear gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak. The front condenser section tunes the RF or grid circuit of the 1C6 tube. Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the R.F. section. The padding condenser is located on the left hand side of the chassis, directly to the left of the 1C6 tube and in front of the first I.F. transformer. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.
This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Bands.

FOREIGN BAND ALIGNMENT The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coils located on the top of the chassis. Set the test oscillator to 14,000 KC. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. The oscillator coil is located near the 1st I.F. Transformer and the antenna or R.F. coil is located directly in front of the Short Wave oscillator coil and alongside the front section of the gang condenser. These two trimmers should be adjusted for peak at 14,000 KC and as the inherent design of the circuit has been expressly developed for simplicity in servicing, no other adjustments are necessary for aligning this band.
Note: Always start this procedure by having the oscillator coil trimmer loose (out all the way), and the antenna coil trimmer fairly tight (in all the way); otherwise it is possible to make a false alignment on the image frequency. In order to prevent alignment on the image frequency, it is suggested that the following check be made: Readjust the pointer to 13,100 KC where the image frequency should be found. If properly aligned, the image frequency will be found to be weaker. If, however, the signal at 13,100 KC is found to be stronger than the signal at 14,000 KC, it signifies that alignment was incorrectly made on the image frequency.
IMPORTANT: Do not attempt any adjustment of the gang condenser trimmers in aligning the Foreign Band as this will throw the Broadcast Band out of alignment.

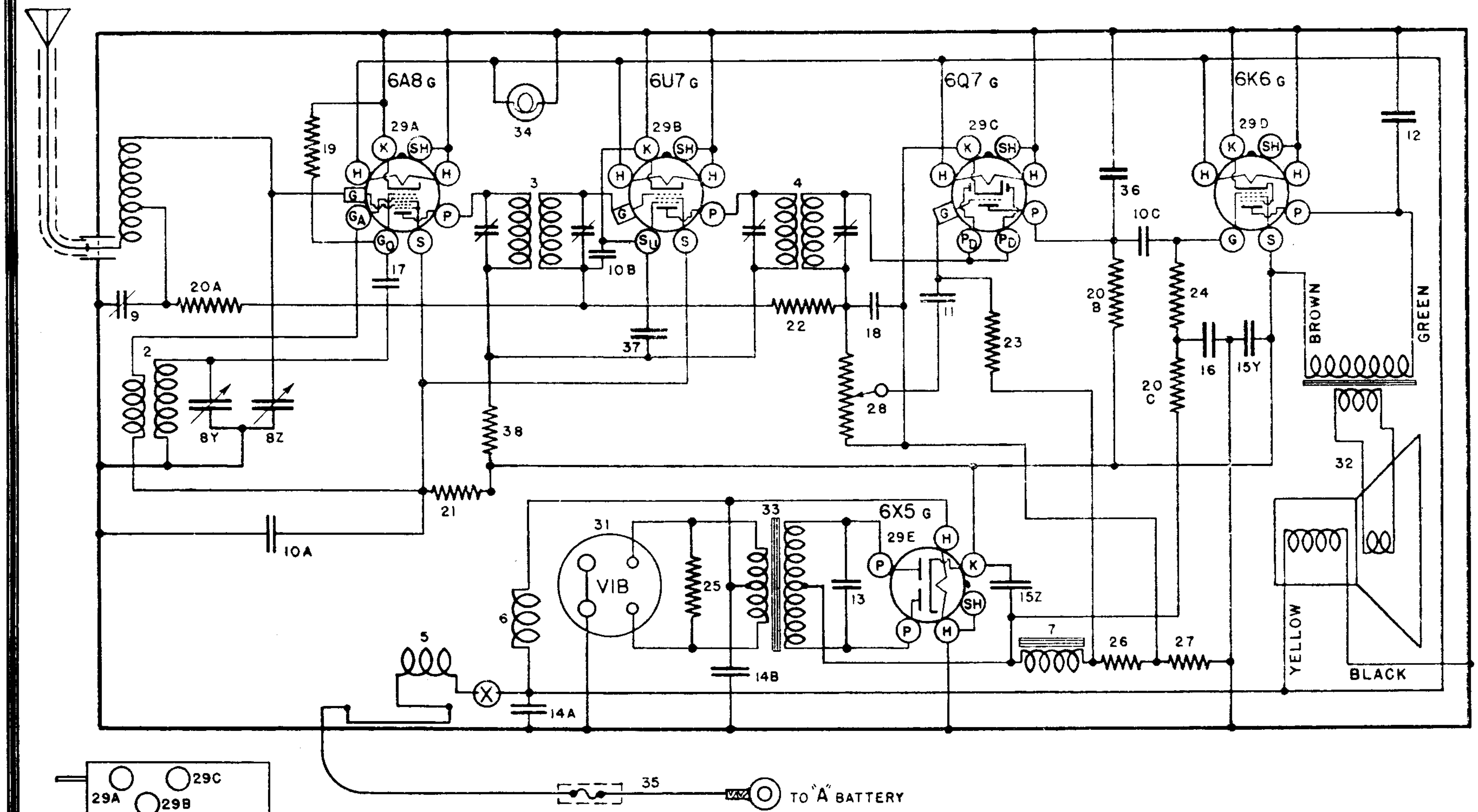
POLICE BAND ALIGNMENT There is only one adjustment to be made in the alignment of the Police Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary. Set the dial pointer to 4000 KC (also the test oscillator) and adjust the antenna coil trimmer to resonance. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment. The two police band coils are under the chassis and the antenna coil trimmer is mounted on the end of the antenna coil. **Important:** This is the only adjustment necessary for the Police Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Police Band, otherwise the Broadcast Band will be thrown out of alignment.

SERVICE DATA FOR ALL BANDS

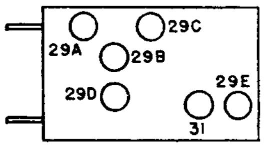
If it is suspected that the oscillator has stopped but is doubtful due to the presence of the usual amount of noise level, it is suggested that the oscillator plate voltage be checked. To ascertain whether the tube is oscillating, ground the oscillator grid of the 1C6 (short stator and rotor plates of oscillator section on gang condenser). If oscillating properly, grounding the grid will cause an appreciable drop in oscillator voltage.

THE CROSLEY RADIO CORPORATION

MODELS A-157 & FIVER ROAMIO



I.F. 455 K.C.



MODEL -- A-157

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and the receiver chassis. Voltage readings taken with a 1000 ohm per volt, 500 volt voltmeter (except filaments) with receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range D-C voltmeter (approximately 0 to 10 volts). Voltage limits may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	Su	K	Ga	Go
6A8-G	Oscillator-Modulator	6.0	220	90	—	0	90	0
6U7-G	I-F Amplifier	6.0	220	90	0	0	—	—
6Q7-G	Diode Detector & A-F Amp.	6.0	110	—	—	0	—	—
6K6-G	Output	6.0	200	220	—	0	—	—
6X5-G	Rectifier	6.0	—	—	—	220	—	—

Power Output approximately 4 Watts.
Battery Drain approximately 5.7 Amperes at 6 Volts.

THE CROSLEY RADIO CORPORATION

MODELS A-157 & FIVER ROAMIO

SPECIFICATIONS

The Crosley Model A-157 auto radio is a single unit, five-tube superheterodyne receiver, incorporating A. V. C. and many advanced features in circuit design. The power supply unit is an integral part of the receiver chassis and uses a primary type vibrator.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to P and S of the 6K6G Output tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd., or larger, condenser to the top cap of the 6A8G Osc-Mod. tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the receiver chassis frame. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Adjust the station selector so that the rotor plates of the tuning condenser are completely disengaged and turn Vol. Cont. to maximum position (RIGHT).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust both trimmers located on the 2nd I-F transformer for maximum output. Fig. 2.

(e) Adjust both trimmers located on the 1st I-F transformer for maximum output.

(f) Repeat operations (d) and (e) for more accurate adjustments.

IN ORDER TO PREVENT A. V. C. ACTION ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

(a) Connect the output lead from the signal generator through a .00025 mfd. condenser to the "ANT" connection of the receiver.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer on the "OSC" section of the tuning condenser for maximum output.

(e) Adjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

(f) Readjust the station selector for maximum output. DO NOT READJUST THE OSC. TRIMMER.

(g) Repeat operation (e) for more accurate adjustment.

3. Adjusting Antenna Compensating Condenser.

(a) Set the signal generator to 600 kilocycyes.

(b) Tune in the 600 kilocycle signal with the station selector for maximum output.

(c) Adjust the antenna compensating condenser, Illustration No. 9, Fig. 3, for maximum output.

(d) Repeat operations (b) and (c) alternately until no further improvement can be obtained.

(e) Set the signal generator to 1400 kilocycles again.

(f) Tune-in the 1400 kilocycle signal with the station selector for maximum output.

(g) Readjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

It will be necessary to adjust the antenna compensating condenser to the car antenna after the receiver has been installed in the car.

(a) After the installation is complete, tune-in a WEAK station between 55 and 65 on the dial.

(b) Adjust the antenna compensating condenser for maximum volume in the speaker.

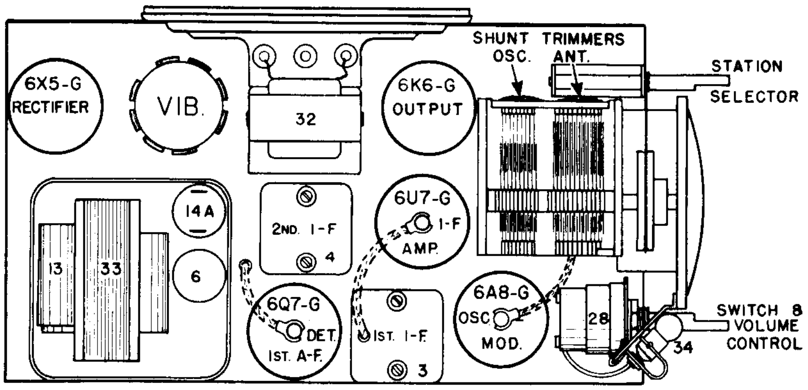


Fig. 2 Top View A-157

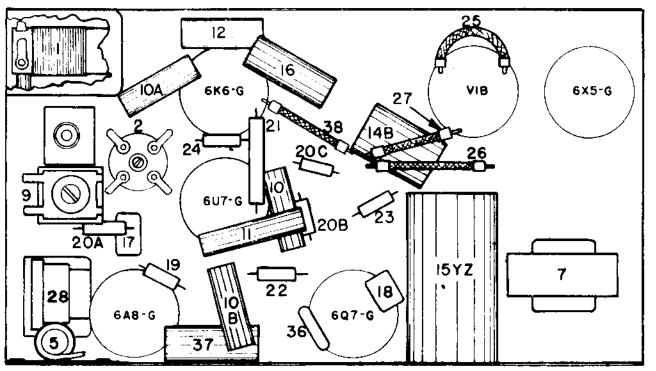


Fig. 3 Bottom View A-157

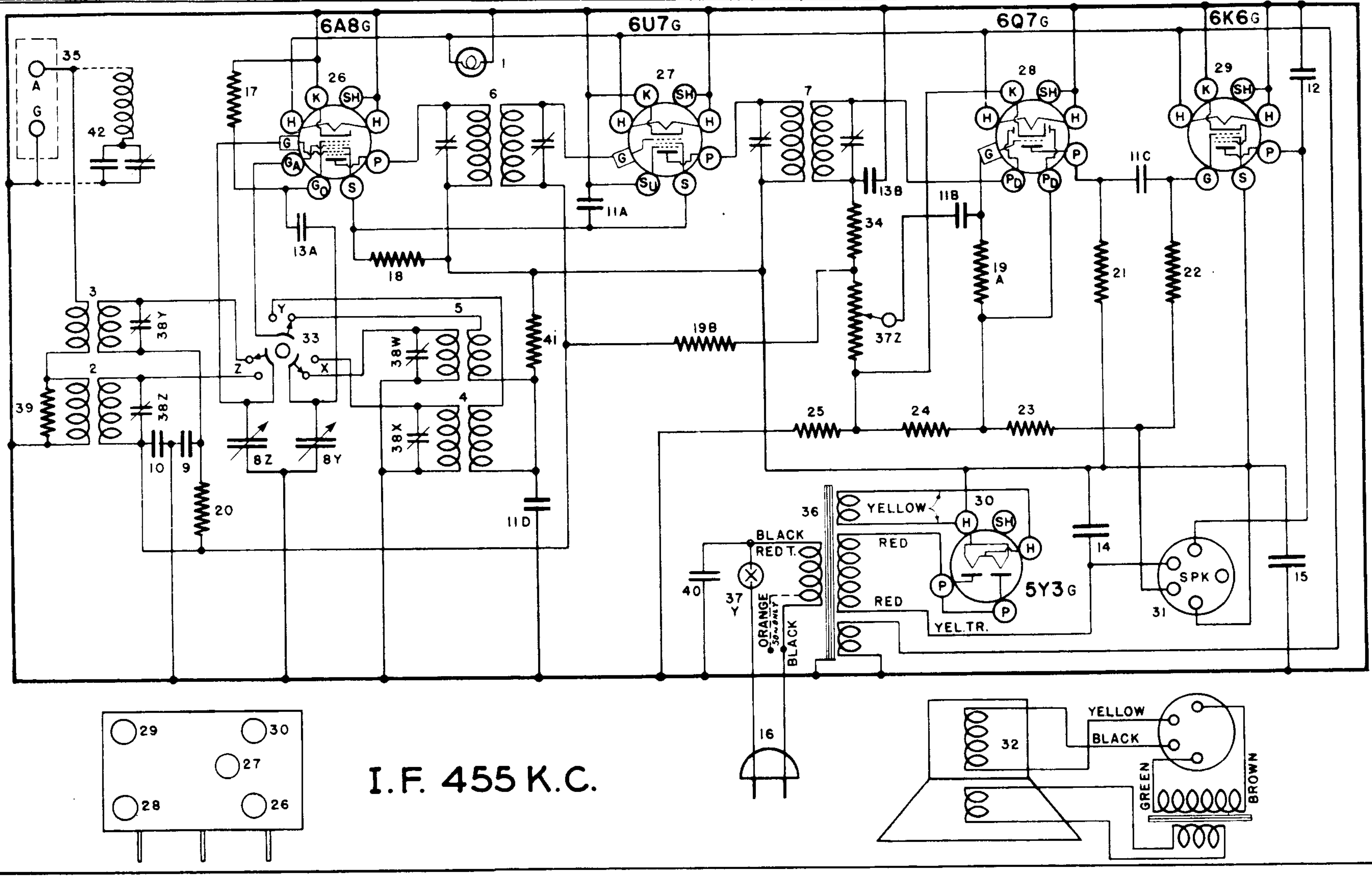
PARTS LIST

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description	Item No.	Part No.	Description
1	G137—32000	Antenna Coil	26	W —23012A	Resistor 40 Ohm ¾W.
2	G137—32002	Oscillator Coil	27	W —24537	Resistor 60 Ohm ½W.
3	G149—32004	1st I-F Assembly, 455 Kc.	28	—50042	Vol. Cont. 1 Meg. & Switch
4	G148—32004	2nd I-F Assembly, 455-Kc.	29	G178—36400	Socket, Octal
5	G16 —32977	Motor Noise Choke		W —50142	Tube Shield, Plain Half } 6U7-G
6	G21 —28067	"A" Filter Choke		W —50143	Tube Shield, Cut-out Half } 6U7-G
7	G16 —29535	"B" Filter Choke		W —31210	Tube Shield Ring } 6U7-G
8	G36 —33001	Var. Tuning Cond., 2 Section	30		NONE
	C —50137	Dial Face (Glass)	31	G105—28807	Socket (Vibrator)
	W —50135	Support Ring (Dial)		W —50123	Gnd. Clip (Vibrator)
	B —50136	Support Bracket (Dial)	32	263—BL7 "U"	Speaker, Spec. 5-S-21
	W —50133	Dial Mask		—44062	V. C. & Cone Assembly } Above Speaker
	G2 —43564	Pulley and Hub Assembly		—44063	Output Trans. } Above Speaker
	—41582	Drive Cord	33	G15 —32769	Power Transformer
	W —50134	Shaft (Drive)		W —50130	P. T. Shield
	W —50128	Mtg. Bracket (Shaft)	34	W —43567	Dial Light Bulb
	W —43549	Retaining Ring (Shaft)		W —43568	Bracket—Dial Light
9	—38998A	Condenser Ant. Comp.	35	G25 —32750	"A" Lead Assembly
10ABC	W -32380	Condenser .05 Mf. 200 V.		W —32757	Fuse, 12 Amp.
11	W —37226	Condenser .02 Mf. 160 V.		W —32777	Fuse Cap (Female)
12	W —23191A	Condenser .01 Mf. 400 V.1		W —32776	Fuse Insulator
13	W —50170	Condenser .01 Mf. 1000 V.		W —31393	Fuse Cap (Male)
14AB	W —50161	Condenser .5 Mf. 120 V.	36	G6 —34002	Condenser .000025 Mfd. 200 V.
15ZY	W —50160	Condenser 4 Mf. 350 V.	37	W —32750	Condenser .05 Mfd. 400 V.
16	W —50105	Condenser .1 Mf. 160 V.	38	W —22514	Resistor 750 Ohm ½W.
17	G1 —34002	Condenser .00025 Mf. 200 V.	38	W —35581	Resistor 1000 Ohm ¾W.
18	G3 —34002	Condenser .0005 Mf. 200 V.		W —38038D	Distr. Suppressor
19	—35928	Resistor 60,000 Ohm ¼W.		W —29754	Gen. Condenser
20ABC	—35601	Resistor 300,000 Ohm ¼W.		W —50167	Mtg. Bracket (Set)
21	—37377	Resistor 20,000 Ohm 1W.		—25846	Mtg. Screw (Set)
22	—35602	Resistor 1 Megohm ¼W.		—6213	Mtg. Nut
23	—35927	Resistor 2 Megohm ¼W.		—35065	Mtg. Bolt
24	—36322	Resistor 500,000 Ohm ¼W.		—35147B	Ant. Connecting Lead (Extra)
25	W —35467	Resistor 220 Ohm ½W.		W —50164	Knob

THE CROSLEY RADIO CORPORATION

MODEL 567



SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt 500 volt d. c. voltmeter (except filaments) with the receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range a. c. voltmeter (approximately 0-10 volts). Readings may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	K	G	Ga
6A8G	Oscillator-Modulator	6.3	160	115	0	-1.2	160
6U7G	I-F Amplifier	6.3	160	115	0	-1.2	—
6Q7G	Diode Detector & A-F Amplifier	6.3	80	—	2.5	-2.5	—
6K6G	Output	6.3	160	160	0	-5.0	—
5Y3G	Rectifier	5.0	—	—	225	—	—

Power output approximately 2 watts.
Power consumption approximately 40 watts at 117.5 volts.
Voltage drop across speaker field 35 volts.

THE CROSLEY RADIO CORPORATION

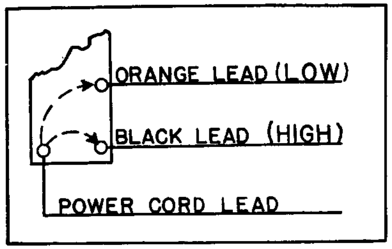
MODEL 567

Tuning Range

540-1725 Kilocycles or 555-173 Metres
5.9-15.3 Megacycles or 51- 18 Metres

50 CYCLE POWER TRANSFORMER ADJUSTMENT

Receivers equipped with a 50 cycle power transformer have a "high" and "low" voltage tap on the under side



of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

The accompanying illustration shows the connections for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and output meter.

CONNECTING OUTPUT METER

Connect the output meter to P and S of the 6K6G output tube. Be certain that the meter is protected from d. c. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

Tuning I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8G tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh and turn the volume control knob to the right (ON).

(c) Turn the band selector switch to the left (Broadcast Band).

(d) Set the signal generator to 455 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F transformer for maximum output. See Fig. 2.

(f) Adjust both trimmers located on the top of the 1st I-F transformer for maximum output.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

Aligning The R-F Amplifier.

When aligning the R-F amplifier the output lead from the signal generator is connected to the antenna (A) terminal of the receiver. For the Broadcast Band a .00025 mfd. condenser should be connected in series with the output lead of the signal generator and for the High Frequency Band a 400 ohm carbon resistor should be used in place of the condenser.

(a) With the station selector adjusted so that the tuning condenser plates are completely out of mesh and the band selector switch set for the band being aligned, adjust the "OSC" shunt trimmer so that the MINIMUM CAPACITY SIGNAL (C), is heard. It is not necessary that the receiver tune through this signal.

(b) Adjust the station selector so that the SHUNT ALIGNMENT signal is tuned-in with maximum output. Then adjust the "ANT" shunt trimmer for maximum output. Readjust the station selector slightly so that the generaor signal is tuned-in with maximum output and check the adjustment of the "ANT" trimmer. DO NOT READJUST THE "OSC" TRIMMER.

NOTE 1: When shunt aligning the High Frequency Band care should be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this, increase the output of the signal generator 10 times, or more, and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct frequency.

NOTE 2: If at any time the H-F coils are replaced, it may be necessary to vary the inductance of the "OSC" coil by moving the cross-over turn of wire at the gap to make the set track at the 6 megacycle end. Moving the turn toward the short end of the coil will decrease the inductance and moving it toward the long end will increase the inductance. If the signal is weak at 6 megacycles, a similar slight change in the inductance of the "ANT" coil should bring up the signal strength. THIS IS A CRITICAL OPERATION AND SHOULD NOT BE DONE ON ANY SET UNLESS CHANGING COILS MAKES IT NECESSARY.

(C) SIGNAL INPUT FREQUENCIES

	Minimum Capacity	Shunt Alignment
American Broadcast Band	1725 Kilocycles	1400 Kilocycles
High Frequency Band	15400 Kilocycles	15000 Kilocycles

WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximatly 455 kilocycles. This assembly is located on the underneath side of the chassis and consists of a coil, a fixed condenser and a trimmer condenser as illustrated by dotted lines in the Wiring diagram.

The wave trap should not be adjusted until all other adjustments have been made. To make the adjustment, feed a 455 kilocycle signal from the signal generator through a .00025 mfd. condenser into the antenna terminal of the receiver. With the band selector switch turned to the Broadcast Band position, the gang condenser open and the volume control full on, adjust the trimmer condenser on the wave trap for minimum output.

Should the interfering station be operating on a frequency of slightly more or less than 455 kilocycles, the exact frequency should be determined with the aid of the signal generator. Then, instead of feeding a 455 kilocycle signal into the receiver the exact frequency of the interfering signal should be used. If it is not possible to determine the exact frequency of the interfering signal the antenna may be attached to the receiver and the receiver tuned to the position where the interfering signal is most noticeable. Then adjust the wave trap for minimum interference.

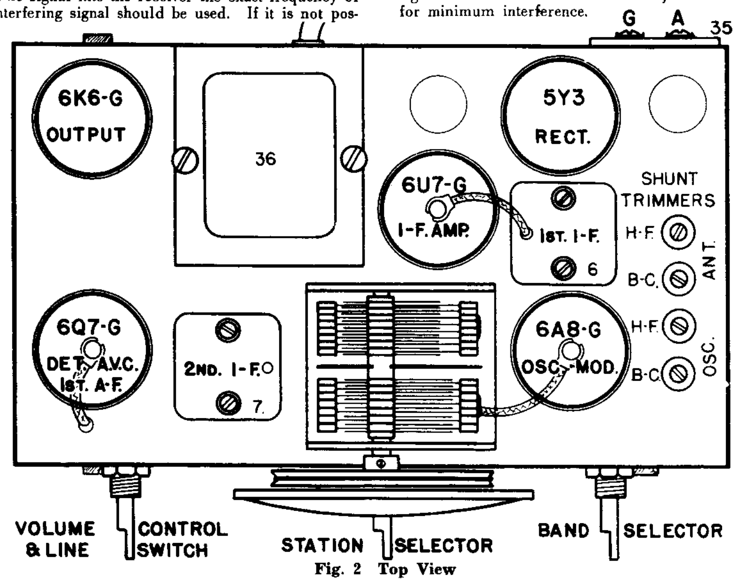


Fig. 2 Top View

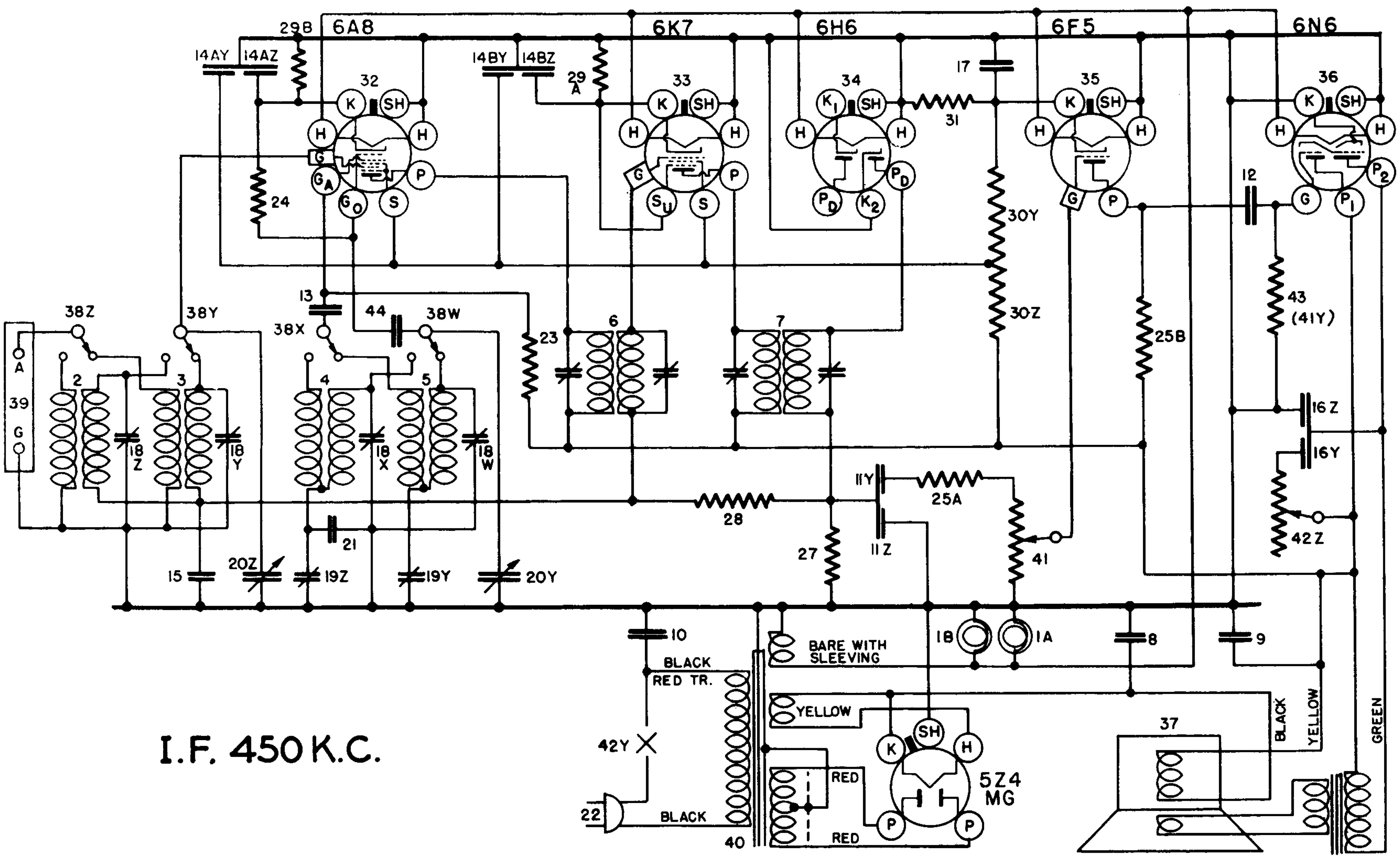
Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1	W —43567	Dial Light, 6-8 V.
	G2 —44252	Socket Assy. Dial Light
2	G132—32000	Ant. Coil, B. C.
3	G133—32000	Ant. Coil, H-F.
4	G132—32002	Osc. Coil, B. C.
5	G133—32002	Osc Coil, H-F.
6	G138—32004	1st I-F Assy.
7	G139—32004	2nd I-F Assy.
	W —36139A	Dual I-F Trimmer
8	G37 —33001	2 Section Gang Cond.
	B —44286C	Dial Face (Glass)
	—44267	Dial Mask (Metal)
	W —44285	Dial Mask (Paper)
	B —43544D	Support—Dial Glass
	W —43550A	Pointer
	W —40486	Screw—Pointer Mtg.
	W —44403	Ring—Dial Glass Support
	G1 —43564	Pulley and Hub Assy.
	W —43542B	Bracket—Drive Shaft
	W —44134	Drive Shaft
	W —43549	Retaining Spring (Shaft)
	—41582	Drive Cord
	W —43561	Spring—Cord Tension
9	G12 —34002	Condenser, 500 Mmf. Molded
10	W —36541	Condenser, .02 Mf. 160 V.
11A	W —28621	Condenser, .02 Mf. 200 V.
11B	W —28621	Condenser, .02 Mf. 200 V.
11C	W —28621	Condenser, .02 Mf. 200 V.
11D	W —28621	Condenser, .02 Mf. 200 V.
12	W —34647	Condenser, .006 Mf. 400 V.
13A	G1 —34002	Condenser, 250 Mmf. Molded
13B	G1 —34002	Condenser, 250 Mmf. Molded
14	W —44012	Condenser, 16 Mf. 250 V.
15	W —44013	Condenser, 16 Mf. 200 V.
16	B —44004	Cord and Plug
17	—33390	Resistor, 30,000 Ohm ¼W.
18	—24990	Resistor, 25,000 Ohm ¼W.
19A	—26577	Resistor, 3 Megohm ¼W.
19B	—26577	Resistor, 3 Megohm ¼W.
20	—21455	Resistor, 300,000 Ohm ¼W.
21	—35601	Resistor, 300,000 Ohm ¼W.
22	—23785	Resistor, 500,000 Ohm ¼W.
23	W —25937	Resistor, 275 Ohm ½W.
24	W —23012A	Resistor, 40 Ohm ½W.
25	W —25357	Resistor, 75 Ohm ¾W.
26	G156—36400	Socket, Type 6A8

Item No.	Part No.	Description
27	G171—36400	Socket, Type 6U7
28	G160—36400	Socket, Type 6Q7
29	G172—36400	Socket, Type 6K6
30	G173—36400	Socket, Type 5Y3
31	G103—28807	Socket Speaker
	W —40911	Tube Shield
32	257BP11"U"	Speaker, Spec. 5-B-5
	—44537	V. C. and Cone Assy.—257BP11"U"
	—44538	Output Trans.—257BP11"U"
	257BP11"B"	Speaker, Spec. 51-A-5
	—42927	V. C. and Cone Assy.—257BP11"B"
	—41473	Output Trans.—257BP11"B"
	—44681	Speaker Plug
33	W —43448A	Band Switch
34	—35600	Resistor, 100,000 Ohm ¼W.
35	G1 —26719	Ant. and Gnd. Terminal Assy.
36	—43479	Power Trans., 110 V. 60 Cy.
	—43569A	Power Trans., 110 V. 50 Cy.
	—43570A	Power Trans., 220 V. 50 Cy.
	—43480A	Power Trans., 110 V. 25 Cy.
	—43481A	Power Trans., 220 V. 25 Cy.
37	—43449A	Vol. Cont. (1 Meg.) and Switch
38	W —41247A	4 Section Shunt Trimmer Assy.
39	—22196	Resistor, 20,000 Ohm ¼W.
40	W —30805	Condenser, .01 Mf. 400 V.
41	—30137	Resistor, 3,500 Ohm ¼W.
	—7BB	Cabinet (Black Body)
	—7BC	Cabinet (Brown Body)
	—7BD	Cabinet (Wood Grain Body)
	—44106B	Cover (Used on 7BC and 7BD) Black
	W—44044A-FS1	Foot—Black
	—44045C	Cover (Used on 7BB) Red
	W—44044A-FS46	Foot—Red
	—44552	Knob (Black)
	—44268A	Escutcheon
	W —44436	Felt Pad (Escutcheon) (4 Req.)
	W —44015A	Chassis Support Brkt. (Upper)
	W —44016	Chassis Support Brkt. (Lower)
	W —44041A	Sound Baffle
	MG44—44026	Grille Cloth Assy.—7BB
	MG43—44026	Baffle Assy.—7BB
	MG42—44026	Grille Cloth Assy.—7BC and 7BD
	MG41—44026	Baffle Assy.—7BC and 7BD
42	G164—32004	Wave Trap

THE CROSLEY RADIO CORPORATION

MODELS 634, 649, 656 & 5656



TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt, 500 volt D.C. voltmeter (except filaments) with receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A-C voltmeter (Approximately 0 to 10 volts). Voltage limits may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Where Used	H	P	P2	S	Su	K	Ga	Go
6A8	Osc-Mod	6.3	275	—	120	—	5	170	—5 to —20
6K7	I. F. Amp.	6.3	275	—	120	4	4	—	—
6H6	Det. & AVC	6.3	0	—	—	—	0	—	—
6F5	A. F. Amp.	6.3	160	—	—	—	2	—	—
6N6	Output	6.3	275	260	—	—	0	—	—
5Z4MG	Rectifier	5.0	—	—	—	—	360	—	—

Power Output Approximately 4 Watts.
Power Consumption Approximately 85 Watts at 117.5 Volts.
Voltage Drop Across Speaker Field Approximately 78 Volts.

THE CROSLEY RADIO CORPORATION

MODELS 634, 649, 656 & 5656

SPECIFICATIONS

The Crosley Radio Models 656 and 5656 are companion models employing the same circuit. The Model 656 is supplied in a table cabinet having the speaker mounted on the chassis and the Model 5656 is a console type having the speaker mounted in the cabinet.

The frequency ranges covered are from 540 to 1710 kilocycles in the broadcast band and from 6,000 to approximately 18,000 kilocycles in the high frequency band.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to P. and P2 of the 6N6 Output Tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8 tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Turn the band selector switch to the right (High Frequency).

(d) Set the signal generator to 450 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F Transformer for maximum output. (Fig. 2).

(f) Adjust both trimmers located on top of the 1st I-F Transformer for maximum output.

(g) Check operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

(a) When aligning the R-F Amplifier the output lead from the signal generator should be connected through a dummy antenna to the "ANT" terminal of the receiver. For the broadcast band the dummy antenna should be a .00025 mfd. condenser and for the high frequency band this condenser should be replaced by a 400 ohm (Non Inductive) carbon resistor.

Each band should be shunt aligned, series aligned and then shunt aligned again in the order given. The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated below for each adjustment.

Adjust the "OSC" and "ANT" shunt trimmers (Shunt alignment. See Fig. 3) in the order given for maximum output. Tune the station selector to the generator signal for maximum output and then check the adjustment of the "ANT" trimmer. NOTE: When aligning the high frequency band care should be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator approximately 10 times and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles below the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct dial setting.

To adjust the "series" trimmers (Fig. 3) set the signal generator to the frequency indicated below and then tune-in this signal with the station selector for maximum output. Adjust the series trimmer while rocking the tuning condenser back and forth slightly, until no further improvement in output can be obtained.

(b) Signal Generator Frequencies.

	Shunt Alignment	Series Alignment
Broadcast Band	1400 Kc.	600 Kc.
High Frequency Band	18000 Kc.	6000 Kc.

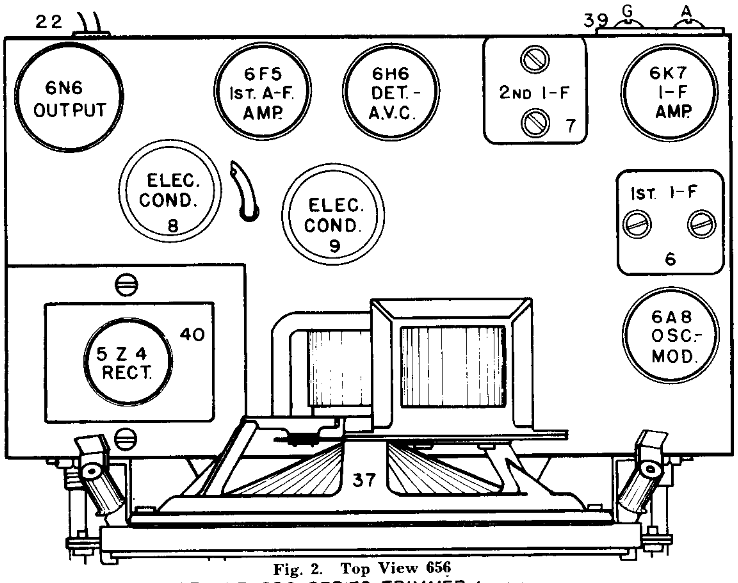


Fig. 2. Top View 656

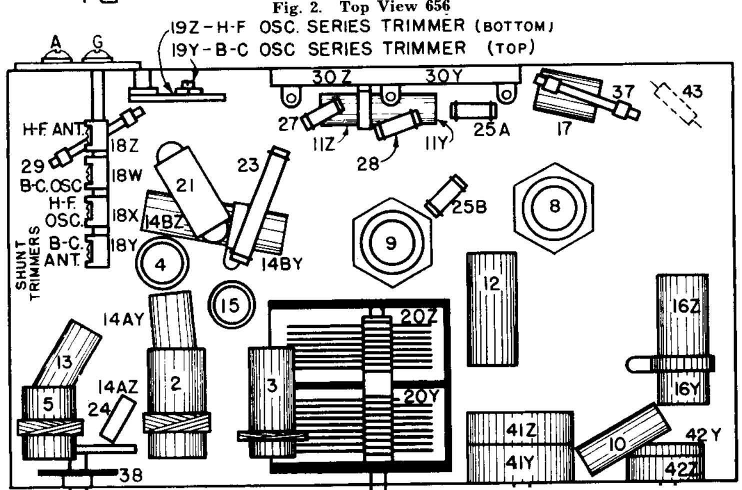


Fig. 3. Bottom View 656

Figures in first column refer to parts in Diagrams.

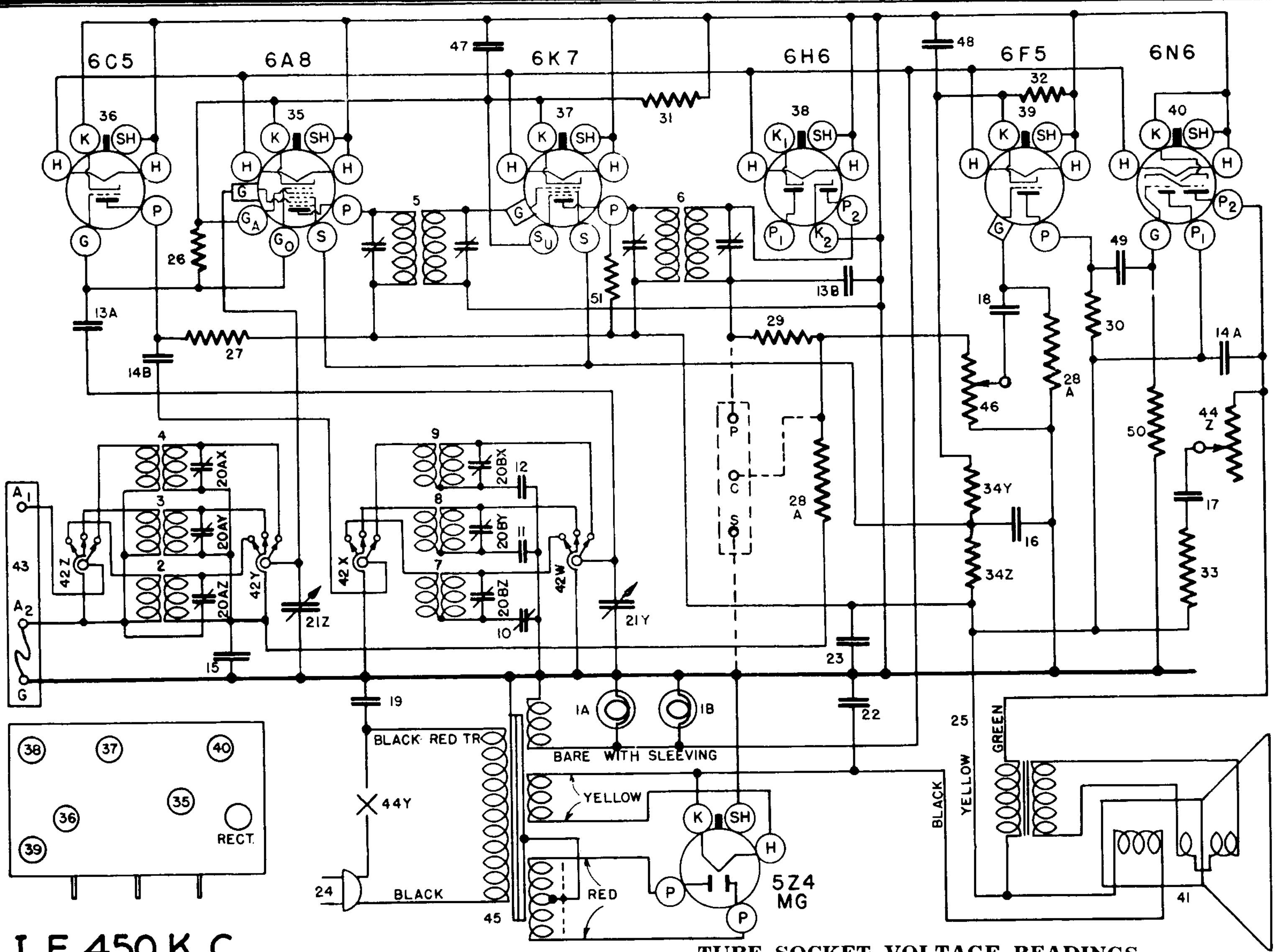
Item No.	Part No.		Name
1-AB	W	37922	Bulb, Dial Light
	G3	37965	Socket Assy., Dial Light
	W	40570	Shield, Dial Light
2	G118	32000	Coil, Antenna (5800-18100 Kc.)
3	G81	32000	Coil, Antenna (540-1725 Kc.)
4	G108	32002	Coil, Osc. (5800-18100 Kc.)
5	G66	32002	Coil, Osc. (540-1725 Kc.
6	G71	32001	Coil Assy., 1st I-F. (450 Kc.)
7	G72	32004	Coil Assy., 2nd I-F. (450 Kc.)
8	W	36055	Cond., 35 Mf. 400V.
9	W	36057	Cond., 40 Mf. 300V.
10	W	30805	Cond., .01 Mf. 400V.
11Z	W	30322-A	Cond., .00017 Mf. 200V.
11Y			Cond., .006 Mf. 200V.
12	W	32780-B	Cond., .05 Mf. 400V.
13	W	32191-A	Cond., .01 Mf. 400V.
14AZ	W	28623	Cond., .02 Mf. 200V.
14AY			Cond., .02 Mf. 200V.
14BZ	W	28623	Cond., .02 Mf. 200V.
14BY			Cond., .02 Mf. 200V.
15	W	27216	Cond., .05 Mf. 200V.
15B	W	36541	Cond., .02 Mf. 160V.
16Y	W	31052	Cond., .05 Mf. 400V.
16Z			Cond., .004 Mf. 400V.
17	See 15B		
18	W	37241	Cond., 4 Section Trimmer
19	G31	33006	Condenser, 2 Section
20	G17	33001	Condenser, Var. Tuning
	Mg35-	40765	Bracket Assy., Dial Support & Spk. Mtg. (656)
	W	40798	Bracket, L.H., Dial Sup.
	W	40799	Bracket, R.H., Dial Sup.
	W	40797	Bracket, (2 Req.), Dial Mtg.
	B	41979	Dial, Calibrated Glass
	W	41739	Drive Unit, Dial
	W	40795-B	Shaft, Hand
	W	40794	Bracket, Hand Shaft Bearing
	W	42629	Pointer (Hand), Dial
	W	40800	Washer (Spring), Hand Shaft
	W	41611	Ring, Shaft Retaining
	B	42374	Mask, Metal (Bronze)
	W	40486	Screw, Pointer Mtg.
21	G7	34000	Condenser, 1750 Mmf.
22	B	33906-A	Cord and Plug, Power

Item No.	Part No.		Name	
23		5370-A	Resistor, 20,000 Ohm 1W.	
24		35928	Resistor, 60,000 Ohm ¼W.	
25A		23403	Resistor, 150,000 Ohm ¼W.	
25B		35928	Resistor, 150,000 Ohm ¼W.	
27		33344	Resistor, 400,000 Ohm ¼W.	
28		37245	Resistor, 1.5 Megohm ¼W.	
29	W	28589	Resistor, 350 Ohm ½W. Flex.	
30Z	W	32301	Resistor, 10,000 Ohm Candohm	
30Y			Resistor, 15,000 Ohm Candohm	
31			Resistor, 165 Ohm ½W. Flex.	
32	G156	36400	Socket, Type 6A8	
33	G151	36400	Socket, Type 6K7	
34	G155	36400	Socket, Type 6H6	
35	G158	36400	Socket, Type 6F5	
36	G165	36400	Socket, Type 6N6	
37	331BL9		Speaker ("M"-1-D 116) (Model 656 only)	
		37039	Cone Assy.	For above Speaker
		40275	Field Coil	
		40276	Output Transformer	
	632CJ3		Speaker ("M"-1-D-610) (Model 5656 only)	
		42879	Cone Assy.	For above Speaker
		42880	Field Coil	
		42881	Output Trans.	
	G3	35696	Speaker Cable, (Model 5656 only)	
38		37247	Switch, Band Selector	
39	G1	26719	Terminal Board, Antenna & Grd.	
40		41978-A	Transformer, 110V. 60 Cy. Power	
41Z		41027	Volume Control, (3 Meg.)	See Note
41Y			Volume Control, (1 Meg.)	
42Z		41028-A	Tone Control, (80,000 Ohm)	
42Y			Line Switch	
	W	42345	Escutcheon	
	D	28	Escutcheon Screws	
	W	37339	Knob, V.C.&S.S.	
	W	37341	Knob, T.C.&B. Sw.	
		42006	Volume Control, (3 Meg.)*	
43		21455	Resistor, 300,000 Ohm ¼W.	*(See Note
		BE	Cabinet, (Model 656)	
		MA	Cabinet, (Model 5656)	

*May be used in place of Dual Volume Control.

THE CROSLEY RADIO CORPORATION

MODELS 716, 744 & 745



I.F. 450 K.C.

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt, 500 volt D.C. voltmeter (except filaments) with the receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A-C voltmeter (Approximately 0-10 volts). Readings may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Where Used	H	P	P2	S	G	K	Go
6C5	Oscillator	6.3	165	—	—	0	0	—
6A8	Modulator	6.3	270	—	120	0	2.85	—5 to —30
6K7	I. F. Amp.	6.3	270	—	120	0	2.85	—
6H6	Diode Detector	6.3	0	—	—	—	—	—
6F5	A. F. Amp.	6.3	170	—	—	0	1.75	—
6N6	Output	6.3	270	255	—	0	0	—
5Z4MG	Rectifier	5.0	—	—	—	—	330	—

Power Consumption Approximately 80 Watts at 117.5 Volts.
Power Output Approximately 6 Watts.
Voltage Drop Across Speaker Field Approximately 60 Volts.

THE CROSLEY RADIO CORPORATION

MODELS 716, 744 & 745

SPECIFICATIONS

The Crosley Radio Model 716 is a seven-tube superheterodyne receiver designed to operate on an ALTERNATING CURRENT power supply.

It is a three band receiver and the dial is divided into three sections as follows:

BLUE 540-1800 Kilocycles (American Broadcast Band)
RED 1.8- 6.0 Megacycles (Police and Amateurs)
GREEN 6.0- 18.0 Megacycles (High Frequency Bands)

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to the two plates of the 6N6 Output Tube. Be sure the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8 tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Turn the band selector switch to the High Frequency Band.

(d) Set the signal generator to 450 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F Transformer for maximum output.

(f) Adjust both trimmers located on top of the 1st I-F Transformer for maximum output.

(g) Check operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

Aligning R-F Amplifier.

When aligning the R-F Amplifier the output lead of the signal generator is connected to the "Ant" terminal of the receiver. For the BLUE and RED bands a .00025 mfd. condenser must be connected in series with the output lead of the signal generator and for the high-frequency band a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be shunt aligned and then series aligned, where provision is made for series alignment (BLUE band). The band selector switch should be set for the band being aligned and the station selector and signal generator should be set to the frequency indicated (c) for each adjustment.

(a) Adjust the "Osc" and "ANT" shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check the adjustments of the "ANT" trimmers. Do NOT READJUST the "OSC" TRIMMER.

NOTE: When shunt aligning the RED and GREEN bands care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times, or more, and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct position.

(b) To align the series trimmer (Item 10, Fig. 2) set the signal generator to the frequency indicated (c) and then tune-in this signal with the station selector for maximum output. To obtain the best adjustment for the series trimmer it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output.

(c) Signal Input Frequencies:

	Shunt Alignment	Series Alignment
American Broadcast Band (BLUE)	1700 Kilocycles	600 Kilocycles
Police Band (RED)	6000 Kilocycles	....
High-Frequency Band (GREEN)	18000 Kilocycles	....

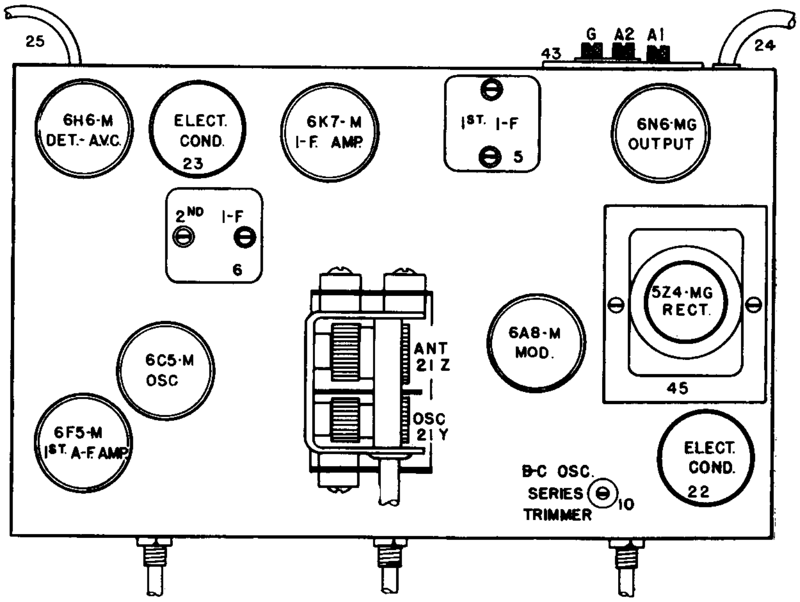
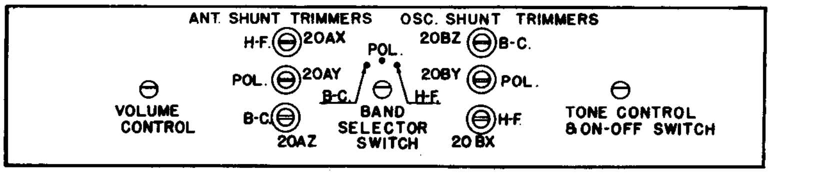


Fig. 2. Top View



Front View

PARTS LIST

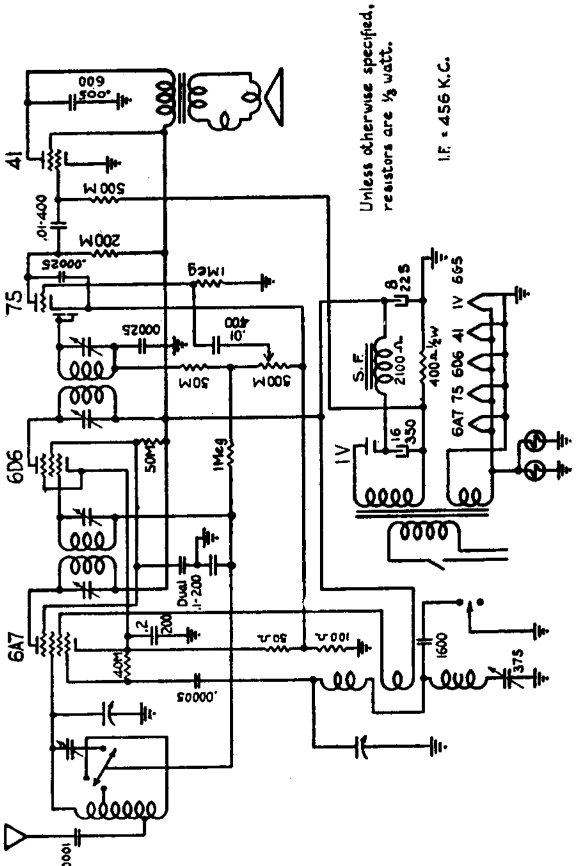
Figures in first column refer to parts in Diagrams.

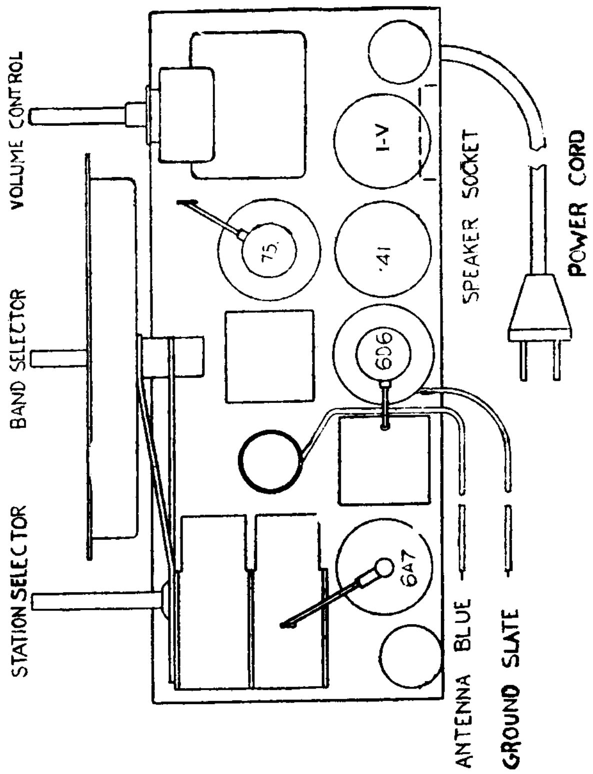
Item No.	Part No.	Name
1-AB	W —37922	Bulb 6-8V., Dial Light
	G3 —37965	Socket Assy., Dial Light
2	G120 —32000	Coil, Ant. (540-1800 Kc.)
3	G119 —32000	Coil Ant. (1800 6000 Kc.)
4	G121 —32000	Coil, Ant. (5800-18000 Kc.)
5	G122 —32004	Coil Assy. 1st I-F (450Kc.)
6	G123 —32004	Coil Assy, 2nd I-F (450Kc.)
7	G112 —32002	Coil, Osc. (540-1800 Kc.)
8	G111 —32002	Coil, Osc. (1800-6000 Kc.)
9	G123 —32002	Coil Osc. (5800-18000 Kc.)
10	—40769	Cond. 400-500 Mmf.
11	G7 —34007	Cond. 1750 Mmf.
12	G 8 —34007	Cond. 4350 Mmf.
13A	G 2 —34002	Cond., .0001Mf.(Molded)
13B	G 2 —34002	Cond., .0001 Mf.(Molded)
14A	W —35139	Cond., .004 Mf. 400V.(Tub.)
14B	W —35139	Cond., .004Mf.400V.(Tub.)
15	W —35936	Cond., .05Mf.200V.(Tub.)
16	W —24049-B	Cond., .1Mf.200V.(Tub.)
17	W —37873	Cond., .1Mf. 400V.(Tub.)
18	W —30488	Cond., .02Mf.400 V.Tub.)
19	W —30805	Cond., .01 Mf.400V.(Tub.)
20	W —35951	Cond.-3 Section Trimmer
21	G21 —33001	Cond.-2 Section Tuning
	B —42142-A	Dial-Calibrated Glass
	—42346	Drive Unit
	B —42338	Mask-Metal
	—41145	Pointer-Dial
	W —40486	Screw, Pointer Mtg.
	MG27—42151	Dial Drive Complete
	—41582	Cable, Drive
22	W —36055	Cond., 35Mf.400V.(Elect.)
23	W —36057	Cond., 40Mf.300V.(Elect.)
24	B —33906-A	Cord and Plug, Power
25	G4 —35696	Speaker Cable
26	—40757	Resistor, 50,000 Ohm 1/4W. (Car.)
27	W —37987	Resistor, 15,000 Ohm 1W (Wire Wound)

Item No.	Part No.	Name
28A	—36688	Resistor, 3 Megohm 1/4W. (Car.)
28B	—36688	Resistor, 3 Megohm 1/4W. (Car.)
29	—21455	Resistor, 300,000 Ohm 1/4W. (Car.)
30	—35930	Resistor, 200,000 Ohm 1/4W. (Car.)
31	W —21964	Resistor, 165 Ohm 3/4W. (Flex.)
32	W —35457	Resistor, 210 Ohm 3/4W. (Flex.)
33	W —27503	Resistor, 1400 Ohm 3/4W. (Flex.)
34Z	W —32301	Resistor, 10,000 Ohm Candohm
34Y		Resistor, 15,000 Ohm Candohm
35	G156 —36400	Socket Type 6A8
36	G152 —36400	Socket Type 6C5
37	G151 —36400	Socket Type 6K7
38	G155 —36400	Socket Type 6H6
39	G158 —36400	Socket Type 6F5
40	G165 —36400	Socket Type 6N6
41	332—BJ3	Speaker "M" Spec. 1-D-390
	—41638	Cone Assy. for "M"332BJ3
	—40275	Field Coil for "M"332PJ3
	—41639	Output Trans. for "M" 332BJ3
42	—40770-A	Switch, Band Selector
43	G27 —26719	Terminal Board, Antenna & Grd.
44Z	—37908	Tone Control, 100,000 Ohm
44Y		Switch, Line
45	—41978	Transformer, 110V. 60 Cy.
	—42149	Transformer, 110V. 25 Cy.
	—42150	Transformer, 220V. 25 Cy.
46	—37967	Volume Control 1Megohm
47	W —29910-A	Cond., .25Mf.200V.(Tub.)
48	W —28621	Cond., .02Mf.200V.(Tub.)
49	W —35758	Cond., .008, 400V. (Tub.)
50	—23785	Resistor, 500,000 Ohm 1/4W. (Car.)
	W —42345	Escutcheon
	D —28	Screw Escutcheon Mtg.
	W —37339	Knob (3 Req.)
	W —40192-B	Knob (1 Req.)
	H	Cabinet, Model 744
	C	Cabinet, Model 745

DETROLA RADIO AND TELEVISION CORPORATION

MODEL 149





SERVICE SUGGESTIONS

Be *sure* that antenna and ground connections are made according to instructions.

See that all tubes are in the proper sockets, that they are in good operating condition, and that clips are attached to the small caps on top of those tubes requiring them. Make sure that tube shields are not shorting the clips to the chassis.

Be sure that the Band Selector Switch is in the proper position for the type of reception desired.

See that all plugs are making proper contact. (SEE INSTALLATION NOTES.)

If the receiver remains inoperative after the above suggestions have been tried, TURN THE POWER SWITCH "OFF." Never leave the switch turned on when signs of abnormal heating are present. A minor circuit trouble may cause an expensive repair bill if the set is allowed to run for any length of time after the trouble develops.

Occasionally a loud hum will be heard as stations are tuned in. Reverse the power supply plug. If the hum persists, remove the cause by properly grounding other sets or appliances in the house.

RECEIVER ALIGNMENT

I. F. Alignment

The I.F. frequency of this receiver is 456 K.C. For realignment, use the following procedure.

It is necessary to use an accurately calibrated signal generator. Couple the signal generator to the grid of the 6A7 tube with a tenth microfarad condenser in series with the "high" lead of the signal generator. Connect the ground side of the signal generator to the chassis. Set the signal generator to 456 K.C. Be sure the wave switch of the set is in the broadcast position and the volume control set at maximum. Attenuate the signal generator so that the signal is just audible in the speaker. If an output meter is used, it should be connected across the voice coil terminals of the speaker. Use ½ volt as standard output.

Adjust the 2nd I.F. transformer first. Each screw should be adjusted for maximum output. After number two I.F. has been adjusted, number one I.F. should be adjusted for maximum output. After both transformers have been adjusted, it is necessary to recheck No. 2 transformer and then recheck No. 1.

See TUBE LAYOUT for location of I.F. and R.F. trimmers and padder.

R. F. Alignment

To align the broadcast band, proceed as follows: First, connect the ground side of the signal generator to the chassis. Connect the high side of the signal generator with a .00025 condenser, in series, to the antenna lead of the set. Make sure the band switch of the set is in the broadcast position. Set the volume control to maximum. Turn the station selector to the highest frequency (as far as it will go). Set the signal generator to 1720 K.C. Adjust the oscillator trimmer until the signal is heard. After the oscillator has been set at 1720 K.C., turn the station selector to 1400 K.C. Set the signal generator to 1400 K.C. When the signal is heard, adjust the first detector trimmer for maximum output.

When the set has been adjusted at 1400 K.C., turn the station selector dial to 600 K.C. Set the signal generator to 600 K.C. When the signal is heard, adjust the padder condenser by rocking the selector back and forth. While adjusting the padder screw, it is necessary to move the selector so that the signal may be kept in tune while adjusting the padder screw. This procedure should be followed until maximum output is obtained.

The foregoing procedure should be repeated. That is, the set is to be rechecked at 1720, 1400 and 600 K.C.

When aligning the R.F., use the same output standard as was used on the I.F. alignment.

Short Wave Alignment

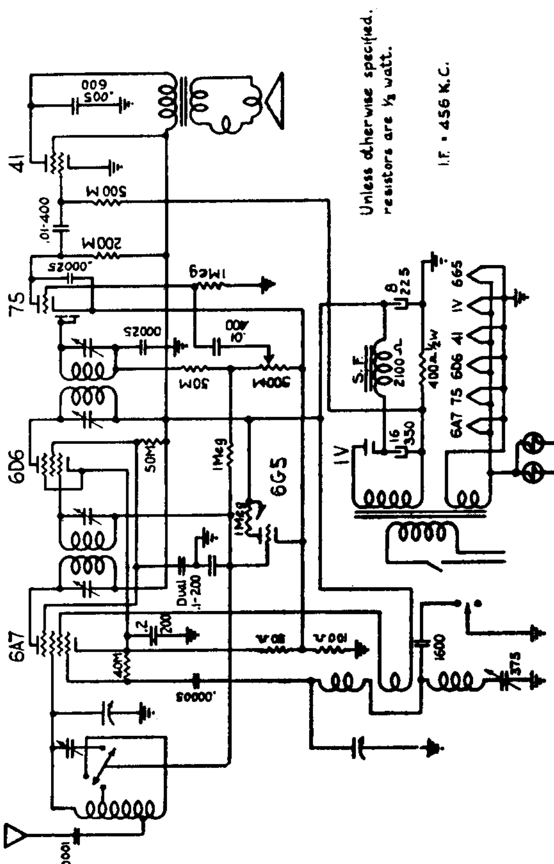
Turn the band selector switch of the set to short wave. Set the signal generator to 6000 K.C. Connect a 400 ohm resistor in series with the .00025 condenser. Tune the set until the signal is heard. If two signals are heard, always align to the highest frequency heard on the receiver. Adjust the small trimmer on the antenna coil for maximum output.

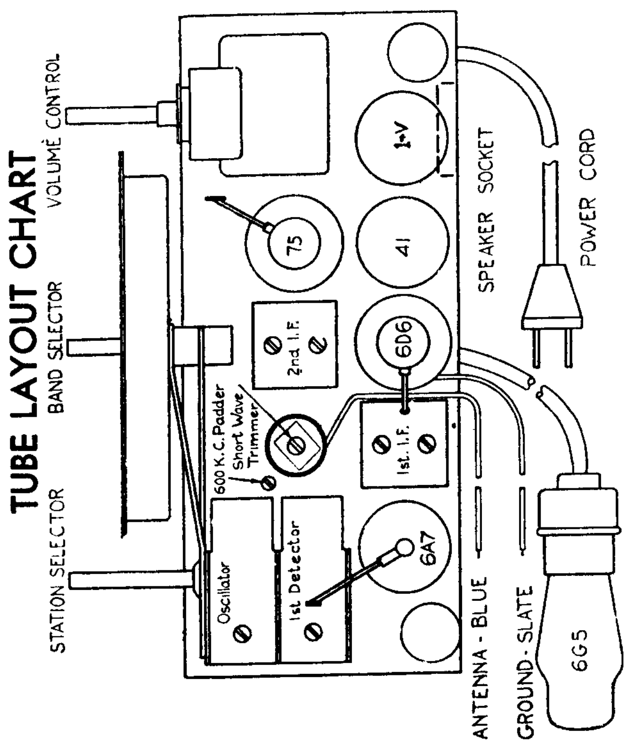
CHASSIS PARTS

PART NO.	REQ.	DESCRIPTION
3364	1	Condenser—.1-200 V. Paper Dual.
568	2	Condenser—.01-400 V. Paper.
581	1	Condenser—.005-600 V. Paper.
2792	1	Condenser—.2-200 V. Paper.
624	1	Resistor—1/3W—1 Meg.
2731	1	Resistor—1/3W—500M + 10%.
2647	1	Resistor—1/3W—50 ohms + 10%.
631	1	Resistor—1/3 W—50M.
2784	1	Resistor—1/2 W—400 ohms + 10%.
2730	1	Resistor—1/3W—200M + 10%.
2689	1	Resistor—1/3W—100 ohms + 10 %.
636	1	Resistor—1/3W—40M.
1416	1	Tube—6A7.
1718	1	Tube—6D6.
1033	1	Tube—75.
2774	1	Tube—41.
2775	1	Tube—IV.
789	3	Socket—6 Lug.
2557	1	Socket—7 Lug.
833	2	Socket—4 Lug.
2546	2	Base—Tube Shield.
2541	1	Shield—Goat Tube.
2644	1	Shield—Goat Tube.
2562	2	Shield—Grid.
2163		Cable—Drive—Approx. 20".
3363	2	Dial Light Sockets.
530	2	Dial Lights—6.3 Volt.
2763	1	Transformer—Power with Covers.
3356	1	Transformer—1st I.F.
3357	1	Transformer—2nd I.F.
2767	1	Electrolytic—8 M.F.—350 W.V.
3351	1	Electrolytic—8 M.F.—Regulating.
2729	3	Grommets—Var. Cond.
3359	1	Variable Condenser.
3491		Schematic Diagram.
3505		Tube Sticker.
2560	1	Condenser—Padding.
1611	1	Condenser—Trimmer 5-35.
1286	1	Condenser—Mica—.00025 Type "O."
1285	1	Condenser—Mica —.0001 Type "O."
2780	1	Condenser—Mica—.00005 Type "O."
3313	1	Condenser—Mica 1600 MMF.
2910	1	Pulley—Drive.
2911	1	Pulley—Pointer Shaft C.
3123	1	Clamp—A.C. Cord.
2908	1	Spring—Drive Cable.
3360	1	Indicator.
2378	1	Pointer.
1408	1	Screw—#3—48T. × ⅛ Lg.
2718	1	Retainer—Indicator.
3361	1	Control—Vol. and Switch with Cover.
3066	1	Switch—Band.
3309	1	Coil—Antenna.
3310	1	Coil—Oscillator.
1732	1	A.C. Cord.

DETROLA RADIO AND TELEVISION CORPORATION

MODEL 149E





SERVICE SUGGESTIONS

Be *sure* that antenna and ground connections are made according to instructions.

See that all tubes are in the proper sockets, that they are in good operating condition, and that clips are attached to the small caps on top of those tubes requiring them. Make sure that tube shields are not shorting the clips to the chassis.

Be sure that the Band Selector Switch is in the proper position for the type of reception desired.

If the receiver remains inoperative after the above suggestions have been tried, TURN THE POWER SWITCH "OFF." Never leave the switch turned on when signs of abnormal heating are present. A minor circuit trouble may cause an expensive repair bill if the set is allowed to run for any length of time after the trouble develops.

Occasionally a loud hum will be heard as stations are tuned in. Reverse the power supply plug. If the hum persists, remove the cause by properly grounding other sets or appliances in the house.

RECEIVER ALIGNMENT

WARNING — This information is to be used by competent service men only. This information is not to be used by an untrained person.

I. F. Alignment

The I.F. frequency of this receiver is 456 K.C. For realignment, use the following procedure.

It is necessary to use an accurately calibrated signal generator. Couple the signal generator to the grid of the 6A7 tube with a tenth microfarad condenser in series with the "high" lead of the signal generator. Connect the ground side of the signal generator to the chassis. Set the signal generator to 456 K.C. Be sure the wave switch of the set is in the broadcast position and the volume control set at maximum. Attenuate the signal generator so that the signal is just audible in the speaker. If an output meter is used, it should be connected across the voice coil terminals of the speaker. Use ½ volt as standard output.

Adjust the 2nd I.F. transformer first. Each screw should be adjusted for maximum output. After number two I.F. has been adjusted, number one I.F. should be adjusted for maximum output. After both transformers have been adjusted, it is necessary to recheck No. 2 transformer and then recheck No. 1.

See TUBE LAYOUT for location of I.F. and R.F. trimmers and padder.

R. F. Alignment

To align the broadcast band, proceed as follows:

First, connect the ground side of the signal generator to the chassis. Connect the high side of the signal generator with a .00025 condenser, in series, to the antenna lead of the set. Make sure the band switch of the set is in the broadcast position. Set the volume control to maximum. Turn the station selector to the highest frequency (as far as it will go). Set the signal generator to 1720 K.C. Adjust the oscillator trimmer until the signal is heard. After the oscillator has been set at 1720 K.C., turn the station selector to 1400 K.C. Set the signal generator to 1400 K.C. When the signal is heard, adjust the first detector trimmer for maximum output.

When the set has been adjusted at 1400 K.C., turn the station selector dial to 600 K.C. Set the signal generator to 600 K.C. When the signal is heard, adjust the padder condenser by rocking the selector back and forth. While adjusting the padder screw, it is necessary to move the selector so that the signal may be kept in tune while adjusting the padder screw. This procedure should be followed until maximum output is obtained.

The foregoing procedure should be repeated. That is, the set is to be rechecked at 1720, 1400 and 600 K.C.

When aligning the R.F., use the same output standard as was used on the I.F. alignment.

Short Wave Alignment

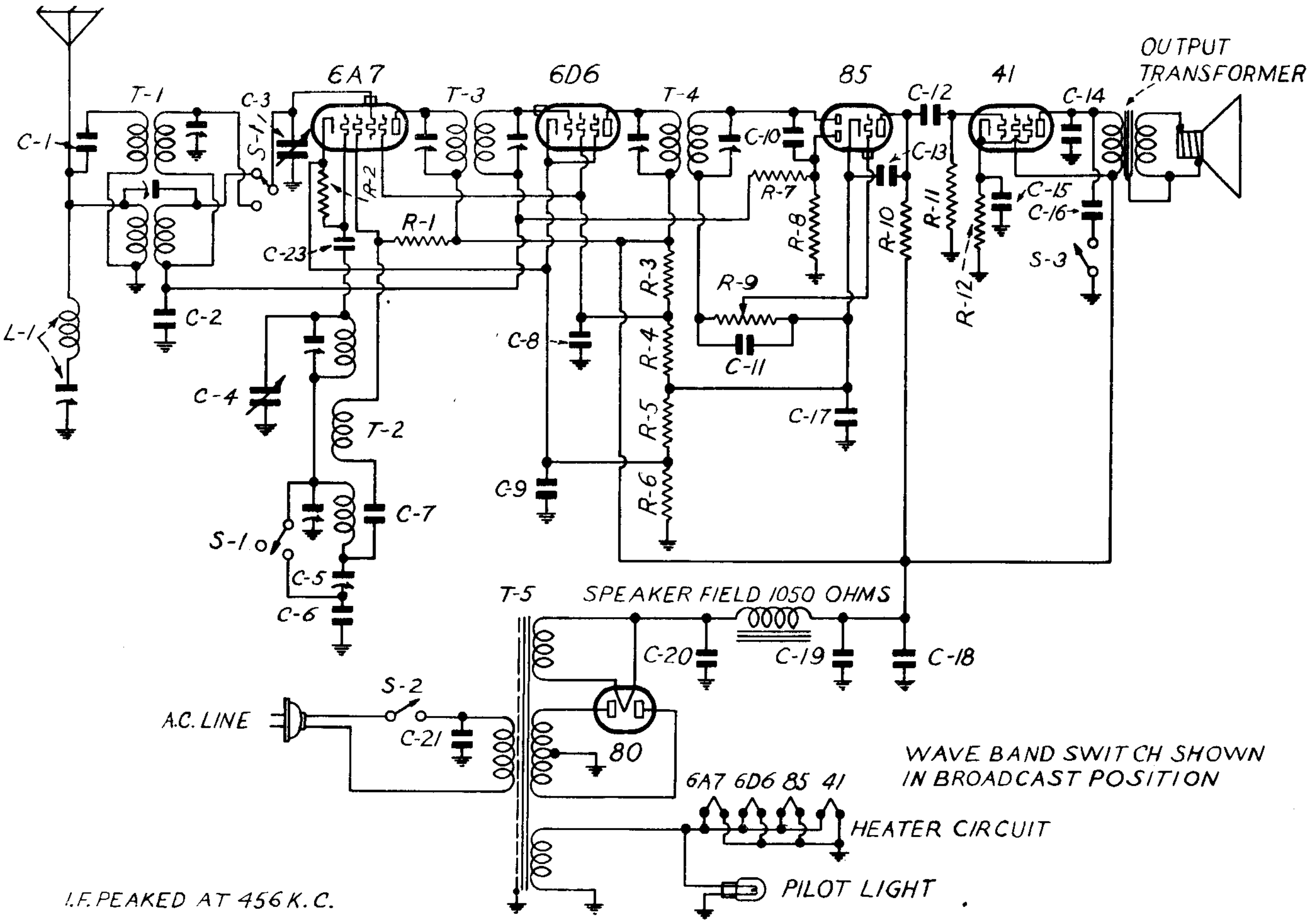
Turn the band selector switch of the set to short wave. Set the signal generator to 6000 K.C. Connect a 400 ohm resistor in series with the .00025 condenser. Tune the set until the signal is heard. If two signals are heard, always align to the highest frequency heard on the receiver. Adjust the small trimmer on the antenna coil for maximum output.

CHASSIS PARTS

Part No.	Req.	Description
3364	1	Condenser—.1-200 V. Paper Dual.
568	2	Condenser—.01-400 V. Paper.
581	1	Condenser—.005-600 V. Paper.
2792	1	Condenser—.2-200 V. Paper.
624	1	Resistor—1/3W—1 Meg.
2731	1	Resistor—1/3W—500M + 10%.
2647	1	Resistor—1/3W—50 ohms + 10%.
631	1	Resistor—1/3 W—50M.
2784	1	Resistor—1/2 W—400 ohms + 10%.
2730	1	Resistor—1/3W—200M + 10%.
2689	1	Resistor—1/3W—100 ohms + 10 %.
636	1	Resistor—1/3W—40M.
1416	1	Tube—6A7.
1718	1	Tube—6D6.
1033	1	Tube—75.
2774	1	Tube—41.
2775	1	Tube—IV.
789	3	Socket—6 Lug.
2557	1	Socket—7 Lug.
833	2	Socket—4 Lug.
2546	2	Base—Tube Shield.
2541	1	Shield—Goat Tube.
2644	!	Shield—Goat Tube.
2562	2	Shield—Grid.
2163		Cable—Drive—Approx. 20".
3363	2	Dial Light Sockets.
530	2	Dial Lights—6.3 Volt.
2763	1	Transformer—Power with Covers.
3356	1	Transformer—1st I.F.
3357	1	Transformer—2nd I.F.
2767	1	Electrolytic—8 M.F.—350 W.V.
3351	1	Electrolytic—8 M.F.—Regulating.
2729	3	Grommets—Var. Cond.
3359	1	Variable Condenser.
3365		Schematic Diagram.
3683		Tube Sticker.
2560	1	Condenser—Padding.
1611	1	Condenser—Trimmer 5-35.
1286	1	Condenser—Mica—.00025 Type "O."
1285	1	Condenser—Mica—.0001 Type "O."
2780	1	Condenser—Mica—.00005 Type "O."
3313	1	Condenser—Mica 1600 MMF.
2910	1	Pulley—Drive.
2911	1	Pulley—Pointer Shaft C.
3123	1	Clamp—A.C. Cord.
2908	1	Spring—Drive Cable.
3360	1	Indicator.
2378	1	Pointer.
1408	1	Screw—#3—48T. × ⅛ Lg.
2718	1	Retainer—Indicator.
3361	1	Control—Vol. and Switch with Cover.
3066	1	Switch—Band.
3309	1	Coil—Antenna.
3310	1	Coil—Oscillator.
1732	1	A.C. Cord.
2891	1	Cable—Tuning Tube.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS L, L117, L122, L133, L135 & L141



REPLACEMENT PARTS

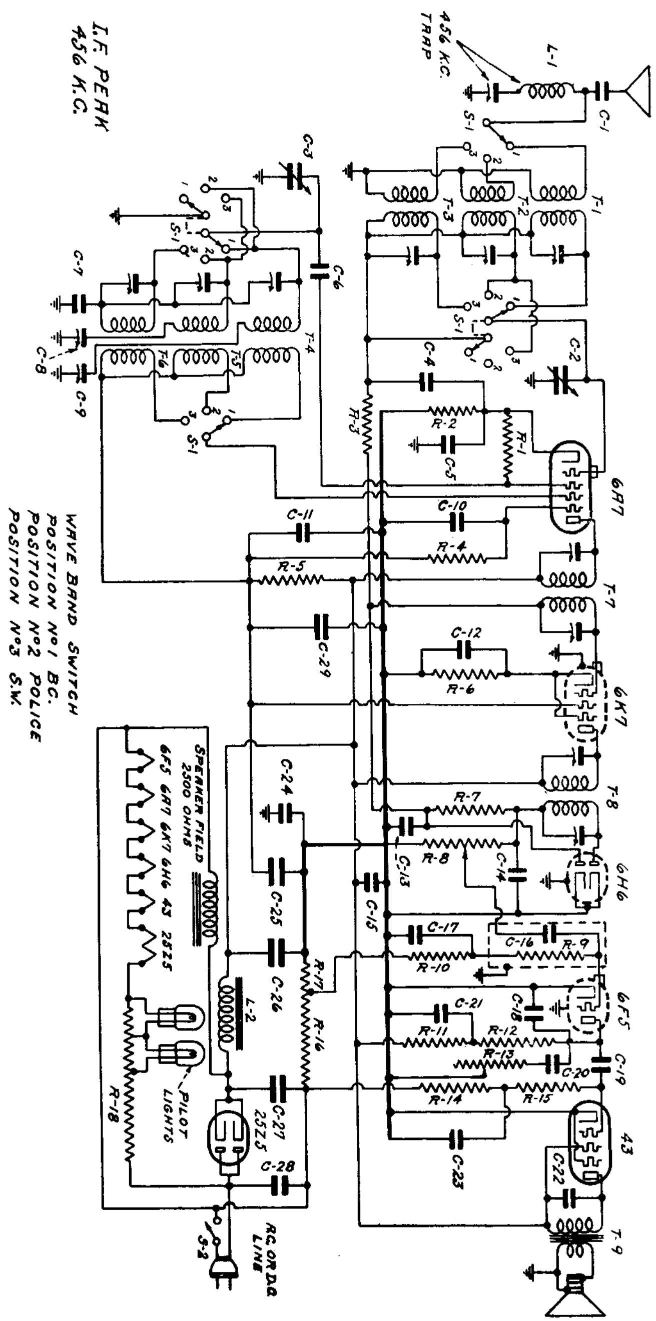
*Item	Part No.	DESCRIPTION	List Price Effective as of Aug. 1st, 1936 PRICE
L1	MMT-149	456 kc adjustable wave trap	$ .50
T1	2NT-226	Two-band antenna coil	1.65
T2	2NT-227	Two-band oscillator coil	1.35
T3	2NT-230	456 kc first i-f transformer	1.35
T4	2NT-231	456 kc second i-f transformer	1.35
T5	2NT-233	Power transformer	4.05
R1	LR-60	20,000 ohm 1/4 watt carbon resistor	.16
R2	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R3	BR-12	25,000 ohm 1 watt carbon resistor	.16
R4	2NR-217	40,000 ohm 1 watt carbon resistor	.16
R5	FFR-126	500 ohm 1/2 watt wire-wound resistor	.16
R6	IIR-130	150 ohm 1/2 watt wire-wound resistor	.16
R7, R8	KR-57	1 megohm 1/4 watt carbon resistor	.16
R9, S2	2NR-214D	Volume control with line switch—250,000 ohms	1.20
R10	KR-54	100,000 ohm 1/4 watt carbon resistor	.16
R11	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R12	CCR-118	450 ohm 1 watt wire-wound resistor	.16
C1, C23	AAC-106A	0.00005 mf mica condenser	.20
C2, C8	BC-12	0.05 mf, 200 volt tubular condenser	.20
C3, C4	3EC-284	Two gang variable condenser	3.65
C5	2NC-231	Single adjustable padding condenser Range—300 to 600 mmf	.50
C6	2NC-230	0.00135 mf mica condenser	.30
C7	KC-58	0.01 mf, 400 volt tubular condenser	.20
C9	BC-13	0.25 mf, 200 volt tubular condenser	.20
C10, C11	AC-7A	0.00025 mf mica condenser	.20
C12	LC-65	0.02 mf, 400 volt tubular condenser	.20
C13	IC-47	0.0005 mf mica condenser	.20
C14	ZC-115	0.006 mf, 1000 volt tubular condenser	.20
C15	IC-43A	Tubular 5 mf, 25 volt dry electrolytic condenser	.90
C16	2TC-189	0.015 mf, 1000 volt tubular condenser	.20
C17	AC-6	0.1 mf, 200 volt tubular condenser	.20
C18	EEC-132	0.1 mf, 400 volt tubular condenser	.20
C19	2NC-247	16 mf, 405 volt wet electrolytic condenser (regulating type)	1.20
C20	2NC-246	16 mf, 450 volt wet electrolytic condenser	1.20
C21	3LC-297	0.01 mf, 250 volt a-c condenser in tubular metal container	.30
	2NS-122	6 1/2" dynamic speaker (Models L117, L122, L141)	5.60
	3LS-199	10" dynamic speaker (Model L135)	8.25
S1	TTS-111K	Wave-band switch	.60
S3	2TS-145E	Tone control switch	.35
	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
	2NZ-364	Dial face	.75
	3CZ-336A	Dial drive belt	.10
	3CZ-337	Dial drive shaft and pulley	.10
	3CZ-339	Idler pulley	.05
	3CZ-340	Idler pulley spring	.05
	3CZ-341	Condenser shaft pulley	.10
	3FZ-353	Dial pointer	.10
	3CZ-350	Escutcheon with crystal	1.05

When ordering replacement parts specify part number.

*Item number locates the article on the schematic diagram.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS U6F, 107 & 111 CHASSIS U6F



REPLACEMENT PARTS LIST

Item	Part No.	DESCRIPTION	Price
L1	MMT-149	456 kc adjustable wave trap	$ .35
L2	2CT-207A	Filter choke—200 ohms	.60
T1, T2, T3	2LT-219	Three-band antenna coil	1.80
T4, T5, T6	2LT-220	Three-band oscillator coil	1.80
T7	2LT-224	456 kc first i-f transformer	1.15
T8	2LT-225	456 kc second i-f transformer	1.15
T9	2LT-221	Speaker output transformer	1.00
R1	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R2, R6	CCR-140	350 ohm 1/2 watt wire-wound resistor	.16
R3	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R4	ZZR-196	30,000 ohm 1/4 watt carbon resistor	.16
R5	LR-64	5,000 ohm 1/4 watt carbon resistor	.16
R7	KR-57	1 megohm 1/4 watt carbon resistor	.16
R8, S2	ZZR-190A	Volume control with line switch—0.5 megohm.	.75
R9, R10, R15	KR-56	0.5 megohm 1/4 watt carbon resistor	.16
R11	KR-54	100,000 ohm 1/4 watt carbon resistor	.16
R12	LR-61	200,000 ohm 1/4 watt carbon resistor	.16
R13	ZZR-191A	Tone control—250,000 ohms	.55
R14	OR-73	25,000 ohm 1/4 watt carbon resistor	.16
R16, R17	2CR-211	250 ohm, one watt, wire-wound tapped resistor R16—230 ohms R17—20 ohms	.25
R18	2LR-212	Plug-in type ballast resistor	.85
C1, C22	AAC-114	0.001 mf mica condenser	.16
C2, C3	ZZC-184	Two-gang variable condenser	1.80
C4, C5	2LC-225	0.05 mf, 200 volt tubular high-frequency condenser	.16
C6	EC-24A	0.0001 mf mica condenser	.16
C7	ZZC-206	0.005 mf mica condenser	.16
C8, C9	JJC-144C	Dual adjustable padding condenser C8—800 to 1400 mmf C9—250 to 550 mmf	.60
C10, C11, C12 C13, C15, C24	2LC-223	Six-section condenser block C10—0.1 mf, 200 v. C13—0.05 mf, 200 v. C11—0.1 mf, 200 v. C15—0.1 mf, 200 v. C12—0.1 mf, 200 v. C24—0.2 mf, 200 v.	1.10
C14, C18	AC-7A	0.00025 mf mica condenser	.16
C16, C19	CCC-127A	0.01 mf, 200 volt tubular condenser	.16
C17, C21, C23	AC-6	0.1 mf, 200 volt tubular condenser	.16
C20	HC-34	0.006 mf, 600 volt tubular condenser	.16
C25, C26, C27	2LC-224	Multiple 4, 8 and 16 mf electrolytic condenser C25—4 mf, 150 volts C26—8 mf, 150 volts C27—16 mf. 150 volts	2.10
C28	LC-64	0.05 mf, 400 volt tubular condenser	.16
C29	YC-98A	Tubular 4 mf, 150 volt electrolytic condenser	.70
	2LS-142	Dynamic speaker (without output transformer)	3.75
S1	ZZS-129A	Wave-band switch	1.05
	XL-9	Pilot light, 6.3 volts, .25 amp. Mazda No. 46	.15
	ZZD-26A	Airplane dial	1.85
	ZZZ-209	Escutcheon	.20

WHEN ORDERING REPLACEMENT PARTS SPECIFY PART NUMBER

*Item number indicates article on schematic diagram.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS L, L117, L122, L133, L135 & L141

Voltage rating .... 105 to 125 volts, a.c.
Current drain .... 0.5 amps.
Frequency range .... 540 to 1750 kc, 2200 to 7500 kc.

GENERAL NOTES

1. The receiver should never be turned on with either the speaker plug or the 41 tube out of its respective socket, since the rapid rise in rectifier voltage will damage the electrolytic condenser.
2. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.
3. The color coding of the i-f transformers is as follows:
   Grid—green / Grid return—black
   B plus—red / Plate—blue
4. The color coding of the power transformer is as follows:
   Primary—two black leads
   High-voltage secondary—two red leads
   High-voltage secondary center tap—red and yellow lead
   6.3 volt secondary—two green leads
   5 volt secondary—two yellow leads.
5. The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the wave-band switch) with the screw adjustment accessible through a hole in the top of the chassis. The short-wave band has a fixed padder which is a 1350 mmf molded mica condenser. (Note that this condenser is coded 1300 mmf.) When replacing this fixed padder be careful to use a condenser which has a capacity within 2% of 1350 mmf, otherwise the short-wave coils may not track.
6. With a few exceptions, the color coding of the general wiring is as follows:
   Plate—blue / Cathode—white or yellow
   B plus—red / Grid—green
   Screen—brown / Fil. and ground—black.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis). Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	255	90	3.5	170	6.3 a.c.
6D6	255	90	3.5	—	6.3 a.c.
35	37	—	5.5	—	6.3 a.c.
41	240	255	15.0	—	6.3 a.c.

B plus at filament of 80 tube—325 volts
Voltage across speaker field—70 volts.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600 and 6000 kc should be used.
An output meter should be used across the voice coil or output transformer for observing maximum response.
If the circuit is at all disturbed, both the broadcast and short-wave bands must be realigned.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The second i-f is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of the cans.

The 456 kc wave trap is located on top of the chassis deck between the 6A7 tube and the first i-f transformer.

The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the 6A7 tube) with the screw adjustment accessible through a hole in the top of the chassis.

The antenna coils for the broadcast and short-wave bands are wound on one form and mounted underneath the chassis deck directly behind the adjustable padding condenser. The trimmers for these coils are also accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the short-wave antenna trimmer. The trimmer farthest from the front of the chassis is the broadcast antenna trimmer.

The oscillator coils for the broadcast and short-wave bands are wound on one form and mounted underneath the chassis deck near the variable condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is for the short-wave oscillator coil and the trimmer farthest from the front is for the broadcast oscillator coil.

I-f and Wave-trap Alignment

Rotate the wave-band switch to the broadcast position, clockwise. Set the variable condenser at the minimum capacity position and feed 456 kc to the grid cap of the 6A7 tube. Adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna lead and adjust the wave-trap trimmer (mounted on wave-trap) for *minimum response.*

Short-wave Alignment (Alignment of the short-wave band should precede broadcast alignment)

Use a 400 ohm dummy antenna (a 400 ohm resistor in series with the test oscillator antenna lead) in aligning the short-wave coils. Rotate the wave-band switch to the short-wave position (counter-clockwise) and set the dial pointer exactly at 6 megacycles. Feed 6000 kc and adjust the short-wave oscillator trimmer (closest to front beside the variable condenser) for maximum response and then adjust the antenna trimmer (left side of top of chassis, closest to front). Be very careful to choose the minimum capacity peak on the oscillator trimmer. (See General Instructions below.)

Broadcast Alignment

Use a standard dummy antenna in aligning the broadcast coils. (A .0002 condenser may be used as a substitute.) Rotate the wave-band switch to the broadcast position, clockwise. Set the dial pointer at 600 and feed 600 kc. Adjust the broadcast series padder (in corner near 6A7 tube) for maximum response. Move the dial pointer to 1600 and feed 1600 kc. Adjust the broadcast oscillator trimmer (farthest from front beside the variable condenser) for maximum response and then adjust the broadcast antenna trimmer (farthest from front at left side of chassis). Return pointer to 600, feed 600 kc and readjust the broadcast series padder, rocking the variable condenser (rotate the variable condenser shaft back and forth through a small arc) for maximum response.

GENERAL INSTRUCTIONS

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Always use as weak a test signal as possible during alignment.

MODELS U6F, 107 & 111 "CHASSIS U6F"

Voltage rating .... 105-130 volts ac-dc
Current drain .... 0.43 amps.
Frequency ranges .... 540 to 1660 kc, 1580 to 4750 kc, 5.5 to 16 mc.

GENERAL NOTES

1. To take the chassis out of the Model 107 cabinet first remove the knobs (knobs are of push-on type), and then the cabinet bottom. Remove the two wood screws and four nuts holding the chassis to the cabinet. With the receiver bottom side up, slide the chassis towards the back and lift out of cabinet.
2. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.
3. The filament dropping resistor, part number 2LR-212, is of the cylindrical plug-in type and is located on top of the chassis between the 6H6 and 25Z5 tubes.
4. The output transformer, part no. 2LT-221 (T9 on schematic diagram) and the filter choke, part no. 2CT-207A (L2 on schematic diagram) are located in the square can on top of the chassis to the left of the speaker.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to the cathode of the 43 tube (B minus). Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	99	43	1.1	80	6.3
6K7	99	80	1.8	—	6.3
6H6	—	—	0	—	6.3
6F5	50	—	0	—	6.3
43	87	99	0	—	24

Voltage across speaker field (black and yellow leads)—120
Voltage across filter choke—9.5

The 250 ohm bias resistor, R16 and R17 on schematic diagram, is located underneath the chassis deck near the volume control.

Voltage across the two outside terminals of this resistor—11.5
Voltage from cathode of 43 tube to central terminal of resistor—1.0

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600, 1700, 4500 and 15,000 kc should be used. In addition, an output meter should be used across the voice coil or output transformer for observing maximum response.

I-f and Wave-trap Alignment

The i-f transformers are located on the top of the chassis. The four trimmers, two for each i-f transformer, are located at the tops of the cans. Set the wave-band switch to broadcast (extreme clockwise position) and rotate variable condenser to minimum capacity. Feed 456 kc to grid of the 6A8 tube and adjust the four i-f trimmers for maximum response. Then feed 456 kc through the antenna and adjust the wave-trap trimmer for *minimum response.* The trimmer is on the wave-trap, which is located on top of the chassis behind the speaker. This reduces telegraphic code interference.

Location of Coils

The antenna coils for the three bands are wound on one form and mounted on the top of the chassis to the right of the speaker. The three trimmers for these coils are mounted on the bakelite strip fastened to the coil form. The upper trimmer is for the short-wave coil, the central trimmer for the police coil and the lower trimmer for the broadcast coil.

The oscillator coils for the three bands are wound on one form and mounted underneath the chassis deck on the right-hand wall with the trimmers facing out. The trimmer screws are available through three holes in the chassis wall. The trimmer closest to front is for the broadcast oscillator coil, the central trimmer is for the police oscillator coil and the trimmer furthest from front is for the short-wave oscillator coil.

The adjusting screws for the dual padder are also available at the right-hand chassis wall. The screw closer to the front is for the broadcast band and the other is for the police band. The short-wave band has no adjustable padder.

Broadcast Alignment

Set the wave-band switch to broadcast position (extreme clockwise) and dial pointer to 600. Feed 600 kc through antenna lead and adjust broadcast padder (lower row on right wall, closest to front) for maximum response. Set pointer to 1600, feed 1600 kc and adjust the broadcast oscillator trimmer (top row on right wall, closest to front) for maximum response, and then the broadcast antenna trimmer (on antenna coil, lower trimmer). Return pointer to 600 and rock the variable condenser (rotate condenser back and forth through small arc) while adjusting the broadcast padder for maximum response. If a readjustment is necessary return to 1600 and realign the antenna and oscillator trimmers.

Police Alignment

Set the wave-band switch to police (central position), pointer to 1700 and feed 1700 kc through antenna lead. Adjust police band padder (furthest from front on right wall, lower row) for maximum response. Set pointer to 4500 and feed 4500 kc. Adjust police band oscillator trimmer (central trimmer on right wall, upper row) for maximum response. If two peaks are heard, select the one of minimum capacity (see General Instructions below). Then adjust police band antenna trimmer (central one on top) for maximum response, selecting the peak of maximum capacity. Again feed 1700 kc, with pointer at 1700, rock variable condenser and adjust police band padder for maximum response. Realign at 4500 if necessary.

Short-wave Alignment

Set wave-band switch to short-wave (counter-clockwise) position and pointer at 15 megacycles. Feed 15,000 kc through antenna. Adjust short-wave oscillator trimmer (furthest from front on right wall, top row) for maximum response. If two peaks are obtained, select the one of minimum capacity. Adjust the short-wave antenna trimmer (upper trimmer on antenna coil) for maximum response while rocking the variable condenser.

Check all three bands for dead spots or incorrect image responses.

General Instructions

The set's oscillator is higher in frequency than the signal on all three bands. Images, therefore, should be observed on the low-frequency side of the signals.

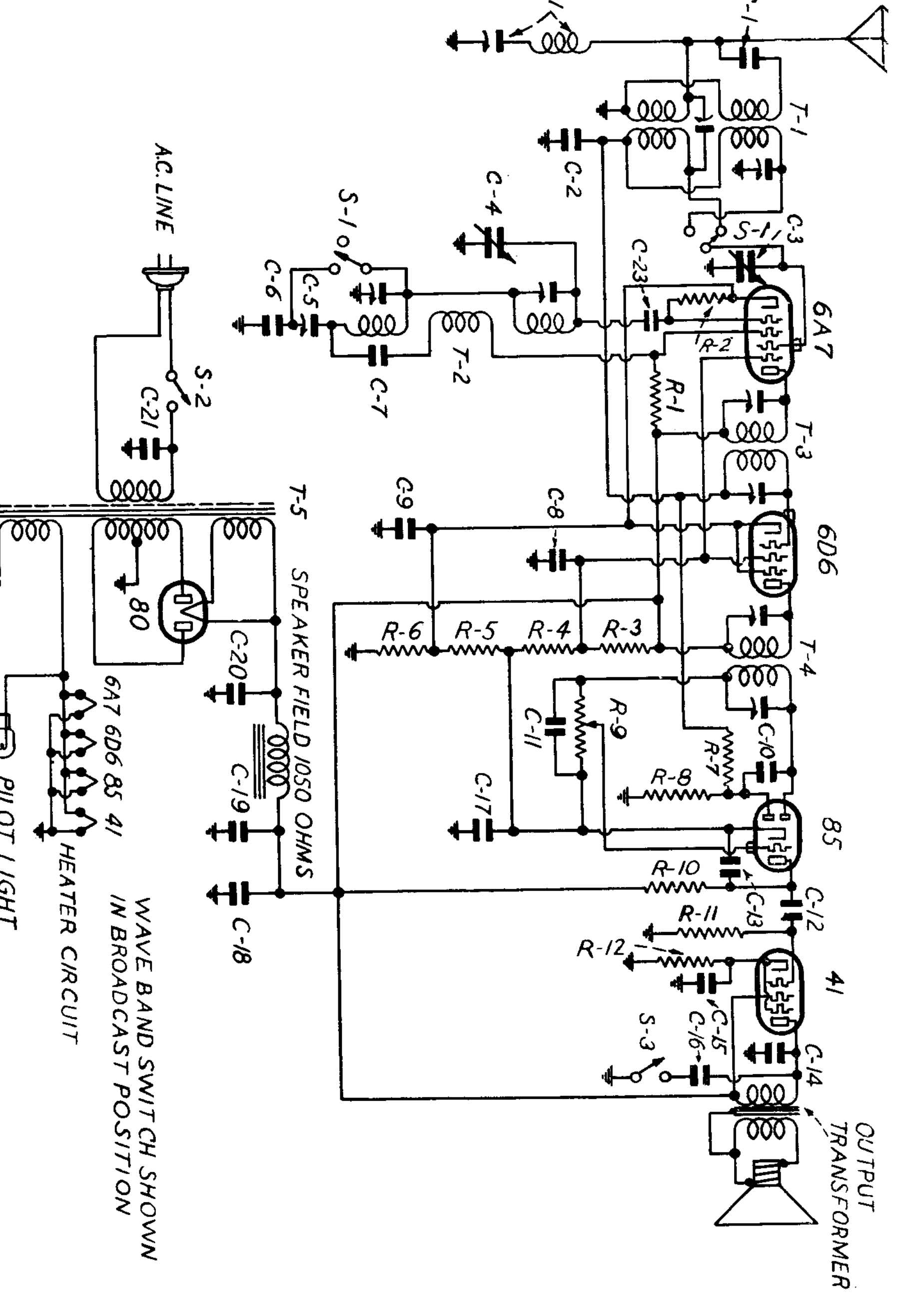
Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peak on the antenna trimmers. The last motion in adjusting trimmers should always be a tightening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a source of noise, frequency drift and microphonism.

In aligning antenna trimmers on the high-frequency signals there is usually a tendency for the oscillator to drift, due to interlocking. To compensate for this, always keep re-tuning the variable condenser.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS L, L117, L122, L133, L135 & L141 "BELOW SERIAL No. 895,962"



I.F. PEAKED AT 456 K.C.

REPLACEMENT PARTS

*Item	Part No.	DESCRIPTION	List Price ea. Effective as of Aug. 1st, 1936 PRICE
L1	MMT-149	456 kc adjustable wave trap	$ .50
T1	2NT-226	Two-band antenna coil	1.65
T2	2NT-227	Two-band oscillator coil	1.35
T3	2NT-230	456 kc first i-f transformer	1.35
T4	2NT-231	456 kc second i-f transformer	1.35
T5	2NT-233	Power transformer	4.05
R1	LR-60	20,000 ohm 1/4 watt carbon resistor	.16
R2	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R3	BR-12	25,000 ohm 1 watt carbon resistor	.16
R4	2NR-217	40,000 ohm 1 watt carbon resistor	.16
R5	FFR-126	500 ohm 1/2 watt wire-wound resistor	.16
R6	IIR-130	150 ohm 1/2 watt wire-wound resistor	.16
R7, R8	KR-57	1 megohm 1/4 watt carbon resistor	.16
R9, S2	2NR-214D	Volume control with line switch—250,000 ohms	1.20
R10	KR-54	100,000 ohm 1/4 watt carbon resistor	.16
R11	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R12	CCR-118	450 ohm 1 watt wire-wound resistor	.16
C1, C23	AAC-106A	0.00005 mf mica condenser	.20
C2, C8	BC-12	0.05 mf, 200 volt tubular condenser	.20
C3, C4	3EC-284	Two gang variable condenser	3.65
C5	2NC-231	Single adjustable padding condenser Range—300 to 600 mmf	.50
C6	2NC-230	0.00135 mf mica condenser	.30
C7	KC-58	0.01 mf, 400 volt tubular condenser	.20
C9	BC-13	0.25 mf, 200 volt tubular condenser	.20
C10, C11	AC-7A	0.00025 mf mica condenser	.20
C12	LC-65	0.02 mf, 400 volt tubular condenser	.20
C13	IC-47	0.0005 mf mica condenser	.20
C14	ZC-115	0.006 mf, 1000 volt tubular condenser	.20
C15	IC-43A	Tubular 5 mf, 25 volt dry electrolytic condenser	.90
C16	2TC-189	0.015 mf, 1000 volt tubular condenser	.20
C17	AC-6	0.1 mf, 200 volt tubular condenser	.20
C18	EEC-132	0.1 mf, 400 volt tubular condenser	.20
C19	2NC-247	16 mf, 405 volt wet electrolytic condenser (regulating type)	1.20
C20	2NC-246	16 mf, 450 volt wet electrolytic condenser	1.20
C21	3LC-297	0.01 mf, 250 volt a-c condenser in tubular metal container	.30
	2NS-122	6 1/2" dynamic speaker (Models L117, L122, L141)	5.60
	3LS-199	10" dynamic speaker (Model L135)	8.25
S1	TTS-111K	Wave-band switch	.60
S3	2TS-145E	Tone control switch	.35
	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
	2NZ-364	Dial face	.75
	3CZ-336A	Dial drive belt	.10
	3CZ-337	Dial drive shaft and pulley	.10
	3CZ-339	Idler pulley	.05
	3CZ-340	Idler pulley spring	.05
	3CZ-341	Condenser shaft pulley	.10
	3FZ-353	Dial pointer	.10
	3CZ-350	Escutcheon with crystal	1.05

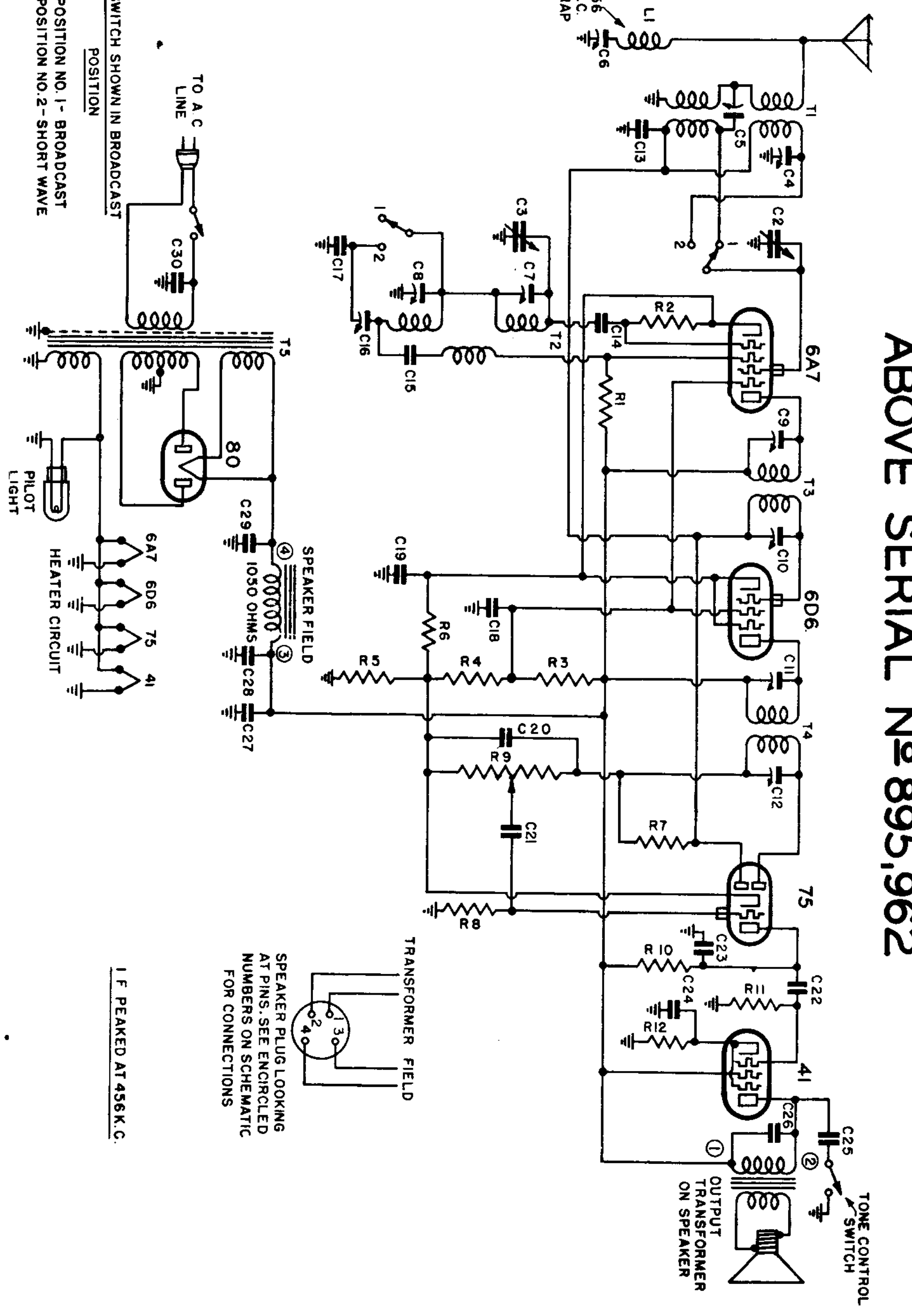
When ordering replacement parts specify part number.

*Item number locates the article on the schematic diagram.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS L, L117, L122, L133, L135 & L141

"ABOVE SERIAL № 895,962"



REPLACEMENT PARTS

*Item	Part No.	DESCRIPTION	List Price ea. Effective as of Aug. 1st, 1936 PRICE
L1	MMT-149	456 kc adjustable wave-trap	$ .50
T1	2NT-226	Two-band antenna coil	1.65
T2	2NT-227	Two-band oscillator coil	1.35
T3	2NT-230	456 kc first i-f transformer	1.35
T4	2NT-231	456 kc second i-f transformer	1.35
T5	2NT-233	Power transformer	4.05
R1	LR-60	20,000 ohm 1/4 watt carbon resistor	.16
R2	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R3	BR-12	25,000 ohm 1 watt carbon resistor	.16
R4	3LR-265	40,000 ohm 1/2 watt carbon resistor	.16
R5	3ER-262	75 ohm 1/2 watt wire-wound resistor	.16
R6	IIR-130	150 ohm 1/2 watt wire-wound resistor	.16
R7, R8	KR-57	1 megohm 1/4 watt carbon resistor	.16
R9	2NR-214D	Volume control with line switch—250,000 ohm	1.20
R10	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R11	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R12	CCR-118	450 ohm 1 watt wire-wound resistor	.16
C14	AAC-106A	0.00005 mf mica condenser	.20
C2, C3	3EC-284	Two-gang variable condenser	3.65
†C4, C5		Trimmers, part of 2NT-226 antenna coil assembly.	
†C6		Trimmer, part of MMT-149 456 kc wave-trap assembly.	
†C7, C8		Trimmers, part of 2NT-227 oscillator coil assembly.	
†C9, C10		Trimmers, part of 2NT-230 first i-f transformer assembly.	
†C11, C12		Trimmers, part of 2NT-231 second i-f transformer assembly.	
C13, C18	BC-12	0.05 mf, 200 volt tubular condenser	.20
C15	KC-58	0.01 mf, 400 volt tubular condenser	.20
C16	2NC-231	Single adjustable padding condenser. Range—300 to 600 mmf	.50
C17	3LC-327	0.0018 mf mica condenser	.30
C19	BC-13	0.25 mf, 200 volt tubular condenser	.20
C20	AC-7A	0.00025 mf mica condenser	.20
C21	CCC-127	0.01 mf, 200 volt tubular condenser	.20
C22	LC-65	0.02 mf, 400 volt tubular condenser	.20
C23	IC-47	0.0005 mf mica condenser	.20
C24	IC-43A	Tubular 5 mf, 25 volt dry electrolytic condenser	.90
C25	2TC-189	0.015 mf, 1000 volt tubular condenser	.20
C26	ZC-115	0.006 mf, 1000 volt tubular condenser	.20
C27	EEC-132	0.1 mf, 400 volt tubular condenser	.20
‡C28	2NC-247	16 mf, 405 volt wet electrolytic condenser (regulating type)	1.20
‡C29	2NC-246	16 mf, 450 volt wet electrolytic condenser	1.20
C30	3LC-297A	0.01 mf, 400 volt molded type paper condenser	.20
	2NS-122	6½" dynamic speaker (Models L117, L122, L141)	5.60
	3LS-199	10" dynamic speaker (Model L135)	8.25
	TTS-111K	Wave-band switch	.60
	2TS-145E	Tone control switch	.35
	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
	2NZ-364	Dial face	.75
	3CZ-336A	Dial drive belt	.10
	3CZ-337	Dial drive shaft and pulley	.10
	3CZ-339	Idler pulley	.05
	3CZ-340	Idler pulley spring	.05
	3CZ-341	Condenser shaft pulley	.10
	3FZ-353	Dial pointer	.10
	3CZ-350	Escutcheon with crystal	1.05

When ordering replacement parts specify part number.

*Item number locates the article on the schematic diagram.

‡ In the Model L150, C28 and C29 are dry electrolytic condensers as follows:
C29—12 mf, 450 volt dry electrolytic condenser 1.60
C28—8 mf, 450 volt dry electrolytic condenser 1.35

† These trimmers are part of coil assemblies and can not be supplied separately.

PRODUCTION CHANGES

In receivers bearing serial numbers below 961,900:

a. The two primaries of the antenna coil T1 were in parallel from antenna to ground, and a 0.00005 mf mica condenser was in series with the antenna lead and the short-wave primary.

b. C17 was an 0.00135 mf mica condenser.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS L, L117, L122, L133, L135 & L141 "BELOW SERIAL № 895,962"

These service notes apply only to receivers bearing serial numbers below 895,962. Different service notes are available for receivers bearing serial numbers above 895,962.

Voltage rating .... 105 to 125 volts, a.c.
Current drain .... 0.5 amps.
Frequency range .... 540 to 1750 kc, 2200 to 7500 kc.

GENERAL NOTES

1. The receiver should never be turned on with either the speaker plug or the 41 tube out of its respective socket, since the rapid rise in rectifier voltage will damage the electrolytic condenser.
2. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.
3. The color coding of the i-f transformers is as follows:
   Grid—green; Grid return—black
   B plus—red; Plate—blue
4. The color coding of the power transformer is as follows:
   Primary—two black leads
   High-voltage secondary—two red leads
   High-voltage secondary center tap—red and yellow lead
   6.3 volt secondary—two green leads
   5 volt secondary—two yellow leads.
5. The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the wave-band switch) with the screw adjustment accessible through a hole in the top of the chassis. The short-wave band has a fixed padder which is a 1350 mmf molded mica condenser. (Note that this condenser is coded 1300 mmf.) When replacing this fixed padder be careful to use a condenser which has a capacity within 2% of 1350 mmf, otherwise the short-wave coils may not track.
6. With a few exceptions, the color coding of the general wiring is as follows:
   Plate—blue; Cathode—white or yellow
   B plus—red; Grid—green
   Screen—brown; Fil. and ground—black.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis). Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	255	90	3.5	170	6.3 a.c.
6D6	255	90	3.5	—	6.3 a.c.
85	37	—	5.5	—	6.3 a.c.
41	240	255	15.0	—	6.3 a.c.

B plus at filament of 80 tube—325 volts
Voltage across speaker field—70 volts.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600 and 6000 kc should be used.
An output meter should be used across the voice coil or output transformer for observing maximum response.
If the circuit is at all disturbed, both the broadcast and short-wave bands must be realigned.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The second i-f is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of the cans.

The 456 kc wave trap is located on top of the chassis deck between the 6A7 tube and the first i-f transformer.

The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the 6A7 tube) with the screw adjustment accessible through a hole in the top of the chassis.

The antenna coils for the broadcast and short-wave bands are wound on one form and mounted underneath the chassis deck directly behind the adjustable padding condenser. The trimmers for these coils are also accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the short-wave antenna trimmer. The trimmer farthest from the front of the chassis is the broadcast antenna trimmer.

The oscillator coils for the broadcast and short-wave bands are wound on one form and mounted underneath the chassis deck near the variable condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is for the short-wave oscillator coil and the trimmer farthest from the front is for the broadcast oscillator coil.

I-f and Wave-trap Alignment

Rotate the wave-band switch to the broadcast position, clockwise. Set the variable condenser at the minimum capacity position and feed 456 kc to the grid cap of the 6A7 tube. Adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna lead and adjust the wave-trap trimmer (mounted on wave-trap) for *minimum response.*

Short-wave Alignment (Alignment of the short-wave band should precede broadcast alignment)

Use a 400 ohm dummy antenna (a 400 ohm resistor in series with the test oscillator antenna lead) in aligning the short-wave coils. Rotate the wave-band switch to the short-wave position (counter-clockwise) and set the dial pointer exactly at 6 megacycles. Feed 6000 kc and adjust the short-wave oscillator trimmer (closest to front beside the variable condenser) for maximum response and then adjust the antenna trimmer (left side of top of chassis, closest to front). Be very careful to choose the minimum capacity peak on the oscillator trimmer. (See General Instructions below.)

Broadcast Alignment

Use a standard dummy antenna in aligning the broadcast coils. (A .0002 condenser may be used as a substitute.) Rotate the wave-band switch to the broadcast position, clockwise. Set the dial pointer at 600 and feed 600 kc. Adjust the broadcast series padder (in corner near 6A7 tube) for maximum response. Move the dial pointer to 1600 and feed 1600 kc. Adjust the broadcast oscillator trimmer (farthest from front beside the variable condenser) for maximum response and then adjust the broadcast antenna trimmer (farthest from front at left side of chassis). Return pointer to 600, feed 600 kc and readjust the broadcast series padder, rocking the variable condenser (rotate the variable condenser shaft back and forth through a small arc) for maximum response.

GENERAL INSTRUCTIONS

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Alw[illegible]se as weak a test signal as possible during alignment.

MODELS L, L117, L122, L133, L135 & L141 "ABOVE SERIAL № 895,962"

These service notes apply only to receivers bearing serial numbers above 895,962. Different service notes are available for receivers bearing serial numbers below 895,962.

Voltage rating .... 105 to 125 volts, a.c.
Current drain .... 0.5 amps.
Frequency range .... 540 to 1750 kc, 2200 to 7500 kc.

GENERAL NOTES

1. The receiver should never be turned on with either the speaker plug or the 41 tube out of its respective socket, since the rapid rise in rectifier voltage will damage the electrolytic condenser.
2. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.
3. The color coding of the i-f transformers is as follows:
   Grid—green; Grid return—black
   B plus—red; Plate—blue
4. The color coding of the power transformer is as follows:
   Primary—two black leads
   High-voltage secondary—two red leads
   High-voltage secondary center tap—red and yellow lead
   6.3 volt secondary—two green leads
   5 volt secondary—two yellow leads.
5. The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the wave-band switch) with the screw adjustment accessible through a hole in the top of the chassis. The short-wave band has a fixed padder which is a 1800 mmf molded mica condenser. When replacing this fixed padder be careful to use a condenser which has a capacity within 2% of 1800 mmf, otherwise the short-wave coils may not track.
6. With a few exceptions, the color coding of the general wiring is as follows:
   Plate—blue; Cathode—white or yellow
   B plus—red; Grid—green
   Screen—brown; Fil. and ground—black.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis). Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	255	90	3.5	170	6.3 a.c.
6D6	255	90	3.5	—	6.3 a.c.
75	120	—	1.8	—	6.3 a.c.
41	240	255	15.0	—	6.3 a.c.

B plus at filament of 80 tube—325 volts
Voltage across speaker field—70 volts.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600 and 6000 kc should be used.
An output meter should be used across the voice coil or output transformer for observing maximum response.
If the circuit is at all disturbed, both the broadcast and short-wave bands must be realigned.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The second i-f is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of the cans.

The 456 kc wave trap is located on top of the chassis deck between the 6A7 tube and the first i-f transformer.

The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the 6A7 tube) with the screw adjustment accessible through a hole in the top of the chassis.

The antenna coils for the broadcast and short-wave bands are wound on one form and mounted underneath the chassis deck directly behind the adjustable padding condenser. The trimmers for these coils are also accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the short-wave antenna trimmer. The trimmer farthest from the front of the chassis is the broadcast antenna trimmer.

The oscillator coils for the broadcast and short-wave bands are wound on one form and mounted underneath the chassis deck near the variable condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is for the short-wave oscillator coil and the trimmer farthest from the front is for the broadcast oscillator coil.

I-f and Wave-trap Alignment

Rotate the wave-band switch to the broadcast position, clockwise. Set the variable condenser at the minimum capacity position and feed 456 kc to the grid cap of the 6A7 tube. Adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna lead and adjust the wave-trap trimmer (mounted on wave-trap) for *minimum response.*

Short-wave Alignment (Alignment of the short-wave band should precede broadcast alignment)

Use a 400 ohm dummy antenna (a 400 ohm resistor in series with the test oscillator antenna lead) in aligning the short-wave coils. Rotate the wave-band switch to the short-wave position (counter-clockwise) and set the dial pointer exactly at 6 megacycles. Feed 6000 kc and adjust the short-wave oscillator trimmer (closest to front beside the variable condenser) for maximum response and then adjust the antenna trimmer (left side of top of chassis, closest to front). Be very careful to choose the minimum capacity peak on the oscillator trimmer. (See General Instructions below.)

Broadcast Alignment

Use a standard dummy antenna in aligning the broadcast coils. (A .0002 condenser may be used as a substitute.) Rotate the wave-band switch to the broadcast position, clockwise. Set the dial pointer at 600 and feed 600 kc. Adjust the broadcast series padder (in corner near 6A7 tube) for maximum response. Move the dial pointer to 1600 and feed 1600 kc. Adjust the broadcast oscillator trimmer (farthest from front beside the variable condenser) for maximum response and then adjust the broadcast antenna trimmer (farthest from front at left side of chassis). Return pointer to 600, feed 600 kc and readjust the broadcast series padder, rocking the variable condenser (rotate the variable condenser shaft back and forth through a small arc) for maximum response.

GENERAL INSTRUCTIONS

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

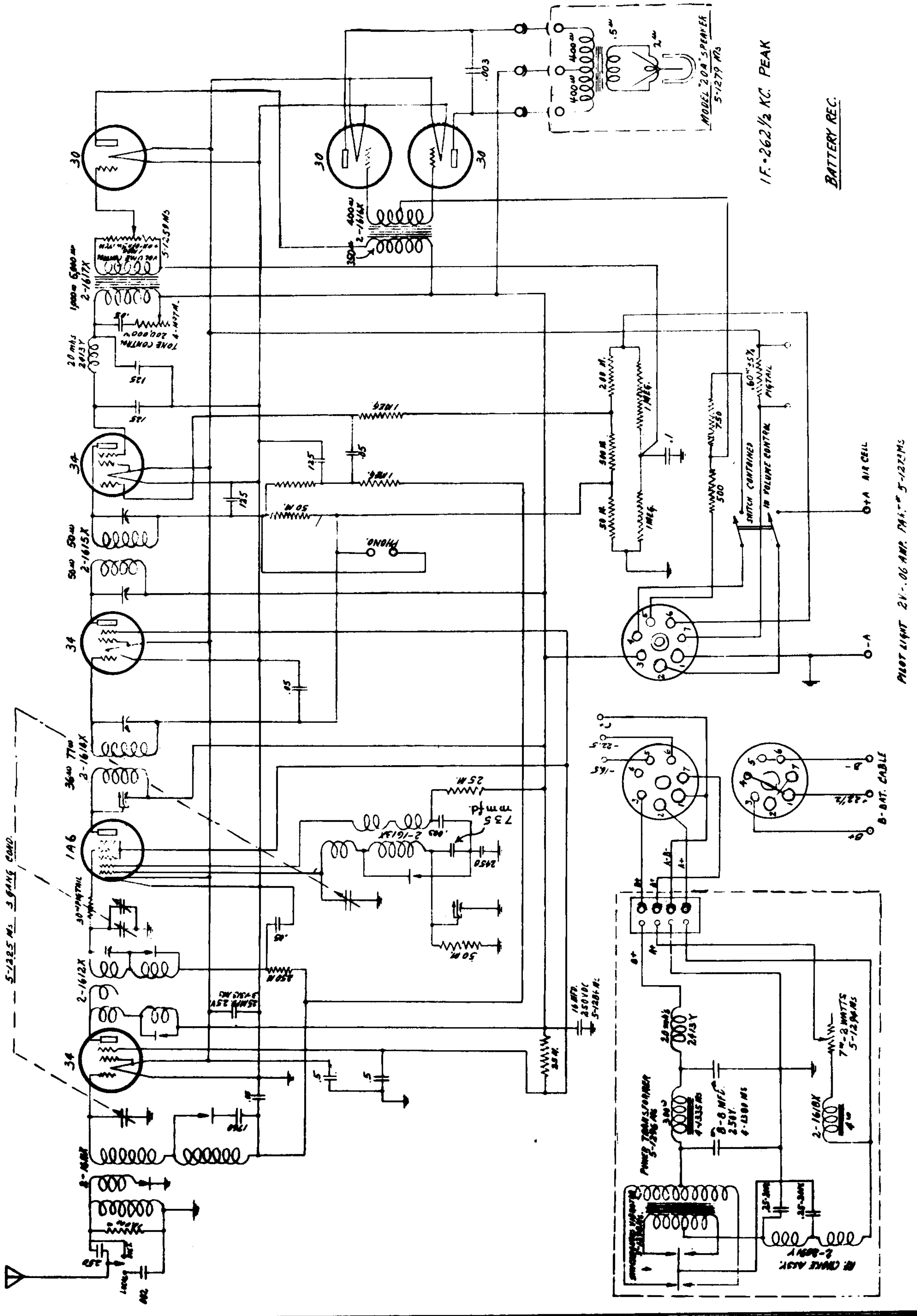
Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Always use as weak a test signal as possible during alignment.

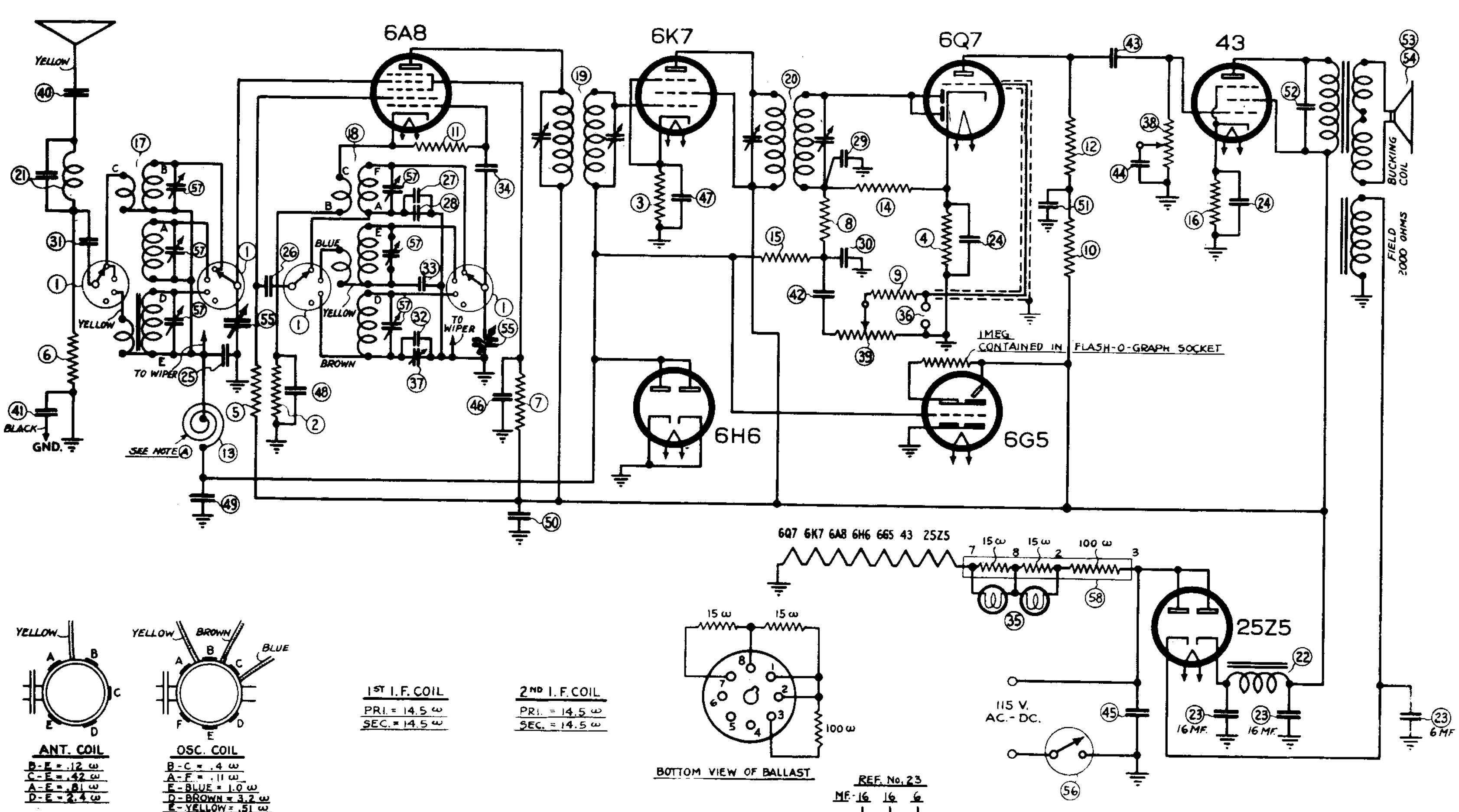
FADA RADIO AND ELECTRIC COMPANY

MODEL 126,127,128 & NK



FADA RADIO AND ELECTRIC COMPANY

MODEL 280



I. F. = 456 KC.

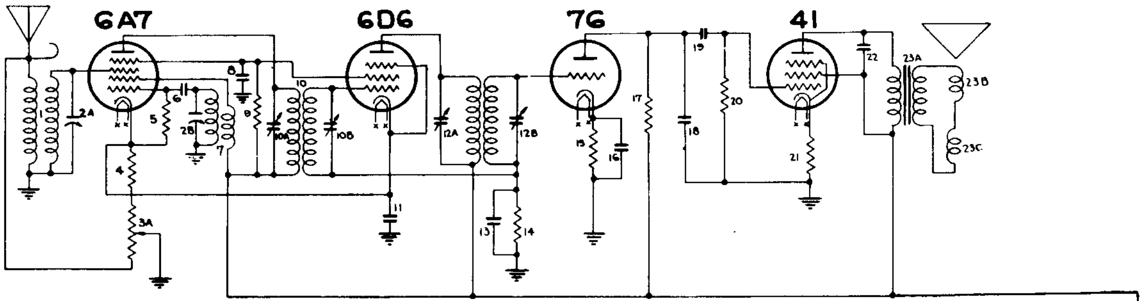
NOTE:
BAND SW. SHOWN IN S.W. POSITION
⏚ = CHASSIS

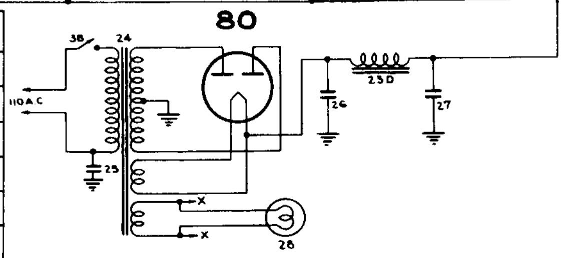
NOTE (A) - ON SOME EARLY MODELS, A 250,000 OHM RES. WAS USED IN PLACE OF THIS CHOKE.

REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	45.35	BAND SWITCH	23	20.46	ELECTRO. COND. - 16-16-6 MF. 100 W.V.	45	10.7	TUBULAR COND. - .05 MF. 400 V.
2	30.45	CARB. RES. - 250 OHMS 1/3 W. ± 10%	24	20.44	" DUAL " 10-10 " 25 "	46	10.5	" " .05 " 200 "
3	30.48	" " 350 " " "	25	15.5	MICA COND. - .002 MF. ± 3%	47	10.5	" " .05 " 200 "
4	30.65	" " 4,400 " " "	26	15.7	" " .002 " 10	48	10.5	" " .05 " 200 "
5	30.1	" " 5,000 " " "	27	15.21	" " .003 " 5	49	10.5	" " .05 " 200 "
6	30.2	" " 10,000 " " "	28	15.62	" " .004 " "	50	10.5	" " .05 " 200 "
7	30.7	" " 15,000 " " "	29	15.3	" " .0001 " 10	51	10.8	" " .25 " 200 "
8	30.26	" " 50,000 " " 20	30	15.3	" " .0001 " "	52	10.13	" " .002 " 400 "
9	30.26	" " 50,000 " " "	31	15.2	" " .0005 " "	53	105.47	SPEAKER (MODELS 272B & 272T)
10	30.26	" " 50,000 " " "	32	15.52	" " .00026 " 5	54	105.48	" (MODEL 272C)
11	30.8	" " 100,000 " " 10	33	15.63	" " .00093 " 3	55	25.66	VARIABLE COND.
12	30.66	" " 150,000 " " 20	34	15.10	50 MMF. 10	56		ON-OFF SW. ON VOL. CONT.
13	3216	CHOKE COIL - 2.3 MH.	35	120.1	PILOT LT'S. 6-8 V. .25 A.	57		MIN. ADJ. ON COILS
14	30.20	CARB. RES. 250,000 OHMS 1/3 W. ± 20%	36	125.1	PHONO JACK	58	BK49D	BALLAST RES. - 15-15-100 ω
15	30.28	" " 2,000,000 " " "	37	25.49	PADDING COND. - 70 MMF.			
16	30.47	" " 625 " 1/2 W. 10	38	55.12	TONE CONTROL - 1/2 MEG.			
17	35.15	ANTENNA COIL	39	50.26	VOLUME " 1 MEG. WITH ON-OFF SW.			
18	35.17	OSCILLATOR "	40	10.4	TUBULAR COND. - .01 MF. 200 V.			
19	35.23	1ST I.F. "	41	10.4	" " .01 " 200 "			
20	35.24	2ND I.F. "	42	10.4	" " .01 " 200 "			
21	35.6	WAVE TRAP	43	10.4	" " .01 " 200 "			
22	40.1	CHOKE COIL	44	10.4	" " .01 " 200 "			

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODEL 5A



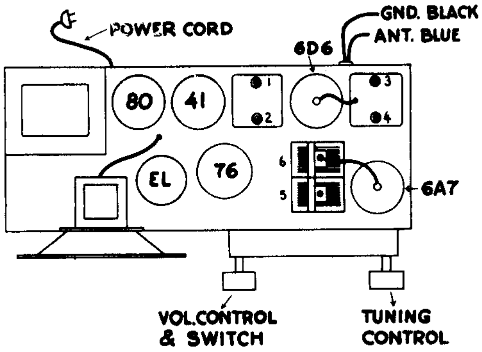


No.	Connect Generator To	Generator Frequency	Dummy	Dial Setting	Stage	Trimmer No.	Peak For	Range Switch	AFC Switch	Special Instrs.
1	6A7 Grid	456 KC	.1 mfd. Condenser	550 KC	2nd IF	1	Max.			
2	6A7 Grid	456 KC	.1 mfd. Condenser	550 KC	2nd IF	2	Max.			
3	6A7 Grid	456 KC	.1 mfd. Condenser	550 KC	1st IF	3	Max.			
4	6A7 Grid	456 KC	.1 mfd. Condenser	550 KC	1st IF	4	Max.			
5	Antenna Lead	1500 KC	200 mmfd. Condenser	1500 KC	Osc.	5	Max.			
6	Antenna Lead	1500 KC	200 mmfd. Condenser	1500 KC	Det.	6	Max.			
Check calibration and sensitivity at 600 KC. No adustment necessary.										

ALIGNMENT PROCEDURE CHART

ALIGNMENT

The model 5A is a five-tube AC operated, superhetrodyne. Alignment is given below in chart form. Make adjustments in the order given. The output meter may be any low range AC voltmeter, preferably about 0-15 volts. It should be connected from the plate of the 6F6G tube to ground with a .1 mfd. condenser in series with one of the leads. When the hand tends to go off scale, reduce the input from the signal generator and keep the volume control at maximum. Inaccurate alignment is likely to result if too strong a signal is used.



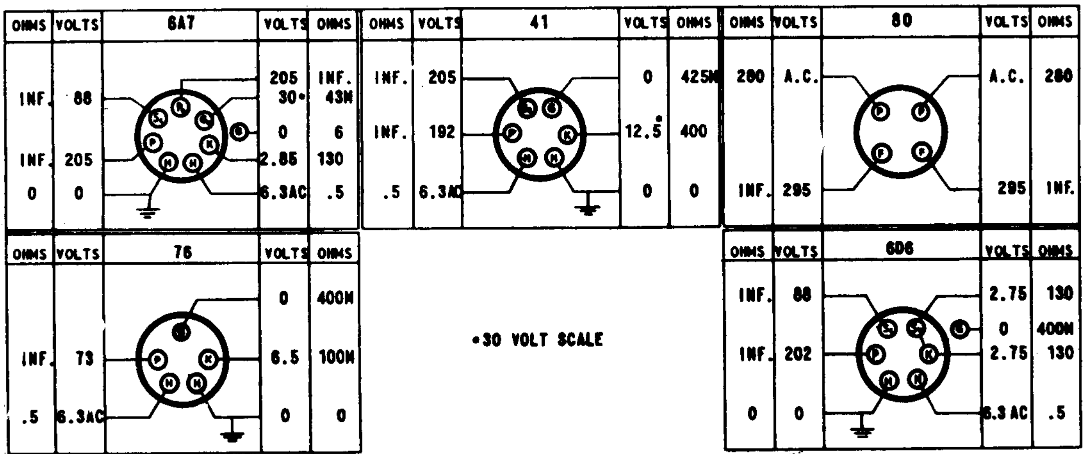
TOP VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS AND TUBES, AS WELL AS OTHER COMPONENT PARTS

PARTS AND PRICE LIST

Part Number	Reference Schematic Diagram	Description	List Price
42-3		Cabinet (T1)	
42-4		Cabinet (T1-V) Ivory	
42-5		Cabinet (T1-K) Black	
801-8		Clips—Grid	$ .02
501-1	1	Coil Assembly—Antenna	1.20
503-1	7	Coil Assembly—Oscillator	1.00
202-3	2 A & B	Condenser—2-Gang Variable	2.50
231-2	26 27	Condenser—Electrolytic (8-8 mfd.)	1.50
250-18	8	Condenser—Tubular .05-400	.18
250-27	11 13	Condenser—Tubular .25-200	.20
250-21	16	Condenser—Tubular .1-200	.18
250-12	19	Condenser—Tubular .01-400	.18
250-11	22	Condenser—Tubular .006-600	.18
251-1	25	Condenser—Moulded .01-600	.18
260-7	6	Condenser—Mica 100 mmfd.	.18
260-18	18	Condenser—Mica 1000 mmfd.	.20
340-3	3 A & B	Control—Volume and Switch	1.20
875-1		Cord and Plug (AC Line)	.50
64-4		Crystal—Pyralin	.40
625-2		Dial Mounting Plate Assembly	.70
601-3		Dial Scale	.60
7382-1		Dial Scale Mounting Rivets	.02
602-3		Dial Pointer	.10
805-3	28	Dial Pilot Bulb	.15
465-3		Dial Pilot Bulb Socket	.10
125-1		Dial Drive Pulley	.40
8036-1		Dial Drive Cord	.20
127-1		Dial Cord Spring	.03
150-1		Dial Shaft Bushing	.15

Part Number	Reference Schematic Diagram	Description	List Price
151-1		Dial Drive Shaft	$ .15
700-1		Grommets—Rubber Black	.03
700-2		Grommets—Rubber (Condenser Mounting)	.04
70-1		Knobs—Walnut	.15
70-4		Knobs—Ivory	.25
70-5		Knobs—Black	.15
302-21	9	Resistor—Carbon 22,000 ohms (1 watt)	.18
306-21	21	Resistor—Carbon 470 ohms (½ watt)	.15
301-8	4	Resistor—Carbon 150 ohms (½ watt)	.15
301-23	5	Resistor—Carbon 47,000 ohms (½ watt)	.15
301-25	15	Resistor—Carbon 100,000 ohms (½ watt)	.15
301-29	20, 17, 14	Resistor—Carbon 470,000 ohms (½ watt)	.15
451-4		Socket—7-Prong	.10
451-3		Socket—6-Prong	.10
451-2		Socket—5-Prong	.10
451-1		Socket—4-Prong	.10
20-2	23	Speaker—5-inch Dynamic	4.50
470-7		Terminal Strip—1-Lug	.05
470-8		Terminal Strip—2-Lug	.06
400-1	24	Transformer—Power 110-volt 50-cycle	3.50
400-7		Transformer—Power, Universal	5.00
550-5	10	Transformer Assembly—I. F. Input	1.50
550-6	12	Transformer Assembly—I. F. Output	1.50
111-3		Tube Shield	.15
123-1		Washer—Cup Type	.04
7476-1		Washer—Spring Type	.02
7475-1		Washer "C" Dozen	.05
8021-1		Washer—Fibre Black Dozen	.05

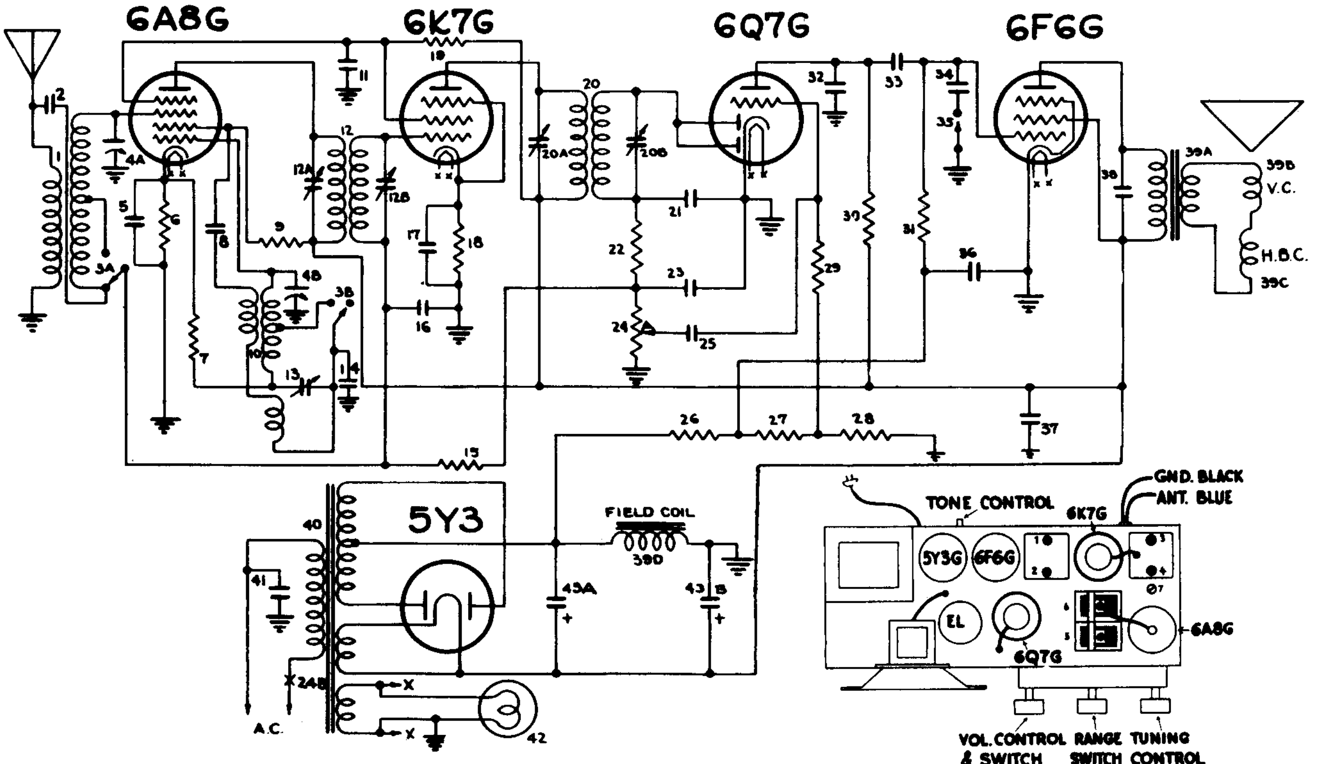
ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE



VOLTAGE AND RESISTANCE ANALYSIS CHART

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODEL 5B



TOP VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS AND TUBES AS WELL AS OTHER COMPONENT PARTS

ALIGNMENT

The model 5B is a five-tube AC operated, superhetrodyne. It is capable of receiving signals on the standard broadcast band, 540 to 1750 kilocycles, and on the police-amateur band, 2.35 to 7.8 megacycles.

Alignment procedure is given below in chart form. Make adjustments in the order given. The output meter may be any low range AC voltmeter, preferably about 0-15 volts. It should be connected from the plate of the 6F6G tube to ground with a .1 mfd. condenser in series with one of the leads. When the hand tends to go off scale, reduce the input from the signal generator and keep the volume control at maximum. If too 'trong a signal is fed to the receiver and the volume control is used to keep the output meter hand on scale, the A.V.C. will operate and inccurate alignment will result.

No.	Connect Generator To	Generator Frequency	Dummy	Range Switch	Dial Setting	Stage	Trimmer No.	AFC Switch	Peak For	Special Instrs.
1	6A8G Grid	456 KC	Condenser .1 mfd.	BC	550 KC	2nd IF	1		Max.	
2	6A8G Grid	456 KC	.1 mfd. Condenser	BC	550 KC	2nd IF	2		Max.	
3	6A8G Grid	456 KC	.1 mfd. Condenser	BC	550 KC	1st IF	3		Max.	
4	6A8G Grid	456 KC	.1 mfd. Condenser	BC	550 KC	1st IF	4		Max.	
5	Antenna Lead	1500 KC	200 mmfd.	BC	1500 KC	Osc.	5		Max.	
6	Antenna Lead	1500 KC	200 mmfd.	BC	1500 KC	Det.	6		Max.	
7	Antenna Lead	600 KC	200 mmfd.	BC	600 KC	Osc.	7		Max.	Rock Gang Condenser

Check Short Wave Calibration at 2.5 and 6 megacycles.
No adjustment is necessary.

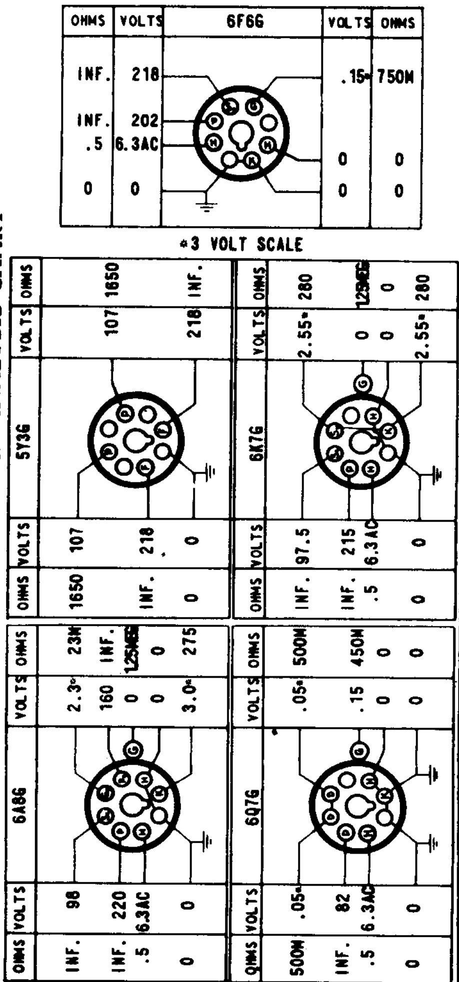
ALIGNMENT CHART

PARTS AND PRICE LIST

Part Number	Reference Schematic Diagram	Description	List Price	Part Number	Reference Schematic Diagram	Description	List Price
42-1		Cabinet (T2)		302-21	19	Resistor—Carbon 22,000 ohms (1 watt)	.18
801-5		Clip—Grid	.02	301-10	6, 18	Resistor—Carbon 330 ohms (½ watt)	.15
501-2	1	Coil Assembly—Antenna	1.20	301-19	9	Resistor—Carbon 10,000 ohms (½ watt)	.15
503-2	10	Coil Assembly—Oscillator	1.20	301-21	7	Resistor—Carbon 22,000 ohms (½ watt)	.15
202-2	4 A & B	Condenser—2-Gang Variable	2.50	301-23	22, 28	Resistor—Carbon 47,000 ohms (½ watt)	.15
271-1	13	Condenser—Padder	.40	301-28	27	Resistor—Carbon 330,000 ohms (½ watt)	.15
232-1	43 A & B	Condenser—Electrolytic (8-8-350)	1.60	301-29	29, 30, 31	Resistor—Carbon 470,000 ohms (½ watt)	.15
250-11	38, 34	Condenser—Tubular .006-600	.18	301-31	15	Resistor—Carbon 1,000,000 ohms (½ watt)	.15
250-15	25, 33	Condenser—Tubular .02-600	.18	301-33	26	Resistor—Carbon 2,200,000 ohms (½ watt)	.15
250-39	5	Condenser—Tubular .05-200	.18	455-1		Socket—Octal 8	.15
250-22	11, 37	Condenser—Tubular .1-400	.18	455-2		Sockets—Octal 5 (Rectifier)	.15
250-21	16, 17	Condenser—Tubular .1-200	.18	20-4	39 ABCDE	Speaker—5½-inch Dynamic	4.50
250-27	36	Condenser—Tubular .25-200	.20	381-2	3 A & B	Switch—Band	.60
251-1	41	Condenser—Moulded .01-600	.18	380-1	35	Switch—Tone Control	.25
260-7	21, 23, 2	Condenser—Mica 100 mmfd.	.18	7245-31		Screw—Chassis Assembly	.01
260-10	32	Condenser—Mica 250 mmfd.	.18	470-1		Terminal Strip (1 Lug)	.04
260-18	8	Condenser—Mica 1000 mmfd.	.20	470-2		Terminal Strip (2 Lug)	.05
261-22	14	Condenser—Mica 3000 mmfd.	.25	470-10		Terminal Strip (4 Lug)	.10
340-2	24 A & B	Control—Volume and Switch	1.20	550-1	12	Transformer—Input I. F.	1.50
875-1		Cord and Plug (AC Line)	.50	550-2	20	Transformer—Output I. F.	1.50
64-2		Crystal—Pyralin	.40	400-2	40	Transformer—Power 110-volt 50-60 cycle	3.50
625-1		Dial Mounting Plate Assembly	.80	400-7	40	Transformer—Power Universal	5.00
601-2		Dial Scale	.80	111-2		Tube Shield	.15
635-1		Dial Scale Clips Doz.	.05	123-1		Washer—Cup Type	.04
805-2	42	Dial Light Bulb (6.3 volt)	.15	7476-1		Washer—Spring	.02

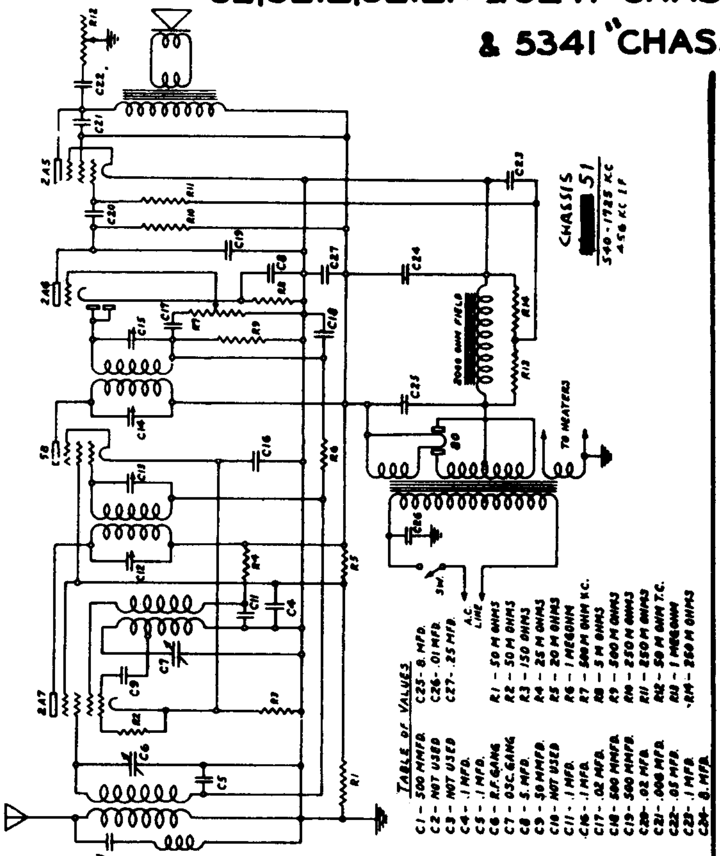
ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

VOLTAGE AND RESISTANCE ANALYSIS CHART



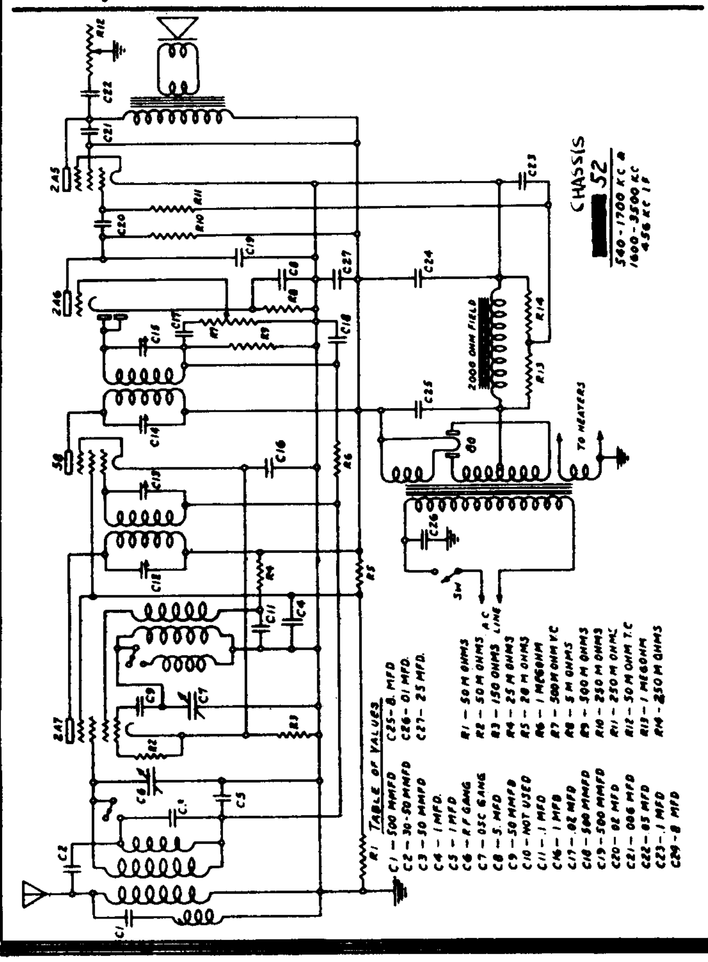
FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

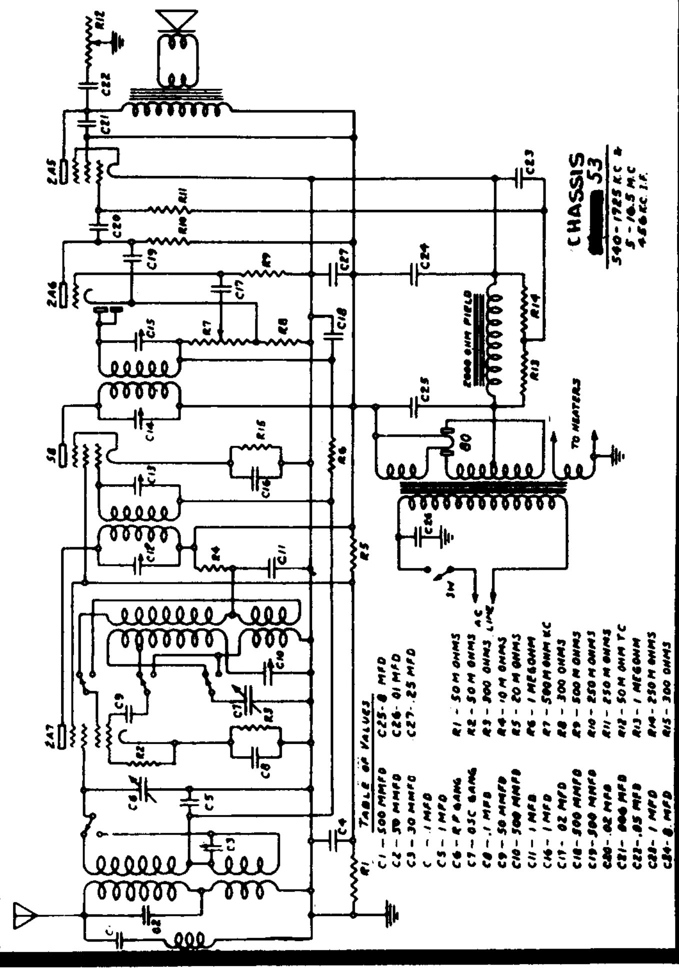
MODELS 51,5106,5107,5108,5109,5110,5111,5112,5141 & 5143 "CHASSIS 51;" 52,5212,5212A & 5241 "CHASSIS 52;" 53,5312,5312A & 5341 "CHASSIS 53."



RESISTANCE VALUES ~ CHASSIS - 51-52-53

PART	MODELS	PRIMARY	SECONDARY
Antenna Wave Trap Coil	51-52-53		4 OHMS
Antenna Coil	51-(52-53-B.C.) 52 S.W. 53 S.W.	24 OHMS 24 OHMS 1 OHM	3 OHMS 1 OHM .1 OHM
Oscillator Coil (Grid)	51-(52-53-B.C.) 52-S.W. 53-S.W.		3 OHMS 1.5 OHMS 1 OHM
Oscillator Coil (Plate)	51-(52-53-B.C.) 52-S.W. 53-S.W.	3 OHMS 3 OHMS 1 OHM	
First I. F. Transformer	51-52 53	12 OHMS 8 OHMS	12 OHMS 8 OHMS
Second I. F. Transformer	51-52-53	12 OHMS	12 OHMS
Output Transformer	51-52-53	600 OHMS	.75 OHM
Speaker (Voice Coil) (Field)	51-52-53	2 OHMS	2000 OHMS
Power Transformer Primary High Voltage Secondary (Each Half)	51-52-53	15 OHMS	250-275





FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODELS 51, 5106, 5107, 5108, 5109, 5110, 5111, 5112, 5141 & 5143 "CHASSIS 51"; 52, 5212, 5212A & 5241 "CHASSIS 52"; 53, 5312, 5312A & 5341 "CHASSIS 53."

COMPOSITE PARTS LIST

Part Number	Used on Models	Description of Part	List Price
14061	51-52-53	Wave Trap Coil	1.00
14007	51-52-53	Combination Antenna Oscillator Coil	2.50
14104	52	Short Wave Oscillator and R. F. Coil	1.50
14206	53	Short Wave Coil Assembly	2.50
14210	53	First I. F. Transformer	3.00
A-145	51-52	First I. F. Transformer (Round can for early Model 51 and all Model 52)	1.50
A-146	51-52-53	Second I. F. Transformer (For early Models 51 and 52 and all Model 53)	1.50
14003	51-52-53	Power Transformer 115 Volt 60 Cycle	4.00
14073		First I. F. Transformer (Square can for late Model 51)	2.00
14074		Second I. F. Transformer (Square can for late Model 51)	2.00
T-6204	51-52-53	Power Transformer 115 Volt 25 Cycle	6.00
T-6203	51-52-53	Power Transformer 240 Volt 60 Cycle	4.50
T-6202	51-52-53	Power Transformer 110 and 220 Volt 60 Cycle	5.00
T-6201	51-52-53	Power Transformer 135 Volt 50 Cycle	5.00
14002	51-52	Gang Condenser Clockwise (With Tracking Section)	3.00
14055	51-52	Gang Condenser Counter Clockwise (No Tracking Section)	3.00
14203	53	Gang Condenser Clockwise	3.00
14201	53	Gang Condenser Counter Clockwise	3.00
14009	51	Dial Assembly (Scale and Hub)	.50
14111	52	Dial Assembly (Scale and Hub)	.50
14022	51-52-53	Escutcheon (Peep Type)	.50
14522	53	Escutcheon (Full Vision)	1.00
14056	52-53	Aeroplane Dial—Disc and Hub with Two Pilot Light Sockets	1.00
14211	53	Dial Assembly (Scale and Hub)	.50
14212	53	Aeroplane Dial Scale (Celluloid)	.50
14005	51-52-53	5 Inch Speaker 2000 OHM Field	6.00
14004	51-52-53	6 Inch Speaker 2000 OHM Field	8.00
14552	51-52-53	8 Inch Speaker 2000 OHM Field	12.00
S-5910	51-52-53	Speaker Socket	.10
S-5911	51-52-53	2A5 Socket	.10
S-5912	51-52-53	2A6 Socket	.10
S-5913	51-52-53	2A7 Socket	.10
S-5914	51-52-53	80 Socket	.10
S-5915	51-52-53	58 Socket	.10
14024	51-52-53	Dial Lamp 2.5 Volt	.10
S-5820	51-52-53	Tube Shield	.15
V-6503	51-52-53	Volume Control and Switch R-7	1.20
V-6504	51-52-53	Tone Control—R-12	.80
R-1836	51-52-53	250,000 OHM ½ Watt Resistor R-10	.20
R-1236	51-52-53	250,000 OHM ¼ Watt Resistor R-11	.20
R-1296	51-52-53	1 Megohm ¼ Watt Resistor R-13	.20
R-1266	51-52-53	500,000 OHM ¼ Watt Resistor R-9	.20
R-1581	51-52	5,000 OHM ½ Watt Resistor R-8	.20
R-1716	51-52	25,000 OHM ½ Watt Resistor R-4	.20
R-1746	51-52-53	50,000 OHM ½ Watt Resistor R-1	.20
R-1146	51-52-53	50,000 OHM ¼ Watt Resistor R-2	.20
R-1431	51-52	150 OHM ½ Watt Resistor R-3	.20
R-2901	51-52-53	20,000 OHM 1 Watt Resistor R-5	.20
R-846	53	300 OHM ¼ Watt Resistor R-3	.20
R-1656	53	10,000 OHM ½ Watt Resistor R-4	.20
EC-16	51-52-53	By-Pass Condenser Can Assembly (C-4-C11-C-16-C-23-C-27)	1.60
EL-8	51-52-53	8 MFD. Electrolytic Cond. 450 Volt C-24-25	1.00
EC-4	51-52-53	.05 Tubular Condenser 400 Volt C-22	.20
EC-12	51-52-53	.006 Tubular Condenser 400 Volt C-21	.20
EC-3	51-52-53	.02 Tubular Condenser 400 Volt C-20	.20
EC-2	51-52-53	.01 Tubular Condenser 400 Volt C-26	.20
EC-5	51-52-53	.1 Tubular Condenser 300 Volt C-4-C-5-C-8-C-11-C16	.25
EL-6	51-52	5. MFD. Tubular Elect. Cond. 25 Volt C-8	.50
C-304	51-52-53	500 MFD. (.0005 MFD.) Moulded C-1-C-18-C-19	.20
C-303	51-52-53	200 MFD. (.002 MFD.) Moulded C-9	.20
C-301	51-52-53	50MMFD. (.00005 MFD.) Moulded C-9.	.20
C-207	53	Trimmer Condenser (Short Wave) C-3	.25
C-203	52-53	Padding Condenser C-10	1.00
14058	51-52-53	A. C. Line Cord and Plug Assembly	.40
14025	52	Band Selector Switch	1.00
14202	53	Band Selector Switch	1.25

THE CIRCUIT

Models 51, 52, and 53 are 5 tube superheterodynes. The circuits are very similar, the only differences being those made necessary in order to cover different wave bands. These sets are in many ways a radical departure from conventional design. Maximum performance with a minimum number of tubes is accomplished thru the use of new multi-purpose tubes and new type, high efficiency, I. F. transformers. Due to the use of a high impedance primary, a litz wire secondary, and a wave trap, very good pre-selection and high gain are obtained in the tuned antenna stage. The antenna circuit is fed into a 2A7 which serves the triple purpose of R. F. amplifier, electron coupled oscillator, and first detector. The I. F. output of this tube is fed into the double tuned, first I. F. transformer and from there into the 58 I. F. amplifier. The output of this tube is fed into the second, double tuned, I. F. transformer. The output of this transformer is fed into the 2A6 where three functions are accomplished. Detection, automatic volume control, and audio amplification. The A. F. output of this tube is resistance coupled to the grid circuit of the 2A5, high gain, output tube from where it is transfered to the loudspeaker. A familiar type 80 rectifier is used in a conventional power supply circuit.

WAVE BANDS

The model 51 chassis is a standard broadcast receiver covering a frequency range of 540 to 1725 kilocycles. The model 52 is a dual band chassis covering frequency ranges of 540 to 1700 kilocycles and 1600 to 3500 kilocycles. The model 53 is a split band chassis covering frequency ranges of 540 to 1725 kilocycles and 5 to 16.5 megacycles.

SUGGESTED SERVICE PROCEDURE

If the set does not operate test all tubes. If no tube tester is available replace the tubes in the set, one by one, with tubes known to be good. A noisy tube cannot always be found by checking in a tube tester, however by sharply tapping each of the tubes in the set the bad tube can usually be located.

If, after replacing any defective tubes, the set is still inoperative follow the instructions given under Resistance and voltage analysis.

ALIGNMENT PROCEDURE

Proper adjustment of the tuned circuits will only be possible thru the use of a good service oscillator and output meter.

The gang condenser plates are properly adjusted in the factory and under no condition should it be necessary to bend them.

All adjustments should be made with the volume control full "on". The wave band switch on models 52 and 53 should be in the broadcast position.

1. Supply a 456 kilocycle signal to the grid of the 2A7 thru a .00005 Mfd. condenser. Carefully adjust both trimmers on the first I. F. transformer. The center screw will peak the grid side and the hexagon nut will peak the plate side. **Next adjust the second I. F. transformer in the same manner. Since these adjustments are very critical it is advisable to go back over them to make sure they are correct.**

2. Turn the gang condenser until it is fully meshed. The dial should read 540 kilocycles, if it is incorrect loosen the set screw and move the dial until the reading is correct.

3. Supply a 1500 kilocycle signal from the test oscillator to the antenna of the set. Tune the set until the dial reads 1500 kilocycles. Adjust the trimmer on the oscillator section of the gang condenser (front section) until the signal comes in at 1500 on the dial. Adjust the trimmer on the R. F. section, of the gang condenser, for maximum output with minimum input from the service oscillator. Some sets do not have a trimmer on the oscillator section and in this case it will only be necessary to adjust the R. F. trimmer for maximum output with the set tuned to the correct frequency reading.

4. On the model 53 a low frequency padding condenser will be found located on the front of the chassis. To adjust this condenser tune the set and the service oscillator to 600 kilocycles. Adjust the padding condenser for maximum output at the same time tune the set back and forth across the 600 kilocycle signal to make sure the correct peak is obtained.

5. If all adjustments have been carefully made the dial readings will be approximately correct on all frequencies If not it will be necessary to go over the entire procedure again.

6. On models 51 and 53 it will sometimes be necessary to make high frequency adjustments at 1200 kilocycles rather than 1500 in the event police calls do not come in properly after alignment.

7. On the model 53 a small trimmer condenser will be found under the chassis and connected across the secondary of the short wave R. F. coil. This condenser should be peaked at 16 megacycles. Turn the band selector to the short wave position and tune the set to 16 megacycles. Supply a 16 megacycle signal to the antenna and adjust the trimmer for maximum output. If no oscillator, supplying a 16 megacycle signal, is available it may be possible to pick up the tenth harmonic of the 1500 kilocycle signal (15 megacycles) from a standard service oscillator. If neither is available it will be necessary to use the signal from a short wave station, near 16 megacycles, or adjust for maximum noise level.

COLOR CODES

SHORT WAVE COIL ASSEMBLY
MODEL 53

ANTENNA COIL
White—Antenna
Other End—Ground

OSC. GRID COIL
Green—Grid
Other End—Ground

OSC. PLATE COIL
Blue Plate
Red B Plus

RF GRID COIL
Green and White—Grid
Black and White—Grid Return

CONDENSER BY-PASS CAN ASSEMBLY

Red Lead	.25	MFD	400 Volts	C-27
Brown Lead	.1	MFD	300 Volts	C-16
Blue Lead	.1	MFD	300 Volts	C-11
Green	.1	MFD	300 Volts	C-23
Red with White	.1	MFD	300 Volts	C-4

CAN—COMMON GROUND

POWER TRANSFORMER
Black (two) 2.5 Volts
Brown (two) PRIMARY
Yellow (two) 5. Volts
Green (two) High Voltage
Red C. T. High Voltage

FIRST I. F. TRANSFORMER
Blue—P-2A7
Red—B PLUS
Green—Grid
Black and White—Grid Return

SECOND I. F. TRANSFORMER
Blue—Plate
Red—B PLUS
Green—Diode Plates
Black and White—Diode Plate Return

The inner screw on the adjustment condenser is the grid adjustment. The outer hex nut is the plate adjustment.

STANDARD RMA RESISTOR AND CONDENSER COLOR CODE

0—Black 2—Red 4—Yellow 6—Blue 8—Grey
1—Brown 3—Orange 5—Green 7—Purple 9—White

RESISTORS

The body color represents the **first figure** of the resistance value.

The end color represents the **second figure** of the resistance value.

The dot color represents the **number of ciphers** following the first two figures.

MICA CONDENSERS

The **first dot** on the condenser represents the **first figure** of the capacity.

The **second dot** on the condenser represents the **second figure** of the capacity.

The **third dot** on the condenser represents the **number of ciphers** following the first two figures.

RESISTANCE AND VOLTAGE ANALYSIS

The following chart gives detailed information regarding the resistance from various points to various other points on the chassis. The measured voltage from the various tube socket contacts to ground is also given. When this chart is faithfully followed little difficulty should be experienced in finding almost any fault that may develop.

Resistance Tests. These tests should be made with an accurate ohm-meter. The speaker should be connected. All tubes should be removed from the set. The volume and tone controls should be full "on". The A. C. line plug must be removed from the A. C. outlet.

Voltage Tests. These readings should be taken with all tubes in their sockets. The volume and tone controls should be full "on". The antenna should be disconnected. Tune the set to a point where no signal is received.

RESISTANCE AND VOLTAGE ANALYSIS CHART

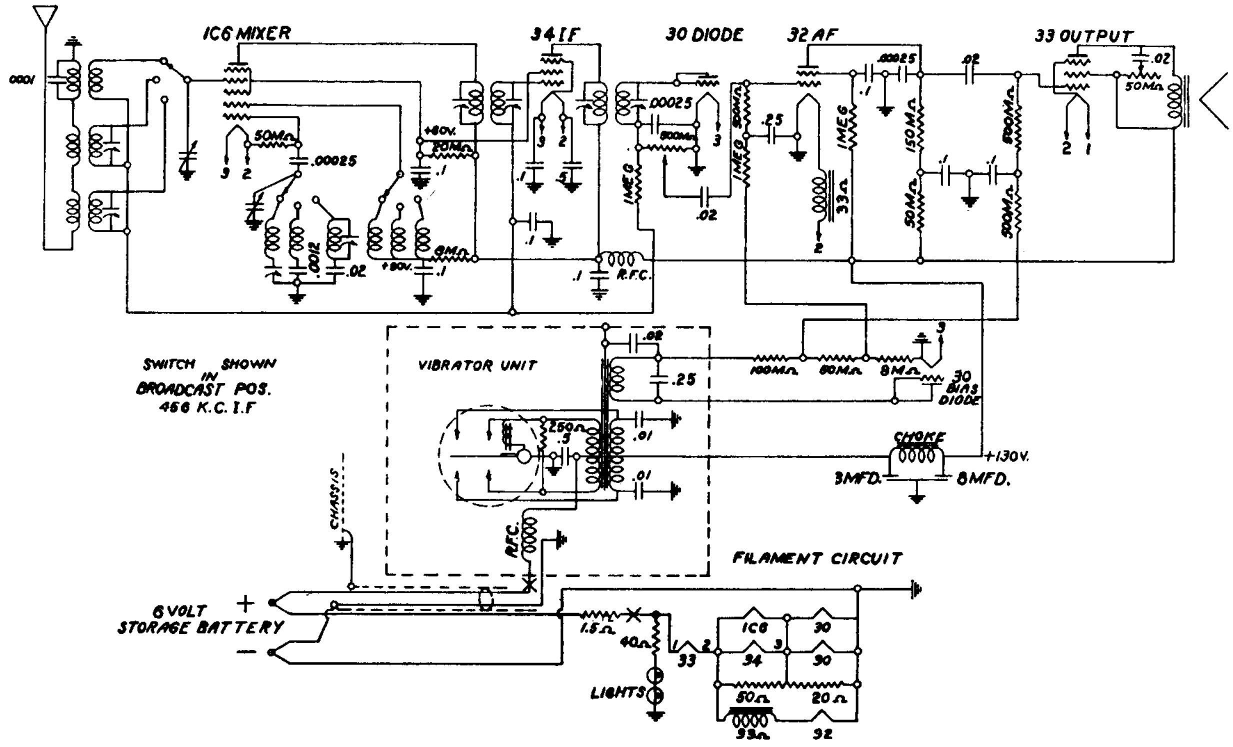
FROM	TO	MODEL	*VOLTS	†OHMS	POSSIBLE FAULTY UNITS
K-2A7	GND	51-52	2.5	150	C-16 R-3
		53	2.5	300	C-8 R-3
OSC G 2A7	K 2A7	51-52-53	....	50M	R-2
OSC P 2A7	GND	51-52	135	95M	R-1 R-4 R-5 COIL C-4 C-11 C-24 C-25 C-27
		53	170	80M	R-1 R-4 R-5 COIL, SWITCH, C-4 C-11 C-24 C-25 C-27
CG-2A7	GND	51-52	0	1.5 MEG	R-6 R-9 COIL (SWITCH 52) C-5 C-17 C-18
		53	0	1.5 MEG	R-6 R-7 R-8 COIL, SWITCH, C-5 C-17 C-18
P 2A7	GND	51-52-53	205	70M	R-1 R-5 COIL, C-4 C-11 C-24 C-25 C-27
SG 2A7	GND	51-52-53	85	50M	R-1 C-4
K 58	GND	51-52	2.5	150	C-16 R-3
		53	2.5	300	C-16 R-15
SG 58	GND	51-52-53	85	50M	R-1 C-4
CG 58	GND	51-52	0	1.5 MEG	R-6 R-9 COIL, (SWITCH 52) C-5 C-17 C-18
		53	0	1.5 MEG	R-6 R-7 R-8 COIL, SWITCH, C-5 C-17 C-18
P 58	GND	51-52-53	205	70M	R-1 R-5 COIL, C-4 C-11 C-24 C-25 C-27
DP 2A6	GND	51-52-53	....	500M	C-17 C-18 R-7 R-8
G 2A6	GND	51-52	0	500M	R-7 C-17 (VOLUME CONTROL "GN")
		53		500M	R-9 C-17 (VOLUME CONTROL "ON")
P 2A6	GND	51-52-53	85	320M	R-1 R-5 R-10 C-4 C-19 C-24 C-25 C-27
K 2A6	GND	51-52	.8	5M	R-8 C-8
		53	.125	300	R-8
P 2A6	G 2A5	51-52-53	....	820M	C-20
K 2A5	GND	51-52-53	0	0	....
G 2A5	GND	51-52-53	0	500M	R-11 R-14 C-23
SG 2A5	GND	51-52-53	205	70M	C-4 C-24 C-25 C-27 R-1 R-5
SG 2A5	P 2A5	51-52-53	....	600	C-21 PRI. OUTPUT TRANSFORMER
P 2A5	GND	51-52-53	195	70600	R-1 R-5 C-4 C-22 C-24 C-25 C-27 PRI. OUTPUT TRANSFORMER
F 80	GND	51-52-53	205	70M	R-1 R-5 C-4 C-24 C-25 C-27
P 80	GND	51-52-53	80	2250 2275	OPEN H.V. SECONDARY, FIELD SHORTED H.V. SECONDARY, FIELD
ANT	GND	51-52-53	....	26	ANT. COIL PRIMARY
AC PLUG	GND	51-52-53	....	OPEN	C-26 (SWITCH "ON")

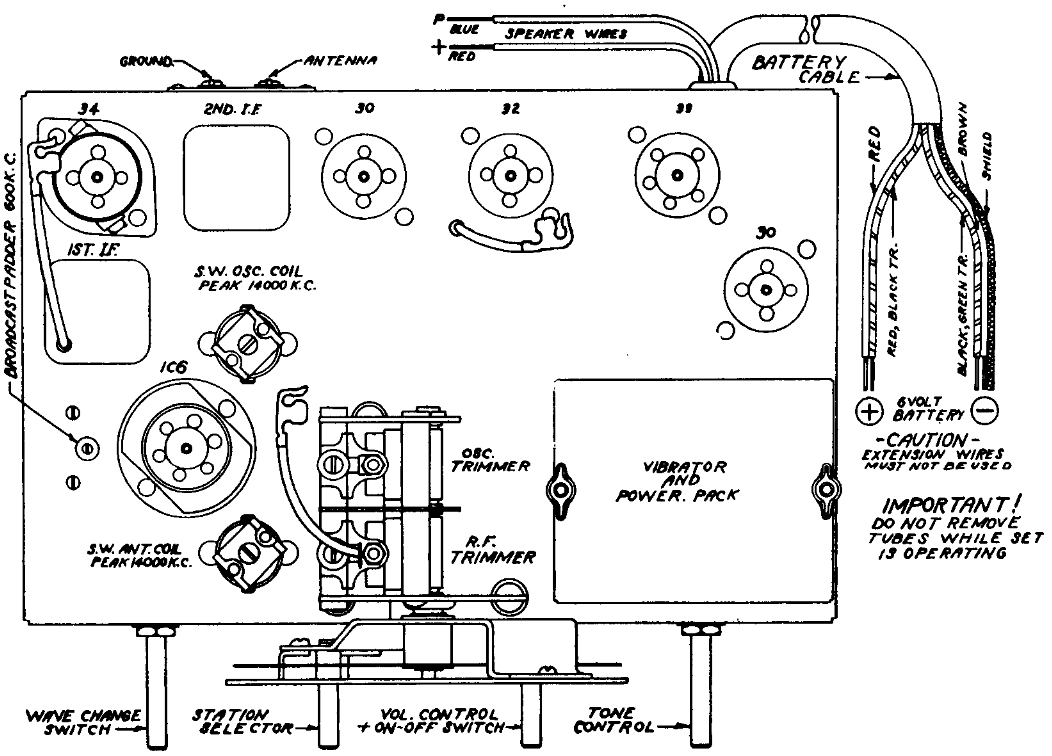
*VOLTAGE AS MEASURED WITH 1000 OHM PER VOLT WESTON METER.
*†VARIATIONS OF 10% PLUS OR MINUS ARE ALLOWABLE ON ALL READINGS.
†IF SOME RESISTANCE READINGS ARE LOW TRY REVERSING POLARITY OF OHM-METER.

FEDERATED PURCHASER INC.

MODELS 53D & 54D

This receiver is designed to operate over three tuning ranges: the broadcast range which extends from 540 to 1700 Kilocycles (KC) (175 to 550 meters), Police and Aviation Band which extends from 1700 to 5000 Kilocycles (KC) (52 to 175 Meters) and the International Short Wave Band which extends from 5800 to 15,200 Kilocycles (KC) (18.5 to 52 meters). This latter range is the one which includes the four internationally assigned bands —the 19, 25, 31 and 49 meter bands.





FEDERATED PURCHASER INC.
MODELS 53D & 54D
REASONS FOR UNSATISFACTORY OPERATION

FAILURE TO OPERATE 1. Check connections from battery cable to storage battery. If connections are reversed, set will not operate. Proper instructions for connecting the battery are given on the first page.
2. Check all tubes. Have them tested by meter equipped to test the type of tubes used in this receiver.
3. Check tube shields for good ground connections. Check grid caps for good connection. See that grid caps and tube shields are not shorted to each other (touching).
4. Reversed connections on Antenna and ground terminals. Try both ways for best results.
5. Oscillator tube (1C6) not oscillating.
6. Vibrator unit not securely in socket.

HOWLS AND SQUEALS 1. Omitting the use of a ground or poor ground connections.
2. Speaker leads placed near the (32) tube. These leads should be kept away from this locality. Speaker leads should be kept along the end of chassis and front corner of cabinet.
3. Check shield on (34) tube for good connection to chassis.

WINDCHARGERS

There are many types of windchargers now on the market which may be used to advantage for greater economy of receiver operation. Such chargers will pay for themselves over a period of time; by saving the cost of battery recharging; removing the inconvenience of taking the battery to a charging station; non-operation of the receiver during the charging period.

IMPORTANT NOTE: The battery must never be charged while set is in operation. If a windcharger is used, it should always be disconnected from the battery when the receiver is being used. An inexpensive single pole switch can be used for disconnecting the windcharger from the battery. This will increase the life of the tubes and give additional economy to the use of the receiver.

HUM A minimum amount of hum, equivalent to A.C. receivers, may be present. Excessive hum may be traced to the following causes:
1. Omitting the use of a ground or a poor ground connection.
2. Vibrator unit not securely fitted in socket.
3. Antenna picking up interference from high tension power lines.
4. Weak or rundown battery. Battery with defective cell.
5. Poor battery connections.
6. Extending or lengthening battery leads cause an enormous increase in "hum." The battery cable attached to the receiver is of special design and its ends **must** be connected directly to the battery terminals. **(See battery connection data on first page.)**

ALIGNMENT DATA AND SERVICING
INFORMATION FOR THE RADIO SERVICE MAN

GENERAL DATA The alignment of this receiver requires the use of a test oscillator which will cover the frequencies of 456, 600, 1400, 1800, 4000, 6000, and 14,000 KC and an output meter which is to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1C6) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the rear gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak. The front condenser section tunes the RF or grid circuit of the 1C6 tube. Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the R.F. section. The padding condenser is located on the left hand side of the chassis, directly to the left of the 1C6 tube and in front of the first I.F. transformer. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.
This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Bands.

FOREIGN BAND ALIGNMENT The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coils located on the top of the chassis. Set the test oscillator to 14,000 KC. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. The oscillator coil is located near the 1st I.F. Transformer and the antenna or R.F. coil is located directly in front of the Short Wave oscillator coil and alongside the front section of the gang condenser. These two trimmers should be adjusted for peak at 14,000 KC and as the inherent design of the circuit has been expressly developed for simplicity in servicing, no other adjustments are necessary for aligning this band. **Note:** Always start this procedure by having the oscillator coil trimmer loose (out all the way), and the antenna coil trimmer fairly tight (in all the way); otherwise it is possible to make a false alignment on the image frequency. In order to prevent alignment on the image frequency, it is suggested, that the following check be made: Readjust the pointer to 13,100 KC where the image frequency should be found. If properly aligned, the image frequency will be found to be weaker. If, however, the signal at 13,100 KC is found to be stronger than the signal at 14,000 KC, it signifies that alignment was incorrectly made on the image frequency.

IMPORTANT: Do not attempt any adjustment of the gang condenser trimmers in aligning the Foreign Band as this will throw the Broadcast Band out of alignment.

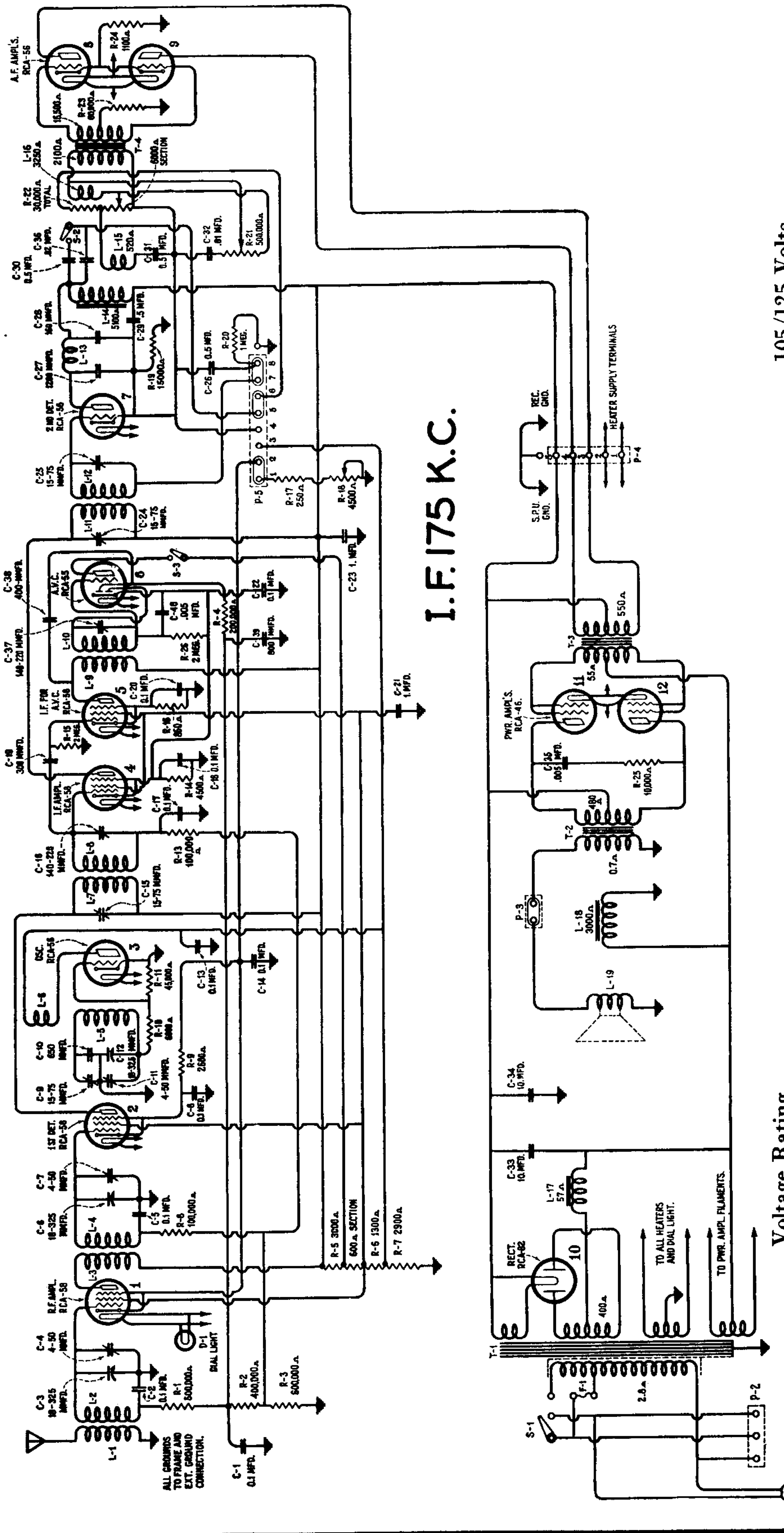
POLICE BAND ALIGNMENT There is only one adjustment to be made in the alignment of the Police Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary. Set the dial pointer to 4000 KC (also the test oscillator) and adjust the antenna coil trimmer to resonance. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment. The two police band coils are under the chassis and the antenna coil trimmer is mounted on the end of the antenna coil. **Important:** This is the only adjustment necessary for the Police Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Police Band, otherwise the Broadcast Band will be thrown out of alignment.

SERVICE DATA FOR ALL BANDS

If it is suspected that the oscillator has stopped but is doubtful due to the presence of the usual amount of noise level, it is suggested that the oscillator plate voltage be checked. To ascertain whether the tube is oscillating, ground the oscillator grid of the 1C6 (short stator and rotor plates of oscillator section on gang condenser). If oscillating properly, grounding the grid will cause an appreciable drop in oscillator voltage.

GENERAL ELECTRIC COMPANY

MODEL J-125A



Voltage Rating .... 105/125 Volts
Frequency Rating .... 50/60 Cycles
Power Consumption .... 110 Watts Average
(The input wattage may vary from 70 to 130 watts, depending on the output volume being used)
Recommended Antenna Length .... 25-100 Feet
Type of Circuit .... Super-Heterodyne with A. V. C., Compensated A. F. System, Class "B" Output Stage and Noise Suppressor
Type and Number of Radiotrons . . 1 RCA-55, 4 RCA-58, 4 RCA-56, 2 RCA-46, 1 RCA-82—Total 12
Number of R. F. Stages .... One
Type of First Detector .... Exponential with Control Grid Voltage Varied by A. V. C. Tube
Number of Intermediate Stages .... Two: One for Signal and One for A. V. C.
Type of Second Detector .... Power Grid Bias

GENERAL ELECTRIC COMPANY

MODEL J-125A

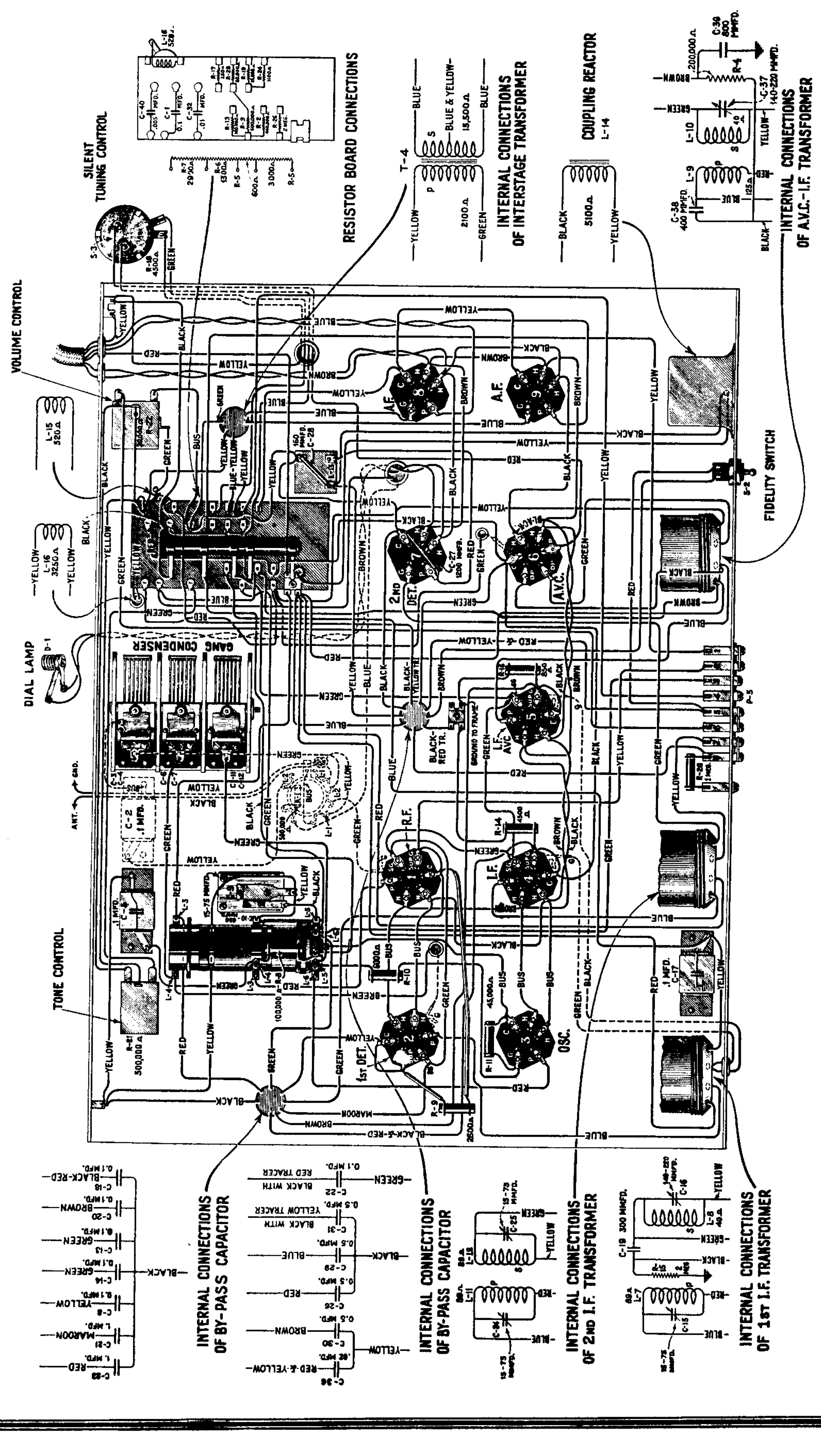


Figure 2—Receiver Wiring Diagram

Number of A. F. Stages............Two: One Push-Pull Driver and One Class "B" Output

Type of Tone Control............Reactor Capacitor and Variable Resistance for Reducing High Frequency Response

Type of Rectifier............Mercury Vapor Full Wave RCA-82

Undistorted Output............Approximately 20 Watts Maximum

GENERAL ELECTRIC COMPANY

MODEL J-125A

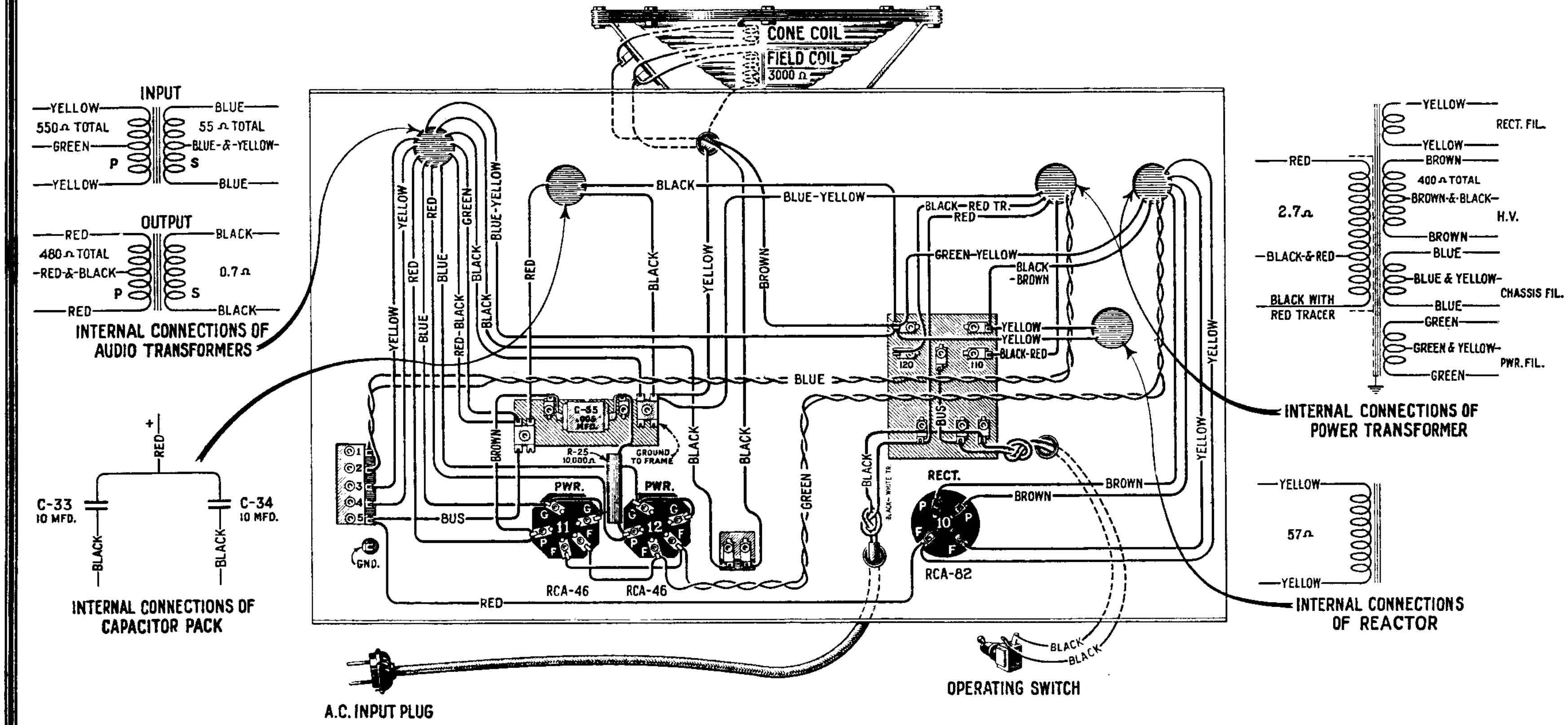


Figure 3—Amplifier Wiring Diagram

When the receiver is tuned to a signal, the signal voltage is amplified in the A. V. C. amplifier and impressed on coils L-9 and L-10. On the positive half of the signal voltage, the signal is rectified in the suppressor circuit which generates a negative potential on the grid of the Radiotron RCA-55. The plate current is thereby reduced to approximately zero which releases the high bias potential on the signal channel I. F. amplifier. Signal voltage will then be impressed on the second detector.

A. V. C. bias for the R. F., first detector and I. F. tubes will be generated when the I. F. voltage on the A. V. C. Diode overcomes and exceeds the positive potential on the cathode of the Radiotron RCA-55. This bias is approximately 10 volts when the receiver is tuned to signal.

The second I. F. transformer feeding the second detector has been changed to two high impedance circuits in order to provide the proper amplification with the increased bias resistor in the I. F. cathode circuit.

The suppressor circuit L-10 has been designed to be a sharp circuit so that the action of the suppressor comes as near the center of the carrier as possible.

The sensitivity control is in the cathode circuit of the R. F. and first detector and reduces the sensitivity of the receiver by increasing the residual bias on these Radiotrons. One end of the sensitivity control has a switch which is provided so that the noise suppressor circuit may be cut out. Under this condition the full sensitivity of the receiver is obtained.

GENERAL ELECTRIC COMPANY

MODEL J-125A

(1) I. F. TUNING ADJUSTMENTS

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only five of the circuits are tuned by adjustable capacitors and require adjustment. The coil used for the A. V. C. is broadly tuned and does not require any adjustment, while the one used for the noise suppressor circuit is sharply tuned. Refer to Figure 4 for location of the adjusting screws.

The transformers are all tuned to 175 K. C., and adjustments are made for maximum output.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvanometer connected to the secondary of the output transformer instead of the cone coil, or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) Remove the oscillator tube and make a good ground connection to the chassis. Place the test oscillator in operation and couple its output from the control grid of the first detector to ground. With the receiver volume control at maximum, the noise suppressor control at its extreme counter-clockwise position and the noise suppressor switch open, adjust the oscillator output until a deflection is obtained in the output meter.

(d) Adjust the secondary and primary of the second and then the first I. F. transformer until a maximum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

(e) Then close the noise suppression control switch by advancing slightly clockwise, but do not advance the control beyond the snapping of the switch. The single noise suppressor circuit should then be adjusted for maximum output.

The points to remember when making these adjustments are that no dummy Radiotron is used and a minimum of input signal is necessary. An excessive signal will make it impossible to get correct adjustments of the signal channel I. F. and especially the suppressor circuit.

It is necessary, when adjusting the suppressor circuit, that the input signal be kept just as low as possible so that the output meter follows every change in the adjustment of the suppressor I. F. circuit.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the J-125 Service Notes.

(2) RADIOTRON SOCKET VOLTAGES

Due to the wide variation in Set Analyzers, the General Electric Company will, in the future, list the actual voltages at which the Radiotrons operate, rather than those that will be obtained with a particular Set Analyzer. It is therefore necessary that the serviceman allow corrections for circuits having high resistance and for meter scales having a relative low resistance. Usually an application of Ohms Law will give an approximate value of the voltage that will be read on a particular meter, assuming that the resistance of the meter is known.

RADIOTRON SOCKET VOLTAGES

120 Volt Line—Fuse At 120 Volt Tap—Antenna Shorted to Ground—No Signal

Radiotron No.	Cathode or Filament to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts D. C.	Cathode or Filament to Plate Volts D. C.	Diode Plate No. 1 to Cathode Volts D. C.	Diode Plate No. 2 to Cathode Volts D. C.	Plate Current M. A.	Heater or Filament Volts D. C.
1. RCA-58—R. F.	—3.5	106	212	—	—	6.5	2.5
2. RCA-56—Osc.	—	—	65	—	—	4.5	2.5
3. RCA-58—1st Det.	—9	101	206	—	—	1.8	2.5
4. RCA-58—I. F.	—12	98	203	—	—	2.0	2.5
5. RCA-58—A. V. C. I. F.	—5	106	210	—	—	4.0	2.5
6. RCA-55—A. V. C. Sup. (Sensitivity Control At Minimum)	0	—	0	0	—12	0	2.5
6. RCA-55—A. V. C. Sup. (Sensitivity Control At Maximum)	0	—	69	0	36	8.0	2.5
7. RCA-56—2nd Det.	—15	—	200	—	—	1.0	2.5
8. RCA-56—Driver	—11	—	204	—	—	5.0	2.5
9. RCA-56—Driver	—11	—	204	—	—	5.0	2.5
10. RCA-46—Power	0	0	400	—	—	6.0	2.5
11. RCA-46—Power	0	0	400	—	—	6.0	2.5
12. RCA-82—Rectifier	462.5 Volts R. M. S. Each Plate.—72 M. A. Total Plate Current.						

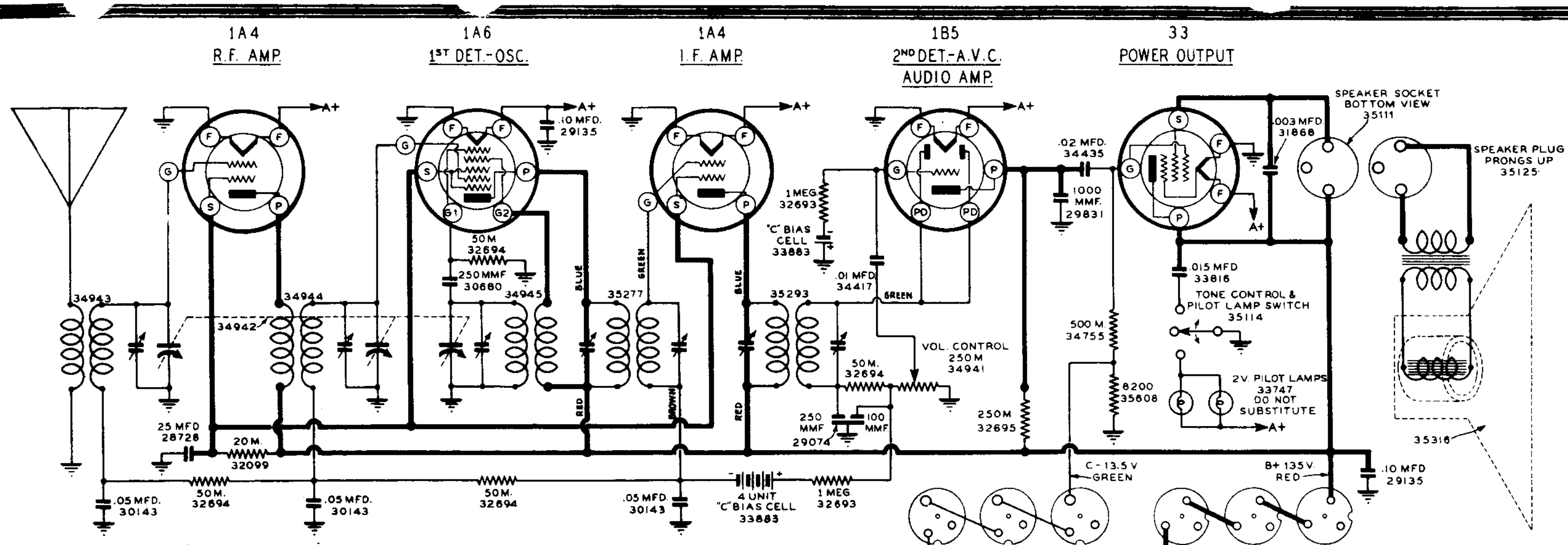
The untuned intermediate I. F. transformer used in the older Model J-125 has been changed to a natural period plate coil L-9 and a sharply tuned secondary coil L-10. Coil L-9 supplies the voltage to operate the A. V. C. circuit, while coil L-10 supplies that used to operate the suppressor circuits. An examination of this circuit will show that with no signal voltage impressed on coil L-10, no current is rectified in the Diode plate and hence the grid of the Radiotron RCA-55 operates at zero bias. The plate current is then at a maximum value—approximately 10 M. A.—and since the cathodes of the Radiotron RCA-55 and the signal channel I. F. tube are common, the I. F. tube is biased to cut-off. This, therefore, prevents signal voltage from reaching the second detector.

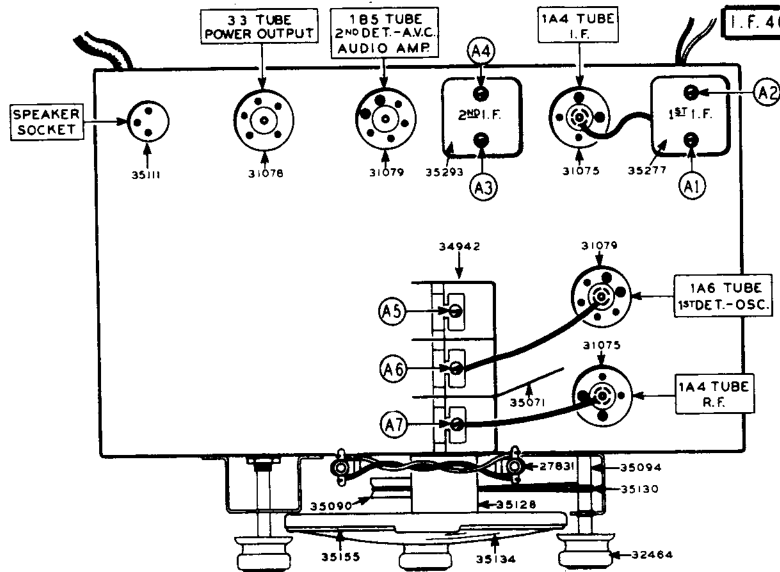
REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2723	Switch—Fidelity switch—Package of 5	$3.00
2746	Socket—Dial lamp socket	.50
2747	Contact cap—Package of 5	.50
3047	Resistor—1,500 ohms—Carbon type—½ watt—Package of 5	2.50
3055	Cushion—Sponge rubber chassis support cushions—Package of 4	.50
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	2.50
3252	Resistor—100,000 ohms—Carbon type—½ watt—Package of 5	2.75
3435	Resistor—250 ohms—Carbon type—½ watt—Package of 5	2.50
3437	Knob—Noise suppressor rheostat knob	.60
3439	Resistor—600,000 ohms—Carbon type—1 watt—Package of 5	2.50
3440	Resistor—4,500 ohms—Carbon type—½ watt—Package of 5	2.50
3441	Resistor—850 ohms—Carbon type—½ watt—Package of 5	2.50
6142	Resistor—6,000 ohms—Carbon type—½ watt—Package of 5	2.00
6188	Resistor—2 megohm—Carbon type—½ watt—Package of 5	2.00
6189	Bracket—Dial lamp bracket and indicator—Package of 2	.65
6192	Spring—3 gang tuning capacitor drive cord tension spring—Package of 10	.50
6251	Capacitor—1200 mmfd.—Package of 5	2.30
6276	Tone control—Complete with mounting nut and washer	2.10
6277	Capacitor—0.1 mfd. capacitor—Located in back of oscillator tube socket	.75
6279	Resistor—15,000 ohms—Carbon type—½ watt—Package of 5	2.50
6280	Resistor—400,000 ohms—Carbon type—½ watt—Package of 5	2.50
6281	Resistor—1,100 ohms—Carbon type—½ watt—Package of 5	2.50
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	2.50
6284	Reactor—Tone control reactor	1.35
6285	Choke coil—Second detector plate choke coil	1.10
6288	Knob—Station selector, tone control, radio or phonograph, volume control knob—Package of 5	1.50
6298	Cord—3 gang tuning capacitor drive cord—Package of 5	1.00
6306	Coil—R. F. coil complete with mounting bracket	1.90
6312	Capacitor—650 mmfd.—Oscillator series—Package of 5	2.50
6314	Capacitor—160 mmfd.—Package of 5	2.50
6315	Resistor—45,000 ohms—Carbon type—½ watt—Package of 5	2.50
6316	Resistor—2,500 ohms—Carbon type—½ watt—Package of 5	2.50
6323	Shaft—Tuning condenser drive shaft with one flat washer and two "C" washers—Package of 2	.85
6351	Resistor—Voltage divider resistor	1.00
6352	Transformer—Third intermediate transformer	3.00
6353	Transformer—Second intermediate transformer	3.00
6354	Rheostat—Noise suppressor rheostat	1.90
6355	Volume control—Complete with mounting nut	1.90
6356	Capacitor—0.1 mfd. capacitor—Located on resistor board	.70
7062	Capacitor—Adjustable trimming capacitor—15 to 70 mmfd.	1.00
7065	Screw driver—Non-metallic screw driver for oscillator and I. F. adjustments	1.10
7298	Capacitor—0.01 mfd. capacitor—Located on resistor board	.80
7438	Capacitor—3 gang variable tuning capacitor complete with mounting screws and washers	5.20
7439	Drum—Dial drum with set screws and 3 dial mounting nuts	.50
7440	Scale—Dial and dial scale	.75
7477	Capacitor pack—Comprising two 1.0 mfd. and five 0.1 mfd. capacitors in metal container	2.90
7478	Capacitor pack—Comprising four 0.5 mfd., one 0.02 mfd., and one 0.1 mfd. capacitors in metal container	3.00
7479	Transformer—Interstage audio transformer in metal container	3.90
7480	Transformer—First intermediate frequency transformer	3.15
7483	Reactor—Compensating reactor	$1.00
7484	Socket—UY type Radiotron socket—4 used	.65
7485	Socket—Radiotron six contact socket—5 used	.70
7486	Board—Phonograph terminal board—8 terminals and 3 links	1.00
7490	Board—Resistor board—Less resistors and capacitors	1.10
7498	Reactor—Coupling reactor	2.50
7500	Cable—Six conductor—From receiver to S. P. U.	1.50
7505	Shield—Tube shield top—1 used—Maroon	.50
7506	Shield—Radiotron tube shield—7 used—Maroon	.55
7540	Coil—Detector and oscillator coil complete with mounting bracket	3.50
	AMPLIFIER ASSEMBLIES	
2725	Fuse—1.5 ampere—Cartridge type fuse—Package of 5	.50
2731	Resistor—10,000 ohms—1 watt—Carbon resistor—Package of 5	2.00
2757	Strip—Terminal strip—2 terminals	.50
3032	Socket—UX type Radiotron socket with insulator	.50
3056	Shield—Radiotron tube shield—Package of 2	.50
3099	Capacitor—0.005 mfd. capacitor	.75
3147	Cover—Fuse cover with bushing and insulator	.95
6289	Strip—Terminal strip—5 terminals	.85
6290	Board—Terminal board complete with terminals, fuse clips, and insulator	1.00
6291	Board—Terminal board complete with terminals and insulator—Less capacitor	.90
6292	Switch—Operating switch	1.25
7054	Cord—Power cord	1.00
7370	Cover—Terminal strip cover with insulator—5 terminals	.55
7491	Socket—UY type Radiotron socket with insulator	.70
8910	Capacitor pack—Comprising two 10 mfd. capacitors in metal container	7.00
8911	Reactor—Filter reactor	4.75
8912	Transformer—Audio transformer pack comprising input and output transformer in metal container	6.50
8913	Transformer—Power transformer—105/125 volts, 50/60 cycles	12.50
8914	Transformer—Power transformer—105/125 volts, 25/50 cycles	16.00
8915	Transformer—Power transformer—200/250 volts, 50/60 cycles	13.50
10907	Fuse—3 ampere fuse (for 25 cycle use)—Package of 5.	.50
	CABINET ASSEMBLIES Prices Furnished Upon Request	
X104	Foot—Cabinet foot	
X106	Board—Baffle board with grille cloth—Assembled	
X107	Stretcher—Stretcher rail—Comprising front, center, side, and back rails	
2776	Catch—Door catch with strike and nail—Package of 2 sets	
G5015	Pull—Door pull with mounting screw—Package of 2.	
G5023	Station Selector Escutcheon	
6294	Hinges—Door hinges—One set of 4 hinges with mounting screws	
G8939	Ornament—Front end top rail ornaments—1 pair	
G8940	Overlay—Door overlay—Right and left hand—One pair	
G8976	Panel—Control panel	
G9579	Top—Cabinet top	
G9580	Doors—Left and right—1 pair—Short doors	
G9581	Leg—Cabinet leg	
G9589	Cabinet—Cabinet complete—Less all equipment—Short doors	
	REPRODUCER ASSEMBLIES	
7292	Screw assembly—Comprising two screws, two nuts, two lock-washers, and 1 plate—For mounting speaker to amplifier	.95
8559	Ring—Cone retaining ring	.80
8916	Cone—Reproducer cone complete with voice coil—Package of 5	15.00
9418	Coil assembly—Comprising field coil, magnet, and cone support	12.00

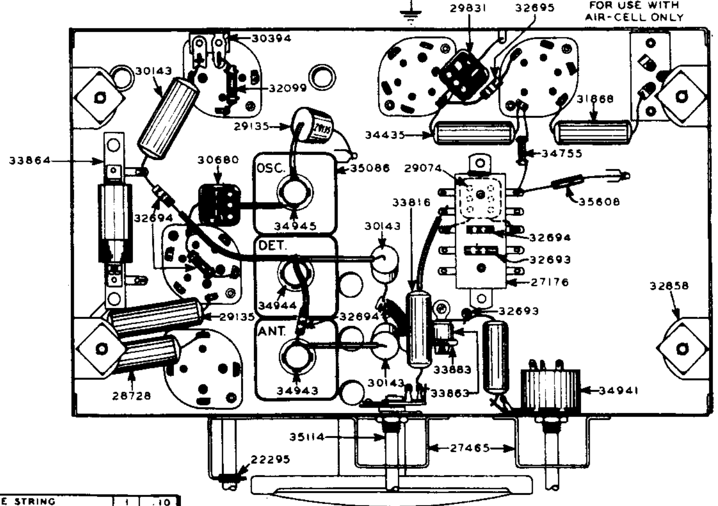
GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 5NB & 510





CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW

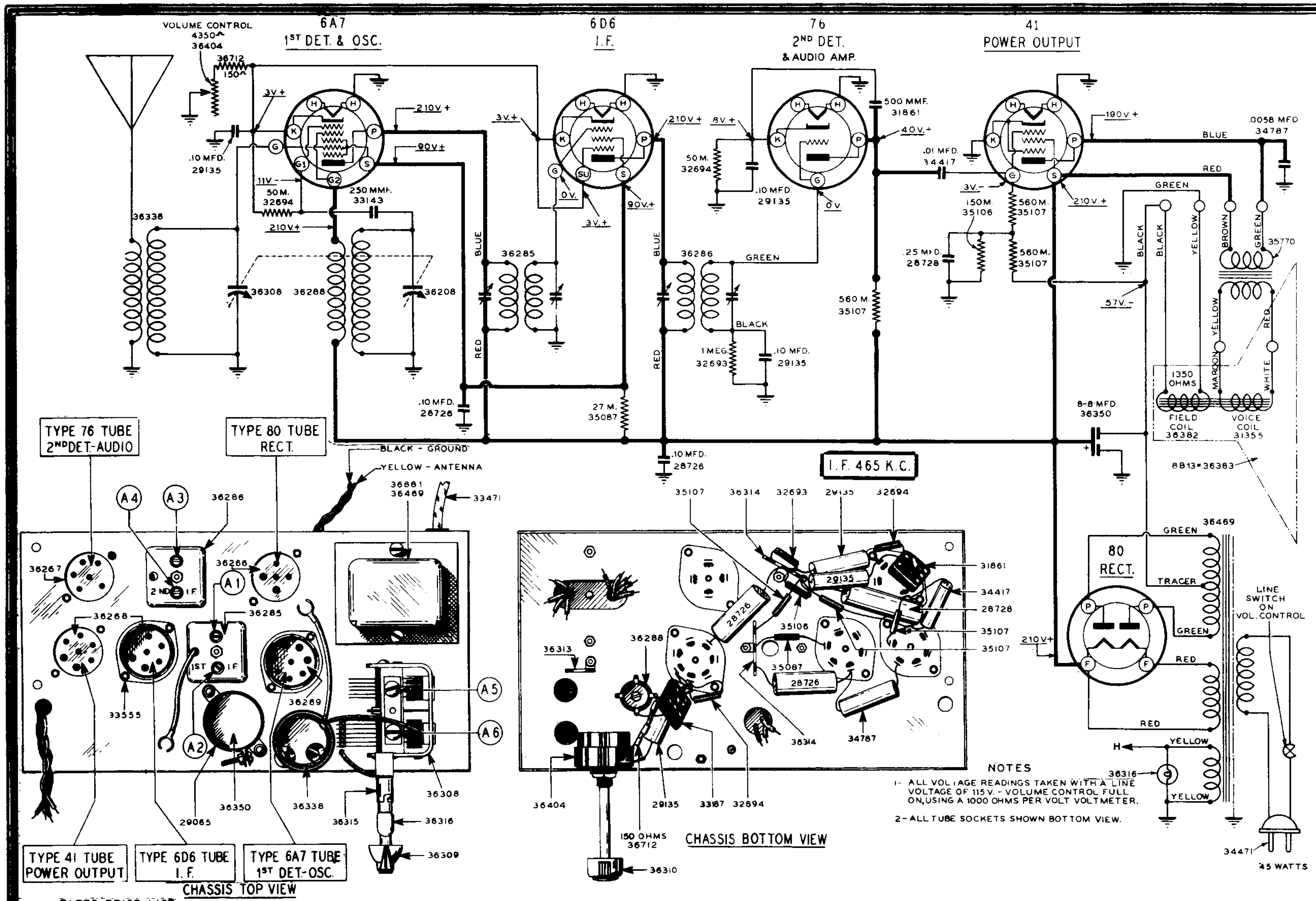
PARTS PRICE LIST			
PART NO.	DESCRIPTION	REQ.	PRICE
22295	'C' WASHER	2	.01
27178	TERMINAL BOARD	1	.20
27342	PILOT LAMP SHIELD	2	.02
27465	BRACKET	2	.15
27831	PILOT LAMP SOCKET	2	.15
28638	POINTER SCREW	1	.02
28728	CONDENSER-.25 MFD.	1	.35
29074	100-250 MMF. CONDENSER	1	.30
29135	REPLACE WITH 34437		
29818	CONDENSER-.003 MFD.	1	.25
29831	CONDENSER-1000 MMF.	1	.30
30143	REPLACE WITH 34436		
30177	DRIVE SPRING	1	.05
30394	TERMINAL STRIP	1	.10
30680	CONDENSER-250 MMF.	1	.20
31075	4 PRONG SOCKET	2	.10
31078	5 PRONG SOCKET	1	.10
31079	6 PRONG SOCKET	2	.15
31868	REPLACE WITH 29818		
32099	RESISTOR-20M OHMS	1	.15
32464	KNOB	3	.20
32693	RESISTOR-1 MEG.	2	.15
32694	RESISTOR-50M OHMS	4	.15
32695	RESISTOR-250M OHMS	1	.15
32858	MOUNTING FOOT	4	.25
33554	TUBE SHIELD CAP	3	.05
33555	TUBE SHIELD BASE	3	.02
33747	PILOT LAMP	2	.15
33816	CONDENSER-.015 MFD.	1	.30
33829	'B' BATTERY PLUG	3	.10
33883	BIAS CELL MTG. STRIP	1	.15
33884	BIAS CELL MTG. STRIP	1	.35
33886	'C' BATTERY PLUG	3	.10
34417	CONDENSER-.01 MFD.	1	.35
34435	CONDENSER-.02 MFD.	1	.35
34436	CONDENSER-.05 MFD.	3	.35
34437	CONDENSER-.10 MFD.	2	.35
34755	RESISTOR-500M OHMS	1	.15
34935	HALF TUBE SHIELD	6	.05
34941	VOLUME CONTROL	1	1.25
34942	VARIABLE CONDENSER	1	3.50
34943	ANTENNA COIL	1	.75
34944	DETECTOR COIL	1	.75
34945	OSCILLATOR COIL	1	.75
35071	GRID SHIELD	1	.10
35086	SHIELD (R.F. COILS)	3	.10
35090	DRIVE DRUM & HUB	1	.60
35094	DRIVE SHAFT	1	.05
35111	SPEAKER SOCKET	1	.15
35114	TONE CONTROL SWITCH	1	.80
35128	DIAL MTG. BRACKET	1	1.00
35130	DRIVE STRING	1	.10
35131	DIAL CHART	1	.75
35132	DIAL POINTER	1	.10
35133	WINDOW GASKET	1	.10
35134	DIAL WINDOW	1	.15
35136	BATTERY CABLE & PLUGS	1	1.25
35155	WINDOW RING	1	.10
35277	1ST I.F. COIL & SHIELD	1	1.75
35293	2ND I.F. COIL & SHIELD	1	1.75
35328	ESCUTCHEON	1	.55
35502	RESISTOR-0.6 OHM	1	.20
35608	RESISTOR-8200 OHMS	1	.15
38204	SPEAKER MTG. SCREW	4	.01
61134	HOLD-DOWN SCREW	2	.01
61207	CHASSIS MTG. SCREW	4	.01
62630	ESCUTCHEON SCREW	4	.01
63838	FELT WASHER	3	.01
63883	CHASSIS MTG. WASHER	4	.01

SPEAKER PARTS			
35125	SPEAKER PLUG	1	.20
35316	COMPLETE SPEAKER	1	8.50
40028	CONE & VOICE COIL	1	3.00
40027	OUTPUT TRANSFORMER	1	2.00

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 5R & 564



PARTS PRICE LIST

PART NO	DESCRIPTION	REQ.	PRICE
28726	CONDENSER-TUB. .10 MFD.	2	.25
28728	CONDENSER-TUB. .25 MFD.	1	.35
29065	CLAMP-ELECTROLYTIC	1	.05
29135	CONDENSER-TUB. .10 MFD.	3	.25
31861	CONDENSER-MICA 500 MMF.	1	.20
32693	RESISTOR — 1 MEG.	1	.15
32694	RESISTOR - 50 M	2	.15
33143	CONDENSER MICA 250 MMF.	1	.20
33471	LINE CORD	1	.40
33554	CAP - TUBE SHIELD	2	.02
33555	SHIELD BASE - TUBE	2	.02
34417	CONDENSER-TUB. .01 MFD.	1	.25
34787	CONDENSER-TUB. .0058 MFD.	1	.25
34935	SHIELD - TUBE	2	.10
34936	SHIELD - TUBE	2	.10
35087	RESISTOR - 27 M	1	.15
35106	RESISTOR - 150 M	1	.15
35107	RESISTOR - 560 M	[illegible]	.15
36204	SPEAKER MOUNTING SCREW	4	.01
36266	SOCKET - 4 PRONG	1	.10
36267	SOCKET - 5 PRONG	1	.15
36268	SOCKET - 6 PRONG	2	.15
36269	SOCKET - 7 PRONG	1	.15
36285	COIL AND SHIELD 1ST. I.F.	1	1.50
36286	COIL AND SHIELD 2ND. I.F.	1	1.50
36287	DIAL CHART	1	.30
36288	COIL - OSC.	1	.80
36308	CONDENSER - VARIABLE	1	3.00
36309	KNOB - TUNING	1	.25
36310	KNOB - VOLUME	1	.20
36313	TERMINAL STRIP	4	.10
36314	TERMINAL STRIP	2	.15
36315	PILOT LIGHT SOCKET	1	.10
36316	PILOT LIGHT	1	.15
36338	COIL - ANTENNA	1	.70
36350	COND. DRY ELECT. 8-8 MFD.	1	2.00
36375	CABINET	1	
36404	CONTROL-VOLUME, OFF-ON	1	1.05
36469	POWER TRANS. 50/60 CYCLE	1	5.00
36712	RESISTOR - 150 OHMS	1	.15
36881	POWER TRANS. 25-50~	1	8.5.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

COMPLETE SPEAKERS MAY NOT BE RETURNED FOR CREDIT.

SPEAKER PARTS-8BG1-1

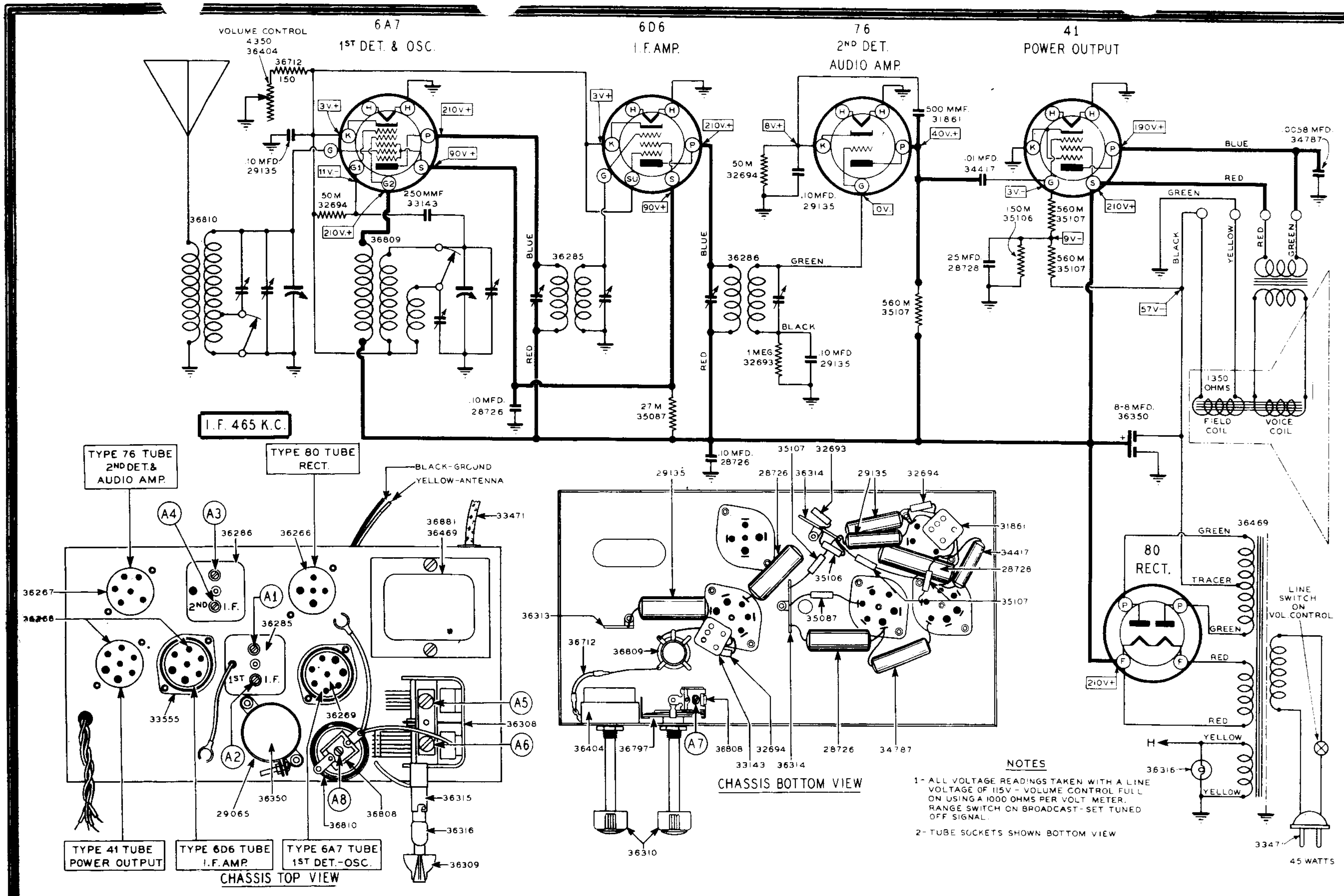
29038	CONE GASKET	1	.10
33202	TERMINAL STRIP	1	.10
35185	POLE PIECE	1	1.00
35186	CONE TERMINAL STRIP	1	.10
35770	OUTPUT TRANSFORMER	1	1.75
36655	8BG1-1 SPKR. COMPLETE	1	10.00
36657	FRAME & POT ASSEM.	1	1.00
36658	FIELD COIL	1	2.80
36912	CONE & VOICE COIL	1	1.00

SPEAKER PARTS-8B13

28844	YOKE AND POLE PIECE	1	1.20
28849	SPACERS	2	.02
29038	CONE GASKET	1	.10
29041	BASKET AND FRONT PLATE	1	1.00
31355	CONE AND VOICE COIL	1	1.00
33202	TERMINAL STRIP	1	.10
35770	OUTPUT TRANSFORMER	1	1.75
36382	FIELD COIL	1	2.80
36383	8B13 SPEAKER COMPLETE	1	10.00

GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 5S & 566



NOTES

1 - ALL VOLTAGE READINGS TAKEN WITH A LINE VOLTAGE OF 115V - VOLUME CONTROL FULL ON USING A 1000 OHMS PER VOLT METER. RANGE SWITCH ON BROADCAST - SET TUNED OFF SIGNAL.

2 - TUBE SOCKETS SHOWN BOTTOM VIEW

PARTS PRICE LIST

PART NO.	DESCRIPTION	REQ.	PRICE
20746	FIBER WASHER-ANT. COIL	1	.01
28726	REPLACE WITH 34437		
28728	CONDENSER-TUB. .25 MFD.	1	.35
29065	CLAMP-ELECTROLYTIC	1	.05
29135	REPLACE WITH 34437		
31861	CONDENSER-500 MMF.	1	.20
32693	RESISTOR-1 MEG.	1	.15
32694	RESISTOR-50M	2	.15
33143	CONDENSER-250MMF.	1	.20
33471	LINE CORD & PLUG	1	.40
33554	TUBE CAP	2	.02
33555	BASE-TUBE SHIELD	2	.02
34417	CONDENSER-TUB. .01 MFD.	1	.25
34437	CONDENSER-TUB. .10 MFD.	5	.30
34787	CONDENSER-.0058 MFD.	1	.25
34935	HALF TUBE SHIELD-SHORT	2	.10
34936	HALF TUBE SHIELD-LONG	2	.10
35087	RESISTOR-27M	1	.15
35106	RESISTOR-150M	1	.15
35107	RESISTOR-560M	3	.15
36204	SCREW-SPKR. MOUNTING	4	.01
36266	SOCKET-4 PRONG TUBE	1	.10
36267	SOCKET-5 PRONG TUBE	1	.15
36268	SOCKET-6 PRONG TUBE	2	.15
36269	SOCKET-7 PRONG TUBE	1	.15
36285	COIL & SHIELD 1ST I.F.	1	1.50
36286	COIL & SHIELD 2ND I.F.	1	1.50
36308	CONDENSER-VARIABLE	1	3.00
36309	KNOB-TUNING	1	.25
36310	KNOB-VOLUME-RANGE SW.	2	.20
36313	TERMINAL STRIP	1	.10
36314	TERMINAL STRIP	2	.15
36315	PILOT LIGHT SOCKET	1	.10
36316	PILOT LIGHT	1	.15
36350	ELECT. CONDENSER	1	2.00
36404	VOLUME CONTROL	1	1.05
36469	POWER TRANSF.-50-60~	1	5.00
36712	RESISTOR-150 OHMS	1	.15
36797	RANGE SWITCH	1	.45
36807	DIAL CHART	1	.40
36808	TRIMMER CONDENSER	2	.25
36809	COIL-OSCILLATOR	1	.85
36810	COIL-ANTENNA	1	1.00
36881	POWER TRANSF. 25-50~	1	8.50
37565	DIAL CHART SHIELD	1	.10
61244	SCREW-CHASSIS MTG.	2	.01

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

SPEAKER PARTS-8BG1-1

29038	CONE GASKET	1	.10
35186	CONE TERMINAL STRIP	1	.10
36771	OUTPUT TRANSFORMER	1	1.75
38655	8BG1-1 SPKR. COMPLETE	1	10.00
36912	CONE & VOICE COIL	1	1.00

SPEAKER PARTS-8BG2-4

29038	CONE GASKET	1	.10
35186	TERMINAL STRIP	1	.10
36742	8BG2-4 SPKR. COMPLETE	1	10.00
36771	OUTPUT TRANSFORMER	1	1.75
36912	CONE & VOICE COIL	1	1.00

GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 5NB & 510

The Grunow Chassis 5NB is a five tube battery operated Superheterodyne receiver using 1—1A4 R. F. Amplifier, 1—1A6 1st Detector and Oscillator, 1—1A4 I. F. Amplifier, 1—1B5 2nd Detector, A. V. C. and A. F. Amplifier and 1—33 Power Output. The tuning range covers the Broadcast Band from 550 kc. to 1750 kc.

REPAIRS

When servicing this chassis, it is IMPERATIVE that parts replacements are made in EXACTLY the same way as the original parts were connected and located. This applies particularly to all ground points.

All parts replacements in the R.F. end of the circuit must be exact duplicates of the originals, especially coils, R.F. by-pass, and coupling condensers.

Any repairs in the R.F. circuit will make a complete re-alignment of the entire tuned circuit necessary.

BIAS CELLS

This Chassis uses "C" bias cell units in both the A.V.C. and Audio Amplification Circuits. These cells may have to be replaced occasionally, and when doing so, note that the carbon or (+) side is connected to the ground side of the cell terminal clip. An indication of a faulty cell will be distorted tone quality. This may be checked by the substitution of new cells in place of the old, or for testing purposes a "C" battery may be used—using 1½ volt tap for a single cell or 4½ volts for the 4 unit cell. This bias cell has a voltage of 1½ volts, but due to its low current output it cannot be measured by any ordinary volt meter.

ALIGNMENT

CIRCUIT ALIGNMENT EQUIPMENT

Do not attempt to align the chassis without the following:

1. Signal Generator.
   A modulated oscillator capable of delivering frequencies from 465 kc. to 1750 kc.
2. Alignment Tool.
   A non-metallic screw driver.
3. Dummy Antenna.
   .05 Mfd. Condenser (I. F. Alignment).
   200 Mmfd. Condenser (Broadcast Alignment).
4. Output Meter.
   A meter of sufficient sensitivity to give a good deflection at very low signal input.

Note: The receiver should be aligned in a location free from local interference. A screen room is recommended.

1. HEATING.
   (A) Allow the receiver to heat up for at least 15 minutes. This is necessary in order to eliminate possible alignment variations due to thermal expansion and contraction of the capacitors and inductances.
   (B) Allow the signal generator to warm up in order to prevent frequency drift during alignment.
2. DIAL CALIBRATION.
   (A) Turn the tuning condenser until plates are fully meshed, set the dial pointer to the horizontal line on the dial chart.
3. SIGNAL GENERATOR ADJUSTMENT.
   During the entire alignment procedure the signal input from the generator to the receiver must be continually attenuated at the generator as the various trimmers are brought into resonance. This is necessary in order to hold the signal at the lowest intensity so that the A.V.C. circuit will remain at its most sensitive point.
4. I. F. ALIGNMENT.
   (A) Set the generator to 465 kc. and connect the output to the grid of the 1A6 tube through the .05 mfd. dummy. Connect the ground to the chassis ground post.
   (B) Set the receiver to 600 kc.
   (C) Adjust the trimmers A1, A2, A3, and A4 to maximum output.
5. 1500 K. C. ALIGNMENT.
   (A) Set the generator to 1500 kc. and connect the output to the chassis antenna post through the 200. mmfd. dummy.
   (B) Set the receiver to 1500 kc.
   (C) Adjust trimmer A5 to maximum output.
   (D) Adjust trimmer A6 in the direction of signal increase and at the same time slowly rock the tuning condenser back and forth through resonance until the combined resonant point of both is determined.
   (E) Repeat operation "C."
   (F) Adjust trimmer A7 to maximum output.

MODELS 5R & 564

The following characteristics apply to the GRUNOW Radio—Chassis 5R:

This model is a 5 tube Super-Heterodyne Broadcast (540 to 1720 K.C.) Receiver using 1-6A7 tube as a 1st Detector and Oscillator, 1-6D6 tube as an I.F. Amplifier, 1-76 tube as a 2nd Detector and audio Amplifier. The 41 output tube is a power amplifier pentode and is capable of producing large power output with a relatively small signal input. The rectifier tube is an 80, the output of which is well filtered through the action of the speaker field and the two 8 mfd. electrolytic condensers.

The following three variable circuits are used: R.F. input, detector or mixer input and oscillator. These circuits are tuned by a 2 gang variable condenser of rugged construction.

The remainder of the circuit is typical and has been designed along lines of what is considered the best engineering practice to date. Parts are all oversize and of the finest quality.

SERVICE DATA

CONTINUITY AND VOLTAGE

Continuity and voltage readings should be taken from the underside of the chassis. The values given on the schematic diagram are average and allow the service man to make a quick check of the chassis constants. The socket layouts given on the schematic diagram show each socket from the underside.

ALIGNMENT

1. EQUIPMENT.

A—Test Oscillator.

A modulated oscillator capable of producing signals at 465 K.C., 600 K.C., 1500 K.C. and 1700 K.C. is necessary for alignment of the 5R Grunow Receiver.

B—Output Meter.

This may be any of the standard output meters on the market but should be sufficiently sensitive to provide a good deflection at low signal strength.

C—Coupling Means.

Coupling condensers of .25 Mfd. and 200 Mmf. should be used when coupling oscillator to receiver during alignment as specified in following paragraphs.

2. DIAL SETTING.

Turn dial pointer until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

3. I.F. ALIGNMENT.

A—Connect signal lead of oscillator through .25 Mfd. condenser to grid of 6A7 (1st Detector Tube.) Connect the ground lead to the Chassis.

B—Place oscillator in operation at 465 K.C. and turn receiver volume control to maximum. (Volume Control should remain at maximum during entire alignment procedure and signal should be attenuated at oscillator to lowest value consistent with obtaining a readable indication on output meter.)

C—Align four I.F. trimmers (A1—A2—A3—A4) located on top of I.F. Transformers.

4. 1700 K.C. ALIGNMENT.

A—Connect signal lead of oscillator to antenna lead (the yellow wire leading from rear of chassis) through 200 Mmf. Condenser.

B—Set dial pointer at 1700 K.C. and place oscillator in operation at 1700 K.C.

C—Align oscillator trimmer (A5) which is the second of the two on the variable condenser as you face chassis.

5. 1500 K.C. ALIGNMENT.

A—Place oscillator in operation at 1500 K.C.

B—Set dial pointer at 1500 K.C.

C—Align antenna trimmer (A6). This operation may require rocking the variable condenser back and forth through resonance. The object of this operation is to be sure that the receiver will reach 1712 K.C. and at the same time have maximum sensitivity on the rest of the broadcast band.

MODELS 5S & 566

The following characteristics apply to the GRUNOW Radio—Chassis 5S:

This model is a 5 Tube Super-Heterodyne Dual Wave (540 to 1725 K.C. and 1725 to 4000 K.C.) Receiver, using 1-6A7 tube as 1st Detector and Oscillator, 1-6D6 tube as an I. F. Amplifier, 1-76 tube as 2nd Detector and Audio Amplifier. The 41 output tube is a power amplified pentode and is capable of producing large power output with relatively small signal input. The rectifier tube is an 80, the output of which is well filtered through the action of the speaker field and the two 8 mfd. electrolytic condensers.

SERVICE DATA

CONTINUITY AND VOLTAGE

Continuity and voltage readings should be taken from the underside of the chassis. The values given on the schematic diagram are average and allow the service man to make a quick check of the chassis constants. The socket layouts given on the schematic diagram show each socket from the under side.

ALIGNMENT

1. EQUIPMENT

A—Test Oscillator.

A modulated oscillator capable of producing signals at 465 K. C., 1500 K. C., 1000 K. C., 600 K. C. and 3500 K. C. is necessary for alignment of the 5S Grunow Receiver.

B—Output Meter.

This may be any of the standard output meters on the market, but should be sufficiently sensitive to provide a good deflection at low signal strength.

C—Coupling Means.

Coupling condensers of .05 Mfd. and 200 Mmf. should be used when coupling oscillator to receiver during alignment as specified in following paragraphs.

2. DIAL SETTING.

Turn dial pointer until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial chart.

3. I. F. ALIGNMENT.

A—Connect signal lead of oscillator through .05 Mfd. condenser to grid of 6A7 (1st Detector tube), connect the ground lead to the chassis.

B—Place oscillator in operation of 465 K. C. and turn receiver Volume Control to maximum (Volume Control should remain at maximum during the entire alignment procedure and signal should be attenuated at oscillator to lowest value consistent with obtaining a readable indication on output meter).

C—Align four I. F. trimmers (A1-A2-A3-A4) located on top of I. F. Transformers.

4. 1500 K. C. ALIGNMENT.

A—Connect signal lead of oscillator to antenna lead (the yellow wire) through 200 Mmf. condenser.

B—Set dial pointer at 1500 K. C. and place oscillator in operation at 1500 K. C. Set Range switch on broadcast position. Knob to the left.

C—Align oscillator trimmer (A5), which is the second trimmer on variable condenser as you face the chassis.

D—Align antenna trimmer (A6), which is the first trimmer on Variable Condenser, in direction of signal increase and at the same time rock the tuning condenser back and forth thru resonance. Continue this procedure until maximum signal is obtained on the output meter.

5. 3500 K. C. ALIGNMENT.

A—Set Range Switch to Short Wave Position. Set test oscillator in operation at 3500 K. C. Turn Dial pointer to 3500 K. C. (3.5 M. C.).

B—Adjust Oscillator Trimmer (A7), located on range switch, to maximum output. (Use the higher of the images for alignment point—the setting giving the least capacity—screw farthest out.)

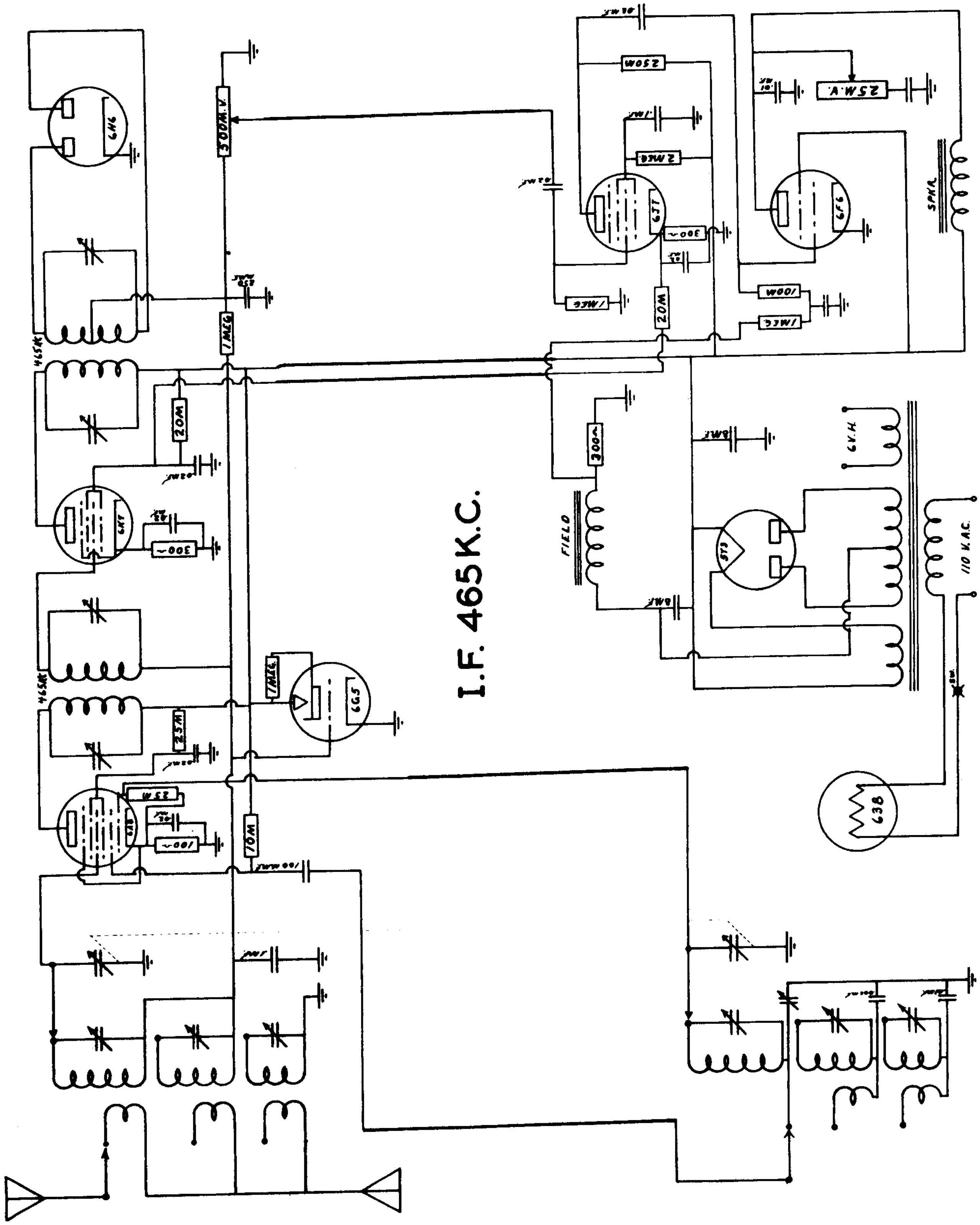
C—Adjust antenna trimmer (A8), located on top of antenna coil, to maximum output while rocking tuning condenser thru resonance.

D—Check at 1500 K. C.

Note: Best results may be had with this receiver when using a high, long antenna.

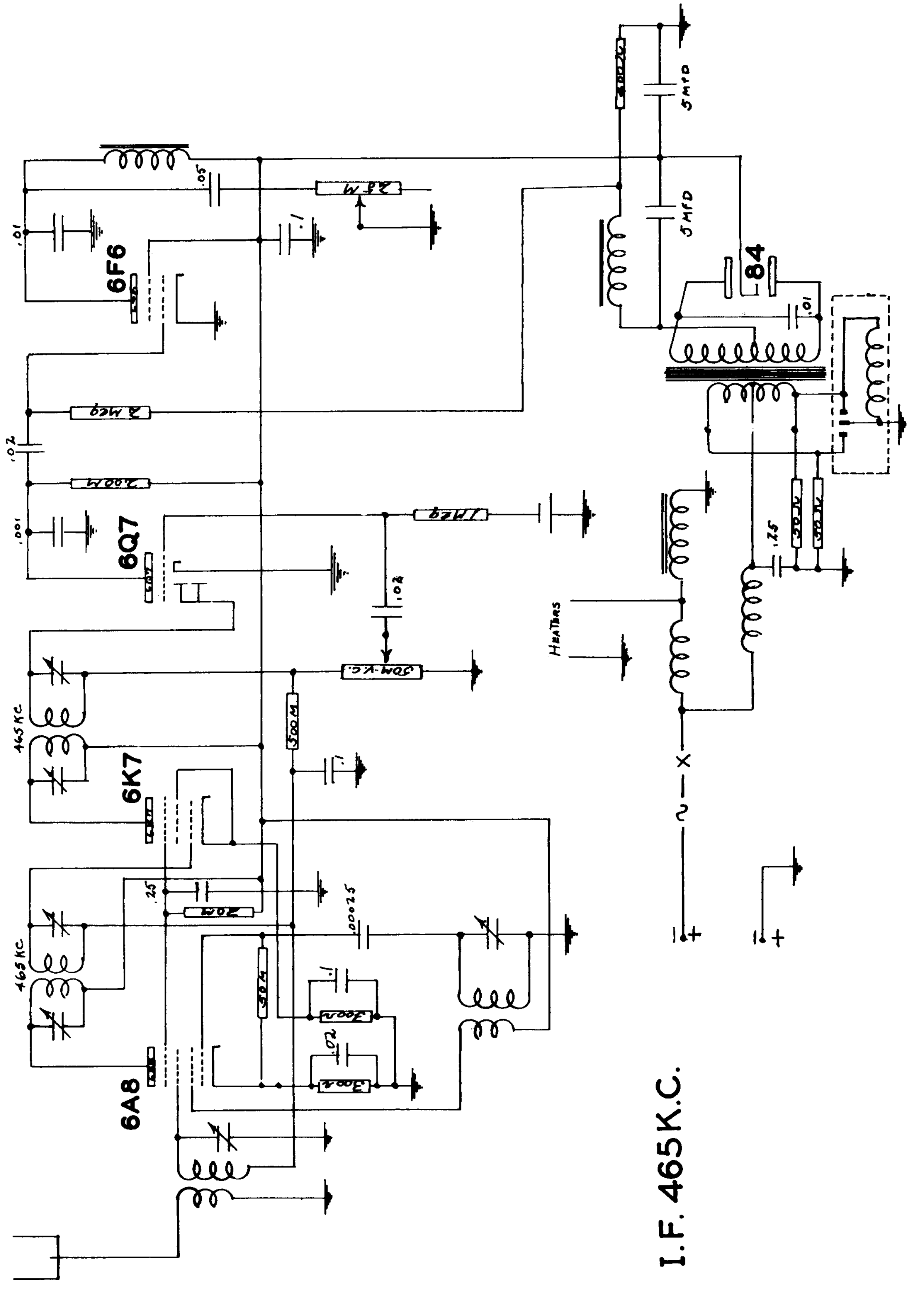
HERBERT H. HORN RADIO MFG. CO.

MODEL 83



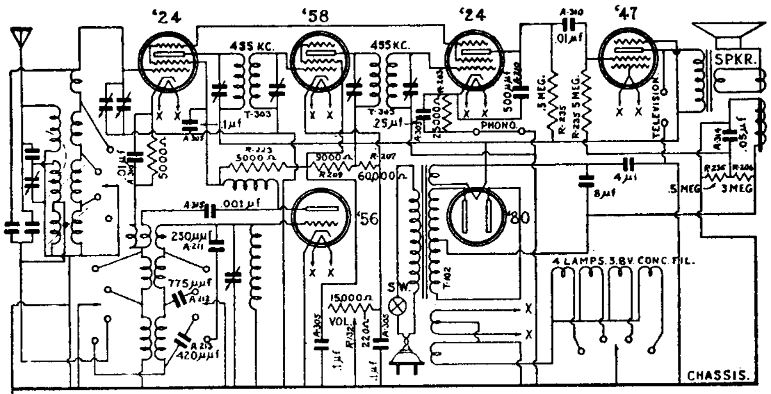
HERBERT H. HORN RADIO MFG. CO.

MODELS 537 & 538



INTERNATIONAL RADIO CORP.

MODEL AW-55



MODEL AW-55

VOLTAGE READINGS:

NOTE: Voltages should be measured with volume control all the way "ON" and the range selector in position 3 (broadcast). Use a 250-volt D. C. meter with a resistance of 1000 ohms per volt.

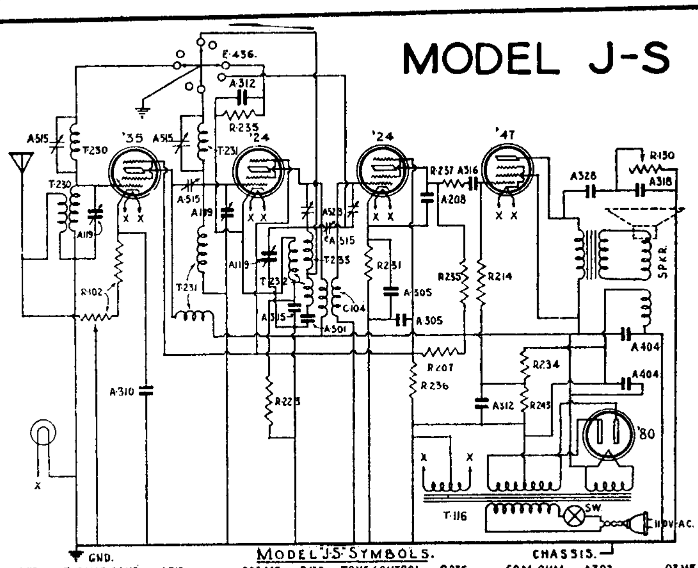
The following are average voltages measured on 118 volt 60 cycle A. C. line. A slight variation is allowable for variations in meters, tubes, and line voltage.

	Plate	Screen	Cathode
'47 Tube —ground to	235	245	......
'24 Tube —ground to (Tube next to '47)	70	40	6
58 Tube —ground to	240	100	3
'24 Tube —ground to	240	40	8
56 Tube —ground to	40	......	0

The grid of the '47 is biased through such high resistances that only an indication of negative bias can be read with an ordinary meter.

Part No.	Description	List Price
D-7	—Dynamic Speaker with cord and plug	$5.55
	—Cabinet	
U-102	—A. C. cord complete with male plug	.20
E-417	—Antenna-ground post assembly	.10
S-111	—Tube shield (for No. 58 tube) base, body and cap	.15
E-405	—Pilot lamp bulb, 3.8v., concentrated filament	.15
E-413	—Quadruple pilot lamp bracket assembly	.40
E-224	—Tuning dial complete with 4-range scale	1.00
E-125	—Large wood knobs, knurled, with set screw	.15
E-126	—Small wood knobs, knurled, with set screw	.12
R-132	—Volume control with A. C. switch	.80
E-444	—Range-selector switch, 16-point	1.00
A-103	—6-Plate variable condenser, selectivity control	.75
A-102	—3-Gang variable tuning condenser	2.50
A-404	—4 Mfd. dry electrolytic filter condenser	.90
A-403	—8 Mfd. dry electrolytic filter condenser	1.00
	Roll type by-pass condenser, any size (See diagram for part number)	.15
	Resistor, any size (See diagram for part number)	.20
	Tube socket with rivets (Specify type stamped on socket)	.15
A-210	—500uuf Molded mica condenser, 10%	.15
A-211	—230uuf Molded mica condenser, special tolerance	.25
A-212	—755uuf Molded mica condenser, special tolerance	.30
A-213	—420uuf Molded mica condenser, special tolerance	.25
C-203	—R. F. Choke, with grounded lead, grid choke	.25
C-204	—R. F. Choke, two free leads, plate choke	.25
T-102	—Power transformer	2.25
T-303	—I. F. transformer, 457.5 K. C. comp. in shield	1.05
T-239AX	—Imput coil assembly (long coil with five windings)	1.25
T-240AX	—Antenna coil No. 1 (small coil mounts above chassis)	.25
T-226AX	—Antenna coil No. 2 (larger coil mounts above chassis)	.30
T-242AX	—Oscillator coil No. 1 (smallest coil mounts under chassis)	.25
T-241AX	—Oscillator coil No. 2 (next larger coil mounts under chassis)	.25
T-226BX	—Oscillator coil No. 3 (next larger coil mounts under chassis)	.35
	Shipping carton complete with packing	.45

MODEL J-S



MODEL 'J-S' SYMBOLS.

A-119	3-GANG COND.	A-318	.005 MF.	R-130	TONE CONTROL.	R-236	60 M. OHM.	A-302	.03 MF.
A-208	.00015 MF.	A-328	.06 MF.	R-207	60 M.OHM 1-WATT	R-237	100 M. OHM.	A-501	ADJ. COND.
A-305	.1 MF.	A-404	4 MF.	R-214	750 M.OHM.	R-243	1 MEGOHM.	R-235	500 OHM.
A-310	.01 MF.	A-515	ADJ. COND.	R-223	5 M. OHM.	T-230	ANT. COIL.	E-436	S.W. SWITCH.
A-312	.03 MF	A-523	I.F. TUNING UNIT	R-251	50 M.OHM.	T-231	R.F. COIL.	T-116	PWR TRANS.
A-315	.001 MF.	C-104	I.F. COIL.	R-234	6 MEGOHM.	T-232	OSC. COIL.		
.316	.003 MF.	R-102	VOL. CONTROL.	R-235	500 M.OHM.	T-233	S.W. COIL.		

MODEL J-S

Voltage Readings:

NOTE: Voltages should be measured with volume control all the way "ON" and the band selector switch at the "long" wave position using zero to 250 volt D. C. voltmeter with resistance of 1,000 ohms per volt.

The following are average voltages taken on 118 volts 60 cycle A. C. line. A slight variation is allowable for variation in meters and line voltage.

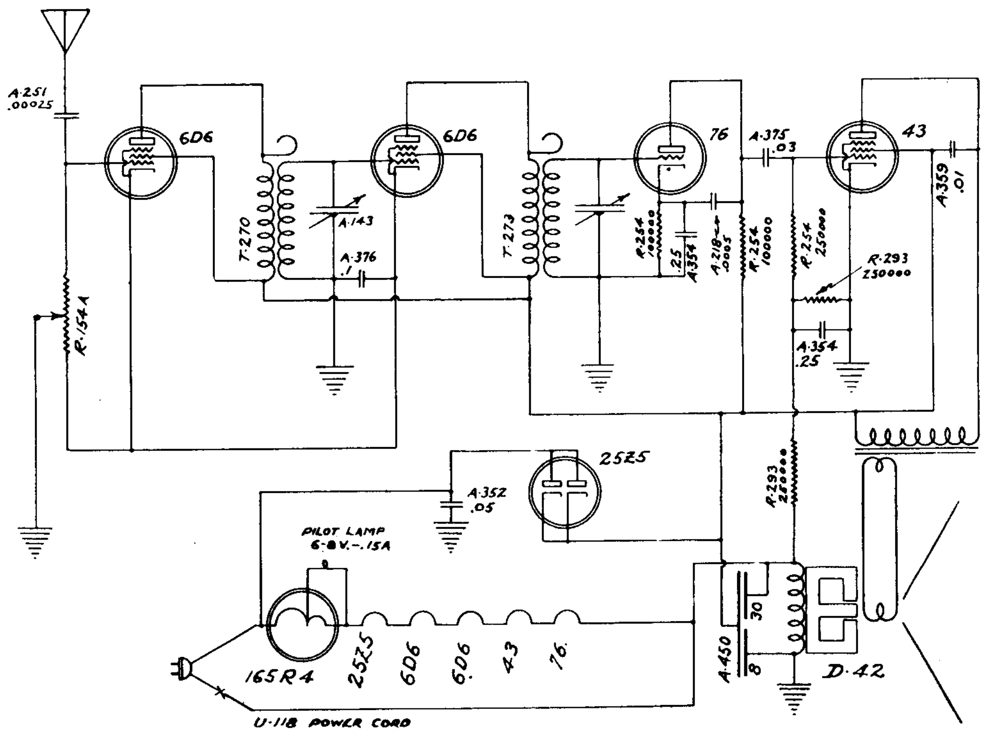
	Plate	Screen	Cathode
Pentode tube —ground to	240	245	None
235 R. F. tube —ground to	245	70	2.5
224 1st. Detector tube —ground to (center tube)	245	70	7
224 2nd. Detector —ground to	75	70	10

The grid of the Pentode is biased through such high resistance that only an indication of negative bias can be read with an ordinary high resistance meter.

Part No.	Quan.	Name	List Price
A-121	1	3 Gang Tuning Condenser	$3.30
A-208	1	.00015 Mfd. Molded Condenser	.20
A-501	1	Adj. Padder Condenser	.40
A-515	4	Adj. Coupling Condenser	.15
		Any Size Tubular Condenser, specify part number of unit required (Refer to diagram)	.15
A-404	2	4 Mfd. 450V Filter Condenser	.90
D-6	1	Speaker, Dynamic	5.60
E-117	2	Small Control Knob with set screw	.12
E-118	1	Large Control Knob with set screw	.15
E-103	1	Selector Knob, only	.10
E-409	1	1.25V Pilot Lamp	.15
E-222	1	Calibrated Dial	.90
E-436	1	4 Arm Band Selector Switch complete	.75
E-301	1	Selector Name Plate	.10
		Sockets, specify number printed on socket required	.15
R-102	1	Volume Control and A. C. Switch	.90
R-130	1	Tone Control	.60
		Carbon Resistors, specify part number (Refer to Diagram)	.20
T-116	1	Power Transformer	2.10
	1	Set Matched R. F. Coils	2.25
U-103	1	A. C. Cord Assembly 6 feet long	.20
	1	Cabinet (Specify Serial No. of Set)	3.60
		Shipping Carton, Complete	.40
T-301	1	Intermediate Freq. Trans. Complete	1.50

INTERNATIONAL RADIO CORP.

MODELS 76X & 676X



ALIGNMENT

Alignment may be accomplished using either a signal generator or weak broadcast signals although the signal generator is preferable. An output meter should be connected from the plate of the 43 tube to ground.

Set signal generator at 1500 kilocycles and feed signal to antenna. Keep the output from signal generator as low as possible. Tune in signal on radio and make adjustments for maximum output. Rock the tuning condenser back and forth across the signal while adjusting the R.F. trimmer for resonance.

Next check the alignment at 1000 Kc. Insert a thin bakelite, celluloid or mica feeler strip between the plates of the variable condensers to determine whether the circuits are properly matched. The action is this—the dielectric constant of the celluloid feeler strip being higher than that of the air it displaces, results in an increase of capacity. Open the variable condenser just enough to indicate two or three points below maximum signal. As the feeler is inserted the meter reading should indicate increasing signal and then decreasing as the feeler is inserted farther. This procedure should be followed on both sections. Should the meter fail to show an increase in signal as the strip is inserted in one section this indicates too great a capacity for the section. This may be corrected by bending the outside rotor plates out at the point where they begin to mesh with the stator.

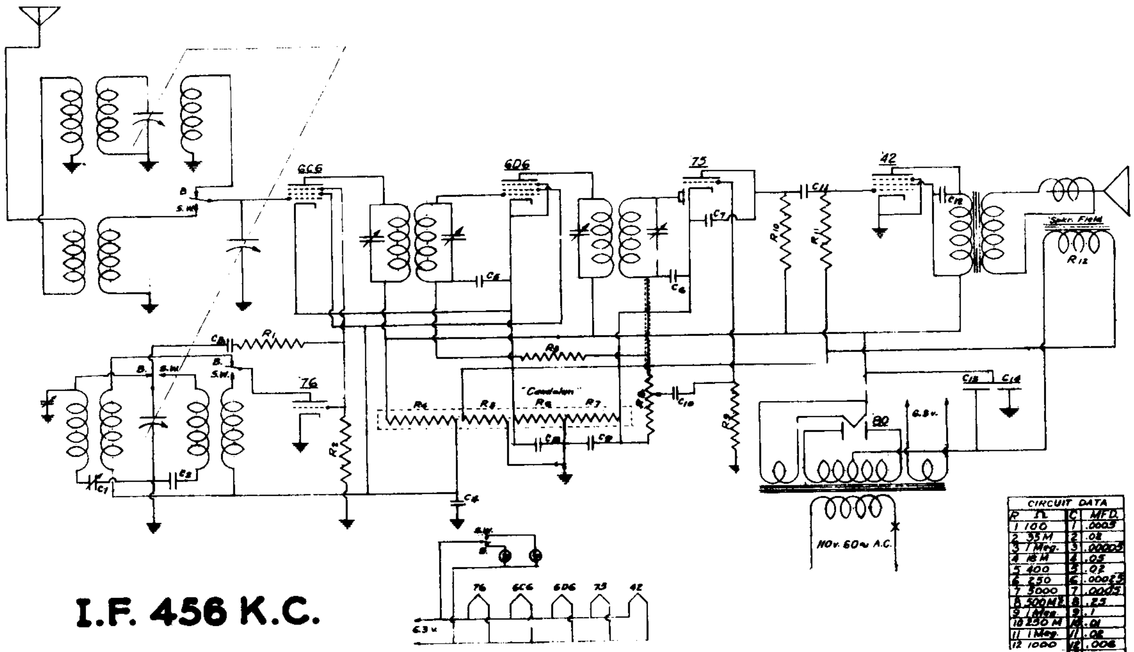
After checking the alignment at 1000 Kc. repeat the process at 600 Kc.

AVERAGE SOCKET VOLTAGES

Tube	Position	Ek	Eg_3	Eg_2	Ep
6D6	Untuned R.F.	4	4	100	100
6D6	Tuned R.F.	4	4	100	100
76	Detector	65	—	—	75
43	Output	0	—	100	92
25Z5	Rectifier	100	—	—	115 A.C.

Line 118 volts. Volume control full on. 10% variation allowable. Measurements made from tube prongs to ground with 1000 ohms per volt instrument on 250 volt scale.

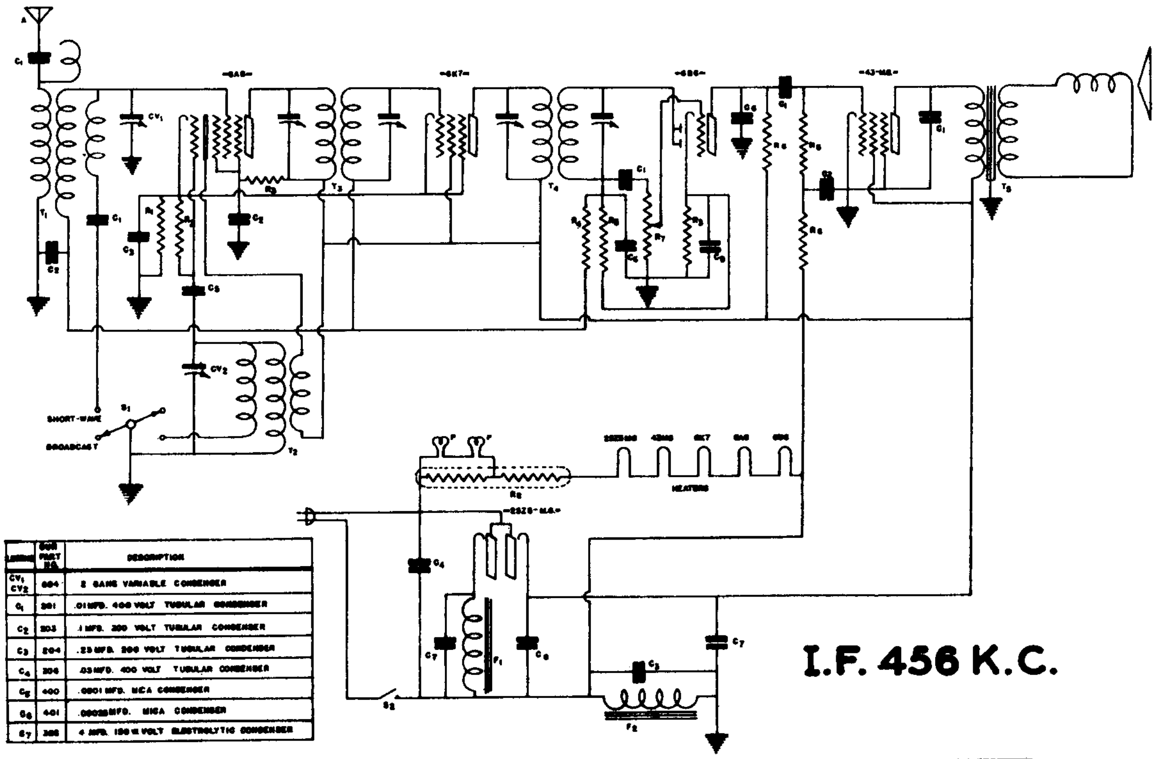
LAFAYETTE RADIO MFG. CO.
MODELS C40 & C42



I.F. 456 K.C.

CIRCUIT DATA			
R	Ω	C	MFD.
1	100	1	.0005
2	35 M	2	.02
3	1 Meg.	3	.00005
4	18 M	4	.05
5	400	5	.02
6	250	6	.00025
7	3000	7	.0005
8	500 M Ξ	8	.25
9	1 Meg.	9	.1
10	250 M	10	.01
11	1 Meg.	11	.02
12	1000	12	.006
		13	8.
		14	4.

MODEL J4



I.F. 456 K.C.

LEGEND	OUR PART NO.	DESCRIPTION
CV_1 CV_2	604	2 GANG VARIABLE CONDENSER
C_1	201	.01 MFD. 400 VOLT TUBULAR CONDENSER
C_2	203	.1 MFD. 200 VOLT TUBULAR CONDENSER
C_3	204	.25 MFD. 200 VOLT TUBULAR CONDENSER
C_4	206	.03 MFD. 400 VOLT TUBULAR CONDENSER
C_5	400	.0001 MFD. MICA CONDENSER
C_6	401	.00025 MFD. MICA CONDENSER
C_7	306	4 MFD. 150 W. VOLT ELECTROLYTIC CONDENSER

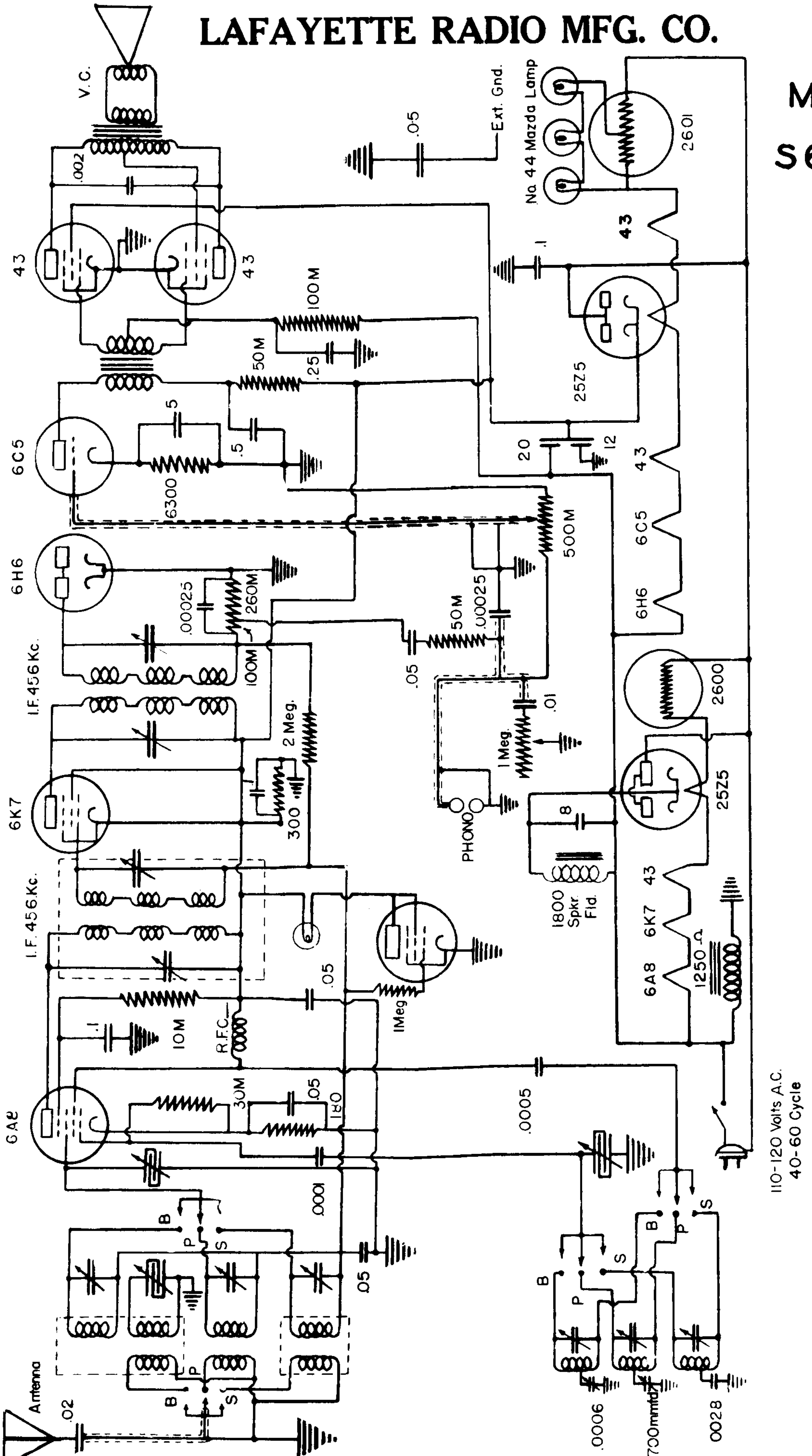
LEGEND	OUR PART NO.	DESCRIPTION
C_8	306	30 MFD. 150 W. VOLT. ELECTROLYTIC CONDENSER
C_9	306	10 MFD. 25 W. VOLT ELECTROLYTIC CONDENSER.
R_1	105	250 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_2	113	50,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_3	108	5000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_4	119	1 MEGOHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_5	117	$\frac{1}{2}$ MEGOHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_6	116	$\frac{1}{4}$ MEGOHM $\frac{1}{2}$ WATT CARBON RESISTOR

LEGEND	OUR PART NO.	DESCRIPTION
R_7	2007	500,000 OHM VOLUME CONTROL
R_8	—	50A2 M.G. BALLAST TUBE
A	1605	20 FEET INDOOR AERIAL
T_1 T_2	1600	TRANSLATOR COIL
T_3	1500	HIGH G I.F. TRANSFORMER
T_5	801-A	5" DYNAMIC SPEAKER TRANSFORMER.
T_4	1502	DIODE COUPLING TRANSFORMER.
S_1	1602	BAND SELECTOR SWITCH

LEGEND	OUR PART NO.	DESCRIPTION
S_2	—	LINE SWITCH ON VOLUME CONTROL
P	2001	MAZDA # 40 PILOT LIGHT
F_1	604	2000 OHM SPEAKER FIELD
F_2	1100	FILTER CHOKE

LAFAYETTE RADIO MFG. CO.

MODELS S61 & S62

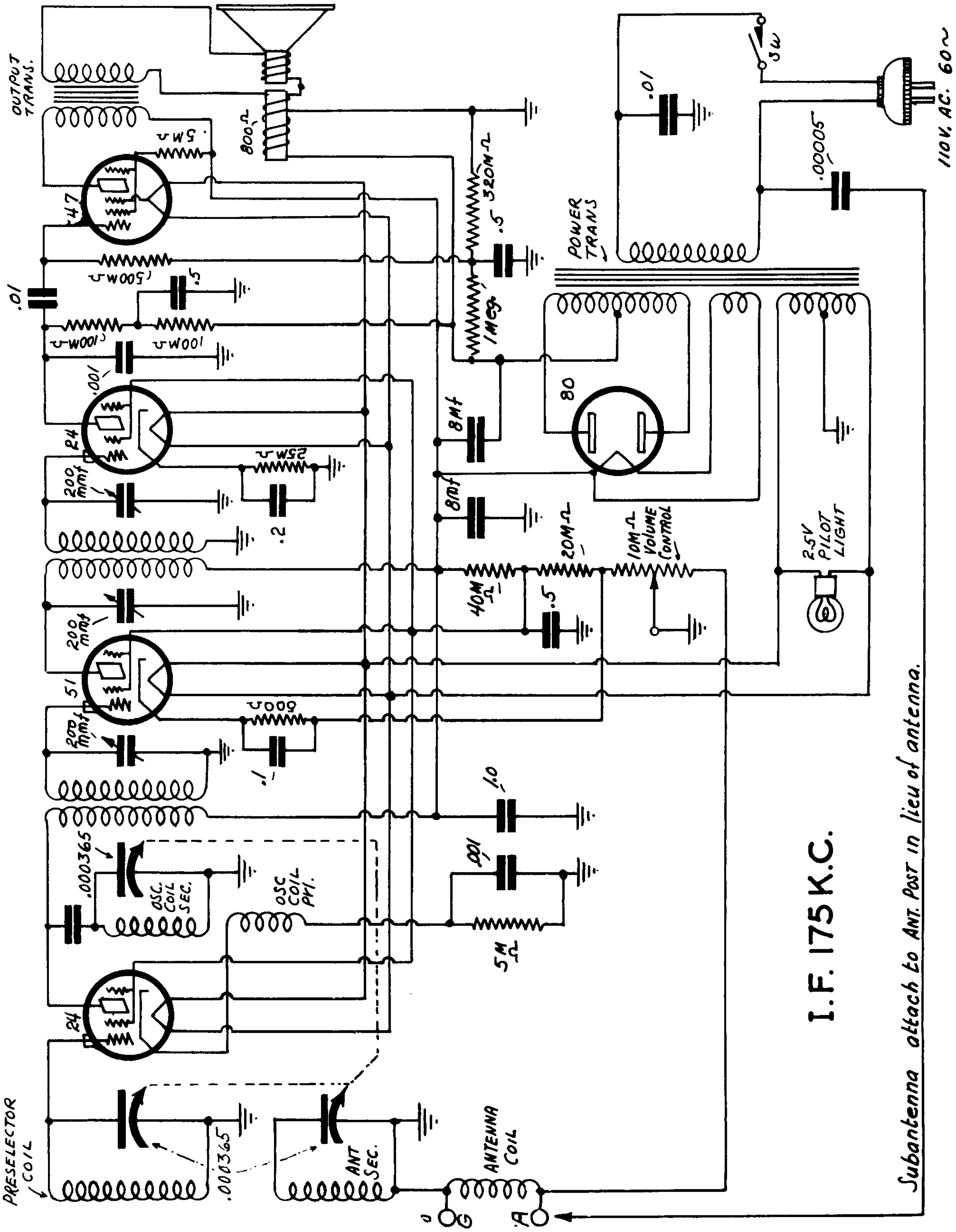


MODEL S-62 IS IDENTICAL S61 EXCEPT FOR SUBSTITUTION OF EUROPEAN BROADCAST BAND FOR POLICE BAND.

All resistance in ohms
All capacities in Mfds.

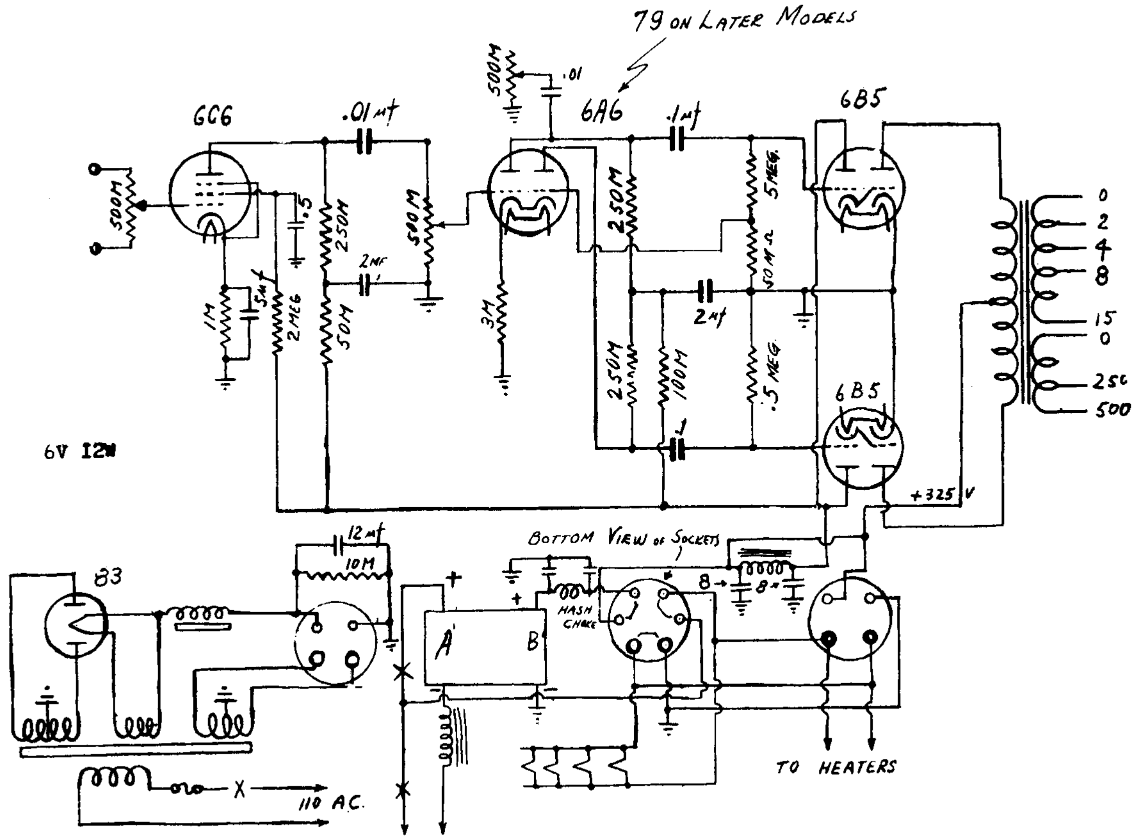
LAFAYETTE RADIO MFG. CO.

MODEL 2A5 "FIRST MINSTREL"

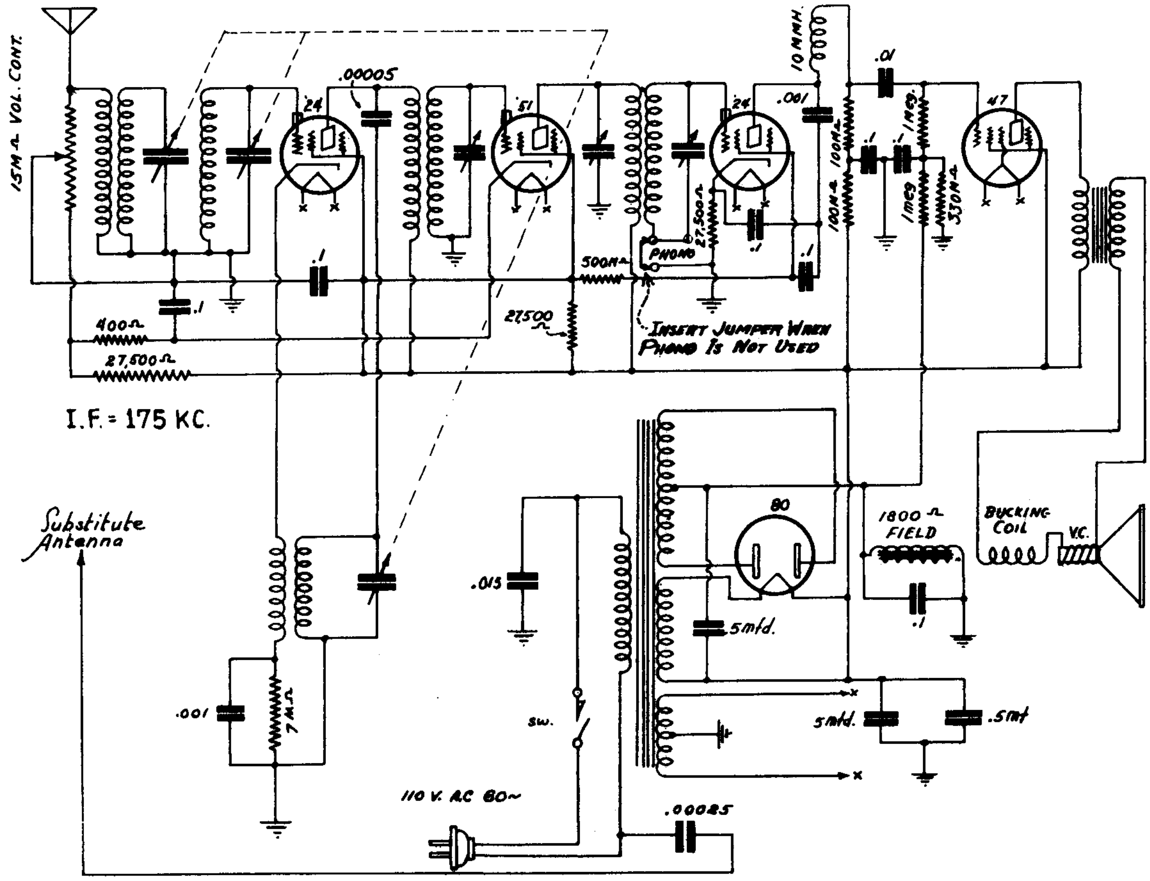


LAFAYETTE RADIO MFG. CO.

MODEL 143A



MODEL MINSTREL 2001



MONTGOMERY WARD & CO.

MODELS 62-267 & 62-277

Alignment and Calibration

Correct alignment is extremely important in connection with standard and short wave radios. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator which will provide an accurately calibrated signal at 456, 1730, 1500, 600, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

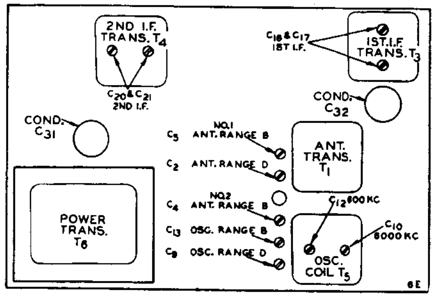


Fig. 3—Location of Trimmers

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the radio to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the two screws inside of the film drum at the bottom which hold the drum in place. Set the drum at the 1500 KC mark and retighten the screws.

Adjust the antenna Range B trimmers (C4) and (C5) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer (C12) until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the radio through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C13) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

Range D Alignment

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC. It may be necessary to increase the input signal to hear the image.

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (short wave band).

Adjust the oscillator Range D trimmer (C9) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the antenna Range D trimmer (C2) to maximum.

When adjusting this trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer (C10) until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

General Service Data

Twenty-five Cycle Radios

The twenty-five cycle model differs from the sixty cycle model only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

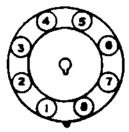


Fig. 4—Metal Tube Terminal Numbering (bottom of socket)

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer 17A36, as shown in the

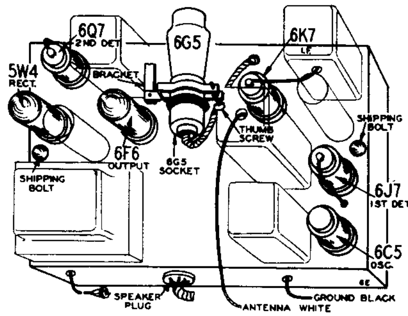


Fig. 5—Location of Tubes

CON'T ON NEXT PAGE

VOLTAGES AT SOCKETS

Line Voltage: 115
Volume Control: Maximum

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6J7	1st Det.	0	6.1(1)	220	130	0		6.1(1)	9
6C5	Osc.	0	6.1(1)	140		0		6.1(1)	0
6K7	I.F.	0	6.1(1)	220	125	2.1		6.1(1)	2.1
6Q7	1st A.F.-2nd Det.	0	6.1(1)	110	0	0		6.1(1)	0(2)
6F6	Power	0	6.1(1)	200	220	12(3)		6.1(1)	0
5W4	Rectifier	0	4.9(4)		615(5)		615(5)		4.9(4)

TUBE	FUNCTION	Plate to Ground	Target to Ground	Cathode to Ground	Across Heater
6G5	Tuning Indicator	20	220	0	6.1

(1) A. C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.3 volts) as read across resistor R13.
(3) Bias voltage as read across resistor R13 and R14.
(4) A.C. voltage as read across filament terminals 2 and 8.
(5) A.C. voltage as read across terminals 4 and 6.

MONTGOMERY WARD & CO.
MODELS 62-267 & 62-277

CON'T FROM PRECEDING PAGE

replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw.

The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

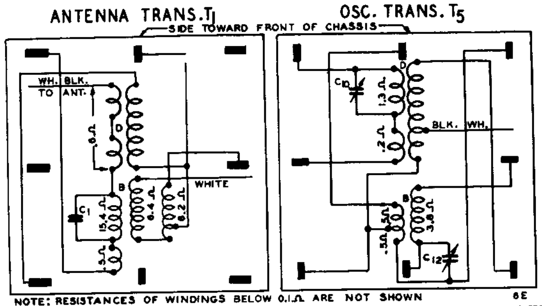


Fig. 6—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings.

Movie Dial Adjustments and Replacements

Issue Letter of Radio

The issue letter is the large letter appearing on the under side of the chassis which identifies the chassis as to major part changes. There are two distinct types of chassis known as Issue A and Issue B. The adjustments, as decribed in the following paragraphs, cover both issues unless otherwise specified.

A chassis bearing the issue letter "A" may be further identified by the die stamped Light and Projector Lens Bracket and the separate die stamped Condenser Lens and Aperture Bracket. See Fig. 9.

The chassis bearing the issue letter "B" may be further identified by a die cast combination Lens, Light and Aperture Bracket. See Fig. 10.

Bringing Lens Adjustment to a Focus

Important—Turn the band switch to the standard wave position.

Move the focusing lever (see Fig. 9) up or down until the image on the screen is clearest. In Fig. 7 is shown the effect of correct and incorrect focusing.

Replacing and Positioning the Dial Lamp

Caution—If a new lamp is required, use only a G. E. lamp, Wards catalogue No. 61P8204. Get this from your nearest Ward store or Ward Mail Order House.

First, turn the radio off.

Loosen the thumb screw and lift the lamp socket assembly out of the light tube—see Fig. 9. This can be lifted vertically by grasping the insulated top of the assembly through which the wire runs.

Remove the old lamp from the socket and put in the new one.

Replace the lamp socket assembly in the light tube with the light tube embossing in the groove of the lamp socket assembly—see Fig. 9. Do not tighten the thumb screw yet.

Turn the radio on.

Then grasp the top of the lamp socket assembly and move it up or down until the image on the screen is clearest and the lines are horizontal. The effect of having the lamp assembly too high or low is shown in Fig. 8. Tighten the thumb screw.

Dial Calibration

The radio is properly calibrated if, when a station is correctly tuned in, the vertical red line on the screen crosses the call letters of that station. If the red line is found to be on one side of the call letters of a large number of stations on the standard wave band (the same side in each case), the dial is out of calibration.

To re-calibrate, carefully tune in the signal of one of the larger nearby stations in accordance with the instructions under "Tuning in a Signal." Choose a station which is near the middle of the dial. Loosen the two screws seen at the inside of the film drum at the bottom. Adjust the position of the drum and tighten the screws.

The dial will then be properly calibrated and this adjustment should not be changed unless re-calibration again becomes necessary. It should be remembered that after calibration a few stations may be tuned in when the vertical red line is near one end or the other of the call letters and city of a station. That is because of slight variations in the film.

Adjusting Film Drum Position to Raise or Lower Image

If the raising and lowering mechanism is not adjusted properly, the image will be too high or too low on the screen and part of the image may be cut off.

If this condition exists, turn the radio on and turn the band switch to the standard wave position. Then loosen the two set screws in the collar on the band switch shaft—See Fig. 9. Move the elevator assembly up or down by means of the fibre arm until the image on the screen is centered from top to bottom. Then tighten the two set screws.

Cleaning the Lenses

It is very seldom necessary to clean the lenses. Occasionally, however, dust or dirt on the lens may cause the image on the screen to be spotted or foggy. If this is the case, the lenses may be removed as explained below and may then be cleaned by wiping carefully with a clean chamois or soft cloth.

Removing Condenser Lens—Remove the four screws which hold the projector compartment and glass screen to the glass screen mounting bracket. Remove the screw at the top and back of the projector compartment. See Fig. 9. Lift the projector compartment up and away from the chassis. Remove the screw from the bottom of the lens and light bracket and take out this bracket, being careful not to scratch the film.

Issue A—Remove the condenser lens bracket from the lens and light bracket—See Fig. 9. The lens can then be cleaned without removal, or it may be forced out of the tube with a wood block. After the lens has been cleaned, reinsert it in the lens tube until the end of the lens barrel is about $\frac{1}{16}$ inch inside the tube.

Issue B—Remove the aperture cap—See Fig. 10. Insert a fine blade screw driver into the slot and then push the condenser lens away from the light tube until it is possible to remove the lens. Clean the lens carefully. Replace the lens so that the lens barrel projects about 1/32 inch beyond the lens tube. Re-

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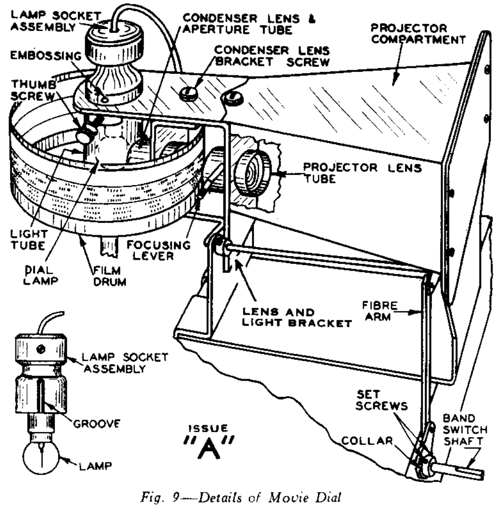


Fig. 9—Details of Movie Dial

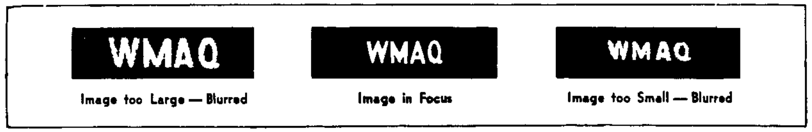


Fig. 7—Effect of Lens Focus

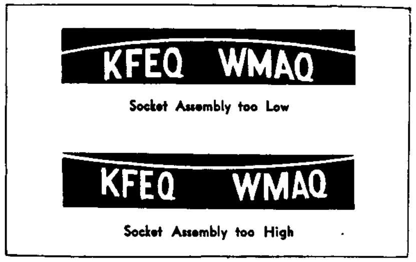


Fig. 8—Effect of Lamp Socket Assembly Height

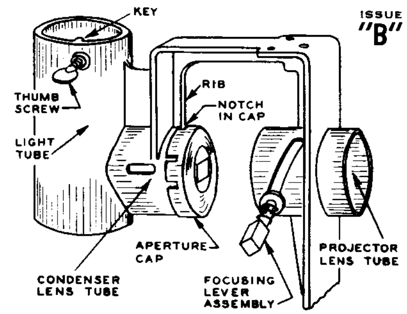


Fig. 10—Issue "B" Lens and Light Bracket

MONTGOMERY WARD & CO.

MODELS 62-267 & 62-277

CON'T FROM PRECEDING PAGE

place the aperture cap so that the square notch of the aperture cap fits over the square rib as illustrated.

Removing Projector Lens—Remove the projector compartment and lens and light bracket as explained in the first paragraph of the article "Removing Condenser Lens."

The projector lens may then be removed by first unscrewing the focusing lever assembly (Issue A radios have focusing lever only). Then push the lens barrel out of the projector lens tube. Clean the lens carefully. Replace the lens barrel so that the threaded hole will coincide with the slot opening of the bracket. Replace the focusing lever assembly.

Reassembling—Replace the lens and light bracket taking care not to scratch the inside of the film.

Replace the projector compartment, glass screen and dial lamp assembly.

When replacing the glass screen, the glass is put on with the frosted side toward the inside of the assembly.

Refocus the projector lens.

Cleaning the Film and Glass Screen

As in the case of the lenses, it is very seldom necessary to clean the film or glass screen. If, however, the image on the screen is spotted or foggy, it may be necessary to clean these items as explained below.

Film—The film may be dusted with a camel hair brush or fine cloth. CAUTION—Extreme care must be taken not to scratch the film.

Glass Screen—If the screen should become dirty, the front may be cleaned by wiping with a clean, dry cloth. If the back of the screen becomes dirty, it should be cleaned with alcohol. Care should be taken not to get any alcohol on the red line at the front of the screen.

Replacing the Film Drum Assembly

Remove the lamp socket assembly from the light tube by lifting it out in accordance with instructions in "Replacing and Positioning the Dial Lamp."

Remove the glass screen, projector compartment and lens and light bracket as described in the article "Removing Condenser Lens."

Remove the film drum assembly by unscrewing the two small screws located inside the drum at the bottom.

Mount the new film drum assembly on the film drum supports leaving the paper around the film for protection, and insert the clamping plate within the film drum. The film drum and clamping plate should then be so placed that the small screws are in the center of the two slots.

Replace the lens and light bracket taking care not to scratch the inside of the film.

Replace the projector compartment, glass screen and dial lamp assembly.

Now remove the paper from the film, turn the radio on and calibrate the dial in accordance with the instructions in the article "Dial Calibration."

The film and mounting drum are sold as one assembly and cannot be ordered separately.

Replacing Rubber Friction Drive Pinion

Loosen the set screw on the brass bushing which holds the rubber pinion—See Fig. 11. Push out the small horseshoe washer on the tuning shaft in back and below the glass screen. Pull the tuning shaft from the front until the brass bushing may be removed. Place the new rubber pinion over the brass bushing and replace the bushing on the tuning shaft. Tighten the set screw on the brass bushing after the bushing has been returned to its original position. Replace the horseshoe washer.

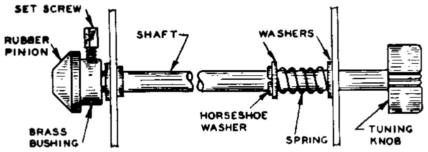


Fig. 11—Drive Shaft Assembly

Replacing Friction Drive Drum

If it is ever necessary to replace the friction drive drum, be sure that the stop on the drum hits the stop on the condenser before the gang rotor is either completely meshed or completely open (maximum or minimum position).

Replacement Parts List

RETAIL STORES: Order any parts from division superintendent at Chicago or Oakland, on stock order. Order by bin number and description. If no bin number is shown, order by part number and description.

Return defective parts to division superintendent only.

There is a large letter on the chassis which identifies the set to major part changes. When ordering parts please be sure to mention the model number and this large letter.

MISCELLANEOUS

SOCKETS

Bin No.	Part No.	Description	Selling Price
10450	3A242	Tube Socket (7 Prong)	$0.08
10249	3A243	Tube Socket (5 Prong)	.08
10301	3A58	Speaker Socket (5 Prong)	.06
9341	13X255	6G5 Tube Socket and Cable Assembly	.30

SPEAKER

Bin No.	Part No.	Description	Selling Price
9545	12A263	8" Dynamic Speaker complete with Output Transformer T7	4.02

Replacement Parts List – (Continued)

MISCELLANEOUS (Cont.)

KNOBS

Bin No.	Part No.	Description	Selling Price
	10A99	Tone or Volume Control—Small Push-on Type	$0.06
	10A100	Band Switch—Large Set Screw Type	.06
	10A101	Tuning Control—Large Push-on Type	.06

GENERAL

Bin No.	Part No.	Description	Selling Price
10884	2X38	Felt Washers (Used behind Knobs) doz.	.04
10565	8X23	Rubber Chassis Mounting Cushions ea.	.04
10887	4A18	Terminal Strip (Two Lugs Insulated)	.04
10003	30X44	Grid Clip Only doz.	.06
9039	2A73	Band Change Switch (1 Section, 2 Position)	.38
	13X214	Antenna and Ground Lead Assembly	.14
	13X80	Line Cord and Plug	.28
10809	25A71	Tuning Eye Tube Clamp Assembly (Console Only)	.20
	9X15	Cardboard Spacer (Tuning Eye—Console Only)	.04
	32X69	Tuning Eye Tube Shield (Mantel Only)	.08
	32X70	Tuning Eye Tube Shield Base (Mantel Only)	.04
	25X221	Chassis Mounting Feet (Front) ea.	.04
	25X231	Chassis Mounting Feet (Rear) ea.	.04
	23A61	Gang Condenser Mounting Cushion Assembly Includes 3—Rubber Cushions 3—Hex Shoulder Nuts 3—No. 6 Flat Washers	.06

TRANSFORMERS AND COILS

Bin No.	Part No.	Code	Description	Selling Price
9577	9A710	T1	Antenna Trans. and Can Assembly	$1.30
	9A712	T3	1st I.F. Trans. and Can Assembly	.82
	9A713	T4	2nd I.F. Trans. and Can Assembly	.82
	9A711	T5	Oscillator Coil and Can Assembly	1.32
9066	53X137	T6	115 Volt 60 Cycle Standard Power Transformer	1.90
	53X138	T6	115 Volt 25 Cycle Standard Power Transformer	3.48
	51X31	T7	Output Transformer (Part of Speaker Ass'bly)	1.18

CONDENSERS

TUBULAR

Bin No.	Part No.	Code	Capacitance	Voltage	Selling Price
11387	46X80	C6	.05 mf.	180	$0.08
11387	46X80	C7	.05 mf.	180	.08
10927	46X202	C8	.02 mf.	360	.08
11256	46X120	C11	.01 mf.	360	.08
10903	46X127	C15	.25 mf.	360	.16
11387	46X80	C18	.05 mf.	180	.08
10927	46X202	C19	.02 mf.	360	.08
11256	46X120	C24	.01 mf.	360	.08
11256	46X120	C26	.01 mf.	360	.08
10903	46X117	C27	.25 mf.	180	.12
10927	46X172	C28	.02 mf.	180	.08
10949	46X108	C29	.05 mf.	600	.10
10934	46X100	C30	.002 mf.	600	.08

ELECTROLYTIC

Bin No.	Part No.	Code	Capacitance	Voltage	Selling Price
9045	44X31	C31	12 mf.	340 Wet	.38
9053	44X32	C32	16 mf.	250 Wet	.36

MOLDED

Bin No.	Part No.	Code	Capacitance	Selling Price
10897	47X69	C1	250 mmf.	.08
10889	47X49	C3	7 mmf.	.06
10049	47X53	C14	35 mmf.	.06
10625	47X56	C22	50 mmf.	.06
10625	47X56	C23	50 mmf.	.06
10897	47X65	C25	250 mmf.	.08

TRIMMER

Bin No.	Part No.	Code	Capacitance	Description	Selling Price
	17A63	C2	2-25 mmf.	Antenna Range "D"	.30
		C4	2-25 mmf.	Antenna Range "B"	
		C5	2-25 mmf.	Antenna Range "B"	
		C9	2-25 mmf.	Oscillator Range "D"	
		C13	2-25 mmf.	Oscillator Range "B"	
	17A67	C10	40-100 mmf.	Oscillator 6000 KC	.20
		C12	300-600 mmf.	Oscillator 600 KC	
	17A57	C16	50-120 mmf.	1st I.F. Trimmer Condensers	.18
		C17	50-120 mmf.		
10229	17A34	C20	70-150 mmf.	2nd I.F. Trimmer Condensers	.20
		C21	150-250 mmf.		
	17A36		2-25 mmf.	(To be used for replacement of any-one section of Trimmer Strip 17A63)	.06

MISCELLANEOUS

3 Gang Condenser (See "Dial and Drive Assembly")

RESISTORS

CARBON

Bin No.	Part No.	Code	Resistance	Wattage	Selling Price
10567	A95402	R1	4,000 Ohm	0.2	$0.06
10968	A94104	R2	100,000 Ohm	0.2	.08
11060	B94203	R3	20,000 Ohm	0.5	.08
10968	A94104	R4	100,000 Ohm	0.2	.08
11205	A94201	R5	200 Ohm	0.2	.08
11071	B94503	R6	50,000 Ohm	0.5	.08
11091	C94203	R7	20,000 Ohm	1.0	.08
11068	A95503	R8	50,000 Ohm	0.2	.06
11086	A95205	R9	2 Megohm	0.2	.06
11086	A95205	R11	2 Megohm	0.2	.06
11085	A95504	R12	500,000 Ohm	0.2	.06
10968	A94104	R15	100,000 Ohm	0.2	.08
11085	A94504	R16	500,000 Ohm	0.2	.08
11050	A95154	R17	150,000 Ohm	0.2	.06
11188	A95105	R19	1 Megohm	0.2	.06
11277	A94805	R20	8 Megohm	0.2	.08
11277	A94805	R21	8 Megohm	0.2	.08

WIRE WOUND

Bin No.	Part No.	Code	Resistance	Wattage	Selling Price
10773	43X69	R13	25 Ohm	.25	.16
		R14	210 Ohm	2.0	

VARIABLE

Bin No.	Part No.	Code	Resistance	Description	Selling Price
10007	36X230	R10	500,000 Ohm	Volume Control and Switch	.44
10807	40X220	R18	150,000 Ohm	Tone Control and Selectivity Switch	.56

DIAL AND DRIVE ASSEMBLY

When ordering Dial and Drive Parts, be sure to mention the Issue Letter. If the letter appearing in the issue letter column for any one item is A, that part is to be used on Issue A radios only; if it is B, it is to be used on Issue B radios only; and if it is A-B, it is used on both Issue A and Issue B radios.

Bin No.	Part No.	Issue Letter	Description	Selling Price
	25X334	A-B	Support Bracket for Gang Condenser	$0.24
	25X335	A-B	Mounting Bracket for Glass Screen	.22
	25X363	B	Stabilizing Bracket (used between Band Switch Shaft and Mounting Bracket for Glass Screen)	.04
	25A102	A-B	Band Change Lever Assembly	.42
	26X236	A-B	Band Change Crank Shaft	.04
	5A37	A	6¼" Drive Shaft Assembly	.42
	5A37G	B	6½" Drive Shaft Assembly	.42
	28X90	A-B	Spring for either of above Drive Shaft Assemblies	.04
	8X51	A	Rubber Drive Pinion	.04
	8X51A	B	Rubber Drive Pinion	.04
	29X65	A-B	Brass Bushing on which either Rubber Pinion is mounted	.08
	24X250D	A	Friction Drive Drum (distance from pin to nearest screw ¾")	.12
	24X250E	B	Friction Drive Drum (distance from pin to nearest screw 1")	.12
	28X95A	A	13 coil Spring attached to brass post of Drive Drum	.04
	28X95B	B	20 coil Spring attached to brass post of Drive Drum	.04
	15A100	A-B	Support and Hub for Film Drum	.30
	12X67	A-B	Film Drum Assembly Complete with Film and Clamping Plate	.58
	25X340	A-B	Lens, Light and Aperture Bracket (used on all replacements)	.70
	12X54	A-B	Aperture Cap (part of above Assembly)	.06
10480	12X45	A-B	Condenser Lens	.50
	12X68	A-B	Projector Lens with Focusing Lever (used on all replacements)	.74
	29X58	A	Focusing Lever for Projector Lens	.04
	29X77	B	Focusing Lever Assembly for Projector Lens	.06
	7A49	A-B	Lamp Socket Assembly	.32
0808	7A50	A-B	Dial Lamp	.10
	32X80	A-B	Projector Compartment	.06
10537	58X166	A-B	Glass Screen	.10
	30X63	A-B	Clamps for Glass Screen ea.	.04
	14A62A	A	3 Gang Condenser (2-5/32" shaft) only	2.02
	14A62B	B	3 Gang Condenser (2½" shaft) only	2.02

Prices subject to change without notice

SPECIFICATIONS

Power Consumption - 60 Watts (At 115 volts 60 cycles)

Power Output - - - - - 2.5 Watts Undistorted

Selectivity - 30 KC Broad at 1000 times Signal (Sharp)

Intermediate Frequency - - - - - - 456 KC

Speaker - - - - - - - - - - 8" Dynamic

Tuning Frequency Range

B Range 528 to 1730 KC

D Range 5750 to 18300 KC

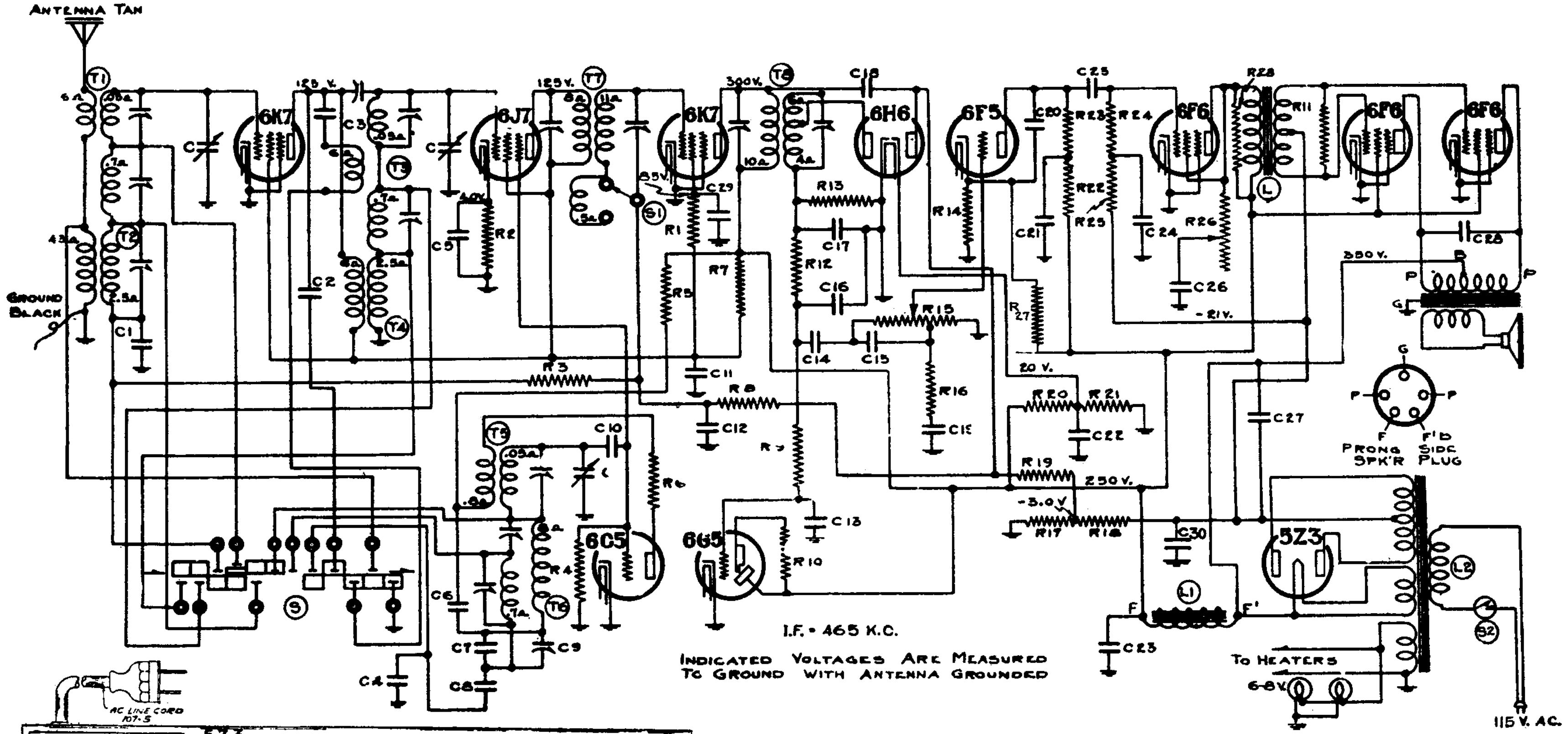
Sensitivity

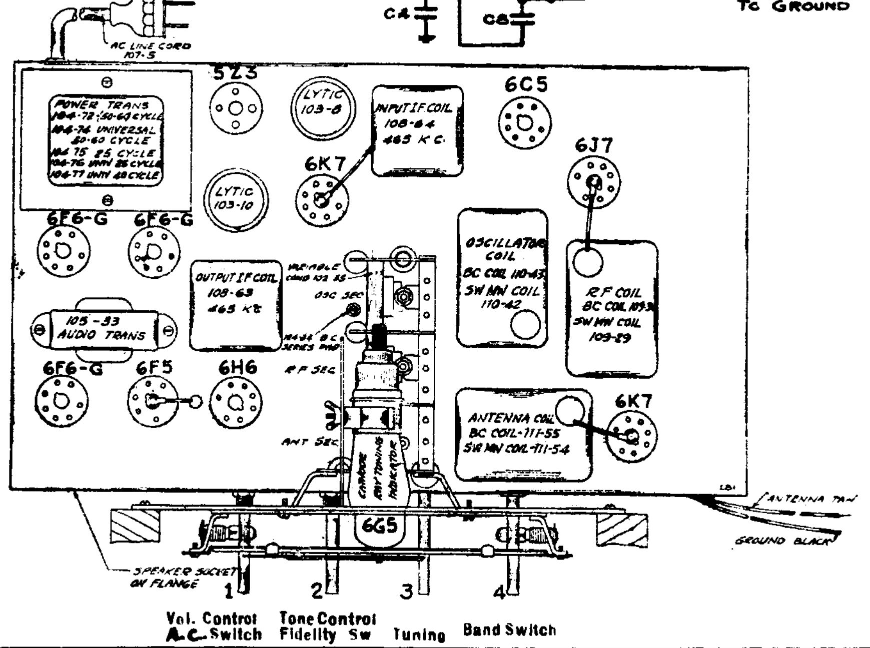
B Range 4 to 5 Microvolts Absolute

D Range 5 to 6 Microvolts Absolute

MONTGOMERY WARD & CO.

MODELS 62-301 & 62-301X





FREQUENCY RANGE

535 to 1720 K. C. (Kilocycles)
1690 to 5300 K. C. (Kilocycles)
5.2 to 18.1 M. C. (Megacycles)

LOCAL INTERFERENCE:

Local interference or "man-made" static is a form of interference often confused with static. It is due to electrical apparatus which, due to arcing or high leakage, radiates interference.

The principal sources of "man-made" noise are nigh voltage power lines, ignition systems of automobiles, brush type motors, street car trolley lines, flasher signs and electrical appliances. The noise from these sources is distributed throughout the entire frequency range used in radio, and is always strong in cities and particularly in business and industrial areas.

In rural areas "man-made" forms of interference are not as common as in cities; however, farm lighting systems, rural telephone systems and nearby high tension transmission lines often develop trouble which make radio reception noisy.

The power companies are willing to co-operate in hunting down and eliminating sources of interference, especially where their equipment is at fault.

MONTGOMERY WARD & CO.
MODELS 62-301 & 62-301X

The tube complement of this chassis consists of the latest metal and octal base glass type amplifying tubes

The type and function of each tube is as follows:

1—Type 6K7 Remote cut-off pentode R.F. amplifier.
1—Type 6J7 Pentode first detector.
1—Type 6C5 Oscillator.
1—Type 6K7 Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6H6 Duplex diode second detector and A.V.C.
1—Type 6F5 First audio amplifier.
1—Type 6F6G Triode driver stage.
2—Type 6F6G Class AB Output pentodes in push-pull
1—Type 5Z3 High vacuum rectifier.
1—Type 6G5 Cathode ray tuning eye.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 108, 127, 150, 225, and 260 volts, (see parts list) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with 115 volts on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary.

No aligning adjustments should be attempted with the chassis in the cabinet. Remove the knobs and the four bolts which are used to fasten the chassis.

All adjustments should be made with a non-metallic screw driver.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-63 Output I.F. Transformer
Part No. 108-64 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the underside of chassis (see bottom view, Fig. 3).

1. With volume control full on, (the extreme right of its rotation), the wave changing switch in the broadcast position, (extreme left of its rotation), the tone control on "Hi" part of the sharp position (as much right rotation as possible without operating the Hi Fidelity switch), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

(a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, located between the two I.F. transformers, and adjust the output I.F. transformer 108-63 to resonance.

(b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6J7 and adjust input I.F. transformer (108-64) to resonance.

(c) With oscillator still connected to 6J7, re-adjust output I.F. transformer if necessary.

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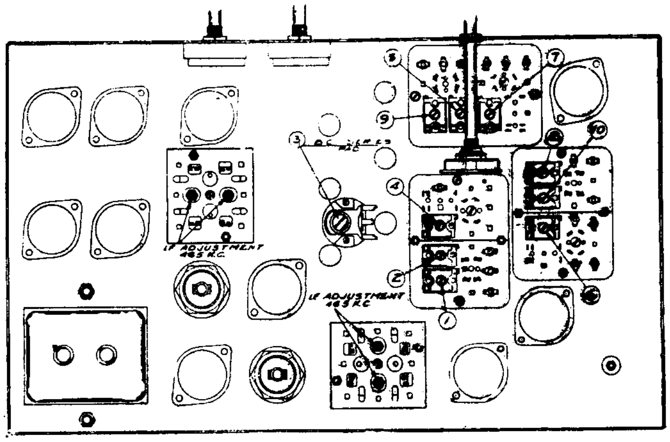


FIG. 3 — BOTTOM VIEW SHOWING TRIMMERS

MONTGOMERY WARD & CO.
MODELS 62-301 & 62-301X

(Continued from preceding page)

BROADCAST BAND ALIGNMENT:
585 to 1720 Kilocycles

1. **With band changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 600 kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:**

   (a) **Adjust broadcast series pad (adjustment number 3) to resonance with oscillator.** Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the 108-63 output I.F. transformer. See top view, Fig. 1.

   (b) Re-set external oscillator to 1400 K.C., **move dial** pointer to 1400 K.C. and adjust oscillator (adjustment number 4), R.F. (adjustment number 6) and antenna (adjustment number 7) to resonance. See bottom view for location of these adjustments, Fig. 3.

   (c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

   (d) Check for tracking and sensitivity at 1000 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

SHORT WAVE BAND ALIGNMENT:
5.2 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 1), short wave R.F. (adjustment number 8) and short wave antenna (adjustment number 9) to resonance.

   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

NOTE: **It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental on the receiver dial. As an example of this a fundamental 18.3 megacycle can be tuned in not only at 18.3 on the dial, but also at approximately 17.4 megacycles.**

MIDDLE WAVE BAND ALIGNMENT:
1690 to 5300 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5 M.C. and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

   (a) Rotate condenser, pick up signal and adjust middle wave R.F. (adjustment number 10), middle wave antenna (adjustment number 5) and middle wave oscillator (adjustment number 2) to resonance.

Part No.	Schematic Reference	Description	No. Used in Set	Selling Price Ea.
		CONDENSERS		
BE 100-9	C1, C5, C12, C19	.05 x 200 Volt Tubular	4	.10
BE 100-11	C13, C29	.01 x 400 Volt Tubular	2	.09
BE 100-13	C6, C25	.05 x 400 Volt Tubular	2	.10
BE 100-19	C22	.006 x 600 Volt Tubular	1	.09
BE 100-20	C21, C24, C30	.1 x 200 Volt Tubular	3	.11
BE 100-22	C14	.05 x 200 Volt Tubular	1	.10
BE 100-32	C28	.0005 x 1000 Volt Condenser	1	.09
BE 100-41	C11	.25 x 400 Volt Tubular (with bracket)	1	.20
BE 100-45	C26	.1 x 600 Volt Tubular	1	.15
BE 103-8	C23	14 mfd. x 400 Volt Electrolytic	1	.70
BE 103-10	C27	30 mfd. x 450 Volt Electrolytic	1	.70
BE 129-3	C18	.00002 Mica—Type MT—20%	1	.09
BE 129-5	C20	.0001 Mica—Type MT—20%	1	.09
BE 129-12	C15	.00025 Mica—Type MT—20%	1	.10
BE 129-31	C10	.000025 Mica—Type MT—15%	1	.10
BE 129-39	C3	00005 Mica—Type MT—20%	1	.10
BE 129-55	C8	.0034 Mica—Type MT—2½%	1	.25
BE 129-57	C7	.0005 Mica—Type MT—5%	1	.10
BE 129-59	C2	.0003 Mica—Type MT—5%	1	.10
BE 129-60	C16, C17	.00015 Mica—Type MT—20%	2	.10
BE 129-69	C4	.0023 Mica—Type MT—2½%	1	.20
		RESISTORS		
BE 106-31	R17, R18	(30 ohm, R17) (175 ohm, R18) Metal Clad Resistor	1	.25
BE 130-3	R19	500M ohm—⅓ Watt—20%—100V Carbon	1	.08
BE 130-4	R9	3 megohm—⅓ Watt—20%—20V Carbon	1	.08
BE 130-12	R4	50M ohm—⅓ Watt—20%—20V Carbon	1	.08
BE 130-19	R8	1 megohm—⅓ Watt—20%—20V Carbon	1	.08
BE 130-20	R3, R12, R13, R22, R23	100M ohm—⅓ Watt—20%—50V Carbon	5	.08
BE 130-21	R11	20M ohm—⅓ Watt—20%—20V Carbon	1	.08
BE 130-22	R16	5M ohm—⅓ Watt—20%—10V Carbon	1	.08
BE 130-31	R28	20M ohm—½ Watt—10% Carbon	1	.08
BE 130-45	R24, R25	250M ohm—⅓ Watt—20%—20V Carbon	2	.08
BE 130-60	R6	100 ohm—⅓ Watt—20%—10V Carbon	1	.08
BE 130-70	R14	500 ohm—⅓ Watt—10%—10V Carbon	1	.08
BE 130-76	R1	30M ohm—⅓ Watt—20%—Carbon	1	.08
BE 130-77	R5	10M ohm—1 Watt—20%—100V Carbon	1	.08
BE 130-82	R21	10M ohm—⅓ Watt—10% Carbon	1	.08
BE 130-88	R7	10M ohm—2 Watt—20%—Wire Wound	1	.20
BE 130-110	R10	1 megohm—1/10 Watt—10%—Carbon	1	.08
BE 130-129	R2	2500 ohm—⅓ Watt—10% Carbon	1	.08
BE 130-130	R20, R27	100M ohm—⅓ Watt—10% Carbon	2	.08
		TRANSFORMERS		
BE 104-72	L2	50/60 Cycle Power Transformer	1	2.50
BE 104-74		Universal—50/60 Cycle Primary		3.60
BE 104-75		25 Cycle Power Transformer		4.00
BE 104-76		Universal—25 Cycle Primary		4.50
BE 104-77		Universal—40 Cycle Primary		3.60
		SOCKETS		
BE 121-8		Five-Prong Socket Marked "Spkr"	1	.08
BE 121-12		Seven-Prong Socket Marked "6K7"	2	.10
BE 121-13		Seven-Prong Socket Marked "6J7"	1	.10
BE 121-14		Seven-Prong Socket Marked "6F6"	3	.10
BE 121-34		Four-Prong Socket Marked "5Z3"	1	.08
BE 121-17		Six-Prong Socket Marked "6C5"	1	.09
BE 121-19		Seven-Prong Socket Marked "6H6"	1	.10
BE 121-33		Five-Prong Socket Marked "6F5"	1	.08
		SPEAKER		
BE 114-47	L1	Twelve Inch Dynamic (Field 1225 Ohms)	1	5.00
		MISCELLANEOUS		
BE 101-40	R26, S1	Tone Control and Fidelity Switch (5M Ohm)	1	.60
BE 101-47	R15, S2	Volume Control and Switch (1 Megohm)	1	.60
BE 102-35	C	Three-Gang Variable Condenser	1	3.00
BE 107-5		Line Cord and Plug	1	.30
BE 115-35		Antenna, Oscillator and R.F. Shield Can	3	.10
BE 115-36		I.F. Shield Can	2	.10
BE 105-33	L	Input Audio Transformer	1	.80
BE 125-18	S	Band Switch	1	.40
BE 124-34	C9	Single J Padder 200 mmf.	1	.20
BE 128-44		"Volume" Knob with Spring—Wood	1	.08
BE 128-45		"Tone" Knob with Spring—Wood	1	.08
BE 128-46		"Band Switch" Knob with Spring—Wood	1	.08
BE 128-47		"Tuning" Knob with Spring—Wood	1	.08

Note: Speakers cannot be ordered, defective speakers must be repaired.

All resistors and mica condensers are RMA color coded—specify value and/or resistor or condenser (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More than—20%	None

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-624

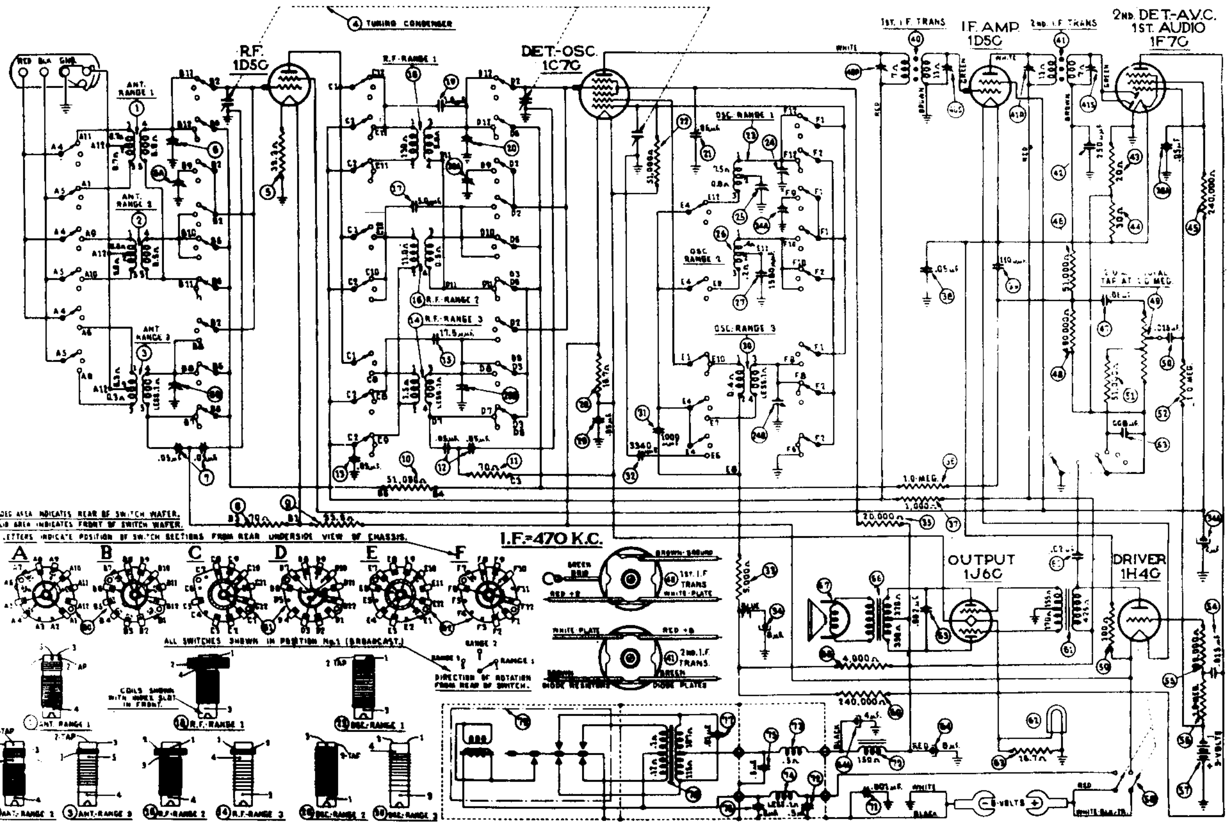


Fig. 5—Schematic Diagram

Replacement Parts—Model 37-624

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (530-1720 K.C.)	32-2108	$1.60
2	Antenna Transformer (2.3 to 7.4 M.C.)	32-2119	1.20
3	Antenna Transformer (7.35 to 22 M.C.)	32-2109	1.20
4	Tuning Condenser	31-1818	5.00
5	Resistor (33.3 ohm flexible)	33-3233	.20
6	Compensator (three sections)	31-6092	.60
7	Condenser (.05 mfd. dual tubular)	30-4394	.35
8	Resistor (70 ohms, ½ watt)	33-070339	.20
9	Resistor (33.3 flexible)	33-3233	.20
10	Resistor (51000 ohms, ½ watt)	33-351339	.20
11	Resistor (70 ohms, ½ watt)	33-070339	.20
12	Condenser (.05 mfd. dual tubular)	30-4394	.35
13	Condenser (.05 mfd. tubular)	30-4123	.20
14	R. F. Transformer (7.35 to 22 M. C.)	32-2126	.70
15	Condenser (17.5 mmfd. mica)	30-1079	.20
16	R. F. Transformer (2.3 to 7.4 M. C.)	32-2106	.70
17	Condenser (5. mmfd. mica)	30-1077	.20
18	R. F. Transformer (530 to 1720 K. C.)	32-2105	1.00
19	Condenser (1. mmfd. wire and lug twisted)	38-7878	
20	Compensator (three sections)	31-6121	.75
21	Condenser (.05 mfd. tubular)	30-4020	.20
22	Resistor (51000 ohms, ½ watt)	33-351339	.20
23	Oscillator Transformer (530 to 1720)	32-2120	1.00
24	Compensator (three sections)	31-6092	.60
25	Compensator (Osc. Broadcast series)	31-6056	.55
26	Oscillator Transformer (2.3 to 7.4 M. C.)	32-2121	.70
27	Condenser (1580 mmfd.)	31-6138	.40
28	Resistor (16.7 ohm flexible)	33-3298	.20
29	Condenser (.05 mfd. tubular)	30-4020	.20
30	Oscillator Transformer (7.35 to 22 M. C.)	32-2110	.70
31	Condenser (1000 mmfd. tubular)	30-4453	20
32	Condenser (3340 mmfd. semi-fixed)	31-6137	.60
33	Resistor (5000 ohms, ½ watt)	33-250339	20
34	Electrolytic Condenser (Blue 8 mfd., Plain 2 mfd.)	30-2171	.00
35	Resistor (20000 ohms, ½ watt)	33-320339	.20
36	Resistor (1.0 megohm, ½ watt)	33-510339	.20
37	Resistor (1000 ohms, ½ watt)	33-210339	.20
38	Condenser (.05 mfd. dual bakelite)	4989-DC	.40
39	Condenser (110 mmfd. mica)	30-1031	.20
40	1st I. F. Transformer	32-2100	
41	2nd I. F. Transformer	32-2102	
42	Condenser (250 mmfd. mica)	30-1032	.25
43	Resistor (20 ohms flexible)	33-3043	$0.25
44	Resistor (30 ohms flexible)	33-3119	.25
45	Resistor (240000 ohms, ½ watt)	33-424339	.20
46	Resistor (51000 ohms, ½ watt)	33-351339	.20
47	Condenser (.01 mfd. tubular)	30-4124	.25
48	Resistor (490000 ohms, ½ watt)	33-490339	.20
49	Volume Control	33-5166	1.00
50	Condenser (.015 mfd. tubular)	30-4358	.20
51	Resistor (51000 ohms, ½ watt)	33-351339	.20
52	Resistor (1.0 megohms, ½ watt)	33-510339	.20
53	Condenser (.008 mfd. tubular)	30-4112	.20
54	Condenser (.015 mfd. single bakelite)	3793-SU	.35
55	Resistor (99000 ohms, ½ watt)	33-399339	.20
56	Resistor (1.0 megohms, ½ watt)	33-510344	.20
57	Bias Cell	41-8009	.30
58	Power Switch and Tone Control	42-1242	1.00
59	Resistor (100 ohms flexible)	33-3187	
60	Condenser (.02 mfd. tubular)	30-4113	.20
61	Audio Transformer	32-7637	2.00
62	Pilot Lamp	34-215(	.22
63	Resistor (16.7 ohms flexible)	33-3298	.20
64	Electrolytic Condenser (4, 8 mfd.)	30-2160	2.00
65	Condenser (.002 mfd. tubular)	30-4177	
66	Output Transformer KR-17, HR-12	32-7639	1.60
67	Cone Voice Coil KR-17	36-3540	.80
	Cone Voice Coil	36-3557	1.20
68	Resistor (4000 ohms, ½ watt)	33-240339	.20
69	Resistor (240000 ohms, ½ watt)	33-424339	.20
70	Filter Choke	32-7543	1.35
71	Condenser (.001 mfd. tubular)	30-4201	.20
72	Condenser (.5 mfd. metal case)	30-4296	.60
73	B Choke	32-1932	.25
74	A Choke	32-1954	.40
75	Condenser (.5 mfd. metal case)	30-4296	.60
76	Condenser (.5 mfd. metal case)	30-4296	.60
77	Condenser (.01 mfd. tubular)	30-4381	.25
78	Power Transformer	32-7682	2.20
79	Vibrator	41-3222	5.25
80	Range Switch (Ant.)	42-1243	1.20
81	Range Switch (R. F.)	42-1244	1.20
82	Range Switch (Osc.)	42-1246	1.20
	Switch Index Plate and Shaft	42-1173	.50
	Pilot Lamp Assembly	38-7875	.45
	Dial	27-5214	.50
	Hub	28-7187	.12
	Clamp	28-2837	.10
	Set Screw	W-1641	$0.02
	Knob Tuning	27-4330	.10
	Knob Tuning Vernier	27-4331	.10
	Vernier Drive Assembly	31-1871	.75
	Knob Range Switch	27-4326	.10
	Knob Tone and Volume	27-4332	.10
	Mask	27-5198	.30
	Mask Arm and Link Assembly	31-1940	.15
	Shaft Coupling and Set Screw	31-1941	
	Felt Washer	27-8399	Per C .30
	Snap Fastener	28-4279	Per C .75
	Mask Guide and Lamp Support	38-7844	.15
	Indicator Bracket Assembly	38-7912	.30
	Volume Control Shaft	38-8059	
	Retaining Clip	28-4394	.01
	Shaft Spring	28-4117	Per C .40
	Socket 7 Prong	27-6057	.11
	Socket 8 Prong	27-6058	.11
	Tube Shield	28-2726	.10
	Base	28-3898	.03
	Bias Cell Panel Assembly	38-7275	.20
	Battery Cable	41-3204	1.20
	Speaker Cable	41-3207	.30
	A Battery	116-R	
	Mtg. Grommet (R. F. Unit)	27-4317	.04
	Mtg. Sleeve (R. F. Unit)	28-2257	.01
	Mtg. Screw (R. F. Unit)	W-729	Per C .45
	Mtg. Washer (R. F. Unit)	27-7807	Per C .50
	Mtg. Rubber (Tuning Cond.)	27-4325	.02
	Mtg. Plate (R. F. Trans.)	28-3808	.02
	Mtg. Spacer (R. F. Trans.)	27-8228	.01
	Mtg. Screw (R. F. Trans.)	W-1635	Per C .30
	Mtg. Bushing (Chassis)	27-4360	.04
	Mtg. Washer Rubber (Chassis)	5189	
	CABINET PARTS		
	Bezel Frame and Plate Assembly	40-5939	.75
	Gasket	27-8311	.01
	Glass	27-8298	.05
	Ring	28-3967	.35
	Screw	W-1644	Per C .50
	Baffle Silk Assembly B Cabinet	40-5970	
	Baffle Silk Assembly J Cabinet	40-5971	.80
	Bottom Shield Plate J Cabinet	28-3895	.25
	Speaker KR-17 B Cabinet	36-1248	10.00
	Speaker HR-12 J Cabinet	36-1250	11.00

Figures in black type indicate circled figures in Base View.

Prices Subject to Change without Notice

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-624

Electrical Specifications

Type Circuit: Superheterodyne, using a vibrator unit operated by a 6 volt storage battery for supplying "B" power to the receiver, and a Class B audio output circuit.

Power Supply: 6 volt storage battery, Philco Type 116R.

Current Drain: 1.5 Amps.

Philco Tubes Used: 6-1D5G, R. F. Amp.; 1C7G, Det. Osc.; 1D5G I. F. Amp.; 1F7G, 2nd Det.—1st Audio A. V. C.; 1H4G, Audio Driver; 1J6G, Output.

Frequency Ranges: Three. Range 1—530 to 1720 K. C.; Range 2—2.3 to 7.4 M. C.; Range 3—7.35 to 22 M. C.

Intermediate Frequency: 470 K. C.

Speakers: KR-17. "B" Cabinet; HR-12. "J" Cabinet.

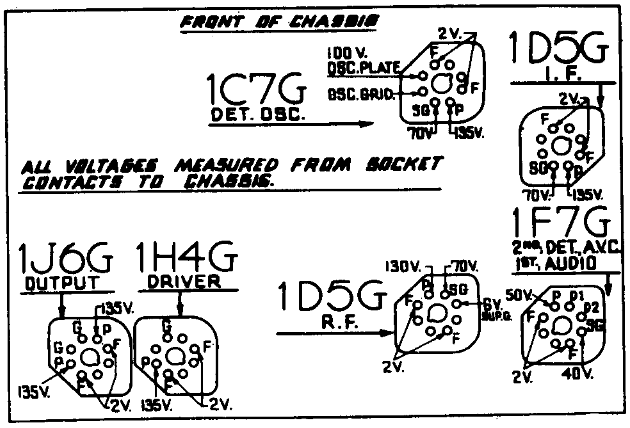


Fig. 1—Socket Voltages and R. F. Compensators

The voltages indicated by arrows were measured with a Philco 025 Circuit Tester which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at maximum, Storage Battery fully charged.

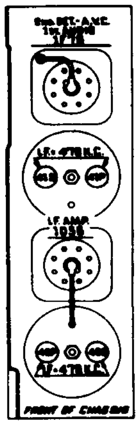


Fig. 2—I. F. Compensators

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator; Philco Model 088 (fundamental frequency 110 to 20000 K. C.) is the correct instrument for this purpose; (2) output meter. **Philco Model 025 Circuit Tester** incorporates an accurate, Sensitive output meter and is recommended; (3) Fibre handle screwdriver (Philco Part No. 27-7059); (4) Special variable condenser (Philco Part No. 45-2325).

DIAL CALIBRATION: Set the tuning condenser at the maximum capacity position. Loosen the set screw of the dial hub and set dial, with the glowing indicator centered between the first and second index lines, at the low frequency end of the broadcast scale. Tighten set screw in this position.

INTERMEDIATE FREQUENCY CIRCUIT

Frequency 470 K. C.

1. Connect the 088 Signal Generator output lead through a .1 mfd. condenser to the control grid of the 1C7G tube, and the ground connection of the Generator to the chassis. Turn the Volume Control to maximum volume position.

2. Set the range switch in position No. 1 (Broadcast), then rotate the tuning condenser of the receiver to approximately 580 K. C. and adjust the signal generator for 470 K. C.

3. Adjust compensators (41S) 2nd I. F. Sec., (41P) 2nd I. F. Pri., (40S) 1st I. F. Sec., and (40P) 1st I. F. Pri. for maximum reading on the output meter.

RADIO FREQUENCY CIRCUIT

Tuning Range (7.35) to (22.0) M. C.

1. Remove the signal generator output lead from the grid of the 1C7G tube and connect it through the .1 mfd. condenser to terminal No. 1 on aerial input panel and the generator ground lead to terminal No. 3, rear of chassis. Terminals 2 and 3 must be connected by the shorting link provided on the panel.

2. Set the range switch in position No. 3. Turn the receiver and signal generator dials to 18 M. C. Now adjust compensator (24B) by turning the screw (clockwise) to the maximum capacity position, then slowly turning it (counter-clockwise) until a second peak signal is reached on the output meter. The first peak from maximum capacity is the image signal and must not be used. **Note**—In adjusting some receivers only one peak will be observed, therefore, tune the compensator to maximum on this peak. If the above procedure is correctly performed, the image signal will be found at 17.06 M. C. by advancing the signal generator attenuator and turning the receiver dial to this frequency mark on the dial.

3. The antenna and R. F. Compensators (6B) and (20B) are now adjusted by connecting a variable condenser of approximately 350 mmfd., Philco Part No. 45-2325 across the oscillator section of the gang condenser and ground. Leaving the signal generator and receiver dials at 18 M. C., tune the added condenser from the maximum capacity point until the second harmonic of the receiver oscillator beats against the signal from the generator thereby bringing in the signal. The antenna and R. F. compensators (6B) and (20B) are then adjusted for maximum output. Now remove the external condenser and readjust compensator (24B) for maximum output.

Tuning Range (2.3) to (7.4) M. C.

1. Set range switch in position 2. Rotate signal generator and receiver dials to 7.0 M. C. Now adjust compensator (24A) for maximum output.

2. Turn the signal generator and receiver dials to 6.0 M. C. and adjust compensators (20A) R. F. and (6A) Ant. for maximum output.

Tuning Range (530) to (1720) K. C.

1. Set range switch in position No. 1 (Broadcast). Rotate the signal generator and receiver dials to 1600 K. C. Now adjust compensators (24) Osc., (20) R. F. and (6) Ant. for maximum output.

2. Rotate the signal generator and receiver dials to 580 K. C. Compensator (25) Osc. series is now adjusted for maximum output as follows:

First tune compensator (25) for maximum output, then vary the tuning condenser of the receiver for maximum output about the 580 K. C. dial mark. Now turn compensator (25) slightly to the right or left and vary the receiver tuning condenser for maximum output. If the out reading increases, turn compensator (25) in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

3. Readjust compensator (24) for maximum output, by turning the signal generator and receiver dials to 1600 K. C.

4. Turn the signal generator and receiver dials to 1500 K. C. and adjust compensators (20) R. F. and (6) Ant. for maximum output.

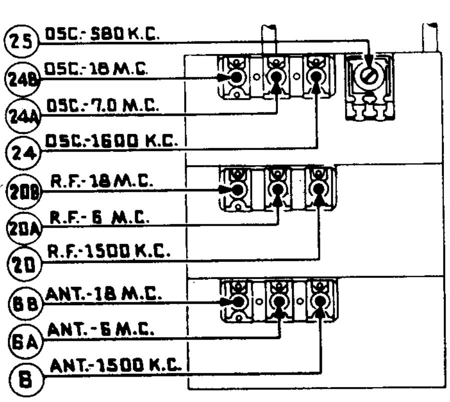


Fig. 3—R. F. Compensators

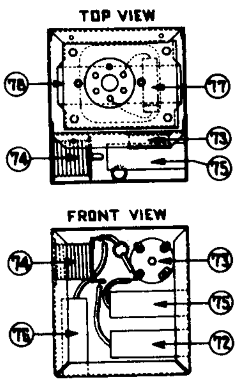


Fig. 3—Power Unit

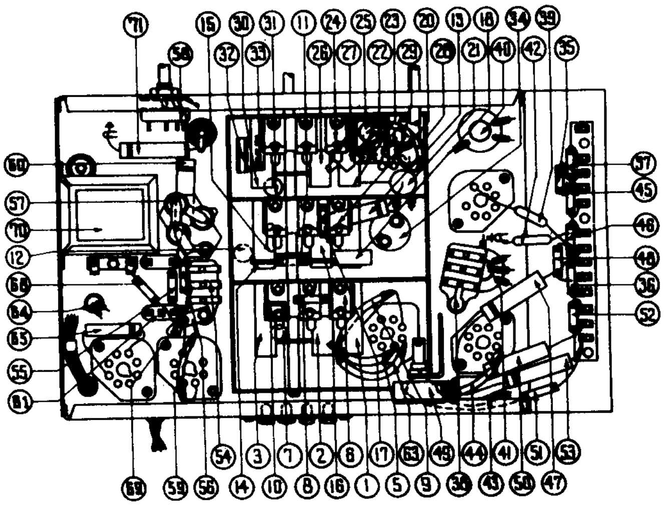
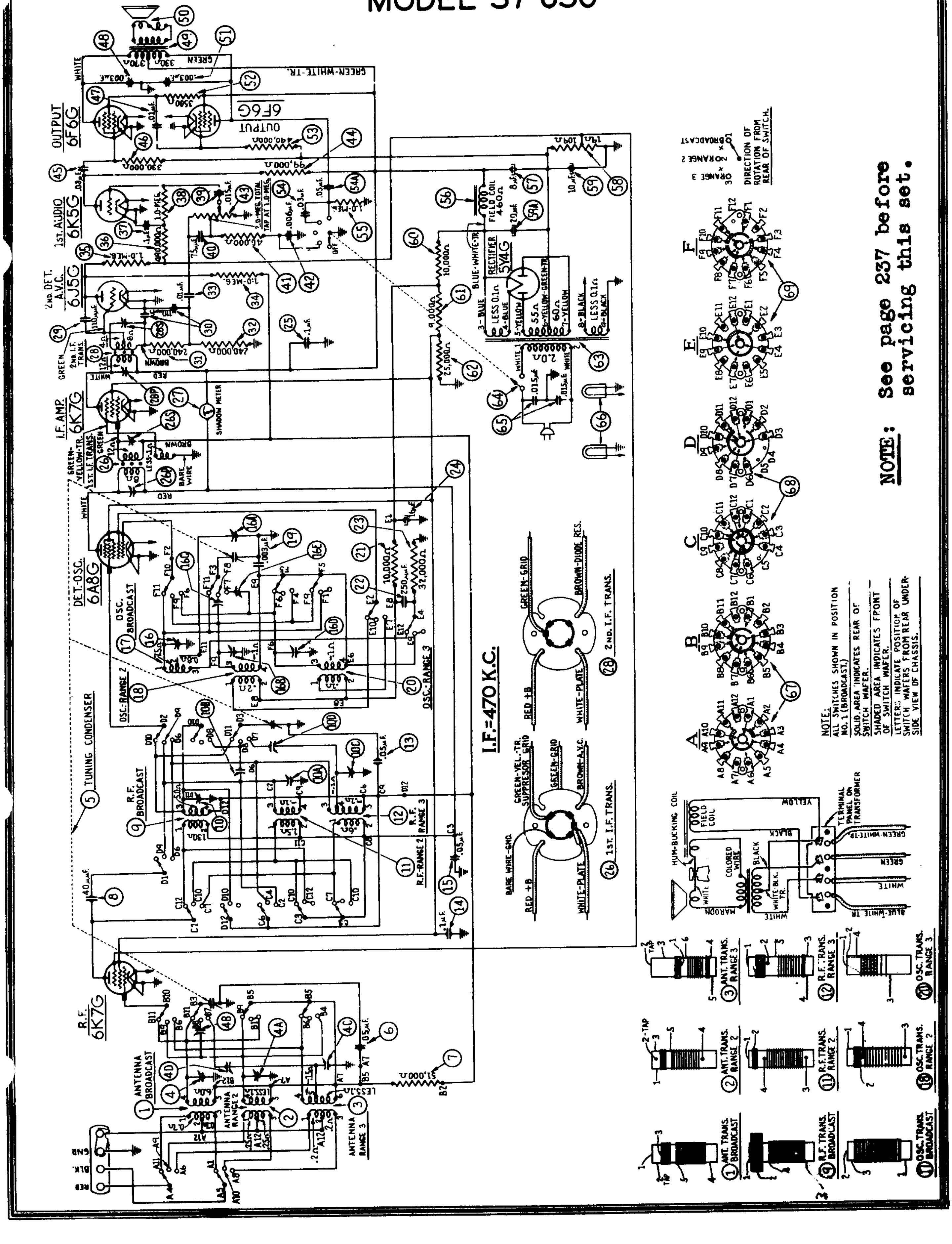


Fig. 4—Parts Locations—Underside of Chassis

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-650



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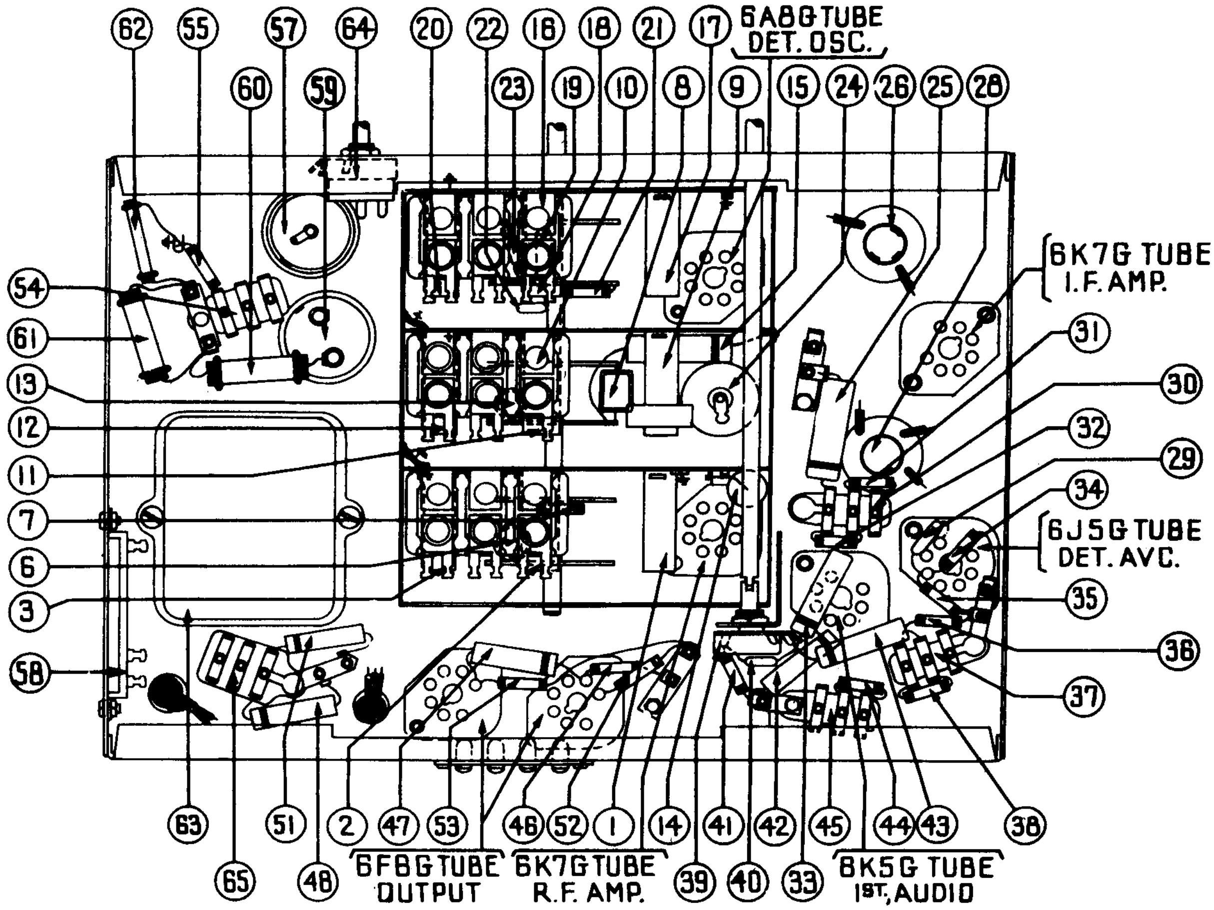
MODEL 37-650



Base View

Schem. No.	Description	Part No.	Price List
1	Ant. Transformer (Broadcast)	32-2108	$0.80
2	Ant. Transformer	32-2150	.80
3	Ant. Transformer (S. W.)	32-2175	.80
4	Compensator Ant. (Five sections)	31-6104	
5	Tuning Condenser	31-1855	4.50
6	Condenser (.05 mfd. tubular)	30-4020	.20
7	Resistor (51000 ohms, ½ watt)	33-351339	.20
8	Condenser (40 mmfd. mica)	30-1076	.20
9	R. F. Transformer (Broadcast)	32-2105	75
10	Compensator (R. F.) (Five sections)	31-6110	
11	R. F. Transformer	32-2151	.60
12	R. F. Transformer (S. W.)	32-2176	.70
13	Condenser (.05 mfd. tubular)	30-4020	.20
14	Condenser (.1 mfd. tubular)	30-4170	.25
15	Condenser (.05 mfd. tubular)	30-4123	.20
16	Compensator Osc. (Six sections)	31-6111	
17	Osc. Transformer (Broadcast)	32-2120	.65
18	Osc. Transformer	32-2152	.75
19	Condenser (.003 mfd. mica)	30-1028	.45
20	Osc. Transformer (S. W.)	32-2182	.70
21	Resistor (10000 ohms, ½ watt)	33-310339	.20
22	Condenser (250 mmfd. mica)	30-1032	.25
23	Resistor (32000 ohms, ½ watt)	33-332339	.20
24	Electrolytic Condenser (16 mfd.)	30-2118	1.65
25	Condenser (.1 mfd. tubular)	30-4170	.25
26	1st I. F. Transformer & Compensators	32-2169	
27	Shadow meter	45-2189	1.50
28	2nd I. F. Transformer & Compensators	32-2171	
29	Condenser (110 mmfd. mica)	30-1031	.20
30	Condenser (110 mmfd. double bakelite)	8035-DG	.25
31	Resistor (240000 ohms, ½ watt)	33-424339	.20
32	Resistor (240000 ohms, ½ watt)	33-424339	.20
33	Condenser (.01 mfd. tubular)	30-4124	.20
34	Resistor (1 megohm, ½ watt)	33-510339	.20
35	Resistor (1 megohm, ½ watt)	33-510339	.20
36	Resistor (190000 ohms, ½ watt)	33-449339	.20
37	Condenser (.1 mfd. bakelite)	4989-SG	.35
38	Resistor (1 megohm, ½ watt)	33-510339	.20
39	Volume Control	33-5158	1.00
40	Condenser (.75 mmfd. mica)	30-1053	.20
41	Resistor (40000 ohms, ½ watt)	33-340339	.20
42	Condenser (.006 mfd. tubular)	30-4125	.20
43	Condenser (.015 mfd. tubular)	30-4358	.20
44	Resistor (99000, ½ watt)	33-399339	.20
45	Condenser (.03 mfd. bakelite)	8318-SU	.35
46	Resistor (330000 ohms, ½ watt)	33-433339	.20
47	Condenser (.01 mfd. tubular)	30-4169	.20
48	Condenser (.003 mfd. tubular)	30-4469	.20

Schem. No.	Description	Part No.	Price List
49	Output Transformer K35-H26	32-7634	$1.50
50	Cone and Voice Coil K35	36-3174	.80
	Cone and Voice Coil H26	02625	1.20
51	Condenser (.003 mfd. tubular)	30-4469	
52	Resistor (3500 ohms, ½ watt)	33-235339	.20
53	Resistor (490000 ohms, ½ watt)	33-449339	.20
54	Condenser (.05 mfd., .03 mfd. bakelite)	3615-YU	
55	Resistor (1 megohm, ½ watt)	33-510339	.20
56	Field Coil K35-H26	36-3687	
57	Electrolytic Condenser 8.0 mfd.	30-2024	1.10
58	Bias Resistor	33-3280	
59	Electrolytic Condenser (10, 20 mfd.)	30-2163	
60	Resistor (10000 ohms, 2 watt)	33-310539	
61	Resistor (9000 ohms, 2 watt)	33-290539	.30
62	Resistor (25000 ohms, 1 watt)	33-325339	.30
63	Power Transformer 115 V., 50-60 cycles	32-7606	
	Power Transformer 115 V., 25-40 cycles	32-7607	
64	Tone Control & A. C. Switch	42-1184	75
65	Condenser (.015 mfd. double bakelite)	3793-DG	.40
66	Pilot Lamp	34-2039	.15
67	Range Switch Ant.	42-1189	1.25
68	Range Switch R. F.	42-1190	1.25
69	Range Switch Osc.	42-1191	1.25
	Selector Switch Indexing Plate & Shaft	42-1192	.50
	Dial	27-5248	.40
	Dial Hub	28-7187	.12
	Dial Clamp	28-2837	.10
	Set Screw	W-1641	.02
	Retaining Washer	4436	Per C 1.50
	Gear (Dial)	28-7185	10
	Gear Drive	31-1884	.25
	Thrust Spring	28-8611	.01
	Thrust Washer	28-3976	Per C .30
	C Washer	28-3904	.01
	Scale Guard	27-8324	
	Indicator Brkt. & Lens Assembly	38-7912	.30
	Pilot Lamp	34-2039	.15
	Pilot Lamp Assembly	38-7706	.35
	Mask	27-5198	.30
	Mask Arm & Link Assembly	31-1866	.35
	Mask Guide	38-7844	
	Mask Washer	27-8318	Per C .50
	Socket 8 prong	27-6058	.11
	Socket 7 prong	27-6057	.11
	Socket, Rect.	27-6052	
	Tube Shield Base	28-3808	.08

Schem. No.	Description	Part No.	Price List
	Tube Shield	28-2726	$0.10
	Terminal Panel Assembly I. F.	38-6306	.03
	Terminal Panel Antenna	38-7714	.15
	Grommet Mtg. R. F. Unit	27-4317	.04
	Sleeve Mtg. R. F. Unit	28-2257	.01
	Screw Mtg. R. F. Unit	W-729	Per C .45
	Washer Mtg. R. F. Unit	28-3927	.01
	Washer Felt R. F. Unit	27-7807	Per C .40
	Grommet Mtg. Tuning Condenser	27-4325	.02
	Shadowmeter Lamp Shield	28-2917	.02
	Mtg. Plate R. F. Transformer	28-3808	.02
	Mtg. Spacer R. F. Transformer	27-8228	.01
	Mtg. Screw R. F. Transformer	W-1635	Per C .30
	Shaft Volume Control	38-8060	.12
	Clip Retaining	28-4394	.03
	Spring	28-4117	Per C .40
	Cable Speaker	41-3202	
	Cord A. C.	L-2183	.40
	Insulator Electrolytic Condenser	27-7194	.01
	Vernier Drive Tuning Condenser		
	I. F. Shield	38-7984	
	Shadowmeter Mtg. Spring	28-8623	Per C .70
	Knob Tuning	27-4330	.10
	Knob Tuning Vernier	27-4331	.10
	Knob Tone Volume	27-4332	.10
	Knob Range Switch	27-4326	.10
	Terminal Cover Speaker	36-3672	
	"B" CABINET		
	Speaker K-35	36-1231	7.25
	Screw Chassis Mtg.		
	Washer Chassis Mtg.	28-2089	Per C .30
	Bezel Frame & Plate Assembly	40-5945	
	Glass	[illegible]-8299	.06
	Ring	28-3987	.40
	Gasket	27-8312	.01
	"X" CABINET		
	Speaker H-26	36-1238	8.25
	Bezel Frame & Plate Assembly	40-5937	
	Glass	27-8300	.06
	Ring	28-3988	.45
	Gasket	27-8313	.01
	Screws	W-1644	Per C .50
	Bottom Shield Plate	28-4031	.45
	Snap Fastener	28-4279	
	Screw Speaker Mtg.	W-1695	
	Nut	W-124	Per C .35
	Washer	W-291	Per C .40
	Screw (Chassis Mtg.)	W-1495	
	Rubber (Chassis Mtg.)	3558	
	Washer	29-2089	Per C .40

Figures in black type indicate circled figures in Base View.

Price Subject to Change without Notice

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PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-650

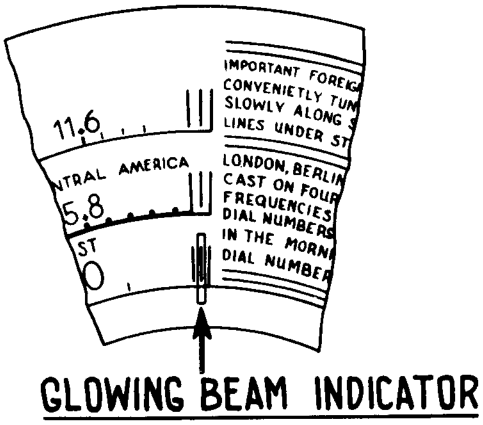


Fig. 4—Dial Calibration

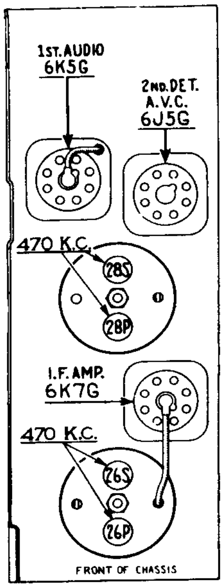


Fig. 5—I. F. Compensators—Top of Chassis

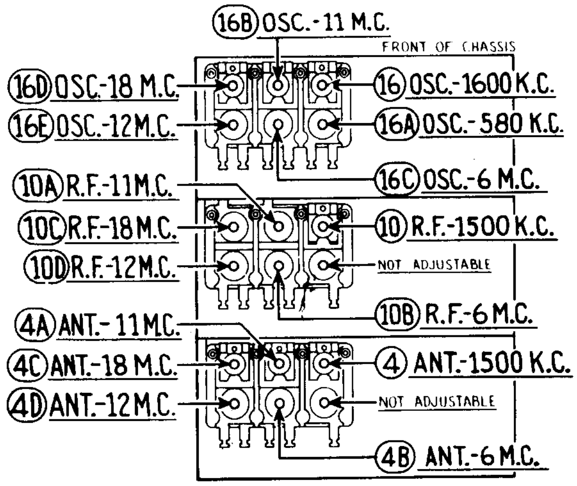


Fig. 6—R. F. Compensators—Underside of Chassis

Alignment of Compensators

The accurate adjustment of the various compensating condensers is vital to the proper functioning of this receiver. There are four compensating condensers in the I. F. Circuit, six in the Oscillator Circuit, five in the R. F. Amplifier Circuit and five in the Antenna Circuit. Incorrect adjustment will cause loss of sensitivity, unsatisfactory tone, and poor selectivity.

To accurately adjust this receiver, precision test equipment is necessary. A signal generator such as the PHILCO MODEL 088 SIGNAL GENERATOR, covering from 110 to 20,000 K. C. is recommended to adjust the compensators at the various frequencies specified. A visual indication of the receiver output is also necessary to obtain correct adjustment of the compensators. PHILCO MODEL 025 CIRCUIT TESTER contains a sensitive output meter and is recommended for these adjustments.

Philco Fibre Handle Screw-driver No. 27-7059 completes the necessary equipment for these adjustments. The locations of the various compensators are shown in Figs. 5 and 6.

The following procedure must be observed in adjusting the compensators:—

SHADOWMETER ADJUSTMENT

1. Remove the aerial and allow tubes to warm up. Then adjust shadowmeter as follows: Move the coil backward and forward until opposite edges of the shadow are ⅛ of an inch from each end of shadow screen, measuring along bottom edge. Adjustment of the shadowmeter light bracket may be necessary for perfect centering.
2. Remove the (5Y4G) rectifier tube from its socket and rotate coil until shadow reaches minimum width. This width is not to exceed $\frac{1}{32}$".
3. Replace the (5Y4G) rectifier tube. Shadow must not widen to more than $\frac{1}{16}$" or less than $\frac{1}{16}$" from each side of screen. If these limits are not obtained readjust the shadowmeter as given in paragraphs 1 and 2 until they are reached.

OUTPUT METER—The 025 Output Meter is connected to the plate and cathode terminals of one of the (6F6G) tubes. Adjust the meter to use the (0-30) volt scale.

DIAL CALIBRATION—Rotate the tuning condenser control to the extreme counter-clockwise position (maximum capacity). Loosen the screw of dial hub, then turn dial until the glowing indicator is centered on the second index line of dial scale (see Fig. 4). Then tighten the dial hub set screw in this position.

INTERMEDIATE FREQUENCY CIRCUIT

Frequency 470 K. C.

1. Turn volume control to maximum volume position. Connect the 088 Signal Generator output through a .1 mfd. condenser, to the control grid of the 6A8G tube and the ground connection of the output lead to the chassis.
2. Set the range switch in position No. 1 (Broadcast), then rotate the tuning condenser of the receiver to the maximum capacity position (counter-clockwise) and adjust the signal generator for 470 K. C.
3. Adjust compensators (28S) 2nd I. F. Sec., (28P) 2nd I. F. Pri., (26S) 1st I. F. Sec. and (26P) 1st I. F. Pri. for maximum reading on the output meter.

RADIO FREQUENCY CIRCUIT

Tuning Range—7.3 to 18.0 M. C.

1. Remove the signal generator output lead from the grid of the 6A8G tube and connect it through the .1 mfd. condenser to terminal No. 1 on aerial input panel and the generator ground lead to terminal No. 3, rear of chassis. Terminals 2 and 3 must be connected with the shorting link provided on the panel during these adjustments.
2. Set the range switch in position No. 3. Turn the receiver and signal generator dials to 18 M. C. Now adjust compensator (16D) by turning the screw (clockwise) to the maximum capacity position. Then slowly turn it counter-clockwise until a second peak signal is reached on the output meter. The first peak from maximum capacity is the image signal and must not be used. NOTE: In some cases only one peak will be found, therefore, tune the compensator to this peak. If the above procedure is correctly performed, the image signal will be found at 17.060 M. C., by advancing signal generator input and turning receiver dial to this frequency mark on the dial.
3. The antenna and R. F. compensators (4C) and (10C) are now adjusted by connecting a variable condenser of approximately 350 mmfd.,—having a good vernier drive—across the oscillator compensator (16D) contact (first contact from left side of receiver facing rear underside view of chassis) and ground. Leaving the signal generator and receiver dials at 18 M. C., tune the added condenser until the second harmonic of the receiver oscillator beats against the signal from the generator, thereby giving an indication on the output meter. It may be necessary to increase the signal generator output to obtain a signal of sufficient strength for reading on the output meter. The antenna and R. F. compensators (4C) and (10C) should then be adjusted for maximum output. Then remove external condenser and readjust compensator (16D) as given in paragraph 2 above.
4. Turn signal generator and receiver dials to 12 M. C. and adjust compensators (16E), (10D), (4D) for maximum output.
5. Now turn signal generator and receiver dials to 18 M. C. and readjust compensators (16D), (10C) and (4C) as given in Paragraphs 2 and 3 above.

Tuning Range—5.7 to 11.6

1. Set range switch in position No. 2. Rotate signal generator and receiver dials to 11 M. C. Compensator (16B) is now adjusted as given in Paragraph 2, under tuning range 7.3 to 18 M. C. above. ***Check image signal on the 10.06 dial mark.*** The only difference in the two procedures is the frequency used.
2. Turn the signal generator to 11 M. C. Then connect a 350 mmfd. variable condenser from the oscillator compensator (16B) contact (third contact from left side of the receiver, facing rear underside view of chassis) and ground. Tune the added condenser, as given in Paragraph 3 under tuning range 7.3 to 18 M. C. Now adjust compensators (10A) and (4A) for maximum output. The only difference in the two procedures is in the connection of the variable condenser and the frequency used.
3. Readjust compensator (16B) as given in Paragraph 1 for maximum output.
4. Turn signal generator and receiver dials to 6 M. C. and adjust compensators (16C), (10B) and (4B) for maximum output.
5. After the 6 M. C. end of scale is adjusted, the high frequency end is readjusted as given in Paragraphs 1, 2 and 3 above.

Tuning Range—530 to 1720 K. C.

1. Turn signal generator and receiver dials to 1600 K. C.—If signal generator scale is not calibrated for 1600 K. C. the dial of the generator may be rotated to 800 K. C. and the second harmonic of this frequency (1600 K. C.) may be used for following adjustments. Compensators (16), (10) and (4) are now adjusted for maximum output.
2. Turn signal generator and receiver dials to 580 K. C. and adjust compensator (16A) for maximum output. This is accomplished as follows:
First tune compensator (16A) for maximum output. Then vary the tuning condenser for maximum output about the 580 K. C. scale mark. Now retune compensator (16A), and again vary the tuning condenser back and forth about 580 K. C. for maximum output. This operation of first tuning the compensator, then the tuning condenser is continued until maximum output is obtained on or about the 580 K. C. dial mark.
3. Turn signal generator and receiver dials to 1600 K. C. and readjust compensator (16) for maximum output.
4. Now rotate signal generator and receiver dials to 1500 K. C. and adjust compensators (10) and (4) for maximum output.

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-650

SERVICE DATA

DESCRIPTION

Model 37-650 is an 8 tube superheterodyne receiver for operation on alternating current. It has three tuning ranges, covering standard broadcast and short-wave frequencies. The chassis is constructed in four basic assembly units, concentrating the R. F., I. F., Audio and Power Circuits in individual units.

The circuit includes the **Philco Foreign Tuning System**—controlled by the range switch—providing maximum sensitivity and noise reduction, when used with the **Philco High Efficiency Aerial;** one stage of radio frequency amplification before the Detector-Oscillator tube; Automatic Bass Compensation in the Volume Control Circuit; Shadow Tuning; Automatic Volume Control, and a Push-Pull Pentode Output Circuit

AERIAL CONNECTIONS

The red and black leads of the High-Efficiency Aerial "transmission line" are connected to terminals 1 and 2 respectively, of the terminal panel provided at the rear of the chassis. Connect the jumper on the terminal panel across terminals 3 and 4.

If a temporary aerial is used, the jumper should be across terminals 2 and 3. The aerial connects to terminal 1 and the ground lead to terminal 3. A good ground connection is desirable in all installations.

REPLACING DIAL

To replace the dial, remove the clamp holding the dial to the hub by turning clamp counter-clockwise, using the two holes provided on the clamp for this purpose.

REMOVING MASK ARM & LINK ASSEMBLY

First remove dial, then loosen set screw of dial hub and remove the hub and felt washer from the shaft. Now loosen screws holding indicator bracket and lens assembly, and move bracket forward about ½ inch. The assembly may now be removed by loosening set screw of range switch arm, then pull arm off of range switch shaft.

REMOVING SWITCH & COIL ASSEMBLIES OF R. F. UNIT

To replace any part in the switch and coil assemblies of the R. F. Unit, each assembly can be removed separately as follows:

First remove the tuning dial, mask and arm assembly. Remove the center mounting screw on the rear of the R. F. Unit. Then lift the rear of the unit and push forward until the rubber mounting grommets, on each side of the unit, clear the mounting slots. The unit is then lifted far enough from the chassis for removal of the two screws holding the selector switch indexing plate and shaft (front of unit). Then pull shaft straight out from the unit. Also, remove the volume control shaft by releasing the retaining clip, inside the chassis, from the shaft.

IMPORTANT—When selector switch shaft is replaced, care should be taken to have all wafer rotors in the same position, so that the key on the switch shaft will slide freely into the notched hole in each wafer rotor. *NEVER* force shaft into rotors.

Servicing Stages—It is necessary to unsolder some connecting leads in order to release the stage for servicing. If all the following connections are unfastened the stage will be entirely released. Ordinarily only one or two leads need be loosened in order to change coils, replace coupling condensers, or replace switch sections.

Antenna Stage Assembly—Rear Section of Unit

A. Remove screw holding shield plate to the unit base. This screw is located in the right hand corner of the shield plate, facing rear underside of the chassis.

B. Unsolder the wires at the I. F. and Aerial terminal panels which connect to the range switch, also wires from tuning condenser housing to tubular condenser (6); tuning condenser stator plate to selector switch contact (B3), and ground lead from assembly shield to unit frame. After disconnecting these wires assembly may be removed

R. F. Stage Assembly—Middle Section

A. Remove screw (right side of assembly) holding shield plate to unit base.

B. Unsolder the two wires connecting the I. F. Unit to range switch contacts (C3) and (D12); also wires connecting tuning condenser housing to tubular condenser (13) and stator plates to selector switch contact (D3); selector switch contact (D2) to the grid of the 6A8G tube, and ground lead from shield to unit frame. Remove assembly from the unit.

Oscillator Stage Assembly—Front Section

A. The oscillator assembly may be removed by unscrewing the four screws holding shield to R. F. base. These screws are located on each side of the R. F. Unit.

B. Unsolder the wires connecting range switch contacts (E2) and (F2) to the 6A8G socket; tuning condenser stator plates to range switch contact (F3); mica condenser (19) to the tuning condenser housing; range switch to resistor (60) and (61), and ground lead to I. F. Unit. With these leads disconnect unit may be removed.

Replace the units by following the above procedure in the reverse order.

Electrical Specifications

Power Supply:

	Voltage	Frequency Cycles	Consumption
	115	50–60	110 watts
	115	25–40	110 watts

Intermediate Frequency: 470 K. C

Output: Undistorted 7 watts.

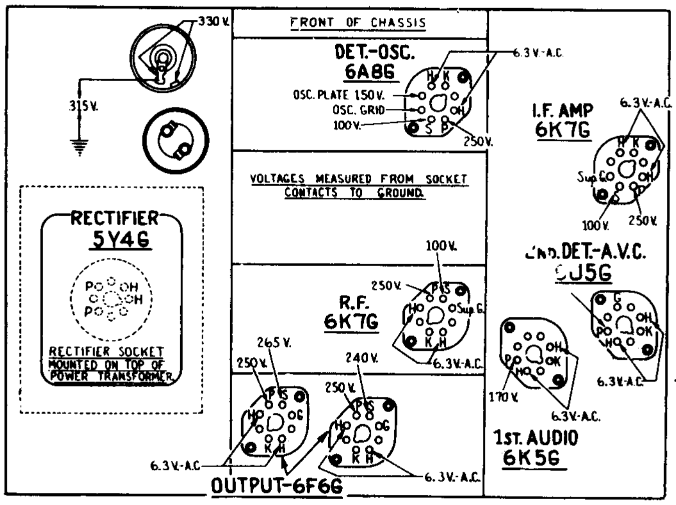
Philco Tubes: 6K7G—R. F. Amplifier; 6A8G—Oscillator and first detector; 6K7G—I. F. Amplifier; 6J5G—2nd Detector, A. V. C.; 6K5G—1st Audio; 2-6F6G—Output; 5Y4G—Rectifier.

Tuning Ranges: Range 1—530 to 1720 K. C.; Range 2—5.7 to 11.6 M. C.; Range 3—11.5 to 18.2 M. C.

Speakers: X Cabinet—H-26; B Cabinet—K-35.

POWER TRANSFORMER DATA

Schematic Lead No.	A. C. Volts	Current	Circuit	Color	Resistance
1-2	120	—	Pri.	White	2.0 ohm
3-4	5.	2.0A	Rect. Fil.	Blue	Less than 0.1 ohm
5-7	700	135 MA	High Volt. Sec.	Yellow	55 ohms 60 ohms
6	—	—	Center Tap 5-7	Yellow Green tr.	—
8-9	6.7	3.3 A	Fil	Black	Less than 0.1 ohm



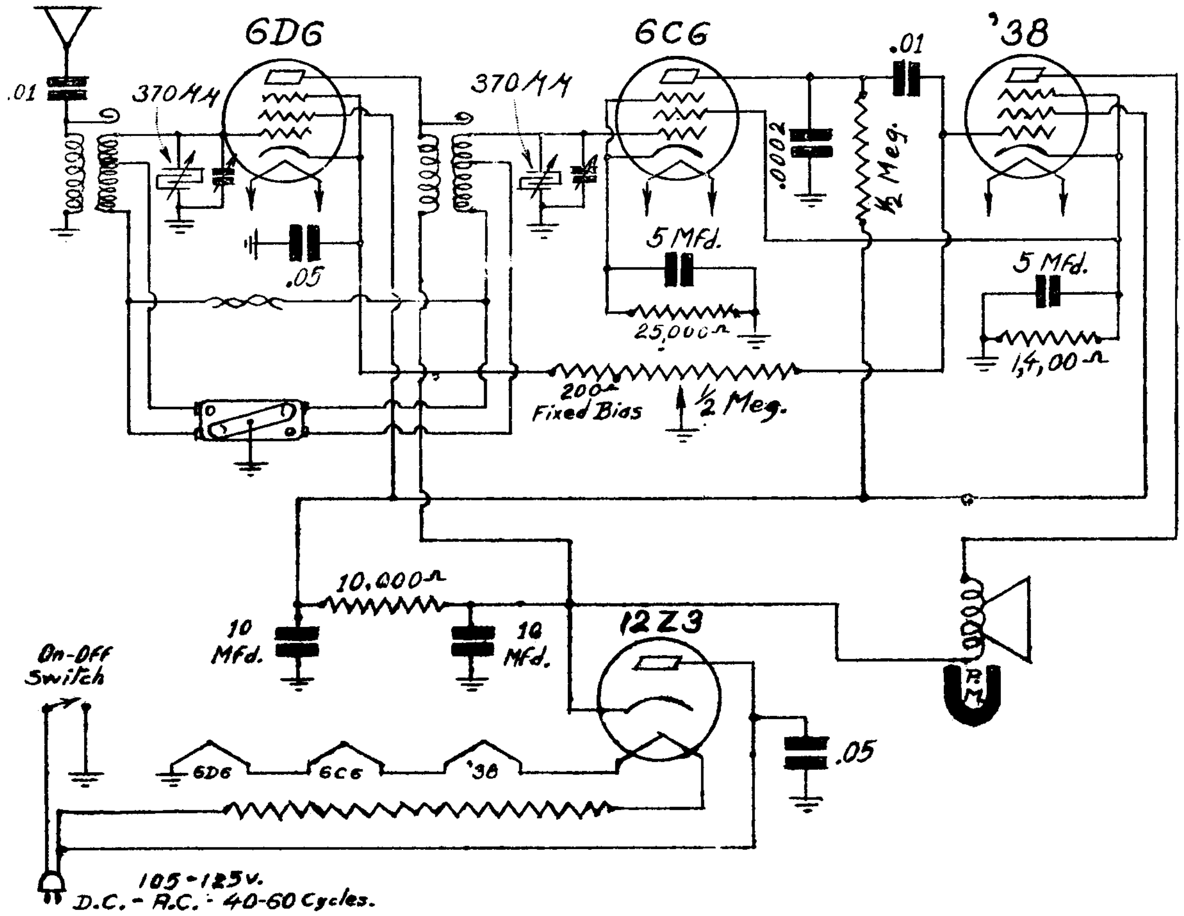
Socket Voltages—Underside of Chassis View

The voltages indicated by arrows were measured with a **Philco 025 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

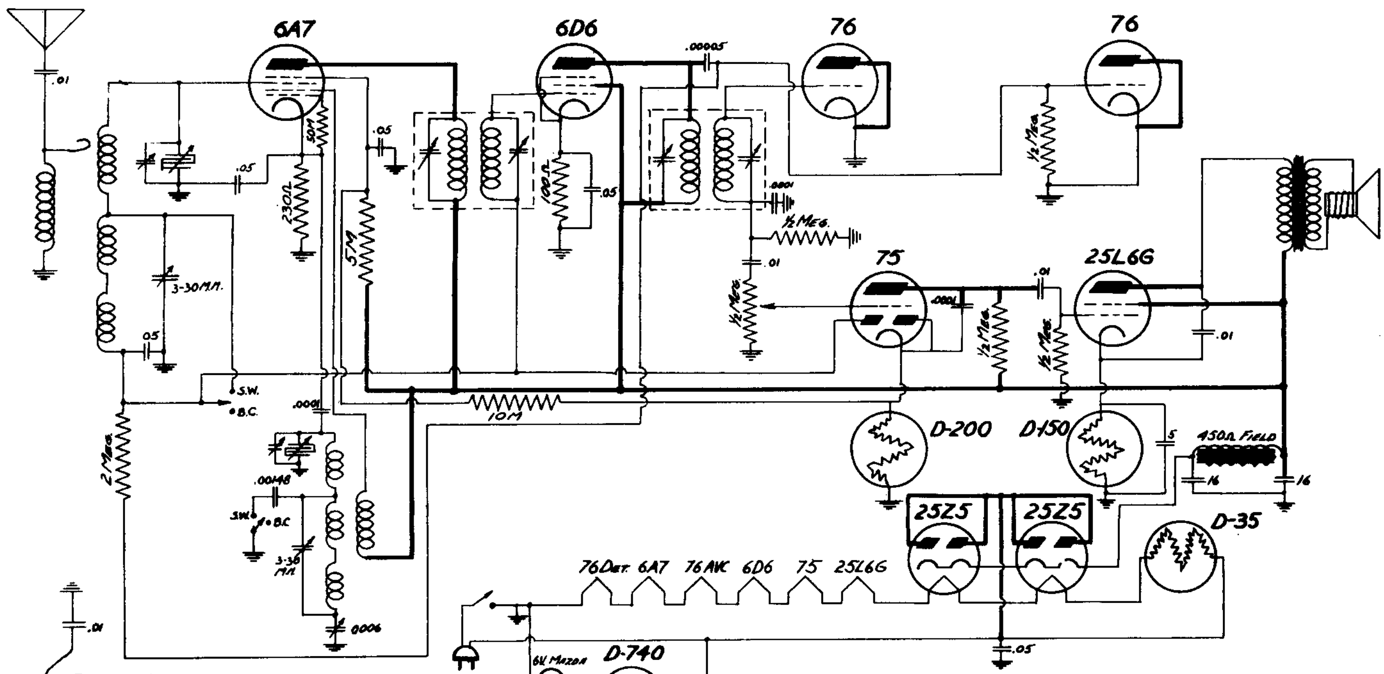
NOTE: See page 237 before servicing this set.

PIERCE AIRO, Inc.

MODEL 401



MODEL 1200

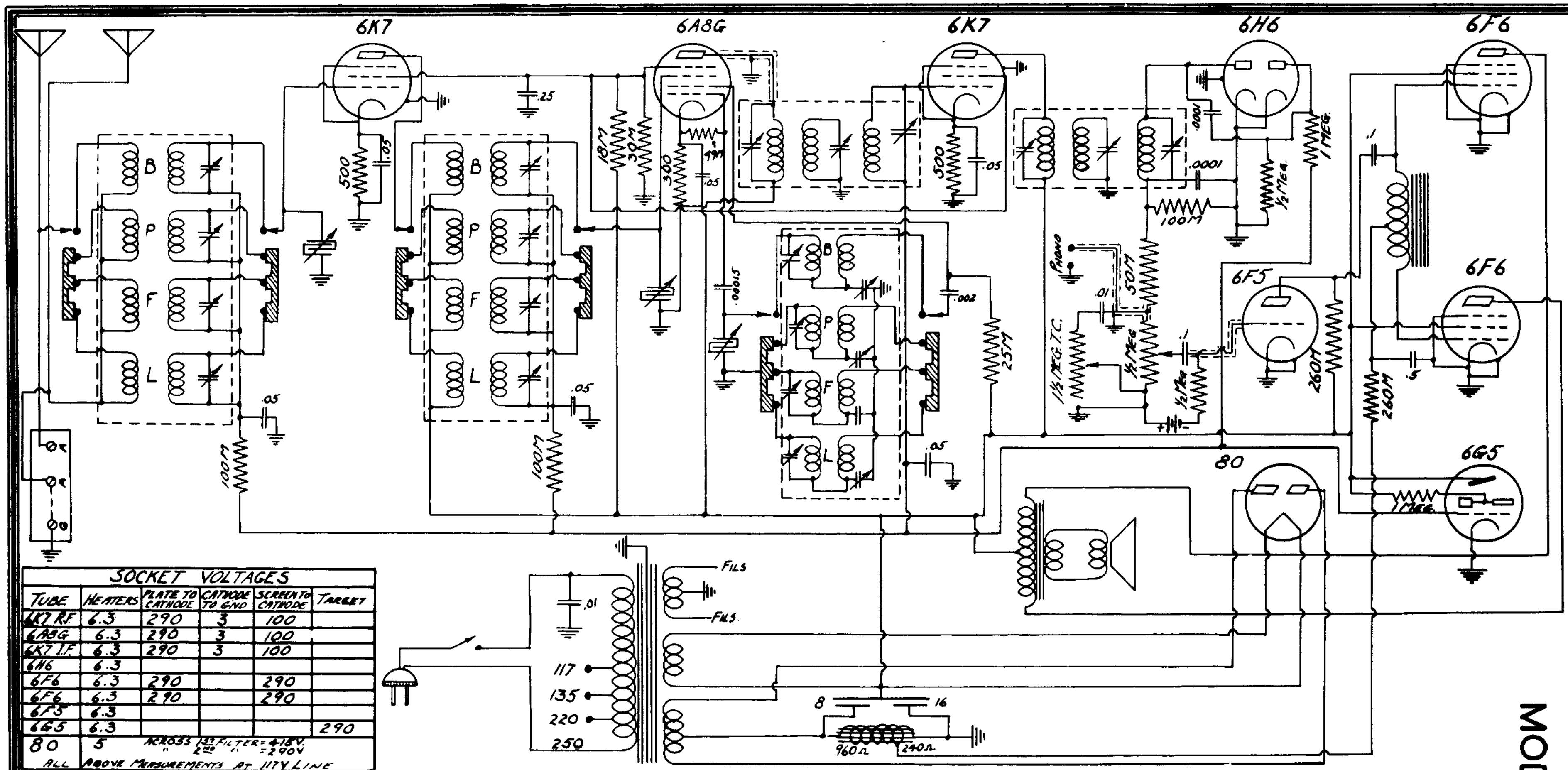


TO CALIBRATE:

Set service oscillator to 456 K.C. and connect "HOT" lead to grid of 6A7 tube. Ground stator of front (oscillator) section of variable condenser. Turn volume control for maximum output and peak intermediate frequency trimmers for maximum gain. Turn wave band switch knob toward right. Adjust service oscillator and receiver to 7 megacycles and peak variable condenser trimmers for maximum gain. Turn wave band switch toward left and adjust oscillator (service) and receiver to 1500 K.C. Peak both trimmers underneath chassis for maximum gain. Then adjust service oscillator and receiver to 600 K.C. and "rock" the variable condenser and adjust the padder (near front of chassis on top) at the same time for maximum gain.

PIERCE AIRO, Inc.

MODELS 901 & 902



Tube	Heaters	Plate to Cathode	Cathode to Gnd	Screen to Cathode	Target
6K7 RF	6.3	290	3	100	
6A8G	6.3	290	3	100	
6K7 I.F.	6.3	290	3	100	
6H6	6.3				
6F6	6.3	290		290	
6F6	6.3	290		290	
6F5	6.3				
6G5	6.3				290
80	5	Across 1st filter = 418V, 2nd " = 290V			

SOCKET VOLTAGES — ALL ABOVE MEASUREMENTS AT 117V LINE

Model #901 "L" Band Omited

SERVICE NOTES

REALIGNMENT The procedure outlined below should be followed should the receiver require realignment. For location aligning trimmers and padders, see Fig. 2.

I. F. ALIGNMENT To align the Intermediate Frequency stages, first place the wave Band Switch in Pos. Blue and Short Circuit the Oscillator Section of the Variable Condenser. Set the test Oscillator to 456 K.C. and connect its output through A .00025 MFD fixed Condenser to the grid cap of the 6A8G Tube and chassis ground. Adjust the six I. F. Compensators (Three on each I.F. Transformer) for Max Signal. (Volume Control must be in maximum position during all adjustments. Use the least possibe input to the receiver to prevent broadening of the resonance peaks.)

BLUE BAND (BROADCAST) ALIGNMENT After the Intermediate Frequency stages have been completely aligned, connect external test oscillator to the Antenna and Ground binding posts of the set. Set the band switch to Blue position. Set test Oscillator to 1500 K.C. and adjust the three Bl Band Compensators for maximum gain. Next, set dial at 600 K.C. and adjust Bl. Band Paddler for maximum signal, rocking Variable Condenser at the same time. Now repeat repeaking operation at 1500 K. C.

White Band ALIGNMENT Turn Wave Band Switch to White Position and set Variable Condenser to 5000 K. C. Adjust test oscillator to this frequency and adjust 3 Wh. Band Trimmers for maximum gain. Next set dial at 1900 K. C. and adjust Wh. Band Paddler for maximum signal. Now repeat repeaking operation at 5000 K. C.

Red Band (SHORT WAVE) ALIGNMENT Turn Wave Band Switch to Red position and set Variable Condenser to 16 megacycles. Adjust test oscillator to this frequency and adjust three Red Band Trimmers.

Green Band (LONG WAVE) ALIGNMENT Turn wave Band Switch to GR. position and align Trimmers on long wave coils at 375 K.C. Adjust GR. Band Padder at 160 K. C.

PIERCE AIRO, Inc.

MODELS 901 & 902

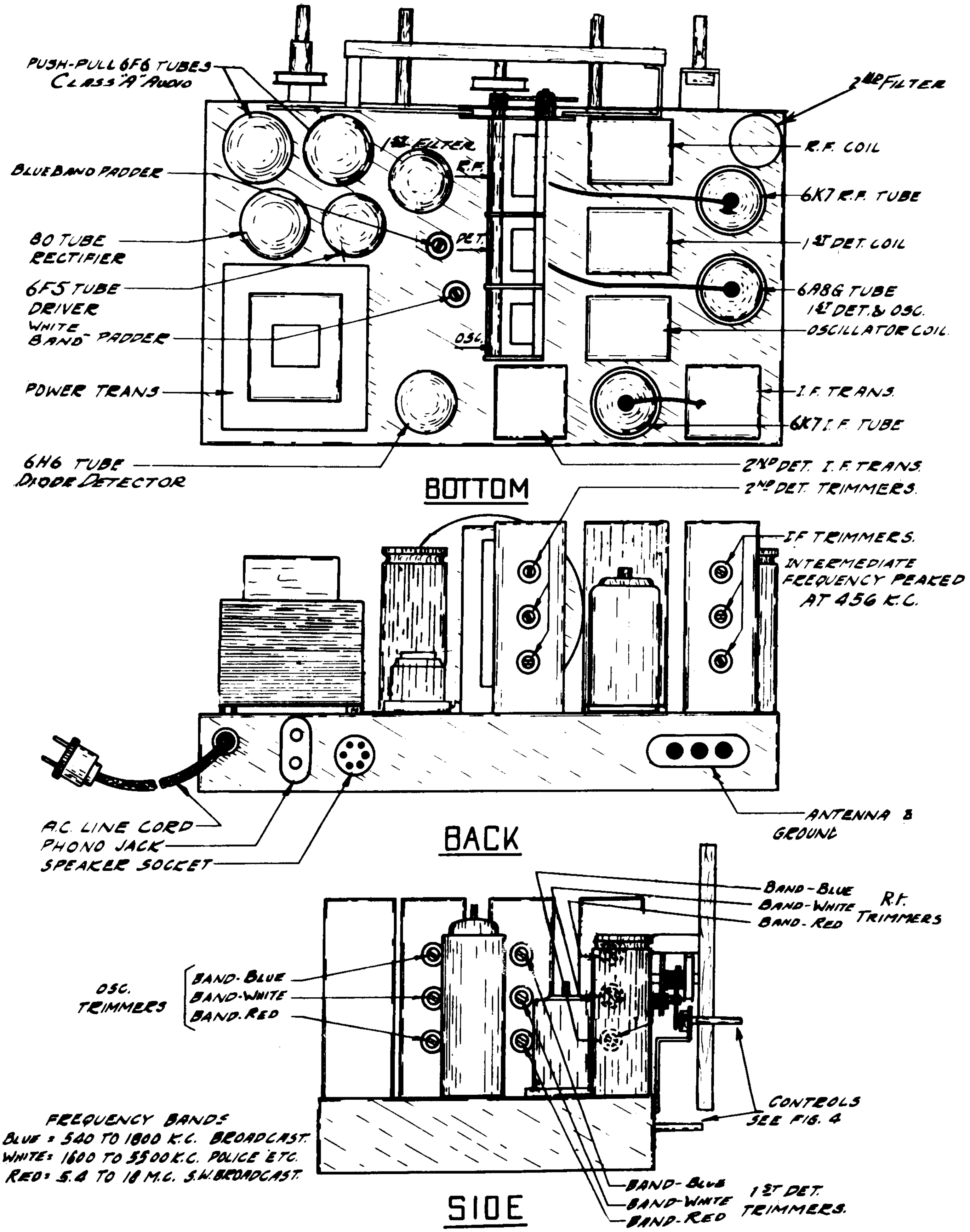
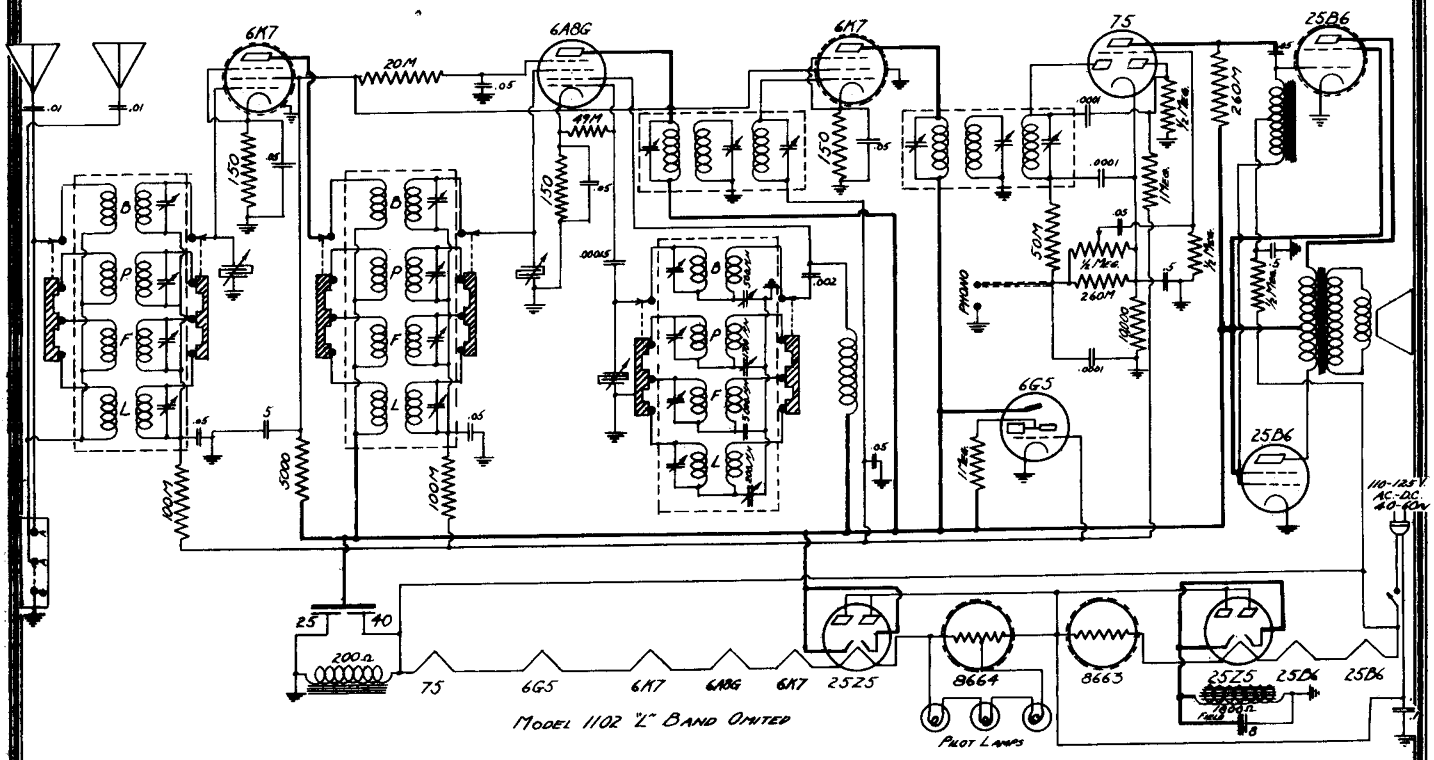


FIG. 2

PIERCE AIRO, Inc.

MODELS 1102 & 1103



I.F. 456 K.C.

SERVICE NOTES.

RE-ALIGNMENT The procedure outlined below should be followed should the receiver require re-alignment. For location aligning trimmers and padders, see Fig. 2.

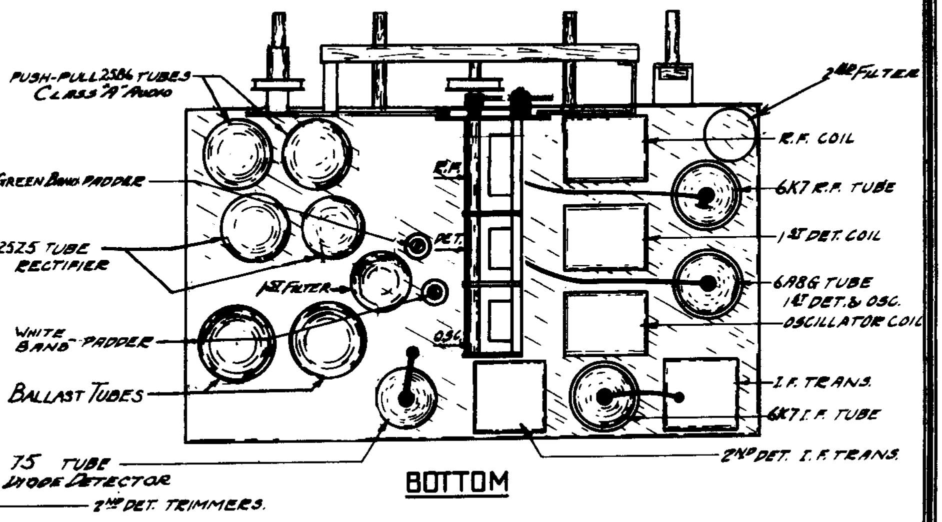
I. F. ALIGNMENT To align the Intermediate Frequency stages, first place the Wave Band Switch in Pos. Green and Short Circuit the Oscillator Section of the Variable Condenser. Set the test Oscillator to 456 K.C. and connect its output through A .00025 MFD fixed Condenser to the grid cap of the 6A8G Tube and chassis ground. Adjust the six I.F. Compensators (Three on each I.F. Trans.) for Max Signal (Volume Control must be in maximum position during all adjustments. Use the least possible input to the receiver to prevent broadening of the resonance peaks.)

GREEN BAND (BROADCAST) ALIGNMENT After the Intermediate Frequency states have been completely aligned, connect external test oscillator to the Antenna and Ground binding posts of the set. Set the band switch to green position. Set test Oscillator to 1500 K.C. and adjust the three Green Band Compensators for maximum gain. Next, set dial at 600 K.C. and adjust Green Band Paddler for maximum signal, rocking Variable Condenser at the same time. Now repeat repeaking operation at 1500 K.C.

WHITE BAND ALIGNMENT Turn Wave Band Switch to White Position and set Variable Condenser to 5000 K.C. Adjust test oscillator to this frequency and adjust 3 Wh. Band Trimmers for maximum gain. Next set dial at 1900 K.C. and adjust White Band Padder for maximum signal. Now repeat repeaking operation at 5000 K.C.

RED BAND (SHORT WAVE) ALIGNMENT Turn Wave Band Switch to Red position and set Variable Condenser to 16 megacycles. Adjust test oscillator to the frequency and adjust three Red Band Trimmers.

BLUE BAND (LONG WAVE) ALIGNMENT Turn Wave Band Switch to Blue position and align Trimmers on long wave coils at 375 K.C. Adjust Blue Band Padder at 160 K.C.



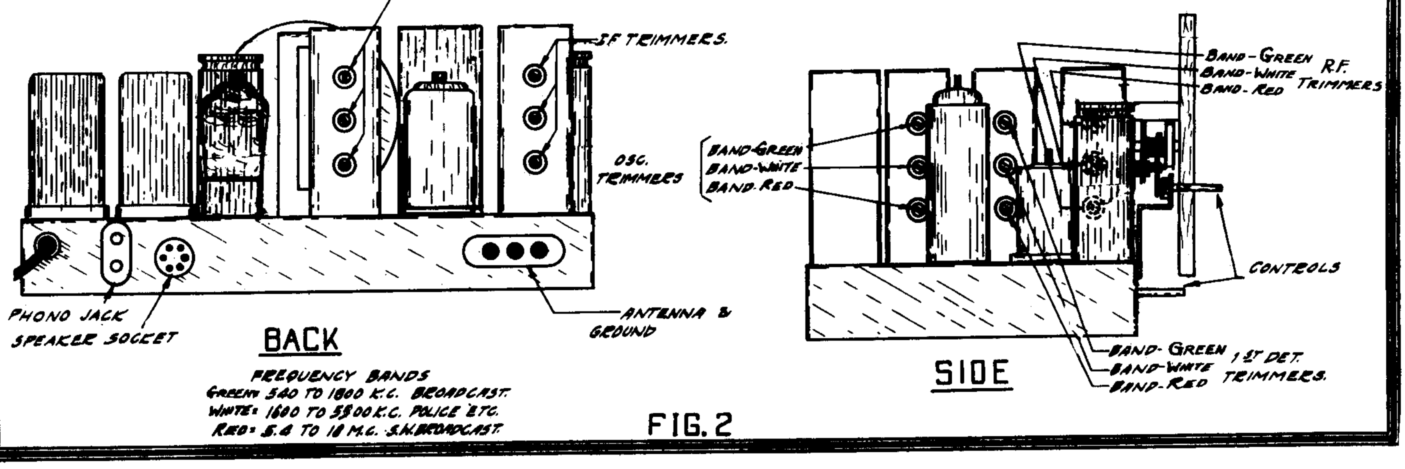
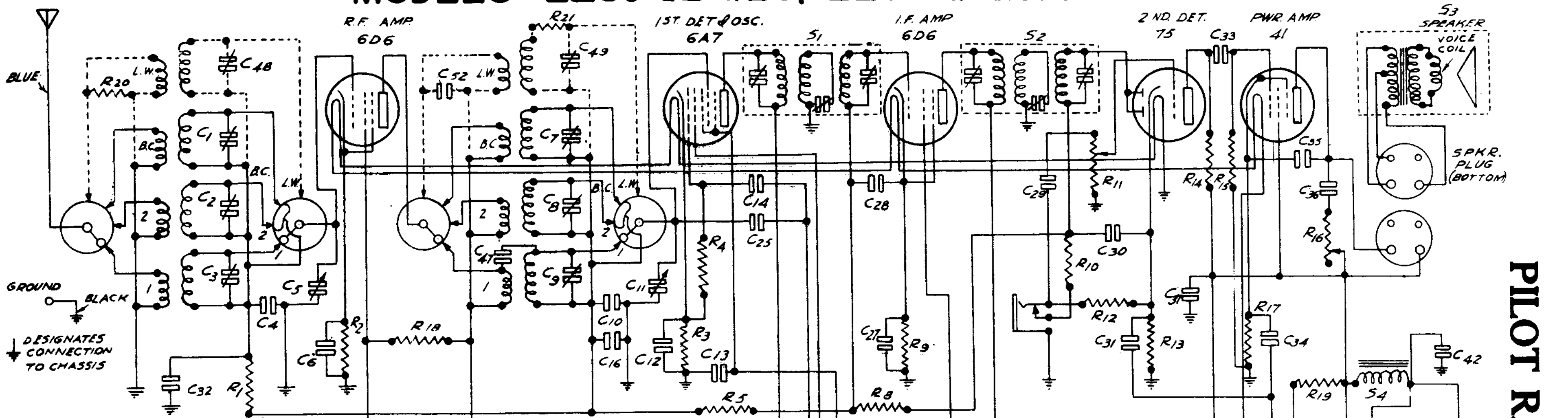
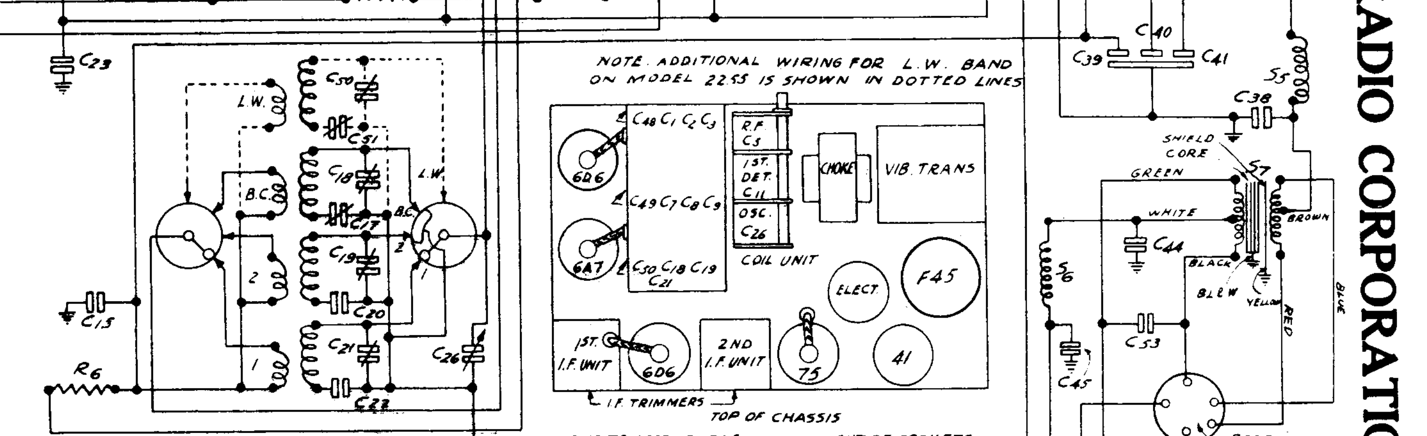


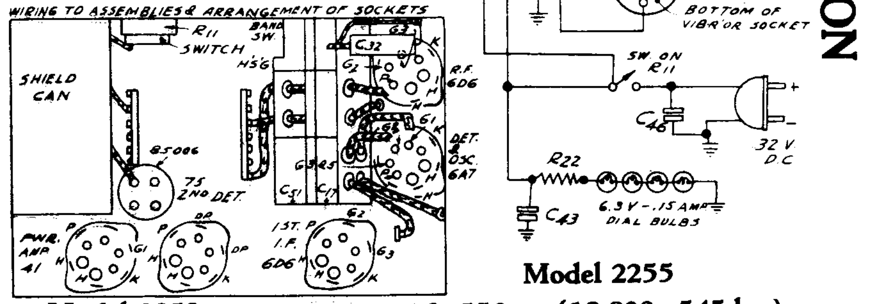
FIG. 2

PILOT RADIO CORPORATION

MODELS 2250 SERIES, 2253 & 2255







MISCELLANEOUS FOR 2253 & 2255		
SYMBOL	PART NO.	DESCRIPTION
S1	71531-B	1ST. I.F. TRANSFORMER
S2	71532-B	2ND I.F. TRANSFORMER
S3	40780	8" P.M. SPEAKER
S4	71635	FILTER CHOKE 8.5 HENRIES
S5	73024	R.F. CHOKE
S6	73023	"A" CHOKE
S7	79006	VIBRATOR TRANSFORMER ASS'Y
BAND SW. & GANG CONDENSER ASS'Y FOR MODEL 2253 IS 71910G & FOR 2255 IS 71910-H		

CONDENSERS FOR MODEL 2253		
C1,2,3,7,8,9	70969-C	TRIMMER STRIP IN BAND SW. HO'NG
C4 C10 C13 C14 C16	22055-J	0.05 mfd. 200 V. PAPER
C5 C11 C26	71921	450 mmfd. 3 GANG VARIABLE
C6,12,27,24,32,38	22055-M	0.1 mfd. 200 V. PAPER
C14	27723-O	0.00005 mfd. MICA
C16	2771l-W	0.001 mfd. MICA
C17	71503-A	250-500 mmfd. PADDER
C18 C19 C21	70969-D	TRIMMER STRIP ON BAND SW. HOUS'G
C20	27743-W	1370 mmfd. MICA
C22	27744-W	2870 mmfd. MICA
C23	22055-S	0.5 mfd. 200V PAPER
C25	71525-A	NEUTRALIZING COND.
C29 C33	22055-A	0.01 mfd. 600 V. PAPER
C30	27701-W	0.00025 mfd. MICA
C31 C34	22481	10 mfd. 25V. ELECTROLITIC
C35	22055-R	0.005 mfd. 1000 V. PAPER
C36	22055-C	0.05 mfd. 600 V. PAPER
C37 C43 C46	22490-B	0.01 mfd. 200 V PAPER H.F.
C39	85006	4 mfd. 250 V ELEC. N.P.
C40 C41	85006	8 mfd. 250 V ELEC. N.P.
C42 C45	27794-W	.005 mfd. MICA
C44	22490-A	0.5 mfd. 200 V PAPER H.F.
C47	27737-O	0.00001 mfd. MICA
C53	22490-D	0.4 mfd. 200 V. PAPER H.F.

CONDENSERS FOR MODEL 2255 SAME AS FOR MODEL 2253 EXCEPT FOLLOWING		
C1 C2 C3 C48	70969-A	TRIMMER STRIP IN BAND SW. HSING
C7 C8 C9 C49	70969-A	" " " " " "
C17 C51	71577-C	DUAL PADDER 250-500 & 30-150 mmfd.
C18 C19 C21 C50	70969-B	TRIMMER STRIP IN BAND SW. H'NG
C52	27701-O	0.00025 mfd. MICA

ALIGNING FREQUENCIES
LONG WAVE 400 & 160 K.C.
BROADCAST-1500 & 600 K.C.
BAND 2- 6 MEGACYCLES
BAND 1- 18 "

I.F. FREQUENCY- 456 K.C.

RESISTORS FOR MODEL 2253		
R1 R5	13031	100,000 OHMS 1/4 WATT
R2 R3 R9	13115	400 OHMS 1/4 WATT
R4 R10	13164	50,000 OHMS 1/4 WATT
R6	13068	30,000 OHMS 1/2 WATT
R8	13001	1 MEGOHM 1/4 WATT
R11	78647-B	750,000 OHMS VOL. CON. & SW.
R12	13147	300,000 OHMS 1/4 WATT
R13	13116	12,000 OHMS 1/4 WATT
R14	13171	250,000 OHMS 1/4 WATT
R15	13024	500,000 OHMS 1/4 WATT
R16	78648-B	100,000 OHMS TONE CONTR.
R17	13082	2000 OHMS 1 WATT
R18	13052	6000 OHMS 1/2 WATT
R19	13073	3000 OHMS 1/2 WATT
R22	78395	55 OHMS 1 1/2 WATT WIRE WD.

RESISTORS FOR MODEL 2255 SAME AS FOR MODEL 2253 EXCEPT FOLLOWING		
R20	13164	50,000 OHMS 1/4 WATT
R21	13029	250 OHMS 1/4 WATT

Model 2253
16 - 550 m. (18,800 - 545 kc.)

Model 2255
16 - 550 m. (18,800 - 545 kc.)
750 - 2000 m. (400 - 150 kc.)

FOR 32-VOLT BATTERY OPERATION

PILOT RADIO CORPORATION

MODELS 2250 SERIES, 2253 & 2255

SERVICE INFORMATION FOR PILOT MODELS 2253 AND 2255

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls and loosen the set screw on the tuning knob.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require re-alignment, the procedure outlined below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

The location of the R. F. alignment trimmer condensers is on the side of the band switch. The trimmers in the lowest row are those for aligning Band 1. Those in the second row from the bottom are for Band 2. Those in the third row up are for the Broadcast. In the Model 2255 there is an additional row of trimmers located immediately above those for the Broadcast.

The padder condenser is located under the rear section of the band switch. In the Model 2255 an additional padder for the long wave range is located at the right of the Broadcast padder. Access to the padder condenser is made through a hole provided in the rear of the chassis frame.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6D6 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6D6 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A7 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. Units.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Insert a 200 mmf. condenser in series with the antenna lead. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located in the lower rear section of the band switch, under the chassis. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT-WAVE BANDS:— The procedure in aligning the short-wave bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. Insert a 400 ohm non-inductive resistor in series with the antenna lead The alignment frequencies are as follows:

Band 2: 50 Meters—(6,000 kc.)
Band 1: 16.6 Meters—(18,000 kc.)

When aligning Band 2, set the Band Selector Switch in the position marked "Band 2". Set the tuning control pointer at 50 meters. Adjust the oscillator alignment capacitor on Band 2 for maximum output. Next adjust the interstage and antenna section alignment capacitors for maximum output.

To align Band 1, set the Band Selector Switch in the position marked "Band 1". Set the tuning control pointer at the 16.6 meter mark. Set the external oscillator at 16.6 meters. Adjust the oscillator section alignment capacitor on Band 1 for maximum output.

Proceed next to align the interstage section of Band 1. In doing this, it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonance peak. Next align the antenna section for maximum sensitivity.

LONG WAVE MODEL 2255

The above alignment positions refer to the Model 2253 only, which is calibrated in frequency. The alignment points for the Model 2255, which is calibrated in meters only, is as follows:

Long Wave	Align at 750 meters.
	Pad at 2,000 meters.
Broadcast	Align at 200 meters.
	Pad at 500 meters.
Band 2	Align at 49 meters.
Band 1	Align at 17 meters.

The Long Wave alignment procedure is similar to that for the Broadcast. A 200 mmf. condenser should be used in series with the antenna lead in aligning this band.

REMOVAL OF BAND SELECTOR SWITCH ASSEMBLY: Should it be necessary to remove the switch assembly, this is easily done by removing the supporting screws. Before doing this, however, it is essential to unsolder the leads between the switch and the chassis.

It is advisable to realign the receiver after reinstalling the switch assembly.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

RCA MANUFACTURING COMPANY, Inc.

MODELS U-101 & U-103

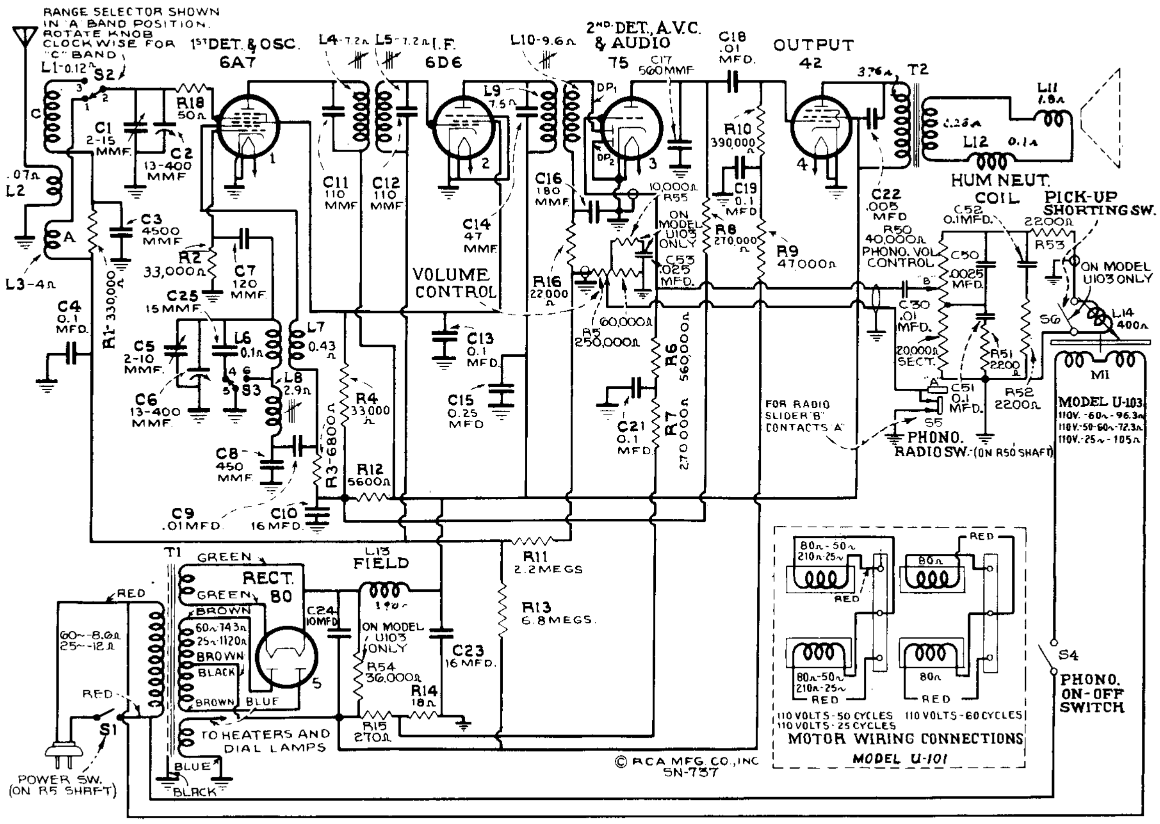


Figure 1—Schematic Circuit Diagram

I.F. 460 K.C.

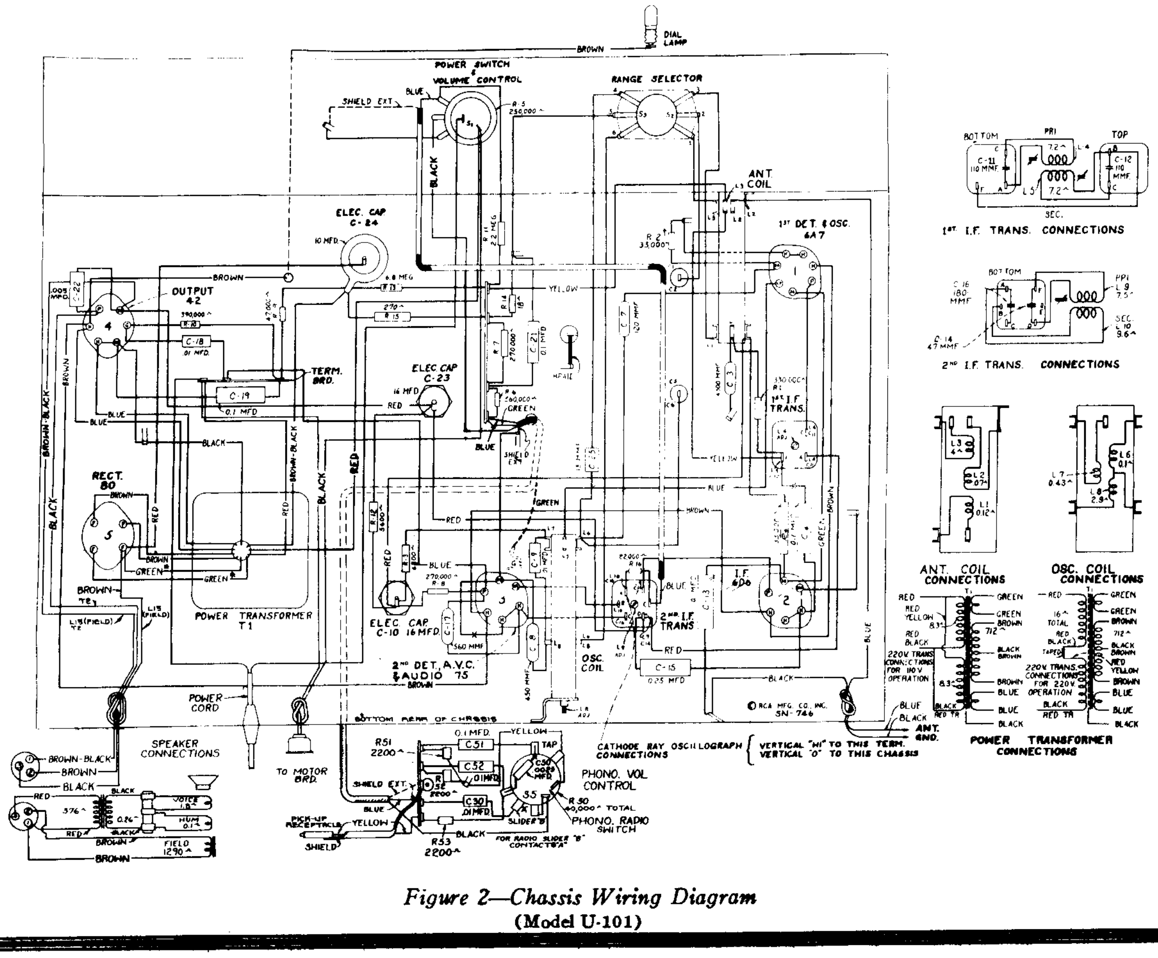
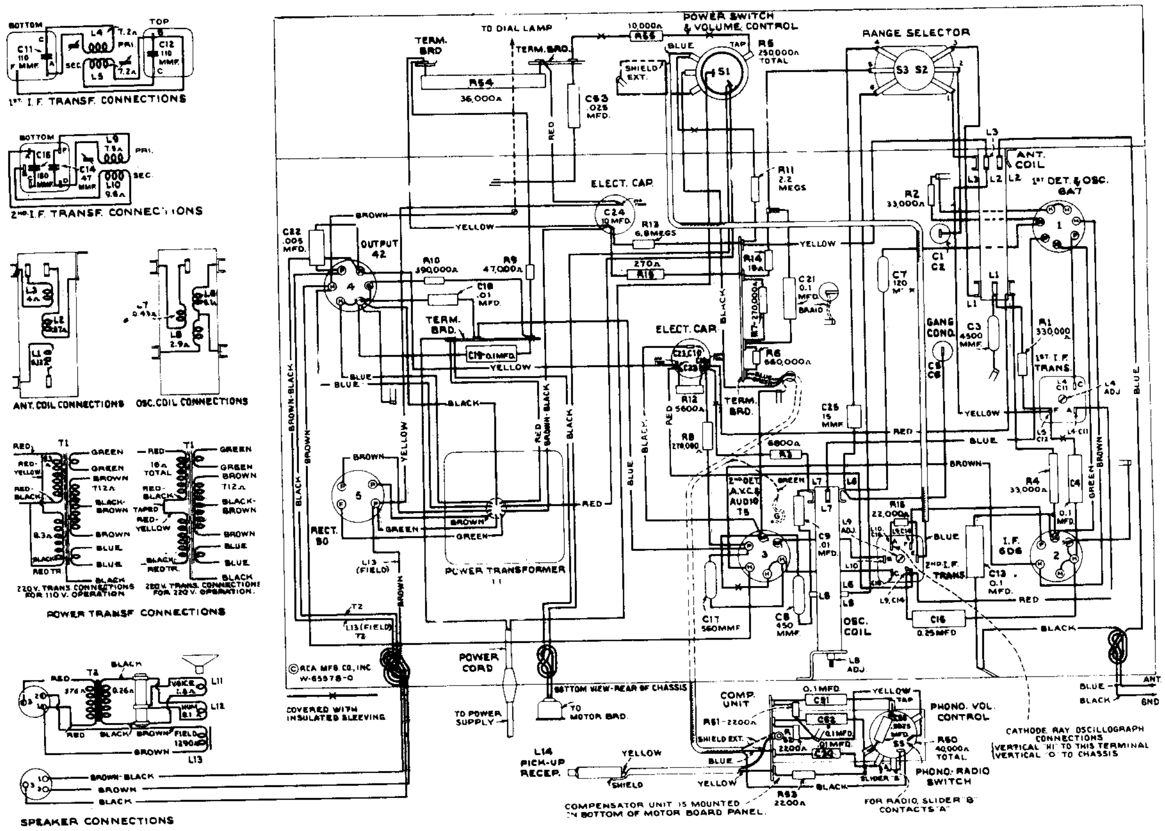


Figure 2—Chassis Wiring Diagram

(Model U-101)

RCA MANUFACTURING COMPANY, Inc.

MODELS U-101 & U-103



Chassis Wiring Diagram
(Model U-103)

General Description

The Model U-103 combination instrument consists of a five-tube superheterodyne receiver and an automatically operated phonograph combined in console-type cabinet. Its design includes magnetic-core adjusted i-f transformers, automatic volume control, resistance-coupled audio system, phonograph compensation pack, self-starting constant-speed motor, improved magnetic pickup, and a twelve-inch dust-proof electrodynamic loudspeaker. The phonograph mechanism will change seven 10-inch records or repeat 12-inch records automatically. It may be operated manually if desired.

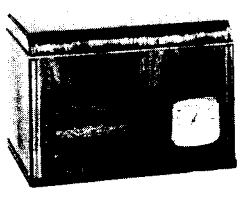
The Model U-101 instrument consists of a similar radio receiver combined with a manually operated phonograph in a table-type cabinet. The loudspeaker is an eight-inch dust-proof electrodynamic unit. The motor is of the synchronous induction type. The circuit arrangement of both receivers is shown on figure 1.

Service Data

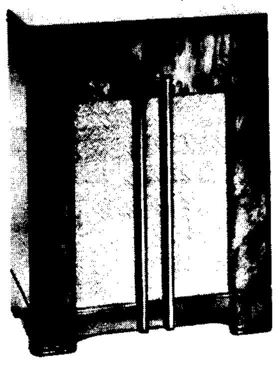
The various diagrams of this model contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such as R1, L1, C1, etc., provide reference between the illustrations and Replacement Parts List. The coils, transformer windings, and reactors are rated in terms of d-c resistance to permit continuity checks.

Precautionary Lead Dress—(1) Dress power line leads to the on-off switch away from grid connection terminal on volume control to reduce hum pickup. (2) Keep leads of capacitor C3 as short as possible. (3) Bus leads from range selector (ter. 6) to oscillator coil tap L6L8 should be maintained 3½ inches long for proper alignment. (4) Capacitor C25 should be dressed free of adjacent parts to maintain correct alignment at high-frequency end of "A" band. (5) Bus lead from range selector (ter. 3) to antenna coil L1 should be maintained 2¼ inches long for proper alignment. (6) The RCA-6A7 grid-cap lead (50-ohm resistor R18) to top of tuning capacitor C2 should be dressed properly to prevent shorts and should be maintained flexible to prevent acoustic howl.

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.



Model U-101



Model U-103 →

Phonograph Mechanism
(Model U-101)

This phonograph motor is of the synchronous type. Under normal operating conditions, service difficulties should be

(Continued on next page)

RCA MANUFACTURING COMPANY, Inc.

MODELS U-101 & U-103

(Continued from preceding page)

negligible. Occasionally, however, certain adjustments may be required. These adjustments are illustrated and explained in figure 7. Refer to figure 1 for motor coil connections.

Automatic Record Mechanism

(Model U-103)

The record changing mechanism is designed to be simple and fool-proof. Certain adjustments may be required occasionally. The adjustments are illustrated and explained in figures 4 and 5.

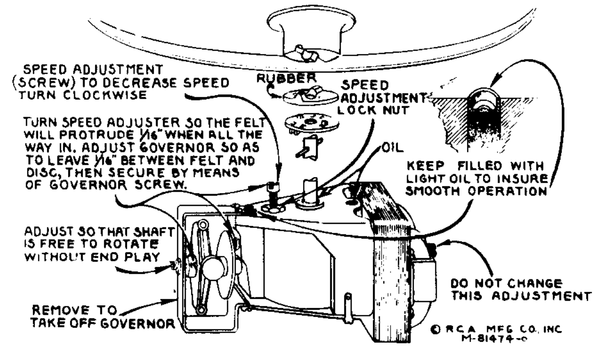


Figure 5—Details of Motor
(Model U-103)

It is important when servicing the automatic mechanism, to have it placed on a level support. It is also important to refrain from forcing the mechanism if there is a tendency to bind or jam, since bent levers and possible broken parts may result.

CAUTION.—**Do not leave records stacked on the record holder posts, when not in use, as they are liable to warp, particularly so in warm climates.**

MAGNETIC PICKUP

The pickup used in the phonograph unit is of an improved design. The horseshoe magnet is rigidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. The frequency response is substantially uniform over a wide range. Service operations which may be necessary on the pickup are as follows:

Centering Armature.—Refer to figure 6 showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, i. e., exactly centered. Whenever this centering adjustment has been disturbed it will be necessary to remove the pickup mechanism from the tone arm by removing the needle holding screw and the two mounting screws from the front of the tone arm, holding the pickup assembly to keep it from dropping. Unsolder the two leads from the lugs on the terminal board at the rear of the pickup. Insert a small rod or nail into the armature needle hole and replace the needle holding screw, tightening it to hold the rod securely. If the armature clamping screws A and B have not been disturbed, screws C should be loosened which will permit the armature to be moved from side to side, the rod acting as a lever to perform this operation. The proper adjustment is obtained when the armature is moved to the extreme position on each side (the movement being

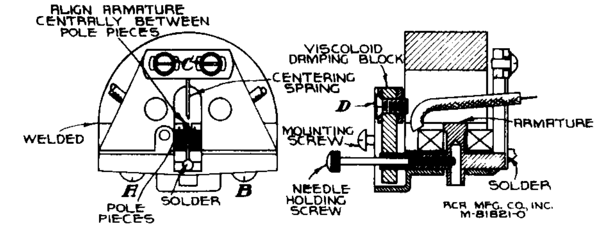


Figure 6—Details of Pickup

limited by the armature striking the pole pieces) and then brought to the mid position between these two extremes. Screws C should then be tightened. The armature position should then be central between the pole pieces and at right angles to them. With a little practice, the correct adjustment of the armature will be obtained. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other foreign material which would obstruct the movement of the pickup armature.

Damping Block.—The viscoloid damping block which is attached to the front end of the armature shank serves as a mechanical filter to eliminate undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, the pickup mechanism should be removed from the tone arm as explained above. Remove screw D and the damping block from the pickup assembly. Make sure that the shaft of the armature which contacts the viscoloid is clean. Then insert the new damping block so that it occupies the same position as that of the origi-

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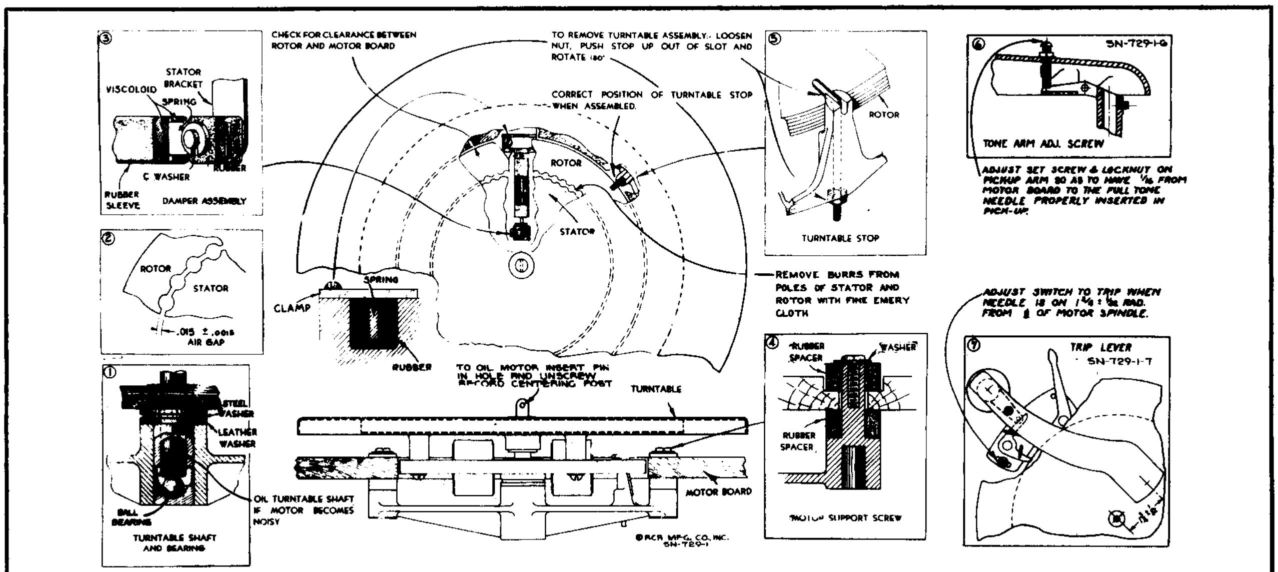

Figure 7—Details of Motor
(Model U-101)

RCA MANUFACTURING COMPANY, Inc.

MODELS U-101 & U-103

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nal block, and is in correct vertical alignment with the armature. The hole in the block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the damping block properly aligned on the armature, screw D with its washer should then be replaced. Heat should be applied to the armature (viscoloid side) so that the damping block will fuse at the point of contact and become rigidly attached to the armature. A special-tip soldering iron, constructed as shown in figure 8 will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block, causing a small bulge on both sides.

Replacing Coil.—Whenever there is defective operation due to an open or shorted pickup coil, this coil should be replaced. Remove the pickup mechanism and terminal board as described above. Remove screws A and B and the magnet assembly. Remove the bakelite coil support (with coil attached) and insert the new coil support assembly in its place, after which replace the magnet assembly and center the armature as described above, then re-assemble the remainder of the unit.

Magnetizing.—In case it becomes necessary to re-magnetize the unit, first remove the pickup mechanism from the tone arm, and then remove the magnet assembly. Place the mag-

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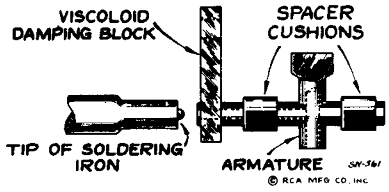


Figure 8—Special Soldering-Iron Tip

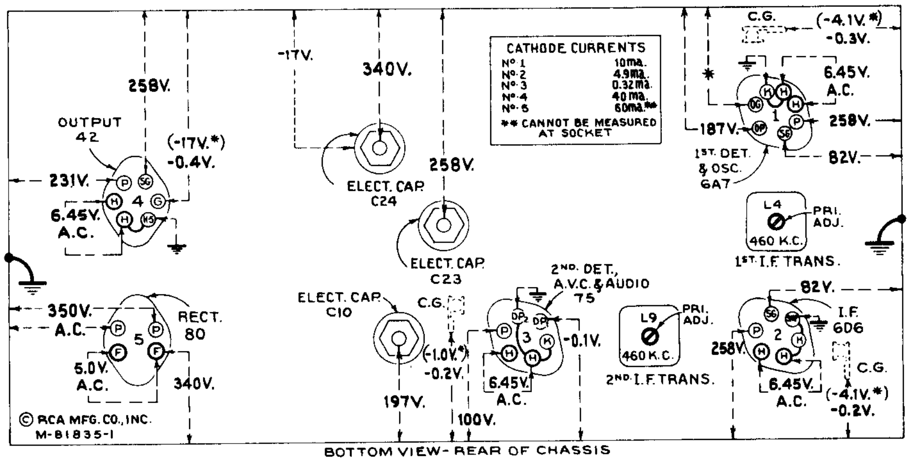


Figure 9—Radiotron Socket Voltages, Coil, and Trimmer Locations
(Model U-101)

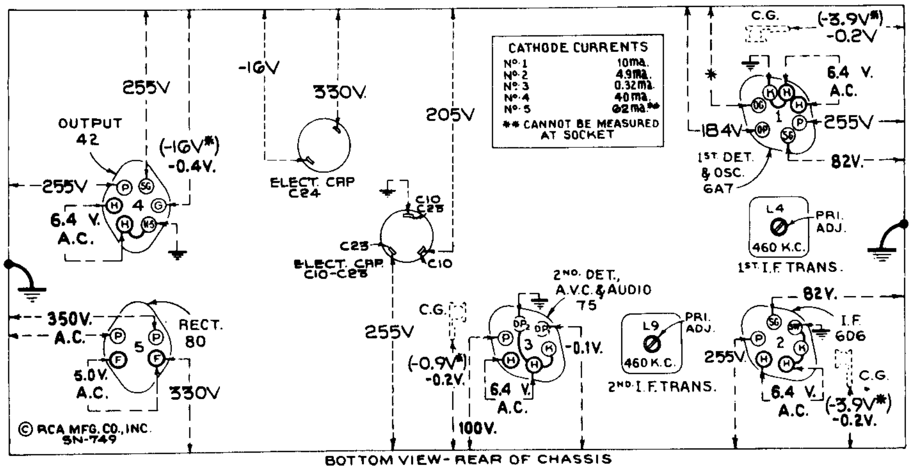


Figure 10—Radiotron Socket Voltages, Coil, and Trimmer Locations
(Model U-103)

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Broadcast")—
No signal being received—Volume control minimum

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

RCA MANUFACTURING COMPANY, Inc.

MODELS U-101 & U-103

(Continued from preceding page)

net assembly on the poles of a standard pickup magnetizer such as the RCA Stock No. 9549 Pickup Magnetizer and charge the magnet in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to remagnetize it so that the same polarity is maintained.

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the center horizontal line with the gang tuning-condenser plates in full-mesh position. This is a screw-driver adjustment

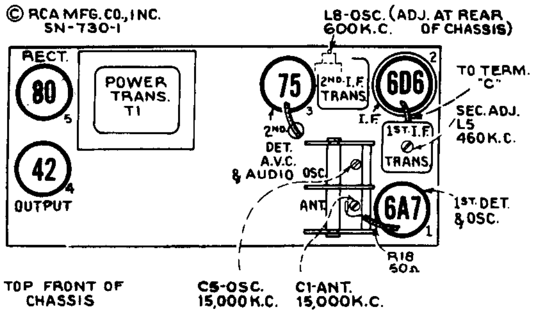


Figure 11—Radiotron, Coil, and Trimmer Locations

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 9, 10, and 11.

Cathode-ray alignment is preferable; the connections to the chassis are shown on figures 2 and 3. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator			Range-Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting					
1	6D6 I-F Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	2nd I-F Trans.	L9	Max. (peak)
2	6A7 Det. Grid Cap	.001 Mfd.	460 kc	"A" Left	No Signal 550-750 kc	1st I-F Trans.	L4 and L5	Max. (peak)
3	Ant. Lead (blue)	300 Ohms	15,000 kc	"C" Right	15,000 kc	"C" Osc.	C5	Max. (peak)†
4	Ant. Lead (blue)	300 Ohms	15,000 kc	"C" Right	Rock Through 15,000 kc	"C" Ant.	C1	Max. (peak)*‡
5	Ant. Lead (blue)	200 Mmfd.	600 kc	"A" Left	600 kc	"A" Osc.	L8	Max. (peak)

† Use maximum capacity peak if two peaks can be obtained.
* Use minimum capacity peak if two peaks can be obtained.
‡ After this adjustment, check for image signal by shifting receiver dial to 15,920 kc.

REPLACEMENT PARTS

Insist on genuine factory tested parts which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14634	Belt—Variable condenser drive belt
14632	Bracket—Dial mounting bracket
5237	Bushing—Variable condenser rubber mounting bushing
14802	Cable—2-conductor shielded compensation cable complete with grid contact cap
12118	Cap—Grid contact cap
12896	Capacitor—15 Mmfd. (C25)
12405	Capacitor—47 Mmfd. (C14)
14262	Capacitor—110 Mmfd. (C11, C12)
12724	Capacitor—120 Mmfd. (C7)
12406	Capacitor—180 Mmfd. (C16)
12812	Capacitor—450 Mmfd. (C8)
14724	Capacitor—560 Mmfd. (C17)
12728	Capacitor—4,500 Mmfd. (C3)
4868	Capacitor—.005 Mfd. (C22)
13138	Capacitor—.01 Mfd. (C9, C18)
4870	Capacitor—.025 Mfd. (C53)
4839	Capacitor—0.1 Mfd. (C4, C13, C19, C21)
12484	Capacitor—0.25 Mfd. (C15)
14814	Capacitor—10 Mfd. (C24)
5212	Capacitor—16 Mfd. (C23)—Model U101 only

STOCK No.	DESCRIPTION
14377	Capacitor—16 Mfd. (C10)—Model U101 only
14813	Capacitor Pack—Comprising two 16 Mfd. sections (C10, C23)—Model U103 only
14646	Coil—Antenna coil (L1, L2, L3)
14647	Coil—Oscillator coil (L6, L7, L8)
14633	Condenser—2-gang variable tuning condenser (C1, C2, C5, C6)
14783	Connector—2-contact female for motor power cable
5119	Connector—3-contact female for speaker cable
14648	Core—Adjustable core and stud for oscillator coil
12006	Core—Adjustable core and stud for I.F. transformer
14631	Dial—Station selector dial
14651	Drive—Variable condenser vernier drive and pinion gear
14635	Indicator—Station selector indicator pointer
5226	Lamp—Dial lamp
14636	Pulley—Idler pulley—less spring
14639	Pulley — Variable condenser drive pulley — located on condenser shaft
14660	Resistor—18 ohms, insulated, ½ watt (R14)
14653	Resistor—50 ohms, flexible type, 1/10 watt (R18)
13819	Resistor—270 ohms, wire wound, 1.1 watt (R15)
5175	Resistor—5,600 ohms, carbon type, ½ watt (R12)

RCA MANUFACTURING COMPANY, Inc.

MODELS U-101 & U-103

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
14659	Resistor—6,800 ohms, carbon type, ½ watt (R3)
14559	Resistor—10,000 ohms, insulated, ½ watt (R55)—Model U103 only
11305	Resistor—22,000 ohms, carbon type, ½ watt (R16)
13735	Resistor—33,000 ohms, carbon type, ½ watt (R2)
5033	Resistor—33,000 ohms, carbon type, 1 watt (R4)
5206	Resistor—36,000 ohms, wire wound, 20 watt (R54)—Model U103 only
11646	Resistor—47,000 ohms, carbon type, ½ watt (R9)
11323	Resistor—270,000 ohms, carbon type, ½ watt (R7, R8)
13733	Resistor—330,000 ohms, carbon type, ½ watt (R1)
13479	Resistor—390,000 ohms, carbon type, ½ watt (R10)
5036	Resistor—560,000 ohms, carbon type, ½ watt (R6)
12679	Resistor—2.2 meg., insulated, ½ watt (R11)
14661	Resistor—6.8 meg., insulated, ½ watt (R13)
5129	Ring—Radiotron shield ring
4389	Screw—No. 6-32x3/16 headless set screw for pulley No. 14639
14638	Shaft—Station selector knob shaft and pulley
12008	Shield—First I.F. transformer shield
12408	Shield—Second I.F. transformer shield
11265	Shield—Radiotron shield
14658	Socket—Dial lamp socket
4794	Socket—4-contact 80 Radiotron socket
4786	Socket—6-contact 6D6, or 42 or 75 Radiotron socket
4787	Socket—7-contact 6A7 Radiotron socket
14637	Spring—Idler pulley tension spring
12007	Spring—Retaining spring for core stock No. 12006 and No. 14648
14640	Switch—Range switch (S2, S3)
14376	Transformer—First I.F. transformer (L4, L5, C11, C12)
14642	Transformer—Second I.F. transformer (L9, L10, C14, C16)
14655	Transformer—Power transformer, 105-125 volts, 50-60 cycle (T1)
14656	Transformer—Power transformer, 105-125 volts, 25-60 cycle (T1)
14657	Transformer—Power transformer, 100-125/200-250 volts, 50-60 cycle (T1)
14826	Volume Control—and power switch (R5, S1)

OPERATING MECHANISM ASSEMBLIES MODEL U-103

STOCK No.	DESCRIPTION
14199	Bushing—Record separator rotating shaft bushing
14183	Cam—Cam and gear assembly
6808	Clutch—Trip lever friction clutch
14197	Finger—Friction finger assembly
14186	Hub—Rotating hub and record separator complete with set screw
14189	Lever—Locating lever assembly
14184	Lever—Main lever and link assembly
14201	Lever—Manual index lever assembly
14193	Lever—Pickup lift cable lever
14194	Lever—Pickup arm lever complete with set screws
14198	Lever—Reject lever assembly
14185	Lever—Trip lever and friction clutch assembly
14196	Pawl—Trip pawl assembly
4563	Screw—Cable lever screw and two locknuts
4059	Screw—Trip lever clutch tension adjustment screw
14200	Screw—No. 8-32 special hex head screw and lockwasher for record separator shaft mounting
14195	Screw—No. 10-32x5/16 fillister-head, cone-pointed set screw for pickup arm lever
14188	Screw—No. 10-32x7/16 fillister-head, cone-pointed set screw for rotating hub
14187	Shaft—Rotating shaft for record separator
3676	Spring—Cam pawl tension spring
3666	Spring—Lift cable tension spring
14190	Spring—Locating lever pawl tension spring
14191	Spring—Locating lever or reject lever tension spring
14192	Spring—Main lever tension spring

MOTORBOARD ASSEMBLIES MODEL U-101

STOCK No.	DESCRIPTION
14803	Brake—Turntable brake and motor switch
14805	Connector—2-contact male connector for motor and switch leads
3261	Rest—Pickup rest
14235	Screw—Motor mounting screw and washer
30100	Springs—Tension springs for brake Stock No. 14803—comprising 1 long and 1 short spring
14804	Switch—Motor switch (S4)—located on turntable brake Stock No. 14803

MOTORBOARD ASSEMBLIES MODEL U-103

STOCK No.	DESCRIPTION
14208	Bracket—Bumper bracket and bumper complete
14209	Bumper—Rubber bumper
14830	Cable—Shielded cable 13-in. long complete with single contact male connector — connects pickup shorting switch to input transformer or compensator
11704	Damper—Turntable damper and damper plate
14212	Escutcheon—Manual index lever and switch escutcheon
14203	Post—Record post—located on front left hand corner of motorboard
14210	Rest—Pickup arm rest
14207	Roller—Pickup lift cable roller and bracket
14211	Socket—Motorboard socket and shell
14205	Support—Pickup arm mounting spacer, washers and nut
14206	Switch—Motor toggle switch (S4)
14629	Switch—Pickup shorting switch (S6)
14204	Turntable Complete
14213	Washer—Pickup arm stop washer and spacing washer

MOTOR ASSEMBLIES MODEL U-101

STOCK No.	DESCRIPTION
10194	Ball—Steel ball bearing
14233	Base—Motor base and bearing assembly
14232	Cap—Turntable spindle cap
14223	Coil—Stator assembly—comprising coils and laminations—105-125 volts, 60 cycle
14224	Coil—Stator assembly—comprising coils and laminations—105-125 volts, 50 cycle
14225	Coil—Stator assembly—comprising coils and laminations—105-125 volts, 25 cycle
14228	Damper—Motor damper assembly comprising one damper, one damper plate, one screw and one "C" washer
14806	Motor—105-125 volts, 60 cycle (M1)
14807	Motor—105-125 volts, 50 cycle (M1)
14808	Motor—105-125 volts, 25 cycle (M1)
14227	Shield—Terminal board shield and nuts
14229	Stop—Turntable stop, lockwasher and nut—prevents removal of turntable
14809	Turntable—Turntable assembly complete with rotor laminations—60 cycle operation
14810	Turntable—Turntable assembly complete with rotor laminations—50 cycle operation
14811	Turntable—Turntable assembly complete with rotor laminations—25 cycle operation
14812	Turntable—10-in. turntable plate only
4083	Washer—Leather washer for turntable bearing
14230	Washer—Metal washer for turntable bearing
14231	Washer—Metal shim washer for turntable bearing

MOTOR ASSEMBLIES MODEL U-103

STOCK No.	DESCRIPTION
14215	Governor—Governor complete for motor Stock No. 9799, No. 14465 and No. 14466
14466	Motor—105-125 volts, 25 cycle (M1)
14465	Motor—105-125 volts, 50-60 cycle (M1)
9799	Motor—105-125 volts, 60 cycle (M1)
14214	Screw—Motor mounting screw and spacer assembly

PICKUP AND ARM ASSEMBLIES MODEL U-101

STOCK No.	DESCRIPTION
14291	Armature—Pickup armature
11732	Coil—Pickup coil (L14)
14292	Damper—Pickup damper assembly — comprising one damper, one clamp and one screw
14933	Pickup and Arm complete
3811	Screw—Needle holding screw

PICKUP AND ARM ASSEMBLIES MODEL U-103

STOCK No.	DESCRIPTION
14291	Armature—Pickup armature assembly
4064	Cable—Pickup lift cable
11732	Coil—Pickup coil (L14)
14292	Damper—Pickup damper block complete with clamp and screw
14290	Pickup and Arm complete
3811	Screw—Needle holding screw
4387	Screw—No. 6-32x¼-in. headless set screw for pickup arm pivot shaft

REPRODUCER ASSEMBLIES (RL63F-1) MODEL U-101

STOCK No.	DESCRIPTION
14356	Board—3-contact reproducer terminal board
13866	Cap—Cone center dust cap
12012	Coil—Field coil (L13)
11469	Coil—Hum neutralizing coil (L12)
12642	Cone—Reproducer cone and dust cap (L11)
5118	Plug—3-contact male plug for reproducer
14360	Reproducer—Complete
14358	Screw—Screw, washer and lockwasher to hold core in yoke
14355	Transformer—Output transformer (T2)
14357	Washer—Spring washer to hold field coil

REPRODUCER ASSEMBLIES (RL70E-1) MODEL U-103

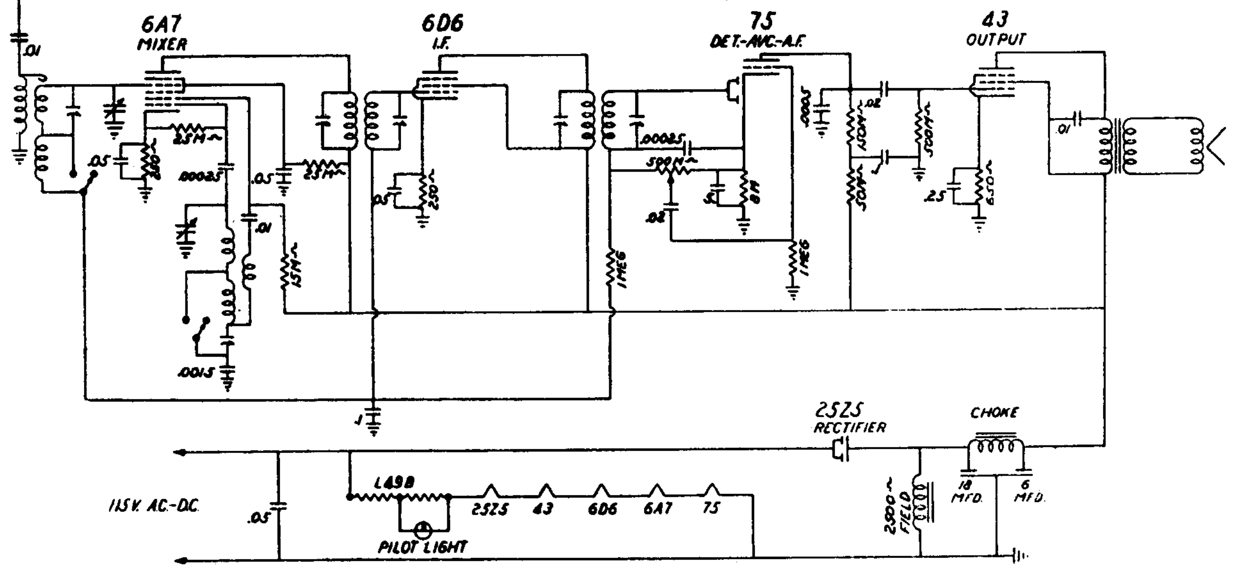
STOCK No.	DESCRIPTION
13866	Cap—Dust cap for cone center
14354	Coil—Field coil (L13)
11469	Coil—Hum neutralizing coil (L12)
12667	Cone—Reproducer cone and dust cap (L11)
5118	Plug—3-contact male plug for reproducer
14395	Reproducer—Complete
14358	Screw—Screw, washer and lockwasher to hold core in yoke
14355	Transformer—Output transformer (T2)
14357	Washer—Spring washer to hold field coil

MISCELLANEOUS ASSEMBLIES

STOCK No.	DESCRIPTION
11762	Box—Needle box—for Model U-101 only
4391	Box—Needle box—for Model U-103 only
14817	Cable—Shielded pickup cable complete with female connector—compensator end
5107	Capacitor—.0025 Mfd. (C50)
13138	Capacitor—.01 Mfd. (C30)
4841	Capacitor—0.1 Mfd. (C51, C52)
14654	Escutcheon—Station selector escutcheon and crystal
12673	Knob—Station selector, range switch, radio volume control or phonograph volume control knob
13716	Resistor—2,200 ohms, insulated, ½ watt (R51, R52, R53)
14267	Screw—Chassis mounting screw and washer—for Model U101 only
13573	Screw—Chassis mounting screw and washer—for Model U103 only
14816	Screw—Motorboard mounting screw and spacer—for Model U103 only
4119	Screw—No. 8-32 headless set screw for knob Stock No. 12673
14815	Volume Control—Phonograph volume control and radio-record switch (R50, S5)

RADOLEK COMPANY

MODEL K16,740



6 TUBE AC-DC 2 BAND — BC.-540 TO 1720 KC. / S.W. 2000 TO 7000 KC

I.F. 456 K.C.

SWITCH SHOWN IN B.C. POSITION

This receiver is designed to operate over two tuning ranges. Upper band which covers the broadcast range, extends from 545 to 1750 kilocycles (175 to 550 meters), lower band which covers Police, Aviation, and the International 49 Meter Foreign Band.

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, and 6000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, the Short Wave Band may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tubes (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the ouput meter.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna lead (Blue) through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the rear gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak.

Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R.F. section. The padding condenser is located on the right hand end of the chassis near the 6A7 tube.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Band.

SHORT WAVE BAND There is only one adjustment to be made in the alignment of the Short Wave Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary.

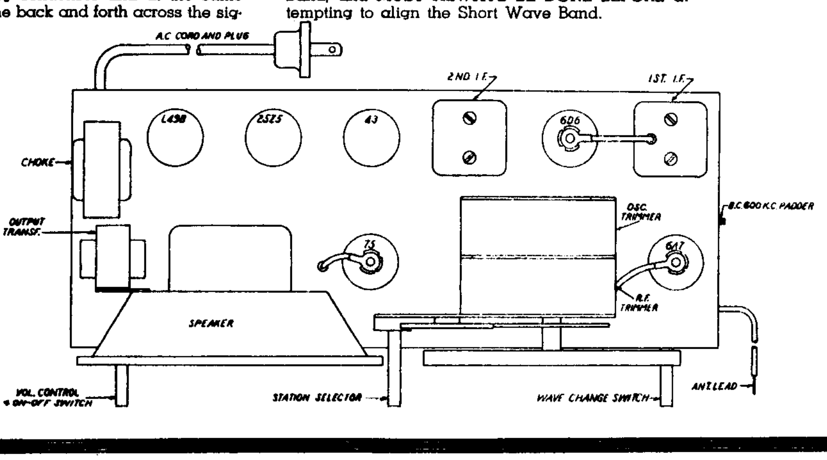
Set the dial pointer to 600 KC (also the test oscillator) and adjust the antenna and antenna trimmer to resonance. The short wave band coils are under the chassis and are located at the right front corner along side of wave band switch.

IMPORTANT: This is the only adjustment necessary for the Short Wave Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Short Wave Band, otherwise the Broadcast Band will be thrown out of alignment.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 6000 KC.

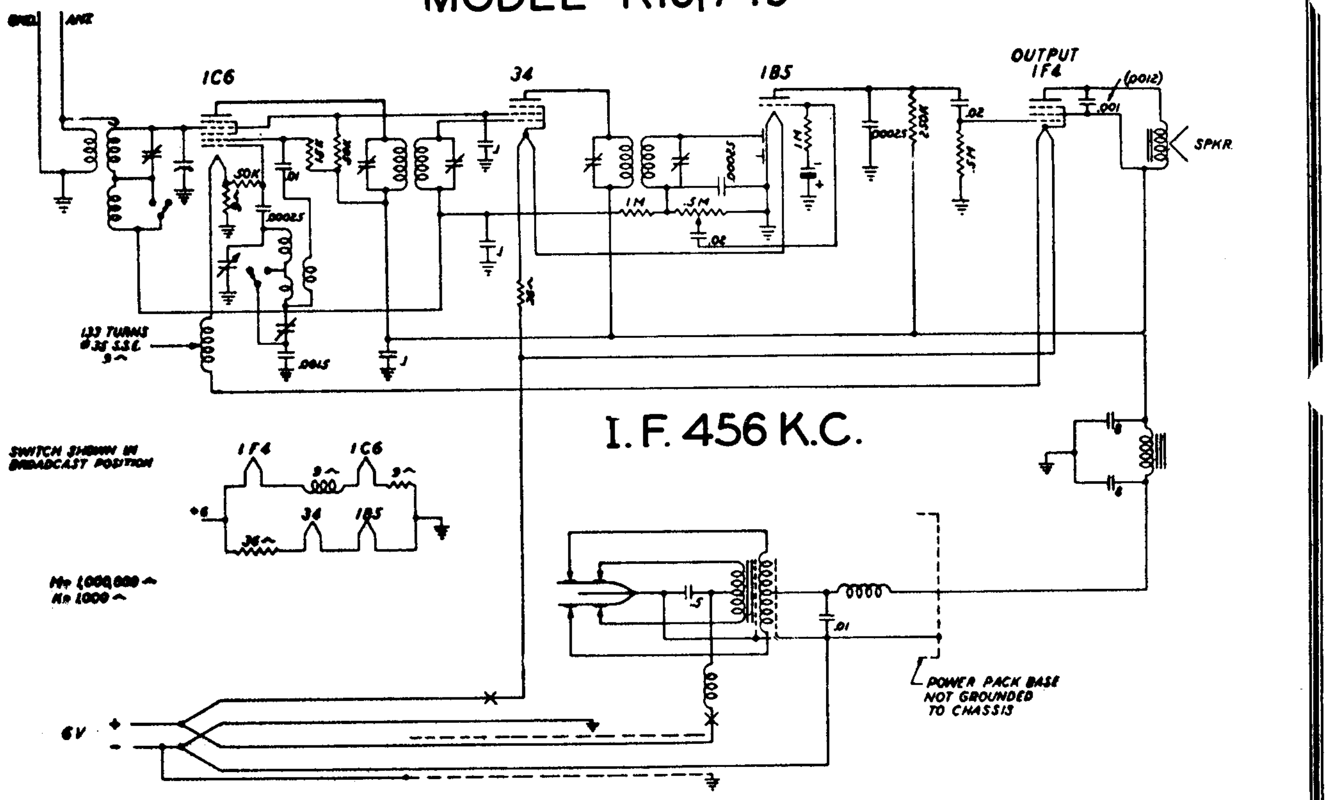
This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and MUST ALWAYS BE DONE BEFORE attempting to align the Short Wave Band.

Part No.	Description	List Price
P189	1st I. F. Transformer	1.25
P190	2nd I. F. Transformer	1.25
P948	Antenna Coil	1.00
P949	Oscillator Coil	.75
P341	Choke Coil	1.00
P913	Wave Change Switch	.50
P911	2 Gang Variable Condenser	3.75
P912	Volume Control with Switch	1.00
P617	Padding Condenser	.35
P544	Small Trimmer Condenser	.15
P194	Tube Shield	.10
P195	Tube Shield Cap	.05
P506	6A7 Tube Socket	.15
P521	75 Tube Socket	.15
P560	43 Tube Socket	.15
P559	25Z5 Tube Socket	.15
P947	L49B Tube Socket	.15
P928	Speaker With Output	4.25
P929	AC Cord & Plug	.40
P930	Knob	.10
P921	Pointer	.10
P922	Dial Scale	.50
P923	Dial Glass	.25
P124	Pilot Light	.20
P136	250 Ohm 1/4 Watt Resistor	.15
P953	650 Ohm 1/2 Watt Resistor	.20
P168	8,000 Ohm 1/4 Watt Resistor	.15
P258	15,000 Ohm 1/4 Watt Resistor	.15
P419	20,000 Ohm 1/4 Watt Resistor	.15
P166	25,000 Ohm 1/4 Watt Condenser	.15
P417	50,000 Ohm 1/4 Watt Resistor	.15
P418	150,000 Ohm 1/4 Watt Resistor	.15
P137	500,000 Ohm 1/4 Watt Resistor	.15
P162	1 Megohm 1/4 Watt Resistor	.15
P142	.10 - 200 Volt Condenser	.20
P143	.02 - 400 Volt Condenser	.20
P147	.00025 Mica Condenser	.20
P148	.05 - 200 Volt Condenser	.15
P276	.10 - 400 Volt Condenser	.25
P335	.01 - 600 Volt Condenser	.20
P336	.0005 Mica Condenser	.20
P927	.0015 Mica Condenser	.25
P304	5.0-30 Volt Electrolytic Condenser	.80
P337	18-6 Mfd.-200 Volt Electrolytic Condenser	2.00
P141	.25-200 Volt Condenser	.20



RADOLEK COMPANY

MODEL K16,749



This receiver is designed to operate over two tuning ranges. Upper band which covers the broadcast range, extends from 545 to 1750 kilocycles (175 to 550 meters), lower band which covers Police, Aviation, and the International 49 Meter Foreign Band

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, and 6000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, the Short Wave Band may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tubes through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the ouput meter.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna lead (Blue) through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the rear gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak.

Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obobtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R.F. section. The padding condenser is located on the right hand end of the chassis

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Band.

SHORT WAVE BAND There is only one adjustment to be made in the alignment of the Short Wave Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary.

Set the dial pointer to 6000 KC (also the test oscillator) and adjust the antenna and antenna trimmer to resonance. The short wave band coils are under the chassis and are located at the right front corner along side of wave band switch.

IMPORTANT: This is the only adjustment necessary for the Short Wave Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Short Wave Band, otherwise the Broadcast Band will be thrown out of alignment.

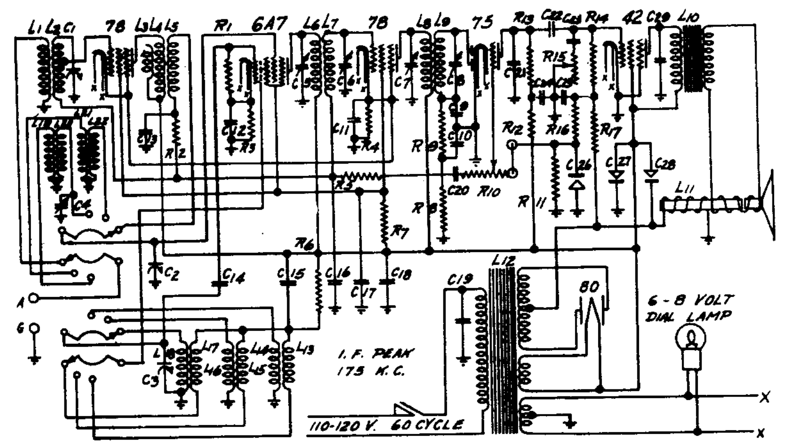
Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 6000 KC.

This completes the correct sequence of operations Band, and MUST ALWAYS BE DONE BEFORE at-
nal with the receiver until the maximum reading is
tempting to align the Short Wave Band.

Part No.	DESCRIPTION	LIST PRICE
P405	Volume Control with Switch	1.00
P913	Wave Change Switch	.50
P911	2 Gang Variable Condenser	3.75
P544	Small Trimmer Condenser	.15
P617	Padding Condenser	.35
P189	1st I. F. Transformer	1.25
P190	2nd I. F. Transformer	1.25
P948	Antenna Coil	1.00
P949	Oscillator Coil	.75
P688	Bias Cell	25
P1101	Vibrator Unit	4.50
P1099	Power Transformer	2.00
P457	A. Choke	.50
P854	R. F. Choke	.50
P1100	R. F. Choke	.50
P411	500 Ohm Filter Choke	.75
P921	Pointer	.10
P922	Dial Scale	.50
P923	Dial Glass	.25
P1097	Magnetic Speaker	5.00
P392	Battery Cord	.75
P553	Type 34 Socket	.15
P554	Type 1C6 Socket	.15
P1094	Type 1F4 Socket	.15
P1095	Type 1B5 Socket	.15
P452	Tube Shield	.10
P958	Electrolytic Condenser	1.50
P671	.01-200 Volt Condenser	.20
P335	.01-600 Volt Condenser	.20
P1079	.01-1000 Volt Condenser	.30
P143	.02-400 Volt Condenser	.20
P395	.5-10 Volt Condenser	.35
P478	.0012-200 Volt Condenser	.20
P142	.10-200 Volt Condenser	.20
P927	0015 Mica Condenser	.25
P147	.00025 Mica Condenser	.20
P258	15,000 Ohm ¼ Watt Resistor	.15
P417	50,000 Ohm ¼ Watt Resistor	.15
P139	250,000 Ohm ¼ Watt Resistor	.15
P137	500,000 Ohm ¼ Watt Resistor	.15
P162	1 Megohm ¼ Watt Resistor	.15
P1104	9 Ohm Candohm Resistor	.20
P1105	36 Ohm Candohm Resistor	.20

REPUBLIC INDUSTRIES

MODEL TL-6C

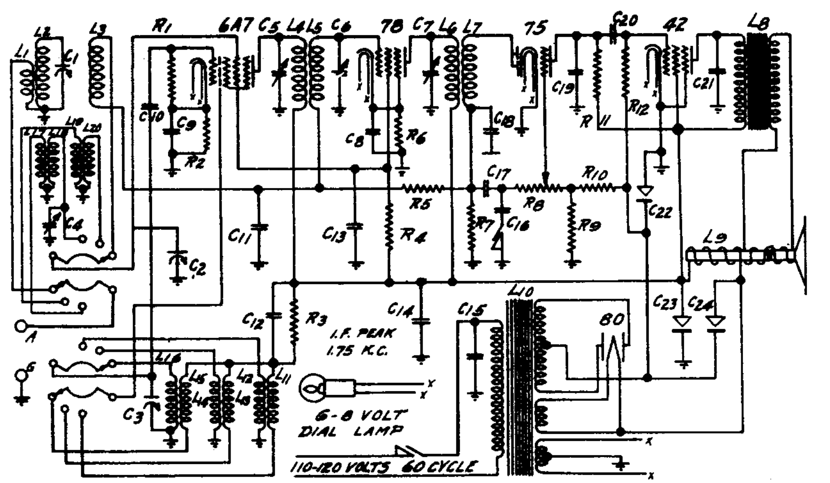


CODE	PART NO.	RESISTORS
R1	898	50,000 Ohm Oscillator Grid Resistor
R2	923	100,000 Ohm A.V.C. Network Resistor
R3	1062	250 Ohm 6A7 Cathode Resistor
R4	1062	250 Ohm R.F. & I.F. Cathode Resistor
R5	926	1 Meg Ohm A.V.C. Network Resistor
R6	920	10,000 Ohm Oscillator Feed Resistor
R7	1042	25,000 Ohm R.F. & I.F. Screen Feed Resistor
R8	925	500,000 Ohm A.V.C. Network Resistor
R9	898	50,000 Ohm Diode Filter Resister
R10	1291	500,000 Ohm Volume Control & Switch
R11	919	5,000 Ohm Bias Network Resistor
R12	923	100,000 Ohm 75 Plate Hum Filter Resistor
R13	924	250,000 Ohm 75 Plate Resistor
R14	925	500,000 Ohm 42 Grid Resistor
R15	1317	250,000 Ohm Tone Control
R16	922	75,000 Ohm Bias Network Resistor
R17	926	1 Meg Ohm 42 Bias Resistor

CODE	PART NO.	CONDENSERS
C1	833	371 MMFD. Preselector Section of 3 Gang
C2	833	371 MMFD. Preselector Section of 3 Gang
C3	833	336 MMFD. Oscillator Section of 3 Gang
C4	972	2 Plate F.B. Preselector Trimmer
C5	1105	55-150 MMFD. First I.F. Primary Trimmer
C6	1104	55-150 MMFD. First I.F. Secondary Trimmer
C7	1105	55-150 MMFD. Second I.F. Primary Trimmer
C8	1247	55-150 MMFD. Second I.F. Secondary Trimmer
C9	339	.0001 MFD. Mica Diode Filter Condenser
C10	339	.0001 MFD. Mica Diode Filter Condenser
C11	272A	.1 MFD. 200 Volt 78's Cathode By-Pass Condenser
C12	272A	.1 MFD. 200 Volt 6A7 Cathode By-Pass Condenser
C13	272A	.1 MFD. 200 Volt 6A7 Grid Isolation Condenser
C14	264	.00005 MFD. Mica Oscillator Coupling Condenser
C15	272A	.1 MFD. 200 Volt Oscillator Feed By-Pass Condenser
C16	272A	.1 MFD. 200 Volt A.V.C. Network By-Pass Condenser
C17	266	1. MFD. 400 Volt Screen By-Pass Condenser
C18	266	1. MFD. 400 Volt B. Supply By-Pass Condenser
C19	269A	.01 MFD. 400 Volt Line By-Pass Condenser
C20	269A	.01 MFD. 400 Volt 75 Grid Feed Condenser
C21	265	.001 MFD. Mica 75 Plate Filter Condenser
C22	269A	.01 MFD. 400 Volt Audio Feed Condenser
C23	343A	.004 MFD. 600 Volt Tone Control Condenser
C24	267A	.1 MFD. 400 Volt 75 Plate Hum Filter Condenser
C25	183	.2 MFD. 200 Volt 42 Grid Hum Filter Condenser
C26	928	25 MFD. 25 Volt Dry Electrolytic Condenser
C27	1129	4 MFD. 450 W.V. Dry Electrolytic Condenser
C28	1129	4 MFD. 450 W.V. Dry Electrolytic Condenser
C29	343A	.004 MFD. 600 Volt 42 Plate Filter Cond.

CODE	PART NO.	INDUCTANCES
L1	1552	Broadcast Preselector Primary 450 Turns #36 S.S.E.
L2	1552	Broadcast Preselector Secondary 91 & 108 Turns #36 D.C.C.
L3	1554	Broadcast Detector Condenser Winding 32 Turns #36 S.S.E.
L4	1554	Broadcast Detector Primary 450 Turns #36 S.S.E.
L5	1554	Broadcast Detector Secondary 144 Turns #36 D.C.C.
L6	1101	8000 Microhenries First I.F. Primary 175 K.C.
L7	1101	8000 Microhenries First I.F. Secondary
L8	1101	8000 Microhenries Second I.F. Primary
L9	1101	8000 Microhenries Second I.F. Secondary
L10	364	42 Output Transformer
L11	364	2500 Ohm Speaker Field
L12	1068	Power Transformer (Unless Special)
L13	1444	Foreign Band Oscillator Primary 9¼ Turns #36 D.C.C.
L14	1444	Foreign Band Oscillator Secondary 8¼ Turns #24 S.S.C.
L15	1567	Police Band Oscillator Primary 15 Turns #36 S.S.E.
L16	1567	Police Band Oscillator Secondary 42 Turns #36 D.C.C.
L17	1616	Broadcast Oscillator Primary 50 Turns #36 S.S.E.
L18	1616	Broadcast Oscillator Secondary 90 Turns #36 D.C.C.
L19	1525	Foreign Band Preselector Primary 16 Turns #32 P.E.
L20	1525	Foreign Band Preselector Secondary 8¼ Turns #24 S.S.C.
L21	1556	Police Band Preselector Primary 25 Turns #36 S.S.E.
L22	1556	Police Band Preselector Secondary 43 Turns #36 D.C.C.

MODEL TR-5B



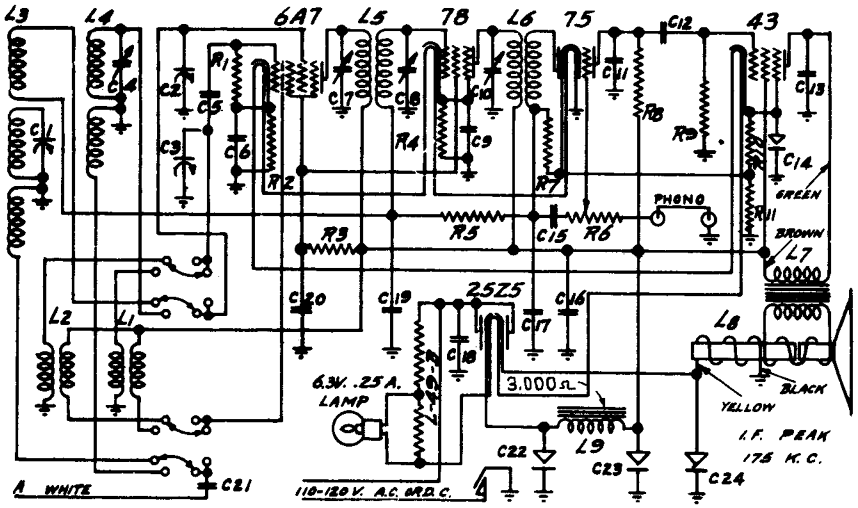
CODE	PART NO.	RESISTORS
R1	898	50,000 Ohm Oscillator Grid Lead
R2	1062	250 Ohm 6A7 Cathode Bias
R3	920	10,000 Ohm Oscillator Feed
R4	898	50,000 Ohm 6A7 & 78 Screen Grid
R5	926	1 Meg Ohm A.V.C. Network
R6	1063	500 Ohm 78 Cathode Bias
R7	925	500,000 Ohm A.V.C. Network
R8	1291	500,000 Ohm Volume Control & Switch
R9	1122	40 Ohm C.Bias Network
R10	1063	500 Ohm C Bias Network
R11	923	100,000 Ohm 75 Plate Resistor
R12	925	500,000 Ohm 42 Grid Resistor

CODE	PART NO.	CONDENSERS
C1	833	371 MMFD. Preselector Section of 3 Gang
C2	833	371 MMFD. Preselector Section of 3 Gang
C3	833	336 MMFD. Oscillator Section of 3 Gang
C4	972	2 Plate F.B. Preselector Trimmer
C5	1104	70-200 MMFD. First I.F. Primary Trimmer
C6	1105	70-200 MMFD. First I.F. Secondary Trimmer
C7	849	75-150 MMFD. Second I.F. Primary Trimmer
C8	272A	.1 MFD. 200 Volt 78 Cathode By-Pass
C9	272A	.1 MFD. 200 Volt 6A7 Cathode By-Pass
C10	264	.00005 MFD. Mica Oscillator Coupling Condenser
C11	272A	.1 MFD. 200 Volt A.V.C. By-Pass
C12	272A	.1 MFD. 200 Volt Oscillator Feed By-Pass
C13	272A	.1 MFD. 200 Volt 6A7 & 78 Screen Grid By-Pass
C14	569A	.2 MFD. 400 Volt B By-Pass
C15	269A	.01 MFD. 400 Volt Line By-Pass
C16	343A	.004 MFD. 600 Volt Tone Control Condenser
C17	269A	.01 MFD. 400 Volt Second Detector Feed
C18	307	.0005 MFD. Mica Diode Filter Condenser
C19	265	.001 MFD. 75 Plate Filter
C20	269A	.01 MFD. 400 Volt Audio Feed
C21	269A	.01 MFD. 400 Volt 42 Plate Filter
C22	928	25 MFD. 25 Volt Electrolytic C Bias Filter
C23	1379	4 MFD. 350 W.V. Electrolytic B Filter
C24	721	8 MFD. 450 W.V. Electrolytic B Filter

CODE	PART NO.	INDUCTANCES
L1	1481	Antenna Primary 175 Turns #36 S.S.E.
L2	1481	Preselector, First 136 Turns #36 S.S.E.
L3	1481	Preselector, Second 126 Turns #36 S.S.E.
L4	1101	8,000 Microhenries First I.F. Primary
L5	1101	8,000 Microhenries First I.F. Secondary
L6	1172	6,000 Microhenries Second I.F. Primary
L7	1172	6,000 Microhenries Second I.F. Secondary
L8	1380	Single 42 Output Transformer
L9	1380	1,500 Ohm Speaker Field
L10	1301	Power Transformer (Unless Special)
L11	1444	Foreign Band Oscillator Primary 9¼ Turns #56 D.C.C.
L12	1444	Foreign Band Oscillator Secondary 8¼ Turns #24 S.S.C.
L13	1487	Police Band Oscillator Primary 15 Turns #36 S.S.E.
L14	1487	Police Band Oscillator Secondary 40 Turns #36 D.C.C.
L15	1111	Broadcast Oscillator Primary 50 Turns #36 S.S.E.
L16	1111	Broadcast Oscillator Secondary 120 Turns #36 D.C.C.
L17	1525	Foreign Band Preselector Primary 16 Turns #32 P.E.
L18	1525	Foreign Band Preselector Secondary 8¼ Turns #24 S.S.C.
L19	1556	Police Band Preselector Primary 25 Turns #36 S.S.E.
L20	1556	Police Band Preselector Secondary 43 Turns #36 D.C.C.

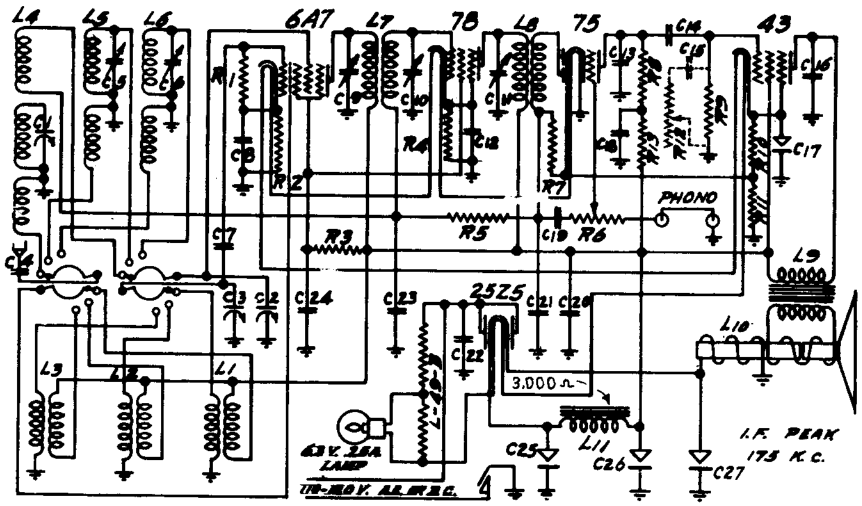
REPUBLIC INDUSTRIES

MODEL 42



CODE	PART NO.	RESISTORS
R1	53-898	50,000 Ohm Oscillator Grid Resistor
R2	53-1062	250 Ohm Oscillator Cathode Resistor
R3	53-1042	25,000 Ohm 6A7 & 78 Screen Resistor
R4	53-1063	500 Ohm 78 Cathode Resistor
R5	53-926	1 Meg Ohm AVC Network Resistor
R6	19-1291	500,000 Ohm Volume Control & Switch
R7	53-925	500,000 Ohm Diode Resistor
R8	53-924	250,000 Ohm 75 Plate Resistor
R9	53-925	500,000 Ohm 43 Grid Resistor
R10	53-1062	500 Ohm 43 Cathode Resistor
R11	53-1122	40 Ohm 75 Cathode Resistor
		CONDENSERS
C1	77-833	366 MMFD. Preselector Section of 3 Gang
C2	77-833	366 MMFD. Preselector Section of 3 Gang
C3	77-833	328 MMFD. Oscillator Section of 3 Gang
C4	78-2010	3-30 MMFD. Foreign Band Preselector Trimmer Cond.
C5	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C6	75-2006	.1 Mfd. 200 Volt Paper 6A7 Cathode By-Pass Cond.
C7	78-2008	First I.F. Primary Trimmer Condenser
C8	78-2011	First I.F. Secondary Trimmer Condenser
C9	75-2005	.1 Mfd. 200 Volt Paper 78 Cathode By-Pass Cond.
C10	78-2009	Second I.F. Trimmer Condenser
C11	76-265	.001 Mfd. Mica 75 Plate Filter Condenser
C12	75-2003	.01 Mfd. 400 Volt Paper Audio Feed Condenser
C13	75-2002	.004 Mfd. 600 Volt Paper 43 Plate Filter Condenser
C14	18-928	25 Mfd. 25 Volt Dry Electrolytic Condenser
C15	75-2003	.01 Mfd. 400 Volt Paper Audio Feed Condenser
C16	75-2011	.5 Mfd. 200 Volt Paper B Supply By-Pass Condenser
C17	76-307	.0005 Mfd. Mica Diode Filter Condenser
C18	75-2006	.1 Mfd. 200 Volt Paper Line By-Pass Condenser
C19	75-2006	.1 Mfd. 200 Volt Paper A.V.C. Network By-Pass Cond.
C20	75-2006	.1 Mfd. 200 Volt Paper 6A7 & 78 Screen By-Pass Cond.
C21	75-2003	.01 Mfd. 400 Volt Paper Antenna Series Condenser
C22	18-2003	11 Mfd. 150 W.V. Dry Electrolytic Condenser
C23	18-2003	4 Mfd. 150 W.V. Dry Electrolytic Condenser
C24	18-2003	4 Mfd. 150 W.V. Dry Electrolytic Condenser

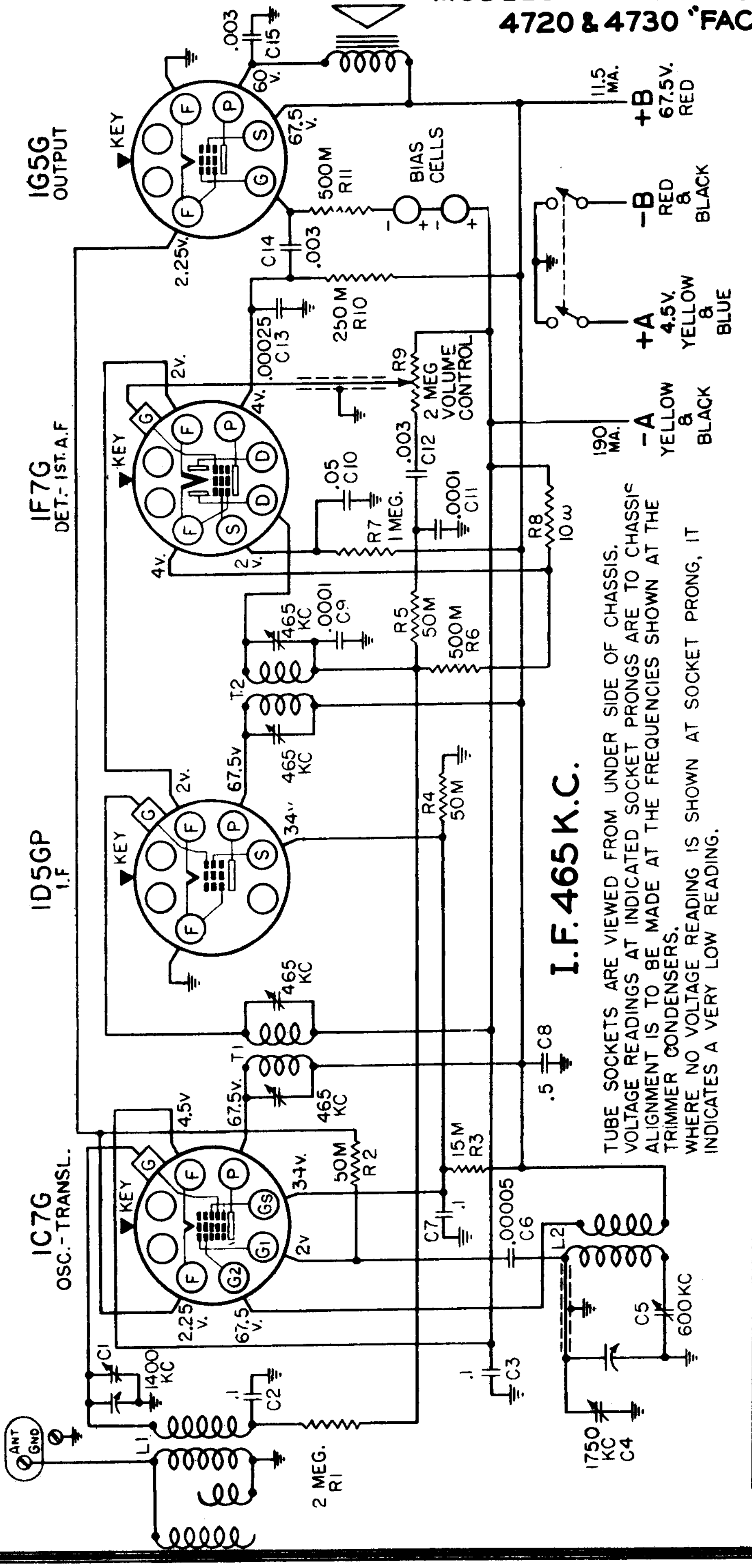
MODEL 51

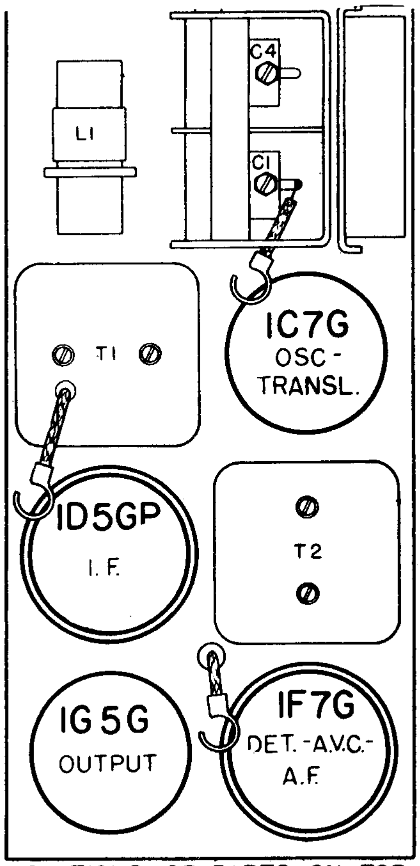


CODE	PART NO.	
R1	53-898	50,000 Ohm Oscillator Grid Resistor
R2	53-1062	250 Ohm Oscillator Cathode Resistor
R3	53-1042	25,000 Ohm 6A7 & 78 Screen Resistor
R4	53-1063	500 Ohm 78 Cathode Resistor
R5	53-926	1 Meg Ohm A.V.C. Network Resistor
R6	19-1291	500,000 Ohm Volume Control & Switch
R7	53-925	500,000 Ohm Diode Resistor
R8	53-924	250,000 Ohm 75 Plate Resistor
R9	53-925	500,000 Ohm 43 Grid Resistor
R10	53-1062	500 Ohm 43 Cathode Resistor
R11	53-1122	40 Ohm 75 Cathode Resistor
R12	19-1317	250,000 Ohm Tone Control on Model A-17
R13	53-898	50,000 Ohm 75 Plate Hum Resistor
C1	77-833	366 MMFD. Preselector Section of 3 Gang
C2	77-833	366 MMFD. Preselector Section of 3 Gang
C3	77-833	328 MMFD. Oscillator Section of 3 Gang
C4	75-2003	.01 Mfd. 400 V. Paper Antenna Series Cond.
C5	78-2010	3-30 MMFD. Police Band Preselector Trimmer
C6	78-2010	3-30 MMFD. Foreign Band Preselector Trimmer
C7	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C8	75-2006	.1 Mfd. 200 V. Paper Oscillator Cathode Cond.
C9	78-2008	First I.F. Primary Trimmer
C10	78-2011	First I.F. Secondary Trimmer
C11	78-2009	Second I.F. Primary Trimmer
C12	75-2006	.1 Mfd. 200 V. Paper 78 Cathode By-Pass Cond
C13	76-265	.001 Mfd. Mica 75 Plate Filter Condenser
C14	75-2003	.01 Mfd. 400 V. Paper Audio Feed Condenser
C15	75-2003	.01 Mfd. 400 V. Paper Tone Control Cond. on Model A-17
C16	75-2002	.004 Mfd. 600 V. Paper Output Plate Filter Condenser
C17	18-928	25 Mfd. 25 Volt Electrolytic Output Cathode By-Pass Cond
C18	75-2006	.1 Mfd. 200 Volt Paper 75 Plate Hum Filter Condenser
C19	75-2003	.01 Mfd. 400 Volt Paper Audio Feed Condenser
C20	75-2011	.5 Mfd. 200 Volt Paper B Supply By-Pass Condenser
C21	76-307	.0005 Mfd. Mica Diode Filter Condenser
C22	75-2006	.1 Mfd. 200 Volt Paper Line By-Pass Condenser
C23	75-2006	.1 Mfd. 200 Volt Paper A.V.C. Network By-Pass Cond.
C24	75-2006	.1 Mfd. 200 Volt Paper Screen By-Pass Condenser
C25	18-2003	11 Mfd. 150 W.V. Dry Electrolytic Filter Condenser
C26	18-2003	4 Mfd. 150 W.V. Dry Electrolytic Filter Condenser
C27	18-2003	4 Mfd. 150 W.V. Dry Electrolytic Filter Condenser

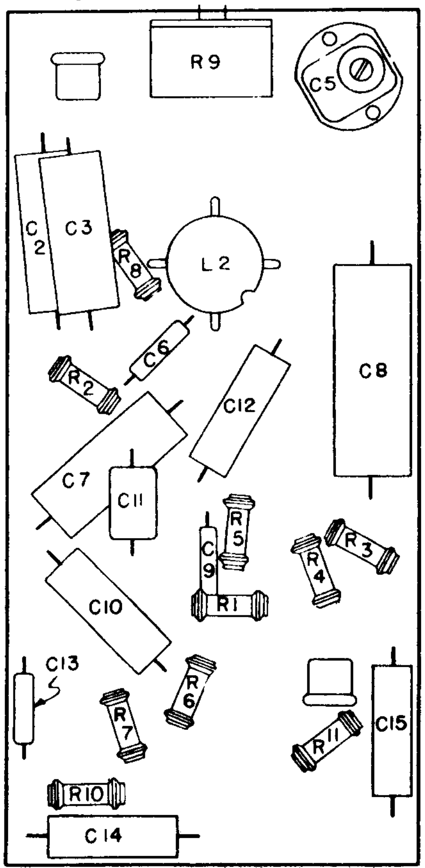
SEARS, ROEBUCK & CO.

MODELS 4602, 4603, 4620, 4621, 4630, 4631, 4720 & 4730 "FACTORY № 101.475"





LOCATIONS OF PARTS ON TOP OF CHASSIS.



LOCATIONS OF PARTS UNDER CHASSIS.

SEARS, ROEBUCK & CO.

MODELS 4602,4603,4620,4621,4630,4631,4720 & 4730

"FACTORY № 101,475"

GENERAL INFORMATION

THE FILAMENT CIRCUIT:

The 1G5G tube and the 1C7G tube are connected in series with each other. The 1D5GP and 1F7G also are connected in series with each other. Accordingly, if any one tube burns out its companion tube also will not light. It is necessary to replace merely the burned out tube; the other then will light. The burned out tube can be identified through the fact that the full voltage of the "A" battery will appear across its filament prongs.

BATTERY CONNECTIONS:

A-	Black and yellow
A+	Yellow and blue
B-	Red and black
B+ 67½V.	Red

SPEAKER ADJUSTMENT:

Two types of speaker have been used. One has a single adjusting screw at the back; the other has two adjusting screws. Speaker rattle can be corrected by turning these screws. In the speaker having two adjusting screws, tighten one screw and loosen the other screw slightly until the rattle is eliminated.

THE BIAS CELL:

The bias cell is filled with thick liquid. When the receiver is in its normal position the liquid in the bias cell will come in contact with the carbon block and the inside of the metal container. However, the receiver may be stood on its end when working on it on the service bench. In this position the bias cell may be upright and the liquid may not touch the carbon block. If this happens, it will cause severe distortion. Accordingly, the necessary precaution should be observed when working on the receiver on the service bench.

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to select the new IF frequency as near as possible to 465 kc.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

THE AVC CIRCUIT:

The diode current of the 1F7G tube, flowing through the 500M ohm resistor, R6, creates a voltage drop across it. This voltage is applied to the control grid of the 1C7G tube to provide AVC.

BATTERY REPLACEMENT:

The dry "A" battery should be replaced when its voltage drops to 3.4 volts, under load. The "B" battery should be replaced when its total voltage has dropped to 51 volts, under load.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . 4000 ohm Weston meter, across speaker terminals

Output meter reading to indicate 50 milliwatts . . . . 9.4 volts

Average sensitivity in microvolts for 50 milliwatts output . . . . See chart below

Generator ground lead connection . . . . Receiver chassis

Dummy antenna value to be in series with generator output . . . . See chart below

Connection of generator output lead . . . . See chart below

Generator modulation . . . . 30%, 400 cycles

Position of Volume Control . . . . Fully on

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	465 kc	.1 mfd.	1C7G Transl. Grid	T2, T1	IF	225
1400 kc *	1400 kc	.0002 mfd.	Antenna Term.	C1, C4	Translator Oscillator	85
600 kc (rock)	600 kc	.0003 mfd.	Antenna Term.	C5	Padder	60

IMPORTANT ALIGNMENT NOTES

* Using the dial as a template make a dummy dial of cardboard with only the 1400 kc calibration on it. Slip this dummy dial over the shaft, hold it horizontal so that the 1400 mark will come at the same position as the 1400 mark of the actual dial and turn the dial pointer to the 1400 kc mark. (The dial pointer should be horizontal when the condenser is fully open or fully meshed.)

The variable should be rocked back and forth a degree or two while making the 600 kc adjustment.

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

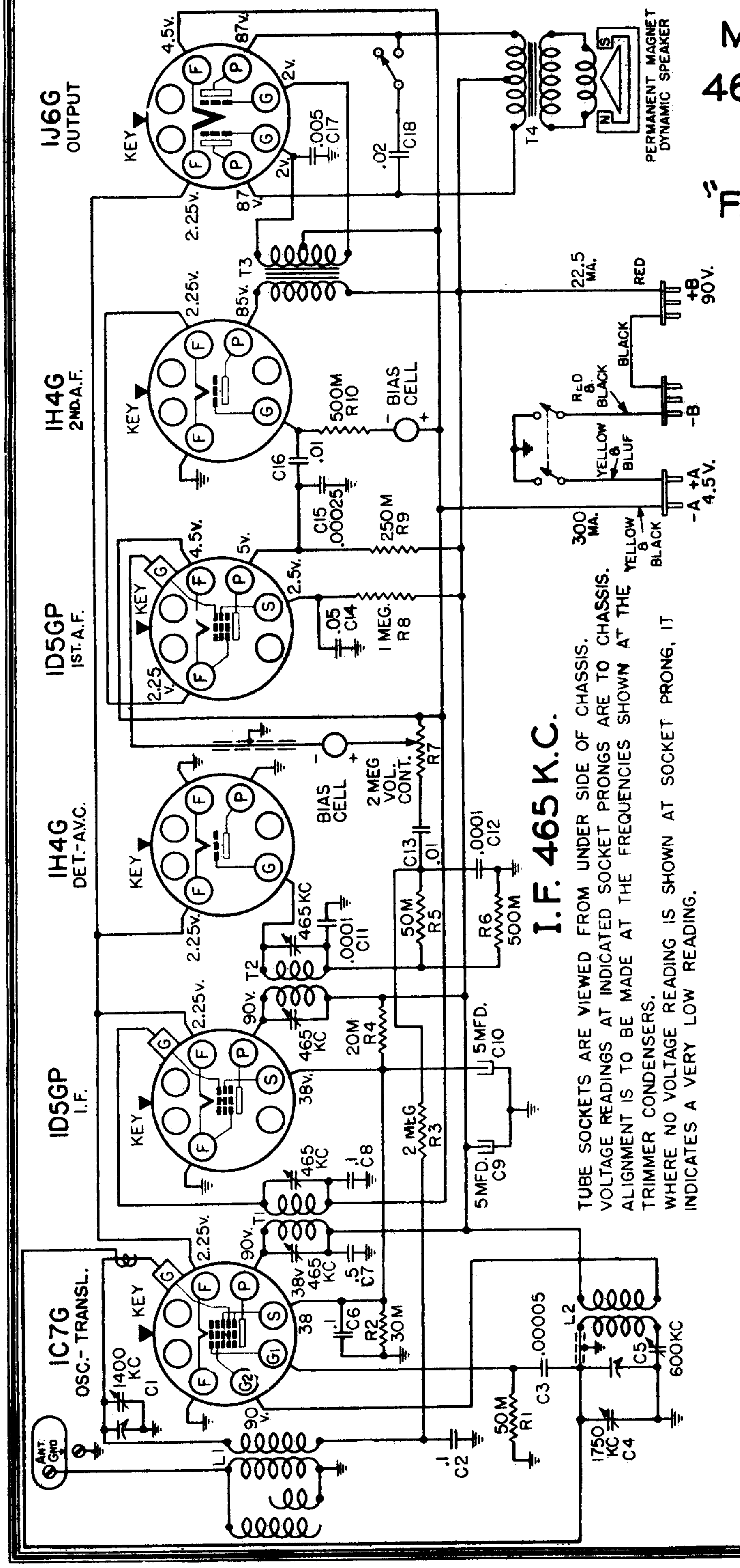
Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

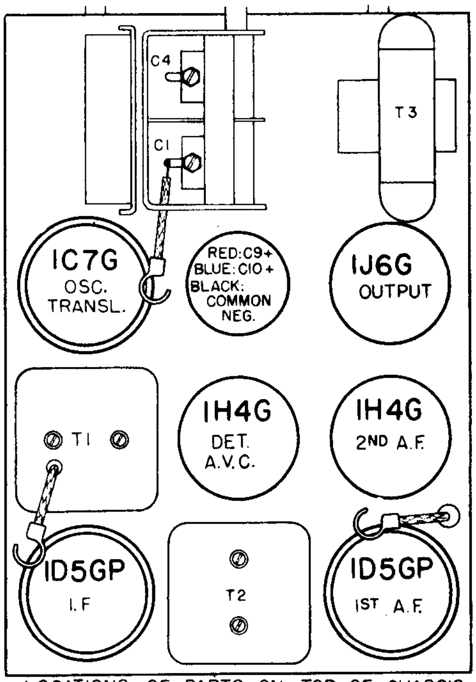
PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SELLING PRICE EACH
	10154165091	Arm - "On-Off" indicator	.23
	10154147031	Board - Antenna terminal	.09
	1015413407	Bushing - Rubber, chassis mtg.	.02
	1015517135	Cable - Battery	.37
	10154163781	Cam - "On-Off" indicator actuating	.22
	1012715564	Cell - Bias	.16
	1015412808	Clip - Grid	.01
L1	1012816257	Coil - Antenna	.67
L2	1012816230	Coil - Oscillator	.32
	1011616231	Condenser - Variable	1.69
C5	1011714433	Condenser - Padder	.29
C8		Condenser - .5 mfd. 200 volts	.29
C2, C3, C7		Condenser - .1 mfd. 200 volts	.16
C10		Condenser - .05 mfd. 300 volts	.13
C12, C14, C15		Condenser - .003 mfd. 400 volts	.10
C13		Condenser - .00025 mfd. mica	.09
C9, C11		Condenser - .0001 mfd. mica	.07
C6		Condenser - .00005 mfd. mica	.07
R9	1013416232	Control - Volume and switch	.76
	1014016266	Dial - Station selector	.30
	1015411567	Grommet - Variable condenser mounting	.02
	1013914405	Knob - Tuning, set screw type	.12
	1013914095	Knob - Volume control and switch, set screw type	.12
	1013916612	Knob - Tuning, push-on type	.11
	1013916613	Knob - Volume control and switch, push-on type	.08
	1015916268	Leaflet - Instruction	.30
	1011816292	Plug - Dry "A" battery	.05
	1011816293	Plug - "B" battery	.07
	1014116234	Pointer	.03
R1		Resistor - 2 megohms, 1/3 watt	.15
R7		Resistor - 1 megohm, 1/3 watt	.15
R6, R11		Resistor - 500M ohms, 1/3 watt	.15
R10		Resistor - 250M ohms, 1/3 watt	.15
R2, R4, R5		Resistor - 50M ohms, 1/3 watt	.15
R3		Resistor - 15M ohms, 1/3 watt	.15
R8		Resistor - 10 ohms, 1/3 watt	.15
	1015315648	Shield - Tube	.11
	1015315650	Shield - Tube, base	.02
	1011813173	Socket - 8 prong, Octal	.14
	1011812757	Socket - 7 prong, Octal	.14
	1015816243	Speaker - 6", Magnetic	3.72
	1015716285	Cone	.94
	1011516286	Actuating coil	.94
	1015816881	Speaker - 6", Magnetic	3.72
	1015716882	Cone	.94
	1015416238	Spring - Tension, "On-Off" indicator	1.14
T1	10133162401	Transformer - IF Input	1.04
T2	1013516241	Transformer - IF Output	1.04

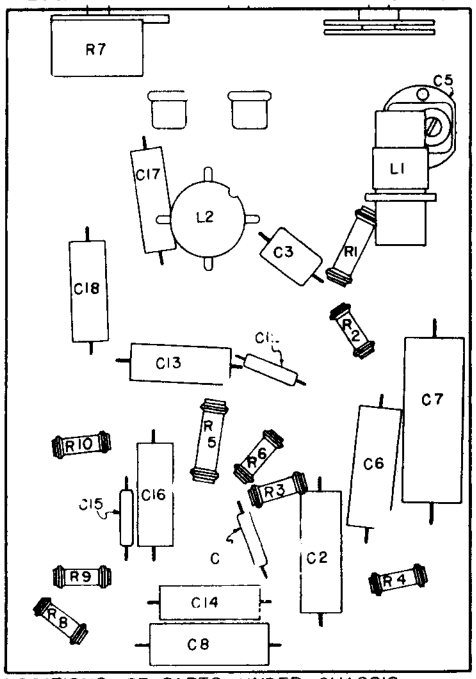
SEARS, ROEBUCK & CO.

MODELS 4604, 4605, 4624, 4625, 4634, 4635 & 4724 "FACTORY No 101,474"





LOCATIONS OF PARTS ON TOP OF CHASSIS.



LOCATIONS OF PARTS UNDER CHASSIS.

SEARS, ROEBUCK & CO.

MODELS 4604,4605,4624,4625,4634,4635 & 4724

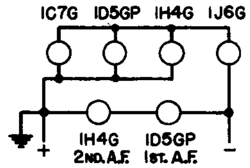
FACTORY № 101,474

GENERAL INFORMATION

These models may be used with either a 4½ volt dry "A" battery or a 4 volt storage "A" battery. Catalog #6000 adapter is necessary to make the connection between the "A" plug and the terminals of a storage battery.

THE FILAMENT CIRCUIT:

Since the tubes have two volt filaments and the "A" supply is four volts, a series parallel arrangement is used for the filament circuit. The 1C7G, the 1D5GP IF and the 1H4G Detector-AVC tubes are connected as one parallel group. This group is connected in series with the 1J6G tube across the "A" supply. The 1H4G second AF and 1D5GP first AF tubes are connected in series with each other across the "A" supply. If any one tube burns out, it will affect the filament voltage and current of its companion tube. The simplified diagram of the filament circuit is shown below.



THE AVC CIRCUIT:

The 1H4G Detector-AVC tube is used as a diode with its grid acting as the diode plate. Diode current, flowing through the 500M ohm resistor, R6, creates a voltage drop across it. This voltage is applied to the control grid of the 1C7G tube to provide AVC.

BATTERY REPLACEMENT:

The dry "A" battery should be replaced when its voltage drops to 3.4 volts, under load. "B" batteries should be replaced when the voltage of each battery has dropped to 34 volts, under load. Because of the class "B" output circuit the "B" drain will vary with volume at which the set is played. Accordingly, the user should be told that for longest battery service the set should not be played louder than necessary.

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to select the new IF frequency as near to 465 kc as possible.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . Across loud speaker voice coil

Output meter reading to indicate 50 milliwatts . . . . 0.37 volts

Generator ground lead connection . . . . Receiver chassis

Dummy antenna value to be in series with generator output . . . . See chart below

Connection of generator output lead . . . . See chart below

Generator modulation . . . . 30%, 400 cycles

Approximate average sensitivity in microvolts for 50 milliwatts output . . . See chart below

Position of Volume Control . . . . Fully clockwise

Position of Tone Control . . . . Fully clockwise

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	465 kc	.1 mfd.	1C7G Transl. Grid	T2,T1	IF	160
1400 kc *	1400 kc	.0002 mfd.	Antenna Term.	C4,C1	Oscillator Translator	50
600 kc (rock)	600 kc	.0002 mfd.	Antenna Term.	C5	Padder	25

IMPORTANT ALIGNMENT NOTES

* Using the dial as a template make a dummy dial of cardboard with only the 1400 kc calibration on it. Slip this dummy dial over the shaft, hold it horizontal so that the 1400 mark will come at the same position as the 1400 mark of the actual dial and turn the dial pointer to the 1400 kc mark. (The dial pointer should be horizontal when the condenser is fully open or fully meshed.)

The variable should be rocked back and forth a degree or two while making the 600 kc adjustment.

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

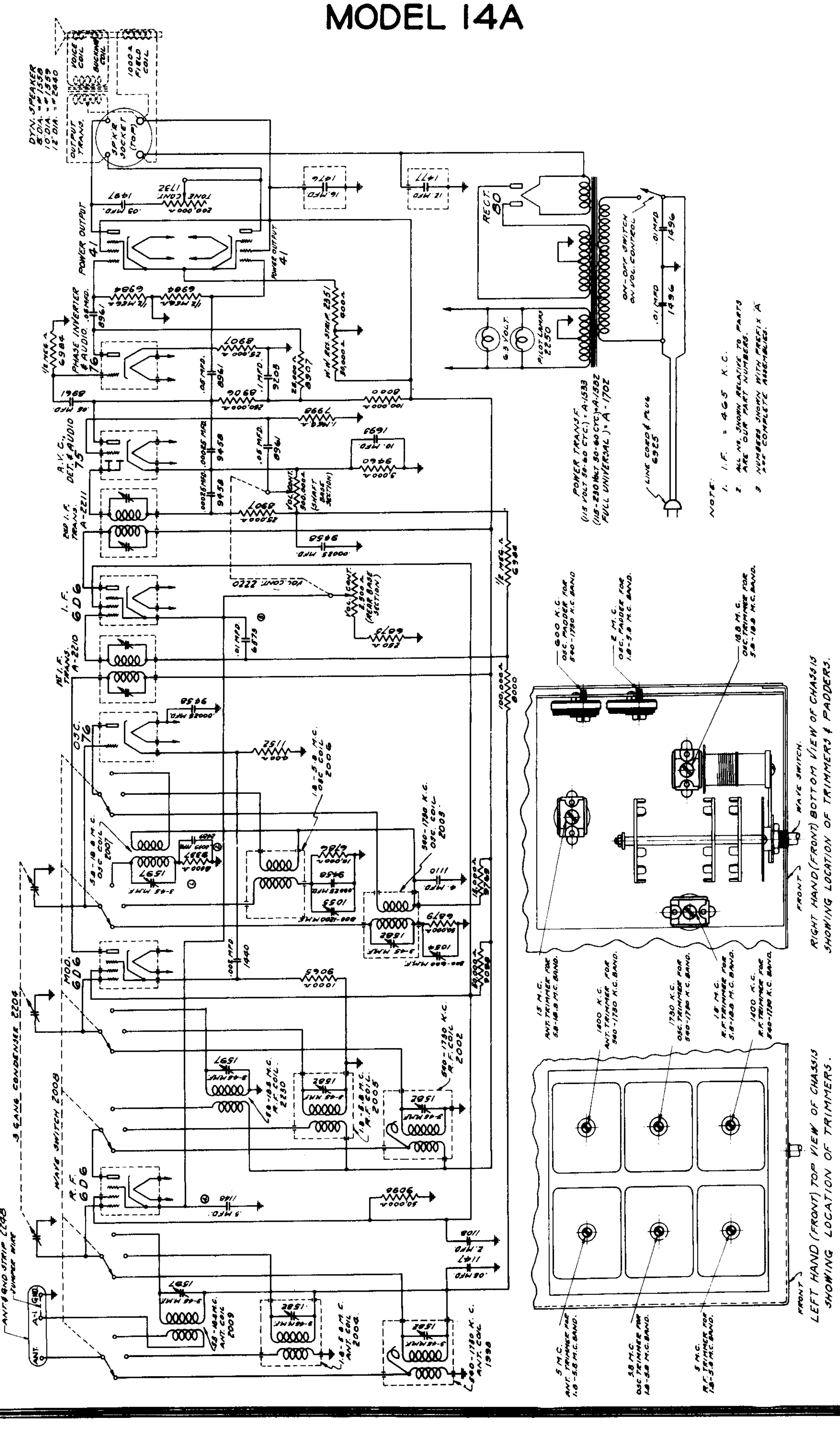
Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SELLING PRICE EACH
	1015416661	Arm - "On-Off" indicator	.20
	10155147031	Board - Antenna terminal	.09
	1015416296	Board - Bias cell mounting	.17
	1015516255	Cable - Battery	.76
	1015516282	Cable Adapter - For storage "A"	.19
	1015416658	Cam - "On-Off" indicator actuating	.20
	1012715564	Cell - Bias	.16
	1015412808	Clip - Grid	.01
L2	1012816230	Coil - Oscillator	.32
L1	1012816257	Coil - Translator	.67
	1011616258	Condenser - Variable	1.86
C9,C10	1012016259	Condenser - Electrolytic, dry, dual	.68
C5	1011714433	Condenser - Padder	.29
C7		Condenser - .5 mfd. 200 volts	.29
C2,C6,C8		Condenser - .1 mfd. 200 volts	.16
C14		Condenser - .05 mfd. 200 volts	.13
C18		Condenser - .02 mfd. 400 volts	.13
C13,C16		Condenser - .01 mfd. 400 volts	.08
C17		Condenser - .005 mfd. 200 volts	.08
C15		Condenser - .00025 mfd. mica	.09
C11,C12		Condenser - .0001 mfd. mica	.07
C3		Condenser - .00005 mfd. mica	.07
R7	1012416260	Control - Volume and switch	.74
	1014016266	Dial - Station selector	.30
	1015411567	Grommet - Variable condenser mtg.	.02
	1013914405	Knob - Tuning, set screw type	.12
	1013914153	Knob - Tone, set screw type	.12
	1013914095	Knob - Volume, set screw type	.12
	1013916612	Knob - Tuning, push-on type	.11
	1013916426	Knob - Tone control, push-on type	.12
	1013916613	Knob - Volume, push-on type	.08
	1015916373	Leaflet - Instruction	.30
	1014116234	Pointer - Dial	.03
R3		Resistor - 2 megohms, 1/3 watt	.15
R8		Resistor - 1 megohm, 1/3 watt	.15
R6,R10		Resistor - 500M ohms, 1/3 watt	.15
R9		Resistor - 250M ohms, 1/3 watt	.15
R1,R5		Resistor - 50M ohms, 1/3 watt	.15
R2		Resistor - 30M ohms, 1/3 watt	.19
R4		Resistor - 20M ohms, 1/3 watt	.15
	1015315648	Shield - Tube	.11
	1011812757	Socket - 7 prong	.14
	1011813173	Socket - 8 prong	.14
	1015816274	Speaker - 6", PM Dynamic	4.56
	1015716352	Cone and voice coil	1.50
T4	1011316353	Transformer	1.31
	1015816589	Speaker - 6", PM Dynamic	4.56
	1015716590	Cone and voice coil	1.50
T4	1011316591	Transformer	1.31
	1015416264	Spring - "On-Off" indicator tension	.02
	1013816261	Switch - Tone	.35
T1	10133162941	Transformer - IF Input	1.26
T2	1013516295	Transformer - IF Output	1.15
T3	1011216265	Transformer - Audio	1.16

SENTINEL RADIO CORP.

MODEL 14A



SENTINEL RADIO CORP.

MODEL 14A

ALIGNMENT PROCEDURE:

Realignment of this receiver should never be necessary unless one of the oscillator, antenna, or I. F. coils has been replaced. Lack of sensitivity, selectivity, and poor tone quality may be due to any one or a combination of causes, such as weak or defective tubes or speaker, inadequate or excessively long antenna, open or grounded bias resistor, bypass condenser, etc. Under no circumstances should realignment be attempted until all other possible sources have been first thoroughly investigated and have been definitely proven not to be the cause.

If an I. F. tube is replaced it is advisable to realign the I. F. amplifier, particularly if the replacement tube is one of a different manufacture than the one in the receiver. It is important when aligning to carefully follow the procedure in the order given, otherwise the receiver will lack sensitivity and the dial calibration will be incorrect.

IT IS IMPERATIVE THAT AN ACCURATELY CALIBRATED OSCILLATOR BE USED WITH SOME TYPE OF OUTPUT MEASURING DEVICE.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the test oscillator output to the control grid of the 6D6 modulator tube through a .02 Mfd. condenser. Leave the grid cap connected to the grid terminal of the tube, and connect the ground side of the test oscillator to the receiver ground.
2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).
3. Align the second intermediate transformer by turning one of the trimmer screws accessible through holes in the top of the transformer shields up and down (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screw of the same transformer for maximum sensitivity.
4. Adjust the first intermediate transformer in the same manner as the second I. F. transformer.

TO ALIGN THE VARIABLE CONDENSER:

It is important when aligning the gang condenser, padding and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The padding and trimmer condensers located underneath the chassis and inside of and accessible through the holes found in the top of the catacomb shield (mounted on top and in the left front corner of the receiver) will be referred to by their function as indicated on the circuit diagram.

1. Connect the high output side of the test oscillator through a 400 ohm resistor to the receiver antenna lead and the low side to the set ground.

2. Place the band selector switch for operation on the 5.8 to 18.8 megacycle band, tune the receiver dial, and set the test oscillator frequency to EXACTLY 18.8 MEGACYCLES.

Rotate gang condenser so that plates are completely out of mesh and then tune in the 18.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 18.8 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 18.8 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillation trimmer at 18 megacycles always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 18.8 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 17.8 megacycles. Then vary the receiver dial slightly to the right and left of 17.8 megacycles, and if the fundamental peak was used in aligning at 18.8 megacycles the test oscillator signal will be heard at approximately 17.8 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 18.8 megacycle oscillator trimmer must be properly readjusted.

3. With band selector switch set for operation on 5.8 to 18.8 megacycle band tune the receiver dial and set test oscillator frequency to EXACTLY 15 MEGACYCLES. Adjust 15 megacycle antenna and R.F. trimmers to maximum 15 megacycle signal sensitivity.

4. Leave band selector switch for operation on the 5.8 to 18.8 megacycle band, tune the receiver dial and set the test oscillator frequency to approximately 6 megacycles. While rocking gang condenser slightly to right and left adjust 6 megacycle oscillator padder for maximum sensitivity.

5. Place band selector switch for operation on 1.8 to 5.8 megacycle band, tune the receiver dial, and set test oscillator frequency to EXACTLY 5.8 MEGACYCLES.

Rotate gang condenser so that plates are completely out of mesh and then BRING IN 5.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT by adjusting 5.8 megacycle oscillator trimmer.

6. With the band selector switch set for operating on 1.8 to 5.8 Megacycle band tune receiver dial and set test oscillator frequency to EXACTLY 5 MEGACYCLES. Then adjust 5 megacycle antenna and R.F. trimmers for maximum 5 megacycle signal sensitivity.

7. Leave band selector switch for operation on 1.8 to 5.8 megacycle band, tune receiver dial and set test oscillator frequency to approximately 2 megacycles. While rocking gang condenser slightly to right and left adjust 2 megacycle oscillator padder for maximum sensitivity.

8. Replace the 400 ohm resistor in series with test oscillator lead with a 200 Mmfd. condenser, place the band selector switch for operation on the 540 to 1730 kilocycle band and set test oscillator frequency to EXACTLY 1730 KILOCYCLES.

Rotate gang condenser so that plates are completely out of mesh and BRING IN THE 1730 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1730 KILOCYCLE OSCILLATOR TRIMMER.

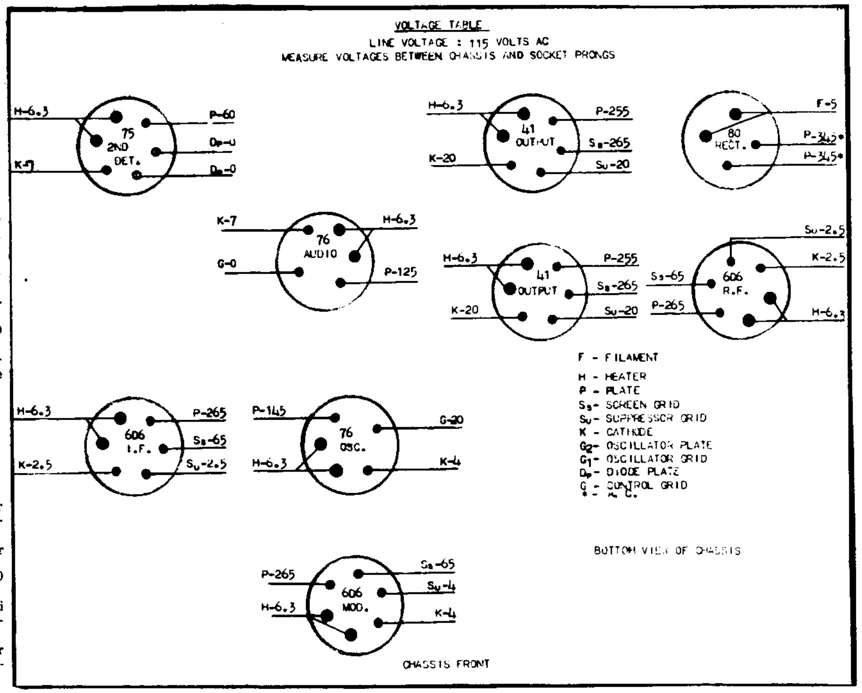
9. With band selector switch placed for operation on the 540 to 1730 kilocycle band set test oscillator frequency and receiver dial to EXACTLY 1400 KILOCYCLES. Adjust 1400 kilocycles R. F. and antenna trimmers for maximum 1400 kilocycle signal sensitivity.

10. Leave band selector switch for operation on 540 to 1720 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator padder for maximum sensitivity.

Part Number		List Price
1998	1730-540 K.C. Band Antenna Coil	$1.05
2002	1730-540 K.C. Band R.F. Coil	1.05
2003	1730 K.C. Band Oscillator Coil	1.05
2004	1.8-5.8 M.C. Band Antenna Coil	70
2005	1.8-5.8 M.C. Band R.F. Coil	.75
2006	1.8-5.8 M.C. Band Oscillator Coil	.85
2009	5.8-18.8 M.C. Band Antenna Coil	.60
2230	5.8-18.8 M.C. Band R.F. Coil	.70
2207	5.8-18.8 M.C. Band Oscillator Coil	.75
2210	First I. F. Transformer	1.50
2211	Second I. F. Transformer	1.50
2204	Three Gang Condenser	3.75
2403	Tuning Dial Assembly	5.00
	Glass for Dial	.45
1054	Padding Condenser	.55
1055	Padding Condenser	.55
1582	Trmimer Condenser	.21
2008	Wave Switch	1.80
2220	Volume Control With Off and On Switch	1.85
1732	Tone Control	.85
1533	115 Volt 50-60 Cycle Power Transformer	5.75
1532	115-230 Volt 50-60 Cycle Power Transformer	6.25
1702	Full Universal Power Transformer	9.50
1476	16 Mfd. Wet Electrolytic Condenser	1.40
1477	12 Mfd. Wet Electrolytic Condenser	1.25
1110	4 Mfd. Dry Electrolytic Condenser	1.14
1108	2 Mfd. Dry Electrolytic Condenser	.99
1693	10 Mfd. Dry Electrolytic Condenser	.75
2248	Antenna and Ground Strip	.22
1628	.0045 Mfd. Moulded Condenser	.21
9458	.00025 Mfd. Moulded Condenser	.21

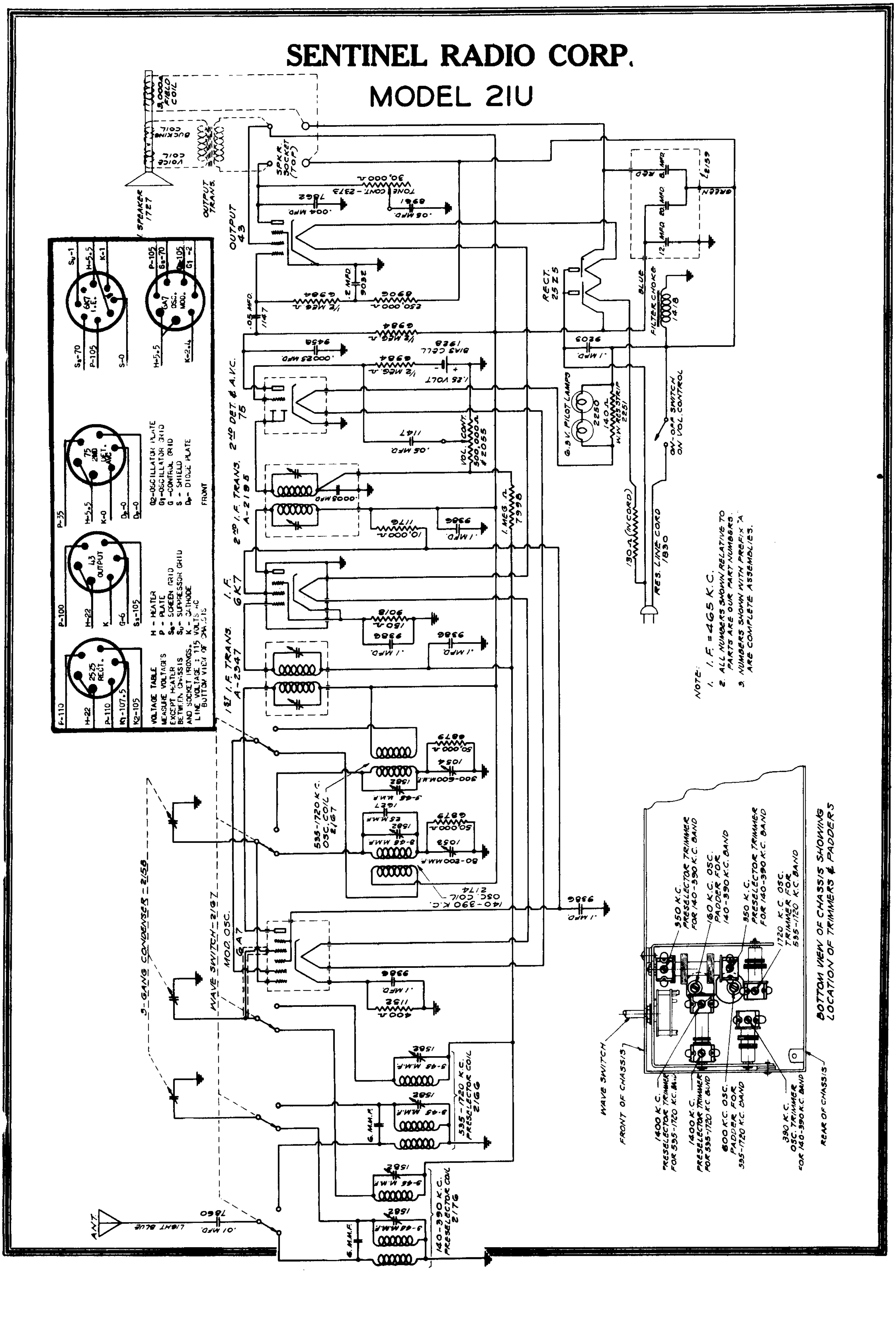
Part Number		List Price
1440	.002 Mfd. Moulded Condenser	.21
1147	.05 Mfd. 200 Volt Condenser	.19
9386	.1 Mfd. 200 Volt Condenser	.19
6573	.01 Mfd. 200 Volt Condenser	.17
8961	.05 Mfd. 400 Volt Condenser	.19
9203	.1 Mfd. 400 Volt Condenser	.20
1496	.01 Mfd. 600 Volt Condenser	.18
1497	.03 Mfd. 600 Volt Condenser	.19
2351	Wire Wound Resistor Strip	1.15
6879	50.000 Ohm 1/3 Watt Resistor	.19
9337	8.000 Ohm 1/3 Watt Resistor	.19
6786	10.000 Ohm 1/3 Watt Resistor	.19
7998	1 Meg Ohm 1/3 Watt Resistor	.19
6984	500,000 Ohm 1/3 Watt Resistor	.19
8906	250,000 Ohm 1/3 Watt Resistor	.19
8000	100,000 Ohm 1/3 Watt Resistor	.19
8907	25,000 Ohm 1/3 Watt Resistor	.19
9463	3.000 Ohm 1/3 Watt Resistor	.19
9065	1.000 Ohm 1/3 Watt Resistor	.19
1152	400 Ohm 1/3 Watt Resistor	.19
6875	250 Ohm 1/3 Watt Resistor	.19
6769	15,000 Ohm 1/2 Watt Resistor	.19
9098	50.000 Ohm 1/2 Watt Resistor	.19
1859	Eight Inch Dynamic Speaker	9.25
1859	Ten Inch Dynamic Speaker	10.00
2440	Twelve Inch Dynamic Speaker	10.75
2442	Small Tuning Knob	.30
2443	Large Tuning Knob	.30
2444	Volume Control Knob	.30
2445	Band Selector Switch Knob	.30
2446	Tone Control Knob	.30

Prices Are Subject to Change Without Notice.



SENTINEL RADIO CORP.

MODEL 21U



SENTINEL RADIO CORP.

MODEL 21U

ALIGNMENT PROCEDURE: Realignment of this receiver should never be necessary unless one of the oscillator, antenna, or I. F. coils has been replaced. Lack of sensitivity, selectivity, and poor tone quality may be due to any one or a combination of causes, such as weak or defective tubes or speaker, inadequate or excessively long antenna, open or grounded resistor, bypass condenser, etc. Under no circumstances should realignment be attempted until all other possible sources have been first thoroughly investigated and have been definitely proven not to be the cause. If an I. F. tube is replaced, it is advisable to realign the I. F. amplifier, particularly if the replacement tube is one of a different manufacture than the one in the receiver. It is important when aligning to carefully follow the procedure in the order given, otherwise the receiver will lack sensitivity and the dial calibration will be incorrect.

IT IS IMPERATIVE THAT AN ACCURATELY CALIBRATED OSCILLATOR BE USED WITH SOME TYPE OF OUTPUT MEASURING DEVICE.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the test oscillator output to the control grid of the 6A7 oscillator-modulator tube through a .02 Mfd. condenser. Leave the grid cap connected to the grid terminal of the tube, and connect the ground side of the test oscillator to the receiver ground.

2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).

3. Align the second intermediate transformer by turning one of the trimmer screws accessible through holes in the top of the transformer shields up and down (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screw of the same transformer for maximum sensitivity.

4. Adjust the first intermediate transformer in the same manner as the second I. F. transformer.

TO ALIGN VARIABLE CONDENSER: It is important when aligning the gang condenser, padding condenser, and wave trap to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The trimmer and padding condensers will be referred to by their function as indicated on the circuit diagram.

1. Connect the high output side of the test oscillator through a .00025 Mfd. condenser to the receiver antenna lead and the low side to the set ground.

2. Place band selector switch for operation on the 1720-535 kilocycle band, rotate gang condenser so that plates are completely out of mesh, set test oscillator frequency to EXACTLY 1720 KILOCYCLES. Adjust 1720 kilocycle oscillator trimmer for maximum 1720 kilocycle signal output.

3. With band selector switch set for operation on the 1720-535 kilocycle band, set the test oscillator frequency and receiver tuning dial to EXACTLY 1400 KILOCYCLES. Then adjust 1400 kilocycle preselector trimmers for maximum 1400 kilocycle response.

4. Tune receiver dial and set test oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator padder for maximum sensitivity.

5. Place band selector switch for operation on the 390-140 kilocycle band, rotate gang condenser so plates are completely out of mesh, and set test oscillator frequency to EXACTLY 390 KILOCYCLES. Bring in 390 kilocycle signal to maximum output with 390 kilocycle oscillator trimmer.

6. With band selector switch for operation on 390-140 kilocycle band, tune receiver dial and set test oscillator frequency to EXACTLY 350 KILOCYCLES. Adjust 350 kilocycle preselector trimmers for maximum 350 kilocycle signal response.

7. Leave band selector switch for operation on the 390-140 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 160 kilocycles. Then while rocking gang condenser slightly to right and left adjust 160 kilocycle padding condenser for maximum sensitivity.

Part Number		List Price
2166	535-1720 K. C. Band Antenna Preselector Coil	$1.30
2167	535-1720 K. C. Band Oscillator Coil	.55
2176	140-390 K. C. Band Antenna Preselector Coil	1.45
2174	140-390 K. C. Band Oscillator Coil	.75
2347	First I. F. Transformer	1.65
2195	Second I. F. Transformer	1.65
2158	Three Gang Condenser	3.60
2109	Tuning Dial Assembly Complete	2.25
1054	Padding Condenser	.55
1053	Padding Condenser	.50
1582	Trimmer Condenser	.21
1928	Bias Cell	.22
2047	Bias Cell Mounting Strip	.11
2055	Volume Control and Off and On Switch	1.10
2373	Tone Control	.75
2161	Wave Switch	1.70
1418	Filter Choke	.92
2159	2x8 and 1-20 Mfd. Dry Electrolytic Condenser	3.50
9458	.00025 Mfd. Mica Condenser	.21
1627	.000025 Mfd. Mica Condenser	.21
9459	.0005 Mfd. Mica Condenser	.21

Part Number		List Price
9386	.1 Mfd. 200 Volt Condenser	.19
9032	.2 Mfd. 200 Volt Condenser	.23
1147	.05 Mfd. 200 Volt Condenser	.19
7862	.004 Mfd. 400 Volt Condenser	.17
8961	.05 Mfd. 400 Volt Condenser	.19
7860	.01 Mfd. 400 Volt Condenser	.17
9203	.1 Mfd. 400 Volt Condenser	.20
1830	Resistor Line Cord 115 Volt	1.00
1831	Resistor Line Cord—220 Volt Extension	1.50
1832	Resistor Line Cord—150 Volt Extension	1.50
2251	Wire Wound Resistor Strip	.28
6984	500,000 Ohm 1/3 Watt Resistor	.19
8906	250,000 Ohm 1/3 Watt Resistor	.19
7998	1 Meg Ohm 1/3 Watt Resistor	.19
6879	50,000 Ohm 1/3 Watt Resistor	.19
1152	400 Ohm 1/3 Watt Resistor	.19
9018	150 Ohm 1/3 Watt Resistor	.19
1176	10,000 Ohm ½ Watt Resistor	.19
1727	6" Dynamic Speaker	8.00
1740	15/16" Knob	.22
1739	13/16" Knob	.22

Prices Are Subject to Change Without Notice

SPARKS-WITHINGTON COMPANY

MODELS 73-AX & 73-BX

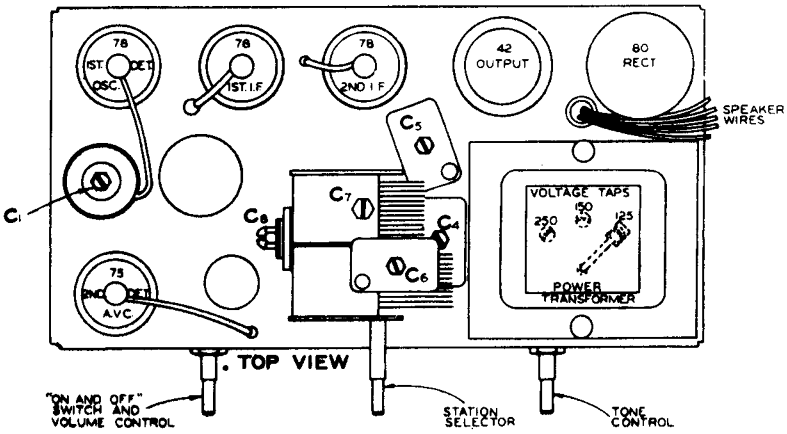
VOLTAGE-RESISTANCE CHART

Line Voltage — 117 Volts
Voltage Tap — 125 Volts

Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Broadcast

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)							
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Grid Cap
78	1st Detector-Oscillator	Volts	2.7	220	100	3.2	3.2	2.7	0
		Ohms	0	20,000	20,000	0	2,500	0	2,000
78	1st I-F Amplifier	Volts	2.7	100	100	0	18	2.7	13
		Ohms	0	28,000	20,000	300	300	0	750,000
78	2nd I-F Amplifier	Volts	2.7	240	100	2.8	2.8	2.7	0
		Ohms	0	28,000	20,000	300	300	0	750,000
75	2nd Det.-A. V. C.	Volts	2.7	85	*	*	1	2.7	0
		Ohms	0	500,000	250,000	250,000	200	0	300,000
42	Power Amplifier	Volts	2.7	235	240	*	0	2.7	—
		Ohms	0	28,000	26,000	500,000	0	0	—
80	Rectifier	Volts	240	130	130	240	—	—	—
		Ohms	2,800	2,500	2,500	2,800	—	—	—

NOTES: Voltage and resistance readings are for schematic diagram shown. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.
*Cannot be measured with Weston No. 665, Type 1.



MODEL 73

VOLTAGE ANALYSIS AND CONTINUITY CHART

Line Voltage 115
Position of Voltage Compensator—125

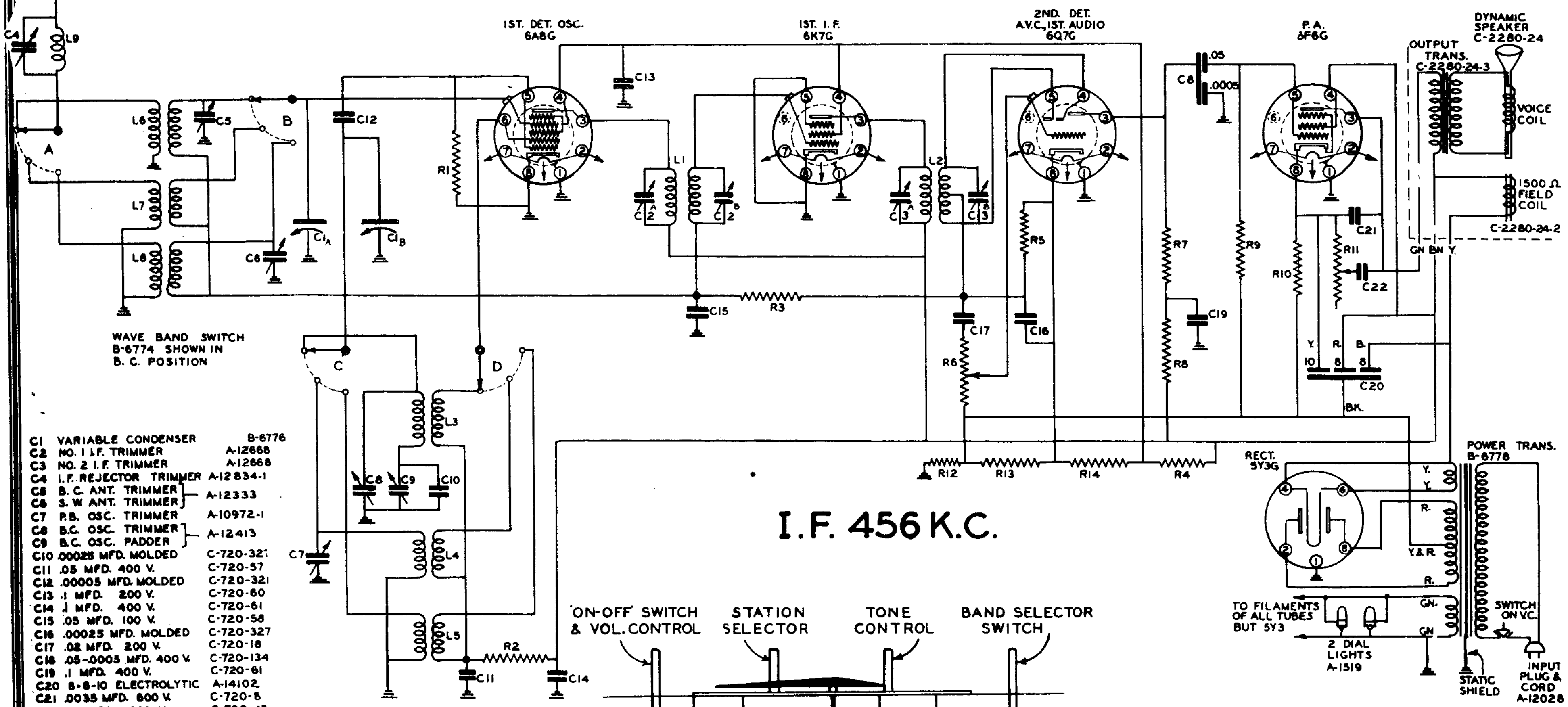
Position of Volume Control—Full with Antenna Disconnected
Position of Band Selector Switch—Broadcast

Tube	Location	PLATE		Screen Grid Volts	Control Grid Volts	Grid Res. to Preceed. Plate (Ohms)	RESISTANCE TO GROUND (OHMS)			
		Volts	Ma.				Plate	Screen	C. Grid	Cathode
6D6	1st Det.	240	3.5	90	—6.5	—	40,000	20,000	600,000	1,700
37	Osc. Stage	90	3.	—	—	—	90,000	—	25,000	0
6D6	I-F Stage	240	8.	90	—1.5	640,000	40,000	20,000	600,000	150
75	Diode Det.-A.V.C.	—	—	—	—	—	300,000	—	—	230
	Triode A-F	75	0.5	—	—1.0	—	390,000	—	250.000	
42	Power Stage	235	20.	240	—20.*	590,000	40,000	40,000	200.000	0
80	Rectifier	340**	25†	—	—	—	—	—	—	—

NOTES: Allow 15% + or — on all measurements.
All heater voltages: 6.3, except 80 Rectifier: 5.0 volts.
* Actual. About —12. volts as read on Jewell 444 Analyzer.
** Filament to negative of field.
† Per plate.

SPARKS-WITHINGTON COMPANY

MODELS 537 & 577

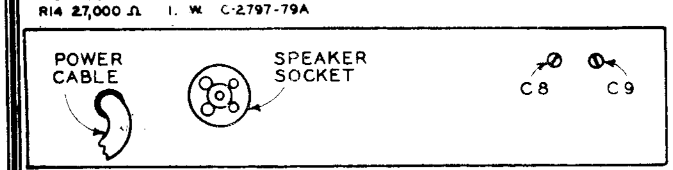


I.F. 456 K.C.

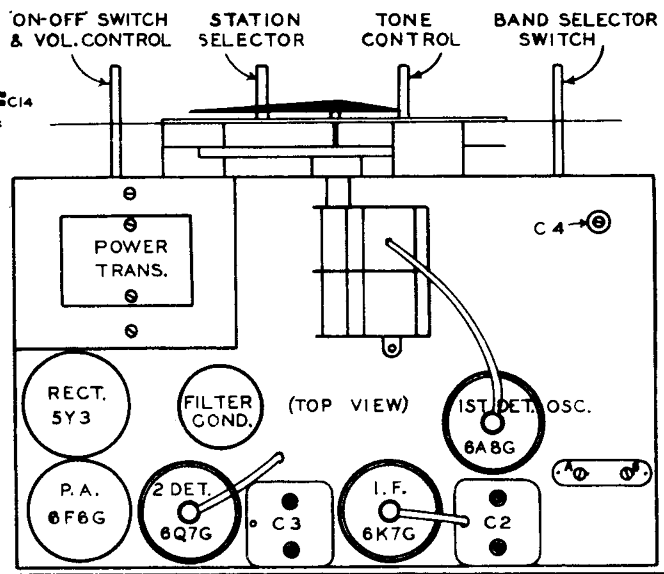
C1	VARIABLE CONDENSER	B-6776
C2	NO. 1 I.F. TRIMMER	A-12668
C3	NO. 2 I.F. TRIMMER	A-12668
C4	I.F. REJECTOR TRIMMER	A-12834-1
C5	B.C. ANT. TRIMMER	A-12333
C6	S.W. ANT. TRIMMER	A-12333
C7	P.B. OSC. TRIMMER	A-10972-1
C8	B.C. OSC. TRIMMER	A-12413
C9	B.C. OSC. PADDER	A-12413
C10	.00025 MFD. MOLDED	C-720-327
C11	.05 MFD. 400 V.	C-720-57
C12	.00005 MFD. MOLDED	C-720-321
C13	.1 MFD. 200 V.	C-720-60
C14	.1 MFD. 400 V.	C-720-61
C15	.05 MFD. 100 V.	C-720-56
C16	.00025 MFD. MOLDED	C-720-327
C17	.02 MFD. 200 V.	C-720-18
C18	.05-.0005 MFD. 400 V.	C-720-134
C19	.1 MFD. 400 V.	C-720-61
C20	8-8-10 ELECTROLYTIC	A-14102
C21	.0035 MFD. 600 V.	C-720-8
C22	.03 MFD. 600 V.	C-720-43

R1	56,000 Ω	.25 W.	C-2795-83B
R2	22,000 Ω	5 W.	C-2796-78A
R3	1 MEGOHM	.25 W.	C-2795-31B
R4	22,000 Ω	2 W.	C-2798-78A
R5	470,000 Ω	.25 W.	C-2795-29B
R6	1 MEGOHM V.C. & SWITCH		A-12988
R7	270,000 Ω	.25 W.	C-2795-91B
R8	100,000 Ω	.25 W.	C-2795-25B
R9	330,000 Ω	.25 W.	C-2795-28B
R10	470 Ω	1. W.	C-2797-58A
R11	1 MEGOHM TONE CONTROL		A-12987
R12	270 Ω	.25 W.	C-2795-55B
R13	390 Ω	.25 W.	C-2795-57B
R14	27,000 Ω	1. W.	C-2797-79A

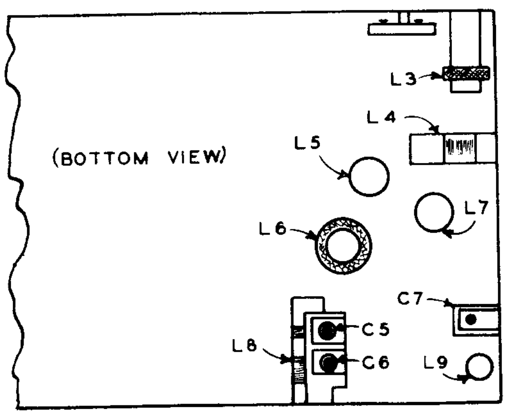
L1	NO. 1 I.F. COIL	A-12064-7
L2	NO. 2 I.F. COIL	A-12989-1
L3	B.C. OSC. COIL	A-12055-7
L4	P.B. OSC. COIL	A-12062-10
L5	S.W. OSC. COIL	A-12062-9
L6	B.C. R.F. COIL	A-12056-4
L7	P.B. R.F. COIL	A-12061-6
L8	S.W. R.F. COIL	A-12061-5
L9	I.F. REJECTOR COIL	A-12666-3



(REAR VIEW)



(TOP VIEW)



(BOTTOM VIEW)

SPARKS-WITHINGTON COMPANY

MODELS 537 & 577

Foreword: The use of quality test equipment is highly recommended and a good test oscillator becomes a virtual necessity when aligning the all-wave or short-wave type of receiver. Due to the fact that the ear cannot distinguish small changes in sound intensity, an output meter is essential to the proper adjustment of the various condensers.

Unless otherwise specified, the adjusting of any condenser consists of turning the adjusting screw or nut to the right or left until the output meter registers the greatest deflection.

1. EQUIPMENT REQUIRED

A. Modulated test oscillator (crystal controlled or accurately calibrated) capable of generating frequencies from 456 to 15,000 kilocycles.

B. Output meter.

C. Part A-5732 adjusting wrench.

D. Dummy antennas, consisting of a 150 mmf. condenser and a 400 ohm non-inductive resistor.

2. STEP BY STEP PROCEDURE

NOTE: For proper alignment of these chassis, the procedure should be followed in the same order as given.

With the condenser plates fully meshed, the dial pointer should point to the first calibration marks immediately to the right of the band identification letters "P", "B" and "F". Any necessary correction may be made simply by moving the pointer on the shaft.

A. Alignment of Intermediate-Frequency Stages

(1) Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

(2) Turn the band selector switch to the broadcast "B" position and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

(3) Connect "antenna" of test oscillator to grid cap of Type 6A8G 1st detector-oscillator tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of Type 6F6G tube to ground. NOTE: It is advisable to read carefully the operating instructions included with the test oscillator.

(4) Tune test oscillator to obtain a signal of 456 KC.

(5) Turn the volume control of receiver on full and adjust I.F. condensers C3 and C2. NOTE: The intermediate frequency circuits are quite selective and care must be taken to insure proper adjustment.

(6) Connect "antenna" of test oscillator to "A" post on chassis and "ground" of test oscillator to "G" post.

(7) Tune test oscillator to 456 KC. and adjust condenser C4 for minimum output.

NOTE: This adjustment is in the code rejector circuit and proper adjustment of this condenser is essential to satisfactory operation of the receiver.

B. Alignment of Broadcast Band

(1) Disconnect "antenna" lead of test oscillator from grid cap of first detector-oscillator tube and connect in series with a 150 mmf. condenser dummy antenna to the antenna terminal of the chassis.

(2) Tune test oscillator and receiver to a frequency of 1500 KC., and without disturbing the setting of the test oscillator or the station selector, adjust condensers C8 and C5 in the order given.

(3) Tune test oscillator and receiver to 600 KC. and adjust condenser C9.

(4) Retune test oscillator and receiver to 1500 KC. and check the adjustments of condensers C8 and C5.

(5) Calibration of the broadcast band should also be checked at 900 kilocycles and 600 kilocycles.

C. Alignment of Police Band

(1) Turn the band selector switch to the Police Band "P".

(2) Remove the 150 mmf. condenser from the "antenna" lead of test oscillator and replace with a 400 ohm non-inductive resistor dummy antenna.

(3) Tune test oscillator and receiver to 4.5 MC. and adjust condenser C7.

NOTE: There are no other adjustments in this band.

D. Alignment of Foreign Band

(1) Turn the band selector switch to the Foreign Band "F".

(2) Tune test oscillator and receiver to 15 MC. and adjust condenser C6.

CAUTION: On this band care must be taken to adjust the condenser to the fundamental of the signal and not to the image. The image signal is equal to the fundamental minus twice the intermediate frequency of the receiver.

A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condensers for that band have probably been adjusted to the image instead of the fundamental.

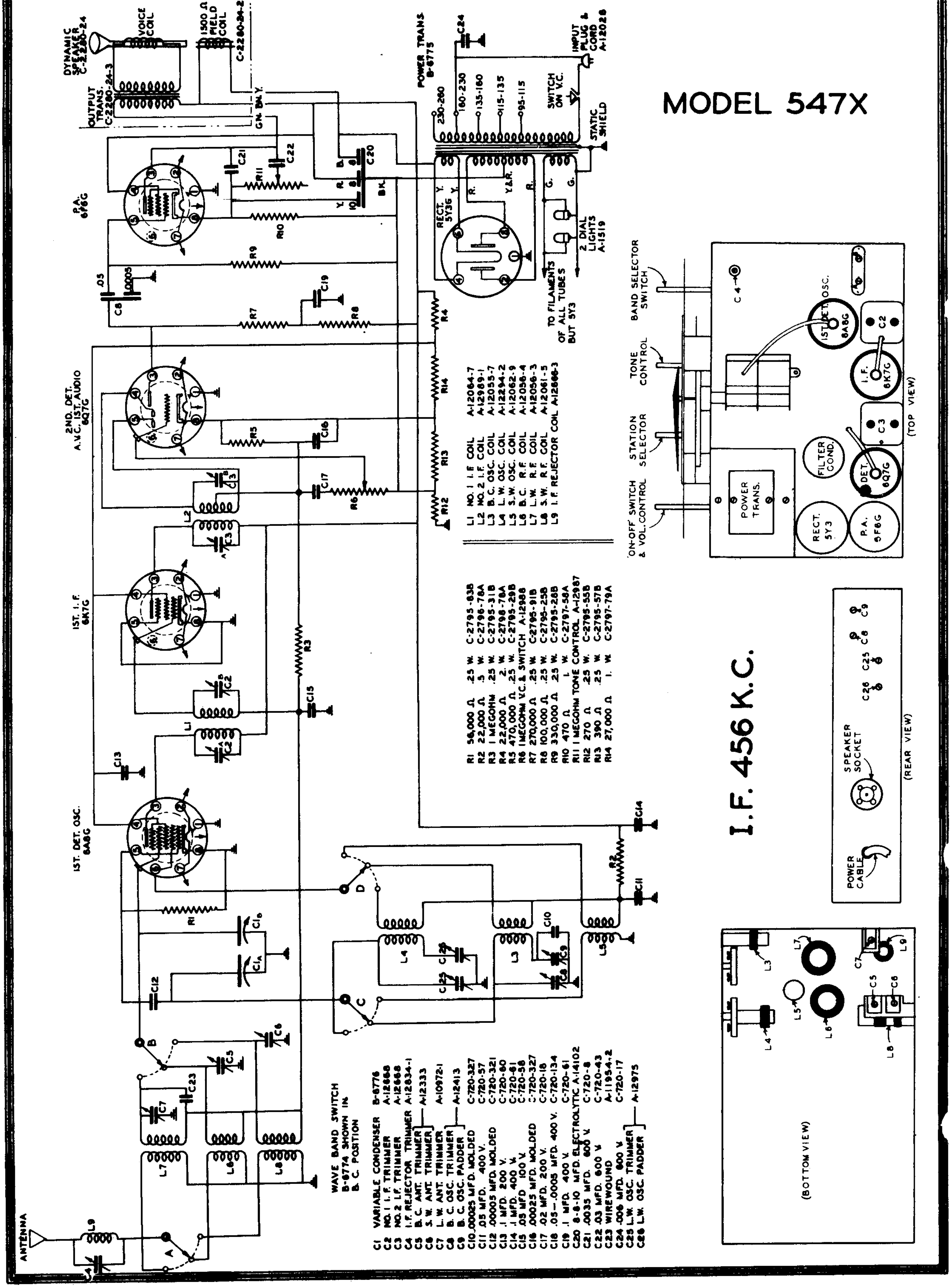
This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector to approximately 15,900 KC. If a strong signal is found approximately at this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 15,000 kilocycles would be 15,000 KC. minus twice 456 KC. or approximately 14,100 KC. Therefore a signal of this frequency may be found with the test oscillator generating a 15,000 KC. signal.

(3) Retune the test oscillator and receiver to 7.5 MC. and check sensitivity and calibration. (There are no other adjustments for this band.)

CAUTION: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.

SPARKS-WITHINGTON COMPANY

MODEL 547X



C1	VARIABLE CONDENSER	B-6776
C2	NO. 1 I. F. TRIMMER	A-12668
C3	NO. 2 I.F. TRIMMER	A-12668
C4	I.F. REJECTOR TRIMMER	A-12834-1
C5	B. C. ANT. TRIMMER	A-12333
C6	S. W. ANT. TRIMMER	A-12333
C7	L. W. ANT. TRIMMER	A-10972-1
C8	B. C. OSC. TRIMMER	A-12413
C9	B. C. OSC. PADDER	A-12413
C10	.00025 MFD. MOLDED	C-720-327
C11	.05 MFD. 400 V.	C-720-57
C12	.00005 MFD. MOLDED	C-720-321
C13	.1 MFD. 200 V.	C-720-60
C14	.1 MFD. 400 V.	C-720-61
C15	.05 MFD 100 V.	C-720-58
C16	.00025 MFD. MOLDED	C-720-327
C17	.02 MFD. 200 V.	C-720-18
C18	.05-.0005 MFD. 400 V.	C-720-134
C19	.1 MFD. 400 V.	C-720-61
C20	8-8-10 MFD. ELECTROLYTIC	A-14102
C21	.0035 MFD. 600 V.	C-720-8
C22	.03 MFD. 600 V.	C-720-43
C23	WIREWOUND	A-11954-2
C24	.006 MFD. 600 V.	C-720-17
C25	L.W. OSC. TRIMMER	A-12975
C26	L.W. OSC. PADDER	A-12975

R1	56,000 Ω	.25 W.	C-2795-83B
R2	22,000 Ω	.5 W.	C-2796-78A
R3	1 MEGOHM	.25 W.	C-2795-31B
R4	22,000 Ω	2. W.	C-2798-78A
R5	470,000 Ω	.25 W.	C-2795-29B
R6	1 MEGOHM V.C. & SWITCH		A-12988
R7	270,000 Ω	.25 W.	C-2795-91B
R8	100,000 Ω	.25 W.	C-2795-25B
R9	330,000 Ω	.25 W.	C-2795-28B
R10	470 Ω	1. W.	C-2797-58A
R11	1 MEGOHM TONE CONTROL		A-12987
R12	270 Ω	.25 W.	C-2795-55B
R13	390 Ω	.25 W.	C-2795-57B
R14	27,000 Ω	1. W.	C-2797-79A

L1	NO. 1 I. F. COIL	A-12064-7
L2	NO. 2 I.F. COIL	A-12989-1
L3	B. C. OSC. COIL	A-12055-7
L4	L. W. OSC. COIL	A-12294-2
L5	S.W. OSC. COIL	A-12062-9
L6	B. C. R.F. COIL	A-12056-4
L7	L.W. R.F. COIL	A-12056-3
L8	S.W. R.F. COIL	A-12061-5
L9	I. F. REJECTOR COIL	A-12866-3

SPARKS-WITHINGTON COMPANY
MODEL 547X

Foreword: The SPARTON Model 547-X is equipped with an adjustable power transformer for operation on various line voltages as indicated under the transformer terminal cover plate.

Before attempting to realign the circuits, be sure that the transformer tap is correctly adjusted for the line voltage to be used.

The use of quality test equipment is highly recommended and a good test oscillator becomes a virtual necessity when aligning the all-wave or short-wave type of receiver. Due to the fact that the ear cannot distinguish small changes in sound intensity, an output meter is essential to the proper adjustment of the various condensers.

Unless otherwise specified, the adjusting of any condenser consists of turning the adjusting screw or nut to the right or left until the output meter registers the greatest deflection.

1. EQUIPMENT REQUIRED

A. Modulated test oscillator (crystal controlled or accurately calibrated) capable of generating frequencies from 150 to 15,000 kilocycles.

B. Output meter.

C. Part A-5732 adjusting wrench.

D. Dummy antennas, consisting of a 150 mmf. condenser and a 400 ohm non-inductive resistor

2. STEP BY STEP PROCEDURE

NOTE: For proper alignment of these chassis, the procedure should be followed in the same order as given.

The dial pointer should point to the first calibration mark immediately to the right of the band indicating letters "L", "B" or "S" when the condenser plates are fully meshed. If the pointer does not read correctly, hold the rotor plates fully meshed with the stator plates and set the pointer so that it reads correctly.

A. Alignment of Intermediate-Frequency Stages.

(1) Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

(2) Turn the band selector switch to the Broadcast Band "B" position and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

(3) Connect "antenna" of test oscillator in series with 150 mmf. condenser dummy antenna to grid cap of Type 6A8G 1st detector-oscillator tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of Type 6F6G tube to ground. NOTE: It is advisable to read carefully the operating instructions included with the test oscillator.

(4) Tune test oscillator to obtain a signal of 456 kilocycles.

(5) Turn the volume control of receiver on full and adjust IF condensers C3 and C2. NOTE: The intermediate frequency circuits are quite selective and care must be taken to insure proper adjustment.

(6) Disconnect test oscillator "antenna" and 150 mmf. condenser from grid cap of 6A8G tube, and connect oscillator "antenna" to antenna post of chassis.

(7) With the test oscillator generating a 456 KC. signal, adjust condenser C4 until a minimum of output is obtained. NOTE: This adjustment is in the code rejector circuit, and care should be taken to see that proper adjustment is made, otherwise the receiver will not operate with maximum efficiency.

B. Alignment of Long-Wave Band

(1) Insert the 150 mmf. condenser in series with the "antenna" lead of test oscillator and the antenna terminal of the chassis.

(2) Turn the band selector switch to the long wave "L" position, tune test oscillator and receiver to a wave length of 870 meters (345 KC.) and without disturbing the setting of the test oscillator or the station selector, adjust condensers C25 and C7 in the order given.

(3) Tune test oscillator and receiver to 2000 meters (150 KC.) and adjust condenser C26.

(4) Retune test oscillator and receiver to 345 kilocycles and check the adjustments of condensers C25 and C7.

C. Alignment of Broadcast Band

(1) Turn band selector switch to the broadcast band "B" position.

(2) Tune test oscillator and receiver to a wave length of 200 meters (1500 kilocycles) and adjust condenser C8 (oscillator trimmer) and condenser C5 (antenna trimmer).

(3) Tune test oscillator and receiver to 500 meters (600 kilocycles) and adjust condenser C9 (oscillator padder).

(4) Retune test oscillator and receiver to 200 meters and check the adjustments of condensers C8 and C5.

(Continued on next page)

SPARKS-WITHINGTON COMPANY
MODELS 537 & 577
VOLTAGE-RESISTANCE CHART

Line Voltage: 115 volts

Position of Volume Control: Full with Antenna Disconnected

Position of Band Selector Switch: Broadcast "B"

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)									
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Grid Cap
6A8G	1st. Det-Oscillator	Volts	0	0	290	240	0	275	0	0	.2
		Ohms	0	0	49000	28000	55000	70000	0	0	1 meg.
6K7G	I-F Amplifier	Volts	0	0	290	245	0	-	0	0	.1
		Ohms	0	0	49000	28000	0	-	0	0	1 meg.
6Q7G	2nd. Det-AVC-1st.A-F	Volts	0	0	225	0	0	-	0	0	*
		Ohms	0	0	400000	470000	470000	-	0	600	1 meg.
6F6G	Power Amplifier	Volts	0	0	370	370	*	-	0	5.9	-
		Ohms	0	0	49000	49000	350000	-	0	650	-
5Y3	Rectifier	Volts	-	5.1	-	370	-	370	-	0	-
		Ohms	-	49000	-	0	-	0	-	49000	-

Notes: Voltage and resistance readings are for schematic diagram shown on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 2.

* Cannot be measured with Weston Selective Analyzer No. 665, Type 2.

MODEL 547X
VOLTAGE-RESISTANCE CHART

Line Voltage: 115 volts

Position of Volume Control: Full with Antenna Disconnected

Position of Band Selector Switch: Broadcast "B"

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)									
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Grid Cap
6A8G	1st. Det-Oscillator	Volts	0	0	290	240	0	275	0	0	.2
		Ohms	0	0	49000	28000	55000	70000	0	0	1 meg.
6K7G	I-F Amplifier	Volts	0	0	290	245	0	-	0	0	.1
		Ohms	0	0	49000	28000	0	-	0	0	1 meg.
6Q7G	2nd. Det-AVC-1st.A-F	Volts	0	0	225	0	0	-	0	0	*
		Ohms	0	0	400000	470000	470000	-	0	600	1 meg.
6F6G	Power Amplifier	Volts	0	0	370	370	*	-	0	5.9	-
		Ohms	0	0	49000	49000	350000	-	0	650	-
5Y3	Rectifier	Volts	-	5.1	-	370	-	370	-	0	-
		Ohms	-	49000	-	0	-	0	-	49000	-

Notes: Voltage and resistance readings are for schematic diagram shown on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 2.

* Cannot be measured with Weston Selective Analvzer No. 665 Type 2.

(Continued from preceding page)

D. Alignment of Short-Wave Band.

(1) Turn the band selector switch to the short wave band "S" position.

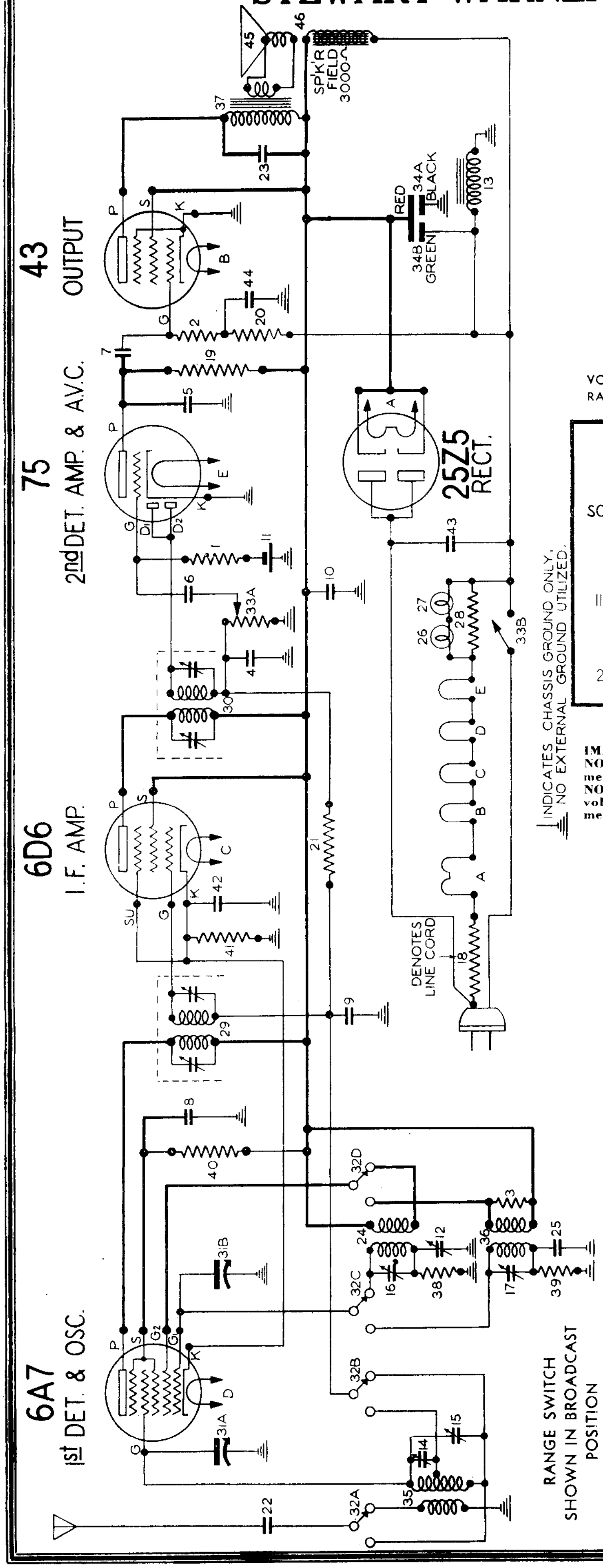
(2) Remove the 150 mmf. condenser from "antenna" lead of test oscillator and replace with a 400 ohm non-inductive resistor dummy antenna.

(3) Tune test oscillator and receiver to 20 meters (15 megacycles) and adjust condenser C6.

CAUTION: On this band care must be taken to adjust the condenser to the fundamental of the signal and not to the image. The image signal is equal to the fundamental minus twice the intermediate frequency of the receiver. A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condensers for that band have probably been adjusted to the image instead of the fundamental.

This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector to approximately 15,900 kilocycles. If a strong signal is found approximately at this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 15,000 kilocycles would be 15,000 kilocycles minus twice 456 kilocycles or approximately 14,100 kilocycles. Therefore a signal of this frequency may be found with the test oscillator generating a 15,000 kilocycle signal.

STEWART-WARNER CORPORATION

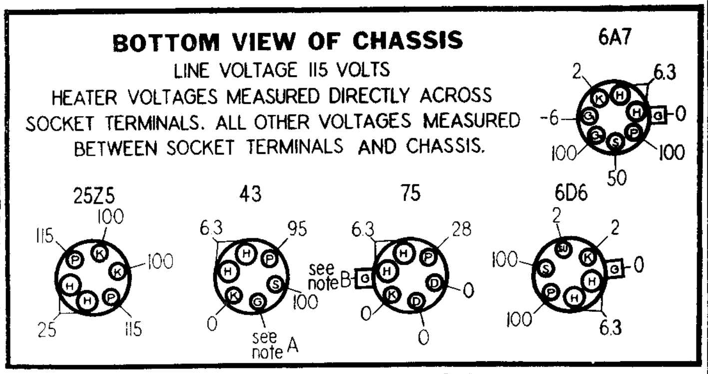


MODELS R171 & 1711 TO 1719

SOCKET VOLTAGES

VOLUME CONTROL ON FULL
RANGE SWITCH SET ON BROADCAST POSITION

ANTENNA GROUNDED
DIAL TUNED TO 535 KC.



REAR OF CHASSIS

IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.
NOTE A: The control grid voltage of the 43 output tube is —16 volts measured across choke 13.
NOTE B: The control grid bias of the triode section of the 75 tube is —1 volt as supplied by the bias cell (number 11), however, this voltage can be measured only with a vacuum tube voltmeter.

I.F. 465 K.C.

Diagram Number	Part Number	DESCRIPTION	List Price
1-2	67262	500,000 ohm, ¼ watt carbon resistor	$0.12
3	67580	6,000 ohm, ¼ watt carbon resistor	.25
4-5	81155	500 mmfd. molded mica condenser	.25
6-7	88189	.05 mfd. 200 volt paper condenser	.25
8-9-10	89421	.1 mfd. 200 volt paper condenser	.25
11	89849	Grid bias cell (1 volt)	.22
12	89938	Padding trimmer (300 to 600 mmfd.)	.55
13	89939	Filter choke	.92
14-15 / 16-17	89940	Trimmer condenser (3 to 45 mmfd.)	.21
18	89941	Line cord (130 ohms)	1.00
19-20	89942	250,000 ohm ¼ watt carbon resistor	.19
21	89943	1 megohm ¼ watt carbon resistor	.19
22-23	89944	.005 mfd. 600 volt paper condenser	.18
24	89945	Broadcast oscillator coil	.65
25	89946	2100 mmfd. molded mica condenser	.28
26-27	89947	Dial lamp (6.3 volt 0.25 ampere)	.19
28	89948	140 ohm 1½ watt wire-wound resistor	.28
29	89949	1st I.F. transformer and shield	1.25
30	89950	2nd I.F. transformer and shield	$1.25
31A-31B	89951	Two-gang variable condenser	2.50
32A to D	89952	Range switch	.69
33A / 33B	89953	Volume control (500,000 ohms) / Line switch	1.00
34A / 34B	89954	12 mfd. 150 volt dry elect. condenser / 20 mfd. 150 volt dry elect. condenser	1.50
35	89955	Antenna coil	.85
36	89956	Short-wave oscillator coil	.85
38	89959	50,000 ohm, ¼ watt carbon resistor	.19
39-40	89960	25,000 ohm, ¼ watt carbon resistor	.19
41	89961	150 ohm, ¼ watt carbon resistor	.19
42	89962	.2 mfd. 200 volt paper condenser	.23
43	89963	.05 mfd. 400 volt paper condenser	.18
44	89964	.25 mfd. 200 volt paper condenser	.24
46	89966	5" Dynamic speaker (complete)	4.75

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STEWART-WARNER CORPORATION

MODELS R171 & 1711 TO 1719

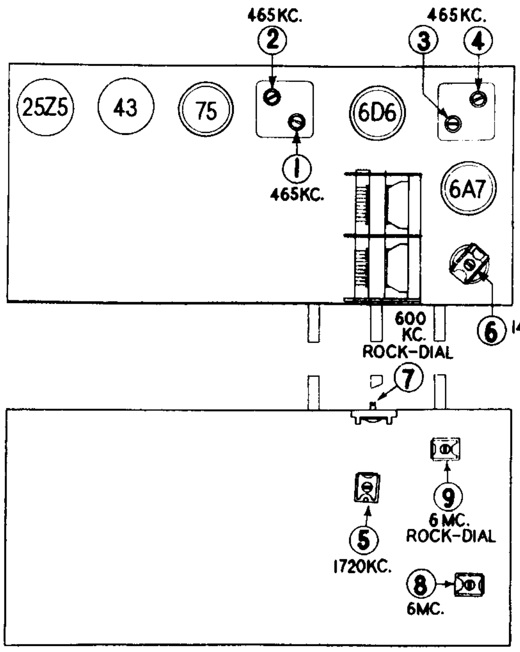
CIRCUIT DESCRIPTION

The model R-171 chassis is a 115 volt A.C. or D.C. five tube superheterodyne receiver. It has an intermediate frequency of 465 K.C.; and tuning ranges of 535 to 1720 K.C.; 2.3 to 6.15 M.C. respectively.

The incoming signal picked up by the antenna is induced in the tuned secondary of the antenna coil and impressed upon the control grid of the 6 A 7 first detector and oscillator. The 465 K.C. output of the 6 A 7 is amplified in the I.F. stage using a 6 D 6 tube. The amplified voltage is then impressed upon the diodes of the 75 twin diode triode tube. The two diodes are tied together and function as a linear second detector and A.V.C. The direct current voltage developed across the fixed ends of the volume control is used as A.V.C. voltage and applied to the control grids of the 6 D 6 and 6 A 7 tubes through a resistance capacity filter.

The potentiometer type of volume control 33A serves as a load resistance for the diode section of the 75 tube and a continuous voltage divider of the audio frequency voltage developed. Hence any portion of the audio voltage developed can be applied to the control grid of the triode section of the 75 tube. It should be noted the grid bias of the 75 tube is obtained from a bias cell. The 75 tube is resistance coupled to the 43 power output tube. Grid bias for the output tube is obtained across the filter choke number 13.

The heaters of all the tubes in the receiver are connected in series. The 25 Z 5 tube is used as a conventional half wave rectifier. When the receiver is operated on direct current the line cord plug must be so inserted that the plates of the rectifier are on the positive side of the line. Under this condition the rectifier acts as a device passing direct current to the plates of the other tubes.



TRIMMER LOCATIONS

Trimmer Number		Alignment Frequency
1.	2nd I.F. Transformer Trimmer	465 KC.
2.	2nd I.F. Transformer Trimmer	465 KC.
3.	1st I.F. Transformer Trimmer	465 KC.
4.	1st I.F. Transformer Trimmer	465 KC.
5.	Broadcast oscillator shunt trimmer	1720 KC.
6.	Broadcast antenna trimmer	1400 KC.
7.	Broadcast oscillator series padder	600 KC.
8.	Short-wave oscillator shunt trimmer	6 MC.
9.	Short-wave antenna shunt trimmer	6 MC.

CALIBRATION AND ALIGNMENT

ALIGNING EQUIPMENT

For proper alignment, an output meter and an accurately calibrated oscillator with a tuning range from 465 KC. to 6 MC. are required.

Connect the output meter from the plate of the output tube to chassis.

ALIGNING THE I.F. AMPLIFIER

(a) Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure.

(b) Turn the range switch to the broadcast position (fully clockwise).

(c) Connect the test oscillator output leads to the 6A7 control grid and chassis with a .1 mfd. condenser in series with the oscillator output.

(d) Set the oscillator to exactly 465 KC.

(e) Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

(f) Adjust the four I.F. trimmers, Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.

BROADCAST BAND CALIBRATION AND ALIGNMENT

(a) With the gang condenser in full mesh, the dial pointer should be on the horizontal line below 540 KC. on the dial scale.

(b) Turn the range switch to the clockwise position and connect the test oscillator output to the antenna lead of the receiver with a 400 ohm carbon resistor in series with the antenna lead and the oscillator output.

(c) Adjust the test oscillator to exactly 1720 KC. and turn the receiver dial pointer to 1720 KC. on the tuning dial.

(d) To calibrate the dial, adjust trimmer No. 5 for maximum output.

(e) Adjust the test oscillator to 1400 KC. and carefully tune the receiver to the signal.

(f) Adjust trimmer No. 6 for maximum output.

(g) Adjust the test oscillator to 600 KC. and tune the receiver to the signal.

(h) Adjust trimmer No. 7 for maximum output. Then try to increase the output meter reading by detuning No. 7 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity, even though the dial may be slightly off calibration at 600 KC.

(i) Check the adjustment of trimmer 5 at 1720 KC. and trimmer 6 at 1400 KC.

SHORT WAVE BAND CALIBRATION AND ALIGNMENT

(a) Turn the range switch to the short wave position (counter-clockwise).

(b) Adjust the test oscillator to exactly 6.0 MC.

(c) Tune in the 6 MC. oscillator signal at or near 6 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 6 MC. If it is, do not adjust the oscillator shunt trimmer No. 8.

(d) If the calibration is incorrect, set the dial pointer to 6 MC. on the dial, and adjust the oscillator shunt trimmer No. 8, until the oscillator signal comes in at this point. If there are two peaks, the proper one is that with the trimmed screw farthest out.

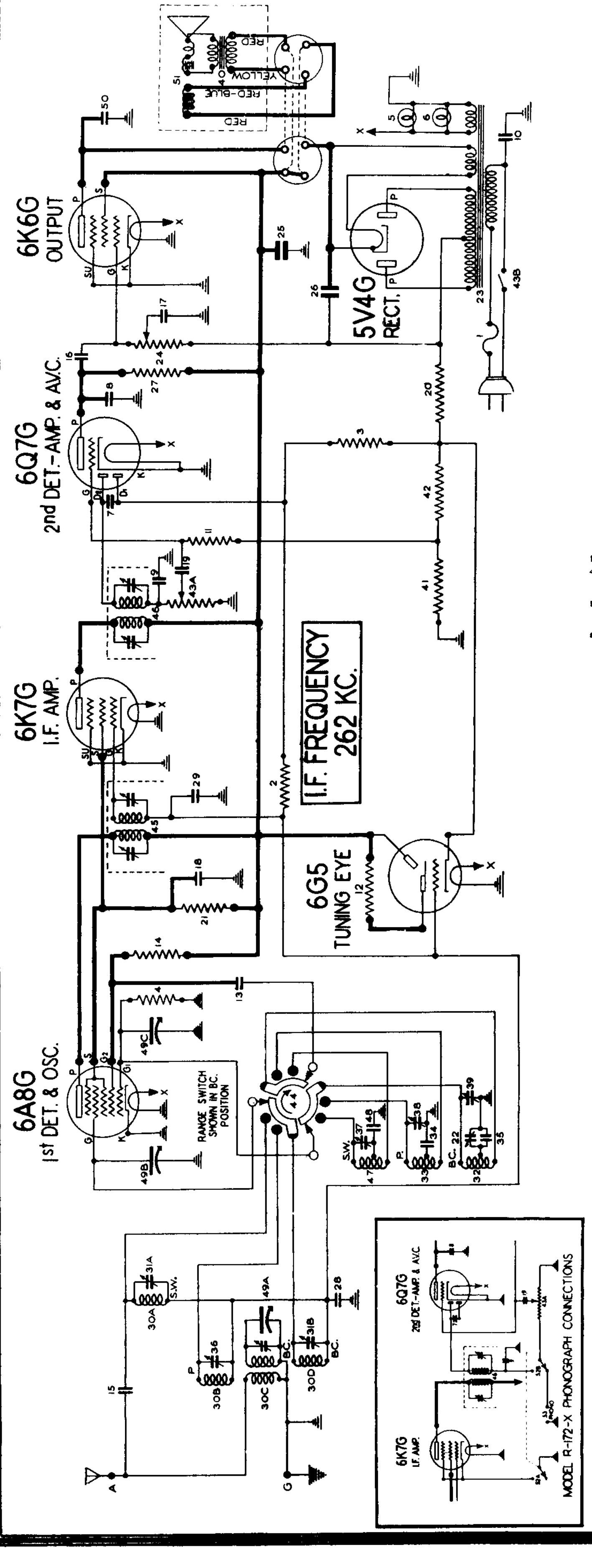
(e) Carefully tune the receiver to the signal and adjust trimmer No. 9 for maximum output. Then try to increase the output by detuning No. 9 slightly and retuning the receiver dial. Continue detuning No. 9 and retuning the dial until the output meter deflection is a maximum

MISCELLANEOUS AND DIAL PARTS

Part Number	DESCRIPTION	List Price
89967	Dial escutcheon less glass	$0.45
89971	Knob (small), volume control and range switch	.19
89972	Knob (large), tuning control	.18
89973	Dial assembly (complete)	.54
89974	Dial scale	.39
89975	Dial glass for escutcheon	.35

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

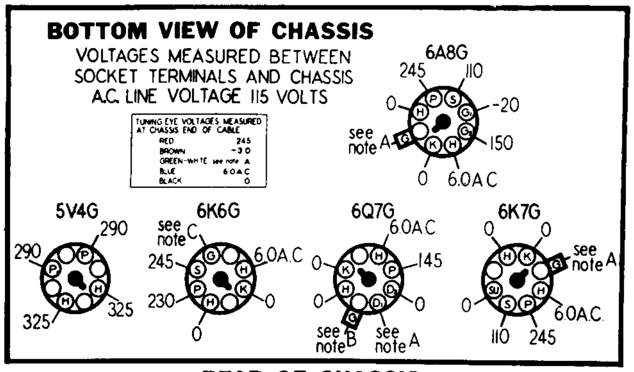
STEWART-WARNER CORPORATION
MODELS R172 & 1721 TO 1729



SOCKET VOLTAGES

VOLUME CONTROL ON FULL. RANGE SWITCH SET ON BROADCAST POSITION

ANTENNA GROUNDED DIAL TUNED TO 530 KC.



REAR OF CHASSIS

IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The grid bias for the 6A8G, 6K7G, and the anode voltage of the A.V.C. section of the 6Q7G is —3 volts measured across resistors 41 and 42.

NOTE B: The grid bias for the audio section of the 6Q7G is —2 volts measured across resistor 41.

NOTE C: The grid bias for the 6K6G output tube is —18 volts measured across resistors 41, 42 and 20.

Diagram Number	Part Number	Description	List Price
1	38841	Fuse, 1 amp., 250 volt	$0.10
2-3	83072	510,000 ohm ¼ watt carbon resistor	.12
4	83080	51,000 ohm ¼ watt carbon resistor	.12
5-6	83278	Dial lamps	.15
7-8	83539	260 mmfd. mica condenser	.20
9	83783	110 mmfd. mica condenser	.20
10	83976	.012 mfd. 1000 volt shielded condenser	.40
11-12	84235	1.1 megohm ¼ watt carbon resistor	.12
13	85061	51 mmfd. mica condenser	.15
14	85442	21,000 ohm ½ watt carbon resistor	.15
15	85454	11 mmfd. mica condenser	.15
16	88026	.02 mfd. 400 volt paper condenser	.25
17	88030	.01 mfd. 400 volt paper condenser	.25
18	88046	.1 mfd. 150 volt paper condenser	.25
19	88189	.05 mfd. 200 volt paper condenser	.25
20	88463	270 ohm 1 watt carbon resistor	.15
21	88464	26,000 ohm 1 watt carbon resistor	.15
22	88478	Padding condenser	.38
23	88481	Power transformer (115 volt—60 cycle)	5.00
24	88488	Tone control—500,000 ohm	.80
25	88511	16 mfd. 300 volt electrolytic condenser	1.10
26	88512	16 mfd. 400 volt electrolytic condenser	1.10
27	88532	210,000 ohm ¼ watt carbon resistor	.12
28, 29	88534	.05 mfd. 150 volt condenser (low loss)	.25
30A to D	88648	Antenna and preselector coil assembly	2.30
31A-31B	88654	Dual trimmer condenser	.30
32	88660	Oscillator coil (BC.)	.60
33	88665	Oscillator coil (Police)	.58
34	88681	.00255 mfd. mica condenser	.30
35	88686	200 mmfd. mica condenser	$0.14
36-37, 38-39	88688	Trimmer condenser	.12
40	88796	Output transformer for R-248A spkr	2.50
40	88912	Output transformer for R-247-A spkr	2.00
41	88920	35 ohm ½ watt wire wound resistor	.12
42	89116	20 ohm ½ watt wire wound resistor	.12
43A, 43B	89606	Volume control—250,000 ohm; A.C. line switch	1.20
44	89607	Range switch	1.25
45	89608	1st I.F. transformer	2.40
46	89609	2nd I.F. transformer	2.25
47	89615	Oscillator coil (S.W.)	.75
48	89635	.00495 mfd. mica condenser	.50
49A to C	89649	Gang condenser	5.00
	89658	262 KC. wave trap (spl. for service only)	1.50
50	89826	.004 mfd. 750 volt paper condenser	.24
51	R-247-A	8 inch dynamic speaker	9.00
51	R-248-A	12 inch dynamic speaker	11.50

MODEL R-172-X PARTS

52A & 52B	84404	Phonograph toggle switch	$1.10
1	88055	Fuse, ¾ amp., used for line voltages of 200 to 240 volts	.12
23	89216	Power transformer (100-240 volts, 25-133 cycles)	11.50
53	89709	Phonograph terminal strip	.15

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STEWART-WARNER CORPORATION

MODELS R172 & 1721 TO 1729

CALIBRATION AND ALIGNMENT

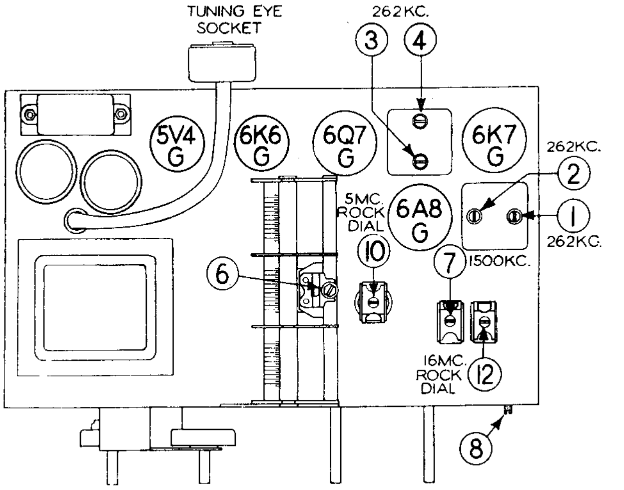
ALIGNING EQUIPMENT: For proper alignment, an output meter and an accurately calibrated oscillator with a tuning range from 262 KC. to 16 MC. are required.

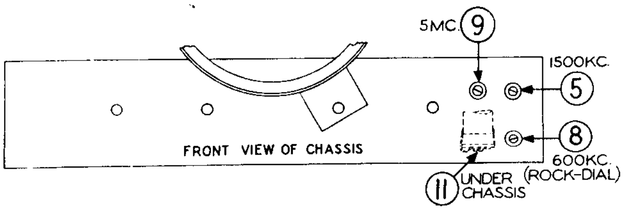
Connect the output meter from the plate of the output tube to chassis. A convenient point to make the plate connection is to the yellow wire on the speaker socket.

ALIGNING THE I. F. AMPLIFIER: Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (fully clockwise).

Connect the test oscillator output leads to the 6A8 control grid and chassis with a **.1 mfd. condenser in series with the oscillator output.** Set the oscillator to exactly 262 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

Adjust the four I.F. trimmers, Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.





FRONT VIEW OF CHASSIS

TRIMMER LOCATIONS

Trimmer Number		Alignment Frequency
1.	2nd I.F. transformer trimmer	262 KC.
2.	2nd I.F. transformer trimmer	262 KC.
3.	1st I.F. transformer trimmer	262 KC.
4.	1st I.F. transformer trimmer	262 KC.
5.	Broadcast oscillator shunt trimmer	1500 KC.
6.	Broadcast antenna shunt trimmer	1500 KC.
7.	Broadcast detector shunt trimmer	1500 KC.
8.	Broadcast oscillator series padder	600 KC.
9.	Police oscillator shunt trimmer	5 MC.
10.	Police antenna shunt trimmer	5 MC.
11.	Short wave oscillator shunt trimmer	16 MC.
12.	Short wave antenna shunt trimmer	16 MC.

BROADCAST BAND CALIBRATION AND ALIGNMENT

With the gang condenser in full mesh, the dial pointer should be on the white horizontal line below 530 KC. on the dial scale. If it does not, hold the dial gear and turn the pointer to the correct position.

Turn the range switch to the extreme clockwise position and connect the test oscillator output to the A and G terminals of the receiver with a 400 ohm carbon resistor in series with the A terminal and the oscillator output.

Adjust the test oscillator to exactly 1500 KC.

Tune in the 1500 KC. oscillator signal or a station above 1300 KC. on the dial and determine whether the dial calibration is correct at the high frequency end of the dial. If the calibration is correct, do not adjust the broadcast oscillator shunt trimmer No. 5. If the calibration is incorrect, adjust trimmer No. 5 to give proper calibration.

Carefully tune the receiver to the signal and adjust trimmers Nos. 6 and 7 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 8 for maximum output. Then try to increase the output meter reading by detuning No. 8 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though the dial may be slightly off calibration at 600 KC.

POLICE BAND CALIBRATION AND ALIGNMENT

Turn the range switch to the center position. Adjust the test oscillator to exactly 5.0 MC. Tune in the 5 MC. oscillator signal at or near 5 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 5 MC. If it is, do not adjust police band oscillator shunt trimmer No. 9. If the calibration is incorrect, set the dial pointer to 5 MC. on the dial, and adjust the oscillator shunt trimmer No. 9 until the oscillator signal comes in at this point. If there are two peaks, the proper one is that with the trimmer screw farthest out.

Carefully tune the receiver to the signal and adjust trimmer No. 10 for maximum output. Then try to increase the output by detuning No. 10 slightly and retuning the receiver dial. Continue detuning No. 10 and retuning the dial until the output meter deflection is a maximum.

SHORT WAVE BAND CALIBRATION AND ALIGNMENT

Turn the range switch to the extreme counter-clockwise position. Set the test oscillator to 16 MC. Tune in the 16 MC. oscillator signal at 16 MC. on the receiver dial to determine whether the receiver dial calibration is correct at 16 MC. If it is, do not adjust the short wave band oscillator shunt trimmer No. 11. If the calibration is incorrect, set the receiver dial pointer exactly at 16 MC. and adjust the oscillator shunt trimmer No. 11 until the oscillator signal comes in at this point.

Check to see that it has been adjusted to the proper peak by tuning the receiver to approximately 15.5 MC. A repeat signal should be heard at this point. If none is present, even with greatly increased oscillator output, retune the receiver to 16 MC. and adjust trimmer No. 11 to the proper peak with the trimmer screw farther **out.**

Carefully tune the receiver to the signal and adjust trimmer No. 12 to a peak. Then try to increase the output by detuning the trimmer slightly and retuning the dial until a maximum output meter deflection is secured. Check the adjustment by tuning the receiver to the image at about 15.5 MC. The image should be much weaker than the 16 MC. signal. If the signal at 15.5 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 12 is not set to the proper peak. Turn the trimmer in a turn or so, then readjust as above.

TUNING DRIVE AND DIAL PARTS

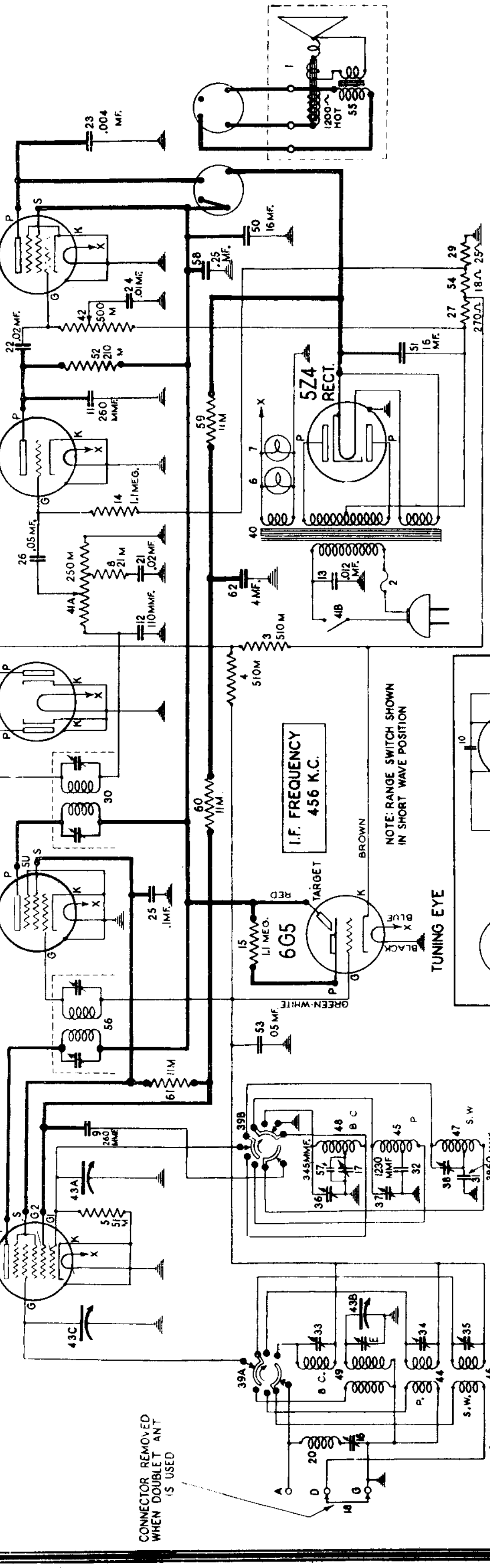
Part Number	Description	List Price
13923	Spring washer for drive shaft	$0.05
77364	Flat steel washer for drive shaft	.01
81068	Dial drive cord, per ft.	.05
81069	Dial cord tension spring	.10
85815	Spring for drive gear	.02
88945	Dial drum, bushing and gear assembly	.72
88956	Dial escutcheon with glass	1.65
89095	Spring washer for pointer shaft	.01
89176	Retaining ring for drive shaft	.02
89283	Dial lamp socket	.10
89284	Dial lamp shield	.02
89666	Dial bracket ring and shaft assembly	2.50
89668	Dial drive shaft	.08
89673	Pointer shaft and gear assembly	.32
89675	Dial background	.12
89676	Dial pointer and stud assembly	.06
89680	Dial scale	1.80
89799	Dial scale retaining clip	.02

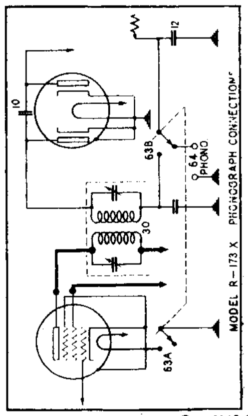
MISCELLANEOUS PARTS

Part Number	Description	List Price
67568	Embossed washer for 88512 elect. condenser	$0.05
67590	Flat steel mounting washer	.01
84015	Paper washer for knobs	.01
84428	Chassis mounting washer (rubber)	.03
84493	No. 10 x 1¼ chassis mounting screw	.02
84805	Felt washer (used with chassis mounting screw)	.01
84981	Tube shield section (plain)	.08
84982	Tube shield section (slotted)	.08
84983	Spring ring for tube shields	.03
85785	Terminal strip (antenna and ground)	.15
88056	Fuse mounting strip	.15
88057	Fuse cover	.08
88675	Speaker socket	.15
88958	No. 2 x ⅜ R.H.W. screw for escutcheon	.01
89038	Knob (tuning, tone and volume controls)	.20
89119	Tuning eye cable and plug	1.50
89749	Knob (range switch)	.20

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STEWART-WARNER CORPORATION
MODELS R173 & 1731 TO 1739

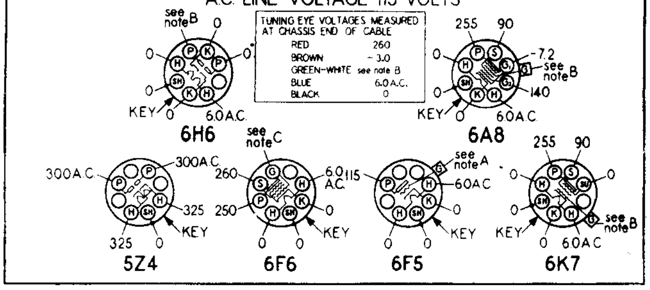




SOCKET VOLTAGES

VOLUME CONTROL ON FULL — ANTENNA GROUNDED
RANGE SWITCH SET ON BROADCAST POSITION — DIAL TUNED TO 530 KC.

BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS
A.C. LINE VOLTAGE 115 VOLTS



REAR OF CHASSIS

IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The grid bias for the 6F5 is —1.3 volts measured across resistor 29.

NOTE B: The grid bias for the 6A8, 6K7, and the anode voltage of the A.V.C. section of the 6H6 is —3.0 volts measured across resistors 29 and 54.

NOTE C: The grid bias for the 6F6 output tube is —17.0 volts measured across resistors 29, 54 and 27.

Diagram Number	Part Number	DESCRIPTION	List Price
1	R-247-A	8" Dynamic Speaker	$9.00
	R-248-A	12" Dynamic Speaker	11.50
2	38841	Fuse, 1 ampere	.10
3-4	83072	510,000 ohm 1/4 watt carbon resistor	.12
5	83080	51,000 ohm 1/4 watt carbon resistor	.12
6-7	83278	Pilot lamp, 6-8 volt	.15
8	83286	21,000 ohm 1/4 watt carbon resistor	.12
9-10-11	83539	260 mmfd. mica condenser	.20
12	83783	110 mmfd. mica condenser	.20
13	83976	.012 mfd. 1000 v. shielded condenser	.40
14-15	84235	1.1 megohm 1/4 watt carbon resistor	.12
16	85285	Wave trap trimmer	.40
17	85285	Padding trimmer	.40
18	85321	Ground connector	.01
20	88014	Wave trap coil	.50
21-22	88026	.02 mfd. 400 v. paper condenser	.30
23	89826	.004 mfd. 750 v. paper condenser	.24
24	88030	.01 mfd. 400 v. paper condenser	.30
25	88046	.1 mfd. 150 v. paper condenser	.30
26	88189	.05 mfd. 200 v. paper condenser	.25
27	88463	270 ohm 1 watt carbon resistor	.15
29	88465	25 ohm 1/2 watt wire wound resistor	.15
56	88466	1st I.F. Transformer	2.40
30	88468	2nd I.F. transformer	2.40
31	88472	3860 mmfd. mica condenser	.50
32	88473	1230 mmfd. mica condenser	.25
33-34-35, 36-37-38	88477	Trimmer condenser	.12
39A & B	88480	Range switch	1.90
40	88481	Power transformer, 115 v. 60 cycle	5.00
41-A, 41-B	88487	Volume control (250,000 ohm) / A. C. line switch	1.25
42	88488	Tone control (500,000 ohm)	.80
43A to C	89649	Three gang condenser	5.00
44	88499	Antenna coil (Police)	.85
45	88501	Oscillator coil (Police)	.65
46	88502	Antenna coil (S.W.)	.80
47	88504	Oscillator coil (S.W.)	$ .80
48	88506	Oscillator coil (B.C.)	.55
49	88507	Antenna coil (B.C.)	1.60
50	88511	16 mfd. 300 v. electrolytic condenser	1.10
51	88512	16 mfd. 400 v. electrolytic condenser	1.10
52	88532	210,000 ohm 1/4 watt carbon resistor	.12
53	88534	.05 mfd. 150 v. condenser (low loss)	.25
54	88584	18 ohm 1/2 watt wire wound resistor	.15
55	88796	Output transformer (on R-248-A speaker)	2.50
55	88912	Output transformer (on R-247-A speaker)	2.00
57	89564	345 mmfd. mica condenser	.40
58	89643	.25 mfd. 300 volt paper condenser	.50
43A to C	89649	Three gang condenser	5.00
59-60	89751	11,000 ohm 1 watt carbon resistor	.12
61	89753	11,000 ohm 1/2 watt carbon resistor	.15
62	89755	4 mfd. 250 volt electrolytic condenser	1.00
23	89826	.004 mfd. 750 v. paper condenser	.24

R-173-X PARTS

Diagram Number	Part Number	DESCRIPTION	List Price
63A & B	84404	Phonograph toggle switch	$1.10
2	88055	Fuse, 3/4 amp. (Use on line voltages of 200 to 240)	.12
40	89216	Power transformer 100 to 240 volt. 25 to 133 cycles	11.50
64	89709	Phonograph terminal strip	.15

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STEWART-WARNER CORPORATION
MODELS R173 & 1731 TO 1739

CALIBRATION AND ALIGNMENT

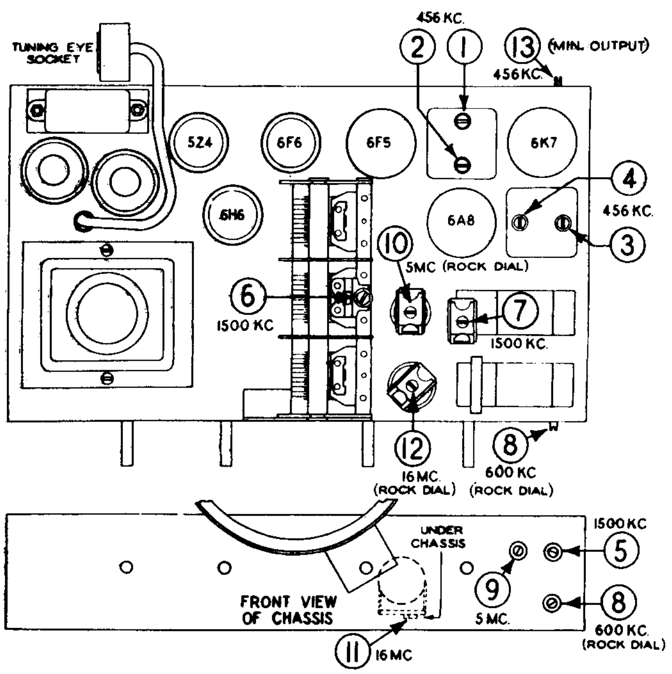
ALIGNING EQUIPMENT: For proper alignment, an output meter and an accurately calibrated oscillator with a tuning range from 456 KC. to 16 MC. are required.

Connect the output meter from the plate of the output tube to chassis. A convenient point to make the plate connection is to the yellow wire on the speaker socket.

ALIGNING THE I. F. AMPLIFIER: Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (fully clockwise).

Connect the test oscillator output leads to the 6A8 control grid and chassis with a .1 mfd. condenser in series with the oscillator output. Set the oscillator to exactly 456 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

Adjust the four I.F. trimmers, Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.



TRIMMER LOCATIONS

Trimmer Number		Alignment Frequency
1.	2nd I.F. transformer trimmer	456 KC.
2.	2nd I.F. transformer trimmer	456 KC.
3.	1st I.F. transformer trimmer	456 KC.
4.	1st I.F. transformer trimmer	456 KC.
5.	Broadcast oscillator shunt trimmer	1500 KC.
6.	Broadcast antenna shunt trimmer	1500 KC.
7.	Broadcast detector shunt trimmer	1500 KC.
8.	Broadcast oscillator series padder	600 KC.
9.	Police oscillator shunt trimmer	5 MC.
10.	Police antenna shunt trimmer	5 MC.
11.	Short wave oscillator shunt trimmer	16 MC.
12.	Short wave antenna shunt trimmer	16 MC.
13.	Wave-trap trimmer	456 KC.

BROADCAST BAND CALIBRATION AND ALIGNMENT: With the gang condenser in full mesh, the dial pointer should be on the white horizontal line below 530 KC. on the dial scale.

Turn the range switch to the extreme clockwise position and connect the test oscillator output to the A and G terminals of the receiver with a 400 ohm carbon resistor in series with the A terminal and the oscillator output.

Adjust the test oscillator to exactly 1500 KC. and turn the receiver dial pointer to 1500 KC. on the tuning dial. To calibrate the dial, adjust trimmer No. 5 for maximum output.

Carefully tune the receiver to the signal and adjust trimmers Nos. 6 and 7 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 8 for maximum output. Then try to increase the output meter reading by detuning No. 8 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though the dial may be slightly off calibration at 600 KC.

WAVE-TRAP ADJUSTMENT: The wave-trap adjusting trimmer, No. 13, is located on the back of the chassis. Leave the test oscillator connected to the A and G terminals through a 400 ohm resistor and set the oscillator at 456 KC. Then adjust the wave-trap trimmer No. 13 for minimum output. If some particular station with a frequency near 456 KC. causes code interference, it may be desirable to adjust the wave-trap on the actual frequency of the interfering station.

Check the adjustment of trimmers 5, 6, and 7 at 1500 KC.

BAND NO. 2 CALIBRATION AND ALIGNMENT: Turn the range switch to the center position.

Adjust the test oscillator to exactly 5.0 MC. and turn the receiver dial pointer to exactly 5.0 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 9 for maximum output. If two peaks are found, the proper one is that with the trimmer screw farthest out.

Carefully tune the receiver to the signal and adjust trimmer No. 10 for maximum output. Then try to increase the output by detuning No. 10 slightly and retuning the receiver dial. Continue detuning No. 10 and retuning the dial until the output meter deflection is a maximum.

BAND NO. 3 CALIBRATION AND ALIGNMENT: Turn the range switch to the extreme counter-clockwise position. Be sure the D and G terminals on the antenna terminal strip are connected together.

Set the test oscillator to 16 MC. and turn the receiver dial pointer to exactly 16 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 11 for maximum output. Check to see that it has been adjusted to the proper peak by tuning the receiver to approximately 15.1 MC. A repeat signal should be heard at this point. If none is present, even with greatly increased oscillator output, retune the receiver to 16 MC. and adjust trimmer No. 11 to the proper peak with the trimmer screw farther out.

Carefully tune the receiver to the signal and adjust trimmer No. 12 to a peak. Then try to increase the output by detuning the trimmer slightly and retuning the dial until a maximum output meter deflection is secured. Check the adjustment by tuning the receiver to the image at about 15.1 MC. The image should be much weaker than the 16 MC. signal. If the signal at 15.1 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 12 is not set to the proper peak. Turn the trimmer in a turn or so, then readjust as above.

MISCELLANEOUS PARTS NOT SHOWN IN CIRCUIT DIAGRAM

Part Number	DESCRIPTION	List Price
67590	Flat steel mtg. washer	$ .01
67568	Embossed washer for 88512 electrolytic condenser	.05
84428	Rubber chassis mtg. bushing	.03
84493	No. 10 x 1¼ chassis mtg. screw	.02
84805	Felt washer (Used with chassis mtg. screw)	.01
85066	G.D.A. terminal strip	.20
88056	Fuse mounting	.08
88057	Fuse cover	.08
88675	Speaker socket	.15
88958	No. 2 x ¾ wood screw for escutcheon (each)	.01
89038	Knob, volume, tone & tuning control	.20
89119	Tuning eye cable and plug	1.50
89749	Knob, range switch	.20

TUNING DRIVE AND DIAL PARTS

Part Number	DESCRIPTION	List Price
81068	Dial drive cord (per ft.)	$ .05
81069	Tension spring for drive cord	.10
81145	Spring clip for pointer shaft	.10
88956	Escutcheon with glass	1.65
88998	Second pointer	.05
89283	Pilot lamp socket	.10
89284	Pilot lamp shield	.02
89514	Dial drum bushing and gear	1.25
89660	Dial scale	1.80
89666	Dial ring bracket and shaft assembly	2.50
89675	Dial background	.12
89693	Main pointer and second pointer shaft assembly	.50
89698	Pointer and stud	.14

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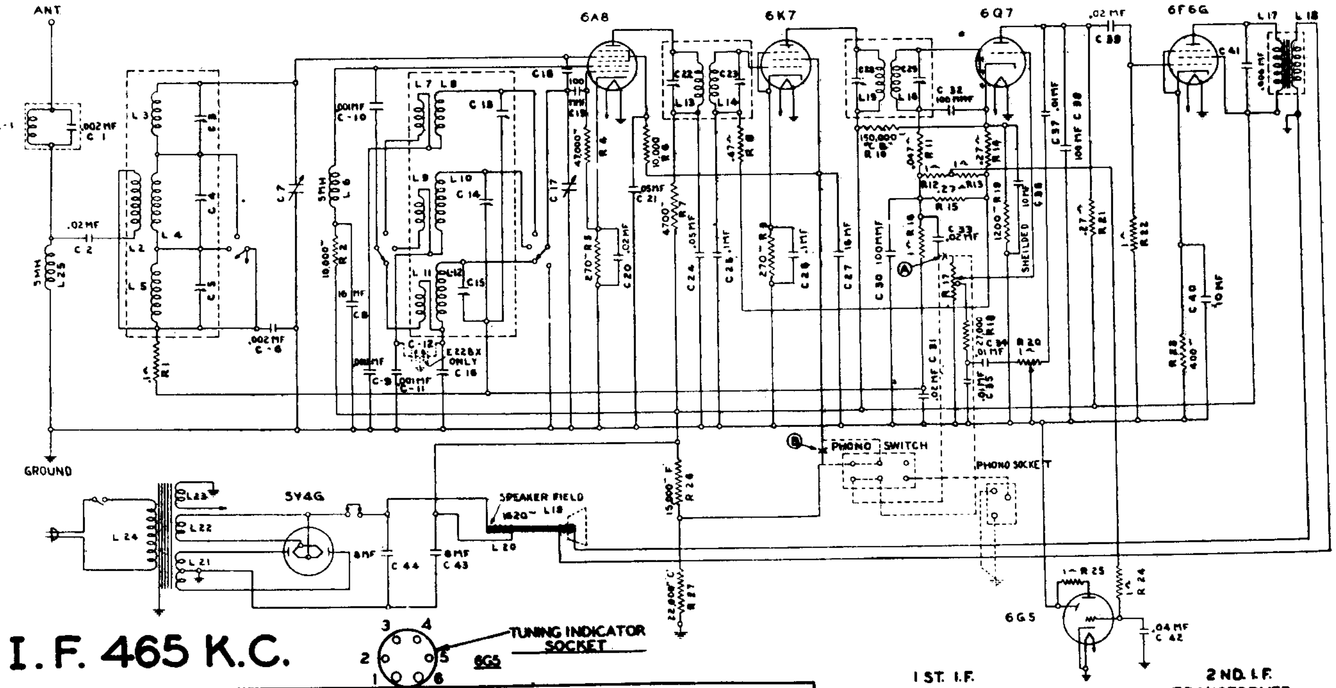
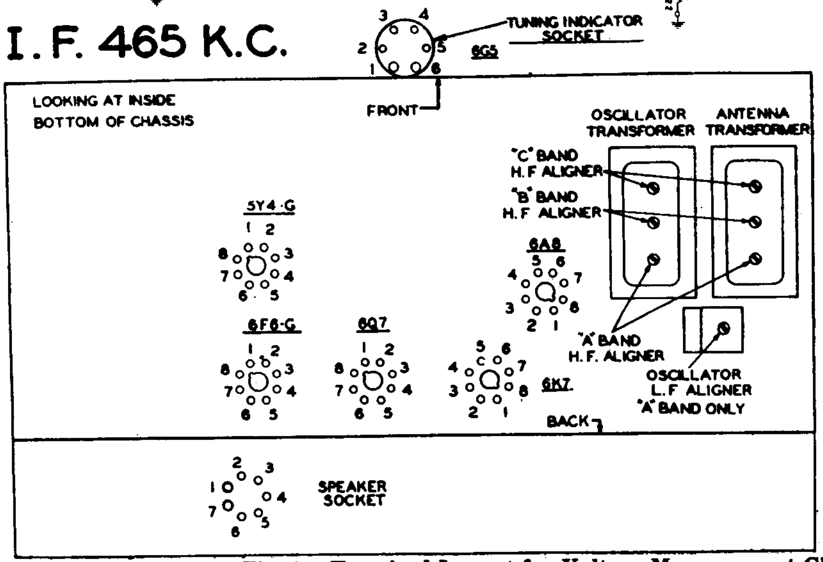
STROMBERG-CARLSON TELEPHONE MFG. CO.

MODELS 228H, 228HB, 228L & 228LB



I.F. 465 K.C.



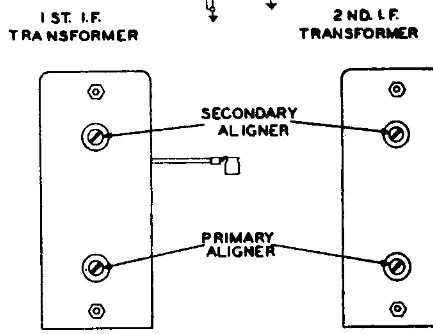


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

REPLACEMENT PARTS

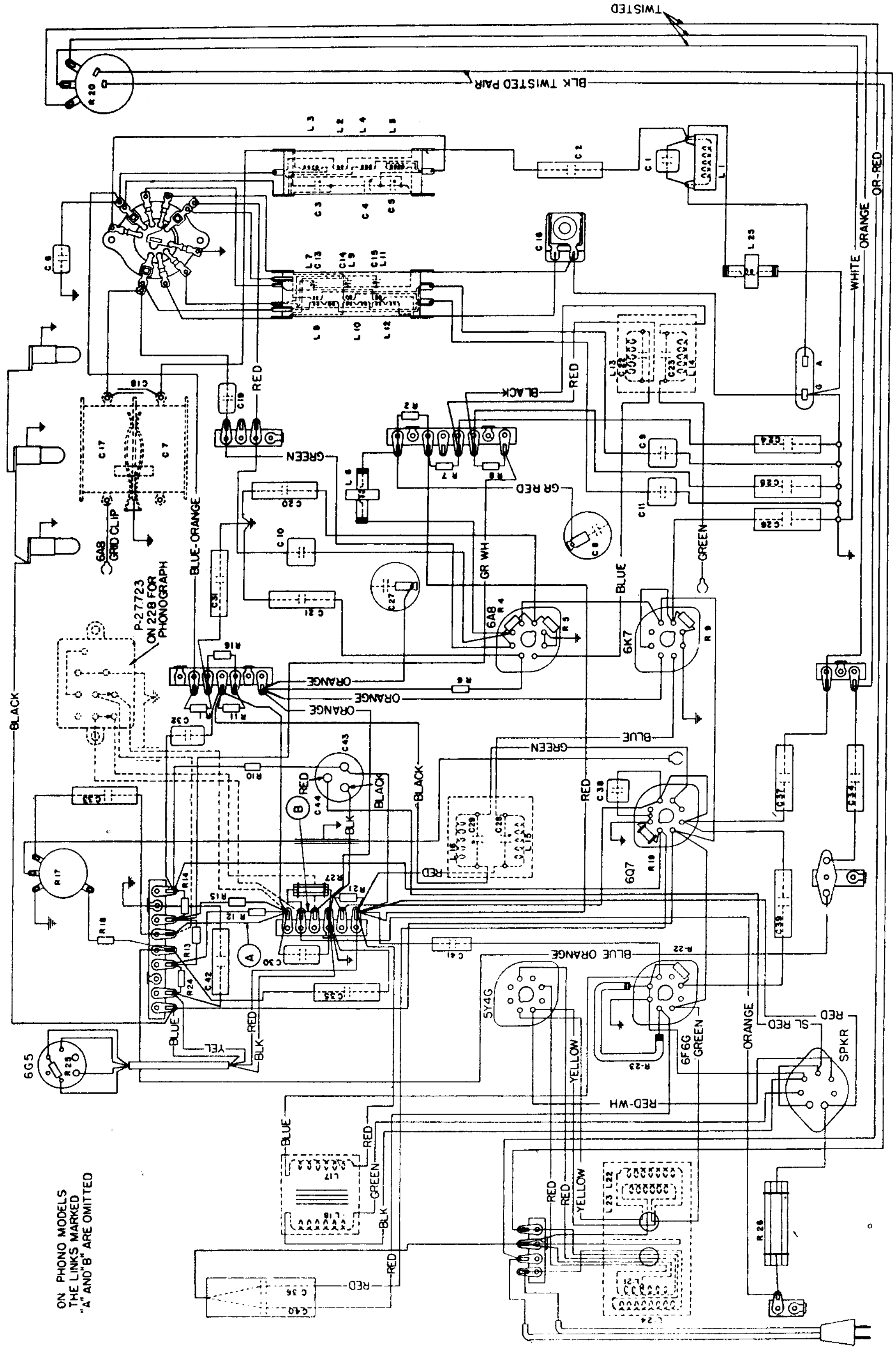
Piece Number	Schematic Circuit Designation	Part
23357	R27	Resistor, Type "C", 22,000 Ohms
23517		Tube Socket, 7 Prong
24268		Cord, Power Supply
24402	C25, C26	Capacitor, .1 Mfd.
24405	C42	Capacitor, .04 Mfd.
24559	C30, C32	Capacitor, Type "O", 100 Mmfd.
24994	C 21, C24	Capacitor, .05 Mfd.
25149	C34, C35, C37	Capacitor, .01 Mfd.
25150	C2, C20, C31, C33, C39	Capacitor, .02 Mfd.
25487	C10	Capacitor, Type "W", .001 Mfd.
25488	C1, C6	Capacitor, Type "W", .002 Mfd.
25489	C9	Capacitor, Type "W", .00125 Mfd.
25500	R23	Resistor, Flexible Type, 400 Ohms
25504	C19, C38	Capacitor, Type "2", 100 Mmfd.
25506	L15, L16	2nd I. F. Transformer
25513	L1	Coil Assembly, Wave Trap
25526	R26	Resistor, Type "F", 15,000 Ohms
25533	C41	Capacitor, .006 Mfd.
25539		Tube Socket, 8 Prong
25814	L6, L25	Coil Assembly, R. F. Choke
26029	C22, C23, C28, C29	Aligning Capacitors, I. F. Transformers
26039	C3, C4, C5	Aligning Capacitors, Antenna Transformer Assembly
26057	C7, C17	Gang Tuning Capacitors
26113	L2, L3, L4, L5	Coil Assembly, Antenna Transformer
26121	L13, L14	1st I. F. Transformer
26157	L7, L8, L9, L10, L11, L12	Coil Assembly, Oscillator Transformer
26161	C13, C14, C15	Aligning Capacitors, Oscillator Transformer Assembly
26172		Range Switch
26287		Dial Lamp
26326	R5, R9	Resistor, Type "E", 270 Ohms
26334	R19	Resistor, Type "E", 1200 Ohms
26341	R7	Resistor, Type "E", 4700 Ohms
26345	R2, R6	Resistor, Type "E", 10,000 Ohms
26353	R4, R11	Resistor, Type "E", 47,000 Ohms
26357	R1	Resistor, Type "E", .1 Megohm
26362	R14, R15, R21	Resistor, Type "E", .27 Megohm
26365	R8	Resistor, Type "E", .47 Megohm
26369	R12, R13, R16, R22, R24, R25	Resistor, Type "E", 1 Megohm
26417	C18	Capacitor, Neutralizing
26727	C11	Capacitor, Type "W", .001 Mfd., Oscillator "B" Range L. F. Padder
26747	C16	Capacitor, Oscillator "A" Range L. F. Aligner
27099		Pilot Lamp Socket
27289		Dial Assembly
27408		Tuning Indicator Socket and Cable
27550	L17, L18	Transformer Assembly, Audio Output
27552	C43, C44	Electrolytic Capacitor; 8 Mfd., 350 Volts, and 8 Mfd., 400 Volts
27553	C8	Electrolytic Capacitor; 16 Mfd., 200 Volts
27554	C27	Electrolytic Capacitor; 16 Mfd., 100 Volts
27555	L21, L22, L23, L24	Power Transformer (50 to 60 Cycles Chassis)
27556	L21, L22, L23, L24	Power Transformer (25 to 60 Cycles Chassis)
27610	R17	Volume Control
27615	R18	Resistor, Type "EI", 27,000 Ohms
27619	C36, C40	Electrolytic Capacitors; 10 Mfd., 25 Volts and 10 Mfd., 25 Volts
27627		Pilot Lamp Socket
27637	R20	Off-On-Switch and Tone Control
27640	R10	Resistor, Type "CB", 150,000 Ohms

MISCELLANEOUS PARTS

Piece Number	Part
26296	Knob (Used on Volume, "On-Off" Switch and "Tone" Control and Station Selector Controls). Used only on No. 228-H Receivers. 3 required
27351	Knob (For Range Switch). Used only on No. 228-H Receiver
26302	Knob (For Volume Control). Used only on No. 228-L Receiver
27790	Knob (For Station Selector Control). Used only on No. 228-L Receiver
27791	Knob (For Range Switch). Used only on No. 228-L Receiver
26384	Knob (For "On-Off" Switch and "Tone" Control). Used only on No. 228-L Receiver
26070	Felt Washer (For use on Control Shafts of No. 228-H Receiver)
26071	Felt Washer (For Use on Control Shafts of No. 228-L Receiver)

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODELS 228H, 228HB, 228L & 228LB



ELECTRICAL SPECIFICATIONS

- Type of Circuit — Superheterodyne
- Tuning Ranges — A—540 to 1500 Kc.; B—1450 to 3500 Kc.; C—5900 to 18,000 Kc.
- Number and Types of Tubes — 1 No. 6A8, 1 No. 6K7, 1 No. 6Q7, 1 No. 6F6G, 1 No. 6G5, 1 No. 5Y4G
- Voltage Rating — 105 to 125 Volts, A. C.
- Input Power Frequency — 25 to 60 Cycles and 50 to 60 Cycles
- Input Power Rating — 56 Watts
- Frequency of Intermediate Amplifier — 465 Kilocycles

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODELS 228H, 228HB, 228L & 228LB

CIRCUIT DESCRIPTION

These receivers are six tube superheterodyne receivers employing metal tubes and a highly efficient dynamic speaker. There are three tuning ranges; the limits of each tuning range are listed under the "Electrical Specifications" given above. These receivers are also equipped with a low level bass frequency compensating network, which in conjunction with the volume control circuit gives balanced reproduction at any setting of the volume control.

The various tubes are used in these receivers as follows: The No. 6A8 tube functions as both Modulator and Oscillator. The No. 6K7 tube is used in the I. F. Amplifier and the No. 6Q7 tube is used as the Demodulator, A. V. C., and Audio Amplifier tube. The No. 6F6G tube is used in the Audio Power Output Stage and the No. 6G5 tube is used for indicating resonance in the Tuning Indicator System. The No. 5Y4G is the Rectifier tube of the power supply unit.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: O-2.5, O-10, O-100, O-250, O-500, O-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

			Terminals of Sockets								*Heater Voltages Between Heater Terminals*	
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6A8	Mod.—Osc.	0	0	0	+210	+65	−20	+180	*6.1*	+1.6	2-7	*6.1*
6K7	I. F. Amp.	0	0	0	+220	+90	+2.5	—	*6.1*	+2.5	2-7	*6.1*
6Q7	Dem.—A. V. C. —Audio	0	0	0	+100	0	0	+100	*6.1*	+1.6	2-7	*6.1*
6F6G	Audio Output	—	0	0	+210	+220	0	0	*6.1*	+13	2-7	*6.1*
6G5	Tuning Ind.	—	0	+2.4*	0	+220	—	*6.1*			1-6	*6.1*
5Y4G	Rectifier	—	0	0	*335*	—	*335*	—	+340	+344	7-8	*4.9*
Speaker Socket		—	+340	0	0	+340	+340	—	+220			

Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the alignment procedure given in the following paragraphs should be carefully followed. In order to make these aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-24608 aligning tool be used.

To accurately align the circuits in these receivers, it is necessary to use a high grade, modulated test oscillator (Signal Generator), the output voltage of which can be varied. In conjunction with this test oscillator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker.

In making any alignment adjustments, always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal. Before proceeding with the alignment of any circuits in these receivers be sure that the "Off-On-Tone" control knob is set for maximum treble response (position where knob is rotated from its maximum counter-clockwise position, slightly clockwise to position where set turns "on"). Figure 1, shows the location of all the aligning capacitors in these receivers.

In making any alignment adjustments on these receivers, it will not be necessary to remove the chassis from the cabinet. The aligning capacitors for the intermediate frequency circuits of these receivers are easily accessible from the rear of the receiver, and the aligning capacitors for the radio frequency circuits are accessible through the aperture located in the bottom metal base plate of the chassis. These apertures are easily accessible either through the bottom of the cabinet or through the bottom of the cabinet shelf depending upon the style of cabinet. See Figure 2.

Dial Adjustment

Before aligning the circuits of any of these receivers, the tuning dial must be properly aligned to track with the gang tuning capacitors. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Station Selector" knob in a clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the gang tuning capacitor in this position, the dial pointer should center over the middle vertical line of the three vertical lines located on the glass dial and the vertical lines located on the metal pan of the dial frame. Now, rotate the "Station Selector" knob so that the dial pointer lines up with the horizontal lines located on the metal pan of the dial frame; with the pointer in this position the two horizontal center marks of the glass dial (located at approximately 9.3 megacycles on the right hand scale and 2.16 megacycles on the left hand scale) should also be in alignment with the dial pointer. If the above conditions are not obtained, loosen the four clamps which hold the glass dial to the dial pan by slightly loosening the four screws, and shift the glass dial so that a good alignment between the dial pointer, the glass dial, and alignment marks located on the metal pan of the dial frame is obtained for both the horizontal and vertical position of the dial pointer.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 465 kilocycles. In making these circuit adjustments always align the circuits in the order given in these instructions.

1. Operate the "Range" switch of the receiver to the "A" range position. Set the receiver's tuning dial at its extreme low frequency position, and operate the Tone Control knob to the "Normal" position. Rotate the Volume Control knob to its maximum clockwise position (maximum volume).
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator-oscillator tube, a modulated signal of 465 kilocycles from the test oscillator, using a 0.1 microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal.
3. Now, noting from Figure 1, the aligning capacitors for the first and second I. F. transformers, align the I. F. circuits in the following manner:
   Secondary of second I. F. transformer.
   Primary of second I. F. transformer.
   Secondary of first I. F. transformer.
   Primary of first I. F. transformer.
   Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

Radio Frequency Adjustments

The alignment of the radio frequency circuits of the various ranges in these receivers should be very carefully made and in the order specified.

Alignment of Short Wave Range (Also Referred to as "C" Band)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the "C" range position, and set the test oscillator's frequency and the receiver's tuning dial to 17 megacycles.
2. Adjust the oscillator's "C" band high frequency aligner for maximum output.
3. Adjust the antenna's "C" band high frequency aligner for maximum output, at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Aircraft, Amateur, and Police Range (Also Referred to as "B" Band)

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short-wave range.

1. Operate the Range Switch on the receiver chassis to the "B" range position, and set the test oscillator's frequency and the receiver's tuning dial to 3.4 megacycles.
2. Adjust the oscillator's "B" band high frequency aligner for maximum output.
3. Adjust the antenna's "B" band high frequency aligner for maximum output, and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Standard Broadcast Range (Also Referred to as "A" Band)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Operate the Range Switch to the "A" range position and set the test oscillator's frequency and the receiver's tuning dial to 1.4 megacycles.
2. Adjust the oscillator's "A" band high frequency aligner for maximum output.
3. Adjust the antenna's "A" band high frequency aligner for maximum output.
4. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
5. Adjust the oscillator's "A" band low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and receiver's tuning dial to 1.4 megacycles and repeat operations Nos. 2 and 3.

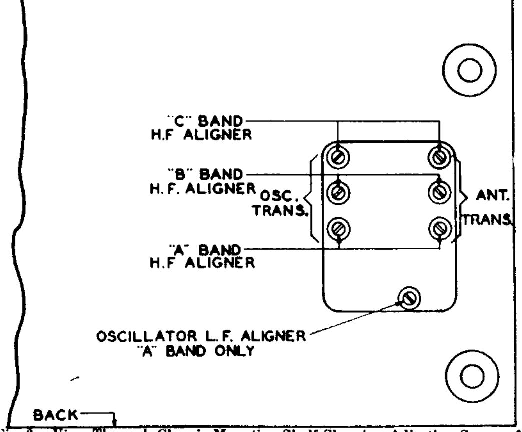
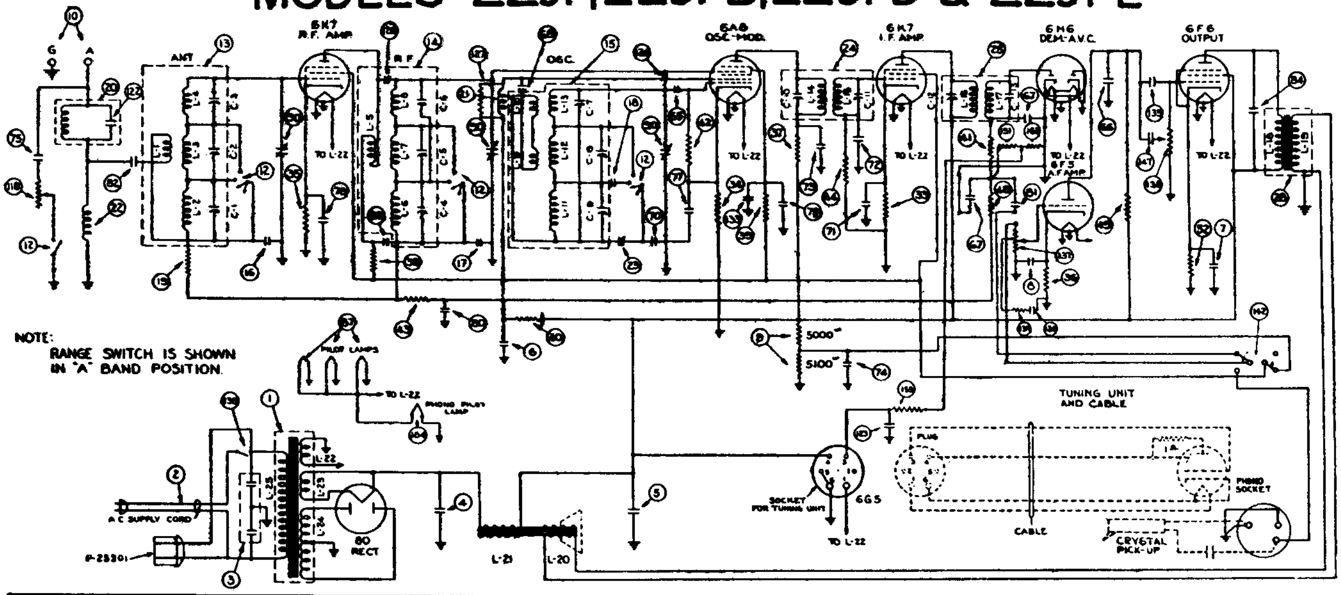


Fig. 2. View Through Chassis Mounting Shelf Showing Adjusting Screws for R. F. Aligning Capacitors.

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODELS 229P, 229PB, 229PD & 229PE



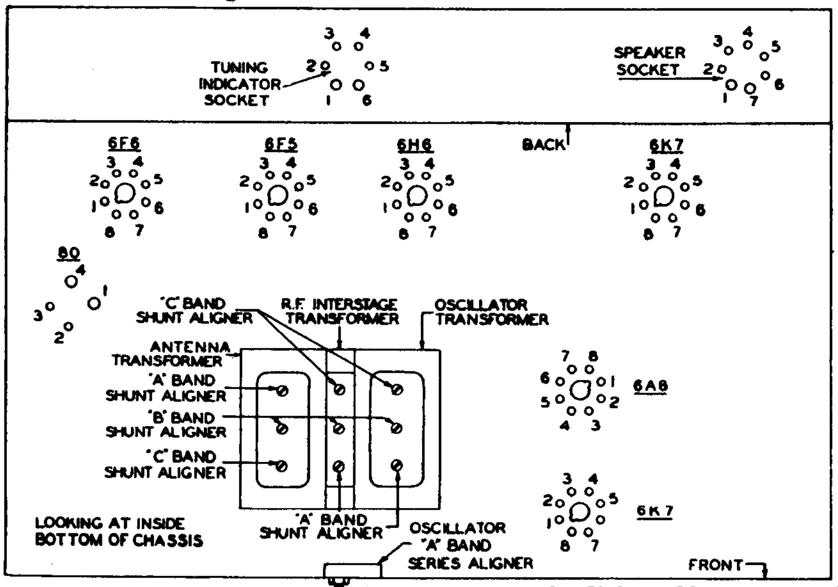
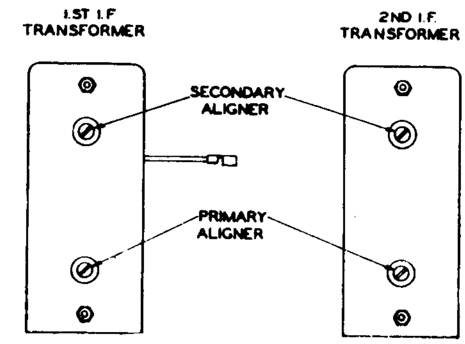


Fig. 2. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

I. F. 465 K.C.



REPLACEMENT PARTS

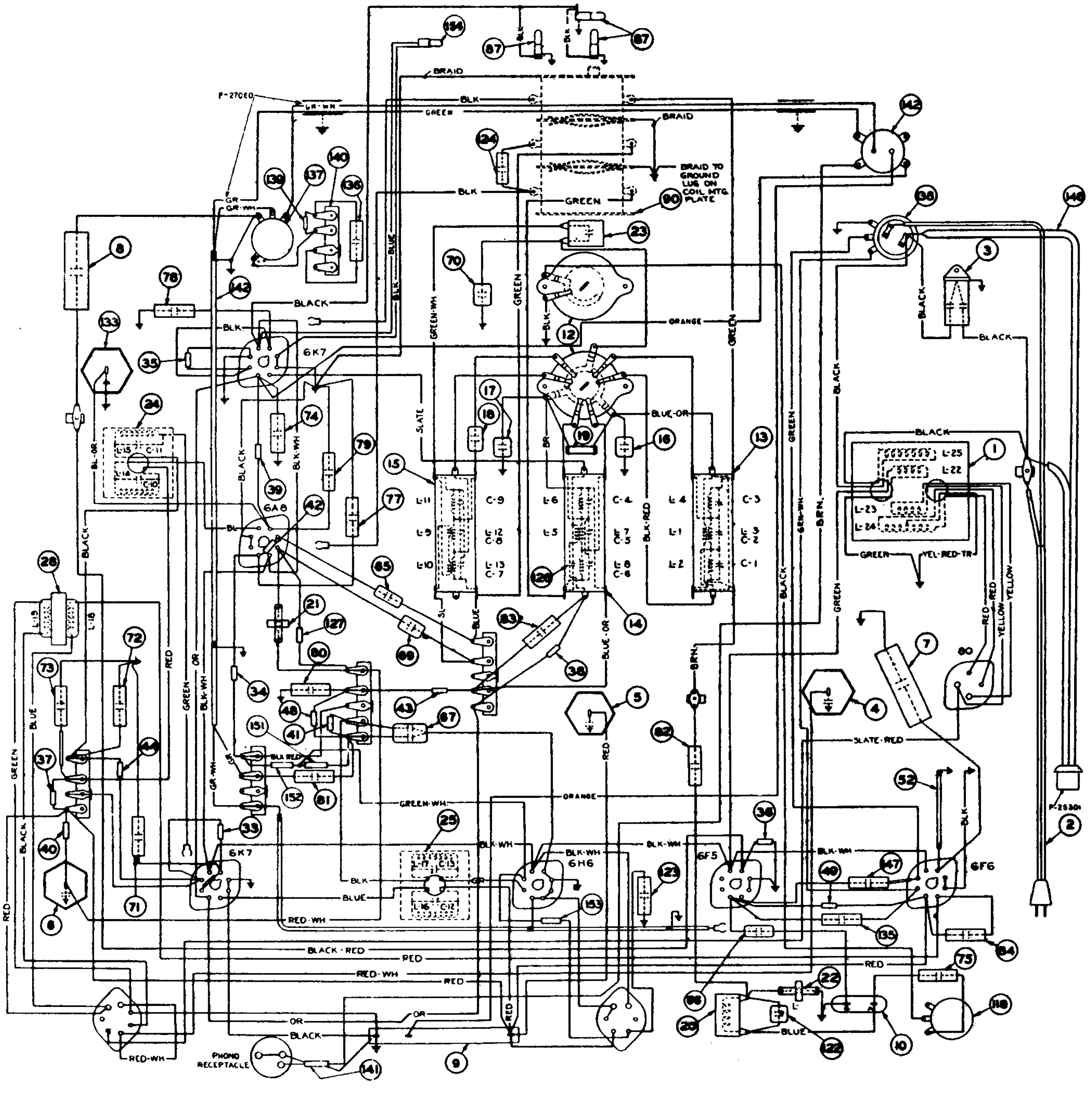
Item Number	Piece Number	Part
1	26248	Power Transformer (50 to 60 Cycles)
1	26249	Power Transformer (25 to 60 Cycles)
2	24268	Cord, A. C. Supply
3	21535	Capacitor Assembly (2-.01 Mf. Capacitors)
4	26408	Capacitor, Electrolytic, 25 Mf.
5	25458	Capacitor, Electrolytic, 16 Mf.
6	26880	Capacitor, Electrolytic, 16 Mf.
7	24207	Capacitor, Electrolytic, 10 Mf., 25 Volts
8	24207	Capacitor, Electrolytic, 10 Mf., 25 Volts
9	26405	Resistor, "B" Voltage Divider
12	26402	Range Switch
13	25510	Coil Assembly, Antenna
14	25511	Coil Assembly, R. F.
15	25512	Coil Assembly, Oscillator
16	25488	Capacitor, .002 Mf.
17	25527	Capacitor, .0027 Mf.
18	25490	Capacitor, .0033 Mf.
19	26388	Resistor, Type "E1", .1 Megohm
20	25513	Coil Assembly, Wave Trap
21	25814	Coil Assembly, R. F. Choke
22	25814	Coil Assembly, R. F. Choke
23	26047	Capacitor, Osc. Series Aligner
24	26406	1st I. F. Transformer
25	25506	2nd I. F. Transformer
28	26411	Transformer, Audio Output
29	22968	Socket, 4 Prong
30	22974	Socket, 6 Prong
31	23517	Socket, 7 Prong
32	25530	Socket, 8 Prong
33	26337	Resistor, Type "E", 330 Ohms
34	26336	Resistor, Type "E", 270 Ohms
35	26331	Resistor, Type "E", 680 Ohms
36	26340	Resistor, Type "E", 3,900 Ohms
37	26341	Resistor, Type "E", 4,700 Ohms
38	26345	Resistor, Type "E", 10,000 Ohms
39	26345	Resistor, Type "E", 10,000 Ohms
40	26350	Resistor, Type "E", 27,000 Ohms
41	26353	Resistor, Type "E", 47,000 Ohms
42	26353	Resistor, Type "E", 47,000 Ohms
43	26357	Resistor, Type "E", .1 Megohm
44	26357	Resistor, Type "E", .1 Megohm
47	26365	Resistor, Type "E", .47 Megohm
48	26369	Resistor, Type "E", 1 Megohm
49	26362	Resistor, Type "E", .27 Megohm
52	25500	Resistor, 400 Ohms, 1 Watt
60	25908	Bracket Assembly
65	25504	Capacitor, 100 Mmf.
66	25504	Capacitor, 100 Mmf.
67	26512	Capacitor Assembly, 2—100 Mmf.
69	25487	Capacitor, .001 Mf.
70	25489	Capacitor, .00125 Mf.
71	24402	Capacitor Assembly, .1 Mf.
72	24402	Capacitor Assembly, .1 Mf.
73	25483	Capacitor Assembly, .1 Mf., 400 Volts
74	25483	Capacitor Assembly, .1 Mf., 400 Volts
75	25149	Capacitor Assembly, .01 Mf.
77	25150	Capacitor Assembly, .02 Mf.
78	25150	Capacitor Assembly, .02 Mf.
79	25150	Capacitor Assembly, .02 Mf.
80	25150	Capacitor Assembly, .02 Mf.
81	25150	Capacitor Assembly, .02 Mf.
82	25150	Capacitor Assembly, .02 Mf.
83	25481	Capacitor Assembly, .002 Mf.
84	25533	Capacitor Assembly, .006 Mf.
87	26287	Pilot Lamp
89	26285	Dial Assembly
90	26414	Gang Tuning Capacitor
118	26095	Potentiometer (Sensitivity Control)
120	26499	Knob (For Sensitivity Control)
122	25488	Capacitor, .002 Mf.
123	24402	Capacitor Assembly, .01 Mf.
124	26417	Capacitor, Gimmick
127	26350	Resistor, Type "E", 27,000 Ohms
133	27554	Electrolytic Capacitor, 16 Mfd., 100 Volts
135	25487	Capacitor, .001 Mfd.
136	27782	Capacitor, .03 Mfd.
137	27616	Potentiometer (Volume Control)
138	27311	Potentiometer, "Off-On" Switch and Tone Control
139	26350	Resistor, Type "E", 27,000 Ohms
141	27968	Shielded Cord and Receptacle Assembly, Phono. Pick-up Circuit
142	26472	Switch, Phono.
143	27060	Shielded Cable Assembly
144	27820	Lamp Socket Assembly
146	25301	Power Supply Cord Assembly for Phono. Unit
147	25149	Capacitor, .01 Mfd.
151	26362	Resistor, Type "E", .27 Megohm
152	26362	Resistor, Type "E", .27 Megohm
153	26369	Resistor, Type "E", 1 Megohm
154	28118	Lamp Socket Assembly for Phono. Unit Compartment

MISCELLANEOUS PARTS

Piece Number	Part
26043	Plug (For Loud Speaker Cable)
26491	Plug (For Tuning Unit Cable)
26369	Resistor, Type "E", 1 Megohm (Used at Socket of No. 6G5 Tube)
26147	Pilot Lamp Socket
26302	Knob (For Volume Control)
26385	Knob (For Range Switch)
26384	Knob (For Off-On-Tone Control)
26305	Knob (For Large Portion of Tuning Shaft)
26306	Knob (For Vernier Portion of Tuning Shaft)
26307	Knob (For Radio-Phono. Control)
26071	Felt Washer (Used on "Volume", "Radio-Phono.." "Range Switch" and "Off-On-Tone" Controls' Shafts)
26072	Felt Washer (Used on "Station Selector" Control Shaft)

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODELS 229P, 229PB, 229PD & 229PE



ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne
Tuning Ranges	A—540 to 1500 Kc.; B—1450 to 3500 Kc.; C—5600 to 18,000 Kc.
Number and Types of Tubes	2 No. 6K7, 1 No. 6A8, 1 No. 6H6, 1 No. 6F5, 1 No. 6F6, 1 No. 80, 1 No. 6G5
Power Supply Voltage	105 to 125 Volts
Power Supply Frequency	See Receivers Listed under "Apparatus Specifications"
Input Power Rating	90 Watts
Frequency of Intermediate Amplifier	465 Kilocycles

STROMBERG-CARLSON TELEPHONE MFG. CO.
MODELS 229P, 229PB, 229PD & 229PE

CIRCUIT DESCRIPTION

The Stromberg-Carlson No. 229-P Radio Receivers are eight tube, superheterodyne receivers employing metal tubes and a highly efficient dynamic speaker. These receivers have three tuning ranges which are quickly interchangeable by means of a rotary switch, the control knob of which is located on the control panel. Ease and convenience of operation are assured by the vernier drive with its associated double knob. Resonance with a signal is indicated by means of the tuning indicator tube which operates on the cathode-ray principle. The strength of a received signal may be determined by observing the size of the aperture appearing on the target of the tuning indicator tube, the stronger a received signal the greater the reduction in the size of the aperture. A low level bass frequency compensating circuit is also provided in the volume control circuit of these receivers, which operates to give balanced reproduction at any setting of the volume control.

These receivers are also equipped with a single record playing phonograph unit which uses a crystal type pick-up in conjunction with a specially equalized circuit.

In order to obtain maximum performance from these receivers, a sensitivity control is provided for use on the standard broadcast range only. Its control knob is located on the rear of the chassis base. When either the "B" or "C" ranges are in operation, this sensitivity control is automatically cut out of the circuit so that the receiver will function at its maximum sensitivity on these two ranges. In some localities it will be found that without the use of this control, it will be impossible to eliminate adjacent channel interference. When this condition is obtained, the receiver should be tuned accurately to the desired station, and this sensitivity control adjusted so that minimum interference is obtained from the interfering station. See Figure 1.

The various tubes are used in these receivers as follows: One No. 6K7 tube is used in the R. F. Amplifier, and the other No. 6K7 tube is used in the I. F. Amplifier. The No. 6A8 tube functions as both Oscillator and Modulator tube. The No. 6H6 tube is used as a Demodulator and Automatic Volume Control tube. The No. 6F5 tube is used in the Audio Frequency Amplifier Stage (Driver), and the No. 6F6 tube is used in the Audio Power Output Stage. The No. 80 tube is the Rectifier tube of the power supply unit, and the No. 6G5 tube is used for indicating resonance in the Tuning Indicator System.

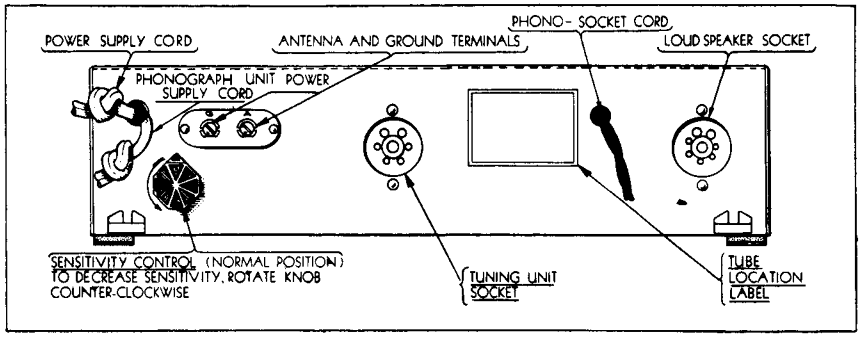


Fig. 1. Location and Operation of Sensitivity Control.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 2 shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: O-2.5, O-10, O-100, O-250, O-500, O-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

			Terminals of Sockets								Heater Voltages Between Heater Terminals	
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6K7	R. F. Amp.	0	0	0	+54	+96	+7.6	+4.5	*6.3*	+7.6	2–7	*6.3*
6A8	Osc.-Mod.	0	0	0	+222	+72	—1.0	+143	*6.3*	+6.1	2–7	*6.3*
6K7	I. F. Amp.	0	0	0	+240	+96	+7.4	+4.5	*6.3*	+7.4	2–7	*6.3*
6H6	Dem.—A.V.C.	—	0	0	0	0	0	—	*6.3*	+4.5	2–7	*6.3*
6F5	Audio Amp.	0	0	0	—	+122*	—	—	*6.3*	+.75	2–7	*6.3*
6F6	Audio Output	—	0	0	+226	+237	0	0	*6.3*	+15	2–7	*6.3*
80	Rectifier	—	+330	*325*	*325*	+330	—	—	—	—	1–4	*4.8*
Tuning Indicator Plug's Socket			*6.3*	0	+7.6	+235	+7.8	0	—	—	1–6	*6.3*
Speaker Socket			+327	0	0	+327	+327	0	+237	—	—	—

Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, this alignment procedure should be carefully followed.

In making any alignment adjustments always adjust the signal generator's output to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal.

Figure 2 shows the location of all the aligning capacitors used in this receiver.

Intermediate Frequency Amplifier Adjustments

The intermediate frequency used in these receivers is 465 kilocycles. In making these I. F. circuit adjustments always align in the following order:

1. Secondary of 2nd I. F. Transformer (Capacitor C-13).
2. Primary of 2nd I. F. Transformer (Capacitor C-12).
3. Secondary of 1st I. F. Transformer (Capacitor C-11).
4. Primary of 1st I. F. Transformer (Capacitor C-10).

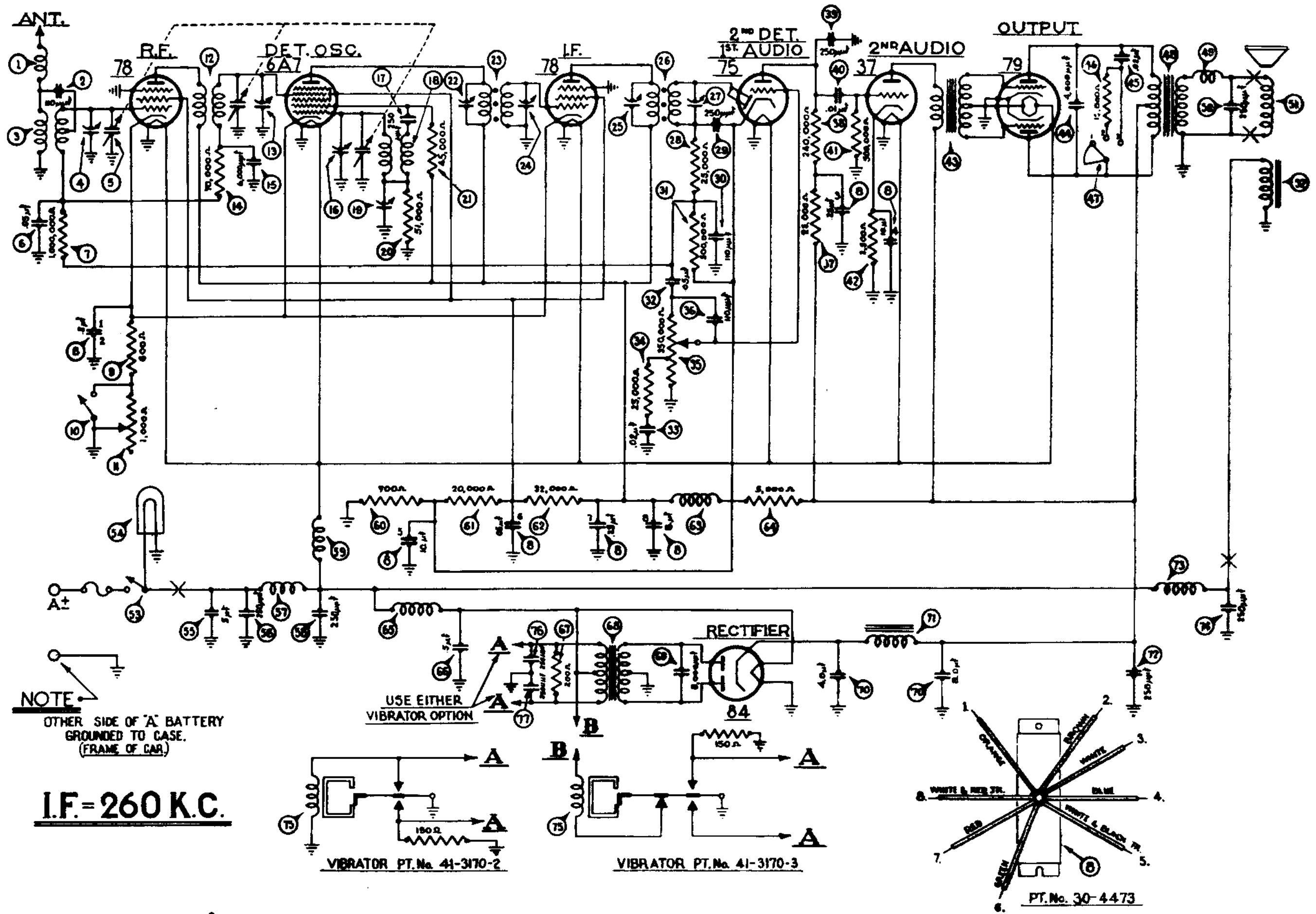
Radio Frequency Adjustments

The adjustments of the aligning capacitors used in the radio frequency circuits in this receiver should be very carefully made in the following order and at the frequencies specified below:

1. Oscillator's "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-7).
2. R. F. Interstage "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-6).
3. Antenna "C" Band Shunt Aligner at 17 Megacycles (Capacitor C-3).
4. Oscillator's "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-8).
5. R. F. Interstage "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-5).
6. Antenna "B" Band Shunt Aligner at 3.4 Megacycles (Capacitor C-2).
7. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-9).
8. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
9. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).
10. Oscillator's "A" Band Series Aligner at 0.6 Megacycles (Capacitor-23).
11. Oscillator's "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-9).
12. R. F. Interstage "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-4).
13. Antenna "A" Band Shunt Aligner at 1.4 Megacycles (Capacitor C-1).

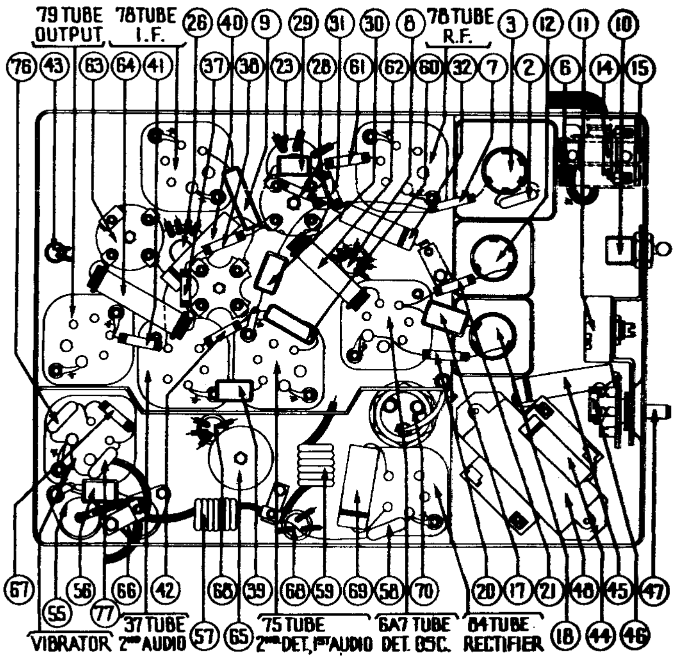
TRANSITONE AUTOMOBILE RADIO CORP.

MODEL P1421 "PACKARD"



MODEL 1421 P — PARTS LIST

No.	Description	Part No.
1	Antenna Choke	38-8074
2	Condenser (110 mmfd.)	30-1031
3	Antenna Transformer	32-2230
4	First Padder (on tun. cond.)	
*5	Tuning Condenser	31-1913
6	Condenser (.05 mfd.)	30-4444
7	Resistor (1,000,000 ohms)	33-510344
8	Condenser (.05-.25-.25-.5-8-10-10 mfd.)	30-4473
9	Resistor (600 ohms)	33-1212
10	Sensitivity Control Switch	42-1225
11	Sensitivity Control	33-5129
12	R. F. Transformer	32-2231
13	Second Padder (on tun. cond.)	
14	Resistor (70,000 ohms)	33-370344
15	Condenser (6000 mmfd.)	30-4445
16	Third Padder (on tun. cond.)	
17	Condenser (250 mmfd.)	30-1032
18	Oscillator Transformer	32-2232
*19	Low Frequency Padder	31-6056
20	Resistor (51,000 ohms)	33-351344
21	Resistor (45,000 ohms)	33-345344
22	Padder (Pri. 1st I. F. trans.)	
23	First I. F. Transformer	32-2252
24	Padder (Sec. 1st I. F. Trans.)	
25	Padder (Pri. 2nd I. F. Trans.)	
26	Second I. F. Transformer	32-2167
27	Padder (Sec. 2nd I. F. Trans.)	
28	Resistor 425,000 ohms)	33-325344
29	Condenser (250 mmfd.)	30-1032
30	Condenser (110 mmfd.)	30-1031
31	Resistor (500,000 ohms)	33-449344
32	Condenser (.05 mfd.)	30-4444
33	Condenser (.02 mfd.)	30-4215
34	Resistor (25,000 ohms)	33-325344
35	Volume Control & Coupling Assembly (350,000 ohms)	38-7968
36	Condenser (110 mmfd.)	30-1031
37	Resistor (25,000 ohms)	33-325344
38	Resistor (240,000 ohms)	33-424344
39	Condenser (250 mmfd.)	30-1032
40	Condenser (.01 mfd.)	30-4145
41	Resistor (500,000 ohms)	33-449344
42	Resistor (2500 ohms)	33-225344
*43	Input Transformer	32-7681
44	Condenser (4000 mmfd.)	30-4185
45	Condenser (.02 mfd.)	30-4419
46	Resistor (15,000 ohms)	33-315344
*47	Tone control switch	42-1139
48	Output Transformer	32-7684
49	Choke	32-2269
50	Condenser (250 mmfd.)	30-1032
51	Cone & Voice Coil	36-3159
*52	Field Coil Assembly	36-3513
53	On & Off Switch	42-1156
54	Pilot Lamp	34-2040
55	Condenser (.5 mfd.)	30-4474
56	Condenser (250 mmfd.)	30-1032
57	"A" Choke	32-1374
58	Condenser (250 mmfd.)	30-1032
59	Filament Choke	32-1374
60	Resistor (700 ohms)	33-1220
61	Resistor (20,000 ohms)	33-320344
62	Resistor (32,000 ohms)	33-332543
63	"B" Choke	32-1932
64	Resistor (5000 ohms)	33-250543
65	Vibrator Choke	32-2249
66	Condenser (.5 mfd.)	30-4474
67	Resistor (200 ohms)	33-120334
68	Power Transformer	32-7683
69	Condenser (8000 mmfd.)	30-4420
70	Filter Condenser (4-8 mfd.)	30-2167
71	"B" Filter Choke	32-7710
72	Condenser (250 mmfd.)	30-1032
73	Choke	32-2268
74	Condenser (250 mmfd.)	30-1032
75	Vibrator — Optional	41-3170-2 / 41-3170-3
76	Condenser (250 mmfd.)	30-1032
77	Condenser (250 mmfd.)	30-1032
	*Four Prong Socket	27-6043
	*Five Prong Socket	27-6035
	*Six Prong Socket	27-6036
	*Seven Frong Socket	27-6037
	*Speaker Socket	27-6030
	Inductive Suppressor	32-2250
	Interference Condenser (gen.)	30-4475
	Interference Condenser (dome light)	30-4476
	Interference Condenser	30-4477
	*Dial	27-5247
	*Tuning Shaft	28-8656

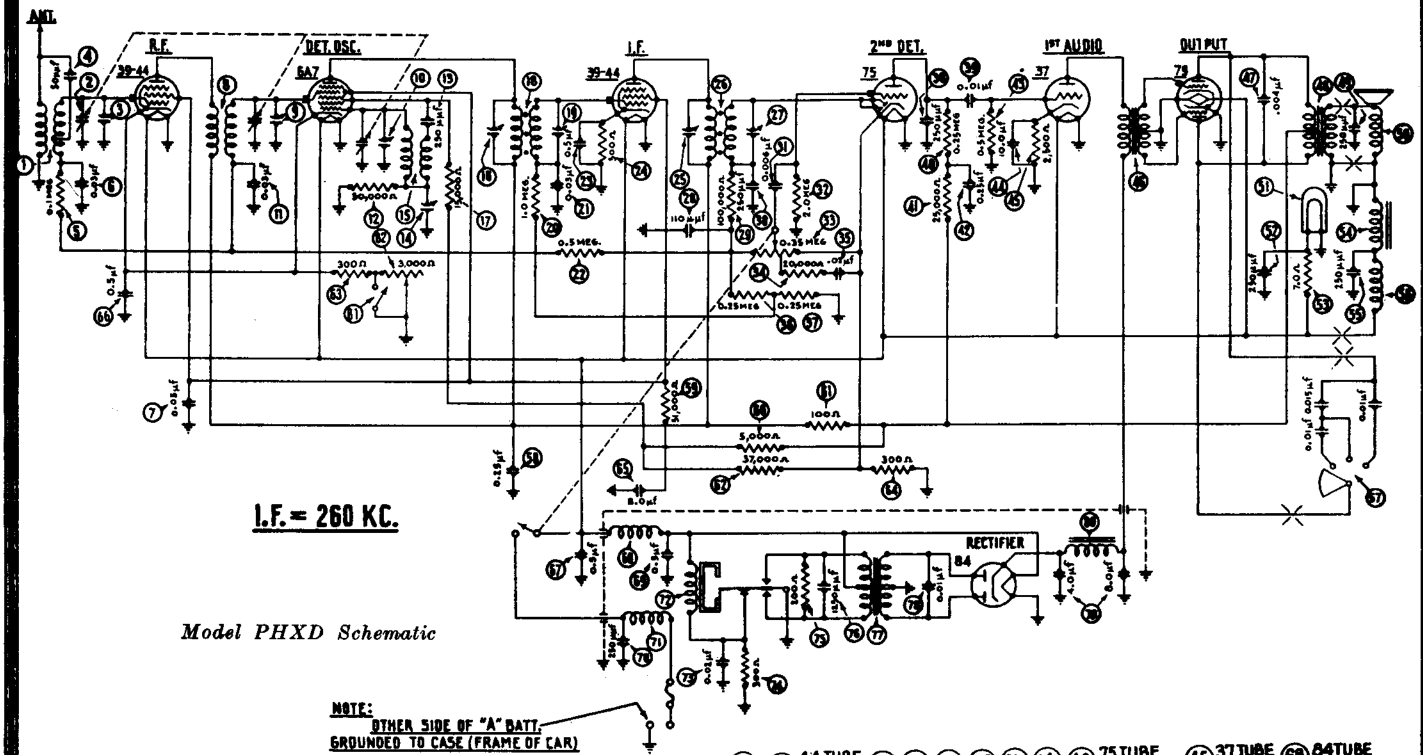


No.	Description	Part No.	No.	Description	Part No.
	*Volume Shaft	28-8657		*Ammeter Lead	38-6595
	*Pilot Lamb Assembly	38-6750		Rivet (switch mtg.)	W-1589
	Fuse	7227		Studs	28-6231
	Fust Insulator	27-7729		Nuts	W-55A
	*Switch & Lead Assembly	41-3217		Washer	4486
	*Antenna Lead	L-2259		Receiver Housing	38-7997

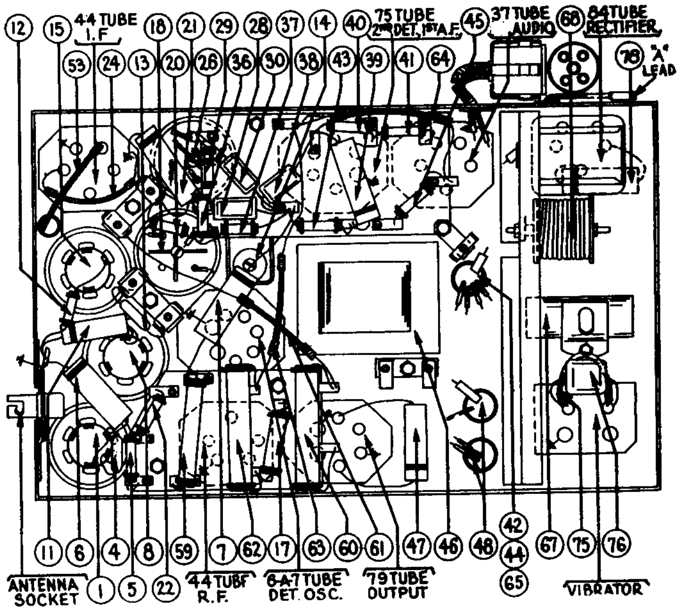
NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia — Chicago or San Francisco.

TRANSITONE AUTOMOBILE RADIO CORP.

MODEL PHXD "PACKARD DeLUXE"



Model PHXD Schematic



— *Model PHXD Base View*

MODEL PHXD PARTS LIST

No.	Description	Part No.
1	Antenna Transformer	32-1462
2	Tuning Condenser	31-1418
3	First Padder (on tun. cond.)	
4	Condenser (50 mmfd.)	30-1029
5	Resistor (100,000 ohms)	6099
6	Condenser (.03 mfd.)	30-4025
7	Condenser (.05 mfd.)	30-4020
8	R. F. Transformer	32-1463
9	Second Padder (on tun. cond.)	
10	Third Padder (on tun. cond.)	
11	Condenser (.03 mfd.)	30-4025
12	Resistor (50,000 ohms)	6098
13	Condenser (250 mmfd.)	30-1032
14	Padder	31-6012
15	Oscillator Transformer	32-1222
16	Padder (Pri. 1st I. F. Trans.)	
17	Resistor (15,000 ohms)	6208
18	First I. F. Transformer	32-1471
19	Padder (Sec. 1st I. F. Trans.)	
20	Resistor (1,000,000 ohms)	33-1096
21	Condenser (.03 mfd.)	30-4025
22	Resistor (500,000 ohms)	6097
23	Condenser (.5 mfd.)	30-4058
24	Resistor (500 ohms)	6977
25	Padder (Pri. 2nd I. F. Trans.)	
26	Second I. F. Transformer	32-1499
27	Padder (Sec. 2nd I. F. Trans.)	
28	Condenser (110 mmfd.)	30-1031
29	Resistor (100,000 ohms)	6099
30	Condenser (250 mmfd.)	30-1032
31	Condenser (.006 mfd.)	30-4125
32	Resistor (2,000,000 ohms)	33-1025
33	Vol. Cont. & Sw. Assembly	38-6022
34	Resistor (20,000 ohms)	33-1130
35	Condenser (.02 mfd.)	30-4215
36	Resistor (250,000 ohms)	33-1097
37	Resistor (250,000 ohms)	33-1097
38	Condenser (250 mmfd.)	30-1032
39	Condenser (.01 mfd.)	30-4145
40	Resistor (250,000 ohms)	33-1097
41	Resistor (25,000 ohms)	33-1013
42	Condenser (.25 mfd.)	30-4135
43	Resistor (500,000 ohms)	6097
44	Condenser (10 mfd.)	30-4135
45	Resistor (2500 ohms)	33-1100
46	Input Transformers	32-7206
47	Condenser (.004 mfd.)	30-4185
48	Output Transformer	32-7205
49	Condenser (250 mmfd.)	30-1032
50	Cone & Voice Coil	36-3159
51	Pilot Lamp	34-2040
52	Condenser (250 mmfd.)	30-1032
53	Resistor (ı ohms)	33-3130
54	Field Coil Assembly	02795
55	Condenser (250 mmfd.)	30-1032
56	Choke	32-1464
57	Tone Control	30-4208
58	Condenser (.25 mfd.)	30-4134
59	Resistor (51,000 ohms)	4237
60	Resistor (5000 ohms)	33-1070
61	Resistor (100 ohms)	33-3023
62	Resistor (37,000 ohms)	33-1098
63	Resistor (300 ohms)	33-3121
64	Resistor (300 ohms)	33-3121
65	Condenser (8 mfd.)	30-4135
66	Condenser (.5 mfd.)	30-4048
67	Condenser (.5 mfd.)	30-4015
68	Vibrator Choke	32-1474
69	Condenser (.5 mfd.)	30-4210
70	Interference Filter	32-1466
71	Interference Filter	32-1466
72	Vibrator	38-5036
73	Condenser (.02 mfd.)	30-4039
74	Resistor (300 ohms)	33-3010
75	Resistor (200 ohms)	7217
76	Condenser (1250 mmfd.)	5886
77	Power Transformer	32-7098
78	Condenser (.01 mfd.)	30-4051
79	Filter Condenser (4-8 mfd.)	30-2015
80	"B" Choke	32-7104
81	Sensitivity Control Switch	42-1140
82	Sensitivity Control	33-5130
	Dial	27-5070
	Antenna Lead	38-5131
	Mounting Studs	28-6231
	Mounting Nuts	W55A
	Spark Plug Resistor	33-1015E
	Distributor Resistor	4851E
	Interference Condenser	4522S
	Interference Condenser	30-4007

Description	Part No.
Spark Plug Terminals	28-6053
4 Hole Socket	27-6006
5 Hole Socket	27-6014
6 Hole Socket	27-6020
7 Hole Socket	27-6005
Knobs	27-4146
Knob Springs	28-1738
"A" Cable and Switch Assembly	38-6023
"A" Switch	42-1080
Flexible Shaft (Tun.)	28-8268
Flexible Shaft (Vol.)	28-8269
Receiver Housing	29-2285

Note: A choke, Part Number 32-1374 has been added. This is connected in series between Pilot Lamp 61 and Condenser 52 and Resistor 53.

TRANSITONE AUTOMOBILE RADIO CORP.

MODEL P1421 "PACKARD"

I. F. TRANSFORMERS AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 4).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 8.

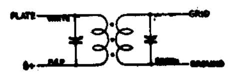


Figure 8

If replacements are ever necessary, replace the entire coil assembly, 32-2252 for the first I. F. stage and 32-2167 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL P-1421 ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A Philco Set Tester, 8164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER—The output meter must be connected by means of an adapter to the plate of the type 79 output tube and to the Receiver chassis.

SIGNAL GENERATOR—With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F.—Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder (27) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (26) for maximum reading (See Figure 4 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder (24) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (23) for maximum reading. Readjust padders (26) and (27) with the generator lead connected to the type 6A7 tube. (See Figure 4 for location of padders).

HIGH FREQUENCY AND R. F.—After padding the first I. F. stage remove the generator lead from the 6A7 tube. Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Using a piece of paper approximately .006" thick as a gauge between the heel of the rotor plates and the stator plates, turn the rotor plates in mesh until they strike against the paper.

With the tuning condenser in this position, adjust the high frequency padder (18) and the R. F. padder (13) until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

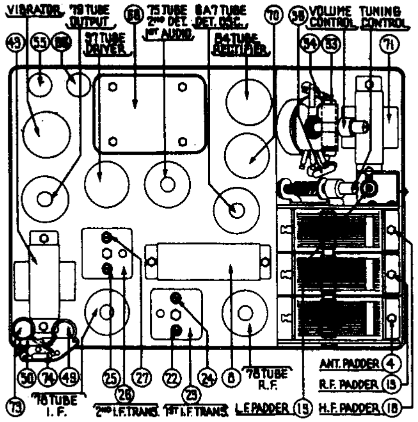


Figure 4

LOW FREQUENCY—Turn the tuning condenser plates in mesh to approximately 600 K. C., 60 on the dial scale and set the signal generator at 600 K. C. Roll the tuning condenser and adjust the low frequency padder screw (15) for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT—Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder (18) again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

ANTENNA — WHEN PADDING THE ANTENNA STAGE IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE USED.

Connect the signal generator lead to the antenna lead on the Receiver using a 280 mmfd. condenser in series between the two leads.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders (13) and (4) for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

MODEL PHXD "PACKARD DeLUXE"

I. F. Transformers and Padders
Model PHXD

The I. F. transformers are assembled complete with padding condensers.

The padders are placed in the top of the shield can, one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figure 8).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 7.

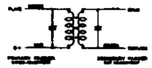


Figure 7

If replacements are ever necessary, replace the entire coil assembly, 32-1471 for the first I. F. stage and 32-1449 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

Model PHXD Adjustments

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments to the Model PHXD are required, the procedure given below must be followed in detail.

Equipment

Full charged heavy duty storage battery or 6-volt power pack, 048 Philco Set Tester, 8164 Padding Wrench, 27-7159 Padding Screw Driver.

General

OUTPUT METER — The output meter must be connected by means of an adapter to one of the plates of the type 79 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

The sensitivity switch must be in the "distance" position. The tone control should be turned to the brilliant position.

Remove the cover from the Receiver. The antenna lead must be disconnected.

I. F.—Adjust the signal generator to exactly 260 K. C. Connect the generator lead to the grid cap of the 89-44 I. F. tube, in series with a .1 mfd. condenser.

Adjust the secondary nut padder (27) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading. (See Figure 8 for location of padders). Note the maximum reading obtained and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off. This adjustment is critical.

Remove the generator lead from the 89-44 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser. Adjust the secondary nut padder (18) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (19) for maximum reading. (See Figure 8 for location of padders). Note the maximum reading obtained and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off. This adjustment is critical.

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube. Adjust the signal generator to 1500 K. C., and then connect the generator lead to the grid cap of the 89-44 R. F. tube in series with a .1 mfd. condenser.

Using a piece of paper approximately .006" thick as a gauge between the heel of the rotor plates and the stator plates, turn the rotor plates until they strike against the paper. With the tuning condenser in this position, adjust the high frequency padder (10) and the R. F. padder (9) until the maximum reading is obtained on the output meter. This is the true setting for the 1500 K. C., 150 on the dial scale.

HIGH FREQUENCY READJUSTMENT—Next turn the tuning condenser plates out of mesh to 1500 K. C., 150 on the dial scale, and adjust the signal generator to 1500 K. C. Then adjust the high frequency padder (10) for maximum reading on the output meter.

LOW FREQUENCY—Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and adjust the signal generator to 580 K. C. Roll the tuning condenser and adjust the low frequency padder (14) for maximum reading on the output meter.

ANTENNA AND R. F.—Connect the generator lead to the antenna lead using a 200 mmfd. condenser in series between the two leads and the .1 mfd. condenser. Turn the tuning condenser to 1400 K. C., and set the generator for 1400 K. C. Adjust the padders (9) and (3) for maximum reading on the output meter.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator has been used, the Receiver will be adjusted properly.

Note: When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. The signal generator output lead should be connected to a wire placed near the car antenna but not connected to it.

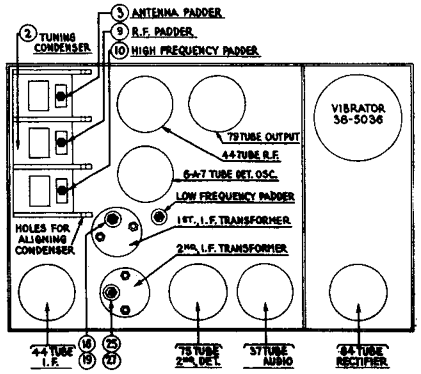
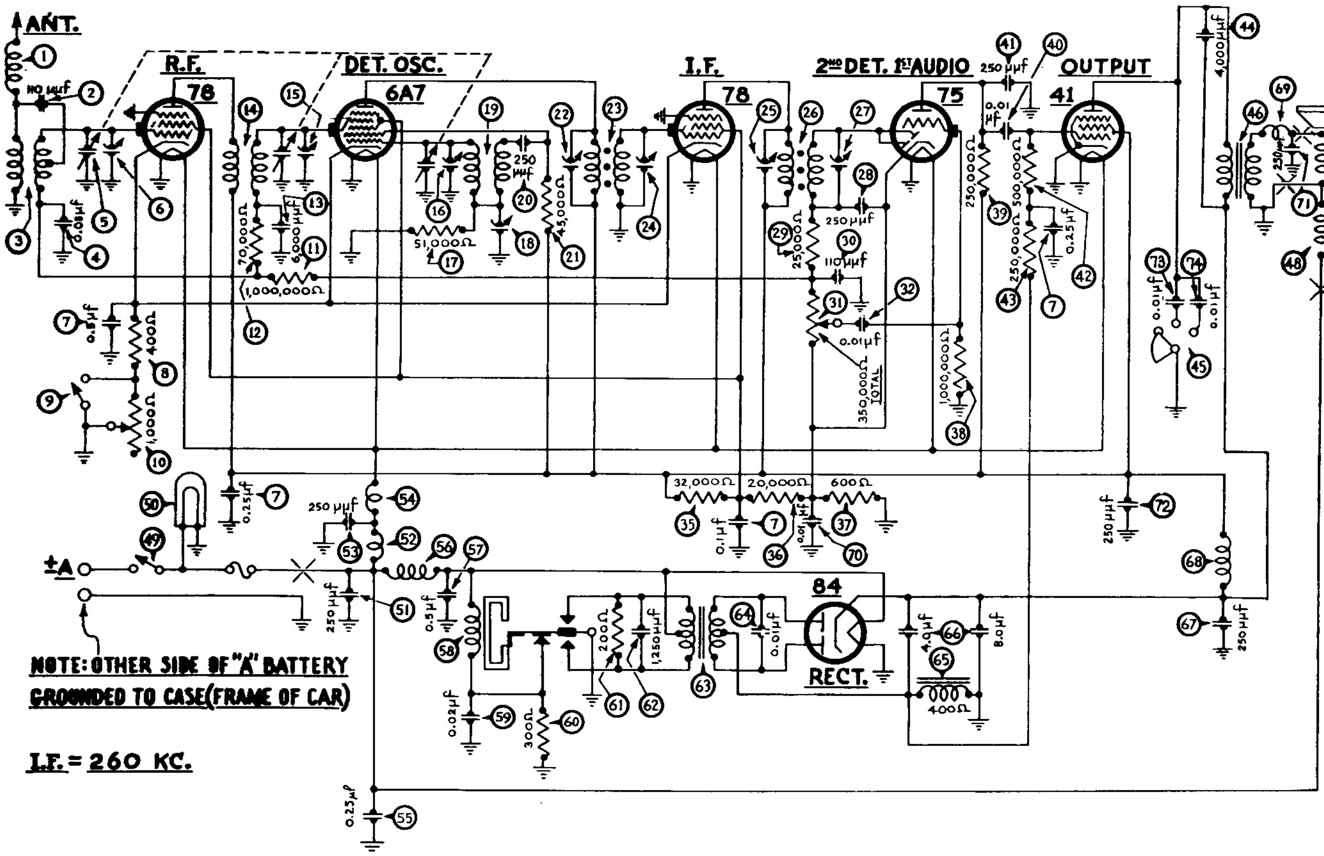


Figure 8 —*Model PHXD—Top View*

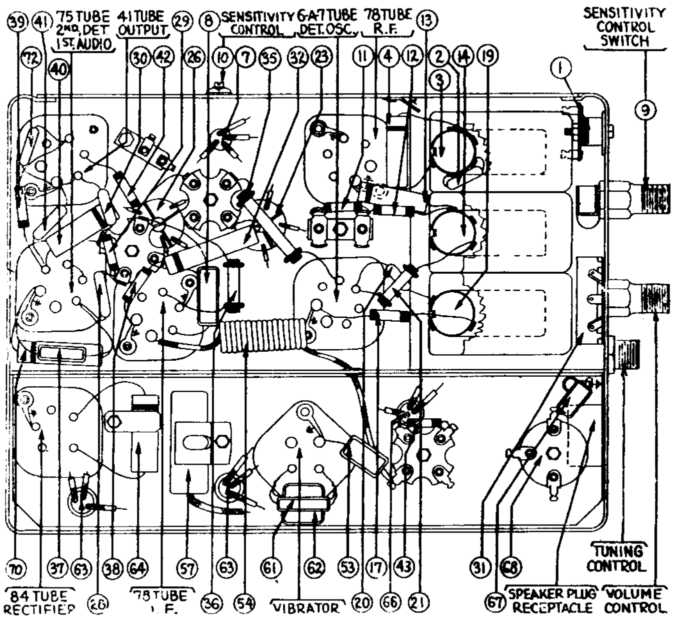
TRANSITONE AUTOMOBILE RADIO CORP.

MODEL ST12 "STUDEBAKER"



Parts List

(1) Antenna Choke 38-7210
(2) Condenser (110 mmfd.) ..30-1031
(3) Antenna Transformer 32-1934
(4) Condenser (.05 mfd.) 30-4020
(5) Tuning Condenser 31-1674
(6) First Padder (on tun. cond.) ....
(7) Condenser (.1-.25-.25-.5 mfd.) 30-4374
(8) Resistor (400 ohms) 33-1211
(9) Sensitivity Control Switch ..42-1140
(10) Sensitivity Control 33-5129
(11) Resistor (1,000,000 ohms) 33-510344
(12) Resistor (70,000 ohms) ..33-370334
(13) Condenser (6000 mmfd.) ..30-4125
(14) R. F. Transformer 32-1926
(15) Second Padder (on tun. cond.) ....
(16) Third Padder (on tun. cond.) ....
(17) Resistor (51,000 ohms) 33-351344
(18) Low Frequency Padder 31-6056
(19) Oscillator Transformer 32-1927
(20) Condenser (250 mmfd.) ...30-1032
(21) Resistor (45,000 ohms) ..33-345344
(22) Padder (Pri. 1st I. F. Trans.) ....
(23) First I. F. Transformer ...32-1928
(24) Padder (Sec. 1st I. F. Trans.) ....
(25) Padder (Pri. 2nd I. F. Trans.) ....
(26) Second I. F. Transformer ..32-1929
(27) Padder (Sec. 2nd I. F. Trans.) ....
(28) Condenser (250 mmfd.) ..30-1032
(29) Resistor (25,000 ohms) .33-325344
(30) Condenser (110 mmfd.) ..30-1031
(31) Volume Control (350,000 ohms) 33-5139
(32) Condenser (.01 mfd.) 30-4124
(35) Resistor (32,000 ohms) .33-332434
(36) Resistor (20,000 ohms) .33-320334
(37) Resistor (600 ohms) 33-1212
(38) Resistor (1,000,000 ohms) 33-510344
(39) Resistor (250,000 ohms) 33-424344
(40) Condenser (.01 mfd.) 30-4145
(41) Condenser (250 mmfd.) ...30-1032
(42) Resistor (500,000 ohms) 33-449344
(43) Resistor (250,000 ohms) 33-424344
(44) Condenser (4000 mmfd.) ..30-4185
(45) Tone Control Switch 42-1139
(46) Output Transformer 32-7495
(47) Cone and Voice Coil 36-3526
(48) Field Coil 32-9236
(49) On and Off Switch 42-1157
(50) Pilot Lamp 34-2039
(51) Condenser (250 mmfd.) 30-1032
(52) "A" Choke 32-1644
(53) Condenser (250 mmfd.) 30-1032
(54) Choke 32-1930
(55) Condenser (.25 mfd.) 30-4146
(56) Vibrator Choke 32-1968
(57) Condenser (.5 mfd.) 30-4047
(58) Vibrator 38-5036
(59) Condenser (.02 mfd.) 30-4039
(60) Resistor (300 ohms) 33-3130
(61) Resistor (200 ohms) 33-1210
(62) Condenser (1250 mmfd.) 5886
(63) Power Transformer 32-7488
(64) Condenser (.01 mfd.) 30-4381
(65) Filter Choke 32-7491
(66) Filter Condenser (4-8 mfd.) 30-2134
(67) Condenser (250 mmfd.) 30-1032
(68) R. F. Choke 32-1932
(69) Choke 32-1464
(70) Condenser (.01 mfd.) 30-4124
(71) Condenser (250 mmfd.) 30-1032
(72) Condenser (250 mmfd.) ..30-1032
(73) Condenser (.01 mfd.) 30-4051
(74) Condenser (.01 mfd.) 30-4051
Four Hole Socket 27-6044
Five Hole Socket 27-6035
Six Hole Socket 27-6036
Seven Hole Socket 27-6037
Distributor Resistor 4851
Interference Condenser (.5 mfd.) 30-4007
Interference Condenser (1 mfd.) 4522
Scale Assembly (Dictator) ..42-5445
Scale Assembly (President) .42-5449
Knob (Sensitivity) 27-4261
Knob (Tun.&Vol.) Dictator 27-4252
Knob (Tun&Vol.) President 27-4254

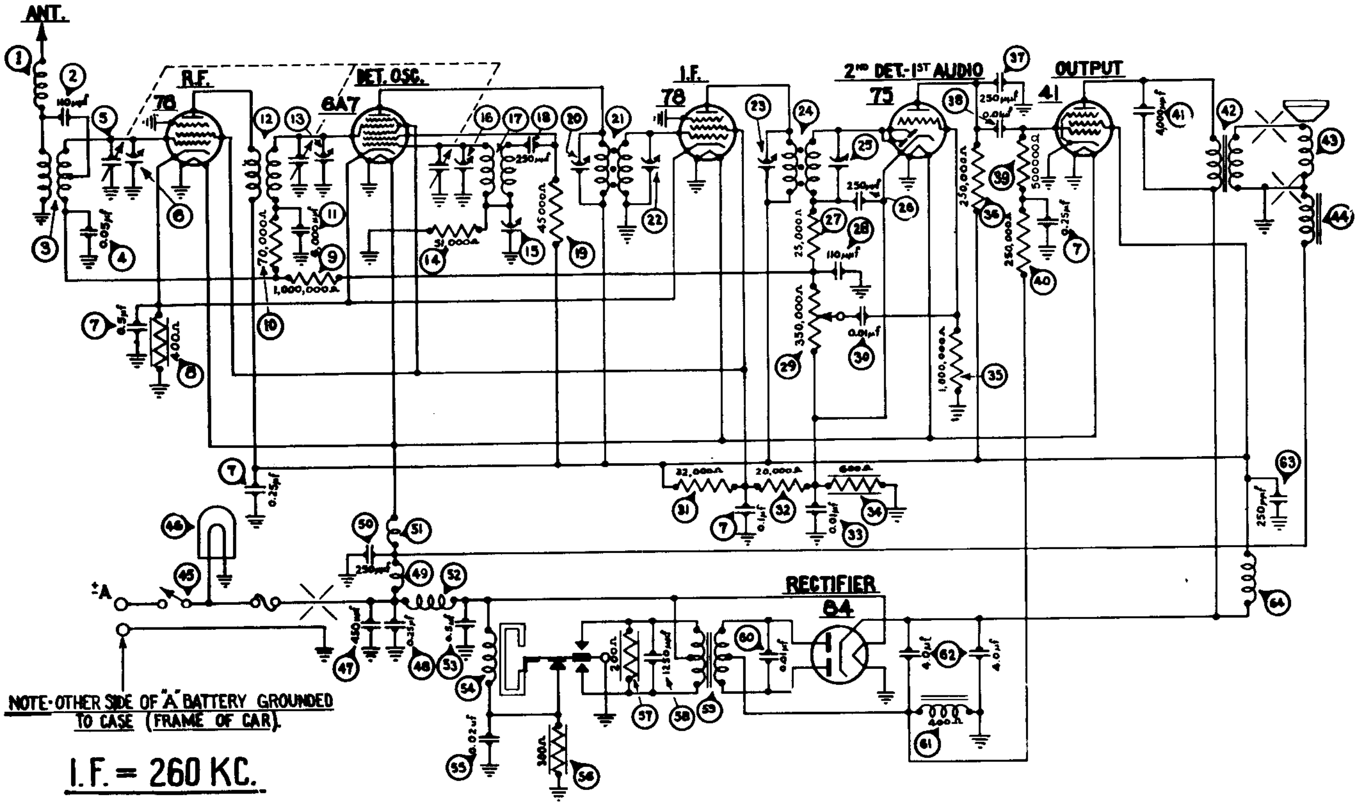


Model ST12 Base View

Pointer Gear Shaft Assembly 42-5456
Tuning and Volume Shaft ..28-8442
Sensitivity Switch Shaft 28-8444
Fuse 7227
Fuse Insulator 27-7729
Tee Bolt (Rec. Mtg.) 28-6161
Nuts (Rec. Mtg.) W518A
Receiver Housing 38-1588
Speaker Cable 41-3175

TRANSITONE AUTOMOBILE RADIO CORP.

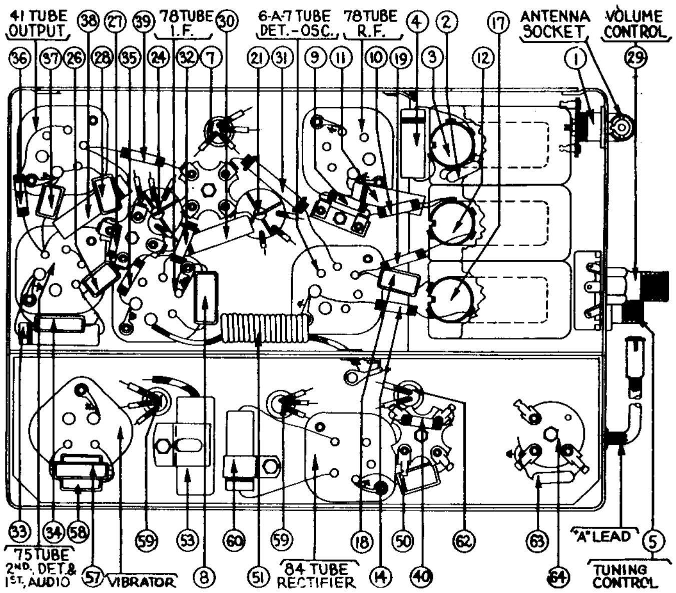
MODEL ST15 "STUDEBAKER"



— Model ST15 Schematic

Model ST15 Parts List

(1) Antenna Choke 38-7210
(2) Condenser (110 mmfd.) 30-1031
(3) Antenna Transformer 32-1934
(4) Condenser (.05 mfd.) 30-4020
(5) Tuning Condenser 31-1674
(6) First Padder (on tun. cond.) ....
(7) Condenser (.1-.25-.25-.5 mfd.) 30-4374
(8) Resistor (400 ohms) 33-1211
(9) Resistor (1,000,000 ohms)33-510344
(10) Resistor ,(70,000 ohms) .33-370344
(11) Condenser (6000 mmfd.) ..30-4125
(12) R. F. Transformer 32-1926
(13) Second Padder (on tun. cond.) ....
(14) Resistor (51,000 ohms) .33-351344
(15) Low Frequency Padder 31-6056
(16) Third Padder (on tun. cond.) ....
(17) Oscillator Transformer 32-1927
(18) Condenser (250 mmfd.) ...30-1032
(19) Resistor (45,000 ohms) .33-345344
(20) Padder (Pri. 1st I. F. Trans.) ....
(21) First I. F. Transformer 32-1928
(22) Padder (Sec. 1st I. F. Trans.) ....
(23) Padder (Pri. 2nd I. F. Trans.) ....
(24) Second I. F. Transformer ..32-1929
(25) Padder (Sec. 2nd I. F. Trans.) ....
(26) Condenser (250 mmfd.) 30-1032
(27) Resistor (25,000 ohms) ..33-325344
(28) Condenser (110 mmfd.) ...30-1031
(29) Volume Control (350.000 ohms) 33-5139
(30) Condenser (.01 mfd.) 30-4124
(31) Resistor (32,000 ohms) .33-332433
(32) Resistor (20,000 ohms) .33-320333
(33) Condenser (.01 mfd.) 30-4124
(34) Resistor (600 ohms) 33-1212
(35) Resistor (1,000,000 ohms)33-510344
(36) Resistor (250,000 ohms) 33-424344
(37) Condenser (250 mmfd.) 30-1032
(38) Condenser (.01 mfd.) 30-4145
(39) Resistor (500,000 ohms) 33-449344
(40) Resistor (250.000 ohms) 33-424344
(41) Condenser (4,000 mmfd.) ..30-4185
(42) Output Transformer 32-7495
(43) Cone and Voice Coil 36-3526
(44) Field Coil Assembly 32-9236
(45) On and Off Switch 42-1157
(46) Pilot Lamp 34-2039
(47) Condenser (450 mmfd.) ..31-6065
(48) Condenser (.25 mfd.) 30-4146
(49) "A" Choke 32-1644
(50) Condenser (250 mmfd.) 30-1032
(51) Filament Choke 32-1464
(52) Vibrator Choke 32-1968
(53) Condenser (.5 mfd.) 30-4047
(54) Vibrator Unit 38-5036
(55) Condenser (.02 mfd.) 30-4039
(56) Resistor (300 ohms) 33-3130
(57) Resistor (200 ohms) 33-1210
(58) Condenser (1250 mmfd.) 5886
(59) Power Transformer 32-7482
(60) Condenser (.01 mfd.) 30-4381
(61) Filter Choke 32-7491
(62) Filter Condenser (4-4 mfd.) 30-2145
(63) Condenser (250 mmfd.) ...30-1032
(64) "B" Choke 32-1932
Four Hole Socket 27-6044
Five Hole Socket 27-6035
Six Hole Socket..........27-6036
Seven Hole Socket 27-6037
Distributor Resistor 4851
Interference Condenser (.5 mfd.) 30-4007
Clamp (Cont. Mtg.) 29-3463
Dial Assembly (Dictator) ..42-5445
Dial Assembly (President) .42-5449
Knob (Tun. & Vol.) 27-4254
Pointer (Dictator) 28-3461
Pointer (President) 28-3462
Tuning Shaft 28-8442
Volume Shaft 28-8443
Fuse 7227
Fuse Insulator 27-7729



— Model ST15 Base View

Tee Bolt (Rec. Mtg.) 28-6161
Nuts (Rec. Mtg.) W518A
Speaker Mtg. Clamp 29-3131
Speaker Cable Assembly 41-3180

TRANSITONE AUTOMOBILE RADIO CORP.

MODEL ST12 "STUDEBAKER"

I. F. Transformers and Padders
Model ST12

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 8).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 7.

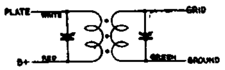


FIGURE 7

If replacements are ever necessary, replace the entire coil assembly, 32-1928 for the first I. F. stage and 32-1929 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

Model ST12 Adjustments

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments to the Model ST12 are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

The sensitivity switch must be in the "distance" position. The tone control should be turned to the brilliant position.

Procedure

I. F. — Adjust the signal generator to exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser.

Adjust the secondary screw padder ⑳ on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder ㉑ for maximum reading. (See Figure 8 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser. Adjust the secondary screw padder ㉔ on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder ㉕ for maximum reading. (See Figure 8 for location of padders).

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Adjust the signal generator to 1600 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser.

Turn the tuning condenser plates out of mesh as far as they will go. With the tuning condenser in this position, adjust the high frequency padder ⑯ and the R. F. padder ⑬ until the maximum reading is obtained on the output meter. This is the true setting for 1600 K. C., 160 on the dial scale.

LOW FREQUENCY — Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and adjust the signal generator to the 580 K. C. Roll the tuning condenser and adjust the low frequency padder screw ⑮ for maximum reading on the ouput meter.

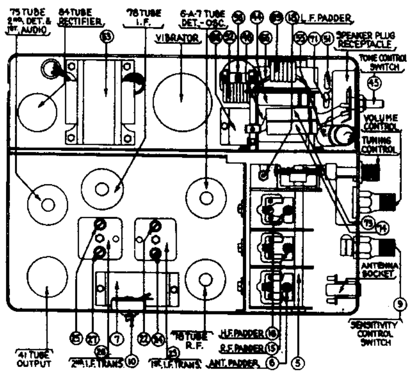


FIGURE 8

HIGH FREQUENCY RE-ADJUSTMENT — Turn the tuning condenser plates out of mesh as far as they will go and adjust the signal generator to 1600 K. C. Then adjust the high frequency padder ⑯ again for maximum reading on the output meter.

ANTENNA — Connect the generator lead to the antenna cable assembly (made up of Part No. L1915 loom, 1-27-7133 terminal and 40 inches of 16 strand No. 30 wire), using a 200 mmfd. condenser in series between the two leads. Plug the cable into the antenna socket.

Turn the tuning condenser to 1400 K. C. and set the generator for 1400 K. C. Adjust the padders ⑬ and ⑥ for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. The signal generator output lead should be connected to a wire placed near the car antenna but not connected to it.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator has been used, the Receiver will be adjusted properly.

MODEL ST15 "STUDEBAKER"

I. F. Transformers and Padders
Model ST15

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 6).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 5.

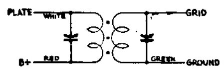


FIGURE 5

If replacements are ever necessary, replace the entire coil assembly, 32-1928 for the first I. F. stage and 32-1929 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

Model ST15 Adjustments

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments to the Model ST15 are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F. — Adjust the signal generator to exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser.

Adjust the secondary screw padder ⑳ on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder ㉑ for maximum reading. (See Figure 6 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser. Adjust the secondary screw padder ㉔ on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder ㉕ for maximum reading. (See Figure 6 for location of padders).

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Adjust the signal generator to 1600 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser.

Turn the tuning condenser plates out of mesh as far as they will go. With the tuning condenser in this position, adjust the high frequency padder ⑯ and the R. F. padder ⑬ until the maximum reading is obtained on the output meter. This is the true setting for 1600 K. C., 160 on the dial scale.

LOW FREQUENCY — Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and adjust the signal generator to the 580 K. C. Roll the tuning condenser and adjust the low frequency padder screw ⑮ for maximum reading on the output meter.

HIGH FREQUENCY RE-ADJUSTMENT — Turn the tuning condenser plates out of mesh as far as they will go and adjust the signal generator to 1600 K. C. Then adjust the high frequency padder ⑯ again for maximum reading on the output meter.

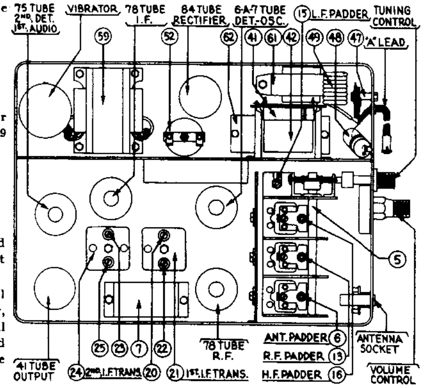


FIGURE 6

ANTENNA — Connect the generator lead to the antenna cable assembly (made up of Part No. L1915 loom, 1-27-7133 terminal and 40 inches of 16 strand No. 30 wire), using a 200 mmfd. condenser in series between the two leads. Plug the cable into the antenna socket.

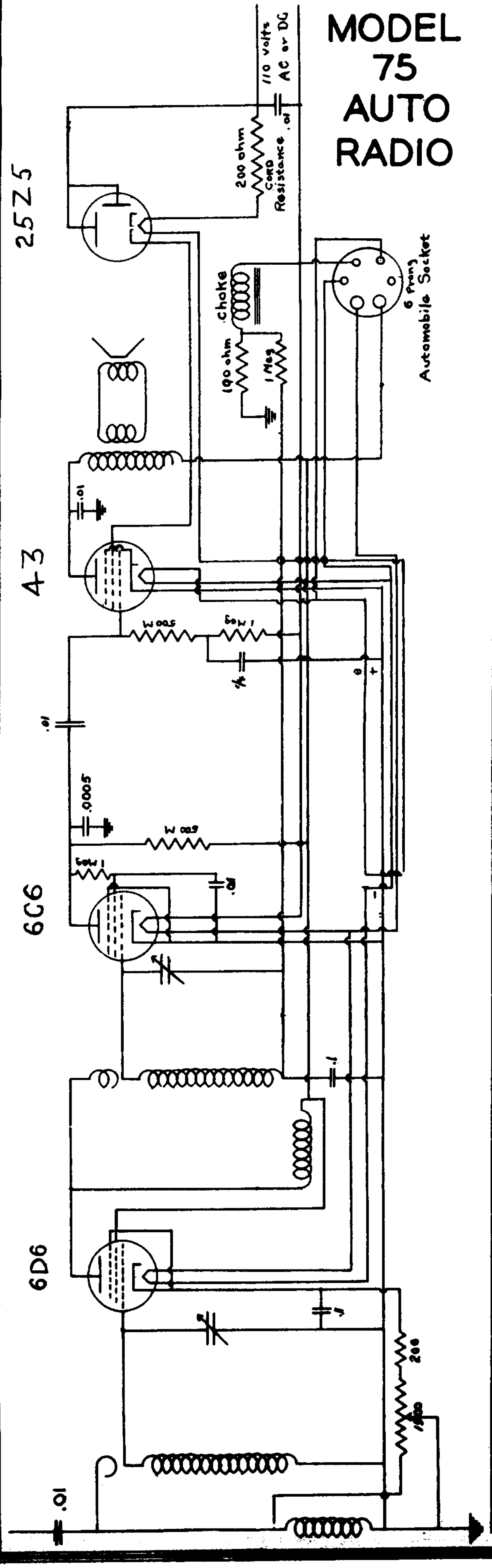
Turn the tuning condenser to 1400 K. C. and set the generator for 1400 K. C. Adjust the padders ⑬ and ⑥ for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. The signal generator output lead should be connected to a wire placed near the car antenna but not connected to it.

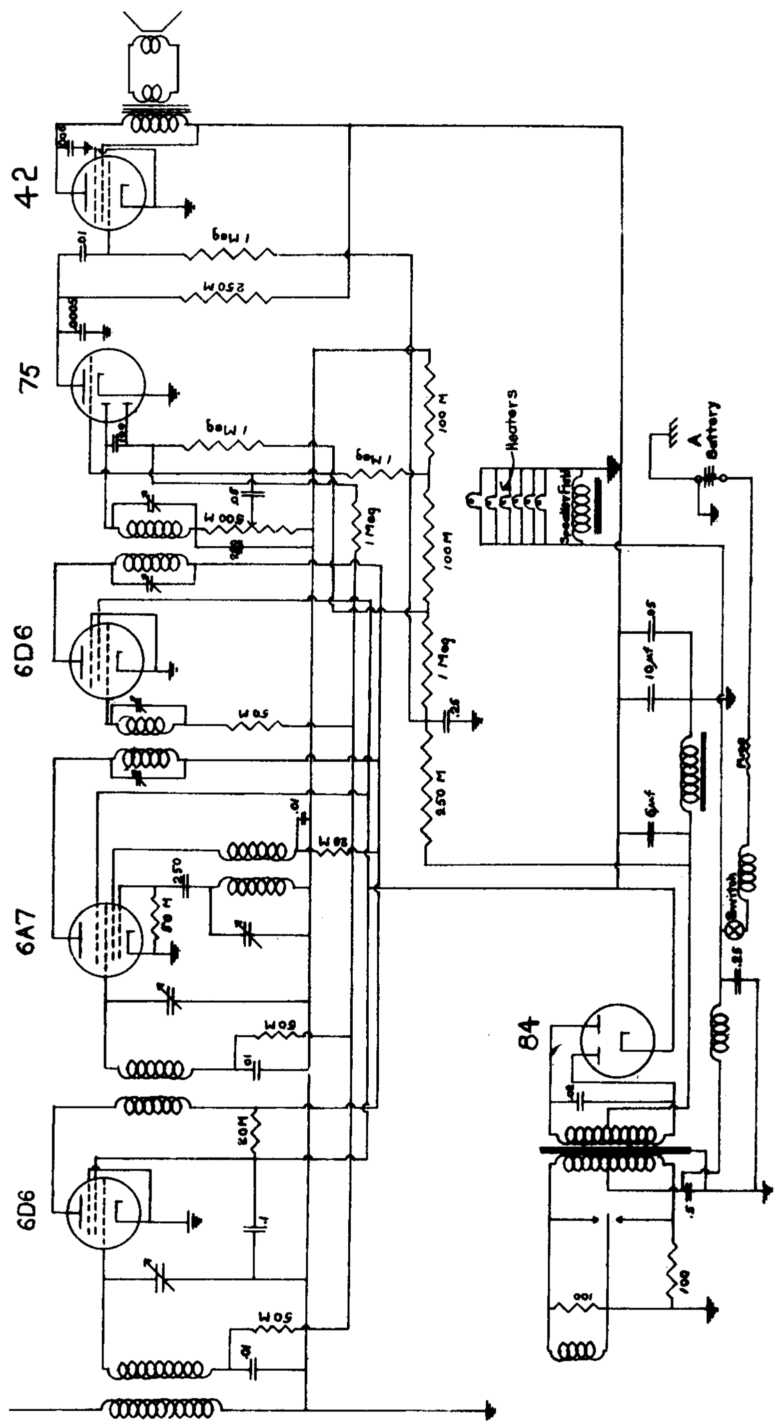
If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator has been used, the Receiver will be adjusted properly.

TRAV-LER RADIO & TELEVISION CORP.

MODEL 75 AUTO RADIO

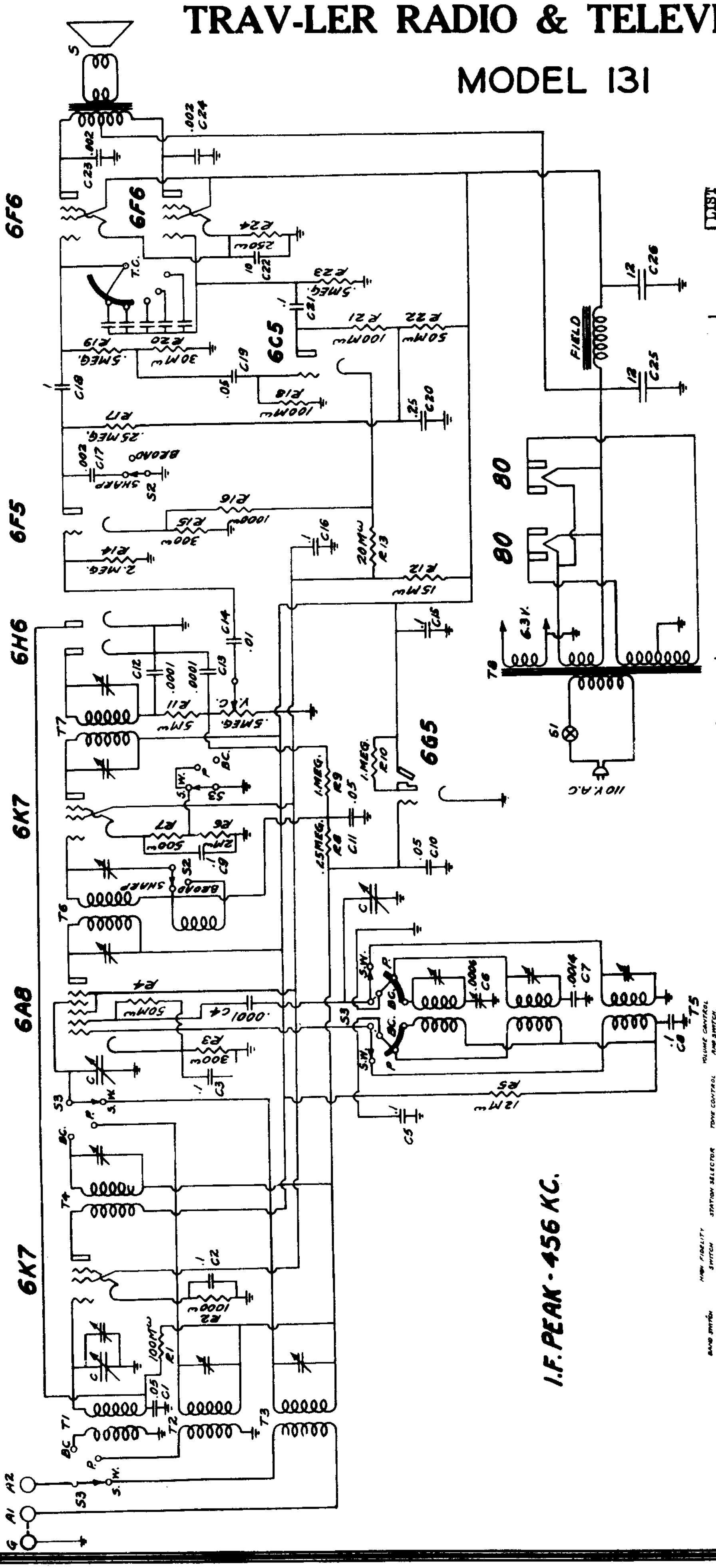


MODEL 64 AUTO RADIO

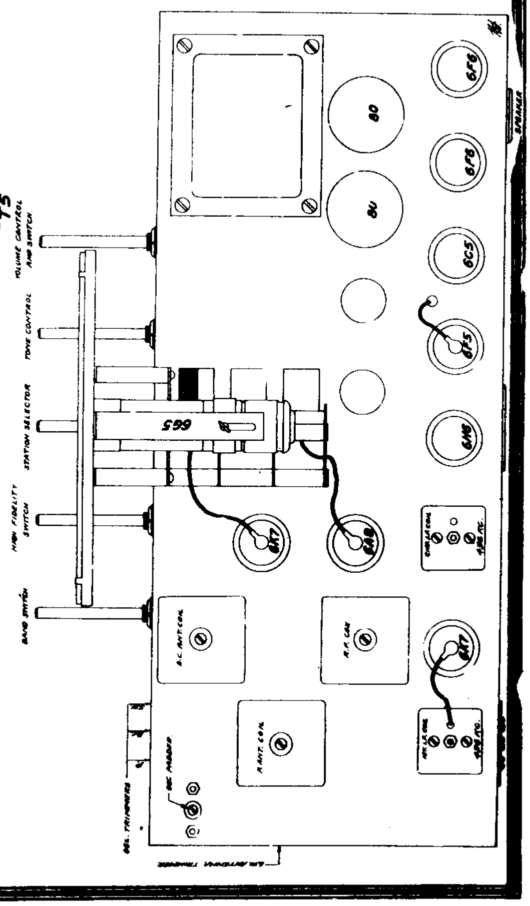


TRAV-LER RADIO & TELEVISION CORP.

MODEL 131

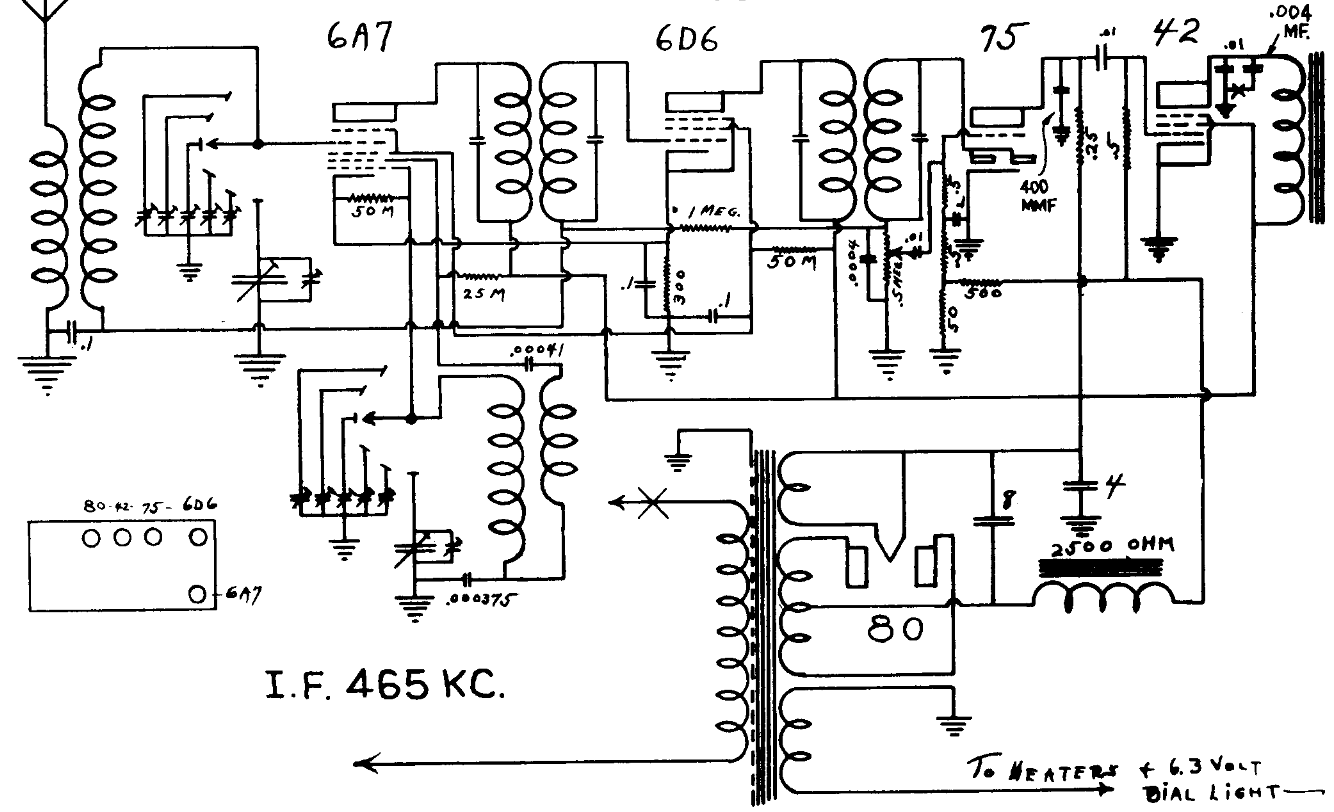


PART #	DESCRIPTION	LETTER	LIST PRICE
3514-A	Antenna Coil - Broadcast	T1	.75
3515-A	" " Police	T2	.60
3516-A	" " Short Wave	T3	.75
3805-A	R.F. Coil	T4	.65
5504-B	Osc. Coil	T5	1.80
5709-A	1st. I.F. Coil	T6	1.50
5706-B	2nd. I.F. Coil	T7	1.10
5904-A	Power Transformer	T8	5.00
3209-A	Tuning Condenser	C	4.00
3010-A	Loud Speaker	S	10.00
4112-A	Volume Control & Switch	V.C. & S1	1.05
4113-A	Tone Control	T.C.	.85
4608-A	High Fidelity Switch	S2	.75
4609A	Band Switch	S3	1.70
4451-K	Pilot Bulb		.15
4555-D	Line Cord		.30
4804-C	Filter Condenser	C25,C26	.70
3305-A	Padder Condenser	C8	.45
5506-A	Dial (Complete)		6.50



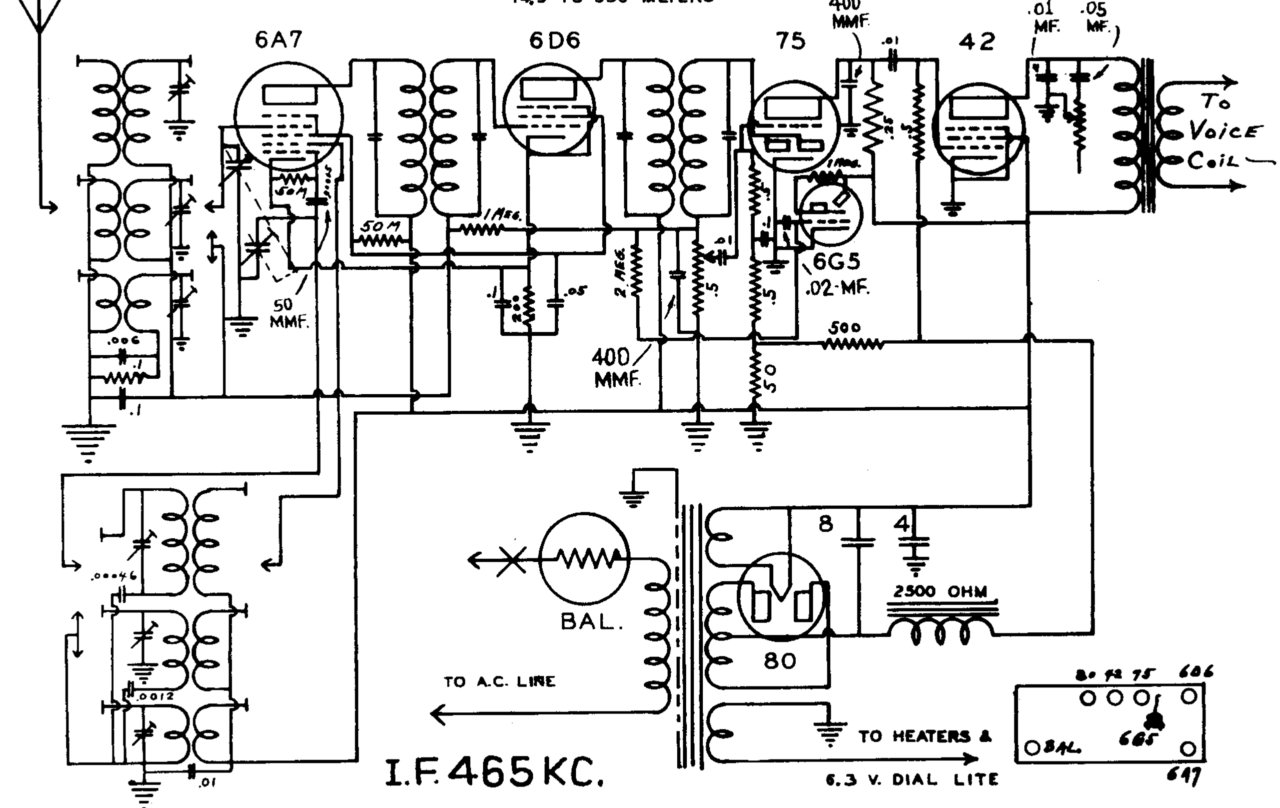
TROY RADIO MANUFACTURING CO.

MODEL 100



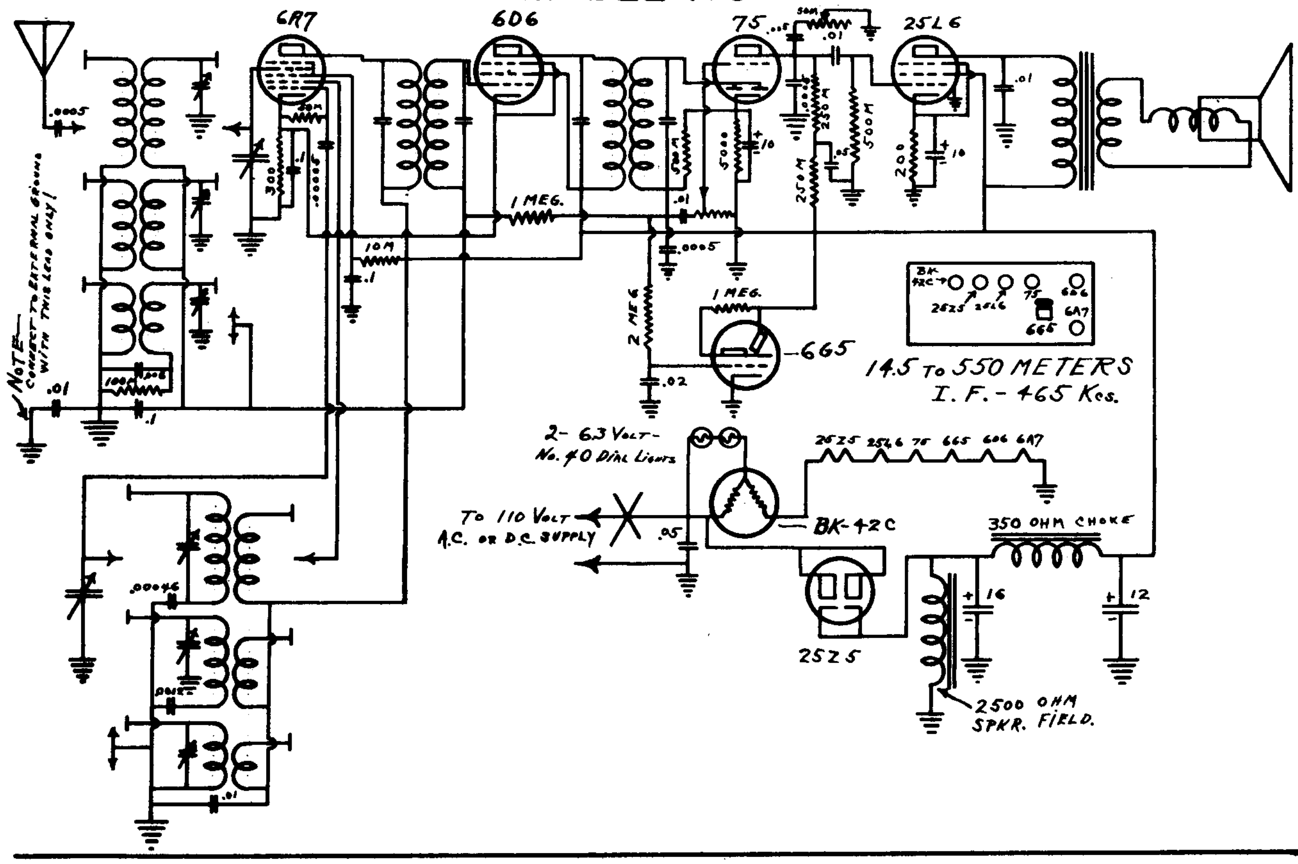
MODEL 79

14.5 TO 550 METERS

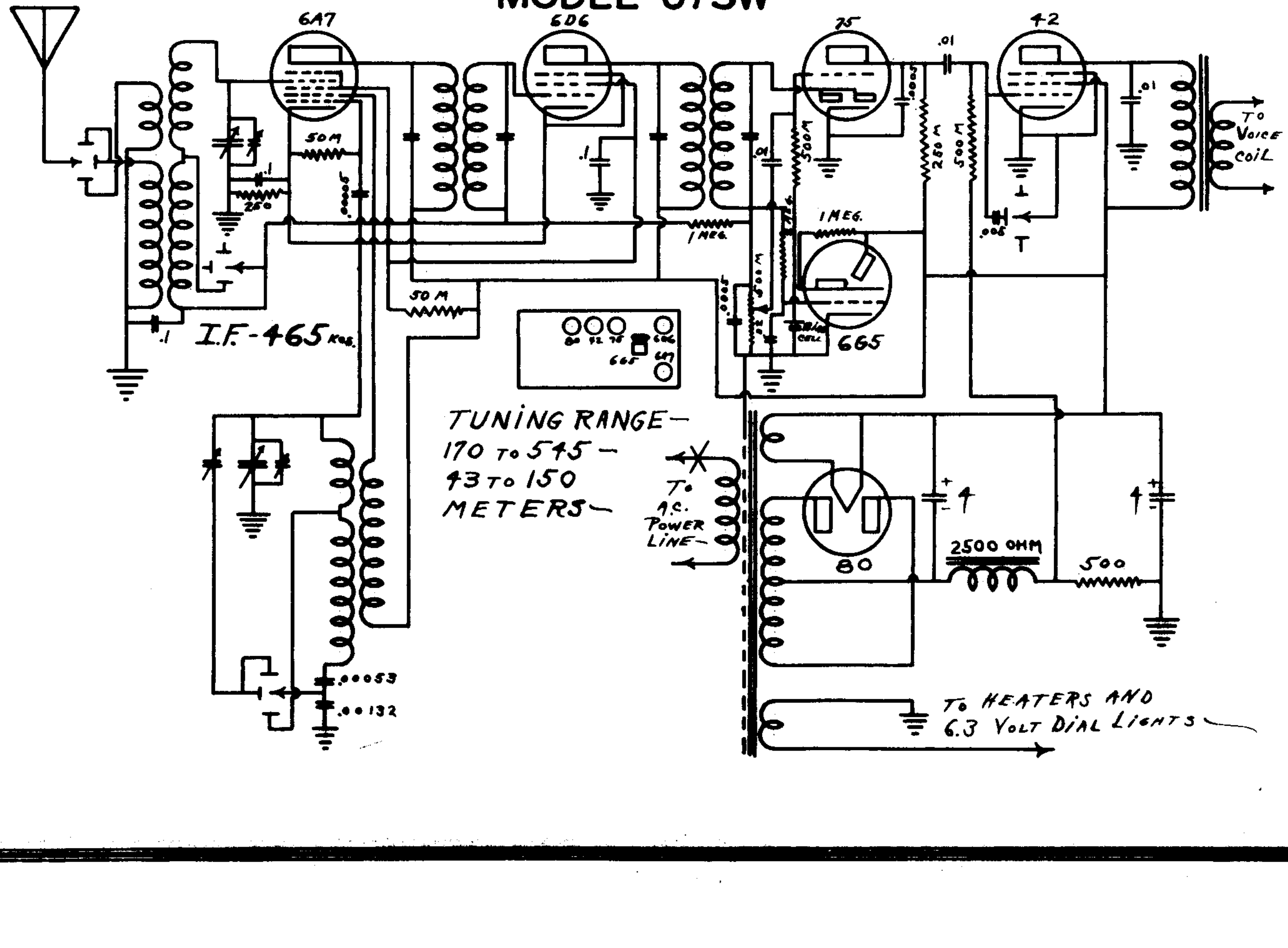


TROY RADIO MANUFACTURING CO.

MODEL 179

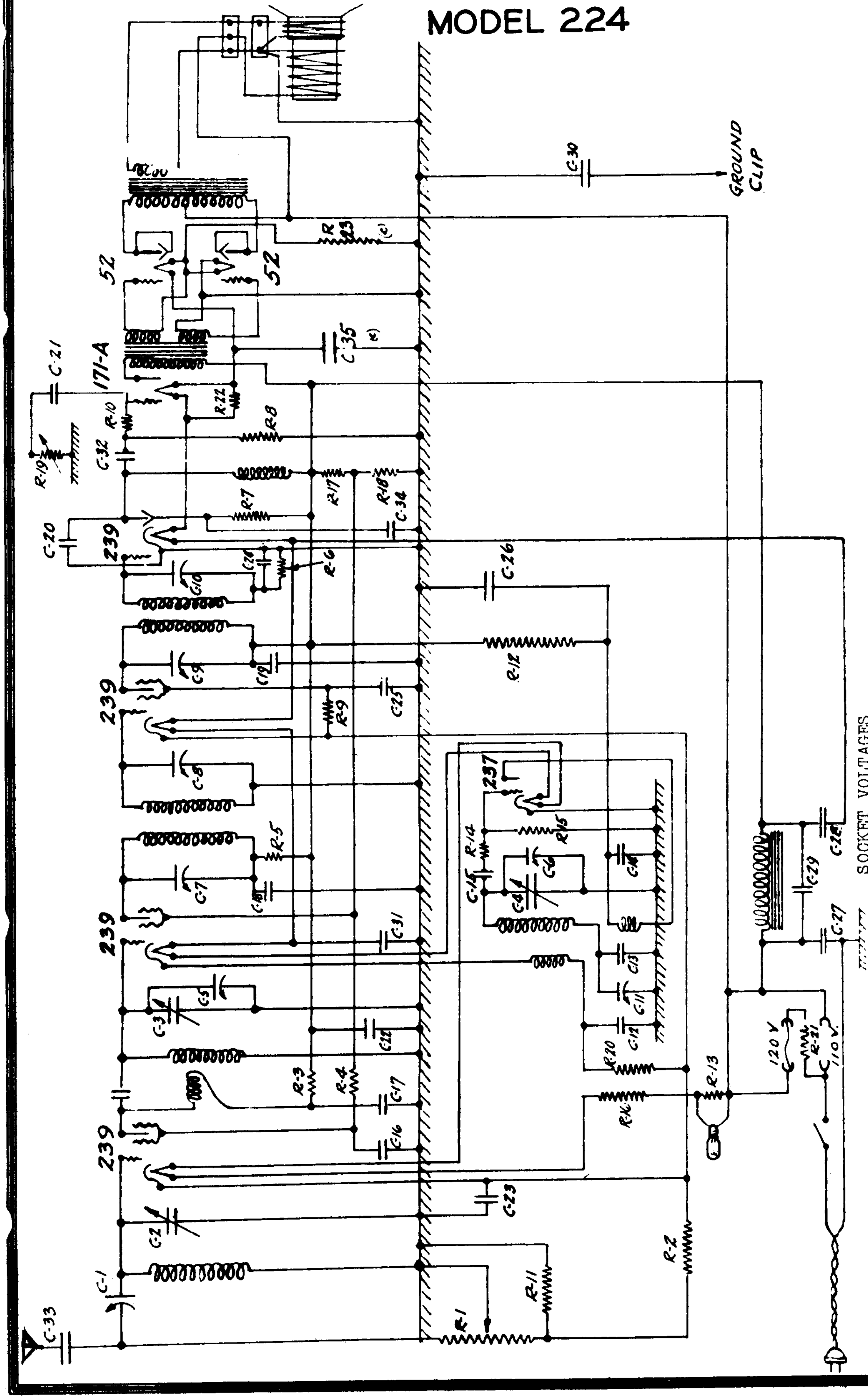


MODEL 67SW



UNITED AMERICAN BOSCH CORPORATION

MODEL 224



SOCKET VOLTAGES

TUBE	STAGE	FIL.	PLATE	SCREEN	CATHODE	GRID
39	R.F.	6.2	90	57	1.4	--
37	OSC.	6.0	80	--	--	--
39	1st. DET.	6.0	90	59	4.4	--
39	I.F.	6.1	90	57	1.4	--
39	2nd DET.	5.4	80	47	0	--
71A	DRIVER	5.0	85	--	--	1.8
52	OUTPUT	6.2	110	--	(6.3 FIL. to GND)	--
52	OUTPUT	6.2	110	--	(6.3 FIL. to GND)	--

UNITED AMERICAN BOSCH CORPORATION

MODEL 224

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes .... 4 #39, 1 #37, 1 #71A, 2 #52 - Total 8
Power Supply Characteristics .... 105 to 125 Volts D.C.
Power Consumption .... 200 Watts
Tuning Range .... 550 to 1500 K.C.
Maximum Undistorted Output .... 3. Watts
Line-Up Frequencies .... I.F. 175 K.C., 1400 K.C., 600 K.C.

GENERAL DESCRIPTION

The Model 224 is an eight tube direct current superheterodyne receiver whose circuit consists of a stage of radio frequency amplification, an oscillator, a stage of intermediate frequency amplification, a second detector, a driver and a push-pull stage of class B audio amplification.

The receiver is designed to operate on the standard broadcast band extending from 550 to 1500 K.C.

LINE-UP CAPACITOR ADJUSTMENTS

To properly align the chassis, it is essential to use a high grade modulated test oscillator and a sensitive output meter. The R.F. signal fed into the receiver must be relatively weak or it will cause the A.V.C. to function making correct alignment difficult. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal. Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and the various alignment condensers. A top view is shown in Figure #1 and should be carefully studied before the actual work is started.

I.F. ADJUSTMENTS - 175 K.C.

1. Set volume control on full.
2. Set test oscillator to 175 K.C. and apply test signal to grid of 39 I.F. tube through a .5 mfd. blocking condenser.
3. Adjust the two trimmers on top of second I.F. transformer to maximum output reducing output of test oscillator as required.
4. Apply test signal to grid of 39 first detector tube and adjust the two trimmers on top of first I.F. transformer to maximum output.
5. Repeat above operations for accuracy.

OSCILLATOR & R.F. ADJUSTMENTS

1. Set test oscillator and dial scale to 1400 K.C.
2. With test signal still applied to the grid of the first detector, adjust oscillator trim condenser A to maximum output.
3. Apply test signal to antenna lead of the set and adjust trimmer B and the antenna adjustment screw to maximum output.
4. Set test oscillator and dial scale to 600 K.C. and adjust oscillator lagging condenser on top of oscillator coil to maximum output.
5. Return to 1400 K.C. setting and readjust A, B and the antenna adjustment screw as the adjustment of the oscillator lagging condenser may have altered these settings.
6. Check the sensitivity and calibration at several different positions of the dial scale.

SERVICE PARTS LIST

Dia.#	Part #	Description
R 1	SA 102552	Vol. control and switch (10,000 ohms)
R 2	SA 101210	150 ohms, 1/2 W. res.
R 3	SA 100729	1000 ohms, 1/2 W. res.
R 4	SA 100729	1000 ohms, 1/2 W. res.
R 5	SA 100729	1000 ohms, 1/2 W. res.
R 6	SA 100194	1/2 meg., 1/2 W. res.
R 7	SA 100512	50,000 ohms, 1/2 W. res.
R 8	SA 100727	100,000 ohms, 1/2 W. res.
R 9	SA 101404	15,000 ohms, 1 W. res.
R10	SA 100727	100,000 ohms, 1/2 W. res.
R11	SA 103836	3,000 ohms, 2 W. res.
R12	SA 100823	2,000 ohms, 1/2 W. res.
R13	SA 102378	21 ohms, 20 W. res.
R14	SA 100824	5,000 ohms, 1/2 W. res.
R15	SA 100727	100,000 ohms, 1/2 W. res.
R16	SA 102752	200 ohms, 30 W. res.
R17	SA 100824	5,000 ohms, 1/2 W. res.
R18	SA 100512	50,000 ohms, 1/2 W. res.
R19	SA 102559	Tone control (1/2 meg.)
R20	SA 100825	10,000 ohms, 1/2 W. res.
R21	SA 102751	30 ohms, 20 W. res.
R22	SA 101210	150 ohms, 1/2 W. res.
R23	SA 102314	200 ohms, 1/2 W. res.
C 1	SA 102294	Antenna trim condenser
C 2) C 3) C 4) C 5) C 6)	SA 102220	Condenser gang w/trimmers (not serviced)
C 7 C 8 C 9 C10	SA 102253) SA 102253) SA 102253) SA 102253)	75 to 140 mmfd. trimmer condensers
C11	SA 102252	100 to 200 mmfd. trimmer condensers
C12	SA 101666	.05 mfd., 600 V. cond.
C13	SA 102349	.0011 mfd., mica cond.
C14	SA 101666	.05 mfd., 600 V. cond.
C15	SA 101143	.0001 mfd., mica cond.
C16	SA 102492	.05 mfd., 400 V. cond.
C17	SA 102492	.05 mfd., 400 V. cond.
C18	SA 102302	.05 mfd., 400 V. cond.
C19	SA 102302	.05 mfd., 400 V. cond.
C20	SA 103852	.002 mfd., 600 V. cond.
C21	SA 103852	.002 mfd., 600 V. cond.
C22	SA 102497	.25 mfd., 200 V. cond.
C23	SA 102492	.05 mfd., 400 V. cond.
C24	SA 99781	.00025 mfd., mica cond.
C25	SA 102499	.5 mfd., 200 V. cond.
C26	SA 102499	.5 mfd., 200 V. cond.
C27) C28) C29) C30)	SA 102380	3 mfd., filter cond. 3 mfd., filter cond. .01 mfd., filter cond. .08 mfd., filter cond.
C31	SA 102492	.05 mfd., 400 V. cond.
C32	SA 102493	.05 mfd., 200 V. cond.
C33	SA 100705	.006 mfd., mica cond.
C34	SA 102499	.5 mfd., 200 V. cond.
C35	SA 104487	25 mfd., 10 V. electrolytic cond. (dry)

MAIN ASSEMBLIES

Part #	Description
SA 103931	Chassis assembly
SA 102290	Dynamic speaker
RK 103755	Cabinet

TUBE SOCKETS & TUBE SHIELDS

FP 102260	Tube shield base
SA 103514	Tube socket - 5 prong
SA 103686	Tube socket - 4 prong
SA 102197	Tube shield assembly
FP 102274	Tube shield (2nd detector)

COILS & TRANSFORMERS

SA 102278	Intermediate coil assembly
SA 102277	Oscillator coil assembly
SA 102276	Antenna coil assembly
SA 102308	R.F. coil assembly
SA 103935	Output transformer assembly
SA 103936	Input transfor er assembly
SA 103894	Choke coil
SA 101588	Field coil

MISCELLANEOUS

FP 100704	Rubber cushion - under chassis
FP 102445	Knobs - 3 used
FP 101617	Dial plate
SA 101556	Terminal plate assy. (on rear plate of chassis)
SA 101805	Dial lamp socket assembly
SA 95572	Dial lamp
SA 101723	Fuse
SA 97906	Plug for line cable
SA 102324	Dial scale assembly
SA 102283	Diaphragm and coil assembly

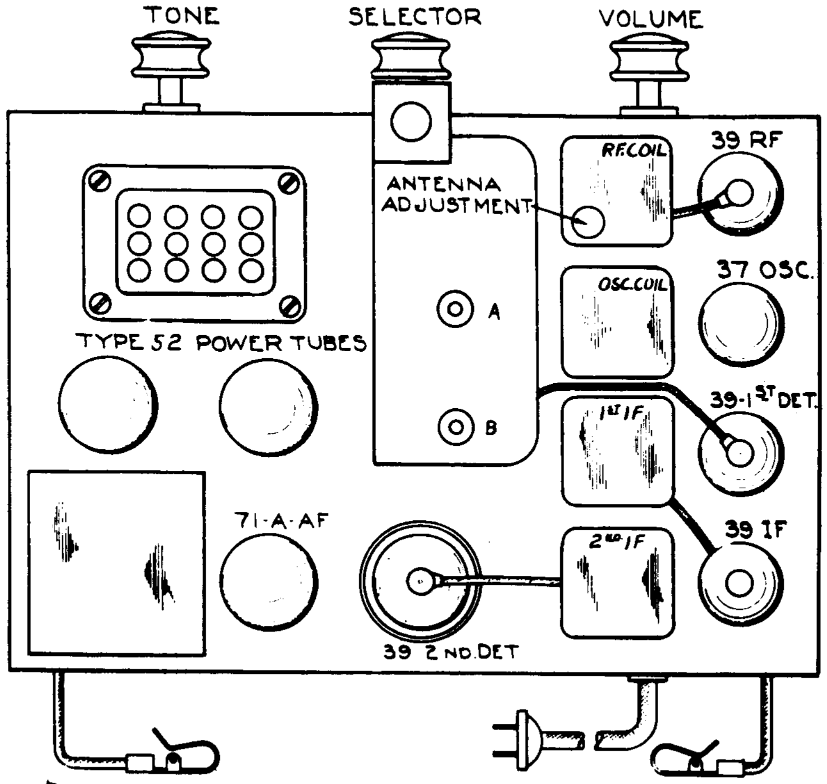
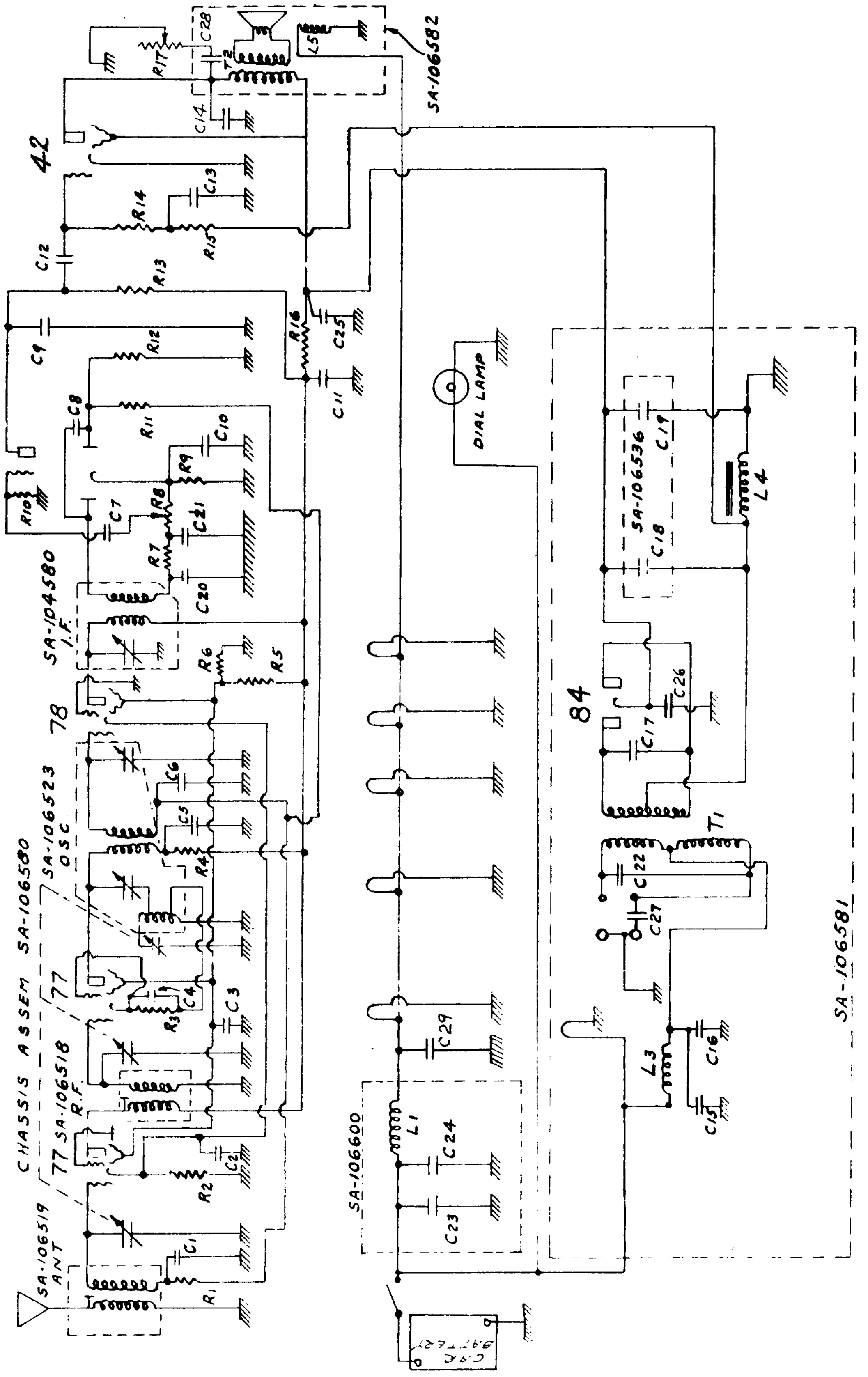


Figure No. 1

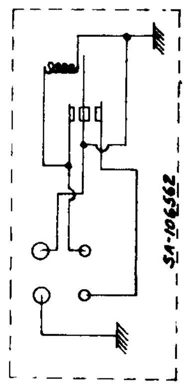
UNITED AMERICAN BOSCH CORPORATION

MODEL 79C CAR RADIO



The tubes employed in this circuit are as follows:

1 type 77 radio frequency amplifier.
1 type 77 detector oscillator.
1 type 78 intermediate frequency amplifier.
1 type 75 second detector, A.V.C. and audio amplifier.
1 type 42 output tube.
1 type 84 rectifier.



UNITED AMERICAN BOSCH CORPORATION

MODEL 79C CAR RADIO

GENERAL DESCRIPTION

This receiver consists of 6-tube superheterodyne circuit with 3-gang condenser, electro-dynamic speaker, and self-contained power pack.

The antenna is coupled to the first stage by means of a transformer. The R.F. stage is also coupled to the oscillator by means of a transformer. Resistance coupling is employed between the audio portion of the type 75 tube and the output tube. The intermediate frequency employed is 175 kilocycles.

Automatic volume control is provided by utilizing the potential drop in the collector circuit of the type 75 tube. The A.V.C. is made a part of the D.C. grid circuits of the R.F. and I.F. amplifiers.
An electro-dynamic speaker is used with this set. This speaker has a field resistance of 5.6 ohms and a voice coil resistance of approximately 3 ohms.

A tone control is provided in the plate circuit of the output tube. This consists of a condenser and variable resistor in series.

TROUBLE CHART

A few general classes of trouble in the Model 79C set are listed below, together with the probable reasons. These should serve as a general guide in checking set trouble.

I. NO RECEPTION (Dial light not illuminated)
- (a) Fuse in "A" battery cable burned out:
  - (1) Short in "A" line or circuit.
  - (2) Shorted elements in vibrator.
  - (3) Shorted elements in tube.
- (b) Poor connection at ammeter.
- (c) Defective switch:
  - (1) Switch is not actuated by shaft due to loose clamp screw.
  - (2) Switch not making contact.

II. NO RECEPTION (Dial light illuminated)
- (a) Car antenna grounded.
- (b) Loose antenna connection.
- (c) Antenna coil open or other coils defective.
- (d) One or more defective tubes.
- (e) Open in voltage supply to tube sockets.
- (f) Vibrator not working or intermitten.

III. WEAK OR INTERMITTENT RECEPTION
- (a) Poor antenna or antenna connections.
- (b) One or more defective tubes.
- (c) Low voltage output of vibrator.
- (d) Open speaker field.
- (e) Grid bell off of tube cap.
- (f) Defective oscillator coil.
- (g) Trimmer condensers out of alignment. (See instructions for alignment)
- (h) Shorted turns in power transformer, giving low "B" voltage.
- (i) Lack of plate voltage on some tube.

IV. POOR TONE QUALITY
- (a) Low car storage battery.
- (b) One or more defective tubes.
- (c) Defective speaker
  - (1) Buzzing in speaker caused by foreign material between voice coil winding and pole piece. Blow out with air pressure.
  - (2) Buzzing in speaker caused by loose voice coil winding. Winding can be tightened by cementing with household cement.
  - (3) Speaker rattle caused by diaphragm hitting screen in front. Remedy - Space speaker away from screen by inserting extra card-board ring. Rattle caused by loose paper inside of voice coil form. Remedy - Take thin metal shim and run around inside of voice coil form to clear out loose paper.
- (d) Low "B" voltage (should be at least 220 at output from power pack).
- (e) Defective tone control.
- (f) Defective tone control .05 condenser.

V. DEAD OVER CERTAIN PORTIONS OF DIAL
- (a) Defective oscillator tube.
- (b) Trimmers not aligned properly.
- (c) Gang condenser shorted for certain positions of rotation.
- (d) Gang condenser wiper contacts dirty.
- (e) Metal chips or foreign metal particles in gang condenser.

VI. OSCILLATION
- (a) I.F. grid lead moved out of position.
- (b) Open in some bypass condenser circuit.

TESTING

(a) ANTENNA: Substitute a piece of insulated wire 6 to 8 feet long and lay on ground; if reception is normal, the regulator antenna is at fault and should be checked for grounds, opens, etc. (Somewhat better reception should be expected with wire aerial than with car antenna.)

(b) TUBES: Remove and test, or substitute known good tubes, one at a time.

(c) VIBRATOR: Remove and substitute known good unit.

(d) SPEAKER: Using voltohmmeter check voltage supplied to speaker field (should be 5.8 V. or more). Disconnect lead from transformer to speaker at #47 (Fig. #1.). Measure resistance between #47 and #48 (should be about 3 ohms).

(e) SECONDARY OUTPUT TRANSFORMER: After unsoldering lead from terminal #47 (Fig. #1), test with ohmmeter between this lead and terminal #48 (full scale reading - ohmmeter).
(f) CHASSIS: After checking the components listed above, test the voltages as they appear on "Voltage Chart" and Fig. #4, and the resistance measurements as found in "Resistance Chart" and Fig. #5. If any particular reading obtained is very different from the chart reading, the trouble is located in the portion of the circuit associated with the points at which this discrepancy occurs. Referring to diagram shown and location drawings (Figs. #1, 2 and 3), each part making up the circuit may be individually tested until the faulty part is specifically located.

ALIGNMENT INSTRUCTIONS

All the adjustable condensers, commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustment unless a coil or I.F. transformer is changed, or the adjustments tampered with in the field. Therefore, DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and a test oscillator is available, then proceed as follows and refer to Fig. #1.

(A) I.F. ADJUSTMENT

(Use .1 mfd. antenna condenser)

1. Connect test oscillator to grid of 1st I.F. (78) tube.
2. Adjust small I.F. coil (between 78 and 75 tube) to maximum output.
3. Connect test oscillator to grid of 1st detector (77) tube.
4. Adjust condensers on coil in left hand corner of receiver for maximum output.
5. Repeat the above operations for accuracy.

(B) OSCILLATOR ADJUSTMENT

(Use .1 mfd. condenser on grid - .002 mfd. on antenna)

1. Connect test oscillator to grid of 1st detector (77) tube. Set at 1500 K.C.
2. Set gang to 1500 K.C. as follows:
   (a) Open gang to fullest extent.
   (b) Close slowly to thickness of approximately .015 of an inch.
3. Peak oscillator condenser on end of gang.
4. Connect test oscillator to antenna lead.
5. Peak other two condensers on gang.
6. Check sensitivity at several points on dial scale.

The set is now fully aligned and normal sensitivity prevails.

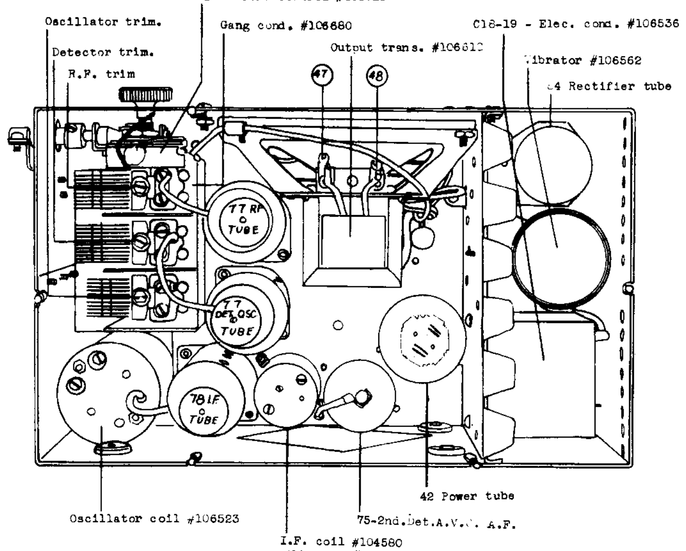


Figure #1

UNITED AMERICAN BOSCH CORPORATION

MODEL 79C CAR RADIO

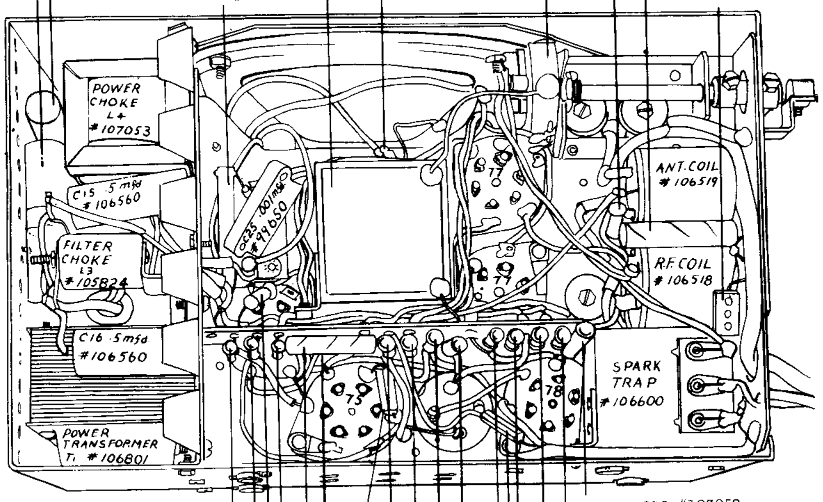


Figure #2

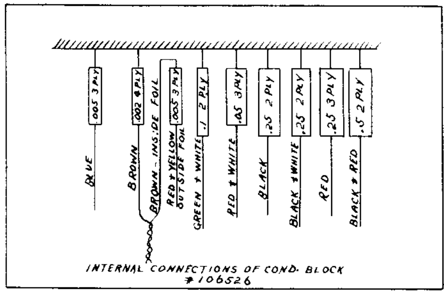


Fig. #3

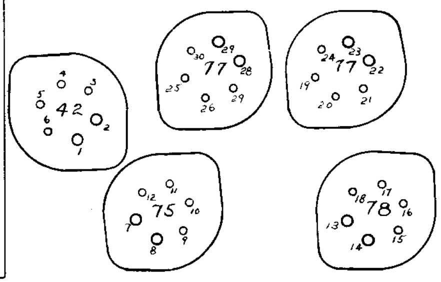


Fig. #4

42 Power
#1 - Fil.
#2 - Fil.
#3 - Cathode
#4 - Grid
#5 - Screen
#6 - Plate

75 2nd Det. AVC
#7 - Fil.
#8 - Fil.
#9 - Cathode
#10 - Di Plate
#11 - Di Plate
#12 - Plate

78 I. F.
#13 - Fil.
#14 - Fil.
#15 - Cathode
#16 - Suppressor
#17 - Screen
#18 - Plate

77 Det. Osc.
#19 - Suppressor
#20 - Screen
#21 - Plate
#22 - Fil.
#23 - Fil.
#24 - Cathode

77 R. F.
#25 - Suppressor
#26 - Screen
#27 - Plate
#28) - Fil.
#29)
#30 - Cathode

VOLTAGE CHART

Voltage readings from ground to following points with Weston Model 564 Voltohmmeter (.6 volt storage battery used).

42 A.F.
#1 - 5.5 V.
#5 - 225
#6 - 205
"B" - 12.5

75 2nd Det.
#7 - 5.5
#9 - 1.3
#12 - 116

78 I. F.
#13 - 5.5
#15 - 3.0
#17 - 81.
#18 - 187

77 Det. Osc.
#20 - 81
#21 - 183
#23 - 5.5
#24 - 4 to 6

77 R.F.
#26 - 81
#27 - 185
#29 - 5.5
#30 - 3.1

RESISTANCE CHART

(All measurements made with ohmmeter)

Antenna Coil
42-44 Primary - 21 ohms
43-45 Secondary- 2.5 ohms

I. F. Coil
31-34 Primary - 100 ohms
32-33 Secondary- 85 ohms

R. F. Coil
49-50 Primary - 80 ohms
51-52 Secondary- Full scale

"B" Plug Terminal to Ground
About 130,000 ohms (shows kick of condenser discharge on contact).

Output Transformer
Primary -- 500 ohms

Detector Osc. Coil
(37-39) - Osc. grid coil - 5 ohms
(40 to grid cap of 78) - Primary I.F. - 70 ohms
(35 to 36) - Secondary I. F. - 70 ohms

Sockets (All readings to ground)
9 - 5500 ohms
24 - 7500 ohms
30 - 550 ohms

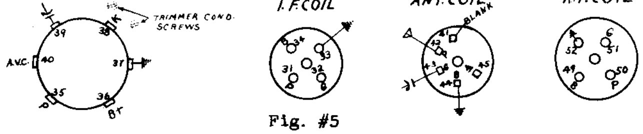


Fig. #5

UNITED AMERICAN BOSCH CORPORATION

MODEL 79C CAR RADIO

PARTS LIST

Part #	Dia. #	Description of Parts
105278	R 1	100,000 ohms $\frac{1}{4}$ W. resistor
105264	R 2	500 ohms $\frac{1}{4}$ W. resistor
105247	R 3	7500 ohms $\frac{1}{4}$ W. resistor
105245	R 4	2000 ohms $\frac{1}{4}$ W. resistor
105251	R 5	40,000 ohms $\frac{1}{4}$ W. resistor
105277	R 6	75,000 ohms $\frac{1}{4}$ W. resistor
105276	R 7	50,000 ohms $\frac{1}{4}$ W. resistor
106514	R 8	.5M Volume control
105249	R 9	5000 ohms $\frac{1}{4}$ W. resistor
105281	R10	1 meg. $\frac{1}{4}$ W. resistor
105246	R11	.5 meg. $\frac{1}{4}$ W. resistor
105246	R12	.5 meg. $\frac{1}{4}$ W. resistor
105278	R13	100,000 ohms $\frac{1}{4}$ W. resistor
105279	R14	$\frac{1}{4}$ meg. $\frac{1}{4}$ W. resistor
105279	R15	$\frac{1}{4}$ meg. $\frac{1}{4}$ W. resistor
106531	R16	4000 ohms 1 W. resistor
106715	R17	500,000 ohms Tone control
102493	C 1	.05 - 200 V. condenser
102497	C 2	.25 - 200 V. condenser
102497	C 3	.25 - 200 V. condenser
103852	C 4	.002 - 500 V. condenser
102492	C 5	.05 - 350 V. condenser
102493	C 6	.05 - 200 V. condenser
103659	C 7	.005 - 350 V. condenser
106417	C 8	100 mmf. mica condenser
103852	C 9	.002 - 500 V. condenser
102499	C10	.5 - 200 V. condenser
102496	C11	.25 - 350 V. condenser
103659	C12	.005 - 350 V. condenser
102495	C13	.1 - 200 V. condenser
103659	C14	.005 - 350 V. condenser
106560	C15	.5 - 200 V. condenser
106560	C16	.5 - 200 V. condenser
106804	C17	.008 - 1600 V. condenser
106536	(C18	6 mf. (450)
	(C19	10 mf. (450)
106417	C20	100 mmf. mica condenser
106417	C21	100 mmf. mica condenser
107001	C22	.5 - 200 V. condenser
103775	C23	.001 mica condenser
105568	C24	.5 - 200 V. condenser
99650	C25	.001 mica condenser
106805	C26	.1 - 350 V. condenser
103775	C27	.001 mica condenser
102492	C28	.05 - 350 V. condenser
106417	C29	100 mmf. mica condenser
106801	T 1	Power transformer
106618	T 2	Output transformer
105824	L 1	Filter choke
105824	L 3	Filter choke
107058	L 4	Power choke
106713	L 5	Field coil

MAIN ASSEMBLIES

106579	Chassis and power pack assembly
106580	Chassis assembly
106581	Power pack assembly
107267	Control unit, complete with shafts
106540	Control unit only
106582	Speaker assembly

BRACKETS, CLIPS AND CLAMPS

100644	Cable clamp
106564	Drive shaft bracket
106565	Drive shaft casing clamp
79381	Clamp for power transformer leads
99623	Terminal clip
100263	Grid clip
100478	Terminal clip
106506	Volume control bracket
BK 959	Speaker transformer bracket
106684	Tone control bracket

COILS

106523	Oscillator coil assembly
104580	I.F. coil assembly
106519	Antenna coil assembly
106518	R.F. coil assembly

CONDENSERS

Part #	Description of Parts
106507	Variable condenser
105300	Suppressor condenser for generator
106600	Condenser and choke assembly
102499	Condenser - .5 200 V.
106526	Condenser assembly (block)
102402	Condenser on spkr. .05 - 350 V.
106417	Condenser .001 mfd. mica

NUTS

81809	Cable clamp nut
104935	Mounting stud nut
106639	Receiver cover thumb nut
104354	Speaker fastening screw nut - also transformer
103039	Nut for tone control and volume control
68226	Nut - choke coil, oscillator coil, condenser block
107563	Control unit binding nut

CONTROL UNIT PARTS

106541	Flexible volume control shaft - 30" long
106542	Flexible tuning shaft - 30" long
107399	Drive shaft for volume control- 7 ft. long
107400	Tuning drive shaft - 7 ft. long
107433	Knob for tuning
107268	Control unit knob with key (Volume Control)
106797	Control unit dial scale
105627	Control unit dial glass
107470	Control unit dial indicator
107333	Control unit dial frame
105597	Control unit mounting bracket
106809	Dial lamp
107424	Dial light cable assembly (barrel type)
107550	Dial light cable assembly (spring type)
105608	Spare key
105607	Control unit mounting strap assembly

CABLE ASSEMBLIES

107317	Battery cable assembly
106544	Dial light cable assembly
105432	Antenna cable assembly
107317	Battery cable, complete

SCREWS

106571	Receiver mounting stud
104337	Cable clamp screw
101700	Fastening screw - I.F. coil, condenser block
106585	Insulation bushing assembly fastening screw
106677	Speaker fastening screw
106577	Fastening screw
106578	Drive shaft casing clamp fastening screw
82831	Screw - speaker baffle, transformer
80256	Insulation bushing set screw
106575	Choke coil screw
105642	Fastening screw for clamp
104347	Fastening screw - speaker to bracket
101865	Fastening screw - variable condenser, insulation plate speaker condenser assembly
106637	Condenser and choke housing fastening screw
104680	Resistor strip fastening screw

Part #	Dia. #	Description of Parts
99005		Speaker centralizer screw
105632		Control unit set screw

TUBE SOCKETS & TUBE SHIELDS

103424	Tube shield
104615	Tube socket
104616	Tube socket - 5 prong
103513	Tube socket - 6 prong

WASHERS, BUSHINGS & SPACERS

102871	Mounting stud spacers
62873	Cable clamp lock washer
104936	Mounting stud plain washer
41033	Mounting stud lock washer
106516	Insulation bushing assembly
108	Speaker fastening screw lock washer
104392	Plain washer for baffle
80589	Tone and volume control lock washer
99545	Insulation washer
53544	Choke terminal strip lock washer
41138	Transformer lock washer
101868	Power transformer lock washer
105144	Variable condenser rubber bushing
103996	Insulation washer on tubes
100377	Spacer - insulation plate assembly, choke coil housing
97803	Resistor strip spacer also for R.F. and antenna coils
95226	Washer for speaker centralizer screw
101742	Cardboard speaker washer
74084	Speaker housing fastening screw lock washer
100377	Speaker condenser spacer
94018	Speaker housing plain washer
105145	Variable condenser rubber washer
95702	Variable condenser plain washer

SUPPRESSORS

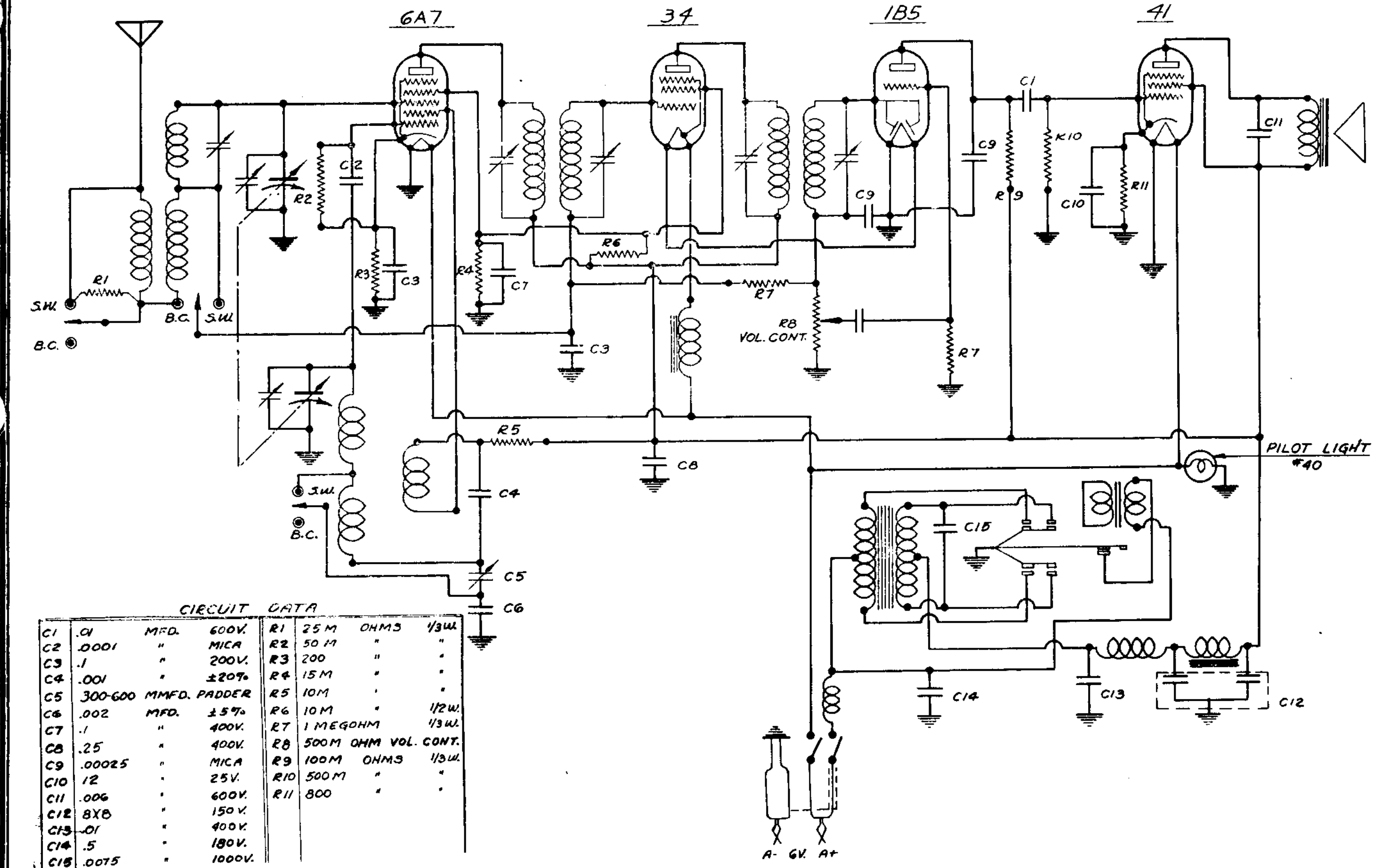
106755	Spark plug suppressor
106754	Coil suppressor
105300	Suppressor condenser for generator

MISCELLANEOUS

105363	Spark plug nipple
106807	Paper template (drilling)
107271	Housing assembly (front half)
106671	Bottom cover assembly
106546	Top cover and nameplate assembly
107205	Screen and baffle assembly
106517	Pin for variable condenser insulation bushing
106716	Tone control knob
106510	Dust shield
107060	Housing assembly (rear half)
106573	Base assembly (power pack)
106562	Vibrator unit
101856	Insulation plate assembly
106545	Base assembly (chassis)
106524	Tube shield cap assembly
106728	Insulation between oscillator coil and base
106513	Speaker baffle
103423	Tube shield base
106617	Diaphragm assembly, complete
101856	Speaker insulation plate assembly
106492	Speaker core and frame assembly
106508	Variable condenser gear
106509	Variable condenser bracket assembly for drive
106983	Fuse (25 amperes) in battery cable
100730	Antenna plate
105429	Battery cable fuse body
105425	Battery cable fuse body cap
105430	Fuse body insulator- battery cable
105427	Battery cable fuse body spring
106508	Gear assembly on variable cond.
106509	Bracket & worm gear on var. cond.

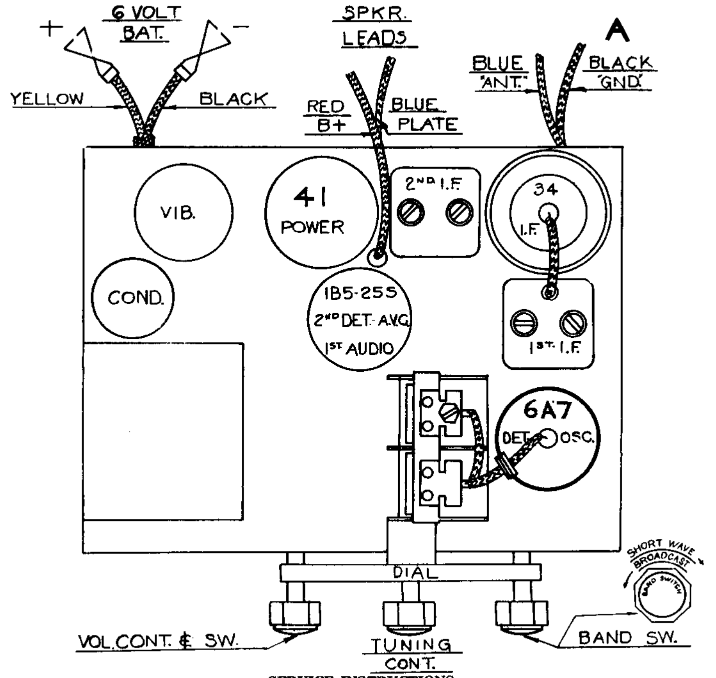
WARWICK MANUFACTURING CO.

MODEL 400



CIRCUIT DATA

C1	.01	MFD.	600V.	R1	25 M	OHMS	1/3 W.
C2	.0001	"	MICA	R2	50 M	"	"
C3	.1	"	200V.	R3	200	"	"
C4	.001	"	±20%	R4	15 M	"	"
C5	300-600	MMFD.	PADDER	R5	10 M	"	"
C6	.002	MFD.	±5%	R6	10 M	"	1/2 W.
C7	.1	"	400V.	R7	1 MEGOHM		1/3 W.
C8	.25	"	400V.	R8	500 M OHM VOL. CONT.		
C9	.00025	"	MICA	R9	100 M	OHMS	1/3 W.
C10	12	"	25V.	R10	500 M	"	"
C11	.006	"	600V.	R11	800	"	"
C12	8X8	"	150 V.				
C13	.01	"	400 V.				
C14	.5	"	180 V.				
C15	.0075	"	1000 V.				



SERVICE INSTRUCTIONS

When set fails to perform properly, always check the voltage of the batteries. Run down batteries will cause weak and poor reception.

Noises may develop from defective tubes and condensers.

This set has been carefully aligned at the factory, but if realignment should become necessary, the following procedure should be followed.

Use a test oscillator and connect an output meter from plate of 41 to B plus.

I. F. Alignment:

Connect the oscillator through a .1 condenser to the grid of the 6A7 tube and set the oscillator to 456 kilocycles. Peak each I. F. stage to resonance as indicated by maximum output on the output meter.

R. F. Alignment:

With the wave change switch in the broadcast position, set oscillator to 1700 kilocycles and connect in series with a .00025 condenser to the antenna of the receiver. Rotate the variable condenser to the 1700 setting of the dial and adjust the trimmer condenser of the broadcast oscillator to resonance. The location of oscillator trimmer is on rear section of variable condenser. Reset the test oscillator to 1400 kilocycles and adjust antenna trimmer located in corner front section of variable condenser. Now set oscillator to 600 kilocycles and adjust padder located on top of the chassis. Check alignment at 1000 kilocycles.

For alignment police band, set test oscillator to 6 megacycles. Turn bandswitch to short wave. Rotate variable condenser until signal is heard. Peak antenna trimmer (across antenna coil under chassis) to maximum. Rock variable condenser slightly backward and forward until maximum peak is reached.

PARTS LIST

1927	2 Gang Cond.	$1.76
6926	Switch, 3 Pole, 2 Pos.	.48
2442	Volume Control 500M	.80
1121A	Antenna Coil	.52
1122	Oscillator Coil	.48
1156	1st I. F. Trans.	1.00
1157	2nd I. F. Trans.	1.00
8026	Trans.	2.05
1845	Electrolytic Dual 8	1.08
3407	Vibrator	3.36
2347	Cable—4 cond.	.60
3515	Battery Clip, minus	.14
3516	Battery Clip, plus	.14
2052	Trimmer	.08
2006	Padder	.24
3307	Choke	.56
3303	R.F. B. Choke, Term Strip	.20
33-100	Iron Core Choke	.58
7104	Tube Shield Base 1½"	.02
7105	Tube Shield 1½"	.10
7107	Tube Shield Base 2"	.03
7108	Tube Shield 2"	.14
All	1/3 W. Resistors	.06
All	1/2 W. Resistors	.08
1616	.25-400	.18
1600	.1-200	.12
1601	.1-400	.14
1603	.01-400	.10
1604	.01-600	.12
1659	12 mfd. 25v	.68
1655	.5-180 No. 14 wire	.32
1616	.25-400	.16
1657	.0075-1000	.12
1500	.001 20% Mica Cond.	.14
1501	.0001 20% Mica Cond.	.10
1504	.00025 20% Mica Cond.	.12
15-100	.006 Mica Cond. 20%	.18
1509D	.002 5%	.20
8902	Pilot Bulb	.14
6850	4 Prong Socket	.08
6852	6 Prong Socket	.08
6853	7 Prong Socket	.08

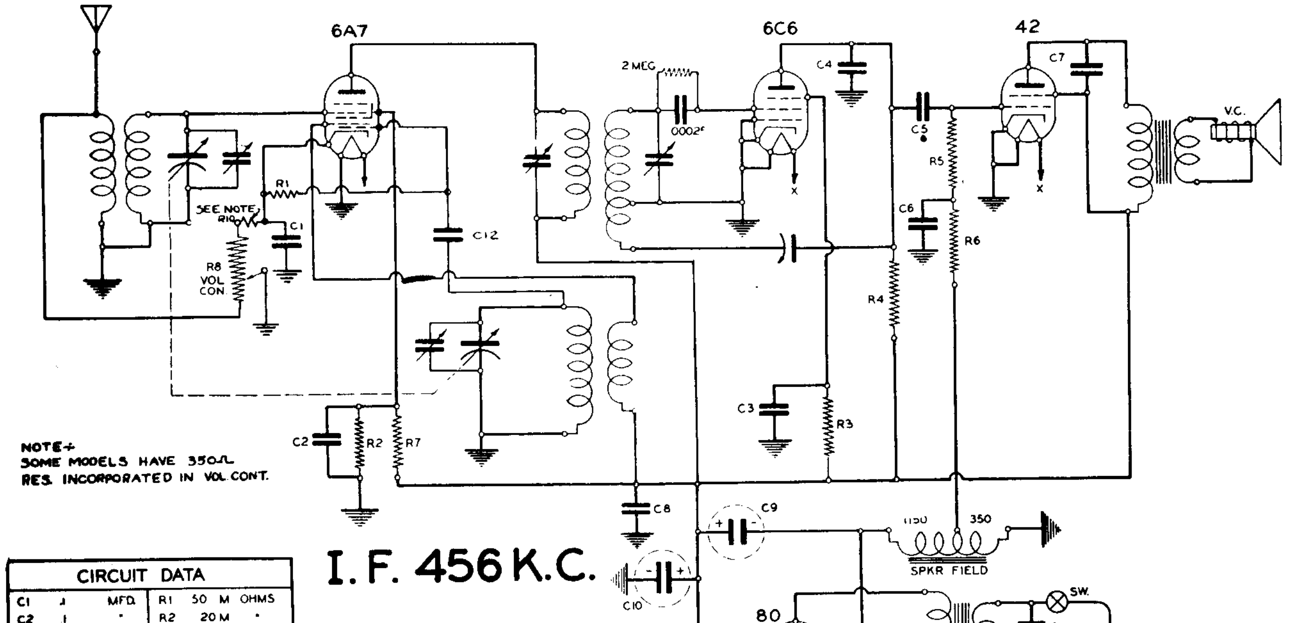
Tube Compliment—

1—1B5-25S
1—41
1—34
1—6A7

KNOBS:—

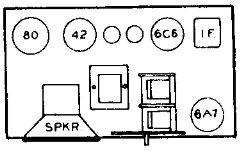
Tuning	Wood	$0.14
	Bakelite	$0.12
Band Switch	Wood	.14
	Bakelite	.12
Volume	Wood	.14
	Bakelite	.12

WARWICK MANUFACTURING CO.
MODEL 460



I. F. 456 K.C.

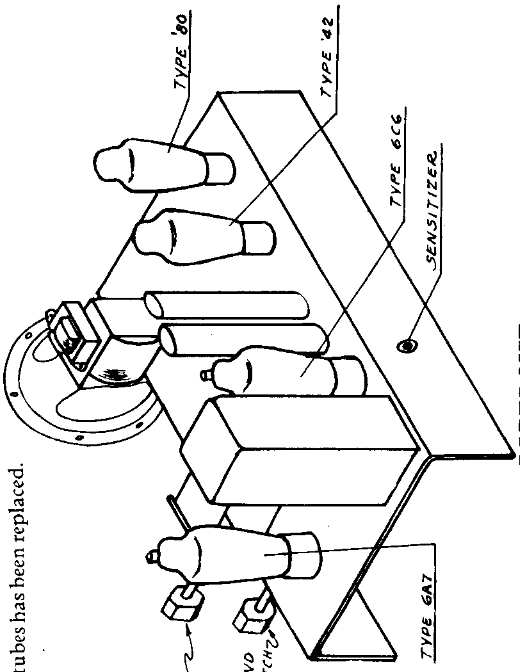
CIRCUIT DATA					
C1	.1	MFD.	R1	50 M	OHMS
C2	1	"	R2	20 M	"
C3	1	"	R3	1 MEG.	"
C4	.00025	"	R4	250 M	"
C5	.01	"	R5	250 M	"
C6	25	"	R6	100 M	"
C7	.004	"	R7	20 M	"
C8	1	"	R8	15 M	"
C9	12	"			
C10	16	"	R10	350	"
C11	1	"			
C12	.0001	"			



TUBE LOCATION

A special feature of this receiver is the "SENSITIZER". The incorporation of this advanced engineering design enables you to obtain maximum sensitivity and efficiency from the receiver regardless of the location in which it is used. No attempt should be made to adjust the "SENSITIZER" until you have familiarized yourself with the proper method of tuning for maximum volume as explained above.

To adjust the "SENSITIZER" carefully tune in a station, preferably one which is received weakly in your locality at or around 600 kilocycles, then with a non metallic rod shaped on one end like a screw driver (a metal screw driver can be used if care is taken), turn the small screw which is visible through the hole at the rear of the set marked "SENSITIZER" to the right for about one-half turn. Retune the station again going back and forth slowly through the station and listen carefully for a whistling sound. If no whistling is heard turn the "SENSITIZER" screw another fraction of a turn to the right and retune. Repeat this procedure until the whistling noise is heard and then unscrew the "SENSITIZER" screw just sufficiently to eliminate the whistle which is heard when tuning. This point of adjustment at which the whistling just disappears is the most sensitive position of the receiver and once properly adjusted, the "SENSITIZER" should not have to be touched again except when using the set in a different location, or with a different aerial, or when either of the type 6C6 or 6A7 tubes has been replaced.



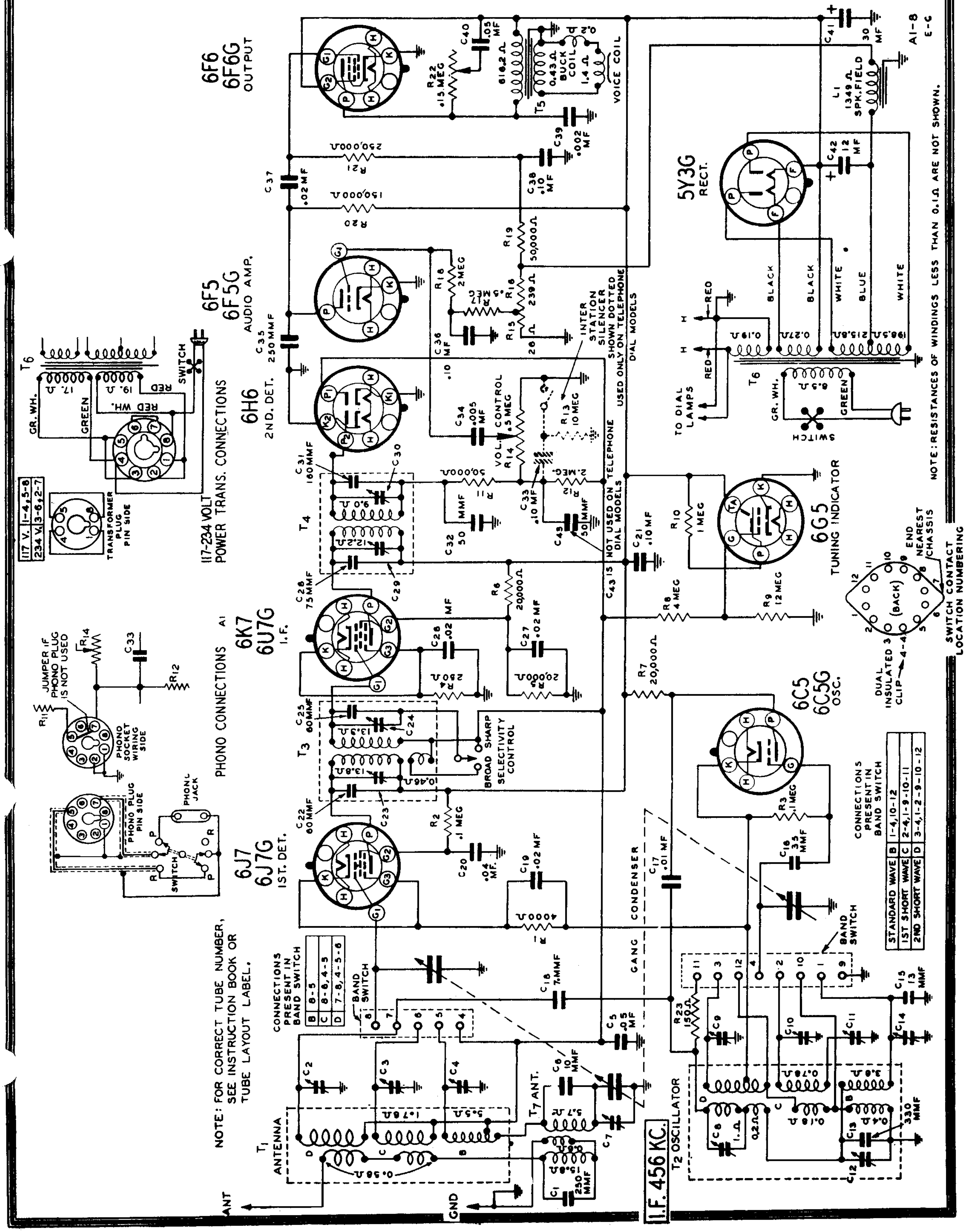
PARTS LIST

1925	2 Gang Condenser	1.65
8030	Power Trans	1.73
2441	Volume Control	.73
1840	Wet Electrolytic 12 mfd.	.60
1841	Wet Electrolytic 16 mfd.	.60
1142	Ant. Coil	.32
1143	Osc. Coil	.10
1126	I. F. Trans.	.85
2054	Trimmer	.10
1600	.1—200 V. Bypass Condenser	.12
1601	.1—400 V. Bypass Condenser	.13
1604	.01—600 V. Bypass Condenser	.10
1614	.25—200 V. Bypass Condenser	.16
1651	.004—600 V. Bypass Condenser	.12
6017	1 Meg. 1/3 W 20% Resistor	.06
6020	2 Meg. 1/3 W 20% Resistor	.06
6024	¼ Meg. 1/3 W 20% Resistor	.06
6025	50 M. 1/3 W 20% Resistor	.06
6026	100 M. 1/3 W. 20% Resistor	.06
6120	20 M. ½ W. 20% Resistor	.08
1501	.0001—20% Mica. Cond.	.10
1504	.00025—20% Mica Cond.	.12
8901	No. 40 Pilot Light Bulb	.18
242	Pilot Light Bracket	.06
6850	4 Prong Socket	.10
6852	6 Prong Socket	.10
6853	7 Prong Socket	.10
7933	Speaker	3.00
	Dial—(order by name and description)	.75
5218	Knobs, Plain	.12

TUBES
6A7
6C6
42
80

WELLS GARDNER & CO.

MODEL AI SERIES



WELLS GARDNER & CO.
MODEL A1 SERIES

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I. F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C29) & (C30)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C23) & (C24)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C14)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st Ant. Range B (C7) 2nd Ant. Range B (C4)	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C12)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C10)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output
2000 KC	Range C	400 Ohm	2000 KC	Antenna Lead	2000 KC (C11)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C9)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Antenna Range D (C2)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
7000 KC	Range D	400 Ohm	7000 KC	Antenna Lead	7000 KC (C8)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

In sets using the moving beam of light indicator, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until the beam is at the 1500 KC mark on the dial. Retighten the screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

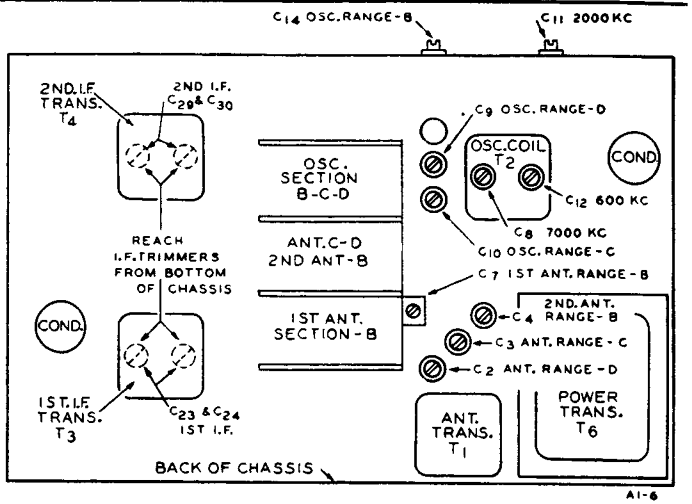


Fig. 3—Location of Trimmers

WELLS GARDNER & CO.
MODEL AI SERIES

SPECIFICATIONS

Power Consumption - 67 Watts (At 117 volts 60 cycles)
Power Output - - - - 2.5 Watts Undistorted, 4.5 Watts Maximum
Selectivity - 30 KC Broad at 1000 times Signal (Sharp)
Intermediate Frequency - - - - 456 KC.
Speakers - - - - 8", 10" or 12" Dynamic

Tuning Frequency Range
B Range .... 528 to 1830 KC.
C Range .... 1810 to 6350 KC.
D Range .... 6300 to 22000 KC.

Sensitivity
B Range .... 8 Microvolts Average
C Range .... 13 Microvolts Average
D Range .... 9 Microvolts Average

Circuit

This model is a three band AC operated radio with a tuning range as shown in the specifications above.

Referring to the schematic circuit diagram, Fig. 2, T1 and T7 are the antenna coil assemblies and T2 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively

The band switch completes connections to the coils in use. When it is in the Range B position, a double tuned antenna R.F. stage is used while for the C and D Ranges, a single tuned secondary is used.

A type 6J7 tube functions as the 1st detector.

A separate type 6C5 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

One stage of I.F. amplification is employed using a 6K7 tube. The primaries and secondaries of the 1st and 2nd I.F. transformers are tuned by small trimmer condensers.

Referring to Fig. 2, it will be noted that there is a coupling winding connected in series with the secondary of I.F. transformer T3. When the selectivity control is in the sharp position, the coupling winding is open circuited and the loose coupling which exists between the primary and secondary of this transformer results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

A 6H6 tube functions as a diode 2nd detector. AVC voltage is applied to the control grid circuits of the 1st detector and I.F. tubes.

A 6F5 triode tube functions as the first audio amplifier while the output stage uses a 6F6 output pentode tube. A dynamic reproducer is employed.

The power unit uses a 5Y3G full wave rectifier. A 6G5 tuning indicator tube is employed.

Glass and Metal Tubes

All sets of this series use a 6H6 metal tube and 5Y3G and 6G5 glass tubes.

It will be noted in the schematic that there are two tube type numbers shown at the other sockets. The "metal" tube sets use the upper tube type numbers which are for metal tubes while the "glass" tube sets use the lower tube type numbers which are for glass tubes.

Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

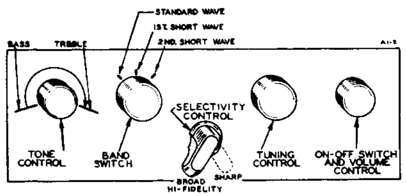


Fig. 1—Arrangement of Controls

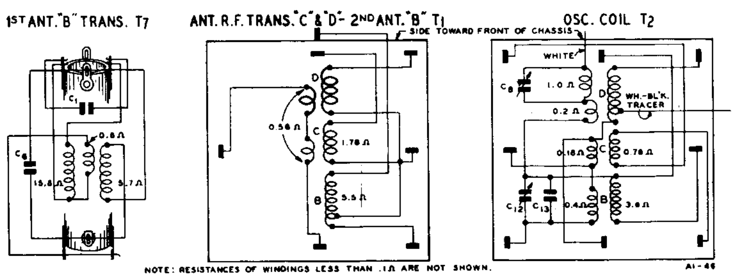


Fig. 7—Coil Terminal Arrangement and D.C. Resistance of Windings

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram Fig. 2. On the side panel of the chassis base is a round knockout 1⅛ inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

Some models are shipped from the factory equipped with the phono socket. A jumper is inserted in this socket which must be removed if the phonograph installation is made—See Fig. 2.

Early Models—A few of the early models did not have the circular knockout for the phonograph socket as mentioned above. If a phonograph installation is to be made in connection with one of these early models, write the factory for detailed instructions.

117-234 Volt Power Transformers

Some models are equipped with a 117-234 volt 40 to 60 cycle power transformer. Connections as shown in Fig. 2 are completed to a special octal socket mounted on the back panel of the chassis. A plug which goes with this socket may then be inserted for either the 117 volt or 234 volt connection.

If one of these transformers is to be installed in a chassis equipped with a regular transformer, there is a 1⅛ inch round knockout on the back panel which may be removed to permit installation of the octal socket mentioned above.

Dial and Drive Assembly

Complete information regarding the dial and drive assemblies will be found in the Dial and Drive Service Manual issued for this chassis.

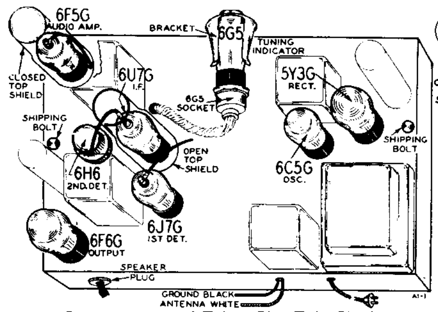


Fig. 4—Location of Tubes—Glass Tube Chassis

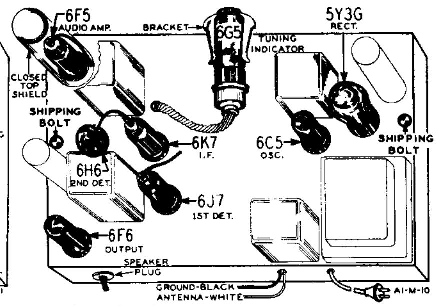


Fig. 6—Location of Tubes—Metal Tube Chassis

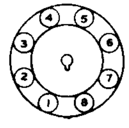


Fig. 5—Octal Tube Terminal Numbering (bottom of socket)

Twenty-five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum
Readings taken with 1000 Ohm-per-volt meter.

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6J7 6J7G	1st Det.	0	6.1(1)	220	100	7.9		6.1(1)	7.9
6C5 6C5G	Osc.	0	6.1(1)	140				6.1(1)	0
6K7 6U7G	I.F.	0	6.1(1)	220	100	2		6.1(1)	2
6H6	2nd Det.	0	6.1(1)		0			6.1(1)	0
6F5 6F5G	Audio Amp.	0	6.1(1)		75			6.1(1)	0(2)
6F6 6F6G	Power	0	6.1(1)	215	220			6.1(1)	0(3)
5Y3G	Rectifier	0	4.9(4)		610(5)		610(5)		4.9(4)
6G5	Tuning Indicator	Plate to Ground 20		Target to Ground 220		Cathode to Ground 0		Across Heater 6.1 A. C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.5 volts) as read across resistor R15.
(3) Bias (14 volts) as read across resistors R15 and R16.
(4) A.C. voltage as read across filament terminals 2 and 8.
(5) A.C. voltage as read across terminals 4 and 6.

WELLS GARDNER & CO.
MODEL AI SERIES

Series A1 - Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter. With the exception of the parts otherwise indicated, the following parts are common to Series AI chassis using either the Telephone Dial or the Phantom Light Dial.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A256	Tube Socket—Octal (7 Prong)	$0.15
3A261	Tube Socket—Octal (5 Prong)	.10
3A263	Tube Socket—Octal (8 Prong)	.15
3A262	Speaker Socket—(6 Prong)	.15
13X295	6G5 Tube Socket and Cable Assembly	.55
3A266	Phono Socket—Octal (4 Prong)	.10
3A252	Dual Keyway Socket—Octal (8 Prong)—Universal Power Transformer Connections	.15
6A214	Plug (4 Prong)—Used with above socket	.25

SPEAKERS

When ordering parts for speakers, specify part number of speaker and letter preceding part number stamped on the speaker.

Part No.	Description	List Price
12A288	8" Dynamic Speaker compl. with Output Transformer (T5)	6.30
	Cone and Voice Coil Assy. for above Spkr.	2.75
	Output Transformer only (T5)	2.45
12A268	10" Dynamic Speaker compl. with Output Transformer (T5)	6.65
	Cone and Voice Coil Assy. for above Spkr.	3.50
	Output Tranformer only (T5)	2.45
12A291	12" Dynamic Speaker compl. with Output Transformer (T5)	7.55
	Cone and Voice Coil Assy. for above Spkr.	4.60
	Output Transformer only (T5)	2.45

KNOBS

	Description	List Price
Specify name of knob & name & model of radio	Volume Control	.15
	Tone Control	.15
	Tuning Control	.15
	Band Switch	.20
	Selectivity Control	.25

GENERAL

Part No.	Description	List Price
32X51	Tube Shield Base	.10
32X32	Tube Shield—Open Top (Used only on models having glass tubes)	.15
32X50	Tube Shield—Closed Top (Used on glass & metal tube chassis)	.15
8X23	Rubber Cushions (Chassis Mounting)	.10
2X38	Felt Washers (Used behind Knobs) doz.	.10
13X80	Line Cord and Plug	.50
13X214	Antenna and Ground Lead Assembly	.30
2A87	Band Change Switch (1 section, 3 position)—Used on Phantom Light Dial Radios only	1.05
2A85	Dial Lamp Switch—Used with above Switch on Phantom Light Dial only	.30
2A77	Band Change Switch (1 section, 3 position)—Used on Telephone Dial Radios only	1.00
25X375	Chassis Mounting Foot	.10
30X44	Grid Clip Only doz.	.10
2A78	Selectivity Switch	.40
4A68	Terminal Strip (3 Lugs Insulated)	.10
25X378	Clamp Bracket for Tuning Eye Tube	.10

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A774	T1	Antenna Transformer and Can Assembly "B" Range Secondary; C & D Range	$2.00
9A778	T7	1st Antenna Coil Assembly "B" Range	1.20
9A775	T2	Oscillator Coil and Can Assembly	3.35
9A776	T3	1st I.F. Transformer and Can Assembly	2.40
9A777	T4	2nd I.F. Transformer and Can Assembly	2.35
	T5	Output Transformer only (See "Speakers")	
53X144	T6	117 Volt, 60 Cycle, Standard Power Transformer	3.10
53X145	T6	117 Volt, 25 Cycle, Standard Power Transformer	5.20
53X146	T6	117-234 Volt, 40-60 Cycle, Universal Power Transformer	4.35

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X80	C5	.05 mf.	180	$0.15
46X120	C17	.01 mf.	360	.15
46X187	C19	.02 mf.	180	.15
46X212	C20	.04 mf.	360	.15
46X106	C21	.1 mf.	360	.20
46X187	C26	.02 mf.	180	.15
46X202	C27	.02 mf.	360	.15
*46X98	C33	.1 mf.	180	.20
46X147	C34	.005 mf.	360	.15

CONDENSERS (Cont.)

TUBULAR (Cont.)

Part No.	Code	Capacitance	Voltage	List Price
46X98	C36	.1 mf.	180	$0.20
46X202	C37	.02 mf.	360	.15
46X98	C38	.1 mf.	180	.20
46X100	C39	.002 mf.	600	.15
46X108	C40	.05 mf.	600	.20

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage	List Price
44X35	C41	30 mf.	250	.75
44X31	C42	12 mf.	340	.80

MOLDED

Part No.	Code	Capacitance	List Price
47X69	C1	250 mmf.	.15
47X63	C6	10 mmf.	.15
47X49	C18	7 mmf.	.10
47X56	C32	50 mmf.	.10
47X65	C35	250 mmf.	.15
†47X56	C43	50 mmf.	.10

TRIMMER

Part No.	Code	Capacitance	Description	List Price
17A73	C2	2-25 mmf.	Antenna Range—"D"	.35
	C3	2-25 mmf.	Antenna Range—"C"	
	C4	2-25 mmf.	2nd Antenna Range—"B"	
17A74	C7	2-25 mmf.	1st Antenna Range—"B"	.10
17A69	C8	40-100 mmf.	Oscillator 7000 KC	.40
	C12	40-120 mmf.	Oscillator 600 KC	
17A76	C9	2-25 mmf.	Oscillator Range "D"	.25
	C10	2-25 mmf.	Oscillator Range "C"	
17A75	C11	1300-1700 mmf.	Range "C"—Series Padding	.50
17A68	C14	1-12 mmf.	Oscillator Range "B"	.20
17A70	C23	15-50 mmf.	1st I.F. Trimmers	.40
	C24	15-50 mmf.		
17A70	C29	15-50 mmf.	2nd I.F. Trimmers	.40
	C30	15-50 mmf.		

MISCELLANEOUS

Part No.	Code	Description	List Price
47X82	C13	330 mmf. Iron Clad	.30
47X81	C16	35 mmf. Iron Clad	.25
47X85	C22	60 mmf. Iron Clad	.30
47X85	C25	60 mmf. Iron Clad	.30
47X84	C28	75 mmf. Iron Clad	.35
47X87	C31	160 mmf. Iron Clad	.30
47X80	C15	13 mmf. Compensating Capacitor	.50
14A70		3 Section Gang Condenser less Gears and Dial Assy.	4.20

* Used only on Telephone Dial Models.
† Used only on Phantom Light Dial Models.

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A95402	R1	4000 Ohm	0.2	$0.10
A94104	R2	100,000 Ohm	0.2	.15
A94104	R3	100,000 Ohm	0.2	.15
A94251	R4	250 Ohm	0.2	.15
C94203	R5	20,000 Ohm	1.0	.15
C94203	R6	20,000 Ohm	1.0	.15
B94203	R7	20,000 Ohm	0.5	.15
A94405	R8	4 Megohm	0.2	.15
A94126	R9	12 Megohm	0.2	.15
A95105	R10	1 Megohm	0.2	.10
A95503	R11	50,000 Ohm	0.2	.10
A95205	R12	2 Megohm	0.2	.10
*A95106	R13	10 Megohm	0.2	.10
A95504	R17	500,000 Ohm	0.2	.10
A95205	R18	2 Megohm	0.2	.10
A95503	R19	50,000 Ohm	0.2	.10
A95154	R20	150,000 Ohm	0.2	.10
A95254	R21	250,000 Ohm	0.2	.10
A95151	R23	150 Ohm	0.2	.10

WIRE WOUND

Part No.	Code	Resistance	Wattage	List Price
43X76	R15	26 Ohm	.25	.35
	R16	239 Ohm	2.0	

VARIABLE

Part No.	Code	Description	List Price
36X235	R14	.5 Megohm Volume Control and On-Off Switch	.90
40X223	R22	.15 Megohm Tone Control	.65

* Used only on Telephone Dial Models.

PHONO ATTACHMENT PARTS

Part No.	Description	List Price
13X298	30" Phono Cable Assembly Complete (Includes Plug, Double-tip Phono Jack, Switch, and Knob)	$2.55
3A266	Phono Socket—Octal (4 Prong)—Must be ordered for Chassis not equipped with this socket	.10
6A218	Plug (8 Prong) Only of Phono Cable	.15
3A12	Phono Jack Only of Phono Cable	.10
2A50	Phono Switch Only of Phono Cable	.70
10A90	Knob Only of Phono Cable	.20

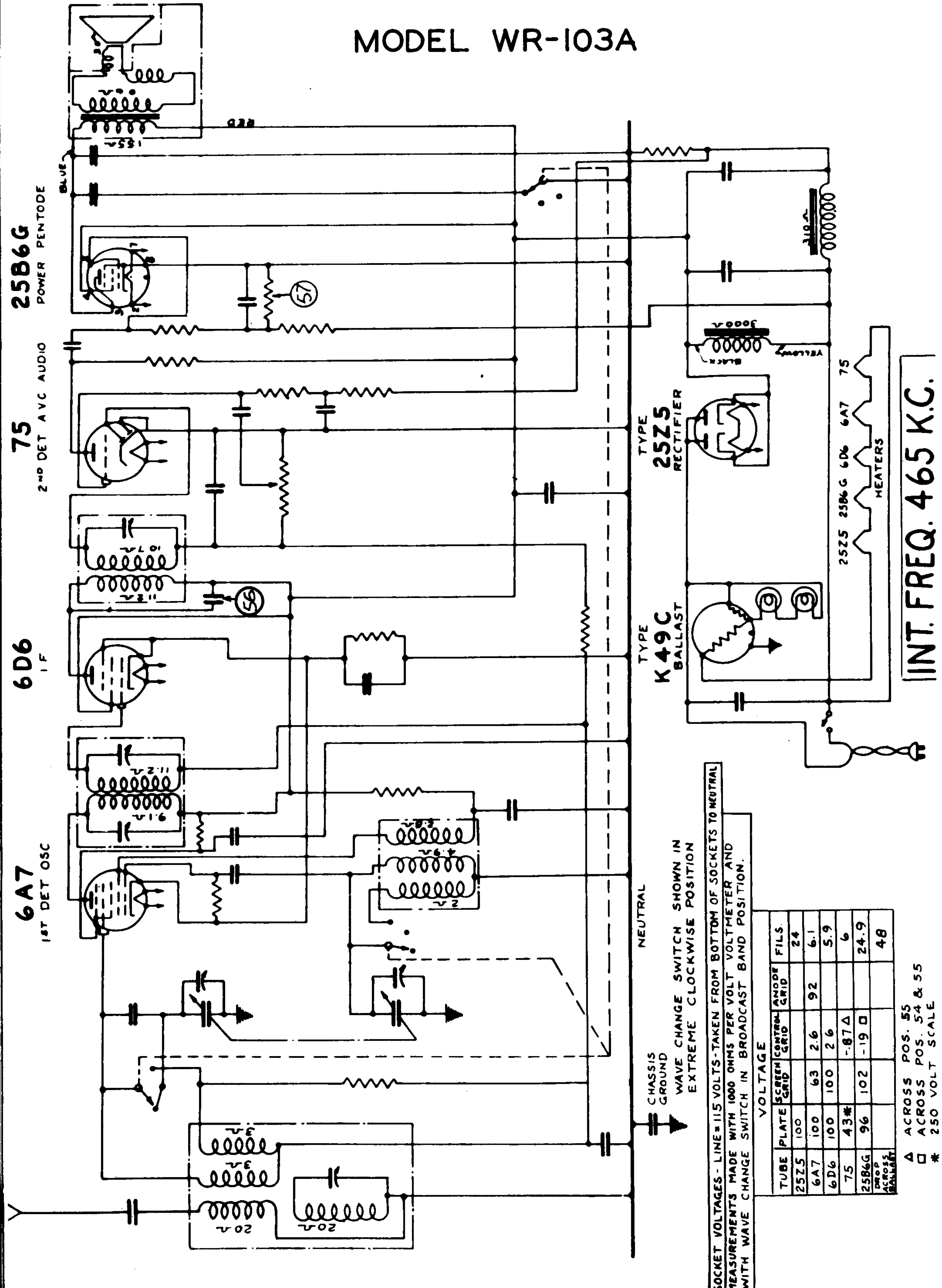
DIAL AND DRIVE ASSEMBLY

DIAL AND DRIVE PARTS WILL BE FOUND IN SPECIAL DIAL AND DRIVE MANUAL.

Prices Subject to Change Without Notice.

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODEL WR-103A



SOCKET VOLTAGES - LINE = 115 VOLTS - TAKEN FROM BOTTOM OF SOCKETS TO NEUTRAL
MEASUREMENTS MADE WITH 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION.

VOLTAGE

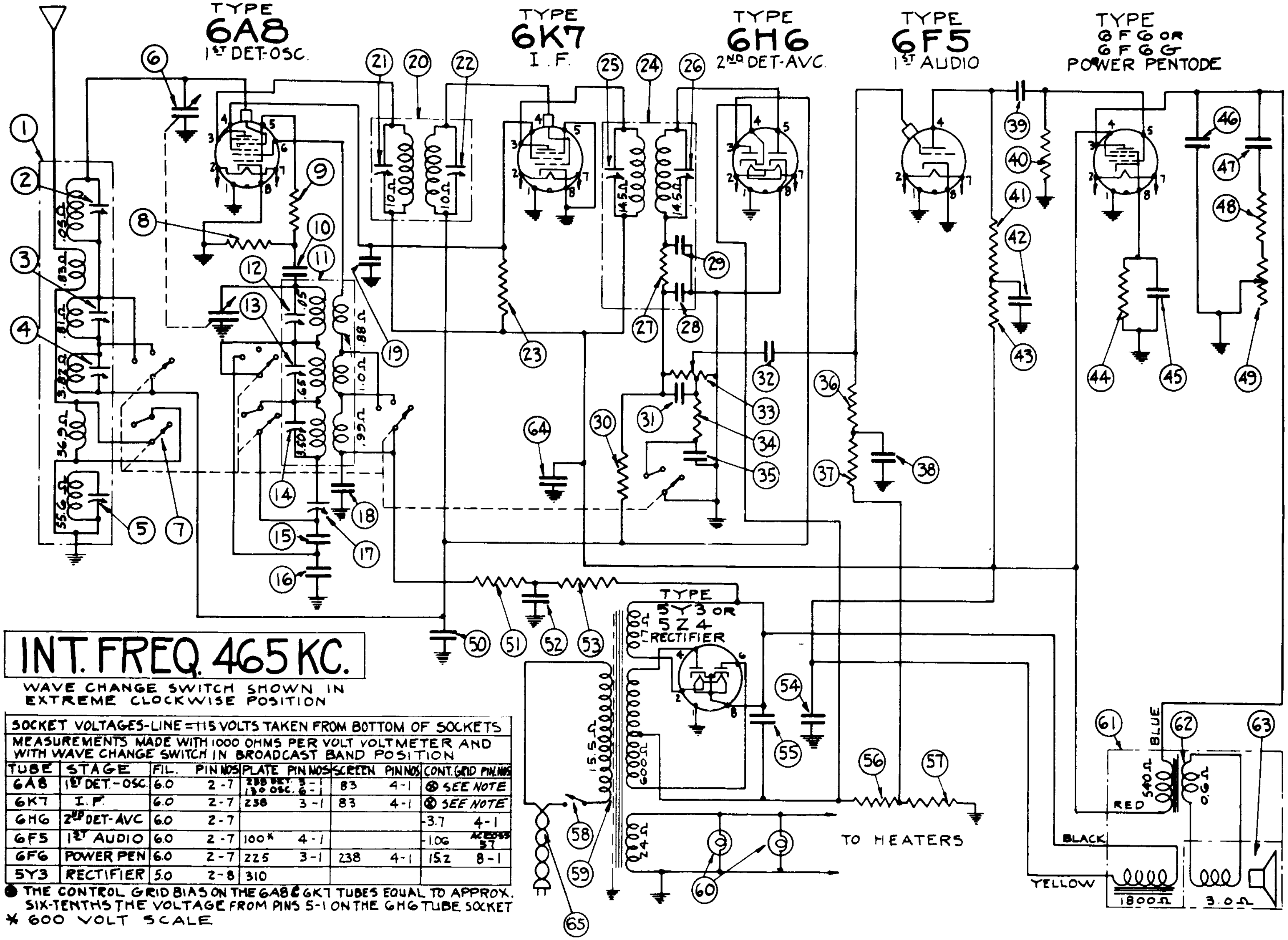
TUBE	PLATE	SCREEN GRID	CONTROL GRID	ANODE GRID	FILS.
25Z5	100				24
6A7	100	63	2.6	92	6.1
6D6	100	100	2.6		5.9
75	43*		-.87△		6
25B6G	96	102	-19□		24.9
DROP ACROSS BALLAST					48

△ ACROSS POS. 55
□ ACROSS POS. 54 & 55
* 250 VOLT SCALE

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODEL WR-211

WESTINGHOUSE RADIO MODEL WR-211



INT. FREQ. 465 KC.

WAVE CHANGE SWITCH SHOWN IN EXTREME CLOCKWISE POSITION

SOCKET VOLTAGES-LINE = 115 VOLTS TAKEN FROM BOTTOM OF SOCKETS
MEASUREMENTS MADE WITH 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION

TUBE	STAGE	FIL.	PIN NOS	PLATE	PIN NOS	SCREEN	PIN NOS	CONT. GRID	PIN NOS
6A8	1ST DET.-OSC.	6.0	2-7	238 DET. 130 OSC.	3-1 6-1	83	4-1	● SEE NOTE	
6K7	I.F.	6.0	2-7	238	3-1	83	4-1	● SEE NOTE	
6H6	2ND DET-AVC	6.0	2-7					-3.7	4-1
6F5	1ST AUDIO	6.0	2-7	100*	4-1			-1.06	ACROSS 57
6F6	POWER PEN	6.0	2-7	225	3-1	238	4-1	15.2	8-1
5Y3	RECTIFIER	5.0	2-8	310					

● THE CONTROL GRID BIAS ON THE 6A8 & 6K7 TUBES EQUAL TO APPROX. SIX-TENTHS THE VOLTAGE FROM PINS 5-1 ON THE 6H6 TUBE SOCKET

* 600 VOLT SCALE

WESTINGHOUSE ELECTRIC SUPPLY COMPANY
MODEL WR-211

GENERAL DESCRIPTION

This model is a six-tube, three-band superheterodyne receiver whose circuits employ all-metal tubes. The circuit employs a type 6A8 tube as a combined first detector-oscillator, a type 6K7 tube as an intermediate frequency amplifier, a type 6H6 tube as a second detector and automatic volume control, a type 6F5 tube as a first audio frequency amplifier, a type 6F6 as an output amplifier, and a type 5Y3 tube as a rectifier.

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload, when the individual circuits of the receiver are brought into alignment. A conventional output meter should be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures #1 and #2 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 KC.)

1. Set volume control to maximum position, the tone control to treble, the wave switch on broadcast and the dial indicator at approximately 600 KC.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 KC., apply signal to grid of 6K7 I.F. tube through a 0.5 mfd. blocking condenser.
4. Adjust trimmers #25 and #26 to maximum output, reducing output of test oscillator as required.
5. Apply test signal to grid of 6A8 first detector-oscillator tube and adjust trimmers #21 and #22 to maximum output.
6. Apply test signal to antenna of receiver.
7. Adjust trap coil trimmer #5 to minimum output.

ADJUSTMENT OF BROADCAST BAND
(540 to 1550 KC.)

1. Set wave-change switch to standard broadcast band position.
2. Set test oscillator and dial indicator to 1400 KC.
3. Apply the test signal to the antenna of the receiver through a .0002 mfd. blocking condenser and adjust the oscillator trimmer condenser #14 until the signal is received.
4. Adjust the preselector trimmer #4 to maximum output.
5. Set the test oscillator and dial indicator to 600 KC., and adjust the oscillator series condenser #17 until the signal is received. Tune the variable condenser to a slightly lower frequency and readjust trimmer #17 to maximum output. If the sensitivity increases, continue this trial and error method in the same direction until no further improvement in sensitivity can be made.

If the sensitivity decreases, try this adjustment at slightly higher frequencies.

ADJUSTMENT OF GREEN BAND

1. Set the wave-change switch to the green band position.
2. Set the test oscillator and dial indicator to 4000 KC., and adjust the oscillator trimmer condenser #13 until the signal is tuned in.
3. Adjust the preselector trimmer condenser #3 to maximum output.
4. Check the sensitivity and calibration over scale.

ADJUSTMENT OF RED BAND

1. Set the wave-change switch to the red band position.
2. Set the test oscillator and dial indicator to 15000 KC., and adjust the oscillator trimmer condenser #12 until the signal is received. Two positions may be found at which the signal may be tuned in. Use the position with the lower capacity trimmer setting or with the alignment screw turned farther out.
3. Adjust the preselector trimmer #2 to maximum output.
4. Check the receiver over scale for calibration and sensitivity.

Power Consumption	47 Watts
Maximum Output	3 Watts
Maximum Undistorted Output	2.4 Watts
Tuning Ranges	(White Band - 540 to 1550 KC.
	(Green Band - 1500 to 4500 KC.
	(Red Band - - 5500 to 15500 KC.
Line-Up Frequencies	I.F. 465 KC., 1400 KC., 600 KC., 4000 KC.

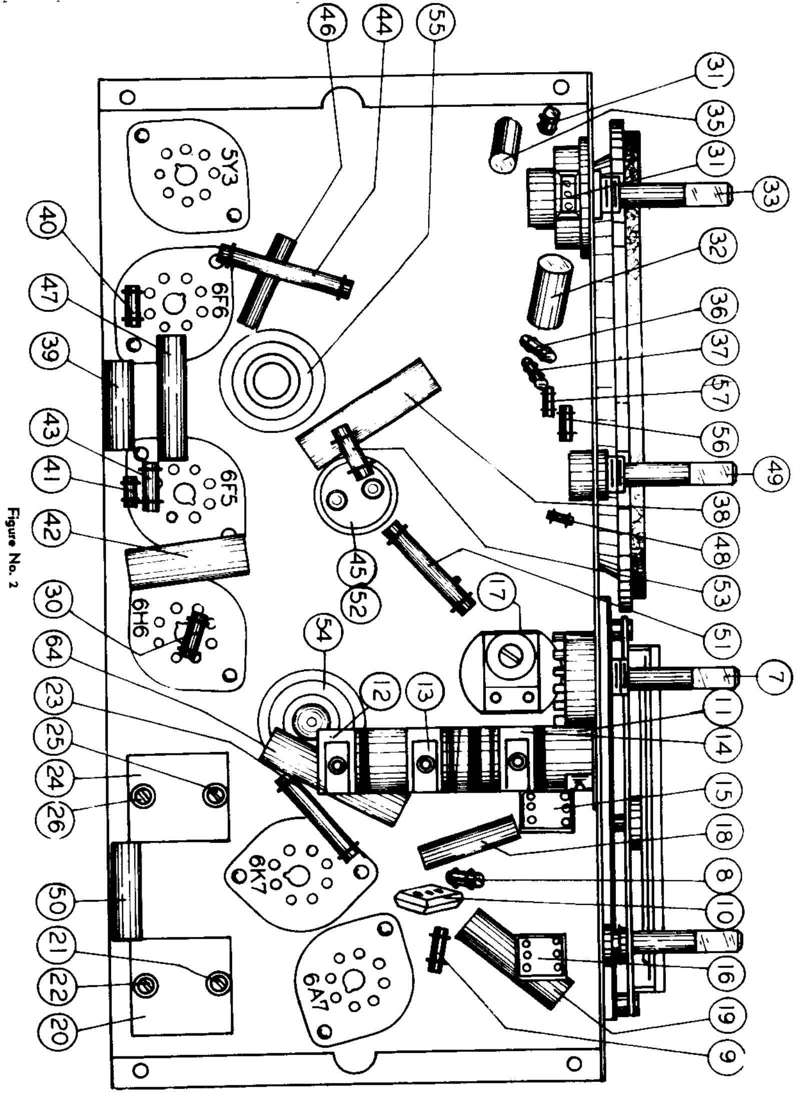
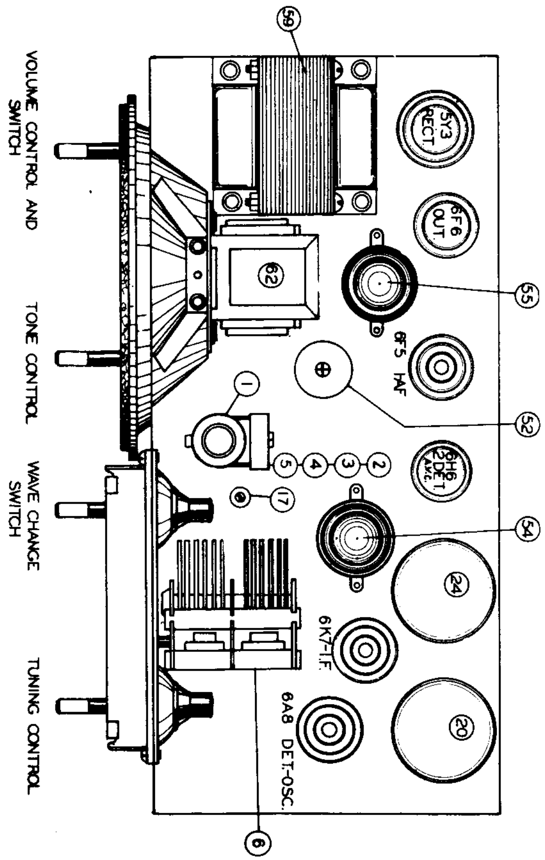


Figure No. 2



WESTINGHOUSE ELECTRIC SUPPLY COMPANY

WESTINGHOUSE RADIO MODEL WR-211

SERVICE PARTS LIST

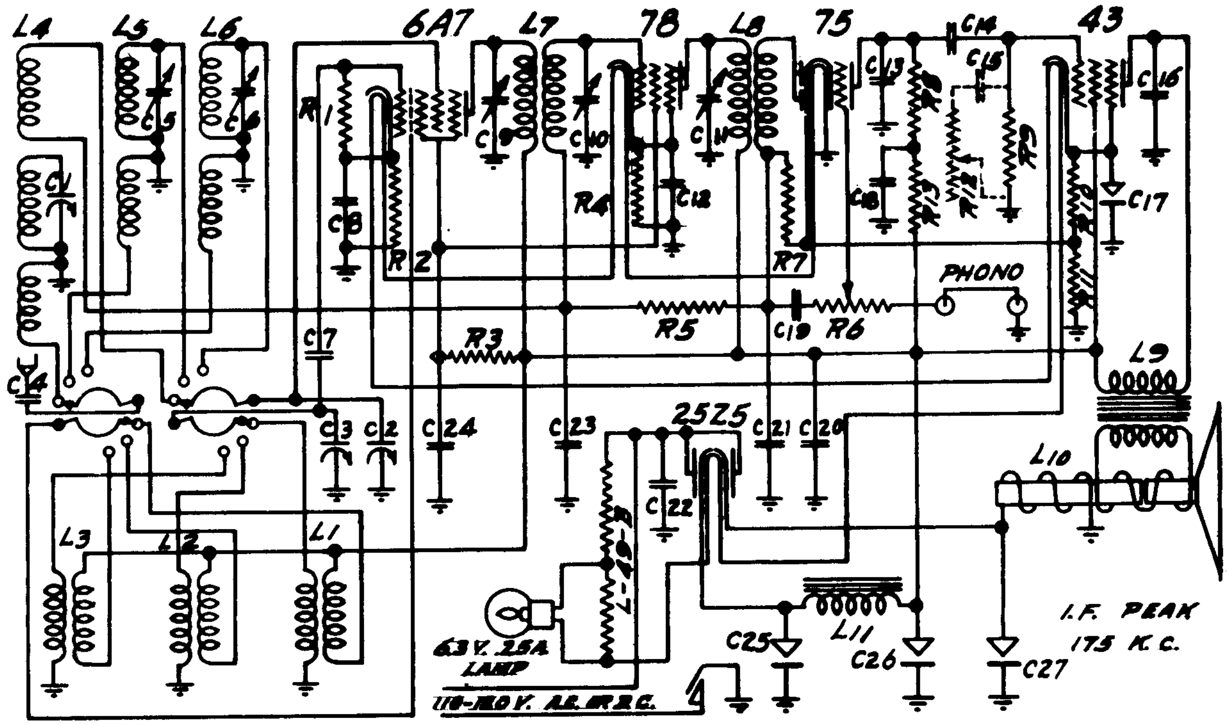
Dia. #	Part #	Description of Parts	List Price
1	RC 95202	Antenna coil assembly	$ 2.25
2		Trimmer condenser - 4-25 mmf. - part of RC 95202	
3		Trimmer condenser - 1.5-10 mmf. - part of RC 95202	
4		Trimmer condenser - 1.5-10 mmf. - part of RC 95202	
5		Trimmer condenser - 30-60 mmf. - part of RC 95202	
6	CG 9549	Variable tuning condenser - 2-gang	2.50
7	SW 9548	Wave-change switch	1.00
8	RE 9575	50,000 ohm, 1/4 W. resistor	.15
9	RE 9582	200 ohm, 1/4 W. resistor	.15
10	CM 9511	.000065 mfd. mica condenser	.15
11	RC 95203	Oscillator coil assembly	1.75
12		Trimmer condenser - 4-25 mmf. - part of RC 95203	
13		Trimmer condenser - 1.5-10 mmf. - part of RC 95203	
14		Trimmer condenser - 1.5-10 mmf. - part of RC 95203	
15	CM 9525	.0027 mfd. mica condenser	.30
16	CM 9524	.0034 mfd. mica condenser	.35
17	CS 9545	300-500 mmf. oscillator series condenser	.40
18	CW 4-005	.005 mfd., 400 V. condenser	.15
19	CW 2-10	.1 mfd., 200 V. condenser	.15
20	IC 9572	First I.F. coil assembly - 465 KC.	1.35
21		Trimmer condenser - 45-135 mmf. - part of IC 9572	
22		Trimmer condenser - 45-135 mmf. - part of IC 9572	
23	SA 99777	25,000 ohm, 1 W. resistor	.20
24	IC 9574	Second I.F. coil assembly - 465 KC.	1.75
25		Trimmer condenser - 30-100 mmf. - part of IC 9574	
26		Trimmer condenser - 30-100 mmf. - part of IC 9574	
27		50,000 ohm, 1/8 W. resistor - part of IC 9574,	
28		.0001 mfd. mica condenser - part of IC 9574	
29		.0001 mfd. mica condenser - part of IC 9574	
30	RE 9577	2 meg., 1/2 W. resistor	.15
31	CM 9519	.0005 mfd. mica condenser	.20
32	CW 4-02	.02 mfd., 400 V. condenser	.15
33	VR 9533	.5 meg. volume control	1.10
34	RE 9568	25,000 ohm, 1/4 W. resistor	.10
35	CW 4-01	.01 mfd., 400 V. condenser	.15
36	RE 9574	1 meg., 1/4 W. resistor	.15
37	RE 9575	50,000 ohm, 1/4 W. resistor	.15
38	CW 2-25	.25 mfd., 200 V. condenser	.20
39	CW 4-02	.02 mfd., 400 V. condenser	.15
40	RE 9579	.5 meg., 1/4 W. resistor	.15
41	RE 9531	250,000 ohm, 1/8 W. resistor	.10
42	CW 2-10	.1 mfd., 200 V. condenser	.15
43	RE 9581	50,000 ohm, 1/4 W. resistor	.15
44	SA 107391	500 ohm, 1 W. resistor	.20
45		10 mfd., 25 V. condenser - part of CE 9537	1.25
46	CW 4-005	.005 mfd., 400 V. condenser	.15
47	CW 4-05	.05 mfd., 400 V. condenser	.15
48	RE 9550	2000 ohm, 1/4 W. resistor	.15
49	VR 9534	20,000 ohm, tone control	.55
50	CW 2-10	.1 mfd., 200 V. condenser	.15
51	SA 101722	30,000 ohm, 1 W. resistor	.20
52		4 mfd., 450 V. electrolytic condenser - part of CE 9537	
53	SA 100825	10,000 ohm, 1/2 W. resistor	.15
54	CE 9535	16 mfd., 300 V. electrolytic condenser	.75
55	CE 9536	12 mfd., 450 V. electrolytic condenser	.80
56	RE 9537	50 ohm, 1/4 W. resistor	10
57	RE 9556	25 ohm, 1/4 W. resistor	.15
58		On-Off switch - part of VR 9533	
59	TR 9555	Power transformer - 105-125 V., 50-60 cycle	3.50

Dia. #	Part #	Description of Parts	List
60	LP 951	Dial lamp (6-8 V., .20 amp.)	$ .20
61	SK 9536	Speaker assembly	6.50
62	SA 107357	Output transformer	1.25
63	SA 106617	Diaphragm and voice coil assembly	1.15
64	CW 4-10	1 mfd., 400 V. condenser	.15
65	CB 9512	Line cable	.50
67	SA 107358	Field coil	1.75

Part #	Description of Parts	List
	MAIN ASSEMBLIES	
CH 95116	Chassis assembly	
KA 9554	Cabinet	
SK 9536	Speaker	6.50
	BRACKETS, CLIPS AND CLAMPS	
BK 95201	Dial mounting bracket on variable condenser	.35
BK 95202	Bracket over dial scale	.25
BK 95182	Large electrolytic condenser mounting bracket	.05
BK 95195	Small electrolytic condenser mounting bracket	.05
	CABLES AND CABLE ASSEMBLY	
CB 9541	Antenna and ground cables	.15
PR 97160	Dial drive belt (18") per yard	.05
	SCREWS AND NUTS	
SC 1069	Dial indicator set screw	.05
SC 953	Escutcheon plate screw	.05
SC 19-16 CA	Chassis mounting screw	.05
SC 102441	Set screw for pulley	.05
	WASHERS, BUSHINGS AND SPACERS	
WA 106339	Chassis mounting washers	.05
SR 953	Spacer for variable condenser mounting	.05
SR 9519 CA	Spacer for vernier drive mounting	.05
IS 1002	Rubber bushing condenser mounting	.05
	MISCELLANEOUS	
SP 9539	Spring drive belt	.05
GA 9511	Dial gasket	.05
KN 9576	Knob - spring type	.20
KN 9580	Knob - set screw type	.20
SO 9520	Dial lamp socket	.10
DS 9559	Dial scale	.90
PL 9581	Masking plate	.20
SI 9564	Dial indicator assembly	.80
PU 9519	Pulley - dial driven	.25
SH 9540	Vernier drive assembly	.70
SP 9540	Spring for dial scale	.05
SO 956	Tube socket - 8 prong	.20
PL 9577	Escutcheon dial plate	.70

WILCOX-GAY CORPORATION

MODELS 3JM6, 3JQ6, A15 & A17



RESISTORS

CODE	PART NO.	RESISTORS
R1	53-898	50,000 Ohm Oscillator Grid Resistor
R2	53-1062	250 Ohm Oscillator Cathode Resistor
R3	53-1042	25,000 Ohm 6A7 & 78 Screen Resistor
R4	53-1063	500 Ohm 78 Cathode Resistor
R5	53-926	1 Meg Ohm A.V.C. Network Resistor
R6	19-1291	500,000 Ohm Volume Control & Switch
R7	53-925	500,000 Ohm Diode Resistor
R8	53-924	250,000 Ohm 75 Plate Resistor
R9	53-925	500,000 Ohm 43 Grid Resistor
R10	53-1062	500 Ohm 43 Cathode Resistor
R11	53-1122	40 Ohm 75 Cathode Resistor
R12	19-1317	250,000 Ohm Tone Control on Model A-17
R13	53-898	50,000 Ohm 75 Plate Hum Resistor

CONDENSERS

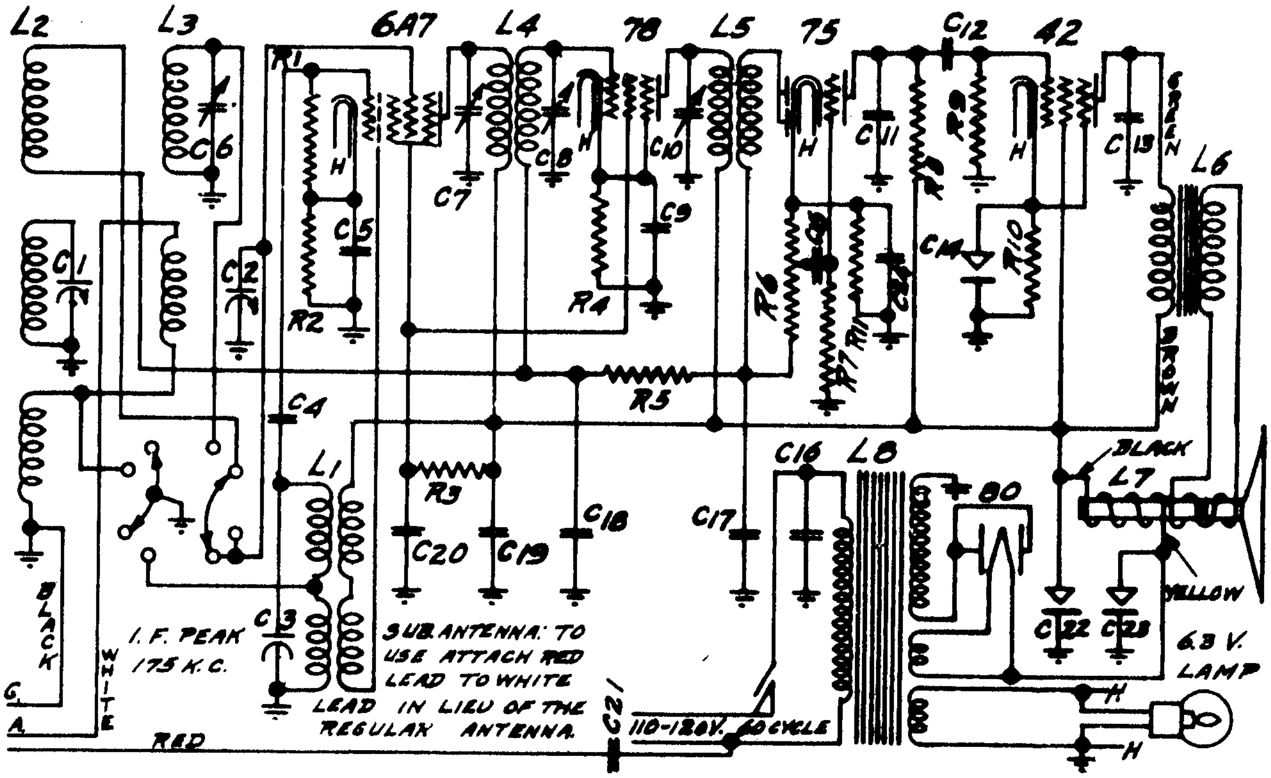
CODE	PART NO.	CONDENSERS
C1	77-833	366 MMFD. Preselector Section of 3 Gang
C2	77-833	366 MMFD. Preselector Section of 3 Gang
C3	77-833	328 MMFD. Oscillator Section of 3 Gang
C4	75-2003	.01 Mfd. 400 V. Paper Antenna Series Cond.
C5	78-2010	3-30 MMFD. Police Band Preselector Trimmer
C6	78-2010	3-30 MMFD. Foreign Band Preselector Trimmer
C7	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C8	75-2006	.1 Mfd. 200 V. Paper Oscillator Cathode Cond.
C9	78-2008	First I.F. Primary Trimmer
C10	78-2011	First I.F. Secondary Trimmer
C11	78-2009	Second I.F. Primary Trimmer
C12	75-2006	.1 Mfd. 200 V. Paper 78 Cathode By-Pass Cond.
C13	76-265	.001 Mfd. Mica 75 Plate Filter Condenser
C14	75-2003	.01 Mfd. 400 V. Paper Audio Feed Condenser
C15	75-2003	.01 Mfd. 400 V. Paper Tone Control Cond. on Model A-17
C16	75-2002	.004 Mfd. 600 V. Paper Output Plate Filter Condenser
C17	18-928	25 Mfd. 25 Volt Electrolytic Output Cathode By-Pass Cond.
C18	75-2006	.1 Mfd. 200 Volt Paper 75 Plate Hum Filter Condenser
C19	75-2003	.01 Mfd. 400 Volt Paper Audio Feed Condenser
C20	75-2011	.5 Mfd. 200 Volt Paper B Supply By-Pass Condenser
C21	76-307	.0005 Mfd. Mica Diode Filter Condenser
C22	75-2006	.1 Mfd. 200 Volt Paper Line By-Pass Condenser
C23	75-2006	.1 Mfd. 200 Volt Paper A.V.C. Network By-Pass Cond.
C24	75-2006	.1 Mfd. 200 Volt Paper Screen By-Pass Condenser
C25	18-2003	11 Mfd. 150 W.V. Dry Electrolytic Filter Condenser
C26	18-2003	4 Mfd. 150 W.V. Dry Electrolytic Filter Condenser
C27	18-2003	4 Mfd. 150 W.V. Dry Electrolytic Filter Condenser

INDUCTANCES

CODE	PART NO.	INDUCTANCES
L1	17-2030	Broadcast Band Oscillator Coil Assembly
L2	17-1667	Police Band Oscillator Coil Assembly
L3	17-2077	Foreign Band Oscillator Coil Assembly
L4	17-2080	Broadcast Band Preselector Coil Assembly
L5	17-1668	Police Band Preselector Coil Assembly
L6	17-2078	Foreign Band Preselector Coil Assembly
L7	68-2012	First I.F. Transformer Assembly
L8	17-2064	Second I.F. Transformer Coil Assembly
L9	64-1260	6½" Speaker 43 Output Trans. on L10
L10	64-1260	6½" Speaker 3000 Ohm Field
L11	14-940	20 Henry Filter Choke

WILCOX-GAY CORPORATION

MODELS 6A5, 6AB5, 6AC5, A11 & A16

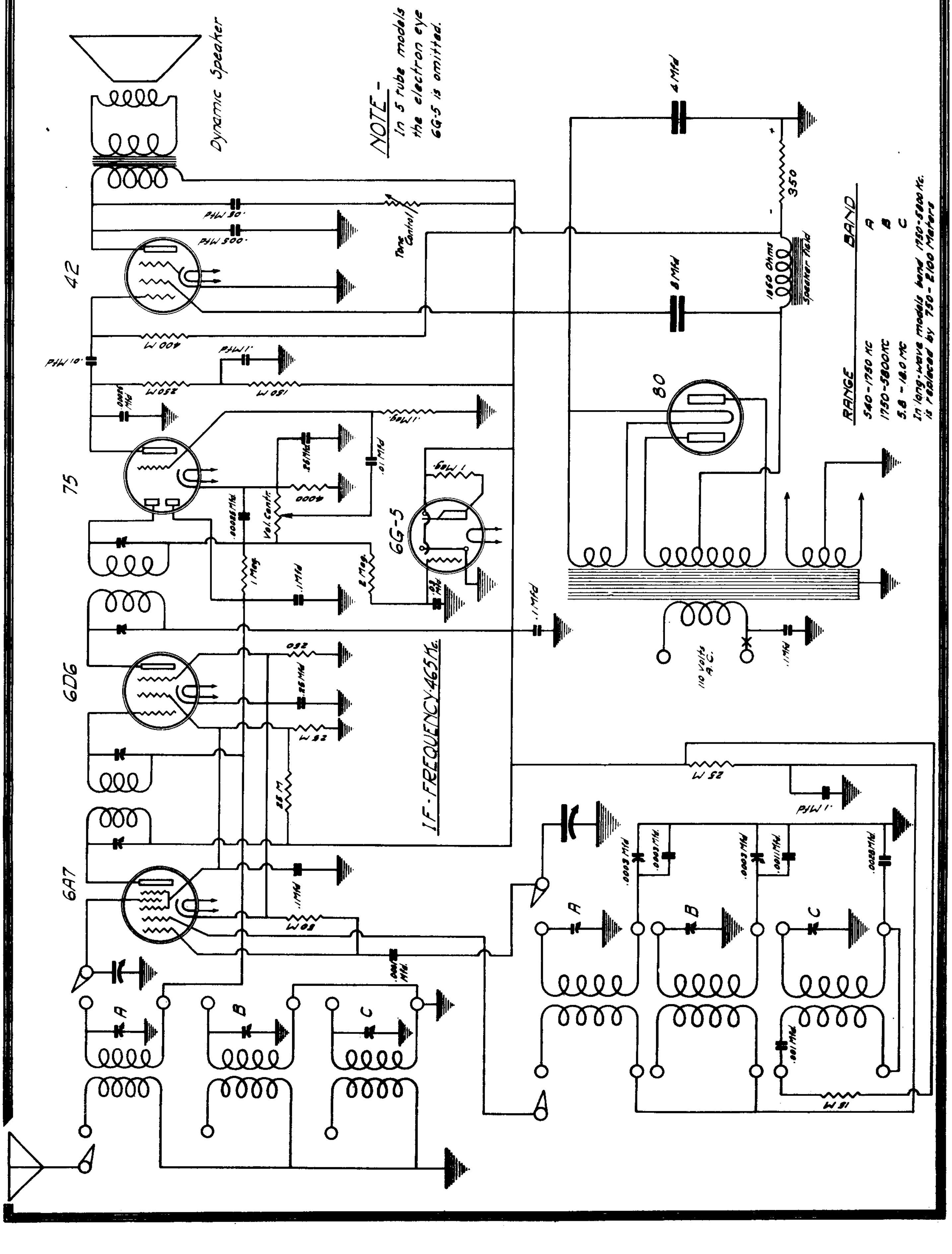


CODE	PART NO.	RESISTORS
R1	53-898	50,000 Ohm 6A7 Grid Resistor
R2	53-1062	250 Ohm 6A7 Cathode Resistor
R3	53-1042	25,000 Ohm 6A7 & 78 Screen Resistor
R4	53-1063	500 Ohm 78 Cathode Resistor
R5	53-926	1 Meg Ohm A.V.C. Network Resistor
R6	19-1291	500,000 Ohm Volume Control & Switch
R7	53-925	500,000 Ohm 75 Grid Resistor
R8	53-924	250,000 Ohm 75 Plate Resistor
R9	53-925	500,000 Ohm 42 Grid Resistor
R10	53-1063	500 Ohm 42 Cathode Resistor
R11	53-919	5,000 Ohm 75 Cathode Resistor

CODE	PART NO.	INDUCTANCES
L1	17-2066	Oscillator Coil Assembly
L2	17-2060	Broadcast Preselector Coil Assembly
L3	17-2067	Police Band Preselector Coil Assembly
L4	68-2012	First I.F. Trans. Assembly
L5	17-2066	Second I.F. Trans. Coil Assembly
L6	64-2021	5" Speaker 42 Tube Output Transformer on L7
L7	64-2021	5" Speaker 1500 Ohm Field
L8	60-2009	Power Transformer for 110-120 V. 60 Cycle

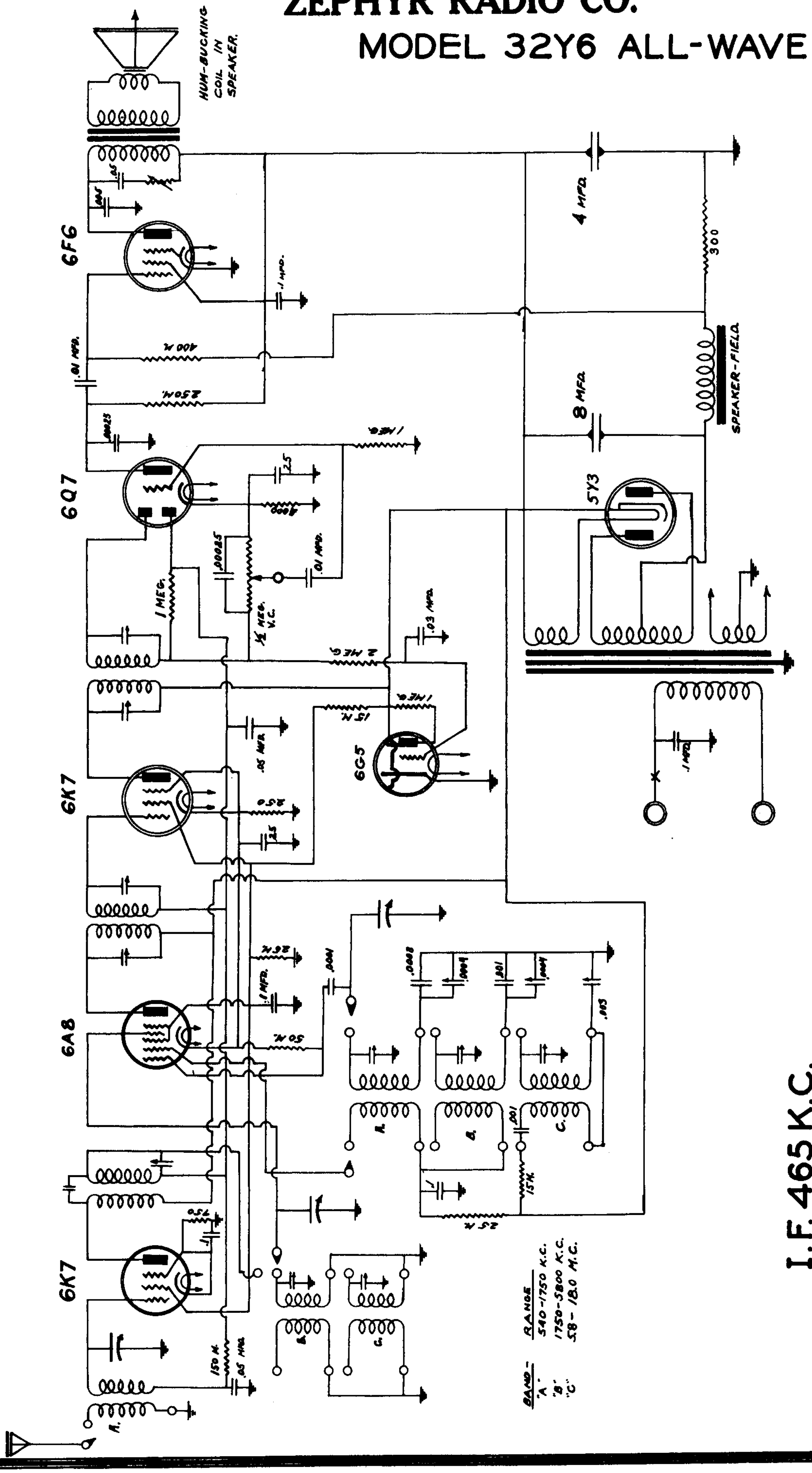
CODE	PART NO.	CONDENSERS
C1	77-833	366 MMFD. Preselector Section of 3 Gang
C2	77-833	366 MMFD. Preselector Section of 3 Gang
C3	77-833	328 MMFD. Oscillator Section of 3 Gang
C4	76-2002	.00005 Mfd. Mica Oscillator Grid Condenser
C5	75-2005	.1 Mfd. 200 Volt Paper 6A7 Cathode By-Pass Cond.
C6	78-2010	3-30 MMFD. Police Band Preselector Trimmer Cond.
C7	78-2008	First I.F. Primary Trimmer Condenser
C8	78-2011	First I.F. Secondary Trimmer Condenser
C9	75-2005	.1 Mfd. 200 Volt Paper 78 Cathode By-Pass Cond.
C10	78-2009	Second I.F. Trimmer Condenser
C11	76-862	.002 Mfd. Mica 75 Plate Filter Condenser
C12	75-2003	.01 Mfd. 400 Volt Paper Audio Feed Condenser
C13	75-2001	.002 Mfd. 600 Volt Paper 42 Plate Filter Cond.
C14	18-928	25 Mfd. 25 Volt Dry Electrolytic Condenser
C15	75-2003	.01 Mfd. 400 Volt Paper Audio Feed Condenser
C16	75-2003	.01 Mfd. 400 Volt Paper Line By-Pass Condenser
C17	76-307	.0005 Mfd. Mica Diode Filter Condenser
C18	75-2005	.1 Mfd. 200 Volt Paper A.V.C. Network By-Pass Cond.
C19	75-2011	.5 Mfd. 200 Volt Paper B Supply By-Pass Condenser
C20	75-2005	.1 Mfd. 200 Volt Paper 6A7 & 78 Screen By-Pass Cond.
C21	75-2003	.01 Mfd. 400 Volt Paper Sub. Antenna Condenser
C22	18-2006	16 Mfd. 250 W.V. Electrolytic Condenser
C23	18-2005	12 Mfd. 325 W.V. Electrolytic Condenser
C24	75-2005	.1 Mfd. 200 V. Paper 75 Cathode By-Pass Cond.

ZEPHYR RADIO CO.
MODEL 32Y5 ALL-WAVE



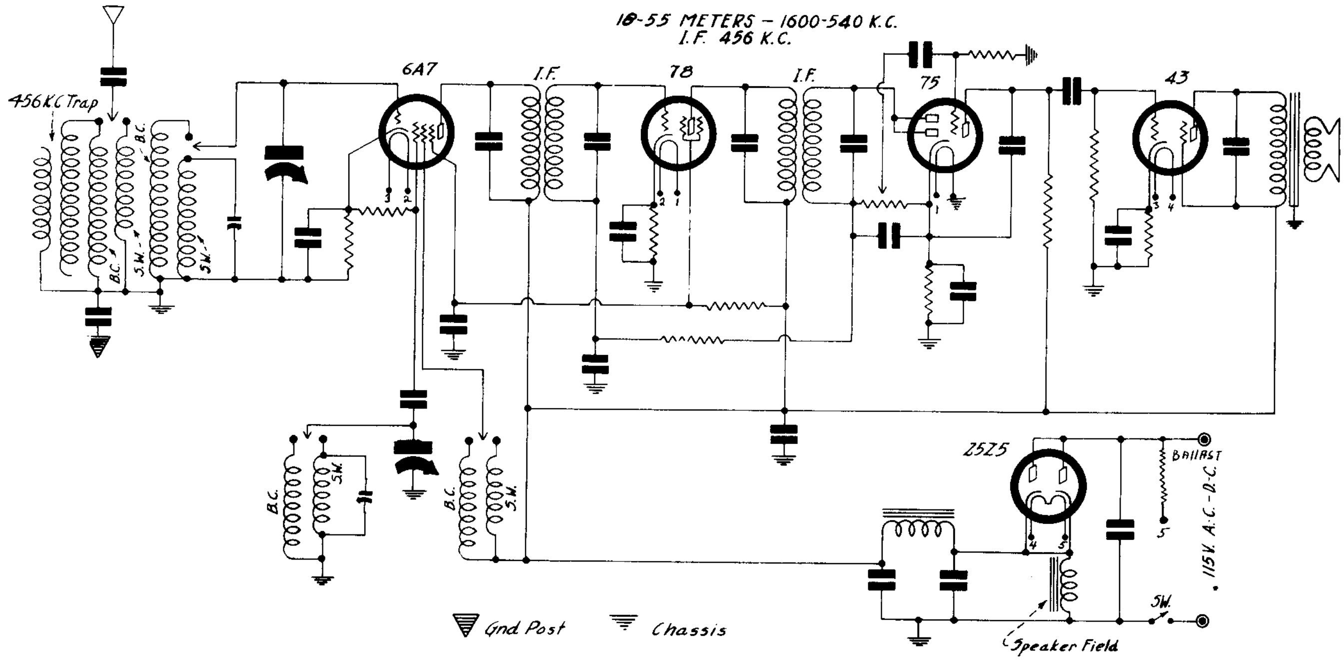
ZEPHYR RADIO CO.

MODEL 32Y6 ALL-WAVE

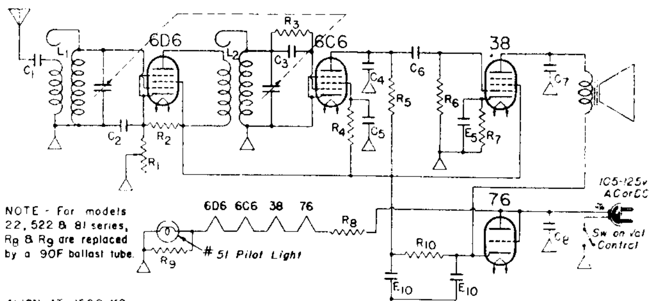


AIR-KING PRODUCTS COMPANY, INC.

MODELS 5TUBE UNIVERSAL ALL-WAVE SET & ATLAS



MODELS 21,22,221,522 & 81 SERIES



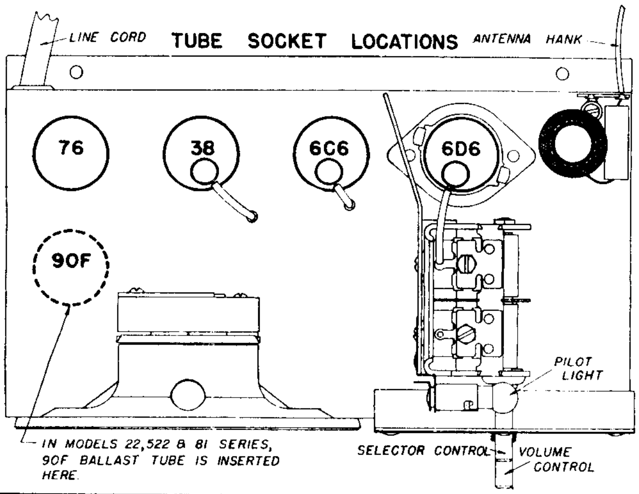
ALIGN AT 1500 KC.

R_1 -	25,000	ohm	vol	control
R_2 -	35,000	"	$\frac{1}{4}$	watt
R_3 -	3,000,000	"	"	"
R_4 -	6,000,000	"	"	"
R_5 -	1,000,000	"	"	"
R_6 -	750,000	"	"	"
R_7 -	1,000	"	"	"
R_8 -	290	"	in line cord	
R_9 -	31	"	3	watt
R_{10} -	2,700	"	$\frac{1}{4}$	"

L_1 Antenna Coil
L_2 R.F. Coil

E_5 - 5 Mfd - 25v
E_{10} - 10 " - 150v
E_{10} - 10 " "

C_1 -	.005 -	400 v
C_2 -	.02 -	400 v
C_3 -	.005 -	400 v
C_4 -	.0001 -	Mica
C_5 -	.02 -	400 v
C_6 -	.02 -	400 v
C_7 -	.005 -	400 v
C_8 -	.05 -	400 v



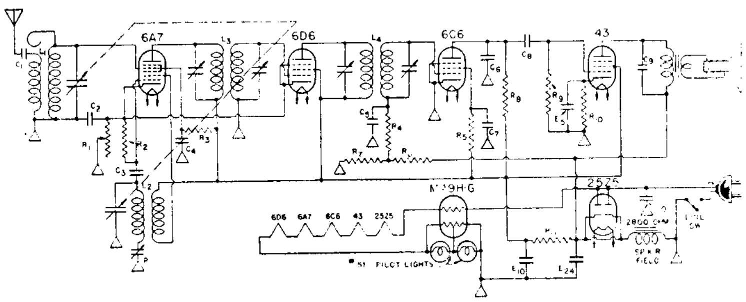
REPLACEMENT PARTS

Stock No.	Description	List Price
21	Cabinet	2.15
22	Cabinet	2.15
522	Cabinet	4.45
81	Cabinet	2.15
1044	Dial scale—for model 22, 21, 522, brown or green	.20
1045	5" mag. speaker	1.50
1046	Variable condenser for models 21, 22, 522	1.30
1008	Variable condenser, for model 81	1.30
1047	290 ohm line cord	.57
1001A-B	Antenna & R F coils, both	.60
1010A	6D6, 6C6, 38 or 76 sockets (each)	.09
1023	35000 ohm ¼ watt resis.	.06
700A	Volume control	57
1011A	Tube shield (base, clip & shield)	.10
1014	.005 — 400 volt cond.	.09
10134	.02 — 400 volt cond.	.10
1048	.0001 mica cond.	.10
1049	.05 — 400 volt cond.	.10
1021	6 meg. ohm ¼ watt resis.	.06
1022	2700 ohm ¼ watt resis.	.06
1020	1 meg. ohm ¼ watt resis.	.06
1028	Antenna hank	.15
1037	Pilot light	.10
1050	Pilot light socket	.10
1051	Electrolytic cond.	.65

Prices subject to change without notice.

AIR-KING PRODUCTS COMPANY, INC.

MODELS 710 & 715



R1 - 7,500 OHM VOL CONTROL
R2 - 50,000 " 1/4 WATT
R3 - 35,000 " " "
R4 - 6,000,000 " " "
R5 - 6,000,000 " " "
R6 - 1,000,000 " " "
R7 - 2,700 " " "
R8 - 1,000,000 " " "
R9 - 500,000 " " "
R10 - 650 " 1/2 "
R11 4,500 " " "

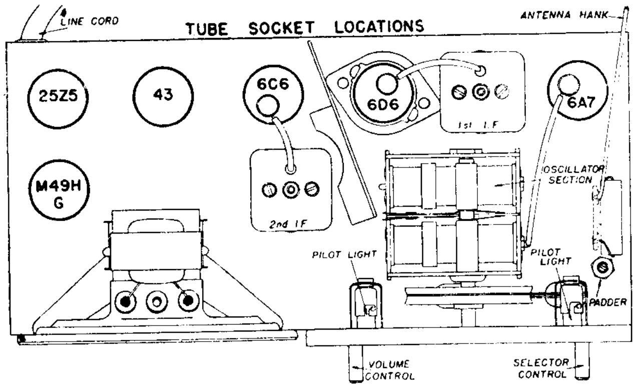
L1 ANTENNA COIL
L2 - OSCILLATOR COIL
L3 - 456 KC INPUT IF
L4 - 456 KC OUTPUT IF

P - 500 MMF MAX

E5 - 5 MFD 25 V
E10 - 10 " 150 V
E24 - 24 " 150 V

C1 005 400 V
C2 - .1 200 V
C3 - 0001 MICA
C4 - 02 400 V
C5 - 005 400 V
C6 - 00025 MICA
C7 - 02 400 V
C8 - 02 400 V
C9 - 005 400 V
C10 - .1 200 V

TUBE SOCKET LOCATIONS

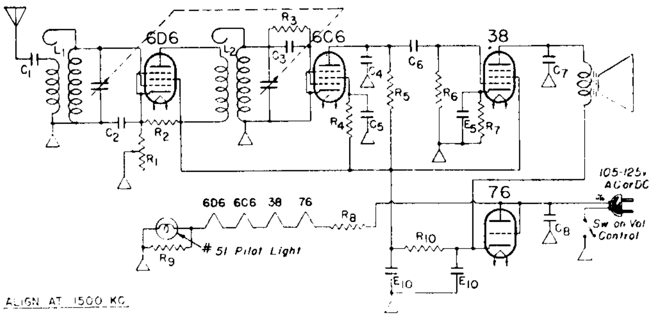


REPLACEMENT PARTS

Stock No.	Description	List Price
710	Cabinet	3.60
715	Cabinet	3.60
S-2280	Dynamic 5" speaker	2.28
1032	Variable Condenser	1.45
1034	Line cord	.21
1042	Dial shaft, bushing & nut	.15
1039	Dial cord	.15
1033	Dial scale	.10
1031	Celluloid dial face	.15
1030	Pointer	.06
1011A	Tube shield (base, clip & shield)	.10
1028	Antenna hank	.15
1037	Pilot light	.10
10134	.02 — 400 volt cond.	.10
1061	.00025 mica cond	.10
1038	Pilot light socket	.10
919-91	24-10-5 electrolytic	.75
1055	Volume control and switch	.60
1056	Antenna coil	.30
1057	Oscilaltor coil	.30
1058	Input. I. F. transformer	.70
1059	Out I. F. transformer	.70
1060	500 MMF padder	.21
1014	.005 — 400 volt cond.	.09
1048	.0001 mica cond.	.10
1062	.1 - 200 volt cond	.09
1063	50,000 ohm resis 1/4 watt	.06
1021	6 meg. ohm 1/4 watt resis.	.06
1016	4500 ohm resis. 1/2W	.06

Prices subject to change without notice.

MODELS 1000 & 2000



ALIGN AT 1500 KC

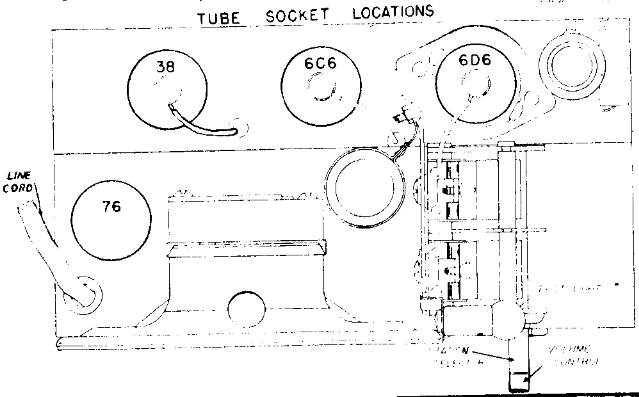
R1 - 25,000 ohm vol control
R2 - 35,000 " 1/4 watt
R3 - 3,000,000 " " "
R4 - 6,000,000 " " "
R5 - 1,000,000 " " "
R6 - 750,000 " " "
R7 - 1,000 " " "
R8 - 290 " in line cord
R9 - 31 " 3 watt
R10 - 2,700 " 1/4 "

L1 Antenna Coil
L2 R F Coil

E5 - 5 Mfd - 25v
E10 - 10 " - 150v
E10 - 10 " "

C1 - 005 - 400 v
C2 - 02 - 400 v
C3 - 005 - 400 v
C4 - .0001 - Mica
C5 - .02 - 400 v
C6 - .02 - 400 v
C7 - 005 - 400 v
C8 - .05 - 400 v

TUBE SOCKET LOCATIONS



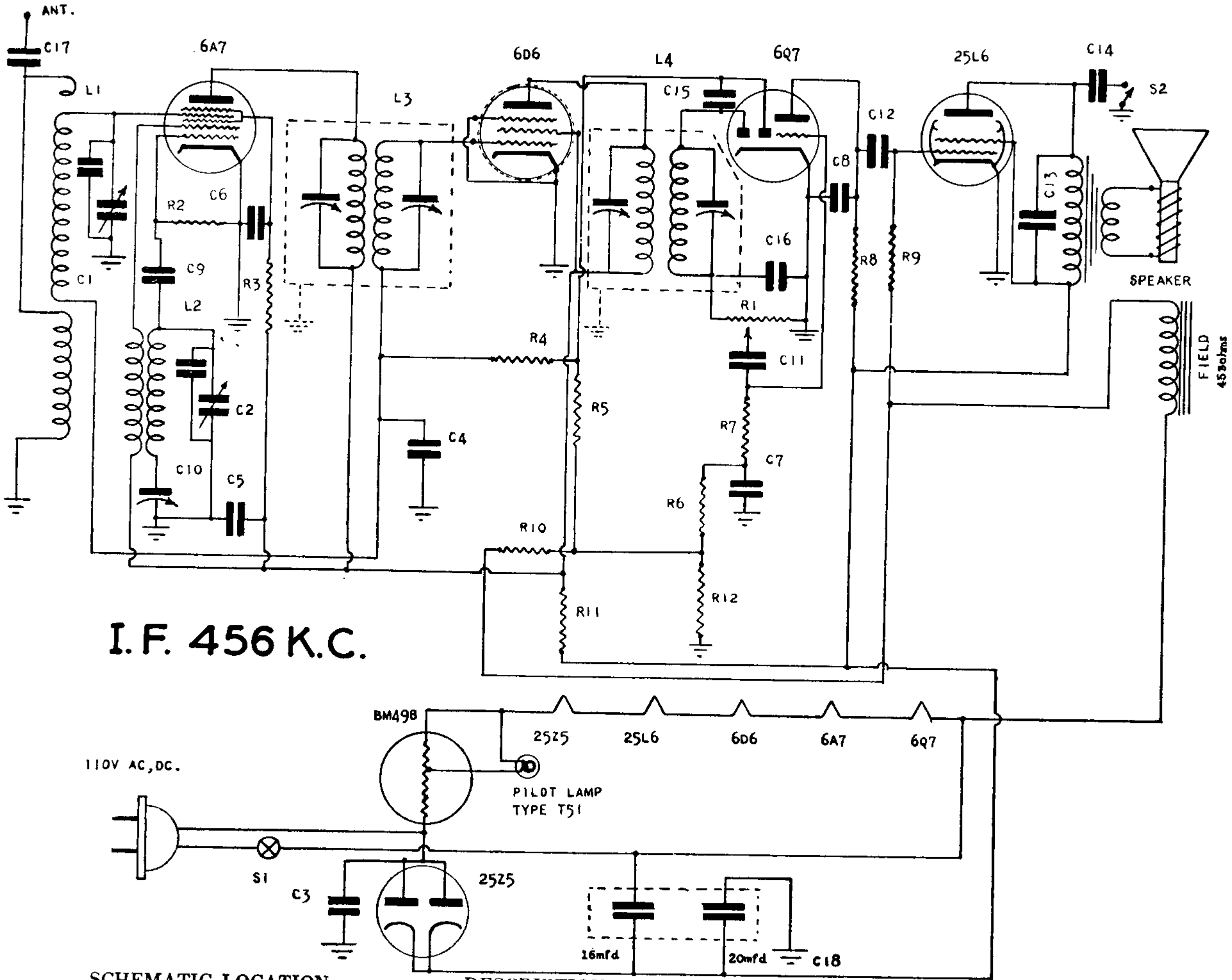
REPLACEMENT PARTS

Stock No.	Description	List Price
1000	Cabinet-walnut, ivory, black, red, maple	2.00
1002A	Dial scale	.20
1003A	Dial pointer	.06
1004A	Knob	.10
1008A	Variable condenser	1.30
1045	5" mag. speaker	1.50
1047	290 ohm line cord	.57
1001A-B	Antenna & R F coils, both	.60
1010A	6D6, 6C6, 38 or 76 sockets (each)	.09
1023	35000 ohm 1/4 watt resis.	.06
700A	Volume control	57
1011A	Tube shield (base, clip & shield)	.10
1014	.005 — 400 volt cond.	.09
10134	.02 — 400 volt cond.	.10
1048	.0001 mica cond.	.10
1049	.05 — 400 volt cond.	.10
1021	6 meg. ohm 1/4 watt resis.	.06
1022	2700 ohm 1/4 watt resis.	.06
1020	1 meg. ohm 1/4 watt resis.	.06
1028	Antenna hank	.15
1037	Pilot light	.10
1050	Pilot light socket	.10
1051	Electrolytic cond.	.65

Prices subject to change without notice.

AUTOMATIC RADIO MFG. CO., Inc.

MODEL B30 SERIES II



SCHEMATIC LOCATION	DESCRIPTION	PART NO.	LIST PRICE
L1	Antenna Coil	BA110	$0.50
L2	Oscillator Coil	BO110	.40
L3	1st I.F. Coil	LC110	.80
L4	2nd I.F. Coil	LC112	.80
———	Speaker	SD23	3.50
C1, C2	Tuning Condenser	CV25	1.80
C3, C4, C5, C6, C7	Fixed " .1mfd—200v	———	.20
C8, C9, C16	Mica " 200mmfd	———	.20
C15	Mica " 100mmfd	———	.20
C10	Variable Padder 550mmfd	———	.40
C11, C12, C13	Fixed Condenser .01mfd—200v	———	.20
C14	Fixed " .02mfd—600v	———	.20
C17	Fixed " .002mfd—600v	———	.25
C18	Electrolytic Condenser Block	CE20	1.40
S1	Line Switch (On Vol. Control)	———	———
S2	Tone Control Switch	S12	.40
R1	Volume Control 1/4 megohm	RV18	.80
R2	Resistors 50,000 ohms—1/4 Watt	———	.15
R3	" 25,000 ohms—1/4 Watt	———	.20
R4, R5	" 2 megohms—1/4 Watt	———	.15
R6, R7	" 1 megohm—1/4 Watt	———	.15
R8,	" 1/4 megohm—1/4 Watt	———	.15
R9	" 1/2 megohm—1/4 Watt	———	.15
R10	" 100 ohms—1/2 Watt	———	.20
R11	" 30 ohms—1/4 Watt	———	.20
R12	" 25 ohms—1/4 Watt	———	.20

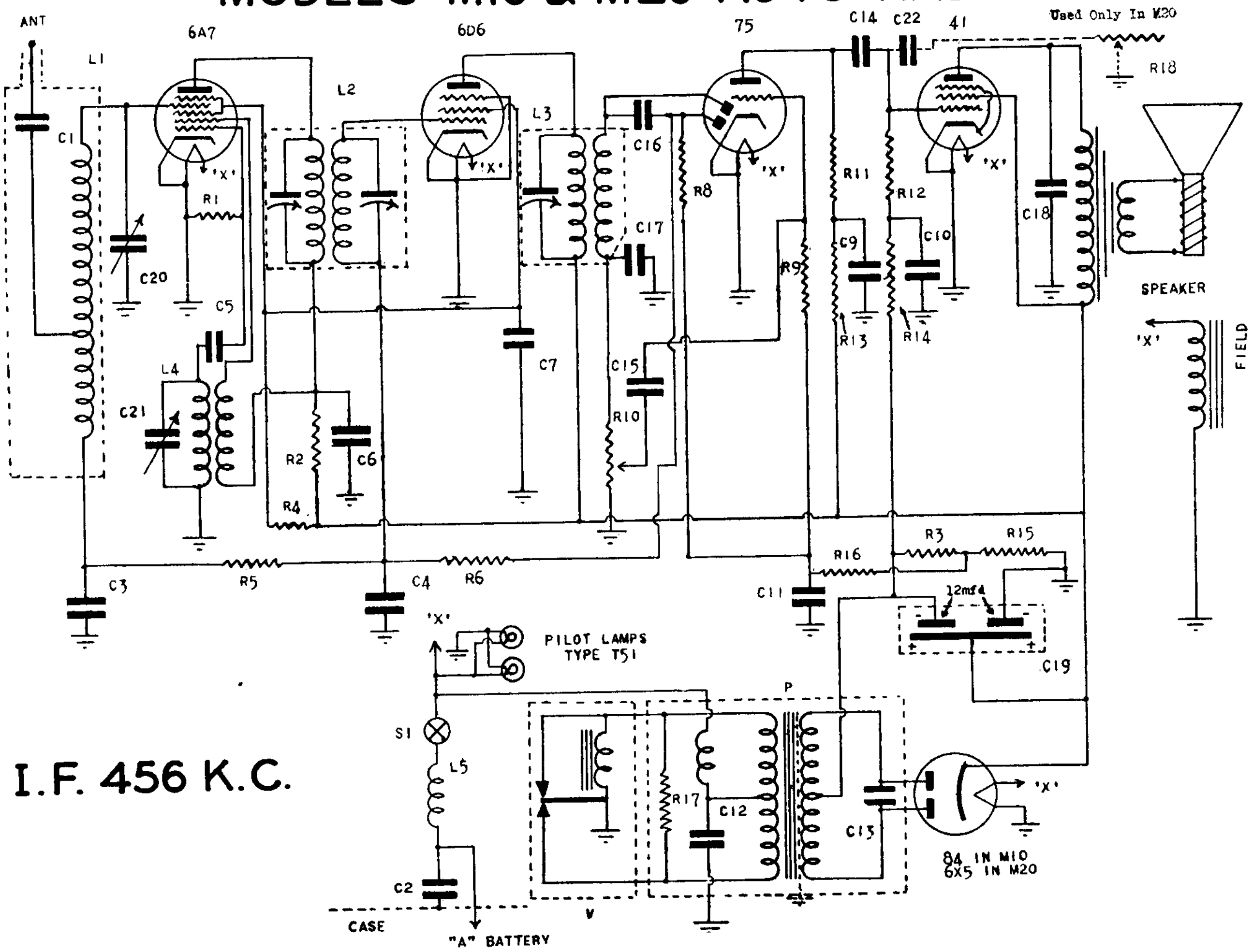
ALIGNMENT PROCEDURE

I. F. Alignment. Connect a signal generator set at 456kc to the 6A7 input and connect an output meter to the speaker output. Using a weak signal tune the two I. F. condensers on the first I. F. coil and the two I. F. condensers on the output I. F. coil for maximum response.

R. F. Alignment. Connect the signal generator set at 1400kc to the antenna lead using a dummy antenna of 200mmf. Tune the set by means of the dial to 1400kc position. Adjust oscillator trimmer for this frequency. Pad at 600kc. Recheck 1400kc and trim antenna stage for maximum response. Repeating the alignment may result in improved sensitivity.

AUTOMATIC RADIO MFG. CO., Inc.

MODELS M10 & M20 AUTO RADIOS



I.F. 456 K.C.

SCHEMATIC LOCATION	DESCRIPTION	PART NO.	LIST PRICE
L1	Antenna Coil	BA300	$0.80
L2, L4	Composite I.F. Trans. and Osc.	LC200	.90
L3	2nd I.F. Transformer	L300	.70
L5	"A" R.F. Choke	RF100	.20
——	Speaker	SD16	3.20
P	Power Transformer	P300	2.40
V	Vibrator	V200	2.50
S1	Line Switch (On Vol. Control)	——	——
C1, C2	Mica Condenser .0005mfd	——	.20
C3, C4	Fixed " .05mfd—200v	——	.20
C5, C16	Mica " 100mmfd	——	.20
C6, C7, C9, C10, C11	Fixed " .1mfd—200v	——	.20
C12	Fixed " .5mfd—200v	——	.30
C13	Fixed " .007mfd—1200v	——	.30
C14, C15	Fixed " .01mfd—400v	——	.20
C17	Mica " 200mmfd	——	.20
C18	Fixed " .005mfd—600v	——	.20
C19	Electrolytic Condenser Block	CE30	1.20
C20, C21	2 sect. Tuning Condenser	CV30	1.80
C22	Fixed Condenser .002mfd—600v	——	.20
R1	Resistor 50,000 ohms—¼ Watt	——	.15
R2	" 250 ohms—¼ Watt	——	.20
R3	" 250 ohms—½ Watt	——	.20
R4	" 25,000 ohms—¼ Watt	——	.20
R5	" 250,000 ohms—¼ Watt	——	.15
R6, R8, R9	" 1 megohm—¼ Watt	——	.15
R10	Volume Control—½ megohm	RV19	.80
R11, R12	Resistor ½ megohm—¼ Watt	——	.15
R13, R14	" ¼ megohm—¼ Watt	——	.15
R15	" 30 ohms—¼ Watt	——	.20
R16	" 100,000 ohms—¼ Watt	——	.15
R17	" 150 ohms—¼ Watt	——	.20
R18	Tone Control—½ megohm	RV30	.60

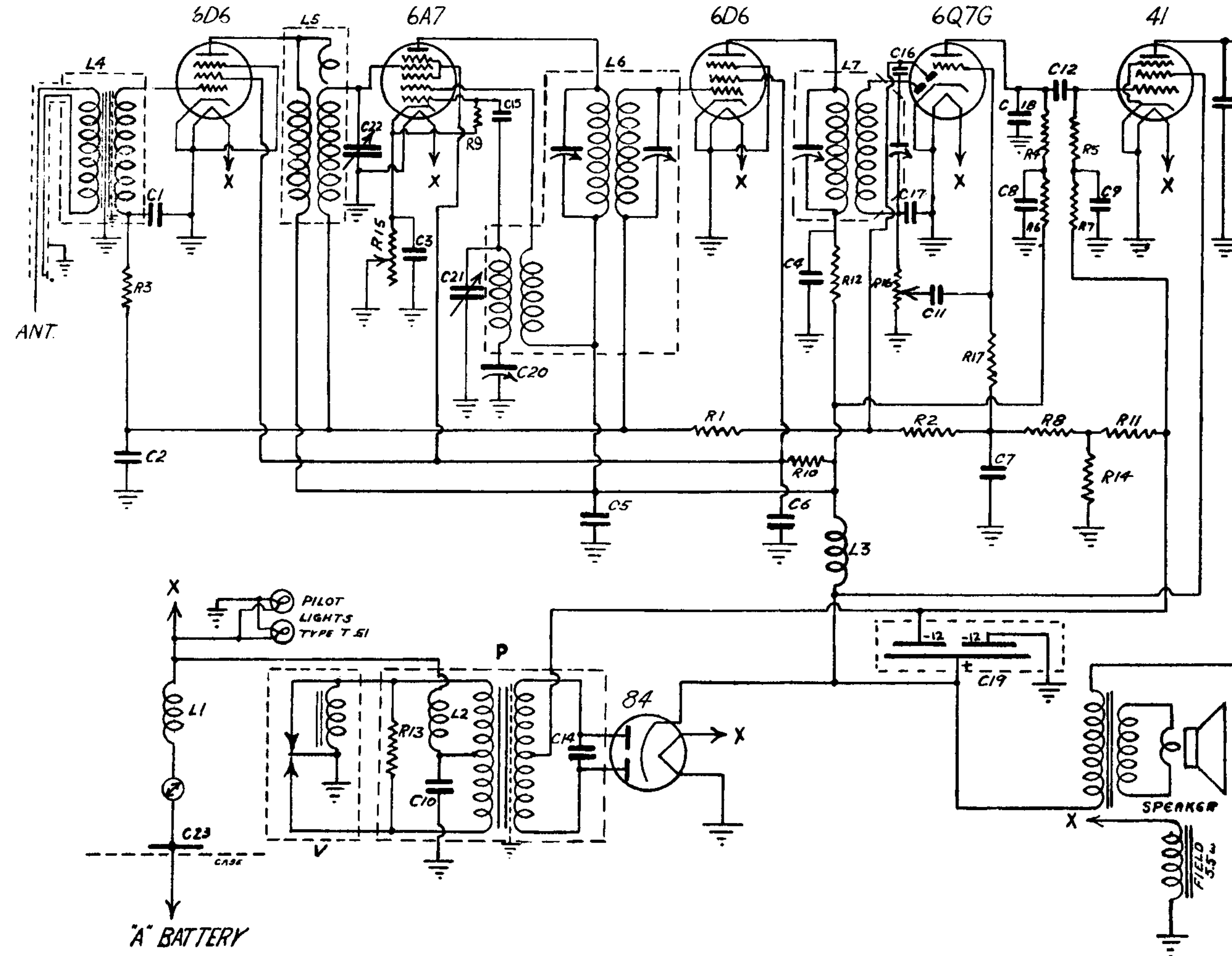
ALIGNMENT PROCEDURE

I. F. Alignment. Connect a signal generator set at 456 kc to the 6A7 grid. Connect an output meter across the secondary terminals of the speaker output transformer. With the weakest signal from the generator necessary to obtain .5 volt deflection on the output meter, peak the two trimmers on the first I. F. transformer and the single trimmer on the second I. F. transformer. This second I. F. transformer is located on the under side of the chassis.

R. F. Alignment. Insert a 200mmfd condenser in series with the antenna lead of the receiver and the signal generator. Set the receiver dial to 1400kc and the signal generator to the same frequency. Again with the weakest signal necessary to obtain .5 volt deflection of the output meter, adjust the terminals on both sections of the variable condenser. It is the utmost importance in making these various adjustments that the signal level be attenuated as far as possible in order to overcome the AVC action which would otherwise introduce serious errors and prevent obtaining optimum results.

AUTOMATIC RADIO MFG. CO., Inc.

MODEL M60 AUTO RADIO



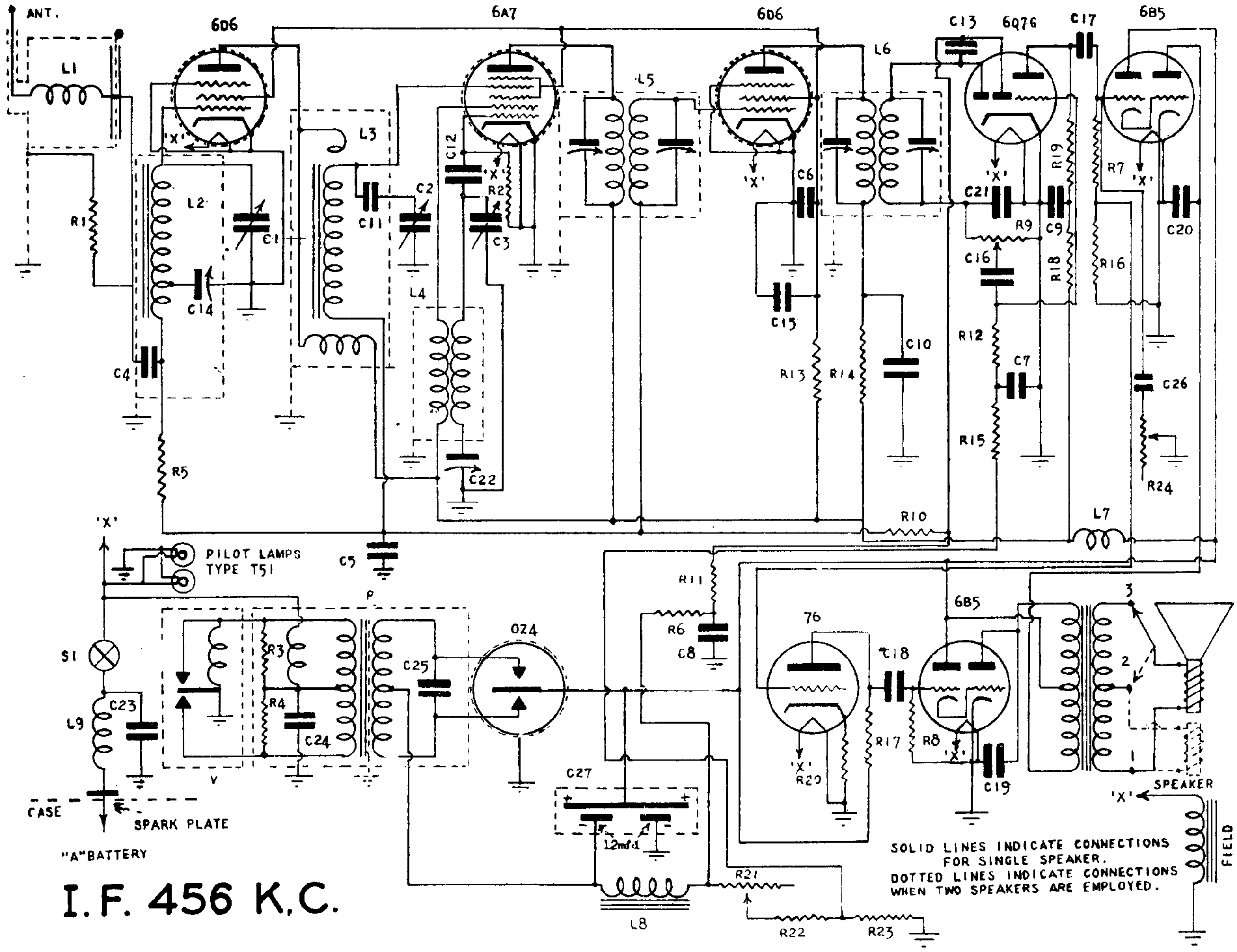
Schematic Location	Description	Part No.	List Price
L1	"A" R.F. Choke	RF100	$0.20
L2	"A" R.F. Choke	RF101	.20
L3	"B" R.F. Choke	RF102	.40
L4	Antenna Coil	BA200	.80
L5	Interstage Coil	BR200	.75
L6	Composite I.F. Trans. an Osc.	LC200	.90
L7	2nd I.F. Transformer	L200	.80
P	Power Transformer	P300	1.80
V	Vibrator	V100	2.40
—	Speaker	SD16	3.50
C1, C2	Fixed Condenser .05 mfd—200 volt	—	.20
C3, C4, C5, C6, C7, C8, C9	" " .1 mfd—200 volt	—	.20
C10	" " .5 mfd—150 volt	—	.30
C11, C12	" " .01 mfd—400 volt	—	.20
C13	" " .006 mfd—600 volt	—	.20
C14	" " .007 mfd—1200 volt	—	.30
C15, C16	Mica Condenser 100 mmfd	—	.20
C17, C18	" " 200 mmfd	—	.20
C19	Electrolytic Condenser Block	CE12	1.20
C20	Variable Padder Condenser 500 mmfd	—	.40
C21, C22	2 Sect. Tuning Condenser	CV21	1.80
C23	Spark Plate 250 mmfd	—	.30
R1, R2, R17	Resistor 1 megohm ¼ watt	—	.15
R3, R4, R5	" ½ megohm ¼ watt	—	.15
R6, R7	" ¼ megohm ¼ watt	—	.15
R8	" 100,000 ohms ¼ watt	—	.15
R9	" 50,000 ohms ¼ watt	—	.15
R10	" 25,000 ohms ½ watt	—	.20
R11	" 250 ohms ½ watt	—	.20
R12	" 250 ohms ¼ watt	—	.20
R13	" 150 ohms ¼ watt	—	.20
R14	" 35 ohms ¼ watt	—	.20
R15	Sensitivity Control 3,000 ohms	RV20	.80
R16	Volume Control 500,000 ohms	RV19	.80

ALIGNMENT PROCEDURE

I. F. Alignment. Connect a signal generator set at 456kc to the 6A7 input and connect an output meter to the speaker output. Using a weak signal tune the two I. F. condensers on the composite coil and the two I. F. condensers on the output I. F. coil for maximum response.

Connect the signal generator set at 1400kc to the antenna lead using a dummy antenna of 200 mmf. Tune the set by means of the dial to 1400kc position. Adjust oscillator trimmer for this frequency. Pad at 600kc, Recheck 1400kc and trim antenna stage for maximum response. Repeating the alignment may result in improved sensitivity.

AUTOMATIC RADIO MFG. CO., Inc.
MODEL M80 AUTO RADIO



I. F. 456 K.C.

SCHEMATIC LOCATION	DESCRIPTION	PART NO.	LIST PRICE
L1	Antenna Noise Filter	LA800	$0.80
L2	Antenna Coil	BA800	1.10
L3	Interstage Coil	B1800	1.20
L4	Oscillator Coil	BO800	.80
L5	1st I.F. Coil	L800	.90
L6	2nd I.F. Coil	L810	.90
L7	"B" R.F. Choke	RF102	.40
L8	Filter Choke—100 ohms	C1780	.80
L9	"A" R.F. Choke	RF160	.20
——	Speaker	SD19	4.80
S1	Line Switch (On Vol. Control)	——	——
P	Power Transformer	PT4	2.80
V	Vibrator	94	3.20
C1, C2, C3	Tuning Condenser	CV23	3.00
C4	Fixed " .01mfd—200v	——	.20
C5, C6, C7, C8, C9, C10	Fixed " .1mfd—200v	——	.20
C11	Padder " 1477mfd	——	.40
C14	Padder " 1300mfd	——	.40
C22	Padder " 300mfd	——	.30
C12, C13	Mica " 100mmfd	——	.20
C21	Mica " 200mmfd	——	.20
C15	Electrolytic " 8mfd—175v	——	.60
C16, C17, C18, C26	Fixed " .02mfd—200v	——	.20
C19, C20	Fixed " .006mfd—600v	——	.20
C23, C24	Fixed " .5mfd—200v	——	.30
C25	Fixed " .008mfd—1200v	——	.30
C27	Electrolytic Condenser Block	CE12H	1.20
R1, R2	Resistors 50,000 ohms—1/3 Watt	——	.15
R3, R4	" 50 ohms—1/3 Watt	——	.20
R5, R6, R7, R8	" ½ megohm—1/3 Watt	——	.15
R10, R11, R12	" 1 megohm—1/3 Watt	——	.15
R13	" 10,000 ohms—½ Watt	——	.20
R14	" 250 ohms—1/3 Watt	——	.20
R15, R16, R17, R18	" 100,000 ohms—1/3 Watt	——	.15
R19	" ¼ megohm—1/3 Watt	——	.15
R20	" 5,000 ohms—1/3 Watt	——	.20
R22	" 17 ohms—1 Watt	——	.30
R23	" 13 ohms—1 Watt	——	.30
R9	Volume Control—½ megohm	RV15	.80
R21	Sensitivity Control—115 ohms	RV21	.80
R24	Tone Control—50,000 ohms	RV22	.75

ALIGNMENT PROCEDURE

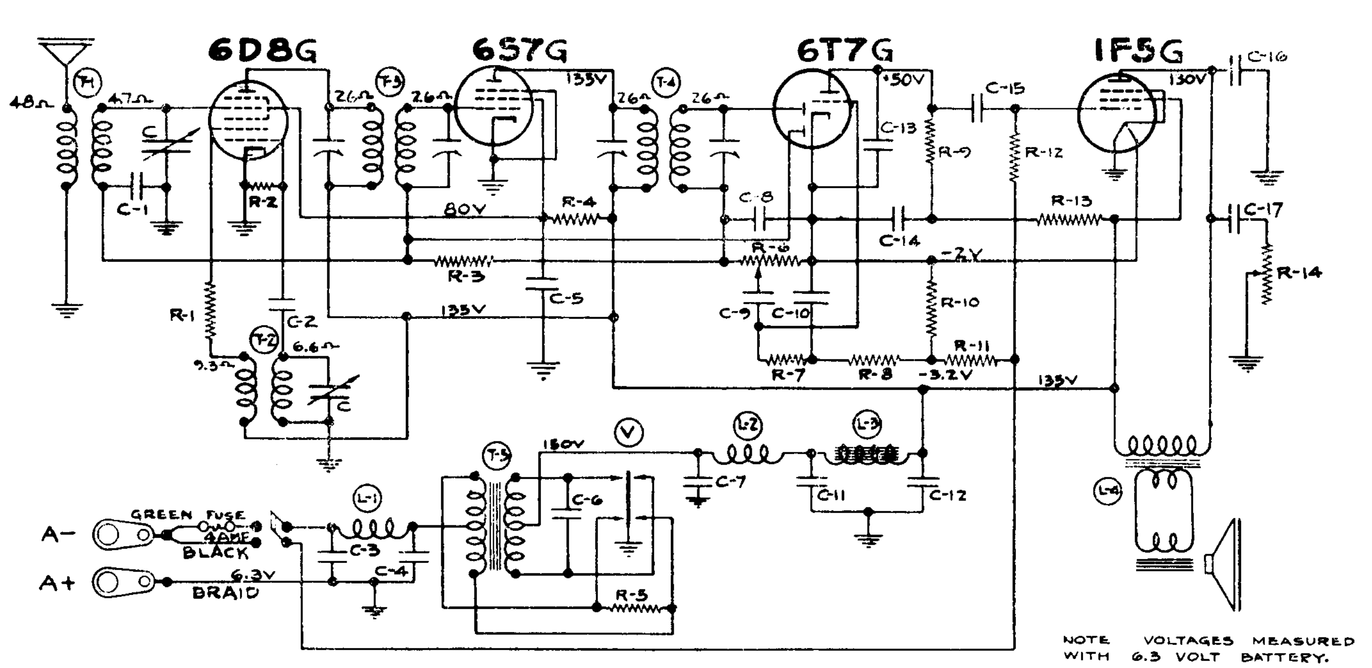
I. F. Alignment. Connect a signal generator set at 456 kc to the 6A7 grid. Connect an output meter across the secondary terminals of the speaker output transformer. With the weakest signal from the generator necessary to obtain .5 volt deflection on the output meter, peak the trimmers on both I. F. transformers.

R. F. Alignment. Insert a 200mmfd condenser in series with the antenna lead of the receiver and the signal generator. Set the receiver dial to 1400kc and the signal generator to the same frequency. Again with the weakest signal necessary to obtain 1 volt deflection of the output meter, adjust the trimmers on the oscillator, antenna and interstage sections of the variable condenser. Tune the receiver to 600kc and set the signal generator to this frequency. Adjust the padder condenser for maximum signal response to minimum signal input. Repeat the high frequency alignment.

It is of the utmost importance in making these various adjustments that the signal level be attenuated as far as possible in order to overcome the AVC action which would otherwise introduce serious errors and prevent obtaining optimum results.

BELMONT RADIO CORPORATION

MODEL 415-SERIES B "SERIAL No 7B542,500 UP"



NOTE VOLTAGES MEASURED WITH 6.3 VOLT BATTERY. ALL VOLTAGES TAKEN FROM GROUND WITH 1000Ω PER VOLT METER. * MEASURED WITH 0-300V SCALE.

I.F. 465 K.C.

DESCRIPTION

RESISTORS

No.	Part No.	
R1	130-23	2M-1/3
R2	130-76	30M-1/3
R3	130-121	3.2 meg-1/3
R4	130-123	15M-1/2
R5	130-84	200-1/3
R6	101-56	1 meg-Volume Control
R7	130-19	1 meg-1/3
R8	130-19	1 meg-1/3
R9	130-100	150M-1/3
R10	106-36	10 Ohm Muter
R11	106-36	25 Ohm Muter
R12	130-19	1 meg-1/3
R13	130-20	100M-1/3
R14	101-72	300M-Tone control

CONDENSERS

C1	100-9	.05-200 v.
C2	129-39	.00005-Mica
C3	100-40	.5-200 v.
C4	100-40	.5-200 v.
C5	100-33	.1-200 v.
C6	100-34	.005-1200 v.
C7	100-33	.1-200 v.
C8	129-5	.0001-Mica
C9	100-11	.01-400 v.
C10	100-11	.01-400 v.
C11	119-28	5. Electrolytic-200 wv.
C12	119-28	5. Electrolytic-200 wv.
C13	129-12	.00025-Mica
C14	100-33	.1-200 v.
C15	100-11	.01-400 v.
C16	100-37	.003-600 v.
C17	100-11	.01-400 v.

PARTS

T1	111-66	Antenna Coil
T2	110-45	Oscillator Coil
T3	108-84	Input I. F. Coil
T4	108-85	Output I. F. Coil
T5	104-62	Power Transformer
L1	105-19	"A" Choke
L2	123-3	RF "B" Choke
L3	105-30	Filter Choke
L4	114-63	Speaker (P. M. Dynamic)
V	126-4	Vibrator
C	102-38	Variable Condenser

LIST OF REPAIR PARTS (Serial No. 7B542500 and up)

Use Only Genuine Factory Replacement Parts

Part No.	Circuit Diagram Reference	Description	List Price Ea.
		CONDENSERS	
100-9	C1	.05 x 200 volt Tubular	.25
100-11	C9, C10, C15, C17	.01 x 400 volt Tubular	.25
100-33	C5, C7, C14	.1 x 200 volt Tubular	.25
100-34	C6,	.005 x 1200 volt Tubular	.25
100-37	C16	.003 x 600 volt Tubular	.25
100-40	C3, C4	.5 x 200 volt Condenser	.35
119-28	C11, C12	Dual 5MFD x 200 volt Lytic Filter	1.25
129-5	C8	.0001 Mica - Type MT - 20%	.25
129-12	C13	.00025 Mica - Type MT - 20%	.25
129-39	C2	.00005 Mica - Type MT - 20%	.25
		RESISTORS	
106-36	R10, R11	(R10 10 Ohms), (R11 25 Ohms) Metal Clad Resistor	.40
130-19	R7, R8, R12	1 Meg Ohm - 1/3 Watt - 20%	.20
130-20	R13	100M Ohm - 1/3 Watt - 20% - 50V. Carbon	.20
130-23	R1	2M Ohm - 1/3 Watt - 20%	.20
130-76	R2	30M Ohm - 1/3 Watt - 20%	.20
130-84	R5	200 Ohm - 1/3 Watt - 10%	.20
130-100	R9	150M Ohm - 1/3 Watt - 20%	.20
130-121	R3	3.2 Meg Ohm - 1/3 Watt - 20% - Type E1	.20
130-123	R4	15M Ohm - 1/2 Watt - 10% 100 V. Carbon	.20
		COILS	
108-84	T3	465 K.C. Input I.F. Coil Assembly Complete with Can	1.25
108-85	T4	465 K.C. Output I.F. Coil Assembly Complete with Can	1.25
110-45	T2	Oscillator Coil Assembly	.50
111-66	T1	Antenna Coil Assembly Complete with Can	1.00
		SOCKETS	
121-8		Five Prong Socket - Marked "SPKR"	.10
121-43		Seven Prong Octal Socket - Marked "6S7"	.15
121-44		Eight Prong Octal Socket - Marked "6D8"	.15
121-49		Seven Prong Octal Socket - Marked "6T7"	.15
121-48		Six Prong Octal Socket - Marked "1F5"	.15
		SPEAKER	
114-63	L4	Six Inch Permanent Magnet Dynamic Speaker	6.00
		MISCELLANEOUS	
101-56	R6, S	Volume Control and Switch (1 Meg Ohm)	1.00
101-72	R14	Tone Control (300M Ohm)	.65
102-38	C	Two Gang Variable Condenser	2.50
104-62	T5	Vibrator Power Transformer	2.50
105-19	L1	"A" Choke Coil	.15

Part No.	Circuit Diagram Reference	Description	List Price Ea.
105-30	L3	Filter Choke Coil	.65
107-62		5 Inch Battery Cable (with Fuse Receptacle)	.20
107-65		48 Inch Battery Cable (Less Fuse Receptacle)	1.00
123-3	L2	R.F. Choke Coil	.25
126-4	V	Vibrator Unit Complete	4.00
128-51		Wood Knob (Spring Type)	.15
131-79		4 Amp Fuse (Type 3AG)	.10

DIAL PARTS LIST

117-41	Dial Housing Including 117-19 Bushing	.30
112-147	Tuning Shaft Including 117-86 Pulley	.10
112-199	Dial Drum Including 117-84 Bushing and Set Screw	.20
120-7B	Take-Up Coil Spring	.03
120-9	Black Irish Linen String	.05
112-171	Dial Scale	.40
131-43	Cinch Buttons for Fastening Scale	.03
112-151	Dial Pointer with 132-19 Screw	.05
112-143	Oval Escutcheon Complete with Crystal	.85

Vibrators can be reconditioned at a cost of $3.00 each list, if the old unit is returned.

All resistors are RMA color coded—specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None.

All prices quoted are list and are subject to the usual trade discounts. Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

WE CANNOT SUPPLY SPEAKER PARTS, CONES, TRANSFORMERS OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $2.00 NET, IF IT IS RETURNED TO OUR FACTORY TRANSPORTATION CHARGES PREPAID.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

BELMONT RADIO CORPORATION

MODEL 415-SERIES B "SERIAL № 7B542,500 UP"

Frequency Range 535-1720 Kilocycles
I. F. Frequency 465 K. C.

BATTERY CONNECTIONS:

Referring to Fig. 1, Page 2, of this manual, connect the battery cable to the storage battery in the following manner:

(a) **The storage battery should be located as far from the receiver as the battery cable will permit.**

(b) **Connect the lead (containing the fuse receptacle) marked A negative (—) to the negative (—) post of the storage battery.**

(c) **Connect the lead marked A positive (+) to the positive (+) post of the storage battery.**

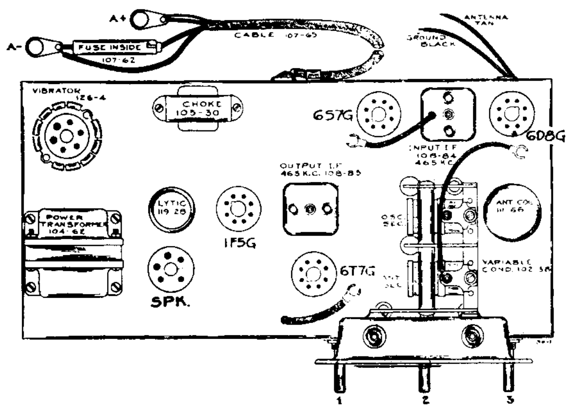


FIG. 1—TOP VIEW

STORAGE "A" BATTERY:

The storage "A" battery, you will notice that when it is new, **does not have its full rated life—this is characteristic of new storage batteries. They reach their maximum capacity after being charged and discharged several times in service. The proper care of a storage battery will enable you to receive several years of good service. Neglect will ruin it very quickly. Check frequently to see that the water level is about one-half inch above the plates. Add only pure distilled water, as often as needed. A little too much water will do no harm. Too little is very harmful to the battery.**

Do not let the battery become completely discharged, but if it should, have it charged again as soon as possible. A battery can be ruined very quickly by permitting it to lie around unused in a fully discharged condition.

Keep the top of the battery clean and dry and grease the terminals occasionally with a little vaseline.

Service Data

DESCRIPTION:

TUBES:

The tube complement of this chassis consists of the following octal base glass tubes which are interchangeable with metal tubes.

The type and function of each tube is as follows:

1—Type 6D8G Pentagrid Mixer, First Detector-oscillator.
1—Type 6S7G Remote Cut-off Pentode I. F. Amplifier (465 K.C.)
1—Type 6T7G Duplex Diode Triode, Second Detector, A.V.C. and First Audio.
1—Type 1F5G Pentode Output Amplifier.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good. If fuse blows out frequently and insulating sleeve has been properly placed over fuse, the trouble is probably in the vibrator, it should be replaced. Do not attempt to make any adjustments on the vibrators.

GROUND:

To obtain the best performance (freedom from radiated noise), a ground **must** be used.

ALIGNING INSTRUCTIONS:

CAUTION—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low storage battery, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. Remove the knobs and the four bolts which are used to fasten the chassis.

All adjustments should be made with a non-metallic screw driver.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 1F5G output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

ALIGNING I.F. TRANSFORMERS: (465 K. C.):

Part No. 108-85 Output I.F. Transformer.
Part No. 108-84 Input I.F. Transformer.

These I.F. Transformers have two adjustments, both of which are accessible from the top of chassis (see fig. 1, top view page 2).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments.

   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 108-85) to resonance.

   (b) Move oscillator output clip from grid of 6S7G to grid cap of 6D8G and adjust input I.F. transformer (No. 108-84) to resonance.

   (c) With oscillator still connected to 6D8G readjust output I.F. transformer (108-85) if necessary.

R. F. ALIGNMENT: (535-1720 K.C.)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to tan antenna and black ground leads and make the following adjustments:

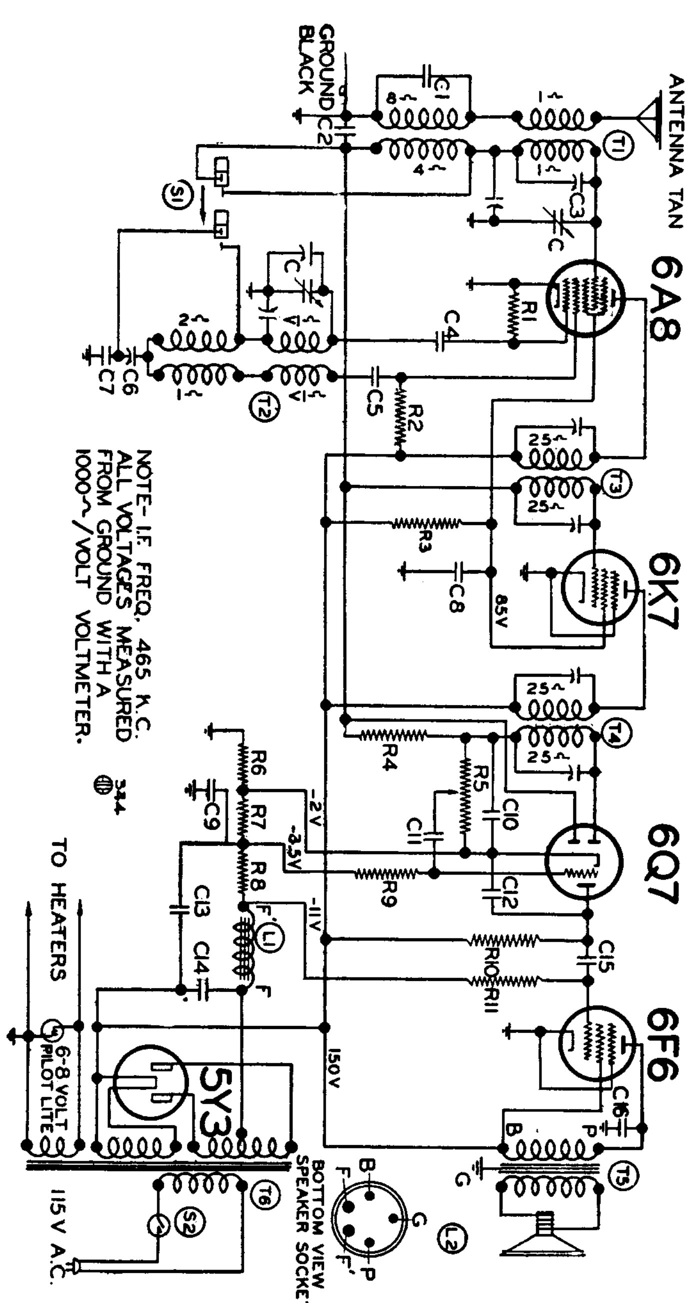
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer (rear of gang condenser).

   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick-up oscillator signal and adjust antenna trimmer to resonance (front section of gang condenser).

   (c) Check sensitivity at 600 and 1000 kilocycles.

BELMONT RADIO CORPORATION

MODEL 588-SERIES A "SERIAL No. 7D569,700 UP"



No.	Part No.	Descript.
		CONDENSERS
C1	129-12	.00025 - Mica 20%
C2	100-22	.05 x 200 25%
C3	124-39	Adjustable Condenser 2-20 mmf.
C4	129-5	.0001 - Mica 20%
C5	100-37	.003 x 600 v. 10%
C6	124-38	Series Pad - 600 mmf.
C7	129-74	.0015 Mica 2½%
C8	100-1	.1 x 400 v. 50% - 10%
C9	100-20	.1 x 200 v. 25%
C10	129-5	.0001 Mica 20%
C11	100-11	.01 x 400 v. 25%
C12	129-2	.0005 Mica 20%
C13	119-38	5 mfd. 200 w. v. Black
C14	119-38	5 mfd. 250 w. v. Brown
C15	100-11	.01 x 400 v. 25%
C16	100-19	.006 x 600 v. 25%
		C13 and C14 - in one unit.
		RESISTORS
R1	130-12	50M ohm - 1/3 w. 20%
R2	130-17	10M ohm - 1/3 w. 20%
R3	130-149	15M ohm - 1/3 w. 20%
R4	130-4	3 megohm - 1/3 w. 20%
R5	101-71	1 megohm - Volume control
R6	106-35	65 ohm - Muter
R7	106-35	45 ohm - Muter
R8	106-35	220 ohm - Muter
R9	130-4	3 megohm - 1/3 w. 20%
R10	130-9	200M ohm - 1/3 w. 20%
R11	130-3	500M ohm - 1/3 w. 20%
		R6, R7 and R8 in one unit
		PARTS
T1	111-75	Antenna coil complete
T2	110-60	Oscillator coil complete
T3	108-104	Input I.F. Assembly complete
T4	108-103	Output I.F. Assembly complete
T5		Output Transformer
T6	104-60B	Power Transformer
L1		2000 ohm - speaker field
L2	114-61	Dynamic speaker
S1	125-27	Wave change switch
S2		Switch on Volume Control

LIST OF REPAIR PARTS (Serial No. 7D569700 and up)

Use Only Genuine Factory Replacement Parts

Part No.	Circuit Diagram Reference	Description	List Price Each
		CONDENSERS	
100-1	C8	.1 x 400 volt Tubular	.25
100-11	C11, C15	.01 x 400 volt Tubular	.25
100-19	C16	.006 x 600 volt Tubular	.25
100-20	C9	.1 x 200 volt Tubular	.25
100-22	C2	.05 x 200 volt Tubular	.25
100-37	C5	.003 x 600 volt Tubular	.25
119-38	C13, C14	5 Mfd. x 200 w. v. - 5 Mfd. x 250 w. v. Electrolytic Filter Condenser	1.25
124-38	C6	Series Padder Condenser (600Mmf.)	.35
124-39	C3	Antenna Coil Trimmer Condenser (2-20Mmf)	.15
129-2	C12	.0005 Mica - Type MT - 20%	.25
129-5	C4, C10	.0001 Mica - Type MO - 20%	.25
129-12	C1	.00025 Mica - Type MT - 20%	.25
129-74	C7	.0015 Mica - Type MW - 2½%	.35
		RESISTORS	
130-3	R11	500M ohm - 1/3 watt - 20%	.20
130-4	R4, R9	3 Meg ohm - 1/3 watt - 20%	.20
130-9	R10	200M ohm - 1/3 watt - 20%	.20
130-12	R1	50M ohm - 1/3 watt - 20%	.20
130-17	R2	10M ohm - 1/3 watt - 20%	.20
130-149	R3	15M ohm - 1/3 watt - 20%	.20
106-35	R6, R7, R8	65 ohm (R6), 45 ohm (R7), 220 ohm (R8) Metal Clad Resistor	.35
		COILS	
108-103	T4	Output I.F. Coil Assembly complete with can	1.25
108-104	T3	Input I.F. Coil Assembly complete with can	1.25
110-60	T2	Oscillator Coil Assembly complete	.60
111-75	T1	Antenna Coil Assembly complete with can	1.00
		SOCKETS	
121-8		Five Prong Socket—Marked "SPKR"	.10
121-12		Seven Prong Socket—Marked "6K7"	.15
121-14		Seven Prong Socket—Marked "6F6"	.15
121-15		Five Prong Socket—Marked "5Y3"	.10
121-26		Seven Prong Socket—Marked "6Q7"	.15
121-22		Eight Prong Socket—Marked "6A8"	.15
		TRANSFORMERS	
104-60B	T6	50/60 Cycle Power Transformer	3.00
104-97		25 Cycle Power Transformer	
104-98		Universal - 25 Cycle Primary	
104-99		Universal - 40 Cycle Primary	
		SPEAKER	
114-61	L1, L2	Six Inch Dynamic (2000 ohm Field)	4.50
		MISCELLANEOUS	
101-71	R5, S2	Volume Control and Switch (1 meg ohm)	1.00
102-43		Two Gang Variable Condenser	2.50
107-5B		Line Cord and Plug	.50
124-38	C6	Series Padder Condenser	.35
124-39	C3	Antenna Coil Trimmer Condenser	.15
125-27	S1	Band Change Switch	.40
128-65		Bakelite Knob with Spring	.10
128-66		Springs for 128-65 Knob	Doz. .10

Tubes are coded and guaranteed by the tube manufacturer. Prompter service can be rendered on adjustments if defective tubes are returned direct to the tube manufacturer rather than through our factory.

All resistors are RMA color coded—specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None

All prices quoted are list and are subject to the usual trade discounts.

Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

WE CANNOT SUPPLY SPEAKER PARTS, CONES, TRANSFORMERS, OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $1.50 NET FOR SIX INCH, AND $2.50 NET FOR TEN INCH, IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

DIAL PARTS LIST

Part No.	DESCRIPTION	List Price Each
	ASSEMBLIES	
117-126	Dial Bracket Assembly - Including:	.50
	1—No. 117-122 Dial Scale Bracket	
	1—No. 117-123 Bracket Brace	
	1—No. 117-125 Tuning Shaft Bushing	
	1—No. 112-248 Tuning Shaft	
	1—No. 117-86 Drive Pulley	

DIAL PARTS ONLY

107-38	Pilot Light Socket	.05
107-97	6-8 Volt Pilot Light (Bayonet Base)	.10
112-199	Dial Drum Including 117-84 Bushing and Set Screw	.20
112-218	Dial Scale (Calibrated) Celluloid	.50
112-163B	Pointer with No. 132-19 Screw and Washer	.15
120-9	Black Irish Linen String	.05
112-247	Crystal for Dial	.35
120-97	Coil Take-up Spring for Dial Drive String	.05
131-43	Cinch Button for Fastening Dial Scale	.01

BELMONT RADIO CORPORATION

MODEL 588-SERIES A "SERIAL No 7D569,700 UP"

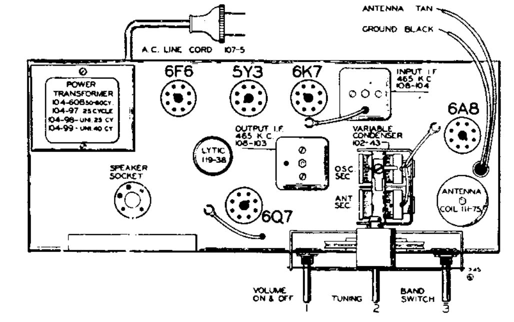
BAND	DIAL SCALE	FREQUENCY RANGE
Broadcast	Upper	535 to 1720 K.C. (Kilocycles)
Short Wave	Lower	2000 to 7000 K.C. (Kilocycles)

I.F. Frequency 465 K.C.

POWER SUPPLY:

Caution:—This radio, unless otherwise marked, must be operated from 105-115 volts, 60 cycle A.C. supply only. If you are in doubt as to the voltage and frequency rating of the power supply, consult your local power company before inserting plug. Do not insert plug unless all tubes and speaker plug are in their proper sockets.

Receivers of this model which are to be used on voltages or frequencies other than 105-115 volts, 60 cycles are so marked. The power consumption of this receiver is 55 watts.



Vol. Control On-Off Switch | Tuning Control | Band Switch

FIG. 1—TOP VIEW

Service Data

DESCRIPTION:
The tube complement of this chassis consists of the following octal base glass tubes which are interchangeable with metal tubes:
1—Type 6A8G Pentagrid mixer, first detector-oscillator.
1—Type 6K7G Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6Q7G duplex diode triode second detector, A.V.C. and audio.
1—Type 6F6G—pentode output amplifier.
1—Type 5Y3G or 5W4—high vacuum rectifier.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 108, 127, 150, 225, and 260 volts, (see instructions) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, no universals.

SERVICE NOTES:
Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 115 volts on the primary of the power transformer.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS:
CAUTION: No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as defective tubes, poor installations, open or grounded antenna systems, defective condensers and resistors.

In order to properly align this chassis, an oscillator (generator) is necessary.

All adjustments should be made with a non-metallic screw driver.

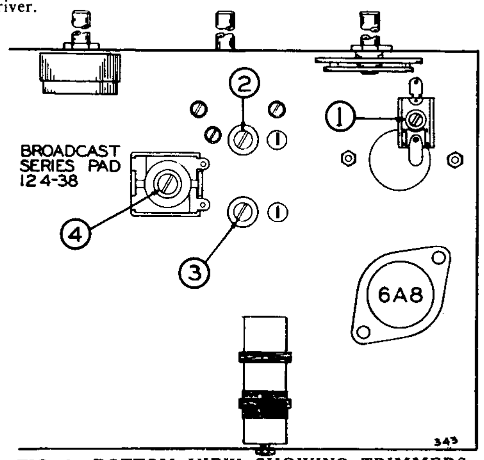


FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

RESONANCE INDICATOR:
Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and screen terminals of the type 6F6G output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:
The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-103 Output I.F. Transformer
Part No. 108-104 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser in its minimum capacity position, plates entirely out of mesh, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7G tube, and adjust the output I.F. transformer (No. 108-103) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7G to grid cap of 6A8G and adjust input I.F. transformer (No. 108-104) to resonance.

SHORT WAVE BAND ALIGNMENT:

2000 to 7000 Kilocycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 6 megacycles and connected in series with "Dummy 3" to the antenna and ground leads, make the following adjustments:
   (a) Move dial pointer to 6 megacycles and adjust short wave oscillator trimmer to resonance.
   This adjustment is the trimmer mounted on the top of rear section of the variable gang condenser (see Fig. 1, top view).
   (b) Adjust short wave antenna trimmer (Adjustment Number 1), to resonance (see Fig. 3, bottom view).

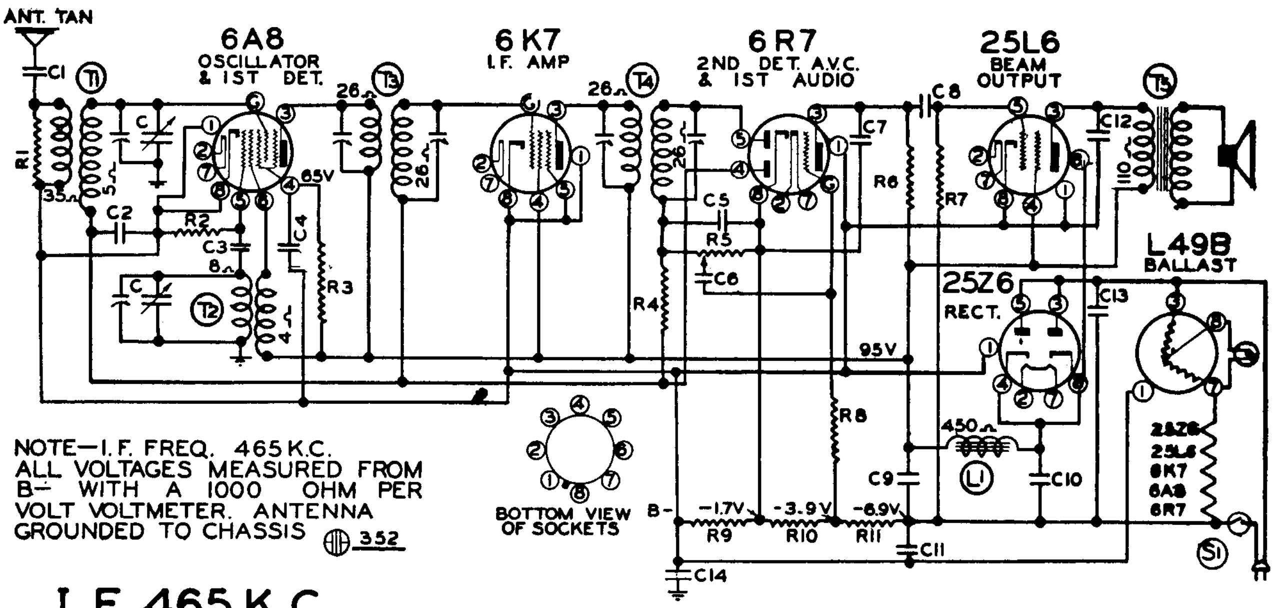
BROADCAST BAND ALIGNMENT:

535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground leads make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 3, see bottom view of chassis, Fig. 3).
   (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (adjustment number 2), to resonance.
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 4), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

BELMONT RADIO CORPORATION

MODEL 602 "SERIAL Nº 7D600,100 UP"



I. F. 465 K.C.

Frequency Range 535-1720 Kilocycles

RESISTORS

No.	Part No.	Description	
R1	130-17	10M ohm - 1/3 w.	20%
R2	130-12	50M ohm - 1/3 w.	20%
R3	130-149	15M ohm - 1/3 w.	20%
R4	130-4	3 meg ohm - 1/3 w.	20%
R5	101-77	Volume Control (1 Meg)	
R6	130-12	50M ohm - 1/3 w.	20%
R7	130-20	100M ohm - 1/3 w.	20%
R8	130-19	1 megohm - 1/3 w.	20%
R9	106-38	30 ohm	
R10	106-38	40 ohm	
R11	106-38	55 ohm	

R9, R10, and R11 in one unit

CONDENSERS

No.	Part No.	Description	
C	102-48	2 gang variable	
C1	100-25	.002 x 600	25%
C2	100-9	.05 x 200	25%
C3	129-12	.00025 Mica	20%
C4	100-22	.05 x 200	25%
C5	129-5	.0001 Mica	20%
C6	100-11	.01 x 400	25%
C7	129-2	.0005 Mica	20%
C8	100-22	.05 x 200	25%
C9	119-39	20 mfd. lytic - 100 w.v.	
C10	119-39	15 mfd. lytic - 100 w.v.	
C11	100-20	.1 x 200	25%
C12	100-13	.05 x 400	25%
C13	100-39	.1 x 400	20%
C14	100-53	.25x400	20%

PARTS

No.	Part No.	Description
T1	111-58B	Antenna Coil Complete
T2	110-46	Oscillator Coil Complete
T3	108-82B	Input I. F. Complete
T4	108-83B	Output I. F. Complete
T5	114-71	Dynamic Speaker
L1		450 ohm speaker field
S1		Switch on Volume Control

LIST OF REPAIR PARTS (Serial No. 7D600,100 and up)

Use Only Genuine Factory Replacement Parts

Part No.	Circuit Diagram Reference	Description	List Price Each
		CONDENSERS	
100-9	C2	.05 x 200 volt Tubular	.25
100-11	C6	.01 x 400 volt Tubular	.25
100-13	C12	.05 x 400 volt Tubular	.25
100-20	C11	.1 x 200 volt Tubular	.25
100-22	C4, C8	.05 x 200 volt Tubular	.25
100-25	C1	.002 x 600 volt Tubular	.25
100-39	C13	.1 x 400 volt Tubular	.25
100-53	C14	.25 x 400 volt Tubular (with Bracket)	.35
129-2	C7	.0005 Mica - Type MT - 20%	.25
129-5	C5	.0001 Mica - Type MT - 20%	.25
129-12	C3	.00025 Mica - Type MT - 20%	.25
119-39	C9, C10	20—15 Mfd Electrolytic Filter 100 w.v.	1.50
		RESISTORS	
106-38	R9, R10, R11	30, 40, 55 ohm Metal Clad Resistor	.35
130-4	R4	3 meg ohm - 1/3 watt - 20%	.20
130-12	R2, R6	50M ohm - 1/3 watt - 20%	.20
130-17	R1	10M ohm - 1/3 watt - 20%	.20
130-19	R8	1 meg ohm - 1/3 watt - 20%	.20
130-20	R7	100M ohm - 1/3 watt - 20%	.20
130-149	R3	15M ohm - 1/3 watt - 20%	.20
		COILS	
108-82B	T3	Input I. F. Coil Assembly Complete with can	1.25
108-83B	T4	Output I. F. Coil Assembly Complete with can	1.25
110-46	T2	Oscillator Coil Assembly Complete	.50
111-58B	T1	Antenna Coil Assembly Complete	.75
		SOCKETS	
121-12		Seven Prong Socket—Marked "6K7"	.15
121-22		Eight Prong Socket—Marked "6A8"	.15
121-31		Seven Prong Socket—Marked "25Z6"	.15
121-54		Seven Prong Socket—Marked "6R7"	.15
121-56		Six Prong Socket—Marked "L49B"	.15
121-62		Eight Prong Socket—Marked "25L6"	.15
		SPEAKER	
114-71	T5, L1	Five Inch Dynamic (450 ohm field)	4.00
		MISCELLANEOUS	
101-77	R5, S1	Volume Control and Switch (1 meg ohm)	1.00
102-48	C	Two Gang Variable Condenser	2.25
107-98		Line Cord and Plug	.50
118-48		Bottom Plate for Chassis	.35
128-104E		Black Bakelite Knob (with Spring)	.10
128-104W		Ivory Bakelite Knob (with Spring)	.10
128-100		Spring for 128-104 Knob ....Doz.	.10
128-101		Baffle Board	.10
128-102		Grill Cloth	.15
128-71E		Black Bakelite Cabinet Complete, including Baffle, Grill Cloth and Carton	3.00
128-71W		Ivory Bakelite Cabinet Complete, including Baffle, Grill Cloth and Carton	4.50

DIAL PARTS LIST—MODEL 602

Part No.	Description	Price
112-271	Dial Bracket and Tuning Shaft Assembly incl. 1—No. 117-128 Dial Bracket; 1—No. 117-129 Bushing for Shaft; 1—No. 112-254 Tuning Shaft; 1—No. 117-134 Drive Pulley	.35
117-132B	Bracket to Mount Variable Condenser	.10
117-131	Dial Housing	.15
112-255	Dial Drum with 117-138 Hub and 132-79 Set Screw	.15
120-9	Linen String for Dial Drive	.05
120-97B	Take-up Coil Spring for Drive String	.05
117-146	Mounting Stud for Dial Housing	.05
112-256	Calibrated Dial Scale	.30
112-160B	Pointer with 132-19 Pointer Screw	.05
131-43	Cinch Button for Fastening Dial Scale	.01
112-257	Celluloid Crystal for Dial	.25
107-106	Pilot Light Socket and Bracket	.10
107-107	Shield for Pilot Light	.01
107-97	6-8 volt T51 Pilot Light (Bayonet Base)	.10

Tubes are coded and guaranteed by the tube manufacturer.

Prompter service can be rendered on adjustments if defective tubes are returned direct to the tube manufacturer rather than through our factory.

All resistors are RMA color coded—specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None

All prices quoted are list and are subject to the usual trade discounts.

Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

WE CANNOT SUPPLY SPEAKER PARTS, CONES, TRANSFORMERS, OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $1.25 NET, IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

BELMONT RADIO CORPORATION

MODEL 602 "SERIAL No 7D600,100 UP"

POWER SUPPLY:

Caution:—This radio, unless otherwise marked, must be operated from 105-125 volts, A.C. or D.C. supply only. If you are in doubt as to the voltage rating of the power supply, consult your local power company before inserting plug. Do not insert plug unless all tubes and speaker plug are in their proper sockets.

Receivers of this model which are to be used on voltages other than 105-125 volts, are so marked. The power consumption of this receiver is 40 watts.

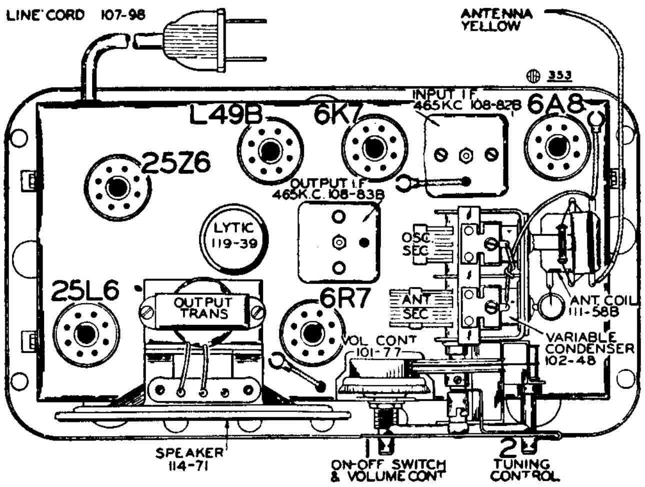


FIG. 1—TOP VIEW

SERVICE DATA

DESCRIPTION:

The tube complement of this chassis consists of the following octal base glass tubes which are interchangeable with metal tubes:

The type and function of each tube is as follows:

1—Type 6A8G Pentagrid Mixer, First Detector-oscillator.
1—Type 6K7G Remote Cut-Off Pentode, I.F. Amplifier (465 K.C.)
1—Type 6R7G Duplex Diode Triode Second Detector, A.V.C. and First Audio.
1—Type 25L6G Beam Output Amplifier.
1—Type 25Z6G High Vacuum Rectifier.
1—Type L49B Ballast Tube.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with 119 volt A.C. or D.C. line.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet.

All adjustments should be made with a non-metallic screw driver.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and screen terminals of the type 25L6G output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-83B Output I.F. Transformer
Part No. 108-82B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

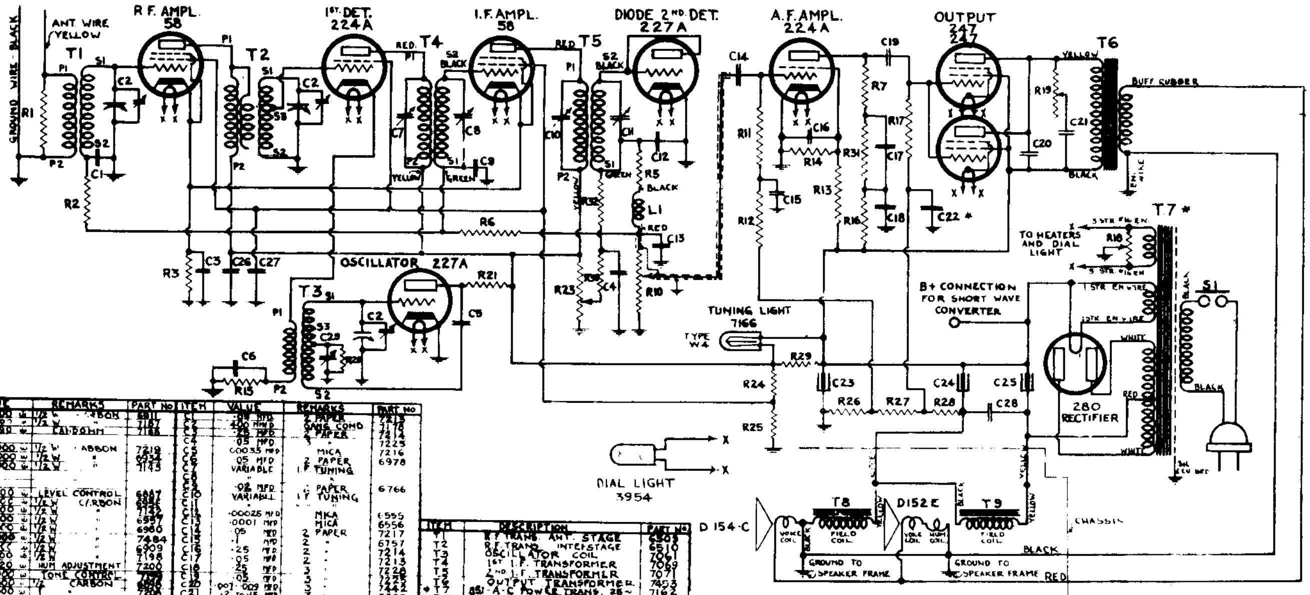
1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6K7G tube, and adjust the output I.F. transformer (No. 108-83B) to resonance.
   (b) Move oscillator output clip from grid of 6K7G to grid of 6A8G and adjust input I.F. transformer (No. 108-82B) to resonance.
   (c) With oscillator still connected to 6A8G, readjust output I.F. transformer (108-83B) if necessary.

R.F. ALIGNMENT: (535-1720 K.C.)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to the antenna lead and chassis ground and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).
   (c) Check sensitivity at 600 and 1000 kilocycles.

CANADIAN RADIO CORP.

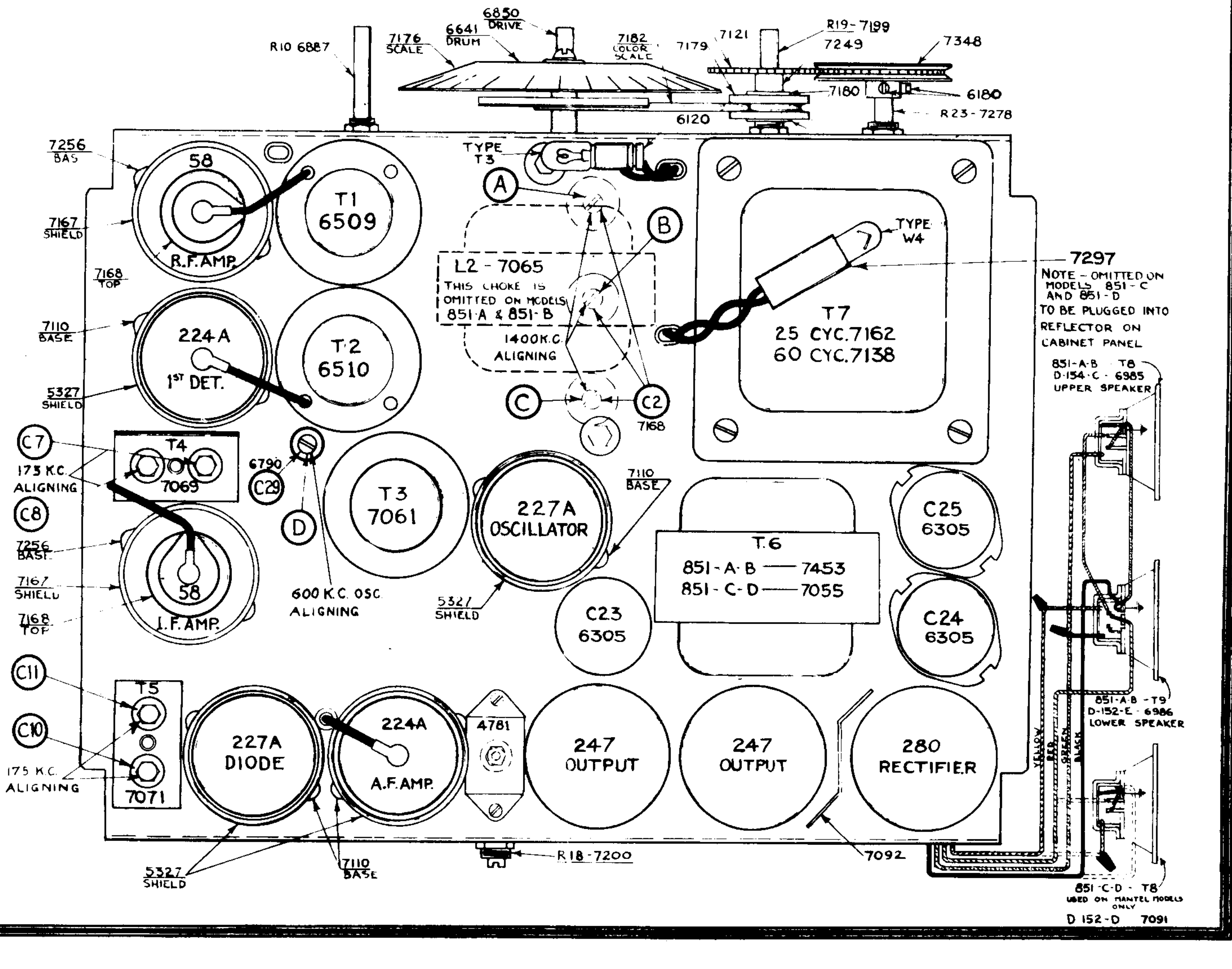
MODELS 851A, 851B, YORK & MAYFAIR



ITEM	VALUE	REMARKS	PART No	ITEM	VALUE	REMARKS	PART No
R1	10,000 Ω	1/2 W CARBON	6811	C1	.05 MFD	2 PAPER	7213
R2	25,000 Ω	1/2 W "	7187	C2	400 MMFD	GANG COND	7176
R3	180 Ω	CANDOHM	7188	C3	.25 MFD	2 PAPER	7214
R4				C4	.05 MFD	3 "	7225
R5	100,000 Ω	1/2 W CARBON	7219	C5	.00035 MFD	MICA	7216
R6	400,000 Ω	1/2 W "	6934	C6	.05 MFD	2 PAPER	6978
R7	50,000 Ω	1/2 W "	7143	C7	VARIABLE	I.F. TUNING	
R8				C8	"	"	
R9				C9	.02 MFD	6 PAPER	6766
R10	500,000 Ω	LEVEL CONTROL	6887	C10	VARIABLE	I.F. TUNING	
R11	1,500,000 Ω	1/2 W CARBON	[illegible]	C11	"	"	
R12	500,000 Ω	1/2 W "	7142	C12	.00025 MFD	MICA	6555
R13	100,000 Ω	1/2 W "	6957	C13	.0001 MFD	MICA	6556
R14	30,000 Ω	1/2 W "	6960	C14	.05 MFD	2 PAPER	7217
R15	20,000 Ω	1/2 W "	7484	C15	.1 MFD	2 "	6757
R16	25,000 Ω	1/2 W "	6909	C16	.25 MFD	2 "	7214
R17	250,000 Ω	1/2 W "	7198	C17	.05 MFD	2 "	7213
R18	20 Ω	HUM ADJUSTMENT	7200	C18	.25 MFD	3 "	7228
R19	50,000 Ω	TONE CONTROL	7199	C19	.05 MFD	3 "	7225
R20	100,000 Ω	1/2 CARBON	[illegible]	C20	.007 .009 MFD	3 "	7442
R21	60,000 Ω	1 "	7202	C21	.2 to .15 MFD	3 "	7309
R22				C22	.25 MFD	2 " (25~ ONLY)	7226
R23	500,000 Ω	SILENCE CONTROL	7278	C23	8 MFD	ELECTROLYTIC	6305
R24	14,000 Ω	2 W CARBON	7144	C24	8 MFD	"	6305
R25	3,000 Ω	1 W "	6950	C25	8 MFD	"	6305
R26	18,000 Ω	1/2 W "	6983	C26	.25 MFD	3 PAPER	7226
R27	82,000 Ω	1/2 W "	6984	C27	.5 MFD	2 "	7221
R28	180,000 Ω	1/2 W "	7207	C28	.5 MFD	2 "	7229
R29	5,000 Ω	1/2 W "	7204	C29	.0009 MFD	VAR OSC PAD	6790
R30	100,000 Ω	1/2 W "	7219	C22	.04 MFD	2 PAPER (60~ ONLY)	6946
R31	15,000 Ω	1/2 W "	7440	C			
R32	1,000,000 Ω	1/2 W "	7441	C			
R33				C			

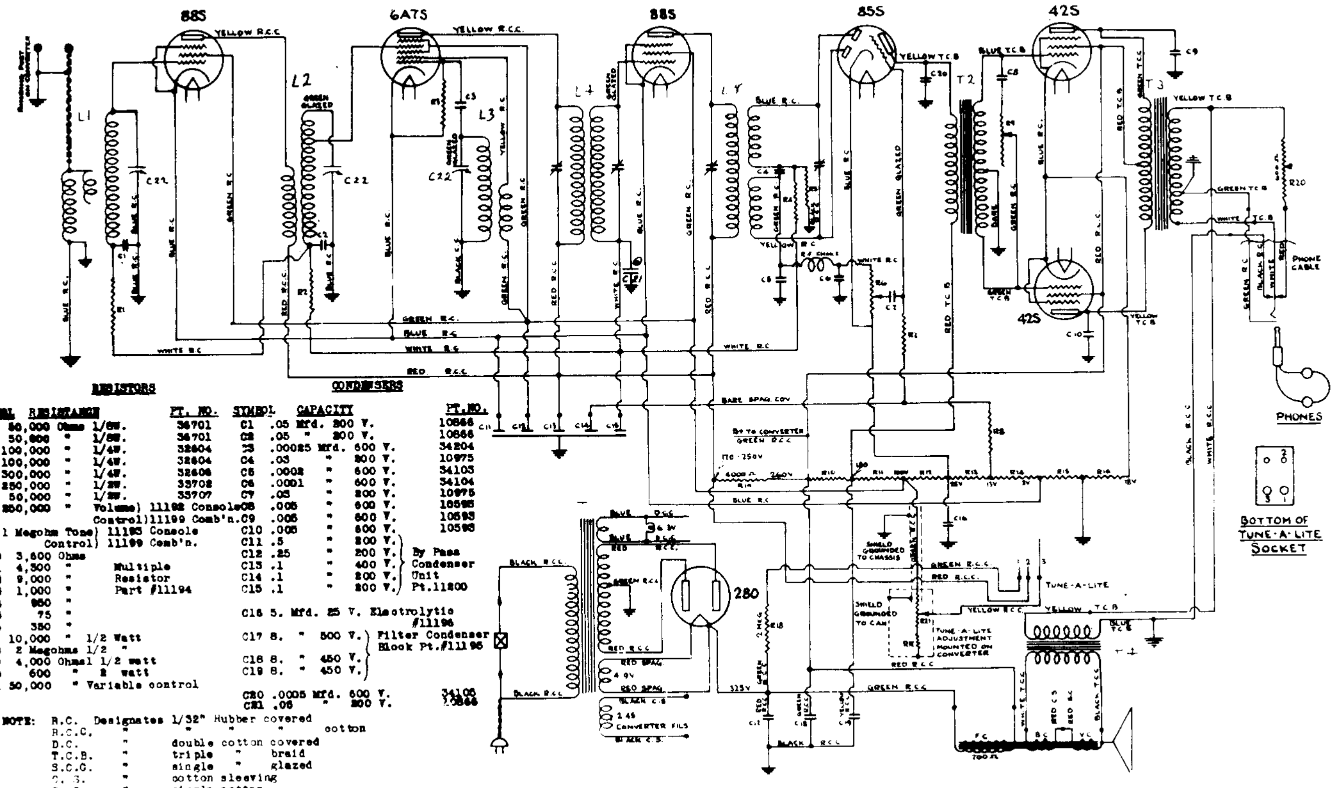
ITEM	DESCRIPTION	PART No.
T1	R.F. TRANS. ANT. STAGE	6509
T2	R.F. TRANS. INTERSTAGE	6510
T3	OSCILLATOR COIL	7061
T4	1ST I.F. TRANSFORMER	7069
T5	2ND I.F. TRANSFORMER	7071
T6	OUTPUT TRANSFORMER	7453
* T7	851-A-C POWER TRANS. 25~	7162
* T7	851-B-D POWER TRANS. 60~	7138
T8	D-154-C SPEAKER (UPPER)	6985
T9	D-152-E SPEAKER (LOWER)	6986
L1	R.F. CHOKE	7370
S-1	"ON" "OFF" SWITCH ON TONE CONT.	6484

MODELS 851A, 851B, 851C & 851D



CANADIAN RADIO CORP.

MODELS 955 & 965



RESISTORS

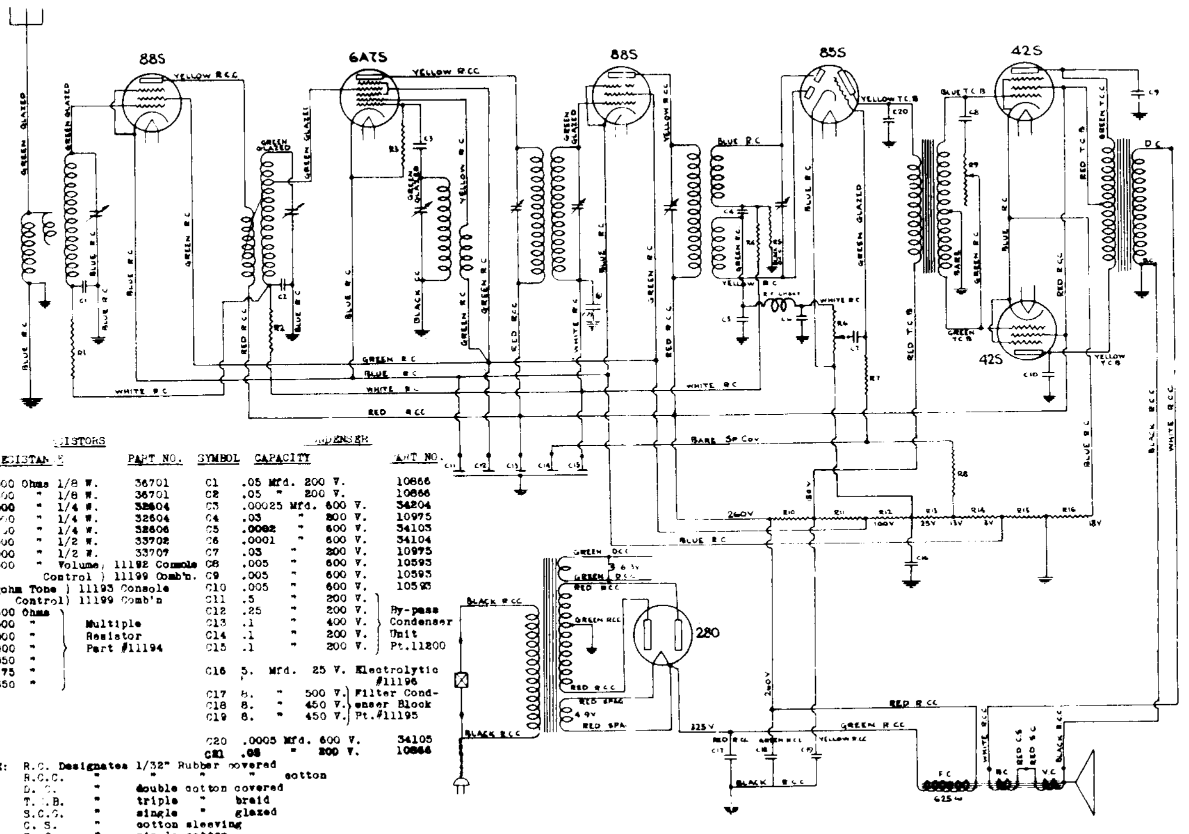
SYMBOL	RESISTANCE	PT. NO.
R1	50,000 Ohms 1/8W.	36701
R2	50,000 " 1/8W.	36701
R3	100,000 " 1/4W.	32604
R4	100,000 " 1/4W.	32604
R5	300,000 " 1/4W.	32606
R7	250,000 " 1/2W.	33702
R8	50,000 " 1/2W.	33707
R6	250,000 " Volume) 11192 Console Control) 11199 Comb'n.	
R9	1 Megohm Tone) 11193 Console Control) 11199 Comb'n.	
R10	3,600 Ohms	
R11	4,300 " Multiple Resistor Part #11194	
R12	9,000 "	
R13	1,000 "	
R14	950 "	
R15	75 "	
R16	350 "	
R17	10,000 " 1/2 Watt	
R18	2 Megohms 1/2 "	
R19	4,000 Ohms 1/2 watt	
R20	600 " 2 watt	
R21	50,000 " Variable control	

CONDENSERS

SYMBOL	CAPACITY	PT. NO.
C1	.05 Mfd. 200 V.	10866
C2	.05 " 200 V.	10866
C3	.00025 Mfd. 600 V.	34204
C4	.03 " 200 V.	10975
C5	.0002 " 600 V.	34103
C6	.0001 " 600 V.	34104
C7	.03 " 200 V.	10975
C8	.005 " 600 V.	10593
C9	.005 " 600 V.	10593
C10	.005 " 600 V.	10593
C11	.5 " 200 V.	By Pass Condenser Unit Pt.11200
C12	.25 " 200 V.	
C13	.1 " 400 V.	
C14	.1 " 200 V.	
C15	.1 " 200 V.	
C16	5. Mfd. 25 V. Electrolytic #11196	
C17	8. " 500 V.	Filter Condenser Block Pt.#11196
C18	8. " 450 V.	
C19	8. " 450 V.	
C20	.0005 Mfd. 600 V.	34105
C21	.05 " 200 V.	10866

NOTE: R.C. Designates 1/32" Rubber covered
R.C.C. " " " " cotton
D.C. " double cotton covered
T.C.B. " triple " braid
S.C.G. " single " glazed
C.S. " cotton sleeving
S.C. " single cotton
SP. " spaghetti

MODELS 935, 940 & 950



RESISTORS

SYMBOL	RESISTANCE	PART NO.
R1	50,000 Ohms 1/8 W.	36701
R2	50,000 " 1/8 W.	36701
R3	100,000 " 1/4 W.	32604
R4	100,000 " 1/4 W.	32604
R5	300,000 " 1/4 W.	32606
R7	250,000 " 1/2 W.	33702
R8	50,000 " 1/2 W.	33707
R6	250,000 " Volume) 11192 Console Control) 11199 Comb'n.	
R9	1 Megohm Tone) 11193 Console Control) 11199 Comb'n	
R10	3,600 Ohms Multiple Resistor Part #11194	
R11	4,300 "	
R12	9,000 "	
R13	1,000 "	
R14	950 "	
R15	75 "	
R16	350 "	

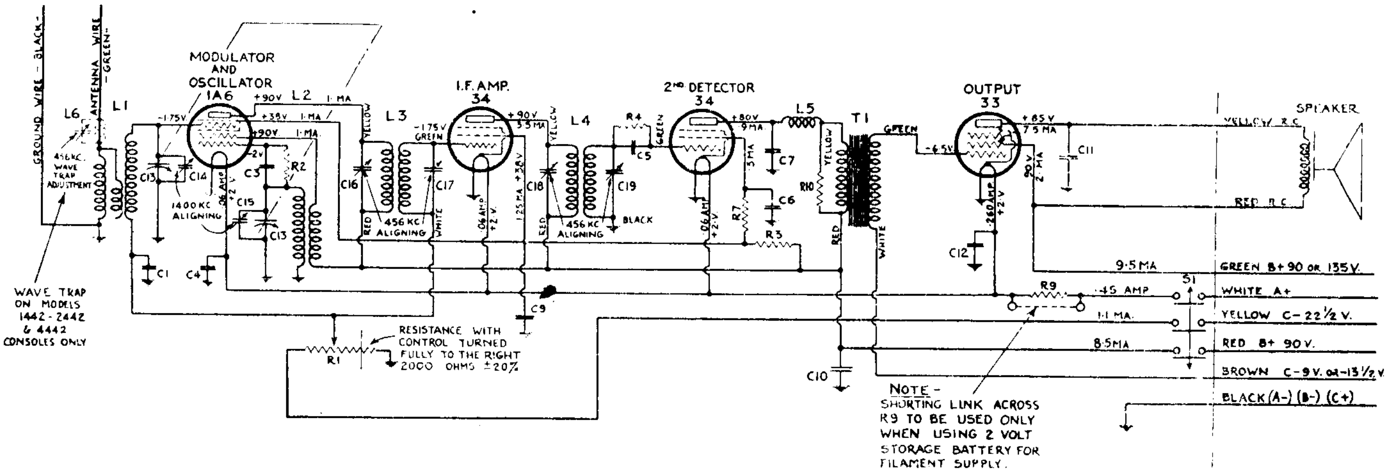
CONDENSER

SYMBOL	CAPACITY	PART NO.
C1	.05 Mfd. 200 V.	10866
C2	.05 " 200 V.	10866
C3	.00025 Mfd. 600 V.	34204
C4	.03 " 200 V.	10975
C5	.0002 " 600 V.	34103
C6	.0001 " 600 V.	34104
C7	.03 " 200 V.	10975
C8	.005 " 600 V.	10593
C9	.005 " 600 V.	10593
C10	.005 " 600 V.	10593
C11	.5 " 200 V.	By-pass Condenser Unit Pt.11200
C12	.25 " 200 V.	
C13	.1 " 400 V.	
C14	.1 " 200 V.	
C15	.1 " 200 V.	
C16	5. Mfd. 25 V. Electrolytic #11196	
C17	8. " 500 V.	Filter Condenser Block Pt.#11195
C18	8. " 450 V.	
C19	8. " 450 V.	
C20	.0005 Mfd. 600 V.	34105
C21	.05 " 200 V.	10866

NOTE: R.C. Designates 1/32" Rubber covered
R.C.C. " " " " cotton
D.C. " double cotton covered
T.C.B. " triple " braid
S.C.G. " single " glazed
C.S. " cotton sleeving
S.C. " single cotton
SP. " spaghetti.

CANADIAN RADIO CORP.

MODEL 4442



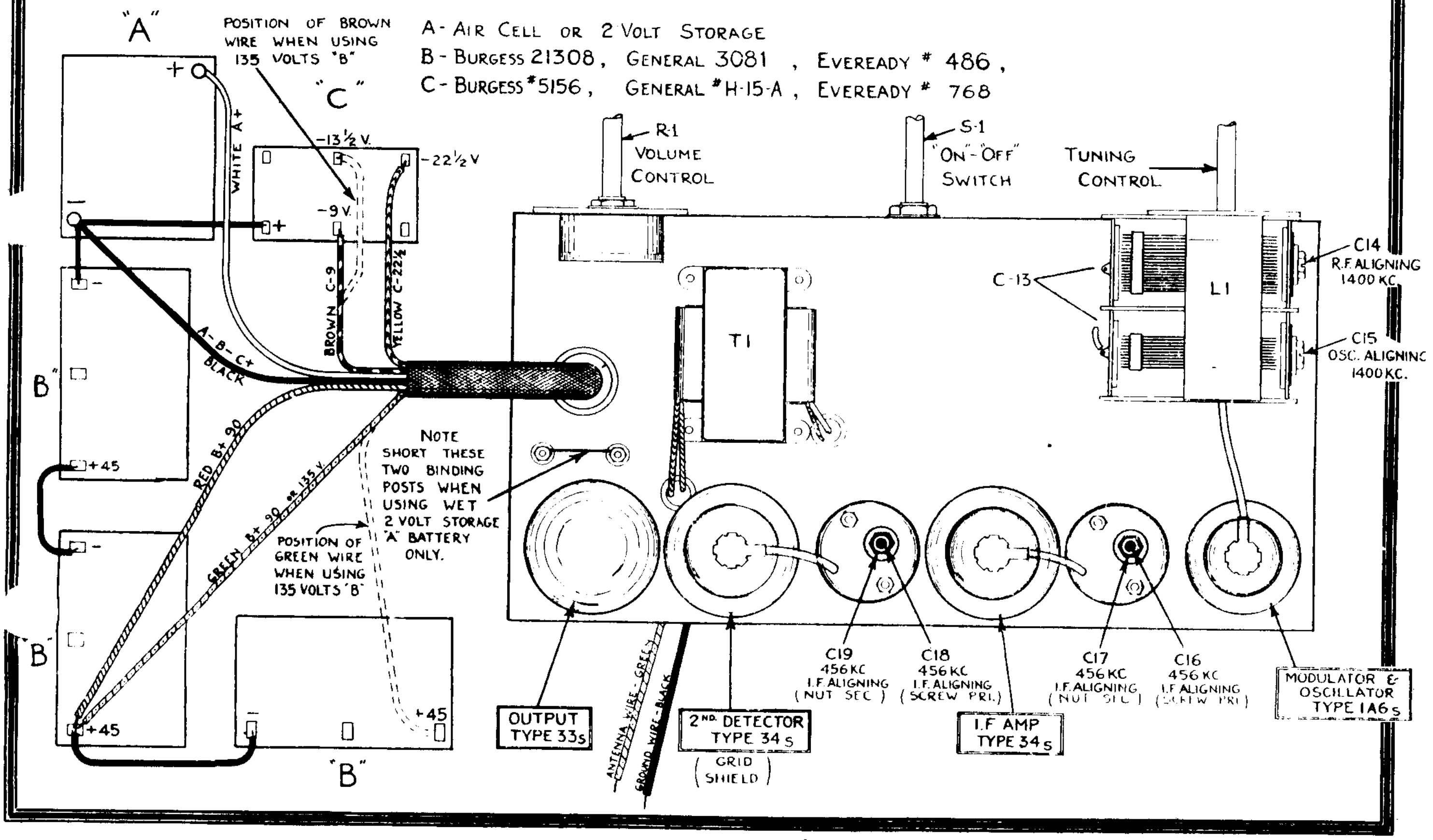
ITEM	RESISTANCE	LIMITS	WATTS	REMARKS	PART NO.
R1	20,000 OHMS			VOL. CONTROL	11428A
R2	100,000 "	±15%	¼ W.	CARBON	32604A
R3	16,000 "	±10%	½ W.	"	33722-A
R4	2,000,000 "	±20%	¼ W.	"	32619-A
R7	100,000 "	±20%	½ W.	"	33706-A
R9	·6 "	±3%	½ W	CANDOHM	38203A
R10	300,000 "	±15%	½ W	CARBON	21018-A

ITEM	CAPACITY	LIMITS	WORKING VOLTS	TYPE	PART NO.
C1	·1 MFD.	+20% -10%	200 V.	PAPER	38106-A
C3	·0002 "	±20%	750 V.	MICA	34103-A
C4	·25 "	+20% -10%	200 V.	PAPER	381C7-A
C5	·0001 "	±20%	750 V.	MICA	37901-A
C6	·1 "	+20% -10%	200 V	PAPER	38106-A
C7	·0002 "	±20%	750 V.	MICA	34103-A
C9	·25 "	+20% -10%	200 V.	PAPER	38107-A
C10	·5 "	+20% -10%	200 V.	"	38108-A
C11	·003 "	+20% -10%	300 V.	"	38103-A
C12	·25 "	+20% -10%	200 V	"	38107-A
C13	TUNING COND.	2 GANG			11424-C
C14	R.F. ALIGNING	PART OF GANG COND.			
C15	OSC. ALIGNING	" " " "			

NOTE-
VOLTAGES SHOWN ARE APPROX. READINGS THAT SHOULD BE OBTAINED WITH A 1000 OHMS. PER. VOLT, VOLTMETER, BETWEEN POINT WHERE VOLTAGE IS INDICATED AND GROUND (CHASSIS).

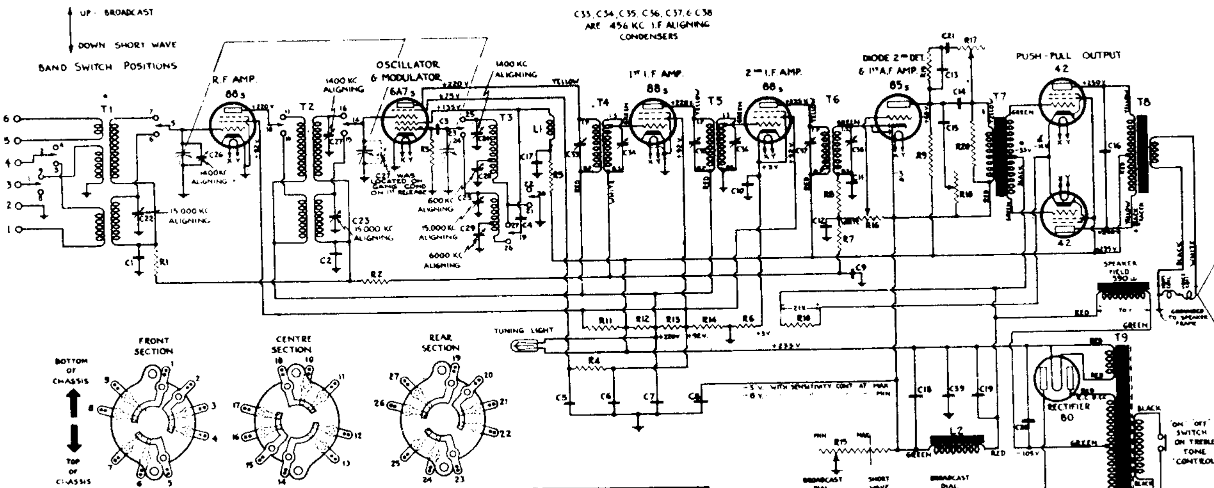
ITEM	DESCRIPTION	PART NO.
L1	ANTENNA R.F. TRANS.	4018-A
L2	OSCILLATOR COIL	4019-A
L3	1ST I.F. TRANSFORMER	4026-A
L4	2ND I.F. TRANSFORMER	4028-A
L5	R.F. CHOKE, DET. PLATE	3551-A
L6	WAVE TRAP ASSEM.	3985-A ON MODELS 1442-2442-4442 ONLY
T1	AUDIO TRANSFORMER	4024-A
S1	BATTERY "ON"-"OFF" SWITCH	11537-A
SPEAKER	MODELS-1441-2441 USES 6" BEST MAGNETIC	11484-A
SPEAKER	MODELS-1442-2442-4442 USES 8" BEST MAGNETIC	11623-C

A- AIR CELL OR 2 VOLT STORAGE
B - BURGESS 21308, GENERAL 3081, EVEREADY # 486,
C - BURGESS # 5156, GENERAL # H-15-A, EVEREADY # 768



CANADIAN RADIO CORP.

MODELS 4821 & 4822

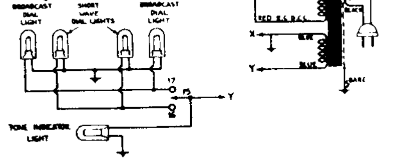


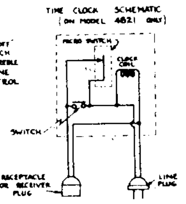
ITEMS MARKED * ARE ON 1ST RELEASE ONLY.
ITEMS MARKED D ARE ON 2ND RELEASE ONLY.

ITEM	CAPACITY	LIMITS	RATED WORKING VOLTAGE	REMARKS	PART NO.
C1	.05 MFD.	± 15 %	200	TUBULAR	38102
C2	.05 "	± 15 %	200	"	38102
C3	.00005 "	± 10 %	750	MICA	34114
C4	.001 "	± 20 %	750	"	34107
C5	.1 "	± [illegible] %	300	BLOCK CONDENSER	11923
C6	.25 "	± [illegible] %	300		
C7	.5 "	± [illegible] %	300		
C8	.1 "	± [illegible] %	200		
C9	.05 "	± 15 %	200	TUBULAR	38102
C10	.1 "	± 15 %	200	"	38106
C11	.0002 "	± 20 %	750	MICA	34103
C12	.0001 "	± 20 %	750	"	34104
C13	.05 "	± [illegible] %	400	TUBULAR	38112
C14	.002 "	± [illegible] %	600	"	38113
C15	.04 "	± 15 %	400	"	38122
C16	.0015 "	± 20 %	800	TUBULAR OIL IMP.	11977
C17	8 "	± [illegible] %	500 (PEAK)	DOUBLE	39003
C19	8 "	± [illegible] %	500 (PEAK)	DRY ELECTROLYTIC	
C18	8 "	± [illegible] %	525 (PEAK)	DRY ELECTROLYTIC	39001
C20	8 "	± [illegible] %	525 (PEAK)	WET ELECTROLYTIC	39002
C21	.1 "	± [illegible] %	400	TUBULAR	38121
C22	15000 KC ANT. ALIGN.			IN ANT. TRANS. ASSY.	
C23	15000 KC R.F. ALIGN.			IN R.F. TRANS. ASSY.	
C24	1400 KC OSC. ALIGN.			IN OSC. COIL ASSY.	
C25	15000 KC OSC. ALIGN.			VARIABLE	4082
C26	1400 KC ANT. ALIGN.			PART OF GANG COND.	
C27	1400 KC R.F. ALIGN.			PART OF GANG COND.	
C28	600 KC OSC. ALIGN.			VARIABLE	4036
C29	6000 KC OSC. ALIGN.			"	4167
C30					
C31					
C32	3 GANG COND.				
C33	456 KC. I.F. ALIGN.			IN 1ST I.F. TRANS.	
C34	456 KC. I.F. ALIGN.			IN 1ST I.F. TRANS.	
C35	456 KC. I.F. ALIGN.			IN 2ND I.F. TRANS.	
C36	456 KC. I.F. ALIGN.			IN 2ND I.F. TRANS.	
C37	456 KC. I.F. ALIGN.			IN 3RD I.F. TRANS.	
C38	456 KC. I.F. ALIGN.			IN 3RD I.F. TRANS.	
C39	.1 MFD.	± [illegible] %	400	TUBULAR	38121
C27	1400 KC R.F. ALIGN.			VARIABLE	4082

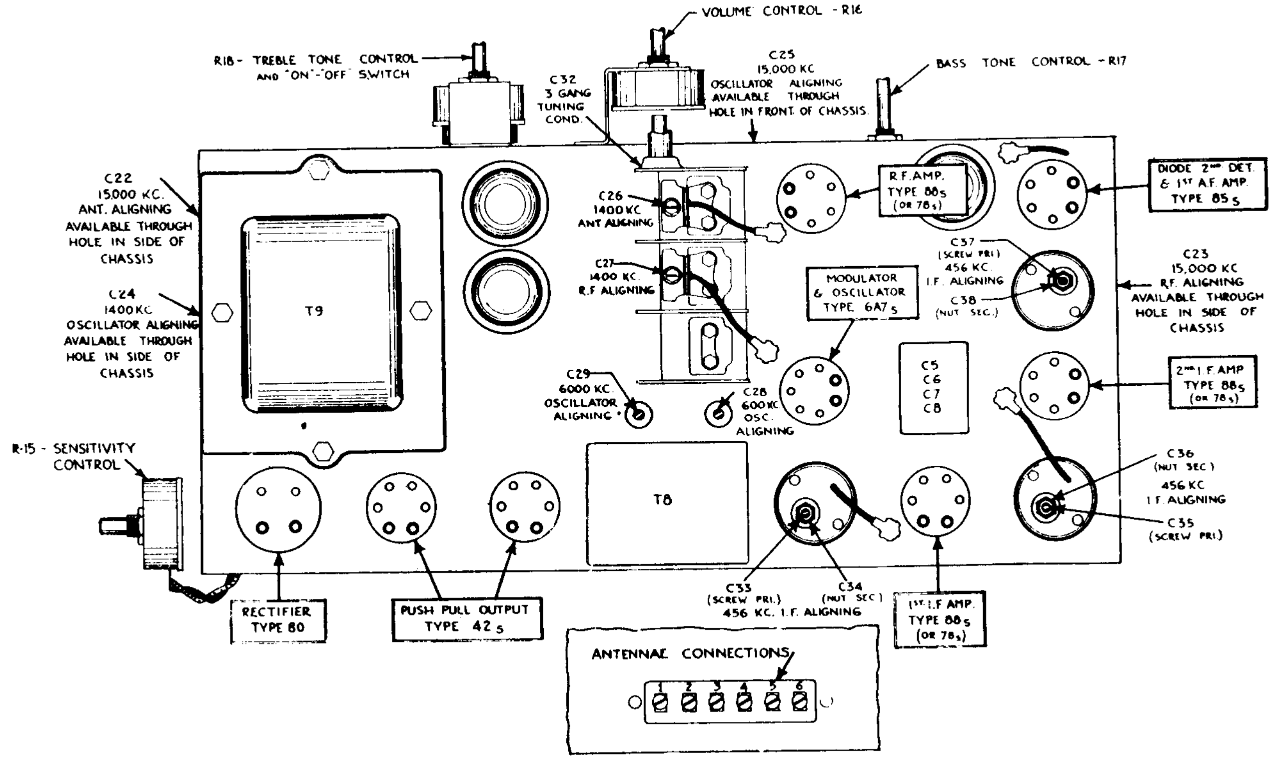
ITEM	DESCRIPTION	PART NO.
T1	ANTENNA TRANS. ASSY.	4077
T2	INTERSTAGE R.F. COIL ASSY.	4254
T3	OSCILLATOR COIL ASSY.	4260
T4	1ST I.F. TRANS. ASSY.	4377
T5	2ND I.F. TRANS. ASSY.	4379
T6	[illegible]	[illegible]
T7	A.F. PUSH-PULL INPUT TRANS. ASSY.	[illegible]
T8	OUTPUT TRANS. ASSY.	4367
T9	POWER TRANS. ASSY.	4383
L1	R.F. CHOKE ASSEMBLY	4136
L2	FILTER CHOKE ASSEMBLY	4391
	SPEAKER ASSEM. (MODEL 160)	4073

ITEM	RESISTANCE	LIMITS	WATTS	REMARKS	PART NO.
R1	100,000 OHMS	± 15 %	½ W	CARBON	[illegible]
R2	100,000 "	± 15 %	½ "	"	[illegible]
R3	50,000 "	± 20 %	½ "	"	[illegible]
R4	5,000 "	± 15 %	½ "	"	[illegible]
R5	40,000 "	± 15 %	½ "	"	[illegible]
R6	370 "	± 10 %	1 "	6 SECTION CANDOHM	12059
R10	330 "	± 10 %	1.5 "		
R11	20,000 "	± 10 %	1 "		
R12	3,500 "	± 10 %	1 "		
R13	10,000 "	± 10 %	2 "		
R14	9,000 "	± 10 %	1 "		
R7	500,000 "	± 20 %	½ "	CARBON	[illegible]
R8	50,000 "	± 20 %	½ "	"	[illegible]
R9	40,000 "	± 15 %	1 "	"	[illegible]
R15	70 - 250 "			SENSITIVITY CONT.	11720
R16	250,000 "			VOLUME CONT.	11707
R17	1,000,000 "			A.F. TONE CONT.	11716
R18	50,000 "			R.F. TONE CONT.	11717
R19	100,000 "	± 15 %	½ "	CARBON	[illegible]
R20	500,000 "	± 20 %	½ "	"	[illegible]





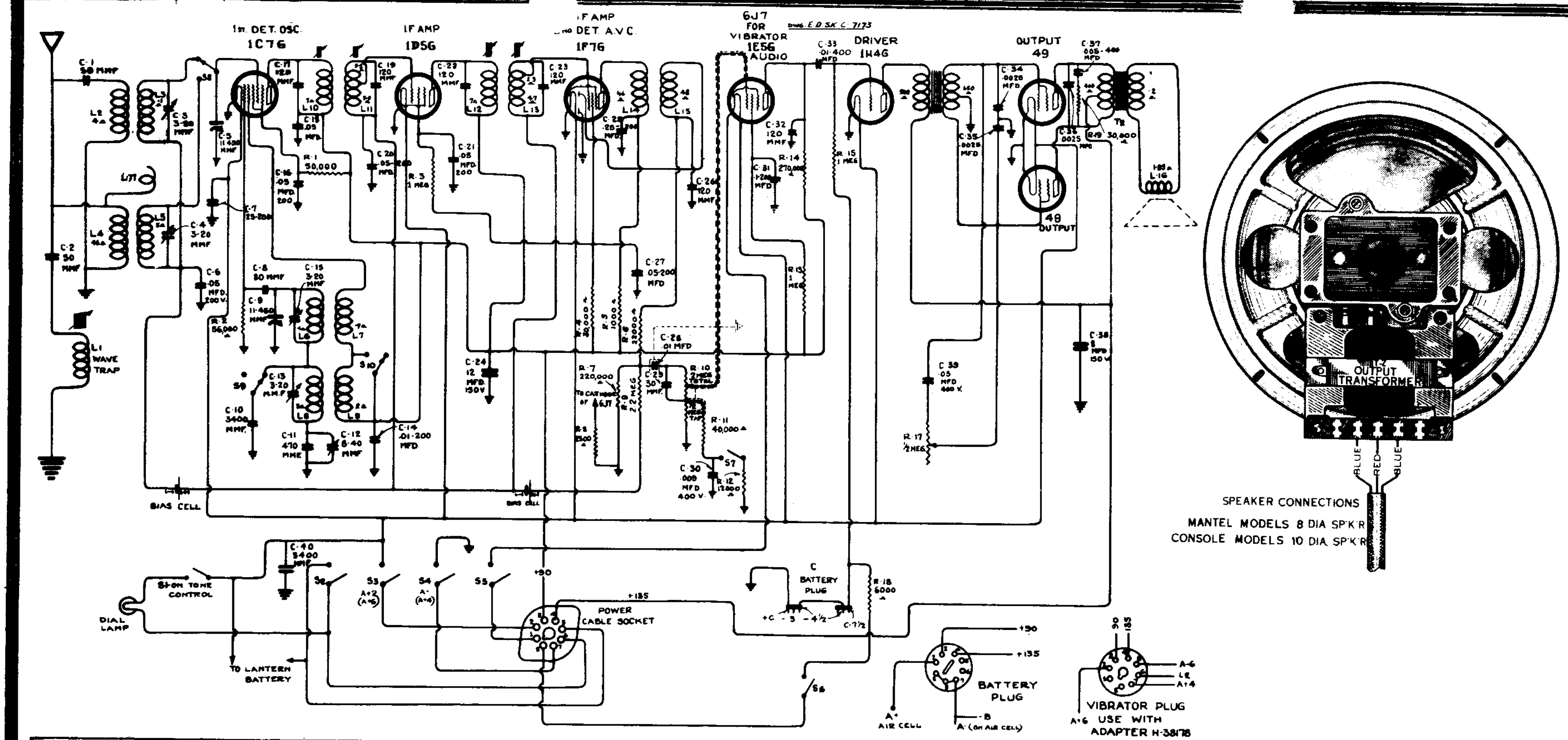
VOLTAGES SHOWN ARE APPROX. READINGS THAT SHOULD BE OBTAINED BETWEEN POINTS WHERE VOLTAGE IS INDICATED AND GROUND (CHASSIS), UNLESS SHOWN OTHERWISE. VOLTAGES ARE MEASURED WITH A 1000 OHMS PER. VOLT VOLTMETER USING 250 VOLT RANGE.
VOLTAGES MARKED * CHANGE WITH SETTING OF SENSITIVITY CONTROL.
VOLTAGES ARE MEASURED WITH SENSITIVITY CONTROL AT MAX.



Note: In late releases C27 is located on band switch in chassis.

CANADIAN WESTINGHOUSE COMPANY Limited

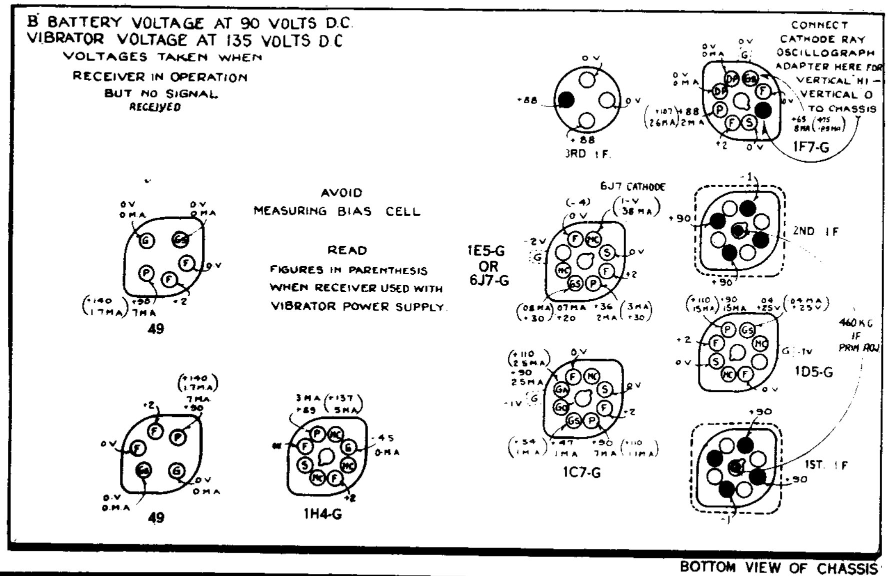
MODELS B-725A & B-725X



Note 1—In many cases the voltage rating of condensers follows the capacity rating (mfd.)

Note 2—On a few of the first chassis built R1 was 82,000 ohms not 50,000 as shown. The lower valve should be installed if oscillation failure occurs when the W-1C7G is replaced.

Note 3—Range Selector Switch is shown above in the S.W. position.



Socket Meter Readings

Caution — Do not attempt to measure voltages on the control grids of the W-1D5G or W-1F7G with any conventional voltmeter as paralysis of the "C-bias" cell will result.

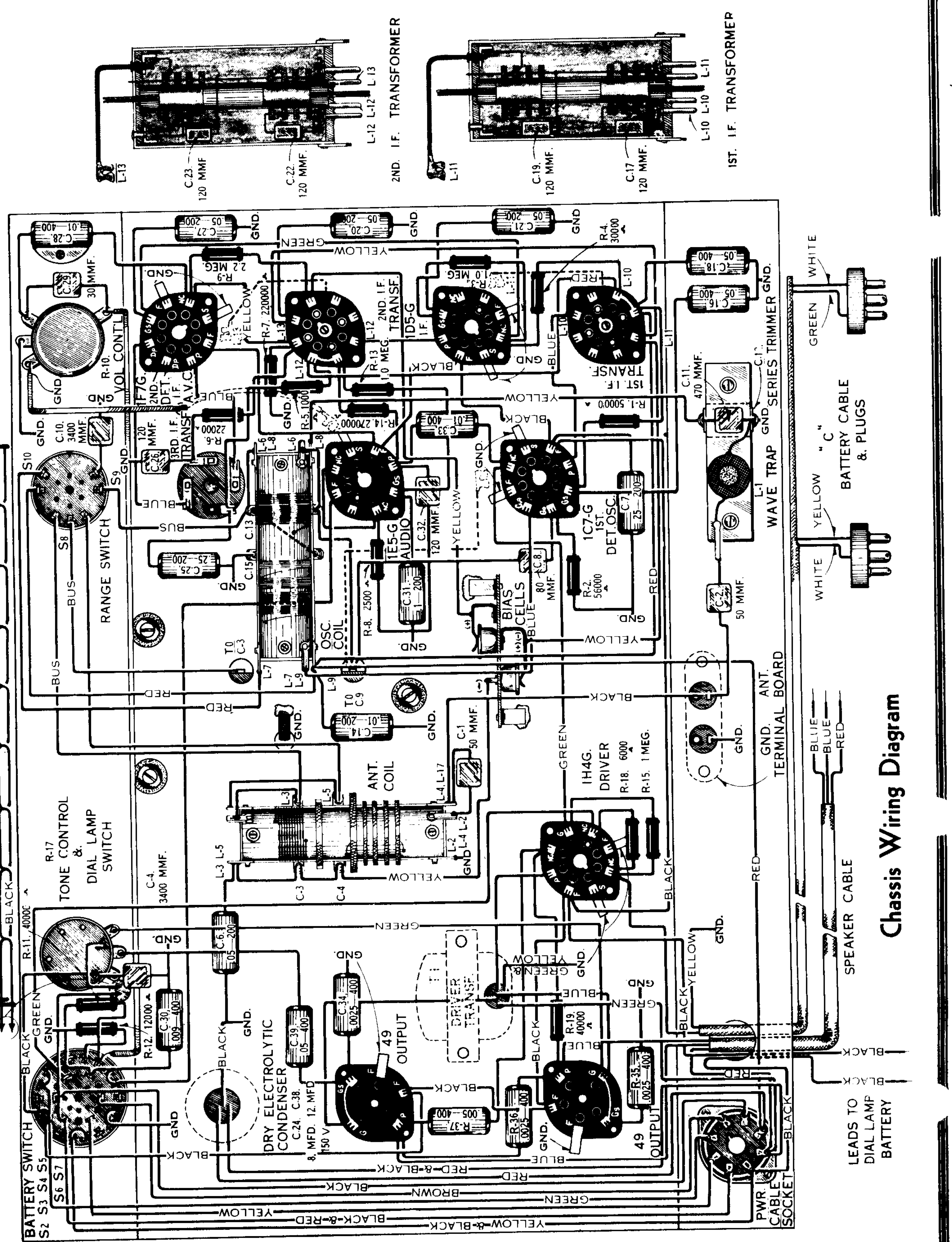
Check "C" cell by noting whether plate current is abnormally high on tubes biased by cells.

A further check on the C bias cell, particularly if it is suspected that the control grid leads have been grounded, is to connect a 3 volt C battery between the control grid cap of the W-1C7G and the chassis frame. The negative of the C battery should be connected to control grid, positive to chassis frame. This connection should be momentarily made only, and if the C cell had been weakened before, it will now be found to be recharged and ordinarily will not need to be replaced.

All voltages are operating voltages with respect to chassis frame, with all batteries at normal voltage—tuned to approximately 1000 K.C.—no signal being received. Due allowance must be made for current drawn by the meter used.

CANADIAN WESTINGHOUSE COMPANY Limited

MODELS B-725A & B-725X



Chassis Wiring Diagram

CANADIAN WESTINGHOUSE COMPANY Limited

MODELS B-725A & B-725X

SERVICE DATA

"A" Battery—1-2½ volt Air-cell Eveready A-600 (or equivalent) or 1-2.0 volt storage battery.

"B" Battery—2 (or 3) 45 volt, heavy duty plug-in type.

"C" Battery—(Audio)—1 (or 2) 4½ volt plug-in type such as Eveready 771 or Burgess 536.

Pilot Lamp Battery—Eveready 409 or Burgess 1042.

Battery Current—"A"—600 milliamperes; "B" 10 milliamperes. (Average at 90 volts.)

Cabinet Dimensions—B-725A, 11" x 22¾" x 9"; B-725X, 39¾" x 22" x 11½".

Shipping Weight—B-725A, 37 lbs.; B-725X, 67 lbs.

Controls—(1) Off-Speech-Music Switch, (2) Treble Tone Control and Dial Light Switch, (3) Station Selector, (4) Range Selector Switch, (5) Volume Control.

Station Selector Drive Ratio .... 90:1 and 18:1

Number and types of radiotrons—(1)-W-1C7G; (1)-W-1D5G; (1)-W-1F7G; (1)-W-E5G; (1)-W-1H4G; (2)-W-49. Total 7.

Pilot Lamps (2)—Mazda No. 40, 6.3 V., 0.15 Amp.

Undistorted output .... 0.2 Watt

Frequency range .... 530 K.C. to 1720 K.C., and 5.5 M.C. to 18.0 M.C.

These receivers are 7 tube superheterodynes incorporating such features as wide broadcast range, the more popular short wave bands, Alnico dynamic speaker, "iron core" I.F. transformers, bass and treble tone controls, automatic volume control, "Cell" type "C" bias, unexcelled battery economy, plug-in batteries, compensated manual volume control, class B output circuit, dust-proof loudspeaker, wave trap and the inherent sensitivity, selectivity and tone quality of the superheterodyne circuit.

The following description of the circuit includes several new design features which are incorporated in this receiver. The first tube (Radiotron W-1C7G) is used as a combined first detector and oscillator. Separate coil assemblies are provided for each function. The antenna, or first detector coil assembly, has two primary coils. Both of these coils are connected in parallel to the antenna at all times. The short wave primary coil has a small condenser in series with it to prevent it absorbing energy at broadcast frequencies. Pole S-8 of the range selector switch selects either of two antenna secondary windings, depending on whether short wave or broadcast range reception is required. Separate trimmers are provided for each coil for adjustment at the high frequency ends of their respective ranges. As the two frequency ranges are so widely separated, there is no necessity to have the range switch short-circuit unused coils to prevent absorption of energy by resonance.

The oscillator plate and grid coils are wound in two sections. Each section of the grid coil has its own high frequency trimmer. There is also a low frequency trimmer for the broadcast range. In the short wave position pole S-10 short-circuits the broadcast portion of the oscillator plate coil, and pole S-2, practically speaking, short-circuits the broadcast grid coil through C-13, which then functions as the oscillator fixed series padding condenser.

The second tube (Radiotron W-1D5G) is an I.F. amplifier. The third tube (Radiotron W-1F7G) is an I.F. amplifier with one diode plate acting as second detector and automatic volume control.

It will be noted that the first two I.F. transformers are of the "Iron-core" type and the third is a non-adjustable "air-core" transformer. The control grids of the I.F. amplifier radiotrons are not connected to the "high" ends of the I.F. transformer secondary windings, but are connected to taps on their respective windings. This arrangement gives the maximum permissible selectivity without excessive I.F. amplification which would result in high background noise level.

The rectified D.C. voltage developed across the diode load resistor (R-7) is applied as A.V.C. voltage through a resistor (R-9) to the control grids of the first detector and both I.F. radiotrons. Two bias cells are also used to give a residual bias of 1.0 volt to the I.F. radiotrons and 2.0 volts to the first detector.

The audio frequency voltage appearing across the diode load resistor of the W-1F7G Radiotron is coupled to an acoustically tapered and compensated volume control. The moving tap of the volume control is connected to the control grid of the W-1E5G first audio amplifier Radiotron, which is in turn resistance-capacitance coupled to a W-1H4G driver Radiotron.

The output of the driver stage is transformer-coupled to the Class B, push-pull output stage which uses two W-49 Radiotrons.

The treble tone control consists of a variable resistance in series with a fixed capacity connected across the secondary of the driver transformer.

The amount of bass response is controlled by the speech-music switch S7. When this switch-pole S7 is closed, the amount of compensation on the volume control is decreased—thus reducing the bass response at low and moderate volume.

Use With Vibrator "B" Supply

These receivers may be used with Westinghouse Style No. H-36133 vibrator "B" supply if a 6.0 volt storage battery is available. The necessary changes are very simple. Follow the instructions given with the vibrator "B" supply, noting also the following points:

The W-1E5G tube must be removed and a W-6J7G radiotron substituted. No Pilot Lamp Battery is required.

Refer to schematic circuit diagram in this leaflet and note the internal connection of the vibrator plug. When vibrator H-36133 is used it is necessary to connect together pins No. 1 and No. 5, on the diagram. This may be done by dissembling the vibrator plug and soldering a jumper in place. It will be more convenient, however, to use a special adapter, Style No. H-38178. (See parts list.)

ALIGNMENT PROCEDURE

There are various alignment trimmers provided in the antenna transformer and oscillator coil tuned circuits. One adjustment is also provided for the wave trap. The i-f transformer adjustments are made by means of screws attached to molded magnetite cores. All of these circuits have been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions or altered during servicing. Loss of sensitivity, improper tone quality, and poor selectivity are the usual indications of improper alignment.

The correct performance of this receiver can only be obtained when the aligning has been done with adequate and reliable apparatus. It is not necessary to use a frequency modulated oscillator and cathode ray oscillograph to align this receiver. Those service men that have this equipment will probably prefer to use it and for their convenience we have indicated on the socket voltage diagram the proper connection point for the cathode ray vertical amplifier input terminal.

By using the Cathode Ray Adapter shown in the Replacement Parts List the cathode ray connections may be made without removing or opening the chassis.

A test oscillator is required as a source of the specified alignment frequencies. Visual indication of receiver output during the adjustment is necessary and should be accomplished by the use of an indicator or meter.

The procedure outlined below should be followed in adjusting the various trimmer capacitors and molded cores:

Calibrate the tuning dial by adjusting pointer to the low frequency end of scale with gang condenser plates fully meshed. The pointer should be horizontal with its painted section resting at the end of the vertical index line. This is a friction adjustment. At the same time set the vernier dial scale (this is secured by two set screws) to read "o".

Perform alignment in proper order as shown by the accompanying chart, starting with No. 1, and following all operations across, then No. 2, etc. The chassis bottom shield must be securely in place when making R.F. adjustments. Adjustment locations and frequencies are shown on a sticker fastened to the bottom side of the chassis shield. These trimmer locations are also shown in one of the accompanying illustrations.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output terminal and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc." means that the receiver should be tuned to a point between 550 and 750 kc. where no signal or interference is received from a station or the receiver (heterodyne) oscillator.

The term "Rock Through" indicates that the receiver station selector should be rocked back and forth while making the indicated adjustment. The adjustment and rocking should be continued until the combined action results in the maximum deflection on the output meter.

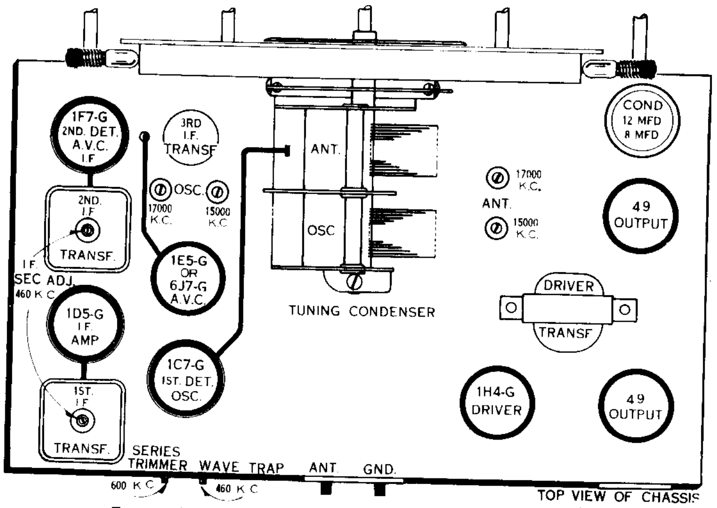
When adjusting oscillator circuits that have both series and shunt trimmers it is good practice to repeat the adjustment on the oscillator shunt trimmer after making the adjustment on the oscillator series trimmer. On some tuning ranges it is found that more than one peak may be secured if the trimmer is adjusted over a wide enough range. When this occurs it should be noted that oscillator circuits should be aligned, using that peak which occurs at the lower capacity setting of the trimmer. On R.F. or first detector trimmers the peak occurring with the larger capacity setting of the trimmer should be used.

It is also good practice to make sure that the trimmers on the short-wave ranges are set so that the oscillator stage develops its signal at a higher frequency than the signal to which the R.F. stage (or stages) is tuned. This check can be made by advancing the test oscillator output control and tuning the receiver above and below the frequency of the test oscillator, noting at what frequency the test signal reappears. It should reappear at a frequency setting on the receiver dial lower than the test oscillator frequency by an amount equal to twice the intermediate frequency.

ALIGNMENT CHART

Order of Alignment	Connection To Receiver	Test Oscillator Dummy Antenna	Frequency Setting	Receiver Dial Setting	Circuit To Adjust	Adjustment Symbols	Adjust to Obtain
1	1D5G I.F. Grid Cap	.001 Mfd.	460 kc.	No Signal 550-750 kc.	2nd I.F. Transf.	L12, L13	Max. (Peak)
2	6A8 Det. Osc.	.001 Mfd.	460 kc.	No Signal 550-750 kc.	1st. I.F. Transf.	L10, L11	Max. (Peak)
3	Ant. Term.	200 Mmfd.	460 kc.	No Signal 550-750 kc.	Wave Trap	L1	Minimum Output
4	Ant. Term.	300 ohms.	17,000 kc.	17,000 kc.	S.W. Osc.	C15	Max. (Peak)*
5	Ant. Term.	300 ohms.	17,000 kc.	17,000 kc.	S.W. Ant.	C3	Max. (Peak)
6	Ant. Term.	200 Mmfd.	1,500 kc.	1,500 kc.	B.C. H.F. Osc.	C13	Max. (Peak)
7	Ant. Term.	200 Mmfd.	1,500 kc.	1,500 kc.	B.C. H.F. Ant.	C4	Max. (Peak)
8	Ant. Term.	200 Mmfd.	600 kc.	Rock Through 600 kc.	B.C. Osc.	C12	Max. (Peak)

*If two peaks obtainable use lower capacity setting and check for image at 16,080 kc.



Trimmer Locations (also see Socket Meter Reading Diagram)

CANADIAN WESTINGHOUSE COMPANY Limited

MODELS B-725A & B-725X

Key No.	Part No.	DESCRIPTION	List Price
C3, C4, L2, L3, L4, L5, L17	H-36314	Coil—Antenna Coil Assembly complete with trimmers	$2.25
L6, L7, L8, L9, C13, C15	H-37896	Coil—Oscillator Coil Assembly complete with trimmers	2.25
L10, L11, C17, C19	H-37897	Transformer—First I.F. ("Iron Core")	2.50
L12, L13, C22, C23	H-38114	Transformer—Second I.F. ("Iron Core")	2.50
L14, L15,	H-33418	Transformer—Third I.F. (non-adjustable)	1.50
T1	H-36081	Transformer—Audio Driver	2.60
R10	H-36266	Volume Control—(2 Meg. with Tap at .5 Meg.)	1.20
R17, S1	H-36344	Tone Control, 0.5 Megohm with dial lamp switch	1.20
S2, S3, S4, S5, S6, S7	H-36075	Off-Speech-Music Switch	1.00
S8, S9, S10	H-36339	Range Selector Switch	1.00
C24, C38	H-37909	Capacitor—Dry Electrolytic Assembly 12 and 8 mfd. 150v	1.75
C5, C9	H-36318	Capacitor—Two Gang Tuning Condenser	On application
	H-36150	Vernier Drive Shaft Assembly	1.00
	H-36149	Drive Disc	.50
L1, C12	H-36274	Trimmer (8-40 mmfd.) and Wave Trap Assembly	1.00
	H-36350	Dial Scale	1.00
	H-38154	Vernier Dial Scale with mounting	0.50
	D-569229 It.6	Mask for rear of dial	0.60
	D-569229 It.1	Dial Frame Complete with pilot light brackets	2.10
	D-569229 It.3	Clamp (to hold dial scale)	0.50 pr.
	K-79864-2	Rubber Channels for dial scale	0.25
	H-34441	Socket—5 contact	0.20
	H-33478	Socket—standard octal	0.25
	Amp. S.P.-8	Socket—octal base for cable plug	0.50
	H-22354	Socket—pilot lamp	0.20
	H-36321	Dial Pointer with bushing	0.30
	G-991-A	Goat tube shield	0.20
	H-34535	Shield Cap for I.F. Transformers	0.20
	H-33492	Control Grid Clip-Small—Pkge. of 5	0.30
	Cat# 1922	Bias Cell Mounting—(2 cell type)	0.25
	K-79677-1	Bias Cell—Pkge. of 5	1.20
	H-36298	Battery Cable—with plug connectors and markers-B-725-A	1.60
	D-585560	Battery Cable—with plug connectors and markers-B-725-X	1.60
	H-36301	"C" Battery Cable—with plug connectors	1.10
	H-37906	Insulating Piece with contacts for dial lamp battery	0.60
	Cat. 30-3B	3 Prong "B" Battery Plug	0.05
	Cat. 30-3C	3 Prong "C" Battery Plug	0.05
	Cat. 7-E	Battery Cable Plug Complete	0.30
	H-36097	"C" Battery Shorting Receptacle	0.05
	H-36098	"B" Battery Shorting Receptacle	0.05
	H-20617	Spade Terminal (for battery cable)—Pkge. of 10	0.10
	Cat. 48	Cable Marker +A-Pkge. of 5	0.15
	Cat. 17	Cable Marker—A-Pkge. of 5	0.15
	C-6201-12	Flexible Resistor—Yellow and Red 0.31 ohms, ¼w.-B-725-A	0.20
	C-6201-11	Flexible Resistor—Grey 0.38 ohms, ¼ watt-B-725-X	0.20
	H-34487	Antenna—Ground Terminal Board	0.20
	H-29586	Retaining Ring (for third I.F. transformer)	0.05
T2, L16	H-37886	Reproducer Assembly complete—B-725-A	10.00
L16	H-37881	Reproducer Cone Assembly—B-725-A	1.60
T2, L16	H-37887	Reproducer Assembly complete B-725-X	12.00
L16	H-37882	Reproducer Cone Assembly—B-725-X	1.60
T2	H-37885	Output transformer—B-725-A or B-725-X	2.00
	C-7131-1	Mantel Cabinet—B-725-A	On application
	H-37816	Console Cabinet—B-725-X	On application
	H-36197	Chassis Cushion complete with mount. screw and washer—Pkge. of 5	0.40
	H-33432	Plain Control Knob	0.25
	H-33433	Control Knob with white dot	0.25
	H-33436	Spring for Control Knob—Pkge. of 5	0.20
	K-79780-1	Tuning Control Knob (large)	0.20
	K-79781-1	Tuning Control Knob (small)	0.20
	K-76886-1	Tuning Knob Spring (large)—Pkge. of 5	0.15
	K-77761-1	Tuning Knob Spring (small)—Pkge. of 5	0.15
	Form 1080-37	Broadcast Book	0.25
	Form 1078-37	Station Finder Chart	0.25
	H-36331	Dial Crystal—(Celluloid)	0.50
	C-7117-1	"Volume" Transfer	0.10
	C-7117-2	"Tone" Transfer	0.10
	C-7117-3	"Off-Speech-Music" Transfer	0.10
	C-7135-1	SW. BC. Transfer	0.10
	H-38178	Vibrator Adapter	0.75

CARBON RESISTORS

Part No.	Ohms	Watts	Key No.
H-30205	1,000	½	R5
H-27708	2,500	½	R8
H-25406	6,000	½	R18
H-25356	12,000	½	R12
H-37822	22,000	½	R6
H-30598	30,000	½	R19, R4
H-22426	40,000	½	R11
H-25375	50,000	1	R1
H-33484	56,000 (insulated)	½	R2
H-33508	220,000 (insulated)	½	R7
H-34458	270,000 (insulated)	½	R14
H-30177	1.0 Meg. (insulated)	½	R3, R15, R13
H-33488	2.2 Meg. (insulated)	½	R9

MICA CAPACITORS

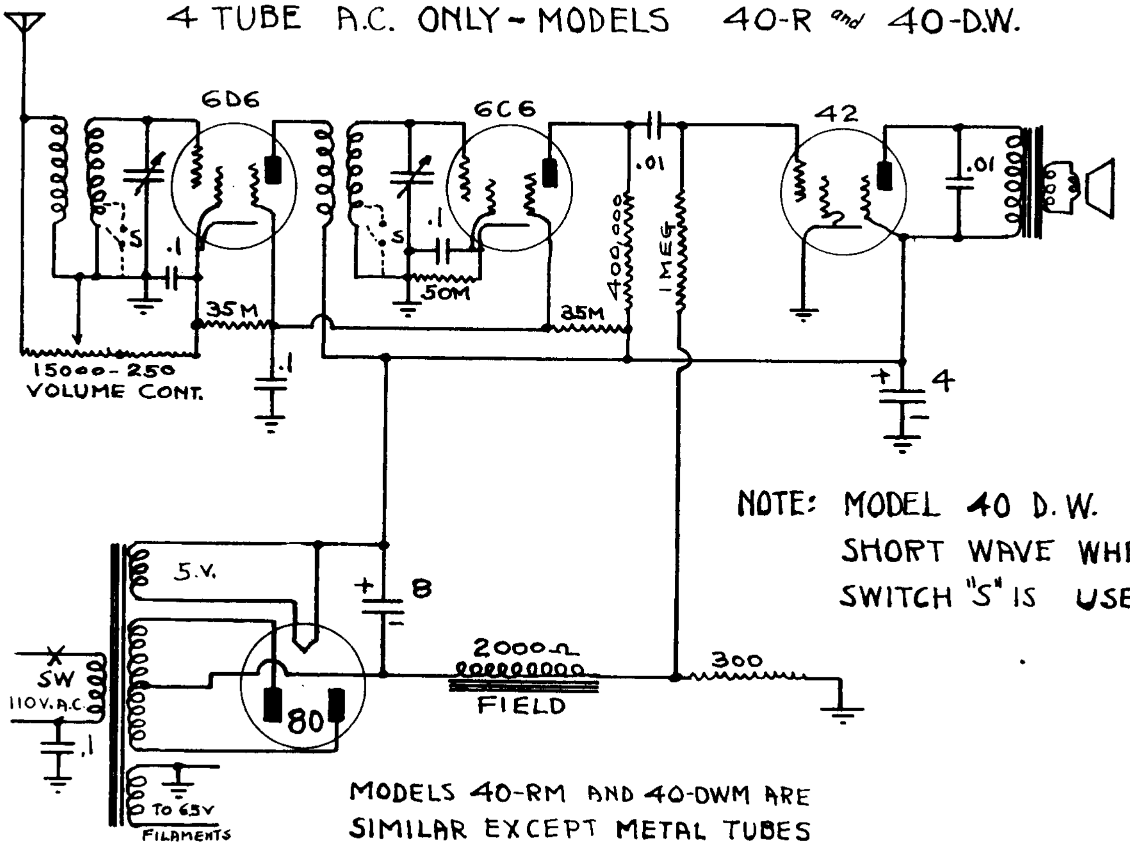
Part No.	Mmfd.	Key No.	List Price
H-34556	30	C29	0.30
H-34479	50	C1, C2	0.30
H-32997	80	C8	0.30
K-77952-502	120	C17, C19, C22, C23	0.35
H-34476	120	C26, C32	0.30
H-38195	470	C11	0.30
H-33423	3400	C10, C40	0.75

TUBULAR CAPACITORS

Part No.	Mfd.	Volts	Key No.
H-34486	0.0025	400 400	C34, C35, C36
H-29601	0.005	400	C37
H-36174	0.009	400	C30
H-32982	0.01 shielded	400	C28
H-34461	0.01	400	C33, C14
H-36188	0.05	400	C6, C16, C18, C20, C21, C27, C39
H-34464	0.1	400	C31
H-34559	0.25	200	C7, C25

CHAMPION RADIO
MODELS 40R, 40DW, 40RM & 40DWM

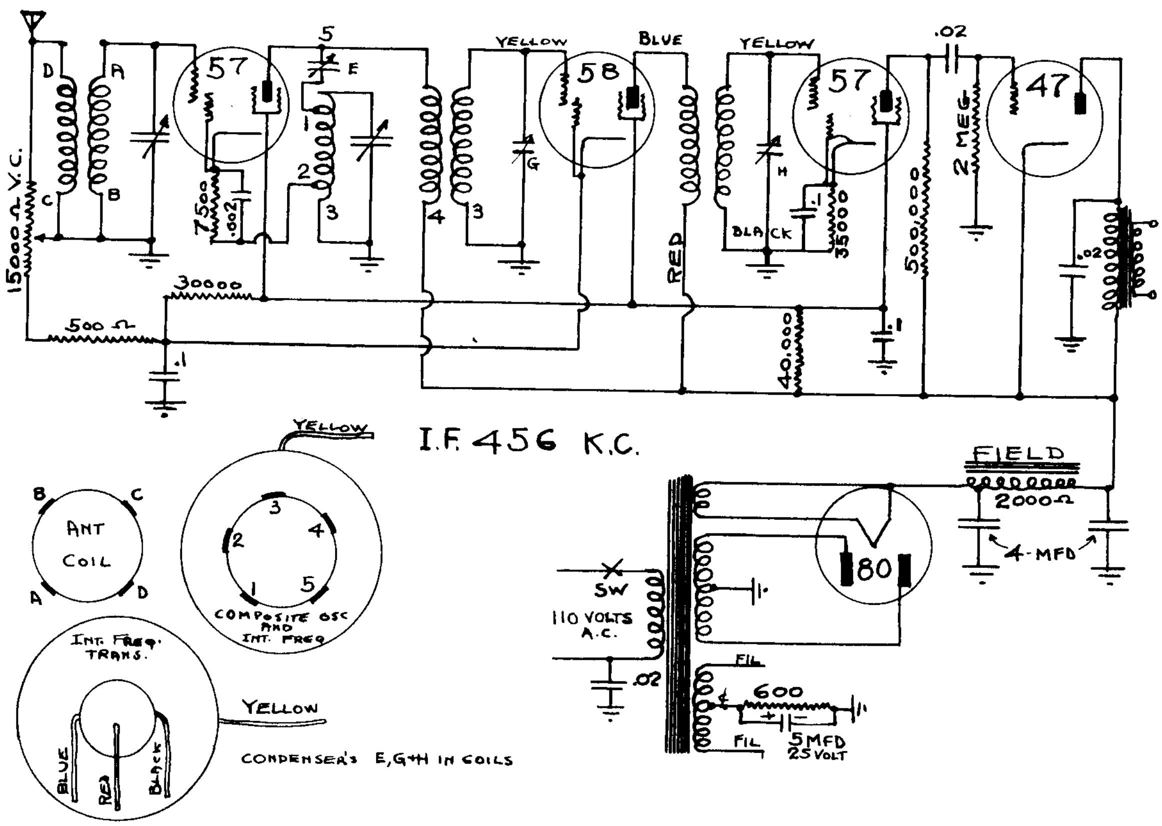
4 TUBE A.C. ONLY - MODELS 40-R and 40-D.W.



NOTE: MODEL 40 D.W. IS SHORT WAVE WHEN SWITCH "S" IS USED.

MODELS 40-RM AND 40-DWM ARE SIMILAR EXCEPT METAL TUBES ARE USED: 6K7, 6J7, 6F6 & 5Z4.

MODEL 558

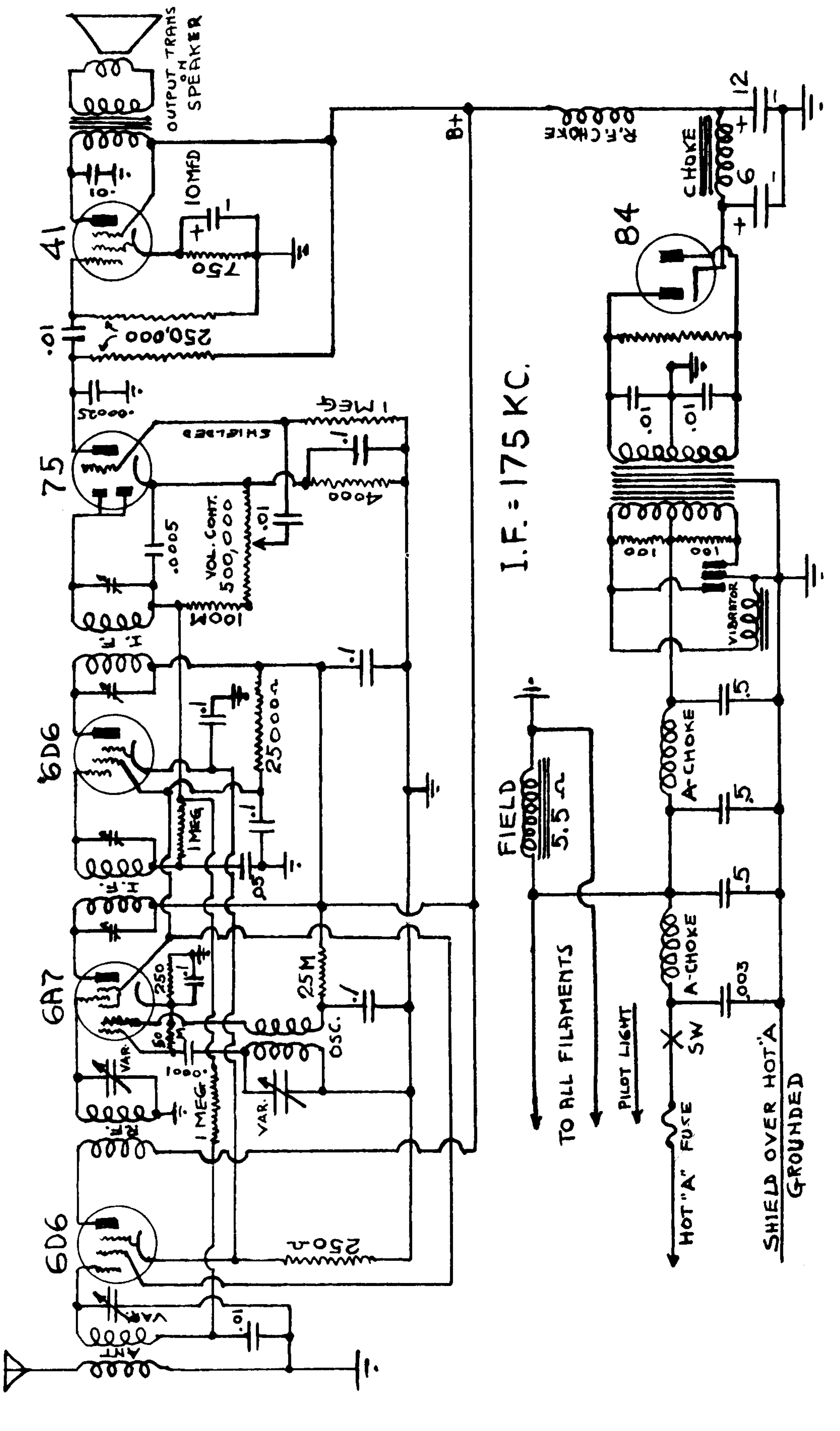


I.F. 456 K.C.

CONDENSERS E, G & H IN COILS

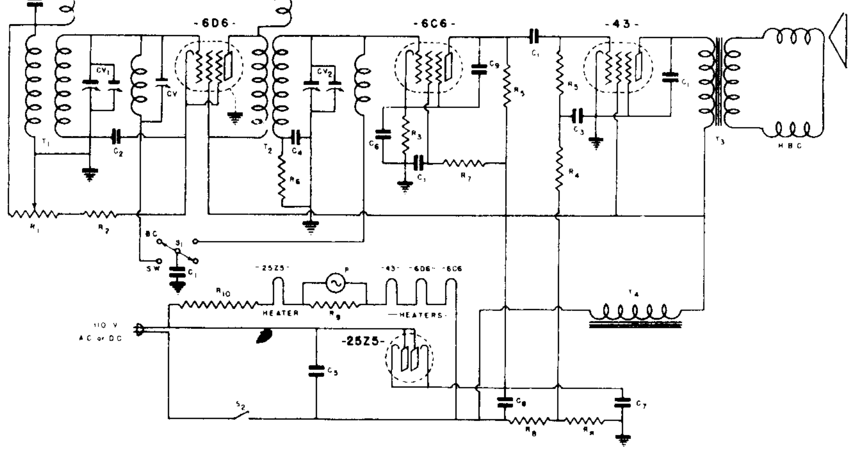
CHAMPION RADIO

MODEL 600 - 6TUBE AUTO RADIO



CLIMAX RADIO & TELEVISION CO., Inc.

DIAMOND
4 TUBE 2 BAND DESK MODEL = AC-DC TYPE

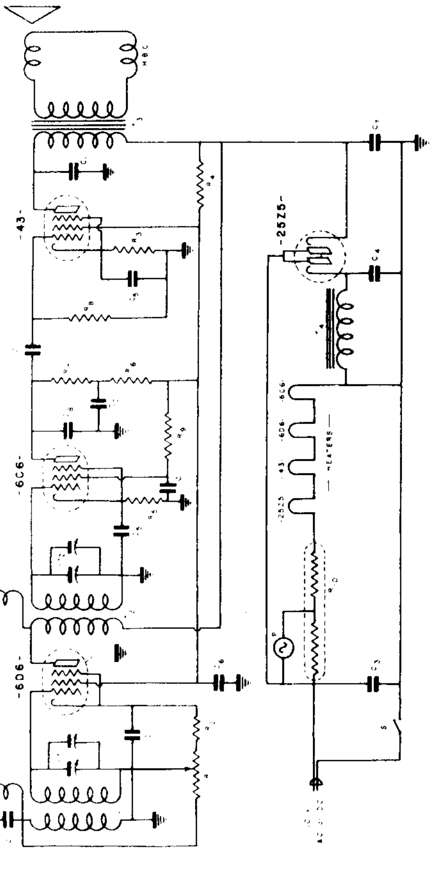


LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD 400V TUBULAR CONDENSER
C_2	212	.05 MFD 400V TUBULAR CONDENSER
C_3	215	.06 MFD 200V TUBULAR CONDENSER
C_4	203	.1 MFD. 200V TUBULAR CONDENSER
C_5	210	.1 MFD. 400V TUBULAR CONDENSER
C_6	IN 321	5 MFD 35 WV ELECTROLYTIC COND
C_7	IN 321	10 MFD 200 WV ELECTROLYTIC COND
C_8	IN 321	20 MFD. 200 W.V. ELECTROLYTIC COND.
C_9	402	.0005 MFD MICA CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
CV_{1-2}	622	2 GANG VARIABLE CONDENSER
CV	500	5-30 MMFD TRIMMER CONDENSER
R_1	2015	10,000 OHM VOLUME CONTROL
R_2	—	525 OHM (Minimum on Volume Control)
R_3	111	25,000 OHM ½ WATT CARBON RESISTOR
R_4	142	51,000 OHM ½ WATT CARBON RESISTOR
R_5	117	500,000 OHM ½ WATT CARBON RESISTOR
R_6	119	1 MEGOHM ½ WATT CARBON RESISTOR
R_7	144	4 MEGOHM ½ WATT CARBON RESISTOR
R_8	135	420 OHM ½ WATT CARBON RESISTOR

LEGEND	OUR PART NO.	DESCRIPTION
R_9	126	90 OHM 1 WATT WIRE WOUND RESISTOR
R_{10}	1807	165 OHM RESISTOR CORD
T_1	1222	BC & SW ANTENNA COIL
T_2	1314	BC & SW RF COIL
T_3	IN 803	SPEAKER OUTPUT TRANSFORMER
T_4	IN 803	SPEAKER FIELD (2500 OHMS)
S_1	1916	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
P	2902	MAZDA #46 PILOT LIGHT
A	2400	INDOOR ANTENNA HANK

DUKE
5 TUBE TRF RECEIVER = AC-DC TYPE

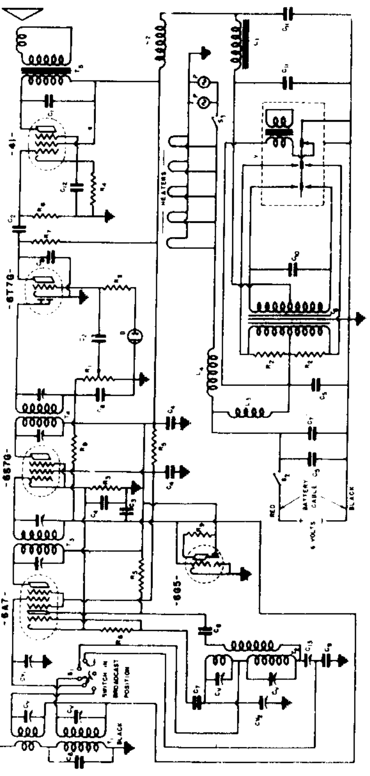


LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD 400 V TUBULAR CONDENSER
C_2	216	.018 MFD 400 V TUBULAR CONDENSER
C_3	210	.1 MFD 400 V TUBULAR CONDENSER
C_4	IN 316	4 MFD 175 W.V. ELECTROLYTIC COND
C_5	IN 316	5 MFD 25 W.V. ELECTROLYTIC COND
C_6	IN 316	8 MFD 150 W.V. ELECTROLYTIC COND
C_7	IN 316	44 MFD 175 W.V. ELECTROLYTIC COND
C_8	401	.00025 MICA CONDENSER
CV_{1-2}	62	2 GANG VARIABLE CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
R_1	2006	10,000 OHM VOLUME CONTROL
R_2	—	275 OHM (Minimum on Volume Control)
R_3	104	600 OHM ½ WATT CARBON RESISTOR
R_4	108	5,000 OHM ½ WATT CARBON RESISTOR
R_5	111	25,000 OHM ½ WATT CARBON RESISTOR
R_6	142	51,000 OHM ½ WATT CARBON RESISTOR
R_7	116	250,000 OHM ½ WATT CARBON RESISTOR
R_8	117	500,000 OHM ½ WATT CARBON RESISTOR
R_9	120	3 MEGOHM ½ WATT CARBON RESISTOR

LEGEND	OUR PART NO.	DESCRIPTION
R_{10}	2903	L-55-B BALLAST TUBE
T_1	1213	ANTENNA COIL
T_2	1312	R F COIL
T_3	IN 809	SPEAKER OUTPUT TRANSFORMER
T_4	IN 809	SPEAKER FIELD (2500 ohms)
S	—	LINE SWITCH ON VOLUME CONTROL
P	2902	MAZDA #46 PILOT LIGHT
A	2400	INDOOR ANTENNA HANK
L	809	5" DYNAMIC SPEAKER

MODEL AKE
5 TUBE SKIP-BAND SUPERHETERODYNE RECEIVER
6 VOLT BATTERY OPERATED



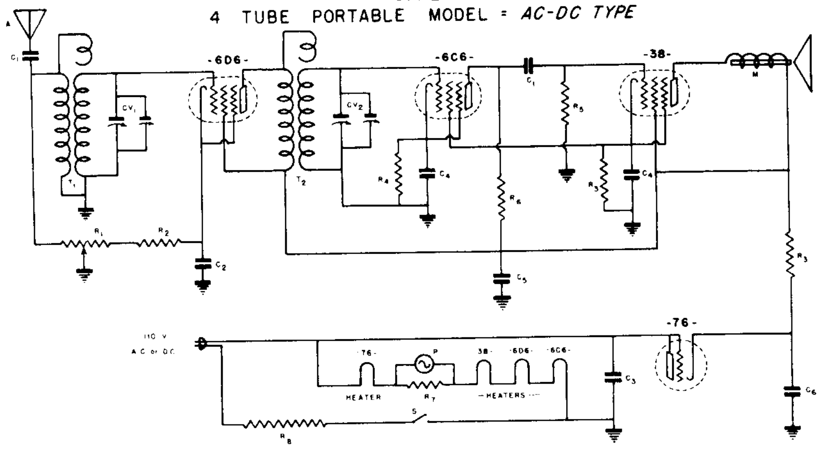
LEGEND	OUR PART NO.	DESCRIPTION
C_1	219	.002 MFD. 600 V. TUBULAR CONDENSER
C_2	211	.01 MFD. 400 V. TUBULAR CONDENSER
C_3	203	.1 MFD. 200 V. TUBULAR CONDENSER
C_4	204	.25 MFD. 200 V. TUBULAR CONDENSER
C_5	217	.5 MFD. 100 V TUBULAR CONDENSER
C_6	412	50 MMFD. MICA CONDENSER
C_7	408	100 MMFD MICA CONDENSER
C_8	401	250 MMFD. MICA CONDENSER
C_9	411	.0015 MFD. MICA CONDENSER
C_{10}	219	.01 MFD. 1600 W.V. OIL FILLED BUFFER COND.
C_{11}	324	8 MFD. 250 W.V. WET ELECTROLYTIC COND
C_{12}	304	10 MFD. 25 W.V. WET ELECTROLYTIC COND.
C_{13}	507	5 PLATE PADDING CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
C_{1-2}	[illegible]	2 GANG VARIABLE CONDENSER
C_V	500	5-30 MMFD. TRIMMER CONDENSER
T_1	1225	SKIP-BAND ANTENNA COIL
T_2	1412	SKIP-BAND OSCILLATOR COIL
T_3	1503	INPUT I.F. TRANSFORMER
T_4	1507	DIODE I.F. TRANSFORMER
T_5	IN 813	5" P.M. DYNAMIC SPEAKER TRANSFORMER
T_6	1010	VIBRATOR TRANSFORMER
S_1	1920	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
S_3	—	PILOT LIGHT SPRING SWITCH
P	2901	MAZDA #40 PILOT LIGHTS
V	2501	PLUG IN VIBRATOR
B	3000	BIAS CELL

LEGEND	OUR PART NO.	DESCRIPTION
R_1	[illegible]	500,000 OHM VOLUME CONTROL
R_2	148	100 OHM ½ WATT CARBON RESISTOR
R_3	101	150 OHM ½ WATT CARBON RESISTOR
R_4	104	600 OHM ½ WATT CARBON RESISTOR
R_5	109	10,000 OHM ½ WATT CARBON RESISTOR
R_6	113	50,000 OHM ½ WATT CARBON RESISTOR
R_7	116	250,000 OHM ½ WATT CARBON RESISTOR
R_8	117	500,000 OHM ½ WATT CARBON RESISTOR
R_9	119	1 MEGOHM ½ WATT CARBON RESISTOR
L_1	1100	FILTER CHOKE
L_2	1618	R.F. "B" CHOKE
L_3	1619	R.F. "A" CHOKE
L_4	1620	R.F. "A" CHOKE

CLIMAX RADIO & TELEVISION CO., Inc.

OPAL
4 TUBE PORTABLE MODEL = AC-DC TYPE

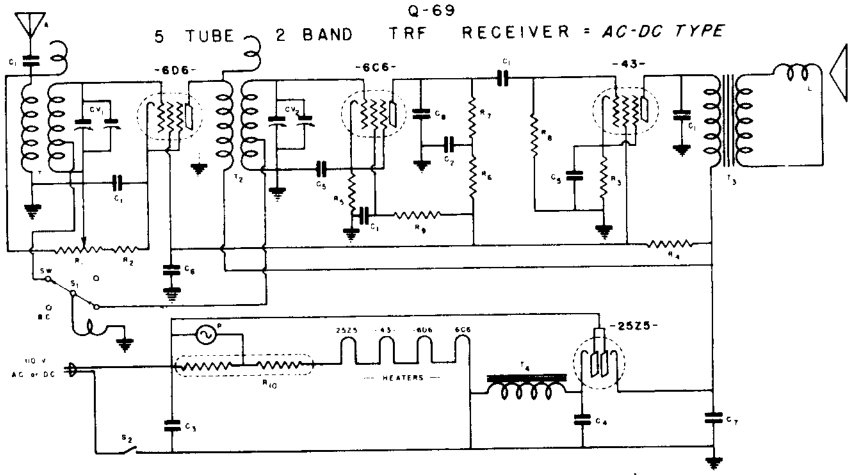


LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD 400V TUBULAR CONDENSER
C_2	203	1 MFD 200V TUBULAR CONDENSER
C_3	210	1 MFD. 400V TUBULAR CONDENSER
C_4	IN 322	5 MFD. 35WV ELECTROLYTIC COND
C_5	IN 322	8 MFD 200WV ELECTROLYTIC COND
C_6	IN 322	10 MFD 200WV ELECTROLYTIC COND
CV_{1-2}	621	2 GANG VARIABLE CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
R_1	2006	10,000 OHM VOLUME CONTROL
R_2	—	275 OHM (Minimum on Volume Control)
R_3	134	2,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	111	25,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_5	117	500,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_6	119	1 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	128	90 OHM $\frac{1}{2}$ WATT WIRE WOUND RESISTOR

LEGEND	OUR PART NO.	DESCRIPTION
R_8	1806	280 OHM RESISTOR CORD
T_1	1213	ANTENNA COIL
T_2	1312	R F COIL
M	900	5 INCH MAGNETIC SPEAKER
S	—	SWITCH ON VOLUME CONTROL
P	2902	MAZDA #46 PILOT LIGHT
A	2400	INDOOR ANTENNA HANK

Q-69
5 TUBE 2 BAND TRF RECEIVER = AC-DC TYPE



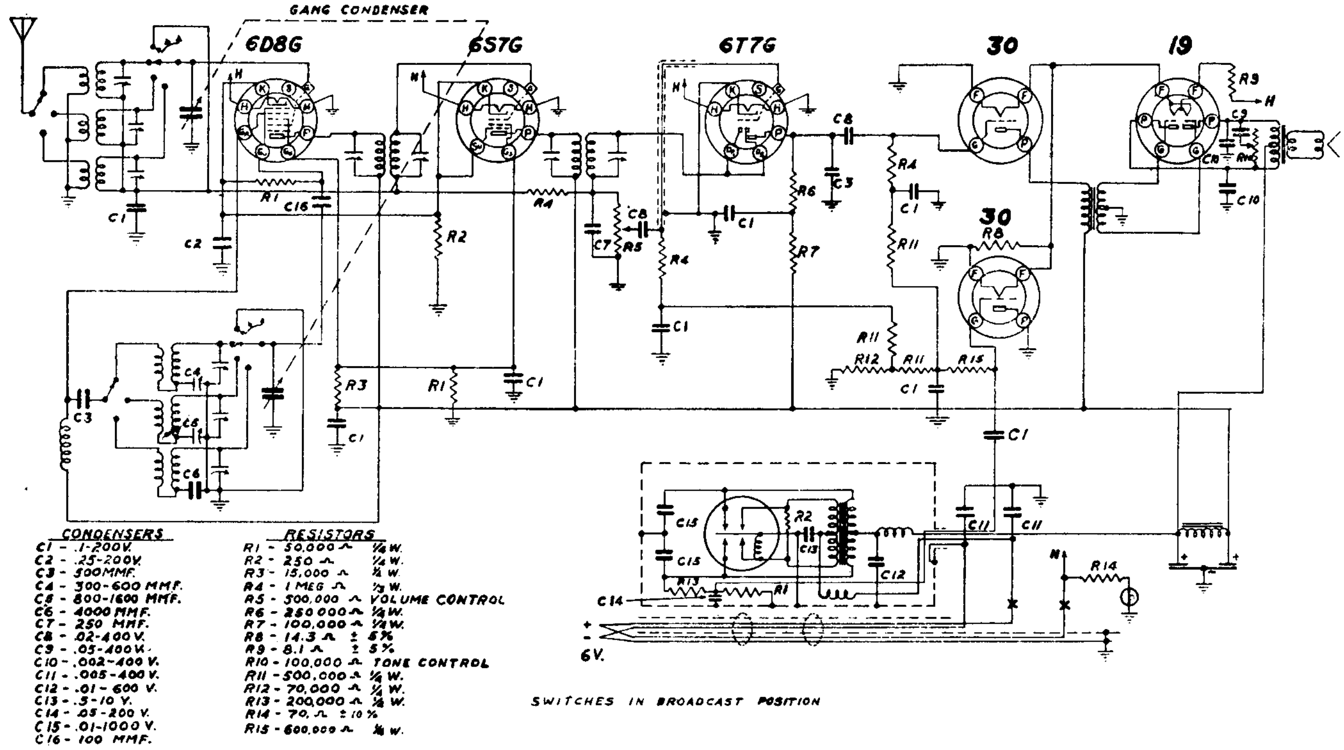
LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD 400V TUBULAR CONDENSER
C_2	218	.018 MFD 400V TUBULAR CONDENSER
C_3	210	1 MFD 400V TUBULAR CONDENSER
C_4	IN 316	4 MFD 175 WV ELECTROLYTIC COND
C_5	IN 316	5 MFD 25 WV ELECTROLYTIC COND
C_6	IN 316	8 MFD 150 WV ELECTROLYTIC COND.
C_7	IN 316	14 MFD 175 WV ELECTROLYTIC COND
C_8	401	.00025 MICA CONDENSER
CV_{1-2}	617-A	2 GANG VARIABLE CONDENSER

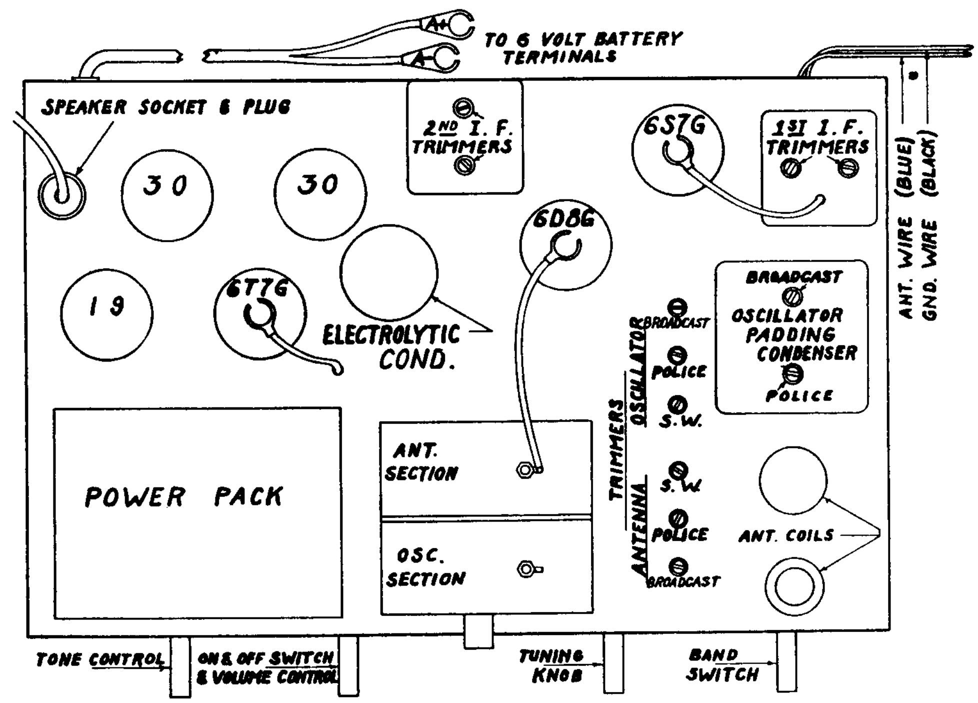
LEGEND	OUR PART NO.	DESCRIPTION
R_1	2016	10,000 OHM VOLUME CONTROL
R_2	—	450 OHM (Minimum on Volume Control)
R_3	104	600 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_4	108	3,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_5	111	25,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_6	142	51,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	116	250,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_8	117	500,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_9	120	3 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_{10}	2903	L-55-B BALLAST TUBE

LEGEND	OUR PART NO.	DESCRIPTION
T_1	1219	BC & SW ANTENNA COIL
T_2	1313	BC & SW RF COIL
T_3	IN 804	SPEAKER OUTPUT TRANSFORMER
T_4	IN 804	SPEAKER FIELD (2500 ohms)
S_1	1919	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
P	2902	MAZDA #46 PILOT LIGHT
A	2400	INDOOR ANTENNA HANK
L	804	5" DYNAMIC SPEAKER

CONTINENTAL RADIO & TELEVISION CORP.

MODEL 6P





This receiver is designed to operate over three tuning. ranges; the broadcast range which extends from 550 to 1700 Kilocycles (KC) (176 to 545 meters), Police and Aviation Band which extends from 1700 to 5400 Kilocycles (KC) (56 to 176 Meters) and the International Short Wave Band which extends from 5600 to 18,100 Kilocycles (KC) 16.5 to 53 Meters). This latter range is the one which includes the four internationally assigned bands —the 19, 25, 31 and 49 meter bands.

CONTINENTAL RADIO & TELEVISION CORP.

MODEL 6P

REASONS FOR UNSATISFACTORY OPERATION

FAILURE TO OPERATE

1. Check connections from battery cable to storage battery. If connections are reversed, set will not operate. Proper instructions for connecting the battery are given on the first page.
2. Check all tubes. Have them tested by meter equipped to test the type of tubes used in this receiver.
3. Check tube shields for good ground connections. Check grid caps for good connection. See that grid caps and tube shields are not shorted to each other (touching).
4. Reversed connections on Antenna and ground terminals. Try both ways for best results.
5. Oscillator tube (6D8G) not oscillating.
6. Vibrator unit not securely in socket.

HUM

A minimum amount of hum, equivalent to A.C. receivers, may be present. Excessive hum may be traced to the following causes:

1. Omitting the use of a ground or a poor ground connection.
2. Vibrator unit not securely fitted in socket.
3. Antenna picking up interference from high tension power lines.
4. Weak or rundown battery. Battery with defective cell.
5. Poor battery connections.
6. Extending or lengthening battery leads causes an enormous increase in "hum." The battery cable attached to the receiver is of special design and its ends **must** be connected directly to the battery terminals.

HOWLS AND SQUEALS

1. Omitting the use of a ground or poor ground connections.
2. Speaker leads placed near the (6T7G) tube. These leads should be kept away from this locality. Speaker leads should be kept along the end of chassis and front corner of cabinet.
3. Check shield on (6S7G) tube for good connection to chassis.

NOTICE — MICROPHONIC NOISE CORRECTION

If this radio instrument appears to be microphonic during operation, loosen the four (4) mounting screws that secure the chassis to the cabinet and remove the two (2) wooden strips that are underneath the chassis. This allows the chassis to float and rest on the four (4) rubber pads used for this purpose.

After the strips have been removed, adjust the chassis in the cabinet so that the dial will be in the center of the front escutcheon plate. Do not retighten the mounting screws.

"Should this radio set be moved any great distance, it is best to put the wooden strips back under the chassis and have the mounting screws securely tightened. If this is not done, damage may be done to the instrument, cabinet or tubes."

WINDCHARGERS

There are many types of windchargers now on the market which may be used to advantage for greater economy of receiver operation. Such chargers will pay for themselves over a period of time; by saving the cost of battery recharging; removing the inconvenience of taking the battery to a charging station; non-operation of the receiver during the charging period.

IMPORTANT NOTE: The battery must never be charged while set is in operation. If a windcharger is used, it should always be disconnected from the battery when the receiver is being used. An inexpensive single pole switch can be used for disconnecting the windcharged from the battery. This will increase the life of the tubes and give additional economy to the use of the receiver.

ALIGNMENT DATA AND SERVICING

GENERAL DATA

The alignment of this receiver requires the use of a test oscillator which will cover the frequencies of 456, 600, 1400, 1730, 1800, 4000, 5600, 6000, and 18,000 KC and an output meter which is to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE

The intermediate frequency (I.F. stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT

With the wave switch in the broadcast band and the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6D8G) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** Approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the antenna. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

POLICE BAND ALIGNMENT

The police band is adjusted by first replacing the .0002 dummy with a 400 ohm resistor and setting the generator to 5600 KC. With the gang set at minimum, adjust the "police oscillator trimmer" to receive this signal, then set the signal generator to 4000 KC and adjust "police antenna trimmer" to give maximum output. Next, set the oscillator to 1800 KC and "pad" the circuit at this frequency as described in the instructions for padding the broadcast circuits.

SHORT WAVE BAND ALIGNMENT

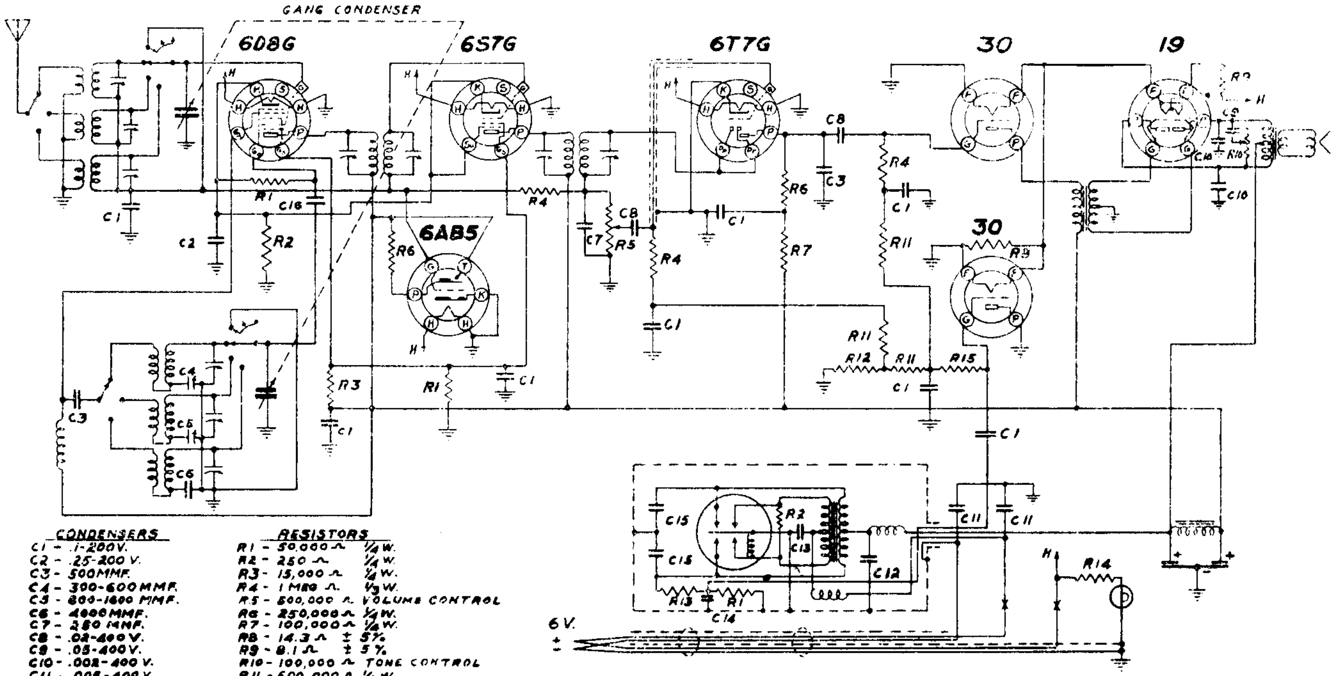
The short wave band is adjusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC and adjust the "short wave antenna" to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

SERVICE DATA FOR ALL BANDS

If it is suspected that the oscillator has stopped but is doubtful due to the presence of the usual amount of noise level, it is suggested that the oscillator plate voltage be checked. To ascertain whether the tube is oscillating, ground the oscillator grid of the 6D8G (short stator and rotor plates of oscillator section on gang condenser). If oscillating properly, grounding the grid will cause an appreciable drop in oscillator voltage.

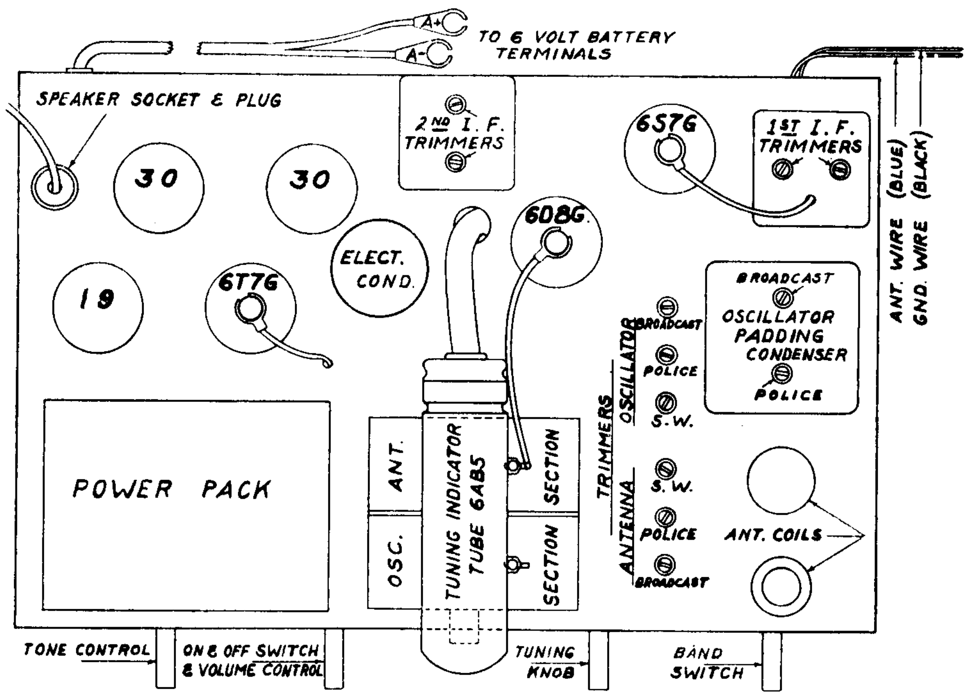
CONTINENTAL RADIO & TELEVISION CORP.

MODEL 7J



CONDENSERS	RESISTORS
C1 - .1-200V.	R1 - 50,000 Ω 1/4 W.
C2 - .25-200 V.	R2 - 250 Ω 1/4 W.
C3 - 500MMF.	R3 - 15,000 Ω 1/4 W.
C4 - 300-600MMF.	R4 - 1 MEG Ω. 1/3 W.
C5 - 800-1600 MMF.	R5 - 500,000 Ω. VOLUME CONTROL
C6 - 4000MMF.	R6 - 250,000 Ω 1/4 W.
C7 - 250 MMF.	R7 - 100,000 Ω 1/4 W.
C8 - .02-400V.	R8 - 14.3 Ω ± 5%
C9 - .05-400V.	R9 - 8.1 Ω ± 5%
C10 - .002-400 V.	R10 - 100,000 Ω TONE CONTROL
C11 - .005-400 V.	R11 - 500,000 Ω 1/4 W.
C12 - .01 - 600 V.	R12 - 70,000 Ω 1/4 W
C13 - .5-10 V.	R13 - 200,000 Ω 1/4 W.
C14 - .05-200 V.	R14 - 70 Ω ± 10%
C15 - .01-1000 V.	R15 - 600,000 Ω 1/4 W.
C16 - 100 MMF.	

SWITCHES IN BROADCAST POSITION



This receiver is designed to operate over three tuning ranges; the broadcast range which extends from 550 to 1700 Kilocycles (KC) (176 to 545 meters), Police and Aviation Band which extends from 1700 to 5400 Kilocycles (KC) (56 to 176 Meters) and the International Short Wave Band which extends from 5600 to 18,100 Kilocycles (KC) 16.5 to 53 Meters). This latter range is the one which includes the four internationally assigned bands —the 19, 25, 31 and 49 meter bands.

CONTINENTAL RADIO & TELEVISION CORP.

MODEL 7J

REASONS FOR UNSATISFACTORY OPERATION

FAILURE TO OPERATE

1. Check connections from battery cable to storage battery. If connections are reversed, set will not operate. Proper instructions for connecting the battery are given on the first page.
2. Check all tubes. Have them tested by meter equipped to test the type of tubes used in this receiver.
3. Check tube shields for good ground connections. Check grid caps for good connection. See that grid caps and tube shields are not shorted to each other (touching).
4. Reversed connections on Antenna and ground terminals. Try both ways for best results.
5. Oscillator tube (6D8G) not oscillating.
6. Vibrator unit not securely in socket.

HUM

A minimum amount of hum equivalent to A.C. receivers may be present. Excessive hum may be traced to the following causes:

1. Omitting the use of a ground or a poor ground connection
2. Vibrator unit not securely fitted in socket.
3. Antenna picking up interference from high tension power lines.
4. Weak or rundown battery. Battery with defective cell.
5. Poor battery connections.
6. Extending or lengthening battery leads causes an enormous increase in "hum." The battery cable attached to the receiver is of special design and its ends **must** be connected directly to the battery terminals.

HOWLS AND SQUEALS

1. Omitting the use of a ground or poor ground connections.
2. Speaker leads placed near the (6T7G) tube. These leads should be kept away from this locality. Speaker leads should be kept along the end of chassis and front corner of cabinet.
3. Check shield on (6S7G) tube for good connection to chassis.

NOTICE — MICROPHONIC NOISE CORRECTION

If this radio instrument appears to be microphonic during operation, loosen the four (4) mounting screws that secure the chassis to the cabinet and remove the two (2) wooden strips that are underneath the chassis. This allows the chassis to float and rest on the four (4) rubber pads used for this purpose.

After the strips have been removed, adjust the chassis in the cabinet so that the dial will be in the center of the front escutcheon plate. Do not retighten the mounting screws.

"Should this radio set be moved any great distance, it is best to put the wooden strips back under the chassis and have the mounting screws securely tightened. If this is not done, damage may be done to the instrument, cabinet or tubes."

WINDCHARGERS

There are many types of windchargers now on the market which may be used to advantage for greater economy of receiver operation. Such chargers will pay for themselves over a period of time; by saving the cost of battery recharging; removing the inconvenience of taking the battery to a charging station; non-operation of the receiver during the charging period.

IMPORTANT NOTE: The battery must never be charged while set is in operation. If a windcharger is used, it should always be disconnected from the battery when the receiver is being used. An inexpensive single pole switch can be used for disconnecting the windcharged from the battery. This will increase the life of the tubes and give additional economy to the use of the receiver.

ALIGNMENT DATA AND SERVICING

GENERAL DATA

The alignment of this receiver requires the use of a test oscillator which will cover the frequencies of 456, 600, 1400, 1730, 1800, 4000, 5600, 6000, and 18,000 KC and an output meter which is to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE

The intermediate frequency (I.F. stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT

With the wave switch in the broadcast band and the gang condenser set at minimum, adjust the test ocillator to 456 KC and connect the output to the grid of the first detector tube (6D8G) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** Approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the antenna. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

POLICE BAND ALIGNMENT

The police band is adjusted by first replacing the .0002 dummy with a 400 ohm resistor and setting the generator to 5600 KC. With the gang set at minimum, adjust the "police oscillator trimmer" to receive this signal, then set the signal generator to 4000 KC and adjust "police antenna trimmer" to give maximum output. Next, set the oscillator to 1800 KC and "pad" the circuit at this frequency as described in the instructions for padding the broadcast circuits.

SHORT WAVE BAND ALIGNMENT

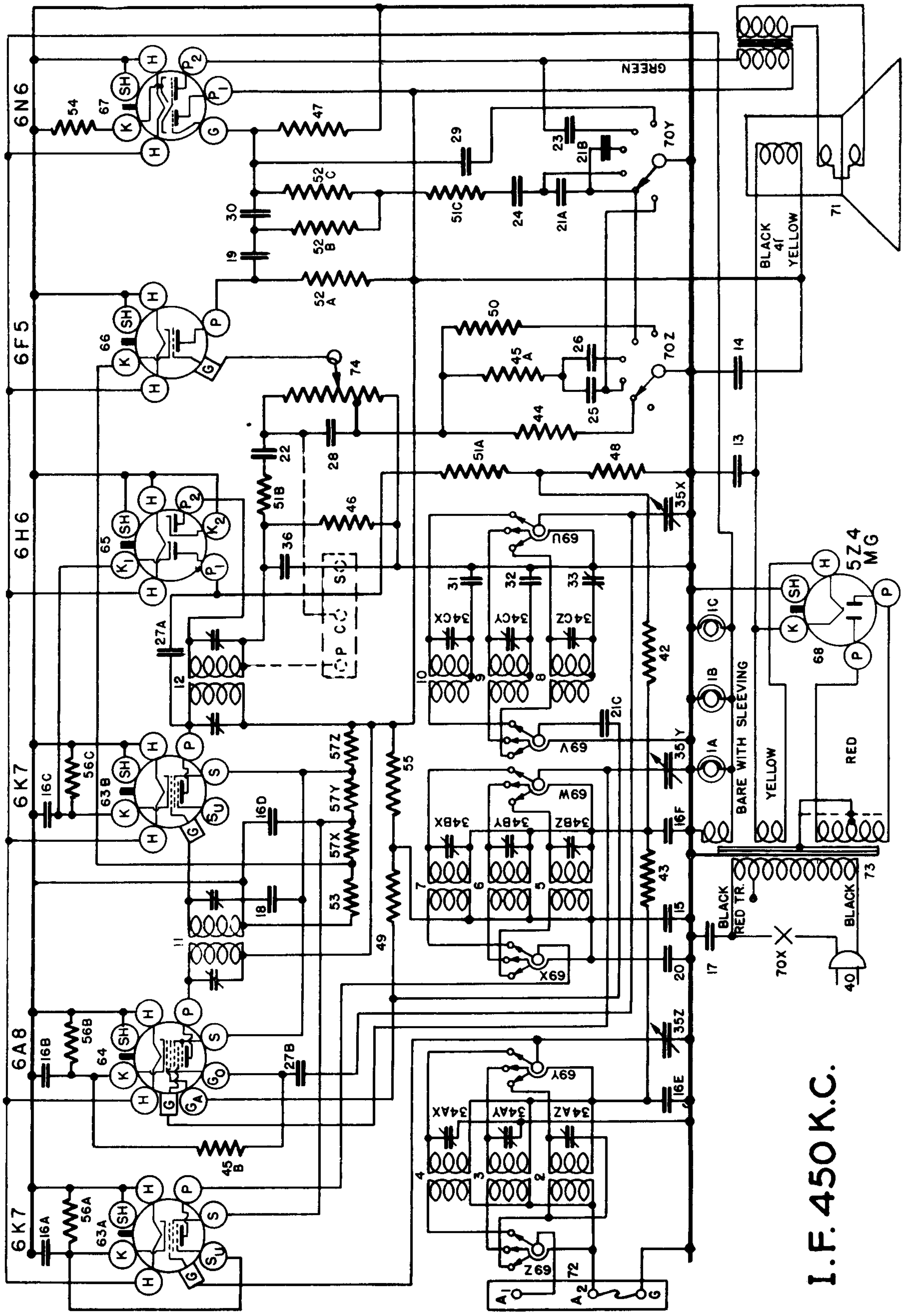
The short wave band is adjusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC and adjust the "short wave antenna" to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

SERVICE DATA FOR ALL BANDS

If it is suspected that the oscillator has stopped but is doubtful due to the presence of the usual amount of noise level, it is suggested that the oscillator plate voltage be checked. To ascertain whether the tube is oscillating, ground the oscillator grid of the 6D8G (short stator and rotor plates of oscillator section on gang condenser). If oscillating properly, grounding the grid will cause an appreciable drop in oscillator voltage.

THE CROSLEY RADIO CORPORATION

MODELS 726 & 769



I.F. 450 K.C.

THE CROSLEY RADIO CORPORATION

MODELS 726 & 769

SPECIFICATIONS

The Crosley Radio Model 726 is a seven tube superheterodyne receiver designed to operate on an ALTERNATING CURRENT power supply. It is available with either 110 V., 60 Cy., or 110 V., 25 Cy., Transformers.

It is a three band receiver and the dial is divided into three sections as follows:

BLUE 540-1800 Kilocycles (American Broadcast Band)
RED 1.8- 6.0 Megacycles (Police and Amateurs)
GREEN 6.0- 18.0 Megacycles (High Frequency Band)

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt. 5 0 volt D.C. voltmeter (except filaments) with the receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A-C voltmeter (Approximately 0-10 volts). Readings may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Where Used	H	P	P_2	S	G	Su	K	Ga
6K7	R. F. Amplifier	6.3	235	--	73	0	3.0	3.0	
6A8	Osc.-Mod.	6.3	270	--	96	0	--	3.5	145
6K7	I. F. Amplifier	6.3	270	--	96	0	2.7	2.7	
6H6	Det. & AVC	6.3	0	--	--	--	--	0	---
6F5	A. F. Amplifier	6.3	135		—	0	-	2.5	--
6N6	Output	6.3	270	260	—	0		2.2	---
5Z4MG	Rectifier	5.0	---	---	-	—	-	350	

Power Output Approximately 6 Watts.
Power Consumption Approximately 83 Watts at 117.5 Volts.
Voltage Drop Across Speaker Field 77 Volts

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits may be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to the two plates of the 6N6 Output Tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8 tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the fidelity control knob to the left (NORMAL).

(c) Turn the band selector switch to the High Frequency Band.

(d) Set the signal generator to 450 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F transformer for maximum output.

(f) Adjust both trimmers located on top of the 1st I-F Transformer for maximum output.

(g) Check operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

Aligning R-F Amplifier.

When aligning the R-F Amplifier the output lead of the signal generator is connected to the "ANT" terminal of the receiver. For the BLUE and RED bands a .00025 mfd. condenser must be connected in series with the output lead of the signal generator and for the high-frequency band a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be shunt aligned and then series aligned, where provision is made for series alignment (BLUE band). The band selector switch should be set for the band being aligned and the station selector and signal generator should be set to the frequency indicated (c) for each adjustment.

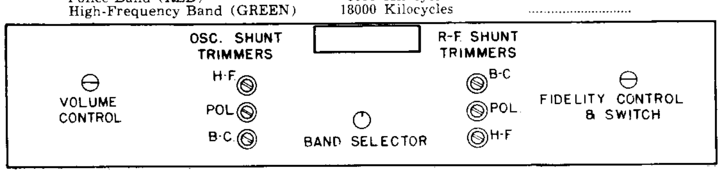
(a) Adjust the "OSC.," "ANT" and "R-F" shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check the adjustments of the "ANT" and "R-F" trimmers. DO NOT READJUST the "OSC" TRIMMER.

NOTE: When shunt aligning the RED and GREEN bands care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times, or more, and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct position.

(b) To align the series trimmer (Item 33, Fig. 2) set the signal generator to the frequency indicated (c) and then tune-in this signal with the station selector for maximum output. To obtain the best adjustment for the series trimmer it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output.

(c) Signal Input Frequencies:

	Shunt Alignment	Series Alignment
American Broadcast Band (BLUE)	1700 Kilocycles	600 Kilocycles
Police Band (RED)	6000 Kilocycles	....
High-Frequency Band (GREEN)	18000 Kilocycles	....



Front View

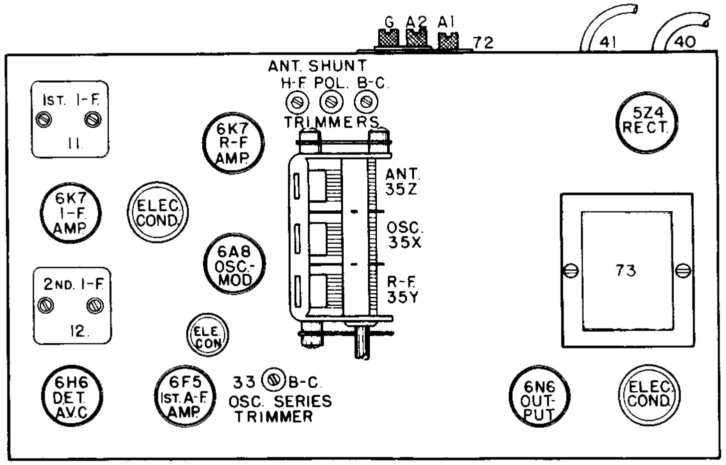


Fig. 2 Top View

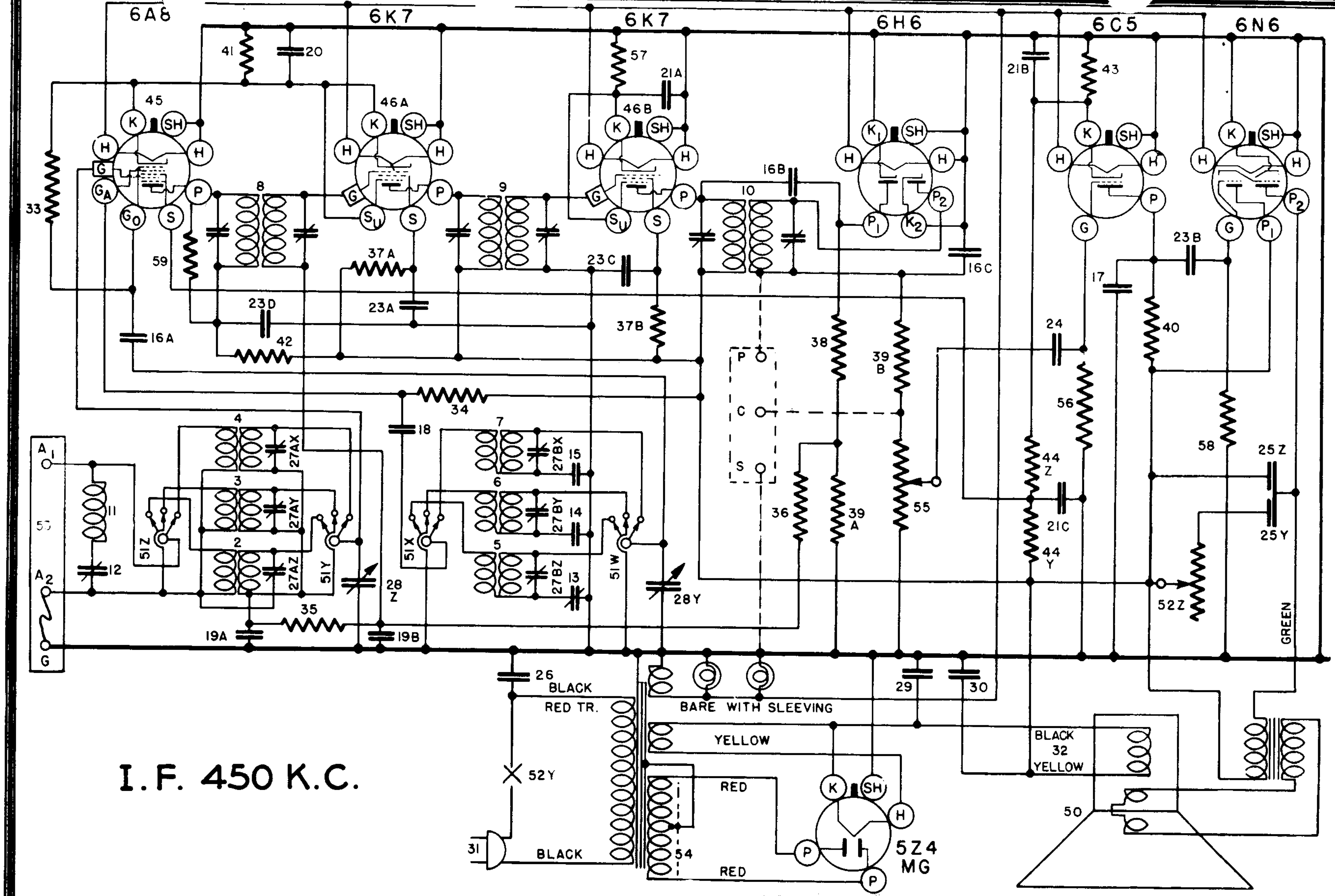
Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1ABC	W —37922	Dial Light
	G3 -37965	Socket Assy. Dial Light
2	G110 -32000	Coil Ant. 540-1800 Kc.
3	G111—32000	Coil Ant. 1800-6000 Kc.
4	G112 -32000	Coil Ant. 6.-18 Mc.
5	G76 —32001	Coil R. F. 540 1800 Kc.
6	G89 —32001	Coil R. F. 1800-6000 Kc.
7	G90 -32001	Coil R. F. 6.-18 Mc.
8	G115- 32002	Coil Osc. 590 1800 Kc.
9	G121 -32002	CoilOsc. 1800 6000 Kc.
10	G122—32002	Coil Osc. 6.-18 Mc.
11	G121 -32004	1st. IF. Assy.
12	G120—32004	2nd. IF. Assy.
13	W -36055	Condenser, 35Mf. 400V.
14	W —36057	Condenser, 40Mf. 300V
15	W 41081	Condenser 16Mf. 250V.
16A TO 16F	W —36541	Condenser, .02Mf. 160V.
	W -36541	Condenser, .02Mf. 160V.
17	W -30805	Condenser, .01Mf. 400V.
18	W —35936	Condenser, .05Mf. 200V.
19	W -32780B	Condenser, 05Mf. 400V.
20	W —32378	Condenser, .01Mf. 400V.
21A	W —35139	Condenser, .004Mf. 400V.
21B	W -35139	Condenser, .004Mf. 400V.
21C	W —35139	Condenser, 004Mf. 400V.
22	W -28621	Condenser, .02Mf. 200V.
23	W -23615	Condenser, .05Mf. 400V.
24	W -30323	Condenser, .01Mf. 200V.
25	W —28619	Condenser, .006Mf. 200V.
26	W -25435	Condenser, .003Mf. 400V.
27A	G2 - 34002	Condenser, .0001Mf. (Mica)
27B	G2 —34002	Condenser, .0001Mf. (Mica)
28	G8 -34002	Condenser, .00001Mf. (Mica)
29	G3 —34002	Condenser, .0005Mf. (Mica)
30	G6 -34002	Condenser, .000025Mf. (Mica)
31	G20 —34000	Condenser, 4910Mmf. (Mica)
32	G7 - 34000	Condenser, 1450Mmf. (Mica)
33	—40769	Condenser, B. C. Osc. Series Trim.
34	W -35951	Condenser, 3 Section Trimmer
35	G52 -33002	Condenser, 3 Gang Var. Tuning
	MG33 —42255	Dial Drive Assy.
	C -42491	Dial Glass (Calibrated)
	—42300	Drive Unit
	-42597	Dial Mask (Cardboard)
	W -42180	Dial Hand, Pointer
	—41144	Dial Hand, Time Log
	W -40486	Pointer Mtg. Screw
36	G1 - 34002	Condenser, .00025 Mf. (Mica)
37	W -30270	Condenser .001 Mf. 400V.
40	B —33906A	Power Cord & Plug
41	G3 - 35696	Cable, Speaker
42	—37245	Resistor, Meg. Ohm. 1/4 W.
43	-35600	Resistor, 100,000 Ohm. 1/4 W.

Item No.	Part No.	Description
44	- 36319	Resistor, 75,000 Ohm. 1/4 W.
45A	-35928	Resistor, 60,000 Ohm. 1/4 W.
45B	—35928	Resistor, 60,000 Ohm. 1/4 W.
46	-36321	Resistor, 400,000 Ohm. 1/4 W.
47	-38623	Resistor 750,000 Ohm. 1/4 W.
48	-36322	Resistor, 500,000 Ohm. 1/4 W.
49	-37377	Resistor, 20,000 Ohm. 1 W.
50	-35929	Resistor, 150,000 Ohm. 1/4 W.
51A	-35601	Resistor, 300,000 Ohm. 1/4 W.
51B	-35601	Resistor, 300,000 Ohm. 1/4 W.
51C	-35601	Resistor, 300,000 Ohm. 1/4 W.
52A	35930	Resistor, 200,000 Ohm. 1/4 W.
52B	-35930	Resistor, 200,000 Ohm. 1/4 W.
52C	-35930	Resistor, 200,000 Ohm. 1/4 W.
53	W -30127	Resistor, 450 Ohm. 1/2 W. Flex.
54	W -23012A	Resistor, 40 Ohm 3/4 W. Flex.
55	- 6705	Resistor, 3500 Ohm. 1 W.
56A	W -28589	Resistor, 350 Ohm. 1/2 W. Flex.
56B	W - 28589	Resistor, 350 Ohm. 1/2 W. Flex.
56C	W -28589	Resistor, 350 Ohm. 1/2 W. Flex.
57Z		Resistor, 16 500 Ohm.
57Y	W -37781	Resistor, 4 000 Ohm. Cand. Ohm.
57X		Resistor 18,500 Ohm.
63A	G151- 36400	Socket Type 6K7
63B	G151 -36400	Socket Type 6K7
64	G156—36400	Socket Type 6A8
65	G155—36400	Socket Type 6H6
66	G158 -36400	Socket Type 6F5
67	G165—36400	Socket Type 6N6
68	G154 36400	Socket Type 5Z4
69	C -40910A	Band Selector Switch
70Z		Fidelity Switch
70Y	B —42387C	Fidelity Switch
70X		Line Switch
71	-645CJ3	Speaker "M" Spec. 1D640
	—42883	Cone Assy. (For Above Speaker)
	- 40406	Field Coil (For Above Speaker)
	-42885	Output Trans. (For Above Speaker)
72	G27 - 26719	Ant. & Gnd. Terminal Assy.
73	42260	Power Trans. 60 Cy. 110 V.
	-42261	Power Trans. 25 Cy. 110 V.
74	- 42501	Volume Control 3 Meg.
		Misc. Parts
	C -42045	Escutcheon
	B -42043	Escutcheon Rubber
	D 30	Screws—Escutcheon Mtg.
	C 42044	Lens—Escutcheon
	W - 40230B	Emblem
	W 32620	Nut Emblem Mtg.
	W -36117	Rubber Mtg. Foot
	W - 37339	Knob (2 Req.)
	W -40192B	Knob, B. S. Sw. (1 Req.)
	W - 42490	Knob, S. S. (1 Req.)
	6-NG	Cabinet

THE CROSLEY RADIO CORPORATION

MODELS 736 & 759



I. F. 450 K.C.

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt, 500 volt D.C. voltmeter (except filaments) with the receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A-C voltmeter (approximately 0-10 volts). Readings may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	K	S	Go	Ga
6A8	Osc.-Mod.	6.3	280	3.2	130	-5 to -30	160
6K7	1st. I. F. Amp.	6.3	280	3.2	110	—	—
6K7	2nd. I. F. Amp.	6.3	280	8.0	130	—	—
6H6	Det. & AVC	6.3	—	—	—	—	—
6C5	1st. A. F. Amp.	6.3	155	6.5	—	—	—
6N6	Output	6.3	220	—	P_2 280	—	—
5Z4	Rectifier	5.0	—	330	—	—	—

Power Output Approximately 6 Watts.

Power Consumption Approximately 80 Watts at 117.5 Volts Voltage Drop Across Speaker Field Approximately 50 Volts.

THE CROSLEY RADIO CORPORATION

MODELS 736 & 759

SPECIFICATIONS

The Crosley Receiver Model 736 is a seven tube superheterodyne radio designed to operate on an ALTERNATING CURRENT power supply. It incorporates a WAVE-TRAP in its construction so that interfering signals between the frequencies of approximately 440 and 480 Kilocycles may be reduced so that they are not objectionable if not entirely eliminated from over riding station being received.

It is a three band receiver and the dial is divided into three sections as follows:

BLUE	540-1800 Kilocycles	(American Broadcast Band)
RED	1.8- 6.0 Megacycles	(Police and Amateurs)
GREEN	6.0- 18.0 Megacycles	(High Frequency Band)

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to the two plates of the 6N6 Output Tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8 tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Turn the band selector switch to the High Frequency Band.

(d) Set the signal generator to 450 kilocycles.

(e) Adjust both trimmers located on the top of the 3rd I-F Transformer for maximum output.

(f) Adjust both trimmers located on top of the 2nd I-F Transformer for maximum output.

(g) Adjust both trimmers located on top of the 1st I-F Transformer for maximum output.

(h) Check operations (e), (f) and (g) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

Aligning R-F Amplifier.

When aligning the R-F Amplifier the output lead of the signal generator is connected to the "ANT" terminal of the receiver. For the BLUE and RED bands a .0002 mfd. condenser must be connected in series with the output lead of the signal generator and for the high-frequency band a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be shunt aligned and then series aligned, where provision is made for series alignment (BLUE band). The band selector switch should be set for the band being aligned and the station selector and signal generator should be set to the frequency indicated (c) for each adjustment.

(a) Adjust the "OSC" and "ANT" shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check the adjustments of the "ANT" trimmers. DO NOT READJUST the "OSC" TRIMMER.

NOTE: When shunt aligning the RED and GREEN bands care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times, or more, and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct position.

(b) To align the series trimmer (Item 13, Fig. 2) set the signal generator to the frequency indicated (c) and then tune-in this signal with the station selector for maximum output. To obtain the best adjustment for the series trimmer it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output.

(c) Signal Input Frequencies:

	Shunt Alignment	Series Alignment
American Broadcast Band (BLUE)	1700 Kilocycles	600 Kilocycles
Police Band (RED)	6000 Kilocycles	....
High-Frequency Band (GREEN)	18000 Kilocycles	....

TO ADJUST WAVE TRAP

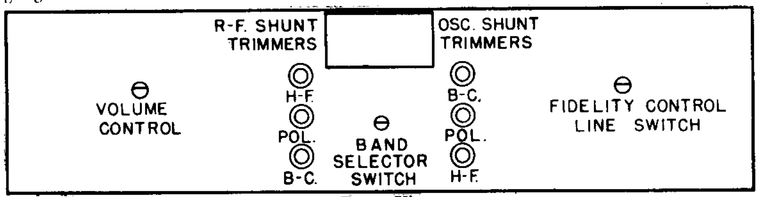
Connect the output of the signal generator through an .02 Mf. condenser to the ANT. terminal on the chassis and the other lead to GND. terminal.

(a) Adjust signal generator to frequency of interfering signal.

(b) Set station selector to approximately 650 Kilocycles with the band selector in the Broadcast position.

(c) Adjust Wave Trap trimmer (Item 12, Fig. 2) to minimum signal.

For simple adjustment tune-in station with maximum interference and adjust Wave Trap Trimmer for minimum interference.



Front View

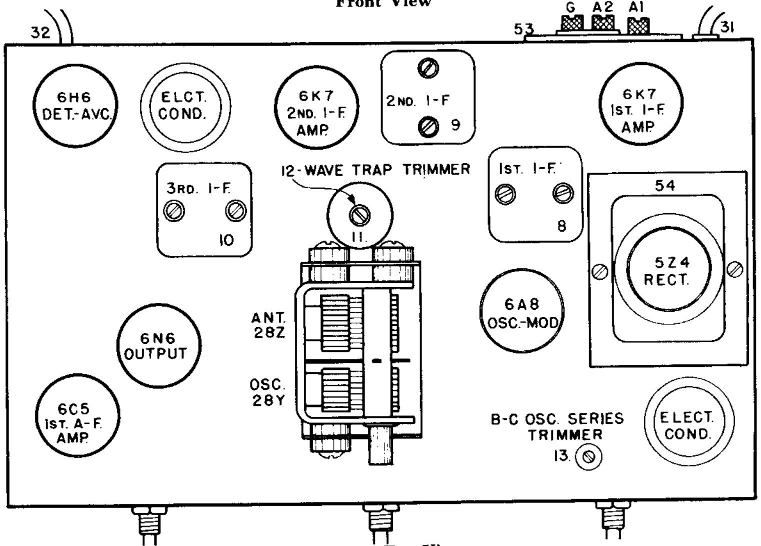


Fig. 2 Top View

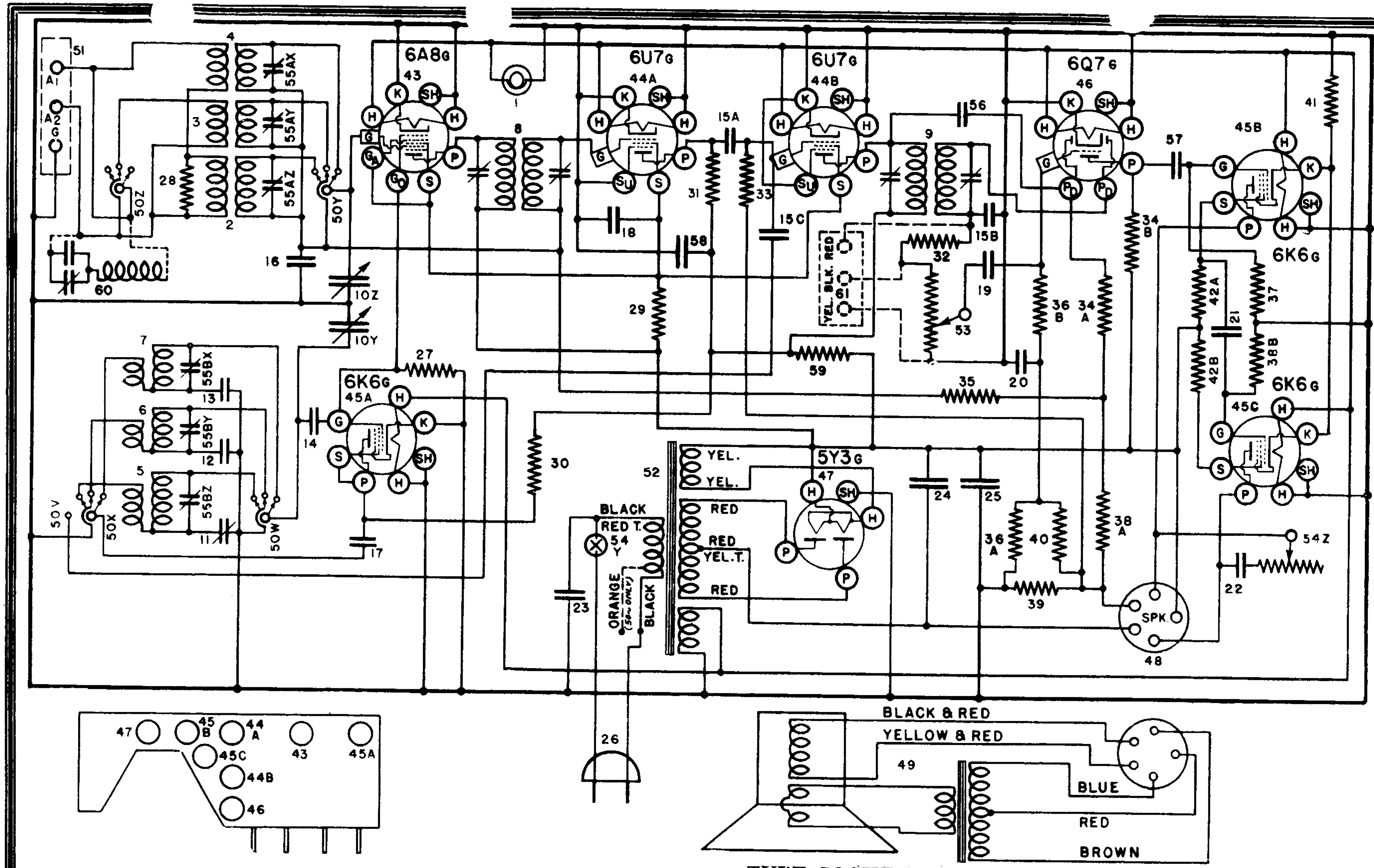
Figures in first column refer to parts in Diagrams.

Item No.	Part No	Name Value
1AB	W —37992	Bulb, Dial Light 6–8V.
	G3 —37965	Socket Assy. Dial Light
2	G120—32000	Coil, Ant. 540-1800 Kc.
3	G119—32000	Coil, Ant. 1800–6000 Kc.
4	G121—32000	Coil, Ant. 6000–18000 Kc.
5	G112—32002	Coil, Osc. 540-1800 Kc.
6	G111—32002	Coil, Osc. 1800-6000 Kc.
7	G113—32002	Coil, Osc. 6000–18000 Kc.
8	G125—32004	Coil, Assy. 1st. I. F. 450 Kc.
9	G124—32004	Coil, Assy. 2nd. I. F. 450 Kc.
10	G100—32004	Coil, Assy. 3rd. I. F. 450 Kc.
11	G1 —32006	Coil, Assy. Wave Trap
	LW —37235A	Coil, Only Wave Trap
12	W —37232	Condenser, Wave Trap Trimmer
	G5 —31927	Shield Assy. Wave Trap
13	—40769	Condenser, 400 to 500 Mmf., B. C. Osc. Series Trimmer
14	G7 —34007	Condenser, 1750 Mmf., Pol. Osc. Series, Fixed
15	G8 —34007	Condenser, 4350 Mmf , H. F. Osc. Series, Fixed
16A	G2 —34002	Condenser, .0001 Mf. Molded
16B	G2 —34002	Condenser, .0001 Mf. Molded
16C	G2 —34002	Condenser, .0001 Mf. Molded
17	G1 —34002	Condenser, .00025 Mf. Molded
18	W —35139	Condenser, .004 Mf. 400 V. Tub.
19A	W —35936	Condenser, .05 Mf. 200 V. Tub.
19B	W —35936	Condenser, .05 Mf. 200 V. Tub.
20	W —29910A	Condenser, .25 Mf. 200 V. Tub.
21A	W —28621	Condenser, .02 Mf. 200 V. Tub.
21B	W —28621	Condenser, .02 Mf. 200 V. Tub.
21C	W —28621	Condenser, .02 Mf. 200 V. Tub.
23A	W —30488	Condenser, .02 Mf. 400 V. Tub.
23B	W —30488	Condenser, .02 Mf. 400 V. Tub.
23C	W —30488	Condenser, .02 Mf. 400 V. Tub.
23D	W —30488	Condenser, .02 Mf. 400 V. Tub.
24	W —35758	Condenser, .008 Mf. 400 V. Tub.
25Z	W —31052	Condenser, .004 Mf. 400 V. Tub.
25Y		Condenser, .05 Mf. 400 V.
26	W —30805	Condenser, .01 Mf. 400 V. Tub.
27A	W —35951	Condenser,3Sect.Trimmer,Ant.Shunt
27B	W —35951	Condenser,3Sect.Trimmer,Osc.Shunt
28	G21 —33001	Condenser, 2 Sect. Gang.
	MG27—42390	Dial Drive Assy.
	C —42420	Dial Glass (Calibrated)
	—41844	Drive Unit
	W —42684	Dial Hand
	W —40486	Screw, Hand Mtg.

Item No.	Part No.	Name Value
	—41582	Cable, Drive
29	W —36055	Condenser, 35 Mf. 400 V. Elect.
30	W —36057	Condenser, 40 Mf. 300 V. Elect.
31	B —33906A	Cord & Plug, Power
32	G3 —35696	Cable, Speaker
33	—40757	Resistor, 50,000 Ohm. ¼ W.
34	—23616	Resistor 15,000 Ohm. 1 W.
35	—21454	Resistor, 1. Megohm ¼ W.
36	—37245	Resistor, 1.5 Megohm ¼ W.
37A	—21875	Resistor, 100,000 Ohm ¼ W.
37B	—21875	Resistor, 100,000 Ohm. ¼ W.
38	—35930	Resistor, 200,000 Ohm. ¼ W.
39A	—21455	Resistor, 300,000 Ohm. ¼ W.
39B	—21455	Resistor, 300,000 Ohm. ¼ W.
40	—37768	Resistor, 6500 Ohm. ½ W.
41	W —21964	Resistor, 165 Ohm. ½ W. Flex.
42	—23013	Resistor, 2000 Ohm. 1 W. Flex.
43	W —22514	Resistor, 750 Ohm. ½ W. Flex.
44Z	W —32301	Resistor, 10000 Ohm } Candohm
44Y		Resistor, 15000 Ohm } Candohm
45	G156—36400	Socket Type. 6A8
46A	G151—36400	Socket Type, 6K7
46B	G151—36400	Socket Type, 6K7
47	G155—36400	Socket Type, 6H6
48	G152—36400	Socket Type, 6C5
49	G165—36400	Socket Type, 6N6
50	—632CJ3	Speaker, "M". Spec. 1—D—610
	—42879	Cone Assy., For Above Spk.
	—42880	Field Coil, For Above Spk.
	—42881	Output Trans., For Above Spk.
51	—40770A	Switch, Band Selector
52Z	—37908	Tone Control 100,000 Ohm.
52Y		Line Switch
53	G27 —26719	Terminal Board, Ant. & Gnd.
54	—41978A	Transformer, Power 110 V. 60 Cy.
55	—37967	Volume Control 1 Megohm.
56	—36688	Resistor, 3 Megohm, ¼ W.
57	W —28106	Resistor, 500 Ohm. ½ W. Flex.
58	—36322	Resistor, 500,000 Ohm. ¼ W.
59	—35928	Resistor, 60,000 Ohm. ¼ W.
	W —42408	Escutheon Ring Assy.
	—41880	Dial Lens
	—41881	Lens Retaining Ring
	—7670	Screws, (2 Req.) Escutcheon Mtg.
	W —37339	Knob, (3 Req.)
	W —40192B	Knob, (1 Req.)
	W —36117	Foot, (4 Req.) Rubber Mtg.
	6-T	Cabinet

THE CROSLEY RADIO CORPORATION

MODEL 817



I. F. 456 K.C.

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt, 500-volt D. C. voltmeter (except filaments) with receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A. C. voltmeter (approximately 0-10 volts). Readings may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	G	K	Go	Ga
6A8G	Modulator	6.3	240	85	Neg	0	Neg	85
6K6G	Oscillator	6.3	145	145	Neg	0	—	—
6U7G	1st I-F Amp	6.3	240	85	Neg	0	—	—
6U7G	2nd I-F Amp	6.3	210	85	Neg	0	—	—
6Q7G	Det., AVC & 1st A-F Amp	6.3	120	—	Neg	0	—	—
6K6G	Output	6.3	235	230	0	18.5	—	—
6K6G	Output	6.3	235	230	0	18.5	—	—
5Y3G	Rectifier	5.0	—	—	—	240	—	—

Power output approximately 5.5 watts.
Power consumption approximately 70 watts at 117.5 volts
Voltage drop across speaker field 80 volts

THE CROSLEY RADIO CORPORATION

MODEL 817

This model Crosley radio is an 8-tube AC receiver designed for American and Foreign broadcast reception.

The tuning range is from 540 kilocycles to 22 megacycles and is divided into three bands as follows:

540-1850 Kilocycles or 555-162 Metres (American Broadcast Band)
1.9- 6.6 Megacycles or 158-45.5 Metres (Police & Amateur Band)
6.4- 22 Megacycles or 47-13.5 Metres (High Frequency or Foreign Band)

Circuit Description

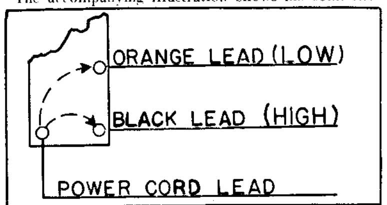
Eight octal base glass tubes are employed in a superheterodyne circuit which consists of separate oscillator and modulator tubes, two stages of I-F amplification—the second of which is resistance coupled, a combination AVC and diode detector and 1st A-F amplifier tube, push pull output and power supply. The speaker field is located in the negative leg of the power supply. The bias for all tubes except the output is developed across a 40 ohm resistor, item 39, located between the speaker field and ground. Phase inversion is obtained in the output circuit by the voltage developed across a 3000 ohm resistor, item 42A, located in the screen circuit of one of the output tubes, item 45B.

50 CYCLE POWER TRANSFORMER ADJUSTMENT

Receivers equipped with a 50 cycle power transformer have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

The accompanying illustration shows the connections



for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits may be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to the plates of the two 6K6G Output tubes. Be certain that the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

Tuning I-F Amplifier to 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8G tube, leaving the tube's grid lead in place. Connect the ground lead from the signal generator to the ground terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Turn the band selector switch to the High Frequency Band.

(d) Set the signal generator to 455 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F assm. for maximum output. (Item 9, Fig. 2)

(f) Adjust both trimmers located on top of the 1st I-F assm. for maximum output. (Item 8, Fig. 2)

(g) Check operations (e) and (f) for more accurate adjustment.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

Aligning R-F Amplifier.

When aligning the R-F amplifier the output lead from the signal generator is connected to the "ANT" terminal of the receiver. For the Broadcast and Police Bands a .00025 mfd. condenser should be connected in series with the output lead of the signal generator and for the High Frequency band a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be shunt aligned and then series aligned where provision is made for series alignment (Broadcast Band). The band selector switch should be set for the band being aligned and the station selector and signal generator should be set to the frequency indicated for each adjustment, paragraph (c) below.

(a) Adjust the "OSC" and "ANT" shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check the adjustment of the "ANT" trimmer. DO NOT READJUST THE "OSC" TRIMMER.

NOTE: When shunt aligning the Police and High Frequency Bands care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times, or more, to try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct frequency.

(b) To align the B. C. OSC. series trimmer (Fig 2), set the signal generator to the frequency indicated below and then tune-in this signal with the station selector for maximum output. To obtain the best adjustment for the series trimmer, it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output.

(C) SIGNAL INPUT FREQUENCIES

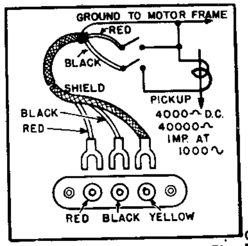
	Shunt Alignment	Series Align.
American Broadcast Band	1700 Kilocycles	600 Kilocycles
Police & Amateur Band	6000 "	
Foreign Band	18 Megacycles	

WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 kilocycles. This assembly is located on the underneath side of the chassis and consists of a coil, a fixed condenser and a trimmer condenser as illustrated by dotted lines in the Wiring Diagram (item 60).

The wave trap should not be adjusted until all other adjustments have been made. To make the adjustment, feed a 455 kilocycle signal from the signal generator through a .00025 mfd. condenser into the antenna terminal of the receiver. With the band selector switch turned to the Broadcast Band position, the gang condenser open and the volume control full on, adjust the trimmer condenser on the wave trap for minimum output.

Should the interfering station be operating on a frequency of slightly more or less than 455 kilocycles, the exact frequency should be determined with the aid of the signal generator. Then, instead of feeding a 455 kilocycle signal into the receiver the exact frequency of the interfering signal should be used. If it is not possible to determine the exact frequency of the interfering signal the antenna may be attached to the receiver and the receiver tuned to the position where the interfering signal is most noticeable. Then adjust the wave trap for minimum interference.



Phonograph Pickup

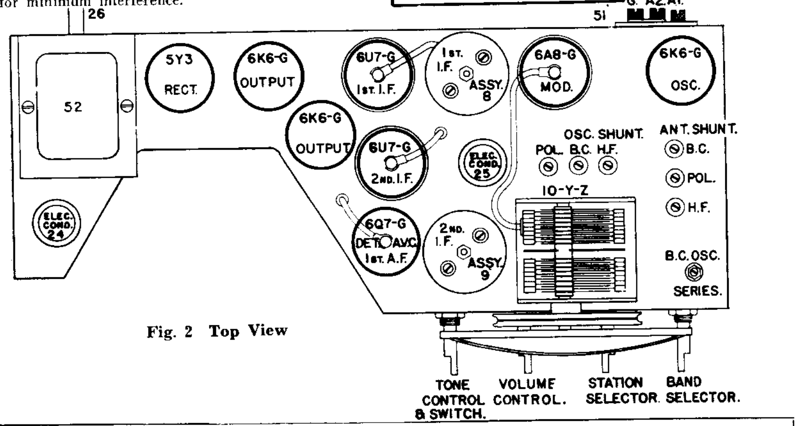


Fig. 2 Top View

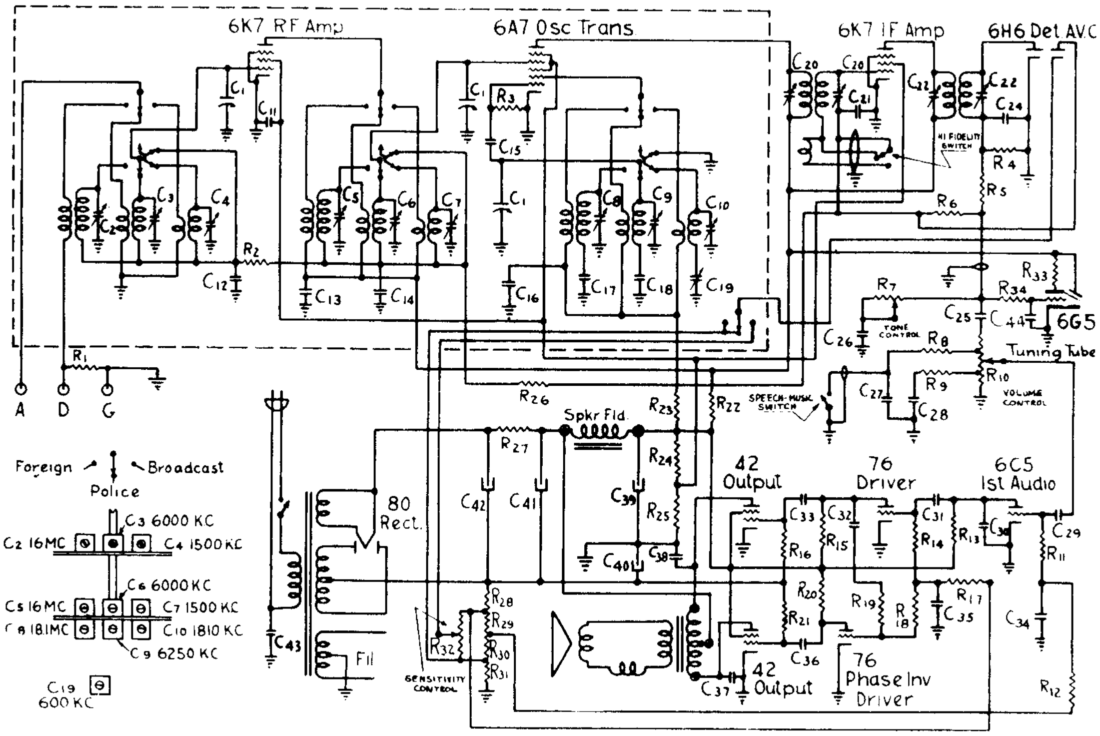
Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Name Function
1	W —43567	Bulb, Dial Light, 6-8 V.
	W —44364	Bracket, for Dial Light
2	G139—32000	Ant. Coil, 535-1850 Kc.
3	G138—32000	Ant. Coil, 1900-6600 Kc.
4	G140—32000	Ant. Coil, 6.5-22 Mc.
5	G139—32002	Osc. Coil, 535-1850 Kc.
6	G138—32002	Osc. Coil, 1900-6600 Kc.
7	G140—32002	Osc. Coil, 6.5-22 Mc.
8	G153 —32004	1st I-F Assy.
9	G154 —32004	2nd I-F Assy.
10ZY	G41 — 33001	2 Section Gang Cond.
	D —44080	Glass Dial Face
	W —44085B	Dial Mask (Paper)
	W —44084	Dial Support Ring
	C —44082	Support Brkt., Dial Glass
	G1 —43564	Pulley and Hub Assy.
	—41582	Drive Cord (11½ in. Req.)
	W —44134	Drive Shaft
	W —43549	Shaft Ret. Ring
	W —43542B	Brkt. for Drive Shaft
	W —43561	Drive Spring
	W —44299	Dial Hand
	W —40486	Pointer Mtg. Screw
11	—40769	B-C. Osc. Series Trimmer
12	G23 —34000	Condenser, 1560 Mmf.
13	G20 —34000	Condenser, 4910 Mmf.
14	G13 —34002	Condenser, 35 Mmf.
15ABC	G2 —34002	Condenser, 100 Mmf.
16	W —35936	Condenser, .05 Mf. 200 V.
17	W —35139	Condenser, .004 Mf. 400 V.
18	W —22688	Condenser, .1 Mf. 400 V.
19	W —27652	Condenser, .003 Mf. 200 V.
20	W —28621	Condenser, .02 Mf. 200 V.
21	W —30488	Condenser, .02 Mf. 400 V.
22	W —23615	Condenser, .05 Mf. 400 V.
23	W —30805	Condenser, .01 Mf. 400 V.
24	W —44054	Condenser, 30 Mf. 350 V.
25	W —36057	Condenser, 40 Mf. 300 V.
26	B —33906A	Power Cord and Plug
27	—21237A	Resistor, 60,000 Ohm. ¼W.
28	—22196	Resistor, 20,000 Ohm. ¼W.
29	—44008	Resistor, 10,000 Ohm. 2W.
30	—23616	Resistor, 15,000 Ohm. 1W.
31	—31093	Resistor, 2,700 Ohm. ¼W.
32	35600	Resistor, 100,000 Ohm. ¼W.
33	—21875	Resistor, 100,000 Ohm. ¼W.

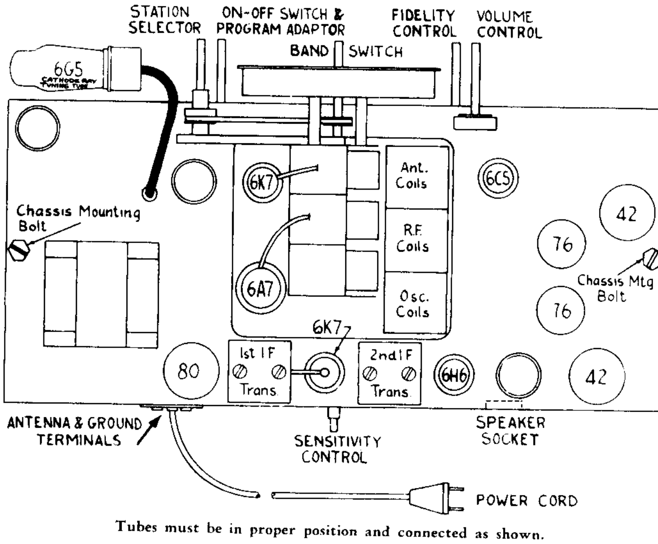
Item No.	Part No.	Name Function
34AB	—21455C	Resistor, 300,000 Ohm. ¼W.
35	—21454	Resistor, 1 Megohm ¼W.
36AB	—26577	Resistor, 3 Megohm ¼W.
37	—36322C	Resistor, 500,000 Ohm. ¼W.
38AB	—23785	Resistor, 500,000 Ohm. ¼W.
39	W —23012A	Resistor, 40 Ohm. ¾W. Flex.
40	—34883	Resistor, 2 Megohm ¼W.
41	W —21965	Resistor, 375 Ohm. 1W. Flex.
42AB	—44009	Resistor, 3,000 Ohm. ¼W.
43	G156—36400	Socket, Type 6A8
44AB	G171—36400	Socket, Type 6U7
45ABC	G172—36400	Socket, Type 6K6
46	G160—36400	Socket, Type 6Q7
47	G173—36400	Socket, Type 5Y3
48	G103 —28807	Socket, Type Speaker
	W —40911	Tube Shield
	W —27981A	Base, Tube Shield
49	465BP—12"M"	Speaker Spec., 1-D-1049 "M"
	—44272	V. C. and Cone Assy. for 465BP12"M" Spkr.
	—44273	Field Coil for 465BP12"M" Spkr.
	—44274	Output Trans. for 465BP12"M" Spkr.
	W —43552	Spk. Plug Clamp
50	—44019	Band Selector Switch
51	G27 —26719	A1-A2-G. Terminal Assy.
52	—44057	Power Trans., 110 V. 60 Cy.
	—44058	Power Trans., 110 V. 50 Cy.
	—44059	Power Trans., 220 V. 50 Cy.
	—44060	Power Trans., 110 V. 25 Cy.
	—44061	Power Trans., 220 V. 25 Cy.
53	44081	Volume Control, 1 Meg.
54Z	—44024	Tone Control, 100,000 Ohm.
54Y		Line Switch
55	W —35951	3 Sect. Shunt Trimmer Assy.
56	G3 —34002	Condenser, 500 Mmf.
57	W —34647	Condenser, .005 Mf. 400 V.
58	W —32378	Condenser, .01 Mf. 400 V.
59	W 23013	Resistor, 2,000 Ohm. 1¼W. Flex.
	W —44088	Knob
	W —50164A	Knob
	W 43553	Rubber Mtg. Foot
	W 44225	Grille Bar (2)
	—44092	Grille Cloth
	-7C	Cabinet
	B —44226B	Escutcheon
60	G165—32001	Wave Trap

DETROLA RADIO AND TELEVISION CORPORATION

MODEL 155X



TUBE LAYOUT *and* CONNECTION DIAGRAM



Tubes must be in proper position and connected as shown.

ALINEMENT PROCEDURE

Connect a high impedance AC voltmeter across the loudspeaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from the generator, strong signals tend to cause improper adjustments.

Be sure that the fidelity control is NOT in the HIGH FIDELITY position. It will not be possible to properly aline the receiver unless this control is turned part way toward its "bass" position.

IF. Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of the generator, apply 456 kc. signal to the grid of the 6K7 IF amplifier tube and aline second IF transformer trimmers. Repeat for first IF transformer, applying signal to grid of the 6A7 tube. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1810 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1500 1600 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

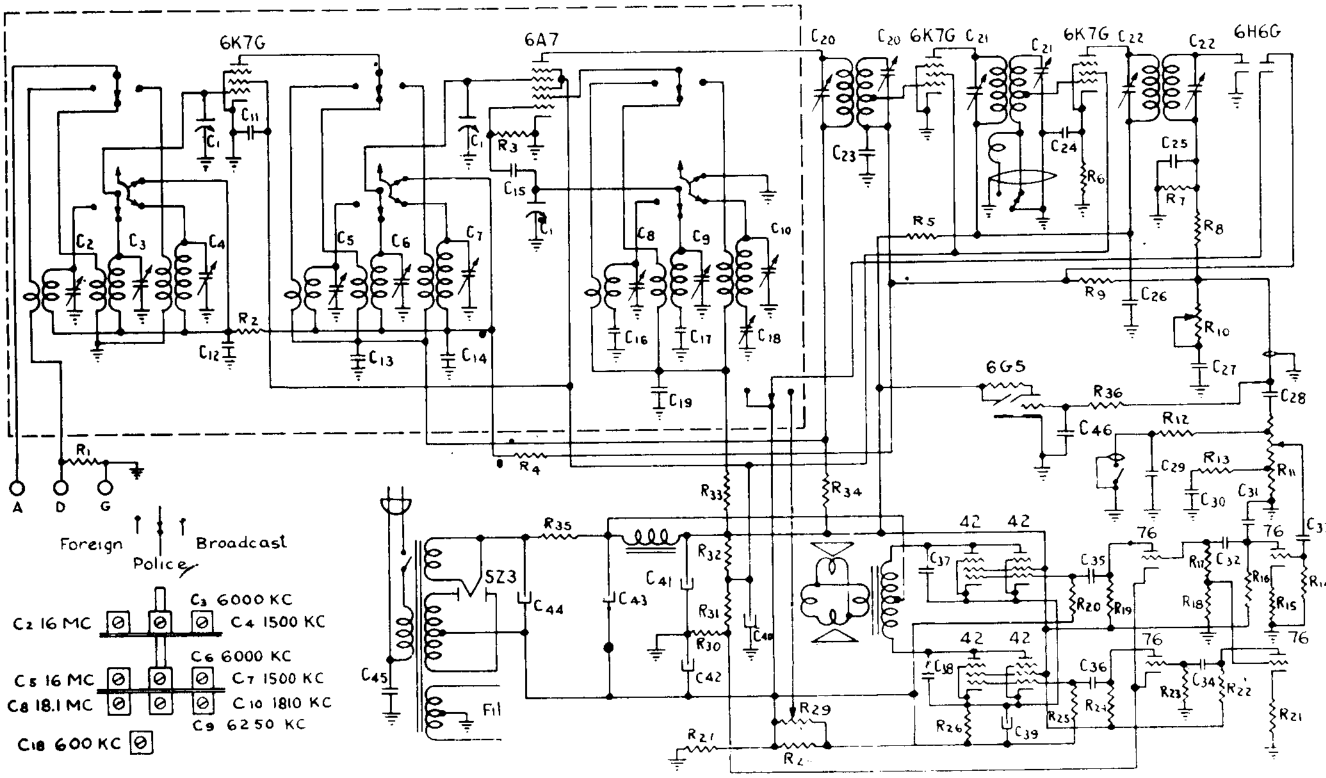
A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alinement of the two short wave bands. Set the band selector switch in the center position, adjust the oscillator top frequency for 6250 kc., then aline the antenna and RF trimmers at about 6000 kc. With the band selector in the extreme right position, adjust the top frequency of the high frequency to 18,100 kc., and aline the antenna and RF trimmers at about 16,000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmer down tight, then unscrew to the second peak. The antenna and RF trimmers should be screwed down tight, then unscrewed to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be set in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

PARTS LIST

Symbol	*Part No.*	*Description*
C1	3814	9 400 mmf Variable
C2,3,4	3822	2 35 triple trimmer
C5,6,7	3822	2-35 triple trimmer
C8,9,10	3822	2 35 triple trimmer
C11,21,34	572	.1 200 V.
C12,14	580	.05 200 V.
C13	575	.1 400 V.
C15,24	2780	50 mmf mica
C16	568	.01 400 V.
C17	2694	.005 5% tolerance
C18	2741	1330 mmf 5% tolerance
C19	2560	350 mmf variable padder
C20 22		IF Trimmers
C25 28	2385	.02 200 V.
C26	2695	.003 600 V.
C27	824	.002 500 V.
C29	576	.02 400 V.
C30	1286	250 mmf mica
C31,33 36	2600	.02 600 V.
C32	563	.05 400 V.
C35	570	.25 200 V.
C37 38	3138	.001 800 V.
C39	3113	16 MF regulating
C40	3136	20 MF 25 V.
C41	3112	16 MF 450 V.
C42	3111	16 MF 500 V.
C43	3135	.003 800 V.
R1,5,15,20 26	603	100 M 1 3 W.
R2 3 13	631	50 M 1 3 W.
R4 14 16 21	615	500 M 1 3 W.
R6	2693	2 meg 1/3 W.
R7	3799	2 meg tone control
R8,17	2568	300 M 1 3 W.
R9,23	617	20 M 1/3 W.
R10	3800	3 meg volume control
R11 12	624	1 meg 1/3 W.
R18	2688	60 M 1 3 W. 10%
R19	2731	500 M 1/3 W. 10%
R22	2421	1 M 1 3 W.
R24	3805	7 M 3.5 W.
R25	3805	8 M 1.5 W.
R27	3809	100 ohms 2 W. 10%
R28	3806	120 ohms 1.5 W. 10%
R29	3808	50 ohms .75 W. 10%
R30	3807	35 ohms .5 W. 10%
R31	3870	15 ohms .5 W. 10%
R32	3801	2 M Variable
	3796	Power transformer
	3797	No. 1 IF transformer
	3798	No. 2 IF transformer
	2981	Tuning tube cable
	3838	12" Speaker
	2898	Tuning tube clamp
	3815	RF coil
	3943	Oscillator coil
	3817	Antenna coil
	3825	Planetary drive
	3826	Drive belt
	3198	Idler pulley
	3199	Idler spring
	3831	Minute pointer
	3832	Tuning pointer
	3802	On off switch
	3818	RF and Antenna switch
	3819	Oscillator switch

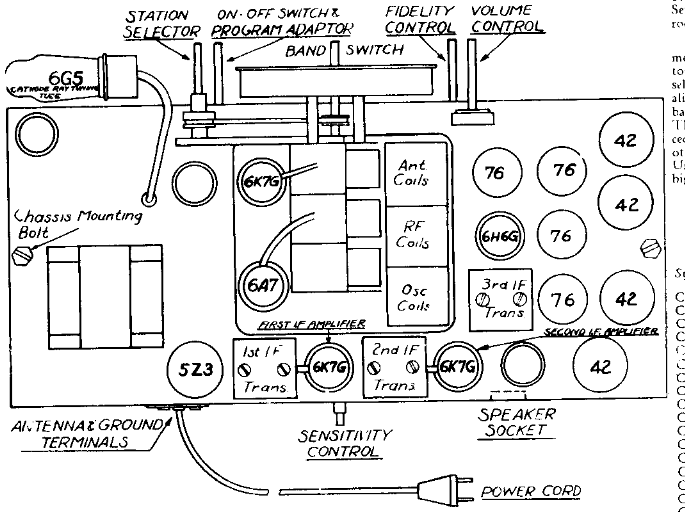
DETROLA RADIO AND TELEVISION CORPORATION

MODEL 163



I.F. 456 K.C.

TUBE LAYOUT and CONNECTION DIAGRAM



Tubes must be in proper position and connected as shown.

ALINEMENT PROCEDURE

Connect a high impedance AC voltmeter across the loudspeaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from the generator, strong signals tend to cause improper adjustments.

Be sure that the fidelity control is NOT in the HIGH FIDELITY position. It will not be possible to properly aline the receiver unless this control is turned part way toward its "bass" position.

IF. Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of generator, apply 456 kc. signal to grid of 6K7G second IF amplifier and aline transformer No. 3. Repeat for transformer No. 2, applying signal to grid of 6K7G first IF amplifier. Repeat for transformer No. 1, applying signal to grid of 6A7 translator. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1810 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1500-1600 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alinement of the two short wave bands. Set the band selector switch in the center position, adjust the oscillator top frequency for 6250 kc., then aline the antenna and RF trimmers at about 6000 kc. With the band selector in the extreme right position, adjust the top frequency of the high frequency to 18,100 kc., and aline the antenna and RF trimmers at about 16,000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmer down tight, then unscrew to the second peak. The antenna and RF trimmers should be screwed down tight, then unscrewed to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be set in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

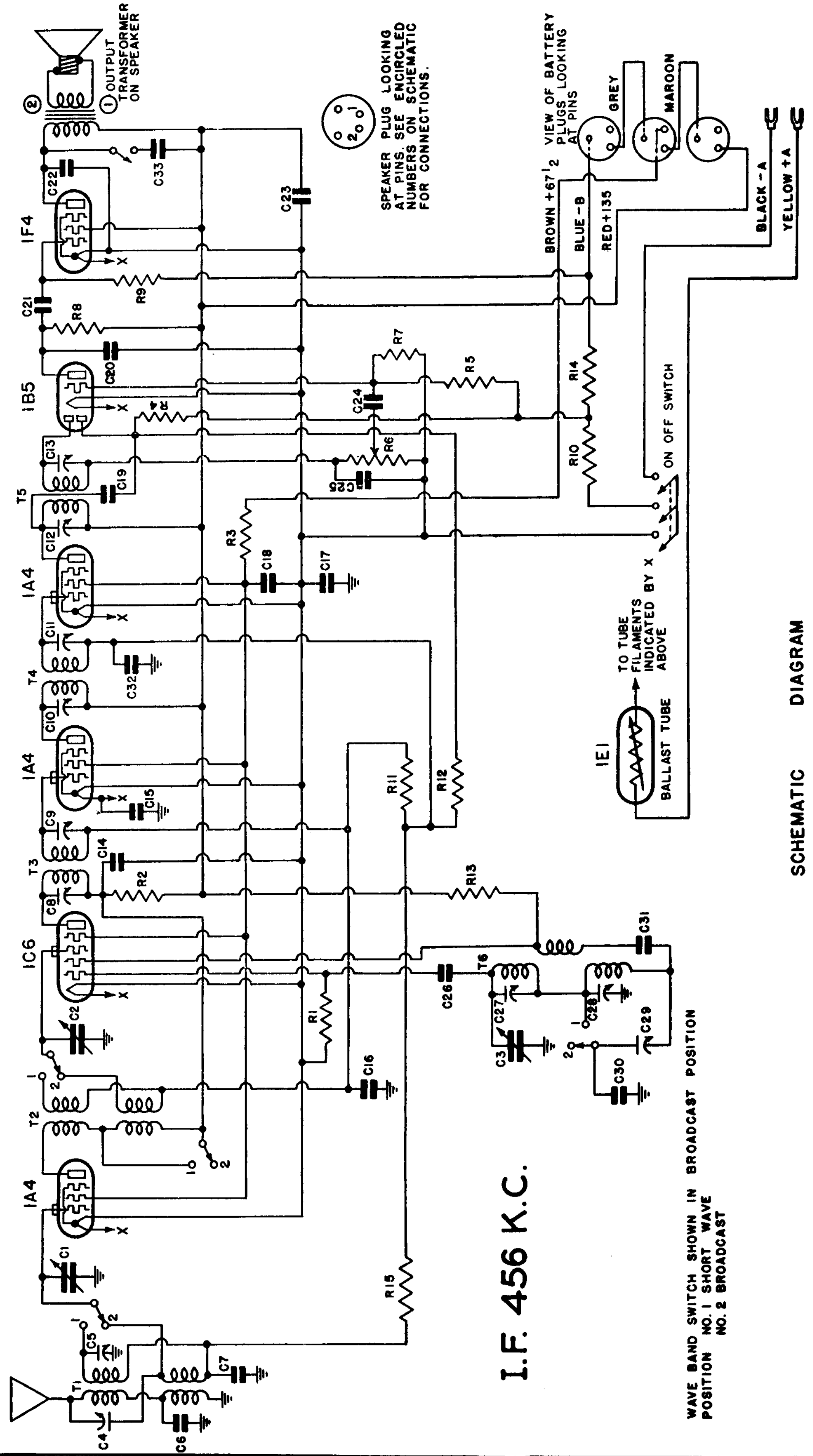
PARTS LIST

Symbol	Part No.	Description
C1	3814	9-400 mmf variable
C2,3,4	3822	2-35 triple trimmer
C5,6,7	3822	2-35 triple trimmer
C8,9,10	3822	2-35 triple trimmer
C11,23	572	.1 200V.
C12,14,46	580	.05 200V.
C13	575	.1 400V.
C15,25	2780	50 mmf mica
C16	2694	.005 5% tolerance
C17	2741	1330 mmf 5% tolerance
C18	2560	350 mmf variable padder
C19,24	568	.01 400V.
C20,21,22		IF trimmers
C26	563	.05 400V.
C27	2695	.003 600V.
C28,33	576	.02 200V.
C29	824	.002 600V.
C30	4072	.03 200V.
C31	1286	250 mmf mica
C32,34,35,36	2600	.02 600V.
C37,38	3138	.001 800V.
C39,42	4071	20 MF 35 WV.
C40	3079	8 MF 150V.
C41	4062	30 MF 275V. Reg.
C43	3112	16 MF 450V.
C44	3111	16 MF 500V
C45	3135	.003 800V.
R1,4,8,16,19,22,24	603	100 M 1/3 W.
R2,3	631	50 M 1/3 W.
R5,6,34	2421	1 M 1/3 W.
R7,23	615	500 M 1/3 W.
R9	2693	2 meg 1/3 W.
R10	3799	2 meg tone control
R11	3800	3 meg volume control

Symbol	Part No.	Description
R12,20,25	2568	300 M 1/3 W.
R13,33	617	20 M 1/3 W.
R14	624	1 meg 1/3 W.
R15,21	614	5 M 1/3 W.
R17	2731	500 M 10% 1/3 W.
R18	2880	100 M 10% 1/3 W.
R26	4068	300 ohm 10% 3 W. flex.
R27	3808	50 ohm 10% 3/4 W. flex.
R28	4069	200 ohm 10% 2 W. flex.
R29	3801	2 M variable
R30	639	750 ohm 1/3 W.
R31	3805	8 M 1.5 W.
R32	3805	7 M 3.5 W.
R35	4070	100 ohm 10% 3 W. flex.
	4058	Power transformer
	4061	No. 1 IF transformer
	4060	No. 2 IF transformer
	3968	No. 3 IF transformer
	2981	Tuning tube cable
	4082	12" Dynamic speaker
	4079	12" P.M. speaker
	2898	Tuning tube clamp
	3815	RF coil
	3943	Oscillator coil
	3817	Antenna coil
	3825	Planetary drive
	3826	Drive belt
	3198	Idler pulley
	3199	Idler spring
	3831	Minute pointer
	3832	Tuning pointer
	3802	On-off switch
	3818	RF and antenna switch
	3819	Oscillator switch

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS AF, AF-171, AF-173, AF-176, AF-179, AF-180 & AF-185



EMERSON RADIO AND PHONOGRAPH CORPORATION
MODELS AF, AF-171, AF-173, AF-176, AF-179, AF-180 & AF-185

Current drain	"A" battery—0.48 amps. "B" battery—0.013 amps. with no signal
Frequency range	540 to 1730 kc and 5.6 to 18.0 mc

GENERAL NOTES

1. The battery complement should be as follows:

Type	*No. Required*	*Battery Manufacturer* Eveready *Part No.*	Burgess *Part No.*	Ray-o-vac *Part No.*
3 volt "A"	1	X-125 or A-600	20F2	P9403
45 volt "B"	3	385 (plug-in type)	22308 (plug-in type)	P9303 (plug-in type)

2. The receiver is designed for an "A" supply of 2 to 3 volts. A 2 volt storage battery may be used, in which case the 1E1 (ballast) tube, in the chassis becomes unnecessary and may be eliminated as follows:
   If it is definitely known that a 2 volt storage battery will always be used it is permissable and advisable to short-circuit the two heavy prongs on the 1E1 tube by connecting them with a short piece of bare wire. *Be sure that the two small prongs on the tube are free of this bare wire.*

3. The color coding of the i-f transformer leads is as follows:
   Grid—green — Plate—blue
   Grid return—black — B plus—red

4. Note that all leads in the battery cable are color coded. The two "A" leads are tagged with small metal markers giving the polarity. The battery cable is equipped with three plugs for "B" battery connections. These plugs are all alike and may be inserted in any order in the sockets of the three "B" batteries. The color coding of the battery cable is as follows:

Red	B plus 135
Brown	B plus 67.5
Blue	B neg.
Yellow	A plus 3
Black	A neg.

5. If replacements are made in the r-f section of the circuit, the receiver should be carefully re-aligned.

6. Be very careful not to remove any of the tubes from their sockets with the power switch turned on, as the rapid rise in filament voltage will damage the remainder of the tubes.

Tube Data

The tube complement is as follows:
1—1A4, r-f amplifier (to right of variable condenser)
1—1C6, oscillator-modulator
1—1A4, 1st i-f amplifier (to left of variable condenser)
1—1A4, 2nd i-f amplifier (behind variable condenser)
1—1B5-25S, 2nd detector, a.v.c., a-f amplifier
1—1F4, pentode output
1—1E1, ballast tube.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to A neg. with volume control turned on full and no signal. The battery voltages for these readings were: "A" 3 volts, "B" 135 volts.

Tube	*Plate*	*Screen*	*Osc. Plate*	*Fil.*
1A4 r-f	130	57	—	2.0
1C6	130	57	100	2.0
1A4 1st i-f	130	57	—	2.0
1A4 2nd i-f	130	57	—	2.0
1B5-25S	65	—	—	2.0
1F4	130	130	—	2.0

Bias for the three 1A4 and the 1C6 tubes is obtained across the resistor R10. The voltage drop across this resistor should be 5 volts. Bias for the output tube (1F4) is obtained across resistors R10 and R14 in series. Voltage drop across these resistors should be 7.5 volts.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600 and 15,000 kc should be used.
An output meter should be used across the voice coil or output transformer for observing maximum response.
If the circuit is at all disturbed, both the broadcast and short-wave bands must be realigned.
The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.
Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.
Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.
Always use as weak a test signal as possible during alignment.
Use a standard dummy antenna for aligning either of the bands. A .0002 mf condenser may be used for the broadcast band dummy antenna and a 400 ohm non-inductive resistor for the short-wave dummy antenna.

Location of Coils and Trimmer Adjustments

The three i-f transformers are in oblong coil cans located on top of the chassis deck.
The first i-f transformer, part number 4ET-350B, is located to the left of the variable condenser.
The second i-f transformer, part number 4ET-350B, is located behind the variable condenser.
The third i-f transformer, part number 4FT-382, is located to the right of the variable condenser. The trimmers, two for each transformer, are accessible through holes in the top of the cans.
The broadcast series padder is located underneath the chassis (in the corner near the 1C6 tube). The screw adjustment is accessible through a hole in the top of the chassis.
The antenna coil for the two bands is wound on one coil form and mounted underneath the chassis to the right of the variable condenser. The trimmers are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is for the short-wave antenna coil.
The r-f interstage coils for the two bands are wound on one form and mounted underneath the chassis to the left of the first i-f transformer. The trimmers are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is for the short-wave interstage coil.
The oscillator coils for the two bands are wound on one coil form and mounted underneath the chassis to the left of the variable condenser. The trimmers are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is for the short-wave oscillator coil.

I-f Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 456 kc through a 0.02 mf paper condenser, to the grid cap of the 1C6 tube (do not remove the grid clip from the tube). Adjust the six i-f trimmers for maximum response.

Short-Wave Alignment (Short-wave alignment should precede broadcast alignment.)

Set the wave-band switch at the short-wave (counter-clockwise) position. Move pointer to 15, feed 15,000 kc to antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator for maximum response. If two peaks are obtained choose minimum capacity peak. Then adjust the interstage and antenna trimmers for maximum response. If two peaks are obtained choose the maximum capacity peak.

Broadcast Alignment

With the wave-band switch at the broadcast (clockwise) position, set the pointer at 600, feed 600 kc through the antenna (using a standard dummy antenna), and adjust the broadcast series padder for maximum response. Move pointer to 1600, feed 1600 kc to the antenna and adjust the oscillator trimmer for maximum response, then adjust interstage and antenna trimmers. Reset the pointer to 600, feed 600 kc to antenna and rock the variable condenser (rotate the condenser back and forth through a small arc) while resetting the oscillator padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary, return to 600 and repeat entire procedure.

REPLACEMENT PARTS LIST

List Price Ea. Effective as of Aug. 15th, 1937 (Subject to change without notice)

*Item	Part No.	DESCRIPTION	PRICE
T1	4FT-380	Two band antenna coil	$1.55
T2	4FT-381	Two-band r-f interstage coil	1.50
T3	4ET-350B	456 kc 1st i-f transformer	1.15
T4	4ET-350B	456 kc 2nd i-f transformer	1.15
T5	4FT-382	456 kc 3rd i-f transformer	1.15
T6	3CT-290A	Two-band oscillator coil	1.35
R1, R8, R9	KR-54	100,000 ohm 1/4 watt carbon resistor	.16
R2, R3	GR-85	2000 ohm 1/4 watt carbon resistor	.16
R4	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R5	NNR-220	3 megohm 1/4 watt carbon resistor	.16
R6	4FR-301	Volume control with on-off switch—500,000 ohms	1.15
R7, R12	KR-57	1 megohm 1/4 watt carbon resistor	.16
R10	3CR-295	410 ohm 1/2 watt wire-wound resistor	.16
R11, R15	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R13	LR-65	10,000 ohm 1/4 watt carbon resistor	.16
R14	3ZR-289	210 ohm 1/2 watt wire-wound resistor	.16
C1, C2, C3	4FC-333A	Three-gang variable condenser	5.50
†C4, C5		Trimmers, part of antenna coil.	
C6, C26	AAC-106A	0.00005 mf mica condenser	.20
C7, C16	BC-12	0.05 mf, 200 volt tubular condenser	.20
†C8, C9		Trimmers, part of first i-f transformer.	
†C10, C11		Trimmers, part of second i-f transformer.	
†C12, C13		Trimmers, part of third i-f transformer.	
C14, C15, C32	AC-6	0.1 mf, 200 volt tubular condenser	.20
C17, C18	BC-13	0.25 mf, 200 volt tubular condenser	.20
C19	EC-24A	0.0001 mf mica condenser	.20
C20	IC-47A	0.0005 mf mica condenser	.20
C21	LC-64	0.05 mf, 400 volt tubular condenser	.20
C22	NNC-199	0.001 mf, 600 volt tubular condenser	.20
C23	VVC-221	8 mf, 150 volt tubular dry electrolytic condenser	1.20
C24, C31	CCC-127	0.01 mf, 200 volt tubular condenser	.20
C25	AC-7A	0.00025 mf mica condenser	.20
†C27, C28		Trimmers, part of oscillator coil.	
C29	2NC-231	Single adjustable padding condenser. Range: 300 to 600 mmf	.50
C30	3EC-267	0.0042 mf mica condenser	.40
C33	3VC-324	0.003 mf, 600 volt tubular condenser	.20
	4FS-296	10" permanent magnet dynamic speaker	10.80
	4FS-274	6 1/2" permanent magnet dynamic speaker	7.20
	4FS-272	Wave-band switch	.75
	3ES-256	Tone control switch	.50
	4FW-90	Battery cable	1.65
	4FZ-596	Dial face	1.20
	3LZ-403	Dial drive belt	.15
	4FZ-602	Dial drive shaft and pulley	.20
	3CZ-339	Idler pulley	.05
	4FZ-603	Idler spring	.10
	4UZ-604	Condenser shaft pulley	.15
	4RZ-592	Dial pointer	.25
	4RZ-595	Escutcheon with crystal	1.95

When ordering replacement parts specify part numbers.

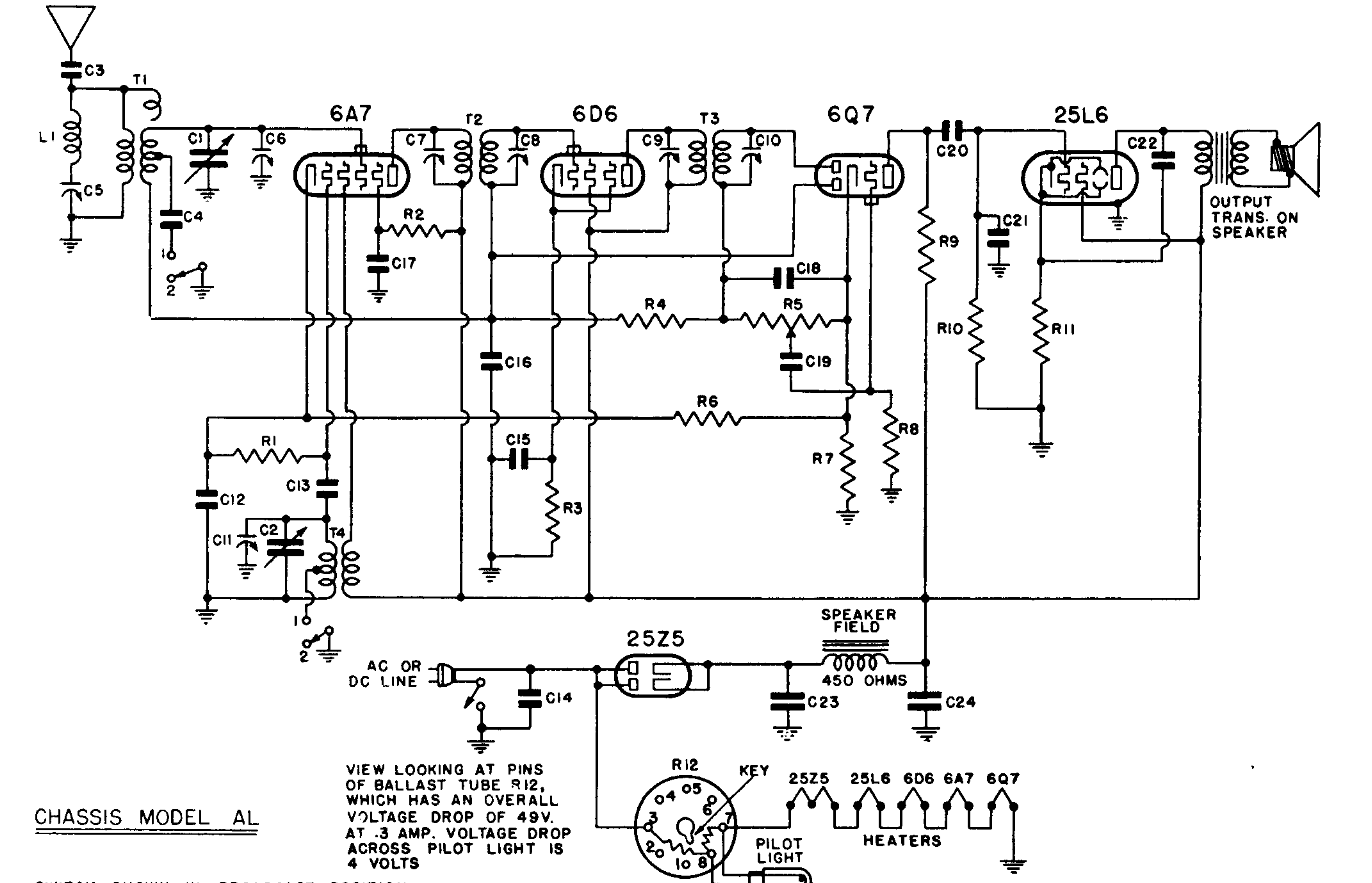
*Item number locates the article on the schematic diagram.

†These trimmers are part of the coil assemblies and cannot be supplied separately.

PRODUCTION CHANGES

Receivers bearing serial numbers above 1,244,716 differ from the schematic diagram as follows:
a. C17 is omitted, and the negative side of the filament circuit is grounded to the chassis.

EMERSON RADIO AND PHONOGRAPH CORPORATION
MODELS AL, AL-130, AL-132, AL-149, AL-168, ALLW, ALLW-130, ALLW-132; ALLW-149 & ALLW-168



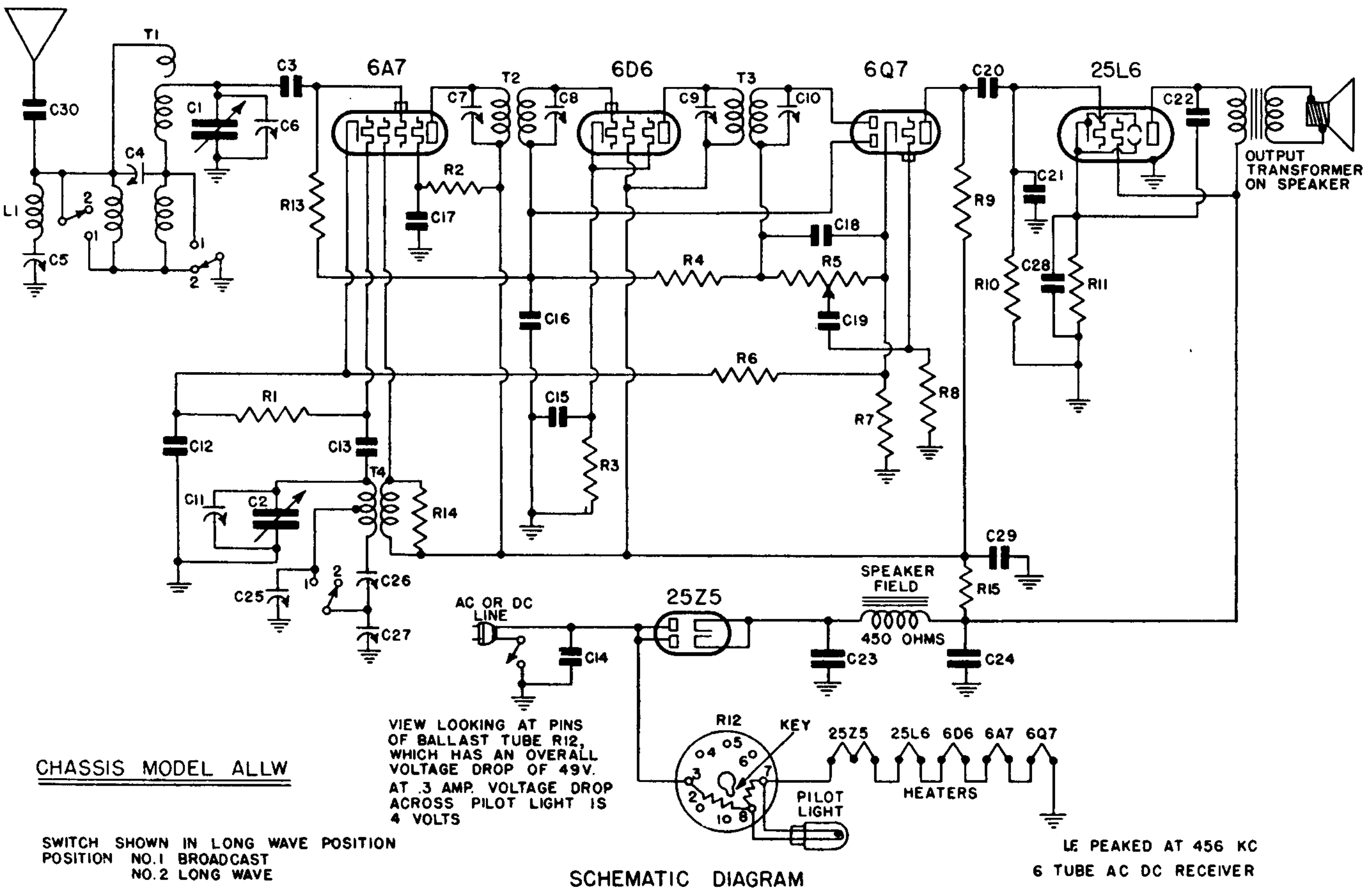
CHASSIS MODEL AL

VIEW LOOKING AT PINS OF BALLAST TUBE R12, WHICH HAS AN OVERALL VOLTAGE DROP OF 49V. AT .3 AMP. VOLTAGE DROP ACROSS PILOT LIGHT IS 4 VOLTS

SWITCH SHOWN IN BROADCAST POSITION
POSITION NO 1 POLICE
NO 2 BROADCAST

SCHEMATIC DIAGRAM

I.F. PEAKED AT 456 KC
6 TUBE AC DC RECEIVER



CHASSIS MODEL ALLW

VIEW LOOKING AT PINS OF BALLAST TUBE R12, WHICH HAS AN OVERALL VOLTAGE DROP OF 49V. AT .3 AMP. VOLTAGE DROP ACROSS PILOT LIGHT IS 4 VOLTS

SWITCH SHOWN IN LONG WAVE POSITION
POSITION NO.1 BROADCAST
NO.2 LONG WAVE

SCHEMATIC DIAGRAM

I.F. PEAKED AT 456 KC
6 TUBE AC DC RECEIVER

EMERSON RADIO AND PHONOGRAPH CORPORATION
MODELS AL, AL-130, AL-132, AL-149, AL-168, ALLW, ALLW-130, ALLW-132, ALLW-149 & ALLW-168

Voltage rating	105 to 125 volts, a.c. or d.c.
Power consumption	43 watts.
Frequency ranges	Model AL: 540 to 1580 kc and 1580 to 4200 kc. Model ALLW: 135 to 360 kc and 530 to 1550 kc.

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f portion of the circuit, the receiver should be carefully re-aligned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor (R12 on schematic) is in a special metal tube at the rear of the chassis. This tube will become quite hot under normal operating conditions. For voltage drop specifications, see below.
4. When operating the receiver on d.c. it may be necessary to reverse the line plug to obtain the correct polarity.
5. The two i-f transformers are held to the chassis by snap-on fasteners. To remove an i-f, unsolder all the leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.
6. The color coding of the i-f transformer leads is as follows:
   Grid—green Plate—blue
   Grid return—black B plus—red
7. The receiver is shipped with an attached antenna wire. In some locations near powerful local stations the addition of a very large antenna may be detrimental to reception, because of the resulting interference. The Emerson Flexible Mast Antenna, Model W-82, has been especially designed for Emerson receivers, featuring compactness and portability while at the same time retaining a high efficiency from the standpoint of performance. Since it functions as an outside antenna the Flexible Mast will substantially improve the receiver performance. Where the Flexible Mast is installed permanently, it is urgently recommended that the receiver antenna wire be cut. Leave just enough of this wire to reach from the receiver to the window strip connector. Instructions for the installation of this compact and efficient outside antenna are supplied with each kit.
8. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

Tube Data

The tube complement is as follows:

1—6A7 pentagrid oscillator-modulator.
1—6D6 first i-f amplifier.
1—6Q7 diode detector, a-f amplifier, a.v.c.
1—25L6 beam power output.
1—25Z5 dual half-wave rectifier.
1—2UR-224 ballast tube (R12 on schematic).

NOTE: Metal tubes may be replaced with equivalent octal-base glass tubes.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	100	50	2.3	100	6.3
6D6	100	100	3.5	—	6.3
6Q7	43	0	1.2	—	6.3
25L6	92	100	6.5	—	25.0

Voltage at 25Z5 cathode—130 volts.
Voltage across speaker field—28 volts.
Voltage drop across ballast tube (pins Nos. 3, 7)—49 volts.
Voltage drop across pilot light section (pins Nos. 8 and 7)—4 volts.

ADJUSTMENTS

An oscillator with frequencies of 172, 345, 456, 600 and 1400 kc should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

If the circuit is at all disturbed, both the broadcast and long-wave bands must be realigned.

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Always use as weak a test signal as possible during alignment.

Use a standard dummy antenna for aligning either of the bands. A .0001 mf condenser may be used for either the broadcast or long-wave band dummy antennas.

CHASSIS MODEL AL

Location of Coil and Trimmer Adjustments on the Model AL

The two i-f transformers are in oblong coil cans located on top of the chassis deck. The first i-f transformer is the one behind the variable condenser. The trimmers for these transformers are accessible through holes in the tops of the cans.

The 456 kc wave-trap is mounted on the right side of the front chassis wall. Its trimmer is accessible through a hole in the bottom plate.

The antenna coils for the broadcast and police bands are wound on one form and are mounted underneath the chassis deck below the variable condenser.

The oscillator coils for the broadcast and police bands are wound on one form and are mounted on the rear wall of the chassis deck near the variable condenser.

The trimmers for the broadcast antenna and oscillator coils are located on the variable condenser. The trimmer on the front sections is for the antenna coil.

I-f Transformer and Wave-Trap Alignment for Model AL

Turn the switch clockwise to the broadcast position and rotate the variable condenser to the minimum capacity position. Feed 456 kc to the grid cap of the 6A7 tube and adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna and adjust the wave-trap trimmer for *minimum* response.

R-f Alignment for Model AL

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1400 kc through a standard dummy antenna (a .0001 mf condenser may be used as a substitute) to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response. The police band is self-tracking and does not require any adjustment.

CHASSIS MODEL ALLW

Location of Coils and Trimmer Adjustments on the Model ALLW

The two i-f transformers are in oblong coil cans located on top of the chassis deck. The first i-f transformer is the one behind the variable condenser. The trimmers for these transformers are accessible through holes in the tops of the cans.

The broadcast antenna coil, the long-wave antenna coil and the 456 kc wave-trap are one assembly mounted underneath the chassis deck to the right of the variable condenser. The trimmers for these coils are accessible through three holes in the top of chassis. The trimmer closest to the front of the chassis is for the 456 kc wave-trap, the central trimmer is for the long-wave oscillator coil and the rear trimmer is for the long-wave antenna coil.

The oscillator coils for the broadcast and long-wave bands are wound on one form and are mounted underneath the chassis below the variable condenser.

The trimmers for the broadcast antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The dual adjustable padding condenser is mounted on the left side of the rear chassis wall. The hexagon nut is the adjustment for the long-wave band and the screw in the center of this nut is for the broadcast band.

I-f Transformer and Wave-Trap Alignment for ALLW

Turn the switch clockwise to the broadcast position and rotate the variable condenser to the minimum capacity position. Feed 456 kc to the grid cap of the 6A7 tube and adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna and adjust the wave-trap trimmer for *minimum* response.

Broadcast Alignment for Model ALLW

Rotate the wave-band switch clockwise to the broadcast position and set dial pointer to 60. Feed 600 kc through a .0001 mf condenser. Adjust padding condenser (slotted screw on dual unit) for maximum response. Move pointer to 140. Feed 1400 kc and adjust broadcast oscillator trimmer (on front section of gang) and broadcast antenna trimmer (on rear section of gang) for maximum response. Return pointer to 60, feed 600 kc and readjust padding condenser while rocking variable condenser.

Long-Wave Alignment for Model ALLW

Rotate the wave-band switch to the long-wave position, counter-clockwise, and set the dial pointer to 345. Feed 345 kc through the dummy antenna and adjust the long-wave oscillator trimmer for maximum response and then adjust the long-wave antenna trimmer. Move the pointer to 172.5 kc and feed 172.5 kc. Adjust the long-wave series padder (hexagon nut on dual unit) for maximum response. Return the pointer to 345 kc and adjust the long-wave oscillator and antenna trimmers. Check at 600 kc on broadcast band and readjust if necessary.

PARTS LIST

List Price ea. Effective as of Aug. 15th, 1937
(Subject to change without notice.)

*Item Chassis AL	*Item Chassis ALLW	Part No.	DESCRIPTION	PRICE
T1	—	3RT-384	Two-band antenna coil	$ .85
—	T1	4LT-389	Two-band antenna coil	2.35
T2	T2	3RT-320B	456 kc first i-f transformer	1.10
T3	T3	3RT-321B	456 kc second i-f transformer	1.10
T4	—	3RT-319A	Two-band oscillator coil	.80
—	T4	4LT-390	Two-band oscillator coil	.85
L1	—	4DT-343	456 kc adjustable wave-trap	.60
—	L1	—	456 kc wave trap, part of antenna coil assembly	
R1	R1	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R2	R2	ZZR-196	30,000 ohm 1/4 watt carbon resistor	.16
R3	R3, R15	3CR-295	410 ohm 1/2 watt wire wound resistor	.16
R4, R8	R4, R8	HR-42	2 megohm 1/4 watt carbon resistor	.16
R5	R5	3FR-256	Volume control with line switch—500,000 ohms	1.05
R6, R7	R6, R7	3CR-294	240 ohm 1/2 watt wire-wound resistor	.16
R9	R9	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R10	R10	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R11	R11	3FR-293	140 ohm 1/2 watt wire-wound resistor	.16
R12	R12	2UR-224	Plug-in type ballast resistor	.80
—	R13	KR-57	1 megohm 1/4 watt carbon resistor	.16
—	R14	LR-65	10,000 ohm 1/4 watt carbon resistor	.16
C1, C2	—	4CC-350A	Two-gang variable condenser	2.60
—	C1, C2	4LC-360	Two-gang variable condenser	2.60
C3	C30	3HC-274	0.002 mf, 600 volt tubular condenser	.20
—	C3	IC-47A	0.0005 mf mica condenser	.20
C4	—	AAC-114	0.001 mf mica condenser	.20
—	†C4, C5, C25	—	Trimmer, part of antenna coil assembly.	
†C5	—	—	Trimmer, part of wave-trap assembly.	
‡C6, C11	‡C6, C11	—	Trimmer, part of variable condenser.	
†C7, C8	†C7, C8	—	Trimmer, part of first i-f transformer assembly.	
†C9, C10	†C9, C10	—	Trimmer, part of second i-f transformer assembly.	
C12, C17	C12, C17, C29	AC-6	0.1 mf, 200 volt tubular condenser	.20
C13	—	AAC-106A	0.00005 mf mica condenser	.20
—	C13	EC-24A	0.0001 mf mica condenser	.20
C14	C14	2VC-242A	0.1 mf, 400 volt molded condenser	.20
C15	C15	FC-29	0.02 mf, 200 volt tubular condenser	.20
C16	C16	BC-12	0.05 mf, 200 volt tubular condenser	.20
C18, C21	C18, C21	NC-70A	0.0002 mf mica condenser	.20
C19	C19	CCC-127	0.01 mf, 200 volt tubular condenser	.20
C20	C20	LC-65	0.02 mf, 400 volt tubular condenser	.20
C22	C22	3FC-336	0.025 mf, 400 volt tubular condenser	.20
C23, C24	C23, C24	3CC-261	20 mf, 150 volt wet electrolytic condenser	.90
	C26, C27	2ZC-257	Dual padding condenser C26—100 to 200 mmf C27—250 to 500 mmf	.65
	C28	1C-43A	5 mf, 25 volt dry electrolytic condenser	.90
		3RS-231	Wave-band switch for AL chassis	.35
		4JS-268	Wave-band switch for ALLW chassis	.80
		3FS-251	5 1/2" dynamic speaker	4.90
		4LZ-582	Dial face (for AL chassis)	.70
		4LZ-655	Dial face (for ALLW chassis)	.70
		XL-9	Pilot light, 6.3 volt, .25 amp. Mazda No. 46	.20
		3CZ-336	Dial drive belt	.10
		3CZ-337	Dial drive shaft and pulley	.10
		3CZ-339	Idler pulley	.05
		3CZ-340	Idler pulley spring	.05
		3CZ-341	Condenser shaft pulley	.10
		4MZ-588	Dial pointer	.25
		3FZ-351	Escutcheon with crystal (for Models AL-130, AL-168, ALLW-130 and ALLW-168)	1.05
		3FZ-398	Dial crystal (for Models AL-132, AL-169, ALLW-132 and ALLW-169)	.50
		3FZ-399	Clip for dial crystal (for Models AL-132, AL-169, ALLW-132 and ALLW-169)	.01

When ordering replacement parts specify part numbers.

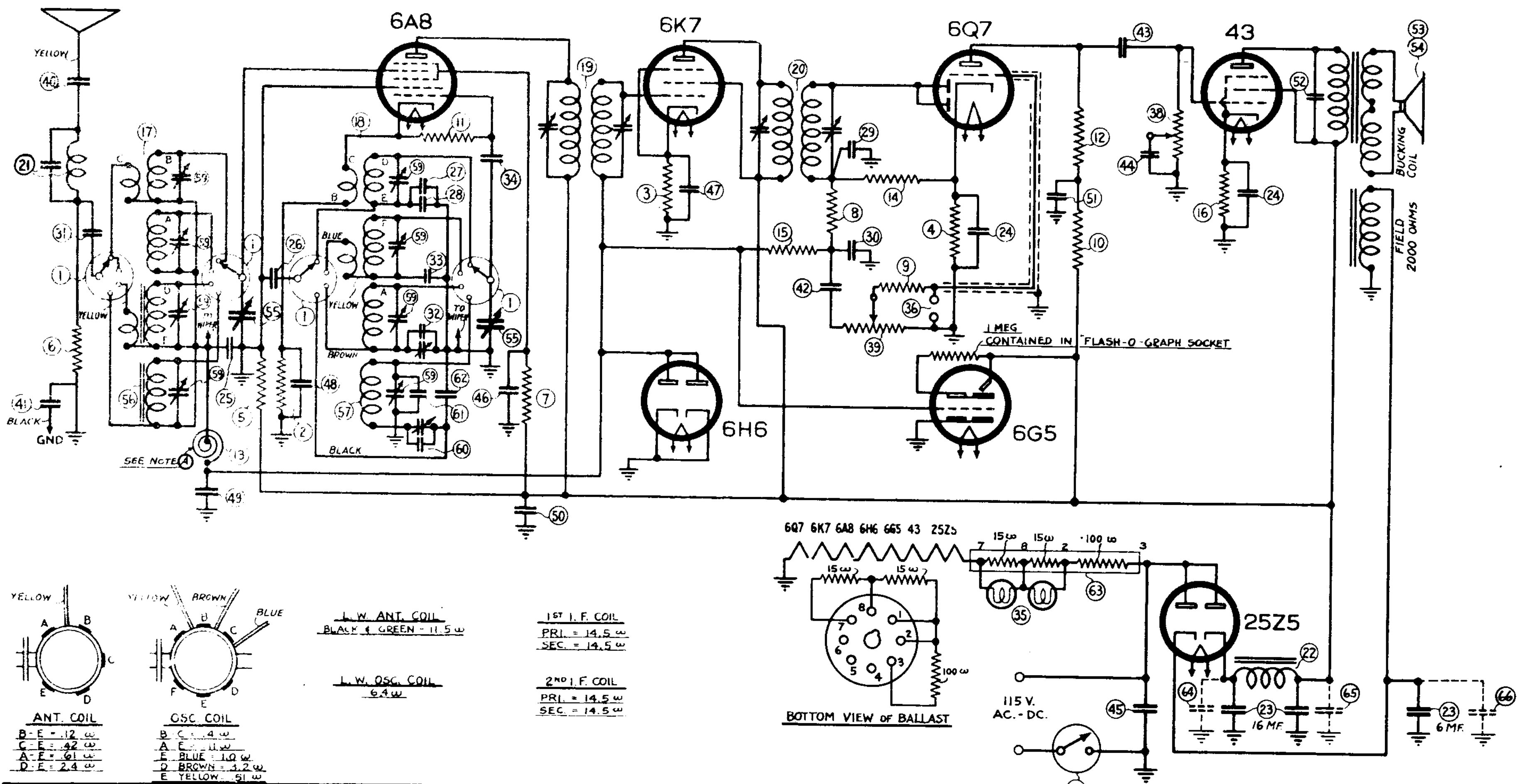
*Item number locates the article on the schematic diagram.

†These trimmers are part of coil assemblies and can not be supplied separately.

‡These trimmers are part of variable condenser and can not be supplied **separately.**

FADA RADIO AND ELECTRIC COMPANY

MODEL 281



REF No	PART No	DESCRIPTION	REF No	PART No	DESCRIPTION	REF No	PART No	DESCRIPTION
1	45.35	BAND SWITCH	23	20.46	ELECTRO COND 16 16-6 MF 100 W.V.	45	10.7	TUBULAR COND. -.05 MF 400 V.
2	30.45	CARB. RES. 250 OHMS 1/3 W ± 10%	24	20.44	" DUAL " 10 10 " 25 "	46	10.5	" " .05 " 200 "
3	30.48	" " 350 " " "	25	5.5	MICA COND .002 MF ± 3%	47	10.5	" " .05 " 200 "
4	30.65	" " 4,400 " " "	26	15.7	" " .002 " 10	48	10.5	" " .05 " 200 "
5	30.1	" " 5,000 " "	27	15.21	" " .003 " 5	49	10.5	" " .05 " 200 "
6	30.2	" " 10,000 " " "	28	15.62	" " .004 " "	50	10.5	" " .05 " 200 "
7	30.7	" " 15,000 " " "	29	15.3	" " .0001 " 10	51	10.8	" " .25 " 200 "
8	30.26	" " 50,000 " " 20	30	15.3	" " .0001 " "	52	10.13	" " .002 " 400 "
9	30.26	" " 50,000 " " "	31	15.2	" " .0005 " "	53	105.47	SPEAKER (MODELS 272B & 272T)
10	30.26	" " 50,000 " "	32	15.52	" " .00026 " 5	54	105.48	" (MODEL 272C)
11	30.8	" " 100,000 " " 10	33	15.63	" " .00093 " 3	55	25.65	VARIABLE COND.
12	30.66	" " 150,000 " " 20	34	15.10	50 MMF 10	56	35.20	L.W. ANT. COIL
13	5409	CHOKE COIL - 20. MH.	35	20.1	PILOT LTS. 6-8 V. .25 A	57	35.22	" OSC. "
14	30.20	CARB. RES 250,000 OHMS 1/3 W ± 20%	36	125.1	PHONO JACK	58		ON-OFF SW. ON VOL CONT
15	30.28	" 2,000,000 "	37	25.49	PADDING COND - 70 MMF.	59		MIN. ADJ. ON COILS
16	30.47	" 625 " 1/2 W 10	38	55.12	TONE CONTROL - 1/2 MEG.	60	15.58	MICA COND. -.0008 MF. ± 5%
17	35.15	ANTENNA COIL	39	50.26	VOLUME " 1 MEG. WITH ON-OFF SW.	61	15.10	" " 50 MMF. ± 10%
18	35.17	OSCILLATOR "	40	10.4	TUBULAR COND. - .01 MF. 200 V	62	15.2	" " .0005 MF. ± "
19	35.23	1ST I F "	41	10.4	" " .01 " 200 "	63	BK49D	BALLAST RES. -15-15-100 ω
20	35.24	2ND I F "	42	10.4	" .01 " 200 "	64	20.25	ELECTRO COND. - 8 MF. 100 W.V.
21	35.6	WAVE TRAP	43	10.4	" .01 200 "	65	20.25	" " 8 " 100 "
22	40.1	CHOKE COIL	44	10.4	" " .01 " 200 "	66	20.25	" " 8 " 100 "

REF. No. 23
MF. 16 16 6
RED RED BLUE
+
−
ELECTRO COND. BLOCK
PART No. 20.46

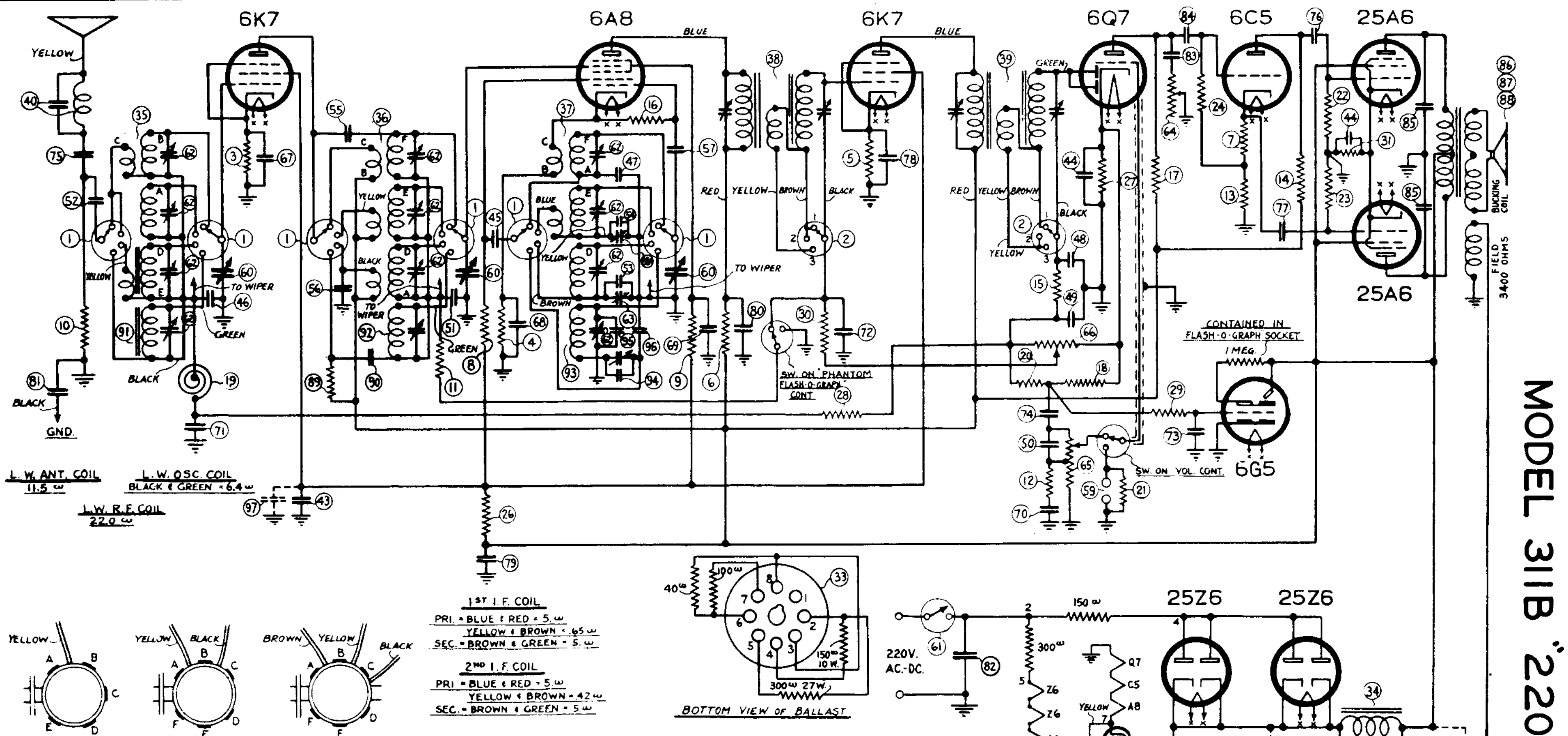
I. F. = 456 KC.

NOTE:
BAND SW. SHOWN IN S. W. POSITION
⏚ = CHASSIS
(64)(65)(66) FOR USE WITH 25 CYCLE OPERATION ONLY.

NOTE (A) - ON SOME EARLY MODELS, A 250,000 OHM RES. WAS USED IN PLACE OF THIS CHOKE.

FADA RADIO AND ELECTRIC COMPANY

MODEL 311B "220V."



ANT. COIL
B-E = .12 ω
C-E = .42 ω
A-E = .61 ω
D-E = 2.4 ω

R. F. COIL
B-C = 4.2 ω
B-YELLOW = 1.3 ω
B-BLACK = 49. ω
A-F = .1 ω
A-E = .56 ω
A-D = 4.8 ω

OSC. COIL
B-C = .4 ω
A-E = .11 ω
E-BLUE = 1.0 ω
D-BROWN = 3.2 ω
E-YELLOW = .51 ω

REF. No.	PART No.	DESCRIPTION
1	45.34	BAND SWITCH
2	45.32	SELECTIVITY SWITCH
3	30.45	CARB. RES. - 250 OHMS 1/3 W ±10%
4	30.45	" " 250 " " " "
5	30.63	" " 300 " " " "
6	30.35	" " 1000 " " " 20
7	30.15	" " 2,000 " " " 10
8	30.1	" " 5000 " " " "
9	30.2	" " 10000 " " " "
10	30.31	" " 10,000 " " " 20
11	30.31	" " 10,000 " " "
12	30.58	" " 20,000 " " " 10
13	30.59	" " 27,000 " " " "
14	30.10	" " 30,000 " " " "
15	30.26	" " 50,000 " " " 20
16	30.8	" " 100,000 " " " 10
17	30.66	" " 150,000 " " " 20
18	30.6	" " 1,000,000 " " " 10
19	5409	CHOKE COIL - 20. MH.
20	30.20	CARB. RES. 250,000 OHMS 1/3 W. ± 20
21	30.23	" " 500000 " " "
22	30.23	" " 500,000 " " "
23	30.23	CARB RES - 500,000 OHMS 1/3 W ± 20
24	30.23	" " 500,000 " " "
25		
26	30.12	" " 4,000 " " "
27	30.65	" " 4,400 " " "
28	30.28	" " 2,000,000 " " "
29	30.28	" " 2,000,000 " " "
30	30.28	" " 2,000,000 " " "
31	30.43	" " 315 " 1 W. 10
32	10.30	TUBULAR COND. - .75 MF. 200 V.
33	115.18	BALLAST RES. - 40-100-150 ω 10 W. 300 ω 27 W.
34	40.3A	CHOKE COIL - 200 OHMS
35	35.15	ANTENNA "
36	35.16	R. F. "
37	35.17	OSCILLATOR "
38	35.18	1ST I. F. "
39	35.19	2ND I. F. "
40	35.6	WAVE TRAP
41	20.54	ELECTRO. COND. 32 MF. 175 WV
42	20.54	" " 16 " 175 "
43	20.55	" " 8 " 175 " tub
44	20.44	" DUAL " 10 10 " 25 " "
45	15.7	MICA COND. - .002 MF. ± 10%
46	15.5	" " .002 " 3
47	15.62	" " .004 " 5
48	15.3	" " .0001 " 10
49	15.3	" " .0001 " "
50	15.3	" " .0001 " "
51	15.6	" " .0025 " 3
52	15.2	" " .0005 " 10
53	15.52	" " .00026 " 5
54	15.63	" " .00093 " 3
55	15.16	" " 3. MMF 10
56	15.61	" " 35. " 5
57	15.10	" " 50. " 10
58	120.3	PILOT LTS. - 6-8 V .15 A
59	125.1	PHONO JACK
60	25.61	VARIABLE COND.
61		ON - OFF SW ON TONE CONT
62		MIN. ADJ ON COILS
63	25.49	PADDING COND. - 70 MMF
64	55.11	TONE CONTROL - 1/2 MEG.
65	50.25	VOLUME - 1 MEG. TAPPED @ 50,000 ω
66	50.24	PHANTOM FLASH-O-GRAPH CONTROL 1 MEG.
67	10.5	TUBULAR COND. - .05 MF 200 V.
68	10.5	" " .05 " 200 "
69	10.5	" " .05 " 200 "
70	10.5	" " .05 " 200 "
71	10.26	" " .02 " 200 "
72	10.26	" " .02 " 200 "
73	10.26	" " .02 " 200 "
74	10.4	" " .01 " 200 "
75	10.4	" " .01 " 200 "
76	10.2	" " .1 " 200 "
77	10.2	" " .1 " 200 "
78	10.2	" " .1 " 200 "
79	10.2	" " .1 " 200 "
80	10.2	" " .1 " 200 "
81	10.23	" " .006 " 200 "
82	10.9	" " .1 " 400 "
83	10.10	" " .01 " 400 "
84	10.10	" " .01 " 400 "
85	10.17	" DUAL " .001 " 600 "
86	105.55	SPEAKER - 3400 ω (MODEL 211 T)
87	105.56	" " (" 211 C)
88	105.57	" " (" 211 CK)
88A	25.64	PADDING COND. - 110 - 250 MMF.
89	30.2	CARB. RES. - 10,000 OHMS 1/3 W. ± 10%
90	15.3	MICA COND. - .0001 MF. ± 10%
91	35.20	L. W. ANT. COIL
92	35.21	L. W. R. F. "
93	35.22	L. W. OSC. "
94	15.58	MICA. COND. - .00018 MF. ± 5%
95	15.10	" " 50 MMF
96	15.2	" " .0005 MF. ± 5%

I. F. = 456 KC.

NOTE:
BAND SW. SHOWN IN S. W. POSITION.
SELECTIVITY SW. " - SHARP "
I. F. TO BE ALIGNED " " "
POS. #1 (SHARP) POS. #2 (BROAD) POS. #3 (HI-FIDELITY)
⏚ = CHASSIS
97 98 99 ELECTRO. COND. - 8 MF. 175 W.V. (FOR 25 CYCLE OPERATION ONLY) (PART No. 20.55)

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODELS 60, 6010 & 6044

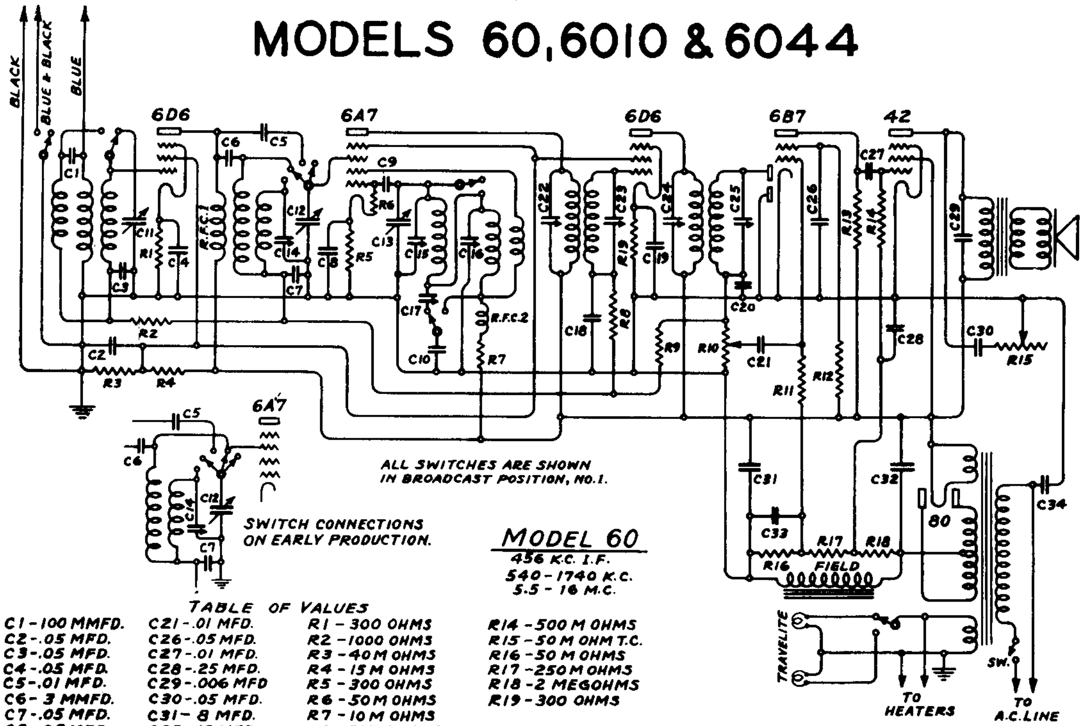


TABLE OF VALUES

C1 - 100 MMFD.	C21 - .01 MFD.	R1 - 300 OHMS	R14 - 500 M OHMS
C2 - .05 MFD.	C26 - .05 MFD.	R2 - 1000 OHMS	R15 - 50 M OHM T.C.
C3 - .05 MFD.	C27 - .01 MFD.	R3 - 40 M OHMS	R16 - 50 M OHMS
C4 - .05 MFD.	C28 - .25 MFD.	R4 - 15 M OHMS	R17 - 250 M OHMS
C5 - .01 MFD.	C29 - .006 MFD	R5 - 300 OHMS	R18 - 2 MEGOHMS
C6 - 3 MMFD.	C30 - .05 MFD.	R6 - 50 M OHMS	R19 - 300 OHMS
C7 - .05 MFD.	C31 - 8 MFD.	R7 - 10 M OHMS	
C8 - .05 MFD.	C32 - 16 MFD.	R8 - 500 M OHMS	
C9 - 50 MMFD.	C33 - .1 MFD.	R9 - 1 MEGOHM	
C10 - .01 MFD.	C34 - .01 MFD.	R10 - 250 M OHM V.C.	FIELD - 2000 OHMS
C18 - .05 MFD.		R11 - 1 MEGOHM	R.F.C.1 - R.F. PLATE CHOKE
C19 - .05 MFD.		R12 - 2 MEGOHMS	R.F.C.2 - OSC. PLATE CHOKE
C20 - 200 MMFD.		R13 - 250 M OHMS	

FIGURE 2
SCHEMATIC DIAGRAM

PARTS LIST

Part Number	Description	List Price
14707	Power Transformer 115 Volt 60 Cycle	$ 5.50
14711	Power Transformer 115 Volt 25 Cycle	7.50
14710	Power Transformer 120-240 Volt 60 Cycle	6.50
14718	Power Transformer 220-240 Volt 60 Cycle	6.00
14709	Power Transformer 135 Volt 50 Cycle	6.50
A-14715	First I. F. Transformer complete	2.00
A-14716	Second I. F. Transformer complete	2.00
S-5820	Tube Shield	.15
S-5819	Tube Shield Base	.05
P-682	Grid Cap Dozen	.20
P-639	Pilot Light Socket and Bracket	.15
14720	Pilot Light Bulb .2 A 6/8 volt	.10
14728	Dial Assembly complete	2.50
14729	Dial Drive Roller (Small)	.25
14730	Dial Drive Spring	.25
14731	Dial Drive Shaft	.50
14701	Band Selector Switch	3.00
14719	3 Conductor Dial Light Cable (Tinsel)	.30
14537	A. C. Power Cord and Plug	.40
14708	Celluloid Scale for Dial	.75
14404	Escutcheon for Dial	1.00
14704	Extruded Celluloid Dial Face	.50
P-610	Rubber Grommet (Ant. Lead) Dozen	.25
P-671	Rubber Grommet (Grid Lead) Dozen	.25
B-5	Speaker Plug Bracket	.05
B-10	Condenser Mounting Bracket (Large)	.05
B-11	Condenser Mounting Bracket (Medium)	.05
B-12	Condenser Mounting Bracket (Small)	.05
S-5918	Tube Socket 6D6	.10
S-5919	Tube Socket 6A7	.10
S-5920	Tube Socket 6B7	.10
S-5921	Tube Socket 42	.10
S-5914	Tube Socket 80	.10
S-5910	Speaker Socket 4 Prong	.10
EL-8	8 Mfd. Wet Electrolytic Condenser	1.00
EL-16	16 Mfd. Wet Electrolytic Condenser	1.25
14732	Paper Tube Shield for EL-16	.15
14702	3 Gang Variable Condenser	4.50
C-209	3 Gang Trimmer Condenser Strip	.60
C-203	Padding Condenser 500 Mmfd.	1.00
EC-2	.01 Mfd. 300 Volt Tubular Condenser (C-5; C-10; C-21; C-27)	.20

Part Number	Description	List Price
EC-4	.05 Mfd. 400 Volt Tubular Condenser (C-2; C-26; C-30)	.20
EC-5	.1 Mfd. 300 Volt Tubular Condenser (C-33)	.25
EC-7	.25 Mfd. 400 Volt Tubular Condenser (C-28)	.30
EC-12	.006 Mfd. 400 Volt Tubular Condenser (C-29)	.20
EC-26	.05 Mfd. 300 Volt Tubular Condenser (C-3; C-4; C-7; C-8; C-18; C-19)	.20
EC-20	.01 Mfd. 400 Volt Metal Clad Condenser (C-34)	.40
C-305	200 Mmfd. Moulded Condenser	.20
C-307	100 Mmfd. Moulded Condenser	.20
C-312	50 Mmfd. Moulded Condenser	.20
V-6509	50,000 Ohm Tone Control and Switch (R-15)	1.20
V-6508	250,000 Ohm Volume Control (R-10)	.80
R-846	300 Ohm ¼ Watt Resistor (R-1; R-5; R-19)	.20
R-1146	50,000 Ohm ¼ Watt Resistor (R-6; R-16)	.20
R-1236	250,000 Ohm ¼ Watt Resistor (R-13; R-17)	.20
R-1266	500,000 Ohm ¼ Watt Resistor (R-8; R-14)	.20
R-1296	1 Megohm ¼ Watt Resistor (R-9; R-11)	.20
R-1311	2 Megohm ¼ Watt Resistor (R-12; R-18)	.20
R-1491	1000 Ohm ½ Watt Resistor (R-2)	.20
R-1656	10,000 Ohm ½ Watt Resistor (R-7)	.20
R-1731	40,000 Ohm ½ Watt Resistor (R-3)	.20
R-2886	15,000 Ohm 10 Watt Resistor (R-4)	.40
A-14465	R. F. Plate Choke Coil (RFC-1)	1.00
A-14550	Oscillator Plate Choke Coil (RFC-2)	1.00
A-14721	R. F. and Oscillator Coil Assembly in Can	3.50
A-14722	Antenna Coil Assembly in Can	3.00
X-7220	10-24 x ⅞" Chassis Mounting Screws	.05
X-7228	8-32 x 1" Decorative Head Screws	.05
K-868	Inlaid Wood Knobs	.20
14726	Alignment Jig	2.25
T-688	Insulated Alignment Tool	1.50
14004	6 Inch Dynamic Speaker (K-4)	8.00
14552	8 Inch Dynamic Speaker (D-16)	12.00

SPEAKER CONES

Speaker cones cannot be supplied.

Speakers on which cones have been damaged will be repaired at the following prices:

6 Inch speaker cone repair	2.50
8 Inch speaker cone repair	2.50

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION
MODELS 60, 6010 & 6044

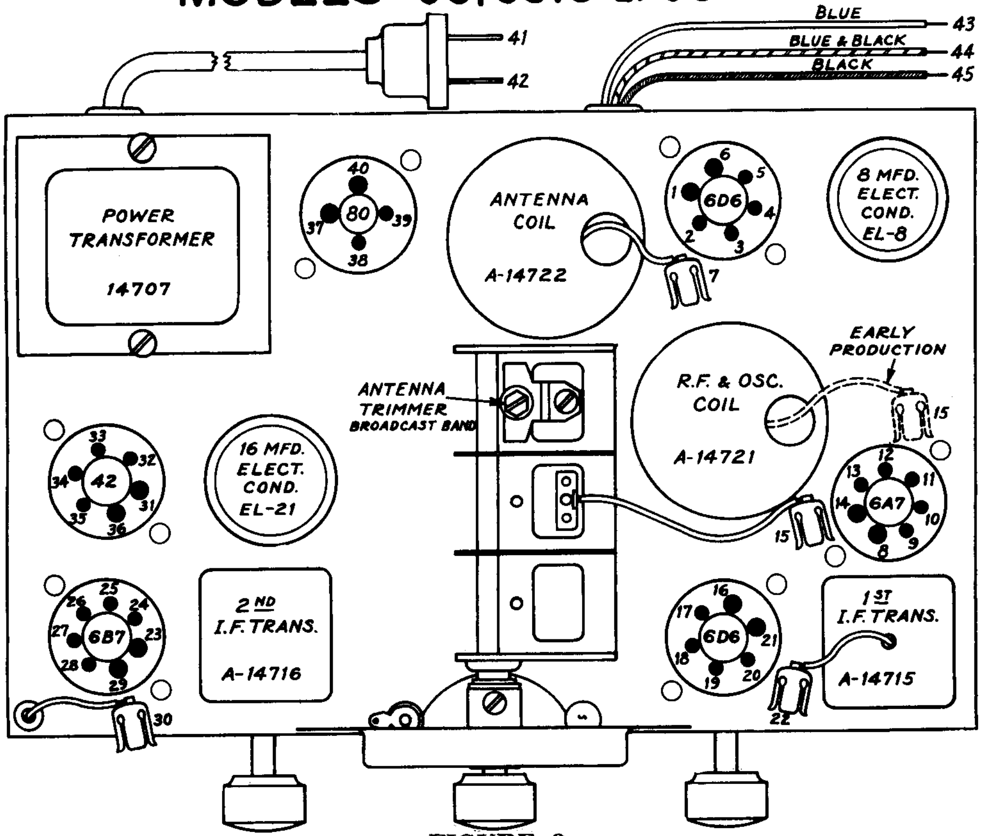


FIGURE 3
TOP VIEW OF THE CHASSIS SHOWING NUMBERS WHICH REFER TO COLUMN ONE OF THE CHART ON THE OPPOSITE PAGE

ALIGNMENT PROCEDURE

To insure the performance the Model 60 is capable of delivering the following instructions should be carefully studied before any alignment adjustments are attempted.

Proper adjustment of the tuned circuits will only be possible through the use of a reliable, all wave, service oscillator and an output meter. Tests have been made in our laboratory on several All Wave service oscillators and it was found that the new Clough-Brengle, continuously variable, Model OC; manufactured by the Clough-Brengle Company, 1134 West Austin Avenue, Chicago, Illinois, was the most satisfactory of the units submitted for the test.

The output meter should be connected across the secondary of the output transformer. The voice coil may be left connected but a larger meter indication will be obtained, on a given signal, if the voice coil is disconnected.

All adjustments should be made with the volume control "full on." Any desired variations in signal strength should be obtained by adjusting the output of the service oscillator.

I. F. ALIGNMENT

All Intermediate Frequency alignment adjustments must be made with the band selector switch in the broadcast (left hand) position.

1. Supply a 456 Kilocycle signal from an accurate service oscillator, to the grid of the 6A7 tube. It is advisable to connect a small condenser, about .00005 Mfd. (50 MMFD) in series with the lead from the service oscillator to prevent the characteristics of the service oscillator circuit from affecting the set.

2. Adjust the grid circuit trimmer condenser of the first intermediate frequency transformer, carefully, for maximum output with minimum input from the service oscillator. The grid circuit trimmer condenser of the first intermediate frequency transformer is controlled by the left hand adjustment screw located on the front of the intermediate frequency transformer can (see Figure 4).

3. Adjust the plate circuit trimmer condenser of the first intermediate frequency transformer, carefully, for maximum output with minimum input from the service oscillator. The plate circuit trimmer condenser of the first intermediate frequency transformer is contolled by the right hand adjustment screw located on the front of the intermediate frequency transformer can (see Figure 4).

4. Adjust the diode circuit trimmer condenser of the second intermediate frequency transformer, carefully, for maximum output with minimum input from the service oscillator. The diode plate circuit trimmer condenser of the second intermediate frequency transformer is controlled by the right hand adjustment screw located on the front of the intermediate frequency transformer can (Grid Trimmer Figure 4).

5. Adjust the plate circuit trimmer condenser of the second intermediate frequency transformer carefully, for maximum output with minimum input from the service oscillator. The plate circuit trimmer condenser of the second intermediate frequency transformer is controlled by the left hand adjustment screw located on the front of the intermediate frequency transformer can (see Figure 4).

6. Much of the sensitivity and selectivity of the receiver depends upon the proper setting of these critical adjustments, for this reason it is necessary to go back over them to make sure they are correct.

R. F. AND OSCILLATOR ALIGNMENT

An alignment jig is available for use in aligning the broadcast and short wave bands of the Model 60. The part number of this jig is 14726, it may be obtained through any Fairbanks-Morse jobber.

BROADCAST BAND

ALIGN AT 1400 INSTEAD OF 1700

1. Place the alignment jig on the front of the chassis. Tune the gang condenser to 1700 Kilocycles. Supply a 1700 Kilocycle signal from the service oscillator to the antenna of the set. Adjust the broadcast band oscillator trimmer (see Figure 3) for maximum output with minimum input from the service oscillator. It is advisable to turn the gang condenser back and forth across the signal while this adjustment is being made to make sure the peak of greatest intensity is obtained. This is necessary to bring the oscillator into track with the R. F. circuit since, in most cases, the R. F. circuit has no trimmer. If the dial reading is incorrect after this adjustment has been made the travelite disc should be adjusted until the reading is correct.

2. Adjust the broadcast band antenna trimmer (Figure 3) for maximum output with minimum input from the service oscillator.

3. Supply a 600 Kilocycle signal to the antenna of the set. Turn the gang condenser to 600 Kilocycles. Adjust the low frequency padding condenser (Figure 4) for maximum output with minimum input from the service oscillator. While making this adjustment turn the gang condenser back and forth across the signal to make sure the peak of greatest intensity is obtained.

SHORT WAVE BAND

1. Supply a 15 megacycle signal to the antenna of the set. Turn the gang condenser to 15 megacycles. Adjust the short wave oscillator trimmer (Figure 5) for maximum output with minimum input from the service oscillator.

2. Adjust the short wave R. F. trimmer (Figure 5) for maximum output with minimum input from the service oscillator. While making this adjustment it is advisable to turn the gang condenser back and forth across the signal to make sure the peak of greatest intensity is obtained. This is desirable because

(Continued on next page)

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION
MODELS 60, 6010 & 6044

(Continued from preceding page)

of the reflected effect of the adjustment of one stage on the other.

NOTE: After all alignment adjustments have been completed the set should be tuned slowly from one end of the dial to the other, on the short wave band. If a howl or "squak" is heard at any point, the set is "crossing track." To remedy this condition loosen the short wave oscillator trimmer (Figure 5) slowly and carefully to the point where the howl disappears.

DIAL CALIBRATION IN CABINET

After the set has been aligned in accordance with the foregoing instructions the dial readings will be approximately correct on all frequencies. When the chassis is placed in the cabinet it should be bolted down and any differences in calibration should be adjusted by loosening the set screw in the travelite disc hub and turning the travelite disc until the reading is correct and then tightening the set screw.

GANG CONDENSER PLATES

The adjustment of the slotted end plates on the gang condenser is very critical since it must be accurate on both bands. These adjustments are made in the factory with precision equipment and under no condition should it be necessary to change them by bending plates.

RESISTANCE AND VOLTAGE ANALYSIS

The following chart gives detailed information regarding the resistance from various points to various other points on the chassis. The measured voltage from the various tube socket contacts to ground is also given. When this chart is faithfully followed little difficulty should be experienced in finding almost any fault that may develop.

RESISTANCE TESTS

These tests should be made with an accurate ohm-meter. The speaker should be connected. All tubes should be removed from the set. The volume and tone controls should be full "on." The A. C. line plug must be removed from the A. C. outlet.

VOLTAGE TESTS

These readings should be taken with all tubes in their sockets. The volume and tone controls should be full "on." The antenna should be disconnected. Tune the set to a point where no signal is received.

RESISTANCE AND VOLTAGE ANALYSIS CHART
LINE VOLTAGE 115

FROM†	TO	Resistance in Ohms	MEASURED VOLTAGE B. C. Band	MEASURED VOLTAGE S. W. Band	**Meter Range in Volts	If Reading Differs More Than 10% plus or minus from Stated Value Check These Units.
6D6 Ant. R. F. Stage						
1. Heater	Ground	.2	6.2 A. C.	6.2 A. C.		Fil. Winding; Pilot Light Socket
2. Plate	Ground	55,000	217.5	217.	300	RFC-1; C-2; C-5; C-6; C-31; C-32; R-3; R-4
3. Screen	Ground	40,000	90	80	300	C-2; R-3; R-4
4. Suppressor	Ground	300	2.4	2.2	3	R-1; C-4
5. Cathode	Ground	300	2.4	2.2	3	R-1; C-4
6. Heater	Ground	0	0	0		Defective Ground
7. Grid	Ground	1,251,000				Coil; R-2; R-9; R-10; C-20
6A7 Converter						
8. Heater	Ground	0	0	0		Defective Ground
9. Plate	Ground	55,000	217.5	217	300	Coil; R-3; R-4; C-2; C-31; C-32
10. Screen G-3 G-5	Ground	40,000	90	80	300	C-2; R-3; R-4
11. Osc. Plate G-2	Ground	65,000	165	145	300	Coil; RFC-2; R-7; R-3; R-4; C-2; C-31; C-32
12. Osc. Grid G-1	Ground	50,300	*−5	*1.5	30	R-6; R-5; C-8
13. Cathode	Ground	300	*3	*4.25	30	R-5; C-8
14. Heater	Ground	.2	6.2 A. C.	6.2 A. C.		Fil. Winding; Pilot Light Socket
15. Grid	Ground	1,250,000				Switch; Coil; R-9; R-10; C-20
6D6 I. F. Stage						
16. Heater	Ground	.2	6.2 A. C.			Fil. Winding; Pilot Light Socket
17. Plate	Ground	55,000	217.5	217	300	Coil; R-3; R-4; C-2; C-31; C-32
18. Screen	Ground	40,000	90	80	300	C-2; R-3; R-4
19. Suppressor	Ground	300	2.35	2.05	3	R-19; C-19
20. Cathode	Ground	300	2.35	2.05	3	R-19; C-19
21. Heater	Ground	0	0	0		Defective Ground
22. Grid	Ground	1,750,000				Coil; R-8; R-9; R-10; C-18; C-20
6B7 Det. AVC & A. F.						
23. Heater	Ground	.2	6.2 A. C.	6.2 A. C.		Fil. Winding; Pilot Light Socket
24. Plate	Ground	305,000	*75	*75	300	R-13; R-3; R-4; C-27; C-2; C-31; C-32
25. Screen	Ground	2,055,000	*22.5	*22.5	300	R-12; R-3; R-4; C-26; C-2; C-31; C-32
26. Diode Plate	Ground	250,000				Coil; R-10; C-20
27. Diode Plate	Ground	0	0	0		Defective Ground
28. Cathode	Ground	0	0	0		Defective Ground
29. Heater	Ground	0	0	0		Defective Ground
30. Grid	Ground	2,004,890				R-11; R-16; C-21; C-33
42 Output						
31. Heater	Ground	.2	6.2 A. C.	6.2 A. C.		Defective Ground
32. Plate	Ground	55,600	205	205	300	Coil; R-3; R-4; C-29; C-30; C-31; C-32; C-2
33. Screen	Ground	55,000	215	215	300	R-3; R-4; C-2; C-31; C-32
34. Grid	Ground	761,000				R-14; R-16; R-17; R-18; C-27; C-28; Field
35. Cathode	Ground	0	0	0		Defective Ground
36. Heater	Ground	0	0	0		Defective Ground
80 Rectifier						
37. Filament	Ground	55,000	215	215	300	Fil. Winding; C-31; C-32; C-2; R-3; R-4
38. Plate	Ground	2,200	−130	−130	300	H. V. Winding; Field
39. Plate	Ground	2,200	−130	−130	300	H. V. Winding; Field
40. Filament	Ground	55,000	215	215	300	C-31; C-32; C-2; R-3; R-4
Miscellaneous						
41. A. C. Line	Ground					Pri. Winding; Switch; C-34
42. A. C. Line	Ground					Pri. Winding; Switch; C-34
43. Ant. (Blue)	Ground	5.7				Coil; C-1
44. Ant. (Blue & Black)	Ground	.02	(OPEN ON B	ROADCAST)		Switch
45. Ground	Ground	0				Defective Ground
41. A. C. Line	42. A. C. Line	8				Switch; Primary; Cord; Plug
38. Plate 80	39. Plate 80	400				H. V. Winding
37. Filament 80	40. Filament 80	.12				Filament Winding

If Resistance Readings are low, try reversing polarity of Ohm-Meter.

*Subject to large variations.

†Figures in the first column refer to socket hole numbers on Figure 3.

**Meter must be 1,000 ohms per volt.

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODELS 60, 6010 & 6044

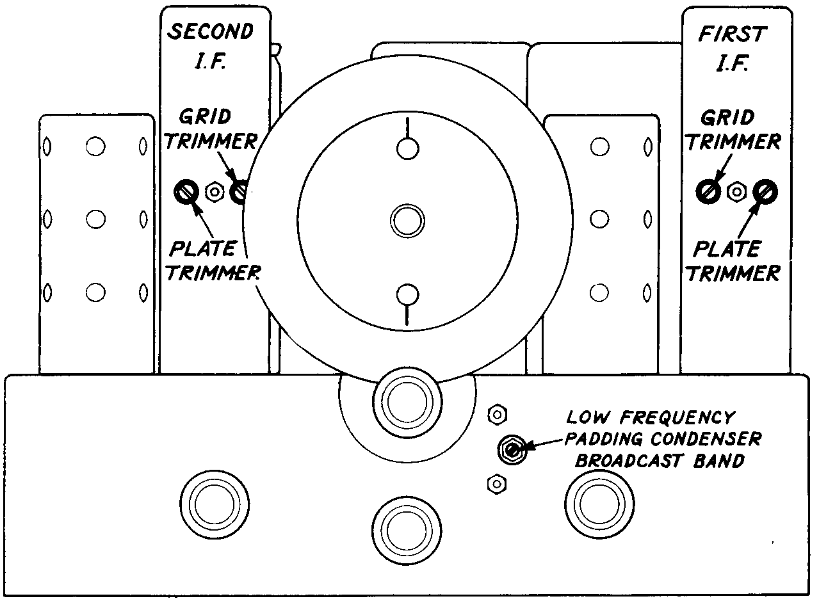


FIGURE 4
FRONT VIEW OF CHASSIS SHOWING
LOCATION OF INTERMEDIATE FREQUENCY COILS AND TRIMMERS

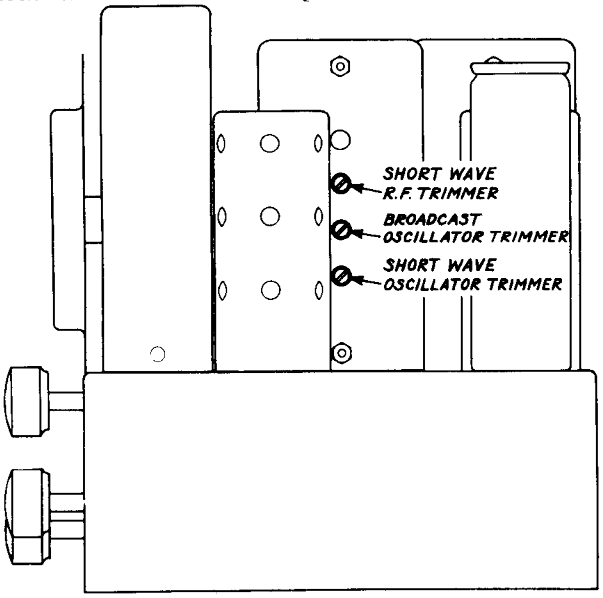


FIGURE 5
SIDE VIEW OF CHASSIS SHOWING
LOCATION OF OSCILLATOR AND RADIO FREQUENCY COIL AND TRIMMERS

COLOR CODES

POWER TRANSFORMER

Primary .... Two Brown Leads
6.3 Volt Filament .... Two Black Leads
5. Volt Filament .... Two Yellow Leads
High Voltage .... Two Green Leads
C. T. High Voltage .... Red

FIRST I. F. TRANSFORMER

Plate .... Blue
Plus "B" .... Red
Grid Return .... Black
Grid (Top) .... Green

SECOND I. F. TRANSFORMER

Plate .... Blue
Plus "B" .... Red
Diode Return .... Black
Diode .... Green

STANDARD R M A
Resistor and Condenser Color Code

0 Black, 1 Brown, 2 Red, 3 Orange, 4 Yellow, 5 Green, 6 Blue, 7 Purple, 8 Grey, 9 White

Resistors

The **Body Color** represents the **first figure** of the resistance value.

The **End Color** represents the **second figure** of the resistance value.

The **Dot Color** represents the **number of ciphers** following the first two figures.

Mica Condensers
(Capacity in Micro-Microfarads)

The **First Dot** on the condenser represents the **first figure** of the capacity.

The **Second Dot** on the condenser represents the **second figure** of the capacity.

The **Third Dot** on the condenser represents the **number of ciphers** following the first two figures.

The colors on the condensers should be read from left to right with the condenser in an upright position.

COIL AND MISCELLANEOUS RESISTANCE VALUES

Refer to Figure 6 for Reference Point Numbers

COIL	FROM	TO	D. C. RESISTANCE
ANTENNA COIL	Lug 3	Lug 8	5.5 Ohms
	Lug 1	Lug 2	4. Ohms
	Lug 2	Lug 4	.5 Ohm
RADIO FREQUENCY AND OSCILLATOR COILS	Lug 3	Lug 4	2.8 Ohms
	Lug 4	Lug 1	.1 Ohm
	Lug 1	Lug 2	.35 Ohm
	Lug 7	Lug 5	.1 Ohm
	Lug 5	Lug 8	4. Ohms
FIRST I. F. TRANS-FORMER	Black	Green	9. Ohms
	Red	Blue	7.25 Ohms
SECOND I. F. TRANS-FORMER	Black	Green	7.5 Ohms
	Red	Blue	4.5 Ohms
OSCILLATOR PLATE CHOKE	B+End	Plate End	12. Ohms
R. F. PLATE CHOKE	B+End	Plate End	75. Ohms
POWER TRANS-FORMER 115 VOLT 60 CYCLE	Brown	Brown	7.5 Ohms
	Black	Black	.12 Ohm
	Yellow	Yellow	.1 Ohm
	Green	Red	185. Ohms
	Green	Red	185. Ohms

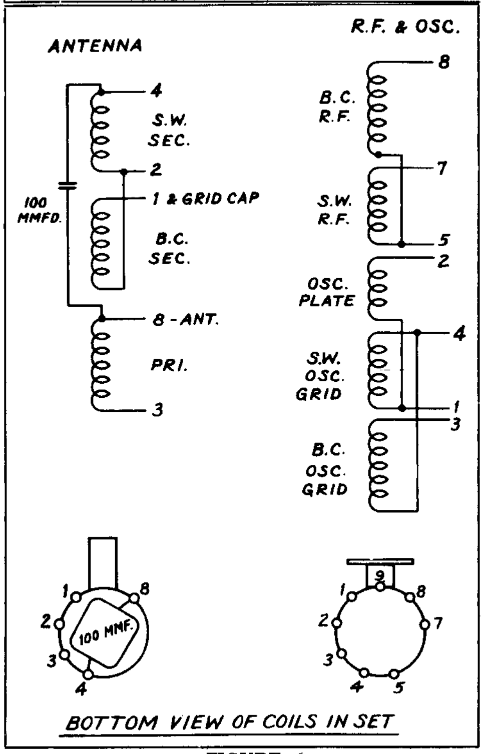


FIGURE 6

GENERAL ELECTRIC COMPANY
MODEL E-79

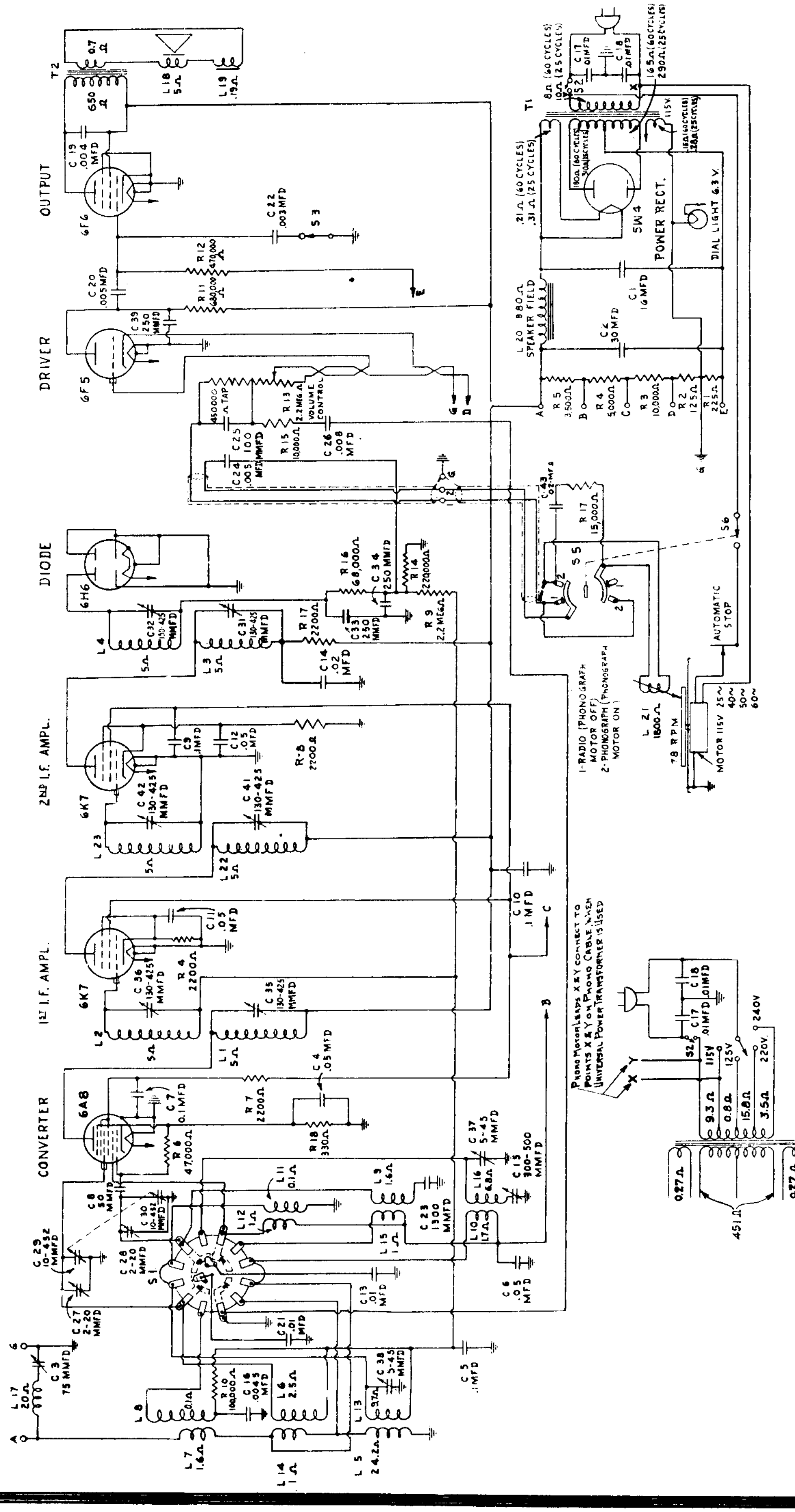


Fig. 1. Schematic Circuit Diagram

Phonograph Pickup
Type—Magnetic
Impedance—18,000 ohms at 1000 cycles

Tuning Frequency Range
Band "B" . . . . 540-1600 kc.
Band "C" . . . . 1560-5800 kc.
Band "D" . . . . 5.6-18.0 mc. (5,600-18,000 kc.)

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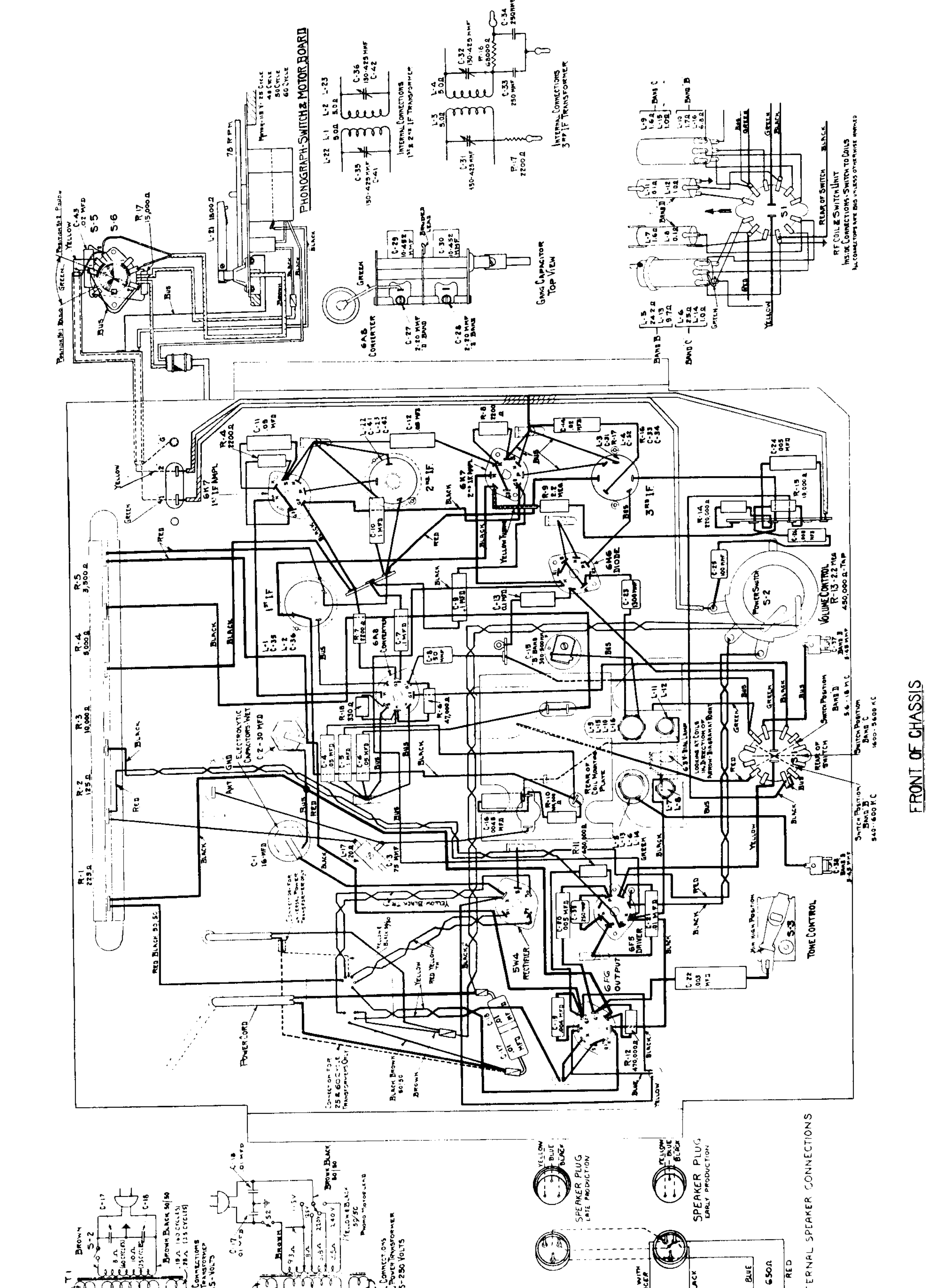

Fig. 2. Chassis Wiring Diagram

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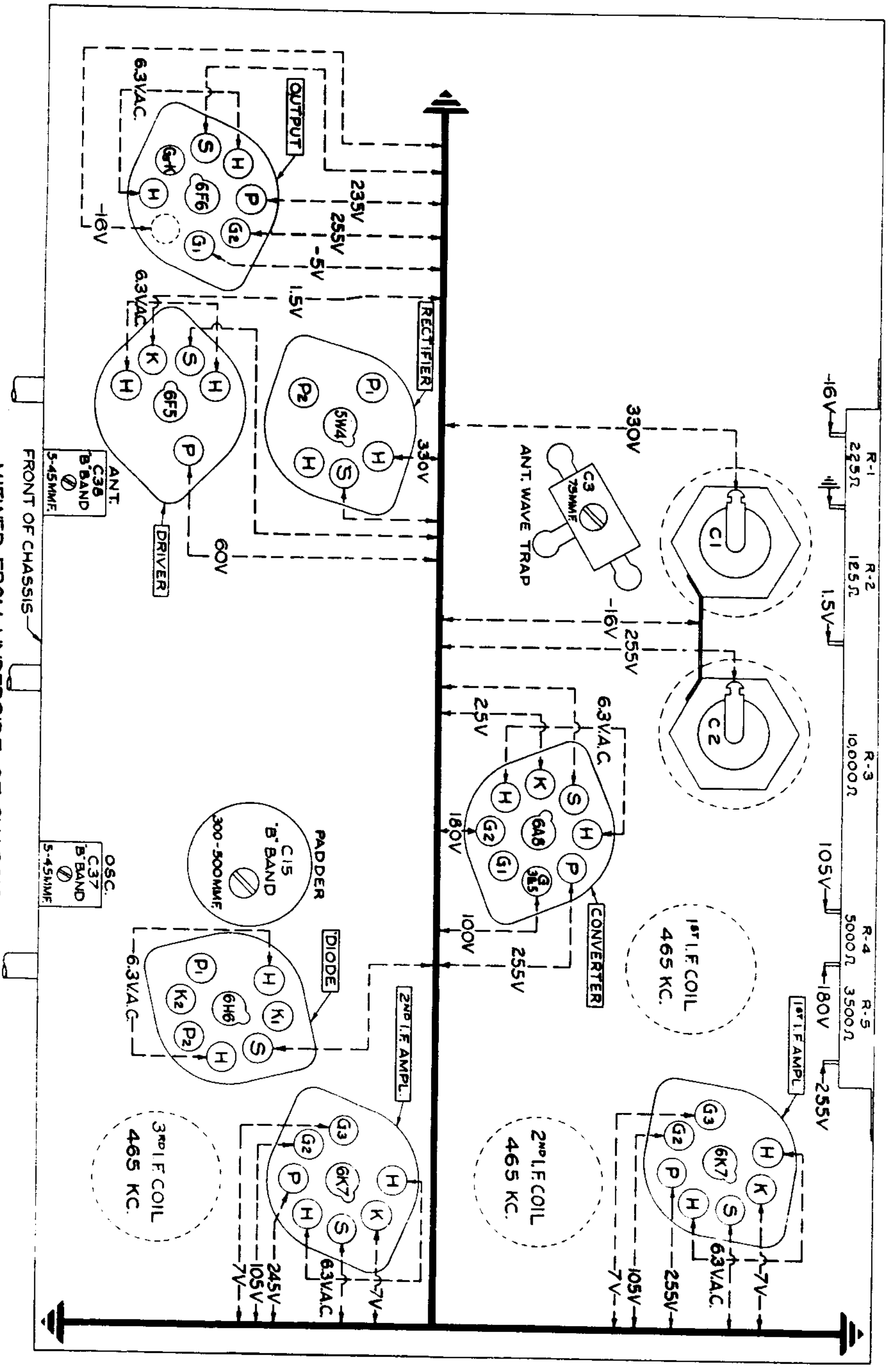

VIEWED FROM UNDERSIDE OF CHASSIS

Fig. 3. Trimmer Location & Socket Voltages

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A 6	115	60	105
A 5	115	50	105
C 2	115	25	105
V 6	105-130/200-250	60	105
V 5	105-130/200-250	50	105
V 4	105-130/200-250	40	110

NOTE.—Taps on universal transformers (Rating "V") are accessible by removing the cap cover on the top of the transformer.

Electrical Power Output

Undistorted.......................... 2.5 watts
Maximum.......................... 5.0 watts

Loud-speaker—Electrodynamic

Cone diameter.......................... 12 in.
Cone Coil Impedance....... 5.5 ohms at 400 cycles

Tubes

Converter and Oscillator.............. 6A8 Pentagrid Converter
1st I. F. Amplifier..... 6K7 Super-control Amplifier
2nd I. F. Amplifier.... 6K7 Super-control Amplifier
Detector and AVC.... 6H6 Twin Diode
Audio Amplifier....... 6F5 High Gain Triode
Output.............. 6F6 Power Amplifier Pentode
Power Rectifier....... 5W4 Full-wave Rectifier
Dial Lamp........... MAZDA No. 46

DESCRIPTION OF ELECTRICAL CIRCUIT—RADIO

Model E-79 employs seven metal envelope tubes to perform the above functions in a superheterodyne circuit, giving the excellent selectivity and sensitivity inherent in this type circuit. The "B" and "C" band coils are wound on a common form, while the "D" band coils have individual forms. Ample undistorted output is obtained through diode detection and two audio amplifier stages.

The signal from the antenna is applied to the control grid of the 6A8 converter tube through the antenna coil, the secondary of which is tuned to the incoming signal by the rear section of the main tuning condenser. The secondary of the coil for the band next lower in frequency to the one in use is short-circuited through a capacitor to prevent absorption of energy at its resonant frequency which falls in the next higher band. (NOTE.—On the schematic diagram, Fig. 1, the center portion of the wave band switch supporting the two shorting lugs rotates simultaneously with the four contact pins.) In the 6A8 tube the incoming signal is combined with the local oscillator signal which is 465 kc. different in frequency. The local signal is generated by the oscillator elements of this tube and the proper frequency difference is maintained throughout the tuning range by the front section of the main tuning condenser in conjunction with the oscillator coil and padding capacitors.

The combination of the signal frequency with the local oscillator frequency in the converter tube produces the intermediate frequency of 465 kilocycles. This particular intermediate frequency is chosen to reduce image response and improve short-wave performance. The intermediate frequency amplifier consists of two 6K7 tubes and three transformers, each with two tuned circuits.

The output of the I. F. amplifier is applied to the 6H6 diode rectifier, which is a combined detector and automatic volume control tube. The direct current component of the rectified signal produces a voltage drop across R-14. This voltage drop provides automatic bias for the R. F. and I. F. amplifier and converter tubes and so gives automatic volume control action. Full automatic bias voltage is applied to the pentagrid converter tube and to the first I. F. amplifier tube. The second I. F. tube is operated on self bias, obtained by the drop through R-8. This enables the second I. F. tube to provide maximum power to the 6H6 diode rectifier.

The manual volume control, R-13, selects the amount of audio signal applied to the grid of the 6F5 audio amplifier tube and this regulates the output of the receiver. The output of the 6F5 tube is resistance coupled to the grid of the 6F6 power amplifier pentode. The plate circuit of the 6F6 is suitably matched to the loud-speaker by means of a step-down output transformer.

The tone control circuit consists of a .003-mfd. capacitor connected in series with a grounding switch S-3 in the grid circuit of the 6F6 output tube. When it is desired to reduce the high frequency output of this receiver the switch S-3 is closed to ground.

Plate and grid voltages for all tubes are supplied by the power supply system employing a 5W4 full-wave rectifier tube which, together with a suitable network of resistors and capacitors, supplies the required voltages and filtering action.

PHONOGRAPH

The record reproducing facilities consist of a high impedance magnetic pickup with its associated balanced tone-arm, a compensated volume control, audio amplifier and loud-speaker of the receiver. In changing from radio reception to phonograph reproduction the phono-radio switch simultaneously disconnects the 6H6 diode from the volume control, connects the phono-pickup across this control, and shorts the 6H6 diode output, rendering the R. F. and I. F. sections inoperative.

The turntable assembly consists of a combination line switch which is simultaneously turned on when the phono-radio switch is turned on the phonograph position. A separate motor switch is provided to permit starting and an adjustable automatic stop.

ALIGNMENT PROCEDURE

The receiver should first be allowed to run for fifteen minutes in order to reach its approximate normal operating temperature. Before making any adjustments, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal at the alignment frequency from the test oscillator to the receiver and inserting a "Tuning Wand" into the coil involved. The "Tuning Wand" consists of a bakelite rod having a brass cylinder attached to one end, and a small core of finely divided iron compacted into the opposite end. For use on this receiver, it is recommended that a "Tuning Wand" having a flexible center portion be employed. The standard "Tuning Wand" may be adapted by cutting the bakelite rod in half and joining the two resulting pieces with a short length of rubber tubing. By inserting the brass cylinder end into the center of a particular coil, the inductance of the coil is lowered, increasing its resonant frequency. Inserting the iron-filled end into the coil raises its inductance, lowering its resonant frequency. If the circuits are in exact alignment, inserting either end of the tuning wand in any coil will result in a decrease in output. When an increase in signal is obtained with the iron-filled end of the wand, a decrease in resonant frequency of that circuit by increasing its trimmer capacity is indicated. When an increase in signal is obtained with the brass cylinder, a decrease in trimmer capacity is indicated.

Changes Indicated by Wand

Wand	Signal	Trimmer Adjustment Required
Brass cylinder	Decrease	None
Iron filings	Decrease	
Brass cylinder	Increase	Decrease capacity
Iron filings	Decrease	
Brass cylinder	Decrease	Increase capacity
Iron filings	Increase	

(Continued on next page)

GENERAL ELECTRIC COMPANY

MODEL E-79

(Continued from preceding page)

ALIGNMENT FREQUENCIES

I. F.	Band "B"	Band "D"	Wave Trap
465 kc.	580 kc. 1500 kc.	18,000 kc.	465 kc

In order to align these receivers properly, it is necessary to have available the following test equipment:

1. A modulated test oscillator with frequencies available of 465, 580, 1500, and 18,000 kc.
2. An output indicator, such as a high resistance a-c. voltmeter with a maximum scale reading of 3 to 5 volts, or a neon lamp output indicator.
3. An alignment tool consisting of an insulating shaft with a small screwdriver blade.
4. A tuning wand.

The location of all trimmer capacitors, as well as socket voltages to chassis, is shown in Figs. 2 and 3.

1. I. F. Alignment

Set the frequency band switch of the receiver to Band "B," short-circuit the antenna and ground terminals and tune the receiver to some point where no signal is heard. Set the volume control at its maximum position and ground the chassis.

The I. F. amplifier is tuned to 465 kc.; set the test oscillator dial at this frequency. Connect the test oscillator output between the converter tube (6A8) control grid and chassis. Connect the output meter across the cone coil of the speaker and adjust the test oscillator output control so that, with the receiver volume control at maximum, a small deflection is observed on the output meter. During both I. F. and R. F. alignment, the test oscillator signal should be maintained at the lowest level that will give a good readable output indication.

Adjust the secondary trimmer of the third I. F. transformer until a maximum output reading is obtained. Maintain a small deflection on the output meter throughout alignment by adjusting the test oscillator output. Next, adjust the primary trimmer of the third I. F. transformer for maximum output. Continue this procedure, adjusting the secondary and primary trimmers, respectively, of the second I. F. transformer. The secondary trimmer of the first I. F. transformer may then be adjusted and, lastly, the primary trimmer of the first I. F. transformer. After completing this procedure, repeat it a second time for final alignment. The I. F. alignment will then be complete.

I. F. Wave Trap Alignment

After completion of the I. F. alignment, with the test oscillator still set on 465 kc., apply this frequency to the antenna post of the receiver through a dummy antenna. This dummy antenna consists of a 400-ohm resistor in series with a 250-mmfd. capacitor and should be connected in series between the test oscillator output and the receiver antenna post. With the 465-kc. signal applied to the receiver antenna post, adjust the I. F. Wave Trap trimmer for *minimum* output indication.

2. R. F. Alignment

First of all, check the position of the dial pointer. To do this, rotate the gang condenser to the maximum capacity position, i.e., plates fully meshed. While in this position, align the pointer with the last black line on the scale by loosening the dial drum set screws and rotating the drum on the gang shaft. Make sure the antenna and ground terminals of the receiver are not short-circuited and connect to them the output of the test oscillator, preferably using the dummy antenna described above between the test oscillator and the receiver antenna terminal. Connect the output indicator across the speaker cone coil.

"D" Band (5.6-18.0 mc.)

Because of the R. F. circuit used in this receiver the "D" band must be aligned first. Set the frequency band switch to the "D" band position by rotating it to its most clockwise position. Tune the test oscillator to 18,000 kc. (18 mc.) and set the dial pointer on the receiver at this frequency. Adjust the "D" band oscillator trimmer, located on the front section of the gang condenser, for maximum output. (NOTE.—The oscillator operates on the *low* frequency side of the incoming signal; therefore adjust the trimmer until the second oscillator peak is reached as the trimmer is *increased* in capacity. A check for the correctness of this adjustment may be made by rotating the gang to the 17,070 kc. calibration mark. If, with increased input from the test oscillator, no signal is detected, the correct oscillator peak has been used.) Keep the receiver volume control at its extreme clockwise position and adjust the test oscillator output to maintain a small reading on the output indicator. When the optimum adjustment on the oscillator trimmer has been obtained, adjust the "D" band antenna trimmer on the rear section of the gang for maximum output while rocking the tuning condenser through the signal.

"C" Band (1.56-5.80 mc.)

No separate trimmers are provided for adjustment of this band. The correct adjustment of the "D" band and "B" band automatically aligns the "C" band. The adjustment procedure for the "B" band follows immediately.

"B" Band (540-1600 kc.)

Set the frequency band switch to the broadcast position. Rotate the gang condenser until the dial pointer indicates the 1500 kc. calibration point, and adjust the test oscillator to this frequency. The "B" band trimmers are located underneath the chassis. (See Fig. 2.) Adjust the broadcast oscillator trimmer for maximum output. This trimmer is the one nearest the volume control. When the oscillator has been peaked, adjust the antenna trimmer for maximum output. Here again, as pointed out previously, it is necessary to maintain a small R. F. input from the test oscillator to avoid erratic action of the output indicator due to automatic volume control action.

Now set the test oscillator at 580 kc. and tune the receiver to that frequency. Slowly, rocking the tuning condenser back and forth through the signal, adjust the 580-kc. padding capacitor for maximum output. When this has been done, return to 1500 kc. on the receiver and test oscillator and recheck the alignment at that frequency for maximum output. The broadcast band should now be in alignment.

ADJUSTMENT OF DIAL MECHANISM

The dial mechanism is rigidly mounted to the frame of the tuning condenser by means of two removable, self-tapping screws. The complete assembly is rubber-mounted on rubber cushions at the points of support.

The dial mechanism consists of the following parts:

1. Dial Scale.
2. Reflector.
3. Mounting Bracket.
4. Dial Pointer.
5. Dial Pointer Drive Cable.
6. Drive Cable Tension Spring.
7. Two Idler Pulleys.
8. Cable Drum (mounted on condenser shaft).
9. Vernier Drive.

To Replace Dial Scale or Reflector

Twist the supporting tabs at either end of the scale into alignment with the slots and remove the scale and reflector. Disengage the old scale from the reflector and insert the new scale in its place with the mounting slots in alignment. Replace scale and reflector on the bracket and twist the inner corner of each tab over the outer edge of the slot with which it is engaged.

To Replace Dial Pointer

Disengage the clamping tabs at the rear of the slider from the cable by bending down the center one of the three tabs. Place the new pointer on the scale in a position to agree with the calibration. Secure the pointer to the cable by pinching together the clamping tabs with enough pressure to hold firmly without damaging the cable.

To Replace Dial Pointer Drive Cable

Remove the dial pointer as explained above and set the tuning condenser gang for maximum capacity (plates all meshed). Remove the old cable from the cable drum and engage one end of the new cable with the upper end of the keyhole slot in the drum circumference. Draw the cable clockwise over the top of the drum and through the notch in the right-hand end of the bracket, then around the idler pulley and to the left, close to the scale, passing around the idler pulley mounted in the tension spring and clockwise over the top of the drum. Note that the pulleys are held in place by the tension on the cable. Release the spring tension on the drive cable by pressing inwardly on the tension idler pulley, then insert the free end of the cable in the keyhole slot.

To Replace Cable Drum

Remove the dial scale and reflector bracket as explained elsewhere. The cable drum can then be removed by loosening the two set screws in the hub. When replacing the cable drum, set the condenser so that all plates are fully meshed. The right-hand end of the radial slot in the drum web should then be approximately $\frac{1}{16}$ of an inch clear of the tuning knob shaft bearing bushing. Locate the cable drum axially on the condenser shaft so as to clear the heads of the two mounting bracket screws.

To Replace Mounting Bracket

Remove the dial scale and reflector bracket, also the cable drum. Access may be had to the mounting bracket self-tapping screws when this is done. In replacing the mounting bracket it is necessary to insure that the lower edge of the bracket is parallel to and at height above the top of the cabinet chassis support panel of 5¾ inches.

To Adjust the "Automatic Vernier" Drive

The vernier drive used on this receiver includes a planetary reduction unit equipped with a clutch which automatically changes the reduction ratio. This clutch consists of a sleeve mounted on the knob shaft. To adjust, loosen the locking screw and move the sleeve axially along the shaft until the cam surface in the end of the sleeve engages with the pin in the knob shaft. This engagement should take place at a point on the cam surface as near to the stop as possible and still allow complete release of the clutch.

PHONOGRAPH

The phonograph mechanism in this receiver has been designed to be simple and foolproof. Under normal operating conditions, service difficulties should be negligible. Occasionally, however, certain adjustments may be required. These adjustments are explained in the following paragraphs.

SOCKET VOLTAGES

Tube No.		Cathode to Ground Volts D.C.	Screen Grid to Ground Volts D.C.	Plate to Ground Volts D.C.	Cathode Current M.A.	Heater Volts A.C.
6A8	Oscillator	2.5	...	180	12.0	6.3
	Converter	...	100	255		
6K7 1st I. F. Amp.		7.0	105	255	9.0	6.3
6K7 2nd I. F. Amp.		7.0	105	245	9.0	6.3
6H6 Detector & AVC.		...	...	...	...	6.3
6F5 Audio Amplifier		1.5	...	*60	0.3	6.3
6F6 Output		...	255	235	36.0	6.3
5W4 Power Rectifier		300 D.C.	...	650/325 R.M.S.	70.0	5.0

Measured at 115 volts supply. No signal input. Volume control maximum. Voltmeter 1000 ohms per volt; measurements taken on highest scale giving accurate readable deflection.
*Supply voltage minus drop in load resistor.

MOTOR ADJUSTMENTS

The speed of the turntable motor is controlled by a governor which allows correct adjustment of the turntable rotation to 78 revolutions per minute. A pointer is provided under the turntable and the base plate is marked "F" and "S" to indicate direction to move pointer for faster or slower operation. A check of the turntable rotational speed may be made by placing a piece of paper under a record on the turntable and counting the number of times it rotates

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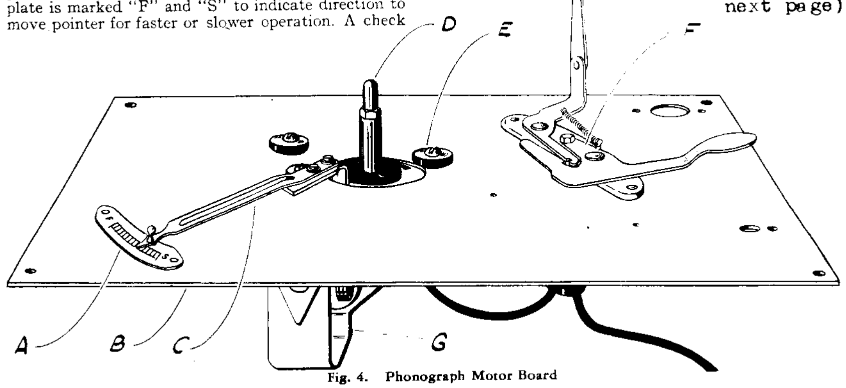


Fig. 4. Phonograph Motor Board

GENERAL ELECTRIC COMPANY

MODEL E-79

(Continued from preceding page)
past a fixed point in one minute.

There is another type motor used in some sets of this model that does not have a speed control on the base plate. The speed of this motor is regulated by an adjustable collar on the governor. This is adjusted to 78 RPM at the factory and should not require attention.

The motor bearings and gears are properly lubricated for long operation under normal weather conditions. If the motor chatters or runs uneven, place a few drops of light machine oil on the governor felt.

TRIP MECHANISM

The trip mechanism is of simple design and consists of a latch bar connected to the motor switch and a trip lever. The latch is held closed by means of a spring between the latch bar and the trip lever. Be sure the parts work freely without binding.

The trip is actuated by an adjustable arm on the trip lever. When the eccentric groove in the record swings the tonearm back and forth, it pushes the latch out of engagement.

MAGNETIC PICKUP

The pickup used in the phonograph is of an improved design. It is horizontally mounted in the tonearm and is held by a single set screw. The horseshoe magnet is fastened to the pole pieces by means of a set screw and clamp. The armature is centered by means of a split rubber block, which also provides a damping effect on the armature movement. The frequency response is uniform over a wide range.

Service operations which may be necessary on the pickup are as follows:

CENTERING ARMATURE

Refer to Fig. 6 showing the pickup inner structure. The armature (11) is shown in its proper relation to the magnet pole pieces, i.e., exactly centered. Whenever this centering adjustment has been disturbed, the screws (5) and (10) should be loosened and the armature rubber cushion (12) adjusted so the vertical axis of the armature is at right angles to the horizontal axis of the pole piece (8). Adjust the tension on the armature until there is a slight rocking motion. The spacing between the pole pieces and armature should be .0125 inch on each side.

DAMPING BLOCK

The top projection of the armature is imbedded in a rubber block (6) attached to the top of the pole pieces. This damping block acts as a mechanical filter to eliminate undesirable resonances and to cause the frequency reponse to be uniform. Should it be necessary to replace this damping block, it may be done by removing the yoke (7).

REPLACING COILS

In case of an open or shorted pickup coil, the method of replacement is obvious upon inspection of the pickup assembly and by study of Fig. 6. It is important to adjust the armature as previously explained after reassembly of the mechanism. Only rosin core solder should be used in soldering the coil leads to the lugs.

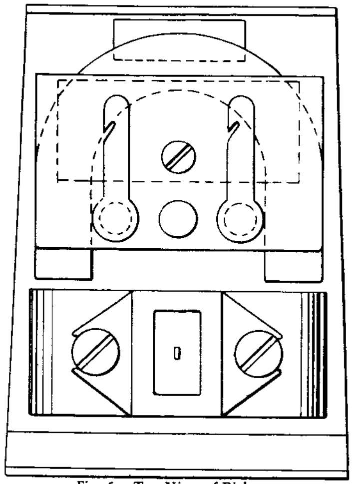


Fig. 5. Top View of Pickup

MAGNETIZING

The loss of magnetization will not occur when the pickup has received normal care, due to the fact that the magnet and pole pieces are one unit and the magnetic circuit remains closed at all times. When the pickup has been mishandled, subjected to a strong AC field, jolted or dropped, there may be an appreciable loss of magnetic strength, in which case it will be necessary to remagnetize the entire structure. This should be done by placing the pickup assembly on the poles of a standard pickup magnetizer and changing the pickup in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to remagnetize it so that the same polarity is maintained.

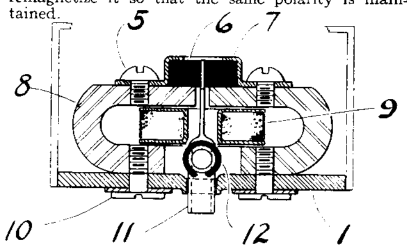


Fig. 6. Front View of Pickup

REPLACEMENT PARTS

INSIST ON GENUINE FACTORY-TESTED PARTS, WHICH MAY BE PURCHASED FROM AUTHORIZED DEALERS

Stock No.	Description	List Price
*RB-026	BOARD—Antenna & Ground Terminal Board	$0.10
RB-040	BOARD—Terminal Board Near Oscill. Padder	.10
RB-054	BOARD—Terminal Board on Front Wall near Volume Control	.10
RB-134	BRACKET—Dial Light Bracket	.15
RB-135	BRACKET—Dial Support Bracket	.15
RC-014	CAPACITOR—.003 mfd., 200 volt, Paper (C-22)	.25
RC-017	CAPACITOR—.0045 mfd., 200 volt, Paper (C-16)	.25
RC-018	CAPACITOR—.004 mfd., 600 volt, Paper (C-19)	.30
*RC-024	CAPACITOR—.005 mfd., 200 volt, Paper (C-24)	.25
*RC-029	CAPACITOR—.005 mfd., 400 volt, Paper (C-20)	.30
*RC-034	CAPACITOR—.01 mfd., 200 volt, Paper (C-21)	.25
RC-036	CAPACITOR—.008 mfd., 200 volt, Paper (C-26)	.25
*RC-072	CAPACITOR—.05 mfd. 200 volt, Paper (C-4, C-11, C-12)	.25
*RC-080	CAPACITOR—.02 mfd., 400 volt, Paper (C-14)	.25
*RC-091	CAPACITOR—.05 mfd., 400 volt, Paper (C-6)	.30
*RC-096	CAPACITOR—.1 mfd., 200 volt, Paper (C-5, C-13)	$0.30

REPLACEMENT PARTS (Cont'd)

Stock No.	Description	List Price
*RC-123	CAPACITOR—.1 mfd., 400 volt, Paper (C-7, C-9, C-10)	.35
RC-218	CAPACITOR—50 mmfd., Mica (C-8)	.25
RC-235	CAPACITOR—100 mmfd., Mica (C-25)	.25
RC-261	CAPACITOR—250 mmfd., Mica (C-33, C-34, C-39)	.25
*RC-344	CAPACITOR—1300 mmfd., Mica (C-23)	.35
*RC-412	CAPACITOR—30 mfd., 280 volt, Wet Electrolytic (C-2)	1.20
RC-413	CAPACITOR—16 mfd., 340 volt, Wet Electrolytic (C-1)	1.25
*RC-608	CAPACITOR—Oscillator Padder, 300-500 mmfd. (C-15)	.40
RC-618	CAPACITOR—Trimmer Capacitor (On Lower Front Wall) (C-37, C-38)	.25
RC-710	CONDENSER—Two-gang Tuning Condenser, 10-452 mmfd. (C-29, C-30)	3.60
RC-754	CAPACITOR—Line Capacitor, .01-.01 mfd., 250 volt A.C. (C-17, C-18)	.40
RC-815	CABLE—Dial Cable (Pkg. of 5)	.50
*RC-854	CORD—Power Cord and Plug	.60
RD-030	DRUM—Condenser Drive Drum	.40
RD-032	DIAL—Dial Scale	.30
RD-034	DRIVE—Condenser Drive	1.10
RF-010	FOOT—Chassis Mounting Foot	.30
*RG-001	GRID CAP—Control Grid Cap, Pkg. of 5	.10
*RK-004	KNOB—Control Knob (Without Dot) (Pkg. of 5)	$0.40
*RK-005	KNOB—Control Knob (With Dot) (Pkg. of 5)	.50
RL-121	COIL—R.F. Coil Band D (L-7, L-8)	.75
RL-122	COIL—R.F. Coil Band B and C (L-5, L-13; L-6, L-14)	1.10
RL-223	COIL—Osc. Coil Band D (L-11, L-12)	.70
RL-224	COIL—Osc. Coil Band B and C (L-9, L-15; L-10, L-16)	1.00
RP-042	PULLEY—Dial Pulley (Pkg. of 2)	.15
RP-045	POINTER—Dial Pointer and Guide	.10
RP-046	PLATE—R.F. Coil Unit End Plate with Shield	.25
RQ-047	RESISTOR—330 ohms, ¼ watt, Carbon (R-18) (Pkg. of 5)	.60
RQ-067	RESISTOR—2200 ohms, ¼ watt, Carbon (R-4, R-7, R-8) (Pkg. of 5)	.60
*RQ-083 (RR-021)	RESISTOR—10,000 ohms, ¼ watt, Carbon (R-15) (Pkg. of 5)	.60
RQ-099	RESISTOR—47,000 ohms, ¼ watt, Carbon (R-6) (Pkg. of 5)	.60
RQ-103	RESISTOR—68,000 ohms, ¼ watt, Carbon (R-16) (Pkg. of 5)	.60
*RQ-107 (RR-050)	RESISTOR—100,000 ohms, ¼ watt, Carbon (R-10) (Pkg. of 5)	.70
RQ-115	RESISTOR—220,000 ohms, ¼ watt, Carbon (R-14) (Pkg. of 5)	.70
RQ-123	RESISTOR—470,000 ohms, ¼ watt, Carbon (R-12) (Pkg. of 5)	.70
RQ-127	RESISTOR—680,000 ohms, ¼ watt, Carbon (R-11) (Pkg. of 5)	.70
RQ-139	RESISTOR—2.2 megohms, ¼ watt, Carbon (R-9) (Pkg. of 5)	.70
RR-716	RESISTOR—Tapped Bleeder Resistor (R-1, R-2, R-3, R-4, R-5)	.90
RR-905	REFLECTOR—Dial Light Reflector	.15
RS-136	SHIELD—1st or 2nd I.F. Shield Can	.20
RS-137	SHIELD—3rd I.F. Shield Can	.20
RS-164	SHIELD—Chassis End Shield	.30
*RS-200	SOCKET—8 Pin Tube Socket (Pkg. of 5)	.75
*RS-204	SOCKET—5 Pin Tube Socket (Pkg. of 5)	.75
RS-321	SWITCH—Tone Control Switch (S-3)	.30
RS-323	SWITCH—Band Change Switch (S-1)	1.25
RS-415	SPRING—Spring Bracket Supporting Cable Pulley (Pkg. of 2)	.10
RS-423	SPRING—Knob Spring (Push-on type) (Pkg. of 10)	.25
RS-858	SCREWS—Set Screws for Dial Drive Drum (Pkg. of 10)	.10
RT-074	TRANSFORMER—Power Transformer, 115 volts, 50-60 cycles (T-1)	4.50
RT-075	TRANSFORMER—Power Transformer, 115 volts, 25-60 cycles (T-1)	8.35
RT-076	TRANSFORMER — Universal Power Transformer, 105-130 volts and 200-250 volts, 40-60 cycles (T-1)	8.50
RT-223	TRANSFORMER—1st or 2nd I.F. Transformer (Complete) (L-1, L-2; C-35, C-36) (L-22, L-23; C-41, C-42)	1.50
RT-224	TRANSFORMER—3rd I.F. Transformer (Complete) (L-3, L-4; C-31, C-32)	1.75
RV-014	VOLUME CONTROL—Volume Control and Power Switch, 2.2 meg. Total Res. (R-13, S-2)	1.15
RW-005	WINDOW—Dial Window	.15

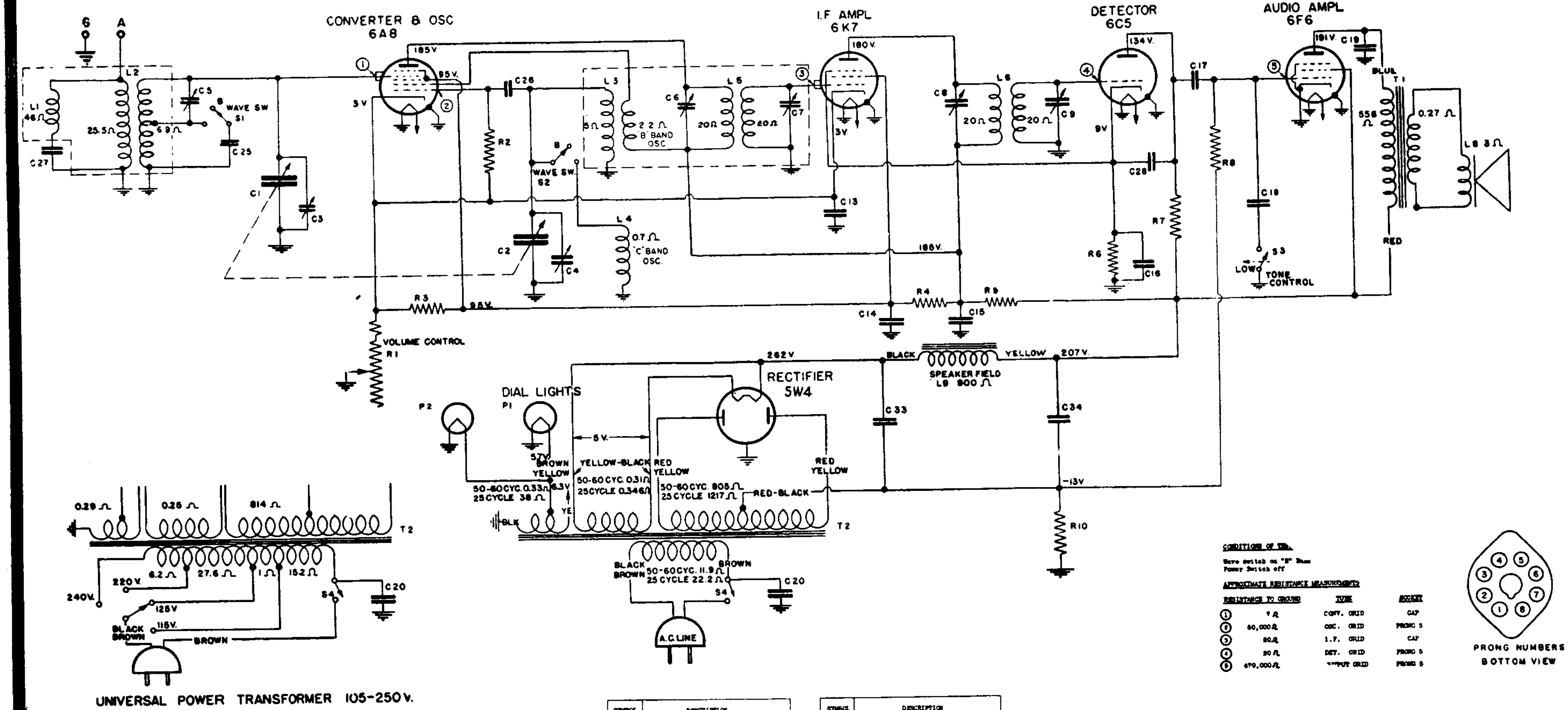
Stock No.	Description	List Price
*RW-101	WASHER—Felt Washers for Control Shafts (Pkg. of 10)	.45
*RW-102	WASHER—Insulating Washer for Mounting Electrolytic (Pkg. of 10)	.20
RW-400	WAVE TRAP COMPLETE—(L-17, C-3)	.80
RX-016	MOUNTING ASSEMBLY—Screws and Cushions for Mounting Tuning Condenser	.30
	SPEAKER ASSEMBLY	
RC-910	CONE—12-in. Cone and Voice Coil and Gasket (L-18)	$1.45
RC-991	CLAMP—Cone Spider Clamp	.05
*RP-012	PLUG—Female Speaker Plug	.20
RP-044	PLUG—Male Speaker Plug	.20
RS-031	SPEAKER—12-in. Reproducer Unit Complete with Transformer (L-18, L-19, L-20, T-2)	9.80
RS-416	SPRING—V.C. Leads Spring (Pkg. of 2)	.10
RT-413	TRANSFORMER—Output Transformer (T-2)	1.30
	PHONOGRAPH MOTOR BOARD ASSEMBLY	
RPB-007	BASE PLATE—13 in. by 13 in. Base plate (Brown enamel finish) (B)	2.50
RPB-008	BASE PLATE—13 in. by 13 in. Base plate Brown enamel finish (for motor with fixed speed regulator) (B)	2.50
RPL-004	LEVER—Motor speed regulator lever (C)	.25
RPP-010	PLATE—Speed Regulator Plate (A)	.35
RPR-004	RIVET—Rivet for Holding Automatic Stop to Base Plate (Pkg. of 5)	.05
RPS-025	SCREW—Turntable shaft thumb screw (D)	.20
RPS-026	SCREW—Screw for attaching speed regulator lever to bracket (Pkg. of 5)	.10
RPS-027	STOP—Automatic stop and switch (complete) (F)	1.50
RPT-002	TURNTABLE—10-in. turntable (Brown velveteen)	1.75
RPW-005	WASHER—Turntable drive washer (rubber)	.05
RPW-019	WASHER—Turntable drive washer (metal)	.05
	MOTOR ASSEMBLIES	
RPM-005	MOTOR—Motor complete—78 RPM 115 V. AC 60 cycles (G)	13.75
RPM-006	MOTOR—Motor complete (with fixed speed reg. mech.) 78 RPM 115 V. AC 60 cycles (G)	12.00
RPM-007	MOTOR—Motor complete—78 RPM 115 V. 50 cycles (G)	13.75
RPM-008	MOTOR—Motor complete—78 RPM 115 V. 40 cycles (G)	15.25
RPM-009	MOTOR—Motor complete—78 RPM 115 V. 25 cycles (G)	15.25
RPX-003	MOUNTING ASSEMBLY—Six steel washers, six rubber washers, three mounting screws and hex. mtg. screw nuts (E)	.20
	PICKUP AND TONEARM ASSEMBLY	
RPA-007	ARM—Pickup arm complete (including base and tonearm mtg. bracket)	2.30
RPA-008	ARMATURE—Pick-up armature (11)	.80
RPB-009	BASE—Pickup base plate (1)	.30
RPC-009	CABLE—Shielded pickup cable	1.50
RPC-010	CUSHION—Armature Rubber damping cushion (6) (Pkg. of 5)	.25
RPL-800	COIL—Pick-up coil assembly (9)	1.50
RPP-011	PICKUP—Pickup unit complete (L-21) (Less tone arm)	5.40
RPS-028	SCREW—Needle clamp screw	.30
	MISCELLANEOUS ASSEMBLIES	
RPB-005	BOARD—Terminal board for phono leads (Rear of chassis)	.15
RPC-011	CABLE—Phono radio switch cable with 3 lugs	.35
RPC-013	CORD—Phonograph power cord with female connector	.80
*RC-046	CAPACITOR—Phono radio switch capacitor (.02 mfd. 200 V.) (C-43)	.25
RK-002	KNOB—Phono radio switch knob (Pkg. of 5)	.50
RQ-087	RESISTOR—Phono radio switch resistor 15,000 ohm ¼ watt carbon (R-17) (Pkg. of 5)	.60
RPS-302	SWITCH—Phono radio switch with hex. nut ⅜"-32 (S5, S6)	1.10

* Indicates part also used on 1936 "A" line receivers.

(Prices subject to change without notice)

GENERAL ELECTRIC COMPANY

MODEL F-53



CONDITIONS OF TEST.

Wave switch on "B" Band
Power Switch off

APPROXIMATE RESISTANCE MEASUREMENTS

RESISTANCE TO GROUND		TUBE	SOCKET
1	7 Ω	CONV. GRID	CAP
2	60,000 Ω	OSC. GRID	PRONG 5
3	80 Ω	I.F. GRID	CAP
4	20 Ω	DET. GRID	PRONG 5
5	470,000 Ω	OUTPUT GRID	PRONG 5

ALL VOLTAGES TO GROUND UNLESS OTHERWISE SPECIFIED
ALL VOLTAGES MEASURED WITH ANTENNA AND GROUND TERMINALS SHORTED
ALL VOLTAGES MEASURED WITH DIAL POINTER AT 1000 K.C.
ALL VOLTAGES MEASURED WITH VOLUME AT MAXIMUM
1000 OHMS PER VOLT METER USED FOR ALL READINGS

SYMBOL	DESCRIPTION
C1	TUNING CAP. R.F. SECT.
C2	TUNING CAP. OSC. SECT.
C3	TRIMMER CAP. R.F. SECT.
C4	TRIMMER CAP. OSC. SECT.
C5	TRIMMER CAP. 5-40 MMF
C6	TRIMMER CAP. 35-80 MMF
C7	TRIMMER CAP. 35-80 MMF
C8	TRIMMER CAP. 35-80 MMF
C9	TRIMMER CAP. 35-80 MMF
C13	PAPER CAP. .25 MF
C14	PAPER CAP. .1 MF
C15	PAPER CAP. .1 MF
C16	PAPER CAP. .1 MF
C17	PAPER CAP. .05 MF
C18	PAPER CAP. .002 MF
C19	PAPER CAP. .006 MF
C20	PAPER CAP. .01 MF
C25	MICA CAP. 1100 MMF
C26	MICA CAP. 100 MMF
C27	MICA CAP. 50 MMF
C28	MICA CAP. 1000 MMF
C33	DRY ELECTROLYTIC CAP. 8 MF
C34	DRY ELECTROLYTIC CAP. 8 MF
T1	OUTPUT TRANSFORMER
T2	POWER TRANSFORMER

SYMBOL	DESCRIPTION
R1	VOLUME CONTROL 4500 Ω
R2	CARBON RESISTOR 56000 Ω
R3	CARBON RESISTOR 18000 Ω
R4	CARBON RESISTOR 10000 Ω
R6	CARBON RESISTOR 100000 Ω
R7	CARBON RESISTOR 270000 Ω
R8	CARBON RESISTOR 470000 Ω
R9	CARBON RESISTOR 1000 Ω
R10	CARBON RESISTOR 240 Ω
L1	WAVE TRAP COIL
L2	ANTENNA COIL
L3	OSC. COIL "B"
L4	OSC. COIL "C"
L5	1st I.F. TRANSFORMER COIL
L6	2nd I.F. TRANSFORMER COIL
L8	SPEAKER VOICE COIL
L9	SPEAKER FIELD COIL
S1	BAND CHANGE SWITCH (ANT. COIL)
S2	BAND CHANGE SWITCH (OSC. COIL)
S3	TONE CONTROL SWITCH
S4	POWER SWITCH
P1	DIAL LIGHT
P2	DIAL LIGHT

Tubes

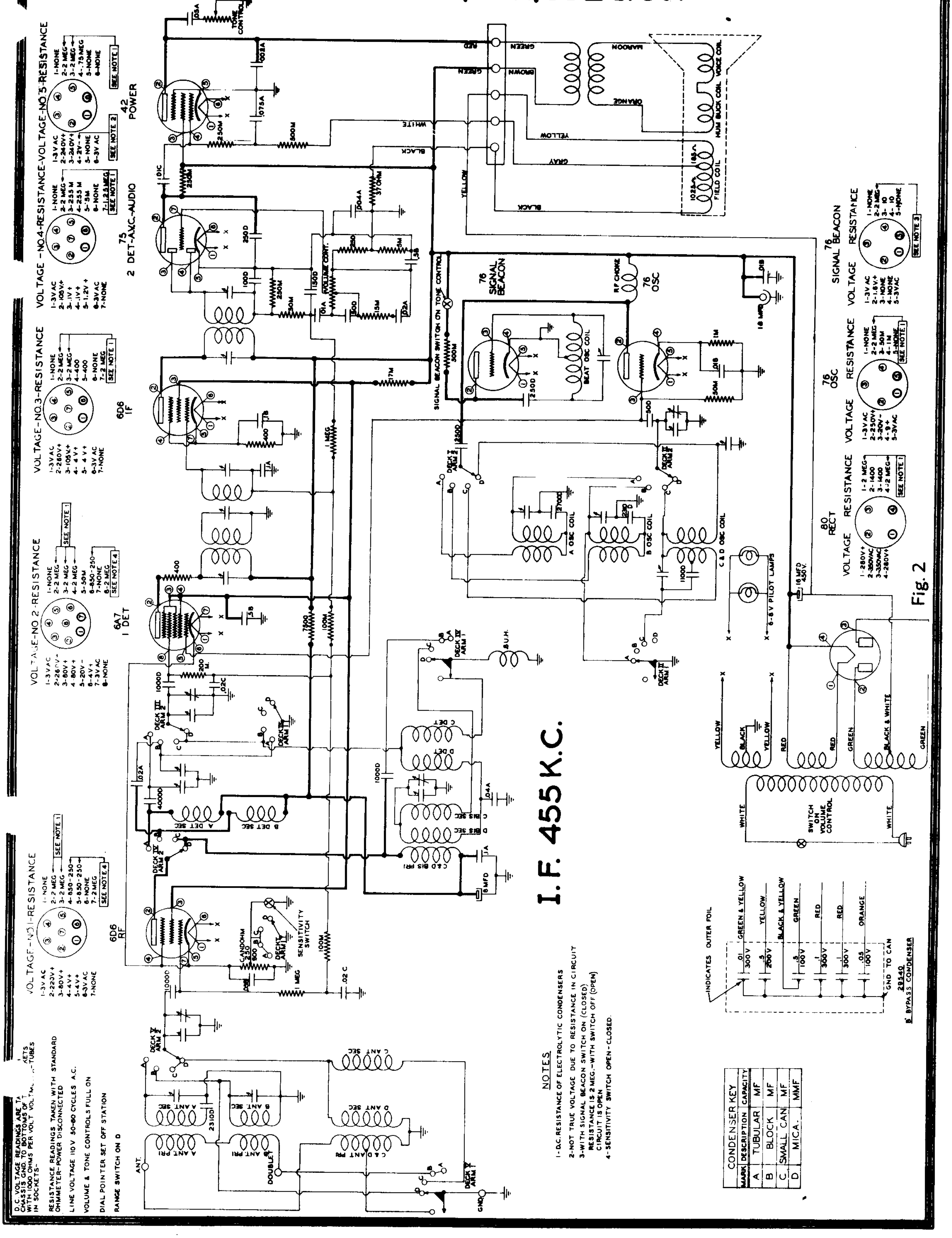
Converter.......6A8 Pentagrid Converter
I.F. Amplifier...6K7 Triple-grid, Super-control Amplifier
Detector........6C5 Low Gain Triode
Output.........6F6 Power Amplifier Pentode
Rectifier........5W4 Full-wave Rectifier
Dial Lamps.....Mazda No. 40 (2)

Tuning Frequency Range

Band "B"..............................540–1800 kc.
Band "C"..............................1800–4000 kc.

Fig. 1. Schematic Circuit Diagram

GENERAL HOUSEHOLD UTILITIES COMPANY
MODELS 8D, 8DX, 8DZ & 861



GENERAL HOUSEHOLD UTILITIES COMPANY
MODEL 8D, 8DX, 8DZ & 861

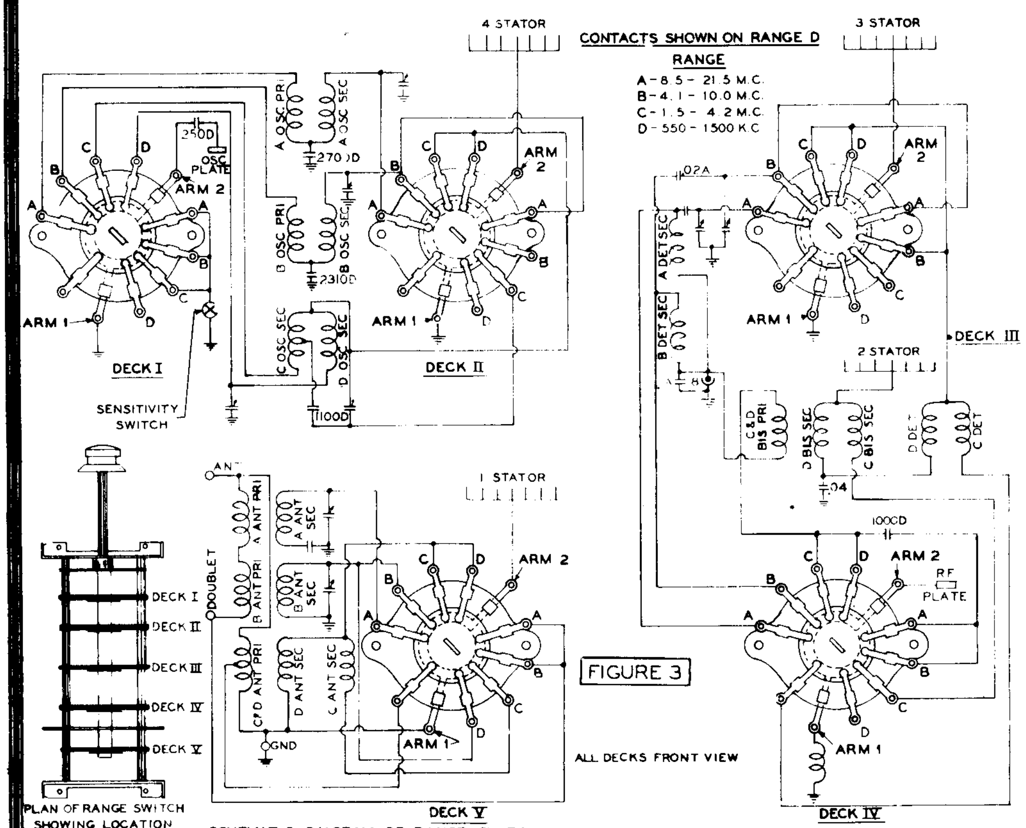
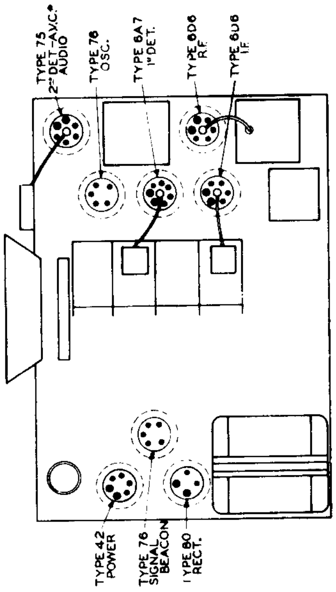


FIGURE 3

SCHEMATIC DIAGRAM OF RANGE SWITCH AND COIL ASSEMBLY ON CHASSIS 8-D



8-D CHASSIS TUBE LAYOUT

FIGURE 1

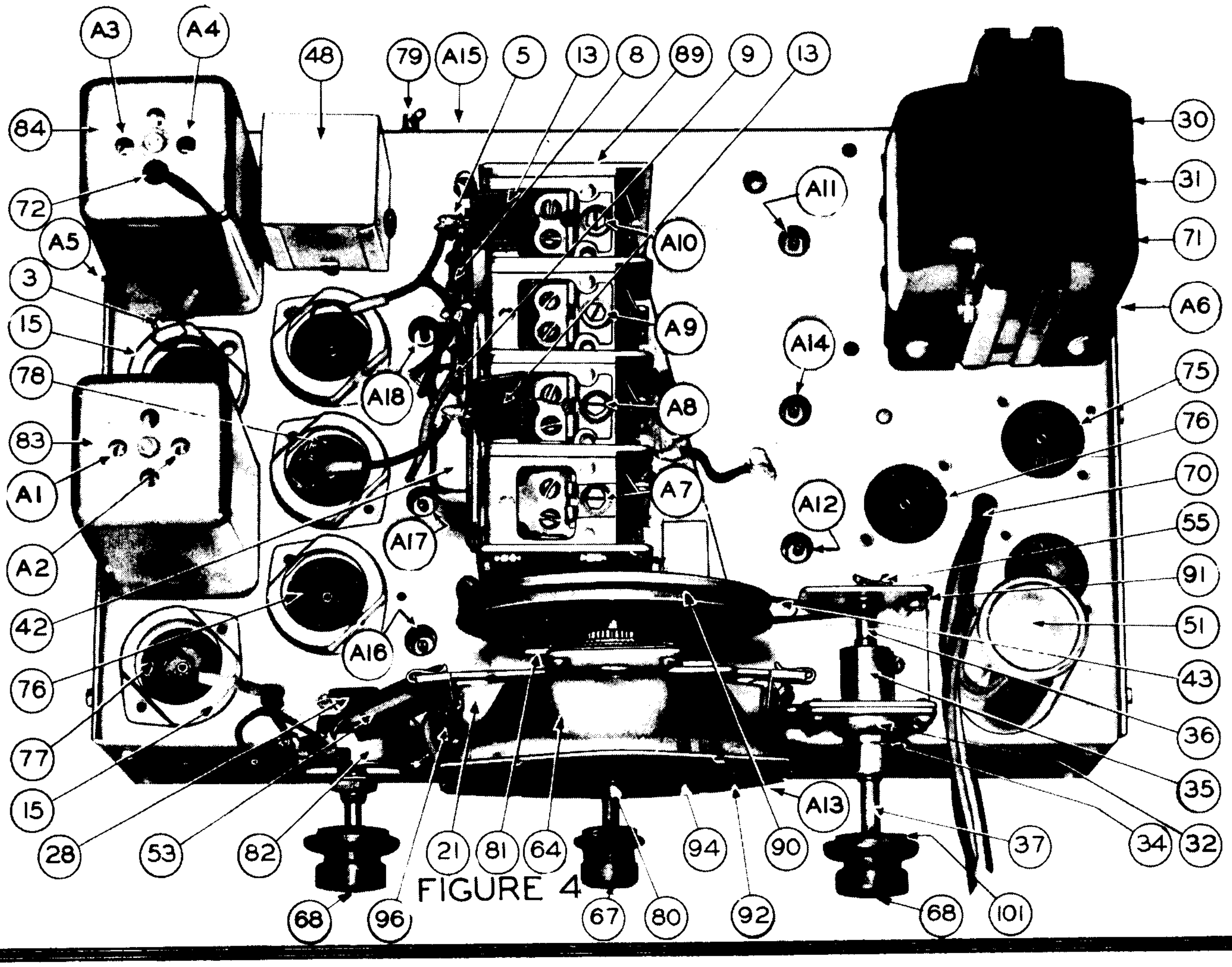


FIGURE 4

GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 8D, 8DX, 8DZ & 861

Chassis 8D —115 volt 50-60 cycle

Chassis 8DX—115 volt 25-50 cycle

Power Consumption 75 watts.

Chassis 8DZ { 110—135—220—250 volt; 50-60 cycle }

Tubes—2-6D6, 1-6A7, 1-75, 1-42, 2-76, 1-80

The following characteristics apply to the Grunow Radio—Chassis Type 8D:

This model is an 8 tube Super-Heterodyne All Wave (550 to 21,000 KC) Receiver, using 1-6D6 tube as an R. F. Amplifier, 1-6A7 tube as a 1st Detector or mixer—being electronicly coupled to a 76 Oscillator tube, 1-6D6 tube as an I.F. amplifier with the 1st I.F. Transformer of the Bi-Selector type and both 1st and 2nd transformers tuned to 455 K. C. A 75 tube (double diode high mu Triode) is used as a diode detector, delayed Automatic Volume Control (AVC) and a high gain audio amplifier. The 42 output tube receives its bias through the voltage drop produced in the tapped speaker field. A type 76 tube is used as a Signal Beacon or beat oscillator. Plate voltage to the Signal Beacon being applied by closing the switch on the tone control. The rectifier tube is an 80, the output of which is well filtered through the choke action of the speaker field and the 8, 16 and 18 mfd. electrolytic condensers.

The broadcast section of the receiver consists of the following 4 variable tuned circuits: R.F. input, bi-selector, mixed input and oscillator. These circuits are tuned with a 4-gang variable condenser of rugged construction.

The short wave section of the receiver consists of 3 variable tuned circuits, the bi-selector being cut out to prevent losses when the receiver is working at the higher frequencies.

The Signal Beacon is a beat oscillator using a 76 tube, and is a feature of the 8D chassis. When this tube is brought into operation it acts as a local oscillator, with a frequency of 455 K.C. The signal of this oscillating circuit is fed into the I.F. circuit through a short lead that acts as a radiator and beats against the incoming signal at the I.F. frequency. The presence of a station's signal will be indicated by a high pitched "whistle," becoming lower in pitch as "resonance" or exact tuning is approached. The Signal Beacon is also used to receive telegraph or continuous wave signals.

A sensitivity Control is incorporated in the 8D chassis and consists of a switch on the rear of the Chassis. This switch when in position No. 1 reduces the sensitivity by allowing the total resistance of 850 Ohms to be used as a grid bias on the 6D6 R.F. tube and the 6A7 1st Det. tube. When on position No. 2, the bias is changed to 250 Ohms by grounding out the 600-Ohm section and increasing the sensitivity of the receiver. It will be noted by referring to schematic diagram that this control is effective only on the "D" or broadcast range.

The remainder of the circuit is typical and has been designed along the lines of what is considered the best engineering practice to date. Parts are all oversize and of the finest quality.

SERVICE DATA

Continuity and Voltage

Continuity and voltage readings should be taken from the underside of the Chassis. The values given on the schematic diagram are average and allow the service man to make a quick check of the Chassis Constants. The socket layouts given on the schematic diagram show each socket from the underside.

The Range Switch

In servicing the 8D Receiver consider the radio frequency end as four different and distinct radios:

One working from 550 to 1500 K.C. (D Range)
One working from 1500 to 4200 K.C. (C Range)
One working from 4100 to 10000 K.C. (B Range)
One working from 8500 to 21500 K.C. (A Range)

These four radios are put into operation as desired by means of the Range Switch.

When on position "A" the short wave coils covering the range from 8,500 to 21,500 K.C. are connected into the three tuned circuits of the receiver, one coil as an R.F. Transformer, one as the Detector Coupler, and one as the Oscillator Transformer.

On position "B" the 4100 to 10,000 K.C. coils are put into operation.

On position "C" the 1500 to 4200 K.C. coils are shunted across the 550 to 1500 K.C. coils in such a manner as to lower the total inductance of the combined coils and reduce the losses caused by open end coils.

On both the "C" and "D" positions, four coil sets are put into the circuit and the receiver operates as a four-tuned circuit radio. On all four ranges the receiver works at maximum sensitivity and selectivity. All coils and condensers are of such construction that atmospheric and temperature changes have minimum effect.

Each circuit is completely shielded from each other, and the complete range switch and coil assembly may be removed for inspection or repair.

ALIGNMENT

Do not attempt to align the 8D Chassis without the proper equipment. Alignment condensers are shown in the accompanying illustrations and are numbered in order of procedure.

1. EQUIPMENT

A—Test Oscillator.

A modulated oscillator capable of producing signals at 455 K.C.—600 K.C.—1400 K.C.—3700 K.C.—10 M.C. and 18 M.C. is necessary for alignment of the 8D Chassis.

B—Insulated screw driver—(All bakelite or fibre) about 6" long.

C—Output Meter.

This may be any of the standard output meters on the market, but should be sufficiently sensitive to provide a good deflection at low signal strength, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

D—Coupling Means.

Coupling Condensers of 200 mmf., .25 Mfd., and a 400 Ohm resistor should be used when coupling oscillator to receiver during alignment as specified in the following paragraphs.

E—The receiver should be aligned in a location free from local interference (man-made static)—as high frequency disturbances will cause difficulties when the short wave section is being adjusted. (A screen room is to be recommended.)

2. DIAL SETTING

Turn dial knob until condensers are fully meshed. The dial pointer (hour hand) should be on the horizontal line of the dial, pointing to 9 and 3 o'clock. The minute hand should be at 12 o'clock or in a vertical position.

3. I. F. ALIGNMENT

Connect signal lead of test oscillator to grid of the 6A7 (1st Detector Tube) through .25 Mfd. Condenser. Connect the ground lead to the chassis.

A—Set Dial pointer to 1400 K.C. and range switch on position D.

B—Place test Oscillator in operation at 455 K.C. Turn receiver volume control and tone control to maximum.

C—Attenuate test oscillator output to lowest valve consistent with obtaining a readable indication on output meter.

D—Adjust five I.F. Trimmers, A1-A2-A3-A4-A5 (Fig 4), located on the I.F. transformers on top of chassis (2 trimmers are on top of each transformer and one, the Bi-Selector, is at the lower side of the 1st I.F. Transformer), until maximum output is obtained. During alignment, maintain as low a value of signal as will allow obtaining of accurate adjustment.

E—Turn the tone control counter clockwise until the Signal Beacon switch snaps on.

F—Adjust Signal Beacon trimmer A6 (Fig. 4), which is located on right hand face of Chassis, to zero beat with the 455 K.C. incoming signal.

4. 1400 K. C. ALIGNMENT

A—Place test oscillator in operation at 1400 K.C.

B—Turn dial pointer to 1400 K.C.

C—Turn range switch to range D.

D—Adjust broadcast oscillator trimmer A7, which is on the variable condenser section nearest the dial to maximum output. (It may be necessary to reduce the capacity of the 600 K.C. padder (A11) to about half its capacity, before the oscillator will peak at 1400 K.C.).

E—Adjust 1st Det. Trimmer A8 (Fig. 4), which is the second from front on top of variable condenser.

F—Adjust Bi-Selector Trimmer A9 (Fig. 4), which is the third from front on top of variable condenser.

G—Adjust Antenna Trimmer A10 (Fig. 4), which is the fourth from the front on top of variable condenser.

5. 600 K. C. ALIGNMENT

A—Place test oscillator in operation at 600 K.C.

B—Tune in signal to maximum (this point does not have to be exactly at 600 K.C. dial setting).

C—Adjust the 600 K.C. Padding Condenser A11 (Fig. 4) (which is on top of chassis on right-hand side third from front as you face chassis) in direction of signal increases. At same time rock the tuning condenser back and forth through resonance while adjusting padding condenser until maximum output is obtained.

D—Readjust Oscillator Trimmer (A7) for maximum output with pointer and signal set at 1400 K.C. (see 1400 K.C. Alignment).

6. 3700 K. C. ALIGNMENT

A—Connect signal lead of test oscillator through 200 Mmf. condenser to antenna binding post.

B—Connect the test oscillator ground lead to the ground post of chassis.

C—Turn range switch to range "C" and set dial pointer to 3700 K.C.

D—Adjust the 3700 K.C. Oscillator Trimmer A12 (Fig. 4) (which is the first of the three located on top of chassis on the right-hand side as you face it) in direction of signal increase. At same time work the tuning condenser back and forth through resonance while adjusting trimmer condenser until maximum output is obtained.

7. 10 M. C. ALIGNMENT

A—Connect signal lead of test oscillator through 400 Ohm resistor to antenna binding post of chassis.

B—Connect the ground lead to ground terminal of chassis.

C—Set range switch to range "B" and turn dial pointer to 10 M.C.

D—Place Test Oscillator in operation at 10 M.C.

E—Adjust Set Oscillator Trimmer A13 (Fig. 4), (located on front face of chassis).

F—Adjust Detector Trimmer A14 (Fig. 4), (located on right-hand side on top of chassis, second from front).

G—Adjust Antenna Trimmer A15 (Fig. 4), (located on rear face of chassis).

8. 18 M. C. ALIGNMENT

A—Set Range Switch on Range "A".

B—Place Test Oscillator in operation at 18 M.C.

C—Turn Dial Pointer to 18 M.C.

D—Adjust Set Oscillator Trimmer A16 (Fig. 4), (located on top of chassis on left of gang condenser, first from front).

E—Adjust Detector Trimmer A17 (Fig. 4), (located second from front on top of chassis on left-hand side).

F—Adjust Antenna Trimmer A18 (Fig. 4), (located third from front on top of chassis on left-hand side).

G—It may be necessary to rock the variable condenser back and forth through resonance while adjusting the Detector (A17) and the Antenna (A18) for maximum output.

GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 8D,8DX,8DZ & 861

PARTS AND PRICE LIST

PART NUMBERS ARE GIVEN ON THE ILLUSTRATION AND THE NUMBERS ARE BROUGHT DOWN IN NUMERICAL ORDER FOR CONVENIENCE

Index No.	Part No.	DESCRIPTION	Quantity Required	Price
1	20678	Ground Terminal	1	$ .02
2	20861	Line Cord and Plug	1	.35
3	20962	Grip Cap	4	.02
4	21598	Rubber Grommet	10	.02
5	22858	Resistor, 1 Megohm, Carbon, ¼ Watt	3	.20
6	23284	Bakelite Washer	13	.02
7	23358	Insulated Terminal Assy. (single)	3	.10
8	23370	Resistor, 100,000 Ohm, Carbon, ¼ Watt	3	.20
9	23538	Resistor, 200,000 Ohm, Carbon, ¼ Watt	1	.20
10	23849	Resistor, 500,000 Ohm, Carbon, ¼ Watt	3	.20
11	23853	Resistor, 50,000 Ohm, Carbon, ¼ Watt	2	.20
12	23998	Resistor, 250,000 Ohm, Carbon, ¼ Watt	4	.20
	24251	Condenser, 100 MMF, Mica (2nd I.F.)	1	.15
13	24254	Condenser, 1000 MMF, Mica	3	.20
14	24487	Condenser, 250 MMF, Mica	3	.20
15	26256	Tube Shield Base	5	.05
16	27382	Trimmer Condenser Assy.	5	.35
	27455	Tube Shield	1	.15
17	27490	Resistor, 1000 Ohm, Carbon, ¼ Watt	1	.20
18	27520	Condenser, 2310 MMF, Mica	1	.45
19	27784	Resistor, 400 Ohm, Carbon, ¼ Watt	2	.20
20	27801	Rubber Grommet	3	.05
	27802	Cup Washers	6	.02
21	27831	Pilot Light Socket, Insulated	2	.15
	28045	Pilot Light Bulb	2	.15
22	28183	Resistor, 7500 Ohm, Carbon, 1 Watt	1	.20
23	28573	Short Wave Coil Shield Assy.	1	.75
24	28638	Dial Pointer Screw	1	.02
25	28717	Condenser, Tubular, .002 Mfd., 700 Volt	1	.25
26	28723	Condenser, Tubular, .05 Mfd., 400 Volt	1	.25
27	28726	Condenser, Tubular, .1 Mfd., 400 Volt	1	.25
28	29083	Condenser, 50 MMF, Mica	2	.20
29	29135	Condenser, Tubular, .1 Mfd., 100 Volt	1	.25
30	29414	Power Transformer, 115 Volt, 50-60 Cycles	1	6.00
31	29416	Power Transformer, 115 Volt, 25-50 Cycles	1	7.25
	29453	Condenser, Tubular, .01 Mfd., 400 Volt (2nd I.F.)	1	.25
32	29476	Ball Race	1	.10
33	29482	Broad Cast Coil Shield Assy.	1	.80
34	29483	Drive Shaft-Stop Spring	1	.05
	29485	Drive Shaft Thrust Spring	1	.05
35	29486	Drive Sleeve	1	.50
36	29487	Drive Shaft, Inner	1	.50
37	29488	Drive Shaft, Outer	1	.75
38	29490	Range Switch	1	4.00
39	29496	Antenna Transformer (Broadcast)	1	1.75
40	29498	1st Detector Transformer (Broadcast)	1	1.25
41	29501	1st Detector Transformer (Short Wave), Black	1	1.25
	29515	Resistor Panel Assy. (includes 29518)	1	1.25
42	29518	Condenser, Small Can, .02-.02 Mfd.	1	.75
43	29520	Drive Cable Assy.	1	.10
	29521	3/16" Ball Bearing	1	.01
	29522	11/32" Ball Bearing	4	.02
	29523	Condenser Mounting Bearing	1	.10
	29524	Cable Tension Spring	1	.10
44	29533	Resistor, Candohm, 5000-37 Ohms	1	.40
45	29534	Condenser, Small Can, .01 Mfd.	1	.60
46	29537	Tone Control, 500,000 Ohms	1	1.15
47	29539	Oscillator Plate Choke	1	.60
48	29540	By-Pass Condenser Block	1	2.50
49	29551	Antenna and Doublet Binding Posts Assy.	1	.10
	29552	Escutcheon Window	1	.15
	29553	Window Retaining Ring	1	.10
	29554	Escutcheon	1	.60
50	29558	Condenser, Dry Electrolytic, 16 Mfd., 450 Volt	1	1.90
51	29562	Condenser, Wet Electrolytic, 18 Mfd., 300 Volt	1	1.25
52	29564	Condenser, Tubular, .075 Mfd., 100 Volt	1	.30
53	29567	Condenser, Tubular, .02 Mfd., 400 Volt	1	.25
	29580	Signal Beacon Trimmer Condenser	1	.75
54	29584	Signal Beacon Shield	1	.30
55	29596	Drive Leaf Spring	2	.05
56	29611	Coupling Inductance Coil	1	.25
	29612	Escutcheon Retaining Spring	1	.20
57	29613	Condenser, 4000 MMF, Mica	1	.50
58	29616	Insulated Terminal Assy. (Single)	5	.10
59	29617	Insulated Terminal Assy. (Double)	1	.15
60	29628	Insulated Terminal (4)	1	.10
61	29812	Condenser, Tubular, .04 Mfd., 500 Volt	1	.30
62	29813	Condenser, Tubular, .004 Mfd., 700 Volt	1	.25
	29832	Tube Shield Body	4	.15
63	29836	Trimmer Condenser Assy.	1	.25
64	29893	Reflector Assembly	1	.50
65	29900	Trimmer Condenser Assy.	1	.50
66	29952	Knob (Range Switch)	1	.30
67	29953	Knob (Tone Control)	1	.20
68	29954	Knob (Tuning and Volume)	2	.20
69	29990	Condenser, Tubular, .02 Mfd., 400 Volt	1	.20
70	29997	Speaker Cable	1	.95
71	30006	Power Transformer (110-135-220-250 Volt, 50-60 Cycle)	1	7.50
	30030	Rubber Mtg. Washer, Upper, Black	3	.05
	30031	Rubber Mtg. Washer, Upper, Red	1	.05
	30032	Rubber Mtg. Washer, Lower, Black	4	.02
72	30104	Grommet (Rubber)	2	.02
	30169	Trimmer Condenser (I.F.)	1	.40
73	30198	Condenser, 1100 MMF, Mica	1	.25
74	31052	Condenser, Dry Electrolytic, 8 Mfd., 350 Volt	1	1.25
75	31075	4 Prong Socket	1	.10
76	31078	5 Prong Socket	2	.10
77	31079	6 Prong Socket	4	.15
78	31080	7 Prong Socket	1	.15
	31215	Tube Shield Cap	4	.10
	31360	Window Gasket	1	.05
79	31363	Sensitivity Switch	1	.40
80	31723	Pointer and Pinion Assy.	1	.40
81	31726	Pinion, Gear and Adj. Plate Assy.	1	.55
82	31910	Volume Control	1	1.30
83	31911	1st I.F. Coil and Shield Assy.	1	4.10
84	31912	2nd I.F. Coil and Shield Assy.	1	3.30
	31914	Range Switch and Coil Assy.	1	26.50
85	31916	Trimmer Condenser	1	.35
86	31918	Oscillator Transformer (Broadcast)	1	1.50
87	31919	Oscillator Transformer (Short Wave), Green	1	1.50
88	31936	Signal Beacon Assy.	1	2.25
	31937	Signal Beacon Coil Assy.	1	1.25
89	31942	Variable Condenser, 4 Gang	1	7.50
90	31945	Drive Drum, Hub, and Gear Assy	1	1.10
91	31947	Mounting Bracket and Bearing Assy.	1	.60
92	31952	Dial Chart	1	.50
93	31958	Resistor, Candohm, 250-600 Ohm	1	.40
94	31962	Pointer	1	.10
95	31964	Resistor, 17,000 Ohm, Carbon, 2 Watt	1	.25
96	31966	Resistor, 15,000 Ohm, Carbon, ¼ Watt	1	.20
97	31967	Vertical Term. Assy., 4 Lug	1	.15
98	32096	Antenna Transformer (Short Wave), Red	1	1.75
	32102	Condenser, 150 MMFD, Mica (2nd I.F.)	1	.20
99	32300	Bi-Selector Transformer (Broadcast)	1	1.50
100	32301	Vertical Insulated Terminal	1	.10
	62578	Chassis Mtg. Screw	4	.02
	52582	Chassis Shipping Screw	2	.02
	63001	Drive Drum Set Screw	2	.02
	63011	Drive Sleeve Set Screw	2	.01
	63838	Felt Knob Washer, 15/16" Dia.	2	.01
	63839	Felt Knob Washer, 3/4" Dia.	2	.01
	63863	Chassis Mtg. Steel Washer	4	.01

SPEAKER PARTS

TYPE 10A9

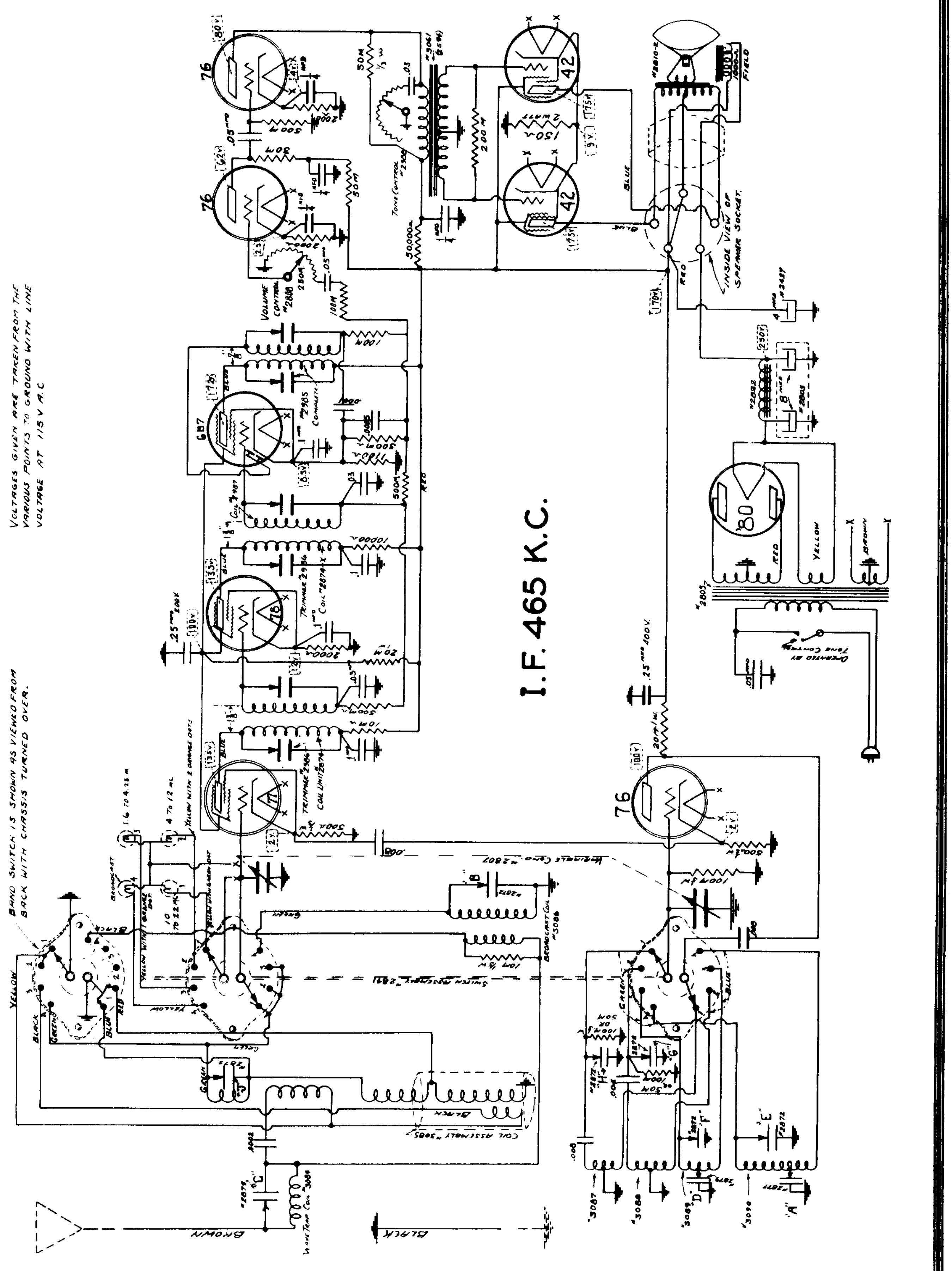
Part No.	Description	Price
20010	Speaker Pot and Pole Piece Assy.	$ 1.15
20041	Speaker Pot Clamp	.10
20045	Terminal Strip Cover	.15
20047	Terminal Strip	.10
27240	Cone Gasket	.10
27591	Output Transformer	1.75
28755	Cone and Voice Coil Assy.	3.30
29964	Field Coil Assembly	3.30
31961	Speaker (Complete)	11.50

COMPLETE SPEAKERS MAY NOT BE RETURNED FOR CREDIT

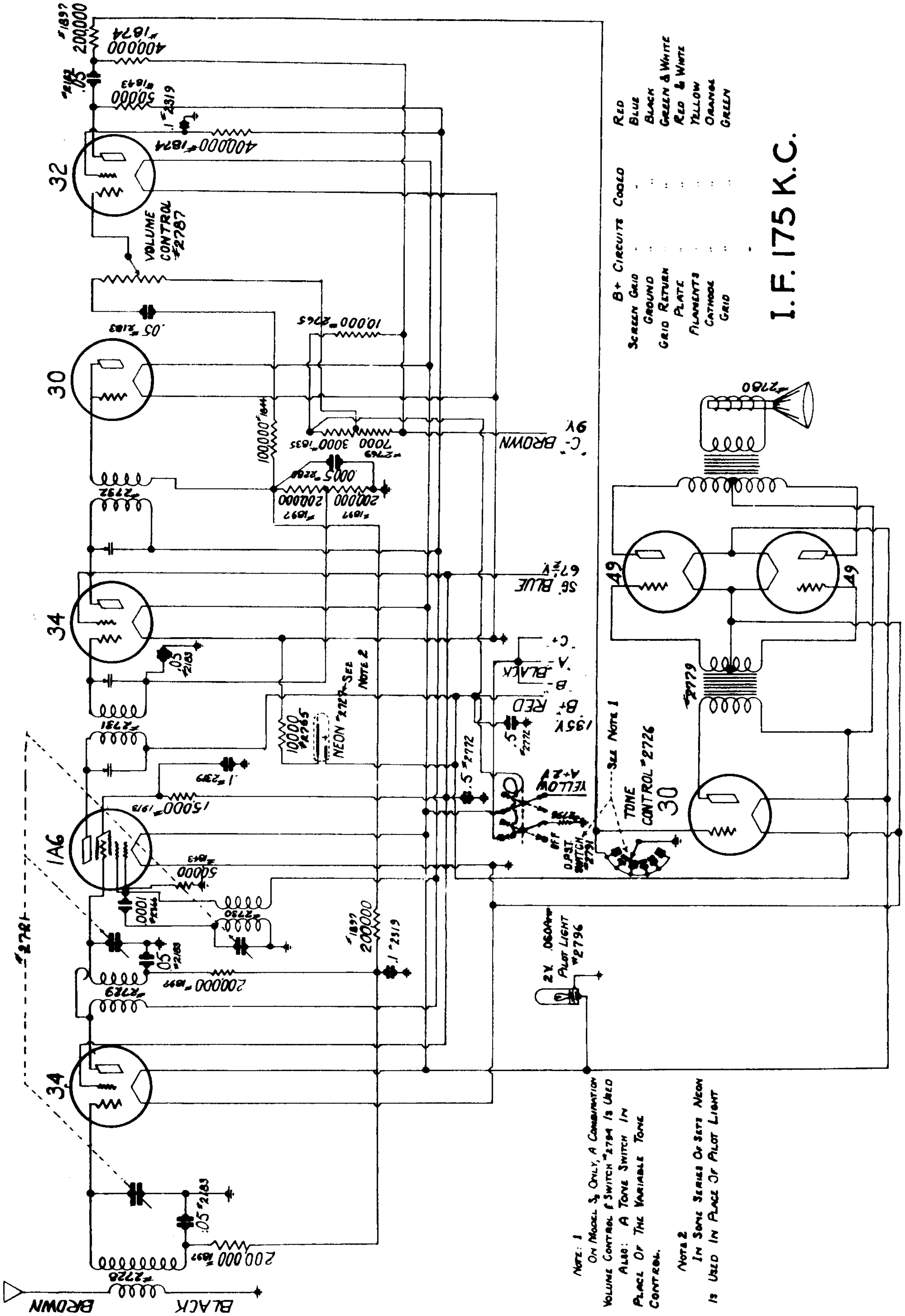
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

HOWARD RADIO COMPANY

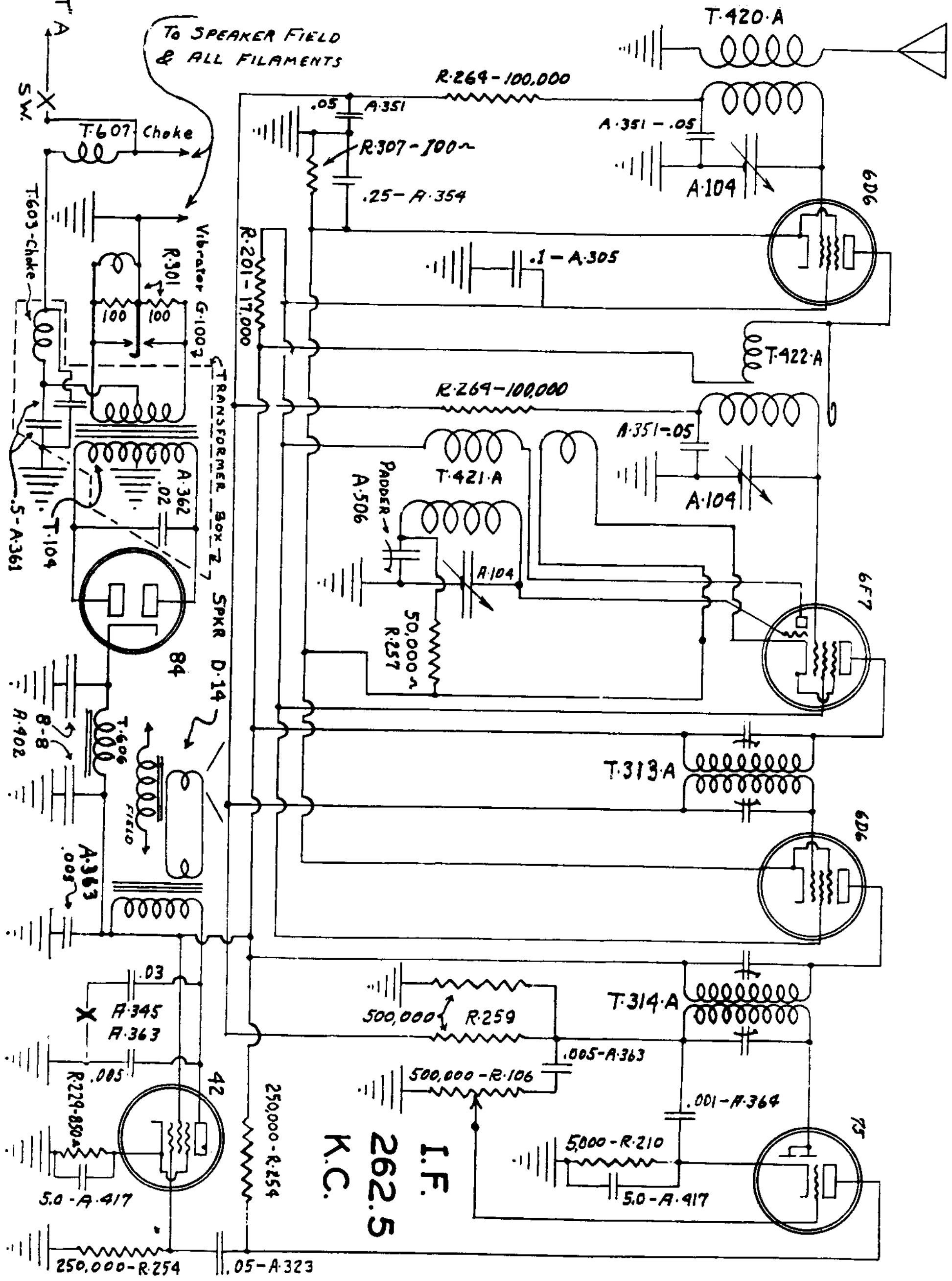
MODEL R-9



HOWARD RADIO COMPANY
MODELS S-2 & S-7



INTERNATIONAL RADIO CORP.
MODEL K-60



Parts Price List

PART NO.	NAME	LIST PRICE
A-104	3 gang variable condenser	$3.25
A-305	.1 mfd. tubular condenser	.15
A-323	.05 mfd. tubular condenser	.15
A-345	.03 mfd. tubular condenser	.15
A-351	.05 mfd. tubular condenser	.15
A-352	.05 mfd. tubular condenser	.15
A-354	.25 mfd. tubular condenser	.15
A-361	.5 mfd. condenser (heavy braid leads)	.60
A-362	.02 mfd. condenser (heavy braid leads)	.20
A-363	.005 mfd. tubular condenser	.15
A-364	.001 mfd. tubular condenser	.15
A-402	8-8 mfd. electrolytic condenser	1.50
A-417	5 mfd. electrolytic condenser	.50
A-506	Variable padder condenser	.45
D-14	6" Dynamic speaker	5.00
E-212	Remote control head assembly, complete with pilot light and wire and with 30½" tuning cables. (*Sold only complete*)	6.75
E-421	Tone control switch	.40
E-430	6-8 volt pilot light bulb	.15
F-6	Fuse holder (male and female)	.10
F-20	Pilot light wire connector (male and female)	.05
G-100	Vibrator	3.75
H-19	6D6 Socket	.10
H-22	6F7 Socket	.10
H-25	75 Socket	.10
H-35	84-6Z4 Socket	.10
H-36	42 Socket	.10
H-37	Vibrator Socket	.10
MSCT 85	8 X 32 - 5/16 self tapping screws per doz.	.10
R-106	Volume control with switch	.80
R-201	17M ohm 1 watt resistor	.20
R-210	5M ohm 1/3 watt resistor	.20
R-229	850 ohm ½ watt resistor	.20
R-254	250 M ohm 1/3 watt resistor	.20
R-257	50 M ohm 1/3 watt resistor	.20
R-259	500 ohm 1/3 watt resistor	.20
R-264	100 M ohm 1/3 watt resistor	.20
R-301	200 ohm center tapped resistor	.20
R-307	100 ohm flexible resistor	.20
S-102	Goat tube shield	.15
T-104	Power transformer only	1.80
T-107A	Complete power transformer assembly consisting of T-104, 2 A-361, A-362 and T-603 assembled in metal box	3.75
T-313A	1st IF coil assembly	1.50
T-314A	2nd IF coil assembly	1.50
T-420A	Antenna coil assembly	.95
T-421A	Oscillator coil assembly	1.20
T-422A	RF coil assembly	.95
T-603	Layer wound A choke	.25
T-606	Filter choke	.70
T-607	Single layer A choke	.30
WHSS18	Shielded antenna wire (2 ft.)	.20

INTERNATIONAL RADIO CORP.

MODEL K-60

Motor Noise Suppression

Every automobile motor generates high frequency electrical interference due to its ignition coil, distributor, and spark plugs. To satisfactorily operate an automobile receiver this motor interference must be suppressed. A standard suppressor kit is supplied with each receiver. Each car, however, is a somewhat different problem, and the service man must use his own ingenuity in addition to following definite instructions.

First, apply the standard suppression parts furnished. A suppressor should be placed on each spark plug and one in the center lead of the distributor. Keep as close to motor as possible. Next, place condenser on generator to eliminate the high pitched "whine" from this source.

Afer standard suppression has been applied check the receiver for chassis pick-up. The antenna wire should not be connected during this test. Turn volume control to FULL ON position and start motor. If any motor noise is heard in the receiver it is originating through the battery circuit. It will be necessary to eliminate this interference before attaching the antenna. One or more of the following should correct this condition. Try one at a time and check for reduction in interference.

Attach condenser (such as supplied for generator) from ammeter to ground (instrument panel).

Attach condenser from battery side of ignition coil primary to ground. Do not put a condenser on the distributor side of the coil primary as this will affect motor operation.

Reduce the gap between the distributor rotor and contacts. This may be done by carefully peening out the end of the distributor arm or building it up with solder. Put the distributor arm and distributor cap back in position but do not clamp the cap down. With ignition OFF turn the motor over slowly with its crank to determine if the rotor arm is touching the contacts. The gap should be small (.001" to .004") but under no circumstances should it touch or cut into the stator contacts.

Badly worn or burned breaker points will cause interference as will also a leaky or defective distributor condenser.

If high and low tension leads from the coil to distributor are run together they should be separated. The low tension lead may be shielded if necessary with copper braid and this shielding bonded to the bulkhead at one end and the motor at the other.

If the coil is located inside the driving compartment it may be necessary to shield the high tension lead from the coil to the point where it passes through the bulkhead. The shielding should terminate at least one and one-half inches from the coil terminal. The shielding should be bonded to the bulkhead and in some cases to the instrument panel also. Wherever possible it helps to move the coil to the motor side of the bulkhead or mount it on the motor.

Cars with rubber mounted motors must have the motor bonded to the bulkhead at the rear and the chassis at the front. Use heavy copper braid for bonding and be sure it is long enough to allow for motor vibration. In many cars without rubber mounted motors it is also very helpful to bond the motor in this manner. Insulated bodies should be grounded in the same way.

A remedy which is effective on one car may not be on another car of the same make and model. Noise suppression is largely a process of elimination. The above suggestions if carefully followed should eliminate chassis pick up of interference. In very stubborn cases it may be necessary to bond the various control rods and wires to the bulkhead at the points where they pass through into the driver's compartment Sometimes reversing the primary leads on the coil will help.

When chassis pickup is eliminated the antenna lead should be connected. The shielding on the antenna lead should be grounded at the point where it enters the windshield post. The hood must be clamped down to prevent radiation. Any motor noise now heard is being picked up by the antenna. The dome light wiring may be bringing the interference up to the antenna. In this case it will be necessary to bypass the dome light wire with a condenser at the point where the dome light wire enters the windshield post. If this is not sufficient a so called dome light filter should be connected in the wire at this point. The dome light filter consists of a condenser and RF choke.

Interference may be picked up by the antenna from the following if poorly grounded: steering column, pedals, brake lever, instrument panel, windshield wiper tube, body, motor hood, etc. The wiring to electrical devices such as cigar lighter, electric clock, electric windshield wiper, etc., may be carrying interference. Bypassing these to ground should correct this condition.

If all the usual methods of eliminating motor noise have been tried without obtaining quiet operation check for the following: weak storage battery, leaky or poorly adjusted spark plugs, leaky distributor cap or case, arc in ignition coil between secondary and primary or ground, leaks in high tension wiring to plugs, distributor or coil.

In some cars having wooden floor boards it may be necessary to cover the floor boards with metal screen or a metal plate and ground to the car frame.

Service

The following headings cover briefly the probable causes and remedies encountered in servicing

1. INOPERATIVE
   - (a) Examine fuse and replace if open. If fuses continue to blow, a probable short circuit exists.
   - (b) Loose or corroded power connection.
   - (c) Defective tube.
   - (d) Defective buzzer.
   - (e) Tube out of socket
   - (f) Broken connection or short circuit in chassis.
2. WEAK
   - (a) Grounded or partially grounded antenna.
   - (b) Defective tube.
   - (c) Weak storage battery.
   - (d) Broken connection.
3. DISTORTION
   - (a) Defective tube.
   - (b) Defective speaker.
4. RATTLES
   - (a) Loose instruments, wires, rods, etc., on instrument panel or bulkhead.
   - (b) Loose speaker or case screws.
   - (c) Loose tube shields.
   - (d) Defective speaker.
5. INTERMITTENT
   - (a) Loose power connection.
   - (b) Grounded or partially grounded antenna or lead-in.
   - (c) Poor contact in fuse container.
   - (d) Defective tubes.
   - (e) Loose connection or short in chassis.
6. MOTOR NOISE
   - (a) Defective suppressor.
   - (b) Defective condenser at generator, coil, ammeter, etc.
   - (c) Loose bonding of any shielding, bonding, etc., which was applied at time of original motor noise elimination.
   - (d) Open ground to lead-in shielding.
   - (e) Burned or pitted distributor rotor or breaker points or defective condenser across breaker points.
   - (f) Leaky distributor head.
   - (g) Leaky ignition wiring or defective coil.
   - (h) Defective dome light filter.

TO REPLACE DIAL LIGHT

Dial light socket assembly may be pried out from the rear of control head by using a small screw driver or knife blade.

AVERAGE TUBE VOLTAGES:

Measurements made from indicated points to chassis. Battery voltage 6 volts.

POSITION	TUBE	Ef	Ek	Eg	Eg	Eg	Ep
R. F. Amplifier	6D6	5.6	2	*	2	75	185
1st Det.-Osc.	6F7	5.6	3	Det. * Osc. —1	3	75	Det. 185 Osc. 75
I.F. Amplifier	6D6	5.6	2	*	2	75	185
2nd Det.-A.V.C.	75	5.6	2	0	0	—	75
Power Amp.	42	5.6	15	0	—	185	175
Rectifier	84	5.6	185	—	—	—	—

f—Filament; k—Cathode; g—Control Grid; g—Suppressor Grid; g—Screen Grid; p—Plate; *—Depends on applied signal strength.

Balancing and Aligning

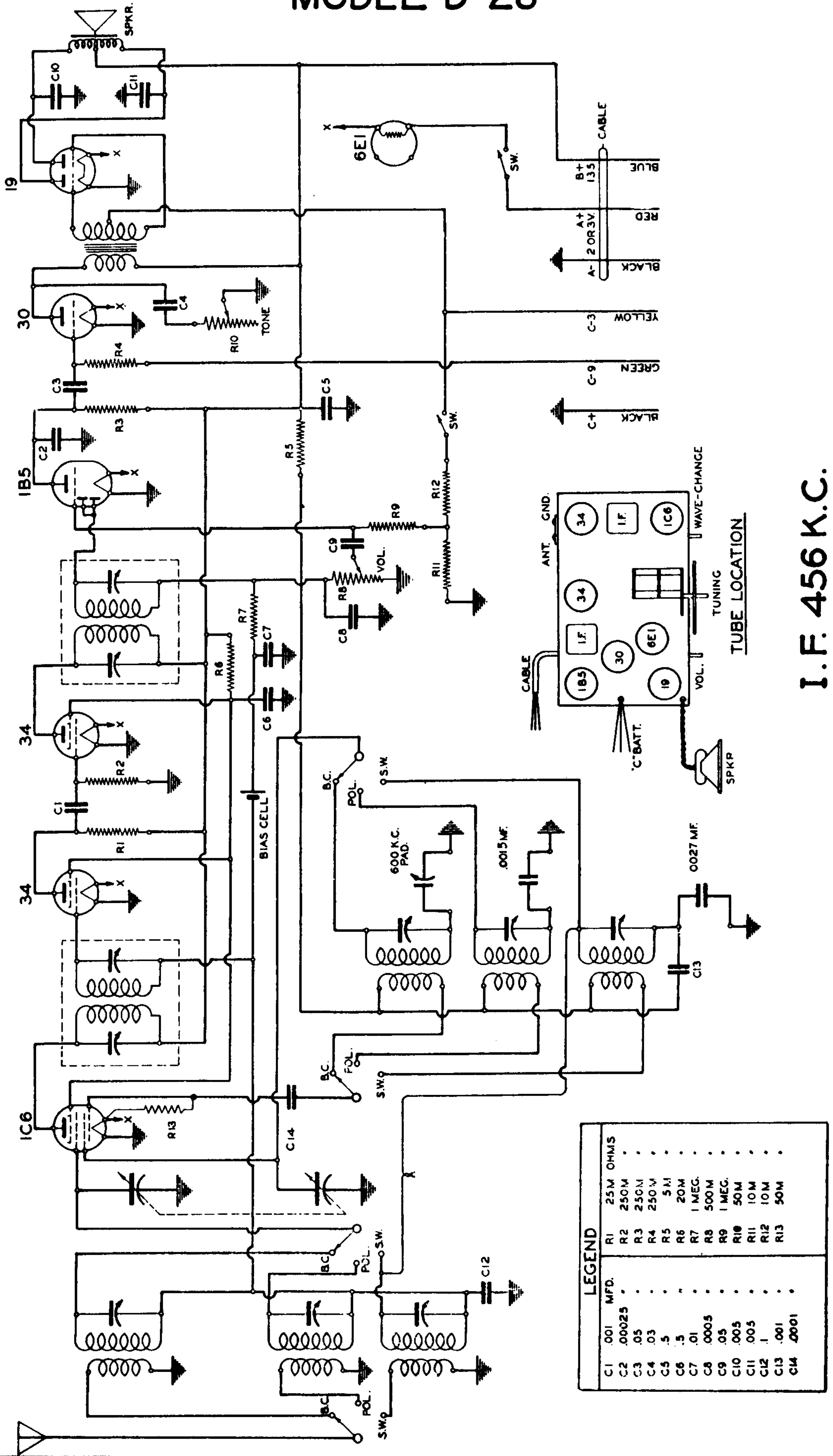
Each automobile radio is carefully balanced on accurate oscillators before leaving the factory. If it is necessary to rebalance because of part changes or other causes a good test oscillator capable of delivering modulated signals at 262½, 1500 and 600 Kc. will be needed. The customary audio out-put meter may be used IF the out-put of the test oscillator is weak enough to get below the A.V.C. action. Otherwise a microammeter will be needed to measure the A.V.C. voltage developed. It should be connected from ground to the junction of two 100M resistors and one condenser in the center bottom of the chassis.

To balance the I.F. circuits, attach the antenna wire to the test oscillator. Short out the oscillator section of the tuning condenser in the radio by inserting a thin piece of metal between the plates. Set the test oscillator to 262½ Kc. and adjust the trimmers on the I.F. transformers for maximum output. Go over all four adjustments at least twice for accuracy.

Next set the test oscillator at 1500 Kc. and open the tuning condenser until it is tuned to the test signal as indicated by maximum output. Adjust the small trimmers on top of the condenser gang for maximum output.

Set the test oscillator at 600 Kc. and, while rocking the tuning condenser slowly back and forth across this setting, adjust the padder condenser for maximum output. Go over the adjustments at least twice for accuracy.

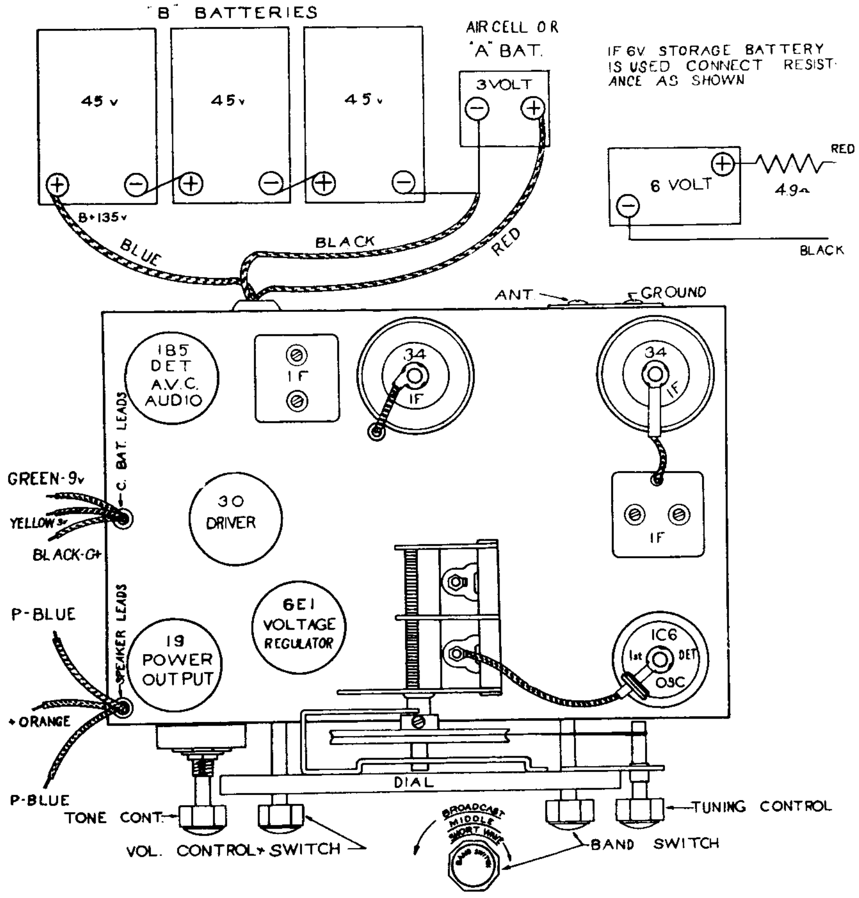
LAFAYETTE RADIO MFG. CO.
MODEL D-28



LAFAYETTE RADIO MFG. CO.

MODEL D-28

The frequercy range covered by this receiver is as follows: Broadcast band 537 KC to 1730 KC. Middle wav band 1.8 megacycles to 5.7 megacycles, short wave band 5.7 megacycles to 18.3 megacycles and any of thes bands are selected at will by a flip of the band change switch. To the left for broadcast. Center for 75M c police. To the right for short wave.



SERVICE INSTRUCTIONS

When set fails to perform properly, always check the voltage of the batteries. Run down batteries wi cause weak and poor reception.

Noises may develope from defective tubes and condensers.

This set has been carefully aligned at the factory, but if realignment should become necessary, the followin procedure should be followed.

Use a test oscillator and connect an output meter from plate to plate of the 19 output tube.

I. F. Alignment:

Connect the oscillator through a .1 condenser to the grid of the 1C6 tube and set the oscillator to 456 kilocycles. Peak each I. F. stage to resonance as indicated by maximum output on the output meter.

R. F. Alignment:

With the wave change switch in the broadcast position, set the oscillator to 1700 kilocycles and connect in series with a .00025 condenser to the antenna of the receiver. Rotate the variable condenser to the 1700 setting of the dial and adjust the trimmer condenser of the broadcast oscillator to resonance. This trimmer is located on the right side of the chassis, second position from the front. Reset the test oscillator to 1400 kilocycles and adjust antenna trimmer located under the chassis. Now set oscillator to 600 kilocycles and adjust padder located on top of the chassis. Check alignment at 1000 kilocycles.

For aligning the police band, set test oscillator to 5 megacycles and switch to the police band position on the set. With the condenser rotated to this frequency setting as indicated on the dial, adjust oscillator trimmer located on the right side of the chassis, first position from the front. Now adjust antenna trimmer located on the front of the chassis, left position, to resonance.

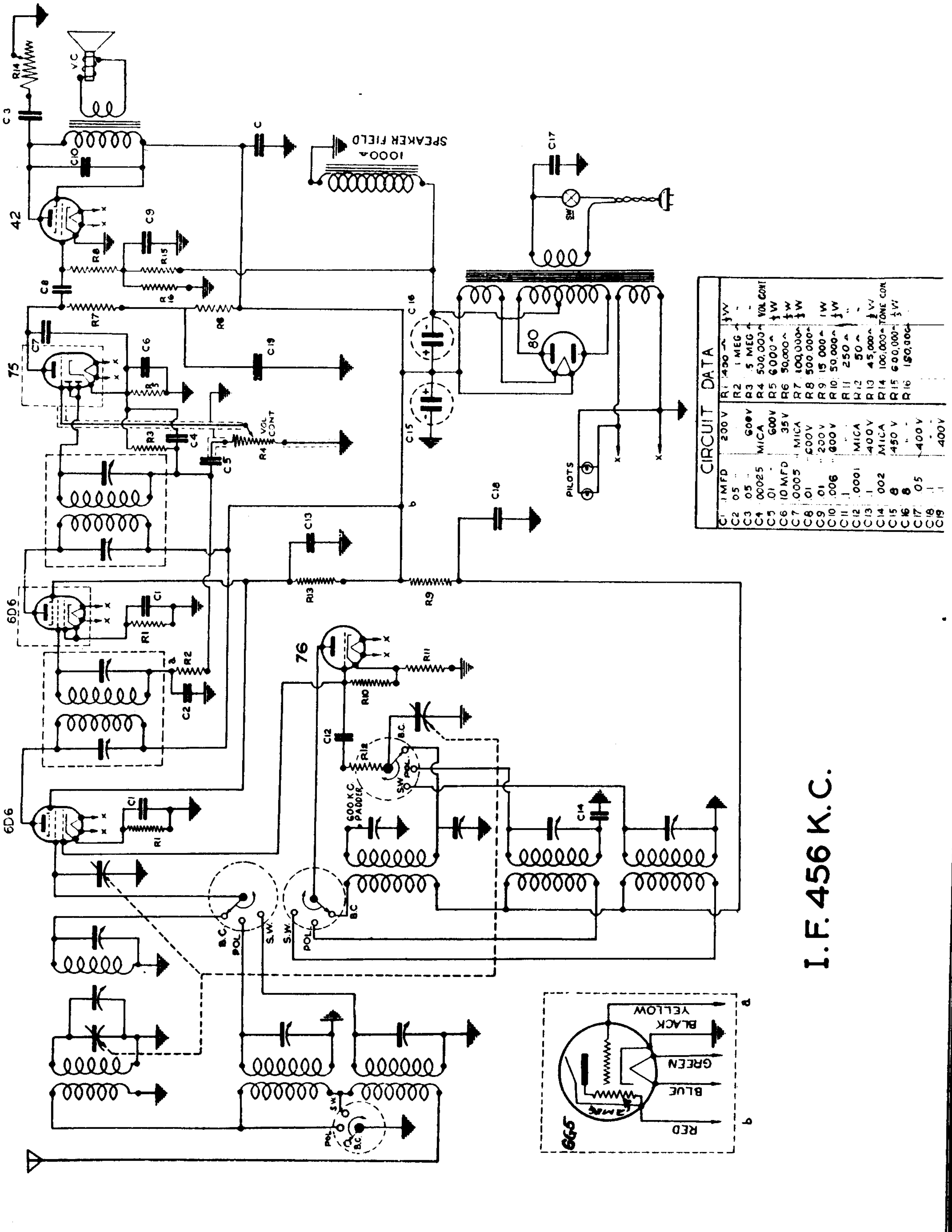
The short wave band is aligned by setting the condenser to 18 megacycles and adjust the oscillator trimmer located on the right side of the chassis, third position from the front to resonance with an 18 megacycle signal from the test oscillator. Turn dial to 16 M. C. Set test oscillator to 16 M. C. and adjust antenna trimmer through right hand hole in front of chassis, rocking variable condenser slightly back and forth to get maximum peak.

1909	2 Gang Cond.	$1.05
2442	Volume Control	.80
2619	Tone Control	.52
6927	Switch 4 Pole—3 Pos.	.52
1133	1st. I. F. Trans.	1.00
1134	2nd. I. F. Trans.	1.00
8010	Input Trans.	1.00
7107	2" Tube Shield Base	.03
7108	2" Tube Shield	.14
7104	1½" Tube Shield Base	.02
7105	1½" Tube Shield	.10
6850	4 Prong Socket	.08
6852	6 Prong Socket	.08
1112A	BC. 75M Skip Band Osc.	.72
1113A	75M Skip Band Ant.	.96
1116A	B. C. Antenna	.28
2006	Padder	.24
2344	3 Cond. Battery Cable	.32
1651	.004—600 Bypass Cond.	.10
1648	.03—600 Bypass Cond.	.12
1621	.5—400 Bypass Cond.	.26
1603	.01—400 Bypass Cond.	.10
1600	.1—200 Bypass Cond.	.12
1607	.05—400 Bypass Cond.	.12
1500	.001—20% Mica Cond.	.14
1501	.0001—20% Mica Cond.	.10
1502	.0005—20% Mica Cond.	.12
1504	.00025 20% Mica Cond.	.12
1511D	.0027—3% Mica Cond.	.25
1512D	.0015—3% Mica Cond.	.24
All	1/3W Resistors	.06
All	1/2W Resistors	.08
4600	Bias Cell	.20
5223	Knob—Bakelite—Tuning	.12
5224	Knob—Bakeltie—Volume Control	.12
5225	Knob—Bakelite—Tone	.12
5226	Knob—Bakelite—Band Switch	.12
7912	6" Magnetic	3.85
7920	8" Magnetic	4.25

Tube Complement—
1—1C6
1—19
1—1B5—25S
1—30
2—34
1—6—1 Ballast

LAFAYETTE RADIO MFG. CO.

MODELS D-30 & D-31



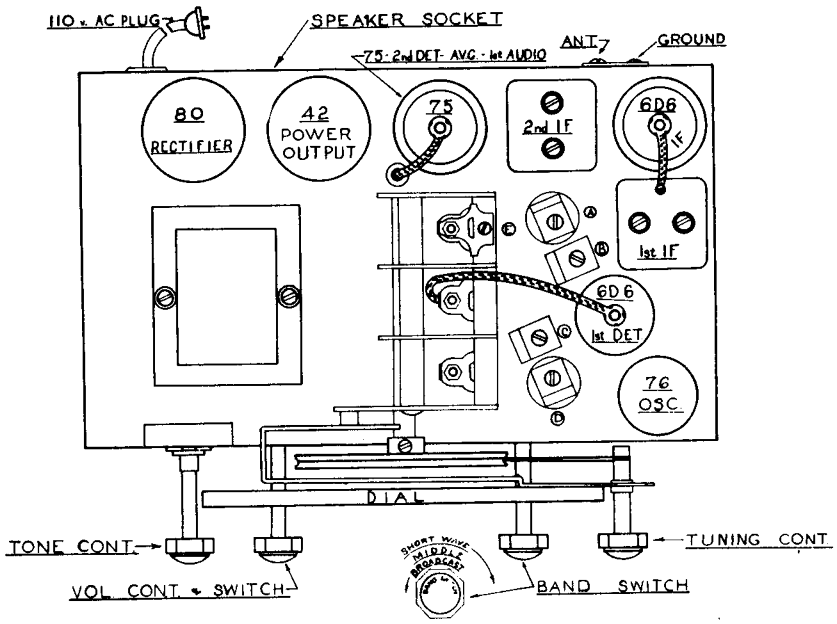
CIRCUIT DATA

C1	.1 MFD	200 V	R1	450 Ω	½W
C2	.05 "		R2	1 MEG Ω	-
C3	.05 "	600 V	R3	.5 MEG Ω	-
C4	.00025	MICA	R4	500,000 Ω	VOL CONT
C5	.01 "	600 V	R5	6000 Ω	½W
C6	10 MFD	35 V	R6	50,000 Ω	½W
C7	.0005 "	MICA	R7	100,000 Ω	½W
C8	.01 "	600 V	R8	500,000 Ω	
C9	.01 "	200 V	R9	15,000 Ω	1W
C10	.006 "	600 V	R10	50,000 Ω	½W
C11	.1	"	R11	250 Ω	"
C12	.0001	MICA	R12	50 Ω	"
C13	.1	400 V	R13	45,000 Ω	½W
C14	.002	MICA	R14	100,000 Ω	TONE CON
C15	8	450 V	R15	600,000 Ω	½W
C16	8	" "	R16	150,000 Ω	
C17	.05	400 V			
C18	" "	"			
C19	" "	400 V			

LAFAYETTE RADIO MFG. CO.

MODELS D-30 & D-31

The frequency range covered by this receiver is as follows: Broadcast band 540 KC to 1550 KC; middle wave band 1.5 megacycles to 4.6 megacycles. Short wave band 5.8 to 16.5 megacycles. These ranges are selected by turning the range switch knob. Turning this knob to the left switches to the broadcast band; in the center, to the middle wave band; and to the right, to the short wave band.



PARTS LIST

1912	3 Gang Variable Cond.	$3.08
8034	Power Transformer	2.95
1123	1st I. F. Transformer	.88
1124	2nd I. F. Transformer	.83
1018	Preslector Coil	.60
1027	Osc. Coil	.16
1030	S. W. and Pol. Ant. Coil	.70
1031	S. W. and Pol. Osc. Coil	.70
6927	Band Switch	.54
2443	Volume Control	.80
2619	Tone Control	.52
1846	Filter Condenser	1.35
2006	Padder	.28
2052	Trimmer	.10
1502	.0005 20% Mica Cond.	.15
1503	.00005 20% Mica Cond.	.12
1504	.00025 20% Mica Cond.	.12
1509D	.002 10% Mica Cond.	20
1600	.1—200 V. Bypass Cond.	.12
1601	.1—400 V. Bypass Cond.	.12
1602	.1—600 V. Bypass Cond.	.15
1604	.01—600 V. Bypass Cond.	.13
1608	.05—600 V. Bypass Cond.	.13
1611	.006—600 V. Bypass Cond.	.13
1615	10 MFD—35 V. Bypass Cond.	.40
1622	.05—200 V. Bypass Cond.	.12
6009	50 Ohm 1/3 W Resistor 20%	.06
6014	400 Ohm 1/3 W Resistor 20%	.06
6016	5 M 1/3 W Resistor 20%	.06
6018	½ Meg. 1/3 W Resistor 20%	.06
6025	50 M 1/3 W Resistor 20%	.06
6026	100 M 1/3 W Resistor 20%	.06
6027	25 M 1/3 W Resistor 20%	.06
6058	190 M 1/3 W Resistor 5%	.11
6059	600 M 1/3 W Resistor 5%	.11
6126	45 M ½ W Resistor 20%	.08
6211	15 M 1 W Resistor 20%	.08
6850	4 Prong Socket	.12
6851	5 Prong Socket	.12
6852	6 Prong Socket	.12
8901	Pilot Light Bulb No. 40	.18
7104	Tube Shield Base	.12
7105	Tube Shield Base	
	Lettered Bakelite Knobs. Each	.13
	Lettered Wood Knobs. Each	.16

SERVICE INSTRUCTIONS

In case of faulty operation of the receiver, first make sure that the antenna and ground are in good condition and properly attached to the receiver. Then determine if any of the tubes are faulty. In case of trouble within the receiver itself, the circuit diagram shown on the opposite page will be useful to the service man in locating and correcting the trouble.

I. F. Alignment:
Connect a test oscillator or signal generator through a .1 mfd. condenser to the grid of the 6A7 tube and set the oscillator to 456 KC. Use an output meter connected to the speaker if possible, to obtain the most accurate adjustments. Peak each I. F. stage to maximum response, reducing the output of the oscillator as far as possible for final adjustments.

R. F. Alignment:
With test oscillator set at 1400 KC, feed this signal into the antenna lead of the receiver through a .00025 condenser. With band switch in broadcast position, set the dial pointer to 1400 KC.
Adjust the broadcast oscillator trimmer (the small trimmer attached to the coil located approximately in front of the range switch) to peak at 1400 KC. Next adjust the trimmer on the preselector (this coil is mounted in the center at the front of the chassis). Then adjust the one trimmer on top of the gang condenser.

Now set the test oscillator to 600 KC. Adjust the broadcast padder condenser (the ceramic-base condenser adjustable through the right hand end of the chassis) in this manner: Move the dial slowly and repeatedly back and forth across the signal while adjusting the padder. Adjust for maximum gain.
Now set the range switch to middle wave band. Adjust the test oscillator to 4000 KC, and set the dial to 400 KC. Adjust the two trimmers located on the tops of the two short wave coils, on top of the chassis, for maximum gain.

Now set the range switch to the short wave position, adjust the test oscillator to 15 megacycles. Turn the dial to read 15 megacycles. Adjust for maximum gain the two trimmers located at the bases of the short wave coils.

MONTGOMERY WARD & CO.

MODELS 62-261, 62-311, 62-411 & OEL SERIES

Tuning Frequency Range

B Range	528 to 1730 KC.
C Range	1715 to 5800 KC.
D Range	5750 to 18300 KC.

Alignment and Calibration

The receivers are properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 1800, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and **all** subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C18) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Turn the calibration screw (under color filter) until the 1500 KC mark on the dial scale is at the vertical red line on the screen. If the film drum cannot be turned a sufficient amount by means of the calibration screw, loosen the 2 screws inside the drum which hold it in place. Adjust the position of the drum and tighten the screws. The early models do not have the calibration screw mentioned above. These models must be adjusted by loosening the drum screws.

Adjust the interstage Range B trimmer (C10) and antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

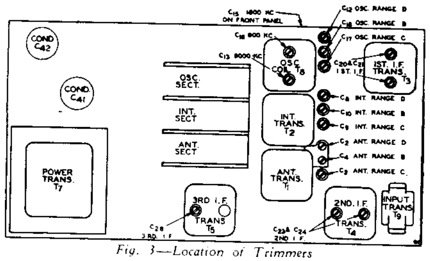


Fig. 3—Location of Trimmers

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C17) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C9) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 1800 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C12) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C8) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage and antenna Range D trimmers, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

General Service Data

Twenty-five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

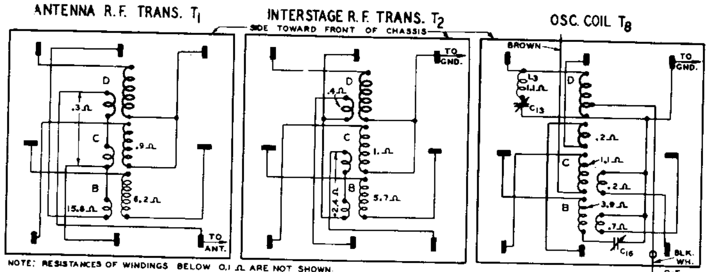


Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 2. In contact locations not used, the number applying to that particular location is not employed.

Voltage Chart

The voltage readings are taken with a voltmeter having a resistance of 1000 ohms per volt.

The standard metal tube socket terminal numbering system (bottom of socket) is shown in Fig. 5. On the schematic circuit diagram, Fig. 2, is a list giving the complete names of the tube elements and the corresponding symbols as used on the sockets on the schematic.

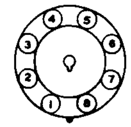


Fig. 5—Metal Tube Terminal numbering (bottom of socket)

Dial and Drive Assembly

Complete information regarding the movie dial and drive assembly will be found in the Movie Dial Manual No. 108.

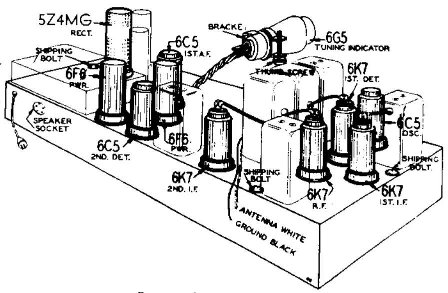


Fig. 6—Location of Tubes

MONTGOMERY WARD & CO.

MODELS 62-261, 62-311, 62-411 & OEL SERIES

Line Voltage: 115
Volume Control: Maximum

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
		VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
6K7	R.F.	0	6.1(1)	250	100	2.5	...	6.1(1)	2.5
6K7	1st Det.	0	6.1(1)	250	120	0	...	6.1(1)	9
6C5	Osc.	0	6.1(1)	120	...	...	...	6.1(1)	0
6K7	1st I.F.	0	6.1(1)	250	100	2.5	...	6.1(1)	2.5
6K7	2nd I.F.	0	6.1(1)	250	100	3	...	6.1(1)	3
6C5	2nd Det.	0	6.1(1)	0	...	...	...	6.1(1)	0
6C5	1st A.F.	0	6.1(1)	110	...	...	...	6.1(1)	4.5
6F6	Power Amp.	0	6.1(1)	330	250	25(2)	...	6.1(1)	0
5Z4MG	Rect.	0	4.8(3)	...	640(4)	...	640(4)	...	4.8(3)

TUBE	FUNCTION	Plate to Ground	Target to Ground	Cathode to Ground	Across Heater
6G5	Tuning Indicator	20(5)	250	0	6.1 A.C.

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) As read across resistor R24.
(3) A.C. voltage as read across heater terminals 2 and 8.
(4) A.C. voltage as read across terminals 4 and 6.
(5) As read with 500,000 ohm meter.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Planetary Drive Assembly

The planetary assembly is the unit that is integral with the tuning shaft.

If the nut on the back end of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and film drum to see if they are turning properly or if they are being obstructed in some way.

If the drive turns unevenly (rough in spots), this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch—See Fig. 8.

The phono switch must be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. This is done by removing the white wire connected to the insulated lug of the terminal strip on which one end of condenser C32 is also connected. The terminal strip is located at the back of the volume control. This wire is then connected to the phono switch as shown in Fig. 7. A wire is then connected from the lug on the above mentioned terminal strip to the phono switch, as shown in Fig. 7. Both of the above wires are connected to the switch terminals nearest the chassis base and should be twisted together as far as possible and run as close to the back of the chassis base as possible.

The lead to condenser C32, after turning away from the back of the chassis base, should be run close to the 6C5 tube sockets.

Complete the other connections as illustrated in Fig. 7, using the lugs in the chassis base, located near the phono switch and jack, for grounding purposes.

The control grid lead of the 6F6 power tube nearest the back of the chassis should be removed and a longer lead substituted. This lead is run from the tone control to the back of the chassis, along the lower edge and is then brought to the grid terminal by being routed between the speaker socket and the tubular condenser next to it.

If a hum is heard when the phono pickup is touched, reverse the two pickup leads.

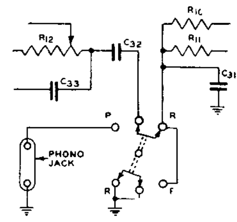


Fig. 7—Phonograph Connections

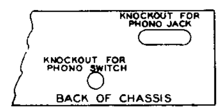


Fig. 8—Location of Phono Knockouts

Replacement Parts List

There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts please be sure to mention the model number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	Selling Price
P-3A211	6K7 Tube Socket	$0.08
P-3A221	6C5 Tube Socket	.08
P-3A210	6F6 Tube Socket	.08
P-3A222	5Z4 Tube Socket	.08
P-3A58	5 Prong Speaker Socket	.06
P-13X255	Tuning Indicator Tube Socket and Cable Assembly	.30

SPEAKER

Part No.	Description	Selling Price
P-12A239	10" Dynamic Speaker Complete with Output Transformer (T6)	4.42

KNOBS

Part No.	Description	Selling Price
P-10A75	Tuning Control—Push-on Type Knob	.08
P-10A76	Band Switch—Set Screw Type Knob	.10
P-10A77	Volume Control—Push-on Type Knob	.08
P-10A78	Tone Control—Push-on Type Knob	.08

GENERAL

Part No.	Description	Selling Price
P-2X38	Felt Washers (Used Behind Knobs) ea.	.04
P-4A50	2 Lug Terminal Strip—Both Lugs Insulated—Mounting Hole in Center	.04
P-4A38	Single Lug Terminal Strip	.04
P-17X18	Glass Dial Crystal	.22
P-28X82	Crystal Retaining Ring	.08
P-2A52	2 Section, 3 Position, Band Change Switch	.74
P-25A71	Tuning Eye Tube Clamp Assembly	.20
P-9X15	Cardboard Spacer—Used on 6G5 Tube	.04
P-30X44	Grid Clip Only	.04
P-13X80	Line Cord and Plug	.28
P-13X214	Antenna and Ground Lead Assembly	.14
P-8X23	Rubber Chassis Mounting Cushions ea.	.04

TRANSFORMERS AND COILS

Part No.	Code	Description	Selling Price
P-9A532	T1	Antenna Transformer and Can Assembly	.96
P-9A491	T2	R. F. Interstage Transformer and Can Assembly	.94
P-9A493	T3	1st I. F. Transformer and Can Assembly	.94
P-9A494	T4	2nd I. F. Transformer and Can Assembly	.94
P-9A495	T5	3rd I. F. Transformer and Can Assembly	.76
P-51X41	T6	Output Transformer (Part of Speaker Assembly)	1.18
P-53X125	T7	115 Volt, 60 Cycle, Power Transformer	2.86
P-53X126	T7	115 Volt, 25 Cycle, Power Transformer	4.59
P-53X127	T7	115-230 Volt, 40-60 Cycle, Power Transformer	4.02
P-9A492	T8	Oscillator Coil and Can Assembly	1.42
P-50X34	T9	Input Transformer	.60
P-9A496	L1	2nd I. F. Plate Isolating Reactor	.36

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	Selling Price
P-46X80	C5	.05 mf.	180	$0.08
P-46X117	C6	.25 mf.	180	.12
P-46X104	C7	.25 mf.	240	.12
P-46X80	C11	.05 mf.	180	.08
P-46X119	C14	.05 mf.	360	.10
P-46X121	C22	.25 mf.	360	.14
P-46X80	C25	.05 mf.	180	.08
P-46X105	C26	.10 mf.	360	.10
P-46X120	C32	.01 mf.	360	.08
P-46X176	C34	.08 mf.	180	.08
P-49X10	C36, C37	.25 mf., .25 mf.	360, 360	.30
P-46X120	C38	.01 mf.	360	.0[illegible]
P-46X174	C39	.005 mf	1000	.1[illegible]
P-46X191	C40	.5 mf.	180	.14

CONDENSERS—Continued

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage	Selling Price
P-45X213	C27, C35	4 mf., 12 mf.	150, 25 Dry	.46
P-44X11	C41	18 mf.	290 Wet	.52
P-44X10	C42	14 mf.	400 Wet	.60

MOLDED

Part No.	Code	Capacitance	Selling Price
P-47X69	C1	250 mmf.	.08
P-47X53	C19	35 mmf.	.06
P-47X56	C29	50 mmf.	.06
P-47X72	C30	25 mmf.	.06
P-47X72	C31	25 mmf.	.06
P-47X72	C33	25 mmf.	.06

TRIMMER

Part No.	Code	Description	Selling Price
P-17A45 Trimmer Strip	C2	2-25 mmf. Range "D" Antenna Trimmer	.46
	C3	2-25 mmf. Range "C" Antenna Trimmer	
	C4	2-25 mmf. Range "B" Antenna Trimmer	
	C8	2-25 mmf. Range "D" Interstage Trimmer	
	C9	2-25 mmf. Range "C" Interstage Trimmer	
	C10	2-25 mmf. Range "B" Interstage Trimmer	
	C12	2-25 mmf. Range "D" Oscillator Trimmer	
	C17	2-25 mmf. Range "C" Oscillator Trimmer	
	C18	2-25 mmf. Range "B" Oscillator Trimmer	

See Part Number 17A36 for replacement of any one section.

Part No.	Code	Description	Selling Price
P-17A35	C13	40-100 mmf. Range "B" Oscillator Padding Condenser	.22
	C16	300-600 mmf. Range "B" Oscillator Padding Condenser	
P-17A47	C15	1200-1600 mmf. Range "C" Oscillator Padding Condenser	.22
P-17A30	C20, C21	150-250 mmf., 150-250 mmf. 1st I. F. Trimmers	.22
P-17A30	C23, C24	150-250 mmf., 150-250 mmf. 2nd I. F. Trimmers	.22
P-17A40	C28	70-150 mmf. 3rd I. F. Trimmer	.14

MISCELLANEOUS

Part No.	Description	Selling Price
P-17A36	2-25 mmf. (to be used for replacement of any one section of Trimmer Strip P-17A45)	.06
P-14A52	3 Gang Condenser, Less Dial and Drive Assembly	1.74

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	Selling Price
P-A94151	R1	150 Ohms	0.2	$0.08
P-A95252	R2	2,500 Ohms	0.2	.06
P-C94253	R3	25,000 Ohms	1.0	.08
P-A94803	R4	80,000 Ohms	0.2	.08
P-D93163	R5	16,000 Ohms	2.0	.20
P-C94303	R6	30,000 Ohms	1.0	.08
P-A94401	R7	400 Ohms	0.2	.08
P-A94304	R8	300,000 Ohms	0.2	.08
P-A95104	R9	100,000 Ohms	0.2	.06
P-A95104	R10	100,000 Ohms	0.2	.06
P-A94205	R11	2.0 Megohms	0.2	.08
P-A94702	R13	7,000 Ohms	0.2	.08
P-E94253	R14	25,000 Ohms	3.0	.14
P-A94401	R15	400 Ohms	0.2	.08
P-A95103	R16	10,000 Ohms	0.2	.06
P-B95703	R17	70,000 Ohms	0.5	.06
P-C95503	R19	50,000 Ohms	1.0	.06
P-A95105	R20	1.0 Megohms	0.2	.06
P-A94205	R21	2.0 Megohms	0.2	.08
P-A94105	R22	1.0 Megohms	0.2	.08
P-A95104	R23	100,000 Ohms	0.2	.06

WIRE WOUND

Part No.	Code	Resistance	Wattage	Selling Price
P-43X56	R24	250 Ohms	3.0	.14

VARIABLE

Part No.	Code	Resistance	Description	Selling Price
P-36X219	R12	2.0 Megohms	Volume Control and On-Off Switch	.54
P-40X213	R18	1.5 Megohms	Tone Control and Selectivity Switch	.62

PHONO ATTACHMENT PARTS

Part No.	Description	Selling Price
P-2A31	Phono Switch (Double Pole Double Throw Switch)	.30
P-3A12	Phono Jack	.06
P-10A36	Switch Knob	.10

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Caution

In all work on the chassis and movie dial, extreme care must be taken not to scratch the film or damage the color filter. The film is easily scratched and should not be touched by the hand or any other object.

Adjustments and Service Data

Bringing Lens Adjustment to a Focus

Important—Turn the band switch to the standard wave position.

Move the focusing lever (see Fig. 2) up or down until the image on the screen is clearest. In Fig. 1 is shown the effect of correct and incorrect focusing. Care should be taken not to touch the color filter

Adjusting Reflecting Mirror

On the back wall of the projector compartment are two screws as shown in Fig. 2, the purpose of which is to adjust the position of the reflecting mirror vertically and horizontally.

If the raising and lowering adjustment screw (see Fig. 2) is not adjusted properly, the image will be too high or too low on the screen and the kilocycle or megacycle lines will not be horizontal. Also, part of the image may be cut off. If this condition exists loosen the nut which holds this screw in place. Back this nut off about one turn and then carefully turn this screw until the image is centered on the screen and the lines are horizontal. Use a fine blade screwdriver for this adjustment. Retighten the nut.

If the image cannot be centered from top to bottom, it may be necessary to adjust the elevator height in accordance with the article on this subject in this manual.

If the image on the screen is too far to the right, there will be a space at the left of the screen without light. If the image is too far to the left the same condition is true on the right side of the screen. In either case, loosen the nut which holds the left and right adjusting screw in place—see Fig. 2. Back this nut off about one turn and then carefully turn this screw with a fine blade screwdriver until the image is centered. Retighten the nut.

Tighten the calibration screw to secure the required cord tension. When this is done the radio might be out of calibration. If this condition occurs, the film drum may be shifted to the proper position by loosening the two screws inside the drum at the bottom. After these two screws are tightened, a fine calibration adjustment may then be obtained by turning the calibration screw.

Dial Calibration

The radio is properly calibrated if, when a station is correctly tuned in, the vertical red line on the screen crosses the call letters of that station. If the red line is found to be on one side of the call letters of a large number of stations on the standard wave band (the same side in each case), the dial is out of calibration.

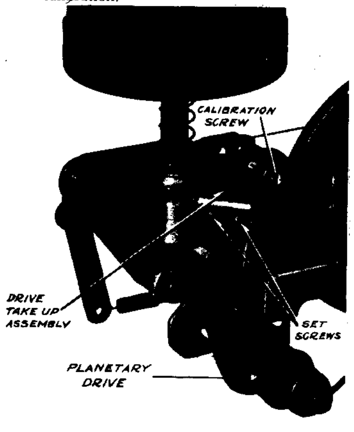

Fig. 3—Drive Takeup Assembly

To re-calibrate, tune in the signal of one of the larger nearby stations. Choose a station which is near the 1500 KC end of the dial and tune carefully to resonance. Turn the calibration screw (see Fig. 2, 3 or 7) until the vertical red line on the screen is at the center of the call letters of that station.

If the film drum cannot be turned a sufficient amount by means of the calibration screw, loosen the 2 screws at the bottom of the drum which hold it in place. Adjust the position of the drum and tighten the screws. The early models do not have the cord take-up calibration screw mentioned above. These models must be calibrated by loosening the drum screws.

The dial will then be properly calibrated and this adjustment should not be changed unless re-calibration again becomes necessary. It should be remembered that after calibration a few of the stations will be tuned in when the vertical red line is near the end of the call letters and city of a station. That is because of slight variations in the film.

Fig. 1—Effect of Lens Focus

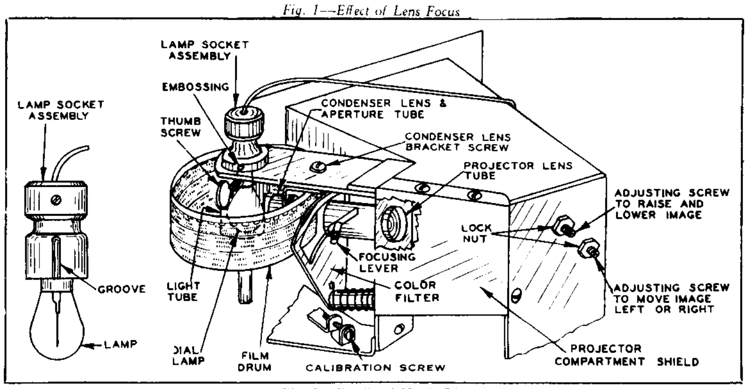

Fig. 2—Details of Movie Dial

Drive Takeup Assembly

Later models are equipped with a drive takeup assembly illustrated in Fig. 7, by means of which the dial drum can be rotated a slight amount for calibration purposes. The earlier models do not have this adjustment. However, a special unit illustrated in Fig. 3 can be put on.

This unit is assembled to the film drum bracket and drive cord as shown in Fig. 3. Unscrew the two set screws and open the slot to the maximum position by turning the adjusting screw in a counter-clockwise direction. Place the unit in position on the bracket.

Push it as far to the left as possible (from back of chassis) and tighten the two set screws. These will extend beneath the film drum bracket. Then place the drive cord between the two pulleys as shown.

Adjusting Elevator to Raise or Lower Image

Adjust the lamp assembly height until the lines on the screen are straight—see article on this adjustment in this manual.

Turn the upper reflecting mirror adjusting screw—see Fig. 2, until the lines on the screen are horizontal.

Turn the band switch to the second short wave position (green).

Loosen the elevator adjusting screw—see Fig. 4.

Raise and lower the elevator until the megacycle line (at bottom) is between the letters "S" and "T" of the word "West" on the glass at either side of the glass screen.

Tighten the elevator adjusting screw.

Removing Play between Band Switch and Elevator

If the elevator arm stops and the band switch stops do not coincide, there will be a certain amount of play between the band switch and the elevator. When this condition occurs, the position of the image on the screen will not be fixed, but can be moved up or down by turning the band switch knob.

To remedy this condition, first turn the band switch to the second short wave position (green).

Loosen the set screw and square head screw on the band switch shaft collar, see Fig. 4. Turn the band switch shaft clockwise as far as it will go. Push the collar arm clockwise as far as it will go without pulling the elevator arm ball bearing out of the bottom slot.

Then tighten the square head screw and set screw in the elevator arm collar.

Planetary Drive Assembly

The planetary assembly is the unit that is integral with the tuning shaft. It is illustrated in Fig. 3.

If the nut of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and film drum to see if they are turning properly or if they are being obstructed in some way.

If the drive turns unevenly (rough in spots), this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

Changes in Early Models

Film Drum Base In the early models a metal film drum base was used. This was replaced in later models with a molded base. The latter type is used in filling orders and is interchangeable with the early type. A clamping plate is now included with the molded base Film Drum Assembly.

Lamp Socket Assembly—Two changes were made in the lamp socket assemblies in the early models The type used with each receiver is illustrated in the instruction book packed with that model. For further information regarding this assembly see the article "Replacing and Positioning the Dial Lamp"

Cleaning Light Reflecting and Transmitting Parts

Cleaning the Lenses

It is very seldom necessary to clean the lenses. Occasionally, however, dust or dirt on the lens may cause the image on the screen to be spotted or foggy. If this is the case, the lenses may be removed as explained below and may then be cleaned by wiping carefully with a clean chamois or soft cloth.

Removing Condenser Lens This lens is inside the film drum as shown in Fig. 2. Turn the band switch to the standard wave position. Take out screw (C) holding the condenser lens bracket in place see Fig. 4. Turn this bracket in a clockwise direction (from top) and lift it out carefully to avoid scratching the film.

This lens can be cleaned without removal or may be forced out of the tube with a wood block. When the lens is replaced, line up the end of the lens barrel with the edge of the tube.

(Continued on next page)

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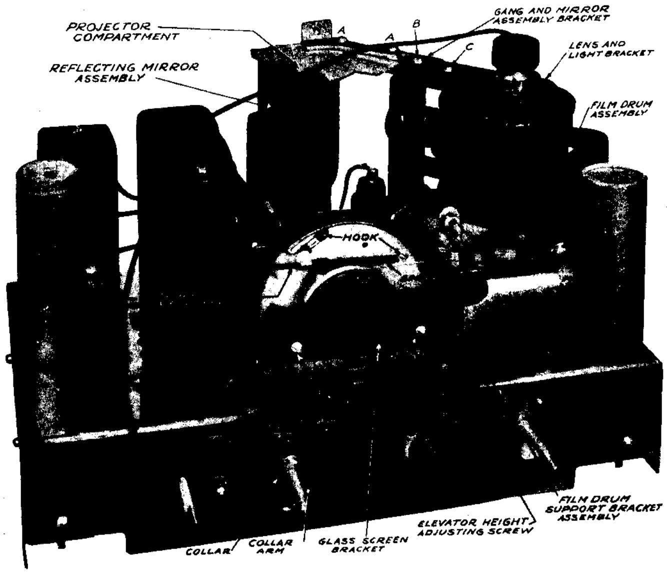

Fig. 4—Movie Dial Chassis

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In replacing the condenser lens bracket, shift this bracket until the end of the condenser lens tube is about ⅛ inch from the dial lamp.

Removing Projector Lens—This lens is inside the projector lens tube as shown in Fig. 2. Turn the band switch to the standard wave position. Take out the three screws which hold the projector compartment shield in place. Then remove the projector compartment shield by tilting the top slightly to the back and toward the right (from back of shield). Move the focusing lever to the highest position. Unscrew and remove this lever.

Push the color filter in a counter-clockwise direction (from front) as far as it will go. Insert a fine blade screwdriver into the projector lens tube (from the front). The blade of the screwdriver should engage the end of the barrel of this lens and push against it until it has been pushed a slight distance toward the projector compartment. CAUTION—Do not let the screwdriver touch the glass. Then insert the screwdriver through the slot in the side of this tube, again engaging the barrel of the lens. Push against the barrel until the lens can be removed by hand from the projector compartment.

Cleaning the Reflecting Mirror, Film, Color Filter and Glass Screen

As in the case of the lenses, it is very seldom necessary to clean the reflecting mirror, film, color filter or glass screen. If, however, the image on the screen is spotted or foggy, it may be necessary to clean these items as explained below.

Reflecting Mirror—The reflecting mirror is located within the projector compartment. Remove the projector compartment shield as described above under "Removing Projector Lens". The glass may then be cleaned without removal of this assembly. Wipe the glass carefully with a clean chamois or soft cloth.

Film—The film may be dusted with a camel hair brush or fine cloth. CAUTION—Extreme care must be taken not to scratch the film.

Color Filter—To clean the color filter, turn the band switch to the second short wave position (green). Clean the filter using a fine cloth or chamois. CAUTION—Extreme care must be taken not to damage the filter.

Glass Screen—If the screen should become dirty, the front may be cleaned by wiping with a clean, dry cloth. If the back of the screen becomes dirty, it should be cleaned with alcohol. Care should be taken not to get any alcohol on the paint on the letters at the sides of the screen, or on the red line at the front of the screen.

Replacing Parts

Replacing and Positioning the Dial Lamp

Caution—If a new lamp is required, use only the correct lamp as shown in the parts list and on the label on each radio. These are special lamps and can be purchased only through Wards stores and mail order houses. The life of the lamp is somewhat less than that of a radio tube.

First, turn the radio off.

Loosen the thumb screw and lift the lamp socket assembly out of the light tube—see Fig. 2. This can be lifted vertically by grasping the insulated top of the assembly through which the wire runs.

Remove the old lamp from the socket and put in the new one.

Replace the lamp socket assembly in the light tube with the light tube embossing in the groove of the lamp socket assembly—see Fig. 2. Do not tighten the thumb screw yet.

Turn the radio on.

Then grasp the top of the lamp socket assembly and move it up or down until the image on the screen is clearest and the lines are horizontal. The effect of having the lamp assembly too high or low is shown in Fig. 5. Tighten the thumb screw.

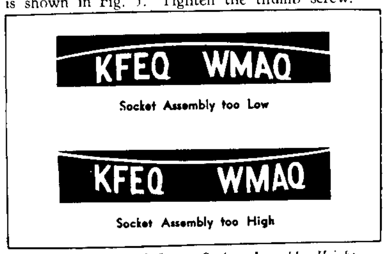

Fig. 5—Effect of Lamp Socket Assembly Height

Early Types—There were two earlier types of lamp socket assemblies.

In the assembly shown in Fig. 6(A) the procedure differs from the above as follows:

To remove the socket assembly from the light tube, grasp the locking ring and turn it in a counter-clockwise direction until the pins are at the vertical portion of the slots. Then lift it out.

When replacing the lamp socket assembly in the light tube, line up the slots in the locking ring over the pins at the top of the light tube. Push the locking ring down and turn it clockwise until the pins move as far as possible into the horizontal portion of the slot—See Fig. 6(A).

To make the image on the screen clear and the lines horizontal, turn the adjusting nut. This moves the lamp assembly up or down depending on the direction of rotation.

In the assembly shown in Fig. 6(B), the procedure differs from that used in the (A) type as follows:

To remove the lamp socket assembly, unscrew the locking ring screw until it is free of the locking ring. Then pry the locking ring upward with a screw driver and lift the assembly out of the light tube.

When replacing the assembly in the light tube, line up one of the holes in the locking ring with the screw in the bracket. Push the locking ring down on the light tube and tighten the locking ring screw until it enters the hole in the locking ring.

Turn the adjusting nut as explained for the type (A) assembly. If the adjusting nut turns hard, grasp the black insulated top of the assembly and lift upward slightly until the nut turns freely.

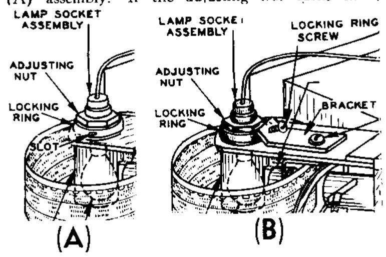

Fig. 6—Early Dial Lamp Assemblies

Important—Latest type used for parts orders. In filling orders for this assembly the latest type, illustrated in the parts list, is shipped. This is interchangeable with all early types.

The early types of lamp socket and light tube did not have the groove and embossing illustrated in Fig. 2. When one of the latest type of socket assembly is used in these models, it will be necessary to turn the assembly until the filament is at right angles to the lens.

Replacing the Film Drum Assembly

Remove the lamp socket assembly from the light tube by lifting it out in accordance with instructions in "Replacing and Positioning the Dial Lamp".

Remove the projector compartment shield by taking out the three screws which hold it in place—See Fig. 2.

Take out the two screws (B and D) which hold the lens and light bracket in place—See Fig. 4. Now remove the lens and light bracket taking care not to scratch the inside of the film.

Remove the film drum assembly by unscrewing the two small screws located inside the drum at the bottom.

Mount the new film drum assembly on the film drum supports leaving the paper around the film for protection, and insert the clamping plate within the film drum. The film drum and clamping plate should then be so placed that the small screws are in the center of the two slots.

Replace the lens and light bracket taking care not to scratch the inside of the film.

Replace the projector compartment shield and dial lamp assembly.

Now remove the paper from the film, turn the radio on and calibrate the dial in accordance with the instructions in the article "Dial Calibration".

The film and mounting drum are sold as one assembly and cannot be ordered separately

Replacing the Glass Screen

Loosen the screws holding the glass screen clamps on each side of the screen. Loosen these only enough to enable the glass screen to be removed by lifting it out from the top.

Mount the new screen from the top being very careful not to touch the back of the screen, as touching the screen will leave fingerprints on the roughened or ground portion.

Push the glass screen down until it rests on the shelves provided for it.

Tighten the four screws holding the screen clamps just enough so that the glass is held firmly in place.

Replacing Film Drum Drive Cord

Remove the projector compartment and glass screen assembly together. To do this, take out the 2 screws (A) see Fig. 4, at the back of the top of the projector compartment, the 2 screws (E) at the bottom of the glass screen bracket, and the 2 brass collars from the volume control and tone control shafts.

Disconnect the tension spring from the arm at the right side of drive mechanism—see Fig. 7.

Remove the old cord by unsoldering it from the

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small lug on the film pulley. Clean the excess solder off of this lug. With a narrow blade screwdriver carefully bend this lug out toward the vertical position, a slight amount.

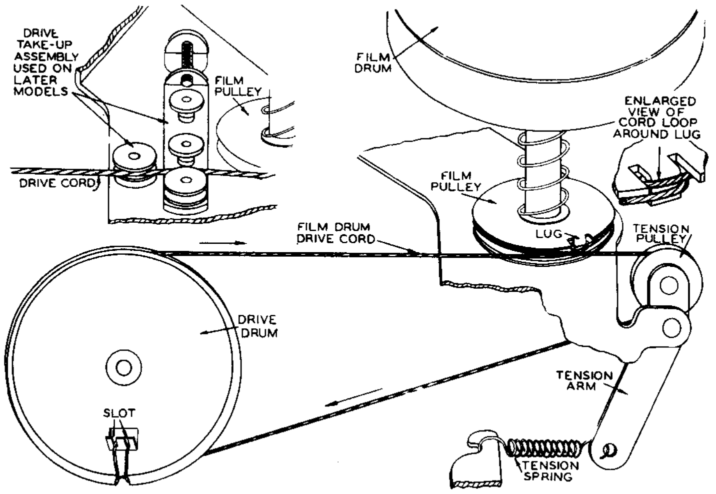

Fig. 7—Replacement of Film Drum Drive Cord

Turn the tuning shaft until the condenser plates are completely in mesh.

Turn the film drum so that the lug on the film pulley is in the position shown in Fig. 7. This is important.

Insert the new drive cord in the left slot in the drive drum (from front) and wind the cord in a clockwise direction one half turn around the drive drum.

Continue the cord horizontally to the lug on the film pulley. Loop the cord around this lug in the manner shown in Fig. 7.

Wind the cord on the film pulley one turn counter-clockwise, being sure that the end coming from the pulley passes over the cord from the drive drum.

Bring the cord over the brass tension pulley and back again to the left. Insert the end in the right slot in the drive drum.

Replace tension spring and reassemble projector compartment, glass screen and collars to the chassis.

Set the signal generator to 600 KC and carefully tune in the signal. Adjust the position of the film drum in accordance with the article "Dial Calibration" in this manual until the 600 KC mark on the dial is at the red line on the screen. **Do not touch the film with the fingers.**

When the above adjustments have been made, carefully bend the lug on the film pulley down over the cord and solder, being sure that the upper cord leaving the pulley receives no solder.

Replacing Condenser Drive Cord

Remove the projector compartment and glass screen assembly together. To do this, take out the 2 screws (A) see Fig. 4, at the back of the top of the projector compartment, the 2 screws (E) at the bottom of the glass screen bracket and the 2 brass collars from the volume control and tone control shafts.

Turn the drive drum until it is in the position shown in Fig. 4.

Place the loop at the end of the drive cord (without the spring) over the small hook nearest the cut out part of the drive drum.

Now turn the chassis on its back. Bring the cord down over the right side (from front) of the drive drum and over the planetary drive pulley, keeping the cord in the groove provided for it. Bring the drive cord up over the left side (from front) of the drive drum to the cut out part of the drum. While holding the cord in place, return the chassis to normal position.

Then bring the cord in toward the inside of the drum, attaching the tension spring to the small hook provided for it.

Reassemble the projector compartment, glass screen and collars to the chassis.

Replacing the Color Filter Semaphore

Push the focusing lever up as far as it will go.

Cut a strip of paper the width of the film drum assembly and place this around the film holding it on with a string wound around the drum. This will protect the film from being scratched on the outside.

Remove the projector compartment shield by taking out the three screws which hold it in place—See Fig. 2

Remove the lens and light bracket by taking out screws (B and D) which hold it in place—See Fig. 4. Care must be taken not to scratch the inside of the film when removing this bracket.

Remove the horseshoe washer from the stud holding the color filter semaphore in place. Then take off the color filter semaphore.

Take the spring off of the old assembly. Put this spring on the new assembly, the straight end of the spring being placed under the small clip provided for it on the color filter semaphore.

Now replace the color filter semaphore on the stud on which it mounts. Put on the horseshoe washer, pinching the open ends together. The free end of the spring should catch the edge of the lens and light bracket

Next turn the color filter one complete turn in a counter-clockwise direction (from front) to provide tension on the spring.

Holding the semaphore in this position, replace the entire assembly with the semaphore stop placed under the film drum (drum in second short wave or highest position). Care must be taken not to scratch the inside of the film when replacing the lens and light bracket assembly.

Now replace the projector compartment shield and remove the paper from around the film.

Turn the radio on and bring the letters on the screen into proper focus by means of the focusing lever—See Fig. 2. The effects of incorrect focusing are shown in Fig. 1.

Movie Dial Parts List

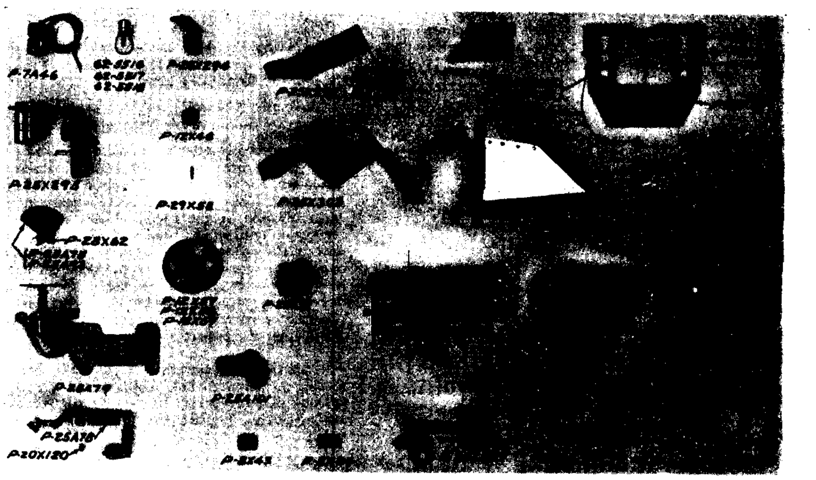

Fig. 8—Replacement Parts

The Series 7LL and OEL radios use the parts shown in the list below.
The Series 2DL, OF, 7P and 7Q radios use the same parts with the exception of the items shown in the four columns to the right.

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Parts For Series 7LL and OEL Radios

Part No.	Description	Selling Price	2DL Part Number	2DL Selling Price	OF Part Number	OF Selling Price	7P Part Number	7P Selling Price	7Q Part Number	7Q Selling Price
			Part Number at Left—Selling Price at Right							
P-6A34	Planetary Drive	$0.60								
P-7A46	Lamp Socket Assembly	.32								
P-8X43	Rubber Mounting Cushion (Front) for Gang Condenser	.04								
P-8X44	Rubber Mounting Cushion (Rear) for Gang Condenser	.04								
P-10X14	Condenser Drive Cord Only (Black)	.10								
P-28X69	Condenser Drive Cord Tension Spring	.04								
P-10X15	Film Drum Drive Cord Only (Phosphor-bronze)	.06								
P-10X18	Indicator Cord (Black) doz.	.12								
P-12X46	Lens (Projector or Condenser)	.50								
P-29X58	Focusing Lever for Projector Lens	.04								
P-12X57	Film Drum Assembly Complete with Film and Clamping Plate	.56					P-12X59	$0.56	P-12X58	$0.56
P-25X332	Clamping Plate for Film Drum	.04								
P-14A52	Gang Condenser Only	1.74	P-14A50	$2.30			P-14A58	$1.74	P-14A58	$1.74
P-24X240	Drive Drum and Pulley Assembly	.40								
P-25A75	Color Filter Semaphore less Spring	.24					P-25A93	$0.24		
P-28X62	Spring for Color Filter Assembly	.04								
P-25A78	Elevator Assembly Complete less Ball Bearing	.40								
P-20X120	Ball Bearing for Elevator	.04								
P-25A79	Film Drum Support Bracket Assembly	1.36								
P-25A81	Reflecting Mirror Assembly Complete with Mirror and Adjusting Screws	.30								
P-41X13	Reflecting Mirror Only	.04								
P-25A101	Drive Takeup Assembly (for early models not equipped with this Assembly)	.20								
P-25X269	Drive Assembly Bracket Only (mounted on Gang Condenser)	.12								
P-25X292	Gang and Mirror Assembly Bracket	.14	P-25X303	$0.18						
P-25X294	Aperture Bracket	.14								
P-25X295	Lens and Light Bracket	.72								
P-28X19	Dial Drive Tension Spring	.04								
P-28X44	Indicator Slide Spring ea.	.04								
P-29X20	Brass Collar ea.	.04								
P-15X63	Tone or Volume Indicator ea.	.06								
P-25X299	Glass Screen Bracket	.14								
P-30X63	Glass Screen Clamp ea.	.04								
P-58X118	Glass Screen	.46					P-58X131	$0.46	P-58X131	$0.46
P-32X67	Projector Compartment	.24								
P-32X68	Projector Compartment Shield	.06								
62-5517	Dial Lamp (6.8v.)	.18			62-5516 (2 v.)	$0.18	62-5518 (30 v.)	$0.26		

Prices subject to change without notice

SUPPLEMENTARY MOVIE DIAL AND DIAL DRIVE DATA

The greatest point of difference between the early and late models is the use of die castings instead of die stampings for the following parts: Drive Drum and Pulley Assembly, Film Drum Support Bracket, Lens and Light Bracket, and Elevator Arm Assembly. A cardboard projector compartment and shield is now used in place of the early metal type compartment.

The models in which the latest changes have been made may be identified in most cases by this cardboard projector compartment.

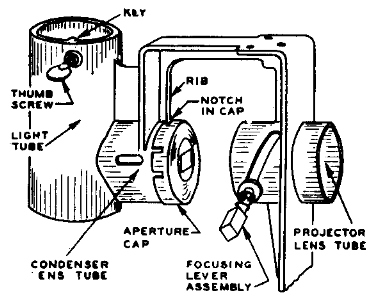
However, this identifying characteristic is not positive. Some models not using die cast parts have the cardboard projector compartment and some models with die cast parts have the metal compartment or a combination of metal and cardboard. When ordering movie dial parts, therefore, determine whether the chassis uses die cast or stamped parts.

Revised Movie Dial Procedures

The changes in design of certain parts of the movie dial assembly have necessitated a revision in the procedure for making some adjustments and replacements. The new instructions are as follows:

Cleaning the Lenses (When die cast lens and light bracket is used)

Removing Condenser Lens—Turn the band switch to the standard wave position. Remove the dial lamp assembly. Take out the two screws holding the lens



Lens and Light Bracket.

and light bracket in place. Take out the three screws holding the projector compartment shield in place. Remove this shield. If a one-piece cardboard compartment is used, remove two screws only and bend the shield down. Turn the lens and light bracket in a clockwise direction (from top) and lift it out carefully to avoid scratching the film.

Remove the aperture cap—See illustration. Insert a fine blade screwdriver into the slot and then push the condenser lens away from the light tube until it is possible to remove the lens. Clean the lens carefully. Replace the lens so that the lens barrel projects about 1/32 inch beyond the lens tube. Replace the aperture cap so that the square notch of the aperture caps fits over the square rib as illustrated.

Reassembling—Replace the lens and light bracket taking care not to scratch the inside of the film.

Replace the projector compartment shield and dial lamp assembly.

Refocus the projector lens.

Removing Projector Lens—Remove the projector shield as explained in the first paragraph of the article "Removing Condenser Lens."

Move the focusing lever to the highest position. Unscrew and remove the focusing lever assembly.

Push the color filter in a counter-clockwise direction (from front) as far as it will go. Insert a fine blade screwdriver into the projector lens tube (from the front). The blade of the screwdriver should engage the end of the barrel of this lens and push against it until it has been pushed a slight distance toward the projector compartment. CAUTION—Do not let the screwdriver touch the glass. Then insert the screwdriver through the slot in the side of this tube, again engaging the barrel of the lens. Push against the barrel until the lens can be removed by hand from the projector compartment.

Clean the lens carefully. Replace the lens barrel so that the threaded hole will coincide with the slot opening of the bracket. Reassemble the focusing lever assembly. Replace the projector compartment shield

Replacing the Film Drum Assembly (When die cast lens and light bracket is used)

Remove the lamp socket assembly from the light tube by lifting it out in accordance with instructions in "Replacing and Positioning the Dial Lamp"

Remove the lens and light bracket as described in the article "Removing Condenser Lens."

Remove the film drum assembly by unscrewing the two small screws located inside the drum at the bottom.

Mount the new film drum assembly on the film drum supports leaving the paper around the film for protection, and insert the clamping plate within the film drum. The film drum and clamping plate should then be so placed that the small screws are in the center of the two slots.

Replace the lens and light bracket taking care not to scratch the inside of the film.

Replace the dial lamp assembly.

Now remove the paper from the film, turn the radio on and calibrate the dial in accordance with the instructions in the article "Dial Calibration"

The film and mounting drum are sold as one assembly and cannot be ordered separately.

Adjusting Elevator to Raise or Lower Image

The elevator adjusting method, utilizing a screw moving in a slot, has been changed to the method explained in the following paragraphs:

Turn the band switch to the standard wave band position (white).

Adjust the lamp assembly height until the lines on the screen are straight—See article on this adjustment

Turn the upper adjusting screw of the reflecting mirror (See Fig. 2 until the lines on the screen are horizontal.

At the bottom of the film drum assembly shaft is an adjustable screw arrangement. To adjust the height of the elevator, loosen the locknut on the adjustable screw. This nut is the smallest hex nut on this shaft. Then turn the adjustable screw, by means of the larger hex head, in a clockwise direction to lower the image on the screen and counter-clockwise to raise the image.

When the correct position has been obtained, tighten the locknut.

Drive Cord Replacements

When ordering the film drum drive cord or the condenser drive cord, it is important that the type of drive drum (die cast or stamped) be noted. The cords used with the die cast drum are not interchangeable with those used with the die stamped drum. The two drive drum assemblies may be differentiated as follows: The die cast drive drum and the smaller pulley which drives the film drum are one piece. The die stamped drum and pulley assembly is composed of two separate pulleys held together with a brass bushing.

Lubrication Necessary

After a period of time some light grease should be placed on the film drum shaft at the point where it passes through the film pulley (See Fig. 7.

Movie Dial Supplementary Parts List

Bin No.	Part No.	Description	Selling Price
11119	*7A42	Lamp Socket (Interchangeable with P-7A46)	$ .32
	‡25X295J	Lens and Light Bracket (Die Cast)	.46
	‡12X54	Aperture Cap for Above Bracket	.06
	†12X64	Condenser Lens (Used instead of P-12X46)	.50
	**12X64	Projector Lens Only (Used instead of P-12X46)	.50
	†29X77	Focusing Lever Assembly for Projector Lens (Used instead of P-29X58)	.06
	†10X21	Condenser Drive Cord—Black (Used instead of P-10X14)	.12
	†24X240D	Drive Drum and Pulley (Die Cast)	.22
	†25A106	Film Drum Support Bracket Assembly (Used instead of P-25A79)	1.04
	†10X22	Film Drum Drive Cord Only—Phosphor-bronze (Used instead of P-10X15)	.10
	†28X104	Film Drum Drive Tension Spring (Used instead of P-28X19)	.04
	*32X83	Cardboard Projector Compartment (One piece—Interchangeable with all early types)	.08
11397	*25A105	Elevator Assembly Complete less Ball Bearing (Die Cast—Interchangeable with P-25A78)	.22

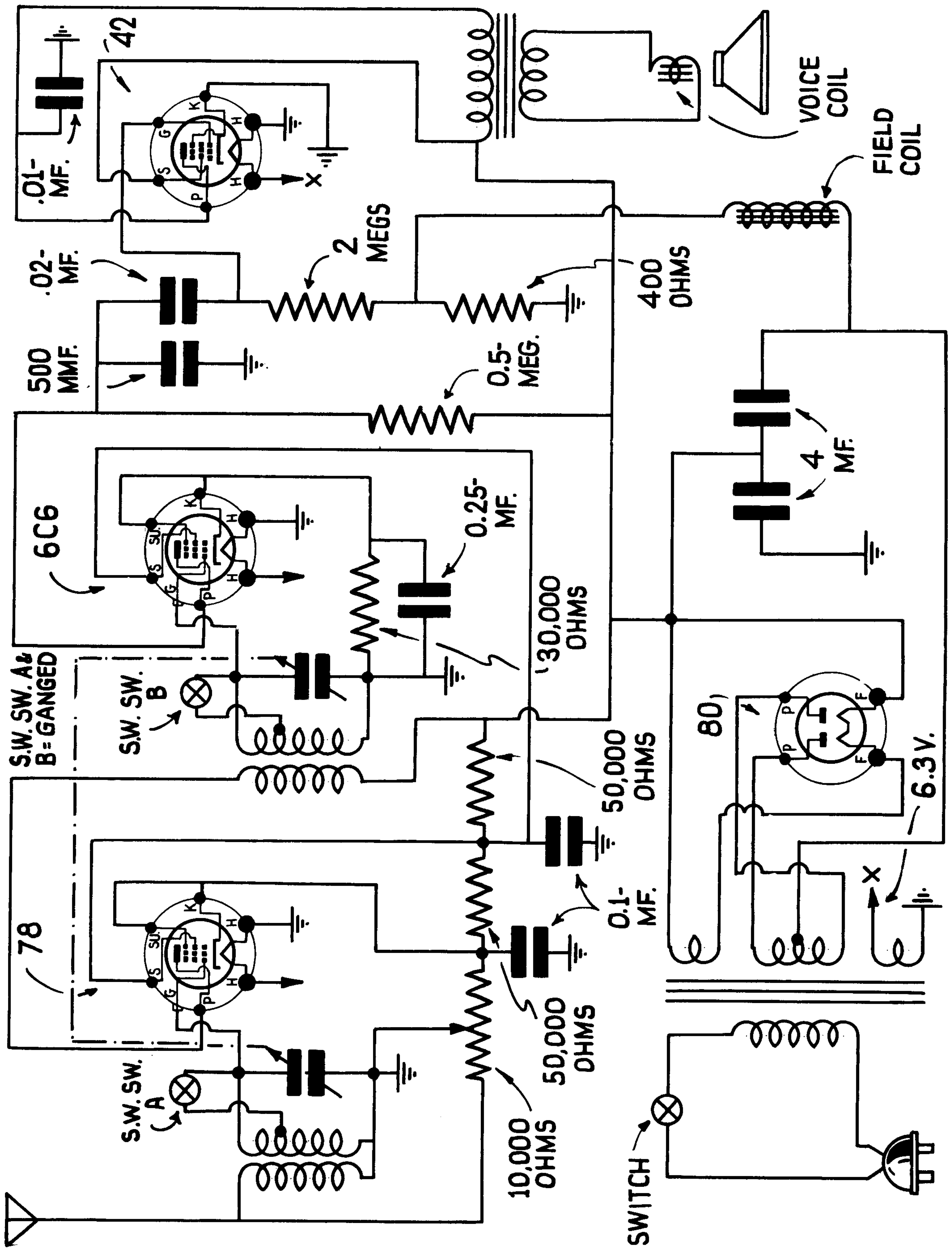
*Interchangeable with early models.

†Not interchangeable with early models.

‡These two items when used together are interchangeable with the combination of P-25X294—Aperture Bracket and P-25X295—Lens and Light Bracket on early models.

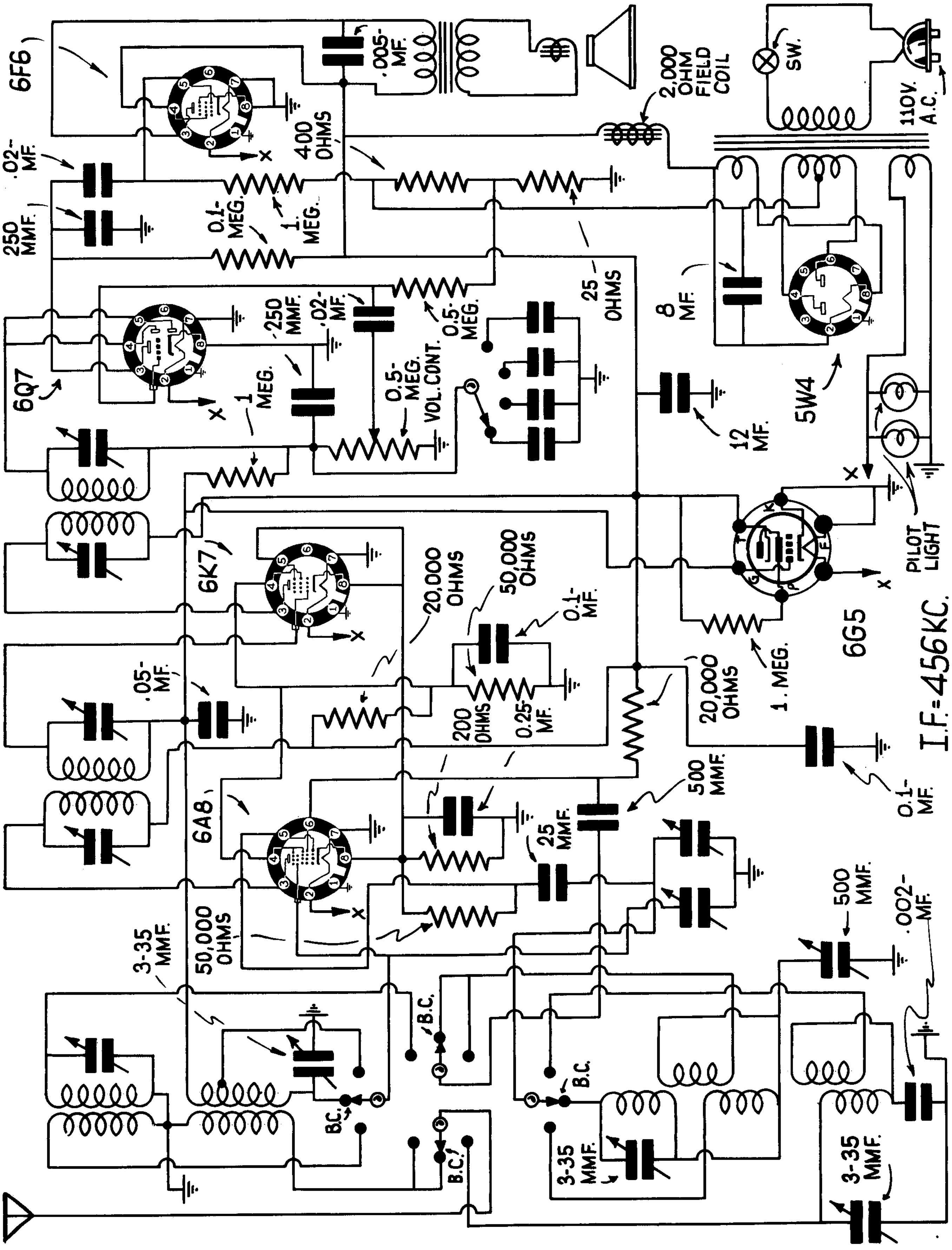
**Interchangeable with P-12X46—Projector Lens (Used on early models) if used with 29X77—Focusing Lever Assembly.

PACIFIC RADIO CORPORATION
MODELS 22, 226 & 226-D



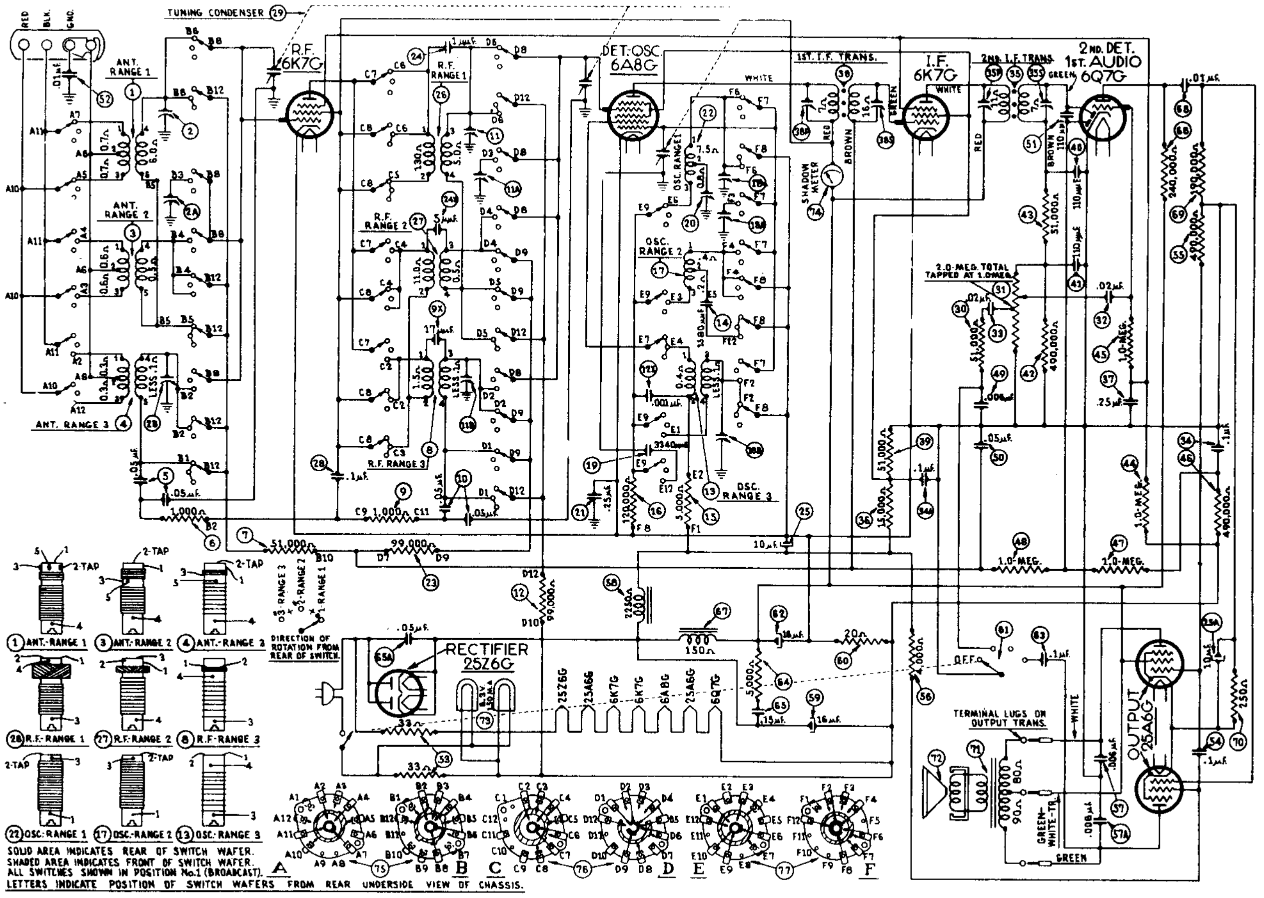
PACIFIC RADIO CORPORATION

MODELS 57 & 57-C



PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-641 "CODE 121"



NOTE: See page 237 before servicing this set.

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2108	$1.60
2	Compensator (three section)	31-6092	.60
3	Antenna Transformer (Range 2)	32-2119	1.20
4	Antenna Transformer (Range 3)	32-2109	1.20
5	Condenser (Dual Tubular .05 mfd.)	30-4489	
6	Resistor (1000 ohms, ½ watt)	33-210339	.20
7	Resistor (51,000 ohms, ½ watt)	33-351339	.20
8	R. F. Transformer (Range 3)	32-2126	.70
9	Resistor (1000 ohms, ½ watt)	33-210339	.20
9X	Condenser (17 mmfd. mica)	30-1079	
10	Condenser (Dual Tubular .05 mfd.)	30-4489	
11	Compensator (three section)	31-6092	.60
12	Resistor (99,000 ohms, ½ watt)	33-399339	.20
X	Condenser (.001 mfd. tubular)	30-4453	.20
	Oscillator Transformer (Range 3)	32-2110	.70
14	Condenser (1580 mmfd.)	31-6138	.40
15	Resistor (5000 ohms. ½ watt)	33-250339	.20
16	Resistor (120,000 ohms, ½ watt)	33-412339	.70
17	Oscillator Transformer (Range 2)	32-2121	.70
18	Compensator Oscillator (three sections)	31-6092	.60
19	Condenser (3340 mmfd.)	31-6138	.40
20	Compensator (Range 1 series)	31-6056	.55
21	Condenser (.25 mfd. tubular)	30-4446	.25
22	Oscillator Transformer (Range 1)	32-2120	1.00
23	Resistor (99,000 ohms, ½ watt)	33-399339	.20
24	Condenser (Lug and wire twisted)	38-7878	.04
24X	Condenser (5 mmfd. mica)	30-1077	
25	Electrolytic Condenser (10 mfd., Dual)	30-2125	1.20
26	R. F. Transformer (Range 1)	32-2105	1.00
27	R. F. Transformer (Range 2)	32-2106	.70
28	Condenser (.1 mfd. tubular)	30-4122	.20
29	Tuning Condenser	31-1818	4.50
30	Resistor (51,000 ohms, ½ watt)	33-351339	.20
31	Volume Control	33-5166	1.00
32	Condenser (.02 mfd. tubular)	30-4113	.20
33	Condenser (.02 mfd. tubular)	30-4113	.20
34	Condenser (.1 mfd dual bakelite)	6287-DU	.40
35	2nd I. F. Transformer	32-2102	1.80
	Resistor (15,000 ohms, ½ watt)	33-351339	.20
	Condenser (.25 mfd. tubular)	30-4446	.25
3	1st I. F. Transformer	32-2100	1.80
39	Resistor (51,000 ohms, ½ watt)	33-351339	.20
40	Condenser (110 mmfd. mica)	30-1031	.20
41	Condenser (110 mmfd. mica)	30-1031	.20
42	Resistor (490,000 ohms, ½ watt)	33-449339	.20
43	Resistor (51,000 ohms, ½ watt)	33-351339	.20
44	Resistor (1 megohm, ½ watt)	33-510339	.20
45	Resistor (1 megohm, ½ watt)	33-510339	.20
46	Resistor (490,000 ohms, ½ watt)	33-449339	20

Schem. No.	Description	Part No.	List Price
47	Resistor (1 megohm, ½ watt)	33-510339	$0.20
48	Resistor (1 megohm, ½ watt)	33-510339	.20
49	Condenser (.006 mfd. tubular)	30-4125	.20
50	Condenser (.05 mfd. tubular)	30-4020	.20
51	Condenser (110 mmfd. mica)	30-1031	.20
52	Condenser (.01 mfd. tubular)	30-4145	.20
53	Resistor (33 ohms, two section)	33-3294	
54	Condenser (.1 mfd. bakelite)	4989-SU	.35
55	Resistor (490,000 ohms, ½ watt)	33-449339	.20
56	Resistor (4,000 ohms, ½ watt)	33-240339	.20
57	Condenser (.006 mfd. dual)	7625-DU	30
58	Choke	32-7667	1.60
59	Electrolytic Condenser (16 mfd.)	30-2124	.75
60	Resistor (20 ohms, flexible)	33-3043	.25
61	Tone Control and A. C. Switch	42-1224	.75
62	Electrolytic Condenser (16 mfd.)	30-2124	.75
63	Condenser (.1 mfd. tubular)	30-4455	.25
64	Resistor (5,000 ohms, ½ watt)	33-250339	.20
65	Condenser (.05, .15 mfd. bakelite)	6287-CU	
66	Resistor (240,000 ohms, ½ watt)	33-424339	.20
67	Choke	33-7527	
68	Condenser (.01 mfd. bakelite)	3903-SU	.25
69	Resistor (190,000 ohms, ½ watt)	33-419339	.20
70	Resistor (250 ohms, flexible)	33-3046	
71	Output Transformer HR-13, KR-18	32-7662	
72	Cone and Voice Coil HR-13	36-3797	
	Cone and Voice Coil KR-18	36-3540	.80
73	Pilot and Shadowmeter Lamps	34-2068	.12
74	Shadowmeter	45-2308	
75	Range Switch (Ant.)	42-1243	1.20
76	Range Switch (R. F.)	42-1244	1.20
77	Range Switch (Osc.)	42-1246	1.20
	Bushing Spacer (Mtg. Chassis)	27-4360	.04
	Bracket Indicator and Lens Assembly	38-7912	.30
	Cable (Power)	L-2183	.40
	Cable (Speaker)	41-3246	
	Clip, Volume Control Shaft	28-4394	.01
	Dial	27-5214	.50
	Hub	28-7187	.12
	Clamp	28-2837	.10
	Gear (Dial)	28-7185	.10
	Gear (Drive)	31-1884	.25
	Guard (Scale)	27-8324	.02
	Knob (Tuning)	27-4330	.10
	Knob (Vernier)	27-4331	.10
	Knob (Tone, Volume)	27-4332	.10
	Knob (Range Switch)	27-4326	.10
	Insulator (Electrolytic Cond. Power Unit)	27-7836	.06

Price subject to Change without Notice

Schem. No.	Description	Part No.	List Price
	Insulator (Electrolytic Cond. Power Unit)	27-7194	$0.01
	Insulator (Electrolytic Cond. Power Unit)	27-8653	
	Mask	27-5198	.30
	Mask Arm and Link Assembly	31-1959	.30
	Mask Guide and Pilot Lamp Bracket	38-7844	.15
	Mask Washer	27-8318	.50 C
	Mtg. Washer (Rubber, chassis)	5189	.03
	Mtg. Grommet	27-4317	.07
	Mtg. Rubber (Tuning Condenser)	27-4325	.02
	Mtg. Sleeve	28-2257	.01
	Mtg. Screw	W-729	.45 C
	Mtg. Washer	28-3927	.01
	Mtg. Washer	27-7807	.50 C
	Panel Wiring, I. F. Unit	38-7895	
	Receptical Assembly Shadowmeter	41-3276	
	Socket 7 Prong	27-6057	.11
	Socket 8 Prong	27-6058	.11
	Shaft Control Volume	38-8059	.10
	Spring (Shaft)	28-4117	.40 C
	Spring (Shadowmeter)	28-8623	.70 C
	Tube (Paper, Volume Shaft)	27-8530	.01
	Shaft and Plate (Range Switch)	42-1173	.50
	Shield (Chassis)	38-8269	
	Shield (Tube)		
	Spring (Thrust, dial gear)	28-8611	.01
	Washer (Thrust, dial gear)	28-3976	.30 C
	Washer "C" (dial gear)	28-3904	.01

"B" CABINET

Description	Part No.	List Price
Baffle and Silk Assembly	40-5974	.40
Bezel Frame and Plate Assembly	40-5937	.60
Gasket	27-8311	.01
Glass	27-8298	.05
Bezel Ring	28-3967	.35
Speaker KR-18	36-1249	10.00

"X" AND "MX" CABINET

Description	Part No.	List Price
Baffle Silk Assembly (X)	40-6043	
Baffle Silk Assembly (MX)	40-6023	
Baffle Board (MX)	16277	
Bezel Plate Assembly	40-5945	.70
Gasket	27-8312	.01
Glass	27-8299	.06
Ring	28-3987	40
Speaker HR-13	36-1251	11.00

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-641 "CODE 121"

Electrical Specifications

Type of Circuit: Superheterodyne, with push-pull pentode audio output.
Power Supply: 115 volts, A. C. or D. C.
Power Consumption: 60 watts.
Power Output: 1.4 watts.
Philco Tubes Used: Seven. One 6A8G; one 6Q7G; one 25Z6G; two 6K7G; two 25A6G.
Tuning Ranges: Three. Range 1—530 to 1720 K. C.; Range 2—2.3 to 7.4 M. C.; Range 3— 7.35 to 22 M. C.
Tone Control: Three Point.
Speaker: "B" Cabinet KR-18. "X" and "MX" Cabinets HR-13.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator; Philco Model 088 (fundamental frequency 110 to 20,000 K. C.) is the correct instrument for this purpose; (2) Output meter. **Philco Model 025 Circuit Tester** incorporates a sensitive output meter and is recommended; (3) Fibre handle screw driver (Philco Part No. 27-7059); (4) Special variable condenser (Philco Part No. 45-2325).

OUTPUT METER—The 025 Output Meter is connected between the plate and cathode prongs of one of the 25A6G tubes. Then adjust the meter to use the (0-30) volt scale.

INTERMEDIATE FREQUENCY CIRCUIT

Set controls as follows:

a. Range Switch position one (broadcast).
b. Volume control maximum.
c. Connect the 088 signal generator output lead through a .1 mfd. condenser to the control grid of the 6A8G tube and the ground connection of the output lead to the chassis.
d. Receiver dial at 580 K. C.
e. Signal generator 470 K. C.
f. Adjust compensators (38P), (38S), (35P), (35S).

RADIO FREQUENCY CIRCUIT

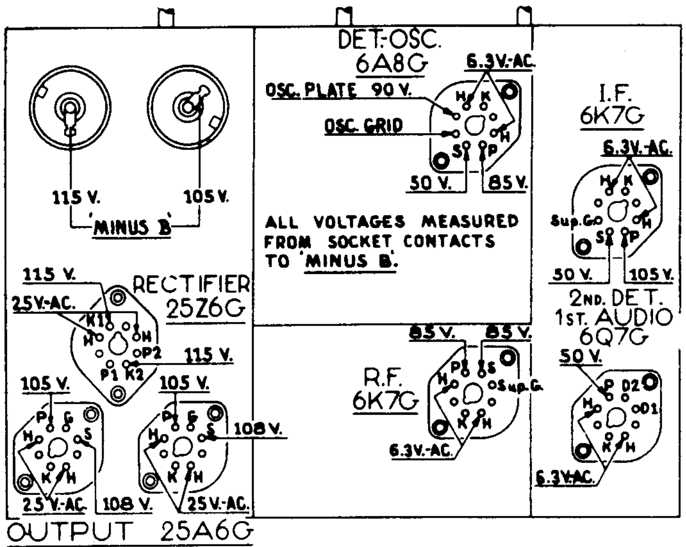
Tuning Range 7.35 to 22 M. C.

1. Connect signal generator output lead with the .1 mfd. condenser to terminal No. 1 and the ground lead to terminal No. 3. Terminals 2 and 3 must be connected with the shorting link provided on the aerial panel.
2. Adjust compensators as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators In Order
3	18 M. C.	18 M. C.	(18B) check image at 17.06 M. C. on receiver dial. (See note B)
3	18 M. C.	18 M. C.	(11B), (2B) use shunt condenser on (18B) (See Note A)
3	18 M. C.	18 M. C.	(18B)

Tuning Range 2.3 to 7.4 M. C.

Range Switch	Signal Generator	Receiver Dial	Compensators In Order
2	7 M. C.	7 M. C.	(18A)
2	6 M. C.	6 M. C.	(11A), (2A)



Socket Voltages—Underside of Chassis View

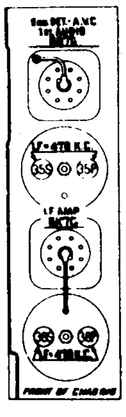
The voltages indicated by arrows were measured with a **Philco 025 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

Tuning Range 530 to 1720 K. C.

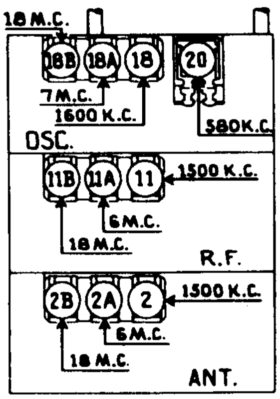
Range Switch	Signal Generator	Receiver Dial	Compensators In Order
1	1600 K. C.	1600 K. C.	(18), (11), (2)
1	580 K. C.	580 K. C.	(20) roll gang
1	1600 K. C.	1600 K. C.	(18)
1	1500 K. C.	1500 K. C.	(11), (2)

NOTE "A"—To eliminate the effect of the R. F. compensator detuning the Osc. circuit, a variable tuning condenser, Philco Part No. 45-2325 is connected from the oscillator compensator to ground when designated in the padding instruction above. Tune the added condenser from the minimum capacity position until the second harmonic of the receiver oscillator beats against the signal from the generator, resulting in a maximum indication on the output meter. Then adjust compensators as noted for maximum output.

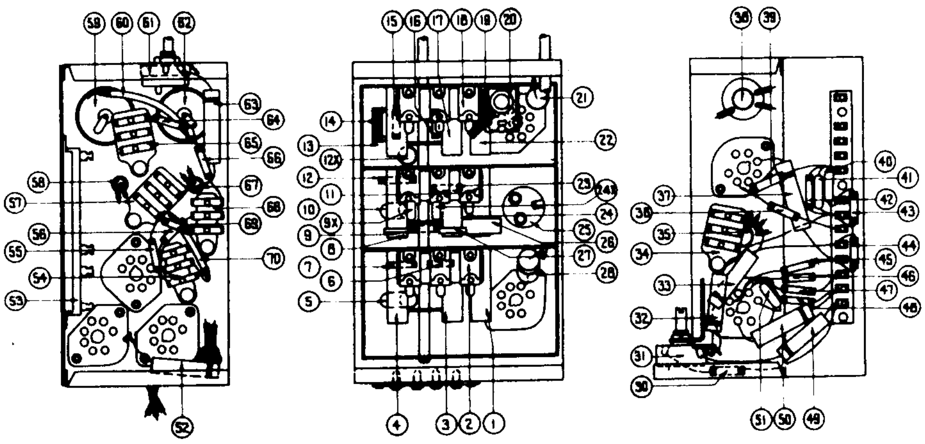
NOTE "B"—To accurately adjust the compensator to the fundamental and not the image signal, turn the oscillator compensator to the maximum capacity position clockwise. Then slowly turn the compensators counter-clockwise until a second maximum peak is obtained on the output meter. The first peak is the image signal and the receiver must not be adjusted to it. If the above procedure is correctly performed, the image signal will be found 940 K. C. below the frequency being used on any high frequency band.



I. F. Compensators



R. F. Compensators

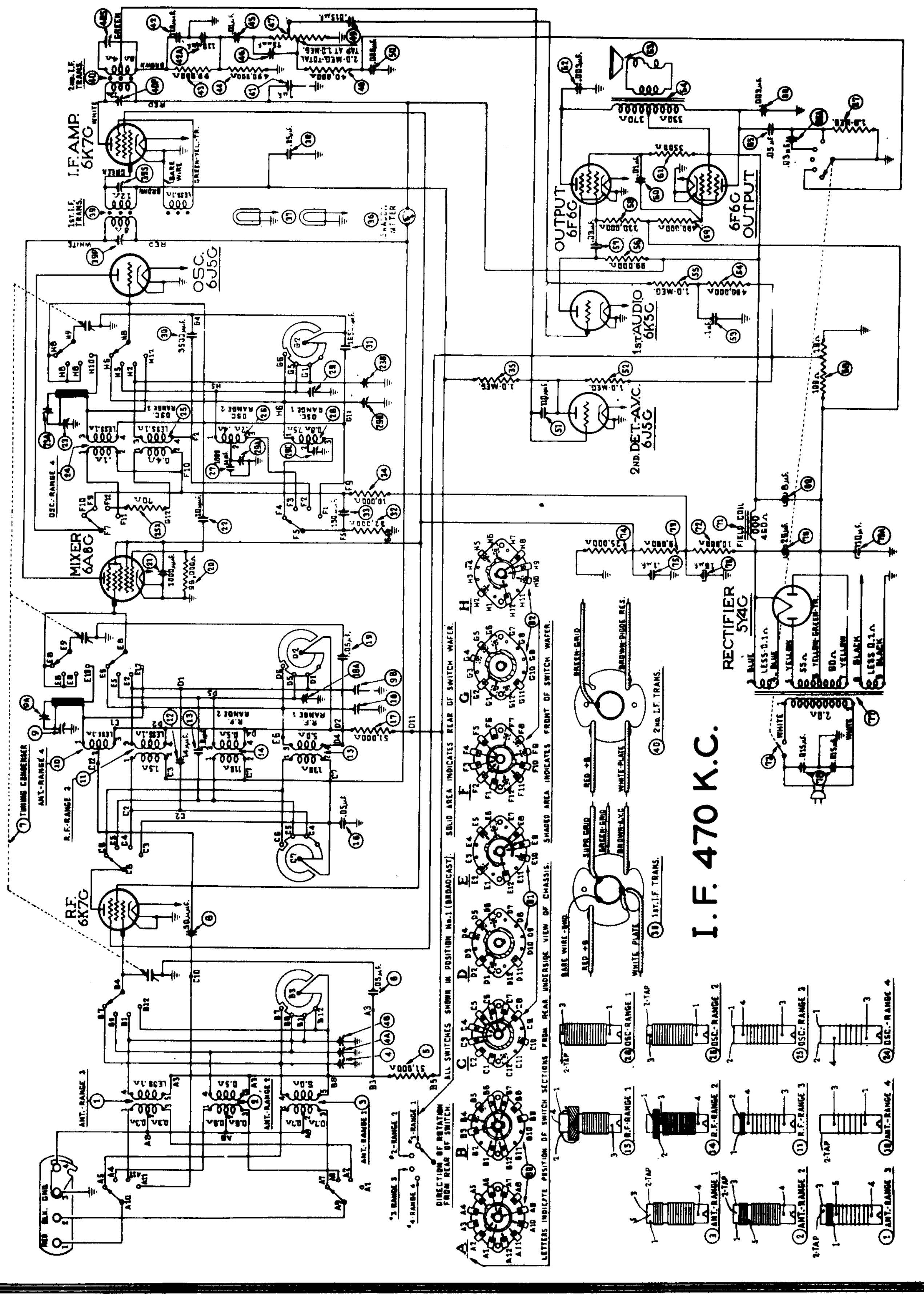


View of Parts from Underside of Chassis

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

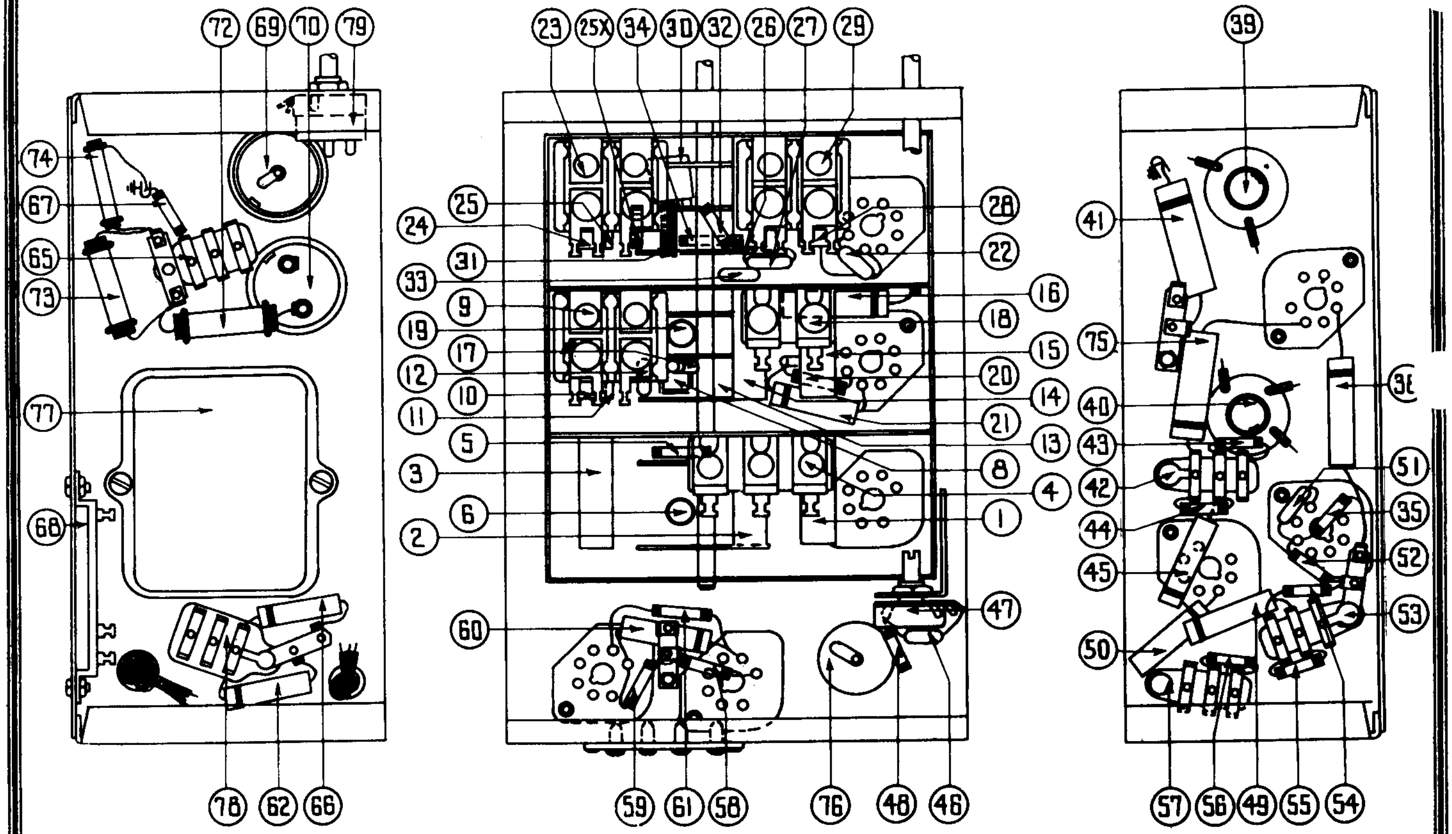
MODEL 37-665



NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-665



Base View of Chassis

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 3)	32-2109	$1.20
2	Antenna Transformer (Range 2)	32-2119	1.20
3	Antenna Transformer (Range 1)	32-2108	1.60
4	Compensator (three section)	31-6092	.60
5	Resistor (51000 ohms, ½ watt)	33-351339	.20
6	Condenser (.05 mfd. tubular)	30-4444	.20
7	Tuning Condenser	31-1938	4.80
8	Condenser (50 mmfd. mica)	30-1029	.20
9	Compensator (3 section)	31-6225	
10	Ant. Transformer (Range 4)	32-2192	.70
11	R. F. Transformer (Range 3)	2-2126	.70
12	Condenser (14 mmfd.)	30-1073	.20
13	Condenser (1.0 mmfd.) twisted wire and lug	38-7878	.04
14	R. F. Transformer (Range 2)	32-2106	.70
15	R. F. Transformer (Range 1)	32-2105	1.00
16	Condenser (.05 mfd. Tubular)	30-4123	.20
17	Resistor (51000 ohms, ½ watt)	33-351339	.20
18	Compensator (two section)	31-6093	.40
19	Condenser (.05 mfd. Tubular)	30-4444	.20
20	Resistor (99,000 ohms)	33-399339	.20
21	Condenser (1000 mmfd.)	30-4453	.20
22	Condenser (10 mmfd.)	30-1065	.20
23	Compensator (three section)	31-6225	
24	Osc. Transformer (Range 4)	32-2196	1.20
25	Osc. Transformer (Range 3)	32-2110	.70
25X	Resistor (70 ohms, ½ watt)	33-070339	
26	Osc. Transformer (Range 2)	32-2121	.70
27	Condenser (1000 mmfd. mica—Green, White)	30-1007	.30
28	Osc. Transformer (Range 1)	32-2120	1.00
29	Compensator (four section)	31-6108	1.00
30	Condenser (3500 mmfd.)	31-6097	.50
31	Condenser (1650 mmfd.)	31-6096	.40
32	Resistor (32000 ohms, ½ watt)	33-332339	.20
33	Condenser (130 mmfd.)	30-1050	.25
34	Resistor (10000 ohms, ½ watt)	33-310339	.20
35	Resistor (1.0 megohm, ½ watt)	33-510339	.20
36	Shadowmeter	45-2307	2.50
37	Shadowmeter and Pilot Lamp	34-2039	.07
38	Condenser (.05 mfd. tubular)	30-4020	.20
39	1st I. F. Transformer	32-2159	1.80
40	2nd I. F. Transformer	32-2171	1.80
41	Condenser (.1 mfd. tubular)	30-4455	.25
42	Condenser (110 mmfd. Dual Bakelite)	8035-DG	.25
43	Resistor (99,000 ohms, ½ watt)	33-399339	.20
44	Resistor (490,000 ohms, ½ watt)	33-449339	.20
45	Condenser (.01 mfd. tubular)	30-4124	.25
46	Condenser (75 mmfd. mica)	30-1031	.20
47	Volume Control	33-5158	1.00
48	Resistor (40,000 ohms, ½ watt)	33-340339	$0.20
49	Condenser (.015 mfd. tubular)	30-4358	.20
50	Condenser (.006 mfd. tubular)	30-4125	.20
51	Condenser (110 mfd. mica)	30-1031	.20
52	Resistor (1.0 megohm, ½ watt)	33-510339	.20
53	Condenser (.1 mfd. Bakelite)	4989-SG	.20
54	Resistor (490,000 ohms, ½ watt)	33-449339	.20
55	Resistor (1.0 megohm, ½ watt)	33-510339	.20
56	Resistor (99,000 ohms, ½ watt)	33-399339	.20
57	Condenser (.03 mfd. bakelite)	8318-SU	.35
58	Resistor (330,000 ohms, ½ watt)	33-433339	.20
59	Resistor (490,000 ohms, ½ watt)	33-449339	.20
60	Condenser (.01 mfd. tubular)	30-4169	.20
61	Resistor (3500 ohms, ½ watt)	33-235339	.20
62	Condenser (.003 mfd. tubular)	30-4469	.20
63	Cone & Voice Coil K35	36-3174	.80
	Cone & Voice Coil H26	36-3801	
64	Output Transformer K35 and H26	32-7634	1.50
65	Condenser (.05, .03 mfd. dual bakelite)	3615-YU	.40
66	Condenser (.003 mfd. tubular)	30-4469	.20
67	Resistor (1.0 megohm, ½ watt)	33-510339	.20
68	Resistor (128 ohms, wirewound)	33-3280	.30
69	Electrolytic Condenser (8 mfd.)	30-2024	1.10
70	Electrolytic Condenser (10, 20 mfd.)	30-2163	2.40
71	Field Coil Assembly K35 and H26	36-3687	4.00
72	Resistor (10,000 ohms, 3 watts)	33-310639	.30
73	Resistor (9000 ohms, 2 watts)	33-290539	.30
74	Resistor (25,000 ohms, 1 watt)	33-325439	.20
75	Condenser (.1 mfd. tubular)	30-4170	.25
76	Electrolytic Condenser (16 mfd.)	30-2118	1.65
77	Power Transformer 115 V., 50 to 60 cycles	32-7606	6.25
	Power Transformer 115 V., 25 to 40 cycles	32-7607	9.00
	Power Transformer 115/220 V., 50 to 60 cycles	32-7608	8.00
78	Condenser (.015 mfd. dual bakelite)	3793-DG	.40
79	Power & Tone Control Switch	42-1184	.75
80	Range Switch Ant.	42-1227	1.25
81	Range Switch R. F.	42-1228	1.60
82	Range Switch Osc.	42-1229	1.60
	Switch Index Plate & Shaft	42-1186	.50
	Pilot Lamp Assembly	38-7706	.35
	Dial	27-5244	.70
	Hub	28-7187	.12
	Clamp	28-2837	.10
	Set Screw	W-1641	.02
	Gear (Dial)	28-7185	.10
	Gear (Drive)	31-1884	.25
	Thrust Spring	28-8611	.01
	Thrust Washer	28-3976	$0.30 C
	"C" Washer	28-3904	.01
	Mask	27-5240	.30
	Mask Washer	27-8318	.50 C
	Mask Arm & Link Assembly	31-1887	.45
	Mask Guide & Bracket	38-7876	.25
	Indicator & Lens Assembly	31-1900	.30
	Volume Control Shaft	38-8060	.12
	Retaining Clip	28-4394	.01
	Shaft Spring	28 4117	.40 C
	Shield (Tube)	28-2726	.10
	Base (Shield)	28-3898	.03
	Socket 7 prong	27-6057	.11
	Socket 8 prong	27-6058	.11
	Socket rectifier	27-6052	.11
	Terminal Panel (Ant.)	38-7714	.15
	Grommet Mtg. R. F. Unit	27-4317	.04
	Sleeve Mtg. R. F. Unit	27-7807	.50
	Screw Mtg. R. F. Unit	W-729	.45 C
	Rubber Mtg. (Gang Condenser)	27-4325	.02
	Spring Mtg. Shadowmeter	28-8623	.70 C
	Plate Mtg. R. F. Transformer	28-3808	.02
	Spacer Mtg. R. F. Transformer	27-8228	.01
	Screw Mtg. R. F. Transformer	W-1635	.30 C
	Shield (Receiver Bottom)	38-8316	
	Snap Fasteners	28-4279	.75 C
	Cable Speaker	41-3202	.40
	A. C. Cord	L-2183	.40
	Knob (tuning)	27-4330	.10
	Knob (tuning vernier)	27-4331	.10
	Knob (tone & volume)	27-4332	.10
	Knob Range Switch	27-4326	.10
	Receptacle (Shadowmeter)	41-3225	.40
	"B" CABINET		
	Speaker K35	36-1231	7.25
	Baffle & Silk Assembly	40-5975	.40
	Bezel Assembly	40-5946	.75
	Gasket	27-8312	.01
	Screw	W-1644	.50 C
	Glass	27-8299	.06
	Ring	28-3987	.40
	"X" CABINET		
	Speaker H26	36-1238	8.25
	Bezel Assembly	40-5948	.80
	Gasket	27-8313	.01
	Glass	27-8300	.06
	Ring	38-3988	
	Speaker Baffle	16276	.70
	Silk	44-1165	.40

Prices Subject to Change Without Notice

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-665

Electrical Specifications

TYPE CIRCUIT:

Superheterodyne, with a High-Frequency tuning range; covering from 25 to 42 megacycles and a Push-Pull pentode audio output circuit.

POWER SUPPLY:

Voltage	Frequency	Power Consumption
115	50 to 60	130 watts
115	25 to 40	130 watts

Power transformers for the different voltage and frequency ratings are listed in the parts list.

INTERMEDIATE FREQUENCY:
470 K. C.

TUNING RANGES: Four.
Range 1—530 to 1720 K. C.
Range 2—2.3 to 7.4 M. C.
Range 3—7.35 to 22 M. C.
Range 4—25 to 42 M. C.

UNDISTORTED OUTPUT: 7 watts.

PHILCO TUBES USED: Nine.
Two 6K7G; two 6F6G; two 6J5G; one 6A8G; one 6K5G and one 5Y4G.

SPEAKERS: B Cabinet, K35. Part No. 36-1231.
X Cabinet, H26. Part No. 36-1238.

Aerial Connections

To obtain the full advantage of the sensitivity of this receiver the Philco High Efficiency Aerial supplied with the receiver must be used. The connections for the aerial are as follows:

The red and black leads of the High-Efficiency Aerial "transmission line" are connected to terminals 1 and 2 respectively, of the terminal panel provided on the rear of the chassis. Connect the jumper on the terminal panel across terminals 3 and 4.

If a temporary aerial is used, the jumper should be across terminals 2 and 3. The aerial connects to terminal 1 and the ground lead to terminal 3. A good ground connection is desirable in all installations.

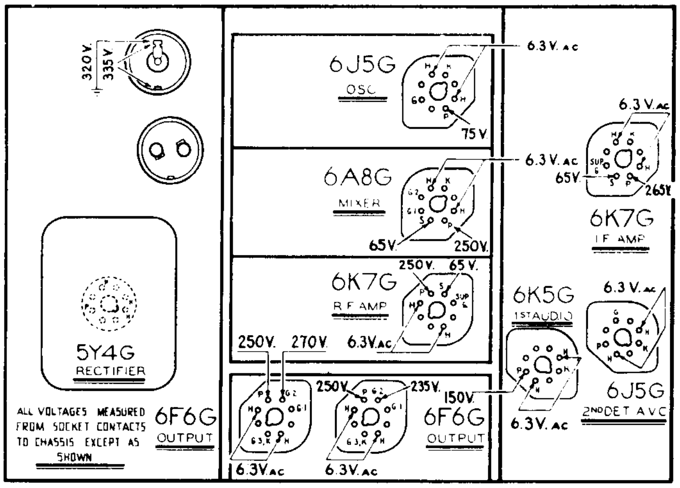
Shadow Meter Adjustment

Remove aerial and allow tubes to warm up. Then adjust shadow meter as follows:

1. Move the shadow meter coil backwards and forwards, until the opposite edges of the shadow are ⅛ of an inch from end of the shadow screen, measuring along the bottom edge of the screen. Adjustment of the shadow meter light bracket may be necessary for perfect centering.

2. Remove the rectifier tube from its socket, and rotate coil until shadow reaches minimum width. This width must not exceed 3/32 of an inch.

3. Replace the 5Y4G rectifier tube in its socket. The shadow should then widen to not more than 3/16 of an inch or less than 1/16 inch from each side of the screen measuring along the bottom edge. If these limits are not obtained readjust the shadow meter as given in paragraphs 1 and 2 until they are reached.



Socket Voltages—Underside of Chassis View

The voltages indicated by arrows were measured with a **Philco 025 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

Dial Calibration

In order to adjust this receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this rotate the tuning control to the extreme counter-clockwise position (maximum capacity). Loosen the set screw of the dial hub, then turn dial until the glowing indicator is centered on the middle index line of dial scale (see Fig. 5). Now tighten the dial hub set screw in this position.

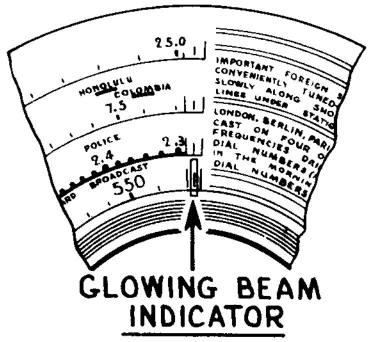
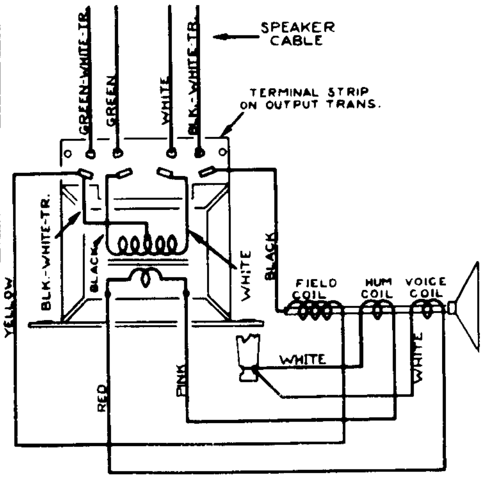


Fig. 5—Dial Calibration

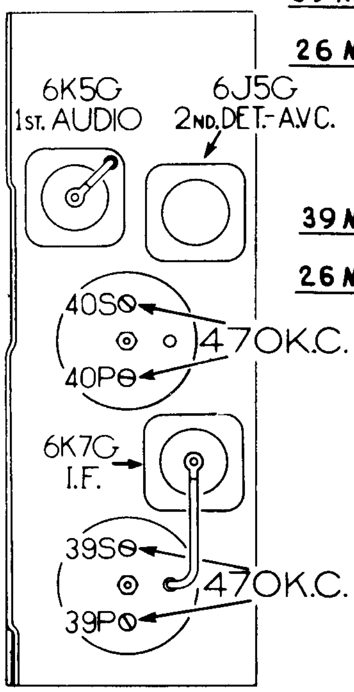
NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

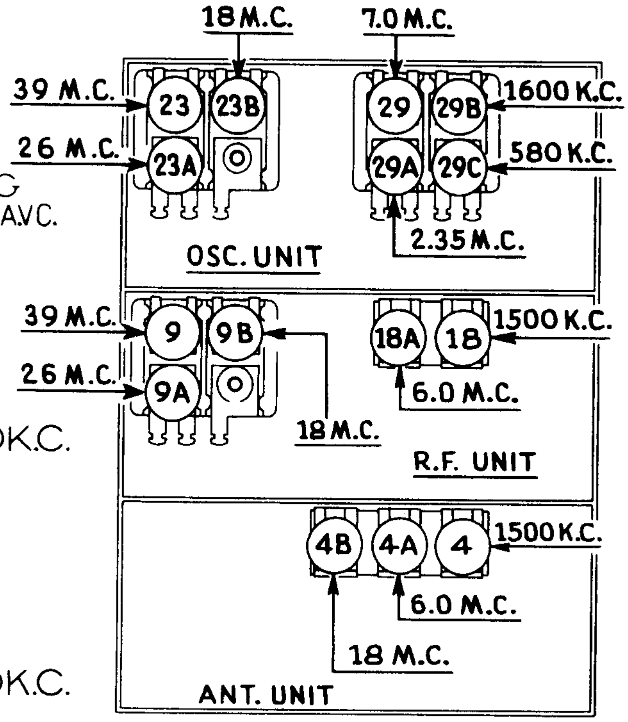
MODEL 37-665



Speaker Wiring, K-35, H-26



I. F. Compensators



R. F. Compensators

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator; Philco **Model 088** (fundamental frequency 110 to 20000 K. C.) is the correct instrument for this purpose; (2) output meter. **Philco Model 025 Circuit Tester** incorporates an accurate, sensitive output meter and is recommended; (3) Fibre handle screw-driver (Philco Part No. 27-7059); (4) Special variable condenser (Philco Part No. 45-2325).

OUTPUT METER: The 025 Output Meter is connected between the plate and cathode prongs of one of the 6F6G tubes. The meter is adjusted to use the (0-30) volt scale.

INTERMEDIATE FREQUENCY CIRCUIT

1. Set controls as follows:
   a. Range switch position one (broadcast)
   b. Receiver dial 580 K. C.
   c. Volume control maximum
   d. Signal generator 470 K. C.
   e. Connect the 088 signal generator output lead through a .1 mfd. condenser to the control grid of the 6A8G tube and the generator ground connection to the chassis.
2. Adjust the following I. F. compensators for maximum output: (39P), (39S), (40P) and (40S).

RADIO FREQUENCY CIRCUIT

Tuning Range (28 to 42 M. C.)

1. Set controls as follows:
   a. Range switch position 4
   b. Connect the signal generator output lead and ground to terminals 1 and 3 respectively on the aerial input panel. Terminals 2 and 3 must be connected with the shorting link provided on the aerial panel.
2. Adjust compensators as follows for maximum output:

Signal Generator	Receiver Dial	Compensators in Order
13 M. C.	39 M. C.	(23) Check image signal at 38.06 on the Receiver Dial. (See Note A)
13 M. C.	39 M. C.	(9) Roll gang
13 M. C.	26 M. C.	(23A)
13 M. C.	26 M. C.	(9A)
13 M. C.	39 M. C.	(23) check image (Note A)
13 M. C.	39 M. C.	(9) Roll gang

Tuning Range 7.35 to 22 M. C.

1. Set controls and adjust compensators for maximum output as follows:
   Range Switch Position 3.

Signal Generator & Receiver Dials	Compensators in Order
18 M. C.	(23B) check image 17.06 M. C.
18 M. C.	(9B), (4B) use shunt condenser on (23B) See Note B

Tuning Range 2.3 to 7.4 M. C.

1. Range Switch Position 2
2. Signal Generator & Receiver Dials / Compensators in Order

Signal Generator & Receiver Dials	Compensators in Order
7.0 M. C.	(29), (18A), (4A)
2.35 M. C.	(29A)
7.0 M. C.	(29)
6.0 M. C.	(18A), (4A)

Tuning Range 530 to 1720 K. C.

1. Range Switch Position 1
2. Signal Generator & Receiver Dials / Compensators in Order

Signal Generator & Receiver Dials	Compensators in Order
1600 K. C.	(29B), (18), (4)
580 K. C.	(29C) Roll gang
1600 K. C.	(29B)
1500 K. C.	(18), (4)

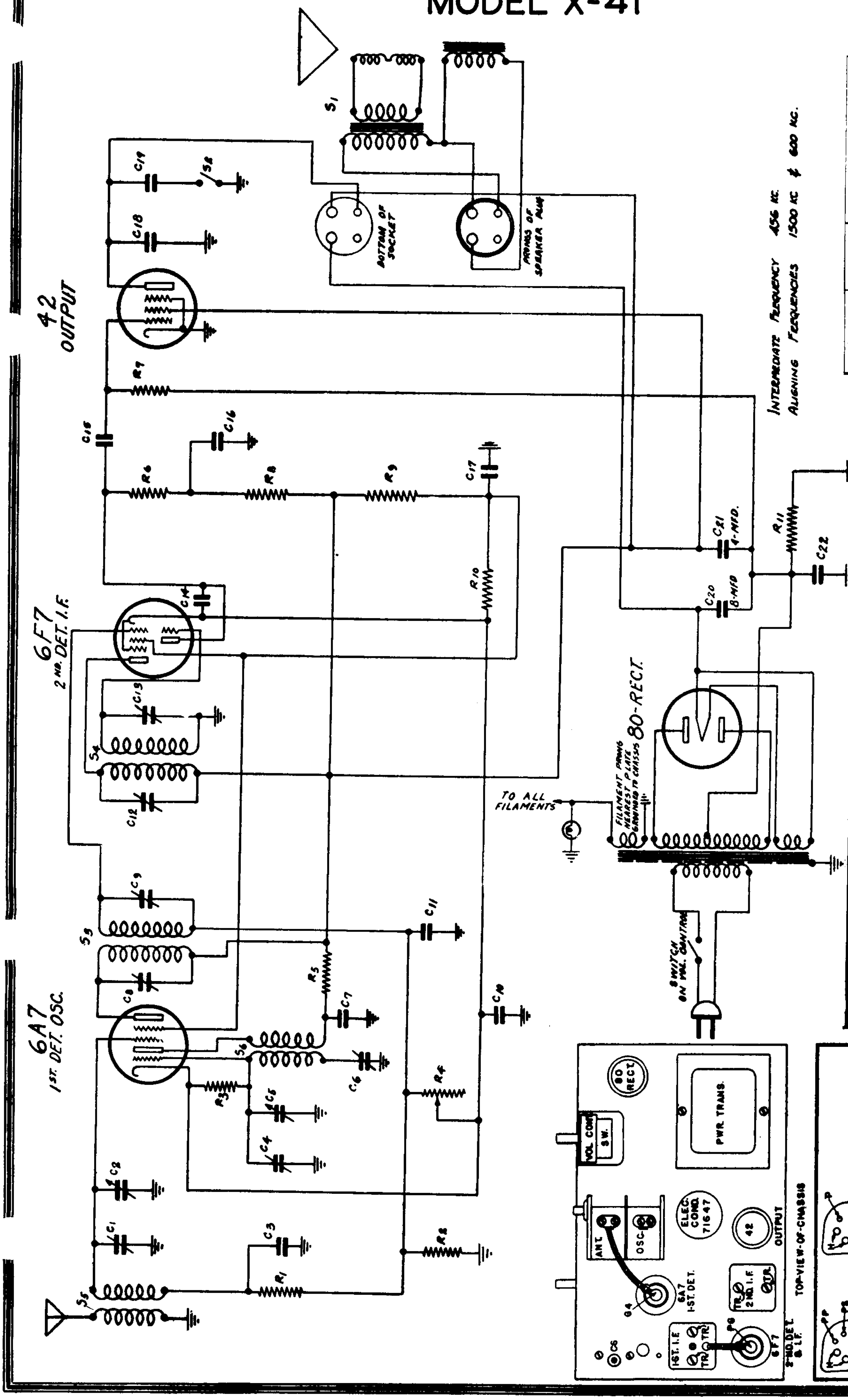
NOTE "A"—To accurately adjust the compensator to the fundamental and not the image signal, turn the oscillator compensator to the maximum capacity position clockwise. Then slowly turn the compensators counter-clockwise until a second maximum peak is obtained on the output meter. The first peak is the image signal and the receiver must not be adjusted to it. If the above procedure is correctly performed, the image signal will be found 940 K. C. below the frequency being used on any high frequency band.

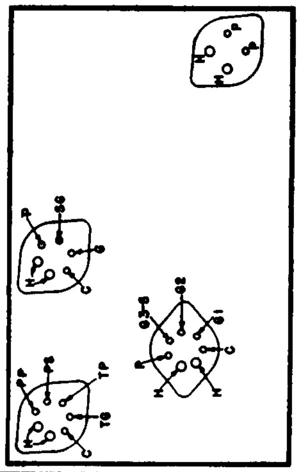
NOTE "B"—To eliminate the effect of the Ant. and R. F. compensators detuning the Osc. circuit, a variable tuning condenser, Philco Part No. 43-2325 is connected from the oscillator compensators to ground when designated in the padding instruction above. Tune the added condenser from the minimum capacity position until the second harmonic of the receiver oscillator beats against the signal from the generator, resulting in a maximum indication on the output meter. Then adjust compensators as noted for maximum output.

NOTE: See page 237 before servicing this set.

PILOT RADIO CORPORATION

MODEL X-41





INTERMEDIATE FREQUENCY 456 KC.
ALIGNING FREQUENCIES 1500 KC & 600 KC.

CONDENSERS

DESIGNATION	PART NO.	DESCRIPTION
C1, C4		TRIMMERS IN GANG COND.
C2, C5	71646	2 GANG COND.
C3 C11 C17	22055-M	.1-200 V. PAPER TUBULAR
C6	71505-A	250-500 MMFD. PADDER
C7 C15	22055-C	.05-600V. PAPER TUBULAR
C8 C9		TRIMMERS IN 1ST. I.F. TRANS.
C12 C13		TRIMMERS IN 2ND. I.F. TRANS.
C10	22056-F	.25-200V. PAPER TUBULAR
C14	27726	.0002 MFD. MICA
C16	22055-AB	.1-600V. PAPER TUBULAR
C18	22055-U	.01-1000 V. PAPER TUBULAR
C19	22055-V	.03-1000 V. PAPER TUBULAR
C20 - C21	71647	4-8 MFD. 450V. ELEC. COND.
C22	22055-5	.5-200V. PAPER TUBULAR

RESISTORS

DESIGNATION	PART NO.	DESCRIPTION
R1	13031	100,000 .25 WATT
R2	19028	1,000-OHMS .25 WATT
R3 R8	13164	50,000 OHMS .25 WATT
R4	71656	VOL. CONTROL & SW. 7000 OHM WIRE 150 Ω MIN.
R5 R10	19074	20,000-OHMS .25 WATT
R6	13171	250,000-OHMS .25 WATT
R7	19072	750,000-OHMS .25 WATT
R9	13126	25,000-OHMS .5 WATT
R11	13054	250-OHMS 1 WATT

MISC.

DESIGNATION	PART NO.	DESCRIPTION
S1	40775	SPEAKER 1400 OHM FIELD
S2	71657	TONE CONTROL SWITCH
S3	70936-4	1ST I.F. TRANS.
S4	70937-4	2ND. I.F. TRANS.
S5	71685	ANT. COIL
S6	71701	OSC. COIL

PILOT RADIO CORPORATION
MODEL X-41

Range: 170 Meters—550 Meters (1,770 kc.—545 kc.)

HOW TO OPERATE THE PILOT X41

1. Examine the label on the rear of the chassis to make sure that the voltage and frequency are correct for the power supply in your home.
2. Connect the blue wire at the rear of the chassis to your antenna. For best results use an antenna of the type described in the PILOT antenna instruction sheet. If you are not experienced in erecting antennas, we strongly advise having this done by your radio service man. Good results can be obtained from a single wire about fifty feet long, and as high above surrounding objects as possible.
3. Connect the clip at the rear of the chassis to the ground. This lead should be as short as possible, connected to the nearest water pipe.
4. When the connections have been made, switch on the set by turning the left-hand knob clockwise. This is the volume control knob as well as the line switch On the right is the tuning knob for the compass dial and at the center, the Tone Control.
5. When tuning in a station, be very careful to adjust the dial to the center of the response with the volume control set at the lowest position that will give sufficient volume. Unless that is done, the tone will be distorted.
6. If signals from local stations are loud enough to overload the speaker, reducing the volume slightly will clear up the tone.

NOTE: This PILOT set, in design, the quality of the materials, and the workmanship, is a fine musical instrument. It deserves careful treatment. Protect it from excessive dampness and from dry heat. Have it inspected and have the tubes checked twice a year by your radio dealer, to assure the maintenance of its fine musical quality.

SERVICE INFORMATION

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the slip-on knobs and felt washers from the controls on the front panel.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require realignment, the procedure outlined below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

I. F. ALIGNMENT: When aligning the intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The tuning condenser should be set at maximum capacity. Connect the antenna lead of the external oscillator to the control grid of the type 6F7 tube in the I. F. Amplifier stage through a 0.1 mfd. fixed condenser. Connect the ground lead of the external oscillator to the receiver ground clip. The I. F. alignment capacitors are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator leads from the type 6F7 I. F. Amplifier tube and connect it in the same manner to the control grid at the top of the type 6A7 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. Amplifier, it is essential to repeat the alignment process in both I. F. units with the external oscillator leads connected across the control grid of the 6A7 tube.

BROADCAST ALIGNMENT: After the I. F. Amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads, this time with a .0002 mfd. condenser in the antenna lead. Adjust the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response. Adjust the signal section trimmer in the same manner.

Next adjust the 600 kc. padder condenser. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

VOLTAGES MEASURED AT TUBE SOCKETS

	Det. Osc. 6A7	Amp. Det. 6F7	Audio Output 42	Rectifier 80
PLATE	220	220	210	335 Volts D.C. from Filament to transformer center tap.
SCREEN	66	66	237	
CATHODE	18	18	*16	
FILAMENT	6.3	6.3	6.3	4.9

Plate and screen voltages measured to cathode.
Cathode voltages measured to chassis frame.

Speaker field volts—85 volts.
Anode grid of 6A7—150 volts.
Triode plate of 6F7—95 volts.

***Measured across 250 ohm resistor, R-11.**
Measurements made with voltmeter of 1,000 ohms per volt.

RCA MANUFACTURING COMPANY, Inc.

MODEL U-103

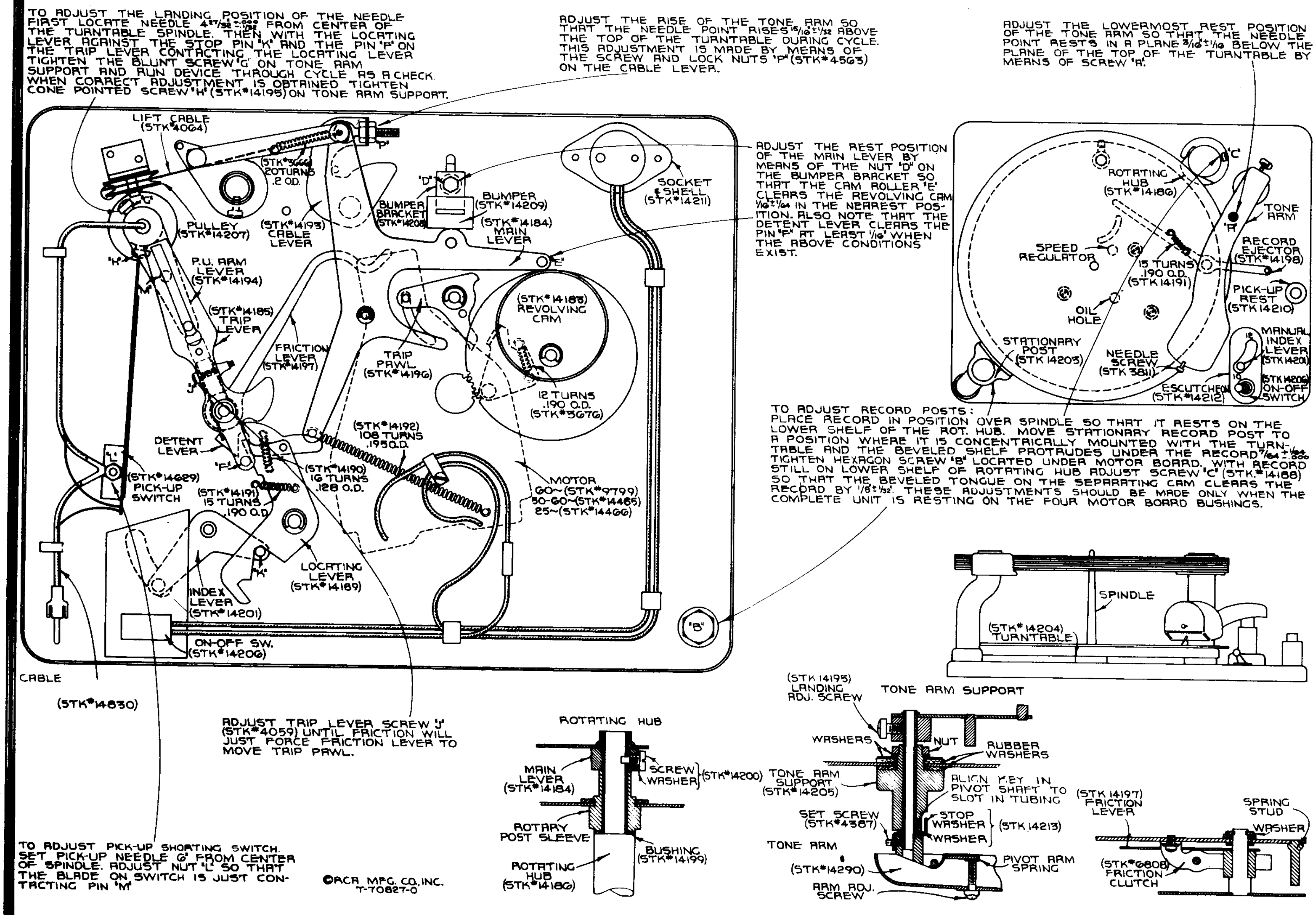
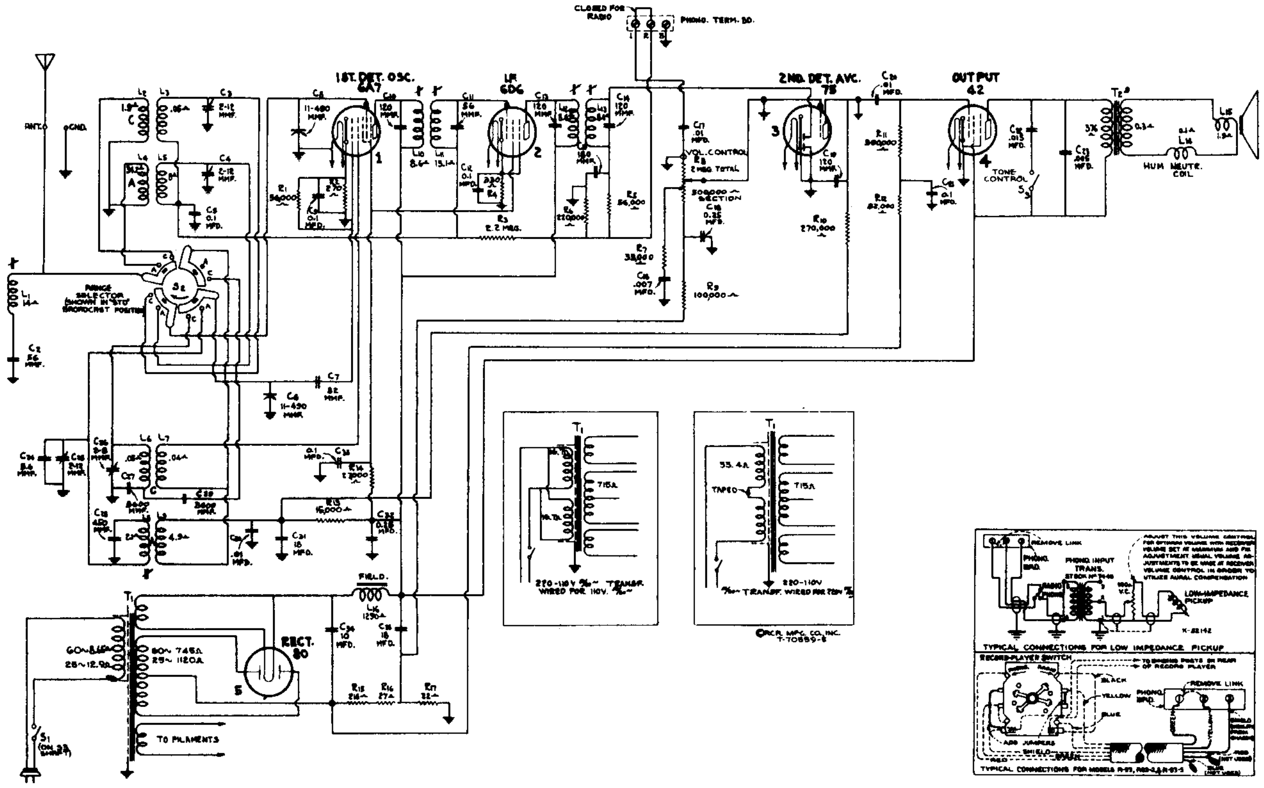
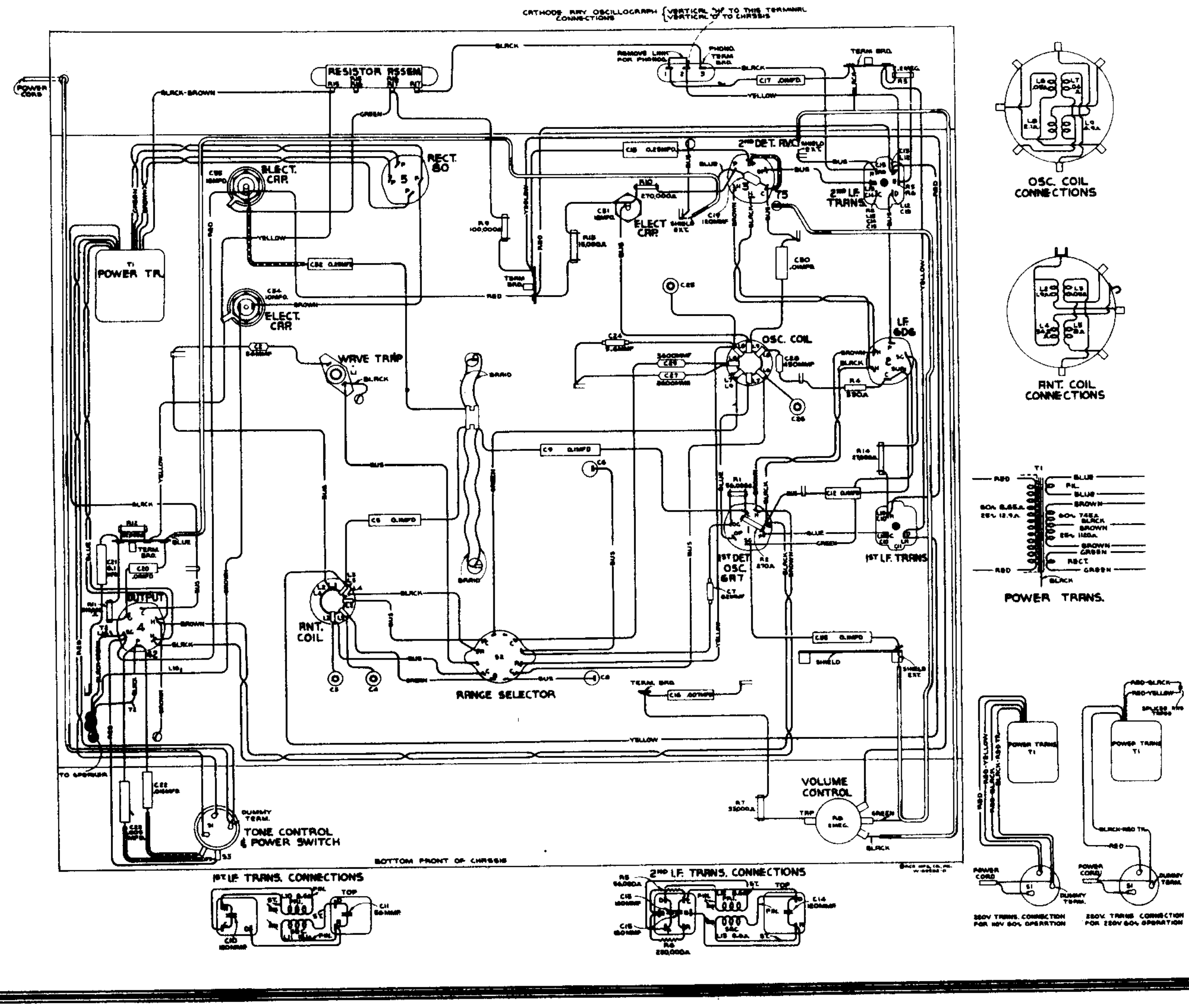


Figure 4—Automatic Record Changer Adjustments
(Model U-103)

RCA MANUFACTURING COMPANY, Inc.
MODEL 5T5





RCA MANUFACTURING COMPANY, Inc.
MODEL 5T5

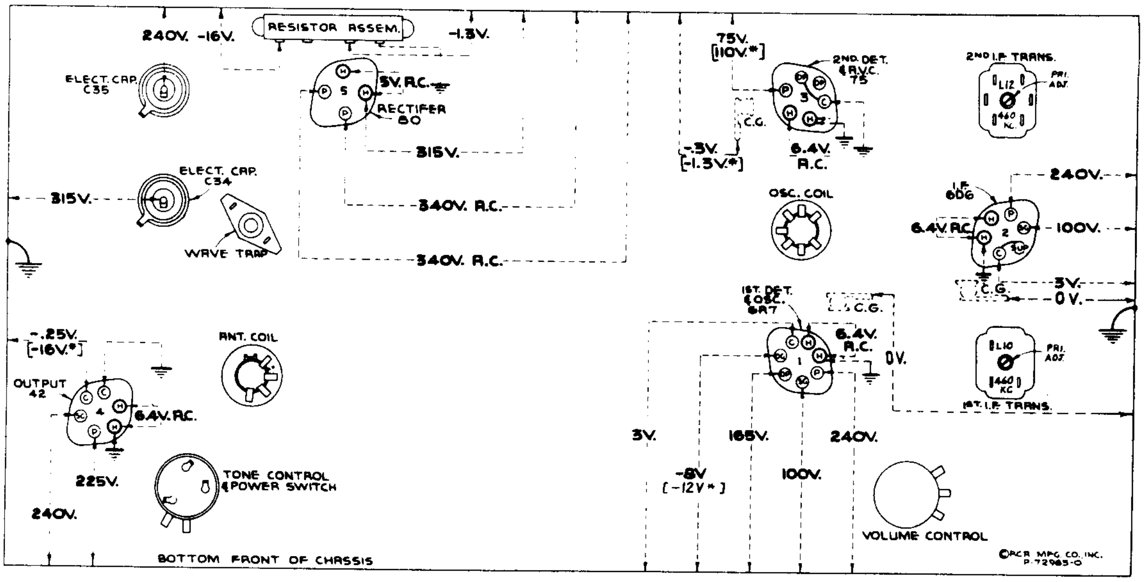


Figure 6—Radiotron Socket Voltages, Coil and Trimmer Locations.

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard broadcast")—

Radiotron Socket Voltages

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.

The voltage values indicated from the Radiotron socket contacts, grid caps, resistors, and terminals to receiver chassis ground on figure 6 will assist in locating cause of faulty operation. Each value as specified should hold within ± 20% when the receiver is normally operative at its rated line voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

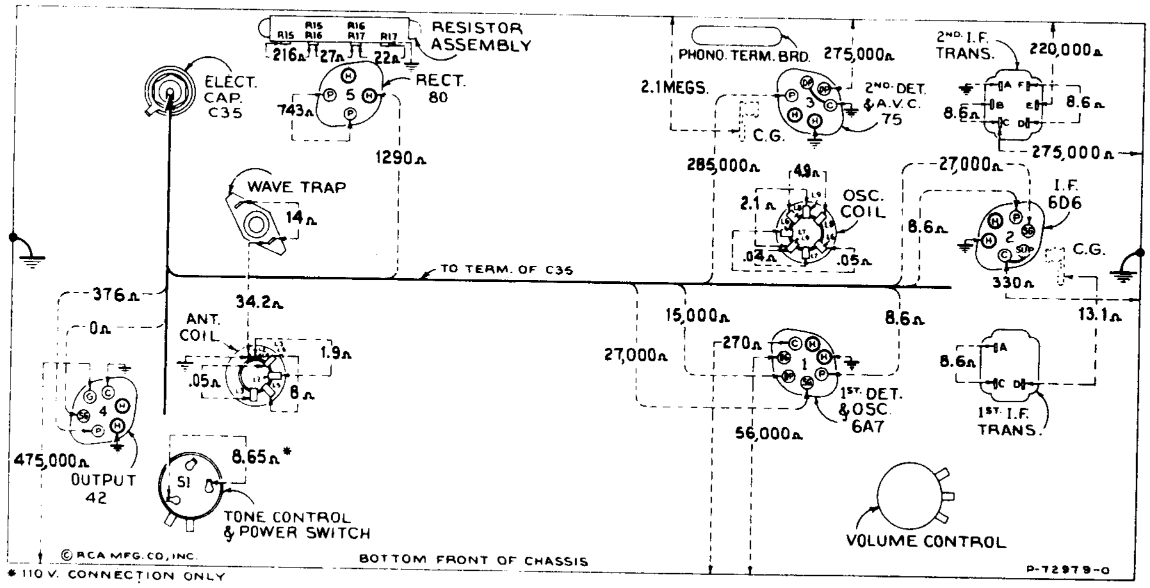


Figure 4—Resistance Diagram

Resistance Measurements

The resistance values shown between Radiotron socket contacts, grid caps, resistors, and terminals to receiver chassis-ground or other pertinent point on figure 4, permit a rapid continuity check of the circuits. The use of this diagram in conjunction with the Schematic Circuit Diagram, figure 1, and Wiring Diagram, figure 2, will permit the location of certain troubles which might otherwise be difficult to ascertain. Each value as specified should hold within ± 20%. Variations in excess of this limit will usually be indicative of trouble in circuit under test. When measuring the resistance between points of the circuit and ground, it will be necessary to connect the negative terminal of the resistance meter to the chassis-ground. If the polarity of the resistance meter is not known, it may be readily ascertained by connecting a d-c voltmeter of indicated polarity across the terminals of the device.

RCA MANUFACTURING COMPANY, Inc.

MODEL 5T5

Electrical Specifications

FREQUENCY RANGES
"Standard broadcast" (A) .... 530-1,900 kc
"Short wave" (C) .... 5,800-21,600 kc

ALIGNMENT FREQUENCIES
"Standard broadcast" (A) .... 600 kc (osc.), 1,700 kc (osc., ant.)
"Short wave" (C) .... 20,000 kc

Intermediate Frequency .... 460 kc

RADIOTRON COMPLEMENT
(1) RCA-6A7 .... First Det.—Oscillator
(2) RCA-6D6 .... Intermediate Amplifier
(3) RCA-75 .. Second Det., A-F Amp. and A.V.C.
(4) RCA-42 .... Audio Power Amplifier
(5) RCA-80 .... Full-Wave Rectifier

Pilot Lamp (1) .... Mazda No. 46, 6.3 volts, 0.25 ampere

POWER SUPPLY RATINGS
Rating A .... 105-125 volts, 50-60 cycles, 75 watts
Rating B .... 105-125 volts, 25-60 cycles, 75 watts
Rating C .... 100-125/200-250 volts, 50-60 cycles, 75 watts

POWER OUTPUT RATING
Undistorted .... 2.0 watts
Maximum .... 4.5 watts

LOUDSPEAKER
Type .... Electrodynamic
Voice Coil Impedance .... 2.2 ohms at 400 cycles

General Features

This receiver is of the superheterodyne type and has many distinctive features. Its design includes magnetite core adjusted i-f transformers and wave-trap, aural compensated volume control, tone control, resistance-coupled audio system, phonograph terminal board, and an 8-inch dust-proof electrodynamic loudspeaker.

Tuning range includes the "Standard broadcast" (A) and "Short wave" (C) bands. The "Short wave" (C) position of this extensive range includes channels assigned for amateur, and international short-wave broadcast on 49, 31, 25, 19, 16 and 13 meters. Trimming adjustments are located at accessible points. Their number is reduced to the least that is consistent with efficient operation. The tuning dial ratio of 10 to 1, with a 50 to 1 vernier, permits ease of tuning, especially in the "Short wave" band.

Circuit Arrangement

The first-detector and oscillator functions are accomplished in a single tube, an RCA-6A7. The input of this tube is coupled to the antenna through a tuned transformer. A shunt (magnetite core adjusted) wave-trap is connected across the primary of this transformer to prevent signals of intermediate frequency (460 kc) from being introduced into the first stage as interference. A two-section gang condenser tunes the antenna transformer secondary and the heterodyne oscillator coils. These coils are shunted by improved plunger-type, air-dielectric, adjustable trimming capacitors, for obtaining exact alignment.

The intermediate frequency stage is coupled to the RCA-6A7 and to the RCA-75 by means of tuned transformers. These transformers resonate with fixed capacitors and are adjusted by molded magnetite cores to tune to 460 kc.

The modulated signal as obtained from the output of the i-f system is detected by one of the diodes of the RCA-75 tube. Audio frequency secured by this process is passed on to the control grid of this same tube for amplification before final reproduction. The d-c voltage, which results from detection of the signal, is used for automatic volume control. This voltage, which develops across resistor R6, is applied as automatic control grid bias to the first-detector and i-f tubes through a suitable resistance filter.

Manual volume control is effected by means of an acoustically tapered potentiometer connected as a variable coupling element between the output of the second detector and the first audio control grid. After amplification by the RCA-75, the audio signal is transmitted by resistance-capacitance coupling to the input of the RCA-42 power output stage, which, in turn, is transformer-coupled to the dynamic speaker. High-frequency tone control is provided by means of a shunt capacitor across the plate circuit of the output tube, which may be cut in or out of the circuit with a control switch S3.

The power supply system consists of an RCA-80 rectifier tube, power transformer, and filter.

SERVICE DATA

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles, such as L1, C2, R1,

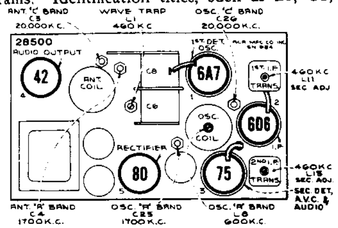


Figure 3—Radiotron, Coil, and Trimmer Locations

etc., are provided for reference between the illustrations and the Replacement Parts List. The coils, reactors, and transformer windings are rated in terms of their d-c resistances only. Ratings of less than one ohm are generally omitted.

Alignment Procedure

There are five alignment trimmers provided in the antenna transformer and oscillator coil tuned circuits. The i-f transformer and wave-trap adjustments are made by means of screws attached to molded magnetite cores. All of these circuits have been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions or altered during servicing. Loss of sensitivity, improper tone quality, and poor selectivity are the usual indications of improper alignment.

The correct performance of this receiver can only be obtained when the aligning has been done with adequate and reliable apparatus. The manufacturer of this receiver has available for sale, through its distributors and dealers, a complete assortment of such service equipment as may be needed for the alignment operation.

A test oscillator, such as the **RCA Stock No. 9595**, is required as a source of the specified alignment frequencies. Visual indication of receiver output during the adjustment is necessary and should be accomplished by the use of an indicator such as the **RCA Stock No. 4317 Neon Output Indicator.**

The procedure outlined below should be followed in adjusting the various trimmer capacitors and molded cores:

I-F Adjustments

The four adjustment screws (attached to molded magnetite cores) of the two i-f transformers (one on top and one on bottom of each i-f transformer) are located as shown by figures 3 and 6. Each circuit must be aligned to a basic frequency of **460 kc.** To do this, attach the output indicator across the loudspeaker voice coil.

Connect the output of the test oscillator to the control grid of the RCA-6A7 through a **.001 mfd.** capacitor. Connect the test oscillator **"Gnd"** terminal to the ground terminal of the receiver chassis. Tune the oscillator to **460 kc.** Advance the receiver volume control to its full-on position and adjust the receiver tuning control to a point, within its range, where no interference is encountered from local broadcast stations or from the local (heterodyne) oscillator. To eliminate signals from the local oscillator short stator of C6 to chassis-ground. Increase the output of the test oscillator until a slight indication is present on the output indicator. Adjust the two magnetite core screws of the second i-f transformer L13 and L12 to produce maximum (peak) indicated receiver output. Then adjust the two magnetite core screws L11 and L10 of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. During these adjustments, regulate the test oscillator output so that the indication is always as low as possible. By doing so, broadness of tuning due to a.v.c. action will be avoided. It is advisable to repeat the adjustment of all i-f magnetite core screws to assure that the interaction between them has not disturbed the original adjustment.

R-F Adjustments

Calibrate the tuning dial by adjusting the scale pointer to the extreme end calibration mark (beyond 55 on dial) while the two-gang tuning condenser plates are in full mesh.

Wave-Trap Adjustment

Attach the output of the test oscillator to the receiver "Antenna" terminal through a **200 mmfd. (important)** capacitor. The ground connections remain connected together. Leave the test oscillator tuned to **460 kc.** Adjust range selector to "Short wave" (C) position. Then adjust the wave-trap screw to the point which causes maximum suppression (minimum received) of the **460 kc** signal.

"Standard Broadcast" Band

(a) Adjust range selector to "Standard broadcast" (A) position. Reduce output of test oscillator to a minimum. Tune the test oscillator to **600 kc** and set receiver dial pointer to **600 kc.** Adjust output of test oscillator until a slight indication of output is visible.

(b) Adjust the oscillator magnetite core screw **L8** (top of oscillator coil) so that maximum (peak) indicated output results.

(c) Set receiver dial pointer to **1,700 kc.** Tune the test oscillator to **1,700 kc.** Carefully adjust the oscillator and antenna trimmers **C25** and **C4** respectively so that each brings about maximum (peak) indicated output.

(d) Tune the test oscillator to **600 kc.** Adjust the receiver to pick up this signal disregarding the dial reading at which it is best received. Adjust oscillator magnetite core screw **L8** (top of oscillator coil) for maximum (peak) output while rocking gang tuning condenser. After completing this adjustment, the trimmers **C25** and **C4** should be re-adjusted as in (c) to correct for any change in the oscillator high-frequency tuning which has been caused by the preceding adjustment.

"Short-Wave" Band

(e) Connect the "Ant." output of the test oscillator to the "Antenna" terminal through a **300-ohm** resistor, leaving the "Gnd." of the oscillator connected to the receiver chassis.

(f) Adjust range selector to its "Short wave" (C) position. Set receiver dial pointer to **20,000 kc.**

Tune test oscillator to **20,000 kc.** Set oscillator trimmer C26 to minimum capacity (plunger full out), and antenna trimmer C3 to maximum capacity (plunger full in). Slowly push in oscillator trimmer C26 until maximum (peak) output is reached. Two peaks may be found. Adjust C26 to the peak with minimum capacity (plunger near out) for maximum indication. Tighten lock nut. Slowly pull out plunger of antenna trimmer C3 until maximum (peak) indicated output is reached while slightly rocking the gang tuning condenser back and forth through the signal. Two peaks may be found with this circuit. The peak with maximum capacity (plunger near in) should be used. Tighten lock nut.

Radiotron Plate Current Readings

Measured with Milliammeter Connected at Tube Socket Plate Terminals Under Conditions Similar to Those of Voltage Measurements

(1) RCA-6A7—1st Det.—Osc.	11.0 ma.
(2) RCA-6D6—I. F. Amp.	10.0 ma.
(3) RCA-75—2nd Det., A.V.C. and A. F.	0.22 ma.
(4) RCA-42—Power Amp.	42.0 ma.
(5) RCA-80—Rectifier	—

Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed by softening its cement with a very

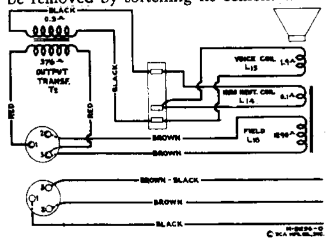
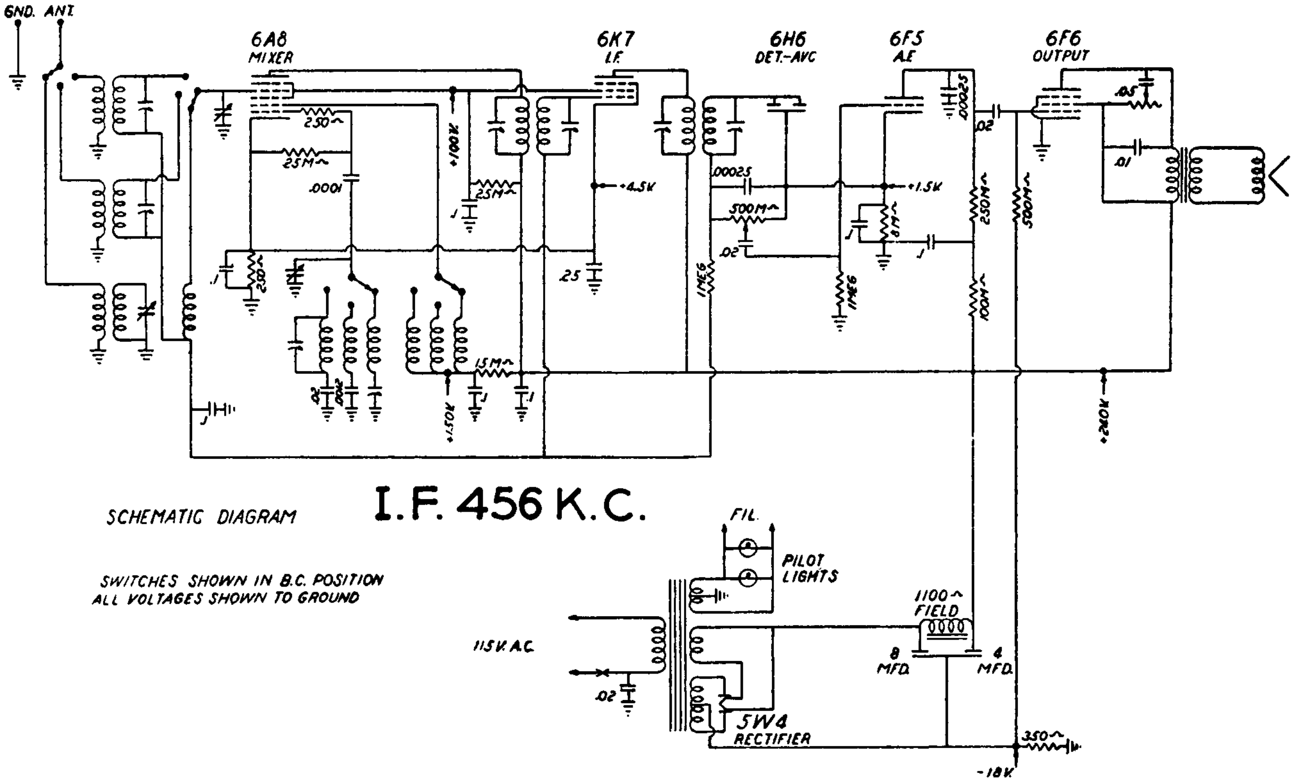


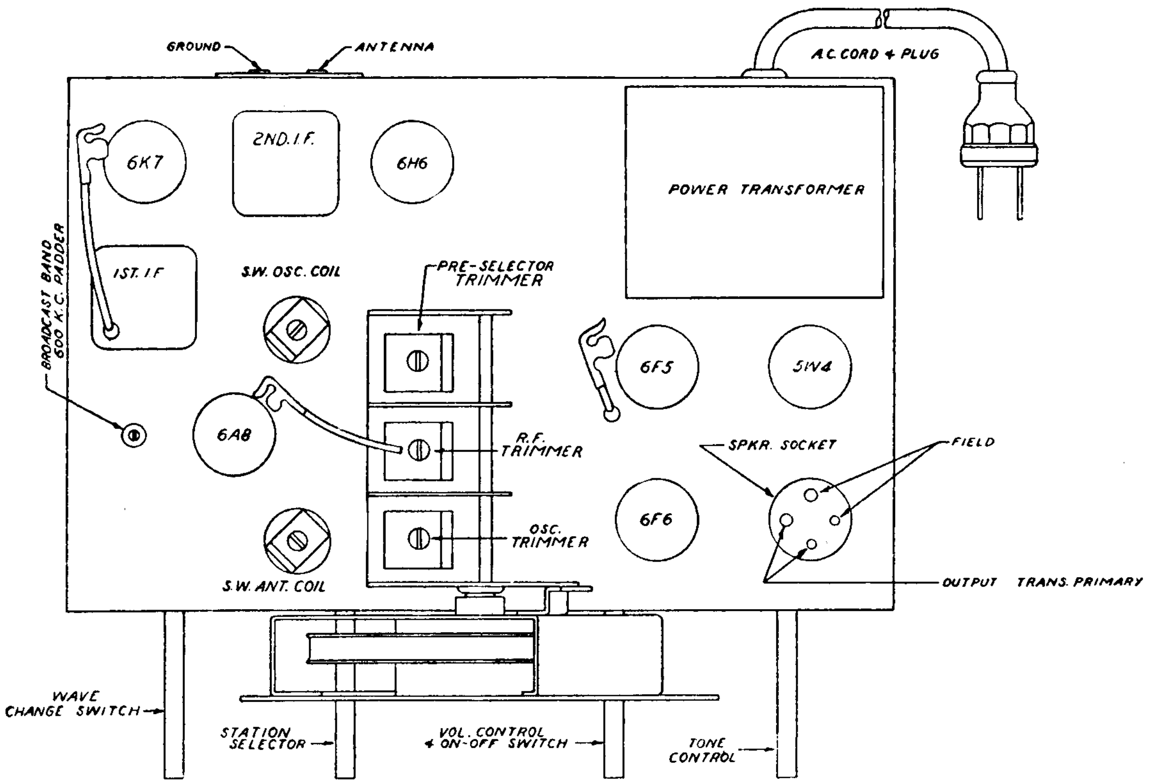
Figure 5—Loudspeaker Wiring

light application of acetone, using care not to allow the acetone to flow down into the air gap. The dust cover may be cemented back in place with ambroid upon completion of adjustment.

RADOLEK COMPANY

MODEL K16,756





This receiver is designed to operate over three tuning ranges. The broadcast range which extends from 545 to 1715 Kilocycles (KC) (175 to 550 meters), Police and Aviation Band which extends from 1715 to 5350 Kilocycles (KC) (56 to 175 Meters) and the International Short Wave Band which extends from 5760 to 16200 Kilocycles (KC) (18.5 to 52 meters). This short wave range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

RADOLEK COMPANY
MODEL K16,756
ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1800, 4000, 6000, and 14,000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tubes (6L7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all six I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the rear gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the center and front trimmers of the gang condenser to peak. The front gang section tunes the R.F. or grid coil of the 6A8 tube and the center condenser section tunes the pre-selector stage circuit.

Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R.F. section. The padding condenser is located on the right hand end of the chassis near the 6K7 tube.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment whon adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Bands.

FOREIGN BAND The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coil located on the top of the chassis. Set the test oscillator to 14,000 KC. The oscillator coil is located near the 1st I.F. Transformer and the antenna or R.F. coil is located directly in front of the Short Wave oscillator coil and about midway between the 1st I.F. Transformer and the 6A7 tube. These two trimmers should be adjusted for peak at 14,000 KC and as the inherent design of the circuit has been expressly designed for simplicity in servicing, no other adjustments are necessary for aligning this band. **Note:** Always start this procedure by having the oscillator coil trimmer loose (out all the way), and the antenna coil trimmer fairly tight (in all the way); otherwise it is possible to make a false alignment on the image frequency.

Important: Do not attempt any adjustment of the gang condenser trimmers in aligning the Foreign Band as this will throw the Broadcast Band out of alignment.

POLICE BAND There is only one adjustment to be made in the alignment of the Police Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary.

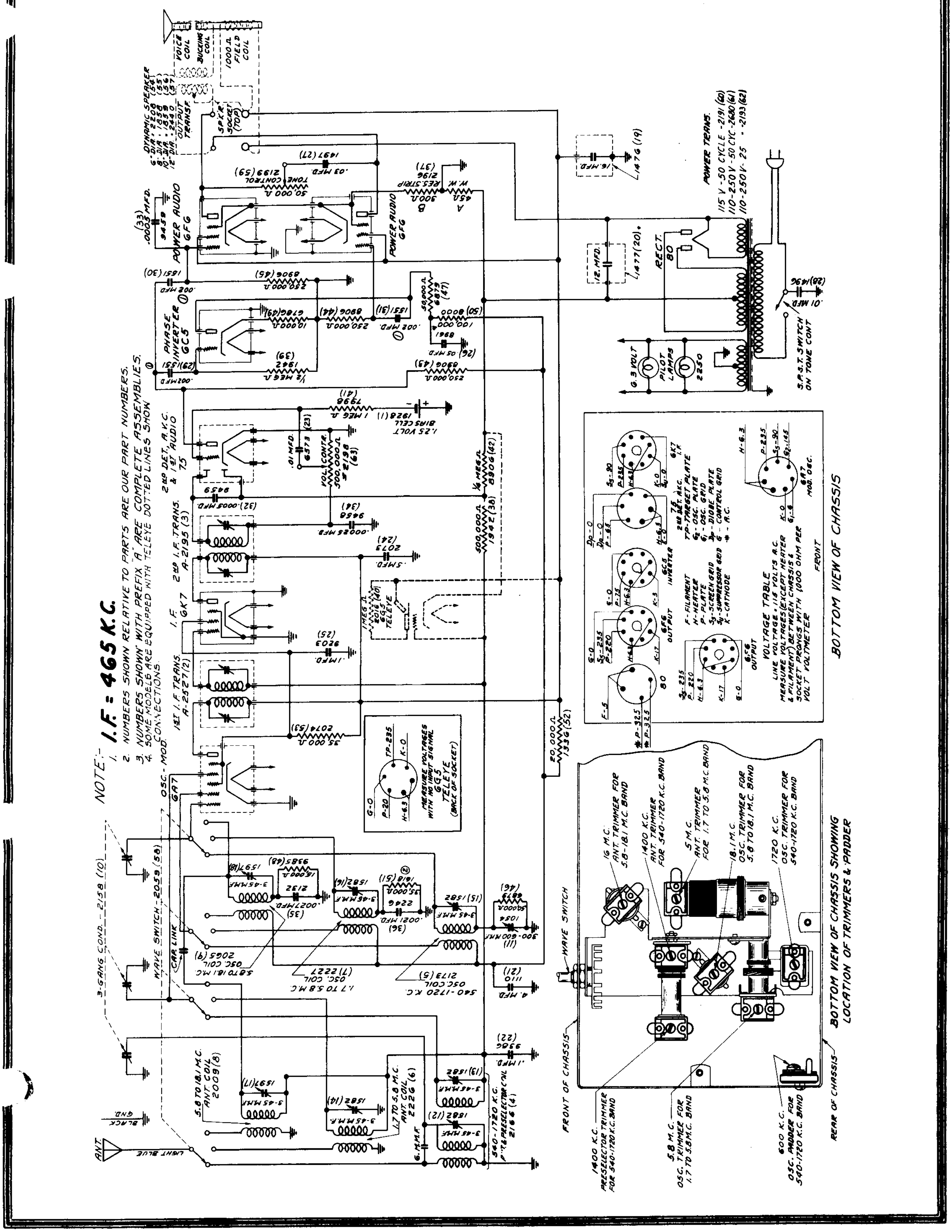
Set the dial pointer to 4000 KC (also the test oscillator) and adjust the antenna coil trimmer to resonance. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment. The two police band coils are under the chassis and the antenna coil trimmer is mounted on the end of the antenna coil.

Important: This is the only adjustment necessary for the Police Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Police Band, otherwise the Broadcast Band will be thrown out of alignment.

PARTS LIST

Part No.	DESCRIPTION	LIST PRICE
P950	Electrolytic Condenser	1.50
P934	Volume Control & "On-Off" Switch	1.10
P994	Wave Change Switch	.75
P995	Tone Control	1.00
P173	Oscillator Coil	.50
P176	A. C. Plug & Cord	.35
P990	Power Transformer	4.00
P987	3 Gang Condenser	4.00
P189	1st I. F. Transformer	1.20
P190	2nd I. F. Transformer	1.20
P678	Pre-Selector Coil	.85
P617	Padding Condenser	.40
G560	Short Wave Antenna Coil	.50
G561	Short Wave Oscillator Coil	.50
G562	Police Band Antenna Coil	.45
G563	Police Band Oscillator Coil	.45
P170	350 Ohm Resistor	.20
P136	250 Ohm 1/4 Watt Resistor	.10
P168	8,000 Ohm 1/4 Watt Resistor	.10
P258	15,000 Ohm 1/4 Watt Resistor	.10
P166	25,000 Ohm 1/4 Watt Resistor	.10
P165	25,000 Ohm 1 Watt Resistor	.20
P280	100,000 Ohm 1/4 Watt Resistor	.10
P139	250,000 Ohm 1/4 Watt Resistor	.10
P137	500,000 Ohm 1/4 Watt Resistor	.10
P162	1 Megohm 1/4 Watt Resistor	.10
P143	.02 Mfd. 400 Volt Condenser	.20
P142	.1 Mfd. 200 Volt Condenser	.20
P276	.1 Mfd. 400 Volt Condenser	.20
P141	.25 Mfd. 200 Volt Condenser	.20
P147	.00025 Mica Condenser	.20
P334	.05 Mfd. 400 Volt Condenser	.20
P335	.01 Mfd. 600 Volt Condenser	.20
P478	.0012 Mfd. 200 Volt Condenser	.20
P182	Speaker Output Transformer	1.00
G573	8 Speaker Cone Only	.45
G564A	8" Spider & Voice Coil Unit Complete	.50
G725	8 Dynamic Speaker with B. C.	6.00
G965	Dial & Scale-Complete	2.00
P938	Dial Glass	.25
P124	Pilot Light	.20
P634	Knob	.15

RADOLEK COMPANY
MODELS K16,770, K16,771 & K16,772

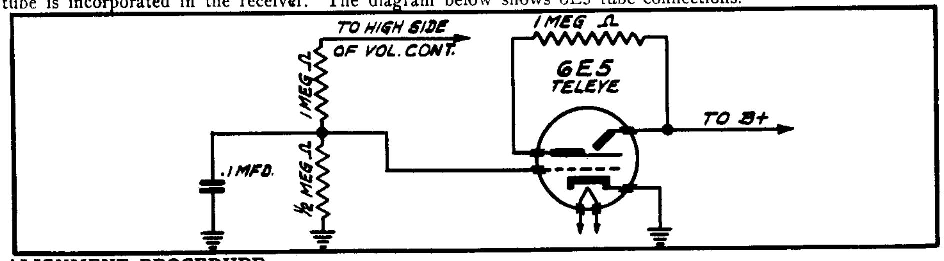


RADOLEK COMPANY

MODELS K16,770, K16,771 & K16,772

NOTE:

Some of these model receivers were equipped with "Teleye" the cathode ray visual tuning indicator. A 6E5 tube was used in early production models, which was replaced by a 6G5 tube in later production. The parts and connections shown in the dotted lines on the complete circuit diagram are used only when a 6G5 "Teleye" tube is incorporated in the receiver. The diagram below shows 6E5 tube connections.



ALIGNMENT PROCEDURE:

Realignment of this receiver should never be necessary unless one of the oscillator, antenna, or I. F. coils has been replaced. Lack of sensitivity, selectivity, and poor tone quality may be due to any one or a combination of causes, such as weak or defective tubes or speaker, inadequate or excessively long antenna, open or grounded bias resistor, bypass condenser, etc. Under no circumstances should realignment be attempted until all other possible sources have been first thoroughly investigated and have been definitely proven not to be the cause.

If an I. F. tube is replaced it is advisable to realign the I. F. Amplifier particularly if the replacement tube is one of a different manufacture than the one in the receiver. It is important when aligning to carefully follow the procedure in the order given, otherwise the receiver will lack sensitivity and the dial calibration will be incorrect.

IT IS IMPERATIVE THAT AN ACCURATELY CALIBRATED OSCILLATOR BE USED WITH SOME TYPE OF OUTPUT MEASURING DEVICE.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the test oscillator output to the control grid of the 6D6 modulator tube through a .02 Mfd. condenser. Leave the grid cap connected to the grid terminal of the tube, and connect the ground side of the test oscillator to the receiver ground.

2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).

3. Align the second intermediate transformer by turning one of the trimmer screws accessible through holes in the top of the transformer shields up and down (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screw of the same transformer for maximum sensitivity.

4. Adjust the first intermediate transformer in the same manner as the second I. F. transformer.

TO ALIGN THE VARIABLE CONDENSER:

It is important when aligning the gang condenser, padding and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The padding and trimmer condensers located underneath the chassis will be referred to by their function as indicated on the circuit diagram.

1. Connect the high output side of the test oscillator through a 400 ohm resistor to the receiver antenna lead and the low side to the set ground.

2. Place the band selector switch for operation on the 5.8 to 18.1 megacycle band, tune the receiver dial, and set the test oscillator frequency to EXACTLY 18.1 MEGACYCLES.

Tune in the 18.1 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 18.1 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER at 18.1 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 18.1 megacycles always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 18.1 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 17.1 megacycles, and if the fundamental peak was used in aligning at 18.1 megacycles the test oscillator signal will be heard at approximately 17.1 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 18.1 megacycle oscillator trimmer must be properly re-adjusted.

3. With band selector switch set for operation on 5.8 to 18.1 megacycle band tune the receiver dial and set test oscillator frequency to EXACTLY 16 MEGACYCLES. Adjust 16 megacycle antenna trimmer for maximum 16 megacycle signal sensitivity.

4. Place band selector switch for operation on 1.7 to 5.8 megacycle band, tune the receiver dial, and set test oscillator frequency to EXACTLY 5.8 MEGACYCLES. BRING IN 5.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT by adjusting 5.8 megacycle oscillator trimmer.

5. With the band selector switch set for operation on the 1.7 to 5.8 megacycle band tune receiver dial and set test oscillator frequency to EXACTLY 5 MEGACYCLES. Then adjust 5 megacycle antenna trimmer for maximum 5 megacycle signal sensitivity.

6. Replace the 400 ohm resister in series with test oscillator lead with a 200 Mmfd. condenser, place the band selector switch for operation on the 540 to 1720 kilocycle band, tune receiver dial, and set test oscillator frequency to EXACTLY 1720 KILOCYCLES. NEXT BRING IN THE 1720 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1720 KILOCYCLE OSCILLATOR TRIMMER.

7. With band selector switch placed for operation on the 540 to 1720 kilocycle band set test oscillator frequency and receiver dial to EXACTLY 1400 KILOCYCLES. Adjust 1400 kilocycle preselector and antenna trimmers for maximum 1400 kilocycle signal sensitivity.

8. Leave band selector switch for operation on 540 to 1720 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator padder for maximum sensitivity.

Illus. No.	Part No.	Part Name	Description	Price
1	1928	Cell	Bias 1.25 Volt	$ .22
2	2527	Coil	1st I.F. Transformer	1.65
3	2195	Coil	2nd I.F. Transformer	1.65
4	2166	Coil	Antenna & Preselector (540-1720 KC)	1.30
5	2173	Coil	Oscillator (540-1720 K.C.)	.65
6	2226	Coil	Antenna (1.7-5.8 M.C.)	.70
7	2227	Coil	Oscillator (1.7-5.8 M.C.)	.55
8	2009	Coil	Antenna (5.8-18.1 M.C.)	.60
9	2065	Coil	Oscillator (5.8-18.1 M.C.)	.65
10	2158	Condenser	3 Gang Tuning	3.60
11	1054	Condenser	Padding (200-600 MMF)	.55
12	1582	Condenser	Trimmer (3-45 M.M.F.)	.21
13	1582	Condenser	Trimmer (3-45 M.M.F.)	.21
14	1582	Condenser	Trimmer (3-45 M.M.F.)	.21
15	1582	Condenser	Trimmer (3-45 M.M.F.)	.21
16	1582	Condenser	Trimmer (3-45 M.M.F.)	.21
17	1597	Condenser	Trimmer (3-45 M.M.F.)	.21
18	1597	Condenser	Trimmer (3-45 M.M.F.)	.21
19	1476	Condenser	Wet Electrolytic (16 Mfd.)	1.40
20	1477	Condenser	Wet Electrolytic (12 Mfd.)	1.25
21	1110	Condenser	Dry Electrolytic (4 Mfd.)	1.14
22	9386	Condenser	Tubular .1 Mfd. 200 Volt	.19
23	6573	Condenser	Tubular .01 Mfd. 200 Volt	.17
24	2073	Condenser	Tubular .5 Mfd. 400 Volt	.56
25	9203	Condenser	Tubular .1 Mfd. 400 Volt	.20
26	8961	Condenser	Tubular .05 Mfd. 400 Volt	.19
27	1497	Condenser	Tubular .03 Mfd. 600 Volt	.19
28	1496	Condenser	Tubular .01 Mfd. 600 Volt	.18
29	1551	Condenser	Tubular .002 Mfd. 600 Volt	.18
30	1551	Condenser	Tubular .002 Mfd. 600 Volt	.18
31	1551	Condenser	Tubular .002 Mfd. 600 Volt	.18
32	9459	Condenser	Moulded .0005 Mfd.	.21
33	9459	Condenser	Moulded .0005 Mfd.	.21
34	9458	Condenser	Moulded .00025 Mfd.	.21
35	2132	Condenser	Moulded .0027 Mfd. + 3%	.21
36	2246	Condenser	Moulded .0021 Mfd. ∓ 3%	.28
37	2196	Resistor	Wire Wound (45 Ohm & 300 Ohm)	.30
38	1942	Resistor	Carbon 500,000 Ohm 1/3 Watt Ins.	.19
39	1942	Resistor	Carbon 500,000 Ohm 1/3 Watt Ins.	.19
40	2016	Resistor	Carbon 1 Meg Ohm 1/3 Watt Ins.	.19
41	7998	Resistor	Carbon 1 Meg Ohm 1/3 Watt Ins.	.19
42	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt	.19
43	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt	.19
44	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt	.19
45	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt	.19
46	6879	Resistor	Carbon 50,000 Ohm 1/3 Watt	.19
47	6879	Resistor	Carbon 50,000 Ohm 1/3 Watt	.19
48	9385	Resistor	Carbon 15,000 Ohm 1/3 Watt	.19
49	6786	Resistor	Carbon 10,000 Ohm 1/3 Watt	.19
50	8000	Resistor	Carbon 100,000 Ohm 1/3 Watt	.19
51	1618	Resistor	Carbon 35,000 Ohm 1/3 Watt	.19
52	1336	Resistor	Carbon 20,000 Ohm 1/2 Watt	.19
53	2074	Resistor	Carbon 35,000 Ohm 1 Watt	.20
54	2208	Speaker	Dynamic (6")	5.00
55	1858	Speaker	Dynamic (8")	9.25
56	1859	Speaker	Dynamic (10")	12.00
57	2440	Speaker	Dynamic (12")	10.75
58	2059	Switch	Band Selector	.75
59	2199	Tone Control	With On-Off Switch	1.24
60	2191	Transformer	Power 115 Volt 50 Cycle	4.25
61	2680	Transformer	Power 95-260 Volt 50 Cycle	7.25
62	2193	Transformer	Power 110-250 Volt 25 Cycle	11.00
63	2198	Vol. Control		.85

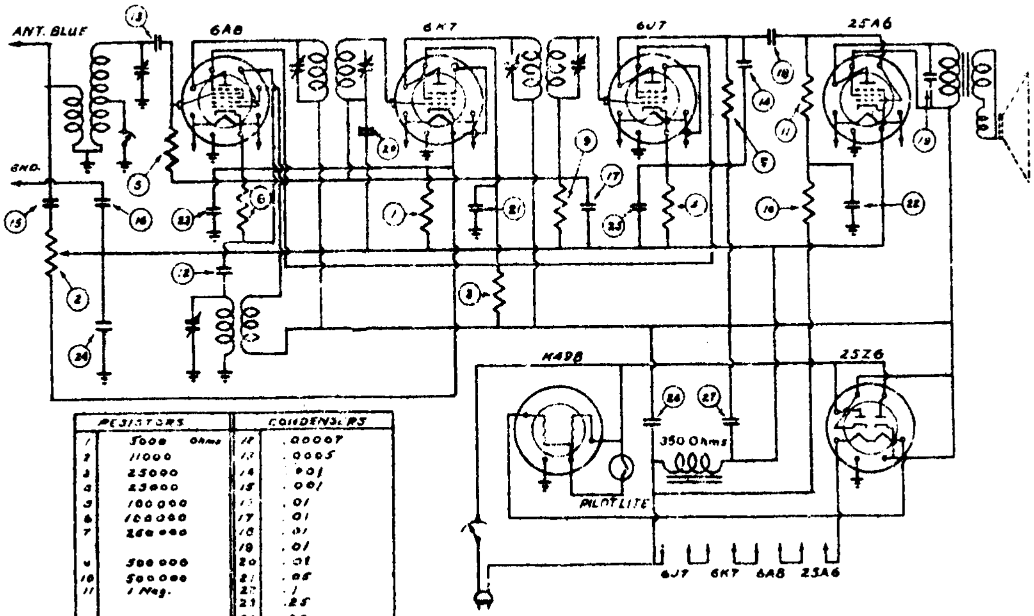
MISCELLANEOUS

Part No.	Part Name	Description	Price
2250	Bulb	Pilot Lamp 6.3 Volt .250 Amp.	.19
2500	Cable	For 6E5 or 6G5 Tube	.50
3101	Dial Assembly	Tuning Complete (Mention Required Name)	3.25
3102	Dial Scale	Calibrated (Mention Required Name)	.50
2796	Glass	For Dial with Escutcheon	.95
2534	Knob	Wood Marked "Tuning"	.30
2444	Knob	Wood Marked "Volume"	.30
2535	Knob	Wood Marked "Tone and On-Off"	.30
2445	Knob	Wood Marked "Band Selector"	.30

Prices are subject to change without notice.

REMLER COMPANY, Ltd.

MODEL 28 "SCOTTIE" (SERIAL № 77039 UP)



RESISTORS		CONDENSERS	
1	5000 Ohms	12	.00007
2	11000	13	.0005
3	25000	14	.001
4	25000	15	.001
5	100000	16	.01
6	100000	17	.01
7	250000	18	.01
		19	.01
9	500000	20	.01
10	500000	21	.05
11	1 Meg.	22	.1
		23	.25
		24	.25
		25	.25
		26	10
		27	10

SERVICE DATA

The antenna-R.F. coil is located over the variable condenser and is trimmed by the trimmer on the rear section of the variable condenser. The oscillator coil is mounted under the chassis and is trimmed by the front trimmer section. The I.F. transformers and trimmers are mounted under the chassis. The I.F. frequency is 450 K.C.

The output transformer and filter choke are in the can on the left of the chassis. To take the chassis out of the cabinet - first, remove the knobs, then the back, and finally the hold down screw in the base of the cabinet. To replace tubes it is only necessary to remove the back.

TUBES

Type 6A8 - Converter
" 6K7 - I.F. Amplifier
" 6J7 - Detector
" 25A6 - Power amplifier pentode
" 25Z6 - Rectifier
" K49B - Ballast
" 46 - Dial lamp

A.C. VOLTAGES

Line	120 volts
25A6, 25Z6	24 "
6A8, 6K7, 6J7	5 "

D.C. VOLTAGES

No signal, full volume.

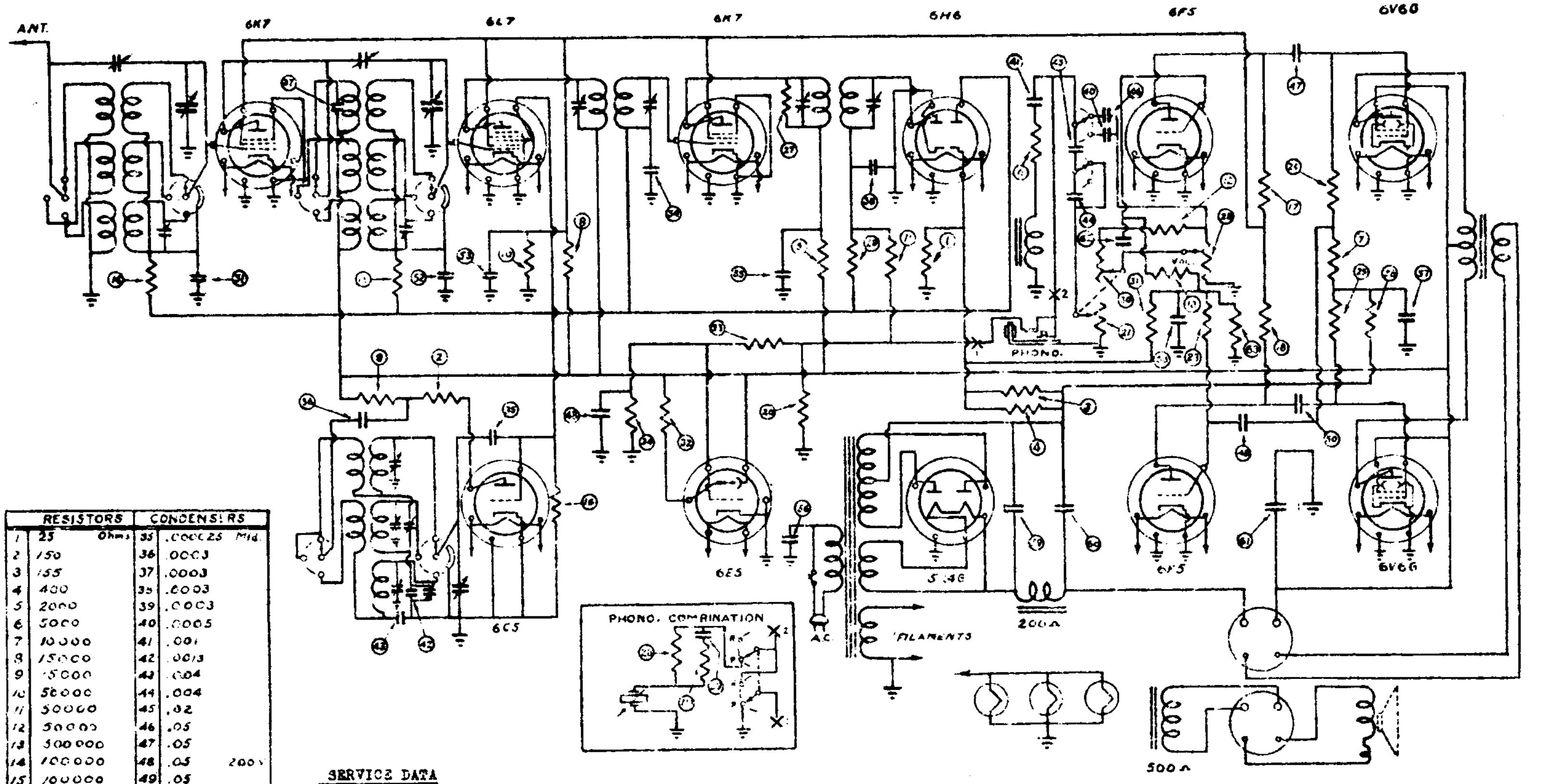
From negative of plate supply to:

6A8	plate	100 volts
6A8	screen	60 "
6A8	osc. plate	100 "
6A8	cathode	3 "
6K7	plate	100 "
6K7	screen	100 "
6K7	cathode	3 "
6J7	plate	40 "
6J7	screen	60 "
6J7	cathode	3 "
25A6	plate	95 "
25A6	screen	100 "
25A6	grid bias supply	15 "

Voltages read with 1000 ohm per volt meter.

REMLER COMPANY, Ltd.

MODELS 89 & 89C (SERIAL № 92582 UP)



RESISTORS		CONDENSERS	
1	25 Ohms	35	.000025 Mfd.
2	150	36	.0003
3	155	37	.0003
4	400	38	.0003
5	2000	39	.0003
6	5000	40	.0005
7	10000	41	.001
8	15000	42	.0013
9	15000	43	.004
10	50000	44	.004
11	50000	45	.02
12	50000	46	.05
13	500000	47	.05
14	100000	48	.05 200V
15	100000	49	.05
16	100000	50	.05
17	100000	51	.1
18	100000	52	.1
19	100000	53	20 250V
20	250000	54	.05
21	500000	55	.05
22	500000	56	.01
23	500000	57	.5
24	500000	58	.5
25	500000	59	10 475 V
26	500000	60	10
27	500000	61	10
28	500000	62	.05 200V
29	1 Meg	63	500000 ohms
30	1 "		
31	1 "		
32	1 "		
33	3 "		
34	3 "		

SERVICE DATA

The following tubes are used in this receiver;

6K7-R.F. Amplifier
6L7-Mixer
6C5-Oscillator
6K7-I.F. Amplifier
6H6-Diode Detector
6F5-A.F. Amplifier
6F5-A.F. Amplifier
6V6G-Beam Power Amplifier
6V6G-Beam Power Amplifier
6E5-Tuning Indicator
5X4G-Rectifier

I.F. 450 K.C.

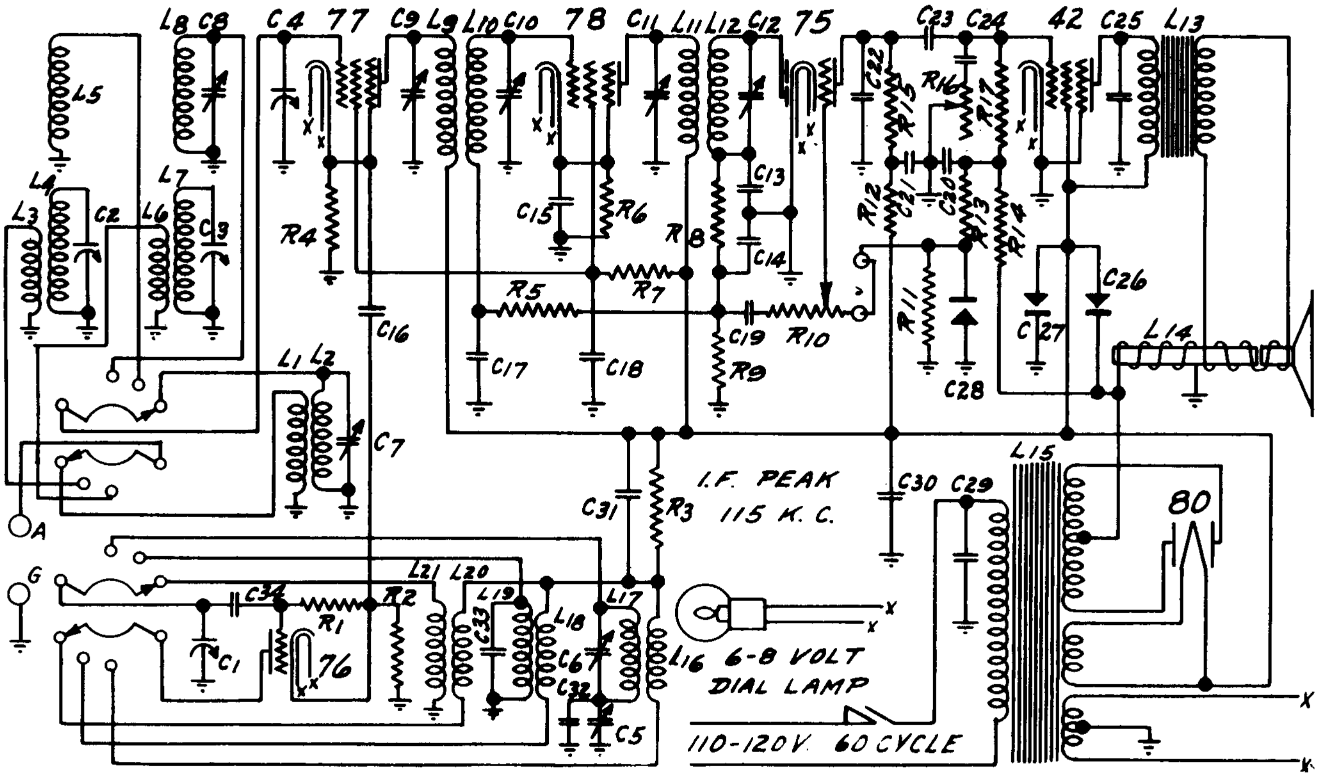
The R.F., Mixer and oscillator coils are located in the large square shields on the right end of the chassis.
Trimmers for these circuits are mounted along the end of the chassis, beneath the coils in the following order; R.F. short wave, Mixer short wave, Oscillator broadcast, Oscillator medium wave, Oscillator short wave. From front to rear.
The R.F. broadcast and Mixer broadcast trimmers are mounted on the range switch assembly. Oscillator pads are located at the back of the variable condenser. The pad nearest the end of the chassis is for the broadcast band and the medium wave is next.
Trimmers for the I.F. transformers are adjustable thru holes in the I.F. transformer shield cans. The I.F. frequency is 450 K.C.

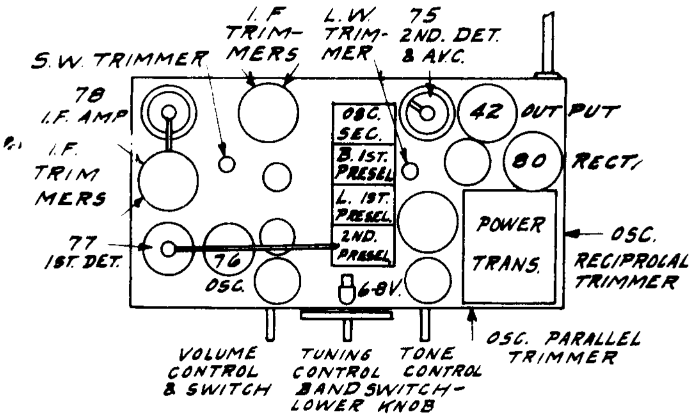
Voltage readings for service work:

A.C. Voltages:		
Line	120 Volts	
Heater 5X4G	4.8 "	
Heaters other tubes	6 "	
D.C. Voltages: (no signal) From ground to:		
5X4G	Rectifier Filament	360 Volts
6V6G	Plates	240 "
6V6G	Screens	260 "
6V6G	Bias	16.5 "
6F5	Plates	80 "
6F5	Bias	1.5 "
6K7	I.F. Plate	250 "
6K7	I.F. Screen	100 "
6K7	I.F. Bias	3 "
6L7	Plate	260 "
6L7	Screen	100 "
6L7	Bias	3 "
6C5	Plate	160 "
6K7	R.F. Plate	250 "
6K7	R.F. Screen	100 "
6K7	R.F. Bias	3 "
6E5	Target Voltage	260 "
	Voltage across speaker field	75 "

NOTE: Model 89C is a phono. combination.

REPUBLIC INDUSTRIES
MODEL CS-6





CODE	PART NO.	RESISTORS
R1	921	40,000 Ohms
R2	1062	250 Ohms
R3	920	10,000 Ohms
R4	1065	1,000 Ohms
R5	926	1 Meg Ohm
R6	1063	500 Ohms
R7	922	75,000 Ohms
R8	898	50,000 Ohms
R9	925	500,000 Ohms
R10	1291	500,000 Ohms Vol. Control & Sw.
R11	919	5,000 Ohms
R12	923	100,000 Ohms
R13	922	75,000 Ohms
R14	926	1 Meg Ohm
R15	924	250,000 Ohms
R16	1317	250,000 Ohms
R17	925	500,000 Ohms
		CONDENSERS
C5	784	4 Plate Trimmer
C6	972	2 Plate Trimmer
C7	972	2 Plate Trimmer
C8	972	2 Plate Trimmer
C9	1228	60 - 130 mmf. Trimmer
C10	1534	60 - 130 mmf. Trimmer
C11	1536	60 - 130 mmf. Trimmer
C12	1535	60 - 130 mmf. Trimmer
C13	339	.0001 mf. Mica
C14	339	.0001 mf. Mica
C15	272A	.1 mf. 200 V.
C16	269A	.01 mf. 400 V.
C17	272A	.1 mf. 200 V.
C18	272A	.1 mf. 200 V.
C19	269A	.01 mf. 400 V.
C20	183A	.2 mf. 200 V.
C21	272A	.1 mf. 200 V.
C22	265	.001 mf. Mica
C23	269A	.01 mf. 400 V.
C24	269A	.01 mf. 400 V.
C25	343A	.004 mf. 600 V.
C26	1129	4 mf.
C27	1129	4 mf.
C28	928	25 mf. 25 V.
C29	269A	.01 mf. 400 V.
C30	266	1 mf. 400 V.
C31	272A	.1 mf. 200 V.
C32	339	.0001 mf. Mica
C33	347	.00001 mf. Mica
C34	264	.00005 mf. Mica

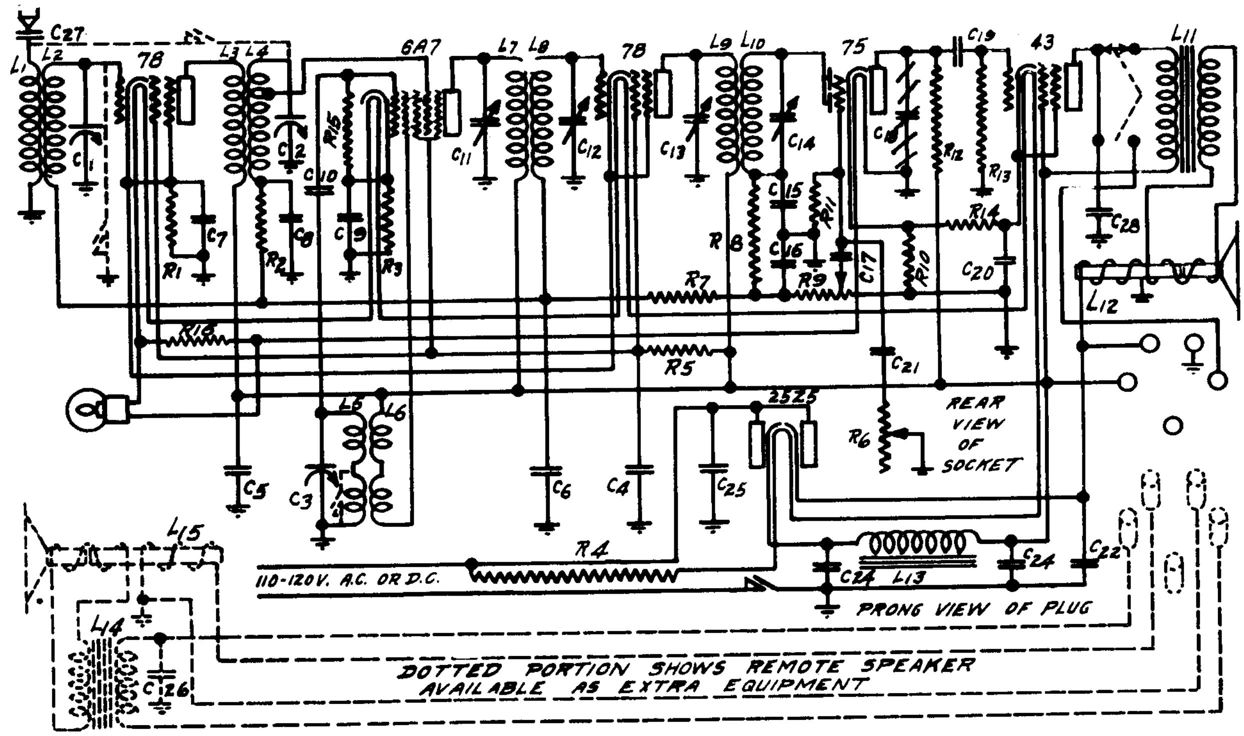
TUBE	FUNCTION	PLATE TO GROUND	SCREEN GRID TO GROUND	CATHODE TO GROUND
77	1st Detector	195	80	2
76	Oscillator	127		2
78	I.F. Amplifier	195	80	2
75	2nd Detector	55	0	0
42	Output	170	195	-5
80	Rectifier			

76 Grid to Ground -- 10 Volts Speaker Field Voltage 147

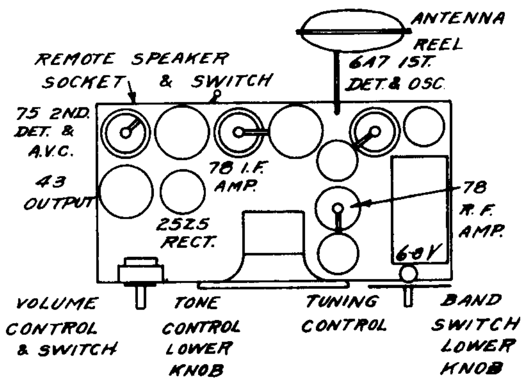
METER

250 Volt Scale -- 1000 Ohms Per Volt

REPUBLIC INDUSTRIES
MODEL SL-6D



I.F. 175 K.C.



Code	Part No.	RESISTORS
R1	1062	250 Ohm R.F. & I.F. Cathode & Screen Resistor
R2	923	100,000 Ohm A.V.C. Network Resistor
R3	1062	250 Ohm 6A7 Cathode Resistor
R4	1125	130 Ohm Resistor In Power Cord
R5	941	20,000 Ohm 78 & 6A7 Screen Feed Resistor
R6	534	250,000 Ohm Tone Control
R7	926	1 Megohm A.V.C. Network Resistor
R8	898	50,000 Ohm A.V.C. Network Filter Resistor
R9	535	500,000 Ohm Volume Control & Power Switch
R10	1122	40 Ohm Bias Network Resistor
R11	925	500,000 Ohm 75 Grid Leak Resistor
R12	925	500,000 Ohm 75 Plate Resistor
R13	925	500,000 Ohm 43 Grid Resistor
R14	1063	500 Ohm Bias Resistor
R15	921	40,000 Ohm Oscillator Grid Leak Resistor
R16	1308	20 Ohm Pilot Light Shunt Resistor
		CONDENSERS
C1	833	371 MMFD. Preselector Section of Tuning Condenser
C2	833	371 MMFD. Preselector Section of Tuning Condenser
C3	833	336 MMFD. Oscillator Section of Tuning Condenser
C4	272	.1 MFD. 78 & 6A7 Screen By-pass Condenser
C5	266	1. MFD. B By-pass Condenser
C6	272	.1 MFD. A.V.C. Network By-pass Condenser
C7	272	.1 MFD. R.F. & I.F. Cathode By-pass Condenser
C8	272	.1 MFD. First Detector R.F. By-pass Condenser
C9	272	.1 MFD. 6A7 Cathode By-pass Condenser
C10	268	.00025 MFD. Oscillator Coupling Condenser
C11	1104	70-200 MMFD. First I.F. Primary Trimmer Condenser
C12	1105	70-200 MMFD. First I.F. Secondary Trimmer Condenser
C13	1106	70-200 MMFD. Second I.F. Primary Trimmer Condenser
C14	1107	70-200 MMFD. Second I.F. Secondary Trimmer Condenser
C15	339	.0001 MFD. Diode Filter Condenser
C16	339	.0001 MFD. Diode Filter Condenser
C17	269	.01 MFD. First Detector Feed Condenser
C19	269	.01 MFD. Audio Feed Condenser
C20	928	25 MFD. 43 Cathode Electrolytic By-pass Condenser
C21	269	.01 MFD. Tone Control Condenser
C22	1085	4 MFD. Dry Electrolytic Condenser
C23	1085	4 MFD. Dry Electrolytic Condenser
C24	1085	11 MFD. Dry Electrolytic Condenser
C25	272	.1 MFD. Line By-pass Condenser
C26	1085	19 MFD. Dry Electrolytic Condenser
C27	269	.01 MFD. Antenna Series Condenser
C28	269	.01 MFD. Output Plate Filter Condenser
		INDUCTANCES
L1	1138	Preselector Primary 450 Turns #36 S.S.E.
L2	1138	Preselector Secondary 144 Turns #36 D.D.C.
L3	1137	Detector Coil Primary 750 Turns #36 S.S.E.
L4	1137	Detector Coil Secondary 118 Turns & 77 Turns #36 D.D.C.
L5	1111	Oscillator Secondary 72 Turns & 50 Turns #36 D.D.C.
L6	1111	Oscillator Primary 35 Turns & 15 Turns #36 S.S.E.
L7	1101	8,000 Microhenries First I.F. Primary
L8	1101	8,000 Microhenries First I.F. Secondary
L9	1101	8,000 Microhenries Second I.F. Primary
L10	1101	8,000 Microhenries Second I.F. Secondary
L11		#43 Output Transformer
L12		3,000 Ohm Speaker Field
L13	940	20 Henry Choke
L14		#43 Output Transformer
L15		2,500 Ohm Speaker Field

TUBE	FUNCTION	PLATE TO GROUND	SCREEN GRID TO GROUND	CATHODE TO GROUND
78	R.F. Amplifier	110	50	1.75
6A7	1st Detector & Oscillator	110	50	1.25
78	I.F. Amplifier	110	50	1.75
75	2nd Detector	67.5		1.0
43	Power Amplifier	105	110	15
25Z5	Rectifier			

Speaker Field Voltage -- 115 V.

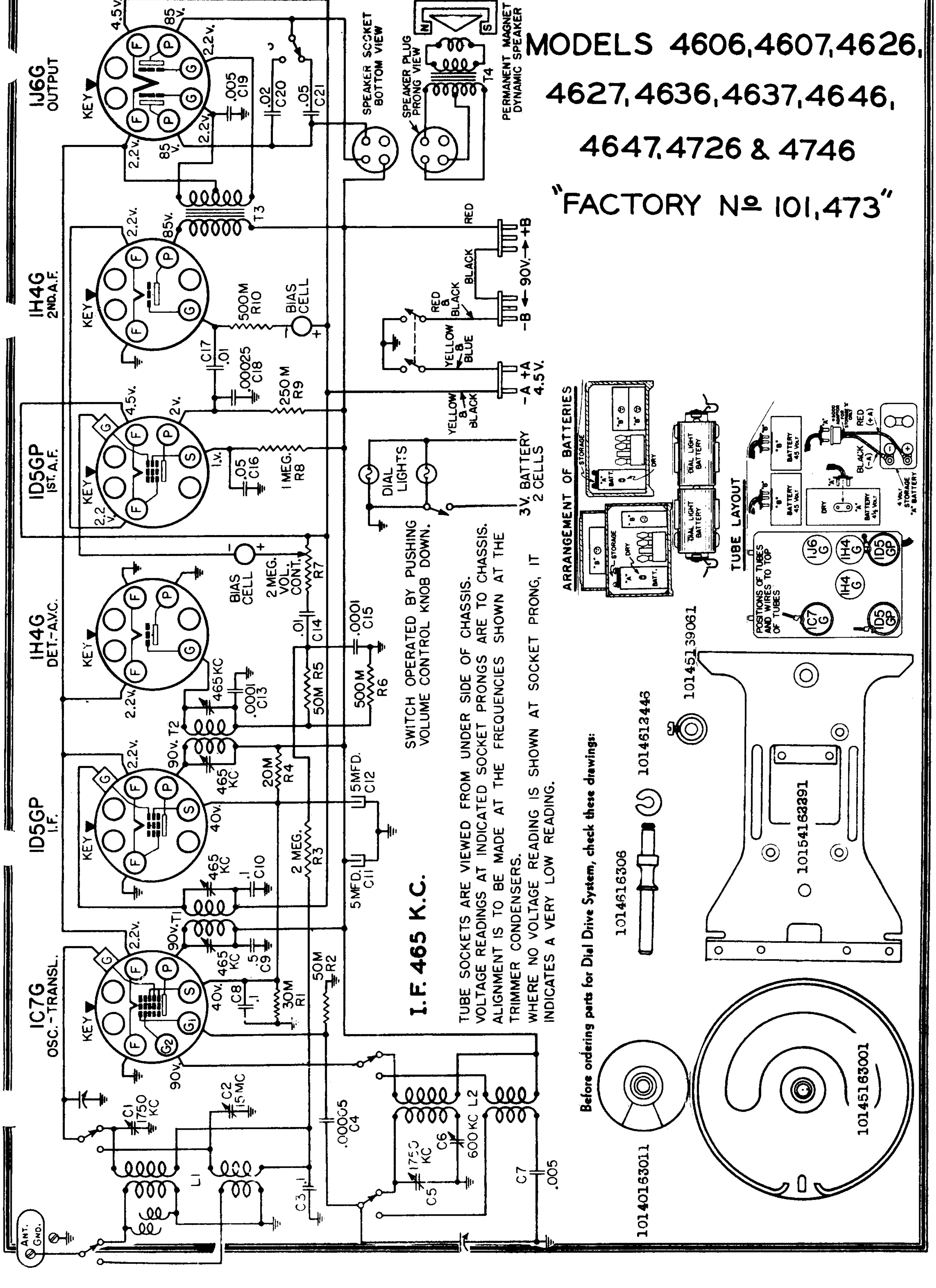
METER

250 Volt Scale -- 1000 Ohms Per Volt

SEARS, ROEBUCK & CO.

MODELS 4606, 4607, 4626, 4627, 4636, 4637, 4646, 4647, 4726 & 4746

"FACTORY No. 101,473"



SEARS, ROEBUCK & CO.
MODELS 4606, 4607, 4626, 4627, 4636, 4637, 4646, 4647, 4726 & 4746 "FACTORY No 101,473"

ELECTRICAL SPECIFICATIONS

TUBES AND FUNCTIONS:

1C7G	Oscillator-Translator	1D5GP	First AF
1D5GP	IF	1H4G	Second AF
1H4G	Detector-AVC	1J6G	Output

POWER SUPPLY:
- "A" Battery (4½ volt dry) . . 1 - #5032
- "A" Battery (4 volt storage) 1 - #5049
- "B" Batteries . . . . 2 - #5131P
- "A" Drain . . . . 0.3 amperes
- "B" Drain . . . . 21 ma

FREQUENCY RANGES:
- Band "A" . . . . 540-1750 kc
- Band "F" . . . . 5.8-18 mc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant.-Transl. Trimmer	Padder
Band "A"	1400 kc	1400 kc	600 kc
Band "F"	-	15 mc	Fixed

INTERMEDIATE FREQUENCY . . . . 465 kc

POWER OUTPUT:
- Type . . . . Class "B"
- Undistorted . . . . 0.4 watts
- Maximum . . . . 1.1 watts

LOUD SPEAKER:
- Type . . . . PM Dynamic
- Size . . . . 6 inch

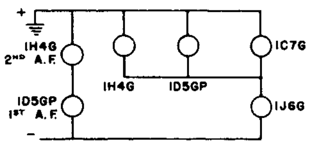
GENERAL INFORMATION

THE "A" SUPPLY:

These models may be used with either a 4½ volt dry "A" battery or a 4 volt storage "A" battery. If a storage "A" battery is used, it will be necessary to use a Catalog #5000 adapter to permit connecting the "A" plug to the storage battery terminals. The customer should be cautioned against using a 6 volt automobile storage battery.

THE FILAMENT CIRCUIT:

Since the tubes have two volt filaments and the "A" supply is four volts, a series parallel arrangement is used for the circuit. A simplified diagram of the filament circuit is shown below. If any one tube burns out, it will affect the filament voltage and current of its companion tubes.



THE AVC CIRCUIT:

The 1H4G Detector-AVC tube is used as a diode with its grid acting as the diode plate. Diode current, flowing through the 50M ohm resistor, R5, and the 500M ohm resistor, R6, create a voltage drop across them. This voltage is applied to the control grid of the 1C7G tube to provide AVC.

BATTERY REPLACEMENT:

The dry "A" battery should be replaced when its voltage drops to 3.4 volts, under load. Approximately 610 hours of service can be expected before the "A" battery voltage drops to this value (based on 3 to 4 hours a day use). If the storage "A" battery is used, it should be recharged every 3 to 4 weeks. Approximately 375 hours of service can be expected from the "B" batteries supplied. Since this receiver uses a class "B" output stage the "B" drain will vary with the volume at which the radio is played. The customer should be informed of this fact and told that for longest "B" battery life the radio should not be played louder than necessary. The "B" batteries should be replaced when the voltage of the 90 volt block has dropped to 68 volts, under load. For longer uninterrupted service, heavy duty "B" batteries should be recommended.

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

DIFFERENCES IN TONE CONTROLS:

Earlier production used a tone control knob having only two positions marked, "HI", "LO". Later production used three positions marked, "HI", "MED", "LO". In both types of set the Tone Control switch is a three position one and the medium tone adjustment can be had with the two position knob by turning the knob so that the marker pin is between "HI" and "LO".

THE DIAL FLASH-O-LITE:

Pushing down on the Volume Control knob closes the switch to light the dial. Two Flash-Light cells supply the voltage for the dial light. Be sure that they are mounted in their holder so that the center contact of one cell touches the bottom of the shell of the other cell. Otherwise, the cells will buck each other and no voltage will be applied to the dial light.

ALIGNMENT PROCEDURE

PRELIMINARY:

- Output meter connection . . . . Across loud speaker voice coil
- Output meter reading to indicate 50 milliwatts . . . . 0.42 volts
- Generator ground lead connection . . . . Receiver chassis
- Dummy antenna value to be in series with generator output . . . . . See chart below
- Connection of generator output lead . . . . See chart below
- Generator modulation . . . . 30%, 400 cycles
- Approximate average sensitivity in microvolts for 50 milliwatts output . . . See chart below
- Position of Volume Control . . . . Fully clockwise
- Position of Tone Control . . . . Fully clockwise
- Position of Dial Pointer with variable fully closed . . . To fall in center of embossed gold block that is about 1/4" to the left of the letters, "MC", at the low frequency end of the FOREIGN scale.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	550 kc	465 kc	.1 mfd.	1C7G Grid	12,T1	IF Output, IF Input	150
"A"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C1,C5	Antenna Oscillator	65
"A"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C6	Padder	30
"A"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C1,C5	Antenna Oscillator	65
"F"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C2	Translator	40
"F"	6 mc	6 mc	400 ohms	Ant. Term.	-	-	250

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The figures given in the "Microvolts" column are only approximate.

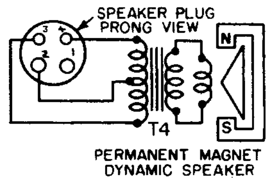
Note that the 1400 kc alignment is to be repeated after the 600 kc padder adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

The high frequency limit of the Broadcast band is 1750 kc although the last dial marking is 1800 kc. This dial marking is only to obtain symmetry of appearance in the dial.

SPEAKER PLUG COLOR CODE

1. Blank	3. Brown
2. Red	4. Green

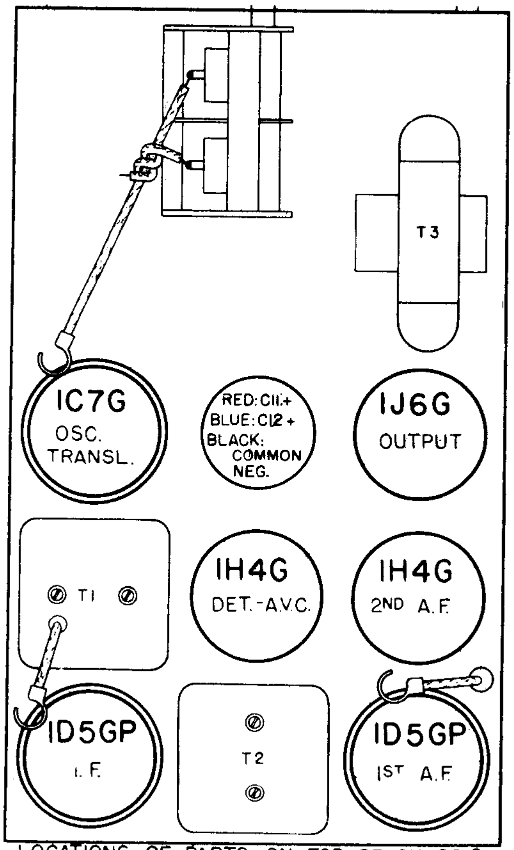


SEARS, ROEBUCK & CO.

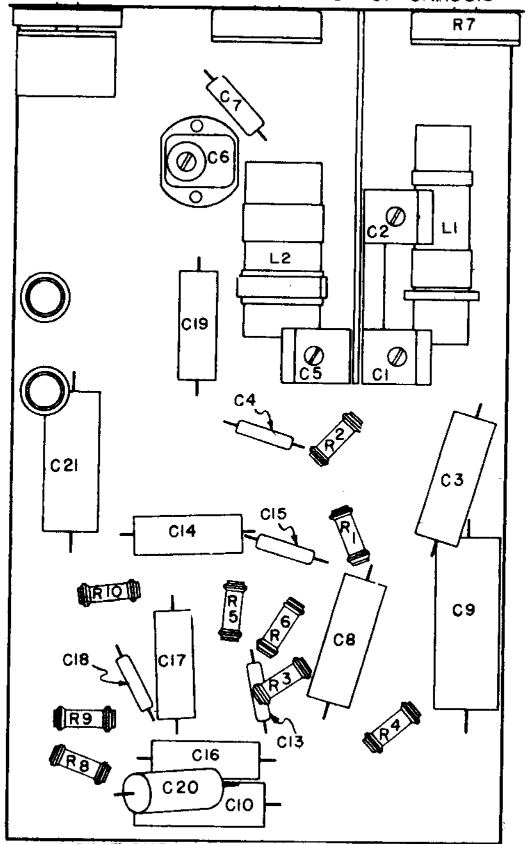
MODELS 4606, 4607, 4626, 4627, 4636, 4637, 4646, 4647, 4726 & 4746 "FACTORY № 101,473"

PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SELLING PRICE EACH
	10155147031	Board - Antenna terminal	.09
	1015416296	Board - Bias cell mounting	.17
	10154124331	Bracket - Dial light batteries mounting	.17
	10154163291	Bracket - Dial mounting	.34
	1015413407	Bushing - Rubber, chassis mtg.	.02
	1015516255	Cable - Battery	.76
	1013715564	Cell - Bias	.16
	1015412808	Clip - Grid	.01
L1	1012816263	Coil - Translator	.95
L2	1012817170	Coil - Oscillator	.67
	1011616267	Condenser - Variable	1.97
C11,C12	1012016259	Condenser - Electrolytic, dual, dry	.68
C1,C2	1011716297	Condenser - Trimmer, dual	.22
C5	1011715723	Condenser - Trimmer	.10
C6	1011714433	Condenser - Padder	.29
C9		Condenser - .5 mfd. 200 volts	.29
C3,C8,C10		Condenser - .1 mfd. 200 volts	.16
C21		Condenser - .05 mfd. 400 volts	.13
C16		Condenser - .05 mfd. 200 volts	.13
C20		Condenser - .02 mfd. 400 volts	.13
C14,C17		Condenser - .01 mfd. 400 volts	.08
C7		Condenser - .005 mfd. mica	.27
C19		Condenser - .005 mfd. 200 volts	.08
C18		Condenser - .00025 mfd. mica	.09
C13,C15		Condenser - .0001 mfd. mica	.07
C4	1	Condenser - .00005 mfd. mica	.07
R7	1012416298	Control - Volume	.77
	10145139747	Cord - Condenser drive	.08
	10145166711	Cord - "On-Off" indicator	.10
	1014016299	Dial - Station selector	.76
	10145163001	Drum - Condenser drive	.46
	1014416422	Escutcheon - With glass	.75
	10140163011	Indicator - "On-Off"	.19
	1013916504	Knob - Tone	.14
	1013916423	Knob - Tuning	.12
	1013916613	Knob - Volume	.14
	1013916425	Knob - Wave switch	.11
	1014912353	Lamp - Dial	.11
	1015916908	Leaflet - Instruction	.30
	1015915947	Log - Station	.01
	1015416427	Nut - Escutcheon mounting	.01
	1014116304	Pointer - Dial	.06
	10145169061	Pulley - "On-Off" indicator actuating	.11
R3		Resistor - 2 megohms, 1/3 watt	.15
R8		Resistor - 1 megohm, 1/3 watt	.15
R6,R10		Resistor - 500M ohms, 1/3 watt	.15
R9		Resistor - 250M ohms, 1/3 watt	.15
R2,R5		Resistor - 50M ohms, 1/3 watt	.15
R1		Resistor - 30M ohms, 1/3 watt	.19
R4		Resistor - 30M ohms, 1/3 watt	.15
	1014616306	Shaft - Condenser drive	.14
	1015315648	Shield - Tube	.11
	101188315	Socket - 6 prong, Speaker	.06
	1011813757	Socket - 7 prong, Octal	.14
	1011813173	Socket - 8 prong, Octal	.14
	1015816320	Speaker - 6", PM	4.56
	1015716321	Cone and voice coil	1.50
T4	1013116322	Transformer	1.31
	1015917055	Speaker - 6", PM	4.56
	1015717056	Cone and voice coil	1.50
T4	1011317057	Transformer	1.31
	1015817058	Speaker - 6", PM	4.56
	1015717059	Cone and voice coil	1.50
T4	1011317060	Transformer	1.31
	1014513948	Spring - Condenser drive cord	.03
	1015416312	Spring - "On-Off" indicator	.03
	1013716307	Switch - Wave	.41
	1013816308	Switch - Tone	.38
T1	10133162941	Transformer - IF Input	1.26
T2	1013516295	Transformer - IF Output	1.16
T3	1011216265	Transformer - Audio	1.16



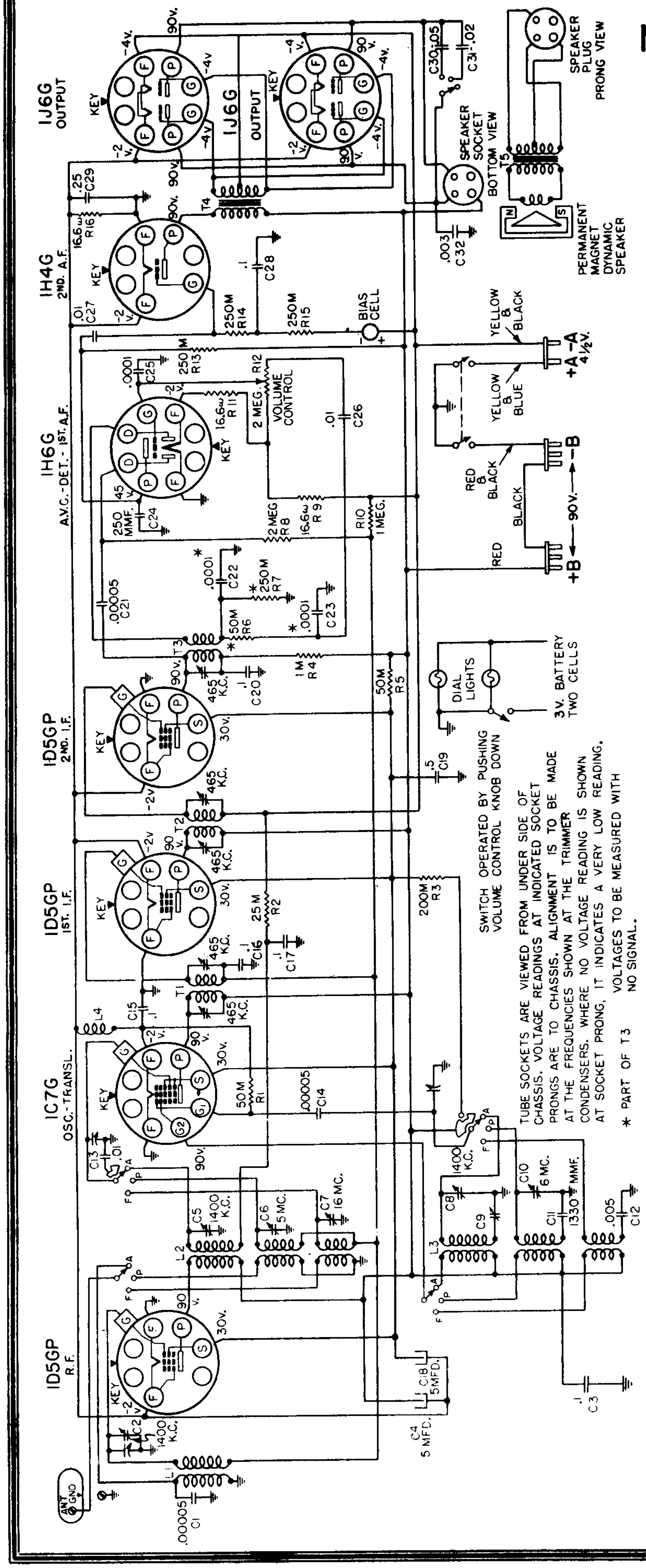
LOCATIONS OF PARTS ON TOP OF CHASSIS

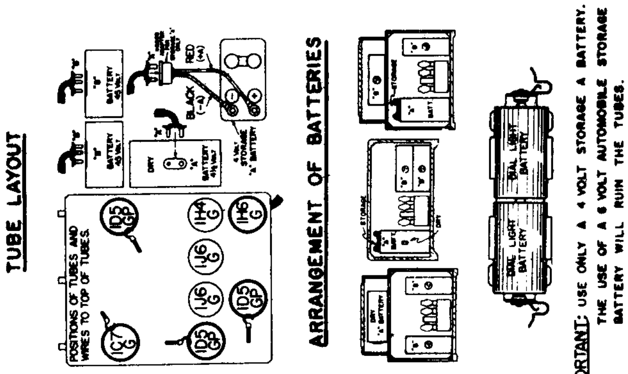


LOCATIONS OF PARTS UNDER CHASSIS

SEARS, ROEBUCK & CO.

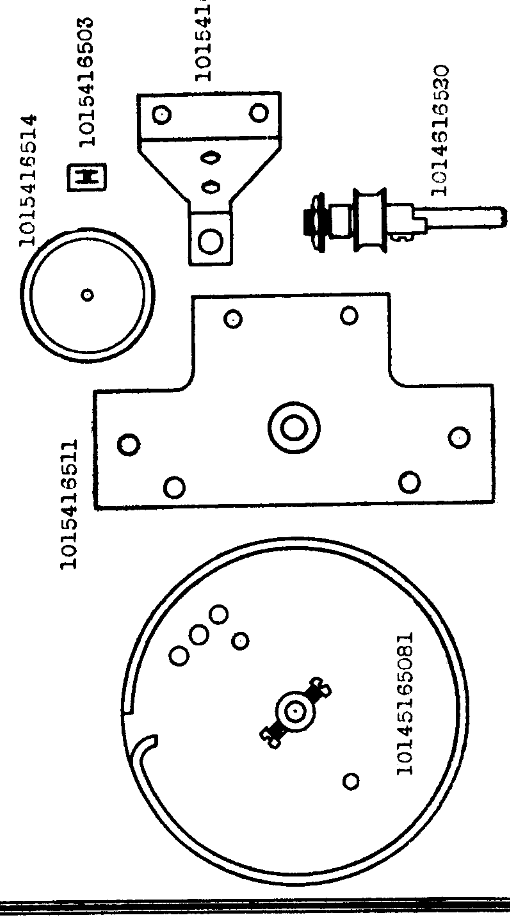
MODELS 4608, 4609, 4628, 4629, 4638, 4639, 4648, 4649, 4728 & 4748 "FACTORY № 101,472"





I.F. 465 K.C.

Before ordering parts for Dial Drive System, check these drawings:



SEARS, ROEBUCK & CO.
MODELS 4608, 4609, 4628, 4629, 4638, 4639, 4648, 4649, 4728 & 4748 "FACTORY № 101,472"

ELECTRICAL SPECIFICATIONS

TUBES AND FUNCTIONS:

1D5GP	RF
1C7G	Oscillator-Translator
1D5GP	First IF
1D5GP	Second IF
1H6G	AVC-Detector-First AF
1H4G	Second AF
2-1J6G	Output

POWER SUPPLY:
"A" Battery (4½ volt dry) . 1 - #5032P
"A" Battery (4 volt storage) 1 - #5049
"B" Batteries . . . . 2 - #5131P

"A" Drain . . . . 0.54 amperes
"B" Drain . . . . 33 ma

FREQUENCY RANGES:
Band "A" . . . . 540-1780 kc
Band "P" . . . . 1760-6200 kc
Band "F" . . . . 5975-18500 kc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant.-Transl Trimmer	Padder
Band "A"	1400 kc	1400 kc	600 kc
Band "P"	5 mc	5 mc	Fixed
Band "F"	-	15 mc	Fixed

INTERMEDIATE FREQUENCY . . . . 465 kc

POWER OUTPUT:
Type . . . . Class "B"
Undistorted . . . . 0.5 watts
Maximum . . . . 1.25 watts

LOUD SPEAKER:
Type . . . Permanent Magnet Dynamic
Size . . . . 6 and 8 inch

OPERATING FEATURES:
Fidelity Range 40 - 5000 cycles
Three Position Tone Control
Automatic Volume Control
"On-Off" Indicator
Flash-O-Light Dial Illumination
Short Wave Stations marked on dial
Wave Band Indicator

CHASSIS FEATURES:
Number RF stages . . One on Broadcast Band
Number IF stages . . . . Two
Number condensers in gang . . . . Three
Antenna . . . . Conventional
Plugs attached to battery cable

THE DIAL FLASH-O-LIGHT:

The Dial Flash-O-Light is operated by pushing down on the Volume Control knob. Two flash light batteries provide the voltage for the two dial lights. It is important that both flash light batteries face in the same direction when put in the holder. That is, the top center contact of one battery must touch the bottom of the shell of the other battery. Otherwise, the voltages of the batteries will buck each other and there will be no voltage available for the dial light.

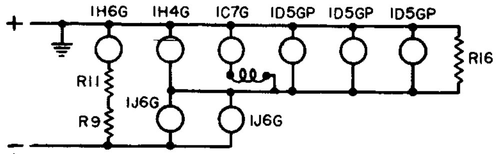
THE AVC CIRCUIT:

The diode current of one of the diode plates of the 1H6G tube, flowing through the one megohm resistor, R10, creates a voltage drop across it. This voltage is applied to the control grids of the RF, translator, and first IF tubes to provide AVC.

THE FILAMENT CIRCUIT:

Since the "A" supply is four volts and the tube filaments are rated at two volts, a series parallel arrangement is used for the filament circuit. A simplified diagram is shown below. If any one tube burns out (except the 1H6G) the filament voltage and current of the other tubes will be affected.

A catalog #5000 adapter must be used on the "A" cable plug when a storage "A" battery is used. The owner should be warned not to attempt the use of a six volt automobile storage battery. Only a four volt storage "A" battery should be used.



ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to select the new IF frequency as near as possible to 465 kc.

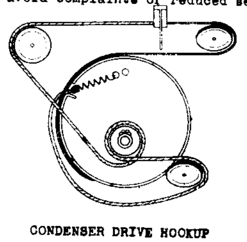
Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

In locations near ship transmitters or airports or air beacon stations, code interference may be experienced. Part #1013114356 wave-trap is designed to eliminate such interference.

Mount the trap, by means of two wood screws, at any convenient place on the chassis shelf or cabinet where it will be near the antenna terminal of the receiver. Connect the yellow lead of the wave-trap to the antenna downlead. Connect the green lead of the wave-trap to the antenna terminal of the receiver. Cut off any excess length of green wire from the trap so that the green lead from the wave-trap to the chassis is as short as possible. The yellow lead from the wave-trap should be run so that it is as far as possible from the green lead. Splice one of the black leads from the wave-trap to the black ground lead of the receiver. Connect the other wave-trap black lead to the ground used for the installation.

The trap is pre-tuned to the IF frequency so that normally no further adjustment is necessary. However, should interference still be experienced, tune the reciever between approximately 550 and 600 kc. Then adjust the wave-trap, by means of the trimmer screw at the bottom of the container, until the interference is eliminated. Addition of the trap will reduce the sensitivity of the receiver around 600 kc by approximately 50%. The customer should be forewarned of this to avoid complaints of reduced sensitivity.



CONDENSER DRIVE HOOKUP

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . Across speaker voice coil
Output meter reading to indicate 50 milliwatts . . . . 0.4 volts
Average sensitivity in microvolts for 50 milliwatts output . . . . See chart below
Dummy antenna value to be in series with generator output . . . . See chart below
Connection of generator output lead . . . . See chart below
Connection of generator ground lead . . . . Receiver chassis
Generator modulation . . . . 30%, 400 cycles
Position of Volume Control . . . . Fully on
Position of Tone Control . . . . Fully clockwise
Position of Dial Pointer . . . . .To fall on end line of scale (low frequency end). Loosen dial drum set screws and rotate drum if necessary. Tighten set screws after pointer is properly set.

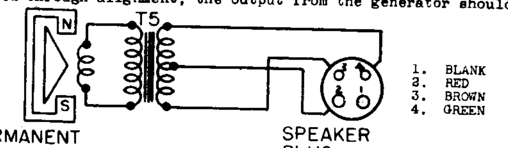
WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"P"	6 mc	465 kc	.1 mfd.	1C7G Grid	T3, T2, T1	IF	20
"A"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C8, C5, C2	Osc., Transl., Antenna	7
"A"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C9	Padder	7
"P"	5 mc	5 mc	400 ohms	Ant. Term.	C10, C6	Oscillator Translator	10
"F"	15 mc	15 mc	400 ohms	Ant. Term.	C7	Translator	15

IMPORTANT ALIGNMENT NOTES

Note that the IF must be adjusted with the Wave Band Switch in the "P" position.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

Always keep the output from the signal generator at its lowest possible value to prevent the AVC action of the receiver from interfering with accurate alignment. As the receiver sensitivity is increased through alignment, the output from the generator should be decreased to compensate.



PERMANENT MAGNET DYNAMIC SPEAKER

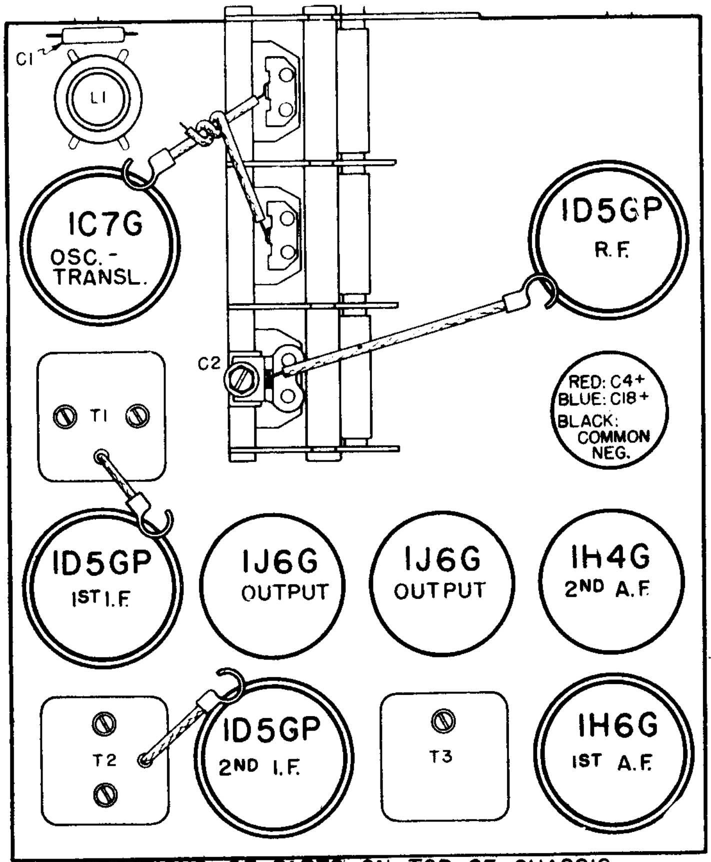
SPEAKER PLUG PRONG VIEW

SEARS, ROEBUCK & CO.

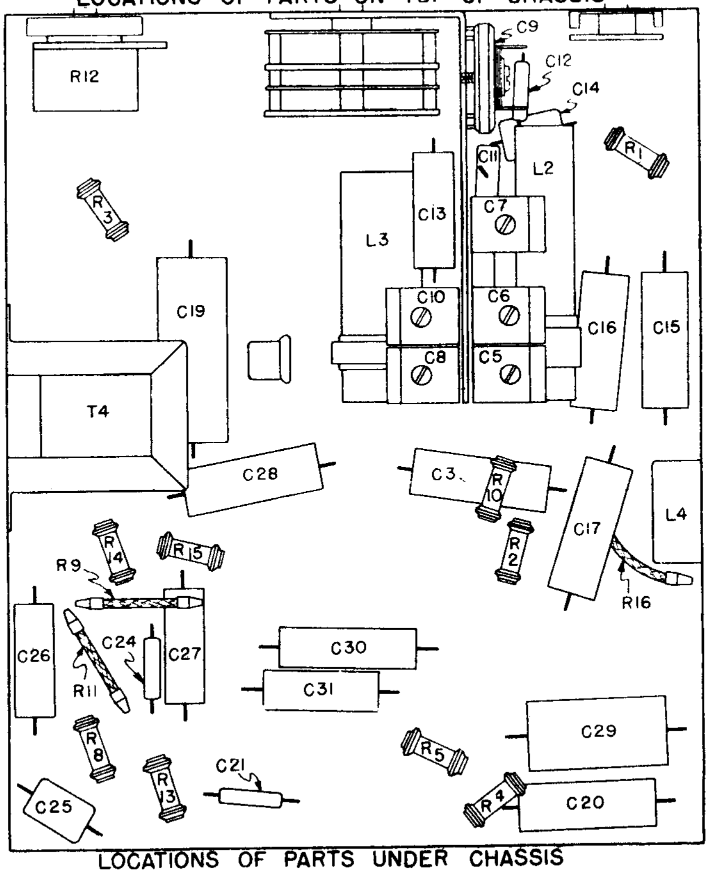
MODELS 4608, 4609, 4628, 4629, 4638, 4639, 4648, 4649, 4728 & 4748 "FACTORY No 101,472"

PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SELLING PRICE EACH
	10154134892	Arm - "On-Off" indicator, with cable	.36
	10154164911	Arm - Band indicator, with link and lever assembly	.36
	10155147031	Board - Antenna terminal	.09
	1015415563	Board - Bias cell mounting	.08
	10154134321	Bracket - Dial light batteries mounting	.17
	1015416511	Bracket - Dial and condenser drive shaft mounting	.11
	1015416494	Bracket - Front support, dial and condenser drive shaft mounting	.02
	1015516255	Cable - Battery	.76
	1015516282	Adapter for storage "A"	.19
	10145139740	Cable - Condenser drive	.12
	1012715564	Cell - Bias	.16
	1015412808	Clip - Grid	.01
	1015416503	Clip - Pulley retaining	.02
L1	1012814821	Coil - Antenna, broadcast	.45
L3	1012816453	Coil - Oscillator	.85
L2	1012816442	Coil - Translator	.86
L4	10130144243	Coil - Choke	.18
	1011616456	Condenser - Variable	2.99
C4,C18	1012016803	Condenser - Electrolytic, dry	.70
C5,C6,C7	1011716448	Condenser - Trimmer, triple, antenna	.31
C8,C10	1011716909	Condenser - Trimmer, dual, oscillator	.22
C9	1011714433	Condenser - Padder	.29
C19		Condenser - .5 mfd. 200 volts	.29
C29		Condenser - .25 mfd. 200 volts	.18
C3,C15,C16, C17,C20,C28		Condenser - .1 mfd. 200 volts	.16
C31		Condenser - .05 mfd. 400 volts	.13
C30		Condenser - .02 mfd. 400 volts	.13
C13,C26,C27		Condenser - .01 mfd. 200 volts	.13
C12		Condenser - .005 mfd. mica	.25
C32		Condenser - .003 mfd. 400 volts	.10
C11	1011916531	Condenser - .00133 mfd. mica	.13
C25		Condenser - .0001 mfd. mica	.06
C24		Condenser - .00025 mfd. mica	.09
C1,C14,C21		Condenser - .00005 mfd. mica	.07
R12	1012416907	Control - Volume with switch	.84
	1014016506	Dial - Station selector	.95
	1014016507	Dial - Background, station selector	.56
	10145165081	Drum - Pointer drive assembly	.48
	1014416574	Escutcheon - Dial	.61
	1015416490	Gasket - Dial glass	1.43
	1015410980	Grommet - Rubber, variable condenser mounting	.02
	1013916965	Knob - Tone	.09
	1013916433	Knob - Tuning	.12
	1013916613	Knob - Volume	.14
	1013916546	Knob - Wave switch	.09
	1014912353	Lamp - Dial	.11
	1015916575	Leaflet - Instruction	.30
	1015915947	Log - Station	.01
	1014314400	Nut - Escutcheon mounting	.01
	1014116513	Pointer - Dial	.08
	10154169061	Pulley - Lower, "On-Off" indicator actuating	.11
	1015416514	Pulley - Large	.11
R8		Resistor - 2 megohms, 1/3 watt	.15
R10		Resistor - 1 megohm, 1/3 watt	.15
R13,R14,R15		Resistor - 250M ohms, 1/3 watt	.15
R3		Resistor - 200M ohms, 1/3 watt	.17
R1,R5		Resistor - 50M ohms, 1/3 watt	.15
R2		Resistor - 25M ohms, 1/3 watt	.15
R4		Resistor - 1M ohms, 1/3 watt	.15
R9,R11,R16		Resistor - 16.6 ohms, 1/2 watt, flexible	.18
O	1014616530	Shaft - Condenser drive, dual ratio	1.13
	1015315648	Shield - Tube, grid type	.11
	1015315649	Shield - Tube, plain	.07
	1015315650	Shield - Tube, base	.02
	101188315	Socket - 4 prong, Speaker	.06
	1011812757	Socket - 7 prong, Octal	.14
	1011813173	Socket - 8 prong, Octal	.14
	1015416760	Spacer - Wood, shipping	.01
	1015816323	Speaker - 8"	5.54
	1015716324	Cone and voice coil	1.68
T5	1011316325	Transformer	1.31
	1015816320	Speaker - 6"	4.56
	1015716321	Cone and voice coil	1.50
T5	1011316322	Transformer	1.31
	1015816595	Speaker - 6"	5.05
	1015716596	Cone and voice coil	1.50
T5	1011316597	Transformer	1.31
	1014515730	Spring - Tension, condenser drive cable	.02
	1015416611	Spring - Tension, "On-Off" indicator	.03
	1013716525	Switch - Wave	.89
	1013816444	Switch - Tone control	.40
T1,T2	10133164431	Transformer - IF Input and interstage	1.01
T3	1013515753	Transformer - IF Output	1.37
T4	1011216449	Transformer - Audio	1.12



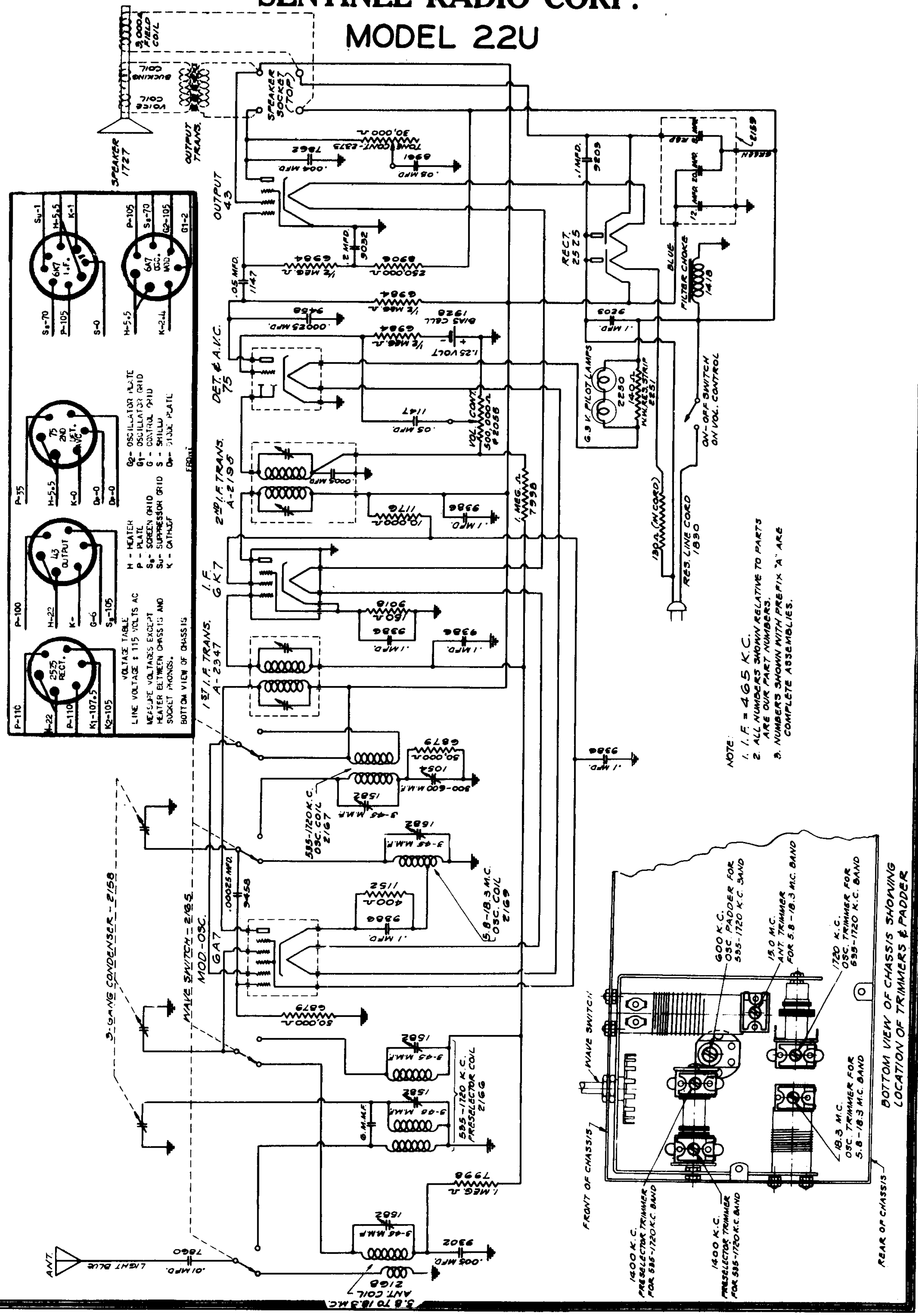
LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

SENTINEL RADIO CORP.

MODEL 22U



SENTINEL RADIO CORP.

MODEL 22U

ALIGNMENT PROCEDURE: Realignment of this receiver should never be necessary unless one of the oscillator, antenna, or I. F. coils has been replaced. Lack of sensitivity, selectivity and poor tone quality may be due to any one or a combination of causes, such as weak or defective tubes or speaker, inadequate or excessively long antenna, open or grounded bias resistor, by-pass condenser, etc. Under no circumstances should realignment be attempted until all other possible sources have been first thoroughly investigated and have been definitely proven not to be the cause.

If an I. F. tube is replaced it is advisable to realign the I. F. amplifier, particularly if the replacement tube is one of a different manufacture than the one in the receiver. It is important when aligning to carefully follow the procedure in the order given, otherwise the receiver will lack sensitivity and the dial calibration will be incorrect.

IT IS IMPERATIVE THAT AN ACCURATELY CALIBRATED OSCILLATOR BE USED WITH SOME TYPE OF OUTPUT MEASURING DEVICE.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the test oscillator output to the control grid of the 6A7 oscillator-modulator tube through a .02 Mfd. condenser. Leave the grid cap connected to the grid terminal of the tube, and connect the ground side of the test oscillator to the receiver ground.
2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).
3. Align the second intermediate transformer by turning one of the trimmer screws accessible through holes in the top of the transformer shields up and down (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screw of the same transformer for maximum sensitivity.
4. Adjust the first intermediate transformer in the same manner as the second I. F. transformer.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning the gang condenser, padding and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The padding and trimmer condensers located underneath the chassis will be referred to by their function as indicated on the circuit diagram.

1. Connect the high output side of the test oscillator through a 400 ohm resistor to the receiver antenna lead and the low side to the set ground.
2. Place the band selector switch for operation on the 5.8 to 18.3 megacycle band, tune the receiver dial, and set the test oscillator frequency to EXACTLY 18.3 MEGACYCLES. In this receiver on the high frequency band the oscillator frequency is tracked LOWER in frequency than the signal frequency instead of higher as ordinarily. This must be borne in mind in retracking.

   Rotate gang condenser so that plates are completely out of mesh and then tune in the 18.3 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 18.3 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer two peaks will be noticed. CARE MUST BE TAKEN SO THAT THE PROPER PEAK IS USED FOR ALIGNING THE RECEIVER AT 18.3 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the SECOND PEAK which is the proper one to use is tuned in. After completing adjustment of the oscillator trimmer at 18.3 megacycles always check to see if the proper peak has been used. To do this leave the receiver dial set at 18.3 megacycles, increase the output of the test oscillator and tune the test oscillator frequency to approximately 17.3 megacycles. Then vary the receiver dial slightly to the right and left of 17.3 megacycles, and if the proper peak was used in aligning at 18.3 megacycles the test oscillator signal will be heard at approximately 18.3 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 18.3 megacycle oscillator trimmer must be properly readjusted.
3. With band selector switch set for operation on 5.8 to 18.3 megacycle band tune the receiver dial and set test oscillator frequency to EXACTLY 15 MEGACYCLES and adjust 15 megacycle antenna trimmer for maximum 15 megacycle signal sensitivity.
4. Replace the 400 OHM resistor in series with test oscillator lead with a 200 mmfd. condenser, place the band selector switch for operation on the 535 to 1720 kilocycle band and set test oscillator frequency to EXACTLY 1720 KILOCYCLES.

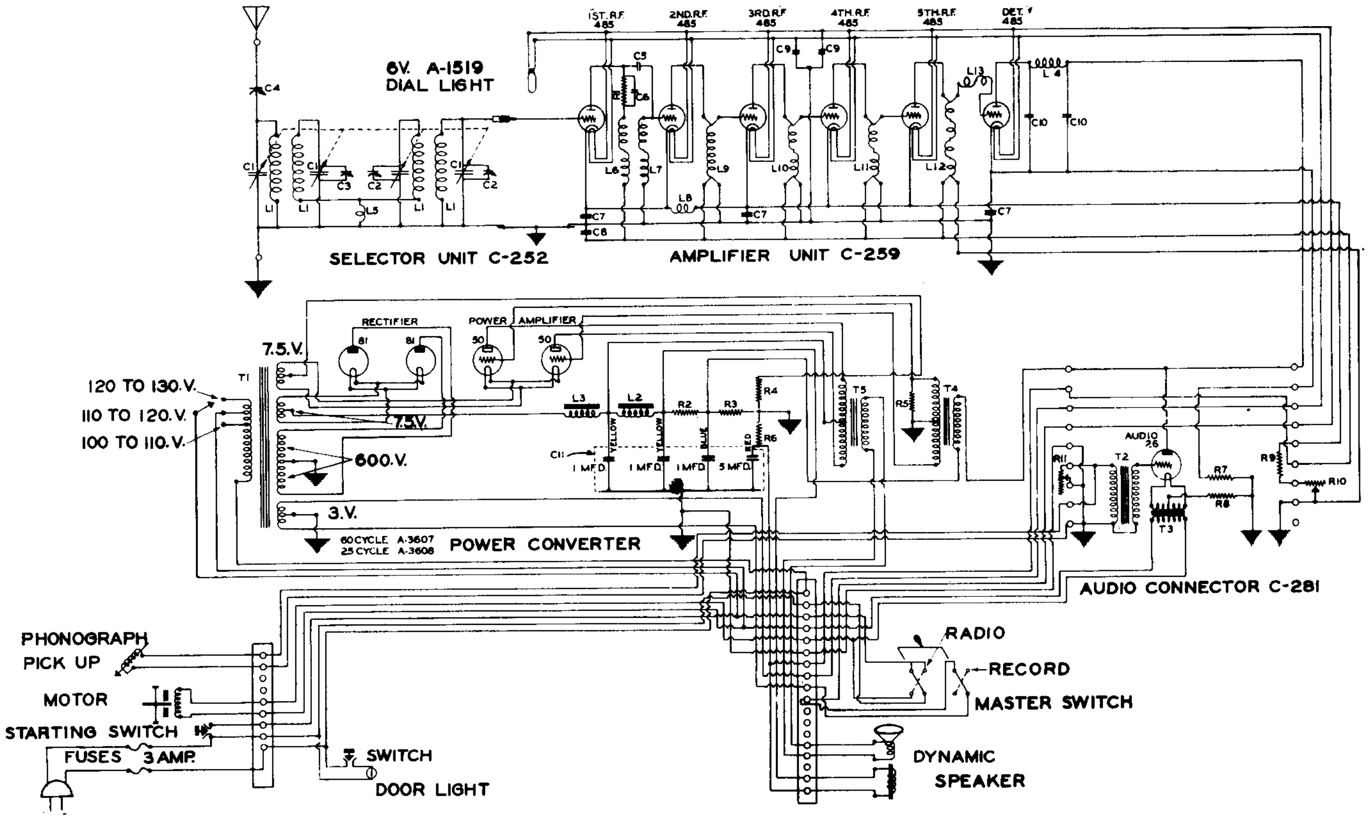
   Rotate gang condenser so that plates are completely out of mesh and BRING IN THE 1720 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1720 KILOCYCLE OSCILLATOR TRIMMER.
5. With band selector switch placed for operation on the 535 to 1720 kilocycle band set test oscillator frequency and receiver dial to EXACTLY 1400 KILOCYCLES. Adjust 1400 kilocycle preselector trimmers for maximum 1400 kilocycle signal sensitivity.
6. Leave band selector switch for operation on 535 to 1720 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator padder for maximum sensitivity.

Part Number		List Price
2166	535-1720 K. C. Band Antenna Preselector Coil	$1.30
2167	535-1720 K. C. Band Oscillator Coil	.55
2168	5.8-18.3 M. C. Band Antenna Preselector Coil	.95
2169	5.8-18.3 M. C. Band Oscillator Coil	.60
2347	First I. F. Transformer	1.65
2195	Second I. F. Transformer	1.65
2158	Three Gang Condenser	3.60
2107	Tuning Dial Assembly Complete	2.25
2165	Wave Switch	.70
1054	Padding Condenser	.55
1582	Trimmer Condenser	.21
1928	Bias Cell	.22
2047	Bias Cell Mounting Strip	.11
2055	Volume Control with Off and On Switch	1.10
2373	Tone Control	.75
1418	Filter Choke	.92
2159	2x8 and 1-20 MFD. Dry Electrolytic Condenser	3.50
9458	.00025 MFD. Mica Condenser	.21
9302	.005 MFD. Mica Condenser	.55
9459	.0005 MFD. Mica Condenser	.21
9386	.1 MFD. 200 Volt Condenser	.19
9032	.2 MFD. 200 Volt Condenser	.23
1147	.05 MFD. 200 Volt Condenser	.19
7862	.004 MFD. 400 Volt Condenser	.17
9203	.1 MFD. 400 Volt Condenser	.20
8961	.05 MFD. 400 Volt Condenser	.19
7860	.01 MFD. 400 Volt Condenser	.17
2251	Wire Wound Resistor Strip	.28
1830	Resistor Line Cord 115 Volts	1.00
1831	Resistor Line Cord 220 Volt Extension	1.50
1832	Resistor Line Cord 150 Volt Extension	1.50
6984	500,000 Ohm 1/3 Watt Resistor	.19
8906	250,000 Ohm 1/3 Watt Resistor	.19
7998	1 Meg Ohm 1/3 Watt Resistor	.19
6879	50,000 Ohm 1/3 Watt Resistor	.19
8907	25,000 Ohm 1/3 Watt Resistor	.19
1152	400 Ohm 1/3 Watt Resistor	.19
9018	150 Ohm 1/3 Watt Resistor	.19
1176	10,000 Ohm 1/2 Watt Resistor	.19
1727	6" Dynamic Speaker	8.00
1740	15/16" Knob	.22
1739	13/16" Knob	.22

Prices are subject to change without notice.

SPARKS-WITHINGTON COMPANY

MODEL 99



C1 VARIABLE CONDENSER
C2 DOUBLE EQ. COND. A-4713
C3 SINGLE EQ. COND. A-4712
C4 ANTENNA COMP. A-3357
C5 .0003 MFD. A-3863
C6 .000023 MFD. A-4354
C7 1 MFD. A-5032
C8 .25 MFD. A-5033
C9 .2 MFD. A-7420
C10 .002 MFD. A-3217
C11 FILTER BLOCK 60~ B-2003
FILTER BLOCK 25~ B-2114

R1 2,800 Ω .5 W. A-4353
R2 20,000 Ω 3 W. A-3422
R3 50,000 Ω 3 W. A-3423
R4 900 Ω 10 W. A-3536
R5 250,000 Ω 1 W. A-4234
R6 7,000 Ω 10 W. A-3535
R7 10,000 Ω 4 W. A-3564
R8 1,000 Ω 2 W. A-3397
R9 110 Ω 1 W. A-4915
R10 50,000 Ω RADIO VOL. CON. A-3491
R11 100,000 Ω RECORD VOL. CON. 88

L1 TUNING COIL A-3244
L2 FILTER CHOKE A-2947
L3 FILTER CHOKE B-2002
L4 DET. PLATE CHOKE A-3506
L5 COUPLING COIL A-3756
L6 FIRST PLATE CHOKE A-3239-W
L7 FIRST GRID CHOKE A-3240
L8 CATHODE CHOKE A-3332
L9 2ND. R.F. TRANS. A-2963-W
L10 3RD. R.F. TRANS. A-2965-W
L11 4TH. R.F. TRANS. A-2967-W
L12 5TH. R.F. TRANS. A-2961-W
L13 FREE GRID COIL A-3238-W

T1 POWER TRANS. 60~ C-257
POWER TRANS 25~ C-287
T2 INPUT AUDIO TRANS. A-3433
T3 FILAMENT TRANS. A-3566
T4 INPUT TRANS. B-2004
T5 OUTPUT TRANS. B-2005

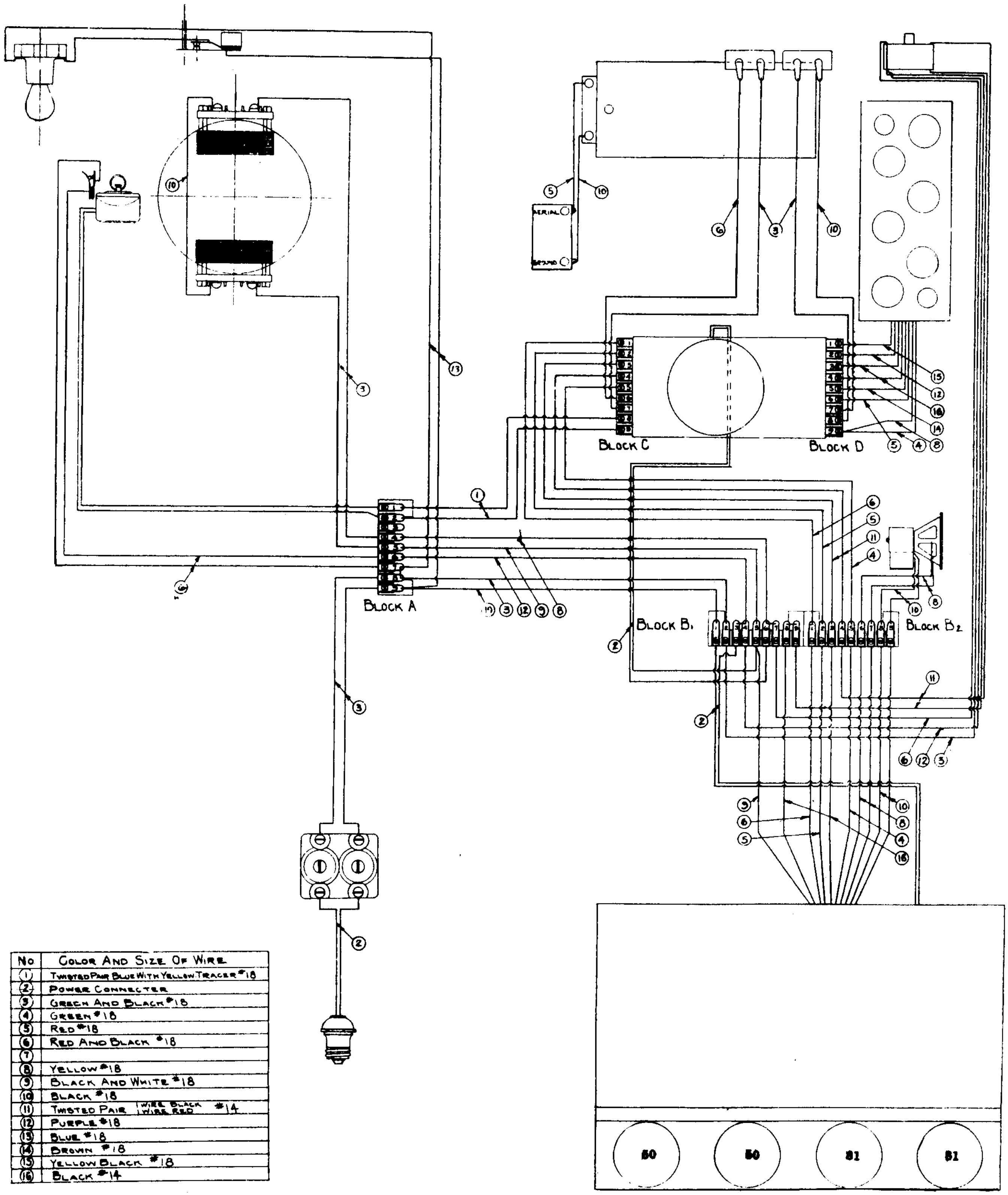
VOLTAGE ANALYSIS

Line Voltage 115 Position of Volume Control Full
Position of Voltage Compensator 100-115 With Antenna disconnected

TUBE	LOCATION	HEATER OR FILAMENT	PLATE	CONTROL GRID —	PLATE CURRENT (ma.)
485	1st. R. F.	2.9 - 3.0	90 - 135	3.0 - 5.0	5.0 - 7.0
485	2nd. R. F.	2.9 - 3.0	90 - 135	3.0 - 5.0	5.0 - 7.0
485	3rd. R. F.	2.9 - 3.0	90 - 135	3.5 - 5.0	5.0 - 7.0
485	4th. R. F.	2.9 - 3.0	90 - 135	3.0 - 5.0	5.0 - 7.0
485	5th. R. F	2.9 - 3.0	90 - 135	3.0 - 5.0	5.0 - 7.0
485	Detector	2.9 - 3.0	150 - 250	14 - 20	1.0 - 2.0
26	Inter-stage	1.4 - 1.5	160 - 200	10 - 15	6.0 - 8.0
60	Power	6.0 - 7.5	270 - 350	46 - 70	28 - 45
50	Power	6.0 - 7.5	270 - 350	46 - 70	28 - 45
81	Rectifier	6.0 - 7.5	550 - 650	-----	70 - 80
81	Rectifier	6.0 - 7.5	550 - 650	-----	70 - 80

SPARKS-WITHINGTON COMPANY

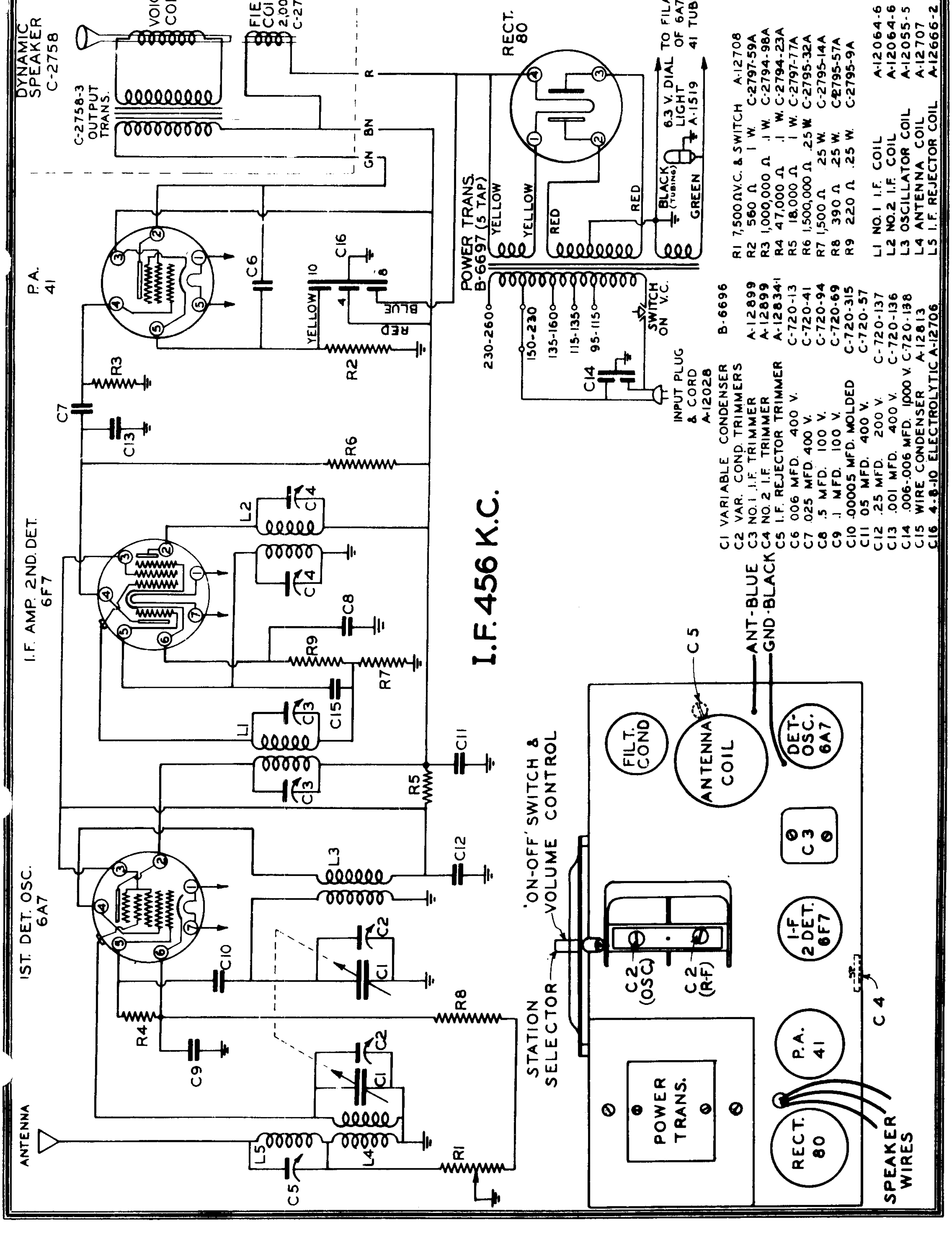
MODEL 99



No	Color And Size Of Wire
1	Twisted Pair Blue With Yellow Tracer #18
2	Power Connecter
3	Grech And Black #18
4	Green #18
5	Red #18
6	Red And Black #18
7	
8	Yellow #18
9	Black And White #18
10	Black #18
11	Twisted Pair Wire Black / Wire Red #14
12	Purple #18
13	Blue #18
14	Brown #18
15	Yellow Black #18
16	Black #14

SPARKS-WITHINGTON COMPANY

MODEL 417X



C1	VARIABLE CONDENSER	B-6696
C2	VAR. COND. TRIMMERS	
C3	NO. 1 I.F. TRIMMER	A-12899
C4	NO. 2 I.F. TRIMMER	A-12899
C5	I.F. REJECTOR TRIMMER	A-12834-1
C6	.006 MFD. 400 V.	C-720-13
C7	.025 MFD. 400 V.	C-720-41
C8	.5 MFD. 100 V.	C-720-94
C9	.1 MFD. 100 V.	C-720-69
C10	.00005 MFD. MOLDED	C-720-315
C11	.05 MFD. 400 V.	C-720-57
C12	.25 MFD. 200 V.	C-720-137
C13	.001 MFD. 400 V.	C-720-136
C14	.006-.006 MFD. 1000 V.	C-720-138
C15	WIRE CONDENSER	A-12813
C16	4-8-10 ELECTROLYTIC	A-12706

R1	7,500 Ω V.C. & SWITCH		A-12708
R2	560 Ω	1 W.	C-2797-59A
R3	1,000,000 Ω	.1 W.	C-2794-98A
R4	47,000 Ω	.1 W.	C-2794-23A
R5	18,000 Ω	1 W.	C-2797-77A
R6	1,500,000 Ω	.25 W.	C-2795-32A
R7	1,500 Ω	.25 W.	C-2795-14A
R8	390 Ω	.25 W.	C-2795-57A
R9	220 Ω	.25 W.	C-2795-9A

L1	NO. 1 I.F. COIL	A-12064-6
L2	NO. 2 I.F. COIL	A-12064-6
L3	OSCILLATOR COIL	A-12055-5
L4	ANTENNA COIL	A-12707
L5	I.F. REJECTOR COIL	A-12666-2

SPARKS-WITHINGTON COMPANY

MODEL 417X

VOLTAGE-RESISTANCE CHART

Line Voltage: 115 volts   **Position of Volume Control: Full with Antenna Disconnected**

Voltage Compensator: 115-135

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Grid Cap
6A7	1st. Det-Oscillator	Volts	*	210	150	150	0	0	*	0
		Ohms	0	250000	250000	250000	55000	400	0	5
6F7	I-F Amplifier-2nd. Det.	Volts	*	225	100	40	0	0	*	0
		Ohms	0	250000	250000	**	0	1500	0	
41	Power Amplifier	Volts	*	300	305	0	0	*	-	-
		Ohms	0	**	**	1 meg.	500	0	-	-
80	Rectifier	Volts	0	310	310	5	-	-	-	-
		Ohms	0	0	0	0	-	-	-	-

Notes; Voltage and resistance readings are for schematic diagram shown on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 2.

* Reading will be zero or 6 volts, depending on twist of heater hook-up wire.

** Cannot be measured with Weston Selective Analyzer No. 665, Type 2.

The SPARTON Model 417-X (Export) is equipped with an adjustable power transformer for operation on various line voltages as indicated under the transformer terminal cover plate. The Receivers are shipped from the factory to operate on a line voltage of 220 volts, unless other specifications are found on the chassis. Before attempting to re-align the circuits, be sure that the transformer tap is correctly adjusted for the line voltage to be used.

The Model 417-X is a single band (Broadcast) Receiver with an Airplane-type dial calibrated to show station readings in Meters and Kilocycles simultaneously.

For proper alignment of this model, the procedure should be followed in the same order as given.

(1) Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

(2) The dial pointer should point to the horizontal lines on the scale when the variable condensers are turned all the way in (rotor plates flush with stator plates). The pointer can be adjusted by holding the condenser plates firmly meshed and then turning the pointer hub which projects through the back of the scale.

(3) Tune test oscillator and receiver to 1400 kilocycles.

(4) Connect the "antenna" lead of the test oscillator to the grid-cap of the Type 6A7 1st. Detector-Oscillator tube, and the test oscillator ground to the chassis frame.

(5) Connect output meter from Plate connection of the Type 41 tube to ground.

(6) Adjust Condensers C4 and C3 until the output meter registers the greatest deflection. It is advisable to keep the output of the receiver down to a low value with the volume control as this permits more exact adjustments.

(7) If necessary, the wirewound condenser (C15 in the schematic diagram) may be adjusted to obtain maximum gain with good stability. If greater gain is required, the wire may be bent to to form more turns results in greater capacity. This wirewound condenser is located on the terminal strip underneath the chassis.

After making any changes in this condenser, it should be waxed thoroughly and condensers C4 and C3 should be re-adjusted.

(1) Disconnect "antenna" lead of test oscillator from grid-cap of Type 6A7 tube and connect it in series with a 250 uuf. (.00025 uf.) condenser to the Antenna terminal (Blue wire) of the receiver. Condenser Part No. C-720-217 may be used.

(2) Tune test oscillator and receiver to 1500 kilocycles and adjust condensers C2 (RF) and C2 (Osc.)

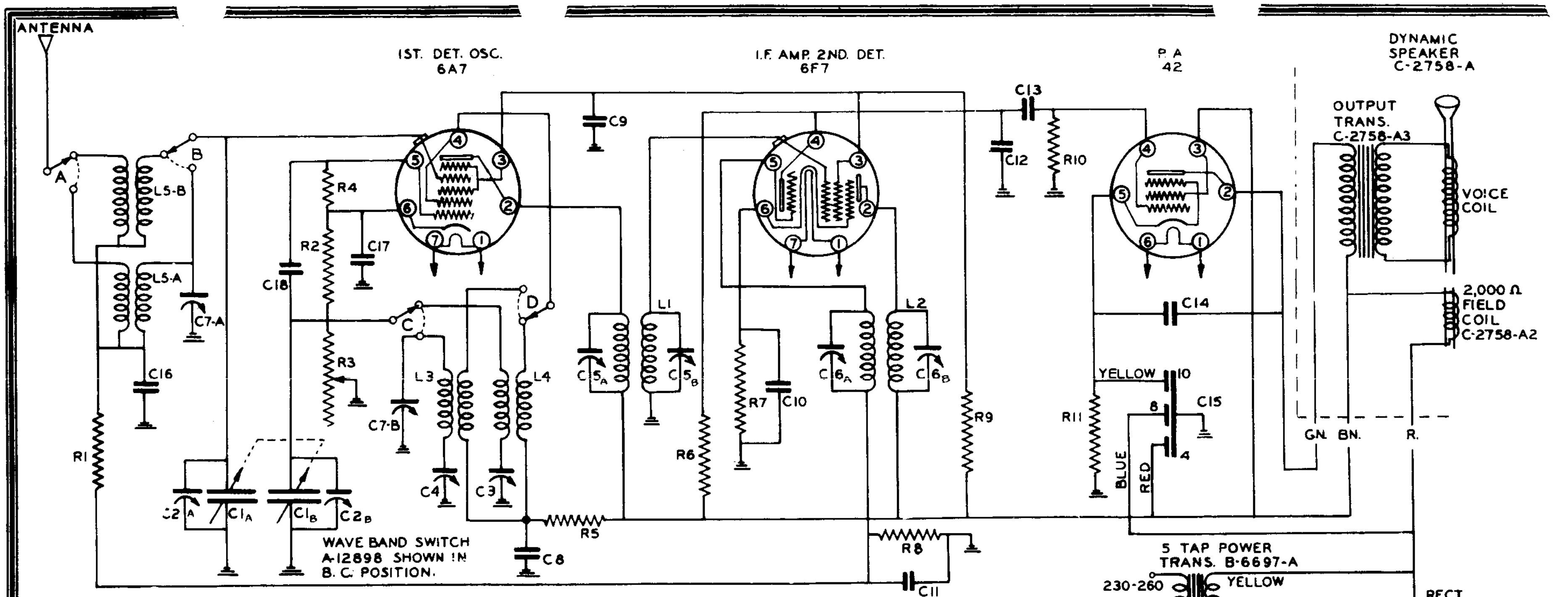
(3) Tune test oscillator and receiver to 900 kilocycles and 600 kilocycles and check sensitivity and calibration. If necessary, the variable condenser plates may be bent slightly to provide correct operation at these frequencies.

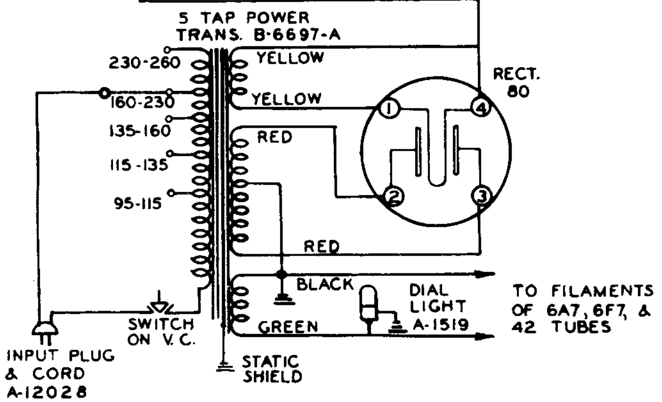
(4) Tune test oscillator to 456 kilocycles and adjust condenser C5 to a point where the output meter registers the minimum deflection.

All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.

SPARKS-WITHINGTON COMPANY

MODELS 427X, 437X & 457X





C1 VARIABLE CONDENSER B-6781
C2 VAR. COND. TRIMMERS
C3 B.C. PADDER 550 MMF. A-12834-2
C4 L.W. PADDER 150 MMF. A-12834-1
C5 NO. 1 I.F. TRIMMER A-12668
C6 NO. 2 I.F. TRIMMER A-12668
C7 L.W.(A), B.C.(B) TRIMMER A-12334
C8 .05 MFD. 400 V. C-720-57
C9 .1 MFD. 400 V. C-720-61
C10 .2 MFD. 200 V. C-720-90
C11 .025 MFD. 200 V. C-720-40
C12 .0005 MFD. 400 V. C-720-4
C13 .025 MFD. 400 V. C-720-41

C14 .006 MFD. 600 V. C-720-15
C15 4-8-10 ELECTROLYTIC A-14101
C16 .1 MFD. 200 V. C-720-60
C17 .1 MFD. 200 V. C-720-60
C18 .00005 MFD. MOLDED C-720-315

L1 NO. 1 I.F. COIL A-12064-8
L2 NO. 2 I.F. COIL A-12064-8
L3 L.W. OSC. COIL A-12294-2
L4 B.C. OSC. COIL A-12055-7
L5-A L.W. ANT. COIL } A-12991
L5-B B.C. ANT. COIL }

R1 100,000 Ω .25 W. C-2795-25B
R2 390 Ω .25 W. C-2795-57B
R3 7,500 Ω V.C. & SWITCH A-12708
R4 47,000 Ω .25 W. C-2795-82B
R5 22,000 Ω .5 W. C-2796-21A
R6 470,000 Ω .25 W. C-2795-29B
R7 330 Ω .25 W. C-2795-56B
R8 220,000 Ω .25 W. C-2795-27B
R9 22,000 Ω 1 W. C-2797-21A
R10 1 MEGOHM .25 W. C-2795-31B
R11 470 Ω 1 W. C-2797-11A

VOLTAGE-RESISTANCE CHART

Line Volt ge: 118 volts

Position of Volume Control: Full with Antenna Disconnected

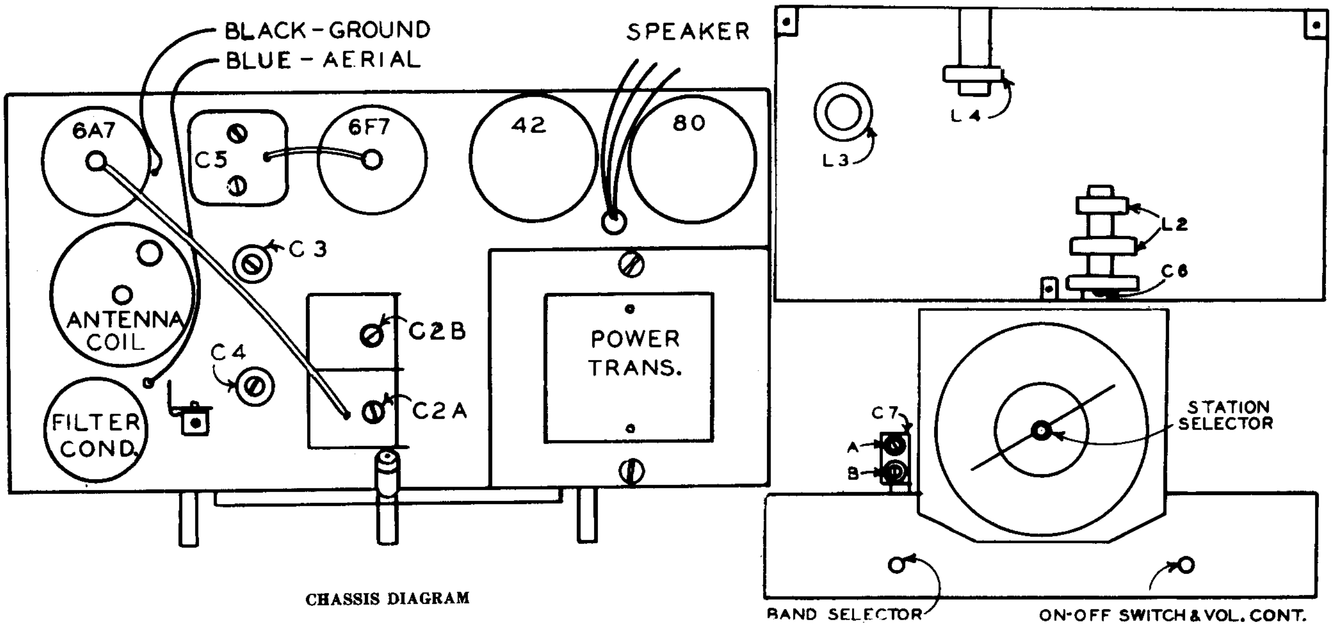
Position of Band Selector Switch: Broadcast

Tube	Function	Measure-ment	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Grid Cap
		Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
6A7	1st. Detector-Oscillator	Volts	0	250	165	235	0	0	0	0
		Ohms	0	100000	120000	120000	53000	6000	0	300000
6F7	I-F Amp., 2nd. Det.	Volts	0	250	140	180	0	0	0	0
		Ohms	0	48000	80000	750000	200000	300	0	0
42	Power Amplifier	Volts	0	325	325	0	0	0	-	-
		Ohms	0	50000	50000	750000	400	0	-	-
80	Rectifier	Volts	0	350	350	0	-	-	-	-
		Ohms	390	390	390	0	-	-	-	-

Notes: Voltage and resistance readings are for schematic diagram shown on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 2.

I. F. 456 K.C.

SPARKS-WITHINGTON COMPANY
MODELS 427X, 437X & 457X



CHASSIS DIAGRAM

FOREWORD: The SPARTON Models 427-X, 437-X and 457-X (Export) are equipped with an adjustable power transformer for operation on various line voltages as indicated under the transformer terminal cover plate.

Before attempting to realign the circuits, be sure that the transformer tap is correctly adjusted for the line voltage to be used. Unless otherwise specified, the adjusting of any condenser consists of turning the adjusting screw or nut to the right or left until the output meter registers the greatest deflection.

STEP BY STEP PROCEDURE

Note: For proper alignment of these chasses, the procedure should be followed in the same order as given.

The dial pointer should be exactly parallel with the horizontal line of the dial scale when the condenser plates are fully meshed. If the pointer does not read correctly, remove the dial cover and move the pointer until it shows a correct reading.

A. Alignment of Intermediate-Frequency

1. Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condenser.

2. Turn the band selector switch to the "Broadcast" position and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

3. Connect antenna of test oscillator to grid cap of Type 6A7 1st detector-oscillator tube and ground of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate terminal of Type 42 tube to ground.

Note: It is advisable to read carefully the operating instructions included with the test oscillator.

4. Tune test oscillator to obtain a signal of 456 kilocycles.

5. Turn the volume control of receiver on full and adjust I-F condensers C5 and C6.

B. Alignment of Broadcast Band

1. Disconnect "antenna" lead of test oscillator from grid cap of Type 6A7 tube and connect it in series with a 150 mmf. condenser dummy antenna to the antenna terminal of the chassis.

2. Tune test oscillator and receiver to a wave length of 200 meters (1500 kilocycles) and adjust condenser C2-B (oscillator trimmer) and condenser C2-A (antenna trimmer).

3. Tune test oscillator and receiver to 500 meters (600 kilocycles) and adjust condenser C4 (oscillator padder).

4. Retune test oscillator and receiver to 200 meters and check the adjustments of condensers C2B and C2A.

5. Calibration of the broadcast band should also be checked at 330 meters (900 kilocycles).

C. Alignment of Long-Wave Band

1. Turn the band selector switch to the "long-wave" band, tune test oscillator and receiver to a wave length of 870 meters (345 kilocycles) and adjust condenser C7-B (long-wave oscillator trimmer) and condenser C7-A (long-wave antenna trimmer).

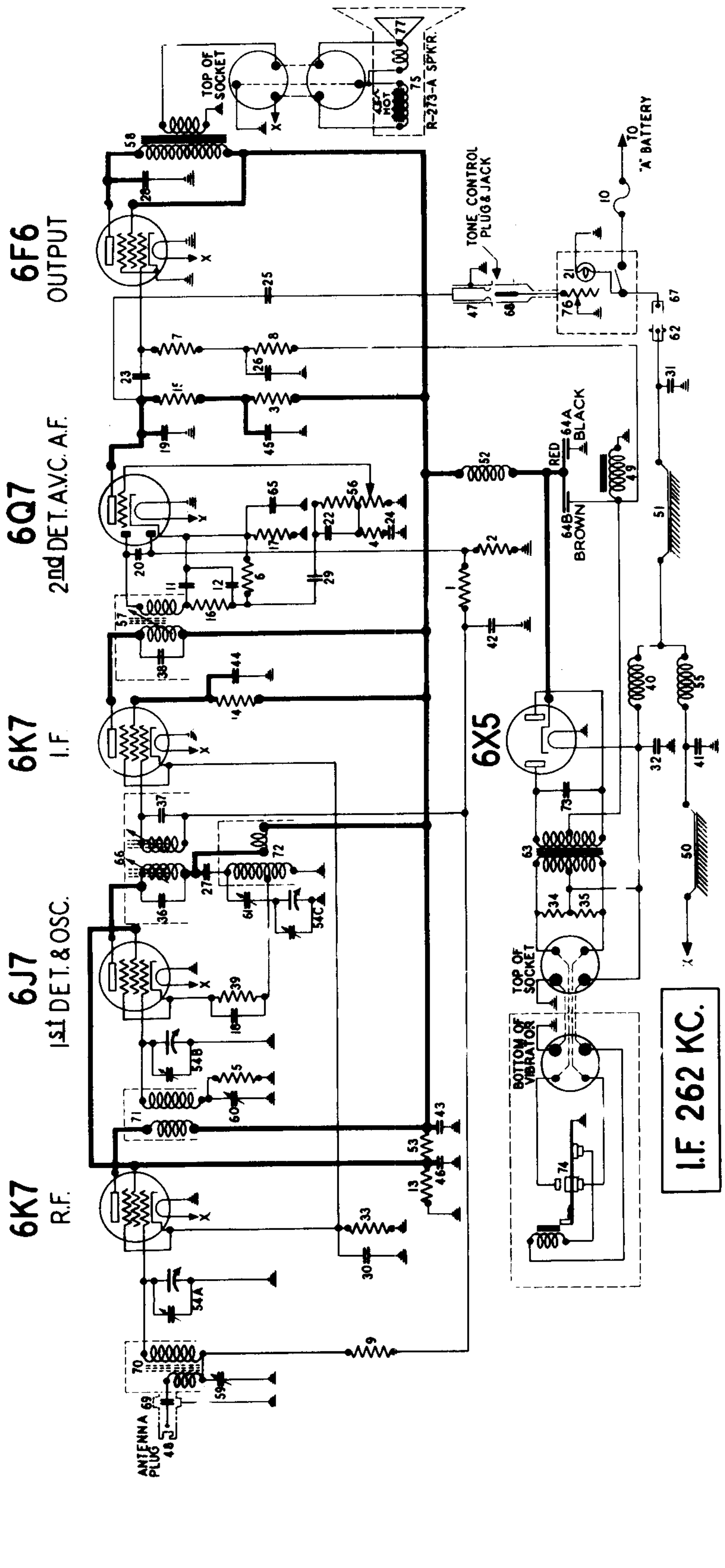
2. Tune test oscillator and receiver to a wave length of 2000 meters (150 kilocycles) and adjust condenser C3 (long-wave oscillator padder).

3. Retune test oscillator and receiver to 870 meters (345 kilocycles) and check the adjustment of condensers C7-B and C7-A.

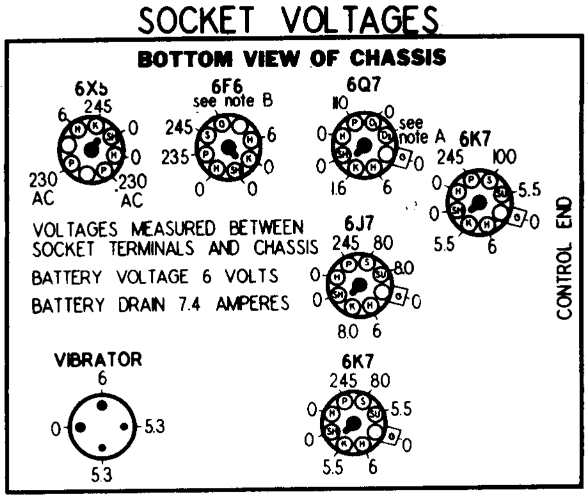
Caution: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.

STEWART-WARNER CORPORATION

MODEL R1781 AUTO RADIO



SOCKET VOLTAGES



IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt. Make allowances for battery voltage variation.

NOTE A: This voltage is 1.6 volts measured across resistor No. 17.

NOTE B: The grid bias of the 6F6 output tube is -14 volts measured between chassis and ungrounded filter choke terminal.

Diagram Number	Part Number	Description	List Price
1-2	83072	Carbon resistor, 510,000 ohm 1/4 watt	$ .12
3-4	83080	Carbon resistor, 51,000 ohm 1/4 watt	.12
5-6-7 8-9	83082	Carbon resistor, 260.000 ohm 1/4 watt	.12
10	83207	Fuse, 15 ampere 25 volt	.05
11-12	83539	Mica condenser, 260 mmfd.	.20
13-14-15	84198	Carbon resistor, 110,000 ohm 1/4 watt	.12
16	84238	Carbon resistor, 11,000 ohm 1/4 watt	.20
17	84240	Carbon resistor, 4,000 ohm 1/4 watt	.20
18	84282	Mica condenser, .001 mfd.	.25
19-20	84370	Mica condenser, 110 mmfd.	.15
21	85296	Dial light bulb (bayonet type)	.16
22	85394	Mica condenser, 510 mmfd.	.25
23	88026	Paper condenser, .02 mfd. 400 volt	.25
24	88029	Paper condenser, .004 mfd. 400 volt	.25
25	88030	Paper condenser, .01 mfd. 400 volt	.25
26	88046	Paper condenser, .1 mfd. 150 volt	.25
27	88173	Mica condenser, 50 mmfd.	.20
28	88185	Paper condenser, .006 mfd. 600 volt	.25
29	88189	Paper condenser, .05 mfd. 200 volt	.25
30	88193	Paper condenser, .25 mfd. 150 volt	.35
31-32	88195	Paper condenser, .5 mfd. 150 volt	.50
33	88203	Carbon resistor, 600 ohm 1/4 watt	.15
34-35	88204	Wire wound resistor, 210 ohm 1/2 watt	.15
36-37-38	88233	Mica condenser, 110 mmfd.	.25
39	88257	Carbon resistor, 9,500 ohm 1/4 watt	.15
40	88289	"A" choke (in vibrator supply)	.20
41	88298	Condenser .25 mfd. 150 volt (low loss)	.40
42	88534	Condenser .05 mfd. 150 volt (low loss)	.25
43-44-45	88682	Paper condenser, .1 mfd. 400 volt	.25
46	89421	Paper condenser, .1 mfd. 200 volt	.25
47	110078	Tone control socket	.08
48	110087	Antenna lead receptacle	.03
49	110149	Filter choke (iron core)	1.10
50-51	110161	Interference elimination capacitor	.34
52	110174	Radio frequency choke	.40
53	110186	Carbon resistor, 110,000 ohm 1/2 watt	.12
54A to C	110300	Three gang variable condenser	5.00
55	110306	"A" choke (in filament supply)	.24
56	110311	Volume control, 500,000 ohm	1.10
57	110312	2nd I.F. transformer	2.00
58	110313	Output transformer	1.90
59	110331	Antenna compensating condenser	.80
60	110332	R.F. padding condenser	1.00
61	110333	Oscillator padding condenser	.60
62	110371	"A" contact and lead assem.	.12
63	110375	Power transformer	4.00
64A 64B	110376	Electrolytic condenser {8 mfd. sect. / 4 mfd. sect.}	1.90
65	110377	Electrolytic condenser, 10 mfd. 25 volt	.60
66	110378	1st I.F. transformer	2.70
67	110404	32 inch "A" lead (standard)(from set to control hd.)	.35
	110444	42 inch "A" lead (special)(from set to control hd.)	.50
68	110405	29 inch tone control cable (standard)	.50
	110443	36 inch tone control cable (special)	.80
69	110414	Paper condenser, .02 mfd. 200 volt	.35
70	110415	Antenna coil and shield	2.20
71	110416	R.F. coil and shield	1.40
72	110417	Oscillator coil and shield	1.90
73	110431	Paper condenser, .01 mfd. 1,700 volt	.35
74	110432	Vibrator	3.50
75	R273A	Speaker 8 inch dynamic	5.00
76	110310	Tone control (250,000 ohm)	1.[illegible]
77	110460	Speaker cone	1.80

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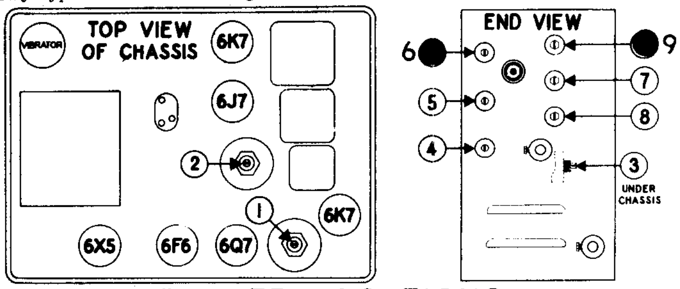
STEWART-WARNER CORPORATION

MODEL R1781 AUTO RADIO

CIRCUIT DESCRIPTION

This receiver employs several outstanding circuit refinements such as permeability-tuned iron core I.F. transformers, iron core antenna coil, bass-compensated volume control, high and low frequency R.F. trimmers, adjustable "antenna compensator", and improved "hash" and ignition interference elimination filters.

IMPORTANT: No check for storage battery polarity is necessary as the receiver works with equal efficiency on cars with negative or positive grounds. This convenient self-contained power unit utilizes a primary type vibrator and a high vacuum full wave rectifier tube.



TRIMMER LOCATIONS

Trimmer Number		Alignment Frequency
1	1st I.F. transformer trimmer (top)	262 KC.
2	2nd I.F. transformer trimmer	262 KC.
3	1st I.F. transformer trimmer (bottom)	262 KC.
4	Oscillator series padder	600 KC.
5	R.F. series padder	600 KC.
6	Antenna compensator (padder)	600 KC.
7	Oscillator shunt trimmer	1400 KC.
8	R.F. Shunt trimmer	1400 KC.
9	Antenna shunt trimmer	1400 KC.

ALIGNMENT

The equipment necessary for proper alignment of this receiver consists of a good modulated oscillator, a sensitive output meter and an insulated screw driver.

The test oscillator must be accurately calibrated and its output must be adjustable to give a very weak signal which will not actuate the A.V.C. of the receiver. The insulated screw driver should be made of fibre or bakelite although a small metal blade inserted at the tip is permissible. A long blade in an insulated handle is not suitable and will prevent accurate adjustment.

An output meter with a full scale reading of four volts or less is desirable so that it can be connected directly across the voice coil terminals of the speaker. Any A.C. voltmeter with such a range will be satisfactory. If your output meter is not equipped with such a low scale, it should be connected from the plate of the output tube to chassis.

During alignment, the volume control should be turned full on and the receiver case should be in place. The front cover can be removed to permit the connection of the output meter. Keep rear cover in place.

I.F. ALIGNMENT

1– (a) Set the test oscillator to exactly 262 KC.

(b) Connect the output terminal of the oscillator to the grid of the 6J7 tube through a .1 to .5 mfd. condenser. Do not remove the grid lead from the tube.

(c) Connect the grounded output lead of the oscillator to the receiver case.

(d) Turn the gang condenser of the receiver to any point where it has no tuning effect on the 262 KC. signal.

(e) Adjust trimmers 1, 2 and 3 for maximum output. Trimmer No. 3 is located under the chassis but can be reached through a hole in the rear cover.

(f) Repeat the adjust of trimmers 1, 2 and 3.

R.F. CALIBRATION AND ALIGNMENT

This receiver employs an unusual circuit which allows the antenna, the R.F. and the oscillator circuits to be adjusted near the low frequency end of the dial in addition to the high frequency end. To get maximum sensitivity and accurate dial calibration, the following procedure must be followed exactly.

2– Low Frequency Alignment.

(a) Connect the output of the test oscillator to the antenna socket of the receiver through a 200 mmfd. (.0002 mfd.) mica condenser. This condenser must not be omitted or alignment will be incorrect.

(b) Connect the control head to the receiver, then turn the tuning knob until the variable condenser plates are in full mesh.

Adjust the dial calibration so that the dial pointer is on the last dial calibration mark below 550 KC. The relative position of the control head, the control shaft, and the receiver must remain unchanged until the alignment is completed.

(c) Turn the tuning knob until the dial pointer indicates that the set is tuned to 600 KC.

(d) Set the test oscillator at exactly 600 KC.

(e) Adjust trimmer No. 4 for maximum output. The adjustment of this trimmer must be made with an insulated screw driver having no more than a small metal tip.

(f) Retune the receiver to the oscillator signal.

(g) Adjust trimmers 5 and 6 for maximum output.

3– High Frequency Alignment.

(a) Tune the receiver to exactly 1400 KC. on the tuning dial.

(b) Adjust the test oscillator to exactly 1400 KC.

(c) Adjust trimmer No. 7 for maximum output.

(d) Carefully tune the receiver to the 1400 KC. oscillator signal.

(e) Adjust trimmers 8 and 9 for maximum output.

4– Final Adjustment.

(a) Repeat operations 2 (c) to (g) and 3 (a) to (e) in the same order until no further improvement in output can be made. Adjustments must be repeated at least once and if the set is badly out of alignment, a second repetition is necessary.

ANTENNA COMPENSATOR AJUSTMENT

The antenna compensator must be adjusted after the installation of the receiver has been completed in order to match the receiver to the antenna. If this adjustment is made for an old under-car aerial, care must be taken that the aerial and its insulators are clean and free from mud or slush which would alter the capacity and resistance. More accurate adjustment is possible if the aerial and its insulators are washed and allowed to dry before attempting adjustment.

The adjustment is to be made as follows:

(a) Carefully tune the receiver to some fairly weak signal between 550 and 650 KC.

(b) Remove the chrome plated button adjacent to the antenna jack. (Covering trimmer No. 6).

(c) Adjust the antenna compensator, trimmer No. 6 for maximum volume. Carefully retune the receiver to the signal, then again adjust the compensator.

Do not attempt to adjust any of the other trimmers on stations at this time or the entire alignment will be upset since an oscillator must be used for all adjustments except the antenna compensator.

Note: If you do not get a peak when adjusting this trimmer and if the car has a built-in antenna of unusually high capacity such as an insulated running board or insulated metal roof, it will be necessary to insert a special plug-in adapter in series with the antenna lead. These adapters are made in two types and can be obtained from United Motors Service Stations. For aerials having a capacity between 400 and 900 micro-microfarads (insulated running boards), the adapter United Motors Part No. 7231410 (marked with red band) should be used. For aerials between 900 and 2,000 micro-microfarads (metal roof tops) their Part No. 1210915 should be used.

MISCELLANEOUS PARTS

Part Number	Description	List Price
83319	Fuse insulator tube	$ .02
83722	Rubber grommet for gang condenser mounting	.03
85427	Eight prong tube socket	.15
88262	Four prong vibrator socket	.14
110075	Cup washer for gang condenser mtg.	.02
110079	Volume control bracket	.04
110090	Green plug button for trimmer holes in case	.08
110097	Speaker baffle	.16
110112	Speaker mounting plate	.60
110133	Speaker cable plug	.10
110134	Speaker dust cap	.02
110189	Coupling for drive shaft	.08
110236	Anti-rattle clips for case	.05
110237	Tube cap shield	.06
110303	Ground clip (soldered to chassis)	.02
110305	Spring clamp for top of vibrator	.04
110327	Speaker socket	.12
110329	Transformer case	.46
110369	Name plate	.70
110372	Rubber tubing for spring clamp on vibrator	.01
110400	Receiver case (less top and bottom)	4.00
110404	32 inch "A" cable and socket (from set to control head)	.35
110405	29 inch tone control cable and jack (standard)(see also #110443)	.50
110406	Ammeter cable and fuse housing	.45
110407	Antenna cable	1.25
110408	Ammeter cable and cap (from fuse to control head)	.30
110413	Chrome plated plug button (for antenna compensator)	.08
110427	Top cover	3.00
110429	Bottom cover and mounting bracket assem.	1.40
110430	Case cover screws (#8x1/4 hex. head)	.01
110443	36 inch tone control lead assembly	.80
110444	42 inch "A" cable and socket (special)	.50
110448	Set screw for flexible cables	.05
110465	Volume control sleeve	.04

FLEXIBLE SHAFTS

Part Number	Description	List Price
110367	18 inch flexible shaft (for tuning control)	1.20
110368	18 inch flexible shaft (for volume control)	1.20
110435	28 inch flexible shaft (for tuning control)	1.50
110436	28 inch flexible shaft (for volume control)	1.50

INSTALLATION PARTS

Part Number	Description	List Price
76914	Split lock washer for receiver mounting	.01
77650	Nut (for special General Motors mounting)	.02
77890	Hex. nut for receiver mounting (1/2"-13)	.04
85012	Receiver mounting bolt	.06
88335	Shakeproof lock washer (for receiver mounting)	.04
88336	Plain washer for receiver mounting	.04
88350	Generator condenser .5 mfd. 150 volt	.75
88422	Ford distributor condenser	.75
88429	Distributor suppressor	.35
88431	Shield for antenna lead	.40
110402	Braided ground bond (10 inch)	.22
110403	Braided ground Bond (6 inch)	.18
110410	Ammeter condenser, .5 mfd. 100 volt	.35
110462	Front wheel static collectors (Firestone-Ward)	.30
110464	Sets G.M. type mounting kits	.30

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STROMBERG-CARLSON TELEPHONE MFG. CO.
MODELS 230 SERIES, 230-H, 230-HB, 230-L, 230-LB; 231 SERIES, 231-F, 231-FB, 231-P, 231-PB, 231-R & 231-RB

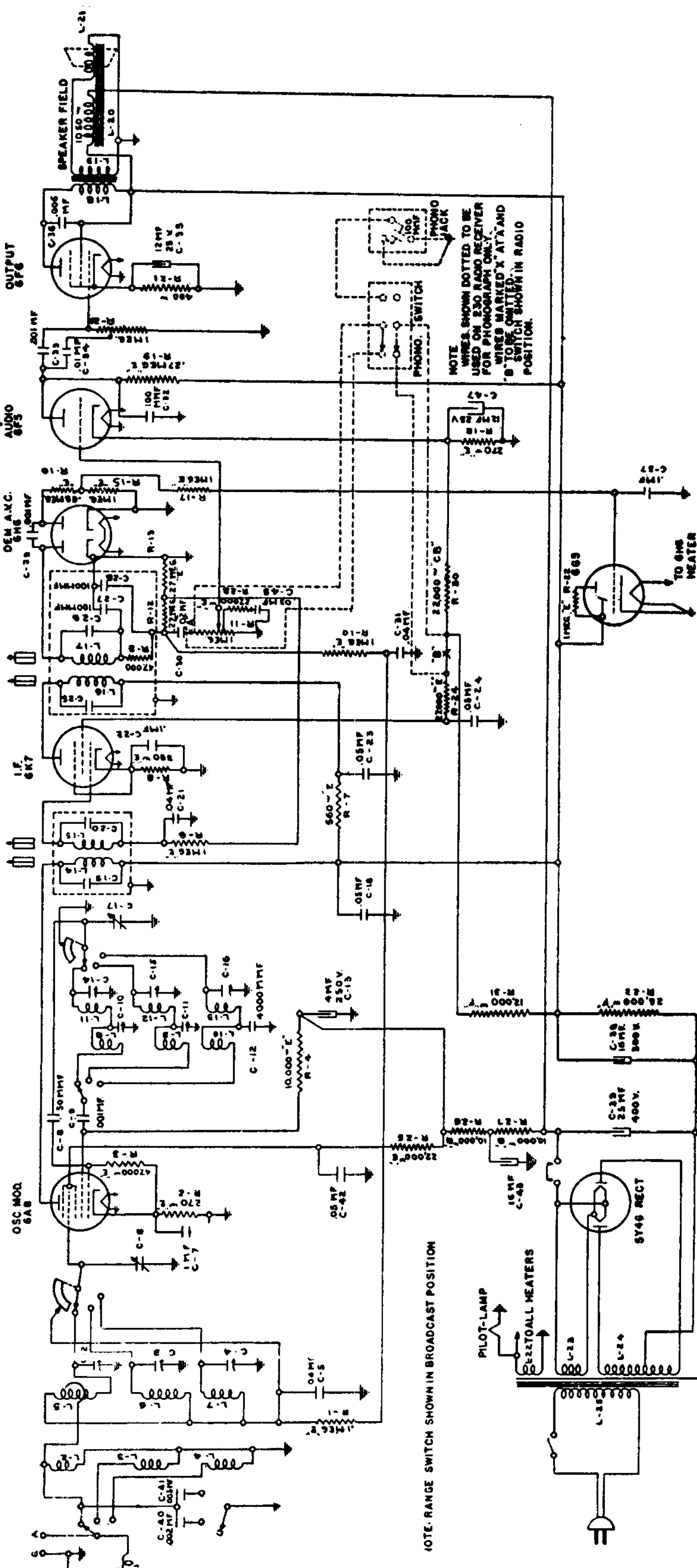


Fig. 3. Schematic Circuit of Receiver

Tube	Circuit	Cap	Terminals of Sockets 1	2	3	4	5	6	7	8	Heater Voltages Between Heater Terminals: Socket Terminal Numbers	Volts
6A8	Mod.—Osc.	0	0	0	+245	+100	−8	+155	*6.1*	+2.5	2–7	*6.1*
6K7	I. F. Amp.	0	0	0	+245	+100	+3	+160	*6.1*	+3	2–7	*6.1*
6H6	Dem.—A. V. C.	—	0	0	0	0	0	0	*6.1*	0	2–7	*6.1*
6F5	Audio Amp.	0	0	0	+250	+115	+150	+150	*6.1*	+1.7	2–7	*6.1*
6F6	Audio Output	—	0	0	+250	+255	0	0	*6.1*	+16	2–7	*6.1*
6G5	Tuning Ind.	—	0	+2.4	0	+250	0	*6.1*			1–6	*6.1*
5Y4G	Rectifier	—	0	0	*350*	0	*350*	0	+330	+330	7–8	*4.8*
Speaker Socket		—	+330	0	0	+330	+330	—	+255			

A. C. voltages are indicated by italics. Receiver tuned to 1000 kc., no signal.

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODELS 230 SERIES, 230-H, 230-HB, 230-L, 230-LB: 231 SERIES, 231-F, 231-FB, 231-P, 231-PB, 231-R & 231-RB

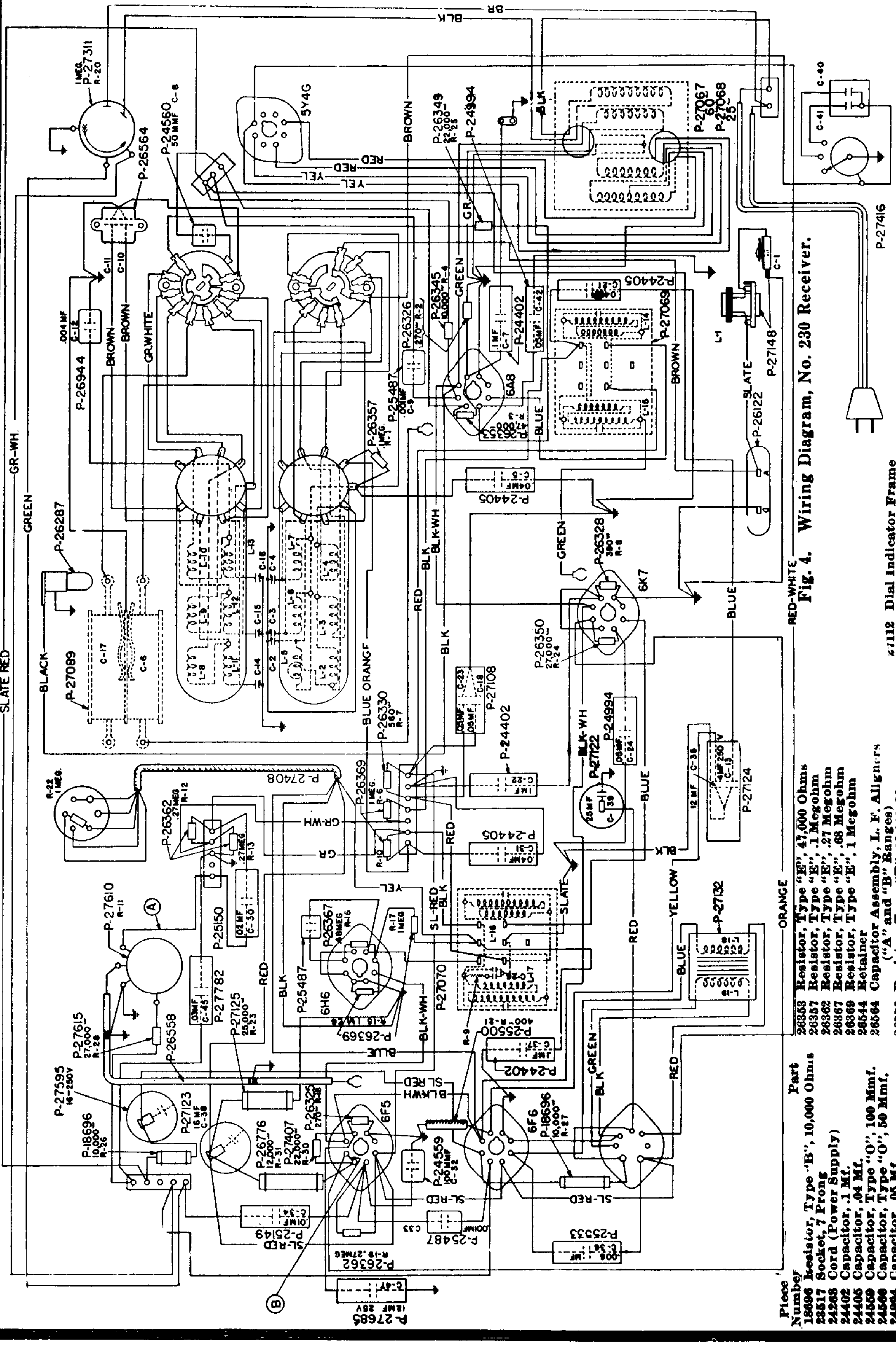


Fig. 4. Wiring Diagram, No. 230 Receiver.

Piece Number	Part
18696	Resistor, Type "B", 10,000 Ohms
23517	Socket, 7 Prong
24268	Cord (Power Supply)
24402	Capacitor, .1 Mf.
24405	Capacitor, .04 Mf.
24559	Capacitor, Type "O", 100 Mmf.
24560	Capacitor, Type "O", 50 Mmf.
24994	Capacitor, .05 Mf.
25149	Capacitor, .01 Mf.
25150	Capacitor, .02 Mf.
25487	Capacitor, Type "W", .001 Mf.
25500	Resistor, Flexible, 400 Ohms.
25533	Capacitor, .01 Mf.
25539	Socket, 8 Prong.
26114	Potentiometer (Volume Control)
26287	Pilot Lamp
26326	Resistor, Type "E", 270 Ohms
26328	Resistor, Type "E", 390 Ohms
26330	Resistor, Type "E", 560 Ohms
26345	Resistor, Type "E", 10,000 Ohms
26349	Resistor, Type "E", 22,000 Ohms
26350	Resistor, Type "E", 27,000 Ohms
26353	Resistor, Type "E", 47,000 Ohms
26357	Resistor, Type "E", .1 Megohm
26362	Resistor, Type "E", .27 Megohm
26367	Resistor, Type "E", .68 Megohm
26369	Resistor, Type "E", 1 Megohm
26544	Retainer
26564	Capacitor Assembly, L. F. Aligners ("A" and "B" Ranges)
26776	Resistor, Type "F", 12,000 Ohms
26944	Capacitor, Type "W", .004 Mf.
27067	Power Transformer (50 to 60 Cycles Chassis)
27068	Power Transformer (25 to 60 Cycles Chassis)
27069	1st I. F. Transformer
27070	2nd I. F. Transformer
27073	Capacitor, Fixed Tuning, 100 Mmf.
27081	Tuning Capacitor, Wave Trap
27090	Gang Tuning Capacitor
27098	Capacitor Assembly, 1—.002 Mf.; 1—.005 Mf., (Signal Control)
27102	Pulley Assembly, Gang Tuning Capacitor
27107	Dial (Tuning)
27108	Capacitor Assembly (2—.05 Mf.)
27110	Spring (Belt Tension Adjustment)
27112	Dial Indicator Frame
27120	Pilot Lamp Socket Assembly
27122	Electrolytic Capacitor, 25 Mf., 400 Volts (Used only on No. 230 Receivers' Chassis)
27123	Electrolytic Capacitor, 16 Mf., 300 Volts (Used only on No. 230 Receivers' Chassis)
27124	Electrolytic Capacitor Assembly, 4 Mf., 250 Volts; 12 Mf., 20 Volts (Used only on No. 230 Receivers' Chassis)
27125	Resistor, Type "F", 25,000 Ohms
27126	Arm Assembly (Belt Tension Adjustment)
27132	Transformer Assembly, Audio Output
27137	Range Switch
27144	Coil Assembly, Antenna
27145	Coil Assembly, Oscillator
27148	Coil Assembly, Wave Trap

STROMBERG-CARLSON TELEPHONE MFG. CO.
MODELS 230 SERIES, 230-H, 230-HB, 230-L, 230-LB; 231 SERIES, 231-F, 231-FB, 231-P, 231-PB, 231-R & 231-RB

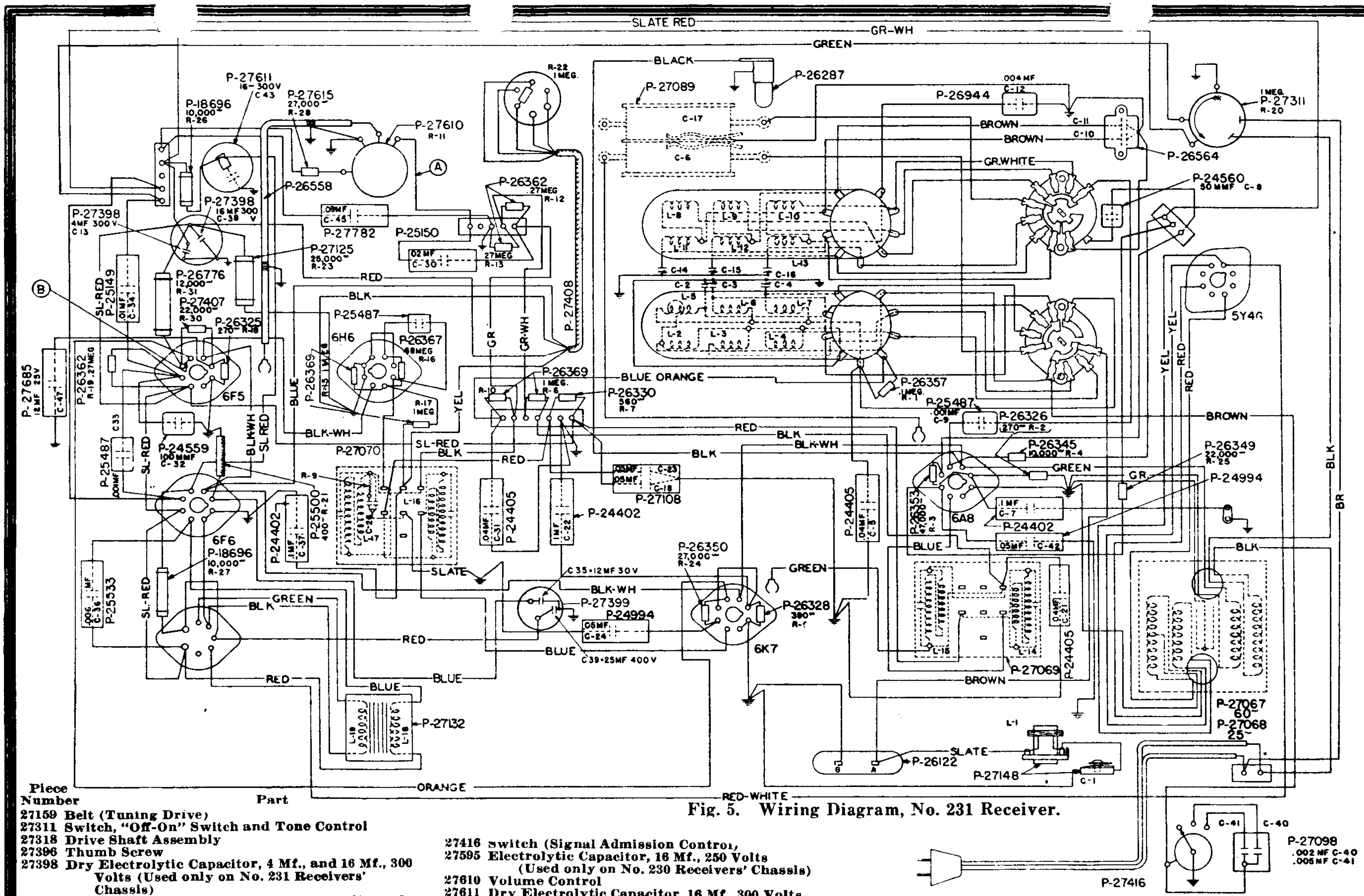


Fig. 5. Wiring Diagram, No. 231 Receiver.

Piece Number	Part
27159	Belt (Tuning Drive)
27311	Switch, "Off-On" Switch and Tone Control
27318	Drive Shaft Assembly
27396	Thumb Screw
27398	Dry Electrolytic Capacitor, 4 Mf., and 16 Mf., 300 Volts (Used only on No. 231 Receivers' Chassis)
27399	Dry Electrolytic Capacitor, 12 Mf., 20 Volts, and 25 Mf., 400 Volts (Used only on No. 231 Receivers' Chassis)
27407	Resistor, Type "CB", 22,000 Ohms
27408	Tuning Indicator Socket and Cable
27409	Cable
27412	Clamp
27416	Switch (Signal Admission Control)
27595	Electrolytic Capacitor, 16 Mf., 250 Volts (Used only on No. 230 Receivers' Chassis)
27610	Volume Control
27611	Dry Electrolytic Capacitor, 16 Mf., 300 Volts (Used only on No. 231 Receivers' Chassis)
27615	Resistor, Type "EI", 27,000 Ohms
27685	Dry Electrolytic Capacitor, 12 Mf., 25 Volts
27782	Capacitor, .03 Mf.

ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne
Tuning Ranges	A—530 to 1700 Kc.; B—1700 to 5600 Kc.; C—5600 to 18,000 Kc.
Number and Type of Tubes	1 No. 6A8, 1 No. 6K7, 1 No. 6H6, 1 No. 6F5, 1 No. 6F6, 1 No. 6G5, 1 No. 5Y4G
Voltage Rating	105 to 125 Volts
Frequency Rating	25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating	65 Watts
Frequency of Intermediate Amplifier	465 Kilocycles

STROMBERG-CARLSON TELEPHONE MFG. CO.
MODELS 230 SERIES, 230-H, 230-HB, 230-L, 230-LB; 231 SERIES, 231-F, 231-FB, 231-P, 231-PB, 231-R & 231-RB

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1 shows the terminal layouts of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and an allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts.

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the alignment procedure given in the following paragraphs should be carefully followed. In order to make these aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-27657 and P-27658 aligning tools be used.

To accurately align the circuits in these receivers, it is necessary to use a high grade, modulated test oscillator (Signal Generator), the output voltage of which can be varied. In conjunction with this test oscillator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker.

In making any alignment adjustments, always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal. Before proceeding with the alignment of any circuits in these receivers be sure that the "Signal Admission Control" is set for the maximum sensitivity position and that the "Off-On-Tone" control knob is set for maximum treble response (position where knob is rotated from its maximum counter-clockwise position, slightly clockwise to position where set turns "on"). Figure 1 shows the location of all the aligning capacitors or adjustments for this receiver.

Except in the case of making any aligning adjustments of the radio frequency circuits in the No. 231-P Receivers, it will not be necessary to remove the chassis in these receivers from their cabinets in order to make any alignment adjustments. If it is necessary to make any alignment adjustments of the radio frequency circuits in the No. 231-P Receivers, it will be necessary to remove the chassis from the cabinet. To remove the chassis in these receivers, it is only necessary to remove the two bolts which hold the chassis shelf to the cabinet. In making any radio frequency circuit alignment adjustments in the No. 231-P Receivers, the chassis should be set at approximately the same position which it occupies when in the cabinet. With the exception of the Nos. 231-F and 231-R Receivers, the alignment adjustments for the intermediate frequency circuits are accessible from the rear of the receiver, and the adjustments for the radio frequency circuits are accessible through the apertures located in the bottom metal base plate of the chassis; these apertures are easily accessible either through the bottom of the cabinet or through the bottom of the cabinet shelf, depending upon the particular style of cabinet. In the Nos. 231-F and 231-R Receivers, the adjustments for the intermediate frequency circuits are accessible through the bottom of the cabinet, while the adjustments for the radio frequency circuits are not accessible until the backs of the cabinets are removed. See Figure 2. Never align any of these receivers without having the metal base plate fastened to the chassis base. In the Nos. 231-F and 231-R Receivers, it is important that the final alignment be made with the chassis mounted in the cabinet.

Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitor. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Rapid Station Selector" knob in a clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the receiver turned "on", the illuminated dial indicator line should be exactly centered over the dial alignment lines (black lines) which are located at the extreme low frequency end of each scale on the dial. If these lines do not center over the illuminated dial indicator line, loosen the two set screws located on the hub of the dial. Then, rotate the dial so that these alignment lines are centered over the illuminated dial indicator line. The two set screws of the dial hub should then be securely tightened.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 465 kilocycles. In making these circuit adjustments always align the circuits in the order given in these instructions.

1. Operate the "Range" switch of the receiver to the "A" range position. Set the receiver's tuning dial at its extreme low frequency position, and operate the Tone Control knob to the "Normal" position. Rotate the Volume Control knob to its maximum clockwise position (maximum volume).
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator-oscillator tube, a modulated signal of 465 kilocycles from the test oscillator, using a 0.1-microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal.
3. Now, noting from Figure 1 the aligning adjustments for the first and second I. F. transformers, align the I. F. circuits in the following manner:
   Secondary of second I. F. transformer.
   Primary of second I. F. transformer.
   Secondary of first I. F. transformer.
   Primary of first I. F. transformer.
   Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

Radio Frequency Adjustments

The alignment of the radio frequency circuits of the various ranges in these receivers should be very carefully made and in the order specified.

Alignment of Short Wave Range (Also Referred to as "C" Band)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the "C" range position, and set the test oscillator's frequency and the receiver's tuning dial to 17 megacycles.
2. Adjust the oscillator's "C" band high frequency aligner for maximum output.
3. Adjust the antenna's "C" band high frequency aligner for maximum output, at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Aircraft, Amateur, and Police Range (Also Referred to as "B" Band)

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short-wave range.

1. Operate the Range Switch on the receiver chassis to the "B" range position, and set the test oscillator's frequency and the receiver's tuning dial to five megacycles.
2. Adjust the oscillator's "B" band high frequency aligner for maximum output.
3. Adjust the antenna's "B" band high frequency aligner for maximum output, and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
4. Set the test oscillator's frequency and the receiver's tuning dial to 1.8 megacycles.

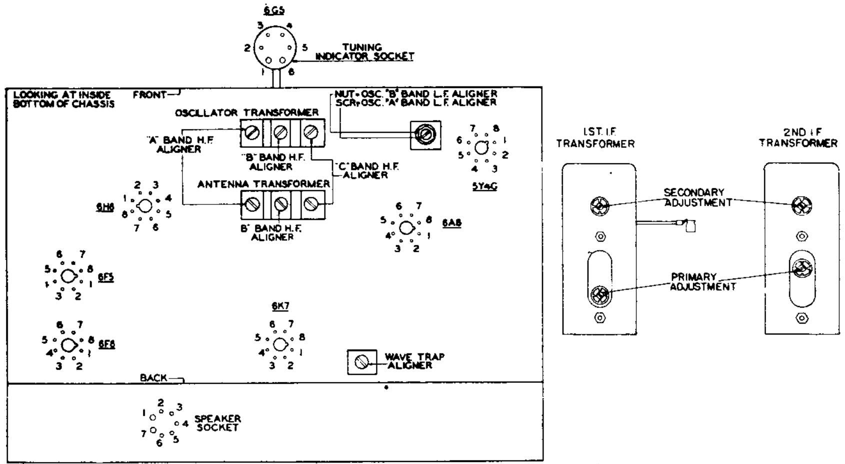


Fig. 1.—Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

5. Adjust the oscillator's "B" band low frequency aligner (series aligner), and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and the receiver's tuning dial to 5 megacycles and repeat operations Nos. 2 and 3.

Alignment of Standard Broadcast Range (Also Referred to as "A" Band)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Operate the Range Switch to the "A" range position and set the test oscillator's frequency and the receiver's tuning dial to 1.4 megacycles.
2. Adjust the oscillator's "A" band high frequency aligner for maximum output.
3. Adjust the antenna's "A" band high frequency aligner for maximum output.
4. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
5. Adjust the oscillator's "A" band low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and receiver's tuning dial to 1.4 megacycles and repeat operations Nos. 2 and 3.

Wave Trap Adjustment

In adjusting the wave trap circuit, the "Signal Admission Control" should be set for the most sensitive position (shaft rotated in the most counter-clockwise direction). Set the Range Switch of the receiver to the "A" range position and the tuning dial to 1000 kilocycles. Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 465 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a minimum indication is obtained on the output meter.

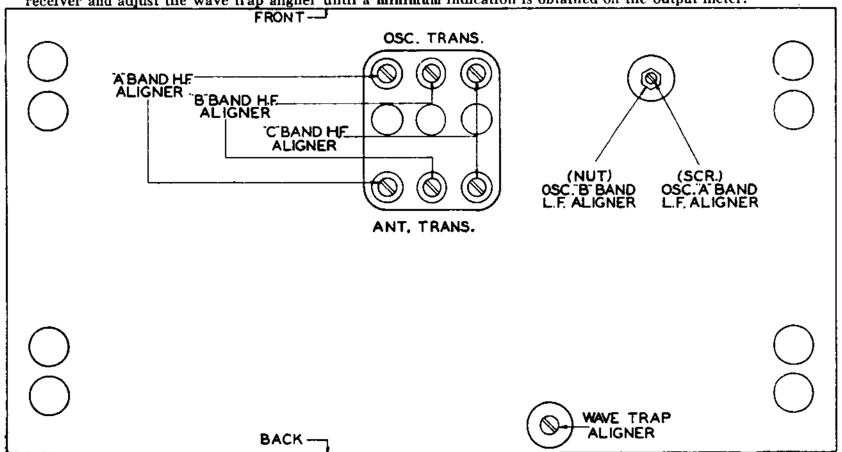
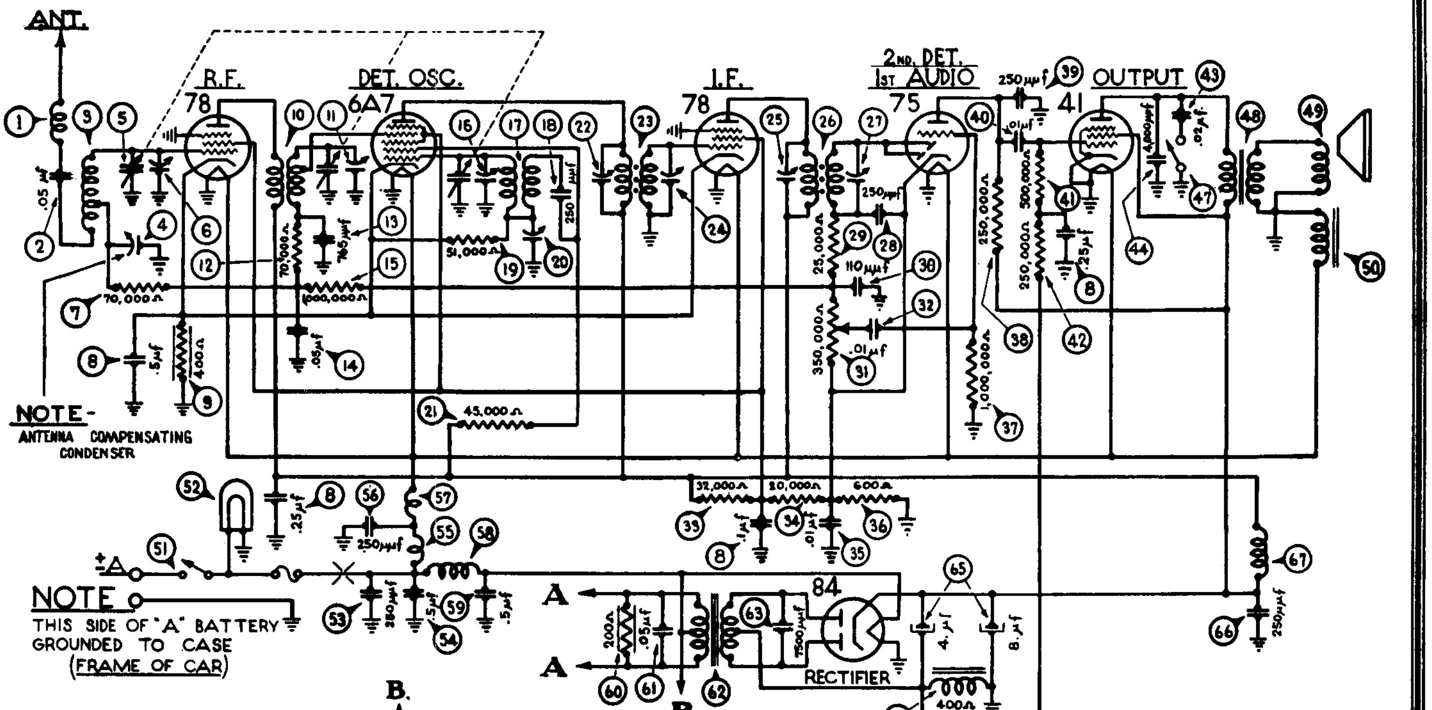
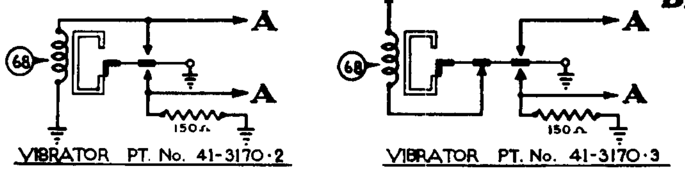


Fig. 2. View Through Chassis Mounting Shelf Showing Adjusting Screws for R. F. Aligning Capacitors.

TRANSITONE AUTOMOBILE RADIO CORP.

MODEL G1418 GRAHAM-PAIGE 91

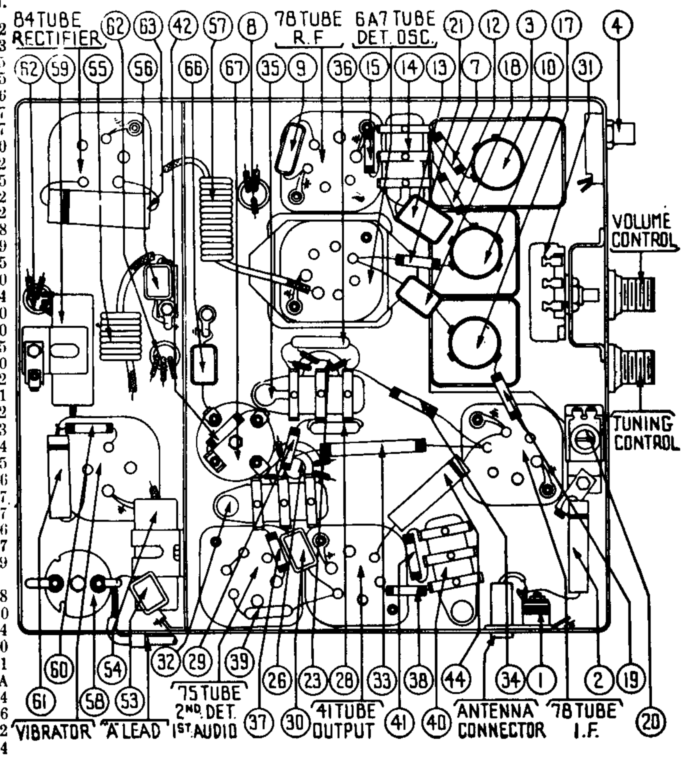




I.F. = 260 K.C.

MODEL G-1418 PARTS LIST

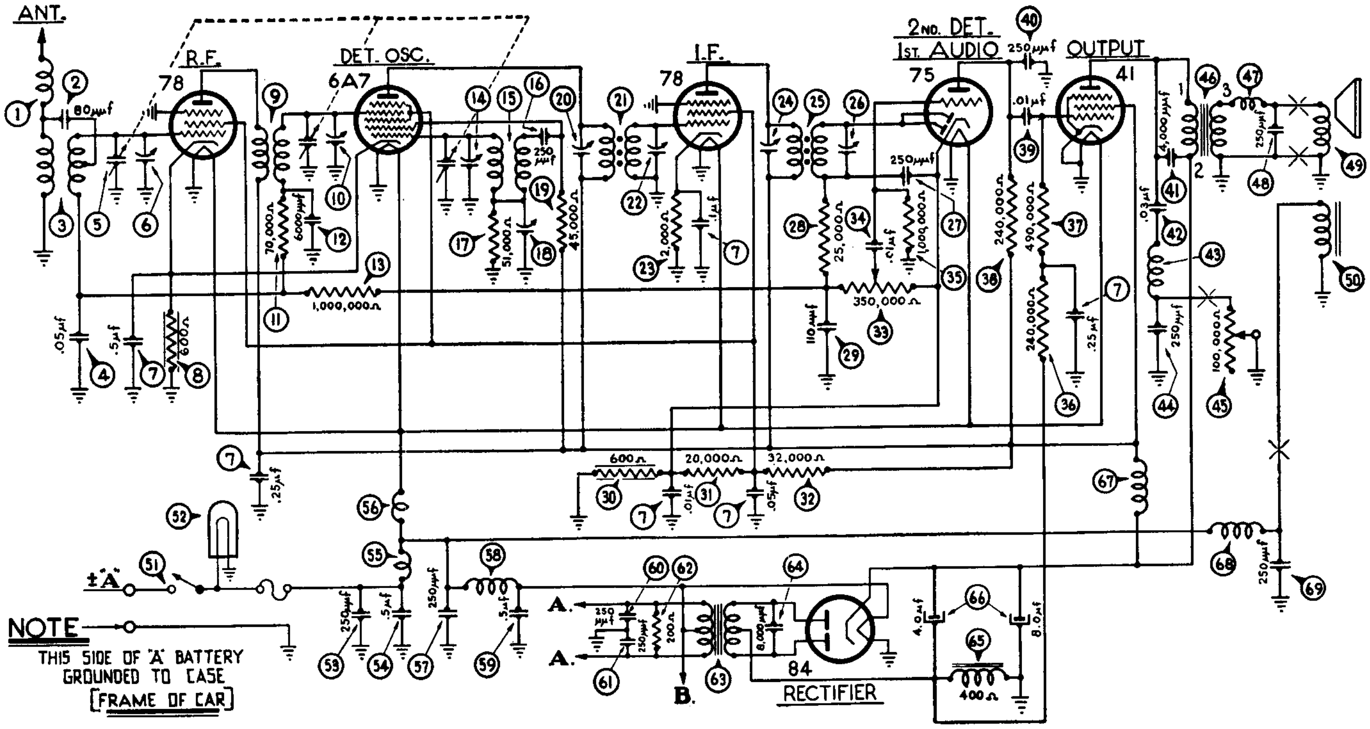
No.	Description	Part No.
1	Antenna Choke	38-8244
2	Condenser (.05 mfd.)	30-4444
3	Antenna Transformer	32-2326
*4	Antenna Coupling Condenser	31-6082
*5	Tuning Condenser	31-1769
6	First padder (On tun. cond.)	....
7	Resistor (70,000 ohms)	33-370334
8	Condenser (.1-.25-.25-.5 mfd.)	30-4415
9	Resistor (400 ohms)	33-1211
10	R. F. Transformer	32-2307
11	Second padder (On tun. cond.)	....
12	Resistor (70,000 ohms)	33-370334
13	Condenser (765 mmfd.)	30-1069
14	Condenser (.05 mfd.)	3615-0SG
15	Resistor (1,000,000 ohms)	33-510344
16	Third padder (On tun. cond.)	....
17	Oscillator Transformer	32-2308
18	Condenser (250 mmfd.)	30-1032
19	Resistor (51,000 ohms)	33-351344
*20	Low Frequency Padder	31-6102
21	Resistor (45,000 ohms)	33-345344
22	Padder (Pri. 1st I. F. Trans.)	
23	First I. F. Transformer	32-2026
24	Fadder (Sec. 1st I. F. Trans.)	....
25	Padder (Pri. 2nd I. F. Trans.)	....
26	Second I. F. Transformer	32-2027
27	Padder (Sec. 2nd I. F. Trans.)	....
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (110 mmfd.)	30-1031
31	Volume Control (350,000 ohms)	33-5139
32	Condenser (.01 mfd.)	3903-0SU
33	Resistor (32,000 ohms)	33-332434
34	Resistor (20,000 ohms)	33-320334
35	Condenser (.01 mfd.)	3903-0SG
36	Resistor (600 ohms)	33-1212
37	Resistor (1,000,000 ohms)	33-510344
38	Resistor (250,000 ohms)	33-424344
39	Condenser (250 mmfd.)	30-1032
40	Condenser (.01 mfd.)	3903-0SU
41	Resistor (500,000 ohms)	33-449344
42	Resistor (240,000 ohms)	33-424344
43	Condenser (.02 mfd.)	30-4495
44	**Condenser (4000 mmfd.)**	**30-4185**
45	Condenser (250 mfd.)	30-1032
46	Choke	32-2063
*47	Tone Control Switch	42-1145
*48	Output Transformer	32-7495
49	Cone & Voice Coil	36-3586
*50	Field Coil Assembly	36-3597
51	On & Off Switch Assembly	42-5617
52	Pilot Lamp	34-2040
53	Condenser (250 mmfd.)	30-1032
54	Condenser (.05 mfd.)	30-4015
55	"A" Choke	32-1432
56	Condenser (250 mmfd.)	30-1032
57	Filament Choke	32-2038
58	Vibrator Choke	32-2039
59	Condenser (.5 mfd.)	30-4015
60	Resistor (200 ohms)	33-1210
61	Condenser (.05 mfd.)	30-4444
62	Power Transformer	32-7550
63	Condenser (7500 mmfd.)	30-4420
64	Filter Choke	32-7545
65	Filter Condenser (4-8 mfd.)	30-2150
66	Condenser (250 mmfd.)	30-1032
67	"B" Choke	32-1281
68	Vibrator OPTIONAL	41-3170-2 41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Frong Socket	27-6036
	Seven Prong Socket	27-6037
	Interference Condenser	30-4007
	Distributor Resistor	33-1196
	Fuse	7227
	Fuse Insulator	27-7729
	Tuning & Volume Control Knob	27-4428
	Tone Control Knob	27-4430
	Knob Base	28-4184
	Control Wrench	28-4380
	Tee Bolt (Rec. Mtg.)	28-6161
	Nut (Rec. Mtg.)	W-518A
	Tuning & Volume Shaft	28-8684
	Tone Control Shaft	28-8686
	Dial Assembly	42-5652
	Pilot Lamp Assembly	38-7734



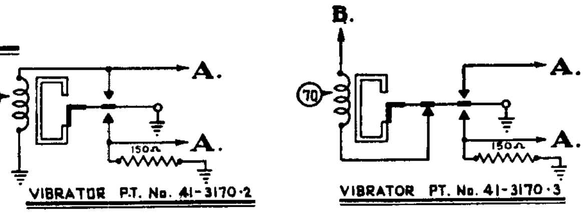
Note: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicago.

TRANSITONE AUTOMOBILE RADIO CORP.

MODEL G1436 GRAHAM-PAIGE 86, 87, 88 & 89

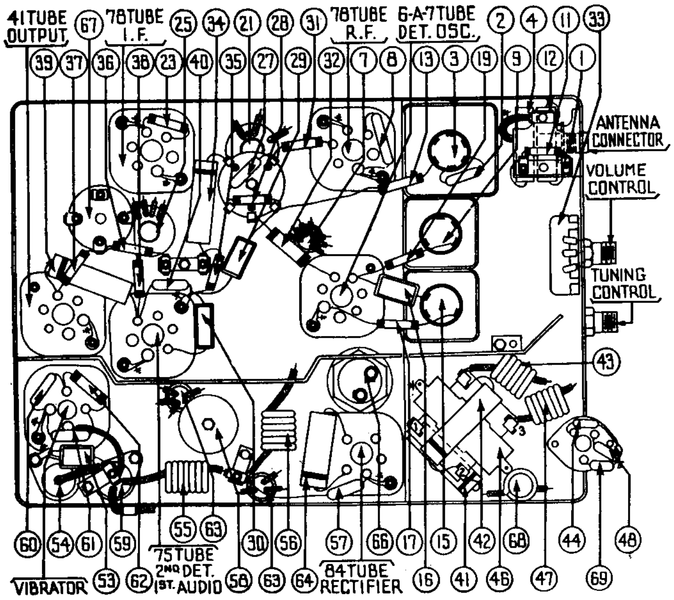


I.F. = 260 K.C.



MODEL G-1436 PARTS LIST

No.	Description	Part No.
1	Antenna Choke	32-1956
2	Condenser (80 mmfd.)	30-1066
3	Antenna Transformer	32-2331
4	Condenser (.05 mfd.)	30-4444
*5	Tuning Condenser	31-1912
6	First Padder (on tun. cond.)	
7	Condenser (.01-.05-.1-.25-.25-.5 mfd.)	30-4478
8	Resistor (600 ohms)	33-1212
9	R. F. Transformer	32-2231
10	Second Padder (on tun. cond.)	
11	Resistor (20,000 ohms)	33-370344
12	Condenser (6000 mmfd.)	30-4445
13	Resistor (1,000,000 ohms)	33-510344
14	Third Padder (on tun. cond.)	
15	Oscillator Transformer	32-2232
16	Condenser (250 mmfd.)	30-1032
17	Resistor (51,000 ohms)	33-351344
*18	Low Frequency Padder	31-6056
19	Resistor (45,000 ohms)	33-345344
20	Padder (Pri. 1st I. F. Trans.)	
21	First I. F. Transformer	32-2286
22	Padder (Sec. 1st I. F. Trans.)	
23	Resistor (2000 ohms)	33-220344
24	Padder (Pri. 2nd I. F. Trans.)	
25	Second I. F. Transformer	32-2167
26	Padder (Sec. 2nd I. F. Trans.)	
27	Condenser (250 mmfd.)	30-1032
28	Resistor (25,000 ohms)	33-325344
29	Condenser (110 mmfd.)	30-1031
30	Resistor (600 ohms)	33-1212
31	Resistor (20,000 ohms)	33-320344
32	Resistor (32,000 ohms)	33-332444
33	Volume Control (350,000 ohms)	33-5139
34	Condenser (.01 mfd.)	30-4479
35	Resistor (1,000,000 ohms)	33-510344
36	Resistor (240,000 ohms)	33-424344
37	Resistor (490,000 ohms)	33-449344
38	Resistor (240,000 ohms)	33-424344
39	Condenser (.01 mfd.)	30-4145
40	Condenser (250 mmfd.)	30-1032
41	Condenser (4000 mmfd.)	30-4185
42	Condenser (.03 mfd.)	30-4380
43	Choke	32-1374
44	Condenser (250 mmfd.)	30-1032
*45	Tone Control (100,000 ohms)	33-5192
*46	Output Transformer	32-7495
47	Choke	32-1374
48	Condenser (250 mmfd.)	30-1032
*49	Cone & Voice Coil	36-3822
*50	Field Coil Assembly	36-3823
51	On & Off Switch Assembly	
52	Pilot Lamp	34-2040
53	Condenser (250 mmfd.)	30-1032
54	Condenser (.5 mfd.)	30-4474
55	"A" Choke	32-1374
56	Filament Choke	32-1561
57	Condenser (250 mmfd.)	30-1032
58	Vibrator Choke	32-2249
59	Condenser (.5 mfd.)	30-4474
60	Condenser (250 mmfd.)	30-1032
61	Condenser (250 mmfd.)	30-1032
62	Resistor (200 ohms)	33-120344
63	Power Transformer	32-7720
64	Condenser (8000 mmfd.)	30-4420
65	Filter Choke	32-7722
66	Filter Condenser (4-8 mfd.)	30-2168
67	"B" Choke	32-1281
68	Choke	32-2269
69	Condenser (250 mmfd.)	30-1032
70	Vibrator (Optional)	41-3170-2 41-3170-3
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	Distributor Resistor	33-1196



No.	Description	Part No.
	Interference Condenser	30-4007
	Interference Condenser	30-4486
	Fuse	7227
	Fuse Insulator	27-7729
	Tee Bolt (Rec. mtg.)	28-6161
	Nut (Rec. mtg.)	W158A
	*Speaker Cable Assembly	41-3255
	*Shielded Loom Assembly	38-8230

NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicago.

TRANSITONE AUTOMOBILE RADIO CORP.

MODEL G1418 GRAHAM-PAIGE 91

I. F. TRANSFORMERS AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 8).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 7.

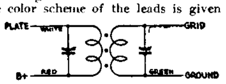


Figure 7

If replacements are ever necessary, replace the entire coil assembly, 32-2026 for the first I. F. stage and 32-2027 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL G-1418 ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER—The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR—With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F.—Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder (27) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading. (See Figure 8 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder (24) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (22) for maximum reading. Readjust padders (25) and (27) with the generator lead connected to the type 6A7 tube. (See Figure 8 for location of padders).

HIGH FREQUENCY AND R. F.—After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Turn the tuning condenser plates out of mesh as far as they will go.

With the tuning condenser in this position, adjust the high frequency padder (16) and the R. F. padder (11) until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

LOW FREQUENCY—Turn the tuning condenser plates in mesh to approximately 600 K. C., 60 on the dial scale and set the signal generator at 600 K. C. Roll the tuning condenser and adjust the low frequency padder screw (20) for maximum reading on the output meter.

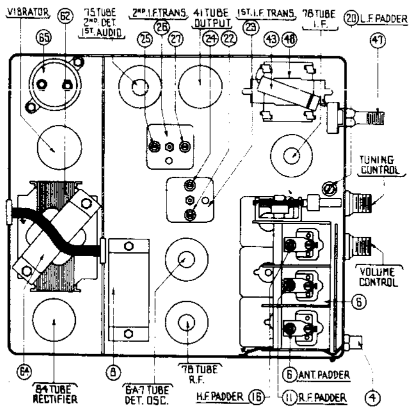


Figure 8

HIGH FREQUENCY READJUSTMENT—Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder (16) again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

ANTENNA—WHEN PADDING THE ANTENNA STAGE IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE CONSTRUCTED AND USED.

Connect the signal generator lead to the antenna cable assembly (made up of Part No. 38-7295 cable, and a 155 mmfd. condenser in series between the lead and the signal generator. Plug the cable into the antenna receptacle on the bottom of the Receiver.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders (11) and (6) for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

MODEL G1436 GRAHAM-PAIGE 86, 87, 88 & 89

I. F. TRANSFORMERS AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield can. (See Figure 4).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 3.

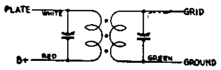


Figure 3

If replacements are ever necessary, replace the entire coil assembly, 32-2286 for the first I. F. stage and 32-2167 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL G-1436 ADJUSTMENTS

All padding instruments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A Philco Set Tester, 3164 Padding Wrench, 27-7159 Padding screw driver.

General

OUTPUT METER—The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR—With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F.—Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder (26) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (24) for maximum reading. (See Figure 4 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder (22) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (20) for maximum reading. Readjust padders (24) and (26) with the generator lead connected to the type 6A7 tube. (See Figure 4 for location of padders.)

HIGH FREQUENCY AND R. F.—After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Using a piece of paper approximately .006″ thick as a gauge between the heel of the rotor plates and the stator plates, turn the rotor plates in mesh until they strike against the paper.

With the tuning condenser in this position, adjust the high frequency padder (14) and the R. F. padder (10) until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

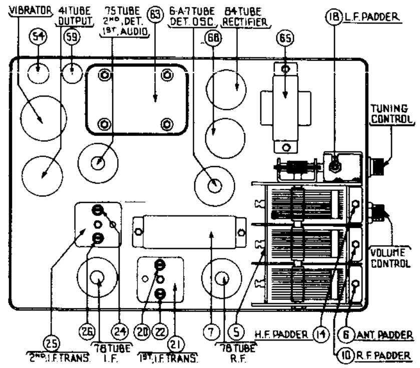


Figure 4

LOW FREQUENCY—Turn the tuning condenser plates in mesh to approximately 600 K. C., 60 on the dial scale and set the signal generator at 600 K. C. Roll the tuning condenser and adjust the low frequency padder screw (18) for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT—Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder (14) again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

ANTENNA—WHEN PADDING THE ANTENNA STAGE IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE CONSTRUCTED AND USED.

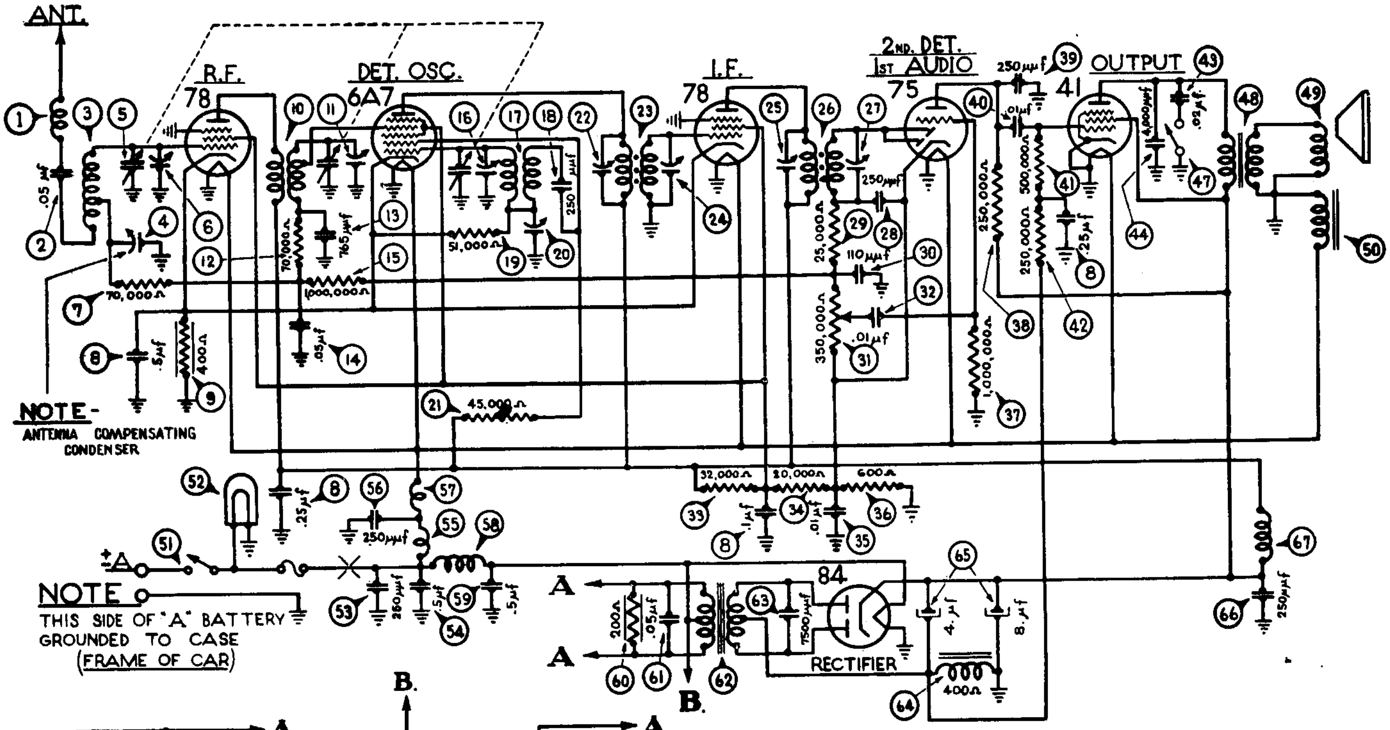
Connect the signal generator lead to the antenna cable assembly (made up of Part No. 38-7295 cable and a 1650 mmfd. condenser in series between the lead and the signal generator. Plug the cable into the antenna lead connector on the end of the Receiver.

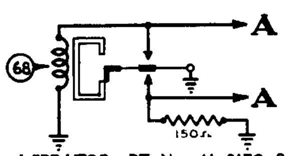
Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders (10) and (6) for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

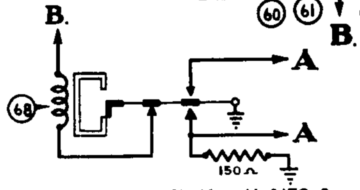
TRANSITONE AUTOMOBILE RADIO CORP.

MODEL N1418 "LAFAYETTE 3710", "NASH 3720 & 3780"





VIBRATOR PT. No. 41-3170-2

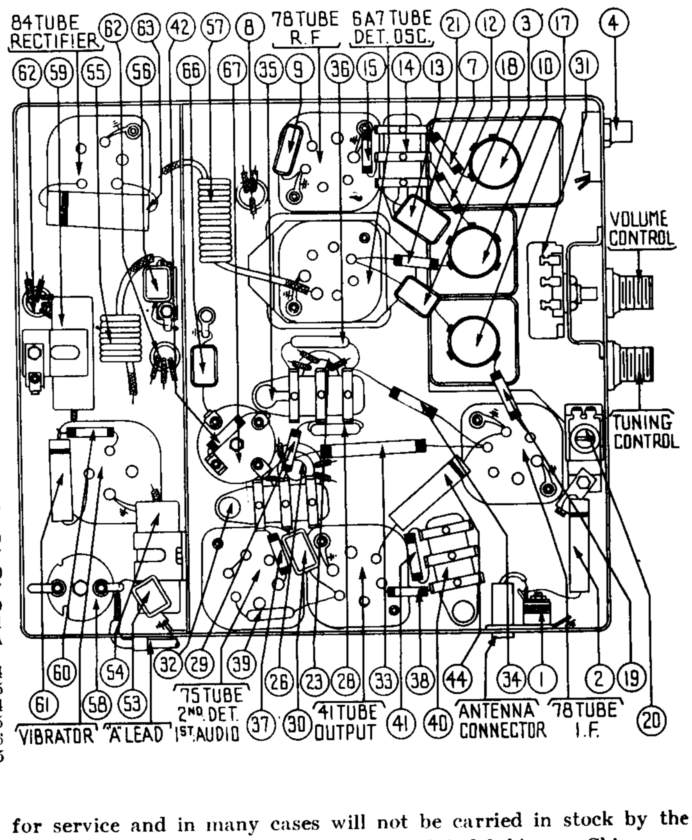


VIBRATOR PT. No. 41-3170-3

I.F. = 260 K.C.

MODEL N-1418 — PARTS LIST

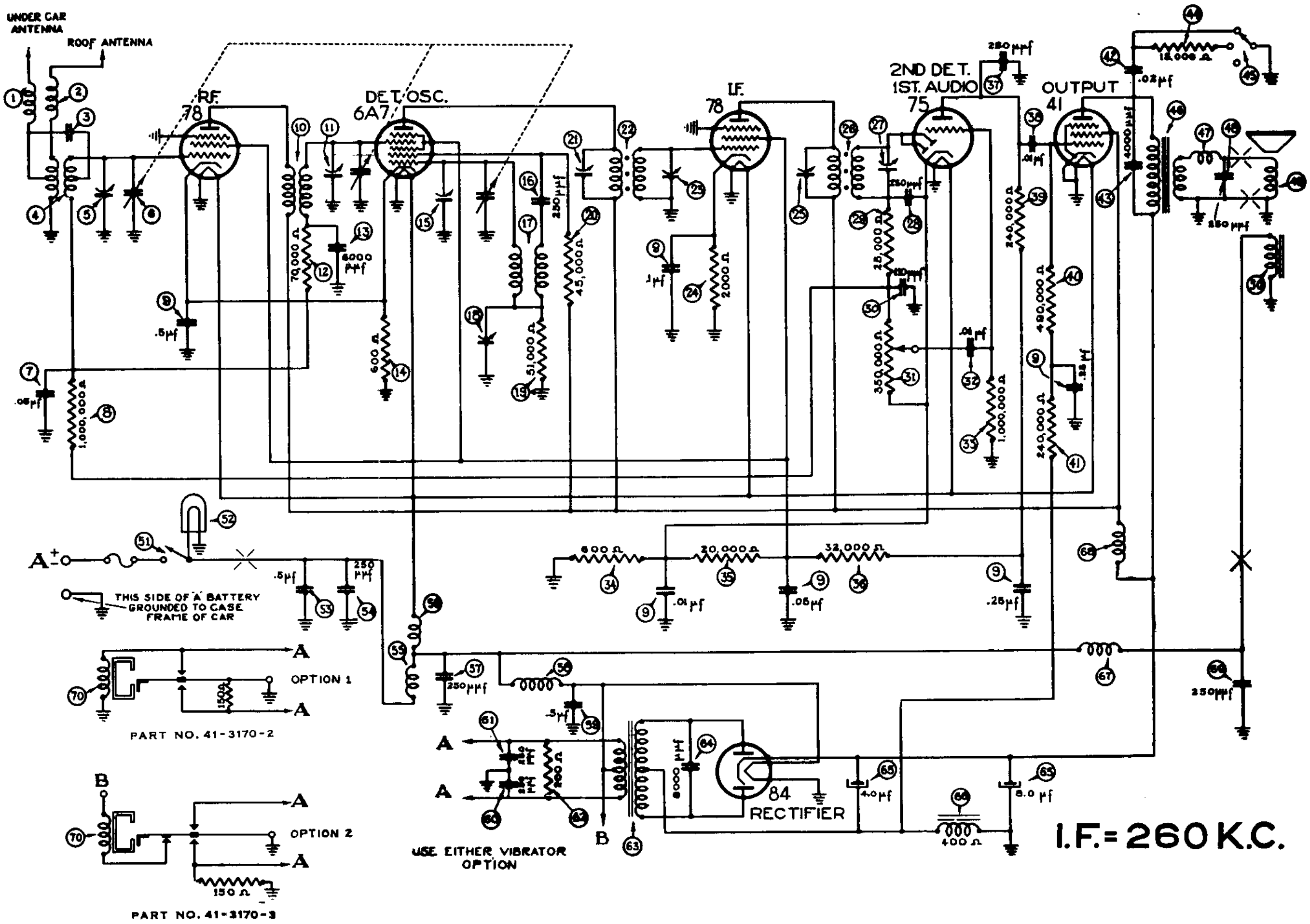
No.	Description	Part No.
1	Antenna choke	38-8244
2	Condenser (.05 mfd.)	30-4444
3	Antenna transformer	32-2326
*4	Antenna coupling condenser	31-6082
*5	Tuning condenser	31-1769
6	First padder (On tun. cond.)	
7	Resistor (70,000 ohms)	33-370344
8	Condenser (.1-.25-.25-.5 mfd)	30-4415
9	Resistor (400 ohms)	33-1211
10	R. F. transformer	32-2307
11	Second padder (On tun. cond.)	
12	Resistor (70,000 ohms)	33-370344
13	Condenser (765 mmfd.)	30-1069
14	Condenser (.05 mfd.)	3615-OSG
15	Resistor (1,000,000 ohms)	33-510344
16	Third padder (On tun. cond.)	
17	Oscillator transformer	32-2308
18	Condenser (250 mmfd.)	30-1032
19	Resistor (51,000 ohms)	33-351344
*20	Low frequency padder	31-6102
21	Resistor (45,000 ohms)	33-345344
22	Padder (Fri. 1st I.F. trans.)	
23	First I.F. transformer	32-2026
24	Padder (Sec. 1st I.F. trans.)	
25	Padder (Pri. 2nd I.F. trans.)	
26	Second I.F. transformer	32-2027
27	Padder (Sec. 2nd I.F. trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (110 mmfd.)	30-1031
31	Volume control (350,000 ohms)	33-5139
32	Condenser (.01 mfd.)	3903-OSU
33	Resistor (32,000 ohms)	33-332434
34	Resistor (20,000 ohms)	33-320334
35	Condenser (.01 mfd.)	3903-OSG
36	Resistor (600 ohms)	33-1212
37	Resistor (1,000,000 ohms)	33-510344
38	Resistor (250,000 ohms)	33-424344
39	Condenser (250 mmfd.)	30-1032
40	Condenser (.01 mfd.)	3903-OSU
41	Resistor (500,000 ohms)	33-449344
42	Resistor (240,000 ohms)	33-424344
43	Condenser (.02 mfd.)	30-4419
44	Condenser (4000 mmfd.)	30-4185
45	Condenser (250 mmfd.)	30-1032
46	Choke	32-2063
*47	Tone Control Switch	42-1145
*48	Output transformer	32-7495
49	Cone & voice coil	36-3586
*50	Field coil assembly	36-3597
51	On & Off switch assembly	42-5617
52	Pilot lamp	34-2040
53	Condenser (250 mmfd.)	30-1032
54	Condenser (.05 mfd.)	30-4015
55	"A" choke	32-1604
56	Condenser (250 mmfd.)	30-1032
57	Filament Choke	32-2535
58	Vibrator choke	32-2039
59	Condenser (.5 mfd.)	30-4015
60	Resistor (200 ohms)	33-20344
61	Condenser (.05 mfd.)	30-4444
62	Power transformer	32-7550
63	Condenser (7500 mmfd.)	30-4420
64	Filter choke	32-7545
65	Filter condenser (4-8 mfd.)	30-2150
66	Condenser (250 mmfd.)	30-1032
67	"B" choke	32-1281
68	Vibrator (Optional)	41-3170-2, 41-3170-3
	Four prong socket	27-6044
	Five prong socket	27-6035
	Six prong socket	27-6036
	Seven prong socket	27-6037
	Ground strap	971-130
	Interference condenser	30-4007
	Inductive Suppressor	32-2250
	Fuse	7227
	Fuse insulator	27-7729
	Tee bolt	28-6161
	Nut (Rec. mtg.)	W518A
	Tuning & volume control knob	28-7214
	Tone control lever	28-7215
	Knob base	28-4184
	Tuning & volume shaft	28-8695
	Tone control shaft	28-8696
	Dial assembly	42-5645



NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicago.

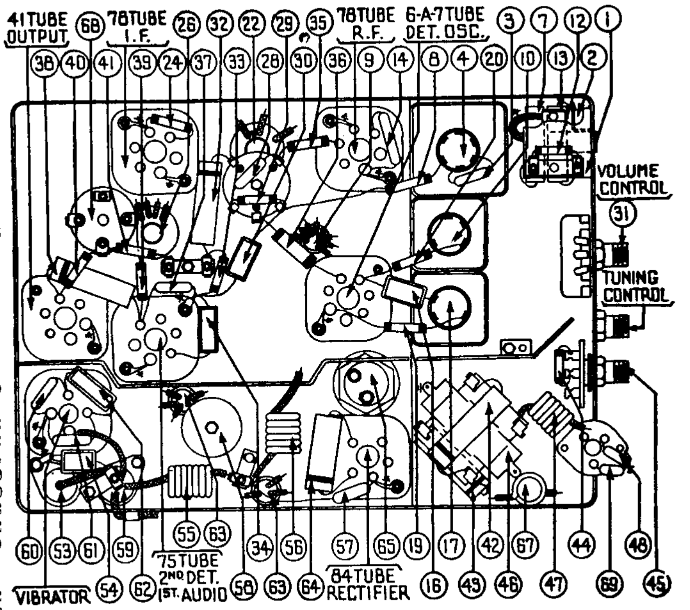
TRANSITONE AUTOMOBILE RADIO CORP.

MODEL N1433H "LAFAYETTE 3710", "NASH 3720 & 3780"



MODEL N-1433-H PARTS LIST

No.	Description	Part No.
1	Antenna choke	38-8106
2	Antenna Choke	38-8106
3	Condenser (70 mmfd.)	30-1068
4	Antenna Transformer	32-2281
5	First Padder (on tun. cond.)	
*6	Tuning Condenser	31-1912
7	Condenser (.05 mfd.)	30-4444
8	Resistor (1,000,000 ohms)	33-510344
9	Condenser (.01-.05-.1-.25-.25-.5 mfd.)	30-4478
10	R. F. Transformer	32-2231
11	Second padder (on tun. cond.)	
12	Resistor (70,000 ohms)	33-370344
13	Condenser (6,000 mmfd.)	30-4445
14	Resistor (600 ohms)	33-1212
15	Third Padder (on tun. cond.)	
16	Condenser (250 mmfd.)	30-1032
17	Oscillator Transformer	32-2232
*18	Low Frequency Padder	31-6056
19	Resistor (51,000 ohms)	33-351344
20	Resistor (45,000 ohms)	33-345344
21	Padder (Pri. 1st I. F. Trans.)	
22	First I. F. Transformer	32-2286
23	Padder (Sec. 1st I. F. Trans.)	
24	Resistor (2,000 ohms)	32-220334
25	Padder (Pri. 2nd I. F. Trans.)	
26	Second I. F. Transformer	32-2167
27	Padder (Sec. 2nd I. F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (110 mmfd.)	30-1031
31	Volume Control (350,000 ohms)	33-5139
32	Condenser (.01 mfd.)	30-4124
33	Resistor (1,000,000 ohms)	33-510344
34	Resistor (600 ohms)	33-1212
35	Resistor (20,000 ohms)	33-320334
36	Resistor (32,000 ohms)	33-332444
37	Condenser (250 mmfd.)	30-1032
38	Condenser (.01 mfd.)	30-4145
39	Resistor (240,000 ohms)	33-424344
40	Resistor (490,000 ohms)	33-449344
41	Resistor (240,000 ohms)	33-424344
42	Condenser (.02 mfd.)	30-4419
43	Condenser (4,000 mmfd.)	30-4185
44	Resistor (15,000 ohms)	33-315344
*45	Tone Control Switch	42-1273
*46	Output Transformer	32-7495
47	Choke	32-1374
48	Condenser (250 mmfd.)	30-1032
49	Cone and Voice Coil	36-3526
*50	Field Coil Assembly	32-9236
*51	On and Off Switch Assembly	42-5617
52	Pilot Lamp	34-2039
53	Condenser (.5 mfd.)	30-4474
54	Condenser (250 mmfd.)	30-1032
55	"A" Choke	32-1374
56	Filament Choke	32-1561
57	Condenser (250 mmfd.)	30-1032
58	Vibrator Choke	32-2249
59	Condenser (.5 mfd.)	30-4474
60	Condenser (250 mmfd.)	30-1032
61	Condenser (250 mmfd.)	30-1032
62	Resistor (200 ohms)	33-120344
63	Power Transformer	32-7720
64	Condenser (8,000 mmfd.)	30-4420
65	Filter Condenser (4-8 mfd.)	30-2168
66	Filter Choke	32-7722
67	Choke	32-2269
68	"B" Choke	32-1281
69	Condenser (250 mmfd.)	30-1032
70	Vibrator (Optional)	41-3170-2 41-3170-3
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	Inductive Suppressor	32-2250
	Interference Condenser	30-4007
	Fuse	7227
	Fuse Insulator	27-7729
	Tee Bolt (Rec. mtg.)	28-6161



No.	Description	Part No.
	Nut (Rec. mtg.)	W518A
	Speaker Cable	41-3247
	Tuning and Volume Knob	28-7214
	Tone Control Knob	28-7215
	Knob Base	28-4184
	Tuning & Volume Shaft	28-8695
	Tone Control Shaft	28-8696
	Scale Assembly	42-5644
	Control Mtg. Wrench	28-4380
	Receiver Housing	38-1727
	Tow Strap	36-3403

NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicago.

TRANSITONE AUTOMOBILE RADIO CORP.

MODEL N1418, "LAFAYETTE 3710", "NASH 3720 & 3780"

I. F. TRANSFORMERS AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 8).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 7.

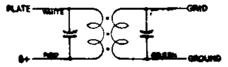


Figure 7

If replacements are ever necessary, replace the entire coil, assembly, 32-2026 for the first I. F. stage and 32-2027 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL N-1418 ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER—The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR—With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F.—Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder (27) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading. (See Figure 8 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder (24) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (22) for maximum reading. Readjust padders (25) and (27) with the generator lead connected to the type 6A7 tube. (See Figure 8 for location of padders).

HIGH FREQUENCY AND R. F.—After padding the first I. F. stage remove the generator lead from the 6A7 tube. Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Turn the tuning condenser plates out of mesh as far as they will go.

With the tuning condenser in this position, adjust the high frequency padder (16) and the R. F. padder (11) until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

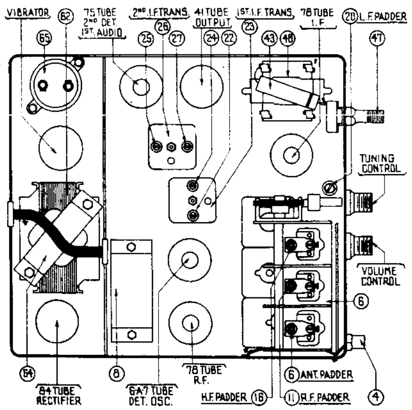


Figure 8

LOW FREQUENCY—Turn the tuning condenser plates in mesh to approximately 600 K. C., 60 on the dial scale and set the signal generator at 600 K. C. Roll the tuning condenser and adjust the low frequency padder screw (20) for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT—Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder (16) again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

ANTENNA—WHEN PADDING THE ANTENNA STAGE IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE CONSTRUCTED AND USED.

Connect the signal generator lead to the antenna cable assembly (made up of Part No. 38-7295 cable and a 155 mmfd. condenser in series between the lead and the signal generator. Plug the cable into the antenna receptacle on the top of the Receiver.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders (11) and (6) for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

MODEL N1433H

I. F. TRANSFORMERS AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

Both the primary and secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 4).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 3.

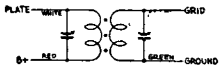


Figure 3

If replacements are ever necessary, replace the entire coil assembly, 32-2286 for the first I. F. stage and 32-2167 for the second I. F. stage. Neither the coil nor the paddlers will be furnished separately. Order only by the above numbers.

MODEL N-1433 ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER—The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR—With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F.—Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder (27) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading. (See Figure 4 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap.) Adjust the secondary screw padder (23) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (21) for maximum reading. Readjust padders (25) and (27) with the generator lead connected to the type 6A7 tube. (See Figure 4 for location of padders).

HIGH FREQUENCY AND R. F.—After padding the first I. F. stage remove the generator lead from the 6A7 tube. Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Using a piece of paper approximately .006" thick as a gauge between the heel of the rotor plates and the stator plates, turn the rotor plates in mesh until they strike against the paper.

With the tuning condenser in this position, adjust the high frequency padder (15) and the R. F. padder (11) until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

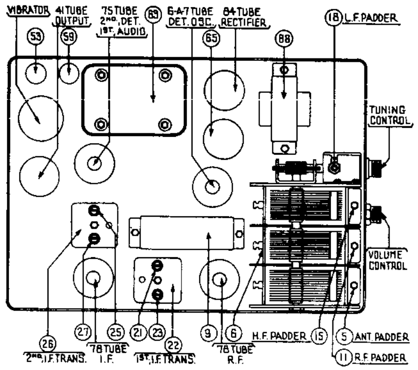


Figure 4

LOW FREQUENCY—Turn the tuning condenser plates in mesh to approximately 600 K. C., 60 on the dial scale and set the signal generator at 600 K. C. Roll the tuning condenser and adjust the low frequency padder screw (18) for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT—Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder (15) again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

ANTENNA—WHEN PADDING THE ANTENNA STAGE IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE CONSTRUCTED AND USED.

Connect the signal generator lead to the antenna cable assembly (made up of Part No. L-2320 lead, and a 64 mmfd. condenser in series between the lead and the signal generator. Plug the cable into the ROOF ANTENNA CONNECTOR on the end of the Receiver.

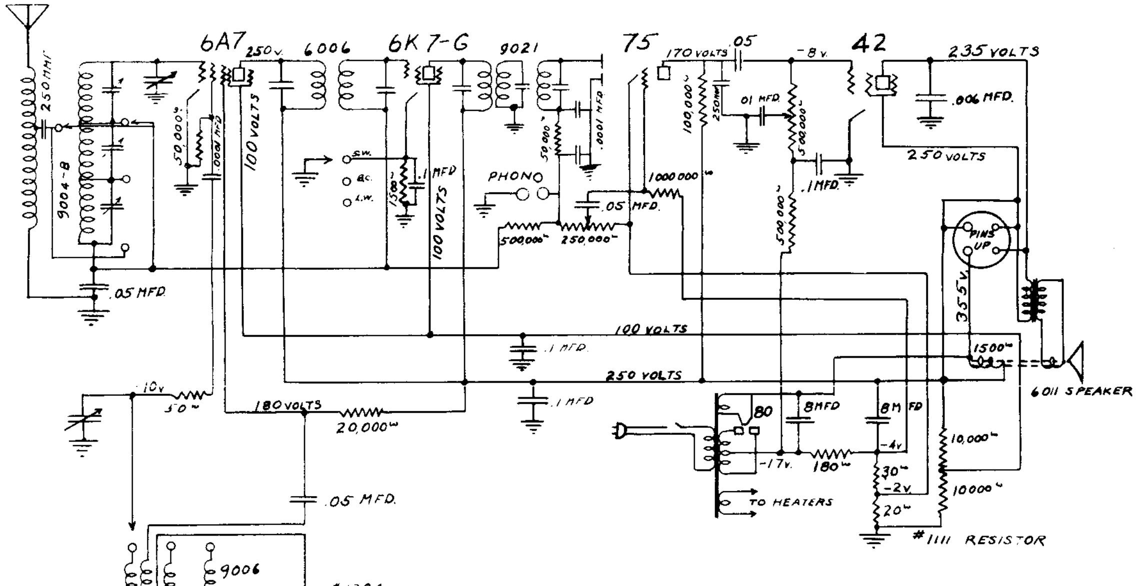
Follow this padding procedure regardless of whether the Receiver is used with the Roof or Under-car antenna.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders (11) and (5) for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

ULTRAMAR MANUFACTURING CORPORATION

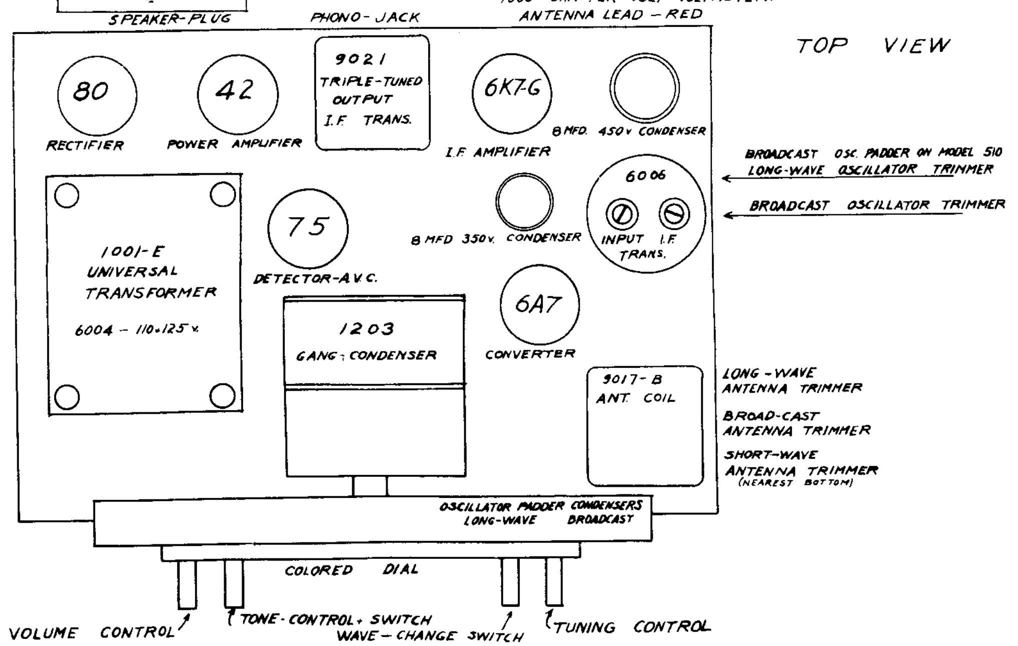
MODELS 510 & 520



WIRING DIAGRAM OF MODELS 510 AND 520

NOTE

LONG-WAVE BAND IS OMITTED ON MODEL 510
VOLTAGES INDICATED ARE MEASURED WITH A
1000 OHM PER VOLT VOLTMETER.
ANTENNA LEAD - RED



TOP VIEW

A calibrated oscillator such as Model 180, covering the ranges from 20 to 2000 meters and an output meter (connected between plate and screen prongs of the 42 tube) will be required. Use low values of output to prevent false readings due to the operation of the automatic volume control while aligning.

The output meter may also be connected across the two small prongs of the speaker plug.

INTERMEDIATE STAGE ALIGNMENT

1. Connect the output of the test oscillator to the grid of the 6A7 converter tube, and connect a 1 megohm resistor from this grid to the chassis. Connect the ground side of the oscillator (the shielding) to the receiver chassis.

2. Set the test oscillator to 465 K.C. Refer to Curve B on the calibration chart to obtain the proper setting of the test oscillator dial.

3. Align the output intermediate transformer by turning one of the trimmer screws accessible at the top of the coil shield until the response is at a maximum. Adjust the other trimmer screws in the same manner.

4. Adjust the input intermediate frequency transformer in the same manner.

SHORT-WAVE ALIGNMENT

5. Set the dial of the test oscillator and the receiver to 20 meters. Connect the output (insulated lead) of the test oscillator to the antenna lead (red) thru a 400 ohm resistor.

6. Adjust the lowest trimmer in the square shield near the front of the chassis till maximum response is obtained while rocking the gang condenser at the same time. By rocking the gang condenser is meant tuning to a point just above and just below the oscillator frequency while making some other adjustment. Set the test oscillator and receiver to 50 meters and check sensitivity.

BROADCAST BAND ALIGNMENT

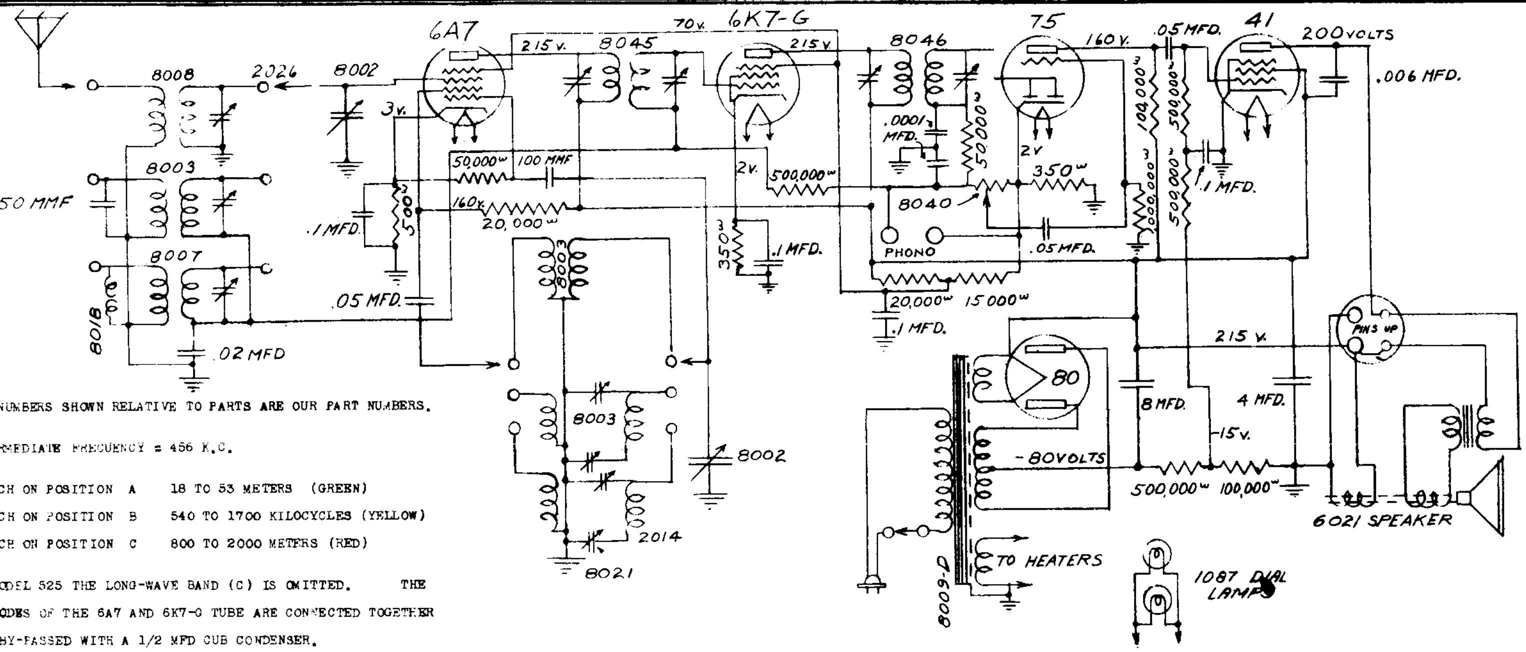
7. Set the test oscillator and receiver to 214 meters (1400 K.C.). Replace the 400 ohm resistor connected to the antenna lead by a .00025 MFD condenser. Adjust the B.C. oscillator trimmer and the center trimmer in the square shield near the front of the chassis (B.C. antenna trimmer) till maximum response is obtained. Set the test oscillator and receiver to 500 meters (600 K.C.) and adjust B.C. padder for maximum response while rocking the gang at the same time. Repeat this entire procedure.

LONG-WAVE BAND ALIGNMENT (MODEL 520 ONLY)

8. Set the test oscillator and receiver to 900 meters and adjust the long-wave oscillator trimmer and long-wave antenna trimmer (highest trimmer in square shield near front of chassis) till maximum response is obtained. Set the test oscillator and receiver to 1800 meters. Adjust the long-wave oscillator padder condenser till maximum response is obtained, rocking the gang condenser at the same time. Repeat the above procedure for this band.

Assuming that all of the component parts are not defective, poor sensitivity, selectivity, or extremely inaccurate dial calibration are an indication that the procedure has not been carefully followed and should be repeated following each step carefully in the above order.

ULTRAMAR MANUFACTURING CORPORATION
MODELS 525 & 526



N O T E:

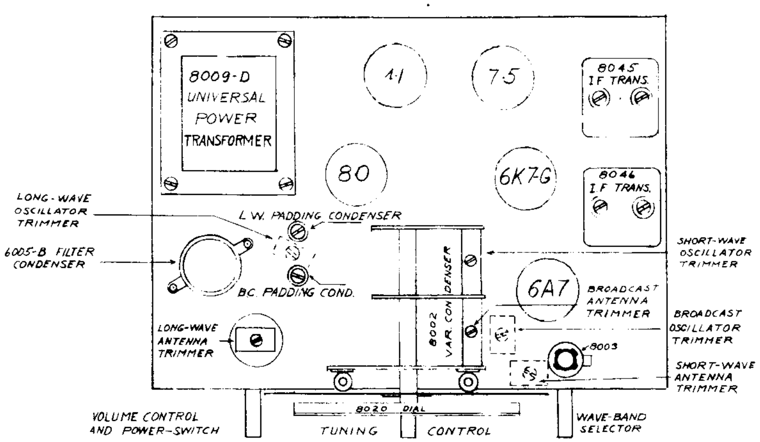
1.- ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.

2.- INTERMEDIATE FREQUENCY = 456 K.C.

3.- SWITCH ON POSITION A 18 TO 53 METERS (GREEN)
SWITCH ON POSITION B 540 TO 1700 KILOCYCLES (YELLOW)
SWITCH ON POSITION C 800 TO 2000 METERS (RED)

4.- ON MODEL 525 THE LONG-WAVE BAND (C) IS OMITTED. THE CATHODES OF THE 6A7 AND 6K7-G TUBE ARE CONNECTED TOGETHER AND BY-PASSED WITH A 1/2 MFD CUB CONDENSER.

TOP VIEW of CHASSIS



A calibrated oscillator such as Model 180, covering the ranges from 20 to 2000 meters and an output meter (connected between plate and screen prongs of the 41 tube) will be required. Use low values of output to prevent false readings due to the operation of the automatic volume control while aligning.

The output meter may also be connected across the two small prongs of the speaker plug.

INTERMEDIATE STAGE ALIGNMENT:

1. Connect the output of the test oscillator to the grid of the 6A7 converter tube, and connect a 1 megohm resistor from this grid to the chassis. Connect the ground side of the oscillator (the shielding) to the receiver chassis.

2. Set the test oscillator to 456 K.C. Refer to Curve B on the calibration chart to obtain the proper setting of the test oscilator dial.

3. Align the output intermediate transformer by turning one of the trimmer screws accessible at the top of the coil shield until the response is at a maximum. Adjust the other trimmer screws in the same manner.

4. Adjust the input intermediate frequency transformer in the same manner.

SHORT-WAVE ALIGNMENT

5. Set the dial of the test oscillator and the receiver to 20 meters. Connect the output (insulated lead) of the test oscillator to the antenna lead (red) thru a 400 ohm resistor.

6. Adjust the short-wave oscillator trimmer located on the wave-band switch till maximum response is obtained while rocking the gang condenser at the same time. By rocking the gang condenser is meant tuning to a point just above and just below the oscillator frequency while making some other adjustment. Set the test oscillator to 50 meters and check sensitivity.

BROADCAST BAND ALIGNMENT

7. Set the test oscillator and receiver to 214 meters (1400 K.C.). Replace the 400 ohm resistor connected to the antenna lead by a .00025 MFD condenser. Adjust the broadcast oscillator trimmer located to the left of the band switch (see diagram for location of all trimmers and padders) and the broadcast antenna trimmer located on the top of the gang condenser till maximum response is obtained. Set the test oscillator and receiver to 500 meters (600 K.C.) and adjust the B.C. padder for maximum response while rocking the gang condenser at the same time. Repeat this entire procedure.

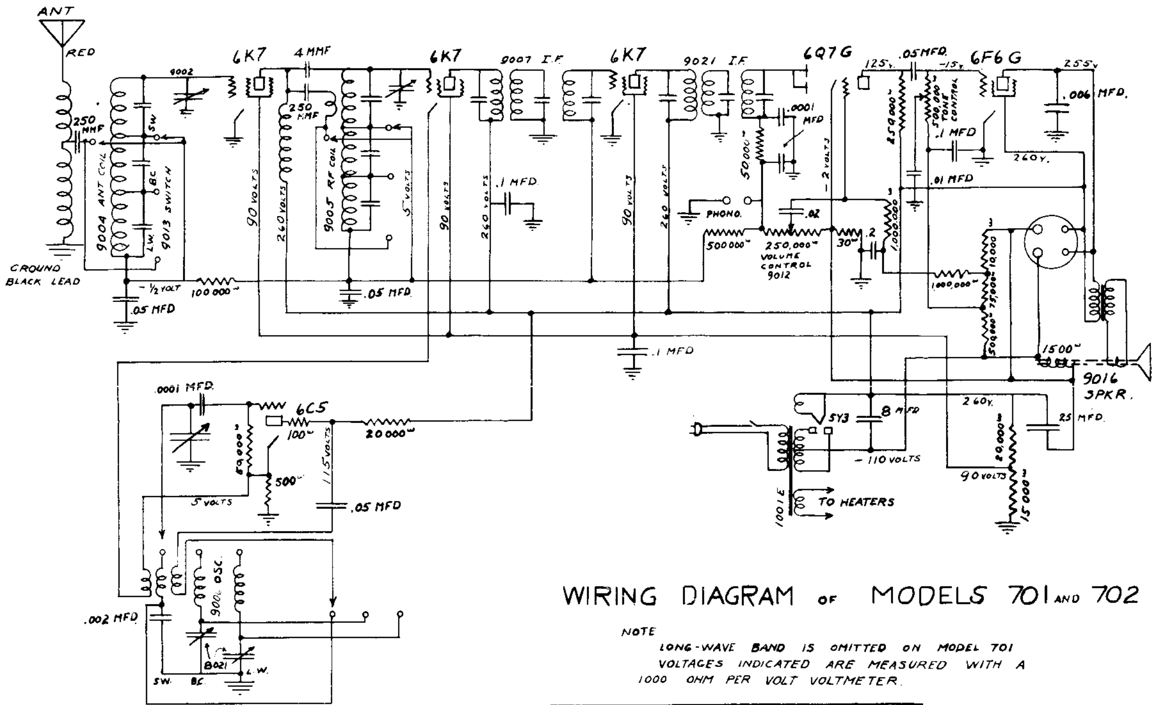
LONG-WAVE BAND (MODEL 526 ONLY)

8. Set the test oscillator and receiver to 900 meters and adjust the long-wave oscillator trimmer and the long-wave antenna trimmer located on top of their respective coils till maximum response is obtained. Set the test oscillator and receiver to 1800 meters. Adjust the long-wave padder condenser till maximum response is obtained, rocking the gang condenser at the same time. Repeat the entire procedure for this band.

Assuming that all of the component parts are not defective, poor sensitivity, selectivity, or extremely inaccurate dial calibration are an indication that the procedure has not been carefully followed and should be repeated following each step carefully in the above order.

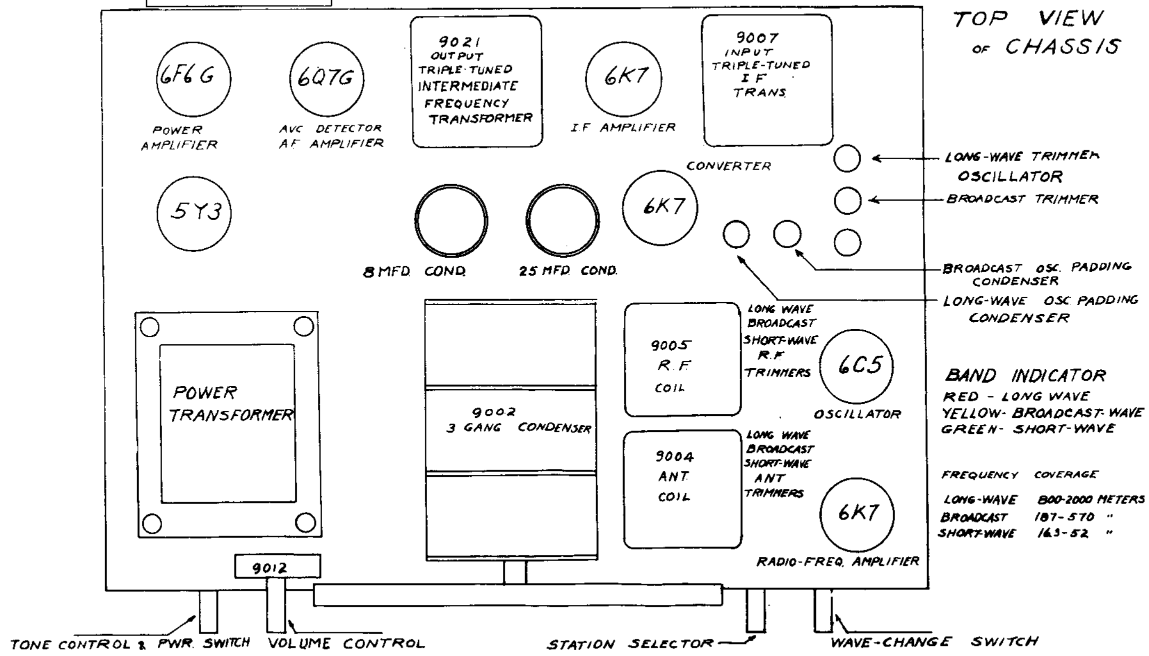
ULTRAMAR MANUFACTURING CORPORATION

MODELS 701 & 702



WIRING DIAGRAM OF MODELS 701 AND 702

NOTE
LONG-WAVE BAND IS OMITTED ON MODEL 701
VOLTAGES INDICATED ARE MEASURED WITH A 1000 OHM PER VOLT VOLTMETER.



A calibrated oscillator such as Model 180, covering the ranges from 20 to 2,000 meters and an output meter (connected between plate and screen prongs of the 6F6G tube) will be required. Use low values of output to prevent false readings due to the operation of the automatic volume control while aligning.

The output meter may also be connected across the two small prongs of the speaker plug.

INTERMEDIATE STAGE ALIGNMENT

1. Connect the output of the test oscillator to the grid of the 6K7 converter tube (located behind tuning condenser), and connect a 1 megohm resistor from this grid to the chassis. Connect the ground side of the oscillator (the shielding) to the receiver chassis.

2. Set the test oscillator to 465 K.C. Refer to Curve B on the calibration chart to obtain the proper setting of the test oscillator dial.

3. Align the output intermediate transformer by turning one of the trimmer screws accessible at the rear of the coil shield until the response is at a maximum. Adjust the other trimmer screws in the same manner.

4. Adjust the input intermediate frequency transformer in the same manner.

SHORT-WAVE ALIGNMENT

5. Set the dials of the test oscillator and the receiver to 20 meters. Connect the output (insulated lead) of the test oscillator to the antenna lead (red) through a 400 ohm resistor.

6. Adjust the two lowest trimmers in the square shields near the front of the chassis till maximum response is obtained while rocking the gang condenser at the same time. By rocking the gang condenser is meant tuning to a point just above and just below the oscillator frequency while making some other adjustment. Set the test oscillator for frequency while making some other adjustment. Set the test oscillator and receiver to 50 meters and check sensitivity.

BROADCAST BAND ALIGNMENT

7. Set the test oscillator and receiver to 214 meters (1400 K.C.). Replace the 400 ohm resistor connected to the antenna lead by a .00025 MFD condenser. Adjust the B.C. oscillator trimmer and center trimmers in the square shields near the front of the chassis (B.C. - R.F. and B.C. antenna trimmers) till maximum response is obtained. Set the test oscillator and receiver to 500 meters (600 K.C.) and adjust the B.C. padder for maximum response while rocking the gang at the same time. Repeat this entire procedure.

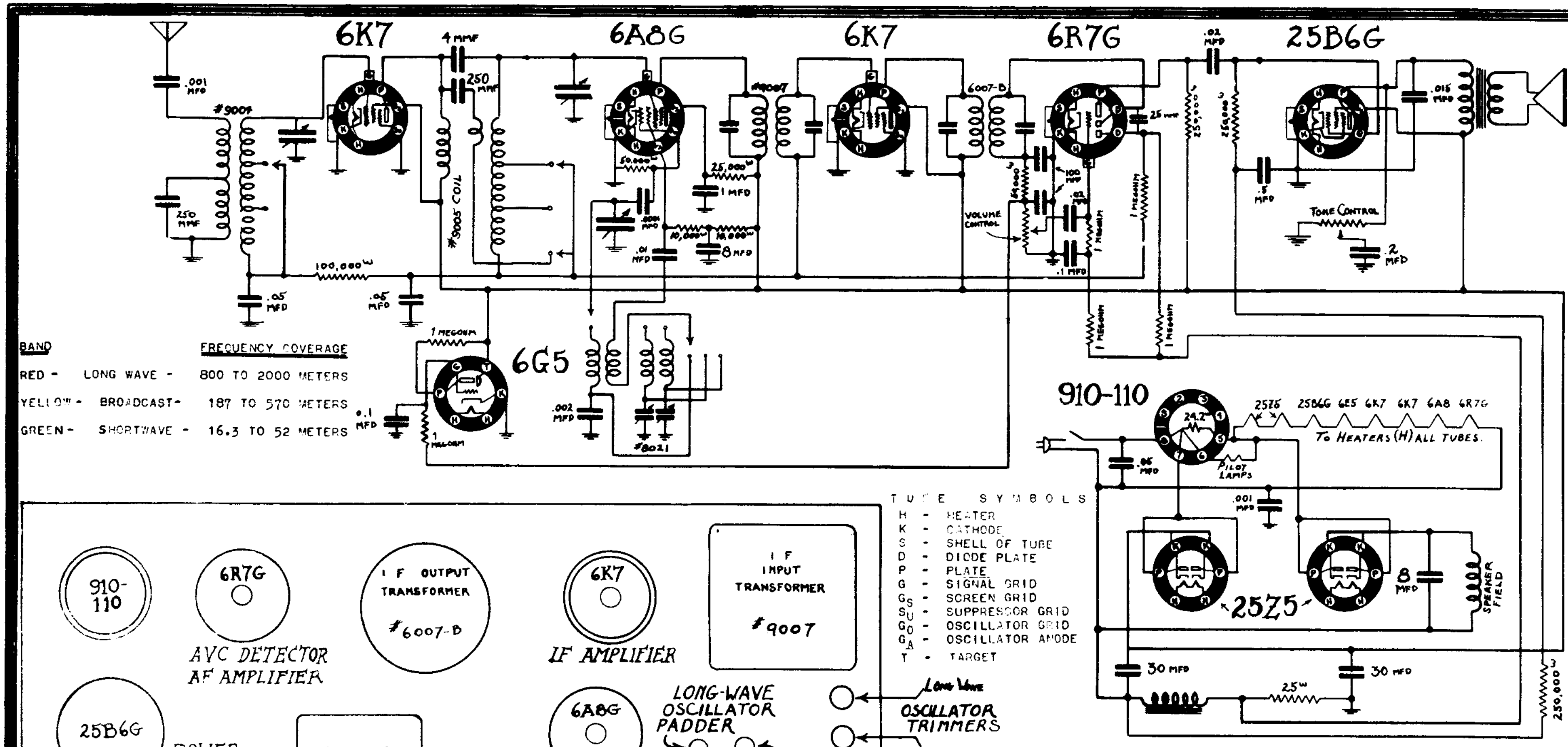
LONG-WAVE BAND ALIGNMENT (Model 702 only).

8. Set the test oscillator and receiver to 900 meters and adjust the L.W. oscillator trimmer and the L.W. antenna and R.F. trimmers (highest trimmers in the square shields near the front of the chassis) till maximum response is obtained. Set the test oscillator and receiver to 1800 meters. Adjust the long-wave oscillator padder condenser at the same time. Repeat the above procedure for this band.

Assuming that all of the component parts are not defective, poor sensitivity, selectivity, or extremely inaccurate dial calibration are an indication that the procedure has not been carefully followed and should be repeated following each step carefully in the above order.

ULTRAMAR MANUFACTURING CORPORATION

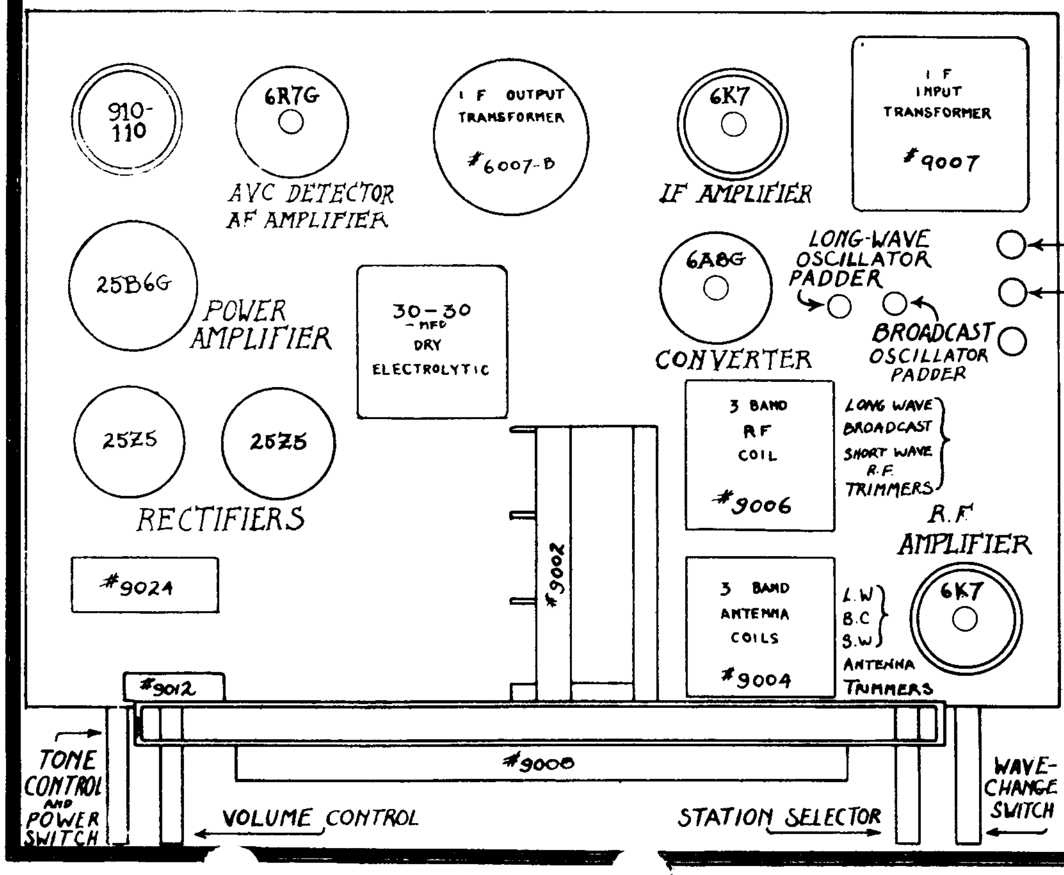
MODEL 910



BAND		FRECUENCY COVERAGE
RED -	LONG WAVE -	800 TO 2000 METERS
YELLOW -	BROADCAST -	187 TO 570 METERS
GREEN -	SHORTWAVE -	16.3 TO 52 METERS

TUBE SYMBOLS

H - HEATER
K - CATHODE
S - SHELL OF TUBE
D - DIODE PLATE
P - PLATE
G - SIGNAL GRID
G_S - SCREEN GRID
S_U - SUPPRESSOR GRID
G_O - OSCILLATOR GRID
G_A - OSCILLATOR ANODE
T - TARGET



OPERATING INSTRUCTIONS

Installation: Remove all packing material from inside the cabinet and be sure the speaker cord is plugged into the socket at the rear of the chassis. Replace the back panel. Do not ever remove this back unless the line-cord has been disconnected from the source of supply.

Current Supply: This receiver can be used with either alternating or direct current. The power supply voltage must correspond to the number of the ballast tube. For 110 volts a #910-110 ballast tube is used. For 230 volts a #910-230 tube is used, in place of the #910-110.

Antenna: Use an outside antenna about fifty feet in length, including the lead-in wire. Connect it to the red wire coming out of the rear of the receiver. No ground connection is necessary with this receiver.

ALIGNING NOTES

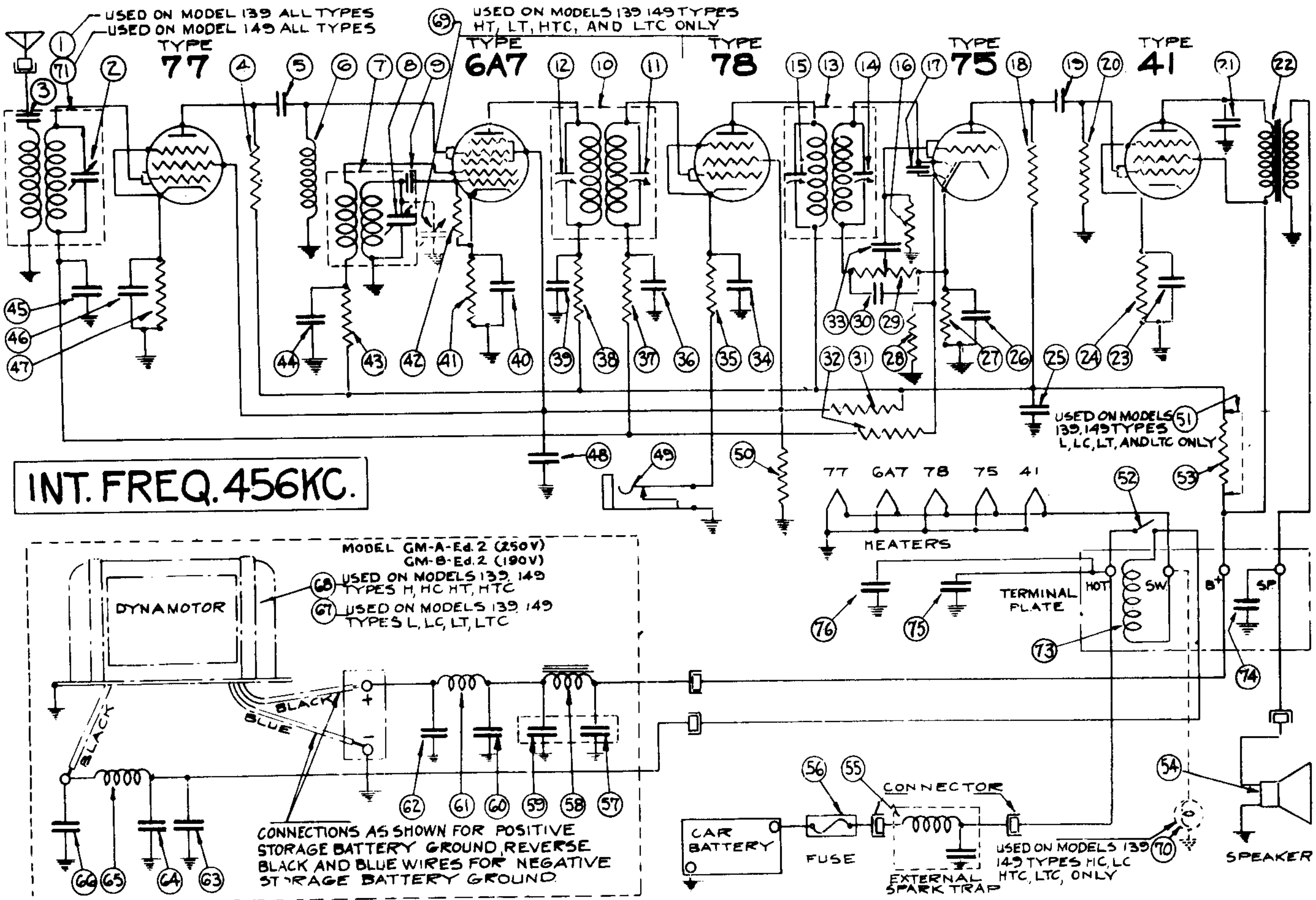
1.- Align the IF Transformers at 465 kilocycles (645 meters).
2.- Align the Short-wave Band (Green) at 20 meters by adjusting the SW Antenna and SW R.F. trimmers (at bottom of square cans, at side of chassis).
3.- Align the Broadcast Band (Yellow) by adjusting the BC Oscillator trimmers and also the BC Antenna and BC R.F. trimmers (center trimmers in the square cans), at 1400 kilocycles (214 meters). Adjust the BC padder condenser at 600 kc. (500 meters).
4.- Align the Long-wave Band (Red) at 900 meters by adjusting the LW Oscillator trimmer and also the LW Antenna and R.F. trimmers (the top trimmers in the square cans). Adjust the LW padder at 1800 meters.

All aligning adjustments are to be made with a standard Signal Generator, and Output Meter.

Caution: Be sure that the four bolts under the cabinet are loosened and that no part of the dial touches the front of the cabinet.

UNITED AMERICAN BOSCH CORPORATION

MODELS 139H, 139HC, 139HT, 139HTC, 139L, 139LC, 139LT, 139LTC, 149H, 149HC, 149HT, 149HTC, 149L, 149LC, 149LT & 149LTC "POLICE RADIO"



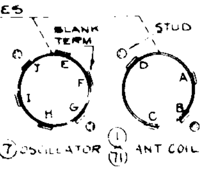
Dia. #	Description	Part #
C* 1	Antenna coil assembly)	SA 105904
2	Condenser - 70-140 mmf.)	
3	.0004 mfd. mica condenser	SA 104835
A* 4	20,000 ohms ½ W. resistor	SA 100813
5	.0001 mfd. mica condenser	SA 106417
6	Choke coil	SA 105912
7	Oscillator coil assembly)	SA 105906
8	Condenser - 70-140 mmf.)	
9	.0001 mfd. mica condenser	SA 101143
10	1st I.F. coil assembly)	
11	Trim. cond. - 7-80 mmf.)	SA 105902
12	Trim. cond. - 7-80 mmf.)	
13	2nd I.F. coil assembly)	
14	Trim. cond. - 7-80 mmf.)	SA 104899
15	Trim. cond. - 7-80 mmf.)	
A* 16	1 meg. 1/4 W. resistor	SA 105281
17	.0001 mfd. mica condenser	SA 106417
18	.25 meg. ¼ W. resistor	SA 105279
19	.005 mfd. 350 V. cond. (part of CD 951 A)	
20	.5 meg. ¼ W. resistor	SA 105246
21	.005 mfd. 350 V. cond. (part of CD 951 A)	
22	Output transformer	SA 105907
23	5 mfd. (elect.) cond. (part of SA 105910)	
24	750 ohms ½ W. resistor	SA 101666
25	.25 mfd. 350 V. condenser (part of CD 951 A)	
26	5 mfd. (elect.) cond.	SA 105910
A* 27	5000 ohms ¼ W. resistor	SA 105249
A* 28	2 meg. ¼ W. resistor	SA 105250
29	Volume control .5 meg.	VR 951
30	.0001 mfd. mica condenser	SA 106417
A* 31	10,000 ohms ½ W. resis.	SA 100825
A* 32	.5 meg. ¼ W. resistor	SA 105246
A* 33	.005 mfd. 350 V. cond.	SA 103659
34	.05 mfd. 200 V. condenser (part of CD 951 A)	
A* 35	300 ohms ¼ W. resistor	SA 105260
36	.05 mfd. 200 V. condenser (part of CD 952 A)	
A* 37	100,000 ohms ¼ W. resis.	SA 105278
A* 38	2000 ohms ¼ W. resistor	SA 105245
39	.05 mfd. 350 V. condenser (part of CD 952 A)	
40	.05 mfd. 200 V. condenser (part of CD 952 A)	
A* 41	300 ohms ¼ W. resistor	SA 105260
A* 42	50,000 ohms ¼ W. resis.	SA 105276
A* 43	20,000 ohms ¼ W. resis.	SA 105274
44	.05 mfd. 350 V. condenser (part of CD 952 A)	
45	.05 mfd. 200 V. condenser (part of CD 952 A)	
46	.05 mfd. 200 V. condenser (part of CD 952 A)	
A* 47	300 ohms ¼ W. resistor	SA 105260
48	.25 mfd. 200 V. condenser (part of CD 951 A)	
49	Tuning meter jack	SA 106686
A* 50	100,000 ohms ½ W. resis.	SA 100727
F* 51	Jumper	
52	Switch - part of VR 951	
53	5000 ohms 1 W. resistor	SA 107572
54	Speaker	SA 106685
55	External spark trap	CC 953 A
56	Fuse - 20 amp.	FU 951
57	4 mfd. (elect.) cond. (part of CE 9510)	
58	Choke coil	TR 957
59	4 mfd. (elect.) cond. (part of CE 9510)	
60	.001 mfd. mica condenser	SA 103775
61	Choke coil	SA 104612
62	.001 mfd. mica condenser	SA 103775
63	.001 mfd. mica condenser	SA 103775
64	.05 mfd. 200 V. condenser	SA 106386
65	Choke coil	SA 105824
66	.1 mfd. 200 V. condenser	SA 102495
F* 67	Dynamotor	MG 953
G* 68	Dynamotor	MG 951
E* 69	Trimmer condenser	CS 955
H* 70	Pilot lamp, 6 V., .20 Amp.	LP 951
D* 71	Antenna coil assembly	SA 105905
73	Choke coil	RC 95157
74	.0001 mfd. mica condenser	SA 106417
75	.0001 mfd. mica condenser	SA 106417
76	.5 mfd. 120 V. condenser	CW 957

A* Insulation strip SA 106649.
C* Used on Model 139 All Types.
D* Used on Model 149 All Types.
E* Used on Models 139, 149 Types HT, LT, HTC & LTC only.
F* Used on Models 139, 149 Types L, LC, LT & LTC only.
G* Used on Models 139, 149 Types H, HC, HT & HTC only.
H* Used on Models 139, 149 Types HC, LC, HTC & LTC only.

WINDING RESISTANCE

*REFER TO SKETCHES

PART	FUNCTION	PRIMARY RESIST	PRIMARY IDENT *	SECONDARY RESIST	SECONDARY IDENT *
1 71	ANT COIL	05	A To C	2	B To GREEN
7	OSC COIL	1	H To K (SEE FIG 1)	2	I To J
10	1st I F	23	RED To BLUE	23	BLACK To GREEN
13	2nd I F	23	RED To BLUE	23	BLACK To GREEN
22	OUTPUT	580	GREEN To BROWN	05	SP TERM To GND
6	CHOKE	3			
58	CHOKE	225	BLUE To BLUE		
61	CHOKE	1			
65	CHOKE	LESS THAN 01			



SOCKET VOLTAGES MODELS 139 149 TYPES H, HC, HT HTC

TUBE	STAGE	FIL	PLATE	SCREEN	CATH
77	RF	57	84	78	11
6A7	OSC	57	88	78	24
	1st DET		142		
78	IF	57	145	78	19
75	2nd DET	57	56		05
41	OUTPUT	57	220	230	17

SOCKET VOLTAGES MODELS 139 149 TYPES L, LC, LT LTC

TUBE	STAGE	FIL	PLATE	SCREEN	CATH
77	RF	58	95	87	13
6A7	OSC	58	101	87	29
	1st DET		161		
78	IF	58	165	87	23
75	2nd DET	58	62		06
41	OUTPUT	58	157	167	12

NOTE ALL VOLTAGE READINGS WITH VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT

UNITED AMERICAN BOSCH CORPORATION
MODELS 139H, 139HC, 139HT, 139HTC, 139L, 139LC, 139LT, 139LTC, 149H, 149HC, 149HT, 149HTC, 149L, 149LC, 149LT & 149LTC "POLICE RADIO"

The Models 139 and 149 are designed especially for police use in motor cars. The Model 139 is for frequency settings between 1500 and 1800 kilocycles, and the Model 149 for settings between 2250 and 2500 kilocycles. The receiver equipment consists of three units:

(1) Receiver unit
(2) "B" power supply unit
(3) Speaker

The receiver is arranged to be mounted on the steering column which is preferable, or on the bulkhead, whereas, the "B" power supply unit and the speaker are arranged to be mounted on the bulkhead. The mounting construction of each unit is such as to simplify removal for servicing.

The receiver unit employs a superheterodyne circuit with five tubes arranged as follows:
1 Type 77 used as an R.F. amplifier
1 Type 6A7 used as a 1st detector and oscillator
1 Type 78 used as an I.F. amplifier
1 Type 75 used as a 2nd detector, AVC tube, and audio amplifier
1 Type 41 used as an audio output tube

The oscillator is tuned to a frequency differing from the signal frequency by 456 KC., the intermediate frequency. The oscillator in Model 139 receiver generates a frequency 456 KC. higher than the signal frequency, whereas, the oscillator in the Model 149 receiver generates a frequency 456 KC. lower than the signal frequency. Accordingly, one model is convertible to the other by merely changing the preselector coil.

1. CONNECT POWER SUPPLY UNIT FOR SUPPLY POLARITY:
(a) Model GM-A-Ed.2 or GM-B-Ed.2. The power supply unit as provided has a terminal plate to which a black wire and a blue wire are connected. These connections are made for the condition where the power supply unit is to be used in a motor car whose storage battery has the positive terminal grounded. If it is desired to use the power supply unit in a car whose storage battery has the negative terminal grounded, it will be necessary to reverse the connections of the blue and black wires on the terminal strip. To gain access to this terminal plate it is necessary to remove the housing and the bottom cover on the power supply unit. The terminal plate will be found on the under side of the sub-base inside of the unit. The terminals on the terminal plate are designated "+" and "-". As furnished, the black wire is connected to the " " terminal and the blue wire is connected to the "-" terminal, to accommodate a positive storage battery ground. When the negative terminal of the storage battery is grounded these wires should be reversed so that the blue wire is connected to the "+" terminal and the black wire is connected to the "-" terminal.
(b) Model GM-EA or GM-EB. The power supply unit as provided is connected for the condition where it is to be used in a motor car whose storage battery has the positive terminal grounded. If it is desired to use the power supply unit in a car whose storage battery has the negative terminal grounded, it will be necessary to remove the end cap from the end, of the dynamotor which is away from the filter unit and interchange the red and black wires which make connections with the brushes.

It is IMPORTANT to observe these instructions since the receiver will not operate if the polarity connection is not correct and serious damage to some of the electrical components may result.

2. INSTALL THE STANDARD SUPPRESSION EQUIPMENT: The method of eliminating ignition noise is the same for practically all of the later model cars. Eight spark plug suppressors, one distributor suppressor, and three shielded condensers are provided in the bag of accessories. Using this material and observing the following procedure in installation, the desired results will be obtained in the majority of cases.

A. Connect a spark plug suppressor in series with each spark plug connection as close to the spark plug as possible. To do this, remove the nuts which secure the ignition wires to the spark plugs and screw a suppressor on each plug. The top of the suppressor is a stud fitted with a push-type clip which can be removed, thereby making the suppressor universally adaptable to all types of spark plug wire connectors.

B. Insert a distributor or suppressor in series with the center lead of the distributor (high tension lead from coil) as close as possible to the distributor. This is done by first cutting the lead to the center of the distributor about 1-1/2 inches above the distributor cap, then remove the short end of this lead from the distributor and screw the suppressor into this short end. Next screw the other end of the suppressor into the long end of the ignition wire to the coil. Plug the lead assembly thus completed back into the distributor. If the weight of the suppressor causes excessive vibration of the wire, it should be taped to some mechanical support to prevent the strands of the wire from breaking. This wire should not be placed close to any metal part.

C. Mount a condenser on the generator housing, in such a manner as to make a good ground as well as a secure mounting. Connect the condenser lead to the battery side of the cutout. (Note: On cars where the generator cutout is mounted on the bulkhead, and there are two terminals on the generator, connect the condenser lead to the terminal carrying the heaviest wire.)

D. In all cars equipped with a roof antenna, it is absolutely necessary to connect a condenser to the dome light lead at the point where the lead enters the post in back of the dash. This condenser may be mounted and grounded on the under lip of the dash. The condenser lead to the dome light should be as short as possible.

E. In many installations it will be necessary to connect a condenser to the battery side of the ignition switch. This condenser can be mounted and grounded at the rear of the dash.

On a Ford V8, this condenser should be mounted on the ignition coil and distributor unit, which is located directly in back of the car radiator, in the motor compartment. The condenser mounting bracket should be bent out straight and clipped off to the edge of the mounting hole, with a pair of cutters. This permits the condenser to be secured under the distributor cap screw nearest the car radiator, without striking it. The condenser lead is then connected to the primary terminal in back of the distributor cap.

3. INSTALL SPARK NOISE TRAP AND CONNECT BATTERY CABLE TO THE AMMETER: A spark noise trap has been included among the accessories. The cable on this trap terminates in a female bayonet connector while the cover at the other end of the trap is fitted with a male bayonet connector. The battery cable on the receiver unit should be disconnected at the fuse container and the spark noise trap inserted, being careful not to let the fuse drop out of the container. The free end of the battery cable should then be connected to the ammeter or to the ammeter side of the automobile fuse. This connection should be made so that the current drawn by the receiver will be registered on the ammeter. When the receiver is turned on, a slight humming noise will be heard from the power supply unit, and a slight sound should be heard in the loudspeaker.

4. INSTALL THE ANTENNA: There are a number of different types of car antennas.
ROOF TYPE: This usually consists of a copper screen, similar to window screening, and is secured to the wooden bracing members of the top, between the top upholstery and the outer top fabric. This type of antenna has been standard equipment in most closed cars without turret tops, and is generally agreed to be the best type for automobile use. To obtain the best results from your radio receiver, this type antenna should be installed.

CAPACITOR PLATE: A metal plate, sometimes adjustable in length with insulated adjustable mounting brackets can be mounted conveniently under the chassis frame or running board of the car. For best results, the height of the plate should be determined by trial with the receiver turned on and connected to it. The height has to be a compromise between sufficient clearance to ground and good reception.

UNDER CAR WIRE TYPE: A length of wire is suspended from insulators attached to various parts of the chassis frame.

All under car antennas should be mounted as far to the rear of the motor and as far from the car storage battery as possible, in order to minimize the ignition noise pickup.

FISH POLE TYPE: A collapsible metal rod similar in construction to a fish pole is mounted on insulators and attached to the rear bumper. This type of antenna is very efficient, particularly at police frequencies.

STREAMLINE TYPE: A length of metal tubing is attached to the top of the car by means of insulators fastened to suction cups. The tubing is bent to conform to the curvature of the car top. This type of antenna is particularly advantageous for use with turret top cars.

5. INSTALL THE ANTENNA LEAD-IN: The proper installation of an antenna lead-in is a VERY IMPORTANT CONSIDERATION FOR GOOD MOTOR NOISE SUPPRESSION. It is essential, therefore, to observe the following instructions:

The antenna lead-in must be kept away from any car cable wiring, choke rods, etc., under the dash. Never coil up excess antenna lead near the dashboard, and do not run the antenna lead near or parallel to the receiver battery cable. Be sure that the antenna lead shielding is completed from the receiver to within 6 or 8 inches from the antenna, and that this shield is grounded about every two feet along its entire length. Always use a good grade of shielded antenna lead-in on all types of antenna, such as Belden Braid or its equivalent.

ROOF ANTENNA LEAD-IN: The lead-in from the roof type of antenna should be led down either the right or left hand windshield post depending upon which is nearer to the receiver. The portion of the lead-in which extends outside of the windshield post should be shielded. Where a roof type of antenna has been installed by the car manufacturer, a lead-in will also have been provided.

UNDER CAR ANTENNA LEAD-IN: Run the shielded lead up through the floor board as near to the edge of the front seat as possible to keep it away from the motor. Most cars have a metal weather strip inside the car at the bottom of the doors. Continue the lead along this strip, and ground the shielding to it. From there the lead should be run up the toe board, and then at right angles to it along the floor where the toe board joins the bulkhead to the receiver.

6. TUNE THE RECEIVER TO THE DESIRED STATION: The radio receiver as delivered will be tuned to the station frequency requested. Due to unavoidable differences between the frequency adjustment made at the factory and that of the station, it will be necessary to realign the tuning condensers slightly. One of the following methods of procedure should be followed depending upon whether or not a tuning meter is available. The method of tuning using a tuning meter is preferable since more accurate adjustment is possible.

A. With Tuning Meter.
With the receiver in the motor car, and connected to the car antenna and battery, turn the receiver fully on and allow it to get into operation which will be indicated by a slight hum heard in the speaker. Plug the tuning meter (SA 107610) into the jack in the receiver housing. If the station desired is not heard, drive the machine (with the radio set in operation), toward the broadcasting station. When the station is heard, stop the motor car and proceed as follows:

(a) Loosen the brass condenser lock nuts (which can be seen through the two holes in the top cover of the housing) using a 7/16" socket wrench (ST 450). This operation must be observed or damage will be done to the tuning condensers when alignment is attempted with a screw driver.

(b) With a screw driver inserted into the slot in the shaft of the left hand condenser (#8-Fig. #1), adjust this condenser until maximum deflection of the tuning meter in the direction indicated by the arrow on the dial is obtained on the station being heard.

(c) Repeat operation "b" with the right hand condenser (#2-Fig. #1).
(d) Lock the condensers with the 7/16" socket wrench.

B. Without Tuning Meter:
With the receiver in the motor car, and connected to the car antenna and battery, turn the receiver fully on and allow it to get into operation which will be indicated by a slight hum heard in the speaker.

If the station desired is not heard, drive the machine (with radio set in operation) toward the broadcasting station. When the

(Continued on next page)

UNITED AMERICAN BOSCH CORPORATION

MODELS 139H, 139HC, 139HT, 139HTC, 139L, 139LC, 139LT, 139LTC, 149H, 149HC, 149HT, 149HTC, 149L, 149LC, 149LT & 149LTC "POLICE RADIO"

(Continued from preceding page)
station is heard faintly, stop the motor car and proceed as follows:

(a) Loosen the brass condenser lock nuts (which can be seen through the two holes in the top cover of the housing) using a 7/16" socket wrench. This operation must be observed or damage will be done to the tuning condensers when alignment is attempted with a screw driver.

(b) With a screw driver inserted into the slot in the shaft of the left hand condenser (#8-Fig. #1), adjust this condenser until the station is heard loudest.

(c) Reduce the volume by rotating the volume control knob on the face of the receiver housing counter-clockwise.

(d) Repeat operations (b) and (c) with the right hand condenser (#2-Fig. #1).

(e) Lock the condensers with the 7/16" socket wrench.

Alignment by the above operations will be only approximate. To attain the exact alignment required for successful operation proceed as follows:

(a) Drive the motor car (with radio operating with volume control on full) to a "dead" spot or to a place sufficiently remote from the transmitter to produce a weak signal. In such a location repeat operations "a", "b", "d" and "e". In this case under no circumstances should the volume of the signal be reduced by adjusting the volume control knob. Keep the volume control in its maximum position. Do not neglect to lock the condensers with the socket wrench after alignment and before replacing cover plates.

C. WITH EXTERNAL TRIMMER CONDENSER - Types HT, LT, HTC, LTC, Only. These models are provided with an auxiliary tuning condenser which permits fine adjustments of the tuning while the receiver is in operation. This condenser is connected in parallel with the main oscillator tuning condenser. The shaft of the trimmer condenser extends through the top cover of the receiver and is provided with a suitable knob. An arrow on the knob indicates the position of the trimmer condenser with respect to a small scale on the cover.

When the receiver is tuned, the trimmer condenser should be adjusted to its mid-position and the information given in Section #5 should be followed. The trimmer condenser knob must be removed before the top cover of the receiver can be taken off.

Before replacing the cover, it is very important to make certain that the trimmer condenser is in its mid-capacity position, i.e. with the rotor plate turned half way into the stator. Then place the cover on the receiver and without turning the trimmer condenser shaft, replace the knob in such a position that the arrow points to the center of the scale. Tighten the set screw securely.

7. REMOVE REMAINING IGNITION NOISE INTERFERENCE: In certain older models of cars, some difficulty may be experienced in the elimination of ignition noise, the expedients described under sections nos. 2, 4 and 5 having proved to be insufficient. In order to facilitate the elimination of noise in the extreme cases of older cars, the following generalities pertaining to ignition noise elimination are stated.

Motor noise gets into radio receivers in automobiles in the following manner:

1. Picked up by the antenna.
2. Picked up by the antenna lead-in.
3. Carried into the receiver on the battery cable.
4. Admitted to the receiver through openings in the housing.

The Models 139 - 149 have been carefully designed to eliminate items #3 and #4 above and to minimize to a very great extent items #1 and #2 above. If, however, it is found in the older cars that there is still some motor noise present, it may be localized and in most cases remedied in accordance with the following procedure:

TO CHECK FOR THE SOURCE: Start the motor and turn on the receiver to full volume. Now turn the motor off and on to make sure that it is motor noise and not some extraneous local interference. Having determined the interference to be motor noise, keep the engine running at a speed where the noise is loudest. Disconnect the antenna lead-in from the receiver. If the noise ceases it is being picked up by the antenna or the antenna lead-in. If the noise continues, it is very rare and can usually be remedied by changing the location of the cable in respect to other car wiring under the dash.

Conditions #1 and #2, although closely related, can be treated separately, by disconnecting the car antenna from the lead-in attached to the set. If the noise still persists, it is in the lead-in, and can be eliminated by following the directions under Section #5 above. In the case of a roof antenna, as stated before, the pickup is usually by the antenna itself. The corrections for antenna pickup vary widely with cars of different makes, and no attempt will be made to list them here. However, the following expedients, if made in the order in which they are set down, will cure the majority of cases.

1. Shield the primary wire from the ignition switch to the ignition coil, running the lead separately from the other wiring and grounding the shield.

2. If the car is equipped with an Electro-Lock System, the cable wiring from it to the motor compartment must be shielded through the bulkhead to the switch.

3. Check the distributor contacts for too wide a gap.
4. Check the spark plugs for too wide a gap.

5. Be sure that the high tension center coil lead does not run closely parallel or in same conduit with the spark plug wires.

6. If the ignition coil is mounted on the driver's side of the bulkhead, move it out in to the motor compartment, close to the distributor, and shield the extended primary lead back to the ignition switch.

IMPORTANT

Material and workmanship represented in this receiver are of the best obtainable. The results obtained from the receiver, however, are dependent upon many features, of which the following are perhaps the most important items:

1. Proper mechanical and electrical installation.
2. Efficient suppression of electrical interference.
3. Adequate source of power or battery supply.

The last one mentioned is perhaps responsible for more complaints than any other item. Battery and generator are supplied with the vehicle and the customer, as a rule, considers them adequate to handle every new appliance he adds to the installation. The efficiency of the receiver will be materially affected in all cases where too small a battery is employed or where the charging equipment is inadequate. Therefore, do not blame the receiver for possible poor performance unless and until you definitely know that your battery and generator equipment are ample to supply the power needed for this installation.

Where cars are on 24 hour service, the standard generator with which the car is equipped, is usually replaced with a volt-omatic generator, which will keep the storage battery fully charged under all ordinary operating conditions.

We will be glad to help you with your battery and generator problems.

SERVICE DATA

TOOLS AND EQUIPMENT

1 Weston Model #564 Volt-Ohmmeter.
1 Test oscillator covering 456 kilocycles.
1 Screw driver with insulated handle.
1 Socket wrench #4.
1 Tuning meter with cord and plug #SA 107610.
1 Socket wrench 7/16" hex. #ST 450.
1 Soldering iron.
1 Long nose pliers.
1 Cutting pliers.

ALIGNMENT INSTRUCTIONS

All of the adjustable condensers, commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustments unless an I.F. transformer is changed, or the adjustments tampered within the field. Therefore, DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and a test oscillator is available, then proceed as follows: (See Fig. #1.)

1. Connect output meter across terminals of speaker voice coil.
2. Set test oscillator at 456 kilocycles.
3. Connect test oscillator lead to grid of I.F. amplifier tube, type 78.
4. Adjust condenser on primary of second I.F. transformer, (Point #15) to peak on output meter.
5. Adjust condenser on secondary of second I.F. transformer, (Point #14) to peak on output meter.
6. Connect ~~test~~ oscillator lead to grid of detector-oscillator tube, type 6A7.
7. Adjust condenser on primary of first I.F. transformer (Point #12) to peak on output meter.
8. Adjust condenser on secondary of first I.F. transformer, (Point #11) to peak on output meter.

The above procedure lines up the I.F. stages properly, so that all that remains is to tune the oscillator and preselector circuits to the frequency of the station it is desired to receive. This has been covered in the section headed TUNING.

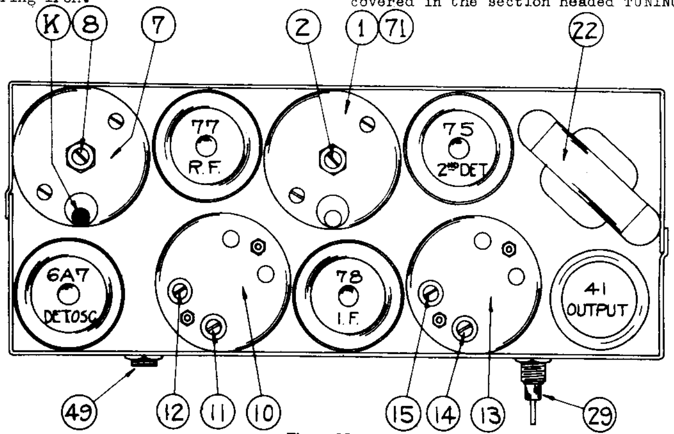


Figure No. 1

TROUBLE CHART

A few general classes of trouble are listed below with the probable reasons. These are intended to serve as a general guide in checking trouble.

1. No reception - power supply unit not operating.
   (a) Fuse in "A" battery cable burned out.
      (1) Short in "A" line or circuit.
      (2) Shorted elements in power supply unit.
      (3) Shorted elements in tube.
   (b) Poor connection at storage battery.
   (c) Connections not made in double cable between chassis and power supply unit.
   (d) Defective switch.
2. No reception - power supply unit operating.
   (a) Car antenna grounded.
   (b) Loose antenna connection.
   (c) Connections not made in double cable between chassis and power supply unit.
   (d) Antenna coil open or other coils defective.
   (e) One or more defective tubes.
   (f) Open circuit in voltage supply to tube sockets.
   (g) Open connection in speaker cable.
   (h) Open voice coil in speaker.
   (i) Contacts in tuning meter jack not

(Continued on next page)

UNITED AMERICAN BOSCH CORPORATION
MODELS 139H, 139HC, 139HT, 139HTC, 139L, 139LC, 139LT, 139LTC, 149H, 149HC, 149HT, 149HTC, 149L, 149LC, 149LT & 149LTC POLICE RADIO

(Continued from preceding page)
making contact when plug is removed.
(j) Grid bell off of tube cap.

3. Weak reception.
(a) Poor antenna or antenna connections.
(b) Incorrect adjustment of oscillator and preselector tuning condensers.
(c) One or more defective tubes.
(d) Low voltage output of power supply unit.
(e) Defective oscillator coil.
(f) Trimmer condensers on I.F. transformers out of alignment. (See Alignment Instructions.)

4. Poor tone quality.
(a) Low storage battery voltage.
(b) One or more defective tubes.
(c) Defective speaker.
(d) Low "B" voltage.

"B" POWER SUPPLY UNIT

The dynamotor contained in the power supply unit will give several thousand hours of satisfactory service under normal conditions of operation. However, it is very important to inspect the dynamotor unit at least ONCE A MONTH in order to insure satisfactory operation. Occasionally due to mistreatment the unit may fail to function properly and a little attention will, in most cases, eliminate the difficulty. However, repairs to the dynamotor should be confined to the replacement of brushes, brush holders and the cleaning of the armature commutators with very fine sandpaper. NEVER attempt to turn the armature commutators on a lathe. Service work should be done carefully, since the guarantee is cancelled on any unit that shows evidence of improper handling. For all other repairs such as the replacement of field coils, armature, bearings, etc., the complete dynamotor should be returned to the United American Bosch Corporation for repairs.

The principal causes of trouble are as follows:

A. LOW OUTPUT:
1. Short or overload in receiver. Indicated by high output current.
2. Low input voltage.
3. Short or ground in power supply unit. Indicated by high input current.
4. Dirty commutators. Clean with very fine sand paper while running.
5. Dirt between bars of commutators.
6. Tight bearings.
7. Armature laminations rubbing on the field laminations.
8. Brushes not free to move and not exerting proper pressure on commutator.
9. Defective filter components. Check condensers and continuity of choke coils.

B. MECHANICAL NOISE:
1. Loose or defective bearings.
2. Brushes chattering.
3. Armature rubbing.
4. Rubber bumpers worn, permitting motor to vibrate against container.

C. ELECTRICAL NOISE IN SPEAKER:
If the receiver has been operated with "B" batteries so that it is certain that the power supply unit is the source of the noise, one of the following conditions in the power supply unit may be the cause.

1. Rough commutator.
2. Brushes not seating properly.
3. Loose connections.
4. Short between primary and secondary armature windings.
5. Defective filter components. Check condensers and resistance of choke coil windings.

In re-assembling the motors apply a small quantity of dynamotor lubricant (BM 1057) to each bearing, and be sure to remove all oil or grease from the commutators. Replace brushes in original position and be sure they are seated properly and are free to move, exerting proper pressure against the commutators.

If new brushes are installed, they should be "run in" a short time to insure proper seating. Any new brushes or springs should be purchased only from the United American Bosch Corporation, since the grade of the brushes and the degree of spring tension is important to insure satisfactory operation.

Make certain that the rubber bumpers supporting the motor do not bind, and that the motor floats freely in rubber.

Observe the precautions with respect to polarity connections given in Section #1 of the Installation Instructions. This is very important.

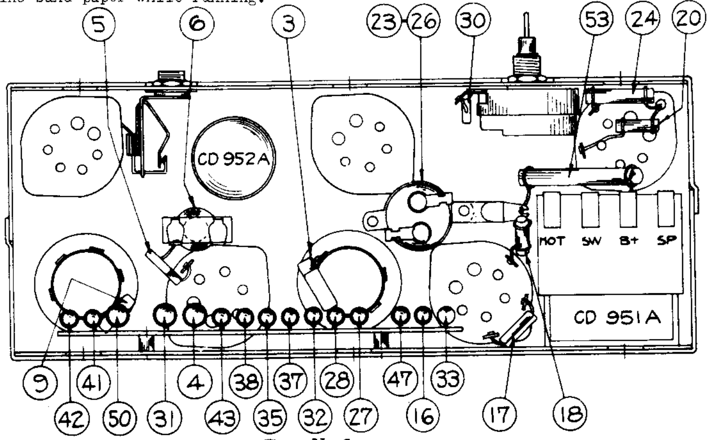


Figure No. 2

SERVICE PARTS LIST GM-EA AND GM-EB POWER SUPPLY

Dia. #	Part #	Description of Parts	List Price
1	MG 957	Gen-e-motor (Low voltage)	
2	MG 958	Gen-e-motor (High voltage)	
3	SA 105824	Choke	$ .35
4	CW 958	.5 mfd., 200 V. condenser	.35
5	SA 104612	Choke	.25
6	TR 9575	Choke	1.00
7		5 mfd., 450 V. condenser - part of CE 9544	.85
8		5 mfd., 450 V. condenser - part of CE 9544	.85
9	CW 4-25	.25 mfd., 400 V. condenser	.20
		MISCELLANEOUS	
AT 954		Armature-MG 957 (Low voltage)	18.00
AT 955		Armature-MG 958 (High voltage)	18.00
BR 959		Output brush	.75
SP 9546		Output brush spring	.10
BR 9510		Input brush assembly (spring & lead)	.90
BG 9531		Armature ball bearing	2.25
PG 9569		Grease plug	.15
SA 106656		Mounting plate	.75
IS 95190		Rubber cushion (Gen-e-motor mounting)	.25
CB 95109		Cable assembly	.75
IB 103210		Rubber bushings	.05
BM 1057		Gen-e-motor lubricating grease per tube	.50Net

WIRING DIAGRAM GM-EA AND GM-EB POWER SUPPLY

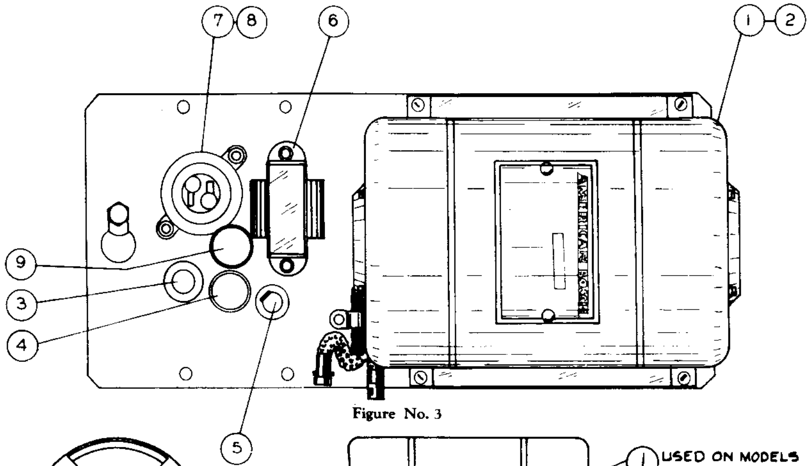


Figure No. 3

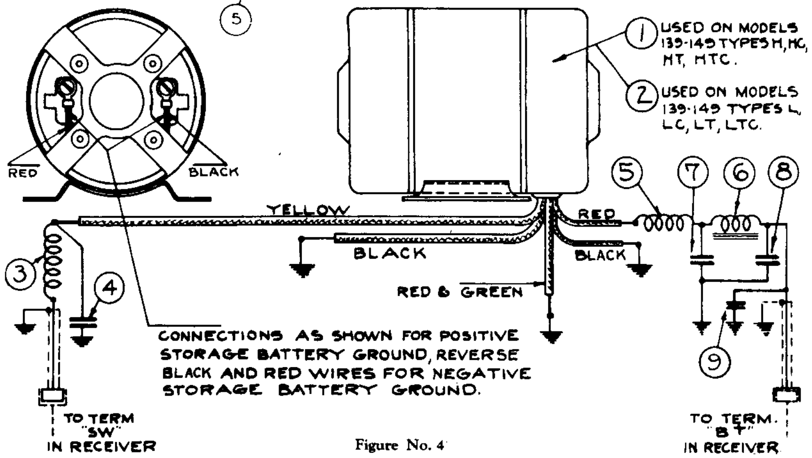
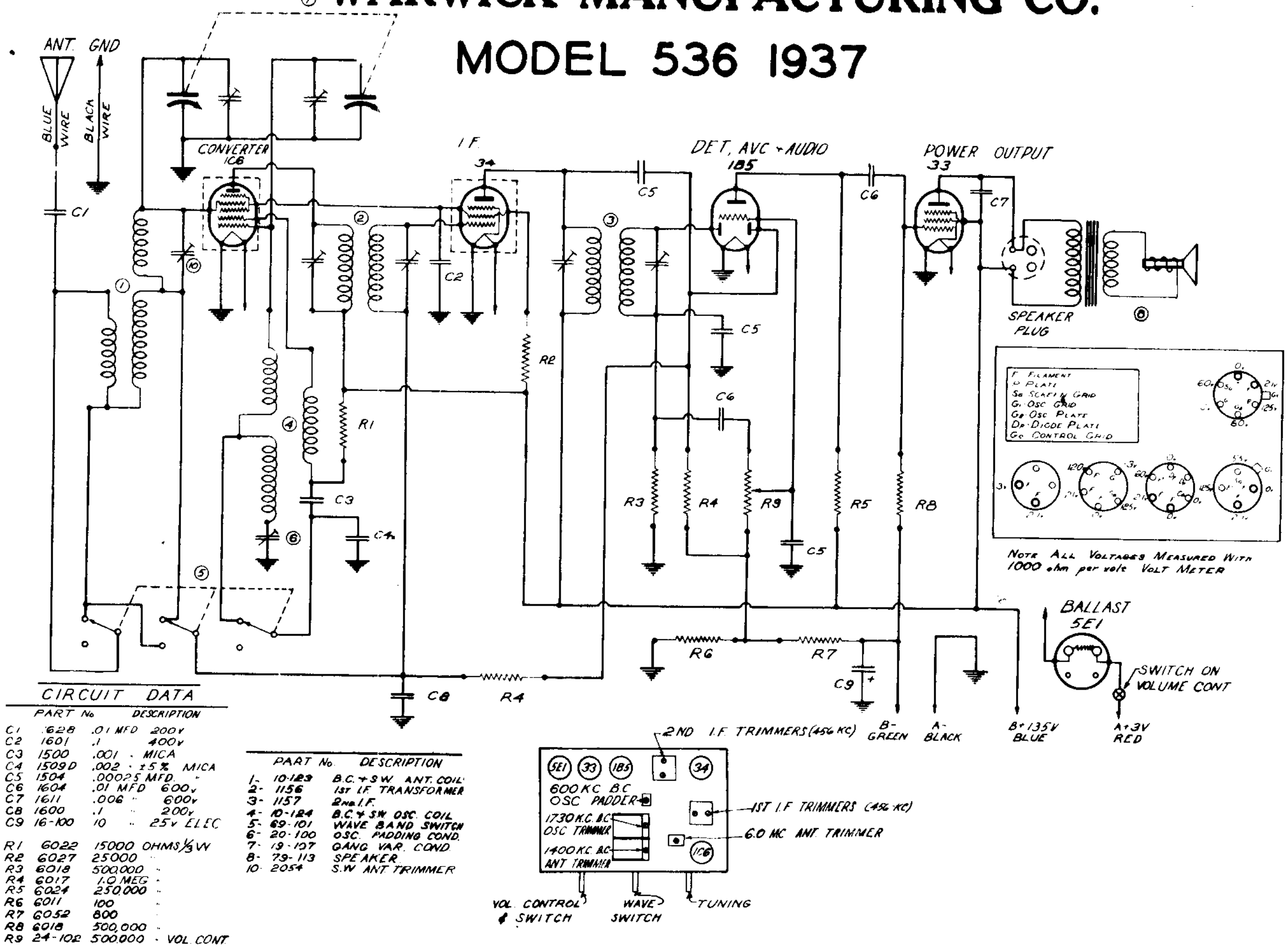


Figure No. 4

WARWICK MANUFACTURING CO.

MODEL 536 1937



CIRCUIT DATA

	PART No	DESCRIPTION
C1	1628	.01 MFD 200v
C2	1601	.1 400v
C3	1500	.001 " MICA
C4	1509D	.002 " ±5% MICA
C5	1504	.00025 MFD. "
C6	1604	.01 MFD 600v
C7	1611	.006 " 600v
C8	1600	.1 " 200v
C9	16-100	10 " 25v ELEC
R1	6022	15000 OHMS 1/3 W
R2	6027	25000 "
R3	6018	500,000 "
R4	6017	1.0 MEG "
R5	6024	250,000 "
R6	6011	100 "
R7	6052	800 "
R8	6018	500,000 "
R9	24-102	500,000 " VOL. CONT.

	PART No.	DESCRIPTION
1-	10-123	B.C. + S.W. ANT. COIL
2-	1156	1st I.F. TRANSFORMER
3-	1157	2nd I.F.
4-	10-124	B.C. + S.W. OSC. COIL
5-	69-101	WAVE BAND SWITCH
6-	20-100	OSC. PADDING COND.
7-	19-107	GANG VAR. COND.
8-	79-113	SPEAKER
10-	2054	S.W. ANT. TRIMMER

This receiver is a 5 tube dry battery operated superheterodyne.

The tubes used are a 1C6 as oscillator modulator, a 34 as I.F. amplifier, a 1B5 as A.V.C. and audio rectifier and audio voltage amplifier, a 33 as power audio amplifier, and a 5E1 as a filament ballast tube.

This receiver is made to cover two tuning bands, the standard broadcast band which ranges from 1730 K.C. to 535 K.C. and the middle or police band which has a frequency range of from 6.4 M.C. to 2.1 M.C.

ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent service men having the proper equipment. Re-alignment is very seldom needed and is usually only required after some major part has been replaced because of damage to the receiver.

The equipment required for re-aligning this receiver is an out-put meter and a modulated source of radio frequency (a signal generator or microvolter). This source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

All alignments must be made with the volume control turned full on and with the signal input reduced to as low a value as possible while still giving a reasonably accurate output indication.

Connect the output meter, through a .5 M. F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 1C6 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K. C., feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

The short wave band is aligned while feeding a 6.0 M.C. signal to the frequency end. Feed a 1730 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1730 K.C. broadcast oscillator trimmer until maximum output is shown. Set the generator to 1400 K.C. and tune in this signal on the receiver. Then adjust the 1400 K.C. broadcast antenna trimmer to maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output **while tuning the receiver back and forth across the signal** from the generator. This completes the alignment of the broadcast band.

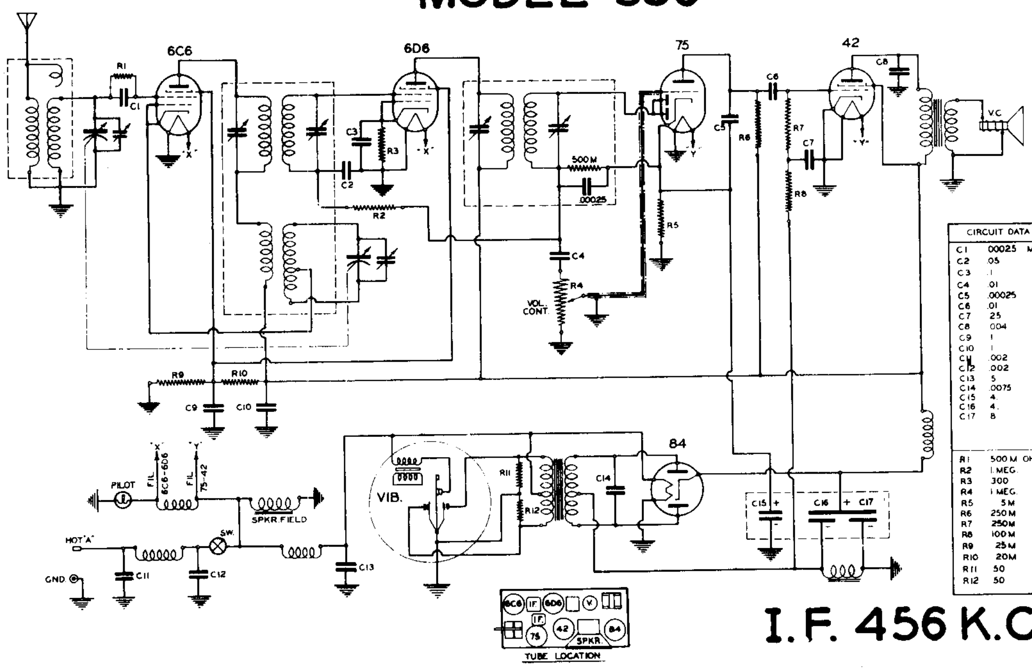
The short wave band is aligned while feeding a 6.0 M.C. signal the to receiver antenna lead through a .00025 M.F. mica condenser. Turn the wave switch to short wave position and tune in the 6.0 M.C. signal. Adjust the 6.0 M.C. short wave trimmer to maximum output.

Parts

Part No.	Description	Price
19-107	2 Gang Variable Condenser	$1.75
69-101	Wave Band Switch	.60
10-123	B.C. & S.W. Antenna Coil	.60
10-124	B.C. & S.W. Oscillator Coil	.50
1156	Ist I.F. Transformer	.90
1157	2nd I.F. Transformer	.90
24-102	Volume Control with Switch	.75
20-100	B. C. Oscillator Padding Condenser	.30
1509D	.002 M.F.D. 5% S.W. Osc. Pad	.30
2054	S.W. Antenna Trimmer	.12
16-100	10 M.F.D. 25V. Electrolytic Cond.	.60
23-100	Bat. Cable (less plugs)	.50
45-100	"A" Battery Plug	.25
45-101	"B" Battery Plug	.25
79-113	6" Hi-Permeability Dynamic Speaker	5.00

WARWICK MANUFACTURING CO.

MODEL 550



CIRCUIT DATA		
C1	00025	MFD.
C2	.05	.
C3	.1	.
C4	.01	.
C5	.00025	.
C6	.01	.
C7	25	.
C8	004	.
C9	1	.
C10	1	.
C11	.002	.
C12	.002	.
C13	5	.
C14	.0075	.
C15	4.	.
C16	4.	.
C17	8	.
R1	500 M	OHMS
R2	1. MEG.	.
R3	300	.
R4	1 MEG.	.
R5	5 M	.
R6	250 M	.
R7	250M	.
R8	100 M	.
R9	25 M	.
R10	20M	.
R11	50	.
R12	50	.

I.F. 456 K.C.

TUBE COMPLEMENT:

1—Type 6C6—Oscillator and first detector.

1—Type 6D6—Intermediate frequency amplifier (456 KC).

1—Type 75 —Second detector, A.V.C. and first audio.

1—Type 42 —Pentode output tube.

1—Type 84 —Rectifier.

RECEIVER INSTALLATION:

This receiver is designed to mount to the instrument panel of any automobile. Select the most convenient location, preferably to the left or right of the steering column. A mounting bracket attached to the auto case above the dial, mounts flush with the lower edge of the instrument panel. Hold the receiver in the most suitable position and mark off the two mounting holes. Drill these holes about one-fourth inch diameter. A long threaded rod is provided to suspend the back of the set from the fire wall. Locate and drill a one-half inch hole in line with the rod. The two nuts and washers must be drawn up tight to each side of the fire wall.

Connect the heavy insulated wire to the battery terminal of the ammeter and splice the shielded antenna lead to the auto antenna. A lug provided on the end of the shield should be fastened to a suitable ground.

OPERATION:

The left hand knob is the switch and volume control. Rotate this knob about half-way to the right and allow a few seconds for the tubes to heat up. The right hand knob is the station selector.

Never de-tune a station off resonance to decrease the volume since this will affect the tone quality and cause noisy reception.

MOTOR NOISE ELIMINATION:

Every auto radio installation presents an individual problem in the elimination of motor noise interference. However, there is a definite procedure to follow which reduces motor noise in every case. First, obtain and attach a distributor suppressor as required for the particular car installation. Then attach a generator condenser from the generator cut-out relay to ground.

Should there be any objectional motor noise after the standard method of suppression is used, it is then advisable to check the ignition system. Spark plugs and distributor points should be properly adjusted.

Below is a list of noise elimination methods which may prove helpful in extreme cases:

1. Shield high tension leads.
2. Bond motor with copper braid to frame of car at points where noise pick-up is reduced to minimum, especially on cars with a floating motor.
3. Isolate low tension battery leads from high-tension leads on cars where these leads are grouped together.
4. Connect a condenser from the battery side of the ammeter to ground.
5. Connect a condenser from dome light wire to ground.
6. Bond together all rods extending through fire-wall and connect to a suitable ground on the motor side of the fire-wall. Use one-half inch copper braid for this purpose.
7. Connect a condenser at electrically operated oil, gas and water gauges to ground.
8. Bond brake-rods or any other possible conductor of high frequency interference.

SERVICE NOTES:

When the set fails to operate, check all external connections before removing set from the car.

A loose battery or antenna connection will cause noisy intermittent reception.

If set is weak check for a weak storage battery, shorted antenna or defective tubes.

A defective vibrator may cause weak and noisy operation.

I. F. ALIGNMENT:

Rotate the variable condenser to its maximum capacity and turn volume control on full. Set a test oscillator to 456 kilocycles and connect in series with a .1 mfd. condenser to the grid of the 6C6 tube. Adjust I. F. trimmers to resonance as indicated on an output meter connected across the voice coil of the speaker or from plate to screen of the 42 tube.

R. F. ALIGNMENT:

Rotate the variable condenser to full open position and connect the test oscillator in series with a .00015 mfd. condenser to the antenna lead of receiver. Feed a 1550 Kilocycle signal to the set and adjust the oscillator trimmer on the gang condenser to resonance. Reset test oscillator to 1400 Kilocycles and adjust R.F. trimmer on gang condenser to resonance. Also check at 1000 KC, 600KC. and 550 KC.

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Identification of Dial and Chassis

The following description will identify the different dials:

No. 9 Dial—17 Button Telephone Dial—Station call letters in black push buttons.

No. 11 Dial—Same as No. 9 Dial except push buttons are brown.

No. 10 Dial—17 Button Telephone Dial—Station call letters are rectangular in shape and are mounted in rectangular openings in escutcheon ring. Equipped with visible tone and volume indicators.

No. 3 Dial—Glass dial—Moving beam of light indicators—Tone and volume indicated by series of circles.

No. 7 Dial—Glass dial—Moving beam of light indicators—Tone and volume indicated by slanting lines.

The following description will identify the chassis used with the above dials:

7 tube—Series A4	9 Tube—Series A7 (Export)
8 tube—Series A1	11 Tube—Series A2
9 tube—Series A5	13 Tube—Series A3

Telephone Dial Assembly

The telephone dial assembly provides a means of pre-setting a number of broadcasting stations and tuning in these stations at any time by depressing a button and rotating the dial to a stop position.

The apparatus is mounted on an assembly attached at the front of the chassis. An examination of this assembly will clearly show the method of operation.

Silencer Circuit—A silencer circuit is provided which results in silent tuning between stations when using the telephone dial buttons.

When a telephone dial button is depressed, a circuit is established between the ungrounded end of the volume control and the chassis ground. Referring to Fig. 1 it will be noted that contact is made between the line from the volume control, contact ring, contact washer arm (when button is depressed), spring and pulley ring stud. Since the pulley ring is at ground potential, this grounds the audio voltage and no signal will be heard until the button is released to break the contact.

It should be noted that the contact ring is part of the pulley ring assembly, but is insulated from it.

In the case of powerful local stations a slight amount of signal may be heard when the button is depressed.

Telephone Dial Adjustments

Noise When Tuning in a Signal with a Telephone Dial Button

As explained in the article on "Silencer Circuit" no noise or signal should be heard when tuning in a signal with a telephone dial button until the button is released. If noise is heard while tuning in a signal with one of these buttons, it can be corrected as follows:

If Noise Occurs on All Buttons—This is probably due to a poor contact between the flat contact spring and the contact ring—See Fig. 1. Clean the flat contact spring and contact ring to insure a good electrical connection. Ordinary cleaning fluid may be used and will be effective in most cases in cleaning the surface without affecting the plating. If the contact is still not satisfactory, a piece of fine emery cloth may be used.

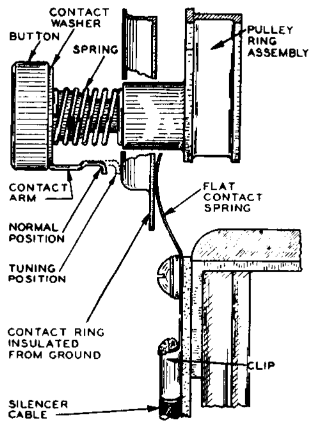

Fig. 1—Silencer Assembly

If Noise Occurs on One Button Only—This is due to a poor contact between the pulley ring stud, spring, contact washer, and contact ring—See Fig. 1. Clean all of these items of the particular button, in the same manner as mentioned previously, so as to provide a good electrical connection.

Telephone Dial Drive Cord Slipping

If the telephone dial drive cord slips on the tuning shaft pulley, this may be remedied by adjusting the drive cord tension pulley. Loosen the tension pulley bracket screw and adjust pulley assembly until the desired tension is obtained.

Position of Stop Pin

When the telephone dial assembly is on the chassis, the gang condenser rotor should not completely open or close. The travel of the rotor in this respect is controlled by the gang stop pin on the pulley ring—See Fig. 4. This is necessary to protect the gang condenser in case the telephone dial is swung rapidly to either of the extreme positions. When the gang stop pin is properly set, it will serve as the stop at both extreme positions. If the rotor is seen to open completely or close completely, the stop pin should be pulled back and re-set to overcome this condition.

Greasing and Oiling

After a period of time, put some light grease on the pulley ring shaft and on the teeth of the pulley ring. Use light oil on the drive shaft assembly bearing, care being taken not to get any on the drive cord.

Telephone Dial Replacements

Replacing Complete Dial and Condenser Assembly

Remove the grid lead clip from tube grid cap.

Remove silencer cable from the contact spring assembly. Unsolder dial lamp lead from terminal of tube socket.

Unsolder the three stator section connections of the gang condenser. Unsolder the three braided shield leads which ground the gang condenser frame to the chassis, taking care not to loosen the connections of any other units which are grounded at these common points.

At the back of the gang condenser is a stud which secures the assembly to an "L" bracket which is secured to the chassis.

Through this stud is a cotter pin. Remove only the cotter pin, metal washer, and rubber washer.

Viewing the assembly from the back, on the left is a brass bolt which holds the dial support bracket to the chassis—remove this bolt from underneath the chassis.

Grasp the dial support brace and move entire assembly toward the front of the chassis. When the support casting rubber cushions slip clear of the slot in front of chassis, lift entire assembly clear of chassis.

To replace this assembly, reverse the procedure as given above.

Replacing Pulley and Button Ring Assembly Only

Remove drive cord.

From underneath the chassis, unsolder the dial lamp lead from prong of the tube socket. Pull this lead through and out to the front of the assembly.

Remove the four escutcheon screws which hold the escutcheon ring and glass crystal in place. The dial scale pointer is removed by unhooking it from the center stud. Unscrew and remove center stud, washers, and dial scale. Slide pulley ring assembly off the center shaft.

On the No. 10 dial, two strips of celluloid between the escutcheon ring and the glass crystal will have to be removed.

To replace the pulley ring assembly, proceed as follows: Lay the assembly face down and adjust the stop pin. The stop pin (Fig. 2) is directly in

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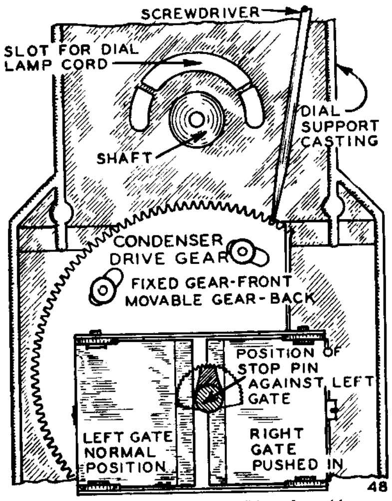

Fig. 2—Replacing Pulley Ring Assembly

back of the wide spacer on the dial button ring. Pull this pin back and adjust it to the center position —See Fig. 2.

Rotate tuning condenser rotor counter-clockwise (from front) as far as possible—See. Fig. 2.

Place the pulley ring assembly on the shaft with the knot of the dial lamp lead at the top—do not engage the gears.

Pull the dial lamp lead through the slot in the pulley ring gear and through the long slot in the dial support casting. Then place this lead through the clip under the dial support brace and out through the opening in the back of this brace.

With the gears still disengaged, rotate the pulley ring clockwise (from front) ½ revolution until the stop pin passes over the right gate and comes to rest against the left gate—See Fig. 2.

With the condenser rotor fully closed, push the pulley ring on the shaft until the pulley ring gear engages the *fixed gear only* (front) of the condenser drive gear assembly. Hold the pulley ring assembly and with a fine blade screw driver, move the movable (back) gear clockwise one tooth relative to the fixed gear—See Fig. 2. Then push the pulley ring all of the way on, engaging the movable gear.

Now lay the chassis on its back. Replace in the order given the large washer with rectangular hole, dial scale, washers, center stud, dial pointer, glass crystal, and escutcheon. Resolder the lamp lead.

For the No. 10 dial, before putting the escutcheon on, lay the two celluloid strips on the glass crystal with the inside flange facing away from the glass. Then lay the escutcheon on top of the celluloid strips. The section not cut out for station call letters should be at the wide spacer in the button spacer ring. Center the small holes in the celluloid discs in the station call letter openings and then tighten the escutcheon screws.

The stop pin must now be adjusted, as explained in article "Position of Stop Pin," until the condenser does not open or close fully. Injury to the condenser will result if allowed to open or close fully.

Replace the drive cord as explained in the article "Replacing Drive Cord."

Replacing Gates

After a great amount of use, one or both of the stop gates may wear, making it necessary to replace the stop gate assembly. This is done by first removing the pulley ring assembly as explained in

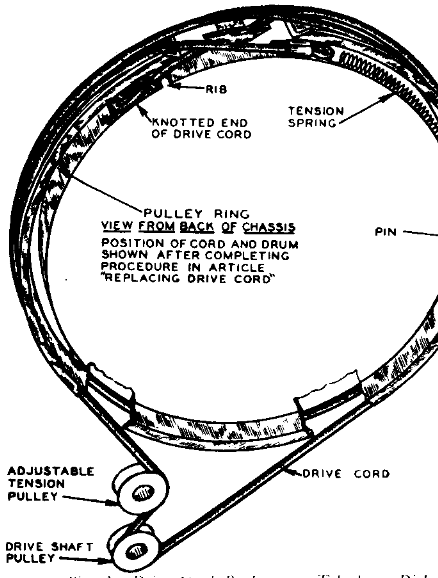

Fig. 3—Drive Cord Replacement-Telephone Dial

the article "Replacing Pulley and Button Ring Assembly."

The stop gate assembly is then removed by taking out the two screws at the bottom of the assembly.

Replacing Drive Cord

Remove the old drive cord and tension spring Rotate telephone dial clockwise (from back of chassis) as far as it will go.

Viewing the pulley ring drum from above and to the back, place the knotted end of the drive cord in the slot provided for it, catching the knot in back of the rib as shown in Fig. 3.

Bring the cord down and around the right side (from back) of the drum at front part of groove in pulley ring drum and under the drive shaft pulley making one-half turn on this pulley. Then bring the cord around the right side (from back) of the adjustable tension pulley and up to the upper left side of the pulley ring drum in front of the cord already on.

Hold the cord in the left hand and rotate the dial counter-clockwise with the right hand. Feed the cord on the drum in such a way that after passing the two openings at the top of the pulley ring drum, it passes to the back of the groove in the drum. After the pulley ring drum makes one complete revolution, place the cord through the left drum opening into the slot and secure the tension spring hook over the pin provided for it—See Fig. 3.

Replacing a Telephone Dial Button or Button Shaft

A telephone dial button or button shaft may be replaced without removing the chassis from the cabinet.

Rotate the dial until the button shaft to be replaced is in the position shown in Fig. 4. Using a wooden wedge block or any other wedge, hold this button shaft in place as shown. Remove the clear celluloid disc and the call letter disc with the point of a pin from the button of the shaft to be replaced (No. 10 dial—brown opaque celluloid disc only).

Remove the hairpin spring from the front of this shaft, spreading it with an ice pick or screwdriver. Take off the button, metal washer, molded bushing, and spring. Take out the wedge block, remove the button shaft to be replaced from the back of the dial assembly and put in the new one. Then put

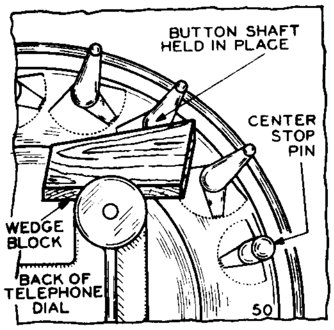

Fig. 4—Holding a Push Button Shaft in Place

the wedge block back in place again as illustrated.

Lay the cabinet back down against a chair so that it will be about 30 degrees from the vertical position.

Assemble the spring, molded bushing, metal washer, and button in the order shown in Fig. 5. (Last three items may be in one unit). Push the button and spring assembly over the button shaft with the tab of the metal washer in the normal

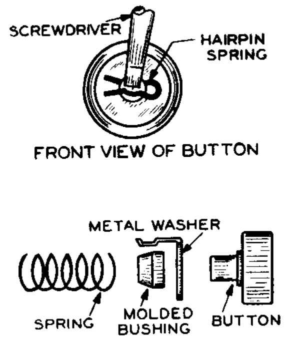

Fig. 5 Putting a Hair Spring on a Push Button Shaft

position—See illustration in instruction book. Hold the tab and rotate the button until the flat in the shank coincides with the flat on the shaft. Push the button all of the way on.

Put the hairpin spring in place, as shown in Fig. 5, with the upper part of the slot near the end of the button shaft and the lower part over the end of the shaft. Place the blade of a screwdriver at the center of the lower part of the spring and push down until the spring snaps into place in the slot on the shaft. Remove the wedge block.

Phantom Light Dial - Replacing Drive Cord

Remove the dial assembly as follows: Take out the screw which secures the dial frame brace to the back of the gang condenser. Take out the two screws which secure the brackets on the bottom of the dial frame to the chassis. Lay the dial assembly face down in front of the chassis—it is not necessary to remove the volume control and tone control indicator cords.

Remove the phantom light assembly from the

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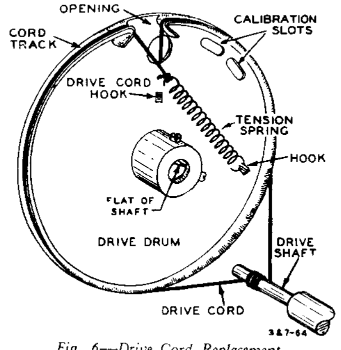

Fig. 6—Drive Cord Replacement. Phantom Light Dial

drive drum by taking out the screw.

Take off the old cord and tension spring. Tie a knot with a small loop in it in one end of the new cord. Then tie the other end of this cord to the hook on the tension spring. The distance from the loop on one end to the tension spring is 17¾ inches.

From the front of the chassis, place the looped end of the cord through the drum hole located near the cord track opening, and hook it over the hook provided for it at the back of the drum.

Bring the cord up and around the right side of the drum, keeping the cord in the grooved track of the drum.

Bring the cord down to the right side of the drive shaft and wind it three and one-third times around this shaft progressing toward the back.

Then bring the cord up and around the left side of the drive drum. Hook the tension spring on the hook of the drive drum.

Replace the phantom light and the dial assembly.

Phantom Light Dial Replacement Parts

See article "Identification of Dial and Chassis" in order to determine the correct dial and chassis assembly number.

The No. 3 Dial is used on the Series A1, A4, and A5 chassis. The No. 7 Dial is used on the Series A1 and A4 chassis only. The following parts are common to both groups unless otherwise specified.

DESCRIPTION	No. 3 DIAL PARTS		No. 7 DIAL PARTS	
	PART NO.	LIST PRICE	PART NO.	LIST PRICE
DIAL ASSEMBLY				
Dial Assembly, Complete with Dial Glass, Dicl Assembly Mounting Plate, Brace, Support Bracket, Celluloid Dial Background, Indicator Tension Spring, Indicator Cords, Indicator Cord Takeup Collars, Side Reflectors, Lamp Sockets and Lamps, Fibre Strips, and Fibre Light Shield	Specify Type of Dial, Name on Dial or Escutcheon, Model or Series of Radio	$10.85	Specify Type of Dial, Name on Dial or Escutcheon, Model or Series of Radio	$10.70
Dial Glass Only (Series A1-A5)	See Above	.95	See Above	.80
Dial Glass Only (Series A4)	See Above	.95	See Above	.70
Celluloid Background for Dial (Series A1-A5)	58X206	.45	9X41	.40
Celluloid Background for Dial (Series A4)	58X206	.45	9X42	.40
Dial Assembly Mounting Plate with Tone & Volume Indicators, and Indicator Pulleys	25X381	.90	25X411	1.00
Dial Assembly Brace (Attached to Gang Condenser)	25X383	.10	25X383	.10
Fibre Strip (At Back of Tone and Volume Indicator Lamps)	11X58	.10	11X58	.10
Tension Spring for Tone and Volume Indicators	28X88	.10	28X88	.10
8" Black Cord for Indicators	doz.	.20	doz.	.20
Brass Collars with Set Screws—to secure Indicator Cords to Shafts	29X20 ea.	.10	29X20 ea.	.10
Dial Lamp Reflector (Right From Front)	41X18	.10	41X18	.10
Dial Lamp Reflector (Left From Front)	41X17	.10	41X17	.10
Dial Lamp Sockets and Clips (For Edge Lighting of Dial and Tone & Volume Indicators)	7A62	.10	7A62	.10
Dial Lamp Socket Assembly (4 Sockets) Less Lamps	7A64	.60	7A64	.60
Dial Lamp (No. 51 Bayonet Type)	7A32	.20	7A32	.20
Phantom Light Assembly Complete with Lamps (Series A1-A5)	25A164	1.65	25A164	1.65
Phantom Light Assembly Complete with Lamps (Series A4)	25A207	1.30	25A207	1.30
Springs for Lamps of Above Assembly	28X86 ea.	.10	28X86 ea.	.10
Brass Collars for Lamps of Above Assembly	19X61	.10	19X61	.10
Bracket (To secure Phantom Light Assembly to Drum)	25X360	.10	25X360	.10
Fibre Strip (At bottom of Dial Glass)	11X59	.10	11X59	.10
DRIVE ASSEMBLY				
Tuning Shaft Only	26X248	.15	26X248	.15
Tuning Drive Cord—20"	doz.	.45	doz.	.45
Tension Spring for Above Cord	28X27 ea.	.10	28X27 ea.	.10
Drive Drum & Hub	24X279	.40	24X279	.40
Rubber Cushion (Front) for Assembly Mounting	8X43 ea.	.10	8X43 ea.	.10
Rubber Cushion (Rear)—Gang Mounting	8X44 ea.	.10	8X44 ea.	.10
Rubber Cushion (Rear—under Chassis)—Gang Mounting	8X45 ea.	.10	8X45 ea.	.10
Rear Mounting Foot for Gang Condenser	25X283	.10	25X283	.10

Support Bracket and Drive Shaft Bushing for Gang Condenser	25X380	.45	25X380	.45

Prices Subject to Change Without Notice.

Telephone Dial Replacement Parts

See article "Identification of Dial and Chassis" in order to determine the correct dial and chassis assembly number.

The parts in the 3 lists shown below apply to the A1, A2, A3, A5, and A7 chassis unless otherwise specified.

DESCRIPTION	No. 9 DIAL PARTS		No. 11 DIAL PARTS		No. 10 DIAL PARTS	
	PART NO.	LIST PRICE	PART NO.	LIST PRICE	PART NO.	LIST PRICE
Pulley, Button Ring and Gang Cond. Assy. complete with Buttons, Dial Scale, Pointer and Glass Crystal (A1, A2, A5, and A7 Chassis)	11A103	$23.20	11A121	$23.40	11A114	$25.50
Pulley, Button Ring, and Gang Condenser Assembly, as above (A3 Chassis)	11A111	24.60	11A120	25.00	11A113	27.00
Support Casting for above	25X368	1.35	25X368	1.35	25X410	1.45
Brace for above Casting (over Tuning Cond.) (A1, A2, A5, and A7 Chassis)	25X371	.15	25X371	.15	25X371	.15
Brace as above (A3 Chassis)	25X367	.20	25X367	.20	25X367	.20
Hex. Brass Stud (Support Bracket Mounting)	20X152	.04	20X152	.04	20X152	.04
Rubber Grommet for above Stud	6X8	.10	6X8	.10	6X8	.10
"L" Bracket—Rear Gang Mounting (A1, A2, A5, and A7 Chassis)	25X362	.08	25X362	.08	25X362	.08
"L" Bracket—Rear Gang Mounting (A3 Chassis)	25X382	.10	25X282	.10	25X382	.10
Stud (Rear Gang Mounting)	20X150	.08	20X150	.08	20X150	.08
Rubber Washer for Gang Mounting on "L" Bracket	2X236 doz.	.15	2X236 doz.	.15	2X236 doz.	.15
Rubber Grommet for Gang Mounting on "L" Bracket	6X16 doz.	.30	6X16 doz.	.30	6X16 doz.	.30
Rubber Cushions for Support Bracket (Front)	8X43	.10	8X43	.10	8X43	.10
Drive Cord Tension Spring	28X114 doz.	.35	28X114 doz.	.35	28X114 doz.	.35
Drive Cord	10X23	.65	10X23	.65	10X23	.65
Cord Tension Adjustment Assembly complete	26A59	.20	26A59	.20	26A59	.20
Drive Shaft only (Tuning)	26X245	.10	26X245	.10	26X245	.10
Front Brass Bearing Race and Drive Pulley for Drive Shaft	29X74	.10	29X74	.10	29X74	.10
Rear Brass Bearing Race for Drive Shaft	29X73	.15	29X73	.15	29X73	.15
8 Ball Bearings in Retainer (Two sets used on above Shaft)	20X151	.10	20X151	.10	20X151	.10
Horseshoe Washer for Drive Shaft	19X67 doz.	.15	19X67 doz.	.15	19X67 doz.	.15
Gate Assembly complete	25A154	.45	25A154	.45	25A154	.45
Spring only for Gate Assembly	28X45 doz.	.10	28X45 doz.	.10	28X45 doz.	.10
Condenser Drive Gear Assembly complete	25A153	.60	25A153	.60	25A153	.60
Gear Spreader Spring for above	28X102 doz.	.20	28X102 doz.	.20	28X102 doz.	.20
Pulley and Button Ring complete (Less Dial Crystal, Dial Crystal Escutcheon, Dial Scale, Dial Scale Washers, Dial Pointer and Stud, and Dial Lamps and Sockets)	26A61	11.50	26A62	11.50	26A62	11.50
Pulley Ring Casting only	25A162	3.20	25A162	3.20	25A162	3.20
Button Spacer Ring only	24X273	1.70	24X285	1.70	24X285	1.70
Silencer Contact Ring	30X79	.30	30X79	.30	30X79	.30
Push Button Assembly complete (Including Hairpin Spring, Button Spring, Push Button, Button Bushing, Button Shaft, Metal Washer and Tab)	26A63	.40	26A64	.40	26A64	.40
Push Button only	10A105	.10	10A111	.10	10A111	.10
Metal Washer and Tab	19X66	.10	19X66	.10	19X66	.10
Bakelite Bushing for Push Button	10A104	.10	10A104	.10	10A104	.10
Shaft for Push Buttons	26X238	.15	26X238	.15	26X238	.15
Hairpin Springs for Push Button Assembly	28X111 doz.	.10	28X111 doz.	.10	28X111 doz.	.10
Springs for Push Buttons	28X109 doz.	.10	28X126 doz.	.10	28X126 doz.	.10
Stop Pin Shaft Assembly (Behind Wide Spacer)	26A60	.30	26A60	.30	26A60	.30
Stop Pin Shaft	26X244	.25	26X244	.25	26X244	.25
Spring for above Stop Pin	28X112 doz.	.10	28X112 doz.	.10	28X112 doz.	.10
Dial Scale (Specify Type of Dial, Name of Radio, and Series or Model Number)		.55		.55		1.20
Washer, Dial Spacer (Large with rectangular hole)	19X74 doz.	.10	19X74 doz.	.10	19X74 doz.	.10
Washer, Dial Clamp (Small with round hole)	19X73 doz.	.10	19X73 doz.	.10	19X73 doz.	.10
Dial Pointer	15X95	.20	15X95	.20	15X95	.20
Dial Pointer Cap	15X96	.10	15X104	.10	15X104	.10
Dial Pointer Stud	20X171	.10	20X171	.10	20X171	.10
Glass Crystal	17X21	.15	17X21	.15	17X21	.15
Glass Crystal Escutcheon	4X174	.45	4X196	.40	4X184	.40
Dial Lamp Socket	7A62 ea.	.10	7A62 ea.	.10	7A62 ea.	.10
Dial Lamp Socket Assembly (3 Sockets) Less Lamps	7A63	.50	7A63	.50	7A63	.50
Dial Lamp (No. 51 Bayonet Type)	7A32	.20	7A32	.20	7A32	.20
Celluloid Dial Light Diffusers	41X16	.10	41X16	.10	41X16	.10
Silencer Contact Spring Assembly	26A57	.10	26A57	.10	26A57	.10
Complete Set of Station Call Letter Discs with 25 Celluloid Discs	26A56	.35	26A56	.35	26A56	.35
Tone Indicator Assembly (Less Dial Light Socket and Dial Lights, Take up Cord and Collar)					26A65	.35
Celluloid Indicator and Arm (Tone or Volume)					26A67	.20
Indicator Mounting Bracket (Tone)					25X407	.10
Spring for Tone or Volume Indicator					28X133 doz.	.60
Brass Collar, Cord Take up (Tone or Volume)					29X20	.10
3" Tone and Volume Indicator Cord					doz.	.10
Volume Indicator Assembly (Less Dial Light Socket, Dial Light, Take up Cord and Collar)					26A66	.35
Indicator Mounting Bracket (Volume)					25X408	.10
Call Letter Holder, Celluloid					58X254	.25
Brown Opaque Discs for Telephone Dial Buttons					58X217 doz.	.10
Dial Lamp Socket Assembly (For Tone or Volume Indicator)					7A57	.10
Paper Light Diffuser—Circular 4⅝" Diameter					41X22	.18
Complete Set of Station Call Letter Cards					26A58	.40
Blank Sheet of Call Letter Cards (Used for Export Sets Only)					58X240	.15

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MODEL 7P SERIES

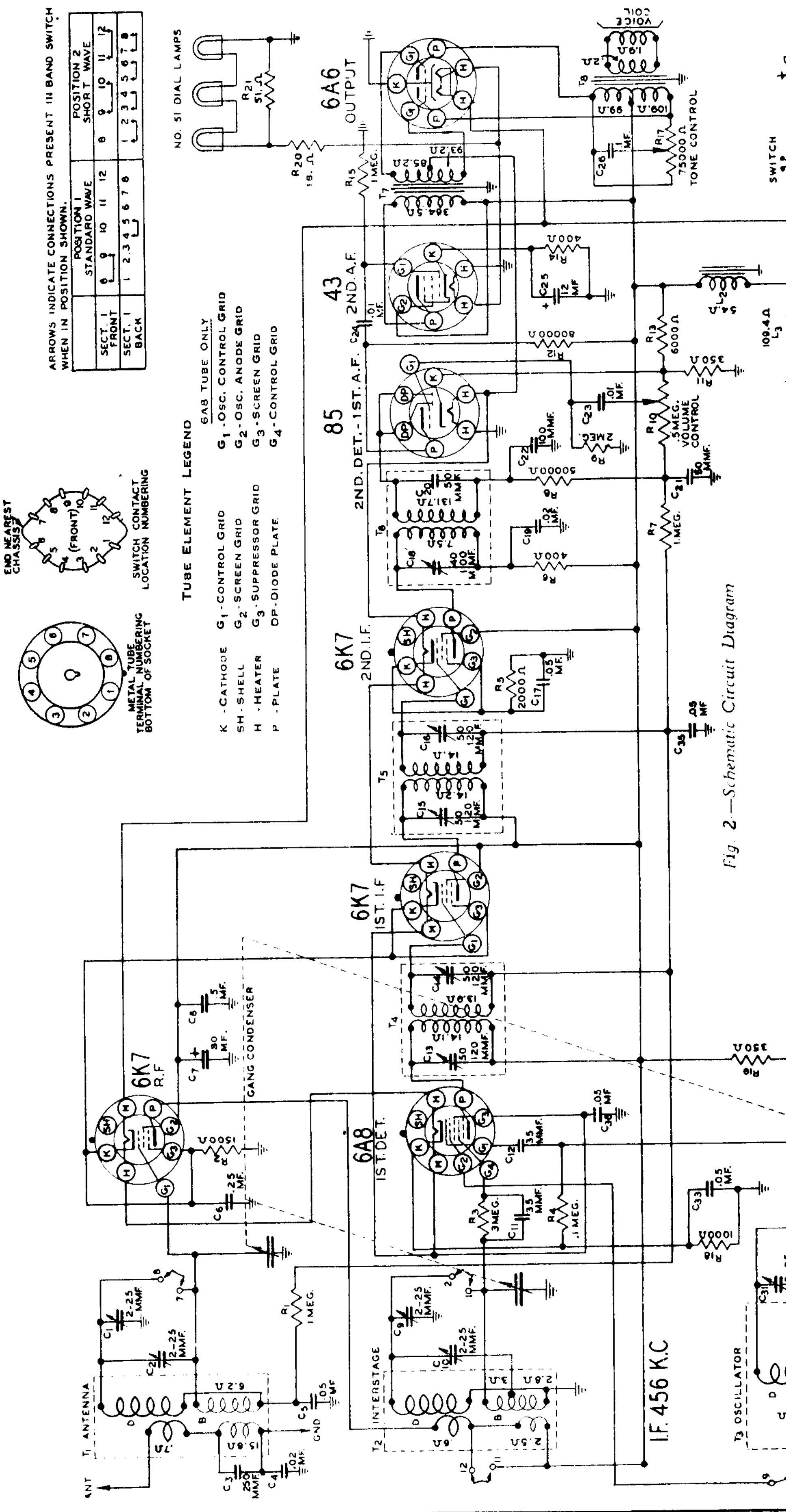


Fig. 2—Schematic Circuit Diagram

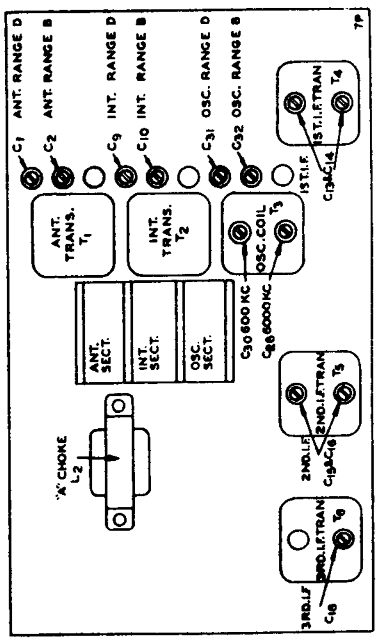


Fig. 3—Location of Trimmers

WELLS GARDNER & CO.

MODEL 7P SERIES

SPECIFICATIONS

Power Consumption - 1.45 Amperes at 32 Volts DC
Power Output - - - - - .17 Watts Undistorted
Selectivity - - 22 KC Broad at 1000 Times Signal
Intermediate Frequency - - - - - - - 456 KC
Speaker - - - - - - - - - 8 inch Dynamic

Tuning Frequency Range
B Range .... 528 to 1730 KC
D Range .... 5650 to 16000 KC

Sensitivity
B Range .... 4 Microvolts Absolute
D Range .... 6 Microvolts Absolute

Circuit

This radio is designed to operate from a power supply source of 32 volts DC. With the exception of the type 43 tube, which has a 25 volt heater, all of the tubes are of the 6 volt type. The heaters of these tubes and the dial lamps are connected across the 32 volt line in a series-parallel arrangement as shown in Figs. 2 and 7. The speaker field winding is also across the line. Plate and screen voltages are obtained directly from the 32 volt line. In working on the set, certain precautions, as explained below and in one of the following articles must be observed.

The chassis base is connected to one side of the line as shown in Fig. 2. Either side of a 32 volt line may be grounded. For that reason the external ground lead is connected to the chassis base through a .02 mf. condenser. Contacts between the antenna or external ground lead and the chassis base must be avoided as the side of the line not connected to the chassis base may be grounded and a line short circuit would result.

Two bands are covered with a tuning range in each band as shown in the specifications above. Two band coverage is accomplished by means of two sets of R.F. and oscillator coils and a single section double throw switch.

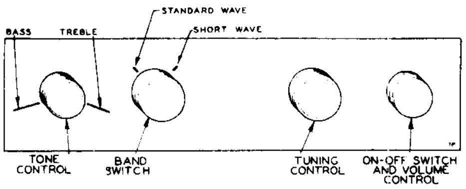


Fig. 1—Arrangement of Controls

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R.F. transformer assemblies and T3 is the oscillator coil assembly. The standard wave and short wave coils are indicated by the letters B and D respectively.

The band switch completes connections to the coils in use. It also short circuits the interstage R.F. transformer B Range primary and oscillator B Range grid coil when it is in the D Range position.

The antenna transformer with tuned secondary feeds into a type 6K7 R.F. amplifier tube. The output of this tube is fed through the interstage R.F. transformer with tuned secondary into the control grid circuit of a 6A8 pentagrid converter tube which functions as the oscillator and 1st detector.

The oscillator potential on the oscillator control grid of this tube modulates the electron stream from the cathode in such a manner as to impress on it the oscillator frequency which is always 456 KC above the frequency to which the R.F. amplifier is tuned. The electron stream is also modulated at the signal frequency by the detector control grid. As a result of the beating of the two frequencies, the intermediate or beat frequency of 456 KC is present in the plate circuit of this tube.

Two stages of I.F. amplification are employed using 6K7 tubes. The primaries and secondaries of the first and second I.F. transformers and the primary of the 3rd I.F. transformer are tuned by small trimmer condensers.

A type 85 duo-diode triode tube functions as the second detector and a one stage audio amplifier. AVC voltage is applied through isolating resistors to the control grid circuits of the R.F. and I.F. tubes. The audio voltage developed across volume control resistor R10 is applied through the movable arm to the control grid of the 85 tube.

Resistance coupling is used between the 1st audio stage and the driver stage which employs a 43 tube. The latter is transformer coupled to the output stage which uses a 6A6 tube. This tube combines 2 triodes in one envelope. Push-pull amplification is used. A dynamic reproducer is employed.

Alignment and Calibration

Alignment Procedure

Correct alignment is extremely important in connection with standard and short wave radios. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 16,000, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the radio if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector (G_4).

Connect the ground lead of the radio to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the radio through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C32) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

Adjust the interstage Range B trimmer (C10) and antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer (C30) until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC. It may be necessary to increase the input signal to hear the image.

16,000 KC Adjustment

Set the signal generator for 16,000 KC.

Connect the antenna lead of the radio through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (short wave band).

Adjust the oscillator Range D trimmer (C31) until maximum output is obtained. See Fig. 3 for location of this trimmer

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C1) to maximum. When adjusting these trimmers, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same

(Continued on next page)

WELLS GARDNER & CO.

MODEL 7P SERIES

(Continued from preceding page)

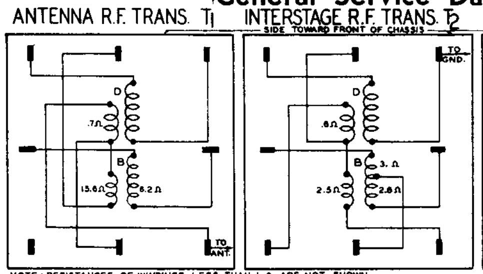
time adjusting the 6000 KC (C28) trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Polarity of Power Supply

There is a red mark on the plug at the end of the power supply cord of the radio. The prong of the plug at which the red mark is placed must be plugged into the positive side of the line.

Use a receptacle on the 32 volt line from which the plug will not have to be removed after it has once been inserted correctly.

General Service Data



NOTE: RESISTANCES OF WINDINGS LESS THAN .1 Ω ARE NOT SHOWN.

Fig. 4—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

CAUTION–Read the Following

To avoid the danger of damage to the radio and accidental short circuit, the following facts should be understood.

The metal chassis is connected to one side of the line—See Fig. 2. 32 volt lines are generally grounded on one side — either side may be used. If the side of the line, not connected to the metal chassis, is grounded and the metal chassis comes in contact with the external ground, the line will be short circuited and an excessive current may result.

In any service work, therefore, on this chassis keep it on a wood or other insulated surface. Disconnect the antenna and ground leads to avoid the possibility of any external ground contacts with the chassis. The person working on the set should avoid coming in contact with any ground.

Eliminating Ignition and Generator Noise

After the radio is in working order, the following procedure must be followed in practically all cases to eliminate ignition and generator noise caused by the charging plant. If the charging plant causes no noise, then of course, these steps do not have to be taken.

One spark plug suppressor must be placed on each spark plug of the engine. One spark plug for example would be required on a one-cylinder engine and four must be used on a four-cylinder engine. To connect the spark plug suppressor, remove the wire from the top of the plug, put the suppressor on and attach the wire to the other end of the suppressor.

A generator condenser must be used. This consists of two .5 mf. sections in one unit. The two sections have one side grounded to the metal case of the condenser. Mount the condenser on the frame of the charging plant. This will ground it. Then connect the two leads to the charging switch, one on each side of the line.

In some large installations, where the charging unit is on only two or three times a week, the above steps do not have to be taken as interference is caused only when the generating plant is in operation.

Noisy Operation

Noisy operation may be due to a faulty antenna system. The action of the automatic volume control, due to the low pickup, causes the radio to operate at its maximum sensitivity, thereby increasing noisy reception due both to external pickup and internal conditions.

The radio may be partially detuned, causing it to operate at maximum sensitivity. The signal should be very carefully tuned in until it is clearest and strongest.

If the reception is noisy only when the generating plant is in operation, then the noise is due to the latter and several things can be done. There may be loose parts in the generator plant rubbing together. Tighten up all parts and be sure that all parts of the

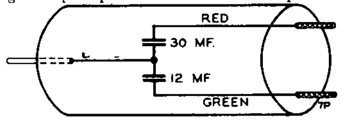


Fig. 5—Electrolytic Condenser Internal Connections

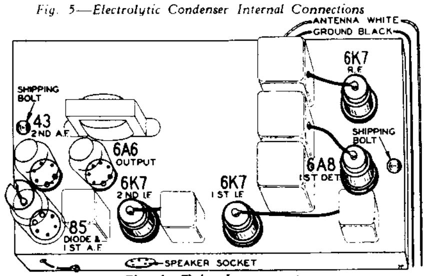


Fig. 6—Tube Arrangement

engine are well grounded. Dirty spark plugs may cause noise. Clean and respace the plugs or try out a new set. In some instances it may be necessary to filter the power supply line to the radio.

If any motor driven devices, such as pumps, are operated from the 32 volt line, the motor may cause noisy reception in the radio. This can be corrected in most cases by connecting one of the dual .5 mf. condensers mentioned above across the line at the motor. The common connection to the two condensers which is grounded to the can is grounded externally by mounting the unit on the motor frame.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately.

There are two trimmers in the strip that are not grounded (2nd and 4th from front of chassis). When replacing either of these trimmers, the side of the replacement trimmer connected to the adjusting screw should be connected to the same terminal as the corresponding side of the defective trimmer after this trimmer has been cut out of the circuit.

In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

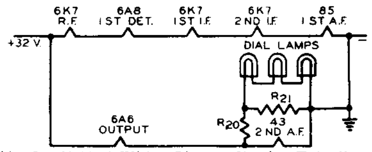


Fig. 7—Abridged Wiring Diagram Showing Tube Heater and Dial Lamp Wiring System

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground — Line Voltage: 32

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Cathode to Ground
6K7	R.F.	6.3(1)	31	31	3.2
6A8	1st Det. and Osc.	6.3(1)	31 31(2)	20	1.25
6K7	1st I.F.	6.3(1)	31	31	3.2
6K7	2nd I.F.	6.3(1)	31	31	3.0
85	2nd Det. and 1st A.F.	6.3(1)	10		1.5
43	2nd A.F.	26.0(1)	28.2	31	3.2
6A6	Output	6.0(1)	31		6.4(3)

(1) Subject to Variation
(2) Anode Grid to Ground
(3) Center Tap of Output Transformer to Ground

Dial Lamps

For the dial lamps, No. 51 bayonet pin base lamps must be used. These lamps are part of one section of the tube heater circuit (See Fig. 7) and any other lamps having a different current drain would upset the voltage system of this section.

Voltages

Check the voltages at the sockets to see if correct values are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the radio connected together. The volume control should be turned to the right or maximum position.

All of the voltage readings as shown in the chart are read with a 1,000 ohm-per-volt meter. As high a range as possible should be used. In general, the higher the resistance of the meter, the more accurate the reading will be.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition. These voltages are typical of the sets but will vary slightly with variations in individual radios tubes, test equipment used and line voltage.

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 2. In contact locations not used, the number applying to that particular location is not employed.

Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
P-3A245	6A8 Tube Socket	$0.15
P-3A242	6K7 Tube Socket	.15
P-3A247	85 Tube Socket	.10
P-3A247	43 Tube Socket	.10
P-3A246	6A6 Tube Socket	.15
P-3A58	5 Prong Speaker Socket	.10

SPEAKERS

Part No.	Description	List Price
P-12A237	8" Dynamic Speaker Complete with Output Transformer T8	5.70

KNOBS

Part No.	Description	List Price
Specify Name of Knob and Name and Model of Radio	Tuning Control—Spring Type	.15
	Band Switch—Set Screw Type	.20
	Volume Control—Spring Type	.15
	Tone Control—Spring Type	.15

GENERAL

Part No.	Description	List Price
P-2X38	Felt Washers (Used behind knobs) ea.	.10
P-8X23	Rubber Chassis Mounting Cushions ea.	.10
P-8X43	Rubber Mounting Cushions (Front) For Gang Condenser ea.	.10
P-8X44	Rubber Mounting Cushion (Rear) for Gang Condenser	.10
P-8X45	Rubber Mounting Cushion (Rear—under Chassis) for Gang Condenser	.10
P-4A18	Terminal Strip (2 lugs, insulated—Mounting foot in center)	.10
P-30X14	Grid Clip Only (Glass Tube)	.10
P-30X44	Grid Clip Only (Metal Tube) ea.	.10
P-13X229	Line Cord and Plug	.50
P-13X214	Antenna and Ground Lead Assembly	.30
P-32X30	Tube Shield Base	.10
P-32X32	Tube Shield	.15
P-25X221	Mounting Feet for Chassis (Front) ea.	.10
P-25X231	Mounting Feet for Chassis (Rear) ea.	.10
P-2A59	1 Section, 2 Position Band Change Switch	.95

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
P-9A696	T1	Antenna Transformer and Can Assembly	$1.80
P-9A697	T2	R. F. Interstage Transformer and Can Assembly	2.05
P-9A698	T3	Oscillator Coil and Can Assembly	2.50
P-9A699	T4	1st I. F. Transformer and Can Assembly	1.30
P-9A700	T5	2nd I. F. Transformer and Can Assembly	1.30
P-9A701	T6	3rd I. F. Transformer and Can Assembly	1.60
P-50X22	T7	Input Transformer	1.85
P-51X45	T8	Output Transformer (Part of Speaker Assembly)	2.45
P-9A555	L1	"B" Reactor	.30
P-52X33	L2	"B" Choke (Iron Core)	1.35

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
P-46X187	C4	.02 mf.	180	$0.15
P-46X80	C5	.05 mf.	180	.15
P-46X117	C6	.25 mf.	180	.25
P-46X123	C8	.5 mf.	180	.30
P-46X80	C17	.05 mf.	180	.15
P-46X187	C19	.02 mf.	180	.15
P-46X124	C23	.01 mf.	180	.15
P-46X124	C24	.01 mf.	180	.15
P-46X98	C26	.1 mf.	180	.20
P-46X117	C27	.25 mf.	180	.25
P-46X187	C29	.02 mf.	180	$0.15
P-46X80	C33	.05 mf.	180	.15
P-46X80	C34	.05 mf.	180	.15
P-46X80	C35	.05 mf.	180	.15
P-46X80	C36	.05 mf.	180	.15

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage		List Price
P-45X217	C7	30 mf.	50	Dry	1.10
	C25	12 mf.	25		

MOLDED

Part No.	Code	Capacitance	List Price
P-47X59	C3	250 mmf.	.15
P-47X47	C11	35 mmf.	.10
P-47X53	C12	35 mmf.	.10
P-47X56	C20	50 mmf.	.10
P-47X56	C21	50 mmf.	.10
P-47X57	C22	100 mmf.	.10

TRIMMER

Part No.	Code	Capacitance	Description	List Price
P-17A55 Trimmer Strip	C1	2-25 mmf.	Range "D" Antenna Trimmer	.65
	C2	2-25 mmf.	Range "B" Antenna Trimmer	
	C9	2-25 mmf.	Range "D" Interstage Trimmer	
	C10	2-25 mmf.	Range "B" Interstage Trimmer	
	C31	2-25 mmf.	Range "D" Oscillator Trimmer	
	C32	2-25 mmf.	Range "B" Oscillator Trimmer	

See Part Number P-17A36 for replacement of any one section

Part No.	Code	Capacitance	Description	List Price
P-17A57	C13, C14	50-120 mmf., 50-120 mmf.	1st I.F. Trimmers	.35
P-17A57	C15, C16	50-120 mmf., 50-120 mmf.	2nd I.F. Trimmers	.35
P-17A38	C18	40-100 mmf.	3rd I.F. Trimmer	.25
P-17A35	C28, C30	40-100 mmf., 300-600 mmf.	Oscillator Padding Condensers	.45
P-17A36		2-25 mmf.	(To be used for replacement of any one section of Trimmer Strip P-17A55)	.10

MISCELLANEOUS

Part No.	Description	List Price
P-14A58	3 Gang Condenser less Dial and Drive Assembly	3.60

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
P-A95104	R1	100,000 Ohm	0.2	$0.10
P-A94152	R2	1500 Ohm	0.2	.15
P-A95305	R3	3 Megohm	0.2	.10
P-A94104	R4	100,000 Ohm	0.2	.15
P-A94202	R5	2000 Ohm	0.2	.15
P-A95401	R6	400 Ohm	0.2	.10
P-A95106	R7	1 Megohm	0.2	.10
P-A95503	R8	50,000 Ohm	0.2	.10
P-A95205	R9	2 Megohm	0.2	.10
P-A94351	R11	350 Ohm	0.2	.15
P-A95803	R12	80,000 Ohm	0.2	.10
P-A94602	R13	6000 Ohm	0.2	.15
P-A94401	R14	400 Ohm	0.2	.15
P-A95105	R15	1 Megohm	0.2	.10
P-A94102	R18	1000 Ohm	0.2	.15
P-A95351	R19	350 Ohm	0.2	.10

WIRE WOUND

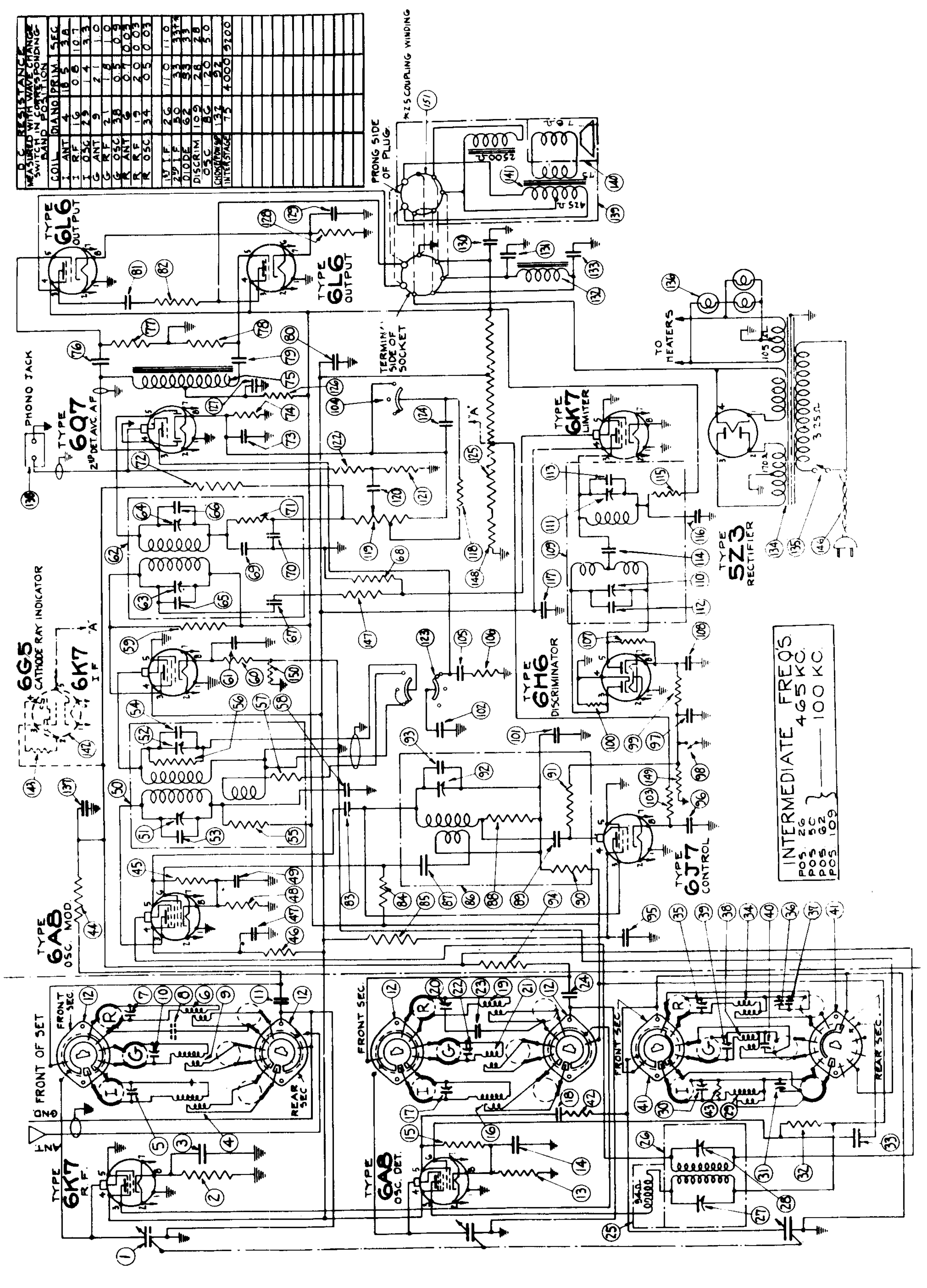
Part No.	Code	Resistance	Wattage	List Price
P-43X73	R20	18 Ohm	4.0	.55
	R21	51 Ohm	6.0	

VARIABLE

Part No.	Code	Resistance	Description	List Price
P-36X213	R10	500,000 Ohm	Volume Control and On-Off Switch	1.05
P-40X209	R17	75,000 Ohm	Tone Control	.70

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODEL WR-315



D.C. RESISTANCE MEASURED WITH WAVE CHANGE SWITCH IN CORRESPONDING BAND POSITION			
COIL	DIAG. NO.	PRIM.	SEC.
I ANT	4	18.5	3.8
I RF	16	0.8	10.7
I OSC	29	1.4	3.3
G ANT	9	2.1	1.0
G RF	21	1.8	1.0
G OSC	38	0.5	0.9
R ANT	6	0.7	0.03
R RF	19	2.0	0.03
R OSC	34	0.5	0.03
1ST I.F.	26	11.0	11.0
2ND I.F.	50	33	33.4
DIODE	62	33	33
DISCRIM	109	28	28
OSC	8C	1.20	5.0
CHOKE(POWER)	132	92	
INTERSTAGE	75	4000	9200

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODEL WR-315

Power Supply Characteristics	105 to 125 volt, 50 to 60 cycle A.C.
Power Consumption	125 Watts
Maximum Output	21 Watts
Maximum Undistorted Output	12.5 Watts
Tuning Ranges	(White Band - 525 to 1,800 KC. (Green Band - 1750 to 6,000 KC. (Red Band - 5800 to 18,500 KC.
Line-Up Frequencies	100 KC., 465 KC., 1600 KC., 570 KC., 5500 KC., 1900 KC., 17,000 KC., and 6000 KC.

LINE-UP CAPACITOR ADJUSTMENTS

To properly align the circuits of the receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied when the individual circuits are brought into alignment. A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal. It is also necessary to use an 0-5 microammeter in order to align the discriminator circuits.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures #1 and #2 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F., CONTROL OSCILLATOR AND DISCRIMINATOR

1. Set the volume control on full and turn the bass control to the bass position (position immediately after set is turned .
2. Connect the output meter across the voice coil of the speaker.
3. Set the test oscillator to 100 KC., and adjust the output to give a readable deflection on the output meter when the signal is applied to the grid of the 6K7 I.F. amplifier tube through a 0.5 mfd. blocking condensor.
4. Connect a 10,000 ohm resistor across the primary winding of the third I.F. coil #62. This should be connected to terminals marked "A" and "B" in Figure #2.
5. Adjust trimmer #64 to maximum output, reducing the output of the test oscillator as required.
6. Remove the 10,000 ohm resistor from the primary side of I.F. coil #62 and connect across the secondary winding from terminals marked "C" and "D".
7. Adjust trimmer #63 to maximum output, reducing the output of the test oscillator as required. Remove 10,000 ohm resistor.
8. Turn switch #98 to the left-hand position (viewed from rear of chassis).
9. Set the output of the test oscillator to a high level.
10. Connect a 0 to 5 microammeter across resistor #149 and adjust trimmer condenser #111 to maximum swing of the microammeter, keeping the output of the signal generator set to a point which will give a deflection of approximately 5 microamperes when condenser #111 is tuned to maximum deflection. WHEN THE SIGNAL GENERATOR IS SET TO THIS OUTPUT, DO NOT ALTER THE OUTPUT OF THE SIGNAL GENERATOR UNTIL THE ALIGNMENT OF THE DISCRIMINATOR CIRCUIT IS COMPLETED.
11. Adjust trimmer #110 until the microammeter reading is reduced exactly to zero.
12. Turn switch #98 to the right-hand position and proceed with the alignment of the I.F.
13. Apply the test signal to the grid of the 6A8 oscillator-modulator tube.
14. Connect the 10,000 ohm resistor across the primary of I.F. coil #50 by connecting it to the terminals marked "E" and "F" in Figure #2.
15. Adjust trimmer #52 to maximum output, reducing the output of the test oscillator as required.
16. Remove the 10,000 ohm resistor and connect across the secondary of I.F. transformer #50. Connect to terminals marked "G" and "H".
17. Adjust trimmer #51 to maximum output, reducing the output of the test oscillator as required.
18. Remove the 10,000 ohm resistor.

19. Set the test oscillator to 465 KC., and adjust the control oscillator trimmer #92 to maximum output.
20. Apply the test signal to the grid of the type 6A8 oscillator-detector tube.
21. Connect the 10,000 ohm resistor across the primary of I.F. transformer #26 by connecting it to the points marked "J" and "K" in Figure #2.
22. Adjust trimmer #28 to maximum output, reducing the output of the test oscillator as required.
23. Remove the 10,000 ohm resistor and connect across the secondary of the I.F. transformer #26 by connecting it to the points marked "L" and "M" in Figures #1 and #2.
24. Adjust trimmer #27 to maximum output, reducing the output of the test oscillator as required. Remove the 10,000 ohm resistor.

ADJUSTMENT OF BROADCAST BAND

1. Set the wave-change switch to the White or Broadcast Band position.

2. Set the test oscillator and dial indicator to 1600 KC.

3. Apply the test signal to the antenna terminal of the chassis through a .0002 mfd. series condenser and adjust the oscillator trimmer condenser #30 until the signal is received at a maximum.

4. Adjust trimmers #17 and #5 to maximum output.

5. Set the test oscillator and dial indicator to 570 KC., and adjust the oscillator series condenser #31 to maximum output, at the same time rocking the condenser gang.

6. Return both the test oscillator and dial indicator to 1600 KC., and check the adjustment of trimmers #30, #17 and #5 for accuracy.

ADJUSTMENT OF GREEN BAND

NOTE: In adjusting the two short-wave bands (Green and Red) a .0002 mfd. condenser and a 400 ohm resistor connected in series should be inserted in the high side of the test oscillator leads. This combination of condenser-resistor combination is the approximate equivalent of a short-wave antenna.

1. Set the wave-change switch to the Green Band position.
2. Set the test oscillator and dial indicator to 5500 KC., and adjust the oscillator trimmer condenser #39 until the signal is received at a maximum.

3. Adjust trimmer condensers #22 and #10 to maximum output.

4. Set the test oscillator and dial indicator to 1900 KC., and adjust the oscillator series condenser #40 to maximum output, at the same time rocking the condenser gang.

5. Return both the test oscillator and dial indicator to 5500 KC., and check the adjustment of trimmers #39, #22 and #10 for accuracy.

ADJUSTMENT OF RED BAND

1. Set the wave-change switch to the Red Band position.

2. Set the test oscillator and dial indicator to 17000 KC., and adjust the oscillator trimmer condenser #35 until the signal is received.

NOTE: When adjusting the oscillator trimmer condenser #35 it will be possible to secure two peaks. The peak secured with the trimmer screw turned farthest out should be used. When aligned on the correct peak a strong signal will be heard at 17000 KC., and a weaker signal at approximately 16000 KC. No signal should be heard at 18000 KC.

3. Adjust trimmer condensers #20 and #7 to maximum output.

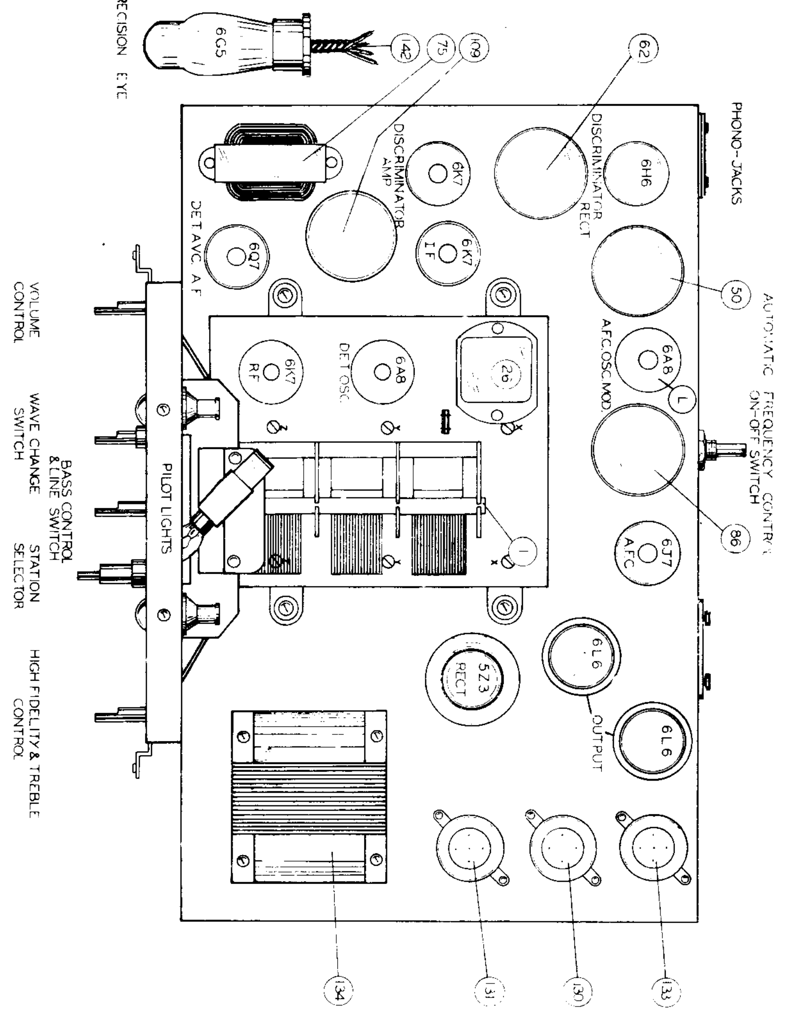


Figure No. 1

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODEL WR-315

4. Set the test oscillator and dial indicator to 6000 KC., and adjust the oscillator series condenser #36 to maximum output, at the same time rocking the condenser gang.

5. Return both the test oscillator and dial indicator to 17000 KC., and check adjustment of trimmers #35, #20 and #7 for accuracy.

IMPORTANT: While testing or making pairs on this receiver, the chassis should not be turned upside down or on its side for any long period of time while the set is turned on as the chemicals in the electrolytic filter condensers will come through the air vents, making the condenser appear to be defective. If left in this position too long the condenser may be injured.

PARTS LIST

Dia. #	Part #	Description of Parts	List Price
1	CG 9551	Variable condenser	$ 4.50
2	RE 95102	600 ohm, 1/4 W. resistor	.15
3	CW 2-05	.05 mfd., 200 V. condenser	.15
4	RC 95209	Antenna coil - Broadcast	1.00
5	CS 9554	4-30 mmf. trimmer condenser	.15
6	RC 95206	Antenna coil - Red Band	.95
7	CS 9554	4-30 mmf. trimmer condenser	.15
8		Twisted wire - part of RC 95206	
9	RC 95212	Antenna coil - Green Band	.80
10	CS 9554	4-30 mmf. trimmer condenser	.15
11	CW 9513	.05 mfd., 200 V. condenser	.25
12	SW 9553	Switch and bracket assembly - antenna and R.F. sections	1.40
13	RE 95102	600 ohm, 1/4 W. resistor	.15
14	CW 2-05	.05 mfd., 200 V. condenser	.15
15	RE 9563	50,000 ohm, 1/2 W. insulated resistor	.15
16	RC 95210	R.F. coil - Broadcast	1.00
17	CS 9554	4-30 mmf. trimmer condenser	.15
18	CM 9511	.000065 mfd. mica condenser	.15
19	RC 95207	R.F. coil - Red Band	1.25
20	CS 9554	4-30 mmf. trimmer condenser	.15
21	RC 95214	R.F. coil - Green Band	1.00
22	CS 9553	1.5-10 mmf. trimmer condenser	.15
23	CM 9512	6 mmf. mica condenser	.15
24	CW 9513	.05 mfd., 200 V. condenser	.25
25	RC 95266	Choke coil assembly	.60
26	IC 9582	1st I.F. coil (465 KC.)	2.35
27		35-130 mmf. trimmer condenser - part of IC 9582	
28		35-130 mmf. trimmer condenser - part of IC 9582	
29	RC 95272	Oscillator coil - Broadcast	2.25
30		5-25 mmf. trimmer condenser - part of CS 9540	.60
31		300-600 mmf. trimmer condenser - part of CS 9540	.60
32	RE 9526	5000 ohm, 1 W. resistor	.20
33	CW 9513	.05 mfd., 200 V. condenser	.25
34	RC 95208	Oscillator coil - Red Band	2.25
35		3-15 mmf. trimmer condenser - part of CS 9520	.75
36		800-1600 mmf. trimmer condenser - part of CS 9520	.75
37	CM 959	.002 mfd. mica condenser	.25
38	RC 95213	Oscillator coil - Green Band	1.75
39		3-15 mmf. trimmer condenser - part of CS 9520	.75
40		800-1600 mmf. trimmer condenser - part of CS 9520	.75
41	SW 9554	Switch and bracket assembly - oscillator section	1.50
42	RE 9537	50 ohm, 1/4 W. resistor	.10
43	RE 95125	20,000 ohm, 1/2 W. insulated resistor	.10
44	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
45	RE 9563	50,000 ohm, 1/2 W. insulated resistor	.15
46	RE 95106	1000 ohm, 1/2 W. insulated resistor	.10
47	CW 2-05	.05 mfd., 200 V. condenser	.15
48	RE 9567	600 ohm, 1/2 W. insulated resistor	.15
49	CW 2-05	.05 mfd., 200 V. condenser	.15
50	IC 9584	2nd I.F. coil (100 KC.)	2.60
51		80-200 mmf. trimmer condenser - part of IC 9584	
52		80-200 mmf. trimmer condenser - part of IC 9584	
53	CM 9528	350 mmf. mica condenser	.20
54	CM 9528	350 mmf. mica condenser	.20
55	RE 95106	1000 ohm, 1/2 W. insulated resistor	.10
56	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
57	RE 95104	75 ohm, 1/2 W. insulated resistor	.10
58	CW 4-05	.05 mfd., 400 V. condenser	.15
59	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
60	RE 9567	600 ohm, 1/2 W. insulated resistor	.15
61	CW 2-05	.05 mfd., 200 V. condenser	.15
62	IC 9585	3rd I.F. coil (100 KC.)	2.75
63		80-200 mmf. trimmer condenser - part of IC 9585	
64		80-200 mmf. trimmer condenser - part of IC 9585	
65	CM 9528	350 mmf. mica condenser	.20
66	CM 9528	350 mmf. mica condenser	.20
67	CM 953	50 mmf. mica condenser	.15
68	RE 95105	1 meg., 1/2 W. insulated resistor	$ .15
69		100 mmf. mica condenser - part of IC 9585	
70		100 mmf. mica condenser - part of IC 9585	
71	RE 9524	50,000 ohm, 1/4 W. resistor	.10
72	RE 95113	1/2 meg., 1/2 W. insulated resistor	.10
73	CE 9515	12 mfd., 25 V. electrolytic condenser	.65
74	RE 95114	2000 ohm, 1/2 W. insulated resistor	.10
75	TR 9579	Interstage transformer	3.00
76	CW 4-02	.02 mfd., 400 V. condenser	.15
77	RE 95112	1/4 meg., 1/2 W. insulated resistor	.10
78	RE 95112	1/4 meg., 1/2 W. insulated resistor	.10
79	CW 4-02	.02 mfd., 400 V. condenser	.15
80	CW 2-05	.05 mfd., 200 V. condenser	.15
81	CW 4-005	.005 mfd., 400 V. condenser	.15
82	RE 95111	20,000 ohm, 1 W. insulated resistor	.15
83	CM 953	50 mmf. mica condenser	.15
84	RE 95110	15,000 ohm, 1 W. insulated resistor	.15
85	RE 95106	1000 ohm, 1/2 W. insulated resistor	.10
86	RC 95265	Oscillator coil (365 KC.)	2.40
87	CM 9519	500 mmf. mica condenser	.20
88	RE 95107	75 ohm, 1/8 W. resistor	.10
89	CM 953	50 mmf. mica condenser	.15
90	RE 95106	1000 ohm, 1/2 W. insulated resistor	.10
91	RE 95105	1 meg., 1/2 W. insulated resistor	.15
92		45-135 mmf. trimmer condenser - part of RC 95265	
93	CM 956	250 mmf. mica condenser	.20
94	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
95	CW 2-05	.05 mfd., 200 V. condenser	.15
96	CW 2-05	.05 mfd., 200 V. condenser	.15
97	CW 9525	1 mfd., 100 V. condenser	.40
98	SW 9563	A. F. C. switch	.45
99	RE 95105	1 meg., 1/2 W. insulated resistor	.15
100	RE 95105	1 meg., 1/2 W. insulated resistor	.15
101	CW 4-05	.05 mfd., 400 V. condenser	.15
102	CW 4-01	.01 mfd., 400 V. condenser	.15
103	RE 95126	300 ohm, 1/2 W. insulated resistor	.10
104	VR 9542	Bass control	.70
105	CW 4-02	.02 mfd., 400 V. condenser	.15
106	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
107	RE 95105	1 meg., 1/2 W. insulated resistor	.15
108	CW 2-05	.05 mfd., 200 V. condenser	.15
109	IC 9583	Discriminator coil	3.75
110		80-200 mmf. trimmer condenser - part of IC 9583	
111		80-200 mmf. trimmer condenser - part of IC 9583	
112	CM 9528	350 mmf. mica condenser	.20
113	CM 9528	350 mmf. mica condenser	.20
114	CM 9519	500 mmf. mica condenser	.20
115	RE 95106	1000 ohm, 1/2 W. insulated resistor	.10
116	CW 4-05	.05 mfd., 400 V. condenser	.15
117	CW 2-05	.05 mfd., 200 V. condenser	.15
118	RE 95124	5000 ohm, 1/2 W. insulated resistor	.10
119	VR 9536	Volume control - 1/2 meg.	.85
120	CW 4-02	.02 mfd., 400 V. condenser	.15
121	RE 95105	1 meg., 1/2 W. insulated resistor	.15
122	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
123	SW 9564	Treble control	.60
124	CW 2-05	.05 mfd., 200 V. condenser	.15
125	RE 9597	140-4500-4500 ohm tapped resister	1.10
126	RE 95124	5000 ohm, 1/2 W. insulated resistor	.10
127	CW 4-25	.25 mfd., 400 V. condenser	.20
128	RE 9598	170 ohm, 4 W. resistor	.35
129	CE 9515	12 mfd., 25 V. electrolytic condenser	.65
130	CE 9535	16 mfd., 300 V. electrolytic condenser	.75
131	CE 9528	8 mfd., 450 V. electrolytic condenser	.80
132	TR 9573	Choke coil	1.65
133	CE 9536	12 mfd., 450 V. electrolytic condenser	.80
134	TR 9580	Power transformer	6.75
135		On-Off switch - part of VR 9542	
136	LP 9515	Dial lamp (3.2 V., - 0.35 amp.)	.20
137	CW 2-05	.05 mfd., 200 V. condenser	.15
138	SA 100050	Phono-jack	.10
139	SK 9546	Speaker	12.50
140	DM 9518	Diaphragm and voice coil	4.75
141	TR 9595	Output transformer	2.25
142	CB 9598	Cable to "precision eye"	.70
143		1 meg., 1/4 W. resistor - part of CB 9598	
146	CB 9512	Line cable	.50
147	RE 95103	100,000 ohm, 1/2 W. insulated resistor	.10
148	RE 9556	25 ohm, 1/4 W. resistor	.15
149	RE 95113	1/2 meg., 1/2 W. insulated resistor	.10
150	RE 95108	3000 ohm, 1/2 W. insulated resistor	.10
151	PG 9567	Speaker plug	.30

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODEL WR-315

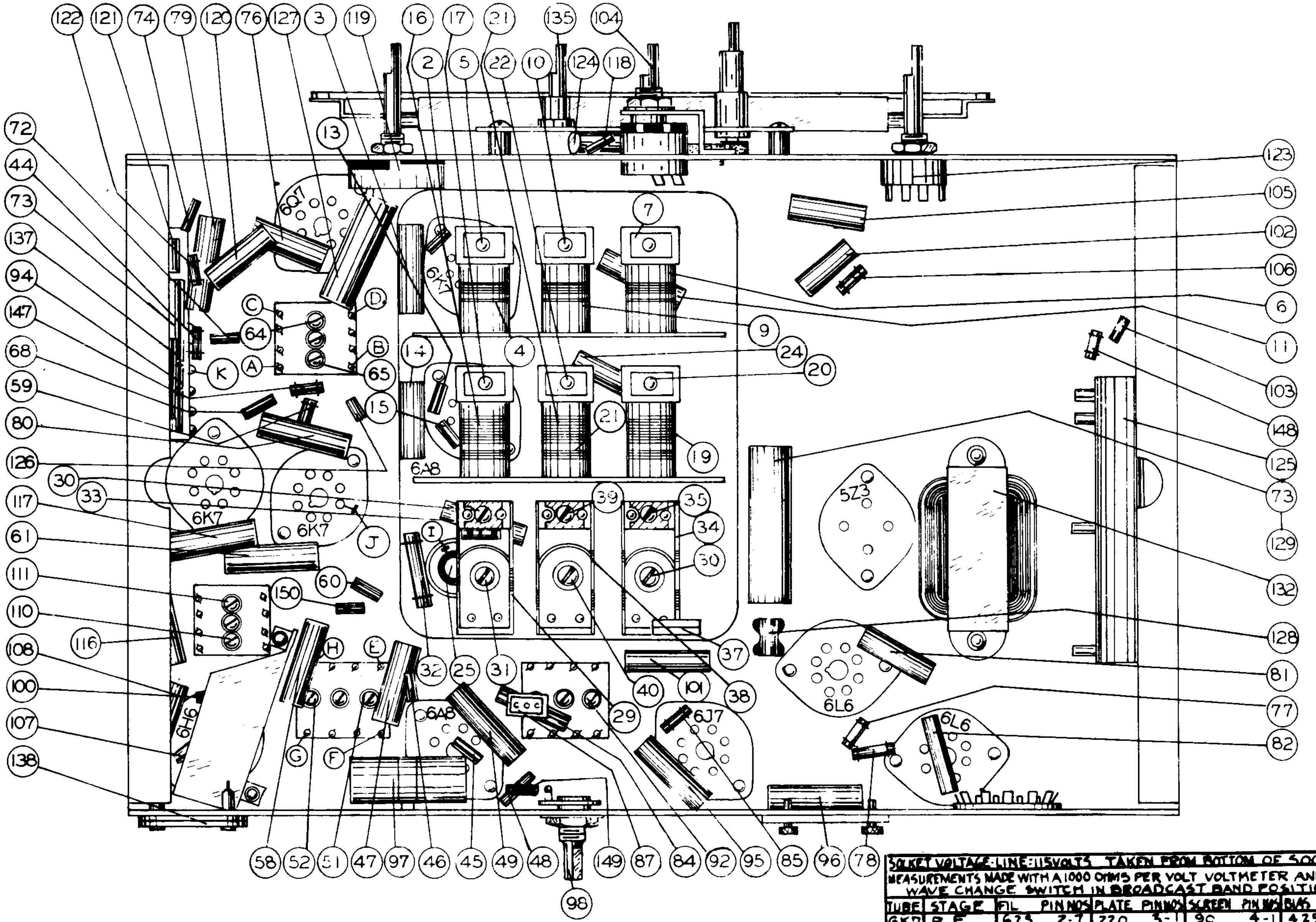


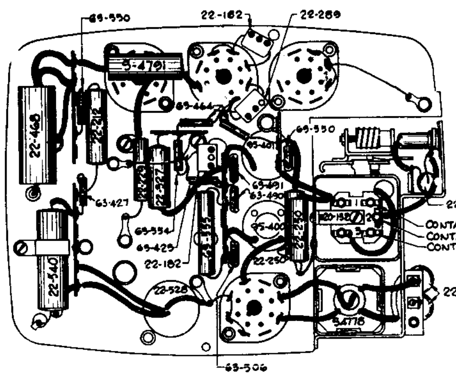
Figure No. 2

SOCKET VOLTAGE-LINE: 115 VOLTS TAKEN FROM BOTTOM OF SOCKET
MEASUREMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION.

TUBE	STAGE	FIL	PIN NOS	PLATE	PIN NOS	SCREEN	PIN NOS	BIAS	PIN NOS
6K7	R.F.	6.25	2-7	220	3-1	90	4-1	4.25	8-1
6A8	OSC-DET	6.25	2-7	[illegible]	[illegible]	90	4-1	3.6	8-1
6A8	OSC-MOD	6.25	2-7	[illegible]	[illegible]	85	4-1	6.5	8-1
6K7	I.F.	6.25	2-7	215	3-1	90	4-1	6.5	8-1
6Q7	2nd DET AMP	6.25	2-7	200	3-1			2.25	8-1
6L6	OUTPUT	6.25	2-7	395	3-1	215	4-1	15.5	8-1
6J7	CONTROL	6.25	2-7	215	3-1	85	4-1	3.6	8-1
6H6	DISCRIM	6.25	2-7						
6K7	LIMITER	6.25	2-7	215	3-1	90	4-1		
5Z3	RECTIFIER	5		400					
6G5	CATH RAY	6.25		215					

ZENITH RADIO CORPORATION

MODELS 5-M-191 & 5520



ANTENNA CONNECTION DATA

CONNECT TO CONTACT #1 FOR ANTENNA CAPACITIES 550 TO 700 MMFD SUCH AS 1936 DODGE SOLID STEEL ROOF ANTENNA, LINCOLN ZEPHER LUGGAGE COMPARTMENT, DOOR ANTENNA, ETC.

CONNECT TO CONTACT #2 FOR ANTENNA CAPACITIES 150 TO 550 MMFD SUCH AS BUILT IN ROOF ANTENNA, RUNNING BOARD ANTENNA, ETC.

CONNECT TO CONTACT #3 FOR ANTENNA CAPACITIES 0 TO 150 MMFD SUCH AS ZENITH FLEETWING & OVER TOP TYPE ANTENNA

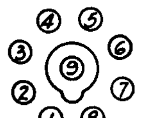
SHIPPED CONNECTED TO CONTACT #2

BOTTOM VIEW

Fig. 2

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Mixer Osc.	0	0	190	90	—4	90	5.9	0	0
6K7	I. F.	0	0	195	90	0	—	5.9	0	0
6Q7	Det. A. V. C. Audio	0	0	80	0	—.1	—	5.9	.8	0
6F6	Power	0	0	185	195	—3.5	—	5.9	0	—
OZ4	Rectifier			Inaccessible						



BOTTOM VIEW OF SOCKET

Voltage at Battery 6V.
Voltage at Receiver 5.9 V.
Antenna disconnected
All voltages measured with 1000 ohms per volt D. C. meter
Total current consumption 5.5 amperes
Sensitivity at 1 watt out put 5 M. V.
Maximum power output 3.2 watts.

IMPORTANT ANTENNA INFORMATION

Some cars are factory equipped with an antenna. If this is the case, the lead should be checked to make certain that it is not grounded, and after being shielded by a large diameter loom, ground this loom to the instrument panel, and attach the Delco-Remy male connector to the end of the antenna wire. This should be done carefully so as to insure a good solder joint, and prevent any grounding at this point to the braided shielding. Insert the antenna lead-in connector into the female Delco-Remy receptacle directly below the tuning cable shoulder on the receiver case.

Where a car is not equipped with an antenna, such as convertible models, or those with all steel turret top, any one of the following Zenith antennas may be used:

Undercar antenna—part No. S-4800 and S-4801.
Over the Top Antenna (Sedan) S-4802.
Over the Top Antenna (Coupe) S-4803.
Zenith Fleet Wing Antenna S-4821.
Zenith Bumper Pole Antenna S-4822.

Complete instructions covering the installation of each of the above antennas is furnished with the various kits.

IMPORTANT: BALANCING SET TO ANTENNA. There is such an extremely wide variation in antenna capacities that it is difficult to match this condition without some means of variable antenna alignment. To accomplish this, an antenna compensating adjustment is provided through the small hole directly above the antenna cable connector on the receiver case. In addition to this, a tapped antenna transformer is also incorporated (see Figure No. 2). The proper method of alignment is as follows: After completely connecting receiver, tune in a signal between 1400 and 1450 K.C. and adjust the antenna compensator shown in Figure 3, for either the roof antenna, or single or double under-car antenna. The receiver is shipped from the factory with the antenna tap shown in Figure 2 set to the No. 2 position, and, therefore, need not be changed for either of the two types of antennas mentioned.

For Zenith Fleet Wing, and Over the Top Antennas, unsolder the antenna lead from the No. 2 lug, and resolder it to the No. 3 lug. After this is done, tune in a station between 1450 and 1400 K.C., and adjust the antenna compensator shown in Figure 3 to resonance.

For high capacity antennas such as the 1936 Dodge solid steel roof, or the Lincoln Zephyr luggage compartment, drawer antenna, etc., remove the antenna lead from the No. 2 lug, as it comes from the factory, and resolder it to the No. 1 connector. After this is done, the same procedure of tuning in a signal from 1450 to 1400 K.C., and balancing to resonance with the antenna compensator, as described above, should be followed.

This system of tapped transformer, and variable compensating adjustment gives an extremely flexible means of resonating the receiver to any type of antenna, and it should be noted that the tap need only be changed in two cases. Of course, it is necessary to remove the bottom cover in order to shift the antenna tap where necessary.

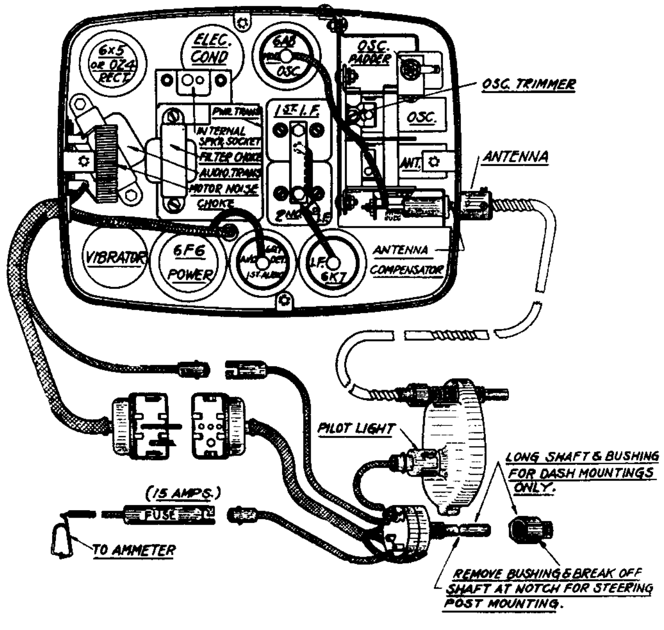
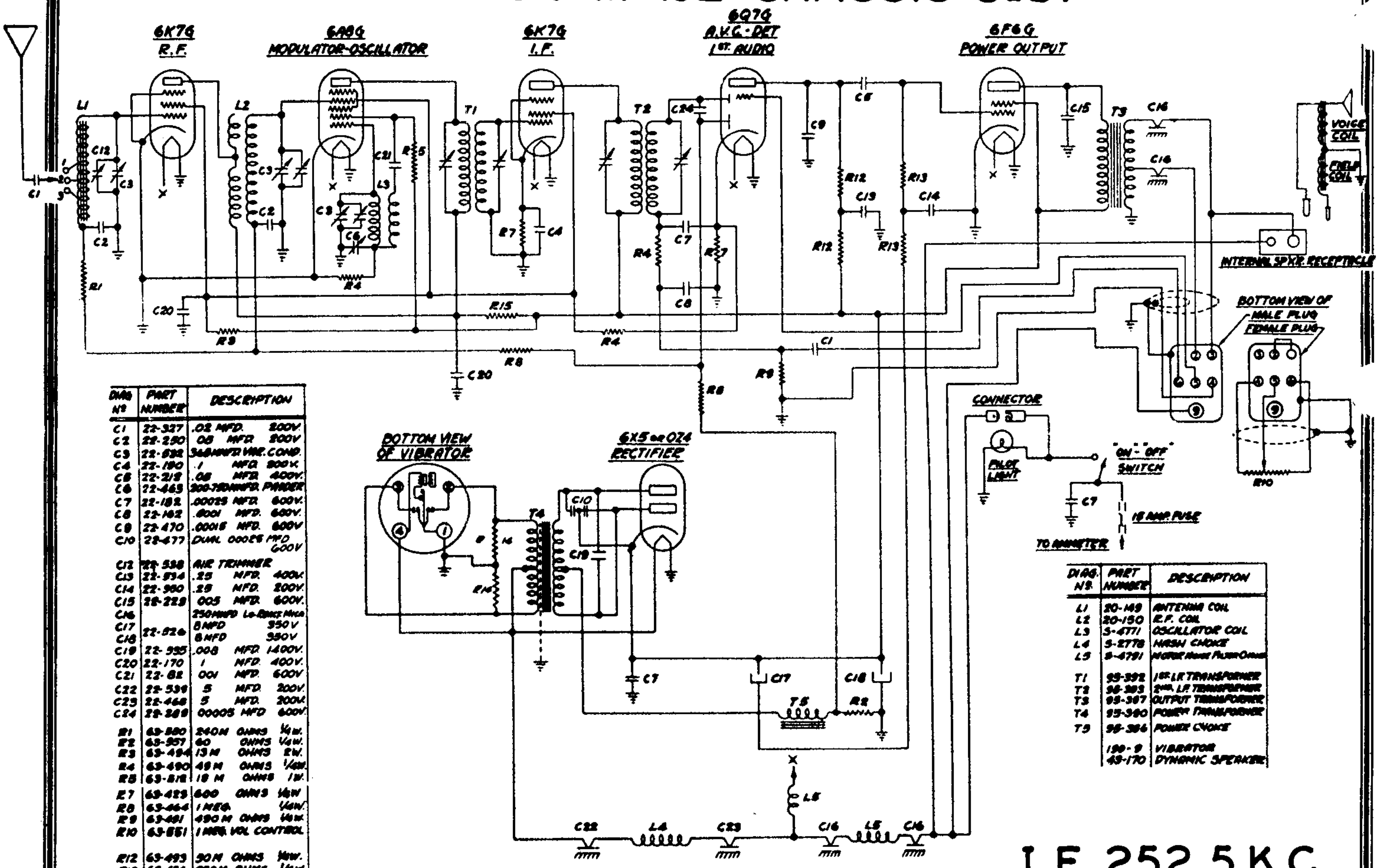


Fig. 3.—Tube Position

ZENITH RADIO CORPORATION

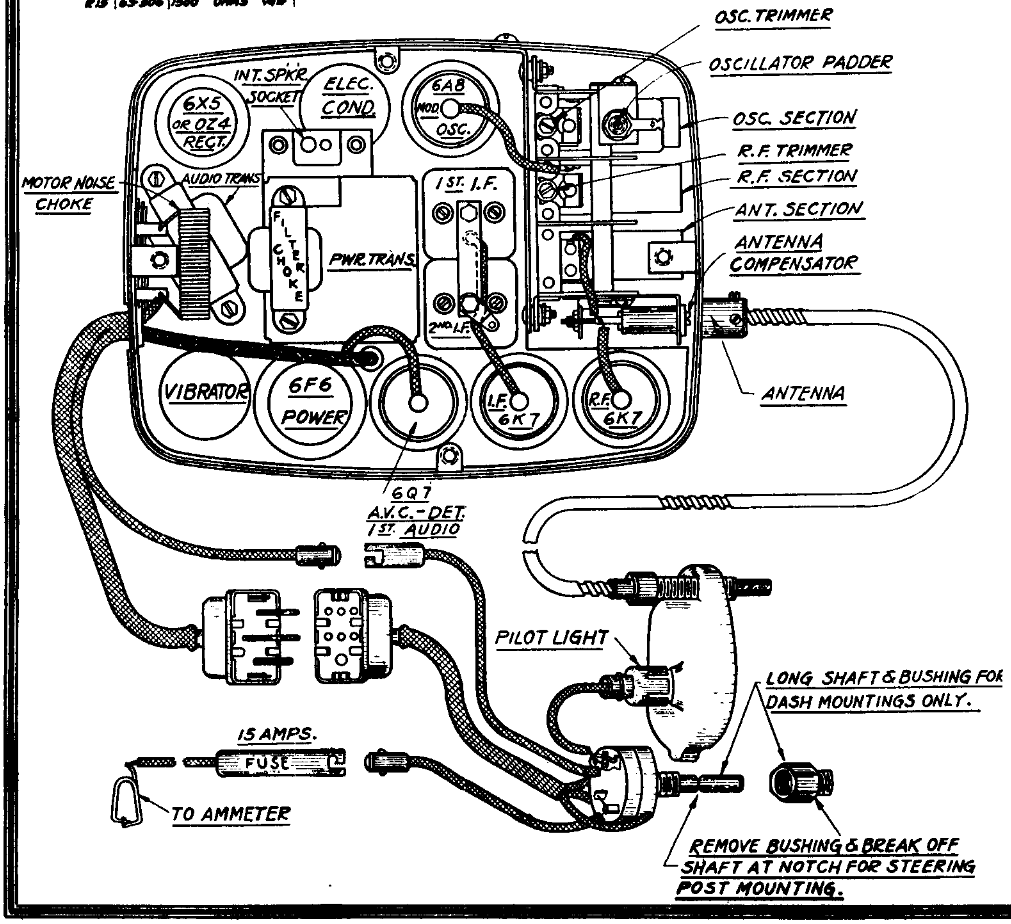
MODEL 6-M-192 "CHASSIS 5637"



DIAG. Nº	PART NUMBER	DESCRIPTION
C1	22-327	.02 MFD. 200V.
C2	22-250	.05 MFD. 200V
C3	22-532	368MMFD VAR. COND.
C4	22-190	.1 MFD. 200V.
C5	22-218	.05 MFD. 400V.
C6	22-463	200-780MMFD. PADDER
C7	22-182	.00025 MFD. 600V.
C8	22-162	.0001 MFD. 600V.
C9	22-470	.00015 MFD. 600V
C10	22-477	DUAL .00025 MFD 600V
C12	22-538	AIR TRIMMER
C13	22-534	.25 MFD. 400V.
C14	22-960	.25 MFD. 200V.
C15	22-223	.005 MFD. 600V.
C16		250MMFD Lo-Loss Mica
C17	22-526	8 MFD 350V
C18		8 MFD 350V
C19	22-555	.008 MFD. 1400V.
C20	22-170	1 MFD. 400V.
C21	22-82	.001 MFD. 600V
C22	22-539	.5 MFD. 200V.
C23	22-468	.5 MFD. 200V.
C24	22-289	.00005 MFD 600V.
R1	63-580	240M OHMS 1/4W.
R2	63-557	60 OHMS 1/4W.
R3	63-494	13 M OHMS 2W.
R4	63-490	49 M OHMS 1/4W.
R5	63-518	18 M OHMS 1W.
R7	63-423	600 OHMS 1/4W
R8	63-464	1 MEG. 1/4W.
R9	63-491	490 M OHMS 1/4W.
R10	63-551	1 MEG. VOL. CONTROL
R12	63-493	30 M OHMS 1/4W.
R13	63-426	250 M OHMS 1/4W
R14	63-563	80 OHMS 1/4W.
R15	63-506	1500 OHMS 1/4W

DIAG. Nº	PART NUMBER	DESCRIPTION
L1	20-149	ANTENNA COIL
L2	20-150	R.F. COIL
L3	S-4771	OSCILLATOR COIL
L4	S-2778	HASH CHOKE
L5	S-4791	MOTOR NOISE FILTER CHOKE
T1	95-392	1ST. I.F. TRANSFORMER
T2	95-393	2ND. I.F. TRANSFORMER
T3	95-387	OUTPUT TRANSFORMER
T4	95-390	POWER TRANSFORMER
T5	95-384	POWER CHOKE
	190-9	VIBRATOR
	49-170	DYNAMIC SPEAKER

I.F. 252.5 KC.



SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	0	225	95	0	—	5.9	0	0
6A8	Mixer Osc.	0	0	225	95	—32	140	5.9	0	0
6K7	I. F.	0	0	235	95	4	—	5.9	4	0
6Q7	Det. A. V. C. Audio	0	0	140	0	—.5	—	5.9	—2	0
6F6	Power	0	0	215	233	—14	—	5.9	0	—
OZ4	Rectifier			Inaccessible						

Voltage at Battery 6V.

Voltage at Receiver 5.9 V.

Antenna disconnected

All voltages measured with 1000 ohms per volt D. C. meter

Total current consumption 6-M-192—7.5 amperes

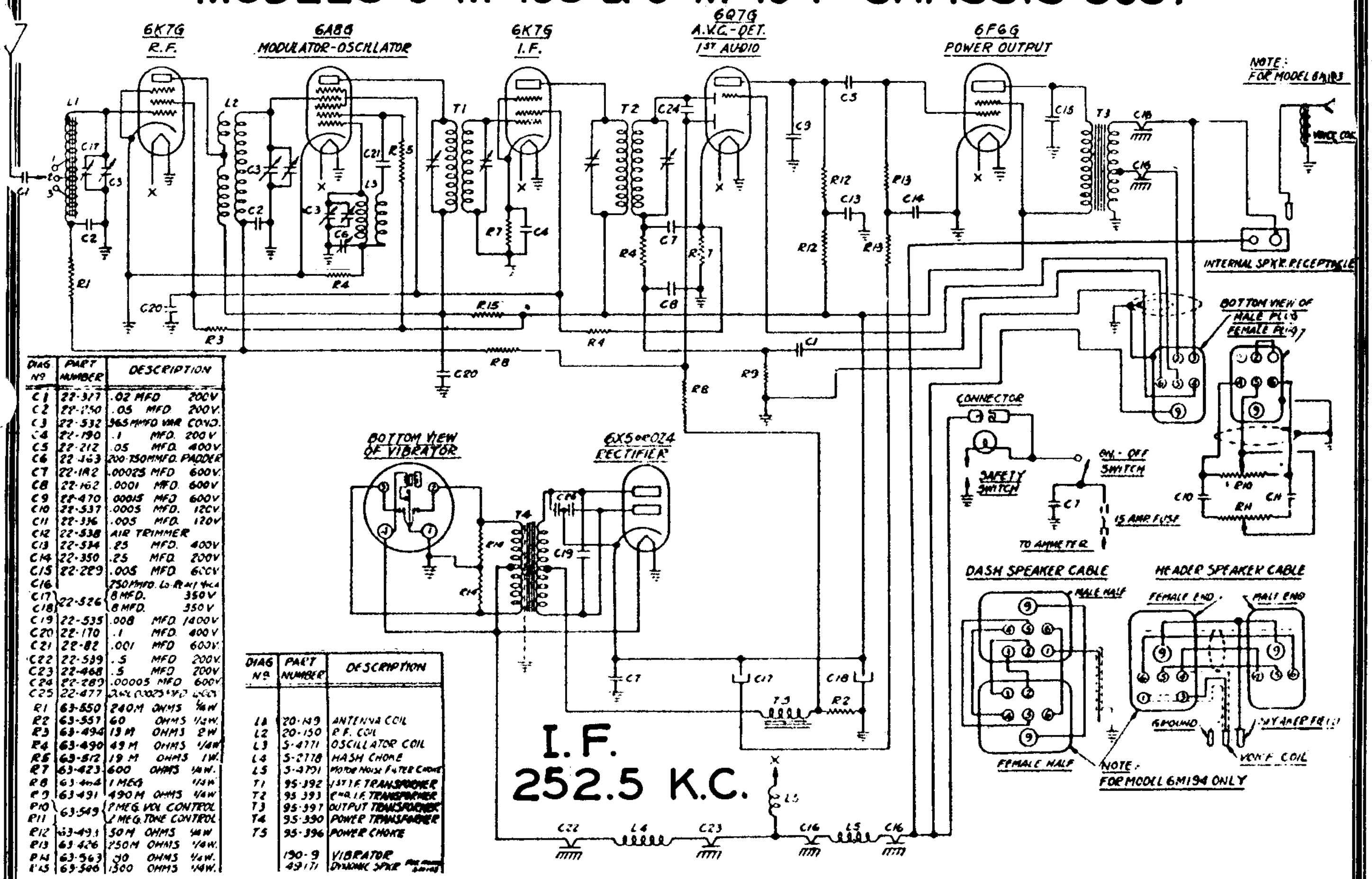
Sensitivity at 1 watt output — .9 M. V.

Maximum power output 4.5 watts.

BOTTOM VIEW OF SOCKET

ZENITH RADIO CORPORATION

MODELS 6-M-193 & 6-M-194 "CHASSIS 5637"

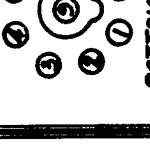


DIAG Nº	PART NUMBER	DESCRIPTION
C1	22-317	.02 MFD 200V
C2	22-150	.05 MFD 200V.
C3	22-532	365 MMFD VAR COND.
C4	22-190	.1 MFD. 200V
C5	22-212	.05 MFD 400V.
C6	22-463	200-750 MMFD. PADDER
C7	22-182	.00025 MFD 600V.
C8	22-162	.0001 MFD. 600V
C9	22-470	.00015 MFD 600V
C10	22-537	.0005 MFD. 120V.
C11	22-336	.005 MFD. 120V
C12	22-538	AIR TRIMMER
C13	22-534	.25 MFD. 400V
C14	22-350	.25 MFD. 200V
C15	22-229	.005 MFD 600V
C16		750 MMFD. Lo-Res. Mica
C17	22-526	8 MFD. 350V
C18	22-526	8 MFD. 350V
C19	22-535	.008 MFD 1400V
C20	22-170	.1 MFD. 400V
C21	22-82	.001 MFD 600V.
C22	22-539	.5 MFD 200V.
C23	22-468	.5 MFD 200V
C24	22-289	.00005 MFD 600V
C25	22-477	[illegible] .00025 MFD 600V
R1	63-550	240M OHMS 1/4W
R2	63-557	60 OHMS 1/2W.
R3	63-494	13 M OHMS 2W
R4	63-490	49 M OHMS 1/4W
R6	63-512	19 M OHMS 1W.
R7	63-423	600 OHMS 1/4W.
R8	63-464	1 MEG 1/4W
R9	63-491	490M OHMS 1/4W
R10	63-549	2 MEG. VOL CONTROL
R11	63-549	2 MEG. TONE CONTROL
R12	63-493	50M OHMS 1/4W
R13	63-426	250M OHMS 1/4W.
R14	63-563	30 OHMS 1/4W.
R15	63-566	1300 OHMS 1/4W.

DIAG Nº	PART NUMBER	DESCRIPTION
L1	20-149	ANTENNA COIL
L2	20-150	R.F. COIL
L3	S-4771	OSCILLATOR COIL
L4	S-2778	HASH CHOKE
L5	S-4791	MOTOR NOISE FILTER CHOKE
T1	95-392	1ST I.F. TRANSFORMER
T2	95-393	2ND I.F. TRANSFORMER
T3	95-397	OUTPUT TRANSFORMER
T4	95-390	POWER TRANSFORMER
T5	95-396	POWER CHOKE
	190-9	VIBRATOR
	49171	DYNAMIC SPKR. [illegible]

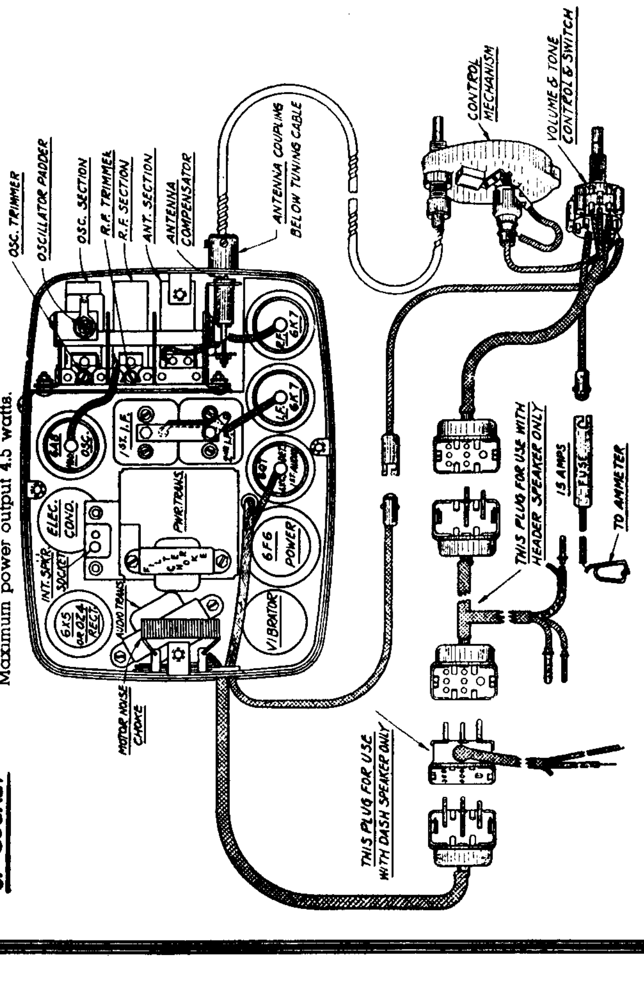
SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	0	225	95	0	—	5.9	0	0
6A8	Mixer Osc.	0	0	225	95	—32	140	5.9	0	0
6K7	I. F.	0	0	235	95	4	—	5.9	4	0
6Q7	Det. A. V. C. Audio	0	0	140	0	—5	—	5.9	—2	0
6F6	Power	0	0	215	233	—14	—	5.9	0	—
OZ4	Rectifier	Inaccessible								

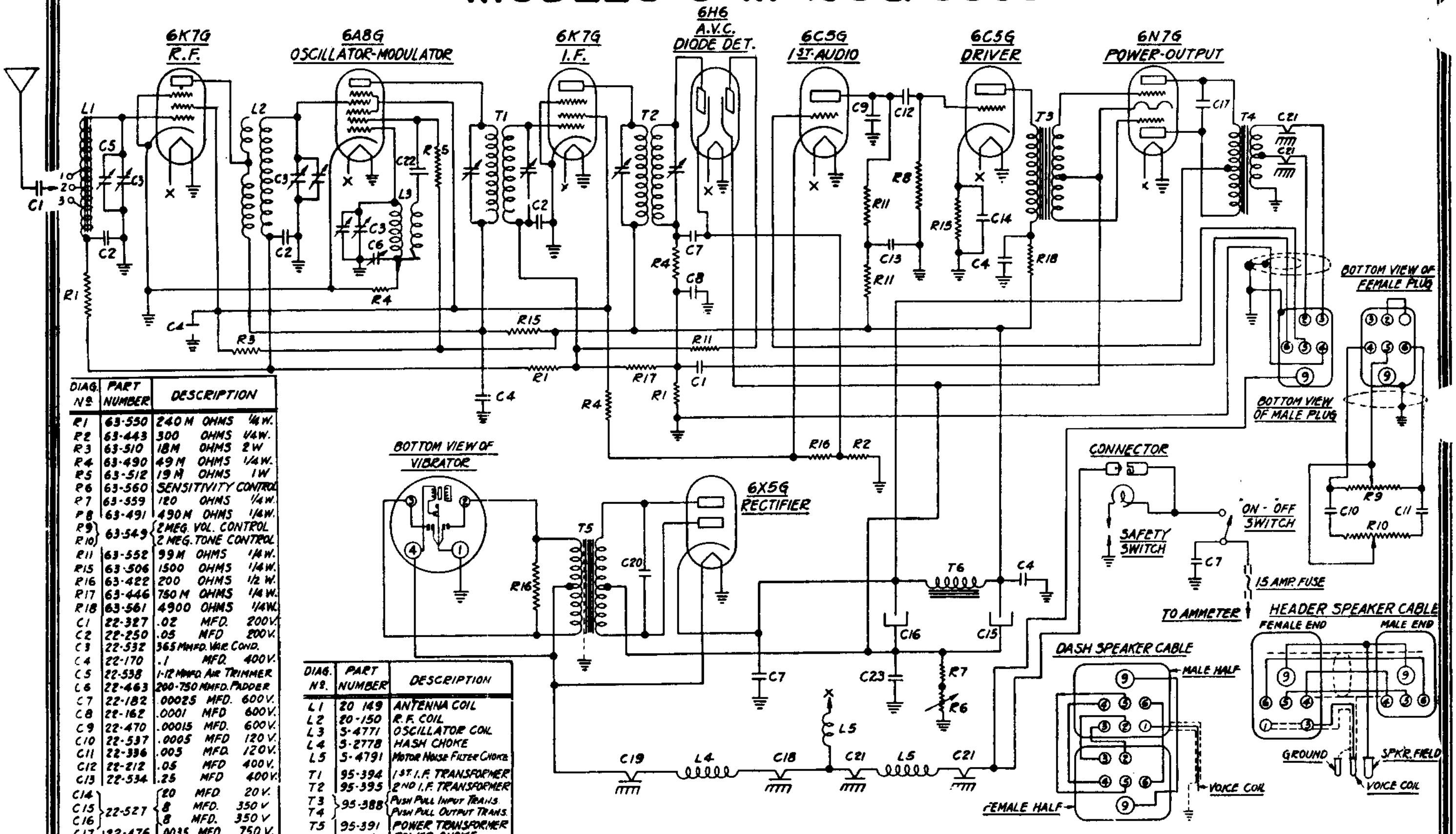


BOTTOM VIEW OF SOCKET

Voltage at Battery 6V.
Voltage at Receiver 5.9 V.
Antenna disconnected
All voltages measured with 1000 ohms per volt D. C. meter
Total current consumption 6-M-193—6-M-194 5.9 amperes
Sensitivity at 1 watt output — .9 M. V.
Maximum power output 4.5 watts.



ZENITH RADIO CORPORATION
MODELS 8-M-195 & 5803



DIAG. Nº	PART NUMBER	DESCRIPTION
R1	63-550	240 M OHMS 1/4 W.
R2	63-443	300 OHMS 1/4 W.
R3	63-510	18 M OHMS 2 W
R4	63-490	49 M OHMS 1/4 W.
R5	63-512	19 M OHMS 1 W
R6	63-560	SENSITIVITY CONTROL
R7	63-559	120 OHMS 1/4 W.
R8	63-491	490 M OHMS 1/4 W.
R9 } R10 }	63-549	{ 2 MEG. VOL. CONTROL / 2 MEG. TONE CONTROL
R11	63-552	99 M OHMS 1/4 W.
R15	63-506	1500 OHMS 1/4 W.
R16	63-422	200 OHMS 1/2 W.
R17	63-446	750 M OHMS 1/4 W.
R18	63-561	4900 OHMS 1/4 W.
C1	22-327	.02 MFD. 200 V.
C2	22-250	.05 MFD 200 V.
C3	22-532	365 MMFD. VAR. COND.
C4	22-170	.1 MFD. 400 V.
C5	22-538	1-12 MMFD. AIR TRIMMER
C6	22-463	200-750 MMFD. PADDER
C7	22-182	.00025 MFD. 600 V.
C8	22-162	.0001 MFD 600 V.
C9	22-470	.00015 MFD. 600 V.
C10	22-537	.0005 MFD 120 V.
C11	22-336	.005 MFD. 120 V.
C12	22-212	.05 MFD 400 V.
C13	22-534	.25 MFD 400 V.
C14 } C15 } C16 }	22-527	{ 20 MFD 20 V. / 8 MFD. 350 V / 8 MFD. 350 V
C17	22-476	.0035 MFD 750 V.
C18	22-468	.5 MFD 200 V.
C19	22-531	.5 MFD 120 V.
C20	22-535	.008 MFD. 1400 V.
C21		250 MMFD. LO-REACT MICA
C22	22-82	.001 MFD. 600 V.
C23	22-350	.25 MFD 200 V.

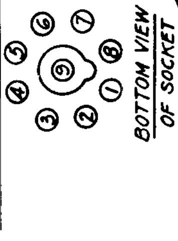
DIAG. Nº.	PART NUMBER	DESCRIPTION
L1	20 149	ANTENNA COIL
L2	20-150	R.F. COIL
L3	S-4771	OSCILLATOR COIL
L4	S-2778	HASH CHOKE
L5	S-4791	MOTOR NOISE FILTER CHOKE
T1	95-394	1ST I.F. TRANSFORMER
T2	95-395	2ND I.F. TRANSFORMER
T3 } T4 }	95-388	{ PUSH PULL INPUT TRANS. / PUSH PULL OUTPUT TRANS.
T5	95-391	POWER TRANSFORMER
T6	95-398	POWER CHOKE
	190 9	VIBRATOR

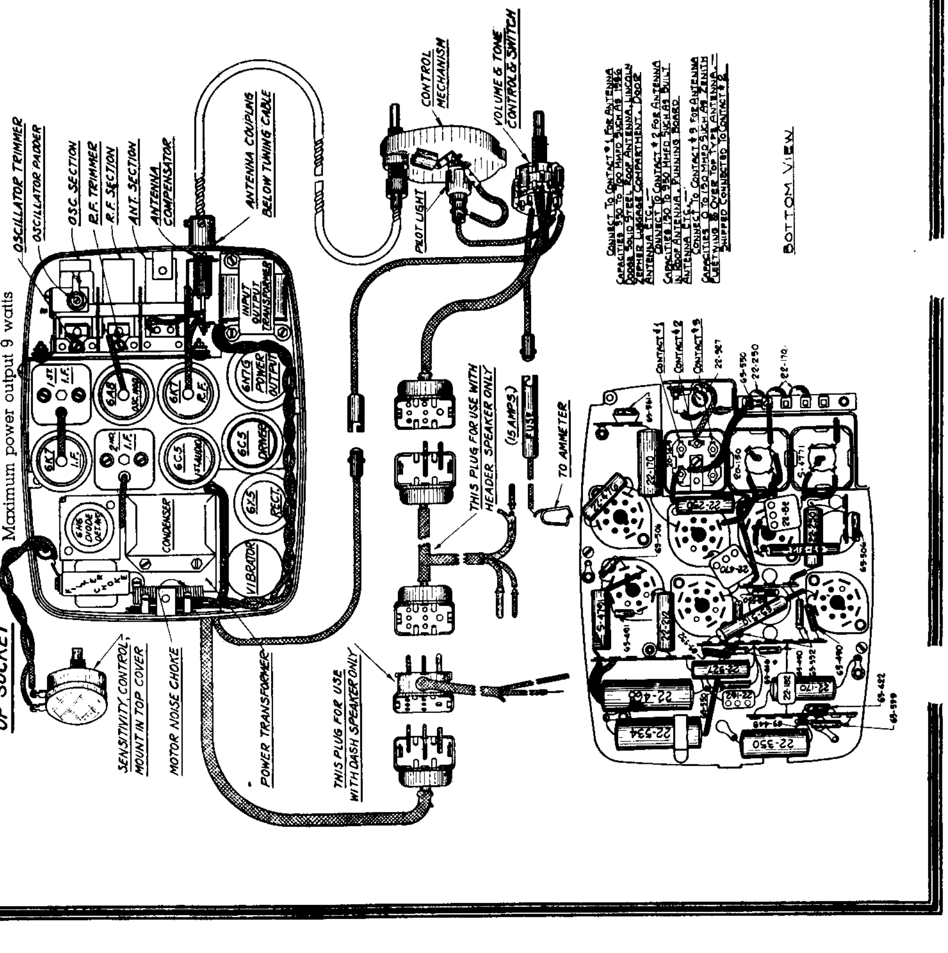
I. F. 252.5 K.C.

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	0	220	75	0	—	5.9	0	0
6A8	Mixer Osc.	0	0	220	75	—11	115	5.9	0	0
6K7	I. F.	0	0	230	75	0	—	5.9	0	0
6H6	Det. A. V. C.	Inaccessible								
6C5	Audio	0	5.9	44	—	0	—	0	1.1	—
6C5	Driver	0	5.9	200	—	0	—	0	6.8	—
6N7	Power	0	0	235	—3.5	—3.5	235	5.9	—3.5	—
6X5	Rectifier	Inaccessible								

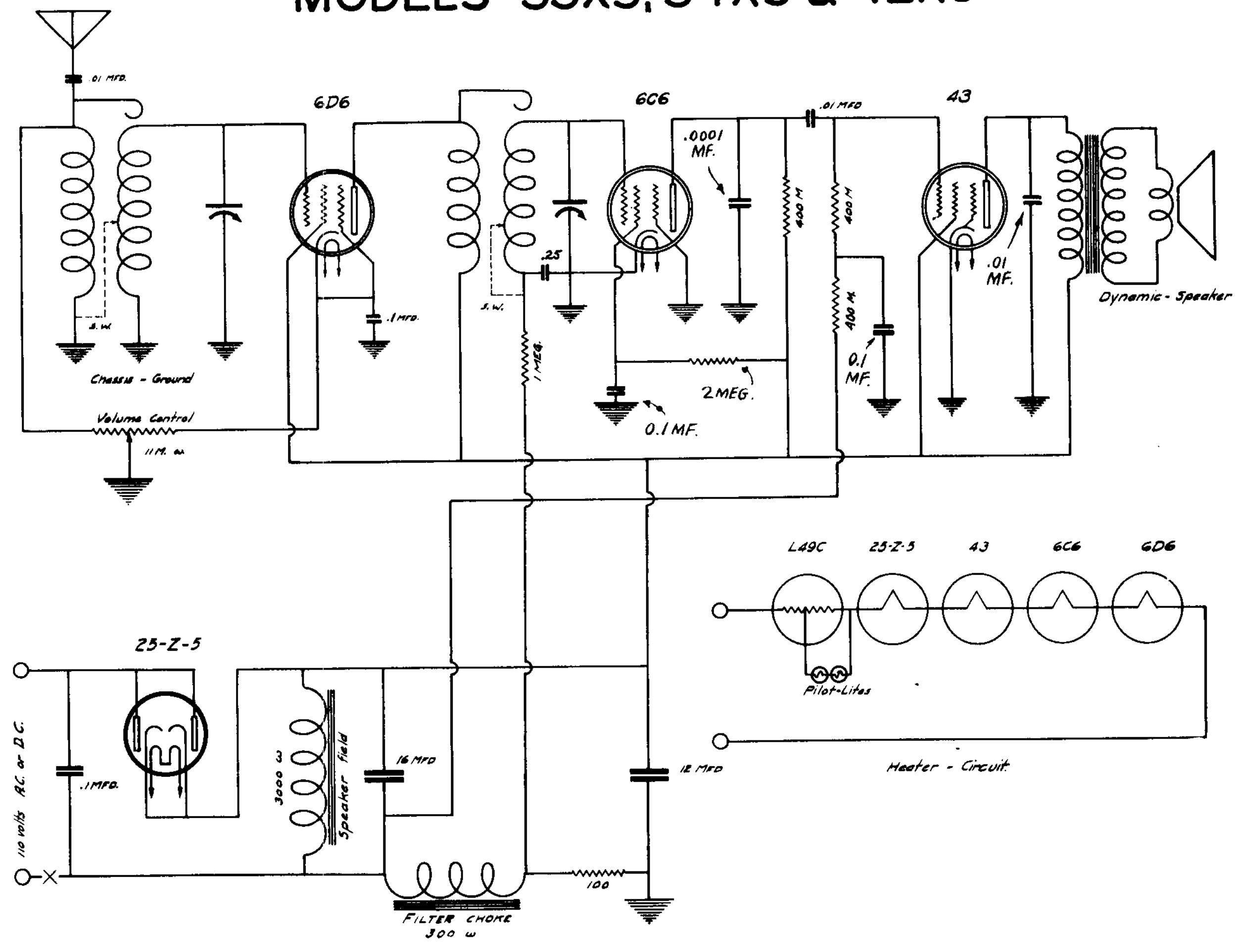
Voltage at Battery 6V.
Voltage at Receiver 5.9 V.
Antenna disconnected
All voltages measured with 1000 ohms per volt D. C. meter
Total current consumption 9.2 amperes
Maximum sensitivity at 1 watt output .9 M. V.
Maximum power output 9 watts



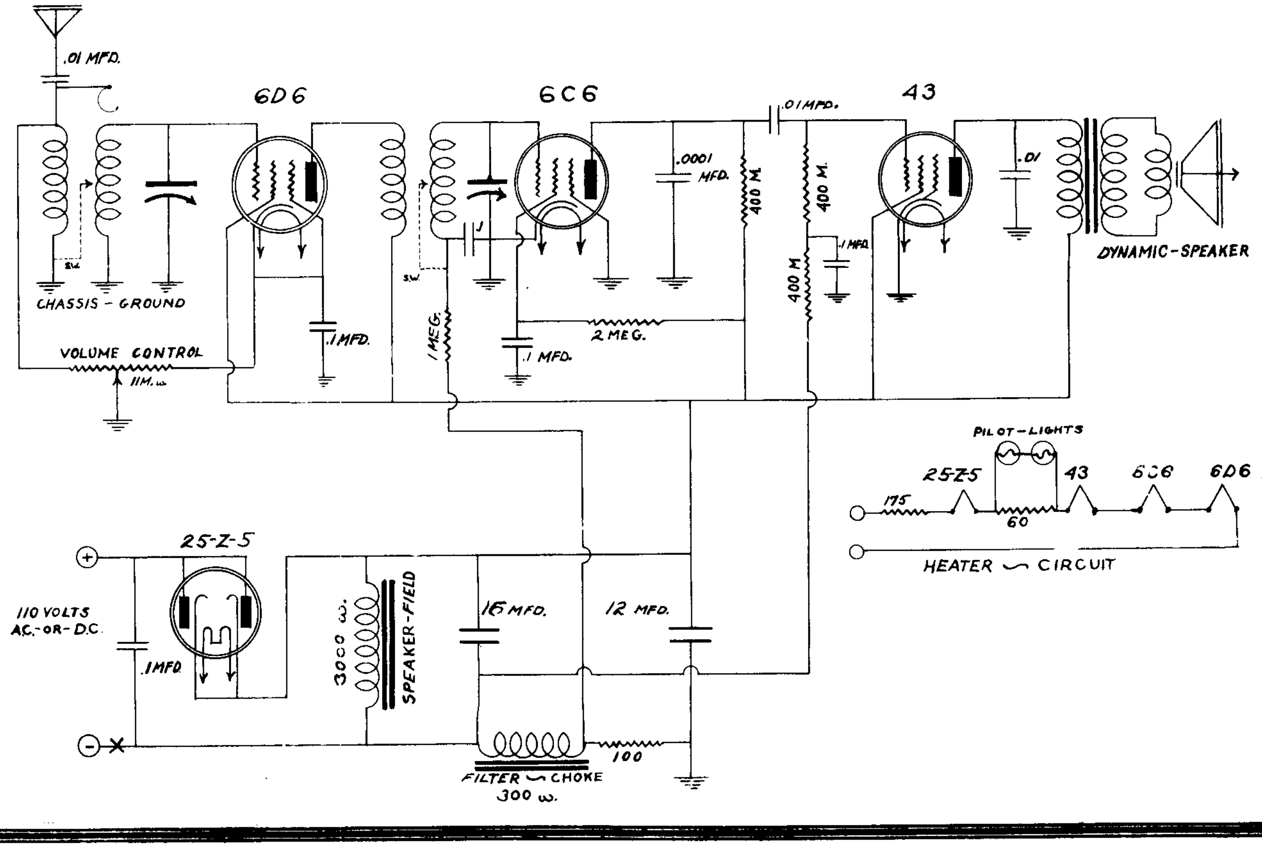


ZEPHYR RADIO CO.

MODELS 33X5, 34X5 & 42X5

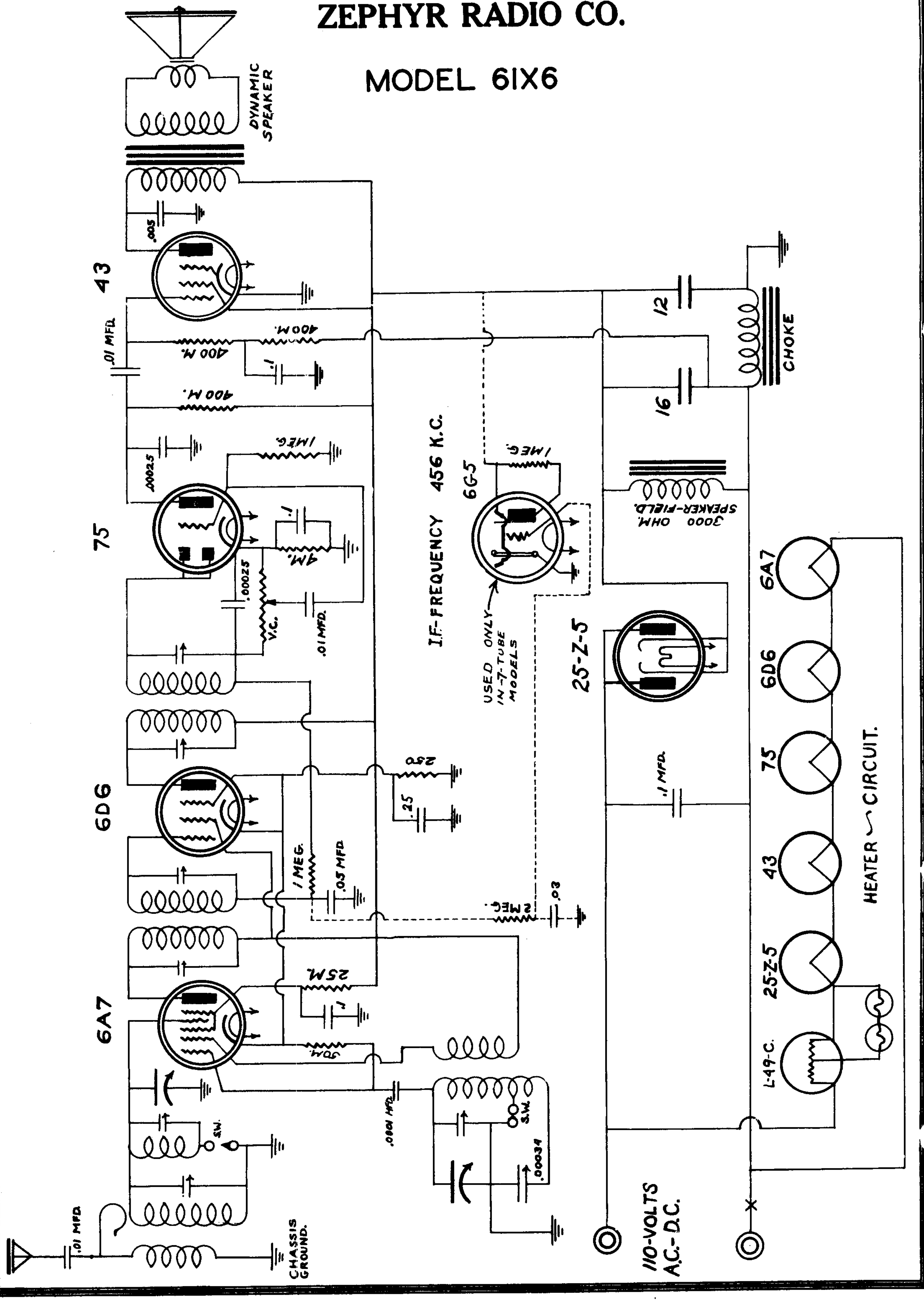


MODEL 41X5

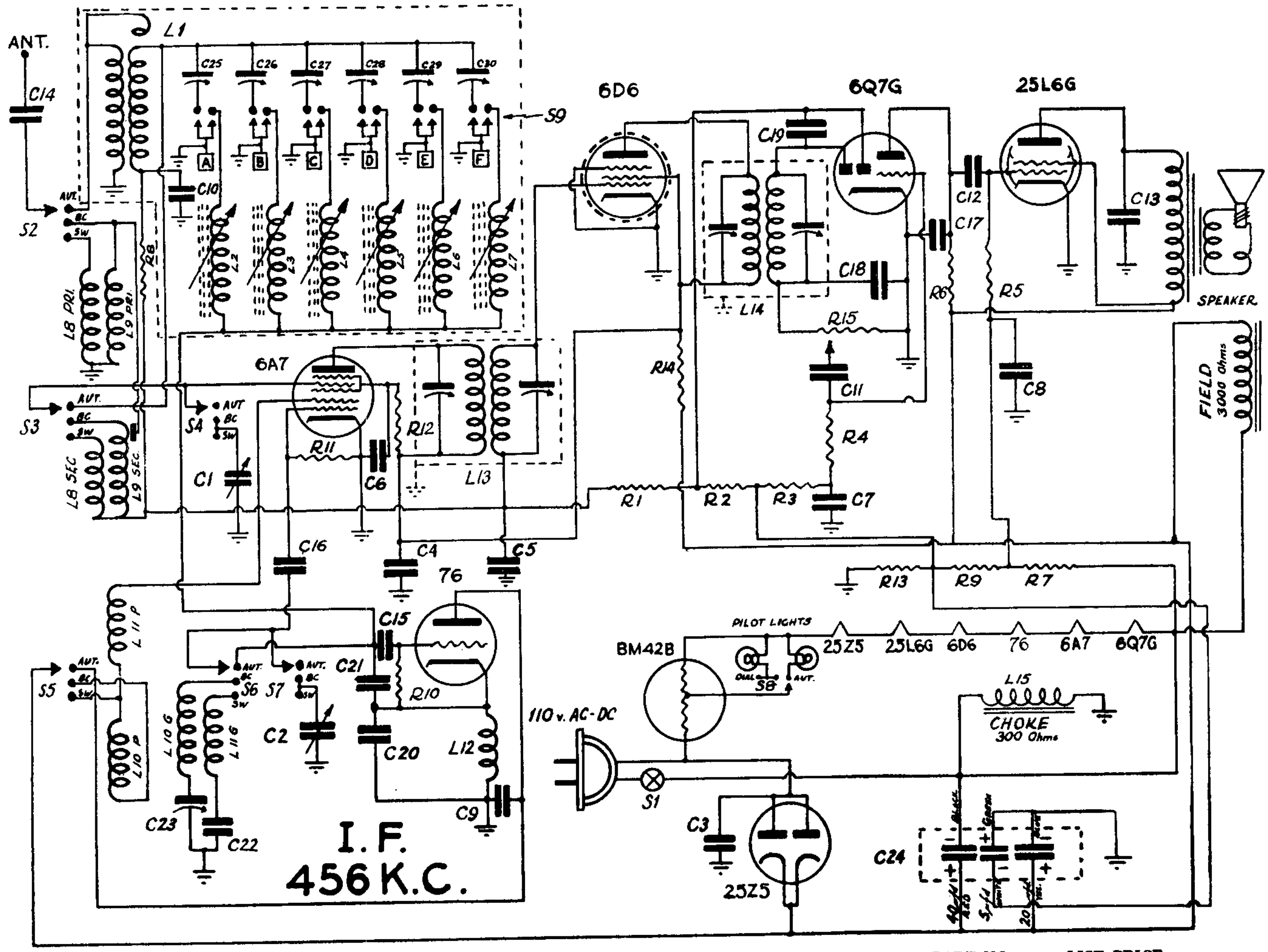


ZEPHYR RADIO CO.

MODEL 61X6



AUTOMATIC RADIO MFG. CO., Inc.
MODEL 855



SCHEMATIC LOCATION	DESCRIPTION	PART NO.	LIST PRICE
L1	Automatic Selector Antenna Coil	BA130	$ .60
L2, 3, 4, 5, 6, 7	Automatic Selector Oscillator Coil Assembly	XL6	2.75
L8	Short Wave Antenna Coil	SA135	.60
L9	Broadcast Antenna Coil	BA135	.60
L10, L11	Composite Oscillator Coil	BSO135	.75
L12	R.F. Choke	L135	.40
L13	1st I.F. Transformer	LC110	.80
L14	2nd I.F. Transformer	LC112	.80
L15	Filter Choke	C1583	.85
———	Speaker	SD27	3.50
S1	Line Switch (On Vol. Control)	———	———
S2, 3, 4, 5, 6, 7, 8	Band Selector Switch	S18	1.20
S9	Automatic Selector Switch Assembly	S17	2.00
C1, C2	2 Sect. Variable Condenser	CV25	1.80
C3, C4, C5, C6, C7 C8, C9, C10	Fixed Condensers .1mfd—200v	———	.20
C11, C12, C13	Fixed " .01mfd—400v	———	.20
C14	Fixed " .002mfd—600v	———	.20
C20, C21	Fixed " .001mfd	CF1000	.30
C15, C16, C17, C18	Mica " 200mmfd	———	.20
C19	Mica " 100mmfd	———	.20
C22	Fixed Padder 4500mmfd—200v	———	.25
C23	Variable Padder 550mmfd	———	.40
C24	Electrolytic Condenser	CE23	1.40
C25, C26, C27, C28, C29, C30	Dual Trimmer Condensers	———	.25
R1, R2	Resistors 2 megohms—¼ Watt	———	.15
R3, R4	" 1 megohm—¼ Watt	———	.15
R5	" ½ megohm—¼ Watt	———	.15
R6	" ¼ megohm—¼ Watt	———	.15
R7	" 150,000 ohms—¼ Watt	———	.15
R8	" 100,000 ohms—¼ Watt	———	.15
R9	" 75,000 ohms—¼ Watt	———	.15
R10, R11	" 50,000 ohms—¼ Watt	———	.15
R12	" 25,000 ohms—¼ Watt	———	.15
R13	" 12,500 ohms—¼ Watt	———	.15
R14	" 30 ohms—¼ Watt	———	.20
R15	Volume Control ¼ megohm	RV18	.80

AUTOMATIC RADIO MFG. CO., Inc.

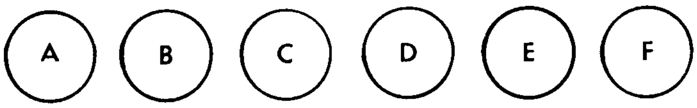
MODEL 855

INSTRUCTIONS FOR ADJUSTING THE AUTOMATIC SELECTOR UNITS

The Automatic Station Selector mechanism incorporated in this receiver has been designed to provide a compact, rugged and efficient unit, which will stand up under the severest use without drift or deviation. Its operation and adjustment is so simple that even the layman can make the necessary adjustments in setting up the device without the use of tools or special equipment. By rigidly adhering to the following instructions, any difficulty in aligning the unit will be obviated.

It is first necessary to determine the stations which are to be controlled by the Automatic Selector mechanism. The six stations which comprise the principal source of entertainment should be chosen. These must be local stations that can be depended upon to provide good reception at all times. Arrange them in the sequence of their frequency assignment. This may be determined by consulting a newspaper or station log. Designate each of the stations selected by the alphabetical series of letters from "A" to "F", inclusive. That station with the highest frequency assignment (nearest the 1500 K.C. end of the broadcast band) should bear designation "A". "B" in the series would be applied to the station of the next highest frequency. This arrangement is followed through the series of letters and terminates with the assignment of the letter "F" to the station of lowest frequency allocation (nearest the 550 K.C. end of the band). The purpose of this series of alphabetical designations is to coordinate the selected stations with the proper adjustment screws, as indicated on the index strip which is mounted on the back of the selector unit. Examination of the index strip will disclose that there are two adjustments for each letter or station; one, is the Oscillator adjustment, and the other the Antenna adjustment. For example, 'A' osc, 'A' ant; 'B' osc, 'B' ant, etc.

It is essential that the frequency of each of the selected stations should fall within the range of frequencies encompassed by the button unit which is being assigned to any particular station. Listed below are the frequency limits of each button position.



POSITION	FREQUENCY RANGE
A	1520 KC to 830 KC
B	1520 KC to 830 KC
C	1250 KC to 740 KC
D	1220 KC to 670 KC
E	970 KC to 580 KC
F	770 KC to 540 KC

Switch the set on by rotating the volume control knob to the right. Rotate the band switch to the intermediate or broadcast position as indicated on the front card, and carefully tune in the station which has been selected for position "A". Note the program emanating from that station. This will provide a simple method of identifying the station while adjusting the selector unit. Rotate the band switch to the left, which is indicated on the front card as the Automatic position. Depress the extreme left hand selector button on the front panel. This is the control for station "A". With a small screw driver adjust the setting marked "A" Osc. until the desired program is heard. Now carefully adjust the screw which is marked "A" Ant. for complete resonance. It is desirable to repeat these adjustments to insure accuracy. Next rotate the band switch to the broadcast position again. Then tune in the station which has been selected for position "B". Observe the nature of its program and rotate band switch to the Automatic position. Depress control button "B", which is the second from the left. Adjust the screws marked "B" Osc. and "B" Ant. in the same manner as was previously done for position "A". The same procedure is followed for each of the other four stations selected. In making the various adjustments keep the volume control turned to the minimum volume necessary for audibility. This will enable more accurate adjustment to be secured. For extreme accuracy in adjustment, a very short antenna should be employed. After the adjustments have been made, the antenna with which the set is to be used may be permanently connected. It is suggested that these adjustments be checked about a week after the original settings are made. No corrections will be necessary thereafter unless it is desired to alter the station selections. The permanent designation of the selected stations can be made through the use of the accompanying station call letter card. Detach the call letters of the stations selected and paste them in the depressions of the appropriate buttons.

ALIGNMENT PROCEDURE

The following instructions are for the sole use of professional radio service men in the event that the receiver should require serviceing.

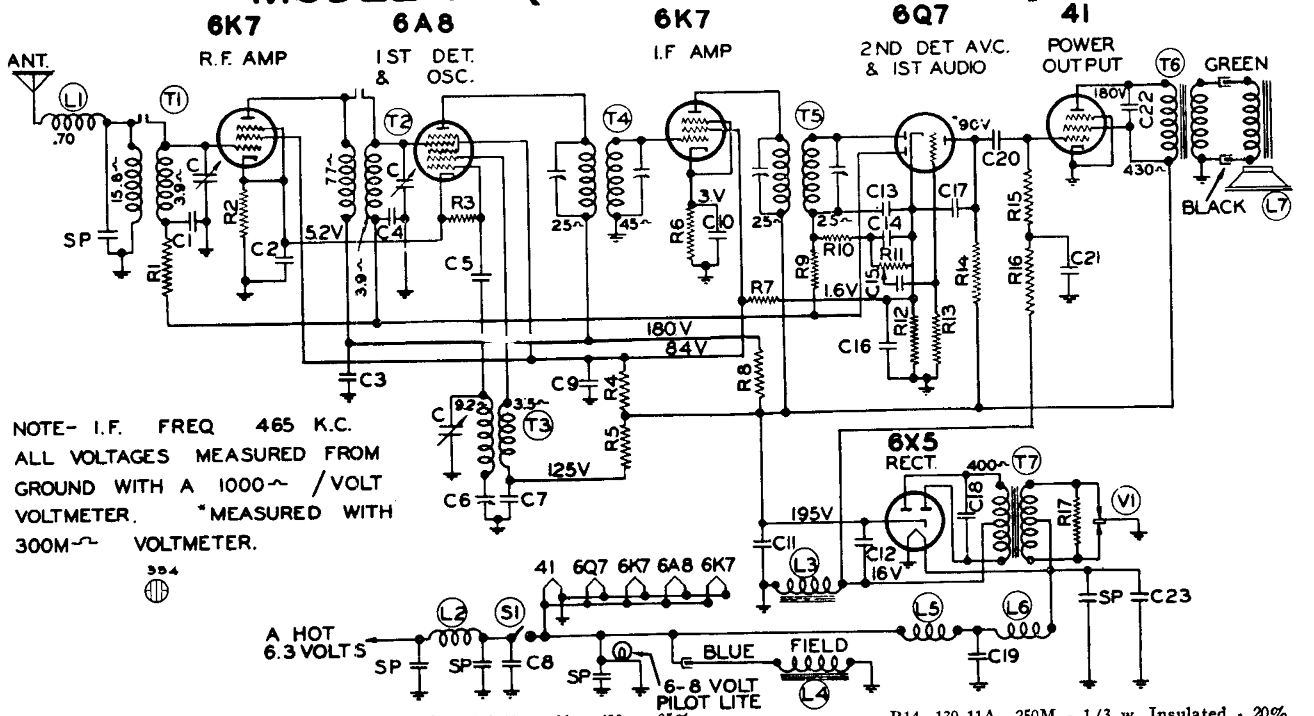
I. F. Alignment. The intermediate frequency to which this set should be adjusted is 456 K.C. To align the intermediate frequency transformers properly, a signal generator emitting a signal of 456 K.C. should be coupled to the signal control grid of the 6A7 tube through a .5 mmfd condenser. An output meter should be connected across the voice coil of the speaker. The four trimmers mounted internally in the top of the two I. F. cans should be adjusted to resonance. The output of the signal generator should be attentuated so as to provide the weakest possible signal necessary to produce a .5 volt deflection on the output meter.

R. F. Alignment. Adjust the signal generator to 17.4 MC. Feed this signal into the antenna lead of the receiver through a 400 ohm resistor. Rotate the band switch on the receiver to the Short Wave position and set the tuning dial to 17.4 on the Short Wave Scale. Adjust the trimmer on the rear section for maximum signal output. Rotate the Band Switch to the broadcast position. Replace the 400 ohm resistor in the Oscillator lead with a 200 mmfd condenser. Set the signal generator to 1560 K.C. and tune the receiver to the same frequency. Adjust the small trimmer condenser which is located near the Oscillator coil underneath the Chassis, to maximum signal response. Attentuate the output of the signal generator to the extent necessary for maintaining a deflection of .5 volts on the output meter and adjust the trimmer mounted on the front section of the variable condenser to resonance. Set the signal generator and the receiver at 600 K.C. and adjust the padder condenser for optimum response. Repeat the last two adjustments to insure accuracy of alignment. Rotate the Band Switch to the Short Wave position and with the signal generator and receiver tuned to 15 MC, adjust the small trimmer condenser which is located near the Short Wave Antenna coil. This last operation should be made with the 400 ohm resistor in the antenna circuit.

It is imperative that all adjustments be made with the minimum signal necessary to obtain the designated deflection on the output meter. This will obviate any difficulty arising from the A.V.C. action of the receiver, and will permit adjustment to absolute resonance.

BELMONT RADIO CORP.

MODEL 661 (SERIAL No W1000 UP)



No.	Part No.	Description
		CONDENSERS
C	102-26	3 Gang Variable Condenser
C1	100-63	.05 x 200v. 50 - 10%
C2	100-63	.1 x 200v. 50 - 10%
C3	100-13	.05 x 400v. 25%
C4	100-22	.05 x 200v. 25%
C5	129-12	.00025 Mica - 20%
C6	124-37	Series Pad
C7	100-20	.1 x 200 v. 25%
C8	100-31	.5 x 120 v. 10 50%
C9	100-62	.25 x 200 v. 50 - 10%
C10	100-20	.1 x 200 v. 25%
C11	119-37	8 mfd. lytic 300 wv.
C12	119-37	4 mfd. lytic 300 wv.
C13	129-5	.0001 Mica 20%
C14	129-5	.0001 Mica 20%
C15	100-11	.01 x 400 v. 25%
C16	100-11	.01 x 400 v. 25%
C17	129-5	.0001 Mica 20%
C18	100-58	.005 x 1200 v. 20 - 10%
C19	100-31	.5 x 120 v. - 10 50%
C20	100-11	.01 x 400 v. 25%
C21	100-62	.25 x 200 v. 50 - 10%
C22	100-54	.006 x 600 v. 25%
C23	100-31	.5 x 120 v. - 10 50%
SP		Spark Plate
		C1, C2 in same block
		C11 and C12 in same block
		C9 and C21 in same block
		RESISTORS
R1	130-20	100M - 1/3 w. - 20%
R2	130-54	500 ohm - 1/3 w. - 20%
R3	130-12A	50M ohm - 1/3 w. insulated 20%
R4	130-165	15M ohm - 1 w. - 20%
R5	130-131A	20M ohm - 1/2 w. - insulated - 10%
R6	130-24	400 ohm - 1/3 w. - 20%
R7	130-139A	40M ohm - 1/3 w. Insulated - 20%
R8	130-31A	1500 ohm - 1/3 w. insulated - 20%
R9	130-19	1 megohm - 1/3 w. - 20%
R10	130-52	50M ohm - 1/3 w. - 20%
R11	101-41	500M ohm - Volume Control
R12	130-153	700 ohm - 1/3 w. - 20%
R13	130-19	1 megohm - 1/3 w - 20%
R14	130-11A	250M ohm - 1/3 w. Insulated - 20%
R15	130-5A	300M ohm - 1/3 w. insulated - 20%
R16	130-11A	250M ohm - 1/3 w. insulated - 20%
R17	130-84	200 ohm - 1/3 w. insulated - 20%
		PARTS
T1	111-71	Antenna Coil Complete
T2	109-35	R.F. Coil Complete
T3	110-57	Oscillator Coil Complete
T4	108-96B	Input I.F. Complete
T5	108-98	Output I. F. Complete
T6	105-37	Output Transformer
T7	104-82	Power Transformer
L1	111-76	Antenna Filter Choke
L2	105-26	"A" Choke
L3	105-46	"B" Filter Choke, 335 ohm
L4		Speaker Field, 4 ohm
L5	105-24	"A" Choke
L6	105-19	"A" Choke
L7	114-59	Dynamic Speaker
S1		Switch on Volume Control
V1	126-1	Vibrator

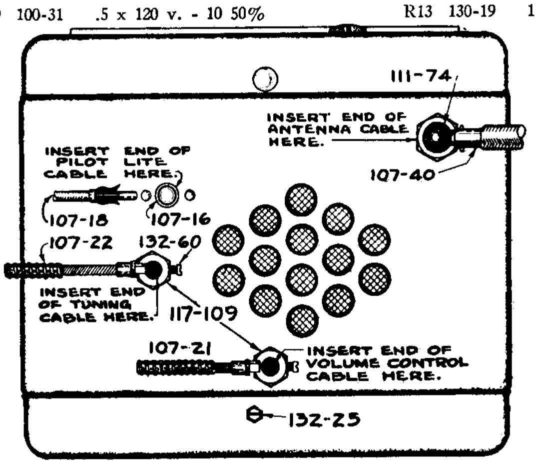


FIG. 1—SIDE VIEW

DIAL ADJUSTMENT

Tune set to some station of a known frequency (between 800 and 1200 K.C.), hold selector knob, then remove pilot light assembly from back of remote head and with a screw driver adjust the slotted screw through this opening and in this way adjust the dial pointer to the correct frequency setting.

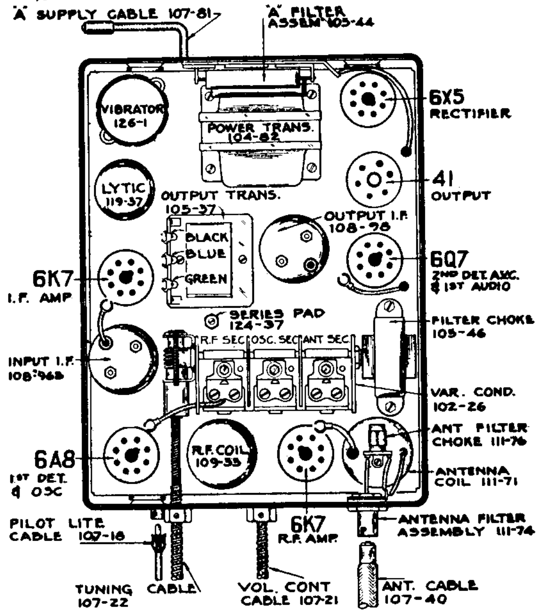


FIG. 2—TOP VIEW

BELMONT RADIO CORP.
MODEL 661 (SERIAL No W1000 UP)

TUBE COMPLEMENT

The tube complement of this chassis consists of the following octal base glass tubes which are interchangeable with metal tubes.

1—Type No. 6K7G—Remote Cut-off Pentode as an R.F. Amplifier
1—Type No. 6A8G—Pentagrid Converter (composite first detector and oscillator)
1—Type No. 6K7G—Remote Cut-off Pentode as an I.F. Amplifier (465 K. C.)
1—Type No. 6Q7G—Duplex Diode Triode Second Detector, A.V.C. and First Audio
1—Type No. 41—Pentode Output Amplifier
1—Type No. 6X5G—High Vacuum Rectifier.

MOTOR NOISE SUPPRESSION

The ignition system of every automobile generates high frequency electrical disturbances which interfere to some extent with the operation of the radio receiver. This disturbance arises from the ignition coil, the distributor and associated wiring. It must either be suppressed at its origin or must be prevented from feeding into the input of the radio receiver through the common storage battery. By proper shielding and by-passing these disturbances are prevented from entering the receiver.

DISTRIBUTOR SUPPRESSOR

The first essential procedure toward minimizing this disturbance is to disconnect the high tension lead to the distributor and insert a distributor suppressor, part number 168-2.

Note: For Ford V-8's, no distributor suppressor is used.

For cap type distributors, exchange standard type 168-2 for a special cable type suppressor, part 168-3, from your dealer.

IGNITION COILS

In cars where the ignition coil is located on the back side of the instrument panel it is often necessary to use an additional capacitor, part number 148-3, obtainable from your dealer. It must be installed from the battery side of the ignition coil to the closest ground on the instrument panel.

Short leads are very important. Where coils are mounted either on the instrument panel or in the driver's compartment, it may be necessary to shield the high tension lead from the coil to the distributor.

HIGH AND LOW TENSION WIRES

This can be done by covering the lead first with flexible loom and then with shielded braid, grounding one side of the braid to the instrument panel and the other to a point on the motor block closest to the distributor. This lead should be run as nearly as possible directly from the coil to the distributor, even if it is necessary to drill an extra hole in the fire wall. It may even be necessary in some stubborn cases to move the coil from the driver's compartment and mount it on the motor block as close as possible to the distributor. The new primary wire should be No. 14 shielded low tension cable. Do not run wires close to the high tension leads and make certain that shields are well grounded.

Make certain that the instrument panel has a ground connection to the frame of the car.

For Ford V-8's, it may be necessary to remove from the high tension housing attached to the left bank of 4 cylinders the master cable containing the generator wire (yellow wire with black tracer) and the red low tension wire connecting ignition coil to the ignition switch.

These two wires must be removed from high tension housing and shielded. Shielding must be grounded at both ends. A capacitor must be connected between the primary of the ignition coil and ground. Your dealer can supply a special type capacitor for this purpose.

BONDING

Cars with floating power must have the motor bonded to the bulkhead and again to the frame to provide a direct path for the high frequency interference developed in the ignition system. 5/8" copper braid will be necessary, SMALL DIAMETER WIRE WILL NOT DO. Bond flexible shaft leads, such as free wheeling, choke wires, etc., which pick up motor noise and reradiate it into the car. Free wheeling cables should be grounded at the point at which they go through the fire wall of the car. In extreme cases it has been found necessary to ground the steering column.

Great care of design has been given the Model No. 661 to minimize motor noise pick-up. Three sources of motor noise pick-up are antenna pick-up, "A" line pick-up, and chassis pick-up. Chassis pick-up is reduced to an absolute minimum by completely insulating the inner chassis from the outer case and grounded at carefully selected points to outer case so as to get minimum impedance drops induced by eddy currents around the R.F. end of the chassis. The "A" line pick-up was eliminated by a carefully designed low pass filter. Antenna pick-up was reduced to a minimum by removing all capacity coupling in the antenna stage.

A further precaution that was taken against motor noise is the insulated couplings used on the end of the volume control shaft and variable condenser shaft. This completely kills any motor noise loop that would have been caused by the grounding of the flexible control cables through Variable Condenser.

CHECK FOR MOTOR NOISE (Chassis Pickup)

After the above instructions have been followed, with the hood clamped down to prevent radiation and the motor running, the receiver should be turned on and the dial turned off a station, with volume control at maximum, and local distance switch in distance position. If motor noise is objectionable the next step is to determine whether the interference is originating through chassis pickup or from the antenna.

To check for chassis pickup, disconnect the antenna from the antenna cable and ground the antenna lead to shield of cable. Chassis pickup is due to the electrical interference being radiated or fed back through the frame of the car into the receiver or through the storage battery to the receiver.

It may be necessary when chassis pickup is present to ground the choke and gas throttle rods securely to the firewall at the point which they enter the drivers compartment.

DISTRIBUTOR ROTOR

Chassis pickup can be reduced by reducing the gap between contacts and the rotating arm in the distributor head. To do this, apply solder to the end of the rotor arm. Replace the rotor in the distributor and turn the engine over slowly with the crank in order to clean the excess solder. The rotor should not brush or wipe the contacts inside the distributor cap, but should just clear them. As an additional precaution check the breaker points. They should be thoroughly cleaned and adjusted or new points installed if they are badly worn. In stubborn cases a good grade mica .002 to .006 condenser connected across the breaker points will reduce interference.

HIGH AND LOW TENSION LEADS

The ignition system of a car must be kept in good condition and leaky cracked high tension wires and bad spark plugs should be replaced. In many cars the low tension battery leads, etc., are grouped together with the high tension wires. These leads will very often pick up motor noise and feed it into the receiver through the battery circuit. In cases such as these it will be necessary to separate the low tension from the high tension wires and run them through another hole if they run from the engine compartment up to the instrument panel. This condition, as explained previously, is particularly true on the V-8 Ford as the battery and primary leads run through a special tube which also houses the high tension leads. Shield and ground these leads.

IGNITION COILS

Where ignition coils are mounted in motor compartments a .5 mfd cond (148-1 or 148-3) connected between primary coil terminal and receiver mounting bolt will often reduce motor noise.

ELECTRICAL ACCESSORIES

Accessories such as lighters, electric motor heaters, horns, light switches, automatic relays, electrical gauges such as oil, water and gas are often a source of interference. In these cases the procedure is to try a condenser from ground to various accessories until the interference is eliminated, then install the condensers in those places permanently. Spark intensifiers should not be used.

CHECK FOR MOTOR NOISE (Antenna Pickup)

Now connect the antenna to the receiver and test for motor noise pick-up, it is entirely probable that if any noise is present it will be very slight and only noticeable between stations. No absolute rule for complete motor noise elimination can be specified inasmuch as many times two cars of the same make present entirely different problems and require bonding or shielding at different points. If motor noise is objectionable, it is due to the interference being radiated and picked up through the antenna system. Motor noise can be radiated into the drivers compartment through the drivers body due to the fact that in the majority of cars the toe board is wood. This can be remedied by covering the entire floor board with copper screen grounded in several places to the frame of the car. This condition is only true in cars which have roof antennas. Under-slung antennas, either of the strap or plate type, will very often pick up motor noise if mounted too far forward on the frame of the car, the noise naturally being picked up due to the close proximity of the antenna to the engine. It is recommended that if an under-slung antenna is used, that it be mounted as far towards the rear of the car as possible.

ANTENNA

Naturally the performance of any radio depends on the effectiveness of the antenna. Many of the older cars on the market today have a wire network in the roof which is nothing more than ordinary chicken wire. This wire network acts as a support to the roof and is in the majority of cases grounded directly to the body of the car at the point at which the roof meets the sides of the body. Service men frequently tack antennas to the underside of the top material in these cars, this is not satisfactory. There are but two things to do. Either an underslung (plate or strap) antenna must be used or the wire network must be cut from all grounds to the car. If this is done this network will in itself make a very good antenna, but it will be necessary to cut the wire network back for a distance of at least three inches from all sides of the car.

When running the lead-in up the corner post of the car to the roof antenna ground it every few inches to the frame of the body of the car. If this is not possible, insulate it, otherwise scratchy noises will result.

STEEL TOP OR TURRET TOP CARS do not contain built-in roof antennas. In cars of this type an under-slung, strap or plate, antenna must be used.

DOME LIGHT LEAD

If after all standard methods to reduce motor noise, as outlined above, have been tried and trouble still persists, carefully check the following: the dome light is usually the greatest source of antenna pick-up interference. First check the dome light by disconnecting the dome light connection on the back of the dash and grounding the wire (for location of this wire see car wiring diagram). If this eliminates the interference it indicates clearly that motor noise is being picked up by the dome light wire and radiated into the antenna. A small R.F. choke connected in series with the dome light wire and by-passed to ground at the dome light side of the choke with a .5 or 1 mfd. condenser, will eliminate this source of interference.

WHEEL STATIC

Wheel or brake noise is probably the most peculiar type of interference and is due to accumulated static charges. This type of interference is only noticeable while the car is in motion and could very easily be confused with ignition interference. Check for this with car running at a good speed, turn the ignition switch off and the clutch disengaged, apply the brakes. If the noise stops, the source of the static is in the wheels. To overcome the wheel static condition, use graphite grease in the wheel bearings or insert grounding springs in the hub caps. In the case of external brakes, it may be necessary to ground the brake bands to the frame of the car.

LOOSE CONNECTIONS

Loose connections are a frequent cause of interference. Make certain that light bulb contacts are clean and that they fit tight in their sockets, that all battery cable connections are tight and well grounded. Secondary high tension leads at the distributor cap or the coil very often work loose and a sparking contact results. Make certain that clips on all high tension wires are clean and bright and are pressed firmly into the receptacies on the distributor cap and the ignition coil.

Ignition noise should, if possible, be checked in a location that is free from electrical disturbances such as power lines, electrical equipment, neon signs, street car and elevated lines. This receiver is a very sensitive instrument and will pick up over its antenna system electrical disturbances in its immediate vicinity.

PILOT LAMP AND FUSE

PILOT LAMP—A 6-8 volt lamp is used (Bulb No. 116-13 Bulb).

Fuse—A 15 ampere automobile fuse is used. CAUTION: BE SURE THE FUSE SHIELD IS ON THE FUSE BEFORE THE LATTER IS INSERTED IN THE RECEPTACLE.

SERVICE DATA

SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good. If fuse blows out frequently and insulating sleeve has been properly placed over fuse, the trouble is probably in the vibrator, it should be replaced. Do not attempt to make any adjustments on the vibrators.

ALIGNING INSTRUCTIONS

All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment, unless it becomes necessary to replace a coil or transformer, or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustment is necessary and only after voltages, tubes and condensers have been checked and found to be normal. To properly re-align this receiver, a test oscillator, as well as an output meter, must be used.

DUMMY ANTENNAS

The dummy antennas referred to in the following instructions are:

"I.F. Dummy" —A .5 mfd. condenser connected in series with the test oscillator output lead.

"Broadcast Dummy"—A 175 mmfd. condenser connected in series with the output lead of the test oscillator.

RESONANCE INDICATOR

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 41 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

I.F. ALIGNMENT: (465 K.C.)

1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 465 K.C. in series with I.F. dummy antenna, to grid of 6K7 I.F. tube.
2. Adjust trimmer condensers of output I.F. transformer No. 108-98 to resonance with oscillator.
3. Move test oscillator connection to grid of 6A8 tube and adjust trimmer condensers of input I.F. transformer No. 108-96B to resonance with oscillator. See top view for location of these transformers. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver.

BROADCAST ALIGNMENT

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. in series with broadcast dummy to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance. (This adjustment is on the middle section of the three-gang condenser—see top view, Fig. 2).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. and antenna trimmers to resonance (see top view, Fig. 2).
4. Re-set test oscillator to 600 K.C. and rotate variable condenser to 600 K.C. Adjust series pad, rocking gang condenser to and fro, at the same time adjusting series pad for maximum gain. This adjustment is accessible from the top of chassis—see top view.
5. Go back and check 1400 K.C. If adjustment is made here, check 600 K.C. again.
6. Check for sensitivity at 1000 K.C. by setting test oscillator to this frequency and picking up the signal by rotating variable condenser. Under no circumstances bend plates of variable condenser sections to correct tracking.

BELMONT RADIO CORP.

MODEL 661 (SERIAL Nº W1000 UP)

DESCRIPTION

Model No. 661 is a six-tube superheterodyne receiver having a tuning range of 530 K.C. to 1550 K.C., operates from a 6.0 volt storage battery and uses the automotive type 6.3 volt tubes. The "B" supply is obtained from a vibrator with a tube rectifier.

The I.F. frequency used is 465 K.C., the R.F. end of the receiver consisting of a high gain iron core antenna coil which gives high signal to noise ratio and an R.F. stage especially designed to give high image rejection and high I.F. attenuation. The I.F. transformers are designed to give high gain and selectivity and yet to have a broad nose for ease of tuning and hi-fidelity response. They are of the air core type and wound with solid wire to give *minimum* drift and variation of gain due to climatic changes.

This receiver has been carefully designed to facilitate servicing, the top and bottom covers are both removable and are fastened in place by spring clips, self tapping screws and trimount buttons.

All adjustments are accessible and any part replaceable without removing the chassis from the case.

Dash kits for the remote control head are available for 1935, 1936, 1937 cars drilled for dash plates.

PARTS

Part No.	Circuit Diagram Reference	Description	List Price Each
		CONDENSERS	
100-11	C15, C16, C20	.01 x 400 volt Tubular	.25
100-13	C3	.05 x 400 volt Tubular	.25
100-20	C7, C10	.1 x 200 volt Tubular	.25
100-22	C4	.05 x 200 volt Tubular	.25
100-31	C8, C19, C23	.5 x 120 volt Tubular (Oval Type)	.60
100-54	C22	.006 x 600 volt Tubular	.25
100-58	C18	.005 x 1200 volt Tubular	.25
100-62	C9, C21	.25 x 200 volt, - .25 x 200 v. Tubular	.50
100-63	C1, C2	.1 x 200 v, - .05 x 200v Tubular (with Bracket)	.35
119-37	C11, C12	8 - 4 Mfd Lytic Filter 300 wv.	1.35
124-37	C6	Series Padder Condenser	.35
129-5	C13, C14, C17	.0001 Mica - Type O - 20%	.25
129-12	C5	.00025 Mica - Type O - 20%	.25
		RESISTORS	
130-5A	R15	300M ohm - 1/3 Watt - 20% (Insulated)	.20
130-11A	R14, R16	250M ohm - 1/3 Watt - 20% (Insulated)	.20
130-12A	R3	50M ohm - 1/3 Watt - 20% (Insulated)	.20
130-19	R9, R13	1 Meg ohm - 1/3 Watt 20%	.20
130-20	R1	20M ohm - 1/3 Watt 20%	.20
130-24	R6	400 ohm - 1/3 Watt 20%	.20
130-31A	R8	1500 ohm - 1/3 Watt - 20% (Insulated)	.20
130-52	R10	50M ohm - 1/3 Watt 20%	.20
130-54	R2	500 ohm - 1/3 Watt 20%	.20
130-84	R17	200 ohm - 1/3 Watt 20%	.20
130-131A	R5	20M ohm - 1/2 Watt - 10% (Insulated)	.20
130-139A	R7	40M ohm - 1/3 Watt - 20% (Insulated)	.20
130-153	R12	700 ohm - 1/3 Watt 20%	.20
130-165	R4	15M ohm - 1 Watt - 20%	.20
		COILS	
108-96B	T4	Input I.F. Coil Assembly Complete with can	1.25
108-98	T5	Output I.F. Coil Assembly Complete with can	1.25
110-57	T3	Oscillator Coil Assembly Complete	.50
111-71	T1	Antenna Coil Assembly Complete with can	1.25
109-35	T2	R.F. Coil Assembly Complete with can	1.00
111-76	L1	Antenna Filter Choke Assembly Complete	.35
		SOCKETS	
121-6		Six Prong Wafer Socket - Marked "41"	.15
121-9		Four Prong Vibrator Socket	.10
121-22		Eight Prong Octal Socket - Marked "6A8"	.15
121-24		Six Prong Octal Socket - Marked "6X5"	.15
121-26		Seven Prong Octal Socket - Marked "6Q7"	.15
121-27		Eight Prong Octal Socket - Marked "6K7"	.15
		TRANSFORMERS	
104-82	T7	Vibrator Power Transformer	2.50
105-37	T6	Output Transformer for Speaker	1.35
		CHOKE COILS	
105-19	L6	"A" Choke Coil (Vibrator Circuit)	.15
105-24	L5	"A" Choke Coil (Filament Circuit)	.15
105-26	L2	"A" Choke Coil (Battery Circuit)	.15
105-46	L3	Filter Choke Coil Complete (335 ohms)	.90
		SPEAKER	
114-59	L4, L7	Five Inch Dynamic Speaker	2.75
		MISCELLANEOUS	
101-41	R11, S1	Volume Control and Switch (500M ohm)	1.25
102-26	C	Three - Gang Condenser	4.00
105-44		"A" Filter Assembly Complete	.75
107-16		Receptacle for Pilot Light Cable	.10
107-40		Shielded Antenna Cable	.60
107-81		Chassis Battery Cable - 4 Inch	15
107-82		Battery Cable Complete with Fuse Assembly and Insulator Sleeve	.25
111-74		Antenna Filter Assembly Complete Less 107-40 Antenna Cable	.35
115-77		Cover Shield for Vibrator Compartment	.10
117-52		Special Brass Mounting Stud	.03
117-109		Bushings for Flexible Cables	.10
126-1	V1	Vibrator Unit Complete	4.00
127-12		Insulator Couplings for Variable Condenser and Volume Control	.10
131-41		Trimount Cinch Buttons	.05
131-111		15 Ampere Fuse Type 3AG	.05
131-112		Mounting Bolts Complete with 131-113 Washer, 131-44 Lock Washer and 133-32 Nut	.10
132-25		No. 8 x ¼ Acorn Head Self Tapping Screw - Doz.	.12
132-60		No. 6-32 x 11/64 Set Screw for 117-109 Bushing - Doz.	.10
134-37		Rubber Grommets for Variable Gang	.02
134-38		Chassis Rubber Cushions	.02
148-1		.5Mfd Generator Condenser	.50
148-3		.5Mfd Ammeter Condenser	.40
168-2		Distributor Suppressor	.30
128-96		Set Case Less Covers	1.50
128-97		Front Case Cover	1.00
128-98		Bottom Case Cover	1.00
128-31		Wire Screen for Grill	.10
128-95		Grill Cloth	.15
128-59		Baffle Board for Speaker	.05
		REMOTE CONTROL PARTS	
112-216		Dial Scale Assembly including Pointer Disc, and Dial Scale Retaining Ring	.40
122-10		Remote Control Unit complete with 107-92 Volume Control Assembly and 107-18 Pilot Lite Assembly	4.00
107-92		Volume Control Assembly complete with Lockwasher and Nut	.30
107-18		Pilot Light Assembly complete less Bulb	.40
107-21		Flexible Volume Control Cable 24"	1.25
107-22		Flexible Selector Control Cable 24"	1.25
117-42		Knurled, Threaded Coupling for Flexible Control Cable	.05
116-13		6 - 8 Volt Pilot Light Bulb, T-50, Round, Bayonet Base	.10

Tubes are coded and guaranteed by the tube manufacturer. Prompter service can be rendered on adjustments if defective tubes are returned direct to the tube manufacturer rather than through our factory.

Vibrators can be reconditioned at a cost of $3.00 each, if the old unit is returned.

All resistors are RMA color coded - specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

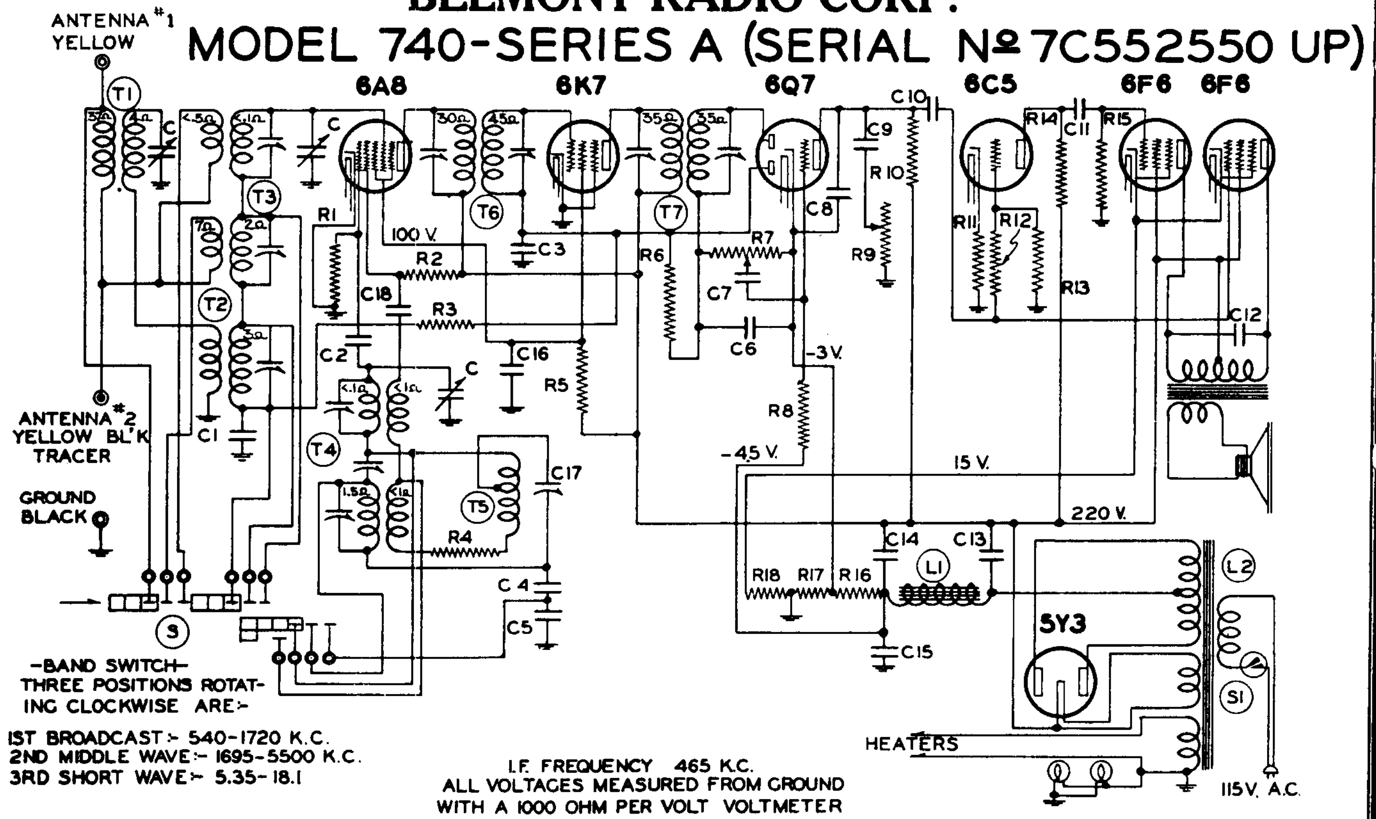
Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None.

All prices quoted are list and are subject to the usual trade discounts. Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

WE CANNOT SUPPLY SPEAKER PARTS, CONES, TRANSFORMERS OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $1.00 NET, IF IT IS RETURNED TO OUR FACTORY TRANSPORTATION CHARGES PREPAID.

BELMONT RADIO CORP.

MODEL 740-SERIES A (SERIAL No. 7C552550 UP)



PARTS

Part No.	Circuit Diagram Reference	Description	List Price Each
		CONDENSERS	
100-11	C7	.01 x 400 Volt Tubular	.25
100-12	C12, C18	.003 x 600 Volt Tubular	.25
100-20	C15	.1 x 200 Volt Tubular	.25
100-22	C1, C3	.05 x 200 Volt Tubular	.25
100-26	C10, C11	.02 x 400 Volt Tubular	.25
100-39	C16	.1 x 400 Volt Tubular (with Bracket)	.25
100-57	C9	.006 x 600 Volt Tubular	.25
103-6	C13	8 Mfd Lytic Filter 350 v.	.85
103-14	C14	16 Mfd Lytic Filter 250 v.	.85
129-2	C8	.0005 Mica - Type MT - 20%	.25
129-5	C6	.0001 Mica - Type MT - 20%	.25
129-39	C2	.00005 Mica - Type MT - 20%	.25
129-54	C5	.003 Mica - Type MW - 2 1/2%	.35
129-55	C4	.0034 Mica - Type MW - 2 1/2%	.35
124-35	C17	Series Padder Condenser (740 mmf)	.40
		RESISTORS	
106-37	R16, R17, R18	Muter Metal Clad Resistor	.40
130-4	R6, R8	3 Megohm - 1/3 Watt - 20%	.20
130-12	R1, R14	50M ohm - 1/3 Watt - 20%	.20
130-22	R11	5M ohm - 1/3 Watt - 20%	.20
130-27	R4	50 ohm - 1/3 Watt - 20%	.20
130-48	R2	15M ohm - 1/3 Watt - 10%	.20
130-96	R5	25M ohm - 1/2 Watt - 10%	.20
130-100	R10, R15	150M ohm - 1/3 Watt - 20%	.20
130-103	R3, R13	100M ohm - 1/3 Watt - 20%	.20
130-163	R12	400M ohm - 1/3 Watt - 10%	.20
		COILS	
108-105	T6	Input I.F. complete with can	1.25
108-106	T7	Output I.F. complete with can	1.25
110-39	T4	Mid-Wave & Short Wave Oscillator Coil Assembly complete less can	1.50
110-55	T5	Broadcast Oscillator Coil Assembly complete less can	.65
111-49	T2	Broadcast Antenna Coil Assembly complete less can	.75
111-50	T3	Mid-Wave & Short Wave Antenna Coil Assembly complete less can	1.50
111-51	T1	Broadcast Pre-Selector Coil Assembly complete	.75
		SOCKETS	
121-8		Five Prong Socket - Marked "Spkr"	.10
121-12		Seven Prong Octal Socket - Marked "6K7"	.15
121-14		Seven Prong Octal Socket - Marked "6F6"	.15
121-17		Six Prong Octal Socket - Marked "6C5"	.15
121-21		Eight Prong Octal Socket - Marked "6Q7"	.15
121-22		Eight Prong Octal Socket - Marked "6A8"	.15
121-51		Six Prong Octal Socket - Marked "5Y3"	.15
		TRANSFORMERS	
104-87	L2	50/60 Cycle Power Transformer	4.00
104-94		25 Cycle Power Transformer	7.50
104-95		Universal Transformer - 25 Cycle Primary	8 50
104-96		Universal Transformer - 40 Cycle Primary	8.25
		SPEAKER	
114-66	L1	Six Inch Dynamic Speaker (Mantel) 10-inch Cord (900 ohm Field)	5.00
114-67	L1	Eight Inch Dynamic Speaker (Mantel) 10-inch Cord (900 ohm Field)	6.00
114-68	L1	Eight Inch Dynamic Speaker (Console) 20-inch Cord (900 ohm Field)	6.00

MISCELLANEOUS

101-74	R7, S1	Volume Control & Switch (1 Meg ohm)	1.00
101-75	R9	Tone Control (300M ohm)	.75
102-47	C	Three-Gang Variable Condenser	4.00
107-5		Line Cord and Plug	.50
115-35		Antenna, Oscillator Coil Shield	.15
115-22		Tube Shield	.15
124-35		Series Padder Condenser	.40
125-17	S	Band Switch	.85
128-51		Wood Knob with Spring	.15
134-37		Rubber Grommet for Variable Condenser	.05
134-47		Rubber Mounting Cushions for Chassis	.05

All resistors are RMA color coded—specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and /or capacitor (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None

All prices quoted are list and are subject to the usual trade discounts.

WE CANNOT SUPPLY SPEAKER PARTS, CONES, TRANSFORMERS OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $1.75 NET, IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

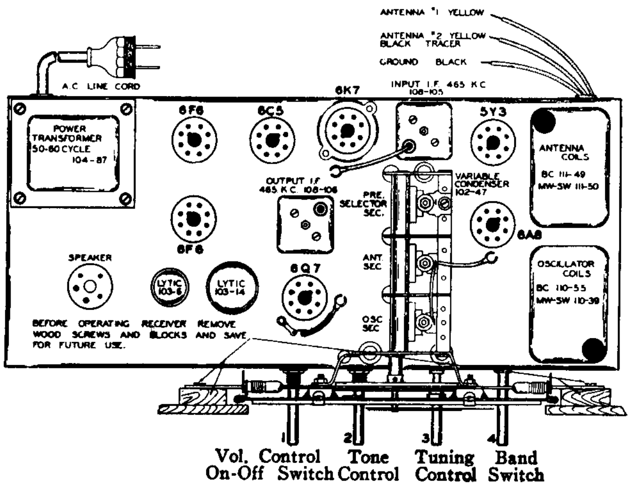
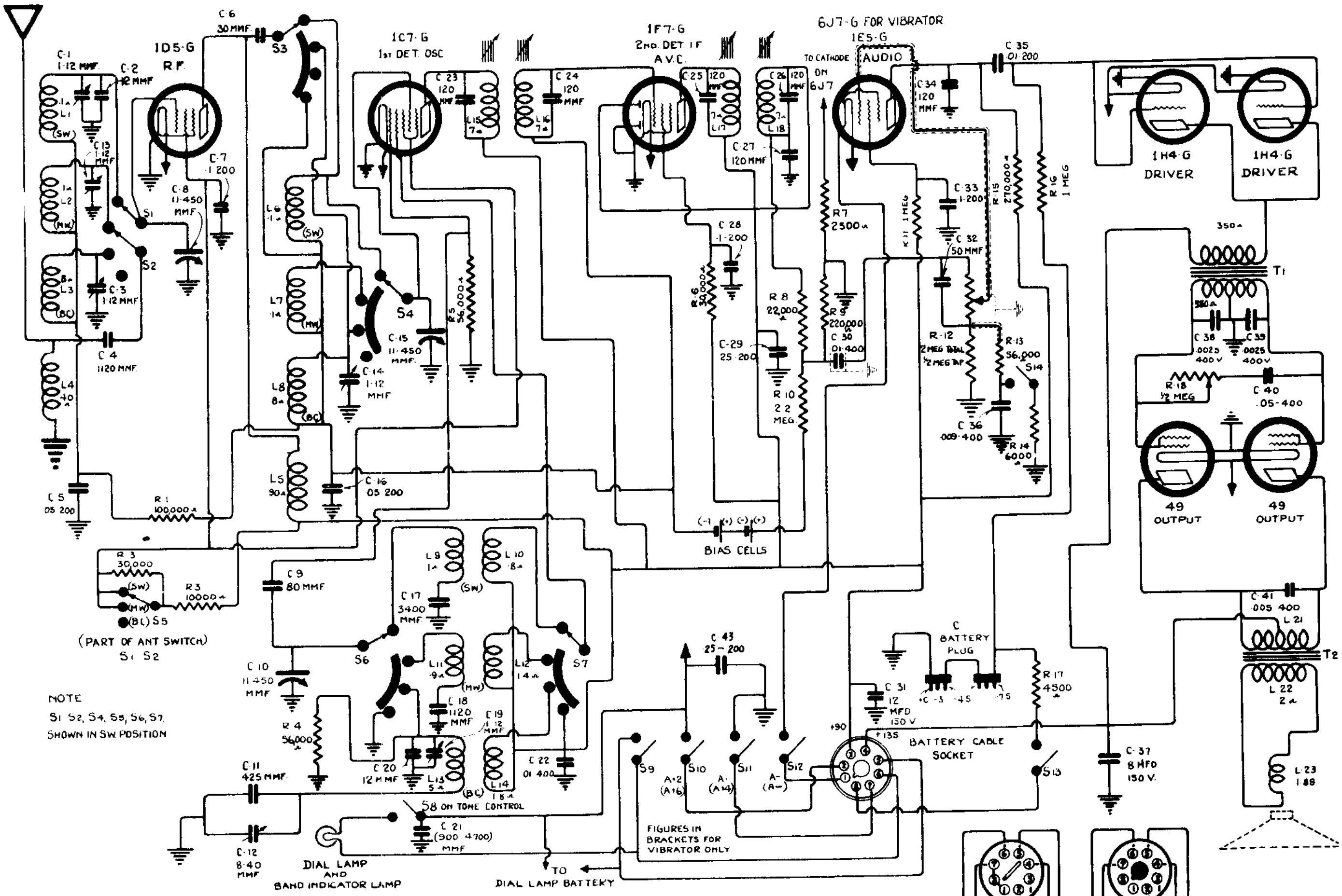


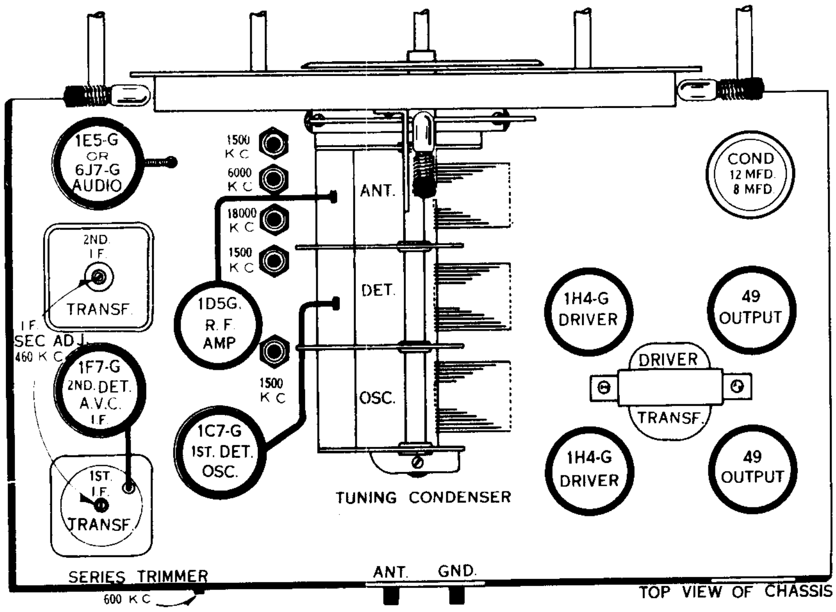
FIG. 1—TOP VIEW

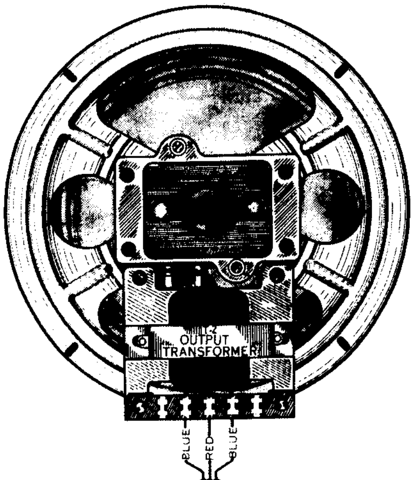
CANADIAN WESTINGHOUSE COMPANY Limited

MODELS B-826A & B-826X



I.F. 460 KC.





SPEAKER CONNECTIONS
MANTEL MODELS 8 DIA SP'K'R
CONSOLE MODELS 10 DIA SP'K'R

CANADIAN WESTINGHOUSE COMPANY Limited

MODELS B-826A & B-826X

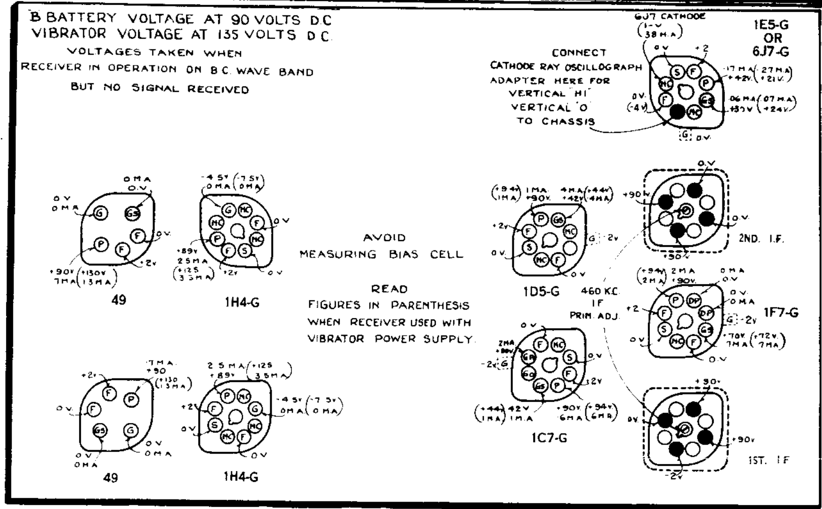
Socket Voltage and Trimmer Locations

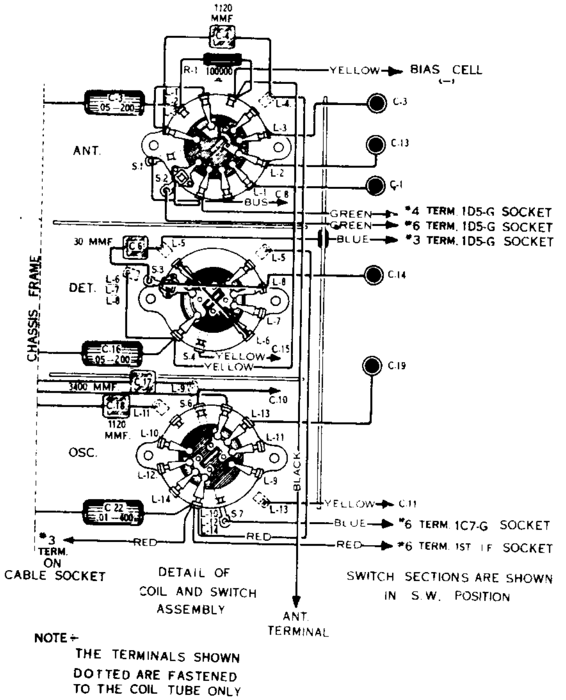
Caution—Do not attempt to measure voltages on the control grids of the W-1D5G, W-1C7G, or W-1F7G with any conventional voltmeter as paralysis of the "C-bias" cell will result.

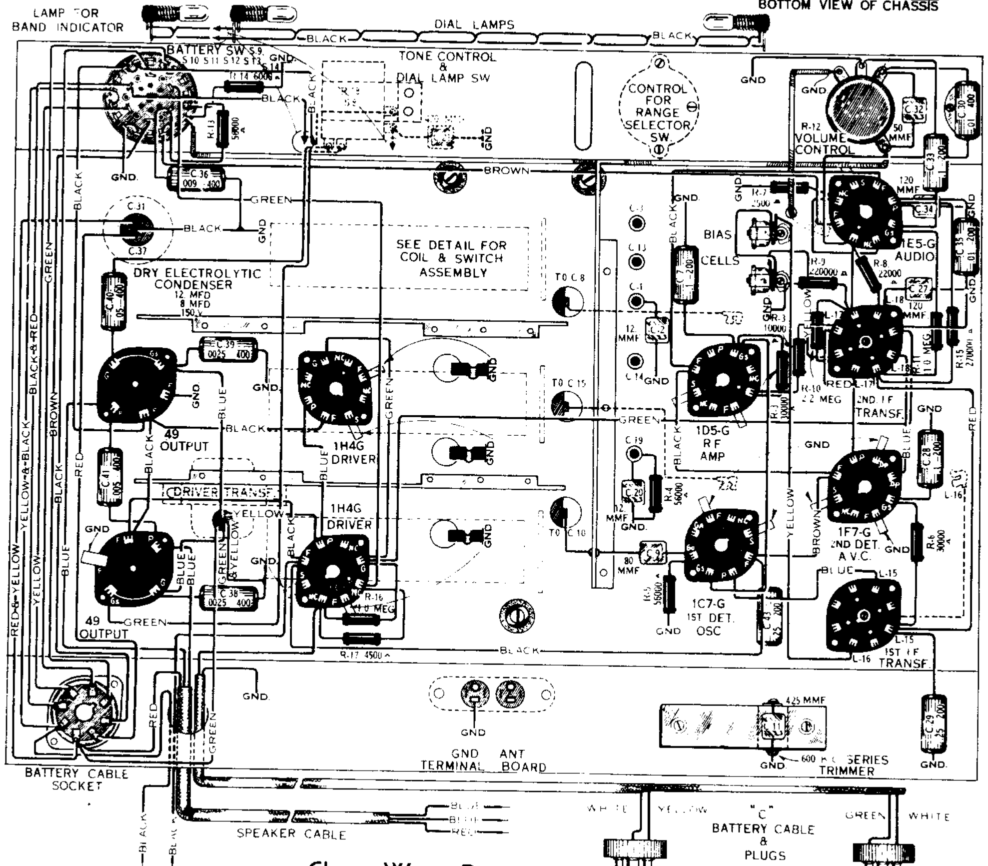
Check "C" cell by noting whether plate current is abnormally high on tubes biased by cells.

A further check on the C bias cell, particularly if it is suspected that the control grid leads have been grounded, is to connect a 1½ volt C battery between the control grid cap of one of the tubes on the C cell circuit and the chassis frame. The negative of the C battery should be connected to control grid, positive to chassis frame. This connection should be momentarily made only, and if the C cell had been weakened before, it will now be found to be recharged and ordinarily will not need to be replaced.

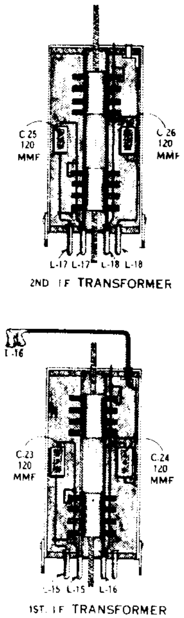
All voltages are operating voltages with respect to chassis frame, with all batteries at normal voltage—tuned to approximately 1000 K.C.—no signal being received. Due allowance must be made for current drawn by the meter used.







Chassis Wiring Diagram



CANADIAN WESTINGHOUSE COMPANY Limited

MODELS B-826A & B-826X

SERVICE DATA

"A" Battery—1-2¼ volt Air-cell Eveready A-600 (or equivalent) or 1-2.0 volt storage battery.

"B" Battery—2 (or 3) 45 volt, heavy duty plug-in type.

"C" Battery—(Audio)—1 (or 2) 4½ volt plug-in type such as Eveready 771 or Burgess 536.

Pilot Lamp Battery—Eveready 409 or Burgess 1042.

Battery Current—"A"=660 milliamperes; "B"=13½ milliamperes. (Average at 90 volts.)

Cabinet Dimensions—B-826A, 11¼ x 22½ x 9"; B-826X, 40" x 23" x 12".

Shipping Weight—B-826A, 30 lbs.; B-826X, 75 lbs.

Controls—(1) Off-Speech-Music Switch, (2) Treble Tone Control and Dial Light Switch, (3) Station Selector, (4) Range Selector Switch, (5) Volume Control.

Station Selector Drive Ratio .... 90:1 and 18:1

Number and types of radiotrons—(1)-W-1C7G; (1)-W-1D5G; (1)-W-1F7G; (1)-W-1E5G; (2)-W-1H4G; (2)-W-49. Total 8.

Pilot Lamps (3)—Mazda No. 40, 6.3 V., 0.15 Amp.

Undistorted output .... 0.4 Watt

Frequency range .... 530 K.C. to 1720 K.C., and 1.7 to 6.0 M.C. and 5.9 to 19 M.C.

These receivers are 8 tube superheterodynes incorporating such features as wide broadcast range, the more popular short wave and police bands, unusually powerful Alnico dynamic speaker, "iron core" I.F. transformers, bass and treble tone controls, automatic volume control, "Cell" type "C" bias, unexcelled battery economy, plug-in batteries, compensated manual volume control, two tube driver stage, class B output circuit, dust-proof loudspeaker, and the inherent sensitivity, selectivity and tone quality of the superheterodyne circuit.

R. F. COIL SYSTEM

Ample R.F. selectivity is secured by the R.F. pre-selector stage, which renders a wave trap unnecessary. This stage uses a W-1D5G Radiotron.

Referring to the schematic circuit diagram, it will be seen that four coils are used to cover the three ranges. Coil L4 is the broadcast antenna primary coil, which is connected to the antenna terminal permanently. In the "BC" position of the range selector, pole S2 is open and pole S1 connects coil L3 to the control grid of the W-1D5G to act as the broadcast antenna secondary coil.

In the "MW" position coil L3 is connected (through condenser C4) to the antenna and acts as the medium wave antenna primary coil. Coil L2, at the same time, becomes the medium wave antenna secondary coil.

In the "SW" position, coil L2 acts as the short wave antenna primary coil, and L1 the antenna secondary coil.

Three air dielectric trimmers are used to align each range of antenna coil circuit.

Radiotron W-1C7G is used as both first detector and oscillator. Poles S3 and S4 of the range selector switch make the necessary circuit changes to the coils coupling the R.F. amplifier to the first detector circuit. Coil L5 is the R.F. broadcast primary coil and is permanently in the plate circuit. In the "BC" position, pole S3 is open, and pole S4 connects coil L8 to the first detector control grid. An air dielectric trimmer is provided to align the R.F. secondary coil L8. In the "MW" position, coil L8 is coupled through condenser C6 to the R.F. amplifier tube plate, and becomes the medium wave R.F. primary winding. (It should be noted that the normal plate current of the R.F. Radiotron does not flow through this coil, but only through coil L5.) At the same time, coil L7 becomes the R.F. secondary coil.

In the "SW" position, the broadcast primary coil L5 acts as a choke, feeding the normal plate current to the R.F. amplifier Radiotron. The amplified R.F. signal is reactance-capacitance, coupled by C6 and L6 to the first detector.

At the same time, the shorting bars on switches S3 and S4 together short-circuit the unused coils L7 and L8 to prevent absorption of energy.

Precision manufacture permits the medium and short wave R.F. coils to be in proper alignment without additional trimmers.

The oscillator circuit is conventional. Pole S6 selects either of three separate grid coils and short-circuits the unused lower frequency windings. Pole S7 selects either of three plate coils and short-circuits the unused lower frequency windings. A series trimmer of the mica compression type is used for 600 K.C. alignment, and a shunt trimmer of the air dielectric type for 1500 K.C. alignment. No trimmers are used on the medium and short wave ranges of the oscillator circuit.

"GENERAL CIRCUIT DETAILS"

The third tube (Radiotron W-1F7G) is an I.F. amplifier with one diode plate acting as second detector and automatic volume control.

It will be noted that the two I.F. transformers are of the "Iron-core" type.

The rectified D.C. voltage developed across the diode load resistor (R-9) is applied as A.V.C. voltage through a resistor (R-10) to the control grids of the R.F., first detector, and I.F. radiotrons. Two bias cells are also used to give a residual bias of 2.0 volts.

The audio frequency voltage appearing across the diode load resistor of the W-1F7G Radiotron is coupled to an acoustically tapered and compensated volume control. The moving tap of the volume control is connected to the control grid of the W-1E5G first audio amplifier Radiotron, which is in turn resistance-capacitance coupled to the driver stage which uses two W-1H4G Radiotrons in parallel.

The output of the driver stage is transformer-coupled to the Class B, push-pull output stage which uses two W-49 Radiotrons.

The treble tone control consists of a variable resistance in series with a fixed capacity connected across the secondary of the driver transformer.

The amount of bass response is controlled by the speech-music switch S14. When this switch-pole is closed, the amount of compensation on the volume control is decreased—thus reducing the bass response at low and moderate volume.

Use With Vibrator "B" Supply

These receivers may be used with Westinghouse Style No. H-36133 vibrator "B" supply if a 6.0 volt storage battery is available. The necessary changes are very simple. Follow the instructions given with the vibrator "B" supply, noting also the following points:

The W-1E5G tube must be removed and a W-6J7G radiotron substituted. No Pilot Lamp Battery is required.

Refer to schematic circuit diagram in this leaflet and note the internal connection of the vibrator plug. When vibrator H-36133 is used, it is necessary to connect together pins No. 1 and No. 5, on the diagram. This may be done by dissembling the vibrator plug and soldering a jumper in place. It will be more convenient, however, to use a special adapter, Style No. H-38178. (See parts list.)

For service data (or operating instructions) on vibrator "B" supply H-36133, see radio service manual, section RS-170.

ALIGNMENT PROCEDURE

There are various alignment trimmers provided in the R.F. tuned circuits. The i-f transformer adjustments are made by means of screws attached to molded magnetite cores. All of these circuits have been accurately adjusted during manufacture and should remain properly aligned, unless affected by abnormal conditions or altered during servicing. Loss of sensitivity, improper tone quality, and poor selectivity are the usual indications of improper alignment.

The correct performance of this receiver can only be obtained when the aligning has been done with adequate and reliable apparatus. It is not necessary to use a frequency modulated oscillator and cathode ray oscillograph to align this receiver. Those service men that have this equipment will probably prefer to use it and, for their convenience, we have indicated on the socket voltage diagram the proper connection point for the cathode ray vertical amplifier input terminal.

By using the Cathode Ray Adapter shown in the Replacement Parts List, the cathode ray connections may be made without removing or opening the chassis.

A test oscillator is required as a source of the specified alignment frequencies. Visual indication of receiver output during the adjustment is necessary, and should be accomplished by the use of an indicator or meter.

The procedure outlined below should be followed in adjusting the various trimmer capacitors and molded cores:

Calibrate the tuning dial by adjusting pointer to the low frequency end of scale, with gang condenser plates fully meshed. The pointer should be horizontal with its painted section resting at the end of the vertical index line. This is a friction adjustment. At the same time, set the vernier dial scale (this is secured by two set screws) to read "o".

Perform alignment in proper order, as shown by the accompanying chart, starting with No. 1, and following all operations across, then No. 2, etc. The chassis bottom shield must be securely in place when making R.F. adjustments. Adjustment locations and frequencies are shown on a sticker fastened to the bottom side of the chassis shield. These trimmer locations are also shown in one of the accompanying illustrations.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output terminal and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc." means that the receiver should be tuned to a point between 550 and 750 kc. where no signal or interference is received from a station or the receiver (heterodyne) oscillator.

The term "Rock Through" indicates that the receiver station selector should be rocked back and forth while making the indicated adjustment. The adjustment and rocking should be continued until the combined action results in the maximum deflection on the output meter.

When adjusting oscillator circuits that have both series and shunt trimmers, it is good practice to repeat the adjustment on the oscillator shunt trimmer after making the adjustment on the oscillator series trimmer. On some tuning ranges, it is found that more than one peak may be secured if the trimmer is adjusted over a wide enough range. When this occurs, it should be noted that oscillator circuits should be aligned, using that peak which occurs at the lower capacity setting of the trimmer. On R.F. or first detector trimmers, the peak occurring with the larger capacity setting of the trimmer should be used.

It is also good practice to make sure that the trimmers on the short-wave ranges are set so that the oscillator stage develops its signal at a higher frequency than the signal to which the R.F. stage (or stages) is tuned. This check can be made by advancing the test oscillator output control and tuning the receiver above and below the frequency of the test oscillator, noting at what frequency the test signal reappears. It should reappear at a frequency setting on the receiver dial lower than the test oscillator frequency by an amount equal to twice the intermediate frequency.

Due to the small number of trimmers, it may be necessary to replace a coil assembly if, due to accident, serious mis-alignment occurs which cannot be corrected by the trimmers available.

It is possible to use a tuning wand (such as stock RCA-6679) in the usual way as a check-up on coil alignment, but, in order to do this, it will be necessary to drill two openings in the chassis shield to permit insertion of the tuning wand into the coils, under operating conditions. This check with the tuning wand should be made, in all cases, before replacing any coil assemblies.

ALIGNMENT CHART

Order of Alignment	Connection To Receiver	Dummy Antenna	Oscillator Setting	Receiver Dial Setting	Circuit To Adjust.	Adjustment Symbols	Adjust to Obtain
1	W-1F7G Grid Cap	.001 mmfd.	460 K.C.	No Signal 550 750 K.C.	2nd I.F. Trans.	L17, L18	Max. (Peak)
2	W-1C7G Grid Cap	.001 mmfd.	460 K.C.	No Signal 550 750 K.C.	1st I.F. Trans.	L15, L16	Max. (Peak)
3	Ant. Term.	300 ohms.	18 M.C.	Rock Through 18 M.C.	S.W. Ant.	C1	Max. (Peak)*
4	Ant. Term.	300 ohms.	6 M.C.	Rock Through 6 M.C.	M.W. Ant.	C13	Max. (Peak)
5	Ant. Term.	200 mmfd.	1,500 K.C.	1,500 K.C.	BC. HF. Osc.	C19	Max. (Peak)
6	Ant. Term.	200 mmfd.	1,500 K.C.	1,500 K.C.	BC. HF. Det.	C14	Max. (Peak)
7	Ant. Term.	200 mmfd.	1,500 K.C.	1,500 K.C.	BC. HF. Ant.	C3	Max. (Peak)
8	Ant. Term.	200 mmfd.	600 K.C.	Rock Through 600 K.C.	BC. LF. Osc.	C12	Max. (Peak)

*If two peaks obtainable use higher capacity setting and check for image at 17,020 K.C.

CANADIAN WESTINGHOUSE COMPANY Limited

MODELS B-826A & B-826X

Key No.	Part No.	Description	List Price
L1, L2, L3, L4	H-36333	Coil—Antenna Coil	$2.25
L5, L6, L7, L8	H-37903	Coil—Detector Coil	2.25
L9, L10, L11, L12, L13, L14	H-38123	Coil—Oscillator Coil	2.25
L15, L16, C23, C24	H-38122	Transformer—First I. F. ("Iron Core")	2.50
L17, L18, C25, C26	H-37813	Transformer—Second I. F. ("Iron Core")	2.50
T1	H-36081	Transformer—Audio Driver	2.60
R12	H-36266	Volume Control (2 meg. with Tap at .5 meg.)	1.20
R18, S8	H-36080	Tone Control, 0.5 Megohm with lamp switch (S.P.S.T.)	1.20
S9, S10, S11, S12, S13, S14	H-36075	Off—Speech-Music Switch	1.00
	H-38258	Range Selector Switch Control and Indicator Arm	1.75
S1, S2, S5	H-36164	Switch Pie—Ant.	.50
S3, S4	H-38259	Switch Pie—Det.	.50
S6, S7	H-36163	Switch Pie—Osc.	.50
C31, C37	H-37909	Capacitator—Dry Electrolytic Assembly 12 and 8 mfd. 150 V.	1.75
C8, C10, C15	H-38125	Capacitator Three gang Tuning Condenser	On application
	H-36150	Vernier Drive Shaft Assembly	1.00
	H-36149	Drive Disc.	.50
C12	H-36273	Trimmer (8-40 mmfd.) Assembly	.60
C1, C3, C13, C14, C19	H-34505A	Trimmer—Air Dielectric (1-12 mmf.)	.35
	H-37901	Dial Scale	1.00
	H-37154	Vernier Dial Scale with Mounting	.50
	C-7269-1	Celluloid Band Indicator	.60
	D-569972-2	Mask for Rear of Dial	.60
	H-38257	Dial Frame Complete with Pilot Light Brackets	2.10
	D-569229 It. 3	Clamp (to hold Dial Scale)	.50
	K-79864-2	Rubber Channels for Dial Scale (pkge. of 10)	.25
	H-34441	Socket—5 contact	.20
	H-33478	Socket—Standard Octal	.25
	Amp. S. P.-8	Socket—Octal Base for Cable Plug	.50
	H-22354	Socket—Pilot Lamp	.20
	H-36321	Dial Pointer with Mounting	.30
	G-991-A	Goat Tube Shield	.20
	H-34535	Shield Cap for I. F. Transformer	.20
	H-33492	Control Grid Clip—Small pkge. of 5	.30
	Cat. No. 60423	Bias Cell Mounting	.15
	K-79677-1	Bias Cell—pkge. of 5	1.20
	H-36298	Battery Cable—with Plug Connectors and Markers B-826-A	1.60
	D-585560	Battery Cable—with Plug Connectors and Markers B-826-X	1.60
	H-36301	"C" Battery Cable—with Plug Connectors	1.10
	H-37906	Insulating Piece with Contacts for Dial Lamp Battery	.60
	Cat. 30-3B	3 Prong "B" Battery Plug	.05
	Cat. 30-3C	3 Prong "C" Battery Plug	.05
	Cat. 7-E	Battery Cable Plug complete	.30
	H-36097	"C" Battery Shorting Receptacle	.05
	H-36098	"B" Battery Shorting Receptacle	.05
	H-20617	Spade Terminal (for Battery Cable) pkge. of 10	.10
	Cat. 48	Cable Marker + A —Pkge. of 5	.15
	Cat. 47	Cable Marker — A —Pkge. of 5	.15
	C-6201-8	Flexible Resistor—White, .24 ohms, ¼ watt, B-826-A	.20
	C-6201-9	Flexible Resistor—Maroon, .29 ohms, ¼ watt, B-826-X	.20
	H-34487	Antenna—Ground Terminal Board	.20
T2, L23	H-37888	Reproducer Assembly complete—B-826-A	10.00
L23	H-37881	Reproducer Cone Assembly—B-826-A	1.60
T2, L23	H-37889	Reproducer Assembly complete—B-826-X	12.00
L23	H-37882	Reproducer Cone Assembly—B-826-X	1.60
T2	H-37885	Output Transformer—B-826-A or B-826-X	2.00
	C-7172	Mantel Cabinet—B-826-A	On application
	C-7201	Console Cabinet—B-826-X	On application
	H-36197	Chassis Cushion complete with Mounting Screw and Washer—pkge. of 5	.40
	H-33432	Plain Control Knob	.25
	H-33433	Control Knob with White Dot	.25
	H-33436	Spring for Control Knob—pkge. of 5	.20
	K-79780-1	Tuning Control Knob (large)	.20
	K-79781-1	Tuning Control Knob (small)	.20
	K-76886-1	Tuning Knob Spring (large) pkge. of 5	.15
	K-77761-1	Tuning Knob Spring (small) pkge. of 5	.15
	Form 1080-37	Broadcast Book	.25
	Form 1078-37	Station Finder Chart	.25
	H-37898	Dial Crystal complete with Frame	1.00
	C-7117-1	"Volume" Transfer	.10
	C-7117-2	"Tone Transfer"	.10
	C-7117-3	"Off-Speech-Music" Transfer	.10
	C-7135-2	"SW, MW, BC" Transfer	.10
	H-38178	Vibrator Adapter	.75

CARBON RESISTORS

Key No.	Part No.	Ohms	Watts
R7	H-27708	2,500	½
R17	H-29315	4,500	½
R14	H-25406	6,000	½
R3	H-25403	10,000	½
R8	H-37822	22,000	½
R6	H-30598	30,000	½
R4, R5, R13	H-33484	56,000 insulated	½
R1	H-30519	100,000	½
R9	H-33508	220,000 insulated	½
R15	H-34458	270,000 insulated	½
R11, R16	H-30177	1.0 Meg. insulated	½
R10	H-33488	2.2 Meg. insulated	½

MICA CAPACITATORS

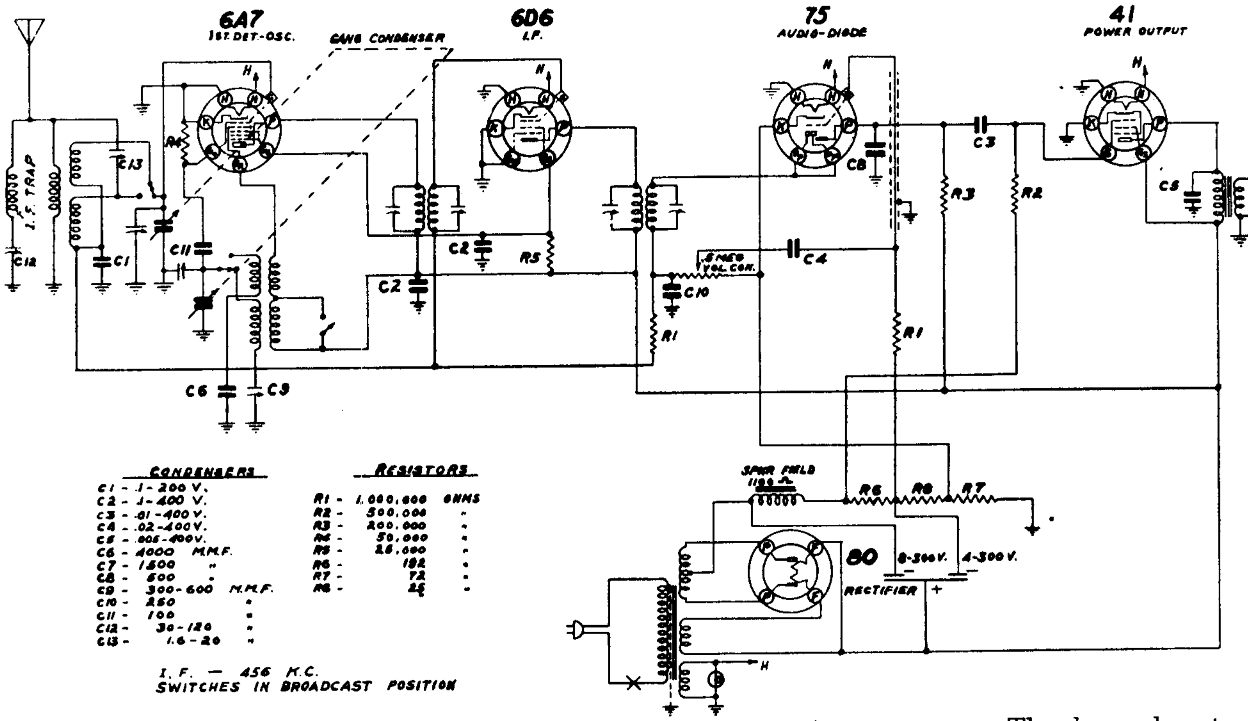
Key No.	Part No.	Mmfd.	List Price
C2, C20	H-38117	12	.30
C6	H-34556	30	.30
C32	H-34479	50	.30
C9	H-32997	80	.30
C23, C24, C25, C26	K-77952-502	120	.35
C27, C34	H-34476	120	.30
C11	H-34472	425	.30
C4, C18	H-34481	1120	.35
C21, C17	H-33423	3400	.75

TUBULAR CAPACITATORS

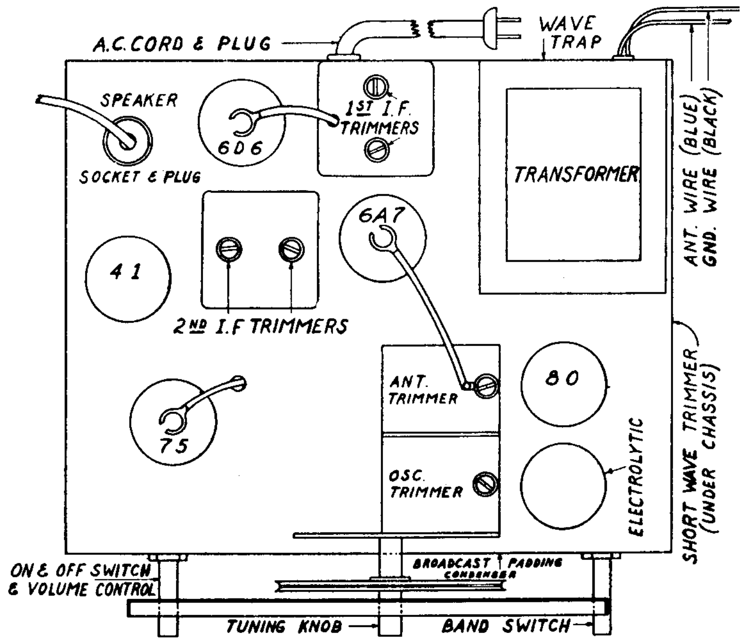
Key No.	Part No.	Mfd.	Volts
C38, C39	H-34486	0.0025	400
C41	H-29601	0.005	400
C36	H-36174	0.009	400
C30	H-32982	0.01 shielded	400
C22, C35	H-34461	0.01	400
C5, C40, C16	H-36188	0.05	400
C7, C33, C28	H-34464	0.1	400
C29, C43	H-34559	0.25	200

CONTINENTAL RADIO & TELEVISION CORP.

MODEL 5M



This receiver is designed to operate over two tuning ranges. The broadcast range, which extends from 535 to 1750 kilocycles (175 to 550 meters) and the International Short Wave Band which extends from 5600 to 18100 Kilocycles (KC) (16.5 to 53.5 meters). This short wave range is one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

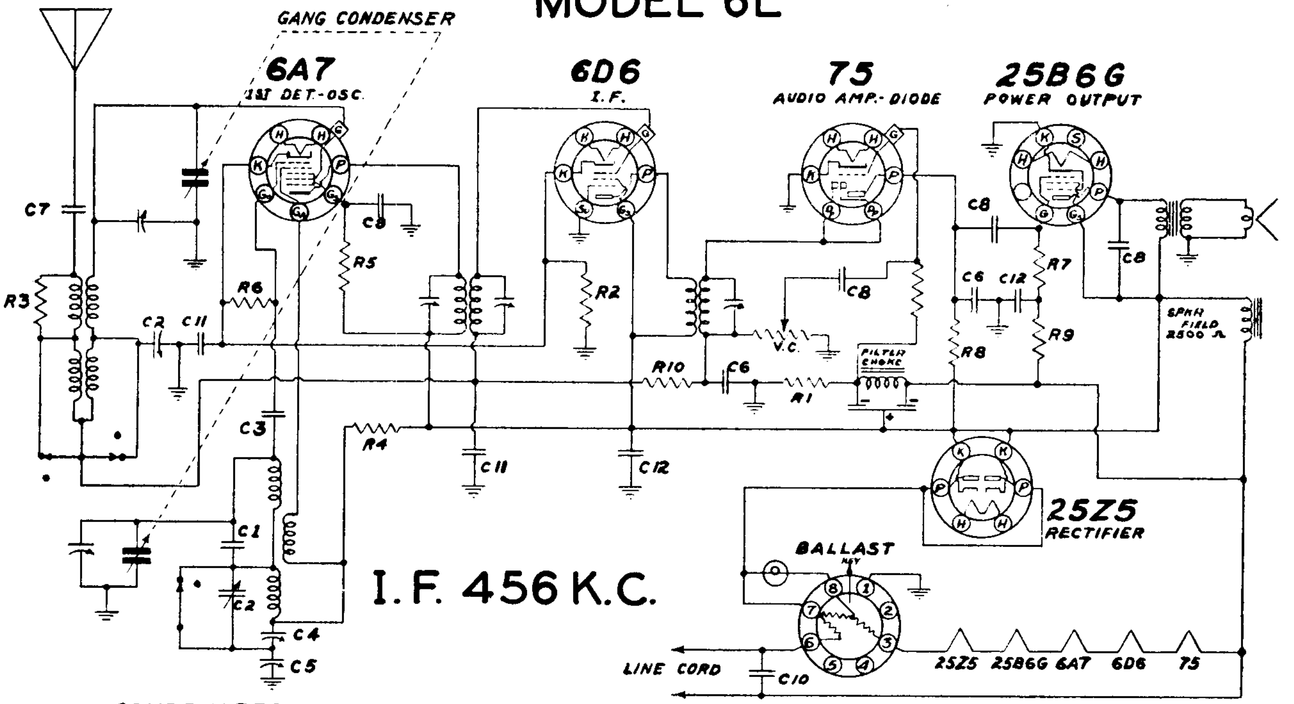


PARTS LIST

P1368	4 Prong Socket
P1277	Type 41 Socket
P521	Type 75 Socket
P492	Type 80 Socket
P506	Type 6A7 Socket
P536	Type 6D6 Socket
P617	Padding Condenser
P1576	Candohm Resistor
P1577	Trimmer Cond. with Bracket
P1578	Gang Condensor
P916	1st I.F. Transformer Coil
P1579	Volume Control and Switch
P143	.02 Mfd. 400V Condenser
P1722	Band Change Switch
P1723	Oscillator Coil
P1724	Antenna Coil
P1557	Riveted Mica Condenser
P1725	Dial Scale
P1584	Pointer
P1503	Pilot Light Socket
P1504	Pilot Light Bulb
P914n	Power Transformer
P929	AC Cord and Plug
P1591	Electrolytic Condenser
P917	2nd I.F. Transformer
P1455	Tube Shield
P276	.1 Mfd. 400V Condenser
P544	High Frequency Trimmer Condenser
P617	Broadcast Padding Condenser
P1592	Wave Trap Coil
P1683	.004 Mfd. Mica Condenser
P480	.0001 Mica Condenser
P164	.01 Mfd. 400V Condenser
P142	.1 Mfd. 200V Condenser
P1194	.005 Mfd. 400V Condenser
P336	.0005 Mfd. Mica Condenser
P817	.00025 Mfd. Mica Condenser
P317	500,000 Ohm ¼ Watt Resistor
P139	250,000 Ohm ¼ Watt Resistor
P162B	1 Megohm 1/3 Watt Resistor
P417	50,000 Ohm ¼ Watt Resistor
P166	25,000 Ohm ¼ Watt Resistor
P1594	Dial Glass
P1671	Knob
P1670	Knob

CONTINENTAL RADIO & TELEVISION CORP.

MODEL 6L



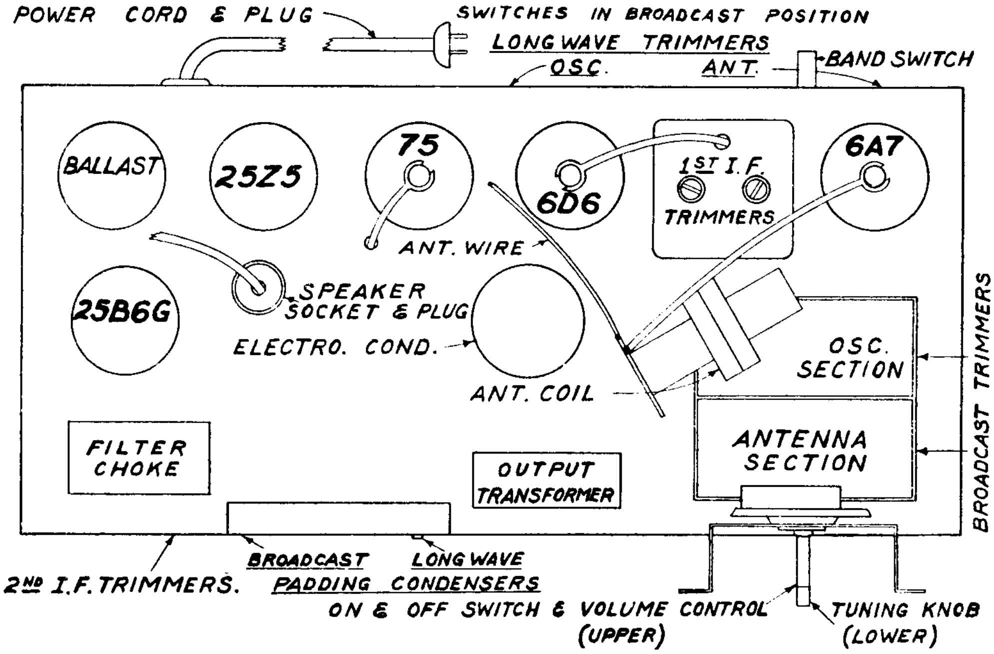
CONDENSERS

NO.	M.M.F.	
C1 -	10	GIMMIK
C2 -	30-100	MICA
C3 -	100	"
C4 -	100-200	"
C5 -	300-600	"
C6 -	500	"
	M.F.	
C7 -	.01	400 V.
C8 -	.02	400 V.
C9 -	.05	200 V.
C10 -	.05	400 V.
C11 -	.1	200 V.
C12 -	.25	200 V.

RESISTORS

NO.	OHMS	WATTS
R1 -	18	
R2 - *	300	1/4
R3 -	8,000	1/4
R4 -	15,000	1/4
R5 -	20,000	1/4
R6 -	25,000	1/4
R7 -	100,000	1/4
R8 -	250,000	1/4
R9 -	400,000	1/4
R10 -	1,000,000	1/4

V.C. - 1/2 MEG. VOLUME CON.
* TOLERANCE ± 10%



MODEL 6L REPLACEMENT PARTS

RESISTORS
P1915 300 Ohm 1/4 Watt, 10% Tolerance
P258 15,000 Ohm 1/4 Watt
P419 20,000 Ohm 1/4 Watt
P166 25,000 Ohm 1/4 Watt
P1564 100,000 Ohm 1/3 Watt
P139 250,000 Ohm 1/3 Watt
P1565 400,000 Ohm 1/3 Watt
P162B 1,000,000 Ohm 1/3 Watt
P1567 19 Ohm 2 Watt Wire Wound Resistor, 5% Tolerance

PAPER CONDENSERS
P143 .02 Mfd. 400 V.
P148 .05 Mfd. 200 V.
P334 .05 Mfd. 400 V.
P142 .1 Mfd. 200 V.
P141 .25 Mfd. 200 V.

MICA CONDENSERS
P480 .0001 Mfd.
P338 .0005 Mfd.

ELECTROLYTIC CONDENSERS
P1561 Electrolytic Condensers

ADJUSTABLE CONDENSERS
P1542 Variable Condenser
P1086 Padding Condenser
P1908 Trimmer Condenser

TRANSFORMERS AND COILS
P1552 Output Transformer
P1904 1st I.F. Transformer
P1558 2nd I. F. Transformer
P1905 Antenna Coil
P1907 Oscillator Coil
P1551 Iron Core Filter Choke Coil

MISCELLANEOUS
P506 6A7 Socket
P521 75 Socket
P536 6D6 Socket
P559 25Z5 Socket
P1550 25B6G Socket
P1368 4 Prong Speaker Socket
P1555 Volume Control and Switch
P1902 Band Change Switch
P929 Line Cord
P530 Tube Shield
P1713 Pilot Bulb
P533 Tube Shield Base
G5333 Speaker
P1568 Knob — Black
P1569 Knob — White
P1487 Dial Bracket
P1488 Pointer Shaft
P1489 Pointer
P1903 Dial Scale
P1491 Dial Glass
P1496 Rubberized Belt
P1497 Take-Up Spring
P1498 Drive Bushing

CONTINENTAL RADIO & TELEVISION CORP.

MODEL 5M

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600 1400, and 16000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which the Short Wave Band may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. Align all four I.F. trimmers to peak or maximum reading on the output meter The four trimmers are located in the two I.F. cans on the top of the chassis.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna lead (Blue) through a .0002 mfd. mica condenser to give the equivalent of a normal antenna. Set the receiver pointer to 1400 KC and adjust the front gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the rear trimmer of the gang condenser to peak. Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R.F. section. The padding condenser is located on the front apron of the chassis.
Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.
This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Band.

SHORT WAVE BAND There is only one adjustment to be made in the alignment of the Short Wave Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary.
Set the test oscillator to 16000 KC and start rotating the tuning condenser from the high frequency end of the dial until the signal of the test oscillator is heard. Adjust the trimmer on the antenna coil located under the chassis to give maximum signal. Be sure to align the antenna coil on the first signal heard as the condenser is turned from the high frequency end of the dial.
IMPORTANT: This is the only adjustment necessary for the Short Wave Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Short Wave Band, otherwise the Broadcast Band will be thrown out of alignment.
Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 16000 KC.

MODEL 6L

This receiver is designed to operate over two tuning ranges. The Outer band, which covers the broadcast range, extends from 535 to 1650 kilocycles (182 to 560 meters); the Inner band, which covers the Longwave band, extends from 800 to 2000 Meters (375 kilocycles to 150 kilocycles).

BALLAST TUBES This receiver is designed to operate from any 60 cycle AC (alternating current) or DC (direct current) power supply main of 110 to 120 volts. However by the use of the proper tube (listed below) any one of the following line voltages can be employed: 115, 130, 150, 230.

Type Tube	Line Voltage
L49BJ	115 Volts
L61BJ	130 Volts
L81BJ	150 Volts
L151BJ	230 Volts

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 160, 325, 375, 456, 600 and 1400 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, the Long Wave Band may be aligned.

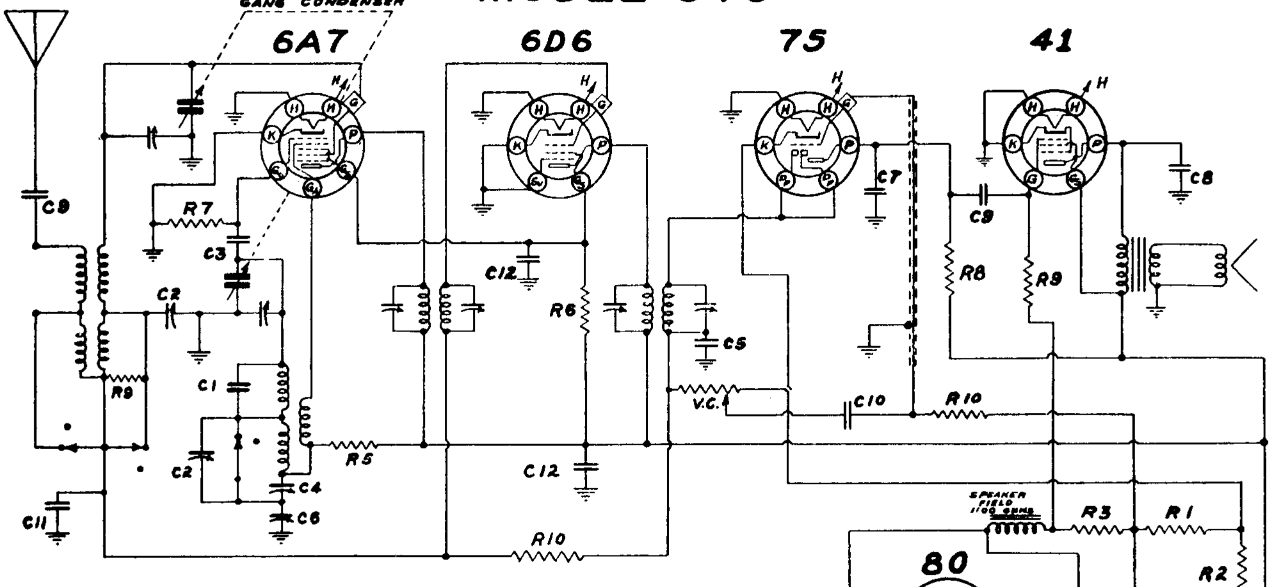
I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tubes (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground if the test oscillator is not grounded to one side of the power line. In case one side is not connected to ground, connect a large condenser from ground on the test oscillator to ground of the chassis. Align all three I.F. trimmers to peak or maximum reading on the output meter. The three trimmers are located as follows: two are located in the I.F. can on top of the chassis, and the third is located on the front apron of the chassis and is the left hand section of the double trimmer.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna lead (Blue) through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the rear gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak.
Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R.F. section. The padding condenser is located on the right hand side of the double trimmer on the front of the chassis.
Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.
This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Long Wave Band.

LONG WAVE BAND ALIGNMENT Set the test oscillator to 375 KC and with the gang condenser all the way out, adjust the long wave oscillator trimmer to peak. Next set the test oscillator to 325 KC and turn the gang towards the low end of the dial until the signal is heard. Peak the antenna at 325 KC. Set the test oscillator to 160 KC and tune in the signal. Adjust the 160 KC pad while rocking the gang back and forth to secure maximum output. Since the long wave pad has considerable effect on the high frequency end of the long wave, it is necessary to repeat the above procedure to secure correct alignment. Use the same antenna dummy on the long wave band as used on the broadcast band.

CONTINENTAL RADIO & TELEVISION CORP.

MODEL 5VU

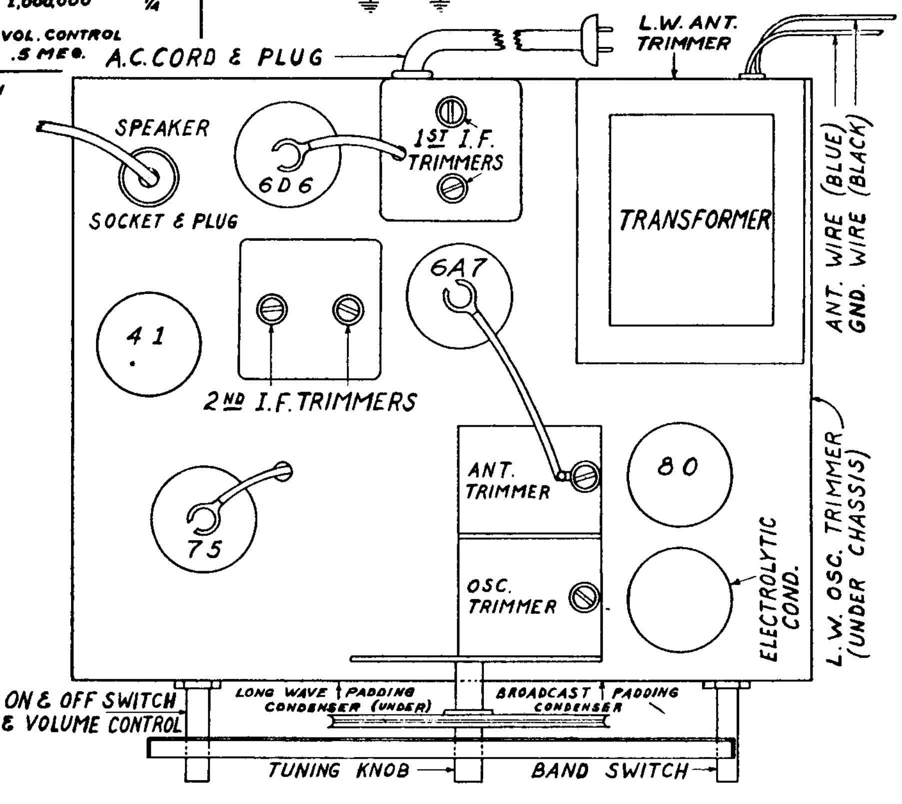


CONDENSERS No.	M.M.F.	
1 -	10	GIMMIK
2 -	30-100	
3 -	100	
4 -	100-200	
5 -	250	
6 -	300-600	
7 -	500	
	M.F.	
8 -	.005	400V
9 -	.01	400V
10 -	.02	400V
11 -	.1	200V
12 -	.1	400V

RESISTORS No.	OHMS	WATTS
1 -	25	¼
2 -	72	¼
3 -	192	¼
4 -		
5 -	15,000	¼
6 -	25,000	¼
7 -	40,000	¼
8 -	250,000	¼
9 -	500,000	¼
10 -	1,000,000	¼

V.C. - VOL. CONTROL .5 MEG.

SWITCHES IN BROADCAST POSITION
I.F. = 456 K.C.



PARTS

TRANSFORMERS AND COILS
P1726 Universal Power Transformer
P1883 1st I.F. Transformer Coil
P1884 2nd I.F. Transformer Coil
P1905 Antenna Coil
P1907 Oscillator Coil

MISCELLANEOUS
P506 6A7 Socket
P521 75 Socket
P536 6D6 Socket
P492 80 Socket
P1277 41 Socket
P1368 4 Prong Speaker Socket
P1579 Volume Control and Switch
P1911 Band Change Switch
P929 AC Cord and Plug
P1455 Tube Shield
P1456 Tube Shield Base
G5317 6" Dynamic Speaker
P1671 Knob — Selector
P1670 Knob
P1586 Dial Bracket and Drum Assembly
P1545 Drive Shaft
P1587 Spring Washer
P1399 Horseshoe Washer
P1588 Cord Tension Spring
P1594 Dial Glass
P1504 Pilot Bulbs
P1489 Pointer

RESISTORS
P166 25,000 Ohm ¼ Watt
P1228 40,000 Ohm ¼ Watt
P139 250,000 Ohm ¼ Watt
P137 500,000 Ohm ¼ Watt
P162B 1,000,000 Ohm ¼ Watt
P1576 Candohm Voltage Divider

PAPER CONDENSERS
P1194 .005 Mfd. 400 V.
P164 .01 Mfd. 400 V.
P142 .1 Mfd. 200 V.
P276 .1 Mfd. 400 V.

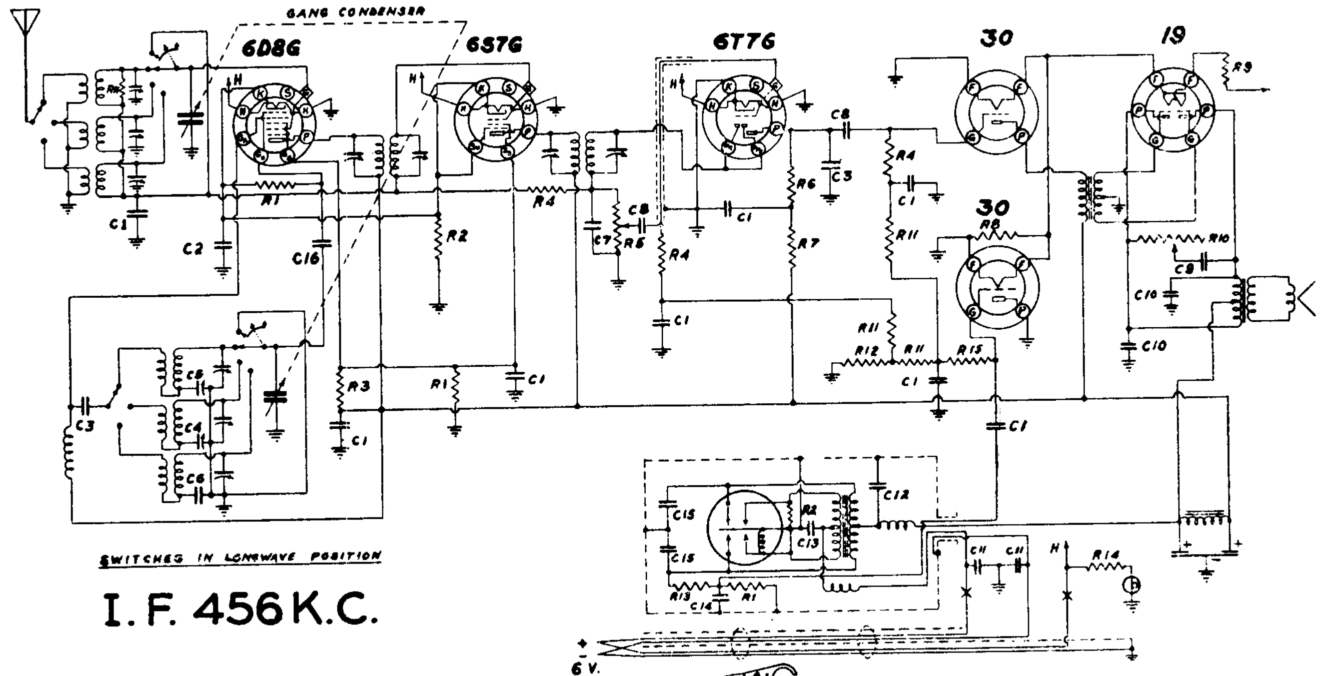
MICA CONDENSERS
P480 .0001 Mfd.
P817 .00025 Mfd.
P336 .0005 Mfd.

ELECTROLYTIC CONDENSERS
P1591 Electrolytic Condenser

ADJUSTABLE CONDENSERS
P1578 Variable Condenser
P617 Padding Condenser
P1577 Trimmer Condenser

CONTINENTAL RADIO & TELEVISION CORP.

MODEL 6PU

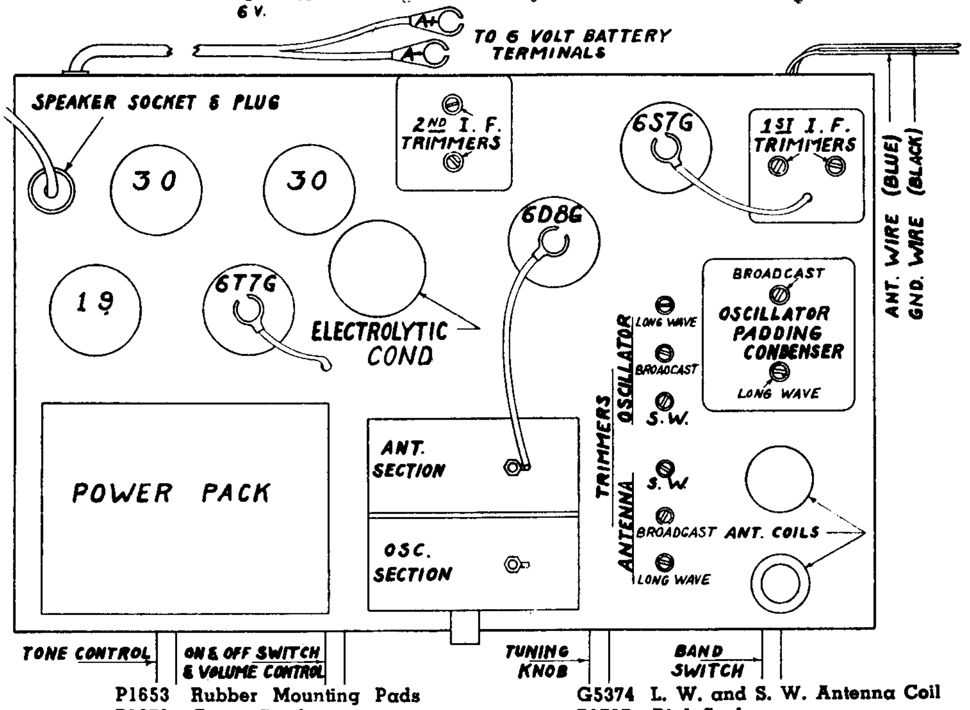


CONDENSERS

C1 - .1-200V.
C2 - .25-200V.
C3 - 500MMF.
C4 - 300-600 MMF.
C5 - 50-200 MMF.
C6 - 4000 MMF.
C7 - 250 MMF.
C8 - .02-400 V.
C9 - .05-400 V.
C10 - .002-400 V.
C11 - .005-400 V.
C12 - .01 - 600 V.
C13 - .5 -10 V.
C14 - .05-200 V.
C15 - .01-1000 V.
C16 - 100 MMF.

RESISTORS

R1 - 50,000 Ω 1/4 W.
R2 - 250 Ω 1/4 W.
R3 - 15,000 Ω 1/4 W.
R4 - 1 MEG Ω 1/3 W.
R5 - 500,000 Ω VOLUME CONTROL
R6 - 250,000 Ω 1/4 W.
R7 - 100,000 Ω 1/4 W.
R8 - 14.3 Ω ± 5%
R9 - 8.1 Ω ± 5%
R10 - 100,000 Ω TONE CONTROL
R11 - 500,000 Ω 1/4 W.
R12 - 70,000 Ω 1/4 W.
R13 - 200,000 Ω 1/4 W.
R14 - 70 Ω ±10%
R16 - 600,000 Ω 1/4 W.



P1727	Antenna Coil
P392	Battery Cable
P402	Vibrator Unit
P406	Vibrator Socket
P411	Filter Choke
P551	Type 30 Socket
P687	Type 19 Socket
P1666	Type 6T7G7 Socket
P1667	Type 6D8G Socket
P1668	Type 6S7G Socket
P1368	Speaker Socket
P1735	1st I.F. Transformer
P954	Power Transformer
P958	Electrolytic Condenser
P1160	6 Gang Trimmer
P1455	Tube Shield
P1540	Escutcheon
P1605	Knob (Volume)
P1606	Knob (Selector)
P1609	Knob (Band Switch)
P1608	Knob (Tone)
P1764	Tone Control
P544	Trimmer Condenser
P1653	Rubber Mounting Pads
P1676	Gang Condenser
P1677	Volume Control and Switch
P1682	Trimmer Condenser
P1663	Pointer
P1685	Band Switch
P1686	Pilot Light Socket
P1687	Pilot Light Bulb
P1688	Dial Scale
P1690	2nd I.F. Transformer
P719	Input Audio Transformer
P1696	6" P. M. Speaker
P1697	8" P. M. Speaker for Console
P675	20,000 1/4 Watt 20% Resistor
P139	250 Ohm 1/4 Watt 20% Resistor
P1732	70 Ohm 1/2 Watt 10% Wire Wound Resistor
P136	250 Ohm 1/4 Watt 20% Resistor
P137	500 Ohm 1/4 Watt 20% Resistor
P258	15,000 Ohm 1/4 Watt 20% Resistor
P280	100,000 Ohm 1/4 Watt 20% Resistor
P417	50,000 Ohm 1/4 Watt 20% Resistor
G5373	Oscillator Coil
G5374	L. W. and S. W. Antenna Coil
P1787	Dial Scale
P1220	200,000 Ohm 1/4 Watt 20% Resistor
P1500	200,000 Ohm 1/3 Watt 20% Resistor
P162B	1 Megohm 1/3 Watt Resistor
P1715	14.3 Ohm 1/2 Watt 5% Wire Wound Resistor
P1716	8.1 Ohm 1/2 Watt 5% Wire Wound Resistor
P141	.25 Mfd. 200 Volt Condenser
P142	.1 Mfd. 200 Volt Condenser
P143	.02 Mfd. 400 Volt Condenser
P148	.05 Mfd. 200 Volt Condenser
P334	.05 Mfd. 400 Volt Condenser
P335	.01 Mfd. 600 Volt Condenser
P395	.5 Mfd. 10 Volt Condenser
P1079	.01 Mfd. 1000 Volt Condenser
P1193	.002 Mfd. 400 Volt Condenser
P1194	.005 Mfd. 400 Volt Condenser
P336	.0005 Mfd. Mica Condenser
P480	.0001 Mfd. Mica Condenser
P1683	.004 Mfd. Mica Condenser
P147	.00025 Mfd. Mica Condenser

CONTINENTAL RADIO & TELEVISION CORP.

MODEL 5VU

This receiver is designed to operate over two tuning ranges. The Outer band, which covers the Broadcast range, extends from 535 to 1650 kilocycles (182 to 560 meters); the Inner band, which covers the Longwave band, extends from 800 to 2000 Meters (375 kilocycles to 150 kilocycles).

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 160, 325, 375, 456, 600 and 1400 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, the Long Wave Band may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the Black wire on the chassis. Align all four I.F. trimmers to peak or maximum reading on the output meter. The four trimmers are located as follows: two in each I.F. can on top of the chassis.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna lead (Blue) through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the front gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the rear trimmer of the gang condenser to peak.

Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R.F. section. The padding condenser is located on the front apron of the chassis.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Long Wave Band.

LONG WAVE BAND ALIGNMENT Set the test oscillator to 375 KC and with the gang condenser all the way out, adjust the long wave oscillator trimmer to peak. Next set the test oscillator to 325 KC and turn the gang towards the low end of the dial until the signal is heard. Peak the antenna at 325 KC. Set the test oscillator to 160 KC and tune in the signal. Adjust the 160 KC pad while rocking the gang back and forth to secure maximum output. Since the long wave pad has considerable effect on the high frequency end of the long wave, it is necessary to repeat the above procedure to secure correct alignment. Use the same antenna dummy on the long wave band as used on the broadcast band.

MODEL 6PU

This receiver is designed to operate over three tuning ranges; the broadcast range which extends from 550 to 1700 Kilocycles (KC) (173 to 562 meters), Longwave Band which extends from 150 to 375 Kilocycles (KC) (800 to 2000 Meters) and the International Short Wave Band which extends from 5600 to 18,100 Kilocycles (KC) (16.5 to 53 Meters). This latter range is the one which includes the four internationally assigned bands — the 19, 25, 31 and 49 meter bands.

REASONS FOR UNSATISFACTORY OPERATION

FAILURE TO OPERATE

1. Check connections from battery cable to storage battery. If connections are reversed, set will not operate. Proper instructions for connecting the battery are given on the first page.
2. Check all tubes. Have them tested by meter equipped to test the type of tubes used in this receiver.
3. Check tube shields for good ground connections. Check grid caps for good connection. See that grid caps and tube shields are not shorted to each other (touching).
4. Reversed connections on Antenna and ground terminals. Try both ways for best results.
5. Oscillator tube (6D8G) not oscillating.
6. Vibrator unit not securely in socket.

HUM A minimum amount of hum, equivalent to A.C. receivers, may be present. Excessive hum may be traced to the following causes:

1. Omitting the use of a ground or a poor ground connection.
2. Vibrator unit not securely fitted in socket.
3. Antenna picking up interference from high tension power lines.
4. Weak or rundown battery. Battery with defective cell.
5. Poor battery connections.
6. Extending or lengthening battery leads causes an enormous increase in "hum." The battery cable attached to the receiver is of special design and its ends **must** be connected directly to the battery terminals. **(See battery connection data on first page.)**

HOWLS AND SQUEALS

1. Omitting the use of a ground or poor ground connections.
2. Speaker leads placed near the (6T7G) tube. These leads should be kept away from this locality. Speaker leads should be kept along the end of chassis and front corner of cabinet.
3. Check shield on (6S7G) tube for good connection to chassis.

NOTICE — MICROPHONIC NOISE CORRECTION

If this radio instrument appears to be microphonic during operation, loosen the four (4) mounting screws that secure the chassis to the cabinet and remove the two (2) wooden strips that are underneath the chassis. This allows the chassis to float and rest on the four (4) rubber pads used for this purpose.

After the strips have been removed, adjust the chassis in the cabinet so that the dial will be in the center of the front escutcheon plate. Do not retighten the mounting screws.

"Should this radio set be moved any great distance, it is best to put the wooden strips back under the chassis and have the mounting screws securely tightened. If this is not done, damage may be done to the instrument, cabinet or tubes."

WINDCHARGERS

There are many types of windchargers now on the market which may be used to advantage for greater economy of receiver operation. Such chargers will pay for themselves over a period of time by saving the cost of battery recharging; removing the inconvenience of taking the battery to a charging station, non-operation of the receiver during the charging period.

IMPORTANT NOTE: The battery must never be charged while set is in operation. If a windcharger is used, it should always be disconnected from the battery when the receiver is being used. An inexpensive single pole switch can be used for disconnecting the windcharger from the battery. This will increase the life of the tubes and give additional economy to the use of the receiver.

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 160, 325, 380, 456, 600 1400, 1730, 6000, 16,000 and 18,100 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned

I.F. ALIGNMENT With the wave switch in the Broadcast Band and the gang condenser set at minimum. Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6D8G) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "preselector" and "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the preselector of the R.F. section. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

SHORT WAVE BAND ALIGNMENT The short wave band is adjusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and the oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

LONG WAVE BAND ALIGNMENT The long wave band is adjusted by connecting the output of the signal generator through a .002 Mfd. mica condenser to the blue antenna lead. Then set the gang to minimum and the generator to 380 KC and adjust the long wave oscillator trimmer to receive this signal. Then set the generator to 325 KC and adjust the long wave antenna trimmer to give maximum output. Next set generator to 160 KC and pad the circuits to maximum output. Owing to the nature of the long wave band, the trimmer and padding condensers react upon each other to quite a degree; consequently, several re-adjustments at the trimming and padding positions are required before the circuits are adjusted properly.

CROSLEY RADIO CORP.

MODELS 926 & 989

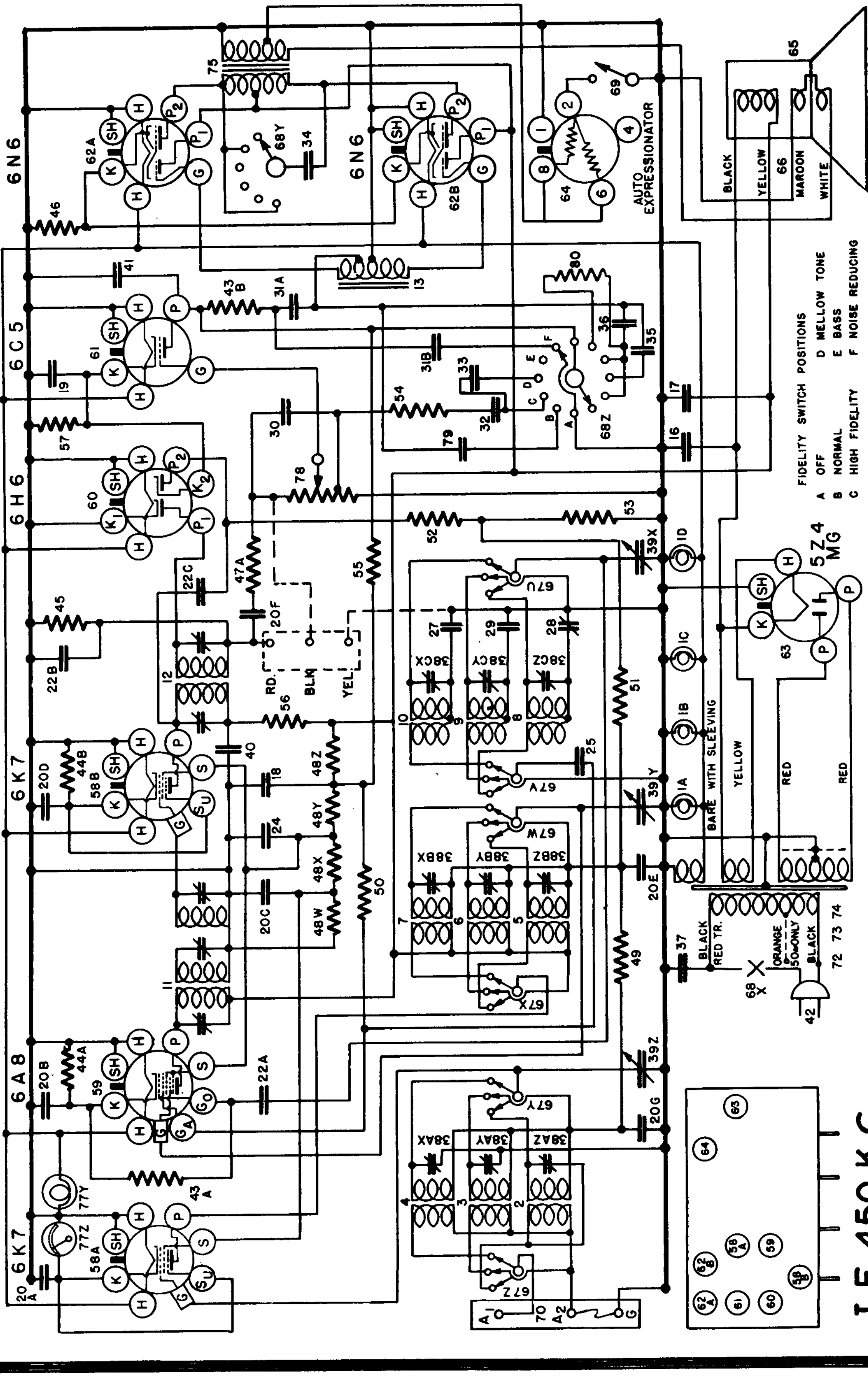


FIG. 1—WIRING DIAGRAM

I.F. 450 K.C.

CROSLEY RADIO CORP.

MODELS 926 & 989

SPECIFICATIONS

The Crosley Model 926 radio is a nine-tube super-heterodyne receiver and uses metal tubes, except the Auto Expressionator tube which is always glass and the 5Z4 rectifier which should always be the MG type. Chassis are available either with a standard 110 Volt-60 Cycle, or 110 Volt—25 Cycle Power Transformer.

The tuning range of the receiver is from 540 to 18100 Kilocycles and is divided into three bands as follows:

BLUE	540-1800 Kc.	or 555-170 Meters (Standard American Broadcast)
RED	1.8- 6.0 Mc.	or 158- 50 Meters (Police and Amateurs)
GREEN	6.0-18.0 Mc.	or 50- 17 Meters (High Frequency)

AUTO EXPRESSIONATOR

The Auto-Expressionator, Item 64, Fig. 1, is connected across the voice coil of the speaker. When operating its resistance varies so as to increase the volume of loud tones, thus giving a wider volume range to reproduced music which tends to compensate for the electrical limitations of broadcasting equipment.

ALIGNMENT PROCEDURE

This is a High Fidelity receiver and in order to secure maximum performance the alignment of its circuits should be done with precision instruments.

Tuning I-F Amplifier to 450 Kilocycles.

The I-F amplifier employs one triple-tuned and one double-tuned I-F transformers and under no condition should their trimmer condensers be readjusted just to determine if they are properly tuned. Fig. 5 shows the selectivity curve of a receiver whose I-F amplifier was slightly mis-tuned while Fig. 6 shows a curve made from actual measurements of a receiver which was properly aligned with the use of an oscilloscope. (See Note 3,

1. Conventional Method—

(a) Connect one terminal of the output meter to P2 of one of the 6N6 Output tubes and the other terminal through a .1 mf., or larger, condenser—Not Electrolytic—to P2 of the other Output Tube.

(b) Connect the output of the signal generator through a .02 mf. condenser, to the top cap of the 6K7 I-F Amp. tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the GND. terminal of the receiver chassis. KEEP THE GENERATOR OUTPUT LEAD AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(c) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. Turn the volume control knob to the right (ON), turn the fidelity control knob to (NORMAL), and turn the Auto-Expressionator Control Switch to the left (NORMAL).

(d) Set the signal generator to 450 Kilocycles.

(e) Adjust the trimmer condensers on the top of the 2nd. I-F transformer for maximum output. Fig. 2 (Item 12).

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

(f) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 Osc.-Mod. tube, leaving the tube's grid clip in place.

(g) Close the middle trimmer condenser on the 1st. I-F transformer (Tert. Fig. 4) so that it is moderately tight. (DO NOT FORCE ADJUSTING SCREW)

(h) Adjust the top (Sec) and then the bottom (Pri) trimmers of the 1st I-F transformer for maximum output.

(i) Transfer the lead of the signal generator from the 6A8 tube to the "ANT" terminal of the receiver and increase the output of the signal generator if necessary.

(j) Check the adjustment of the bottom (Pri) trimmer of the 1st. I-F transformer. Then adjust the middle trimmer by opening until maximum output is obtained. DO NOT READJUST TOP OR BOTTOM TRIMMERS AFTER THE MIDDLE TRIMMER HAS BEEN ADJUSTED.

2. Oscilloscope Method—

(a) Connect the output of the signal generator through a .02 mf. condenser to the top cap of the 6K7 I-F amplifier tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the receiver chassis. KEEP THE GENERATOR OUTPUT LEAD AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Connect the vertical plates of the cathode ray oscilloscope to the receiver as follows: The binding post marked "GND" should be connected to the receiver chassis and the other binding post should be connected to the plate terminal of the 6C5 tube, (Fig. 1). (Be sure the oscilloscope is protected from D. C. by connecting a condenser, 0.1 to .05 mf., in series with the lead to the plate of the 6C5 tube).

(c) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. The exact setting should be at a position where no broadcast signal will be received. Turn the volume control to the right (ON), turn the fidelity control to the left (NORMAL) and turn the Auto-Expressionator switch to the left (NORMAL).

(d) Set the signal generator to 450 kilocycles. See Instructions supplied with signal generator and oscilloscope.

(e) Adjust the trimmer condensers located on top of the 2nd. I-F transformer for maximum amplitude and symmetry of the selectivity curve on the resonance line (R).

NOTE: Keep the signal generator output as low as possible in order to prevent AVC action in the receiver.

(f) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 oscillator-modulator tube, leaving the tube's grid clip in place.

(g) Close the middle trimmer (TERT) of the 1st. I-F transformer so that it is moderately tight. (Do not force adjustment screw).

(h) Increase the output of the signal generator and adjust the top trimmer (Sec) of the 1st. I-F transformer for maximum symmetry and amplitude.

(i) Adjust the bottom trimmer (Pri) of the 1st. I-F transformer for maximum amplitude.

(j) Reduce the output of the signal generator and adjust the middle trimmer of the 1st. I-F transformer for maximum symmetry and amplitude.

Aligning R-F Amplifier.

The R-F amplifier can best be aligned in the conventional manner, using a modulated signal generator and output meter.

When aligning the R-F amplifier the output lead of the signal generator is connected to the antenna terminal of the receiver. For the BLUE and RED bands a .0002 mf. condenser must be in series with the output lead of the signal generator and for the high-frequency band a 400 Ohm carbon resistor should be used in place of the condenser.

Each band should be shunt aligned and then series aligned, where provision is made for series alignment (BLUE band). The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated (c) for each adjustment.

(a) Adjust the "Osc.," "R-F" (Fig. 4) and "Ant." (Fig. 2) shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check the adjustments of the "R-F" and "Ant." trimmers in the order given. DO NOT READJUST THE "OSC" TRIMMER.

NOTE: When shunt aligning the RED and GREEN bands care must be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 900 Kilocycles less than the fundamental frequency. To check on this, increase the output of the signal generator ten times or more and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 Kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct position.

(b) To align the B-C "OSC" series trimmer, Item 28, Fig. 4, set the signal generator to 600 Kilocycles and then tune-in this signal with the station selector for maximum output. While the series trimmer is being adjusted rotate the station selector back and forth slightly until no further improvement in output can be obtained.

(C) SIGNAL INPUT FREQUNCIES

		Shunt Aligned	Series Aligned
American Broadcast	(BLUE)	1700 Kc.	600 Kc.
Pol. & Amateur	(RED)	6000 Kc.	
High-Frequency	(GREEN)	18000 Kc.	

NOTE 3: The high frequency oscillator on this receiver is neutralized by the addition of some small capacity coupling between the oscillator grid and the R-F grid of the 6A8 tube. This is accomplished by loosely wrapping a piece of insulated hook-up wire around the R-F grid lug and connecting it to the oscillator grid lug on the band selector switch.

It is necessary on some sets to adjust or even remove this coupling, in which case the wire should be unwrapped and threaded through the extra hole in the grid end of the R-F coil.

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1ABCD	W —37922	Dial Light (bulb)
	G3 —37965	Light Socket Assembly
	W —40570	Dial Light Shield
2	G110—32000	Ant. Coil—B-C-B
3	G111—32000	Ant. Coil—Pol-B.
4	G112—32000	Ant. Coil—H-F-B.
5	G76 —32001	R-F. Coil—B-C-B.
6	G89 —32001	R-F. Coil—Pol-B.
7	G90 —32001	R-F. Coil—H-F-B.
8	G121—32002	Osc. Coil—B-C-B.
9	G115—32002	Osc. Coil—Pol-B.
10	G122—32002	Osc. Coil—H-F-B.
11	G112—32004	1st I-F Assembly
12	G114—32004	2nd I-F Assembly
13	G63 —24628	A-F Input Choke
14		None
15		None
16	W —36055	Condenser 35 Mfd. 400 V.
17	W —41080	Condenser 12 Mfd. 300 V.
18	W —41081	Condenser 16 Mfd. 250 V.
19	W —41598	Condenser 50 Mfd. 25 V.
20A	W —36541	Condenser, .02 Mfd. 160 V.
To		
20G	W —36541	Condenser, .02 Mfd. 160 V.
21		None
22A	G2 —34002	Condenser, .0001 Mfd.
22B	G2 —34002	Condenser, .0001 Mfd.
22C	G2 —34002	Condenser, .0001 Mfd.
23		None
24	W —35936	Condenser, .05 Mfd. 200 V.
25	W —35139	Condenser, .004 Mfd. 400 V.
26		None
27	G20 —34000	Condenser, 4410 Mmfd.
28	—40769	Condenser, B-C. Osc. Series Trimmer
29	G7 —34000	Condenser, 1450 Mmfd.
30	G8 —34002	Condenser, .00001 Mfd.
31A	W —35758	Condenser, .008 Mfd. 400 V.
31B	W —35758	Condenser, .008 Mfd. 400 V.
32	W —37988	Condenser, .017 Mfd. 200 V.
33	W —28619	Condenser, .006 Mfd. 200 V.
34	W —23615	Condenser, .05 Mfd. 400 V.
35	W —32380	Condenser, .05 Mfd. 200 V.
36	W —29910A	Condenser, .25 Mfd. 200 V.
37	W —30805	Condenser, .01 Mfd. 400 V.
38	W —35951	Condenser, 3 Section Shunt Trim. Assy.
39	G52 —33002	Condenser, 3 Section Var. Tuning
	C —42311	Dial Glass—Calibrated
	—41914A	Dial Mask (Paper background)
	MG-22-42320	Dial Drive Complete Assembly
	—42305	Dial Drive Unit
	W —42180	Dial Hand (short)
	W —41144	Dial Hand (long)
	W —40486	Screw (Dial Hand Mtg.)
	W —42306	Expressionator Flipper (R. H.)
	W —42307	Fidelity Flipper (L. H.)
	—43080	Flipper Control Cable Assy. (R. H.)
	—43081	Flipper Control Cable Assy. (L. H.)
	W —42308	Control Cable Pulley (R. H.) (L. H.)
	—40638	Cable—Band Indicator Control

Item No.	Part No.	Description
	W —37909A	Pulley—Indicator Cable
40	W —30488	Condenser, .02 Mfd. 400 V
41	G1 —34002	Condenser, .00025 Mfd.
42	B —33906	Power Cord & Plug
43A	—21237A	Resistor, 60,000 Ohm ¼W.
43B	—21237A	Resistor, 60,000 Ohm ¼W.
44A	W —28589	Resistor, 350 Ohm ½W. Flex.
44B	W —28589	Resistor, 350 Ohm ½W. Flex.
45	—36321	Resistor, 400,000 Ohm ¼W.
46	W —24537	Resistor, 60 Ohm ½W. Flex.
47A	—23403	Resistor, 150,000 Ohm ¼W.
47B		See Item 79
48Z	W —41484	Resistor, 1000 Ohms (Candohm)
48Y	W —41484	Resistor, 7000 Ohms (Candohm)
48X	W —41484	Resistor, 3,500 Ohms (Candohm)
48W	W —41484	Resistor, 15,000 Ohms (Candohm)
49	—35600	Resistor, 100,000 Ohm ¼W.
50	—37987	Resistor, 15,000 Ohm 1W.
51	—37245	Resistor, 1.5 Megohm ¼W.
52	—35930	Resistor, 200,000 Ohm ¼W.
53	—23785	Resistor, 500,000 Ohm ¼W.
54	—36319	Resistor, 75,000 Ohm ¼W.
55	—36952	Resistor, 30,000 Ohm 1W.
56	W —23013	Resistor, 2,000 Ohm 1¼W. Flex.
57	W — 6705	Resistor, 3,500 Ohm 1W.
58AB	G151—36400	Socket Type 6K7
59	G156—36400	Socket Type 6A8
60	G155—36400	Socket Type 6H6
61	G152—36400	Socket Type 6C5
62AB	G165—36400	Socket Type 6N6
63	G154—36400	Socket Type 5Z4
64	G167—36400	Socket Type Plain
65	636CJ4 "M"	Speaker "M" Spec. No. 1-D-641
	—42882	Cone Assy. (Spk. 636CJ4 "M")
	—40406	Field Coil (Spk. 636CJ4 "M")
66	G4 —37918	Speaker Cable
67	C —40910	Band Selector Switch
68	B —42295A	Fidelity & Line Switch
69	W —41486	Expressionator Switch
70	G27 —26719	Ant. & Gnd. Terminal Assembly
71		None
72	—41506	Power Transformer 110 V. 60 Cy.
	—41507	Power Transformer 110 V. 25 Cy.
75	G70 —24628	Output Transformer
77Y	W —41259	Tuning Meter Bulb
77Z	W —41464	Tuning Meter
78	—41301	Vol. Cont. 3 Megohm Tap at 1 Meg.
79	W —41209	Condenser, .048 Mfd. 200 V.
80	—36317	Resistor, 10,000 Ohm ¼W.
	C —42045	Escutcheon
	—42013	Escutcheon Rubber
	C —42044	Dial Lens (Escutcheon Glass)
	D —30	Mtg. Screws (Escutcheon)
	W —40192B	Knob (Fidelity & Band Sel.) (2)
	W —37339	Knob (V. C. & Station Sel.)
	W —42490	Knob (Expressionator)
	W —40230B	Crosley Shield
	W —32620	Nut—Shield Mtg.
	—6-SA	Cabinet

CROSLEY RADIO CORP.

MODELS 926 & 989

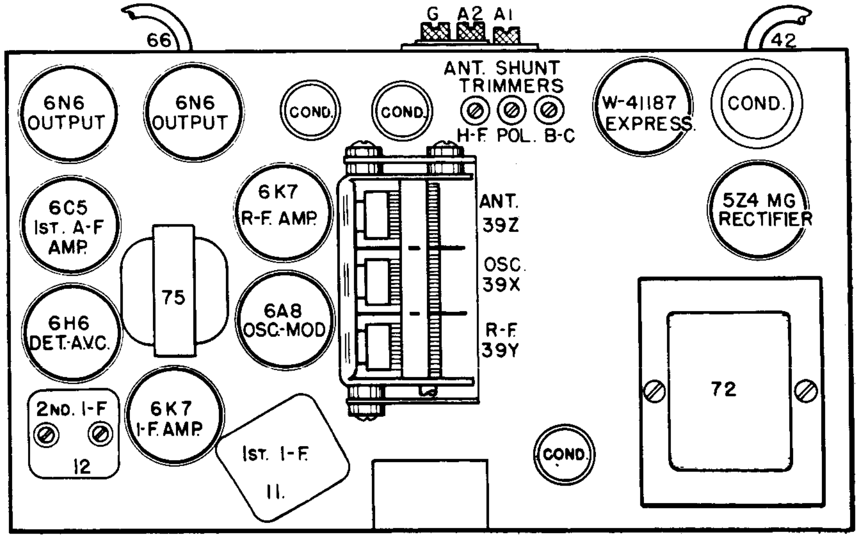
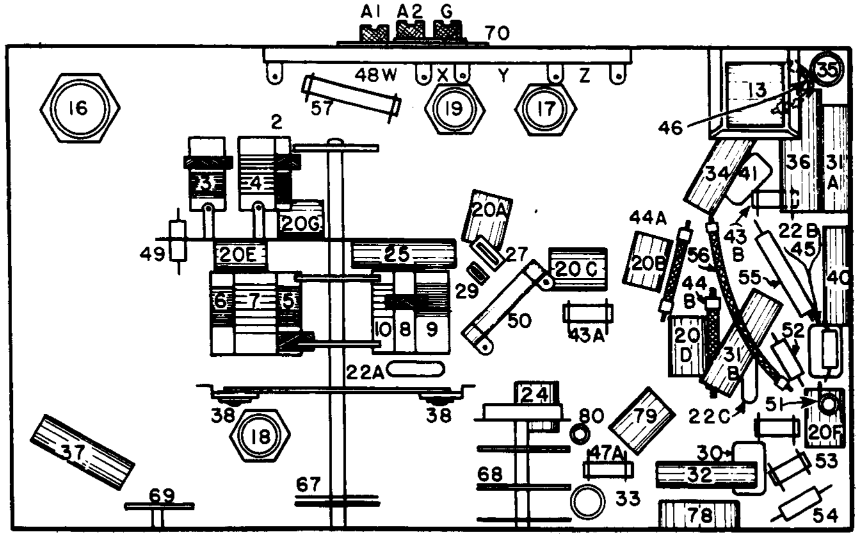


Fig. 2 Top View



Bottom View

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt, 500 volt D.C. voltmeter (except filaments) with the receiver in operating condition and no signal input. The filaments should be measured with an accurate low range A.C. voltmeter. Readings may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	P_2	S	Su	G	K	Ga	Go
6K7	R-F Amplifier	6.3	225	—	90	4.0	—	4.0	—	—
6A8	Osc.-Modulator	6.3	250	—	120	—	—	5.0	Var.	150
6K7	I-F Amplifier	6.3	235	—	120	4.0	—	4.0	—	—
6H6	Det. & A. V. C.	6.3	—	—	—	—	—	4.0	—	—
6C5	1st A-F Amp.	6.3	120	—	—	—	—	12.0	—	—
6N6	(2) Output	6.3	250	245	—	—	—	4.0	—	—
5Z4	Rectifier	5.0	—	—	—	—	—	350	—	—

W-41187 Expressionator—Variable.

Voltage drop across speaker field 100 Volts.
Power output approximately 8 watts.
Power consumption approximately 115 watts.
All readings taken on 117.5 line voltage.

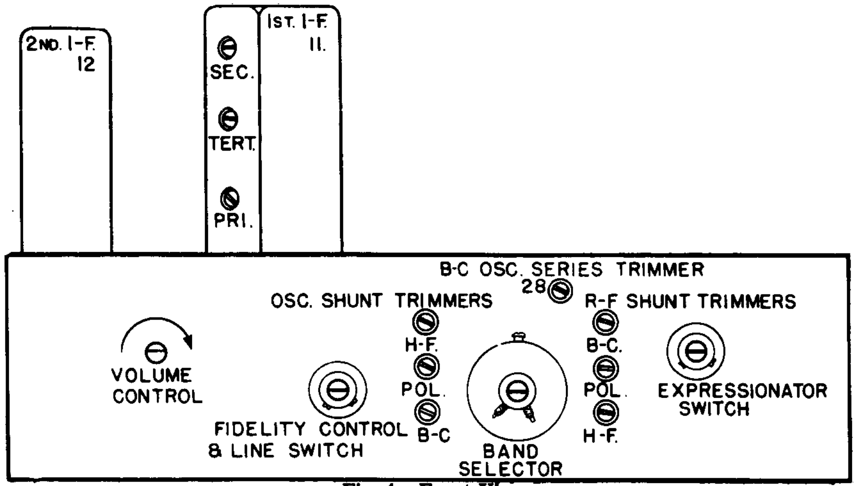


Fig. 4. Front View

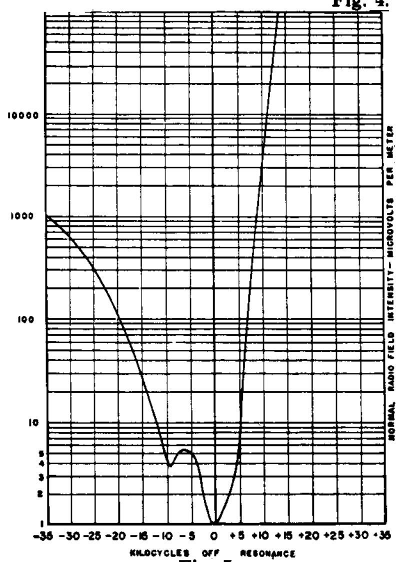


Fig. 5

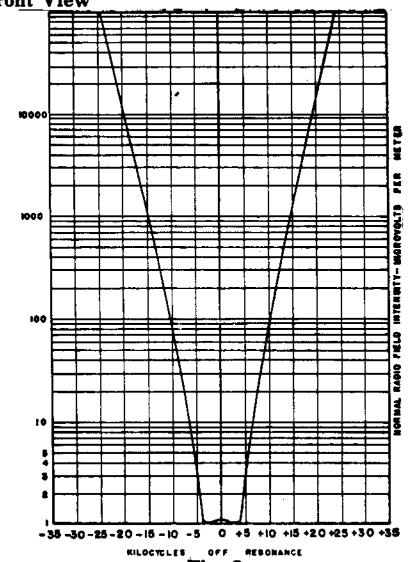
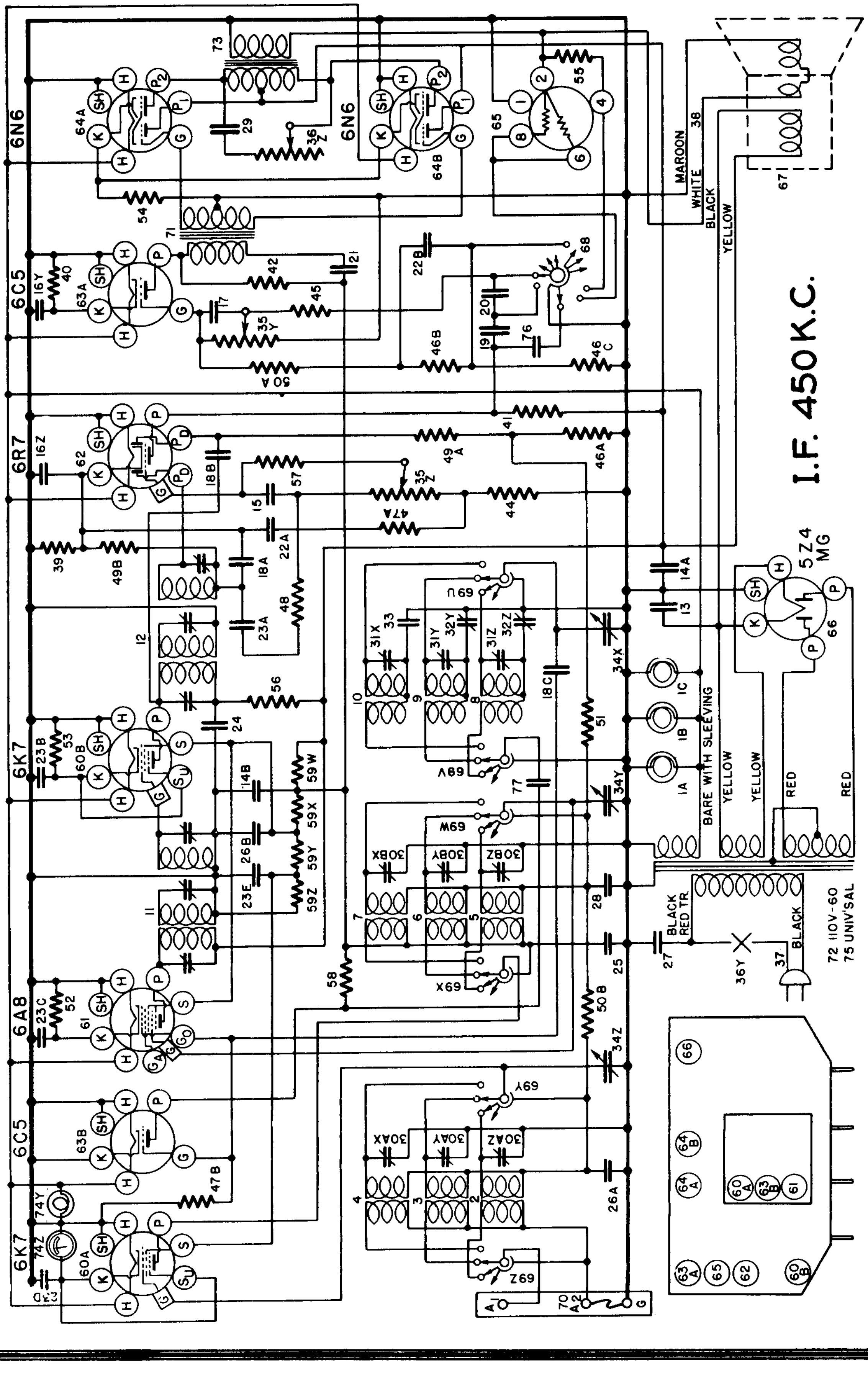


Fig. 6

CROSLEY RADIO CORP.

MODEL 1026



CROSLEY RADIO CORP.

MODEL 1026

The tuning range of the receiver is from 540 to 19000 Kilocycles and is divided into three bands as follows:

BLUE	540-1900	Kc.	or	555-158 Meters (American Broadcast Band)
RED	1.9-6.5	Megacycles	or	158- 46 Meters (Police & Amateurs)
GREEN	6.0-19	Megacycles	or	50- 16 Meters (High Frequency Band)

AUTO-EXPRESSIONATOR

The Auto-Expressionator tube, Illustration No. 65, is connected across the voice coil of the speaker. When it is operating its resistance varies so as to increase the volume of loud tones, thus giving a wider volume range to reproduced music which tends to compensate for the electrical limitations of broadcasting equipment.

UNIVERSAL POWER TRANSFORMER

The Model 1026 chassis for use on other than 110 volts —60 cycles, is supplied with a universal power transformer designed to operate on a power supply of from 95 to 267 volts and any commercial frequency of 25 cycles or above. To adapt the set to a different line voltage it is necessary to remove the chassis from the cabinet, remove the bottom from the chassis, locate the terminal strip on the bottom of the power transformer and locate the wire leading from the power switch to the terminal strip. After careful measurement of the maximum values of line voltage, unsolder the wire described above, from the lug on the terminal strip and solder it to the correct lug. The correct lug will be the one marked so as to cover or nearly cover the maximum line voltage. THE MAXIMUM LINE VOLTAGE SHOULD NOT EXCEED THE HIGHEST VOLTAGE STAMPED ON THE TERMINAL STRIP BESIDE THE LUG TO BE USED BY MORE THAN 3%.

PHONOGRAPH PICKUP

Chasses equipped with a universal power transformer also have three terminals on the back for connecting a phonograph pickup. These terminals are marked P C S and the pickup is connected through a double pole—single throw switch to these terminals as shown in Fig. 7.

ALIGNMENT PROCEDURE

This is a High Fidelity receiver and in order to secure maximum performance the alignment of its circuits should be done with precision instruments.

Tuning I-F Amplifier to 450 Kilocycles

The I-F amplifier employs two triple-tuned I-F transformers and under no condition should their trimmer condensers be readjusted just to determine if they are properly tuned. Fig. 5 shows the selectivity curve of a receiver whose I-F amplifier was slightly mis-tuned while Fig. 6 shows a curve made from actual measurements of a receiver which was properly aligned with the use of an oscilloscope.

I. Conventional Method—

(a) Connect one terminal of the output meter to P2 of one of the 6N6 Output tubes and the other terminal through a .1 mf., or larger, condenser—not electrolytic —to P2 of the other 6N6 Output tube.

(b) Connect the output of the signal generator through a .02 mf. condenser to the top cap of the 6K7 I-F Amplifier tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver chassis. KEEP THE GENERATOR OUTPUT LEAD AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(c) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. Turn the volume control knob to the right (ON), turn the tone control knob to the left (TREBLE) and turn the Multivox control knob to the Auditorium Position (Third position in the clockwise direction).

(d) Set the signal generator to 450 kilocycles.

(e) Close the middle trimmer condenser on the 2nd. I-F transformer (Tert. Fig. 4) so that it is moderately tight. (Do not force the adjustment screw).

(f) Adjust the top trimmer and then the bottom trimmer (Sec. & Pri) of the 2nd. I-F transformer for maximum output. ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

(g) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 Modulator tube, leaving the tube's grid clip in place.

(h) Open the middle trimmer of the 1st I-F transformer three or four turns from the closed position. (Care should be taken that the adjustment screw does not become dislodged from the nut).

(i) Adjust the top trimmer and then the bottom trimmer of the 1st I-F transformer for maximum output.

(j) Transfer the output lead of the signal generator from the 6A8 tube to the "ANT" terminal of the receiver and increase the output of the signal generator, if necessary.

(k) Adjust the middle trimmer of the 2nd. I-F transformer by opening until maximum output is obtained. DO NOT READJUST THE TOP AND BOTTOM TRIMMERS.

(l) Adjust the middle trimmer of the 1st I-F transformer by closing until maximum output is obtained. DO NOT READJUST TOP AND BOTTOM TRIMMERS.

II. Oscilloscope Method.

(a) Connect the output of the signal generator through a .02 mf. condenser to the top cap of the 6K7 I-F amplifier tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the receiver chassis. KEEP THE GENERATOR OUTPUT LEAD AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Connect the vertical plates of the cathode ray oscilloscope to the receiver as follows: The binding post marked "GND" should be connected to the receiver chassis and the other binding post should be connected to the terminal marked "P" of the 6R7 tube. (Be sure the oscilloscope is protected from D. C. by connecting a condenser, .1 to .05 mf., in series with the lead connected to the plate of the 6R7 tube).

(c) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. The exact setting should be at a position where no broadcast signal will be received. Turn the volume control knob to the right (ON), turn the tone control knob to the left (TREBLE) and turn the Multivox control knob to the Auditorium Position (Third position in the clockwise direction).

(d) Set the signal generator to 450 kilocycles. See Instructions supplied with signal generator and oscilloscope.

(e) Close the middle trimmer condenser on the 2nd. I-F transformer (Tert. Fig. 4) so that it is moderately tight. (Do not force adjustment screw).

(f) Adjust the top trimmer (Sec) of the 2nd. I-F transformer so that the nose of the selectivity curves is centered on the resonance axis (R) of the transparent scale supplied with the oscilloscope.

(g) Adjust the bottom trimmer (Pri) of the 2nd. I-F transformer for maximum amplitude of the selectivity curve on resonance line (R).

(h) Reduce the output of the signal generator and adjust the middle trimmer of the 2nd. I-F transformer for maximum amplitude and symmetry of the selectivity curve about the resonance line.

NOTE: Keep the base of the selectivity curve centered on the transparent scale from —15 to +15 and keep the signal generator output as low as possible in order to prevent AVC action in the receiver.

(i) Readjust the bottom trimmer of the 2nd. I-F transformer for maximum symmetry and amplitude.

(j) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 Modulator tube, leaving the tube's grid clip in place.

(k) Open the middle trimmer of the 1st. I-F transformer three or four turns from the closed position. (Care should be taken that the adjustment screw does not become dislodged from the nut).

(l) Increase the output of the signal generator and adjust the top trimmer (Sec) of the 1st. I-F transformer for maximum symmetry and amplitude.

(m) Adjust the bottom trimmer of the 1st I-F transformer for maximum amplitude.

(n) Reduce the output of the signal generator and adjust the middle trimmer of the 1st. I-F transformer for maximum symmetry and amplitude.

(o) Carefully repeat operations (h), (i) and (n) for more accurate adjustments.

Aligning R-F Amplifier.

The R-F amplifier can best be aligned in the conventional manner, using a modulated signal generator and output meter.

When aligning the R-F amplifier the output lead of the signal generator is connected to the antenna terminal of the receiver. For the BLUE and RED bands a .00025 mfd. condenser must be connected in series with the output lead of the signal generator and for the high-frequency band a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be shunt aligned and then series aligned, where provision is made for series alignment (BLUE and RED bands). The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated (c) for each adjustment.

(a) Adjust the "OSC", "R-F" and "ANT" shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check the adjustments of the "R-F" and "ANT" trimmers in the order given. DO NOT READJUST THE "OSC" TRIMMER.

NOTE: When shunt aligning the RED and GREEN bands care must be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times or more and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct position.

(b) To align the series trimmers, 32Y and 32Z Fig. 2, set the signal generator to the frequency indicated below and then tune-in this signal with the station selector for maximum output. At the time that any series trimmer is being adjusted rotate the station selector back and forth slightly until no further improvement in output can be obtained.

(c) Signal Input Frequencies:

	Shunt Aligned	Series Aligned
American Broadcast Band (BLUE)	1700 Kc.	600 Kc.
Police Band (RED)	6000 Kc.	2000 Kc.
High-Frequency Band (GREEN)	18000 Kc.	....

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1ABC	W —37922	Dial Light
	G3 —37965	Dial Light Socket
2	G94 —32000	Ant. Coil, B. C. B.
3	G95 —32000	Ant. Coil, Pol. B.
4	G113—32000	Ant. Coil, H. F. B.
5	G68 —32001	R. F. Coil, B. C. B.
6	G80 —32001	R. F. Coil, Pol. B.
7	G79 —32001	R. F. Coil, H. F. B.
8	G101—32002	Osc. Coil, B. C. B.
9	G102—32002	Osc. Coil, Pol. B.
10	G103—32002	Osc. Coil, H. F. B.
11	G90 —32004	1st I. F. Assembly
12	G91 —32004	2nd I. F. Assembly
13	W —36055	Condenser 35 Mfd. 400 V. Electrolytic
14A	W —36057	Condenser 40 Mfd. 300 V. Electrolytic
14B	W —36057	Condenser 40 Mfd. 300 V. Electrolytic
15	G8 —34002	Condenser, .00001 Mfd. (Molded)
16Z, 16Y	W —37778	Condenser, 12. Mfd. 25 V. Electrolytic
17	G6 —34002	Condenser, .000025 Mfd. (Molded)
18A	G2 —34002	Condenser, .0001 Mfd. (Molded)
18B	G2 —34002	Condenser, .0001 Mfd. (Molded)
18C	G2 —34002	Condenser, .0001 Mfd. (Molded)
19	W —32780B	Condenser, .05 Mfd. 400 V.
20	G3 —34002	Condenser, .0005 Mfd. (Molded)
21	W —37732	Condenser, .3 Mfd. 160 V.
22A	W —31219	Condenser, .023 Mfd. 200 V.
22B	W —31219	Condenser, .023 Mfd. 200 V.
23A	W —36541	Condenser, .02 Mfd. 160 V.
23A to 23E	W —36541	Condenser, .02 Mfd. 160 V.
24	W —30488	Condenser, .02 Mfd. 400 V.
25	W —32378	Condenser, .01 Mfd. 400 V.
26A	W —35936	Condenser, .05 Mfd. 200 V.
26B	W —35936	Condenser, .05 Mfd. 200 V.
27	W —30805	Condenser, .01 Mfd. 400 V.
28	W —32380	Condenser, .05 Mfd. 200 V.
29	W —23615	Condenser, .05 Mfd. 400 V.
30	W —37891	3 Section Shunt Trimmer Assembly
31	W —35951	3 Section Shunt Trimmer Assembly
32Z	W —37874	B. C. Osc. Series Trimmer Cond.
32Y		Pol. Osc. Series Trimmer Cond.
33	G18 —34000	H. F. Fixed Series Condenser
34	G47 —33002	3 Section Var. Tuning Cond.
	MG54—41214	Dial Drive Complete
	—41153	Drive Unit (only)
	C —41148	Dial—Calibrated Glass
	—41136	Dial Paper Mask
	—40485	Long Hand
	—41145	Short Hand
	W —40486	Hand Mtg. Screw
	—40537	Coupling Unit
	—41157	Belt (Drive)
	—40638	Indicator Cable
35Z	—41417	Volume Control 1st A. F. 3 Meg.
35Y		Volume Control 2nd A. F. 1 Meg.
36Z	—37966	Tone Control
36Y		A. C. Switch
37	B —33906A	Power Cord & Plug

Item No.	Part No.	Description
38	G3 —37918	Speaker Cable
39	—31093	Resistor, 2,700 Ohm ¼ W.
40	W —21452	Resistor, 1,100 Ohm ½ W. Flex.
41	—37768	Resistor, 65,000 Ohm ½ W.
42	— 5370A	Resistor, 20,000 Ohm 1 W.
43	None	
44	—21454	Resistor, 1 Megohm ¼ W.
45	—21455	Resistor, 300,000 Ohm ¼ W.
46A	—23785	Resistor, 500,000 Ohm ¼ W.
46B	—23785	Resistor, 500,000 Ohm ¼ W.
46C	—23785	Resistor, 500,000 Ohm ¼ W.
47A	—21453	Resistor, 40,000 Ohm ¼ W.
47B	—21453	Resistor, 40,000 Ohm ¼ W.
48	—23403	Resistor, 150,000 Ohm ¼ W.
49A	—33344	Resistor, 400,000 Ohm ¼ W.
49B	—33344	Resistor, 400,000 Ohm ¼ W.
50A	—35600	Resistor, 100,000 Ohm ¼ W.
50B	—35600	Resistor, 100,000 Ohm ¼ W.
51	—37245	Resistor, 1.5 Megohm ¼ W.
52	W —28589	Resistor, 350 Ohm ½ W. Flex.
53	W —28106	Resistor, 500 Ohm ½ W. Flex.
54	W —23012A	Resistor, 40 Ohm ¾ W. Flex.
55	W —41193	Resistor, 1. Ohm 2½ W. Flex.
56	W —23013	Resistor, 2,000 Ohm 1¼ W. Flex.
57	—21273A	Resistor, 60,000 Ohm ¼ W.
58	W —37987	Resistor, 15,000 Ohm 1. W. Wire Wound
59	W —41225	4 Section Candohm
60A	G151—36400	Socket Type 6K7
60B	G151—36400	Socket Type 6K7
61	G156—36400	Socket Type 6A8
62	G164—36400	Socket Type 6R7
63A	G152—36400	Socket Type 6C5
63B	G152—36400	Socket Type 6C5
64A	G165—36400	Socket Type 6N6
64B	G165—36400	Socket Type 6N6
65	G167—36400	Socket Type 2C2
66	G154—36400	Socket Type 5Z4
67	—40193	Speaker, Type 633CJ4 "M"
	—40701	Cone Assembly for 40193
	—40702	Field Coil for 40193
68	W —41446	Switch Multivox Control
69	C —37958E	Switch Band Slector
70	G27 —26719	Ant. & Grd. Terminal Board Assembly
71	G1 —37995	Audio Input Transformer
72	G43 —25669	Power Supply Transformer (110V.60Cy.)
73	G48 —24628	Audio Output Transformer
74Z	W —41259	Tuning Meter
74Y		Tuning Meter Bulb
75	—37685A	Universal Power Tranxformer
76	W —41445	Condenser, .036 Mfd. 400 V.
77	W —34647	Condenser, .006 Mfd. 400 V.
	C —37894	Escutcheon
	B —37876A	Escutcheon Ret. Spring
	B —37898	Dial Lens (Escutcheon Glass)
	B —37897	Lens Retaining Spring
	W —40365	Escutcheon Felt
	W —37339	Knob (3 required)
	W —40192B	Knob (2 required)
	W —40230A	Emblem (Crosley Shield)

CROSLEY RADIO CORP.

MODEL 1026

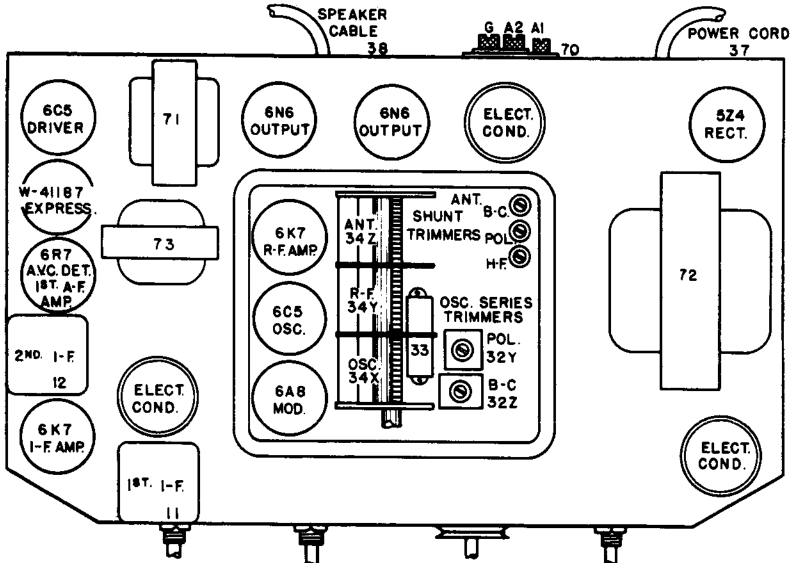
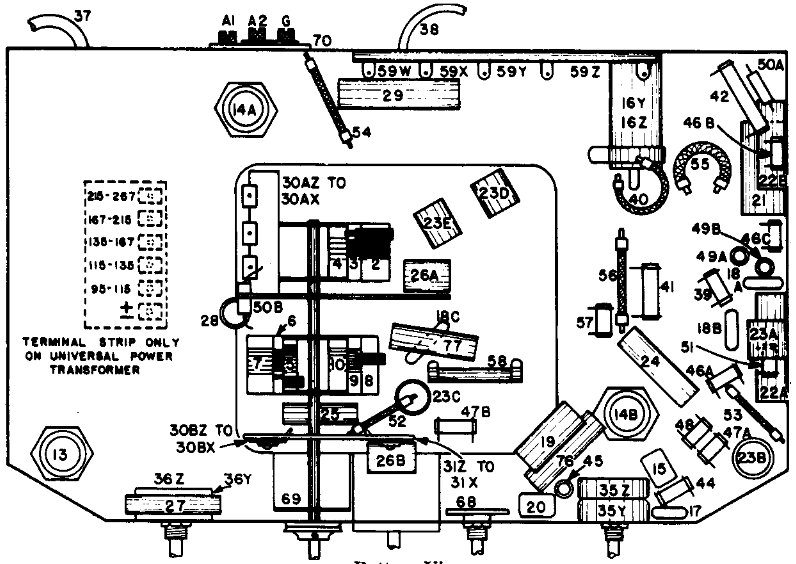


Fig. 2. Top View



Bottom View

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt, 500 volt D.-C. voltmeter (except filaments) with the receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A.-C. voltmeter. Readings may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	P_2	S	Su	G	K	Ga
6K7	R-F Amplifier	6.3	221	—	98	4	0	4	—
6A8	Modulator	6.3	221	—	138	—	0	4.5	4.5
6C5	Oscillator	6.3	140	—	—	—	—	0	—
6K7	I-F Amplifier	6.3	260	—	138	5	0	5	—
6R7	Detector & 1st A-F Amplifier	6.3	130	—	—	—	0	6.5	—
6C5	2nd A-F Amplifier	6.3	150	—	—	—	0	6.5	—
6N6	(2) Output	6.3	278	285	—	—	0	3.2	—
5Z4	Rectifier	4.5	357	—	—	—	—	—	—

Auto-Expressionator Tube (W41187) Varies with power output.

Voltage drop across speaker field 72 Volts.
Power Output approximately 9 Watts.
Power Consumption approximately 117 Watts.
All readings taken on 117.5 volt power supply.

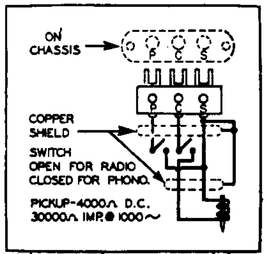
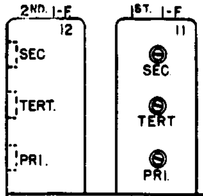


Fig. 7. Phonograph Pickup



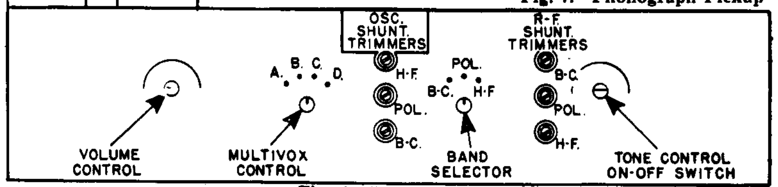


Fig. 4. Front View

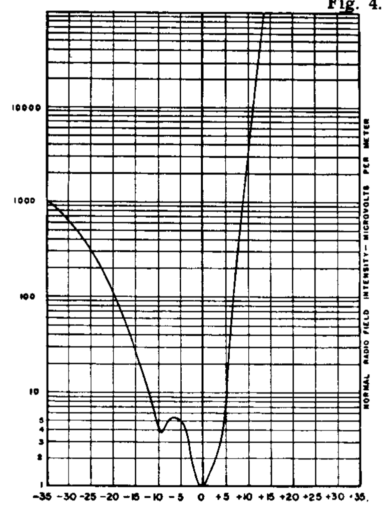


Fig. 5

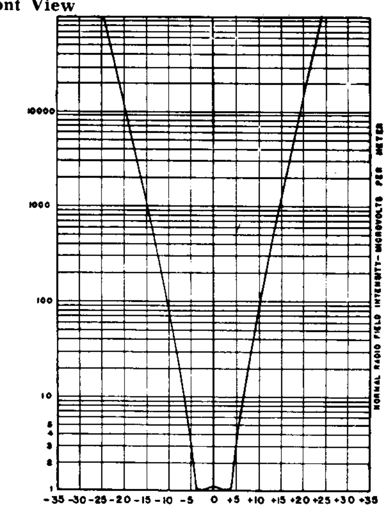
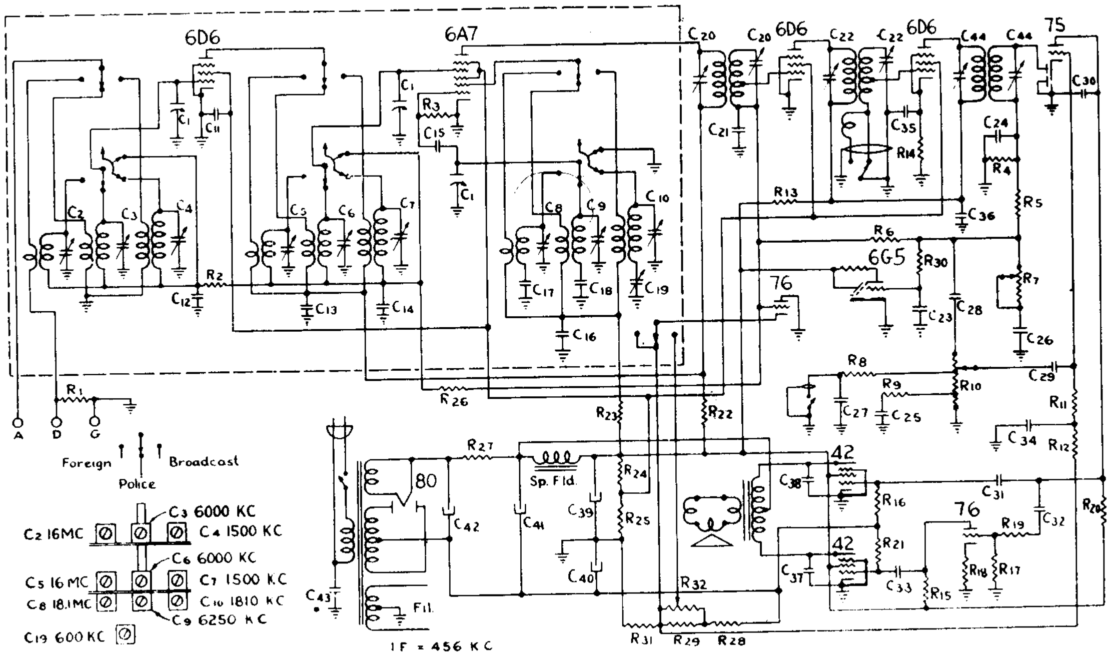
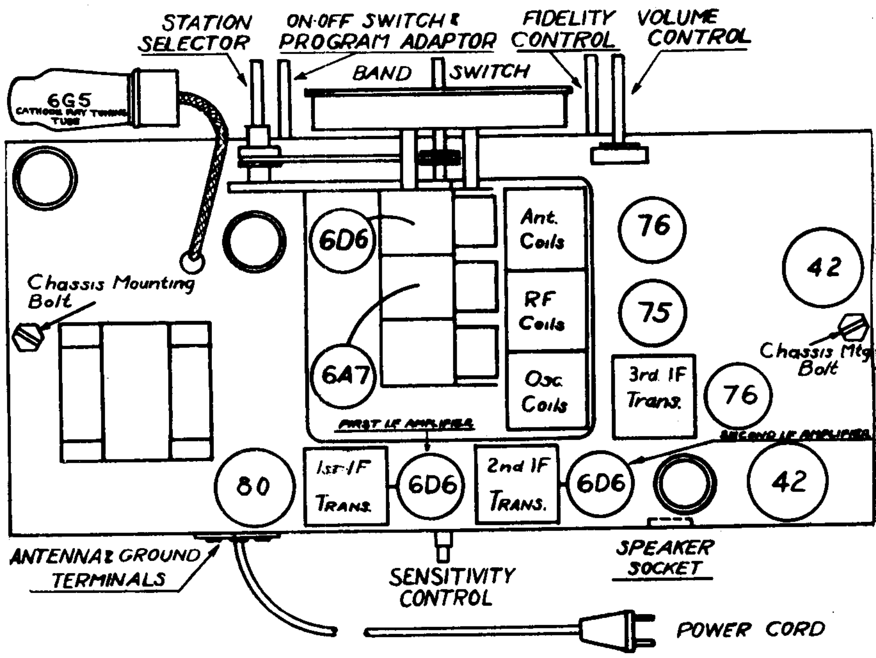


Fig. 6

DETROLA RADIO AND TELEVISION CORPORATION

MODEL 165





Tubes must be in proper position and connected as shown.

Symbol	Part No.	Description
C1	3814	9-400 mmf variable
C2,3,4	3822	2-35 triple trimmer
C5,6,7	3822	2-35 triple trimmer
C8,9,10	3822	2-35 triple trimmer
C11,21,34	572	.1-200 V.
C12,14,23	580	.05-200 V.
C13	575	.1-400 V.
C15,24	2780	50 mmf mica
C16,35	568	.01-400 V.
C17	2694	.005 5% tolerance
C18	2741	1330 mmf 5% tolerance
C19	2560	350 mmf variable padder
C20,22,44		IF Trimmer
C25	4072	.03-200 V.
C26	2695	.003-600 V.
C27	824	.002-600 V.
C28,29	576	.02-400 V.
C30	1286	250 mmf mica
C31,33	2600	.02-600 V.
C32,36	563	.05-400 V.
C37,38	3138	.001-800 V.
C39	3113	16 MF regulating
C40	3136	20 MF 25 V.
C41	3112	16 MF 450 V.
C42	3111	16 MF 500 V.
C43	3135	.003-800 V.
R1,5,15,26	603	100 M 1/3 W.
R2,3	631	50 M 1/3 W.
R4,16,21	615	500 M 1/3 W.
R6	2693	2 meg 1/3 W.
R7	3799	2 meg tone control
R8	2568	300 M 1/3 W.
R9,23	617	20 M 1/3 W.
R10	3800	3 meg volume control
R11,12	624	1 meg 1/3 W.
R13,14,22	2421	1 M 1/3 W.
R17	2880	100 M 1/3 W. 10%
R18	614	5 M 1/3 W.
R19	2731	500 M 1/3 W. 10%
R20	598	200 M 1/3 W.
R24	3805	7 M 3.5 W.
R25	3805	8 M 1.5 W.
R27	3809	100 ohms 2 W. 10%
R28	3806	120 ohms 1.5 W. 10%
R29	4111	85 ohms 1.0 W. 10%
R30	2106	3 meg 1/3 W.
R31	3870	15 ohms .5 W. 10%
R32	3801	2 M variable
	3796	Power transformer
	4061	No. 1 IF transformer
	4060	No. 2 IF transformer
	3968	No. 3 IF transformer
	2981	Tuning tube cable
	3838	12" Speaker
	2898	Tuning tube clamp
	3815	RF coil
	3943	Oscillator coil
	3817	Antenna coil
	3826	Drive belt
	3198	Idler pulley
	3199	Idler spring
	3831	Minute pointer
	4113	Tuning pointer
	3802	On-off switch
	3818	RF and Antenna switch
	3819	Oscillator switch
	3825	Planetary drive

ALINEMENT PROCEDURE

Connect a high impedance AC voltmeter across the loudspeaker terminals Volume control should be set a few degrees back of maximum volume position. Use a weak signal from the generator, strong signals tend to cause improper adjustments.

Be sure that the fidelity control is NOT in the HIGH FIDELITY position. It will not be possible to properly aline the receiver unless this control is turned part way toward its "bass" position.

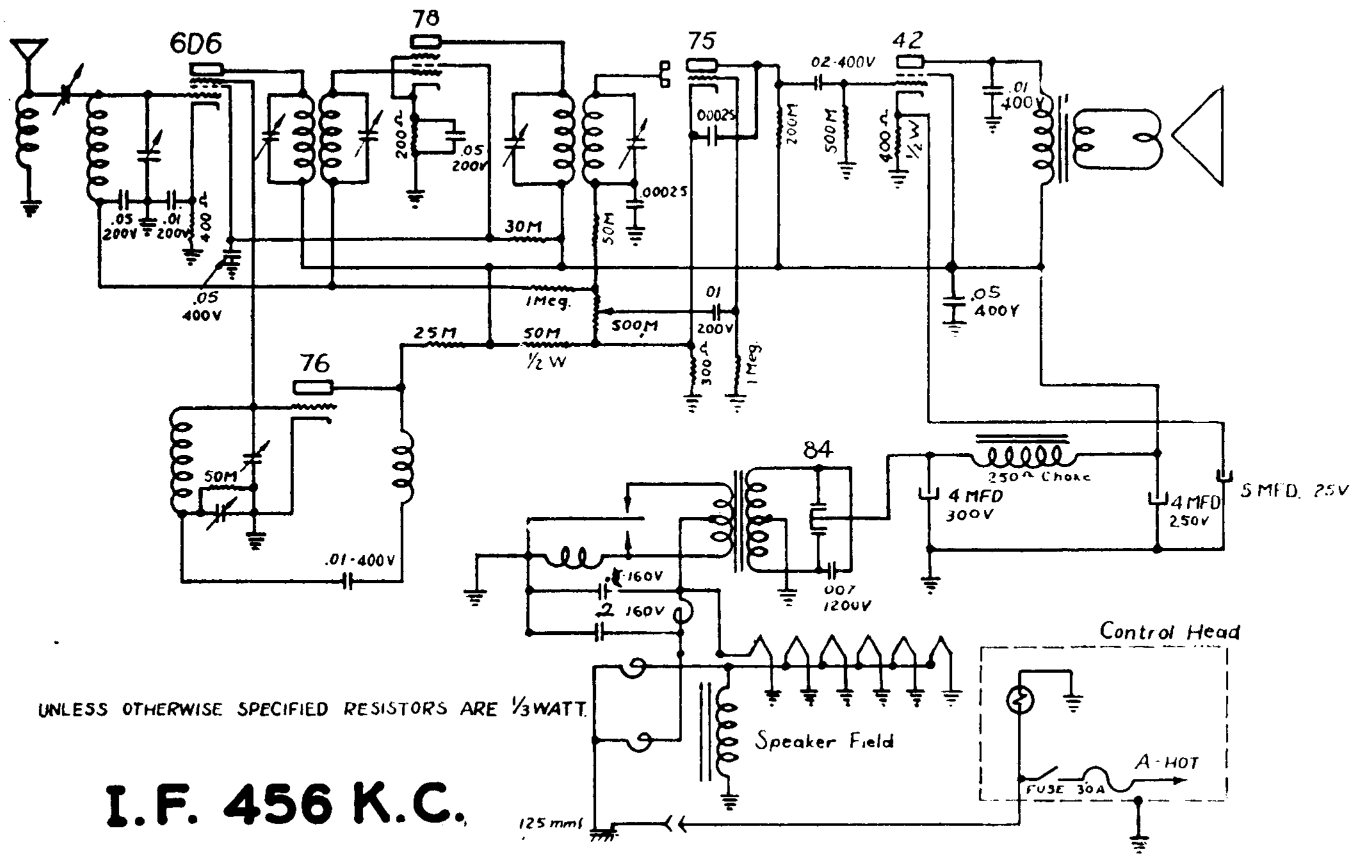
IF. Connect the generator ground to receiver chassis. Using .1 mfd condenser in series with high side of generator, apply 456 kc signal to grid of 6D6 second IF amplifier and aline transformer No. 3. Repeat for transformer No. 2, applying signal to grid of 6D6 first IF amplifier. Repeat for transformer No. 1 applying signal to grid of 6A7 translator. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1810 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1500-1600 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alinement of the two short wave bands. Set the band selector switch in the center position, adjust the oscillator top frequency for 6250 kc., then aline the antenna and RF trimmers at about 6000 kc. With the band selector in the extreme right position, adjust the top frequency of the high frequency to 18,100 kc., and aline the antenna and RF trimmers at about 16,000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmer down tight, then unscrew to the second peak. The antenna and RF trimmers should be screwed down tight, then unscrewed to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be set in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

DETROLA RADIO AND TELEVISION CORPORATION

MODEL 166



I. F. Alignment

The I.F. frequency of this receiver is 456 K.C. For realignment, use the following procedure.

It is necessary to use an accurately calibrated signal generator. Couple the signal generator to the grid of the 6D6 tube with a tenth microfarad condenser in series with the "high" lead of the signal generator. Connect the ground side of the signal generator to the chassis. Set the signal generator to 456 K.C. Be sure the volume control is set at maximum. Attenuate the signal generator so that the signal is just audible in the speaker. If an output meter is used, it should be connected across the voice coil terminals of the speaker. Use ½ volt as standard output.

Adjust the 2nd I.F. transformer first. Each screw should be adjusted for maximum output. After number two I.F. has been adjusted, number one I.F. should be adjusted for maximum output. After both transformers have been adjusted, it is necessary to recheck No. 2 transformer and then recheck No. 1.

See TUBE LAYOUT for location of I.F. and R.F. trimmers and padder.

R. F. Alignment

To align the broadcast band, proceed as follows:

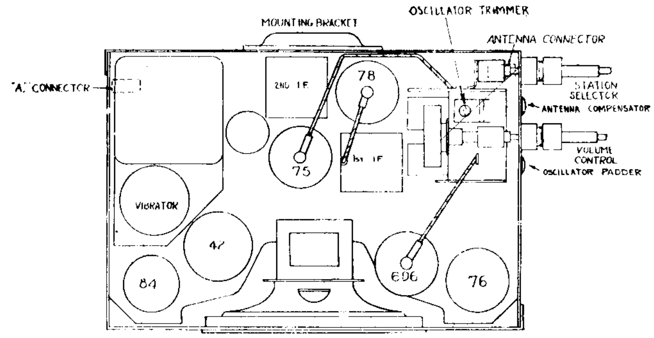
First, connect the ground side of the signal generator to the chassis. Connect the high side of the signal generator with a .00025 condenser, in series, to the antenna lead of the set. Set the volume control to maximum. Turn the station selector to the highest frequency (as far as it will go). Set the signal generator to 1570 K.C. Adjust the oscillator trimmer until the signal is heard. After the oscillator has been set at 1570 K.C., turn the station selector to 1400 K.C. Set the signal generator to 1400 K.C. When the signal is heard, adjust the antenna trimmer for maximum output.

When the set has been adjusted at 1400 K.C., turn the station selector dial to 600 K.C. Set the signal generator to 600 K.C. When the signal is heard, adjust the padder condenser by rocking the selector back and forth. While adjusting the padder screw, it is necessary to move the selector so that the signal may be kept in tune while adjusting the padder screw. This procedure should be followed until maximum output is obtained.

The foregoing procedure should be repeated. That is, the set is to be rechecked at 1570, 1400 and 600 K.C.

When aligning the R.F., use the same output standard as was used on the I.F. alignment.

TUBE LAYOUT *and* CONNECTION DIAGRAM



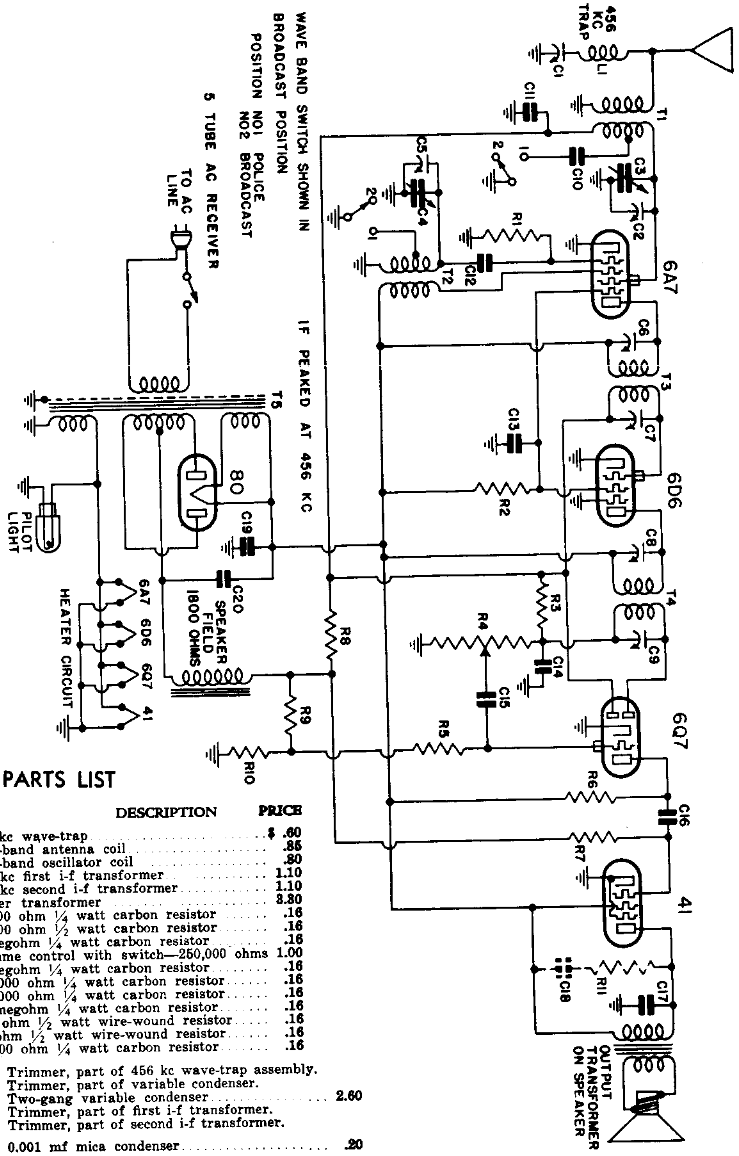
PARTS

Part No.	Req.	Description
624	1	Resistor—1 Meg.—⅓ W.
615	1	Resistor—500 M.—⅓ W.
2730	1	Resistor—200 M.—⅓ W.
631	1	Resistor—50 M.—⅓ W.
621	1	Resistor—25 M.—⅓ W.
2692	1	Resistor—300 ohm—⅓ W.
2268	1	Resistor—200 ohm—⅓ W.
2572	1	Resistor—400 ohm—⅓ W.
629	1	Resistor—50 M.—½ W.
2784	1	Resistor—400 ohm—½ W.
3583	-	Resistor—30 M.—⅓ W.
3012	1	Transformer—Vibrator
3052	1	Cover—Transformer
3042	1	Adapter—Variable Condenser
2293	1	Choke—Iron Core
4158	1	Coil—Antenna
4159	1	Coil—Oscillator
3000	1	Vibrator—With Ground Ring
2860	1	Transformer—1st I.F.
2916	1	Transformer—2nd I.F.
4165	1	Condenser—Dry Elec.

Part No.	Req.	Description
3298	1	Speaker
3299	1	Grille Screen
4156	1	Grille Cloth
4157	1	Condenser—Variable
4169	1	Condenser—Ant. Trimmer
4170	1	Condenser—Osc. Padder
4167	1	Antenna Cable
4187	1	Steering Post Control Head
1286	1	Condenser—.00025 Mica
3002	1	Condenser—.0075-1200 V. Buffer
3061	2	Cables Control. Includes Casing Tips and Flex. Shafts
580	3	Condenser—.05—200 V. Paper
565	2	Condenser—.01—200 V. Paper
2601	2	Condenser—.01—600 V. Paper
2600	1	Condenser—.02—600 V. Paper
4171	1	Condenser—.2—160 V. N.I.—Paper
3003	1	Condenser—.5—160 V. N.I.—Paper

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS AC, AC-130, AC-149 & AC-168



Voltage rating		105-125 volts, 60 cycles, a.c.
Power consumption		45 watts.
Frequency ranges		540 to 1580 kc. and 1580 to 4200 kc.

GENERAL NOTES

1. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
2. The receiver should never be turned on with the 41 tube out of its socket since the rapid rise in rectifier voltage would damage the electrolytic condensers.
3. The two i-f transformers are held to the chassis by snap-on fasteners. To remove an i-f, unsolder all the leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.
4. The color coding of the leads of the i-f transformers, is as follows:
   Grid—green Plate—blue
   Grid return—black B plus—red
5. The color coding of the power transformer leads is as follows:
   Primary—two green leads 6.3 v. sec.—two heavy blue leads
   High voltage sec.—two black leads 5 v. sec.—two heavy red leads
   High voltage sec. center tap—yellow
6. With a few exceptions, the color coding of the general wiring is as follows:
   Plate—blue A.v.c. and cathode—white or yellow
   B plus—red Grid—green
   Screen—brown Filament and ground—black
7. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. For reduction of noise and achievement of high efficiency on all frequency ranges the Emerson All-Wave High-Fidelity Antenna, Model W-78, and the Emerson All-Wave Antenna System, Model W-89, are recommended. Instructions for the installation of these antennas are supplied with each kit.

   In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.

Tube Data

The tube complement is as follows:

1—6A7 pentagrid oscillator-modulator
1—6D6 i-f amplifier
*1—6Q7 diode detector, audio amplifier, automatic volume control
1—41 pentode power output
1—80 full-wave rectifier

Unless otherwise specified all octal-base tubes may be replaced with either metal or octal-base glass tubes.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	182	70	0	182	6.3
6D6	182	70	0	—	6.3
6Q7	87	—	0	—	6.3
41	165	182	0	—	6.3

Voltage across speaker field—70.
Voltage from B minus to chassis—80.
B plus at 80 tube filament—262.

*See production changes

ADJUSTMENTS

An oscillator with frequencies of 456 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The first i-f transformer is the one directly behind the variable condenser. The trimmers for the two i-f transformers are available through holes in the tops of the cans.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 456 kc wave-trap is mounted on the front chassis wall beneath the variable condenser. The trimmer for the 456 kc wave-trap is mounted on the coil and is accessible from the bottom of the chassis.

I-f and Wave-Trap Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 456 kc, through a 0.02 mf paper condenser, to the grid cap of the 6A7 tube (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) and adjust the wave-trap trimmer for *minimum* response. (See General Notes.)

R-f Alignment

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1400 kc through a standard dummy antenna (a .0002 mf condenser m. be used as a substitute) to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response. The police band is self-tracking and does not require any adjustment.

NOTE: The Model AC-149 should be aligned with the chassis bottom plate in place.

PRODUCTION CHANGES

In receivers bearing serial numbers below 1,258,237:

a. C17 was a .001 mf, 600 volt tubular condenser.
b. R11 and C18 were connected from the plate of the 41 tube to B plus as shown by the dotted lines on the schematic diagram.

In receivers bearing serial numbers below 1,333,800:

a. The second detector and first audio amplifier was a type 75.
b. R9 was a 310 ohm ½ watt wire-wound resistor, part number 3RR-276.
c. R10 was a 23 ohm ½ watt wire-wound resistor, part number 3RR-266.

PARTS LIST

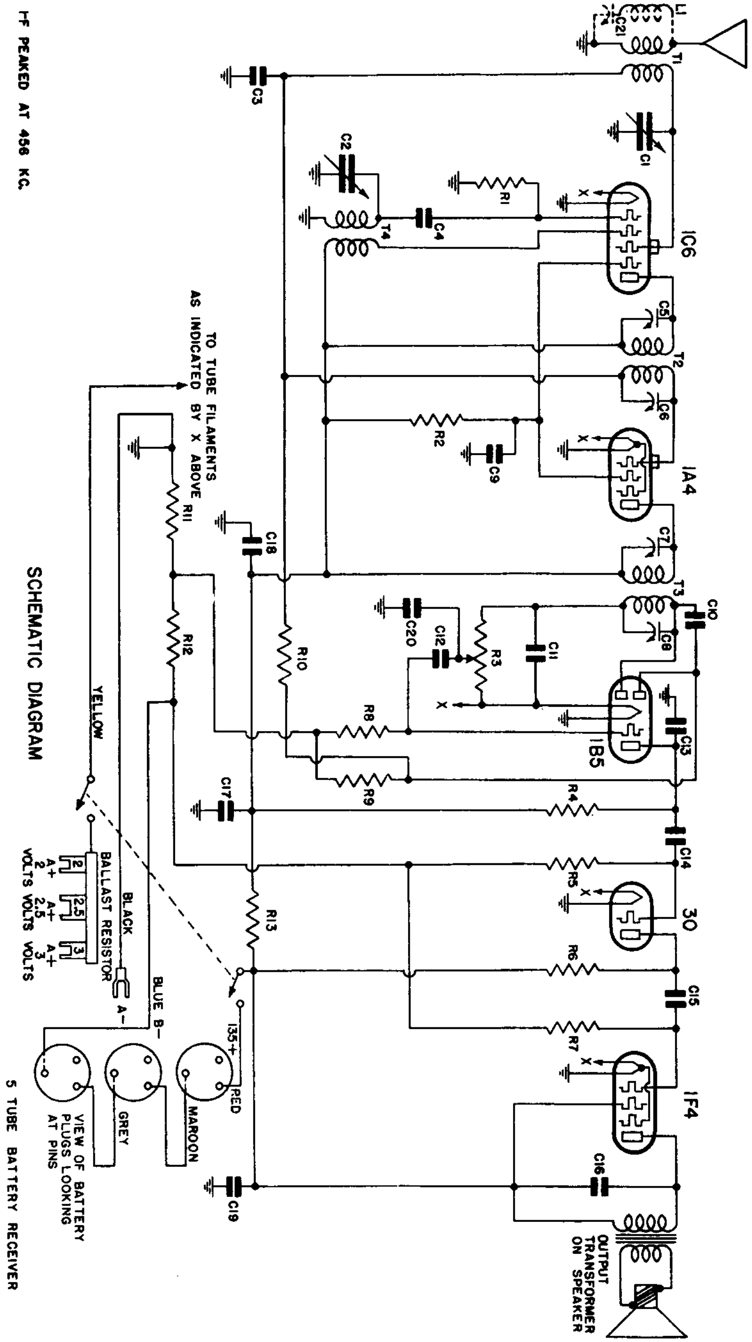
Item	Part No.	DESCRIPTION	PRICE
L1	MMT-149A	456 kc wave-trap	$ .60
T1	3RT-384	Two-band antenna coil	.85
T2	3RT-319A	Two-band oscillator coil	.80
T3	3RT-320B	456 kc first i-f transformer	1.10
T4	3RT-321B	456 kc second i-f transformer	1.10
T5	3RT-322A	Power transformer	3.30
R1	KR-53U	50,000 ohm ¼ watt carbon resistor	.16
R2	3LR-265U	40,000 ohm ½ watt carbon resistor	.16
R3	HR-42U	2 megohm ¼ watt carbon resistor	.16
R4	3FR-265B	Volume control with switch—250,000 ohms	1.00
R5	3RR-274U	5 megohm ¼ watt carbon resistor	.16
R6	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R7	KR-56U	500,000 ohm ¼ watt carbon resistor	.16
R8	3RR-275U	10 megohm ¼ watt carbon resistor	.16
R9	4CR-321	290 ohm ½ watt wire-wound resistor	.16
R10	4CR-320	35 ohm ½ watt wire-wound resistor	.16
R11	LR-65U	10,000 ohm ¼ watt carbon resistor	.16
†C1		Trimmer, part of 456 kc wave-trap assembly.	
‡C2, C5		Trimmer, part of variable condenser.	
C3, C4	4CC-350A	Two-gang variable condenser	2.60
†C6, C7		Trimmer, part of first i-f transformer.	
†C8, C9		Trimmer, part of second i-f transformer.	
C10	AAC-114	0.001 mf mica condenser	.20
C11, C13			
C18	BC-12	0.05 mf, 200 volt tubular condenser	.20
C12	AAC-106A	0.00005 mf mica condenser	.20
C14	IC-47A	0.0005 mf mica condenser	.20
C15, C17	HC-34	0.006 mf, 600 volt tubular condenser	.20
C16	KC-58	0.01 mf, 400 volt tubular condenser	.20
C19, C20	3RC-318A	Dual 5 mf, 300 volt dry electrolytic condenser	1.00
	3RS-231	Wave-band switch	.35
	4CS-269	5½" dynamic speaker	4.75
	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20

†These trimmers are part of coil assemblies and can not be supplied separately.

‡These trimmers are part of variable condenser and can not be supplied separately.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS AJ, AJ-130, AJ-137 & AJ-149



I-F PEAKED AT 456 KC.

SCHEMATIC DIAGRAM

5 TUBE BATTERY RECEIVER

PARTS LIST

*Item	Part No.	DESCRIPTION	PRICE (List Price as Effective as of August 1st, 1937)
T1	3PT-309A	Antenna coil	$ .85
T2	3RT-320A	456 kc first I-f transformer	1.10
T3	3RT-321B	456 kc second I-f transformer	1.10
T4	4JT-385	Oscillator coil	.60
L1	4DT-343	456 kc wave-trap (used only on Model AJ-137)	.60
R1, R4, R6	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R2	KR-63	15,000 ohm ¼ watt carbon resistor	.16
R3	3HR-240	Volume control with line switch—500,000 ohms	1.20
R5, R9	KR-57	1 megohm ¼ watt carbon resistor	.16
R7	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R8, R10	HR-42	2 megohm ¼ watt carbon resistor	.16
R11	4JR-305	180 ohm ½ watt wire-wound resistor	.16
R12	3RR-276	310 ohm ½ watt wire-wound resistor	.16
R13	KR-51	2,500 ohm ¼ watt carbon resistor	.16
R14	4JR-304	Metal-clad ballast resistor—1.77 ohms	.35
C1, C2	4CC-350A	Two-gang variable condenser	2.60
C3	BC-12	.05 mf, 200 volt tubular condenser	.20
C4	EC-24A	.0001 mf mica condenser	.20
†C5, C6	——	Trimmer, part of first I-f transformer.	
†C7, C8	——	Trimmer, part of second I-f transformer.	
C9, C12, C18	FC-29	.02 mf, 200 volt tubular condenser	.20
C10	EC-24A	.0001 mf mica condenser	.20
C11	AC-7A	.00025 mf mica condenser	.20
C13	IC-47A	.0005 mf mica condenser	.20
C14, C15	LC-65	.02 mf, 400 volt tubular condenser	.20
C16	3HC-274	.002 mf, 600 volt tubular condenser	.20
C17	VVC-221A	8 mf, 150 volt dry electrolytic condenser	1.05
C19	AC-6	.1 mf, 200 volt tubular condenser	.20
C20	AAC-106A	.00005 mf mica condenser	.20
	3HS-183	6½" permanent magnet dynamic speaker	8.60
	4JW-92	Battery cable	1.50
	3FZ-352	Dial face	.75
	3CZ-336	Dial drive belt	.10
	3CZ-337B	Dial drive shaft and pulley	.10
	3CZ-339	Idler pulley	.05
	3CZ-340	Idler spring	.05
	3CZ-341	Condenser shaft pulley	.10
	4MZ-588	Dial pointer	.25
	3FZ-351	Escutcheon with crystal	1.05
	3FZ-398A	Pyralin crystal (used only in Model AJ-149)	.50
	3FZ-399	Clip for pyralin crystal	.01

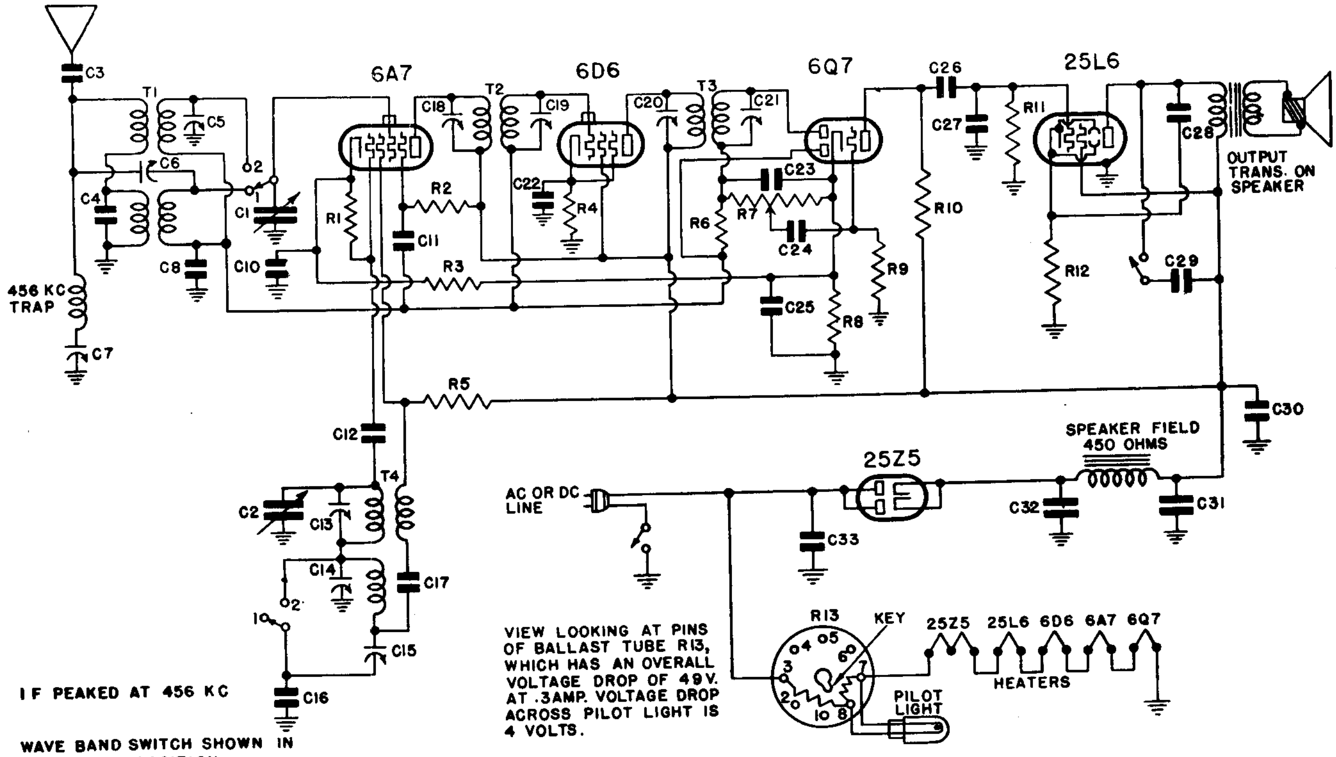
When ordering replacement parts specify part numbers.

*Item number locates the article on the schematic diagram.

†These trimmer condensers are part of the coil assemblies and cannot be supplied separately.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS AM, AM-131, AM-169 & AM-187



WAVE BAND SWITCH SHOWN IN BROADCAST POSITION
POSITION NO1 BROADCAST
NO2 SHORT WAVE

SCHEMATIC DIAGRAM

6 TUBE AC DC RECEIVER

PARTS LIST

List Price as Effective as of Aug. 15, 1937 (Subject to change without notice)

*Item	Part No.	DESCRIPTION	PRICE
T1	3CT-289A	Two-band antenna coil	$1.80
T2	3CT-274	456 kc first i-f transformer	1.50
T3	3CT-275	456 kc second i-f transformer	1.35
T4	3CT-290A	Two-band oscillator coil	1.35
R1	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R2	ZZR-196	30,000 ohm 1/4 watt carbon resistor	.16
R3	AAR-119	300 ohm 1/2 watt wire-wound resistor	.16
R4	3CR-295	410 ohm 1/2 watt wire-wound resistor	.16
R5	LR-65	10,000 ohm 1/4 watt carbon resistor	.16
R6, R9	KR-57	1 megohm 1/4 watt carbon resistor	.16
R7	2NR-214C	Volume control with line switch—250,000 ohms	1.20
R8	3CR-294	240 ohm 1/2 watt wire-wound resistor	.16
R10	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R11	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R12	3FR-293	140 ohm 1/2 watt wire-wound resistor	.16
R13	2UR-224	Plug-in type ballast resistor	.80
C1, C2	3CC-275A	Two-gang variable condenser (see production changes)	3.95
C3	AAC-114	0.001 mf mica condenser	.20
C4, C12	AAC-106A	0.00005 mf mica condenser	.20
†C5, C6, C7		Trimmer, part of antenna coil assembly.	
C8, C29	BC-12	0.05 mf, 200 volt tubular condenser	.20
C10, C22			
C25, C30	AC-6	0.1 mf, 200 volt tubular condenser	.20
C11	KC-59	0.006 mf, 400 volt tubular condenser	.20
†C13, C14		Trimmer, part of oscillator coil assembly.	
C15	2NC-231	Single adjustable padding condenser. Range: 300 to 600 mmf	.50
C16	3EC-267	0.0042 mf mica condenser	.40
C17	CCC-127	0.01 mf, 200 volt tubular condenser	.20
†C18, C19		Trimmer, part of first i-f transformer.	
†C20, C21		Trimmer, part of second i-f transformer.	
C23, C27	AC-7A	0.00025 mf mica condenser	.20
C24	FC-29	0.02 mf, 200 volt tubular condenser	.20
C26, C28	LC-65	0.02 mf, 400 volt tubular condenser	.20
C31	3CC-337	40 mf, 150 volt wet electrolytic condenser	.90
C32	3CC-261	20 mf, 150 volt wet electrolytic condenser	.90
C33	EEC-132	0.1 mf, 400 volt tubular condenser	.20
	3ES-256	Tone control switch	.50
	TTS-111G	Wave-band switch	.60
	3CS-254	6 1/2" dynamic speaker	5.25
	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
	3CZ-514	Dial face	.70
	3CZ-336A	Dial drive belt	.10
	3CZ-337	Drive shaft and pulley	.10
	3CZ-339	Idler pulley	.05
	3CZ-340	Idler spring	.05
	3CZ-341	Condenser shaft pulley	.10
	4MZ-588	Dial pointer (see production changes)	.25
	3CZ-350	Escutcheon with crystal (for Models AM-131 and AM-169)	1.05
	4MZ-644	Dial crystal (for Model AM-187)	.50

When ordering replacement parts specify part numbers.

*Item number locates the article on the schematic diagram.

†These trimmers cannot be supplied separately.

PRODUCTION CHANGES

In receivers bearing serial numbers below 1,184,290:

The variable condenser was part number 3CC-275. The dial pointer was part number 4MZ-590.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS AJ, AJ-130, AJ-137 & AJ-149

Current drain .... "A" battery—.42 amps.
"B" battery—.016 amps. with no signal
Frequency range .... 540 to 1730 kc.

1. The battery complement should be as follows:

Portable (Small Batteries)

Type	No. Req.	Eveready Part No.	Burgess Part No.	Ray-o-vac Part No.
1½ volt "A"	2	7111	4FA	6 Railroad
45 volt "B"	3	762 (plug-in type)	5308 (plug-in type)	5303 (plug-in type)

Home (Heavy Duty Batteries)

Type	No. Req.	Eveready Part No.	Burgess Part No.	Ray-o-vac Part No.
3 volt "A"	1	X-125	20F2	P9403
45 volt "B"	3	385 (plug-in type)	22308 (plug-in type)	P9303 (plug-in type)

The batteries indicated above for portable use are chosen for size so that the entire complement can be housed by the portable cabinet. In general, it will be found that the "B" batteries will last somewhat longer than the "A" batteries.

2. The receiver is designed for an "A" supply of 2 to 3 volts. If a 2 volt storage battery is used, its positive terminal should be connected to the terminal marked "2" on the metal clad ballast resistor. If a 2½ volt air-cell battery is used, it should be connected to the terminal marked "2.5". A 3 volt supply should be connected to the terminal marked "3".

3. The i-f transformers are of the snap-on type. To remove, unsolder all leads under the chassis, pinch together the prongs of the snap-on fastener and lift out.

4. The color coding of the i-f transformer leads is as follows:
Grid—green Plate—blue
Grid return—black B plus—red

5. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. For reduction of noise and achievement of high efficiency on all frequency ranges the Emerson All-Wave High-Fidelity Antenna, Model W-78, and the Emerson All-Wave Antenna System, Model W-89, are recommended. Instructions for the installation of these antennas are supplied with each kit.

Tube Data

The tube complement is as follows:
1—1C6 oscillator-modulator
1—1A4 1st i-f amplifier
1—1B5-25S 2nd detector, a.v.c., a-f amplifier
1—30 a-f amplifier
1—1F4 pentode output

VOLTAGE ANALYSIS

Readings should be taken with a 1,000 ohms-per-volt meter. The voltages listed below are from point indicated to A minus with volume control turned on full and no signal. The battery voltages for these readings were as follows: "A" battery 3 volts, "B" battery 135 volts.

Tube	Plate	Screen	Osc. Plate	Fil.
1C6	105	105	57	2.0
1A4	105	57	—	2.0
1B5-25S	75	—	—	2.0
30	90	—	—	2.0
1F4	127	135	—	2.0

ADJUSTMENTS

An oscillator with frequencies of 456 and 1600 kc should be used.
An output meter should be used across the voice coil or output transformer for observing maximum response.
If the circuit is at all disturbed, the receivers must be realigned.
The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.
Always choose the minimum capacity peak on the oscillator trimmer and the maximum capacity peak on the antenna trimmer. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.
Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.
Always use as weak a test signal as possible during alignment.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The first i-f is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of the cans.
The antenna and oscillator trimmers are located on the right hand side of the variable condenser. The rear trimmer is the oscillator trimmer.
On portable model AJ-137, the 456 kc wave-trap is located below the chassis deck, directly underneath the variable condenser. Its trimmer is accessible through a hole in the bottom plate.

Alignment Procedure

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 456 kc to the grid cap of the 1C6 tube.
3. Adjust the four i-f trimmers, repeating for maximum response.
4. If the receiver is portable model AJ-137, feed 456 kc to the antenna through a standard dummy antenna (a .0002 mf mica condenser may be substituted) and adjust the wave-trap trimmer for minimum response.
5. Set dial pointer to 1600 and feed 1600 kc to the antenna lead through a standard broadcast dummy antenna (a .0002 mf mica condenser may be used as a substitute).
6. Adjust the oscillator trimmer (on rear section of variable condenser) for maximum response.
7. Adjust the r-f trimmer (on front section of variable condenser) for maximum response.

MODELS AM, AM-131, AM-169 & AM-187

Voltage rating .... 105-125 volts, a.c. or d.c.
Power consumption .... 50 watts.
Frequency ranges .... 540 to 1,730 kc, and 5.6 to 18.0 megacycles.

1. If replacements are made or the wiring disturbed in the r-f portion of the circuit, the receiver should be carefully re-aligned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor (R13 on schematic) is in a special metal tube at the rear of the chassis. This tube will become quite hot under normal operating conditions. For voltage drop specifications, see below.
4. When operating the receiver on d.c. it may be necessary to reverse the line plug to obtain the correct polarity.
5. The two i-f transformers are held to the chassis by snap-on fasteners. To remove an i-f, unsolder all the leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.
6. The color coding of the i-f transformer leads is as follows:
Grid—green Plate—blue
Grid return—black B plus—red
7. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. For reduction of noise and achievement of high efficiency on all frequency ranges the Emerson All-Wave High Fidelity Antenna, Model W-78, and the Emerson All-Wave Antenna System, Model W-89, are recommended. Instructions for the installation of these antennas are supplied with each kit.
In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.
8. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

Tube Data

The tube complement is as follows:
1—6A7 pentagrid oscillator-modulator.
1—6D6 first i-f amplifier.
1—6Q7 diode detector, a-f amplifier, a.v.c.
1—25L6 beam power output.
1—25Z5 dual half-wave rectifier.
1—2UR-224 ballast tube (R13 on schematic).
NOTE: All metal tubes may be replaced with equivalent octal base glass tubes.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	Plate	Screen	Cathode	Osc. Plate	Fil.
6A7	96	45	2.3	74	6.3
6D6	96	96	4.5	—	6.3
6Q7	40	—	1.0	—	6.3
25L6	92	100	6.2	—	25.0

Voltage at 25Z5 cathode—125 volts.
Voltage across speaker field—29 volts.
Voltage drop across ballast tube (pins Nos. 3, 7)—49 volts.
Voltage drop across pilot light section (pins Nos. 8, 7)—4 volts.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1425 and 15,000 kc should be used.
In addition an output meter should be used across the voice coil or output transformer for observing maximum response.
The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.
Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.
Always use as weak a test signal as possible during alignment.
Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Location of Coils and Trimmer Adjustments

The broadcast antenna coil, the short-wave antenna coil and the 456 kc wave trap are one assembly mounted underneath the chassis deck to the right of the variable condenser. The trimmers for these coils are accessible through three holes in the top of the chassis. The trimmer closest to the front of the chassis is for the short-wave antenna coil. The central trimmer is for the broadcast antenna coil and the trimmer farthest from the chassis front is for the 456 kc wave trap.
The broadcast oscillator and short-wave oscillator coils are wound on one form and mounted on the inside of the rear chassis wall. The trimmers for these coils are accessible through two holes in the rear chassis wall. The left-hand trimmer (looking at the rear wall) is for the short-wave oscillator coil and the right-hand trimmer is for the broadcast oscillator coil.
The two i-f transformers are in oblong coil cans located on the top of the chassis. The first i-f transformer is the one behind the variable condenser. The trimmers for these transformers are accessible through holes in the tops of the cans.
The broadcast series padding condenser is located on the rear wall of the chassis below the 6A7 tube.

I-f Transformer and Wave-Trap Alignment

Turn the switch clockwise to the broadcast position and rotate the variable condenser to the minimum capacity position. Feed 456 kc to the grid cap of the 6A7 tube and adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna and adjust the wave-trap trimmer (rear screw beside variable condenser) for minimum response.

Short-Wave Alignment

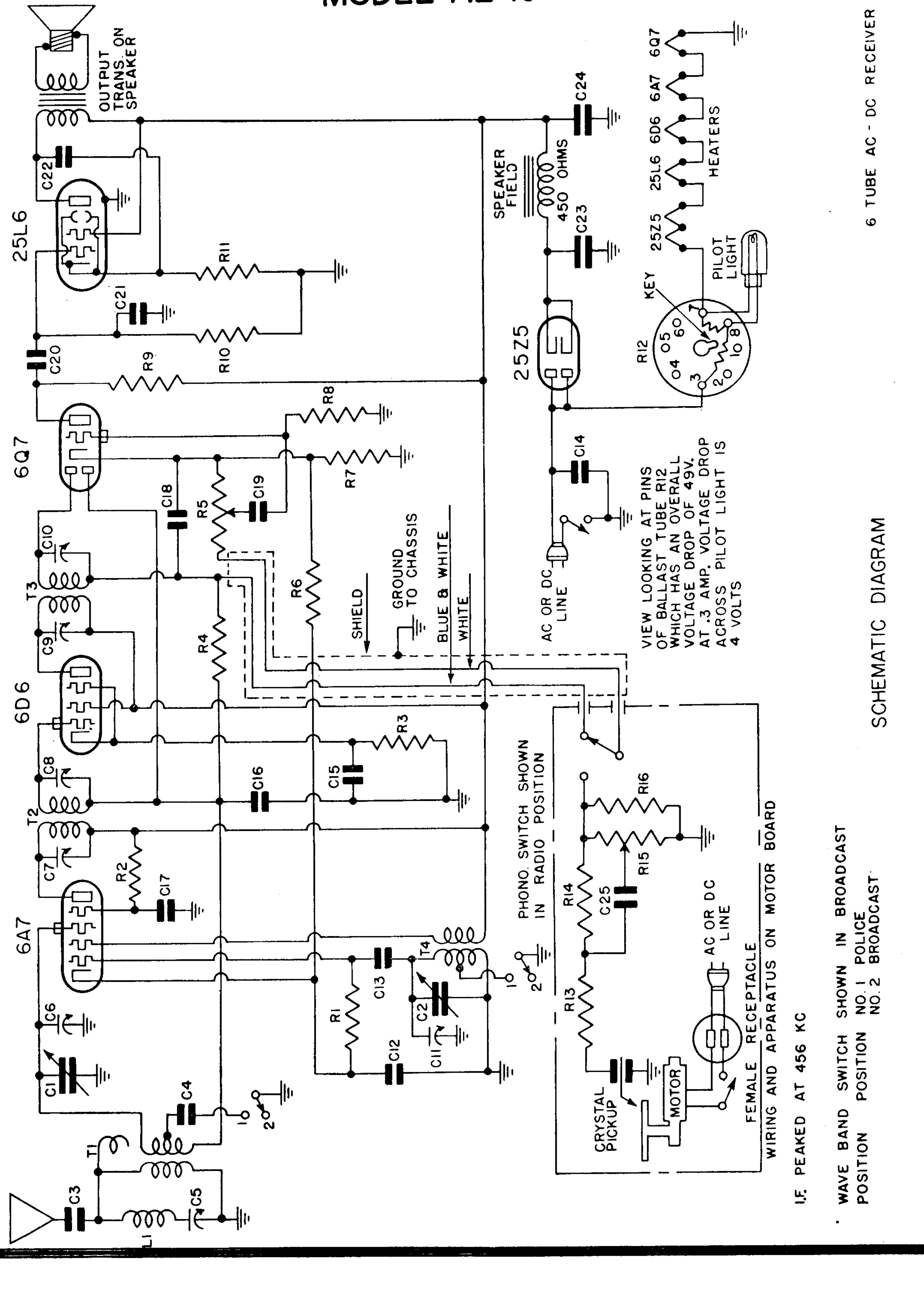
Use a dummy antenna (400 ohm resistor) when aligning the short-wave coils.
Rotate the wave-band switch counter-clockwise to the short-wave position and set the dial pointer to 15 megacycles. Feed 15 megacycles through the dummy antenna and adjust the short-wave oscillator trimmer (left-hand screw on rear chassis wall) for maximum response and then adjust the short-wave antenna trimmer (front screw beside variable condenser) for maximum response. The variable condenser should be rocked while adjusting the antenna trimmer. (Rotate variable condenser rotor shaft back and forth through a small arc).

Broadcast Alignment

Rotate the wave-band switch to the broadcast position, clockwise, and set the dial pointer at 60. Feed 600 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute).
Adjust the broadcast series padding condenser (on rear chassis wall, below 6A7 tube) for maximum response. Move pointer to 142.5, feed 1425 kc and adjust the broadcast oscillator trimmer (right-hand screw on rear chassis wall) for maximum response and then adjust the broadcast antenna trimmer (central screw beside variable condenser) for maximum response. Return pointer to 60, feed 600 kc and readjust the series padding condenser rocking the variable condenser for maximum response.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL AL-164



EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL AL-164

Voltage rating	105 to 125 volts a.c. or d.c.
Power consumption	43 watts for receiver and 26 watts for motor
Frequency range	540 to 1580 kc (See paragraph 11 in General Notes below)

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f portion of the circuit, the receiver should be carefully re-aligned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor (R12 on schematic) is in a special metal tube at the rear of the chassis. This tube will become quite hot under normal operating conditions. For voltage drop specifications, see below.
4. When operating the receiver on d.c. it may be necessary to reverse the line plug to obtain the correct polarity.
5. The two i-f transformers are held to the chassis by snap-on fasteners. To remove an i-f, unsolder its leads under the chassis, pinch together the prongs of the snap-on fastener and lift the i-f can from the chassis.
6. The color coding of the i-f transformer leads is as follows:
   Grid—green Plate—blue
   Grid return—black B plus—red
7. The receiver is shipped with an attached antenna wire. In some locations near powerful local stations the addition of a very large antenna may be detrimental to reception, because of the resulting interference. The Emerson Flexible Mast Antenna, Model W-82, has been especially designed for Emerson receivers, featuring compactness and portability while at the same time retaining a high efficiency from the standpoint of performance. Since it functions as an outside antenna the Flexible Mast will substantially improve the receiver performance. Where the Flexible Mast is installed permanently, it is urgently recommended that the receiver antenna wire be cut. Leave just enough of this wire to reach from the receiver to the window strip connector. Instructions for the installation of this compact and efficient outside antenna are supplied with each kit.
8. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
9. The phonograph motor has been adjusted at the factory, to turn at a speed of 78 r.p.m. The speed may be checked by counting the turns per minute or by using a stroboscope disc and a neon light (the stroboscope method will only work when the neon bulb is lighted from a 60 cycle a.c. supply).
10. An a.c.-d.c. switch is provided to switch the motor for a.c. or d.c. power supply. It is important that this switch be in the proper position for the power supply available.
11. The receiver in this combination is designed to cover two frequency ranges, but since it is represented as a single band receiver only, the short-wave band, although available, may be ignored.

Tube Data

The tube complement is as follows:
1—6A7 pentagrid oscillator-modulator.
1—6D6 first i-f amplifier.
1—6Q7 diode detector, a-f amplifier, a.v.c.
1—25L6 beam power output.
1—25Z5 dual half-wave rectifier.
1—2UR-224 ballast tube (R12 on schematic).

Unless otherwise specified all octal-base tubes may be replaced with either metal or octal-base glass tubes.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	100	50	2.3	100	6.3
6D6	100	100	3.5	—	6.3
6Q7	43	—	1.2	—	6.3
25L6	92	100	6.5	—	25.0

Voltage at 25Z5 cathode—130 volts.
Voltage across speaker field—28 volts.
Voltage drop across ballast tube (pins Nos. 3, 7)—49 volts.
Voltage drop across pilot light section (pins Nos. 8 and 7)—4 volts.

ADJUSTMENTS

An oscillator with frequencies of 456, 600 and 1400 kc should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Always use as weak a test signal as possible during alignment.

Use a .0001 mf mica condenser as a dummy antenna during alignment.

Location of Coils and Trimmer Adjustments

The two i-f transformers are in oblong coil cans located on top of the chassis deck. The first i-f transformer is the one behind the variable condenser. The trimmers for these transformers are accessible through holes in the tops of the cans.

The 456 kc wave-trap is mounted on the right side of the front chassis wall. Its trimmer is accessible at the bottom of the chassis.

The antenna coils for the broadcast and police bands are wound on one form and are mounted underneath the chassis deck below the variable condenser.

The oscillator coils for the broadcast and police bands are wound on one form and are mounted on the rear wall of the chassis deck near the variable condenser.

The trimmers for the broadcast antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

I-f Transformer and Wave-Trap Alignment

Turn the switch clockwise to the broadcast position and rotate the variable condenser to the minimum capacity position. Feed 456 kc to the grid cap of the 6A7 tube and adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna and adjust the wave-trap trimmer for *minimum* response.

R-f Alignment

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response. The police band is self-tracking and does not require any adjustment.

PARTS LIST

List Price as. Effective as of Sept. 1st, 1937 (Subject to change without notice)

*Item	Part No.	DESCRIPTION	PRICE
T1	3RT-384	Two-band antenna coil	$ .85
T2	3RT-320B	456 kc first i-f transformer	1.10
T3	3RT-321B	456 kc second i-f transformer	1.10
T4	3RT-319A	Two-band oscillator coil	.80
L1	4DT-343	456 kc adjustable wave-trap	.60
R1	KR-53	50,000 ohm 1/4 watt carbon resistor	.16
R2	ZZR-196	30,000 ohm 1/4 watt carbon resistor	.16
R3	3CR-295	410 ohm 1/2 watt wire wound resistor	.16
R4, R8	HR-42	2 megohm 1/4 watt carbon resistor	.16
R5	3FR-256	Volume control with line switch—500,000 ohms	1.05
R6, R7	3CR-294	240 ohm 1/2 watt wire wound resistor	.16
R9	KR-55	250,000 ohm 1/4 watt carbon resistor	.16
R10, R13, R16	KR-56	500,000 ohm 1/4 watt carbon resistor	.16
R11	3FR-293	140 ohm 1/2 watt wire wound resistor	.16
R12	2UR-224	Plug-in type ballast resistor	.80
R14	4LR-313	1.5 megohm 1/4 watt carbon resistor	.16
R15	4LR-312	Tone control and motor on-off switch	1.05
C1, C2	4CC-350A	Two-gang variable condenser	2.60
C3	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C4	AAC-114	0.001 mf mica condenser	.20
†C5	——	Trimmer, part of wave-trap assembly.	
‡C6, C11	——	Trimmer, part of variable condenser.	
†C7, C8	——	Trimmer, part of first i-f transformer assembly.	
†C9, C10	——	Trimmer, part of second i-f transformer assembly.	
C12, C17	AC-6	0.1 mf, 200 volt tubular condenser	.20
C13	AAC-106A	0.00005 mf mica condenser	.20
C14	2VC-242A	0.1 mf, 400 volt molded condenser	.20
C15	FC-29	0.02 mf, 200 volt tubular condenser	.20
C16	BC-12	0.05 mf, 200 volt tubular condenser	.20
C18, C21	NC-70A	0.0002 mf mica condenser	.20
C19	CCC-127	0.01 mf, 200 volt tubular condenser	.20
C20	LC-65	0.02 mf, 400 volt tubular condenser	.20
C22	3FC-336	0.025 mf, 400 volt tubular condenser	.20
C23, C24	3CC-261	20 mf. 150 volt wet electrolytic condenser	.90
C25	AC-7A	0.00025 mf mica condenser	.20
	3RS-231	Wave-band switch	.35
	3GS-202	Phono-radio switch	.50
	3FS-251	5½" dynamic speaker	4.90
	4LZ-582	Dial face	.70
	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
	3CZ-336	Dial drive belt	.10
	3CZ-337B	Dial drive shaft and pulley	.10
	3CZ-339	Idler pulley	.05
	3CZ-340	Idler pulley spring	.05
	3CZ-341	Condenser shaft pulley	.10
	4MZ-588	Dial pointer	.25
	3FZ-351	Escutcheon with crystal	1.05
	3GM-251	Phonograph needle cup	.75
	3GPM-1	A.c.-d.c. phonograph motor complete with accessories	45.00
	3ZZ-564A	Crystal pick-up	18.00

When ordering replacement parts specify part numbers.

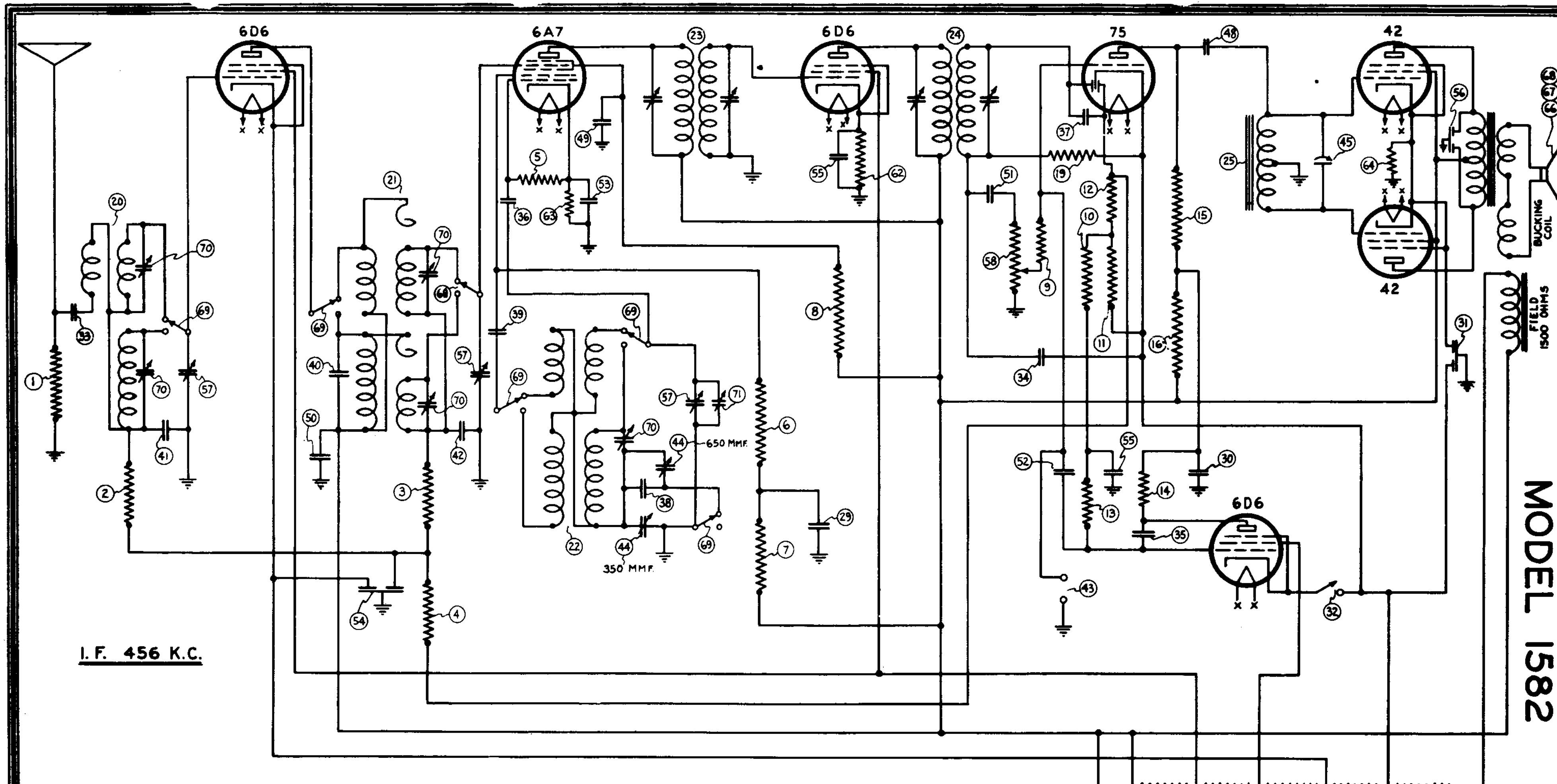
*Item number locates the article on the schematic diagram.

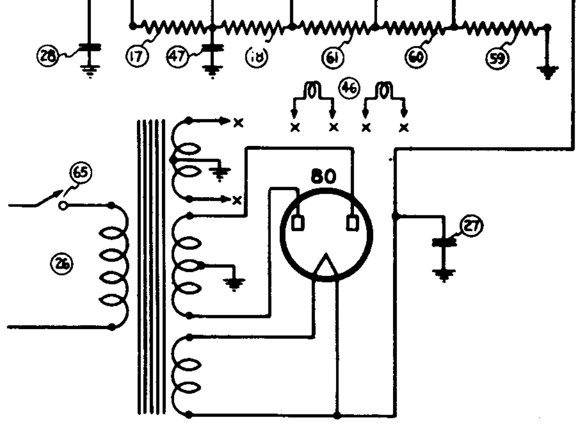
†These trimmers are part of coil assemblies and can not be supplied separately.

‡These trimmers are part of variable condenser and can not be supplied separately.

FADA RADIO AND ELECTRIC COMPANY

MODEL 1582

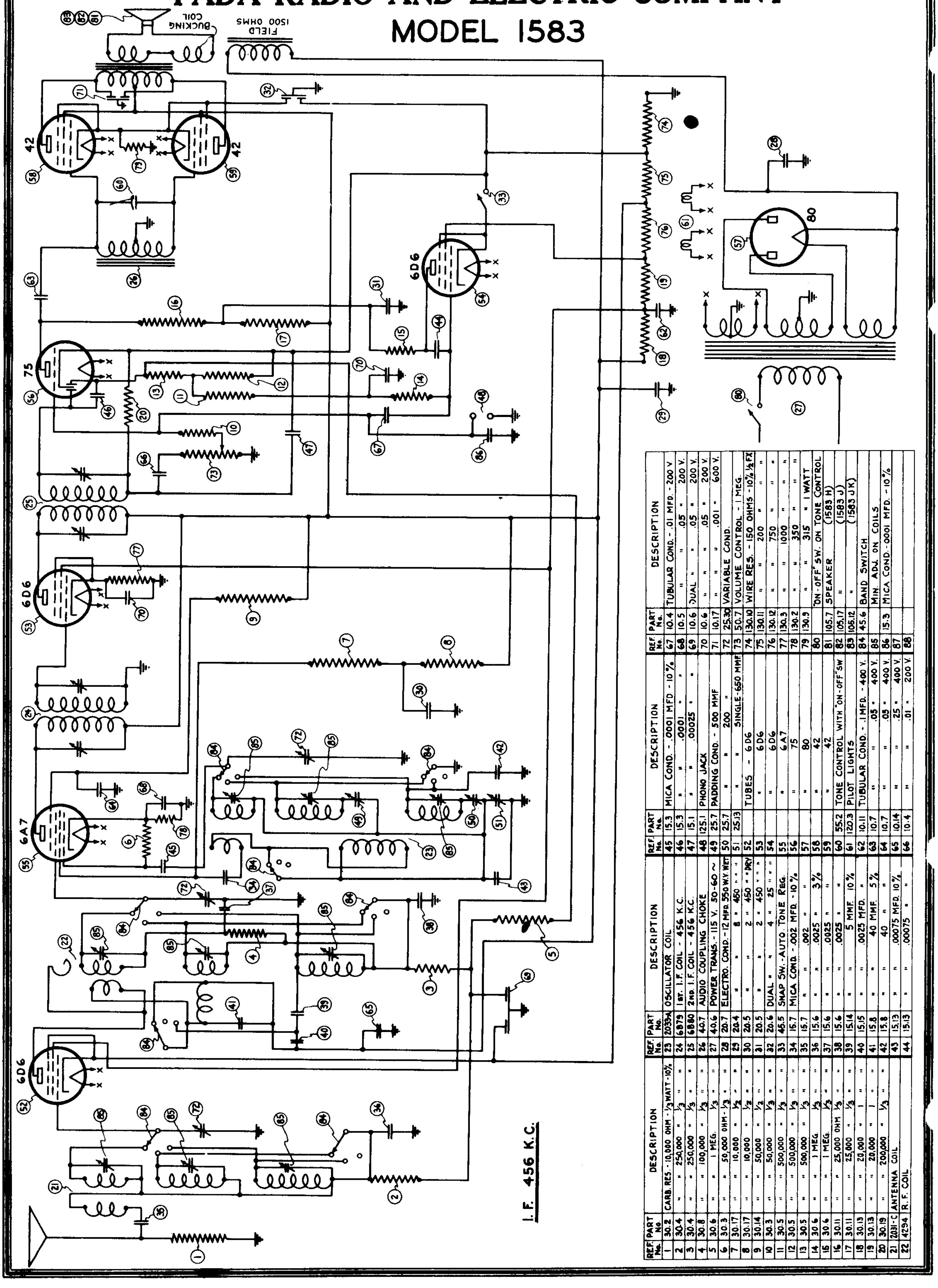




REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	30.2	CARB. RES. - 10,000 OHM - 1/3 WATT - 10%	23	6B79	1ST. I.F. COIL - 456 K.C.	45	55.2	TONE CONTROL WITH "ON-OFF" SW.	67	105.17	SPEAKER (1582 J)
2	30.4	" " 250,000 " 1/3 " "	24	6B80	2ND. I.F. COIL - 456 K.C.	46	120.3	PILOT LIGHTS - 6.8 V. - .15 A	68	105.12	" (1582 JK)
3	30.4	" " 250,000 " 1/3 " "	25	40.7	AUDIO COUPLING CHOKE	47	10.11	TUBULAR COND. - .1 MFD. - 400 V.	69	45.4	BAND SWITCH
4	30.6	" " 1 MEG. " 1/3 " "	26	40.6	POWER TRANS. - 115 V. 50-60~	48	10.7	" " .05 " 400 V.	70		MIN. ADJ. ON COILS
5	30.3	" " 50,000 " 1/3 " "	27	20.7	ELECTRO COND. - 12 MFD. 550 W.V. WET	49	10.7	" " .05 " 400 V.	71		" " " VAR. COND.
6	30.17	" " 10,000 " 1/2 " "	28	20.4	" " 8 " 450 " " "	50	10.14	" " .25 " 400 V.	72		
7	30.17	" " 10,000 " 1/2 " "	29	20.5	" " 2 " 450 " " DRY	51	10.4	" " .01 " 200 V.	73		
8	30.14	" " 50,000 " 1/2 " "	30	20.5	" " 2 " 450 " " "	52	10.4	" " .01 " 200 V.	74		
9	30.3	" " 50,000 " 1/3 " "	31	20.6	DUAL " " 4 " 25 " " "	53	10.5	" " .05 " 200 V.	75		
10	30.5	" " 500,000 " 1/3 " "	32	45.5	SNAP SW. - AUTO TONE REG.	54	10.6	DUAL " " .05 " 200 V.	76		
11	30.5	" " 500,000 " 1/3 " "	33	15.2	MICA COND. - .0005 MFD. - 10%	55	10.6	" " " .05 " 200 V.	77		
12	30.5	" " 500,000 " 1/3 " "	34	15.1	" " .00025 " "	56	10.17	" " " .001 " 600 V.	78		
13	30.6	" " 1 MEG. " 1/3 " "	35	15.13	" " .00075 " "	57	25.10	VARIABLE COND.	79		
14	30.6	" " 1 MEG. " 1/3 " "	36	15.3	" " .0001 " "	58	50.7	VOLUME CONTROL - 1 MEG.	80		
15	30.11	" " 25,000 OHM 1/3 " "	37	15.3	" " .0001 " "	59	130.10	WIRE RES. - 150 OHMS - 10% - 1/2 FX	81		
16	30.11	" " 25,000 " 1/3 " "	38	15.11	" " .0004 " "	60	130.11	" " 200 " " "	82		
17	30.13	" " 20,000 " 1 " "	39	15.7	" " .002 " "	61	130.12	" " 750 " " "	83		
18	30.13	" " 20,000 " 1 " "	40	15.10	" " 50 MMF "	62	130.3	" " 1000 " " "	84		
19	30.19	" " 200,000 " 1/3 " "	41	15.6	" " .0025 MFD. - 3%	63	130.2	" " 350 " " "	85		
20	2026	ANTENNA COIL	42	15.6	" " .0025 " "	64	130.9	" " 315 " 1 WATT	86		
21	3407B	R.F. COIL	43	125.1	PHONO JACK	65		"ON-OFF" SW. ON TONE CONTROL	87		
22	3408B	OSCILLATOR COIL	44	25.6	PADDING COND. - 350-650 MMF.	66	105.7	SPEAKER (1582 H)	88		

FADA RADIO AND ELECTRIC COMPANY

MODEL 1583



REF. No.	PART No.	DESCRIPTION
1	30.2	CARB. RES. - 10,000 OHM - 1/3 WATT - 10%
2	30.4	" " 250,000 " 1/3 " "
3	30.4	" " 250,000 " 1/3 " "
4	30.8	" " 100,000 " 1/3 " "
5	30.6	" " 1 MEG. 1/3 " "
6	30.3	" " 50,000 OHM - 1/3 " "
7	30.17	" " 10,000 " 1/2 " "
8	30.17	" " 10,000 " 1/2 " "
9	30.14	" " 50,000 " 1/2 " "
10	30.3	" " 50,000 " 1/3 " "
11	30.5	" " 500,000 " 1/3 " "
12	30.5	" " 500,000 " 1/3 " "
13	30.5	" " 500,000 " 1/3 " "
14	30.6	" " 1 MEG. 1/3 " "
15	30.6	" " 1 MEG. 1/3 " "
16	30.11	" " 25,000 OHM 1/3 " "
17	30.11	" " 25,000 " 1/3 " "
18	30.13	" " 20,000 " 1 " "
19	30.13	" " 20,000 " 1 " "
20	30.19	" " 200,000 " 1/3 " "
21	2031-C	ANTENNA COIL
22	4294	R. F. COIL
23	2033-A	OSCILLATOR COIL
24	6879	1st. I.F. COIL - 456 K.C.
25	6880	2nd. I.F. COIL - 456 K.C.
26	40.7	AUDIO COUPLING CHOKE
27	40.6	POWER TRANS. - 115 V. 50-60 ~
28	20.7	ELECTRO. COND. - 12 MFD. 550 W.V. WET
29	20.4	" " 8 " 450 " " "
30	20.5	" " 2 " 450 " " DRY
31	20.5	" " 2 " 450 " " "
32	20.6	DUAL " " 4 " 25 " " "
33	45.5	SNAP SW. - AUTO. TONE REG.
34	15.7	MICA COND. - .002 MFD. - 10%
35	15.7	" " .002 " "
36	15.6	" " .0025 " 3%
37	15.6	" " .0025 " "
38	15.6	" " .0025 " "
39	15.14	" " 5 MMF. 10%
40	15.15	" " .0025 MFD. "
41	15.8	" " 40 MMF. 5%
42	15.8	" " 40 " "
43	15.13	" " .00075 MFD. 10%
44	15.13	" " .00075 " "

REF. No.	PART No.	DESCRIPTION
45	15.3	MICA COND. - .0001 MFD. - 10%
46	15.3	" " .0001 " "
47	15.1	" " .00025 " "
48	125.1	PHONO JACK
49	25.7	PADDING COND. - 500 MMF
50	25.7	" " 200 "
51	25.13	" " SINGLE-650 MMF
52		TUBES - 6D6
53		" 6D6
54		" 6D6
55		" 6A7
56		" 75
57		" 80
58		" 42
59		" 42
60	55.2	TONE CONTROL WITH "ON-OFF" SW.
61	120.3	PILOT LIGHTS
62	10.11	TUBULAR COND. - .1 MFD. - 400 V.
63	10.7	" " .05 " 400 V.
64	10.7	" " .05 " 400 V.
65	10.14	" " .25 " 400 V.
66	10.4	" " .01 " 200 V.
67	10.4	TUBULAR COND. - .01 MFD. - 200 V.
68	10.5	" " .05 " 200 V.
69	10.6	DUAL " " .05 " 200 V.
70	10.6	" " " .05 " 200 V.
71	10.17	" " " .001 " 600 V.
72	25.30	VARIABLE COND.
73	50.7	VOLUME CONTROL - 1 MEG.
74	130.10	WIRE RES. - 150 OHMS - 10% 1/2 FX
75	130.11	" " 200 " " "
76	130.12	" " 750 " " "
77	130.3	" " 1000 " " "
78	130.2	" " 350 " " "
79	130.9	" " 315 " 1 WATT
80		"ON-OFF" SW. ON TONE CONTROL
81	105.7	SPEAKER (1583 H)
82	105.17	" (1583 J)
83	105.12	" (1583 JK)
84	45.6	BAND SWITCH
85		MIN. ADJ. ON COILS
86	15.3	MICA COND. - .0001 MFD. - 10%
87		
88		

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODELS 5C & 6A

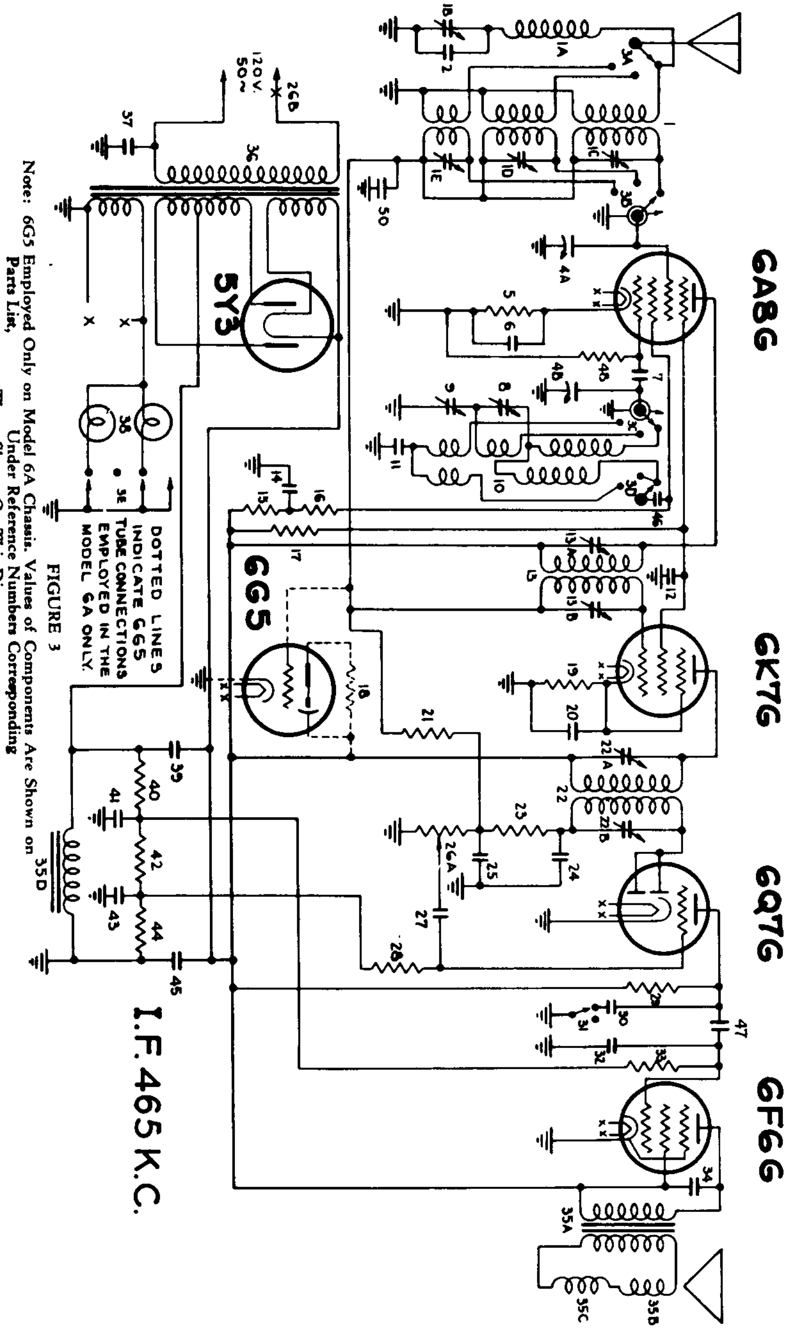


FIGURE 3

Note: 6G5 Employed Only on Model 6A Chassis. Values of Components Are Shown on Parts List, Under Reference Numbers Corresponding to Those Shown On This Diagram.

ELECTROLYTIC CONDENSER COLOR CODE

(ALL OTHER COLOR CODES—STANDARD R. M. A.)

With the positive (+) or center solder lug toward you, read the colored markings as follows from left to right:

LEFT HAND OR CAPACITY COLOR

Black	0 to 9 mfd.
Brown	9 to 19 mfd.
Red	19 to 29 mfd.
Orange	29 to 39 mfd.
Yellow	39 to 49 mfd.

SECOND FROM LEFT OR MAXIMUM VOLTAGE COLOR

Black	0 to 99 volts
Brown	99 to 199 volts
Red	199 to 299 volts
Orange	299 to 399 volts
Yellow	399 to 499 volts
Green	499 to 599 volts

If a third (blue) stripe is shown, the condenser is a regulator and should be in the position farthest from the rectifier tube in the filter circuit.

PARTS AND PRICE LIST

Part Number	Reference Figure 3	Description	List Price
42-6		Cabinet (T4)	
40-2		Cabinet (C-1)	
42-2		Cabinet (T3) No Eye Hole	
121-1	Includes R-18	Cable and Socket (Eye Tube)	.70
155-1		Clamp—Eye Tube Socket	.25
801-5		Clip—Grid	.01
501-4	1 ABCDE	Coil Assembly—Antenna	3.00
503-4	10	Coil Assembly—Oscillator	3.00
202-4	4 A & B	Condenser—Tuning 2-Gang	3.50
211-1	39	Condenser—Wet Electrolytic (16-400)	1.10
231-3	14, 45	Condenser—Dry Electrolytic (8-8 mfd.)	1.40
272-10	8, 9	Condenser—Padder Dual	.80
260-1	2	Condenser—Mica 10 mmf.	.18
261-23	11	Condenser—Mica 4000 mmf.	.30
260-7	7, 24, 25	Condenser—Mica 100 mmf.	.18
260-10	32	Condenser—Mica 250 mmf.	.18
260-18	46	Condenser—Mica 1000 mmf.	.20
251-1	37	Condenser—Moulded .01-600	.18
250-21	50, 41	Condenser—Tubular .1-200	.18
250-22	12	Condenser—Tubular .1-400	.18
250-15	27, 47	Condenser—Tubular .02-600	.18
250-39	5, 19, 43	Condenser—Tubular .05-200	.18
250-8	30	Condenser—Tubular .003-600	.18
250-11	34	Condenser—Tubular .006-600	.18
340-2	26 A & B	Control—Volume and Switch	1.20
875-3		Cord and Plug (AC Line)	.50
64-3		Crystal—Pyralin	.50
810-1		Dial Drive Belt	.25
131-1		Dial Drive Belt Tension Assembly	.20
126-1		Dial Drive Pulley	.15
151-1		Dial Drive Shaft	.15
150-1		Dial Drive Shaft Bushing	.15
805-2	38	Dial Light Bulb (Bayonet Type)	.15
465-6		Dial Light Socket	.10
602-4		Dial Pointer—Station Selector	.20
602-2		Dial Pointer—Vernier	.15
611-1		Dial Reflector Pan	.70
601-4		Dial Scale	.80
61-1		Escutcheon for Crystal	.90
700-1		Grommet—Black Rubber 1/16"	.02

Part Number	Reference Figure 3	Description	List Price
700-3		Grommet—Black Rubber ½"	.03
70-7		Knob—Bakelite, Round	.15
70-6		Knob—Bakelite, Bar Type	.15
301-9	5, 19	Resistor—Carbon 220 ohm ½ watt	.15
301-17	15	Resistor—Carbon 4700 ohm ½ watt	.15
301-19	16	Resistor—Carbon 10,000 ohm ½ watt	.15
302-21	17	Resistor—Carbon 22,000 ohm 1 watt	.18
301-22	48	Resistor—Carbon 33,000 ohm ½ watt	.15
301-23	23, 44	Resistor—Carbon 47,000 ohm ½ watt	.15
301-28	42	Resistor—Carbon 330,000 ohm ½ watt	.15
301-29	28, 29, 33	Resistor—Carbon 470,000 ohm ½ watt	.15
301-31	21	Resistor—Carbon 1,000,000 ohm ½ watt	.15
301-33	40	Resistor—Carbon 2,200,000 ohm ½ watt	.15
7245-31		Screw—Chassis 8/32x¼" ... Doz.	.15
7372-2		Screw—Headless Set Screw ... Doz.	.30
455-1		Socket—Octal Base 8-Prong	.15
455-2		Socket—Octal Base 5-Prong	.15
20-5	35 ABCD	Speaker—Electrodynamic 8"	5.00
20-3	35 ABCD	Speaker—Electrodynamic 6"	4.50
372-1	3 ABCDE	Switch—Range	1.50
380-2	31	Switch—Tone	.45
470-1		Terminal Strips 1-Lug	.05
470-2		Terminal Strips 2-Lug	.05
470-3		Terminal Strips 3-Lug	.10
550-1	13 A & B	Transformer—I. F. Input	1.50
550-2	22 A & B	Transformer—I. F. Output	1.50
400-3	36	Transformer—Power 110-volt 50-60 cycle	3.75
400-8	36	Transformer—Power Universal	6.50
111-2		Tube Shield Assembly	.15
220-1		Tube—Paper Electrolytic Shield	.05
7477-1		Washer—Felt ... Doz.	.05
7476-1		Washer—Spring Type	.02
7475-1		Washer—"C" Type ... Doz.	.05

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION
MODELS 5C & 6A

The models 5C and 6A are AC operated, superheterodyne chassis with automatic volume control. These receivers operate on three bands—broadcast, police-amateur, and short wave. The 6A has the tuning eye, Figures 3 and 4; the 5C does not. Otherwise, the two chassis are identical.

Alignment procedure is given below in chart form, Figures 1 and 2. Make adjustments in the order given. The output meter may be any low range AC voltmeter, preferably about 0-15 volts. It should be connected from the plate of the 6F6G tube to ground with a .1 mfd. condenser in series with one of the leads. When the hand tends to go off scale, reduce the input from the signal generator and keep the volume control at maximum. If too strong a signal is fed to the receiver and the volume control is used to keep the output meter hand on scale, the A. V. C. will operate and inaccurate alignment will result.

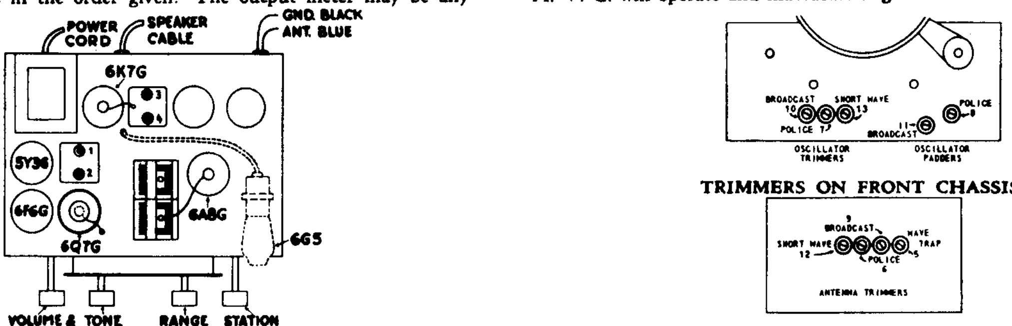
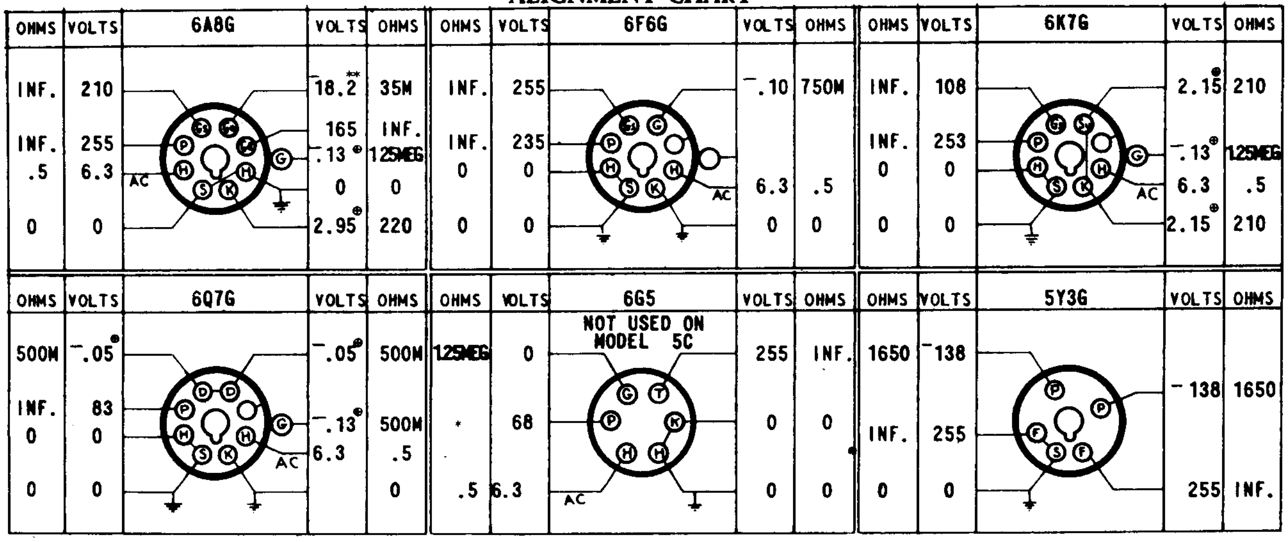


FIGURE 1 TRIMMERS ON SIDE OF CHASSIS
TOP, SIDE AND END VIEW OF CHASSIS SHOWING TUBE LOCATIONS, CONTROLS, TRIMMERS AND PADDERS

No.	Connect Generator To	Signal Generator Frequency	Dummy	Range Switch	Dial Setting	Stage	Trimmer No.	AFC Switch	Peak For	Special Instructions
1	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	2nd IF	1		Max.	
2	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	2nd IF	2		Max.	
3	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	1st IF	3		Max.	
4	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	1st IF	4		Max.	
5	Antenna	456 KC*	400 ohm Resistor	Broadcast	530 KC	Wave Trap	5		Min.	*Raise input until signal is heard.
6	Antenna	5.4 MC	400 ohm Resistor	Police Amateur	5.4 MC	Police Osc.	6		Max.	
7	Antenna	5.4 MC	400 ohm Resistor	Police Amateur	5.4 MC	Police Det.	7		Max.	
8	Antenna	1.8 MC	400 ohm Resistor	Police Amateur	1.8 MC	Police Osc.	8		*Max.	*While rocking — Repeat 6, 7 and 8 until no change is noted.
9	Antenna	1500 KC	200 mmfd. Condenser	Broadcast	1500 KC	B. C. Osc.	9		Max.	
10	Antenna	1500 KC	200 mmfd. Condenser	Broadcast	1500 KC	B. C. Det.	10		Max.	
11	Antenna	600 KC	200 mmfd. Condenser	Broadcast	600 KC	B. C. Osc.	11		*Max.	*While rocking — Repeat 9, 10 and 11 until no change is noted.
12	Antenna	18 MC	400 ohm Resistor	Short Wave	18 MC	S. W. Osc.	12		Max.	
13	Antenna	18 MC	400 ohm Resistor	Short Wave	18 MC	S. W. Det.	13		Max.	
14	Antenna	6 MC	400 ohm Resistor	Short Wave	6 MC		*			*Check calibration at 6 MC—Padder is fixed.

FIGURE 2
ALIGNMENT CHART

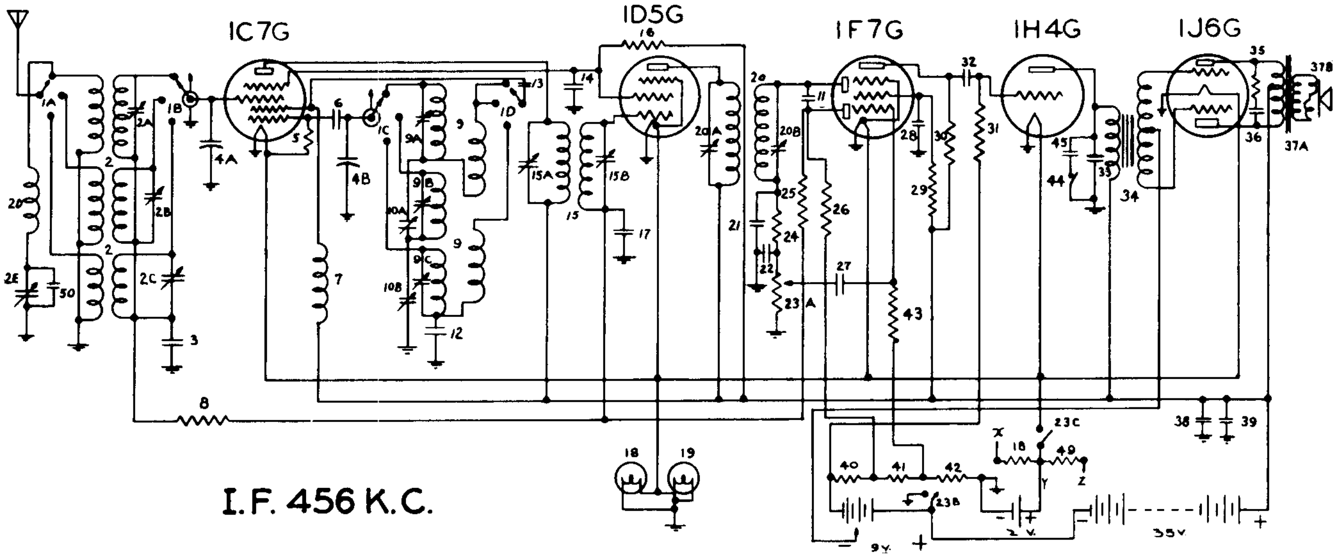


*CONNECTED TO TARGET THRU 1 MEGOHM RESISTOR ** 30 VOLT SCALE ● 3 VOLT SCALE

FIGURE 5
VOLTAGE AND RESISTANCE ANALYSIS CHART

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODEL 5D



I. F. 456 K.C.

The model 5D is a battery operated superhetrodyne with automatic volume control. It receives signals on three bands—broadcast, police-amateur, and short wave.

Alignment procedure is given below in chart form, figures 1 and 2. Make adjustments in the order given. The output meter may be any low range AC voltmeter, preferably about 0-15 volts. It should be connected across the two plates of the 1J6G tube with a .1 mfd. condenser in series with one of the leads. Set the volume at maximum during the alignment and as the meter hand tends to go off scale, decrease the output from the signal generator. If too strong a signal is fed to the receiver and the volume control is used to keep the output meter hand on scale, the AVC will operate and inaccurate alignment will result.

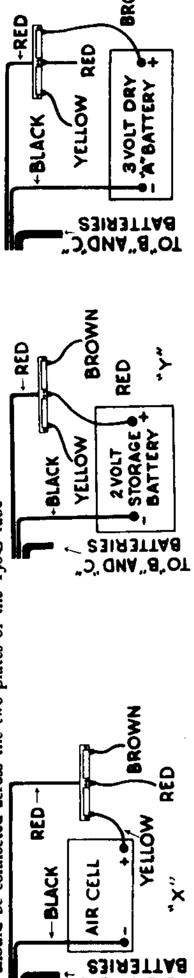


Figure 2 BATTERIES AND CONNECTIONS

PARTS AND PRICE LIST

Part Number	Schematic Reference Number	Description	List Price
480-4		Battery Cable Assembly	$2.00
810-1		Belt—Condenser Drive	.25
150-1		Bushing—Drive Shaft	.15
42-2		Cabinet (T3-B)	
		Cabinet (C1-B)	
425-3	7	Choke Assembly—R. F.	.50
501-4	2	Coil Assembly—Antenna	3.00
503-4	9	Coil Assembly—Oscillator	3.00
210-1	39	Condenser—Electrolytic 8-200	.75
260-1	50	Condenser—Mica 10 Mmf.	.18
260-26	11	Condenser—Mica 15 Mmf.	.18
260-7	6, 21, 22	Condenser—Mica 100 Mmf.	.18
260-18	13	Condenser—Mica 1000 Mmf.	.18
260-22	33	Condenser—Mica 3000 Mmf.	.18
272-10	10 A & B	Condenser—Padder Dual	.80
250-8	36	Condenser—Tubular .003-600	.18
250-15	27, 32, 45	Condenser—Tubular .02-600	.18
250-21	38	Condenser—Tubular .1-200	.18
250-39	3, 17, 14, 28	Condenser—Tubular .05-200	.18
202-4	4 A & B	Condenser—Variable Tuning (2-Gang)	3.50
340-1	23 (ABC)	Control—Volume and Switch 500,000 Ohm	1.20
64-3		Crystal—Pyralin	.50
805-1	18, 19	Dial Light—2 Volt 60 MA (Screw Base)	.25
611-1		Dial Reflector	.70
601-4		Dial Scale	.80
61-1		Escutcheon	.90
801-5		Grid Clips	.01
700-1		Grommet—Rubber 1⁄16" Black	.02
700-2		Grommet—Rubber ½" Pure Gum	.04
700-3		Grommet—Rubber ½" Black	.03
702-1		Grommet—Rubber (Variable Mounting)	.03
70-6		Knob—Bakelite (Bar Type)	.15
70-7		Knob—Bakelite (Round)	.15
602-4		Pointer—Main Tuning	.20
602-2		Pointer—Vernier	.15

Part Number	Schematic Reference Number	Description	List Price
126-1		Pulley—Drive	.15
301-13	41, 42	Resistor—Carbon 1000 Ohm	.15
301-17	40	Resistor—Carbon 4700 Ohm	.15
301-20	16	Resistor—Carbon 15000 Ohm	.15
301-22	35	Resistor—Carbon 33000 Ohm	.15
301-23	24, 5	Resistor—Carbon 47000 Ohm	.15
301-27	30	Resistor—Carbon 220,000 Ohm	.15
301-29	31, 8	Resistor—Carbon 470,000 Ohm	.15
301-31	43, 25, 29	Resistor—Carbon 1,000,000 Ohm	.15
301-32	26	Resistor—Carbon 1,500,000 Ohm	.15
335-10	48	Resistor—Wire Wound .3 Ohm ½ Watt	.20
335-11	49	Resistor—Wire Wound 1.15 Ohm ½ Watt	.20
7372-2		Screw—Headless Set 8-32x3⁄16" Doz.	.30
7245-31		Screw—S.H.W.H. Tap 8-32x¼" Doz.	.15
151-1		Shaft—Dial Drive	.15
465-1		Socket—Dial Light (Screw Type)	.10
455-1		Socket—Octal Base Tube 8-Contact	.15
22-3	37	Speaker—P. M. Dynamic 6"	5.00
22-5	37	Speaker—P. M. Dynamic 8"	6.50
372-1	1 A to D	Switch—Range	1.50
380-2	44	Switch—Tone	.45
131-1		Tension Pulley Assembly	.20
470-1		Terminal Strip—1-Lug	.05
470-2		Terminal Strip—2-Lug	.05
470-3		Terminal Strip—3-Lug	.10
470-5		Terminal Strip—4-Lug	.10
470-12		Terminal—3-Lug Battery Cable	.10
410-1	34	Transformer—Audio	2.00
550-9	15	Transformer Assembly—I.F. Input	1.50
550-10	20	Transformer Assembly—I.F. Output	1.50
111-2		Tube Shield Assembly	.15
7476-1		Washer—Spring Type	.02
7475-1		Washer—"C" Type Doz.	.05

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODEL 5D

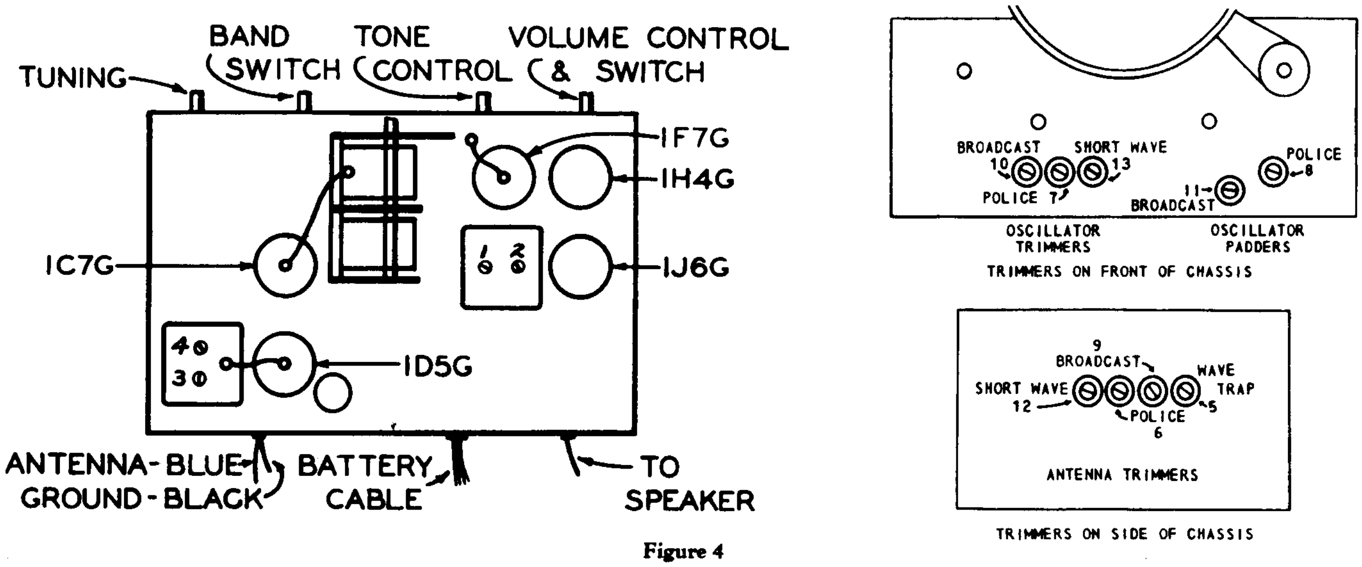


Figure 4

TOP, FRONT AND END VIEWS OF THE 5D CHASSIS SHOWING LOCATION OF TRIMMERS, CONTROLS AND COMPONENT PARTS

No.	Connect Generator To	Signal Generator Frequency	Dummy	Range Switch	Dial Setting	Stage	Trimmer No.	AFC Switch	Peak For	Special Instructions
1	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	2nd IF	1		Max.	
2	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	2nd IF	2		Max.	
3	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	1st IF	3		Max.	
4	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	1st IF	4		Max.	
5	Antenna	456 KC*	400 ohm Resistor	Broadcast	530 KC	Wave Trap	5		Min.	*Raise input until signal is heard.
6	Antenna	5.4 MC	400 ohm Resistor	Police Amateur	5.4 MC	Police Osc.	6		Max.	
7	Antenna	5.4 MC	400 ohm Resistor	Police Amateur	5.4 MC	Police Det.	7		Max.	
8	Antenna	1.8 MC	400 ohm Resistor	Police Amateur	1.8 MC	Police Osc.	8		*Max.	*While rocking — Repeat 6, 7 and 8 until no change is noted.
9	Antenna	1500 KC	200 mmf. Condenser	Broadcast	1500 KC	B. C. Osc.	9		Max.	
10	Antenna	1500 KC	200 mmf. Condenser	Broadcast	1500 KC	B. C. Det.	10		Max.	
11	Antenna	600 KC	200 mmf. Condenser	Broadcast	600 KC	B. C. Osc.	11		*Max.	*While rocking — Repeat 9, 10 and 11 until no change is noted.
12	Antenna	18 MC	400 ohm Resistor	Short Wave	18 MC	S. W. Osc.	12		Max.	
13	Antenna	18 MC	400 ohm Resistor	Short Wave	18 MC	S. W. Det.	13		Max.	
14	Antenna	6 MC	400 ohm Resistor	Short Wave	6 MC	S.W. Pad.	*			*Check calibration at 6 MC—Padder is fixed.

BATTERIES AND CONNECTIONS

AIR CELL "A" BATTERY. If the receiver is to be operated on an Air Cell Battery, only one section of the "resistance link" circuit should be connected. (See "X," Figure 2.) The remaining two leads from the positive (+) "A" lead should be taped or otherwise insulated so they will not come in contact with any of the battery terminals.

TWO-VOLT STORAGE "A" BATTERY. If the receiver is to operate on a Two-Volt Storage "A" Battery, none of the "resistance link" circuit is to be used. The positive (+) "A" connection is to be made as shown under "Y" of Figure 2. The unused leads should be taped so they will not come in contact with the other battery terminals.

THREE-VOLT "A" BATTERY (DRY). If the receiver is to be operated on a Three-Volt "A" Battery, the "resistance link" circuit should be connected as shown under "Z" of Figure 2. The unused leads should be taped so they will not come in contact with any of the battery terminals.

When the Three-Volt "A" Battery becomes so low or weak that the receiver will no longer operate satisfactorily, the connections may then be changed to conform with "X" under Figure 2, thus obtaining a little more operating time from the battery.

When the Three-Volt "A" Battery again becomes so low that the receiver will not operate satisfactorily, the connections may once again be changed to conform with "Y," Figure 2, thus obtaining more operating time from the battery.

NOTE—These changes must not be made until the battery becomes so low that the receiver does not operate properly, and then the change must be made one step at a time as described above, otherwise the tubes in the receiver may be damaged.

"A" battery current consumption may be reduced approximately 18 per cent. by removing both dial light bulbs.

"B" BATTERIES. Three 45-volt "B" Batteries, with standard plug receptacles, are required with the receiver. Good quality, HEAVY DUTY batteries are recommended.

"C" BATTERIES. Two 4½-volt "C" Batteries, with standard plug receptacles are required with the receiver.

"A" BATTERY (2-VOLT). The Black battery lead is to be connected to "A" minus (—). The Red battery lead is to be connected to "A" plus (+).

"B" AND "C" BATTERIES. Five standard battery plugs will be found on the battery cable. While each has three prongs, it will be noted that three of the plugs have prongs which are all the same size. These are the "B" battery plugs and are to be plugged into the standard receptacles on the three 45-volt "B" batteries. The remaining plugs, each having one large prong and two small ones are to be plugged into the standard receptacles on the $4\frac{1}{2}$-volt "C" batteries.

WARNING—DO NOT ALLOW THE "A" BATTERY LEADS TO COME IN CONTACT WITH ANY OF THE "B" BATTERY TERMINALS. IF THIS HAPPENS THE TUBES, RECEIVER, AND BATTERIES MAY BE SERIOUSLY DAMAGED.

GAMBLE-SKOGMO INC.
MODEL A1 SERIES

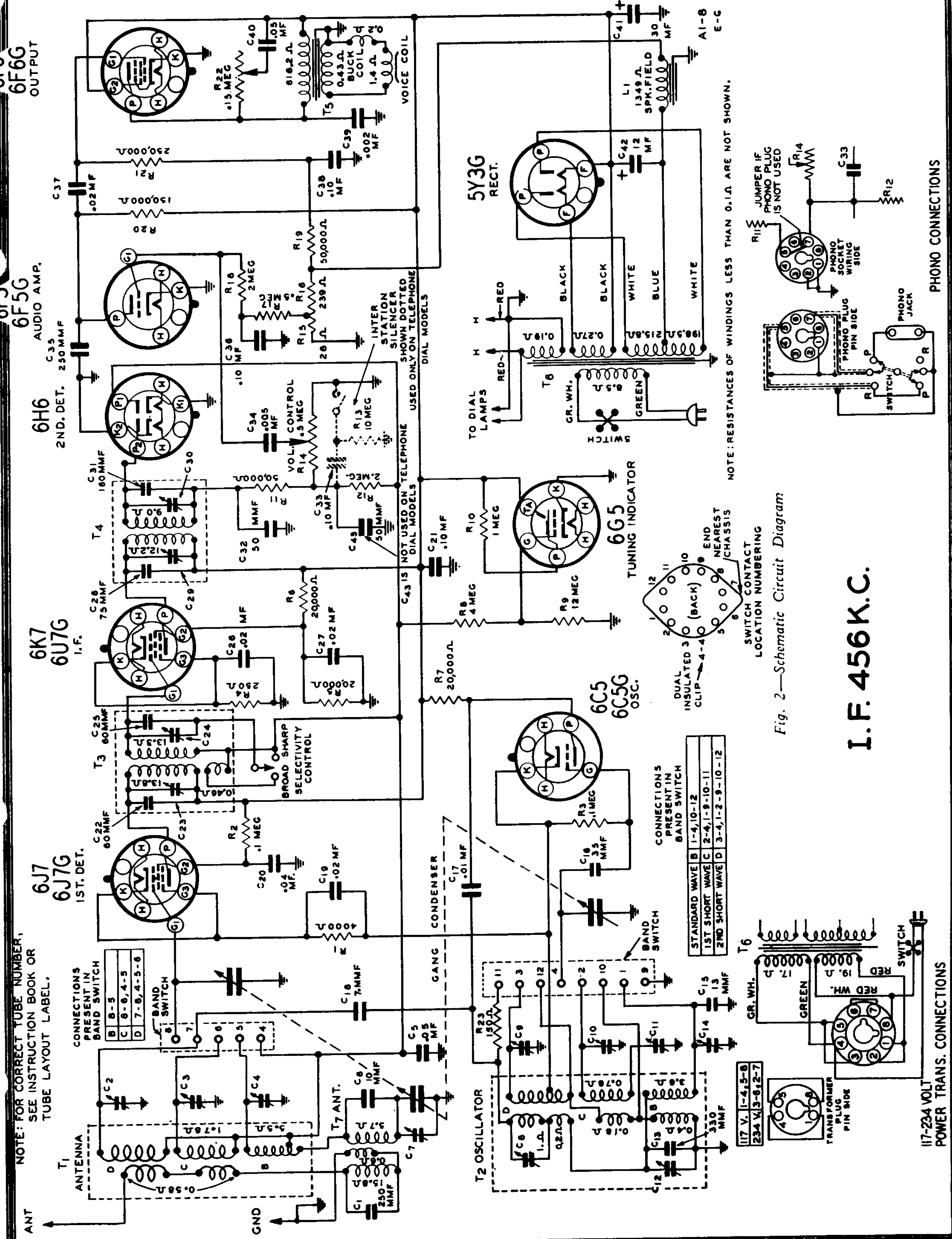


Fig. 2—Schematic Circuit Diagram

GAMBLE-SKOGMO INC.
MODEL A1 SERIES

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I. F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C29) & (C30)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C23) & (C24)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C14)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st Ant. Range B (C7) 2nd Ant. Range B (C4)	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C12)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C10)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output
2000 KC	Range C	400 Ohm	2000 KC	Antenna Lead	2000 KC (C11)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C9)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Antenna Range D (C2)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
7000 KC	Range D	400 Ohm	7000 KC	Antenna Lead	7000 KC (C8)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

In sets using the moving beam of light indicator, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until the beam is at the 1500 KC mark on the dial. Retighten the screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

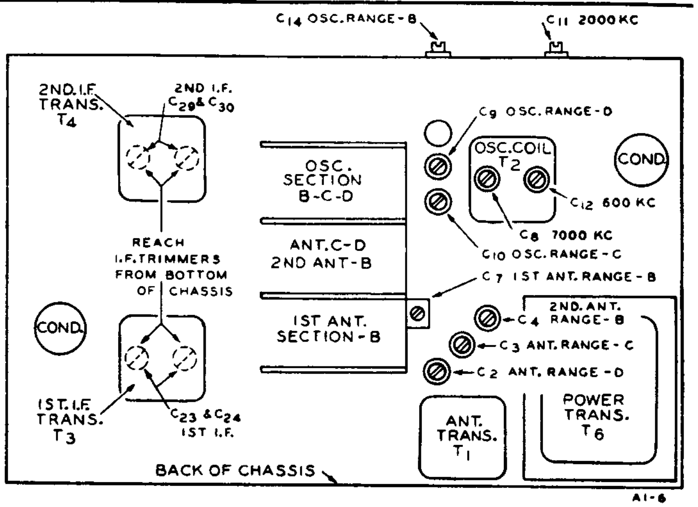


Fig. 3—Location of Trimmers

GAMBLE-SKOGMO INC.
MODEL AI SERIES

SPECIFICATIONS

Power Consumption - 67 Watts (At 117 volts 60 cycles)
Power Output - - - - 2.5 Watts Undistorted, 4.5 Watts Maximum
Selectivity - 30 KC Broad at 1000 times Signal (Sharp)
Intermediate Frequency - - - - 456 KC.
Speakers - - - - 8", 10" or 12" Dynamic

Tuning Frequency Range
B Range .... 528 to 1830 KC.
C Range .... 1810 to 6350 KC.
D Range .... 6300 to 22000 KC.

Sensitivity
B Range .... 8 Microvolts Average
C Range .... 13 Microvolts Average
D Range .... 9 Microvolts Average

Circuit

This model is a three band AC operated radio with a tuning range as shown in the specifications above.

Referring to the schematic circuit diagram, Fig. 2, T1 and T7 are the antenna coil assemblies and T2 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively.

The band switch completes connections to the coils in use. When it is in the Range B position, a double tuned antenna R.F. stage is used while for the C and D Ranges, a single tuned secondary is used.

A type 6J7 tube functions as the 1st detector.

A separate type 6C5 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

One stage of I.F. amplification is employed using a 6K7 tube. The primaries and secondaries of the 1st and 2nd I.F. transformers are tuned by small trimmer condensers.

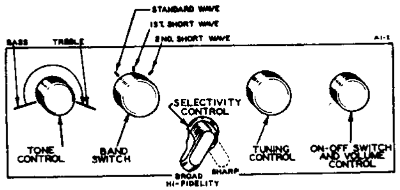


Fig. 1—Arrangement of Controls

Referring to Fig. 2, it will be noted that there is a coupling winding connected in series with the secondary of I.F. transformer T3. When the selectivity control is in the sharp position, the coupling winding is open circuited and the loose coupling which exists between the primary and secondary of this transformer results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

A 6H6 tube functions as a diode 2nd detector. AVC voltage is applied to the control grid circuits of the 1st detector and I.F. tubes.

A 6F5 triode tube functions as the first audio amplifier while the output stage uses a 6F6 output pentode tube. A dynamic reproducer is employed.

The power unit uses a 5Y3G full wave rectifier. A 6G5 tuning indicator tube is employed.

Glass and Metal Tubes

All sets of this series use a 6H6 metal tube and 5Y3G and 6G5 glass tubes.

It will be noted in the schematic that there are two tube type numbers shown at the other sockets. The "metal" tube sets use the upper tube type numbers which are for metal tubes while the "glass" tube sets use the lower tube type numbers which are for glass tubes.

Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

General Service Data

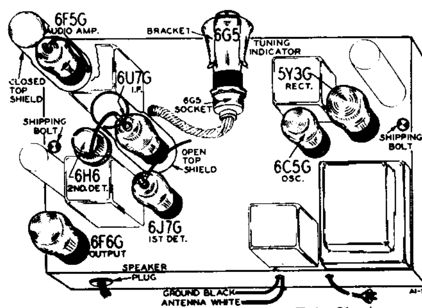


Fig. 4—Location of Tubes—Glass Tube Chassis

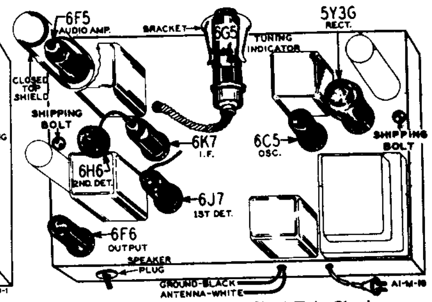


Fig. 6—Location of Tubes—Metal Tube Chassis

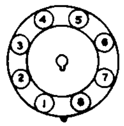


Fig. 5—Octal Tube Terminal Numbering (bottom of socket)

Twenty-five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum
Readings taken with 1000 Ohm-per-volt meter.
Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
		VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)							
6J7 6J7G	1st Det.	0	6.1[1]	220	100	7.9		6.1[1]	7.9
6C5 6C5G	Osc.	0	6.1[1]	140				6.1[1]	0
6K7 6U7G	I.F.	0	6.1[1]	220	100	2		6.1[1]	2
6H6	2nd Det.	0	6.1[1]		0			6.1[1]	0
6F5 6F5G	Audio Amp.	0	6.1[1]		75			6.1[1]	0[2]
6F6 6F6G	Power	0	6.1[1]	215	220			6.1[1]	0[3]
5Y3G	Rectifier	0	4.9[4]		610[5]		610[5]		4.9[4]
6G5	Tuning Indicator	Plate to Ground 20		Target to Ground 220		Cathode to Ground 0		Across Heater 6.1 A. C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.5 volts) as read across resistor R15.
(3) Bias (14 volts) as read across resistors R15 and R16.
(4) A.C. voltage as read across filament terminals 2 and 8.
(5) A.C. voltage as read across terminals 4 and 6.

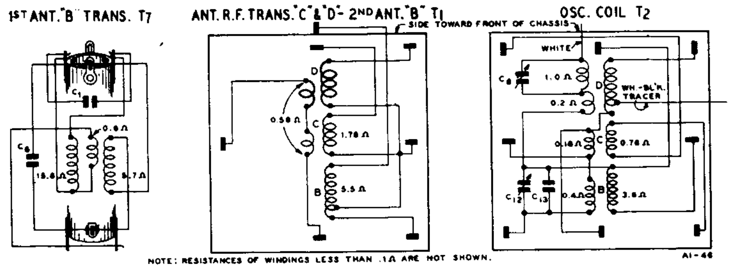


Fig. 7—Coil Terminal Arrangement and D.C. Resistance of Windings

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram Fig. 2. On the side panel of the chassis base is a round knockout 1⅛ inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

Some models are shipped from the factory equipped with the phono socket. A jumper is inserted in this socket which must be removed if the phonograph installation is made—See Fig. 2.

Early Models—A few of the early models did not have the circular knockout for the phonograph socket as mentioned above. If a phonograph installation is to be made in connection with one of these early models, write the factory for detailed instructions.

117-234 Volt Power Transformers

Some models are equipped with a 117-234 volt 40 to 60 cycle power transformer. Connections as shown in Fig. 2 are completed to a special octal socket mounted on the back panel of the chassis. A plug which goes with this socket may then be inserted for either the 117 volt or 234 volt connection.

If one of these transformers is to be installed in a chassis equipped with a regular transformer, there is a 1⅛ inch round knockout on the back panel which may be removed to permit installation of the octal socket mentioned above.

Dial and Drive Assembly

Complete information regarding the dial and drive assemblies will be found in the Dial and Drive Service Manual issued for this chassis.

GAMBLE-SKOGMO INC.

MODEL A1 SERIES

Series A1 - Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter. With the exception of the parts otherwise indicated, the following parts are common to Series A1 chassis using either the Telephone Dial or the Phantom Light Dial.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A256	Tube Socket—Octal (7 Prong)	$0.15
3A261	Tube Socket—Octal (5 Prong)	.10
3A263	Tube Socket—Octal (8 Prong)	.15
3A262	Speaker Socket—(6 Prong)	.15
13X295	6G5 Tube Socket and Cable Assembly	.55
3A266	Phono Socket—Octal (4 Prong)	.10
3A252	Dual Keyway Socket—Octal (8 Prong)—Universal Power Transformer Connections	.15
6A214	Plug (4 Prong)—Used with above socket	.25

SPEAKERS

When ordering parts for speakers, specify part number of speaker and letter preceding part number stamped on the speaker.

Part No.	Description	List Price
12A288	8" Dynamic Speaker compl. with Output Transformer (T5)	6.30
	Cone and Voice Coil Assy. for above Spkr.	2.75
	Output Transformer only (T5)	2.45
12A268	10" Dynamic Speaker compl. with Output Transformer (T5)	6.65
	Cone and Voice Coil Assy. for above Spkr.	3.50
	Output Tranformer only (T5)	2.45
12A291	12" Dynamic Speaker compl. with Output Transformer (T5)	7.55
	Cone and Voice Coil Assy. for above Spkr.	4.60
	Output Transformer only (T5)	2.45

KNOBS

Specify name of knob & name & model of radio	Volume Control	.15
	Tone Control	.15
	Tuning Control	.15
	Band Switch	.20
	Selectivity Control	.25

GENERAL

Part No.	Description	List Price
32X51	Tube Shield Base	.10
32X32	Tube Shield—Open Top (Used only on models having glass tubes)	.15
32X50	Tube Shield—Closed Top (Used on glass & metal tube chassis)	.15
8X23	Rubber Cushions (Chassis Mounting)	.10
2X38	Felt Washers (Used behind Knobs) doz.	.10
13X80	Line Cord and Plug	.50
13X214	Antenna and Ground Lead Assembly	.30
2A87	Band Change Switch (1 section, 3 position)—Used on Phantom Light Dial Radios only	1.05
2A85	Dial Lamp Switch—Used with above Switch on Phantom Light Dial only	.30
2A77	Band Change Switch (1 section, 3 position)—Used on Telephone Dial Radios only	1.00
25X375	Chassis Mounting Foot	.10
30X44	Grid Clip Only doz.	.10
2A78	Selectivity Switch	.40
4A68	Terminal Strip (3 Lugs Insulated)	.10
25X378	Clamp Bracket for Tuning Eye Tube	.10

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A774	T1	Antenna Transformer and Can Assembly "B" Range Secondary; C & D Range	$2.00
9A778	T7	1st Antenna Coil Assembly "B" Range	1.20
9A775	T2	Oscillator Coil and Can Assembly	3.35
9A776	T3	1st I.F. Transformer and Can Assembly	2.40
9A777	T4	2nd I.F. Transformer and Can Assembly	2.35
	T5	Output Transformer only (See "Speakers")	
53X144	T6	117 Volt, 60 Cycle, Standard Power Transformer	3.10
53X145	T6	117 Volt, 25 Cycle, Standard Power Transformer	5.20
53X146	T6	117-234 Volt, 40-60 Cycle, Universal Power Transformer	4.35

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X80	C5	.05 mf.	180	$0.15
46X120	C17	.01 mf.	360	.15
46X187	C19	.02 mf.	180	.15
46X212	C20	.04 mf.	360	.15
46X105	C21	.1 mf.	360	.20
46X187	C26	.02 mf.	180	.15
46X202	C27	.02 mf.	360	.15
*46X98	C33	.1 mf.	180	.20
46X147	C34	.005 mf.	360	.15

CONDENSERS (Cont.)

TUBULAR (Cont.)

Part No.	Code	Capacitance	Voltage	List Price
46X98	C36	.1 mf.	180	$0.20
46X202	C37	.02 mf.	360	.15
46X98	C38	.1 mf.	180	.20
46X100	C39	.002 mf.	600	.15
46X108	C40	.05 mf.	600	.20

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage	List Price
44X35	C41	30 mf.	250	.75
44X31	C42	12 mf.	340	.80

MOLDED

Part No.	Code	Capacitance	List Price
47X69	C1	250 mmf.	.15
47X63	C6	10 mmf.	.15
47X49	C18	7 mmf.	.10
47X56	C32	50 mmf.	.10
47X65	C35	250 mmf.	.15
†47X56	C43	50 mmf.	.10

TRIMMER

Part No.	Code	Capacitance	Description	List Price
17A73	C2	2-25 mmf.	Antenna Range—"D"	.35
	C3	2-25 mmf.	Antenna Range—"C"	
	C4	2-25 mmf.	2nd Antenna Range—"B"	
17A74	C7	2-25 mmf.	1st Antenna Range—"B"	.10
17A69	C8	40-100 mmf.	Oscillator 7000 KC	.40
	C12	40-120 mmf.	Oscillator 600 KC	
17A76	C9	2-25 mmf.	Oscillator Range "D"	.25
	C10	2-25 mmf.	Oscillator Range "C"	
17A75	C11	1300-1700 mmf.	Range "C"—Series Padding	.50
17A68	C14	1-12 mmf.	Oscillator Range "B"	.20
17A70	C23	15-50 mmf.	1st I.F. Trimmers	.40
	C24	15-50 mmf.		
17A70	C29	15-50 mmf.	2nd I.F. Trimmers	.40
	C30	15-50 mmf.		

MISCELLANEOUS

Part No.	Code	Capacitance	Description	List Price
47X82	C13	330 mmf.	Iron Clad	.30
47X81	C16	35 mmf.	Iron Clad	.25
47X85	C22	60 mmf.	Iron Clad	.30
47X85	C25	60 mmf.	Iron Clad	.30
47X84	C28	75 mmf.	Iron Clad	.35
47X87	C31	160 mmf.	Iron Clad	.30
47X80	C15	13 mmf.	Compensating Capacitor	.50
14A70			3 Section Gang Condenser less Gears and Dial Assy.	4.20

* Used only on Telephone Dial Models.
† Used only on Phantom Light Dial Models.

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A95402	R1	4000 Ohm	0.2	$0.10
A94104	R2	100,000 Ohm	0.2	.15
A94104	R3	100,000 Ohm	0.2	.15
A94251	R4	250 Ohm	0.2	.15
C94203	R5	20,000 Ohm	1.0	.15
C94203	R6	20,000 Ohm	1.0	.15
B94203	R7	20,000 Ohm	0.5	.15
A94405	R8	4 Megohm	0.2	.15
A94126	R9	12 Megohm	0.2	.15
A95105	R10	1 Megohm	0.2	.10
A95503	R11	50,000 Ohm	0.2	.10
A95205	R12	2 Megohm	0.2	.10
*A95106	R13	10 Megohm	0.2	.10
A95504	R17	500,000 Ohm	0.2	.10
A95205	R18	2 Megohm	0.2	.10
A95503	R19	50,000 Ohm	0.2	.10
A95154	R20	150,000 Ohm	0.2	.10
A95254	R21	250,000 Ohm	0.2	.10
A95151	R23	150 Ohm	0.2	.10

WIRE WOUND

Part No.	Code	Resistance	Wattage	List Price
43X76	R15	26 Ohm	.25	.35
	R16	239 Ohm	2.0	

VARIABLE

Part No.	Code	Description	List Price
36X235	R14	.5 Megohm Volume Control and On-Off Switch	.90
40X223	R22	.15 Megohm Tone Control	.65

* Used only on Telephone Dial Models.

PHONO ATTACHMENT PARTS

Part No.	Description	List Price
13X298	30" Phono Cable Assembly Complete (Includes Plug, Double-tip Phono Jack, Switch, and Knob)	$2.55
3A266	Phono Socket—Octal (4 Prong)—Must be ordered for Chassis not equipped with this socket	.10
6A218	Plug (8 Prong) Only of Phono Cable	.15
3A12	Phono Jack Only of Phono Cable	.10
2A50	Phono Switch Only of Phono Cable	.70
10A90	Knob Only of Phono Cable	.20

Prices Subject to Change Without Notice.

GENERAL ELECTRIC COMPANY

MODEL F-53

Physical Specifications

Model.................F-53
Height................ 8¾ in
Width.................12⅝ in.
Depth................. 6⅞ in.
Weight packed.........14½ lbs

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	115	60	50
C	115	25–60	55
V	105–130 and 200–250	40–60	55

Tuning Control Drive Ratio

Single Speed.......................................1:1

Electrical Power Output

Undistorted..1.0
Maximum..3.0

Loud-speaker—Electrodynamic

Cone Diameter: 6½ in.
Cone Coil Impedance: 3 ohms at 400 cycles

DESCRIPTION OF ELECTRICAL CIRCUIT

The signal from the antenna is applied to the control grid of the 6A8 tube through the R.F. transformer, the secondary of which is tuned to the incoming signal by the rear section of the main tuning condenser. In the 6A8 tube the incoming signal is combined with the local oscillator signal which is 465 kc. higher in frequency. The local signal is generated by the oscillator section of this tube, and the proper frequency difference is maintained throughout the tuning range by the front section of the tuning condenser in conjunction with the oscillator coils. The special-cut rotor of the front condenser section permits dispensing with the usual padding capacitor.

The combination of the two signals produces the intermediate frequency of 465 kc. This particular frequency is chosen to reduce image response and improve short-wave performance. The intermediate frequency amplifier consists of a 6K7 tube and two transformers, both of which have tuned primaries and secondaries. Volume is controlled by the 4500-ohm variable resistor, R-1, which varies the bias applied to the control grids of the 6A8 and 6K7 tubes.

The output of the I.F. amplifier is applied to the grid of the 6C5 detector which is properly biased for this service by the .1 megohm cathode resistor, R-6.

The output of the 6C5 detector is resistance coupled to the grid of the 6F6 power amplifier pentode. The plate circuit of the 6F6 is suitably matched to the loud-speaker by means of a step-down output transformer.

The tone control circuit consists of a .002 mfd. capacitor, connected in series with a two-point grounding switch, S-3, in the grid circuit of the 6F6 power pentode. When it is desired to reduce the high frequency output of the receiver, the switch, S-3, is turned to its counterclockwise grounding position.

Plate and grid voltages for all tubes are supplied by the power supply system employing a 5W4 full-wave rectifier tube which, together with a suitable network of resistors and capacitors, supplied the required voltages and filtering action.

ALIGNMENT PROCEDURE

Before making any adjustments to the R.F. circuits, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal from the test oscillator to the receiver and inserting a "tuning wand" into the antenna coil. The "tuning wand" consists of a bakelite rod having a brass cylinder attached to one end, and a small core of finely divided iron compacted into the opposite end. By inserting the brass cylinder end into the antenna coil, the inductance is lowered, increasing its resonant frequency. Inserting the iron-filled end into the coil raises its inductance, lowering its resonant frequency. If the circuits are in exact alignment, inserting either end of the tuning wand in the coil will result in a decrease in output. When an increase in signal is obtained with the iron-filled end of the wand at the 1500-kc. point or the 4.0-mc. point, a decrease in resonant frequency of that circuit by increasing the antenna trimmer capacity is indicated. When an increase in signal is obtained with the brass cylinder, a decrease in antenna trimmer capacity is indicated.

Changes Indicated by Wand

Wand	Signal	Trimmer Adjustment Required
Brass cylinder Iron filings	Decrease Decrease	None
Brass cylinder Iron filings	Increase Decrease	Decrease capacity
Brass cylinder Iron filings	Decrease Increase	Increase capacity

ALIGNMENT FREQUENCIES

I.F.	Broadcast	Short-wave
465 Kc.	1500 Kc.	4000 Kc.

In order to align these receivers properly it is necessary to have available:

1. A modulated test oscillator capable of producing the above alignment frequencies.
2. An output indicator, such as a high-resistance a-c voltmeter with a maximum scale reading of 3 to 5 volts, or a neon lamp indicator.
3. An alignment tool consisting of an insulating shaft with a small screwdriver blade.

The location of all alignment trimmer capacitors are illustrated in Fig. 2.

(1) *I.F. Alignment*

Set the frequency band switch of the receiver to the broadcast position and turn the volume control to maximum (extreme clockwise position). Tune the receiver to a point where no signal comes in and short-circuit the antenna and ground leads.

Connect the test oscillator output between the chassis and the control grid of the 6A8 tube. Connect the output meter across the cone coil of the speaker. Set the test oscillator to 465 kc. and adjust the output until a small deflection is observed in the output meter.

The four I.F. trimmers, see Fig. 2, are adjusted in the following sequence:

1. Secondary trimmer on second I.F. transformer.
2. Primary trimmer on second I.F. transformer.
3. Secondary trimmer on first I.F. transformer.
4. Primary trimmer on first I.F. transformer.

Throughout all adjustments the output should be maintained at a low level by decreasing the test oscillator output as the various stages are brought in line. After these adjustments have been made, the same procedure should be repeated as a final check. The I.F. alignment will then be complete.

(2) *I.F. Wave Trap*

No adjustable trimmer is provided for the I.F. trap adjustment in this receiver. The capacitor C-27, in conjunction with the inductance, L-1, automatically provides rejection of incoming I.F. signals.

(3) *R.F. Alignment*

The Ant. and oscillator trimmers are aligned at 1500 kc. First of all, check the position of the dial pointer. To do this, rotate the gang condenser to the maximum capacity position, i.e., plates fully meshed. While in this position, align the pointer with the last black line on the scale by loosening the dial drum set screws and rotating the drum on the gang shaft. Remove the short-circuit from the antenna and ground terminals and connect the test oscillator to same through a dummy antenna consisting of a 400-ohm resistor in series with a 250-mmf. capacitor. Connect the output indicator across the speaker cone coil.

(*a*) *Broadcast Band—(540-1800 Kc.)*

With the band switch in the clockwise position, set the tuning indicator to 1500 kc. Set the test oscillator at 1500 kc. and adjust the broadcast band oscillator trimmer, C-4 for maximum output. Next, set the Ant. trimmer, C-3, for maximum output, taking care that the output from the test oscillator is not high enough to overload any part of the set. No padding adjustment is required.

To complete the broadcast band line-up, repeat the Ant. trimmer adjustment after aligning the short-wave band.

(*b*) *Short-wave Band (1800-4000 Kc.)*

Turn the band switch to its counterclockwise position. Set the test oscillator at 4000 kc. and tune the receiver to resonate at this frequency. No trimmer is provided for short-wave oscillator alignment. To perform the Ant. short-wave adjustment, rock the tuning condenser back and forth through resonance while adjusting the short-wave Ant. trimmer, C-5, for maximum output indication on the tuning meter. It may now be necessary to readjust the broadcast band Ant. trimmer as indicated above.

Alignment of the receiver is now complete.

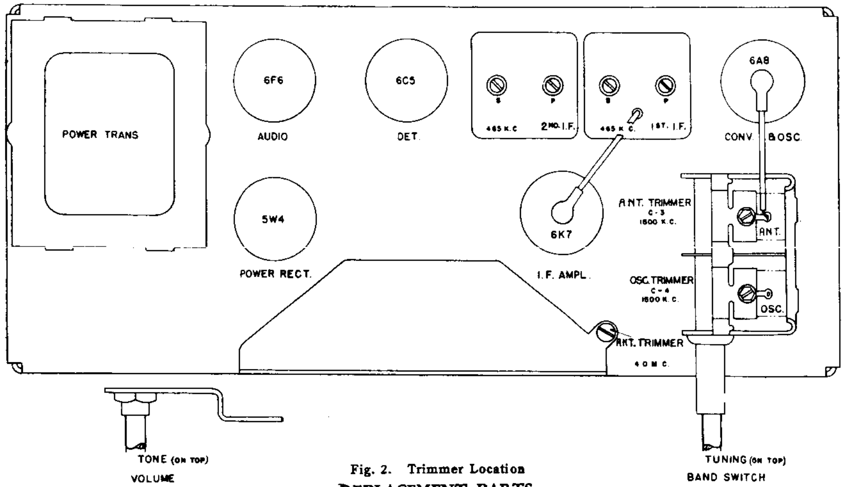


Fig. 2. Trimmer Location

REPLACEMENT PARTS

(Insist on genuine factory-tested parts which may be purchased from authorized dealers)

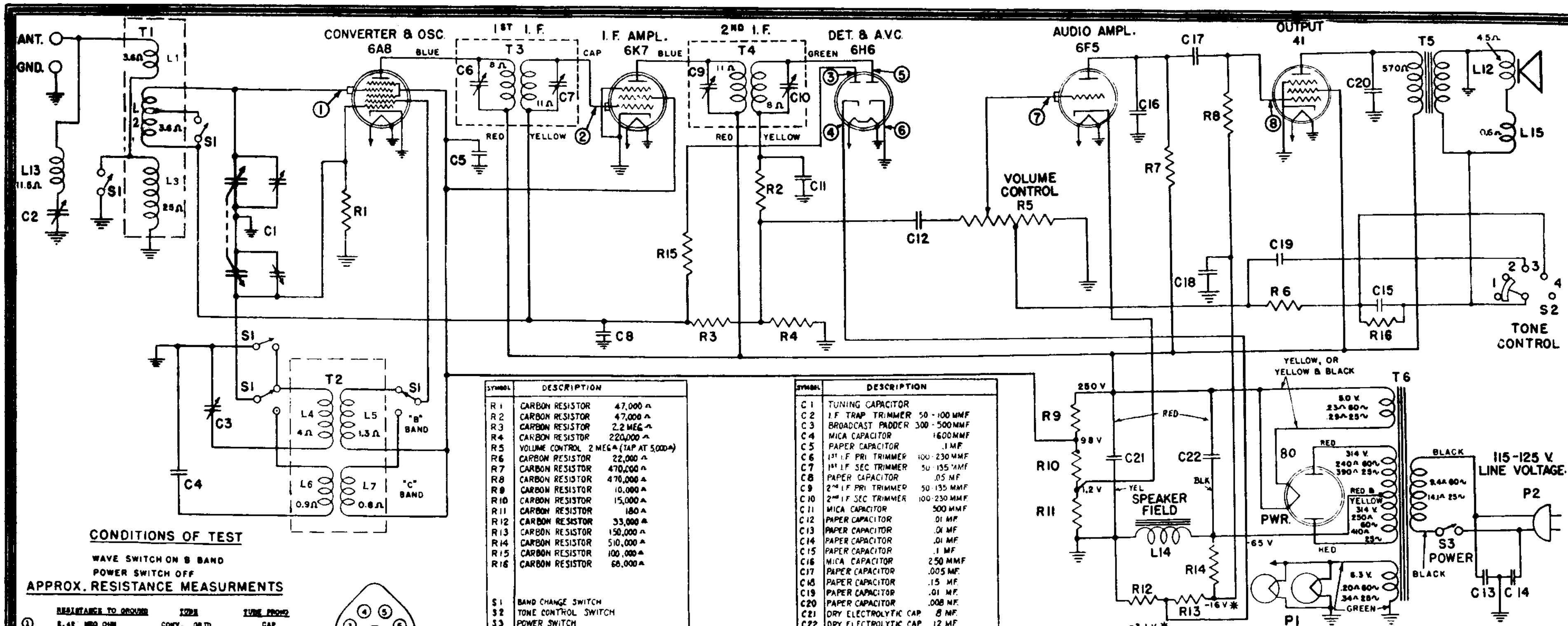
Stock No.	Description	List Price
	RECEIVER ASSEMBLY	
*RB-008	BOARD—Terminal Board (two lugs).....	$0.10
*RB-053	BOARD—Terminal Board (3 lugs).......	.10
*RC-013	CAPACITOR—.002 Mfd., 200 V. paper (C-18)................	.25
*RC-027	CAPACITOR—.006 Mfd., 1000 V. paper (C-19)................	.30
RC-039	CAPACITOR—.01 Mfd., 600 V. paper (C-20)................	.25
*RC-083	CAPACITOR—.03 Mfd., 400 V. paper (C-17)................	.25
*RC-096	CAPACITOR—.1 Mfd., 200 V. paper (C-14, C-16)............	.30
*RC-123	CAPACITOR—.1 Mfd., 400 V. paper.....	.35
*RC-136	CAPACITOR—.25 Mfd., 200 V. paper (C-13)................	.30
*RC-210	CAPACITOR—50 Mmf., Mica (C-27)....	.25
*RC-235	CAPACITOR—100 Mmf., Mica (C-26)...	.25
*RC-333	CAPACITOR—1000 Mmf., Mica (C-28)..	.30
*RC-338	CAPACITOR—1100 Mmf., Mica (C-25)..	.25
*RC-564	CAPACITOR—8 Mfd., 350 V.; 8 Mfd., 350 V. dry electrolytic (C-33, C-34)........	1.25
*RC-631	CAPACITOR—5–40 Mmf., Mica trimmers (C-5)................	.30
*RC-714	CONDENSER—2 section tuning condenser with trimmers (C-1, C-2, C-3, C-4)..	3.00
RC-835	CABLE—Dial cable assembly (complete) (pkg. of 5)............	.15
*RC-860	CORD—Power Cord..................	.65
*RC-944	CUSHION—Gang mtg. cushion.........	.10
*RC-945	CLAMP—Electrolytic mounting clamp...	.05
RD-049	DIAL—Dial scale..................	.50
RD-050	DRUM—Gang drive drum.............	.30
RE-015	ESCUTCHEON—Escutcheon plate......	1.25
*RG-001	GRID CLIP—Control grid clip (Pkg. of 5)	.10
RK-016	KNOB—Control knob (Pkg. of 5)........	.40
*RL-024	COIL—Antenna coil (L-1, L-2)..........	1.00
*RL-234	COIL—Osc. coil Band "C" (L-4)........	.40
RL-919	LAMP—6.3 volt dial lamp (P-1, P-2) (pkg. of 10)............	1.20
RP-071	POINTER—Dial scale pointer (Pkg. of 5)	.25

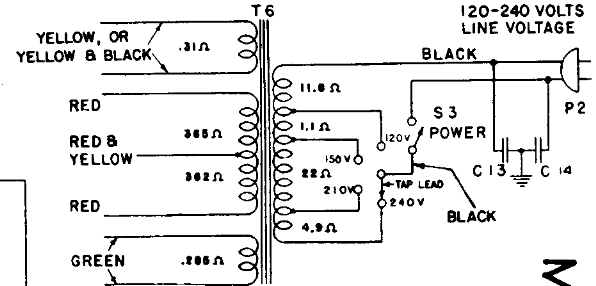
Stock No.	Description	List Price
*RQ-101	RESISTOR—56,000 ohms, ¼ W. Carbon (R-2) (Pkg. of 5)............	$0.60
*RQ-107 (RR-050)	RESISTOR—100,000 ohms, ¼ W. Carbon (R-6) (Pkg. of 5)............	.70
*RQ-117	RESISTOR—270,000 ohms, ¼ W. Carbon (R-7) (Pkg. of 5)............	.70
*RQ-123	RESISTOR—470,000 ohms, ¼ W. Carbon (R-8) (Pkg. of 5)............	.70
*RQ-444	RESISTOR—240 ohms, 1 W. Carbon (R-10)................	.15
*RQ-459	RESISTOR—1000 ohms, 1 W. Carbon (R-9)................	.15
*RQ-483	RESISTOR—10,000 ohms, 1 W. Carbon (R-4)................	.15
*RQ-489	RESISTOR—18,000 ohms, 1 W. Carbon (R-3)................	.15
*RS-200	SOCKET—8-pin tube socket (Pkg. of 5)..	.75
*RS-204	SOCKET—5-pin tube socket (Pkg. of 5)..	.75
RS-216	SOCKET—Pilot lamp socket..........	.05
*RS-332	SWITCH—Band change switch (S-1)....	.60
*RS-333	SWITCH—Tone control switch (S-3)....	.40
*RT-229	TRANSFORMER—1st I.F. transformer (complete) (L-3, L-5, C-6, C-7)........	1.90
*RT-230	TRANSFORMER—2nd I.F. transformer (complete) (L-6, C-8, C-9)...........	1.50
*RT-057	TRANSFORMER—Power transformer, 60 cycles, 115-120 volt (T-2)...........	3.85
*RT-058	TRANSFORMER—Power transformer, 25-60 cycles, 115-120 volts (T-2).......	7.50
*RT-059	TRANSFORMER—Universal power transformer................	8.00
*RW-101	WASHER—Felt washer for knobs (Pkg. of 10)................	.45
*RX-019	WASHER—Mounting washers and screws	.10
*RV-019	VOLUME CONTROL—4500 ohm volume control and power switch (R-1, S-4)....	.95
	SPEAKER ASSEMBLY	
*RC-915	CONE—Speaker cone................	.90
*RS-040	SPEAKER—6½-inch type speaker (Complete with output transformer)........	6.00
*RT-420	TRANSFORMER—Output transformer (T-1)................	1.00

* Used on previous receivers. **(Prices subject to change without notice)**

GENERAL ELECTRIC COMPANY

MODELS F-63, F-65 & F-66





SYMBOL	DESCRIPTION
R1	CARBON RESISTOR 47,000 Ω
R2	CARBON RESISTOR 47,000 Ω
R3	CARBON RESISTOR 2.2 MEG Ω
R4	CARBON RESISTOR 220,000 Ω
R5	VOLUME CONTROL 2 MEG Ω (TAP AT 5,000 Ω)
R6	CARBON RESISTOR 22,000 Ω
R7	CARBON RESISTOR 470,000 Ω
R8	CARBON RESISTOR 470,000 Ω
R9	CARBON RESISTOR 10,000 Ω
R10	CARBON RESISTOR 15,000 Ω
R11	CARBON RESISTOR 180 Ω
R12	CARBON RESISTOR 33,000 Ω
R13	CARBON RESISTOR 150,000 Ω
R14	CARBON RESISTOR 510,000 Ω
R15	CARBON RESISTOR 100,000 Ω
R16	CARBON RESISTOR 68,000 Ω
S1	BAND CHANGE SWITCH
S2	TONE CONTROL SWITCH
S3	POWER SWITCH
T1	ANT. TRANSFORMER
T2	OSC. TRANSFORMER
T3	1st I.F. TRANSFORMER
T4	2nd I.F. TRANSFORMER
T5	OUTPUT TRANSFORMER
T6	POWER TRANSFORMER

SYMBOL	DESCRIPTION
C1	TUNING CAPACITOR
C2	I.F. TRAP TRIMMER 50-100 MMF
C3	BROADCAST PADDER 300-500 MMF
C4	MICA CAPACITOR 1600 MMF
C5	PAPER CAPACITOR .1 MF
C6	1st I.F. PRI. TRIMMER 100-230 MMF
C7	1st I.F. SEC. TRIMMER 50-135 MMF
C8	PAPER CAPACITOR .05 MF
C9	2nd I.F. PRI. TRIMMER 50-135 MMF
C10	2nd I.F. SEC. TRIMMER 100-230 MMF
C11	MICA CAPACITOR 500 MMF
C12	PAPER CAPACITOR .01 MF
C13	PAPER CAPACITOR .01 MF
C14	PAPER CAPACITOR .01 MF
C15	PAPER CAPACITOR .1 MF
C16	MICA CAPACITOR 250 MMF
C17	PAPER CAPACITOR .005 MF
C18	PAPER CAPACITOR .15 MF
C19	PAPER CAPACITOR .01 MF
C20	PAPER CAPACITOR .008 MF
C21	DRY ELECTROLYTIC CAP. 8 MF
C22	DRY ELECTROLYTIC CAP. 12 MF
L12	VOICE COIL
L13	WAVE TRAP COIL
L14	LOUDSPEAKER FIELD
L15	HUM BUCKING COIL

Fig. 1. Schematic Circuit Diagram

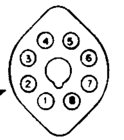
CONDITIONS OF TEST

WAVE SWITCH ON B BAND

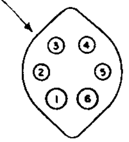
POWER SWITCH OFF

APPROX. RESISTANCE MEASURMENTS

	RESISTANCE TO GROUND	TYPE	TUBE PRONG
1	2.42 MEG OHM	CONV. GRID	CAP
2	2.42 MEG OHM	I.F. GRID	CAP
3	2.38 MEG OHM	DIODE PLATE	PRONG 3
4	31,000 OHM	DIODE CATHODE	PRONG 4
5	267,000 OHM	DIODE PLATE	PRONG 5
6	GROUNDED	DIODE CATHODE	PRONG 6
7	0-2 MEG OHM VOL. CONT.	A.F. GRID	CAP
8	600,000 OHM	OUTPUT GRID	PRONG 4



PRONG NUMBERS BOTTOM VIEW 1 TO 7 INCL.



PRONG NUMBERS BOTTOM VIEW FOR 8

* MEASURED WITH VOLTMETER OF AT LEAST 500,000 OHMS RESISTANCE

I.F. 465 K.C.

Tuning Frequency Range

Band "B" . . . . 540-1750 KC
Band "C" . . . . 2.2-7.0 MC

Tubes

Oscillator and Converter . . . . 6A8 Pentagrid converter
IF Amplifier . . . . 6K7 Triple-grid Super-control Amplifier
Detector and AVC . . . . 6H6 Twin Diode
First Audio Amplifier . . . . . . 6F5 High-gain Triode
Audio Power Amplifier . . . . . 41 Power Amplifier Pentode
Rectifier . . . . 80 Full-wave Rectifier
Dial Lamp . . . . MAZDA No. 46

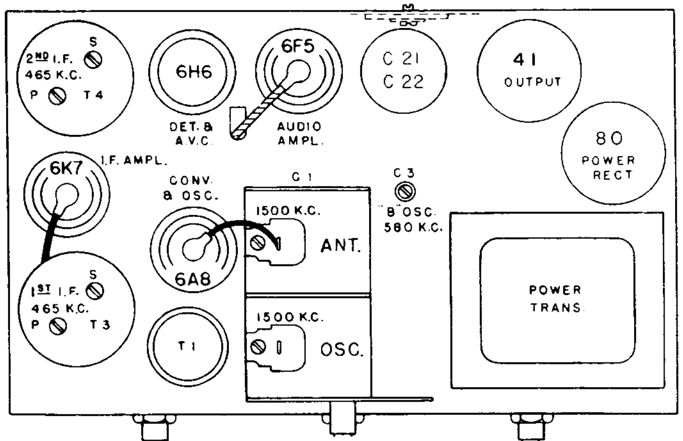


Fig. 3. Chassis Layout and Trimmer Location

#0026137

GENERAL ELECTRIC COMPANY

MODELS F-63, F-65 & F-66

SERVICE DATA

Tuning Control Drive Ratio............8 to 1

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	115-125	50-60	70
C	115-125	25-60	70
V	115-155 and 190-250	50-60	75

NOTE: Rating "V" receivers may be used on 40-cycle circuits provided the voltage does not exceed 110 volts on the 115-125-volt tap or 200 volts on the 190-220-volt tap.

Electrical Power Output

Undistorted...............2.5 Watts
Maximum...............5.0 Watts

Tone Control...............4-point control

Loud-speaker—Electrodynamic

Cone: Model F-63......... 6½ in.
Model F-65......... 8 in.
Model F-66.........12 in.

Speaker Impedance........5.5 ohms at 400 cycles

GENERAL INFORMATION

These two-band receivers employ six General Electric tubes described above in a superheterodyne circuit which includes a single stage of I.F., automatic volume control, four-point tone control, wave trap and pentode output.

L1, L2 and L3 are the components of the "B" band antenna coil and are wound on the same coil form. When operating in the "C" band, L3 and a part of L2 are shorted out by the wave change switch. L4–L5 and L6–L7 are the "B" and "C" band oscillator coils respectively and are wound on the same coil form. The "B" band oscillator grid coil is shorted out by a contact of S-1 when the set is operating on the "C" band.

The intermediate frequency amplifier consists of a 6K7 tube and two transformers, both of which have tuned primaries and secondaries. The output of this amplifier is applied to one plate of the 6H6 diode which is a combined detector, initial bias and automatic volume control tube.

Volume is controlled by the variable potentiometer R-5 in the grid circuit of the 6F5 1st audio amplifier tube. The output of the 6F5 tube is resistance coupled to the grid of the type 41 power amplifier pentode. The plate circuit of the 41 tube is suitably matched to the loud-speaker by means of a step-down output transformer.

Proper bias voltages for the various tubes are obtained by the use of a tapped bleeder circuit across the speaker field L14. One of the cathodes of the 6H6 diode is returned to −3.1 volts on this bleeder circuit in order to provide initial bias to all the tubes controlled by the A.V.C.

Tone Control

When the tone control switch is in the "normal" position, a portion of the output voltage of the receiver is fed back through a resistor-capacitor network consisting of C-15, R-16 and R-6 to a tap on the volume control. This feed back voltage is out of phase with the input and the resulting degeneration improves the frequency characteristic and reduces distortion. In the "bass" position, the tone control switch connects C-19 in parallel with the above network. The value of C-19 is such that more degeneration of the high than the low frequency notes occurs, thereby increasing the bass response. The "foreign" position of the switch shorts out C-15 and R-16 and places C-19 and R-6 in parallel which gives a frequency response best suited for short-wave reception. In the "speech" position, C-15 and R-16 are shorted out, C-19 is removed from the circuit, leaving R-6, thereby providing flat degeneration at all frequencies which is the most desirable condition for the reception of programs predominating in speech. The tone control switching described can be traced on the schematic diagram shown in Fig. 1.

ALIGNMENT PROCEDURE

In order to align these receivers properly, it is necessary to have the following test equipment:

1. A modulated test oscillator.

2. An output indicator such as an a-c voltmeter with a scale reading of 3 to 5 volts.

3. A screwdriver-type alignment tool.

To realize all the performance built into these receivers at the factory, alignment using cathode-ray equipment is to be preferred. The alignment procedure is given in table form on page 5 along with a trimmer location drawing Fig. 3. The "Dummy Antenna" is the capacitor or capacitor and resistor used in series with the signal generator antenna lead. The grid lead should not be removed from the tube to which the input signal is applied when aligning the I.F.

SOCKET VOLTAGES

Tube No.	Plate to Ground Volts D-C	Screen Grid to Ground Volts D-C	Cathode to Ground Volts D-C	Cathode Current M.A.	Heater Volts A-C
6A8 Oscillator	98	....	0	....	6.3
6A8 Converter	250	98	0	12.0	6.3
6K7 I.F. Amplifier	250	98	0	9.0	6.3
6H6 Detector and AVC	....	....	....	....	6.3
6F5 Audio Amplifier	90*	....	1.2	0.3	6.3
41 Output	234	250	0	38.0	6.3
80 Power Rectifier	628/314 RMS	....	....	64.0	5.0

A-C line voltage 120—No signal input—1000 ohms per voltmeter—dial pointer at 530 K.C.

* Measured on 1000-volt scale.

I. F. ALIGNMENT WITH OSCILLOSCOPE

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"	465 K.C. Sweep	I.F. Grid	.05 Mfd. or Larger	2nd I.F. Sec. (C-10) 2nd I.F. Pri. (C-9)	Gang condenser plates wide open—connect audio input of oscilloscope to ground and to the junction of R-3 and R-4 of the 2nd I.F. transformer—Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude.
2. Band "B"	465 K.C. Sweep	Converter Grid	.05 Mfd. or Larger	1st I.F. Sec. (C-7) 1st I.F. Pri. (C-6)	
3. Band "B"	465 K.C. Sweep	Antenna Post	250 Mmf. 400 ohms	Wave Trap Trimmer (C-2)	Adjust trimmer for minimum amplitude.

I. F. ALIGNMENT WITH OUTPUT METER

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"	465 K.C. with Modulation	I.F. Grid	.05 Mfd. or Larger	2nd I.F. Sec. (C-10) 2nd I.F. Pri. (C-9)	Gang condenser plates wide open—connect output meter across voice coil—keep input signal low and volume control on as far as possible. Adjust all trimmers for maximum output
2. Band "B"	465 K.C. with Modulation	Converter Grid	.05 Mfd. or Larger	1st I.F. Sec. (C-7) 1st I.F. Pri. (C-6)	
3. Band "B"	465 K.C. with Modulation	Antenna Post	250 Mmf. 400 ohms	Wave Trap Trimmer (C-2)	Adjust trimmer for minimum output.

R. F. ALIGNMENT

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
1. Band "B"					Close gang plates—Adjust pointer to first line at left end of tuning scale.
2. Band "C"	No adjustments necessary				
3. Band "B"	1500 K.C. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. trimmer (Front sect. of gang cond.) Ant. trimmer (Rear sect. of gang cond.)	Connect output meter across voice coil—tone control on "bass" position—peak trimmers for maximum output with a low input signal.
4. Band "B"	580 K.C. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. padder (C-3)	Adjust padder for a maximum output meter indication in vicinity of 580 K.C. while rocking the gang condenser.
5. Band "B"	Repeat operation No. 3				

PARTS LIST

Stock No.	Description	List Price
*RB-041	BOARD—Terminal Board (on rear wall of chassis)	$0.10
RB-055	BOARD—Terminal Board (under 1st I.F. transformer)	.10
RB-058	BOARD—Terminal Board (near power transformer)	.10
*RC-023	CAPACITOR—.005 Mfd., 600 V. Paper (C-17)	.25
*RC-042	CAPACITOR—.01 Mfd., 1000 V. Paper (C-12)	.30
*RC-091	CAPACITOR—.05 Mfd., 400 V. Paper (C-8)	.30
RC-103	CAPACITOR—.01 Mfd., 200 V. Paper (close tolerance) (C-15)	.30
*RC-110	CAPACITOR—.15 Mfd., 200 V. Paper (C-18)	.30
*RC-123	CAPACITOR—0.1 Mfd., 400 V. Paper (C-5)	.35
RC-134	CAPACITOR—.01 Mfd., 200 V. Paper (close tolerance) (C-19)	.25
RC-193	CAPACITOR—.008 Mfd., 600 V. Paper (C-20)	.25
*RC-259	CAPACITOR—250 Mmf., Mica (C-16)	.30
*RC-296	CAPACITOR—500 Mmf., Mica (C-11)	.25
*RC-348	CAPACITOR—1600 Mmf., Mica (C-4)	.35
RC-574	CAPACITOR—8 Mfd., 400 V.; 12 Mfd., 400 V. Dry Electrolytic (C-21, C-22)	1.55
*RC-608	CAPACITOR—B.C. Padder 300-500 Mmf. (C-3)	.45
*RC-609	CAPACITOR—Wave Trap Trimmer 50-100 Mmf. (C-2)	.40
RC-644	CAPACITOR—Double Trimmers, 1st or 2nd I.F. Transformer (C-6, D-7, C-9, C-10)	.40
*RC 709-22	CONDENSER—2 Gang Tuning Condenser (C-1)	3.25
*RC-753	CAPACITOR—Line Capacitor .01-.01 Mfd., 250 V. A.C. (C-13, C-14)	.40
RC-839	CABLE—Speaker Cable and Female Plug	.50
RC-864	CORD—Power Cord with Plug	.50
*RD-033-22	DRIVE—Condenser Vernier Drive	1.00
RE-014	ESCUTCHEON—Escutcheon (Complete)	1.40
*RF-004	FOOT—Chassis Mtg. Foot	.15
*RG-001	GRID CAP—Control Grid Clip (Pkg. of 5)	.10
RG-300	GROMMET—Tuning Shaft Grommet (Pkg. of 5)	.20
RK-017	KNOB—Control Knob (Pkg. of 5)	.40
RK-018	KNOB—Wave Change Switch Knob (Pkg. of 5)	.40
RL-042	COIL—Antenna Coil Band "B" and "C" (T-1)	1.20
RL-244	COIL—Oscillator Coil Band "B" and "C" (T-2)	.95
RL-602	COIL—Wave Trap Coil (L-13)	.50
RL-920	LAMP—Dial Lamp 6.3 V., 0.25 Amp. (P-1) (Pkg. of 10)	1.50
RQ-883	RESISTOR—10,000 ohm, 3 W. Carbon (R-9)	.25
RQ-1241	RESISTOR—180 ohm, ½ W. Carbon (R-11) (Pkg. of 5)	.70
RQ-1291	RESISTOR—22,000 ohm, ½ W. Carbon (R-6) (Pkg. of 5)	.70
RQ-1295	RESISTOR—33,000 ohm, ½ W. Carbon (R-12) (Pkg. of 5)	.70
RQ-1299	RESISTOR—47,000 ohm, ½ W. Carbon (R-1, R-2) (Pkg. of 5)	.70
RQ-1303	RESISTOR—68,000 ohm, ½ W. Carbon (Pkg. of 5)	.70
RQ-1307	RESISTOR—100,000 ohm, ½ W. Carbon (R-15) (Pkg. of 5)	.70
RQ-1311	RESISTOR—150,000 ohm, ½ W. Carbon (R-13) (Pkg. of 5)	.70
RQ-1315	RESISTOR—220,000 ohm, ½ W. Carbon (R-4) (Pkg. of 5)	.70
RQ-1323	RESISTOR—470,000 ohm, ½ W. Carbon (R-7, R-8) (Pkg. of 5)	.70
RQ-1324	RESISTOR—510,000 ohm, ½ W. Carbon (R-14) (Pkg. of 5)	.70
RQ-1339	RESISTOR—2.2 Megohm, ½ W. Carbon (R-3) (Pkg. of 5)	.70
RQ-1487	RESISTOR—15,000 ohm, 1 W. Carbon (R-10) (Pkg. of 5)	1.00
RS-215	SOCKET—Tube Socket (Pkg. of 5)	.60
RS-322	SWITCH—Band Change Switch	$0.75
RS-347	SWITCH—Tone Control Switch	.50
*RS-200	SOCKET—8-pin Tube Socket (Pkg. of 5)	.75
RS-217	SOCKET—4-prong Tube Socket (Pkg. of 5)	.50
RS-141	SHIELD—1st I.F. Transformer Shield	.15
RS-142	SHIELD—2nd I.F. Transformer Shield	.15
RT-0611	TRANSFORMER—Power Transformer 115-120 Volt, 60 Cycles (T-6)	4.00
RT-0612	TRANSFORMER—Power Transformer 115-120 Volt, 25/60 Cycles (T-6)	6.25
RT-0613	TRANSFORMER—Universal power transformer 105-130 V., 200-250 V., 40/-60 Cycles	7.60
RT-241	TRANSFORMER—1st I.F. Transformer (Complete) (T-3)	1.60
RT-242	TRANSFORMER—2nd I.F. Transformer (Complete) (T-4)	1.65
RV-028	VOLUME CONTROL—Volume Control and Power Switch (R-5, S-3)	.95
RW-015	WINDOW—Escutcheon Window and Rubber Mountings	.35
*RW-101	WASHER—Felt Washer for Control Shafts (Pkg. of 10)	.45
*RX-015	ASSEMBLY—Chassis Mounting Bolts and Nuts	.10
*RX-016	MOUNTING ASSEMBLY—Tuning Condenser Mounting Assembly (Includes 3 Cushions, 3 Screws)	.30
	F-63 SPEAKER ASSEMBLY	
RC-923	CONE—6½-inch Type Cone and Voice Coil	.90
*RC-1950	CLAMP—Cone Spider Clamp and Screw	.05
RP-015	PLUG—Male Speaker Plug	.20
RS-053	SPEAKER—6½-inch Type Speaker (Complete with Output Transformer)	5.70
RT-427	TRANSFORMER—Output Transformer (T-5)	1.20
	F-65 SPEAKER ASSEMBLY	
RC-924	CONE—8-inch Cone and Voice Coil	.90
*RC-990	CLAMP—Cone Spider Clamp and Screw	.05
RP-015	PLUG—Male Speaker Plug	.20
RS-054	SPEAKER—8-inch Type Speaker (Complete with Output Transformer)	5.90
*RS-416	SPRING—Voice Coil Leads Spring (Pkg. of 2)	.10
RT-428	TRANSFORMER—Output Transformer (T-5)	1.20
	F-66 SPEAKER ASSEMBLY	
*RC-991	CLAMP—12-inch Cone Spider Clamp	.05
RC-925	CONE—12-inch Cone and Voice Coil	1.25
RP-015	PLUG—Male Speaker Plug	.20
RS-055	SPEAKER—12-inch Type Speaker (Complete with Output Transformer)	6.80
*RS-416	SPRING—Voice Coil Leads Spring (Pkg. of 2)	.10
RT-428	TRANSFORMER—Output Transformer) (T-5)	1.20
	DIAL SCALE MECHANISM	
RB-604	BUSHING—Volume Control Cable Drive Bushing	.10
RC-840	CABLE—Gang Condenser Drive Cable (Pkg. of 5)	.45
RC-841	CABLE—Volume Control Drive Cable (Pkg. of 5)	.45
RC-842	CABLE—Tone Control Drive Cable (Pkg. of 5)	.40
RD-051	DIAL—Dial Scale	1.00
*RD-030	DRUM—Condenser Drive Drum	.40
RP-073	POINTER—Volume or Tone Control Pointer (Pkg. of 5)	.10
RP-074	POINTER—Dial Scale Pointer (Pkg. of 5)	.90
RP-075	PULLEY—Small Drive Cord Idler Pulley (Pkg. of 6)	.20
RP-076	PULLEY—Tone Control Drive Pulley	.15
RR-910	REFLECTOR—Lamp Reflector	.10
RS-218	SOCKET—Lamp Socket Assembly	.10
RS-425	SPRING—Tuning Drive Cord Tension Spring (Pkg. of 5)	.10
RS-426	SPRING—Tone or Volume Control Drive Cord Spring (Pkg. of 5)	.10

* Used on previous receivers.

(Prices subject to change without notice)

GENERAL ELECTRIC CO.
MODELS F-70 & F-75

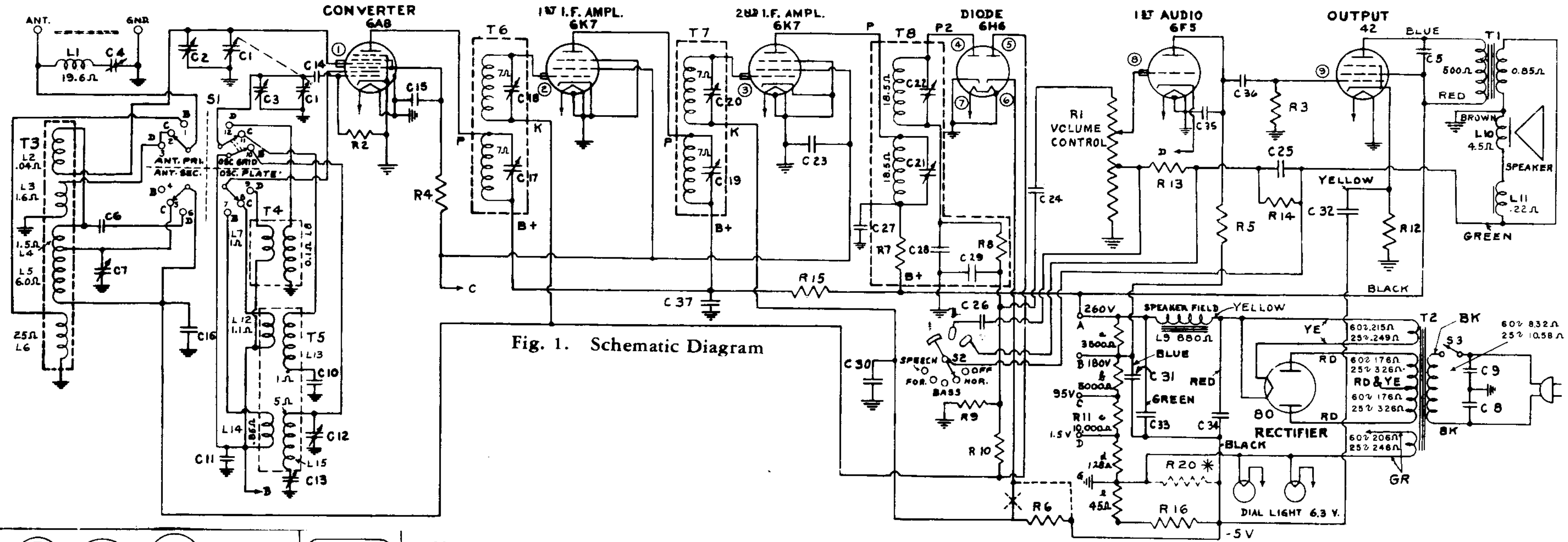
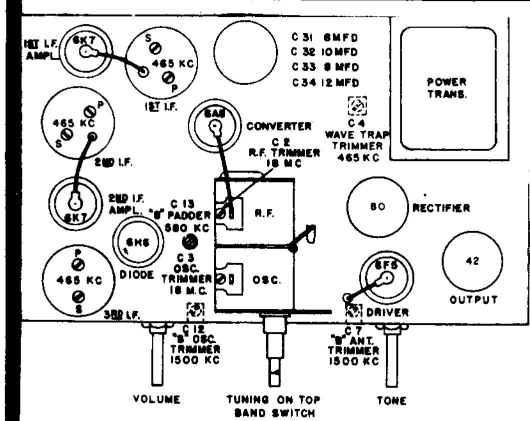


Fig. 1. Schematic Diagram



CHASSIS LAYOUT AND TRIMMER LOCATIONS

Fig. 4. Chassis Layout and Trimmer Location

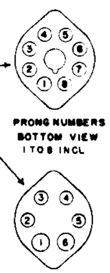
CONDITIONS OF TEST

WAVE SWITCH ON B BAND
POWER SWITCH OFF

APPROXIMATE RESISTANCE MEASUREMENTS

	RESISTANCE TO GROUND	TUBE	SOCKET PRONG
(1)	1.2 MEG. Ω	CONV. GRID	CAP
(2)	1.2 MEG. Ω	1ST I.F. GRID	CAP
(3)	100,000 Ω	2ND I.F. GRID	CAP
(4)	290,000 Ω	DIODE PLATE	PRONG 3
(5)	1.2 MEG. Ω	DIODE PLATE	PRONG 5
(6)	100,000 Ω	DIODE CATH.	PRONG 4
(7)	GROUNDED	DIODE CATH.	PRONG 8
(8)	0-2 MEG. Ω VOL. CONT.	1ST AUDIO GRID	CAP
(9)	470,000 Ω	OUTPUT GRID	PRONG 4

ALL VOLTAGES TO GROUND UNLESS OTHERWISE SPECIFIED.
ALL VOLTAGES MEASURED WITH ANT. & GND. TERMINALS SHORTED & 120V ON PRI

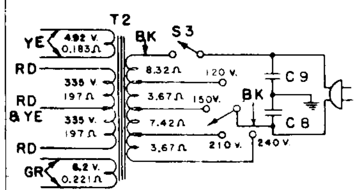


PRONG NUMBERS BOTTOM VIEW 1 TO 8 INCL

PRONG NUMBERS BOTTOM VIEW FOR 9

SYMBOL	DESCRIPTION		
C1	TUNING	CAPACITOR	10-450 MMF
C2	D ANT. TRIM.		2-20 MMF
C3	D OSC. TRIM.		2-20 MMF
C4	WAVE TRAP TRIM.		75 MMF
C5	PAPER		.01 MF
C6	PAPER		.0045 MF
C7	B ANT TRIM.		5-45 MMF
C8	PAPER		.01 MF
C9	PAPER		.01 MF
C10	MICA		1300 MMF
C11	PAPER		.05 MF
C12	B OSC. TRIM.		5-45 MMF
C13	B PADDER TRIM.		350-550 MMF
C14	MICA		50 MMF
C15	PAPER		.05 MF
C16	PAPER		.1 MF
C17	1ST I.F. PRI. TRIM.		335 MMF
C18	1ST I.F. SEC. TRIM.		335 MMF
C19	2ND I.F. PRI. TRIM.		335 MMF
C20	2ND I.F. SEC. TRIM.		335 MMF
C21	3RD I.F. PRI. TRIM.		190 MMF
C22	3RD I.F. SEC. TRIM.		190 MMF
C23	PAPER		.05 MF
C24			.005 MF
C25			.1 MF
C26			.01 MF
C27	PAPER		.02 MF
C28	MICA		250 MMF
C29	MICA		250 MMF
C30	PAPER		.1 MF
C31	DRY ELECT.		8 MF
C32			10 MF
C33			8 MF
C34	DRY ELECT.		12 MF
C35	MICA		250 MMF
C36	PAPER		.01 MF
C37	PAPER	CAPACITOR	.1 MF
R1	VOLUME CONTROL 2 MEGΩ TAP AT 5,000Ω		
R2	CARBON RESISTOR		47,000Ω
R3			470,000Ω
R4			2,200Ω
R5			220,000Ω
R6			100,000Ω
R7			4,700Ω
R8			68,000Ω
R9			220,000Ω
R10	CARBON		1 MEGΩ
R11	CANDOHM		
R12	MOULDED		410Ω
R13	CARBON		22,000Ω
R14			68,000Ω
R15			3,900Ω
R16	CARBON RESISTOR		39Ω

* CONNECTIONS & PARTS SHOWN IN BROKEN LINES USED IN LATER PRODUCTION RECEIVERS OR R20 (350Ω) IS REMOVED AND R16 CHANGED FROM 39Ω TO 22Ω.



UNIVERSAL TRANSFORMER 120-240 VOLTS

T1	OUTPUT TRANSFORMER
T2	POWER
T3	B C D ANT.
T4	D OSC.
T5	B C OSC.
T6	1ST I.F.
T7	2ND I.F.
T8	3RD I.F. TRANSFORMER
L1	WAVE TRAP COIL
L9	SPEAKER FIELD
L10	VOICE
L11	HUM COIL
S1	BAND CHANGE SWITCH
S2	TONE CONTROL SWITCH
S3	POWER SWITCH

I.F. ~~456~~ 465 K.C.

GENERAL ELECTRIC CO.

MODELS F-70 & F-75

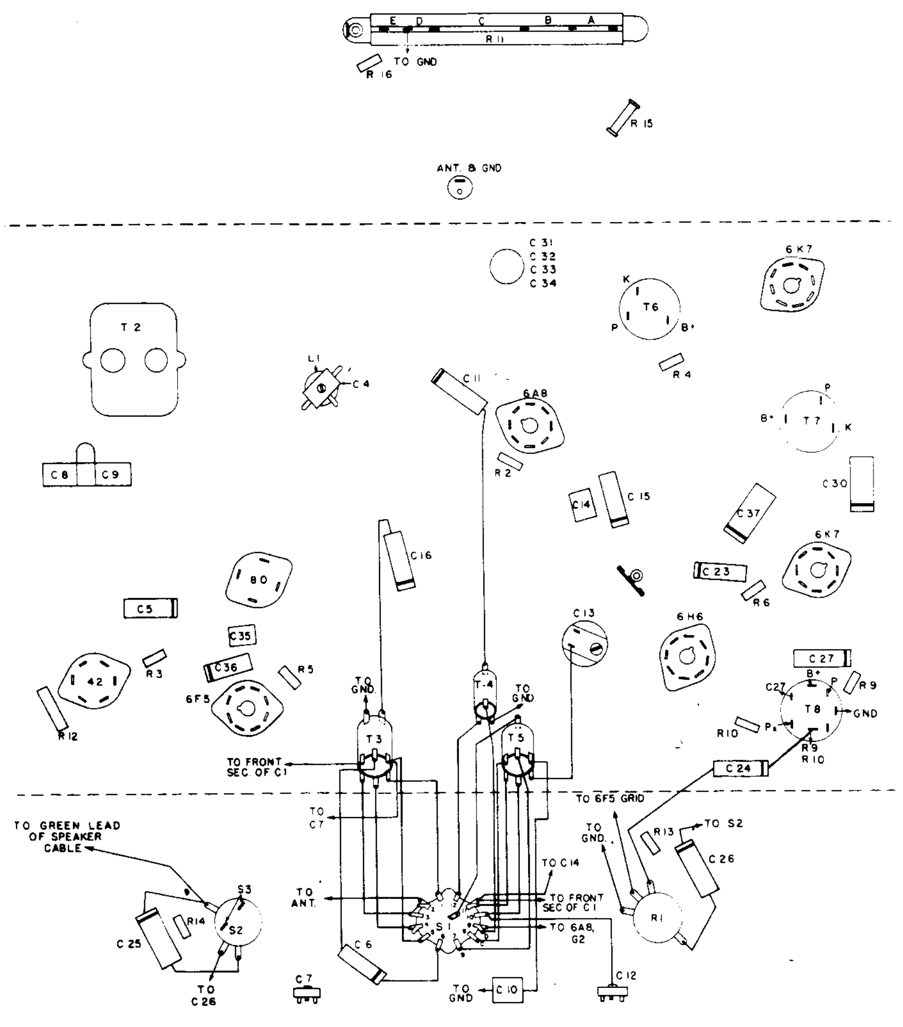


Fig. 2. Chassis Parts Layout

PARTS LIST

Stock No.	Description	List Price
*RB-008	BOARD—Terminal Board (2 Terminals)	$0.10
*RB-026	BOARD—Ant.& Gnd. Terminal Board	.10
*RC-017	CAPACITOR—.0045 Mfd., 200 V. Paper (C-6)	.25
*RC-023	CAPACITOR—.005 Mfd., 600 V. Paper (C-24)	.25
*RC-034	CAPACITOR—.01 Mfd., 200 V. Paper (C-26) (Close Tolerance)	.25
*RC-042	CAPACITOR—.01 Mfd., 1000 V. Paper (C-5, C-36)	.30
*RC-080	CAPACITOR—.02 Mfd., 400 V. Paper (C-27)	.25
*RC-091	CAPACITOR—.05 Mfd., 400 V. Paper (C-11, C-15, C-23)	.30
RC-103	CAPACITOR—0.1 Mfd., 200 V. Paper (Close Tolerance) (C-25)	.30
*RC-123	CAPACITOR—.1 Mfd., 400 V. Paper (C-16, C-30, C-37)	.35
*RC-213	CAPACITOR—50 Mmf. Mica (C-14)	.25
*RC-259	CAPACITOR—250 Mmf. Mica (C-29, C-35)	.30
RC-339	CAPACITOR—1300 Mmf. Mica (C-10)	.35
RC-575	CAPACITOR—Dry Electrolytic; 8 Mfd., 350 V; 10 Mfd., 25 V; 8 Mfd., 400 V; 12 Mfd., 450 V; (C-31, C-32, C-33, C-34)	2.10
*RC-618	CAPACITOR—"B" Band Osc. Trimmer 5-45 Mmf. (C-7, C-12)	.25
RC-634	CAPACITOR—"B" Band Osc. Padder 350-550 Mmf. (C-13)	.35
RC-635	CAPACITOR—Double Trimmer, 1st or 2nd I.F. Transformer (C-18, C-17, C-19, C-20)	.45
*RC-637	CAPACITOR—Double Trimmer, 3rd I.F. Transformer (C-21, C-22)	.60
*RC-710-22	CONDENSER—2-Gang Tuning Condenser (C-1, C-2, C-3)	3.60
*RC-754	CAPACITOR—Line Filter Capacitor .01-.01 Mfd., 250 V., A.C. (C-8, C-9)	.40
RC-843	CABLE—Speaker Cable and Plug	.35
RC-865	CORD—Power Cord and Plug	.45
*RD-034-22	DRIVE—Tuning Condenser Drive Reduction Mechanism	1.10
RE-014	ESCUTCHEON—Escutcheon Plate Assembly	1.75
'RF-010	FOOT—Mounting Foot Assembly (Pkg. of 2)	.30
RG-001	GRID CLIP—Control Grid Clip (Pkg. of 5)	.10
RG-300	GROMMET—Tuning Shaft Grommet (Pkg. of 5)	.20
RK-017	KNOB—Control Knob (Pkg. of 5)	.40
RK-018	KNOB—Wave Change Switch Knob (Pkg. of 5)	.40
RL-043	COIL—"B", "C" and "D" Band Ant. Coil (T-3)	1.50
RL-245	COIL—"D" Band Oscillator Coil (T-4)	.65
RL-246	COIL—"B" and "C" Band Oscillator Coil (T-5)	1.05
RL-920	LAMP—Dial Lamp. 6.3 V., 0.25 Amp. (Pkg. of 10)	1.50
RQ-1225	RESISTOR—39 Ohms, ½ W. Carbon (R-16) (Pkg. of 5)	.70
RQ-1267	RESISTOR—2,200 Ohm., ½ W. Carbon (R-4) (Pkg. of 5)	.70
RQ-1273	RESISTOR—3,900 Ohms, ½ W. Carbon (R-15) (Pkg. of 5)	.70
RQ-1275	RESISTOR—4,700 Ohms, ½ W. Carbon (R-7) (Pkg. of 5)	.70
RQ-1291	RESISTOR—22,000 Ohms, ½ W. Carbon (R-13) (Pkg. of 5)	.70
RQ-1299	RESISTOR—47,000 Ohms, ½ W. Carbon (R-2) (Pkg. of 5)	.70
RQ-1303	RESISTOR—68,000 Ohms, ½ W. Carbon (R-8, R-14) (Pkg. of 5)	.70
RQ-1307	RESISTOR—.1 Meg., ½ W. Carbon (R-6) (Pkg. of 5)	.70
RQ-1315	RESISTOR—220,000 Ohms, ½ W. Carbon (R-5, R-9) (Pkg. of 5)	.70
RQ-1323	RESISTOR—470,000 Ohms, ½ W. Carbon (R-3) (Pkg. of 5)	.70
RQ-1331	RESISTOR—1.0 Megohm, ½ W. Carbon (R-10) (Pkg. of 5)	.70
RR-726	RESISTOR—Candohm Tapped Resistor (R-11)	.65
RR-727	RESISTOR—410 Ohms, 1½ W. Molded Resistor (R-12)	.15
RS-172	SHIELD—Shield for 1st, 2nd or 3rd I.F. Transformer	.25
RS-174	SHIELD—6F5 Grid Shield Cap (Pkg. of 5)	$0.25
*RS-200	SOCKET—8-pin Octal Base Socket (Pkg. of 5)	.75
RS-215	SOCKET—6-prong Tube Socket (Pkg. of 5)	.60
RS-217	SOCKET—4-prong Tube Socket (Pkg. of 5)	.50
RS-348	SWITCH—Tone Control and Power Switch (S-2, S-3)	.85
RS-349	SWITCH—Band Change Switch (S-1)	1.30
RT-078	TRANSFORMER—Power Transformer, 115-125 V., 50 cycles (T-2)	4.30
RT-0711	TRANSFORMER—Power Transformer, 115-125 V., 25-60 cycles (T-2)	7.60
RT-0710	TRANSFORMER—Universal Power Transformer (T-2)	7.40
*RT-232	TRANSFORMER—3rd I.F. Transformer (Complete) (L-8, C-21, C-22)	1.75
RT-233	TRANSFORMER—1st or 2nd I.F. Transformer (Complete) (L-6, C-17, C-18; L 7, C 19, C 20)	1.50
RV-029	VOLUME CONTROL—2 Megohm Volume Control (R-1)	.75
RW-015	WINDOW—Escutcheon Window with Rubber Mountings	.45
*RW-101	WASHER—Felt Washers for Knobs (Pkg. of 10)	.45
*RW-400	WAVE TRAP—Wave Trap Complete (L-1, C-4)	.80
*RX-016	ASSEMBLY—Gang Condenser Mounting Assembly	.30
RX-021	ASSEMBLY—Chassis Mounting Assembly	.10
	SPEAKER ASSEMBLY F-70	
RC-924	CONE—8-in. Cone and Voice Coil Assembly (Early Production)	$0.90
RC-927	CONE—8-in. Cone and Voice Coil Assembly (Late Production) — See Text Under Speaker	.90
*RC-990	CLAMP—Voice Coil Spider Clamp (Early Production)	.05
RC-1967	CLAMP—Voice Coil Spider Clamp (Late Production)	.05
*RP-015	PLUG—Male Speaker Plug	.20
RS-056	SPEAKER—8-inch Speaker (Complete)	5.90
*RS-416	SPRING—Voice Coil Leads Spring (Pkg. of 2)	.10
RT-421	TRANSFORMER—Output Transformer	1.30
	SPEAKER ASSEMBLY F-75	
RC-925	CONE—12-in. Cone and Voice Coil Assembly	$1.25
*RC-991	CLAMP—Voice Coil Spider Clamp	.05
*RP-015	PLUG—Male Speaker Plug	.20
RS-057	SPEAKER—12-in. Speaker Complete	6.80
*RS-416	SPRING—Voice Coil Leads Spring (Pkg. of 2)	.10
RT-421	TRANSFORMER—Output Transformer	1.30
	DIAL SCALE MECHANISM	
RB-155	BRACKET—Band Change Bracket	$0.05
RB-604	BUSHING—Volume Control Cable Drive Bushing	.10
RC-840	CABLE—Gang Condenser Drive Cable (Pkg. of 5)	.55
RC-844	CABLE—Tone Control Cable (Pkg. of 5)	.45
RC-845	CABLE—Volume Control Cable (Pkg. of 5)	.45
*RD-030	DRUM—Condenser Drive Drum	.40
RD-052	DIAL—Dial Scale	1.40
RP-073	POINTER—Volume or Tone Control Pointer (Pkg. of 5)	.10
RP-075	PULLEY—Small Drive Cord Idler Pulley (Pkg. of 6)	.20
RP-076	PULLEY—Tone Control Drive Pulley	.15
RP-077	POINTER—Dial Scale Pointer (Pkg. of 5)	.90
RR-910	REFLECTOR—Lamp Reflector	.10
RS-218	SOCKET—Lamp Socket Assembly	.10
RS-425	SPRING—Tuning Drive Cord Tension Spring (Pkg. of 5)	.10
RS-426	SPRING—Tone or Volume Control Drive Cord Spring (Pkg. of 5)	.10
RX-022	ASSEMBLY—Band Indicator Assembly (Includes Cord, Pointer, and Spring)	.20

*Used on previous receivers.

(Prices subject to change without notice)*

GENERAL ELECTRIC CO.
MODELS F-70 & F-75

SERVICE DATA

Physical Specifications

Model	F-70	F-75
Height	10 11/16 in.	40 in.
Width	20¾ in.	25⅞ in.
Depth	9 1/16 in.	12¼ in.
Wt. Packed	29 pounds	66 pounds

Tuning Control Drive Ratio

Fast Tuning . . . . . 8 to 1
Vernier Tuning . . . . . 40 to 1

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	115–125	50–60	80
C	115–125	25–60	85
V	115–155 and 190–250	50–60	85

NOTE: Rating "V" receivers may be used on 40-cycle circuits provided the voltage does not exceed 110 volts on the 115-125 volt tap or 200 volts on the 190-220 volt tap.

Tuning Frequency Range

Band "B" . . . . . 540- 1600 K.C.
Band "C" . . . . . 1550- 5800 K.C.
Band "D" . . . . . 5400-18000 K.C.

Intermediate Frequency . . . . . 465 K.C.

Electrical Power Output

Undistorted . . . . . 2.5 watts
Maximum . . . . . 5.0 watts

Tone Control . . . . . 4-point control

Loud-speaker—Electrodynamic

Cone: Model F-70 . . . . . 8 in.
Model F-75 . . . . . 12 in.

Speaker Impedance . . . . . 5.5 ohms at 400 cycles

Tubes

Oscillator and Converter . . . 6A8 Pentagrid Converter
1st I.F. Amplifier . . . . . 6K7 Triple-grid Super-control Amplifier
2nd I.F. Amplifier . . . . . 6K7 Triple-grid Super-control Amplifier
Detector and AVC . . . . . 6H6 Twin Diode
First Audio Amplifier . . . . . 6F5 High-gain Triode
Audio Power Amplifier . . . . . 42 Power Amplifier Pentode
Rectifier . . . . . 80 Full-wave Rectifier
Dial Lamp . . . . . MAZDA No. 46

GENERAL INFORMATION

The Models F-70 and F-75 employ seven General Electric tubes described above in a superheterodyne circuit, which includes two stages of I.F and wave trap, compensated volume control, four-point tone control, and ample pentode power output.

The "B," "C" and "D" band antenna coils are wound on a single coil form designated as T-3 in Fig. 1. Coils L4, L5 and L6 are the components of the "B" band antenna coil. When operating in the "C" band, L4 is used for the grid coil while L3 acts as the antenna primary. L2 is the "D" band antenna grid coil using L3, as in the "C" band, for the antenna primary coil. T4 consisting of plate and grid coils L7 and L8 are the components of the "D" band oscillator coil. L12, L13 and L14, L15 are the "C" and "B" band oscillator coils respectively and are wound on the same coil form. The "B" and "C" band oscillator grid coils are shorted out by a contact of S1 when the set is operating in the "C" and "D" bands respectively.

The intermediate frequency amplifier consists of two 6K7 tubes and three tuned transformers. The output of the third I.F. transformer is applied to one plate of the 6H6 diode, which is a combined detector, initial bias and automatic volume control tube.

Volume is controlled by the variable potentiometer R1 in the grid circuit of the 6F5 audio amplifier tube. The output of the 6F5 is resistance coupled to the grid of the type 42 power amplifier pentode. The plate circuit of the 42 tube is matched to the loud-speaker by means of a suitable step-down output transformer.

Proper bias for the various tubes are obtained by the use of a tapped bleeder resistance (R-11). One of the cathodes of the 6H6 diode is returned to −5 volts on this bleeder in order to provide initial bias to all tubes controlled by the AVC.

Tone Control

When the tone control is in the "normal" position, a portion of the output voltage of the receiver is fed back through a resistor-capacitor network consisting of C-25, R-14 and R-13 to a tap on the volume control. This feedback voltage is out of phase with the input and the resulting degeneration reduces the speaker resonance boom due to pentode output, gives an extended and relatively flat response to a wide range of low frequencies, and reduces distortion arising in the audio amplifier. In the "bass" position, the tone control switch connects C-26 in parallel with the above network. The value of C-26 is such that more degeneration of the high than the low frequency notes occurs, thereby increasing the bass response. The "foreign" position of the switch shorts out Capacitor C-25 and Resistor R-14 and places C-26 and R-13 in parallel which gives a frequency response best suited for short-wave reception. In the speech position, C-25 and R-14 are shorted out; C-26 is removed from the circuit, leaving R-13, thereby providing flat degeneration at all frequencies which is the most desirable condition for the reception of programs predominating in speech. The tone control switching described can be traced on the schematic diagram shown in Fig. 1.

Speaker

Two different types of voice coil suspensions are used in both the 8-inch and 12-inch speakers.

The 8-inch cone assemblies are designated as early and late production and are not interchangeable. The early production voice coil suspension is 4⅝ in. between points of clamping while the later production voice coil suspension is 2⅜ in. between points of clamping.

The 12-inch cone assemblies which were changed in design during production are interchangeable.

ALIGNMENT PROCEDURE

In order to align these receivers properly, it is necessary to have the following test equipment:

1. A modulated test oscillator.
2. An output indicator such as an a-c voltmeter with a scale reading of 3 to 5 volts. A cathode-ray oscilloscope is preferred for I.F. alignment.
3. A screwdriver-type alignment tool.

The alignment procedure is given in table form on page 5 along with the trimmer location drawing, Fig. 4. A "dummy antenna" should be used in all alignments and is the capacitor or capacitor and resistor used in series with the signal generator. The grid lead should not be removed from the tube to which the input signal is applied when aligning the I.F. as this would remove the grid bias from the tube.

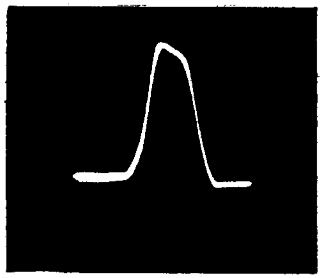


Fig. 3. Overall I.F. Curve

SOCKET VOLTAGES

Tube No.	Plate to Ground Volts D-C	Screen Grid to Ground Volts D-C	Cathode to Ground Volts D-C	Cathode Current M.A.	Heater Volts A-C
6A8 Oscillator	190	....	....	....	....
6A8 Converter	235	100	0	11	6.3
6K7 1st I.F. Amplifier	235	105	0	5	6.3
6K7 2nd I.F. Amplifier	235	105	0	7	6.3
6H6 Detector and A.V.C.	0 sig. −6 delay	....	0 sig. −6 delay	0 0	6.3
6F5 Audio Amplifier	120*	....	1.2	0.2	6.3
42 Output	250	265	16	39	6.3
80 Power Rectifier	640/320 RMS	....	335 D-C	70	5.0

A-C line voltage 120—No signal input—1000 ohms per volt-meter—dial pointer at 530 K.C.
* Measured on 500-volt scale.

ALIGNMENT PROCEDURE

Band Switch Setting	Input Freq.	Point of Input	Dummy Antenna	Trimmer	Comments
I. F. ALIGNMENT WITH OSCILLOSCOPE					
1. Band "B"	465 K.C. Sweep	2nd I.F. Grid	.05 Mfd.	3rd I.F. Sec. (C-22) 3rd I.F. Pri. (C-21)	Gang condenser plates wide open—connect vertical input of oscilloscope to ground and the junction of C-24 and R-9 on 3rd I.F. transformer. Adjust trimmers for a single symmetrical curve of maximum amplitude. The resulting curve with input at converter grid is shown in Figure 3.
2. Band "B"	465 K.C. Sweep	1st I.F. Grid	.05 Mfd.	2nd I.F. Sec. (C-20) 2nd I.F. Pri. (C-19)	
3. Band "B"	465 K.C. Sweep	Converter Grid	.05 Mfd.	1st I.F. Sec. (C-18) 1st I.F. Pri. (C-17)	
4. Band "B'	465 K.C. Sweep	Antenna Post	250 Mmf. 400 ohms	Wave Trap Trimmer (C-4)	Adjust for minimum amplitude.
I. F. ALIGNMENT WITH OUTPUT METER					
1. Band "B"	465 K.C. with Modulation	2nd I.F. Grid	.05 Mfd.	3rd I.F. Sec. (C-22) 3rd I.F. Pri. (C-21)	Gang condenser plates wide open—connect output meter across voice coil—keep input signal low and volume control at maximum. Adjust all trimmers in order mentioned for maximum output. Do not attempt an overall realignment after stage by stage alignment has been accomplished.
2. Band "B"	465 K.C. with Modulation	1st I.F. Grid	.05 Mfd.	2nd I.F. Sec. (C-20) 2nd I.F. Pri. (C-19)	
3. Band "B"	465 K.C. with Modulation	Converter	.05 Mfd.	1st I.F. Sec. (C-18) 1st I.F. Pri. (C-17)	
4. Band "B"	465 K.C. with Modulation	Antenna Post	250 Mmf. 400 ohms	Wave Trap Trimmer (C-4)	Adjust for minimum output.
R. F. ALIGNMENT					
1. Band "B"					Close gang plates—adjust pointer to first line at left end of tuning scale.
2. Band "D"	18 M.C. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. (C-3) Ant. (C-2)	Connect output meter across voice coil—tone control on "Bass" position. The image of any "D" band signal should be heard 930 K.C. above input signal when (C-3) is on proper peak. Example: 15 M.C. image—15,930 K.C. Peak (C-2) while rocking the gang condenser.
3. Band "C"	No adjustments necessary.				
4. Band "B"	1500 K.C. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. (C-12) Ant. (C-7)	Peak trimmers for maximum output with a low input signal.
5. Band "B"	580 K.C. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. Padder (C-13)	Adjust padder for maximum output in vicinity of 580 K.C. while rocking the gang condenser.
6. Band "B"	1500 K.C. with Modulation	Antenna Post	250 Mmf. 400 ohms	Osc. (C-12) Ant. (C-7)	Peak trimmers for maximum output with a low input signal.

GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 6M, 631 & 643

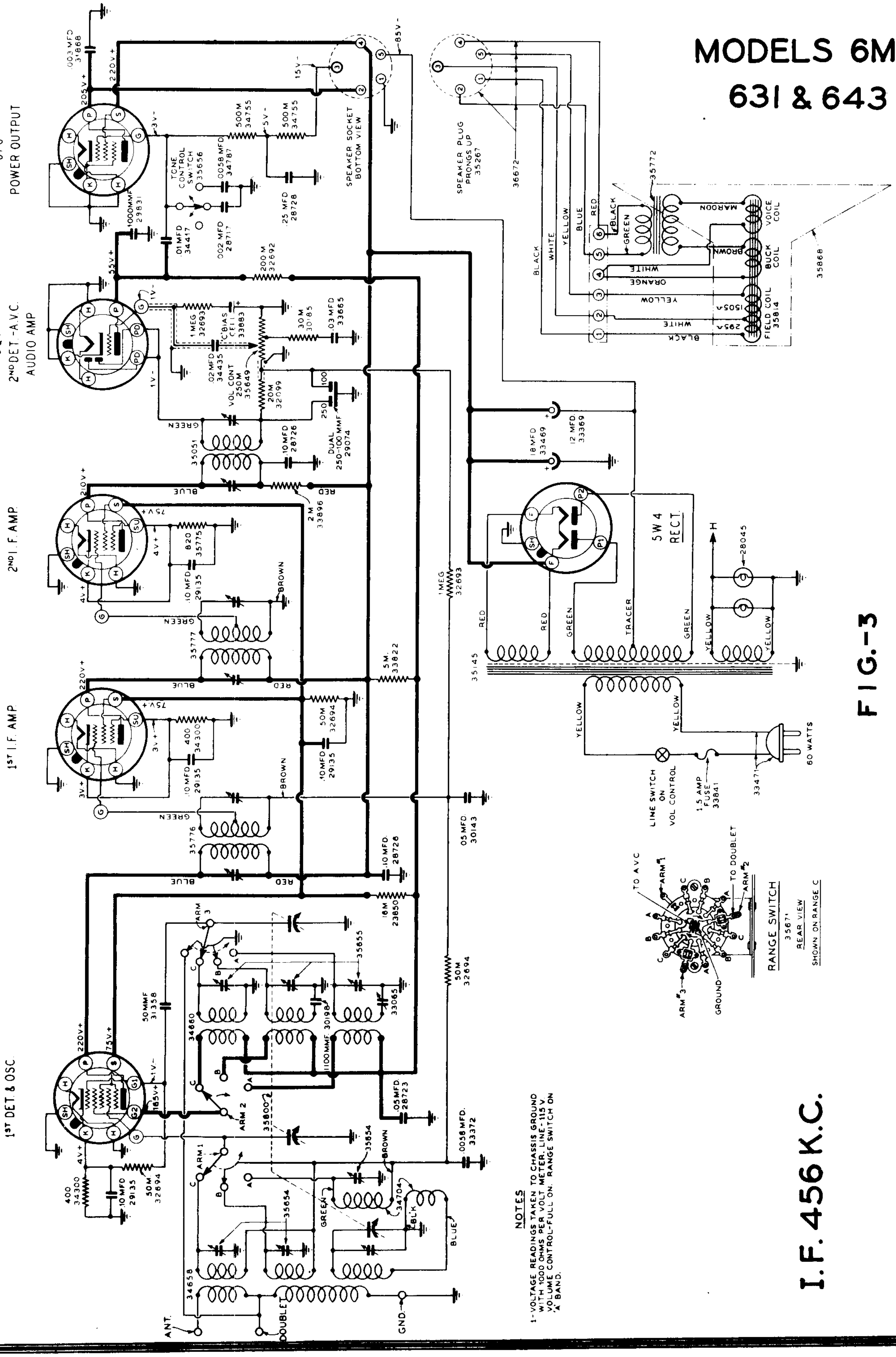


FIG.-3

I.F. 456 K.C.

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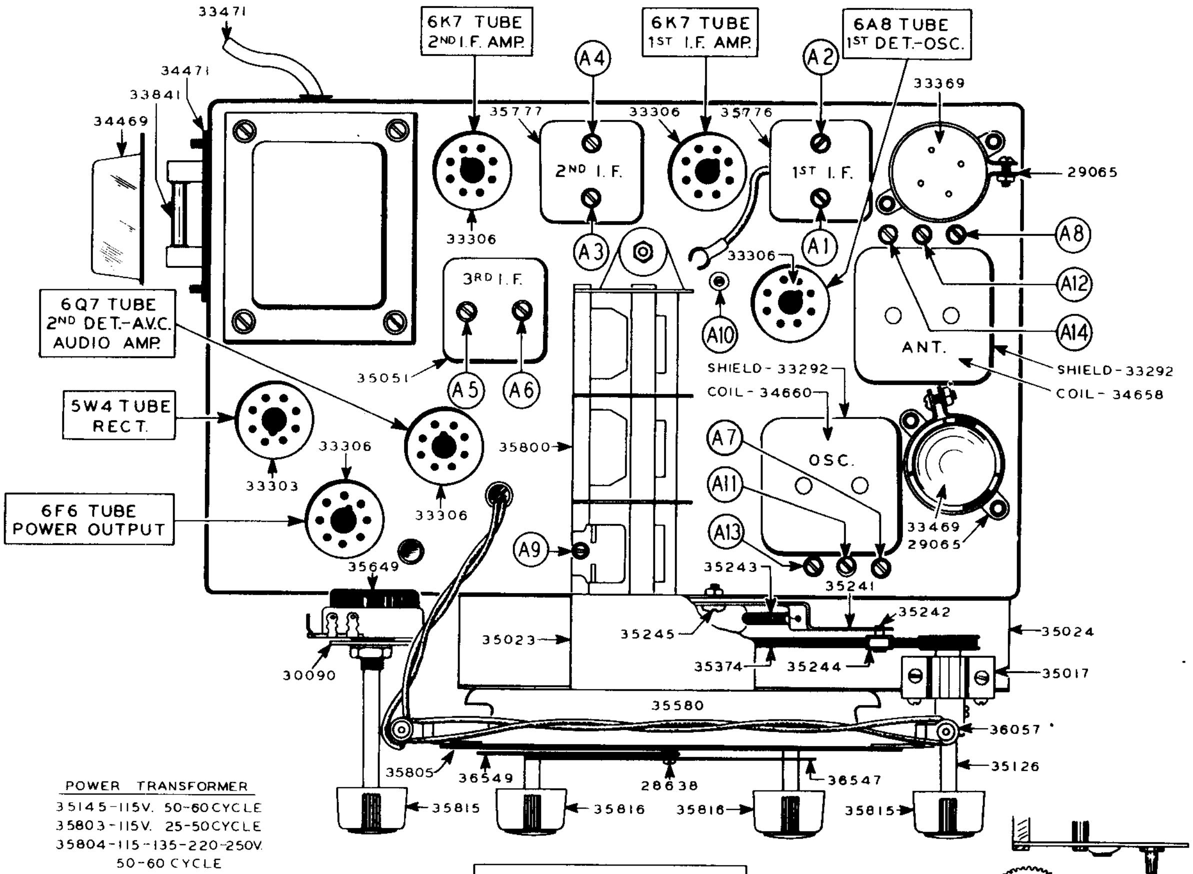
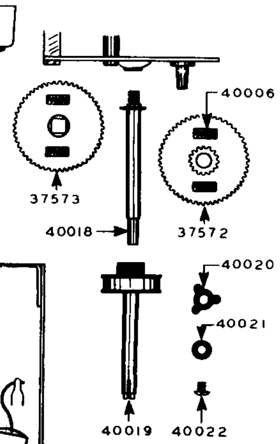
MODELS 6M, 631 & 643

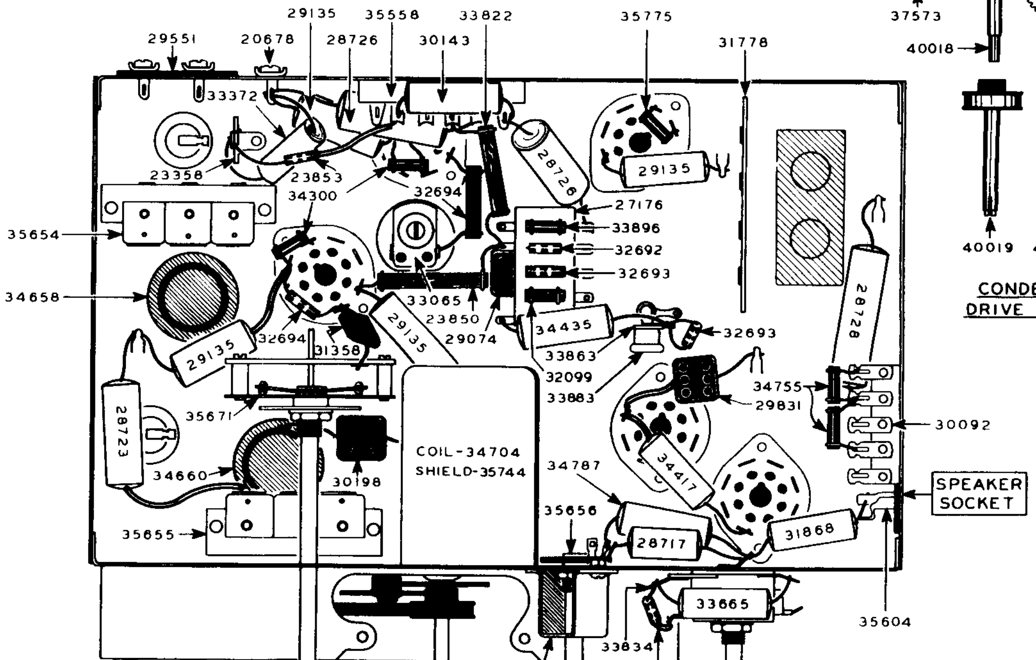


CHASSIS TOP VIEW

FIG.-1



CONDENSER DRIVE PARTS



CHASSIS BOTTOM VIEW

FIG.-2

GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 6M, 631 & 643

INTRODUCTION

The Grunow Chassis 6M is a six tube, three band superheterodyne receiver, using 1-6A8 1st Detector and Oscillator, 1-6K7 1st I. F. Amplifier, 1-6K7 2nd I. F. Amplifier, 1-6Q7 2nd Detector, A. V. C. and Audio Amplifier, 1-6F6 Power Output, and 1-5W4 Rectifier. The tuning range is divided into three divisions or bands covering from 550 K. C. to 1750 K. C. on the "A" or Broadcast Band, 1750 K. C. to 5.5 M. C. on the "B" or Police Amateur Band and 5.5 M. C. to 18.2 M. C. on the "C" or Foreign Broadcast Band.

SERVICE DATA

CONTINUITY AND VOLTAGE

Tube sockets on the schematic diagram (Fig. 3) are shown bottom view, each element being in its actual position in respect to the guide pin. The voltage measurements shown are average and were taken with a line voltage of 115 V., the volume control "full on" and the range switch in position "A" using a 1000 ohms per volt meter.

REPAIRS

When servicing this chassis it is IMPERATIVE that the service man make all parts replacements in EXACTLY the same way as the original part was located and connected. This applies particularly to ground points. All parts replacements in the R. F. end of the circuit must be exact duplicates of the originals, especially so in the case of coils, R. F. by-pass or coupling condensers. Any repairs in the R. F. circuit will make a complete realignment of the tuned circuit necessary.

BIAS CELL

This Chassis uses a "C" bias cell unit in the control grid of the 6Q7 tube. This type bias cell has an exceedingly long life but occasionally may have to be replaced. When replacing the cell note that the carbon or (+) side is connected to the ground side of all terminal clips. To check the bias cell a new cell or a 1½ volt battery must be substituted, as the cell voltage cannot be measured with an ordinary voltmeter due to its low current rating.

CIRCUIT ALIGNMENT EQUIPMENT

Do not attempt to align the 6M Chassis without the equipment specified below:

1. Signal Generator—A modulated oscillator capable of delivering signals from 465 K.C. to 18.2 M.C.

2. Alignment Tool—A non-metallic screw driver.

3. Dummy Antenna — .05 Mfd. Condenser (I. F. Alignment); 200 Mmfd. Condenser (Broadcast Alignment); 400 Ohm Carbon Resistor (Short Wave Alignment).

4. Output Meter—A meter of sufficient sensitivity to give a good deflection at very low signal input.

Note: The receiver should be aligned in a location free from local interference. A screen room is recommended.

ALIGNMENT PROCEDURE

1. HEATING

(A) Allow the receiver to heat up for a period of 20 to 30 minutes. This is necessary in order to eliminate possible alignment variations due to the thermal expansion and contraction of the capacitors and inductances.

(B) Allow the signal generator to warm up in order to prevent frequency drift during alignment.

2. DIAL CALIBRATION

Turn the condenser until the plates are fully meshed, set the pointer (Hour Hand) to 9 and 3 on the outer edge of dial chart. Set the vernier pointer (Minute Hand) to the line pointing to 12.

3. SIGNAL GENERATOR ADJUSTMENT

During the entire alignment procedure the signal input from the generator to the receiver must be continually attenuated at the generator as the various trimmers are brought into resonance. This is necessary in order to hold the signal at the lowest intensity so that the A. V. C. Circuit will remain at the most sensitive point.

4. I. F. ALIGNMENT

(A) Set the generator to 465 K.C. and connect the output lead to the control grid of the 6A8 tube through the .05 Mfd. dummy and the generator ground to the chassis ground post.

(B) Set the receiver dial pointer to 600 K.C., the range switch to position "A" and turn the volume control full on.

(C) Connect the output meter across the two primary terminals on the output transformer.

(D) Adjust the I. F. Trimmers A1, A2, A3, A4, A5, and A6 to maximum output.

5. 1500 K.C. ALIGNMENT

(A) Set the generator to 1500 K.C. and connect the output to the antenna post on the chassis through the 200 Mmfd. dummy.

(B) Set the receiver dial pointer to 1500 K.C.

(C) Adjust the trimmers (A7) Oscillator, (A8) Detector and (A9) Antenna to maximum output.

6. 600 K.C. ALIGNMENT

(A) Set generator to 600 K.C.

(B) Set receiver dial pointer to 600 K.C.

(C) Turn trimmer (A10) in direction of signal increase and at the same time rock tuning condenser slowly back and forth through resonance until the exact resonant point on both is obtained.

7. 5 M.C. ALIGNMENT

(A) Set generator to 5 M.C.

(B) Set receiver range switch to position "B" and dial pointer to 5 M.C.

(C) Adjust trimmer (A11) Oscillator and (A12) Antenna to maximum output.

8. 18 M.C. ALIGNMENT

(A) Set generator to 18 M.C. and connect the output to the chassis Antenna post through the 400 Ohm dummy.

(B) Set the receiver range switch to position "C" and the dial pointer to 18 M.C.

(C) Screw the Oscillator trimmer (A13) down tight and back off until signal is heard, then rock the tuning condenser slowly back and forth through resonance uhtil exact resonant point is determined.

(D) Adjust Antenna trimmer (A14) to maximum output.

(E) Readjust Oscillator trimmer(A13) to maximum output.

REPLACEMENT PARTS PRICE LIST

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Part No.	Description	Quantity	Price
20678	Ground Terminal	1	$0.02
23358	Vertical Terminal	1	.10
23850	Resistor—16M Ohms, 1 Watt	1	.20
27176	Terminal Board (10 Lug)	1	.20
27422	Step Washer (Elect. Cond.)	1	.02
27465	Bracket (Tone Control)	1	.15
28045	Bulb—Pilot Light	2	.15
28638	Pointer Screw	1	.02
28717	Condenser Tub., .002 Mfd., 700 V.	1	.30
28723	Condenser—Replace with No. 34436		
28726	Condenser—Replace with No. 34437		
28728	Condenser Tub., .25 Mfd., 200 V.	1	.35
28793	Junction Box Connector Assy. (Z Chassis)	1	1.00
29065	Clamp (Electro. Cond. Mtg.)	2	.05
29074	Condenser Mica—Dual—100-250 Mmfd.	1	.30
29135	Condenser—Replace with No. 34437		
29551	Binding Post Assy. (Ant. and Doublet)	1	.20
29818	Condenser Tub., .003 Mfd., 700 V.	1	.25
29831	Condenser Mica (1000 Mmfd.)	1	.30
30090	Mtg. Bracket (Vol. Control)	1	.15
30092	Junction Terminal Board	1	.10
30104	Rubber Grommet	2	.02
30143	Condenser—Replace with No. 34436		
30152	Terminal Board	1	.10
30185	Resistor—30M Ohm, ½ Watt	1	.20
30198	Condenser-Mica—1100 Mmfd.	1	.25
31358	Condenser-Mica—50 Mmfd.	1	.20
31424	Insulating Shield (Elect. Cond.)	1	.10
31637	Mtg. Stud (Var. Cond.)	3	.02
31739	Mtg. Washer (Var. Cond.—Rubber)	6	.05
31778	Junction Terminal Board	1	.10
31868	Condenser—Replace with No. 29818		
32099	Resistor—20 Ohm, ¼ Watt	1	.15
32692	Resistor—200 M Ohms, ½ Watt	1	.15
32693	Resistor—1 Meg Ohm, ⅓ Watt	2	.15
32694	Resistor—50 M. Ohm, ½ Watt	3	.15
32858	Mtg. Foot (Chassis)	4	.25
32916	Mtg. Foot (Var. Cond.—Rear)	1	.10
33065	Condenser—600 K.C. Padder	1	.40
33078	Shipping Block (Fibre)	2	.05
33287	Support Bracket (Range Switch)	1	.05
33292	Shield (Coil)	2	.35
33303	Socket—5 Prong (5W4)	1	.15
33306	Socket—8 Prong (Universal)		.15
33368	Spade Lug (Elect. Cond.)	1	.02
33369	Condenser—Electrolytic—12 Mfd., 450 V.	1	1.20
33372	Condenser—Replace with No. 34787		
33469	Condenser—Electrolytic—18 Mfd., 300 V.	1	.90
33471	Line Cord and Plug	1	.40
33665	Condenser Tub., .03 Mfd., 200 V.	1	.30
33822	Resistor, 5 M Ohm, 1 Watt	1	.20
33834	Terminal Strip (Vol. Cont.)	1	.10
33841	Fuse (1.5 Amp.)	1	.15
33863	Bias Cell Mtg. Strip	1	.15
33883	Grid Bias Cell	1	.25
33896	Resistor—2 M Ohms, ½ Watt	1	.15
34300	Resistor—400 Ohm, ½ Watt	2	.15
34417	Condenser—Tub., .01 Mfd., 500 V.	1	.35
34435	Condenser—Tub., .02 Mfd., 400 V.	1	.35
34436	Condenser—Tub., .05 Mfd., 400 V.	1	.35
34437	Condenser—Tub., .10 Mfd., 400 V.	4	.35
34469	Cover (Fuse)	1	.15
34470	Insulator (Fuse)	1	.05
34471	Mtg. Clip (Fuse)	1	.10
34536	"J" Bolt (Chassis Mtg.)	2	.03
34658	Coil—Antenna	1	1.25
34660	Coil—Oscillator	1	1.25
34704	Coil—Pre-Selector	1	1.25
34755	Resistor—500 M Ohm, ½ Watt	2	.15
34787	Condenser—Tub., .0058 Mfd., 700 V.	2	.25

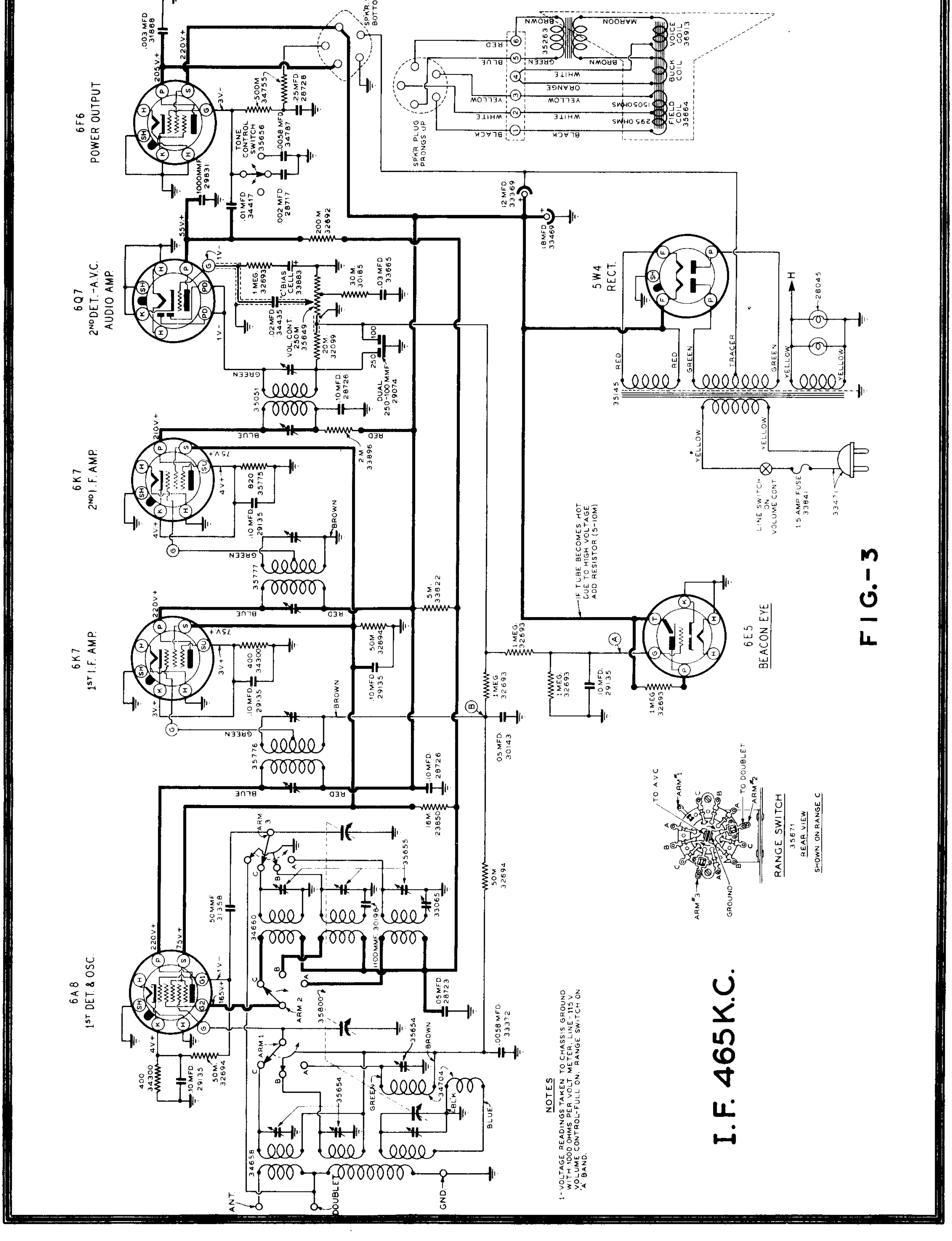
Part No.	Description	Quantity	Price
35017	Vernier Clamp	1	.10
35023	Bracket (Dial Support)	1	.10
35024	Mtg. Foot (Var. Cond.—Front)	1	.20
35051	Coil and Shield—Diode I. F.	1	1.75
35126	Pick-up Vernier with Pulley	1	1.50
35145	Power Transformer, 115 V., 50/60 cycles	1	5.00
35241	Idler Arm	1	.10
35242	Stud (Idler Pulley)	1	.20
35243	Tension Spring	1	.10
35244	Pulley (Idler)	1	.15
35245	Special Binding Head Screw	1	.05
35329	Escutcheon (Dial)	1	1.00
35359	Window (Dial)	1	.60
35360	Gasket (Window)	1	.10
35361	Retaining Ring (Window)	1	.25
35374	Drive Belt	1	.25
35492	Retaining Spring (Escutcheon)	1	.20
35516	Mtg. Foot (Cond. Support)	1	.15
35558	Terminal Board	1	.15
35580	Reflector	1	1.00
35604	Socket—Speaker	1	.15
35606	Decalcomania (A. B. C.)	1	.10
35607	Decalcomania (H. M. L.)	1	.10
35649	Volume Control	1	1.25
35654	Condenser (Antenna Trimmer)	1	.45
35655	Condenser (Osc. Trimmer)	1	.45
35656	Tone Control Switch	1	.60
35662	Shaft Extension (Range Switch)	1	.25
35671	Range Switch	1	1.50
35744	Shield (Pre-Selector Coil)	1	.35
35755	Resistor—820 Ohms, ⅓ Watt	1	.15
35776	Coil and Shield, 1st I. F.	1	1.70
35777	Coil and Shield, 2nd I. F.	1	1.70
35800	Condenser—Variable	1	5.00
35803	Power Transformer, 115 V., 25/50 cycles	1	8.50
35804	Power Transformer—Universal	1	8.50
35805	Dial Chart	1	.80
35815	Knob (Plain)	2	.20
35816	Knob (White Dot)	2	.20
36057	Socket—Pilot Light	2	.15
36547	Hour Pointer	1	.20
36549	Minute Pointer	1	.15
37572	Intermediate Gear and Pinion	1	.75
37573	Rotor Shaft Gear	1	.50
40006	Spring (Gear Tension)	4	.05
40012	Clamp (Vernier Drive)	1	.10
40018	Inner Pointer Shaft	1	1.10
40019	Outer Pointer Shaft	1	1.20
40020	Spring Washer	1	.05
40021	Washer	1	.02
40022	Screw	1	.02
61134	1" x No. 8-32 Screw (Red Head)	2	.01
61207	1" x No. 8-32 Screw (Chassis Mtg.)	4	.01
63838	Felt Washer (Under Knob)	4	.01
63863	Flat Washer (Chassis Mtg.)	6	.01
63945	Black Fibre Washer (Pointer)	1	.01

TYPE 108-C-10 SPEAKER

Part No.	Description	Quantity	Price
27240	Cone Mtg. Gasket	1	$0.10
32008	Cone and Voice Coil Assy.	1	1.35
32228	Speaker Clamp	1	.10
33202	Terminal Strip	1	.20
33203	Terminal Strip—Cover	1	.10
33204	Terminal Strip—Insulator	1	.05
35267	Plug	1	.15
35772	Output Transformer	1	1.75
35814	Field Coil	1	3.25
35868	108-C-10 Speaker Complete	1	11.50
36672	Cable and Plug Assy.	1	.55

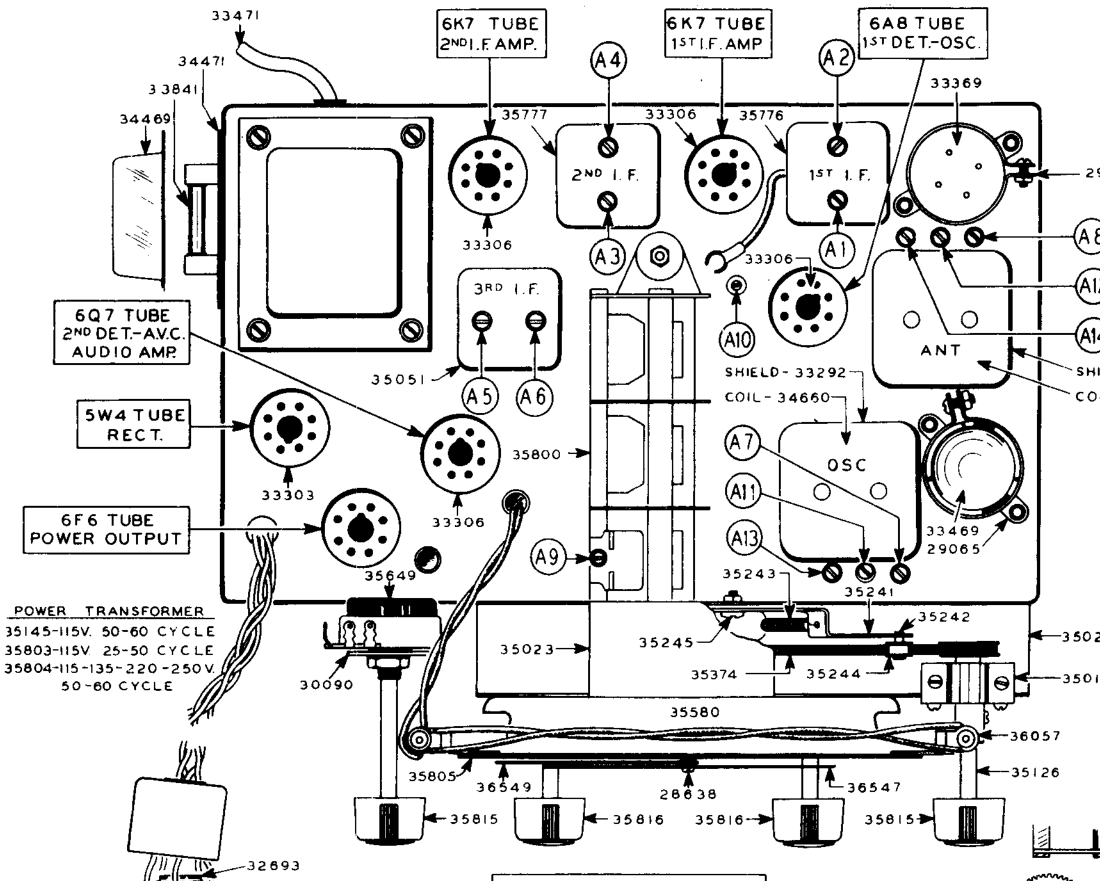
GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 7M, 723, 731, 733 & 735



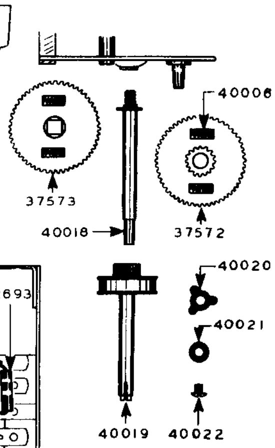
GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 7M,723,731,733 & 735

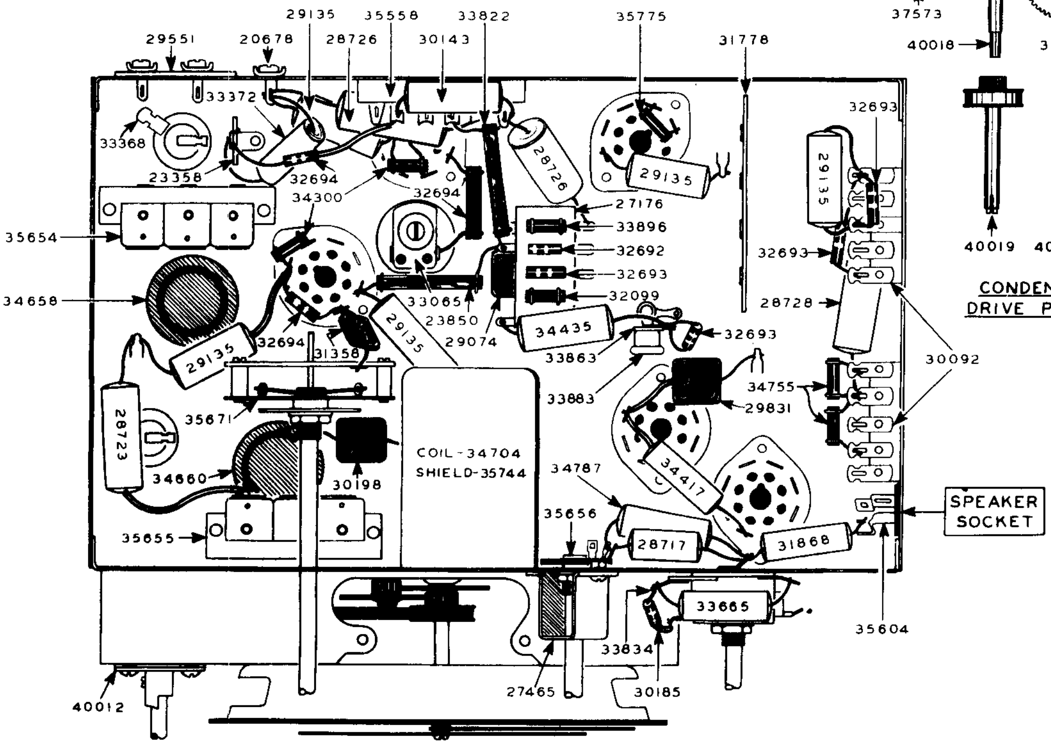


CHASSIS TOP VIEW

FIG.-1



CONDENSER DRIVE PARTS



CHASSIS BOTTOM VIEW

FIG.-2

GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 7M, 723, 731, 733 & 735

INTRODUCTION

The Grunow Chassis 7M is a seven tube, three band superheterodyne receiver using 1-6E5 Beacon Eye tuning indicator, 1-6A8 1st Detector and Oscillator, 1-6K7 1st I. F. Amplifier, 1-6K7 2nd I. F. Amplifier, 1-6Q7 2nd Detector, A. V. C. and Audio Amplifier, 1-6F6 Power Output and 1-5W4 Rectifier. The tuning range is divided into three divisions or bands covering from 550 K.C. to 1750 K.C. on "A" Broadcast Band, 1750 K.C. to 5.5 M.C. on the "B" Police Amateur Band, and 5.5 M.C. to 18.2 M.C. on the "C" Foreign Broadcast Band.

SERVICE DATA

CONTINUITY AND VOLTAGE

Tube sockets on the schematic diagram (Fig. 3) are shown bottom view, each element being in its actual position in respect to the guide pin. The voltage measurements shown are average and were taken with a line voltage of 115 V., the volume control "full on" and the range switch in position "A" using a 1000 ohms per volt meter.

REPAIRS

When servicing this chassis it is IMPERATIVE that the service man make all parts replacements in EXACTLY the same way as the original part was located and connected. This applies particularly to ground points. All parts replacements in the R.F. end of the circuit must be exact duplicates of the originals, especially so in the case of coils, R.F. by-pass or coupling condensers. Any repairs in the R.F. circuit will make a complete re-alignment of the tuned circuit necessary.

BIAS CELL

This Chassis uses a "C" bias cell unit in the control grid of the 6Q7 tube. This type bias cell has an exceedingly long life, but occasionally may have to be replaced. When replacing the cell, note that the carbon or (+) side is connected to the ground side of cell terminal clip. To check the bias cell, a new cell or a 1½ volt battery must be substituted, as the cell voltage cannot be measured with an ordinary voltmeter due to its low current rating.

BEACON EYE SENSITIVITY ADJUSTMENTS

The 6E5 Beacon Eye tube is designed to give the best results with the proper size antenna. However, where a full sized antenna cannot be erected or an inside antenna must be used, a type 6G5 Beacon Eye Tube can be substituted by making the following changes in the wiring of the circuit:

Refer to schematic diagram Fig. 3 and disconnect the "Green" grid wire at point "A" and connect to point "B". This change can be made quickly and will give a maximum sensitivity on the weaker signals.

CIRCUIT ALIGNMENT EQUIPMENT — Do not attempt to align the 7M Chassis without the equipment specified below:

1. Signal Generator—A modulated oscillator capable of delivering signals from 465 K.C. to 18.2 M.C.

2. Alignment Tool—A non-metallic screw driver.

3. Dummy Antenna — .05 Mfd. Condenser (I. F. Alignment); 200 Mmfd. Condenser (Broadcast Alignment); 400 Ohm Carbon Resistor (Short Wave Alignment).

4. Output Meter—A meter of sufficient sensitivity to give a good deflection at very low signal input.

Note: The receiver should be aligned in a location free from local interference. A screen room is recommended.

ALIGNMENT PROCEDURE

1. HEATING

(A) Allow the receiver to heat up for a period of 20 to 30 minutes. This is necessary in order to eliminate possible alignment variations due to the thermal expansion and contraction of the capacitors and inductances.

(B) Allow the signal generator to warm up in order to prevent frequency drift during alignment.

2. DIAL CALIBRATION

Turn the condenser until the plates are fully meshed, set the pointer (Hour Hand) to 9 and 3 on the outer edge of dial chart. Set the vernier pointer (Minute Hand) to the line pointing to 12.

3. SIGNAL GENERATOR ADJUSTMENT

During the entire alignment procedure the signal input from the generator to the receiver must be continually attenuated at the generator as the various trimmers are brought into resonance. This is necessary in order to hold the signal at the lowest intensity so that the A. V. C. Circuit will remain at the most sensitive point.

4. I. F. ALIGNMENT

(A) Set the generator to 465 K.C. and connect the output lead to the control grid of the 6A8 tube through the .05 Mfd. dummy and the generator ground to the chassis ground post.

(B) Set the receiver dial pointer to 600 K.C., the range switch to position "A" and turn the volume control full on.

(C) Connect the output meter across the two primary terminals on the output transformer.

(D) Adjust the I. F. Trimmers A1, A2, A3, A4, A5, and A6 to maximum output.

5. 1500 K.C. ALIGNMENT

(A) Set the generator to 1500 K.C. and connect the output to the antenna post on the chassis through the 200 Mmfd. dummy.

(B) Set the receiver dial pointer to 1500 K.C.

(C) Adjust the trimmers (A7) Oscillator, (A8) Detector and (A9) Antenna to maximum output.

6. 600 K.C. ALIGNMENT

(A) Set generator to 600 K.C.

(B) Set receiver dial pointer to 600 K.C.

(C) Turn trimmer (A10) in direction of signal increase and at the same time rock tuning condenser slowly back and forth through resonance until the exact resonant point on both is obtained.

7. 5 M.C. ALIGNMENT

(A) Set generator to 5 M.C.

(B) Set receiver range switch to position "B" and dial pointer to 5 M.C.

(C) Adjust trimmer (A11) Oscillator and (A12) Antenna to maximum output.

8. 18 M.C. ALIGNMENT

(A) Set generator to 18 M.C. and connect the output to the chassis Antenna post through the 400 Ohm dummy.

(B) Set the receiver range switch to position "C" and the dial pointer to 18 M.C.

(C) Screw the Oscillator trimmer (A13) down tight and back off until signal is heard, then rock the tuning condenser slowly back and forth through resonance until exact resonant point is determined.

(D) Adjust Antenna trimmer (A14) to maximum output.

(E) Readjust Oscillator trimmer(A13) to maximum output,

REPLACEMENT PARTS PRICE LIST

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

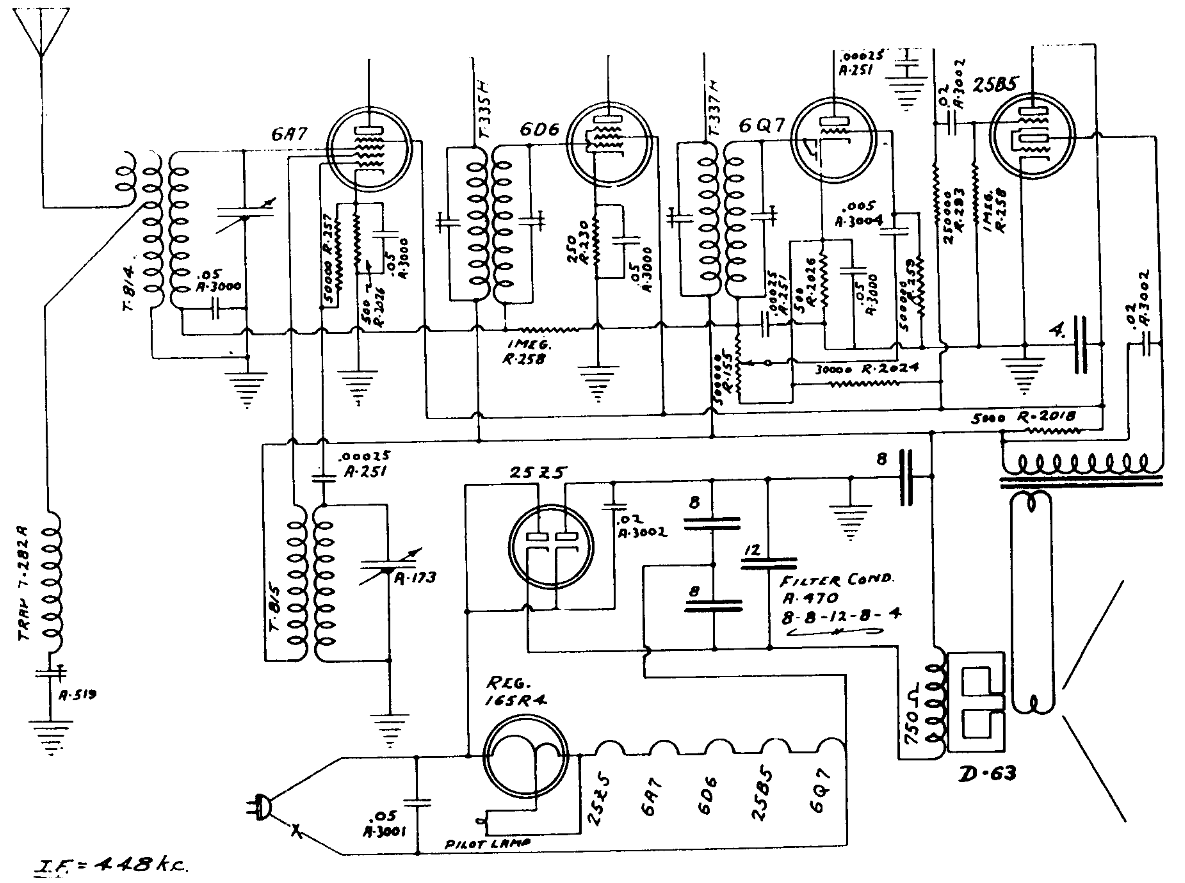
Part No.	Description	Quantity	Price
20678	Ground Terminal	1	$0.02
23358	Vertical Terminal	1	.10
23850	Resistor—16M Ohms, 1 Watt	1	.20
27176	Terminal Board (10 Lug)	1	.20
27422	Step Washer (Elect. Cond.)	1	.02
27465	Bracket (Tone Control)	1	.15
28045	Bulb—Pilot Light	2	.15
28638	Pointer Screw	1	.02
28717	Condenser Tub., .002 Mfd., 700 V.	1	.30
28723	Condenser—Replace with No. 34436		
28726	Condenser—Replace with No. 34437		
28728	Condenser Tub., .25 Mfd., 200 V.	1	.35
28793	Junction Box Connector Assy. (Z Chassis)	1	1.00
29065	Clamp (Electro. Cond. Mtg.)	2	.05
29074	Condenser Mica—Dual—100-250 Mmfd.	1	.30
29135	Condenser—Replace with No. 34437		
29551	Binding Post Assy. (Ant. and Doublet)	1	.20
29818	Condenser Tub., .003 Mfd., 700 V.	1	.25
29831	Condenser Mica (1000 Mmfd.)	1	.30
30090	Mtg. Bracket (Vol. Control)	1	.15
30092	Junction Terminal Board	1	.10
30104	Rubber Grommet	2	.02
30143	Condenser—Replace with No. 34436		
30152	Terminal Board	1	.10
30185	Resistor—30M Ohm, ½ Watt	1	.20
30198	Condenser-Mica—1100 Mmfd.	1	.25
31358	Condenser-Mica—50 Mmfd.	1	.20
31424	Insulating Shield (Elect. Cond.)	1	.10
31637	Mtg. Stud (Var. Cond.)	3	.02
31739	Mtg. Washer (Var. Cond.—Rubber)	6	.05
31778	Junction Terminal Board	1	.10
31868	Condenser—Replace with No. 29818		
32099	Resistor—20 Ohm, ¼ Watt	1	.15
32692	Resistor—200 M Ohms, ½ Watt	1	.15
32693	Resistor—1 Meg Ohm, ⅓ Watt	2	.15
32694	Resistor—50 M. Ohm, ½ Watt	3	.15
32858	Mtg. Foot (Chassis)	4	.25
32916	Mtg. Foot (Var. Cond.—Rear)	1	.10
33065	Condenser—600 K.C. Padder	1	.40
33078	Shipping Block (Fibre)	2	.05
33287	Support Bracket (Range Switch)	1	.05
33292	Shield (Coil)	2	.35
33303	Socket—5 Prong (5W4)	1	.15
33306	Socket—8 Prong (Universal)		.15
33368	Spade Lug (Elect. Cond.)	1	.02
33369	Condenser—Electrolytic—12 Mfd., 450 V.	1	1.20
33372	Condenser—Replace with No. 34787		
33469	Condenser—Electrolytic—18 Mfd., 300 V.	1	.90
33471	Line Cord and Plug	1	.40
33665	Condenser Tub., .03 Mfd., 200 V.	1	.30
33822	Resistor, 5 M Ohm, 1 Watt	1	.20
33834	Terminal Strip (Vol. Cont.)	1	.10
33841	Fuse (1.5 Amp.)	1	.15
33863	Bias Cell Mtg. Strip	1	.15
33883	Grid Bias Cell	1	.25
33896	Resistor—2 M Ohms, ½ Watt	1	.15
34300	Resistor—400 Ohm, ½ Watt	2	.15
34417	Condenser—Tub., .01 Mfd., 500 V.	1	.35
34435	Condenser—Tub., .02 Mfd., 400 V.	1	.35
34436	Condenser—Tub., .05 Mfd., 400 V.	1	.35
34437	Condenser—Tub., .10 Mfd., 400 V.	4	.35
34469	Cover (Fuse)	1	.15
34470	Insulator (Fuse)	1	.05
34471	Mtg. Clip (Fuse)	1	.10
34536	"J" Bolt (Chassis Mtg.)	2	.03
34658	Coil—Antenna	1	1.25
34660	Coil—Oscillator	1	1.25
34704	Coil—Pre-Selector	1	1.25
34755	Resistor—500 M Ohm, ½ Watt	2	.15
34787	Condenser—Tub., .0058 Mfd., 700 V.	2	.25
34851	Socket (Beacon Eye), Incl. Cap	1	.60
35017	Vernier Clamp	1	.10
35023	Bracket (Dial Support)	1	.10

Part No.	Description	Quantity	Price
35024	Mtg. Foot (Var. Cond.—Front)	1	.20
35051	Coil and Shield—Diode I. F.	1	1.75
35126	Pick-up Vernier with Pulley	1	1.50
35145	Power Transformer, 115 V., 50/60 cycles	1	5.00
35241	Idler Arm	1	.10
35242	Stud (Idler Pulley)	1	.20
35243	Tension Spring	1	.10
35244	Pulley (Idler)	1	.15
35245	Special Binding Head Screw	1	.05
35329	Escutcheon (Dial)	1	1.00
35330	Escutcheon (Beacon Eye)	1	.50
35359	Window (Dial)	1	.60
35360	Gasket (Window)	1	.10
35361	Retaining Ring (Window)	1	.25
35374	Drive Belt	1	.25
35492	Retaining Spring (Escutcheon)	1	.20
35516	Mtg. Foot (Cond. Support)	1	.15
35558	Terminal Board	1	.15
35580	Reflector	1	1.00
35604	Socket—Speaker	1	.15
35606	Decalcomania (A. B. C.)	1	.10
35607	Decalcomania (H. M. L.)	1	.10
35649	Volume Control	1	1.25
35654	Condenser (Antenna Trimmer)	1	.45
35655	Condenser (Osc. Trimmer)	1	.45
35656	Tone Control Switch	1	.60
35662	Shaft Extension (Range Switch)	1	.25
35671	Range Switch	1	1.50
35744	Shield (Pre-Selector Coil)	1	.35
35755	Resistor—820 Ohms, ⅓ Watt	1	.15
35776	Coil and Shield, 1st I. F.	1	1.70
35777	Coil and Shield, 2nd I. F.	1	1.70
35800	Condenser—Variable	1	5.00
35803	Power Transformer, 115 V., 25/50 cycles	1	8.50
35804	Power Transformer—Universal	1	8.50
35805	Dial Chart	1	.80
35815	Knob (Plain)	2	.20
35816	Knob (White Dot)	2	.20
36057	Socket—Pilot Light	2	.15
36190	Tube Sleeve (Beacon Eye)	1	.10
36547	Hour Pointer	1	.20
36549	Minute Pointer	1	.15
37572	Intermediate Gear and Pinion	1	.75
37573	Rotor Shaft Gear	1	.50
40006	Spring (Gear Tension)	4	.05
40012	Clamp (Vernier Drive)	1	.10
40018	Inner Pointer Shaft	1	1.10
40019	Outer Pointer Shaft	1	1.20
40020	Spring Washer	1	.05
40021	Washer	1	.02
40022	Screw	1	.02
61134	1" x No. 8-32 Screw (Red Head)	2	.01
61207	1" x No. 8-32 Screw (Chassis Mtg.)	4	.01
63838	Felt Washer (Under Knob)	4	.01
63863	Flat Washer (Chassis Mtg.)	6	.01
63945	Black Fibre Washer (Pointer)	1	.01

SPEAKER TYPES 1210A-4 AND 1210A-3

Part No.	Description	Quantity	Price
20041	Clamp	1	$0.10
27242	Cone Gasket	1	.10
33202	Terminal Strip	1	.20
33203	Terminal Strip Cover	1	.10
33204	Terminal Strip Insulator	1	.05
35263	Output Transformer	1	1.75
35268	Shell Cap and Insulator	1	.10
35269	Plug	1	.10
35544	Pot Cover	1	.50
35663	1210A-3 Speaker Complete	1	14.50
35664	Field Coil	1	4.25
36228	Cable and Plug—1210A-3 Speaker	1	.55
36229	Cable and Plug—1210A-4 Speaker	1	.55
36342	1210A-4 Speaker Complete	1	14.50
36913	Cone and Voice Coil Assy.	1	2.00
61245	1" x No. 10-32 Screw	1	.01

INTERNATIONAL RADIO CORP.
MODEL K-10



This chassis is designed to operate from 110-125 volt, 60 cycle, alternating current power lines. It is a single band receiver covering the American broadcast band.

The following tubes are employed:

6A7 —Mixer-Oscillator
6D6 —I. F. Amplifier
6Q7 —2nd Detector-AVC-1st A. F. (Metal)
25B5 - Pentode Output
25Z5 —Rectifier
165 1R—Regulator

ALIGNMENT

ESSENTIAL DATA: The intermediate frequency employed is 448 Kc.

The standard type of output meter should be used to indicate signal strength. It should be connected from the output plate of the 25B5 tube to ground.

Poor sensitivity may be an indication of incorrectly adjusted I. F. trimmers.

Aligning should be done on 1400 1000 and 600 kilocycles.

INTERMEDIATES: To align the I. F. circuits, set the signal generator to 448 Kc and feed its modulated signal direct to the antenna. Adjust the first I. F. transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second I. F. transformer. If adjustments are not made accurately, selectivity will be poor and I. F. oscillation may result. Finally, adjust the trimmer in the tuned wave trap for *minimum* meter reading.

BROADCAST: Turn the dial to 1400 Kc and feed a *very weak* 1400 Kc modulated signal from your signal generator to the antenna. Adjust the broadcast oscillator trimmer and detector trimmer (on condenser gang) for maximum reading.

There is no adjustable padder condenser in this model so resonance on lower frequencies is accomplished by bending plates on tuning condensers.

AVERAGE SOCKET VOLTAGES

Tube	Position	Ek	Esu	Egs	Ega	Ep	Ep input
6A7	Mixer-Osc.	4	—	90	150	150	—
6D6	I.F.	2.5	2.5	90	—	150	—
6Q7M	2nd Det. AVC-AF	1.3	—	—	—	*-50	—
25B5	Output	0	—	—	—	150	90
25Z5	Rectifier	200				118 AC	—

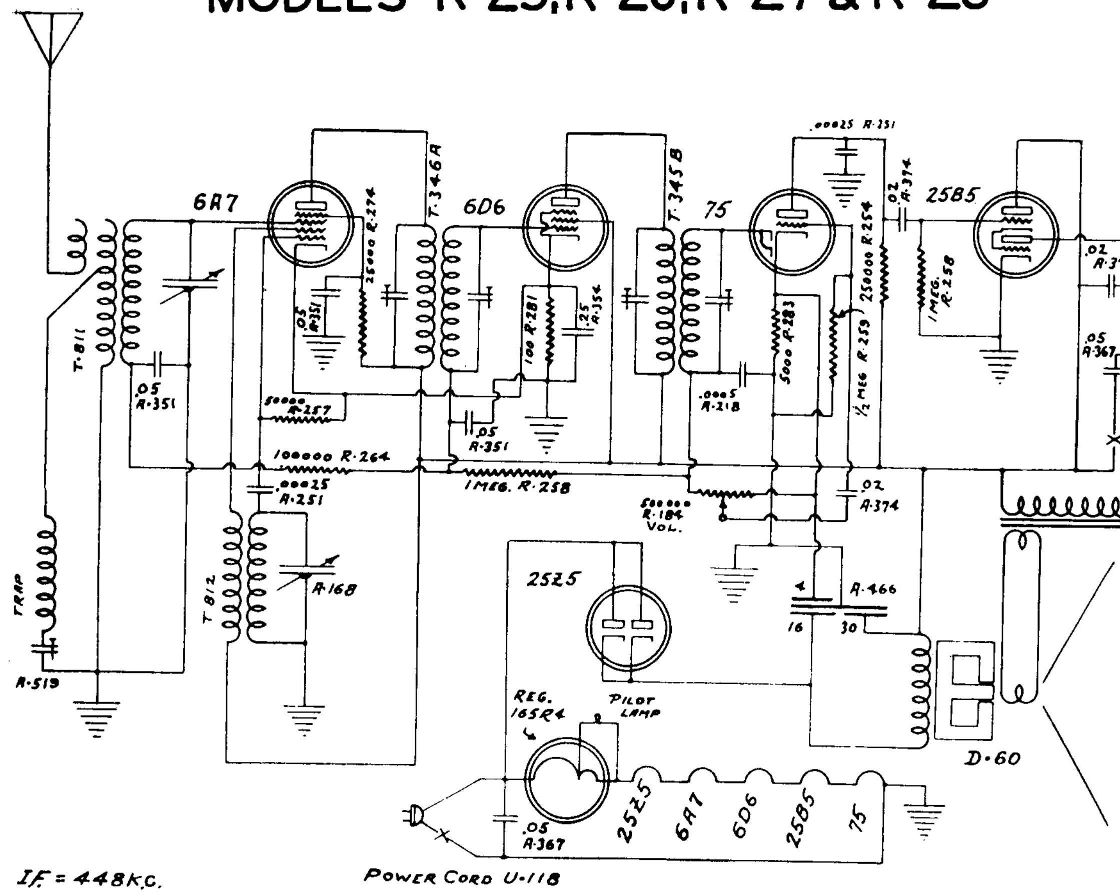
Line 118 volts. Volume control full on. 10% variation allowable. Measurements made from tube prongs to ground with 1000 ohms per volt instrument.
* Through 250 ohm.

PARTS PRICE LIST

Part No.	Description	List Price
A-173	Variable Condenser	$1.60
A-251	250 mmf. Mica Condenser	.20
A-470	Filter Condenser	1.15
A-514	Dual I. F. Trimmers	.50
A-519	Single Three Plate Trimmer	.15
A-3000	.05 mfd. 200 Volt Paper Condenser	.20
A-3001	.05 mfd. 400 Volt Paper Condenser	.20
A-3002	.02 mfd. 400 Volt Paper Condenser	.20
A-3004	.005 mfd. 600 Volt Paper Condenser	.20
D-63	Speaker	3.25
E-165	Special Knob (specify color) each	.20
E-288	Dial Pointer	.05
E-481	Pilot Lamp 6-8 Volt, .15 Amp.	.15
E-2006	Dial Window	.20
E-2052	Dial Scale	.15
G-114	Dial Springs	.05
H-17	6A7 Tube Socket	.10
H-18	25Z5 Tube Socket	.10
H-19	6D6 Tube Socket	.10
H-58	Regulator Tube Socket	.10
H-61	6Q7M Tube Socket	.10
H-65	25B5 Tube Socket	.10
R-155	Volume Control and Switch	.65
R-230	250 ohm, 1/3 Watt Carbon Resistor	.20
R-257	50M ohm, 1/3 Watt Carbon Resistor	.20
R-258	1 Megohm, 1/3 Watt Carbon Resistor	.20
R-259	500M ohm, 1/3 Watt Carbon Resistor	.20
R-293	250 ohm, 1/3 Watt Carbon Resistor	.20
R-2018	5M ohm, 1 Watt Carbon Resistor	.20
R-2024	30M ohm, 1/2 Watt Carbon Resistor	.20
R-2026	500 ohm, 1/3 Watt Carbon Resistor	.20
T-282A	Tuned Wave Trap	.50
T-335H	1st I. F. Transformer	1.25
T-337H	2nd I. F. Transformer	1.25
T-814	Antenna Coil	1.00
T-815	Oscillator Coil	1.00
U-118	Power Cord and Plug	.30
WL-20	Antenna Wire	.10

INTERNATIONAL RADIO CORP.

MODELS K-25, K-26, K-27 & K-28



This chassis is designed to operate from 110-125 volt power lines, either alternating or direct current. It is a single band receiver covering the American broadcast band.

The following tubes are employed:

6A7 —1st Detector-Oscillator	25B5 —Output
6D6 —I.F. Amplifier	25Z5 —Rectifier
75 —2nd Detector A.V.C.-A.F.	165R4—Regulator (Metal)

ALIGNMENT

ESSENTIAL DATA: The intermediate frequency employed is 448 Kc.

The standard type of output meter should be used to indicate signal strength. It should be connected from the output plate of the 25B5 tube to ground.

Poor sensitivity may be an indication of incorrectly adjusted I.F. trimmers.

Aligning of Broadcast band should be done on 1400, 1000, and 600 kilocycles.

INTERMEDIATES: To align the I.F. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. Adjust the first I.F. transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second I.F. transformer. If adjustments are not made accurately, selectivity will be poor and I.F. oscillation may result. Finally, adjust the trimmer in the tuned wave trap for *minimum meter reading*.

BROADCAST BAND: Turn the dial to 1400 Kc. and feed a very weak 1400 Kc. modulated signal from your signal generator to the antenna. Adjust the oscillator trimmer for maximum reading. Then peak antenna trimmer to this setting.

There is no adjustable padder condenser in this model so resonance on lower frequencies is accomplished by bending plates on tuning condensers

AVERAGE SOCKET VOLTAGES

Tube	Position	Ek	Ega	Esu	Egs	Ep	Ep input
6A7	Det.-Osc.	*-1.8	100	—	60	100	—
6D6	I.F.	*-1.8	—	*-1.8	100	100	—
75	2nd Det. A.V.C.-A.F.	*-.6	—	—	—	†-40	—
25B5	Output	0	—	—	—	90	100
25Z5	Rectifier	100	—	—	—	118 AC	—

Line 118 volts—volume control full on. 10% variation allowable. Measurements made from tube prongs to ground with 1000 ohms per volt instruments on 250 volt scale except * on 10 volt scale.

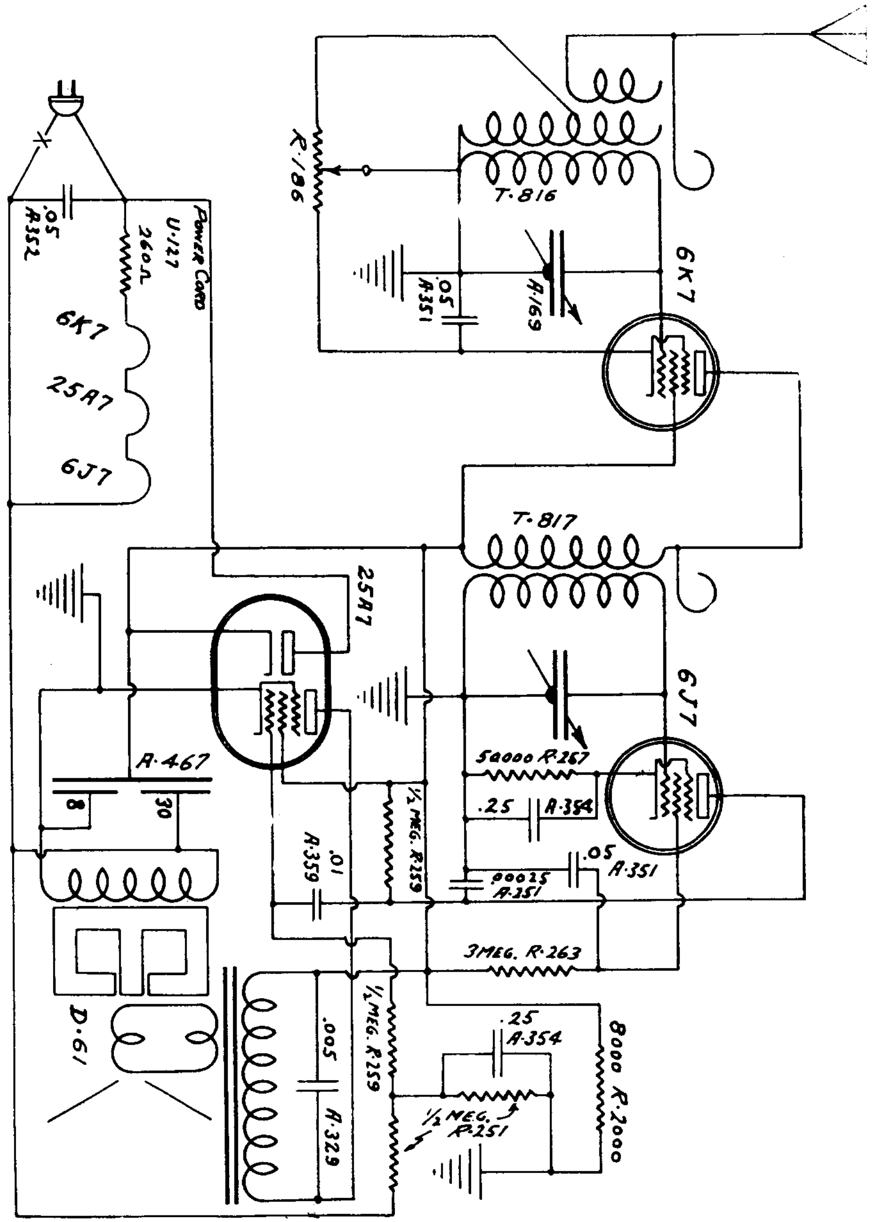
† Through .25 megohm

PARTS PRICE LIST

Part No.	Description	List Price
A-168	Tuning condenser	$1.65
A-218	.0005 mfd. mica condenser	.20
A-251	.00025 mfd. mica condenser	.20
A-351	.05 mfd. 200 tubular condenser	.15
A-354	.25 mfd. 25 volt tubular condenser	.20
A-367	.05 mfd. 400 volt tubular condenser	.15
A-374	.02 mfd. 400 volt tubular condenser	.15
A-466	Electrolytic filter condenser	1.25
A-535	Dual I.F. trimmer condenser	.50
A-519	3 plate single trimmer	.15
D-60	Speaker	3.25
E-178	Knob (front) specify color	.25
E-179	Knob (rear) specify color	.20
E-388	Dial ring and escutcheon	1.50
E-481	Pilot lamp 6-8 volt, .15 amps.	.15
E-2005	Dial pointer	.25
E-4022	Tone control switch	.30
G-111	Dial string	.05
G-116	Dial spring	.05
H-17	6A7 tube socket	.10
H-18	25Z5 tube socket	.10
H-19	6D6 tube socket	.10
H-25	75 tube socket	.10
H-58	Ballast tube socket	.10
H-65	25B5 tube socket	.10
R-184	Volume control and power switch	.65
R-254	250M ohms 1/3 watt resistor	.20
R-258	1 meg. ohm 1/3 watt resistor	.20
R-259	500M ohm 1/3 watt resistor	.20
R-264	100M ohm 1/3 watt resistor	.20
R-274	25M ohm 1/3 watt resistor	.20
R-281	100 ohm 1/3 watt resistor	.20
R-283	5M ohm 1/3 watt resistor	.20
S-119	Goat tube shield	.10
T-345B	2nd I. F. transformer	1.25
T-346A	1st I. F. transformer	1.25
T-811	Antenna coil	1.00
T-812	Oscillator coil	1.00
U-118	Power cord	.30
WL-20	Antenna wire	.10
X-3052	Cabinet for Model K-25	10.50
X-3053	Cabinet for Model K-26	10.50
X-3054	Cabinet for Model K-27	10.50
X-3055	Cabinet for Model K-28	10.50
X-3056	Back panel (specify color or cabinet model number)	.30

Prices Subject to Change Without Notice

INTERNATIONAL RADIO CORP.
MODEL K-43



This chassis is designed to operate from 110-125 volt power lines, either alternating or direct current. It is a single band receiver covering the American broadcast band.

The following tubes are employed:

6K7M —Tuned R. F.
6J7M —Detector
25A7G—Pentode output and Rectifier

ALIGNMENT

Alignment may be accomplished using either a signal generator or weak broadcast signals although the signal generator is preferable. An output meter should be connected from the plate of the 25A7G tube to ground.

Set signal generator at 1500 kilocycles and feed signal to antenna. Keep the output from signal generator as low as possible. Tune in signal on radio and set detector to calibrate to the dial. Rock the tuning condenser back and forth across the signal while adjusting the R. F. trimmer for resonance.

Next check the alignment at 1000 Kc. Insert a thin bakelite, celluloid or mica feeler strip between the plates of the variable condensers to determine whether the circuits are properly matched. The action is this—the dielectric constant of the celluloid feeler strip being higher than that of the air it displaces, results in an increase of capacity. Open the variable condenser just enough to indicate two or three points below maximum signal. As the feeler is inserted the meter reading should indicate increasing signal and the decreasing as the feeler is inserted farther. This procedure should be followed on both sections. Should the meter fail to show an increase in signal as the strip is inserted in one section this indicated too great a capacity for the section. This may be corrected by bending the outside rotor plates out at the point where they begin to mesh with the stator.

After checking the alignment at 1000 Kc. repeat the process at 600 K

AVERAGE SOCKET VOLTAGES

Tube	Position	Ek	Eg	Egs	Esu	Ep	Rectifier Ep	Rectifier Ek
6K7	R.F.	*-3	0	100	*-3	100		
6J7	Det.	*-1.2	0	†-10	*-1.2	‡-20		
25A7g	Output Rectifier	0	††	100	—	100	118 AC	100

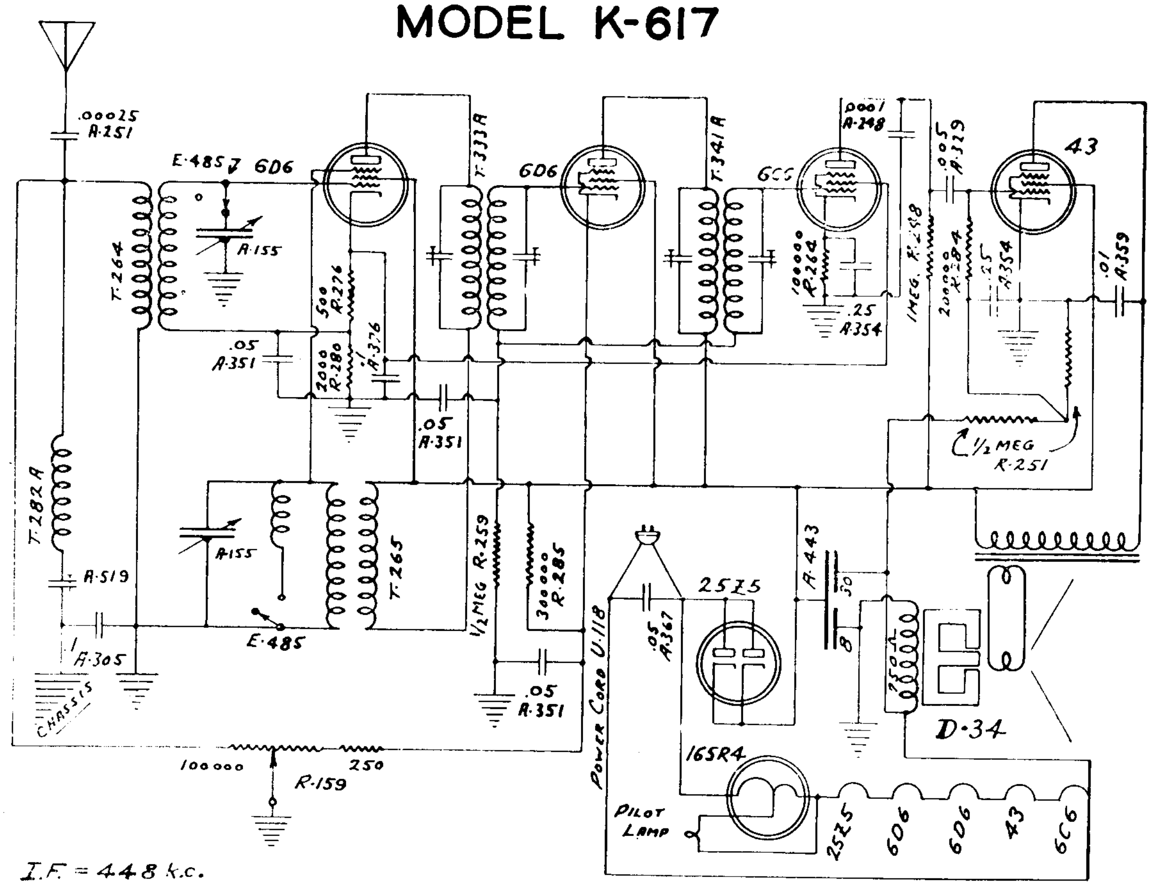
Line 118 volts. Volume control full on. 10% variation allowable. Measurements made from tube prongs to ground with 1000 ohms per volt instrument on 250 volt scale except * on 10 volt scale.
† Through 3 megohms. ‡ Through .5 megohms. ††Biased by negative leg filter drop.

PARTS PRICE LIST

Part No.	Description	List Price	Part No.	Description	List Price
A-169	Tuning Condenser	$1.65	R-251 or R-2050	500M ohm, 1/3 Watt, 10% Carbon Resistor	.20
A-251	250 mmf. Mica Condenser	.20	R-257 or R-2052	50M ohm, 1/3 Watt, 20% Carbon Resistor	.20
A-329	.005 mfd. 600 V., Paper Condenser	.15	R-259 or R-2051	500M ohm, 1/3 Watt, 20% Carbon Resistor	.20
A-351	.05 mfd. 200 V., Paper Condenser	.15	R-263 or R-2053	3 Megohm 1/3 Watt, 20% Carbon Resistor	.20
A-352	.05 mfd. 400 V., Paper Condenser	.15	R-2000	8M ohm, 1 Watt, 20% Carbon Resistor	.20
A-354	.25 mfd. 25 V., Paper Condenser	.20	T-816	Antenna Coil	1.00
A-359	.01 mfd. 400 V., Paper Condenser	.15	T-817	RF Coil	1.00
A-467	Electrolytic Filter Condenser	1.00	U-127	Resistor Cord and Plug	.65
D-61	Dynamic Speaker	3.00	WL-20	Antenna Wire	.10
E-111	Knob (order by color as well as number)	.15	X-321	Walnut Bakelite Cabinet Complete (no back)	2.75
E-249	Volume Control Scale	.10	X-322	Ivory Plaskon Cabinet Complete (no back)	4.00
E-2047	Selector Scale	.10	X-323	Red Plaskon Cabinet Complete (no back)	4.00
H-53	6J7 Tube Socket	.10	*	Grille Only with silk for all models	.50
H-54	6K7 Tube Socket	.10	*	Backs for all models	.20
H-70	25A7G Tube Socket	.10			
R-186	Volume Control and Switch	.65			

NOTE: The above cabinets are not interchangeable with cabinets used on Kadette Jewel with *magnetic speaker.*

INTERNATIONAL RADIO CORP.
MODEL K-617



I.F. = 448 k.c.

This chassis is designed to operate from 110-125 volt power lines, either alternating or direct current. It is a two band receiver covering the American broadcast and police and airport bands.

The following tubes are employed:

6D6 —1st Detector-Oscillator
6D6 —I. F. Amplifier
6C6 —2nd Detector
43 —Pentode Output
25Z5 —Rectifier
165R4—Regulator

ALIGNMENT

ESSENTIAL DATA: The intermediate frequency employed is 448 Kc.

The standard type of output meter should be used to indicate signal strength. It should be connected from the plate of the 43 tube to ground.

Poor sensitivity may be an indication of incorrectly adjusted I. F. trimmers.

Aligning of broadcast band should be done on 1400, 1000 and 600 kilocycles

INTERMEDIATES: To align the I. F. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. Adjust the first I. F. transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second I. F. transformer. If adjustments are not made accurately, selectivity will be poor and I. F. oscillation may result. Finally, adjust the trimmer in the tuned wave trap for minimum meter reading.

BROADCAST BAND: Place the band change switch on the Broadcast position. Turn the dial to 1400 Kc. and feed a *very weak* 1400 Kc. modulated signal from your signal generator to the antenna. Adjust the oscillator trimmer for maximum reading. Then peak the antenna trimmer to this setting.

There is no adjustable padder condenser in this model so resonance on lower frequencies is accomplished by bending plates on tuning condensers.

SHORT WAVE BAND: No alignment necessary.

AVERAGE SOCKET VOLTAGES

Tube	Position	Ek	Eg3	Eg2	Ep
6D6	Det.-Osc.	14	0	100	100
6D6	I.F.	1	1	100	100
6C6	2nd Det.	2.5	—	14	25
43	Output	0	—	100	87
25Z5	Rect.	100	—	—	35

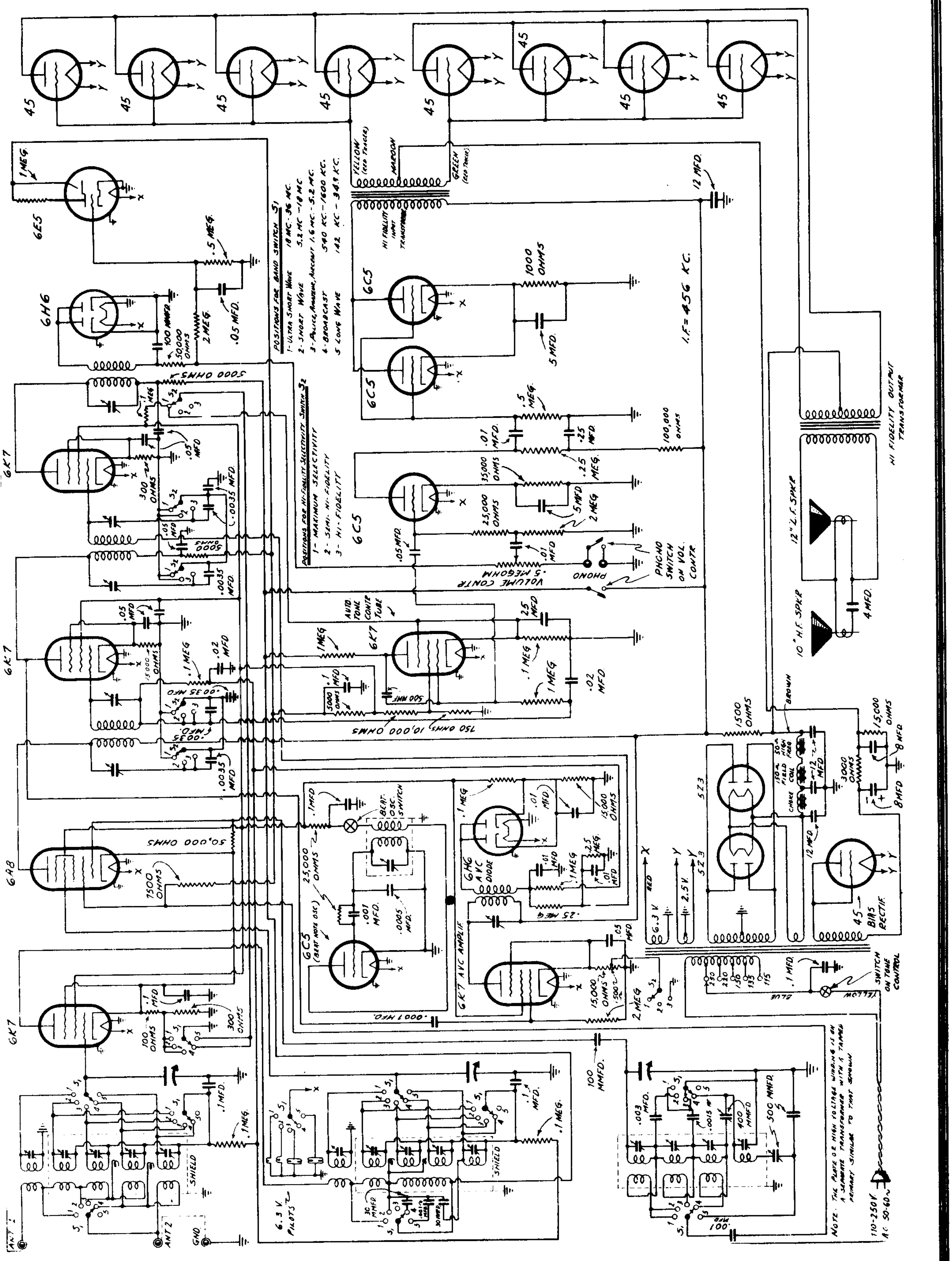
Line 118 volts. Volume control full on. 10% variation allowable
Measurements made from tube prongs to circuit ground.

PARTS PRICE LIST

Part No.	Description	List Price
A-155	Variable condenser	$1.80
A-248	100 mmf. mica condenser	.20
A-251	.00025 mfd., mica condenser	.20
A-305	.1 mfd., 200 volt tubular condenser	.15
A-329	.005 mfd., 600 volt tubular condenser	.15
A-351	.05 mfd., 200 volt tubular condenser	.15
A-354	.25 mfd., 25 volt tubular condenser	.20
A-359	.01 mfd., 400 volt tubular condenser	.15
A-367	.05 mfd., 400 volt tubular condenser	.15
A-376	.1 mfd., 25 volt tubular condenser	.15
A-443S	Filter condenser	1.15
A-514	Dual I. F. trimmer condenser	.50
A-519	Three plate single trimmer	.15
D-34	Speaker	3.25
E-176	Small knob	.10
E-177	Large knob	.10
E-481	Pilot lamp, 6-8 volt, .15 amp.	.15
E-485	Wave band switch	.35
H-18	25Z5 tube socket	.10
H-19	6D6 tube socket	.10
H-21	43 tube socket	.10
H-41	6C6 tube socket	.10
H-58	Ballast tube socket	.10
R-159	Volume control and power switch	.70
R-251	500M ohm, 1/3 watt resistor	.20
R-258	1 megohm, 1/3 watt resistor	.20
R-259	500M, ohm 1/3 watt resistor	.20
R-264	100M ohm, 1/3 watt resistor	.20
R-276	500 ohm, 1/3 watt resistor	.20
R-280	2M ohm, 1/3 watt resistor	.20
R-284	200M ohm, 1/3 watt resistor	.20
R-285	300M ohm, 1/3 watt resistor	.20
S-119	Goat tube shield	.10
T-264	Detector coil	1.00
T-265	Oscillator coil	1.00
T-282A	Tuned wave trap	.50
T-333A	1st I. F. transformer	1.25
T-341A	2nd I. F. transformer	1.25
U-118	Power cord	.30
X-387	Cabinet	5.50

Prices Subject to Change Without Notice

LAFAYETTE RADIO MFG. CO.
MODEL C-95



LAFAYETTE RADIO MFG. CO.

MODEL C-95

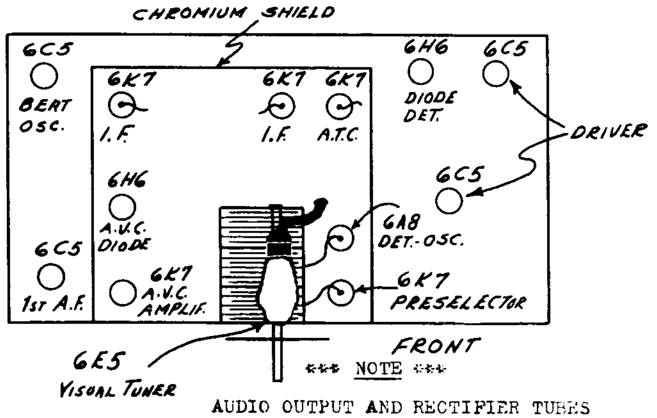
ALIGNMENT PROCEDURE

Realignment of this receiver should not be attempted except by an experienced serviceman and only after all other possible causes of faulty operation have first been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave bands is required. Either a suitable output meter or the cathode-ray tuning indicator may be used for indicating the effects of adjustments. It is necessary, in all of the ensuing procedure, that the signal generator be attenuated as much as possible.

I.F. ADJUSTMENT - The i.f. transformers are housed in the polished metal shield on the chassis. The location of these transformers is indicated in the accompanying diagram. The trimmers are on the tops of the transformer cans. The first and second i.f. transformers have two trimmers each and the detector coupling transformer has only one trimmer. These trimmers are adjusted at 456 kc. for maximum gain. In making this adjustment, the oscillator (rear) section of the tuning condenser should be short-circuited, and the signal generator connected between the grid cap of the 6A8 and the ground post of the receiver. The selectivity switch should of course be in the high selectivity position.

SHORT WAVE BAND - With the output from the signal generator connected across the aerial and ground terminals of the receiver, and the volume control in position for maximum volume, the oscillator trimmer for this band is adjusted for maximum response as indicated by the 6E5. This adjustment must be made with the dial set at exactly 17 mc., otherwise the calibration will be off. The series padder for this band should then be adjusted by setting the signal generator at a frequency of 5.5 megacycles and tuning the signal in on the receiver. The tuning condenser is rotated slightly back and forth as the padder screw is adjusted for maximum output. The 17 mc. adjustment should then be rechecked. If the dial calibration is off, the procedure should be repeated again.

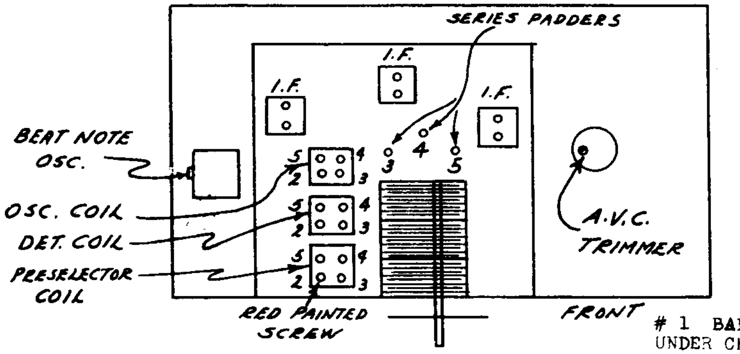
TOP VIEW OF CHASSIS SHOWING LOCATION OF TUBES



*** NOTE ***

AUDIO OUTPUT AND RECTIFIER TUBES ARE IN POWER SUPPLY CHASSIS.

TOP VIEW OF CHASSIS SHOWING LOCATION OF ALIGNING TRIMMERS



1 BAND TRIMMERS UNDER CHASSIS

WAVE BANDS:- The wave bands covered by this receiver are as follows:

	Kilocycles or Megacycles		Meters	
(1) Ultra Short Wave	36.25	18	8.125	-16.6
(2) Foreign & American Short Wave, Airplanes	18	5.2	16.6	-57.5
(3) Police, Amateur, Airplanes	5.2	1.6	57.5	-187.5
(4) Broadcast	1600-540		187.5	-554
(5) Long Wave	343-142		872	-2100

ULTRA SHORT WAVE BAND - The trimmers for this band are adjusted at 36 megacycles in the manner described above. They are located on the under side of the chassis and are not shown on the chassis layout diagram. There are only two trimmers for this band, the oscillator operating on a harmonic of another band.

POLICE BAND ADJUSTMENT - The trimmers for this band are adjusted at 4.8 megacycles in the manner described and the series padder at 1.7 mc. exactly as indicated in the SHORT WAVE BAND ADJUSTMENT procedure.

BROADCAST BAND - The adjustments for this band are as described above. The trimmers are adjusted at 1400 kc. and the padder at 600 kc.

LONG WAVE BAND - The adjustments for this band are made in the prescribed manner, the trimmers being adjusted at 340 kc. and the padder at approximately 150 kc.

A.V.C. AMPLIFIER ADJUSTMENT - The a.v.c. has a separate amplifier which is tuned as follows: The signal generator is set at 1400 kc. and the signal tuned in on the receiver, as indicated by the minimum opening in the 6E5 beam. The a.v.c. trimmer is then adjusted to give the WIDEST opening in the beam. The receiver is then carefully retuned and the adjustment repeated.

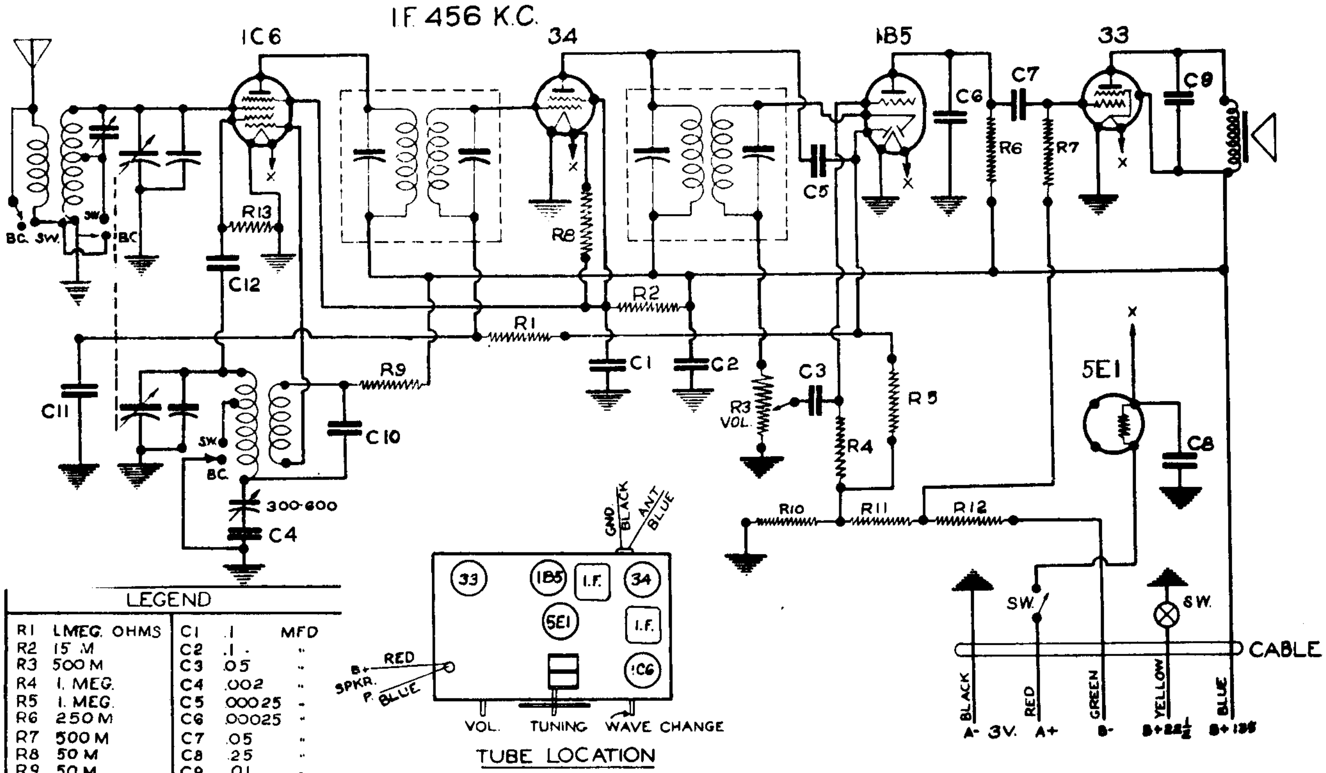
BEAT NOTE OSCILLATOR ADJUSTMENT - A weak signal from the signal generator is tuned in on the receiver as indicated by the minimum opening in the 6E5 beam. The beat oscillator switch is then turned on. An audible note should be heard whose pitch may be varied by adjusting the screw on the small square can on the left side of the chassis. This should be so adjusted that when the station is tuned in exactly, no beat is heard (zero beat). If no beat note is audible when first turned on, rotation of this same screw should bring in the note.

VOLTAGE TABLE

All voltages are measured between socket terminals and chassis: set in operation: volume control full on; antenna disconnected. voltmeter sensitivity - 1000-ohms-per volt. Line voltage measured:- 115.0 Power Consumption: 250 watts

TUBE	FUNCTION	H'T'R	PLATE	SCR.GR.	SUPPR.GR.	CATH.	OSC.PL.
6K7	preselector	6.0	200.0	85.0	1.0	1.0	---
6A8	det.-osc.	6.0	200.0	100.0	---	5.2	175.0
6K7	i.f. amplif.	6.0	175.0	85.0	---	2.2	---
6K7	i.f. amplif.	6.0	175.0	85.0	12.0	12.0	---
6H6	diode det.	6.0	---	---	---	---	---
6C5	1st audio	6.0	120.0	---	---	7.0	---
6C5) 6C5)	2nd audio	6.0	200.0	---	---	7.0	---
45's	audio output	2.2	240.0	---	---	---	---
6K7	A.T.C.	6.0	200.0	85.0	9.0	9.0	---
6C5	beat osc.	6.0	58.0	---	---	7.0	---
6H6	a.v.c.-diode	6.0	9.0	---	---	10.0	---
6K7	a.v.c. amplif.	6.0	140.0	8.0	40.0	40.0	---
6E5	tuning indicator	6.0	---	200.0(target)	---	145.0	---
5Z3) 5Z3)	rectifier	4.5	340.0	---	---	---	---
45	grid bias rectifier	2.2	75.0	---	---	---	---

LAFAYETTE RADIO MFG. CO.
MODELS D-27 & D-29



LEGEND

R1	1.MEG. OHMS	C1	.1 MFD
R2	15 M	C2	.1 "
R3	500 M	C3	.05 "
R4	1. MEG.	C4	.002 "
R5	1. MEG.	C5	.00025 "
R6	250 M	C6	.00025 "
R7	500 M	C7	.05 "
R8	50 M	C8	.25 "
R9	50 M	C9	.01 "
R10	400	C10	.001 "
R11	4500	C11	.1 "
R12	2 M	C12	.0001 "
R13	50 M		

The frequency range covered by this receiver is as follows: Broadcast band 537 KC to 1730 KC. The short wave band covers a range of 2.2 megacycles to 6.4 megacycles and either of these bands are selected at will by a flip of the band change switch. To the left for broadcast—To the right for short wave.

SERVICE INSTRUCTIONS

When set fails to perform properly, always check the voltage of the batteries. Run down batteries will cause weak and poor reception.

Noises may develope from defective tubes and condensers.

This set has been carefully aligned at the factory, but if realignment should become necessary, the following procedure should be followed.

Use a test oscillator and connect an output meter from plate of 33 to B plus.

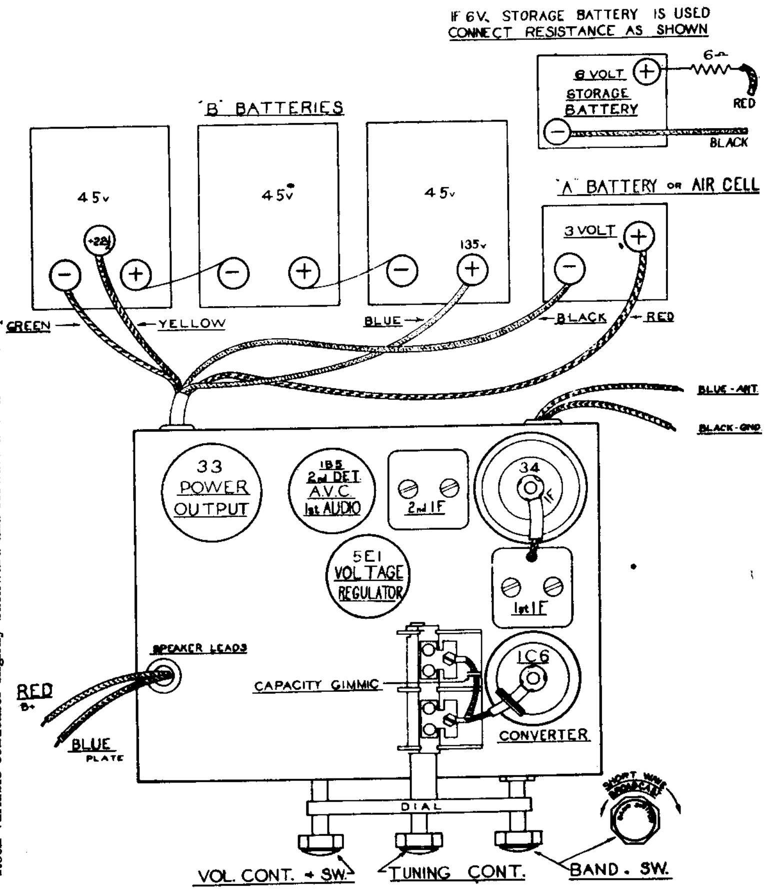
I. F. Alignment:

Connect the oscillator through a .1 condenser to the grid of the 1C6 tube and set the oscillator to 456 kilocycles. Peak each I. F. stage to resonance as indicated by maximum output on the output meter.

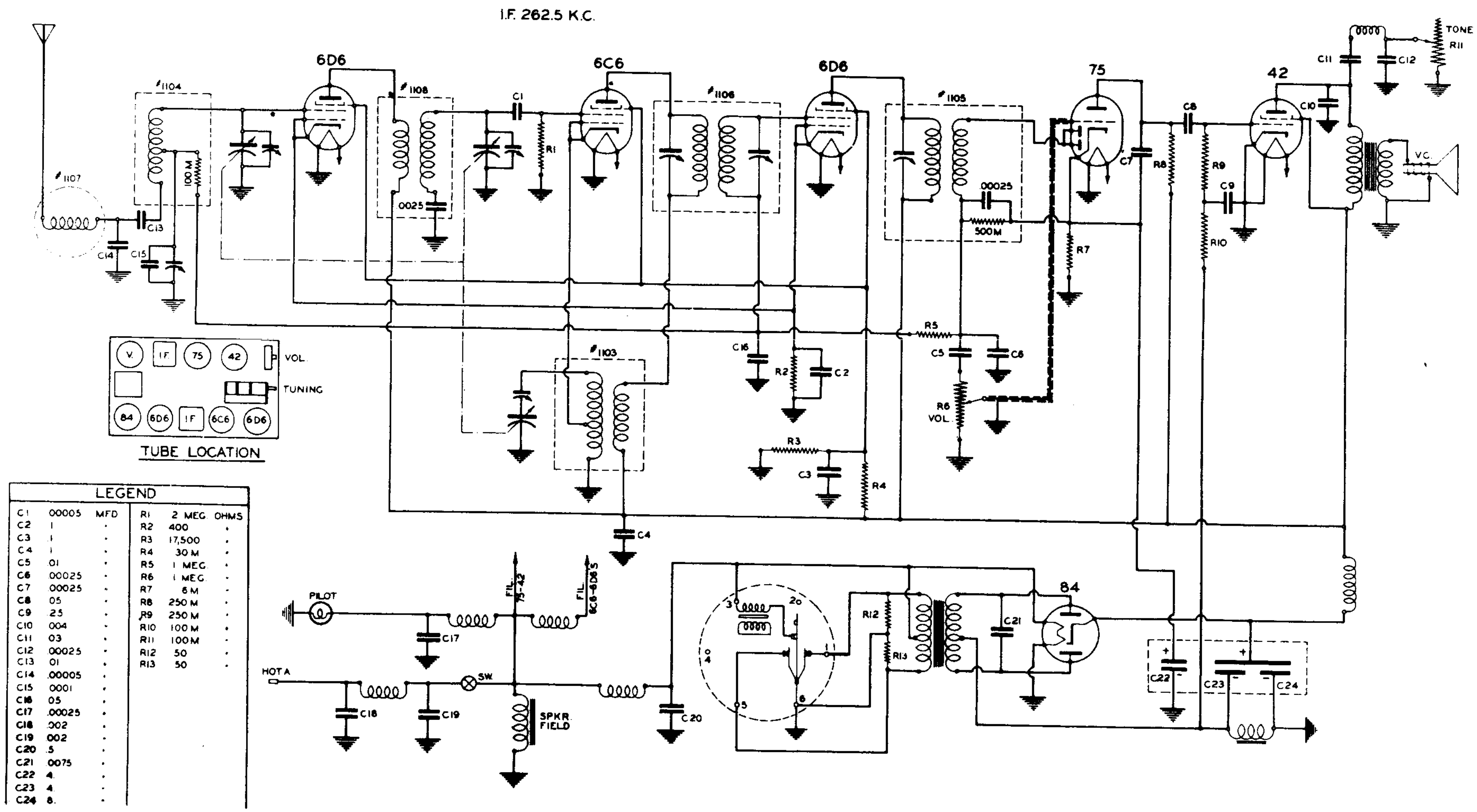
R. F. Alignment:

With the wave change switch in the broadcast position, set the oscillator to 1700 kilocycles and connect in series with a .00025 condenser to the antenna of the receiver. Rotate the variable condenser to the 1700 setting of the dial and adjust the trimmer condenser of the broadcast oscillator to resonance. The location of oscillator trimmer is on rear section of variable condenser. Reset the test oscillator to 1400 kilocycles and adjust antenna trimmer located corner front section of variable condenser. Now set oscillator to 600 kilocycles and adjust padder located on side of chassis. Check alignment at 1000 kilocycles.

For aligning police band, set test oscillator to 6 megacycles. Turn band switch to short wave. Rotate variable condenser until signal is heard. Peak antenna trimmer (across antenna coil under chassis) to maximum. Rock variable condenser slightly backward and forward until maximum peak is reached.



LAFAYETTE RADIO MFG. CO.
MODELS D-45 & D-46



LEGEND	MFD		OHMS
C1	.00005	R1	2 MEG
C2	.1	R2	400
C3	.1	R3	17,500
C4	.1	R4	30 M
C5	.01	R5	1 MEG
C6	.00025	R6	1 MEG
C7	.00025	R7	6 M
C8	.05	R8	250 M
C9	.25	R9	250 M
C10	.004	R10	100 M
C11	.03	R11	100 M
C12	.00025	R12	50
C13	.01	R13	50
C14	.00005		
C15	.0001		
C16	.05		
C17	.00025		
C18	.002		
C19	.002		
C20	.5		
C21	.0075		
C22	4.		
C23	4.		
C24	8.		

I. F. ALIGNMENT:

With volume control on full and variable gang condenser at maximum capacity, attach test oscillator lead in series with a .1 mfd. condenser to stator of R. F. section of gang condenser (center section). Set test oscillator at 262.5 KC and adjust I.F. trimmers for maximum output as indicated on an output meter connected across voice coil of speakers or from plate and screen of 42 tube.

Set test oscillator to 600 KC and adjust oscillator padding (located on bakelite strip, 2nd from front). Also adjust 600 KC antenna padding condenser (located on bakelite strip, 1st condenser). Reset test oscillator to 1400 KC and readjust antenna and R. F. trimmers.

R. F. ALIGNMENT:

Set test oscillator at 1550 KC and connect through a 150 mmf. condenser to antenna of reciever. Rotate variable gang condenser to minimum capacity and back off slightly. Adjust trimmer on oscillator section of gang condenser (third section from shaft end) to resonance indicated by maximum output. Re-set test oscillator of 1400 KC and rotate variable condenser until oscillator signal is picked up. Adjust antenna trimmer (front section) and R. F. trimmer (center section) to resonance.

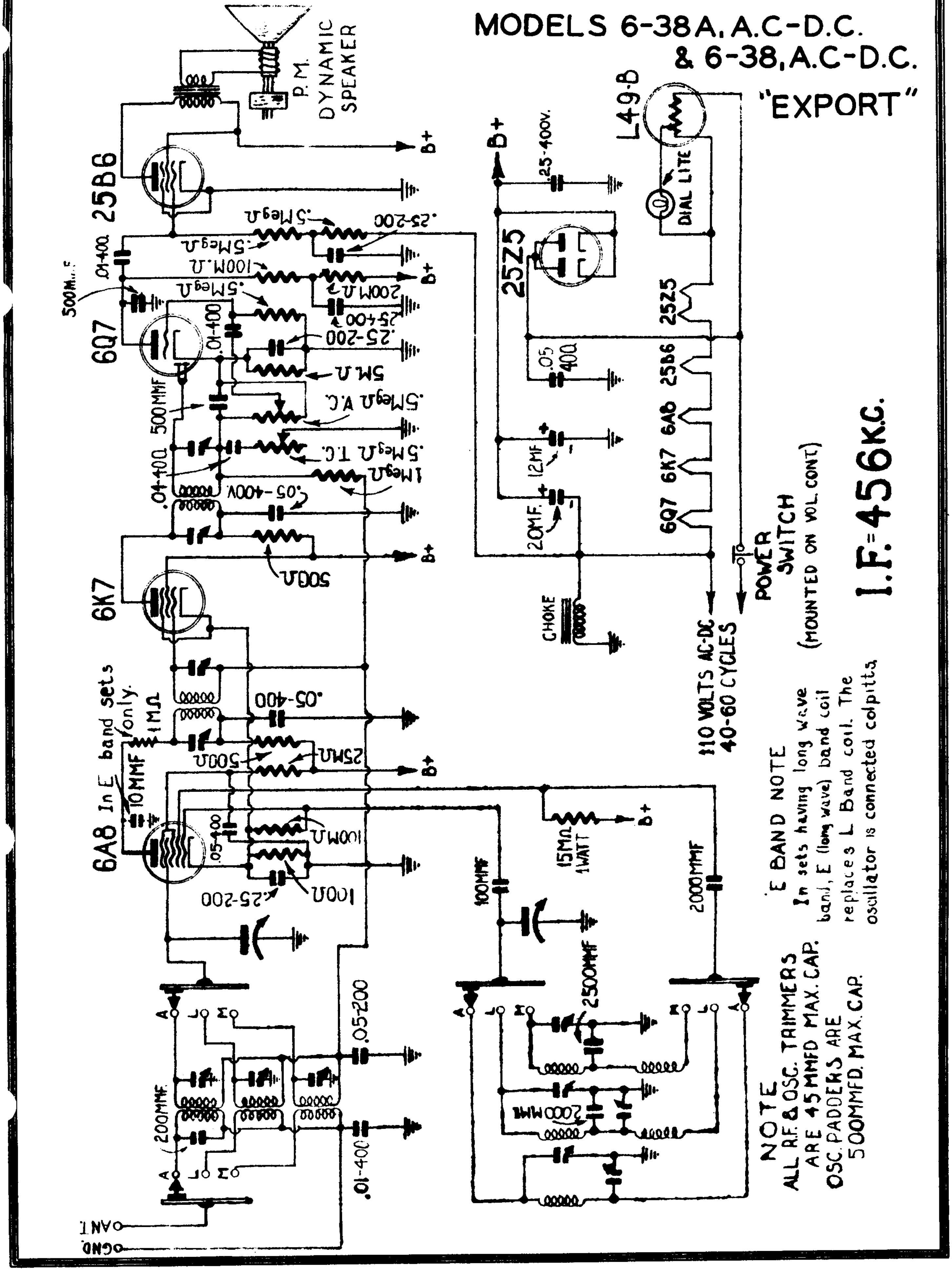
ANTENNA ADJUSTMENT:

When set is in operation, tune to a station on or about 1400 KC and adjust antenna trimmer to maximum volume. This trimmer is accessable by removing the plug button on the front cover of the receiver.

Proper adjustment of this trimmer matches the particular antenna used in the auto to the receiver which increases the sensitivity of the receiver.

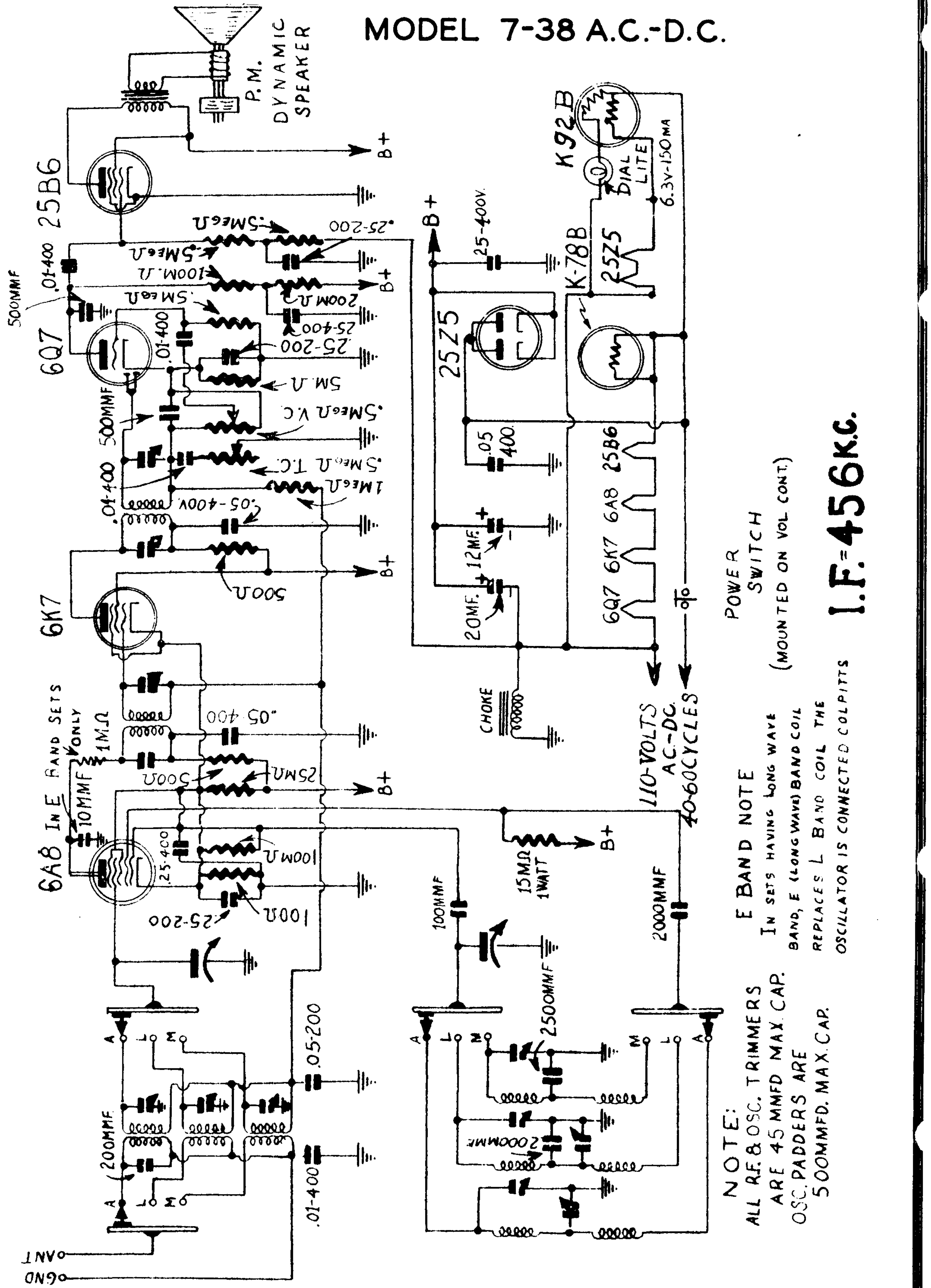
MIDWEST RADIO CORP.

MODELS 6-38A, A.C-D.C. & 6-38, A.C-D.C. "EXPORT"



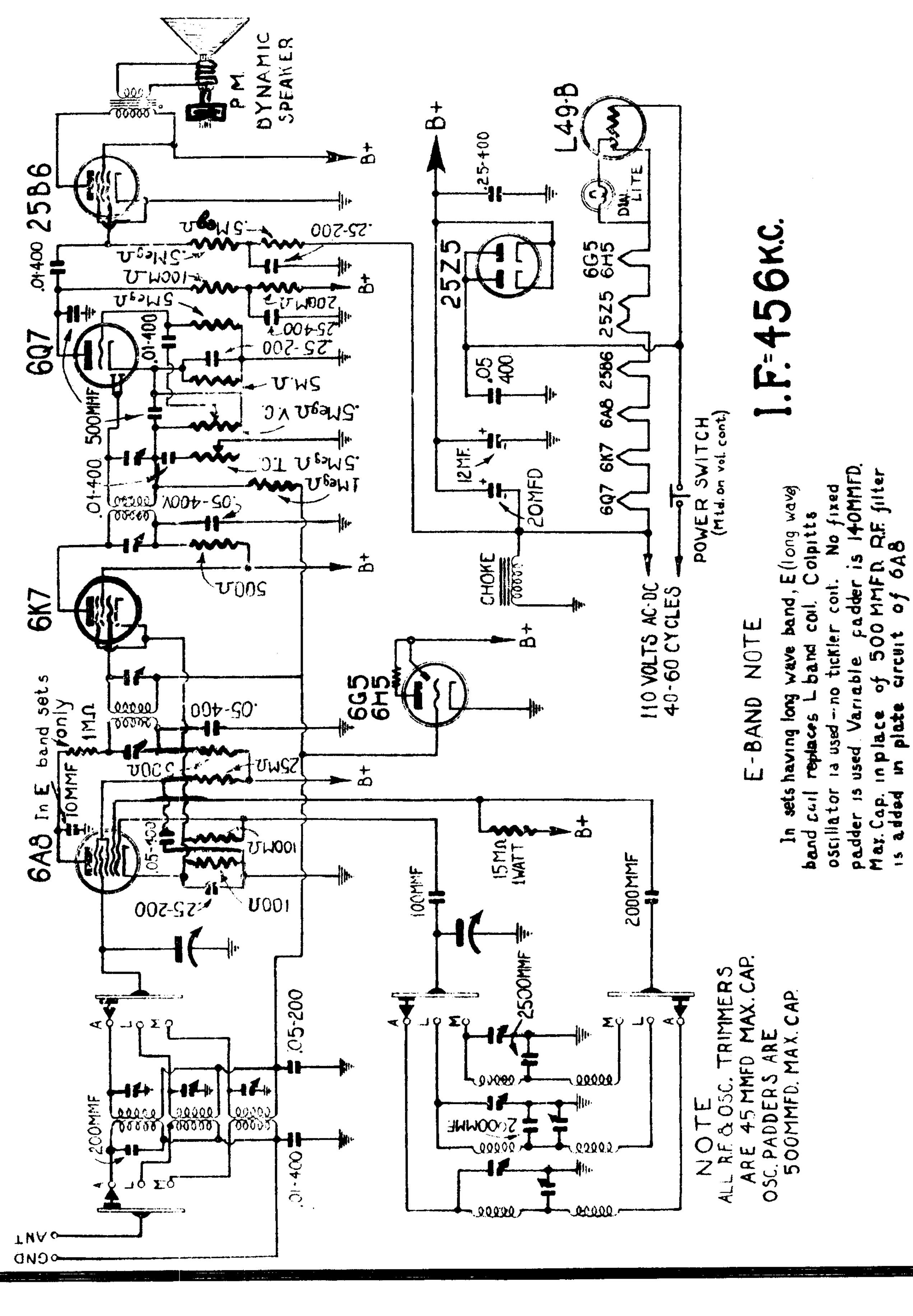
MIDWEST RADIO CORP.

MODEL 7-38 A.C.-D.C.



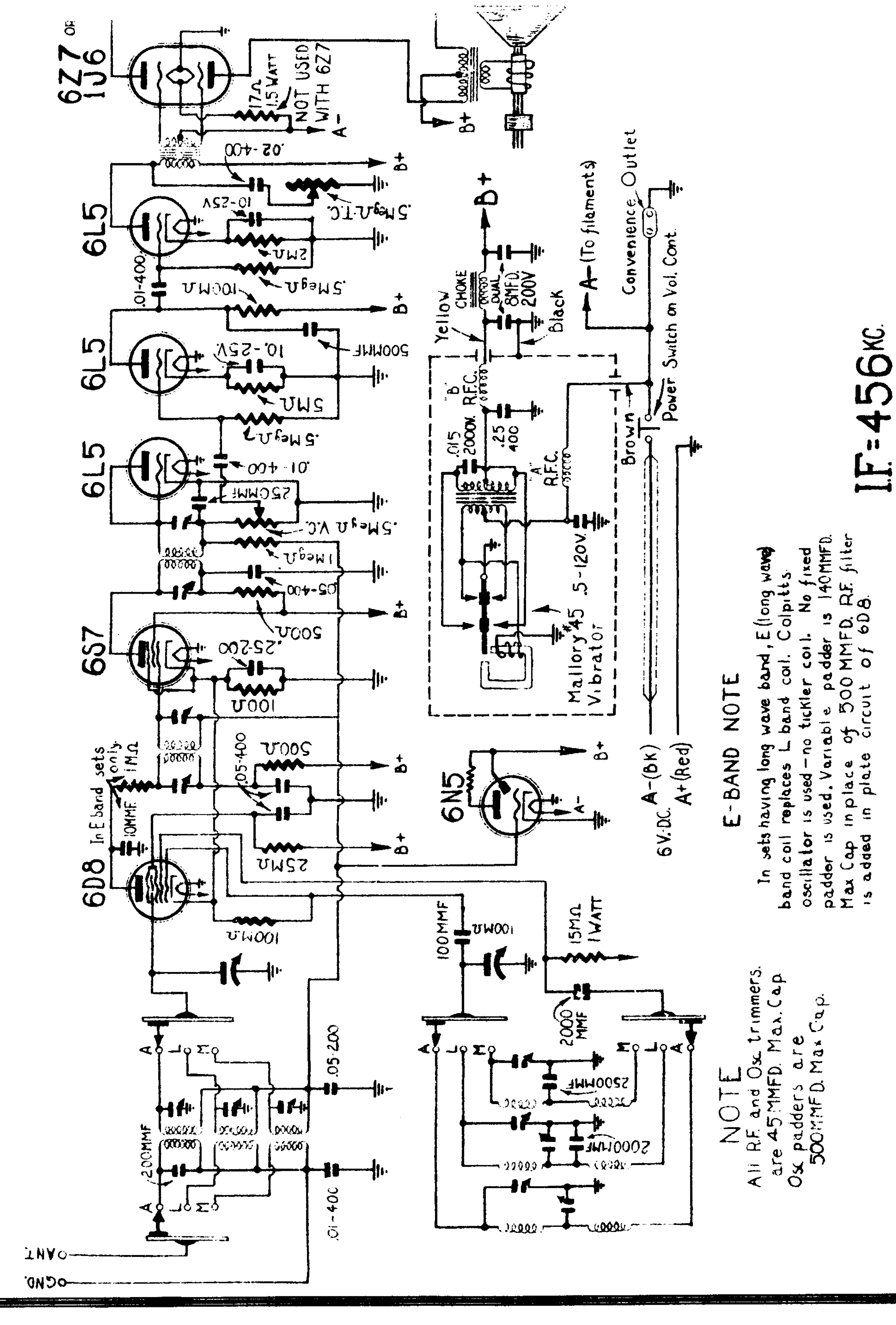
MIDWEST RADIO CORP.

MODELS 7-38A, A.C.-D.C. & 7-38, A.C.-D.C. "EXPORT"



MIDWEST RADIO CORP.

MODELS 7-38A & 7-38 "EXPORT" BATTERY SETS



MONTGOMERY WARD & CO.
MODELS 62-310, 62-410 & OF SERIES

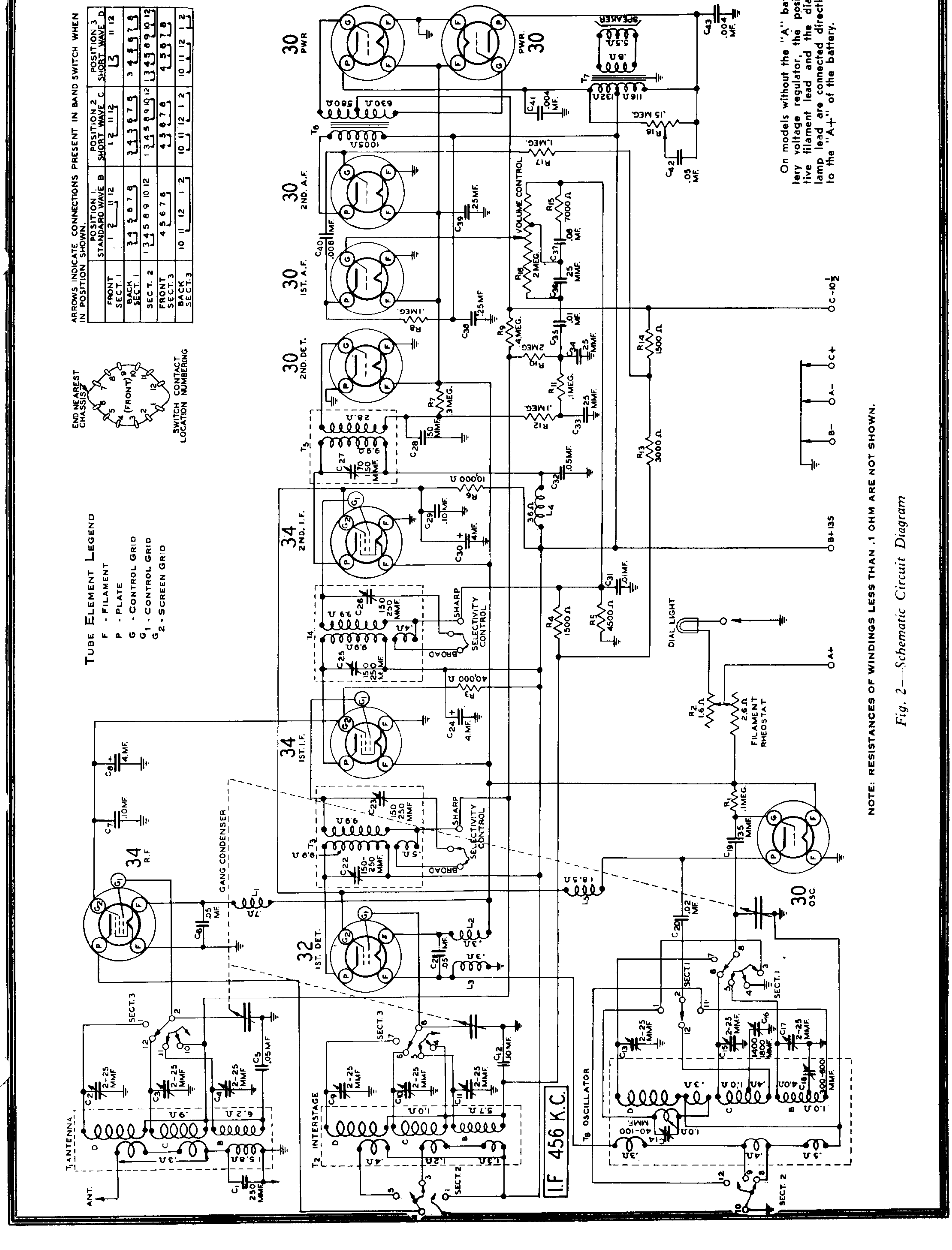


Fig. 2—Schematic Circuit Diagram

MONTGOMERY WARD & CO.

MODELS 62-310, 62-410 & OF SERIES

SPECIFICATIONS

Input Voltages and Currents

"A" Battery	2 Volts—.6 Amperes
"B" Batteries	135 Volts—21 to 47 Ma.
"C" Battery	10½ Volts

Power Output - - - - 1.4 Watts Undistorted

Selectivity - 21 KC Broad at 1000 times Signal (Sharp)

Intermediate Frequency - - - - - - 456 KC

Speaker - - - - - - - - 8" P. M. Dynamic

Tuning Frequency Range

B Range	528 to 1730 KC.
C Range	1710 to 5800 KC.
D Range	5750 to 18300 KC.

Sensitivity

B Range	1 to 3 Microvolts Absolute
C Range	1 to 4 Microvolts Absolute
D Range	1 to 7 Microvolts Absolute

Alignment and Calibration

Alignment Procedure

Correct alignment is extremely important in connection with all wave radios. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 1800, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

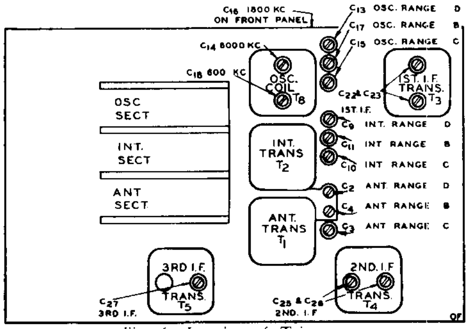


Fig. 6—Location of Trimmers

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 6.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and **all** subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C17) until maximum output is obtained. The location of this trimmer is shown in Fig. 6.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Turn the calibration screw (under color filter) until the 1500 KC mark on the dial scale is at the vertical red line on the screen. If the film drum cannot be turned a sufficient amount by means of the calibration screw, loosen the 2 screws inside the drum which hold it in place. Adjust the position of the drum and tighten the screws. The early models do not have the calibration screw mentioned above. These models must be adjusted by loosening the drum screws.

Adjust the interstage Range B trimmer (C11) and antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 600 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C15) until maximum output is obtained. See Fig. 6 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C10) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 1800 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C13) until maximum output is obtained. See Fig. 6 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage and antenna Range D trimmers, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor slowly back and forth, at the same time adjusting the 6000 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

MONTGOMERY WARD & CO.
MODELS 62-310, 62-410 & OF SERIES

General Service Data

Tubes

The tubes used in this receiver are of the 2 volt series. All of them are of the filament or directly heated types. All of them have a 2 volt filament and should not be connected to a power supply not intended for this type of tube. **Maximum filament voltage range is 1.8 to 2.0 volts. Operation of the tubes at under or over this value will be injurious to the tubes and may affect operation of the receiver.**

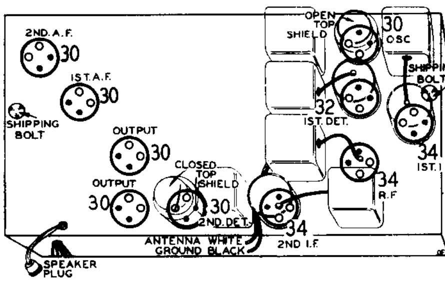


Fig. 7—Location of Tubes

Voltages

Check the voltages at the sockets to see if correct values are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together. The volume control should be turned to the right or maximum position.

All of the voltage readings as shown in the chart are read with a 1,000 ohm-per-volt meter. As high a range as possible should be used. In general, the higher the resistance of the meter, the more accurate the reading will be.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition. These voltages are typical of the sets but will vary slightly with variations in individual receivers, tubes, test equipment used and battery voltages.

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 2. In contact locations not used, the number applying to that particular location is not employed.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Planetary Drive Assembly

The planetary assembly is the unit that is integral with the tuning shaft.

If the nut on the back end of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and film drum to see if they are turning properly or if they are being obstructed in some way.

If the drive turns unevenly (rough in spots), this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

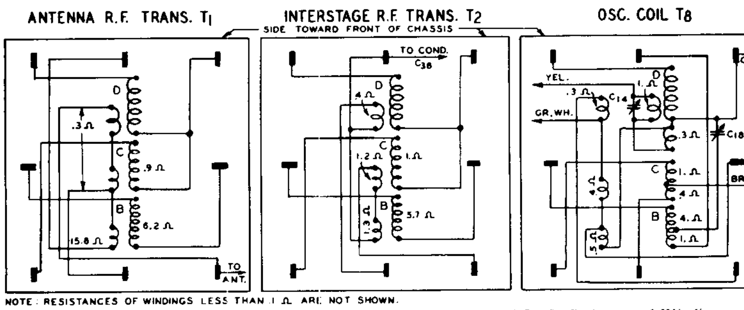


Fig. 8—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

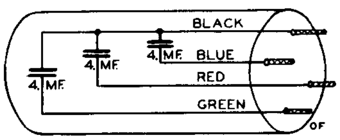


Fig. 9—Electrolytic Condenser Internal Connections

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground — Band Switch in Standard Wave Position

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Control Grid to Ground
34	R. F.	2.0	135	65	
32	1st Det.	2.0	135	90	6
30	Osc.	2.0	90		
34	1st I. F.	2.0	135	65	
34	2nd I. F.	2.0	135	90	4.5
30	2nd Det.	2.0			
30	1st A. F.	2.0	75		4.5 (1)
30	2nd A. F.	2.0	132		9 (2)
30	Power	2.0	135		10.5

(1) Volume control at minimum setting.
(2) As read from connection between R13 and R14, and ground.

Parts List

MISCELLANEOUS

SOCKETS

Part No.	Description	Selling Price
P-3A244	4 Prong Tube Socket (All Types)	$0.06

SPEAKERS

Part No.	Description	Selling Price
P-12A241	8" Dynamic Speaker complete with Output Transformer	3.82
P-13X268	Speaker Cable and Socket Assembly	.22

KNOBS

Part No.	Description	Selling Price
P-10A78	Tone Control—Small Push-on Type	.08
P-10A77	Volume Control—Small Push-on Type	.08
P-10A75	Tuning Control—Large Push-on Type	.08
P-10A76	Band Switch—Large Set-screw Type	.10

GENERAL

Part No.	Code Capacitance Voltage	Selling Price
P-2X38	Felt Washers (Used behind Knobs)	.04
P-8X23	Rubber Chassis Mounting Cushions ea.	.04
P-4A38	Terminal Strip (Single Lug Insulated—mounting foot to left of lug)	.04
P-4A42	Terminal Strip (Two Lugs Insulated—mounting hole in center)	.06
P-4A54	Terminal Strip (Five Lugs Insulated—Two Lugs Grounded)	.06
P-2A56	3 Section, 3 Position, Band Change Switch	.84
P-2A60	Dial Lamp Push Button Switch Assembly	.24
P-30X14	Grid Clip Only	.04
P-13X219	"A", "B" and "C" Battery Cable	.56
P-13X214	Antenna and Ground Lead Assembly	.14
P-32X63	Tube Shield (Large)	.10
P-32X32	Tube Shield (Small—Open Top)	.08
P-32X50	Tube Shield (Small—Closed Top)	.06
P-32X18	Tube Shield Base (Large)	.04
P-32X30	Tube Shield Base (Small)	.04
P-25X221	Chassis Mounting Feet ea.	.04
P-8X43	Rubber Mounting Cushions for Gang Condenser (front) ea.	.04
P-8X44	Rubber Mounting Cushion for Gang Condenser (rear)	.04
P-8X45	Rubber Mounting Cushion for Gang Condenser (rear-under chassis base)	.04

TRANSFORMERS AND COILS

Part No.	Code	Description	Selling Price
P-9A533	T1	Antenna Transformer and Can Assembly	$0.96
P-9A534	T2	R. F. Interstage Transformer and Can Assembly	.96
P-9A536	T3	1st I.F. Transformer and Can Assembly	.86
P-9A537	T4	2nd I.F. Transformer and Can Assembly	.86
P-9A538	T5	3rd I.F. Transformer and Can Assembly	.80
P-50X11	T6	Input Transformer	1.02
P-51X44	T7	Output Transformer (Part of Speaker Assembly)	.62
P-9A535	T8	Oscillator Coil and Can Assembly	1.62
P-9A599	L1 L5	Filament Reactor "B" Reactor — One Assembly	.30
P-9A410	L2 L3	Double Filament Reactor	.14
P-9A598	L4	2nd I.F. Plate Isolating Reactor	.34

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	Selling Price
P-46X80	C5	.05 mf.	180	$0.08
P-46X80	C6	.05 mf.	180	.08
P-46X98	C7	.1 mf.	180	.10
P-46X195	C12	.1 mf.	180	.08
P-46X187	C20	.02 mf.	180	.08
P-46X80	C21	.05 mf.	180	.08
P-46X98	C29	.1 mf.	180	.10
P-46X124	C31	.01 mf.	180	$0.08
P-46X80	C32	.05 mf.	180	.08
P-46X120	C35	.01 mf.	360	.08
P-46X176	C37	.08 mf.	180	.08
P-46X117	C38	.25 mf.	180	.12
P-46X117	C39	.25 mf.	180	.12
P-46X101	C40	.006 mf.	600	.08
P-46X114	C41	.004 mf.	600	.08
P-46X119	C42	.05 mf.	360	.10
P-46X114	C43	.004 mf.	600	.08

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage	Selling Price
P-45X214	C8 C24 C30	4 mf. 4 mf. 4 mf.	150 Dry	.56

MOLDED

Part No.	Code	Capacitance	Selling Price
P-47X69	C1	250 mmf.	.08
P-47X53	C19	35 mmf.	.06
P-47X56	C28	50 mmf.	.06
P-47X72	C33	25 mmf.	.06
P-47X72	C34	25 mmf.	.06
P-47X72	C36	25 mmf.	.06

TRIMMER

Part No.	Code	Description	Selling Price
P-17A45 Trimmer Strip	C2 C3 C4 C9 C10 C11 C13 C15 C17	2-25 mmf. Range "D" Antenna Trimmer 2-25 mmf. Range "C" Antenna Trimmer 2-25 mmf. Range "B" Antenna Trimmer 2-25 mmf. Range "D" Interstage Trimmer 2-25 mmf. Range "C" Interstage Trimmer 2-25 mmf. Range "B" Interstage Trimmer 2-25 mmf. Range "D" Oscillator Trimmer 2-25 mmf. Range "C" Oscillator Trimmer 2-25 mmf. Range "B" Oscillator Trimmer	.46
		See Part Number P-17A36 for replacement of any one section	
P-17A35	C14 C18	40-100 mmf. 6000 KC Oscillator Padding Condenser 300-600 mmf. 600 KC Oscillator Padding Condenser	.22
P-17A47	C16	1400-1800 mmf. 1800 KC Oscillator Padding Condenser	.22
P-17A30	C22 C23	150-250 mmf. 1st I.F. Trimmer Condenser 150-250 mmf. 1st I.F. Trimmer Condenser	.22
P-17A30	C25 C26	150-250 mmf. 2nd I.F. Trimmer Condenser 150-250 mmf. 2nd I.F. Trimmer Condenser	.22
P-17A40	C27	70-150 mmf. 3rd I.F. Trimmer Condenser	.14
P-17A36		(To be used for replacement of any one section of Trimmer Strip P-17A45)	.06

MISCELLANEOUS

Part No.	Description	Selling Price
P-14A52	3 Gang Condenser Only (less Drive Mechanism and Dial Assembly)	1.74

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	Selling Price
P-A94104	R1	.1 Megohm	.2	$0.08
P-A94403	R3	40,000 Ohm	.2	.08
P-A94152	R4	1,500 Ohm	.2	.08
P-A94452	R5	4,500 Ohm	.2	.08
P-B94103	R6	10,000 Ohm	.5	.08
P-A94304	R7	.3 Megohm	.2	.08
P-A95104	R8	.1 Megohm	.2	.06
P-A94405	R9	4 Megohm	.2	.08
P-A94205	R10	2 Megohm	.2	.08
P-A95104	R11	.1 Megohm	.2	.06
P-A95104	R12	.1 Megohm	.2	.06
P-A94302	R13	3,000 Ohm	.2	.08
P-A94152	R14	1,500 Ohm	.2	.08
P-A94702	R15	7,000 Ohm	.2	.08
P-A95105	R17	1 Megohm	.2	.06

VARIABLE

Part No.	Code	Description	Selling Price
P-43X57	R2	Filament Rheostat (Voltage Regulator)	.24
P-36X220	R16	2 Megohm Tapped Volume Control and Switch	.50
P-40X211	R18	.15 Megohm Tone Control and Selectivity Switch	.52

MONTGOMERY WARD & CO.
MODELS 62-313, 62-413 & 2DL SERIES

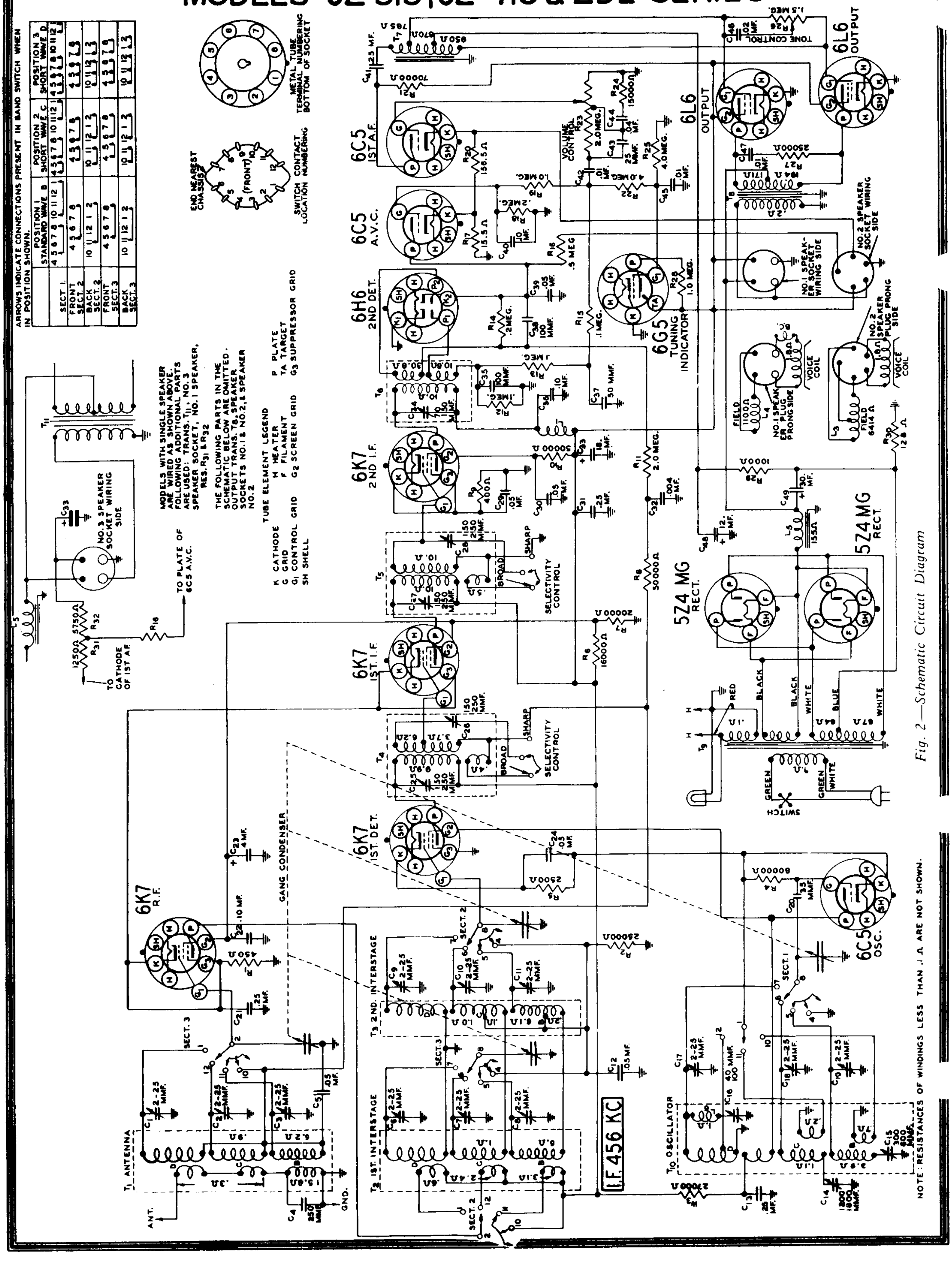


Fig. 2—Schematic Circuit Diagram

MONTGOMERY WARD & CO.

MODELS 62-313, 62-413 & 2DL SERIES

SPECIFICATIONS

Power Consumption - 170 Watts (At 115 volts 60 cycles)

Power Output - - - - - 20 Watts Undistorted

Selectivity - 19 KC Broad at 1000 times Signal (Sharp)

Intermediate Frequency - - - - - - 456 KC.

Speakers - - - - - - - Two 12" Dynamics

Tuning Frequency Range

B Range	528 to	1730 KC.
C Range	1710 to	5800 KC.
D Range	5750 to	18300 KC.

Sensitivity

B Range	1.0 Microvolt Absolute
C Range	0.5 to 3 Microvolts Absolute
D Range	1.0 to 5 Microvolts Absolute

Alignment and Calibration

Correct alignment is extremely important in connection with all wave radios. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 1800, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

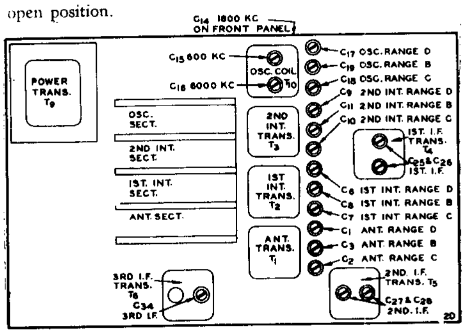


Fig. 3—Location of Trimmers

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C19) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Turn the calibration screw (under color filter) until the 1500 KC mark on the dial scale is at the vertical red line on the screen. If the film drum cannot be turned a sufficient amount by means of the calibration screw, loosen the 2 screws inside the drum which hold it in place. Adjust the position of the drum and tighten the screws. The early models do not have the calibration screw mentioned above. These models must be adjusted by loosening the drum screws.

Adjust the 1st and 2nd interstage Range B trimmer (C8 and C11) and antenna Range B trimmer (C3) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C18) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range C trimmers (C7 and C10) and antenna Range C trimmer (C2) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 1800 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C17) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range D trimmers (C6 and C9) and antenna Range D trimmer (C1) to maximum.

When adjusting the 2nd interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

General Service Data

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 2. In contact locations not used, the number applying to that particular location is not employed.

Voltage Chart

The voltage readings are taken with a voltmeter having a resistance of 1000 ohms per volt.

Line Voltage: 115
Volume Control: Maximum

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
		VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
6K7	R.F.	0	6.2(1)	250	110	7.5(2)		6.2(1)	7.5(2)
6K7	1st Det.	0	6.2(1)	250	110			6.2(1)	9.0
6C5	Osc.	0	6.2(1)	110				6.2(1)	
6K7	1st I.F.	0	6.2(1)	250	110	7.5		6.2(1)	7.5(2)
6K7	2nd I.F.	0	6.2(1)	250	145	5(2)		6.2(1)	5.0
6H6	2nd Det.	0	6.2(1)					6.2(1)	
6C5	A.V.C.	0	6.2(1)	5(3)				6.2(1)	0.5
6C5	1st A.F.	0	6.2(1)	130				6.2(1)	6.0
6L6	Power	0	6.2(1)	350	250	20(4)		6.2(1)	
5Z4MG	Rectifier	0	5.0(5)		1024(6)		1024(6)		5.0(5)

6G5	Tuning Indicator	Plate to Ground 25(3)	Target to Ground 250	Cathode to Ground 0	Across Heater 6.2 A.C.

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Subject to variation.
(3) As read with 500.000 ohm meter.
(4) As read across R-30.
(5) A.C. voltage as read across heater terminals 2 and 8.
(6) A.C. voltage as read across terminals 4 and 6.

(See next page for Socket Numbering Scheme)

MONTGOMERY WARD & CO.
MODELS 62-313, 62-413 & 2DL SERIES

The standard metal tube socket terminal numbering system (bottom of socket) is shown in Fig. 4 On the schematic circuit diagram, Fig. 2, is a list giving the complete names of the tube elements and the corresponding symbols as used on the sockets on the schematic.

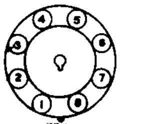


Fig. 4—Metal Tube Terminal numbering (bottom of socket)

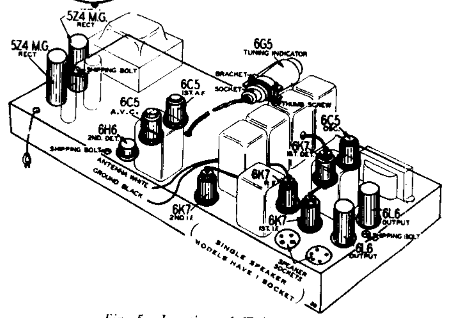


Fig. 5—Location of Tubes

this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

Twenty-five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

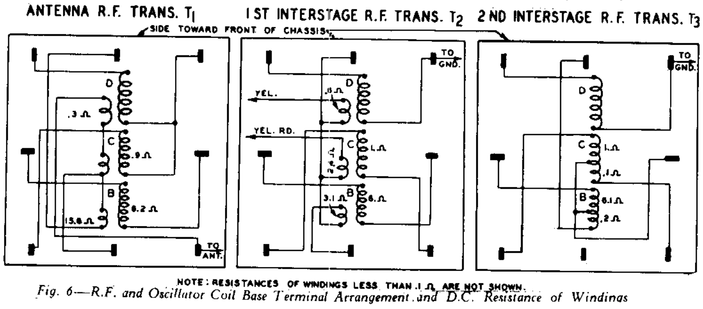
A 115-230 volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Phonograph Connections

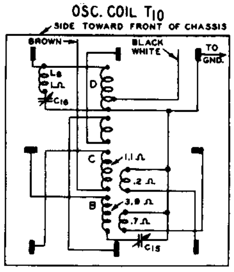
Phonograph connections can be made as shown in Fig. 7. The parts required as shown in the parts list. Knockouts are provided in the back of the chassis for mounting the phono jack and phono switch See Fig. 8.

The phono switch should be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. This is done by removing the wire connecting condenser C42 to resistors R15, R19 and R22, at the terminal strip located near the back of the planetary drive. Cut this wire to



NOTE: RESISTANCES OF WINDINGS LESS THAN .1 Ω ARE NOT SHOWN.
Fig. 6—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings



Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Planetary Drive Assembly

The planetary assembly is the unit that is integral with the tuning shaft.

If the nut on the back end of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and film drum to see if they are turning properly or if they are being obstructed in some way.

If the drive turns unevenly (rough in spots),

correct length and solder it to the proper terminal on the phono switch—See Fig. 7, keeping the wire close to the back of the chassis base.

A wire is then connected from the lug on the above mentioned terminal strip to which C42 was connected, to the correct terminal on the phono switch—See Fig. 7. This wire should be brought directly to the back of the chassis at a point close to the phono jack pin tip nearest the channel provided for a chassis mounting bolt, and then routed over to the switch.

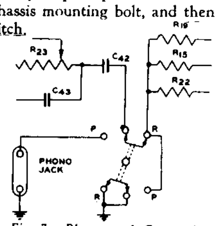


Fig. 7—Phonograph Connections.

Complete the other connections as illustrated in Fig. 7.

It will be necessary to re-route the AC line cord away from the 6C5 1st audio grid lead by running it between the volume control and the filter choke and then straight back to the hole provided for it in the chassis base.

If a hum is heard when the phono pickup is touched, reverse the two pickup leads.

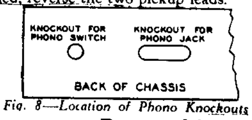


Fig. 8—Location of Phono Knockouts

Parts List

MISCELLANEOUS

SOCKETS

Part No.	Description	Selling Price
P-3A233	6L6 Tube Socket	$0.08
P-3A232	6H6 Tube Socket	.08
P-3A221	6C5 Tube Socket	.08
P-3A211	6K7 Tube Socket	.08
P-3A222	5Z4 Tube Socket	.08
P-3A60	4 Prong Speaker Socket	.06
P-3A88	5 Prong Speaker Socket	.06
P-13X206	6G5 Tube Socket and Cable Assembly (17")	.30

Part No.	Code	Capacitance Voltage	Selling Price
		SPEAKERS	
P-12A246		12" Dynamic Speaker (No. 1-4 Prong Speaker Plug)	4.78
P-12A245		12" Dynamic Speaker (No. 2-5 Prong Speaker Plug)	5.06
		KNOBS	
P-10A78		Tone Control—Small Push-On Type	.08
P-10A77		Volume Control—Small Push-On Type	.08
P-10A75		Tuning Control—Large Push-On Type	.08
P-10A76		Band Switch—Large Set Screw Type	.10
		GENERAL	
P-2X38		Felt Washers (Used behind Knobs)	.04
P-8X50		Rubber Chassis Mounting Cushions	.04
P-2A57		3 Section, 3 Position, Band Change Switch	.92
P-4A53		Terminal Strip (3 lugs, insulated)	.04
P-30X44		Grid Clip Only	.04
P-13X80		Line Cord and Plug	.28
P-13X214		Antenna and Ground Lead Assembly	.14
P-25A71		Tube Clamp Assembly (Tuning Eye)	.20
P-9X15		Cardboard Spacer (Tuning Eye)	.04

TRANSFORMERS AND COILS

Part No.	Code	Description	Selling Price
P-9A511	T1	Antenna Transformer and Can Assembly	$0.96
P-9A512	T2	1st R.F. Interstage Transformer and Can Assembly	.92
P-9A513	T3	2nd R.F. Interstage Transformer and Can Assembly	.84
P-9A515	T4	1st I.F. Transformer and Can Assembly	.92
P-9A516	T5	2nd I.F. Transformer and Can Assembly	.82
P-9A517	T6	3rd I.F. Transformer and Can Assembly	1.02
P-50X34	T7	Input Transformer	.60
P-51X46	T8	Output Transformer	.96
P-53X116	T9	115 Volt, 60 Cycle, Standard Power Transformer	4.04
P-53X117	T9	115 Volt, 25 Cycle, Standard Power Transformer	6.46
P-53X118	T9	115-230 Volt, 40-60 Cycle, Standard Power Transformer	5.44
P-9A514	T10	Oscillator Coil and Can Assembly	1.44
P-9A600	L1	2nd I.F. Plate Isolating Reactor	.34
P-52X46	L5	Filter Reactor	1.14

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	Selling Price
P-46X80	C5	.05 mf.	180	$0.08
P-46X80	C12	.05 mf.	180	.08
P-46X107	C13	.25 mf.	360	.14
P-46X117	C21	.25 mf.	180	.12
P-46X181	C22	.1 mf.	240	.08
P-46X80	C24	.05 mf.	180	.08
P-46X80	C29	.05 mf.	180	.08
P-46X119	C30	.05 mf.	360	.10
P-46X107	C31	.25 mf.	360	.14
P-46X114	C32	.004 mf.	600	.08
P-46X105	C36	.1 mf.	360	.10
P-46X80	C39	.05 mf.	180	.08
P-46X98	C40	.1 mf.	180	.10
P-46X127	C41	.25 mf.	360	.16
P-46X120	C42	.01 mf.	360	.08
P-46X200	C44	.04 mf.	180	.08
P-46X124	C45	.01 mf.	180	.08
P-46X202	C46	.02 mf.	360	.08
P-46X194	C47	.01 mf.	1000	.10

MOLDED

Part No.	Code	Capacitance	Selling Price
P-47X59	C4	250 mmf.	.08
P-47X53	C20	35 mmf.	.06
P-47X57	C35	100 mmf.	.06
P-47X56	C37	50 mmf.	.06
P-47X57	C38	100 mmf.	.06
P-47X72	C43	25 mmf.	.06

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage		Selling Price
P-45X216	C23	4 mf.	200	Dry	$0.38
P-44X11	C33	18 mf.	300	Wet	.52
P-45X209	C48	12 mf.	25	Dry	.32
P-44X21	C49	30 mf.	450	Wet (insulated from Chassis)	.78

TRIMMER

Part No.	Code	Description	Selling Price
P-17A53 Trimmer Strip	C1	2-25 mmf. Range "D" Antenna Trimmer	.60
	C2	2-25 mmf. Range "C" Antenna Trimmer	
	C3	2-25 mmf. Range "B" Antenna Trimmer	
	C6	2-25 mmf. Range "D" 1st Interstage Trimmer	
	C7	2-25 mmf. Range "C" 1st Interstage Trimmer	
	C8	2-25 mmf. Range "B" 1st Interstage Trimmer	
	C9	2-25 mmf. Range "D" 2nd Interstage Trimmer	
	C10	2-25 mmf. Range "C" 2nd Interstage Trimmer	
	C11	2-25 mmf. Range "B" 2nd Interstage Trimmer	
	C17	2-25 mmf. Range "D" Oscillator Trimmer	
	C18	2-25 mmf. Range "C" Oscillator Trimmer	
	C19	2-25 mmf. Range "B" Oscillator Trimmer	

See Part Number 17A36 for replacement of any one section.

Part No.	Code	Description	Selling Price
P-17A47	C14	1200-1800 mmf. Oscillator Padding Condenser (1800 KC Adjustment)	.22
P-17A35	C15	300-600 mmf. Oscillator Padding Condenser (600 KC Adjustment)	.22
	C16	40-100 mmf. Oscillator Padding Condenser (6000 KC Adjustment)	
P-17A30	C25	150-250 mmf. 1st I.F. Trimmer	.22
	C26	150-250 mmf. 1st I.F. Trimmer	
P-17A30	C27	150-250 mmf. 2nd I.F. Trimmer	.22
	C28	150-250 mmf. 2nd I.F. Trimmer	
P-17A40	C34	70-150 mmf. 3rd I.F. Trimmer	.14
P-17A36		2-25 mmf. (To be used for replacement of any one section of Trimmer Strip P-17A53)	.06

MISCELLANEOUS

Part No.	Description	Selling Price
P-14A50	4 Gang Condenser, Less Dial and Drive Assembly	2.30

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	Selling Price
P-B94451	R1	450 Ohm	0.5	$0.08
P-A95253	R2	25,000 Ohm	0.2	.06
P-C94273	R3	27,000 Ohm	1.0	.08
P-A94803	R4	80,000 Ohm	0.2	.08
P-A95252	R5	2,500 Ohm	0.2	.06
P-D94163	R6	16,000 Ohm	2.0	.16
P-D94203	R7	20,000 Ohm	2.0	.16
P-A95503	R8	50,000 Ohm	0.2	.06
P-A94401	R9	400 Ohm	0.2	.08
P-B94503	R10	50,000 Ohm	0.5	.08
P-A95205	R11	2.0 Megohm	0.2	.06
P-A95104	R12	0.1 Megohm	0.2	.06
P-A94104	R13	0.1 Megohm	0.2	.08
P-B94204	R14	0.2 Megohm	0.5	.08
P-A95104	R15	0.1 Megohm	0.2	.06
P-A94504	R16	0.5 Megohm	0.2	.08
P-A94204	R18	0.2 Megohm	0.2	.08
P-A94105	R19	1.0 Megohm	0.2	.08
P-B95703	R21	70,000 Ohm	0.5	.06
P-A94405	R22	4.0 Megohm	0.2	.08
P-A94153	R24	15,000 Ohm	0.2	.08
P-A94405	R25	4.0 Megohm	0.2	.08
P-C95253	R27	25,000 Ohm	1.0	.06
P-A95105	R28	1.0 Megohm	0.2	.06
P-A95102	R29	1,000 Ohm	0.2	.06

WIRE WOUND

Part No.	Code	Resistance	Wattage	Selling Price
P-43X58	R17	15.5 Ohm	0.5	.22
	R20	156.5 Ohm	0.5	
	R30	128.0 Ohm	4.0	

VARIABLE

Part No.	Code	Description	Selling Price
P-36X221	R23	2.0 Megohm Tapped Volume Control and Switch	.56
P-40X214	R26	1.5 Megohm Tone Control and Selectivity Switch	.62

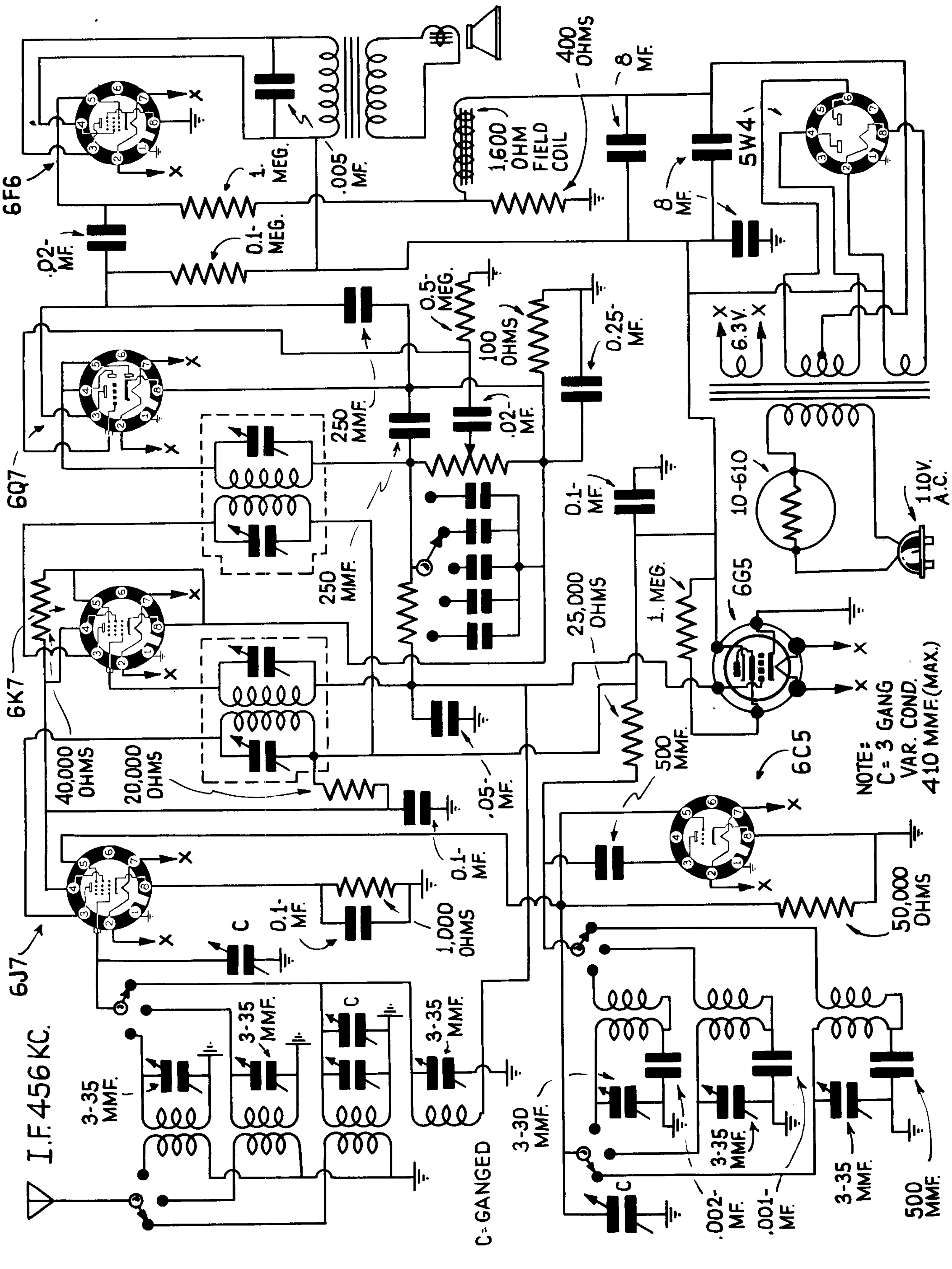
PHONO ATTACHMENT PARTS

Part No.	Description	Selling Price
P-2A31	Phono Switch (Double Pole Double Throw Switch)	.30
P-3A12	Phono Jack	.06
P-10A36	Switch Knob	.10

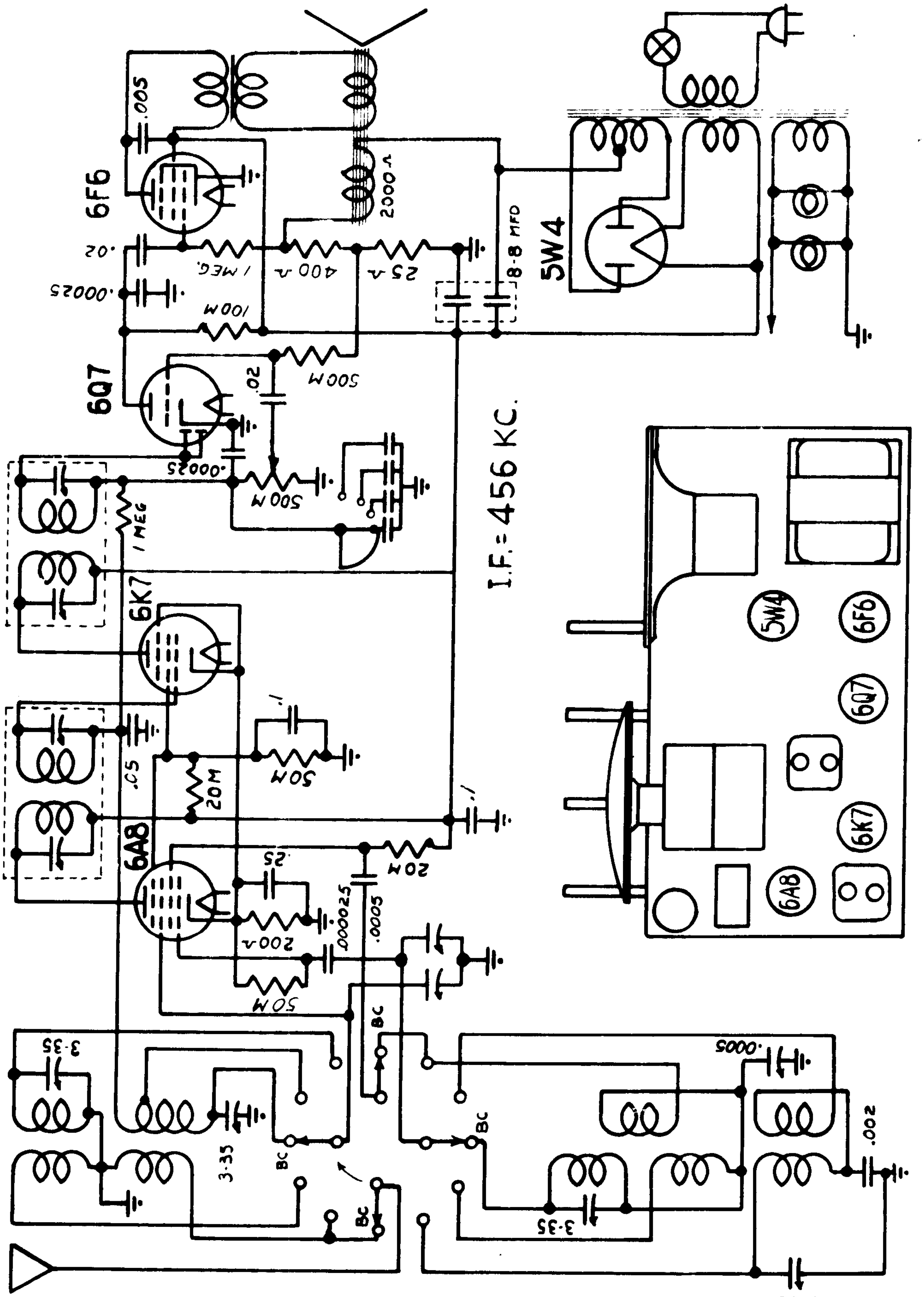
Prices subject to change without notice

PACIFIC RADIO CORPORATION

MODELS 80.806 & 806-C

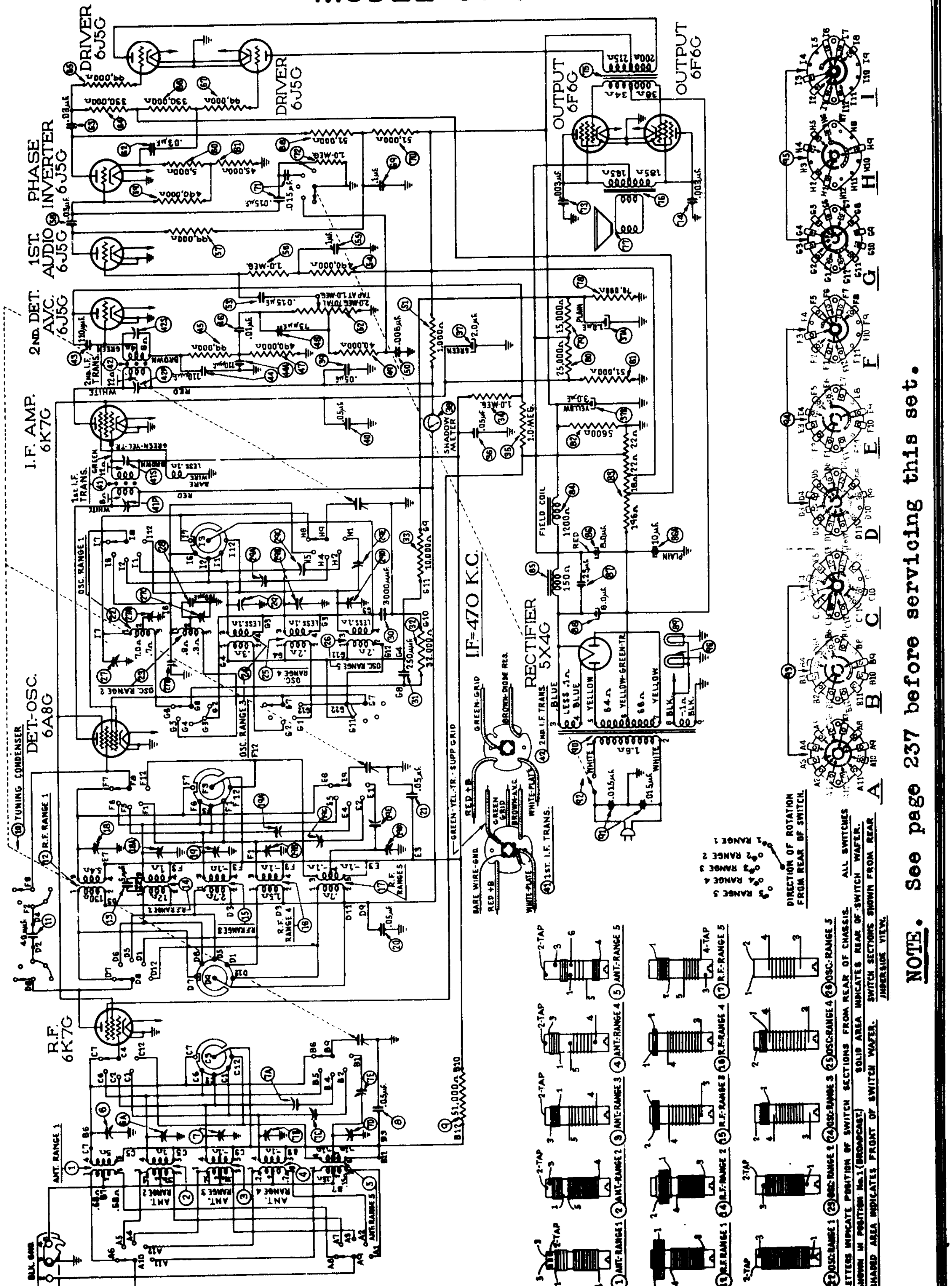


PACIFIC RADIO CORPORATION
MODELS 556 & 556-C



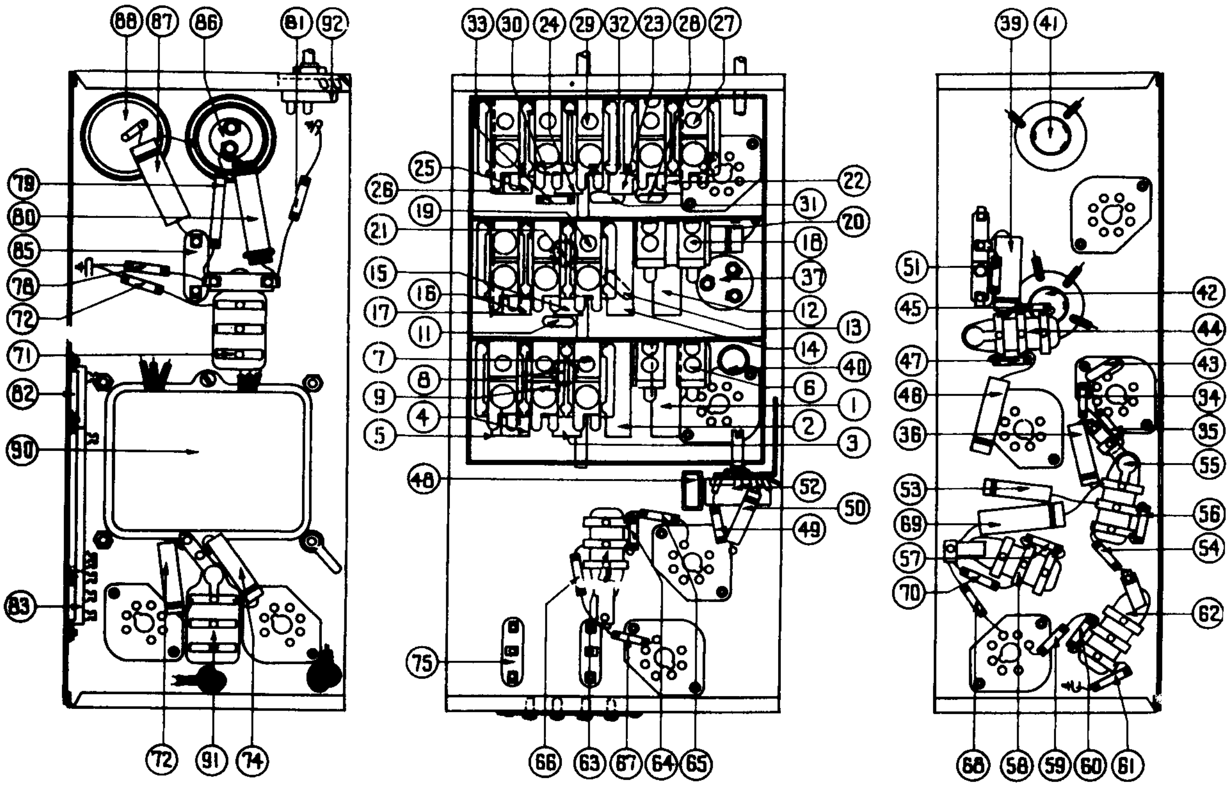
PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-670



PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-670



Parts Location—Underside of Chassis

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (530 to 1600 K.C.)	32-2106	$0.80
2	Antenna Transformer (1.58 to 4.75 M.C.)	32-2146	.80
3	Antenna Transformer (4.7 to 7.4 M.C.)	32-2183	.60
4	Antenna Transformer (7.35 to 11.6 M.C.)	32-2185	.70
5	Antenna Transformer (11.5 to 18.2 M.C.)	32-2175	.80
6	Compensator (two section)	31-6093	.40
7	Compensator (six section)	31-6112	1.40
8	Condenser (.05 mfd. tubular)	30-4020	.20
9	Resistor (51000 ohms)	33-351339	.20
10	Tuning Condenser	31-1856	4.50
11	Condenser (40 mmfd. mica)	30-1076	.20
12	R. F. Transformer (530 to 1600 K.C.)	32-2105	.75
13	Condenser (5 mmfd. mica)	30-1077	.20
14	R. F. Transformer (1.58 to 4.75 M.C.)	32-2147	.60
15	R. F. Transformer (4.7 to 7.4 M.C.)	32-2177	.60
16	R. F. Transformer (7.3 to 11.6 M.C.)	32-2178	.60
17	R. F. Transformer (11.5 to 18.2 M.C.)	32-2176	.70
18	Compensator (two section)	31-6093	.40
19	Compensator (six section)	31-6113	1.40
20	Condenser (.05 mfd. tubular)	30-4123	.20
21	Condenser (.05 mfd. tubular)	30-4020	.20
22	Oscillator Transformer (530 to 1600 K.C.)	32-2120	.65
23	Oscillator Transformer (1.58 to 4.75 M.C.)	32-2149	.60
24	Oscillator Transformer (4.7 to 7.4 M.C.)	32-2184	.60
25	Oscillator Transformer (7.3 to 11.6 M.C.)	32-2186	.70
26	Oscillator Transformer (11.6 to 18.2 M.C.)	32-2182	.70
27	Compensator (four section)	31-6106	
28	Condenser (700 mmf.)	5863	.25
29	Compensator (six section)	31-6112	
30	Condenser (3000 mmfd. mica)	30-1028	.45
31	Condenser (250 mmfd. mica)	30-1083	.25
32	Resistor (32000 ohms)	33-332339	.20
33	Resistor (10000 ohms)	33-310339	.20
34	Resistor (1.0 megohm)	33-510339	.20
35	Resistor (1.0 megohm)	33-510339	.20
36	Condenser (.05 mfd. tubular)	30-4444	.20
37	Electrolytic Condenser (2, 1, 3 mfd.)	30-2122	1.85
38	Shadowmeter	45-2189	2.50
39	Condenser (.05 mfd. tubular)	30-4012	.25
40	Condenser (.05 mfd. tubular)	30-4123	.20
41	1st I. F. Transformer	32-2170	2.00
42	2nd I. F. Transformer	32-2173	2.00
43	Condenser (110 mmfd. mica)	30-1031	.20
44	Condenser (110 mmfd. dual bakelite)	8085-DG	.25
45	Resistor (99000 ohms)	33-399339	.20
46	Condenser (.01 mfd. tubular)	30-4124	.25
47	Resistor (490000 ohms)	33-449339	.20
48	Condenser (75 mmfd. mica)	30-1053	.20

Schem. No.	Description	Part No.	List Price
49	Resistor (40000 ohms)	33-340339	$0.20
50	Condenser (.006 mfd. tubular)	30-4125	
51	Resistor (1000 ohms)	33-210339	.20
52	Volume Control	33-5158	1.00
53	Condenser (.015 mfd. tubular)	30-4358	.30
54	Resistor (490000 ohms)	33-449339	.20
55	Condenser (.1 mfd. bakelite)	4969-SG	.35
56	Resistor (1 megohm)	33-510339	.20
57	Resistor (99000 ohms)	33-399339	.20
58	Condenser (.08 mfd. bakelite)	8318-SU	.35
59	Resistor (490000 ohms)	33-449339	.20
60	Resistor (5000 ohms)	33-250339	.20
61	Resistor (45000 ohms)	33-345339	.20
62	Condenser (.08 mfd. bakelite)	8318-SU	.20
63	Condenser (.08 mfd. bakelite)	8318-SU	.20
64	Resistor (330000 ohms)	33-433339	.20
65	Resistor (99000 ohms)	33-399339	.20
66	Resistor (330000 ohms)	33-433339	.20
67	Resistor (99000 ohms)	33-399339	.20
68	Resistor (51000 ohms)	33-351339	.20
69	Condenser (.1 mfd. tubular)	30-4455	
70	Resistor (51000 ohms)	33-351339	.20
71	Condenser (.015 mfd. dual bakelite)	3903-LU	
72	Resistor (1 megohm)	33-510339	.20
73	Condenser (.008 mfd. tubular)	30-4409	.20
74	Condenser (.008 mfd. tubular)	30-4409	.20
75	Audio Input Transformer	32-7671	2.50
76	Output Transformer (K-37, H-28)	32-7638	
77	Cone and Voice Coil (K-37)	36-3020	
	Cone and Voice Coil (H-28)	02625	
78	Resistor (70000 ohms)	33-370439	.20
79	Resistor (15000 ohms)	33-315339	.20
80	Resistor (25000 ohms)	33-325639	.30
81	Resistor (51000 ohms)	33-351339	.20
82	Resistor (5600 ohms wirewound)	33-3282	.60
83	Resistor (258 ohms wirewound)	33-3281	.60
84	Field Coil Assembly (K-37, H-28)	36-3104	
85	Filter Choke	32-7115	1.80
86	Electrolytic Condenser (8, 10 mfd.)	30-2045	1.80
87	Condenser (.25 mfd.) tubular	30-4446	.25
88	Electrolytic Condenser (8 mfd.)	30-2025	1.35
89	Pilot Lamp	34-2089	.15
90	Power Transformer 115 V., 50-60 cycles	32-7640	6.50
	Power Transformer 115 V., 25-40 cycles	32-7641	
91	Condenser (.015 mfd. dual bakelite)	3793-DG	.40
92	Power and Tone Control Switch	42-1184	.75
93	Range Switch (Ant.)	42-1211	1.00
94	Range Switch (R.F.)	42-1255	1.00
95	Range Switch (Osc.)	42-1213	1.00
96.	Shadowmeter Lamp	34-2064	.09
	Switch Index Plate and Shaft	42-1187	.50
	Pilot Lamp Assembly	38-7706	.35
	Dial	27-5213	.40
	Hub	28-7187	.12

Schem. No.	Description	Part No.	List Price
	Clamp	28-2837	$0.05
	Set Screw	W-1641	.02
	Gear (Dial)	28-7185	.10
	Gear (Drive)	31-1864	.25
	Thrust Spring	28-8611	.01
	Thrust Washer	28-3976	.30 C
	"C" Washer	28-3904	.01
	Mask	27-5206	.30
	Mask Arm and Link Assembly	31-1887	.45
	Mask Washer	27-8318	.50 C
	Mask Guide and Bracket	38-7876	.25
	Screens and Lens Holder Assembly	31-1900	.30
	Volume Control Shaft	38-8060	
	Retaining Clip	28-4204	
	Spring	28-4117	.40 C
	Tube Shield	28-3726	
	Tube Shield Base	28-3806	
	Socket 7 prong	27-6057	.11
	Socket 8 prong	27-6058	.11
	Socket Rectifier	27-6062	.11
	Terminal Panel (Ant.)	38-7714	.15
	Grommet Mtg. R. F. Unit	27-4317	.04
	Sleeve Mtg. R. F. Unit	28-3267	.01
	Washer Mtg. R. F. Unit	27-7807	.50 C
	Screw Mtg. R. F. Unit	W-739	.45 C
	Rubber Mtg. (Gang Condenser)	27-4325	.03
	Spring Mtg. Shadowmeter	28-3622	.70 C
	Plate Mtg. R. F. Transformer	28-3806	
	Spacer Mtg. R. F. Transformer	27-8286	
	Screw Mtg. R. F. Transformer	W-1635	
	Screw Chassis Mtg.	W-1405	1.50 C
	Washer Chassis Mtg.	28-3069	.30 C
	Shield (Chassis Bottom)	38-8143	
	Snap Fasteners	28-4379	
	Rubber Cushion (X Cabinet)	3558	
	Rubber Bushing (two required)	27-4360	
	Rubber Washer	5180	
	Speaker Cable	41-3310	
	A. C. Cord	L-2183	.40
	Knob Tuning	27-4330	.10
	Knob Tuning Vernier	27-4331	.10
	Knob Tone & Volume	27-4332	.10
	Knob Range Switch	27-4336	10

B & X CABINET PARTS

Description	Part No.	List Price
Bezel Frame and Plate	40-5043	.80
Glass	27-5300	.06
Ring	28-3068	.45
Gasket	27-8313	.01
Speaker K-37, "B" Cabinet	34-1225	7.25
Baffle Silk Assembly, X Cabinet	40-6015	
Speaker (H-28) "X" Cabinet	34-1243	

Figures in black type indicate circled figures in Base View. Prices Subject to Change Without Notice.

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-670

SERVICE DATA

Model 37-670 is an 11 tube superheterodyne receiver designed for operation on alternating current. It has five tuning ranges, covering standard broadcast and short-wave frequencies. The chassis is constructed in four basic assembly units, concentrating the R.F., I.F., Audio and Power circuits in individual units.

The circuit includes the PHILCO Foreign Tuning System—controlled by the range switch—providing maximum sensitivity and noise-reduction, when used with the Philco High-Efficiency Aerial; automatic bass compensation in the volume control circuit; shadow tuning; automatic volume control, and a push-pull class "A" output circuit.

AERIAL CONNECTIONS

The red and black leads of the High-Efficiency Aerial "transmission line" are connected to terminals 1 and 2 respectively, of the terminal panel provided on the rear of the chassis. Connect the jumper on the terminal panel across terminals 3 and 4.

If a temporary aerial is used, the jumper should be across terminals 2 and 3. The aerial connects to terminal 1 and the ground lead to terminal 3. A good ground connection is desirable in all installations.

REPLACING DIAL

To replace the dial, remove the clamp holding the dial to the hub, by turning clamp counter-clockwise, using the two holes provided on the clamp for this purpose.

REMOVING MASK ARM & LINK ASSEMBLY

First remove dial, then loosen set screw of dial hub and remove the hub and felt washer from the shaft. Now loosen screws holding indicator bracket and lens assembly, and move bracket forward about ½ inch. The assembly may now be removed by loosening set screw of range switch arm, then pulling arm off of range switch shaft.

REMOVING SWITCH & COIL ASSEMBLIES OF R.F. UNIT

To replace any part in the switch and coil assemblies of the R.F. Unit, each assembly can be removed separately as follows:

First remove the tuning dial, mask and arm assembly. Remove the center mounting screw on the rear of the R.F. Unit. Then lift the rear of the unit and push forward until the rubber mounting grommets, on each side of the unit, clear the mounting slots. The unit is then lifted far enough from the chassis for removal of the two screws holding the selector switch indexing plate and shaft (front of unit). Then pull shaft straight out from the unit. Also, remove the volume control shaft by releasing the retaining clip, inside the chassis, from the shaft.

IMPORTANT—When selector switch shaft is replaced, care should be taken to have all wafer rotors in the same position, so that the key on the switch shaft will slide freely into the notched hole in each wafer rotor. **NEVER** force shaft into rotors.

Servicing Stages—It is necessary to unsolder some connecting leads in order to release the stage for servicing. If all the following connections are unfastened the stage will be entirely released. Ordinarily only one or two leads need be loosened in order to change coils, replace coupling condensers, or replace switch sections.

ANTENNA ASSEMBLY—Rear Section

1. Unsolder the wires which connect the antenna panel and I.F. Unit to the range switch, also the assembly shield ground leads.
2. Unsolder the two leads from the gang condenser terminal panel which connect to the range switch. Also the lead of tubular condenser (**40**) at the ground lug on the R.F. Unit.
3. Remove the screw holding the shield plate to the unit base. This screw is located in the right hand corner of the shield plate, facing the rear underside of the chassis. The assembly can then be removed.

R.F. ASSEMBLY—Middle Section

1. Unsolder the wires from the I.F. Unit and the 6K7G plate contact in R.F. Unit which connect to the range switch. Then remove ground leads of shield plate.
2. Unsolder the leads from the gang condenser terminal panels and the lead connecting D2 on the range switch to the 6K7G Plate Contact.
3. Remove the screw holding the shield plate to the unit base. This screw is located in the right hand corner of the shield plate facing the rear underside of the chassis. Then pull the assembly straight out.

OSCILLATOR ASSEMBLY—Front Section

1. Unscrew the two screws located on each side of the R.F. Unit.
2. Unsolder the wires connecting the range switch to resistors (**81**) and (**78**) in the power unit, electrolytic condenser (**77**) in the R.F. Unit and Osc. plate and grid contacts on the 6A8G socket.
3. Remove the leads from the gang condenser terminal panels and the lead of Mica condenser (**30**) at the ground lug on R.F. Unit base. With these leads disconnected lift oscillator section from unit.

Electrical Specifications

POWER SUPPLY:

Voltage	Frequency	Power Consumption
115	50–60	130 watts
115	25–40	130 watts
220		

Power transformers for the different voltage and frequency ratings are listed in the Parts List, page 3.

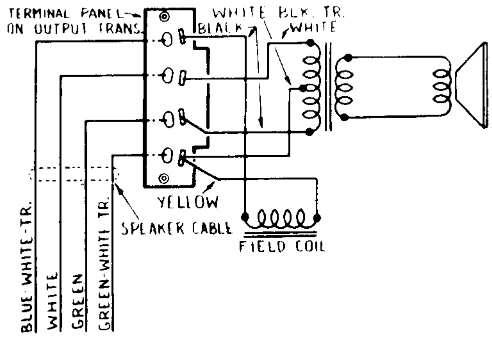
Intermediate Frequency: 470 K. C.

Audio Output: 10 watts

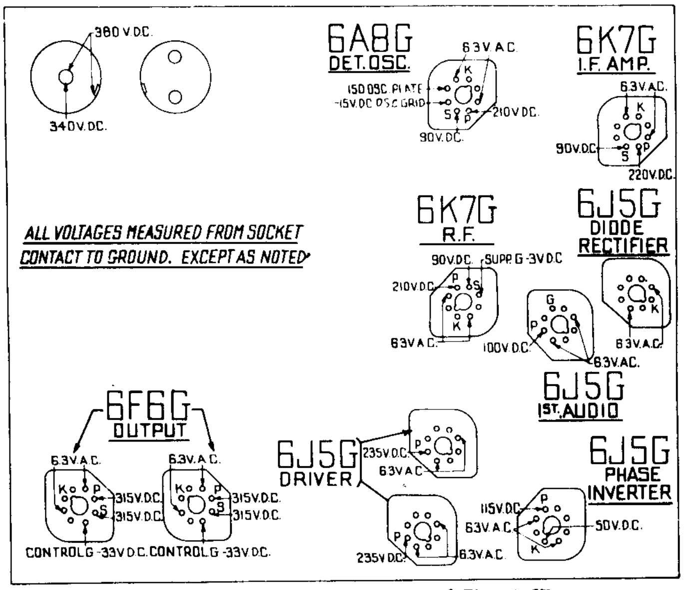
Philco Tubes Used: 6K7G, R.F. Amplifier; 6A8G, Oscillator and First Detector; 6K7G, I.F. Amplifier; 6J5G, 2nd Detector, A.V.C.; 6J5G, First Audio; 6J5G, Phase Inverter; 2-6J5G, Push-Pull Drivers; 2-6F6G, Output; 5X4G, Rectifier.

Tuning Ranges: Five. Range 1—530-1600 K. C.; Range 2—1.58 to 4.75 M. C.; Range 3—4.7 to 7.4 M. C.; Range 4—7.35 to 11.6 M. C.; Range 5—11.5 to 18.2 M. C.

Speakers: "X" Cabinet, H-28; "B" Cabinet, K-37.



Speaker Wiring for Types K-37 and H-28



Socket Voltages—Underside of Chassis View

The voltages indicated by arrows were measured with a **Philco 025 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-670

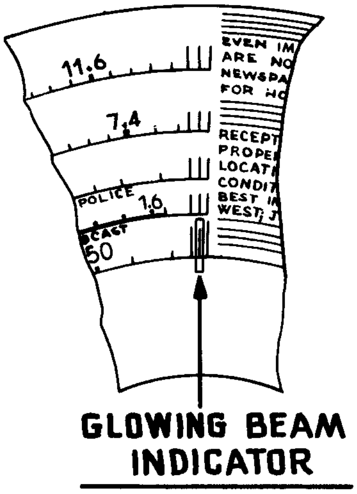


Fig. 5—Dial Calibration

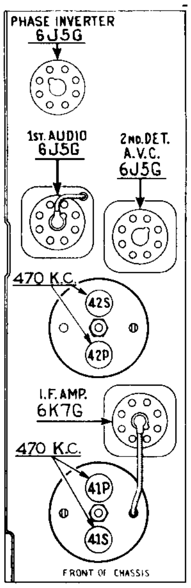


Fig. 6—I.F. Compensators Top of Chassis

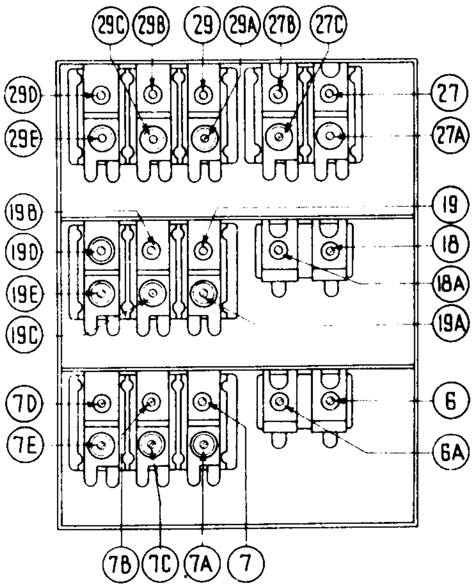


Fig. 7—R.F. Compensators Underside of Chassis

Alignment of Compensators

To accurately adjust this receiver, precision test equipment is necessary. A signal generator such as the PHILCO MODEL 088 Signal Generator, covering from 110 to 20,000 K. C. is recommended for use in adjusting the compensators at the various frequencies specified. A visual indication of the receiver output is also necessary to obtain correct adjustment of the compensators.

PHILCO MODEL 025 CIRCUIT TESTER contains a sensitive output meter and is recommended for these adjustments.

Philco Fibre Handle Screw-driver No. 27-7059 completes the necessary equipment for these adjustments. The locations of the various compensators are shown in Figs. 6 and 7.

The following procedure must be observed in adjusting the compensators:

DIAL CALIBRATION—In order to adjust this receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this rotate the tuning control to the extreme counter-clockwise position (maximum capacity). Loosen the set screw of the dial hub, then turn dial until the glowing indicator is centered on second index line of dial scale (see Fig. 5). Now tighten the dial hub set screw in this position.

SHADOW METER ADJUSTMENT—Remove aerial and allow tubes to warm up. Then adjust the shadow meter as follows:

1. Move the shadow meter coil backwards and forwards, until the opposite edges of the shadow are 1/8 of an inch from each end of the shadow screen, measuring along the bottom edge of the screen. Adjustment of the shadow meter light bracket may be necessary for perfect centering.
2. Remove the 5X4G rectifier tube from its socket and rotate coil until shadow reaches minimum width. This width must not exceed 3/32 of an inch.
3. Replace the 5X4G rectifier tube in its socket. The shadow should then widen until it is not more than 3/16 inch or less than 1/16 inch from each side of the screen, measuring along the bottom edge. If these limits are not obtained readjust the shadow meter as given in paragraphs 1 and 2 until they are reached.

OUTPUT METER—The 025 Output Meter is connected between the plate and cathode prongs of one of the (6F6G) tubes. The meter is adjusted to use the (0-30) volt scale.

INTERMEDIATE FREQUENCY CIRCUIT

Frequency 470 K. C.

1. Connect the 088 Signal Generator output lead through a .1 mfd. condenser to the control grid of the 6A8G tube, and the ground connection of the output lead to the chassis. Turn the Volume Control to maximum volume position.
2. Set the range switch in position No. 1 (Broadcast), then rotate the tuning condenser of the receiver to approximately 580 K. C. and adjust the signal generator for 470 K. C.
3. Adjust compensators (**42S**) 2nd I.F. Sec., (**42P**) 2nd I.F. Pri., (**41S**) 1st I.F. Sec., and (**41P**) 1st I.F. Pri. for maximum reading on the output meter.

RADIO FREQUENCY CIRCUIT

Tuning Range (11.5) to (18.2) M. C.

1. Remove the signal generator output lead from the grid of the 6A8G tube and connect it through the .1 mfd. condenser to terminal No. 1 on aerial input panel and the generator ground lead to terminal No. 3, rear of chassis. Terminals 2 and 3 must be connected by the shorting link provided on the panel.
2. Set the range switch in position No. 5. Turn the receiver and signal generator dials to 18 M. C. Now adjust compensator (**29D**) by turning the screw (clockwise) to the maximum capacity position, then slowly turning it (counter-clockwise) until a second peak signal is reached on the output meter. The first peak from maximum capacity is the image signal and must not be used. NOTE—In adjusting some receivers only one peak will be observed, therefore, tune the compensator to maximum on this peak. If the above procedure is correctly performed, the image signal will be found at 17.06 M. C. by advancing the signal generator attenuator and turning the receiver dial to this frequency mark on the dial.
3. The antenna and R.F. compensators (**7D**) and (**19D**) are now adjusted by connecting a variable condenser of approximately 350 mmfd.—Philco Part No. 45-2325 across the oscillator compensator (**29D**) (First contact from left side of the receiver facing rear underside of chassis) and ground. Leaving the signal generator and receiver dials at 18 M. C., tune the added condenser from the maximum capacity point until the second harmonic of the receiver oscillator beats against the signal from the generator thereby bringing in the signal. The antenna and R. F. compensators (**7D**) and (**19D**) are then adjusted for maximum output. Now remove the external condenser and readjust compensator (**29D**) as given in paragraph 2 above.
4. Turn signal generator and receiver dials to 12 M. C. and adjust compensator (**29E**) for maximum output. Then adjust compensators (**19E**) and (**7E**) for maximum output.
5. Now turn the signal generator and receiver dials to 18 M. C. and readjust compensators (**29D**) Osc., (**7D**) Ant. and (**19D**) R.F. as given in paragraphs 2 and 3 above.

Tuning Range (7.35) to (11.6) M. C.

1. Set range switch in position 4. Rotate signal generator and receiver dials to 11 M. C. Now adjust compensator (**29B**) by turning the screw (clockwise) to the maximum capacity position, then slowly turn it (counter-clockwise) until a second peak signal is reached on the output meter. The first peak from maximum capacity is the image signal and must not be used. NOTE—In adjusting some receivers only one peak will be observed, therefore, tune the compensator to maximum on this peak. If the above procedure is correctly performed, the image signal will be found at 10.06 M. C. by advancing the signal generator attenuator and turning receiver dial to this frequency mark on the dial.
2. Using the 11 M. C. signal, compensators (**19B**) R.F. and (**7B**) Ant. are adjusted by using the procedure given in paragraph 3, under tuning range (11.5) to (18.2) M. C. with the exception that the external condenser is connected across compensator (**29B**) (Third contact from left side of the receiver) and ground.
3. Remove the variable condenser and readjust compensator (**29B**) Osc. as given in paragraph 1 above.
4. Turn the signal generator and receiver dials to 7.5 M. C. and adjust compensators (**29C**) Osc. series, (**19C**) R.F. and (**7C**) Ant. for maximum output.
5. Due to the slight interaction of the high and low frequency compensators of this range, compensators (**29B**) Osc., (**19B**) R.F. and (**7B**) Ant. must be readjusted using the procedure in paragraphs 1 and 2 above.

Tuning Range (4.7) to (7.4) M. C.

1. Set range switch in Position 3. Turn signal generator and receiver dials to 7.0 M. C. Now adjust compensator (**29**) Osc., (**19**) R.F. and (**7**) Ant. for maximum output.
2. Turn the signal generator and receiver dials to 5.0 M.C. and adjust compensators (**29A**), (**19A**) and (**7A**) for maximum output.
3. Turn the signal generator and receiver dials to 7.0 M. C. and readjust compensators (**29**) Osc., (**19**) R.F. and (**7**) Ant. for maximum output.

Tuning Range (1.58) to (4.75) M. C.

1. Set the range switch in position 2. Turn the signal generator and receiver dials to 4.5 M. C
2. Now adjust compensators (**27B**) Osc., (**18A**) R.F. and (**6A**) Ant. for maximum output.
3. Rotate the signal generator and receiver dials to 1.7 M. C. Compensator (**27C**) Osc. series is now adjusted for maximum output as follows:

First tune compensator (**27C**) for maximum output, then vary the tuning condenser of the receiver for maximum output about the 1.7 M. C. dial mark. Now turn compensator (**27C**) slightly to the right or left and vary the receiver tuning condenser for maximum output. If the output reading increases, turn compensator (**27C**) in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

4. Turn signal generator and receiver dials to 4.5 M. C. and readjust compensators (**27B**). (**18A**) and (**6A**) as given in Paragraphs 1 and 2 above.

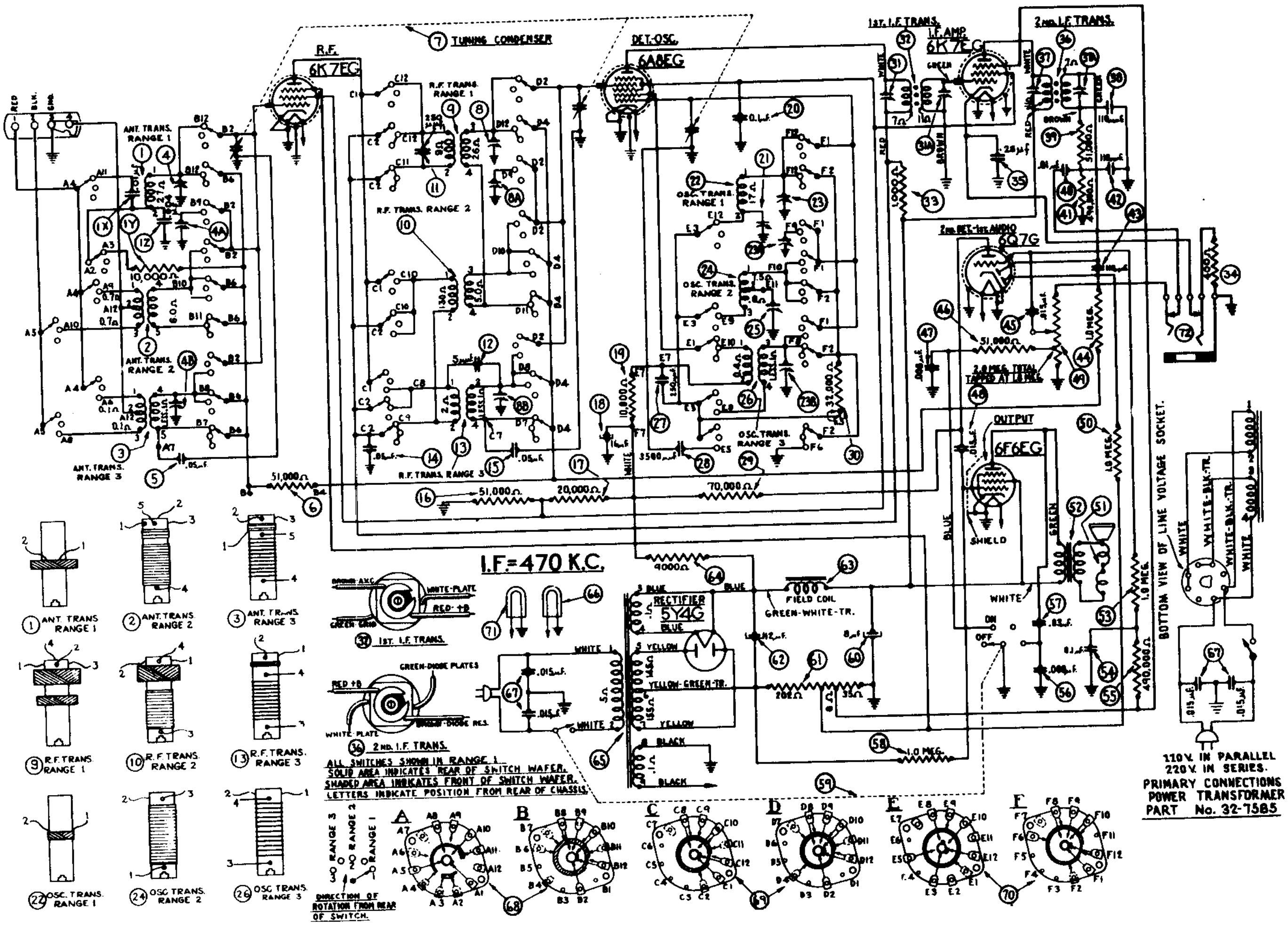
Tuning Range (530) to (1600) K. C.

1. Set range switch in position No. 1 (Broadcast). Rotate the signal generator and receiver dials to 1500 K. C. Now adjust compensators (**27**) Osc., (**18**) R.F. and (**6**) Ant. for maximum output.
2. Tune signal generator and receiver dials to 580 K. C. Compensator (**27A**) Osc. series is then adjusted for maximum output as given in paragraph 3 under tuning range (1.58) to (4.75) M. C., the only difference in the procedure being in the frequency used.
3. Readjust compensator (**27**) for maximum output, by turning the signal generator and receiver dials to 1500 K. C.
4. Turn the signal generator and receiver dials to 1400 K. C. and adjust compensators (**18**) R.F. and (**6**) Ant. for maximum output.

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-2620



Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2218	$0.80
2	Antenna Transformer (Range 2)	32-2108	.65
3	Antenna Transformer (Range 3)	32-2142	.75
4	Compensator Ant. 1500 K. C.	31-6122	.60
5	Condenser (.05 mfd. tubular)	30-4020	.20
6	Resistor (51000 ohms ½ watt)	33-351339	.20
7	Tuning Condenser	31-1818	4.50
8	Compensator (R. F. 1500 K. C.)	31-6122	.60
9	R. F. Transformer (L. W.)	32-2219	.75
10	R. F. Transformer (Broadcast)	32-2105	.65
11	Condenser (250 mmfd.)	30-1032	
12	Condenser (5 mmfd. Mica)	30-1077	.20
13	R. F. Transformer (S. W.)	32-2222	.55
14	Condenser (.05 mfd. Tubular)	30-4123	.20
15	Condenser (.05 mfd. Tubular)	30-4020	.20
16	Resistor (51000 ohms 1 watt)	33-351439	.20
17	Resistor (20000 ohms 1 watt)	33-320439	.20
18	Electrolytic Condenser (16 mfd.)	30-2118	1.65
19	Resistor (10000 ohms ½ watt)	33-310339	.20
20	Condenser (.1 mfd. Tubular)	30-4170	.25
21	Compensator (Osc. Series Nut 160 K. C.)	31-6060	.55
22	Osc. Transformer (L. W.)	32-2221	.65
23	Compensator (Osc. 1600 K. C.)	31-6223	.60
24	Osc. Transformer (Broadcast)	32-2120	.40
25	Condenser (Screw 580 K. C.)	Part of (21)	
26	Osc. Transformer (S. W.)	32-2143	.75
27	Condenser (250 mmfd. Mica)	30-1032	.25
28	Condenser (3500 mmfd. Semi-fixed)	31-6097	.50
29	Resistor (70000 ohms ½ watt)	33-370339	.20
30	Resistor (32000 ohms ½ watt)	33-332339	.20
31	Compensator (1st I. F. Pri. 470 K. C.)	Part of (39)	
32	1st I. F. Transformer	32-2311	
33	Resistor (1000 ohms ½ watt)	33-210339	.20
34	Resistor (400 ohm bakelite)	33-1211	.20
35	Condenser (.25 mfd. Tubular)	30-4446	.20
36	2nd I. F. Transformer	32-2312	1.50
37	Compensator (2nd I. F. Pri. 470 K. C.)	Part of (42)	
38	Condenser (110 mmfd. Mica)	30-1031	.20
39	Resistor (51000 ohms ½ watt)	33-351339	.20
40	Condenser (.01 mfd. Tubular)	30-4124	.25
41	Resistor (490000 ohms ½ watt)	33-449339	.20
42	Condenser (110 mmfd. Mica)	30-1031	.20
43	Condenser (110 mmfd. Mica)	30-1031	.20
44	Resistor (1 megohm ½ watt)	33-510339	$0.20
45	Condenser (.015 mfd. Tubular)	30-4358	.20
46	Resistor (51000 ohms ½ watt)	33-351339	.20
47	Condenser (.006 mfd. Tubular)	30-4112	.20
48	Condenser (.015 mfd. Tubular)	30-4226	.20
49	Volume Control	33-5158	1.00
50	Resistor (1 megohm ½ watt)	33-510339	.20
51	Voice Coil and Cone, S7 Speaker	36-3014	.80
	Voice Coil and Cone, HS Speaker	36-3796	
52	Output Transformer S7 & HS Speaker	32-7019	.85
53	Resistor (1 megohm ½ watt)	33-510339	.20
54	Condenser (0.1 mfd. Tubular)	30-4122	.20
55	Resistor (490000 ohms ½ watt)	33-449339	.20
56	Condenser (.008 mfd. Tubular)	30-4112	.20
57	Condenser (.03 mfd.)	8318-SU	
58	Resistor (1 megohm ½ watt)	33-510339	.20
59	Tone Control & A. C. Switch	42-1182	.75
60	Electrolytic Condenser (8 mfd.)	30-2024	1.10
61	Bias Resistor	33-3284	
62	Electrolytic Condenser (12 mfd.)	30-2117	1.20
63	Field Coil Assembly, S7 Speaker	36-3039	2.75
	Field Coil Assembly, HS Speaker	36-3690	
64	Resistor (9000 ohms, 2 watt)	33-290539	.30
65	Power Transformer (115 Volt 50-60 cycle)	32-7583	4.50
	Power Transformer (115 Volt 25-40 cycle)	32-7584	
	Power Transformer (110-220 Volt 50-60 cycle)	32-7585	
66	Pilot Lamp	34-2039	.15
67	Condenser (.015-.015 mfd. Double Bakelite)	3793-DG	.40
68	Wave Switch Antenna	42-1170	1.10
69	Wave Switch R. F.	42-1245	1.00
70	Wave Switch Osc.	42-1246	1.10
71	Lamp	34-2039E	
72	Phono Jack	42-1197	
73	Condenser (.01 mfd. Tubular)	30-4169	
74	Resistor (10000 ohms ½ watt)	33-310339	
75	Condenser (.004 mfd. Tubular)	30-4185	
	Wave Switch Indexing Plate & Shaft	42-1173	.50
	Pilot Lamp Assembly	38-7706E	.35
	Dial	27-5245	.50
	Dial Hub	28-7187	.12
	Dial Clamp	28-2837	$0.10
	Dial Hub Set Screw	W-1641	.02
	Dial Gear	28-7185	.10
	Dial Guard	27-8324	.02
	Thrust Spring	28-8611	.01
	Thrust Washer	28-3976	.30 C
	"C" Washer	28-3904	.01
	Drive Gear	31-1884	.25
	Vernier Drive	31-1871	.75
	Mask	27-5198	.30
	Mask Arm Assembly	31-1940	.35
	Mask Guide on Lamp Bracket Support	28-7844	.15
	Mask Washer	27-8318	.50 C
	Dial Screen Assembly	38-7912	.30
	Volume Control Shaft	38-8059	.10
	Volume Control Shaft Spring	28-4117	.40 C
	Retaining Clips	28-4394	.03
	Socket 8 prong	27-6058	.11
	Socket 7 prong	27-6057	.11
	Tube Shield	28-2726	.10
	Tube Shield Base	28-3898	.03
	I. F. Shield	38-7763	.20
	Terminal Panel I. F. Unit	38-7703	.25
	Grommet R. F. Unit	27-4317	.04
	Sleeve Mtg. R. F. Unit	28-2257	.01
	Spacer Mtg. R. F. Unit	27-8339	.40 C
	Screw Mtg. R. F. Unit	W-729	.45 C
	Washer Mtg. R. F. Unit	28-3927	.01
	Antenna Panel	38-7714	.15
	Speaker Cable	L-2181	.25
	A. C. Cord	L-2183	.40
	Speaker S7—B Cabinet	36-1009	5.75
	Speaker HS—J Cabinet	36-1220	6.25
	Speaker K-38 (CS 124 Cabinet)	36-1262	
	Knobs Tuning	27-4330	.10
	Knobs Tuning Vernier	27-4331	.10
	Knobs Wave Switch	27-4326	.10
	Knobs Tone & Volume	27-4332	.10
	Bezel Frame & Plate Assembly	40-5939	.75
	Gasket	27-8311	.01
	Glass	27-8298	.05
	Ring	28-3967	.35
	Screw Bezel Mtg.	W-1644	.50 C

Prices Subject to Change Without Notice

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-2620

Electrical Specifications

Type of Circuit: Superheterodyne with Pentode Output.

Power Supply:

Voltage	Frequency	Power Consumption
115	50 to 60	65 Watts
115	25 to 40	65 Watts
220	50 to 60	65 Watts

Power transformers for the different voltages and frequencies are listed on the Parts List.
Intermediate Frequency: 470 K. C.
Tuning Ranges: Three. Range 1—150 to 350 K. C.; Range 2—530 to 1720 K. C.; Range 3—5.7 to 18 M. C.
Philco Tubes Used: *Six. Two 6K7EG; one 6A8EG; one 6Q7EG; one 6F6EG; one 5Y4G.
Speakers: "B" Cabinet—S7; "J" Cabinet—HS; "CS" Cabinet—K38.
***NOTE**—Receivers in the United States use tubes without the "E" designation.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator; Philco Model 088 (fundamental frequency 110 to 20,000 K. C.) is the correct instrument for this purpose; (2) Output Meter. Philco Model 025 Circuit Tester incorporates sensitive output meter and is recommended; (3) Fibre handle screw-driver (Philco Part No. 27-7059); (4) Special variable condenser (Philco Part No. 45-2325).

DIAL CALIBRATION—In order to adjust this receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, rotate the tuning condenser control to the extreme counter-clockwise position (maximum capacity). Loosen the screw of dial hub, then turn dial until the glowing indicator is centered on the first index line of dial scale, with range switch in the long wave position. Now tighten the dial hub set screw in this position.

OUTPUT METER—The 025 Output Meter is connected to the plate and cathode terminals of one of the (6F6EG) tubes. Adjust the meter to use the (0-30) Volt Scale.

INTERMEDIATE FREQUENCY CIRCUIT

FREQUENCY 470 K. C.

1. Set controls as follows:
   - **a.** Range Switch position 2 (Broadcast).
   - **b.** Receiver dial at 580 K. C.
   - **c.** Adjust signal generator for 470 K. C.
   - **d.** Connect the 088 signal generator output lead through a .1 mfd. condenser to the control grid of the 6A8G tube and the ground connection to the chassis.
2. Adjust the following I. F. compensators for maximum output: (37a), (37), (31a) and (31).

RADIO FREQUENCY CIRCUIT

Tuning Range 5.7 to 18 M. C.

1. Set controls as follows:
   - **a.** Range Switch position 3 (Shortwave).
   - **b.** Connect the signal generator output lead and ground to terminals 1 and 3 on aerial input panel. Terminals 2 and 3 must be connected with the shorting link provided on the aerial panel.
2. Adjust compensators as follows for maximum output:

Signal Generator and Receiver Dial	Compensators in order
18 M. C.	(23B)
18 M. C.	(8B), (4B).
18 M. C.	(23B) Use shunt condenser on (23B). (See Note A.) First contact from left rear underside view of R. F. Unit. Check image at 17.06 on receiver dial (see Note B).

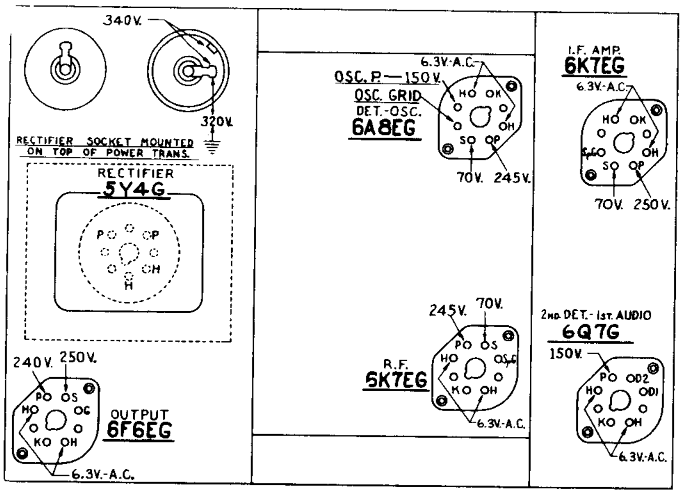
Tuning Range 530-1720

1. Set controls as follows:
   - **a.** Range Switch position 2 (Broadcast).
   - **b.** Signal Generator to aerial panel as in Range 3.
2. Adjust compensators as follows for maximum output:

Signal Generator and Receiver Dial	Compensators in order
1600 K. C.	(23A), (8A), (4A).
580 K. C.	(25) Roll gang for maximum output point.
1600 K. C.	(23A), (8A), (4A).
1500 K. C.	(8A), (4A).

Tuning Range 150 to 350 K. C.

1. Set controls as follows:
   - **a.** Range Switch position 1 (long wave).
   - **b.** Signal Generator output lead to aerial panel through a 250 mmfd. condenser.



Socket Voltages, Measured from Underside of Chassis

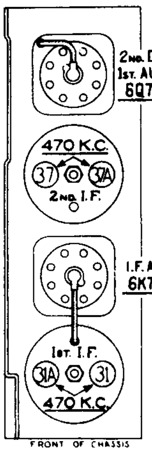
The voltages indicated by arrows were measured with a **Philco 025 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

2. Adjust compensators as follows for maximum output:

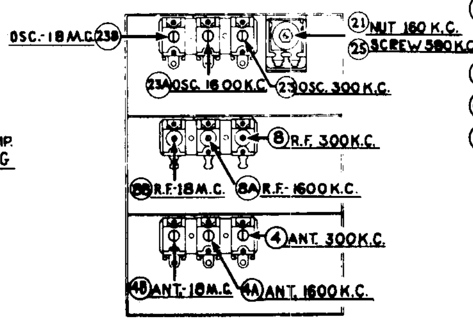
Signal Generator and Receiver Dial	Compensators in Order
300 K. C.	(23), (8), (4).
160 K. C.	(21) Roll gang for maximum output.
300 K. C.	(23), (8), (4).
160 K. C.	(21) Roll gang for maximum output.
300 K. C.	(23), (8), (4)

NOTE "A"—To eliminate the effect of the R. F. compensator detuning the Osc. circuit a variable tuning condenser, 350 Mmfd., Philco Part No. 45-2325 is connected from the oscillator compensators to ground when designated in the padding instruction above. Tune the added condenser from the minimum capacity position until the second harmonic of the receiver oscillator beats against the signal from the generator, resulting in a maximum indication on the output meter. Then adjust compensators as noted for maximum output.

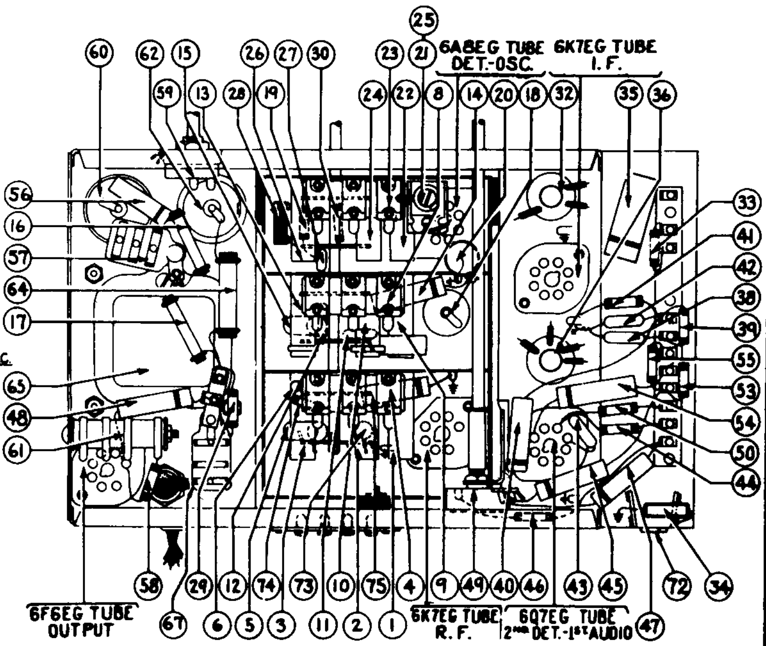
NOTE "B"—To accurately adjust the compensator to the fundamental and not the image signal, turn the oscillator compensator to the maximum capacity position clockwise. Then slowly turn the compensators counter-clockwise until a second maximum peak is obtained on the output meter. The first peak is the image signal and the receiver must not be adjusted to it. If the above procedure is correctly performed, the image signal will be found 940 K. C. below the frequency being used on any high frequency band.



I. F. Compensator



R. F. Compensator

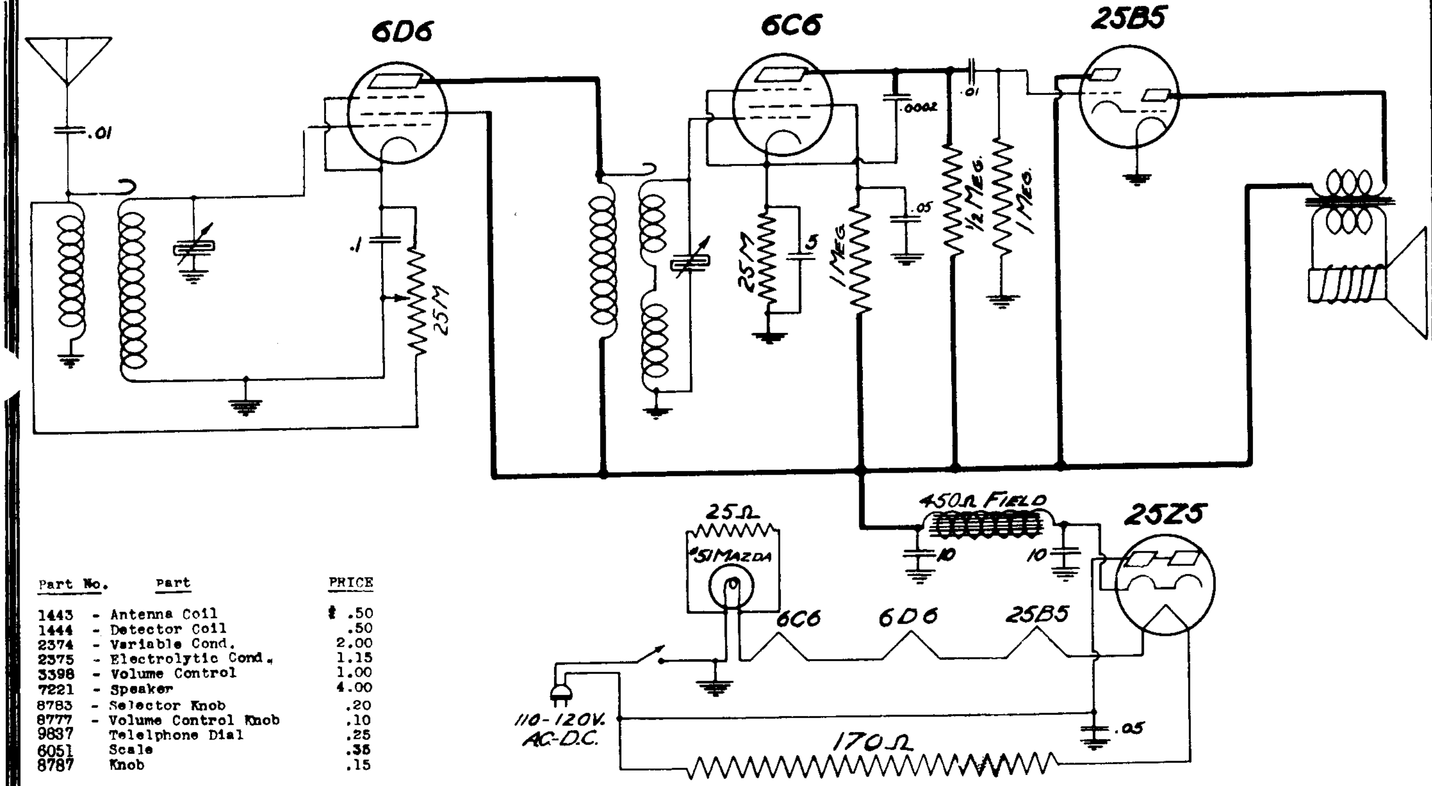


Base View of Chassis

NOTE: See page 237 before servicing this set.

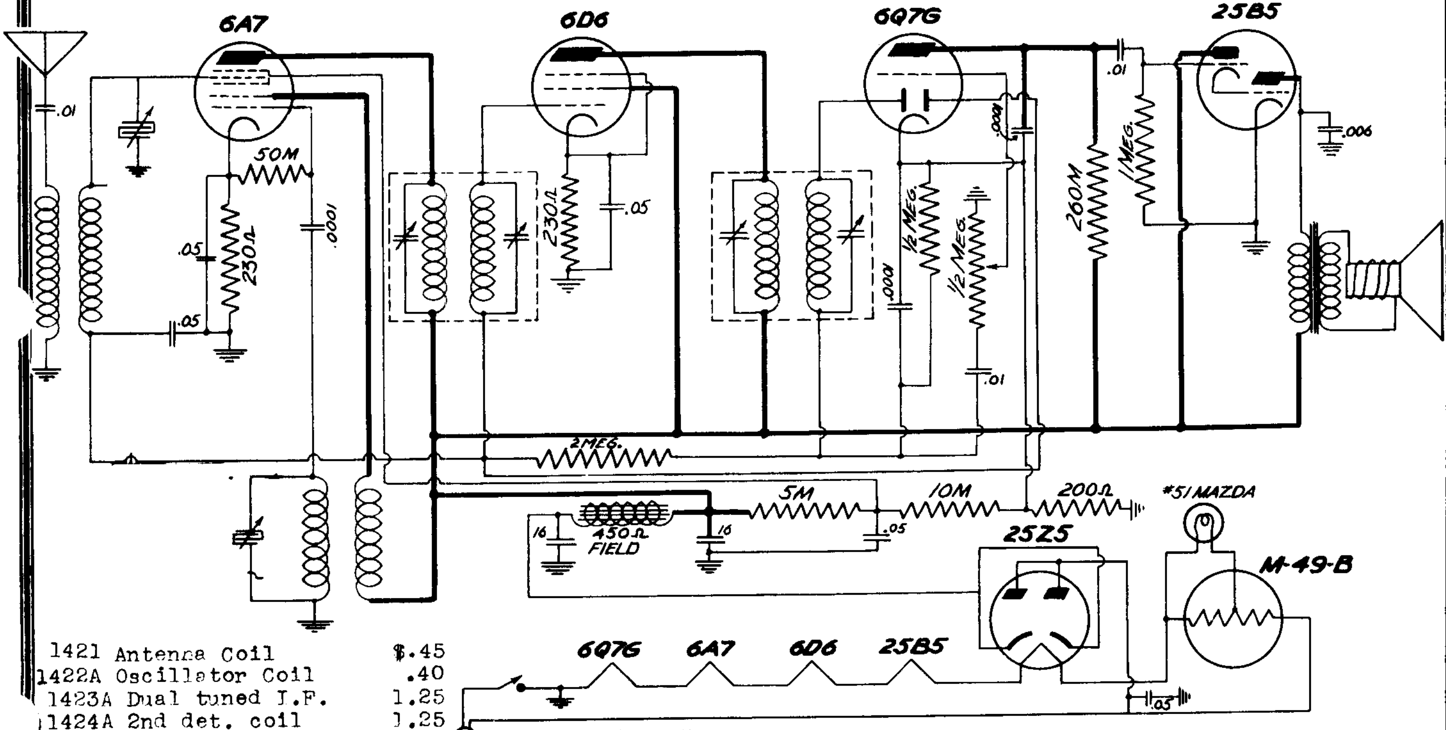
PIERCE AIRO, Inc.

MODELS 400 & 405



Part No.	Part	PRICE
1443	- Antenna Coil	$ .50
1444	- Detector Coil	.50
2374	- Variable Cond.	2.00
2375	- Electrolytic Cond.	1.15
3398	- Volume Control	1.00
7221	- Speaker	4.00
8783	- Selector Knob	.20
8777	- Volume Control Knob	.10
9837	Telephone Dial	.25
6051	Scale	.35
8787	Knob	.15

MODEL 633-S



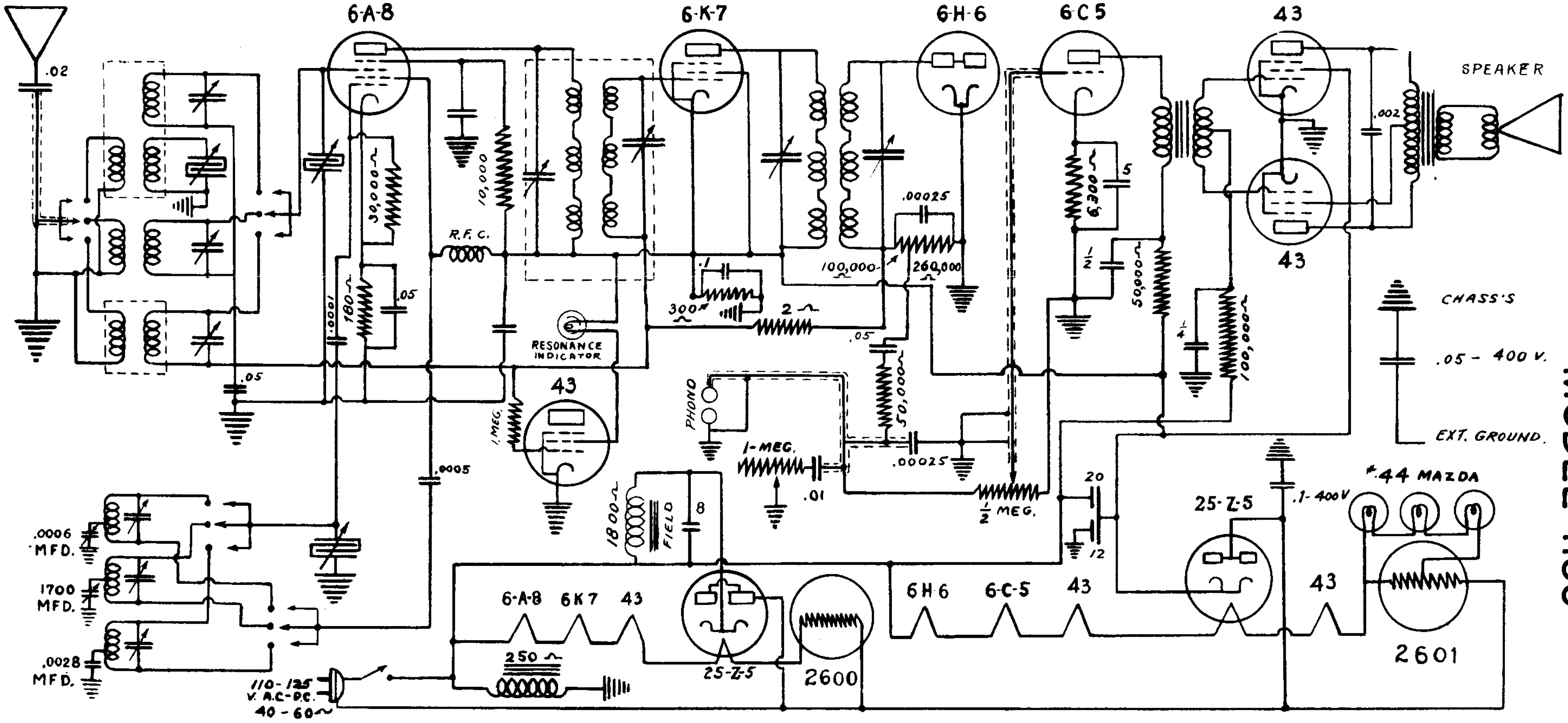
1421	Antenna Coil	$.45
1422A	Oscillator Coil	.40
1423A	Dual tuned I.F.	1.25
1424A	2nd det. coil	1.25
2380	Variable Condenser	2.00
2381	Comb. electrolytic	1.00
3401	Comb. volume control	1.00
7222	Speaker	4.00
8777	Knobs	.10
6039	Scale	1.10
9823	Pointer	.10
9818	Shaft	.10
9799	Drum	.05

TO CALIBRATE:

Set Service Oscillator to 456 K.C. and connect "HOT" lead to grid of 6A7, Ground stator of rear (oscillator) section of variable condenser. Turn Volume Control for maximum gain. Remove Variable Condenser short.

Adjust service oscillator and receiver to 1500 K.C. and peak variable condenser trimmers for maximum gain.

PIERCE AIRO, Inc.
MODEL 1100



I.F. FREQUENCY 456 K.C.

WHITE SHORT WAVE OPERATION — For reception of stations on the short wave band, (5.5 to 16.5) megacycles) turn wave band switch to the left, White position), and tune carefully noting the white scale. Due to the sharpness of the tuning on the short wave it is usually necessary to turn up the volume control in order to avoid passing over stations.

RED BAND OPERATION — This band covers the frequency range between 1600 to 4600 K.C., in the Model 1100, or 150 to 410 K.C. in the Model 1100 LW. When tuning on these ranges, the wave band switch is in the center position and the red scale is in use.

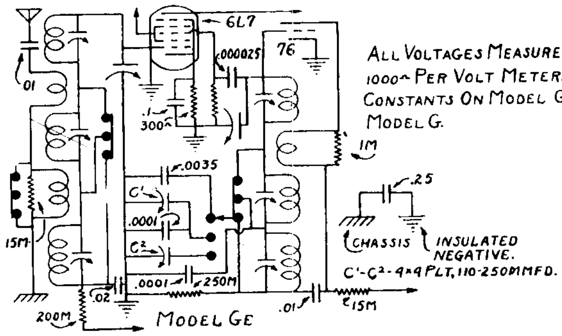
RESONANCE INDICATOR — Green spot in the lower right hand side of dial is the Resonance Indicator. When tuning receiver watch this spot until the glow is at a minimum. At this point the receiver is tuned exactly on the station desired.

PHONOGRAPH PICKUP — It is also possible to use this receiver with an electric phono pickup attachment for the reproduction of disc. recordings. For this purpose, a Phono Jack is located at the rear of the Chassis. The Volume Control will control the strength of signals for phonograph reproduction (any high impedance pickup of high quality may be used with this receiver)

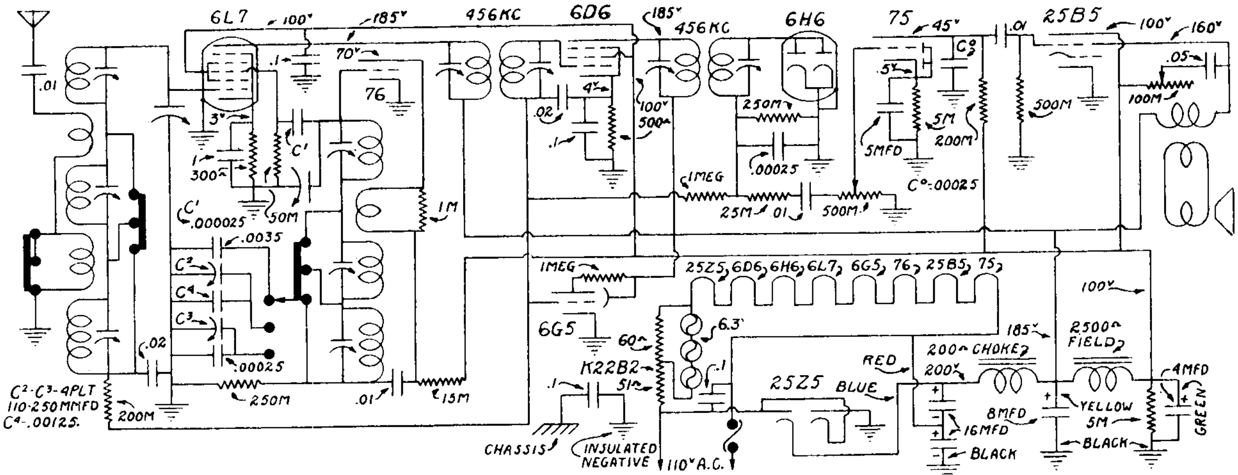
PILGRIM ELECTRIC CORPORATION

MODELS G & GE
"SERIAL No. 707,001 UP"
I.F. 456 K.C.

All Voltages Measured With A 1000Ω Per Volt Meter. All Other Constants On Model GE Same As Model G.

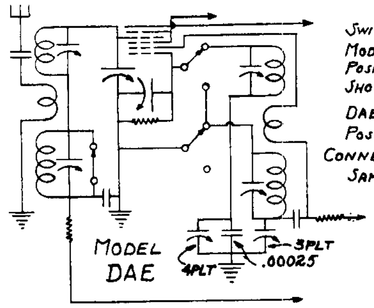


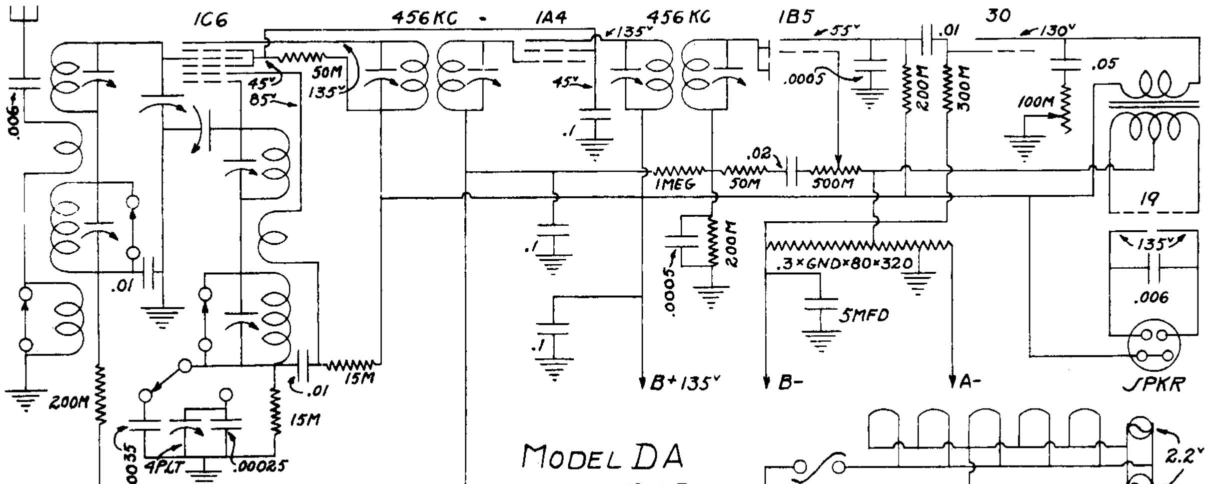
Model GE



MODELS DA & DAE
"SERIAL No. 460,001 UP"
I.F. 456 K.C.

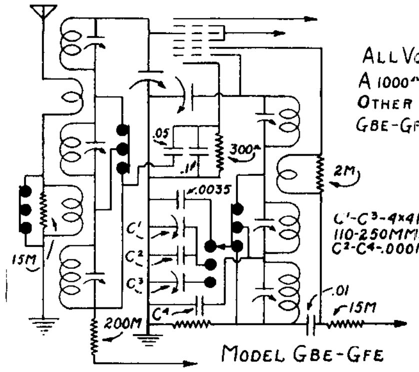
Switches Shown On Model DA In S.W. Position. Switches Shown On Model DAE In Broadcast Position. All Other Connections On DAE Same As DA.





Model DA
460,001 AND UP

PILGRIM ELECTRIC CORPORATION

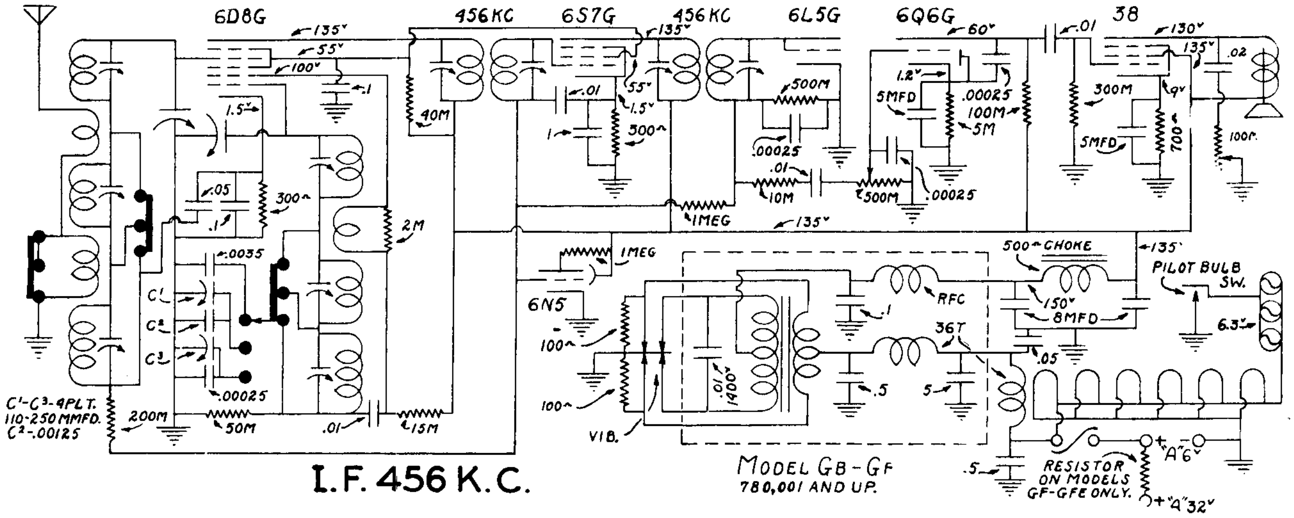


Model GBE-GFE

All Voltages Measured With A 1000 Ω Per Volt Meter. All Other Constants On Models GBE-GFE Same As Models GB-GF.

MODELS GB, GF, GBE & GFE

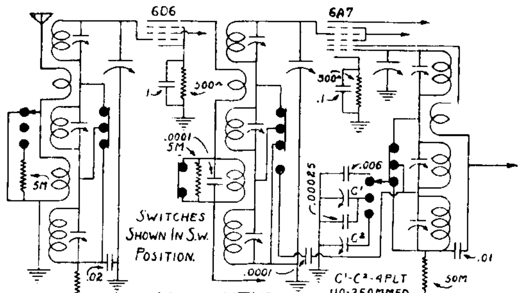
"SERIAL № 780,001 UP"



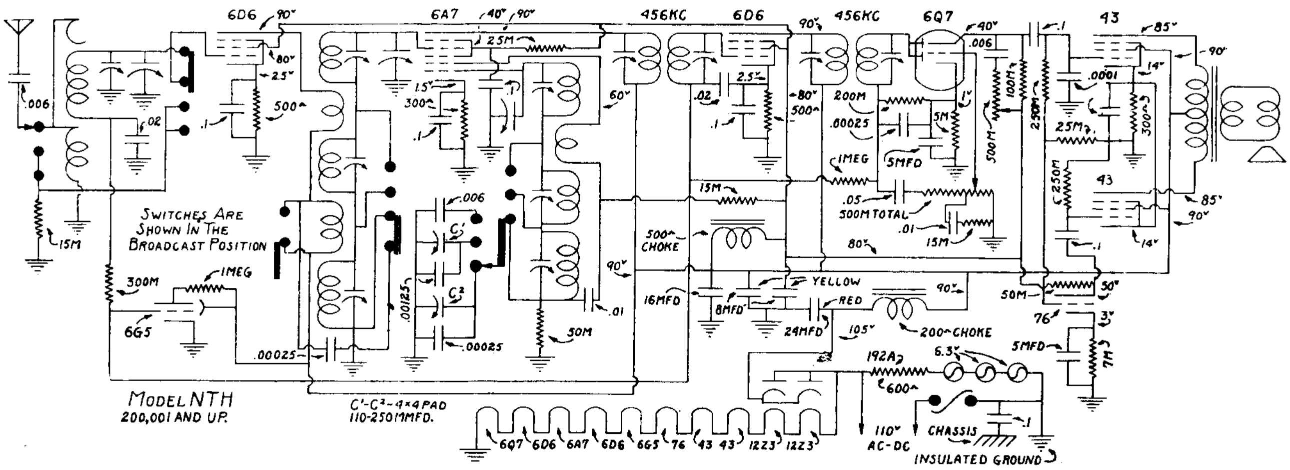
I.F. 456 K.C.

MODELS NTH & NTHE

"SERIAL № 200,001 UP"



Model NTHE



Model NTH
200,001 AND UP.

I.F. 456 K.C.

Model NTHE-Additional Parts-.00002 Mica, 6Q7 Grid To Ground. .0005 Mica, 6Q7 Plate To Ground. 150M, ½ Watt Resistor, In Series With 6Q7 Grid Lead. .25 MFD-150V, Ins. Gnd To Chassis.

RCA MANUFACTURING COMPANY, Inc.

MODELS R-96 & R-97
ELECTRIC PHONOGRAPHS

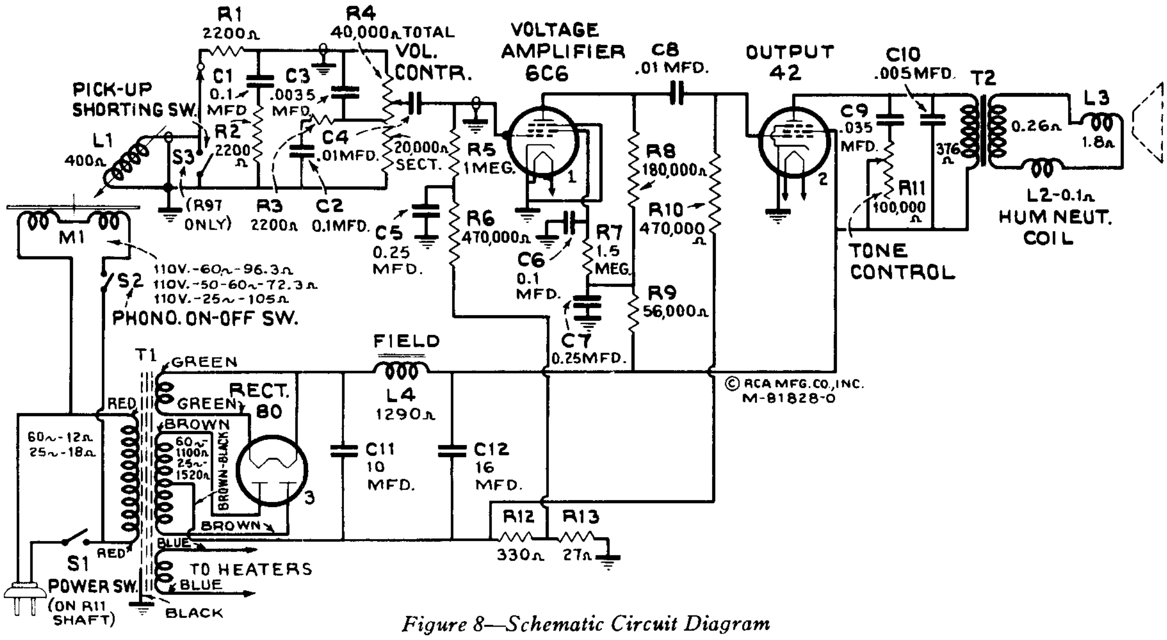


Figure 8—Schematic Circuit Diagram

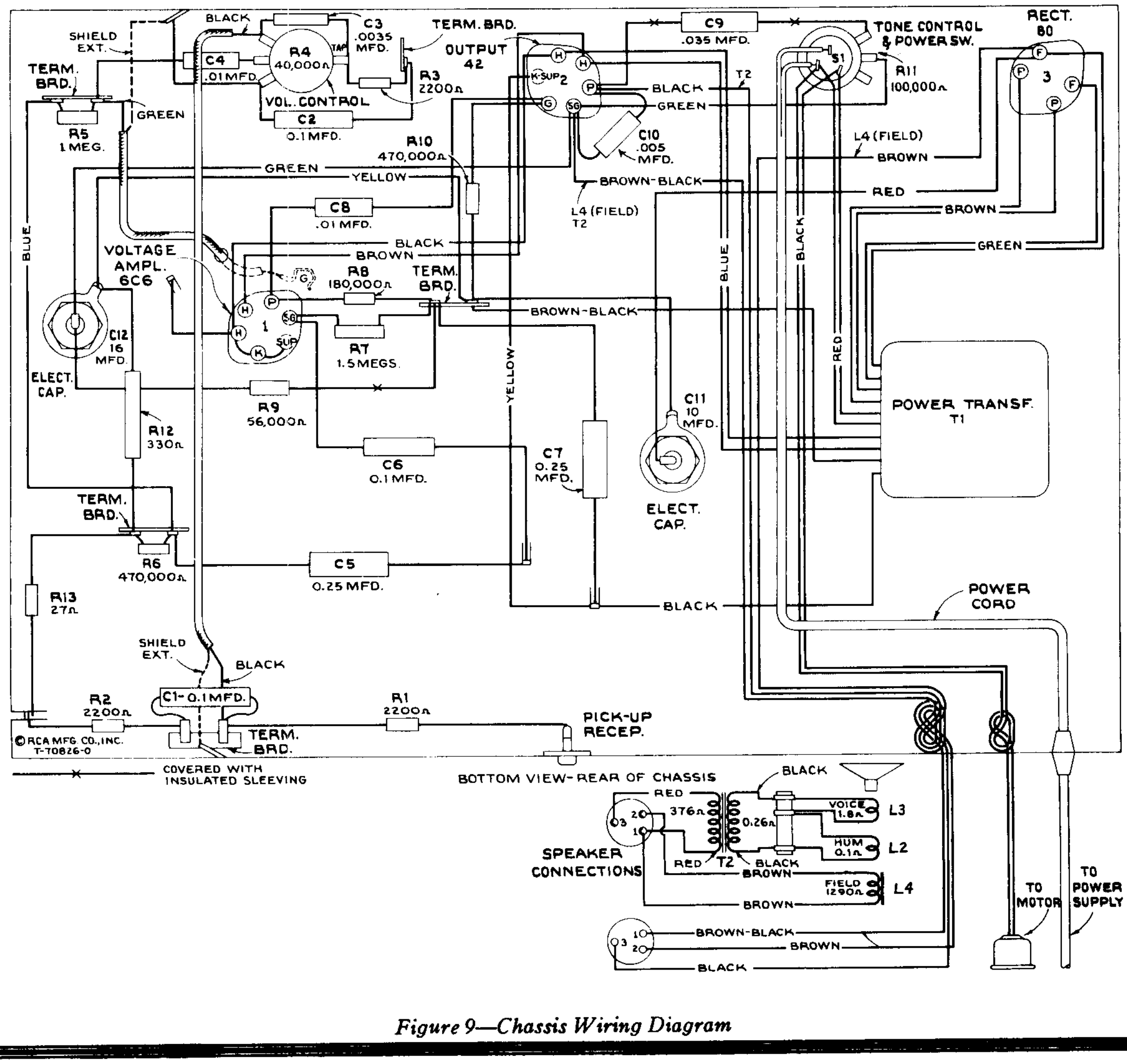


Figure 9—Chassis Wiring Diagram

RCA MANUFACTURING COMPANY, Inc.
MODEL R-97

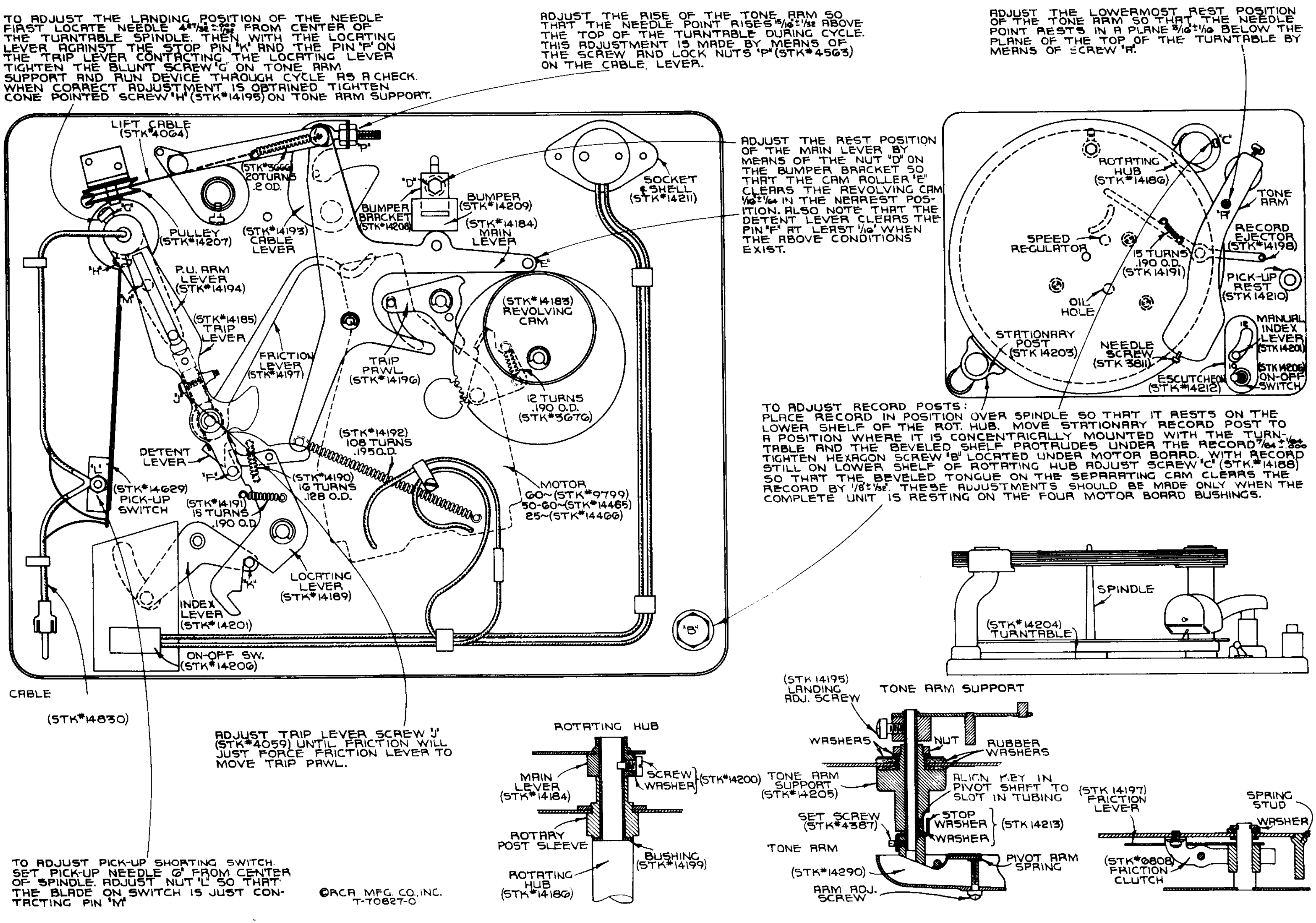


Figure 7—Automatic Record Changer Adjustments

(Model R-97)

RCA MANUFACTURING COMPANY, Inc.

MODELS R-96 & R-97

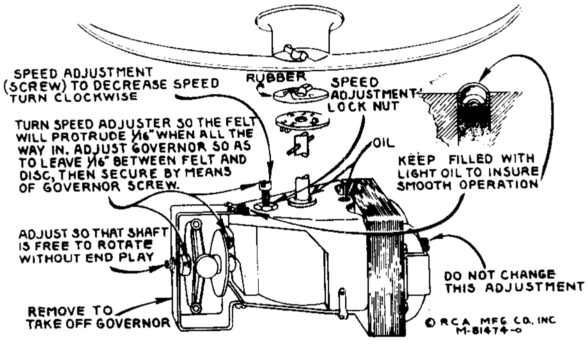


Figure 1—Details of Motor

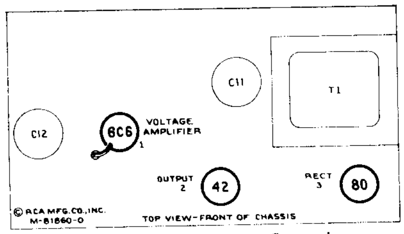


Figure 4—Radiotron Locations

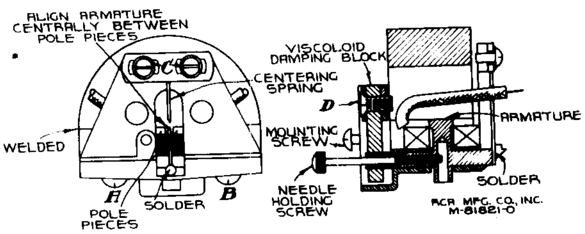


Figure 2—Details of Pickup

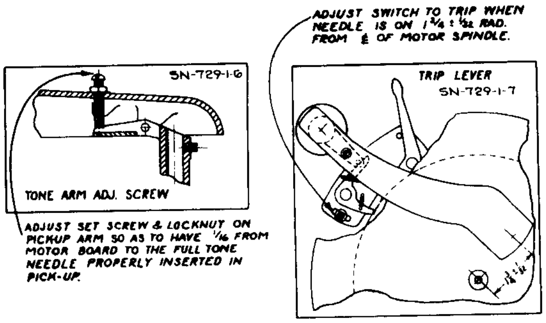


Figure 5—Tone Arm and Motor Switch Adjustments (Model R-96)

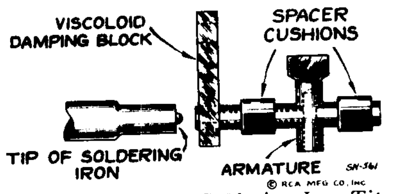


Figure 3—Special Soldering-Iron Tip

LOUDSPEAKER

Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

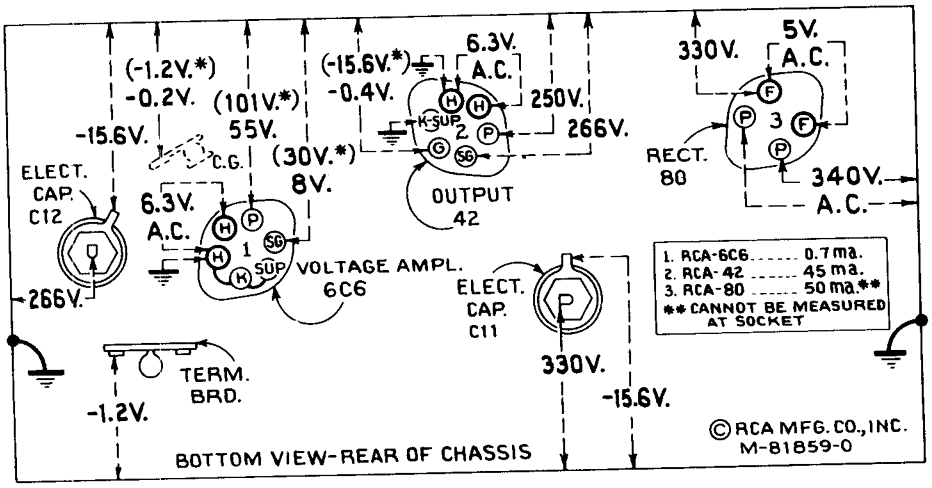


Figure 6—Radiotron Socket Voltages

Measured at 115 volts, 60-cycle supply—Volume control minimum

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter.

Voltage values as specified should hold within ±20% when instrument is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

RCA MANUFACTURING COMPANY, Inc.

MODELS R-96 & R-97

Electrical Specifications

RADIOTRON COMPLEMENT
(1) RCA-6C6................ Audio Voltage Amplifier
(2) RCA-42.......................... Power Output
(3) RCA-80.................................. Rectifier

POWER SUPPLY RATINGS
Rating A-6 .... 105-125 volts, 60 cycles, 90 watts
Rating A .... 105-125 volts, 50-60 cycles, 90 watts
Rating B-2 .... 105-125 volts, 25 cycles, 90 watts
Rating C-6 .... 105-125/200-250 volts, 60 cycles, 90 watts
Rating C-5 .... 105-125/200-250 volts, 50-60 cycles, 90 watts

POWER OUTPUT
Undistorted.................................. 2.5 watts
Maximum.................................. 4.5 watts

LOUDSPEAKER
Type.......................... 8-inch Electrodynamic
Impedance (V.C.).............. 2.2 ohms at 400 cycles

MOTOR-BOARD	R-96	R-97
Type	Manual	Automatic-Manual
Turntable Speed (adjustable)	78 r.p.m.	78 r.p.m.
Pickup	High-impedance Magnetic	
Pickup Impedance	1,400 ohms at 1,000 cycles	

General Description

The Model R-97 Electric Phonograph consists of a three-tube audio amplifier, an eight-inch dust-proof electrodynamic loudspeaker, and an automatic record changer combined in a hinged-top table-type cabinet. Its design includes a phonograph compensation pack, resistance-coupled audio system, self-starting constant-speed motor, improved magnetic pickup, and a tone control. The phonograph mechanism will play a series of eight 10-inch records (changes seven) or repeat 12-inch records. It may be operated manually if desired.

The Model R-96 Electric Phonograph is identical to Model R-97 electrically, has a manually operated turntable, and a slightly different cabinet design.

The circuit arrangement of either instrument is shown on figure 8.

Service Data

AUTOMATIC RECORD CHANGER
(Model R-97)

The record changing mechanism is designed to be simple and fool-proof. Certain adjustments may be required occasionally. The adjustments are illustrated and explained in figures 1 and 7.

It is important when servicing the automatic mechanism, to have it placed on a level support. It is also important to refrain from forcing the mechanism if there is a tendency to bind or jam, since bent levers and possible broken parts may result.

CAUTION.—Do not leave records stacked on the record holder posts, when not in use, as they are liable to warp, particularly so in warm climates.

MOTOR ADJUSTMENTS

The phonograph motors are of the governor induction type and are designed to be simple and foolproof. Occasionally, however, certain adjustments may be required. These adjustments are illustrated and explained in figure 1. Application of oil to the felt pad which rubs against the governor disc will insure smooth operation.

MAGNETIC PICKUP

The pickup used is of an improved design. The horseshoe magnet is rigidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. The frequency response is substantially uniform over a wide range. Service operations which may be necessary on the pickup are as follows:

Centering Armature.—Refer to figure 2 showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, i. e., exactly centered. Whenever this centering adjustment has been disturbed it will be necessary to remove the pickup mechanism from the tone arm by removing the needle holding screw and the two mounting screws from the front of the tone arm, holding the pickup assembly to keep it from dropping. Unsolder the two leads from the lugs on the terminal board at the rear of the pickup. Insert a small rod or nail into the armature needle hole and replace the needle holding screw, tightening it to hold the rod securely. If the armature clamping screws A and B have not been disturbed, screws C should be loosened which will permit the armature to be moved from side to side, the rod acting as a lever to perform this operation. The proper adjustment is obtained when the armature is moved to the extreme position on each side (the movement being limited by the armature striking the pole pieces) and then brought to the mid position between these two extremes. Screws C should then be tightened. The armature position should then be central between the pole pieces and at right angles to them. With a little practice, the correct adjustment of the armature will be obtained. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other foreign material which would obstruct the movement of the pickup armature.

Damping Block.—The viscoloid damping block which is attached to the front end of the armature shank serves as a mechanical filter to eliminate undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, the pickup mechanism should be removed from the tone arm as explained above. Remove screw D and the damping block from the pickup assembly. Make sure that the shaft of the armature which contacts the viscoloid is clean. Then insert the new damping block so that it occupies the same position as that of the original block, and is in correct vertical alignment with the armature. The hole in the block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the damping block properly aligned on the armature, screw D with its washer should then be replaced. Heat should be applied to the armature (viscoloid side) so that the damping block will fuse at the point of contact and become rigidly attached to the armature. A special-tip soldering iron, constructed as shown in figure 3, will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block, causing a small bulge on both sides.

Replacing Coil.—Whenever there is defective operation due to an open or shorted pickup coil, this coil should be replaced. Remove the pickup mechanism and terminal board as described above. Remove screws A and B and the magnet assembly. Remove the bakelite coil support (with coil attached) and insert the new coil support assembly in its place, after which replace the magnet assembly and center the armature as described above, then re-assemble the remainder of the unit. Only rosin core solder should be used for soldering the coil leads and pickup leads to the pickup terminal board. This same type of solder should be used when necessary for soldering the centering spring to the armature.

Magnetizing.—Loss of magnetization will not usually occur when the pickup has received normal care because the magnet and pole pieces are one unit and the magnetic circuit remains practically closed at all times. When the pickup has been mishandled, subjected to a strong a-c field, jolted, or dropped, there may be an appreciable loss of magnetic strength, in which case it will be necessary to remagnetize the entire structure. To do this, it will be necessary to first remove the pickup mechanism from the tone arm, and then remove the magnet assembly. Place the magnet assembly on the poles of a standard pickup magnetizer such as the RCA Stock No. 9549 Pickup Magnetizer and charge the magnet in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to remagnetize it so that the same polarity is maintained.

REPLACEMENT PARTS

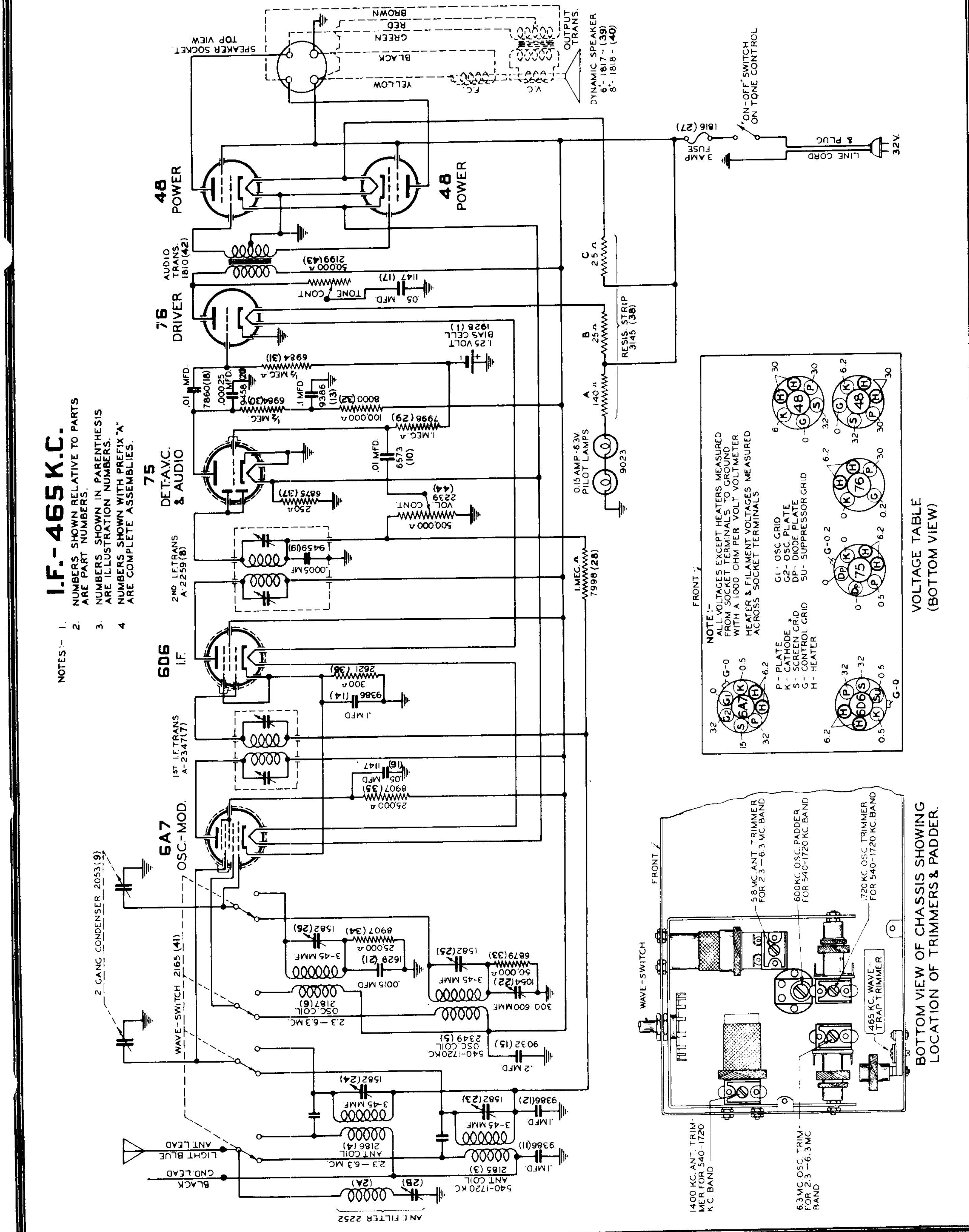
Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION
	AMPLIFIER ASSEMBLIES
12118	Cap—Grid contact cap
5005	Capacitor—.0035 Mfd. (C3)
4838	Capacitor—.005 Mfd. (C10)
13138	Capacitor—.01 Mfd. (C4, C8)
12670	Capacitor—.035 Mfd. (C9)
4839	Capacitor—0.1 Mfd. (C1, C2, C6)
5170	Capacitor—0.25 Mfd. (C7)
12484	Capacitor—0.25 Mfd. (C5)
11203	Capacitor—10 Mfd. (C11)
5212	Capacitor—16 Mfd. (C12)
14783	Connector—2-contact female connector for motor power cable
5119	Connector—3-contact female connector for reproducer cable
11955	Resistor—27 Ohms—Carbon type, ¼ watt (R13)
11670	Resistor—330 Ohms—Carbon type, 1 watt (R12)
5159	Resistor—2,200 Ohms—Carbon type, ¼ watt (R1, R2, R3)
5029	Resistor—56,000 Ohms—Carbon type, ¼ watt (R9)
14943	Resistor—180,000 Ohms—Carbon type, ¼ watt (R8)
11172	Resistor—470,000 Ohms—Carbon type, ¼ watt (R6, R10)
13730	Resistor—1 Meg.—Carbon type, ¼ watt (R5)
4241	Resistor—1.5 Meg.—Carbon type, ¼ watt (R7)
4233	Shield—6C6 Radiotron shield
14278	Socket—Single contact female pickup cable socket
4794	Socket—4-contact 80 Radiotron socket
4786	Socket—6-contact 6C6 or 42 Radiotron socket
14797	Tone Control and power switch (R11, S1)

STOCK No.	DESCRIPTION
14796	Transformer—Power transformer—105-125 volts, 50-60 cycles (T1)
14843	Transformer—Power transformer—105-125 volts, 25-60 cycles (T1) (Model R97 only)
14798	Volume Control (R4)
	MOTORBOARD ASSEMBLIES (Model R-96)
14803	Brake—Turntable brake and motor switch
3261	Rest—Pickup rest
30248	Screw—Motor mounting screw, washer, rubber washers, clamp plate and spacer assembly
30100	Springs—Tension springs for brake Stock No. 14803 comprising 1 long and 1 short spring
14804	Switch—Motor switch (S2)—located on turntable brake Stock No. 14803
	MOTOR ASSEMBLIES (Model R-96)
11703	Governor—Complete motor governor, governor shaft and gear assembly
14800	Motor—105-125 volts, 60 cycle (MI)
	OPERATING MECHANISM ASSEMBLIES (Model R-97)
14199	Bushing—Record separator rotating shaft bushing
14183	Cam—Cam and gear assembly
6808	Clutch—Trip lever friction clutch
14197	Finger—Friction finger assembly
14186	Hub—Rotating hub and record separator complete with set screw
14189	Lever—Locating lever assembly
14201	Lever—Manual index lever assembly
14184	Lever—Main lever and link assembly
14194	Lever—Pickup arm lever complete with set screws
14193	Lever—Pickup lift cable lever
14198	Lever—Reject lever assembly
14185	Lever—Trip lever and friction clutch assembly
14196	Pawl—Trip pawl assembly
4563	Screw—Cable lever screw and two locknuts
4059	Screw—Trip lever clutch tension adjustment screw
14200	Screw—No. 8-32 special hex head screw and lockwasher for record separator shaft mounting
14188	Screw—No. 10-32x7/16 fillister-head cone-pointed set screw for rotating hub
14195	Screw—No. 10-32x5/16 fillister-head cone-pointed set screw for pickup arm lever
14187	Shaft—Rotating shaft for record separator
3676	Spring—Cam pawl tension spring
3666	Spring—Lift cable tension spring
14190	Spring—Locating lever pawl tension spring
14191	Spring—Locating lever or reject lever tension spring
14192	Spring—Main lever tension spring
	MOTORBOARD ASSEMBLIES (Model R-97)
14208	Bracket—Bumper bracket and bumper complete
14209	Bumper—Rubber bumper
14830	Cable—Shielded cable 13" long complete with single contact male connector—connects pickup shorting switch to input transformer or compensator
14212	Escutcheon—Manual index lever and switch escutcheon
14203	Post—Record post—located on front left hand corner of motorboard
14210	Rest—Pickup arm rest
14207	Roller—Pickup lift cable roller and bracket
14211	Socket—Motorboard socket and shell
14205	Support—Pickup arm mounting spacer, washers and nut
14206	Switch—Motor toggle switch (S2)
14629	Switch—Pickup shorting switch (S3)
14204	Turntable—Complete
14213	Washer—Pickup arm stop washer and spacing washer
	MOTOR ASSEMBLIES (Model R-97)
14215	Governor—Governor complete with motor Stock Nos. 9799, 14465 and 14466
14466	Motor—105-125 volts, 25 cycle (M1)
14465	Motor—105-125 volts, 50-60 cycle (M1)
9799	Motor—105-125 volts, 60 cycle (M1)
14214	Screw—Motor mounting screw and spacer assembly
	PICKUP AND ARM ASSEMBLIES (For Model R-96 only)
14291	Armature—Pickup armature
11732	Coil—Pickup coil (L1)
14292	Damper—Pickup damper assembly — comprising one damper, one clamp and one screw
14931	Pickup and Arm Complete
3811	Screw—Needle holding screw
	PICKUP AND ARM ASSEMBLIES (For Model R-97 only)
14291	Armature—Pickup armature assembly
4064	Cable—Pickup lift cable
11732	Coil—Pickup coil (L1)
14292	Damper—Pickup damper block complete with clamp and screw
14290	Pickup and Arm Complete
3811	Screw—Needle holding screw
4387	Screw—No. 6-32x¼" headless set screw for pickup arm pivot shaft
	REPRODUCER ASSEMBLIES (RL-63-F1)
14356	Board—3-contact reproducer terminal board
13866	Cap—Cone center dust cap
12012	Coil—Field coil (L4)
11469	Coil—Hum coil (L2)
12642	Cone—Reproducer cone and dust cap (L3)
6118	Plug—3-contact male plug for reproducer
14360	Reproducer—Reproducer complete
14358	Screw—Screw, washer and lockwasher to hold core in yoke
14355	Transformer—Output transformer (T2)
14357	Washer—Spring washer to hold field coil
	MISCELLANEOUS ASSEMBLIES
4391	Box—Needle box for Model R-97 only
11762	Box—Needle box for Model R-96 only
11704	Damper—Turntable damper and damper plate
12673	Knob—Volume control or tone control and power switch knob
14267	Screw—Amplifier chassis mounting screw and washer
30249	Screw—Motorboard mounting screw, spring, spacer, washer, lockwasher, and rubber washer assembly for Model R-96 only
30250	Screw—Motorboard mounting screw, spring, washers and rubber washer assembly for Model R-97 only
4119	Screw—No. 8-32 headless set screw for knob Stock No. 12673
14801	Turntable—Complete for Model R-96 only

RADOLEK COMPANY

MODELS K16,773 & K16,774



RADOLEK COMPANY

MODELS K16,773 & K16,774

Alignment of this receiver should never be necessary unless one of the coils has been replaced.

Lack of sensitivity, selectivity or poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, inadequate or excessively long antenna, low plant voltage, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

NOTE: BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMER AND PADDING CONDENSERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE CIRCUIT DIAGRAM.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

ALIGNING I.F. STAGE AT 465 KILOCYCLES:

(a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead to the grid cap of the 6A7 tube through a .02 Mfd. condenser DO NOT REMOVE GRID CLIP.

(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.

(c) Peak each of the second I.F. transformer trimmers.

(d) Peak each of the first I.F. transformer trimmers.

ADJUSTING 465 KILOCYCLE WAVE TRAP:

(a) Connect the high output side of the test oscillator through a .00025 Mfd. condenser to the receiver antenna lead and the low side to the set ground.

(b) Set test oscillator frequency to EXACTLY 465 kilocycles and adjust the 465 K.C. wave trap trimmer condenser mounted on and accessible through hole in rear of chassis for MINIMUM 465 kilocycle signal response.

ALIGNING 1720-540 KILOCYCLE BAND:

(a) Adjust band selector switch for operation on 1720-540 kilocycle band and leave test oscillator lead connected to receiver antenna lead through the .00025 Mfd. series condenser.

(b) Set test oscillator frequency and receiver dial to EXACTLY 1720 kilocycles.

(c) Adjust 1720 K. C. oscillator trimmer to bring in 1720 kilocycle test oscillator signal to maximum output.

(d) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.

(e) Adjust 1400 K.C. antenna trimmer for maximum sensitivity.

(f) Set receiver dial and test oscillator frequency to approximately 600 kilocycles.

(g) While rocking gang condenser slightly to right and left adjust 600 K.C. padder for maximum sensitivity.

ALIGNING 2.3-6.3 MEGACYCLE BAND:

(a) Replace .00025 Mfd. test oscillator lead series condenser with a 400 ohm resistor. Adjust band selector switch for operation on 6.3 to 2.3 megacycle band, and tune receiver dial and set test oscillator frequency to EXACTLY 6.3 megacycles.

(b) Adjust 6.3 M.C. oscillator trimmer to bring in 6.3 megacycle test oscillator signal to maximum output.

(c) Tune receiver dial and set test oscillator frequency to 5.8 megacycles, and while rocking gang condenser slightly to right and left adjust 5.8 M.C. antenna trimmer for maximum sensitivity.

(d) No adjustment is required at low frequency end of this band as a fixed oscillator pad is used.

To assure more accurate trimmer setting repeat all above adjustments several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

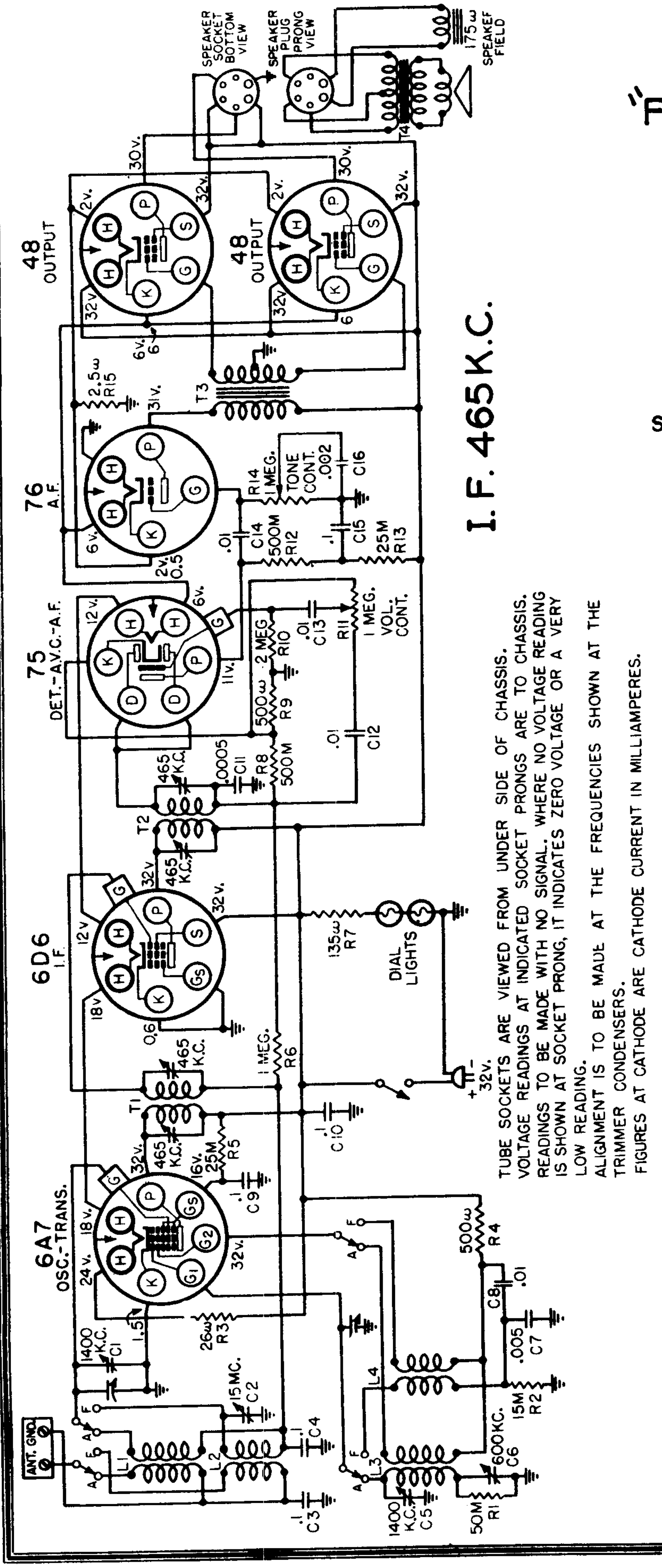
Illus. No.	Part No.	Part	Description	Price
1	1928	Coil	Bias 1.25 Volt	$ .22
2	2252	Coil	Antenna Wave Trap	.65
3	2185	Coil	Antenna 540-1720 K.C. Band	.80
4	2186	Coil	Antenna 2.3-6.3 M.C. Band	.70
5	2349	Coil	Oscillator 540-1720 K.C. Band	.65
6	2187	Coil	Oscillator 2.3-6.3 M.C. Band	.55
7	2347	Coil	1st I.F. Transformer	1.65
8	2259	Coil	2nd I.F. Transformer	1.60
9	2053	Condenser	Two Gang Tuning	2.65
10	6573	Condenser	Tubular .01 Mfd. 200 Volt	.17
11	9386	Condenser	Tubular .1 Mfd. 200 Volt	.19
12	9386	Condenser	Tubular .1 Mfd. 200 Volt	.19
13	9386	Condenser	Tubular .1 Mfd. 200 Volt	.19
14	9386	Condenser	Tubular .1 Mfd. 200 Volt	.19
15	9032	Condenser	Tubular .2 Mfd. 200 Volt	.23
16	1147	Condenser	Tubular .05 Mfd. 200 Volt	.19
17	1147	Condenser	Tubular .05 Mfd. 200 Volt	.19
18	7860	Condenser	Tubular .01 Mfd. 400 Volt	.17
19	9459	Condenser	Mica .0005 Mfd.	.21
20	9458	Condenser	Mica .00025 Mfd.	.21
21	1629	Condenser	Mica .0015 Mfd.	.21
22	1054	Condenser	Padding 300-600 M.M.F.	.55
23	1582	Condenser	Trimmer 3-45 M.M.F.	.21
24	1582	Condenser	Trimmer 3-45 M.M.F.	.21
25	1582	Condenser	Trimmer 3-45 M.M.F.	.21
26	1582	Condenser	Trimmer 3-45 M.M.F.	.21
27	1816	Fuse	Type 3 AG (3 Amp.)	$ .12
28	7998	Resistor	Carbon 1 Meg. Ohm 1/3 Watt	.19
29	7998	Resistor	Carbon 1 Meg. Ohm 1/3 Watt	.19
30	6984	Resistor	Carbon 500,000 Ohm 1/3 Watt	.19
31	6984	Resistor	Carbon 500,000 Ohm 1/3 Watt	.19
32	8000	Resistor	Carbon 100,000 Ohm 1/3 Watt	.19
33	6879	Resistor	Carbon 50,000 Ohm 1/3 Watt	.19
34	8907	Resistor	Carbon 25,000 Ohm 1/3 Watt	.19
35	8907	Resistor	Carbon 25,000 Ohm 1/3 Watt	.19
36	2621	Resistor	Carbon 300 Ohm 1/3 Watt	.19
37	6875	Resistor	Carbon 250 Ohm 1/3 Watt	.19
38	3145	Resistor	Wire Wound (140, 25 & 2.5 ohms)	.75
39	1817	Speaker	Dynamic (6")	7.25
40	1818	Speaker	Dynamic (8")	9.00
41	2165	Switch	Band Selector	.70
42	1810	Transformer	Audio	1.75
43	2199	Tone Control	With On-Off Switch	1.24
44	2239	Volume Control		.80
			MISCELLANEOUS	
	9023	Bulb	6.3 Volt .150 Ampere Dial Light	.19
	3115	Dial Assembly	Complete (Mention name required)	2.50
	3116	Dial Scale	Calibrated Scale	.48
	2796	Glass	For Dial with Escutcheon	.95
	3031	Knob	Small	.19
	3032	Knob	Large	.18

Prices are subject to change without notice.

SEARS, ROEBUCK & CO.

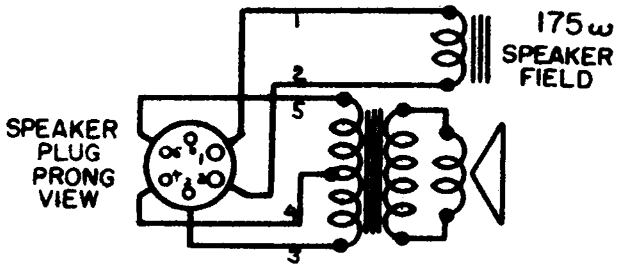
MODEL 4619

"FACTORY № 101.478"



SPEAKER CABLE COLOR CODE

1. Black	4. Red
2. Yellow	5. Brown
3. Green	6. Blank



PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SELLING PRICE EACH
	10155169551	Board - Antenna terminal	.09
	10154164592	Bracket - With bearing, dial and front variable condenser mounting	.51
	1015413407	Bushing - Rubber, chassis mounting	.02
	1015414479	Clip - Grid	.01
L1	1012814287	Coil - Antenna, broadcast	.60
L3	1012814246	Coil - Oscillator, broadcast	.41
L2	10128138463	Coil - Antenna, short wave	.52
L4	10128138464	Coil - Oscillator, short wave	.51
	1011616953	Condenser - Variable	2.58
		Condenser - .5 mfd. 200 volts	.31
C3,C4,C9, C10,C15		Condenser - .1 mfd. 200 volts	.16
C8,C12, C13,C14		Condenser - .01 mfd. 200 volts	.13
C7	1011916656	Condenser - .005 mfd. mica	.25
C16		Condenser - .002 mfd. 200 volts	.08
C11		Condenser - .0005 mfd. mica	.10
C2	1011713332	Condenser - Trimmer, 20 mmf.	.10
C5	1011712851	Condenser - Trimmer, 15 mmf.	.11
C6	1011714433	Condenser - Padder	.29
R14	1012516893	Control - Tone	.52
R11	1012416951	Control - Volume with switch	.69
	1015514711	Cord - Power	.35
	1014016973	Dial - Station selector	.95
	10145163001	Drum - Condenser drive	.46
	1014416422	Escutcheon - Dial	.75
	1015410980	Grommet - Condenser mounting	.02
	1014016302	Guard - Pointer	.28
	1013914095	Knob - Volume	.12
	1013914405	Knob - Tuning	.12
	1013914153	Knob - Tone	.12
	1013914752	Knob - Wave switch	.11
	101492288	Lamp - Dial, 6.3 Volts (Blue Bead)	.12
	1015917118	Leaflet - Instruction	.30
	1015915947	Log - Station	.01
	1015414400	Nut - Escutcheon mounting	.01
	1014116304	Pointer - Dial	.06
R10		Resistor - 2 megohms, 1/3 watt	.15
R6		Resistor - 1 megohm, 1/3 watt	.15
R8,R12		Resistor - 500M ohms, 1/3 watt	.15
R1		Resistor - 50M ohms, 1/3 watt	.15
R5,R13		Resistor - 25M ohms, 1/3 watt	.17
R2		Resistor - 15M ohms, 1/3 watt	.15
R4,R9		Resistor - 500 ohms, 1/3 watt	.15
R7		Resistor - 135 ohms, 4 watts	.26
R3		Resistor - 26 ohms, 3 watts	.24
R15		Resistor - 2.5 ohms, 3 watts, flexible	.30
	1014616464	Shaft - Condenser drive	.11
	1015315648	Shield - Tube	.11
	101188253	Socket - 5 prong	.06
	101188092	Socket - 6 prong, Speaker	.07
	101188072	Socket - 7 prong	.08
	1011813962	Socket - Dial light (ungrounded shell)	.07
	1011812625	Socket - Dial light (grounded shell)	.06
	1015817119	Speaker - 6", Dynamic	3.44
	1015717120	Cone and voice coil	2.39
	1011517121	Field coil	1.42
T4	1011317122	Transformer	1.50
	1014513948	Spring - Tension, condenser drive cord	.03
	10145139749	String - Condenser drive with spring	.07
	1012312486	Suppressor - 20M ohms	.24
	1013816917	Switch - Wave	.49
T3	10112121761	Transformer - Audio	1.51
T1	10133147181	Transformer - IF Input	1.18
T2	1013514148	Transformer - IF Output	1.07
	1015412446	Washer - Retaining, condenser drive shaft	.01

SEARS, ROEBUCK & CO.

MODEL 4619 "FACTORY No. 101,478"

ELECTRICAL SPECIFICATIONS

TUBES AND FUNCTIONS:
- 6A7 . . . . . . Oscillator-Translator
- 6D6 . . . . IF
- 75 . . . . AVC-Detector-AF
- 76 . . . . AF
- 2-48 . . . . Output

POWER SUPPLY:
All models available . . . . 32 Volts, DC; 46 Watts

FREQUENCY RANGES:
- Band "A" . . . . 540-1750 kc
- Band "F" . . . . 5475-16500 kc

ALIGNMENT FREQUENCIES:

	Ant.-Transl. Trimmer	Oscil. Trimmer	Oscil. Padder
Band "A"	1400 kc	1400 kc	600 kc
Band "F"	15 mc	-	Fixed

INTERMEDIATE FREQUENCY . . . . 465 kc

POWER OUTPUT:
- Type . . . . Push-Pull
- Undistorted . . . . 0.15 watts
- Maximum . . . . 0.32 watts

LOUD SPEAKER:
- Type . . . . Dynamic
- Size . . . . 6"
- Field Coil Resistance . . . . 175 ohms

OPERATING FEATURES:
- Fidelity Range . . . 50 - 5000 cycles
- Tone Control . . . . Variable
- Automatic Volume Control

CHASSIS FEATURES:
- Number IF stages . . . . One
- Antenna . . . . Conventional
- Push-Pull Output

GENERAL INFORMATION

POWER SUPPLY:

These models are to be operated from a 32 volt DC supply source only. The power supply cord plug must be inserted in its receptacle correctly. If, after waiting a full minute with the receiver turned on, there is no sound from the speaker turn the power cord plug half way around and re-insert it in its receptacle. When the correct position has been determined, as just described, mark the plug with a notch or by a similar method so that the plug can be correctly re-inserted should it be removed from its receptacle for any reason. No vibrator or generator is used, the 32 volt supply being applied directly to the tube elements.

THE NOISE SUPPRESSION EQUIPMENT:

Two condensers and a suppressor are supplied for eliminating the electrical interference created by the gasoline engine that drives the 32 volt lighting plant generator.

In single cylinder installations, cut the high tension wire going to the spark plug and screw the suppressor onto the two ends of the wire. In multi-cylinder installations, cut the high tension wire going to the center terminal of the distributor cap and screw the suppressor onto the two ends of the wire.

Connect one of the condensers between the two generator brushes. Ground the generator frame. Connect the other condenser from the battery side of the ignition coil to ground.

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to select the new IF frequency as close as possible to 465 kc.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

ALIGNMENT PROCEDURE

PRELIMINARY

Output meter connection . . . . Across speaker voice coil

Output meter reading to indicate 50 milliwatts output . . . . 0.45 volts

Approximate average sensitivity in microvolts for 50 milliwatts output . . See chart below

Dummy antenna value to be in series with generator output . . . . See chart below

Connection of generator output lead . . . . See chart below

Generator ground lead connection . . . . To receiver chassis

Generator modulation . . . . 30%, 400 cycles

Position of volume control . . . . .Fully clockwise

Position of tone control . . . . Fully clockwise

Position of dial pointer with condenser fully meshed . . To fall in center of small raised block which is about 1/4" to the left of the letters, "MC", which are at the low frequency end of the FOREIGN scale.

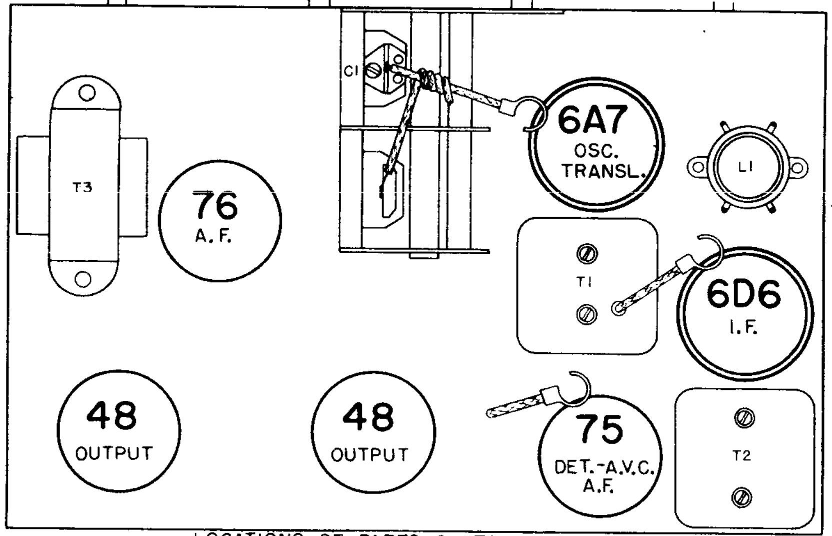
IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

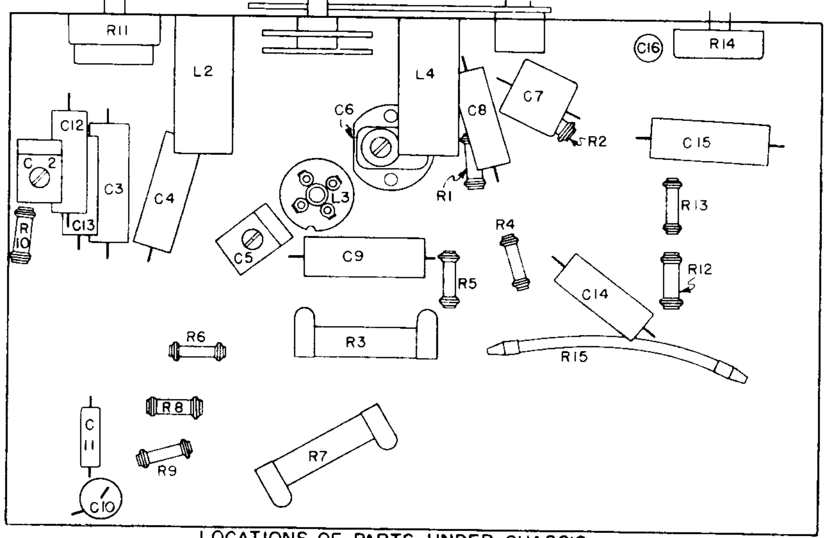
The figures given in the "Microvolts" column are only approximate.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	550 kc	465 kc	.1 mfd.	6A7 Grid	T2, T1	IF	35
"A"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C5, C1	Oscillator Translator	18
"A"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C6	Padder	12
"F"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C3	Translator	20
"F"	6 mc	6 mc	400 ohms	Ant. Term.	-	-	60



LOCATIONS OF PARTS ON TOP OF CHASSIS

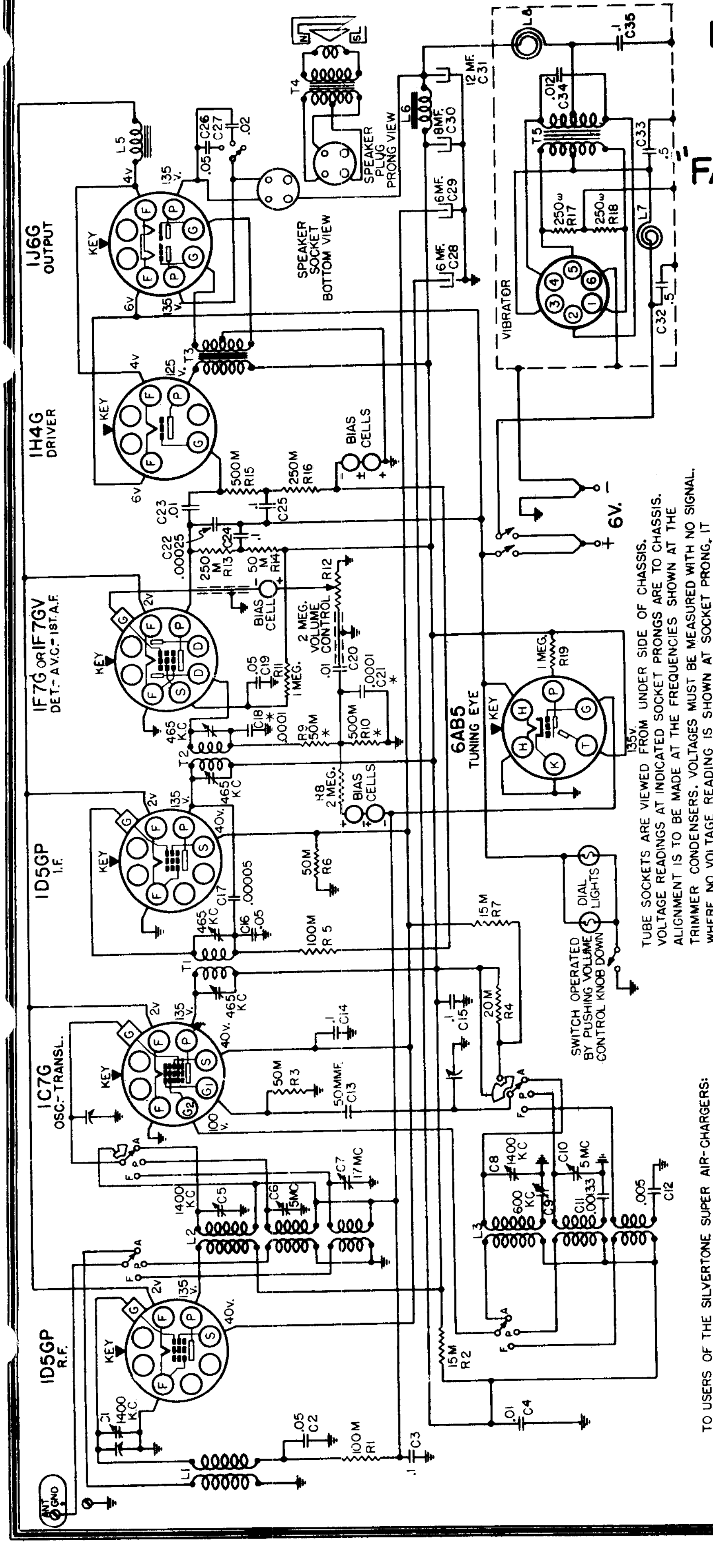


LOCATIONS OF PARTS UNDER CHASSIS.

SEARS, ROEBUCK & CO.

MODELS 4640, 4650, 4740 & 4750

"FACTORY Nº 101,476 UP"

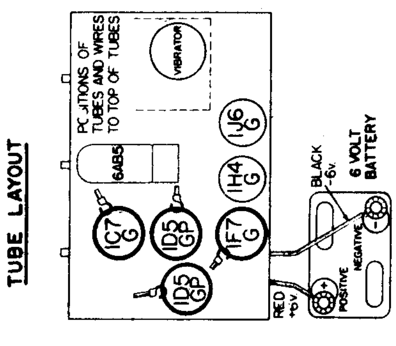


TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS. VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.
FIGURES AT CATHODES INDICATE CATHODE CURRENT IN MILLIAMPERES.
* - PART OF T2

TO USERS OF THE SILVERTONE SUPER AIR-CHARGERS: THIS RECEIVER USES A NEGATIVE GROUND.

I.F. 465 K.C.

TUBE LAYOUT



PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SELLING PRICE EACH
	10154164911	Arm - Band indicator, with link and lever assembly	.36
	10155147031	Board - Antenna connection	.09
	1015416450	Board - Bias cell mounting, dual	.12
	1015416647	Board - Bias cell mounting, dual	.13
	1015415613	Board - Bias cell mtg. single	.07
	1014616494	Bracket - Condenser drive shaft, front support	.02
	1015413407	Bushing - Rubber, chassis mtg.	.02
	1015516876	Cable - Tuning Eye, with socket	.45
	1014513974C	Cable - Condenser drive	.07
	1012715564	Cell - Bias	.16
	1015414310	Clip - "A" battery	.12
	1015412808	Clip - Grid	.01
	1015416462	Clip - Tuning Eye tube mounting	.05
	1015415503	Clip - Pulley retaining	.02
L1	1012814621	Coil - Antenna, broadcast	.46
L3	1012816453	Coil - Oscillator	.85
L2	1012816442	Coil - Translator	.86
L5	1011416556	Coil - "A" choke	.75
L8	1013011695	Coil - RF choke	.13
L6	1011416107	Coil - "B" choke	.80
L7	10130132503	Coil - Choke	.45
	1011616456	Condenser - Variable	2.99
C28, C29, C30, C31	1012016473	Condenser - Electrolytic, dry	1.09
C5, C6, C7	1011716446	Condenser - Trimmer, triple, antenna	.31
C8, C10	1011716909	Condenser - Trimmer, dual, oscillator	.22
C9	1011714433	Condenser - Padder	.29
C32, C33		Condenser - .5 mfd. 200 volts	.29
C3, C14, C15, C24, C25, C35		Condenser - .1 mfd. 200 volts	.16
C2, C16, C19		Condenser - .05 mfd. 200 volts	.13
C26		Condenser - .05 mfd. 400 volts	.13
C27		Condenser - .02 mfd. 400 volts	.13
C34		Condenser - .012 mfd. 1000 volts	.11
C4		Condenser - .01 mfd. 200 volts	.13
C20, C23		Condenser - .01 mfd. 400 volts	.08
C12		Condenser - .005 mfd. mica	.25
C11	1011916531	Condenser - .00133 mfd. mica	.13
C22		Condenser - .00025 mfd. mica	.09
C13, C17		Condenser - .00005 mfd. mica	.07
R12	1012416445	Control - Volume with switch	.80
	1014016506	Dial - Station selector	.95
	1014016507	Dial - Background	.56
	10145165061	Drum - Condenser drive	.46
	1014416745	Escutcheon - Dial	.60
	1015416490	Gasket - Dial	.02
	1015410960	Grommet - Rubber, condenser mounting, vibrator unit assembly mounting	.02
	1013916423	Knob - Tuning	.12
	1013916613	Knob - Volume	.06
	1013916546	Knob - Wave switch	.09
	1013916504	Knob - Tone control	.14
	101492288	Lamp - Dial	.12
	10155164711	Lead - Battery, red, with clip	.44
	10155164721	Lead - Battery, black, with clip	.44
	1015916651	Leaflet - Instruction	.30
	1015915947	Log - Station	.01
	1014314400	Nut - Escutcheon mounting	.01
	1014616511	Plate - Condenser drive shaft mtg.	.11
	1014116513	Pointer - Dial	.06
	1015416514	Pulley	.11
R8		Resistor - 2 megohms, 1/3 watt	.15
R11, R19		Resistor - 1 megohm, 1/3 watt	.15
R15		Resistor - 500M ohms, 1/3 watt	.15
R13, R16		Resistor - 250M ohms, 1/3 watt	.15
R1, R5		Resistor - 100M ohms, 1/3 watt	.15
R3, R6, R14		Resistor - 50M ohms, 1/3 watt	.15
R4		Resistor - 20M ohms, 1/3 watt	.15
R2, R7		Resistor - 15M ohms, 1/3 watt	.15
R17, R18		Resistor - 250 ohms, 1/3 watt	.16
	1014616520	Shaft - Condenser drive, dual ratio	1.13
	1015315648	Shield - Tube	.11
	1015315650	Shield - Tube, base	.02
	101168315	Socket - 4 prong, Speaker	.06
	101168092	Socket - 6 prong, Vibrator	.07
	1011812757	Socket - 7 prong, Octal	.14
	1011613173	Socket - 8 prong, Octal	.14
	1015816671	Speaker - 6", P.M.	4.34
T4	1011316771	Transformer	2.28
	1015816786	Speaker - 8", P.M.	5.05
T4	1011316786	Transformer	2.28
	1014515720	Spring - Tension, condenser drive cable	.02
	1015416521	Stud - Pulley mounting, upper right hand	.02
	1015416522	Stud - Pulley mounting, upper L.H. and lower R.H.	.02
	1013716525	Switch - Wave	.89
	1013816444	Switch - Tone	.40
T1	10133164741	Transformer - IF Input	1.06
T2	1013516460	Transformer - IF Output	1.31
T3	1011316555	Transformer - Audio Input	1.12
T5	10151164611	Transformer - Power	1.97
	1015114840	Vibrator	2.39

SEARS, ROEBUCK & CO.
MODELS 4640, 4650, 4740 & 4750
"FACTORY № 101,476 UP"

ELECTRICAL SPECIFICATIONS

TUBES AND FUNCTIONS:
1D5GP . . . . RF
1C7G . . . . . Oscillator-Translator
1D5GP . . . . IF
1F7G . . . . . Detector-AVC-First AF
1H4G . . . . Driver
1J6G . . . . Output
6AB5 . . . . Tuning Eye

POWER SUPPLY:
Six volt storage battery
Battery drain . . . . . 1.35 amperes

FREQUENCY RANGES:
Band "A" . . . . 540-1760 kc
Band "P" . . . . 1760-6200 kc
Band "F" . . . . 5975-18,500 kc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant.-Transl. Trimmer	Padder
Band "A"	1400 kc	1400 kc	600 kc
Band "P"	5 mc	5 mc	Fixed
Band "F"	-	15 mc	Fixed

POWER OUTPUT:
Type . . . . Class "B"
Undistorted . . . . 1.2 watts
Maximum . . . . 1.6 watts

LOUD SPEAKER:
Type . . . . PM Dynamic
Size . . . . 6" and 8"

OPERATING FEATURES:
Tone Control . . . . . Three position
Automatic Volume Control
Dial Flash-O-Lite

CHASSIS FEATURES:
Number RF stages . . . One on Band "A" only.
Number IF stages . . . . One
Number condenser in gang . . . Three
Antenna . . . . Conventional
Synchronous Vibrator-Rectifier

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 980 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to select the new IF frequency as close to 465 kc as possible.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

IMPORTANT ALIGNMENT NOTES

The variable should be rocked back and forth a degree or two while making the adjustment, where indicated by the word, "Rock", in the alignment chart.

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

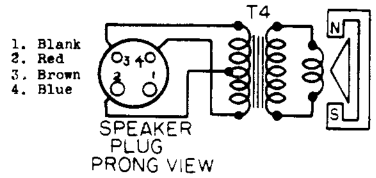
Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

ALIGNMENT PROCEDURE

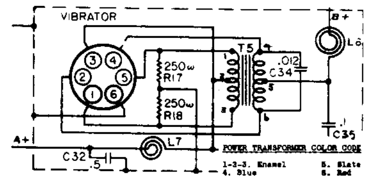
PRELIMINARY:

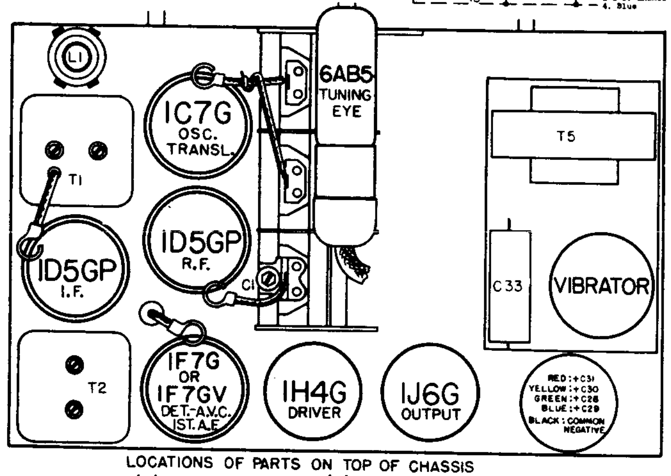
Output meter connection . . . . Across speaker voice coil
Output meter reading to indicate 50 milliwatts . . . . 0.39 volts
Generator ground lead connection . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . See chart below
Connection of generator output lead . . . . See chart below
Generator modulation . . . . 30%, 400 cycles
Position of volume control . . . . All the way on
Position of tone control . . . . Fully clockwise
Position of dial pointer with variable fully closed . . . . To fall on end line at low frequency end of the AMERICAN scale.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"P"	1.8 mc	465 kc	.1 mfd.	1C7G Grid	T2, T1	IF	75
"A"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C8, C5, C1	Osc.-Transl. Antenna	15
"A"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C9	Padder	15
"P"	5 mc	5 mc	400 ohms	Ant. Term.	C10, C6	Osc.-Transl.	55
"P"	1.8 mc	1.8 mc	400 ohms	Ant. Term.	-	-	125
"F"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C7	Translator	85
"F"	6 mc	6 mc	400 ohms	Ant. Term.	-	-	200

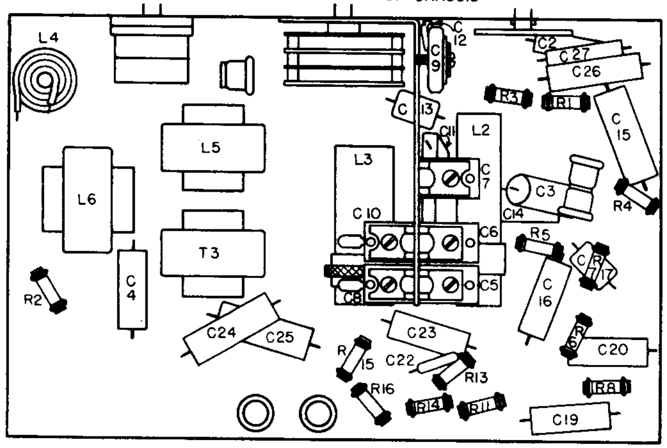


SPEAKER PLUG PRONG VIEW

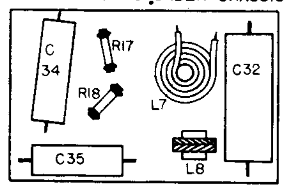




LOCATIONS OF PARTS ON TOP OF CHASSIS



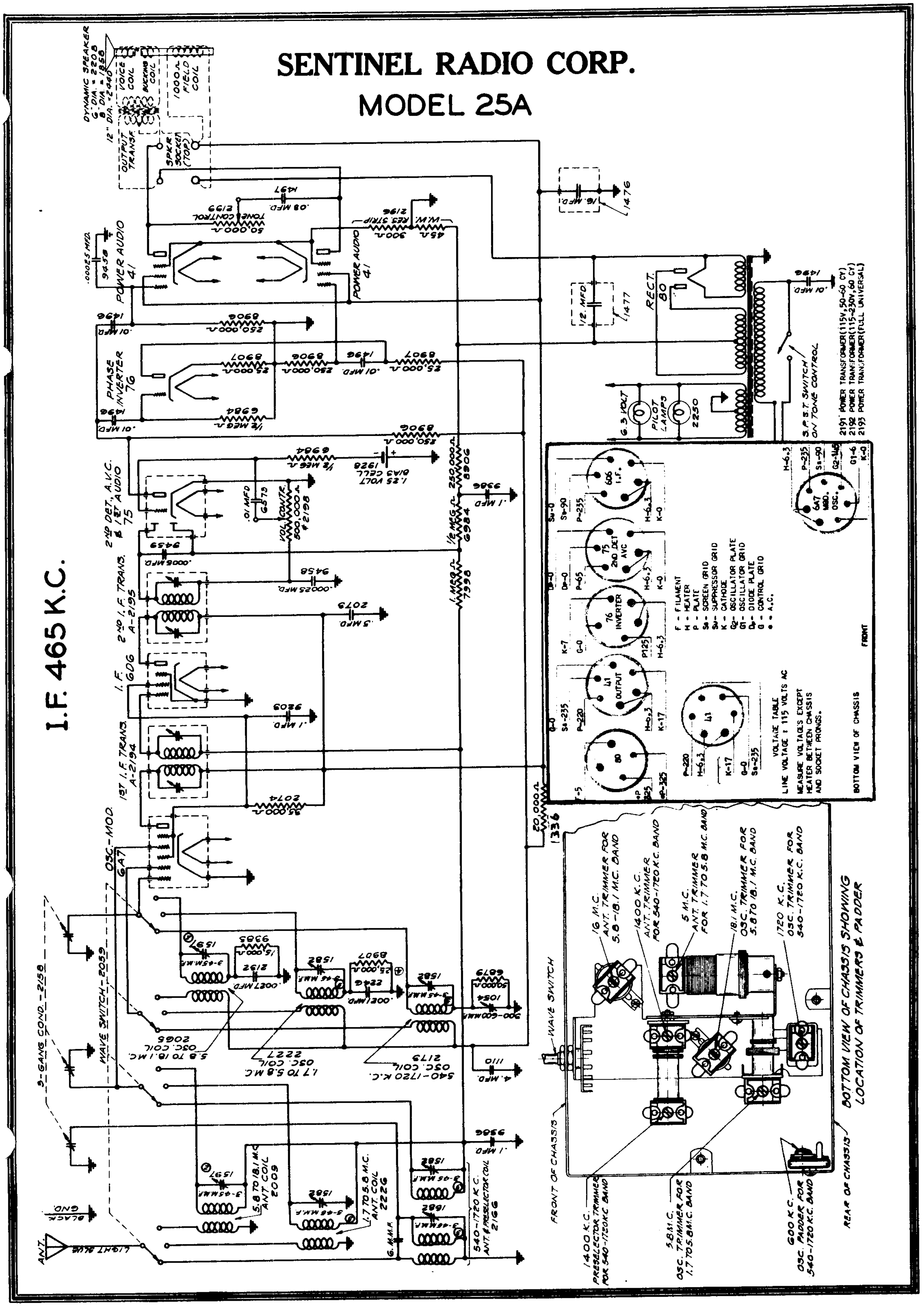
LOCATIONS OF PARTS UNDER CHASSIS



LOCATION OF PARTS UNDER POWER SUPPLY UNIT

SENTINEL RADIO CORP.

MODEL 25A



SENTINEL RADIO CORP.

MODEL 25A

ALIGNMENT PROCEDURE:

Realignment of this receiver should never be necessary unless one of the oscillator, antenna or I.F. coils has been replaced. Lack of sensitivity, selectivity, and poor tone quality may be due to any one or a combination of causes, such as weak or defective tubes or speaker, inadequate or excessively long antenna, open or grounded bias resistor, bypass condenser, etc. Under no circumstances should realignment be attempted until all other possible sources have been first thoroughly investigated and have been definitely proven not to be the cause.

If an I.F. tube is replaced it is advisable to realign the I.F. amplifier, particularly if the replacement tube is one of a different manufacture than the one in the receiver. It is important when aligning to carefully follow the procedure in the order given, otherwise the receiver will lack sensitivity and the dial calibration will be incorrect.

IT IS IMPERATIVE THAT AN ACCURATELY CALIBRATED OSCILLATOR BE USED WITH SOME TYPE OF OUTPUT MEASURING DEVICE.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the test oscillator output to the control grid of the 6A7 modulator tube through a .02 Mfd. condenser. Leave the grid cap connected to the grid terminal of the tube, and connect the ground side of the test oscillator to the receiver ground.
2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).
3. Align the second intermediate transformer by turning one of the trimmer screws accessible through holes in the top of the transformer shields up and down (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screw of the same transformer for maximum sensitivity.
4. Adjust the first intermediate transformer in the same manner as the second I.F. transformer.

TO ALIGN THE VARIABLE CONDENSER:

It is important when aligning the gang condenser, padding and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The padding and trimmer condenser located underneath the chassis will be referred to by their functions as indicated on the circuit diagram.

1. Connect the high output side of the test oscillator through a 400 ohm resister to the receiver antenna lead and the low side to the set ground.
2. Place the band selector switch for operation on the 5.8 to 18.1 megacycle band, tune the receiver dial, and set the test oscillator frequency to EXACTLY 18 MEGACYCLES.

Rotate gang condenser so that plates are completely out of mesh and then tune in the 18 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 18 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST B ETAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 18 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 18 megacycles always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 18 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 17 megacycles. Then vary the receiver dial slightly to the right and left of 17 megacycles, and if the fundamental peak was used in aligning at 18 megacycles the test oscillator signal will be heard at approximately 17 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 18 megacycle oscillator trimmer must be properly readjusted.

3. With band selector switch set for operation on 5.8 to 18.1 megacycles band tune the receiver dial and set test oscillator frequency to EXACTLY 16 MEGACYCLES and adjust 16 megacycle antenna trimmer for maximum 16 megacycle signal sensitivity.
4. Place band selector switch for operation on 1.7 to 5.8 megacycle band, tune the receiver dial, and set test oscillator frequency to EXACTLY 5.8 MEGACYCLES.

Rotate gang condenser so that plates are completely out of mesh and BRING IN THE 5.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 5.8 MEGACYCLE OSCILLATOR TRIMMER.

5. Leave band selector switch for operation on 5.8 to 18.1 megacycle band, set test oscillator frequency and receiver dial to EXACTLY 5 MEGACYCLES. Adjust 5 megacycle antenna trimmer for maximum 5 megacycle signal sensitivity.
6. Replace the 400 ohm resistor in series with test oscillator lead with a 200 mmfd. condenser, place the band selector switch for operation on the 540 to 1720 kilocycle band, and set test oscillator frequency to EXACTLY 1720 KILOCYCLES.

Rotate gang condenser so that plates are completely out of mesh and BRING IN THE 1720 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT by adjusting 1720 kilocycle oscillator trimmer.

7. With band selector switch placed for operation on the 540 to 1720 kilocycle band set test oscillator frequency and receiver dial to exactly 1400 kilocycles. Adjust 1400 kilocycle preselector and antenna trimmers for maximum 1400 kilocycle signal sensitivity.
8. Leave band selector switch for operation on 540 to 1720 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator padder for maximum sensitivity.

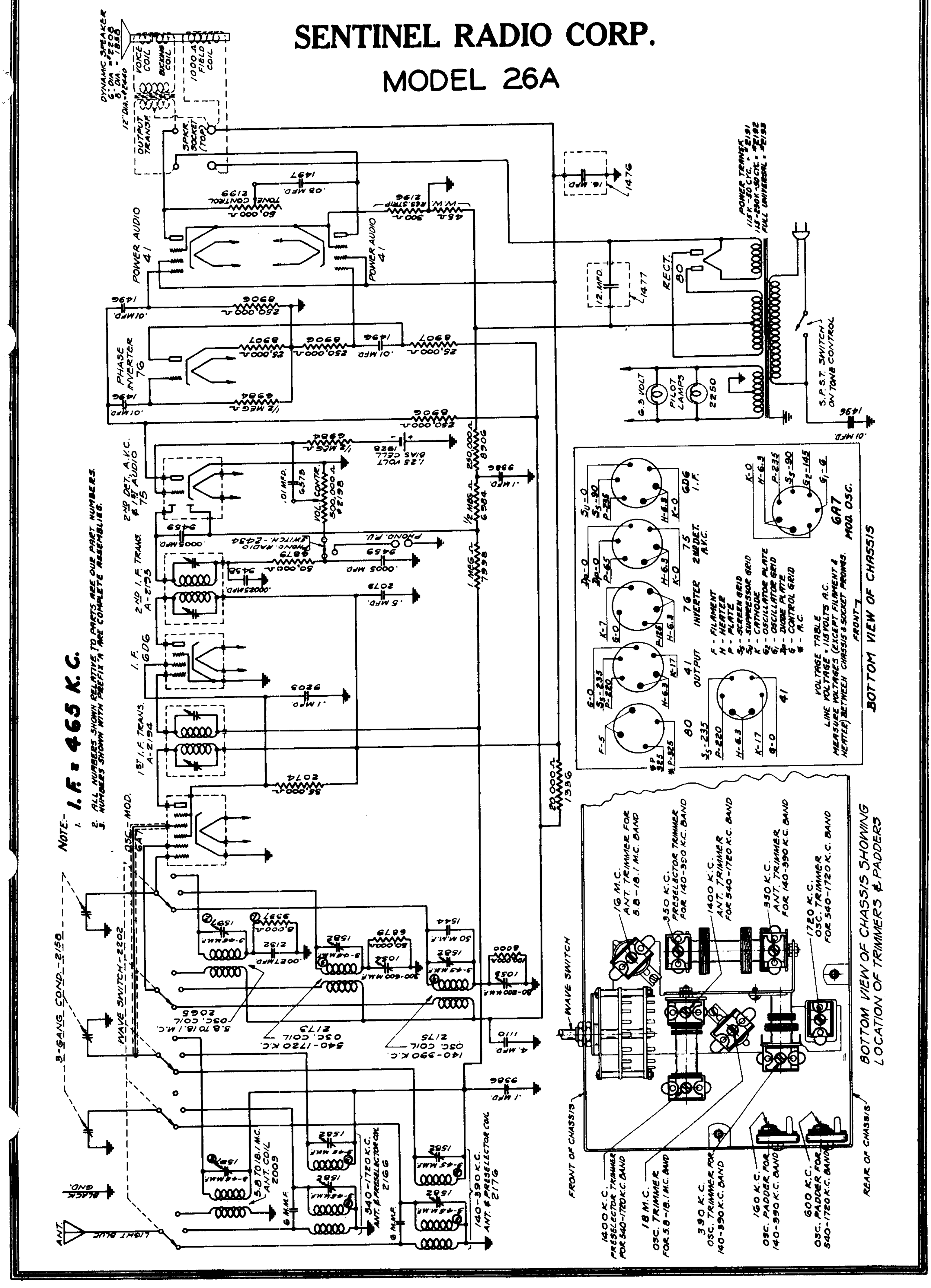
Part Number		List Price
2166	540-1720 K.C. Band Antenna Preselector Coil	$1.30
2173	540-1720 K.C. Band Oscillator Coil	.65
2226	1.7-5.8 M.C. Band Antenna Coil	.70
2227	1.7-5.8 M.C. Band Oscillator Coil	.55
2009	5.8-18.1 M. C. Band Antenna Coil	.60
2065	5.8-18.1 M.C. Band Oscillator Coil	.65
2194	First I.F. Transformer	1.65
2195	Second I.F. Transformer	1.65
2158	Three Gang Condenser	3.60
2111	Tuning Dial Ascembly Complete	2.25
2191	Power Transformer 115 Volts 50-60 Cycle	4.25
2192	Power Transformer 115-230 Volts 50-60 Cycle	4.90
2193	Power Transformer Full Universal	11.00
1476	16 Mfd. Wet Electrolytic Condenser	1.40
1477	12 Mfd. Wet Electrolytic Condenser	1.25
1110	4 Mfd. Dry Electrolytic Condenser	1.14
1054	Padding Condenser	.55
1582	Trimmer Condenser	.21
1597	Trimmer Condenser	.21
2198	Volume Control	.85
2199	Tone Control and Off and On Switch	1.24
2059	Wave Switch	.75
1928	Bias Cell	.22
2047	Bias Cell Mounting Strip	.11

Part Number		List Price
2196	Wire Wound Resistor Strip	.30
7998	1 Meg Ohm 1/3 Watt Resistor	.19
6984	500,000 Ohm 1/3 Watt Resistor	.19
8906	250,000 Ohm 1/3 Watt Resistor	.19
6879	50,000 Ohm 1/3 Watt Resistor	.19
1336	20,000 Ohm 1/2 Watt Resistaor	.19
2074	35,000 Ohm 1 Watt Resistor	.20
9385	15,000 Ohm 1/3 Watt Resistor	.19
9459	.0005 Mfd. Mica Condenser	.21
9458	.00025 Mfd. Mica Condenser	.21
2132	.0027 Mfd. Mica Condenser	.21
2246	.0021 Mfd. Mica Condenser	.28
1497	.03 Mfd. 600 Volt Condenser	.19
6573	.01 Mfd. 200 Volt Condenser	.17
1496	.01 Mfd. 600 Volt Condenser	.18
9386	.1 Mfd. 200 Volt Condenser	.19
9203	.1 Mfd. 400 Volt Condenser	.20
2073	.5 Mfd. 400 Volt Condenser	.56
2208	Six Inch Dynamic Speaker	5.00
1858	Eight Inch Dynamic Speaker	9.25
2440	Twelve Inch Dynamic Speaker	10.75
1739	13/16" Knob	.22
1740	15/16" Knob	.22
1794	15/16" Knob With White Line	.25

Prices Are Subject to Change Without Notice

SENTINEL RADIO CORP.

MODEL 26A



SENTINEL RADIO CORP.

MODEL 26A

ALIGNMENT PROCEDURE:

Realignment of this receiver should never be necessary unless one of the oscillator, antenna, or I.F. coils has been replaced. Lack of sensitivity, selectivity, and poor tone quality may be due to any one or a combination of causes, such as weak or defective tubes or speaker, inadequate or excessively long antenna, open or grounded bias resistor, bypass condenser, etc. Under no circumstances should realignment be attempted until all other possible sources have been first thoroughly investigated and have been definitely proven not to be the cause.

If an I.F. tube is replaced it is advisable to realign the I.F. amplifier, particularly if the replacement tube is one of a different manufacture than the one in the receiver. It is important when aligning to carefully follow the procedure in the order given, otherwise the receiver will lack sensitivity and the dial calibration will be incorrect.

IT IS IMPERATIVE THAT AN ACCURATELY CALIBRATED OSCILLATOR BE USED WITH SOME TYPE OF OUTPUT MEASURING DEVICE.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the test oscillator output to the control grid of the 6A7 modulator tube through a .02 Mfd. condenser. Leave the grid cap connected to the grid terminal of the tube, and connect the ground side of the test oscillator to the receiver ground.
2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).
3. Align the second intermediate transformer by turning one of the trimmer screws accessible through holes in the top of the transformer shields up and down (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screw of the same transformer for maximum sensitivity.
4. Adjust the first intermediate transformer in the same manner as the second I.F. transformer.

TO ALIGN THE VARIABLE CONDENSER:

It is important when aligning the gang condenser, padding and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The padding and trimmer condensers located underneath the chassis will be referred to by their functions as indicated on the circuit diagram.

1. Connect the high output side of the test oscillator through a 400 ohm resistor to the receiver antenna lead and the low side to the set ground.
2. Place the band selector switch for operation on the 5.8 to 18.1 megacycle band, tune the receiver dial, and set the test oscillator frequency to EXACTLY 18 MEGACYCLES.

Rotate gang condenser so that plates are completely out of mesh and then tune in the 18 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 18 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 18 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 18 megacycles always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 18 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 17 megacycles. Then vary the receiver dial slightly to the right and left of 17 megacycles, and if the fundamental peak was used in aligning at 18 megacycles the test oscillator signal will be heard at approximately 17 megacycles on the receiver dial. If it is not possible to receiver the signal, then the fundamental peak was not used and the 18 megacycle oscillator trimmer must be properly readjusted.

3. With the band selector switch set for operation on 5.8 to 18.1 megacycle band, tune the receiver dial and set test oscillator frequency to EXACTLY 16 MEGACYCLES and adjust 16 megacycle antenna trimmer for maximum 16 megacycle signal sensitivity.
4. Replace the 400 ohm resistor in series with test oscillator lead with a 200 mmfd. condenser, place the band selector switch for operation on the 540 to 1720 kilocycle band, and set the test oscillator frequency to EXACTLY 1720 KILOCYCLES.

Rotate gang condenser so that plates are completely out of mesh and BRING IN THE 1720 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY adjusting 1720 kilocycle oscillator trimmer.

5. With band selector switch placed for operation on the 540 to 1720 kilocycle band set test oscillator frequency and receiver dial to EXACTLY 1400 KILOCYCLES. Adjust 1400 kilocycle preselector and antenna trimmers for maximum 1400 kilocycle signal sensitivity.
6. Leave band selector switch for operation on 540 to 1720 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator padder for maximum sensitivity.
7. Place band selector switch for operation on the 390-140 kilocycle band, rotate gang condenser so plates are completely out of mesh, and set test oscillator frequency to EXACTLY 390 KILOCYCLES. Bring in 390 kilocycle signal to maximum output with 390 kilocycle oscillator trimmer.
8. With band selector switch for operation on 390-140 kilocycle band, tune receiver dial and set test oscillator frequency to EXACTLY 350 KILOCYCLES. Adjust 350 kilocycle antenna and preselector trimmers for maximum 350 kilocycle signal response.
9. Leave band selector switch for operation on the 390-140 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 160 kilocycles. Then while rocking gang condenser slightly to right and left adjust 160 kilocycle padding condenser for maximum sensitivity.

Part No.	Part Name	Description	List Price
1928	Cell	Bias Voltage	$ 0.22
2166	Coil	Antenna-Preselector 540-1720 K.C. Band	1.30
2173	Coil	Oscillator 540-1720 K.C. Band	.65
2176	Coil	Antenna-Preselector 140-390 K.C. Band	1.45
2175	Coil	Oscillator 140-390 K.C. Band	.75
2009	Coil	Antenna-Preselector 5.8-18.1 M.C. Band	.60
2065	Coil	Oscillator 5.8-18.1 M.C. Band	.65
2194	Coil Assembly	First I.F.	1.65
2195	Coil Assembly	Second I.F.	1.65
2158	Condenser	Tuning Three Gang	3.60
1054	Condenser	Padding 300-600 Mmfd.	.55
1053	Condenser	Padding 80-200 Mmfd.	.50
1582	Condenser	Trimmer 4-50 Mmfd.	.21
1597	Condenser	Trimmer 3-45 Mmfd.	.21
1476	Condenser	Wet Electrolytic 16 Mfd.	1.40
1477	Condenser	Wet Electrolytic 12 Mfd.	1.25
1110	Condenser	Dry Electrolytic 4 Mfd.	1.14
1497	Condenser	Tubular .03 Mfd. 600 Volts	.19
6573	Condenser	Tubular .01 Mfd. 200 Volts	.17
1496	Condenser	Tubular .01 Mfd. 600 Volts	.18
9386	Condenser	Tubular .01 Mfd. 200 Volts	.19
9203	Condenser	Tubular .1 Mfd. 400 Volts	.20
2073	Condenser	Tubular .5 Mfd. 400 Volts	.56
9459	Condenser	Moulded .0005 Mfd.	.21
9458	Condenser	Moulded .00025 Mfd.	.21
2132	Condenser	Moulded .0027 Mfd.	.21
1544	Condenser	Moulded .00005 Mfd.	.21

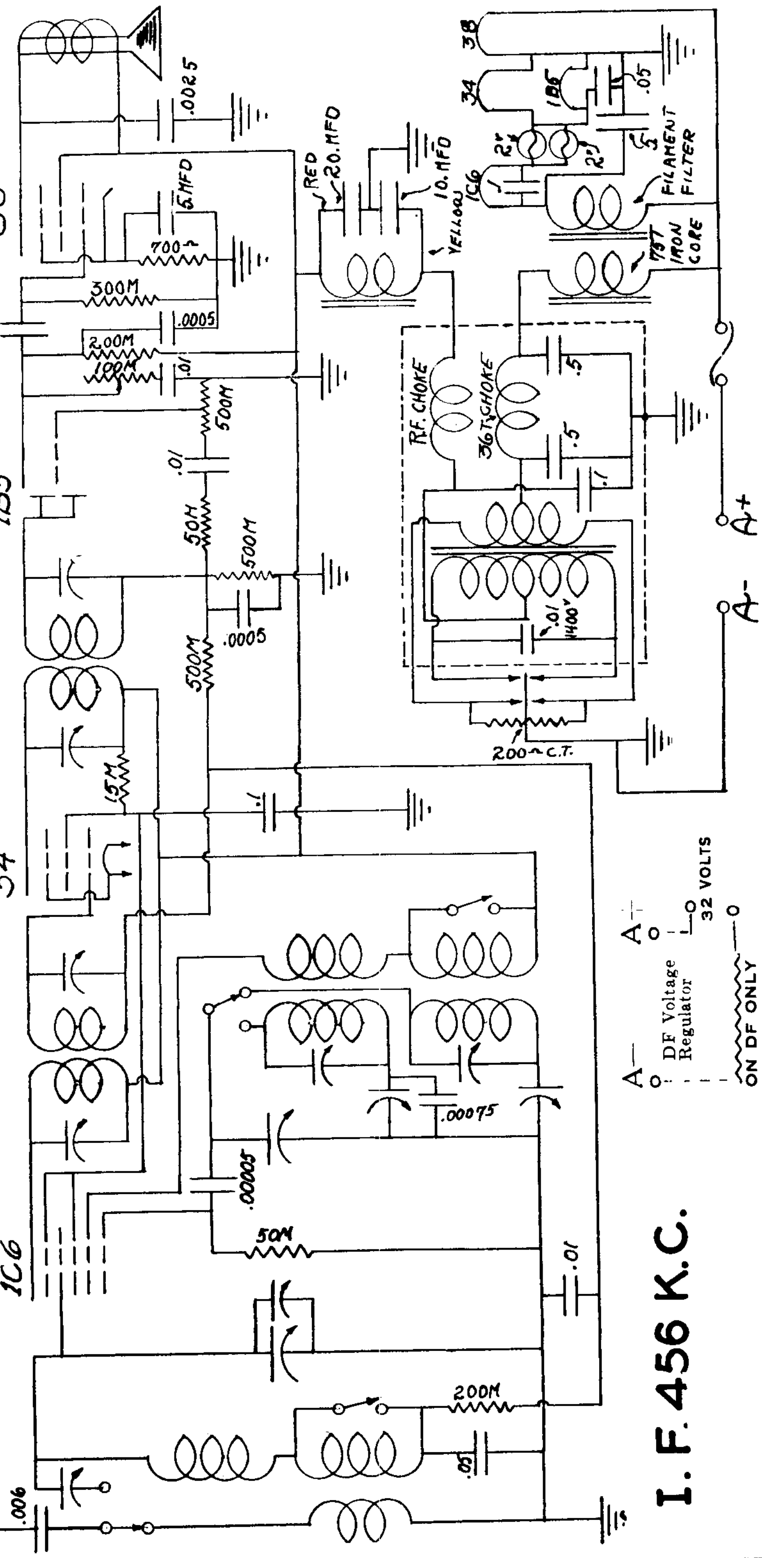
Prices are subject to change without notice.

Part No.	Part Name	Description	List Price
2113	Dial Assembly	Tuning Complete	2.25
2114	Dial Scale		.50
	Dial Glass	For above dial	.35
1739	Knob	Bakelite 13/16"	.22
1740	Knob	Bakelite 15/16" Plain	.22
1794	Knob	Bakelite 15/16" with white line	.25
6576	Phono Jacks		.14
9023	Pilot Light	6.3 Volts .150 Amperes	.19
2196	Resistor	Wire Wound Strip	.30
7998	Resistor	Carbon 1 Meg. Ohm 1/3 Watt	.19
6984	Resistor	Carbon 500,000 Ohm 1/3 Watt	.19
8906	Resistor	Carbon 250.000 Ohm 1/3 Watt	.19
8000	Resistor	Carbon 100,000 Ohm 1/3 Watt	.19
6879	Resistor	Carbon 50,000 Ohm 1/3 Watt	.19
8907	Resistor	Carbon 25,000 Ohm 1/3 Watt	.19
9337	Resistor	Carbon 8,000 Ohm 1/3 Watt	.19
1336	Resistor	Carbon 20,000 Ohm 1/2 Watt	.19
2074	Resistor	Carbon 35,000 Ohm 1 Watt	.20
2208	Speaker	Dynamic (Six Inch)	5.00
1858	Speaker	Dynamic (Eight Inch)	9.25
2440	Speaker	Dynamic (Twelve Inch)	10.75
2202	Switch	Band Selector	1.50
2434	Switch	Phono S.P.D.T.	.70
2199	Tone Control	With Off and On Switch	1.24
2191	Transformer	Power 115 Volts 50-60 Cycle	4.25
2192	Transformer	Power 115 & 230 Volts 50-60 Cycles	4.90
2193	Transformer	Power Full Universal	11.00
2198	Volume Control		.85

THE SIMPLEX RADIO CO.

MODELS DB & DF

SERIAL № 775,001 UP

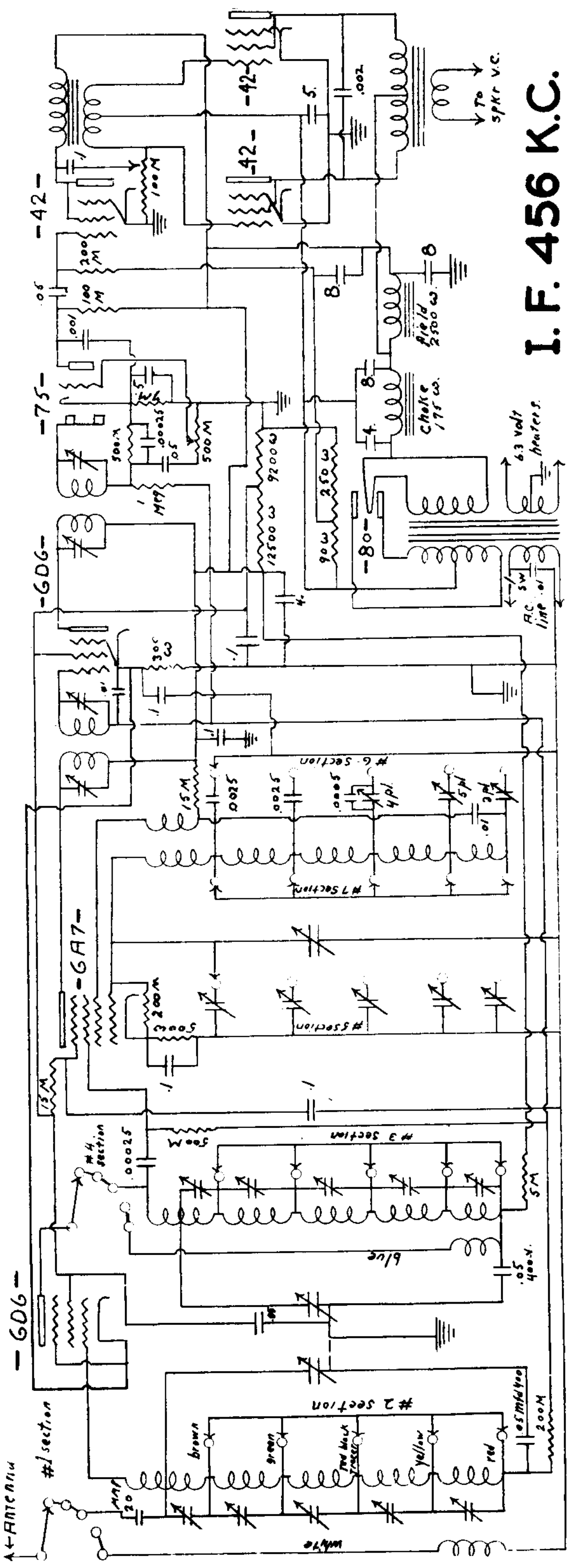


A- A+ 32 VOLTS
DF Voltage Regulator
ON DF ONLY

I. F. 456 K.C.

MODEL 8J ALL-WAVE

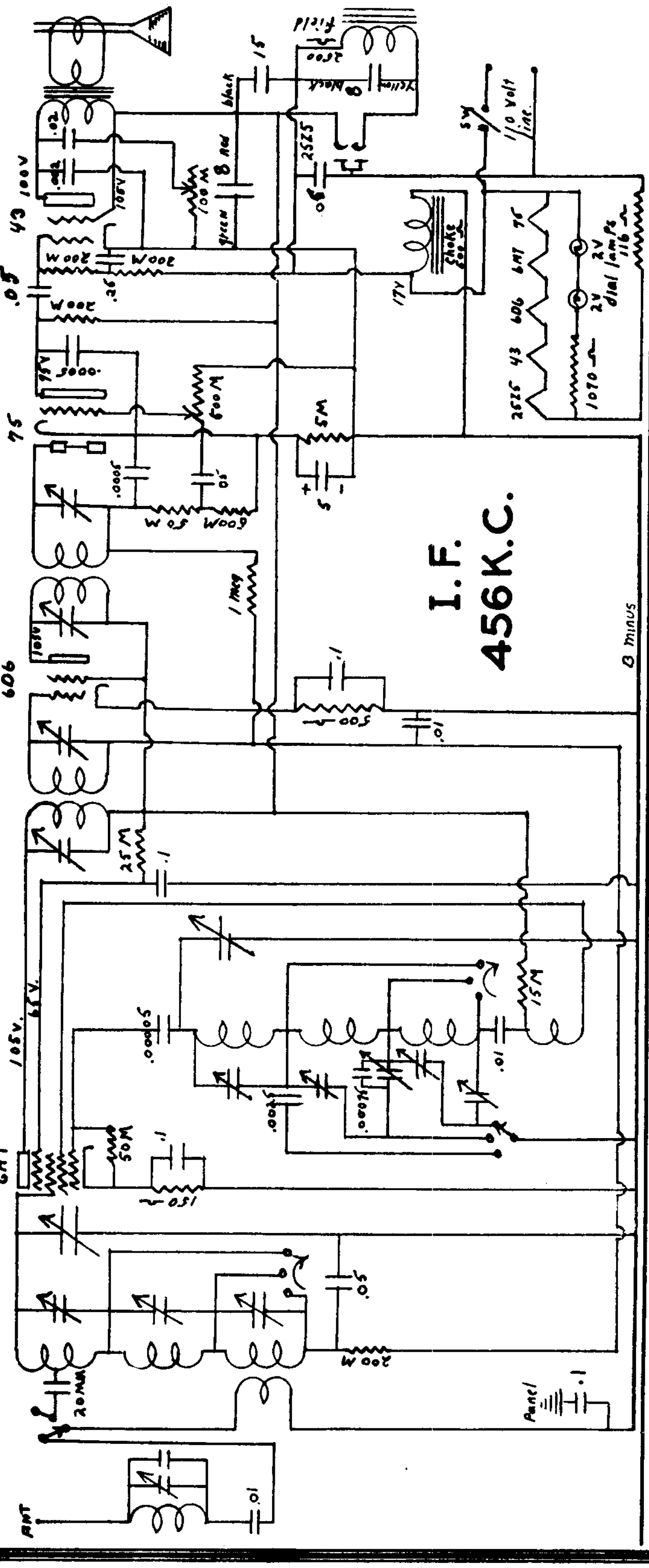
SERIAL № 765,001 UP



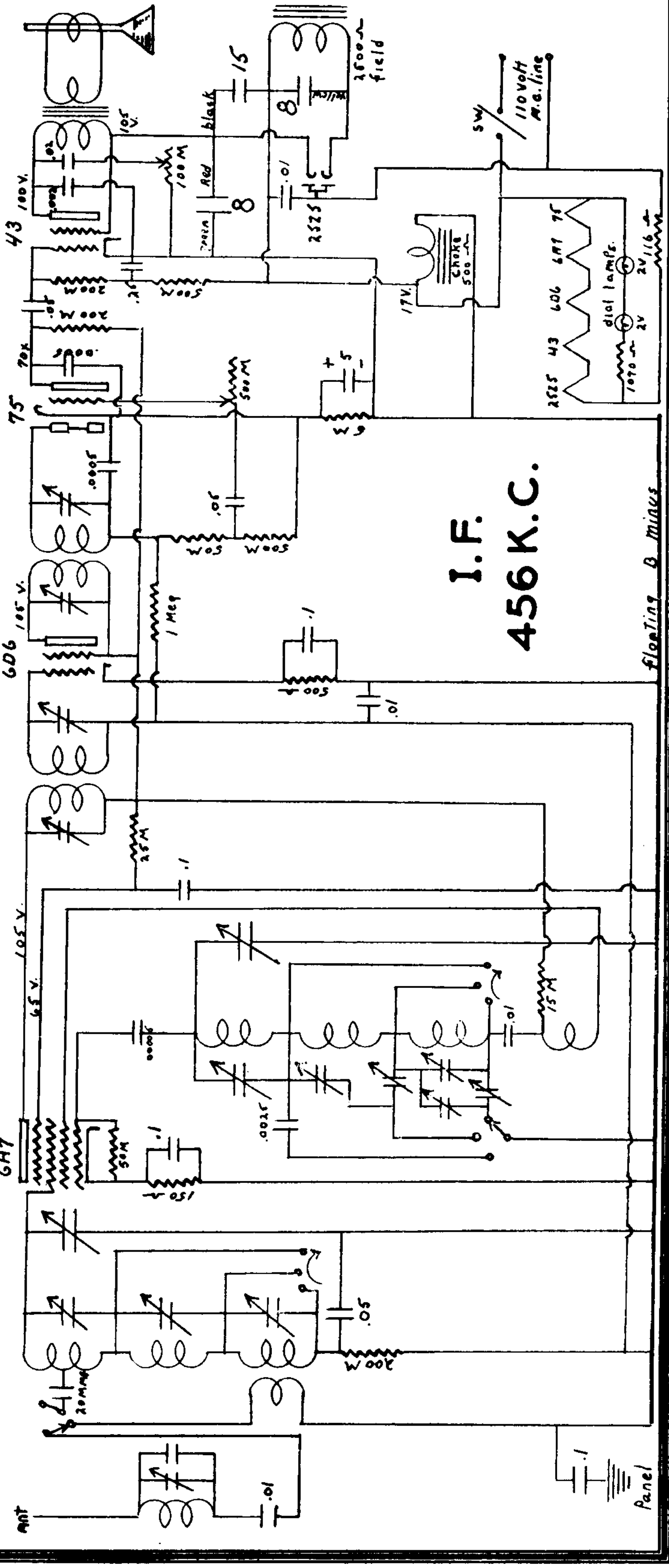
I. F. 456 K.C.

THE SIMPLEX RADIO CO.

MODELS PH & PE
SERIAL Nº 690,001 UP

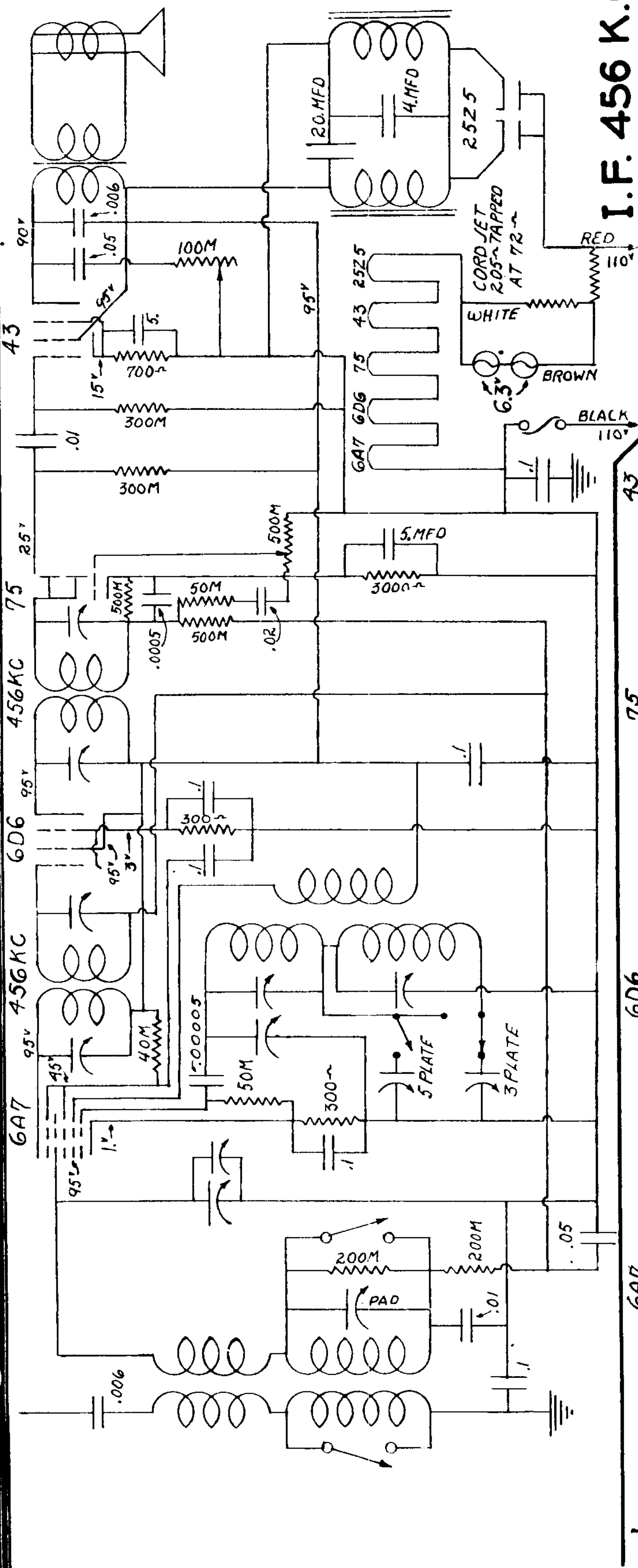


MODEL PHE
SERIAL Nº 690,001 UP

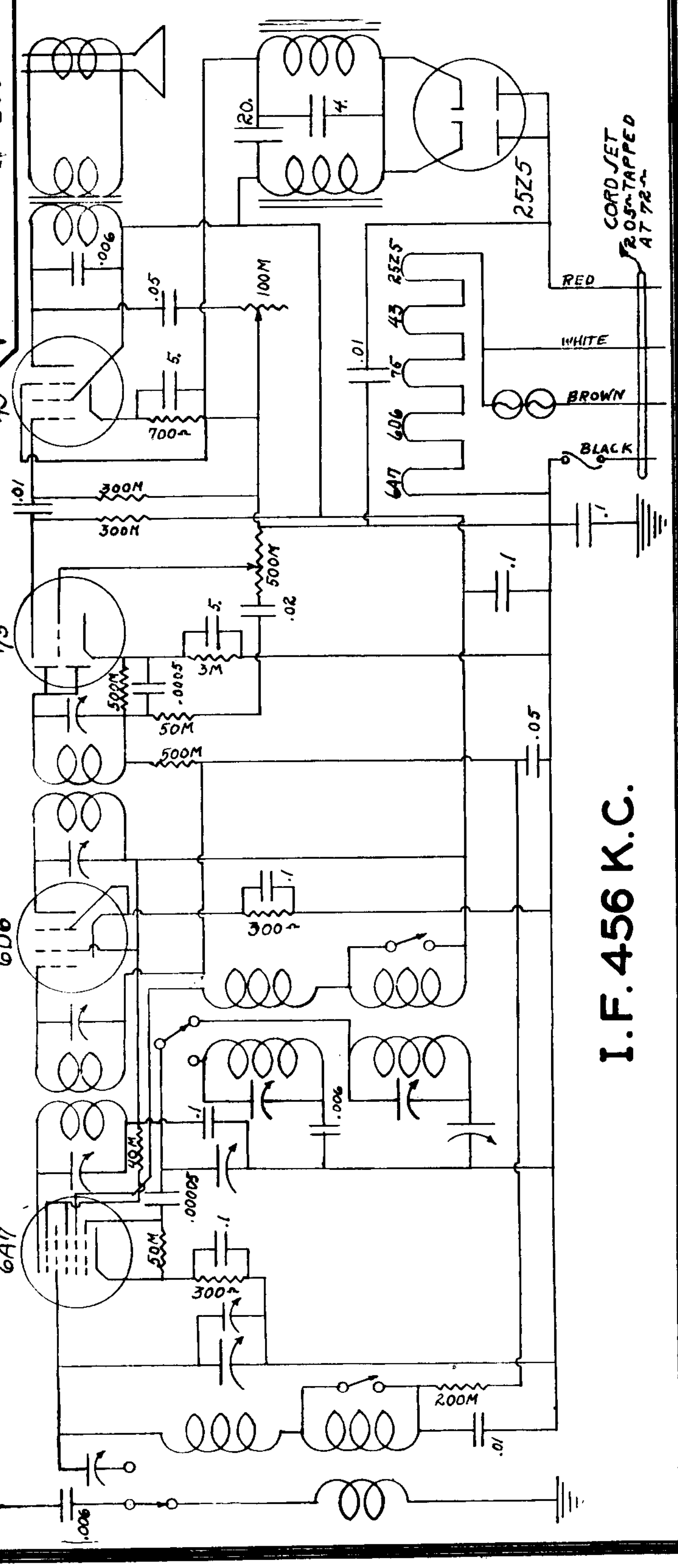


THE SIMPLEX RADIO CO.

MODEL 5DE
SERIAL № 780,001 UP

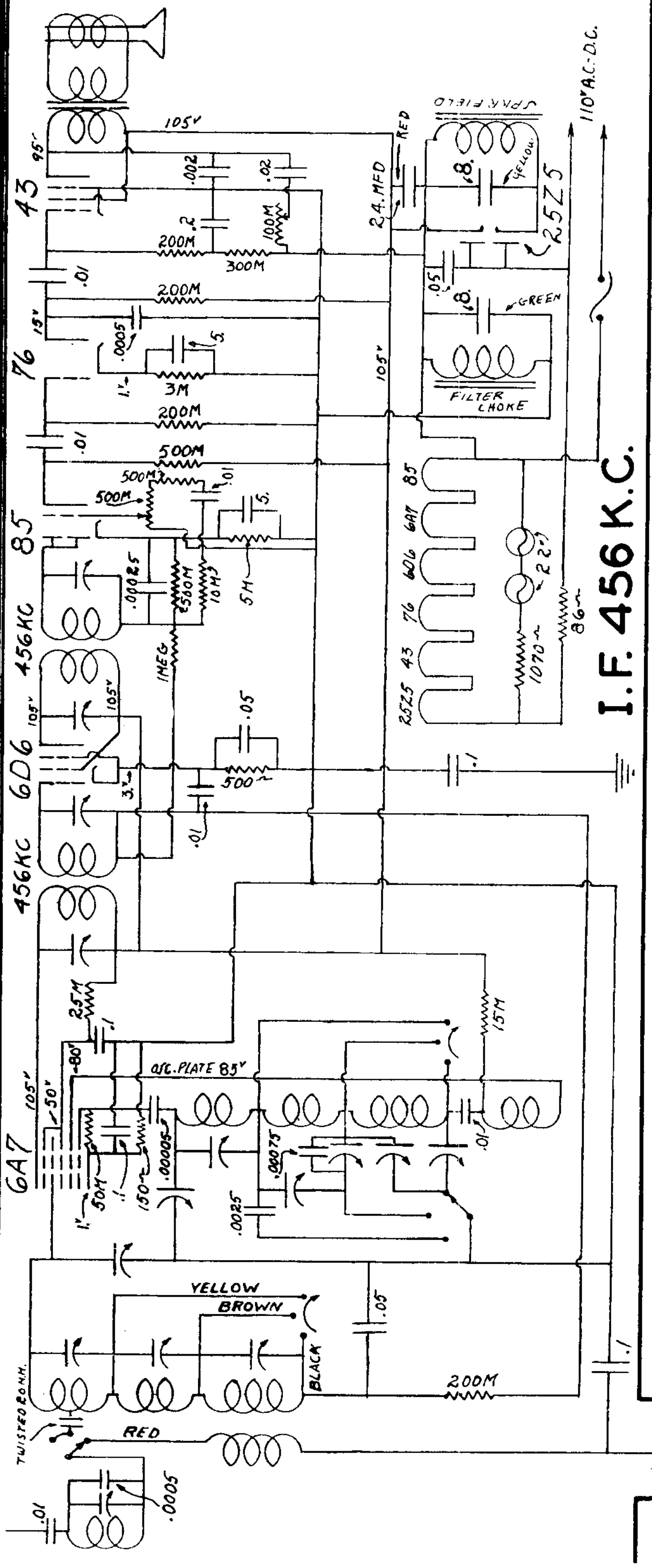


MODEL 5DK
SERIAL № 780,001 UP

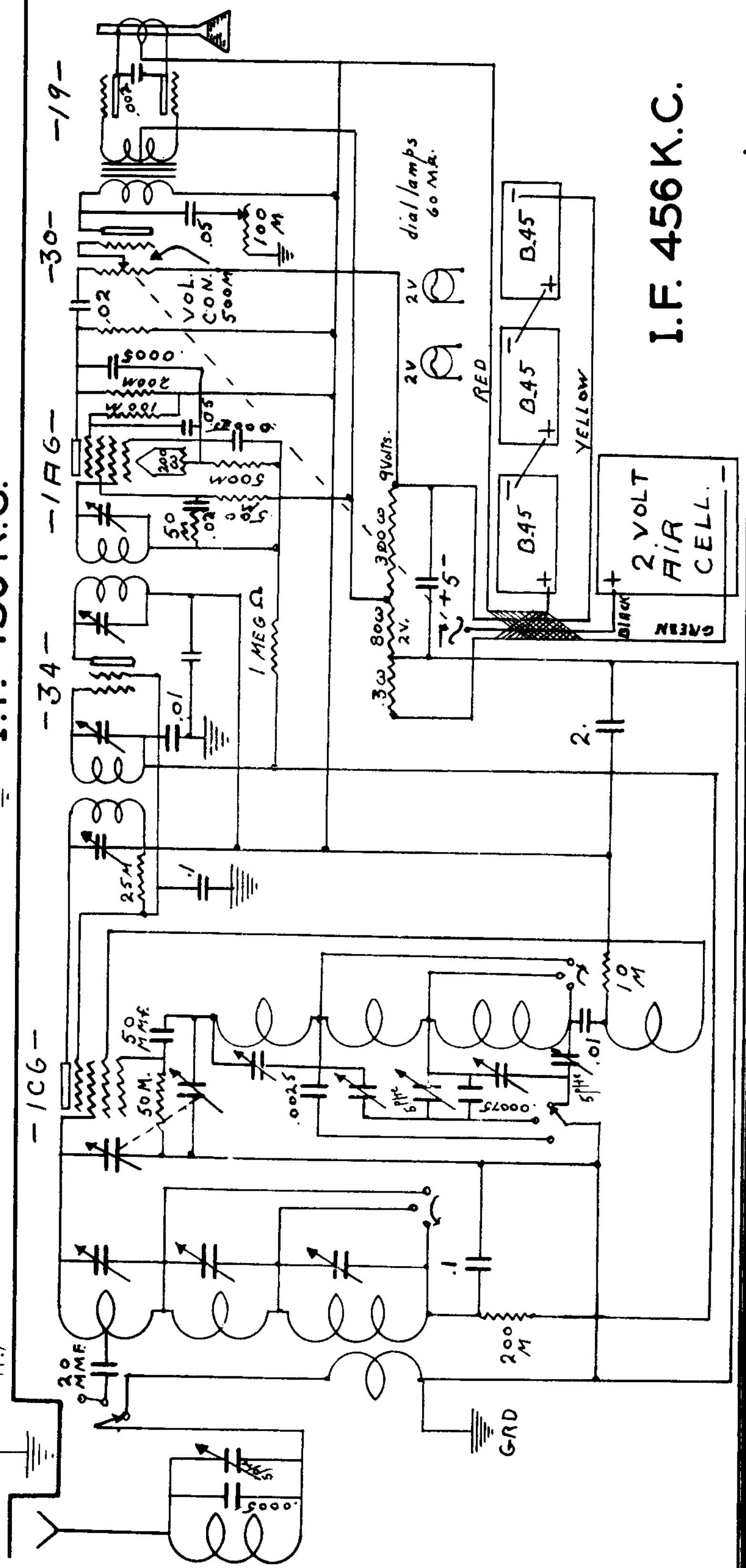


THE SIMPLEX RADIO CO.

MODEL 6GH
SERIAL № 691,001 UP



MODEL PA
SERIAL № 675,001 UP



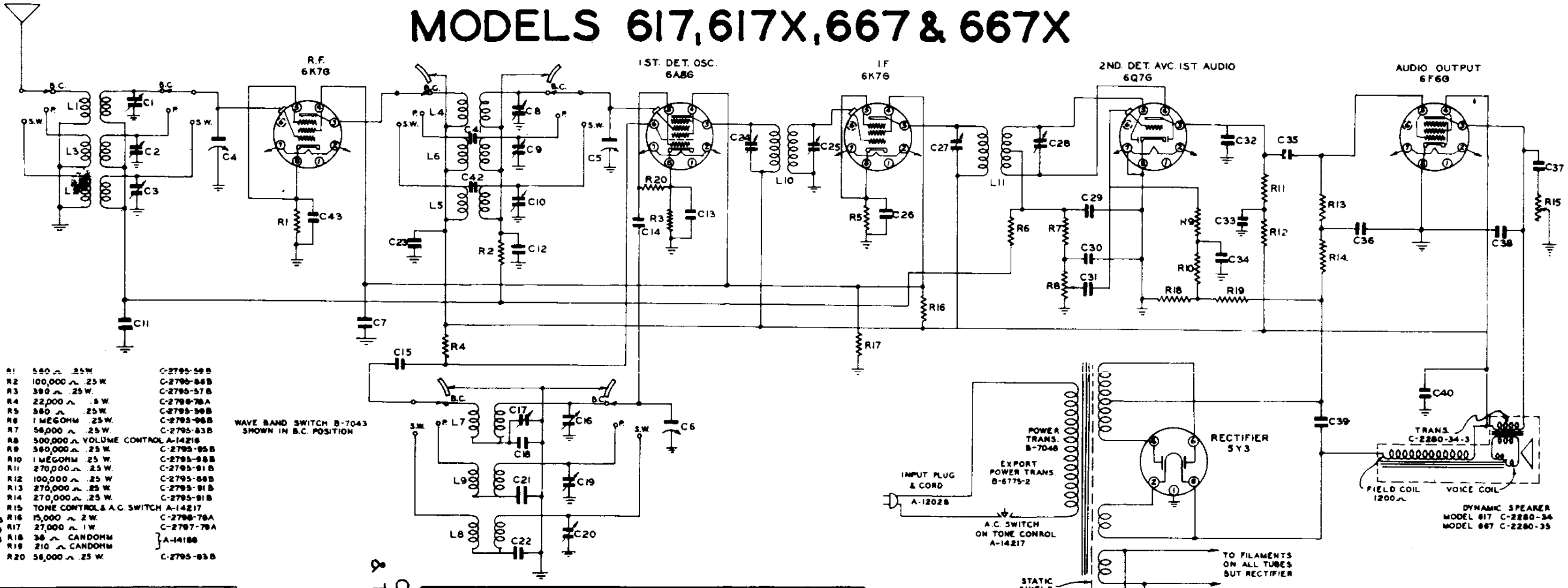
SPARKS-WITHINGTON COMPANY

MODELS 617, 617X, 667 & 667X

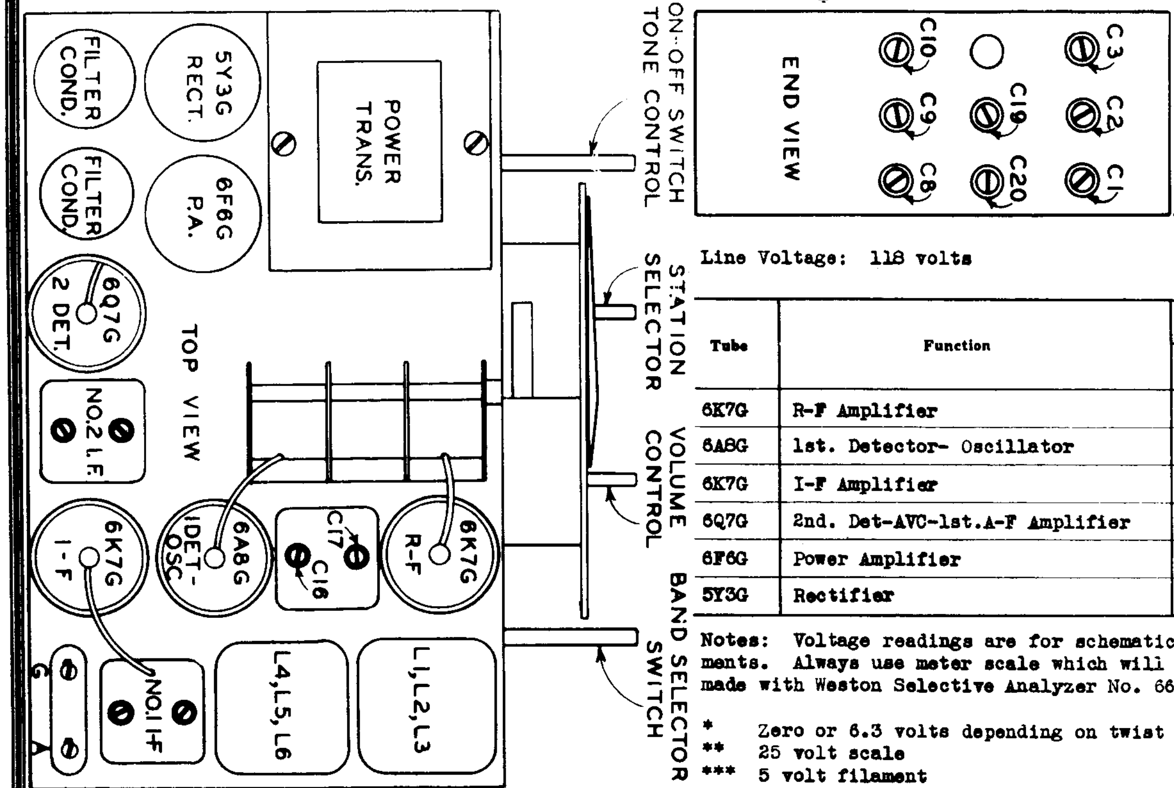
C1	ANT. B.C. TRIMMER	A-14199
C2	ANT. POL. TRIMMER	A-14199
C3	ANT. S.W. TRIMMER	A-14199
C4	VARIABLE CONDENSER	B-7044
C5	VARIABLE CONDENSER	B-7044
C6	VARIABLE CONDENSER	B-7044
C7	.1 MFD. 200 V.	C-720-60
C8	R.F. B.C. TRIMMER	A-14199-1
C9	R.F. POL. TRIMMER	A-14199-1
C10	R.F. S.W. TRIMMER	A-14199-1
C11	.05 MFD. 200 V.	C-720-52
C12	.05 MFD. 200 V.	C-720-52
C13	.05 MFD. 200 V.	C-720-52
C14	.00005 MFD. MOLDED	C-720-320
C15	.006 MFD. 600 V.	C-720-17
C16	OSC. B.C. TRIMMER	A-12444
C17	OSC. B.C. PADDER	A-12444
C18	.00035 MFD. MOLDED	C-720-329
C19	OSC. POL. TRIMMER	A-14200
C20	OSC. S.W. TRIMMER	A-14200
C21	.00165 MFD. MOLDED	C-720-335
C22	.0046 MFD. MOLDED	C-720-336
C23	.1 MFD. 400 V.	C-720-61
C24	NO. 1 I.F. TRIMMER	A-14205
C25	NO. 1 I.F. TRIMMER	A-14205
C26	.05 MFD. 200 V.	C-720-52
C27	NO. 2 I.F. TRIMMER	A-14205
C28	NO. 2 I.F. TRIMMER	A-14205
C29	.0001 MFD. MOLDED	C-720-325
C30	.0001 MFD. MOLDED	C-720-325
C31	.02 MFD. 200 V.	C-720-145
C32	.00025 MFD. MOLDED	C-720-319
C33	.1 MFD. 400 V.	C-720-61
C34	.1 MFD. 200 V.	C-720-60
C35	.05 MFD. 400 V.	C-720-57
C36	.1 MFD. 200 V.	C-720-60
C37	.03 MFD. 600 V.	C-720-12
C38	.003 MFD. 600 V.	C-720-7
C39	16 MFD. ELECT.	A-14073
C40	30 MFD. ELECT.	A-14072
C41	WIRE WOUND COND.	A-11954-3
C42	12 MMFD. COUPLER	A-10896
C43	.05 MFD. 200 V.	C-720-52

L1	B.C. ANT. COIL	A-14209
L2	S.W. ANT. COIL	A-14209
L3	POL. ANT. COIL	A-12060-3
L4	B.C. R.F. COIL	A-14210
L5	S.W. R.F. COIL	A-14210
L6	POL. R.F. COIL	A-12061-7
L7	B.C. OSC. COIL	A-14213
L8	S.W. OSC. COIL	A-14213
L9	POL. OSC. COIL	A-12059-3
L10	NO. 1 I.F. COIL	A-12064-9
L11	NO. 2 I.F. COIL	A-12989-3

R1	560 Ω .25 W.	C-2795-59B
R2	100,000 Ω .25 W.	C-2795-88B
R3	390 Ω .25 W.	C-2795-57B
R4	22,000 Ω .5 W.	C-2796-78A
R5	560 Ω .25 W.	C-2795-59B
R6	1 MEGOHM .25 W.	C-2795-98B
R7	56,000 Ω .25 W.	C-2795-83B
R8	500,000 Ω VOLUME CONTROL	A-14216
R9	560,000 Ω .25 W.	C-2795-95B
R10	1 MEGOHM .25 W.	C-2795-98B
R11	270,000 Ω .25 W.	C-2795-91B
R12	100,000 Ω .25 W.	C-2795-88B
R13	270,000 Ω .25 W.	C-2795-91B
R14	270,000 Ω .25 W.	C-2795-91B
R15	TONE CONTROL & A.C. SWITCH	A-14217
R16	15,000 Ω 2 W.	C-2798-76A
R17	27,000 Ω 1 W.	C-2797-79A
R18	36 Ω CANDOHM	A-14188
R19	210 Ω CANDOHM	A-14188
R20	56,000 Ω .25 W.	C-2795-83B



I.F. 345 K.C.



VOLTAGE CHART

Line Voltage: 118 volts

Position of Volume Control: Full with Antenna Disconnected

Position of Band Selector Switch: Broadcast

Tube	Function	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Grid Cap
		Voltage of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
6K7G	R-F Amplifier	0	*	260	120	0	-	*	0	0
6A8G	1st. Detector- Oscillator	0	*	260	125	0	245	*	0	0
6K7G	I-F Amplifier	0	*	255	115	0	-	*	0	0
6Q7G	2nd. Det-AVC-1st.A-F Amplifier	0	*	105	0	0	-	*	0	0
6F6G	Power Amplifier	0	*	320	320	-	2**	*	0	-
5Y3G	Rectifier	0	***	-	380	-	380	-	0	-

Notes: Voltage readings are for schematic diagram shown on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 2.

* Zero or 6.3 volts depending on twist of heater hookup wire.
** 25 volt scale
*** 5 volt filament

SPARKS-WITHINGTON COMPANY
MODELS 617, 617X, 667 & 667X

Foreword: The SPARTON Models 617-X and 667-X are equipped with an adjustable power transformer for operation on various line voltages as indicated under the transformer terminal cover plate.

Before attempting to realign the circuits, be sure that the transformer tap is correctly adjusted for the line voltage to be used.

The use of quality test equipment is highly recommended and a good test oscillator becomes a virtual necessity when aligning the all-wave or short-wave type of receiver. Due to the fact that the ear cannot distinguish small changes in sound intensity, an output meter is essential to the proper adjustment of the various condensers.

Unless otherwise specified, the adjusting of any condenser consists of turning the adjusting screw or nut to the right or left until the output meter registers the greatest deflection.

1. EQUIPMENT REQUIRED

A. Modulated test oscillator (crystal controlled or accurately calibrated) capable of generating frequencies from 345 to 18,000 kilocycles.

B. Output meter.

C. Part A-5732 adjusting wrench.

D. Dummy antennas, consisting of a 200 mmf. condenser and a 100 ohm non-inductive resistor.

2. STEP BY STEP PROCEDURE

NOTE: For proper alignment of these chassis, the procedure should be followed in the same order as given.

With the condenser plates fully meshed, the dial pointer should point to the first calibration marks immediately to the right of the band identification letters "P", "B" and "F". Any necessary correction may be made simply by moving the pointer on the shaft.

A. Alignment of Intermediate-Frequency Stages

(1) Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

(2) Turn the band selector switch to the broadcast "B" position and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

(3) Connect "antenna" of test oscillator to grid cap of Type 6A8G 1st detector-oscillator tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of Type 6F6G tube to ground. NOTE: It is advisable to read carefully the operating instructions included with the test oscillator.

(4) Tune test oscillator to obtain a signal of 345 KC.

(5) Turn the volume control of receiver on full and adjust I.F. condensers. NOTE: The intermediate frequency circuits are quite selective and care must be taken to insure proper adjustment. (See diagram for I.F. transformer and trimmer locations.)

(6) Connect "antenna" of test oscillator to "A" post on chassis and "ground" of test oscillator to "G" post.

B. Alignment of Broadcast Band

(1) Disconnect "antenna" lead of test oscillator from grid cap of first detector-oscillator tube and connect in series with a 200 mmf. condenser dummy antenna to the antenna terminal of the chassis.

(2) Tune test oscillator and receiver to a frequency of 1500 KC., and without disturbing the setting of the test oscillator or the station selector, adjust condensers C16, C8 and C1 in the order given.

(3) Tune test oscillator and receiver to 600 KC. and adjust condenser C17.

(4) Retune test oscillator and receiver to 1500 KC. and check the adjustments of condensers C16, C8 and C1.

(5) Calibration of the broadcast band should also be checked at 900 kilocycles and 600 kilocycles.

C. Alignment of Police Band

(1) Turn the band selector switch to the Police Band "P".

(2) Remove the 200 mmf. condenser from the "antenna" lead of test oscillator and replace with a 100 ohm non-inductive resistor dummy antenna.

(3) Tune test oscillator and receiver to 4.5 MC. and adjust condensers C19, C9 and C2.

NOTE: There are no other adjustments in this band.

D. Alignment of Foreign Band

(1) Turn the band selector switch to the Foreign Band "F".

(2) Tune test oscillator and receiver to 18 MC. and adjust condensers C20, C10 and C3.

(3) When making these adjustments, the station selector should be moved slightly back and forth in order to obtain maximum gain.

CAUTION: On this band care must be taken to adjust the condensers to the fundamental of the signal and not to the image. The image signal is equal to the fundamental minus twice the intermediate frequency of the receiver. A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condensers for that band have probably been adjusted to the image instead of the fundamental.

This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector to approximately 15,700 KC. If a strong signal is found approximately at this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 15,000 kilocycles would be 15,000 KC. minus twice 345 KC. or approximately 15,300 KC. Therefore a signal of this frequency may be found with the test oscillator generating a 15,000 KC. signal.

CAUTION: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.

STROMBERG CARLSON TELEPHONE MFG. CO.

MODELS 240-H, 240-HB, 240-L, 240-LB, 240-M, 240-MB, 240-P, 240-PB, 240-R, 240-RB, 240-S, 240-SB, 240-W & 240-WB

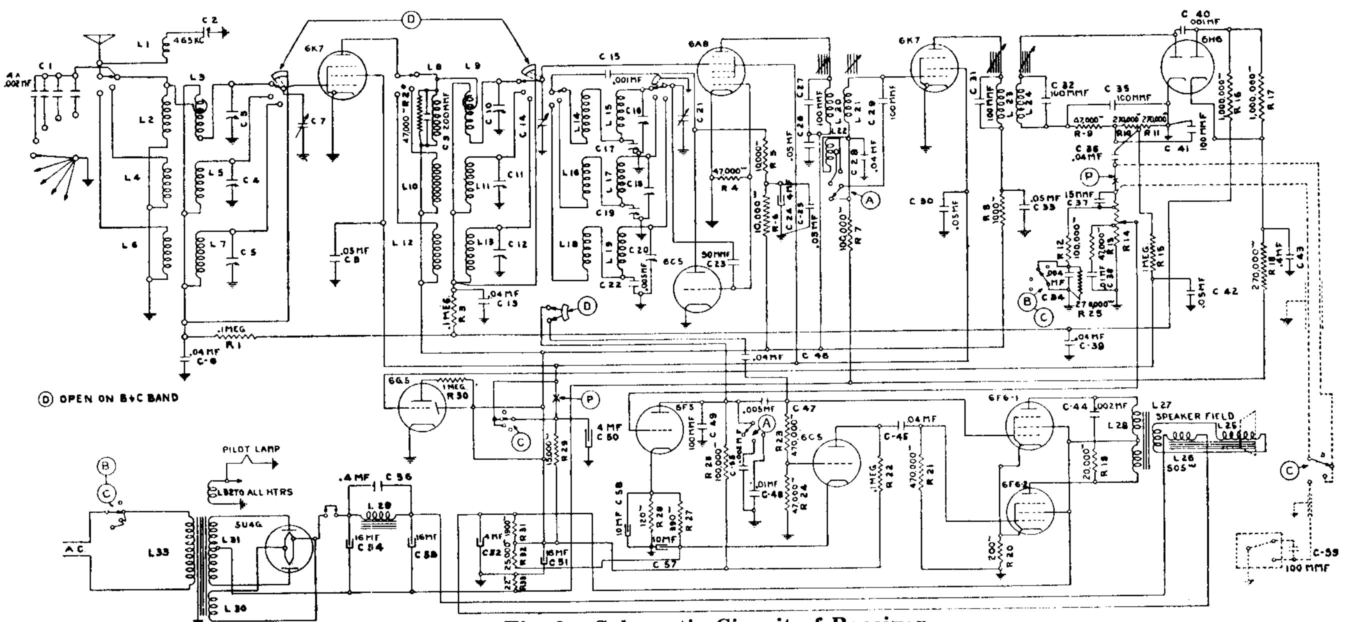


Fig. 3. Schematic Circuit of Receiver.

I.F. 465 K.C.

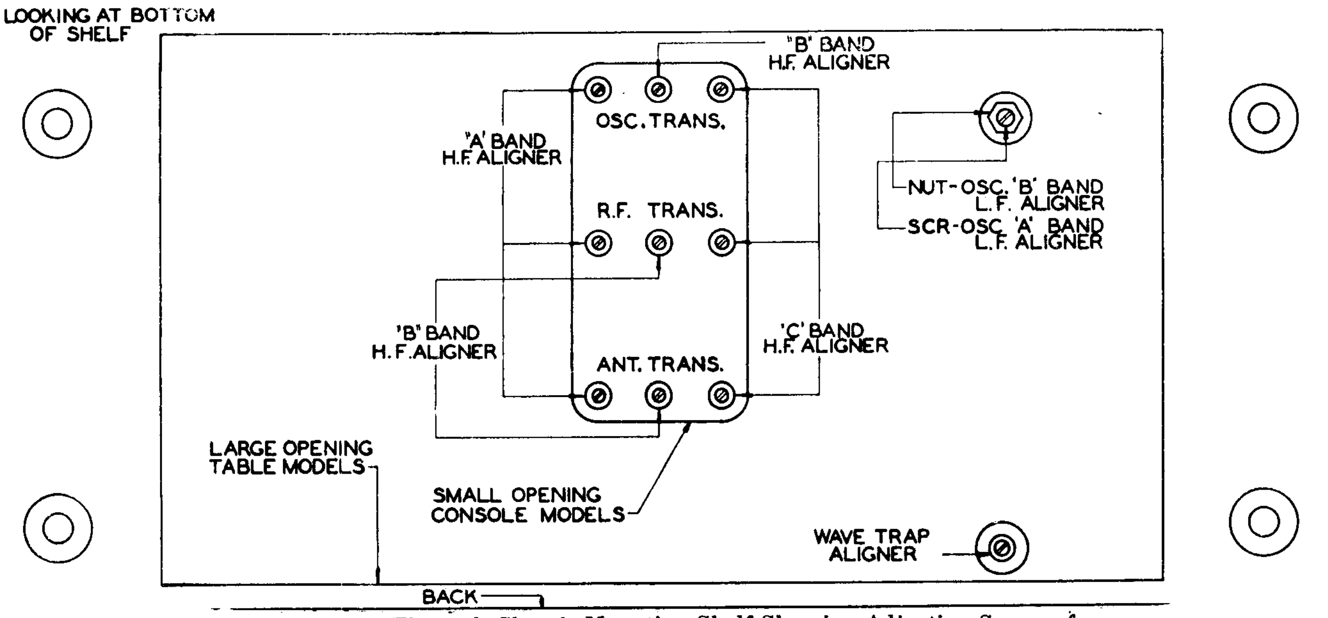


Fig. 2. View Through Chassis Mounting Shelf Showing Adjusting Screws for R. F. Aligning Capacitors.

APPARATUS SPECIFICATIONS

No. 240-H ---50 to 60 Cycles; P-27244 Chassis; P-27503 Loud Speaker
No. 240-HB ---25 to 60 Cycles; P-27245 Chassis; P-27503 Loud Speaker
No. 240-L ---50 to 60 Cycles; P-27244 Chassis; P-27385 Loud Speaker
No. 240-LB ---25 to 60 Cycles; P-27245 Chassis; P-27385 Loud Speaker
No. 240-M ---50 to 60 Cycles; P-27244 Chassis; P-27504 Loud Speaker
No. 240-MB ---25 to 60 Cycles; P-27245 Chassis; P-27504 Loud Speaker
No. 240-R ---50 to 60 Cycles; P-27244 Chassis; P-27385 Loud Speaker
No. 240-RB ---25 to 60 Cycles; P-27245 Chassis; P-27385 Loud Speaker
No. 240-S ---50 to 60 Cycles; P-27244 Chassis; P-27504 Loud Speaker
No. 240-SB ---25 to 60 Cycles; P-27245 Chassis; P-27504 Loud Speaker
No. 240-W ---50 to 60 Cycles; P-27244 Chassis; P-27504 Loud Speaker
No. 240-WB ---25 to 60 Cycles; P-27245 Chassis; P-27504 Loud Speaker
No. 240-P ---60 Cycles Only; P-27505 Chassis; P-27504 Loud Speaker
No. 240-PB ---25 Cycles Only; P-27506 Chassis; P-27504 Loud Speaker

ELECTRICAL SPECIFICATIONS

Type of Circuit ---------- Superheterodyne
Tuning Ranges ---------- A—530 to 1700 Kc.; B—1700 to 5600 Kc.; C—5600 to 18,000 Kc.
No. and Type of Tubes ---------- 2 No. 6K7, 1 No. 6A8, 2 No. 6C5, 1 No. 6H6, 1 No. 6F5, 2 No. 6F6, 1 No. 6G5, 1 No. 5U4G
Voltage Rating ---------- 105 to 125 Volts, A. C.
Power Frequency Rating ---------- 25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating:
Radio Models Only ---------- 132 Watts
Radio-Phono. Models ---------- 165 Watts
Frequency of Intermediate Amplifier ---------- 465 Kilocycles

STROMBERG CARLSON TELEPHONE MFG. CO.

MODELS 240-H, 240-HB, 240-L, 240-LB, 240-M, 240-MB, 240-P, 240-PB, 240-R, 240-RB, 240-S, 240-SB, 240-W & 240-WB

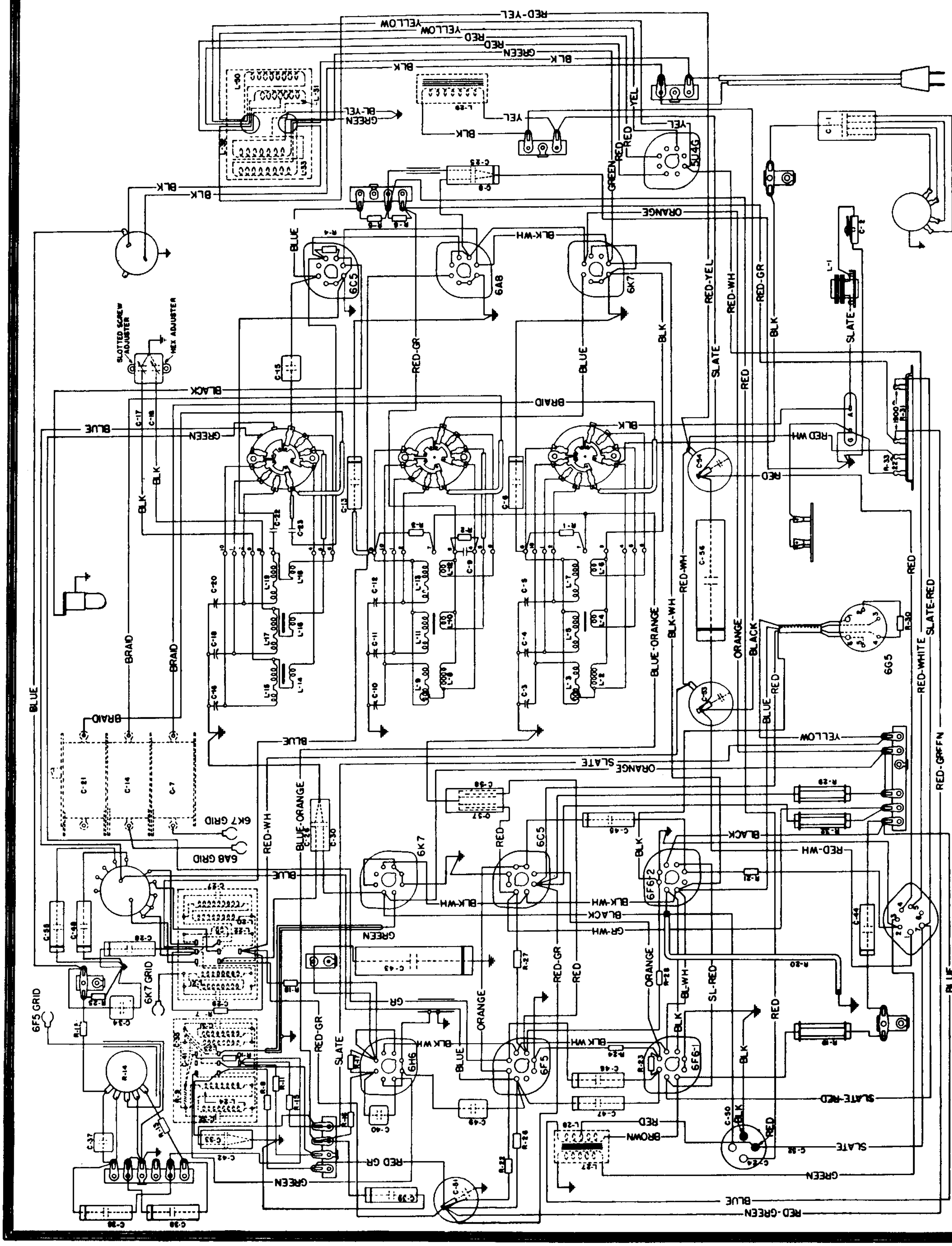


Fig. 4. Wiring Diagram.

STROMBERG CARLSON TELEPHONE MFG. CO.

MODELS 240-H, 240-HB, 240-L, 240-LB, 240-M, 240-MB, 240-P, 240-PB, 240-R, 240-RB, 240-S, 240-SB, 240-W & 240-WB

CIRCUIT DESCRIPTION

The No. 240 Receivers are eleven tube "Adjustable High Fidelity" receivers employing metal tubes. These receivers have three tuning ranges, the frequency limits of each range being listed under the "Electrical Specifications." In order to obtain maximum performance on the Standard Broadcast Range ("A" Range) of these receivers, a "signal admission control switch" is provided. This control is located on the inside rear flange of the chassis base, and has a slotted shaft which protrudes through the base so that it may be adjusted by the use of a screwdriver. When either the "B" or "C" ranges are in operation, this "signal admission control" is automatically cut out of the circuit, allowing the receiver to function at its maximum sensitivity on these two ranges. When operating in the Standard Broadcast Range, maximum sensitivity is obtained when the slotted shaft of this control is rotated to its maximum counter-clockwise position. To properly set this control, place the receiver in operation and then adjust this control so that clearest reception is obtained. The control should remain in this position. Do not readjust this control for each frequency. The above adjustment should be made in the evening if best results are to be obtained.

When reception conditions warrant, the fidelity of this receiver can be increased by rotating the "Tone-Fidelity" switch control knob in a clockwise rotation from the normal position of this control. High Fidelity reproduction is obtained in two steps from the normal position of this control. These receivers are also provided with a low level bass frequency compensating circuit in conjunction with the volume control circuit, so that balanced reproduction is obtained for any setting of the volume control.

A metal guard frame is furnished on these receivers to prevent damage to the chassis components and also to facilitate ease of servicing should this become necessary. Do not turn the chassis over on its guard frame without first removing the tuning indicator unit which is secured to the metal guard frame. To remove the tuning indicator unit from the guard frame, first unscrew the knurled screw which holds the tuning indicator's clamp to the metal guard frame, which will then allow the tuning indicator unit to be removed from the guard frame.

The various tubes are used in these receivers as follows: One No. 6K7 tube is used in the R. F. Amplifier, and the other No. 6K7 tube is used in the I. F. Amplifier. The No. 6A8 tube is used as a Modulator tube. One No. 6C5 tube is used as the Oscillator tube, and the other No. 6C5 tube is used as the Phase Inverter tube of the audio amplifier circuit. The No. 6H6 tube is used as a Demodulator and A. V. C. tube, and the No. 6F5 tube is used in the Audio Amplifier Stage (Driver). The two No. 6F6 tubes are used in the Audio Power Output Stage. The No. 5U4G tube is the Rectifier tube of the Power Supply Unit, and the No. 6G5 tube is used for indicating resonance in the Tuning Indicator System.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: O-2.5, O-10, O-100, O-250, O-500, O-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

			Terminals of Sockets								*Heater Voltages Between Heater Terminals*	
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6K7	R. F. Amp.	0	0	0	+230	+95	0	—	*6.1*	0	2–7	*6.1*
6A8	Modulator	0	0	0	+235	+95	—17	+95	*6.1*	0	2–7	*6.1*
6C5	Oscillator	—	0	0	+130	—	—17	0	*6.1*	0	2–7	*6.1*
6K7	I. F. Amp.	0	0	0	+225	+95	0	—	*6.1*	0	2–7	*6.1*
6H6	Dem.—A. V. C.	—	0	0	0	0	0	0	*6.1*	0	2–7	*6.1*
6F5	Audio Amp.	0	0	0	—	+125	+115	+125	*6.1*	+1.2	2–7	*6.1*
6C5	Audio Amp.	—	0	0	+115	+115	0	+230	*6.1*	+5.2	2–7	*6.1*
1st 6F6	Audio Output	—	0	0	+295	+300	0	0	*6.1*	+20	2–7	*6.1*
2nd 6F6	Audio Output	—	0	0	+290	+300	0	0	*6.1*	+20	2–7	*6.1*
6G5	Tuning Ind.	—	*6.1*	+2*	0	+225	0	0			1–6	*6.1*
5U4G	Rectifier	—	—	+420	—	*380*	—	*380*	—	+417	2–8	*4.8*
Speaker Socket		—	+410	0	0	+420	+420	—	+300			

A. C. voltages are indicated by italics. Receiver tuned to 1000 Kc., no signal

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the alignment procedure given in the following paragraphs should be carefully followed. In order to make these aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-27657 and P-27658 aligning tools be used.

To accurately align the circuits in these receivers, it is necessary to use a high grade, modulated test oscillator (Signal Generator), the output voltage of which can be varied. In conjunction with this test oscillator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker.

In making any alignment adjustments, always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal. Before proceeding with the alignment of any circuits in these receivers be sure that the "Signal Admission Control" is set for the maximum sensitivity position and that the "Fidelity" control knob is set for the "normal" position. The "Off-On-Bass" control knob should also be set for the normal position. Figure 1 shows the location of all the aligning capacitors or adjustments for this receiver.

It will not be necessary to remove the chassis in these receivers from their cabinets in order to make any alignment adjustments. The alignment adjustments for the intermediate frequency circuits are accessible from the rear of the receiver, and the adjustments for the radio frequency circuits are accessible through the apertures located in the bottom metal base plate of the chassis; these apertures are easily accessible either through the bottom of the cabinet or through the bottom of the cabinet shelf, depending upon the particular style of cabinet. See Figure 2. Never align any of these receivers without having the metal base plate fastened to the chassis base.

Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitor. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Rapid Station Selector" knob in a clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the receiver turned "on", the illuminated dial indicator line should be exactly centered over the dial alignment lines (black lines) which are located at the extreme **low frequency** end of each scale on the dial. If these lines do not center over the illuminated dial indicator line, loosen the two set screws located on the hub of the dial. Then, rotate the dial so that these alignment lines are centered over the illuminated dial indicator line. The two set screws of the dial hub should then be securely tightened.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 465 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed.

1. Operate the Range Switch of the receiver to the "A" range position and set the tuning dial to its extreme low frequency position. Set the "Fidelity" control knob to its "Normal" position, and the "Off-On-Bass" control knob to its normal position. **Never attempt to align the I. F. circuits of this receiver with the "Fidelity" control set at any position other than the "Normal" fidelity position.** Rotate the Volume Control knob to its maximum clockwise position (maximum volume).
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator tube, a modulated signal of 465 kilocycles from the test oscillator, using a 0.1 microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal.
3. Now, noting from Figure 1 the aligning adjustments for the first and second I. F. transformers, align the I. F. circuits in the following manner:
   Secondary of second I. F. transformer.
   Primary of second I. F. transformer.
   Secondary of first I. F. transformer.
   Primary of first I. F. transformer.
   Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

Radio Frequency Adjustments

The alignment of the radio frequency circuits of the various ranges in these receivers should be very carefully made and in the order specified.

Alignment of Short Wave Range (Also Referred to as "C" Band)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the "C" range position, and set the test oscillator's frequency and the receiver's tuning dial to 16 megacycles.
2. Adjust the oscillator's "C" band high frequency aligner for maximum output.
3. Adjust the R. F. interstage "C" band high frequency aligner for maximum output and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
4. Adjust the antenna's "C" band high frequency aligner for maximum output, at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Aircraft, Amateur, and Police Range (Also Referred to as "B" Band)

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short-wave range.

1. Operate the Range Switch on the receiver chassis to the "B" range position, and set the test oscillator's frequency and the receiver's tuning dial to 5 megacycles.
2. Adjust the oscillator's "B" band high frequency aligner for maximum output.
3. Adjust the R. F. interstage "B" band high frequency aligner for maximum output and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
4. Adjust the antenna's "B" band high frequency aligner for maximum output, and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
5. Set the test oscillator's frequency and the receiver's tuning dial to 1.8 megacycles.
6. Adjust the oscillator's "B" band low frequency aligner (series aligner), and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
7. Reset both the test oscillator's frequency and the receiver's tuning dial to 5 megacycles and repeat operations Nos. 2, 3 and 4.

Alignment of Standard Broadcast Range (Also Referred to as "A" Band)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Operate the Range Switch to the "A" range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the oscillator's "A" band high frequency aligner for maximum output.
3. Adjust the R. F. interstage "A" band high frequency aligner for maximum output.
4. Adjust the antenna's "A" band high frequency aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
6. Adjust the oscillator's "A" band low frequency aligner (series aligner) for maximum output, and at the same

(Continued on next page)

STROMBERG CARLSON TELEPHONE MFG. CO.

MODELS 240-H, 240-HB, 240-L, 240-LB, 240-M, 240-MB, 240-P, 240-PB, 240-R, 240-RB, 240-S, 240-SB, 240-W & 240-WB

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time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.

7. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2, 3 and 4.

Wave Trap Adjustment

In adjusting the wave trap circuit, the "Signal Admission Control" should be set for the most sensitive position (shaft rotated in the most counter-clockwise direction). Set the Range Switch of the receiver to the "A" range position and the tuning dial to 1000 kilocycles. Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 465 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a minimum indication is obtained on the output meter.

REPLACEMENT PARTS

Piece Number	Schematic Circuit Designation	Part
22775	C43, C56	Capacitor, .4 Mfd.
23517		Tube Socket, 7 Prong
24268		Cord, Power Supply
24405	C6, C13, C28, C36, C39, C45, C46	Capacitor, .04 Mfd.
24560	C23	Capacitor, Type "O", 50 Mmfd.
25149	C38, C48	Capacitor, .01 Mfd.
24559	C35, C41	Capacitor, Type "O", 100 Mmfd.
25481	C55	Capacitor, .002 Mfd.
25487	C15, C40	Capacitor, Type "W", .001 Mfd.
25498	C57, C58	Electrolytic Capacitor, 10 Mfd., 25 Volts, and 10 Mfd., 25 Volts
25504	C49, C59	Capacitor, Type "2", 100 Mmfd.
25526	R29	Resistor, Type "F", 15,000 Ohms
25539		Tube Socket, 8 Prong
26151	C47	Capacitor, .005 Mfd.
26260	L29	Choke Assembly
26287		Pilot Lamp
26322	R28	Resistor, Type "E", 120 Ohms
26328	R27	Resistor, Type "E", 390 Ohms
26338	R8	Resistor, Type "E", 1000 Ohms
26345	R5, R6	Resistor, Type "E", 10,000 Ohms
26353	R2, R4, R9, R13, R24	Resistor, Type "E", 47,000 Ohms
26357	R1, R3, R7, R12, R22, R26	Resistor, Type "E", .1 Megohm
26362	R10, R11, R18, R25	Resistor, Type "E", .27 Megohm
26365	R21, R23	Resistor, Type "E", .47 Megohm
26369	R15, R16, R17, R30	Resistor, Type "E", 1 Megohm
26564	C17, C19	Capacitor, Oscillator Low Frequency Aligners
26678		Socket, Phono-Jack
26775	R19	Resistor, Type "F", 20,000 Ohms
27081	C2	Capacitor, Aligning
27101	C9	Capacitor, Type "O", 200 Mmfd.
27102		Pulley Assembly
27108	C8, C25, C26, C30, C33, C42	Capacitor, Two, .05 Mfd., 400 Volts
27110		Spring
27120		Pilot Lamp Socket Assembly
27123	C51	Electrolytic Capacitor, 16 Mfd., 300 Volts
27125	R32	Resistor, Type "F", 25,000 Ohms
27126		Strap Assembly
27134	L27, L28	Output Transformer
27141		Dial Hub Plate
27143	C3, C4, C5, C10, C11, C12, C16, C18, C20	H. F. Aligners for Antenna, R. F. and Oscillator Transformers
27148	L1	Coil Assembly, Wave Trap
27159		Belt
27189	L30, L31, L32, L33	Power Transformer (50 to 60 Cycles Chassis)
27190	L30, L31, L32, L33	Power Transformer (25 to 60 Cycles Chassis)
27196		Range Switch Assembly
27232	C7, C14, C21	Gang Tuning Capacitors
27236		Mask Assembly (Selectorlite Dial)
27237		Arm Assembly (Mask Actuator)
27238		Rod, Mask (Actuator)
27239		Dial (Tuning)
27264	L2, L3, L4, L5, L6, L7	Coil Assembly, Antenna Transformer
27265	L8, L9, L10, L11, L12, L13	Coil, Assembly, R. F. Transformer
27266	L14, L15, L16, L17, L18, L19	Coil Assembly, Oscillator Transformer
27313		Switch for Fidelity Control
27314	L20, L21, L22	First I. F. Transformer
27318		Drive Assembly
27332		Indicator Frame Assembly
27336	C53	Electrolytic Capacitor, 16 Mfd., 500 Volts
27337	C34	Capacitor, Type "W", .004 Mfd.
27339		Switch, "Off-On-Bass" (Used on Radio Models only)
27341	R20	Resistor, Flexible, 200 Ohms
27374	R31, R33	Resistor, "B" Voltage Divider
27408		Cable Assembly
27411		Clamp Assembly, Tuning Indicator
27493	C1	Capacitor Assembly; Four, .002 Mfd.
27537	C24, C50, C52	Electrolytic Capacitor, 4 Mfd., 400 Volts; 4 Mfd., 250 Volts; 4 Mfd., 250 Volts
27540		Switch, Signal Admission Control
27569	R14	Volume Control
27577	C37	Capacitor, Type "O", 15 Mmfd.
27622	C54	Electrolytic Capacitor, 16 Mfd., 500 Volts
27646	C44	Capacitor, .002 Mfd.
27659	L23, L24	Second I. F. Transformer
26751		Switch, "Off-On-Bass-Phono" (Used only on "Radio-Phono" Models)
27947		Cord Assembly (Used only on "Radio-Phono" Models)

MISCELLANEOUS PARTS

Piece Number	Part
27800	Knob Assembly (Used on "Volume", "Range Switch" and "Off-On-Bass" Controls' Shafts)
27801	Knob Assembly (For "Fidelity" Shaft)
27802	Knob Assembly (For "Rapid Station Selector" Control Shaft)
27803	Knob Assembly (For "Vernier Station Selector" Control Shaft)
27628	Felt Washer (Used on "Volume", "Fidelity", "Range Switch" and "Off-On-Bass" Controls' Shafts)
27630	Felt Washer (For "Rapid Station Selector" Control Shaft)

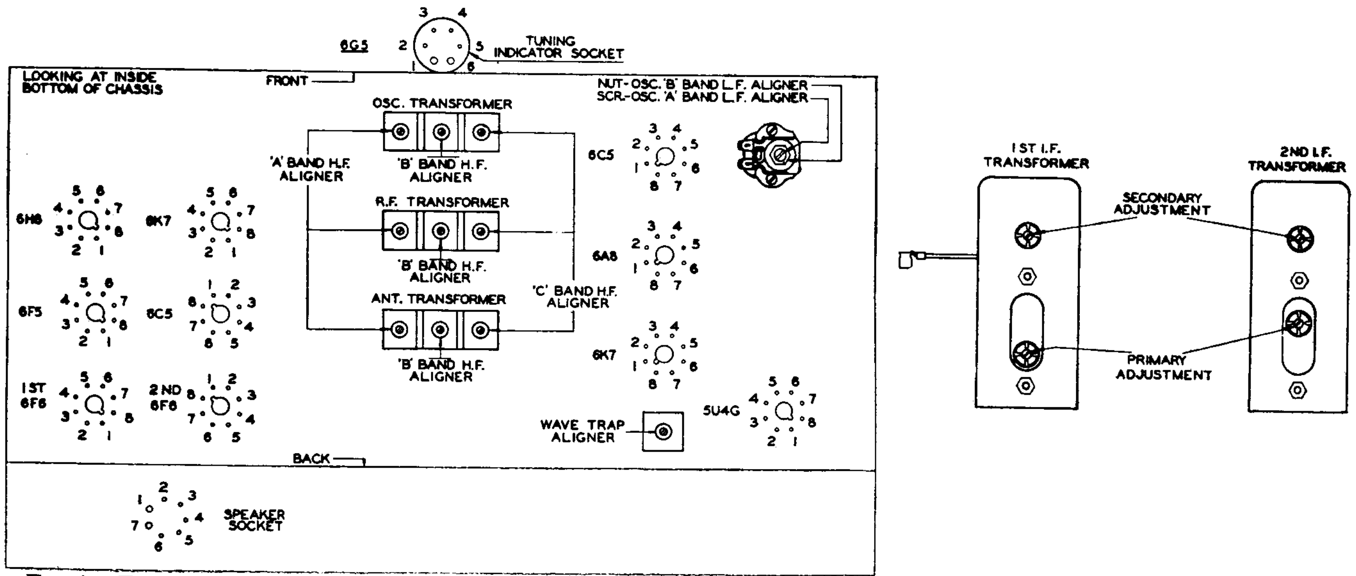

Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODELS 250 SERIES, 250-L & 250-LB

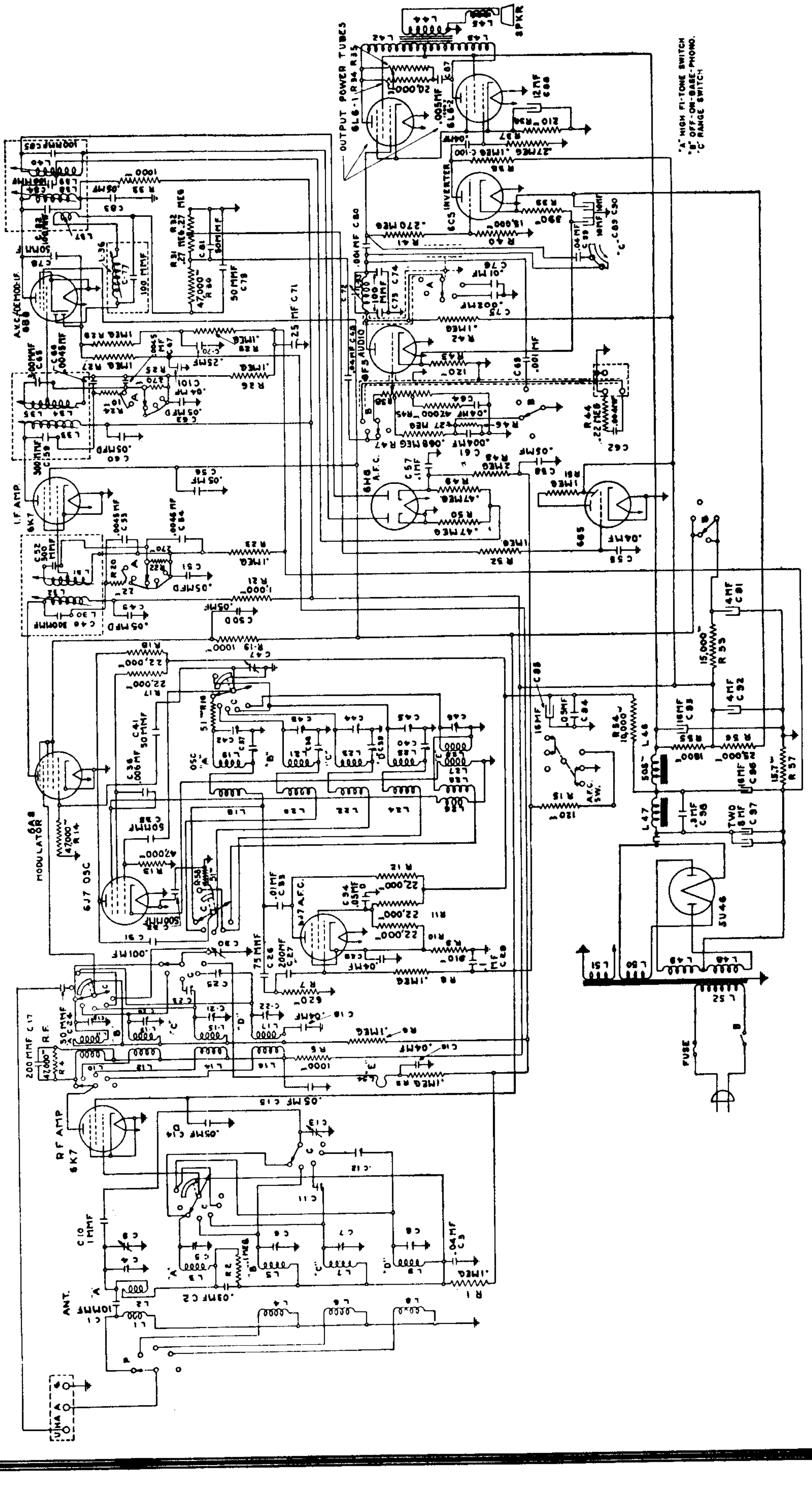

Fig. 2. Schematic Circuit.

STROMBERG-CARLSON TELEPHONE MFG. CO.

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250-L & 250-LB

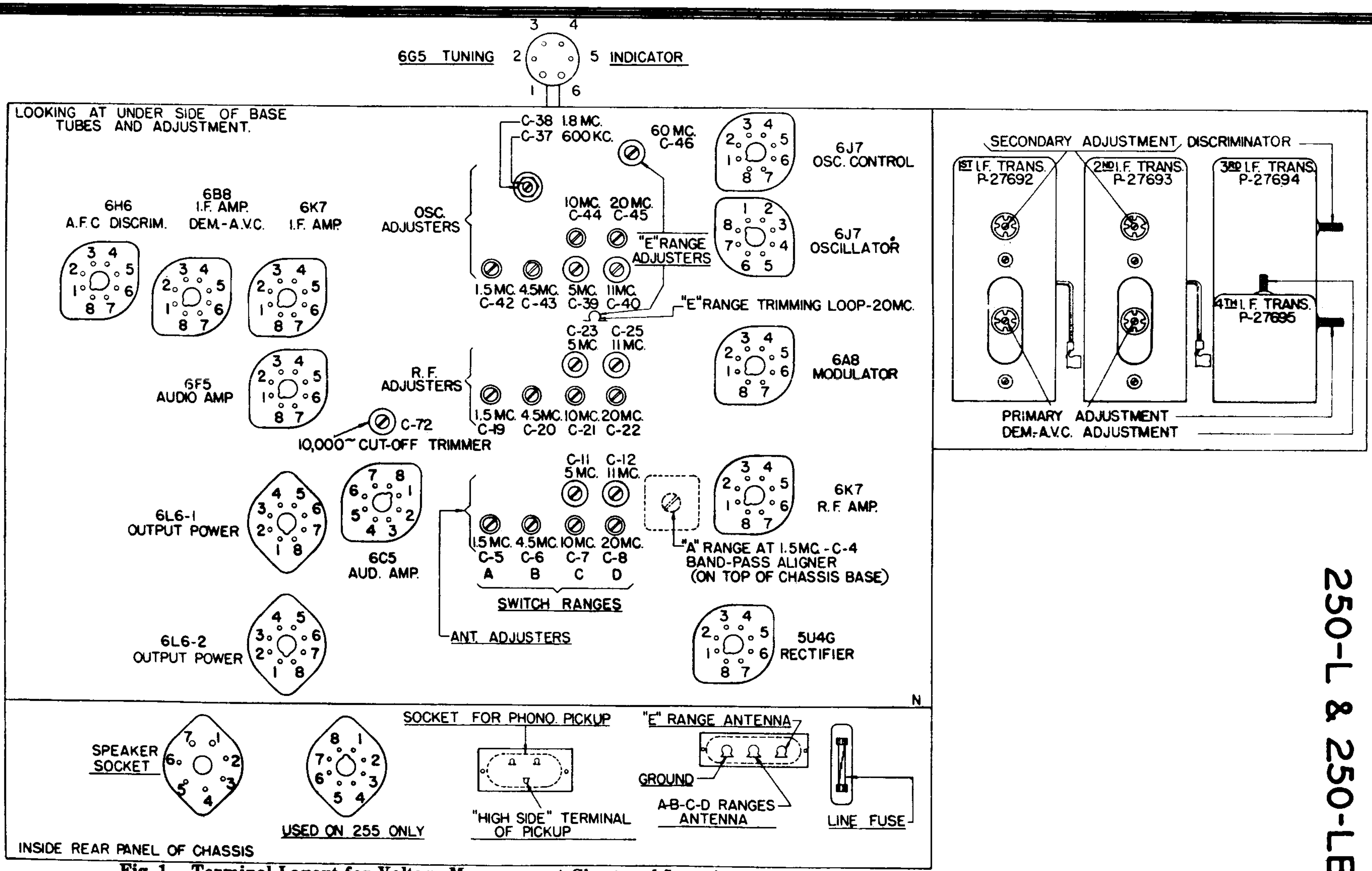


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Adjustments.

ELECTRICAL SPECIFICATIONS

Type of Circuit ---------- Superheterodyne with Automatic Frequency Control

Tuning Ranges ---------- A—530 to 1600 Kc.; B—1600 to 4800 Kc.; C—4800 to 11,000 Kc. D—11,000 to 22,000 Kc.; E—22,000 to 60,000 Kc.

Number and Types of Tubes -- 2 No. 6K7, 1 No. 6A8, 2 No. 6J7, 1 No. 6B8, 1 No. 6H6, 1 No. 6F5, 1 No. 6C5, 2 No. 6L6, 1 No. 6G5, 1 No. 5U4G

Input Voltage Rating ---------- 105 to 125 Volts A. C.

Power Frequency Rating ---------- 25 to 60 Cycles and 50 to 60 Cycles

Input Power Rating ---------- 145 Watts

Frequency of Intermediate Amplifier ---------- 465 Kilocycles

APPARATUS SPECIFICATIONS

No. 250-L --- 50 to 60 Cycles; P-27631 Chassis; P-27504 Loud Speaker

No. 250-LB --- 25 to 60 Cycles; P-27632 Chassis; P-27504 Loud Speaker

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODELS 250 SERIES, 250-L & 250-LB

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

			Terminals of Sockets								*Heater Voltages Between Heater Terminals*	
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6K7	R. F. Amp.	0	0	0	+230	+90	0	+80	*6.1*	0	2–7	*6.1*
6A8	Modulator	0	0	0	+230	+80	−2.0	+80	*6.1*	0	2–7	*6.1*
6J7	Oscillator	0	0	*6.1*	+60	+180	0	0	0	0	2–7	*6.1*
6J7	Oscillator Control	0	0	0	+190	+110	+5.8	0	*6.1*	+5.8	2–7	*6.1*
6K7	I. F. Amp.	0	0	0	+235	+90	0	0	*6.1*	0	2–7	*6.1*
6B8	I. F. Amp.—Dem.—A. V. C.	0	0	*6.1*	+225	−0.1	−0.1	+90	0	0	2–7	*6.1*
6H6	A. F. C. Discriminator	—	0	0	−0.25	0	−0.2	−0.2	*6.1*	0	2–7	*6.1*
6F5	Audio Amp.	0	0	0	+135	+135	0	0	*6.1*	+1.3	2–7	*6.1*
6C5	Audio Amp.	—	0	0	+100	+135	0	+1.3	*6.1*	+5.2	2–7	*6.1*
6L6 No. 1	Audio Output	—	0	0	+300	+305	0	0	*6.1*	+22	2–7	*6.1*
6L6 No. 2	Audio Output	—	0	0	+300	+305	0	0	*6.1*	+22	2–7	*6.1*
6G5	Tuning Indicator	—	*6.1*	+0.5	−0.2*	+245	0	0	—	—	1–6	*6.1*
5U4G	Rectifier	—	0	+430	—	*395*	—	*395*	—	+430	2–8	*4.8*
Speaker Socket		—	+420	0	0	+430	+430	0	+320	—		

A. C. voltages are indicated by italics. Receiver tuned to 1000 kc., no signal.

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the procedure given in these instructions should be carefully followed. The preferred method of aligning these receivers is by the use of a suitable cathode ray oscillograph and frequency modulator unit in conjunction with the standard signal generator.

To accurately align circuits in these receivers, it is necessary to use a high grade signal generator capable of being modulated 30% and having an output voltage of at least 100,000 microvolts; it will also be necessary to have this output voltage controlled so that only a few microvolts may be fed into the receiver. In conjunction with the signal generator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker. In addition to this equipment, it will be necessary when making a final adjustment of the "Discriminator" tuned circuit to use a milliammeter having a range of 0 to 10 milliamperes connected in series with the cathode of the No. 6J7 oscillator control tube by means of an adaptor plug inserted between the tube and its socket. The leads to the meter should not be longer than 15", and should be shunted at the socket connections by a capacitor of not less than 0.25 Mfd.

In order to make the aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-27657 and P-27658 aligning tools be used.

Before proceeding with the alignment of any circuits in these receivers, except when specifically directed, be sure that the Fidelity Control knob is set for the "Normal" position and that the Automatic Frequency Control knob is set to the "Off" position. The "Off-On-Bass-Phonograph" Control should also be set for the "Normal" position. In making any alignment adjustments always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained, except when specifically directed in these instructions. Figure 1, shows the location of all the aligning capacitors or adjustments for this receiver. It will not be necessary to remove the chassis in this receiver from its cabinet in order to make any alignment adjustments. The alignment adjustments for the Intermediate Frequency circuits are accessible from the rear of the receiver, and the adjustments for the Radio Frequency circuits are accessible through the apertures located in the bottom metal base plate of the chassis. These apertures are easily accessible through the bottom of the cabinet shelf. **Never align any of these receivers without having the metal base plate fastened to the chassis base.**

Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitor. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Rapid Station Selector" knob in a counter-clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the receiver turned "on", the illuminated dial indicator line should be exactly centered over the dial alignment lines (black lines) which are located at the extreme low frequency end of each scale on the dial. If these lines do not center over the illuminated dial indicator line, loosen the two set screws located on the hub of the dial. Then, rotate the dial so that these alignment lines are centered over the illuminated dial indicator line. The two set screws of the dial hub should then be securely tightened.

Intermediate Frequency and A. F. C. Circuit Adjustments

The intermediate frequency system employed in this receiver is a complex circuit. The first I. F. amplifier is coupled to the second I. F. amplifier through the No. 6K7 tube. The second and third I. F. transformers are coupled through the pentode section of the No. 6B8 tube. The third I. F. transformer is in effect a distributing network rather than a transformer only; it contains a primary winding coupled to two other networks. One of these networks links the diode stage (Demodulator-A. V. C.) with the I. F. signal, while the other network resembles the secondary of a push-pull transformer and constitutes the tuned "Discriminator" circuit. This "Discriminator" network operating into the No. 6H6 tube supplies the characteristic voltage demanded by the oscillator control tube. The fourth I. F. transformer feeds the diode plates of the No. 6B8 tube.

The intermediate frequency used in these receivers is 465 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed:

1. Operate the Range Switch of the receiver to the "A" range position, and set the tuning dial to its extreme low frequency position. Set the Fidelity Control to its "Normal" position, the Automatic Frequency Control knob to the "Off" position and the "Off-On-Bass" Control knob to its "Normal" position. **Never attempt to align the R. F. or I. F. circuits of this receiver with the Fidelity Control knob set at any position other than the "Normal Fidelity" position, and the Automatic Frequency Control knob set at the "On" position unless specifically directed in the following paragraphs.**
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator tube, a modulated signal of 465 kilocycyes from the signal generator, using a 0.1 Mfd. capacitor in series with the connection between the output terminal of the signal generator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the signal generator should be connected to either the chassis base or the ground binding post terminal.
3. Now noting from Figure 1, the alignment adjustments for the First, Second, Third, and Fourth I. F. Transformers, align the I. F. circuits in the following manner:
   - Adjust the third I. F. transformer primary circuit for maximum output.
   - Adjust the fourth I. F. transformer circuit for maximum output.
   - Adjust the third I. F. transformer "Discriminator" circuit midway between the peaks where maximum output is obtained.
   - Adjust the second I. F. transformer secondary circuit for maximum output.
   - Adjust the second I. F. primary circuit for maximum output.
   - Adjust the first I. F. secondary circuit for maximum output.
   - Adjust the first I. F. primary circuit for maximum output.

Carefully make all the above adjustments, watching carefully the output meter and reduce the output of the test oscillator as required.

To make the final adjustment of the "Discriminator" circuit proceed as follows:

Check the position of the A. F. C. control knob which should be set to the "off" position. **Before making this circuit adjustment be sure that the I. F. Amplifier is tuned exactly to 465 kilocycles.** With the signal generator still set at a frequency of 465 kilocycles, adjust the signal generator's output control so that a signal of 50,000 to 100,000 microvolts is fed into the No. 6A8 Modulator tube. Now observe the reading of the milliammeter which is connected in series with the cathode of the No. 6J7 oscillator control tube. Rotate the A. F. C. Control knob to the "on" position, and observe whether there is any difference in the reading of the milliammeter. When this circuit is correctly adjusted, there should be no difference in the reading of the milliammeter when the A. F. C. Control knob is rotated from the "off" to the "on" position. If there is any difference in the milliammeter reading while rotating the Automatic Frequency Control knob to the "off" and "on" position, at a rate of about two cycles per second, adjust the "Discriminator" circuit by means of the screw adjustment located on the third I. F. transformer until the meter reading has the same value regardless of whether the A. F. C. Control knob is rotated to the "on" or "off" position. When this condition is obtained the "Discriminator" circuit of these receivers is properly adjusted.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

When making any aligning adjustments of these circuits, the A. F. C. Control knob should be rotated to the "off" position, the Fidelity Control knob should be set for "Normal" operation, and the "Off-On-Bass-Phonograph" Control knob should also be set for "Normal" operation.

Alignment of Ultra-Short Wave Range (Also referred to as "E" Band)

In order to align the circuits of this range, it is desirable to have a signal generator whose high frequency range will go to 60 megacycles. Such equipment, however, is rare and costly, and in most cases it will be necessary to make use of a signal generator whose high frequency range does not extend beyond 20 megacycles, using harmonics of 20 megacycles for aligning this range on 60 megacycles.

In aligning the radio frequency circuits for this range, replace the 0.1 mfd. capacitor which was placed in series with the signal generator's output lead for the I. F. alignment with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post marked "U. H. A." located on the rear of the receiver chassis. The ground terminal (or low side) of the signal generator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the "E" range position and set the signal generator's frequency and the receiver's tuning dial to 60 megacycles.
2. Adjust the aligning capacitor C-46 until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 20 megacycles and adjust the "E" range trimming loop, L-54, until maximum voltage output is obtained on the output meter. The adjustment of this loop is obtained by distorting its normally circular shape until it offers the correct inductive effect. If the oscillator does not track with the tuning dial scale at this frequency, it will be necessary to also adjust the oscillator's tuning loop.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 60 megacycles and repeat operation No. 2.

Alignment of Short-Wave Range (Also referred to as "D" Band)

In aligning the radio frequency circuits for this range use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the signal generator as was used for aligning the Ultra-Short Wave Range. Connect this lead to the antenna binding post marked "A" located on the rear of the receiver chassis, and align as follows:

1. Operate the Range Switch on the receiver chassis to the "D" range position and set the signal generator's frequency and the receiver's tuning dial to 20 megacycles.
2. Adjust aligning capacitors C-45, C-22, and C-8 respectively; and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 11 megacycles and adjust aligning capacitors C-40, C-25, and C-12 respectively; and at the same time rotate the gang tuning capacitor back

(Continued on next page)

STROMBERG-CARLSON TELEPHONE MFG. CO.

MODELS 250 SERIES, 250-L & 250-LB

(Continued from preceding page)
and forth through resonance until maximum voltage output is obtained on the output meter.

4. Reset both the signal generator's frequency and the receiver's tuning dial to 20 megacycles and repeat operation No. 2.

Alignment of Short-Wave Range (Also referred to as "C" Band)

In aligning the radio frequency circuits for this range use the same artificial antenna and binding post on the receiver chassis as was used for aligning the "D" range.

1. Operate the Range Switch on the receiver chassis to the "C" range position and set the signal generator's frequency and the receiver's tuning dial to 10 megacycles.
2. Adjust the aligning capacitors C-44, C-21, and C-7 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 5 megacycles and adjust the aligning capacitors C-39, C-23, and C-11 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 10 megacycles and repeat operation No. 2.

Alignment of Aircraft Range (Also referred to as "B" Band)

In aligning the radio frequency circuits for this range, use the same artificial antenna and antenna binding post as was used for aligning the "C" range, and align this range as follows:

1. Operate the Range Switch on the receiver chassis to the "B" range position and set the signal generator's frequency and the receiver's tuning dial to 4.5 megacycles.
2. Adjust the aligning capacitors C-43, C-20, and C-6 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 1.8 megacycles and adjust the aligning capacitor C-38 and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 4.5 megacycles and repeat operation No. 2.

Alignment of Standard Broadcast Range (Also referred to as "A" Band)

In aligning the radio frequency circuits for this range, replace the 400-ohm resistor in series with the signal generator's output with a 200-micro-microfarad capacitor and align this range as follows:

1. Operate the Range Switch to the "A" range position and set the signal generator's frequency and the receiver's tuning dial to 1.5 megacycles (1500 kilocycles).
2. Adjust the aligning capacitors C-42, C-19, C4, and C-5 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 0.6 megacycles (600 kilocycles) and adjust the aligning capacitor C-37; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 1.5 megacycles and repeat operation No. 2.

Adjustment of 10 Kilocycle Audio Cut-Off Filter

The adjustment of this filter is correctly made at the factory and no additional adjustment is required.

PROCEDURE FOR OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

A socket having three contacts is provided on the rear of the chassis base, and is wired to the "Off-On-Bass-Phonograph" switch assembly located on the front of the receiver. A three prong plug is also inserted in the socket so that if at any time it is desired to use an electric pick-up and phonograph unit in conjunction with this receiver, it may readily be accomplished.

In order to obtain the best quality of phonograph reproduction from this receiver, a Stromberg-Carlson No. 10 Record Player is recommended. This record player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit. To attach this instrument to a No. 250 Receiver, it is only necessary to remove the three-prong plug furnished with the receiver and insert the three-prong plug which comes with the unit into the three-prong socket located on the rear of the chassis base. Then, the power supply plug of the phonograph unit should be inserted into a suitable power supply receptacle, and the unit will be ready for use.

If the Stromberg-Carlson No. 10 Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a low capacity shielded cable between the three-prong plug furnished with the receiver and the pick-up. This shielded cable should be of the low capacity type, in order to prevent the excessive cutting of high frequencies which is caused when a shielded cable having high capacity is used. The length of the shielded cable used should be kept as short as possible.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong plug and the pick-up. The transformer should be located as near to the receiver as possible, in which case it will not be necessary to use a shielded cable.

REPLACEMENT PARTS

Piece Num.	Schematic Circuit Designation	Part
21984		Fuse Block Assembly
22775	C98	Capacitor, .4 Mfd.
23517		Tube Socket, 7 Prong
24268		Cord, Power Supply
24314	C1	Capacitor, Type "O", 10 Mmfd.
24402	C29, C57	Capacitor, .1 Mfd.
24405	C3, C16, C18, C28, C55, C64, C68, C99, C100, C101	Capacitor, .04 Mfd.
24559	C84	Capacitor, Type "O", 100 Mmfd.
24994	C15, C56, C58, C83	Capacitor, .05 Mfd.
25149	C33, C76	Capacitor, .01 Mfd.
25481	C75	Capacitor, .002 Mfd.
25487	C31, C69, C80	Capacitor, Type "W", .001 Mfd.
25498	C89, C90	Electrolytic Capacitor, 10 Mfd., 25 Volts; 10 Mfd., 25 Volts
25526	R53	Resistor, Type "F", 15,000 Ohms
25539		Tube Socket, 8 Prong
26062	R54	Resistor, Type "F", 10,000 Ohms
26287		Pilot Lamp
26300	R24	Resistor, Type "E", 10 Ohms
26313	R20	Resistor, Type "E", 22 Ohms
26322	R15, R43	Resistor, Type "E", 120 Ohms
26326	R22, R25	Resistor, Type "E", 270 Ohms
26328	R39	Resistor, Type "E", 390 Ohms
26333	R5, R19, R21, R33	Resistor, Type "E", 1,000 Ohms
26349	R10, R11, R12, R17	Resistor, Type "E", 22,000 Ohms
26353	R4, R13, R14, R30, R45	Resistor, Type "E", 47,000 Ohms
26357	R2, R8, R23, R26, R29, R38, R42	Resistor, Type "E", .1 Megohm
26361	R44	Resistor, Type "E" .22 Megohm
26362	R31, R32, R37, R46	Resistor, Type "E", .27 Megohm
26365	R49, R50	Resistor, Type "E", .47 Megohm
26369	R27, R28, R51, R52	Resistor, Type "E", 1 Megohm
26373	R48	Resistor, Type "E", 2.2 Megohms
26383	R1, R3, R6	Resistor, Type "El", .1 Megohm
26410		Grid Clip Assembly
26417	C10	Capacitor (Gimmick)
26512	C73, C74	Capacitor, Two, Type "W", 100 Mmfd.
26515	L53	Coil Assembly (High Frequency Cut-Off Filter)
26531		Socket (Tuning Indicator Tube)
26568	C72	Capacitor (High Frequency Cut-Off Filter)
26678		Socket, Phonograph Unit
26735		Antennas and Ground Binding Posts
26751		Switch Assembly, "Off-On-Bass-Phono" Control
26775	R34, R35	Resistor, Type "F", 20,000 Ohms
26819		Fuse, 5 Amperes
27006	C36	Capacitor, Type "W", .006 Mfd.
27009	C32	Capacitor, Type "2", 500 Mmfd.
27073	C77, C82, C85	Capacitor, 100 Mmfd.
27092		Rubber Bushing
27101	C17	Capacitor, Type "O", 200 Mmfd.
27105		Washer, Felt
27106		Washer, Dial Clamp
27108	C14, C34, C49, C50, C51, C60, C63, C94	Capacitor, Two, .05 Mfd.
27121		Insulating Tube
27125	R56	Resistor, Type "F", 25,000 Ohms
27305	C24, C35, C41, C78	Capacitor, Type "O", 50 Mmfd.
27309	C48, C52, C59, C65	Fixed Capacitor, First I. F. Transformer
27337	C61, C62	Capacitor, Type "W", .004 Mfd.
27407	R18	Resistor, Type "EB", 22,000 Ohms
27411		Clamp Assembly
27504	L45, L46	Loud Speaker
27569	R60	Potentiometer, Volume Control
27588	C5, C6, C7, C8, C11, C12	Capacitors, Aligning
27589	C19, C20, C21, C22, C23, C25	Capacitors, Aligning
27592	L3, L4, L5, L6, L7	Bi-Resonator Coil "A" Range, Antenna Transformer "B" and "C" Ranges
27593	L10, L11, L12, L13, L14, L15	R. F. Transformer, "A", "B", and "C" Ranges.
27594	L18, L19, L20, L21, L22, L23	Oscillator Transformer, "A", "B", and "C" Ranges
27608		Range Switch Assembly
27635	L48, L49, L50, L51, L52	Power Transformer (50 to 60 Cycles Chassis)
27636	L48, L49, L50, L51, L52	Power Transformer (25 to 60 Cycles Chassis)
27643	L8, L9	Antenna Transformer, "D" Range
27644	L16, L17	R. F. Transformer, "D" Range
27645	L24, L25	Oscillator Transformer, "D" Range
27692	L30, L31, L32	First I. F. Transformer
27693	L33, L34, L35	Second I. F. Transformer
27694	L37, L38, L39, L40	Third I. F. Transformer
27695	L36	Fourth I. F. Transformer
27710	C9, C13, C30, C47	Gang Tuning Capacitor
27715		Coupling Assembly (Tuning Drive)
27720		Gear and Bracket Assembly
27728		Spring
27731		Drive Assembly
27732		Mask Assembly
27733		Lever Assembly, Mask Actuator
27735		Rod
27736		Spring Washer
27737		Indicator Frame Assembly
27748		Dial
27751		Tube Socket, 8 Prong
27752		Brace, Dial Support
27753	C97	Electrolytic Capacitor, 8 Mfd., 500 Volts
27754	C96	Electrolytic Capacitor, 16 Mfd., 480 Volts
27755	C93	Electrolytic Capacitor, 16 Mfd., 350 Volts
27756	C95	Electrolytic Capacitor, 16 Mfd., 300 Volts
27757	C91, C92	Electrolytic Capacitor, 4 Mfd., 250 Volts; 4 Mfd., 100 Volts
27758	C26	Capacitor, Type "O", 75 Mmfd.
27759	C88	Capacitor, 12 Mfd., 30 Volts
27760	C87	Capacitor, .005 Mfd., 1,000 Volts
27761	R7	Resistor, Type "E", 620 Ohms
27762	R9	Resistor, Type "EB", 910 Ohms
27764	R36, R55, R57	Resistor, "B" Voltage Divider
27765	L42, L43, L44	Output Transformer
27767	L47	Choke Assembly
27769	L1, L2	Antenna Transformer, "A" Range
27773		Switch Assembly, High Fidelity-Tone Control
27778		Switch, A. F. C.
27779		Crank Arm
27782	C2	Capacitor, .03 Mfd.
27882	C4	Capacitor, H. F. Aligner for "A" Range Antenna Transformer
27916	L26, L27, L28, L29	Oscillator Transformer, "E" Range
27921	C46	Capacitor, Aligner, "E" Range
27986		Shield, "D" and "E" Range Coils
27988	L54	Antenna Transformer Tuning Loop, "E" Range
27989	C37, C38	L. F. Aligners for "A" and "B" Range Oscillators
27994		Pilot Lamp Socket Assembly
27996		Cable Assembly (Tuning Indicator Unit)
27998	C27	Capacitor, Type "O", 200 Mmfd.
27999	C79, C81	Capacitor, Type "WD", 50 Mmfd.
28001	C53, C54, C66, C67	Capacitor, Type "W", .0045 Mfd.
28002	C70, C71	Capacitor, .25 Mfd., 150 Volts
28003	R40	Resistor, Type "E", 15,000 Ohms
28004	R41	Resistor, Type "E", .27 Megohm
28005	R16, R58	Resistor, Type "E", 51 Ohms
28006		Cable Assembly, Phonograph Switch to Phonograph Socket
28034	C39, C40, C42, C43, C44, C45	Capacitors, Aligning
28179	R47	Resistor, Type "EB", 68,000 Ohms

MISCELLANEOUS PARTS

27800		Knob Assembly (Used on Volume, Range Switch and Off-On-Bass-Phonograph Controls' Shafts)
27801		Knob Assembly (Used on Fidelity and A. F. C. Controls' Shafts)
27802		Knob Assembly (For Rapid Station Selector Control Shaft)
27803		Knob Assembly (For Vernier Station Selector Control Shaft)
27628		Felt Washer (Used on Volume, Fidelity, Range Switch, A. F. C., and Off-On-Bass-Phonograph Controls' Shafts)
27630		Felt Washer (Used on Rapid Station Selector Control Shaft)

L. TATRO PRODUCTS CORP.
MODEL EN-6-4

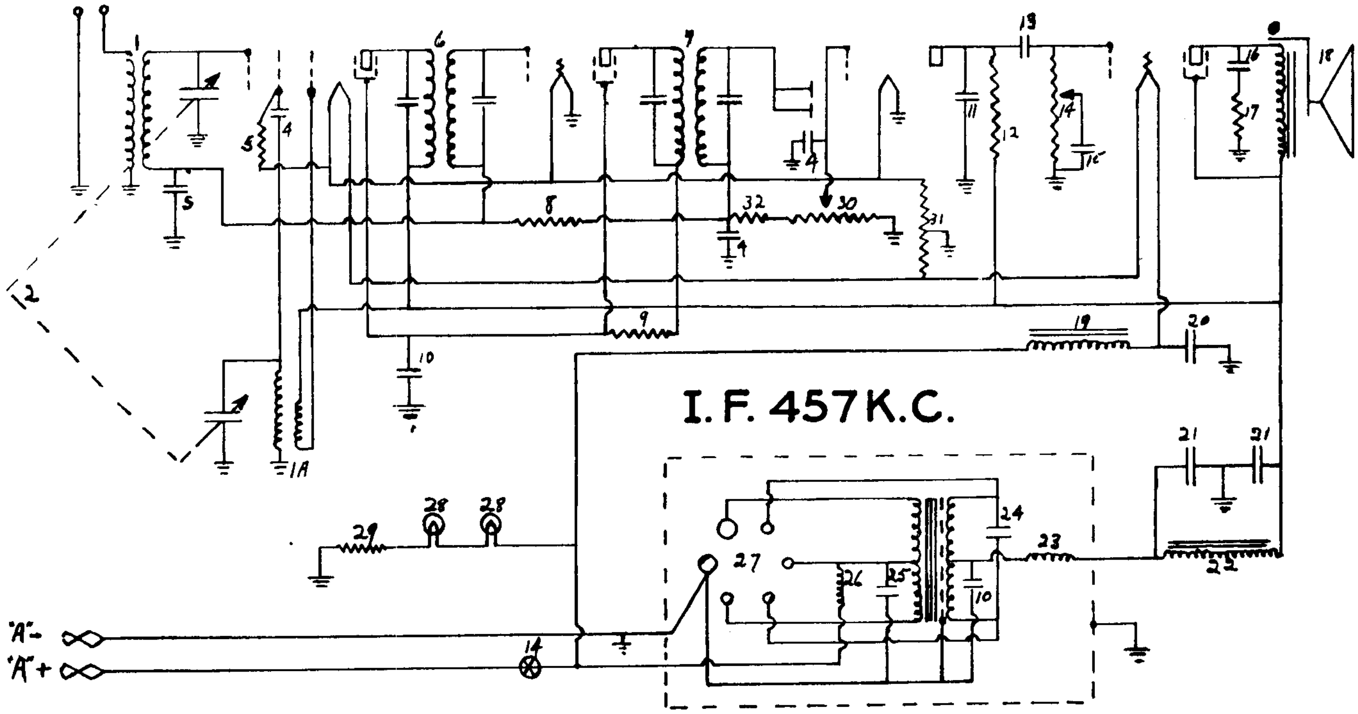


Diagram No.	Part No.	Name
1–1A.	10N-1	Antenna Osc. Coil
2.	9N-1	Variable Condenser
3.	5N-1	.05 Mf. 400 V. Condenser
4.	7N-1	.0001 Mf. Mica Condenser
5.	4N-1	50 M. Ohm Resistor
6.	11N-1	Input I. F. Coil
7.	11N-2	Output I. F. Coil
8.	4N-2	1 Megohm Resistor
9.	4N-3	25 M. Ohm
10.	5N-2	.1 Mf. 400 V. Condenser
11.	5N-3	.00025 Mf. 600 V. Condenser
12.	4N-4	250 M. Ohm Resistor
13.	5N-4	.01 Mf. 400 V. Condenser
14.	16N-1	.5 Mogohm Potentiometer and Switch
15.	5N-5	.005 Mf. 600 V. Condenser
16.	5N-6	.0015 Mf. 600 V. Condenser
17.	4N-5	38 M. Ohm Resistor
18.	35N-1	Loud Speaker
19.	14N-1	Filament Choke
20.	6N-1	10 Mf. 6 V. Electrolytic Condenser
21.	6N-2	8 Mf. 6 V. Electrolytic Condenser
22.	14N-2	Filter Choke
23.	12N-1	Secondary R. F. Choke
24.	5N-7	.005 Mf. 1600 V. Buffer Condenser
25.	5N-8	.5 Mf. 160 V. Condenser
26.	12N-2	Primary R. F. Choke
27.		Vibrator (Socket Connections)
28.	32N-1	Dial Light Bulbs, 6 V. .06 Amp.
29.	3N-1	33 Ohm Wire Wound Resistor
30.	16N-2	.5 Megohm Volume Control
31.	3N-2	400 Ohm Wire Wound Center Tapped Resistor
32.	4N-5	38 M. Ohm Resistor
	17N-1	Dial Unit Complete
	34N-1	Cabinet

Model EN-6-4 can be operated, without special shielded cable, at a distance from the storage battery that is dependent on the gauge of wire used to extend the cable supplied with the radio. The following guide may be of assistance in making such an installation: For a distance of 10 feet between the radio and battery, use 12 Ga. Wire.
For a distance of 30 feet between the radio and battery, use 8 Ga. Wire.

Electrical Specifications

Tuning Range: 540–1720 K. C.

Tube Complement:

(1) 1C6—First Detector and Oscillator.
(2) 1A4—Intermediate Frequency Amp.
(3) 1B5/25S—Second Det., A. F. and A. V. C.
(4) 1F4—Power Output Amplifier.

Alignment Frequencies:
1400 K. C. (Oscillator and Antenna).
600 K. C. (Oscillator).

Intermediate Frequency: 457 K. C.
Battery Current Drain: 1 Ampere, or 6 Watts.
Power Output: Undistorted .4 Watt, Maximum .6 Watt.

I. F. Adjustments—A. Connect test oscillator output leads to control grid cap of 1C6 and to the chassis. Adjust oscillator to 457 K. C. and turn the receiver to a point where no interference is received from the heterodyne oscillator or from a local station. B. Adjust trimmers in top of I. F. coil shield cans for maximum output from the receiver as shown by an output meter.

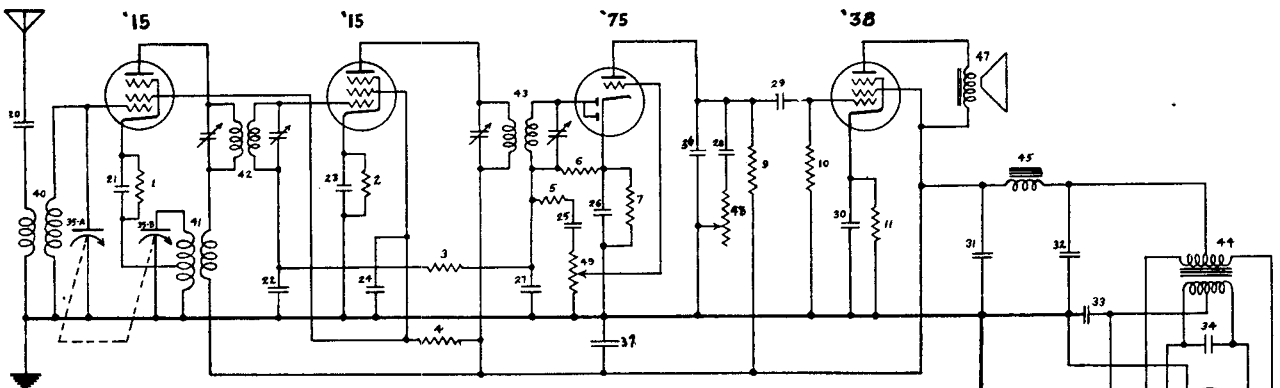
R. F. Adjustments—Check dial calibration of dial scale by turning the variable condenser to the "full-in" position and make sure that the dial pointer registers the end of the scale. Then tune to 1400 K. C. on the dial, adjust test oscillator to 1400 K. C. and adjust trimmers on top of tuning condenser for maximum output as shown by an output meter.

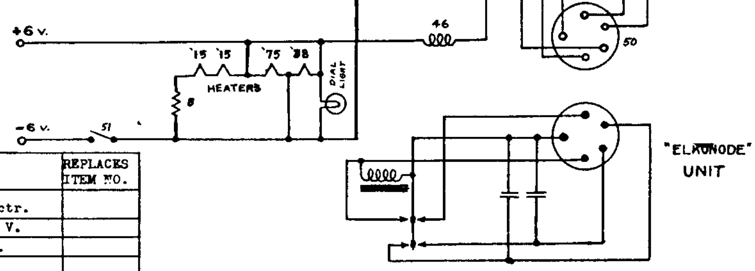
Vibrator Unit—The vibrator power unit supplies the proper B and C voltages for the set's operation. It contains a plug-in vibrator, step-up transformer, and filter system. No adjustments should be undertaken on the vibrator unit, as it has been properly adjusted with precision equipment for a long service life.

Voltages—Proper voltage in 1F4 Screen and R. F. and I. F. tube plates on a fully charged battery is 125 to 130 volts. R. F. and I F. Screen voltage is 55 to 60 volts.

L. TATRO PRODUCTS CORP.

MODELS H465 & I465





ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.
1	2L-24	5000 ohms 1/4 watt	
2	2L-17A	800 ohms 1/2 watt	
3	2L-57	1 megohm 1/4 watt	
4	2L-44	100M ohms 1/4 watt	
5	2L-44	100M ohms 1/4 watt	
6	2L-53	500M ohms 1/4 watt	
7	2L-24	5000 ohms 1/4 watt	
8	1L-1F	10 ohms 10 watt	
9	2L-53	500M Ohms 1/4 watt	
10	2L-57	1 megohm 1/4 watt	
11	2L-19A	1500 ohms 1/2 watt	
12			
13			
14			
15			
16			
17			
18			
19			
20	3L-16	.02 MFD 400 V.	
21	3L-24	.0015 MFD 600 V.	
22	3L-17	.05 MFD 400 V.	
23	3L-18	.10 MFD 400 V.	
24	3L-18	.10 MFD 400 V.	
25	3L-16	.02 MFD 400 V.	

ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.
26	4L-5	10 MFD 6V. Electr.	
27	3L-12	.00025 MFD 400 V.	
28	3L-40	.005 MFD 600 V.	
29	3L-17	.05 MFD 400 V.	
30	4L-11	10 MFD 25v. Electr.	
31	4L-1	8 MFD 250v. Electr.	
32	4L-1	8 MFD 250v. Electr.	
33	3L-60	1 MFD 200v.	
34	3L-10H	.5 MFD 200 V.	
35A	7L-1	Ant. section V. C.	
35B	7L-1	Osc. section V. C.	
36	3L-23	.0005 MFD 600 V.	
37	3L-17	.05 MFD 400 V.	
38			
39			
40	8L-1	Antenna Coil	
41	8L-2	Osc. Coil with item 42	
42	8L-2	Comp. I F trans. 456	
43	8L-3	2nd I F trans. 456 KC	

ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.
44	9L-1	Power transformer	
45	9L-11	Filter choke AF	
46	8L-4	RF Filter choke	
47	18L-1	Magnetic speaker	
48	10L-11	Tone Control	
49	10L-1	Volume Control	
50	13L-2	5 prong socket	
51		Switch with item 49	

I.F. 456 K.C.

The Model H & I is a low drain highly efficient 4 tube superheterodyne receiver operating from a 6 volt storage battery, and requires no B or C batteries. The six volt current from the battery is converted by means of an efficient rectifying vibrator and power transformer to the high voltage necessary for B and C supply. The two type '15 tube filaments are connected in series so that failure of type '15 filament will cause both type '15 tubes to become inoperative.

The colored "A" battery lead must be connected to the positive terminal of the storage battery, or the set will be inoperative and will draw abnormal battery current.

If all the tubes light and the receiver fails to function, make sure the 'Elkonode' vibrator is operating, and check for defective tubes by substitution in a normally operating receiver. Other suspected faulty parts are also best checked by the substitution method.

Drawing Number 3A1 shows the complete circuit diagram with itemized parts list. In ordering replacement parts always use the part numbers shown to facilitate filling orders and to avoid mistakes and delay.

Tube socket voltage readings:

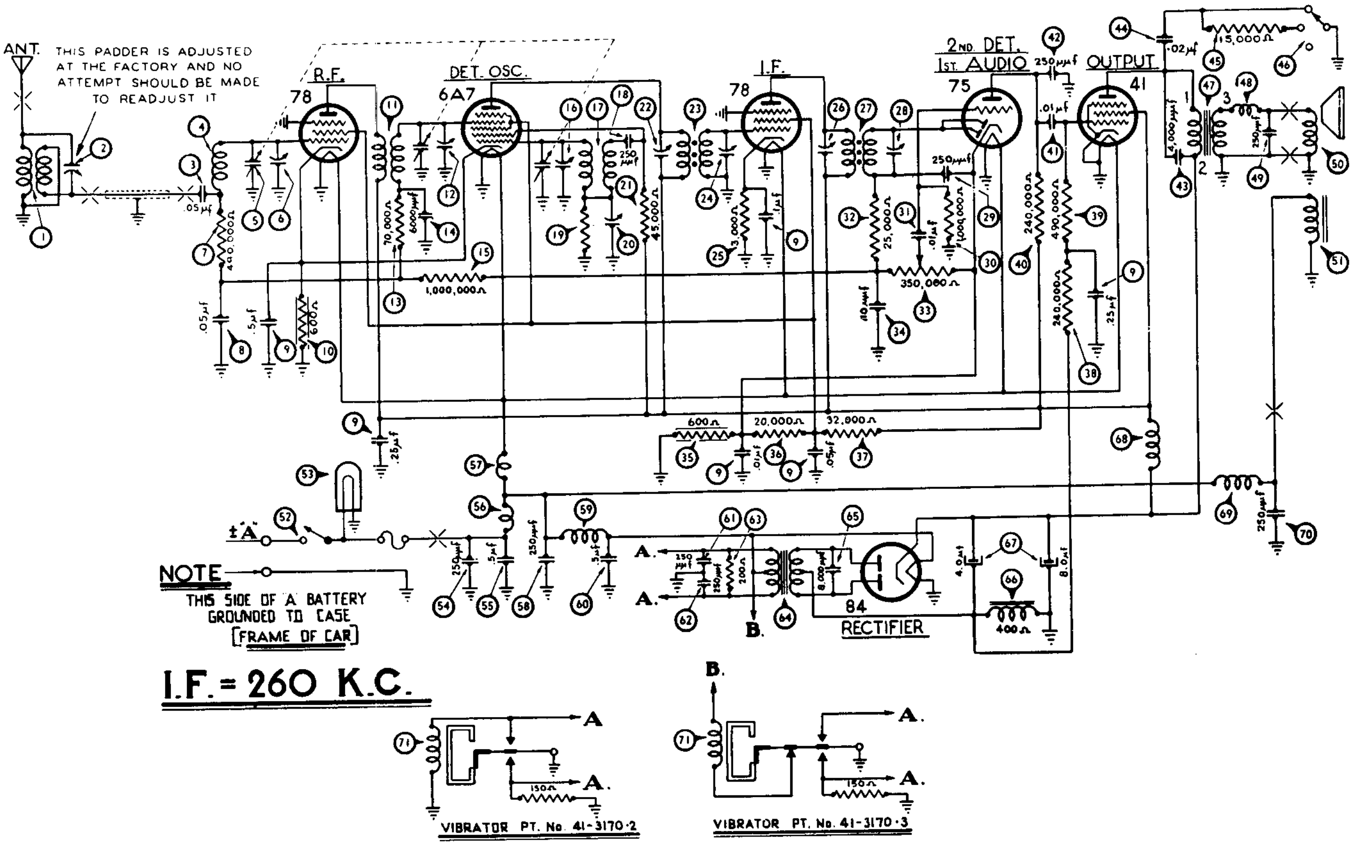
Tube	Use	(a) cathode	screen	* plate
'15	1st det.	3.5 v.	72 v.	154 v.
'15	IF ampl.	1.6 v.	72 v.	154 v.
'75	2nd det.	0.5 v.	(none)	42 v.
'38	Output.	13.5 v.	154 v.	144 v.

(a) measured with a voltmeter having a resistance of 30,000 ohms.
(*) measured with a voltmeter having a resistance of 300,000 ohms.
All measurements made from points indicated to chassis.

No adjustments are to be made to any trimmer condensers, either I.F. or R.F. without the aid of a correctly calibrated signal generator of reliable make used in conjunction with a high resistance output meter connected from plate to screen of the type 38 output tube. The normal frequency is 456 KC.

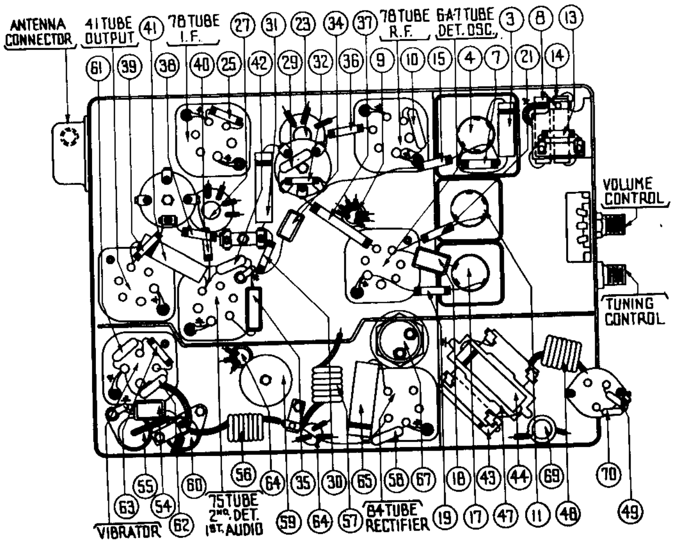
TRANSITONE AUTOMOBILE RADIO CORP.

MODEL F1440 "FORD"



PARTS LIST

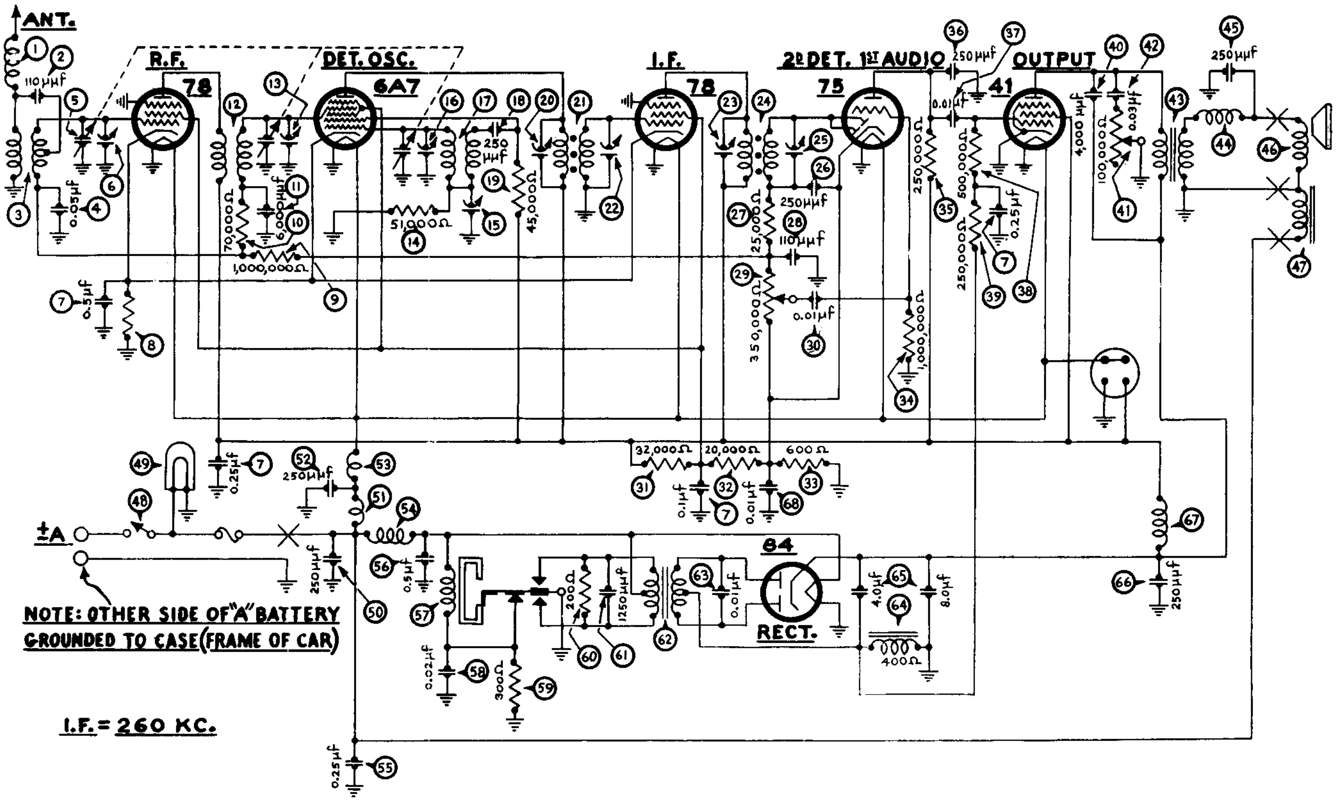
No.	Description	Part No.
1	Roof antenna transformer	32-2418
2	Padder	31-6165
3	Condenser (.05 mfd.)	30-4444
4	Receiver antenna transformer	32-2422
5	Tuning condenser	31-1954
6	First padder (on tun. cond.)	
7	Resistor (490,000 ohms)	33-449344
8	Condenser (.05 mfd.)	30-4444
9	Condenser (.01, .05, .1, .25, .25, .5 mfd.)	30-4478
10	Resistor (600 ohms)	33-1212
11	R. F. transformer	32-2231
12	Second padder (on tun. cond.)	
13	Resistor (70,000 ohms)	33-370344
14	Condenser (6000 mmfd.)	30-4445
15	Resistor (1,000,000 ohms)	33-510344
16	Third padder (on tun. cond.)	
17	Oscillator transformer	32-2232
18	Condenser (250 mmfd.)	30-1032
19	Resistor (99,000 ohms)	33-399344
20	Low frequency padder	31-6056
21	Resistor (45,000 ohms)	33-345344
22	Padder (Pri. 1st I. F. trans.)	
23	First I. F. transformer	32-2286
24	Padder (Sec. 1st I. F. trans.)	
25	Resistor (3000 ohms)	33-230344
26	Padder (Pri. 2nd I. F. trans.)	
27	Second I. F. transformer	32-2167
28	Padder (Sec. 2nd I. F. trans.)	
29	Condenser (250 mmfd.)	30-1032
30	Resistor (1,000,000 ohms)	33-510344
31	Condenser (.01 mfd.)	30-4124
32	Resistor (25,000 ohms)	33-325344
33	Volume control (350,000 ohms)	33-5139
34	Condenser (110 mmfd.)	30-1031
35	Resistor (600 ohms)	33-1212
36	Resistor (20,000 ohms)	33-320344
37	Resistor (32,000 ohms)	33-332444
38	Resistor (240,000 ohms)	33-424344
39	Resistor (490,000 ohms)	33-449344
40	Resistor (240,000 ohms)	33-424344
41	Condenser (.01 mfd.)	30-4145
42	Condenser (250 mmfd.)	30-1032
43	Condenser (4000 mmfd.)	30-4185
44	Condenser (.02 mfd.)	30-4419
45	Resistor (15,000 ohms)	33-315344
46	Tone control switch	42-1139
47	Output transformer	32-7495
48	Choke	32-1374
49	Condenser (250 mmfd.)	30-1032
50	Cone & voice coil	36-3586
51	Field coil assembly	32-9236
52	On & Off switch	42-1277
53	Pilot lamp	34-2040
54	Condenser (250 mmfd.)	30-1032
55	Condenser (.5 mfd.)	30-4474
56	"A" choke	32-1374
57	Filament choke	32-1561
58	Condenser (250 mmfd.)	30-1032
59	Vibrator choke	32-2249
60	Condenser (.5 mfd.)	30-4474
61	Condenser (250 mmfd.)	30-1032
62	Condenser (250 mmfd.)	30-1032
63	Resistor (200 ohms)	33-120344
64	Power transformer	32-7720
65	Condenser (8000 mmfd.)	30-4420
66	Filter choke	32-7722
67	Filter condenser	30-2168
68	"B" choke	32-1281
69	Choke	32-2269
70	Condenser (250 mmfd.)	30-1032
71	Vibrator (OPTIONAL)	41-3170-2 41-3170-3
	Four prong socket	27-6044
	Five prong socket	27-6035
	Six prong socket	27-6036
	Seven prong socket	27-6037
	Tuning shaft	28-8699
	Volume shaft	28-8714



No.	Description	Part No.
	Knob	27-4437
	Pilot lamp assembly	38-8265
	Dial	27-4456
	Glass	27-8656
	Pointer	27-4457
	Fuse	7227
	Fuse insulator	27-7729
	Speaker cable	41-3250
	"U" clamp (cont. mtg.)	28-4680
	Transformer lead (shield)	L-2651
	Transformer assembly	32-2424

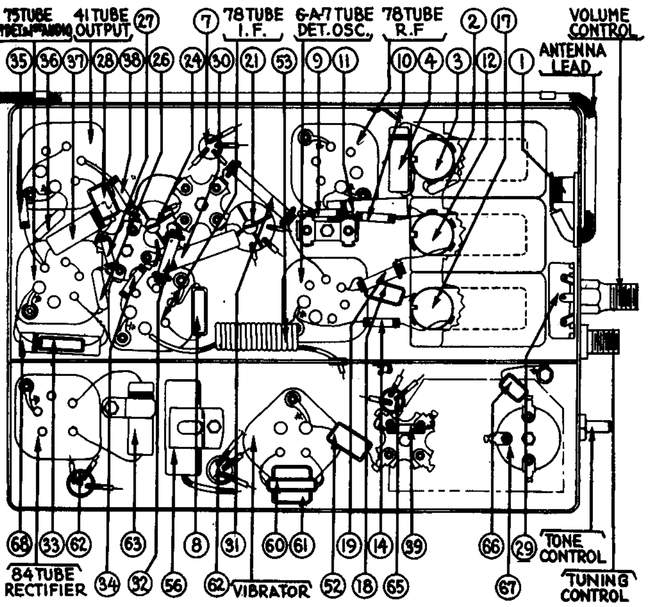
TRANSITONE AUTOMOBILE RADIO CORP.

MODEL FT9 "FORD"



MODEL FT-9 — PARTS LIST

No.	Description	Part No.
1	Antenna Choke	38-7219
2	Condenser (110 mmfd.)	30-1031
3	Antenna Transformer	32-1939
4	Condenser (.05 mfd.)	30-4020
5	Tuning Condenser	31-1674
6	First Padder (on tun. cond.)	.....
7	Condenser .1-.25-.25-.5 mfd.)	30-4374
8	Resistor (400 ohms)	33-1211
9	Resistor (1,000,000 ohms)	33-1096
10	Resistor (70,000 ohms)	33-1115
11	Condenser (6000 mmfd.)	30-4125
12	R. F. Transformer	32-1926
13	Second Padder (on tun. cond.)	.....
14	Resistor (51,000 ohms)	6098
15	Low Frequency Padder	31-6066
16	Third Padder (on tun. cond.)	.....
17	Oscillator Transformer	32-1927
18	Condenser (250 mmfd.)	30-1032
19	Resistor (45,000 ohms)	5256
20	Padder (Pri 1st I.F. transf.)	.....
21	First I. F. Transformer	32-1928
22	Padder (Sec: 1st I. F. transf.)	...
23	Padder (Pri. 2nd I.F. transf.)	....
24	Second I. F. transformer	32-1929
25	Padder (Sec. 2nd I.F. transf.)	....
26	Condenser (250 mmfd.)	30-1032
27	Resistor (25,000 ohms)	33-1013
28	Condenser (110 mmfd.)	30-1031
29	Volume Control (350,000 ohms)	33-5139
30	Condenser (.01 mfd.)	30-4124
31	Resistor (32,000 ohms)	3525
32	Resistor (20,000 ohms)	6650
33	Resistor (600 ohms)	33-1212
34	Resistor (1,000,000 ohms)	33-1096
35	Resistor (250,000 ohms)	33-1097
36	Condenser (250 mmfd.)	30-1032
37	Condenser (.01 mfd.)	30-4145
38	Resistor (500,000 ohms)	6097
39	Resistor (250,000 ohms)	33-1097
40	Condenser (4000 mmfd.)	30-4185
41	Tone Control (100,000 ohms)	33-5101
42	Condenser (.03 mfd.)	30-4380
43	Output Transformer	32-7495
44	Choke	32-1644
45	Condenser (250 mmfd.)	30-1032
46	Cone and Voice Coil	36-3526
47	Field Coil Assembly	32-9236
48	On and Off Switch	42-5422
49	Pilot Lamp	34-2039
50	Condenser (250 mmfd.)	30-1032
51	"A" Choke	32-1644
52	Condenser (250 mmfd.)	30-1032
53	Choke	32-1930
54	Vibrator Choke	32-1968
55	Condenser (.25 mfd.)	30-4146
56	Condenser (.5 mfd.)	30-4047
57	Vibrator	38-5036
58	Condenser (.02 mfd.)	30-4039
59	Resistor (300 ohms)	33-3130
60	Resistor (200 ohms)	33-1210
61	Condenser (1250 mmfd.)	5886
62	Power Transformer	32-7488
63	Condenser (.01 mfd.)	30-4381
64	Filter Choke	32-7491
65	Filter Condenser	30-2134
66	Condenser (250 mmfd.)	30-1032
67	R. F. Choke	32-1932
68	Condenser (.01 mfd.)	30-4124
	Four-hole Socket	27-6044
	Five-hole socket	27-6035
	Six-hole Socket	27-6036
	Seven-hole Socket	27-6037
	Tuning and Volume Shaft	28-8435
	Pilot Lamp Assembly	38-7217
	Glass	27-7757
	Face Assembly	28-3444
	Pointer	28-2605
	Knob	27-4249
	"U" Clamp (control mtg.)	29-2699
	Wing Nut (control mtg.)	W1321
	Tee Bolt (set mtg.)	28-6161
	Nut (set mtg.)	W518A



— *Model FT9 Base View*

No.	Description	Part No.	No.	Description	Part No.
	Fuse	7227		Dome Light Condenser	30-4388
	Fuse Insulator	27-7729		Oil Gauge Condenser	30-4307
	Distributor Condenser	30-4176		Speaker Cable	41-3167
	Generator Condenser	30-4181		Tow Strap	36-3432
	Gas gauge Condenser	30-4387		Antenna Lead	L-1921
				Receiver Housing	38-1567

TRANSITONE AUTOMOBILE RADIO CORP.

MODEL F1440 "FORD"

I. F. TRANSFORMERS AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

Both the primary and secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 4).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 3.

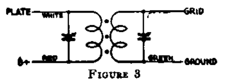


FIGURE 3

If replacements are ever necessary, replace the entire coil assembly, 32-2286 for the first I. F. stage and 32-2167 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL F-1440 ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER—The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR—With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F.—Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder (22) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (24) for maximum reading. (See Figure 4 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder (26) on the first I. F. transformer for the maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading. Readjust padders (26) and (25) with the generator lead connected to the type 6A7 tube. (See Figure 4 for location of padders).

HIGH FREQUENCY AND R. F.—After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Using a piece of paper approximately .006" thick as a gauge between the heel of the rotor plates and the stator plates, turn the rotor plates in mesh until they strike against the paper.

With the tuning condenser in this position adjust the high frequency padder (16) and the R. F. padder (12) until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

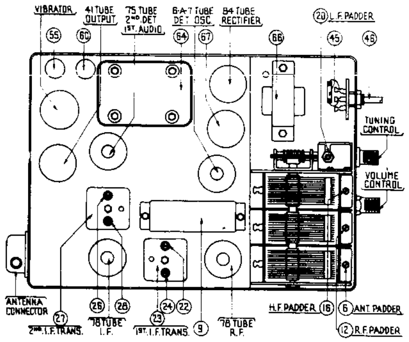


FIGURE 4

LOW FREQUENCY—Turn the tuning condenser plates in mesh to approximately 600 K. C., 60 on the dial scale and set the signal generator at 600 K. C. Roll the tuning condenser and adjust the low frequency padder screw (20) for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT—Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder (16) again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

ANTENNA—WHEN PADDING THE ANTENNA STAGE, IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE CONSTRUCTED AND USED AND THAT THE ANTENNA TRANSFORMER ASSEMBLY AND LEAD (Part No. 32-2424) BE CONNECTED TO THE RECEIVER.

Connect a 15 mmfd. condenser (Part No. 30-1080) in series between the signal generator and the socket on the Antenna transformer assembly. Then connect the transformer lead to the Antenna connector on the Receiver housing.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders (12) and (6) for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

MODEL FT9 FORD

I. F. Transformers and Padders
Model FT9

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Fig. 2).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

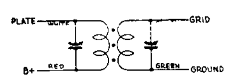


FIGURE 1

If replacements are ever necessary, replace the entire coil assembly, 32-1928 for the first I. F. stage and 32-1929 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

Model FT9 Adjustments

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments to the Model FT9 are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

The tone control should be turned to the brilliant position.

I. F. — Adjust the signal generator to exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser.

Adjust the secondary screw padder (22) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (20) for maximum reading. (See Fig. 2 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser. Adjust the secondary screw padder (29) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading. (See Figure 2 for location of padders).

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube. Adjust the signal generator to 1600 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser.

Turn the tuning condenser plates out of mesh as far as they will go. With the tuning condenser in this position, adjust the high frequency padder (16) and the R. F. padder (13) until the maximum reading is obtained on the output meter. This is the true setting for 1600 K. C., 160 on the dial scale.

LOW FREQUENCY — Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and adjust the signal generator to 580 K. C. Roll the tuning condenser and adjust the low frequency padder screw (15) for maximum reading on the output meter.

HIGH FREQUENCY RE-ADJUSTMENT — Turn the tuning condenser plates out of mesh as far as they will go and adjust the signal generator to 1600 K. C. Then adjust the high frequency padder (16) again for maximum reading on the output meter.

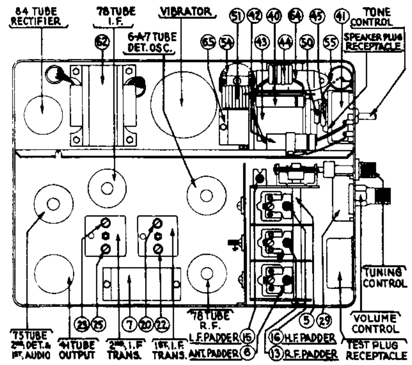


FIGURE 2 — *FT9 Top View*

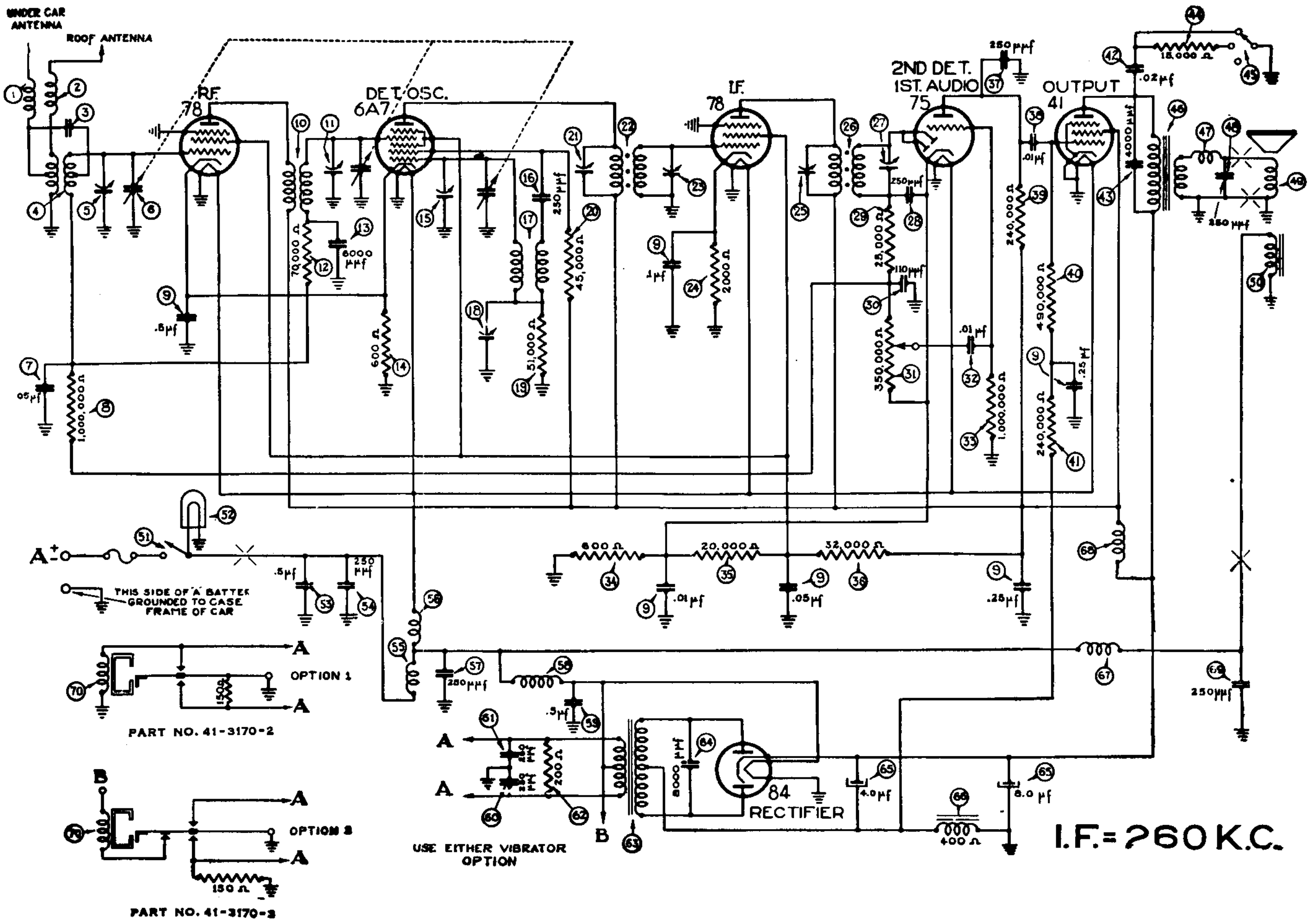
ANTENNA — Connect the generator lead to the antenna lead using a 125 mmfd. condenser in series between the two leads. Turn the tuning condenser to 1400 K. C. and set the generator for 1400 K. C. Adjust the padders (13) and (6) for maximum reading on the output meter.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator has been used, the Receiver will be adjusted properly.

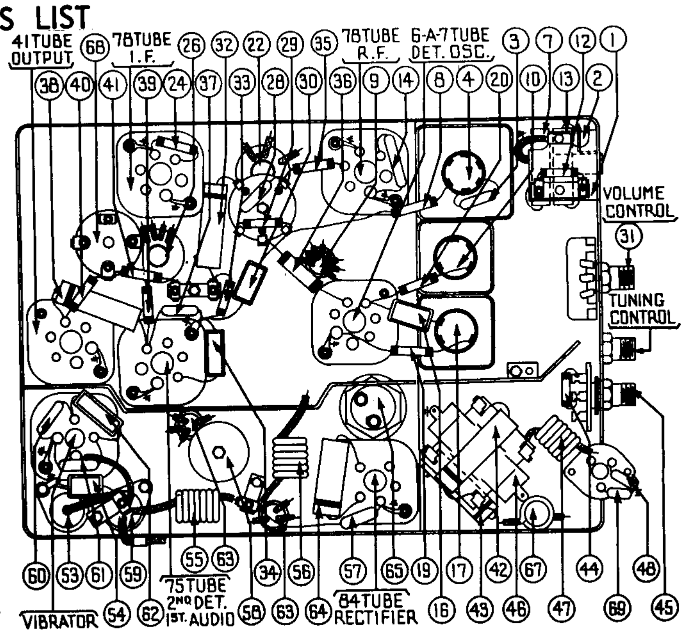
NOTE: When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. The signal generator output lead should be connected to a wire placed near the car antenna but not connected to it.

TRANSITONE AUTOMOBILE RADIO CORP.

MODEL S1431 "STUDEBAKER"



PARTS LIST



No.	Description	Part No.
1	Antenna Choke	38-8106
2	Antenna Choke	38-8106
3	Condenser (70 mmfd.)	30-1068
4	Antenna Transformer	32-2281
5	First Padder (on tun. cond.)	
*6	Tuning Condenser	31-1912
7	Condenser (.05 mfd.)	30-4444
8	Resistor (1,000,000 ohms)	33-510344
9	Condenser (.01-.05-.1-.25-.25-.5 mfd)	30-4478
10	R. F. Transformer	32-2231
11	Second Padder (on tun. cond.)	
12	Resistor (70,000 ohms)	33-370344
13	Condenser (6,000 mmfd.)	30-4445
14	Resistor (600 ohms)	33-1212
15	Third Padder (on tun. cond.)	
16	Condenser (250 mmfd.)	30-1032
17	Oscillator Transformer	32-2232
*18	Low Frequency Padder	31-6056
19	Resistor (51,000 ohms)	33-351344
20	Resistor (45,000 ohms)	33-345344
21	Padder (Pri. 1st I.F. Trans.)	
22	First I. F. Transformer	32-2286
23	Padder (Sec. 1st I.F. Trans.)	
24	Resistor (2,000 ohms)	33-220334
25	Padder (Pri. 2nd I. F. Trans.)	
26	Second I. F. Transformer	32-2167
27	Padder (Sec. 2nd I. F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (110 mmfd.)	30-1031
31	Volume Control (350,000 ohms)	33-5139
32	Condenser (.01 mfd.)	30-4479
33	Resistor (1,000,000 ohms)	33-510344
34	Resistor (600 ohms)	33-1212
35	Resistor (20,000 ohms)	33-320334
36	Resistor (32,000 ohms)	33-332444
37	Condenser (250 mmfd.)	30-1032
38	Condenser (.01 mfd.)	30-4145
39	Resistor (240,000 ohms)	33-424344
40	Resistor (490,000 ohms)	33-449344
41	Resistor (240,000 ohms)	33-424344

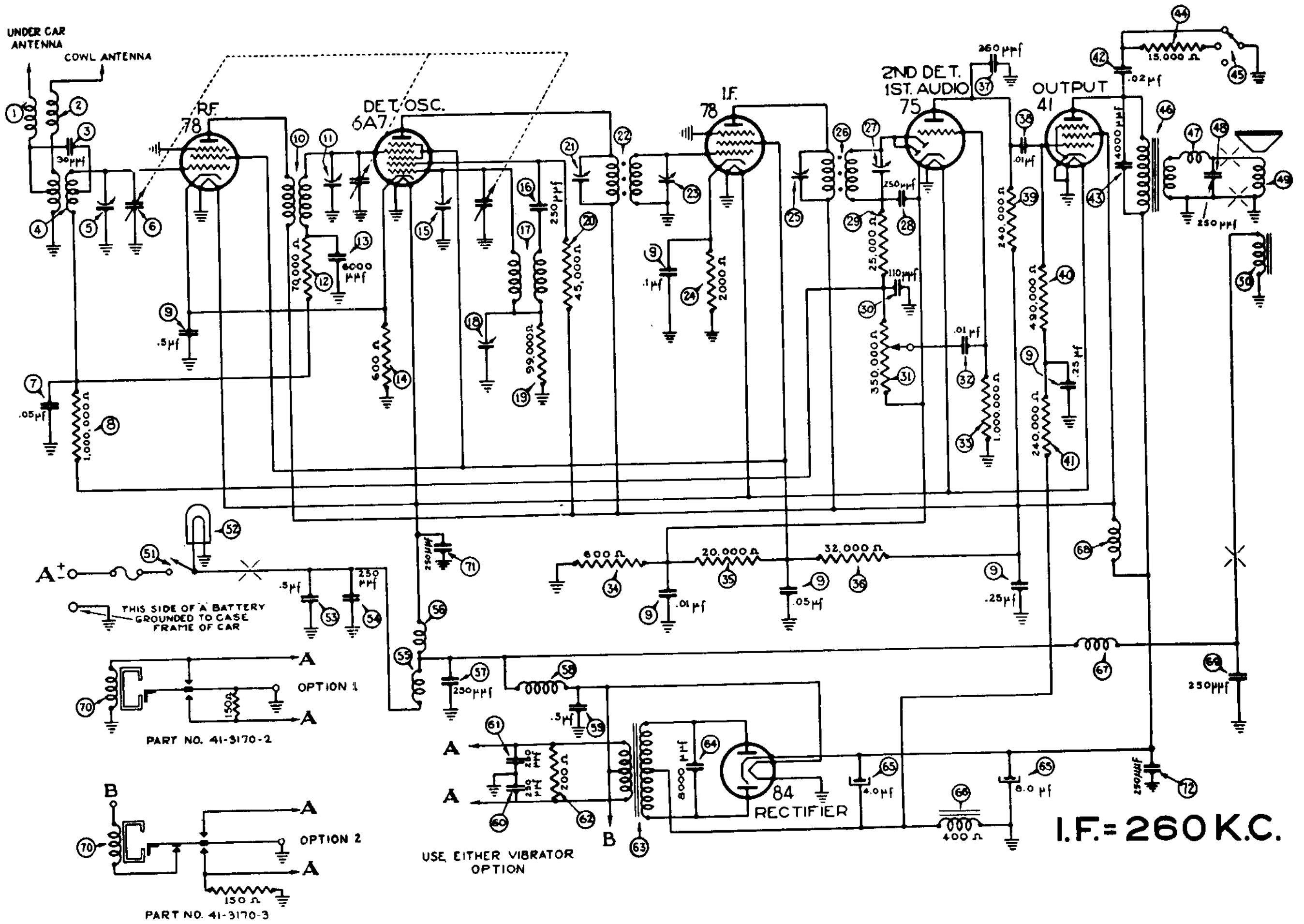
No.	Description	Part No.
42	Condenser (.02 mfd.)	30-4419
43	Condenser (4,000 mmfd.)	30-4185
44	Resistor (15,000 ohms)	33-315344
*45	Tone Control Switch	42-1273
*46	Output Transformer	32-7495
47	Choke	32-1374
48	Condenser (250 mmfd.)	30-1032
49	Cone and Voice Coil	36-3526
*50	Field Coil Assembly	32-9236
*51	On and Off Switch Assembly	42-5617
52	Pilot Lamp	34-2039
53	Condenser (.5 mfd.)	30-4474
54	Condenser (250 mmfd.)	30-1032
55	"A" Choke	32-1374
56	Filament Choke	32-1561
57	Condenser (250 mmfd.)	30-1032
58	Vibrator Choke	32-2249
59	Condenser (.5 mfd.)	30-4474
60	Condenser (250 mmfd.)	30-1032
61	Condenser (250 mmfd.)	30-1032
62	Resistor (200 ohms)	33-120344
63	Power Transformer	32-7720
64	Condenser (8,000 mmfd.)	30-4420
65	Filter Condenser (4-8 mfd.)	30-2168
66	Filter Choke	32-7722
67	Choke	32-2269
68	"B" Choke	32-1281
69	Condenser (250 mmfd.)	30-1032
70	Vibrator (Optional)	41-3170-2
	Vibrator (Optional)	41-3170-3
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	Inductive Suppressor	32-2250
	Interference Condenser	30-4007
	Distributor Condenser	30-1087
	Fuse	7227
	Fuse Insulator	27-7729
	Static Collector (Pres.)	28-3584
	Static Collector (Dict.)	38-7405
	Tee Bolt (Rec. mtg.)	28-6161
	Nut (Rec. Mtg.)	W-518A

No.	Description	Part No.	No.	Description	Part No.
	Speaker Cable	41-3231		Volume Shaft	28-8667
	Ground Strap	38-7425		Tone Control Shaft	28-8668
	Tuning and Volume Knob	28-7211		Scale Assembly	42-5630
	Tone Control Knob	28-7212		Receiver Housing	38-1727
	Tuning Shaft	28-8666			

Note: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicago.

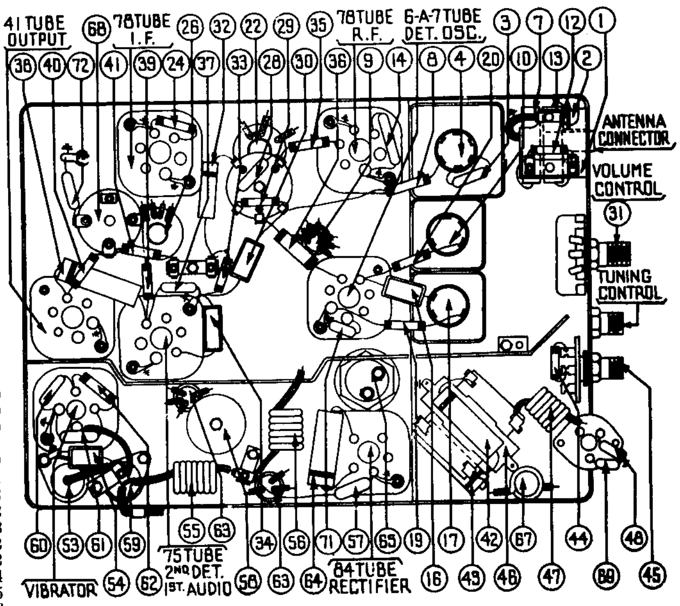
TRANSITONE AUTOMOBILE RADIO CORP.

MODEL S1437 "STUDEBAKER"



MODEL S-1437 PARTS LIST

No.	Description	Part No.
1	Antenna Choke	38-8106
2	Antenna Choke	38-8106
3	Condenser (30 mmfd.)	30-1059
4	Antenna Transformer	32-2461
5	First Padder (on tun. cond.)	
*6	Tuning Condenser	31-1912
7	Condenser (.05 mfd.)	30-4444
8	Resistor (1,000,000 ohms)	33-510344
9	Condenser (.01-.05-.1-.25-.25-.5 mfd)	30-4478
10	R. F. Transformer	32-2231
11	Second Padder (on tun. cond.)	
12	Resistor (70,000 ohms)	33-370344
13	Condenser (6,000 mmfd.)	30-4445
14	Resistor (600 ohms)	33-1212
15	Third Padder (on tun. cond.)	
16	Condenser (250 mmfd.)	30-1032
17	Oscillator Transformer	32-2232
*18	Low Frequency Padder	31-6056
19	Resistor (99,000 ohms)	33-399344
20	Resistor (45,000 ohms)	33-345344
21	Padder (Pri. 1st I.F. Trans.)	
22	First I. F. Transformer	32-2286
23	Padder (Sec. 1st I.F. Trans.)	
24	Resistor (2,000 ohms)	33-220334
25	Padder (Pri. 2nd I.F. Trans.)	
26	Second I. F. Transformer	32-2167
27	Padder (Sec. 2nd I.F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (110 mmfd.)	30-1031
31	Volume Control (350,000 ohms)	33-5139
32	Condenser (.01 mfd.)	30-4479
33	Resistor (1,000,000 ohms)	33-510344
34	Resistor (600 ohms)	33-1212
35	Resistor (20,000 ohms)	33-320334
36	Resistor (32,000 ohms)	33-332444
37	Condenser (250 mmfd.)	30-1032
38	Condenser (.01 mfd.)	30-4145
39	Resistor (240,000 ohms)	33-424344
40	Resistor (490,000 ohms)	33-449344
41	Resistor (240,000 ohms)	33-424344
42	Condenser (.02 mfd.)	30-4495
43	Condenser (4,000 mmfd.)	30-4185
44	Resistor (15,000 ohms)	33-315344
*45	Tone Control Switch	42-1273
*46	Output Transformer	32-7495
47	Choke	32-1374
48	Condenser (250 mmfd.)	30-1032
49	Cone and Voice Coil	36-3526
*50	Field Coil Assembly	32-9236
*51	On & Off Switch Assembly	42-5617
52	Pilot Lamp	34-2039
53	Condenser (.5 mfd.)	30-4474
54	Condenser (250 mmfd.)	30-1032
55	"A" Choke	32-1374
56	Filament Choke	32-1438
57	Condenser (250 mmfd.)	30-1032
58	Vibrator Choke	32-2537
59	Condenser (.5 mfd.)	30-4474
60	Condenser (250 mmfd.)	30-1032
61	Condenser (250 mmfd.)	30-1032
62	Resistor (200 ohms)	33-120344
63	Power Transformer	32-7720
64	Condenser (8,000 mmfd.)	30-4420
65	Filter Condenser (4-8 mfd.)	30-2179
66	Filter Choke	32-7722
67	Choke	32-2269
68	"B" Choke	32-1281
69	Condenser (250 mmfd.)	30-1032
70	Vibrator (OPTIONAL)	41-3170-2 41-3170-3
71	Condenser (250 mmfd.)	30-1032
72	Condenser (250 mmfd.)	30-1032
	Four-prong Socket	27-6044
	Five-prong Socket	27-6035
	Six-prong Socket	27-6036
	Seven-prong Socket	27-6037
	Inductive Suppressor	32-2250
	Interference Condenser	30-4007
	Distributor Condenser	30-1087
	Fuse	7227
	Fuse Insulator	27-7729
	Static Collector (Pres.)	28-3584
	Static Collector (Dict.)	38-7405



No.	Description	Part No.	No.	Description	Part No.
	Tee Bolt (Rec. Mtg.)	28-6161		Tuning Shaft	28-8666
	Nut (Rec. Mtg.)	W-518A		Volume Shaft	28-8667
	Speaker Cable	41-3231		Tone Control Shaft	28-8668
	Ground Strap	38-7425		Scale Assembly	42-5630
	Tuning & Volume Knob	28-7211		Receiver Housing	38-1727
	Tone Control Knob	28-7212			

NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be neccssary to order these parts from Philco Transitone, Philadelphia or Chicago.

TRANSITONE AUTOMOBILE RADIO CORP.

MODEL S1431 "STUDEBAKER"

I. F. TRANSFORMERS AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 4).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 8.

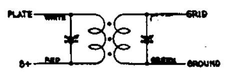


Figure 8

If replacements are ever necessary, replace the entire coil assembly, 32-2286 for the first I. F. stage and 32-2167 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL S-1431 ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER—The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR—With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F.—Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder 27 on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder 26 for maximum reading. (See Figure 4 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder 23 on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder 21 for maximum reading. (See Figure 4 for location of padders).

HIGH FREQUENCY AND R. F.—After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Using a piece of paper approximately .006" thick as a gauge between the heel of the rotor plates and the stator plates, turn the rotor plates in mesh until they strike against the paper.

With the tuning condenser in this position, adjust the high frequency padder 15 and the R. F. padder 11 until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

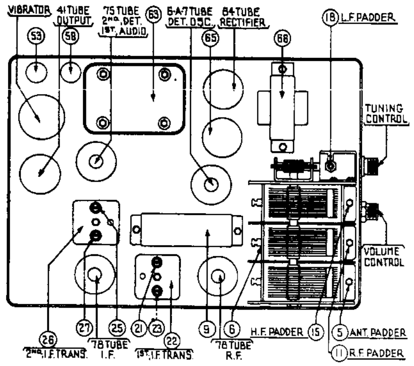


Figure 4

LOW FREQUENCY—Turn the tuning condenser plates in mesh to approximately 600 K. C., 60 on the dial scale and set the signal generator at 600 K. C. Roll the tuning condenser and adjust the low frequency padder screw 18 for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT—Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder 15 again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

ANTENNA—When padding the antenna stage it is extremely important that the proper dummy antenna be constructed and used.

Connect the signal generator lead to the antenna cable assembly (made up of Part No. L-2520 lead, and a 64 mmfd. condenser in series between the lead and the signal generator. Plug the cable into the ROOF ANTENNA CONNECTOR on the end of the Receiver.

Follow this padding procedure regardless of whether the Receiver is used with the Roof or Under-car antenna.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders 11 and 5 for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

MODEL S1437 "STUDEBAKER"

I. F. TRANSFORMERS AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 4).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 8.

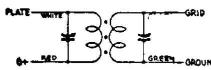


Figure 8

If replacements are ever necessary, replace the entire coil assembly, 32-2286 for the first I. F. stage and 32-2167 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL S-1437 ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A or 09⁰ Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER—The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR—With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F.—Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder 27 on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder 26 for maximum reading. (See Figure 4 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder 23 on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder 21 for maximum reading. Readjust padders 26 and 27 with the generator lead connected to the type 6A7 tube. (See Figure 4 for location of padders).

HIGH FREQUENCY AND R. F.—After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Using a piece of paper approximately .006" thick as a gauge between the heel of the rotor plates and the stator plates, turn the rotor plates in mesh until they strike against the paper.

With the tuning condenser in this position, adjust the high frequency padder 15 and the R. F. padder 11 until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

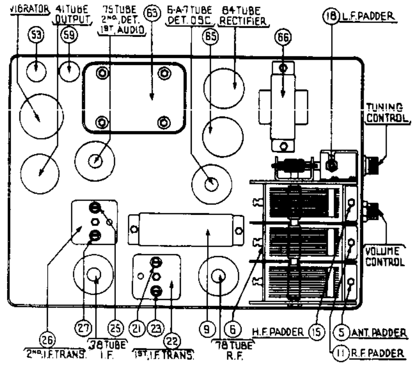


Figure 4

LOW FREQUENCY—Turn the tuning condenser plates in mesh to approximately 600 K. C., 60 on the dial scale and set the signal generator at 600 K. C. Roll the tuning condenser and adjust the low frequency padder screw 18 for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT—Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder 15 again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

ANTENNA—WHEN PADDING THE ANTENNA STAGE IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE CONSTRUCTED AND USED.

Connect the signal generator lead to the antenna cable assembly, made up of Part No. L-2650 lead, and a 22 mmfd. condenser (Part No. 30-1067) in series between the lead and the signal generator. Plug the cable into the COWL ANTENNA CONNECTOR on the end of the Receiver.

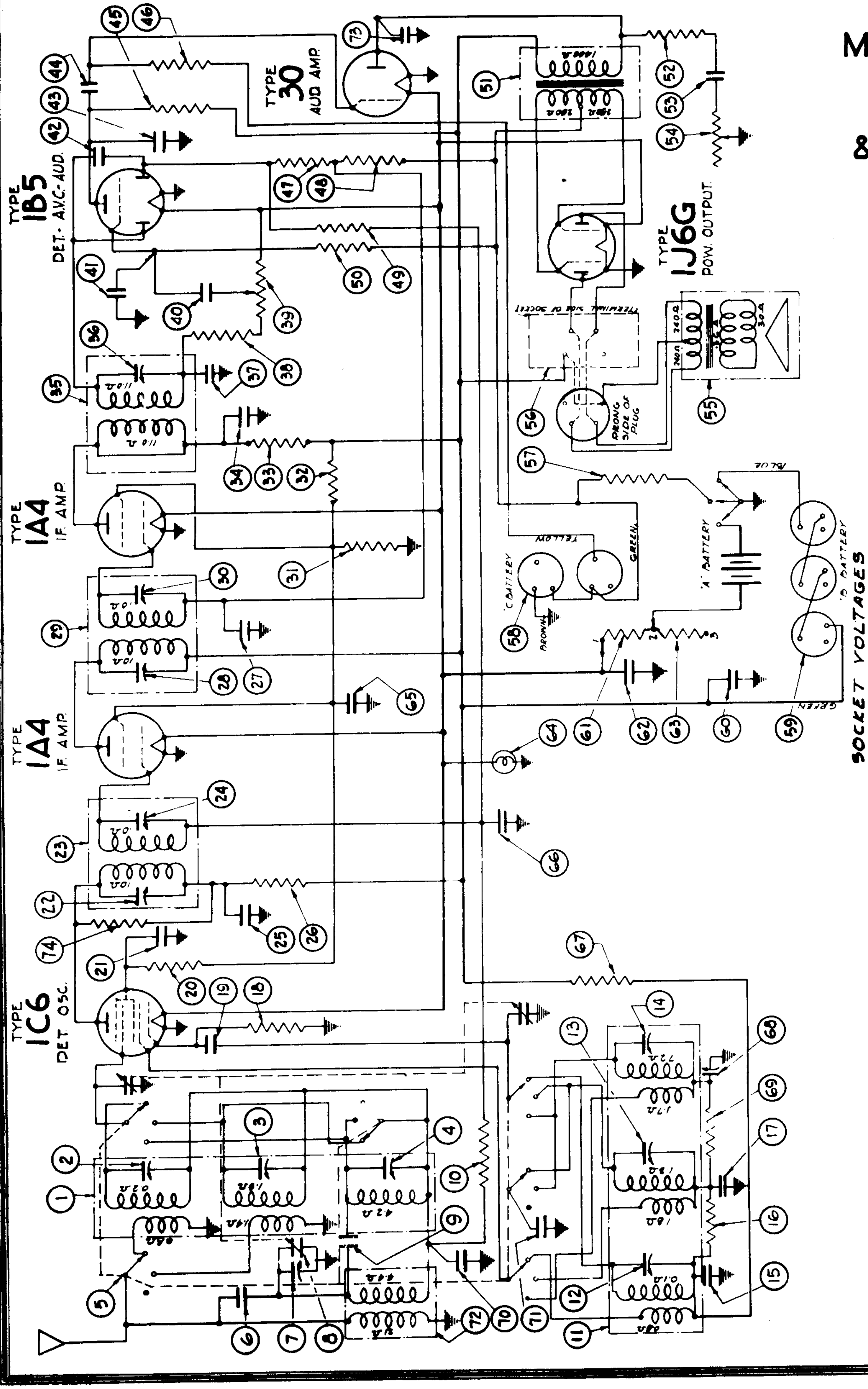
Follow this padding procedure regardless of whether the Receiver is used with the Cowl or Under-car antenna.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders 11 and 5 for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

UNITED AMERICAN BOSCH CORPORATION

MODELS 602T & 602C



SOCKET VOLTAGES

ALL VOLTAGES MEASURED TO CHASSIS WITH 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION

TUBE	STAGE	FIL.	PLATE	SCREEN	BIAS
1C6	DET.-OSC.	2.0	135 PLATE-100 OSC.	70	3.0
1A4	I.F. AMP.	2.0	135	70	3.0
1A4	I.F. AMP.	2.0	135	70	3.0
1B5	DET.-AVC.-AUD.	2.0	65	—	3.0
30	AUD. AMP.	2.0	130	—	7.5
1J6G	POW. OUTPUT.	2.0	133	—	3.0

I.F. 465 K.C.

UNITED AMERICAN BOSCH CORPORATION

MODELS 602T & 602C

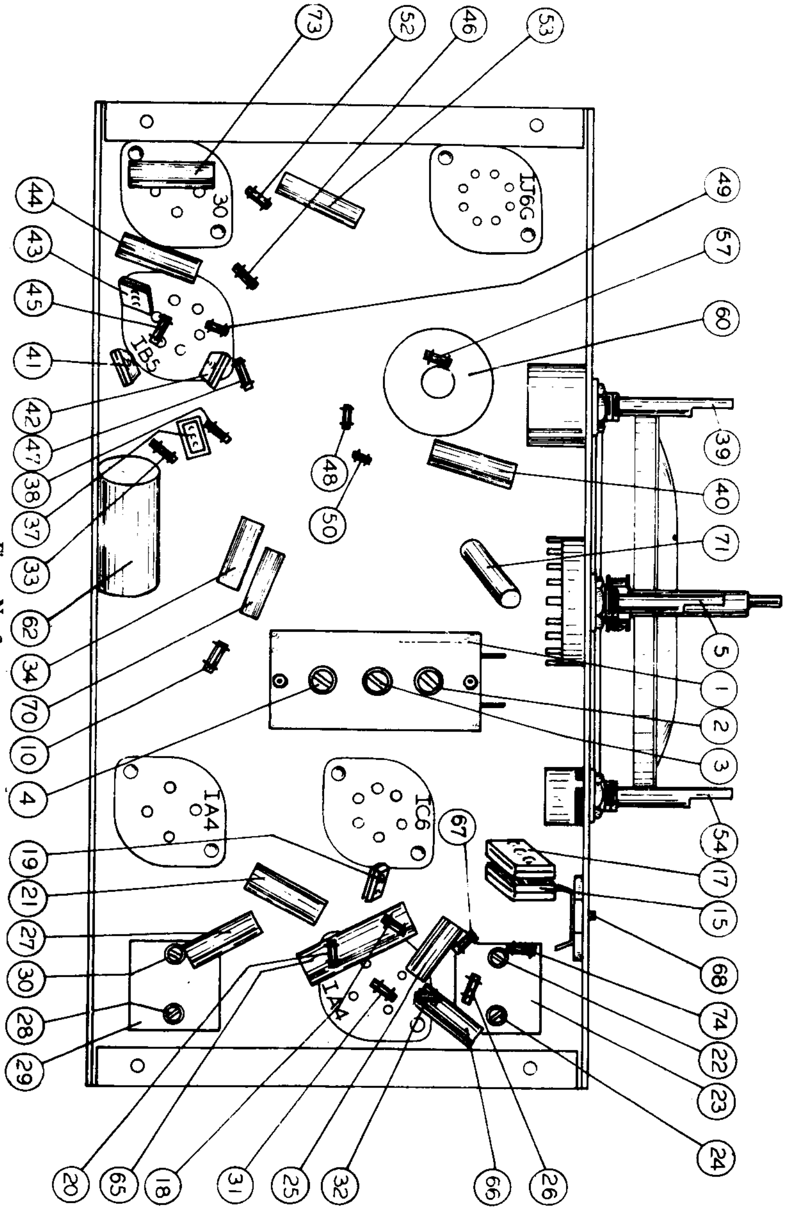


Figure No. 2

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes	1 #1C6, 2 #1A4, 1 #1B5, 1 #30, 1 #1J6G, Total - 6
Total "A" Battery current	.65 amps.
Total "B" Battery current	.23 Mils.
Batteries Required	(Aircell, 3 Volt dry pack, or 2 V. storage battery (3 - 45 Volt "B" Batteries (2 - 4½ Volt "C" Batteries
Maximum Output	1.2 Watts
Undistorted Output	.5 Watts
Tuning Ranges	540 to 1725 KC., 2200 to 6000 KC., 5800 to 16000 KC.
Tune-Up Frequencies	465 KC. I.F., 1600 KC., 600 KC., 6000 KC., 14000 KC.

GENERAL DESCRIPTION

These models are six-tube, three band, battery-operated, superheterodyne receivers whose circuits employ a type 1C6 tube as a combined first detector-oscillator, two type 1A4 tubes as intermediate frequency amplifiers, a type 1B5 as a combined second detector - A.V.C. - first audio amplifier, a type 30 as an audio frequency amplifier, and a type 1J6G as a power output amplifier. This receiver is equipped with a permanent magnet dynamic speaker.

LINE-UP CAPACITOR ADJUSTMENTS

To properly align the receiver, it is essential to use a high grade modulated test oscillator and a sensitive output meter. The R.F. signal fed into the receiver must be relatively weak or it will cause the A.V.C. to function making correct alignment difficult. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the location of the tubes and the various alignment condensers. The top and bottom view of the chassis are shown in Figure #1 and #2 and should be carefully studied before the actual work is started.

1. Connect the receiver to the batteries by plugging the "B" battery plugs and "C" battery plugs in their respective batteries. Connect the wire coming from the rear of the receiver to the terminal marked for the type of "A" supply you plan on using. Connect the red "A" battery lead to the positive terminal of the "A" battery and the black lead to the negative terminal of the "A" battery.

2. Set the volume control to the maximum position, the tone control to the treble position, the wave change switch to the broadcast band and the dial indicator to approximately 600 KC.

3. Set the test oscillator to 465 KC. and apply the test signal to the grid of the type 1A4 second I.F. tube through a .5 mfd. blocking condenser and adjust I.F. trimmer #36 to maximum output.

4. Apply the test signal to the grid of the type 1A4 first I.F. tube and adjust I.F. trimmers #28 and #30 to maximum output.

5. Apply the test signal to the grid of the type 1C6 first detector-oscillator tube and adjust I.F. trimmer condensers #22 and #24 to maximum output.

ADJUSTMENT OF BROADCAST BAND

1. Set the test oscillator and dial indicator to 1600 KC.

2. Apply the test signal to the antenna terminal of the receiver through a .0002 mfd. condenser and adjust the broadcast oscillator trimmer condenser #14 to maximum output.

3. Adjust the broadcast band preselector trimmer condensers #7 and #4 to maximum output.

4. Set the test oscillator and dial indicator to 600 KC. and adjust the broadcast oscillator series condenser #68 to maximum output at the same time rocking the variable condenser.

5. Return both the test oscillator and dial indicator to 1600 KC. and check the adjustment of trimmer condenser #14, #7, and #4.

ADJUSTMENT OF GREEN BAND

1. Set the wave change switch to the green band position.
2. Set the test oscillator and dial indicator to 6000 KC. and adjust the green band oscillator trimmer condenser #13 to maximum output.

3. Adjust the green band preselector trimmer condenser #3 to maximum output.

4. Check the receiver over the green band for sensitivity and calibration.

ADJUSTMENT OF RED BAND

1. Set the wave change switch in the red band position.

2. Set the test oscillator and dial indicator to 14000 KC. and adjust the red band oscillator trimmer condenser #12 to maximum output.

3. Adjust the red band preselector trimmer condenser #2 to maximum output.

4. Check the receiver over the red band for sensitivity and calibration.

UNITED AMERICAN BOSCH CORPORATION

MODELS 602T & 602C

PARTS LIST

Ia. #	Part #	Description of Parts	List Price
1	RC 95257	Preselector coil	$ 2.85
2		30-60 mmf. trimmer condenser - part of RC 95257	
3		4-30 mmf. trimmer condenser - part of RC 95257	
4		4-30 mmf. trimmer condenser - part of RC 95257	
5	SW 9548	Wave change switch	1.00
6		10 mmf. mica condenser - part of RC 95258	
7		15-25 mmf. trimmer condenser - part of CG 9554	
8	CG 9554	Variable condenser - 3 gang	4.50
9		Twisted wires	
10	RE 9584	100,000 ohm, 1/4 W. resistor	.15
11	RC 95259	Oscillator coil	3.50
12		1.5 to 10 mmf. trimmer condenser - part of RC 95259	
13		1.5 to 10 mmf. trimmer condenser - part of RC 95259	
14		4-30 mmf. trimmer condenser - part of RC 95259	
15	CM 9510	.0032 mfd. mica condenser	.35
16	RE 95128	2500 ohm, 1/8 W. resistor	.10
17	CM 959	.002 mfd. mica condenser	.25
18	SA 105276	50,000 ohm, 1/4 W. resistor	.15
19	CM 9513	.0001 mfd. mica condenser	.10
20	SA 105267	1000 ohm, 1/4 W. resistor	.15
21	CW 2-05	.05 mfd., 200 V. condenser	.15
22		45 to 135 mmf. trimmer condenser - part of IC 9572	
23	IC 9572	1st I.F. coil (465 KC.)	1.35
24		45 to 135 mmf. trimmer condenser - part of IC 9572	
25	CW 2-05	.05 mfd., 200 V. condenser	.15
26	SA 105270	2500 ohm, 1/4 W. resistor	.15
27	CW 2-05	.05 mfd., 200 V. condenser	.15
28		45 to 135 mmf. trimmer condenser - part of IC 9569	
29	IC 9569	2nd I.F. coil	1.50
30		45 to 135 mmf. trimmer condenser - part of IC 9569	
31	SA 105276	50,000 ohm, 1/4 W. resistor	.15
32	SA 105272	10,000 ohm, 1/4 W. resistor	.15
33	SA 105267	1000 ohm, 1/4 W. resistor	.15
34	CW 2-05	.05 mfd., 200 V. condenser	.15
35	IC 9568	3rd I.F. coil (465 KC.)	1.25
36		30-60 mmf. trimmer condenser - part of IC 9568	
37	CM 9513	.0001 mfd. mica condenser	.10
38	SA 105276	50,000 ohm, 1/4 W. resistor	.15
39	VR 9540	1/2 meg. volume control	.95
40	CW 4-02	.02 mfd., 400 V. condenser	.15
41	CM 9513	.0001 mfd. mica condenser	.10
42	CM 9513	.0001 mfd. mica condenser	.10
43	CM 956	.00025 mfd. mica condenser	.20
44	CW 4-02	.02 mfd., 400 V. condenser	.15
45	RE 9585	.25 meg., 1/4 W. resistor	.15
46	RE 9572	.5 meg., 1/4 W. resistor	.15
47	RE 9574	1 meg., 1/4 W. resistor	.15
48	RE 9574	1 meg., 1/4 W. resistor	.15
49	RE 9574	1 meg., 1/4 W. resistor	.15
50	RE 9574	1 meg., 1/4 W. resistor	.15
51	TR 9570	Audio transformer	2.00
52	SA 105267	1000 ohm, 1/4 W. resistor	.15
53	CW 2-05	.05 mfd., 200 V. condenser	.15
54	VR 9539	10,000 ohm tone control	.55
55	SK 9541	Speaker	7.50
56	SA 107257	Speaker socket	.10
57	SA 105267	1000 ohm, 1/4 W. resistor	.15
58	PG 9514	"C" battery plug	.10
59	PG 958	"B" battery plug	.10
60	CE 9543	30 mfd.. 200 V. electrolytic condenser	.70
61	RE 9594	0.31 ohm resistor	.15
62	CW 2-50	.5 mfd., 200 V. condenser	.25
63	RE 9591	0.94 ohm resistor	.15
64	LP 9518	Dial lamp	.30
65	CW 2-25	.25 mfd., 200 V. condenser	.20
66	CW 2-05	.05 mfd., 200 V. condenser	.15
67	SA 105270	2500 ohm, 1/4 W. resistor	.15
68	CS 9560	350-700 mmf. oscillator series condenser	.35
69	RE 9527	5000 ohm, 1/8 W. resistor	.10
70	CW 2-05	.05 mfd., 200 V. condenser	.15
71	CW 4-005	.005 mfd., 400 V. condenser	.15
72	RC 95258	Antenna coil	1.15
73	CW 4-005	.005 mfd., 400 V. condenser	.15
74	RE 9584	.1 meg., 1/4 W. resistor	.15
75	TR 9596	Output transformer	1.25
76	DM 9520	Speaker diaphragm	1.50

BRACKETS

BK 9578	Dial scale bracket assembly	.40
BK 95182	Electrolytic condenser mounting bracket	.05

TUBE SOCKETS, SHIELD, BASE

SA 104615	Tube socket - 4 prong	.10
SA 104617	Tube socket - 6 prong	.20
SO 956	Tube socket - 8 prong	.20
BE 956	Tube shield base	.05
CV 954	Tube shield	.10

SCREWS, WASHERS AND SPACERS

SC 1039 CA	Chassis mounting screw	.05
WA 107586	Chassis mounting screw washer	.05
WA 1033	Rubber washer (chassis mounting)	.05
SR 1008 CA	Chassis mounting spacer	.05
SA 97969	Felt foot - 602T	.05
SC 102441	Set screws (pulleys)	.05
IS 1002	Rubber mounting bushing (variable condenser)	.05
SC 952	Indicator screw	.05

MISCELLANEOUS

KN 9560	Knob tuning - small	.20
KN 9565	Knob tuning - large	.20
KN 9561	Knob volume and tone	.20
KN 9563	Knob wave switch	.20
DS 9572	Dial scale	1.10
SO 9519	Dial lamp socket	.10
SI 9540	Dial indicator	.10
PU 952	Pulley, drive and driven	.20
SH 9534	Vernier drive assembly	.70
IS 9593	Antenna and ground terminal strip	.20
PR 98511	Dial drive cable - 9 inches	.20
IS 95184	"A" supply change terminal	.20
GA 958	Dial gasket	.30

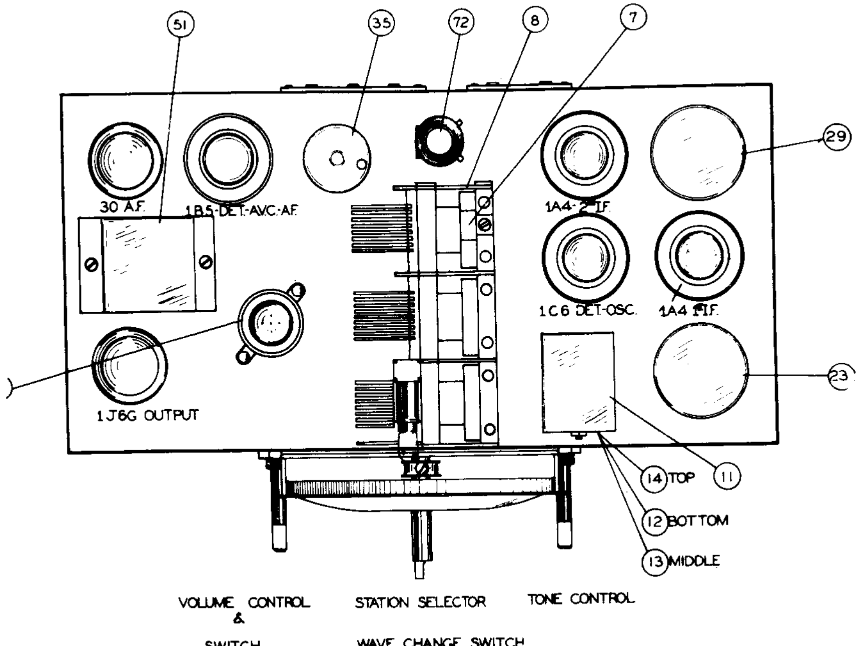
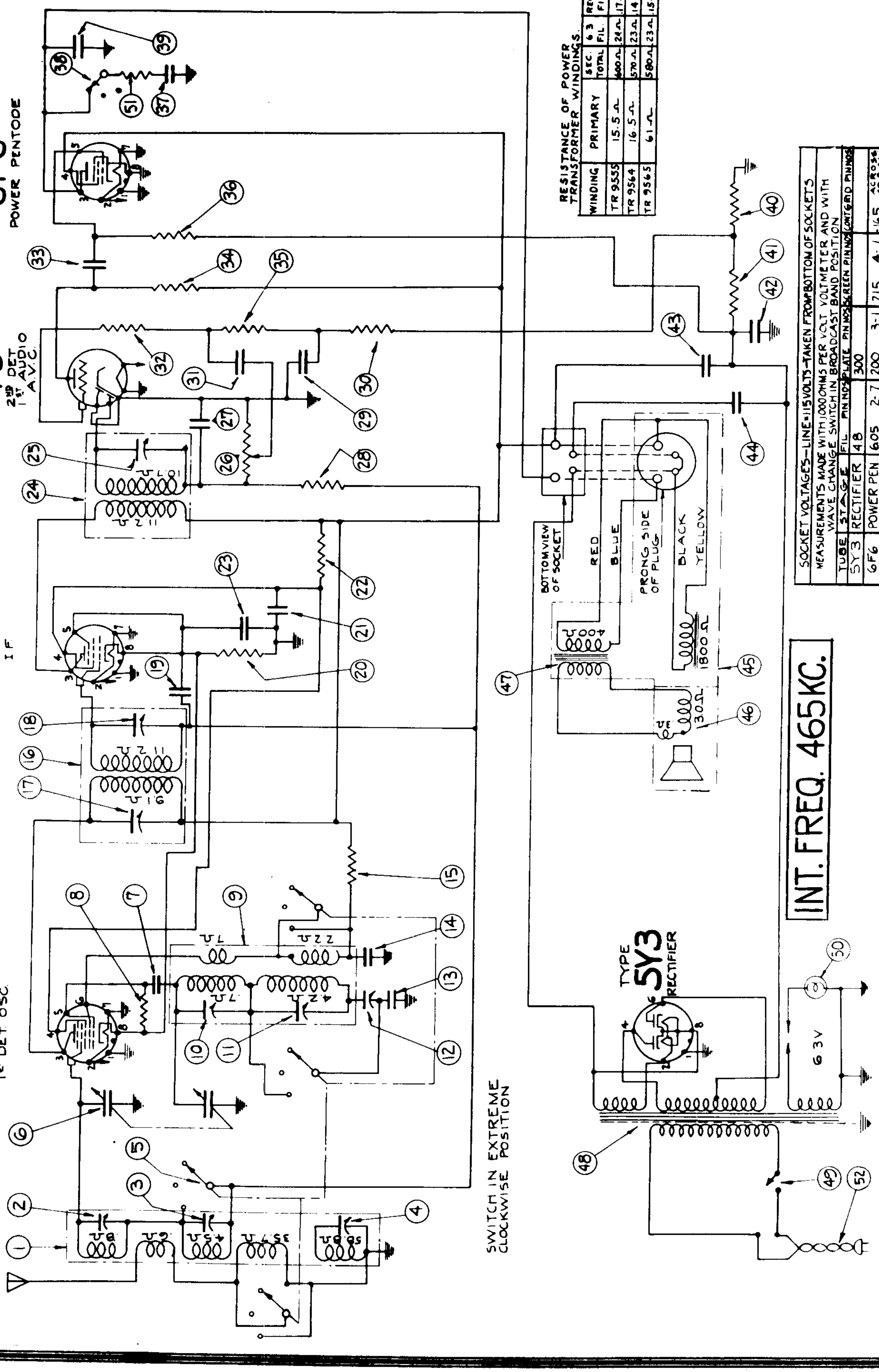


Fig. 1

UNITED AMERICAN BOSCH CORPORATION

MODELS 605 & 605C



RESISTANCE OF POWER TRANSFORMER WINDINGS.

WINDING	PRIMARY	SEC. TOTAL	6.3 FIL.	RECT. FIL.
TR 9555	15.5 Ω	600 Ω	.24 Ω	.17 Ω
TR 9564	16.5 Ω	570 Ω	.23 Ω	.14 Ω
TR 9565	61 Ω	580 Ω	.23 Ω	.15 Ω

SOCKET VOLTAGES—LINE=115 VOLTS—TAKEN FROM BOTTOM OF SOCKETS

MEASUREMENTS MADE WITH 1,000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION

TUBE	STAGE	FIL.	PIN NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	CONT. GRID	PIN NOS.
5Y3	RECTIFIER	4.8		300					
6F6	POWER PEN.	6.05	2-7	200	3-1	215	4-1	-16.5	ACROSS 40 & 41
75	2ND DET-AUDIO	6.05		100				-1.08	ACROSS 40
6K7	I F	6.05	2-7	215	3-1	75	4-1	-2.25	8-1
6A8	DET. OSC	6.05	2-7	215 DET. 170 OSC.	3-1 6-1	75	4-1	-2.25	8-1

UNITED AMERICAN BOSCH CORPORATION

MODELS 605 & 605C

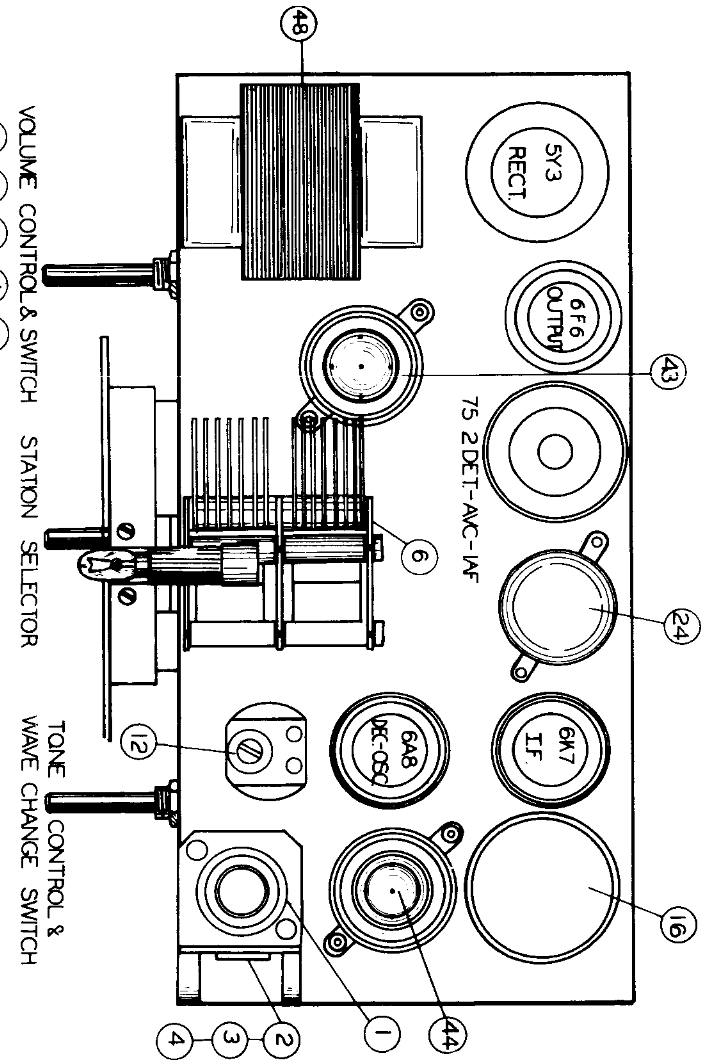


Figure No. 1

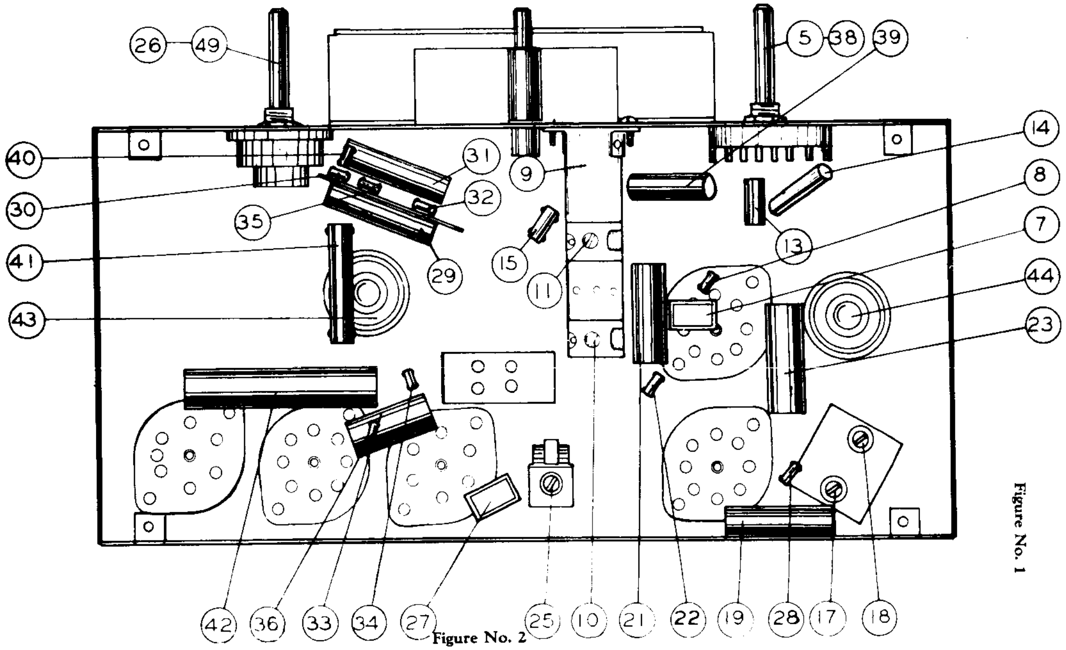


Figure No. 2

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes .... 1 #6A8, 1 #6K7, 1 #75, 1 #6F6, 1 #5Y3 - Total 5
Power Supply Characteristics .... 105 to 125 volts, 50 to 60 cycle A.C.
Power Consumption .... 46 Watts
Power Output .... 3.0 Watts
Undistorted Power Output .... 1.5 Watts
Tuning Range .... 545 to 1725 KC., and 2100 to 7200 KC.
Line-Up Frequencies .... 465 KC., 1600 KC., 600 KC., 6000 KC.

GENERAL DESCRIPTION

These models are five-tube, two-band superheterodyne receivers employing a type 6A8 tube as a combination first detector-oscillator, a type 6K7 tube as a first I.F. amplifier, a type 75 tube as a combination second detector - A.V.C. - first audio amplifier, a type 6F6 tube as an output amplifier and a type 5Y3 tube as a rectifier.

These models are designed to operate over two bands on frequencies from 545 to 1725 KC. and 2100 to 7200 KC.

The model 605 is a table model while the model 605C is a console model using a larger speaker.

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment.

A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figs. #1 and #2 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 KC.)

1. Connect the output meter to the terminals of the speaker voice coil.
2. Set the volume control to maximum position, the tone control to treble, the wave change switch on broadcast, and the dial indicator at approximately 600 KC.
3. Apply the test signal to the grid of the type 6K7 I.F. tube through a .1 mfd. blocking condenser.
4. Adjust trimmer condenser #25 to maximum output.
5. Apply the test signal to the grid of the type 6A8 first detector-oscillator tube and adjust trimmer condensers #17 and #18 to maximum output.

ADJUSTMENT OF BROADCAST BAND

1. Apply test signal to antenna lead and with a strong input signal adjust wave trap trimmer condenser #4 (bottom) to minimum output.
2. Apply test signal to the antenna lead through a .0002 mfd. condenser.
3. Set test oscillator and dial indicator to 1700 KC. and adjust oscillator trimmer condenser #11 until the signal is received.
4. Adjust preselector trimmer #3 (middle) to maximum output.
5. Set test oscillator and dial indicator to 600 KC. and adjust oscillator series condenser #12 to maximum output.
6. Return both test oscillator and dial indicator to 1600 KC. and check adjustment of oscillator and preselector trimmer condensers.

ADJUSTMENT OF S.W. BAND

1. Turn the wave change switch to the short-wave position.
2. Set the test oscillator and dial indicator to 6000 KC. and adjust oscillator trimmer condenser #10 until the signal is received.
3. Adjust the preselector trimmer condenser #2 (top) to maximum output.
4. Check the receiver over scale for sensitivity and calibration.

UNITED AMERICAN BOSCH CORPORATION

MODELS 605 & 605C

PARTS LIST

Dia. #	Part #	Description of Parts	List Price
1	RC 95200	Antenna coil	$ 2.00
2		4-25 mmf. trimmer condenser - part of RC 95200	
3		1.5-10 mmf. trimmer condenser - part of RC 95200	
4		30-60 mmf. trimmer condenser - part of RC 95200	
5	SW 9546	Switch assembly	.95
6	CG 9548	Variable tuning condenser (2 gang)	2.75
7	CM 9513	.0001 mfd. mica condenser	.10
8	RE 9524	50,000 ohm, 1/8 W. resistor	.10
9	RC 95199	Oscillator coil	1.25
10		10-45 mmf. trimmer condenser - part of RC 95199	
11		4-25 mmf. trimmer condenser - part of RC 95199	
12	CS 9545	Oscillator series condenser (300-600 mmf.)	.40
13	CM 9523	.003 mfd. mica condenser	.30
14	CW 4-005	.005 mfd., 400 V. condenser	.15
15	SA 105249	5000 ohm, 1/4 W. resistor	.15
16	IC 9569	1st I.F. coil (465 KC.)	1.50
17		45-135 mmf. trimmer condenser - part of IC 9569	
18		45-135 mmf. trimmer condenser - part of IC 9569	
19	CW 2-05	.05 mfd., 200 V. condenser	.15
20	RE 9570	180 ohm, 1/8 W. resistor	.10
21	CW 2-05	.05 mfd., 200 V. condenser	.15
22	RE 9524	50,000 ohm, 1/8 W. resistor	.10
23	CW 2-10	.1 mfd., 200 V. condenser	.15
24	IC 9568	2nd I.F. coil (465 KC.)	1.25
25		30-60 mmf. trimmer condenser - part of IC 9568	
26	VR 9532	Volume control (.5 megohm)	.90
27	CM 9519	.0005 mfd. mica condenser	.20
28	RE 9530	1 meg., 1/8 W. resistor	.10
29	CW 2-05	.05 mfd., 200 V. condenser	.15
30	RE 9524	50,000 ohm, 1/8 W. resistor	.10
31	CW 4-02	.02 mfd., 400 V. condenser	.15
32	RE 9534	100,000 ohm, 1/8 W. resistor	.10
33	CW 4-02	.02 mfd., 400 V. condenser	.15
34	RE 9531	1/4 meg., 1/8 W. resistor	.10
35	RE 9530	1 meg., 1/8 W. resistor	.10
36	RE 9531	1/4 meg., 1/8 W. resistor	.10
37	CW 4-05	.05 mfd., 400 V. condenser	.15
38		Tone control switch - part of SW 9546	
39	CW 4-005	.005 mfd., 400 V. condenser	.15
40	RE 9556	25 ohm, 1/4 W. resistor	.15
41	SA 102564	350 ohm, 1 W. resistor	.20
42	CE 9515	12 mfd., 25 V. electrolytic condenser	.65
43	CE 9535	16 mfd., 300 V. electrolytic condenser	.75
44	CE 9536	12 mfd., 450 V. electrolytic condenser	.80
45	SK 9525	Speaker assembly	4.75
46	DM 9510	Diaphragm and voice assembly	1.25
47	TR 9559	Output transformer	1.25
48	TR 9555	Power transformer (110 volts, 50-60 cycle)	3.50
49		On-Off switch - part of VR 9532	
50	LP 9510	Dial light (6.3 volts, .25 amp.)	.15
51	RE 9579	2000 ohm, 1/8 W. resistor	.10
52	CB 9512	Line cable and plug	.50

Part #	Description of Parts	List Price
	MAIN ASSEMBLIES	
CH 95101	Chassis assembly	
SK 9525	Speaker (6" Dia.)	4.75
KA 9546	Cabinet (Table)	

Part #	Description of Parts	List Price
	BRACKETS	
BK 95182	Filter condenser mounting bracket	$ .05
BK 95196	Bracket - dial to tuning condenser	.05
BK 95198	Bracket for dial lamp	.10
	SCREWS AND NUTS	
SC 107395	Speaker mounting screws	.05
SC 952	Screw for dial indicator	.05
SC 953	Felt feet and chassis mounting screws	.05
NT 96071	Nut for speaker mounting screws	.05
	TUBE SOCKETS & TUBE SHIELDS	
BE 956	Tube shield base	.05
CV 954	Tube shield	.10
SA 104617	Tube socket - 6 prong	.20
SA 107257	Speaker socket	.10
SO 956	Tube socket - 8 prong	.20
	MISCELLANEOUS	
CV 95194	Dial scale cover	.50
KN 9538	Knobs	.10
GA 9511	Dial gasket	.05
DS 9551	Dial scale	1.15
PL 9561	Plate to support dial	.35
SO 9519	Dial lamp socket	.10
SP 9540	Spring clip on dial	.05
SI 9546	Dial indicator (Pointer)	.20
SH 9539	Dial drive shaft	.10
PU 9516	Dial drive pulley (on drive shaft)	.10
PU 9518	Dial pulley - on condenser shaft	.35
SP 9539	Spring on dial drive belt	.05
PR 97160	Dial drive belt (Per yard)	.05
BG 9523	Dial drive shaft bearing	.05

MODEL 605C

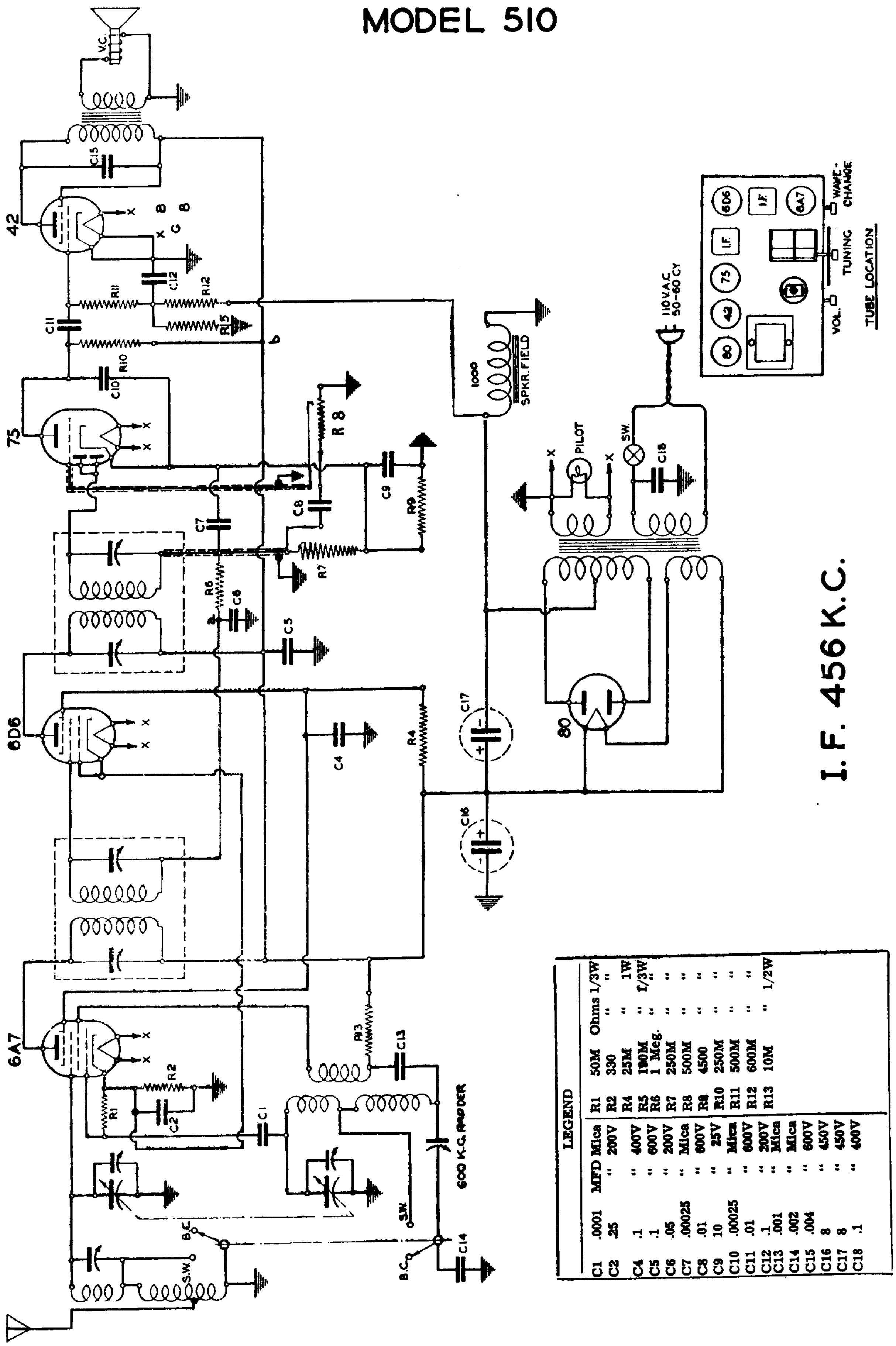
All service parts for Model 605C are the same as for Model 605 except for the following parts:

Dia. #	Part #	Description of Parts	List Price
45	SK 9512	Speaker (14" Dia.)	$ 10.75
46	DM 956	Diaphragm and voice coil assembly	1.25
47	TR 9558	Output transformer	1.25

Part #	Description of Parts	List Price
	MAIN ASSEMBLIES	
SK 9534	Speaker (14" Dia.)	10.75
KA 9547	Cabinet (Console)	
	MISCELLANEOUS	
SC 19-16 CA	Chassis mounting screws	.05
KN 9559	Knobs	.20
SC 100874	Speaker mounting screws	.05
CL 9537	Speaker field coil	1.65

WARWICK MANUFACTURING CO.

MODEL 510

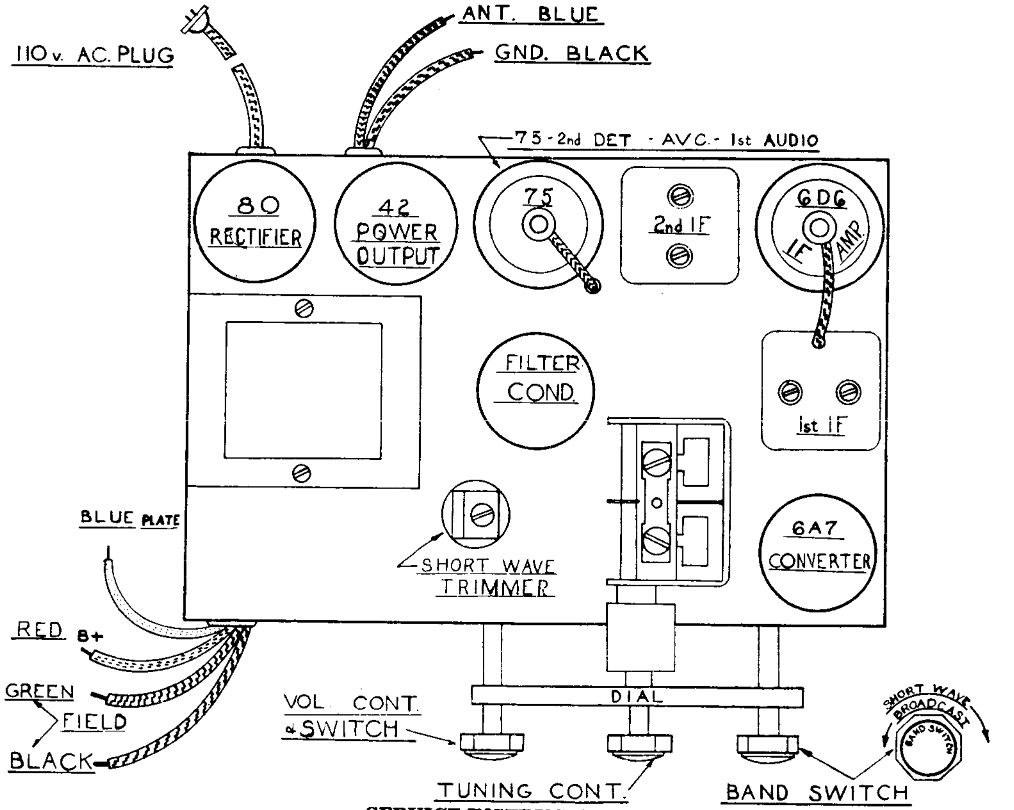


LEGEND

C1	.0001	MFD	Mica	R1	50M	Ohms	1/3W
C2	.25	"	200V	R2	330	"	"
C4	.1	"	400V	R4	25M	"	1W
C5	.1	"	600V	R5	100M	"	1/3W
C6	.05	"	200V	R6	1 Meg.	"	"
C7	.00025	"	Mica	R7	250M	"	"
C8	.01	"	600V	R8	500M	"	"
C9	10	"	25V	R9	4500	"	"
C10	.00025	"	Mica	R10	250M	"	"
C11	.01	"	600V	R11	500M	"	"
C12	.1	"	200V	R12	600M	"	"
C13	.001	"	Mica	R13	10M	"	1/2W
C14	.002	"	Mica				
C15	.004	"	600V				
C16	8	"	450V				
C17	8	"	450V				
C18	.1	"	400V				

WARWICK MANUFACTURING CO.

MODEL 510



SERVICE INSTRUCTIONS

In case of faulty operation of the receiver, first make sure that the antenna and ground are in good condition and properly attached to the receiver. Then determine if any of the tubes are faulty. In case of trouble within the receiver itself, the circuit diagram shown on the opposite page will be useful to the service man in locating and correcting the trouble.

I. F. Alignment:

Connect a test oscillator or signal generator through a .1 mfd. condenser to the grid of the 6A7 tube and set the oscillator to 456 KC. Use an output meter connected to the speaker if possible, to obtain the most accurate adjustments. Peak each I.F. stage to maximum response, reducing the output of the oscillator as far as possible for final adjustments.

R. F. Alignment:

With the test oscillator set to 1720 KC and connected to the antenna wire of the receiver through a .00025 mfd condenser, switch the receiver to the broadcast band and set the pointer at the end of travel on the right (at the 1700 KC end). Adjust the rear trimmer on the top of the variable condenser, for maximum gain. Then set the test oscillator at 1400 KC and tune in this signal on the receiver as though tuning a station. If an adjustment at this point is necessary on your set, you will have a trimmer condenser to adjust on top of the variable condenser at the front; this is adjusted for maximum gain.

Now adjust the test oscillator to 600 KC and tune in this signal. Adjust the padder condenser (which is adjusted through the right hand end of the chassis) in the following manner: turn the dial slowly and repeatedly back and forth across the signal while adjusting the padder. Adjust for maximum gain.

Now switch the receiver to short wave. With the test oscillator set at 6 megacycles, tune in this signal on the receiver. Then adjust the short wave trimmer (which is located on top of the coil above the chassis) for maximum gain.

PARTS LIST

1924	2 gang condenser	$1.72
8036	Power Transformer	2.20
2443	Volume Control	.75
6922	Switch	.52
1154	Antenna Coil	.48
1155	Oscillator Coil	.40
1123	1st I. F.	.88
1124	2nd I. F.	.88
1846	Filter Condenser	1.36
243	Pilot Lite Bracket	.08
8901	No. 40 Pilot Lite	.18
6850	4 Prong Socket	.10
6852	6 Prong Socket Each	.10
6853	7 Prong Socket	.10
2006	Padder	.28
2050	Trimmer	.10
7104	Tube Shield Base } Per Set	.12
7105	Tube Shield	
1500	.001—20%	.14
1501	.0001—20%	.10
1509D	.002—5%	.20
1504	.00025—20%	.12
6017	1 Meg. 1/3 W 20% Resistor	.06
6018	½ Meg. 1/3 W 20% Resistor	.06
6024	¼ Meg. 1/3 W 20% Resistor	.06
6025	50 M. 1/3 W 20% Resistor	.06
6058	330 Ohms 1/3 W 10% Resistor	.08
6057	4500 Ohms 1/3 W 20% Resistor	.06
6059	190 M. 1/3 W 5% Resistor	.08
6060	600 M. 1/3 W 5% Resistor	.08
6105	10 M. ½ W 20% Resistor	.08
6117	25 M. ½ W 20% Resistor	.08
1600	.1—200 V Bypass Condenser	.12
1601	.1—400 V. Bypass Condenser	.12
1615	10 mfd. 35 V. Bypass Condenser	.35
1604	.01—600 V. Bypass Condenser	.14
1614	.25—200 V. Bypass Condenser	.16
1622	.05—200 V. Bypass Condenser	.12
1603	.01—400 V. Bypass Condenser	.09
1651	.004—600 V. Bypass Condenser	.12
Dial	(order by name and description)	1.64
7946A	Speaker	3.16
5218	Knobs	.12
TUBES		
	80	
	42	
	75	
	6A7	
	6D6	

WELLS-GARDNER & CO.
MODEL A2 SERIES

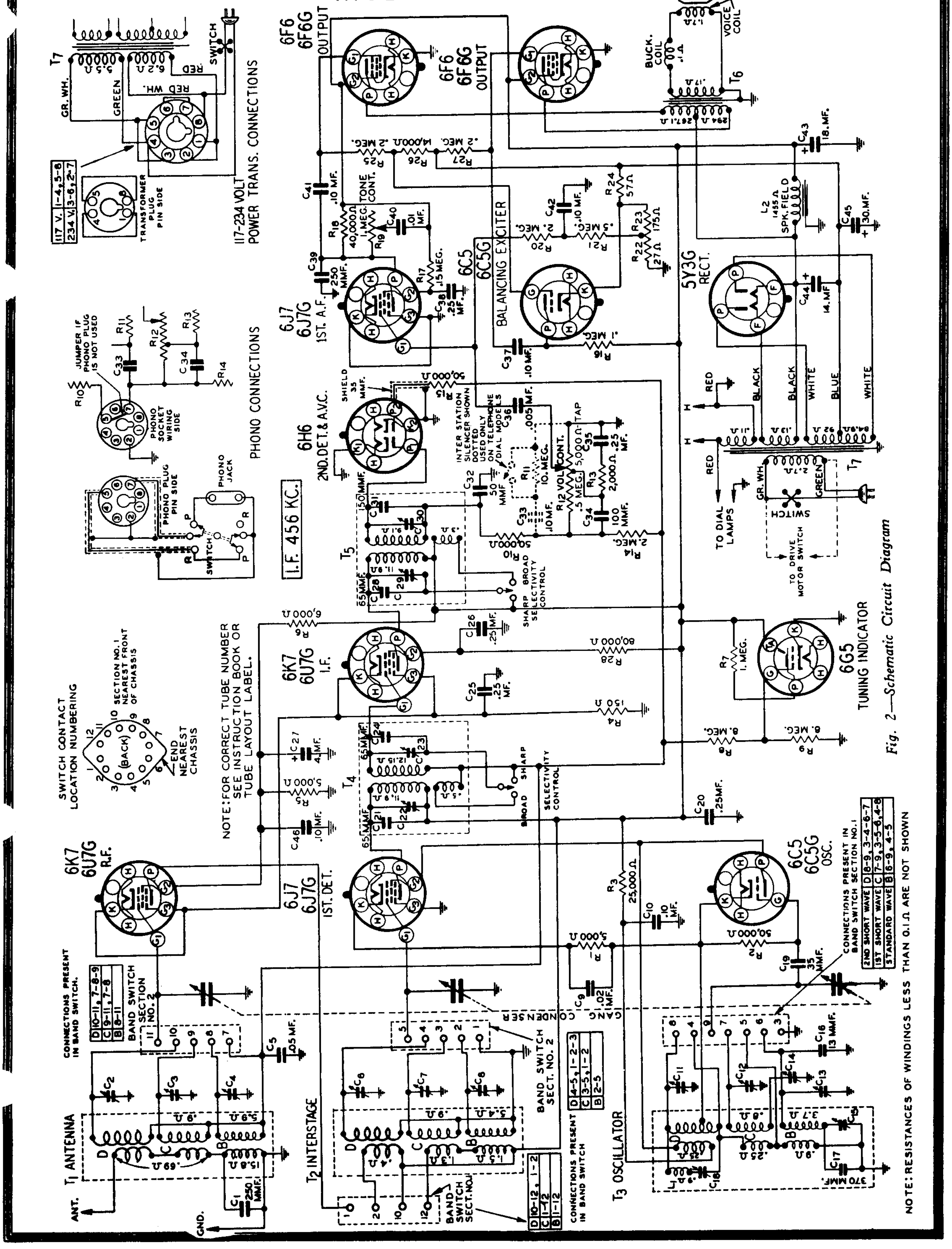


Fig. 2—Schematic Circuit Diagram

WELLS-GARDNER & CO.
MODEL A2 SERIES

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I. F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C29) & (C30)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C22) & (C23)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C13)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	Ant. Range B (C4) Int. Range B (C8)	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C15)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C12)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3) Int. Range C (C7)	Turn Rotor to Max. Output	Adjust to Maximum Output
2000 KC	Range C	400 Ohm	2000 KC	Antenna Lead	2000 KC (C14)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C11)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Ant. Range D (C2) Int. Range D (C6)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
7000 KC	Range D	400 Ohm	7000 KC	Antenna Lead	7000 KC (C18)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

In sets using the moving beam of light indicator, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until the beam is at the 1500 KC mark on the dial. Retighten the screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

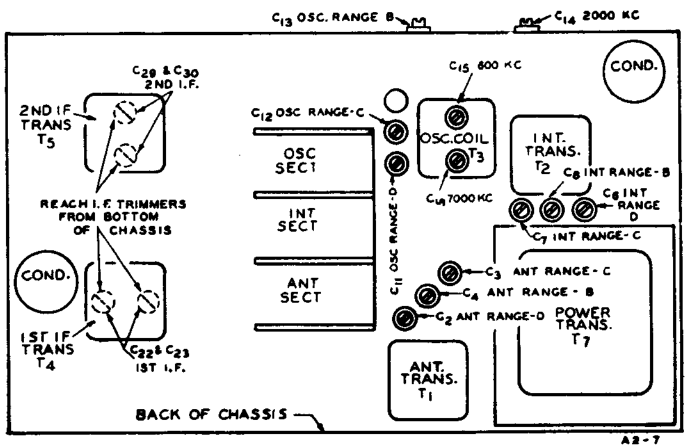


Fig. 3—Location of Trimmers

WELLS-GARDNER & CO.

MODEL A2 SERIES

SPECIFICATIONS

Power Consumption - 100 Watts	(At 117 volts 60 cycles)	**Tuning Frequency Range**	
Power Output - - - - - -	9.8 Watts Undistorted 12 Watts Maximum	B Range	528 to 1830 KC.
		C Range	1810 to 6350 KC.
Selectivity (Sharp) - - 27 KC Broad at 1000 times Signal		D Range	6300 to 22000 KC.
Intermediate Frequency - - - - - - - 456 KC.		**Sensitivity**	
Speaker - - - - - - - - 12" Dynamic		B Range	1.0 Microvolts Average
		C Range	1.0 Microvolts Average
		D Range	2.0 Microvolts Average

Circuit

This model is a three band AC operated radio with a tuning range as shown in the specifications above.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R.F. transformer assemblies and T3 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively.

The band switch completes connections to the coils in use. The band switch sections are designated in the schematic as section 1 and section 2.

The antenna transformer with tuned secondary feeds into a type 6K7 R.F. amplifier tube. The output of this tube is fed through the interstage R.F. transformer with tuned secondary into a 6J7 tube which functions as the 1st detector.

A separate type 6C5 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

One stage of I.F. amplification is employed using a 6K7 tube. The primaries and secondaries of the 1st and 2nd I.F. transformers are tuned by small trimmer condensers.

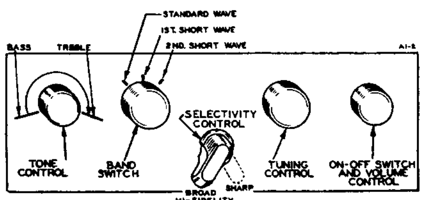


Fig. 1—Arrangement of Controls

Referring to the 1st and 2nd I.F. transformers T4 and T5 in Fig. 2, it will be noted that there is a coupling winding shown below the primary of T4 and below the secondary of T5.

When the selectivity control is in the sharp position, the coupling windings are open circuited and the loose coupling which exists between the primary and secondary of these transformers results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary in the case of T4 is connected in series with the secondary. In the case of T5, the coupling winding which is wound under the secondary is in series with the primary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

A 6H6 tube functions as a diode 2nd detector. AVC voltage is applied to the control grid circuits of the R.F. and I.F. tubes.

Across the volume control resistor R12 is a filter composed of condensers C34 and C35 and resistor R13. At high volume settings, the filter is not effective. At low volume settings, the action of this filter results in an increase of high and low frequency amplitudes relative to the other frequency amplitudes.

The output of the 2nd detector is applied to the 6J7 1st A. F. tube. The output of this tube is fed thru resistance coupling into the 6F6 output tube shown nearest to it in the schematic.

A portion of the voltage developed across the output tube grid resistor is applied to the control grid of the 6C5 balancing exciter tube. This tube functions as a phase inverter and applies the audio voltage of proper phase and amplitude to the other 6F6 output tube. The two output tubes operate as a stage of Class A push-pull amplification. The balancing exciter tube thus replaces a push-pull input transformer. A dynamic reproducer is employed.

The power unit uses a 5Y3G full wave rectifier. A 6G5 tuning indicator tube is employed.

Glass and Metal Tubes

All sets of this series use a 6H6 metal tube and 5Y3G and 6G5 glass tubes.

It will be noted in the schematic that there are two tube type numbers shown at the other sockets. The "metal" tube sets use the upper tube type numbers which are for metal tubes while the "glass" tube sets use the lower tube type numbers which are for glass tubes.

Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

General Service Data

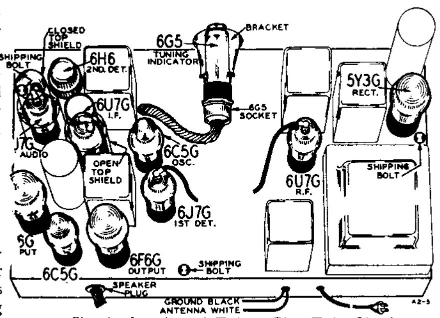


Fig. 4—Location of Tubes—Glass Tube Chassis

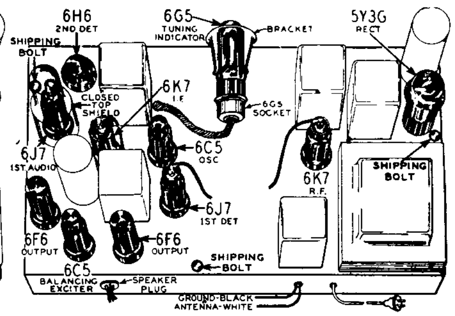


Fig. 5—Location of Tubes—Metal Tube Chassis

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum
Readings taken with 1000 Ohm-per-volt meter.

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7 6U7G	R.F.	0	6.1(1)	250	105	2.5		6.1(1)	2.5
6J7 6J7G	1st Det.	0	6.1(1)	250	125	0		6.1(1)	5.8
6C5 6C5G	Osc.	0	6.1(1)	125(2)				6.1(1)	0
6K7 6U7G	I.F.	0	6.1(1)	250	100	2.5		6.1(1)	2.5
6H6	2nd Det.—A.V.C.	0	6.1(1)					6.1(1)	0
6J7 6J7G	1st A.F.	0	6.1(1)	110	120	0(3)		6.1(1)	0(3)
6C5 6C5G	Balancing Exciter	0	6.1(1)	100				6.1(1)	18.5
6F6 6F6G	Output	0	6.1(1)	330	250			6.1(1)	0(4)
5Y3G	Rectifier	0	4.8(5)		730(6)		730(6)		4.8(5)
6G5	Tuning Indicator	Plate to Ground 20		Target to Ground 250		Cathode to Ground 0		Across Heater 6.1 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Subject to variation.
(3) Bias (2.5 volts) as read across resistor R22.
(4) Bias (24 volts) as read across resistors R22, R23, & R24.
(5) A.C. voltage as read across filament terminals 2 and 8.
(6) A.C. voltage as read across terminals 4 and 6.

WELLS-GARDNER & CO.

MODEL A2 SERIES

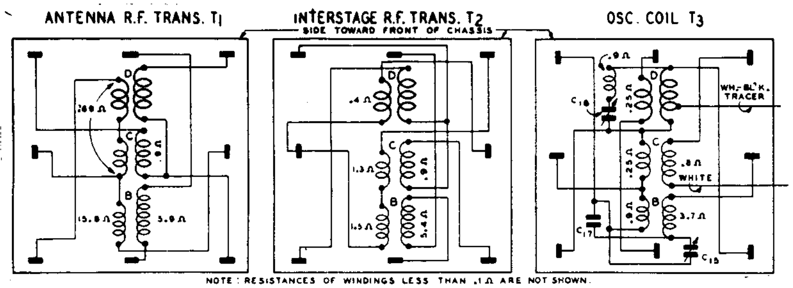


Fig. 6—Coil Terminal Arrangement and DC Resistance of Windings

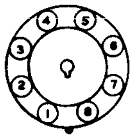


Fig. 7—Octal Tube Terminal Numbering (bottom of socket).

Twenty-Five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true—the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram Fig. 2. On the front panel of the chassis base is a round knockout 1⅛ inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

Some models are shipped from the factory equipped with the phono socket. A jumper is inserted in this socket which must be removed if the phonograph installation is made—see Fig. 2.

117-234 Volt Power Transformers

Some models are equipped with a 117-234 volt 40 to 60 cycle power transformer. Connections as shown in Fig. 2 are completed to a special octal socket mounted on the back panel of the chassis. A plug which goes with this socket may then be inserted for either the 117 volt or 234 volt connection

If one of these transformers is to be installed in a chassis equipped with a regular transformer, there is a 1⅛ inch round knockout on the back panel which may be removed to permit installation of the octal socket mentioned above.

Dial and Drive Assembly

Complete information regarding the dial and drive assemblies will be found in the Dial and Drive Service Manual issued for this chassis.

Changes in Later Models

Later models of this series have the following changes incorporated in them.

On the first models, the 2nd I.F. Coil was not expanded. In other words, the extra selectivity coupling winding was not incorporated in the early type coil. Models with the letter "C" or any later issue stamped on the chassis use the new type coil with the selectivity coupling winding. Because of the change in coil connections, the selectivity switch used on the late model is not interchangeable with that on the early model.

When ordering parts, therefore, it is important that the issue letter on the chassis be noted and the correct part number as shown in the parts list be specified.

The R.F. circuit of early models was slightly different from that used in later models. The screen grids of the R.F. and I.F. tubes now supplied by separate voltage sources were formerly connected together and supplied from a single source. On the latter models, resistor R 28 and condenser C 46 were not used.

Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A256	Tube Socket—Octal (7 Prong)	$0.15
3A263	Tube Socket—Octal (8 Prong)	.15
3A261	Tube Socket—Octal (5 Prong)	.10
3A262	Speaker Socket (6 Prong)	.15
13X296	Tuning Eye Tube Socket and Cable Assembly	.55
3A266	Phono Socket—Octal (4 Prong)	.10
3A252	Dual Keyway Socket—Octal (8 Prong)—Universal Power Transformer Connections	.15
6A214	Plug (4 Prong)—Used with above Socket	.25

SPEAKERS

When ordering parts for speakers, specify part number of speaker and letter preceding part number stamped on the speaker.

Part No.	Description	List Price
12A269	12" Dynamic Speaker, complete with Output Trans. (T6)	7.70
	Cone and Voice Coil Assembly for above speaker	4.60
	Output Transformer only (T6)	2.45

KNOBS

	Description	List Price
Specify Name of Knob & Name & Model of Radio	Volume Control Knob	.15
	Tone Control Knob	.15
	Tuning Control Knob	.15
	Band Switch Knob	.20
	Selectivity Control Knob	.25

GENERAL

Part No.	Description	List Price
25X378	Clamp Bracket for Tuning Eye Tube	.10
32X50	Tube Shield—Closed Top (Used on glass and metal tube chassis)	.15
32X32	Tube Shield—Open Top (Used only on models having glass tubes)	.15
32X51	Tube Shield Base	.10
2X38	Felt Washers (Used Behind Knobs) doz.	.10
8X23	Rubber Cushions (Chassis Mounting)	.10
30X44	Grid Clip only doz.	.10
2A78	Selectivity Switch (Early Type—Used when 2nd I.F. is not expanded)	.40
2A83	Selectivity Switch (Late Type—Used when 2nd I.F. is expanded)	.45
4A38	Terminal Strip (1 lug insulated, one lug used for mtg.)	.10
4A53	Terminal Strip (3 lugs insulated, mounting hole used)	.10
4A68	Terminal Strip (3 lugs insulated)	.10
13X214	Antenna and Ground Lead Assembly	.30
13X80	Line Cord and Plug	.50
2A79	Band Switch (2 section, 3 position)	1.65

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A779	T1	Antenna Transformer and Can Assembly	$2.15
9A780	T2	R.F. Interstage Transformer and Can Assembly	2.30
9A781	T3	Oscillator Coil and Can Assembly	3.60
9A782	T4	1st I.F. Transformer and Can Assembly	2.40
9A783	T5	2nd I.F. Transformer and Can Assembly (Early Type—Without selectivity coupling winding)	2.25
9A857	T5	2nd I.F. Transformer and Can Assembly (Late Type—With selectivity coupling winding)	2.25
	T6	Output Transformer (See "Speakers")	
53X148	T7	117 Volt, 60 Cycle, Standard Power Transformer	4.45
53X149	T7	117 Volt, 25 Cycle, Standard Power Transformer	7.15
53X150	T7	117-234 Volt, 40-60 Cycle, Universal Power Transformer	5.75

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X80	C5	.05 mf.	180	$0.15
46X187	C9	.02 mf.	180	.15
46X105	C10	.10 mf.	360	.20
46X121	C20	.25 mf.	360	.30
46X117	C25	.25 mf.	180	.25
46X121	C26	.25 mf.	360	.30
46X98	C33	.10 mf.	180	.20
46X197	C35	.25 mf.	180	.25
46X147	C36	.005 mf.	360	.15
46X105	C37	.10 mf.	360	.20
46X121	C38	.25 mf.	360	.30
46X161	C40	.01 mf.	600	.15
46X105	C41	.10 mf.	360	.20
46X98	C42	.10 mf.	180	.20
*46X181	C46	.10 mf.	240	.15

CONDENSERS (Cont.)

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage	List Price
45X223	C27	4 mf.	150 Dry	$0.75
44X11	C43	18 mf.	290 Wet	1.10
44X30	C44	14 mf.	450 Wet	1.00
45X222	C45	30 mf.	25 Dry	.95

MOLDED

Part No.	Code	Capacitance	List Price
47X69	C1	250 mmf.	.15
47X81	C19	35 mmf.	.25
47X56	C32	50 mmf.	.10
47X57	C34	100 mmf.	.10
47X65	C39	250 mmf.	.15

TRIMMER

Part No.	Code	Capacitance	Description	List Price
17A73	C2	2-25 mmf.	Range "D" Antenna Trimmer	.35
	C3	2-25 mmf.	Range "C" Antenna Trimmer	
	C4	2-25 mmf.	Range "B" Antenna Trimmer	
17A73	C6	2-25 mmf.	Range "D" Interstage Trimmer	.35
	C7	2-25 mmf.	Range "C" Interstage Trimmer	
	C8	2-25 mmf.	Range "B" Interstage Trimmer	
17A76	C11	2-25 mmf.	Range "D" Oscillator Trimmer	.25
	C12	2-25 mmf.	Range "C" Oscillator Trimmer	
17A68	C13	1-12 mmf.	Range "B" Oscillator Trimmer	.20
17A75	C14	1300-1700 mmf.	2000 KC Adjustment	.50
17A69	C15	40-120 mmf.	Oscillator 600 KC Adjustment	.40
	C18	40-100 mmf.	Oscillator 7000 KC Adjustment	
17A70	C22	15-55 mmf.	1st I.F. Trimmer	.40
	C23	15-55 mmf.		
17A70	C29	15-55 mmf.	2nd I.F. Trimmer	.40
	C30	15-55 mmf.		

MISCELLANEOUS

Part No.	Code	Description	List Price
47X80	C16	13 mmf. Compensating Capacitor	.50
47X89	C17	370 mmf. Iron Clad	.30
47X91	C21	65 mmf. Iron Clad	.25
47X91	C24	65 mmf. Iron Clad	.25
47X91	C28	65 mmf. Iron Clad	.25
47X83	C31	150 mmf. Iron Clad	.35
14A70		3 Section Gang Condenser (less dial and drive assembly)	4.20

* Used on late models only.

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A94502	R1	5,000 Ohm	0.2	$0.15
A94503	R2	50,000 Ohm	0.2	.15
C94253	R3	25,000 Ohm	1.0	.15
A94151	R4	150 Ohm	0.2	.15
E94502	R5	5,000 Ohm	3.0	.30
G94602	R6	6,000 Ohm	5.0	.40
A95105	R7	1 Megohm	0.2	.10
A94805	R8	8 Megohm	0.2	.15
A94805	R9	8 Megohm	0.2	.15
A95503	R10	50,000 Ohm	0.2	.10
A95106	R11	10 Megohm	0.2	.10
A94202	R13	2,000 Ohm	0.2	.15
A95205	R14	2 Megohm	0.2	.10
A95503	R15	50,000 Ohm	0.2	.10
A94104	R16	100,000 Ohm	0.2	.15
A94154	R17	150,000 Ohm	0.2	.15
B94403	R18	40,000 Ohm	0.5	.15
A95205	R20	2 Megohm	0.2	.10
A95504	R21	500,000 Ohm	0.2	.10
B93570	R24	57 Ohm	0.5	.20
A93204	R25	200,000 Ohm	0.2	.20
A93143	R26	14,000 Ohm	0.2	.20
A95204	R27	200,000 Ohm	0.2	.10
*B94803	R28	80,000 Ohm	0.5	.15

WIRE WOUND

Part No.	Code	Resistance	Wattage	List Price
43X77	R22	27 Ohm	0.25	.35
	R23	175 Ohm	2.0	

VARIABLE

Part No.	Code	Description	List Price
36X236	R12	500,000 Ohm Volume Control and On-Off Switch	1.00
40X224	R19	1 Megohm Tone Control	.65

* Used on late models only.

PHONO ATTACHMENT PARTS

Part No.	Description	List Price
13X298	30" Phono Cable Assembly Complete (Includes Plug, Double-tip Phono Jack, Switch, and Knob)	$2.65
3A266	Phono Socket—Octal (4 Prong)—Must be ordered for Chassis not equipped with this socket	.10
6A218	Plug (8 Prong) Only of Phono Cable	.15
1A12	Phono Jack Only of Phono Cable	.10
2A50	Phono Switch Only of Phono Cable	.70
10A90	Knob Only of Phono Cable	.20

Prices subject to change without notice.

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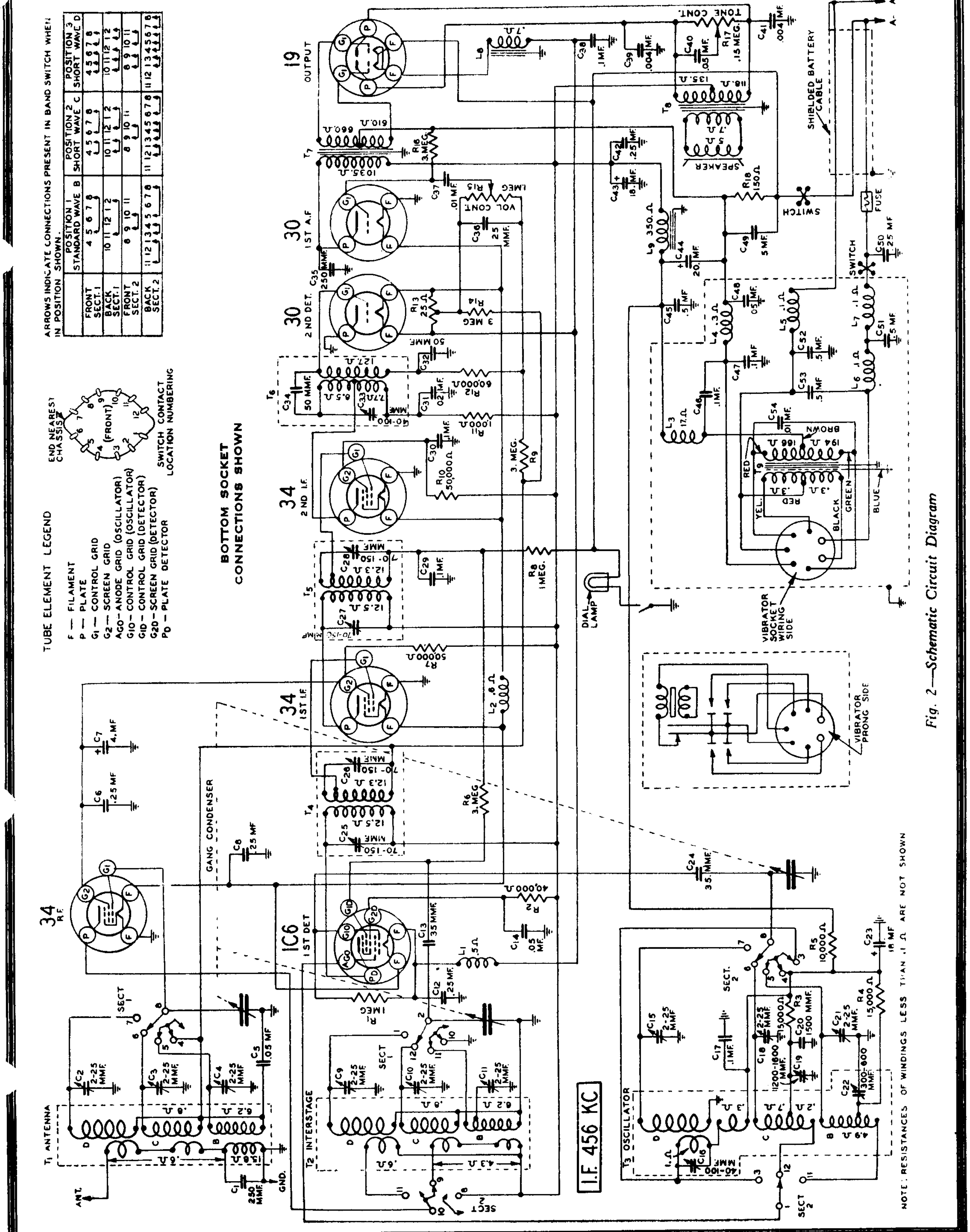

Fig. 2—Schematic Circuit Diagram

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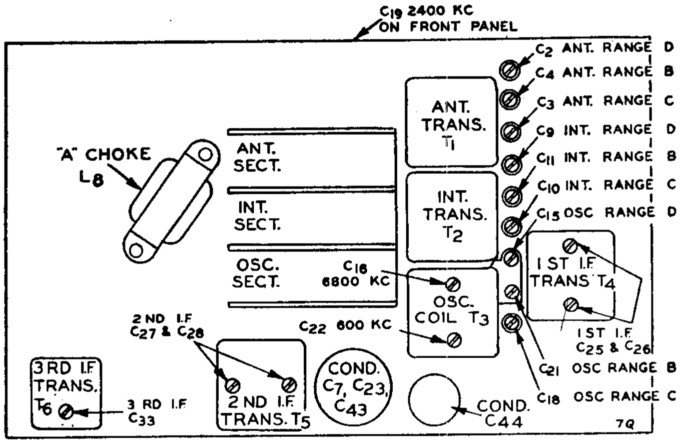


Fig. 3—Location of Trimmers

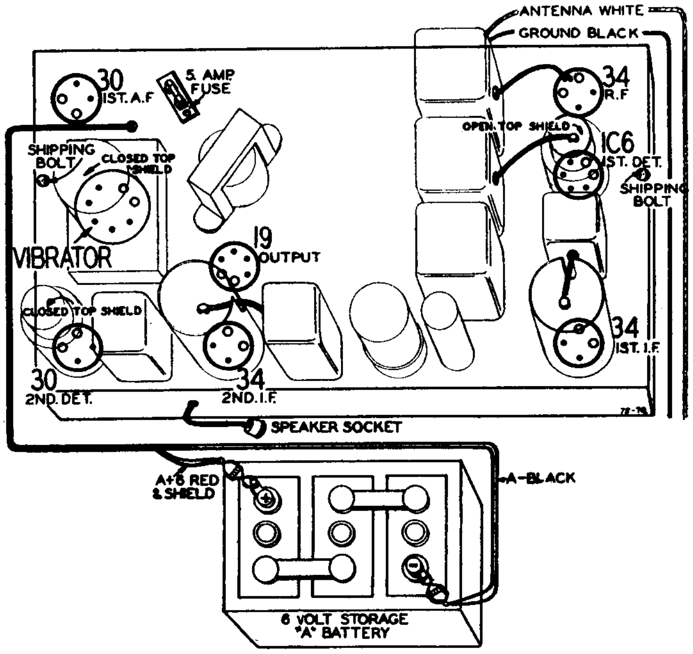


Fig 4—Tube Arrangement and Battery Connections

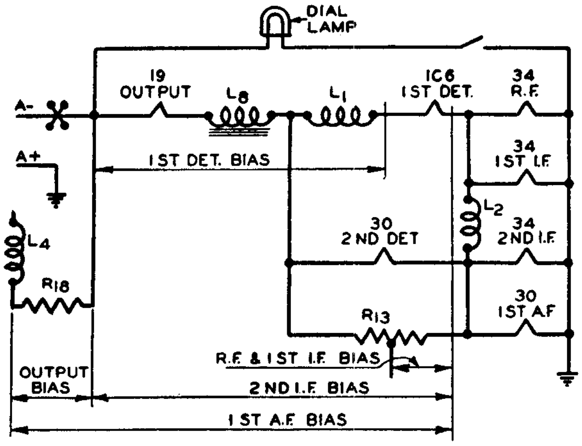
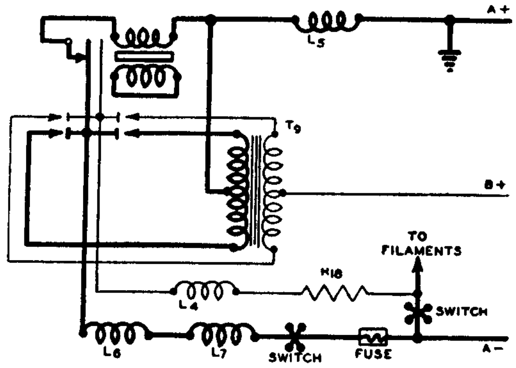
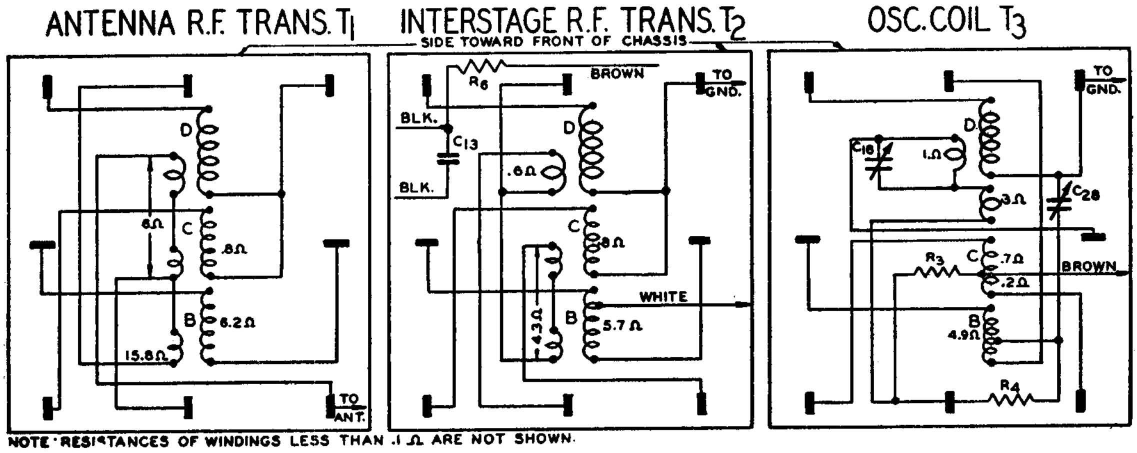


Fig. 5—Abridged wiring diagram showing filament wiring system and points at which no-signal bias voltages are obtained.



HEAVY LINES DENOTE "A" CIRCUITS.
LIGHT LINES DENOTE "B" CIRCUITS.

Fig. 6—Abridged wiring diagram showing action of synchronous vibrator



NOTE: RESISTANCES OF WINDINGS LESS THAN .1 Ω ARE NOT SHOWN.

Fig. 7—R.F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

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MODEL 7Q SERIES

SPECIFICATIONS

Power Consumption - 1.4 Amperes at 6.3 Volts
Power Output - - - - - 1.1 Watt Undistorted
Selectivity - - 24 KC Broad at 1000 times Signal
Intermediate Frequency - - - - - - 456 KC.
Speaker - - - - 6 inch P.M. Dynamic—Mantel Models
8 inch P.M. Dynamic—Console Models

Tuning Frequency Range

B	Range	528 to 1730 KC.
C	Range	2300 to 6700 KC.
D	Range	6500 to 18400 KC.

Sensitivity

B	Range Average	2.0 Microvolts Absolute
C	Range Average	4.0 Microvolts Absolute
D	Range Average	8.0 Microvolts Absolute

Circuit

This radio is designed to operate from a 6 volt storage battery and uses a synchronous vibrator and a transformer to provide the required high voltage. The tubes used are of the 2 volt type and are connected in a series parallel arrangement across the 6 volt battery.

Three bands are covered with a tuning range in each band as shown in the specifications above. Three band coverage is accomplished by means of three sets of R.F. and oscillator coils and a two section triple throw switch.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R.F. transformer assemblies and T3 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively. The band switch sections are designated as section one and section two.

The band switch completes connections to the coils in use. It short circuits the R.F. transformer secondaries and oscillator grid coils of lower frequency not in use. It also short circuits the interstage R.F. transformer Range B and C primaries when in the Range D position. The Range D oscillator plate coil is short circuited by the band switch when it is in Range B and C positions.

The antenna transformer with tuned secondary

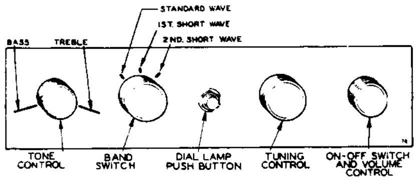


Fig. 1—Arrangement of Controls

feeds into a type 34 R.F. amplifier tube. The output of this tube is fed through the interstage R.F. transformer with tuned secondary into the control grid circuit of a 1C6 pentagrid converter tube which functions as the oscillator and 1st detector.

The oscillator potential on the oscillator control grid of this tube modulates the electron stream from the cathode in such a manner as to impress on it the oscillator frequency which is always 456 KC above the frequency to which the R.F. amplifier is tuned. The electron stream is also modulated at the signal frequency by the detector control grid. As a result of the beating of the two frequencies, the intermediate or beat frequency of 456 KC is present in the plate circuit of this tube.

Two stages of I.F. amplification are employed using type 34 tubes. The primaries and secondaries of the first and second I.F. transformers and the primary of the 3rd I.F. transformer are tuned by small trimmer condensers.

A type 30 tube functions as a diode second detector and as the automatic volume control tube. AVC voltage is applied to the R.F. and 1st I.F. tubes.

The audio voltage developed across the volume control resistor R15 is applied to the control grid of the type 30 1st A.F. tube.

The output stage employs a type 19 tube. This tube is a Class "B" power amplifier and combines 2 triodes in one envelope. A P.M. dynamic reproducer is used.

Filament Wiring—Fig. 5 is an abridged wiring diagram which shows the tube filament and dial lamp wiring system and also indicates the points at which the no-signal bias voltages are obtained.

Synchronous Vibrator—The action of the synchronous vibrator used in the power unit is shown in the abridged wiring diagram Fig. 6. When the switch is closed, the armature is drawn over as a result of the current through the vibrator coil. When this occurs, the two contacts at the lower right side of the armature are closed and the circuit through the vibrator coil is broken. The spring action then causes the armature to spring back and the two contacts at the lower left side are closed. The circuit through the vibrator coil again is completed and the armature is drawn over to start the next cycle.

The "A" current (heavy lines, Fig. 6) flows first through one side of the power transformer primary and then through the other side in the opposite direction. An AC voltage is induced in the secondary as a result. That portion of the armature shown in light lines rectifies the current in the secondary circuit.

Alignment and Calibration

The radios are properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 6700, 6000, 2400, 18,400, 15,000 and 6800 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector G_{1D}.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C21) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

Adjust the interstage Range B trimmer (C11) and antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

6700 KC Adjustment

Set the signal generator for 6700 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C18) until maximum output is obtained. See Fig. 3 for location of this trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C10) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

2400 KC Adjustment

Set the signal generator for 2400 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 2400 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

18,400 KC Adjustment

Set the signal generator for 18,400 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C15) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage and antenna Range D trimmers, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6800 KC Adjustment

Set the signal generator for 6800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6800 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

General Service Data

Planetary Drive Assembly

The planetary assembly is the unit that is integral with the tuning shaft.

If the nut on the back end of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and gears to see that they are turning properly and that they are not being obstructed in some way.

If the drive turns unevenly (rough in spots), this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then

(Continued on next page)

WELLS GARDNER & CO.

MODEL 7Q SERIES

(Continued from preceding page)
made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Voltages

Check the voltages at the sockets to see if correct values are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together. The volume control should be turned to the right or maximum position.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition. These voltages are typical of the sets but will vary slightly with variations in individual radios, tubes, test equipment used and battery voltage.

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground
Battery - 6 Volts — Band Switch in Standard Wave Position

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Bias Voltage See Notes
34	R.F.	2.0	145	55	1.0 (1)
1C6	1st Det.-Osc.	2.0	145 90 (2)	60	2 (3)
34	1st I.F.	2.0	145	55	1.0 (1)
34	2nd I.F.	2.0	140	90	4.0 (3)
30	2nd Det.	2.0			
30	1st A.F.	2.0	140		9 (4)
19	Power	2.0	140		5 (5)

(1) As read from negative filament leg to tap of resistor R13.
(2) Anode grid to ground.
(3) As read from negative filament leg to A—.
(4) Total voltage drop from negative filament leg to low potential end of resistor R18.
(5) As read across resistor R18.

Tubes

The tubes used in this radio are of the 2 volt series. All of them are of the filament or directly heated types. The filaments are connected in the series-parallel arrangement shown in Fig. 5.

Caution

Do not turn the radio on unless ALL the tubes are in the sockets. Removal of any of them will result in abnormal voltages on the remaining tubes.

Be sure that the battery clips are connected to the battery with the correct polarity. Reversed connections may damage the radio.

Do not use any power source other than a 6 volt storage battery.

If the radio does not operate after being turned on, turn the switch off immediately, examine the battery connections and the fuse and see if all tubes are properly inserted.

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 2. In contact locations not used, the number applying to that particular location is not employed.

Servicing Power Unit

The power unit is that portion of the chassis assembly contained within the large rectangular shield can and the circuit for which is shown within the dotted lines at the lower right side of the schematic diagram, Fig. 2.

Continuity Resistance Check—The power transformer, choke coil circuits and condenser shorts may be checked by utilizing the vibrator socket terminals and various points on the "A" or "B" lines, without removal of the shield can. For example: when checking the continuity or resistance of the upper half of the transformer secondary, contact may be made with the test prods at the proper vibrator socket terminal, as shown on the circuit diagram, and at the positive terminal of the 20 mf. electrolytic condenser. C44.

Removing Transformer and Vibrator Socket Assembly—Take off the filter unit shield can by removing the four self tapping screws at the right side (from front) of the chassis base and the five hex nuts from the bolts at the top of the chassis.

Unsolder the ground connections from the two lugs on the inside of the chassis base (right side from front). Unsolder the black and white coded wire from the terminal strip lug nearest the front of the chassis. This terminal strip is mounted on the transformer cover. Now unsolder the bracket holding the terminal strip to the transformer cover.

Remove the four nuts from the bolts holding the transformer assembly to the chassis. Do not remove these bolts from the transformer core. Then lift the assembly to free it from the chassis so that all parts of the assembly are readily accessible.

Proceed with replacement of the power transformer or with any other necessary service or replacements and then reassemble.

Replacement of Buffer Condenser C54—This condenser is located in the top of the transformer and vibrator assembly just underneath the vibrator socket. To replace, remove the assembly as explained in the preceding article.

In addition, the two screws holding the vibrator socket to the transformer cover assembly should be taken out. The condenser is then easily replaced.

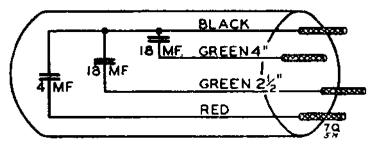


Fig. 8—Electrolytic Condenser Internal Connections

Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
P-3A244	Tube Socket (4 Prong)	$0.10
P-3A247	Tube Socket (6 Prong)	.10
*P-3A234	Vibrator Socket (7 Prong)	.20

SPEAKERS

Part No.	Description	List Price
P-12A252	6" P.M. Dynamic Speaker complete with Output Trans. T8	5.70
P-12A253	8" P.M. Dynamic Speaker complete with Output Trans. T8	6.00
P-13X268	Speaker Cable and Socket Assembly	.45

KNOBS

Part No.	Description	List Price
Specify Name of Knob and Name and Model of Radio	Tone Control—Small Push-on Type	.15
	Volume Control—Small Push-on Type	.15
	Tuning Control—Large Push-on Type	.15
	Band Switch—Large Set Screw Type	.20

GENERAL

Part No.	Description	List Price
P-2X38	Felt Washers (Used behind Knobs) ea.	.10
P-8X23	Rubber Chassis Mounting Cushions ea.	.10

Replacement Parts List (Continued)

Part No.	Description	List Price
P-4A38	Terminal Strip—Single Lug Insulated (with Mounting Foot to left of lug)	.10
P-4A49	Terminal Strip—Single Lug Insulated (with Mounting Hole at one end)	.10
P-4A50	Terminal Strip—Two Lugs Insulated (with Mounting Hole in Center)	.10
P-4A17	Terminal Strip—Single Lug Insulated (with Mounting Foot to Right of Lug)	.10
P-30X14	Grid Clip Only	.10
P-13X269	Shielded Battery Cable	1.00
P-30X35	Battery Clips (rated at 25 amp.) ea.	.15
P-13X214	Antenna and Ground Lead Assembly	.30
P-16X9	Fuse Clip Assembly	.10
P-16X19	5 amp. Fuse	.10
*P-28X52	Vibrator Spring Clip	.10
*P-32X18	Vibrator Shield Base	.10
P-32X72	Vibrator Shield	.20
P-19A27	Vibrator	4.55
P-32X18	Tube Shield Base (Large)	.10
P-32X30	Tube Shield Base (Small)	.10
P-32X63	Tube Shield (Large)	.20
P-32X32	Tube Shield (Small—Open Top)	.15
P-32X50	Tube Shield (Small—Closed Top)	.10
P-2A58	2 Section, 3 Position, Band Change Switch	1.55
P-8X43	Rubber Mounting Cushions for Gang Condenser (Front) ea.	.10
P-8X44	Rubber Mounting Cushion for Gang Condenser (Rear)	.10
P-8X45	Rubber Mounting Cushion for Gang Condenser (Rear, under Chassis Base)	.10
P-32X71	Shield Can for Filter Assembly (Under Vibrator Assembly)	.50
P-25X221	Chassis Mounting Feet ea.	.10

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
P-9A634	T1	Antenna Trans. and Can Assembly	$1.85
P-9A635	T2	R.F. Interstage Trans. and Can Assembly	2.35
P-9A636	T3	Oscillator Coil and Can Assembly	3.20
P-9A637	T4	1st I.F. Trans. and Can Assembly	1.50
P-9A638	T5	2nd I.F. Trans. and Can Assembly	1.50
P-9A639	T6	3rd I.F. Trans. and Can Assembly	1.60
P-50X35	T7	Input Transformer	1.95
P-51X44	T8	Output Transformer (Part of Speaker Assembly)	1.30
*P-53X128	T9	Power Transformer Only	2.45
P-25A86		Power Transformer Assembly (Includes Parts Marked *)	3.85
P-9A613	L1	1st Det. Filament Reactor	.40
P-9A607	L2	Filament Reactor	.35
P-9A609	L3	"B" Reactor	.30
P-9A611	L4	"B" Reactor	.30
P-9A683	L5	"A" Line Reactor	.35
P-9A608	L6	"A" Line Reactor	.35
P-9A683	L7	"A" Line Reactor	.35
P-52X47	L8	"A" Choke (Iron Core)	.85
P-52X27	L9	"B" Choke (Iron Core)	1.00

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
P-46X80	C5	.05 mf.	180	.15
P-46X117	C6	.25 mf.	180	.25
P-46X117	C8	.25 mf.	180	.25
P-46X117	C12	.25 mf.	180	.25
P-46X80	C14	.05 mf.	180	.15
P-46X98	C17	.1 mf.	180	.20
P-46X98	C29	.1 mf.	180	.20
P-46X98	C30	.1 mf.	180	.20
P-46X187	C31	.02 mf.	180	.15
P-46X124	C37	.01 mf.	180	.15
P-46X195	C38	.1 mf.	180	.15
P-46X114	C39	.004 mf.	600	.15
P-46X103	C40	.05 mf.	240	.15
P-46X114	C41	.004 mf.	600	.15
P-46X117	C42	.25 mf.	180	.25
P-46X135	C45	.5 mf.	180	.40
P-46X98	C46	.1 mf.	180	.20
P-46X98	C47	.1 mf.	180	.20
P-46X80	C48	.05 mf.	180	.15
P-46X196	C49	.5 mf.	180	.30
P-46X117	C50	.25 mf.	180	.25
P-46X135	C51	.5 mf.	180	.40
P-46X135	C52	.5 mf.	180	.40
P-46X204	C53	.5 mf.	180	.30
*P-46X201	C54	.1 mf.	1000	.15

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage	Type	List Price
P-45X215	C7	4 mf.	150	Dry	1.50
	C23	18 mf.	150		
	C43	18 mf.	150		
P-44X17	C44	20 mf.	150	Wet	.95

MOLDED

Part No.	Code	Capacitance	List Price
P-47X65	C1	250 mmf.	.15
P-47X53	C13	35 mmf.	.10
P-47X74	C20	1500 mmf.	.20
P-47X53	C24	35 mmf.	.10
P-47X56	C32	50 mmf.	.10
P-47X56	C34	50 mmf.	.10
P-47X65	C35	250 mmf.	.15
P-47X72	C36	25 mmf.	.10

TRIMMER

Part No.	Code	Description	List Price
P-17A45 Trimmer Strip	C2	2-25 mmf. Range "D" Antenna Trimmer	.95
	C3	2-25 mmf. Range "C" Antenna Trimmer	
	C4	2-25 mmf. Range "B" Antenna Trimmer	
	C9	2-25 mmf. Range "D" Interstage Trimmer	
	C10	2-25 mmf. Range "C" Interstage Trimmer	
	C11	2-25 mmf. Range "B" Interstage Trimmer	
	C15	2-25 mmf. Range "D" Oscillator Trimmer	
	C18	2-25 mmf. Range "C" Oscillator Trimmer	
	C21	2-25 mmf. Range "B" Oscillator Trimmer	

See Part Number 17A36 for replacement of any one section

Part No.	Code	Description	List Price
P-17A35	C16 C22	40-100 mmf. 300-600 mmf. Oscillator Padding Condensers	.45
P-17A58	C19	1200-1600 mmf. Oscillator Padding Condenser	.50
P-17A33	C25 C26	70-150 mmf. 70-150 mmf. 1st I.F. Trimmer Condensers	.40
P-17A33	C27 C28	70-150 mmf. 70-150 mmf. 2nd I.F. Trimmer Condensers	.40
P-17A38	C33	40-100 mmf. 3rd I.F. Trimmer Condenser	.25
P-17A36		2-25 mmf. (To be used for replacement of any one section of Trimmer Strip P-17A45)	.10

MISCELLANEOUS

Part No.	Description	List Price
P-14A58	3 Gang Condenser Less Drive Mechanism and Dial Assembly	3.60

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
P-A94104	R1	100,000 Ohm	0.2	.15
P-A95403	R2	40,000 Ohm	0.2	.10
P-A95153	R3	15,000 Ohm	0.2	.10
P-A95153	R4	15,000 Ohm	0.2	.10
P-A94103	R5	10,000 Ohm	0.2	.15
P-A95305	R6	3 Megohm	0.2	.10
P-A94503	R7	50,000 Ohm	0.2	$0.15
P-A95104	R8	100,000 Ohm	0.2	.10
P-A94305	R9	3 Megohm	0.2	.15
P-A94503	R10	50,000 Ohm	0.2	.15
P-A95102	R11	1,000 Ohm	0.2	.10
P-A95603	R12	60,000 Ohm	0.2	.10
P-A94305	R14	3 Megohm	0.2	.15
P-A95305	R16	3 Megohm	0.2	.10

WIRE WOUND

Part No.	Code	Resistance	Wattage	List Price
P-43X60	R13 R18	25 Ohm 150 Ohm	0.3 2.0	.45

VARIABLE

Part No.	Code	Description	List Price
P-36X222	R15	1 Megohm Volume Control and On-Off Switch	1.00
P-40X215	R17	.15 Megohm Tone Control	.65

DIAL AND DRIVE ASSEMBLY

DIAL ASSEMBLY

Part No.	Description	List Price
Specify Name and Model of Radio	Dial Assembly Complete with Dial Glass; Dial Plate; Dial Cardboard; Small Pointers; Reflectors; Small Pointer Cords, Springs, Pulleys and Collars; and Band Indicator Assembly less Large Station Pointer and Micrometer Pointer.	$3.85
See above	Dial Glass Only	1.45
P-25A125	Dial Assembly Mounting Plate, Includes Small Pointer Shafts and Pulleys, and Band Indicator Assembly	1.20
P-25X297	Dial Assembly Support Brackets (Attached to Gang Condenser) ea.	$0.10
P-15X59	Large Station Pointer	.20
P-15X60	Micrometer Pointer	.10
P-15X57	Small Volume or Tone Control Pointer ea.	.10
P-9X16	Dial Cardboard	.10
P-11X41	Fibre Strip (At Bottom of Dial Glass)	.10
P-41X12	Dial Lamp Reflectors (At each side of Dial Plate) ea.	.10
P-7A37	Dial Lamp Sockets and Clips ea.	.10
P-7A32	Dial Lamps ea.	.20
	10" Black Cord for Small Pointers doz.	.45
P-29X20	Brass Collars with Set Screws for Securing Small Pointer Cords to Shafts ea.	.10
P-28X44	Tension Springs for Small Pointer Cords ea.	.10
P-26X229	Small Pointer Shafts and Pulleys ea.	.10
P-17X15	Glass Dial Crystal	.35
P-28X58	Crystal Retaining Ring	.15
P-2A60	Dial Lamp Push Button Switch Assembly	.50

DRIVE ASSEMBLY

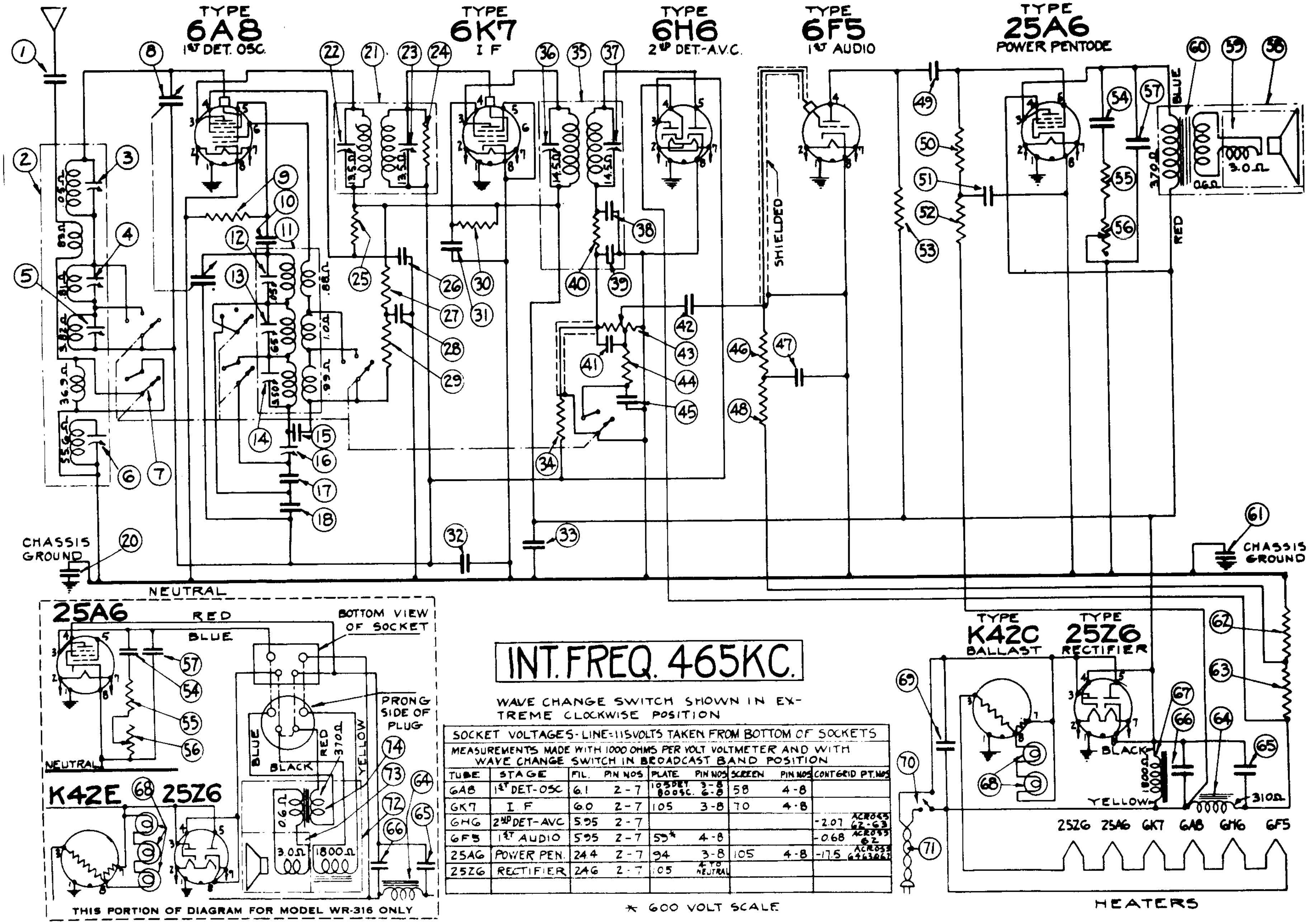
Part No.	Description	List Price
P-5A34	Planetary Assembly Complete with Hex Nut and Lockwasher (This is the unit mounted at the front of the chassis base. It is integral with the tuning shaft.)	1.25
P-10X14	Black Tuning Drive Cord Only	.30
P-28X69	Tension Spring for Tuning Drive Cord	.10
P-25X269	Drive Assembly Bracket Only (Mounted on Gang Condenser)	.25
P-25X283	Rear Mounting Foot for Gang Condenser	.10
P-24X239	Drive Drum Assembly Complete with Gears, Micrometer and Main Pointer Shaft	1.35
P-28X84	Spreader Spring for Rotary Gear (Part of Above Assembly)	.10
P-28X83	Spreader Spring for Stationary Gear (Part of Above Assembly)	.10

*See Part No. P-25A86 under Transformers and Coils

Prices subject to change without notice

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODELS WR-116 & WR-316



INT. FREQ. 465KC.

WAVE CHANGE SWITCH SHOWN IN EXTREME CLOCKWISE POSITION

SOCKET VOLTAGES - LINE=115VOLTS TAKEN FROM BOTTOM OF SOCKETS

MEASUREMENTS MADE WITH 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION

TUBE	STAGE	FIL.	PIN NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	CONT GRID	PT. NOS.
6A8	1ST DET-OSC	6.1	2-7	105 DET. 80 OSC.	3-8 6-8	58	4-8		
6K7	I. F.	6.0	2-7	105	3-8	70	4-8		
6H6	2ND DET-AVC	5.95	2-7					-2.07	ACROSS 62-63
6F5	1ST AUDIO	5.95	2-7	55*	4-8			-0.68	ACROSS 62
25A6	POWER PEN.	24.4	2-7	94	3-8	105	4-8	-17.5	ACROSS 64&63&62
25Z6	RECTIFIER	24.6	2-7	105	4 TO NEUTRAL				

* 600 VOLT SCALE

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODELS WR-116 & WR-316

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes .... 1 #6A8, 1 #6K7, 1 #6H6, 1 #6F5, 1 #25A6, 1 #25Z6, 1 #K42C (Ballast) in Model WR-116, 1 #K42E (Ballast) in Model WR-316 - Total 7

Power Supply Characteristics .... 105-125 volts D.C. or 105-125 volts, 50-60 cycle A.C.

Power Consumption .... 52 Watts

Maximum output .... 1.0 Watts

Maximum Undistorted Output .... 0.75 Watts

Tuning Ranges .... (White Band - 540 to 1550 K.C.
(Green Band - 1500 to 4500 K.C.
(Red Band - - 5500 to 16500 K.C.

Line-Up Frequencies .... I.F. 465 K.C., 1400 K.C., 600 K.C., 4000 K.C., 15000 K.C.

GENERAL DESCRIPTION

These models are seven-tube, three-band, A.C.-D.C. superheterodyne receivers whose circuits employ all metal tubes. A type 6A8 tube is used as a combined first detector-oscillator, a type 6K7 tube as an intermediate frequency amplifier, a type 6H6 tube as second detector and automatic volume control, a type 6F5 as a first audio frequency amplifier, a type 25A6 as an output amplifier, a type 25Z6 as a rectifier, and a type K42C as a ballast tube in the Model WR-116 or a type K42E in the Model WR-316.

The Model WR-116 is a personal model with the speaker mounted on the chassis while the Model WR-316 is a console model using a larger separate speaker.

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment.

A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figs. #1 and #2 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 KC.)

1. Set the volume control to maximum position, the tone control to treble position, the wave-change switch on broadcast and the dial indicator at approximately 600 KC.
2. Connect the output meter to the terminals of the voice coil.
3. Set the test oscillator to 465 KC. and apply the test signal to the grid of the type 6K7 I.F. tube through a .5 mfd. blocking condenser.
4. Adjust trimmer condensers #36 and #37 to maximum output.
5. Apply the test signal to the grid of the type 6A8 first detector-oscillator tube and adjust trimmer condensers #22 and #23 to maximum output.
6. Connect the test oscillator to the antenna of the receiver and with a strong input signal adjust wave trap trimmer condenser #6 to minimum output.

BROADCAST BAND ADJUSTMENT

1. Set the test oscillator and dial indicator to 1400 KC.
2. Apply the test signal to the antenna of the receiver through a .0002 mfd. condenser.
3. Adjust oscillator trimmer condenser #14 until the signal is received.
4. Adjust the preselector trimmer condenser #5 to maximum output.
5. Set test oscillator and dial indicator to 600 KC. and adjust the oscillator series condenser #16 until the signal is received. Tune the receiver to a slightly lower frequency and readjust trimmer #16 to maximum output. If the sensitivity increases, continue this procedure in the same direction until maximum sensitivity is reached. If the sensitivity decreases, try this procedure at slightly higher frequencies until maximum sensitivity is reached.
6. Return test oscillator and dial indicator to 1400 KC. and check adjustment of the oscillator and preselector trimmer condensers.

ADJUSTMENT OF GREEN BAND

1. Set the wave-change switch to the Green Band position.
2. Set the test oscillator and dial indicator to 4000 KC. and adjust the oscillator trimmer condenser #13 until the signal is received.
3. Adjust the preselector trimmer condenser #4 to maximum output.
4. Check the sensitivity and calibration over scale.

ADJUSTMENT OF RED BAND

1. Set the wave-change switch to the Red Band position.
2. Set the test oscillator and dial indicator to 15,000 KC. and adjust the oscillator trimmer condenser #12 until the signal is received. Two positions may be found at which the signal may be tuned in. Use the position with the lower capacity trimmer setting or with the alignment screw turned farther out.
3. Adjust the preselector trimmer #3 to maximum output.
4. Check the receiver over scale for calibration and sensitivity.

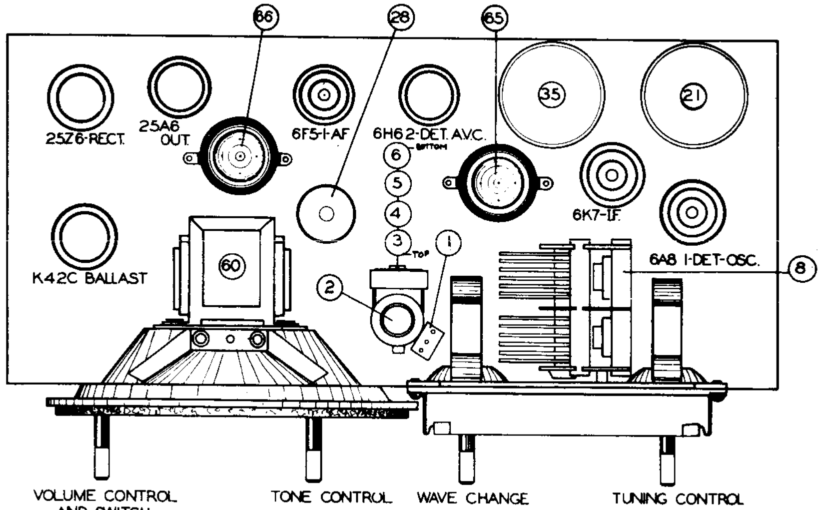


Figure No. 1

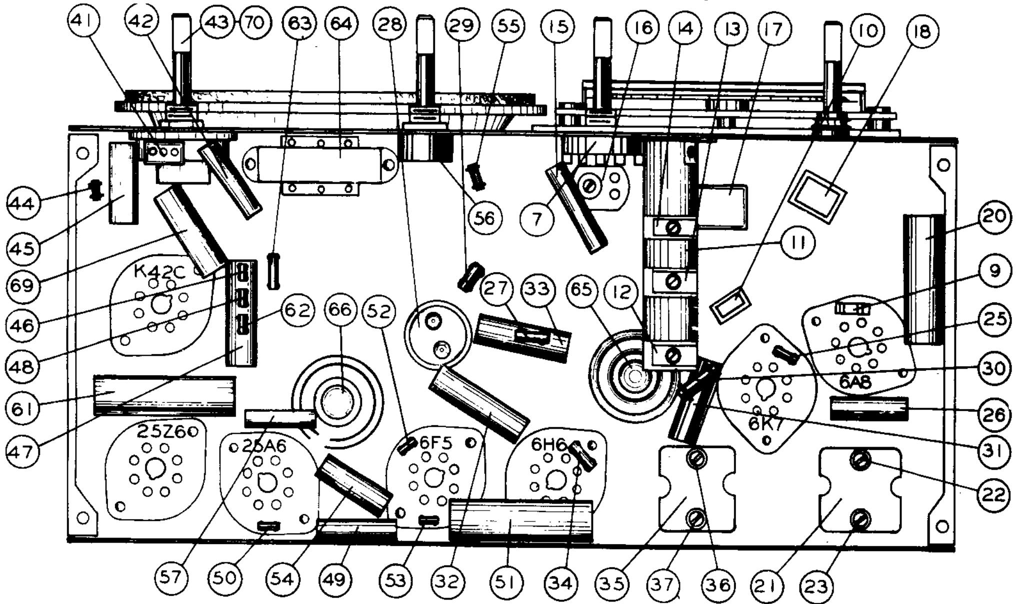


Figure No. 2

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODELS WR-116 & WR-316

PARTS LIST
MODEL WR-116

Dia. #	Part #	Description of Parts	List Price
1	SA 103775	.001 mfd. mica condenser	$ .20
2	RC 95202	Antenna coil assembly	2.25
3		4-25 mmf. trimmer condenser - part of RC 95202	
4		1.5-10 mmf. trimmer condenser - part of RC 95202	
5		1.5-10 mmf. trimmer condenser - part of RC 95202	
6		30-60 mmf. trimmer condenser - part of RC 95202	
7	SW 9548	Wave-change switch	1.00
8	CG 9549	Variable condenser (2 gang)	2.50
9	RE 9581	50,000 ohm, 1/4 W. resistor	.15
10	SA 106417	.0001 mfd. mica condenser	.20
11	RC 95203	Oscillator coil assembly	1.75
12		4-25 mmf. trimmer condenser - part of RC 95203	
13		1.5-10 mmf. trimmer condenser - part of RC 95203	
14		1.5-10 mmf. trimmer condenser - part of RC 95203	
15	CW 4-005	.005 mfd., 400 V. condenser	.15
16	CS 9545	300-600 mmf. oscillator series condenser	.40
17	CM 9525	.0027 mfd. mica condenser	.30
18	CM 9524	.0034 mfd. mica condenser	.35
20	CW 6-10	.1 mfd., 600 V. condenser	.20
21	IC 9573	1st I.F. coil (465 KC.)	2.00
22		30-100 mmf. trimmer condenser - part of IC 9573	
23		30-100 mmf. trimmer condenser - part of IC 9573	
24		500,000 ohm, 1/4 W. resistor - part of IC 9573	
25	RE 9536	20,000 ohm, 1/4 W. resistor	.10
26	CW 2-05	.05 mfd., 200 V. condenser	.15
27	SA 105249	5000 ohm, 1/4 W. resistor	.15
28	CE 9540	4 mfd., 150 V. condenser	.95
29	SA 105249	5000 ohm, 1/4 W. resistor	.15
30	RE 9568	25,000 ohm, 1/4 W. resistor	.10
31	CW 2-05	.05 mfd., 200 V. condenser	.15
32	CW 2-10	.1 mfd., 200 V. condenser	.15
33	CW 2-10	.1 mfd., 200 V. condenser	.15
34	RE 9577	2 meg., 1/2 W. resistor	.15
35	IC 9574	Second I.F. coil (465 KC.)	1.75
36		30-100 mmf. trimmer condenser - part of IC 9574	
37		30-100 mmf. trimmer condenser - part of IC 9574	
38		.0001 mfd. mica condenser - part of IC 9574	
39		.0001 mfd. mica condenser - part of IC 9574	
40		50,000 ohm, 1/8 W. resistor - part of IC 9574	
41	CM 9519	.0005 mfd. mica condenser	.20
42	CW 4-005	.005 mfd., 400 V. condenser	.15
43	VR 9533	1/2 meg. volume control	1.10
44	RE 9568	25,000 ohm, 1/4 W. resistor	.10
45	CW 4-01	.01 mfd., 400 V. condenser	.15
46	RE 9572	500,000 ohm, 1/4 W. resistor	.15
47	CW 2-10	.1 mfd., 200 V. condenser	.15
48	RE 9572	500,000 ohm, 1/4 W. resistor	.15
49	CW 4-01	.01 mfd., 400 V. condenser	.15
50	RE 9572	500,000 ohm, 1/4 W. resistor	.15
51	CW 9525	1 mfd., 100 V. condenser	.40
52	RE 9534	100,000 ohm, 1/8 W. resistor	.10
53	RE 9531	250,000 ohm, 1/8 W. resistor	.10
54	CW 2-05	.05 mfd., 200 V. condenser	.15
55	RE 9550	2000 ohm, 1/4 W. resistor	.15
56	VR 9534	20,000 ohm tone control	.55
57	CW 4-01	.01 mfd., 400 V. condenser	.15
58	SK 9532	Speaker (6" Dia.)	6.50
59	SA 106617	Diaphragm and voice coil	1.15
60	TR 9554	Output transformer	1.25
61	CW 6-10	.1 mfd., 600 V. condenser	.15
62	RE 9571	15 ohm, 1/4 W. resistor	.15
63	RE 9556	25 ohm, 1/4 W. resistor	.15
64	TR 9553	Choke coil	1.10
65	CE 9538	20 mfd., 150 V. condenser	.85
66	CE 9539	30 mfd., 150 V. condenser	.90
67	CL 9554	Field coil	1.50
68	LP 9516	Dial lamp - 6.3 volts, 0.15 ampere	.20
69	CW 2-10	.1 mfd., 200 V. condenser	.15
70		On-Off switch - part of VR 9533	
71	CB 9512	Line cable and plug	.50

MAIN ASSEMBLIES

Part #	Description of Parts	List Price
CH 95114	Chassis assembly	
KA 9554	Cabinet	
SK 9532	Speaker assembly	6.50

Dia. #	Part #	Description of Parts	List Price
		BRACKETS, CLIPS AND CLAMPS	
	BK 95201	Dial scale bracket on tuning condenser	.35
	BK 95202	Bracket over dial scale	.25
	BK 95199	Dial lamp socket bracket	.05
	BK 95182	Large electrolytic condenser mounting bracket	.05
	BK 95195	Small electrolytic condenser mounting bracket	.05
		CABLES AND CABLE ASSEMBLY	
	PR 97160	Dial drive cable - 18" (per yard)	.05
	CB 95108	Antenna cable	.10
		SCREWS AND NUTS	
	SC 958	Escutcheon plate screw	.05
	SC 19-16 CA	Chassis mounting screw	.05
	SC 1069	Set screw for dial indicator	.05
	SC 102441	Set screw for pulley	.05
		WASHERS, BUSHINGS AND SPACERS	
	WA 106339	Chassis mounting washer	.05
	IS 1002	Rubber bushing for tuning condenser mounting	.05
	SR 953	Spacer for variable condenser mounting	.05
	SR 9519 CA	Spacer for vernier drive	.05
		MISCELLANEOUS	
	PL 9577	Escutcheon dial plate	.70
	SP 9539	Spring for drive cable	.05
	GA 9511	Dial gasket	.05
	KN 9576	Knob - spring type	.20
	KN 9580	Knob - set screw type	.20
	SO 9518	Dial lamp socket	.10
	DS 9559	Dial scale	.90
	PL 9581	Masking plate	.20
	SI 9564	Dial scale indicator assembly	.80
	SH 9540	Vernier drive assembly	.70
	SP 9540	Spring for dial scale	.05
	PU 9519	Pulley - dial driven	.25
	SO 956	Tube socket - 8 prong	.20

MODEL WR-316

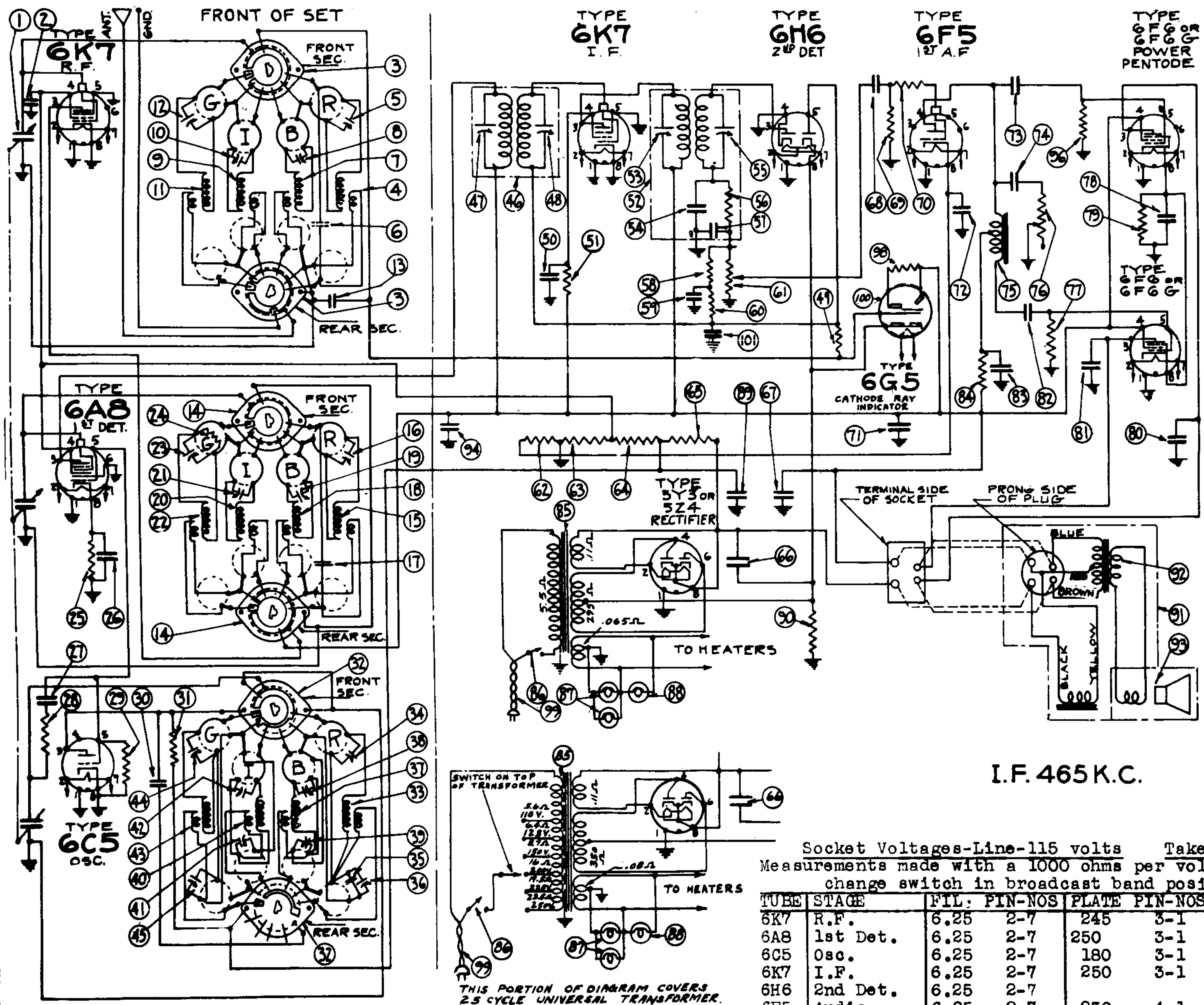
All service parts for Model WR-316 are the same as for Model WR-116 except for the following:

Dia. #	Part #	Description of Parts	List Price
32	CW 2-25	.25 mfd., 200 V. condenser	$ .20
43	VR 9535	1/2 meg. volume control	1.10
44	RE 9527	5000 ohm, 1/4 W. resistor	.10
45	CW 2-05	.05 mfd., 200 V. condenser	.15
70		On-Off switch - part of VR 9535	
72	SK 9538	Speaker assembly (14" Dia.)	10.00
73	DM 956	Diaphragm and voice coil assembly	1.25
74	TR 9556	Output transformer	1.35
80	CL 9556	Field coil	1.60

Part #	Description of Parts	List Price
	MAIN ASSEMBLIES	
CH 95115	Chassis assembly	
KA 9555	Cabinet	
SK 9538	Speaker assembly (14" Dia.)	10.00
	MISCELLANEOUS	
GA 9512	Dial gasket	.10
SI 9549	Dial indicator assembly	.90
DS 9561	Dial scale	1.35
PL 9562	Masking plate	.25
BK 95203 CA	Bracket over dial scale	.30
SC 99005	Speaker centralizer screw	.05
SA 107278	Speaker plug (4 prong)	.10
SA 107279	Speaker plug cover	.10
SA 107257	Speaker socket (4 prong)	.10
PL 9578	Escutcheon dial plate	1.25

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODELS WR-214 & WR-314



I.F. 465 K.C.

D.C. RESISTANCE
Measured with wave change switch in corresponding band position

Coil	Dia.No.	Prim.	Sec.
G-Ant.	11	120	20
G-R.F.	22	11	20
G-Osc.	43	6	8
I-Ant.	9	18.5	3.8
I-R.F.	20	0.8	10.7
I-Osc.	40	1.4	3.3
B-Ant.	7	2.1	1.0
B-R.F.	18	1.8	1.0
B-Osc.	37	0.5	0.9
R-Ant.	4	0.7	0.03
R-R.F.	15	2.0	0.03
R-Osc.	33	0.5	0.03
1st I.F.	46	8.6	8.6
2nd I.F.	52	8.6	8.6
Interstage Trans.	75	4200	9000
Output Trans.	92	265 312	.03
Spkr. Field		1800	
Voice Coil	33	3.2	

Socket Voltages-Line-115 volts   Taken from bottom of sockets
Measurements made with a 1000 ohms per volt voltmeter & with wave change switch in broadcast band position

TUBE	STAGE	FIL.	PIN-NOS	PLATE	PIN-NOS	SCREEN	PIN-NOS	BIAS	PIN-NOS
6K7	R.F.	6.25	2-7	245	3-1	100	4-1	* See note	
6A8	1st Det.	6.25	2-7	250	3-1	100	4-1	2.4	8-1
6C5	Osc.	6.25	2-7	180	3-1				
6K7	I.F.	6.25	2-7	250	3-1	105	4-1	* See note	
6H6	2nd Det.	6.25	2-7					5.1	8-1
6F5	Audio	6.25	2-7	230	4-1			1.5	8-1
6F6	Output	6.25	2-7	235	3-1	250	4-1	21.5	8-1
5Y3	Rectifier	5.	2-8	395	8-1				
6F6	Output	6.25	2-7	235	3-1	250	4-1	21.5	8-1
6G5	Tuning Indicator	6.35	1-6	263	2-5			* See note	

* Control grid bias on 6K7 & 6G5 tubes is equal to approx. six-tenths the voltage from pins 5-1 on the 6H6 tube socket.

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODELS WR-214 & WR-314

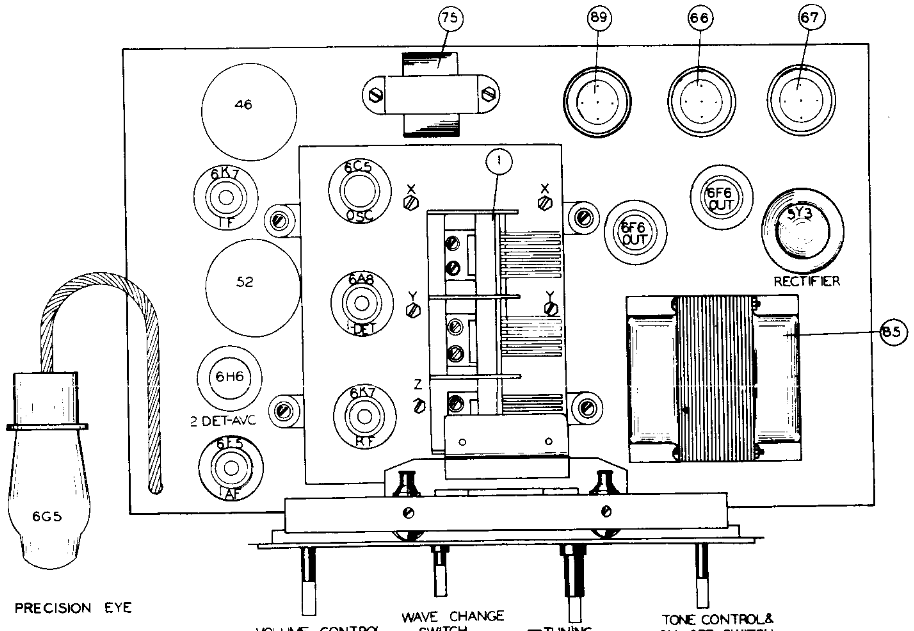


Figure No. 1

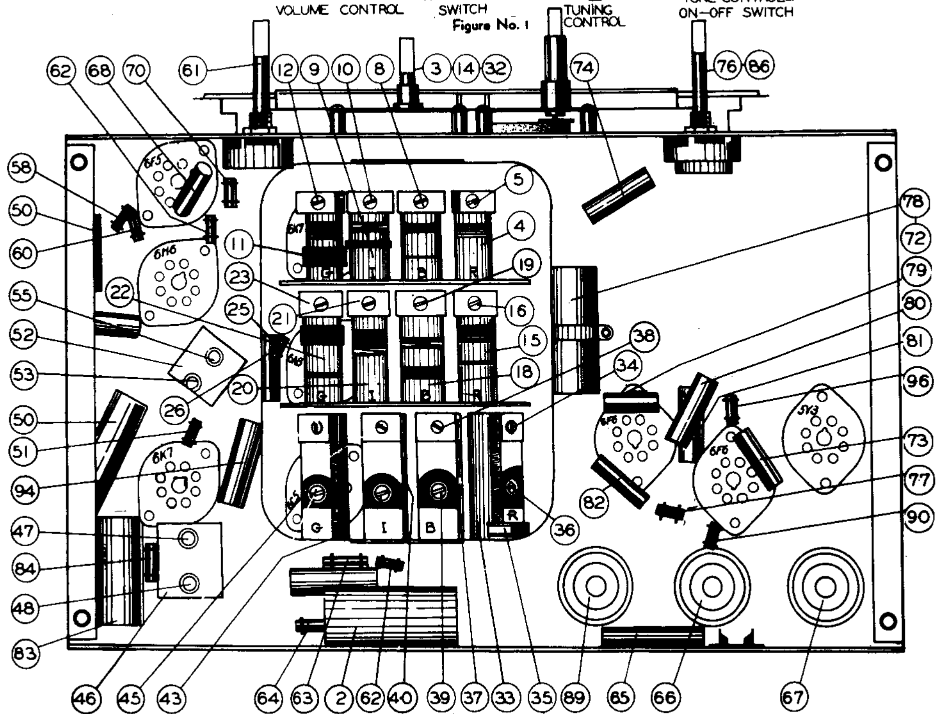


Figure No. 2

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ...... 2 #6K7, 1 #6A8, 1 #6C5, 1 #6H6, 1 #6F5, 2 #6F6, 1 #6G5, 1 #5Y3 - Total 10

Power Supply .... 105 to 125 volts, 50 to 60 cycles

Power Consumption .... 80 Watts

Maximum Undistorted Output .... 4.5 Watts

Maximum Output .... 6.5 Watts

Tuning Ranges ....
(Green Band - 150 to 390 KC
(White Band - 525 to 1800 KC
(Blue Band - 1750 to 6000 KC
(Red Band - - 5800 to 18500 KC

Line-Up Frequencies .. I.F. 465 KC.,350 KC.,165 KC.,1600 KC.,570 KC.,5500 KC.,1900 KC., 17000 KC., and 6000 KC

GENERAL DESCRIPTION

This model is a ten-tube, four-band superheterodyne receiver designed for worldwide reception including the U.S. Weather Band and employs the new all-metal tubes. The circuit employs a high frequency amplifier using the new type 6K7 tube. This is followed by the first detector circuit employing a 6A8 tube and a separate oscillator (type 6C5). These tubes with their associated circuits, (coils, variable condensers, trim condensers for R.F. and detector stages, and trim and lag condensers for the oscillators) comprise a complete assembly in compact form separately cushioned from the main chassis. This assembly is known as the "Precision Tuner". From the high frequency assembly the energy passes through an I.F. selective transformer and to an I.F. amplifier tube (type 6K7). From here further selection takes place and the energy is sent to the diode (type 6H6) where second detection takes place and voltages are provided for automatic volume control. A first audio amplifier tube (type 6F5) follows the diode and this is further followed by a push-pull output stage employing two type 6F6 tubes. A type 5Y3 rectifier supplies the direct current for energizing the tubes, and a type 6G5 acts as a tuning indicator.

REMOVING INDIVIDUAL COIL AND SWITCH SECTIONS OF PRECISION TUNER

If a component part located underneath the switch and coil assemblies of the "Precision Tuner" has to be replaced or a section of the unit has to be removed for inspection, each section can easily be removed separately. To do this proceed with care as follows:

1. Remove the two screws which fasten the mounting plate of the wave change switch shaft to the chassis frame. Pull switch shaft straight out.
2. Unsolder the stator and rotor leads from the gang condenser.
3. The fastening screws for the switch sections are located on top of the "Precision Tuner" and are indicated by X, Y, and Z in Figure #1. Remove the corresponding screw.
4. Each individual section can then be pulled out straight.

NOTE: On the R.F. section, the plate lead from the 6K7 socket will have to be unsoldered from the switch terminal before the section can be removed.

On the oscillator section, the plate lead to the 6C5 socket and the plate supply lead will have to be unsoldered from the switch terminal before the section can be removed.

5. After repairs have been made, resolder the plate leads mentioned above and replace the section being careful to observe that the slotted holes in the switch bracket line up with the round guide pins on the base plate of the "Precision Tuner". This is IMPORTANT as the switch shaft cannot be inserted if the switch brackets do not line up.
6. Replace the section fastening screws.
7. Resolder the stator and rotor leads on gang condenser.
8. Replace the switch shaft and the mounting fastening screws. When inserting the switch shaft, be careful that all the switch discs are in the same position. Otherwise the switch shaft will not slide in. NEVER force the shaft into the switch discs. If shaft does not slide in freely, examine the position of the slot in each switch disc.

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment. A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures #1 and #2 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 KC.)

1. Set volume control on full and turn tone control to bass position.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 KC. and adjust its output to produce a measurable reading on output meter when test signal is applied to the grid of 6K7 I.F. tube through a .5 mfd. blocking condenser.
4. Adjust trimmers #53 and #55 for maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 6A8 first detector and adjust #47 and #48 for maximum output.

ADJUSTMENT OF GREEN BAND

1. Set wave change switch to Green Band position.
2. Set test oscillator and dial indicator to 350 KC

(Continued on next page)

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODELS WR-214 & WR-314

(Continued from preceding page)

3. Apply test signal to antenna terminal of the chassis through a .0002 mfd. series condenser and adjust #44, #23, and #12 for maximum output.
4. Set test oscillator and dial indicator to 165 KC. and adjust #45 for maximum output, at the same time rocking the variable tuning condenser.
5. Return to 350 KC. setting with both test oscillator and dial indicator and repeat adjustment of #44, #23 and #12 for accuracy.

ADJUSTMENT OF BROADCAST BAND

1. Set wave change switch to the White or Broadcast Band position.
2. Set test oscillator and dial indicator to 1600 KC. and adjust #42, #21 and #10 for maximum output.
3. Set test oscillator and dial indicator to 570 KC., and adjust #41 for maximum output, at the same time rocking the variable tuning condenser.
4. Return to 1600 KC. setting and make re-adjustment of #42, #21 and #10.

ADJUSTMENT OF BLUE BAND

NOTE: In adjusting the Blue and Red Bands, a .0002 mfd. condenser and a 400 ohm resistor connected in series should be inserted in the high side of the test oscillator leads. This condenser-resistor combination is the approximate equivalent of a short-wave antenna.

1. Set wave change switch to Blue Band position.
2. Set test oscillator and dial indicator to 5500 KC. and adjust #38, #19 and #8 for maximum output.
3. Set test oscillator and dial indicator to 1900 KC. and adjust #39 for maximum output, at the same time rocking the variable tuning condenser.

ADJUSTMENT OF RED BAND

1. Set wave change switch to Red Band position.
2. Set test oscillator and dial indicator to 17000 KC. and adjust #34, #16 and #5 for maximum output.
3. Set test oscillator and dial indicator to 6000 KC. and adjust #36 for maximum output, at the same time rocking the variable tuning condenser.
4. Return to 17000 KC. setting and make readjustment of #34, #16 and #5.

IMPORTANT: While testing or making repairs on this receiver, the chassis should not be turned upside down or on its side for any long period of time while the set is turned on as the chemicals in the electrolytic filter condenser will come out through the air vents making the condenser appear to be defective. If left in this position too long the condenser may be injured.

Dia. #	Part #	Description of Parts	List Price
1	CG 9551	Variable condenser - 3 gang	$ 4.50
2	CW 2-100	1 mfd., 200 V. condenser	.40
3	SW 9555	Switch and bracket assembly - antenna section	1.40
4	RC 95220	Antenna coil (Red)	.95
5	CS 9554	4-30 mmf. trimmer condenser	.15
6		Twisted wire - part of RC 95220	
7	RC 95212	Antenna coil (Blue)	.80
8	CS 9554	4-30 mmf. trimmer condenser	.15
9	RC 95218	Antenna coil (White)	1.00
10	CS 9554	4-30 mmf. trimmer condenser	.15
11	RC 95219	Antenna coil (Green)	1.25
12	CS 9554	4-30 mmf., trimmer condenser	.15
13	CW 9513	.05 mfd., 200 V. condenser	.25
14	SW 9556	Switch and bracket assembly - R.F. section	1.40
15	RC 95217	R.F. coil (Red)	1.35
16	CS 9554	4-30 mmf. trimmer condenser	.15
17	CM 9512	6 mmf. mica condenser	.15
18	RC 95214	R.F. coil (Blue)	1.00
19	CS 9553	1.5-10 mmf. trimmer condenser	.15
20	RC 95215	R.F. coil (White)	1.00
21	CS 9554	4-30 mmf. trimmer condenser	.15
22	RC 95216	R.F. coil (Green)	1.30
23	CS 9553	1.5-10 mmf. trimmer condenser	.15
24		.1 meg., 1/4 W. resistor - part of RC 95216	
25	RE 9529	300 ohm, 1/4 W. resistor	.10
26	CW 2-05	.05 mfd., 200 V. condenser	.15
27	CM 9511	.000065 mfd. mica condenser	.15
28	RE 9537	50 ohm, 1/4 W. resistor	.10
29	RE 9524	50,000 ohm, 1/4 W. resistor	.10
30	CW 9515	.05 mfd., 200 V. condenser	.25
31	RE 9526	5,000 ohm, 1 W. resistor	.20
32	SW 9557	Switch and bracket assembly - oscillator section	1.50
33	RC 95223	Oscillator coil (Red)	2.50
34		3-15 mmf., trimmer condenser - part of CS 9557	.80
35	CM 959	.002 mfd., mica condenser	.25
36		800-1600 mmf. oscillator series cond. - part of CS 9557	
37	RC 95213	Oscillator coil (Blue)	1.75
38		3-15 mmf. trimmer condenser - part of CS 9520	.75
39		800-1600 mmf. osc. series condenser - part of CS 9520	
40	RC 95221	Oscillator coil (White)	1.80
41		300-600 mmf. osc. series condenser - part of CS 9517	.55
42		5-25 mmf. trimmer condenser - part of CS 9517	
43	RC 95222	Oscillator coil (Green)	1.85
44		50-100 mmf. trimmer condenser - part of CS 9558	.50
45		60-150 mmf. osc. series condenser - part of CS 9558	
46	IC 9576	First I.F. coil assembly - 465 K.C.	1.50
47		80-200 mmf. trimmer condenser - part of IC 9576	
48		80-200 mmf. trimmer condenser - part of IC 9576	
49	RE 9585	.25 meg., 1/4 W. resistor	.15
50	CW 2-25	.25 mfd., 200 V. condenser	.15
51	SA 105277	75,000 ohm, 1/4 W. resistor	.15
52	IC 9577	Second I.F. coil assembly - 465 KC.	1.85
53		80-200 mmf. trimmer condenser - part of IC 9577	
54		100 mmf. mica condenser - part of IC 9577	
55		80-200 mmf. trimmer condenser - part of IC 9577	
56		50,000 ohm, 1/4 W. resistor - part of IC 9577	
57		100 mmf. mica condenser - part of IC 9577	
58	SA 105281	1 meg., 1/4 W. resistor	.15
59	CW 2-05	.05 mfd., 200 V. condenser	.15
60	SA 105281	1 meg., 1/4 W. resistor	.15
61	VR 959	.5 meg. volume control	1.00
62	SA 105268	1500 ohm, 1/4 W. resistor	.15
63	SA 104966	30,000 ohm, 1/2 W. resistor	.15
64	SA 101404	15,000 ohm, 1 W. resistor	.20
65	SA 103835	10,000 ohm, 2 W. resistor	.25
66	CE 9536	12 mfd., 450 V. electrolytic condenser	.80
67	CE 9535	16 mfd., 300 V. electrolytic condenser	.75
68	CW 4-02	.02 mfd., 400 V. condenser	.15
69	SA 105281	1 meg., 1/4 W. resistor	.15
70	RE 9584	.1 meg., 1/4 W. resistor	.15
71	CW 4-10	.1 mfd., 400 V. condenser	.15
72	CE 9526	12 mfd., 25 V. electrolytic condenser	.90
73	CW 4-02	.02 mfd., 400 V. condenser	.15
74	CW 4-02	.02 mfd., 400 V. condenser	.15
75	TR 9563	Interstage transformer	2.50
76	VR 9537	.1 meg., tone control - 5,000 ohm min.	1.00
77	RE 9585	.25 meg., 1/4 W. resistor	.15
78		12 mfd. electrolytic condenser - part of CE 9526	
79	RE 9587	500 ohm resistor	.35
80	CW 4-005	.005 mfd., 400 V. condenser	.15
81	CW 4-005	.005 mfd., 400 V. condenser	.15
82	CW 4-02	.02 mfd., 400 V. condenser	.15
83	CW 9526	1 mfd., 400 V. condenser	.40
84	SA 105272	10,000 ohm, 1/4 W. resistor	.15
85	TR 9562	Power transformer - 105-125 V., 50-60 cycle	5.00
86		On & Off switch - part of VR 9537	
87	LP 9515	Dial lamp - 3.5 V., .35 amp.	.20
88	LP 9510	Tuning indicator lamp - 6.3 V., .25 amp.	.15
89	CE 9528	8 mfd., 450 V. electrolytic condenser	.80
90	RE 95101	37 ohm, 1/4 W. resistor	.15
91	SK 9537	Speaker	7.50
92	TR 9577	Output transformer	1.75
93	SA 107282	Diaphragm and voice coil assembly	1.15
94	CW 4-05	.05 mfd., 400 V. condenser	.15
96	RE 9585	.25 meg., 1/4 W. resistor	.15
98		1 meg., 1/4 W. resistor - part of CB 9598	
99	CB 9512	Line cable and plug	.50
100	CB 9598	"Precision eye" cable assembly	.70
101	CW 2-05	.05 mfd., 200 V. condenser	.15

ZENITH RADIO CORPORATION

MODELS 5-M-191, 5520; 6-M-192, 6-M-193 & 6-M-194 "CHASSIS 5637"; 8-M-195 & 5803

IGNITION INTERFERENCE

Remove the center high tension lead of the distributor and insert the suppressor into the distributor at that point. The wire is then placed in the open end of the suppressor. The generator condenser is fastened under the cut-out housing and the wire connected to the generator connection on the cut-out. The coil condenser is attached to the battery connection of the coil and the other end to the coil case. Make absolutely certain that this condenser is not accidentally connected to the distributor side of the coil since this will increase motor noise terrifically and make operation of the receiver highly unsatisfactory when the motor is running. Where two distributors or two coils are employed a corresponding number of condensers and suppressors must be applied. In some instances it might be of benefit to attach a by-pass condenser from one side of the ammeter to a grounded part of the instrument panel. If the dome light is feeding interference to the antenna the lead should be cut where it comes from the post and a switch inserted on the instrument panel at that point, to turn it off and on. In some cases, a by-pass condenser connected to the dome-light lead and grounded at the post is as effective as a separate switch. Try this first.

If additional attention is necessary to reduce motor interference, the motor block must be securely bonded, both at the rear and front supports with ½ inch copper braid. Also bond or ground all metal control cables or pipes feeding from the motor side into the car. These bonds should be made to the control wire or pipe and soldered to the fire wall immediately adjacent on the motor side. As a further precaution the rotor should be lengthened to reduce the gap between it and the distributor head contacts by either peening the end or applying a small quantity of solder at this point.

ALIGNMENT

Every Zenith receiver is carefully balanced, and the sensitivity measured on accurate crystal controlled signal generators before leaving the factory, and unless a part is changed, or the receiver otherwise altered, the adjustment should not be tampered with.

When realignment is required, an accurately calibrated service oscillator and output meter are essential.

The proper procedure is as follows:

MODELS 5-M-191 & 5520

"A" Connect the service oscillator output leads to the control grid of the 6A8 tube, and to the chassis. If the oscillator output is a single shielded lead the shield should connect to the chassis.

Connect an output meter across the primary of the speaker transformer.

Set the service oscillator at 456 K.C. and adjust the trimmers on the I.F. transformers to the point giving the greatest reading on the output meter. These, as well as the following adjustments should be made using as small an output from the signal generator as possible so that the A.V.C. action will be least effective.

"B" Change the service oscillator lead from the grid of the 6A8 to the antenna connection. A male Delco Remy connector may be used in making a connection to the antenna lead.

Set the service oscillator at 1600 K.C. and rotate the gang condenser until the plates are entirely out of mesh. Adjust the oscillator section trimmer until the 1600 K.C. signal is tuned in.

"C" Set the service oscillator to 600 K.C. and rock the gang condenser slowly to and fro past the point where this signal is received, meanwhile adjusting the padder condenser for a setting which gives the greatest output reading.

"D" Repeat operation "B". See antenna instruction **MODEL 5-M-191** for correct alignment of antenna stage.

MODELS 6-M-192, 6-M-193 & 6-M-194 "CHASSIS 5637"; 8-M-195 & 5803

"A" Connect the service oscillator to the control grid of the 6A8 tube and the chassis.

Connect the output meter across the primary of the speaker transformer.

Set the service oscillator to 252.5 K.C. and adjust the trimmers on the I.F. transformers for the greatest output reading. These adjustments should be repeated several times using as weak an input signal as possible so as to obtain greater accuracy.

"B" Change the service oscillator lead from the grid of the 6A8 to the antenna connection. A male Delco Remy connector may be used in making a connection to the antenna lead.

Set the service oscillator at 1600 K.C. and rotate the gang condenser until the plates are entirely out of mesh. Adjust the oscillator section trimmer until the 1600 K.C. signal is tuned in.

Change the service oscillator to 1400 K.C. Rotate the gang condenser until this signal is tuned in, and then adjust the R.F. trimmer on the gang condenser to the point giving the greatest output reading.

"C" Set the service oscillator to 600 K.C. and rock the gang condenser slowly to and fro past the point where this signal is received, meanwhile adjusting the padder condenser for a setting which gives the greatest output reading.

"D" Repeat operation "B".

The sensitivity control should be in the extreme clockwise position when making all adjustments.

NOTE — Due to the high gain type of I.F. transformers used in these receivers it is essential that a non metallic screw driver be used in making all adjustments. See antenna instructions **MODEL 5-M-191** for correct alignment of antenna stage.

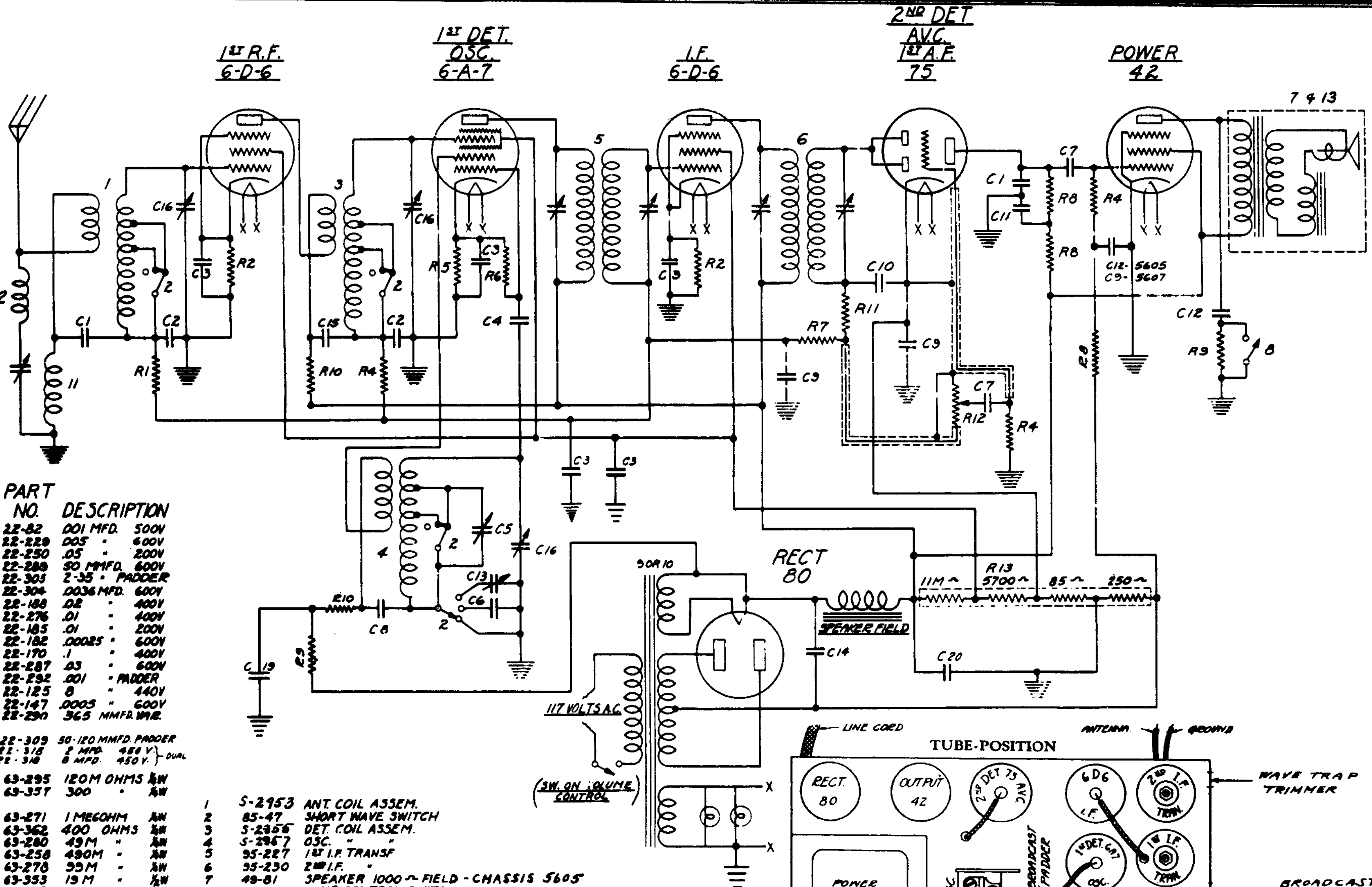
SERVICE NOTE

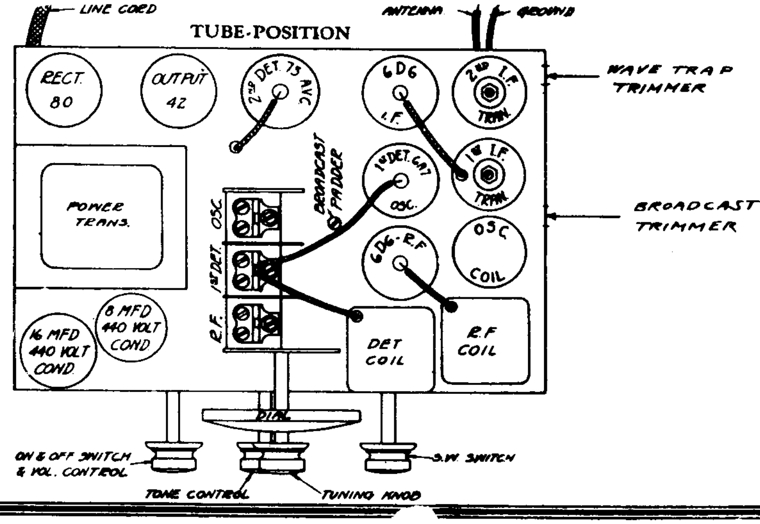
The 0Z4 rectifier tube used in the 5 and 6 tube models may be replaced with a 6X5 rectifier, providing the 6X5 tube is inclosed in a grounded tube shield.

The Goat shield with a ground clip which connects to the shield contact pin of the tube is the most convenient type to use.

ZENITH RADIO CORPORATION

MODELS 808, 809, 860, 861, 5605 & 5607





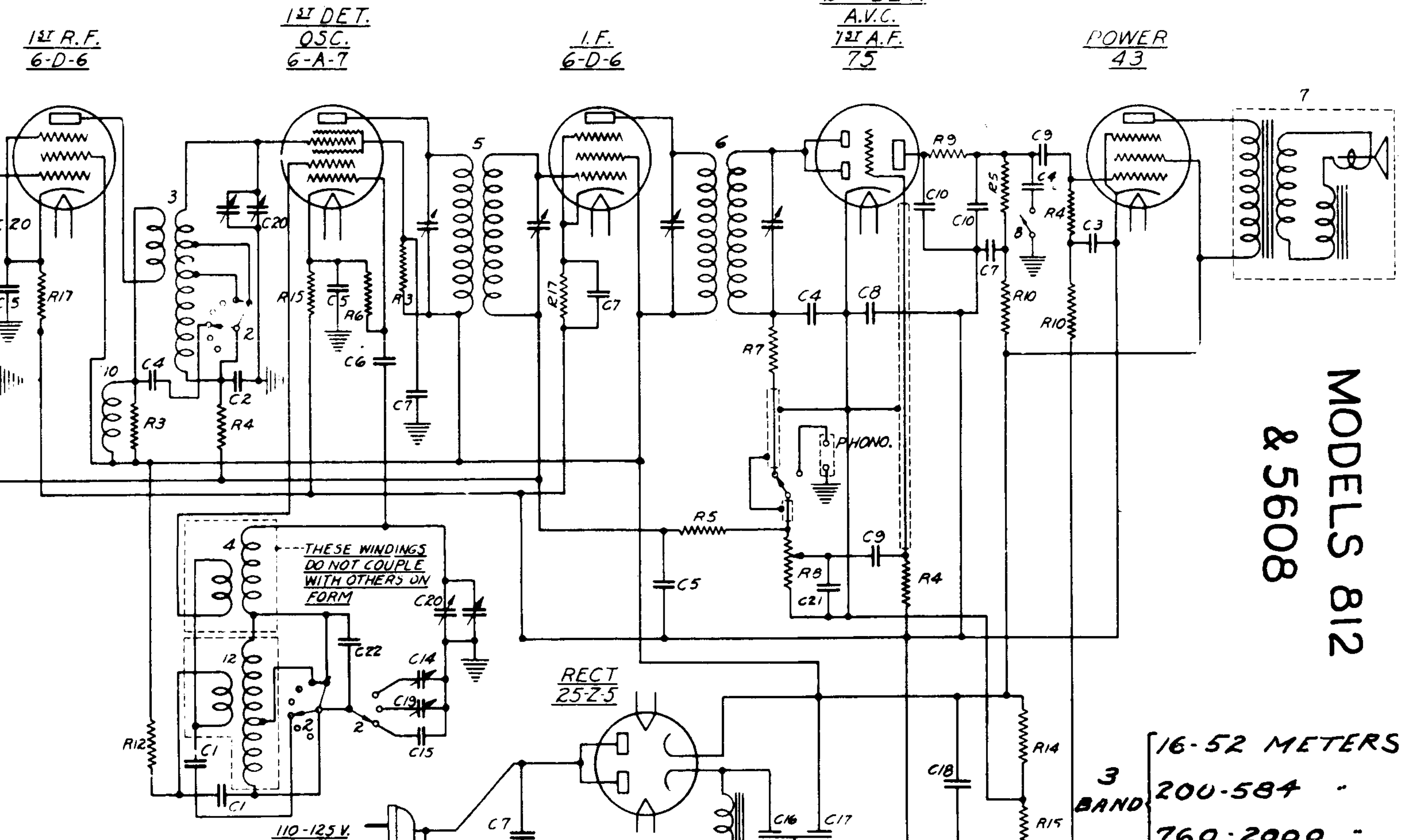
DIAG NO.	PART NO.	DESCRIPTION
C1	22-82	.001 MFD. 500V
C2	22-229	.005 " 600V
C3	22-250	.05 " 200V
C4	22-289	50 MMFD. 600V
C5	22-305	2-35 " PADDER
C6	22-304	.0036 MFD. 600V
C7	22-188	.02 " 400V
C8	22-276	.01 " 400V
C9	22-185	.01 " 200V
C10	22-182	.00025 " 600V
C11	22-170	.1 " 400V
C12	22-287	.03 " 600V
C13	22-292	.001 " PADDER
C14	22-125	8 " 440V
C15	22-147	.0005 " 600V
C16	22-290	365 MMFD. VAR.
C18	22-309	50-120 MMFD. PADDER
C19	22-318	2 MFD. 450 V. } DUAL
C20	22-318	8 MFD. 450 V. } DUAL
R1	63-295	120M OHMS ¼W
R2	63-357	300 " ¼W
R4	63-271	1 MEGOHM ¼W
R5	63-362	400 OHMS ¼W
R6	63-280	49M " ¼W
R7	63-258	490M " ¼W
R8	63-278	99M " ¼W
R9	63-353	19M " ½W
R10	63-373	11M " ¼W
R11	63-355	51M " ¼W
R12	63-366	200M " VOL.CON.
R13	63-351	17,035 " CANDOHM

1	S-2953	ANT. COIL ASSEM.
2	85-47	SHORT WAVE SWITCH
3	S-2956	DET. COIL ASSEM.
4	S-2957	OSC. " "
5	95-227	1ST I.F. TRANSF
6	95-230	2ND I.F. "
7	49-81	SPEAKER 1000 ~ FIELD - CHASSIS 5605
8	85-48	TONE CONTROL SWITCH
9	95-234	POWER TRANSF. 50-60 CYCLE
10	95-229	" " 25 CYCLE
11	20-71	ANT. CHOKE
12	20-75	WAVE TRAP CHOKE
13	49-85	SPEAKER - CHASSIS 5607

I.F. 252 K.C.

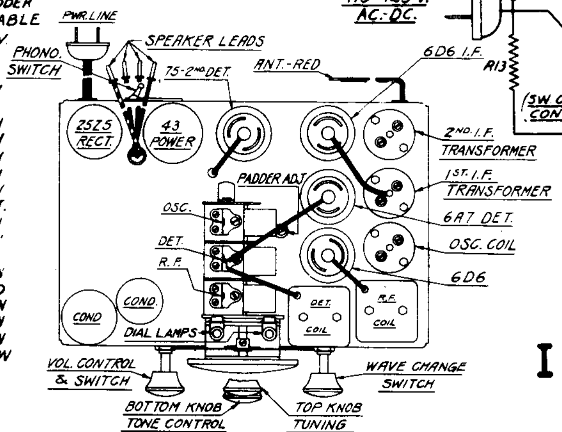
ZENITH RADIO CORPORATION

MODELS 812 & 5608



3 BAND
16-52 METERS
200-584 "
760-2000 "

DIAG. NO.	PART NO.	DESCRIPTION
C1	22-82	.001 MFD. 600V
C2	22-319	.005 " 200V
C3	22-255	.25 " 200V
C4	22-147	.0005 " 600V
C5	22-286	.05 " 200V
C6	22-127	25 MMFD. 600V
C7	22-256	.1 MFD. 200V
C8	22-276	.01 " 400V
C9	22-188	.02 " 400V
C10	22-162	.0001 " 600V
C11	22-199	.5 " 200V
"		
C14	22-320	200-500 MMFD. PADDER
C15	22-219	.03 MFD. 200V
C16	22-307	5 " 150V
C17	22-307	25 " 150V
C18	22-308	16 " 100V
C19	22-161	900-1500 MMFD. PADDER
C20	22-290	365 MMFD. VARIABLE
C21	22-289	50 MMFD 600V.
C22	22-305	2-35 "
R1	63-295	120 M OHMS ¼W
R3	63-375	24 M " ¼W
R4	63-293	990 M " ¼W
R5	63-258	490 M " ¼W
R6	63-376	190 M " ¼W
R7	63-280	49 M " ¼W
R8	63-366	200 M OHM VOL. CONT.
R9	63-261	9,900 OHMS ¼W
R10	63-278	99 M " ¼W
R12	63-326	4000 " ¼W
R13	11-9	90 OHM RES. CORD
R14	63-372	50 M OHMS ¼W
R15	63-244	500 " ¼W
R16	63-374	50 " 2W
R17	63-362	400 " ¼W



Tube Position

I.F. 125 K.C.

1	S-3020	ANT. COIL ASSEM.
2	85-57	SHORT WAVE SWITCH
3	S-3019	DET. COIL ASSEM.
4	S-3067	H.F. OSC. " "
5	95-237	1ST I.F. TRANSF.
6	95-238	2ND I.F. "
7	49-87	SPEAKER 3000 Ω FIELD
8	85-48	TONE CONTROL SWITCH
9	20-82	ANT. CHOKE
10	20-76	R.F. PLATE IMPEDANCE COIL
11	95-236	POWER FILTER CHOKE
12	S-3016	BDCST & L.W. OSC. COIL ASSEM.

ZENITH RADIO CORPORATION

MODELS 808,809,860,861,5605 & 5607

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6D6	R.F.	5.6	2.4	0	70	2.4	200
6A7	1St. Det.	5.6	3	0	70	-	250
	Osc.			3.6	-	-	230
6D6	I.F.	5.6	2.6	0	70	2.6	250
75	2nd.Det. 1st Audio	5.6	1.4	0	-	-	148
42	PWR.	5.6	0	-.6	250	-	250
80	RECT.	4.6	-	-	-	-	300

Line Voltage 112 Antenna and Ground Disconnected
All measurements taken from point indicated to ground, using a 1000 ohm per volt. D.C. meter (except heaters).
F - Filament; K - Cathode; g1 - Control Grid; g2 - Screen Grid; g3 - Suppressor Grid; p - Plate.

Alignment

1. Balance intermediate transformers at 252.5 K.C. with oscillator connected to grid of first detector and ground.
2. Adjust wave trap padder (located underneath chassis at rear right side) for weakest signal with 252.5 K.C. oscillator connected to aerial and ground.
3. Turn wave band switch clockwise to the highest frequency band. Connect 15,000 K.C. oscillator to aerial and ground. Balance oscillator trimmer on three-gang condenser for correct dial reading at this frequency.
4. Turn wave band switch counter-clockwise to standard broadcast position. Adjust broadcast oscillator trimmer (located underneath chassis at right center) for correct dial reading at 1400 K.C. and balance R. F. and 1st detector trimmers on three-gang condenser for loudest signal.
5. Adjust oscillator standard broadcast padder through hole in top center of chassis for correct dial reading at 600 K.C.

MODELS 812 & 5608

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6D6	R.F.	5.7	4.2	5	96	5	98
6A7	1st Det.	5.7	2.3	2	50	-	96
	Osc.			0	-	-	96
6D6	I. F.	5.7	4.1	5	96	5	96
75	2nd Det.	5.7	1.1	5	-	-	25
43	PWR.	24	0	-5	96	-	90
25Z5	RECT.	24	Spkr.Fld. 80	-	-	-	-

Line Voltage 112 Antenna and Ground Disconnected
All voltages measured from B-(negative side of C18) using a 1000 ohm per volt D.C. meter (except heaters).
F - Filament; K - Cathode; g1 - Control Grid; g2 - Screen Grid; g3 - Suppressor Grid; p - Plate.

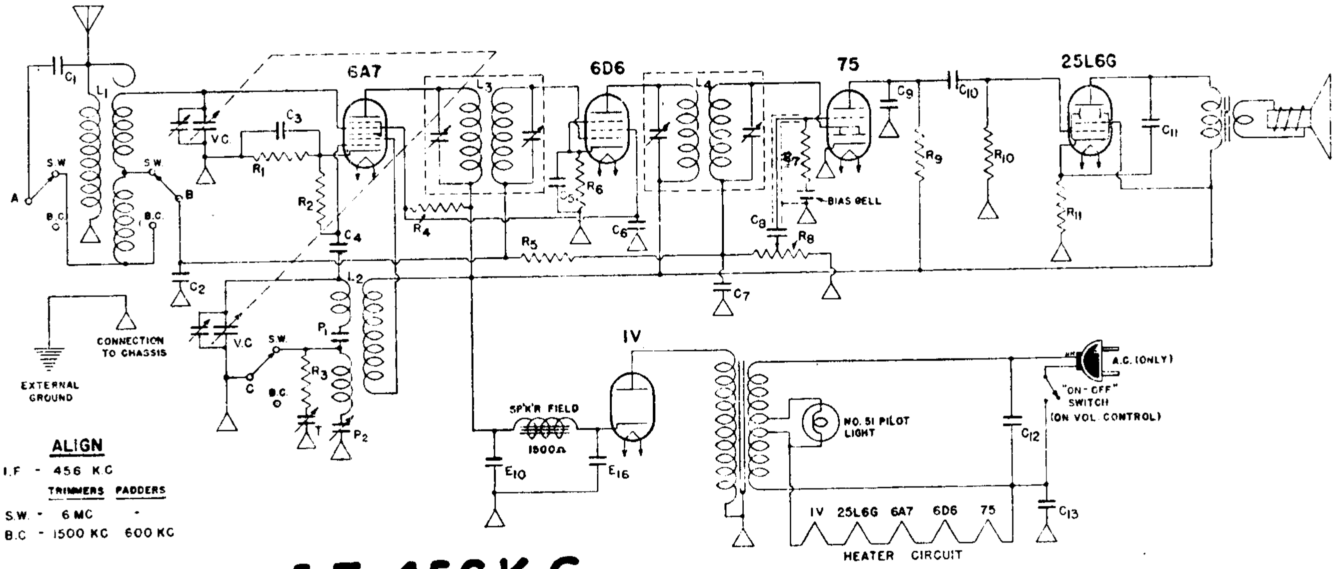
Alignment

1. Balance intermediate transformers at 125 K.C. with service oscillator connected to grid of first detector and chassis.
2. Rotate wave-band switch clockwise to the short-wave position. Connect service oscillator to antenna and ground leads and set for 18750 K.C. Balance oscillator trimmer on gang for correct dial reading at 16 meters.
3. Turn wave-band switch to center or standard broadcast position. Adjust padder condenser (located on top center of chassis next to gang) for correct dial reading at 500 meters (600 K.C.).
4. Balance oscillator trimmer (located underneath chassis at right center) for correct dial reading at 210 meters (1440 K.C.). Balance R.F. and 1st detector trimmers on gang to resonance
5. Turn switch counter-clockwise to long-wave position. Adjust oscillator padder (located underneath chassis at rear right side) for correct dial reading at 2000 meters (150 K.C.).

NOTE: If howls are encountered on short-wave band the oscillator trimmer on gang is too tight.

AIR-KING PRODUCTS COMPANY, INC.

MODEL 810



ALIGN

I.F - 456 K.C

	TRIMMERS	PADDERS
S.W. -	6 MC	-
B.C -	1500 KC	600 KC

I.F. 456 K.C.

R_1 -	250	OHM	1/4	WATT
R_2 -	50,000	"	"	"
R_3 -	85	"	"	"
R_4 -	25,000	"	"	"
R_5 -	3,000,000	"	"	"
R_6 -	400	"	"	"
R_7 -	750,000	"	"	"
R_8 -	500,000	"	VOL. CONTROL	
R_9 -	500,000	"	1/4	WATT
R_{10} -	500,000	"	"	"
R_{11} -	300	"	"	"

SWITCHES A,B,C, - 3 POLE DOUBLE THROW WAVE BAND SWITCH

L_1 - COMBINATION ANTENNA COIL
L_2 - COMBINATION OSCILLATOR COIL
L_3 - 456 KC. INPUT I.F
L_4 - 456 KC OUTPUT I.F

P_1 - 1380 MMF. MICA PADDER
P_2 - 700 MMF. MAX. PADDER

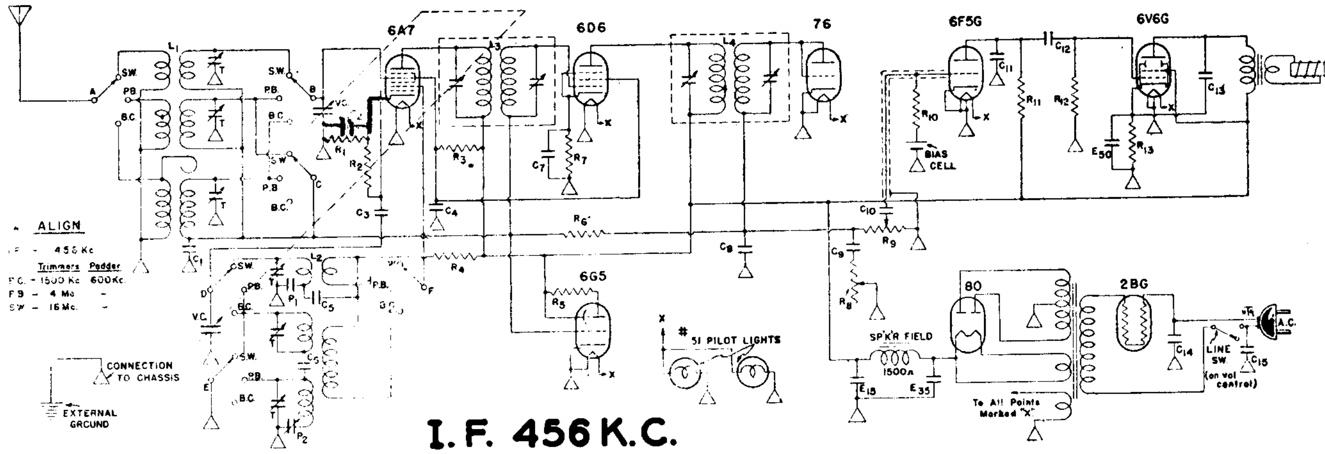
E_{10} - 10 MFD. 250 V.W
E_{16} - 16 " " "

V.C. - 410 MMF MAX. VARIABLE COND

T - 3-35 MMF TRIMMER

C_1 -	.005	-	400 V
C_2 -	.02	-	200 V
C_3 -	.05	-	"
C_4 -	.0001	-	MICA
C_5 -	.05	-	400 V
C_6 -	.02	-	"
C_7 -	.00025	-	MICA
C_8 -	.02	-	400 V.
C_9 -	.00025	-	MICA
C_{10} -	.02	-	400 V.
C_{11} -	.01	-	600 V
C_{12} -	.05	-	400 V
C_{13} -	.05	-	"

MODELS 828 & 838



ALIGN

I.F - 456 Kc

	Trimmers	Padder
F.C. -	1500 Kc	600 Kc.
F B -	4 Mc	-
SW -	16 Mc.	-

I.F. 456 K.C.

R_1 -	250	OHM	1/4	WATT
R_2 -	50,000	"	"	"
R_3 -	50,000	"	1/2	"
R_4 -	20,000	"	"	"
R_5 -	1,000,000	"	1/4	"
R_6 -	2,000,000	"	"	"
R_7 -	400	"	"	"
R_8 -	500,000	"	TONE CONTROL	
R_9 -	500,000	"	VOL CONTROL	
R_{10} -	750,000	"	1/4	WATT
R_{11} -	500,000	"	"	"
R_{12} -	500,000	"	"	"
R_{13} -	300	"	1	"

SW. A,B,C,D,E,F - 2 DECK: EACH DECK 3 SECTION, 1 TO 3 POSITION EACH SECTION.

L_1 - COMBINATION 3-BAND ANT COIL
L_2 - COMBINATION 3-BAND OSC. COIL
L_3 - INPUT I.F
L_4 - OUTPUT I.F

E_{15} - 15 MFD. - 350 PV.
E_{35} - 35 " - 450 "
E_{50} - 50 " - 15 WV

V.C - 410 MMF MAX. VARIABLE COND

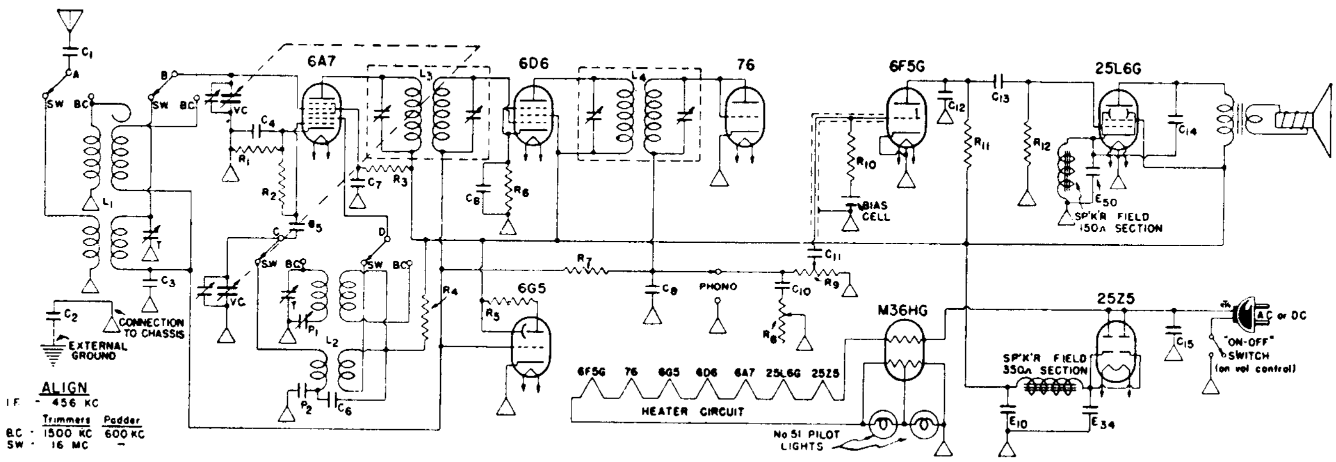
T - 3 35 MMF. TRIMMER

P_1 - 4700 MMF. PADDER
P_2 - 500 MMF MAX. PADDER

C_1 -	.05	-	200 V.
C_2 -	.05	-	"
C_3 -	.0001	-	MICA
C_4 -	.02	-	400 V.
C_5 -	.02	-	"
C_6 -	.002175	-	MICA
C_7 -	.05	-	200 V.
C_8 -	.00025	-	MICA
C_9 -	.005	-	400 V.
C_{10} -	.02	-	"
C_{11} -	.00025	-	MICA
C_{12} -	.02	-	400 V
C_{13} -	.01	-	"
C_{14} -	.02	-	"
C_{15} -	.02	-	"

AIR-KING PRODUCTS COMPANY, INC.

MODELS 824 & 834



R_1 -	250	OHM	1/4 WATT
R_2 -	50,000	"	" "
R_3 -	35,000	"	" "
R_4 -	4,500	"	" "
R_5 -	1,000,000	"	" "
R_6 -	400	"	" "
R_7 -	3,000,000	"	" "
R_8 -	500,000	"	TONE CONTROL
R_9 -	500,000	"	VOL. CONTROL
R_{10} -	750,000	"	1/4 WATT
R_{11} -	500,000	"	" "
R_{12} -	500,000	"	" "

SWITCH A,B,C,D - 4 POLE DOUBLE THROW WAVE BAND SWITCH

L_1 - COMBINATION 2-BAND ANT. COIL
L_2 - COMBINATION OSCILLATOR COIL
L_3 - 456 KC INPUT I.F.
L_4 - 456 KC OUTPUT I.F.

P_1 - 500 MMF MAX PADDER
P_2 - .0034 MFD. MICA PADDER

E_{10} - 10 MFD. 150 V.W.
E_{34} - 34 - " "
E_{50} - 50 - 15 -

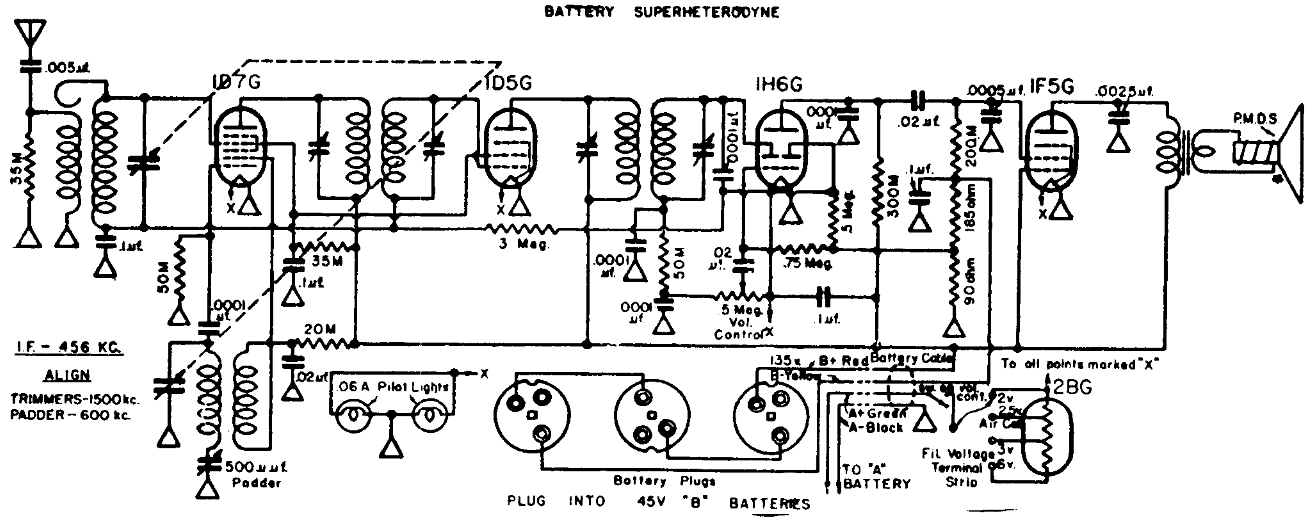
VC - 410 MMF MAX VARIABLE COND

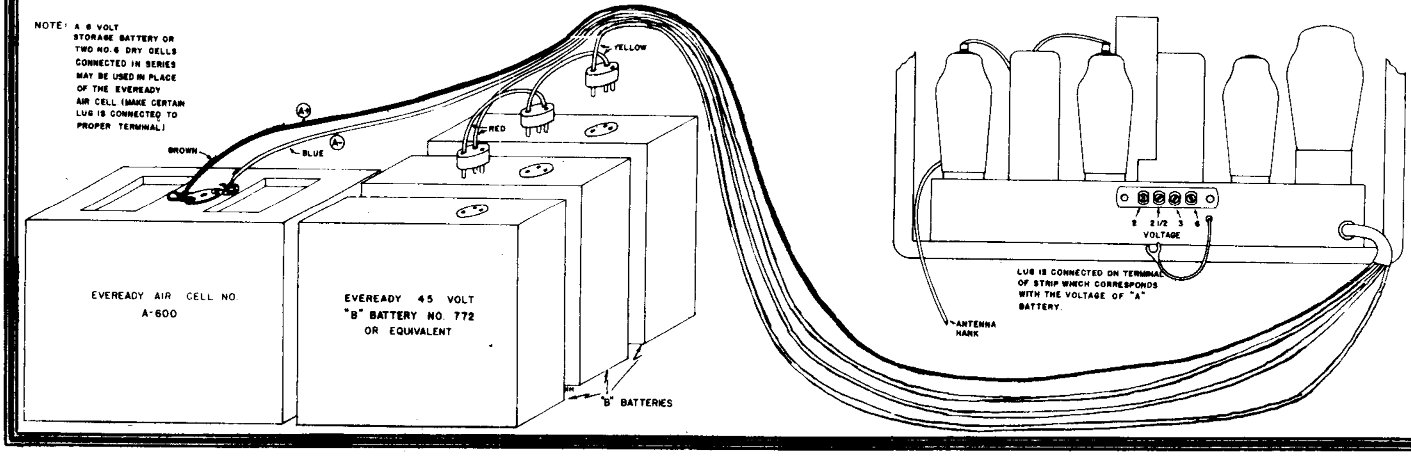
T - 3-35 MMF TRIMMER

C_1 -	.005	- 400 V
C_2 -	.05	- "
C_3 -	.05	- 200 V
C_4 -	.05	- "
C_5 -	.0001	- MICA
C_6 -	.02	- 400 V
C_7 -	.02	- "
C_8 -	.05	- 200 V
C_9 -	.00025	- MICA
C_{10} -	.005	- 400 V
C_{11} -	.02	- "
C_{12} -	.00025	- MICA
C_{13} -	.02	- 400 V
C_{14} -	.01	- "
C_{15} -	.05	- "

MODELS 850, 730 & 731

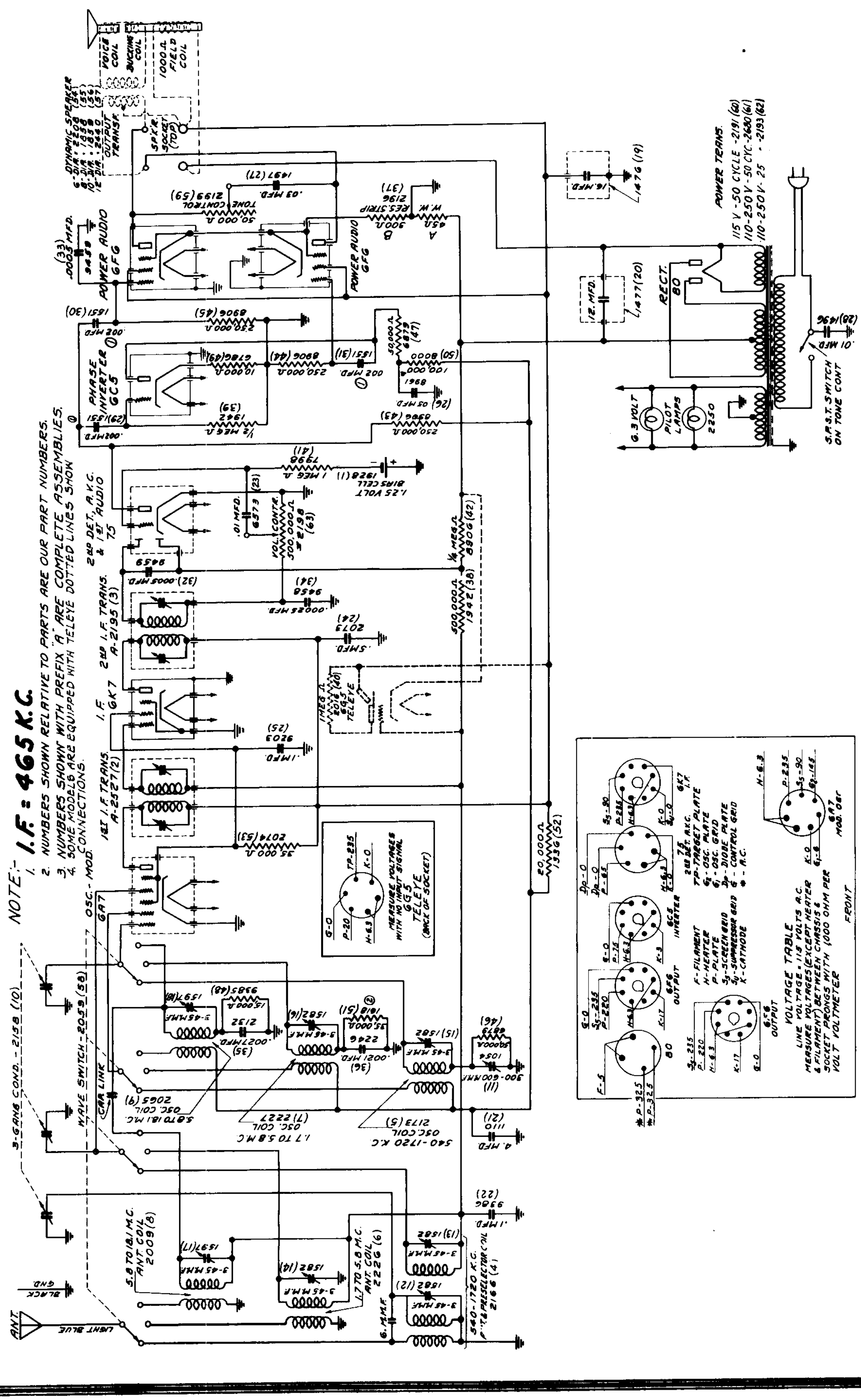
BATTERY SUPERHETERODYNE





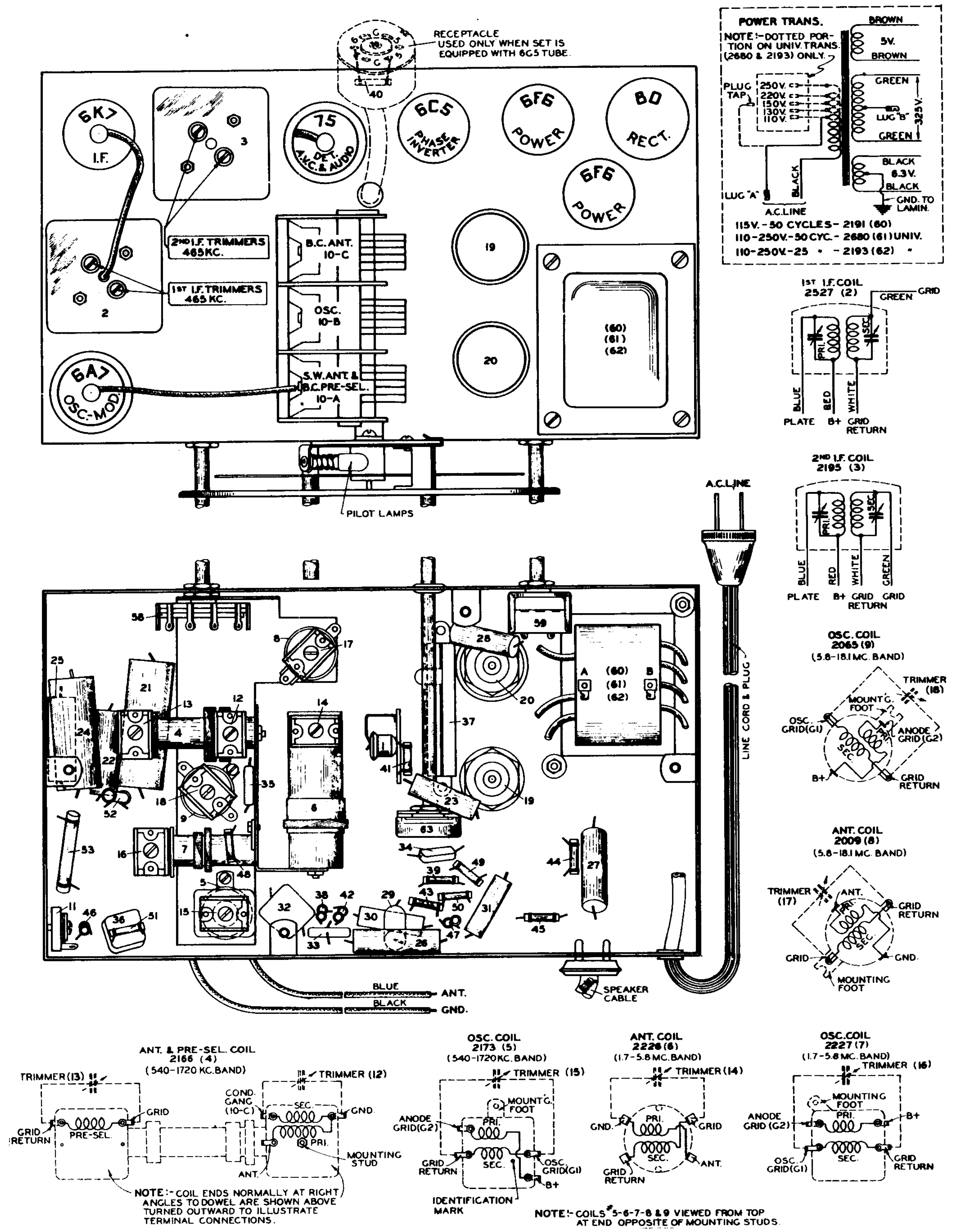
ALLIED RADIO CORP.

MODELS A9752, A9753, A9754 & A9755



ALLIED RADIO CORP.

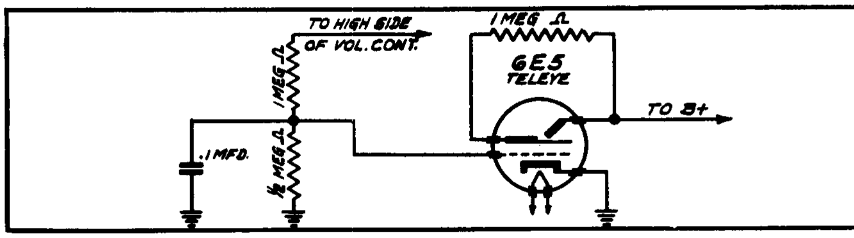
MODELS A9752, A9753, A9754 & A9755



ALLIED RADIO CORP.

MODELS A9752, A9753, A9754 & A9755

Some of these model receivers were equipped with "Teleye" the cathode ray visual tuning indicator. A 6E5 tube was used in early production models, which was replaced by a 6G5 tube in later production. The parts and connections shown in the dotted lines on the complete circuit diagram are used only when a 6G5 "Teleye" tube is incorporated in the receiver. The diagram below shows 6E5 tube connections.



Illus. No.	Part No.	Part Name	Description	Price
1	1928	Coil	Bias 1.25 Volt	$ .22
2	2527	Coil	1st I.F. Transformer	1.65
3	2195	Coil	2nd I.F. Transformer	1.65
4	2166	Coil	Antenna & Preselector (540-1720 KC)	1.30
5	2173	Coil	Oscillator (540-1720 K.C.)	.65
6	2226	Coil	Antenna (1.7-5.8 M.C.)	.70
7	2227	Coil	Oscillator (1.7-5.8 M.C.)	.55
8	2009	Coil	Antenna (5.8-18.1 M.C.)	.60
9	2065	Coil	Oscillator (5.8-18.1 M.C.)	.65
10	2158	Condenser	3 Gang Tuning	3.60
11	1054	Condenser	Padding (200-600 MMF)	.55
12	1582	Condenser	Trimmer (3-45 M.M.F.)	.21
13	1582	Condenser	Trimmer (3-45 M.M.F.)	.21
14	1582	Condenser	Trimmer (3-45 M.M.F.)	.21
15	1582	Condenser	Trimmer (3-45 M.M.F.)	.21
16	1582	Condenser	Trimmer (3-45 M.M.F.)	.21
17	1597	Condenser	Trimmer (3-45 M.M.F.)	.21
18	1597	Condenser	Trimmer (3-45 M.M.F.)	.21
19	1476	Condenser	Wet Electrolytic (16 Mfd.)	1.40
20	1477	Condenser	Wet Electrolytic (12 Mfd.)	1.25
21	1110	Condenser	Dry Electrolytic (4 Mfd.)	1.14
22	9386	Condenser	Tubular .1 Mfd. 200 Volt	.19
23	6573	Condenser	Tubular .01 Mfd. 200 Volt	.17
24	2073	Condenser	Tubular .5 Mfd. 400 Volt	.56
25	9203	Condenser	Tubular .1 Mfd. 400 Volt	.20
26	8961	Condenser	Tubular .05 Mfd. 400 Volt	.19
27	1497	Condenser	Tubular .03 Mfd. 600 Volt	.19
28	1496	Condenser	Tubular .01 Mfd. 600 Volt	.18
29	1551	Condenser	Tubular .002 Mfd. 600 Volt	.18
30	1551	Condenser	Tubular .002 Mfd. 600 Volt	.18
31	1551	Condenser	Tubular .002 Mfd. 600 Volt	.18
32	9459	Condenser	Moulded .0005 Mfd.	.21
33	9459	Condenser	Moulded .0005 Mfd.	.21
34	9458	Condenser	Moulded .00025 Mfd.	.21
35	2132	Condenser	Moulded .0027 Mfd. ± 3%	.21
36	2246	Condenser	Moulded .0021 Mfd. ± 3%	.28

ALIGNMENT PROCEDURE:

Realignment of this receiver should never be necessary unless one of the oscillator, antenna, or I. F. coils has been replaced. Lack of sensitivity, selectivity, and poor tone quality may be due to any one or a combination of causes, such as weak or defective tubes or speaker, inadequate or excessively long antenna, open or grounded bias resistor, bypass condenser, etc. Under no circumstances should realignment be attempted until all other possible sources have been first thoroughly investigated and have been definitely proven not to be the cause.

If an I. F. tube is replaced it is advisable to realign the I. F. Amplifier particularly if the replacement tube is one of a different manufacture than the one in the receiver. It is important when aligning to carefully follow the procedure in the order given, otherwise the receiver will lack sensitivity and the dial calibration will be incorrect.

IT IS IMPERATIVE THAT AN ACCURATELY CALIBRATED OSCILLATOR BE USED WITH SOME TYPE OF OUTPUT MEASURING DEVICE.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the test oscillator output to the control grid of the 6D6 modulator tube through a .02 Mfd. condenser. Leave the grid cap connected to the grid terminal of the tube, and connect the ground side of the test oscillator to the receiver ground.

2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).

3. Align the second intermediate transformer by turning one of the trimmer screws accessible through holes in the top of the transformer shields up and down (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screw of the same transformer for maximum sensitivity.

4. Adjust the first intermediate transformer in the same manner as the second I. F. transformer.

Illus. No.	Part No.	Part Name	Description	Price
37	2196	Resistor	Wire Wound (45 Ohm & 300 Ohm)	.30
38	1942	Resistor	Carbon 500,000 Ohm 1/3 Watt Ins.	.19
39	1942	Resistor	Carbon 500,000 Ohm 1/3 Watt Ins.	.19
40	2016	Resistor	Carbon 1 Meg Ohm 1/3 Watt Ins.	.19
41	7998	Resistor	Carbon 1 Meg Ohm 1/3 Watt Ins.	.19
42	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt	.19
43	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt	.19
44	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt	.19
45	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt	.19
46	6879	Resistor	Carbon 50,000 Ohm 1/3 Watt	.19
47	6879	Resistor	Carbon 50,000 Ohm 1/3 Watt	.19
48	9385	Resistor	Carbon 15,000 Ohm 1/3 Watt	.19
49	6786	Resistor	Carbon 10,000 Ohm 1/3 Watt	.19
50	8000	Resistor	Carbon 100,000 Ohm 1/3 Watt	.19
51	1618	Resistor	Carbon 35,000 Ohm 1/3 Watt	.19
52	1336	Resistor	Carbon 20,000 Ohm 1/2 Watt	.19
53	2074	Resistor	Carbon 35,000 Ohm 1 Watt	.20
54	2208	Speaker	Dynamic (6")	5.00
55	1858	Speaker	Dynamic (8")	9.25
56	1859	Speaker	Dynamic (10")	12.00
57	2440	Speaker	Dynamic (12")	10.75
58	2059	Switch	Band Selector	.75
59	2199	Tone Control	With On-Off Switch	1.24
60	2191	Transformer	Power 115 Volt 50 Cycle	4.25
61	2680	Transformer	Power 95-260 Volt 50 Cycle	7.25
62	2193	Transformer	Power 110-250 Volt 25 Cycle	11.00
63	2198	Vol. Control		.85
			MISCELLANEOUS	
	2250	Bulb	Pilot Lamp 6.3 Volt .250 Amp.	.19
	2500	Cable	For 6E5 or 6G5 Tube	.50
	3101	Dial Assembly	Tuning Complete (Mention Required Name)	3.25
	3102	Dial Scale	Calibrated (Mention Required Name)	.50
	2796	Glass	For Dial with Escutcheon	.95
	2534	Knob	Wood Marked "Tuning"	.30
	2444	Knob	Wood Marked "Volume"	.30
	2535	Knob	Wood Marked "Tone and On-Off"	.30
	2445	Knob	Wood Marked "Band Selector"	.30

Prices are subject to change without notice.

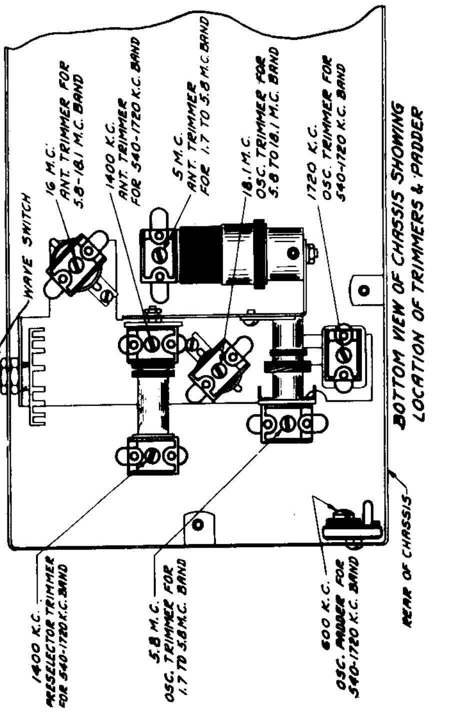
TO ALIGN THE VARIABLE CONDENSER:

It is important when aligning the gang condenser, padding and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The padding and trimmer condensers located underneath the chassis will be referred to by their function as indicated on the circuit diagram.

1. Connect the high output side of the test oscillator through a 400 ohm resistor to the receiver antenna lead and the low side to the set ground.

2. Place the band selector switch for operation on the 5.8 to 18.1 megacycle band, tune the receiver dial, and set the test oscillator frequency to EXACTLY 18.1 MEGACYCLES.

Tune in the 18.1 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 18.1 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER at 18.1 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 18.1 megacycles always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 18.1 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 17.1 megacycles, and if the fundamental peak was used in aligning at 18.1 megacycles the test oscillator signal will be heard at approximately 17.1 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 18.1 megacycle oscillator trimmer must be properly re-adjusted.



BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS & PADDER

3. With band selector switch set for operation on 5.8 to 18.1 megacycle band tune the receiver dial and set test oscillator frequency to EXACTLY 16 MEGACYCLES. Adjust 16 megacycle antenna trimmer for maximum 16 megacycle signal sensitivity.

4. Place band selector switch for operation on 1.7 to 5.8 megacycle band, tune the receiver dial, and set test oscillator frequency to EXACTLY 5.8 MEGACYCLES. BRING IN 5.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT by adjusting 5.8 megacycle oscillator trimmer.

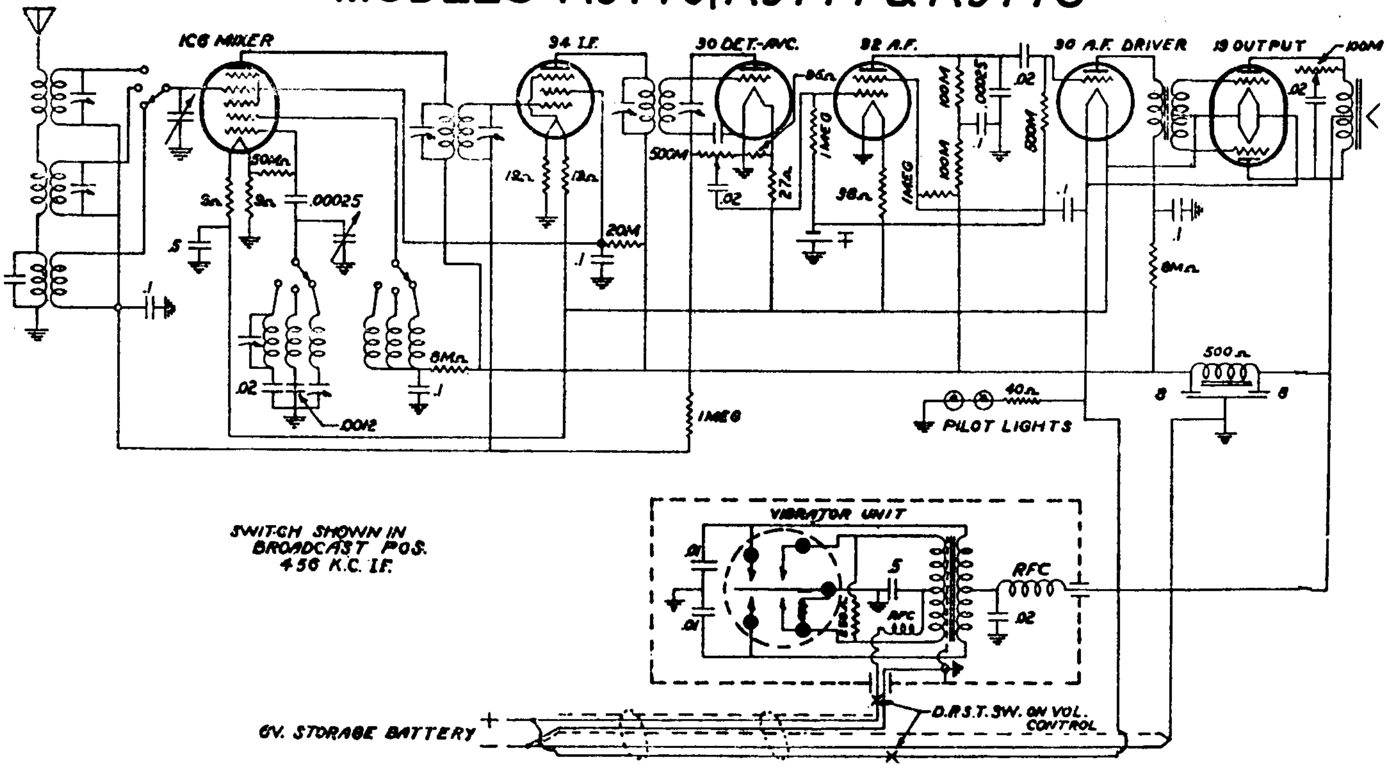
5. With the band selector switch set for operation on the 1.7 to 5.8 megacycle band tune receiver dial and set test oscillator frequency to EXACTLY 5 MEGACYCLES. Then adjust 5 megacycle antenna trimmer for maximum 5 megacycle signal sensitivity.

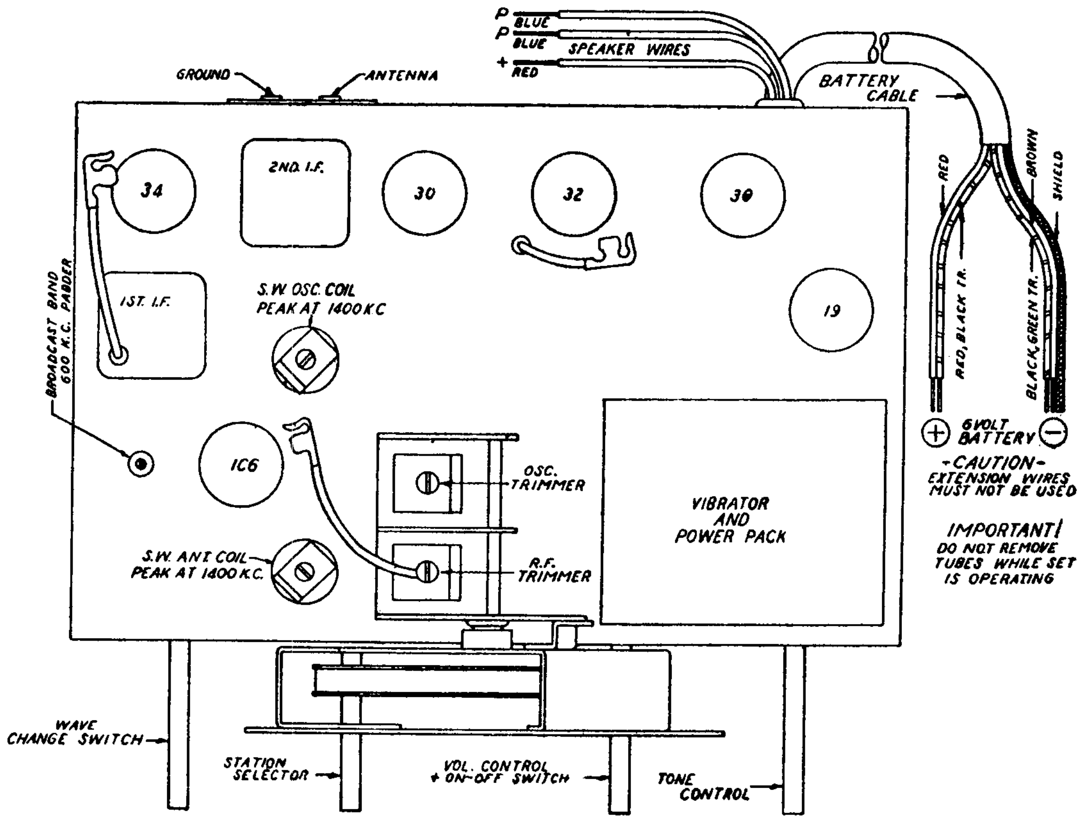
6. Replace the 400 ohm resister in series with test oscillator lead with a 200 Mmfd. condenser, place the band selector switch for operation on the 540 to 1720 kilocycle band, tune receiver dial, and set test oscillator frequency to EXACTLY 1720 KILOCYCLES. NEXT BRING IN THE 1720 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1720 KILOCYCLE OSCILLATOR TRIMMER.

7. With band selector switch placed for operation on the 540 to 1720 kilocycle band set test oscillator frequency and receiver dial to EXACTLY 1400 KILOCYCLES. Adjust 1400 kilocycle preselector and antenna trimmers for maximum 1400 kilocycle signal sensitivity.

8. Leave band selector switch for operation on 540 to 1720 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator padder for maximum sensitivity.

ALLIED RADIO CORP.
MODELS A9776, A9777 & A9778





This receiver is designed to operate over three tuning ranges: the broadcast range which extends from 540 to 1700 Kilocycles (KC) (175 to 550 meters), Police and Aviation Band which extends from 1700 to 5500 Kilocycles (KC) (52 to 175 Meters) and the International Short Wave Band which extends from 5500 to 18,100 Kilocycles (KC) (16.5 to 55 meters). This latter range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

ALLIED RADIO CORP.

MODELS A9776, A9777 & A9778

REASONS FOR UNSATISFACTORY OPERATION

FAILURE TO OPERATE 1. Check connections from battery cable to storage battery. If connections are reversed, set will not operate. Proper instructions for connecting the battery are given on the first page.
2. Check all tubes. Have them tested by meter equipped to test the type of tubes used in this receiver.
3. Check tube shields for good ground connections. Check grid caps for good connection. See that grid caps and tube shields are not shorted to each other (touching).
4. Reversed connections on Antenna and ground terminals. Try both ways for best results.
5. Oscillator tube (1C6) not oscillating.
6. Vibrator unit not securely in socket.

HUM A minimum amount of hum, equivalent to A.C. receivers, may be present. Excessive hum may be traced to the following causes:
1. Omitting the use of a ground or a poor ground connection.
2. Vibrator unit not securely fitted in socket.
3. Antenna picking up interference from high tension power lines.
4. Weak or rundown battery. Battery with defective cell.
5. Poor battery connections.
6. Extending or lengthening battery leads cause an enormous increase in "hum." The battery cable attached to the receiver is of special design and its ends must be connected directly to the battery terminals.

HOWLS AND SQUEALS 1. Omitting the use of a ground or poor ground connections.
2. Speaker leads placed near the (32) tube. These leads should be kept away from this locality. Speaker leads should be kept along the end of chassis and front corner of cabinet.
3. Check shield on (34) tube for good connection to chassis.

WINDCHARGERS

There are many types of windchargers now on the market which may be used to advantage for greater economy of receiver operation. Such chargers will pay for themselves over a period of time; by saving the cost of battery recharging; removing the inconvenience of taking the battery to a charging station; non-operation of the receiver during the charging period.

IMPORTANT NOTE: The battery must never be charged while set is in operation. If a windcharger is used, it should always be disconnected from the battery when the receiver is being used. An inexpensive single pole switch can be used for disconnecting the windcharger from the battery. This will increase the life of the tubes and give additional economy to the use of the receiver.

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator which will cover the frequencies of 456, 600, 1400, 1800, 4000, 6000, and 14,000 KC and an output meter which is to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1C6) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the rear gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak. The front condenser section tunes the RF or grid circuit of the 1C6 tube. Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the R.F. section. The padding condenser is located on the left hand side of the chassis, directly to the left of the 1C6 tube and in front of the first I.F. transformer. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.
This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Bands.

FOREIGN BAND ALIGNMENT The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coils located on the top of the chassis. Set the test oscillator to 14,000 KC. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. The oscillator coil is located near the 1st I.F. Transformer and the antenna or R.F. coil is located directly in front of the Short Wave oscillator coil and alongside the front section of the gang condenser. These two trimmers should be adjusted for peak at 14,000 KC and as the inherent design of the circuit has been expressly developed for simplicity in servicing, no other adjustments are necessary for aligning this band. **Note: Always start this procedure by having the oscillator coil trimmer loose** (out all the way), and the antenna coil trimmer fairly tight (in all the way); otherwise it is possible to make a false alignment on the image frequency. In order to prevent alignment on the image frequency, it is suggested that the following check be made: Readjust the pointer to 13,100 KC where the image frequency should be found. If properly aligned, the image frequency will be found to be weaker. If, however, the signal at 13,100 KC is found to be stronger than the signal at 14,000 KC, it signifies that alignment was incorrectly made on the image frequency.

IMPORTANT: Do not attempt any adjustment of the gang condenser trimmers in aligning the Foreign Band as this will throw the Broadcast Band out of alignment.

POLICE BAND ALIGNMENT There is only one adjustment to be made in the alignment of the Police Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary. Set the dial pointer to 4000 KC (also the test oscillator) and adjust the antenna coil trimmer to resonance. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment. The two police band coils are under the chassis and the antenna coil trimmer is mounted on the end of the antenna coil. **Important: This is the** only adjustment necessary for the Police Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Police Band, otherwise the Broadcast Band will be thrown out of alignment.

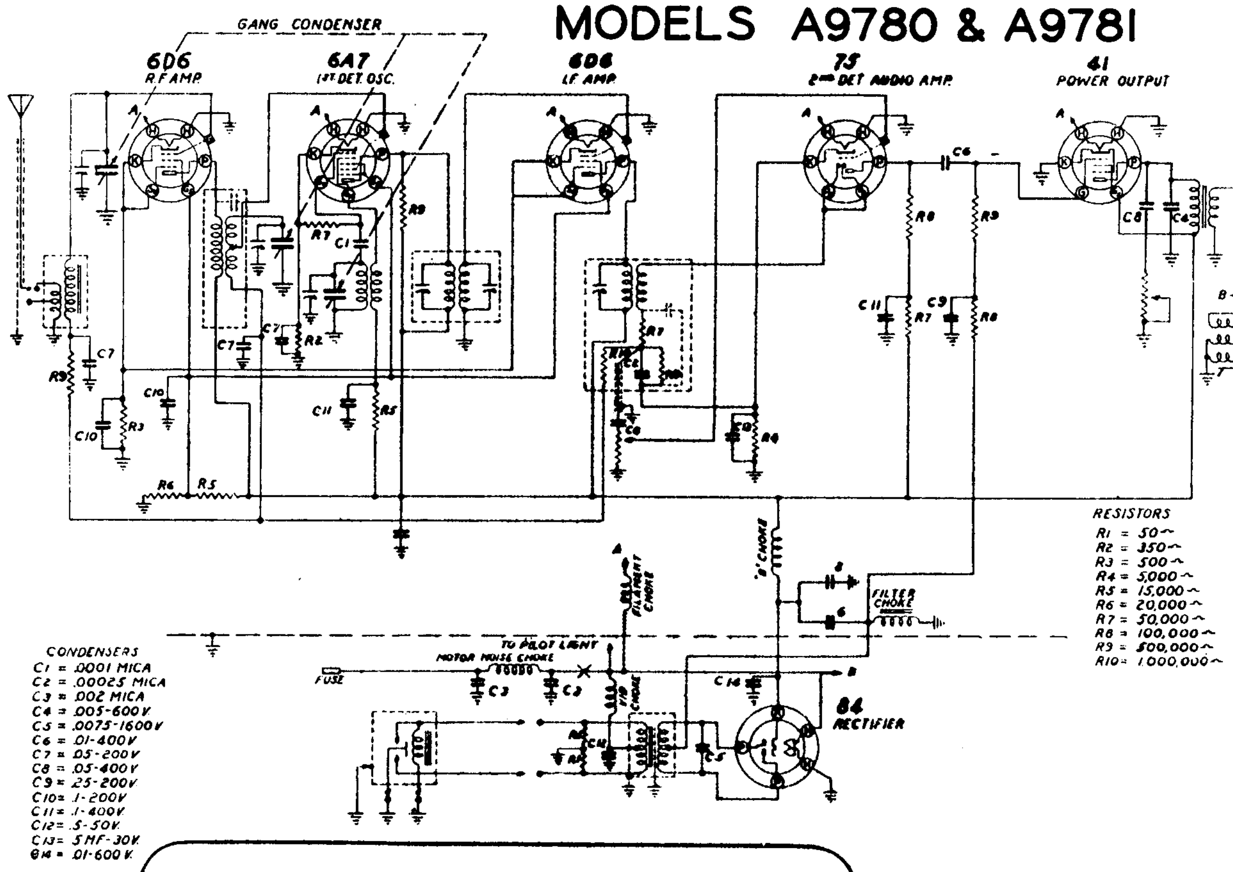
SERVICE DATA FOR ALL BANDS

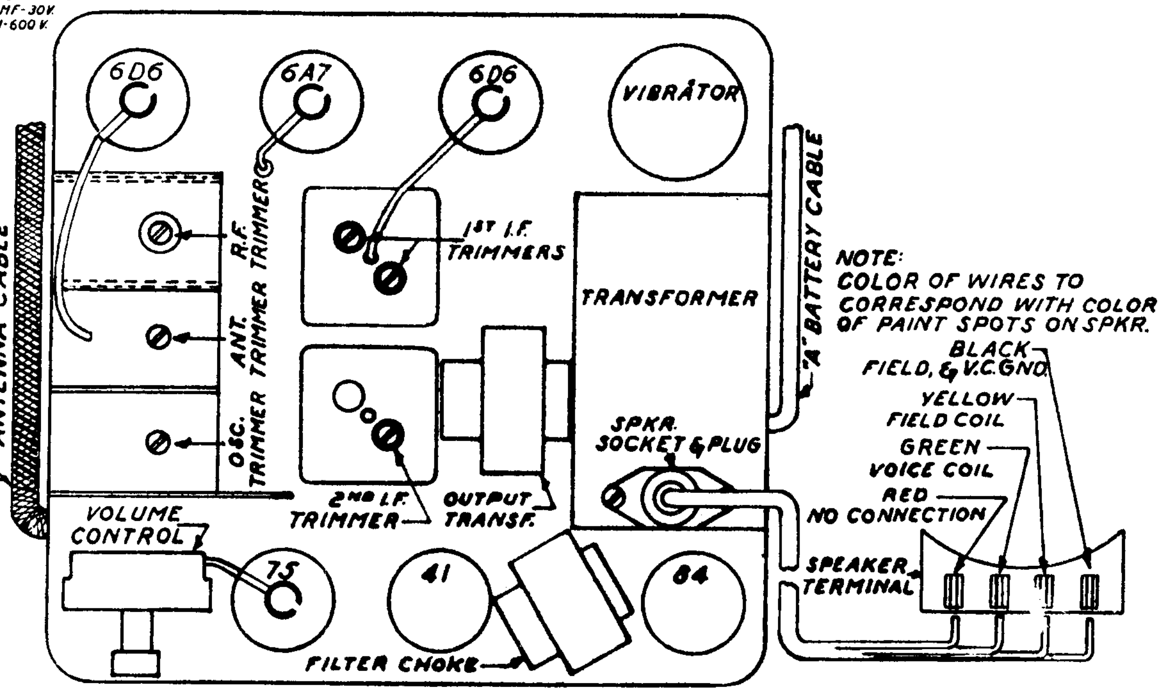
If it is suspected that the oscillator has stopped but is doubtful due to the presence of the usual amount of noise level, it is suggested that the oscillator plate voltage be checked. To ascertain whether the tube is oscillating, ground the oscillator grid of the 1C6 (short stator and rotor plates of oscillator section on gang condenser). If oscillating properly, grounding the grid will cause an appreciable drop in oscillator voltage.

Part No.	Description	List Price
P173	Oscillator Coil	.50
P189	1st I. F. Transformer	1.20
P190	2nd I. F. Transformer	1.20
P194	Tube Shield	.10
P298	Antenna & Ground Post	.15
P382	Antenna Coil	.75
P392	Battery Cord	.75
P958	Dual 8-Electrolytic Condenser	2.00
P402	Vibrator Unit	5.00
P406	Vibrator Socket	.15
P411	Filter Choke 500-ohm	.75
P422	40-Ohm Candohm Resister	.20
P446	Pilot Light 2V.-06-M.A.	.35
P452	Tube Shield	.15
P854	R. F. Choke	.50
P457	A. Choke	.50
P932	Pilot Light Bracket	.15
P970	2-Gang Condenser	2.75
P544	Trimmer Condenser	.15
P617	Padding Condenser	.40
G965	Dial & Scale Complete	3.00
P634	Knob	.25
P937	Escutcheon Plate	.60
P938	Convex Glass	.20
P939	Glass Retainer Ring	.15
P941	Escutcheon Ring	.20
P961	Volume Control with Switch	1.10
P962	Tone Control	.70
P684	6/32 Wing Nuts	.10
P688	Bias Cell	.25
P689	Bias Cell Panel	.15
P719	Input Transformer	1.50
G999	Power Unit Complete with Vibrator	12.00
P954	Power Transformer	2.00
P777	Candohm 19-9-Ohm Resistor	.30
P778	Candohm Gang Resistor	.50
P933	Wave Switch	.85
G560	Short Wave Antenna Coil	.50
G561	Short Wave Oscillator Coil	.50
G562	Police Band Antenna Coil	.45
G563	Police Band Oscillator Coil	.45
P975	6" Per. Magnet Spkr.	7.00
P980	8" Perm. Mag. Spkr.	7.50
P551	Type 30 Socket	.15
P553	Type 34 Socket	.15
P554	Type 1C6 Socket	.15
P555	Type 32 Socket	.15
P687	Type 19 Socket	.15
P136	250 Ohm ¼ Watt Resistor	.10
P137	500,000 Ohm ¼ Watt Resistor	.10
P162	1-Megohm ¼ Watt Resistor	.10
P168	8,000 Ohm ¼ Watt Resistor	.10
P280	100,000 Ohm ¼ Watt Resistor	.10
P417	50,000 Ohm ¼ Watt Resistor	.10
P419	20,000 Ohm ¼ Watt Resistor	.10
P142	.1-MFD-200V Condenser	.15
P143	.02-MFD-400V Condenser	.20
P147	.00025-Mica-20% Condenser	.20
P335	.01-MFD-600V Condenser	.15
P395	.5-10V Condenser	.35
P478	.0012-MFD-200V Condenser	.20
P480	.0001 Mica Condenser	.15
P672	.001 Mica Condenser	.20

ALLIED RADIO CORP.

MODELS A9780 & A9781





ALIGNMENT DATA AND SERVICING

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 175, 600 and 1400 K.C., and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignment should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

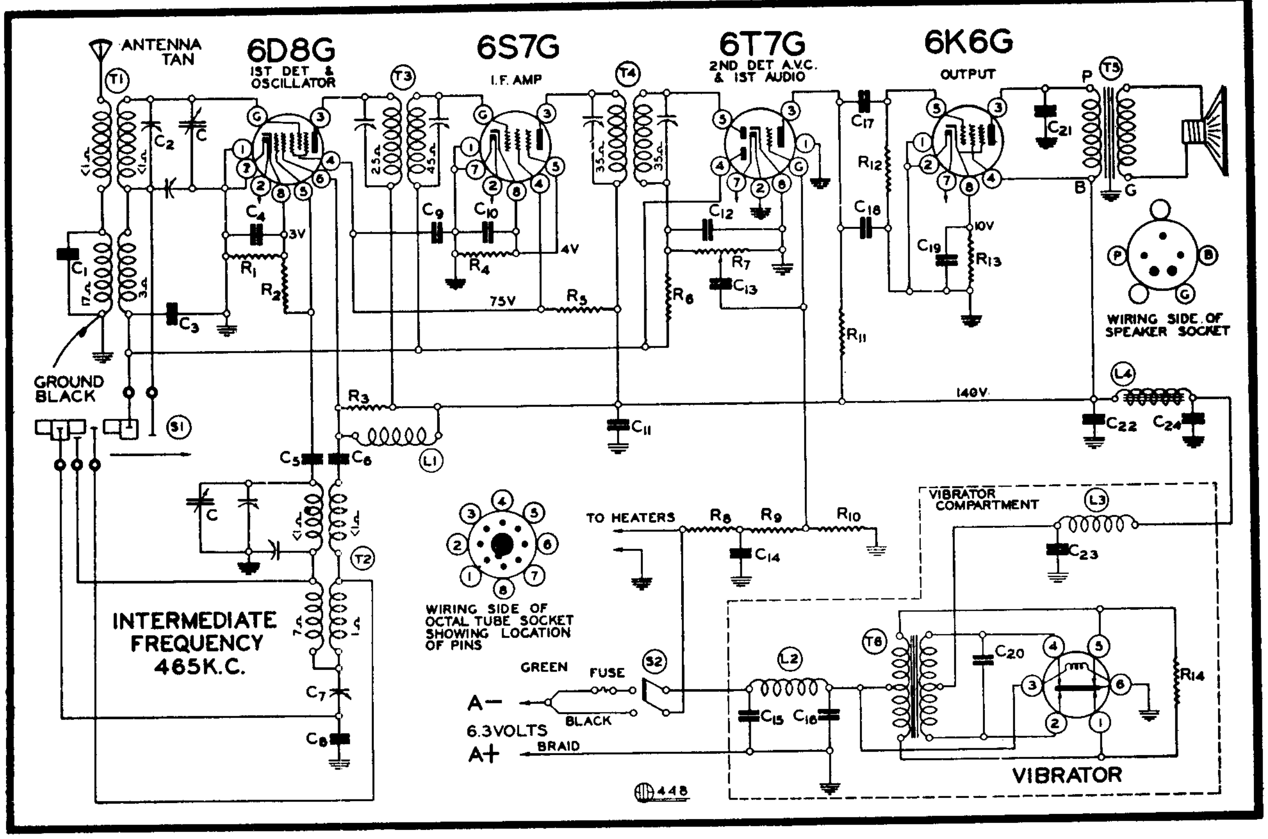
CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) transformers should be alligned properly as the first step.

I.F. ALIGNMENT. Adjust the test oscillator to 175 K.C. and connect the output directly to the grid of the first detector tube (6A7), without the use of any series condenser or resistor; the omission of series condenser and resistor to block out the AVC action. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second I.F. transformers to peak or maximum reading on the output meter.

OSCILLATOR ALIGNMENT. Adjust the test oscillator to 1400 K.C. and connect the output to the antenna through a .0001 mfd. mica condenser to give the equivalent of a low capacity type average auto antenna. Set the dial pointer to 1400 K.C. and adjust the oscillator trimmer to peak. (Front section of gang condenser.)

R.F. ALIGNMENT. The next step is to adjust the center and rear trimmers of the gang condenser to peak. The center section of the gang condenser tunes the antenna amplifier stage (6D6 tube), and the rear condenser section tunes the detector grid coil of the 6A7 tube.

BELMONT RADIO CORP.
MODEL 489 SERIES A



BATTERY CONNECTIONS:

Referring to Fig. 1, connect the battery cable to the storage battery in the following manner:

(a) The storage battery should be located as far from the receiver as the battery cable will permit.

(b) Connect the lead (containing the fuse receptacle) marked A negative (—) to the negative (—) post of the storage battery.

(c) Connect the lead marked A positive (+) to the positive (+) post of the storage battery.

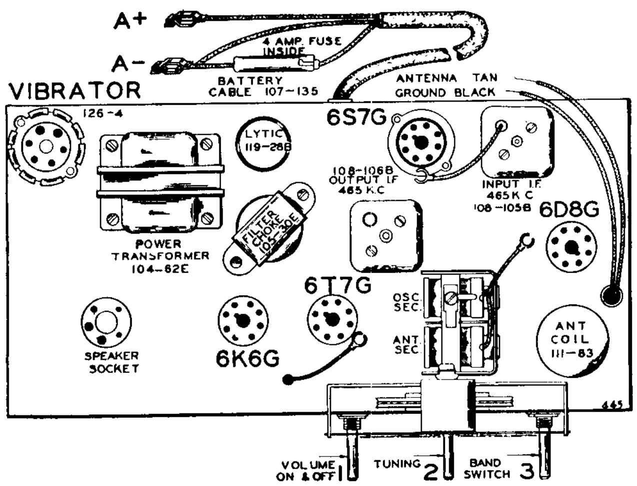


FIG. 1—TOP VIEW

No.	Part No.	Description
		RESISTORS
R1	130-54	500 ohm - 1/3 w.
R2	130-12	50M ohm - 1/3 w.
R3	130-12	50M ohm - 1/3 w.
R4	130-26	1000 ohm - 1/3 w.
R5	130-149	15M ohm - 1/3 w.
R6	130-4	3 megohm - 1/3 w.
R7	101-91	1 meg volume control
R8	130-191	1.5 megohm - 1/3 w.
R9	130-4	3 megohm - 1/3 w.
R11	130-9	200M ohm - 1/3 w.
R12	130-3	500M ohm - 1/3 w.
R13	130-153	700 ohm - 1/3 w.
R14	130-84	200 ohm - 1/3 w.
R10	130-191	1.5 meg - 1/3 w.
		CONDENSERS
C	102-43	2 gang variable
C1	129-5	.0001 Mica
C2	124-39B	Adj. Cond. 2-25 mmf.
C3	100-22	.05 x 200
C4	100-20	.1 x 200
C5	129-39	.00005 Mica
C6	100-25	.002 x 600
C7	124-38	Series pad 600 mmf. W. C.
C8	129-54	.003 Mica
C9	100-20	.1 x 200
C10	100-20	.1 x 200
C11	100-11	.01 x 400
C12	129-5	.0001 Mica
C13	100-11	.01 x 400
C14	100-11	.01 x 400
C15	100-40	.5 x 200
C16	100-40	.5 x 200
C17	100-26	.02 x 400
C18	129-2	.0005 Mica
C19	119-22	10.0 mfd. 25 v. lytic
C20	100-34	.005 x 1200
C21	100-19	.006 x 600
C22	119-28B	5.0 mfd. lytic
C23	100-20	.1 x 200
C24	119-28B	5.0 mfd. lytic C22 - C24 in same unit
		PARTS
T1	111-83	Antenna coil complete
T2	110-66B	Oscillator coil complete
T3	108-105B	Input I.F. complete 465 kc.
T4	108-106B	Output I.F. complete 465 kc.
T5	114-96	6" speaker (P.M.)
T6	104-62E	Power Transformer
L1	123-4	R. F. "B" Choke
L2	105-19	A Choke
L3	123-3	R. F. "B" Choke
L4	105-30E	"B" Filter Choke (400 ohms)
S1	125-39	Wave Band Switch
S2		Switch on volume control

BELMONT RADIO CORP.

MODEL 489 SERIES A

BAND	DIAL SCALE	FREQUENCY RANGE
Broadcast	Upper	535 to 1720 K.C. (Kilocycles)
Short Wave	Lower	5.5 to 18.1 M.C. (Megacycles)

I. F. Frequency 465 K.C.

SERVICE DATA

DESCRIPTION:

The tube complement of this chassis consists of the following octal base glass tubes which are interchangeable with metal tubes:

1—Type 6D8G Pentagrid Mixer, First Detector-oscillator.
1—Type 6S7G Remote Cut-off Pentode I. F. Amplifier (465 K.C.).
1—Type 6T7G Duplex Diode Triode, Second Detector, A. V. C. and First Audio.
1—Type 6K6G Pentode Output Amplifier.

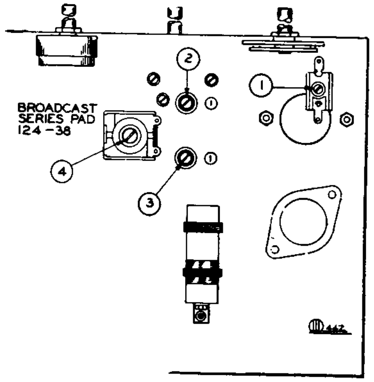
SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.



Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS:

CAUTION: No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as defective tubes, poor installations, open or grounded antenna systems, defective condensers and resistors

In order to properly align this chassis, an oscillator (generator) is necessary.

All adjustments should be made with a non-metallic screw driver.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and screen terminals of the type 6K6G output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 onm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K. C.):

Part No. 108-106B Output I.F. Transformer
Part No. 108-105B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser in its minimum capacity position, plates entirely out of mesh, make the following adjustments:

(a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 108-106B) to resonance.

(b) With "Dummy 1" still connected, move oscillator output clip from grid of 6S7G to grid cap of 6D8G and adjust input I.F. transformer (No. 108-105B) to resonance.

SHORT WAVE BAND ALIGNMENT:
5.5 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the antenna and ground leads, make the following adjustments:

(a) Move dial pointer to 17 megacycles and adjust short wave oscillator trimmer to resonance.

This adjustment is the trimmer mounted on the top of rear section of the variable gang condenser (see Fig. 1, top view).

(b) Adjust short wave antenna trimmer (Adjustment Number 1), to resonance (see Fig. 3, bottom view).

BROADCAST BAND ALIGNMENT:
535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground leads make following adjustments:

(a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 3, see bottom view of chassis, Fig. 3).

SERVICE DATA (Cont.)

(b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (adjustment number 2), to resonance.

(c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 4), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).

(d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

(e) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

LIST OF REPAIR PARTS

Use Only Genuine Factory Replacement Parts

Part No	Circuit Diagram Reference	Description	List Price Each
		CONDENSERS	
100-11	C11, C13, C14	.01 x 400 volt Tubular Condenser	.25
100-19	C21 C4, C9	.006 x 600 volt Tubular Condenser	.25
100-20	C10, C23	.1 x 200 volt Tubular Condenser	.25
100-22	C3	.05 x 200 volt Tubular Condenser	.25
100-25	C6	.002 x 600 volt Tubular Condenser	.25
100-26	C17	.02 x 400 volt Tubular Condenser	.25
100-34	C20	.005 x 1200 volt Tubular Condenser	.25
100-40	C15, C16	.5 x 200 volt Tubular Condenser	.35
119-22	C19	10MFD x 25 W. V. Electrolytic	.75
119-28B	C22, C24	Dual 5 MFD Electrolytic Filter	1.25
124-38	C7	Series Padder Condenser (600 MMF)	.35
124-39B	C2	Trimmer Condenser for Antenna Coil	.15
129-2	C18	.0005 Mica — Type MT — 20%	.25
129-5	C1, C12	.0001 Mica — Type MT — 20%	.25
129-39	C5	.00005 Mica — Type MT — 20%	.25
129-54	C8	.003 Mica — Type MW — 2½%	.35
		RESISTORS	
130-3	R12	500M ohm — 1/3 watt — 20%	.20
130-4	R6, R9	3 Meg ohm — 1/3 watt — 20%	.20
130-9	R11	200M ohm — 1/3 watt — 20%	.20
130-12	R2, R3	50M ohm — 1/3 watt — 20%	.20
130-26	R4	1M ohm — 1/3 watt — 20%	.20
130-54	R1	500 ohm — 1/3 watt — 20%	.20
130-84	R14	200 ohm — 1/3 watt — 20%	.20
130-149	R5	15M ohm — 1/3 watt — 20%	.20
130-153	R13	700 ohm — 1/3 watt — 20%	.20
130-191	R8, R10	1.5 Meg ohm — 1/3 watt — 10%	.20
		COILS	
108-105B	T3	Input I.F. Coil Assembly complete with can	1.25
108-106B	T4	Output I.F. Coil Assembly complete with can	1.25
110-66B	T2	Oscillator Coil Assembly complete	.75
111-83	T1	Antenna Coil Assembly complete with can	1.25
		SOCKETS	
121-6		Six Prong Socket Marked "V1B"	.15
121-8		Five Prong Socket Marked "SPKR"	.10
121-43		Seven Prong Octal Socket Marked "6S7"	.15
121-44		Eight Prong Octal Socket Marked "6D8"	.15
121-49		Seven Prong Octal Socket Marked "6T7"	.15
121-86		Eight Prong Octal Socket Marked "6K6"	.15
		TRANSFORMER	
104-62E	T6	Power Transformer for Vibrator	2.50

Part No	Circuit Diagram Reference	Description	List Price Each
		SPEAKERS	
114-95		Eight Inch P. M. Dynamic Speaker	6.50
114-96	T5	Six Inch P. M. Dynamic Speaker	5.50
		MISCELLANEOUS	
101-91	R7, S2	Volume Control and Switch (1 Meg ohm)	1.00
102-43	C	Two Gang Variable Condenser	2.50
105-19	L2	"A" Choke Coil	.15
105-30E	L4	Filter Choke Coil (400 ohms)	.65
107-135		Battery Cable Complete	1.50
115-49		Goat Type Tube Shield complete with 115-48 Clamp	.15
115-95		Shield Cover for Vibrator Compartment	.15
123-3	L3	R. F. Choke Coil	.35
123-4	L1	R. F. Choke Coil	.40
124-38	C7	Series Padder Condenser	.35
124-39B	C2	Adjustable Trimmer Condenser	.15
125-39	S1	Band Change Switch	.50
126-4		Vibrator Unit Complete	4.00
128-109		Wood Knob (Spring Type)	.10
139-79		4 Ampere Fuse (Type 3AG)	.10

Tubes are coded and guaranteed by the tube manufacturer. Prompter service can be rendered on adjustments if defective tubes are returned direct to the tube manufacturer rather than through our factory.

Vibrators can be reconditioned at a cost of $3.00 each list, if the old unit is returned.

All resistors are RMA color coded—specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None

All prices quoted are list and are subject to the usual trade discounts.

Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

WE CANNOT SUPPLY SPEAKER PARTS, CONES, TRANSFORMERS, OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $2.00 NET FOR SIX INCH, AND $2.25 NET FOR EIGHT INCH, IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

DIAL PARTS LIST—MODEL 489

ASSEMBLIES

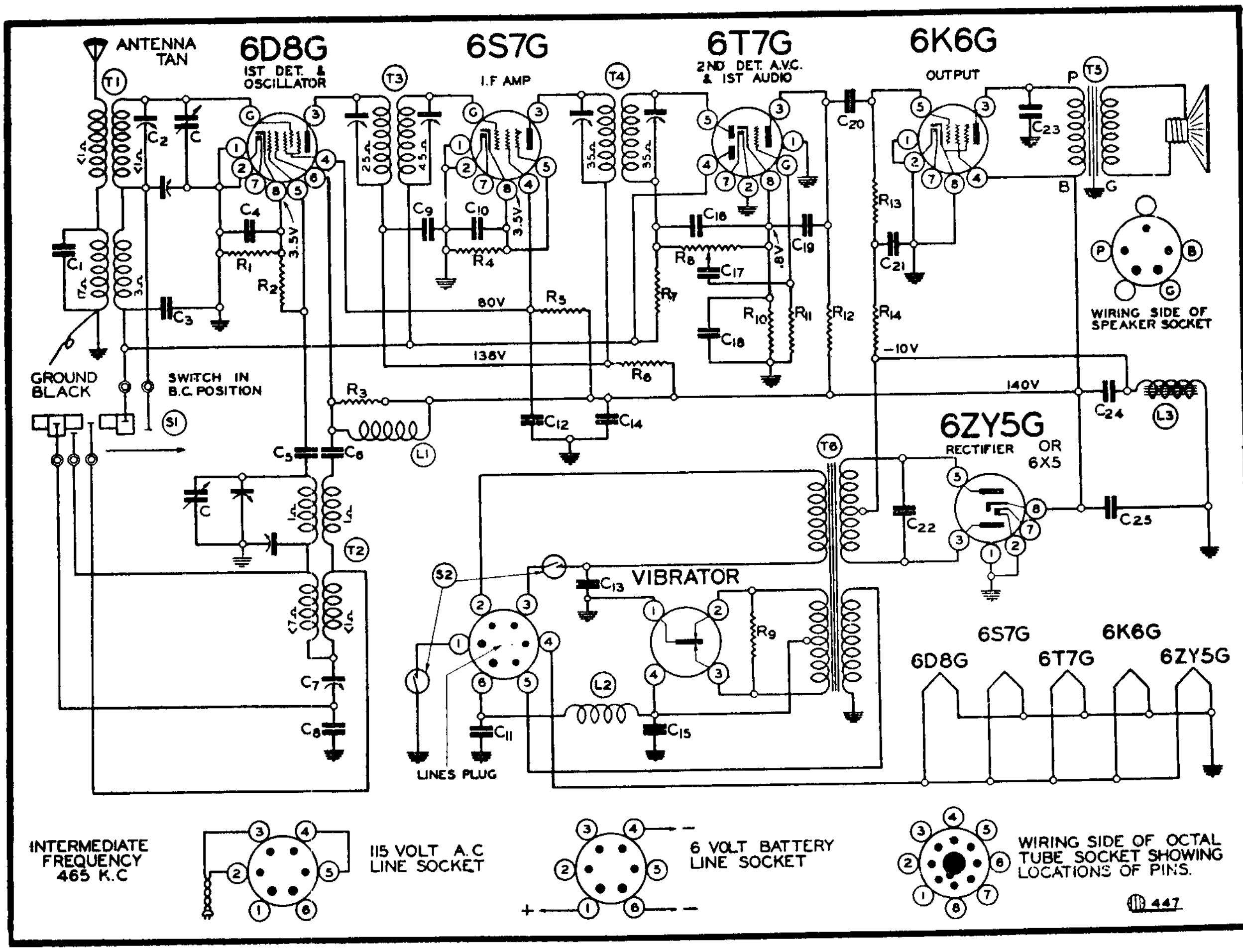
Part No	Description	List Price Each
117-126	Dial Bracket Assembly—Including: 1—No. 117-122 Dial Scale Bracket 1—No. 117-123 Bracket Brace 1—No. 117-125 Tuning Shaft Bushing 1—No. 112-319 Tuning Shaft 1—No. 117-116 Drive Pulley	.50

DIAL PARTS ONLY

Part No	Description	List Price Each
112-199	Dial Drum Including 117-84 Bushing and Set Screw	.25
112-160C	Pointer with 132-19 Screw and Washer	.05
112-305	Dial Scale (Calibrated)	.50
112-247	Crystal for Dial (Plasta Seal)	.35
117-124	Cross Member for Dial Assembly	.10
120-97	Coil Take-up Spring for Dial Drive String	.05
120-9	Linen Drive String	.05
131-43	Cinch Buttons for Fastening Dial Scale	.01

BELMONT RADIO CORP.

MODEL 505 SERIES A



		RESISTORS	C12	100-20	.1 x 200
R1	130-70	500 ohm - 1/3 w.	C13	129-82	.003 Mica
R2	130-12	50M ohm - 1/3 w.	C14	129-12	.00025 Mica
R3	130-12	50M ohm - 1/3 w.	C15	100-40	.5 x 200
R4	130-92	1000 ohm - 1/3 w.	C16	129-5	.0001 Mica
R5	130-149	15M ohm - 1/3 w.	C17	100-11	.01 x 400
R6	130-192	2M ohm - 1/3 w.	C18	119-22	10 mfd. lytic 25 wv.
R7	130-170	3 megohm - 1/3 w.	C19	129-12	.00025 Mica
R8	101-91	1 meg volume control			
R9	130-84	200 ohm - 1/3 w.	C20	100-11	.01 x 400
R10	130-192	2M ohm - 1/3 w.	C21	100-20	.1 x 200
R11	130-19	1 meg - 1/3 w.	C22	100-73	.008 x 1200
R12	130-100	150M ohm - 1/3 w.	C23	100-37	.003 x 600
R13	130-3	500M ohm - 1/3 w.	C24	119-24B	5 mfd. lytic
R14	130-11	250M ohm - 1/3 w.	C25	119-24B	5 mfd. lytic
					C24 and C25 in same unit

		CONDENSERS			**PARTS**
C	102-43	2 gang variable	T1	111-83	Antenna Coil
C1	129-5	.0001 Mica	T2	110-66B	Oscillator Coil
C2	124-39B	Adj. condenser	T3	108-105B	Input I.F.
C3	100-22	.05 x 200	T4	108-106B	Output I.F.
C4	100-20	.1 x 200	T5	114-95	or
C5	129-39	.00005 Mica		114-96	Speaker
C6	100-25	.002 x 600	T6	104-114	Power Transformer
C7	124-38	Series Pad	L1	123-4	"B" Choke
C8	129-54	.003 Mica	L2	105-19	"A" Choke
C9	100-6	.25 x 200	S1	125-39	Wave band switch
C10	100-20	.1 x 200	S2		Off-On Switch on Volume Control
C11	100-40	.5 x 200	L3	105-52	300 ohm 4.5 henry filter choke

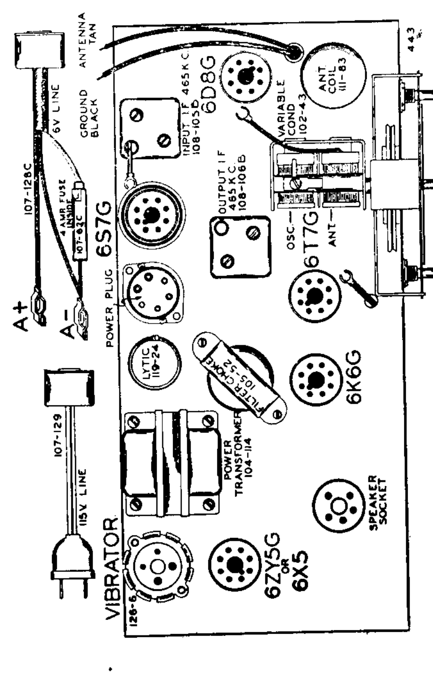


FIG. 1—TOP VIEW

BELMONT RADIO CORP.

MODEL 505 SERIES A

BAND	DIAL SCALE	FREQUENCY RANGE
Broadcast	Upper	535 to 1720 K.C. (Kilocycles)
Short Wave	Lower	5.5 to 18.1 M.C. (Megacycles)

I. F. Frequency 465 K.C.

POWER SUPPLY:

Caution:—This radio, unless otherwise marked, must be operated from 105-115 volts, 60 cycle A.C. supply only. If you are in doubt as to the voltage and frequency rating of the power supply, consult your local power company before inserting plug. Do not insert plug unless all tubes and speaker plug are in their proper sockets.

Receivers of this model which are to be used on voltages or frequencies other than 105-115 volts, 60 cycles are so marked. The power consumption of this receiver is 30 watts.

1. For 6 volt storage battery operation:
   (a) Use cable No. 107-128C.
   (b) Connect the lead (containing the fuse receptacle) marked A negative (—) to the negative (—) post of the storage battery.
   (c) Connect the lead marked A positive (+) to the positive (+) post of the storage battery
2. For 105-115 volts, 60 cycle operation:
   (a) Use special cable No. 107-129.
   (b) Plug receptacle of cable into power socket on chassis.

SERVICE DATA

DESCRIPTION:

The tube complement of this chassis consists of the following octal base glass tubes which are interchangeable with metal tubes:

The type and function of each tube is as follows:

1—Type 6D8G Pentagrid Mixer, First Detector-oscillator.
1—Type 6S7G Remote Cut-off Pentode I. F. Amplifier (465 K.C.)
1—Type 6T7G Duplex Diode Triode, Second Detector, A.V.C. and First Audio.
1—Type 6K6G Pentode Output Amplifier.
1—Type 6ZY5G Rectifier.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets

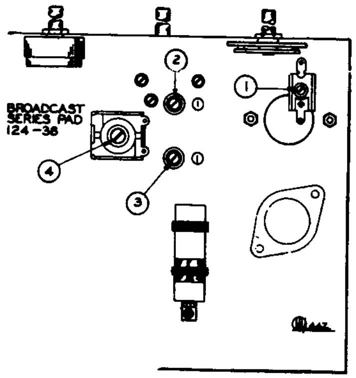


FIG. 3—BOTTOM VIEW SHOWING TRIMMERS

and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 115 volts A.C. line or a fully charged 6 volt storage battery.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS:

CAUTION: No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as defective tubes, poor installations, open or grounded antenna systems, defective condensers and resistors.

In order to properly align this chassis, an oscillator (generator) is necessary.

All adjustments should be made with a non-metallic screw driver.

RESONANCE INDICATOR:

Use as a resonance indicator a.. output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and screen terminals of the type 6K6G output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-106B Output I.F. Transformer
Part No. 108-105B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser in its minimum capacity position, plates entirely out of mesh, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer No. 108-106B to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6S7G to grid cap of 6D8G and adjust input I.F. transformer (No. 108-105B) to resonance.

SHORT WAVE BAND ALIGNMENT:

5.5 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the antenna and ground leads, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator trimmer to resonance.

   This adjustment is the trimmer mounted on the top of rear section of the variable gang condenser (see Fig. 1, top view).

   (b) Adjust short wave antenna trimmer (Adjustment Number 1), to resonance (see Fig. 3, bottom view).

BROADCAST BAND ALIGNMENT:

535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground leads make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 3, see bottom view of chassis, Fig. 3).
   (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (adjustment number 2), to resonance.
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 4), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

REPAIR PARTS

Part No.	Circuit Diagram Reference	Description	No. Used in Set	List Price Each
		CONDENSERS		
100-6	C9	.25 x 200 Volt Tubular	1	.25
100-11	C17, C20 C4, C21	.01 x 400 Volt Tubular	2	.25
100 20	C10, C12	.1 x 200 Volt Tubular	4	.25
100-22	C3	.05 x 200 Volt Tubular	1	.25
100-25	C6	.002 x 600 Volt Tubular	1	.25
100-73	C22	.008 x 1200 Volt Tubular	1	.35
100-40	C11, C15	.5 x 200 Volt Tubular	2	.35
100-73	C22	.008 x 1200 Volt Tubular	1	.35
119-22	C18 C24	10MFD x 25 W.V. Electrolytic	1	.75
119-24B	C25	Dual 5MFD Electrolytic Filter	1	1.25
124-38	C7	Series Padder Condenser	1	.35
124-39B	C2	Trimmer Condenser For Antenna Coil	1	.15
129-5	C1, C16	.0001 Mica — Type MT — 20%	2	.25
129-12	C14, C19	.00025 Mica — Type MT — 20%	2	.25
129-39	C5	.00005 Mica — Type MT — 20%	1	.25
129-54	C8	.003 Mica — Type MW — 2½%	1	.35
129-82	C13	.003 Mica — Type MW — 20%	1	.35
		RESISTORS		
130-3	R13	500M Ohm — 1/3 Watt — 20%	1	.20
130-11	R14	250M Ohm — 1/3 Watt — 20%	1	.20
130-12	R2, R3	50M Ohm 1/3 Watt — 20%	2	.20
130-19	R11	1 Meg Ohm — 1/3 Watt — 20%	1	.20
130-70	R1	500 Ohm — 1/3 Watt — 10%	1	.20
130-84	R9	200 Ohm — 1/3 Watt 20%	1	.20
130-92	R4	1M Ohm — 1/3 Watt — 10%	1	.20
130-100	R12	150M Ohm — 1/3 Watt — 20%	1	.20
130-149	R5	15M Ohm — 1/3 Watt — 20%	1	.20
130-170	R7	3 Meg Ohm — 1/3 Watt — 25%	1	.20
130-192	R6, R10	2M Ohm — 1/3 Watt — 10%	2	.20
		COILS		
108-105B	T3	Input I.F. Coil Assembly Complete with Can	1	1.25
108-106B	T4	Output I.F. Coil Assembly Complete with Can	1	1.25
110-66B	T2	Oscillator Coil Assembly complete	1	.75
111-83	T1	Antenna Coil Assembly complete with Can	1	1.25
		SOCKETS		
121-8		Five Prong Socket Marked "SPKR"	1	.10
121-9		Four Prong Socket Marked "VIB"	1	.10
121-44		Eight Prong Octal Socket Marked "6D8"	1	.15
121-49		Seven Prong Octal Socket Marked "6T7"	1	.15
121-71		Seven Prong Octal Socket Marked "6K6"	1	.15
121-80		Six Prong Octal Socket Marked "6ZY5"	1	.15
121-87		Eight Prong Octal Socket Marked "6S7"	1	.15
121-79		Special Six Prong Power Socket	1	.15
		TRANSFORMER		
104-114	T6	Power Transformer for Vibrator	1	3.50

Part No.	Circuit Diagram Reference	Description	No. Used in Set	List Price Each
		SPEAKERS		
114-95	T5	Eight Inch P.M. Dynamic Speaker	1	6.50
114-96	T5	Six Inch P.M. Dynamic Speaker	1	5.50
		MISCELLANEOUS		
101-91	R8, S2	Volume Control and Switch (1 Meg Ohm)	1	1.00
102-43	C	Two Gang Variable Condenser	1	2.50
105-19	L2	"A" Choke Coil	1	.15
105-52	L3	Filter Choke Coil (300 Ohm)	1	.75
107-128C		Battery Cable Complete	1	1.65
107-129		Special Line Cord and Plug for AC Operation	1	.85
115-49		Goat Type Tube Shield Complete with 115-48 Clamp	2	.15
115-95		Shield Cover for Vibrator Compartment	1	.15
121-79		Special Six Prong Plug (Mounted on Chassis) for Attaching either the Battery Cable or Special A.C. Line Cord	1	.15
123-4	L1	R.F. Choke Coil	1	.40
124-38	C7	Series Padder Condenser	1	.35
124-39B	C2	Adjustable Trimmer Condenser	1	.15
125-39	S1	Band Change Switch	1	.50
126-6		Vibrator Unit Complete	1	3.50
128-109		Wood Knob (Spring Type)	3	.10

Tubes are coded and guaranteed by the tube manufacturer. Prompter service can be rendered on adjustments if defective tubes are returned direct to the tube manufacturer rather than through our factory. Vibrators can be reconditioned at a cost of $3.00 each list, if the old unit is returned.

All resisters are RMA color coded—specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number. Mica condensers are coded with an additional dot indicating tolerance:

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None.

All resistors are RMA color coded—specify value and/or resistor number. Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

WE CANNOT SUPPLY SPEAKER PARTS, CONES, TRANSFORMERS OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $2.00 NET FOR SIX INCH AND $2.25 NET FOR EIGHT INCH, IF IT IS RETURNED TO OUR FACTORY TRANSPORTATION CHARGES PREPAID.
PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

DIAL PARTS LIST—MODEL 505

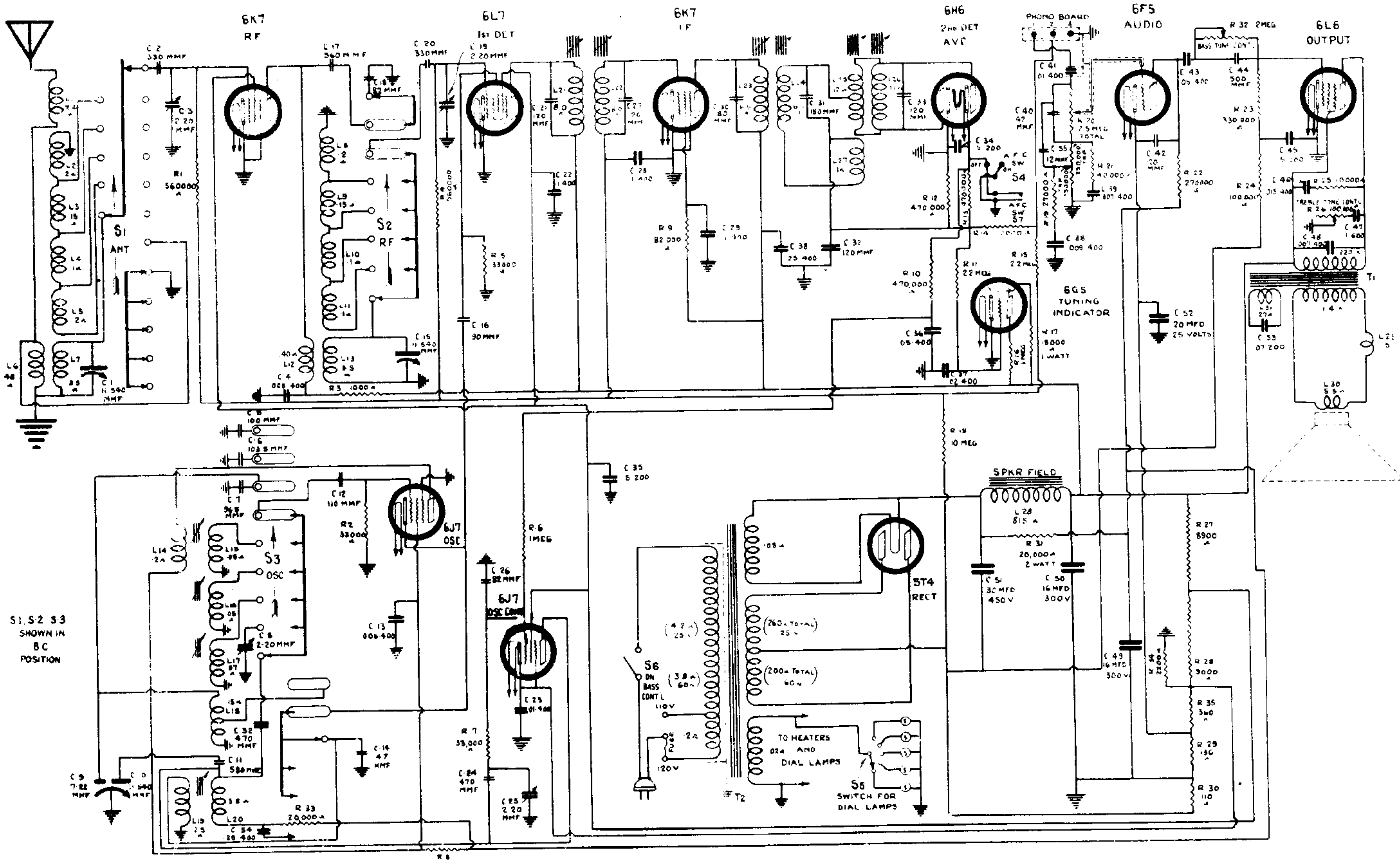
Part No.	Description	No. Used in Set	List Price Each
	ASSEMBLIES		
117-126	Dial Bracket Assembly — Including: 1—No. 117-122 Dial Scale Bracket 1—No. 117-123 Bracket Brace 1—No. 117-125 Tuning Shaft Bushing 1—No. 112-319 Tuning Shaft 1—No. 117-116 Drive Pulley	1	.50

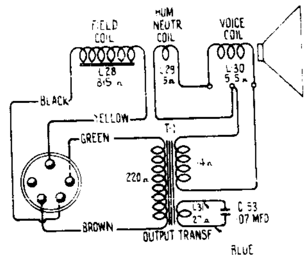
DIAL PARTS ONLY

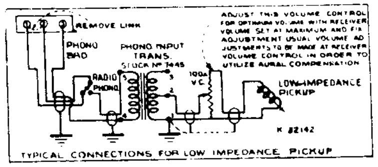
Part No.	Description	No. Used in Set	List Price Each
112-199	Dial Drum Including 117-84 Bushing and Set Screw	1	.25
112-160C	Pointer with 132-19 Screw and Washer	1	.05
112-305	Dial Scale (Calibrated)	1	.50
112-247	Crystal For Dial	1	.35
117-124	Cross Member for Dial Assembly	1	.10
120-97	Coil Take-Up Spring for Dial Drive String	1	.05
120-9	Linen Drive String	1	.05
131-43	Cinch Button for Fastening Dial Scale	1	.01

CANADIAN WESTINGHOUSE COMPANY Limited

MODELS 1029X & 1029Y







Schematic Circuit Diagran

ELECTRICAL SPECIFICATIONS

Frequency Ranges

Broadcast .... 530-1720 kc.

49 Meter 5.97-6.24 M.C. .... 31 Meter 15.09-15.30 M.C.

25 Meter 11.68-11.92 M.C. .... 19 Meter 9.4-9.7 M.C.

Intermediate Frequency .... 460 kc.

Radiotron Complement:

(1) W-6K7 .... R. F. Amplifier

(2) W-6L7 .... First-Detector

(3) W-6J7 .... Oscillator

(4) W-6K7 .... Intermediate Frequency Amplifier

(5) W-6H6 .... A.F.V., A.F.C. and Second Detector

(6) W-6J7 .... Oscillator Control

(7) W-6F5 .... First Audio Stage

(8) W-6L6 .... Power Output

(9) W-5T4 .... Full-wave Rectifier

(10) W-6G5 .... Tuning Indicator

Pilot Lamps (5) .... Mazda No. 46, 6.3. volts, 0.25 amperes

Power Output Rating:

Undistorted .... 5.0 watts

Maximum .... 7.2 watts

Electrodynamic Loudspeaker:

Voice Coil Impedance .... 4.5 ohms at 400 cycles

Size: .... 12"

CANADIAN WESTINGHOUSE COMPANY Limited.

MODELS 1029X & 1029Y

WHEN RECEIVER IS CORRECTLY TUNED IN

(1) I.F. signal developed here is 460 k.c. and this voltage is applied across points A and B.

(2) Voltage acting across R13 and diode No. 1 is sum of voltage applied across points A-B and voltage applied across upper half of L25.

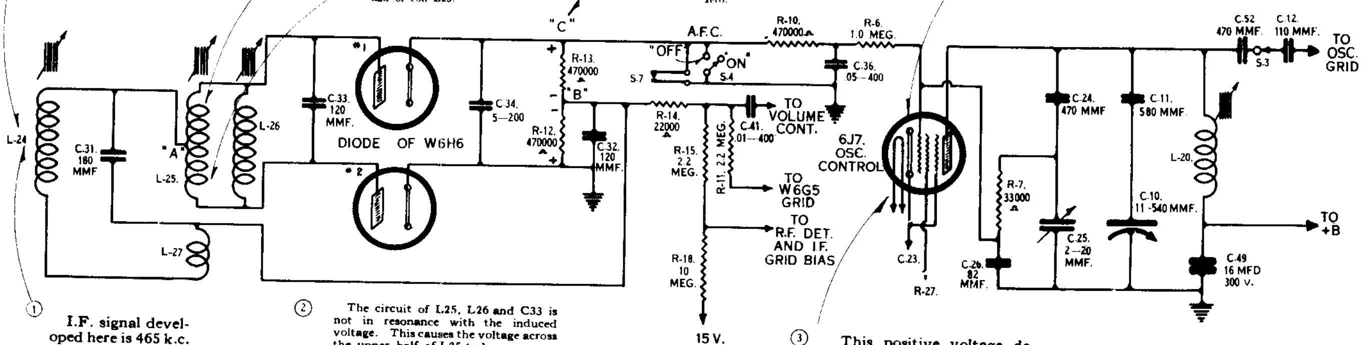
Voltage acting across R 12 and diode No. 2 is sum of voltage applied across A B and voltage across lower half of coil L25.

(3) The circuit of L25, L26 and C33 is tuned to 460 K.C. and is in resonance with the induced voltage.

The induced voltage across each half of L25 has an equivalent phase relation with respect to the voltage applied across A and B consequently the resultant rectified voltages across R12 and R13 are equal and opposite and the A. F. C. voltage from C to ground is zero.

(4) Grid of control tube is connected to a point on the oscillator tuned circuit and the plate is connected to the "high" end of the oscillator tuned circuit.

The phase relations are such that the amplified voltage developed on the plate has the same effect as an inductance in parallel with the tuned circuit.



(1) I.F. signal developed here is 465 k.c. and this voltage is applied across points A and B

WHEN RECEIVER IS INCORRECTLY TUNED IN (5 K.C. HIGH)

(2) The circuit of L25, L26 and C33 is not in resonance with the induced voltage. This causes the voltage across the upper half of L25 to become more nearly in phase with the voltage applied across A and B and increases the rectified voltage across R13. It also causes the voltage across the lower half of L25 to become further out of phase with the voltage applied across A and B and decreases the rectified voltage across R12. Consequently the resultant voltage from C to ground is positive.

(3) This positive voltage decreases the bias on the control tube and increases the amplification. This has the effect of increasing the equivalent inductance across the oscillator tuned circuit and consequently lowers the oscillator frequency so as to correct the error in dial setting.

DETAIL OF AUTOMATIC FREQUENCY CONTROL CIRCUIT

When the receiver is tuned too low, the A.F.C. voltage becomes negative, and results in an opposite corrective effect on the oscillator frequency.

It will be noted that the automatic frequency control is applied to the broadcast band only and that two switches S-4 and S-7 are provided to short circuit the automatic frequency control voltage when its presence is not desired. One switch S-7 is mounted so that by an inward motion while turning the station selector the A.F.C. voltage is removed, thus permitting the station to be tuned without a "dragging" effect that would otherwise exist if the operator attempted to tune past a powerful station to pick up a weaker one.

ALIGNMENT PROCEDURE

There are various alignment trimmers provided in the detector and oscillator coil tuned circuits. The i-f transformer adjustments are made by means of screws attached to molded magnetite cores. All of these circuits have been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions or altered during servicing. Loss of sensitivity, improper tone quality, and poor selectivity are the usual indications of improper alignment.

The correct performance of this receiver can only be obtained when the aligning has been done with adequate and reliable apparatus. It is not necessary to use a frequency modulated oscillator and cathode ray oscillograph to align this receiver. Those service men that have this equipment will probably prefer to use it and for their convenience we have indicated on the trimmer location diagram the proper connection point for the cathode ray vertical amplifier input terminal.

A test oscillator is required as a source of the specified alignment frequencies. Visual indication of receiver output during the adjustment is necessary and should be accomplished by the use of an indicator or meter.

The procedure outlined below should be followed in adjusting the various trimmer capacitors and molded cores:

Calibrate the tuning dial by adjusting pointer to the low frequency end of scale with gang condenser plates fully meshed. The pointer may be adjusted along the phosphor bronze drive cable by slackening the stud which secures the glider to the phosphor bronze drive cable.

Perform alignment in proper order as shown by the accompanying chart, starting with No. 1, and following all operations across, then No. 2, etc. The chassis bottom shield must be securely in place when making R.F. adjustments. Adjustment locations and fequencies are shown on a sticker fastened to the bottom side of the chassis shield. These trimmer locations are also shown in one of the accompanying illustrations.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test oscillator output terminal and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc." means that the receiver should be tuned to a point between 550 and 750 kc. where no signal or interfrence is received from a station or the receiver (heterodyne) oscillator.

The term "Rock Through" indicates that the receiver station selector should be rocked back and forth while making the indicated adjustment. The adjustment and rocking should be continued until the combined action results in the maximum deflection on the output meter.

When adjusting oscillator circuits that have both series and shunt trimmers it is good practice to repeat the adjustment on the oscillator shunt trimmer after making the adjustment on the oscillator series trimmer.

When calibrating the short wave "spread" bands (see operations 6, 9, 10 and 11 in the Alignment Chart), it is necessary to have a very accurate source of test signal. As there are no service oscillators available at present with sufficient accuracy for this calibration adjustment, it is recommended that the respective adjustments to L-16, L-17, L-15 and C-8 be made while listening to a short wave broadcast station of known frequency, approximately in the middle of the band being calibrated. Operations 7 and 8 may be performed after operation 6 by setting the receiver to 11,800 kc. and tuning the test oscillator to the receiver

PRECAUTIONARY LEAD DRESS—(1) All bare bus leads adjacent to the R.F. coils or Range Selector Switch should be as short and direct as possible.

(2) All insulated leads adjacent to the R.F. coils should be dressed away from the coils.

(3) Heater leads should be tightly twisted together and dressed away from grid leads of audio tubes to avoid hum pick-up.

(4) Leads connected to phonograph pick-up terminal should be tightly twisted together and dressed close to chassis frame.

(5) Power output stage grid leads should be dressed away from the high voltage secondary winding leads of power transformer to avoid hum pick-up.

CANADIAN WESTINGHOUSE COMPANY Limited

MODELS 1029X & 1029Y
ALIGNMENT PROCEDURE FOR A.F.C. I.F. TRANSFORMER

In the alignment chart the first adjustment given is to turn the A.F.C. I.F. transformer tuning screw in coil L-26 all the way out so that the normal alignment adjustment may be made independently. It is convenient at the same time to check the centering of the core in coil L-25. This is not an adjustment for tuning purposes, but merely to obtain equal inductance in each half of coil L-25 by accurately adjusting the magnetite core to the centre of the coil.

The final adjustment to tune the A.F.C. I.F. transformer to resonance with the other I.F. transformers is as follows:

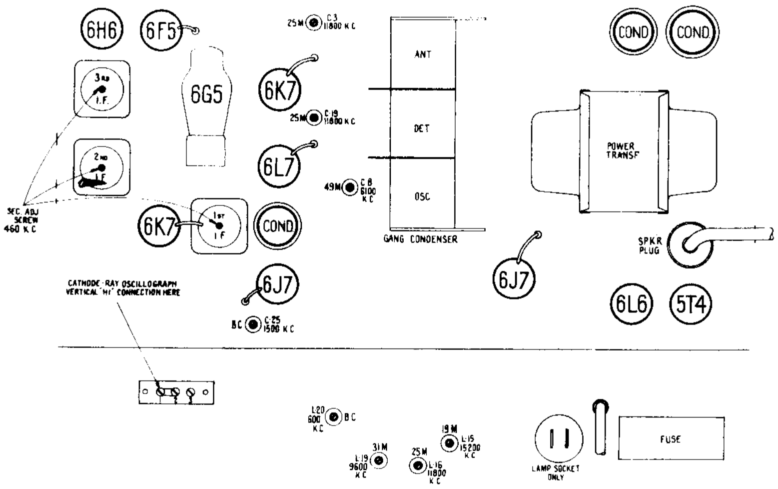
1. Using a standard antenna, and leaving the master-manual switch in the manual position, tune in a powerful station, preferably a local, very accurately, using the tuning indicator to secure exact resonance.
2. With the test oscillator set and connected exactly the same as in the fourth operation of the alignment chart feed a 460 K.C. signal into the first detector. If the proper adjustments have been made there should be a very low pitched beat note in the loud speaker.
3. Slightly readjust the test oscillator frequency to secure lowest frequency, or "zero beat" in the reproducer.
4. Turn the master-manual switch to the "master" position. This will immediately change the frequency of the heterodyne oscillator in the receiver and cause the beat note in the reproducer to become fairly high in pitch.
5. Adjust the magnetite core screw in coil L-26 until "zero beat" is again obtained in the reproducer output.

The A.F.C. I.F. transformer is now correctly tuned and switching the "manual-master" switch back and forth should produce no change in the reproducer output.

To check the operation of the A.F.C. circuit disconnect the test oscillator, set the "master-manual" switch at "manual" and tune the receiver approximately 5 K.C. away from a fairly strong signal. The quality of reception will, of course, be poor and noisy. Turn the master-manual switch to the "master" position. The reception should immediately improve and correspond to that obtainable from the same station when accurately tuned to resonance.

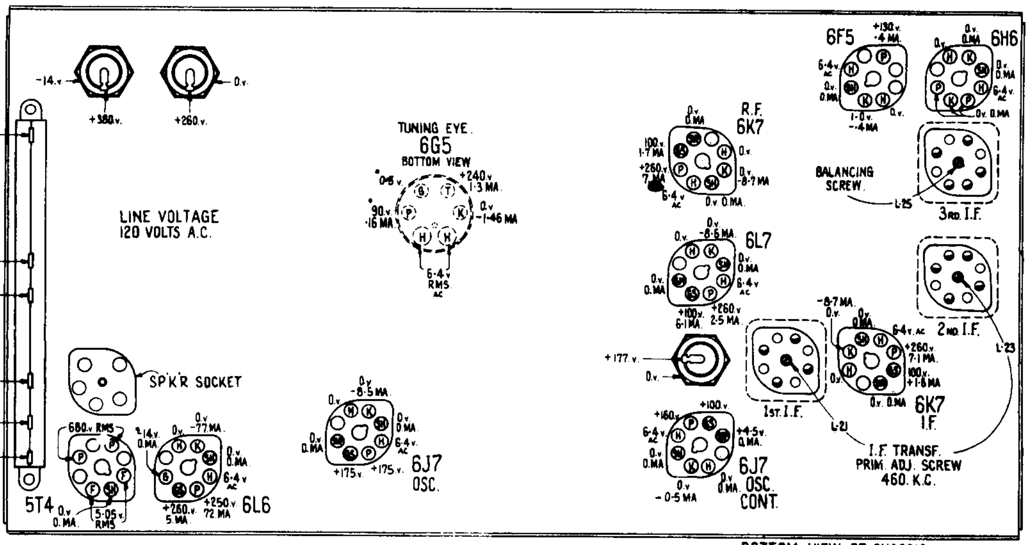
Socket Meter Readings
BELOW

The meter readings given in the diagram are taken with the antenna and ground binding posts short circuited and with 120 volts line. All readings are actual operating conditions and in some cases it will be necessary to allow for meter resistance. All D.C. voltage readings are taken with respect to the chassis frame. All readings are given for normal operation. If readings are taken with a set analyser, circuits that are not intended to oscillate, may oscillate, thus increasing plate or screen voltages and decreasing plate or screen current. The set analyser cable may also cause the oscillator radiotron to cease oscillating, thus increasing current and decreasing voltage.



Trimmer Locations

Corrected Socket Meter Reading Diagram Model 1029



BOTTOM VIEW OF CHASSIS

OTHER CHANGES

A.F.C. Alignment—Somewhat better results will be secured if in operation No. 1 (see chart) the core screw is turned almost all in instead of all out as a greater amount of detuning is possible.

Parts List—Price of Mask C7405-1 should be $0.35 not $0.75. Length of Drive Cable should be 45¼ inches.

CANADIAN WESTINGHOUSE COMPANY Limited

MODELS 1029X & 1029Y

ALIGNMENT CHART

Order of Align-ment	Connection To Receiver	Test Oscillator Dummy Antenna	Frequency Setting	Receiver Dial and Range Setting	Master-Manual Sw. Position	Circuit To Adjust	Adjust-ment Symbols	Adjust to Obtain
1.	Turn this screw all the way out.					A.F.C. I.F.	L 26	
2.	Check with mechanic's scale. This screw should protrude exactly ¼ inch.					A.F.C. I.F.	L 25	
3	W-6K7 I.F. Grid Cap	.001 Mfd.	460 kc.	No signal 550-750 kc.	Manual	2nd. I.F. Transf.	L23, L24	Max. (Peak)
4	W-6L7 First Det.	.001 Mfd.	460 kc.	No Signal 550-750 kc.	Manual	1st. I.F. Transf.	L21, L22	Max (Peak)
5	W-6L7 First Det.	.001 Mfd.	460 kc.	No Signal 550-750 kc.	Manual	2nd. I.F. Transf.	L23, L24	Max (Peak)
6	Ant. Term.	400 ohms	11,800 kc.	11,800 kc.	Manual	Osc. 25M.	L16	Max (Peak)†
7	Ant. Term.	400 ohms	11,800 kc.	11,800 kc.	Manual	Det. 25M.	C19	Max (Peak)**
8	Ant. Term.	400 ohms	11,800 kc.	11,800 kc.	Manual	Ant. 25M.	C3	Max (Peak)**
9	Ant. Term.	400 ohms	9,600 kc.	9,600 kc.	Manual	Osc. 31M.	L17	Max (Peak)†
10	Ant. Term.	400 ohms	15,200 kc.	15,200 kc.	Manual	Osc. 19M.	L15	Max (Peak)†
11	Ant. Term.	400 ohms	6,100 kc.	6,100 kc.	Manual	Osc. 49M.	C8	Max (Peak)*
12	Ant. Term.	200 mmfd.	1,500 kc.	1,500 kc.	Manual	B.C. H.F. Osc.	C25	Max (Peak)**
13	Ant. Term.	200 mmfd.	600 kc.	Rock Through 600 kc.	Manual	B.C. L.F. Osc.	L20	Max (Peak)
14	Repeat 12							
15	Repeat 13							
16	Repeat 12							
17	See instructions below for A.F.C. Alignment						L26.	

* If two peaks obtainable use higher capacity setting.
** If two peaks obtainable use lower capacity setting.
† If two peaks obtainable use lower inductance setting (screw further out).

Radio Replacement Parts

Key No.	Part No.	Description	List Price
L6, L7	M-81776-G501	Coil—B.C. Antenna Assembly	$1.50
L1, L2, L3, L4, L5	M-81780-G501	Coil—S.W. Antenna Assembly	1.50
L12, L13	M-81781-G501	Coil—B.C. Dtector Assembly	1.50
L8, L9, L10, L11	M-81777-G501	Coil—S.W. Detector Assembly	1.50
L19, L20	M-81784-G502	Coil—B.C. Oscillator Assembly	1.10
L17	M-81778-G501	Coil—31M. Oscillator Assembly with Adjustable Core	1.50
L16	M-81773-G502	Coil—25M. Oscillator Assembly with Adjustable Core	1.50
L14, L15	M-81784-G501	Coil—19M. Oscillator Assembly	1.00
L18	M-81788-G501	Coil—49M. Oscillator Assembly	1.00
C49, C50	H-38180	Capacitor—Wet Electrolytic—18 Mfd. 300 v. complete with Mtg. Details	1.40
C51	H-38183	Capacitor—Wet Electrolytic—30 Mfd. 450 v. complete with Mtg. Details	1.80
C1, C15, C10, C9	H-38138	Capacitor—Variable—3 Gang Condenser with Auxiliary S.W. Section	On application
C3, C8, C19, C25	M-80832-G501	Capacitor—Air Dielectric Trimmer 2-20 Mmf.	.40
C52	H-37864	Capacitor—Dry Electrolytic 20 Mfd. 25 Volts	1.00
R20	H-38153	Control—Volume 2.5 Meg. total,—Taps at 500,000 and 250,000 ohms	1.40
R26	H-38151	Control—Tone—Treble, 100,000 ohms	1.20
R32, S6	H-38152	Control—Tone—Bass, 2 meg. with SP. ST. Switch	1.60
S4	H-38277	Control—A.F.C. SP. ST.	.65
S1, S2, S3, S5	H-38148	Switch—Range Selector Assembly complete with 4 Pies attached	
S7	H-38209	Switch—A.F.C. Shorting Switch (operated by station selector knob)	.65
	H-33478	Socket—Standard Octal	.25
	H-34441	Socket—5 contact	.20
	H-22354	Socket—Pilot Lamp	.20
	No. 7723	Socket—110 V. Lamp Receptacle	.45
L21, L22, C21, C27	H-38133	Transformer—1st I.F. "iron-core"	2.40
L23, L24, C30, C31	H-38134	Transformer—2nd I.F. "iron-core"	2.40
L25, L26, L27, C33	H-38135	Transformer—3rd I.F. A.F.C.	3.00
T2	H-38136	Transformer—Power, 25 and 60 cycle	9.00
T2	H-38218	Transformer—Power, 60 cycle only	7.00
		DIAL AND DRIVE ASSEMBLIES	
	D-585633	Dial Support complete with Mtg. Brackets	2.00
	H-38169	Drum complete with Mtg. Hub for Cond. Drive	1.00
	K-83394	Pulley—for belt (upper) with 2 set screws	.20
	H-38283	Pulley—for belt (lower) complete with shaft	.25
	K-83416	Pulley—belt idler, complete with Mtg	.30
	K-83418	Pulley—for drive cable	.10
	C-7426-4	Spring—for operating A.F.C. switch S7	.20
	C-7426-1	Spring—for idler pulley on belt	.10
	M-81391-P4	Spring—for drive cable	.10
	H-38167	Cable—Phosphor Bronze 42" long (loop to loop)	.75
	H-38170	Pointer—complete with support	.30
	H-38281	Slider—for pointer, complete with Tension Spring Assem.	.30
	H-38282	Channel—for slider, complete with Supports and Pulley Shafts	.70
	D-585624-1	Shaft—for slider	.25
	H-38150	Condenser Drive belt	.35
	D-585624-5	Stud—for mtg. idler spring	.05
	C-7405-1	Mask—for rear of dial scales	.75
	H-38149	Separator Strip—for dial scales	.20
	D-585618-1	Clamp—for dial scales—2 to a set	.20
	C-7407-1	Rubber Strip—for dial scales mtg.—pkge. of 4	.10
	K-85110-P1	Hairpin Retainer—to hold pulleys in place etc.—pkge. of 5	.10
	Cat.48730	Shield—for dial lamps	.10
	H-38213	Dial Scale—B.C.	.60
	H-38215	Dial Scale—49 Meter	.60

RADIO REPLACEMENT PARTS—*Continued*

Key No.	Part No.	Description	List Price
	H-33492	Control Grid Clip—Small pkg. of 5	.30
	H-38184	Tuning Light Cable and Socket with Mtg. Brkt.	.75
	K-85106	Osc.—B.C. and 19 M. Adjustable Magnetite Core Assembly	.75
R27, R28	H-38176	Voltage Divider	
R35, R29 R30			1.40
	K-79780	Knob—Large for Tuning Condenser	
	K-76886	Knob—Spring (large) Pkg. of 5	.20
	K-79781	Knob—Small for selector switch and controls	.15
	K-77761	Knob Spring (small) Pkg. of 5	.20
	C-7347	Cabinet—Model 1029X	.15
	C-7408	Cabinet—Model 1029Y	On application
	H-38224	Escutcheon Glass	On application
	H-38206	Escutcheon for dial	.40
	K-79864-2	Rubber channel—For Escutcheon Glass—Pkg. of 10	1.50
	C-7398-1	Transfer—"Westinghouse"	.25
	C-7117-6	Transfer—"Off"	.10
	C-7117-1	Transfer—"Volume"	.10
	C-7117-4	Transfer—Treble Tone	.10
	C-7117-5	Transfer—"Bass Tone"	.10
	C-7117-7	Transfer—"Manual-Master"	.10
	C-7117-9	"B.C. 49M. 31M. 25M. 19M."	.10
	Form 1083-37	Tuning Book	.10
	Form 1029XY	Instruction Card	.40
	K-65415	Rubber Mtg. Bushing for Var. Condenser Pkg. of 4	.15
		REPRODUCER ASSEMBLIES	.15
	H-38173	Reproducer Complete	
L30	H-36127	Cone Assembly	On application
T1	H-36129	Output Transformer	3.00
L28	H-36211	Field Coil	2.75
L29	H-36212	Hum Bucking Coil	2.00
	H-23781	Cable Plug Assembly	.50
			.25
	H-38214	Dial Scale 31 Meter	.60
	H-38212	Dial Scale 25 Meter	.60
	H-38211	Dial Scale 19 Meter	.60
	H-38286	Washer Slider Tension Fibre Washer Pkg. of 5	.10
	H-38284	Clamp and Stud Assem. for cable to slider	.10
		MISCELLANEOUS ASSEMBLIES	
	H-38137	Ant. & Gnd. Terminal Board	.30
	M-80872-5	Phono Terminal Board with Link	.35
	M-81641-3	Wiring Terminal Board (2 lugs)	.10
	D-584317	Fuse Terminal Board Complete	.75
	H-37908	Fuse 3 amp. Special High Lag—Pkg. of 5	.65
	H-34394	Line Cord and Plug	.45
	H-34535	Shield for I.F. Transformer	.30

CARBON RESISTORS

Key No.	Part No.	Ohms	Watts
R8	H-38188	470	½
R3	H-30205	1000	½
R34	H-33491	2200	½
R25	H-25372	10,000	1
R17	H-38190	18,000	1
R33	H-31735	20,000	½
R31	H-29236	20,000	2
R14	H-37822	22,000	½
R19	H-38115	27,000	½
R2, R5, R7	H-23675	33,000	½
R21	H-22426	40,000	½
R9	H-34545	82,000	½
R24	H-30561	100,000	½
R22	H-34458	270,000	½
R23	H-38116	330,000	½
R10, R12 R13	H-34416	470,000	½
R1, R4	H-38187	560,000	½
R6, R16	H-30177	1.0 Meg.	½
R11, R15	H-33488	2.2 Meg.	½
R18	H-36294	10.0 Meg.	½

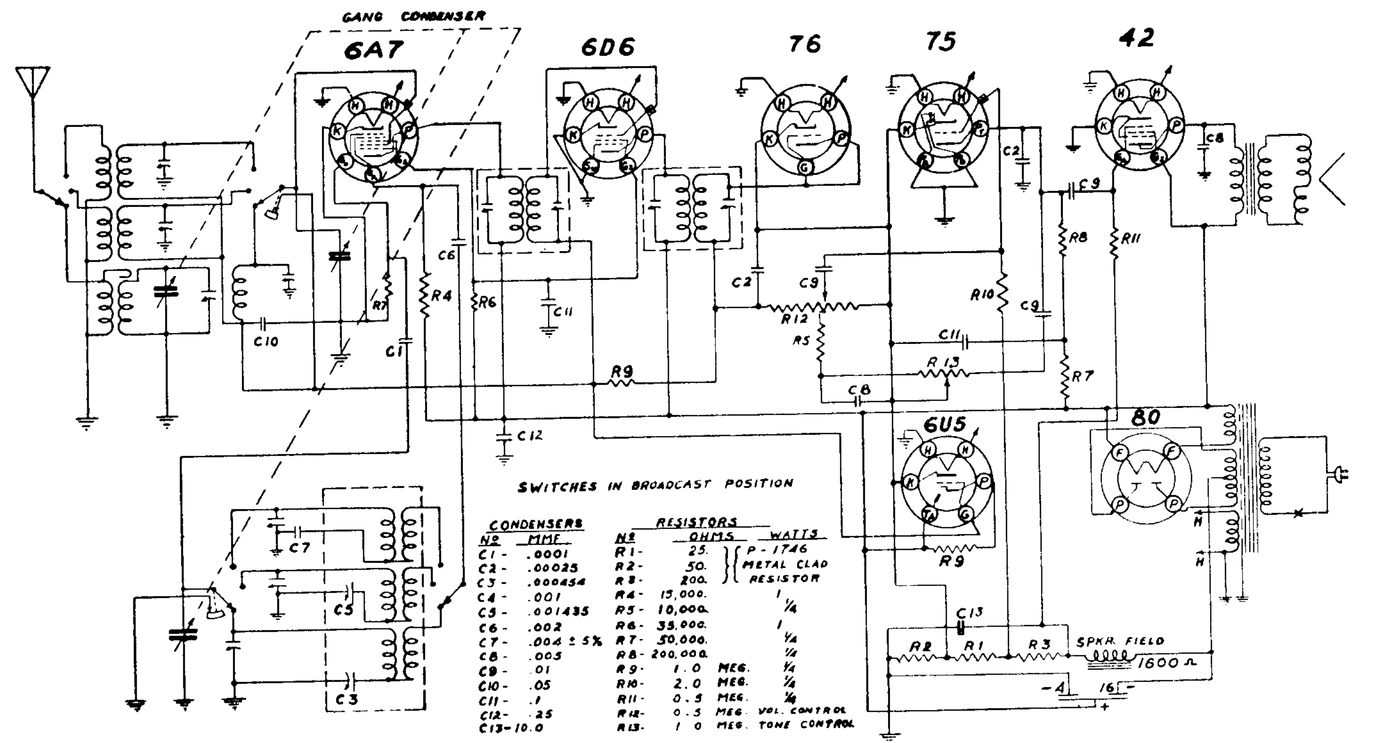
TUBULAR CONDENSERS

Key No.	Part No.	Description
C34, C35	H-27752	.5 Mfd. 200 volt
C54	H-27683	.25 Mfd. 400 volt
C29, C47	H-37839	.1 Mfd. 600 volt
C22, C28	H-34464	.1 Mfd. 400 volt
C53	H-36113	.07 Mfd. 400 volt
C36, C43	H-36188	.05 Mfd. 400 volt
C37	H-32989	.02 Mfd. 400 volt
C46	H-29636	.015 Mfd. 400 volt
C23	H-34461	.01 Mfd. 400 volt
C41	H-32982	.01 Mfd. 400 volt (shielded)
C38	H-36174	.009 Mfd. 400 volt
C39, C48	H-34537	.007 Mfd. 400 volt
C4, C13	H-29601	.005 Mfd. 400 volt

MICA CAPACITORS

Key No.	Part No.	Description	List
C14	H-38200	4.7 mmf.	.30
C55	H-38117	12 mmf.	.30
C40	H-37862	42 mmf.	.30
C18, C26	H-38196	82 mmf.	.30
C16	K-82422-4A	90.0 mmf. Lucite Capacitors	
C7	K-82422-1A	96.5 mmf. Lucite Capacitors	
C5	K-82422-2A	100.0 mmf. Lucite Capacitors	
C6	K-82422-3A	103.5 mmf. Lucite Capacitors	
C12	K-82422-5A	110.0 mmf. Lucite Capacitors	
C21, C27, C33 C32, C42	H-36340	120 mmf. (low loss)	.30
C30, C31	H-38230	180 mmf. (low loss)	.30
C2, C20	H-38193	330 mmf.	.30
C24, C52	H-38195	470 mmf.	.30
C44	H-31728	500 mmf.	.30
C17	H-38199	560 mmf.	.30
C11	H-38194	580 mmf.	.30

CONTINENTAL RADIO & TELEVISION CORP.
MODEL 7M



CONDENSERS Nº	MMF	RESISTORS Nº	OHMS	WATTS
C1 -	.0001	R1 -	25.	P-1746 METAL CLAD RESISTOR
C2 -	.00025	R2 -	50.	
C3 -	.000454	R3 -	200.	
C4 -	.001	R4 -	15,000.	1
C5 -	.001435	R5 -	10,000.	1/4
C6 -	.002	R6 -	35,000.	1
C7 -	.004 ± 5%	R7 -	50,000.	1/4
C8 -	.005	R8 -	200,000.	1/4
C9 -	.01	R9 -	1.0 MEG.	1/4
C10 -	.05	R10 -	2.0 MEG.	1/4
C11 -	.1	R11 -	0.5 MEG.	1/4
C12 -	.25	R12 -	0.5 MEG. VOL. CONTROL	
C13 -	10.0	R13 -	1 0 MEG. TONE CONTROL	

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1730, 1800, 4000, 5600, 6000, 16,000 and 18,100 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

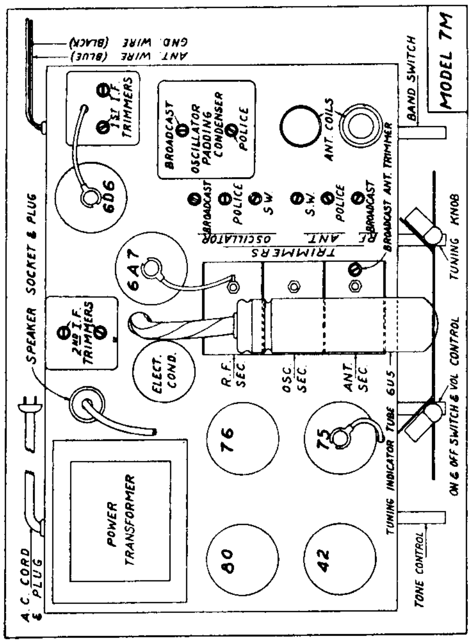
CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT With the wave switch in the Broadcast Band and the gang condenser set at minimum. Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "preselector" and "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the preselector of the R.F. section. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 K.C.

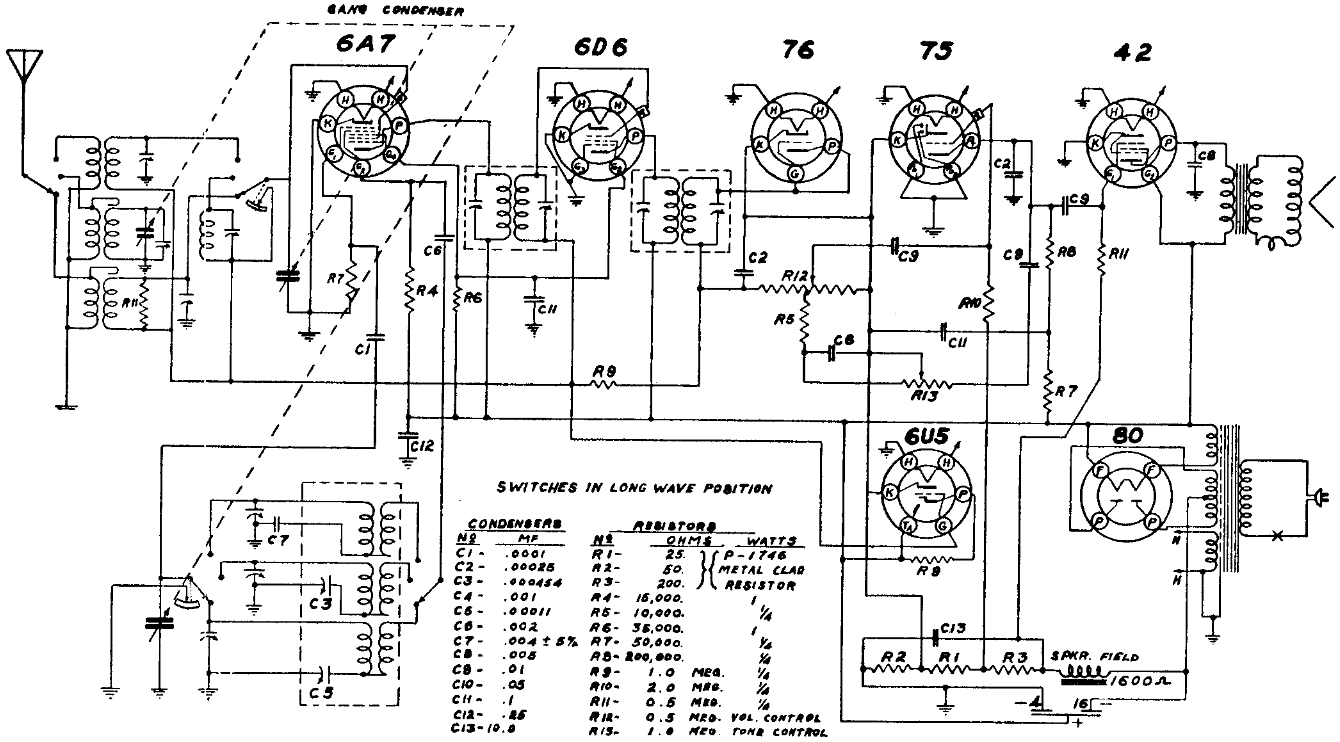
POLICE BAND ALIGNMENT The police band is adjusted by first replacing the .0002 dummy with a 400 ohm resistor and setting the generator to 5600 K.C. With the gang set at minimum, adjust the "police oscillator trimmer" to receive this signal, then set the signal generator to 4000 KC and adjust "police antenna trimmer" to give maximum output. Next, set the oscillator to 1800 KC and "pad" the circuit at this frequency as described in the instructions for padding the broadcast circuits.

SHORT WAVE BAND ALIGNMENT The short wave band is adusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.



This receiver is designed to operate over three tuning ranges; the broadcast range which extends from 550 to 1700 Kilocycles (KC) (176 to 545 meters), Police and Aviation Band which extends from 1700 to 5400 Kilocycles (KC) (56 to 176 Meters) and the International Short Wave Band which extends from 5600 to 18,100 Kilocycles (KC) 16.5 to 53 Meters). This latter range is the one which includes the four internationally assigned bands —the 19, 25, 31 and 49 meter bands.

CONTINENTAL RADIO & TELEVISION CORP.
MODEL 7MU



CONDENSERS No.	MF	RESISTORS No.	OHMS	WATTS
C1 -	.0001	R1 -	25.	P-1746 METAL CLAD RESISTOR
C2 -	.00025	R2 -	50.	
C3 -	.000454	R3 -	200.	
C4 -	.001	R4 -	15,000.	1
C5 -	.00011	R5 -	10,000.	1/4
C6 -	.002	R6 -	35,000.	1
C7 -	.004 ± 5%	R7 -	50,000.	1/4
C8 -	.005	R8 -	200,000.	1/4
C9 -	.01	R9 -	1.0 MEG.	1/4
C10 -	.05	R10 -	2.0 MEG.	1/4
C11 -	.1	R11 -	0.5 MEG.	1/4
C12 -	.25	R12 -	0.5 MEG.	VOL. CONTROL
C13 -	10.0	R15 -	1.0 MEG.	TONE CONTROL

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 160, 325, 380, 456, 600, 1400, 1730, 6000, 16,000 and 18,100 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

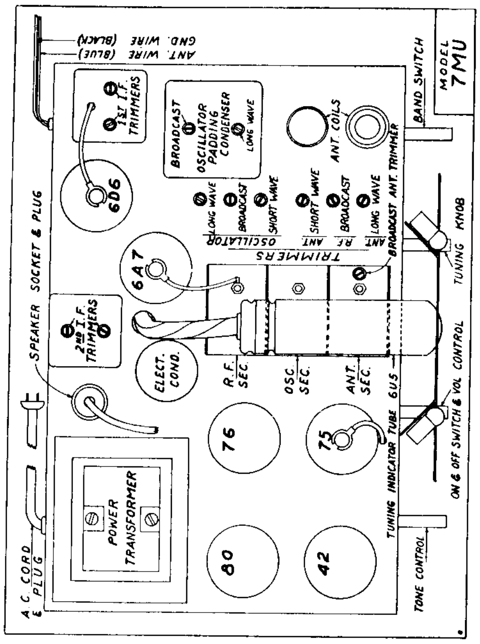
CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT With the wave switch in the Broadcast Band and the gang condenser set at minimum. Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "preselector" and "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the preselector of the R.F. section. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 K.C.

SHORT WAVE BAND ALIGNMENT The short wave band is adjusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

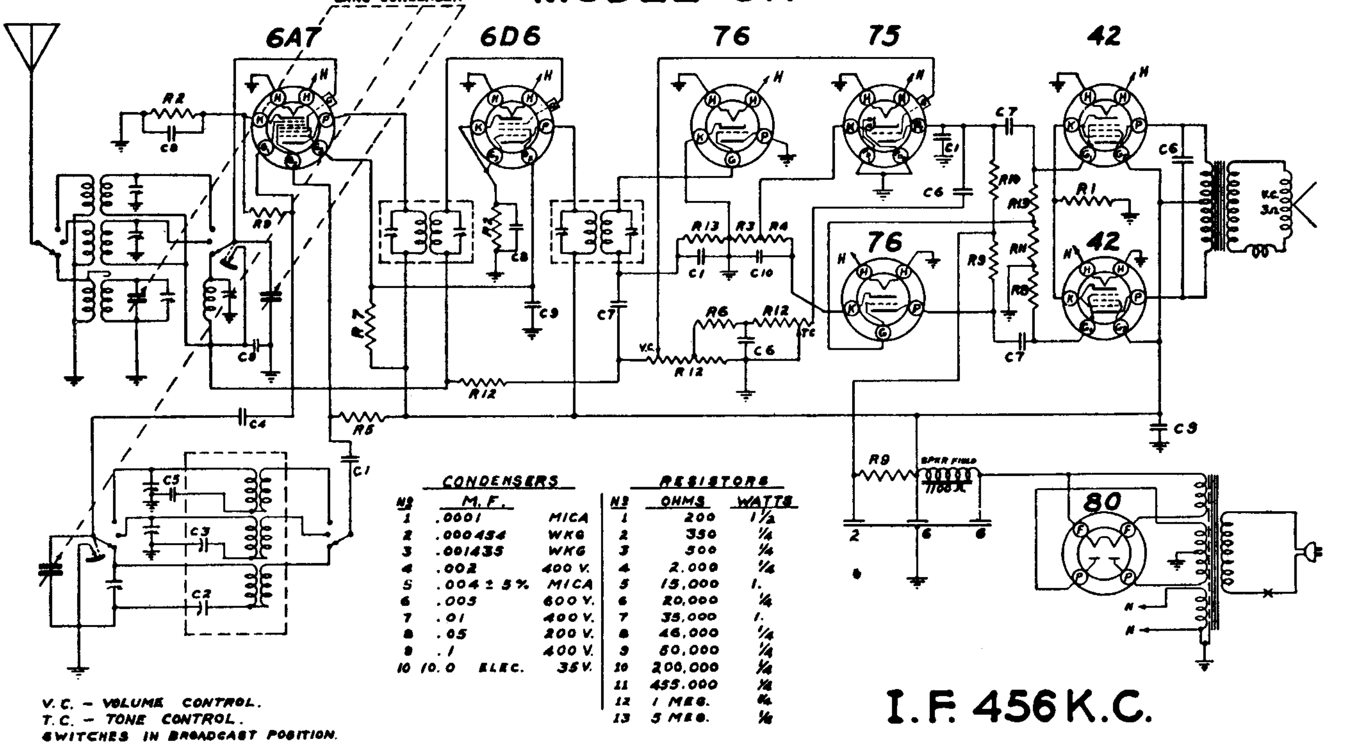
LONG WAVE BAND ALIGNMENT The long wave band is adjusted by connecting the output of the signal generator through a .0002 Mfd. mica condenser to the blue antenna lead. Then set the gang to minimum and the generator to 380 KC and adjust the long wave oscillator trimmer to receive this signal. Then set the generator to 325 KC and adjust the long wave antenna trimmer to give maximum output. Next set generator to 160 KC and pad the circuits to maximum output. Owing to the nature of the long wave band, the trimmer and padding condensers react upon each other to quite a degree; consequently, several re-adjustments at the trimming and padding positions are required before the circuits are adjusted properly.



This receiver is designed to operate over three tuning ranges; the broadcast range which extends from 550 to 1700 Kilocycles (KC) (173 to 562 meters), Longwave Band which extends from 375 to 150 Kilocycles (KC) (800 to 2000 Meters) and the International Short Wave Band which extends from 5600 to 18,100 Kilocycles (KC) (16.5 to 53 Meters). This latter range is the one which includes the four internationally assigned bands — the 19, 25, 31 and 49 meter bands.

CONTINENTAL RADIO & TELEVISION CORP.

MODEL 8K



CONDENSERS

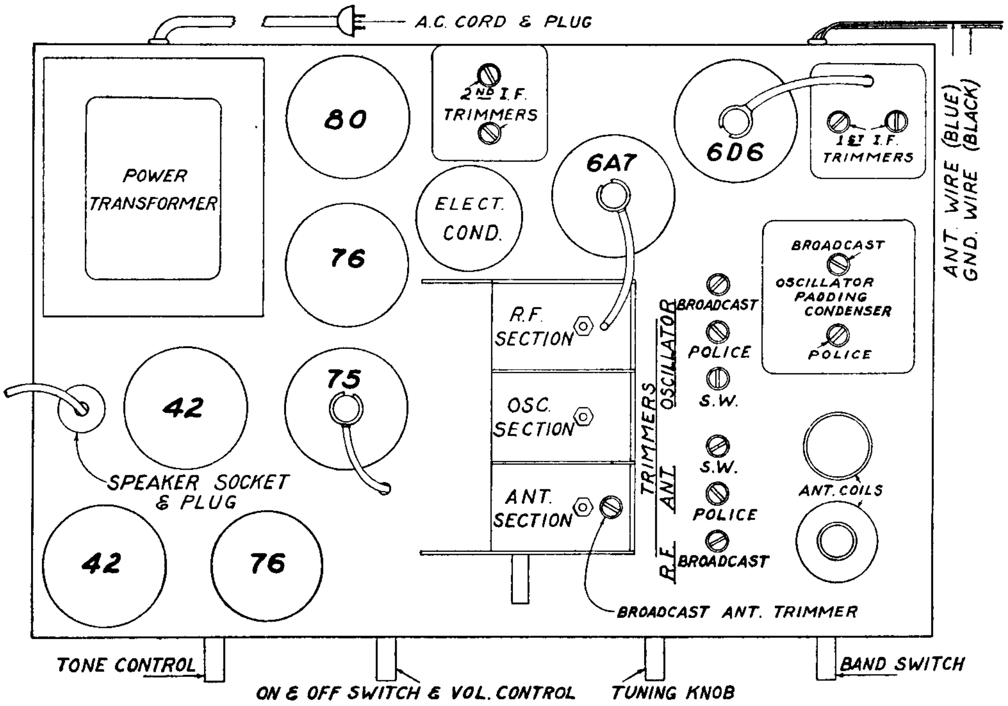
No.	M.F.	
1	.0001	MICA
2	.000454	WKG
3	.001435	WKG
4	.002	400 V.
5	.004 ± 5%	MICA
6	.005	600 V.
7	.01	400 V.
8	.05	200 V.
9	.1	400 V.
10	10.0 ELEC.	35 V.

RESISTORS

No.	OHMS	WATTS
1	200	1½
2	350	¼
3	500	¼
4	2,000	¼
5	15,000	1.
6	20,000	¼
7	35,000	1.
8	46,000	¼
9	60,000	¼
10	200,000	¼
11	455,000	¼
12	1 MEG.	¼
13	5 MEG.	¼

V.C. - VOLUME CONTROL.
T.C. - TONE CONTROL.
SWITCHES IN BROADCAST POSITION.

I.F. 456 K.C.



REPLACEMENT PARTS LIST

P929	AC Cord and Plug
P1160	Six Gang Trimmer
P1455	Tube Shield
P1456	Tube Shield Base
P1504	Pilot Light Bulbs
P1605	Knob—Volume
P1606	Knob—Selector
P1607	Knob—Band Switch
P1608	Knob—Tone
P1682	Trimmer Condenser
P1751	Broadcast Antenna Coil
P1847	Pilot Light Socket
P1818	Candohm Resistor
P1819	Gang Condenser
P1820	1st I.F. Transformer
P1821	Volume Control and Switch
P1822	Tone Control
P1823	Band Switch
P1824	Power Transformer
P1825	Electrolytic Condenser
P1826	2nd IF. Transformer Coil
P1368	Speaker Socket
P492	Socket Type 80
P506	Socket Type 6A7
P521	Socket Type 75
P537	Socket Type 76
P535	Socket Type 42
P536	Socket Type 6D6
P137	500,000 Ohm ¼ Watt Resistor
P162	1 Megohm ¼ Watt Resistor
P258	15,000 Ohm ¼ Watt Resistor
P1218	2,000 Ohm ¼ Watt Resistor
P417	50,000 Ohm ¼ Watt Resistor
P810	350 Ohm ¼ Watt Resistor
P279	500 Ohm ¼ Watt Resistor
P1169	15,000 Ohm 1 Watt Resistor
P1843	455,000 Ohm ¼ Watt Resistor
P1842	46,000 Ohm ¼ Watt Resistor
P1215	35,000 Ohm ¼ Watt Resistor
P1217	60,000 Ohm ¼ Watt Resistor
P1220	20,000 Ohm ¼ Watt Resistor
P141	.1 Mfd. 200 Volt Condenser
P164	.01 Mfd. 400 Volt Condenser
P276	.1 Mfd. 400 Volt Condenser
P334	.05 Mfd. 400 Volt Condenser
P1193	.002 Mfd. 400 Volt Condenser
P1194	.005 Mfd. 400 Volt Condenser
P1783	10 Mfd. 35 Volt Condenser
P1789	.25 Mfd. 400 Volt Condenser
P480	.0001 Mfd. Mica Condenser
P1683	.004 Mfd. Mica Condenser
G5309	Oscillator Coil Assembly
G5310	Police and Short Wave Antenna Coil Assembly
P1808	Dial Scale
P1809	Dial Glass
P1810	Dial Pointer
P1811	Push Button and Shaft
P1812	Shaft Spring
P1813	Movable Station Adjusting Plate
P1814	Stationary Station Adjusting Plate
P1815	Rubberized Belt

CONTINENTAL RADIO & TELEVISION CORP.

MODEL 8K

BEFORE OPERATING THE RECEIVER ALL INSTRUCTIONS SHOULD BE CAREFULLY READ.

This receiver is designed to operate over three tuning ranges with a pointer swing o 340°; the broadcast range which extends from 535 to 1730 Kilocycles (KC) (173 to 560 meters) Police and Aviation Band which extends from 1.7 to 5.6 Megacycles (MC) (53 to 176 Meters and the International Short Wave Band which extends from 5.6 to 18.1 Megacycles (MC) (16.5 to 53 Meters). This latter range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

DIAL CALIBRATION

STANDARD BROADCAST BAND (Outer Scale) **(173 to 560 Meters)**—The outer scale is calibrated from 550 to 1700 (Standard Broadcast). This band covers all Standard Broadcast frequencies of the United States, Canada, Mexico, Cuba and many Central and South American Countries; also the popular 1712 kilocycle (KC) Police Band.

POLICE BAND (Middle Scale) **(53 to 176 Meters)**—The scale is graduated from 5.6 to 1.7, which reads directly in megacycles. This scale covers reception of Short Wave Police Bands, Airplanes, Amateurs, and Ships at Sea.

FOREIGN AND AMERICAN SHORT WAVE BAND (Inner Scale) **(16.5 to 53 Meters)**—The entire inner scale is devoted to this band which covers the most popular Foreign and American Short Wave Broadcasts. This scale is numerically graduated from 5.6 to 18.1 megacycles. Mentally adding three "0s" converts megacycles to kilocycles (KC); i.e., 5.6 megacycles equals 5,600 kilocycles (KC) and 18.1 megacycles is equivalent to 18,100 kilocycles (KC).

49 METER BAND The popular 49 meter band is the area adjacent to the 6 megacycle calibration and offers the most consistent reception from Italy, Germany, Africa and Java. This area also affords the most popular reception of North and South American Short Wave Broadcasts and many other Foreign Countries. (Best evening reception all year round.)

31 METER BAND The 31 meter band is the area extending from the 10 megacycles and lists Spain, Italy, Portugal and Australia as the most favorable of the Foreign Countries in this range. (Late afternoon and early evening.)

25 METER BAND The 25 meter band is the area adjacent to the twelve megacycle calibration and associates itself with the listing of Russia, France, England and Höland. (Late afternoon and early evening.) This band is unusually free from static during the summer months when maximum static is prevalent on the Standard Broadcast Band.)

19 METER BAND The 19 meter band is the area extending from 9 to 15 megacycle calibration and lists France, Holland, England and Amateur phones. This band offers the least possibilities for satisfactory reception due to the unreliable character of this particular frequency.

SHORT WAVE TUNING

When tuning short wave stations, the selector knob must be turned more slowly and carefully, due to the sharp selectivity of the receiver in these bands. If you tune rapidly, many stations will be skipped entirely. When a response is heard, work the dial a little from left to right until you hit a point where the station comes in at maximum volume. This critical tuning is necessary if results are to be expected. It may require a little patient experimenting to become accustomed to short wave tuning. The use of a short wave "log" will be of great assistance in picking up short wave stations. Such logs are available from any of the leading radio magazines. They list the location, frequency and operating time schedules of short wave stations all over the world.

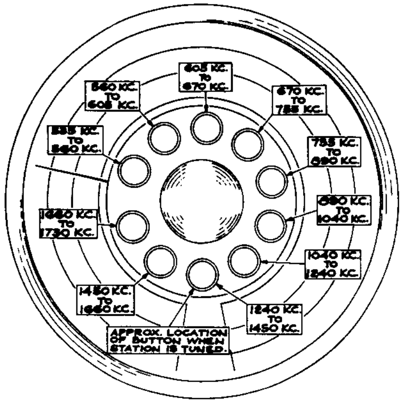


Figure 1

PROCEDURE FOR SETTING TELEPHONE DIAL STATIONS

CHOOSING THE STATIONS TO BE USED

The telephone dial has 10 buttons located in a ring within the dial scale. Make a list of 10 of your favorite stations, stations which are tuned in regularly. Shown in Fig. 1 is the approximate frequency range that each button will cover. **Note:** If 2 stations happen to fall within the range of one button, one station will necessarily have to be tuned in with the selector knob.

PROCEDURE FOR ADJUSTING THE TELEPHONE DIAL BUTTONS

(1) Choose one of the stations out of the list of stations selected and by means of the station selector very carefully tune in this station, noting at the same time the exact pointer location on the dial.

(2) Now select the proper button for the first station chosen by referring to Fig. 1 and noting the button into whose range the station falls. For example, station WGN with a frequency of 720 KC comes under the button whose frequency ranges from 670 to 755 KC. Usually the button nearest the tuning point or the bottom of the dial will be the proper button.

(3) Loosen the button by unscrewing it (not the dial) ½ turn to the left. Now press the button in all the way and rock the dial back and forth a trifle until a

(4) From the station call sheet supplied remove the proper station disc and insert into the push button so that the wording is horizontal when the button is at the bottom, and then insert a clear celluloid insert. Follow this same procedure for the remaining buttons.

(5) If for any reason it is necessary to remove a station call letter disc, the use of a pen knife or any sharp pointed instrument will facilitate the removal

click is heard. Do not release the button now but set the pointer to its former location and with the dial in this position, being careful not to move it, proceed to tighten the button by turning it in the opposite direction (to the right). Make sure the button is very securely tightened as it may get out of adjustment.

HOW TO TUNE IN STATIONS ON THE TELEPHONE DIAL

Press in the button of the station desired tuned and rotate the dial slowly until a click is heard and the dial will not turn in either direction until the button is released. The station is now tuned in and can be adjusted to the volume desired by means of the volume control. The proper direction of rotation of the dial can be determined by turning the dial in the direction which will not allow the wide space adjacent to the pointer to converge into the space at the bottom of the dial. See Fig. (1).

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1730, 1800, 4000, 5600, 6000, 16,000 and 18,100 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT With the wave switch in the Broadcast Band and the gang condenser set at minimum. Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "preselector" and "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the preselector of the R.F. section. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

POLICE BAND ALIGNMENT The police band is adjusted by first replacing the .0002 dummy with a 400 ohm resistor and setting the generator to 5600 KC. With the gang set at minimum, adjust the "police oscillator trimmer" to receive this signal, then set the signal generator to 4000 KC and adjust "police antenna trimmer" to give maximum output. Next, set the oscillator to 1800 KC and "pad" the circuit of this frequency as described in the instructions for padding the broadcast circuits.

SHORT WAVE BAND ALIGNMENT The short wave band is adjusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

THE CROSLEY RADIO CORPORATION

MODELS 1126 & 1199

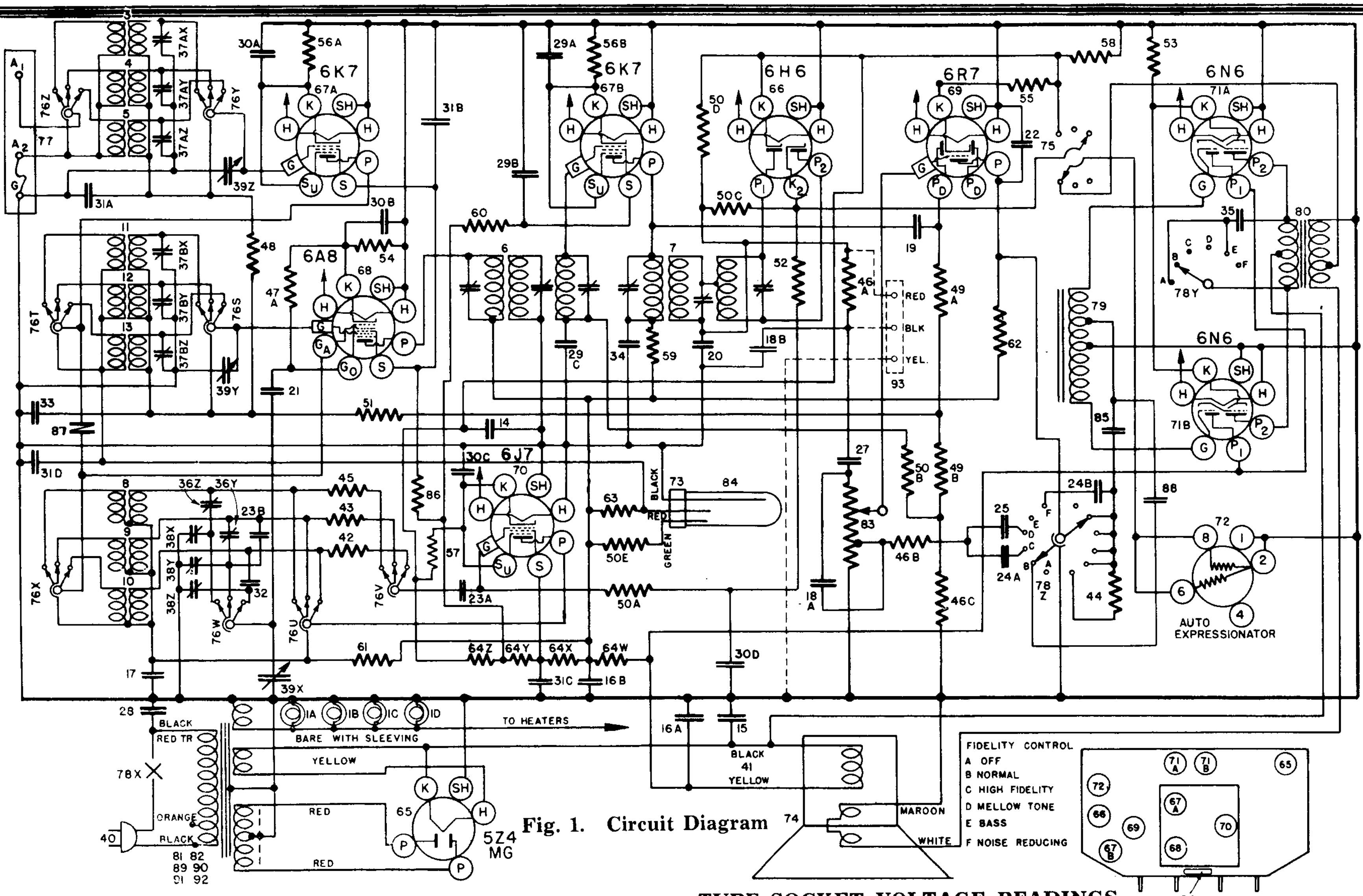


Fig. 1. Circuit Diagram

I. F. 450 K.C.

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt, 500 volt D.C. meter (except filaments) with the receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A.C. voltmeter. Readings may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P1	P2	S	Su	K	Ga	Go
6K7	R-F Amplifier	6.3	80	—	105	3.5	3.5	—	—
6A8	Oscillator-Modulator	6.3	235	—	105	—	3	150	-4 to -12
6J7	AFC Control	6.3	150	—	137	10.7	10.7	—	—
6K7	I-F Amplifier	6.3	228	—	104	3.4	3.4	—	—
6H6	AFC Diode	6.3	—	—	—	—	4.2	—	—
6R7	A-F Amplifier	6.3	150	—	—	—	6.0	—	—
6N6	(2) Output	6.3	235	345	—	—	5.2	—	—
5Z4	Rectifier	5.0	—	—	—	—	345	—	—
W42419A	Neon Tuning Tube	—	155	80	—	—	—	—	—

W41187 Auto-Expressionator Tube — Varies with power output.

Voltage drop across speaker field 110 volts. Power consumption approximately 123 watts.

Power output approximately 15 watts. All readings taken on 117.5 volt power supply.

THE CROSLEY RADIO CORPORATION

MODELS 1126 & 1199

SPECIFICATIONS

The Crosley Model 1126 radio is an eleven-tube receiver featuring High Fidelity, Volume Expansion which is accomplished by the Auto-Expressionator tube and Automatic Frequency Control which is known as the Mystic Hand.

The tubes used are 6K7 R-F Amplifier, 6A8 Oscillator-Modulator, 6J7 AFC Control, 6K7 I-F Amplifier, 6H6 Detector and AFC Diode, 6R7 AVC Diode and A-F Amplifier, two 6N6 Output, 5Z4 Rectifier, W41187 Auto Expressionator and W42419A Neon Tuning Tube.

The tuning range of this receiver is divided into three bands as follows:

BLUE	540-1725 Kc. or 555-173 Meters	(American Broadcast Band
RED	1.8- 5.5 Megacycles or 170-55 Meters	(Police and Amateurs)
GREEN	5.6- 18.1 Megacycles or 54-16.5 Meters	(High Frequency Band)

AUTO-EXPRESIONATOR

The Auto-Expressionator tube, item No. 72, Fig. 1, is connected across the voice coil of the speaker. When it is operating its resistence varies so as to increase the volume of loud tones, thus giving a wider volume range to reproduced music, which tends to compensate for the electrical limitations of broadcasting equipment.

PHANTOM CONTROL

The Phantom Control permits the listener to use the Mystic Hand (Automatic Frequency Control) and the Auto-Expressionator as desired. The various positions of the control are shown on an illuminated indicator on the dial.

The receiver may be operated with normal power output and fidelity, such as would ordinarily be desired in the average home, with the control in the NORMAL position.

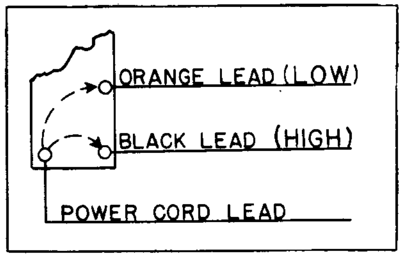
The Mystic Hand automatically tunes the receiver accurately to the strongest signal within a frequency range of approximately 10 kilocycles of the station selector setting.

50 CYCLE POWER TRANSFORMER ADJUSTMENT

Receivers equipped with a 50 cycle power transformer have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

The accompanying illustration shows the connections for changing from high to low or low to high line voltage.



Note the "jumper" wire which is attached to the terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

ALIGNMENT PROCEDURE

This model receiver should be turned on and allowed to "warm-up" for about 15 minutes before aligning its circuits.

It is a High Fidelity receiver and in order to secure maximum performance the alignment should be done with precision instruments. The alignment condensers should not be readjusted just to determine if they are properly tuned. Fig. 5, shows the selectivity curve of a receiver whose I-F amplifier was slightly mistuned while Fig. 6, shows a curve made from actual measurements of a receiver employing a triple-tuned I-F amplifier which was properly aligned with the use of a FREQUENCY MODULATED R-F signal generator and an oscilloscope.

The alignment of the AFC circuit may be checked by means of a modulated signal generator and output meter as follows:

(a) Connect one terminal of the output meter to P2 of one of the 6N6 Output tubes and the other terminal through a .1 mf., or larger, condenser—not electrolytic—to P2 of the other 6N6 Output tube.

(b) Connect the output of the signal generator through a .00025 mf. condenser to the top cap of the 6A8 Oscillator-Modulator tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver chassis.

(c) Rotate the Phantom Control to the left-hand position (NORMAL).

(d) Adjust the frequency of the signal generator in the region of 450 kilocycles for maximum reading on the output meter.

(e) Without altering the connections or adjustments of the signal generator or output meter connect an antenna to the antenna terminal "A1" and tune-in a local broadcasting station. Turn off modulation of signal generator. Adjust station selector slightly for zero beat.

(f) Rotate the Phantom Control to the Mystic Hand position and listen to the beat note. If the note is less than 200 cycles, or the equivalent of some tone below middle C on the piano, the AFC alignment is satisfactory.

(g) If the beat note is higher than middle C realignment is necessary.

(h) In cases where the beat note is not more than about two octaves above middle C or from 1000 to 1500 cycles the AFC circuit may be aligned for zero beat by making a slight adjustment of the top trimmer condenser on the 2nd I-F transformer. This circuit is very critical and a slight adjustment will produce a great change in the beat note.

(i) Where the AFC is considerably out of alignment as evidenced by a beat note of higher than 1500 cycles the standard alignment procedure outlined below should be followed.

TUNING I-F AMPLIFIER

I. Conventional Method.

(a) Connect the output meter as outlined above in (a).

(b) Check the 6J7 cathode bias which should be approximately 6.5 volts with no signal applied.

(c) Connect the output of the signal generator through a .02 mf. condenser to the top cap of the 6K7 I-F amplifier tube, leaving the tube's grid clip in place. Connect the ground lead of the signal generator to the "GND" terminal of the receiver chassis.

(d) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. The exact setting should be at a position where no broadcast signal will be received. Turn the volume control all the way to the right (clockwise), turn the fidelity control to HIGH FIDELITY and the Phantom Control to NORMAL.

(e) Set the signal generator to 450 kilocycles.

(f) Adjust the middle trimmer and then the bottom trimmer of the 2nd I-F transformer for maximum reading on the output meter. Caution: do not attempt to adjust the top trimmer at this time. ALWAYS USE THE LOWEST GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

(g) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 oscillator-modulator tube, leaving the tube's grid clip in place.

(h) Open the middle trimmer of the 1st I-F transformer three or four turns of the adjustment screw. (Care should be taken that the adjustment screw does not become dislodged from the nut).

(i) Adjust the top trimmer and then the bottom trimmer of the 1st I-F transformer for maximum reading on the output meter.

(j) Adjust the middle trimmer of the 1st I-F transformer by closing until maximum reading is obtained on the output meter.

(k) Transfer the output lead of the signal generator from the 6A8 tube to the antenna terminal "A1" of the receiver and recheck the adjustment of the bottom trimmer of the 1st -IF transformer.

(l) To adjust the AFC system it will be necessary to transfer the output lead of the signal generator back to the top cap of the 6K7 I-F amplifier tube. The .02 mf. condenser should still be connected in series with this lead.

(m) Insert a 0-5 milliammeter in series with the cathode circuit of the 6J7 tube and with a strong 450 kilocycle signal from the signal generator, the reading of the cathode current should be recorded.

(n) Turn the Phantom Control to the MYSTIC HAND position and without changing the output of the signal generator, adjust the top trimmer condenser of the 2nd I-F transformer so that the reading of the 0-5 milliammeter is the same as was recorded with the Phantom Control in the NORMAL position. This value of current will be obtained with the trimmer closed, with the trimmer open and at some intermediate position. A very slight adjustment while in the intermediate position will cause the meter to read from 0 to 1.5 milliamperes. This is the setting that should be used. An insulated screw driver should be used in adjusting the AFC trimmer condenser.

(o) As a final check on the AFC adjustment, disconnect the test equipment and tune-in a fairly weak broadcast station in the region of 1500 kilocycles. Turn the AFC "ON" and "OFF." If reception is the same in both positions and will automaticaly tune-in strong stations within approximately plus or minus 10 kilocycles of the station selector setting with AFC "ON," the AFC is properly aligned. If distortion is noted and the receiver will not automatically tune-in stations as described, the AFC alignment should be rechecked.

II. Oscilloscope Method.

(a) Connect the output of a FREQUENCY MODULATED R-F signal generator through a .02 mf. condenser to the top cap of the 6K7 I-F amplifier tube, leaving the tube's grid clip in place. KEEP THE GENERATOR LEAD AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Connect the vertical plates of the cathode ray oscilloscope to the receiver as follows: The "High" side should be connected to the plate of the 6R7 tube and the "low" side should be connected to the receiver chassis. (Be sure the oscilloscope is protected from D.C. by connecting a condenser, .1 mf. to .05 mf., in series with the lead of the 6R7 tube).

(c) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. The exact setting should be at a position where no broadcast signal will be received. Turn the volume control to the right (clockwise), turn the fidelity control to HIGH FIDELITY and the Phantom Control to NORMAL.

(d) Set the signal generator to 450 kilocycles. See instructions supplied with signal generator and oscilloscope.

(e) Adjust the middle trimmer of the 2nd I-F transformer so that the nose of the selectivity curve is centered on the resonance axis (R) of the transparent scale supplied with the oscilloscope.

(f) Adjust the bottom trimmer of the 2nd I-F transformer for maximum amplitude of the selectivity curve on resonance axis (R).

(g) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 oscillator-modulator tube, leaving the tube's grid clip in place.

(h) Open the middle trimmer of the 1st I-F transformer three or four turns of the adjustment screw. (Care should be taken that the adjustment screw does not become dislodged from the nut).

(i) Increase the output of the signal generator and adjust the top trimmer of the 1st I-F transformer for maximum symmetry and amplitude.

(j) Adjust the bottom trimmer of the 1st I-F transformer for maximum amplitude.

(k) Reduce the output of the signal generator and adjust the middle trimmer of the 1st I-F transformer for maximum symmetry and amplitude.

(l) Carefully repeat operations (f) and (k) for more accurate adjustments.

Aligning R-F Amplifier.

The R-F amplifier can best be aligned in the conventional manner, using a modulated signal generator and output meter.

When aligning the R-F amplifier the output lead of the signal generator is connected to the antenna terminal "A1" of the receiver. For the BLUE and RED bands a .00025 mf. condenser must be connected in series with the output lead of the signal generator and for the high frequency band a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be shunt aligned and then series aligned, where provision is made for series alignment (BLUE and RED bands). The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated in "C" below for each adjustment.

(a) Adjust the "OSC", "R-F" and "ANT" shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check in the order given. DO NOT READJUST THE "OSC" TRIMMER.

NOTE: When shunt aligning the RED and GREEN bands care must be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times or more and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct position.

(b) To align the series trimmers, 39Z and 39Y—Fig. 2, set the signal generator to the frequency indicated below and then tune-in this signal with the station selector for maximum output. At the time that any series trimmer is being adjusted rotate the station selector back and forth slightly until no further improvement in output is obtained.

(c) SIGNAL INPUT FREQUENCIES

	Shunt Alignment	Series Alignment
American Broadcast Band (BLUE)	1,400 Kilocycles	600 Kilocycles
Police and Amateur Band (RED)	5,000 Kilocycles	2000 Kilocycles
High Frequency Band (GREEN)	18,000 Kilocycles	———

THE CROSLEY RADIO CORPORATION

MODELS 1126 & 1199

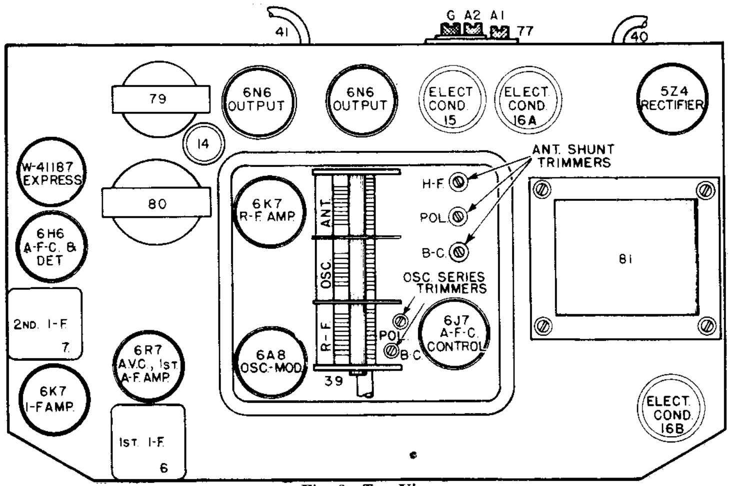


Fig. 2 Top View

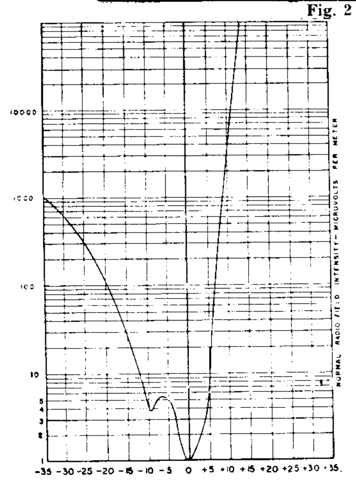


Fig. 5

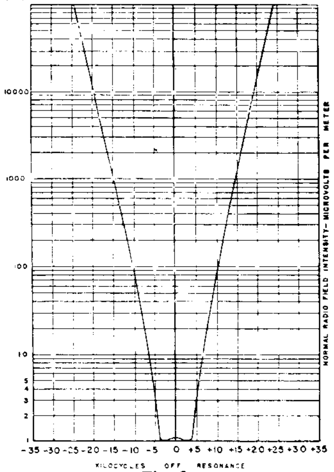
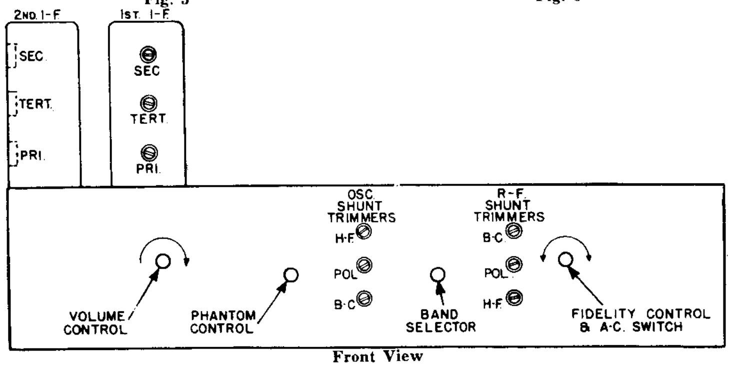
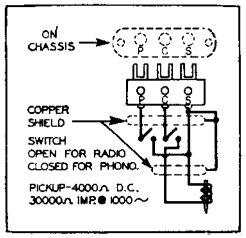


Fig. 6



Front View



Phonograpn Pickup

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1ABCD	W —37922	Dial Light Bulb, 6.3V.
	G3 —37965	Socket, Dial Light
	W —40570	Shield, Dial Light
2	W —41187	Expressionator Tube
3	G94 —32000	Antenna Coil—B. C. B.
4	G108—32000	Antenna Coil—Pol. B.
5	G107—32000	Antenna Coil—H. F. B.
6	G90 —32004	1st I-F Assembly
7	G126—32004	2nd I-F Assembly
8	G97 —32002	Osc. Coil —B. C. B.
9	G96 —32002	Osc. Coil —Pol. B.
10	G95 —32002	Osc. Coil —H. F. B.
11	G68 —32001	R-F Coil—B. C. B.
12	G75 —32001	R-F Coil—Pol. B.
13	G71 —32001	R-F Coil—H. F. B.
14	W —41598	Condenser, 50 Mf. 25V. (Elect.)
15	W —36055	Condenser, 35 Mf. 400V. (Elect.)
16A	W —42386	Condenser, 20 Mf. 300V. (Elect.)
16B	W —42386	Condenser, 20 Mf. 300V. (Elect.)
17	G18 —34000	Condenser,5600 Mmf. H-F Osc.Series
18A	G5 —34002	Condenser, .00005 Mf. Mica 200V.
18B	G5 —34002	Condenser, .00005 Mf. Mica 200V.
19	G10 —34002	Condenser, .00005 Mf. Mica 300V.
20	G2 —34002	Condenser, .0001 Mf. Mica 200V.
21	G6 —34002	Condenser, .000025 Mf. Mica 200V.
22	G1 —34005	Condenser, .00025 Mf. Mica 300V.
23A	G3 —34002	Condenser, .0005 Mf. Mica 200V.
23B	G3 —34002	Condenser, .0005 Mf. Mica 200V.
24A	W —35758	Condenser, .008 Mf. 400V.
24B	W —35758	Condenser, .008 Mf. 400V.
25	W —41461	Condenser, .0014 Mf. 200V.
26		None
27	W —28621	Condenser, .02 Mf. 200V.
28	W —30805	Condenser, .01 Mf. 400V.
29A	W —27216	Condenser, .05 Mf. 200V.
29B	W —27216	Condenser, .05 Mf. 200V.
29C	W —27216	Condenser, .05 Mf. 200V.
30A	W —36541	Condenser, .02 Mf. 160V.
to		
30D	W —36541	Condenser, .02 Mf. 160V.
31A	W —35936	Condenser, .05 Mf. 200V.
to		
31D	W —35936	Condenser, .05 Mf. 200V.
32	W —41209	Condenser, .048 Mf. 200V.
33	W —32380	Condenser, .05 Mf. 200V.
34	W —32780B	Condenser, .05 Mf. 400V.
35	W —22688	Condenser, .1 Mf. 400V.
36	W —41218	Trimmer Cond. B.C. & Pol. Osc.Ser.
37A	W —37891	Trimmer Cond. 3 Sect. Shunt
37B	W —37891	Trimmer Cond. 3 Sect. Shunt
38	W —35951	Trimmer Cond. 3 Sect. Shunt
39	G47 —33002	Cond. Gang—3 Sect. Var. Tuning
	MG12 —42411	Dial Drive Assembly
	C —42421	Dial Glass (Calibrated)
	—42598A	Dial Mask (Paper Backing)
	—42325B	Dial Drive Unit (only)
	W —41144	Dial Hand—Long
	W —42180	Dial Hand—Short
	W —40486	Screw—Hand Mtg.
	E —13647	Mystic Hand, etc., Flipper (L. H.)
	E —13648	Fidelity, etc., Flipper (R. H.)
	W —42308	Flipper Pulley (2)
	W —37909A	Band Indi. Pulley
	—43081	L. H. Flipper Control Cable
	—43080	R. H. Flipper Control Cable
	—40638	Band Indicator Control Cable
	—41157	Drive Belt
	—40537	Drive Flexible Coupling
40	B —33906A	Power Cord & Plug
41	G2 —37918	Speaker, Cable
42	—36760	Resistor, 20,000 Ohm. ¼W.
43	—33390	Resistor, 30,000 Ohm. ¼W.
44	—21453	Resistor, 40,000 Ohm. ¼W.

Item No.	Part No.	Description
45	—34019	Resistor, 75,000 Ohm. ¼W.
46ABC	—35600	Resistor, 100,000 Ohm. ¼W.
47A	—35930	Resistor, 200,000 Ohm. ¼W.
48	—35601	Resistor, 300,000 Ohm. ¼W.
49AB	—36321	Resistor, 400,000 Ohm. ¼W.
50A	—36322	Resistor, 500,000 Ohm. ¼W.
to		
50E	—36322	Resistor, 500,000 Ohm. ¼W.
51	—21454	Resistor, 1 Megohm. ¼W.
52	—36688	Resistor, 3 Megohm. ¼W.
53	W —32961	Resistor, 100 Ohm. 3W. Flex.
54	W —25937	Resistor, 275 Ohm. ½W. Flex.
55	W —34900	Resistor, 68 Ohm. ¾W. Flex.
56AB	W —28589	Resistor, 350 Ohm. ½W. Flex.
57	—24814	Resistor, 7,000 Ohm. ¼W. Carbon
58	W —42518	Resistor, 150 Ohm. ½W. Flex.
59	W —21452	Resistor, 1,100 Ohm. ¾W. Flex.
60	W —27503	Resistor, 1,400 Ohm. ¾W. Flex.
61	— 4921	Resistor, 10,000 Ohm. 1W. Carbon
62	—36952	Resistor, 30,000 Ohm. 1W. Carbon
63	W —42516	Resistor, 20,000 Ohm. 1W. W. W.
64Z	W —41966	4,000 Ohm. Candohm
64Y		1,000 Ohm.
64X		3,000 Ohm.
64W		200 Ohm.
65	G154—36400	Socket Type 5Z4
66	G155—36400	Socket Type 6H6
67AB	G151—36400	Socket Type 6K7
68	G156—36400	Socket Type 6A8
69	G164—36400	Socket Type 6R7
70	G157—36400	Socket Type 6J7
71AB	G165—36400	Socket Type 6N6
72	G167—36400	Socket Type Expressionator
73	G2 —42584	Socket Neon Tube
74	649CJ4 "M"	Speaker Spec. 1-D-668
	—40701	Cone Assy. for above Speaker
	—40699	Field Coil for above Speaker
	34CJ4 "M"	Speaker Spec. 1-D-244
	—40268	Cone Assy. for above Speaker
	—40272	Field Coil for above Speaker
75	W —41029B	Phantom Control Switch
76	C —41235A	Band Sel. Switch
77	G27 —26719	Ant. & Gnd. Terminal Assy.
78	B —42295A	Fidelity & Line Switch
79	G64 —24628	Choke, Audio Input
80	G60 —24628	Output Transformer
81	—42557	Power Trans. 60 Cy. 110V.
	—43088	Power Trans. 50 Cy. 110V.
	—43089	Power Trans. 50 Cy. 220V.
	—43008	Power Trans. 25 Cy. 110V.
	—43170	Power Trans. 25 Cy. 220V.
82		None
83	—41301	Vol. Cont. 3 Meg. Tap 1 Meg.
84	W —42419A	Neon Tube
	W —42589	Tube Cover
	—42592	Cover Gasket
85	W —42554	Condenser .12 Mf. 160V.
86	— 6705	Resistor, 3,500 Ohm. 1W.
87	G101—34403	R-F Neutralizer Assembly
88	W —43091	Condenser .07 Mf. 160V.
	G37 —26719	Phono Terminal Assembly
	C —43134	Escutcheon
	—42043	Escutcheon Rubber Strip
	C —42044	Escutcheon Lens
	D — 30	Mtg. Screws, Escutcheon
	W —37339	Knob, V. C. & Sta. Sel.
	W —40192	Knob, Bd. Sel. & Phantom Cont.
	W —42490	Knob, Fidelity Cont.
	W —36117	Rubber Mtg. Foot
	W —40230B	Emblem
	W —32620	Nut, Emblem Mtg.
	—6-W	Cabinet

THE CROSLEY RADIO CORPORATION

MODELS 1211 & 1216

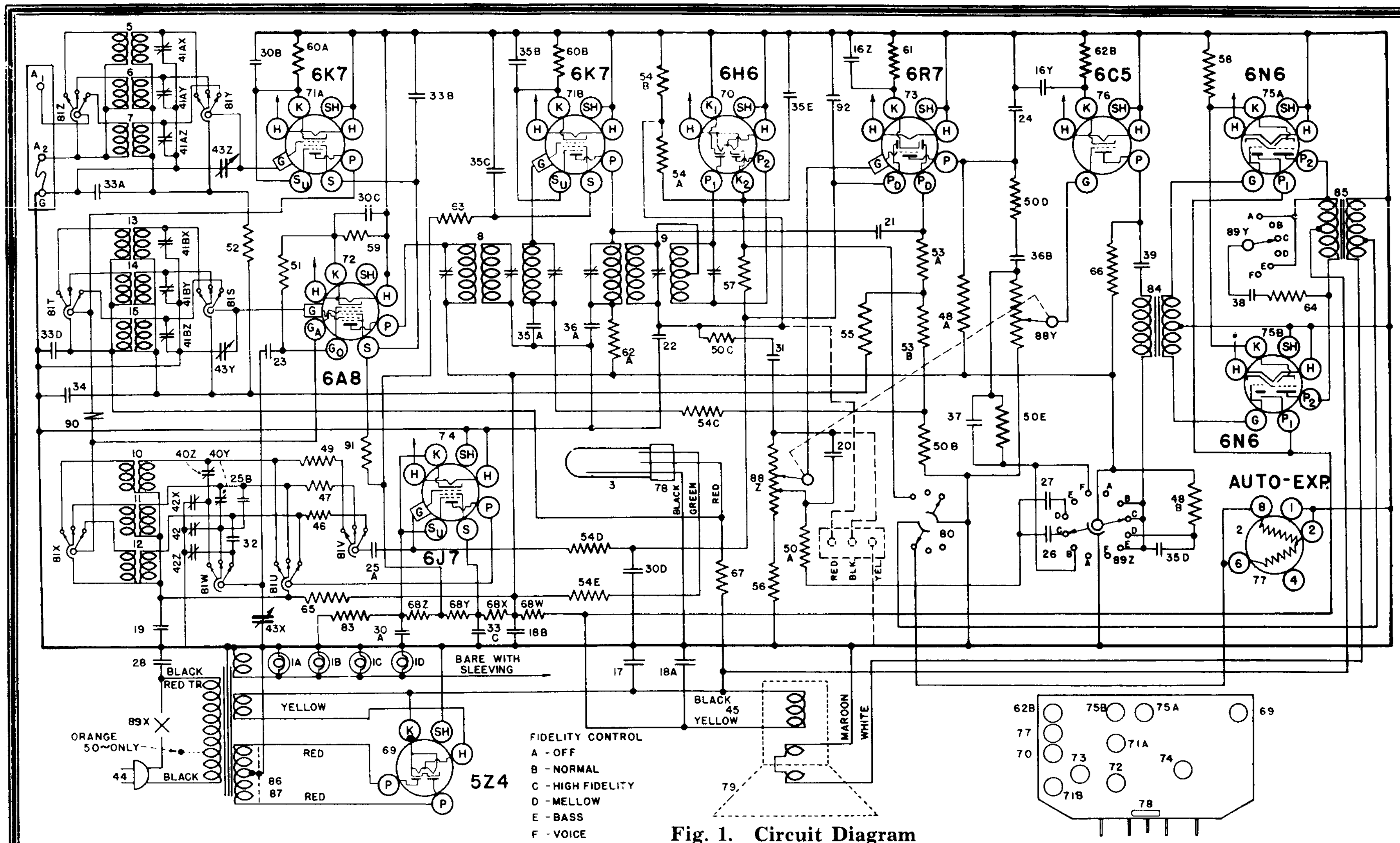


Fig. 1. Circuit Diagram

I. F. 450 K. C.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P_1	P_2	S	Su	K	Ga	Go
6K7	R-F Amplifier	6.3	100	—	110	3.3	3.3	—	—
6A8	Oscillator-Modulator	6.3	250	—	110	—	3.8	175	-4 to -12
6J7	AFC Control	6.3	160	—	140	6.3	6.3	—	—
6K7	I-F Amplifier	6.3	240	—	108	3.0	3.0	—	—
6H6	AFC Detector	6.3	—	—	—	—	—	—	—
6R7	Diode and 1st A-F Amplifier	6.3	75	—	—	—	2.3	—	—
6C5	A-F Driver	6.3	170	—	—	—	5.2	—	—
6N6	(2) Output	6.3	250	370	—	—	6.0	—	—
5Z4	Rectifier	5.0	—	—	—	—	370	—	—
W42419A	Tuning Tube	—	100–170	170	—	—	—	—	—
W41187	Auto-Expressionator Tube	Varies with power output.							

Voltage drop across speaker field 120 volts.
Power output approximately 20 watts.
Power consumption approximately 123 watts.
All readings taken on 117.5 volt power supply.

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt, 500 volt D.C. meter (except filaments) with the receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A.C. voltmeter. Readings may vary plus or minus 10% of values given.

THE CROSLEY RADIO CORPORATION

MODELS 1211 & 1216

SPECIFICATIONS

The Crosley Model 1126 radio is an eleven-tube receiver featuring High Fidelity, Volume Expansion which is accomplished by the Auto-Expressionator tube and Automatic Frequency Control which is known as the Mystic Hand.

The tubes used are 6K7 R-F Amplifier, 6A8 Oscillator-Modulator, 6J7 AFC Control, 6K7 I-F Amplifier, 6H6 Detector and AFC Diode, 6R7 AVC Diode and A-F Amplifier, two 6N6 Output, 5Z4 Rectifier, W41187 Auto Expressionator and W42419A Neon Tuning Tube.

The tuning range of this receiver is divided into three bands as follows:

BLUE	540-1725 Kc. or 555-173 Meters	(American Broadcast Band
RED	1.8- 5.5 Megacycles or 170-55 Meters	(Police and Amateurs)
GREEN	5.6-18.1 Megacycles or 54-16.5 Meters	(High Frequency Band)

AUTO-EXPRESIONATOR

The Auto-Expressionator tube, item No. 72, Fig. 1, is connected across the voice coil of the speaker. When it is operating its resistence varies so as to increase the volume of loud tones, thus giving a wider volume range to reproduced music, which tends to compensate for the electrical limitations of broadcasting equipment.

PHANTOM CONTROL

The Phantom Control permits the listener to use the Mystic Hand (Automatic Frequency Control) and the Auto-Expressionator as desired. The various positions of the control are shown on an illuminated indicator on the dial.

The receiver may be operated with normal power output and fidelity, such as would ordinarily be desired in the average home, with the control in the NORMAL position.

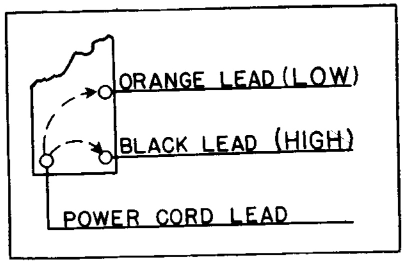
The Mystic Hand automatically tunes the receiver accurately to the strongest signal within a frequency range of approximately 10 kilocycles of the station selector setting.

50 CYCLE POWER TRANSFORMER ADJUSTMENT

Receivers equipped with a 50 cycle power transformer have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

The accompanying illustration shows the connections for changing from high to low or low to high line voltage.



Note the "jumper" wire which is attached to the terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

ALIGNMENT PROCEDURE

This model receiver should be turned on and allowed to "warm-up" for about 15 minutes before aligning its circuits.

It is a High Fidelity receiver and in order to secure maximum performance the alignment should be done with precision instruments. The alignment condensers should not be readjusted just to determine if they are properly tuned. Fig. 5, shows the selectivity curve of a receiver whose I-F amplifier was slightly mistuned while Fig. 6, shows a curve made from actual measurements of a receiver employing a triple-tuned I-F amplifier which was properly aligned with the use of a FREQUENCY MODULATED R-F signal generator and an oscilloscope.

The alignment of the AFC circuit may be checked by means of a modulated signal generator and output meter as follows:

(a) Connect one terminal of the output meter to P2 of one of the 6N6 Output tubes and the other terminal through a .1 mf., or larger, condenser—not electrolytic—to P2 of the other 6N6 Output tube.

(b) Connect the output of the signal generator through a .00025 mf. condenser to the top cap of the 6A8 Oscillator-Modulator tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver chassis.

(c) Rotate the Phantom Control to the left-hand position (NORMAL).

(d) Adjust the frequency of the signal generator in the region of 450 kilocycles for maximum reading on the output meter.

(e) Without altering the connections or adjustments of the signal generator or output meter connect an antenna to the antenna terminal "A1" and tune-in a local broadcasting station. Turn off modulation of signal generator. Adjust station selector slightly for zero beat.

(f) Rotate the Phantom Control to the Mystic Hand position and listen to the beat note. If the note is less than 200 cycles, or the equivalent of some tone below middle C on the piano, the AFC alignment is satisfactory.

(g) If the beat note is higher than middle C realignment is necessary.

(h) In cases where the beat note is not more than about two octaves above middle C or from 1000 to 1500 cycles the AFC circuit may be aligned for zero beat by making a slight adjustment of the top trimmer condenser on the 2nd I-F transformer. This circuit is very critical and a slight adjustment will produce a great change in the beat note.

(i) Where the AFC is considerably out of alignment as evidenced by a beat note of higher than 1500 cycles the standard alignment procedure outlined below should be followed.

TUNING I-F AMPLIFIER

I. Conventional Method.

(a) Connect the output meter as outlined above in (a).

(b) Check the 6J7 cathode bias which should be approximately 6.5 volts with no signal applied.

(c) Connect the output of the signal generator through a .02 mf. condenser to the top cap of the 6K7 I-F amplifier tube, leaving the tube's grid clip in place. Connect the ground lead of the signal generator to the "GND" terminal of the receiver chassis.

(d) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. The exact setting should be at a position where no broadcast signal will be received. Turn the volume control all the way to the right (clockwise), turn the fidelity control to HIGH FIDELITY and the Phantom Control to NORMAL.

(e) Set the signal generator to 450 kilocycles.

(f) Adjust the middle trimmer and then the bottom trimmer of the 2nd I-F transformer for maximum reading on the output meter. Caution: do not attempt to adjust the top trimmer at this time. ALWAYS USE THE LOWEST GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

(g) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 oscillator-modulator tube, leaving the tube's grid clip in place.

(h) Open the middle trimmer of the 1st I-F transformer three or four turns of the adjustment screw. (Care should be taken that the adjustment screw does not become dislodged from the nut).

(i) Adjust the top trimmer and then the bottom trimmer of the 1st I-F transformer for maximum reading on the output meter.

(j) Adjust the middle trimmer of the 1st I-F transformer by closing until maximum reading is obtained on the output meter.

(k) Transfer the output lead of the signal generator from the 6A8 tube to the antenna terminal "A1" of the receiver and recheck the adjustment of the bottom trimmer of the 1st -IF transformer.

(l) To adjust the AFC system it will be necessary to transfer the output lead of the signal generator back to the top cap of the 6K7 I-F amplifier tube. The .02 mf. condenser should still be connected in series with this lead.

(m) Insert a 0-5 milliammeter in series with the cathode circuit of the 6J7 tube and with a strong 450 kilocycle signal from the signal generator, the reading of the cathode current should be recorded.

(n) Turn the Phantom Control to the MYSTIC HAND position and without changing the output of the signal generator, adjust the top trimmer condenser of the 2nd I-F transformer so that the reading of the 0-5 milliammeter is the same as was recorded with the Phantom Control in the NORMAL position. This value of current will be obtained with the trimmer closed, with the trimmer open and at some intermediate position. A very slight adjustment while in the intermediate position will cause the meter to read from 0 to 1.5 milliamperes. This is the setting that should be used. An insulated screw driver should be used in adjusting the AFC trimmer condenser.

(o) As a final check on the AFC adjustment, disconnect the test equipment and tune-in a fairly weak broadcast station in the region of 1500 kilocycles. Turn the AFC "ON" and "OFF." If reception is the same in both positions and will automaticaly tune-in strong stations within approximately plus or minus 10 kilocycles of the station selector setting with AFC "ON," the AFC is properly aligned. If distortion is noted and the receiver will not automatically tune-in stations as described, the AFC alignment should be rechecked.

II. Oscilloscope Method.

(a) Connect the output of a FREQUENCY MODULATED R-F signal generator through a .02 mf. condenser to the top cap of the 6K7 I-F amplifier tube, leaving the tube's grid clip in place. KEEP THE GENERATOR LEAD AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Connect the vertical plates of the cathode ray oscilloscope to the receiver as follows: The "High" side should be connected to the plate of the 6R7 tube and the "low" side should be connected to the receiver chassis. (Be sure the oscilloscope is protected from D.C. by connecting a condenser, .1 mf. to .05 mf., in series with the lead of the 6R7 tube).

(c) Set the band selector switch to the Broadcast Band and rotate the station selector to approximately 60 on the dial. The exact setting should be at a position where no broadcast signal will be received. Turn the volume control to the right (clockwise), turn the fidelity control to HIGH FIDELITY and the Phantom Control to NORMAL.

(d) Set the signal generator to 450 kilocycles. See instructions supplied with signal generator and oscilloscope.

(e) Adjust the middle trimmer of the 2nd I-F transformer so that the nose of the selectivity curve is centered on the resonance axis (R) of the transparent scale supplied with the oscilloscope.

(f) Adjust the bottom trimmer of the 2nd I-F transformer for maximum amplitude of the selectivity curve on resonance axis (R).

(g) Transfer the output lead of the signal generator from the 6K7 tube to the top cap of the 6A8 oscillator-modulator tube, leaving the tube's grid clip in place.

(h) Open the middle trimmer of the 1st I-F transformer three or four turns of the adjustment screw. (Care should be taken that the adjustment screw does not become dislodged from the nut).

(i) Increase the output of the signal generator and adjust the top trimmer of the 1st I-F transformer for maximum symmetry and amplitude.

(j) Adjust the bottom trimmer of the 1st I-F transformer for maximum amplitude.

(k) Reduce the output of the signal generator and adjust the middle trimmer of the 1st I-F transformer for maximum symmetry and amplitude.

(l) Carefully repeat operations (f) and (k) for more accurate adjustments.

Aligning R-F Amplifier.

The R-F amplifier can best be aligned in the conventional manner, using a modulated signal generator and output meter.

When aligning the R-F amplifier the output lead of the signal generator is connected to the antenna terminal "A1" of the receiver. For the BLUE and RED bands a .00025 mf. condenser must be connected in series with the output lead of the signal generator and for the high frequency band a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be shunt aligned and then series aligned, where provision is made for series alignment (BLUE and RED bands). The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated in "C" below for each adjustment.

(a) Adjust the "OSC", "R-F" and "ANT" shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check in the order given. DO NOT READJUST THE "OSC" TRIMMER.

NOTE: When shunt aligning the RED and GREEN bands care must be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times or more and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct position.

(b) To align the series trimmers, 39Z and 39Y—Fig. 2, set the signal generator to the frequency indicated below and then tune-in this signal with the station selector for maximum output. At the time that any series trimmer is being adjusted rotate the station selector back and forth slightly until no further improvement in output is obtained.

(c) SIGNAL INPUT FREQUENCIES

	Shunt Alignment	Series Alignment
American Broadcast Band (BLUE)	1,400 Kilocycles	600 Kilocycles
Police and Amateur Band (RED)	5,000 Kilocycles	2000 Kilocycles
High Frequency Band (GREEN)	18,000 Kilocycles	————

THE CROSLEY RADIO CORPORATION

MODELS 1211 & 1216

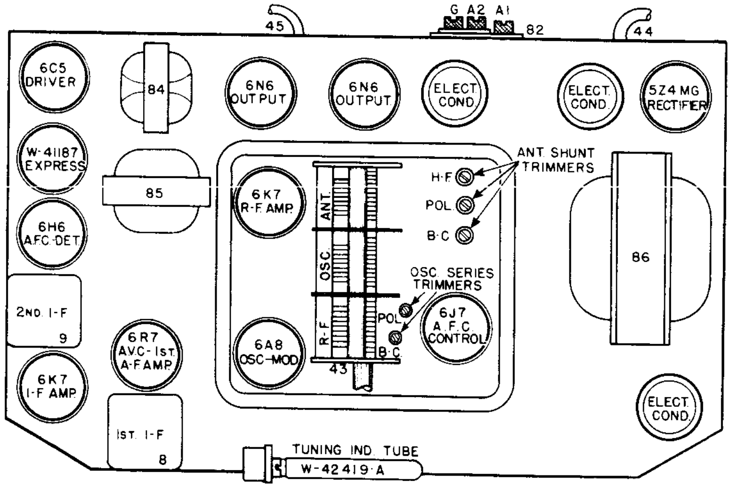
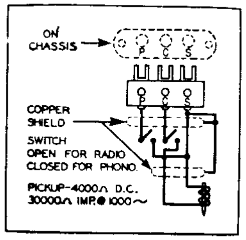


Fig. 2 Top View



Phonograph Pickup

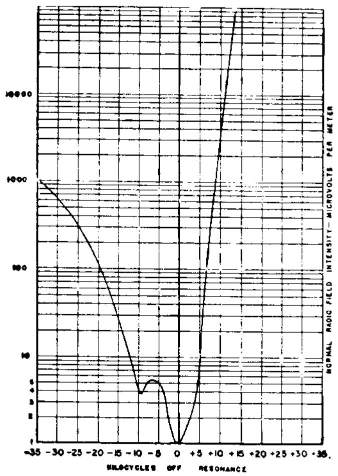


Fig. 5

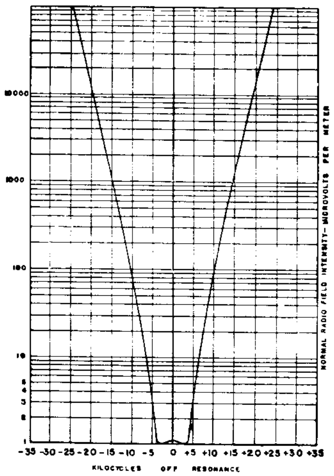
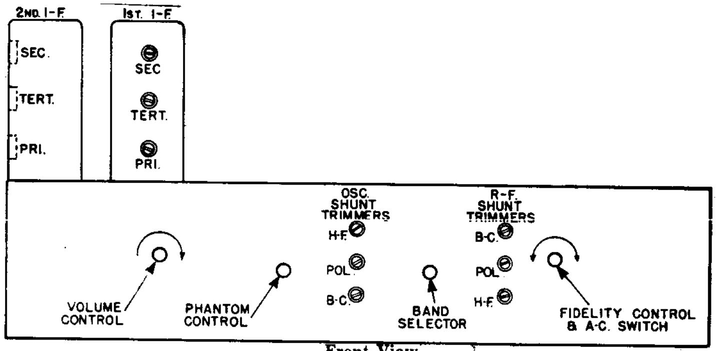


Fig. 6



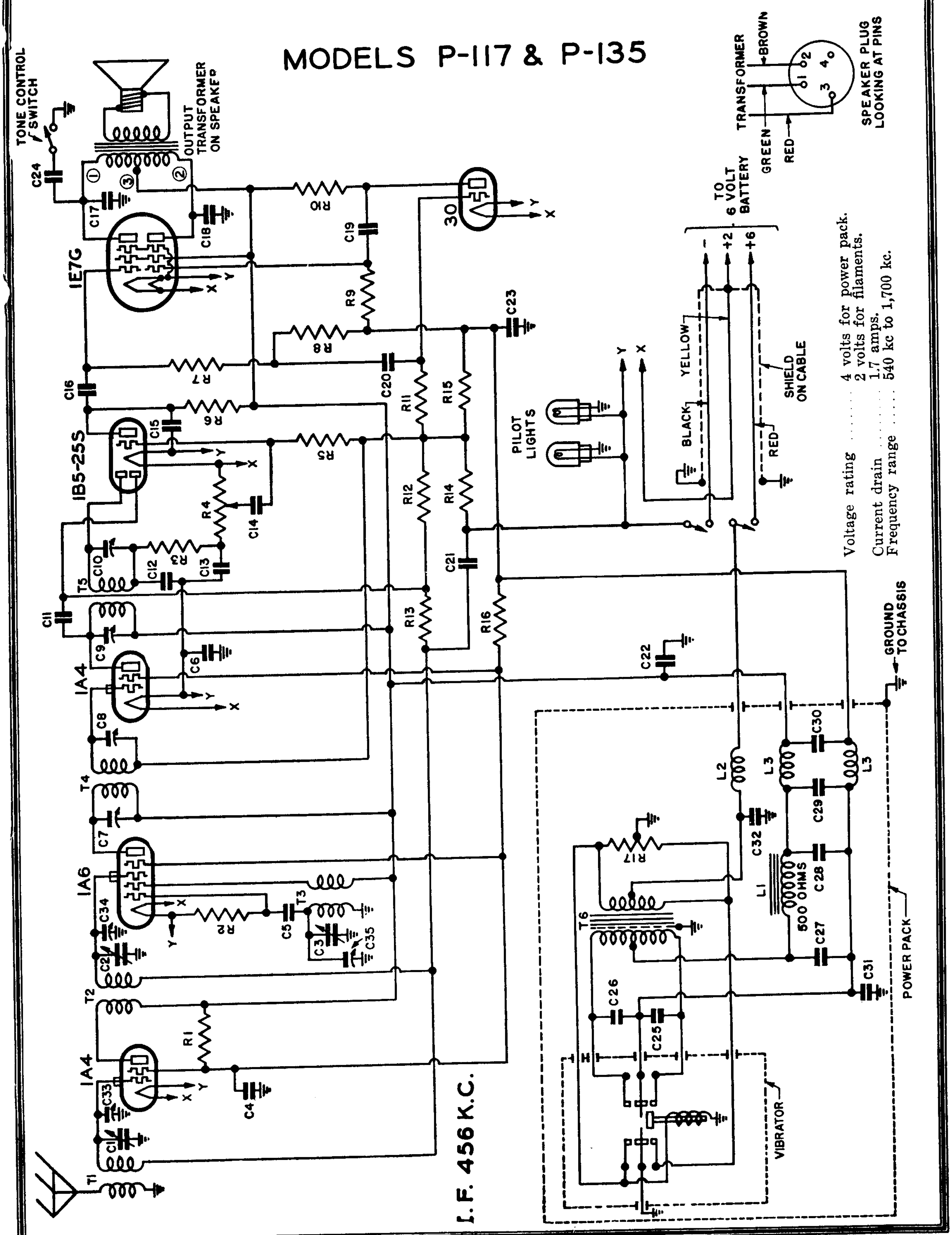
Front View

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1ABCD	W —37922	Dial Light Bulb
	G 3—37965	D. L. Socket
	W — 4057	D. L. Shield
2	W —41187	Auto Express. Tube
3	W —42419A	Neon Tuning Indi. Tube
	G 2—42584	Neon Socket Assembly
	W —42589	Neon Tube Cover
	—42592	Cover Gasket. (N. T.)
4		None
5	G 94—32000	Antenna Coil, B. C. B.
6	G108—32000	Antenna Coil, Pol. B.
7	G107—32000	Antenna Coil, H. F. B.
8	G 90—32004	1st I-F Assembly
9	G126—32004	2nd I-F Assembly
10	G 97—32002	Osc. Coil, B. C. B.
11	G 96—32002	Osc. Coil, Pol. B.
12	G 95—32002	Osc. Coil, H. F. B.
13	G 68—32001	R-F. Coil, B. C. B.
14	G 75—32001	R-F. Coil, Pol. B.
15	G 74—32001	R-F. Coil, H. F. B.
16Z	W —37778	Condenser, 12 Mf. 25V.
16Y		Condenser, 12 Mf. 25V.
17	W —36055	Condenser, 35 Mf. 400V.
18AB	W —42386	Condenser, 20 Mf. 300V.
19	G 18—34000	Condenser, 5600 Mmf.
20	G 5—34002	Condenser, .00005 Mf. 200V.
	G 10—34002	Condenser, .00005 Mf. 300V.
22	G 2—34002	Condenser, .0001 Mf. 200V.
23	G 6—34002	Condenser, .000025 Mf. 200V.
24	G 1—34005	Condenser, .00025 Mf. 300V.
25AB	G 3—34002	Condenser, .0005 Mf. 200V.
26	W —35758	Condenser, .008 Mf. 400V.
27	W —41461	Condenser, .0014 Mf. 200V.
28	W —30805	Condenser, .01 Mf. 400V.
29		NONE
30ABCD	W —36541	Condenser, .02 Mf. 160V.
31	W —28621	Condenser, .02 Mf. 200V.
32	W —41209	Condenser, .048 Mf. 200V.
33ABCD	W —35936	Condenser, .05 Mf. 200V.
34	W —32380	Condenser, .05 Mf. 200V.
35ABCDE	W —27216	Condenser, .05 Mf. 200V.
36AB	W —32780B	Condenser, .05 Mf. 400V.
37	W —43094	Condenser, .011 Mf. 160V.
38	W —22688	Condenser, .1 Mf. 200V.
39	W —42554	Condenser, .12 Mf. 160V.
40Z	—41218	B. C. Osc. Series Trimmer
40Y		Pol. Osc. Series Trimmer
41	W —37891	3 Section Trimmer (Shunt)
42	W —35951	3 Section Trimmer (Shunt)
43	G 47—33002	3 Section Var. Tuning Cond. Gang
	MG12 —42411	Dial Drive Assembly
	C —42421	Dial Glass (Calibrated)
	—42325A	Drive Unit
	W —41144	Dial Hand (Long)
	W —42180	Dial Hand (Short)
	W —40486	Hand Mtg. Screw
	E —13648	R. H. Indic. Flipper
	E —13647	L. H. Indic. Flipper
	W —42308	Flipper Pulley
	—43081	L. H. Flipper Cont. Cable
	—43080	R. H. Flipper Cont. Cable
	—40638	Indi. Cont. Cable
	—41157	Drive Belt
	W —23877	Flex. Coupling
	W —37909A	Band Sel. Pulley
44	B —33906A	Power Cord and Plug
45	G 2—37918	Speaker Cable
46	—35760	Resistor, 20,000 Ohm ¼W.
47	—33390	Resistor, 30,000 Ohm ¼W.
48AB	—35928	Resistor, 60,000 Ohm ¼W.
49	—34019	Resistor, 75,000 Ohm ¼W.
50ABC	—35600	Resistor, 100,000 Ohm ¼W.
51	—35930	Resistor, 200,000 Ohm ¼W.
52	—35601	Resistor, 300,000 Ohm ¼W.
53AB	—36321	Resistor, 400,000 Ohm ¼W.
54ABCDE	—36322	Resistor, 500,000 Ohm ¼W.
55	—36176	Resistor, 1.3 Megohm ¼W.
56	—21451	Resistor, 1. Megohm ¼W.
57	—36688	Resistor, 3. Megohm ¼W.
58	W —32961	Resistor, 100 Ohm 3W. Flex.
59	W —25937	Resistor, 275 Ohm ½W. Flex.
60AB	W —28589	Resistor, 350 Ohm ½W. Flex.
61	W —22514	Resistor, 750 Ohm ½W. Flex.
62AB	W —21452	Resistor, 1100 Ohm ¾W. Flex.
63	W —23013	Resistor, 2000 Ohm 1½W. Flex.
64	W —23907	Resistor, 750 Ohm 1½W. Flex.
65	— 4921C	Resistor, 10,000 Ohm 1W.
66	—36952	Resistor, 30,000 Ohm 1W.
67	W —42516	Resistor, 20,000 Ohm 1W.
68Z	W —41966	Resistor, 4,000 Ohm
68Y		Resistor, 1,000 Ohm (Candohm)
68X		Resistor, 3,000 Ohm
68W		Resistor, 200 Ohm
69	G154—36400	Socket Type, 5Z4
70	G155—36400	Socket Type, 6H6
71AB	G151—36400	Socket Type, 6K7
72	G156—36400	Socket Type, 6A8
73	G164—36400	Socket Type, 6R7
74	G157—36400	Socket Type, 6J7
75AB	G165—36400	Socket Type, 6N6
76AB	G152—36400	Socket Type, 6C5
77	G167—36400	Socket Type, Auto Expressionator
78		See Item 3
79	649CJ4 "M"	Speaker, Spec. 1-D-668
	—40701	Cone Assembly for above Spk.
	—40699	Field Coil for above Spk.
80	W —41029A	Phantom Control Switch
81	C —41235A	Band Selector Switch
82	G 27—26719	Ant. and Gnd. Terminal Assembly
83	W —42679	Resistor, 245 Ohm ½W. Flex.
84	G 1—37995	A-F Driver Transformer
85	G 60—24628	Out-Put Transformer
86	—42557	Pwr. Trans., 60 Cy. 110V.
	—43088	Pwr. Trans., 50 Cy. 110V.
	—43089	Pwr. Trans., 50 Cy. 220V.
	—43008	Pwr. Trans., 25 Cy. 110V.
	—43170	Pwr. Trans., 25 Cy. 220V.
87		See Item 86
88Z	—41375	Vol. Cont., 3 Meg.
88Y		Vol. Cont., 1 Meg.
89	B —42295A	Fidelity Cont. and Line Switch
90	G101—34403	Neutralizing Cond. Assembly
91	W — 6705	Resistor, 3500 Ohm 1W.
92	W —24049A	Condenser, .1 Mf. 200V.
	C —43134	Escutcheon
	—42043	Escutcheon Gasket
	C —42044	Escutcheon Lens
	D — 30	Screws Escut. Mtg.
	W —37339	Knob, V. C. and Station Selector
	W —40192B	Knob, Bd. Sel. and Phantom Cont.
	W —42490	Knob, Fid. Cont.
	W —36117	Rubber Mtg. Feet
	— 6-P	Cabinet

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS P-117 & P-135



EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS P-117 & P-135

GENERAL NOTES

1. The large, oblong metal box on the top of the chassis deck contains the power pack. The function of this power pack is to convert the 4 volt direct current from the storage battery into 145 volt direct current. The vibrator used is of the synchronous type.
2. The illustration on the right indicates the correct battery connections. Three battery clips are attached to the ends of the leads emerging from the battery cable. One of the two small clips is marked plus and should be attached to the positive terminal of the battery. The small clip without marking should be attached to the negative side of the battery.

   Note that the battery is made up of three cells. The large battery clip should be attached to the positive side of the same cell to which the negative clip is attached.

   It is important that these battery connections be made correctly. Before turning the receiver on check the connections with the illustration.
3. Make certain that all battery connections make good con tact, otherwise the receiver may be noisy. The positive terminal of an unmarked battery may be distinguished by a deposit of green corrosion, which usually collects on this terminal. On most batteries the positive terminal is larger than the negative terminal.
4. The color coding of the leads of the i-f transformers is as follows:
   Grid—green — Plate—blue
   Grid return—black — B plus—red
5. With few exceptions the color coding of the general wiring is as follows:
   Plate—blue — Cathode—white or yellow
   B plus—red — Grid—green
   Screen—brown — Filament and ground—black
6. The color coding of the leads of the power pack is as follows:
   A plus—yellow — B plus—red — Common neg.—black.
7. An efficient antenna system (aerial) is necessary to enable a full realization of the merits of the receiver. The Emerson All-Wave Antenna is especially designed for high efficiency and reduction of noise on all frequency ranges. Complete instructions for the installation of this antenna are supplied with each kit.

Tube Data

The tube complement is as follows:

1—1A4, r-f amplifier
1—1A6, oscillator-modulator
1—1A4, 1st i-f amplifier
1—1B5/25S 2nd detector, a.v.c., a-f amplifier
1—30, phase inverter
1—1E7G, push-pull pentode output.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to chassis with volume control turned on full and no signal. Battery voltage for these readings was 6.1 volts.

Tube	*Plate*	*Screen*	*Osc. Plate*
1A4 r-f	137	53	—
1A6	137	53	137
1A4 i-f	137	53	—
1B5/25S	95	—	—
30	55	—	—
1E7G	135	137	—

Voltage across filaments—2 volts.

To check the bias of the 1E7G tube, measure the voltage from the filament terminal, *closest to the screen*, of the 30 tube to the negative side of the 20 mf tubular electrolytic condenser. This reading should be 7.5 volts.

To check the bias of the other tubes, measure the voltage from the filament terminal, *closest to the screen*, of the 30 tube to the grid cap of the 1A4 i-f tube. This reading should be 3 volts.

ADJUSTMENTS

An oscillator with frequencies of 456 kc and 1500 kc should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Location of I-f Transformers and Trimmers

The first i-f transformer, part number 3HT-287A is in an oblong coil can located on the top of the chassis to the right of the variable condenser. The two trimmers for this i-f are accessible through holes in the top of the coil can.

The second i-f transformer, part number 3HT-288A, is in an oblong coil can located on the top of the chassis directly behind the first i-f tube. The two trimmers for this i-f are accessible through holes in the top of the coil can.

The oscillator, antenna, and r-f trimmers are located on the top of the variable condenser. The oscillator trimmer is on the rear section of the variable condenser, the antenna trimmer is on the front section of the variable condenser and the r-f trimmer is on the central section of the variable condenser.

Alignment Procedure

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 456 kc to the grid cap of the 1A6 tube.
3. Adjust the four i-f trimmers, repeating for maximum response.
4. Set dial pointer to 1500 and feed 1500 kc to the antenna lead through a standard broadcast dummy antenna (a .0002 mf mica condenser may be used as a substitute).
5. Adjust the oscillator trimmer (on rear section of variable condenser) for maximum response.
6. Adjust the r-f trimmer (on central section of variable condenser) for maximum response.
7. Adjust the antenna trimmer (on front section of variable condenser) for maximum response.

REPLACEMENT PARTS LIST

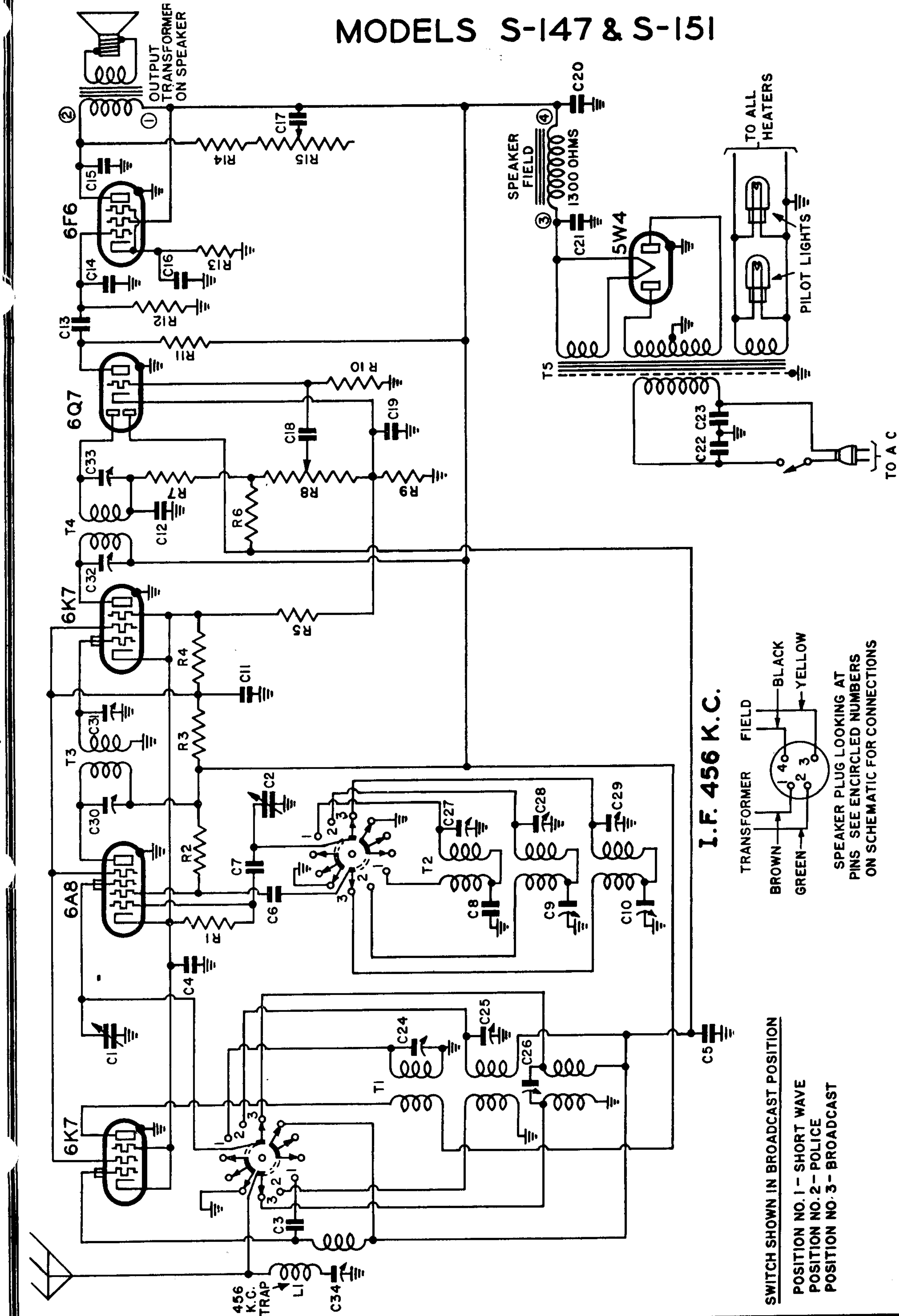
*ITEM	PART NO.	DESCRIPTION	List Price as Effective as of Aug. 15, 1936 PRICE
T1	3PT-309	Antenna coil	$ .86
T2	3HT-285	R-f interstage coil	.75
T3	3HT-286	Oscillator coil	.50
T4	3HT-287A	456 kc first i-f transformer	1.35
T5	3HT-288A	456 kc second i-f transformer	1.35
T6	3PT-310	Power transformer	2.00
L1	2KT-239	Iron-core filter choke (500 ohms)	1.20
L2	2KT-240	Layer-wound "A" choke	.65
L3	3PT-311	Dual r-f choke assembly (170 microhenries each section)	1.50
R1	LR-60	20,000 ohm, 1/4 watt carbon resistor	.16
R2, R3	KR-53	50,000 ohm, 1/4 watt carbon resistor	.16
R4	3PR-258	Volume control (250,000 ohms)	.75
R5, R12	KR-56	500,000 ohm, 1/4 watt carbon resistor	.16
R6, R10	KR-54	100,000 ohm, 1/4 watt carbon resistor	.16
R7	LR-61	200,000 ohm, 1/4 watt carbon resistor	.16
R8	ZZR-196	30,000 ohm, 1/4 watt carbon resistor	.16
R9, R11	KR-55	250,000 ohm, 1/4 watt carbon resistor	.16
R13	KR-57	1 megohm, 1/4 watt carbon resistor	.16
R14	IIR-130	150 ohm, 1/2 watt wire-wound resistor	.16
R15	3PR-260	200 ohm, 1/2 watt wire-wound resistor	.16
R16	3BR-247	40,000 ohm, 1/4 watt carbon resistor	.16
R17	ZR-105	200 ohm wire-wound center-tapped resistor	.16
C1, C2, C3	3PC-304	Three-gang variable condenser	4.15
C4, C21	AC-6	0.1 mf, 200 volt tubular condenser	.20
C5, C11	EC-24A	0.0001 mf mica condenser	.20
C6,	BBC-131	0.9 mf, 200 volt tubular condenser	.50
C7, C8		Trimmers, part of 3HT-287A, first i-f transformer assembly. (Trimmers can not be supplied separately.)	
C9, C10		Trimmers, part of 3HT-228A, second i-f transformer assembly. (Trimmers can not be supplied separately.)	
C12, C13, C15	AC-7A	0.00025 mf mica condenser	.20
C14, C20	FC-29	0.02 mf, 200 volt tubular condenser	.20
C16, C19, C30	LC-65	0.02 mf, 400 volt tubular condenser	.20
C17, C18	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C23	3PC-310	20 mf, 25 volt tubular dry electrolytic condenser	.80
C22	BC-13	0.25 mf, 200 volt tubular condenser	.20
C24	TTC-177	0.01 mf, 600 volt tubular condenser	.20
C25, C26	3PC-308	0.0125 mf, 800 volt tubular condenser	.60
C27, C28	3PC-307	Dual 8 mf, 300 volt dry electrolytic condenser	3.00
C29	EEC-132	0.1 mf, 400 volt tubular condenser	.20
C31, C32	2KC-236	0.5 mf, 120 volt tubular condenser	.60
C33, C34, C35		Trimmers on three-gang variable condenser. (Trimmers can not be supplied separately.)	
	3PS-214	6½ permanent magnet dynamic speaker (for Model P-117)	8.25
	3PS-222	10" permanent magnet dynamic speaker (for Model P-135)	11.00
	2TS-145E	Tone control switch	.35
	3PS-215	Power switch	.75
	3PW-81	Battery cable	1.85
	AL-2	Pilot light 2.5 volt, 0.5 amp Mazda No. 41	.20
	3PZ-452	Dial face	.75
	3PZ-456	Dial drive belt	.20
	3CZ-337	Dial drive shaft and pulley	.10
	3CZ-339	Idler pulley	.05
	3CZ-340	Idler spring	.05
	3CZ-341	Condenser shaft pulley	.10
	3FZ-353	Dial pointer	.10
	3CZ-350	Escutcheon with crystal	1.05

WHEN ORDERING REPLACEMENT PARTS SPECIFY PART NUMBERS.

*Item number locates the article on the schematic diagram.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS S-147 & S-151



Voltage rating .... 105-125 volts a.c.
Current drain .... 0.55 amps.
Frequency ranges .... 550 to 1750 kc., 1750 to 5500 kc., 5.7 to 18.0 megacycles.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS S-147 & S-151

GENERAL NOTES

1. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
2. The receiver should never be turned on with either the speaker plug or the 6F6 tube out of their sockets, since the rapid rise in rectifier voltage would damage the electrolytic condensers.
3. Pilot lights may be replaced by slipping the push-on sockets off the dial and unscrewing the bulbs. It is not necessary to remove either the dial or chassis from cabinet.
4. In replacing chassis in cabinet do not tighten mounting screws so much that chassis will not float freely, and do not allow any part of the dial assembly to touch the cabinet. Do not push control knobs on so far that they touch the cabinet front panel. If these precautions are not observed the receiver may become microphonic.
5. The color coding of the power transformer leads is as follows:
   Primary—two green leads
   High voltage sec.—two black leads
   High voltage sec. center tap—yellow
   6.3 v. sec.—two heavy blue leads
   5 v. sec.—two heavy red leads
6. An efficient antenna system (aerial) is necessary to enable a full realization of the merits of the receiver. The Emerson All-Wave Antenna is especially designed for high efficiency and reduction of noise on all three frequency ranges. Complete instructions for the installation of this antenna are supplied with each kit.

Tube Data

The tube complement is as follows:

1—6K7—R-f amplifier (Right-hand front corner)
1—6A8—Pentagrid modulator-oscillator
1—6K7—I-f amplifier (Between i-f transformers)
1—6Q7—Second detector, a.v.c., a-f amplifier
1—6F6—Pentode output
*1—5W4—Full-wave rectifier

*See Production Changes

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground, with no signal. Line voltage for these readings was 117.5 volts, 60 cycles.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6K7—R-f amp.	230	90	2.8	—	6.3 a.c.
6A8—Osc.-mod.	230	90	2.8	140	6.3 a.c.
6K7—I-f amp.	230	90	2.8	—	6.3 a.c.
6Q7—2nd det.	118	—	1.4	—	6.3 a.c.
6F6—Output	215	230	14	—	6.3 a.c.

Voltage across speaker field—80 volts.

Voltage from 5W4 filament to ground—310 volts.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600, 1800, 5000 and 15000 kc should be used.

An output meter should be used across the voice coil or speaker output transformer for observing maximum response.

Use a standard dummy antenna for aligning any of the three bands. A .0002 mf condenser may be used for the broadcast band dummy antenna, a .0001 mf condenser for police-band antenna and a 400 ohm non-inductive resistor for the short-wave antenna.

Location of Coils and Trimmers

The i-f transformers are in oblong coil cans located on the top of the chassis. The four trimmers, two for each transformer, are available through holes in the tops of the cans. The trimmer for the wave-trap is available through a hole in the top of the chassis deck at the rear, near the rectifier tube.

The antenna coils for the three bands are wound on one form and mounted underneath the chassis on the front wall, directly under the variable condenser. The trimmers for the three coils are available through holes in front of the chassis. The trimmer farthest to the right is the broadcast antenna trimmer. The central trimmer is the police-band antenna trimmer, and the trimmer to the left is the short-wave antenna trimmer.

The oscillator coils for the three bands are wound on one form and mounted underneath the chassis, directly behind the wave-band switch. The trimmers for the three coils are available through holes in the top of the chassis. The trimmer farthest to the right is the broadcast oscillator trimmer. The central trimmer is the police-band oscillator trimmer, and the trimmer farthest to the left is the short-wave oscillator trimmer.

The adjusting screws for the dual padder are available through holes in the top of the chassis to the right of the electrolytic condenser. The screw nearest the front of the chassis is for the broadcast band padder and the screw farthest from the front is for the police-band padder.

I-f and Wave-trap Alignment

Set the wave-band switch at the broadcast (clockwise) position and the variable condenser at the minimum capacity position. Feed 456 kc to the grid cap of the 6A8 tube. Adjust the four i-f trimmers carefully for maximum response. Feed 456 kc through a dummy antenna into the antenna terminal and adjust the 456 kc wave-trap for *minimum response.*

If a particular telegraphic station causes interference, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

Broadcast Alignment

With the wave-band switch at the broadcast (clockwise) position, set the pointer at 60, feed 600 kc through the antenna (using a standard dummy antenna), and adjust the broadcast series padder for maximum response. Move pointer to 160, feed 1600 kc to the antenna and adjust the oscillator trimmer for maximum response, then adjust the antenna trimmer. Reset the pointer to 60, feed 600 kc to antenna and rock the variable condenser (rotate the condenser back and forth through a small arc) while resetting the oscillator padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary, return to 600 and repeat entire procedure.

Police Alignment

Set the switch at police (central) position and the pointer at 1.8. Feed 1800 kc to antenna (using a 0.0001 mf condenser for a dummy antenna), and adjust the police-band series padder for maximum response. Move the pointer to 5.0, feed 5000 kc to the antenna and adjust the police-band oscillator for maximum response. If two peaks are obtained select the minimum capacity peak. (See General Instructions below.) Then adjust the antenna trimmer for maximum response. If two peaks are obtained select the maximum capacity peak. Return the pointer to 1.8, feed 1800 kc to the antenna and rock the variable condenser while adjusting the police-band series padder for maximum response. Return to 5000 and check alignment. If readjustment is necessary return to 1800 and repeat entire procedure.

Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move pointer to 15, feed 15000 kc to antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator for maximum response. If two peaks are obtained choose minimum capacity peak. Then adjust the antenna trimmer for maximum response. If two peaks are obtained choose the maximum capacity peak.

GENERAL INSTRUCTIONS

Always use as weak a test signal as possible during alignment.

The set's oscillator is higher in frequency than the signal on all three bands. Images, therefore, should be observed on the low-frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmer and maximum capacity peaks on antenna trimmers.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a source of noise, frequency drift and microphonism.

In aligning antenna trimmers on the high-frequency signals there is usually a tendency for the oscillator to drift, due to interlocking. To compensate for this always keep re-tuning the variable condenser as you align.

PARTS LIST

*Item	Part No.	DESCRIPTION	List Price Effective as of Aug. 1st, 1936 Price
L1	2PT-283	456 kc wave-trap	$ .60
L2	3ST-306	Antenna choke coil	.20
T1	3ST-304	Three-band antenna coil	2.75
T2	3ST-305	Three-band oscillator coil	2.35
T3	3ST-312	456 kc first i-f transformer	1.45
T4	3ST-313	456 kc second i-f transformer	1.45
T5	3ST-314	Power transformer	4.40
R1	KR-53	50,000 ohm, 1/4 watt carbon resistor	.16
R2	AR-3	25,000 ohm, 1/2 watt carbon resistor	.16
R3	3BR-246	10,000 ohm, 2 watt carbon resistor	.28
R4	2TR-225	12,000 ohm, 2 watt carbon resistor	.28
R5, R9	3SR-257	50 ohm, 1/2 watt wire-wound resistor	.16
R6, R10	HR-42	2 megohm, 1/4 watt carbon resistor	.16
R7, R11	KR-54	100,000 ohm, 1/4 watt carbon resistor	.16
R8	NNR-157B	Volume control—500,000 ohms	.90
R12	KR-55	250,000 ohm, 1/4 watt carbon resistor	.16
R13	FFR-126	500 ohm 1/2 watt wire-wound resistor	.16
R14	LR-64	5,000 ohm, 1/4 watt carbon resistor	.16
R15	3MR-251	Tone control—100,000 ohms	.80
C1, C2	3SC-298	Two-gang variable condenser	3.50
C3, C7	AAC-106A	0.00005 mf mica condenser	.20
C4	BC-13	0.25 mf, 200 volt tubular condenser	.20
C5	BC-12	0.05 mf, 200 volt tubular condenser	.20
C6, C18	KC-58	0.01 mf, 400 volt tubular condenser	.20
C8	XXC-197	0.0038 mf, mica condenser	.35
C9, C10	3SC-309	Dual adjustable padding condenser C9—1200 to 2000 mmf; C10—300 to 600 mmf	.95
C11, C17	EEC-132	0.1 mf, 400 volt tubular condenser	.20
C12	EC-24A	0.0001 mf, mica condenser	.20
C13	LC-64	0.05 mf, 400 volt tubular condenser	.20
C14	IC-47A	0.0005 mf, mica condenser	.20
C15	ZC-115	0.006 mf, 1,000 volt tubular condenser	.20
C16	IC-43A	5 mf, 25 volt tubular electrolytic condenser	.90
C19	AC-6	0.1 mf, 200 volt tubular condenser	.20
C20	3BC-289	40 mf, 300 volt wet electrolytic condenser	1.30
C21	3SC-303	40 mf, 375 volt wet electrolytic condenser	1.70
C22, C23	XXC-220	Dual 0.01 mf, 250 volt a.c. metal clad tubular condenser	.45
†C24, C25, C26		Trimmers, part of 3ST-304 antenna coil assembly.	
†C27, C28, C29		Trimmers, part of 3ST-305 oscillator coil assembly.	
†C30, C31		Trimmers, part of 3ST-312 first i-f coil assembly.	
†C32, C33		Trimmers, part of 3ST-313 second i-f coil assembly.	
†C34		Trimmer, part of 2PT-283 wave-trap assembly.	
	3BS-176	12" dynamic speaker	10.60
	3BS-191	8" dynamic speaker	8.80
	3SS-206	Wave-band switch	1.80
	3BS-226	Power switch	.55
	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
	3SZ-437	Dial face	1.30
	3SD-42	Dial plate	1.25
	3SZ-443	Dial drive belt	.20
	3SZ-444	Drive shaft and pulley	.20
	3CZ-339	Idler pulley	.05
	3SZ-457	Idler pulley spring	.05
	3CZ-341	Condenser pulley	.10
	3JZ-375	Dial drive-shaft bushing	.10
	3SZ-436	Dial pointer	.10
	3SZ-438	Escutcheon with crystal	1.55

WHEN ORDERING REPLACEMENT PARTS SPECIFY PART NUMBERS.

*Item number locates the article on the schematic diagram.

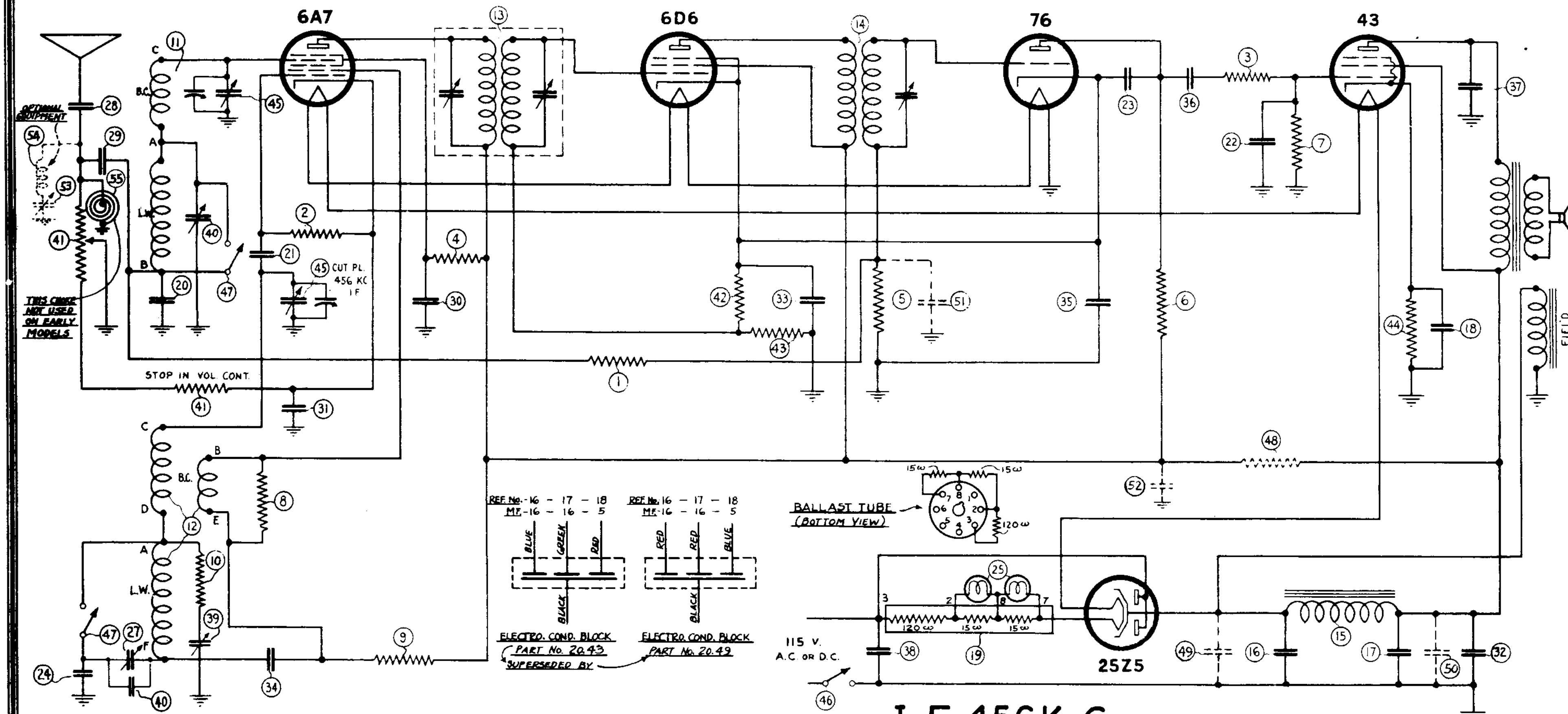
†These trimmers are part of the coil assemblies and can not be supplied separately.

PRODUCTION CHANGES

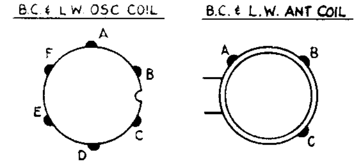
On later receivers the rectifier tube was changed from a 5W4 (metal) to a 5Z3 (glass).

FADA RADIO AND ELECTRIC COMPANY

MODEL 261



I.F. 456 K.C.



A-F = 13.4 OHMS
B-E = 1.8 "
C-D = 6.7 "

A-C = 11. OHMS
A-B = 18.5 "

D.T.I.F. COIL
PRI. = 16. OHMS
SEC. = 15.5 "

S.T.I.F. COIL
PRI. = 24.5 OHMS
SEC. = 24.5 "

NOTE:
BAND SW. SHOWN IN L.W. POS.
PARTS SHOWN IN DOTTED LINES ARE FOR 25 ~ OPERATION ONLY
⏚ = CHASSIS

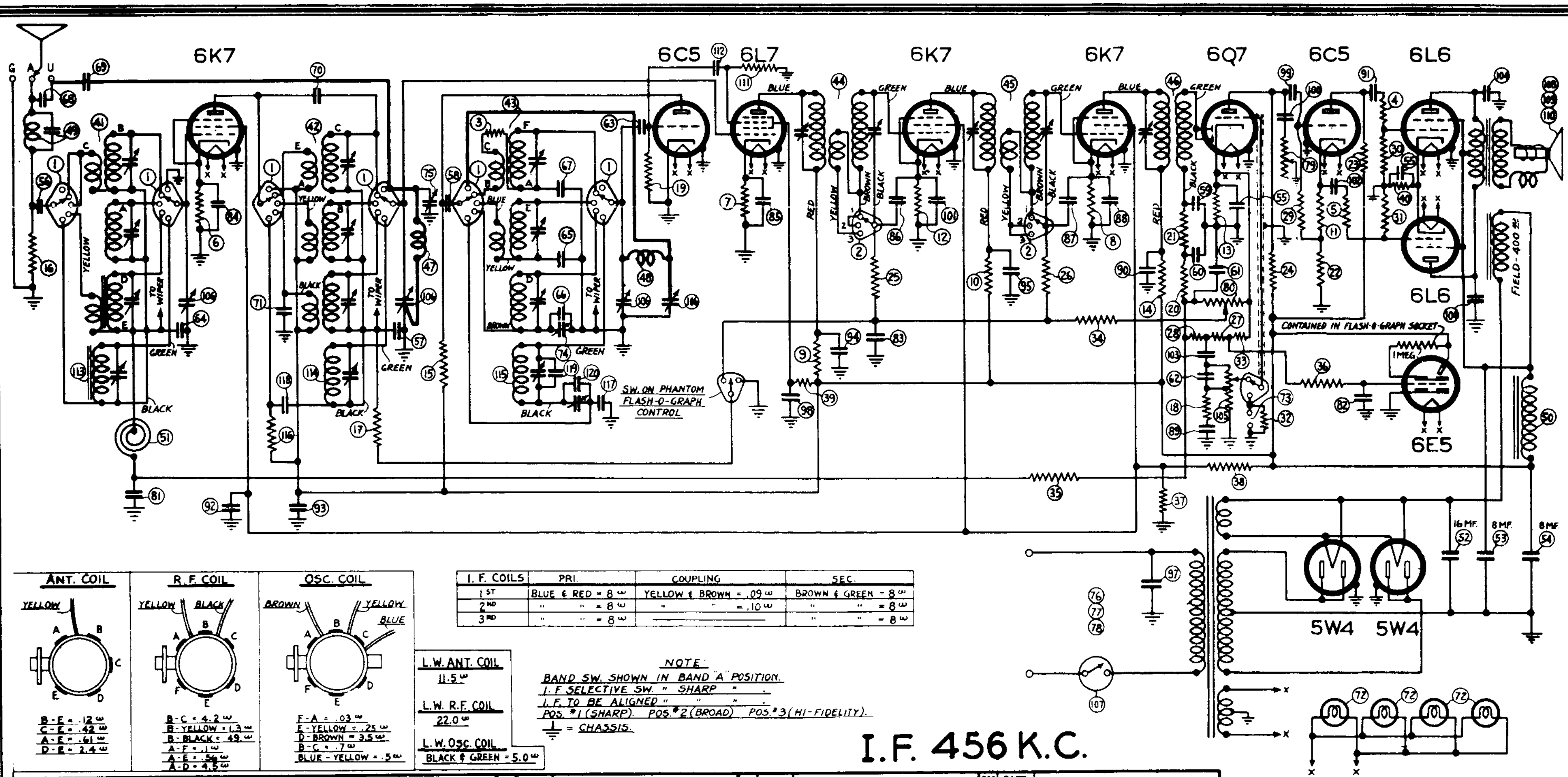
REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION
1	30.20	CARB. RES - 250,000 OHM 1/3W ±20%	23	15.2	MICA COND - .0005 MFD ± 10%	45	25.57	VARIABLE COND
2	30.3	" " 50,000 " " " " 10%	24	15.56	" " .0008 " " 5%	46		ON-OFF SW. ON VOLUME CONT.
3	30.3	" " 50,000 " " " " "	25	120.3	PILOT LIGHTS 6-8 V. .15 A	47	45.31	BAND SWITCH
4	30.21	" " 30,000 " " " " 20%	26	105.21	SPEAKER - 3000 OHMS	48	30.30	CARB. RES - 1400 OHM - 1/3W ±10%
5	30.22	" " 1 MEG " " " " "	27	25.49	PADDING COND. - 70 MMF.	49	20.25	TUBULAR ELECTRO. COND. - 8 MF. - 100 W.V.
6	30.23	" " 500,000 " " " " "	28	10.18	TUBULAR COND - .002 MFD. 200 V	50	20.25	" " 8 " "
7	30.23	" " 500,000 " " " " "	29	10.18	" " .002 " "	51	10.2	" COND - .1 MF. - 200 V.
8	30.1	" " 5,000 " " " " 10%	30	10.5	" " .05 " "	52	10.8	" " .25 " " "
9	30.1	" " 5,000 " " " " "	31	10.5	" " .05 " " "	53	25.50	TRIMMING COND. - 150 MMF
10	30.42	" " 500 " " " " "	32	10.5	" " .05 " " "	54	4697	WAVE TRAP COIL
11	35.14	B.C. & L.W. ANTENNA COIL	33	10.1	" " .35 " " "	55	3216	CHOKE COIL - 2.3 MH.
12	4575	B.C. & L.W. OSCILLATOR "	34	10.4	" " .01 " "			
13	7B79	D.T. I.F. COIL	35	10.4	" " .01 " " "			
14	4336	S.T. I.F. "	36	10.4	" " .01 " " "			
15	40.160	CHOKE COIL - 400 OHM	37	10.4	" " .01 " " "			
16	20.49	ELECTRO. COND. BLOCK - 16 MFD. 100 W.V.	38	10.7	" " .05 " 400 "			
17	20.49	" " " 16 " " " "	39	25.59	TRIMMER 30 - 80 MMF			
18	20.49	" " " 5 " 25 " "	40	15.41	MICA COND. .0002 MFD ± 5%			
19	BK498	BAL. RESISTOR - 120-15-15 OHM	41	50.22	VOLUME CONT - 10,000 OHM WITH 450 OHM STOP			
20	15.5	MICA COND. - .002 MFD. ± 3%	42	30.45	CARB. RES. - 250 OHM - 1/3 10%			
21	15.3	.0001 " " 10%	43	30.48	" " 350 " " "			
22	15.3	.0001 " " "	44	30.47	" " 625 " 1/2 "			

Refs. 48–52: FOR 25 CYCLE OPERATION ONLY

Refs. 53–54: OPTIONAL EQUIPMENT

FADA RADIO AND ELECTRIC COMPANY

MODEL 312



B-E = .12 Ω
C-E = .42 Ω
A-E = .61 Ω
D-E = 2.4 Ω

B-C = 4.2 Ω
B-YELLOW = 1.3 Ω
B-BLACK = 49. Ω
A-F = .1 Ω
A-E = .56 Ω
A-D = 4.5 Ω

F-A = .03 Ω
E-YELLOW = .25 Ω
D-BROWN = 3.5 Ω
B-C = .7 Ω
BLUE - YELLOW = .5 Ω

L.W. ANT. COIL 11.5 Ω

L.W. R.F. COIL 22.0 Ω

L.W. OSC. COIL BLACK & GREEN = 5.0 Ω

I. F. COILS	PRI.	COUPLING	SEC.
1ST	BLUE & RED = 8 Ω	YELLOW & BROWN = .09 Ω	BROWN & GREEN = 8 Ω
2ND	" " = 8 Ω	" " = .10 Ω	" " = 8 Ω
3RD	" " = 8 Ω		" " = 8 Ω

NOTE:
BAND SW. SHOWN IN BAND "A" POSITION.
I. F. SELECTIVE SW. " SHARP " .
I. F. TO BE ALIGNED " " .
POS. #1 (SHARP). POS. #2 (BROAD) POS. #3 (HI-FIDELITY).
⏚ = CHASSIS.

I.F. 456 K.C.

REF. No.	PART No.	DESCRIPTION
1	45.36	BAND SW.
2	45.32A	SELECTIVITY SW.
3	30.78	CARB. RES. - 25 OHMS 1/3 W. ± 10%
4	30.70	" " 130 " " " " 20
5	30.70	" " 130 " " " " "
6	30.45	" " 250 " " " " 10
7	30.71	" " 450 " " " " "
8	30.15	" " 2,000 " " " " "
9	30.64	" " 2,000 " " " " 20
10	30.64	" " 2,000 " " " " "
11	30.57	" " 3,000 " " " " 10
12	30.1	" " 5,000 " " " " "
13	30.1	" " 5,000 " " " " "
14	30.36	" " 5,000 " " " " 20
15	30.2	" " 10,000 " " " " 10
16	30.31	" " 10,000 " " " " 20
17	30.31	" " 10,000 " " " " "
18	30.58	" " 20,000 " " " " 10
19	30.11	" " 25,000 " " " " "
20	30.32	" " 25,000 " " " " 20
21	30.32	" " 25,000 " " " " "
22	30.59	" " 27,000 " " " " 10
23	30.10	" " 30,000 " " " " "
24	30.53	" " 200,000 " " " " 20

REF. No.	PART No.	DESCRIPTION
25	30.20	CARB. RES. - 250,000 OHMS 1/3 W. ± 20%
26	30.20	" " 250,000 " " " " "
27	30.62	" " 400,000 " " " " 10
28	30.5	" " 500,000 " " " " "
29	30.23	" " 500,000 " " " " 20
30	30.23	" " 500,000 " " " " "
31	30.23	" " 500,000 " " " " "
32	30.23	" " 500,000 " " " " "
33	30.67	" " 600,000 " " " " 10
34	30.28	" " 2,000,000 " " " " 20
35	30.28	" " 2,000,000 " " " " "
36	30.28	" " 2,000,000 " " " " "
37	30.14	" " 50,000 " 1/2 " " 10
38	30.33	" " 25,000 " 1 " " "
39	30.73	" " 12,500 " 2 " " "
40	30.72	" " 210 " 2 " " "
41	35.15	COIL - ANT.
42	35.16	" R.F.
43	35.31	" OSC.
44	35.25	" 1ST I.F.
45	35.26	" 2ND I.F.
46	35.27	" 3RD I.F.
47	35.28	" U.H.F. ANT.
48	35.29	" " OSC.

REF. No.	PART No.	DESCRIPTION
49	35.6	COIL - WAVE TRAP
50	40.53	" CHOKE - 900 Ω
51	5409	" R.F. CHOKE - 20. MH.
52	20.50	ELECTRO. COND. - 16 MF. 475 W.V.
53	20.4	" " 8 " 450 "
54	20.4	" " 8 " 450 "
55	20.44	" DUAL " 10-10 " 25 "
56	15.2	MICA COND. - .0005 MF. ± 10%
57	15.6	" " .0025 " " 3
58	15.7	" " .002 " " 10
59	15.3	" " .0001 " " "
60	15.3	" " .0001 " " "
61	15.3	" " .0001 " " "
62	15.3	" " .0001 " " "
63	15.10	" " 50 MMF. " "
64	15.5	" " .002 MF. " 3
65	15.69	" " .0018 " " "
66	15.66	" " .0005 " " 5
67	15.32	" " .0056 " " "
68	15.9	" " 10 MMF. " 10
69	15.9	" " 10 " " "
70	15.16	" " 3 " " 1/2 MMF.
71	15.61	" " 35 " " 5%
72	120.3	PILOT LTS. - 6-8 V. .15 A.

REF. No.	PART No.	DESCRIPTION
73	125.1	PHONO. JACK
74	25.40	PADDING COND. - 140 MMF.
75	25.49	" " 70 "
76	40.49	POWER TRANS. - 115 V. 50-60 ~
77	40.50	" " - 115 V. 25 ~
78	40.51	" " TAP. PRI. 110, 130, 150, 220, 250 V.
79	55.13	TONE CONTROL - 1/2 MEG.
80	50.24	FLASH-O-GRAPH CONTROL - 1 MEG.
81	10.26	TUBULAR COND. - .02 MF. 200 V.
82	10.26	" " .02 " 200 "
83	10.26	" " .02 " 200 "
84	10.5	" " .05 " 200 "
85	10.5	" " .05 " 200 "
86	10.5	" " .05 " 200 "
87	10.5	" " .05 " 200 "
88	10.5	" " .05 " 200 "
89	10.5	" " .05 " 200 "
90	10.9	" " .1 " 400 "
91	10.9	" " .1 " 400 "
92	10.9	" " .1 " 400 "
93	10.9	" " .1 " 400 "
94	10.7	" " .05 " 400 "
95	10.7	" " .05 " 400 "
96		

REF. No.	PART No.	DESCRIPTION
97	10.7	TUBULAR COND. - .05 MF. 400 V.
98	10.10	" " .01 " 400 "
99	10.10	" " .01 " 400 "
100	10.10	" " .01 " 400 "
101	10.2	" " .1 " 200 "
102	10.2	" " .1 " 200 "
103	10.4	" " .01 " 200 "
104	10.17	" DUAL " .001 " 600 "
105	50.25	VOLUME CONTROL - 1 MEG. TAPPED AT 50,000 Ω
106	25.63	VARIABLE COND.
107	45.37	ON-OFF SW. (LINE)
108	105.49	SPEAKER - 400 Ω (MODEL 212 T)
109	105.50	" " (" 212 C)
110	105.51	" " (" 212 CK)
111	30.3	CARB. RES. - 50,000 OHMS 1/3 W ± 10%
112	15.10	MICA COND. - 50 MMF. ± 10%
113	35.20	L.W. ANT. COIL
114	35.21	L.W. R.F. "
115	35.33	L.W. OSC. "
116	30.2	CARB. RES. - 10,000 OHMS 1/3 W ± 10%
117	15.3	MICA COND. - .0005 MF. ± 10%
118	15.2	" " .0001 " " "
119	15.23	" " .00007 " " 5
120	15.53	" " .00043 " " "

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODEL 6C

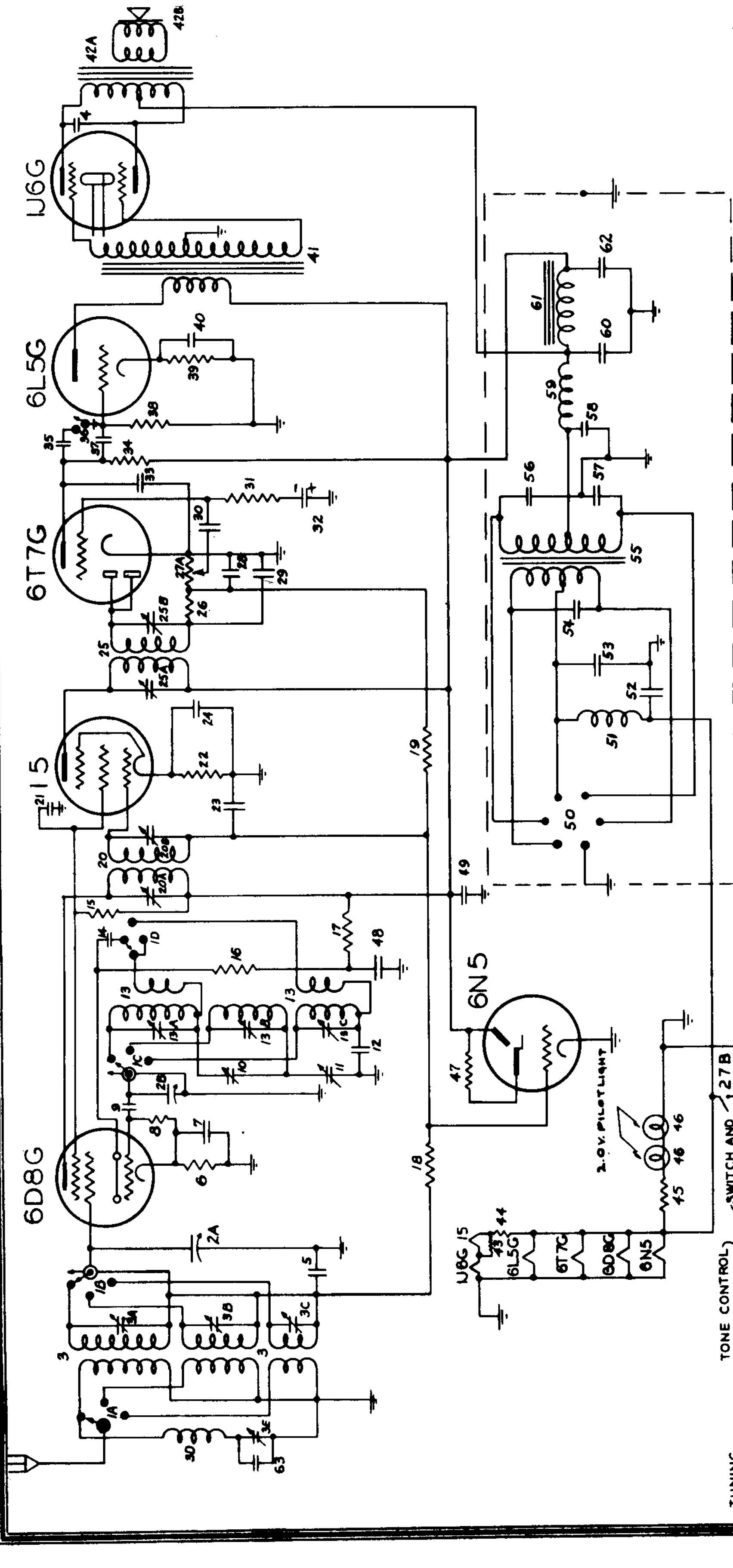


Figure 3

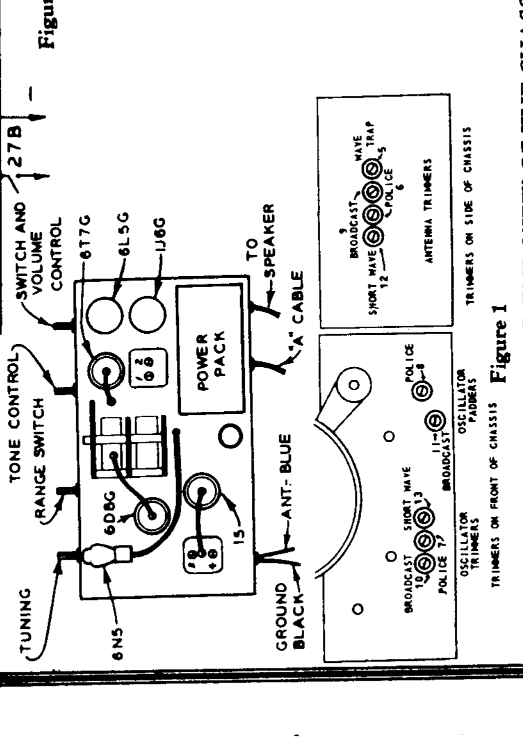


Figure 1

TOP VIEW, FRONT VIEW AND END VIEW OF THE CHASSIS SHOWING THE LOCATION OF TRIMMERS, CONTROLS, TUBES AND COMPONENT PARTS

Tube	OHMS	VOLTS	VOLTS	OHMS
6D8G	INF.	83	-.62*	41M
	INF.	125	85	INF.
	0	0	U	125MEG
			6.3	1.5
			1.37*	135
15	INF.	127	83	INF.
	1.5	2.2	.05*	1MEG
			1.25*	450
			4.1	2.5
6T7G	450M	-.15*	-.15*	450M
	INF.	58	-.3*	350M
	0	0	6.3	1.5
	0	0	0	0
6L5G	INF.	225	0	130M
	1.5	6.3	0	0
			4.2	1100
6N5	1MEG	0	126	INF.
		⊕	0	0
	1.5	6.3	0	0
1J69	240	0	0	260
	INF.	136	136	INF.

*3 VOLT SCALE

⊕ CONNECTED TO TARGET (T) THRU 1 MEGOHM. RESISTOR IN SOCKET

Figure 5 VOLTAGE AND RESISTANCE ANALYSIS CHART

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODEL 6C

The model 6C is a six-volt battery operated superhetrodyne with automatic volume control and tuning eye. It receives signals on three bands—broadcast, police-amateur, and short wave.

Alignment procedure is given below in chart form, figures 1 and 2. Make adjustments in the order given. The output meter may be any low range AC voltmeter, preferably about 0-15 volts. It should be connected across the two plates of the 1J6G tube with a .1 mfd. condenser in series with one of the leads. Set the volume at maximum during the alignment and as the meter hand tends to go off scale, decrease the output from the signal generator. If too strong a signal is fed to the receiver and the volume control is used to keep the output meter hand on scale, the AVC will operate and inaccurate alignment will result.

No.	Connect Generator To	Signal Generator Frequency	Dummy	Range Switch	Dial Setting	Stage	Trimmer No.	AFC Switch	Peak For	Special Instructions
1 •	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	2nd IF	1		Max.	
2	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	2nd IF	2		Max.	
3	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	1st IF	3		Max.	
4	6A8G Grid	456 KC	.1 mfd. Condenser	Broadcast	530 KC	1st IF	4		Max.	
5	Antenna	456 KC*	400 ohm Resistor	Broadcast	530 KC	Wave Trap	5		Min.	*Raise input until signal is heard.
6	Antenna	5.4 MC	400 ohm Resistor	Police Amateur	5.4 MC	Police Osc.	6		Max.	
7	Antenna	5.4 MC	400 ohm Resistor	Police Amateur	5.4 MC	Police Det.	7		Max.	
8	Antenna	1.8 MC	400 ohm Resistor	Police Amateur	1.8 MC	Police Osc.	8		*Max.	*While rocking. Repeat 6, 7 and 8 until no change is noted.
9	Antenna	1500 KC	200 mmf. Condenser	Broadcast	1500 KC	B. C. Osc.	9		Max.	
10	Antenna	1500 KC	200 mmf. Condenser	Broadcast	1500 KC	B. C. Det.	10		Max.	
11	Antenna	600 KC	200 mmf. Condenser	Broadcast	600 KC	B. C. Osc.	11		*Max.	*While rocking. Repeat 9, 10 and 11 until no change is noted.
12	Antenna	18 MC	400 ohm Resistor	Short Wave	18 MC	S. W. Osc.	12		Max.	
13	Antenna	18 MC	400 ohm Resistor	Short Wave	18 MC	S. W. Det.	13		Max.	
14	Antenna	6 MC	400 ohm Resistor	Short Wave	6 MC		*			*Check calibration at 6 MC. Padder is fixed.

Figure 2 ALIGNMENT PROCEDURE CHART

ELECTROLYTIC CONDENSER COLOR CODE

(All Other Color Codes Standard R. M. A.)

With the positive (+) or center solder lug toward you, read the colored markings as follows from left to right:

LEFT HAND OR CAPACITY COLOR	
Black	0 to 9 mfd.
Brown	9 to 19 mfd.
Red	19 to 29 mfd.
Orange	29 to 39 mfd.
Yellow	39 to 49 mfd.

SECOND FROM LEFT OR MAXIMUM VOLTAGE COLOR	
Black	0 to 99 volts
Brown	99 to 199 volts
Red	199 to 299 volts
Orange	299 to 399 volts
Yellow	399 to 499 volts
Green	499 to 599 volts

If a third (blue) stripe is shown, the condenser is a regulator and should be in the position farthest from the rectifier tube in the filter circuit.

BATTERY CONNECTIONS

BATTERY

A storage battery with a capacity of at least 135 ampere hours should be used with the receiver. The storage battery should be located as far from the chassis of the receiver as the battery cables will permit. Attach the long, red lead from the receiver to the positive (+) side of the storage battery. Attach the long, black lead from the receiver to the negative (—) side of the battery.

NOTE: Do not lengthen the battery leads. The clips must be attached directly to the heavy storage battery terminals.

FUSE

Make sure that the fuse, located in a metal cartridge near the end of the positive (red) battery lead, is intact. If it should become necessary to replace this fuse, a duplicate can be obtained from the dealer through whom you purchased the receiver.

NOTE: The antenna lead-in should be placed so as to avoid running close to the battery or battery cables.

PARTS AND PRICE LIST

Part Number	Schematic Reference Number	Description	List Price
8625-1		Band, Rubber	$ .05
481-3		Battery Cable—Only	.40
480-3		Battery Cable Assembly with Clips	.75
803-1		Battery Clip	.15
810-1		Belt, Condenser Drive	.25
800-1	32	Bias Cell	.20
150-1		Bushing, Drive Shaft	.15
40-10		Cabinet C2-B	
42-6		Cabinet T4-B	
155-1		Clamp Tube Mounting (Eye Tube)	.25
501-4	3	Coil Assembly, Antenna	3.00
503-4	13	Coil Assembly, Oscillator	3.00
202-4	2 A & B	Condenser, Variable 2-Gang	3.50
210-1		Condenser, Electrolytic (Wet) 8-200	.75
272-10		Condenser, Variable Padding Dual	.80
250-12	4	Condenser, Tubular .01-400	.18
250-15	37, 30	Condenser, Tubular .02-600	.18
250-39	40, 7, 5, 2?	Condenser, Tubular .05-200	.18
250-21	21	Condenser, Tubular .1-200	.18
250-27	39	Condenser, Tubular .25-200	.20
250-11	35	Condenser, Tubular .006-600	.18
230-1	40	Condenser, Tubular (Dry) Elec 10-25	.80
260-1	63	Condenser, Mica 10 mmfd.	.18
260-7	9, 28, 29	Condenser, Mica 100 mmfd	.18
260-13	33	Condenser, Mica 500 mmfd.	.20
261-23	12	Condenser, Mica 4000 mmf.	.30
260-18	14	Condenser, Mica 1000 mmfd	.20
340-2	27 A & B	Control, Volume and Switch	1.20
64-3		Crystal, Pyralin	.50
805-1	46	Dial Light (60 Ma 2 Volt)	.25
611-1		Dial Reflector	.70
601-4		Dial Scale	.80
61-1		Escutcheon	.90
7540-2		Eyelet, Flat Flange	Doz. .15
8636-1		Fuse (15 Amp)	.04
801-8		Grid Clip—Large	.01
801-5		Grid Clip—Small	.01
700-1		Grommet, Rubber 5/16" Black	.02
700-3		Grommet, Rubber 1/2" Black	.03
702-1		Grommet, Rubber Variable Cond. Mtng.	.03
700-2		Grommet, Rubber 1/2" Pure Gum	.04
70-7		Knob Bakelite (Round)	.15
70-6		Knob Bakelite (Bar)	.15
602-4		Pointer, Main Tuning	.20
602-2		Pointer, Vernier	.15
126-1		Pulley, Drive	.15
112-2		Ring, Condenser Mounting 1"	.10
301-8	6	Resistor, Carbon 150 ohm—1/2 Watt	.15
301-11	22	Resistor, Carbon 470 ohm—1/2 Watt	.15
301-17	17	Resistor, Carbon 4700 ohm—1/2 Watt	.15
301-19	16, 15	Resistor, Carbon 10,000 ohm—1/2 Watt	.15
301-23	8, 26	Resistor, Carbon 47,000 ohm—1/2 Watt	.15
301-26	34, 38	Resistor, Carbon 150,000 ohm—1/2 Watt	.15
301-29	31, 18	Resistor, Carbon 470,000 ohm—1/2 Watt	.15
301-31	19	Resistor, Carbon 1 meg—1/2 Watt	.15
335-6	44	Resistor, Wire Wound 7.2 ohm	.20
335-7	45	Resistor, Wire Wound 41.5 ohm	.20
335-8	43	Resistor, Wire Wound 78.0 ohm	.20
7381-1		Rivet, Split—1/8"x1/4"	Doz. .10
191-1		Rubber Mtg. Block (Tone Projector)	.05
7113-1		Screw, Fillister H. M. (St. Blue) 1/4-20x1 1/4"	Doz. .25
7362-2		Screw, Gulmite Head Mach—No. 4-36x3/16"	Doz. .08
7372-2		Screw, Headless Set—8-32x3/16"	Doz. .30
7129-1		Screw, Ornamental Head—No. 6-32x1"	Doz. .18
7245-31		Screw, Tap Screw No. 8-32x1/4"	Doz. .15
7245-35		Screw, S.H.W.H. (Tap Screw) No. 8-32x1/2"	Doz. .15
7245-40		Screw, S.H.W.H. (Tap Screw) No. 8-32x1 1/4"	Doz. .20
151-1		Shaft, Dial Drive	.15
121-1	Incl. R-47	Socket & Cable Assembly (Eye Tube)	.70
455-1		Socket, Octal Base, Twist-in, 8 Cont.	.15
465-1		Socket, Dial Light, Screw Type	.10
451-2		Socket, Tube—5-Prong	.10
451-3		Socket, Vibrator—6-Prong	.10
7700-2		Solder Lug, Shakeproof—No. 8	.01
22-3	42 A & B	Speaker, P.M. Dyn.—6"	5.00
22-4	42 A & B	Speaker, P.M. Dyn.—12"	11.00
372-1	1 A to D	Switch, Range	1.50
380-2	56	Switch, Tone	.45
470-1		Terminal Strip—1-Lug	.05
470-2		Terminal Strip—2 Lugs	.05
470-5		Terminal Strip—4 Lugs	.10
470-15		Terminal Strip—Bias Cell Mtg.	.15
550-9	20	Transformer Assembly—IF—Input	1.50
550-10	25	Transformer Assembly—IF—Output	1.50
410-1	41	Transformer—Audio	2.00
131-1		Tension Pulley Assembly	.20
111-2		Tube Shield Assembly	.15
111-4		Tube Shield Assembly	.15
7510-4		Tack, Escutcheon	Doz. .05
189-1		Tone Projector Assembly	1.80
7479-1		Washer—Slotted	.01
7476-1		Washer—Spring	.02
7475-1		Washer—"C"	Doz. .05
123-1		Washer—Clip	.04
8021-1		Washer—Fibre	Doz. .10
7477-1		Washer—Felt	Doz. .05

POWER PACK PARTS MODEL 6C

Part Number	Schematic Reference Number	Description	List Price
425-1	51	"A" Choke Assembly	$ .30
425-2	59	"B" Choke Assembly	.40
420-1	61	Choke—Iron Core	1.50
231-1		Condenser, Elec—8-8-200	1.50
250-40	52, 53, 54	Condenser, Tubular .5-150	.25
250-22	58	Condenser, Tubular .1-400	.20
250-41	56, 57	Condenser, Tubular .01-1200	.20
112-1		Ring, Condenser Mtg.—1 1/8"	.10
405-1	55	Transformer, Vibrator	3.00
806-1	50	Vibrator, Synchronous—6-Prong	4.00
451-3		Socket—6-Prong	.10

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FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODEL 8A

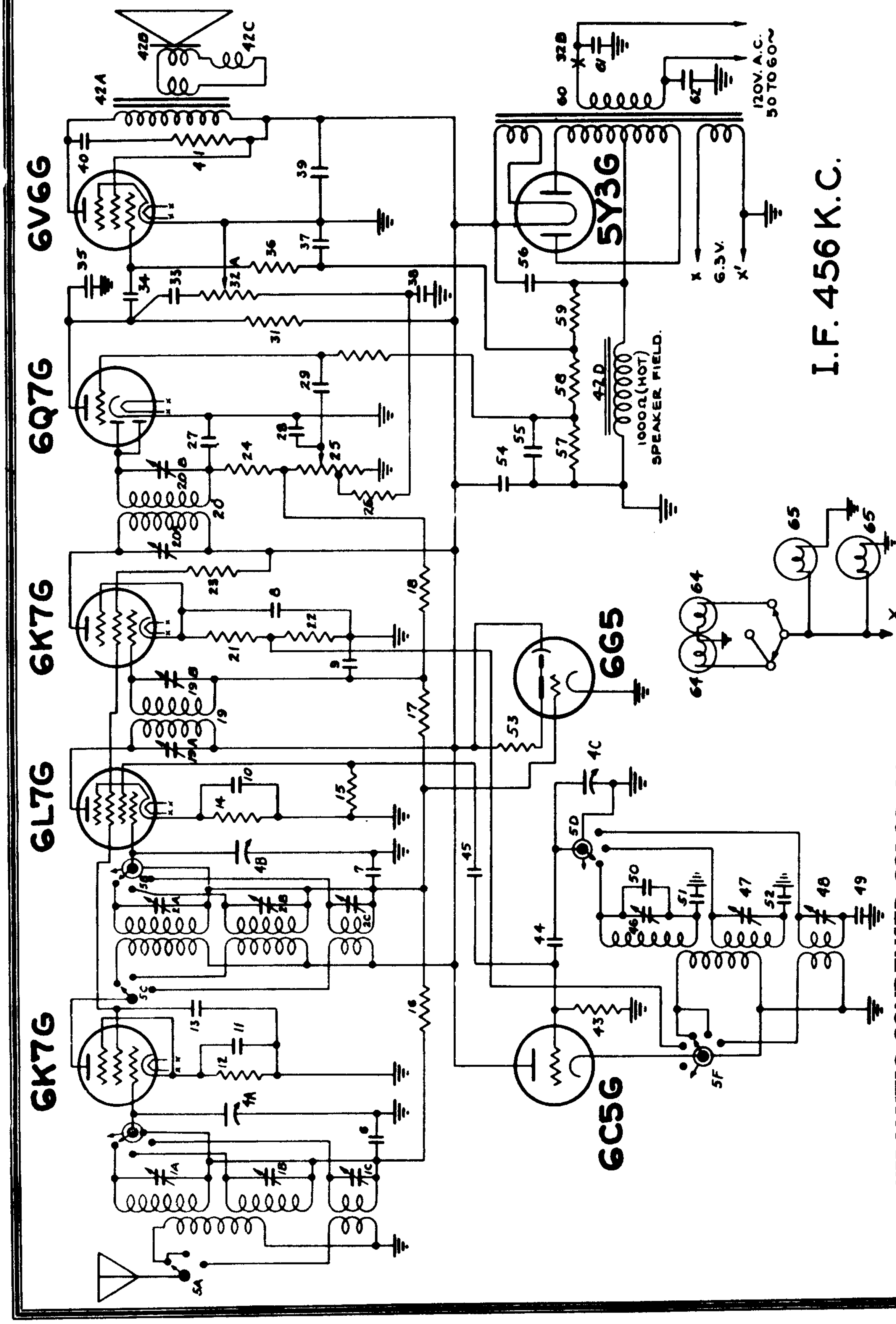


Figure 2

SECOND FROM LEFT OR MAXIMUM VOLTAGE COLOR

Black	0 to 99 volts
Brown	99 to 199 volts
Red	199 to 299 volts
Orange	299 to 399 volts
Yellow	399 to 499 volts
Green	499 to 599 volts

If a third (blue) stripe is shown, the condenser is a regulator and should be in the position farthest from the rectifier tube in the filter circuit.

ELECTROLYTIC CONDENSER COLOR CODE

(All Other Color Codes Standard R. M. A.)

With the positive (+) or center solder lug toward you, read the colored markings as follows from left to right:

LEFT HAND OR CAPACITY COLOR

Black	0 to 9 mfd.
Brown	9 to 19 mfd.
Red	19 to 29 mfd.
Orange	29 to 39 mfd.
Yellow	39 to 49 mfd.

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODEL 8A

The model 8A is an AC operated superhetrodyne with automatic volume control, signa-lite band indication and tuning eye. It has three wave bands—broadcast, police-amteur and short wave. It will be noted that no padding operation is shown in the alignment procedure. These adjustments have been eliminated by the use of semi-fixed padders, so called because they are adjusted and aged at the factory and then impregnated with a "fixing" compound. This treatment acts on the padder in such a way as to allow it to hold its original setting regardless of changes in humidity or temperature, and gives it a stabilty far superior to that of the adjustable type of condenser. Once moved, however, the padder loses its stability and tends to drift, for it then becomes nothing more than an adjustable padder (within narrow limits). For that reason it is recommended that should one of these condensers be encountered which shows signs of having been moved or which through some other cause seems to have lost its original setting, it be changed rather than readjusted. Replacements are furnished already set and sealed and do not require any adjustment after being placed in the receiver.

Alignment procedure is given in the following pages in chart form. Make adjustments in the order given. Any low range AC voltmeter, preferably about 0-15 volts, may be used for an output meter. It should be connected from the plate of the 6V6G tube to ground with a .1 mfd. condenser in series with one of the leads. The volume control should be set at maximum during the alignment and the output from the signal generator should be decreased as the meter hand tends to go off scale. If too strong a signal is used and the volume control is used to keep the hand on scale, the AVC will operate and inaccurate alignment will result.

When aligning the police and short wave bands, care must be taken to see that the trimmers are set on the proper frequency and not on the image. The signal from the oscillator beating with the incoming signal in the mixer tube produces two 456 kilocycle hetrodynes, one equal to the oscillator frequency minus the frequency of the incoming signal, and the other equal to the incoming signal minus the oscillator. The former is the one to which the RF and antenna trimmers must be tuned if the receiver is to work correctly over the entire band. The image falls 912 kilocycles below the fundamental signal, so at 18 megacycles the image should be heard at 18 megacycles minus .912 megacycle or 17.1 megacycles aprpoximately.

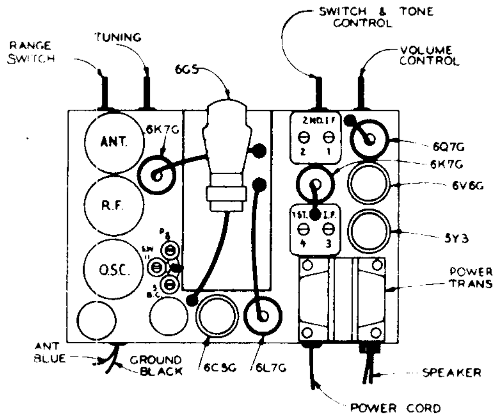
After setting the oscillator trimmer, increase the input from the signal generator and make sure that the image comes in at the proper point. When you can hear one signal at the frequency to which your generator is set, and one at about 1 megacycle below it, you are ready to finish the alignment. Go back to the fundamental frequency and start peaking the RF trimmer, rocking the tuning condenser slightly as you do so. When you reach a peak, compare the strength of the fundamental signal and the image. If the image is the stronger, you have the wrong peak on the RF trimmer. Find the other peak and again compare the two signals. You will probably find it necessary to increase the generator input greatly in order even to hear the image when you have found the right peak. The antenna trimmer may be peaked in the same manner.

Extreme howling or motorboating on the short wave bands or dead spots near the high frequency end of the dial are good indications that the RF trimmer is improperly aligned and may easily be corrected by resetting it as described above.

No.	Connect Generator To	Signal Generator Frequency	Dummy	Range Switch	Dial Setting	Stage	Trimmer No.	AFC Switch	Peak For	Special Instructions
1	6L7G Grid	456 KC	.1 mfd. Condenser	Broadcast	550 KC	2nd IF	1		Max.	
2	6L7G Grid	456 KC	.1 mfd. Condenser	Broadcast	550 KC	2nd IF	2		Max.	
3	6L7G Grid	456 KC	.1 mfd. Condenser	Broadcast	550 KC	1st IF	3		Max.	
4	6L7G Grid	456 KC	.1 mfd. Condenser	Broadcast	550 KC	1st IF	4		Max.	
5	Antenna Lead	1500 KC	200 mmf. Condenser	Broadcast	1500 KC	BC Osc.	5		Max.	
6	Antenna Lead	1500 KC	200 mmf. Condenser	Broadcast	1500 KC	BC Det.	6		Max.	
7	Antenna Lead	1500 KC	200 mmf. Condenser	Broadcast	1500 KC	BC Ant.	7		Max.	Check calibration at 600 KC
8	Antenna Lead	5.4 MC	400 ohm Resistor	Police	5.4 MC	Police Osc.	8		Max.	
9	Antenna Lead	5.4 MC	400 ohm Resistor	Police	5.4 MC	Police Det.	9		Max.	
10	Antenna Lead	5.4 MC	400 ohm Resistor	Police	5.4 MC	Police Ant.	10		Max.	Check calibration at 1.8 MC
11	Antenna Lead	18 MC	400 ohm Resistor	Short Wave	18 MC	S.W. Osc.	11		Max.	Check for image at 17.1 MC. It should not be as strong as the
12	Antenna Lead	18 MC	400 ohm Resistor	Short Wave	18 MC	S.W. Det.	12		Max.	signal at 18 MC
13	Antenna Lead	18 MC	400 ohm Resistor	Short Wave	18 MC	S.W. Ant.	13		Max.	Check calibration at 6 MC

Figure 4

ALIGNMENT PROCEDURE CHART



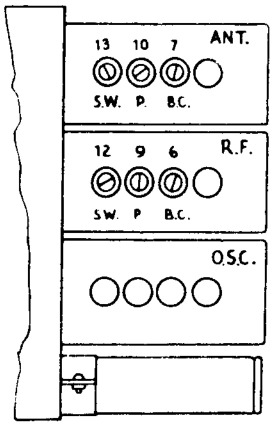


Figure 3

RIGHT SIDE AND TOP VIEWS OF THE CHASSIS SHOWING TRIMMER LOCATIONS, TUBE LOCATIONS AND COMPONENT PARTS

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODEL 8A

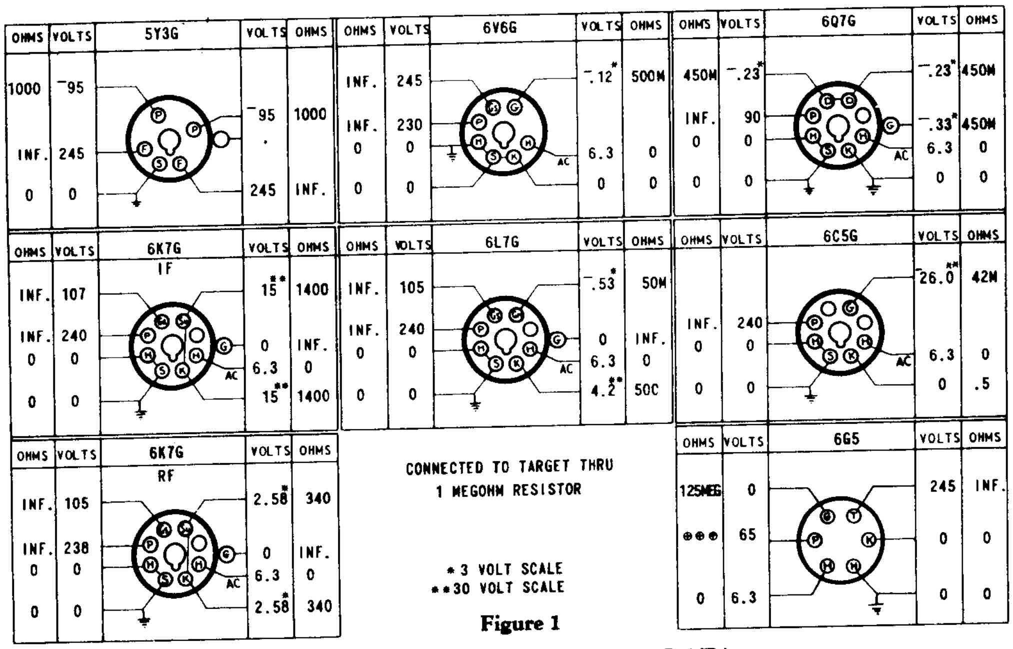


Figure 1

VOLTAGE AND RESISTANCE DATA

PARTS AND PRICE LIST

Part Number	Schematic Reference Number	Description	List Price
810-2		Belt—Flat Drive	$ .25
103-3		Bracket—Dial Drive	.10
42-7		Cabinet (T8)	
40-3		Cabinet (C2)	
40-4		Cabinet (C3)	
155-1		Clamp—Mounting for Ray Tube	.25
635-2		Clip—Dial Scale Mounting	.01
801-5		Clip—Grid	.01
501-3	1	Coil Assembly—Antenna	3.50
503-5	3	Coil Assembly—Oscillator	3.50
502-1	2	Coil Assembly—R.F.	3.50
280-1	46, 47, 48	Condenser—Air Trimmer 2-12 mmf.	.20
211-2	56	Condenser—Electro. 16 mfd. 450 V.	1.25
214-1	54	Condenser—Electro. 18 mfd. (Reg.)	1.10
260-26	50	Condenser—Mica 15 mmf.	.18
260-5	45	Condenser—Mica 50 mmf.	.18
260-7	27, 28, 44	Condenser—Mica 100 mmf.	.18
260-13	35	Condenser—Mica 500 mmf.	.20
261-23	49	Condenser—Mica 4000 mmf.	.30
251-1	61, 62	Condenser—Moulded Paper .01-600	.18
285-1	51	Condenser—Padder 507 mmf.	.25
285-2	52	Condenser—Padder 1454 mmf.	.35
250-15	40, 29, 34	Condenser—Tubular Paper .02-600	.18
250-16	33	Condenser—Tubular Paper .03-600	.18
250-39	6, 7, 8, 9, 10, 11	Condenser—Tubular Paper .05-200	.18
250-21	38, 55	Condenser—Tubular Paper .1-200	.18
250-22	13, 39	Condenser—Tubular Paper .1-400	.18
250-27	37	Condenser—Tubular Paper .25-200	.20
203-1	4 (ABC)	Condenser—Variable Tuning 3-Gang	4.50
340-5	32 A & B	Control—Tone and AC Switch	1.20
340-6	25	Control—Volume 550,000 ohm	1.00
875-2		Cord and Plug (AC Line)	.50
8036-1		Cord—Indicator Drive	.08
62-1		Crystal—Glass	.70
805-2	64	Dial Light (Long Bulb)	.15
805-3	65	Dial Light (Round Bulb)	.15
601-5		Dial Scale—Glass	1.40
61-2		Escutcheon—Dial	1.25
7540-2		Eyelet—Flat Flange Doz.	.15
5055-3		Flywheel—Lead	.75
707-1		Grommet—Rubber (Base mtng.) Doz.	.15
702-1		Grommet—Rubber for Gang Cond.	.03
70-8		Knob—Bakelite (Bar Type)	.25
70-9		Knob—Bakelite (Round)	.20
602-6		Pointer—Main Tuning	.20
602-5		Pointer—Vernier	.10
303-20	23	Resistor—Carbon 15,000 ohms 2 watt	.25
302-19	41	Resistor—Carbon 10,000 ohms 1 watt	.18
301-10	12, 21	Resistor—Carbon, 330 ohm ½ watt	.15
301-13	22	Resistor—Carbon 1000 ohm ½ watt	.15

Part Number	Schematic Reference Number	Description	List Price
301-11	14	Resistor—Carbon 470 ohm ½ watt	.15
301-16	26	Resistor—Carbon 3,300 ohm ½ watt	.15
301-22	57	Resistor—Carbon 33,000 ohm ½ watt	.15
301-23	15, 16, 24, 43	Resistor—Carbon 47,000 ohm ½ watt	.15
301-27	31, 36	Resistor—Carbon 220,000 ohm ½ watt	.15
301-28	58	Resistor—Carbon 330,000 ohm ½ watt	.15
301-29	17, 30	Resistor—Carbon 470,000 ohm ½ watt	.15
301-31	18	Resistor—Carbon 1 megohm ½ watt	.15
301-33	59	Resistor—Carbon 2.2 megohm ½ watt	.15
112-1		Ring—Condenser Mounting	.10
708-1		Rubber—Channel Strips	.01
8625-2		Rubber—Escutcheon Glass Band	.40
191-1		Rubber—Mounting Block Tone Proj.	.05
7141-3		Screw—6-32x¼"	.10
7375-1		Screw—Escutcheon OH Wood Doz.	.10
7113-1		Screw—Fillister Doz.	.25
7362-2		Screw—Gulmite HM 4/36x⅛"	.01
7245-17		Screw—Self Tapping 6/32x¼" Doz.	.15
7132-1		Screw—Special Thumb 8/32"	.03
7245-31		Screw—Tap Screw 8/32x¼" Doz.	.15
7245-40		Screw—Tap Screw 8/32x1¼" Doz.	.20
7245-65		Screw—Tap Screw 10/24x⅜" Doz.	.18
152-1		Shaft—Drive Assembly	.15
111-2		Shield—Tube Assembly	.15
121-2	53	Socket—Electron Ray Assby. inc. 53	.70
451-2		Socket—Speaker 5-Prong	.10
455-1		Socket—Twist-In Octal 8-Contact	.15
455-2		Socket—Twist-In Octal 5-Contact	.15
20-6	42 (A to D)	Speaker—8" Electrodynamic (T8)	6.50
20-8	42 (A to D)	Speaker—12" Electrodynamic (C2)	8.50
20-9	42 (A to D)	Speaker—12" Electrodynamic (C3)	10.00
127-3		Spring—Cord Tension	.05
370-1	5 (A to E)	Switch—Range	2.00
131-1		Tension Pulley Assembly	.20
221-1		Terminal—Cathode	.01
470-2		Terminal Strip—2-Lug	.05
470-3		Terminal Strip—3-Lug	.10
189-1		Tone Projector Assembly	1.80
7466-1		T Nut ¼-20	.06
550-7	19 A & B	Transformer—I.F. Input	1.50
550-8	20 A & B	Transformer—I.F. Output	1.50
400-4	60	Transformer—Power 110 V. 50-60 cycle	5.00
	60	Transformer—Power Universal	
220-1		Tube—Paper Insulating	.05
183-1		Turret Shield Corner Fillet	.15
180-1		Turret Top Assembly	2.00
7477-1		Washer—Felt Doz.	.05
8021-1		Washer—Fibre Gang Condenser Doz.	.05
7479-1		Washer—Slotted for Gang Condenser	.01

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FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODEL 9A

I.F. 456 K.C.

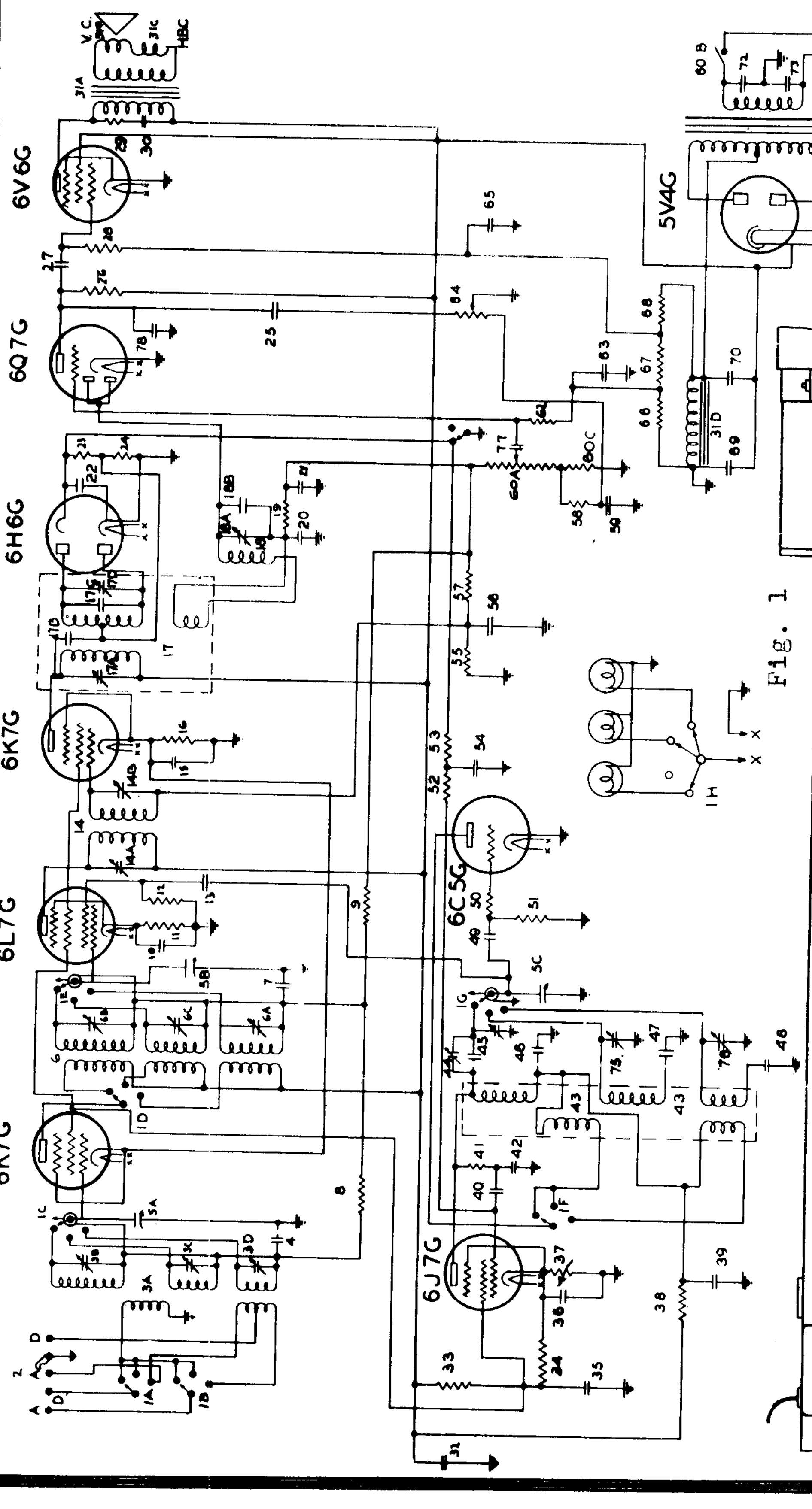


Fig. 1

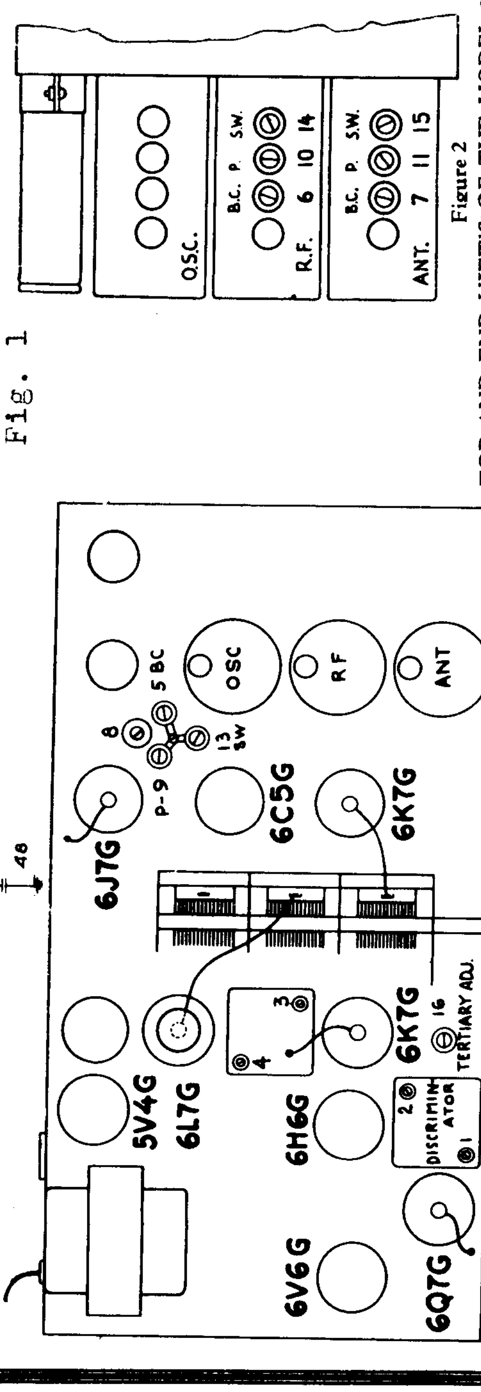


Figure 2

TOP AND END VIEWS OF THE MODEL 9A SHOWING THE LOCATIONS OF TRIMMERS, CONTROLS AND VARIOUS COMPONENT PARTS

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODEL 9A

The Model 9A is an AC operated superheterodyne with automatic volume control, signa-lite band indication, automatic dial and automatic frequency control. It receives signals on three bands, broadcast, police-amateur, and short wave.

Alignment procedure is given in chart form.
Make adjustments in the order given. The output meter may be any low range AC voltmeter, preferably about 0-15 volts. It should be connected from the plate of the 6V6G tube to ground with a .1 mfd. condenser in series with one of the leads. The volume control should be set at maximum during the alignment, and as the meter hand tends to go off scale the output from the signal generator should be decreased. If too strong a signal is fed to the receiver and the volume control is used to keep the hand on scale the A.V.C. will operate and inaccurate alignment will result.

When aligning the police and short wave bands, care must be taken to see that the trimmers are set on the proper frequency and not on the image. The signal from the oscillator beating with the incoming signal in the mixer tube produces two 456 kilocycle heterodynes, one equal to the osclllator frequency minus the frequency of the incoming signal and the other equal to the incoming signal minus the oscillator. The former is the one to which the RF and antenna trimmers must be tuned if the receiver is to work correctly over the entire band. The image falls 912 kilocycles below the fundamental signal, so at 18 megacycles the signal should be heard at 18 minus .912 or 17.1 megacycles approximately.

After setting the oscillator trimmer, increase the input from the signal generator and make sure that the image comes in at the proper point. When one signal can be heard at the frequency to which the generator is set and one at about one megacycle below it the alignment is ready to be finished. Go back to the fundamental frequency and start peaking the RF trimmer, rocking the tuning condenser slightly at the same time. When a peak has been reached, compare the strength of the fundamental signal and the image. If the image is the stronger, the RF trimmer is at the wrong peak. Find the other peak and again compare the two signals. It will probably be necessary to increase the generator input greatly in order even to hear the image when the right peak has been found.

THE AUTOMATIC DIAL

Since the Models 9AC4 and 9AC5 are to be delivered to the customer with the dial set up for the locality in which he lives, it is important that the service man be thoroughly familar with the proper set-up procedure so that he can perform the operation accurately and in a small amount of time.

It would be practically impossible to design a mechanical tuning device for a receiver as selective as the 9A which would automatically tune stations to the exact point of resonance every time without the operator's having to watch some sort of resonance indicator. For that reason automatic frequency control (true AFC tuning) has been incorporated into this model. The automatic frequency control makes up for the slight mechanical tolerances necessary in a device such as the automatic dial by shifting the oscillator to the exact frequency of the station to which the dial is tuned. It will be noted that stations can be "pulled" into resonance with the dial as much as 10 kilocycles away from the point where they would come in with the automatic tuning switch in the "out" position, and for that reason accurate setting of the dial might seem unimportant. It must be remembered, however, that the sensitivity of the receiver is best at the point where the stations come in without A.F.C. and that A.F.C. shifts only the oscillator frequency, not the RF and detector stages. Therefore, accurate setting of the dial is important if good reception is to be obtained on all the stations.

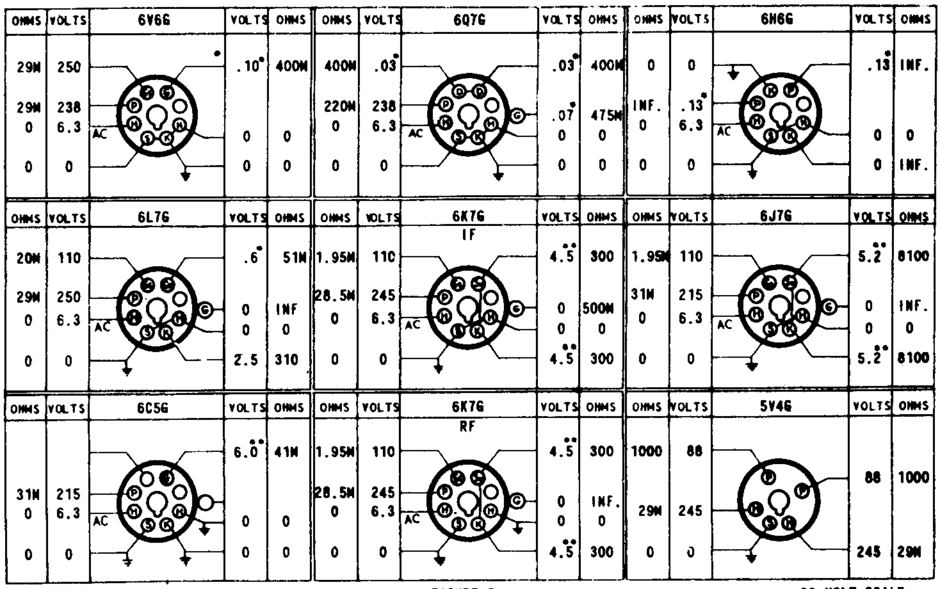
First, throw the automatic tuning switch to the "OUT" position. Then, by means of the outer tuning knob, tune in a station to which a button is to be assigned. Now, place a finger on the button nearest the "click" point (the mid-point at the bottom) and move it over to the "click" point until the dial locks. Care must be taken at this point that in depressing the button without its pyralin covering the metal plunger in the center is not pushed to a point where the dial will not lock. If this difficulty is experienced, try depressing the button with the nail of the forefinger against its outer edge.

After the dial has clicked into place and seems to be locking properly, release the button taking care not to move the dial. Now, with a pencil or screw driver held in the left hand push the metal plunger at the center of the button in as far as it will go. With the right hand retune the station carefully and then release the metal plunger. It may not come all the way out at first and a slight back and forth motion of the vernier knob may be necessary before it snaps out to its original position. Be sure that the plunger is back into place before the station tab is placed in the button.

To check the setting before putting in the station tab, rotate the dial until the button which was just set is somewhere near the top of the dial. Throw the automatic tuning switch to the "IN" position and use the button to tune in the station just as is described under "Automatic Tuning" in the Operating Instructions. Observe the same precautions as were mentioned before in regard to the metal plunger or the setting will have to be made all over again. With the station still tuned in, throw the automatic tuning switch to the "OUT" position and note the amount of detuning which occurs. If the station is detuned more than 3 or 4 kilocycles or to a point where the side bands are just barely audible, there is a closer setting possible and the button should be reset. When the dial seems to be tuning in the station properly, put in the proper station tab and place one of the pyralin discs over it. The tab should be placed so as to read right side up when the button is at the "click" point. This gives a uniform appearance to the dial when the buttons have all been set. In case any of the buttons are not used, put in one of the blank tabs supplied and a pyralin disc.

Set the remainder of the buttons in exactly the same manner, making sure each time that the switch is in the "OUT" position before an adjustment is started.

When the dial setting has been completed, replace the sheets of station tabs in their envelope and put the envelope, together with the one containing the pyralin discs, into the back of the cabinet beside the chassis so that they will be available later should the customer desire to have the dial set for other stations.



*3 VOLT SCALE

FIGURE 5
VOLTAGE AND RESISTANCE ANALYSIS CHART

**30 VOLT SCALE

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION
MODEL 9A

No.	Connect Generator To	Signal Generator Frequency	Dummy Antenna	Range Switch	Dial Setting	Stage	Trimmer No.	AFC Switch	Peak For	Special Instructions
1	6L7G Grid	456 KC	1 Mfd. Condenser	Broadcast	550 KC	Disc.	1	Out	Max.	
2	6L7G Grid	456 KC	.1 Mfd. Condenser	Broadcast	550 KC	Disc.	2	Out	Max.	
3	6L7G Grid	456 KC	.1 Mfd. Condenser	Broadcast	550 KC	Disc.	16	Out	Max.	
4	6L7G Grid	456 KC	.1 Mfd. Condenser	Broadcast	550 KC	1st IF	3	Out	Max.	
5	6L7GGrid	456 KC	.1 Mfd. Condenser	Broadcast	550 KC	1st IF	4	Out	Max.	
6	Antenna	1500 KC	200 Mmf. Condenser	Broadcast	1500 KC	B.C. Osc.	5	Out	Max.	
7	Antenna	1500 KC	200 Mmf. Condenser	Broadcast	1500 KC	B.C. R.F.	6	Out	Max.	
8	Antenna	1500 KC	200 Mmf. Condenser	Broadcast	1500 KC	B.C. Ant.	7	Our	Max.	*While rocking. Repeat 6, 7, 8, and 9 until no change is noted.
9	Antenna	600 KC	200 Mmf. Condenser	Broadcast	600 KC	B.C. Pad.	8	Out	*Max.	
10	Antenna	1500 KC	200 Mmf. Condenser	Broadcast	1500 KC	Disc.	1	In	Max.	
11	Antenna	5.4 MC	400 Ohm Resistor	Police Amateur	5.4 MC	Police Osc.	9	Out	Max.	
12	Antenna	5.4 MC	400 Ohm Resistor	Police Amateur	5.4 MC	Police R.F.	10	Out	Max.	
13	Antenna	5.4 MC	400 Ohm Resistor	Police Amateur	5.4 MC	Police Ant.	11	Out	Max.	
14	Antenna	1.8 MC	400 Ohm Resistor	Police Amateur	1.8 MC	Police Pad.	*	Out		*Check calibration at 1.8 MC. Padder is fixed.
15	Antenna	18 MC	400 Ohm Resistor	Short Wave	18 MC	S.W. Osc.	13	Out	Max.	
16	Antenna	18 MC	400 Ohm Resistor	Short Wave	18 MC	S.W. R.F.	14	Out	Max.	
17	Antenna	18 MC	400 Ohm Resistor	Short Wave	18 MC	S.W. Ant.	15	Out	Max.	
18	Antenna	6.0 MC	400 Ohm Resistor	Short Wave	6.0 MC	S.W. Pad.	*	Out	Max.	*Check calibration at 6.0 MC. Padder is fixed.

Figure 3

ALIGNMENT PROCEDURE CHART

ELECTROLYTIC CONDENSER COLOR CODES
(All Other Color Codes Standard R. M. A.)

With the positive (+) or center solder lug toward you, read the colored markings as follows from left to right:

LEFT HAND OR CAPACITY COLOR

Black	0 to 9 mfd.
Brown	9 to 19 mfd.
Red	19 to 29 mfd.
Orange	29 to 39 mfd.
Yellow	39 to 49 mfd.

SECOND FROM LEFT OR MAXIMUM VOLTAGE COLOR

Black	0 to 99 volts
Brown	99 to 199 volts
Red	199 to 299 volts
Orange	299 to 399 volts
Yellow	399 to 499 volts
Green	499 to 599 volts

If a third (blue) stripe is shown, the condenser is a regulator and should be in the position farthest from the rectifier tube in the filter circuit.

PARTS AND PRICE LIST

Part Number		Description	List Price
40-6		Cabinet (C5)	
40-5		Cabinet (C4)	
7710-1		Cinch Plug Button	$ .05
501-5	1	Coil Assembly—Antenna	3.50
502-1	10	Coil Assembly—R. F.	1.50
503-3	29	Coil Assembly—Oscillator	3.50
280-1	74, 75, 76	Condenser—Air Trimmer 2-12 mmf	.20
211-2	70	Condenser—Electrolytic 16-450	1.25
214-2	69	Condenser—Electrolytic 30-300 (Reg.)	1.10
210-2	39	Condenser—Electrolytic 8-300	.80
261-2	42	Condenser—Mica 20 mmf	.18
260-5	13, 49	Condenser—Mica 50 mmf	.18
260-7	20, 21, 40, 17B	Condenser—Mica 100 mmf	.18
260-13	78	Condenser—Mica 500 mmf	.20
263-1	45	Condenser—Mica 490 mmf	.35
261-23	48	Condenser—Mica 4000 mmf	.30
251-1	72, 73	Condenser—Moulded .01-600	.18
285-2	47	Condenser—Semi-Fixed Padder, 1457 mmf	.35
275-5	18B, 17C	Condenser—Tooth Pick 50 mmf	.25
291-1	44	Condenser—Trimmer Isolantite Base	.25
250-12	22	Condenser—Tubular .01-400	.18
250-15	30, 77, 25, 27	Condenser—Tubular .02-600	.18
250-19	47, 54, 56, 36	Condenser—Tubular .05-200	.18
250-21	10, 59	Condenser—Tubular .10-200	.18
250-22	32, 35, 46	Condenser—Tubular .10-400	.18
250-27	15, 63, 65	Condenser—Tubular .25-200	.20
203-5	5 A, B & C	Condenser—Variable Tuning 3-Gang	4.50
340-7	64	Control—Tone 500,000 ohm	1.00
340-3	60 A, B & C	Control—Volume and AC Switch	1.20
875-1		Cord and Plug (AC Line)	.50
600-1		Dial Assembly	22.50
684-1		Dial Glass	.60
805-1		Dial Lights (Bayonet Type) 6.3 V Round	.15
805-2		Dial Lights—6.3 V Long	.15
601-5		Dial Scale—Pyralin	2.00
61-1		Escutcheon	1.50
7540-2		Eyelet—Flat Flange Doz.	.15
801-5		Grid Clip	.01
707-1		Grommets—Rubber (Base Mtg.) Doz.	.15
702-1		Grommets—Rubber Variable Cond. Mtg.	.03
663-1		Index Button Crystal—Pyralin	.05
640-3		Indicator Disc—Tone	.20
640-4		Indicator Disc—Volume	.20
70-8		Knob—Bar	.25
70-10		Knob—Volume and Tone	.20
660-1		Knob—Micrometer Dial	.30
661-1		Knob—Vernier	.20
303-19	33	Resistor—Carbon 10,000 ohm 2 watt	.25
302-19	29	Resistor—Carbon 10,000 ohm 1 watt	.18
302-21	34	Resistor—Carbon 22,000 ohm 1 watt	.18
301-7	50	Resistor—Carbon 100 ohm ½ watt	.15
301-10	11, 16	Resistor—Carbon 130 ohm ½ watt	.15
301-15	38	Resistor—Carbon 2200 ohm ½ watt	.15

Part Number	Schematic Reference Number	Description	List Price
301-16	58	Resistor—Carbon 3300 ohm ½ watt	.15
301-23	8, 51, 41, 19, 12, 66	Resistor—Carbon 47,000 ohm ½ watt	.15
301-27	67, 26, 28	Resistor—Carbon 220,000 ohm ½ watt	.15
301-29	62	Resistor—Carbon 470,000 ohm ½ watt	.15
301-31	9, 52, 55, 57	Resistor—Carbon 1 megohm ½ watt	.15
301-32	23, 24, 68	Resistor—Carbon 1.5 megohm ½ watt	.15
301-34	53	Resistor—Carbon 3.3 megohm ½ watt	.15
335-9	37	Resistor—Wire Wound 850 ohm	.20
112-1		Ring—Condenser Mounting	.10
112-2		Ring—Condenser Mounting	.10
191-1		Rubber Mounting Block—Tone Proj.	.05
7375-1		Screw—Escutcheon 2x⅛" Doz.	.10
7313-1		Screw—Fillister Head Mech. ¼-20x1¼" Doz.	.25
7132-1		Screw—Special Thumb 8-32	.03
7245-40		Screw—Self Tapping 8-32x1¼" Doz.	.20
7245-37		Screw—Self Tapping 8-32x¾" Doz.	.18
7245-31		Screw—Self Tapping 8-32x¼" Doz.	.15
7245-65		Screw—Self Tapping 10-24x⅜" Doz.	.15
7245-17		Screw—Self Tapping 6-32x¼" Doz.	.15
465-9		Socket—Dial Light	.15
455-1		Socket—Octal Base Twist-In 8-Contact	.15
455-2		Socket—Octal Base Twist-In 5-Contact	.15
451-2		Socket—Speaker 5-Prong	.10
20-10	31 (A, B, C & D)	Speaker—Electrodynamic 12" (C4)	9.50
20-11	31 (A, B, C & D)	Speaker—Electrodynamic 12" (C5)	10.00
664-1		Station Letter Disc (Sheet)	.15
664-2		Station Letter Disc (Sheet)	.15
664-3		Station Letter Disc (Sheet)	.15
664-4		Station Letter Disc (Sheet)	.15
664-5		Station Letter Disc (Sheet)	.15
380-3	79	Switch—A. F. C.	.40
374-1		Switch—Range	2.50
221-1		Terminal—Cathode	.01
470-2		Terminal Strip—2-Lug	.05
470-3		Terminal Strip—3-Lug	.10
470-5		Terminal Strip—4-Lug	.10
470-8		Terminal Strip—2-Lug (Ext. Mtg.)	.06
470-14		Terminal Strip (Antenna Doublet Ground)	.25
7466-1		T Nuts ¼-20	.06
189-1		Tone Projector Assembly	1.80
80-1		Transfer—Auto Tuning	.05
80-2		Transfer—Range	.05
550-11	17	Transformer—IF Discriminator	3.00
550-13	14	Transformer—IF Input	2.00
550-12	18	Transformer—IF Tertiary	1.50
400-5	71	Transformer—Power	5.50
220-1		Tube—Paper Electrolytic Insulation	.05
111-2		Tube—Shield Assembly	.35
183-1		Turret Shield Corner Fillet	.15
180-2		Turret Top Assembly	2.00
7477-1		Washer—Felt Doz.	.05
7479-1		Washer—Slotted	.01

AUTOMATIC DIAL PARTS

Part Number	Description	List Price
691-1	A. F. C. Jack—Top Leaf	$ .15
691-2	A. F. C. Jack—Bottom Leaf	.15
708-2	Channel—Rubber (10" Length)	.20
615-2	Clips—Glass Mounting	.01
671-1	Collar—Gear Clamp	.10
845-1	Coupling—Flexible Assembly	.75
684-1	Dial Glass	.60
805-2	Dial Light—6.3 Volt, ¼ A (Long)	.15
805-3	Dial Light—6.3 Volt, ¼ A (Round)	.15
601-6	Dial Scale	2.00
697-1	Gear—129 Tooth (Solid)	.15
697-2	Gear—129 Tooth (Loose)	.15
697-3	Gear—91 Tooth (Solid)	.15
697-4	Gear—91 Tooth (Loose)	.15
700-2	Grommet—Rubber (⅛" Pure Gum)	.04
689-1	Insulator—Jack	.01
690-1	Insulator—Sleeve Jack	.03
690-2	Insulator—Sleeve Jack (Long)	.03
660-1	Knob—Micrometer Dial	.30
661-1	Knob—Vernier	.20
655-1	Lock Gate Assembly	.70
656-1	Main Rotor Assembly	10.00
680-1	Mute Wiper	.15
668-1	Nut—Special Hex (Brass) ⅜"-18	.01
696-1	Planetary Drive Assembly	1.00
7235-1	Screw—Fillister Head Tap No. 8-32x⅜"	.02
7363-1	Screw—Gulmate Low Head No. 8-32x⅜" Doz.	.10
7246-18	Screw—S.H.H. Tap No. 6-32x⅜" Doz.	.10
7246-33	Screw—S.H.H. Tap No. 8-32x⅜" Doz.	.18
7246-33	Screw—S.H.H. Tap No. 8-32x⅜" Doz.	.18
7112-1	Screw—Thumb—Special No. 8-32x⅜" Doz.	.30
667-1	Shaft—Jack	.25
686-1	Spring—Gear Backlash	.02
465-6	Socket—Dial Light	.15
465-8	Socket—Dial Light	.15
7582-1	Trimounts Doz.	.10
7491-10	Washer—Lock (Steel Cad.) ⅜" Int. Doz.	.18

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

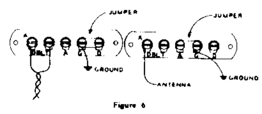
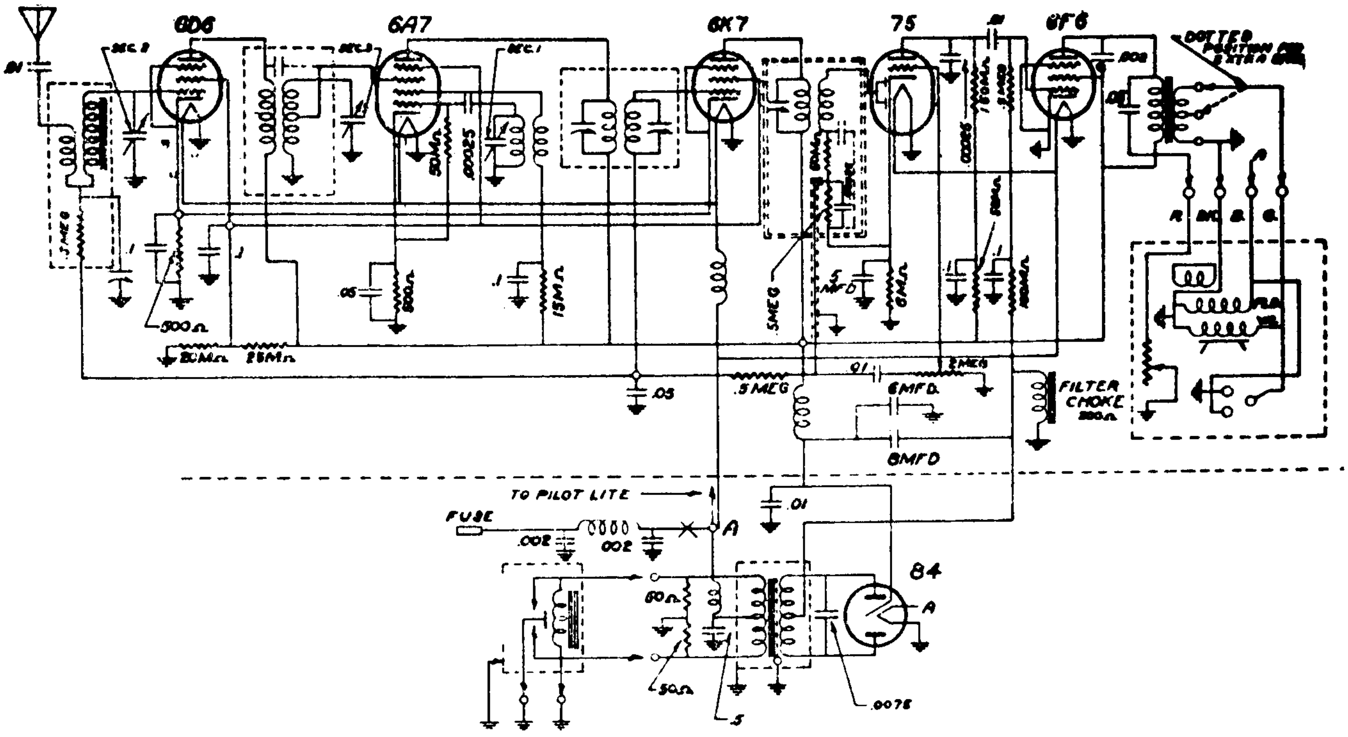


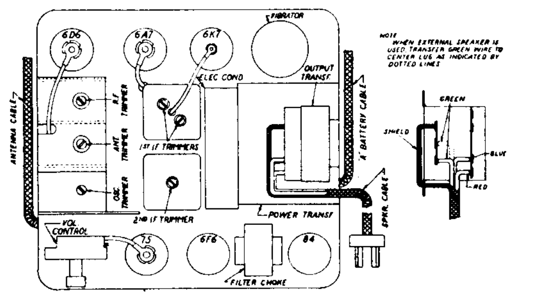
Figure 6

ANTENNA CONNECTIONS USING A DOUBLET ANTENNA

ANTENNA CONNECTIONS USING A SINGLE WIRE ANTENNA

FEDERATED PURCHASER INC.
MODEL 44D





ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 175, 600 and 1400 K.C., and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignment should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) transformers should be aligned properly as the first step.

I.F. ALIGNMENT Adjust the test oscillator to 175 K.C. and connect the output directly to the grid of the first detector tube (6A7), without the use of any series condenser or resistor; the omission of series condenser and resistor to block out the AVC action. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second I.F. transformers to peak or maximum reading on the output meter.

OSCILLATOR ALIGNMENT Adjust the test oscillator to 1400 K.C. and connect the output to the antenna through a .0001 mfd. mica condenser to give the equivalent of a low capacity type average auto antenna. Set the dial pointer to 1400 K.C. and adjust the oscillator trimmer to peak. (Front section of gang condenser.)

R.F. ALIGNMENT The next step is to adjust the center and rear trimmers of the gang condenser to peak. The center section of the gang condenser tunes the R.F. antenna amplifier stage (6D6 tube), and the rear condenser section tunes the detector grid coil of the 6A7 tube.

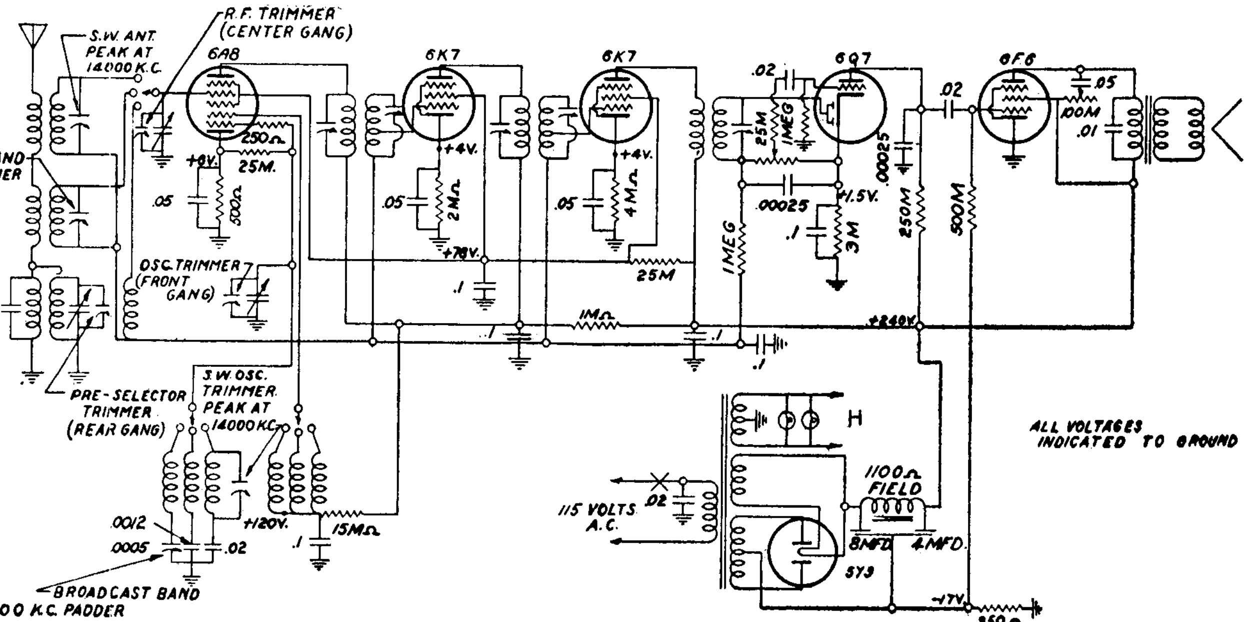
LOW FREQUENCY PADDING Next, reset the dial pointer on the control head and the test oscillator to 600 K.C., adjust the antenna compensator condenser to peak. This adjustment is best reached from the bottom of the chassis and the location of the condenser will be found near the volume control.

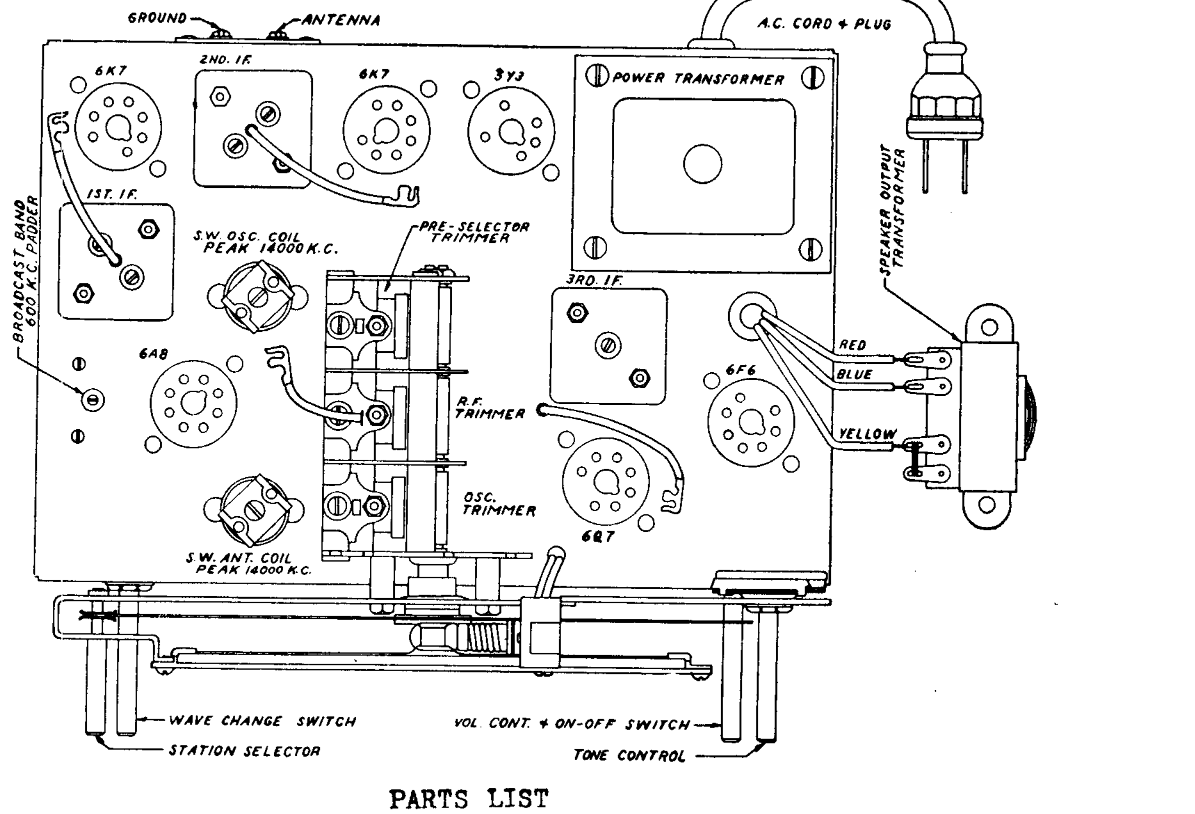
The adjustment of the antenna compensator should again be gone over after the auto set has been again installed in the car, to compensate for the difference that may exist in the capacity of the car antenna and the .0001 mfd. capacitor used with the test oscillator. Section VII of the installation Instructions completely covers the adjustment of the antenna compensator.

REPLACEMENT PARTS LIST

Part No.	DESCRIPTION	Part No.	DESCRIPTION
P800	3 Gang Condenser (special)	P279	500 Ohm ¼ Watt Resistor
G843	Transformer complete in Can	P811	6000 Ohm ¼ Watt Resistor
P822	Output Transformer	P258	15,000 Ohm ¼ Watt Rasistor
P816	Vibrator Unit	P812	20,000 Ohm ½ Watt Resistor
P824	Vibrator Socket	P165	25,000 Ohm 1 Watt Resistor
P795	8-6 Mfd. Elect. Condenser (350 W.V.)	P417	50,000 Ohm ¼ Watt Resistor
P801	Volume Control and Switch	P820	50,000 Ohm 2/10 Watt Resistor
P828	Tone Control	P280	100,000 Ohm ¼ Watt Resistor
P829	Tone Control Knob	P418	150,000 Ohm ¼ Watt Resistor
P832	1st I.F. Transformer	P137	500,000 Ohm ¼ Watt Resistor
P833	2nd I.F. Transformer	P819	500,000 Ohm 2/10 Watt Resistor
P834	Antenna Coil	G867	.00075 1600 Volt Condenser
P835	Interstage R.F. Coil	P164	.01 400 Volt Condenser
P836	Oscillator Coil	G868	.01 600 Volt Condenser
P617	Padding Condenser (Antenna Compensator)	P334	.05 400 Volt Condenser
P807	Iron B Filter Choke	G869	.10 400 Volt -.01 400 Volt Condenser (Dual)
P853	Hash Choke	G865	.25 200 Volt -.10 400 Volt Condenser (Dual)
P854	Small R.F. Choke	G863	.05 200 Volt -.10 200 Volt Condenser (Dual)
P835	Filament Choke	G866	.10 400 Volt -.10 200 Volt Condenser (Dual)
P856	Motor Noise Choke	G864	.05 200 Volt -5.0 25 Volt Condenser (Dual)
P439	6K7 Socket	P818	.002 Mica Condenser
P493	6F6 Socket	F817	.00025 Mica Condenser
P506	6A7 Socket	P813	.5 25 Volt Condenser
P521	75 Socket	P796	Mounting Stud Nut
P536	6D6 Socket	P803	Chassis Mounting Bolts
P805	Antenna Socket	P830	A Cable with Fuse Holder
P815	84 Socket	P831	Fuse (20 Ampere)
P839	Speaker Socket	P851	Flexible Drive Cables
P194	Plain Tube Shield	G870	Antenna Cable Complete
P530	Fitted Tube Shield	G874	8" Speaker Cable and Plug
G840	Speaker Complete		
P809	50 Ohm ½ Watt Resistor		

FEDERATED PURCHASER INC.
MODELS 55D & 56D





PARTS LIST

Part No.	Description
P617	Padding Condenser
P634	Knob
P646	Complete Dial & Scale
P660	Volume Control & "On-Off" Switch
P661	Tone Control
P668	Dial Glass
P670	3 Gang Condenser
P674	Wave Change Switch
P686	I.F. Transformer
P758	I.F. Transformer
P160	Electrolytic Condense
P170	350 Ohm Resistor
P173	Oscillator Coil
P176	AC Cord & Plug
P182	Output Transformer
P193	Pre-Selector Coil
P306	Power Transformer
P480	.0001 Mica Condenser
P142	.10 Mfd. 200 Volt Condenser
P143	.02 Mfd. 600 Volt Condenser
P148	.05 Mfd. 200 Volt Condenser
P276	.10 Mfd. 400 Volt Condenser
G560	Short Wave Antenna Coil
G561	Short Wave Oscillator Coil
G562	Police Band Antenna Coil
G563	Police Band Oscillator Coil
P124	Pilot Light
P147	.00025 Mica Condenser
P334	.05 Mfd. 400 Volt Condenser
P335	.01 Mfd. 200 Volt Condenser
P478	.0012 Mfd. 200 Volt Condenser
P136	250 Ohm 1/4 Watt Resistor
P137	500,000 Ohm 1/4 Watt Resistor
P139	250,000 Ohm 1/4 Watt Resistor
P162	1 Megohm 1/4 Watt Resistor
P165	25,000 Ohm 1 Watt Resistor
P166	25,000 Ohm 1/4 Watt Resistor
P258	15,000 Ohm 1/4 Watt Resistor
P278	1,000 Ohm 1/4 Watt Resistor
P279	500 Ohm 1/4 Watt Resistor
P481	3,000 Ohm 1/4 Watt Resistor
P757	4,000 Ohm 1/4 Watt Resistor
P756	2,000 Ohm 1/4 Watt Resistor
P435	6" Speaker Cone Only
P439	Speaker Field Coil
G564	Spider & Voice Coil Unit—Complete
	6" Dynamic Speaker

FEDERATED PURCHASER INC.

MODELS 55D & 56D

This receiver is designed to operate over three tuning ranges. The broadcast range which extends from 540 to 1700 Kilocycles (KC) (175 to 550 meters), Police and Aviation Band which extends from 1700 to 5000 Kilocycles (KC) (52 to 175 Meters) and the International Short Wave Band which extends from 5800 to 15,200 Kilocycles (KC) (18.5 to 52 meters). This short wave range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1800, 4000, 6000, and 14,000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tubes (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all five I.F. trimmers, of the three I.F. transformers, to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the front gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the center and rear trimmers of the gang condenser to peak. The center gang section tunes the R.F. or grid coil of the 6A8 tube and the front condenser section tunes the pre-selector stage circuit.

Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R.F. section. The padding condenser is located on the left hand side of the chassis, directly to the left of the 6A7 tube and in front of the first I.F. transformer.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Bands.

FOREIGN BAND The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coil located on the top of the chassis. Set the test oscillator to 14,000 KC. The oscillator coil is located near the 1st I.F. Transformer and the antenna or R.F. coil is located directly in front of the Short Wave oscillator coil and about midway between the 1st I.F. Transformer and the 6A7 tube. These two trimmers should be adjusted for peak at 14,000 KC and as the inherent design of the circuit has been expressly designed for simplicity in servicing, no other adjustments are necessary for aligning this band. **Note:** Always start this procedure by having the oscillator coil trimmer loose (out all the way), and the antenna coil trimmer fairly tight (in all the way); otherwise it is possible to make a false alignment on the image frequency.

Important: Do not attempt any adjustment of the gang condenser trimmers in aligning the Foreign Band as this will throw the Broadcast Band out of alignment.

POLICE BAND There is only one adjustment to be made in the alignment of the Police Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary.

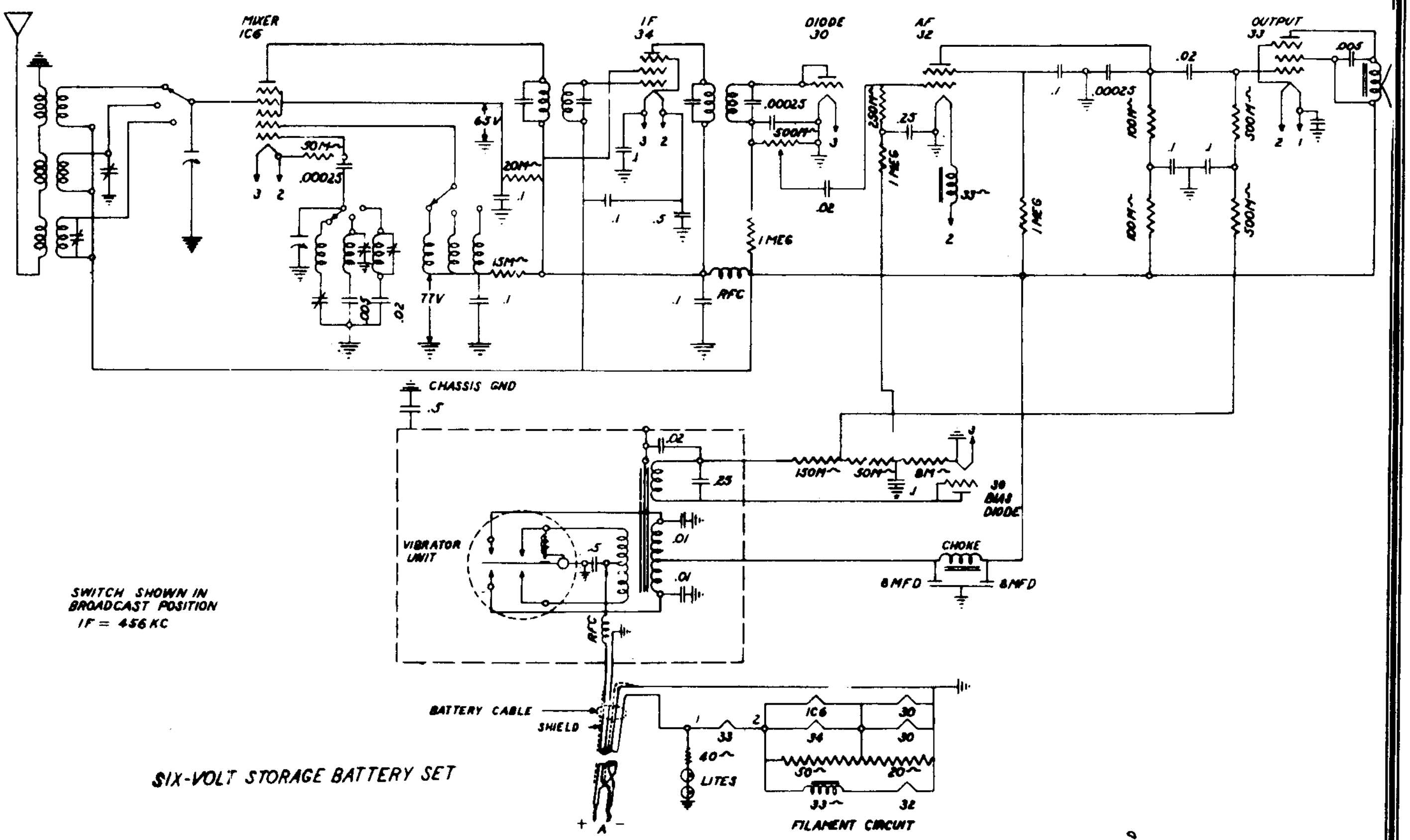
Set the dial pointer to 4000 KC (also the test oscillator) and adjust the antenna coil trimmer to resonance. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment. The two police band coils are under the chassis and the antenna coil trimmer is mounted on the end of the antenna coil.

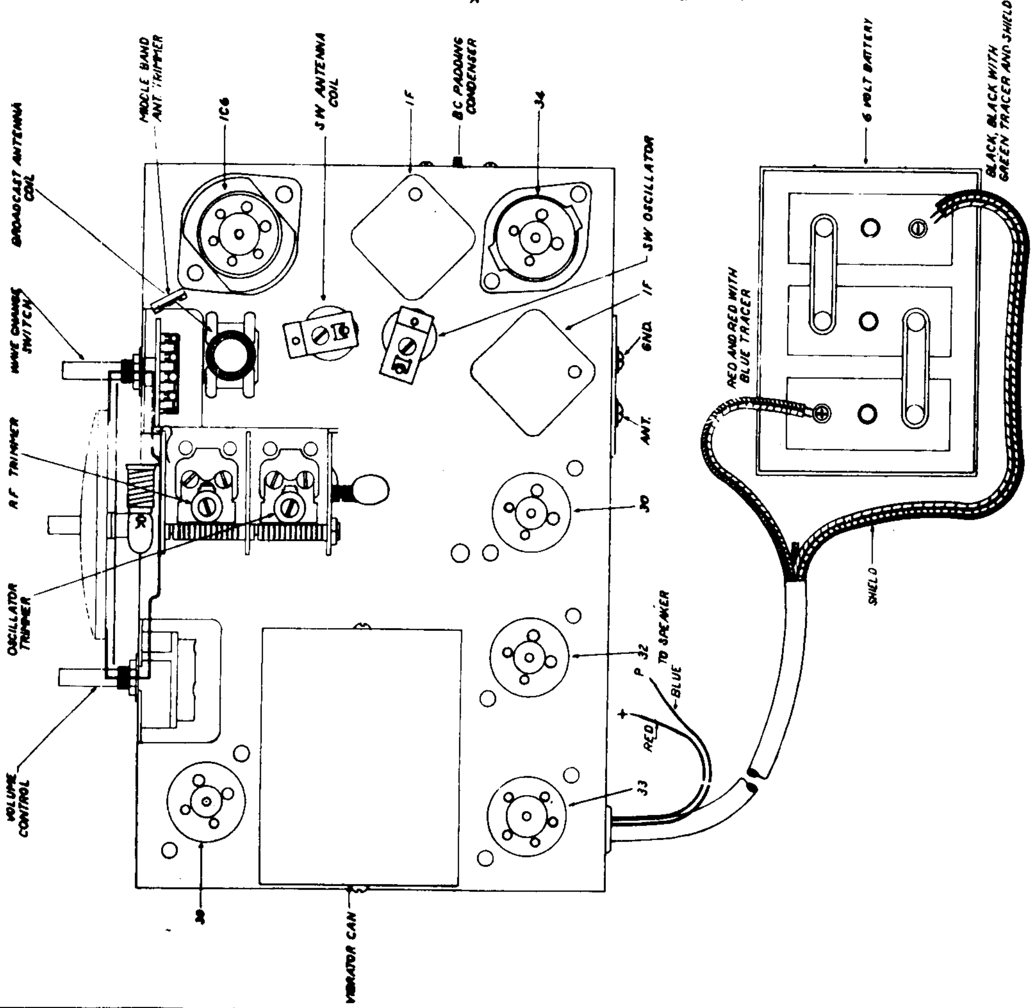
Important: This is the only adjustment necessary for the Police Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Police Band, otherwise the Broadcast Band will be thrown out of alignment.

SERVICE DATA FOR ALL BANDS

If it is suspected that the oscillator has stopped but is doubtful due to the presence of the usual amount of noise level, it is suggested that the oscillator plate voltage be checked. To ascertain whether the tube is oscillating, ground the oscillator grid of the 6A8 (short stator and rotor plates of oscillator section on gang condenser). If oscillating properly, grounding the grid will cause an appreciable drop in oscillator voltage.

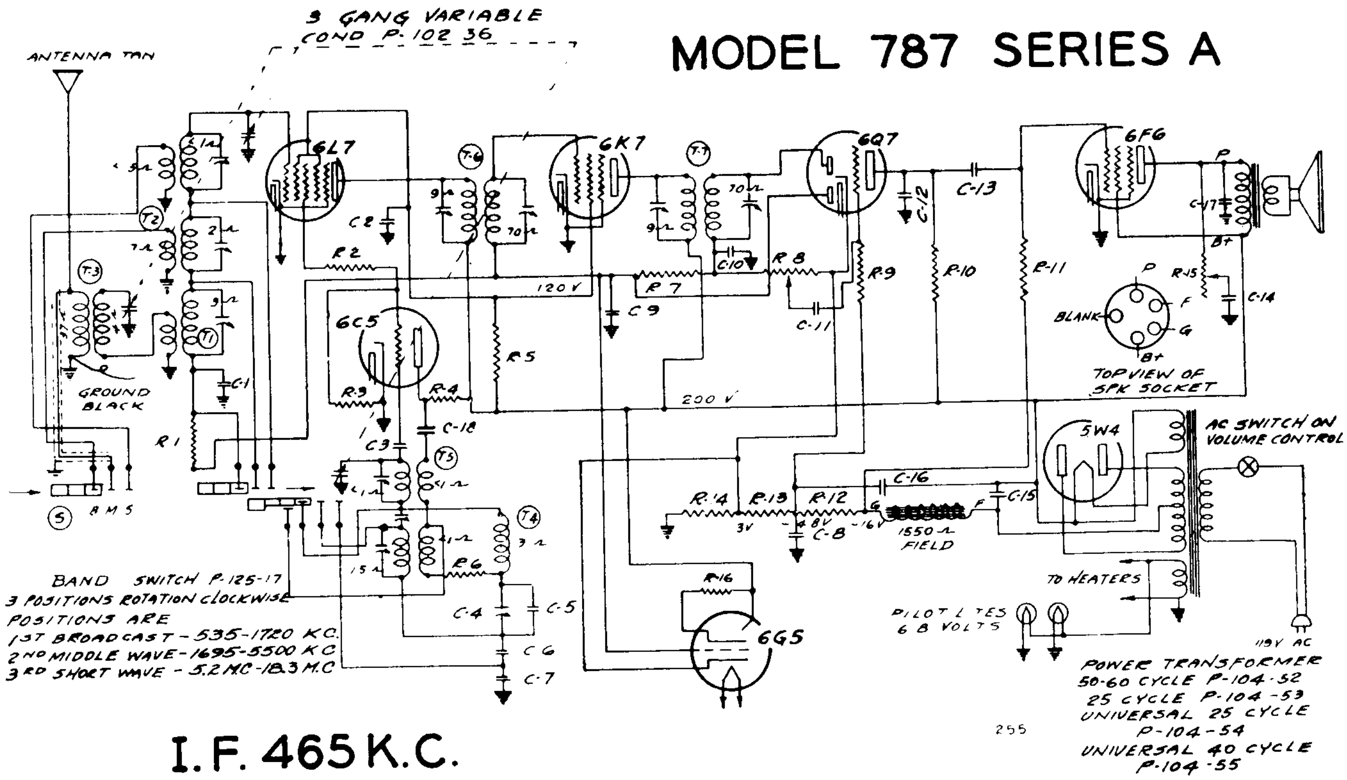
FEDERATED PURCHASER INC.
MODEL 179-B





GAMBLE-SKOGMO INC.

MODEL 787 SERIES A



I.F. 465 K.C.

255

RESISTORS

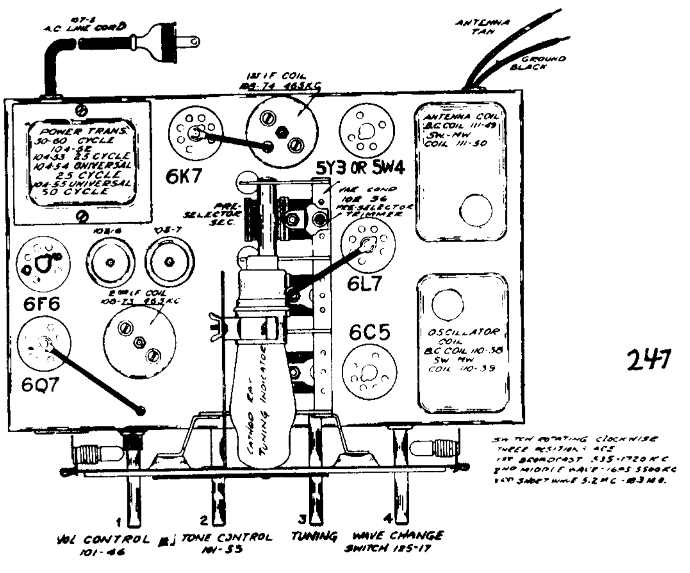
No.	Part No.	Description
R1	130-20	100M Ohm—⅓ Watt—20%— 50 Volt Carbon
R2	130-105	150 Ohm—⅓ Watt—20%— 10 Volt Carbon
R3	130-12	50M Ohm—⅓ Watt—20%— 10 Volt Carbon
R4	130-104	9M Ohm— 1 Watt—20%—100 Volt Carbon
R5	130-34	19M Ohm— 1 Watt—20%—100 Volt Carbon
R6	130-27	50 Ohm—⅓ Watt—20%— 3 Volt Carbon
R7	130-19	1 Meg Ohm—⅓ Watt—20%—100 Volt Carbon
R8	101-46	1 Meg Ohm—Volume Control
R9	130-4	3 Meg Ohm—⅓ Watt—20%—100 Volt Carbon
R10	130-103	100M Ohm—⅓ Watt—20%— 50 Volt Carbon
R11	130-102	500M Ohm—⅓ Watt—10%— 50 Volt Carbon
R12	106-26	220 Ohm
R13	106-26	32 Ohm
R14	106-26	52 Ohm
R15	101-53	50M Ohm—Tone Control
R16	130-110	1 Meg Ohm—1/10 Watt—10%—100 Volt Carbon

CONDENSERS

C1	100-22	.05x200 Volt—25%
C2	100-1	.1x400 Volt—+50%—10%
C3	129-39	.00005 Mica (MT-O)—20%
C4	124-28	Series Pad (80-225)
C5	129-65	.00055 Mica (MT-O)—5%
C6	129-55	.0034 Mica (MW-W)—2½%
C7	129-54	.003 Mica (MW-W)—2½%
C8	100-20	.1x200 Volt—25%
C9	100-22	.05x200 Volt—25%
C10	129-12	.00025 Mica (MT-0)—20%
C11	100-11	.01x400 Volt—25%
C12	129-2	.0005 Mica (MT-O)—20%
C13	100-11	.01x400 Volt —25%
C14	100-27	.025x600 Volt—25%
C15	103-6	8 Mfd. x 350 Volt Electrolytic
C16	103-7	8 Mfd. x 300 Volt Electrolytic
C17	100-25	.002x600 Volt—20%
C18	100-37	.003x600 Volt—10%

PARTS

T1	111-49	Broadcast Antenna Coil
T2	111-50	S.W.-M.W. Antenna Coil
T3	111-51	B.C.-Pre-Selector Coil Assem.
T4	110-38	B.C. Oscillator Coil
T5	110-39	S.W.-M.W. Oscillator Coil
T6	108-74	Input I.F. - 465 K.C.
T7	108-73	Output I.F. - 465 K.C.
S	125-17	Wave Change Switch



60 Cycle, 55 Watt, 105-115 Volt
BRC-787 (Model 787), Series A

FIG. 1—TOP VIEW

247

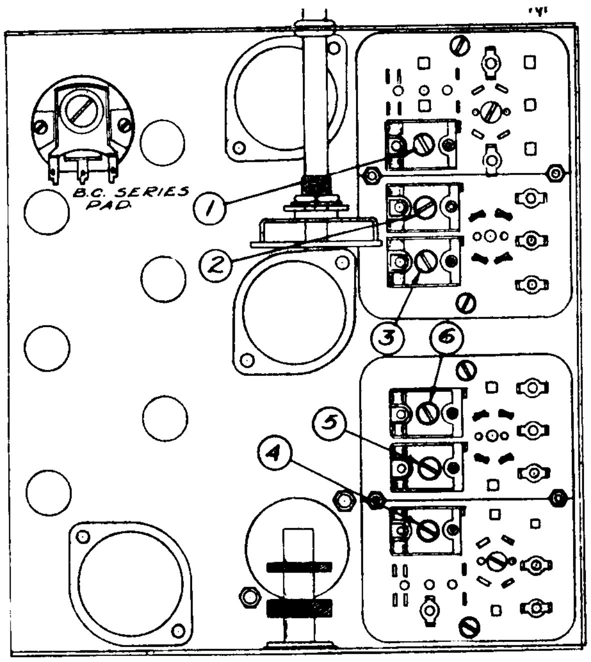


FIG. 3—BOTTOM VIEW (Showing Trimmers)

GAMBLE-SKOGMO INC.

MODEL 787 SERIES A

DESCRIPTION:

Model 787 is a seven tube A.C. all wave superheterodyne receiver. It has a tuning range of 535 K.C. to 18.3 megacycles in three bands, and is characterized by its exceptional stability, and by a sensitivity both high and uniform, with high signal to noise ratio on all bands. The I.F. frequency used is 465 K.C., which in conjunction with the pre-selector circuit, gives high image and I.F. attenuation (freedom from whistles and telegraphic interference).

A separate oscillator; effective automatic volume control; broad nose sharp skirt selectivity and new type oval airplane dial, are a few of the outstanding features of this model.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40, and 60 cycles and with primary taps for 108, 127, 150, 225 and 260 volts (see instructions), and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

TUBE COMPLEMENT:

The tube complement of the model 787 consists of the latest metal tubes. They are as follows:

1-Type 6L7 Pentagrid Mixer, First Detector.

1-Type 6C5 Oscillator.

1-Type 6K7 Remote Cut-off Pentode, I.F. Amplifier (465 K.C.).

1-Type 6Q7 Duplex Diode Triode Second Detector, A.V.C and First Audio.

1-Type 6F6 Pentode Output Amplifier.

1-Type 5W4 High Vacuum Rectifier.

1-Type 6G5 Cathode-Ray Tuning Indicator. (Note: 6G5 available in all glass only.)

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with 119 volts on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. Remove the knobs and the four bolts which are used to fasten the chassis.

All adjustments should be made with a non-metallic screw driver.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 6F6 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

ALIGNING I.F. TRANSFORMERS; (465 K.C.):

Part No. 108-73 Output I.F. Transformer.
Part No. 108-74 Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the broadcast position (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-73) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6L7 and adjust input I.F. transformer (No. 108-74) to resonance.
   (c) With oscillator still connected to 6L7, readjust output I.F. transformer (108-73) if necessary.

ALIGNMENT PROCEDURE:

The following adjustments to be made after the I.F.'s have been aligned as explained above.

BROADCAST BAND ALIGNMENT:

535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly, Fig. 3).
   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

SHORT WAVE BAND ALIGNMENT:

5.2 to 18.3 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment number 3) and short wave antenna (Adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) **Re-set external oscillator and check set at 18.1 megacycles and 5.3 megacycles for band coverage.**

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 18.3 megacycle signal appears near 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:

1695 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (Adjustment number 2) and middle wave antenna (Adjustment number 5) to resonance.
   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 5400 kilocycles and 1700 kilocycles for band coverage.

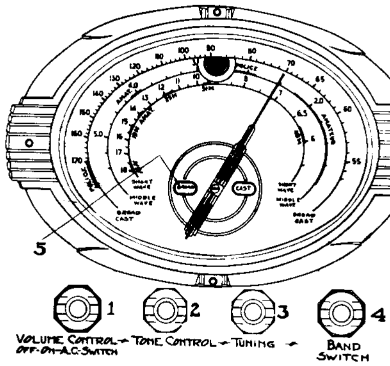


FIG. 2—FRONT VIEW

LIST OF REPAIR PARTS

Part No.	Description	Circuit Diagram Reference	List Price
	CONDENSERS		
100-1	.1 x 400 Volt Tubular	C2	$0.25
100-11	.01 x 400 Volt Tubular	C11-C13	.25
100-20	.1 x 200 Volt Tubular	C8	.25
100-22	.05 x 200 Volt Tubular	C1-C9	.25
100-25	.002 x 600 Volt Tubular	C17	.25
100-27	.025 x 600 Volt Tubular	C14	.25
100-37	.003 x 600 Volt Tubular	C18	.25
103-6	8 Mfd. x 350 Volt Electrolytic	C15	.85
103-7	8 Mfd. x 300 Volt Electrolytic	C16	.75
129-2	.0005 Mica—Type MT—20%	C12	.25
129-12	.00025 Mica—Type MT—20%	C10	.25
129-39	.00005 Mica—Type MT—20%	C3	.25
129-54	.003 Mica—Type MW—2½%	C7	.35
129-55	.0034 Mica—Type MW—2½%	C6	.35
129-65	.00055 Mica—Type MT—5%	C5	.25
	RESISTORS		
106-26	Metal Clad Resistor	R12-13-14	$0.35
130-4	3 Meg Ohm-⅓ Watt-20%-100 Volt Carbon	R9	.20
130-12	50 M Ohm-⅓ Watt-20%- 20 Volt Carbon	R3	.20
130-19	1 Meg Ohm-⅓ Watt-20%-100 Volt Carbon	R7	.20
130-20	100 M Ohm-⅓ Watt-20%- 50 Volt Carbon	R1	.20
130-27	50 Ohm-⅓ Watt-20%- 3 Volt Carbon	R6	.20
130-34	19 M Ohm- 1 Watt-20%-100 Volt Carbon	R5	.20
130-102	500 M Ohm-⅓ Watt-10%- 50 Volt Carbon	R11	.20
130-103	100 M Ohm-⅓ Watt-10%- 50 Volt Carbon	R10	.20
130-104	9 M Ohm- 1 Watt-20%-100 Volt Carbon	R4	.20
130-105	150 Ohm-⅓ Watt-20%- 10 Volt Carbon	R2	.20
130-110	1 Meg Ohm-1/10 Watt-10%-100 Volt Carbon	R16	.20

Part No.	Description	Circuit Diagram Reference	List Price
	COILS		
108-73	Output I.F. Coil Assem. Comp. with Can.	T7	$1.50
108-74	Input I.F. Coil Assem. Comp. with Can.	T6	1.50
110-38	Broadcast Oscillator Coil Assem. Complete less Can.	T4	.50
110-39	Mid Wave and Short Wave Oscillator Assem. less Can.	T5	1.50
111-49	Broadcast Antenna Coil Assembly Complete less Can.	T1	.75
111-50	Mid Wave and Short Wave Antenna Coil Assem. less Can.	T2	1.50
111-51	Broadcast Preselector Coil Assembly	T3	.75
	SOCKETS		
121-8	Five Prong Socket—Marked "SPKR"		$0.10
121-12	Seven Prong Socket—Marked "6K7"		.10
121-14	Seven Prong Socket—Marked "6F6"		.10
121-15	Five Prong Socket—Marked "5W4"		.10
121-17	Six Prong Socket—Marked "6C5"		.10
121-18	Seven Prong Socket—Marked "6L7"		.10
121-26	Seven Prong Socket—Marked "6Q7"		.10
	SPEAKERS		
114-15	Six Inch Dynamic Speaker (1550 Ohm field)		$5.00
114-16	Five Inch Dynamic Speaker (1550 Ohm field)		4.50
114-45	Eight Inch Dynamic Speaker (1550 Ohm field)		6.00
	TRANSFORMERS		
104-52	50/60 Cycle Power Transformer		$3.50
104-53	25 Cycle Power Transformer		4.50
104-54	Universal Transformer 25 Cycle Primary		5.00
104-55	Universal Transformer 40 Cycle Primary		5.00
	MISCELLANEOUS		
101-46	Volume Control and Switch, 1 Meg Ohm	R8	$1.25
101-53	Tone Control, 50M Ohm	R15	.65
102-36	Three Gang Variable Condenser		4.00
107-5	Line Cord and Plug		.50
115-35	Antenna, Oscillator, Shield		.15
124-28	J-S Series Pad 3 Pl.	C4	.35
125-17	Band Switch	S	.85
128-51	Wood Knob with Spring		.15

All resistors and mica condensers are RMA color coded—specify value and/or resistor or condenser (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None

When ordering condensers, specify part number, model and/or capacitor (per schematic diagram) and model number.

When ordering parts, always specify part and model number as well as serial number of chassis.

All prices quoted are list and are subject to the usual trade discounts. Prices subject to change without notice.

Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

WE CANNOT SUPPLY SPEAKER PARTS, CONES, TRANSFORMERS OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $1.25 NET FOR FIVE OR SIX INCH TYPE AND $2.00 NET FOR EIGHT INCH TYPE, IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.

DIAL PARTS LIST—MODEL 787

Part No.	Description	List Price Each
	ASSEMBLIES	
112-193	Dial Plate and Switch Assembly—including:	$0.85
	1—No. 117-76 Dial Plate	
	1—No. 117-73 Tuning Shaft Bushing	
	1—No. 117-77 Band Disc Bushing	
	1—No. 112-182 Band Indicator Disc	
	2—No. 131-64 Brass washers	
	1—No. 117-40C Switch Link	
	1—No. 117-12 Switch Arm	
	2—No. 131-26 Spring Washer	
	2—No. 162-5 Rivets	
	1—No. 117-35 Bushing	
	2—No. 132-18 Set Screw	
	DIAL PARTS ONLY	
107-46	Right Pilot Light Bracket and Socket	$0.10
107-47	Left Pilot Light Bracket and Socket	.10
112-118	Metal Oval Escutcheon Only	1.25
112-119	Dial Pointer with No. 132-8 Screw	.20
112-123	Oval Glass Crystal Only	.35
112-125	Drive Belt	.20
112-139	Oval Glass Retaining Ring	.10
112-175A	Background Plate Gasket	.10
112-181	Glass Dial Scale	.90
112-183	Tuning Shaft	.07
107-14	6-8 Volt, T-46 Pilot Light	.10
117-20A	Drive Belt Pulley	.05
117-39	Pulley for Take-up Spring	.03
117-72	Reflector	.10
120-55	Drive Belt Take-up Coil Spring	.03
131-65	Glass Dial Retaining Clips	.03

CATHODE RAY TUNING INDICATOR PARTS

Part No.	Description	List Price
107-50	Cable and Socket Assembly (with 130-10 Resistor)	$0.75
117-57	Holder and Clamp	.25

GENERAL ELECTRIC COMPANY

MODELS F-81 & F-86

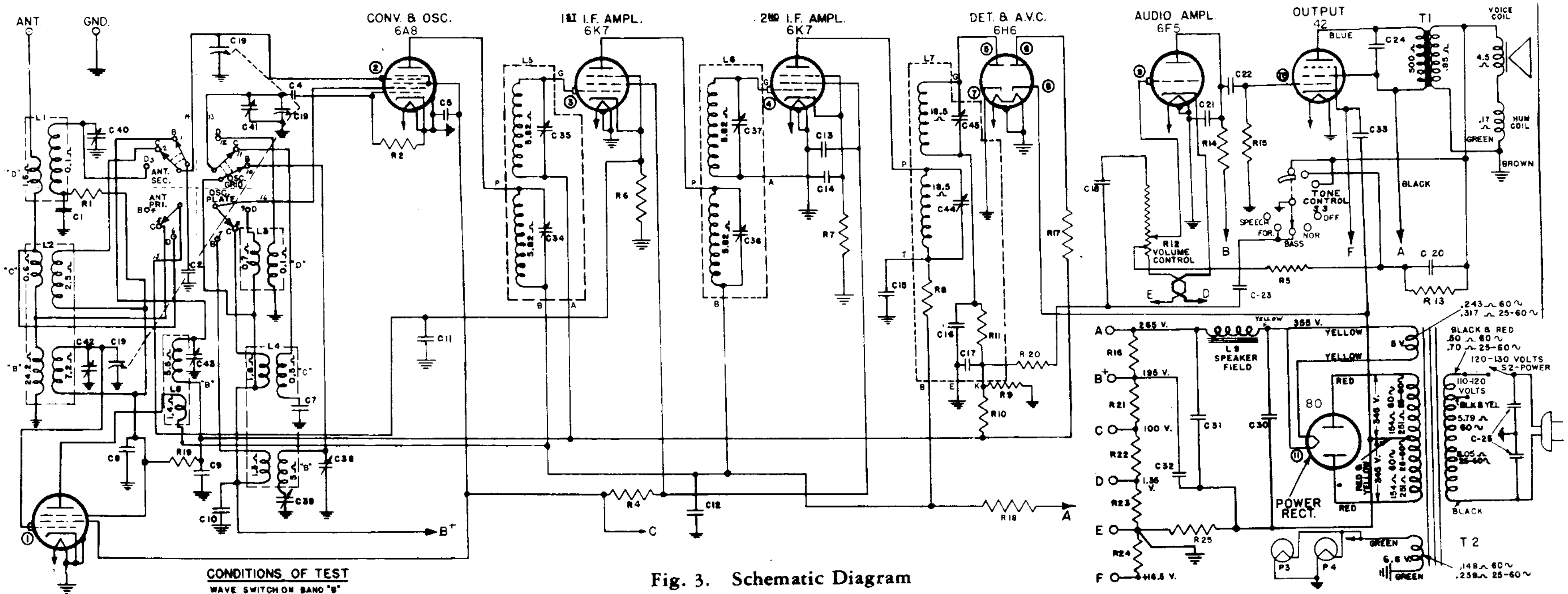


Fig. 3. Schematic Diagram

ALL VOLTAGES TO GROUND UNLESS OTHERWISE SPECIFIED.
ALL VOLTAGES MEASURED WITH ANT. & GND. TERMINALS SHORTED & 120 V ON 110-120V PRIMARY TAP

CONDITIONS OF TEST

WAVE SWITCH ON BAND "B"
POWER SWITCH OFF

APPROXIMATE RESISTANCE MEASUREMENTS

	RESISTANCE TO GROUND	TUBE	SOCKET PRONG
1	1.3 MEG. Ω	RF GRID	CAP
2	1.25 MEG. Ω	CONV. GRID	CAP
3	1.25 MEG. Ω	1ST I.F. GRID	CAP
4	6.0 Ω	2ND I.F. GRID	CAP
5	288,000 Ω	DIODE PLATE	PRONG 3
6	1.2 MEG Ω	DIODE PLATE	PRONG 5
7	GROUNDED	DIODE CATH.	PRONG 4
8	100,000 Ω	DIODE CATH.	PRONG 8
9	0-2 MEG. Ω VOL. CONT.	A.F. GRID	CAP
10	.5 MEG. Ω	OUTPUT GRID	PRONG 5
11	19,500 Ω	80 FILAMENT	PRONG 1 OR 4

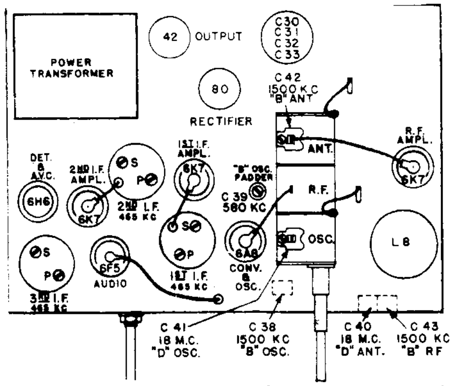
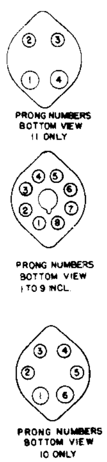
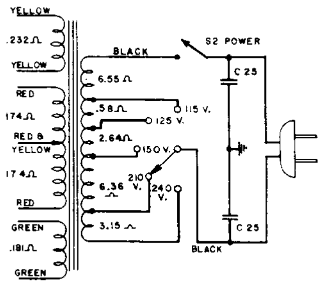


Fig. 2. Chassis Layout and Trimmer Location



SYMBOL	DESCRIPTION
C 1	PAPER CAPACITOR .0045 MF
C 2	PAPER .01 MF
C 4	MICA 50 MMF
C 5	PAPER .25 MF
C 7	MICA 1170 MMF
C 8	PAPER .05 MF
C 9	PAPER .05 MF
C 10	PAPER .05 MF
C 11	PAPER .05 MF
C 12	PAPER .1 MF
C 13	PAPER .25 MF
C 14	PAPER .05 MF
C 15	PAPER .02 MF
C 16	MICA 250 MMF
C 17	MICA 75 MMF
C 18	PAPER .005 MF
C 19	TUNING 10-450 MMF
C 20	PAPER .1 MF
C 21	MICA 250 MMF
C 22	PAPER .01 MF
C 23	PAPER .001 MF
C 24	PAPER .01 MF
C 25	PAPER .01-.01 MF
C 30	DRY ELECT. 12 MF
C 31	DRY ELECT. 8 MF
C 32	DRY ELECT. 8 MF
C 33	DRY ELECT. CAPACITOR 10 MF
C 34	1ST I.F. PRI TRIMMER (OPERATE 335 MMF)
C 35	1ST I.F. SEC. TRIMMER (OPERATE 335 MMF)
C 36	2ND I.F. PRI. TRIMMER (OPERATE 335 MMF)
C 37	2ND I.F. SEC. TRIMMER (OPERATE 335 MMF)
C 38	"B" OSC. TRIMMER 5-45 MMF
C 39	"B" PADDER TRIMMER 350-550 MMF
C 40	"D" ANT. TRIMMER 3-40 MMF
C 41	"D" OSC. TRIMMER 2-20 MMF
C 42	"B" ANT. TRIMMER 3-35 MMF
C 43	"B" R.F. TRIMMER 3-40 MMF
C 44	3RD I.F. PRI. TRIMMER (OPERATE 190 MMF)
C 45	3RD I.F. SEC. TRIMMER (OPERATE 190 MMF)
S 1	BAND CHANGE SWITCH
S 2	POWER SWITCH
S 3	TONE CONTROL SWITCH

SYMBOL	DESCRIPTION
R 1	CARBON RESISTOR 47,000 Ω
R 2	47,000 Ω
R 4	2,200 Ω
R 5	22,000 Ω
R 6	2,700 Ω
R 7	680 Ω
R 8	4,700 Ω
R 9	220,000 Ω
R 10	1 MEG
R 11	CARBON RESISTOR 68,000 Ω
R 12	VOLUME CONTROL 2 MEG - TAP AT 5000 Ω
R 13	CARBON RESISTOR 68,000 Ω
R 14	CARBON 220,000 Ω
R 15	CARBON 470,000 Ω
R 16	CANDOHM 3,500 Ω
R 17	CARBON 100,000 Ω
R 18	CARBON 2,200 Ω
R 19	CARBON 47,000 Ω
R 20	CARBON 220,000 Ω
R 21	CANDOHM 5,000 Ω
R 22	CANDOHM 10,000 Ω
R 23	CANDOHM 125 Ω
R 24	CANDOHM 410 Ω
R 25	CARBON RESISTOR 68 Ω
L 1	"D" ANTENNA COIL
L 2	"B" & "C" ANTENNA COIL
L 3	"D" OSCILLATOR COIL
L 4	"B" & "C" OSCILLATOR COIL
L 5	1ST I.F. TRANSFORMER ASSEMBLY
L 6	2ND I.F. TRANSFORMER ASSEMBLY
L 7	3RD I.F. TRANSFORMER ASSEMBLY
L 8	"B" R.F. INTERSTAGE COIL
L 9	FIELD COIL 872 Ω (COLD) 82 MA
T 1	OUTPUT TRANSFORMER (ON SPEAKER)
T 2	POWER TRANSFORMER {50-60, 25-60, 50-60 (UNIV.)}
P 3	PILOT LIGHT, CLEAR .25 A., 6.3 V.
P 4	PILOT LIGHT, CLEAR .25 A., 6.3 V.



110-250 VOLTS
UNIVERSAL TRANSFORMER

I.F. 465 K.C.

GENERAL ELECTRIC COMPANY

MODELS F-81 & F-86

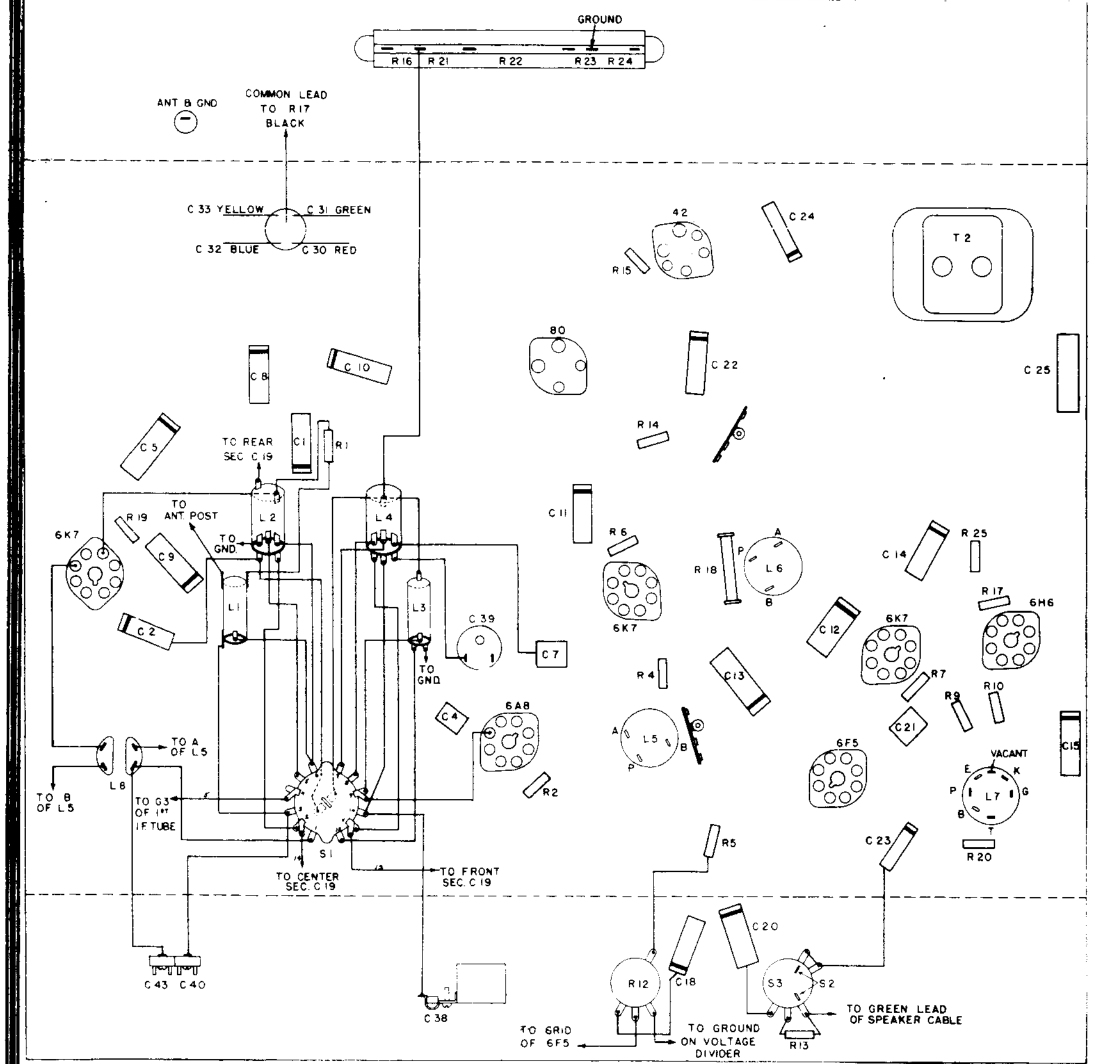


Fig. 4 Chassis Parts Layout

Tubes

R.F. Amplifier............6K7 Triple-grid, Super-control Amplifier
Oscillator and Converter..6A8 Pentagrid Converter
1st I.F. Amplifier........6K7 Triple-grid, Super-control Amplifier
2nd I.F. Amplifier........6K7 Triple-grid, Super-control Amplifier
Detector and AVC.......6H6 Twin Diode
First Audio Amplifier....6F5 High-gain Triode
Audio Power Amplifier...42 Power Amplifier Pentode
Rectifier..................80 Full-wave Rectifier
Dial Lamp.................Mazda No. 46—6.3 volts, 0.25 amps.

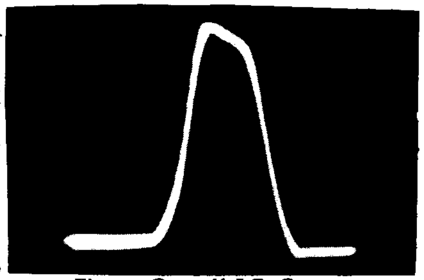


Fig. 1. Overall I.F. Curve

SERVICE DATA

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	110–120 120–130	50–60	90
C	110–120 120–130	25–60	90
V	110–155 and 190–260	50–60	85

NOTE: Rating "V" receivers may be used on 40-cycle circuits provided the voltage does not exceed 105 volts on the 110–120-volt tap or 200 volts on the 190–220-volt tap.

Tuning Frequency Range

Band "B"........................ 540–1620 kc.
Band "C"........................1600–6000 kc.
Band "D"........................5400–18,000 kc.

Electrical Power Output

Undistorted........................2.5 watts
Maximum............................5.0 watts

Loud-speaker—Electrodynamic

Cone: Model F-81..................... 8-inch
Model F-86..........................12-inch
Speaker Impedance............5.5 ohms at 400 cycles

GENERAL INFORMATION

The Models F-81 and F-86 are three-band a-c operated receivers employing eight General Electric tubes as described above in a superheterodyne circuit. The circuit incorporates a single R.F. amplifier, two stages of I.F. amplification, I.F. wave trap, four-point tone control, and other features of design as described in the following paragraphs.

Coil System

L1 is the "D" band antenna coil. The "B" and "C" band antenna coils are wound on a single coil form designated as L2 in Fig. 3. The coil L8, tuned by the center section of the gang condenser C-19 and coupled to a 6K7 tube are the essential elements of an R.F. stage, used only on the "B" band. L3 and L4 are the oscillator coils for the "D," "C," and "B" bands respectively. The antenna secondary and oscillator plate coils on the next lower frequency band to the one in use are shunted out by the wave switch contacts which are connected to C-2 and the B+ lead respectively.

The various contact terminals of the wave-change switch are numbered from 1 to 16 to facilitate the tracing of the circuit to the switch.

Receiver Operation

The RF amplifier as mentioned above is only used on the "B" band. The intermediate frequency amplifier consists of two 6K7 tubes and three tuned transformers. The output of the third IF transformer is applied to one plate of the 6H6 diode, which is a combined detector, initial bias, and automatic volume control tube.

Volume is controlled by the variable potentiometer R-12 in the grid circuit of the 6F5 audio amplifier tube. The output of the 6F5 is resistance coupled to the grid of the Type 42 power amplifier pentode.

Proper bias for the various tubes is obtained by the use of a tapped bleeder resistance. One of the cathodes of the 6H6 diode is returned to a negative voltage on this bleeder in order to provide initial bias to all tubes controlled by the AVC. The band change switch automatically grounds the cathode of the 1st IF amplifier tube through the primaries of L2 when operating in the "C" and "D" bands thus increasing the sensitivity on these bands.

NOTE: During production R-17 was moved from the cathode ⑧ lead of the 6H6 into the plate ⑥ circuit.

ALIGNMENT PROCEDURE

In order to align these receivers properly, it is necessary to have the following test equipment

1. A modulated test oscillator.
2. An output indicator such as an a-c voltmeter with a scale reading of 3 to 5 volts. A Cathode-ray oscilloscope is preferred for I.F. alignment.
3. A screwdriver-type alignment tool.

The alignment procedure is given in table form along with the trimmer location drawing, Fig. 2. A "dummy antenna" should be used in all alignments and is the capacitor or capacitor and resistor used in series with the signal generator. The grid lead should not be removed from the tube to which the input signal is applied when aligning the IF as this would remove the grid bias from the tube.

ALIGNMENT PROCEDURE

Band Switch Setting	Input Frequency	Point of Input	Dummy Ant.	Trimmer	Remarks
I.F. Alignment with Oscilloscope					
1. Band "B"	465 K.C. Sweep	2nd I.F. Grid	.05 Mfd.	3rd I.F. Sec. (C-45) Pri. (C-44)	Gang condenser plates wide open—connect vertical input of oscilloscope to ground and the junction of R-9 and R-10 on 3rd I.F. transformer. Adjust trimmers for a single symmetrical curve of maximum amplitude. The resulting curve with input at converter grid is shown in Fig. 1.
2. Band "B"	465 K.C. Sweep	1st I.F. Grid	.05 Mfd.	2nd I.F. Sec. (C-37) Pri. (C-36)	
3. Band "B"	465 K.C. Sweep	Converter Grid	.05 Mfd.	1st I.F. Sec. (C-35) Pri. (C-34)	
I.F. Alignment with Output Meter					
1. Band "B"	465 K.C. with Modulation	2nd I.F. Grid	.05 Mfd.	3rd I.F. Sec. (C-45) Pri. (C-44)	Gang condenser plates wide open—connect output meter across voice coil—keep input signal low and volume control at maximum. Adjust all trimmers in order mentioned for maximum output. Do not attempt an overall realignment after stage by stage alignment has been accomplished.
2. Band "B"	465 K.C. with Modulation	1st I.F. Grid	.05 Mfd.	2nd I.F. Sec. (C-37) Pri. (C-36)	
3. Band "B"	465 K.C. with Modulation	Converter Grid	.05 Mfd.	1st I.F. Sec. (C-35) Pri. (C-34)	
R.F. Alignment					
1. Band "B"					Close gang plates—adjust pointer to first line at left end of tuning scale.
2. Band "D"	18 M.C. with Modulation	Antenna Post	250 Mmf. 400 Ohms	Osc. (C-41) Ant. (C-40)	Connect output meter across voice coil—tone control on "Bass" position. The image of any "D" band signal should be heard 930 K.C. above input signal when (C-41) is on proper peak. Example: 15 M.C. image—15,930 K.C. Peak (C-40) while rocking the gang condenser.
3. Band "C"	No adjustment necessary				
4. Band "B"	1500 K.C. with Modulation	Antenna Post	250 Mmf. 400 Ohms	Osc. (C-38) R.F. (C-43) Ant. (C-42)	Peak trimmers for maximum output with a low input signal.
5. Band "B"	580 K.C. with Modulation	Antenna Post	250 Mmf. 400 Ohms	Osc. padder (C-39)	Adjust padder for maximum output in vicinity of 580 K.C. while rocking the gang condenser.
6. Band "B"	Repeat operation 4				

GENERAL ELECTRIC COMPANY
MODELS F-81 & F-86

SOCKET VOLTAGES

Tube No.		Plate to Ground Volts D-c	Screen Grid to Ground Volts D-c	Cathode to Ground Volts D-c	Cathode Current M.A.	Heater Volts A-c
6K7	R.F. Amplifier	225	100	0	6.8	6.3
6A8	Oscillator	180	100	0	11.0	6.3
	Converter	225	100	0		
6K7	1st I.F. Amplifier	225	92	4.6	1.8	6.3
6K7	2nd I.F. Amplifier	200	92	4.0	5.6	6.3
6H6 Det. and AVC	Sig. Plate	0	....	....	....	6.3
	Delay Plate	—4.5	....	....	....	
6F5	Audio Amplifier	137*	....	1.3	0.4	6.3
42	Output	237	250	14.5	34	6.3
80	Power Rectifier	....	....	Filament to ground 330	70	5.2

A-C line voltage—120 volts with transformer connected for 120-130-volt operation—no signal input—1000 ohms per volt meter-dial pointer at 530 K.C. on "B" band.

* Measured on 1000-volt scale.

Power Supply

The power supply consists of an 80-type rectifier, power transformer, and the associated filter system; the speaker field acting as the filter choke.

The transformers on the "A" and "C" rating receivers have two primary taps so as to accommodate a range of voltages from 110-130 volts. As shipped from the factory the receivers have the power cord connected to the 120-130-volt tap of the transformer (black and red lead). If the normal voltage of the power supply is always below 115 volts, the connection of the power cord should be removed from the lead and soldered to the 110-120-volt tap (black and yellow lead). After changing the connection, tape the soldered joint as well as the exposed end of the unused lead. This change requires removal of the chassis from the cabinet.

Speaker

Two different types of voice coil suspensions are used in both the 8- and 12-in. speakers.

The 8-in. cone assemblies are designated as early and late production and are not interchangeable. The early production voice coil suspension is 4⅝ inches between points of clamping, while the later production voice coil suspension is 2⅜ inches between points of clamping.

The 12-in. cone assemblies which were changed in design during production are interchangeable.

DIAL MECHANISM

The dial mechanism (Fig. 5) is rigidly mounted to the chassis by means of two brackets and four self-tapping screws. The dial pointer is operated by means of an "automatic vernier" reduction drive unit, mounted on the receiver chassis, and connected to the gang drive drum by a drive cord.

Motion imparted to the gang condenser rotor is transmitted through a series of pulleys and an interconnecting cable to the dial pointer slider which is supported on a rail in the rear of the dial scale. The following instructions should aid you in making any repairs to this mechanism.

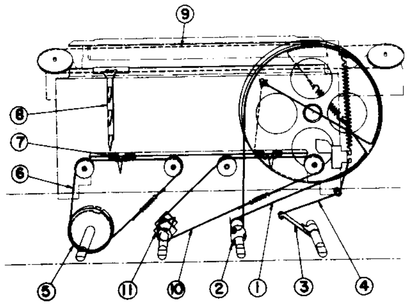


Fig. 5. Dial Drive Mechanism

To Replace Pointer Cable and Drive Cable

Remove the dial scale, allowing ready access to the dial scale mechanism.

To replace the drive cord (1), set the drive drum to the relative position as shown in Fig. 5, loop the cord through the tab on the drum, then thread it down through the hole in the chassis and around the vernier drive as indicated. The other end of the cord is looped through one end of the tension spring in back of the drive drum.

To replace the wire pointer drive cord (9), set the drive drum to the relative position as shown in Fig. 5. Loop the cord through the tab on the drum, and thread it around the drive pulley and idler pulleys and back to the tension spring on the drive drum. With the gang condenser plates fully meshed, adjust the pointer (8) along the drive cord until it coincides with the end mark at the left-hand end of the scale. The scale may be slid into place to ascertain this correct position. After final adjustment is made, solder the pointer to the wire cable (9).

To Replace Tone Control Cable

Thread the cable (6) as shown in Fig. 5 around the drive pulley (5) and around the idler pulleys, fastening the ends to the tension spring. For adjustment: turn the pulley (5) to the extreme counterclockwise, setting the pointer (7) so it extends about 1/16 in. over the left-hand edge of the rail. Crimp the pointer tab on the drive cable. A final adjustment of the pointer may be made by means of the drive pulley (5) with the dial scale in place.

To Replace Volume Control Cable

Thread the cable (10) around the drive pulley (11) as shown in Fig. 5. Fasten the loops of the cable into the tension spring. To adjust, turn the control to the extreme clockwise direction and set the pointer so that the right-hand side of the pointer rider coincides with the right-hand edge of the rail. Crimp the pointer tab on the drive cable. A final adjustment of this pointer may be made by adjusting the pulley (11) on the volume control shaft after the scale has been replaced.

Band and Indicator Control

The threading and assembly of the band indicator is self-explanatory from an inspection of Fig. 5.

To "Adjust Automatic Vernier" Drive

The vernier drive used on this receiver includes a planetary reduction unit equipped with a clutch which automatically changes the reduction ratio. This clutch consists of a sleeve mounted on the knob shaft. To adjust, loosen the locking screw and move the sleeve (2) axially along the shaft until the cam surface in the end of the sleeve engages with the pin in the knob shaft. This engagement should take place at a point on the cam surface as near to the stop as possible and still allow complete release of the clutch.

To Change Dial Lamps

Dial lamps are located at either end of the dial scale assembly. Remove the dial lamp bracket from the projection at the top of the dial mechanism and replace bulb. This may be accomplished without removing the chassis from the cabinet

PARTS LIST

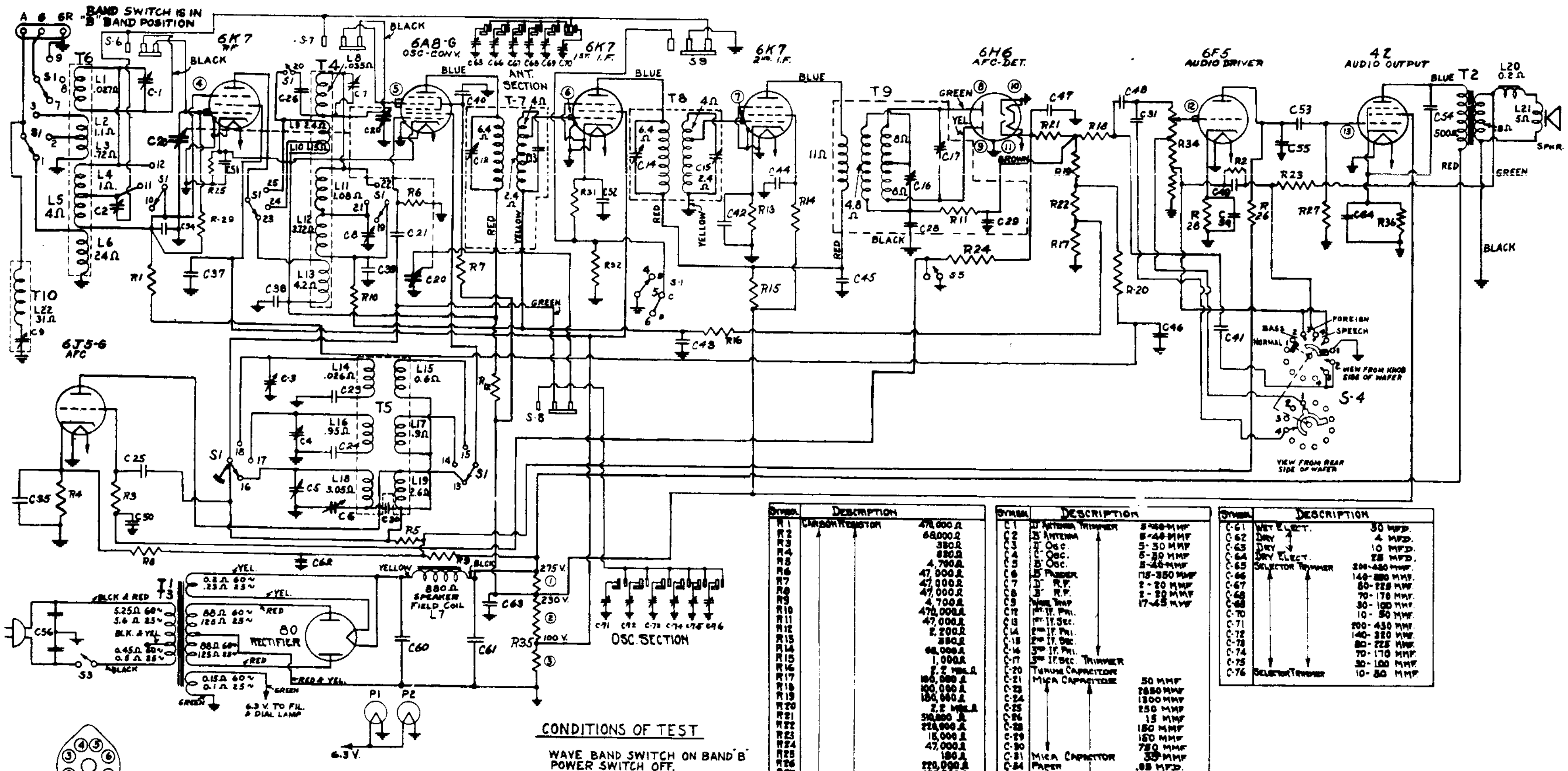
Insist on genuine factory-tested parts which may be purchased from authorized dealers

Stock No.	Description	List Price
*RB-026	BOARD—Ant. and gnd. terminal board	$0.10
*RB-040	BOARD—Terminal Board (3 lugs)	.10
*RB-139	BRACKET—Gang condenser mtg. brackets	.15
RC-003	CAPACITOR—.001 Mfd., 200 V. Paper (C-23) (Close Tolerance)	.25
*RC-017	CAPACITOR—.0045 Mfd., 200 V. Paper (C-1)	.25
*RC-023	CAPACITOR—.005 Mfd., 600 V. Paper (C-18)	.25
*RC-042	CAPACITOR—.01 Mfd., 1000 V. Paper (C-2, C-22, C-24)	.30
*RC-080	CAPACITOR—.02 Mfd., 400 V. Paper (C-15)	.25
*RC-091	CAPACITOR—.05 Mfd., 400 V. Paper (C-8, C-9, C-10, C-11, C-14)	.30
*RC-123	CAPACITOR—0.1 Mfd., 400 V. Paper (C-12, C-20)	.35
*RC-150	CAPACITOR—.25 Mfd., 400 V. Paper (C-5, C-13)	.35
*RC-213	CAPACITOR—50 Mmf., Mica (C-4)	.25
*RC-223	CAPACITOR—75 Mmf., Mica (C-17)	.25
*RC-259	CAPACITOR—250 Mmf., Mica (C-21)	.30
*RC-336	CAPACITOR—1170 Mmf., Mica (C-7)	.30
RC-569	CAPACITOR—12 Mfd., 450 V.; 8 Mfd., 400 V.; 8 Mfd., 350 V.; 10 Mfd., 25 V. dry electrolytic (C-30, C-31, C-32, C-33)	2.20
*RC-618	CAPACITOR—"B" band oscillator trimmer (5-45 Mmfd.) (C-38)	.25
*RC-632	CAPACITOR—Double trimmer (3-40 Mmfd.) (C-40, C-43)	.25
*RC-634	CAPACITOR—"B" band padder (350-550 Mmfd.) (C-39)	.35
RC-635	CAPACITOR—Double trimmers, 1st or 2nd I.F. transformer (C-34, C-35, C-36, C-37)	.45
*RC-637	CAPACITOR—Double trimmer, 3rd I.F. (C-44, C-45, C-16)	.60
RC-718	CONDENSER—3-gang tuning condenser (C-19) (Includes trimmers C-41, C-42)	4.20
*RC-755	CAPACITOR—Line capacitor, .01-.01 Mfd. 250 V. A-C (C-25)	.40
RC-849	CABLE—Speaker cable and plug	.55
*RC-863	CORD—Power cord and plug	.65
RC-992	CUSHION—Gang condenser mtg. cushions (Pkg. of 3)	.10
RD-201	DRIVE—Vernier drive mechanism	1.55
RE-016	ESCUTCHEON—Escutcheon plate	2.05
*RF-002	FOOT—Chassis mtg. foot	.20
*RF-008	FOOT—Chassis mtg. foot (red rubber)	.20
*RG-001	GRID CAP—Control grid clip (Pkg. of 5)	.10
RK-017	KNOB—Control knob (plain) (Pkg. of 5)	.40
RK-018	KNOB—Control knob (band selector and tone control (Pkg. of 5)	.40
*RL-035	COIL—Ant. coil band "D" (L-1)	.70
*RL-036	COIL—Ant. coil "B" and "C" band (L-2)	1.10
*RL-131	COIL—RF coil "B" band (L-8)	.75
*RL-237	COIL—Osc. coil band "D" (L-3)	.70
*RL-238	COIL—Osc. coil "B" and "C" band (L-4)	1.00
RQ-1231	RESISTOR—68 ohms, ½ W. Carbon (R-25) (Pkg. of 5)	.70
RQ-1255	RESISTOR—680 ohm, ½ W. Carbon (R-7) (Pkg. of 5)	.70
RQ-1267	RESISTOR—2200 ohm, ½ W. Carbon (R-4) (Pkg. of 5)	.70
RQ-1269	RESISTOR—2700 ohm, ½ W. Carbon (R-6) (Pkg. of 5)	.70
RQ-1275	RESISTOR—4700 ohm, ½ W. Carbon (R-8) (Pkg. of 5)	.70
RQ-1291	RESISTOR—22,000 ohm, ½ W. Carbon (R-5) (Pkg. of 5)	$0.70
RQ-1299	RESISTOR—47,000 ohm, ½ W. Carbon (R-1, R-2, R-19) (Pkg. of 5)	.70
RQ-1303	RESISTOR—68,000 ohm, ½ W. Carbon (R-11, R-13) (Pkg. of 5)	.70
RQ-1307	RESISTOR—100,000 ohm, ½ W. Carbon (R-17) (Pkg. of 5)	.70
RQ-1315	RESISTOR—220,000 ohm, ½ W. Carbon (R-9, R-14, R-20) (Pkg. of 5)	.70
RQ-1323	RESISTOR—470,000 ohm, ½ W. Carbon (R-15) (Pkg. of 5)	.70
RQ-1331	RESISTOR—1.0 Megohm, ½ W. Carbon (R-10) (Pkg. of 5)	.70
RQ-1467	RESISTOR—2200 ohms, 1 W. Carbon (R-18)	.20
RR-725	RESISTOR—Tapped bleeder resistor (R-16, R-21, R-22, R-23, R-24)	1.00
RS-140	SHIELD—"B" Band RF Transformer Shield Can	.20
RS-172	SHIELD—1st, 2nd, or 3rd I.F. Transformer Shield	.25
*RS-200	SOCKET—8-pin Tube Socket (Pkg. of 5)	.75
RS-215	SOCKET—6-prong Tube Socket (Pkg. of 5)	.60
RS-217	SOCKET—4-prong Glass Tube Socket (Pkg. of 5)	.50
RS-350	SWITCH—Tone control and Power Switch (S-2, S-3)	1.10
RS-351	SWITCH—Band Change Switch (S-1)	1.30
RT-0810	TRANSFORMER—Power Transformer, 110-130 volts, 50/60 cycles (T-2)	4.75
RT-0811	TRANSFORMER—Power Transformer Universal 50/60 cycles (T-2)	8.50
RT-0812	TRANSFORMER—Power Transformer 110-130 V., 25/60 cycles (T-2)	8.00
RT-233	TRANSFORMER—1st or 2nd IF Transformer	1.50
RT-243	TRANSFORMER—3rd IF Transformer	1.60
RV-030	VOLUME CONTROL—2 megohm control tapped at 5,000 ohms	.80
RW-014	WINDOW—Escutcheon Window and Rubber Mounting	.45
*RW-101	WASHER—Felt Washer for Control Shafts (Pkg. of 10)	.45
RX-021	ASSEMBLY—Chassis Mounting Assembly	.10
	SPEAKER ASSEMBLY F-81	
RC-924	CONE—8-in. Cone and Voice Coil Assembly (early production) (See text under Speaker)	.90
RC-927	CONE—8-in. Cone and Voice Coil Assembly (late production) (See text under Speaker)	.90
*RC-990	CLAMP—Voice Coil Spider Clamp (early production) (See text under Speaker)	.05
RC-1967	CLAMP—Voice Coil Spider Clamp (late production) (See text under Speaker)	.05
*RP-015	PLUG—Male speaker plug	.20
RS-058	SPEAKER—8-in. Speaker (complete)	6.00
*RS-416	SPRING—Voice Coil Leads Spring (Pkg. of 2)	.10
RT-421	TRANSFORMER—Output Transformer	1.30
	SPEAKER ASSEMBLY F-86	
RC-925	CONE—12-in. Cone and Voice Coil Assembly	1.25
*RC-991	CLAMP—12-in. Cone Spider Clamp and Screw	.05
*RP-015	PLUG—Male Speaker Plug	$0.20
RS-057	SPEAKER—12-in. Speaker (complete)	6.80
*RS-416	SPRING—Voice Coil Leads Spring (Pkg. of 2)	.10
RT-421	TRANSFORMER—Output Transformer (T-1)	1.30
	DIAL SCALE MECHANISM	
RB-155	BRACKET—Band Change Indicator Bracket)	.05
RB-604	BUSHING—Volume Control Cable Drive Bushing	.10
RC-846	CABLE—Volume Control Cable (Pkg. of 5)	.40
RC-847	CABLE—Tone Control Cable (Pkg. of 5)	.40
RC-848	CABLE—Condenser Drum Drive Cable and Pointer Cable (Pkg. of 5)	.90
*RD-013	DRUM—Condenser Drive Drum	.35
RD-053	DIAL—Dial Scale	$1.40
RL-920	LAMP—Dial Lamp, .25 amp., 6.3 V. (Pkg. of 10)	1.50
*RP-049	PULLEY—Idler Pulley for Cond. Drive Cable	.15
RP-073	POINTER—Volume or Tone Control Pointers (Pkg. of 5)	.10
RP-075	PULLEY—Idler Pulley for Tone and Volume Control Cords (Pkg. of 6)	.20
RP-076	PULLEY—Tone Control Drive Pulley	.15
RP-077	POINTER—Dial Scale Pointer Assembly (Pkg. of 5)	.90
RS-218	SOCKET—Lamp Socket Assembly	.10
RS-401	SPRING—Tuning Drive Cord Tension Spring (Pkg. of 5)	.10
RS-426	SPRING—Volume or Tone Control Drive Cord Tension Spring	.10
RX-023	ASSEMBLY—Band Indicator Assembly (Includes cord, pointer, and spring)	.20

* Used on previous receivers.

GENERAL ELECTRIC COMPANY

MODEL F-96



CONDITIONS OF TEST

WAVE BAND SWITCH ON BAND "B"
POWER SWITCH OFF.

APPROXIMATE RESISTANCE MEASUREMENTS

	RESITANCE TO GROUND	TUBE	SOCKET PRONG
4	3 MEG. Ω	R.F. GRID	CAP
5	2.8 MEG. Ω	6A8 CONV.	CAP
6	2.3 MEG. Ω	1ST. I.F. GRID	CAP
7	2.4 Ω	2ND. I.F. GRID	CAP
8	340,000 Ω	DIODE PLATE	PRONG 3 A.F.C. SWITCH CLOSED
9	340,000 Ω	DIODE PLATE	PRONG 5 A.F.C. SWITCH CLOSED
10	GROUNDED	DIODE CATHODE	PRONG 4
11	1 MEG. Ω A.F.C. SWITCH OPEN 47,000 Ω A.F.C. SWITCH CLOSED	DIODE CATHODE	PRONG 8
12	0-2 MEG. Ω VOL. CONTROL	1ST. AUDIO GRID	CAP
13	470,000 Ω	42 GRID	PRONG 4

ALL VOLTAGES TO GROUND UNLESS OTHERWISE SPECIFIED
ALL VOLTAGES MEASURED WITH ANT. & GND TERMINALS SHORTED-120 V. ON PRI.

SYMBOL	DESCRIPTION	
R1	CARBON RESISTOR	470,000 Ω
R2		68,000 Ω
R3		330 Ω
R4		820 Ω
R5		4,700 Ω
R6		47,000 Ω
R7		47,000 Ω
R8		47,000 Ω
R9		4,700 Ω
R10		470,000 Ω
R11		47,000 Ω
R12		2,200 Ω
R13		330 Ω
R14		68,000 Ω
R15		1,000 Ω
R16		2.2 MEG. Ω
R17		100,000 Ω
R18		100,000 Ω
R19		100,000 Ω
R20		2.2 MEG. Ω
R21		510,000 Ω
R22		220,000 Ω
R23		15,000 Ω
R24		47,000 Ω
R25		180 Ω
R26		220,000 Ω
R27		470,000 Ω
R28		2700 Ω
R29		470,000 Ω
R31		390 Ω
R32	CARBON RESISTOR	3300 Ω
R34	VOLUME CONTROL · 2 MEG. TAP AT [illegible]	
R35	CARBOHM RESISTOR	
1		880 Ω
2		10,500 Ω
3		10,000 Ω
R36	MOLDED W.W. RESISTOR	410 Ω
S1	BAND CHANGE SWITCH	
S3	POWER SWITCH WITH S-4	
S4	TONE CONTROL	
S5	AFC. CUT OFF SWITCH	
S6	SWITCH-ANT. MAN.	
S7	SWITCH-R.F. MAN.	
S8	SWITCH-OSC. MAN.	
S9	I.F. BIAS CHANGE SWITCH	

SYMBOL	DESCRIPTION	
C1	"D" ANTENNA TRIMMER	5-40 MMF
C2	"B" ANTENNA	5-40 MMF
C3	"D" OSC.	5-30 MMF
C4	"C" OSC.	5-30 MMF
C5	"B" OSC.	5-40 MMF
C6	"B" PADDER	115-350 MMF
C7	"D" R.F.	2-20 MMF
C8	"B" R.F.	2-20 MMF
C9	WAVE TRAP	17-45 MMF
C12	1ST I.F. PRI.	
C13	1ST I.F. SEC.	
C14	2ND I.F. PRI.	
C-15	2ND I.F. SEC.	
C-16	3RD I.F. PRI.	
C-17	3RD I.F. SEC. TRIMMER	
C-20	TUNING CAPACITOR	
C-21	MICA CAPACITOR	50 MMF
C-23		2650 MMF
C-24		1300 MMF
C-25		250 MMF
C-26		15 MMF
C-28		150 MMF
C-29		150 MMF
C-30		750 MMF
C-31	MICA CAPACITOR	35 MMF
C-34	PAPER	.05 MFD.
C-35		0.1 MFD.
C-37		.25 MFD.
C-38		0.1 MFD.
C-39		.05 MFD.
C-40		.05 MFD.
C-41		.00075 MFD.
C-42		0.1 MFD.
C-43		.05 MFD.
C-44		.05 MFD.
C-45		0.1 MFD.
C-46		.05 MFD.
C-47		0.1 MFD.
C-48		.005 MFD.
C-49		.05 MFD.
C-50		.05 MFD.
C-51		0.1 MFD.
C-52		0.1 MFD.
C-53		.01 MFD.
C-54	PAPER	.010 MFD.
C-55	MICA	250 MMF.
C-56	LINE CAPACITOR	.01-.01 MFD.
C-58	DRY ELECT.	10 MFD.
C-60	WET ELECT.	16 MFD.

SYMBOL	DESCRIPTION	
C-61	WET ELECT.	30 MFD.
C-62	DRY	4 MFD.
C-63	DRY	10 MFD.
C-64	DRY ELECT.	25 MFD.
C-65	SELECTOR TRIMMER	200-430 MMF.
C-66		140-320 MMF.
C-67		80-225 MMF.
C-68		70-170 MMF.
C-69		30-100 MMF.
C-70		10-50 MMF.
C-71		200-430 MMF.
C-72		140-320 MMF.
C-73		80-225 MMF.
C-74		70-170 MMF.
C-75		30-100 MMF.
C-76	SELECTOR TRIMMER	10-80 MMF.

Fig. 5. Schematic Diagram

GENERAL ELECTRIC COMPANY
MODEL F-96

SERVICE DATA

Physical Specifications

Model . . . F-96
Height . . . 41 in.
Width . . . 26½ in.
Depth . . . 14¼ in.
Weight packed . . . 81 lb

Tuning Control Drive Ratio

Fast tuning . . . 10 to 1
Vernier tuning . . . 55 to 1

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	110-120 and (120-130)*	50-60	105
C	110-120 and (120-130)*	25-60	105

*The receiver as shipped from the factory, has the power cord connected to the 120-130 volt tap of the transformer, (red and black lead). If the normal voltage of your power supply is always below 115 volts, the power cord should be removed from this tap and connected to the lower voltage tap, (yellow and black lead). Solder and tape the joint and also tape the exposed end of the unused lead.

Tuning Frequency Range

Band "B" . . . 540-1640 kc.
Band "C" . . . 1600-5650 kc.
Band "D" . . . 5640-18,000 kc.

Intermediate Frequency . . . 465 kc.

Electrical Power Output

Undistorted . . . 2.5 watts
Maximum . . . 5.0 watts

Tone Control . . . 4-point

Loud-speaker—Electrodynamic

Cone . . . 12-inch
Voice Coil Impedance . . . 5.5 ohms at 400 cycles

Tubes

R.F. Amplifier . . . 6K7 Triple-grid, super-control Amplifier
Oscillator and Converter . . 6A8-G Pentagrid Converter
A.F.C. Control . . . 6J5-G Detector Amplifier Triode
1st I.F. Amplifier . . . 6K7 Triple-grid, Super-control Amplifier
2nd I.F. Amplifier . . . 6K7 Triple-grid, Super-control Amplifier
Detector APC and AVC . . 6H6 Twin Diode
First Audio Amplifier . . . 6F5 High Gain Triode
Audio Power Amplifier . . 42 Power Amplifier Pentode
Rectifier . . . 80 Full-wave Rectifier
Dial Lamp . . . Mazda No. 46—6.3 volts, 0.25 amps.

GENERAL INFORMATION

Model F-96 is a three band a-c operated receiver employing nine General Electric Pre-tested Tubes as described above in a superheterodyne circuit. The receiver circuit consists of an R.F. amplifier, an oscillator-converter with automatic frequency control, a two stage I.F. amplifier, a detector, avc and discriminator circuit and the audio amplifier. Added features are a four point tone control, wave trap, and the "Touch Tuning" system with its seven buttons allowing the instant selection of seven stations.

Receiver Operation

The R.F. amplifier consists of the antenna transformer (T-6) connected to the 6K7 which is coupled to the 6A8-G through the R.F. transformer (T-4). The signal is converted to an intermediate frequency of 465 kc by the oscillator and converter tube 6A8-G. The intermediate frequency is then amplified by the two 6K7 tubes used in conjunction with the three double tuned I.F. transformers. The primary and secondary coils of these I.F. transformers are carefully adjusted midway between the points of critical and over coupling so as to give the I.F. amplifier a broadened band width with the resultant improvement in fidelity of the received program.

The output of the I.F. amplifier is applied to a 6H6 twin diode, which is a combination detector, automatic volume control and discriminator voltage source for the automatic frequency control tube 6J5-G.

A detailed explanation of A.F.C. will be found in a following paragraph.

The volume is controlled by a potentiometer in the grid circuit of the 6F5 audio amplifier tube. This tube is resistance coupled to the 42 pentode output tube. The output transformer is designed to correctly load the 42 tube over a broad range of frequencies thus enabling the tube to deliver ample undistorted output to the 12-inch speaker.

Tone Control

Negative feed back is used to control the quality and tone of reproduction. The frequency response of the audio circuit is varied by the tone control switch and its associated network as follows:

In the "Normal" position, voltage from the voice coil is fed back through R-23, R-2 and C-40 to a tap on the volume control. C-31 serves to inject high frequencies into a tap higher up on the volume control. This arrangement gives an extended high frequency response, holds down the "boom" caused by pentode output and speaker resonance, and at the same time improves the quality and response to an extended range of both high and low frequencies.

In the "Bass" position, the high frequency input to the audio system is limited by the addition of C-41 across the volume control and its coupling condenser; and, also, by the omission of the high frequency injector capacitor C-31. This permits the true reproduction of a wide range of low frequencies without the "boom" at speaker resonance.

In the "Foreign" position R-2 and C-40 are shorted out of the network used for "Bass." C-41 is used, as in the "Bass" position, to limit the high frequency input to the audio amplifier. This permits more degeneration of the lower frequencies, and provides a tone range most suited for foreign reception. This position may be used to reduce noise and also to reduce bass on programs which predominate in low frequency tones.

C-41 is removed from the circuit in the "Speech" position; R-2 and C-40 are shorted out leaving R-23 and C-31 in the circuit, thus allowing flat degeneration of all frequencies. This arrangement has been found to give the best response for programs predominating in speech.

Coil System

The coils for the three bands are wound on a single form. The antenna transformer is designated as T-6, the R.F. transformer as T-4 and the oscillator transformer as T-5. All contacts on the band switch are numbered in Fig. 5 and Fig. 6 to facilitate tracing the coil circuits.

The band switch connects the coils to operate as follows:

	Primary	Secondary	Remarks
Ant. "B"	L-6	L-4 & L-5	
"C"	L-3	L-4	L-5 shorted
"D"	L-2 & L-3	L-1	L-4 & L-5 shorted
R.F. "B"	L-13	L-11 & L-12	
"C"	L-10	L-11	L-12 shorted
"D"	L-9 & L-10	L-8	L-11 & L-12 shorted
Osc. "B"	L-19	L-18	
"C"	L-17	L-16	Connects C-30 across L-18
"D"	L-15	L-14	Connects C-30 across L-16

On "D" band contact No. 9 is used to provide a ground for the General Electric noise-reducing antenna systems KV-300 and FT-40.

Automatic Frequency Control

The Automatic Frequency Control used in this receiver shifts the oscillator frequency so that the correct intermediate frequency is very closely produced even when the receiver is mistuned several kilocycles.

The essential elements are the discriminator transformer T-9, the twin diode 6H6 with its balanced discriminator network, and the 6J5-G control tube connected across the broadcast oscillator plate coil.

The discriminator transformer is designed to deliver (when properly tuned to 465 kc.) equal voltages to each section of the 6H6. Under this condition the voltage drop across R-21 is equal and opposite to the voltage across the total resistance of R-19, R-22, and R-17; thus no discriminator voltage is produced to control the 6J5-G tube.

However, if the signal frequency is increased above 465 kc. unequal voltages are applied to the diodes and the voltage over R-21 is greater than the voltage over the combined resistance of R-19, R-22, and R-17. The difference of these two voltages is positive and is applied to the 6J5-G control tube.

When the signal frequency is decreased below 465 kc. the result is less voltage over R-21 and a greater voltage over the combined resistances R-19, R-22 and R-17. The difference of these two voltages, as applied to the 6J5-G control tube, is negative.

Thus three conditions arise:

On resonance: no discriminator voltage developed
Above 465 kc.: a positive control voltage
Below 465 kc.: a negative control voltage

The 6J5-G A.F.C. control tube has a combination of self and fixed bias, the latter being the result of the current supplied through R-8 to the cathode resistor R-4. The R.F. voltage applied to the control grid of the 6J5-G is obtained from the drop across the C-6 series padder and C-30. The vector sum of these two voltages is applied to the phase-shifting network C-25 and R-3 and in turn to the control grid. This phase-shifting network causes the control tube to appear as a reactance in parallel with the oscillator coil. The value of the apparent reactance depends upon the control voltage produced by the discriminator.

When the set is mistuned above the incoming signal the converter output is above the 465 kc. required. A positive discriminator voltage is produced as explained above. This causes the 6J5-G tube to act as more capacitive reactance and thus lower the oscillator frequency; this gives a lower converter output frequency, approximately 465 kc.

When the set is mistuned below the incoming signal, the converter output is below the 465 kc. required. A negative discriminator voltage is produced as explained above. This causes the 6J5-G to act as less capacitive reactance thus increasing the oscillator frequency. This in turn gives a higher converter output frequency, approximately 465 kc.

A decided A.F.C. action is apparent on short waves. The discriminator voltage is produced in the same manner as above. However, the action of the 6J5-G tube is different. The 6A8-G oscillator plate voltage and 6J5-G plate voltage are supplied through the same resistor (R-5). A positive discriminator voltage allows the 6J5-G plate current to increase, thus reducing the 6A8-G oscillator plate voltage. This causes a lower oscillator frequency with the resultant lower converter output frequency, approximately 465 kc.

With a negative discriminator voltage the 6J5-G plate current is less, thus increasing the 6A8-G oscillator plate voltage. This causes a higher oscillator frequency with the resultant higher converter output frequency, approximately 465 kc.

Touch Tuning

This receiver employs six pairs of selector trimmers to tune the antenna and oscillator circuits to six different stations in the broadcast band. By leaving the gang condenser tuned to a station, not tuned by the above trimmers, any one of seven stations is available by merely touching a button.

The manual button operates the switches S-6, S-7, S-8, and S-9 simultaneously. The switches are shown in the manual position in Fig. 5. S-9 is used to provide the ground connection for the 1500 kc. antenna trimmer C-2, and it also grounds the antenna selector trimmers.

Pressing any one of the buttons releases any other button which may have been depressed. When the manual button is in the released position, S-6 opens the antenna transformer connection to the grid of the 6K7 R.F. amplifier, and replaces the antenna section of the gang condenser with the antenna selector trimmers.

S-7 opens the circuit to the R.F. stage and connects the 6A8-G grid to the antenna transformer. It should be noted that both the input and output circuits of the R.F. stage are disconnected.

S-9 removes the ground from C-2 and from the antenna selector trimmers. It shorts out R-32 thus decreasing the self bias on the 6K7, 1st I.F. amplifier, and consequently increasing the sensitivity.

S-8 connects the oscillator selector trimmers in the place of the oscillator section of the gang condenser C-20.

A depressed station button simultaneously connects the antenna and oscillator selector trimmers. As an example, the extreme left-hand button connects C-65 and C-71 to the antenna and oscillator transformers respectively.

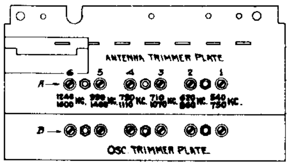


Fig. 1. Selector Trimmer Location

The frequency range covered by each trimmer is shown in Fig. 1. To set up a pair of trimmers for a station within their range, press the corresponding button until it locks in position. First tune the oscillator trimmer to the station and then tune the antenna trimmer for maximum output. Weak stations may require an approximate setting of the antenna trimmer before it will be possible to tune in the station with the oscillator trimmer. Be sure the A.F.C. switch is turned off while making these adjustments. The trimmers in the top row tune the antenna transformer while those in the lower row are used to tune the oscillator.

When operating with the manual button depressed, the gang condenser is used to tune the secondary circuits as described under coil system. The manual button must be depressed when operating on "C" and "D" bands.

SERVICE HINTS

If depressing a button does not release another button which was depressed, check the latch-bar spring. If there is only one spring, and that spring is in the center of the latch bar, decreasing the tension will remedy the trouble. Another solution is to replace the center spring with two springs, one at each end of the latch bar. They should have approximately the same tension. Make sure that the ears on the latch bar are twisted sufficiently to reduce, to a minimum, play in the direction of key movement.

C-2 was connected directly to ground in some of the early production receivers; connecting C-2 as shown in Fig. 5 will extend the high-frequency range of the antenna selector trimmers, because C-2 is then connected across only a small part of the antenna secondary when operating the touch tuning.

Where local conditions require a special range trimmer, this can be obtained by selecting a trimmer of lower capacity and shunting it with a good grade low power factor mica capacitor. Replacement parts RC-207, RC-211, RC-228 and RC-236 have capacities of 25, 50, 85 and 100 Mmf. respectively and should fill the requirements.

Where trimmers do not cover the high-frequency range assigned to them, inspect the trimmer for a bent lug. The lug may be bent in such a manner that the trimmer plates do not separate sufficiently to reach minimum capacity.

It will be found that stability is better if care is exercised to operate the trimmers near maximum capacity where possible, rather than using the trimmer of the next higher range and thus operating that trimmer at minimum capacity.

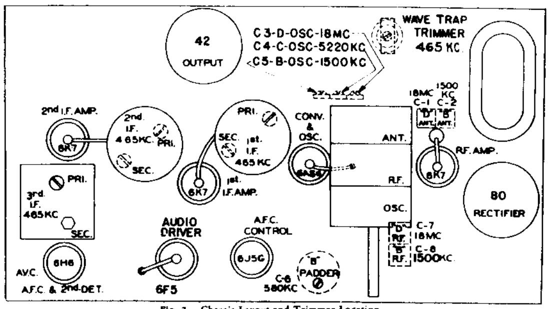


Fig. 2. Chassis Layout and Trimmer Location

ALIGNMENT PROCEDURE

In order to align these receivers properly, it is necessary to have the following test equipment:

1. A modulated test oscillator.
2. An output indicator such as an AC voltmeter with a scale reading of 3 to 5 volts. A cathode ray oscilloscope is preferred for I.F. Alignment.
3. A screwdriver type alignment tool.

The alignment procedure is given in table form along with the trimmer location drawing, Fig. 2. A "dummy antenna" should be used in all alignments and is the capacitor, or capacitor and resistor, used in series with the signal generator. The grid lead should not be removed from the tube to which the input signal is applied when aligning the I.F. as this would remove the grid bias from the tube.

4. Alignment of the "touch tuning" trimmers is discussed in the section on "Touch Tuning."

Automatic Frequency Control Adjustments

After I.F. alignment is completed with output meter, without disturbing the generator setting, remove the signal generator lead from the grid of the 6A8-G converter. Apply the 465 kc. signal to the 6A8-G grid capacitively through the insulation of the grid lead.

Tune in a weak broadcast station at about 1000 kc. and, with the A.F.C. switch "off," tune the receiver carefully for "zero" beat between this carrier and the 465 kc. generator signal. Throw the A.F.C. switch on and adjust the 3rd I.F. secondary trimmer (C-17) to zero beat. This adjustment is very critical and must be made with great care. When the alignment is correctly done, there will be no appreciable difference in the beat note with the A.F.C. switch "on" or "off."

Another method of A.F.C. adjustment, after I.F. alignment with an output meter, is to connect a low range voltmeter between the cathodes of the 6H6 A.F.C. tube. Leave the signal generator connected to the 6A8-G grid and, without disturbing the 465 kc. setting of the signal generator, adjust C-17. It will be noticed that the meter reads plus when C-17 is tuned off resonance on one side and negative when tuned on the opposite side of resonance. The correct adjustment of C-17 is between these positions, when the voltmeter reads zero.

ALIGNMENT PROCEDURE

I.F. Alignment with Oscilloscope

Band Switch Setting	Input Frequency	Point of Input	Dummy Ant.	Trimmer (See Fig. 2)	Remarks
1. Band "B"	465 kc. Sweep	2nd I.F. Grid	.05 Mfd.	3rd I.F. Pri. (C-16)	A.F.C. switch "off"—Condenser gang at minimum capacity—vertical input ground and the junction of R-18, R-19, R-21 and brown lead from the 3rd I.F. trans. Adjust trimmers in order listed for a single curve of maximum amplitude. The resulting curve with input at converter grid is shown in Fig. 3.
2. Band "B"	465 kc. Sweep	1st I.F. Grid	.05 Mfd.	2nd I.F. Sec. (C-15) Pri. (C-14)	
3. Band "B"	465 kc. Sweep	Converter Grid	.05 Mfd.	1st I.F. Sec. (C-13) Pri. (C-12)	
4. Band "B"	465 kc. Sweep	Converter Grid	.05 Mfd.	3rd I.F. Sec. (C-17)	Disconnect one end of C-47—Turn A.F.C. switch "on"—Vertical input of oscilloscope to ground and discriminator cathode; prong No. 8 on 6H6. Adjust trimmer for cross on horizontal axis Fig. 4.
5. Band "B"	465 kc. Sweep	Antenna Post	250 Mmf. 400 Ohms	Wave Trap Trimmer (C-9)	Adjust for minimum amplitude.

I.F. Alignment with Output Meter

1. Band "B"	465 kc. Modulated	2nd I.F. Grid	.05 Mfd.	3rd I.F. Pri. (C-16)	A.F.C. switch "off"—Condenser gang at minimum capacity—output meter connected across the voice coil volume control at maximum—input as low as practical. Adjust all trimmers in order listed for maximum output. Do not attempt an over-all re-alignment once a stage alignment has been completed.
2. Band "B"	465 kc. Modulated	1st I.F. Grid	.05 Mfd.	2nd I.F. Sec. (C-15) Pri. (C-14)	
3. Band "B"	465 kc. Modulated	Converter Grid	.05 Mfd.	1st I.F. Sec. (C-13) Pri. (C-12)	
4. Band "B"	. . .	. . .	. . .	3rd I.F. Sec. (C-17)	See paragraph on A.F.C. adjustment.
5. Band "B"	465 kc. Modulated	Antenna Post	250 Mmf. 400 Ohms	Wave Trap Trimmer (C-9)	Adjust for minimum amplitude.

R.F. Alignment

1. Band "B"	. . .	. . .	. . .	. . .	Turn A.F.C. switch "off"—Set dial pointer to first line at left-hand end of dial scale with condenser gang fully meshed.
2. Band "D"	18 mc. Modulated	Antenna Post	250 Mmf. 400 Ohms	Osc. (C-3) R.F. (C-7) Ant. (C-1)	Connect output meter across voice coil—Turn tone control to bass. D band image should be 930 kc. *below* input signal when oscillator trimmer (C-3) is peaked properly. Example: 15 mc.—image 14.07 mc. Peak C-7 and C-1 while rocking gang condenser.
3. Band "C"	5220 kc. Modulated	Antenna Post	250 Mmf. 400 Ohms	Osc. (C-4)	Adjust trimmer for greatest output with dial pointer at 5220 kc.
4. Band "B"	1500 kc. Modulated	Antenna Post	250 Mmf. 400 Ohms	Osc. (C-5) R.F. (C-8) Ant. (C-2)	Adjust trimmers, in order listed, for greatest output at 1500 kc.
5. Band "B"	580 kc. Modulated	Antenna Post	250 Mmf. 400 Ohms	Osc. Padder (C-6)	Adjust padder for maximum output in vicinity of 580 kc. while rocking gang condenser.
6. Band "B"	Repeat operation No. 4				

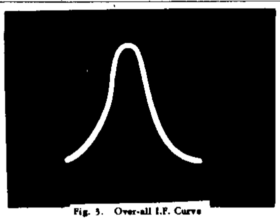


Fig. 3. Over-all I.F. Curve

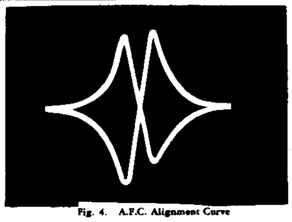


Fig. 4. A.F.C. Alignment Curve

REPLACEMENT PARTS LIST

Stock No.	Description	List Price
	CHASSIS ASSEMBLY	
*RB-008	BOARD—Terminal board (2 terminals)	$0.10
*RB-009	BOARD—Terminal board (1 terminal)	.15
*RB-023	BOARD—Terminal board (4 terminals)	.10
*RB-049	BOARD—Antenna ground terminal board	.10
*RB-053	BOARD—Terminal board (3 terminals)	.10
RB-062	BOARD—Terminal board (6 terminals)	.10
RB-606	LATCH BAR—Latch bar for push buttons	.10
RB-607	BUTTON—Push button (Pkg. of 5)	.20
RC-002	CAPACITOR—.00075 Mfd., 200 V. paper (C-41)	.25
*RC-023	CAPACITOR—.005 Mfd., 600 V. paper (C-48)	.25
*RC-042	CAPACITOR—.01 Mfd., 1,000 V. paper (C-53, C-54)	.30
*RC-091	CAPACITOR—.05 Mfd., 400 V. paper (C-34, C-39, C-40, C-43, C-44, C-46, C-49, C-50)	.30
*RC-123	CAPACITOR—.1 Mfd., 400 V. paper (C-35, C-38, C-42, C-45, C-47, C-51, C-52)	.35
*RC-150	CAPACITOR—.25 Mfd., 400 V. paper (C-37)	.35
*RC-204	CAPACITOR—15 Mmf., mica (C-26)	.25
RC-206	CAPACITOR—50 Mmf., mica (special for oscillator) (C-21)	.25
RC-208	CAPACITOR—35 Mmf., mica (C-31)	.25
*RC-242	CAPACITOR—150 Mmf., mica (C-28, C-29)	.25
*RC-259	CAPACITOR—250 Mmf., mica (C-25, C-55)	.30
RC-308	CAPACITOR—750 Mmf., mica (C-30)	.35
*RC-360	CAPACITOR—2,850 Mmf., mica (C-23)	.50
RC-364	CAPACITOR—1,300 Mmf., mica (C-24)	.35
RC-427	CAPACITOR—Wet electrolytic 16 Mfd., 450 V. (C-60)	1.05
RC-428	CAPACITOR—Wet electrolytic 30 Mfd., 450 V. (C-61)	1.20

(Continued on next page)

GENERAL ELECTRIC COMPANY
MODEL F-96

(Continued from preceding page)

PARTS LIST CONTINUED

Stock No.	Description	List Price
RC-579	CAPACITOR—Dry electrolytic 10 Mfd., 12 V.; 4 Mfd., 400 V.; 10 Mfd., 400 V.; 25 Mfd., 25 V. (C-59, C-62, C-63, C-64)	1.70
RC-650	CAPACITOR—Double trimmer "B" and "D" band antenna 5-40 Mmf. (C-1, C-2)	.25
RC-651	CAPACITOR—Double trimmer "B" and "D" band R.F. 2-20 Mmf. (C-7, C-8)	.25
RC-652	CAPACITOR—"B" band padder 175-350 Mmf. (C-6)	.30
RC-655	CAPACITOR—Double trimmer 3rd I.F. transformer (C-16, C-17)	1.55
RC-661	CAPACITOR—"B," "C" and "D" band oscillator triple trimmer (C-3, C-4, C-5)	.60
RC-665	CAPACITOR—Double trimmer antenna or oscillator selector 200-430 Mmf. and 140-320 Mmf. (C-65, C-66, C-71, C-72)	.50
RC-666	CAPACITOR—Double trimmer, antenna or oscillator selector 80-225 Mmf. and 70-170 Mmf. (C-67, C-68, C-73, C-74)	.45
RC-667	CAPACITOR—Double trimmer, antenna or oscillator selector 30-100 Mmf. and 10-50 Mmf. (C-69, C-70, C-75, C-76)	.40
RC-673	CAPACITOR—Double trimmer 1st or 2nd I.F. transformer (C-12, C-13, C-14, C-15)	.45
RC-722	CONDENSER—3-gang tuning condenser (C-20)	5.10
*RC-755	CAPACITOR—Line capacitor .01-.01 Mfd., 250 V. A.C. (C-56)	.40
*RC-863	CORD—Power cord with plug	.65
*RC-992	CUSHION—Gang condenser mounting cushions (Pkg. of 3)	$0.10
RC-1968	CUSHION—Cushion for push button assembly (Pkg. of 5)	.05
RC-8025	CABLE—Speaker cable and female plug	.60
RD-201	DRIVE—Vernier drive mechanism	1.55
RE-023	ESCUTCHEON—Push button escutcheon	.70
RE-024	ESCUTCHEON—Escutcheon for dial (complete)	2.10
*RG-001	GRID CLIP—Control grid clip (Pkg. of 5)	.10
RK-017	KNOB—Control knob (Pkg. of 5)	.40
RK-018	KNOB—Band or A.F.C. switch knob (wing) (Pkg. of 5)	.40
RK-201	KEY—Push button key (Pkg. of 5)	.15
RL-053	COIL—"B," "C" & "D" band antenna coils (T-6)	1.20
RL-139	COIL—"B," "C" and "D" band R.F. coils (T-4)	1.10
RL-257	COIL—"B," "C" and "D" band oscillator coils (T-5)	1.25
RQ-1241	RESISTOR—180 ohm, ½ watt carbon (R-25) (Pkg. of 5)	.70
RQ-1247	RESISTOR—330 ohm, ½ watt carbon (R-3, R-13) (Pkg. of 5)	.70
RQ-1249	RESISTOR—390 ohm, ½ watt carbon (R-31) (Pkg. of 5)	.70
RQ-1257	RESISTOR—820 ohm, ½ watt carbon (R-4) (Pkg. of 5)	.70
RQ-1259	RESISTOR—1,000 ohm, ½ watt carbon (R-15) (Pkg. of 5)	.70
RQ-1269	RESISTOR—2,700 ohm, ½ watt carbon (R-28) (Pkg. of 5)	.70
RQ-1271	RESISTOR—3,300 ohm, ½ watt carbon (R-32) (Pkg. of 5)	.70
RQ-1275	RESISTOR—4,700 ohm, ½ watt carbon (R-5) (Pkg. of 5)	.70
RQ-1287	RESISTOR—15,000 ohm, ½ watt carbon (R-23) (Pkg. of 5)	.70
RQ-1299	RESISTOR—47,000 ohm, ½ watt carbon (R-6, R-7, R-11, R-24) (Pkg. of 5)	.70
RQ-1303	RESISTOR—68,000 ohm, ½ watt carbon (R-2, R-14) (Pkg. of 5)	.70
RQ-1307	RESISTOR—100,000 ohm, ½ watt carbon (R-17, R-18) (Pkg. of 5)	.70
RQ-1313	RESISTOR—180,000 ohm, ½ watt carbon (R-19) (Pkg. of 5)	.70
RQ-1315	RESISTOR—220,000 ohm, ½ watt carbon (R-22, R-26) (Pkg. of 5)	.70
RQ-1323	RESISTOR—470,000 ohm, ½ watt carbon (R-1, R-10, R-27, R-29) (Pkg. of 5)	.70
RQ-1324	RESISTOR—510,000 ohm, ½ watt carbon (R-21) (Pkg. of 5)	.70
RQ-1339	RESISTOR—2.2 Megohm, ½ watt carbon (R-16, R-20) (Pkg. of 5)	.70
RQ-1475	RESISTOR—4,700 ohm, 1 watt carbon (R-9) (Pkg. of 5)	.70

Stock No.	Description	List Price
RQ-1499	RESISTOR—47,000 ohm, 1 watt carbon (R-8)	.20
RR-727	RESISTOR—410 ohm, 1 watt moulded (R-36)	.15
RR-733	RESISTOR—Candohm tapped resistor (R-35)	.60
*RS-139	SHIELD—3rd I.F. transformer shield	.20
RS-175	SHIELD—1st or 2nd I.F. transformer shield	.25
RS-179	SHIELD—Tube shield (includes base)	.10
*RS-200	SOCKET—8-pin octal base socket (Pkg. of 5)	.75
RS-215	SOCKET—6-prong tube socket (Pkg. of 5)	.60
RS-217	SOCKET—4-prong tube socket (Pkg. of 5)	$0.50
RS-223	SOCKET—Special socket for oscillator (Pkg. of 5)	.80
RS-356	SWITCH—A.F.C. switch (S-5)	.40
RS-370	SWITCH—Manual control switch (4 sections) (S-6, S-7, S-8, S-9)	8.15
RS-371	SWITCH—Tone control and power switch (S-3, S-4)	1.15
RS-372	SWITCH—Wave change switch (S-1)	2.50
RS-431	SPRING—Key spring, staple and spacer (Pkg. of 5)	.05
RS-433	SPRING—Latch bar spring (Pkg. of 5)	.10
RT-096	TRANSFORMER—Power transformer 115-125 V., 25-60 cycles (T-1)	9.30
RT-097	TRANSFORMER—Power transformer 115-125 V., 60 cycles (T-3)	5.95
RT-247	TRANSFORMER—3rd I.F. (A.F.C.) transformer (complete) (T-9)	3.95
RT-248	TRANSFORMER—1st or 2nd I.F. transformer and trimmers (no shield) (T-7, T-8)	1.20
RV-035	VOLUME CONTROL—2 Megohm volume control tap at 5,000 and 500,000 ohm (R-34)	.90
RW-014	WINDOW—Escutcheon window and rubber mounting	.45
RW-017	WINDOW—Push-button celluloid window (Pkg. of 25)	.10
*RW-101	WASHER—Felt washer for control shafts (Pkg. of 10)	.45
RW-403	WAVE TRAP—Wave trap (complete) (L-8, C-9)	.70
RX-027	ASSEMBLY—Chassis mounting bolts and washers	.15

SPEAKER ASSEMBLY F-96

Stock No.	Description	List Price
RC-925	CONE—12-in. cone and voice coil assembly	1.25
RC-991	CLAMP—Voice coil spider clamp	.05
*RP-015	PLUG—Male speaker plug	$0.20
RS-057	SPEAKER—12-in. speaker (complete)	6.80
*RS-416	SPRING—Voice coil leads spring (Pkg. of 2)	.10
RT-421	TRANSFORMER—Output transformer (T-2)	1.30
RX-030	ASSEMBLY—Speaker mounting cushions and nuts	.10

DIAL SCALE MECHANISM

Stock No.	Description	List Price
RB-155	BRACKET—Band change bracket	.05
RB-604	BUSHING—Volume control cable drive bushing	.10
RC-869	CABLE—Volume or tone control pointer cable (Pkg. of 5)	.30
RC-870	CABLE—Dial pointer drive cable (Pkg. of 5)	.70
RC-871	CABLE—Tuning condenser drive cable (Pkg. of 5)	.45
*RD-013	DRUM—Condenser drive drum	.35
RD-062	DIAL—Dial scale	3.50
RL-920	LAMP—Pilot lamp 6.3 V., .25 amp. (Pkg. of 10)	1.50
*RP-049	PULLEY—Pointer cable pulley	.15
RP-073	POINTER—Volume or tone control pointer (Pkg. of 5)	.10
RP-075	PULLEY—Small drive cord idler pulley (Pkg. of 6)	.20
RP-076	PULLEY—Tone control cord drive pulley	.15
RP-077	POINTER—Dial scale pointer (Pkg. of 5)	.90
RP-091	PULLEY—Tuning drive cord idler pulley	.10
RS-218	SOCKET—Lamp socket assembly	.10
*RS-401	SPRING—Tuning condenser cable tension spring (Pkg. of 2)	.20
RS-426	SPRING—Volume or tone control cable tension spring (Pkg. of 5)	.10
RX-023	ASSEMBLY—Band indicator, cord and spring	.20

* Used on previous receivers.

(Prices subject to change without notice)

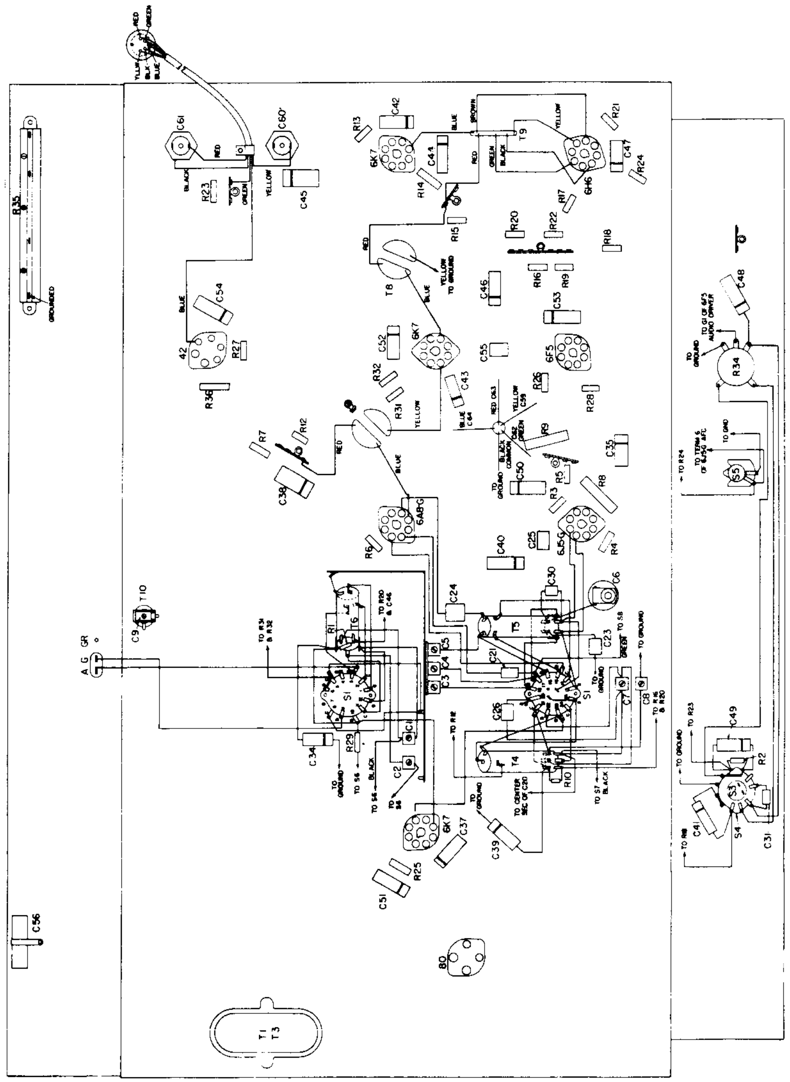
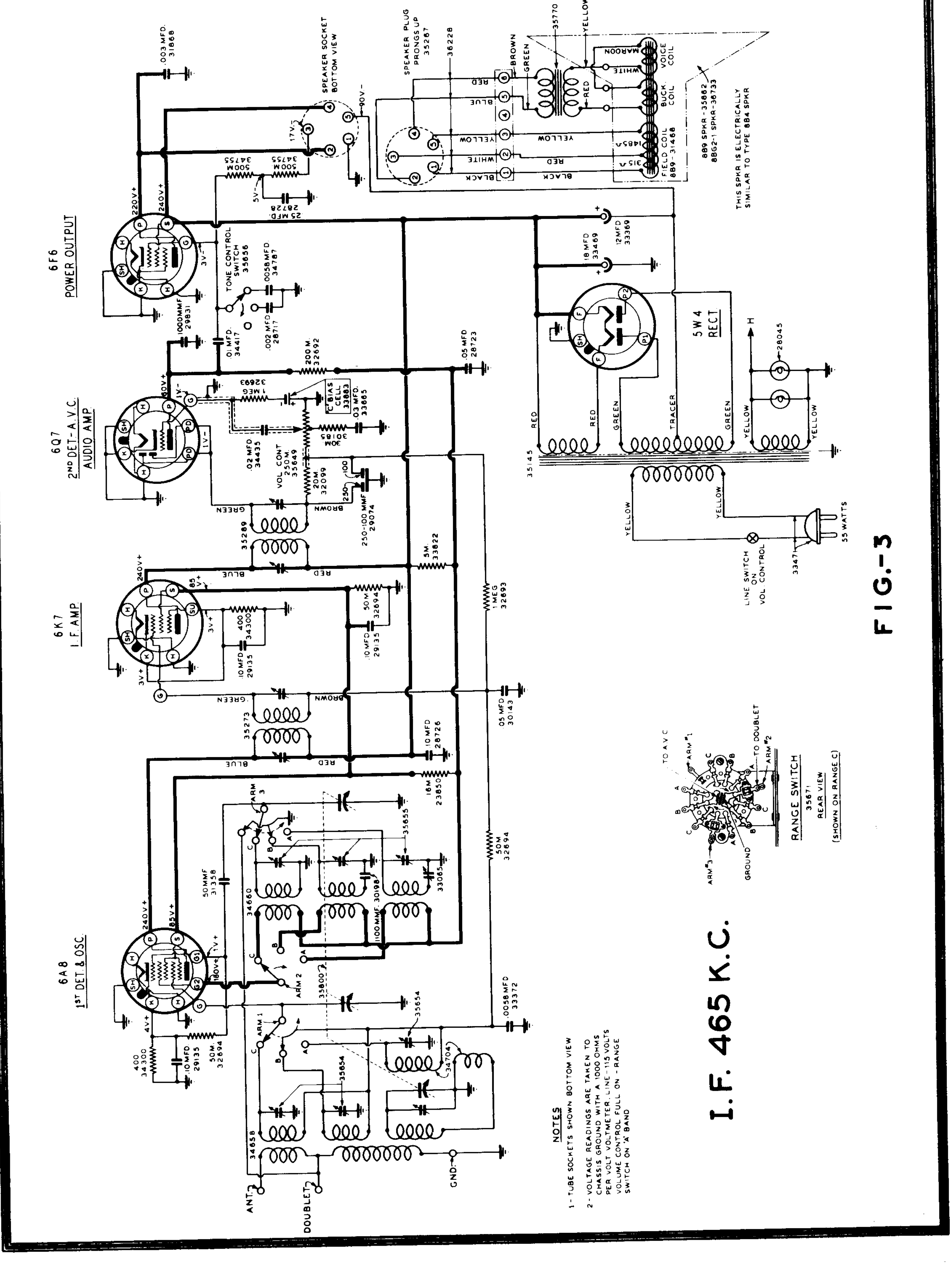
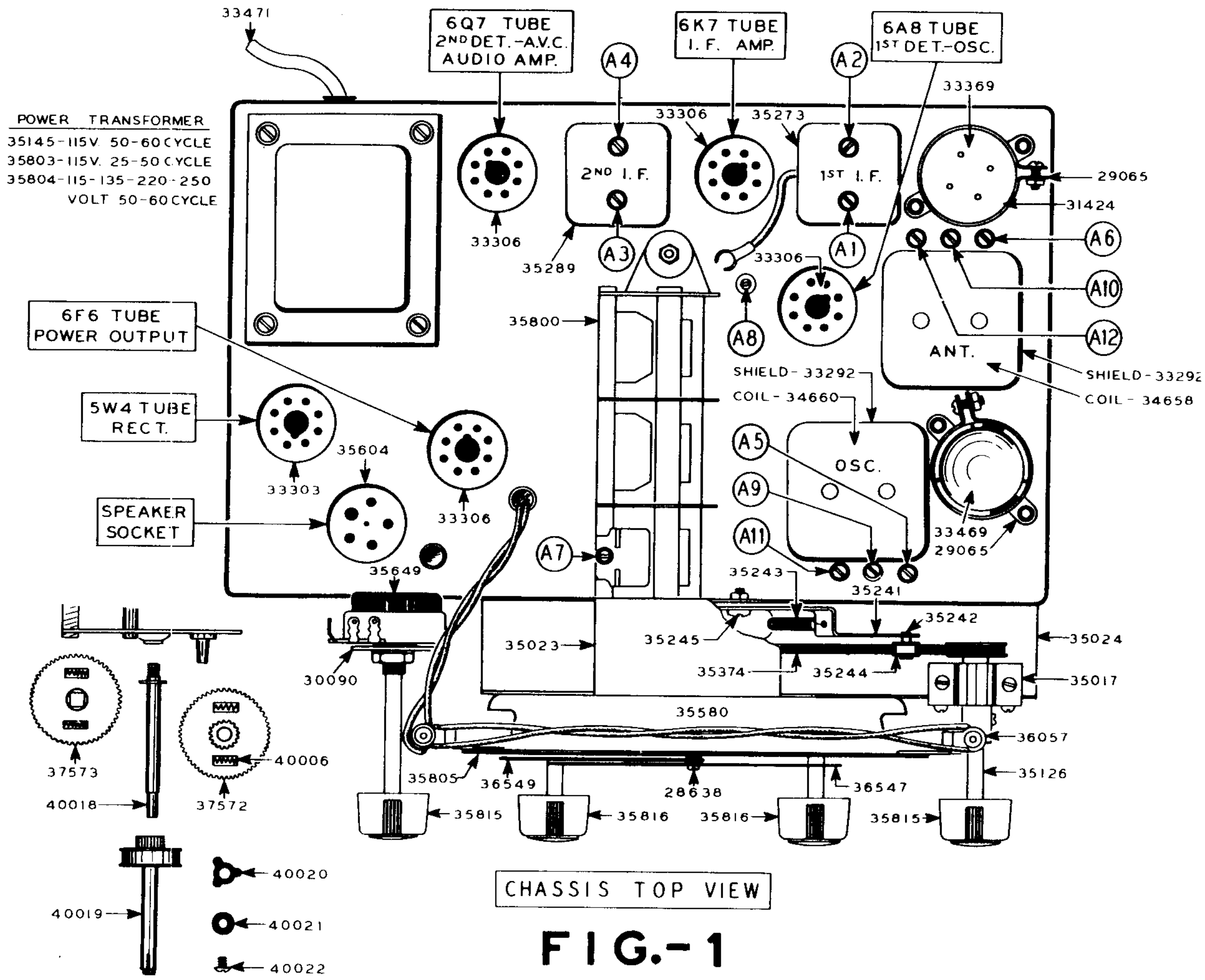


Fig. 6. Chassis Parts Layout

GENERAL HOUSEHOLD UTILITIES COMPANY
MODELS 5Q & 573

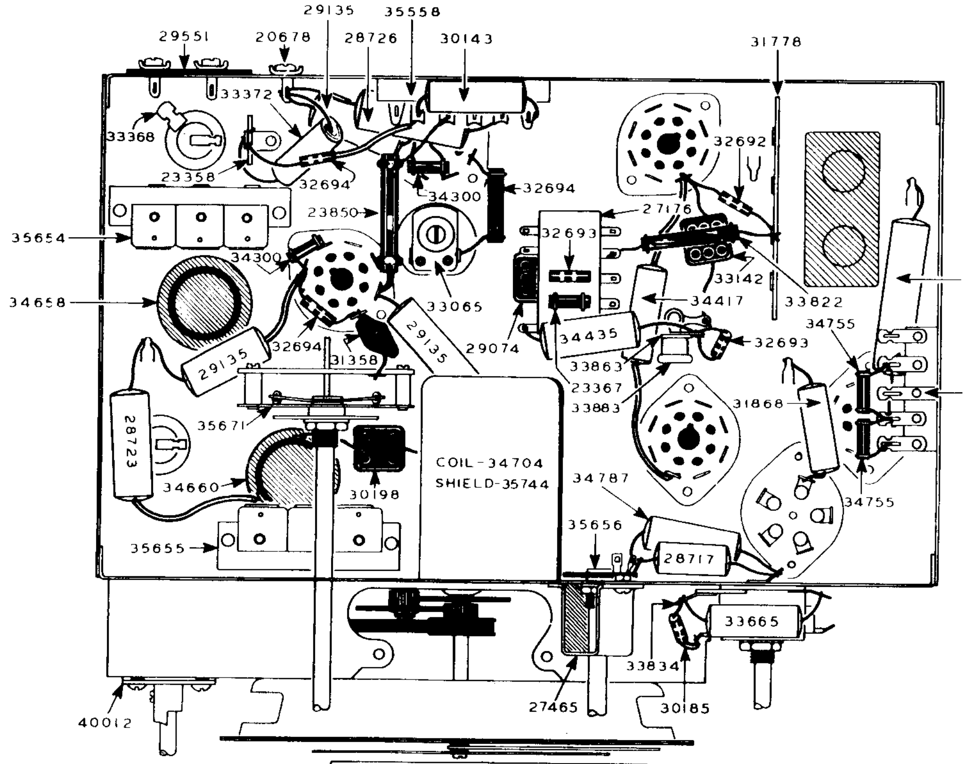


GENERAL HOUSEHOLD UTILITIES COMPANY
MODELS 5Q & 573



CHASSIS TOP VIEW

FIG.-1



CHASSIS BOTTOM VIEW

FIG.-2

GENERAL HOUSEHOLD UTILITIES COMPANY
MODELS 5Q & 573

INTRODUCTION

The GRUNOW Chassis 5Q is a five tube three band superheterodyne receiver, using 1-6A8 1st Detector and Oscillator, 1-6K7 I. F. Amplifier, 1-6Q7 2nd Detector, A. V. C. and Audio Amplifier, 1-6F6 Power Output and 1-5W4 Rectifier. The tuning range is divided into three divisions or bands covering from 550 K.C. to 1750 K.C. on the "A" or Broadcast Band, 1750 K.C. to 5.5 M.C. on the "B" or Police Amateur Band and 5.5 M.C. to 18.2 M.C. on the "C" or Foreign Broadcast Band.

SERVICE DATA

CONTINUITY AND VOLTAGE

Tube sockets on the schematic diagram (Fig. 3) are shown bottom view, each element being in its actual position in respect to the guide pin. The voltage measurements shown are average and were taken with a line voltage of 115 V., the volume control "full on" and the range switch in position "A" using a 1000 ohms per volt meter.

REPAIRS

When servicing this chassis it is IMPERATIVE that the service man make all parts replacements in EXACTLY the same way as the original part was located and connected. This applies particularly to ground points. All parts replacements in the R. F. end of the circuit must be exact duplicates of the originals, especially so in the case of coils, R. F. by-pass or coupling condensers. Any repairs in the R. F. circuit will make a complete realignment of the tuned circuit necessary.

BIAS CELL

This Chassis uses a "C" bias cell unit in the control grid of the 6Q7 tube. This type bias cell has an exceedingly long life but occasionally may have to be replaced. When replacing the cell note that the carbon or (+) side is connected to the ground side of all terminal clips. To check the bias cell a new cell or a 1½ volt battery must be substituted, as the cell voltage cannot be measured with an ordinary voltmeter due to its low current rating.

CIRCUIT ALIGNMENT EQUIPMENT

Do not attempt to align the 5Q Chassis without the equipment specified below:

1. Signal Generator—A modulated oscillator capable of delivering signals from 465 K.C. to 18.2 M.C.

2. Alignment Tool—A non-metallic screw driver.

3. Dummy Antenna — .05 Mfd. Condenser (I. F. Alignment); 200 Mmfd. Condenser (Broadcast Alignment); 400 Ohm Carbon Resistor (Short Wave Alignment).

4. Output Meter—A meter of sufficient sensitivity to give a good deflection at very low signal input.

Note: The receiver should be aligned in a location free from local interference. A screen room is recommended.

ALIGNMENT PROCEDURE

1. HEATING

(A) Allow the receiver to heat up for a period of 20 to 30 minutes. This is necessary in order to eliminate possible alignment variations due to the thermal expansion and contraction of the capacitors and inductances.

(B) Allow the signal generator to warm up in order to prevent frequency drift during alignment.

2. DIAL CALIBRATION

Turn the condenser until the plates are fully meshed, set the pointer (Hour Hand) to 9 and 3 on the outer edge of dial chart. Set the vernier pointer (Minute Hand) to the line pointing to 12.

3. SIGNAL GENERATOR ADJUSTMENT

During the entire alignment procedure the signal input from the generator to the receiver must be continually attenuated at the generator as the various trimmers are brought into resonance. This is necessary in order to hold the signal at the lowest intensity so that the A. V. C. Circuit will remain at the most sensitive point.

4. I. F. ALIGNMENT

(A) Set the generator to 465 K.C. and connect the output lead to the control grid of the 6A8 tube through the .05 Mfd. dummy and the generator ground to the chassis ground post.

(B) Set the receiver dial pointer to 600 K.C., the range switch to position "A" and turn the volume control full on.

(C) Connect the output meter across the two primary terminals on the output transformer.

(D) Adjust the I. F. Trimmers A1, A2, A3, and A4 to maximum output.

5. 1500 K.C. ALIGNMENT

(A) Set the generator to 1500 K.C. and connect the output to the antenna post on the chassis through the 200 Mmfd. dummy.

(B) Set the receiver dial pointer to 1500 K.C.

(C) Adjust the trimmers (A5) Oscillator, (A6) Detector and (A7) Antenna to maximum output.

6. 600 K.C. ALIGNMENT

(A) Set generator to 600 K.C.

(B) Set receiver dial pointer to 600 K.C.

(C) Turn trimmer (A8) in direction of signal increase and at the same time rock tuning condenser slowly back and forth through resonance until the exact resonant point on both is obtained.

7. 5 M.C. ALIGNMENT

(A) Set generator to 5 M.C.

(B) Set receiver range switch to position "B" and dial pointer to 5 M.C.

(C) Adjust trimmer (A9) Oscillator and (A10) Antenna to maximum output.

8. 18 M.C. ALIGNMENT

(A) Set generator to 18 M.C. and connect the output to the chassis Antenna post through the 400 Ohm dummy.

(B) Set the receiver range switch to position "C" and the dial pointer to 18 M.C.

(C) Screw the Oscillator trimmer (A11) down tight and back off until signal is heard, then rock the tuning condenser slowly back and forth through resonance until exact resonant point is determined.

(D) Adjust Antenna trimmer (A12) to maximum output.

(E) Readjust Oscillator trimmer (A11) to maximum output.

REPLACEMENT PARTS PRICE LIST

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Part No.	Description	Quantity	Price
20678	Ground Terminal	1	$0.02
23358	Vertical Terminal	1	.10
23850	Resistor—16M Ohms, 1 Watt	1	.20
27176	Terminal Board (10 Lug)	1	.20
27422	Step Washer (Elect. Cond.)	1	.02
27465	Bracket (Tone Control)	1	.15
28045	Bulb—Pilot Light	2	.15
28638	Pointer Screw	1	.02
28717	Condenser Tub., .002 Mfd., 700 V	1	.30
28723	Condenser—Replace with No. 34436		
28726	Condenser—Replace with No. 34437		
28728	Condenser Tub., .25 Mfd., 200 V	1	.35
28793	Junction Box Connector Assy. (Z Chassis)	1	1.00
29065	Clamp (Electro. Cond. Mtg.)	2	.05
29074	Condenser Mica—Dual—100-250 Mmfd	1	.30
29135	Condenser—Replace with No. 34437		
29551	Binding Post Assy. (Ant. and Doublet)	1	.20
29818	Condenser Tub., .003 Mfd., 700 V	1	.25
29831	Condenser Mica (1000 Mmfd.)	1	.30
30090	Mtg. Bracket (Vol. Control)	1	.15
30092	Junction Terminal Board	1	.10
30104	Rubber Grommet	2	.02
30143	Condenser—Replace with No. 34436		
30185	Resistor—30M Ohm, ½ Watt	1	.20
30198	Condenser-Mica—1100 Mmfd.	1	.25
31358	Condenser-Mica—50 Mmfd.	1	.20
31424	Insulating Shield (Elect. Cond.)	1	.10
31637	Mtg. Stud (Var. Cond.)	3	.02
31739	Mtg. Washer (Var. Cond.—Rubber)	6	.05
31778	Junction Terminal Board	1	.10
31868	Condenser—Replace with No. 29818		
32099	Resistor—20 Ohm, ¼ Watt	1	.15
32692	Resistor—200 M Ohms, ½ Watt	1	.15
32693	Resistor—1 Meg Ohm, ½ Watt	2	.15
32694	Resistor—50 M. Ohm, ½ Watt	3	.15
32858	Mtg. Foot (Chassis)	4	.25
32916	Mtg. Foot (Var. Cond.—Rear)	1	.10
33065	Condenser—600 K.C. Padder	1	.40
33078	Shipping Block (Fibre)	2	.05
33287	Support Bracket (Range Switch)	1	.05
33292	Shield (Coil)	2	.35
33303	Socket—5 Prong (5W4)	1	.15
33306	Socket—8 Prong (Universal)		.15
33368	Spade Lug (Elect. Cond.)	1	.02
33369	Condenser—Electrolytic—12 Mfd., 450 V	1	1.20
33372	Condenser—Replace with No. 34787		
33469	Condenser—Electrolytic—18 Mfd., 300 V	1	.90
33471	Line Cord and Plug	1	.40
33665	Condenser Tub., .03 Mfd., 200 V	1	.30
33822	Resistor, 5 M Ohm, 1 Watt	1	.20
33834	Terminal Strip (Vol. Cont.)	1	.10
33863	Bias Cell Mtg. Strip	1	.15
33883	Grid Bias Cell	1	.25
34300	Resistor—400 Ohm, ½ Watt	2	.15
34417	Condenser—Tub., .01 Mfd., 500 V	1	.35
34435	Condenser—Tub., .02 Mfd., 400 V	1	.35
34436	Condenser—Tub., .05 Mfd., 400 V	1	.35
34437	Condenser—Tub., .10 Mfd., 400 V	4	.35
34536	"J" Bolt (Chassis Mtg.)	2	.03
34658	Coil—Antenna	1	1.25
34660	Coil—Oscillator	1	1.25
34704	Coil—Pre-Selector	1	1.25
34755	Resistor—500 M Ohm, ½ Watt	2	.15
34787	Condenser—Tub., .0058 Mfd., 700 V	2	.25
35017	Vernier Clamp	1	.10
35023	Bracket (Dial Support)	1	.10
35024	Mtg. Foot (Var. Cond.—Front)	1	.20
35126	Pick-up Vernier with Pulley	1	1.50
35145	Power Transformer, 115 V., 50/60 cycles	1	5.00
35241	Idler Arm	1	.10
35242	Stud (Idler Pulley)	1	.20

Part No.	Description	Quantity	Price
35243	Tension Spring	1	.10
35244	Pulley (Idler)	1	.15
35245	Special Binding Head Screw	1	.05
35273	Coil and Shield—1st I. F.	1	1.75
35289	Coil and Shield—2nd I. F.	1	1.75
35329	Escutcheon (Dial)	1	1.00
35359	Window (Dial)	1	.60
35360	Gasket (Window)	1	.10
35361	Retaining Ring (Window)	1	.25
35374	Drive Belt	1	.25
35492	Retaining Spring (Escutcheon)	1	.20
35516	Mtg. Foot (Cond. Support)	1	.15
35558	Terminal Board	1	.15
35580	Reflector	1	1.00
35604	Socket—Speaker	1	.15
35606	Decalcomania (A. B. C.)	1	.10
35607	Decalcomania (H. M. L.)	1	.10
35649	Volume Control	1	1.25
35654	Condenser (Antenna Trimmer)	1	.45
35655	Condenser (Osc. Trimmer)	1	.45
35656	Tone Control Switch	1	.60
35662	Shaft Extension (Range Switch)	1	.25
35671	Range Switch	1	1.50
35744	Shield (Pre-Selector Coil)	1	.35
35800	Condenser—Variable	1	5.00
35803	Power Transformer, 115 V., 25/50 cycles	1	8.50
35804	Power Transformer—Universal	1	8.50
35805	Dial Chart	1	.80
35815	Knob (Plain)	2	.20
35816	Knob (White Dot)	2	.20
36057	Socket—Pilot Light	2	.15
36547	Hour Pointer	1	.20
36549	Minute Pointer	1	.15
37572	Intermediate Gear and Pinion	1	.75
37573	Rotor Shaft Gear	1	.50
40006	Spring (Gear Tension)	4	.05
40012	Clamp (Vernier Drive)	1	.10
40018	Inner Pointer Shaft	1	1.10
40019	Outer Pointer Shaft	1	1.20
40020	Spring Washer	1	.05
40021	Washer	1	.02
40022	Screw	1	.02
61134	1" x No. 8-32 Screw (Red Head)	2	.01
61207	1" x No. 8-32 Screw (Chassis Mtg.)	4	.01
63838	Felt Washer (Under Knob)	4	.01
63863	Flat Washer (Chassis Mtg.)	6	.01
63945	Black Fibre Washer (Pointer)	1	.01

TYPE 8B9 SPEAKER

Part No.	Description	Quantity	Price
29038	Cone Gasket	1	$0.10
31355	Cone and Voice Coil Assy.	1	1.00
31468	Field Coil	1	3.00
33202	Terminal Strip	1	.20
33203	Cover Terminal Strip	1	.10
33204	Insulator—Terminal Strip	1	.05
35267	Speaker Plug	1	.25
35770	Output Transformer	1	1.75
35862	8B9 Speaker Complete	1	10.00
36228	Speaker Cable and Plug	1	.55

TYPE 8BG2-1 SPEAKER

Part No.	Description	Quantity	Price
29038	Cone Gasket	1	$0.10
33202	Terminal Strip (Transformer)	1	.20
33203	Cover—Terminal Strip	1	.10
33204	Insulator—Terminal Strip	1	.05
35186	Terminal Strip (Cone)	1	.10
35267	Speaker Plug Assy.	1	.25
35770	Output Transformer	1	1.75
36228	Speaker Cable and Plug	1	.55
36733	8BG2-1 Speaker Complete	1	10.00
36912	Cone and Voice Coil Assy.	1	1.00

GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 6N & 654

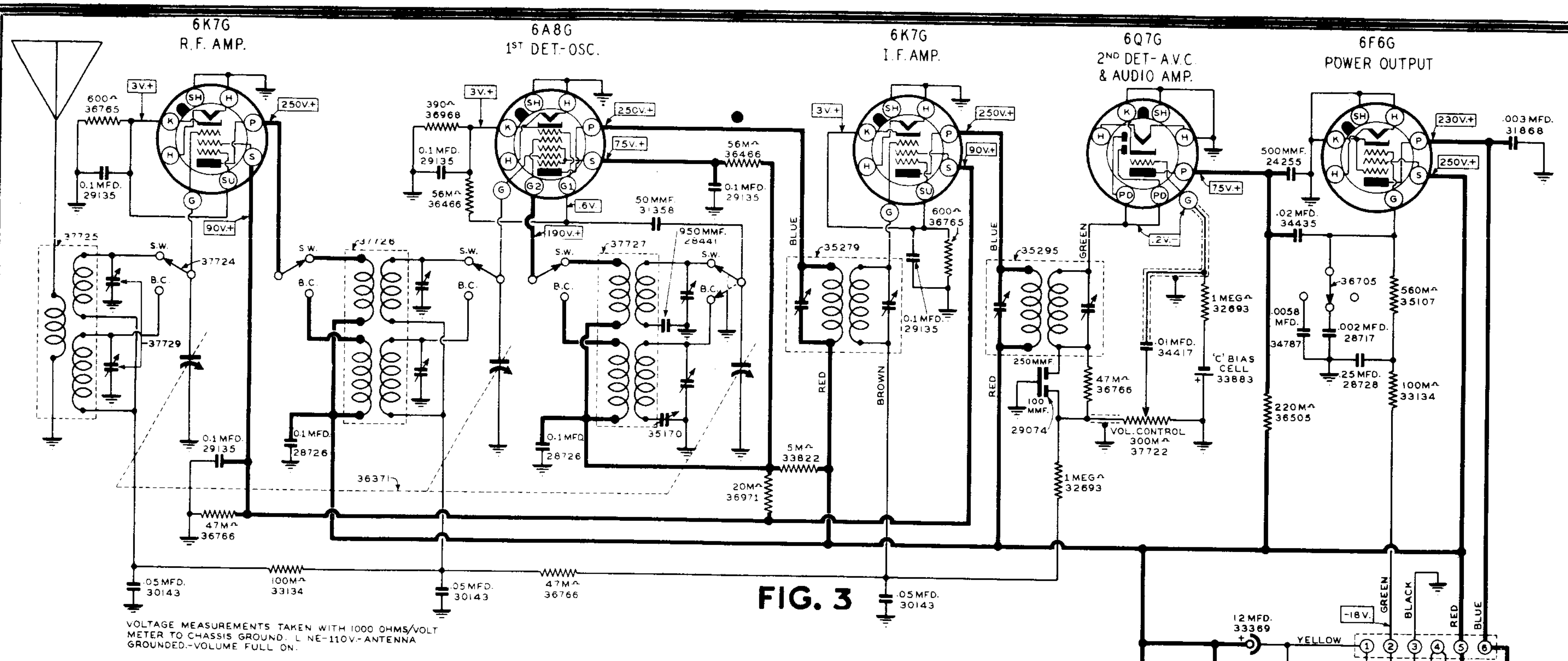
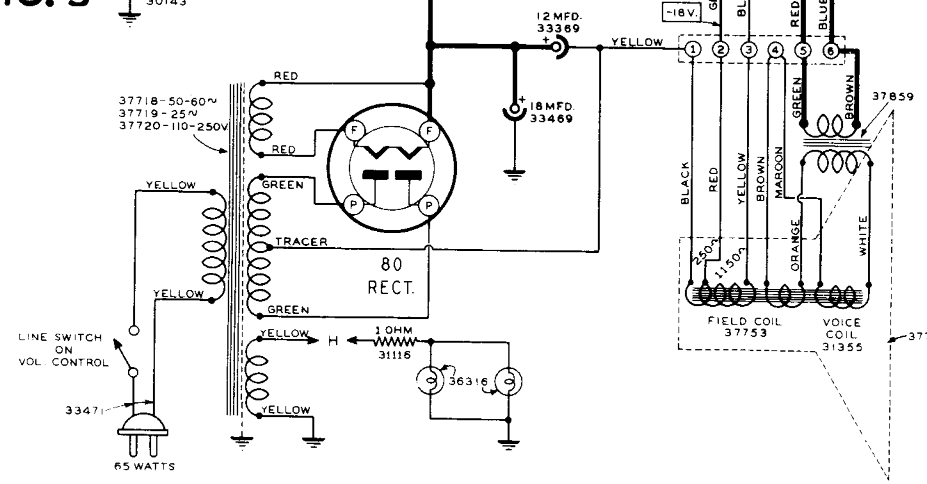


FIG. 3



This chassis utilizes a "C" bias cell in the control grid of the 6Q7 tube. To check the cell, a new one or a 1½ volt battery must be substituted, as the cell voltage cannot be measured with an ordinary voltmeter due to its low current rating. When replacing the cell note that the carbon (+) side is connected to the ground side of the terminal clip.

ALIGNMENT PROCEDURE

ALIGNING I.F. STAGES AT 465 kc.

Connect the ground lead of the signal-generator to the chassis sub-panel. Connect an .05 mfd. condenser in series with the signal lead and connect it to the grid clip of the 6 A8 tube. Set signal-generator at 465 kc. and turn receiver volume full-on. Adjust I.F. trimmers A1, A2, A3 & A4 to maximum output. To insure accurate adjustment repeat the operation, using the lowest signal-generator output that will give a readable deflection of the output meter.

DIAL CALIBRATION

With the condenser fully meshed the dial pointer should coincide with the horizontal line on the dial chart.

1400 kc. ALIGNMENT

Turn range switch knob to left. Connect a 200 mmf. condenser in series with the signal-lead and connect the lead to the antenna wire. Set signal-generator to 1400 kc. Turn condenser to 140 (1400 kc.) dial reading and adjust trimmers A5, A6 & A7 to maximum output.

600 kc. ALIGNMENT

Change signal-generator to 600 kc. and tune in signal to maximum. (This point may not coincide exactly with 600 kc. dial reading.) Adjust the 600 kc. padder A8 while rocking the condenser gang slightly in direction of signal increase until no further improvement in output can be obtained.

SHORT WAVE ALIGNMENT

Turn range switch knob to right. Remove 200 mmf. condenser from signal lead and connect a 400 ohm carbon resistor in its place. Change signal-generator to 6 mc. dial reading, adjust trimmers A9, A10 and A11 to maximum output. Note: On all of the above operations, use the lowest signal-generator output that will give a readable deflection of the output meter in order to prevent the A.V.C. from levelling the output as adjustments are made.

I.F. 465 K.C.

GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 6N & 654

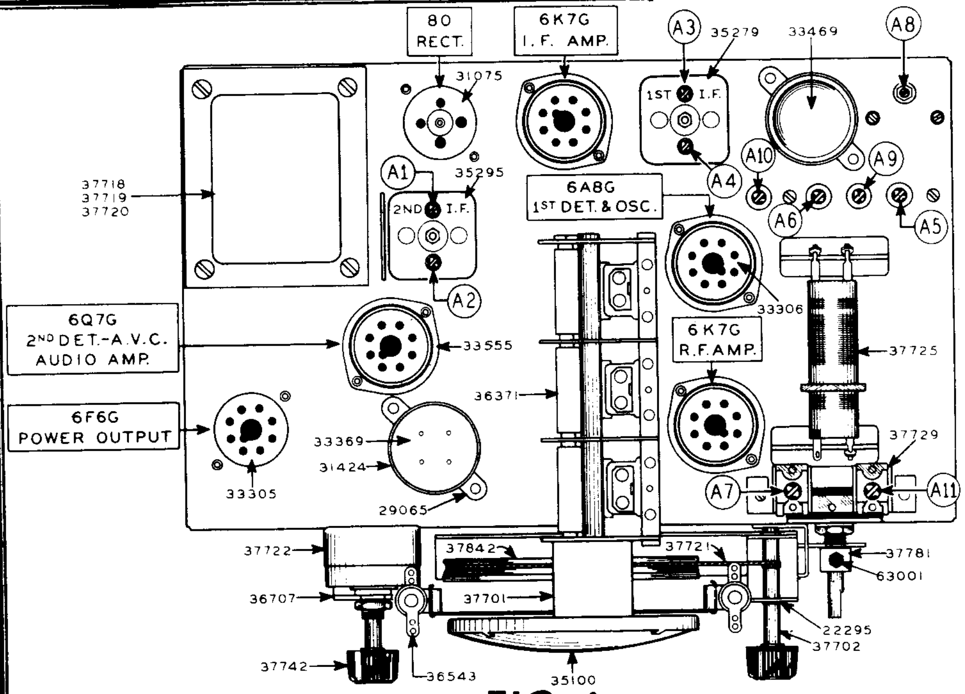


FIG. 1

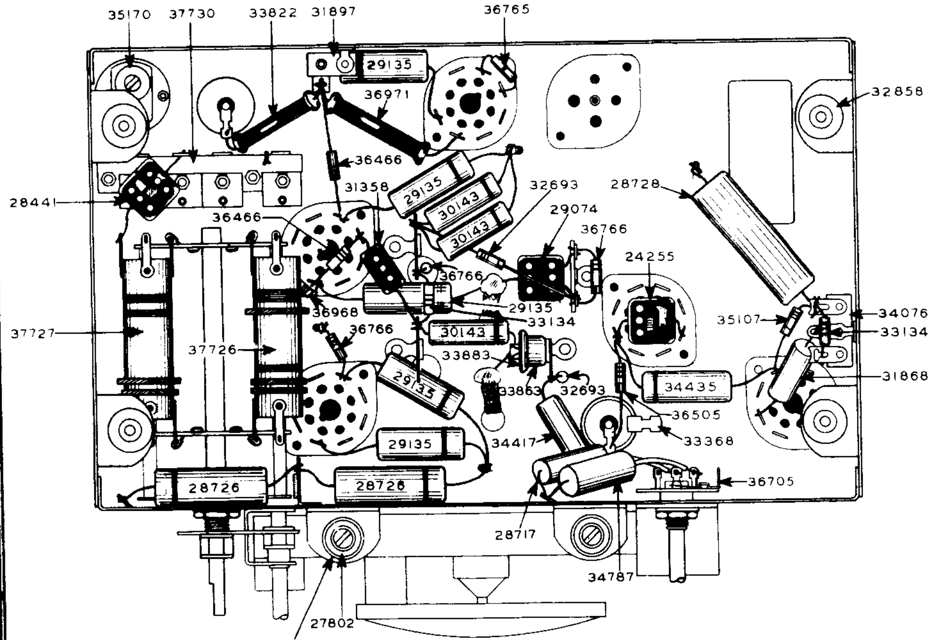


FIG.2

PARTS PRICE LIST

PART NO.	DESCRIPTION	NO. REQ.	PRICE
22295	"C" Washer	5	.01
24255	Condenser Mica - 500 mmfd.	1	.25
27422	Step Washer - Elect. Cond. Mtg.	1	.02
27801	Grommet - Rubber (Cond. Mtg.)	3	.05
27802	Cup Washer (Cond. Mtg.)	3	.02
28441	Condenser - Mica - 950 mmfd.	1	.25
28638	Pointer Screw	1	.02
28717	Condenser - Tub. .002 mfd. 700 V.	1	.30
28726	Condenser - Replace with #34437		
28728	Condenser - Tub. .25 mfd. 200 V.	1	.35
28793	Junction Box Connection Assem. (Used with 110-250 V. Transformer)	1	1.00
29065	Clamp - Electrolytic Cond. Mtg.	2	.05
29074	Condenser - Mica 250-100 mmfd. - Dual	1	.30
29135	Condenser - Replace with #34437		
30143	Condenser - Replace with #34436		
30150	Spacer - (Trimmer Mtg.)	2	.05
30152	Terminal Strip (4 lug)	1	.10
30177	Drive Cable Spring	1	.05
31075	Socket - 4 Prong	1	.10
31116	Resistor - 1 ohm (Pilot Lamps)	1	.20
31358	Condenser - Mica 50 mmfd.	1	.20
31424	Shield - (Elect. Cond.)	1	.10
31868	Condenser - Replace with #29818		
31897	Terminal Strip (1 lug)	1	.05
32693	Resistor - 1 meg. ½ watt	2	.15
32858	Mtg. foot - chassis	4	.25
33078	Shipping Block (fibre)	2	.05
33082	Spacer (power trans. mtg.)	4	.03
33134	Resistor - 100 M ohms ½ watt	2	.15
33298	Spacer (Osc. trimmer mtg.)	2	.04
33305	Socket - 7 prong	4	.15
33306	Socket - 8 prong	1	.15
33368	Cathode terminal (Elect. cond.)	1	.02
33369	Electrolytic Condenser 12 mfd. 450 v.	1	1.20
33469	Electrolytic Condenser 18 mfd. 300 v.	1	.90
33471	Line cord and plug	1	.40
33554	Cap - tube shield	4	.05
33555	Base - tube shield	4	.02
33585	Tube shield	4	.10
33822	Resistor - 5 M ohms 1 watt	1	.20
33863	Mtg. strip (Bias cell)	1	.15
33883	Bias Cell	1	.25
34076	Terminal strip (5 lug)	3	.10
34417	Condenser - tub. .01 mfd. 500 v.	1	.35
34435	Condenser - tub. .02 mfd. 500 v.	1	.35
34436	Condenser - tub. .05 mfd. 400 v.	4	.35
34437	Condenser - tub. .10 mfd. 400 v.	6	.35
34787	Condenser - tub. .0058 mfd. 700 v.	1	.25
35099	Dial chart gasket	1	.05
35100	Dial window	1	.20

PART NO.	DESCRIPTION	NO. REQ.	PRICE
35107	Resistor - 560 M ohms ½ watt	1	.15
35170	Padder condenser	1	.45
35279	1st I.F. Coil & Shield	1	1.75
35295	2nd I.F. Coil & Shield	1	1.75
35327	Escutcheon	1	.40
36371	Variable Condenser	1	4.25
35854	Grid cap	4	.01
36316	Pilot lamp	2	.15
36466	Resistor - 56 M ohms ½ watt	2	.15
36505	Resistor - 220 M ohms ½ watt	1	.15
36543	Pilot lamp socket	2	.15
36705	Tone control switch	1	.50
36707	Bracket - Vol. control Mtg.	1	.10
36765	Resistor - 600 ohms ½ watt	2	.15
36766	Resistor - 47 M ohms ½ watt	3	.15
36968	Resistor - 390 ohms ½ watt	1	.15
36971	Resistor - 20 M ohms 1 watt	1	.20
37701	Dial & Drive Mtg. Bracket	1	.50
37702	Drive shaft (tuning)	1	.10
37718	Power transformer - 115 v 50-60 cycles	1	5.00
37719	Power transformer - 115 V 25 cycles	1	8.50
37720	Power transformer - 110-135-220-250 V. 50-60 cycles	1	8.50
37721	Drive cable		
37722	Volume control	1	1.15
37724	Range switch	1	2.25
37725	Antenna Coil	1	1.25
37726	Detector coil	1	1.25
37727	Oscillator coil	1	1.25
37729	Ant. trimmer (2 gang)	1	.35
37730	Det. & Osc. trimmer (4 gang)	1	.65
37737	Cabinet - less baffle	1	
37742	Knob	4	.20
37776	Vertical terminal strip	1	.10
37777	Vertical terminal strip	1	.10
37780	Drive shaft (range switch)	1	.10
37781	Lever & link assy.	1	.50
37784	Bracket (range switch)	1	.10
37838	Dial chart	1	.40
37842	Drive drum & hub	1	.60
37849	Speaker baffle	1	.50
37851	Pointer	1	.10
37865	Spacer - range switch shaft	1	.05
61134	Screw - chassis hold-down	2	.01
61207	Screw - chassis mtg.	4	.01
62631	Screw - escutcheon mtg.	4	.01
63001	Hex. head set screw	1	.01
63014	Head less set screw	2	.01
63301	Nut - chassis hold-down	2	.01
63839	Felt washer	4	.01
63863	Washer - chassis mtg.	4	.01
63866	Washer - chassis hold-down	2	.01
63943	Fibre washer (pointer)	1	.01

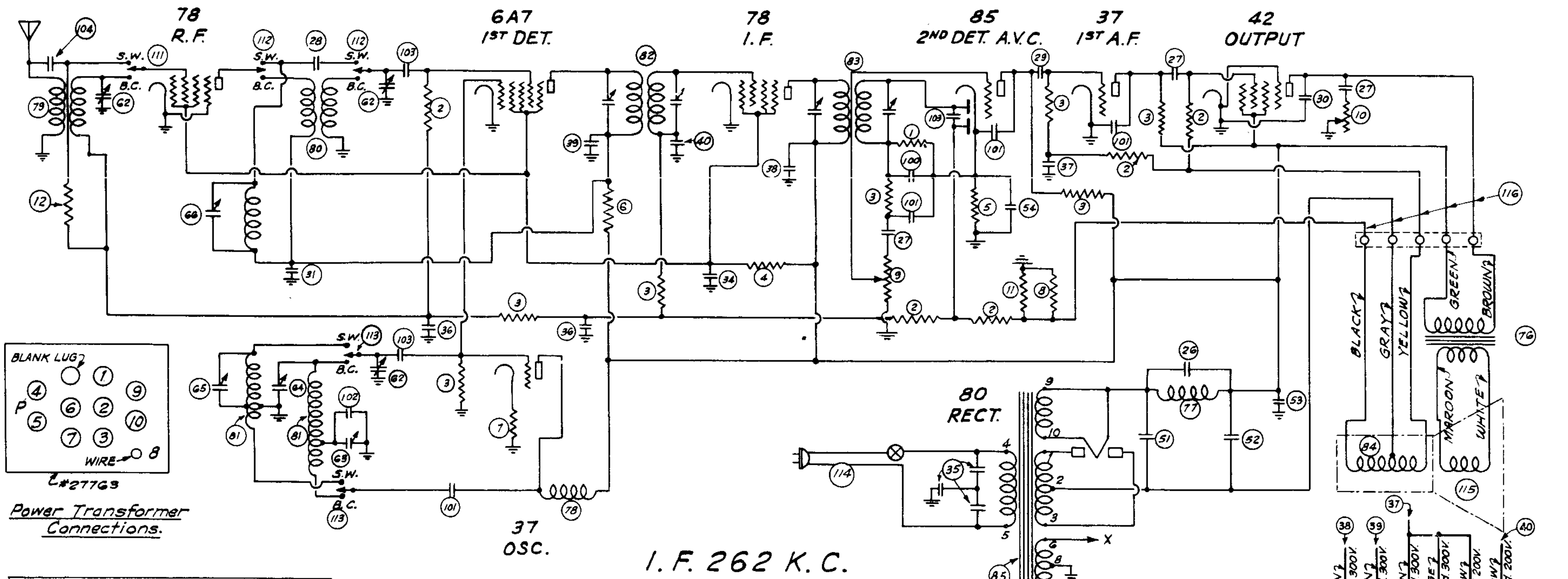
SPEAKER PARTS

PART NO.	DESCRIPTION	NO. REQ.	PRICE
31355	Cone and voice coil assy.	1	1.00
33202	Terminal strip	1	.20
33203	Terminal cover	1	.10
33204	Terminal insulator	1	.05
36746	Pole piece	1	.40
37746	8 BG 2-5 Speaker	1	7.50
37753	Field coil	1	2.60
37859	Output transformer	1	1.75

Prices subject to change without notice.

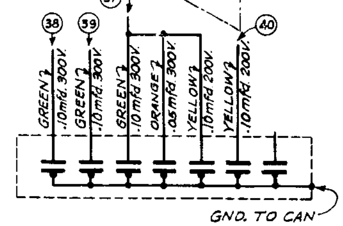
GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 8B & 821

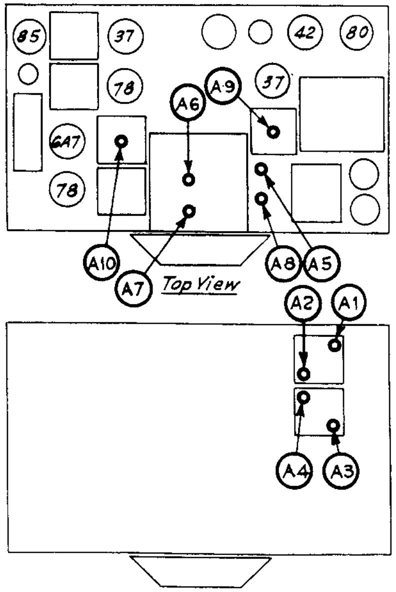


Power Transformer Connections.

I.F. 262 K.C.



Detail Of By-Pass Condenser #27815



LOCATION OF TRIMMER CONDENSERS

RESISTORS

Item	Part No.	Description	No. Req.	Price
1	22858	1 Meg. ±20% ¼ Watt	1	.20
2	23849	500,000 Ohm ±20% ¼ W.	5	.20
3	23853	50,000 Ohm ±20% ¼ W.	7	.20
4	23850	16,000 Ohm ±10% 1 W.	1	.20
5	22857	10,000 Ohm ±10% 1 W.	1	.20
6	28118	1,000 Ohm ±10% 1 W.	1	.20
7	27784	400 Ohm ±10% ¼ W.	1	.20
8	31515	80 Ohm ±10% 1 W.	1	.20
9	27687	Vol. Control 1 Meg.	1	1.10
10	27646	Tone Control	1	.75
11	27446	Candohm	1	.80
12	21348	100,000 Ohm ±20% 1 W.	1	.25

TRANSFORMERS & CHOKES

Item	Part No.	Description	No. Req.	Price
76	27591	Output Transformer	1	1.50
77	27387	Filter Choke	1	1.50
78	29539	R.F. Choke	1	.60
79	31494	Ant. Coil	1	1.00
80	31488	Det. Coil	1	.80
81	31498	Osc. Coil	1	1.75
82	28094	1st I.F. Assy.	1	2.50
83	31511	2nd I.F. Diode Assy.	1	2.90
84	27214	Speaker Field	1	2.75
85	27763	Power Transformer	1	8.00

PAPER CONDENSERS

Item	Part No.	Description	No. Req.	Price
26	28726	0.1 Mfd. 400 Volt	1	.25
27	28723	0.05 Mfd. 400 Volt	3	.25
28	29567	0.02 Mfd. 400 Volt	1	.25
29	28721	0.1 Mfd. 500 Volt	1	.25
30	28717	0.002 Mfd. 700 Volt	1	.25
31	28725	0.08 Mfd. 400 Volt	1	.25
34	28138	1 Mfd. Can	1	1.25
35	28043	3-.01 Mfd. Bathtub	1	.80
36	27524	2-.10 Mfd. 200 V.	1	.75
37	27815	0.25 Mfd. 200 V.	1	2.00
38		0.10 Mfd. 300 V.	1	
39		0.10 Mfd. 300 V.	1	
40		0.10 Mfd. 200 V.	1	

MISCELLANEOUS

Item	Part No.	Description	No. Req.	Price
111	31502	Range Switch, Deck I	1	2.75
112		Range Switch, Deck II	1	
113		Range Switch, Deck III	1	
114	20861	Line Cord	1	.35
115	31526	10A6 Speaker	1	11.50
116	27562	Speaker Cable	1	.45

ELECTROLYTIC CONDENSERS

Item	Part No.	Description	No. Req.	Price
51	27414	8 Mfd. 500 V.	1	1.50
52	27413	8 Mfd. 500 V.	1	1.50
53	29562	18 Mfd. 300 V.	1	1.25
54	27668	8 Mfd. 25 V.	1	.75

ADJUSTABLE CONDENSERS

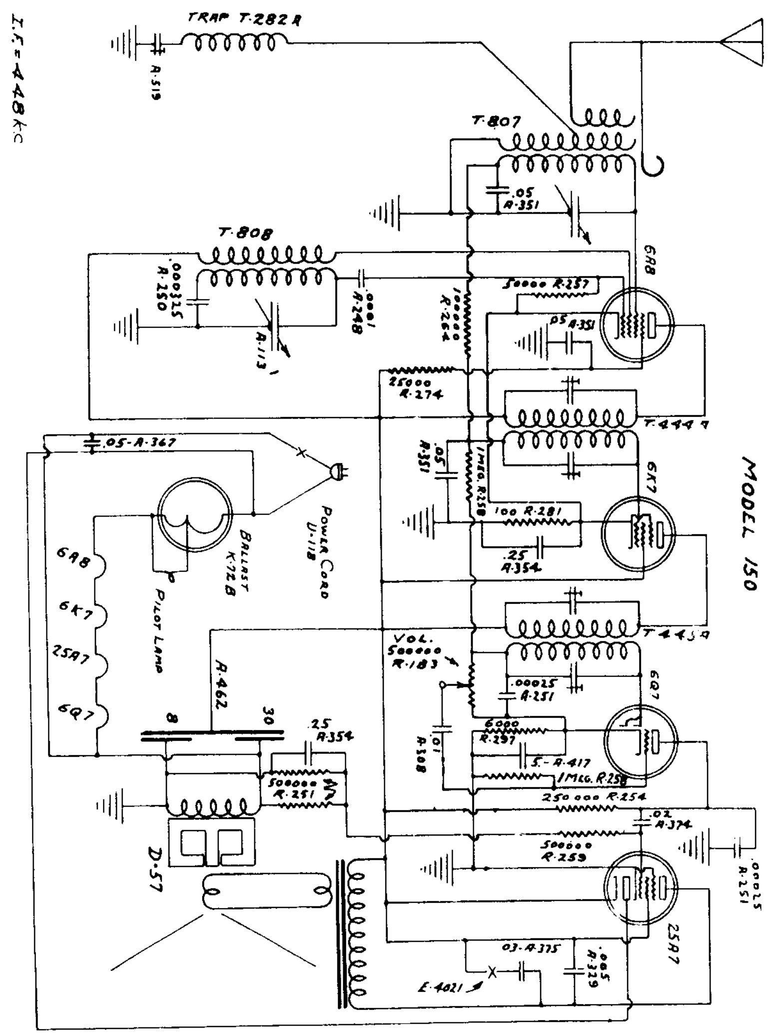
Item	Part No.	Description	No. Req.	Price
62	31532	Variable Condenser	1	4.50
63	27542	Osc. Trimmer (600 K.C.)	1	.60
64	27382	B.C. Osc. Trimmer (1400 K.C.)	1	.35
65	30131	S.W. Osc. Trimmer	1	.35
66	30131	S.W. Det. Trimmer	1	.35

MICA CONDENSERS

Item	Part No.	Description	No. Req.	Price
100	24251	100 Mmf. ±20%	1	.15
101	24487	250 Mmf. ±10%	4	.20
102	24255	500 Mmf. ±10%	1	.25
103	29083	50 Mmf. ±20%	3	.20
104	29597	600 Mmf	1	.25

INTERNATIONAL RADIO CORP.

MODELS 150 & 151



ALIGNMENT

The standard type of output meter should be used to indicate signal strength. It should be connected from the output plate of the 25A7G tube to ground. Tone control should be turned "high". The signal from the signal generator *must be kept at a very low level.*

ESSENTIAL DATA: The Intermediate frequency employed is 448 Kc. The oscillator frequency is 448 kilocycles higher than the signal frequency. Aligning should be done on the following frequencies: 1,400, 1,000 and 600 Kc.

INTERMEDIATES: To align the I.F. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. Adjust the first I.F. transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second I.F. transformer. If adjustments are not made accurately, selectivity will be poor and I.F. oscillation may result. Finally, adjust the trimmer on the tuned wave trap for *minimum* meter reading.

BROADCAST BAND: Turn the dial to 1,400 Kc. and feed a *very weak* 1,400 Kc. modulated signal from your signal generator to the antenna. Adjust the Broadcast oscillator trimmer for maximum reading. Then peak Broadcast antenna trimmer to this oscillator setting.

There is no adjustable padder condenser in this model so resonance on lower frequencies is accomplished by bending plates on tuning condenser.

AVERAGE SOCKET VOLTAGES

Tube	Position	Ek	Eg	Eg3	Egs	Esu	Ep	Rectifier Ep	Rectifier Ek
6A8	Det.-Osc.	1.5	0	100	50	—	100	—	—
6K7	I.F.	1.5	0	—	100	1.5	100	—	—
6Q7	2nd Det. A.V.C. 1st audio	1	0	—	—	—	*35	—	—
25A7G	Output Rectifier	0	13	—	100	—	100	118 A.C.	100

Line voltage 118 volts, 10% variation allowable. Measurements made from tube prongs to circuit ground and made with 1000 ohms per volt instrument on 250 volt scale.
* through .25 megohm

PARTS PRICE LIST

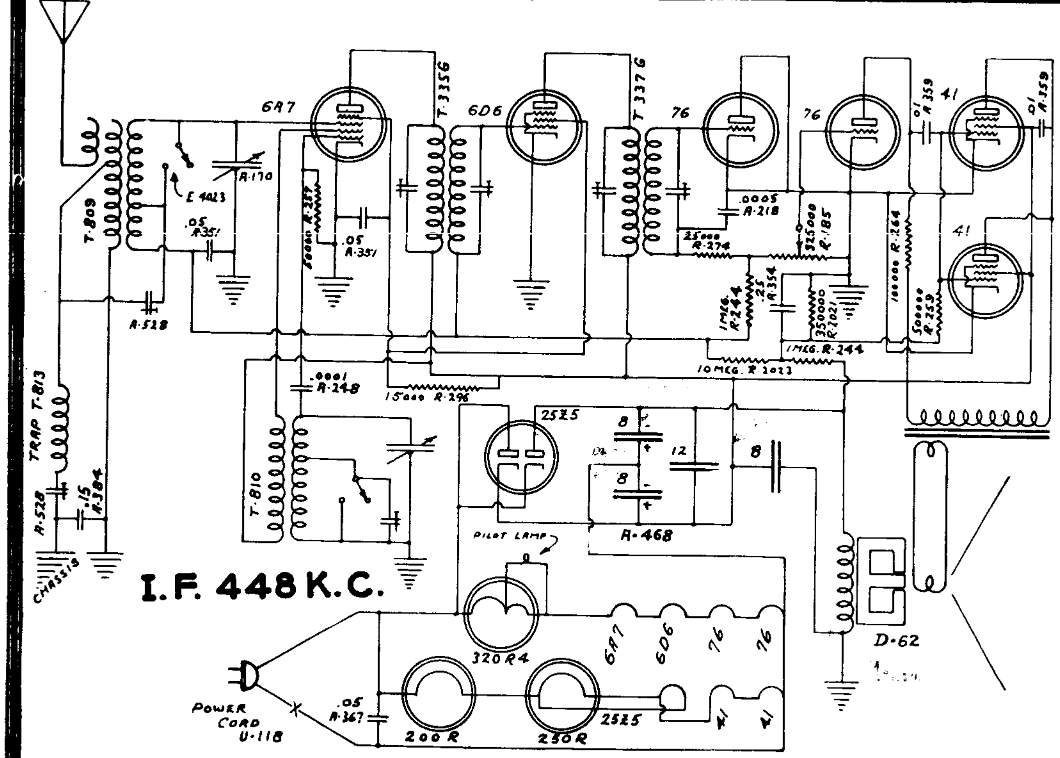
Part No.	Description	List Price
A-113	Two gang tuning condenser (serial No. 1001-200 incl.)	$2.20
A-167	Two gang tuning condenser (serial over No. 2001)	1.85
A-248	100 mmf. mica condenser	.20
A-251	250 mmf. mica condenser	.20
A-250	325 mmf. mica condenser (serial No. 1001-2000 only)	.20
A-308	.01 mfd., 600 volt paper condenser	.15
A-329	.005 mfd. 600 volt paper condenser	.15
A-351	.05 mfd. 200 volt paper condenser	.15
A-354	.25 mfd., 25 volt paper condenser	.20
A-367	.05 mfd., 400 vold paper condenser	.15
A-374	.02 mfd., 400 volt paper condenser	.15
A-375	.03 mfd. 400 volt paper condenser	.15
A-417	5 mfd., 25 volt electrolytic condenser	.55
A-462	Electrolytic filter condenser	.75
D-57	Dynamic speaker	3.00
E-133W	Dial knob (Model 150)	.10
E-1331	Dial knob (Model 151)	.10
E-148W	Small knob (Model 150)	.10
E-1481	Small knob (Model 151)	.10
E-449	Pilot lamp socket	.10
E-481	Special pilot lamp 6-8 volt., 15 amp.	.15
E-2045	Dial scale (serial 1001-2000)	.20
E-2055	Dial scale (serial 2001)	.20
E-4021	Tone control switch	.30
F-31	Pilot lamp socket clip	.10
H-49	6A8 tube socket	.10
H-54	6K7 tube socket	.10
H-64	6Q7 tube socket	.10
H-70	25A7G tube socket	.10
H-79	K72B tube socket	.10
I-140	Rubber feet for cabinet	.01
R-183	Volume control and power switch	.65
R-251	500M ohm 1/3 watt carbon resistor	.20
R-254	250M ohm 1/3 watt carbon resistor	.20
R-257	50M ohm 1/3 watt carbon resistor	.20
R-258	1 megohm 1/3 watt carbon resistor	.20
R-259	500M ohm 1/3 watt carbon resistor	.20
R-264	100M ohm 1/3 watt carbon resistor	.20
R-274	25M ohm 1/3 watt carbon resistor	.20
R-281	100 ohm 1/3 watt carbon resistor	.20
R-297	6000 ohm 1/3 watt carbon resistor	.20
T-282A	Tuned wave trap	.50
T-344A	1st I.F. transformer	1.25
T-345A	2nd I.F. transformer	1.25
T-807	Antenna coil	1.00
T-808	Oscillator coil	1.00
U-118	Power cord and plug	.30
WL-20	Antenna wire	.10
X-3040	Cabinet (Model 150 dark walnut bakelite)	2.50
X-3041	Cabinet (Model 151 ivory plaskon)	3.50
X-3050	Back (Model 150 dark walnut bakelite)	1.00
X-3051	Back (Model 151 ivory plaskon)	1.25

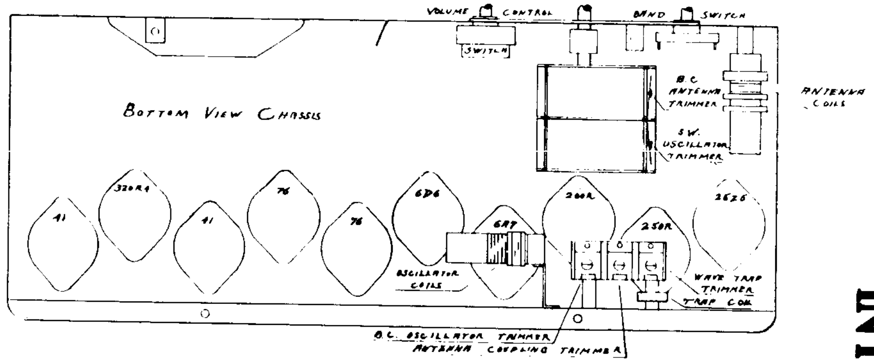
Prices Subject to Change Without Notice

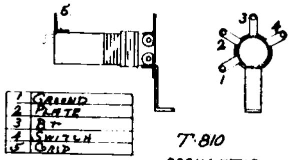
ALWAYS ORDER BY PART NUMBER

INTERNATIONAL RADIO CORP.

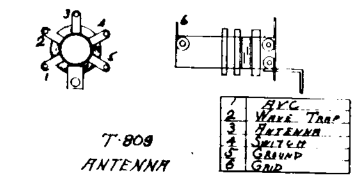
MODEL 1019







T-810
OSCILLATOR



T-809
ANTENNA

This chassis is designed to operate from 110 125 volt, 50-60 cycle alternating current power lines. It is a two band receiver covering the American broadcast band and Police, Airport and 49 meter European bands.

The following tubes are employed:

6A7	—1st Detector-Oscilator	41	—Audio Output
6D6	—I.F. Amplifier	200R	—Ballast tube
76	—2nd Detector	25Z5	—Rectifier
76	—1st Audio	250R	—Ballast tube
41	—Audio Output	320R4	—Regulator tube

ALIGNMENT

ESSENTIAL DATA: The intermediate frequency employed is 448 Kc.

The standard type of output meter should be used to indicate signal strength. It should be connected from the plate of the 41 tubes to ground.

Poor sensitivity may be an indication of incorrectly adjusted I. F. trimmers.

Aligning of Broadcast band should be done on 1400, 1000 and 600 kilocycles.

INTERMEDIATES: To align the I.F. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. Adjust the first I.F. transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second I.F. transformer. If adjustments are not made accurately, selectivity will be poor and I.F. oscillation may result. Finally, adjust the trimmer in the tuned wave tap for *minimum* meter reading.

SHORT WAVE

Turn the dial to 6000 Kc. and feed a *very weak* 6000 Kc. modulated signal from your signal generator to the antenna. Adjust the Short Wave oscillator trimmer for maximum reading. Then peak antenna coupling condenser to this oscillator setting. Do not attempt to align the low frequency end of this band.

BROADCAST

Turn the dial to 1400 Kc. and feed a *very weak* 1400 Kc. modulated signal to the antenna. Adjust Broadcast oscillator trimmer for maximum reading. Then peak Broadcast antenna trimmer to this oscillator setting.

There is no adjustable padder condenser in this model so resonance on lower frequencies is accomplished by bending plates on tuning condenser.

AVERAGE SOCKET VOLTAGES

Tube	Position	Ek	Eg	Ega	Egs	Esu	Ep
6A7	Det.-Osc.	0	*-1.5	165	90	—	165
6D6	I.F.	0	*-1.5	—	90	0	165
76	2nd Det.	0	*-.45	—	—	—	0
76	1st Audio	0	‡	—	—	—	†35
41	Output	0	*-12.5	—	165	—	160
41	Output	0	*-12.5	—	165	—	160
25Z5	Rect.	165	—	—	—	—	AC

Line voltage 118 volts, 10% variation allowable. Measurements made from tube prong to circuit ground with 1000 ohms per volt instrument on 250 volt scale.

* Not measureable-calculate from 50 volt drop across speaker field.

† Through .1 megohm ‡ Diode biased

PARTS|PRICE LIST

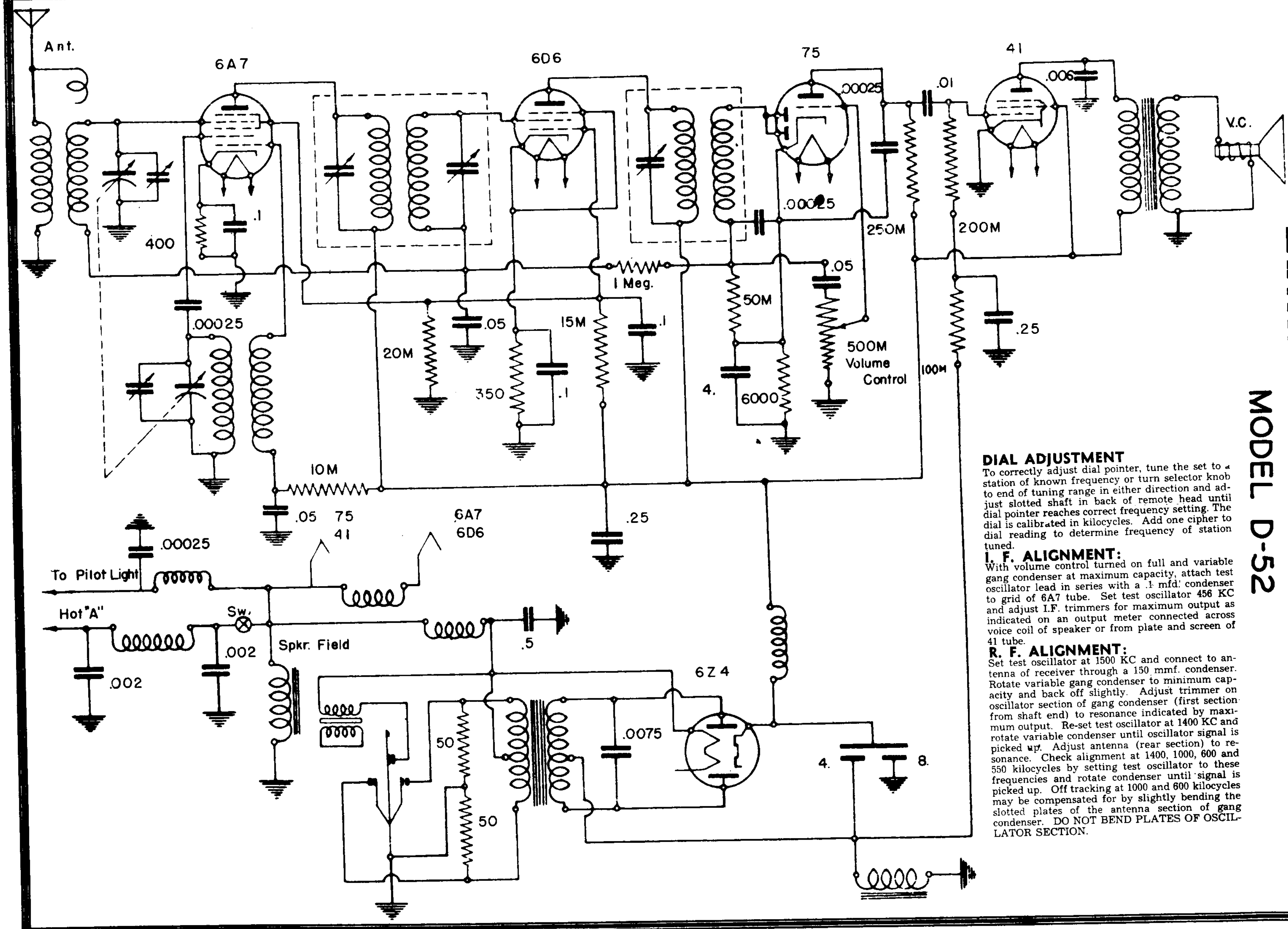
Part No.	Description	List Price	Part No.	Description	List Price
A-170	Two gang condenser	$1.65	H-19	6D6 tube socket	.10
A-218	500 mmf. mica condenser	.20	H-26	76 tube socket	.10
A-354	.25 mfd., 25 volt paper condenser	.20	H-47	41 tube socket	.10
A-351	.05 mfd., 200 volt paper condenser	.15	H-80	200R tube socket	.10
A-354	.25 mfd., 25 volt paper condenser	.20	H-81	250R tube socket	.10
A-359	.01 mfd., 400 volt paper condenser	.15	H-82	320R4 tube socket	.10
A-367	.05 mfd., 400 volt paper condenser	.15	R-185	Volume control and switch	.60
A-384	.15 mfd., 200 volt paper condenser	.15	R-244	1 megohm, 1/3 watt carbon resistor	.20
A-468	Electrolytic condenser	1.00	R-257	50M ohm, 1/3 watt carbon resistor	.20
A-528	3 gang trimmer strip	.30	R-259	500M ohm, 1/3 watt carbon resistor	.20
D-62	Dynamic speaker	2.85	R-264	100M ohm, 1/3 watt carbon resistor	.20
E-176	Small knob	.10	R-274	25M ohm, 1/3 watt carbon resistor	.20
E-177	Large knob	.10	R-296	15,000 ohm, 1 watt carbon resistor	.20
E-481	Special pilot lamp, 6-8 volt, .15 amp.	.15	R-2021	350M ohm, 1/3 watt carbon resistor	.20
E-512	Dial pointer	.05	R-2023	10 megohm, 1/3 watt carbon resistor	.20
E-2046	Dial scale	.25	S-113	Goat tube shield	.10
E-2049	Dial window	.25	T-335G	1st I.F. transformer	1.25
E-4003	Pilot lamp socket & bracket	.10	T337G	2nd I.F. transformer	1.25
E-4023	Wave band switch	.30	T-809	Antenna coil	1.00
G-111	Dial string	.05	T-810	Oscillator coil	1.00
G-116	Dial spring	.05	T-813	Wave trap coil	.35
H-17	6A7 tube socket	.10	U-118	Power cord and plug	.30
H-18	25Z5 tube socket	.10	X-386	Cabinet	5.50

Prices Subject to Change Without Notice

ALWAYS ORDER BY PART NUMBER

LAFAYETTE RADIO MFG. CO.

MODEL D-52



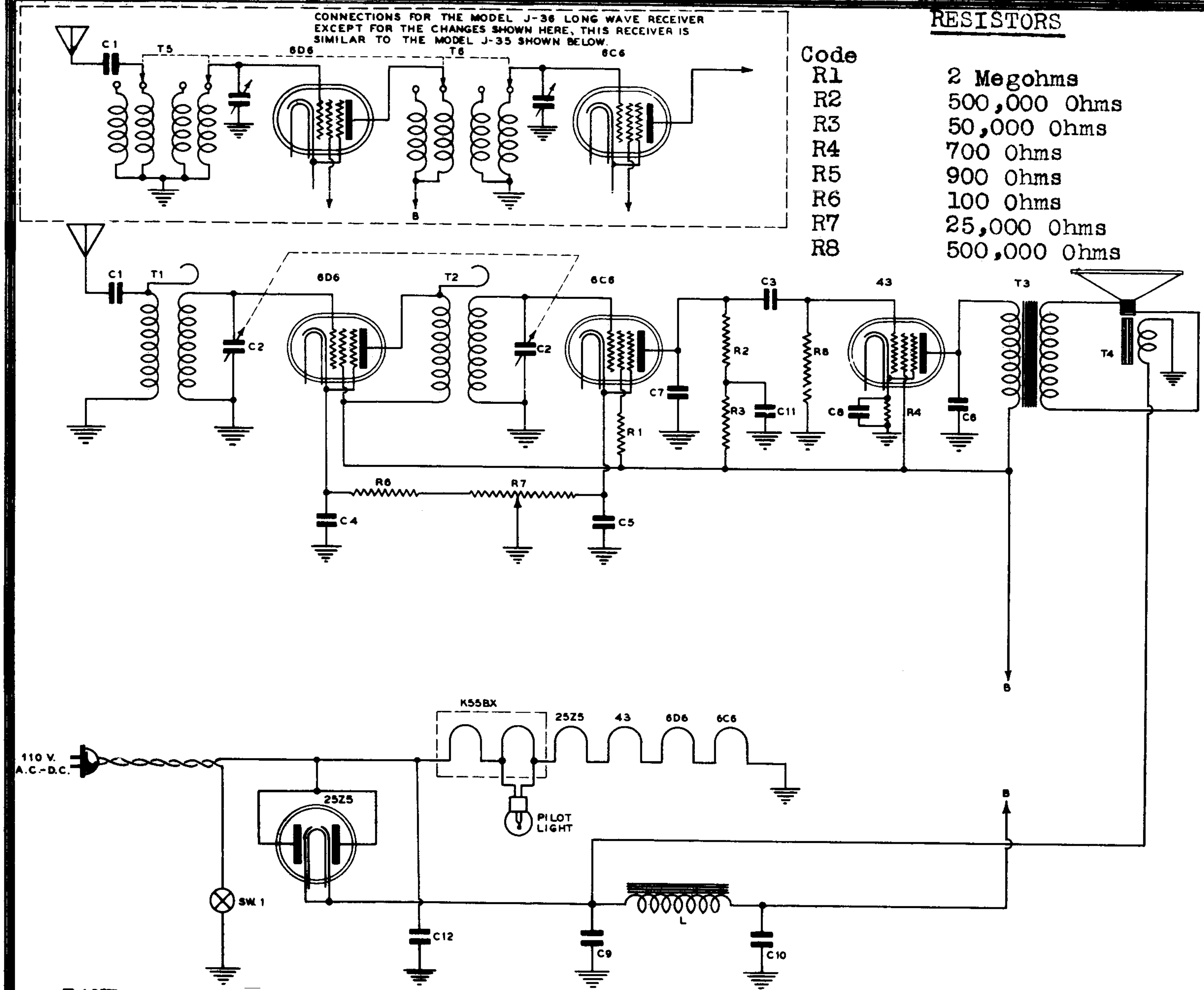
DIAL ADJUSTMENT
To correctly adjust dial pointer, tune the set to a station of known frequency or turn selector knob to end of tuning range in either direction and adjust slotted shaft in back of remote head until dial pointer reaches correct frequency setting. The dial is calibrated in kilocycles. Add one cipher to dial reading to determine frequency of station tuned.

I. F. ALIGNMENT:
With volume control turned on full and variable gang condenser at maximum capacity, attach test oscillator lead in series with a .1 mfd. condenser to grid of 6A7 tube. Set test oscillator 456 KC and adjust I.F. trimmers for maximum output as indicated on an output meter connected across voice coil of speaker or from plate and screen of 41 tube.

R. F. ALIGNMENT:
Set test oscillator at 1500 KC and connect to antenna of receiver through a 150 mmf. condenser. Rotate variable gang condenser to minimum capacity and back off slightly. Adjust trimmer on oscillator section of gang condenser (first section from shaft end) to resonance indicated by maximum output. Re-set test oscillator at 1400 KC and rotate variable condenser until oscillator signal is picked up. Adjust antenna (rear section) to resonance. Check alignment at 1400, 1000, 600 and 550 kilocycles by setting test oscillator to these frequencies and rotate condenser until signal is picked up. Off tracking at 1000 and 600 kilocycles may be compensated for by slightly bending the slotted plates of the antenna section of gang condenser. DO NOT BEND PLATES OF OSCILLATOR SECTION.

LAFAYETTE RADIO MFG. CO.

MODELS J-35 & J-36



RESISTORS

Code	
R1	2 Megohms
R2	500,000 Ohms
R3	50,000 Ohms
R4	700 Ohms
R5	900 Ohms
R6	100 Ohms
R7	25,000 Ohms
R8	500,000 Ohms

CONDENSERS

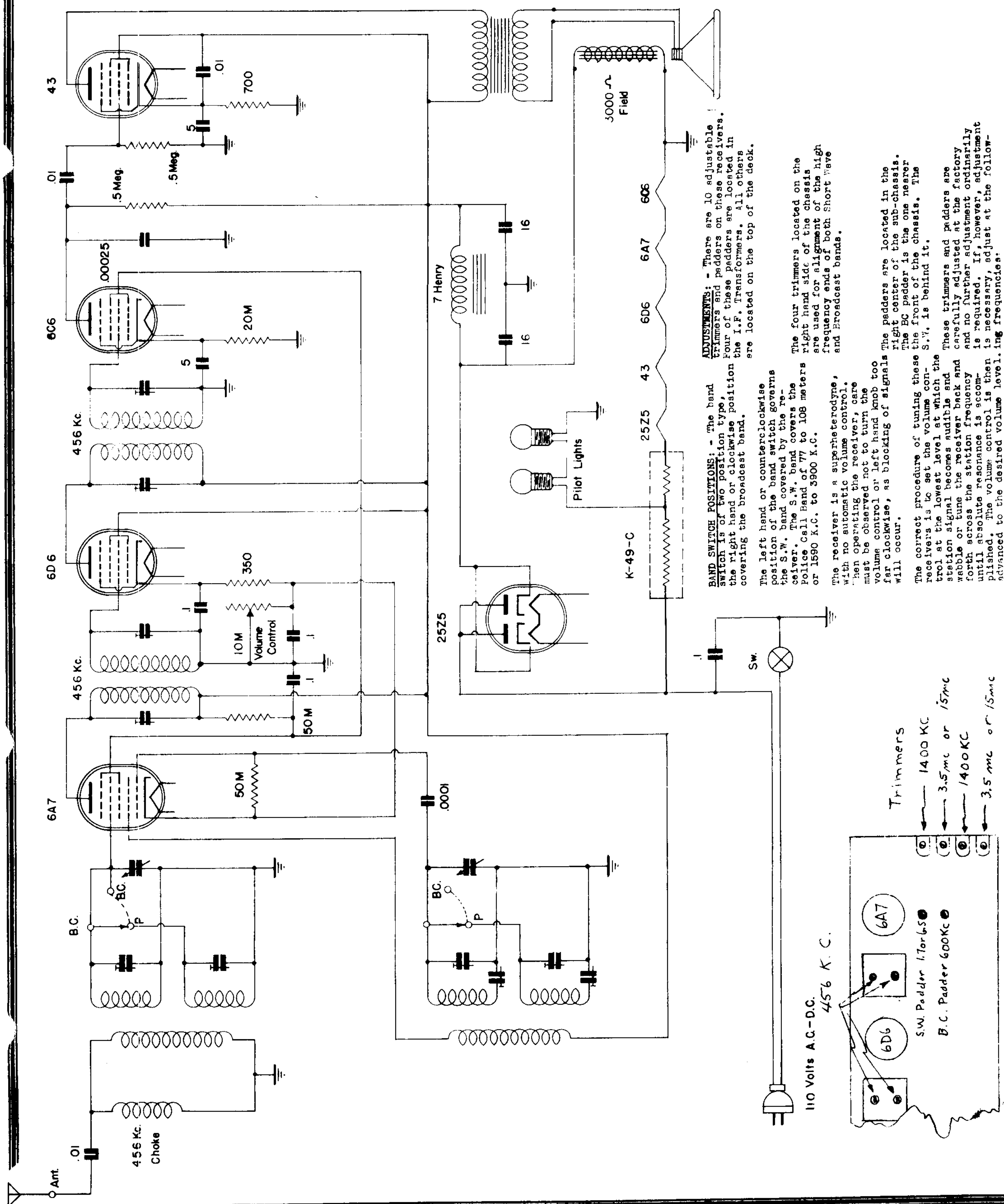
Code	
C1	.01 Mf.
C2	360 Mf.
C3	.01 Mf.
C4	.1 Mf.
C5	5 Mf.
C6	.01 Mf.
C7	.0001 Mf.
C8	5 Mf.
C9	16 Mf.
C10	16 Mf.
C11	8 Mf.
C12	.1 Mf.

BAND	H.F.	L.F.
Broadcast	1400 K.C.	600 K.C.
Long Wave	350 K.C.	160 K.C.

ADJUSTMENTS: - There are two adjustable trimmers located on the outside of the variable condenser. They should be made at 1400 K.C. and 600 K.C. only.

LAFAYETTE RADIO MFG. CO.

MODEL J-43



BAND SWITCH POSITIONS: - The band switch is of two position type, the right hand or clockwise position covering the broadcast band.

The left hand or counterclockwise position of the band switch governs the S.W. band covered by the receiver. The S.W. band covers the Police Call Band of 77 to 108 meters or 1590 K.C. to 3900 K.C.

The receiver is a superheterodyne, with no automatic volume control. When operating the receiver, care must be observed not to turn the volume control or left hand knob too far clockwise, as blocking of signals will occur.

The correct procedure of tuning these receivers is to set the volume control at the lowest level at which the station signal becomes audible and wabble or tune the receiver back and forth across the station frequency until absolute resonance is accomplished. The volume control is then advanced to the desired volume level.

ADJUSTMENTS: - There are 10 adjustable trimmers and padders on these receivers. Four of these padders are located in the I.F. Transformers. All others are located on the top of the deck.

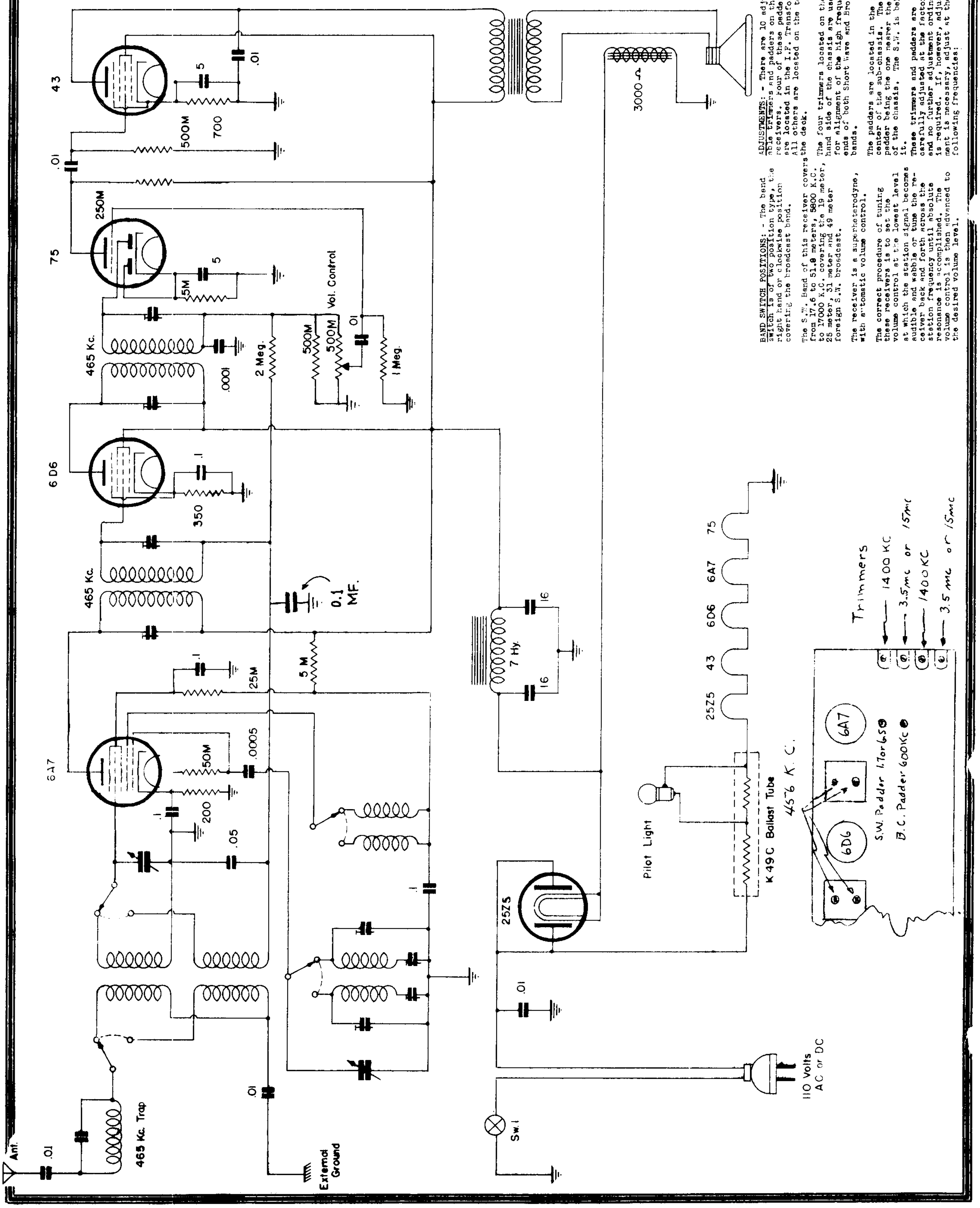
The four trimmers located on the right hand side of the chassis are used for alignment of the high frequency ends of both Short Wave and Broadcast bands.

The padders are located in the right center of the sub-chassis. The BC padder is the one nearer the front of the chassis. The S.W. is behind it.

These trimmers and padders are carefully adjusted at the factory and no further adjustment ordinarily is required. If, however, adjustment is necessary, adjust at the following frequencies:

LAFAYETTE RADIO MFG. CO.

MODEL J-44



BAND SWITCH POSITIONS: - The band switch is of two position type, the right hand or clockwise position covering the broadcast band.

The S.W. Band of this receiver covers from 17.6 to 51.8 meters, 5800 K.C. to 17000 K.C. covering the 19 meter, 25 meter, 31 meter and 49 meter foreign S.W. broadcast.

The receiver is a superheterodyne, with automatic volume control.

The correct procedure of tuning these receivers is to set the volume control at the lowest level at which the station signal becomes audible and wabble or tune the receiver back and forth across the station frequency until absolute resonance is accomplished. The volume control is then advanced to the desired volume level.

ADJUSTMENTS: - There are 10 adjustable trimmers and padders on these receivers. Four of these padders are located in the I.F. Transformers. All others are located on the top of the deck.

The four trimmers located on the right hand side of the chassis are used for alignment of the high frequency ends of both Short Wave and Broadcast bands.

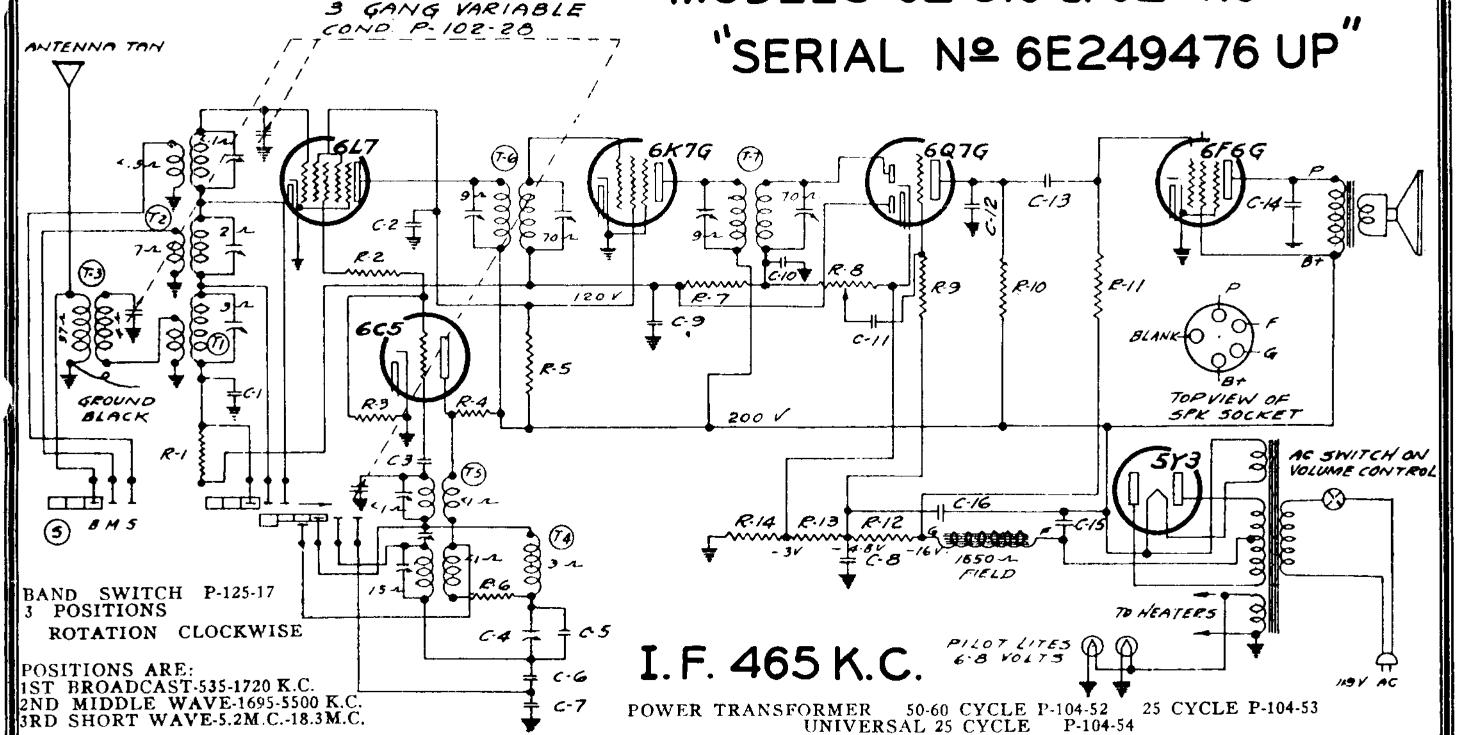
The padders are located in the right center of the sub-chassis. The BC padder being the one nearer the front of the chassis. The S.W. is behind it.

These trimmers and padders are carefully adjusted at the factory and no further adjustment ordinarily is required. If, however, adjustment is necessary, adjust at the following frequencies:

MONTGOMERY WARD & CO.

MODELS 62-316 & 62-416

"SERIAL № 6E249476 UP"



BAND SWITCH P-125-17
3 POSITIONS
ROTATION CLOCKWISE

POSITIONS ARE:
1ST BROADCAST-535-1720 K.C.
2ND MIDDLE WAVE-1695-5500 K.C.
3RD SHORT WAVE-5.2M.C.-18.3M.C.

I.F. 465 K.C.

POWER TRANSFORMER 50-60 CYCLE P-104-52 25 CYCLE P-104-53
UNIVERSAL 25 CYCLE P-104-54
UNIVERSAL 40 CYCLE P-104-55

BAND	DIAL SCALE	FREQUENCY RANGE
Broadcast	Outer Scale —Blue	535 to 1720 K.C. (Kilocycles)
Middle Wave	Center Scale—Green	1695 to 5500 K.C. (Kilocycles)
Short Wave	Inner Scale —Buff	5.2 to 18.3 M.C. (Megacycles)

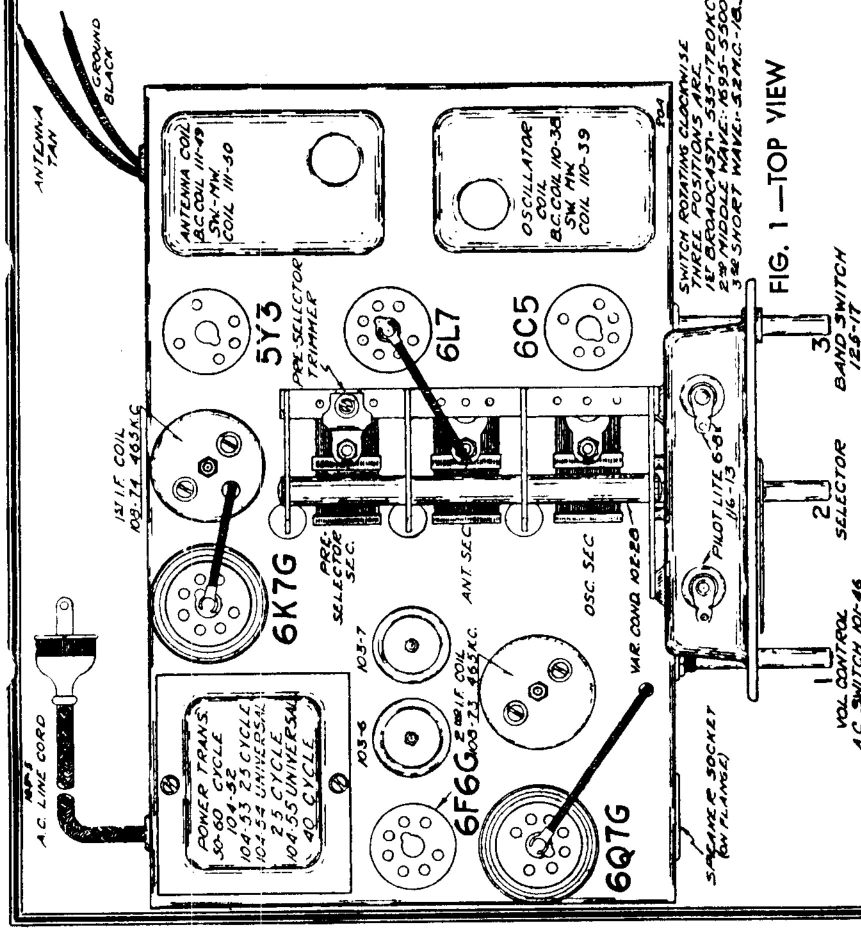


FIG. 1—TOP VIEW

LIST OF REPAIR PARTS

Part No.	Schematic Reference	Description	No. Used in Set	Selling Price Ea.
		CONDENSERS		
BE 100-11	C-11: C-13	.01 x 400 Volt Tubular	2	$0.09
BE 100-20	C-2: C-8	.1 x 200 Volt Tubular	2	.11
BE 100-22	C-1: C-9	.05 x 200 Volt Tubular	2	.10
BE 100-19	C-14	.006 x 600 Volt Tubular	1	.10
BE 103-6	C-15	8 Mfd. x 350 Volt Electrolytic	1	.50
BE 103-7	C-16	8 Mfd. x 300 Volt Electrolytic	1	.44
BE 129-2	C-12	.0005 Mica—Type MT—20%	1	.09
BE 129-12	C-10	.00025 Mica—Type MT—20%	1	.12
BE 129-39	C-3	.00005 Mica—Type MT—20%	1	.12
BE 129-54	C-7	.003 Mica—Type MW—2½%	1	.25
BE 129-55	C-6	.0034 Mica—Type MW—2½%	1	.25
BE 129-56	C-5	.00055 Mica—Type MT—10%	1	.10
		RESISTORS		
BE 106-26	R-12: R-13: R-14	(R-12, 220 Ohm) (R-13, 32 Ohm) (R-14, 52 Ohm) Metal Clad Resistor	1	.24
BE 130-4	R-9	3 Meg Ohm—⅓ Watt—20%—100 Volt Carbon	1	.08
BE 130-12	R-3	50M Ohm—⅓ Watt—20%— 20 Volt Carbon	1	.08
BE 130-19	R-7	1 Meg Ohm—⅓ Watt—20%—100 Volt Carbon	1	.08
BE 130-20	R-1	100M Ohm—⅓ Watt—20%— 50 Volt Carbon	1	.08
BE 130-27	R-6	50 Ohm—⅓ Watt—20%— 3 Volt Carbon	1	.10
BE 130-102	R-11	500M Ohm—½ Watt—10%— 50 Volt Carbon	1	.10
BE 130-103	R-10	100M Ohm—⅓ Watt—10%— 50 Volt Carbon	1	.10
BE 130-104	R-4: R-5	9M Ohm— 1 Watt—20%—100 Volt Carbon	2	.10
BE 130-105	R-2	150 Ohm—⅓ Watt—20%— 10 Volt Carbon	1	.10
		COILS		
BE 108-73	T-7	Output I.F. Coil Assem. Comp. with Can.	1	.90
BE 108-74	T-6	Input I.F. Coil Assem. Comp. with Can.	1	.90
BE 110-38	T-4	Broadcast Oscillator Coil Assem. Comp. with Can.	1	.35
BE 110-39	T-5	Mid Wave and Short Wave Oscillator Assem. less Can.	1	.75
BE 111-49	T-1	Broadcast Antenna Coil Assem. Comp. with Can.	1	.40
BE 111-50	T-2	Mid Wave and Short Wave Antenna Coil Assem. less Can.	1	.80
BE 111-51	T-3	Broadcast Preselector Coil Assembly	1	.35

MONTGOMERY WARD & CO.
MODELS 62-316 & 62-416
"SERIAL № 6E249476 UP"

Part No.	Schematic Reference	Description	No. Used in Set	Selling Price Ea.
		SOCKETS		
BE 121-8		Five Prong Socket—Marked "SPKR"	1	.08
BE 121-12		Seven Prong Socket—Marked "6K7"	1	.10
BE 121-14		Seven Prong Socket—Marked "6F6"	1	.10
BE 121-15		Five Prong Socket—Marked "5Y3"	1	.08
BE 121-17		Six Prong Socket—Marked "6C5"	1	.09
BE 121-18		Seven Prong Socket—Marked "6L7"	1	.10
BE 121-26		Seven Prong Socket—Marked "6Q7"	1	.10
		SPEAKER		
BE 114-15		Six Inch Dynamic	1	3.00
		TRANSFORMERS		
BE 104-52		Power Transformer, 50/60 Cycle	1	2.00
BE 104-53		Power Transformer, 25 Cycle	1	2.50
BE 104-54		Universal Power Transformer, 25 Cycle Primary	1	3.00
BE 104-55		Universal Power Transformer, 40 Cycle Primary	1	3.00
		MISCELLANEOUS		
BE 101-46	R-8	Volume Control and Switch (1 Meg Ohm)	1	$0.60
BE 102-28		Three Gang Variable Condenser	1	2.50
BE 107-5		Line Cord and Plug	1	.30
BE 115-35		Antenna, Oscillator, Shield	2	.12
BE 124-28	C-4	J-S Series Pad 3 Pl.	1	.16
BE 125-17	S	Wave Change Switch	1	.35
128-44		"Volume" Knob with Spring	1	.08
128-46		"Band Switch" Knob with Spring	1	.08
128-47		"Tuning" Knob with Spring	1	.08

DIAL PARTS LIST

Part No.	Schematic Reference	Description	No. Used in Set	Selling Price Ea.
		ASSEMBLIES		
BE 117-41		Drive Bracket including: 1—No. 117-19—Tuning Shaft Bushing	1	$0.06
BE 117-66		Switch Disc and Link Assembly, including: 1—No. 117-12 —Switch Arm 1—No. 117-35 —Bushing with Screws 1—No. 117-40B—Switch Link 3—No. 131-26 —Spring Washers 3—No. 162-5 —Rivets 1—No. 112-144—Switch Disc—Inc. Red Tape	1	.12
		DIAL PARTS ONLY		
BE 112-125		Drive Belt	1	.10
BE 112-143		Oval Eschutcheon complete with Celluloid Crystal	1	.50
BE 112-148A		Dial Scale complete with Fastener, Pointer Disc, and Screw	1	.24
BE 112-147		Tuning Shaft	1	.06
BE 112-151		Pointer complete with Screw	1	.02
BE 112-156		Pilot Light Assembly	2	.06
BE 116-13		6.8 Volt T-51 Pilot Light	2	.08
BE 117-20A		Tuning Shaft Pulley	1	.03
BE 117-38		Stud, for take-up Spring	1	.03
BE 117-39		Pulley, for take-up Spring	1	.02
BE 120-14		Take-up Spring	1	.02
BE 134-9		Horse Shoe Washer	1	.01
BE 134-40		Rubber Grommet	2	.02

Note: Speakers cannot be ordered, defective speakers must be repaired.
All resistors and mica condensers are RMA color coded — specify value and/or resistor or condenser (per schematic diagram) and model number.
Mica condensers are coded with an additional dot indicating tolerance:

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More than—20%	None

When ordering condensers, specify part number, tolerance and/or schematic reference number.
When ordering parts, always specify part and model number as well as serial number of chassis.

Service Data

DESCRIPTION:

TUBES:

The tube complement of this chassis consists of two metal type tubes, and four glass typo tubes with octal base.

The type and function of each tube is as follows:

1—Type 6L7 Pentagrid Mixer, First Detector.
1—Type 6C5 Oscillator.
1—Type 6K7G Remote Cut-Off Pentode, I. F. Amplifier (465 K.C.)
1—Type 6Q7G Duplex Diode Triode Second Detector, A.V.C. and First Audio
1—Type 6F6G Pentode Output Amplifier.
1—Type 5Y3 High Vacuum Rectifier.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 108, 125, 150, 220 and 250 volts (see parts list) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with 119 volts on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

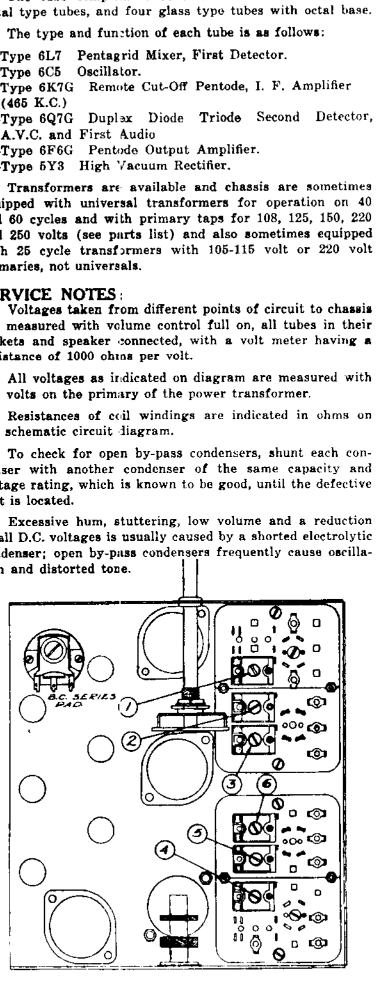


FIG. 3—BOTTOM VIEW SHOWING TRIMMERS

ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary.

No aligning adjustments should be attempted with the chassis in the cabinet. Remove the knobs and the four bolts which are used to fasten the chassis.

All adjustments should be made with a non-metallic screw driver.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 6F6G output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-73 Output I.F. Transformer
Part No. 108-74 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7G tube, and adjust the output I.F. transformer (No. 108-73) to resonance.

   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7G to grid cap to 6L7 and adjust input I.F. transformer (No. 108-75) to resonance.

   (c) With oscillator still connected to 6L7, readjust output I.F. transformer (108-73) if necessary.

BROADCAST BAND ALIGNMENT:

535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:

   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance (Adjustment number 1; see bottom view of coil assembly. Fig. 3)

   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment).

   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).

   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

   (e) Check for tracking and sensitivity at 1000 kilocycles. Under no circumstances bend plates of variable condenser sections to correct tracking.

SHORT WAVE BAND ALIGNMENT:

5.2 to 18.3 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment number 3) and short wave antenna (Adjustment number 6) to resonance.

   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.

   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.3 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental on the receiver dial. As an example of this a fundamental 18.3 megacycle signal can be tuned in not only at 18.3 on the dial but also at approximately 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:

1695 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (adjustment number 2) and middle wave antenna (adjustment number 5) to resonance.

   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.

   (c) Re-set external oscillator and check set at 5400 kilocycles and 1700 kilocycles for band coverage.

MONTGOMERY WARD & CO.
MODELS 62-315 & 62-415
"SERIAL № 6E248475 UP"

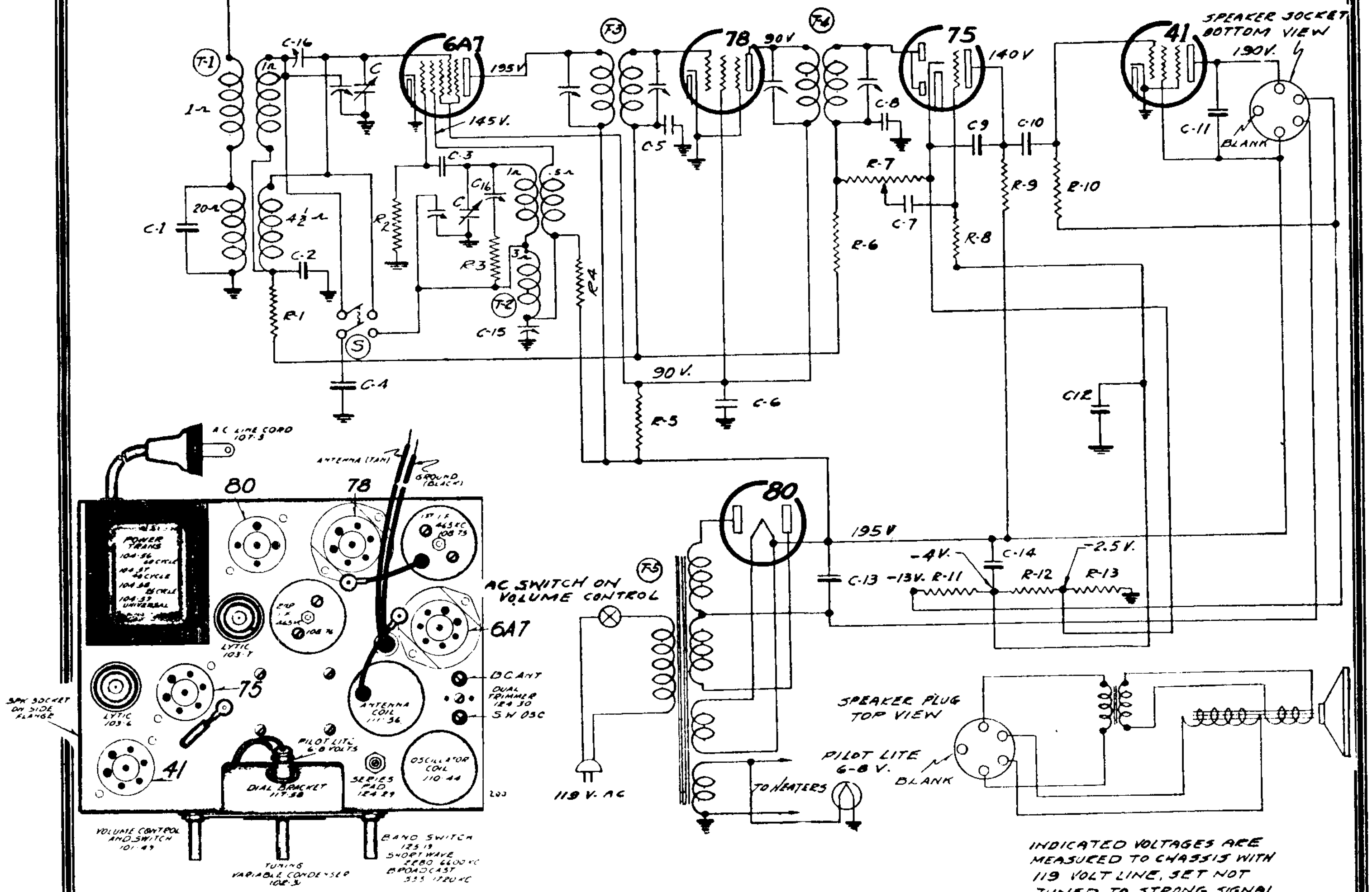


FIG. 1—TOP VIEW

LIST OF REPAIR PARTS (Serial No. 6E248475 and up)

Use Only Genuine Factory Replacement Parts

Part No.	Schematic Reference	Description	No. Used in Set	Selling Price Ea.
		CONDENSERS		
BE 100-6	C-12: C-6	.25 x 200 Volt Tubular—Without Bracket	2	$0.16
BE 100-9	C-5	.05 x 200 Volt Tubular	1	.10
BE 100-11	C-10: C-7	.01 x 400 Volt Tubular	2	.09
BE 100-19	C-11	.006 x 600 Volt Tubular	1	.09
BE 100-26	C-2	.02 x 400 Volt	1	.10
BE 103-6	C-12	8 Mfd. x 350 Volt Electrolytic	1	.50
BE 103-7	C-14	8 Mfd. x 300 Volt Electrolytic	1	.44
BE 129-5	C-9	.0001 Mica—Type O—20%	1	.09
BE 129-12	C-8	.00025 Mica—Type O—20%	1	.12
BE 129-61	C-4	.0017 Mica—Type W—2½%	1	.20
BE 129-62	C-3	.00003 Mica—Type O—10%	1	.10
BE 129-63	C-1	.0004 Mica—Type W—10%	1	.10
		RESISTORS		
BE 106-26	R-11; R-12; R-13	220 Ohm (R-11), 33 Ohm (R-12), 52 Ohm (R-13), Metal Clad Resistor	1	.24
BE 130-12	R-2	50M Ohm— ⅓ Watt—20%— 20 Volt—Carbon	1	.08
BE 130-20	R-9	100M Ohm— ⅓ Watt—20%— 50 Volt—Carbon	1	.08
BE 130-22	R-4	5M Ohm— ⅓ Watt—20%— 10 Volt—Carbon	1	.08
BE 130-77	R-5	10M Ohm— 1 Watt—20%—100 Volt—Carbon	1	.08
BE 130-100	R-10	150M Ohm— ⅓ Watt—20%— 50 Volt—Carbon	1	.08
BE 130-110	R-6	1 Meg Ohm—1/10 Watt—10%—100 Volt—Carbon	1	.08
BE 130-111	R-1	100M Ohm—1/10 Watt—20%— 50 Volt—Carbon	1	.08
BE 130-112	R-3	100 Ohm—1/10 Watt—20%— 10 Volt—Carbon	1	.08
BE 130-113	R-8	2 Meg Ohm—1/10 Watt—20%—100 Volt—Carbon	1	.08
		COILS		
BE 108-75	T-3	465 K.C. Input I.F. Coil Assembly Complete with Can	1	.66
BE 108-76	T-4	465 K.C. Output I.F. Coil Assembly Complete with Can	1	.75
BE 110-44	T-2	Oscillator Coil Assembly Complete with Can	1	.66
BE 111-56	T-1	Antenna Coil Assembly Complete with Can	1	.80
		SOCKETS		
BE 121-6		Six Prong Socket—Marked "78"	1	.09
BE 121-6		Six Prong Socket—Marked "75"	1	.09
BE 121-6		Six Prong Socket—Marked "41"	1	.09
BE 121-7		Seven Prong Socket—Marked "6A7"	1	.10
BE 121-8		Five Prong Socket—Marked "SPKR"	1	.08
BE 121-9		Four Prong Socket—Marked "80"	1	.08
		SPEAKER		
BE 114-16		Five Inch Dynamic Speaker	1	3.00

Part No.	Schematic Reference	Description	No. Used in Set	Selling Price Ea.
		TRANSFORMERS		
BE 104-56	T-5	60 Cycle—110 Volt Power Transformer	1	1.74
BE 104-57		40 Cycle—110 Volt Power Transformer		2.50
BE 104-58		25 Cycle—110 Volt Power Transformer		3.50
BE 104-59		40 Cycle Primary—Universal Power Transformer		3.00
		MISCELLANEOUS		
BE 101-49	R-7	Volume Control & A. C. Switch (1 Meg Ohm)	1	.74
BE 102-31	C	Two Gang Variable Condensor	1	1.30
BE 107-5		Line Cord & Plug	1	.30
BE 112-15		Dial Crystal Only—Less Escutcheon	1	.04
BE 112-131		Bakelite Escutcheon Complete with Crystal	1	.20
BE 112-156		Pilot Light Assembly	1	.06
BE 112-159		Dial Scale	1	.12
BE 112-160		Dial Pointer Complete with Screw	1	.04
BE 115-22		Tube Shield	2	.10
BE 116-13		6-8 Volt, T-51 Pilot Light Bulb	1	.08
BE 117-58		Dial Housing	1	.12
BE 117-59		Pointer Stud	1	.02
BE 117-60		Pointer Bushing Assembly	1	.10
BE 117-61		Drive Pulley	1	.06
BE 120-7		Belt Tension Spring	1	.02
BE 124-29	C-15	Type TU5 Series Pad	1	.20
BE 124-30	C-16	Dual Ceramic Padder	1	.18
BE 125-19	S	Band Switch	1	.24
BE 131-2		Bakelite Knob	3	.06
BE 131-43		Cinch Button for Fastening Dial Scale	5	.01
BE 131-49		Drive Belt	1	.02
BE 134-9		Compression Spring	1	.01

Note: Speakers cannot be ordered, defective speakers must be repaired.

All resistors and mica condensers are RMA color coded — specify value and/or resistor or condenser (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More than—20%	None

When ordering condensers, specify part number, tolerance and/or schematic reference number.

When ordering parts, always specify part and model number as well as serial number of chassis.

MONTGOMERY WARD & CO
MODELS 62-315 & 62-415
"SERIAL №6E248475 UP"

BAND	DIAL SCALE	FREQUENCY RANGE
Broadcast.....	Upper Scale—Blue	535 to 1720 K.C. (Kilocycles)
Short Wave...	Lower Scale— Buff	2280 to 6600 K.C. (Kilocycles)

DESCRIPTION:

TUBES:

The tube complement of this chassis consists of the following tubes.

The type and function of each tube is as follows:

1—Type 6A7 Pentagrid Mixer, First Detector-oscillator
1—Type 78 Remote Cut-Off Pentode, I. F. Amplifier (465 K.C.)
1—Type 75 Duplex Diode Triode Second Detector, A.V.C. and First Audio.
1—Type 41 Pentode Output Amplifier.
1—Type 80 High Vacuum Rectifier.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 108, 125, 150, 220 and 250 volts (see parts list) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with 119 volts on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. Remove the knobs and the four bolts which are used to fasten the chassis.

All adjustments should be made with a non-metallic screw driver.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 41 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-76 Output I.F. Transformer
Part No. 108-75 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 78 tube, and adjust the output I.F. transformer (No. 108-76) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 78 to grid cap to 6A7 and adjust input I.F. transformer (No. 108-75) to resonance.
   (c) With oscillator still connected to 6A7, readjust output I.F. transformer (108-76) if necessary.

BROADCAST AND SHORT WAVE BAND ALIGNMENT

Broadcast Band:—535 to 1720 Kilocycles.
Short Wave Band:—2280 to 6600 Kilocycles.

Important:—These adjustments must be made in the following order:

SHORT WAVE OSCILLATOR ADJUSTMENT:

1. With band switch in the short wave band position, extreme right of its rotation, and with the gang condenser in its minimum capacity position, plates entirely out of mesh, and with the external oscillator connected in series with "Dummy 1" to grid cap of the 6A7 tube, make the following adjustment:
   (a) Set external oscillator to 6.6 megacycles and adjust short wave oscillator trimmer to resonance. This adjustment is marked "S.W. Osc." (see top view of chassis, Fig. 1, for location of this adjustment).

NOTE: Make certain that the fundamental 6.6 megacycles signal has been tuned in and not the image frequency, noting that the image appears when the tuning knob is moved to approximately 5.7 megacycles.

BROADCAST BAND OSCILLATOR ADJUSTMENT:

1. With band switch in the broadcast position, extreme left of its rotation, and with the gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 1" to grid cap of the 6A7 tube, make the following adjustment:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. This adjustment is the trimmer mounted on the front section of the variable gang condenser.

BROADCAST BAND ANTENNA ADJUSTMENT:

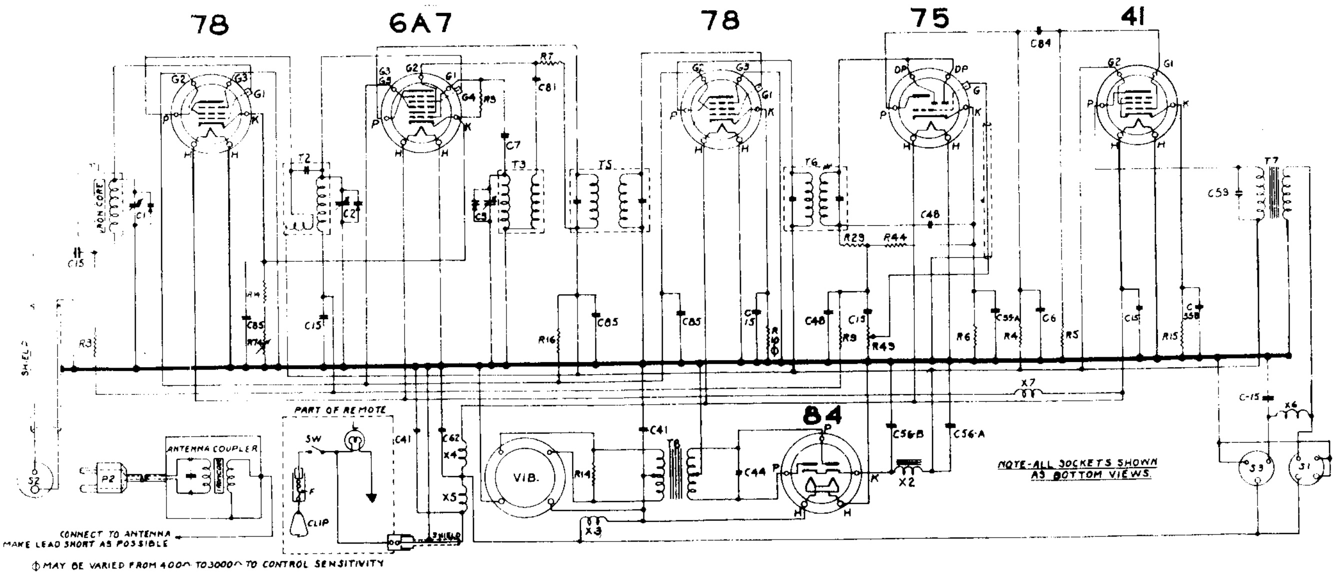
1. With the band switch still in the broadcast position, move the external oscillator from the grid cap of the 6A7 tube to the tan antenna lead and black ground lead, in series with "Dummy 2" and make the following adjustments:
   (a) Set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer to resonance. This adjustment is marked "B.C. Ant." (See top view of chassis, Fig 1, for location of this adjustment.)
   (b) Re-set external oscillator to 600 K.C. and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until, by adjusting series pad, maximum output is attained. This adjustment is located on the top of the chassis directly in front of the antenna coil. (See top view of chassis, Fig. 1).
   (c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

SHORT WAVE BAND ANTENNA ADJUSTMENT:

1. With the band switch in the short wave position, and with external oscillator connected in series with "Dummy 3," to the tan antenna lead and black ground lead, make following adjustment:
   (a) Set external oscillator to 6 megacycles and adjust the short-wave antenna trimmer to resonance. This adjustment is the trimmer mounted on the rear section of the variable gang condenser.

NOBLITT SPARKS INDUSTRIES INC.

MODEL 19



RESISTORS.									
R	OHMS	W	PART NO.	PRICE	R	OHMS	W	PART NO.	PRICE
3	100M	1/4	17-2068						
4	200M	1/4	17-2069						
5	500M	1/4	17-2070						
6	.5M	1/4	17-2071						
7	20M	1/4	17-2072						
9	1MEG	1/4	17-2080						
10	500	1/4	17-2088						
14	200	1/4	17-4287						
15	500	1/2	17-4717						
16	50M	1	17-4763						
29	50M	1/4	17-2060						
44	150M	1/4	17-4288						
49	500M	V.C.	17-14836						
74	800		17-14102						

CONDENSERS.									
C	CAPACITY	VOLT	PART NO.	PRICE	C	CAPACITY	VOLT	PART NO.	PRICE
1, 2, 3	3 GANG VARIABLE		17-14732						
7	.0001 MICA	600	17-2064						
15	.05 P.M.	160	17-14036						
41	1.	15	17-4708						
44	.005	1600	17-14057						
48	.00025 MICA	600	17-4207						
55-A, 55B	10, 10 ELECT.	25	17-14608						
56A, 56B	4, 8 ELECT.	250	17-14614						
58	.01 P.M.	400	17-14615						
62	.5	15	17-4708						
81	.003 MICA	600	17-14088						
84	.01 P.M.	600	17-14100						
85	.1 P.M.	400	17-14101						
6	.002 MICA	600	17-2063						

CHOKES & TRANSFORMERS			
T-X	TYPE	PART NO.	PRICE
T	TRANSFORMERS		
1	ANTENNA COIL	00-14748	
2	R.F. COIL	00-14779	
3	OSC. COIL	00-14780	
5	1ST. I.F. COIL	00-14749	
6	2ND. I.F. COIL	00-14750	
7	OUTPUT TRANSF.	00-14668	
8	POWER TRANSF.	00-14662	
X	CHOKES		
2	"B" CHOKE (IRON CORE)	00-4764	
3	"A" FILTER CHOKE	00-4516	
4	"A" FILTER CHOKE	00-4515	
5	SUPPRESSION CHOKE	00-14661	
6	H.C. R.F. FILTER	00-14676	
7	HEATER FILTER	00-14677	

MISCELLANEOUS UNITS.			
SYMBOL	DESCRIPTION	PART NO.	PRICE
S1	SPEAKER SOCKET (INSIDE CASE)	17-2230	
S2	ANTENNA COUPLER SOCKET	17-14526	
S3	SPEAKER SOCKET (EXTERNAL SPKR.)	17-14527	
P2	ANTENNA COUPLER PLUG	17-14526	
L	DIAL LIGHT (REMOTE CONTROL)	17-13904	
SW.	POWER SWITCH (REMOTE CONTROL)		
VIB	VIBRATOR	17-14552	
F	FUSE 10AMP. 25 VOLT	17-2197	
	ANTENNA COUPLER	00-14759	

IF PEAK 170 K.C.

BALANCE AT 1400 K.C.

CHECK AT 1000 & 600 K.C.

MODEL 19 SOCKET VOLTAGES

Voltages given here are actually for an input battery voltage of 5.8 amp., even though the normal heater voltage is shown as 6.3 amp. The reason for this is that it is thought that the average battery used on a service bench without constant charging, would not be fully charged. A corresponding increase in all voltages should be expected if an absolutely fully charged battery is used.

Tube	Heater	Cathode	Suppressor Grid	Screen Grid	Plate	*Oscillator Grid	Anode Grid	†Diode Plates
78	6.3	2.5-4.5	0	76	227	....	....	....
6A7	6.3	2.5-4.5	....	76	227	5-12	160	....
78	6.3	2.5	0	76	227	....	....	....
75	6.3	1.3	....	....	100	....	....	2.0
41	6.3	12.0	....	2.30	220	....	....	....
84	6.3	235	....	....	250	....	....	....

* Measured at 1500 K. C.
† Measured with Vacuum Tube Voltmeter.

POINT TO POINT RESISTANCES

78—R. F. Amplifier
Heater 0
Heater .... ∞
Cathode, adj. max .... 1,000 Ω
Suppressor 0
Screen to +B .... 50,000 Ω
Plate to +B .... 100 Ω
Control Grid .... 1,255,000 Ω

6A7—1st Det. Oscillator
Heater 0
Heater .... ∞
Cathode, adj. max .... 1,000 Ω
Osc. Grid .... 100,600 Ω
Anode Grid to +B .... 20,000 Ω
Screen Grid to +B .... 50,000 Ω
Plate to +B .... 74 Ω
Control Grid .... 1,155,000 Ω

78—I. F. Amplifier
Heater 0
Heater .... ∞
Cathode (See Diag.) .... 1,000 Ω
Suppressor 0
Screen to +B .... 50,000 Ω
Plate to +B .... 74 Ω
Control Grid .... 74 Ω

75—AVC Det; 1st Audio
Heater 0
Heater .... ∞
Cathode .... 3,000 Ω
Diode .... 205,000 Ω
Diode .... 205,000 Ω
Plate to +B .... 200,000 Ω
Control Grid, V. C. on .... 500,000 Ω
Control Grid, V. C. off .... Max. 25 Ω

41—Power Output
Heater 0
Heater .... ∞
Cathode .... 500 Ω
Control Grid .... 500,000 Ω
Screen to +B 0
Plate to +B .... 625 Ω

84—Rectifier
Heater 0
Heater .... ∞
Cathode to +B .... 140 Ω
Plate .... 250 Ω
Plate .... 270 Ω
Plate to Plate .... 520 Ω

COIL AND TRANSFORMER RESISTANCES

Phant. Filter Pri. .... 8.5 Ω
Phant. Filter Sec. .... 1.0 Ω
Antenna Coil .... 2.325 Ω
R. F. Coil Pri. .... 100.0 Ω
R. F. Coil Sec. .... 3.475 Ω
Osc. Coil Pri. .... 3.0 Ω

Osc. Coil Sec. .... 1.8 Ω
1st I. F. Trans. Pri. .... 75.0 Ω
1st I. F. Trans. Sec. .... 75.0 Ω
2nd I. F. Trans. Pri. .... 75.0 Ω
2nd I. F. Trans. Sec. .... 75.0 Ω
Output Trans. Pri. .... 625.0 Ω

Output Trans. Sec. .... .40 Ω
"B" Filter Choke .... 140.0 Ω
"B" R. F. Choke .... 1.35 Ω
Power Trans. Pri. .... .075-0-.075 Ω
Power Trans. Sec. .... 175.0-0-200.0 Ω

ELECTRICAL DATA

TUBES:
78—R. F. Amplifier
6A7—1st Detector—Oscillator
78—I. F. Amplifier
75—2nd Detector, 1st Audio Amplifier
41—Audio Output Amplifier
84—Full Wave Rectifier

FREQUENCY RANGE: 1575-540 Kilocycles
POWER OUTPUT: 3.5 Watts
SPEAKER: Optional
VOICE COIL: 3 Ohms

POWER SUPPLY: 6-V. Storage Battery
AMPERE DRAIN: 6.1 Amperes

BALANCING INSTRUCTIONS

SPECIAL NOTE: All Arvin 1937 model car radios are designed to use the Exclusive Arvin Permaset pre-balanced intermediate frequency transformers, which require no adjustment whatsoever. This Arvin feature greatly simplifies balancing procedure. It is necessary, therefore, to adjust only the three screws located on the tuning condenser as follows:

1. Rotate the tuning condenser completely out of mesh. Connect the balancing oscillator to the antenna terminal of the Phantom Filter. Ground the balancing oscillator to the radio chassis.
2. With the balancing oscillator set to 1575 K. C. adjust padder condenser No. 1 for maximum output.
3. Reset the balancing oscillator to 1400 K. C. Rotate the tuning condenser until this signal is tuned to resonance. Reduce the output of the balancing oscillator until the signal barely deflects the output meter.
4. Adjust padders No. 2 and No. 3 until maximum output reading is obtained.
5. After installation in car tune in a WEAK station between 1150 and 1400 K. C. and readjust padder No. 3 for maximum output.

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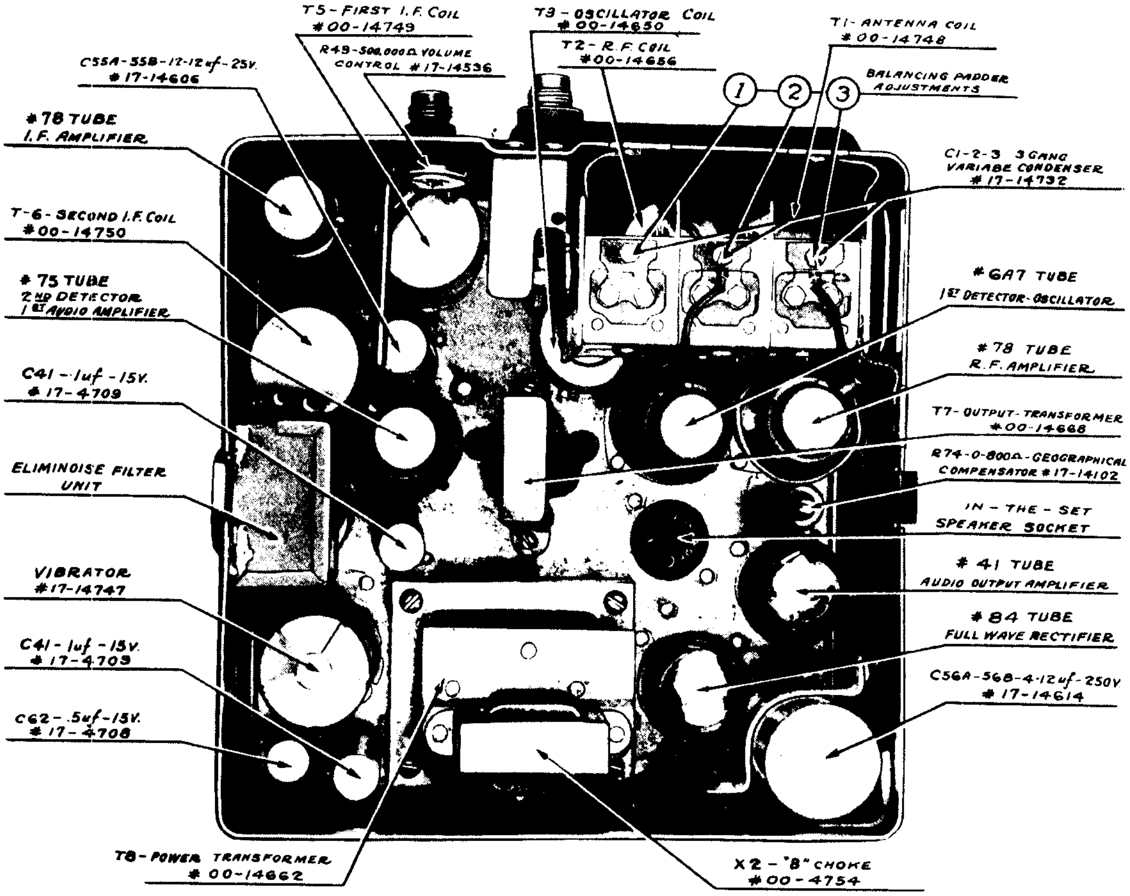
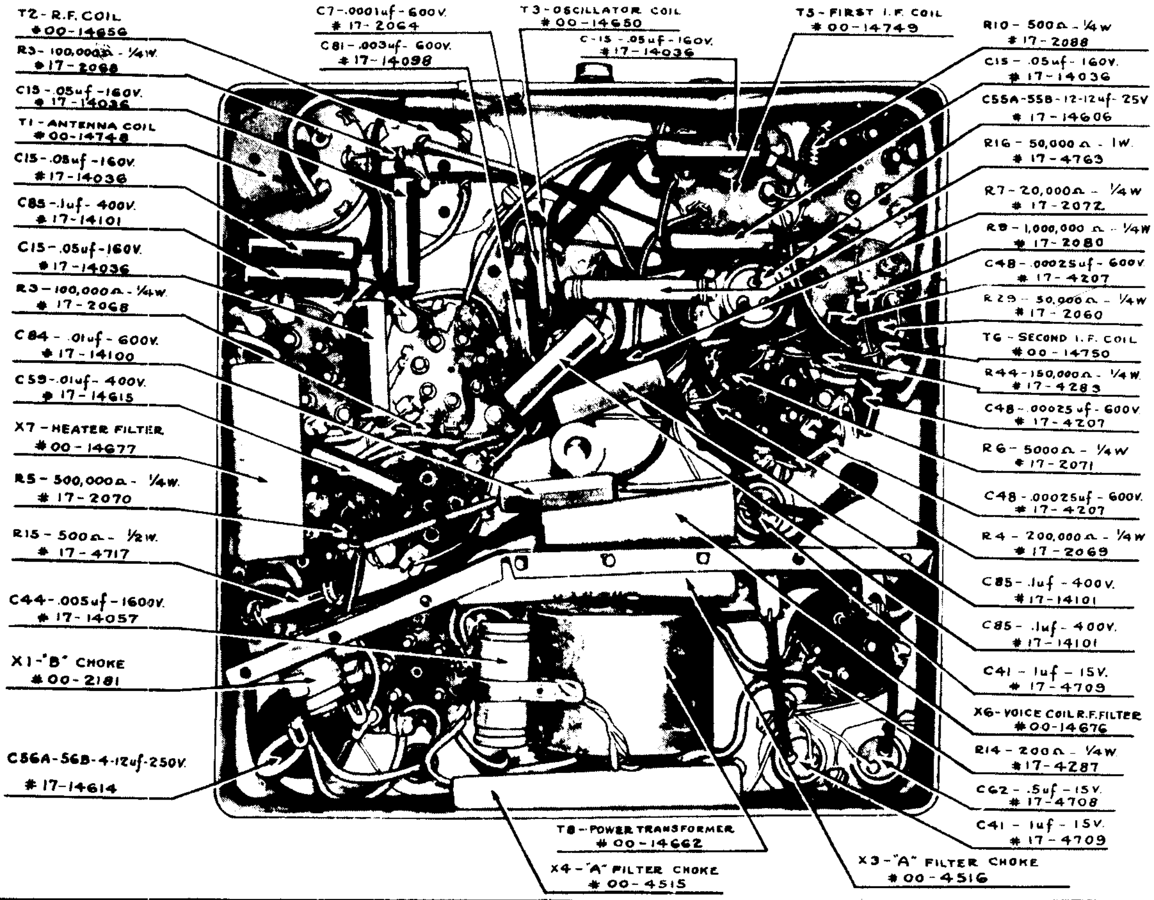
MODEL 19





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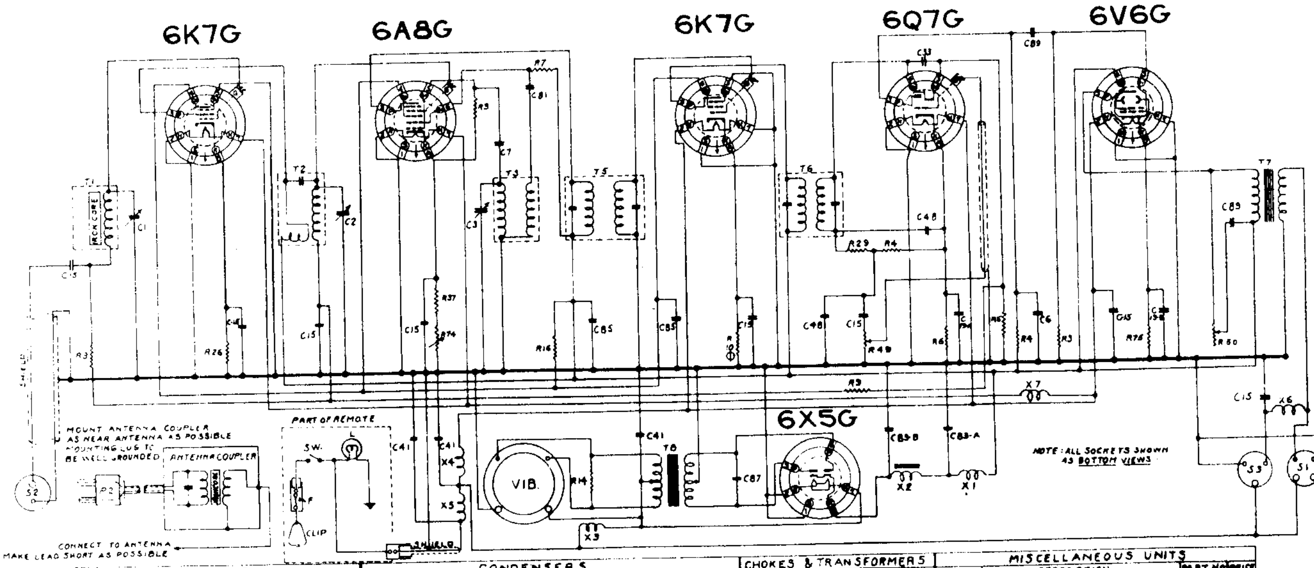
MODEL 29



⊕ MAY BE VARIED FROM 400Ω TO 3000Ω TO CONTROL SENSITIVITY

RESISTORS

R	OHMS	W	PART NO	PRICE
[illegible]	100M	1/4	17-2068	
[illegible]	200M	1/4	17-3269	
[illegible]	500M	1/4	17-2270	
[illegible]	5M	1/4	17-2071	
[illegible]	20M	1/4	17-2072	
8	1 MEG	1/4	17-2060	
9	500	1/4	17-2088	
[illegible]	200	1/4	17-4287	
[illegible]	30M	1	17-4763	
26	600	1/4	17-4781	
[illegible]	50M	1/4	17-2060	
37	300	1/4	17-14033	
49	800M	V.C.	17-14536	
50	100M	V.C.	17-14508	
74	800	1/2	17-14108	
75	240	1/2	17-14109	

CONDENSERS

C	CAPACITY	VOLT	PART NO	PRICE
1, 2, 3	3 GANG VARIABLE		17-14732	
[illegible]	MICA	600	17-2063	
[illegible]	MICA	600	17-2064	
15	.05 MOLDED	160	17-14036	
40-A,B	.12 ELECT	25	17-4707	
[illegible]	MICA	400	17-14097	
41	CAN	15	17-4709	
48	.00025 MICA	600	17-4207	
80	.003 MICA	600	17-14098	
83-A,B	ELECT	350	17-14092	
[illegible]	.1 P.M.	400	17-14101	
[illegible]	.004	1600	17-14104	
[illegible]	.05 P.M.	600	17-14106	

CHOKES & TRANSFORMERS

T.X	TYPE	PART NO.	PRICE
T	TRANSFORMERS		
1	ANTENNA COIL	00-14748	
2	R.F. COIL	00-14778	
3	OSC COIL	00-14780	
5	1ST I.F. COIL	00-14740	
6	2ND I.F. COIL	00-14760	
7	OUTPUT TRANSF	00-14763	
8	POWER TRANSF	00-14735	
X	CHOKES		
1	"B" CHOKE (AIR CORE)	00-2181-1	
2	"B" CHOKE (IRON CORE)	00-4754	
3	"A" FILTER CHOKE	00-4316	
4	"A" FILTER CHOKE	00-4313	
5	SUPPRESSION CHOKE	00-14661	
6	R.F. FILTER	00-14676	
7	HEATER FILTER	00-14677	

MISCELLANEOUS UNITS

SYMBOL	DESCRIPTION	PART NO	PRICE
S1	SPEAKER SOCKET (INSIDE CASE)	17-8320	
S3	SPEAKER SOCKET (EXTERNAL SPKR)	17-14587	
P2	ANTENNA COUPLER PLUG	17-14588	
S2	ANTENNA COUPLER SOCKET	17-14526	
L	DIAL LIGHT (REMOTE CONTROL)	17-13904	
SW	POWER SWITCH (REMOTE CONTROL)		
VIB	VIBRATOR	17-14747	
F	FUSE 10 AMP. 25 VOLT	17-8197	
	ANTENNA COUPLER	00-14756	

I.F. PEAK 170 K.C.
BALANCE AT 1400 K.C.
CHECK AT 1000 & 600 K.C.

TUBES:
6K7G—R. F. Amplifier
6A8G—1st Detector-Oscillator
6K7G—I. F. Amplifier
6Q7G—2nd Detector, 1st Audio Amplifier
6V6G—Beam Power Output Amplifier
6X5G—Full Wave Rectifier

FREQUENCY RANGE: 1575-540 Kilocycles
POWER OUTPUT: 4.5 Watts
SPEAKER: Optional
VOICE COIL: 3 Ohms
POWER SUPPLY: 6 V. Storage Battery
AMPERE DRAIN: 6.7 Amperes

BALANCING INSTRUCTIONS

SPECIAL NOTE: All Arvin 1937 model car radios are designed to use the Exclusive Arvin Permaset pre-balanced intermediate frequency transformers, which require no adjustment whatsoever. This Arvin feature greatly simplifies balancing procedure. It is necessary, therefore, to adjust only the three screws located on the tuning condenser as follows:

1. Rotate the tuning condenser completely out of mesh. Connect the balancing oscillator to the antenna terminal of the Phantom Filter. Ground the balancing oscillator to the radio chassis.
2. With the balancing oscillator set to 1575 K. C. adjust padder condenser No. 1 for maximum output.
3. Reset the balancing oscillator to 1400 K. C. Rotate the tuning condenser until this signal is tuned to resonance. Reduce the output of the balancing oscillator until the signal barely deflects the output meter.
4. Adjust padders No. 2 and No. 3 until maximum output reading is obtained.
5. After installation in car tune in a WEAK station between 1150 and 1400 K. C. and readjust padder No. 3 for maximum output.

MODEL 29 SOCKET VOLTAGES

Voltages given here are actually for an input battery voltage of 5.8 amp., even though the normal heater voltage is shown as 6.3 amp. The reason for this is that it is thought that the average battery used on a service bench without constant charging would not be fully charged. A corresponding increase in all voltages should be expected if an absolutely fully charged battery is used.

Tube	Heater	Cathode	Suppressor Grid	Screen Grid	Plate	*Oscillator Grid	Anode Grid	†Diode Plates
6K76	6.3	2.7	0	74	243	....	....	....
6A8G	6.3	2-6.4	....	74	243	5-12	176	....
6K7G	6.3	3.1	0	74	242	....	....	....
6Q7G	6.3	1.8	....	....	146	....	....	2.0
6V6G	6.3	10.5	....	250	224	....	....	....
6X5G	6.3	255	....	....	275	....	....	....

* Measured at 1500 K. C.
† Measured with Vacuum Tube Voltmeter.

POINT TO POINT RESISTANCES—MODEL 29

6K7G—R. F. Amplifier

Heater	0
Heater	∞
Cathode	600 Ω
Suppressor	0
Screen to +B	50,000 Ω
Plate to +B	100 Ω
Control Grid	1,600,000 Ω

6A8G—1st Det. Oscillator

Heater	0
Heater	∞
Cathode, adj. max.	1,000 Ω
Osc. Grid	100,600 Ω
Anode Grid to +B	20,000 Ω
Screen to +B	50,000 Ω
Plate to +B	74 Ω
Control Grid	1,500,000 Ω

6K7G—I. F. Amplifier

Heater	0
Heater	∞
Cathode	500 Ω
Suppressor	0
Screen to +B	50,000 Ω
Plate to +B	74 Ω
Control Grid	74 Ω

6Q7G—AVC 2nd Det.; 1st Audio

Heater	0
Heater	∞
Cathode	5,000 Ω
Diode	205,000 Ω
Diode	205,000 Ω
Plate to +B	200,000 Ω
Control Grid, V. C. on	500,000 Ω
Control Grid, V. C. off	Max. 25 Ω

6V6G—Beam Power Output

Heater	0
Heater	∞
Cathode	240 Ω
Control Grid	100,000 Ω
Screen to +B	0
Plate to +B	395 Ω

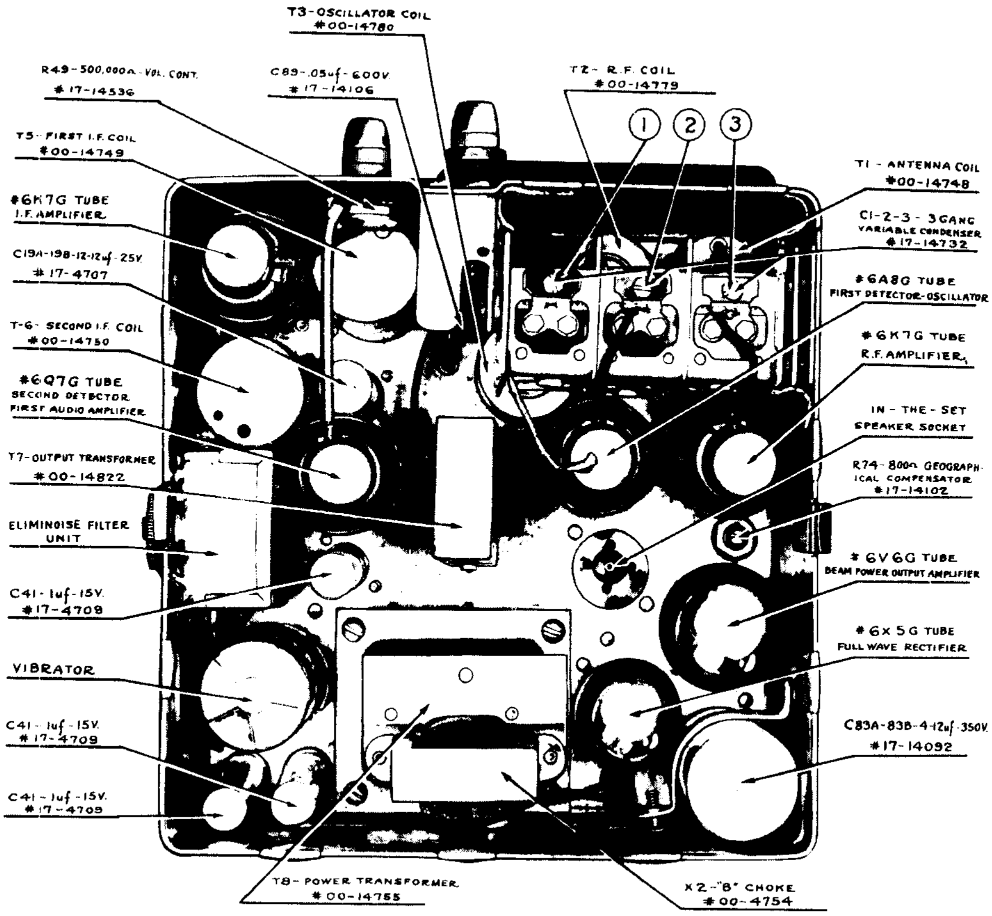
6X5G—Rectifier

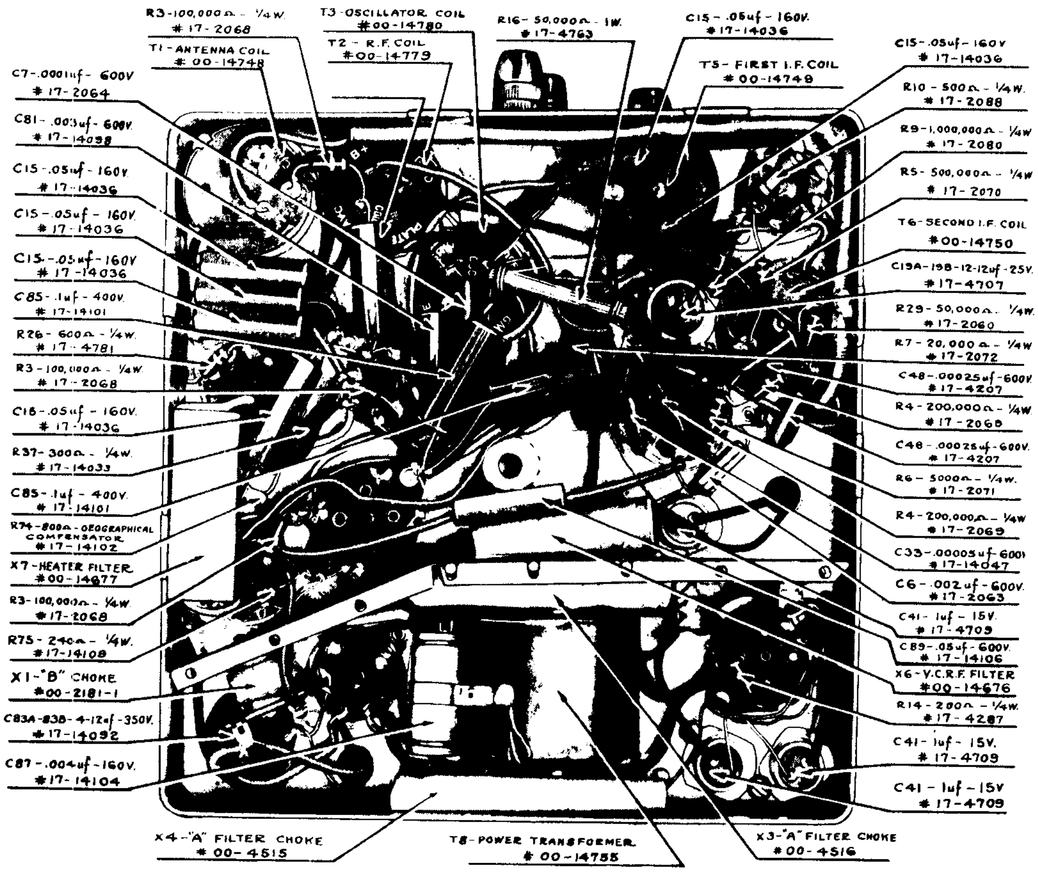
Heater	0
Heater	∞
Cathode to +B	140 Ω
Plate	185 Ω
Plate	163 Ω
Plate to Plate	348 Ω

COIL AND TRANSFORMER RESISTANCES

Phant. Filter Pri.	8.5 Ω
Phant. Filter Sec.	1.0 Ω
Antenna Coil	2.325 Ω
R. F. Coil Pri.	100.0 Ω
R. F. Coil Sec.	3.475 Ω
Osc. Coil Pri.	3.0 Ω
Osc. Coil Sec.	1.8 Ω
1st I. F. Trans. Pri.	75.0 Ω
1st I. F. Trans. Sec.	75.0 Ω
2nd I. F. Trans. Pri.	75.0 Ω
2nd I. F. Trans. Sec.	75.0 Ω
Output Trans. Pri.	395.0 Ω
Output Trans. Sec.	.1 Ω
Power Trans. Pri.	.075-.075 Ω
Power Trans. Sec.	175-0-200.0 Ω
"B" Filter Choke	140.0 Ω
"B" R. F. Choke	1.35 Ω

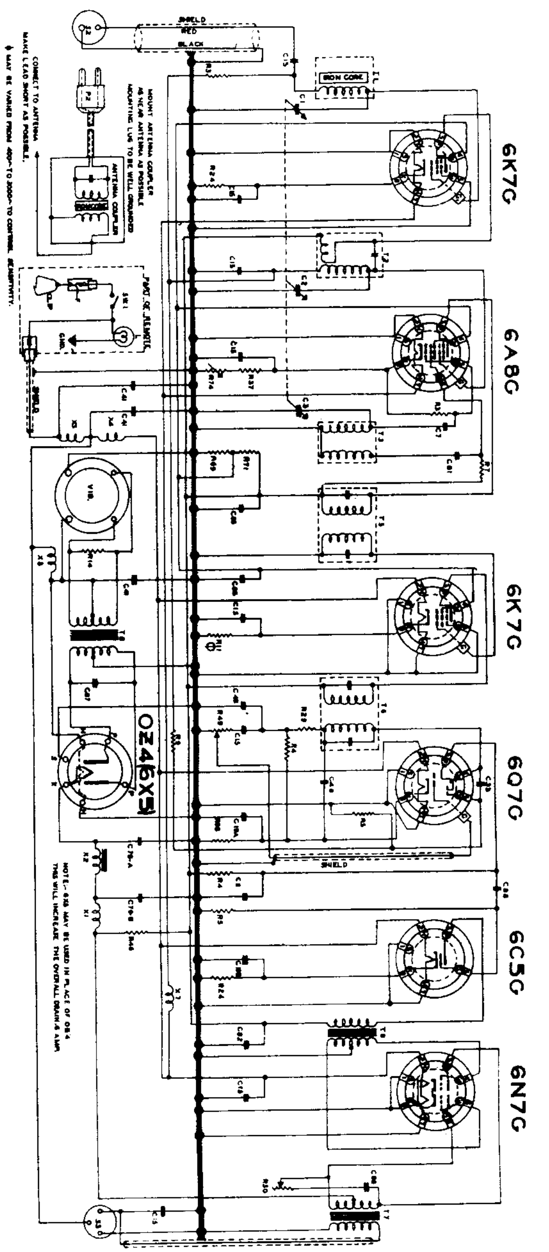
NOBLITT SPARKS INDUSTRIES INC.
MODEL 29





NOBLITT-SPARKS INDUSTRIES, Inc.

MODEL 39



RESISTORS

R	Ω	W	PART NO.	R	Ω	W	PART NO.
3	100 M	1/4	17-2068	74	800	-	17-14102
4	200 M	1/4	17-2069				
5	500 M	1/4	17-2070				
7	20 M	1/4	17-2072				
9	1MEG	1/4	17-2080				
11	2 M	1/4	17-4202				
14	200	1/4	17-4287				
24	1000	1/4	17-2066				
29	50 M	1/4	17-2060				
37	300	1/4	17-14033				
46	1000	1	17-14048				
49	300M	VC	17-14836				
50	100M	TC	17-14835				
68	8 M	1/4	17-4290				
69	60M	1/2	17-4190				
71	4000	1	17-14087				

CONDENSERS

C	CAPACITY	VOLT	PART NO.	C	CAPACITY	VOLT	PART NO.
1, 2, 3	3 GANG VARIABLE		17-14732	79-A, 79-B	12-12 ELECT.	450	17-14080
6	.002 MICA	600	17-2063	68	4. ELECT.	350	17-4710
7	.0001 MICA	500	17-2064	81	.003 MICA	600	17-14099
15	.05 MOULDED	180	17-14038	85	.1P.M.	400	17-14101
19-A, 19-B	12-12 ELECT.	25	17-4707	87	.004	1600	17-14104
33	.00005 MICA	600	17-14047	88	.02 P.M.	600	17-14106
41	1 CAN	13	17-4709	89	.05 P.M.	600	17-14106
40	.00025 MICA	600	17-4207				

CHOKES & TRANSFORMERS

T-X	TYPE	PART NO.
T	TRANSFORMERS	
1	ANT. COIL	00-14746
2	R.F. COIL	00-14779
3	OSC. COIL	00-14780
5	FIRST I.F. COIL	00-14749
6	SECOND I.F. COIL	00-14750
7	OUTPUT TRANSF.	00-14776
8	POWER TRANSF.	00-14786
9	INPUT TRANSF.	00-14783
X	CHOKES	
1	'B' CHOKE	00-2181-1
2	'B' CHOKE (IRON CORE)	00-4754
3	'A' FILTER CHOKE	00-4616
4	'A' FILTER CHOKE	00-4615
6	SUPPRESSION CHOKE	00-14661
7	HEATER FILTER	00-14677

MISCELLANEOUS UNITS

SYMBOL	DESCRIPTION	PART NO.
	ANTENNA COUPLER	00-14756
S2	ANT. COUPLER SOCKET	17-14526
S3	SPEAKER SOCKET	17-14527
P2	ANT. COUPLER PLUG	17-14525
L	DIAL LIGHT (IN REMOTE CONTROL)	17-13004
SW.	POWER SWITCH (INTEGRAL WITH REMOTE)	——
F	FUSE RENEWAL 20 AMP - 25V.	17-2220
VIB.	VIBRATOR.	17-14663

I.F. PEAK 170 K.C.
BALANCE AT 1400 K.C.
CHECK AT 600 K.C.

TUBES:
6K7G—R. F. Amplifier
6A8G—1st Detector-Oscillator
6K7G—I. F. Amplifier
6Q7G—2nd Detector, 1st Audio Amplifier
6C5G—2nd Audio Amplifier, driver
6N7G—Push Pull Audio Output Amplifier
6X5G—Full Wave Rectifier

FREQUENCY RANGE: 1575-540 Kilocycles
POWER OUTPUT: 7.5 Watts
SPEAKER: Optional
VOICE COIL: 3 Ohms
POWER SUPPLY: 6 V. Storage Battery
AMPERE DRAIN: 7.2 Amperes

BALANCING INSTRUCTIONS

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1. Rotate the tuning condenser completely out of mesh. Connect the balancing oscillator to the antenna terminal of the Phantom Filter. Ground the balancing oscillator to the radio chassis.
2. With the balancing oscillator set to 1575 K. C. adjust padder condenser No. 1 for maximum output.
3. Reset the balancing oscillator to 1400 K. C. Rotate the tuning condenser until this signal is tuned to resonance. Reduce the output of the balancing oscillator until the signal barely deflects the output meter.
4. Adjust padders No. 2 and No. 3 until maximum output reading is obtained.
5. After installation in car tune in a WEAK station between 1150 and 1400 K. C. and readjust padder No. 3 for maximum output.

MODEL 39 SOCKET VOLTAGES

Voltages given here are actually for an input battery voltage of 5.8 amp., even though the normal heater voltage is shown as 6.3 amp. The reason for this is that it is thought that the average battery used on a service bench without constant charging would not be fully charged. A corresponding increase in all voltages should be expected if an absolutely fully charged battery is used.

Tube	Heater	Cathode	Suppressor Grid	Screen Grid	Plate	*Oscillator Grid	Anode Grid	†Diode Plates
6K76	6.3	3.5	0	78	273	....	....	....
6A8G	6.3	3.0	....	78	273	5-12	184	....
6K76	6.3	5.0	0	78	273	....	....	....
6Q7G	6.3	1.9	....	....	150	....	....	2.0
6C5	6.3	7.15	....	....	265	....	....	....
6N7	6.3	0	....	....	290	....	....	....
6X4G	6.3	285	....	....	310	....	....	....

* Measured at 1500 K. C.
† Measured with Vacuum Tube Voltmeter.

POINT TO POINT RESISTANCES—MODEL 39

6K7G—R. F. Amplifier
Heater 0
Heater .... ∞
Cathode .... 600 Ω
Suppressor 0
Screen to +B .... 40,000 Ω
Screen .... 60,000 Ω
Plate to +B .... 100 Ω
Control Grid .... 1,700,000 Ω

6A8G—1st Det. Oscillator
Heater 0
Heater .... ∞
Cathode, adj. max. .... 1,000 Ω
Osc. Grid .... 100,600 Ω
Anode Grid to +B .... 20,000 Ω
Screen to +B .... 50,000 Ω
Plate to +B .... 74 Ω
Control Grid .... 400,000 Ω

6K7G—I. F. Amplifier
Heater 0
Heater .... ∞
Cathode .... †2,000 Ω
Suppressor 0
Screen to +B .... 40,000 Ω
Screen .... 60,000 Ω
Plate to +B .... 74 Ω
Control Grid .... 500,000 Ω

6Q7G—AVC, 2nd Det.; 1st Audio
Heater 0
Heater .... ∞
Cathode .... 8,000 Ω
Diode .... 258,000 Ω
Diode .... 600,000 Ω
Plate to +B .... 200,000 Ω
Control Grid, V. C. on .... 500,000 Ω
Control Grid, V. C. off .... Max. 25 Ω

6C5G—2nd Audio
Heater 0
Heater .... ∞
Cathode .... 1,000 Ω
Plate to +B .... 1,200 Ω
Control Grid .... 500,000 Ω

6N7G—Power Output
Heater 0
Heater .... ∞
Cathode 0
Control Grid .... 320 Ω
Control Grid .... 235 Ω
Plate to +B .... 175 Ω
Plate to +B .... 160 Ω

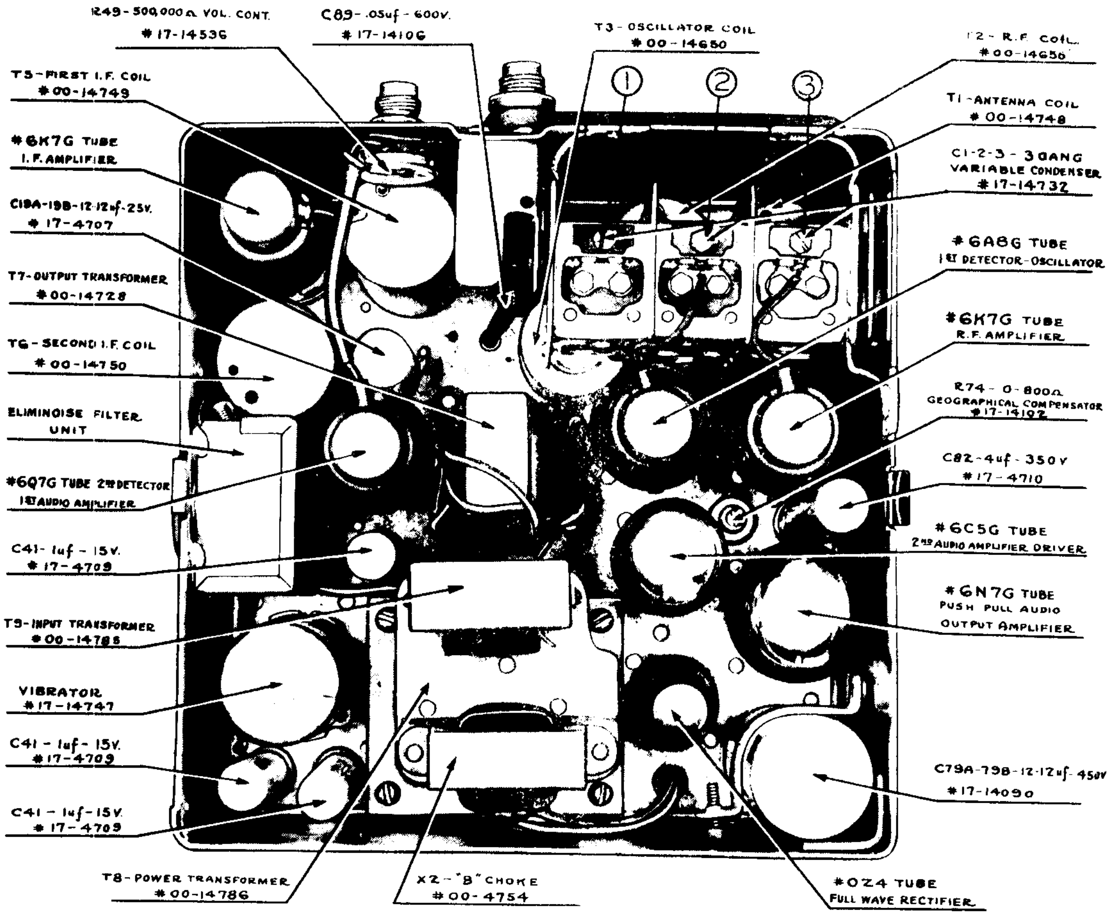
0Z4 (or 6X5)—Rectifier
Heater 0
Heater .... ∞
Cathode to +B .... 140 Ω
Plate .... 175 Ω
Plate .... 200 Ω
Plate to Plate .... 375 Ω

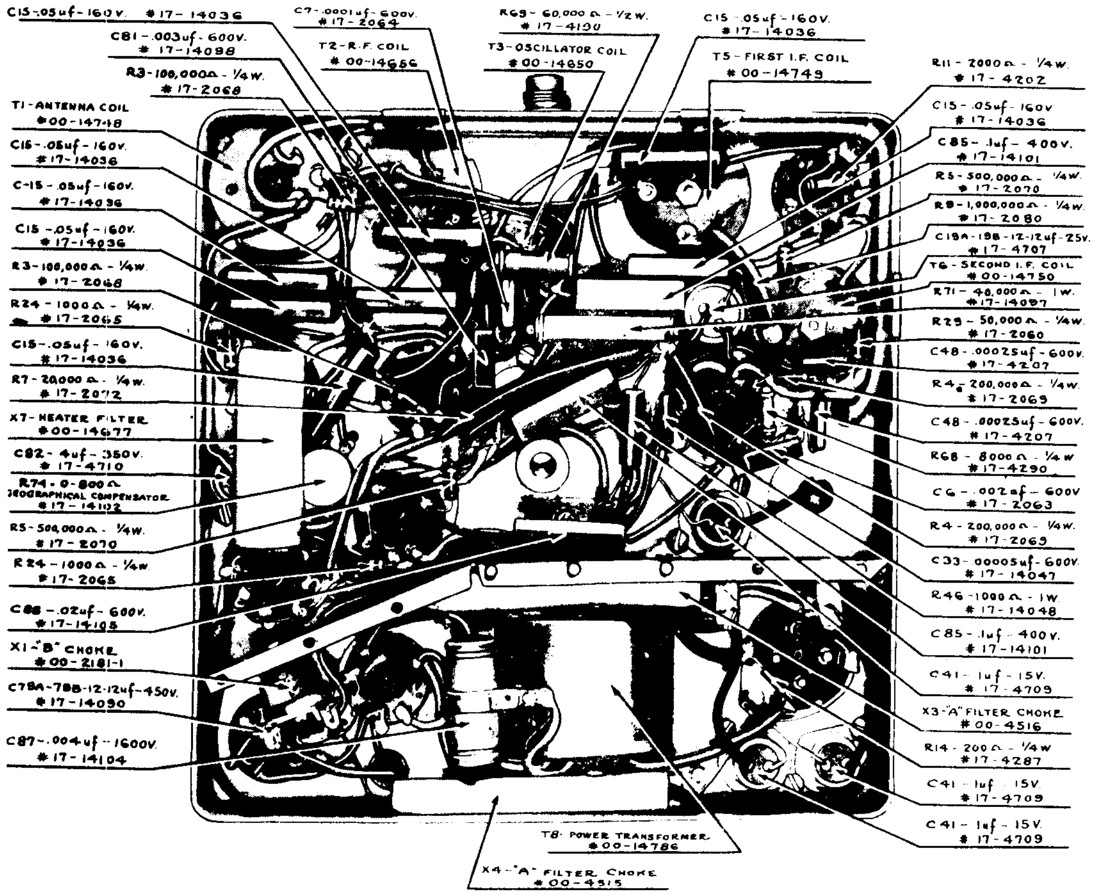
†This resistor may be varied to further control receiver sensitivity.

COIL AND TRANSFORMER RESISTANCES

Phant. Filter Pri. .... 8.5 Ω
Phant. Filter Sec. .... 1.0 Ω
Antenna Coil .... 2.325 Ω
R. F. Coil Pri. .... 100.0 Ω
R. F. Coil Sec. .... 3.475 Ω
Osc. Coil Pri. .... 3.0 Ω
Osc. Coil Sec. .... 1.8 Ω
1st I. F. Trans. Pri. .... 75 Ω
1st I. F. Trans. Sec. .... 75 Ω
2nd I. F. Trans. Pri. .... 75 Ω
2nd I. F. Trans. Sec. .... 75 Ω
Output Trans. Pri. .... 175-0-160 Ω
Output Trans. Sec. .... .1 Ω
Power Trans. Pri. .... .075-0-.075 Ω
Power Trans. Sec. .... 175-0-200 Ω
"B" Filter Choke .... 140. Ω
"B" R. F. Choke .... 1.35 Ω

NOBLITT-SPARKS INDUSTRIES, Inc.
MODEL 39





NOBLITT-SPARKS INDUSTRIES, Inc.

MODELS 19, 29 & 39

MODEL 19 PARTS PRICE LIST

Resistors

Part No.	Description	Price
17-4763	50,000 ohms 1 w.	$0.25
17-2060	50,000 ohms ¼ w.	.20
17-2069	200,000 ohms ¼ w.	.20
17-2068	100,000 ohms ¼ w.	.20
17-2070	500,000 ohms ¼ w.	.20
17-2071	5,000 ohms ¼ w.	.20
17-2072	20,000 ohms ¼ w.	.20
17-2080	1,000,000 ohms ¼ w.	.20
17-2088	500 ohms ¼ w.	.20
17-4283	150,000 ohms ¼ w.	.20
17-4287	200 ohms ¼ w.	.20
17-4717	500 ohms ½ w.	.20
17-4781	600 ohms ¼ w.	.20
17-14102	800 ohms adjustable ½ w.	.50

Condensers

Part No.	Description	Price
17-2064	.0001 mfd.—600 V.	$0.25
17-4708	.5 mfd.—160 V.	.45
17-4207	.00025 mfd.—600 V.	.25
17-4709	.1 mfd.—160 V.	.55
17-14036	.05 mfd.—160 V.	.35
17-14057	.005 mfd.—1600 V.	.60
17-14098	.003 mfd.—600 V.	.25
17-14100	.01 mfd.—600 V.	.35
17-14101	.1 mfd.—400 V.	.45
17-14606	12-12 mfd.—25 V.	1.50
17-14614	4-12 mfd.—250 V.	2.00
17-14615	.01 mfd.—400 V.	.35
17-14732	3 Gang Tuning Condenser	4.50

Coils and Transformers

Part No.	Description	Price
00-4515	"A" R. F. Input Choke	$0.40
00-4516	"A" R. F. Vibrator Choke	.40
00-4754	"B" Filter Choke	1.30
00-14650	Oscillator Coil	.75
00-14656	R. F. Coil	1.00
00-14661	Vibrator R. F. Choke	.40
00-14662	Power Transformer	4.00
00-14676	Speaker Lead R. F. Choke	.40
00-14677	R. F. Filament Choke	.40
00-14748	Antenna Coil	1.25
00-14749	Permaset 1st I. F. Trans.	1.75
00-14750	Permaset 2nd I. F. Trans.	1.75
00-14759	Phantom Filter	2.25
00-14668	Speaker Transformer	1.75

Miscellaneous

Part No.	Description	Price
38-14744	Top Chassis Cover	$0.35
38-14510	Bottom Chassis Cover	.35
39-14547	Top Cover Latch Spring	.10
23-14523	Mounting Stud	.10
23-14765	Flexible Shaft Nuts (1937 Controls)	.10
17-14747	Vibrator	4.00
29-14644	"A" Cable Assembly	.35
17-14536	500,000 Ohm Volume Control	.75
17-14505	100,000 Ohm Tone Control	.75
29-14540	Tube Shield	.15
29-14585	Tube Shield Top Caps	.05
19-13053	Grid Cap (Small Type) (Per Dozen)	.25
19-14522	Case Ground Wedge (Per Dozen)	.15
29-14574	Variable Condenser Drive Coupling	.25
17-14526	Antenna Connector Socket	.25
17-14527	External Speaker Socket	.25
17-13904	Dial Light	.15
17-4297	Distributor Suppressor	.50
23-14514	Shaft Casing Clamp Nut (1936 Controls)	.10
17-1456	Ammeter Connector Clip	.02
19-2033	Grid Cap (Large Type) (Per Dozen)	.25

Flexible Shafting

Part No.	Description	Price
00-14809	25" Tuning Shaft	$0.90
00-14807	23" Tuning Shaft	.90
00-14805	21" Tuning Shaft	.90
00-14803	19" Tuning Shaft	.80
00-14808	24" Volume and Tone Shaft	.90
00-14806	22" Volume and Tone Shaft	.90
00-14804	20" Volume and Tone Shaft	.90
00-14802	18" Volume and Tone Shaft	.80
00-14575	15" Tuning Shaft	.75
00-14576	15" Volume and Tone Shaft	.75

MODEL 29 PARTS PRICE LIST

Resistors

Part No.	Description	Price
17-4763	50,000 ohm ¼ w.	$0.20
17-2080	1,000,000 ohm ¼ w.	.20
17-4189	400 ohm ½ w.	.20
17-2070	500,000 ohm ¼ w.	.20
17-2068	100,000 ohm ¼ w.	.20
17-2067	75,000 ohm ¼ w.	.20
17-2060	50,000 ohm ¼ w.	.20
17-2069	200,000 ohm ¼ w.	.20
17-2088	500 ohm ¼ w.	.20
17-14102	800 ohm adjustable ½ w.	.50
17-2072	20,000 ohm ¼ w.	.20
17-2071	5,000 ohm ¼ w.	.20
17-4781	600 ohm ¼ w.	.20
17-4287	200 ohm ¼ w.	.20

Condensers

Part No.	Description	Price
17-14732	Gang Tuning Condenser	$4.50
17-14098	.003 mfd.—600 V.	.25
17-4709	1.0 mfd.—160 V.	.55
17-14100	.01 mfd.—600 V.	.35
17-14036	.05 mfd.—160 V.	.35
17-14106	.05 mfd.—600 V.	.40
17-2064	.0001 mfd.—600 V.	.25
17-14101	.1 mfd.—400 V.	.45
17-2064	.0001 mfd.—600 V.	.25
17-4707	12-12 mfd.—25 V.	1.50
17-14104	.004 mfd.—1600 V.	.50
17-14092	4-12 mfd.—350 V.	2.25
17-4207	.00025 mfd.—600 V.	.25

Coils and Transformers

Part No.	Description	Price
00-14755	Power Transformer	$4.00
00-14763	Speaker Transformer	1.75
00-4754	"B" Filter Choke	1.30
00-14748	Antenna Coil	1.25
00-14779	R. F. Coil	1.00
00-14780	Oscillator Coil	.75
00-14749	Permaset 1st I. F. Transformer	1.75
00-14750	Permaset 2nd I. F. Transformer	1.75
00-4515	"A" R. F. Input Choke	.40
00-4516	"A" R. F. Vibrator Choke	.40
00-14661	Vibrator R. F. Choke	.40
00-14676	Speaker Lead R. F. Choke	.40
00-14677	R. F. Filament Choke	.40
00-2181	"B" R. F. Choke	.40
00-14759	Phantom Filter	2.25

Miscellaneous

Part No.	Description	Price
38-14744	Top Chassis Cover	$0.35
38-14510	Bottom Chassis Cover	.35
39-14547	Top Cover Latch Spring	.10
23-14523	Mounting Stud	.10
23-14765	Flexible Shaft Nuts (1937 Controls)	.10
17-14747	Vibrator	4.00
29-14644	"A" Cable Assembly	.35
17-14536	500,000 Ohm Volume Control	.75
17-14505	100,000 Ohm Tone Control	.75
29-14540	Tube Shield	.15
29-14585	Tube Shield Top Caps	.05
19-13053	Grid Cap (Small Type) (Per Dozen)	.25
19-14522	Case Ground Wedge (Per Dozen)	.15
29-14574	Variable Condenser Drive Coupling	.25
17-14526	Antenna Connector Socket	.25
17-14527	External Speaker Socket	.25
17-13904	Dial Light	.15
17-4297	Distributor Suppressor	.50
23-14514	Shaft Casing Clamp Nut (1936 Controls)	.10
17-1456	Ammeter Connector Clip	.02

Flexible Shafting

Part No.	Description	Price
00-14809	25" Tuning Shaft	$0.90
00-14807	23" Tuning Shaft	.90
00-14805	21" Tuning Shaft	.90
00-14803	19" Tuning Shaft	.80
00-14803	24" Volume and Tone Shaft	.90
00-14805	22" Volume and Tone Shaft	.90
00-14804	20" Volume and Tone Shaft	.90
00-14802	18" Volume and Tone Shaft	.80
00-14575	15" Tuning Shaft	.75
00-14576	15" Volume and Tone Shaft	.75

MODEL 39 PARTS PRICE LIST

Resistors

Part No.	Description	Price
17-2060	50,000 ohm ¼ w.	$0.20
17-2065	1,000 ohm ¼ w.	.20
17-2068	100,000 ohm ¼ w.	.20
17-2069	200,000 ohm ¼ w.	.20
17-2070	500,000 ohm ¼ w.	.20
17-2072	20,000 ohm ¼ w.	.20
17-2080	1,000,000 ohm ¼ w.	.20
17-4190	60,000 ohm ¼ w.	.20
17-4202	2,000 ohm ¼ w.	.20
17-4287	200 ohm ¼ w.	.20
17-4290	8,000 ohm ¼ w.	.20
17-14048	1,000 ohm 1 w.	.25
17-14096	400,000 ohm ¼ w.	.20
17-14097	40,000 ohm 1 w.	.25
17-14102	800 ohm adjustable ½ w.	.50

Condensers

Part No.	Description	Price
17-2063	.002 mfd.—600 V.	$0.25
17-2064	.0001 mfd.—600 V.	.25
17-4207	.00025 mfd.—600 V.	.25
17-4707	12-12 mfd.—25 V.	1.50
17-4709	1.0 mfd.—160 V.	.55
17-4710	4 mfd.—400 V.	1.25
17-14036	.05 mfd.—160 V.	.35
17-14047	.00005 mfd.—600 V.	.25
17-14090	12-12 mfd.—450 V.	2.75
17-14098	.003 mfd.—600 V.	.25
17-14101	.1 mfd.—400 V.	.45
17-14104	.004 mfd.—1600 V.	.50
17-14105	.02 mfd.—600 V.	.40
17-14106	.05 mfd.—600 V.	.40
17-14732	3 Gang Tuning Condenser	4.50

Coils and Transformers

Part No.	Description	Price
00-14785	Interstage Audio Trans.	$0.00
00-14786	Power Transformer	4.00
00-14728	Speaker Output Trans.	2.00
00-4754	"B" Filter Choke	1.35
00-14748	Antenna Coil	1.25
00-14656	R. F. Coil	1.00
00-14650	Oscillator Coil	.75
00-14749	Permaset 1st I. F. Trans.	1.75
00-14750	Permaset 2nd I. F. Trans.	1.75
00-4515	"A" R. F. Input Choke	.40
00-4516	"A" R. F. Vibrator Choke	.40
00-14661	Vibrator R. F. Choke	.40
00-14677	R. F. Filament Choke	.40
00-2181	"B" R. F. Choke	.40
00-14676	Speaker Lead R. F. Choke	.40
00-14759	Phantom Filter	2.25

Miscellaneous

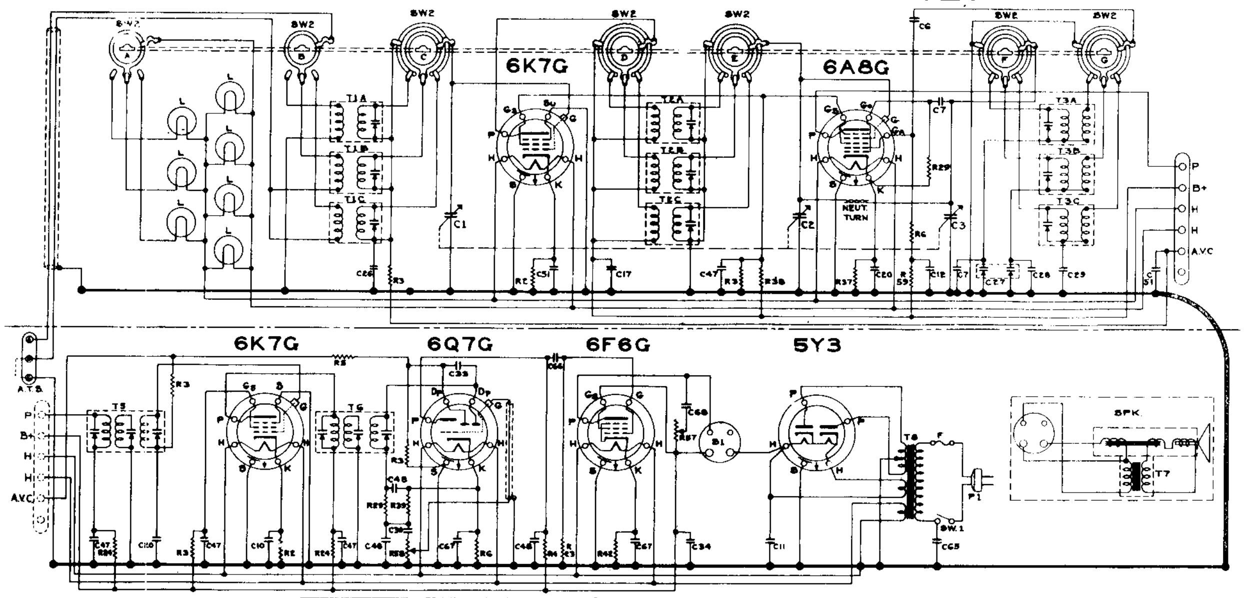
Part No.	Description	Price
38-14744	Top Chassis Cover	$0.35
38-14510	Bottom Chassis Cover	.35
39-14547	Top Cover Latch Spring	.10
23-14523	Mounting Stud	.10
23-14765	Flexible Shaft Nuts (1937 Controls)	.10
17-14747	Vibrator	4.00
29-14644	"A" Cable Assembly	.35
17-14536	500,000 Ohm Volume Control	.75
17-14505	100,000 Ohm Tone Control	.75
29-14540	Tube Shield	.15
29-14585	Tube Shield Top Caps	.05
19-13053	Grid Cap (Small Type) (Per Dozen)	.25
19-14522	Case Ground Wedge (Per Dozen)	.15
29-14574	Variable Condenser Drive Coupling	.25
17-14526	Antenna Connector Socket	.25
17-14527	External Speaker Socket	.25
17-13904	Dial Light	.15
17-4297	Distributor Suppressor	.50
23-14514	Shaft Casing Clamp Nut (1936 Controls)	.10
17-1456	Ammeter Connector Clip	.02
19-2033	Grid Cap (Large Type) (Per Dozen)	.25

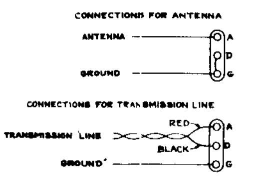
Flexible Shafting

Part No.	Description	Price
00-14809	25" Tuning Shaft	$0.90
00-14807	23" Tuning Shaft	.90
00-14805	21" Tuning Shaft	.90
00-14803	19" Tuning Shaft	.90
00-14808	24" Volume and Tone Shaft	.90
00-14806	22" Volume and Tone Shaft	.90
00-14804	20" Volume and Tone Shaft	.90
00-14802	18" Volume and Tone Shaft	.80
00-14575	15" Tuning Shaft	.75
00-14576	15" Volume and Tone Shaft	.75

NOBLITT-SPARKS INDUSTRIES, Inc.

ARVIN HOME RADIO MODELS 617 & 627





RESISTORS							
R	OHMS	W	PART NO.	R	OHMS	W	PART NO.
2	400	1/4	17-4762				
3	100 M	1/4	17-2068				
4	200 M	1/4	17-2069				
5	500 M	1/4	17-2070				
6	5 M	1/4	17-2071				
23	250 M	1/4	17-3011				
24	1000	1/4	17-2065				
29	50 M	1/4	17-2060				
37	300	1/2	17-14033				
38	30 M	1/2	17-14028				
39	300 M	1/4	17-14081				
42	400	1/2	17-4189				
57	100 M	T.C.	17-15604				
58	500 M	V.C.	17-15605				
59	15 M	1/4	17-4191				

CONDENSERS							
C	CAPACITY	VOLT	PART NO.	C	CAPACITY	VOLT	PART NO.
1	3 GANG VARIABLE		17-15632	34	30. ELECT.	475	17-14003
2				47	.15 CAN	400	17-4714
3				48	.00025 MICA	600	17-4207
6	.002 MICA	600	17-2063	51	.05 CAN	160	17-14041
7	.0001 MICA	600	17-2064	65	.01 STRAP	400	17-14072
10	.1 CAN	400	17-14034	66	.02	600	17-14076
11	16. ELECT.	475	17-14002	67	12. ELECT.	25	17-14075
12	8. ELECT.	475	17-14001	68	.1 STRAP	600	17-14073
17	.005 MICA	600	17-14029				
20	.05 STRAP CAN	160	17-14027				
26	.02	150	17-14012				
27	SER. PADDER		17-13077				
28	.0001 MICA	600	17-14023				
29	.0005±2% MICA	600	17-14022				
30	.02 CAN	150	17-14010				
33	.00005	600	17-14047				

CHOKES & TRANSFORMERS		
T-X	TYPE	PART NO.
T	TRANSFORMERS	
1A	"A" BAND ANT. COIL	00-13975
1B	"B" BAND ANT. COIL	00-13978
1C	"C" BAND ANT. COIL	00-13981
2A	"A" BAND R.F. COIL	00-13976
2B	"B" BAND R.F. COIL	00-13979
2C	"C" BAND R.F. COIL	00-13982
3A	"A" BAND OSC. COIL	00-13977
3B	"B" BAND OSC. COIL	00-13980
3C	"C" BAND OSC. COIL	00-13983
5	FIRST I.F. COIL	00-13079
6	SECOND I.F. COIL	00-13080
7	OUTPUT TRANSF. 617	17-15753
	OUTPUT TRANSF. 627	17-15754
8	POWER TRANSF.	00-15644

MISCELLANEOUS UNITS		
SYMBOL	DESCRIPTION	PART NO.
SW.1	POWER SWITCH	17-15625
SW2 A&B	BAND SWITCH WAFER	17-15608
SW2 C-G	BAND SWITCH WAFER	17-13044
S1	SPEAKER SOCKET	17-13026
P1	PLUG & CORD ASSEMBLY	17-15791
L	DIAL LIGHT	17-13904
A.T.S.	ANTENNA TERMINAL STRIP	17-15643
SPK	DYNAMIC SPEAKER ASSEMBLY 617	17-15628
SPK	DYNAMIC SPEAKER ASSEMBLY 627	17-15653
F	FUSE, 2 AMP.-250V.	17-13076

I.F. PEAK 456 K.C.

3 BANDS:
- BALANCE 1.5 M.C. PAD .60 M.C.
- BALANCE 4.7 M.C. PAD 1.9 M.C.
- BALANCE 15. M.C. CHECK 6.0 M.C.

MODEL 617-627 SOCKET VOLTAGES

(INPUT VOLTAGE 115 RMS)

Tube	Heaters	Plate	Screen	Cathode	Oscillator Grid. 1500 KC.	Anode Grid.
6K7G	6.3	250	100	3.0	......	......
6A8G	6.3	250	100	3.0	9.0	170
6K7G	6.3	250	90	3.0	......	......
6Q7G	6.3	115	......	1.3	......	......
6F6G	6.3	240	250	15.0	......	......
5Y3	5.0	330-0-330	......	......	......	......

POINT TO POINT RESISTANCES

All readings taken to ground unless otherwise stated. Tubes removed, speaker connected and volume control in full on position.

6K7G

Heater	0
Shell	0
Heater	.1
Cathode	400 ohms
Suppressor Grid	0
Screen to B+	30,000 ohms
Plate to B+	1.35-11-.9
Screen to Gnd.	100,000 ohms
Control Grid	700,000 ohms

6A8G

Heater	0
Shell	0
Heater	.1
Cathode	300 ohms
Oscillator Grid	50,300 ohms
Anode to B+	20,000 ohms
Screen to B+	30,000 ohms
Screen to Gnd.	100,000 ohms
Plate to B+	1,000 ohms
Control Grid	5.-.45-.15 ohms

6K7G

Heater	0
Shell	0
Heater	.1
Cathode	400 ohms
Suppressor Grid	0
Screen to B+	100,000 ohms
Plate to B+	1,000 ohms
Screen	230,000 ohms
Control Grid	700,000 ohms

6Q7G

Heater	0
Shell	0
Heater	.1
Cathode	5,000 ohms
Diode	355,000 ohms
Diode	100,000 ohms
Plate to B+	200,000 ohms
Control Grid	500,000 ohms

6F6G

Heater	0
Shell	0
Heater	.1
Cathode	400 ohms
Control Grid	250,000 ohms
Screen to B+	0
Screen to Ground	130,000 ohms
Plate to B+	310 ohms

5Y3

Filament to B+	1,400 ohms
Shell	0
Filament to B+	1,400 ohms
Plate	155 ohms
Plate	140 ohms
Plate to Plate	295 ohms

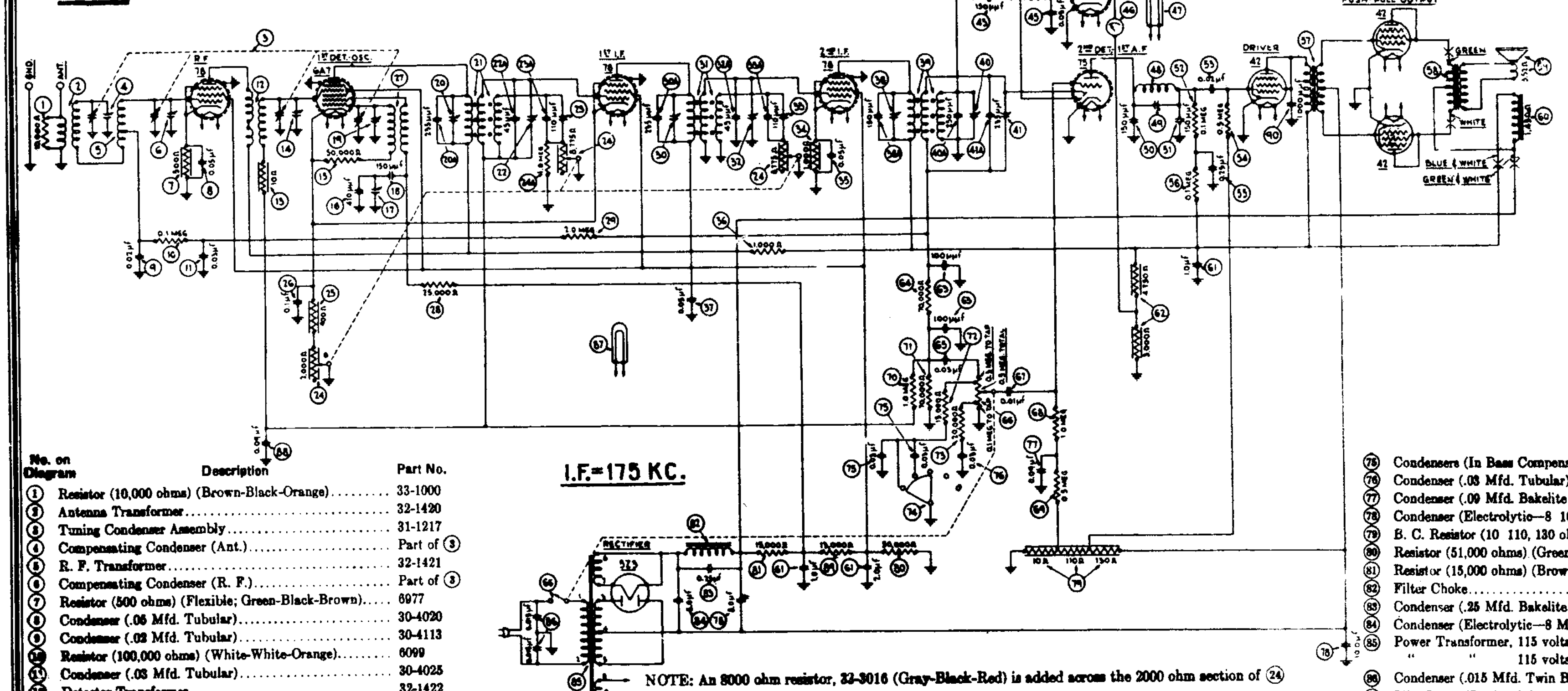
COIL AND TRANSFORMER RESISTANCES

A Band Ant. Pri.	20. ohms
A Band Ant. Sec.	5. ohms
A Band R. F. Pri.	1.35 ohms
A Band R. F. Sec.	5. ohms
A Band Osc. Pri.	2.0 ohms
A Band Osc. Sec.	7.0 ohms
B Band Ant. Pri.	1. ohms
B Band Ant. Sec.	.45 ohms
B Band R. F. Pri.	1.1 ohms
B Band R. F. Sec.	.9 ohms
B Band Osc. Pri.	1.2 ohms
B Band Osc. Sec.	.75 ohms
C Band Ant. Pri.	.75 ohms
C Band Ant. Sec.	.15 ohms
C Band R. F. Pri.	.9 ohms
C Band R. F. Sec.	.2 ohms
C Band Osc. Pri.	.5 ohms
C Band Osc. Sec.	.25 ohms
1st I. F. Trans. Pri.	8.2 ohms
1st I. F. Trans. Sec.	14.2 ohms
2nd I. F. Trans. Pri.	13.0 ohms
2nd I. F. Trans. Sec.	13.0 ohms
Power Trans. 110 V. Pri.	13.0 ohms
Power Trans. 5 V. Sec.	.3 ohms
Power Trans. 6 V. Sec.	1.0 ohms
Power Trans. Hi-V. Sec.	155-0-140 ohms
Output Trans. Pri.	310 ohms
Output Trans. Sec.	.4 ohms
Speaker Filed	1400 ohms
Speaker Voice Coil	.50 ohms

PHILCO RADIO & TELEVISION CORPORATION

MODEL 200

NOTE: See page 237 before servicing this set.



I.F.=175 KC.

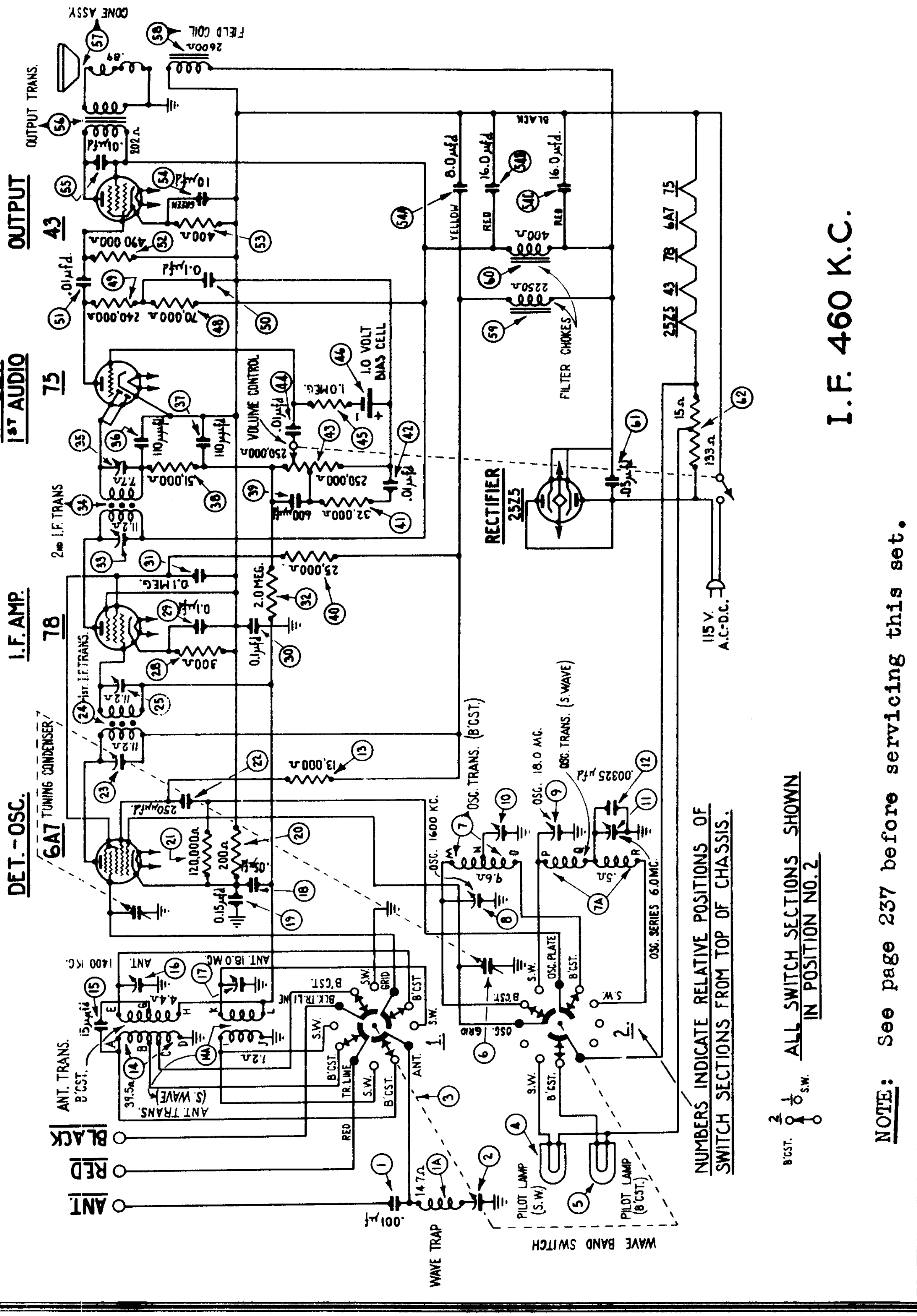
NOTE: An 8000 ohm resistor, 33-3016 (Gray-Black-Red) is added across the 2000 ohm section of (24)

No. on Diagram	Description	Part No.
1	Resistor (10,000 ohms) (Brown-Black-Orange)	33-1000
2	Antenna Transformer	32-1420
3	Tuning Condenser Assembly	31-1217
4	Compensating Condenser (Ant.)	Part of (3)
5	R. F. Transformer	32-1421
6	Compensating Condenser (R. F.)	Part of (3)
7	Resistor (500 ohms) (Flexible; Green-Black-Brown)	6977
8	Condenser (.05 Mfd. Tubular)	30-4020
9	Condenser (.02 Mfd. Tubular)	30-4113
10	Resistor (100,000 ohms) (White-White-Orange)	6099
11	Condenser (.03 Mfd. Tubular)	30-4025
12	Detector Transformer	32-1422
13	Resistor (10 ohms Flexible Wire-Wound)	33-3139
14	Compensating Condenser (Det.)	Part of (3)
15	Resistor (50,000 ohms) (Green-Brown-Orange)	5868
16	Condenser (.00041 Mfd. Mica)	30-1000
17	Compensating Condenser (Osc. L. F.)	04000R
18	Condenser (.00015 Mfd. Mica)	30-1033
19	Compensating Condenser (Osc. H. F.)	Part of (3)
20	Compensating Condenser (1st I. F. Pri.)	Part of (21)
20A	Condenser (.000235 Mfd. Mica)	30-1037
21	First I. F transformer	32-1403
22	Compensating Condenser (1st I. F. Sec.)	Part of (21)
22A	Condenser (.000045 Mfd. Mica)	30-1034
23	Compensating Condenser (1st I. F. Tertiary)	04000A
23A	Condenser (.00011 Mfd. Mica)	30-1035
24	Fidelity-Selectivity Control (Wire-Wound Resistors) (2000, 8775, 8775 ohm)	33-5070
24A	Resistor (1 Meg.) (Brown-Black-Green)	33-1096
25	Resistor (400 ohms Flexible Wire-Wound)	33-3016
26	Condenser (.1 Mfd. Tubular)	30-4122
27	Oscillator Transformer	32-1423
28	Resistor (25,000 ohms) (Red-Green-Orange)	4516
29	Resistor (2 Megs.) (Red-Black-Green)	33-1025
30	Compensating Condenser (2d I. F. Primary)	Part of (31)
30A	Condenser (.000235 Mfd. Mica)	30-1037
31	2d I. F. Transformer	32-1403
32	Compensating Condenser (2d I. F. Sec.)	Part of (31)
32A	Condenser (.000045 Mfd. Mica)	30-1034
33	Compensating Condenser (2d I. F. Tertiary)	04000A
33A	Condenser (.00011 Mfd. Mica)	30-1035
34	Resistor (1,000 ohms) (Flexible Wire-Wound)	33-3017
35	Condenser (.05 Mfd. Tubular)	30-4020
36	Resistor (1,000 ohms) (Brown-Black-Red)	5837
37	Condenser (.05 Mfd. Tubular)	30-4123
38	Compensating Condenser (3d I. F. Primary)	Part of (39)
38A	Condenser (.00015 Mfd. Mica)	30-1041
39	Third I. F. Transformer	32-1404
40	Compensating Condenser (3d I. F. Tertiary)	04000X
40A	Condenser (.00025 Mfd. Mica)	30-1038
41	Compensating Condenser (3d I. F. Secondary)	Part of (39)
41A	Condenser (.000235 Mfd. Mica)	30-1037
42	Resistor (2 Megs.) (Red-Black-Green)	33-1025
43	Condenser (.00015 Mfd. Mica)	30-1033
44	Resistor (2 Megs.) (Red-Black-Green)	33-1025
45	Condenser (.05 Mfd. Tubular)	30-4020
46	Shadowmeter	45-2028
47	Pilot Lamp (Shadowmeter)	Part of (46)
48	Filter Coil (10 K. C.)	32-7261
49	Compensating Condenser (10 K.C. Audio Filter Trap Circuit)	04000B
50	Condenser (.00015 Mfd. Mica)	30-1033
51	Condenser (.00015 Mfd. Mica)	30-1033
52	Resistor (100,000 ohms) (White-White-Orange)	6099
53	Condenser (.02 Mfd. Tubular)	30-4113
54	Resistor (.5 Meg.) (Yellow-White-Yellow)	6097
55	Condenser (.25 Mfd. Metal Case)	4264
56	Resistor (100,000 ohms) (White-White-Orange)	6099
57	Audio Transformer	32-7057
58	Output Transformer (On Speaker)	32-7247
59	Voice Coil and Cone Assembly (U-7 Speaker)	36-3321
60	Field Coil and Pot Assembly (U-7 Speaker)	36-3088
61	Condenser (Electrolytic—1, 1, 2 Mfd.)	30-2080
62	B. C. Resistor (Wire-Wound—4750 ohms, 3000 ohms)	33-3138
63	Condenser (.0001 Mfd. Twin—Bakelite Block)	8035-P
64	Resistor (70,000 ohms) (Violet-Black-Orange)	33-1115
65	Condenser (.03 Mfd. Tubular)	30-4025
66	Volume Control (500,000 ohms Tapped at 100,000) and On-Off Switch	33-5071
67	Condenser (.01 Mfd. Bakelite Block)	3903-G
68	Resistor (1 Meg.) (Brown-Black-Green)	33-1096
69	Resistor (500,000 ohms) (Yellow-White-Yellow)	6097
70	Resistor (1 Meg.) (Brown-Black-Green)	33-1096
71	Resistor (70,000 ohms) (Violet-Black-Orange)	33-1115
72	Resistor (15,000 ohms) (Brown-Green-Orange)	6208
73	Resistor (20,000 ohms) (Red-Black-Orange)	6650
74	Bass Compensator	30-4196
75	Condensers (In Bass Compensator)	Part of (74)
76	Condenser (.03 Mfd. Tubular)	30-4025
77	Condenser (.09 Mfd. Bakelite Block)	4989AR
78	Condenser (Electrolytic—8 10 Mfd.)	30-2046
79	B. C. Resistor (10 110, 130 ohms)	33-3137
80	Resistor (51,000 ohms) (Green-Brown-Orange)	4518
81	Resistor (15,000 ohms) (Brown-Green-Orange)	5718
82	Filter Choke	32-7056
83	Condenser (.25 Mfd. Bakelite Block)	6287-S
84	Condenser (Electrolytic—8 Mfd.)	30-2011
85	Power Transformer, 115 volts 60 cycles	32-7258
	" " 115 volts 25 cycles	32-7259
86	Condenser (.015 Mfd. Twin Bakelite Block)	3793-K
87	Pilot Lamp (Station Selector)	6608
88	Condenser (.09 Mfd. Bakelite Block)	4989N
89	Resistor (13,000 ohms) (Brown-Orange-Orange)	3766
90	Condenser (.001 Mfd. Tubular)	30-4201
	Four Prong Socket	7544
	Five Prong Socket	7546C
	Six Prong Socket	6417C
	Seven Prong Socket	27-6005
	Speaker Socket	4957
	Dial Assembly	31-1255
	Dial Scale	27-5049
	Knob (Large)	27-4051
	Knob (Small)	27-4052
	Chassis Mtg. Screw	W1388A
	Chassis Mtg. Foot (Rubber)	27-4116
	Chassis Mtg. Foot (Steel)	29-1983
	Chassis Mtg. Foot Plate	27-7497
	Tube Shield	28-1107
	A. C. Cord and Plug Assembly	L-943A

Circuit	R.F.	Det. Osc.	1st I.F.	2d I.F.	Shadowmeter Control	A.F.	Driver	Output	Rect.
Type Tube / Test Points	78	6A7	78	78	37	75	42	42 42	5Z3
F to F	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
P to K	225	210 (G3&5-K)	210	220	63	110	225	335 335	350 to Gnd.
SG to K	80	73	73	76	...	...	225	335	...
K to Gnd	3	8	8	4	0	0	0	0 0	...
CG to K	0.2	0	0.2	4	0	...	0.2	35 35	...
6A7—G1 to K	22.0								
6A7—G2 to K	90.0								

PHILCO RADIO & TELEVISION CORPORATION

MODEL 604



PHILCO RADIO & TELEVISION CORPORATION

MODEL 604

General Specifications

TYPE OF CIRCUIT: Superheterodyne with pentode output stage; built in connections for the Philco All-wave Aerial; Automatic Aerial tuning system (controlled by the wave band selector), and a compensated volume control circuit which affects high and low audio frequencies, giving greater clarity of tone. Special new design bias cell supplies grid voltage in 1st audio tube.

TUNING DRIVE: Two-speed, Gear Drive, 50 to 1 ratio for slow speed tuning; glowing arrow.

POWER SUPPLY: 115V., D.C., or A.C., 25 to 60 cycles.
POWER CONSUMPTION: 50 watts.

PHILCO TUBES USED: 1 type 6A7, Det. Osc., 1 type 78 I.F. amplifier, 1 type 75, 2nd Det., 1st audio, 1 type 43 output, 1 type 25Z5 rectifier.

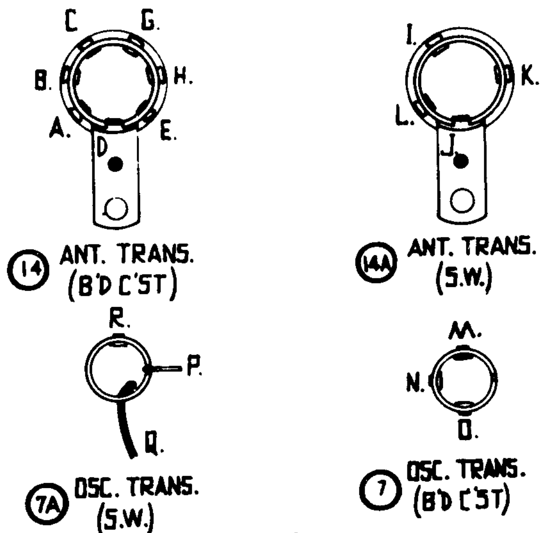
WAVE BANDS: Two: (1) Shortwave, (2) Standard and some Police.

FREQUENCY RANGE: Band (1) 6.0 to 18.0 M.C., Band (2) 530 to 1750 K.C.

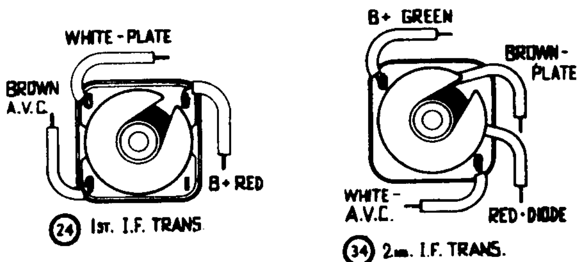
SPEAKER: B5.

POWER OUTPUT: ¼ Watt.

The letters appearing on the terminals of the transformers below, correspond to those shown on the schematic diagram

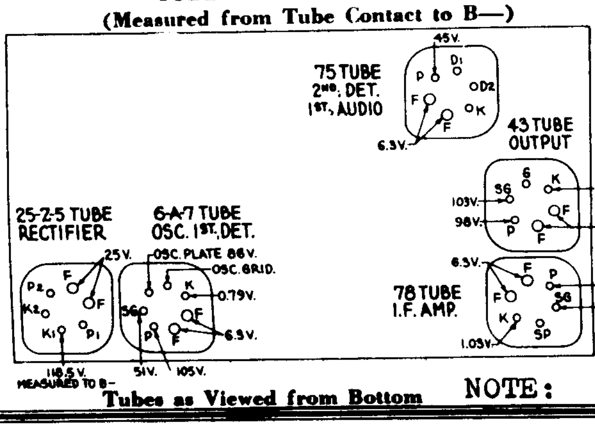


R.F. Transformers



I.F. Transformers

TUBE SOCKET VOLTAGES
(Measured from Tube Contact to B—)



Tubes as Viewed from Bottom

TO REPLACE PILOT LAMP:

Facing the front (top) of receiver the center screw holds the pilot lamp bracket assembly to the gang condenser. This screw is removed, to replace the pilot lamp.

The right hand screw holding the pilot lamp housing to the gang condenser MUST NOT BE TOUCHED as this would throw the dial off calibration.

The voltages at the points indicated by the arrows above were obtained with a Philco type 025 Circuit Tester which contains a high resistance (1000 ohms per volt) voltmeter. Volume control at minimum, waveband switch at standard broadcast. B5 speaker.

Schematic Number	Part and Description	Part No.	List Price
1	Condenser (.001 Mfd. Tubular)	30-4201	$0.20
1a	Wave Trap Coil	32-2093	.50
2	Wave Trap Compensator (460 K.C.)	31-6084	.15
3	Wave Band Switch Assy.	38-7631	1.50
4	Pilot Lamp (S.W. 6.3 V.)	34-2068	.16
5	Pilot Lamp (Bdcst. 6.3 V.)	34-2068	.16
6	Tuning Condenser	31-1796	3.25
7	Oscillator Transformer. (Bdcst.)	32-2047	.45
7a	Oscillator Transformer (S.W.)	32-2048	.45
8	Compensator (Osc. 1600 K.C.)	31-6085	.60
9	Compensator (Osc. 18.0 M.C.)	Part of 8	
10	Compensator (Osc. series, screw, 580 K.C.)	31-6027	.70
11	Compensator (Osc. series, nut, 6.0 M.C.)	Part of 10	
12	Condenser (.00325 Mfd. Mica)	30-1061	.45
13	Resistor (13,000 ohms, ¼ watt)	33-313133	.20
14	Antenna Transformer (Bdcst.)	32-2045	1.10
14a	Antenna Transformer (S.W.)	32-2046	.55
15	Condenser (15 Mmfd., Mica)	30-1030	.20
16	Compensator (Ant., 1400 K.C.)	Part of 8	
17	Compensator (Ant., 18.0 M.C.)	Part of 8	
18	Condenser (.05 Mfd., Tubular)	30-4020	.20
19	Condenser (.15 Mfd., Tubular)	30-4191	.25
20	Resistor (200 ohms, wire wound)	7217	.20
21	Resistor (120,000 ohms, ½ watt)	33-412334	.20
22	Condenser (250 Mmfd., Mica)	30-1032	.25
23	Compensator (1st I.F. Pri. 460 K.C.)	Part of 24	
24	1st I.F. Transformer	32-2049	1.50
25	Compensator (1st I.F. Sec. 460 K.C.)	Part of 24	
26, 27	Eliminated By Production Changes		
28	Resistor (300 ohms, wire wound)	33-3010	.20
29	Condenser (.1 Mfd. Twin Bakelite)	4989-ODU	.40
30	Condenser (.1 Mfd. Twin Bakelite)	Part of 29	
31	Condenser (.1 Mfd. Twin Bakelite)	4989-ODU	.40
32	Resistor (2.0 Meg., ¼ watt)	33-520143	.20
33	Compensator (2nd I.F. Pri., 460 K.C.)	Part of 34	
34	2nd I.F. Transformer	32-2059	3.00
35	Compensator (2nd I F. Sec. 460 K.C.)	Part of 34	
36	Condenser (110 Mmfd., Twin Bakelite)	8035-ODU	.25
37	Condenser (110 Mmfd.)	Part of 36	
38	Resistor (51,000 oms, ¼ watt)	33-351143	.20
39	Condenser (600 Mmfd., Mica)	30-1049	.25
40	Resistor (25,000 ohms, ½ watt)	33-325344	.20
41	Resistor (32,000 ohms, ½ watt)	33-332334	.20
42	Condenser (.01 Mfd. Tubular)	30-4124	.25
43	Volume Control Assy. (500,000 ohms)	38-7630	1.45
44	Condenser (.01 Mfd. Tubular)	30-4124	.25
45	Resistor (1.0 Meg., ¼ watt)	33-510143	$0.20
46	Bias Cell (1.0 volt)	41-8009	.20
47	Eliminated By Production Changes		
48	Resistor (70,000 ohms, ¼ watt)	33-370133	.20
49	Resistor (240,000 ohms, ½ watt)	33-424344	.20
50	Condenser (0.1 Mfd.)	Part of 61	
51	Condenser (.01 Mfd. Tuoular)	30-4169	.20
52	Resistor (490,000 ohms, ½ watt)	33-449344	.20
53	Resistor (400 ohms, wire wound)	33-3122	.25
54	Elec. Condensers (10.0 Mfd., 8.0 Mfd., 16.0 Mfd., 16 Mfd.)	30-2154	3.25
55	Condenser (.01 Mfd. Bakelite)	3903-OSU	.25
56	Output Transformer	32-7568	.95
57	Cone Assy.	36-3029	.60
58	Field Coil Assy.	36-3620	2.75
59	Fiiter Choke	32-7569	1.30
60	Filter Choke	32-7572	1.00
61	Condenser (.05 Mfd. Tubular)	30-4020	.20
62	B. C. Resistor (15 133 ohms)	33-3235	.55
	R. F. Coil Housing	29-3755	.15
	R. F. Coil Housing, Side	29-3770	.10
	R. F. Coil Housing, Back	29-3814	.05
	Bias Cell Panel Assy.	38-7436	.15
	B. C. Resistor Mtg. Screw	W-650-A	.40C
	B. C. Resistor Mtg. Nut	W-95-A	.30C
	Tube Shield Body	28-2726	.10
	Tube Shield Base	28-2725	.03
	Socket (6-prong)	27-6036	.11
	Socket (7-prong)	27-6037	.11
	Volume Control Mtg. Nut	W-684-A	1.25C
	Volume Control Shaft	Part of 43	
	Wave Switch Shaft	Part of 3	
	Dial Assembly	31-1799	
	Shaft Centering Plate	29-3805	.10
	Pilot Lamo Bracket Assy.	38-7616	.80
	Chassis Mtg. Screw	W-1587-A	.75C
	Chassis Mtg. Nut	W-124-A	.35C
	Chassis Mtg. Washer	W-151	.20C
	Chassis Mtg. Washer	W-1335	.80C
	Chassis Mtg. Washer	W-291	40C
	Knob (Tuning)	27-4206	.12
	Knob (Slow Speed Tuning)	27-4207	.10
	Knob (Wave Band Switch, Vol. Control)	27-4208	.10
	Shield Plate Assy.	29-3769	.40
	Shield Plate Ins.	27-8214	1.15
	Baffle Assy.	40-5918	

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 604

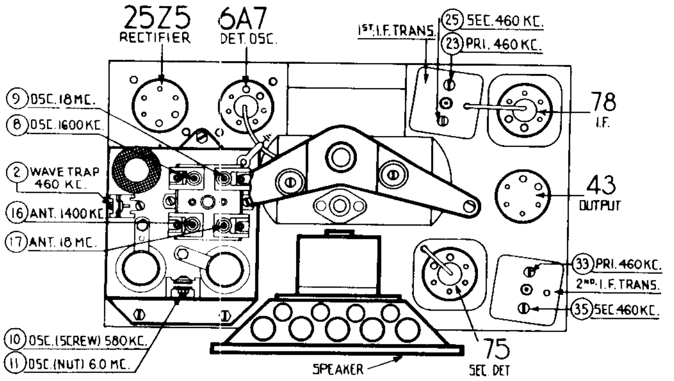
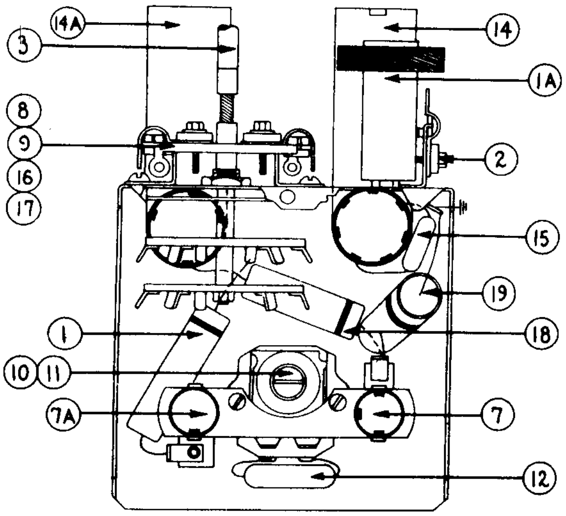


FIG. 4. Location of Compensating Condensers

For the low frequency adjustment of this band, turn the dial to 6.0 M.C., set the signal generator at 6.0 M.C. and adjust condenser 11 (nut) for maximum output meter reading. Readjust condenser 9 at 18.0 M.C.

STANDARD AND POLICE: Turn wave band switch to position 2 (extreme left), set signal generator at 800 K.C. and dial of receiver at 1600 K.C. (using second harmonic of Signal Generator). Now adjust the oscillator and antenna "standard" condensers. These are 8 and 16 respectively. Turn dial of receiver and Signal Generator to 1400 K.C., and readjust condenser 16.

Turn the dial of receiver to 58, set signal generator at 580 K.C. and adjust condenser 10, (oscillator standard series), (screw) for maximum output meter reading.


Rear View of R. F. Unit.

Adjusting Compensating Condensers

Adjustment of compensating condensers in Model 604 requires an accurate signal generator covering I.F., and standard-wave frequencies. The **PHILCO Model 088 All-Wave Signal Generator,** having a continuous range of from 100 to 20,000 K.C., is ideal for this purpose.

An output meter is also needed. **PHILCO Model 025 Circuit Tester** includes a high grade output meter.

Philco No. 3164 fibre wrench and No. 27-7059 fibre-handled screwdriver complete the equipment needed for making these adjustments. The locations of the various compensating condensers are shown in Fig. 4. Connect the output meter to the plate and cathode contacts of the type 43 power tube (using the adapters provided with the "025") and set it at the 0-30 volt range.

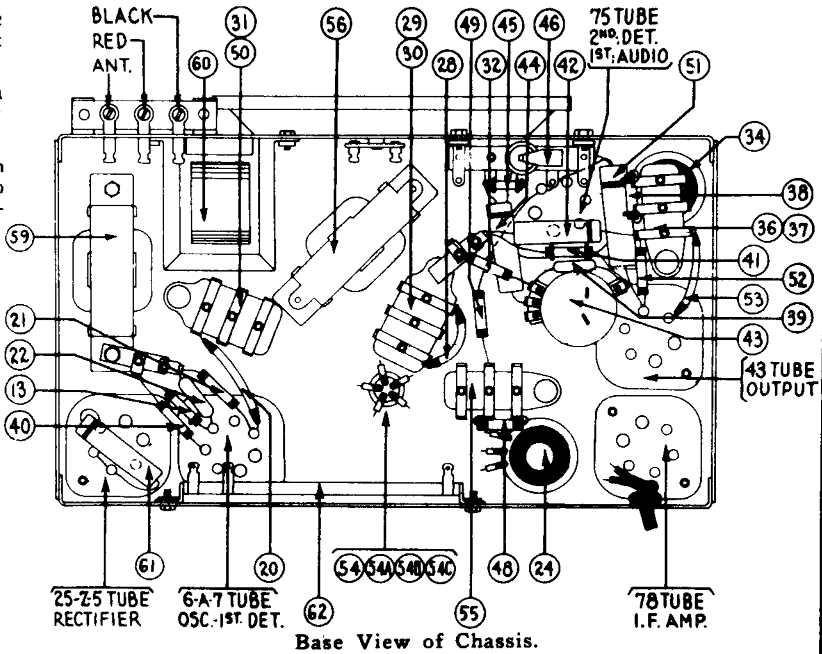
INTERMEDIATE FREQUENCY: Turn the condenser gang all the way in (maximum capacity) and set the volume control of Receiver at maximum (clockwise). Connect the 088 signal generator antenna lead to the grid of the 78 I.F. tube through a .00025 mf. condenser and the ground lead to the chassis of the receiver. **Set the 088 signal generator attenuator for approximately ¼ scale reading on output meter.** Adjust condensers **33 and 35 for maximum output meter reading.**

Remove the 088 signal generator antenna lead from the grid of the 78 and connect it to the grid of the 6A7, adjust condensers 23 and 25 for maximum output meter reading.

WAVE TRAP: Connect the 088 signal generator antenna lead to the aerial post of receiver. Adjust condenser 2 for *minimum* output meter reading.

SHORT WAVE: In adjusting the short wave or high frequency band, the det. compensator will have a tendency to "pull" or **change** the frequency of the oscillator. By shunting a padding or variable condenser (about .00025 Mf.) across the oscillator section of the gang (bottom section) and tuning it so that the second harmonic, instead of the fundamental, beats with the incoming signal, this "pull" can be minimized. The procedure for tuning this band is as follows:

Set the dial of the receiver at 18 megacycles (top scale) and the 088 dial at the same frequency. Turn wave band switch to position 1 (extreme right). Connect the shunt condenser to the oscillator section of the gang and tune it so that the second harmonic of the oscillator beats with the 18 M.C. signal from the 088. Next tune condenser 17 (antenna) for maximum reading of the output meter. Disconnect shunt condenser and tune condenser 9 (osc.) for correct dial calibration. The receiver, oscillator frequency, when correctly adjusted, will be higher than that of the incoming signal. In order to check this it should be possible to pick up the 18 M.C. 088 oscillator signal as an image signal by increasing the 088 output and tuning the receiver to approximately 17.1 M.C.

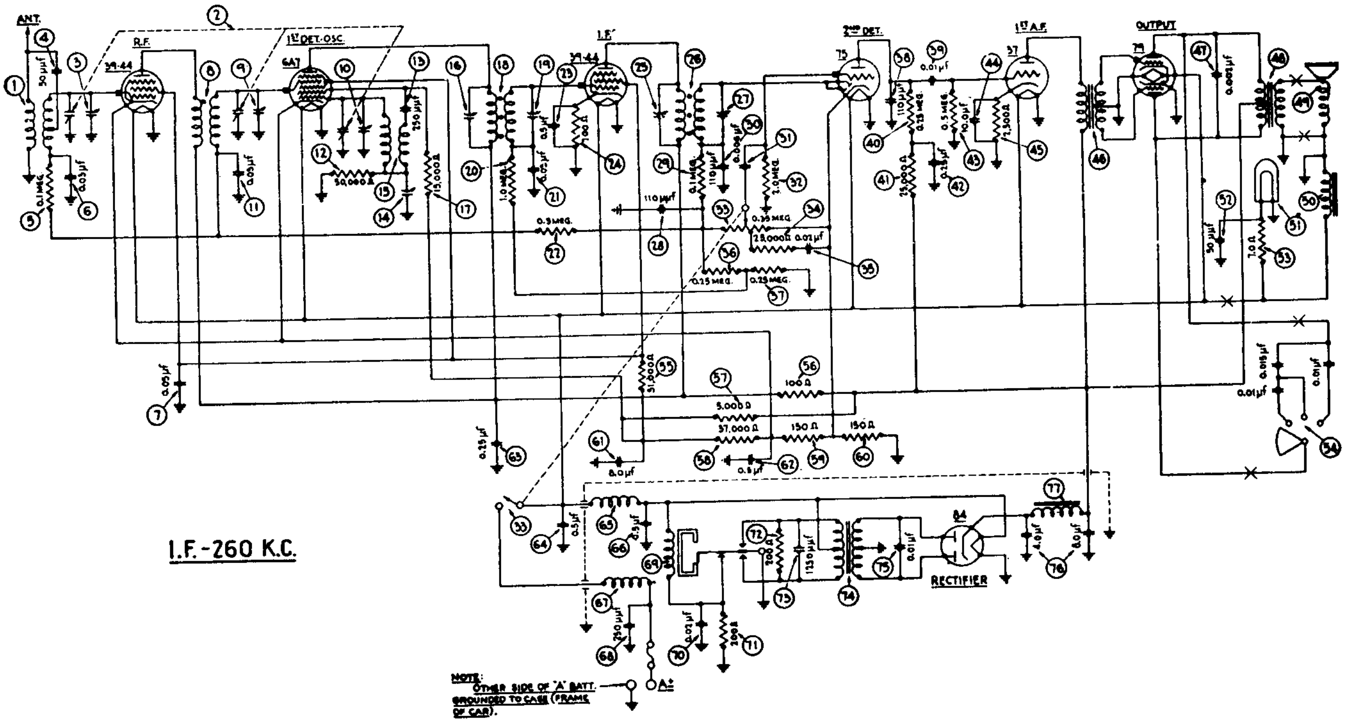


Base View of Chassis.

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

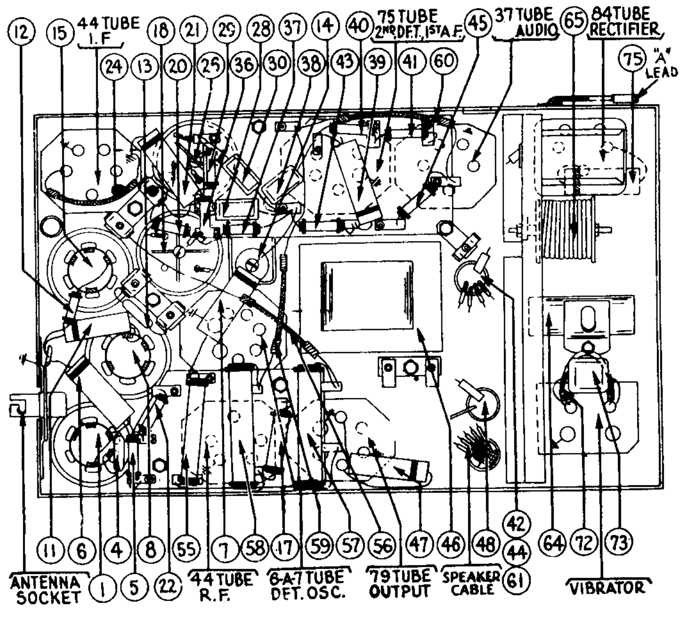
MODEL 800-CODE 122 "AUTO RADIO"



① Antenna Transformer......32-1462
② Tuning Condenser........31-1202
③ First Padder (in tun. cond.)........
④ Condenser (50 mmfd.).....30-1029
⑤ Resistor (100,000 ohms).... 6099
⑥ Condenser (.03 mfd.)......30-4025
⑦ Condenser (.05 mfd.)......30-4020
⑧ R. F. Transformer.........32-1463
⑨ Second Padder (in tun. cond.)......
⑩ Third Padder (in tun. cond.)......
⑪ Condenser (.03 mfd.)......30-4025
⑫ Resistor (50,000 ohms)..... 6098
⑬ Condenser (250 mmfd.)....30-1032
⑭ Padder.................30-6012
⑮ Oscillator Transformer.....32-1222
⑯ Padder (Pri. 1st I. F. trans.)......
⑰ Resistor (15,000 ohms)..... 6208
⑱ First I. F. Transformer....32-1471
⑲ Padder (Sec. 1st I. F. trans.)......
⑳ Resistor (1,000,000 ohms)..33-1096
㉑ Condenser (.03 mfd.)......30-4025
㉒ Resistor (500,000 ohms).... 6097
㉓ Condenser (.5 mfd.).......30-4058
㉔ Resistor (700 ohms)....... 6443
㉕ Padder (Pri. 2nd I. F. trans.).......
㉖ Second I. F. Transformer...32-1449
㉗ Padder (Sec. 2nd I. F. trans.)......
㉘ Condenser (110 mmfd.)....30-1031
㉙ Resistor (100,000 ohms).... 6099
㉚ Condenser (110 mmfd.)....30-1031
㉛ Condenser (.006 mfd.).....30-4125
㉜ Resistor (2,000,000 ohms)..33-1025
㉝ Volume control & switc ı assembly..............38-5851
㉞ Resistor (25,000 ohms).....33-1013
㉟ Condense- (.02 mfd.)......30-4215
㊱ Resistor (250,000 ohms)....33-1097
㊲ Resistor (250,000 ohms)....33-1097
㊳ Condenser (110 mmfd.)....30-1031
㊴ Condenser (.01 mfd.)......30-4145
㊵ Resistor (250,000 ohms)....33-1097
㊶ Resistor (25,000 ohms).....33-1013
㊷ Condenser (.25 mfd.)......30-4135
㊸ Resistor (500,000 ohms).... 6097
㊹ Condenser (10 mfd.).......30-4135
㊺ Resis'or (2500 ohms)......33-1100
㊻ Input Transformer.........32-7206
㊼ Condenser (.002 mfd.).....30-4177
㊽ Output Transformer.......32-7205
㊾ Cone & Voice Coil.........36-3159
㊿ Field Coil Assembly....... 02795
(51) Pilot Lamp..............34-2039
(52) Condenser (50 mmfd.).....30-1029
(53) Resistor (7 ohms).........33-3130
(54) Tone Control.............30-4220
(55) Resistor (51,000 ohms)..... 4237
(56) Resistor (100 ohms).......33-3023
(57) Resistor (5000 ohms)......33-1070
(58) Resistor (37,000 ohms).....33-1098
(59) Resistor (150 ohms).......33-3045
(60) Resistor (150 ohms).......33-3045
(61) Condenser (8 mfd.)........30-4135
(62) Condenser (.5 mfd.).......30-4018
(63) Condenser (.25 mfd.)......30-4134
(64) Condenser (.5 mfd.).......30-4015
(65) Vibrator Choke...........32-1474
(66) Condenser (.5 mfd.).......30-4047
(67) "A" Choke...............32-1493
(68) Condenser (250 mmfd.)....32-1493
(69) Vibrator.................38-5036
(70) Condenser (.02 mfd.)......30-4039
(71) Resistor (200 ohms)....... 7217
(72) Resistor (200 ohms)....... 7217
(73) Condenser (1250 mmfd.)... 5886
(74) Power Transformer........32-7098
(75) Condenser (.01 mfd.)......30-4051
(76) Filter Condenser (4-8 mfd.).30-2015
(77) "B" Choke...............32-7104
Spark Plug Resistors.......33-1015
Distributor Resistor......33-1113E
Screw Type Resistor....... 4851
Interference Condenser.....30-4007
Studs...................28-6036
Nuts (Mounting).......... W55A

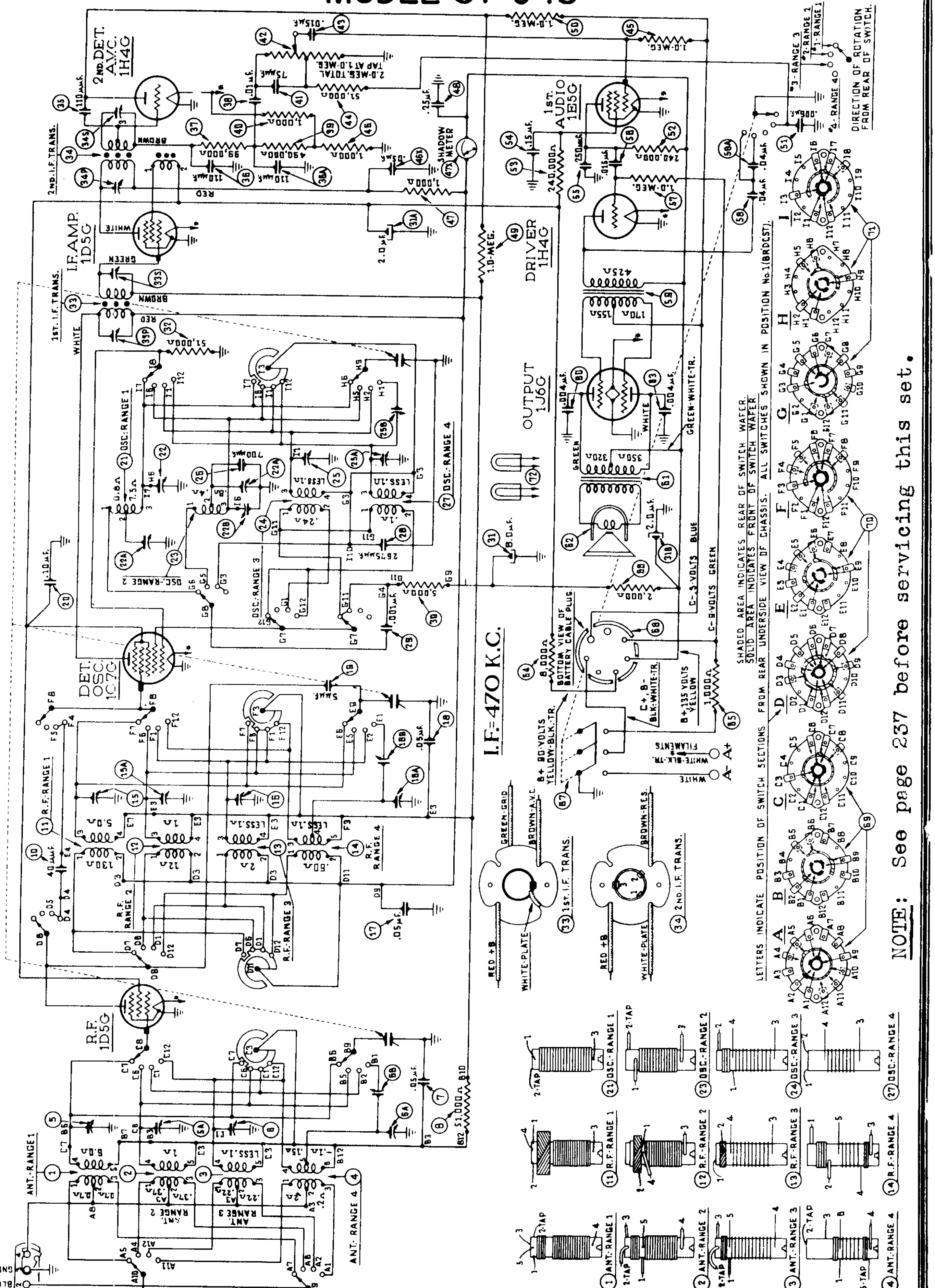
Battery Cable............38-5296
Antenna Lead............38-5131
Acorn Nut............... W821
Fuse.................... 7227
Fuse Insulator...........27-7131
Control Assembly.........42-5185
Bracket................. 6035
Strap................... 04344
Knob...................27-4058
Knob Spring.............28-1738

Glass...................27-7325
Glass Gasket.............27-7509
Pointer.................28-1957
Shaft...................28-8206
Face Assembly............42-5191
Cover...................29-7064
4-prong Socket...........27-6006
5-prong Socket...........27-6014
6-prong Socket...........27-6020
7-prong Socket...........27-6005
Auto Radio Lock Switch ..42-1076



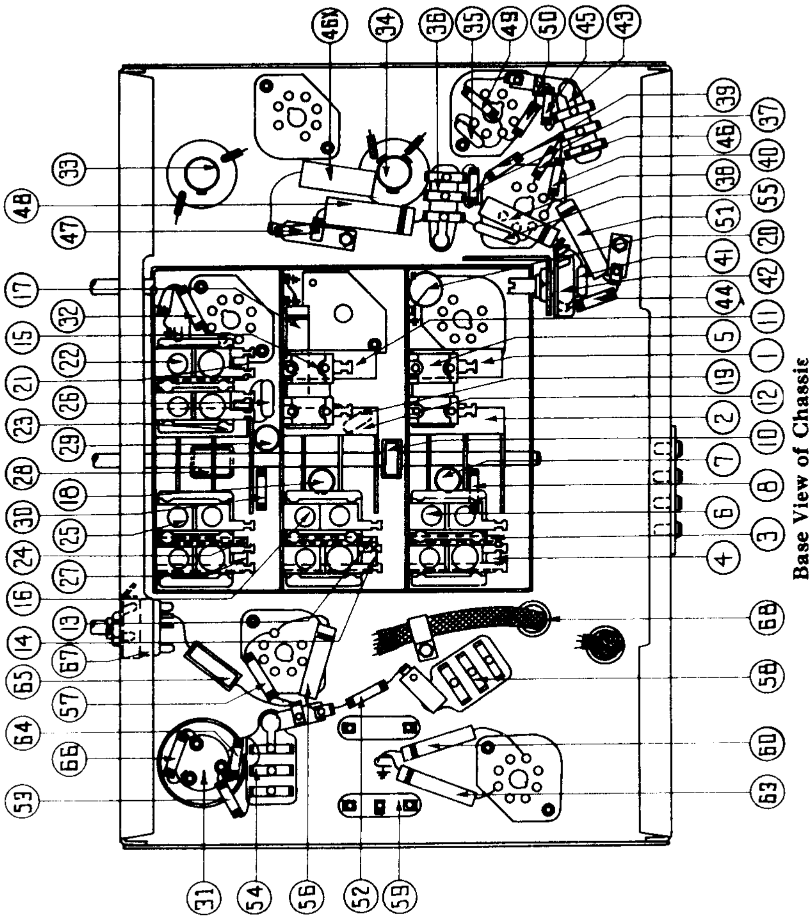
NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION
MODEL 37-643

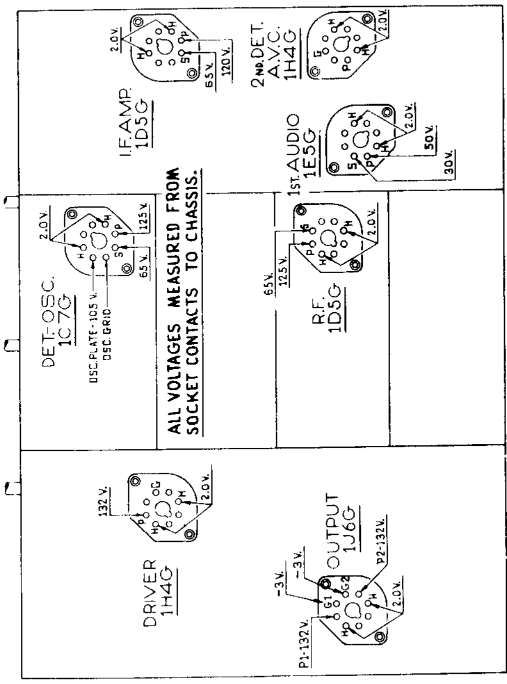


PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-643



Base View of Chassis



Socket Voltages and R. F. Compensators
The voltages indicated by arrows were measured with a **Philco 025 Circuit Tester** which contains a voltmeter having a resistance of 1000 ohms per volt. Volume control at minimum; Range Switch in broadcast position; Storage Battery fully charged.

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer (Range 1)	32-2108	$1.60
2	Antenna Transformer (Range 2)	32-2146	1.20
3	Antenna Transformer (Range 3)	32-2150	1.20
4	Antenna Transformer (Range 4)	32-2175	1.20
5	Compensator (two section)	31-6093	.40
6	Compensator (three section)	31-6128	1.00
7	Condenser (.05 mfd. tubular)	30-4020	.20
8	Resistor (51,000 ohms, ½ watt)	33-351339	.20
9	Tuning Condenser	31-1855	4.50
10	Condenser (40 mmfd. mica)	30-1076	.20
11	R. F. Transformer (Range 1)	32-2105	1.00
12	R. F. Transformer (Range 2)	32-2147	.70
13	R. F. Transformer (Range 3)	32-2151	.70
14	R. F. Transformer (Range 4)	32-2176	1.20
15	Compensator (two section)	31-6120	.50
16	Compensator (three section)	31-6127	1.00
17	Condenser (.05 mfd. tubular)	30-4020	.20
18	Condenser (.05 mfd. tubular)	30-4020	.20
19	Condenser (5 mmfd. mica)	30-1077	.20
20	Condenser (.1 mfd. tubular)	30-4122	.20
21	Oscillator Transformer (Range 1)	32-2120	1.00
22	Compensator (four section)	32-6108	
23	Oscillator Transformer (Range 2)	32-2149	.70
24	Oscillator Transformer (Range 3)	32-2152	.70
25	Compensator (three section)	32-6128	....
26	Condenser (650 mmfd. mica)	5863	.25
27	Oscillator Transformer (Range 4)	32-2182	.70
28	Condenser (2675 mmfd.)	30-1085	.40
29	Condenser (.001 mmd. tubular)	30-4453	.20
30	Resistor (5,000 ohms, ½ watt)	33-250339	.20
31	Electrolytic Condenser (8, 2, 2, mfd.)	30-2161	1.60
32	Resistor (51,000 ohms, ½ watt)	33-351339	.20
33	1st I. F. Transformer	32-2253	1.80
34	2nd I. F. Transformer	32-2255	1.80
35	Condenser (110 mmfd. mica) 80 mmf.	30-1031	.20
36	Condenser (110 mmfd. dual)	8035-DG	.25
37	Resistor (99,000 ohms, ½ watt)	33-399339	.20
38	Condenser (.01 mfd. tubular)	30-4124	.20
39	Resistor (490,000 ohms, ½ watt)	33-449339	.20
40	Resistor (1,000 ohms, ½ watt)	33-210339	.20
41	Condenser (75 mmfd. mica)	30-1053	....
42	Volume Control	33-5158	1.00
43	Condenser (.015 mfd. bakelite)	3793-SU	.35
44	Resistor (51,000 ohms, ½ watt)	33-351339	.20
45	Resistor (1 megohm, ½ watt)	33-510339	.20
46	Resistor (1000 ohms, ½ watt)	33-210339	.20
46X	Condenser (.05 mfd. tubular)	30-4020	....

Schem. No.	Description	Part No.	List Price
47	Resistor (1,000 ohms, ½ watt)	33-210339	$0.20
47X	Shadow Meter	45-2307	....
48	Condenser (.25 mfd. tubular)	30-4446	.25
49	Resistor (1 megohm, ½ watt)	33-510339	.20
50	Resistor (1 megohm, ½ watt)	33-510339	.20
51	Condenser (.006 mfd. tubular)	30-4125	.20
52	Resistor (240,000 ohms, ½ watt)	33-424339	.20
53	Resistor (240,000 ohms, ½ watt)	33-424339	.20
54	Condenser (.15 mfd. tubular)	6287-SG	.20
55	Condenser (250 mmfd. mica)	30-1032	.25
56	Condenser (.015 mfd. tubular)	30-4226	.20
57	Resistor (1 megohm, ½ watt)	33-510339	.20
58	Condenser (.04 mfd. dual bakelite)	8327-DU	.40
59	Audio Transformer (Input)	32-7637	2.00
60	Condenser (.004 mfd. tubular)	30-4456	.20
61	Output Transformer KR-17—HR-12	32-7639	1.60
62	Cone and Voice Coil KR-17	36-3540	.80
	Cone and Voice Coil HR-12	36-3557	1.20
63	Condenser (.004 mfd. tubular)	30-4456	.20
64	Resistor (8,000 ohms, ½ watt)	33-280339	.20
65	Resistor (1,000 ohms, ½ watt)	33-1223	.20
66	Resistor (2,000 ohms, ½ watt)	33-220339	.20
67	Switch and Tone Control	42-1241	1.00
68	Battery Cable Assembly	41-3198	1.40
69	Ant. Range Switch	42-1202	....
70	R. F. Range Switch	42-1254	....
71	Oscillator Range Switch	42-1204	....
72	Pilot Lamp (dial) and Shadow Meter	34-2150	.22
	Shadow Meter Receptacle Assem.	41-3225	....
	Range Switch Shaft and Index Plate	42-1186	.50
	Pilot Lamp Assembly	38-7875	.45
	Dial	27-5250	.70
	Hub	28-7187	.12
	Clamp	28-2837	.10
	Set Screw	W-1641	.02
	Dial Hole Cover	27-8425	.02
	Gear (Dial)	28-7185	.10
	Gear (Drive)	31-1884	.25
	Thrust Spring	28-8611	.01
	Thrust Washer	28-3976	.30 C
	"C" Washer	28-3904	.01
	Mask	27-5240	.30
	Mask Arm and Link Assembly	31-1959	.30
	Mask Washer	27-8318	.50 C
	Mask Guide and Lamp Bracket	38-7844	.15
	Indicator Bracket and Lens Assembly	31-1900	.30
	Scale Guard	27-8324	.02

Schem. No.	Description	Part No.	List Price
	Volume Control Shaft	38-8060	$0.12
	Retaining Clip	28-4394	.01
	Spring	28-4117	.40 C
	Tube Shield	28-2726	.10
	Tube Shield Base	28-3898	.03
	Shield Shadow Meter	28-2917	.02
	Socket (7 prong)	27-6057	.11
	Socket (8 prong)	27-6058	.11
	Grommet Mtg. R. F. Unit	27-4317	.04
	Sleeve Mtg. R. F. Unit	28-2257	.01
	Washer Mtg. R. F. Unit	27-7807	.50 C
	Screw Mtg. R. F. Unit	W-729	.45 C
	Mtg. Rubber (Gang Condenser)	27-4325	.02
	Mtg. Spring (Shadow Meter)	28-8623	.70 C
	Mtg. Plate (R. F. Transformer)	28-3808	.02
	Mtg. Spacer (R. F. Transformer)	27-8228	.01
	Mtg. Screw (R. F. Transformer)	W-1635	.30 C
	Mtg. Busher (Cabinet)	27-4360	.04
	Mtg. Rubber (Cabinet)	3558	.03
	Speaker Cable	41-3207	.30
	Knob (Tuning)	27-4330	.10
	Knob (Tuning Vernier)	27-4331	.10
	Knob (Tone and Volume)	27-4332	.10
	Knob (Range Switch)	27-4326	.10
	"A" Battery	172-R	....
	"B" Battery	41-8007	....
	"B" CABINET		
	Speaker KR-17	36-1248	....
	Baffle and Silk Assembly	40-5975	.40
	Bezel Assembly	40-5946	.75
	Gasket	27-8312	.01
	Screw	W-1644	.50 C
	Glass	27-8299	.06
	Ring	28-3987	.40
	"X" CABINET		
	Baffle Silk Assembly	40-6036	1.20
	Speaker HR-12	36-1250	11.00
	Bezel and Plate Assembly	40-5948	.80
	Glass	27-8300	.06
	Ring	28-3988	.45
	Gasket	27-8313	.01
	Screw	W-1644	.50 C

Prices Subject to Change Without Notice

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION
MODEL 37-643

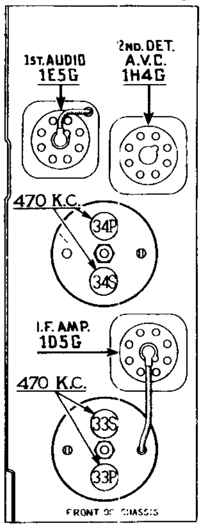


Fig. 5— I. F. Compensators

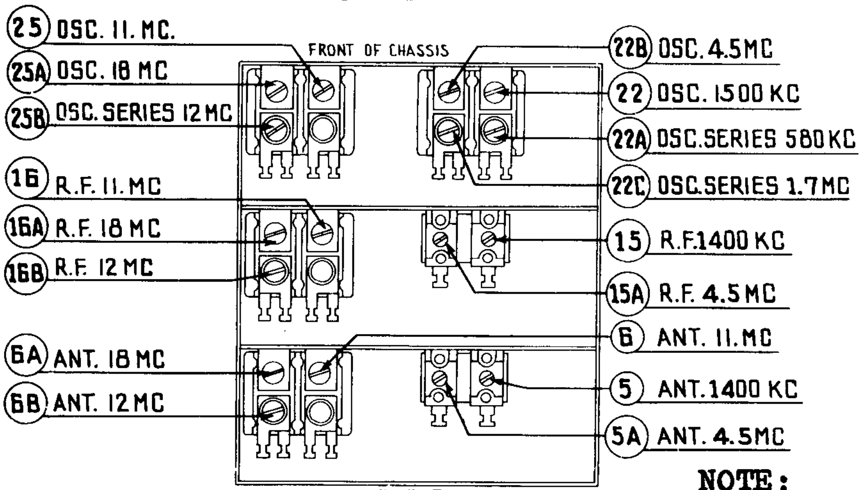


Fig. 6—R. F. Compensators

NOTE: See page 237 before servicing this set.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator; Philco Model 088 (fundamental frequency 110 to 20,000 K. C.) is the correct instrument for this purpose; (2) output meter. Philco Model 025 Circuit Tester incorporates a sensitive output meter and is recommended; (3) Fibre handle screw driver (Philco Part No. 27-7059); (4) Special variable condenser (Philco Part No. 45-2325).

OUTPUT METER: The 025 Output Meter is connected between the plate prong of the 1H4G Driver tube and the chassis. Then adjust the meter to use the (0-30) volt scale.

INTERMEDIATE FREQUENCY CIRCUIT

Set controls as follows:

a. Range switch position one (broadcast)
b. Volume control maximum
c. Connect the 088 Signal Generator output lead through a .1 mfd. condenser to the control grid of the 1C7G tube, and the ground connection of the output lead to the chassis.
d. Receiver dial at 580 K. C.
e. Signal Generator 470 K. C.
f. Adjust compensators (34S), (34P), (33S), and (33P) for maximum output.

RADIO FREQUENCY CIRCUIT

Tuning Range 11.5 to 18.2 M. C.

1. Connect signal generator output lead with the .1 mfd. series condenser to terminal No. 1 and the ground lead to terminal No. 3. Terminals 2 and 3 must be connected with the shorting link provided on the aerial panel.
2. Adjust compensators as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
4	18.0 M. C.	18.0 M. C.	(25A) check image at 17.06 M. C. on receiver dial (See Note B)
4	18.0 M. C.	18.0 M. C.	(6A), (16A) use shunt condenser on 25A. First lug from left side of R. F. Unit fig. 6. (See Note A)
4	12.0 M. C.	12.0 M. C.	(25B), (16B), (6B)
4	18.0 M. C.	18.0 M. C.	(25A)
4	18.0 M. C.	18.0 M. C.	(6A), (16A) use shunt condenser on (25A). First lug from left side of R. F. Unit fig. 6. See Note (A)

Tuning Range 7.35 to 11.6 M. C.

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
3	11.0 M. C.	11.0 M. C.	(25) check image 10.06 M. C. on receiver
3	11.0 M. C.	11.0 M. C.	(16), (6) use shunt on (25). Third lug from left side of R. F. Unit fig. 6. (See Note A)
3	11.0 M. C.	11.0 M. C.	(25)

Tuning Range 4.7 to 7.4 M. C.

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
2	4.5 M. C.	4.5 M. C.	(22B), (15A), (5A)
2	1.7 M. C.	1.7 M. C.	(22C)
2	4.5 M. C.	4.5 M. C.	(22B), (15A), (5A)

Tuning Range 530 to 1600 K. C.

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
1	1500 K. C.	1500 K. C.	(22), (15), (5)
1	580 K. C.	580 K. C.	(22A) roll tuning condenser
1	1500 K. C.	1500 K. C.	(22)
1	1400 K. C.	1400 K. C.	(15), (5)

NOTE "A"—To eliminate the effect of the Ant. and R. F. compensators detuning the Osc. circuit, a variable tuning condenser, Philco Part No. 45-2325 is connected from the oscillator compensators to ground when designated in the padding instruction above. Tune the added condenser from the minimum capacity position until the second harmonic of the receiver oscillator beats against the signal from the generator, resulting in a maximum indication on the output meter. Then adjust compensators as noted for maximum output

NOTE "B"—To accurately adjust the compensat... to the fundamental and not the image signal, turn the oscillator compensator to the maximum capacity position clockwise. Then slowly turn the compensators counter-clockwise until a second maximum peak is obtained on the output meter. The first peak is the image signal and the receiver must not be adjusted to it. If the above procedure is correctly performed, the image signal will be found 940 K. C. below the frequency being used on any high frequency band.

Electrical Specifications

TYPE CIRCUIT: Superheterodyne; battery operated; with Class "B" output circuit; the Philco Automatic Aerial Tuning System, and built-in connection for the Philco High-Efficiency Aerial.

BATTERY REQUIRED: "A" Philco 172-R, storage battery or a dry "A" battery Philco Part No. 41-8011. If a dry "A" battery is used, a ballast lamp Philco type 1Z1 must be inserted in the socket provided in the dry 'A" battery. This lamp acts as a voltage regulator and maintains a constant potential of two volts on the filament of the receiver tubes.

"BC" battery—Philco Part No. 41-8007 is used to supply B and C voltages. This battery contains a socket into which the receiver battery cable plug is inserted.

CURRENT DRAIN:

"A" battery 0.9 amps
"B" battery 23 M.A.

PHILCO TUBES USED: Seven: 2—1D5G; 1—1C7G; 2—1H4G; 1—1E5G; 1—1J6G.

FREQUENCY RANGES: Four:

Range 1—530 to 1600 K. C.
Range 2—1.58 to 4.8 M. C.
Range 3—4.7 to 11.6 M. C.
Range 4—11.5 to 18.2 M. C.

INTERMEDIATE FREQUENCY: 470 K. C.

SPEAKER:

"B" KR-17
"X" HR-12

Shadow Meter Adjustment

With receiver turned ON, remove aerial lead and adjust the shadow meter as follows:

1. Move the shadow meter coil backwards and forwards, until the opposite edges of the shadow are ⅛ of an inch from each end of the shadow screen, measuring along the bottom edge of the screen. Adjustment of the shadow meter light bracket may be necessary for perfect centering.
2. Remove the "B" Battery plug from its socket and rotate coil until shadow reaches minimum width. This width must not exceed ⅛ of an inch.
3. Replace the "B" Battery plug in its socket. The shadow should then widen until it is not more than ⅛ inch or less than 1/16 inch from each side of the screen, measuring along the bottom edge. If these limits are not obtained readjust the shadow meter as given in paragraphs 1 and 2 until they are obtained.

Aerial Connections

The red and black leads of the High Efficiency Aerial "transmission line" are connected to terminals 1 and 2 respectively, of the terminal panel provided on the rear of the chassis. Connect the jumper on the terminal panel across terminals 3 and 4.

If a temporary aerial is used, the jumper should be across terminals 2 and 3. The aerial connects to terminal 1 and the ground lead to terminal 3. A good ground connection is desirable in all installations.

Dial Calibration

In order to adjust this receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this rotate the tuning control to the extreme counter-clockwise position (maximum capacity). Loosen the set screw of the dial hub, then turn dial until the glowing indicator is centered on second index line of dial scale (see Fig. 2). Now tighten the dial hub set screw in this position.

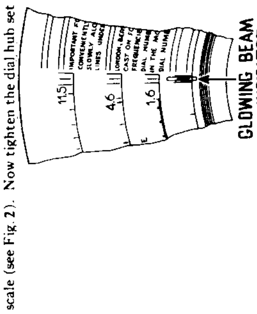
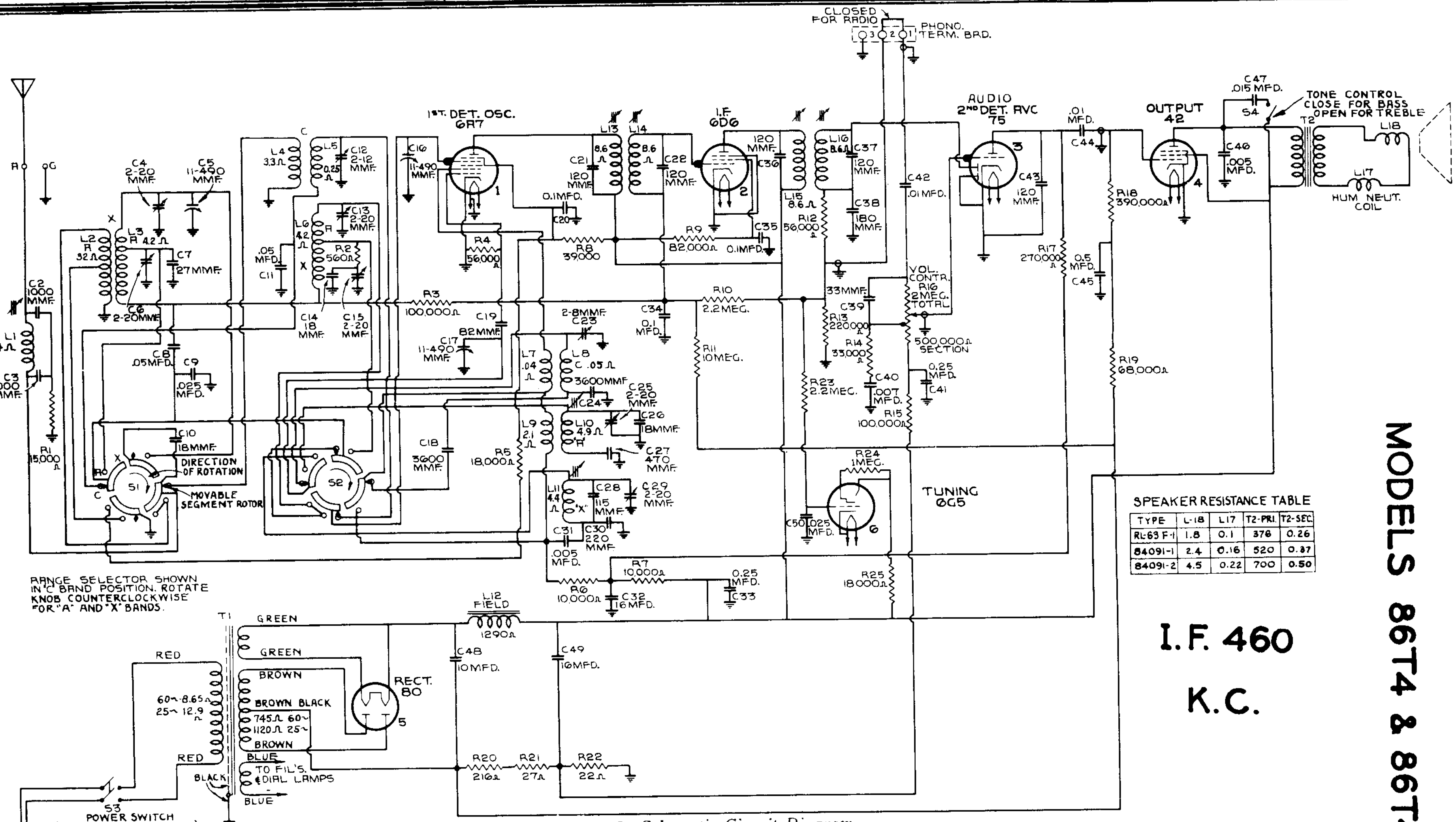


Fig. 2—Dial

RCA MANUFACTURING COMPANY, Inc.

MODELS 86T4 & 86T44



SPEAKER RESISTANCE TABLE

TYPE	L-18	L17	T2-PRI.	T2-SEC.
RL-63 F-1	1.8	0.1	376	0.26
84091-1	2.4	0.16	520	0.37
84091-2	4.5	0.22	700	0.50

I.F. 460 K.C.

Figure 3—Schematic Circuit Diagram

Electrical Specifications

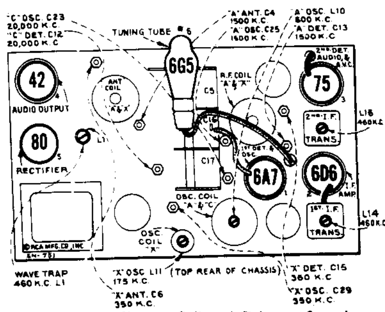


Figure 1—Radiotron, Coil, and Trimmer Locations

Frequency or Wave-length Ranges
"Long Wave" (X). 145-350 kc (approx. 2,068-857 meters)
"Medium Wave" (A). 525-1,550 kc (approx. 571-193 meters)
"Short Wave" (C) .... 5.8-22 megacycles
Intermediate Frequency .... 460 kc

Radiotron Complement
(1) RCA-6A7 .... First Detector—Oscillator
(2) RCA-6D6 .... Intermediate Amplifier
(3) RCA-75 ..... Second Detector, A-F Amp. and A.V.C.
(4) RCA-42 .... Audio Power Amplifier
(5) RCA-80 .... Full-Wave Rectifier
(6) RCA-6G5 .... "Magic Eye" Tuning Tube
Pilot Lamps (2) .... Mazda No. 46, 6.3 volts, 0.25 ampere

Power Supply Ratings
Rating A .... 105-125 volts, 50-60 cycles, 75 watts
Rating B .... 105-125 volts, 25-60 cycles, 75 watts
Rating C .... 100-130/140-160/195-250 volts, 40-60 cycles, 75 watts

Power Output Rating
Undistorted .... 2.5 watts
Maximum .... 4.5 watts

R-F Alignment Frequencies
"Short Wave" (C) .... 20,000 kc (osc., det.)
"Medium Wave" (A)..600 kc (osc.), 1,500 kc (osc., det., ant.)
"Long Wave" (X).... 175 kc (osc.), 350 kc (osc., det., ant.)

Loudspeaker
Type .... Electrodynamic
V.C. Impedance.... (RL-63F-1) 2.2— (84091-1) 2.6— (84091-2) 4.7— ohms at 400 cycles

RCA MANUFACTURING COMPANY, Inc.

MODELS 86T4 & 86T44

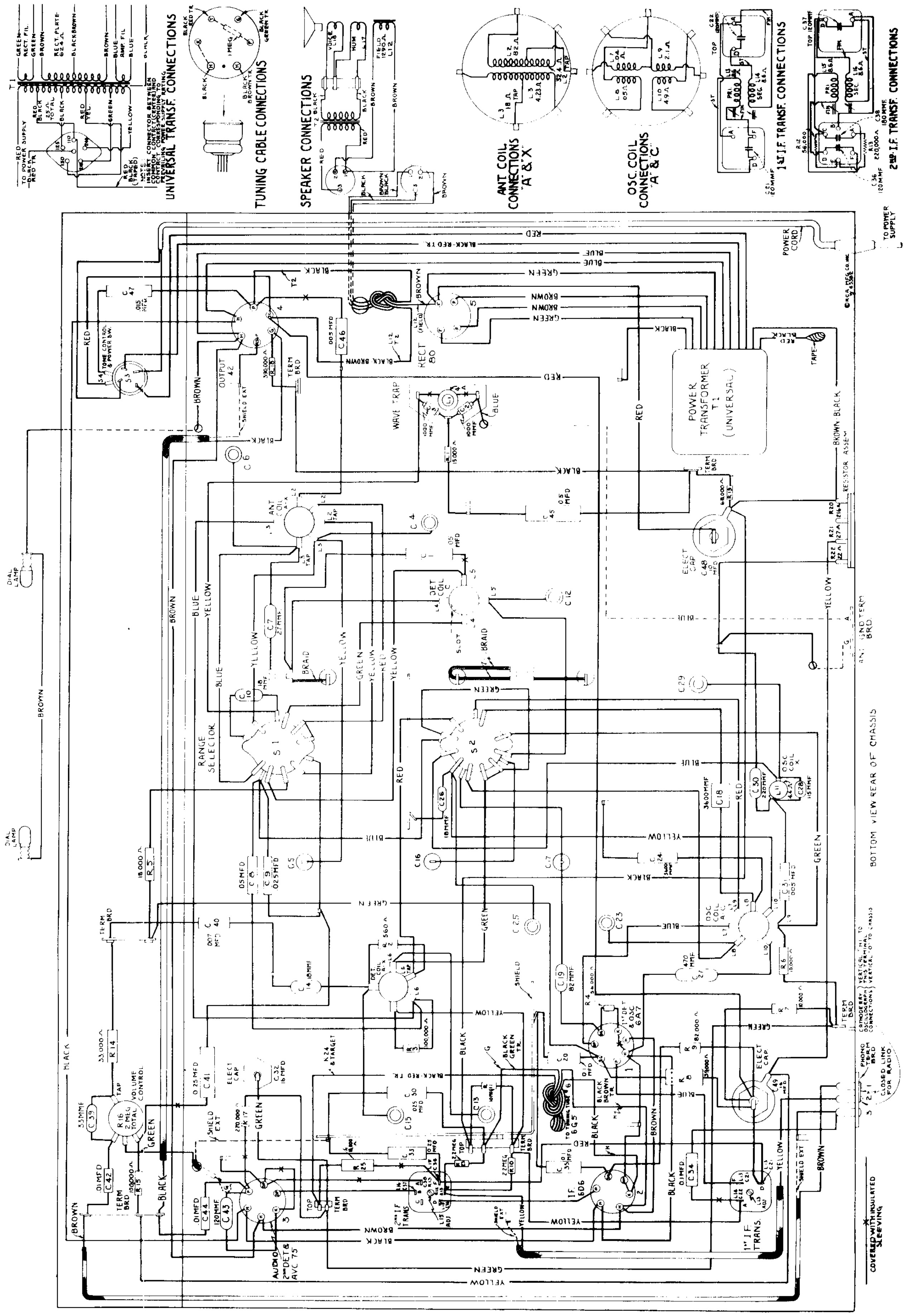


Figure 4—Chassis Wiring Diagram

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MODELS 86T4 & 86T44

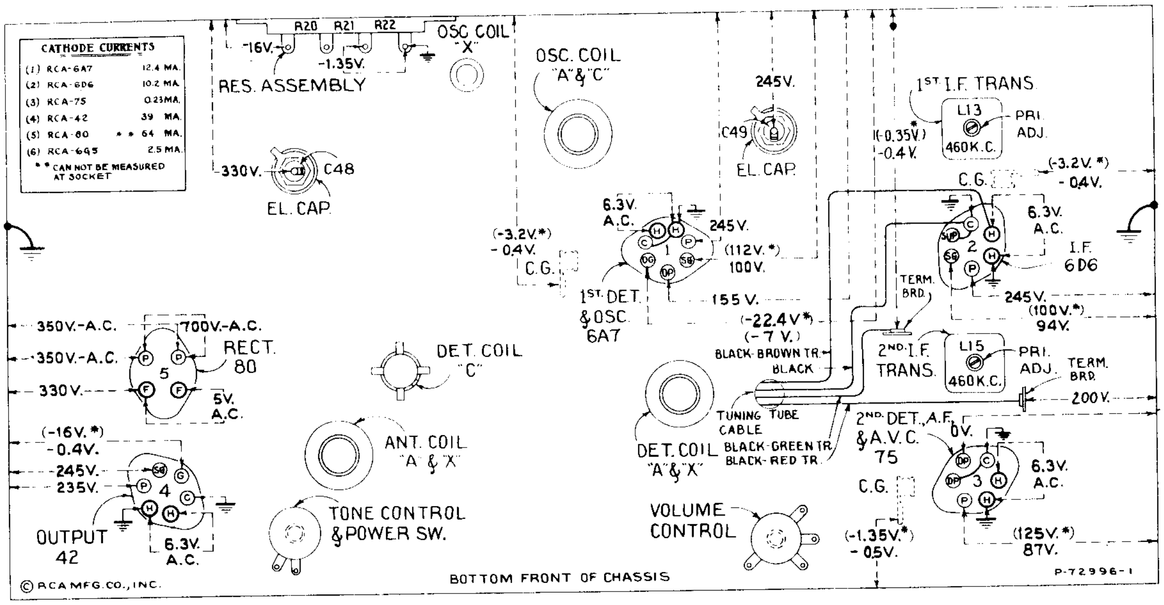

Figure 2—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc or 300 meters "A" band—No signal being received—Volume control minimum

***Note:** Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.*

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250 and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

Alignment Procedure

Calibrate the tuning dial by adjusting main dial pointer to the low-frequency (end) calibration mark on dial with the gang tuning-condenser plates in full-mesh position; then adjust the small (vernier) pointer to figure 0. These are friction adjustments.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1 and 2.

Cathode-ray alignment is highly preferable; the connections to the chassis are shown on figure 4. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver "G" (ground) terminal for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc (400-550 meters) where no signal or interference is received from a station or local (heterodyne) oscillator.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator: Connection to Receiver	Test Oscillator: Dummy Antenna	Test Oscillator: Frequency Setting	Receiver Dial Setting	Range Selector	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
1	6D6 I-F Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc (400-560 meters)	"A" Center	2nd I-F Trans.	L15 and L16	Max. (peak)
2	6A7 Det. Grid Cap	.001 Mfd.	460 kc	No Signal 550-750 kc (400-550 meters)	"A"	1st I-F Trans.	L13 and L14	Max. (peak)
3	Ant. Term.	200 Mmfd.	460 kc	No Signal 550-750 kc (400-550 meters)	"A"	Wave-trap	L1	Minimum Output
4	Ant. Term.	300 Ohms	20,000 kc	20 mc	"C" Right	"C" Osc.	C23	Max. (peak)*
5	Ant. Term.	300 Ohms	20,000 kc	Rock Thru 20 mc	"C"	"C" Det.	C12	Max. (peak)†‡
6	Ant. Term.	200 Mmfd.	600 kc	600 kc (500 meters)	"A" Center	"A" L-F Osc.	L10	Max. (peak)
7	Ant. Term.	200 Mmfd.	1,500 kc	1,500 kc (200 meters)	"A"	"A" H-F Osc.	C25	Max. (peak)
8	Ant. Term.	200 Mmfd.	600 kc	Rock Thru 600 kc (500 meters)	"A"	"A" L-F Osc.	L10	Max. (peak)
9	Ant. Term.	200 Mmfd.	1,500 kc	1,500 kc (200 meters)	"A"	"A" H-F Osc.	C25	Max. (peak)
10	Ant. Term.	200 Mmfd.	1,500 kc	1,500 kc (200 meters)	"A"	"A" Det.	C13	Max. (peak)
11	Ant. Term.	200 Mmfd.	1,500 kc	1,500 kc (200 meters)	"A"	"A" Ant.	C4	Max. (peak)
12	Ant. Term.	200 Mmfd.	175 kc	175 kc (1715 meters)	"X" Left	"X" L-F Osc.	L11	Max. (peak)
13	Ant. Term.	200 Mmfd.	350 kc	350 kc (857 meters)	"X"	"X" H-F Osc.	C29	Max. (peak)
14	Ant. Term.	200 Mmfd.	175 kc	Rock Thru 175 kc (1715 meters)	"X"	"X" L-F Osc.	L11	Max. (peak)
15	Ant. Term.	200 Mmfd.	350 kc	350 kc (857 meters)	"X"	"X" H-F Osc.	C29	Max. (peak)
16	Ant. Term.	200 Mmfd.	350 kc	350 kc (857 meters)	"X"	"X" Det.	C15	Max. (peak)
17	Ant. Term.	200 Mmfd.	350 kc	350 kc (857 meters)	"X"	"X" Ant.	C6	Max. (peak)

* Use minimum capacity peak if two peaks can be obtained.
† Use maximum capacity peak if two peaks can be obtained.
‡ After this adjustment, check for image signal by shifting receiver dial to 19,080 kc.

Service Data

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such as R1, L1, C1, etc., provide reference between the illustrations and Replacement Parts List. The coils, transformer windings, and reactors are rated in terms of d-c resistance to permit continuity checks.

Precautionary Lead Dress.—Keep the following leads as short as possible. (1) Bus lead from C16 to S2, (2) bus lead from L8 to S2, (3) leads from C24 to L8 and to chassis. (4) Bus lead from L5 to S2 should be 2½ inches long between lugs and dressed away from S2, (5) bus lead from C17 to S2 should be dressed away from adjacent parts, (6) leads should be dressed away from grid lug of 42 tube, (7) C11 lead to L5 should be 1 inch long and dressed between L5 and C4, C11 lead to ground should be short, (8) green lead between opposite lugs on S2 should be dressed away from S2, (9) excess antenna lead should be dressed above chassis, (10) blue lead from L7 to 6A7 oscillator plate lug should be dressed down and away from L8 lug and away from oscillator grid of 6A7. (11) green lead from L6 to S2 should be dressed away from bus connected between C17 and S2, (12) red lead from L6 tap to S2 should be dressed away from bus connected between C17 and S2. When necessary to replace bus leads, use only wire having same diameter as original.

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio amplifying circuit. RCA Victor Models R-93, R-93-A, R-93-2, or R-94 Record Players should be connected as follows: Remove link between terminals 1 and 2 on terminal board. Connect green wire in Radio-Record switch cable to terminal 1, yellow to terminal 2, and shield extension to terminal 3. Tape unused red and blue leads separately. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch.

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care that the acetone does not flow into the air gap. Speakers RL-63F-1 and 84091-1 have screws for the centering adjustment, while on speaker 84091-2, it is necessary to separate the glued centering disc from the housing, insert paper feelers in air gap, then apply cement to the centering disc, press down firmly, and leave the feelers in place until the cement dries. The dust cover should be cemented back in place with ambroid after completion of the adjustment.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14542	Arm—Band indicator operating arm and hub—less set screw, Stock No. 14350
12038	Band—Rubber band for tuning tube
14388	Belt—Variable condenser drive belt
13216	Board—Antenna and ground terminal board
12717	Board—Phonograph terminal board
14338	Bushing—Variable condenser mounting bushing and screw assembly
14394	Cable—Tuning tube cable and socket
12607	Cap—First I.F. transformer shield top
12581	Cap—Second I.F. transformer shield top
12118	Cap—Grid contact cap
12884	Capacitor—Adjustable trimmer (long) (C4, C6, C13, C15, C25, C29)
12714	Capacitor—Adjustable trimmer (medium) (C12)
12807	Capacitor—Adjustable trimmer (short) (C23)
12722	Capacitor—18 Mmfd. (C10, C14, C26)
13605	Capacitor—27 Mmfd. (C7)
12948	Capacitor—33 Mmfd. (C39)
12813	Capacitor—82 Mmfd. (C19)
13604	Capacitor—115 Mmfd. (C28)
12404	Capacitor—120 Mmfd. (C21, C22, C36, C37)
12724	Capacitor—120 Mmfd. (C43)
12406	Capacitor—180 Mmfd. (C38)
13602	Capacitor—220 Mmfd. (C30)
13603	Capacitor—470 Mmfd. (C27)
13593	Capacitor—1,000 Mmfd. (C2, C3)
12811	Capacitor—3,800 Mmfd. (C18, C24)
4838	Capacitor—.005 Mfd. (C31, C46)
5148	Capacitor—.007 Mfd. (C40)
13138	Capacitor—.01 Mfd. (C42, C44)
11315	Capacitor—.015 Mfd. (C47)
13606	Capacitor—.025 Mfd. (C9)
4870	Capacitor—.025 Mfd. (C50)
4886	Capacitor—.05 Mfd. (C11)
13607	Capacitor—.05 Mfd. (C8)
4839	Capacitor—0.1 Mfd. (C20, C34, C35)
12484	Capacitor—0.25 Mfd. (C33, C41)
12741	Capacitor—0.5 Mfd. (C45)
11203	Capacitor—10 Mfd. (C48)
5212	Capacitor—16 Mfd. (C49)
14377	Capacitor—16 Mfd. (C32)
13587	Coil—Antenna coil and shield—"X" and "A" bands (L2, L3)
13589	Coil—Antenna coil—"C" band only (L4, L5)
13590	Coil—Oscillator coil and shield—"X" band only (L11)
12798	Coil—Oscillator coil and shield—"A" and "C" bands (L7, L8, L9, L10)
13588	Coil—R.F. coil and shield—"X" and "A" bands (L6)
14539	Condenser—3-gang variable tuning condenser (C5, C16, C17)
5119	Connector—3-contact female connector for reproducer cable
12800	Core—Adjustable core and stud assembly for Stock No. 12798
12882	Core—Adjustable core and stud for Stock No. 13590
12006	Core—Adjustable core and stud for Stock Nos. 12652 and 12653
12664	Core—Adjustable core and stud for Stock No. 13592
14541	Dial—Station selector dial scale, complete with tuning tube escutcheon (for European use only)
14543	Dial—Band indicator dial and mounting bracket
14544	Dial—Station selector dial scale complete with tuning tube escutcheon (for other than European use)
14540	Drive—Variable condenser vernier drive pinion gear and shaft
14345	Drum—Variable condenser drive belt drum, complete with set screws
14387	Escutcheon—Tuning tube escutcheon
11982	Fastener—Dial scale fastener
30085	Gear—Indicator drive gear and hub assembly and indicator pointer stem and gear assembly
14341	Idler—Station selector drive belt idler
14344	Indicator—Station selector indicator pointer
14382	Indicator—Vernier indicator pointer
5226	Lamp—Dial lamp
14028	Nut—Jamb nut for Stock Nos. 12884, 12807 and 12714
14340	Pulley—Station selector drive belt pulley and knob shaft
14362	Reflector—Dial reflector, lamp bracket and tuning tube mounting bracket and clamp
14343	Retainer—Drive shaft and pulley retainer—holds tuning knob shaft and pulley on range switch shaft
11324	Resistor—560 Ohms—Carbon type, ¼ watt (R2)
3078	Resistor—10,000 Ohms—Carbon type, ¼ watt (R6, R7)
13594	Resistor—15,000 Ohms—Carbon type, 1/10 watt (R1)
3219	Resistor—18,000 Ohms—Carbon type, ¼ watt (R5)
14078	Resistor—18,000 Ohms—Carbon type, 1 watt (R25)
13735	Resistor—33,000 Ohms—Carbon type, ¼ watt (R14)
13206	Resistor—39,000 Ohms—Carbon type, 2 watt (R6)
5029	Resistor—56,000 Ohms—Carbon type, ¼ watt (R4)
11282	Resistor—56,000 Ohms—Carbon type, 1/10 watt (R12)
12333	Resistor—68,000 Ohms—Carbon type, ¼ watt (R19)
5064	Resistor—82,000 Ohms—Carbon type, ¼ watt (R9)
5145	Resistor—100,000 Ohms—Carbon type, ¼ watt (R3, R15)
11398	Resistor—220,000 Ohms—Carbon type, 1/10 watt (R13)
12199	Resistor—270,000 Ohms—Insulated, ¼ watt (R17)
13479	Resistor—390,000 Ohms—Carbon type, ¼ watt (R18)
12613	Resistor—1 Megohm—Carbon type, 1/10 watt (R24)
12679	Resistor—2.2 Megohm—Insulated, ¼ watt (R10, R23)
13601	Resistor—10 Megohm—Insulated, ¼ watt (R11)
12004	Resistor—Voltage divider—Comprising one 216 ohm, one 27 ohm and one 22 ohm sections (R20, R21, R22)
14350	Screw—No. 8-32 x 3/16 square head set screw for gear, Stock No. 14365, and drum, Stock No. 14345, and arm, Stock No. 14542
12710	Shield—Coil shield for Stock Nos. 13587 and 13588
12799	Shield—Coil shield for Stock No. 12798
12883	Shield—Coil shield for Stock No. 13590
12008	Shield—I.F. transformer shield
12798	Shield—Oscillator coil and shield—"A" and "C" bands (L7, L8, L9, L10)
3682	Shield—6A7, or 75 Radiotron shield
4253	Shield—6D6 Radiotron shield
11383	Shield—42 Radiotron shield
14114	Socket—Dial lamp socket
4794	Socket—4-contact 80 Radiotron socket
4786	Socket—6-contact 42, 75 or 6D6 Radiotron socket
4787	Socket—7-contact 6A7 Radiotron socket
12007	Spring—Retaining spring for core, Stock Nos. 12006, 12664 and 12882
12907	Spring—Tension spring for indicator drive gear, Stock No. 14365
14342	Spring—Tension spring for idler, Stock No. 14341
14537	Switch—Range switch (S1, S2)
14538	Switch—Tone and power switch (S3, S4)
12652	Transformer—First I.F. transformer (L13, L14, C21, C22)
12653	Transformer—Second I.F. transformer (L15, L16, C36, C37, C38, R12, R13)
13392	Transformer—Power transformer—105-125 volts, 50-60 cycles (T1)
13568	Transformer—Power transformer—105-125 volts, 25-60 cycles (T1)
12646	Transformer—Power transformer—100-130 140-160 195-250 volts, 50-60 cycles (T1)
13592	Trap—Wave trap (L1)
14335	Volume Control (R16)
14379	Washer—Felt washer for indicator pointer
	REPRODUCER ASSEMBLIES
	Model 86T4 (Speaker No. RL-63F-1)
14356	Board—3-contact reproducer terminal board
13886	Cap—Cone center dust cap
12012	Coil—Field coil (L12)
11469	Coil—Hum neutralizing coil (L17)
12642	Cone—Reproducer cone and dust cap (L18)
5118	Plug—3-contact male plug for reproducer
14360	Reproducer—Reproducer complete
14358	Screw—Screw, washer and lockwasher to hold core in yoke
14355	Transformer—Output transformer (T2)
14357	Washer—Spring washer to hold field coil
	Model 86T44 (Speaker No. 84091-1)
14616	Coil—Reproducer field coil (L12, L17)
14614	Cone—Reproducer cone and voice coil (L18)
5118	Plug—3-contact male plug
14613	Reproducer—Complete
14615	Transformer—Output transformer (T2)
	MISCELLANEOUS ASSEMBLIES
14396	Escutcheon—Station selector escutcheon and crystal
14269	Knob—Volume control, tone control or range switch knob
14359	Knob—Station selector knob
11377	Screw—Chassis mounting screw assembly
4982	Spring—Retaining spring for knob, Stock No. 14359
14270	Spring—Retaining spring for knob, Stock No. 14269

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MODEL 810T4

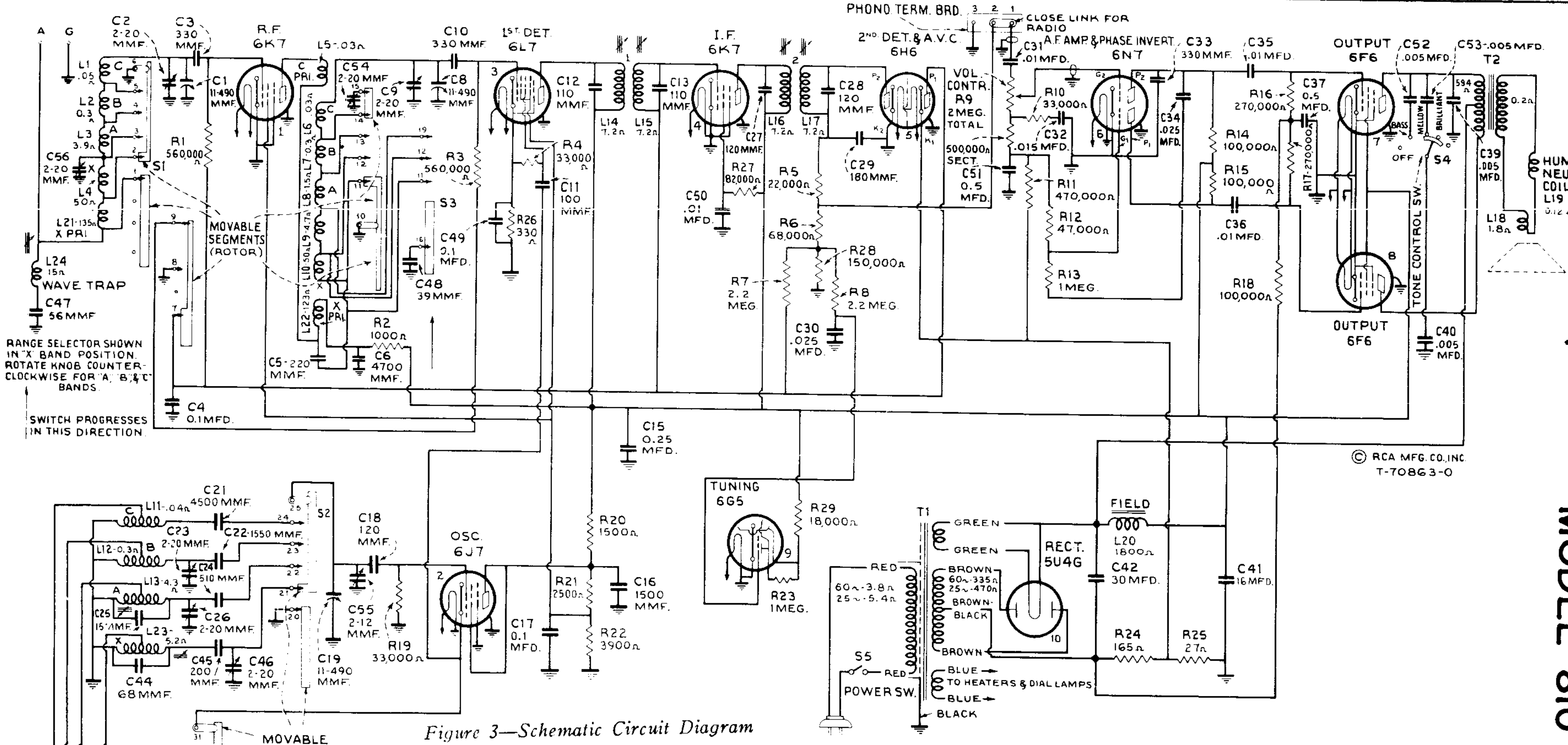

Figure 3—Schematic Circuit Diagram

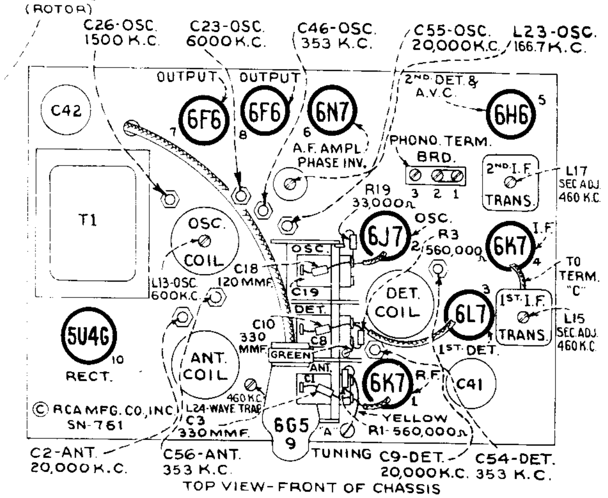

Figure 1—Radiotron, Coil, and Trimmer Locations

Electrical Specifications

Frequency Ranges

"Long Wave" (X) .... 2,000-850 meters (150-353 kc)
"Medium Wave" (A) ..... 565-180 meters (531-1,666 kc)
"Short Wave 1" (B) .... 2.1-6.8 mc (143-44.1 meters)
"Short Wave 2" (C) .... 6.8-22 mc (44.1-13.64 meters)
Intermediate Frequency .... 460 kc

Radiotron Complement

(1) RCA-6K7 .... R-F Amplifier
(2) RCA-6J7 .... Heterodyne Oscillator
(3) RCA-6L7 .... First Detector
(4) RCA-6K7 .... Intermediate Amplifier
(5) RCA-6H6 .... Second Detector and A.V.C.
(6) RCA-6N7 .... Phase Inverter A-F Amplifier
(7) RCA-6F6 .... Power Output
(8) RCA-6F6 .... Power Output
(9) RCA-6G5 .... "Magic Eye" Tuning Tube
(10) RCA-5U4G .... Full-Wave Rectifier

Pilot Lamps (5) .... Mazda No. 46, 6.3 volts, 0.25 amp.

Power Supply Ratings

Rating A .... 105-125 volts, 50-60 cycles, 135 watts
Rating B .... 105-125 volts, 25-60 cycles, 135 watts
Rating C .... 100-130/140-160/195-250 volts, 40-60 cycles, 135 watts

Power Output

Undistorted .... 10 watts
Maximum .... 12.5 watts

R-F Alignment Frequencies

"Short Wave 2" (C) .... 20,000 kc (osc., det., ant.)
"Short Wave 1" (B) .... 6,000 kc (osc.)
"Medium Wave" (A) ...... 600 kc (osc.), 1,500 kc (osc.)
"Long Wave" (X). 166.7 kc (osc.), 353 kc (osc., det., ant.)

Loudspeaker

Type .... 8-inch Electrodynamic
Impedance (v.c.) .... 2.2 ohms at 400 cycles

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MODEL 810T4

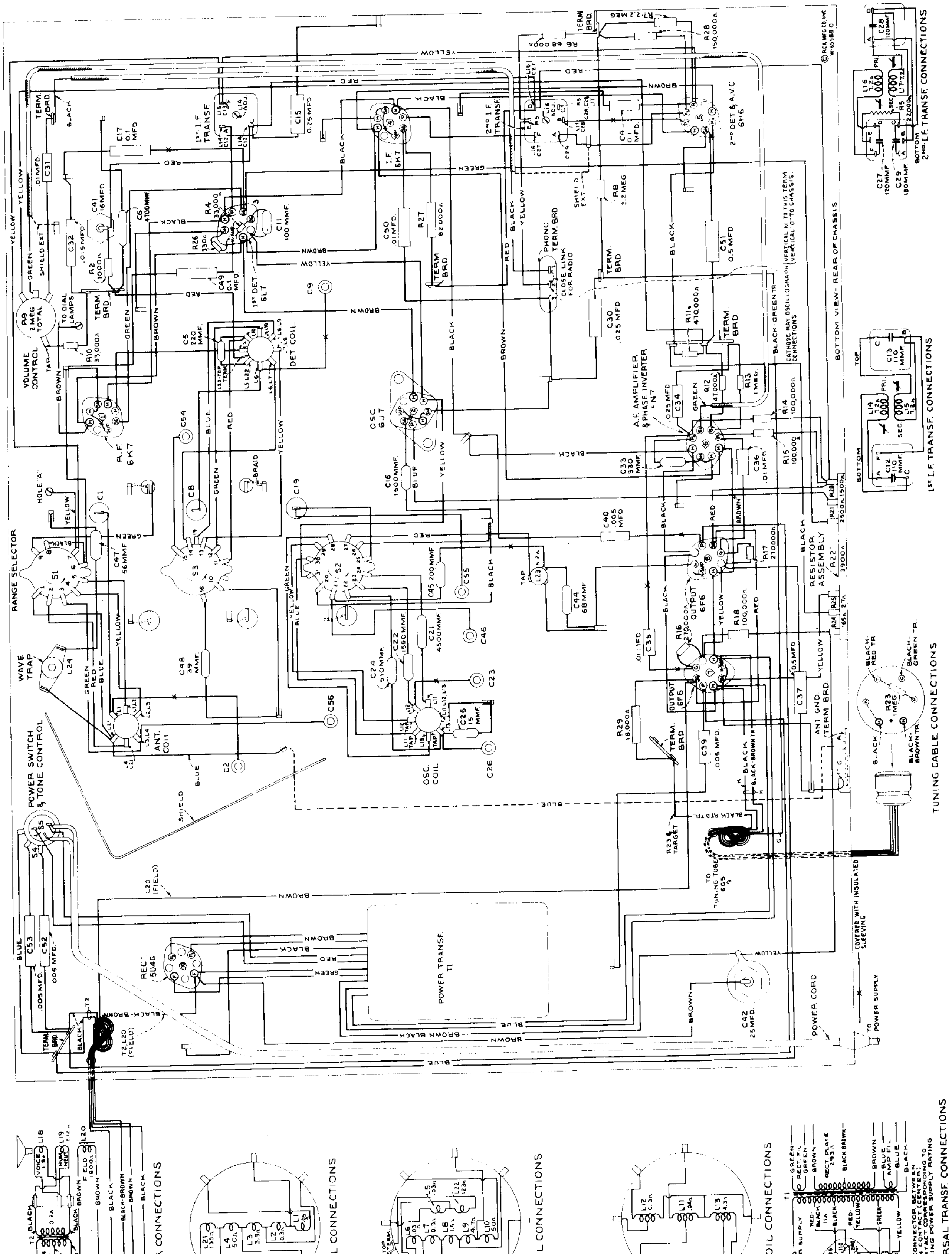

Figure 4—Chassis Wiring Diagram

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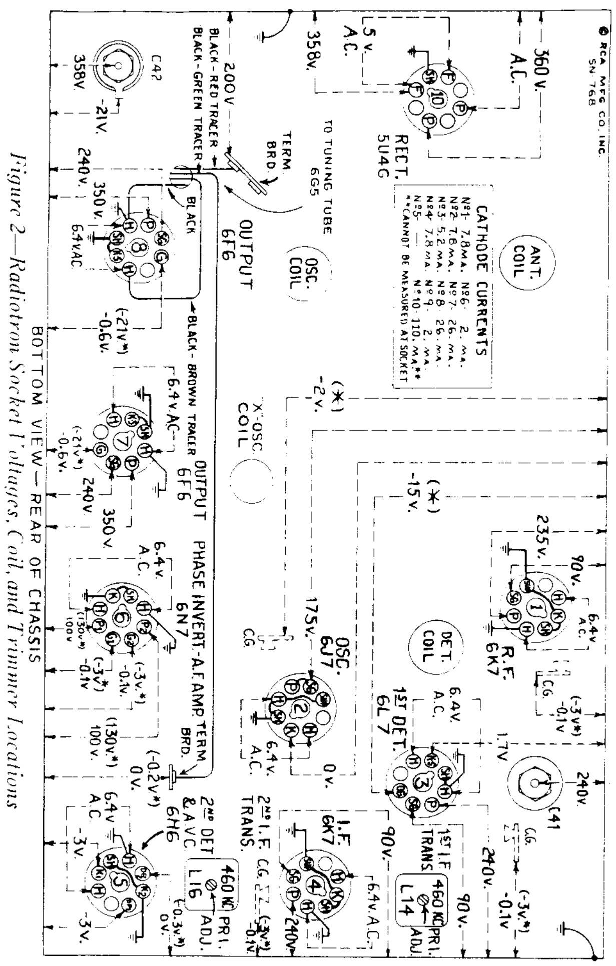

Figure 2—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc or 300 meters, "A" band ("Medium Wave")—No signal being received—Volume control minimum

***Note:** Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.*

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250 and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

Alignment Procedure

Calibrate the tuning dial by adjusting main dial pointer to the low-frequency (end) calibration mark on dial with the gang tuning-condenser plates in full-mesh position; then adjust the small (vernier) pointer to "0." These are friction adjustments.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1 and 2.

Cathode-ray alignment is highly preferable: the connections to the chassis are shown on figure 4. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver "G" (ground) terminal for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 545-400 meters" means that the receiver should be tuned to a point between 545 and 400 meters where no signal or interference is received from a station or local (heterodyne) oscillator. In extreme noisy locations, one end of C10 (top of gang) should be unsoldered during i-f alignment.

Conversion of kilocycles (kc) to meters for alignment frequencies is as follows: 20,000 kc (20 mc) = 15 meters, 6,000 kc (6 mc) = 50 meters; 1,500 kc = 200 meters; 600 kc = 500 meters; 460 kc = 652 meters; 353 kc = 850 meters; and 166.7 kc = 1,800 meters.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator: Connection to Receiver	Test Oscillator: Dummy Antenna	Test Oscillator: Frequency Setting	Range Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
1	6K7 I-F Grid Cap	.001 Mfd.	460 kc	"Medium Wave"	No Signal 545-400 meters	2nd I-F Trans.	L16 and L17	Max. (peak)
2	6L7 Det. Grid Cap	.001 Mfd.	460 kc	"Medium Wave"	No Signal 545-400 meters	1st I-F Trans.	L14 and L15	Max. (peak)
3	Ant. Term.	200 Mmfd.	460 kc	"Medium Wave"	No signal 545-400 meters	Wave Trap	L24	Minimum Output
4	Ant. Term.	300 Ohms	20,000 kc	"Short Wave 2"	20 mc	"C" Osc.	C55	Max. (peak)*
5	Ant. Term.	300 Ohms	20,000 kc	"Short Wave 2"	20 mc	"C" Det.	C9	Max. (peak)†
6	Ant. Term.	300 Ohms	20,000 kc	"Short Wave 2"	20 mc	"C" Ant.	C2	Max. (peak)‡
7	Ant. Term.	300 Ohms	6,000 kc	"Short Wave 1"	6 mc	"B" Osc.	C23	Max. (peak)*
8	Ant. Term.	200 Mmfd.	600 kc	"Medium Wave"	500 meters	"A" L-F Osc.	L13	Max. (peak)
9	Ant. Term.	200 Mmfd.	1,500 kc	"Medium Wave"	200 meters	"A" H-F Osc.	C26	Max. (peak)
10	Ant. Term.	200 Mmfd.	600 kc	"Medium Wave"	500 meters	"A" L-F Osc.	L13	Max. (peak)
11	Ant. Term.	200 Mmfd.	1,500 kc	"Medium Wave"	200 meters	"A" H-F Osc.	C26	Max. (peak)
12	Ant. Term.	200 Mmfd.	166.7 kc	"Long Wave"	1,800 meters	"X" L-F Osc.	L23	Max. (peak)
13	Ant. Term.	200 Mmfd.	353 kc	"Long Wave"	850 meters	"X" H-F Osc.	C46	Max. (peak)
14	Ant. Term.	200 Mmfd.	353 kc	"Long Wave"	850 meters	"X" Det.	C54	Max. (peak)
15	Ant. Term.	200 Mmfd.	353 kc	"Long Wave"	850 meters	"X" Ant.	C56	Max. (peak)
16	Ant. Term.	200 Mmfd.	166.7 kc	"Long Wave"	1,800 meters	"X" L-F Osc.	L23	Max. (peak)
17	Ant. Term.	200 Mmfd.	353 kc	"Long Wave"	850 meters	"X" H-F Osc.	C46	Max. (peak)

* Use minimum capacity peak if two peaks can be obtained.
† Use maximum capacity peak if two peaks can be obtained.
‡ After this adjustment, check for image signal by shifting receiver dial to 19,080 mc.

Service Data

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such as R1, L1, C1, etc., provide reference between the illustrations and Replacement Parts List. The coils, transformer windings, and reactors are rated in terms of d-c resistance to permit continuity checks.

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow celluloid or paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio amplifying circuit. RCA Victor Models R-93, R-93-A, R-93-2, or R-94 Record Players should be connected as follows. Remove link between terminals 1 and 2 on terminal board. Connect green wire in Radio-Record switch cable to terminal 1, yellow to terminal 2, and shield extension to terminal 3. Tape unused red and blue leads separately. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw terminals on Radio-Record switch. If additional volume is desired, connect an RCA Stock No. 9632 transformer between the two-conductor twisted cable and the screw terminals on Radio-Record switch as follows: yellow and brown transformer leads and one side of twisted cable to ground screw-terminal on switch, black transformer lead to other side of twisted cable; and blue transformer lead to other screw-terminal on switch.

Precautionary Lead Dress.—(1) Twist yellow, blue, and green leads from oscillator coil to S2. (2) Dress C43 and C21 away from C55. (3) Dress black lead from S2 to ground lance away from C55. (4) Dress yellow lead from 6J7 socket to S2 under bus on 6J7 socket. (5) Make lead from S3 to ground 2½ inches long and dress away from chassis. (6) Twist filament leads. (7) Dress shielded lead from C31 to phono. term. board away from 6L7 socket. (8) Dress yellow lead from term. "K" of 6J7 to C11 away from chassis and from brown filament lead. (9) Dress all molded capacitors perpendicular to chassis. (10) Dress filament leads away from terms "G1" and "G2" of 6N7. (11) Twist blue leads from terms "P" of 6F6's. Make the following as short as possible: (12) Lead from oscillator coils to ground. (13) Lead from S2 to C19. (14) Lead from detector coil to S3. (15) Lead from detector coil to C8. (16) Lead from S1 to chassis ground lance. (17) Lead from antenna coil to S1. (18) Lead from antenna coil to C1. (19) Yellow lead from 2nd i-f transformer to phono term. board. When necessary to replace bus leads, use only wire having same diameter as original.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
12038	Band—Rubber band for tuning tube
14384	Belt—Variable condenser drive belt
14517	Board—Antenna and ground terminal board
12717	Board—Phonograph terminal board
14338	Bushing—Variable condenser mounting bushing assembly
14524	Cable—Band indicator cable, approximately 6½ inches long
14523	Cable—Tone control indicator cable, approximately 3 inches long
14394	Cable—Tuning tube cable and socket
11350	Cap—Grid contact cap
12607	Cap—First I-F transformer shield top
12581	Cap—Second I-F transformer shield top
12884	Capacitor—Adjustable trimmer (long) (C2, C9, C23, C26, C46, C54, C56)
12714	Capacitor—Adjustable trimmer (medium) (C55)
12896	Capacitor—15 Mmfd. (C25)
13546	Capacitor—39 Mmfd. (C48)
12723	Capacitor—56 Mmfd. (C47)
30233	Capacitor—68 Mmfd. (C44)
12720	Capacitor—100 Mmfd. (C11)
14262	Capacitor—110 Mmfd. (C12, C13)
12404	Capacitor—120 Mmfd. (C27, C28)
12724	Capacitor—120 Mmfd. (C18)
12406	Capacitor—180 Mmfd. (C29)
30232	Capacitor—200 Mmfd. (C45)
14548	Capacitor—220 Mmfd. (C5)
12952	Capacitor—330 Mmfd. (C3, C10, C33)
30231	Capacitor—510 Mmfd. (C24)
13762	Capacitor—1,500 Mmfd. (C16)
12729	Capacitor—1,550 Mmfd. (C22)
12728	Capacitor—4,500 Mmfd. (C21)
12897	Capacitor—4,700 Mmfd. (C6)
4838	Capacitor—.005 Mfd. (C39, C40, C52, C53)
13138	Capacitor—.01 Mfd. (C31, C35, C36, C50)
11315	Capacitor—.015 Mfd. (C32)
4870	Capacitor—.025 Mfd. (C30, C34)
4839	Capacitor—0.1 Mfd. (C4, C17, C49)
12484	Capacitor—0.25 Mfd. (C15)
12741	Capacitor—0.5 Mfd. (C37, C51)
5212	Capacitor—16 Mfd. (C41)
14531	Capacitor—25 Mfd. (C42)
30228	Coil—Antenna coil and shield—A, B, C, and X bands (L1, L2, L3, L4, L21)
14516	Coil—Oscillator coil and shield—A, B, and C bands (L11, L12, L13)
12881	Coil—Oscillator coil and shield—X band only (L23)
30229	Coil—R-F coil and shield—A, B, C, and X bands (L5, L6, L7, L8, L9, L10, L22)
14513	Condenser—3-gang variable tuning condenser (C1, C8, C19)
5040	Connector—4-contact female connector for reproducer cable
30567	Connector—4-contact female connector with metal shell for reproducer cable in later production
12006	Core—Adjustable core and stud for transformer, Stock Nos. 14376 and 14308
12800	Core—Adjustable core and stud for coil, Stock No. 14516
30230	Dial—Station selector dial scale, complete with tuning tube escutcheon
14514	Drive—Variable condenser vernier drive pinion gear and shaft
14345	Drum—Variable condenser drive belt drum, complete with set screws
14387	Escutcheon—Tuning tube escutcheon
11982	Fastener—Dial scale fastener
30085	Gear—Indicator drive gear and hub, and pointer stem and gear
14341	Idler—Station selector drive belt idler
14519	Indicator—Station selector indicator pointer
14382	Indicator—Vernier indicator pointer
5226	Lamp—Dial lamp
14028	Nut—Jamb nut for adjustable trimmer capacitor, Stock Nos. 12714 and 12884
12471	Plate—6J7 Radiotron socket mounting plate and rubber cushions—less socket
14340	Pulley—Station selector drive belt pulley and knob shaft
30227	Reflector—Dial reflector and bracket, complete with dial lamp bracket, tuning tube bracket and tone and band indicators
13250	Resistor—330 ohms, carbon type, ¼ watt (R26)
14720	Resistor—1,000 ohms, carbon type, ¼ watt (R2)
14078	Resistor—18,000 ohms, carbon type, 1 watt (R29)
14284	Resistor—22,000 ohms, carbon type, 1/10 watt (R5)
11500	Resistor—33,000 ohms, carbon type, 1/10 watt (R19)
13735	Resistor—33,000 ohms, carbon type, ¼ watt (R4, R10)
11646	Resistor—47,000 ohms, carbon type, ¼ watt (R12)
12333	Resistor—68,000 ohms, carbon type, ¼ watt (R6)
8064	Resistor—82,000 ohms, carbon type, ¼ watt (R27)
11281	Resistor—100,000 ohms, carbon type, 1/10 watt (R18)
5145	Resistor—100,000 ohms, carbon type, ¼ watt (R14, R15)
5027	Resistor—150,000 ohms, carbon type, ¼ watt (R28)
11453	Resistor—270,000 ohms, carbon type, 1/10 watt (R16, R17)
11172	Resistor—470,000 ohms, carbon type, ¼ watt (R11)
11397	Resistor—560,000 ohms, carbon type, 1/10 watt (R1, R3)
12013	Resistor—1 megohm, carbon type, 1/10 watt (R23)
13730	Resistor—1 megohm, carbon type, ¼ watt (R13)
11626	Resistor—2.2 megohms, carbon type, ¼ watt (R7, R8)
14532	Resistor—Voltage divider—comprising one 1,500 ohm, one 2,500 ohm, one 3,900 ohm, one 27 ohm, and one 165 ohm sections (R20, R21, R22, R24, R25)
14343	Retainer—Station selector knob shaft and pulley retainer
14350	Screw—No. 8-32 x 3/16 square-head set-screw for drum, Stock No. 14345, gear, Stock No. 30085, and hub and arm on band indicator cable
12799	Shield—Antenna or R-F coil shield
12008	Shield—First or second I-F transformer shield
14375	Shield—Oscillator coil shield for Stock No. 14516
12883	Shield—Oscillator coil shield for Stock No. 12881
14114	Socket—Dial lamp socket
11195	Socket—5-contact 5U4G Radiotron socket
11196	Socket—8-contact 6F6, 6H6, 6K7, 6L7, 6J7, or 6N7 Radiotron socket
12907	Spring—Tension spring for indicator drum gear, Stock No. 30085
14342	Spring—Tension spring for idler, Stock No. 14341
12007	Spring—Retaining spring for core, Stock Nos. 12006 and 12800
30084	Switch—High-frequency tone and power switch (S4, S5)
30226	Switch—Range switch (S1, S2, S3)
12654	Trap—Wave trap (L24)
14376	Transformer—First I-F transformer (L14, L15, C12, C13)
14308	Transformer—Second I-F transformer (L16, L17, C27, C28, C29, R5)
11212	Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1)
11213	Transformer—Power transformer, 105-250 volts, 50-60 cycles (T1)
14335	Volume Control (R9)
14379	Washer—Felt washer for indicator pointer
	REPRODUCER ASSEMBLIES (RL-63F-2)
14356	Board—3-contact reproducer terminal board
13866	Cap—Cone center dust cap
11234	Coil—Field coil (L20)
11469	Coil—Hum neutralizing coil (L19)
12642	Cone—Reproducer cone and dust cap (L18)
5039	Plug—4-contact male plug for reproducer
14533	Reproducer, complete
14358	Screw—Screw, washer, and lockwasher to hold core in yoke
14534	Transformer—Output transformer (T2)
14357	Washer—Spring washer to hold field coil
	MISCELLANEOUS ASSEMBLIES
5040	Connector—4-contact female connector for reproducer interconnecting cable in later production
30568	Connector—4-contact male connector for reproducer interconnecting cable in later production
30234	Escutcheon—Station selector escutcheon and crystal, complete with tone and band indicating stripe
14611	Index—Tone control indicating strip—mounts in station selector escutcheon
30235	Index—Band indicating strip—mounts in station selector escutcheon
14359	Knob—Station selector knob
14269	Knob—Volume control, tone control, or range switch knob
11377	Screw—Chassis mounting screw and washer assembly
4982	Spring—Retaining spring for knob, Stock No. 14359
14270	Spring—Retaining spring for knob, Stock No. 14289

RCA MANUFACTURING COMPANY, Inc.

MODEL 813K

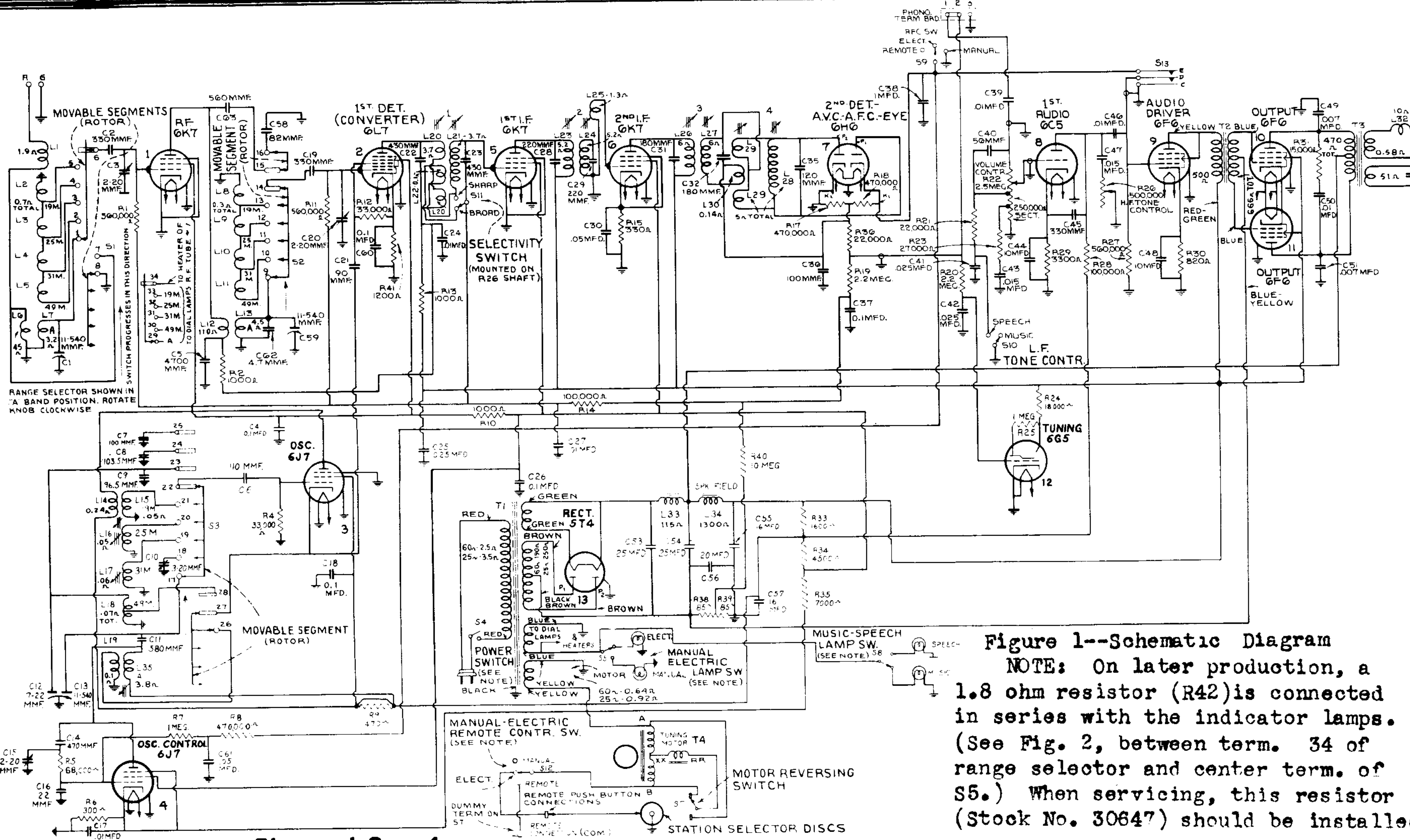

Figure 1--Schematic Diagram

NOTE: On later production, a 1.8 ohm resistor (R42) is connected in series with the indicator lamps. (See Fig. 2, between term. 34 of range selector and center term. of S5.) When servicing, this resistor (Stock No. 30647) should be installed.

Electrical Specifications

Frequency Ranges

"Standard Broadcast" (A) .... 530-1,720 kc
"49M." (49 Meters) .... 5,970-6,240 kc
"31M." (31 Meters) .... 9,410-9,690 kc
"25M." (25 Meters) .... 11,680-11,920 kc
"19M." (19 Meters) .... 15,090-15,380 kc

R-F Alignment Frequencies

"31M." (31 Meters) .... 9,600 kc (osc., det., ant.)
"25M." (25 Meters) .... 11,700 kc (osc.)
"19M." (19 Meters) .... 15,300 kc (osc.)
"49M." (49 Meters) .... 6,100 kc (osc.)
"Standard Broadcast" (A) .. 600 kc (osc.), 1,500 kc (osc.)

Intermediate Frequency .... 460 kc

Power Supply Ratings

Rating A .... 105-125 volts, 50-60 cycles, 150 watts
Rating B .... 105-125 volts, 25 cycles, 150 watts
Rating C .... 100-130/140-160/195-250 volts, 50-60 cycles, 150 watts

Power Output

Undistorted .... 15 watts
Maximum .... 20 watts

Loudspeaker

Type .... 12-inch Electrodynamic
Impedance (v.c.) .... 11.5 ohms at 400 cycles

General Description

This receiver employs a thirteen-tube, five-band, "Magic Brain" superheterodyne circuit. Features of design include "Electric Tuning" with push-button operation; automatic frequency control; spread-band "Overseas" dial; "qumulative-wound" antenna and detector "A" band coils; tuned r-f amplifier; magnetite-core adjusted i-f transformers and low-frequency "A" oscillator tracking; two-stage i-f amplifier; phonograph terminal board; "Magic Eye" tuning tube; twelve-inch electrodynamic loudspeaker; plunger-type, air-dielectric trimming capacitors; temperature-stabilized capacitors; two-point aural-compensated volume control; "Fidelity" control; "Music-Speech" control; and a driven push-pull power-output stage. In addition, this model has a cabinet incorporating the "Sonic Arc" Magic Voice.

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MODEL 813K

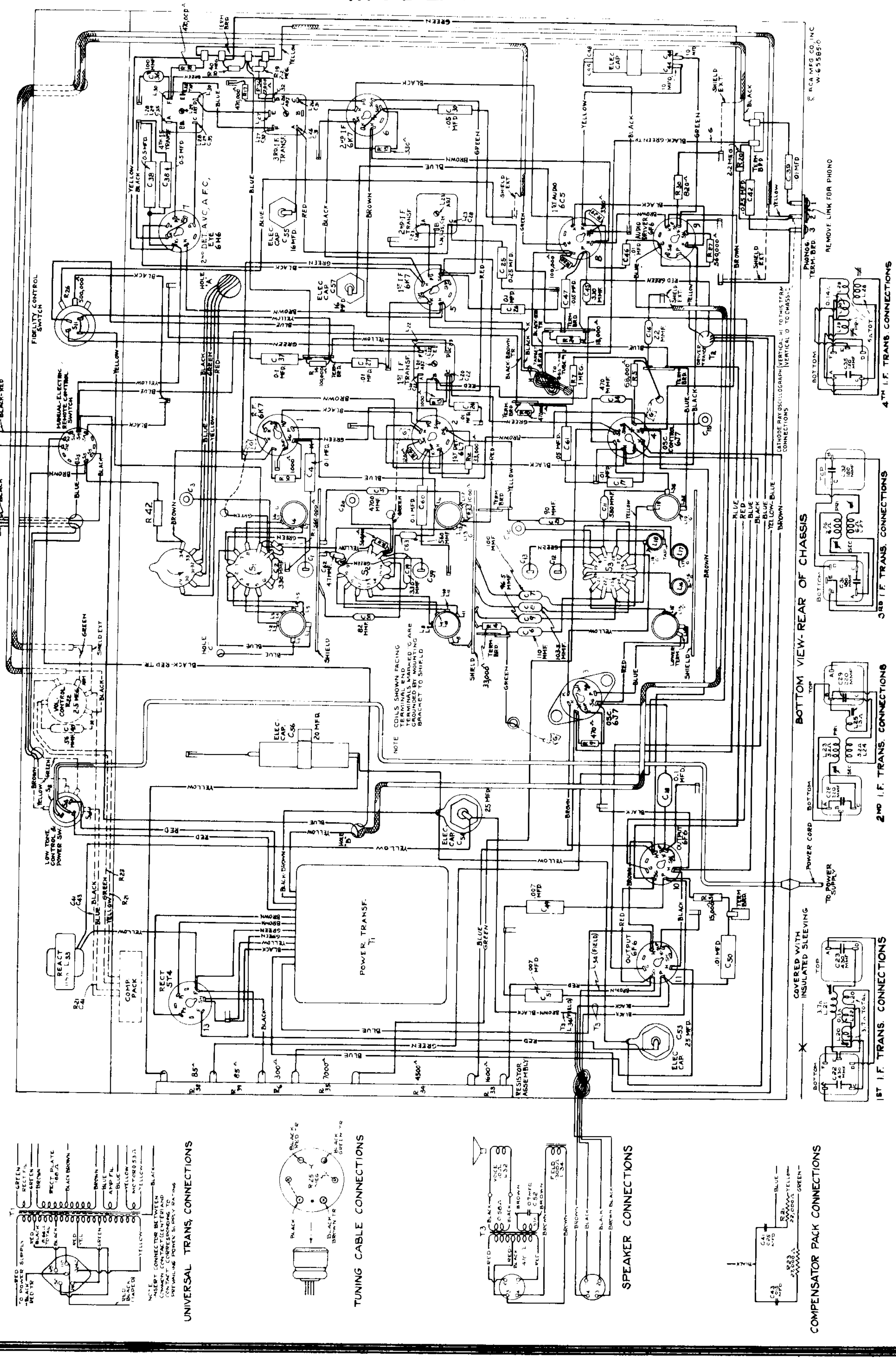

Figure 2—Chassis Wiring Diagram

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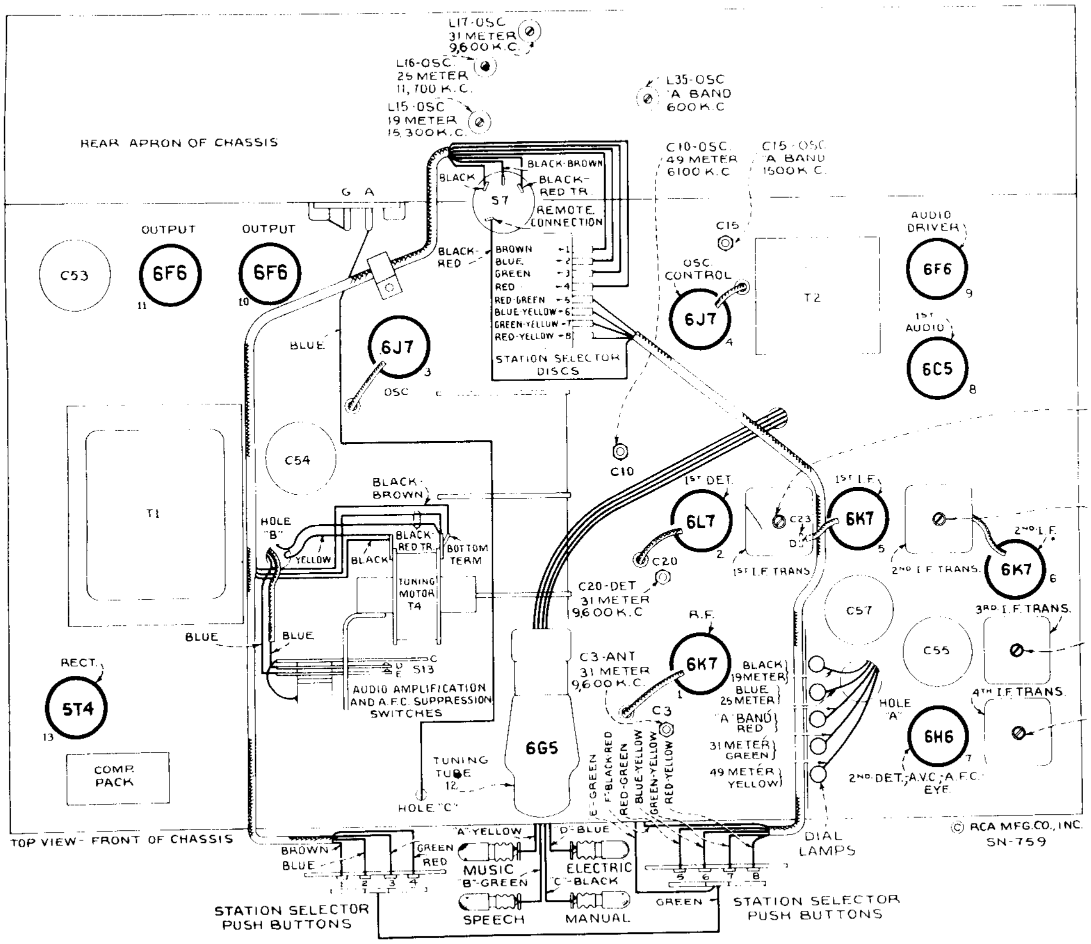

Figure 3—Radiotron, Coil, and Trimmer Locations

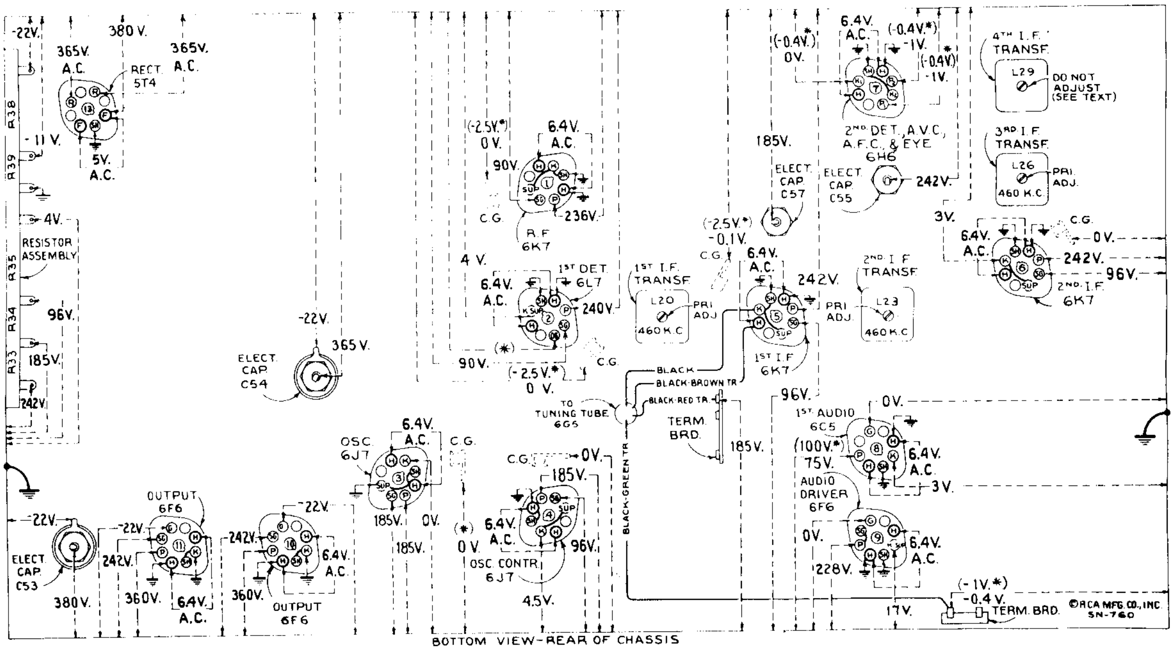

Figure 6—Radiotron Socket Voltages, Coil, and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard Broadcast")—"Manual" control—No signal being received—Volume control minimum—Fidelity control optional

***Note:** Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter.*

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250 and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

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MODEL 813K

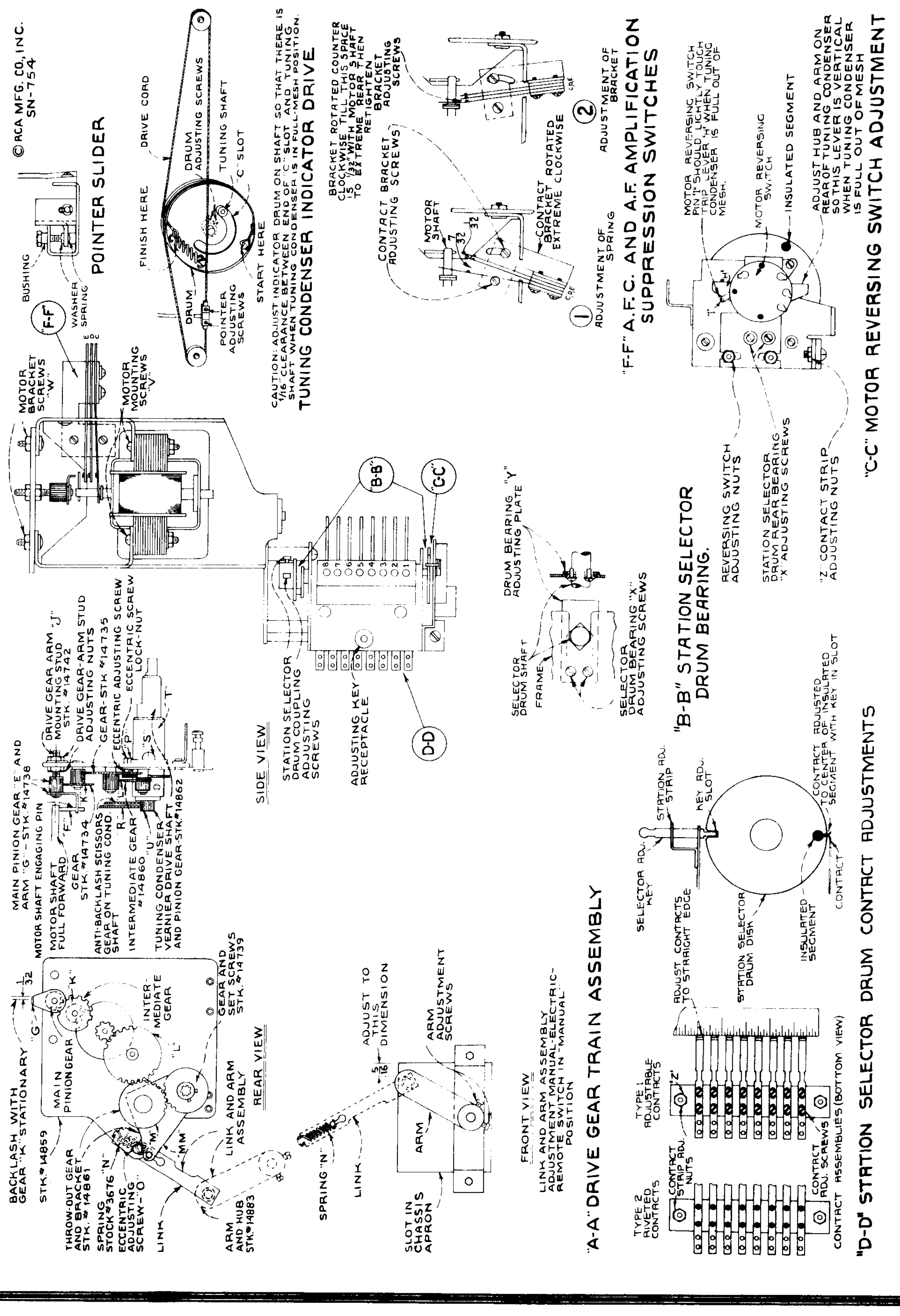

Figure 4—"Electric Tuning" Mechanism Adjustments

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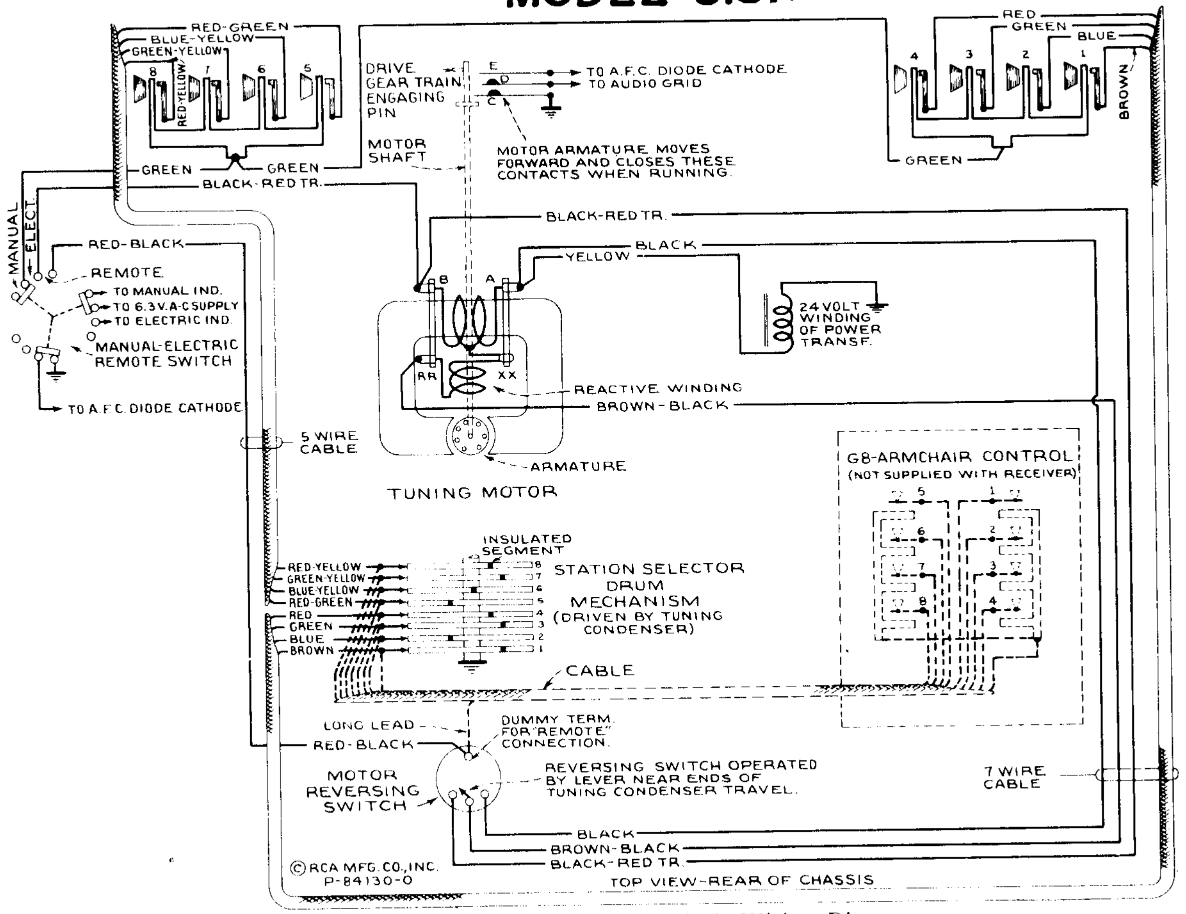


Figure 5—"Electric Tuning" Wiring Diagram
(Viewed from rear of chassis)

Circuit Arrangement

The circuit consists of an r-f amplifier stage; first-detector (converter) stage; separate heterodyne-oscillator stage; oscillator-control stage, two i-f amplifier stages; diode detector, automatic-frequency and volume-control stage; audio voltage-amplifier stage; audio-driver stage; push-pull power-amplifier stage; tuning indicator "Magic Eye"; and a full-wave rectifier.

The antenna and first-detector coils are constructed with a special type of winding ("gumulative") to provide increased sensitivity and selectivity on the "Standard Broadcast" band. Special capacitors shunting the spread-band oscillator coils change in capacity with temperature variations to reduce oscillator frequency drift.

Spread-band tuning is accomplished electrically by shunting the low-capacity section of the oscillator variable capacitor with relatively large temperature-stabilized fixed capacitors for tuning the oscillator coil on the "19M," "25M," "31M," and "49M" bands. Antenna and first-detector coils are designed to be sufficiently broad-tuned to require no variable tuning over the narrow frequency range of the spread-bands.

The spread-band oscillator coils and the "Standard Broadcast" band oscillator, first-detector, and antenna coils are all wound on separate forms. The antenna and first-detector spread-band coils are tapped. Undesirable interaction between coils is avoided by shorting proper unused sections by means of the range selector.

The intermediate-frequency amplifier consists of two RCA-6K7 tubes in a two-stage transformer-coupled circuit. The windings of all i-f transformers are resonated by fixed capacitors and are adjusted by molded magnetite cores to tune to 460 kc. A third winding, L22, in the first i-f transformer, closely coupled to the primary, L20, is placed in series with the main secondary, L21, when the fidelity control switch S11 is thrown to "broad" position (see figure 1), thereby increasing the coupling between the primary and secondary circuits with a consequent broadening of the band width of the i-f amplifier, permitting higher fidelity reception.

The function of the automatic-frequency-control circuit is to automatically change the frequency of the heterodyne oscillator so that the correct i-f frequency is formed for the i-f amplifier. The circuit consists essentially of an i-f discriminator which, as the name implies, discriminates or furnishes control voltage of the correct polarity to an oscillator frequency-control tube for generated i-f carrier frequencies slightly above and below 460 kc, or the frequency to which the i-f amplifier is tuned.

The plate circuit of the RCA-6J7 oscillator-control tube is caused to act as an apparent variable inductance in parallel with the "A" band oscillator tuned circuit of which coil L35 is a part. The series combination of resistor R5 and the capacitor C16 is also in parallel with the oscillator tuned circuit. Since the resistance of R5 is many times greater than the reactance of C16, at the oscillator frequency, the r-f current through the combination will be practically in phase with the r-f voltage across the oscillator tuned circuit. However, the r-f voltage impressed across the C16 capacitance section of the combination, or from grid to cathode, will lag the r-f voltage across the combination, or the tuned circuit, approximately 90 degrees. The grid-cathode r-f voltage will be amplified by the control tube but will be shifted an additional 180 degrees (grid and plate voltages of all tubes are always opposite in phase) so that the amplified r-f voltage appearing across the plate circuit will now lead the voltage across the combination or the tuned circuit by 90 degrees, or, in other words, the control tube is acting as an equivalent shunt inductance. The amount of this action is determined by the amplification of the tube which, in turn, is governed by the grid-cathode bias voltage. In operation, a residual bias is developed across the cathode resistor R6. The d-c control-grid voltage is fed to the control grid from the discriminator circuit through resistor R7. If this voltage is negative with respect to ground, the amplification of the control tube will be decreased, the apparent plate-circuit inductance of the tube increased, which will lower the frequency of the oscillator tube. The converse will occur when the grid voltage is positive with respect to ground.

The action of the discriminator circuit depends upon the fact that a 90-degree phase difference exists between the primary and secondary potentials of a double-tuned loosely-coupled transformer when the resonant frequency is applied, and that this phase difference varies as the applied frequency varies, i.e., the maximum resultant response voltage across the primary and secondary windings connected in series will occur at a frequency either lower or higher in frequency than the frequency to which the individual windings are resonated, respectively, depending on whether the windings are connected series aiding or opposing.

The discriminator, or fourth i-f transformer, consists of the primary winding, L30, which is a part of the third i-f transformer secondary tuned circuit (tuned to 460 kc) and the center-tapped secondary, L29. The upper and lower halves of L29 may be considered as two secondary coils, the upper series aiding and the lower series opposing the primary, L30. The magnetite core in L29 is inserted to inductively balance the two halves. The function of coil L28 (magnetite core adjusted), in parallel with L29, is to tune the secondary to 460 kc. Therefore, the maximum voltage will be applied to diode circuit P_1K_1 and R18 when the i-f signal frequency is below 460 kc and to the diode circuit P_2K_2 and R17 when the i-f signal frequency is above 460 kc. Resistors R17 and R18 are connected in series between ground and a point leading to the oscillator control-tube grid.

The voltages, resulting from diode rectification, across R17 and R18 are always in opposition, consequently the oscillator control-tube grid-bias voltage is a differential amount, depending upon the i-f signal strength and its frequency deviation from the nominal value of 460 kc. The polarity of this differential oscillator control-tube grid-bias, with respect to ground, depends on whether the i-f signal frequency is above or below 460 kc, thus bringing the generated i-f frequency nearer to 460 kc. A-f-c action is automatically eliminated for "manual" tuning by grounding diode cathode K_1 through switch S9.

Service Data

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation if such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such as R1, L1, C1, etc., provide reference between the illustrations and Replacement Parts List. The coils, transformer windings, and reactors are rated in terms of d-c resistance to permit continuity checks.

Precautionary Lead Dress.—(1) Green bus leads from C1 to S1 and from C39 to S2 should be dressed away from nearby parts. (2) Green bus lead from C13 to S3 should be 2⅛ inches long and dressed away from nearby parts. (3) Bus leads from C12 to L18 and from L18 to S3 should be as short as possible. (4) Red and blue leads from tube No. 3 to 19M oscillator coil should be dressed away from coil. (5) Tube No. 3 grid lead should be 6 inches long and dressed away from grounded metal parts. (6) All leads behind oscillator coils should be dressed close to chassis. (7) "Magic Eye" cable should be clamped to dial bracket. (8) Filament leads should all be twisted. (9) Leads from C44 and C48 should be dressed close to chassis. (10) A-c leads near R22 should be dressed away from R22. (11) Leads from S11 to the first i-f transformer should be twisted and dressed away from chassis. (12) Capacitors C7, C8, and C9 should be dressed perpendicular to chassis and away from each other and grounded metal parts. (13) Motor-cable leads should be dressed away from pinion gear. (14) Blue bus lead from "A" detector coil to "P" of tube No. 1 should be dressed centrally between band-switch shield and air trimmer C20. (15) Yellow bus lead from "K" of tube No. 3 to S3. (16) Yellow bus lead from "OG" of tube No. 2. (17) Blue bus lead from C47 to R26.

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio-amplifying circuit. RCA Victor Models R-93, R-93-A, R-93-2, or R-94 Record Players should be connected as follows: Remove the link from the phonograph terminal board. Connect green wire in Radio-Record switch cable to terminal 1; yellow to terminal 2; shield to terminal 3, and tape up the red and blue. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw-terminals on Radio-Record switch. If additional volume is desired, connect an RCA Stock No. 9632 transformer between the 2-conductor twisted cable and the screw-terminals on Radio-Record switch as follows: Yellow and brown transformer leads and one side of twisted cable to ground screw-terminal on switch; black transformer lead to other side of twisted cable; and blue transformer lead to other screw-terminal on switch.

Loudspeaker.—Two types of loudspeakers are used which will be referred to as types 1 and 2. In type 1 the cone centering diaphragm is cemented to a fixed ring, while in type 2 the centering diaphragm is cemented to an adjustable ring. Replacement of cone for either type is identical. Centering of cone for type 1 loudspeaker is made with three narrow celluloid or paper feelers after first removing the front dust cover and cutting free the cone centering diaphragm. The dust cover may be removed by a light application of acetone, using care not to allow the acetone to flow into the air gap. The centering diaphragm should be cemented in place after placement of feelers. Sufficient time should be allowed for the ambroid to set before removing feelers. Use ambroid to replace dust cover. Centering of cone for type 2 loudspeaker differs only in that it is not necessary to cut free the centering-diaphragm, adjustment being made in the usual manner by means of screws on the adjustable cone centering ring.

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the left ends of horizontal calibration lines with the gang tuning-condenser plates in full-mesh position. This is a screw-driver adjustment.

The "Fidelity" control should be turned counter-clockwise during all alignment operations. The "Manual-Electric-Remote" switch should be turned to "Manual" (clockwise) during alignment unless otherwise specified. The bottom shield-pan must be in place during spread-band alignment. Permit the set to operate at least five minutes before attempting alignment.

CAUTION. The magnetite core screw L29 on the bottom of the 4th i-f transformer has been accurately adjusted, for an exact electrical balance of coil L29 to center tap, during manufacture and **should not be disturbed.** However, if for any reason the adjustment has been moved from its original position, it will be necessary to mechanically adjust this screw until the end of the stud protrudes exactly ⅛ of an inch (four threads exposed) above the brass bushing prior to any alignment operations.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. A-f-c discriminator adjustments should follow r-f and i-f adjustments tabulated below. Adjustment locations are shown on figures 3 and 6.

Cathode-ray alignment is preferable for adjustments 2, 3, and 4 due to the flat-top i-f characteristics; the connections to the chassis are shown on figure 2. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position. The Magic Eye may be used as an output indicator for all other adjustments. It is preferable to replace the 6G5 tuning tube with a 6E5 during alignment.

Connect the "low" output terminal of the test oscillator to the receiver chassis for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action and reduce possibility of error in spread-band adjustments.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator. "Min. Eye" means minimum width of dark sector of Magic Eye.

For further details on alignment, refer to booklet "RCA Victor Receiver Alignment."

Order of Alignment	Test Oscillator: Connection to Receiver	Test Oscillator: Dummy Antenna	Test Oscillator: Frequency Setting	Range Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
1	——	——	——	——	——	4th I-F Trans.	L28	Turn Extreme Counter-clockwise
2	No. 6, 6K7 2nd I-F Grid Cap	.001 Mfd.	460 kc	"Standard Broadcast"	No Signal 550-750 kc	3rd I-F Trans.	L26 and L27	Max. (peak)
3	No. 5, 6K7 1st I-F Grid Cap	.001 Mfd.	460 kc	"Standard Broadcast"	No Signal 550-750 kc	2nd I-F Trans.	L23 and L24	Max. (peak)
4	No. 2, 6L7 Det. Grid Cap	.001 Mfd.	460 kc	"Standard Broadcast"	No Signal 550-750 kc	1st I-F Trans.	L20 and L21	Max. (peak)
5	Ant. Term.	300 Ohms	1,600 kc a	"31M."	9.6 mc	"31M." Osc.	L17	Min. Eye b
6	Ant. Term.	300 Ohms	1,600 kc a	"31M."	9.6 mc	"31M." Det.	C20	Min. Eye
7	Ant. Term.	300 Ohms	1,600 kc a	"31M."	9.6 mc	"31M." Ant.	C3	Min. Eye
8	Ant. Term.	300 Ohms	1,300 kc a	"25M."	11.7 mc	"25M." Osc.	L16	Min. Eye c
9	Ant. Term.	300 Ohms	1,700 kc a	"19M."	15.3 mc	"19M." Osc.	L15	Min. Eye d
10	Ant. Term.	300 Ohms	6,000 kc e	"49M."	6.0 mc	"49M." Osc.	C10	Min. Eye f
11	Ant. Term.	300 Ohms	6,100 kc e	"49M."	6.1 mc	"49M." Osc.	C10	Min. Eye
12	Ant. Term.	200 Mmfd.	600 kc	"Standard Broadcast"	600 kc	"A" L-F Osc.	L35	Min. Eye
13	Ant. Term.	200 Mmfd.	1,500 kc	"Standard Broadcast"	1,500 kc	"A" H-F Osc.	C15	Min. Eye

(Continued on next page)

RCA MANUFACTURING COMPANY, Inc.

MODEL 813 K

(Continued from preceding page)

Order of Alignment	Test Oscillator: Connection to Receiver	Test Oscillator: Dummy Antenna	Test Oscillator: Frequency Setting	Range Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
14	Ant. Term.	200 Mmfd.	600 kc	"Standard Broadcast"	600 kc	"A" L-F Osc.	L35	Min. Eye
15	Ant. Term.	200 Mmfd.	1,500 kc	"Standard Broadcast"	1,500 kc	"A" H-F Osc.	C15	Min. Eye
16	Proceed to A-F-C Discriminator Adjustments Outlined Below							

a—Refer to "Spread-band Adjustments" below for Test Oscillator setting for adjustments 5, 6, 7, 8, and 9.
b—Use minimum inductance peak (plunger out) if two peaks can be obtained. To check for correct harmonic, carefully set Test Oscillator to 1,200 kc using Crystal Calibrator. Signal should be indicated by "Magic Eye" in "31M." band near 9.6 mc.
c—Use minimum inductance peak (plunger out) if two peaks can be obtained. To check for correct harmonic, carefully set Test Oscillator to 900 kc using Crystal Calibrator. Signal should be indicated by "Magic Eye" in "25M." band near 11.7 mc.
d—Use minimum inductance peak (plunger out) if two peaks can be obtained. To check for correct harmonic, carefully set Test Oscillator to 900 kc using Crystal Calibrator. Signal should be indicated by "Magic Eye" in "19M." band near 15.3 mc.
e—Refer to "Spread-band Adjustments" below for method of using the RCA Stock No. 9572 Crystal Calibrator for adjustments 10 and 11.
f—Use minimum capacity peak if two peaks can be obtained from 1,000 kc harmonics.

Spread-band Adjustments.—Bottom shield-pan must be in place before attempting spread-band alignment. Alignment of the spread ("Overseas") bands requires special procedure since test oscillators used alone are not ordinarily sufficiently accurate for this purpose. The RCA Stock No. 9572 Crystal Calibrator affords a convenient and accurate alignment standard. Wrap a few turns of wire around the crystal calibrator and connect one free end to the antenna terminal of the receiver. Using the crystal calibrator to obtain the necessary accuracy, follow the tabulated alignment procedure for the "31M," "25M," and "19M." bands.

The "31M." band alignment, for example, is done as follows: Tune the receiver ("Standard broadcast" band) to the 1,000 kc crystal calibrator output with the crystal calibrator "Hi-Lo" switch in "Hi" position. Snap "Hi-Lo" switch to "Lo" and carefully tune receiver to 1,600 kc (the sixth 100 kc harmonic above 1,000 kc) for minimum "Magic Eye" opening (Min. Eye). Move crystal calibrator away from antenna wire, connect test oscillator, and carefully adjust test oscillator for minimum "Magic Eye" opening at a setting of approximately 1,600 kc. (If Stock No. 150 Test Oscillator is used, refer to second paragraph below.) Raise test-oscillator output to give sufficient harmonic output and use 6th harmonic (9,600 kc) for aligning in "31M." band at 9.6 mc. Align in the "25M." band at 11.7 mc (11,700 kc), the 9th harmonic of the test-oscillator 1,300 kc output. Align in the "19M." band at 15.3 mc (15,300 kc), the 9th harmonic of the test-oscillator 1,700 kc output. In each case select the peak giving minimum "Magic Eye" opening.

For the "49M." band, snap crystal calibrator "Hi-Lo" switch to "Hi", turn the range selector to "49M." band, and set receiver dial pointer to 6.0 mc. Adjust oscillator trimming capacitor C10 for minimum "Magic Eye" opening. Use the peak indicated by the alignment table. Snap "Hi-Lo" switch to "Lo" and locate 6,100 kc (the first 100 kc harmonic above 6,000 kc) by slightly readjusting C10 with the dial pointer set at 6.1 mc. This method insures selection of correct crystal-calibrator harmonic.

When aligning with the RCA Stock No. 150 Test Oscillator,† use the variable (unmodulated) oscillator and "Magic Eye" indication of receiver output. Set test-oscillator dial 800 kc lower than the desired signal for the four lower frequency ranges and 800 kc higher than the desired signal for the two high ranges and use in same manner as TMV-97-C. Insert an open-circuit telephone plug in the test oscillator "Ext. Mod." jack, so the modulated fixed-frequency oscillator will be cut off, and align on the unmodulated variable oscillator signal, which will close the "Magic Eye" and evidence itself by a rushing noise in the speaker.

If the crystal calibrator signals are weak, disconnect test oscillator while using the crystal calibrator.

More accurate alignment in the spread-bands can be accomplished by making final slight adjustments using American, English, or German short-wave broadcasting stations of known frequency for frequency standards.

A-F-C Discriminator Adjustments.—These adjustments are rather critical and should be performed with extreme care. Improper adjustment may result in complete failure of the oscillator control tube to function or else may cause it to detune the oscillator instead of tuning it to the signal. It is assumed that the magnetite core adjusting screw L28 (top of 4th i-f transformer) has been turned all the way out (extreme counter-clockwise) during the preceding tabulated adjustments. Adjustments are as follows: Remove spring "N" on link and arm assembly which connects the "Manual-Electric-Remote" switch shaft to the throw-out gear bracket. Turn "Fidelity" control counter-clockwise. Connect antenna to receiver antenna terminal. With the "Manual-Electric-Remote" switch in "Manual" (right) position, tune in a strong local station near 600 kc or the low-frequency end of the "A" band as accurately as possible by means of the tuning tube "Magic Eye." The most accurate adjustment will be obtained by adjusting the "vernier" tuning knob mid-way between the two points where the eye just appears to start to open. This will place the generated i-f carrier signal frequency exactly in the center of the i-f amplifier response curve (should be 460 kc if i-f amplifier was properly aligned) and is the frequency to which the a-f-c discriminator (4th i-f transformer) should be tuned to resonance. Without disturbing any of the receiver adjustments, place the "high" test-oscillator lead about ¾ of an inch from the grid cap lead of the RCA-6K7, 1st i-f amplifier tube, adjust the test-oscillator output to maximum, turn test-oscillator "Modulation" off, and carefully zero-beat the test-oscillator frequency (approximately 460 kc) with the i-f carrier signal. Avoid placing the test-oscillator lead nearer to the grid-cap lead than specified above, as doing so will tend to detune the i-f amplifier. It may be necessary to reduce the local station signal, during this operation, by shortening antenna lead or grounding antenna "A" terminal to chassis in order to increase the loudness of the beat note sufficiently for accurate zero-beat adjustment.

Throw "Manual-Electric-Remote" switch to "Electric" (center) position. A high whistle or beat note will now be heard. Turn the magnetite core screw L28 (top of 4th i-f transformer) slowly clockwise. As this screw is turned, the beat note will first increase to a high audio frequency and will then decrease to a **zero-beat** and then increase in frequency again. The point of exact **zero-beat** is the position for correct adjustment of the discriminator. Zero-beat should also still exist when the "Manual-Electric-Remote" switch is thrown back to "Manual" position. The adjustment is now complete and may be checked by slightly detuning the receiver above and below the local station frequency with the "Manual-Electric-Remote" in "Manual" position, switching to "Electric" position, and noting the oscillator pull-in. Replace spring "N."

† The No. 150 Test Oscillator employs a fixed-frequency (800 kc), modulated oscillator and a variable, unmodulated oscillator. The scale is calibrated to the sum frequency for the two higher frequency ranges and to the difference frequency for the four lower frequency ranges.

ELECTRIC TUNING

Principle of Operation

The electric tuning mechanism consists essentially of a quick engaging and dis-engaging reversible electric motor, tuning condenser driving gear train, and eight mechanically interlocked (pushing one button releases all others) station selector push buttons respectively wired to eight adjustable station selector contactor discs (each with a motor stopping insulated segment) mounted on a drum which is direct-coupled to the gang tuning condenser shaft. The arrangement permits any one of eight pre-determined stations to be electrically tuned in by merely touching the correct push button. If all eight buttons are inadvertently locked in, firmly pushing the right-hand button will release them.

The operation may be more readily understood by reference to figures 1, 4, and 5. When the motor is not energized, the armature is pushed to the rear or slightly out of the magnetic center by tension of contact spring "C" and the motor shaft is dis-engaged from the driving gear train. Pressing in any one of the eight push buttons will complete the motor circuit through a station selector contactor disc, assuming that the "Manual-Electric-Remote" switch is in "Electric" position and that the insulated segment in the contactor disc is not opposite its contactor. As the motor starts, the armature will be drawn forward, due to solenoid action, and the pin "F" on the end of its shaft will engage the arm "G" on the small main pinion gear, thereby driving the tuning mechanism. At the same time contact springs "E" and "D" will be grounded, causing suppression of audio amplification and automatic frequency control during the tuning cycle. The motor will continue to operate until the insulated segment in the selector disc breaks the motor circuit, whereupon spring "C" will instantly dis-engage the motor pin "F" from the arm "G" on the small pinion driving gear and open contacts "E" and "D." Pushing another button will cause the above mentioned cycle to be repeated except that the motor will be interrupted by the insulated segment on a corresponding disc. The discs are individually adjustable on a drum mechanism, providing a choice of eight "Electric Tuned" "Broadcast" stations. The arrangement of the motor is such that its rotation will continue in the same direction regardless of the number of "Electric" tuning cycles until the tuning condenser approaches either full-out or full-in of mesh, whereupon lever "H" trips switch S7 which reverses the direction of rotation. A throw-out idler gear is link-coupled to the "Manual-Electric-Remote" control to disconnect the motor drive gear train when the control is thrown to "Manual" position.

Mechanism Adjustments

The electric tuning mechanism is designed to be as simple in construction and as fool proof in operation as is possible. In order to maintain the accurate results possible with this device care must be taken in effecting any repairs or adjustments. Reference should be made to figure 4 and the following:

A-F-C and A-F Amplification Suppression Switches.—This switch assembly is located on the motor bracket and closes due to solenoid action of motor armature. The tension of the long contact spring "C" is important in bringing about quick dis-engagement of the motor and in permitting the motor to pull into mesh with the drive mechanism. Normal adjustment is attained when the short springs "D" and "E" are aligned exactly straight with contact points separated approximately 1/32 of an inch and with the spring "C" spaced approximately 7/32 of an inch from spring "D" at the point of contact. If necessary, in order to obtain positive pull-in and quick dis-engagement of the motor, the tension of spring "C" should be increased or decreased by bending. This action should be checked with the front apron of the chassis raised two inches higher than the rear. Contacts of the switch must be kept clean. Crocus cloth or a relay burnisher may be used for this purpose.

Motor Reversing Switch.—It is necessary to automatically stop and reverse the drive motor before the tuning condenser reaches the ends of its travel. Approximately 175 degrees of sweep is required, and the reversal must take place above 1,700 kc and below 540 kc but not too near the limits of the scale. The coupling between the station selector drum and the tuning condenser shaft should be attached so that the reversing switch trip lever "H" is exactly vertical when the condenser is full-out of mesh. There should be 1/32 of an inch clearance between the end of the condenser shaft and the selector drum shaft. While the trip lever is in this position the reversing switch bracket should be adjusted by means of its elongated mounting holes until the switch pin "I" just lightly touches trip lever "H."

Main Pinion Gear.—Clearance between the small high-speed pinion gear "E" and the intermediate gear "K" determines the amount of mechanical noise produced. Correct adjustment will give approximately 1/32 of an inch movement of back lash at the end of pinion arm "G" when gear "K" is held stationary. Arm "G" must also be adjusted for correct mesh with motor shaft drive pin "F." With the motor shaft completely forward and pinion "E" tight against its front bearing, the pinion mounting stud "J" should be adjusted so that pin "F" meshes full thickness with the rotating arm "G." An increase of this mesh will increase over travel on tuning while a decrease of mesh will decrease the over travel. The elongated hole in the front bracket allows sufficient movement of the mounting stud "J" to permit above mentioned gear mesh adjustment.

"Manual-Electric-Remote" Changeover.—(1) Link and arm adjustment—To properly line up the mechanical link between the switch shaft and throw-out gear bracket "MM," the set screws holding the link arm on the switch shaft must be loosened, the switch turned to the "Manual" position (extreme right) and the link lever revolved until the distance between the link-connecting pin (extends through chassis apron) and the right-hand (viewed from front) side of the slot, in front apron of chassis, is exactly 5/16 of an inch. If this adjustment is not properly made, correct operation of "Electric" or "Remote" tuning will not result. (2) Throw-out Gear Adjustment. To obtain smooth operation on "Electric" or "Remote" positions it is important that the proper clearance is maintained between the throw-out gear "M" and the intermediate gear "L." With the "Manual-Electric-Remote" control thrown to "Remote" position (extreme left) adjust the mesh between these gears by means of the eccentric screw "O" and lock nut "P," contacting the throw-out gear bracket "MM," until there is approximately 1/64 of an inch backlash of gear "L" when gear "M" is held stationary.

Vernier Tuning.—In case it becomes necessary to remove tuning condenser drive shaft "T," it should be replaced by sliding anti-backlash gear "R" on condenser shaft apart so that compression amounting to one tooth on the gear is obtained in the springs. Adjust mesh of gear "R" with pinion gear "U" on vernier shaft before tightening screws "S" so that smooth tuning is obtained throughout the range.

Motor Alignment.—The motor shaft must be exactly aligned with the axis of the pinion gear with which it engages. This may be adjusted by loosening the mounting screws "V" of the motor and aligning shaft by sight. Correct alignment may be tested by slowly rotating motor and observing the relation between the pin "F" of the motor shaft and the arm "G" on the pinion. The relation of the two should remain the same throughout the revolution. Additional movement for adjustment may be obtained by the motor bracket screws "W" if necessary.

Station Selector Drum.—(1) Bearing Adjustment. The selector drum may be removed by unscrewing the two bearing adjusting screws "X" on the front and rear bearings and sliding shaft out of slots on frame. To replace drum, the reverse procedure should be followed holding bearing adjusting plates "Y" firmly against the shaft and tightening adjusting screws. (2) Contact adjustment—Two types of contact strips are used. They are designated on figure 4, as types 1 and 2, on which the individual contacts are respectively adjustable and fixed. On type 1, the individual contacts should be adjusted by setting the end contact springs near the mid-position of their travel and aligning the remaining springs to them by means of a straight edge. Either type of contact strip should be adjusted to the selector drum by firmly placing two selector adjusting keys in the station adjustment strip, positions 1 and 8 (locking respective discs), loosening contact strip adjusting nuts "Z" and shifting the contact strip until the end contacts are exactly centered on the respective disc insulating segments. More accurate adjustment may be made by silhouetting the point of contact with a piece of white paper held behind the contact. Adjustment will be facilitated by removing complete assembly from rear of tuning condenser by unscrewing the three mounting screws. Contacts and discs must be kept free of dirt, filings, and other extraneous matter.

Lubrication.—The dial pointer slide should be greased with petrolatum. This same lubrication should be applied lightly to all gear faces of the drive mechanism and sparingly with a cloth to the station selector discs. Any good household oil, such as "3-IN-ONE," is suitable for the motor shaft bearings. A light grade of engine oil should be used for all gear bearings. Medium viscosity engine oil, similar to "PYROIL" (B), should be applied between the thrust washers on the motor shaft. "CASTORDAG," a mixture of graphite and castor oil, is recommended for use at the selector drum end-bearing slots and at the bearings of cable pulleys.

Station Adjustment

Any eight stations may be chosen for "Electric" tuning. Remove the two escutcheon plates from the side of the dial, place proper call letter labels in the celluloid windows, and replace escutcheons. Turn the power on and proceed to set up the "Electric" tuning as follows:

1. Set Range Selector to "Standard Broadcast."
2. Turn "Manual-Electric-Remote" control to "Electric."
3. Turn Fidelity control counter-clockwise.
4. Press push button No. 1 (left) and wait until station pointer comes to rest.
5. Turn the "Manual-Electric-Remote" control to "Manual."
6. Remove adjusting key from receptacle on top of station selector drum mechanism.
7. Insert key in position marked "1" in station adjustment strip and push the key all the way down to properly fit in slot in disc.
8. Tune the receiver very carefully by means of the manual tuning knob and the "Magic Eye," to station chosen for No. 1.
9. Remove key.
10. Turn the "Manual-Electric-Remote" control to "Electric."

Button No. 1 is now properly set for "Electric" tuning. Proceed similarly for the other seven push buttons, matching each station on the dial with the same number on the station adjustment strip. Repeat the above steps but place the key respectively in positions 2, 3, 4, etc., and in each case tune to the proper station. Pressing the proper button will now cause the desired station to be tuned in electrically.

Armchair Control

When a Model G-8 armchair control is attached to the receiver as shown in figure 5 it duplicates the action of the push buttons on the front panel when the "Manual-Electric-Remote" control is turned to "Remote" position.

Service Hints

a. Capacitor C18 should be carefully checked for leakage or short circuit in cases of intermittent operation or no operation. R9 should be shorted out and C18 replaced by Stock No. 4839, as shown by the Schematic Circuit Diagram figure 1, in the event of trouble in this circuit.
b. Capacitor C5 should be checked for leakage or short circuit.
c. Resistor R5 was 33,000 ohms in some instruments. Replace with Stock No. 12333.
d. Capacitor C16 was 82 mmfd. in some instruments. Replace with Stock No. 14021.
e. Capacitor C38 was two 0.5 mfd. in parallel on some instruments. Replace with Stock No. 30623.

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals Under Conditions Similar to Those of Voltage Measurements

(1)	RCA-6K7—R-F Amp.	9.0 ma.
(2)	RCA-6L7—1st Det.	3.5 ma.
(3)	RCA-6J7—Osc.	8.5 ma.
(4)	RCA-6J7—Osc. Control	1.8 ma.
(5)	RCA-6K7—1st I-F Amp.	9.0 ma.
(6)	RCA-6K7—2nd I-F Amp.	8.0 ma.
(7)	RCA-6H6—2nd Det.	—
(8)	RCA-6C5—A-F Amp.	0.9 ma.
(9)	RCA-6F6—Driver	22 ma.
(10)	RCA-6F6—Output	25 ma.
(11)	RCA-6F6—Output	25 ma.
(12)	RCA-6G5—Tuning Tube	3.0 ma.
(13)	RCA-5T4—Rectifier	128 ma.**

(**Cannot be measured at socket)

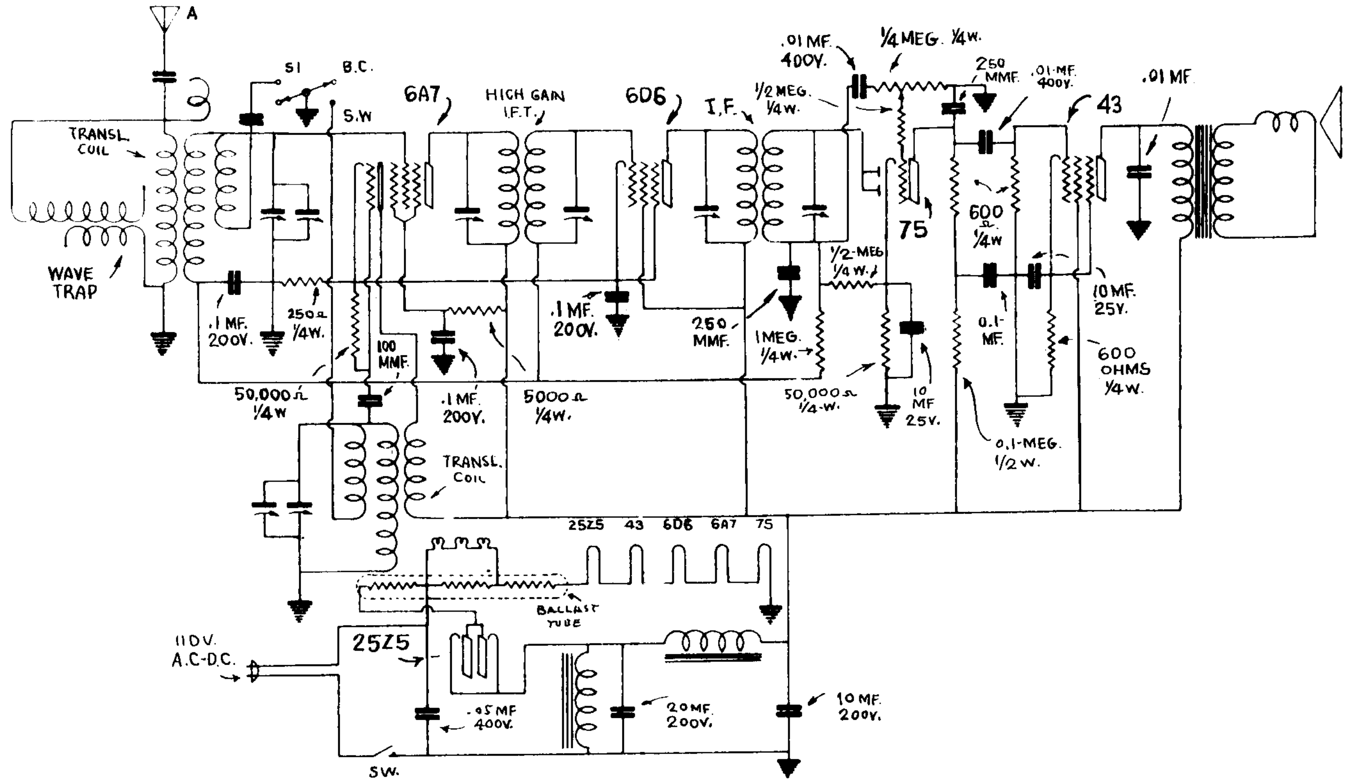
REPLACEMENT PARTS

Insist on genuine factory tested parts which are readily identified and may be purchased from authorized dealers.

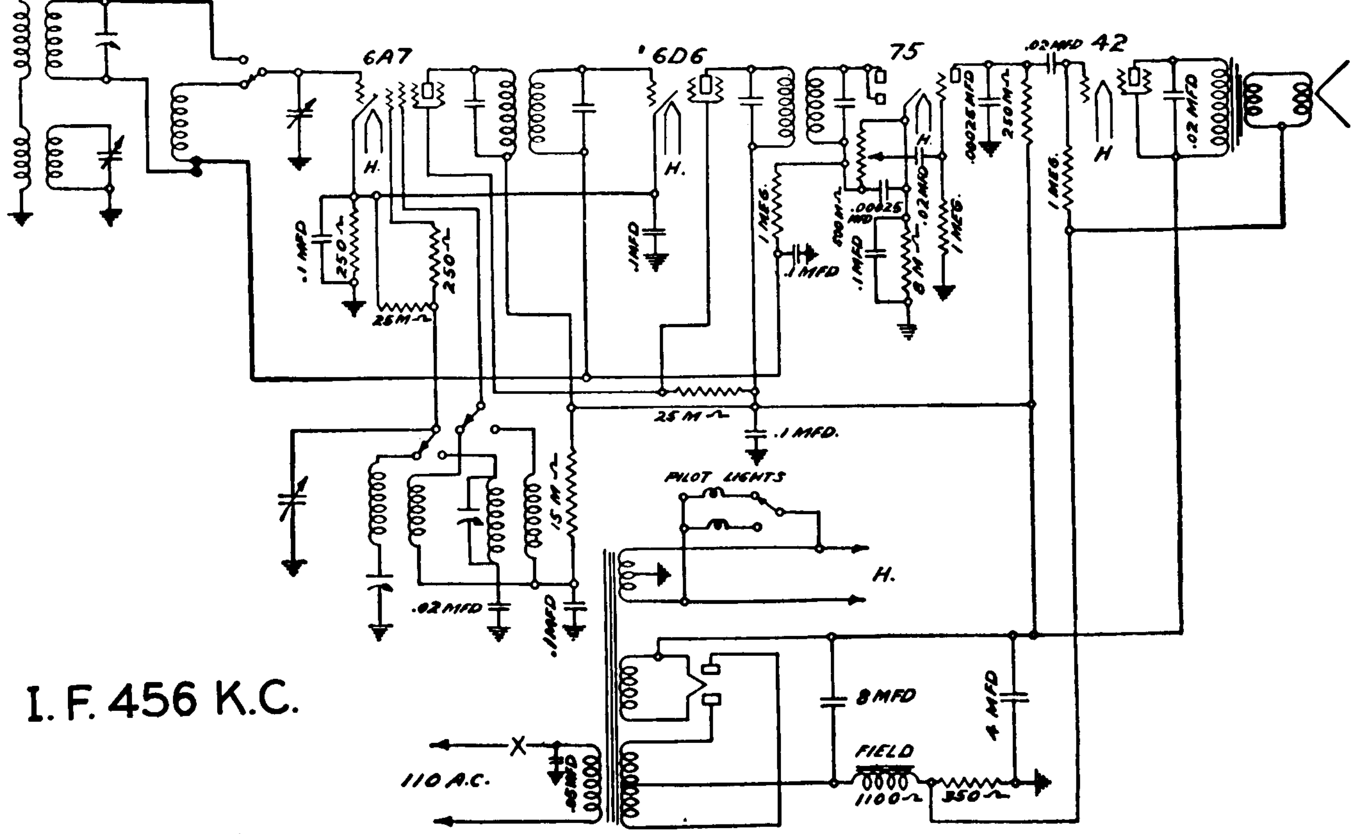
STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14728	Arm—Hub and arm complete with set screws—Connects station selector drum to rear of tuning condenser shaft
14883	Arm—Arm and hub assembly located on "Manual-Electric-Remote" switch shaft
14517	Board—Antenna and ground terminal board
12717	Board—Phonograph terminal board
14885	Bracket—Left hand dial bracket and pulley assembly
14884	Bracket—Right hand dial bracket and pulley assembly
14878	Bracket—Tuning tube mounting bracket and clamp assembly
5237	Bushing—Variable condenser rubber mounting bushing assembly
14919	Cable—6 conductor push-button selector cable
14918	Cable—7 conductor tuning drive motor and push-button selector cable
12607	Cap—First or second I-F transformer shield cap
12581	Cap—Third or fourth I-F transformer shield cap
11350	Cap—Grid contact cap
12884	Capacitor—Adjustable trimmer (long) (C5, C10, C15, C20)
14392	Capacitor—4.7 Mmfd. (C62)
14021	Capacitor—22 Mmfd. (C16)
12723	Capacitor—56 Mmfd. (C40)
12813	Capacitor—82 Mmfd. (C58)
14910	Capacitor—90 Mmfd. (C21)
14908	Capacitor—96.5 Mmfd. (C9)
14906	Capacitor—100 Mmfd. (C7)
12720	Capacitor—100 Mmfd. (C36)
14907	Capacitor—103.5 Mmfd. (C8)
14909	Capacitor—110 Mmfd. (C6)
12404	Capacitor—120 Mmfd. (C35)
14712	Capacitor—180 Mmfd. (C31, C32)
14711	Capacitor—220 Mmfd. (C28, C29)
12952	Capacitor—330 Mmfd. (C2, C19, C45)
14710	Capacitor—430 Mmfd. (C22, C23)
13052	Capacitor—470 Mmfd. (C14)
14724	Capacitor—560 Mmfd. (C63)
14911	Capacitor—580 Mmfd. (C11)
12897	Capacitor—4700 Mmfd. (C5)
13033	Capacitor—.007 Mfd. (C49, C51)
4937	Capacitor—.01 Mfd. (C50)
13138	Capacitor—.01 Mfd. (C17, C24, C27, C39, C46)
11315	Capacitor—.015 Mfd. (C47)
4870	Capacitor—.025 Mfd. (C42)
4886	Capacitor—.05 Mfd. (C30, C61)
4839	Capacitor—0.1 Mfd. (C4, C18, C26, C37, C60)
5170	Capacitor—0.25 Mfd. (C25)
30623	Capacitor—1 Mfd. (C38)
5212	Capacitor—16 Mfd. (C55)
14377	Capacitor—16 Mfd. (C57)
13611	Capacitor—20 Mfd. (C56)
14531	Capacitor—25 Mfd. (C53, C54)
30017	Capacitor Pack—Compensating capacitor pack comprising one .025 Mfd. and one .015 Mfd. capacitor, one 22,000 ohm and one 27,000 ohm resistor (C41, C43, R21, R23)
14902	Capacitor Pack—Comprising two sections 10 mfd. each (C44, C48)
14865	Coil—"A" band antenna coil (L6, L7)
14866	Coil—Special band spread antenna coil (L1, L2, L3, L4, L5)
14867	Coil—"A" band detector coil (L12, L13)
14868	Coil—Special band spread detector coil (L8, L9, L10, L11)
14869	Coil—"A" band oscillator coil (L19, L35)
14873	Coil—19 meter band oscillator coil (L14, L15)
14872	Coil—25 meter band oscillator coil (L16)
14871	Coil—31 meter band oscillator coil (L17)
14870	Coil—49 meter band oscillator coil (L18)
14858	Condenser—3 gang variable tuning condenser complete with gear train (C1, C12, C13, C59)
5040	Connector—4 contact female connector for reproducer cable
30567	Connector—4 contact female connector with metal shell for reproducer cable in later production
14733	Contact—Spring contact for engaging discs in station selector drum for type 1 contact assembly
30365	Contact—Comprising 8 spring contacts assembled on insulating strip for engaging discs in station selector drum (type 2 contact assembly)
14857	Cord—Indicator drive cord
12006	Core—Adjustable core and stud for I-F transformers
14890	Cushion—Black rubber dial cushion
14888	Dial—Dial assembly, ready to mount on support brackets. Includes 7 glass dial strips and indicator slider assembled on metal frame
14862	Drive—Tuning condenser vernier drive shaft and pinion gear
14856	Drum—Drive cord drum complete with set screws
14731	Drum—Station selector drum rotor—comprising 8 station selector contactor discs assembled on shaft
14738	Gear—Drive pinion gear and arm
14739	Gear—Drive gear and set screws—located on tuning condenser knob shaft
14734	Gear—Intermediate gear assembly—comprising one .740-in. O.D., 34 tooth gear and one .291-in. O.D., 12 tooth pinion assembled
14735	Gear—Intermediate gear assembly—comprising one 1.541-in. O.D., 72 tooth gear and one .291-in. O.D., 12 tooth pinion assembled
14860	Gear—Intermediate gear assembly—comprising one 1.541-in. O.D., 72 tooth gear and hub assembled
14861	Gear—Throwout gear and bracket
14900	Indicator—Station selector indicator pointer
5226	Lamp—Dial Lamp
14729	Motor—Tuning drive motor for 60 cycle models only (M-1)
14730	Motor—Tuning drive motor for 25 cycle models only (M-1)
14859	Plate—Tuning condenser front plate and studs assembled for mounting drive gears
12471	Plate—6J7 socket mounting plate assembly for cushion socket—less socket
14886	Pulley—Indicator drive cord pulley—located on right or left hand dial bracket
14854	Reactor—Filter reactor (L33)
30647	Resistor—1.8 ohms, Resisto-fuse, 1 amp. (R42)
13250	Resistor—330 ohms, carbon type, ¼ watt (R15)
30158	Resistor—820 ohms, carbon type, ¼ watt (R30)
5112	Resistor—1000 ohms, carbon type, ¼ watt (R10)
13030	Resistor—1000 ohms, carbon type 1/10 watt (R2, R13)
11783	Resistor—1200 ohms, carbon type, ¼ watt (R41)
13031	Resistor—3300 ohms, carbon type, 1/10 watt (R29)
5114	Resistor—15,000 ohms, carbon type, 1 watt (R31)
14078	Resistor—18,000 ohms, carbon type, 1 watt (R24)
11281	Resistor—22,000 ohms, carbon type, 1/10 watt (R36)
12154	Resistor—33,000 ohms, insulated, ¼ watt (R4, R12)
12333	Resistor—68,000 ohms, carbon type, ¼ watt (R5)
5145	Resistor—100,000 ohms, carbon type, ¼ watt (R14, R28)
11452	Resistor—470,000 ohms, carbon type 1/10 watt (R17, R18)
11172	Resistor—470,000 ohms, carbon type, ¼ watt (R8)
11397	Resistor—560,000 ohms, carbon type, 1/10 watt (R1, R11, R27)
12013	Resistor—1 Megohm, carbon type, 1/10 watt (R25)
3033	Resistor—1 Megohm, carbon type, ¼ watt (R7)
11151	Resistor—2.2 Megohm, carbon type, ¼ watt (R20)
5131	Resistor—2.2 Megohm, carbon type, 1/10 watt (R19)
13673	Resistor—10 Megohm, carbon type, ¼ watt (R40)
14875	Resistor—Voltage divider comprising one 1600 ohm, one 4500 ohm, one 7,000 ohm, one 300 ohm and two 85 ohm sections (R6, R33, R34, R35, R38, R39)
14887	Retainer—Indicator drive cord pulley retainer
14897	Scale—19 meter glass dial strip
14896	Scale—25 meter glass dial strip
14894	Scale—31 meter glass dial strip
14893	Scale—49 meter glass dial strip
30012	Scale—"A" band glass dial strip
4669	Screw—No. 8-32x5/32 square head set screw for drum Stock No. 14856, arm Stock No. 14728 and Stock No. 14883
12418	Screw—No. 8-32x3/16 milled head screw for gear Stock No. 14739
14848	Selector—Station selector drum mechanism—comprising selector contactor discs, spring contacts, and motor reversing switch assembled in metal frame
14882	Shield—Chassis bottom shield
12735	Shield—Dial lamp shield
12008	Shield—I-F transformer shield can
14901	Shield—Rubber shield for tuning tube
14892	Slide—Indicator pointer slider and spring assembly
11195	Socket—5 contact 5T4 Radiotron socket
11196	Socket—8 contact 6K7, 6J7, 6F6, 6H6, or 6C5, Radiotron socket
14877	Socket—8 contact 6J7 Radiotron impregnated socket for socket mounting plate Stock No. 12471 and 6K7 or 6L7 Radiotron
14114	Socket—Dial lamp socket
13638	Spring—Drive cord tension spring
12007	Spring—Retaining spring for core Stock No. 12006
3676	Spring—Tension spring for link and arm Stock No. 14883
14694	Spring—Tension spring for station selector push-button switch latch bar
14889	Strap—Strap and bolt assembly used to hold glass dial strips in position
14899	Strip—Bottom glass dial strip
14891	Strip—Finish strip used between glass dial strips
14898	Strip—Top glass dial strip
14742	Stud—Mounting stud for gear and arm Stock No. 14738
14874	Switch—"Manual-Electric-Remote" switch (S5, S9, S12)
14863	Switch—"Power-Tone" (Music-Speech) switch (S4, S8, S10)
14732	Switch—Motor reversing switch and mounting plate for station selector (S7)
14864	Switch—Range switch (S1, S2, S3)
14728	Switch—A-F-C and A-F amplification suppression switch (S13)
14904	Switch—Station selector switch parts comprising one 4 point contact board, one 4 point conductor plate, insulator and lockplate
14703	Tone control—"Fidelity" control (R26, S11)
14706	Transformer—First I-F transformer (L20, L21, L22, C22, C23)
14707	Transformer—Second I-F transformer (L23, L24, L25, C28, C29)
14708	Transformer—Third I-F transformer (L26, L27, C31, C32)
14709	Transformer—Fourth I-F transformer (L28, L29, L30, C35)
14855	Transformer—Driver transformer (T2)
14879	Transformer—Power transformer 105-125 volts, 50-60 cycle (T1)
14880	Transformer—Power transformer 105-125 volts, 25-60 cycle (T1)
14881	Transformer—Power transformer 100-130/140-160/195-250 volts, 50-60 cycle (T1)
12861	Volume Control (R22)
	REPRODUCER ASSEMBLIES (RL-76-2)
14606	Cap—Dust cap for cone center
14922	Coil—Reproducer field coil (L34)
14602	Cone—Reproducer cone, voice coil, center suspension and dust cap (L32)
5039	Plug—4 contact male plug for reproducer
14920	Reproducer—Complete
14921	Transformer—Output transformer (T3, C52)
14357	Washer—Spring washer to hold field coil securely
	MISCELLANEOUS ASSEMBLIES
14745	Button—Station selector switch button
30361	Card—Call letter cards for station selector
5040	Connector—4 contact female connector for reproducer inter-connecting cable in later production
30568	Connector—4 contact male connector for reproducer inter-connecting cable in later production
14925	Crystal—Dial escutcheon crystal only
14923	Escutcheon—Dial and tuning tube escutcheon only—less crystal and buttons
14924	Escutcheon—Dial and tuning tube escutcheon and crystal complete
14926	Indicator—"Electric-Manual" indicating screen
14927	Indicator—"Music-Speech" indicating screen
14751	Key—Key for use in adjusting "Electric Tuning"
14359	Knob—"Tuning" (large) control knob
14688	Knob—"Range Selector" knob
14269	Knob—"Power-Tone" (Music-Speech), "Volume", "Tuning" (small), "Manual-Electric-Remote", and "Fidelity" control knobs
5210	Screw—Chassis mounting screw and washer assembly
14746	Shield—Celluloid shield for station markers
4982	Spring—Retaining spring for knob Stock No. 14359
14270	Spring—Retaining spring for knob Stock Nos. 14269 and 14688

RADOLEK COMPANY

MODEL K16,705



MODEL S-47



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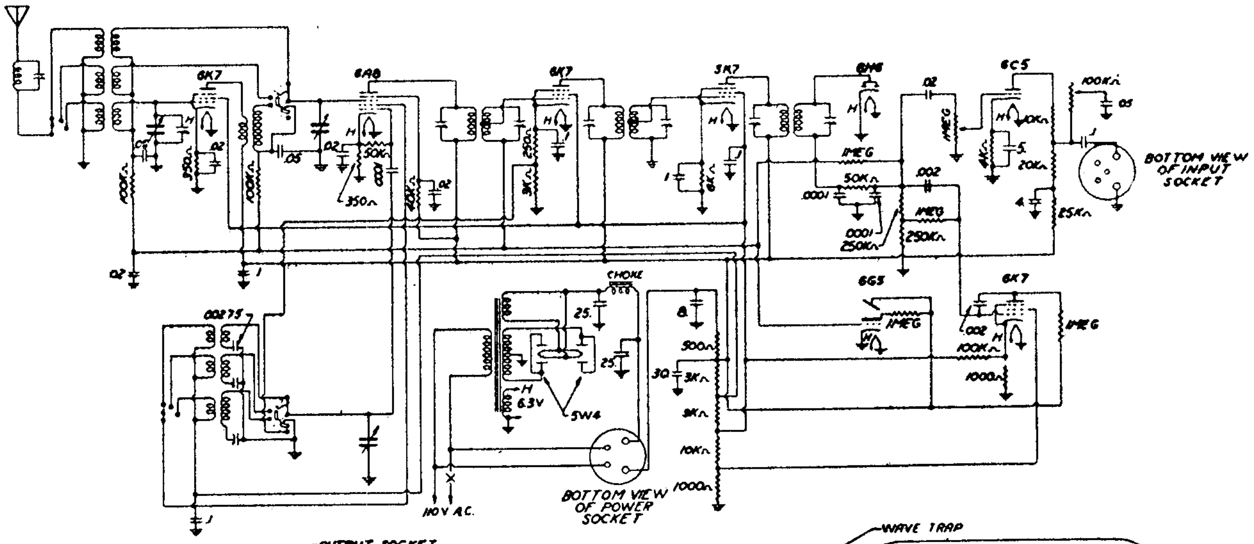
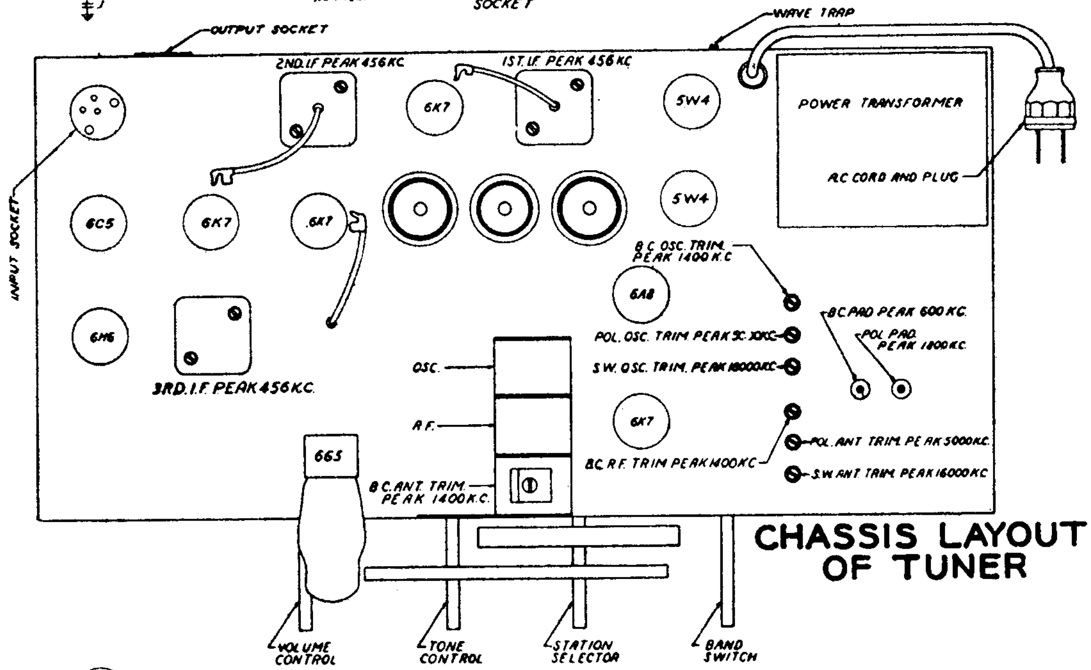
RADOLEK COMPANY

MODELS K16,750, K16,751 & K16,753





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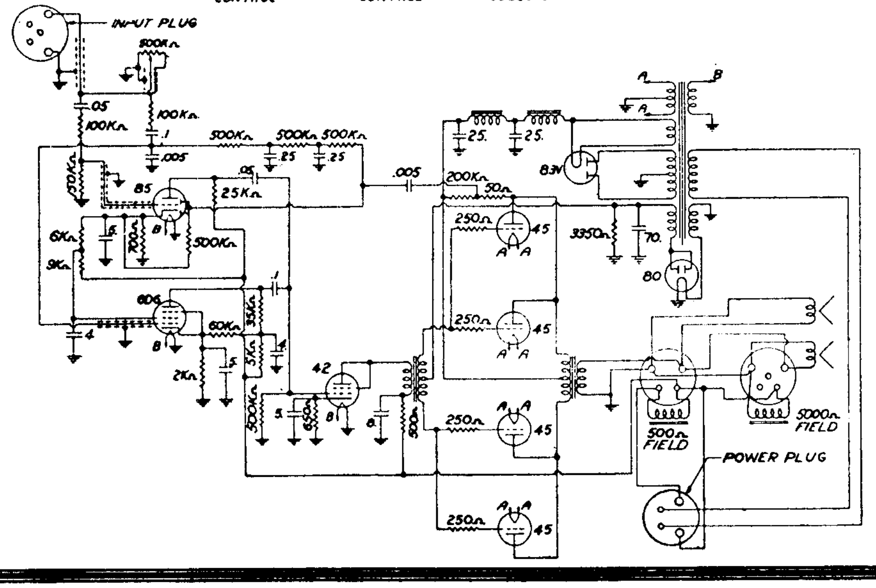


RADOLEK COMPANY

MODELS K16,750, K16,751 & K16,753

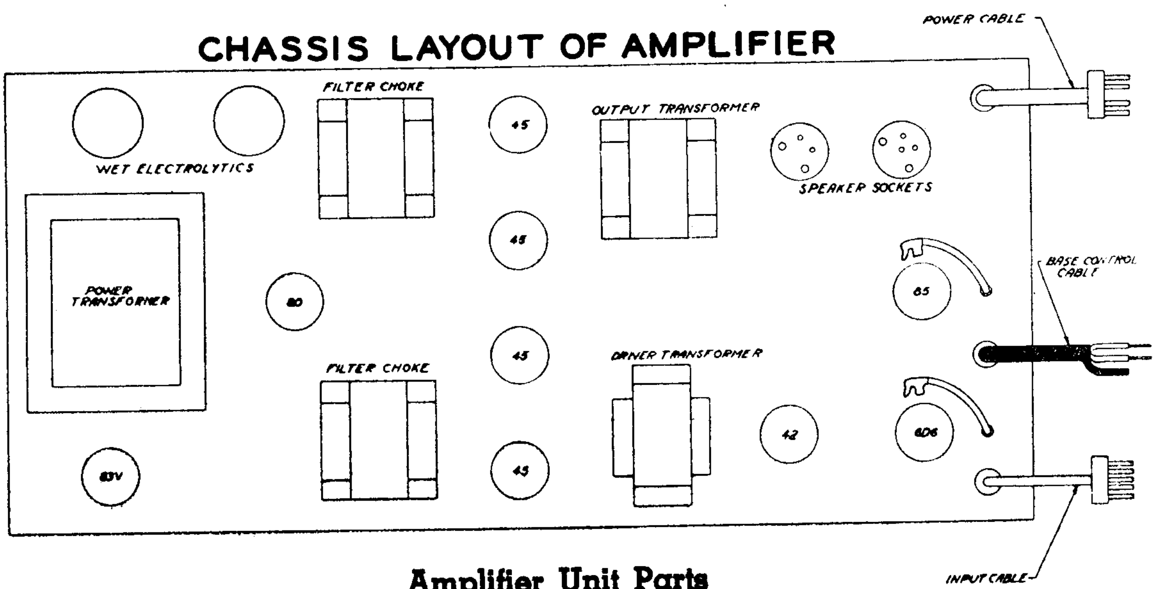
PARTS LIST

Part No.	DESCRIPTION
P 124	Pilot Light
P1029	Output Audio Transformer
P1038	Large Knob
P1040	Small Knob
P1047	Broadcast Interstage Coil
P1046	Broadcast Antenna Coil
P1162	Wave Trap Coil
P1172	Power Transformer
P 176	AC Cord and Plug
P1149	1st I.F. Transformer
P1151	2nd I.F. Transformer
P1152	Double Tuned I.F. Transformer
P1129	3 Gang Variable Condenser
P1146	Tilt Dial Complete
P 907	Escutcheon Plate
P 490	6H6 Tube Socket
P 944	5W4 Tube Socket
P 489	6K7 Tube Socket
P 488	6A8 Tube Socket
P1041	6G5 Tube Socket
P1032	Input Audio Transformer
P 945	Speaker Socket
P 873	Speaker Plug

Part No.	DESCRIPTION
P1191	Gang Candohm Resistor
P1158	Volume Control with Switch
P1159	Tone Control
P1135	Wave Switch
P1160	6 Gang Trimmer Condenser
P 617	500 Mmfd. Padding Condenser
P1139	1500 Mmfd. Padding Condenser
G1187	Short Wave Antenna Coil Complete
G1188	Short Wave Oscillator Coil Comp.
G1189	Middle Band Antenna Coil Comp.
G1190	Middle Band Oscillator Coil Comp.
P1145	Straight Dial Complete
P1166	Volume Control with Switch (S. Dial)
P1167	Tone Control (S. Dial)
P1143	Wave Switch (S. Dial)
P 906	Escutcheon Plate and Glass (S. Dial)
P1154	30 Mfd. 300 V. Electrolytic Con.
P1155	12 Mfd. 300 V. Electrolytic Con.
P1043	4 Mfd. 300 V. Electrolytic Con.
P1156	25 Mfd. 450 V. Electrolytic Con.
P 304	5 Mfd. 30 V. Electrolytic Con.
P 334	.05-400 V. Condenser
P 142	.10-200 V. Condenser

Part No.	Description
P 276	.10-400 V. Condenser
P 143	.02-400 V. Condenser
P1193	.002-400 V. Condenser
P1194	.005-400 V. Condenser
P1055	.00275 Mica Condenser + 5%
P 480	.0001 Mica Condenser
P1114	2 Megohm ¼ Watt Resistor
P162A	1 Megohm Insulated ¼ Watt Resistor
P1192	1,500 Ohm ¼ Watt Resistor
P 417	50,000 Ohm ¼ Watt Resistor
P 278	1,000 Ohm ¼ Watt Resistor
P 162	1 Meg. Ohm ¼ Watt Resistor
P 136	250 Ohm ¼ Watt Resistor
P 280	100,000 Ohm ¼ Watt Resistor
P1186	600 Ohm ¼ Watt Resistor
P 757	4,000 Ohm ¼ Watt Resistor
P1169	15,000 Ohm 1 Watt Resistor
P 810	350 Ohm ¼ Watt Resistor
P 167	10,000 Ohm ¼ Watt Resistor
P 419	20,000 Ohm ¼ Watt Resistor
P 166	25,000 Ohm ¼ Watt Resistor

CHASSIS LAYOUT OF AMPLIFIER



Amplifier Unit Parts

Part No.	Description
P 194	Tube Shields
P 492	80 Tube Socket
P 535	42 Tube Socket
P 536	6D6 Tube Socket
P 873	4 Prong Speaker Plug
P 945	4 Prong Speaker Socket
P1199	Output Audio Transformer
P1200	Power Transformer
P1201	Input Audio Transformer
P1202	Filter Choke
P1203	Filter Choke
P1204	85 Tube Socket
P1206	83 Tube Socket

Part No.	Description
P1207	45 Tube Socket
P1211	Bass Tone Control
P1212	5 Prong Speaker Socket
P1213	5 Prong Speaker Plug
P1221	Base Control Cable
P1222	Power Cable
P1223	Input Cable
P1040B	Knob
P 141	.25-200 V Condenser
P1208	70 Mfd. 100 V Electrolytic Con.
P 304	5 Mfd. 25 V Electrolytic Con.
P 950	4-8 Mfd. 450 V Electrolytic Con.
P1156	25 Mfd. 450 V Electrolytic Con.

Part No.	Description
P 136	250 Ohm Resis. ¼ Watt Resis.
P 137	500,000 Ohm Resis. ¼ Watt Resis.
P 165	25,000 Ohm Resis. 1 Watt Resis.
P 167	10,000 Ohm Resis. ¼ Watt Resis.
P 418	150,000 Ohm Resis. ¼ Watt Resis.
P1215	35,000 Ohm Resis. 1 Watt Resis.
P1216	5,000 Ohm Resis. ¼ Watt Resis.
P1230	60,000 Ohm Resis. 2 Watt Resis.
P1218	2,000 Ohm Resis. ¼ Watt Resis.
P1219	500 Ohm Resis. ½ Watt Resis.
P1220	200,000 Ohm Resis. ¼ Watt Resis.
P1209	Candohm Resistor
P1210	Gang Candohm Resistor

RADOLEK COMPANY

MODELS K16,750, K16,751 & K16,753

The dial is calibrated with each band covering 340 degrees of tuning scale length and are each concentric with the center of the dial face. The innermost scale is calibrated for standard broadcasts covering from 550 to 1700 K.C. (175 to 545 meters). The second band from the center covers the intermediate short wave length broadcasts of Police, Amateur, Aircraft and ships and extends from 1700 to 5400 K.C. (55 to 180 meters). The third band covers all of the principle short wave channels for reception from countries all over the world. This band carries a calibration of from 5.5 to 18 megacycles (16.4 to 55 meters.) This short wave scale is the one which includes the five internationally assigned bands—the 19, 25, 31, 39, and 49 meter channels.

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator which will cover the frequencies of 456, 600, 1400, 1800, 4000, 6000, and 14,000 KC and an output meter which is to be connection across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A8) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all five I.F. trimmers to peak or maximum reading on the output meter. As there are two stages of I.F. in this receiver, there will be consequently three I.F. transformers to align.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .001 md. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the broadcast oscillator trimmer to peak. (See drawing for location.) After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak. The front condenser section tunes the pre-amplifier stage. Then adjust the Broalcast Band R. F. trimmer to peak. This trimmer aligns the grid or input circuit of the 6A8 tube. (See drawing for position of Broadcast R. F. trimmer). Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the B. C. oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the R.F. section. (For location of B.C. padding condenser see drawing.) Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band.

FOREIGN BAND ALIGNMENT The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers marked and illustrated in the drawing as S.W. oscillator and S.W. trimmer. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. Set the receiver pointer to 14,000 KC (also test oscillator).

Then proceed to adjust these two trimmers for peak at 14,000 KC (adjust oscillator trimmer first) and as the inherent design of the circuit has been expressly developed for simplicity in servicing, only these two adjustments are necessary for aligning this band. NOTE: Always start this procedure by having the oscillator coil trimmer loose (out all the way), and the antenna coil trimmer fairly tight (in all the way); otherwise it is possible to make a false alignment on the image frequency. In order to prevent alignment on the image frequency, it is suggested that the following check be made: Readjust the pointer to 13,100 KC where the image frequency should be found. If properly aligned, the image frequency will be found to be weaker. If, however, the signal at 13,100 KC is found to be stronger than the signal at 14,000 KC, it signifies that alignment was incorrectly made on the image frequency.

POLICE BAND In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with a .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment.

Set the receiver pointer to 4000 KC (also test oscillator) and adjust the Police Band oscillator circuit trimmer to peak.

After this has been carefully done, the next step is to adjust the Police Band antenna trimmer to peak.

Now reset the dial pointer and the test oscillator to 1800 KC in preparation for adjusting the police band padding condenser.

Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated, but is the easiest way to correctly adjust the oscillator to the R.F. or antenna section. Return to 4000 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made 1800 KC.

If it is found that in returning to 4000 KC the pointer is accurately on scale, no further adjustment should be necessary (in this recheck). If the pointer is found off scale, it may be corrected and put on scale by readjustment of the police band oscillator trimmer. Alignment of the pointer can only be corrected by adjustment of the oscillator trimmer.

IMPORTANT: The Police Band Oscillator Trimmer, Police Band Antenna Trimmer Police Band Padding Trimmer are the only three adjustments required in aligning this band.

WAVE TRAP ADJUSTMENT At the rear of the chassis near the Antenna and Ground posts is an adjustment screw connected to a trap circuit for elimination of code interference when operating on the broadcast band. If code interference is encountered adjustment of this screw will filter it out. It is to be used only if such interference is experienced in broadcast reception. It's use prevents code transmitters operating on a frequency around 456 K. C. from being received by the I. F. amplifier which is tuned to 456 K. C.

SERVICE DATA FOR ALL BANDS

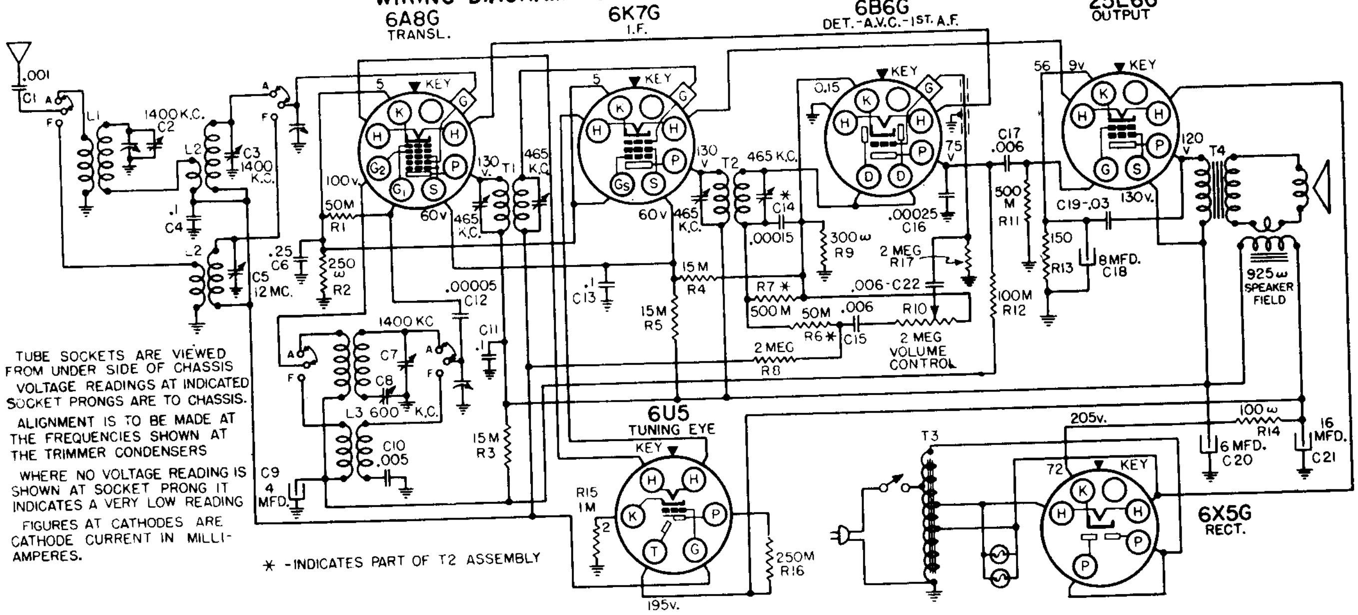
If it is suspected that the oscillator has stopped bu is doubtful due to the presence of the usual amoun of noise level, it is suggested that the oscillator plate voltage be checked. To ascertain whether the tube is oscillating, ground the oscillator grid of the 6A8 (short stator and rotor plates of oscillator section on gang condenser). If oscillating properly, grounding the grid will cause an appreciable drop in oscillator voltage. Grounding or shorting the stator and grid components should be accomplished by grounding the stator mounting nut to the frame of the condenser with a screw-driver or any metallic conductor.

Do not wedge a screw-driver between the plates for this is liable to permanently warp the plates and thus prevent the oscillator section of the gang condenser from tracking probably.

SEARS, ROEBUCK & CO.

MODELS 4611 & 4660 "FACTORY No 101,487"

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.487



ELECTRICAL SPECIFICATIONS

TUBES AND FUNCTIONS:

6A8G	Translator	25L6G	Output
6K7G	IF	6X5G	Rectifier
6B6G	Detector-AVC-First AF	6U5	Tuning Eye

POWER SUPPLY:
All models available . . . . 105-125 volts, 60 cycle, 45 watts

FREQUENCY RANGES:
American . . . . 540-1750 kc
Foreign . . . . 3800-13,200 kc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant.-Transl. Trimmer	Padder
American	1750 kc	1400 kc	600 kc
Foreign	-	12 mc	-

INTERMEDIATE FREQUENCY . . . . 465 kc

POWER OUTPUT:
Type . . . . Beam Tube
Undistorted . . . . 1.8 watts
Maximum . . . . 2.5 watts

LOUD SPEAKER:
Type . . . . Dynamic
Size . . . . 6 inch
Field coil resistance (App.) . 925 ohms

OPERATING FEATURES:
Automatic Volume Control
Wave Switch

CHASSIS FEATURES:
Number IF stages . . . . One
Antenna . . . . Self contained
Tuning Eye

IMPORTANT ALIGNMENT NOTES

• Push a pin through the attached antenna wire at a point near where it comes out of the chassis so that the pin makes contact with the antenna wire inside the insulation. Connect the generator output lead to the pin. The generator output connection should not be made to the free end of the attached antenna wire.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The figures given in the "Microvolts" column are only approximate.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

After the alignment procedure has been completed, tune in a broadcast station at about 900 kc and, if necessary, shift the dial pointer to the station's frequency marking on the dial.

ALIGNMENT PROCEDURE

Output meter connnections . . . . Across speaker voice coil
Output meter reading to indicate 50 milliwatts output . . . . .0.38 volts
Dummy antenna value to be in series with generator output . . . . See chart below
Connection of generator output lead . . . . See chart below
Connection of generator ground lead . . . . To external ground
Generator modulation . . . . 30%, 400 cycles
Position of Volume Control . . . . Fully clockwise
Position of Dial Pointer with variable fully closed . . . . To fall along bottom edge of letters "MC" and "KC" at the 550 kc end of the dial.

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	550 kc	465 kc	.1 mfd.	6A8G Grid	T2, T1	IF	75
"AM"	Fully open	1750 kc	.0002 mfd.	•	C7	Oscillator Trimmer	150
"AM"	1400 kc	1400 kc	.0002 mfd.	•	C2, C3	Antenna Translator	100
"AM"	600 kc (rock)	600 kc	.0002 mfd.	•	C8	Padder	50
"FOR"	12 mc (rock)	12 mc	400 ohms	•	C5	Translator Trimmer	70

GENERAL INFORMATION

POWER TRANSFORMER:

An auto-transformer is used. Therefore, under certain conditions, the chassis may be above ground potential. Do not allow any grounded object to come into contact with the chassis while the line cord is plugged in. Also, be careful when working on the chassis out of its cabinet, to avoid shocks.

ANTENNA:

The receiver has a coil of thin flexible antenna wire attached. This should be uncoiled and run as far from the receiver as possible, instead of being zigzagged back and forth near the receiver. For best reception, and for satisfactory FOREIGN reception, the end of the self-contained antenna wire should be spliced to a good outdoor antenna.

The antenna is insulated from the chassis by means of a .001 condenser so that there is no danger of shock from touching the antenna. The receiver is designed to be used without a ground connection and no attempt should be made to use one.

THE HEATER CIRCUIT:

All of the tubes except the rectifier tube are connected in series. Therefore, if any one tube burns out, the others will not light. It is necessary to replace only the burned out tube; the others then will light. The full heater voltage, approximately 49 volts, will appear across the filament prongs of the burned out tube.

THE AVC CIRCUIT:

The diode current of the 6B6G tube, flowing through the 500M ohm resistor, R7, creates a voltage drop across it. This voltage is applied to the control grids of the 6A8G and 6K7G tube to provide AVC.

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to choose the new IF frequency as near to 465 kc as possible.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

HUM:

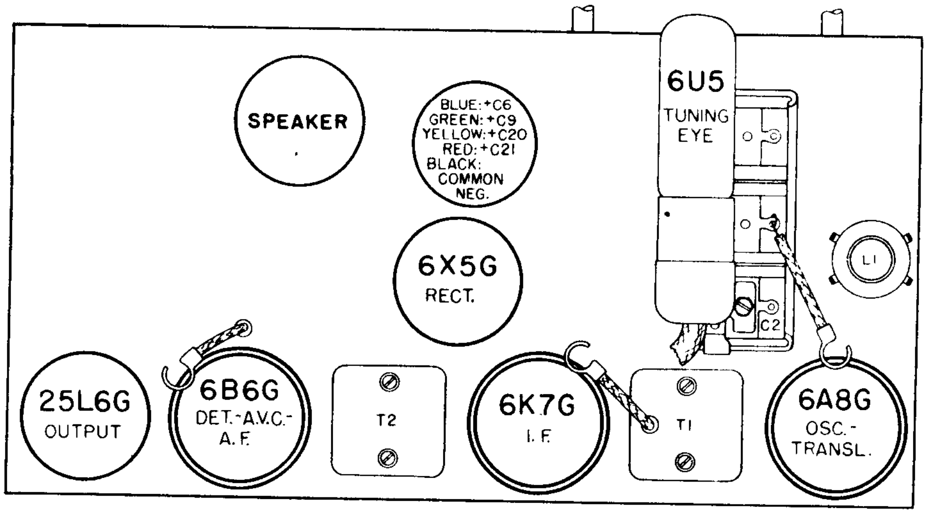
Reversing the line cord plug may reduce excessive hum.

INCREASING TUNING EYE SENSITIVITY:

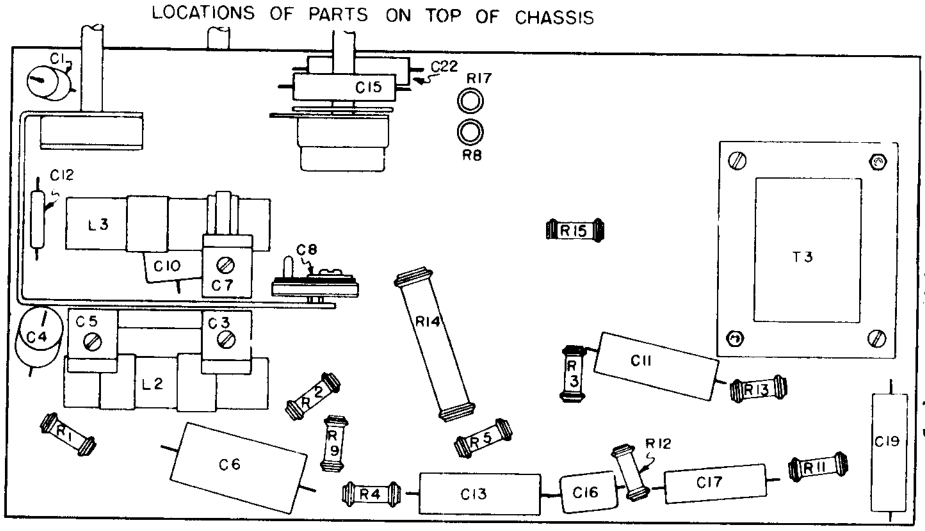
If necessary, the sensitivity of the Tuning Eye can be increased by changing the 1 meg-ohm resistor in the cable socket to 250M ohms.

SEARS, ROEBUCK & CO.

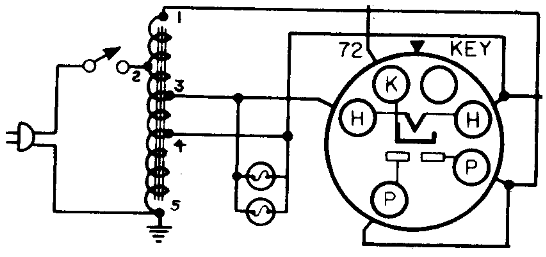
MODELS 4611 & 4660 "FACTORY No 101,487"



LOCATIONS OF PARTS ON TOP OF CHASSIS



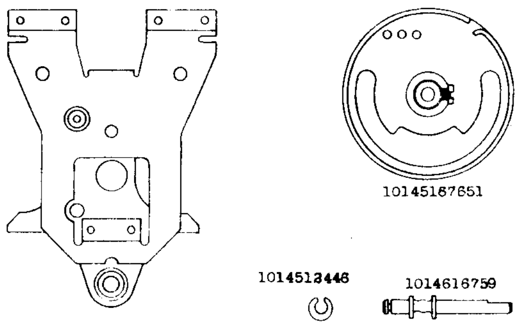
LOCATIONS OF PARTS UNDER CHASSIS.



POWER TRANSFORMER COLOR CODE

1. RED. Rectifier Plate
2. GREEN. Primary
3. YELLOW. Heater
4. BLUE. Heater
5. BLACK. Primary, Grounded

Before ordering parts for Dial Drive System, check these drawings:



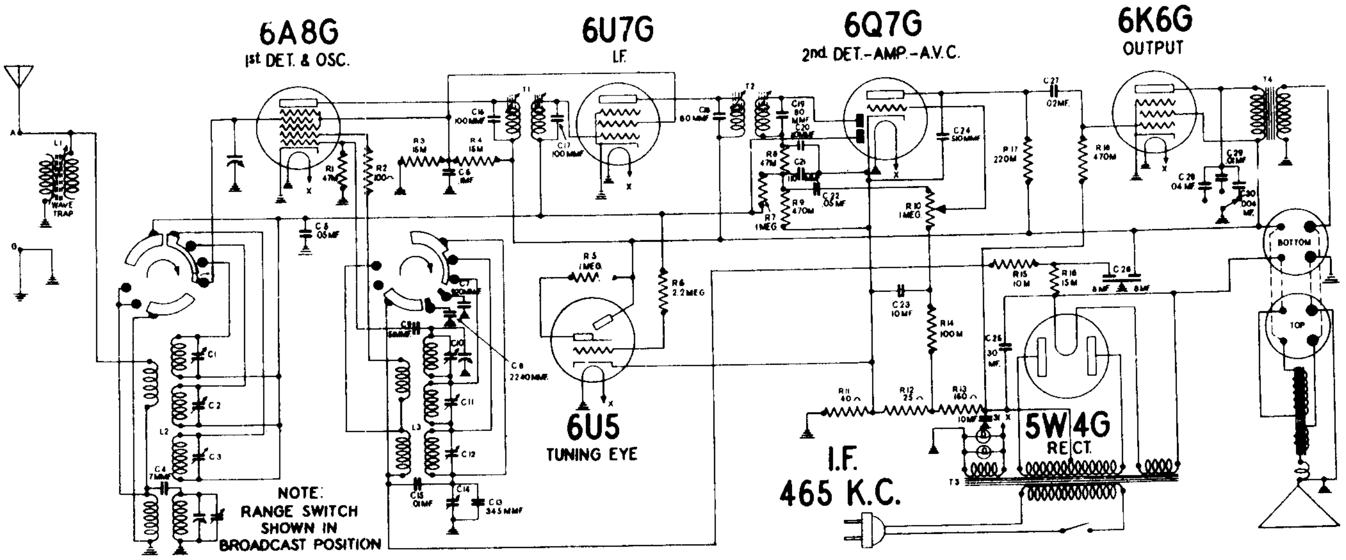
PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SELLING PRICE EACH
	1015514030	Antenna - Wire	.14
	10146187661	Bracket - With bearing, condenser drive shaft	.65
	1015518790	Cable - With socket, Tuning Eye	.49
	1015416462	Clip - Tuning Eye mounting	.04
	1015415975	Clip - Grid	.01
L1	1012814821	Coil - Antenna, broadcast	.46
L3	1012816341	Coil - Oscillator	.55
L2	1012816340	Coil - Translator	.58
	1011616767	Condenser - Variable	2.81
C9,C18, C20,C21	1012016355	Condenser - Electrolytic, dry	1.07
C3,C5	1011716557	Condenser - Trimmer, dual, antenna	.33
C7	1011715723	Condenser - Trimmer	.10
C8	1011714433	Condenser - Padder	.39
C6		Condenser - .25 mfd. 200 volts	.18
C4.C11.C13		Condenser - .1 mfd. 200 volts	.18
C19		Condenser - .03 mfd. 400 volts	.08
C15,C17		Condenser - .006 mfd. 400 volts	.08
C10		Condenser - .005 mfd. mica	.25
C1		Condenser - .001 mfd. 400 volts	.08
C16		Condenser - .00025 mfd. mica	.09
C12		Condenser - .00005 mfd. mica	.13
R10	1013417313	Control - Volume with switch	.67
	1015516836	Cord - Power	.41
	10145139748	Cord - Condenser drive, with spring	.08
	1014016800	Dial - Station selector	.95
	10145187651	Drum - Condenser drive	.40
	1014416461	Escutcheon - Dial	.53
	1015416421	Grommet - Chassis mounting	.03
	1015416360	Metal insert for grommet	.17
	1015410980	Grommet - Variable condenser mtg.	.03
	1013914405	Knob - Tuning	.12
	1013914095	Knob - Volume	.12
	1013914858	Knob - Wave switch	.10
	101492288	Lamp - Dial	.12
	1015913795	Leaflet - Instruction	.30
	1015915947	Log - Station	.01
	1014313437	Nut - Escutchen mounting	.01
	1014113304	Pointer - Dial	.06
R8		Resistor - 2 megohms, 1/3 watt	.15
R11		Resistor - 500M ohms, 1/3 watt	.15
R12		Resistor - 100M ohms, 1/3 watt	.15
R1		Resistor - 50M ohms, 1/3 watt	.15
R3,R4		Resistor - 15M ohms, 1/3 watt	.15
R5		Resistor - 10M ohms, 1/2 watt	.19
R15		Resistor - 1M ohms, 1/3 watt	.15
R2,R9		Resistor - 300 ohms, 1/3 watt	.15
R13		Resistor - 150 ohms, 1/2 watt	.19
R14		Resistor - 100 ohms, 3 watts	.31
	1015413876	Ring - Felt, Tuning Eye	.01
	1014613759	Shaft - Dial drive	.12
	101188253	Socket - 5 prong, Speaker	.06
	1011812757	Socket - 7 prong	.14
	1011813173	Socket - 8 prong	.14
	1011817095	Socket - Dial light	.06
	1015416798	Spacer - Wood, shipping	.01
	1015816736	Speaker - 6", Dynamic	3.59
	1015713793	Cone and voice coil	1.53
	1011516593	Field coil	1.46
T4	1013116794	Transformer	1.57
	1014515730	Spring - Tension, condenser drive cord	.02
	1013716763	Switch - Wave	.49
T1	10133163502	Transformer - IF Input	1.06
T2	10135133511	Transformer - IF Output	1.27
T3	1011016792	Transformer - Power	1.89
	1014513446	Washer - Spring, condenser drive shaft retaining	.01

SEARS, ROEBUCK & CO.

MODELS 4663 & 4763 "FACTORY No. 100,158"

SCHEMATIC FOR SILVERTONE CHASSIS 100.158



ALIGNMENT PROCEDURE

PRELIMINARY

Output meter connections....................Across voice coil leads
Output meter reading to indicate 1/2 watt output....................1.41 volts
Average sensitivity in microvolts for 1/2 watt output..........See chart below

Generator ground connection....................Receiver Chassis
Dummy antenna to be in series with generator output..........See chart below
Connection of generator output lead....................See chart below
Generator modulation....................30%, 400 cycles

Position of volume control....................Maximum clockwise
Position of tone control....................Maximum clockwise

ORDER OF ALIGN.	* DIAL POINTER POSITION	SIGNAL GENERATOR FREQUENCY	DUMMY ANTENNA	SIGNAL GENERATOR CONNECTION	TRIMMER NUMBER	SENSITIVITY (MICRO-VOLTS)	BAND SWITCH POSITION
A	ANY PT. WHICH DOES NOT AFFECT SIGNAL	465 KC.	.1 MFD.	6A8 CONTROL GRID	1, 2 3, 4	60	BAND A (Clock-wise)
B	ANY POINT WHICH DOES NOT AFFECT SIGNAL	465 KC.	250 MMFD.	ANT. LEAD	5 MINIMUM OUTPUT	—	BAND A (Clock-wise)
C	16 MC.	16 MC.	400 OHM.	ANT. LEAD	*** C10, C1	45	BAND F (Counter-clock-wise
D	5 MC.	5 MC.	400 OHM.	ANT. LEAD	*** C11, C2	56	BAND P (Center)
E	1500 KC.	1500 KC.	250 MMFD.	ANT. LEAD	C12, C3, 6	28	BAND A (Clock-wise)
F	** TUNE TO 600 KC. GEN.SIG.	600 KC.	250 MMFD.	ANT. LEAD	C14	25	BAND A (Clock-wise)

IMPORTANT ALIGNMENT NOTES

* Before attempting to align the receiver check to see that the dial pointer is horizontal when the gang condenser is in full mesh.

After adjusting the I.F. trimmers 1, 2, 3 and 4 go back and repeat the adjustment, since the setting of each trimmer will have some effect on others. When adjusting 5, antenna trap trimmer, increase generator output to obtain clearly defined trimmer setting for a minimum output.

** When aligning at 600 KC. it is necessary to adjust trimmer C14 while rocking the gang condenser through a small distance. Rocking the gang is essential if maximum sensitivity is to be obtained.

*** When aligning the short wave bands, care should be taken in adjusting trimmers C10 and C11, since two possible adjustments of these trimmers will result in signal peaks. The proper peak is that which occurs with the trimmer screw farthest out.

ELECTRICAL SPECIFICATIONS

TUBE COMPLEMENT
1 6A8-G..........1st Det. & Osc.
1 6U7-G....................I.F. Amp.
1 6Q7-G.....2nd Det; Amp; & A.V.C.
1 6K6-G..............Pwr. Output
1 5W4-G................Rectifier
1 6U5..................Tuning Eye

POWER SUPPLY
Models 4663, 4763..............105-135 volts, 50-60 cycle, 60 watts

FREQUENCY RANGES
Band A............525 to 1750 KC.
Band P...........1710 to 5600 KC.
Band F..........5350 to 18,100 KC.

ALIGNMENT FREQUENCIES
1500 KC.; 600 KC.
5000 KC.
16,000 KC.

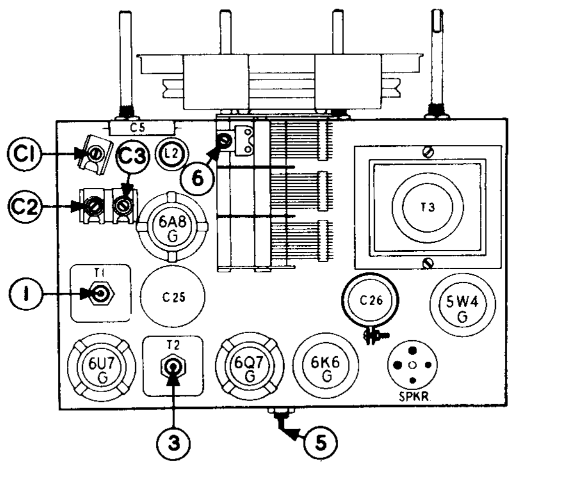
INTERMEDIATE FREQUENCY.................................465 KC

POWER OUTPUT
Type......................Pentode
Undistorted..............2.5 Watts
Maximum..................4.0 Watts

LOUD SPEAKER
Type......................Dynamic
Size.......................6 inch
Field Coil Res.....1060 ohms (Hot)
Field Coil Voltage........60 volts

OPERATING FEATURES
Fidelity Rge.(±6DB)..100-3000 Cyc.
Tone Control..........Three Point
Resonance Indicator.....Tuning Eye
Volume Stabilizer....A.V.C. System

CHASSIS FEATURES
Preselector Stage..............One
Number of I.F. Stages..........One
Number of Cond. in Gang......Three
Antenna..............Conventional
465 KC. Wave Trap



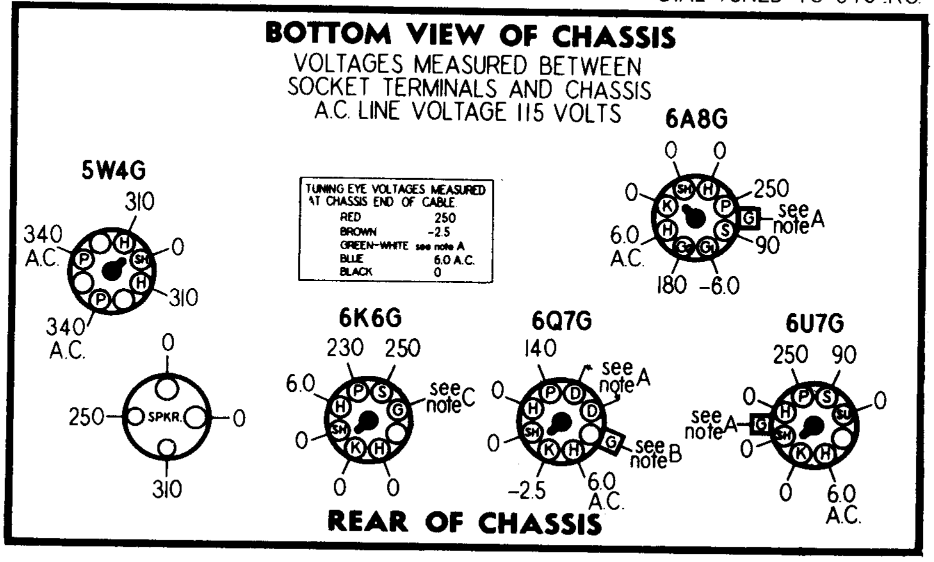
SEARS, ROEBUCK & CO.

MODELS 4663 & 4763 "FACTORY No 100,158"

SOCKET VOLTAGES

ANTENNA GROUNDED

DIAL TUNED TO 540 KC.

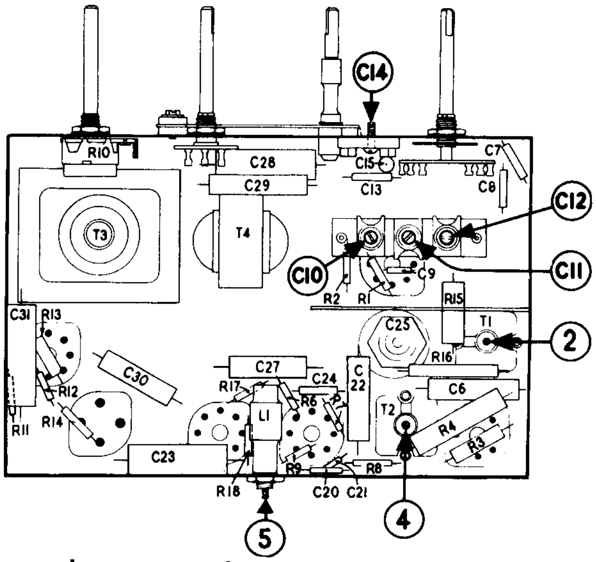


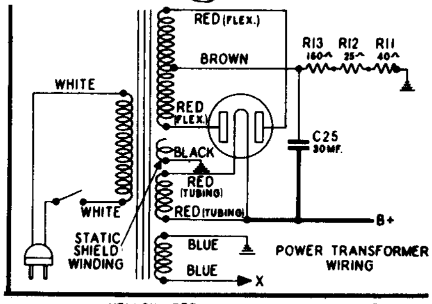
Use a high resistance voltmeter of 1000 ohms per volt.

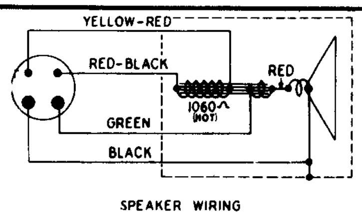
NOTE A: The bias for the control grids of the 6A8-G, 6U7-G and the diode plates of the 6Q7-G tubes is -2.5 volts measured across resistor R11.

NOTE B: The bias for the control grid of the 6Q7-G is -4.5 volts measured across resistors R11 and R12.

NOTE C: The bias for the control grid of the 6K6-G output tube is -15 volts measured across resistors R11, R12 and R13.





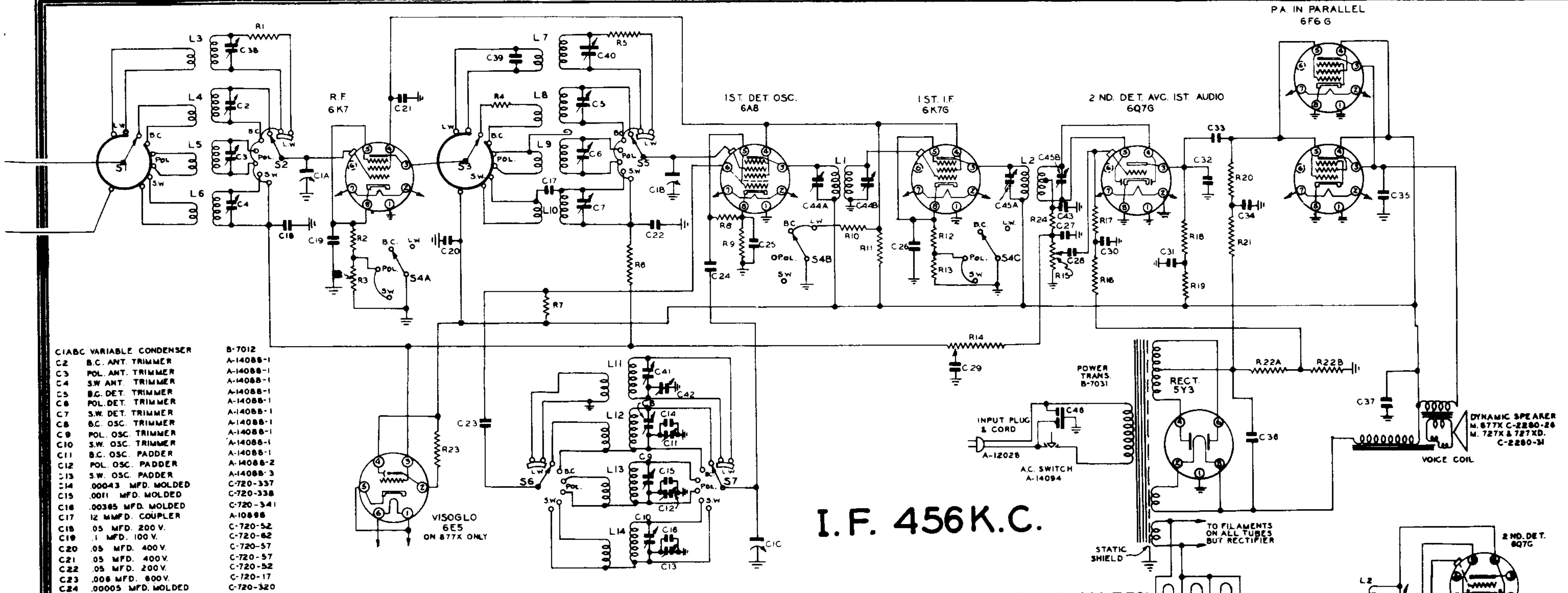


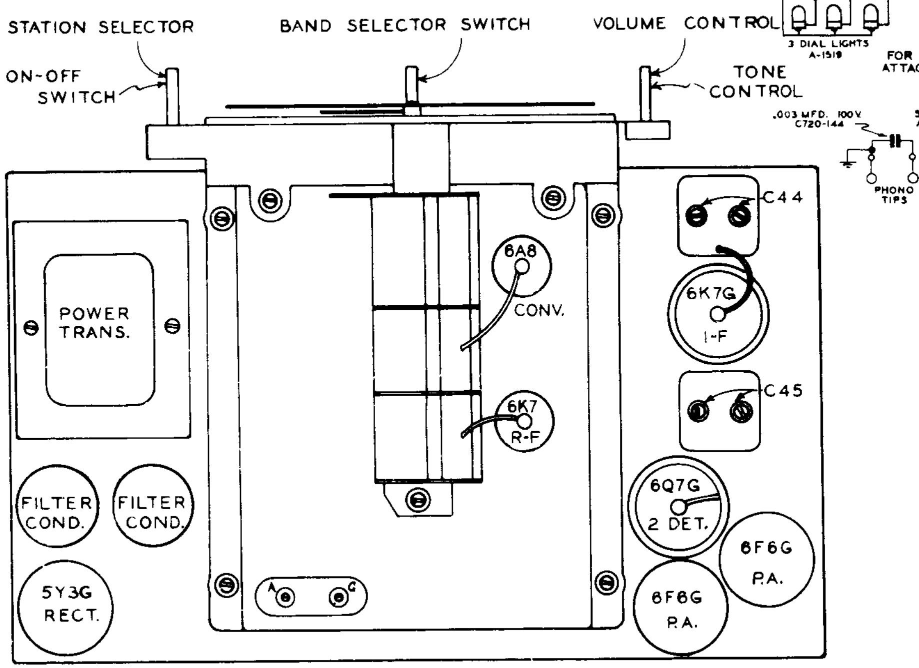
PARTS LIST

Part Number	Schematic Location	Description	Selling Price Each
10040111001		Dial - guard (beneath dial scale)	.60
10040111000		Dial scale	1.65
10058110942		Diaphragm assem. - (for 10058286 speaker)	1.20
10046110807		Drive shaft - dial	.20
10045110839		Drum & bushing - dial	.64
10044110676		Escutcheon (with glass) - for dial	1.98
10039110879		Knob - range switch	.15
10039110877		Knob - for tuning control	.26
10039110878		Knob - for volume control	.15
10039110880		Knob - for tone control	.20
10049110629		Lamp - dial (6.3 volt - .25 amp.)	.16
10041110810		Pointer - dial	.20
	R1	Resistors - 47,000 ohms 1/4 watt	.12
	R2	Resistors - 100 ohms 1/4 watt	.12
	R3	Resistors - 15,000 ohms 1/2 watt	.15
	R4	Resistors - 15,000 ohms 2 watts	.30
	R5	Resistors - 1 megohm 1/4 watt	.12
	R6	Resistors - 2.2 megohms 1/4 watt	.15
	R7	Resistors - 1 megohm 1/4 watt	.12
	R8	Resistors - 47,000 ohms 1/4 watt	.12
	R9	Resistors - 470,000 ohms 1/4 watt	.12
10024110939	R10	Resistors - vol. cont. & off-on sw.(1 meg.)	1.15
	R11	Resistors - 40 ohms 1/2 watt	.12
	R12	Resistors - 25 ohms 1/2 watt	.15
	R13	Resistors - 160 ohms 1 watt	.12
	R14	Resistors - 100,000 ohms 1/4 watt	.12
	R15	Resistors - 10,000 ohms 1/2 watt	.15
	R16	Resistors - 15,000 ohms 1 watt	.18
	R17	Resistors - 220,000 ohms 1/4 watt	.12
	R18	Resistors - 470,000 ohms 1/4 watt	.12
10028111052	L2	Coil - antenna & preselector (dual trimmer)	$3.10
10028110948	L3	Coil - oscillator (without trimmer)	1.40
10017111049	C1-C2	Condenser - trimmer for ant. coil (2 sect.)	.44
10017111043	C3	Condenser - trimmer for ant. coil (sgle.sect.)	.25
10019110850	C4	Condenser - 7 mmfd.	.18
	C5	Condenser - .05 mfd. 150 volts	.25
	C6	Condenser - .1 mfd. 200 volts	.25
10019110986	C7	Condenser - 920 mmfd. mica	.30
10019110985	C8	Condenser - .00224 mfd. mica	.36
1001985061	C9	Condenser - 51 mmfd. mica	.15
10017111047	C10-C11-C12	Condenser - trimmer (3 sect. for osc. coil)	.70
1001989564	C13	Condenser - 345 mmfd. mica (3%)	.40
1001785285	C14	Condenser - padding	.15
	C15	Condenser - .01 mfd. 400 volts	.25
10019110952	C16-C17	Condenser - 100 mmfd. mica (5%) (In I.F. coil)	.18
10019110959	C18-C19	Condenser - 80 mmfd. mica (5%) (In I.F. coil)	.18
1001983783	C20-C21	Condenser - 110 mmfd.	.20
	C22	Condenser - .05 mfd. 200 volts	.25
10020110377	C23-C31	Condenser - 10 mfd. 25 volts electrolytic	.80
1001985394	C24	Condenser - 510 mmfd. mica	.25
1002089937	C25	Condenser - 30 mfd. 450 volts electrolytic	1.60

SPARKS-WITHINGTON COMPANY

MODELS 727-X, 727-XD & 877-X





C1ABC	VARIABLE CONDENSER	B-7012
C2	B.C. ANT. TRIMMER	A-14088-1
C3	POL. ANT. TRIMMER	A-14088-1
C4	S.W. ANT. TRIMMER	A-14088-1
C5	B.C. DET. TRIMMER	A-14088-1
C6	POL. DET. TRIMMER	A-14088-1
C7	S.W. DET. TRIMMER	A-14088-1
C8	B.C. OSC. TRIMMER	A-14088-1
C9	POL. OSC. TRIMMER	A-14088-1
C10	S.W. OSC. TRIMMER	A-14088-1
C11	B.C. OSC. PADDER	A-14088-1
C12	POL. OSC. PADDER	A-14088-2
C13	S.W. OSC. PADDER	A-14088-3
C14	.00043 MFD. MOLDED	C-720-337
C15	.0011 MFD. MOLDED	C-720-338
C16	.00365 MFD. MOLDED	C-720-341
C17	12 MMFD. COUPLER	A-10898
C18	.05 MFD. 200 V.	C-720-52
C19	.1 MFD. 100 V.	C-720-62
C20	.05 MFD. 400 V.	C-720-57
C21	.05 MFD. 400 V.	C-720-57
C22	.05 MFD. 200 V.	C-720-52
C23	.006 MFD. 600 V.	C-720-17
C24	.00005 MFD. MOLDED	C-720-320
C25	.1 MFD. 100 V.	C-720-62
C26	.1 MFD. 100 V.	C-720-62
C27	.0001 MFD. MOLDED	C-720-325
C28	.01 MFD. 200 V.	C-720-20
C29	.004 MFD. 200 V.	C-720-5
C30	.1 MFD. 100 V.	C-720-62
C31	.1 MFD. 400 V.	C-720-61
C32	.00025 MFD. MOLDED	C-720-319
C33	.05 MFD. 400 V.	C-720-57
C34	.1 MFD. 100 V.	C-720-62
C35	.006 MFD. 600 V.	C-720-15
C36	16 MFD. ELECT.	A-14073
C37	30 MFD. ELECT.	A-14072
C38	L.W. ANT. TRIMMER	A-14088-1
C39	.00025 MFD. MOLDED	C-720-319
C40	L.W. DET. TRIMMER	A-14088-1
C41	L.W. OSC. TRIMMER	A-14088-1
C42	L.W. OSC. PADDER	A-14088-3
C43	.0001 MFD. MOLDED	C-720-325
C44A&B	NO. 1 I.F. TRIMMER	A-14231
C45A&B	NO. 2 I.F. TRIMMER	A-14231
C46	.006-.006 MFD. 1000V.	C-720-138

L1	NO. 1 I.F. COIL	A-12064-12
L2	NO. 2 I.F. COIL	A-12989-2
L3	L.W. ANT. COIL	A-14243-4
L4	B.C. ANT. COIL	A-14243-1
L5	POL. ANT. COIL	A-14243-2
L6	S.W. ANT. COIL	A-14243-3
L7	L.W. DET. COIL	A-14242-4
L8	B.C. DET. COIL	A-14242-1
L9	POL. DET. COIL	A-14242-2
L10	S.W. DET. COIL	A-14242-3
L11	L.W. OSC. COIL	A-14241-4
L12	B.C. OSC. COIL	A-14241-1
L13	POL. OSC. COIL	A-14241-2
L14	S.W. OSC. COIL	A-14241-3

R1 100 Ω .1 W.	C-2794-50B
R2 270 Ω .25 W.	C-2795-55B
R3 1000 Ω .25 W.	C-2795-62B
R4 2200 Ω .1 W.	C-2794-68-B
R5 100 Ω .1 W.	C-2794-50B
R6 100 000 Ω .25 W.	C-2795-25B
R7 22 000 Ω .5 W.	C-2796-78C
R8 56 000 Ω .25 W.	C-2795-83B
R9 330 Ω .25 W.	C-2795-56-B
R10 22 000 Ω .5 W.	C-2796-78C
R11 15 000 Ω 2 W.	C-2798-187A
R12 270 Ω .25 W.	C-2795-55B
R13 470 Ω .25 W.	C-2795-58B
R14 500 000 Ω TONE CONTROL	A-14089
R15 250 000 Ω VOLUME CONTROL	A-14075
R16 1 MEGOHM .25 W.	C-2795-98B
R17 560 000 Ω .25 W.	C-2795-95B
R18 270 000 Ω .25 W.	C-2795-91B
R19 100 000 Ω .25 W.	C-2795-25B
R20 270 000 Ω .25 W.	C-2795-91B
R21 270 000 Ω .25 W.	C-2795-91B
R22 CANDOHM R22A 179 Ω CANDOHM R22B 28 Ω	A-14081
R23 1 MEGOHM .25 W. (877X ONLY)	C-2795-98B
R24 56 000 Ω .25 W.	C-2795-83B

NO. FROM BACK OF SET

S1	ANT. PRI. SECTION
S2	ANT. SEC. SECTION
S3	DET. PRI. SECTION
S4A, S4B, S4C	BAIS & SCREEN VOLTAGE SECTION
S5	DET. SEC. SECTION
S6	OSC. PRI. SECTION
S7	OSC. SEC. SECTION

SPARKS-WITHINGTON COMPANY

MODELS 727-X, 727-XD & 877-X

VOLTAGE CHART

Line Voltage: 112 volts

Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast Band

Tube	Function	Voltage of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 6	Grid Cap
6K7	R-F Amplifier	0	6.2	250	105	0	-	0	0	0
6A8	1st Det-Oscillator	0	6.2	250	105	0	235	0	0	0
6K7G	I-F Amplifier	0	6.2	250	130	0	-	0	0	0
6Q7G	2nd Det-AVC-1st A-F Amp.	0	6.2	30*	0	0	-	0	0	0
6F6G	Power Amplifier	0	6.2	260	260	5**	-	0	0	-
6F6G	Power Amplifier	0	6.2	260	260	5**	-	0	0	-
5Y3G	Rectifier	0	5.0	-	400	-	400	-	0	-
6E5 †	Viso-Glo	6.2	20***	0	250	0	0	-	-	-

Notes: Voltage readings are for schematic diagram shown on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits except as indicated. All measurements made with Weston Selective Analyzer No. 665, Type 2.

* 50 volt scale ** 250 volt scale *** 100 volt scale

† Model 877-X only

MODELS 827-X, 827-XD & 997-X

VOLTAGE CHART

Line Voltage: 120 volts

Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast Band

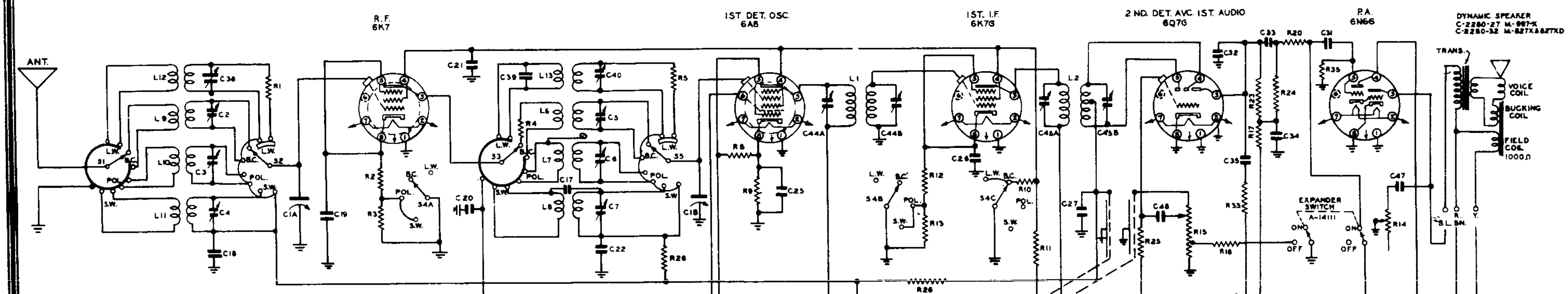
Tube	Function	Voltage of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 6	Grid Cap
6K7	R-F Amplifier	0	6.2	250	115	0	-	0	0	0
6A8	1st. Det-Oscillator	0	6.2	230	145	0	205	0	0	0
6K7G	I-F Amplifier	0	6.2	240	115	0	-	0	0	0
6Q7G	2nd. Det-AVC-1st. A-F Amp.	0	6.2	150	0	0	-	0	0	0
6J7G	Expander Amplifier	0	6.2	0	0	0	-	0	0	0
6K7G	Expander	0	6.2	0	95	0	-	0	80	85
6N6G	Power Amplifier	0	6.2	410	410	0	-	0	0	-
5Y3G	Rectifier	0	5.2	-	410	-	410	-	0	-
6E5 †	Viso-Glo	6.2	25*	0	225	0	0	-	-	-

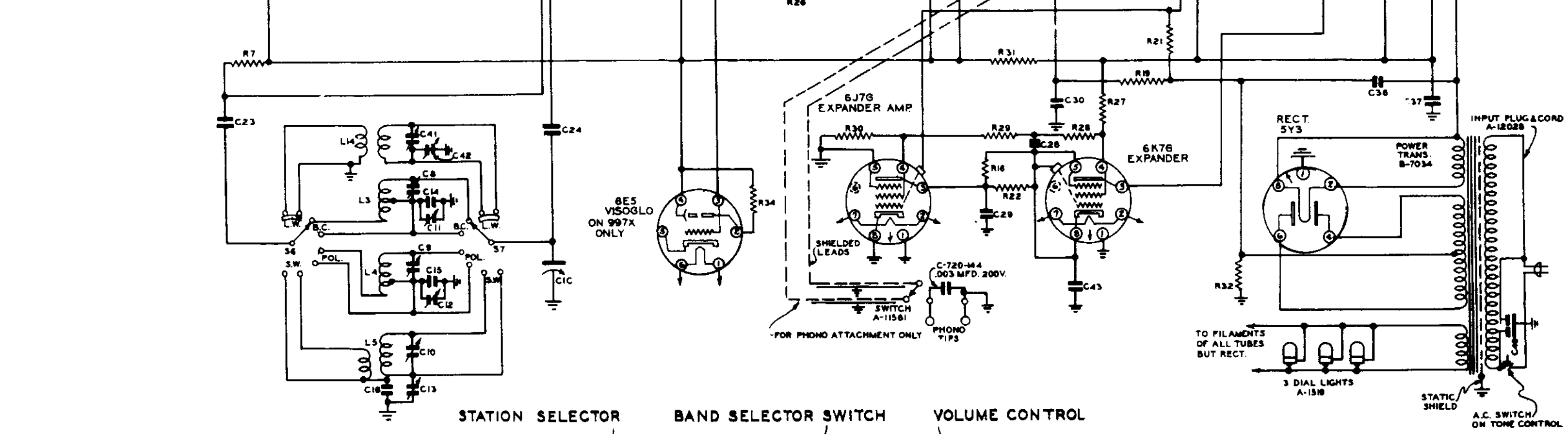
Notes: Resistance readings are for schematic diagram shown on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 2.

†. Model 997-X only

SPARKS-WITHINGTON COMPANY

MODELS 827-X, 827-XD & 997-X





C1-A B & C	VARIABLE CONDENSER	B-7012
C2	B.C. ANT. TRIMMER	A-14088-1
C3	POL. ANT. TRIMMER	A-14088-1
C4	S.W. ANT. TRIMMER	A-14088-1
C5	B.C. DET. TRIMMER	A-14088-1
C6	POL. DET. TRIMMER	A-14088-1
C7	S.W. DET. TRIMMER	A-14088-1
C8	B.C. OSC. TRIMMER	A-14088-1
C9	POL. OSC. TRIMMER	A-14088-1
C10	S.W. OSC. TRIMMER	A-14088-1
C11	B.C. OSC. PADDER	A-14088-1
C12	POL. OSC. PADDER	A-14088-2
C13	S.W. OSC. PADDER	A-14088-3
C14	.00043 MFD. MOLDED	C-720-337
C15	.0011 MFD. MOLDED	C-720-338
C16	.00365 MFD. MOLDED	C-720-341
C17	12 MMF. COUPLER	A-10896
C18	.05 MFD. 200 V.	C-720-52
C19	.1 MFD. 100 V.	C-720-62
C20	.05 MFD. 400 V.	C-720-57
C21	.05 MFD. 400 V.	C-720-57
C22	.05 MFD. 200 V	C-720-52
C23	.006 MFD. 600 V.	C-720-17
C24	.00005 MFD. MOLDED	C-720-320
C25	.1 MFD. 100 V.	C-720-62
C26	.1 MFD. 100 V.	C-720-62
C27	.0001 MFD. MOLDED	C-720-325
C28	.2 MFD. 200 V.	C-720-87
C29	.3 MFD. 200 V.	C-720-91
C30	.1 MFD. 100 V.	C-720-62
C31	.05 MFD. 400 V.	C-720-57
C32	.00025 MFD. MOLDED	C-720-319
C33	.05 MFD. 400 V.	C-720-57
C34	.1 MFD. 400 V.	C-720-61
C35	.006 MFD. 600 V.	C-720-17
C36	16 MFD. 475 V. ELECT.	A-14122
C37	25 MFD. 350 V. ELECT.	A-14113
C38	L.W. ANT. TRIMMER	A-14088-1
C39	.00025 MFD. MOLDED	C-720-319
C40	L.W. DET. TRIMMER	A-14088-1
C41	L.W. OSC. TRIMMER	A-14088-1
C42	L.W. OSC. PADDER	A-14088-3
C43	.5 MFD. 200 V.	C-720-104
C44A&B	1ST. I.F. TRIMMER	A-14231
C45A&B	2ND. I.F. TRIMMER	A-14231
C46	.006-.006 MFD. 1000 V.	C-720-138
C47	.03 MFD. 600 V.	C-720-12
C48	.05 MFD. 200 V.	C-720-52

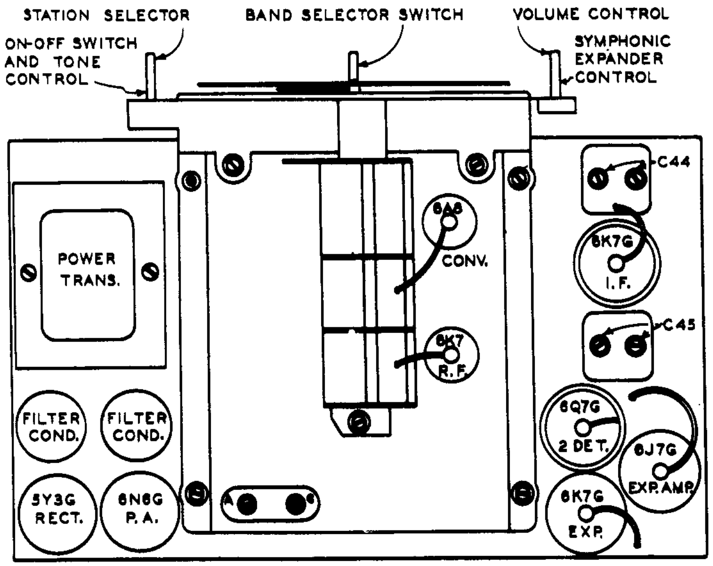
R1	100 Ω .1 W.	C-2794-50-B
R2	270 Ω .25 W.	C-2795-55B
R3	1000 Ω .25 W.	C-2795-62B
R4	2200 Ω .1 W.	C-2794-66B
R5	100 Ω .1 W.	C-2794-50B
R6	100 000 Ω .25 W.	C-2795-25B
R7	22 000 Ω .5 W.	C-2796-78C
R8	56 000 Ω .25 W.	C-2795-83B
R9	330 Ω .25 W.	C-2795-56-B
R10	22 000 Ω .5 W.	C-2796-78C
R11	15 000 Ω 2 W.	C-2798-187A
R12	270 Ω .25 W.	C-2795-55B
R13	470 Ω .25 W.	C-2795-58B
R14	TONE CONT. & A.C. SWITCH	A-14112
R15	500 000 Ω VOL. CONT.	A-14110
R16	1 MEGOHM .25 W.	C-2795-98B
R17	56 000 Ω .25 W.	C-2795-83B
R18	56 000 Ω .25 W.	C-2795-83B
R19	100 000 Ω .25 W.	C-2795-25B
R20	100 000 Ω .25 W.	C-2795-25B
R21	470 000 Ω .25 W.	C-2795-94B
R22	470 000 Ω .25 W.	C-2795-94B
R23	220 000 Ω .25 W.	C-2795-90B
R24	680 000 Ω .25 W.	C-2795-96B
R25	1 MEGOHM .25 W.	C-2795-98B
R26	1 MEGOHM .25 W.	C-2795-98B
R27	27 000 Ω 2 W.	C-2798-193A
R28	750 Ω .25 W.	C-2795-156B
R29	8200 Ω 1 W.	C-2797-181A
R30	2400 Ω .5 W.	C-2798-168A
R31	3300 Ω 2 W.	C-2798-88A
R32	27 Ω .25 W.	C-2795-121B
R33	1 MEGOHM .25 W.	C-2795-98B
R34	1 MEGOHM .25 W. (997X ONLY)	C-2795-98B
R35	1 MEGOHM .25 W.	C-2795-98B

I. F. 456 K.C.

L1	NO. 1 I.F. COIL	A-12064-12
L2	NO. 2 I.F. COIL	A-12989-2
L3	B.C. OSC. COIL	A-14241-1
L4	POL. OSC. COIL	A-14241-2
L5	S.W. OSC. COIL	A-14241-3
L6	B.C. DET. COIL	A-14242-1
L7	POL. DET. COIL	A-14242-2
L8	S.W. DET. COIL	A-14242-3
L9	B.C. ANT. COIL	A-14243-1
L10	POL. ANT. COIL	A-14243-2
L11	S.W. ANT. COIL	A-14243-3
L12	L.W. ANT. COIL	A-14243-4
L13	L.W. DET. COIL	A-14242-4
L14	L.W. OSC. COIL	A-14241-4

NO. FROM BACK OF SET

S1	ANT. PRI. SECTION
S2	ANT. SEC. SECTION
S3	DET. PRI SECTION
S4A, S4B, S4C	BIAS & SCREEN SECTION
S5	DET SEC. SECTION
S6	OSC. PRI SECTION
S7	OSC. SEC. SECTION



SPARKS-WITHINGTON COMPANY

MODELS 727-X, 727-XD, 827-X, 827-XD, 867, 877-X, 987, 997-X & 1167

Detailed Alignment Instructions for SPARTON Models

727-X 827-X 867 987
727-XD 827-XD 877-X 997-X 1167

FOREWORD: Models 727-X, 827-X, 877-X, and 997-X are Export Receivers equipped with power transformers having voltage compensating taps which must be adjusted to correspond with the local line voltage before any attempt is made to re-align the circuits. Similar transformers are used with the Models 727-XD and 827-XD.

Unless otherwise specified, the adjusting of any condenser consists of turning the adjusting screw or nut to the right or left until the output meter registers the greatest deflection.

1. EQUIPMENT REQUIRED

A. Modulated test oscillator (crystal controlled or accurately calibrated) capable of generating frequencies from 456 to 18,000 kilocycles.

B. Output meter.

C. Part A-5732 adjusting wrench.

D. Dummy antennas, consisting of:

Part C-720-294 Condenser, 200 mmf.
Part B-5458-54 Resistor, 100 ohms.

2. STEP BY STEP PROCEDURE

NOTE: For proper alignment of these chassis, the procedure should be followed in the same order as given. The dial pointer should be exactly parallel with the horizontal line of the kilocycle scale when the condenser plates are fully meshed. If the pointer does not read correctly, loosen the set screw holding the pointer, hold the rotor plates fully meshed with the stator plates and set the pointer so that it is parallel with the horizontal lines on the kilocycle scale, then tighten the set screw.

A. Alignment of Intermediate-Frequency Stages

NOTE: All of the above models except the Model 1167 employ I-F transformers with two trimmers. The first I-F transformer of the Model 1167 is equipped with a third tuned circuit which results in three trimmers for this I-F stage.

(1) Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

(2) Turn the band selector switch to the Broadcast position (with white diamond illuminated) and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

(3) Connect "antenna" of test oscillator to the grid cap of a Type 6A8 converter tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of power output tube to ground. Note: It is advisable to read carefully the operating instructions included with the test oscillator.

(4) Tune test oscillator to obtain a signal of 456 kilocycles.

(5) Turn the volume control of receiver on full and adjust I-F trimmers C44, C45 (C41, C42 on Model 987; C59, C60 on Model 1167) which are reached from the top of the chassis. NOTE: The intermediate frequency circuits are quite selective and care must be taken to insure proper adjustment.

B. Alignment of Broadcast Band

(1) Disconnect "antenna" lead of test oscillator from grid cap of converter tube and connect in series with a 200 mmf. condenser dummy antenna to the antenna terminal of the chassis.

(2) Tune receiver and test oscillator to a frequency of 1500 kilocycles and adjust condensers C8, C5 and C2 in the order given.

(3) Tune test oscillator and receiver to 600 kilocycles and adjust condenser C11.

(4) Retune test oscillator and receiver to 1500 kilocycles and check the adjustments of condensers C8, C5 and C2.

(5) Calibration of the broadcast band should also be checked at 900 kilocycles and 600 kilocycles.

C. Alignment of Long-Wave Band
(Except Models 867 and 987)

(1) Turn the band selector switch to the long-wave position (yellow diamond illuminated).

(2) Tune test oscillator and receiver to 345 kilocycles and adjust condensers C41, C40 and C38.

(3) Tune test oscillator and receiver to 150 kilocycles and adjust condenser C42.

(4) Retune test oscillator and receiver to 345 kilocycles and check the adjustments of condensers C41, C40 and C38.

D. Alignment of 1st. Short-Wave Band

(1) Turn band selector switch to the 1st short-wave band (red diamond illuminated).

(2) Tune test oscillator and receiver to 6 megacycles and adjust condensers, C9, C6 and C3.

(3) Tune test oscillator and receiver to 1.95 megacycles and adjust condenser C12.

(4) Retune test oscillator and receiver to 6 megacycles and check the adjustments of condensers C9, C6 and C3.

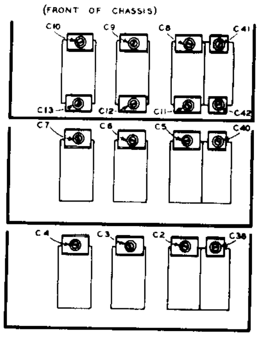
E. Alignment of 2nd. Short-Wave Band

(1) Connect the 100 ohm non-inductive dummy antenna resistor in series with the 200 mmf. condenser connected between the test oscillator "antenna" lead and the grid cap of the 6A8 converter tube.

(2) Turn the band selector switch to the 2nd short-wave band (blue diamond illuminated).

(3) Tune test oscillator and receiver to 18 megacycles and adjust condensers C10, C7 and C4.

(4) Tune test oscillator and receiver to 6 megacycles and adjust condenser C13.



TRIMMER LOCATIONS
Models 727-X, 727-XD, 827-X, 827-XD, 877-X, 997-X, 1167.

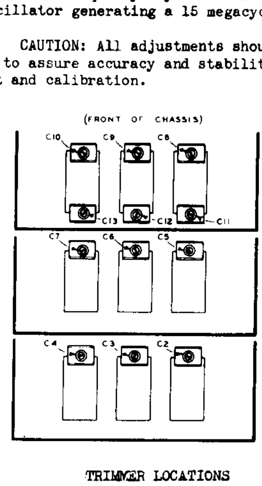
(5) Retune test oscillator and receiver to 18 megacycles and check adjustments of condensers C10, C7 and C4.

IMPORTANT: To obtain the best sensitivity at 18 megacycles on this band, the dial should be turned back and forth slightly while adjusting the antenna and R.F. trimmers.

CAUTION: On this band care must be taken to adjust the various condensers to the fundamental of the signal and not to the image. The image signal is equal to the fundamental minus twice the intermediate frequency of the receiver. A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condensers for that band have probably been adjusted to the image instead of the fundamental.

This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector to approximately 15,900 kilocycles. If a strong signal is found approximately at this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 15 megacycles or 15,000 kilocycles would be 15,000 kilocycles minus twice 456 kilocycles or approximately 14,100 kilocycles. Therefore a signal of this frequency may be found with the test oscillator generating a 15 megacycle signal.

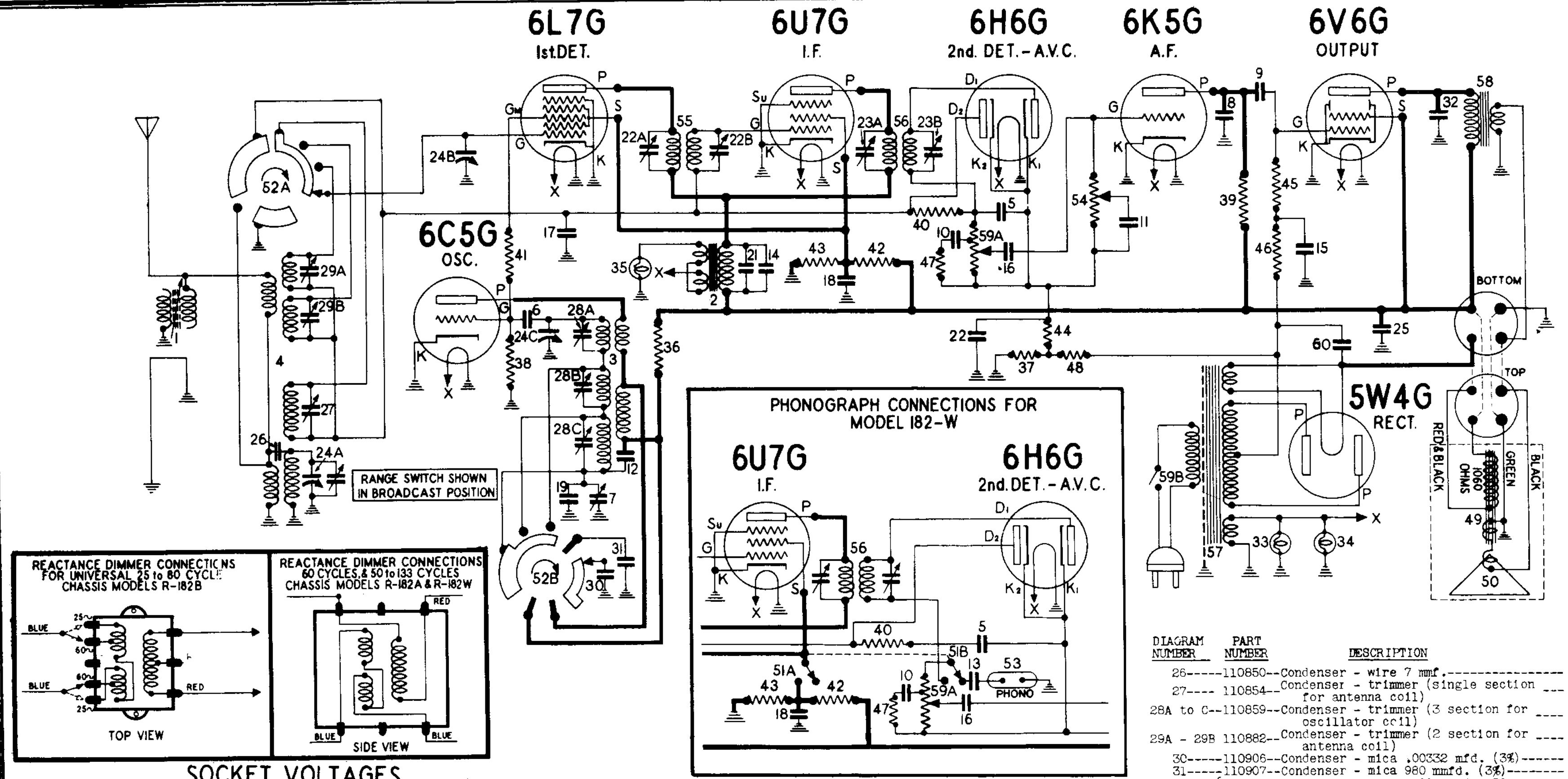
CAUTION: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.



TRIMMER LOCATIONS
Models 867 and 987

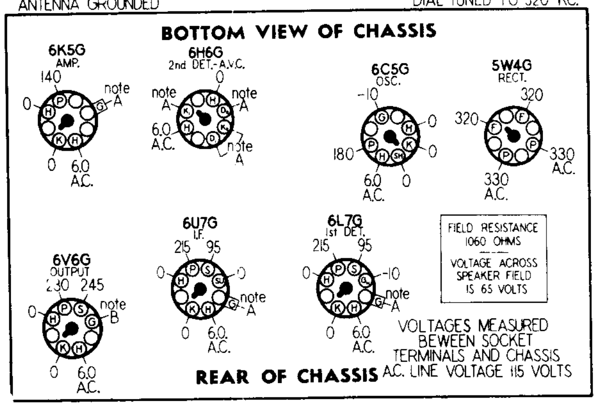
STEWART-WARNER CORPORATION

MODELS R182 & 1821 TO 1829



SOCKET VOLTAGES

ANTENNA GROUNDED DIAL TUNED TO 520 KC.



IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6L7G, 6U7G, and the diode plates of the 6H6G is -2.5 volts measured across resistor no. 37.

NOTE B: The bias for the control grid of the 6V6G is -12.5 volts measured across resistors number 37 and 48.

MODEL R-182 PARTS LIST

(SEE OPPOSITE SIDE FOR OTHER PARTS)

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	110536	Coil - wave trap	$1.02
2	110786	Coil - reactance dimmer (60 cycles)	2.25
	112152	Coil - reactance dimmer (for 182-W only)(50 to 133 cycle)	2.50
	110996	Coil - reactance dimmer (25 to 80 cycle model 182-B only)	3.00
3	110860	Coil - osc. (less trimmers)	1.40
4	110881	Coil - assembly (antenna & preselector) with trimmer	3.00
5	83539	Condenser - mica 260 mmfd.	.20
6	85061	Condenser - mica 51 mmfd.	.15
7	85285	Condenser - padding	.40
8	85394	Condenser - mica 510 mmf.	.25
9	88026	Condenser - paper .02 mfd. 400 volt	.25
10-11-12	88030	Condenser - paper .01 mfd. 400 volt	.25
13-14-15	88046	Condenser - paper .1 mfd. 150 volt	.25
16	88189	Condenser - paper .05 mfd. 200 volt	.25
17	88534	Condenser - paper .05 mfd. 150 volt	.25
18	89421	Condenser - paper .1 mfd. 200 volt	.25
19	89564	Condenser - mica 345 mmfd. (3%)	.40
60	89937	Condenser - elect. 30 mfd. 450 volt	1.60
20-21	110377	Condenser - elect. 10 mfd. 25 volt	.80
	112113	Condenser - electrolytic 10 mfd. 50 volt (for model 182-W only)	.85
22A - 22B, 23A - 23B	110516	Condenser - trimmer strip (for I. F. transformer	.58
24A to C	110743	Condenser - variable gang	4.50
25	110768	Condenser - elect. 8 mfd. 450 volt	1.25
	112108	Condenser - electrolytic 8 mfd. 450 volt (model 182-W only)	1.30

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
26	110850	Condenser - wire 7 mmf.	.18
27	110854	Condenser - trimmer (single section for antenna coil)	.24
28A to C	110859	Condenser - trimmer (3 section for oscillator coil)	.65
29A - 29B	110882	Condenser - trimmer (2 section for antenna coil)	.44
30	110906	Condenser - mica .00332 mfd. (3%)	.40
31	110907	Condenser - mica 980 mmfd. (3%)	.30
32	89826	Condenser - paper .004 mfd. 750 volt (used in early production)	.24
	111214	Condenser - paper .01 mfd. 600 volt (used in late production)	.24
33-34	110629	Lamp - dial 6.3 volt - .25 amps.	.15
35	110911	Lamp - dimmer reactor 2.5 Volt .5 amp.	.15
36	110550	Resistor - carbon 10,000 ohms 1/2 watt	.15
37	110534	Resistor - wire wound 40 ohm 1/2 watt	.12
38	110552	Resistor - carbon 47,000 ohm 1/4 watt	.12
39	110553	Resistor - carbon 220,000 ohm 1/4 watt	.12
40	110554	Resistor - carbon 1 megohm - 1/4 watt	.12
41	110560	Resistor - carbon 100 ohm 1/4 watt	.12
42	110561	Resistor - carbon 15,000 ohm 2 watt	.30
43	110562	Resistor - carbon 22,000 ohm 1/2 watt	.12
44-45	110564	Resistor - carbon 100,000 ohm 1/4 watt	.12
46	110565	Resistor - carbon 22,000 ohm 1/4 watt	.12
47	110566	Resistor - carbon 33,000 ohm 1/4 watt	.12
48	110928	Resistor - wire wound 150 ohms 1 watt	.12
49	R-277-A	Speaker - dynamic 8 inch (MODEL 1821)	7.50
	R-280-A	Speaker - dynamic 10 inch (MODEL 1825)	9.00
50	110943	Cone - voice coil assem. for R-277-A spkr. (Do not place gasket between cone and frame)	1.70
	110945	Cone - voice coil assem.(For R-280-A speaker)	1.80
51A - 51B	84404	Switch - phono toggle	1.10
52A - 52B	110856	Switch - range	1.20
53	89709	Terminal Strip - phono	.15
54	110767	Tone Control - (500,000 ohm)	.80
55	110851	Transformer - 1st I. F.	1.85
56	110853	Transformer - 2nd I. F.	1.65
57	110862	Transformer - power (115 volt 60 cycle)	5.00
	112076	Transformer - power (115 volt 25 cycle)	7.50
	112119	Transformer - power (100-240 volt)(50-133 cycle)	7.75
58	110925	Transformer - output(Model 181A or 181B)	1.75
	112154	Transformer - output (Model R-181-W)	1.70
59A - 59B	110927	Vol. Cont. - 1 meg. (with on-off switch)	1.25

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STEWART-WARNER CORPORATION

MODELS R182 & 1821 TO 1829

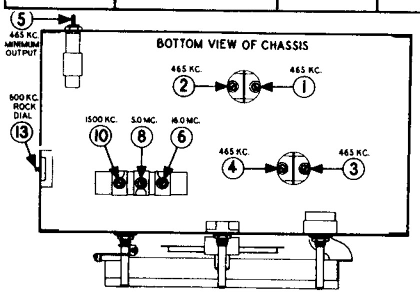
ALIGNMENT EQUIPMENT & PROCEDURE

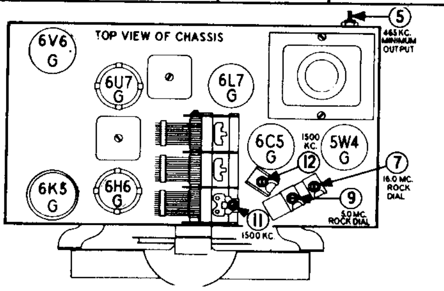
For alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 18 MC. are required.

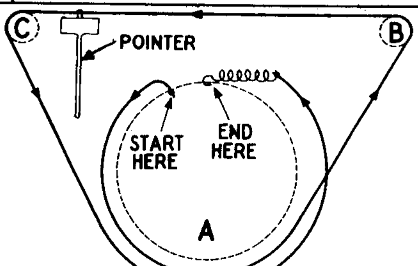
1. Connect the output meter across the voice coil or between the plate of the 6V6G tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis of the receiver.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh set the pointer on the last scale division on the low frequency end of the dial. This may be accomplished by releasing the clip on the pointer slider; where it attaches to the dial cord.

IMPORTANT:—THE BROADCAST BAND MUST BE ALIGNED AFTER THE SHORT-WAVE BAND AND POLICE BAND.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6L7G TUBE	465 KC.	BROADCAST (Clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1 - 2	1ST I.F.	ADJUST FOR MAXIUM OUTPUT. THEN REPEAT ADJUSTMENT.
					3 - 4	2ND I.F.	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	465 KC.	BROADCAST (Clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC.	SHORT-WAVE (Counter-clockwise)	16 MC.	6	SHORT-WAVE OSCILLATOR	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 15.1 KC. IF IMAGE DOES NOT APPEAR REALIGN AT 16 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC.	SHORT-WAVE (Counter-clockwise)	TUNE TO 16 MC. GENERATOR SIGNAL	7	SHORT-WAVE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5.0 MC.	POLICE (Center)	5.0 MC.	8	POLICE OSCILLATOR	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 4.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 5.0 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5.0 MC.	POLICE (Center)	TUNE TO 5.0 MC. GENERATOR SIGNAL	9	POLICE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (Clockwise)	1500 KC.	10	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (Clockwise)	TUNE TO 1500 KC. GEN.SIG.	11	ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
					12	DETECTOR	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	600 KC.	BROADCAST (Clockwise)	TUNE TO 600 KC. GENERATOR SIGNAL	13	BROADCAST OSCILLATOR (Series Pad)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.







DIAL DRIVE & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
110712	Band Indicator - assembly	$ .35
110693	Bracket - dial support (R.H.)	.25
110694	Bracket - dial support (L.H.)	.25
110487	Clamp - for mtg. 8 inch speaker	.06
89912	Clip - grounding, for tube base	.02
81068	Cord - dial drive (35" lengths)-----Per Ft.	.05
110782	Cord - for band indicator (2 Ft.)	.10
110690	Drum - and disc assembly	.48
111030	Escutcheon - with glass window	1.30
110707	Frame - dial, with scale complete	1.70
110679	Knob - tuning (Model 1821); all controls (Model 1825)	.20
111125	Knob - tone, vol. & range (Model 1821 only)	.18
110784	Lever - assembly for band indicator	.12
12349	Nut - 8-32 for speaker mtg.-----Per C	.45
36437	Pin - escutcheon mtg. (No. 18 x 5/16")Per C	.10
110496	Plug - speaker (4 prong)	.12
110785	Pointer - dial	.14
110711	Scale - dial	.85
67449	Screw - 8x3/8" Self tapping(for dial brkts)	.03
110716	Screw - band indicator pivot	.03
110830	Screw - #10 x 1 for chassis mtg.	.03
85827	Set Screw - 8/32 (squarehead)	.04
110715	Shaft - dial drive (brkt. & indic. assem.)	1.00
88161	Shield - tube (short section)	.08
88162	Shield - tube (long section)	.08

HOW TO REPLACE DIAL CORD

Before attempting to replace the dial cord, fully mesh the gang condenser. The holes in drum A should be in the top position as shown in the diagram above.

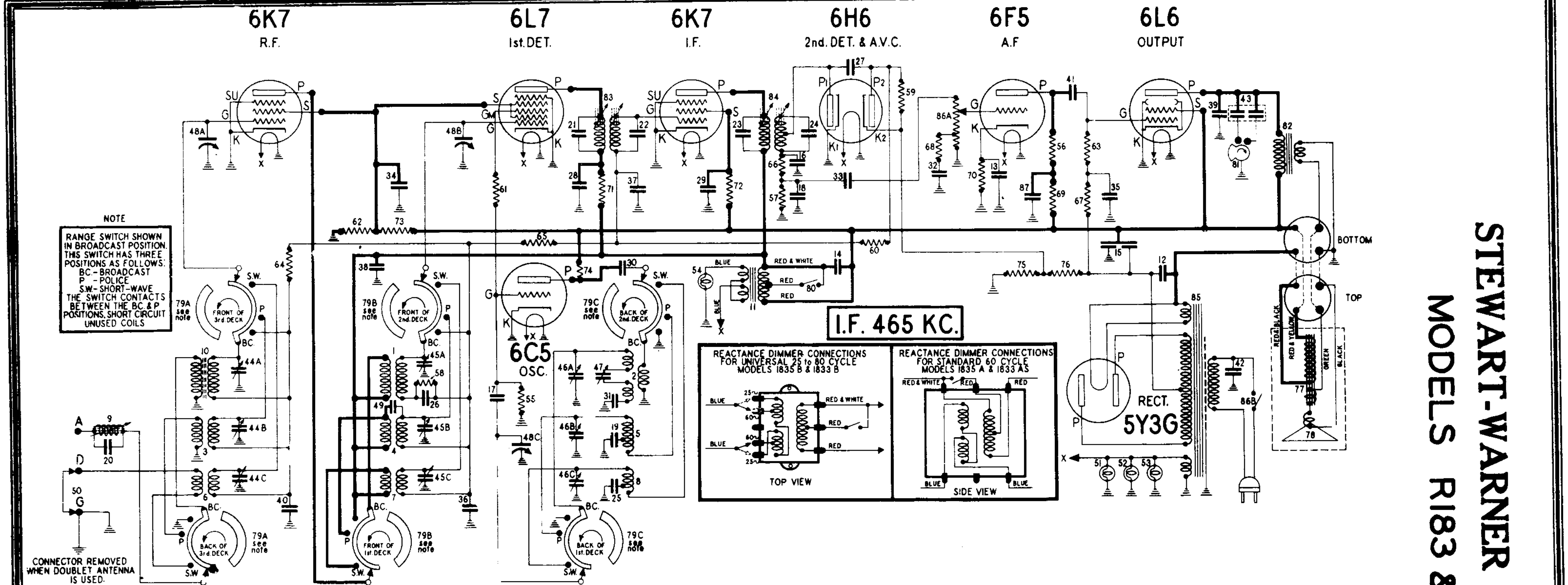
The pointer drive cord should be 33 inches or more in length. Place one end of the cord through the left hole in drum; then knot the end. Run the free end of the cord down around the drum and up to pulley B. Continue over pulley B to pulley C, then down to drum A. Bring the cord up around drum D. Tie the cord to the end of the tension spring so that the spring will be extended to about 1-1/8 inches, when hooked to the slot in the drum. Now place the pointer on its track so that it points to the last scale division on the low frequency end of the dial, then clip it to the cord.

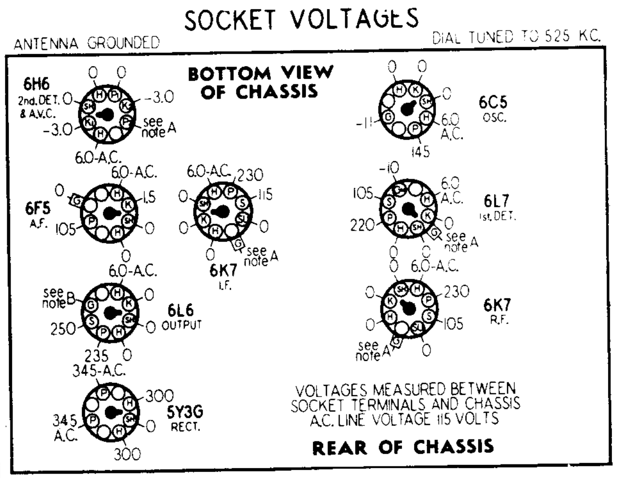
PART NUMBER	DESCRIPTION	LIST PRICE
88164	Shield Cap - tube, grid type	.06
89911	Shield - tube, base	.04
85427	Socket - octal base	.15
110501	Socket - 4 prong (for speaker)	.16
110627	Socket - dial lamp & dimmer lamp	.12
110817	Speed Nut - retainer for escu. to cabinet	.01
81069	Spring - for tightening drive rope	.10
110719	Spring - for band indicator	.05
85785	Terminal strip (G.-A.)	.15
67568	Washer - embossed (for mtg. 89937 elect.)	.05
77223	Washer - speaker mtg.	.01
89746	Washer - (paper) for back of knobs)	.005
110829	Washer - flat steel, for mtg. chassis	.01

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STEWART-WARNER CORPORATION

MODELS R183 & 1831 TO 1839





IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The bias for the control grid of the 6K7 R.F., 6L7 mixer, 6K7 I.F. and the diode plate of the 6H6 tubes is -3 volts measured across resistor 75.

NOTE B: The bias for the control grid of the 6L6 output tube is -13 volts measured across resistors 75 and 76.

MODEL R-183 PARTS LIST

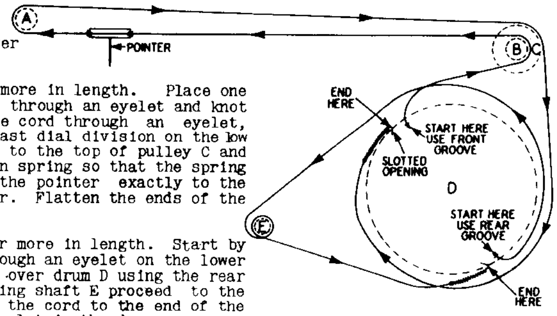
(SEE OPPOSITE SIDE FOR OTHER PARTS)

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	111056	Coil - R.F. (broadcast)	$1.25
2	111057	Coil - oscillator (broadcast)	1.05
3	111058	Coil - antenna (police)	.80
4	111059	Coil - R.F. (police)	1.05
5	111060	Coil - oscillator (police)	1.00
6	111062	Coil - antenna (short-wave)	.90
7	111063	Coil - R.F. (short-wave)	.90
8	111064	Coil - oscillator (short-wave)	.85
9	111079	Coil - antenna trap	1.20
10	111103	Coil - antenna (broadcast)	1.82
11	111191	Coil - reactance dimmer (60 cycle)	2.25
	112201	Coil - reactance dimmer (25 to 80 cycle)	.48
12	89937	Condenser - electrolytic 30 mfd. 450 volt	1.60
	112315	Condenser - elec. 16 mfd. 450 volt (for 183-AS or 183-BS armchair models)	1.55
13-14	110377	Condenser - electrolytic 10 mfd. 25 volt	.80
15	111098	Condenser - electrolytic dual 8 mfd.	2.00
16	83539	Condenser - mica 260 mmfd.	.20
17-18	85061	Condenser - mica 51 mmfd.	.15
19	85467	Condenser - mica 1370 mmfd. (3%)	.30
20	88205	Condenser - mica 2100 mmfd.	.35
21-22	110952	Condenser - mica 100 mmfd. (5%)	.18
23	110958	Condenser - mica 70 mmfd. (5%)	.18
24	110959	Condenser - mica 80 mmfd. (5%)	.18
25	111122	Condenser - mica 3580 mmfd. (3%)	.48
26	111123	Condenser - mica 7750 mmfd. (5%)	.85
27	85061	Condenser - mica 51 mmfd.	.15
28-29	88029	Condenser - paper .004 mfd. 400 volt	.25
30-31-32	88030	Condenser - paper .01 mfd. 400 volt	.25
33	88189	Condenser - paper .05 mfd. 200 volt	.25
34	88191	Condenser - paper .1 mfd. 300 volt	.25
35	88193	Condenser - paper .25 mfd. 150 volt	.35
36-37	88534	Condenser - paper .05 mfd. 150 volt	.25
38	88682	Condenser - paper .1 mfd. 400 volt	.25
39	89826	Condenser - paper .004 mfd. 750 volt	.24
40	111117	Condenser - low loss .05 mfd. 150 volt	.35
41	111252	Condenser - paper .05 mfd. 400 volt	.13
42	83976	Condenser - shielded .012 mfd. 1000 volt	.40
43	111384	Condenser - shielded (Sect. A - .02 mfd. 600 volt) (Sect. B - .03 mfd. 600 volt)	.85
44A to C, 45A to C	111076	Condenser - trimmer (3 section) for R.F. or antenna (all bands)	.75
46A to C	111089	Condenser - trimmer (3 section) for oscillator (all bands)	.75
47	111115	Condenser - pad (single section)	.63
48A to C	111073	Condenser - variable gang	6.25
49	111080	Condenser - 3 mmfd. (wire)	.10
50	85321	Connector - ground Per C	.01
51-52-53	110629	Lamp - bayonet type (6.3 volt .25 amp.)	.15
54	110911	Lamp - dimmer reactor lamp 2.5 volt .5 amp.	.15
55	110552	Resistor - carbon 47,000 ohm 1/4 watt	.12
56-57-58	110553	Resistor - carbon 220,000 ohm 1/4 watt	.12
59-60	110559	Resistor - carbon 470,000 ohm 1/4 watt	.12
61	110560	Resistor - carbon 100 ohm 1/4 watt	.12
62	110562	Resistor - carbon 22,000 ohm 1/2 watt	.12
63-64-65	110564	Resistor - carbon 100,000 ohm 1/4 watt	.12
66-67	110565	Resistor - carbon 22,000 ohm 1/4 watt	.12
68-69	110566	Resistor - carbon 33,000 ohm 1/4 watt	.12
70	110572	Resistor - carbon 4,700 ohm 1/4 watt	.12
71	110573	Resistor - carbon 2,200 ohm 1/4 watt	.12
72	110574	Resistor - carbon 68,000 ohm 1/4 watt	.12
73	110575	Resistor - carbon 12,000 ohm 2 watt	.30
74	110592	Resistor - carbon 22,000 ohm 1 watt	.12
75	111119	Resistor - wire wound 30 ohm 1/2 watt (5%)	.12
76	111120	Resistor - wire wound 110 ohm 2 watt (5%)	.12
77	R-281-A	Speaker - dynamic 12 inch (R-1835)	10.00
	R-287-A	Speaker - dynamic 8 inch (R-1833)	6.75
78	111490	Cone - voice coil assem. for 12 inch spkr.	2.30
	112562	Cone - and voice coil (for 8 inch speaker)	1.90
79A to C	111077	Switch - range and bracket	3.30
80	111218	Switch - for reactance dimmer	.28
81	111234	Switch - tone control	.65
82	111074	Transformer - output	1.85
83	111081	Transformer - 1st I.F.	2.50
84	111082	Transformer - 2nd I.F.	2.45
85	111092	Transformer - power 115 volt 60 cycle	5.65
	112127	Transformer - power 115 volt 25 cycle	10.00
86A-86B	111096	Volume control - 200,000 ohms (with off-on switch)	1.25
87	88682	Condenser - paper .1 mfd. 400 volt	.25

(PRICES SUBJECT TO CHANGE WITHOUT NOTICE)

STEWART-WARNER CORPORATION
MODELS R183 & 1831 TO 1839

HOW TO REPLACE THE DIAL CORD



Before attempting to replace either dial cord, fully mesh the gang condenser plates. The holes in drum D should be in the position shown in the diagram.

REPLACING THE POINTER DRIVE CORD: The pointer drive cord should be 40 inches or more in length. Place one end of the cord through the upper hole in the front groove of the drum. Put it through an eyelet and knot the end. Flatten the eyelet. Run the free end up over pulley B. Then thread the cord through an eyelet, the pointer slider, and another eyelet. (See diagram). Set the pointer to the last dial division on the low frequency end of the scale. After this run the cord up over pulley A and back to the top of pulley C and down around drum D, using the front groove. Tie the cord to the end of the tension spring so that the spring will be extended to 1-1/8 inches when hooked to the slot in the drum. Now set the pointer exactly to the last low frequency dial scale division and push the eyelets into the pointer slider. Flatten the ends of the eyelets to hold the slider in position on the cord.

CONDENSER DRIVE CORD: The cord for the main condenser drive should be 19 inches or more in length. Start by placing an end of the cord through the lower hole in the rear groove. Put it through an eyelet on the lower side of the drum and tie a knot in the end. Run the loose end of the cord up and over drum D using the rear groove. Then take the cord down to shaft E and wind 1-1/2 turns around it. Leaving shaft E proceed to the lower side of drum D and place the tension spring on the end of the cord. Tie the cord to the end of the tension spring so that the spring will be extended 1-1/8 inches when hooked to the slot in the drum.

ALIGNMENT EQUIPMENT & PROCEDURE

1—With the gang condenser in full mesh the dial pointer should stop opposite the last low frequency scale division. If the pointer is off not more than one scale division, release the setscrew on the flexible coupler and keeping gang closed, turn the tuning knob until the pointer stops in the correct position. Then retighten the setscrew. If the pointer is off several dial divisions it will be necessary that you release the cord at the slider and reset it.

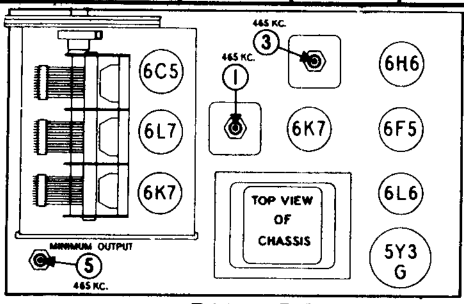
2—Connect the output meter between the plate of the 6L6 and the chassis, or across the voice coil of the speaker, depending on the type of meter. The more sensitive type should be connected across the voice coil.

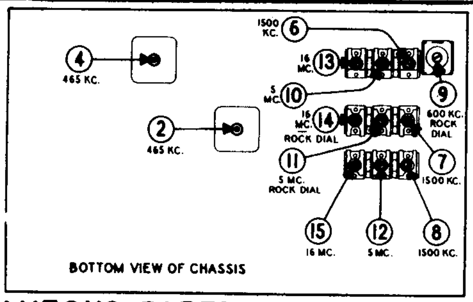
3—Connect the ground lead of the signal generator to the chassis and leave it there throughout the entire alignment procedure.

4—Turn the volume control to maximum volume position. Turn the tone control to the brilliant position.

5—KEEP THE GROUND AND DOUBLET CONNECTIONS, ON THE ANTENNA TERMINAL STRIP, CONNECTED TOGETHER THROUGHOUT THE ENTIRE ALIGNMENT PROCEDURE.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	CONTROL GRID OF 6L7 TUBE	465 KC.	BROADCAST (Counter-clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2 3-4	1ST I.F. 2ND I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	465 KC.	BROADCAST (Counter-clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT WITH STRONG SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (Counter-clockwise)	1500 KC.	6	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (Counter-clockwise)	TUNE TO 1500 KC. GENERATOR SIGNAL	7 8	BROADCAST R.F. BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	600 KC.	BROADCAST (Counter-clockwise)	TUNE TO 600 KC. GENERATOR SIGNAL	9	BROADCAST OSCILLATOR SERIES PADDER	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5.0 MC.	POLICE (Center)	5.0 MC.	10	POLICE OSCILLATOR (Shunt)	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 4.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 5.0 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5.0 MC.	POLICE (Center)	TUNE TO 5.0 MC. GENERATOR SIGNAL	11 12	POLICE R.F. POLICE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16.0 MC.	SHORT-WAVE (Clockwise)	16.0 MC.	13	SHORT-WAVE OSCILLATOR (Shunt)	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 15.1 KC. IF IMAGE DOES NOT APPEAR REALIGN AT 16 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16.0 MC.	SHORT-WAVE (Clockwise)	TUNE TO 16.0 MC. GENERATOR SIGNAL	14 15	SHORT-WAVE R.F. SHORT-WAVE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.





DIAL DRIVE & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
111228	Band indicator - frame & scale	$ .48
111261	Bolt - chassis mtg. (#14x1-1/4")	.03
111179	Bracket - and bushing (for drive drum)	.20
111201	Bracket - dial support (L.H.)	.48
111202	Bracket - dial support (R.H.)	.40
112321	Bracket - for chassis mtg.(Armchair)	.30
111260	Bushing - rubber (for chassis mtg.)	.06
110782	Cord - for band indicator (2 ft.)	.10
111302	Cord - drive (order 4 - 88348 eyelets) 44" required for pointer dr. 22" required for cond. drive (6 ft.)	.30
111233	Dial - frame & scale complete	2.50
111317	Drum - & bushing	.45
88348	Eyelet - for cord drive — Per dz.	.05
111226	Escutcheon - for dial (with glass)	3.00
111310	Flywheel - with setscrews	1.25
111209	Gear - and shaft (for rope drive)	.50
112363	Glass top - large sect.(Armchair model)	2.90
112365	Glass top - small section (with knob)	3.15
110679	Knob - for range, tone & volume	.20
112125	Knob - tuning	.18
112322	Knob - brass (for glass top)	.75
111197	Lever - for band indicator (on shaft)	.12
110496	Plug - speaker (4 prong)	.12
111236	Pointer - and slide assembly	.15
81145	Retaining ring - for drive shaft- Per C	.50
111222	Scale - dial	1.20
88707	Screw - for mtg. dial frame — per dz.	.06
110716	Screw - band indicator pivot	.03
112138	Setscrew - slotted (round head) 8/32	.03
111206	Shaft - tuning	.40
85427	Socket - 8 prong octal	.15
110501	Socket - speaker (4 prong)	.16
110627	Socket - dial lamp	.12
111008	Socket - band indicator lamp	.12
110817	Speed nut - retainer for escu. to cab.	.01
85815	Spring - between gears (to remove backlash)	.02
111221	Spring - flat (for pointer slide)	.02
111232	Spring - torsion for band indicator	.05
112430	Spring - coil (between flexible coupler)	.02
85066	Terminal strip - G.D.A.	.20
67568	Washer - embossed (for mtg. 89937 electrolytic)	.05
89746	Washer - (paper) for back of knobs	.005
111262	Washer - flat steel mtg. (15/16" O.D.)	.02

STROMBERG CARLSON TELEPHONE MFG. CO.

MODEL 255

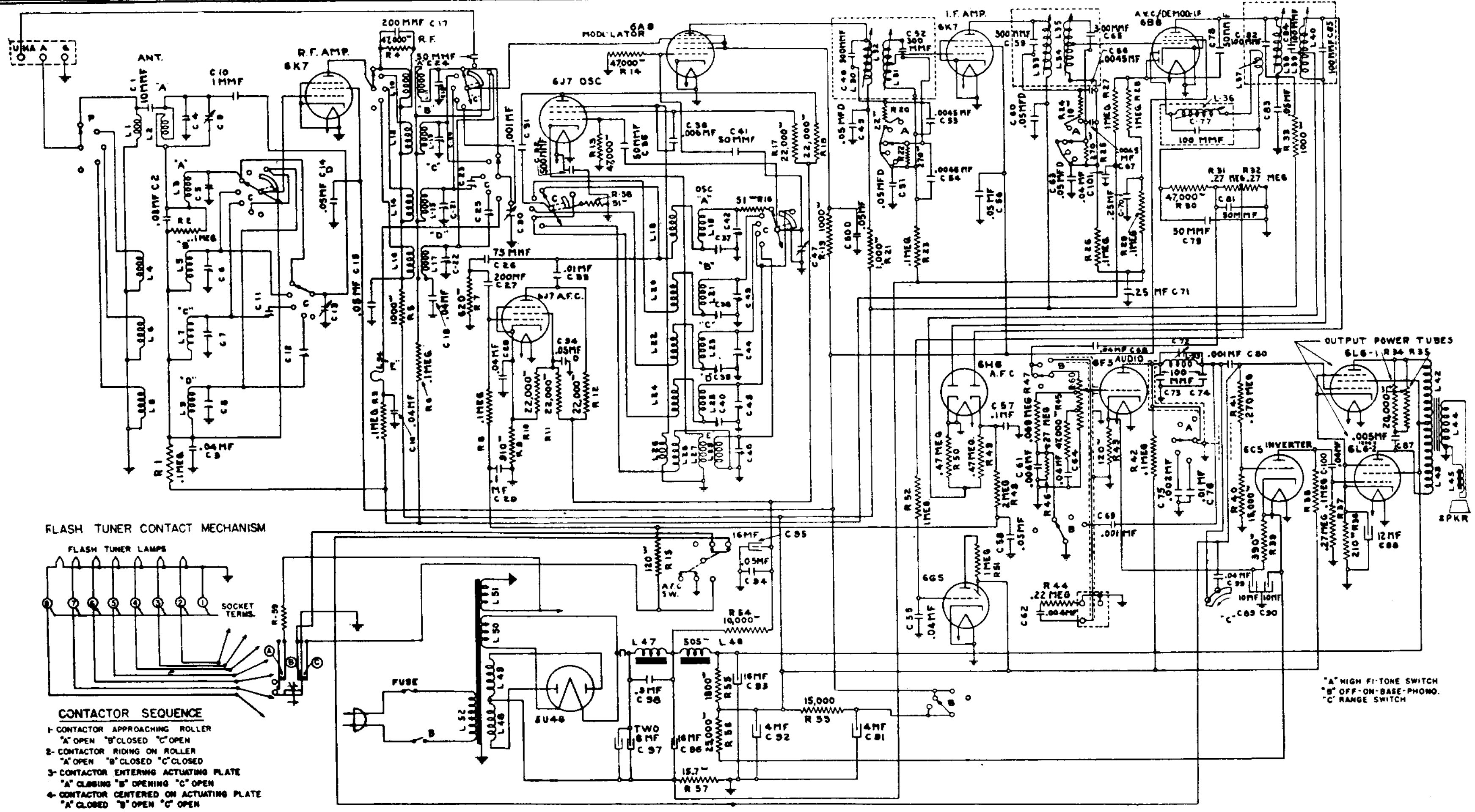


Fig. 2. Schematic Circuit.

ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne with Automatic Frequency Control
Tuning Ranges	A—530 to 1600 Kc.; B—1600 to 4800 Kc.; C—4800 to 11,000 Kc. D—11,000 to 22,000 Kc.; E—22,000 to 60,000 Kc.
Number and Types of Tubes	2 No. 6K7, 1 No. 6A8, 2 No. 6J7, 1 No. 6B8, 1 No. 6H6, 1 No. 6F5 1 No. 6C5, 2 No. 6L6, 1 No. 6G5, 1 No. 5U4G
Input Voltage Rating	105 to 125 Volts A. C.
Power Frequency Rating	25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating	145 Watts
Frequency of Intermediate Amplifier	465 Kilocycles

APPARATUS SPECIFICATIONS

No. 255-L	50 to 60 Cycles; P-27633 Chassis; P-27504 Loud Speaker
No. 255-LB	25 to 60 Cycles; P-27634 Chassis; P-27504 Loud Speaker

STROMBERG CARLSON TELEPHONE MFG. CO.
MODEL 255

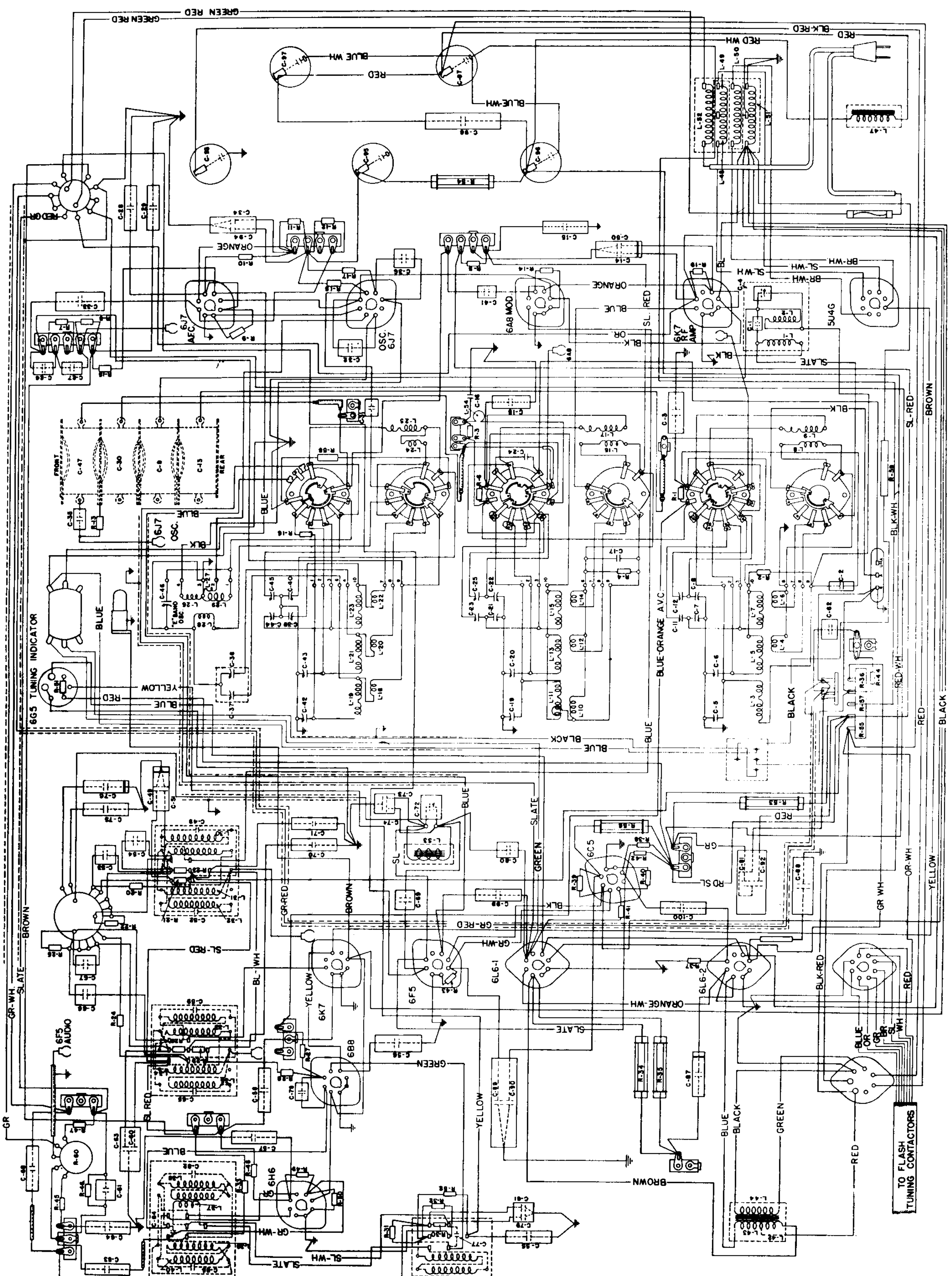


Fig. 3. Wiring Diagram.

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MODEL 255

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1 shows the terminal layout of the sockets with the pro er terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

			Terminals of Sockets								*Heater Voltages Between Heater Terminals*	
Tube	*Circuit*	*Cap*	1	2	3	4	5	6	7	8	*Socket Terminal Numbers*	*Volts*
6K7	R. F. Amp.	0	0	0	+230	+90	0	+80	*6.1*	0	2-7	*6.1*
6A8	Modulator	0	0	0	+230	+80	2.0	+80	*6.1*	0	2-7	*6.1*
6J7	Oscillator	0	0	*6.1*	+60	+180	0	0	0	0	2-7	*6.1*
6J7	Oscillator Control	0	0	0	+190	+110	+5.8	0	*6.1*	+5.8	2-7	*6.1*
6K7	I. F. Amp.	0	0	0	+235	+90	0	0	*6.1*	0	2-7	*6.1*
6B8	I. F. Amp.-Dem. A. V. C.	0	0	*6.1*	+225	-0.1	-0.1	+90	0	0	2-7	*6.1*
6H6	A. F. C. Discriminator	—	0	0	-0.25	0	0.2	0.2	*6.1*	0	2-7	*6.1*
6F5	Audio Amp.	0	0	0	+135	+135	0	0	*6.1*	+1.3	2-7	*6.1*
6C5	Audio Amp.	—	0	0	+100	+135	0	+1.3	*6.1*	+5.2	2-7	*6.1*
6L6 No. 1	Audio Output		0	0	+300	+305	0	0	*6.1*	+22	2-7	*6.1*
6L6 No. 2	Audio Output		0	0	+300	+305	0	0	*6.1*	+22	2-7	*6.1*
6G5	Tuning Indicator		*6.1*	+0.5	0.2*	+245	0	0	—	—	1-6	*6.1*
5U4G	Rectifier	—	0	+430		*395*		*395*		+430	2-8	*4.8*
Speaker Socket		—	+420	0	0	+430	+430	0	+320	—		

A. C. voltages are indicated by italics. Receiver tuned to 1000 kc., no signal.

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the procedure given in these instructions should be carefully followed. The preferred method of aligning these receivers is by the use of a suitable cathode ray oscillograph and frequency modulator unit in conjunction with the standard signal generator.

To accurately align circuits in these receivers, it is necessary to use a high grade signal generator capable of being modulated 30% and having an output voltage of at least 100,000 microvolts; it will also be necessary to have this output voltage controlled so that only a few microvolts may be fed into the receiver. In conjunction with the signal generator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker. In addition to this equipment, it will be necessary when making a final adjustment of the "Discriminator" tuned circuit to use a milliammeter having a range of 0 to 10 milliamperes connected in series with the cathode of the No. 6J7 oscillator control tube by means of an adapter plug inserted between the tube and its socket. The leads to the meter should not be longer than 15", and should be shunted at the socket connections by a capacitor of not less than 0.25 Mfd.

In order to make the aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlsor. P-27657 and P-27658 aligning tools be used.

Before proceeding with the alignment of any circuits in these receivers, except when specifically directed, be sure that the Fidelity Control knob is set for the "Normal" position and that the Automatic Frequency Control knob is set to the "Off" position. The "Off-On-Bass-Phonograph" Control should also be set for the "Normal" position. In making any alignment adjustments always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained, except when specifically directed in these instructions. Figure 1, shows the location of all the aligning capacitors or adjustments for this receiver. It will not be necessary to remove the chassis in this receiver from its cabinet in order to make any alignment adjustments. The alignment adjustments for the Intermediate Frequency circuits are accessible from the rear of the receiver, and the adjustments for the Radio Frequency circuits are accessible through the apertures located in the bottom metal base plate of the chassis. These apertures are easily accessible through the bottom of the cabinet shelf. **Never align any of these receivers without having the metal base plate fastened to the chassis base.**

Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitor. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Rapid Station Selector" knob in a counter-clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the receiver turned "on", the illuminated dial indicator line should be exactly centered over the dial alignment lines (black lines) which are located at the extreme low frequency end of each scale on the dial. If these lines do not center over the illuminated dial indicator line, loosen the two set screws located on the hub of the dial. Then, rotate the dial so that these alignment lines are centered over the illuminated dial indicator line. The two set screws of the dial hub should then be securely tightened.

Intermediate Frequency and A. F. C. Circuit Adjustments

The intermediate frequency system employed in this receiver is a complex circuit. The first I. F. amplifier is coupled to the second I. F. amplifier through the No. 6K7 tube. The second and third I. F. transformers are coupled through the pentode section of the No. 6B8 tube. The third I. F. transformer is in effect a distributing network rather than a transformer only; it contains a primary winding coupled to two other networks. One of these networks links the diode stage (Demodulator-A. V. C.) with the I. F. signal, while the other network resembles the secondary of a push-pull transformer and constitutes the tuned "Discriminator" circuit. This "Discriminator" network operating into the No. 6H6 tube supplies the characteristic voltage demanded by the oscillator control tube. The fourth I. F. transformer feeds the diode plates of the No. 6B8 tube.

The intermediate frequency used in these receivers is 465 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed:

1. Operate the Range Switch of the receiver to the "A" range position, and set the tuning dial to its extreme low frequency position. Set the Fidelity Control to its "Normal" position, the Automatic Frequency Control knob to the "Off" position and the "Off-On-Bass" Control knob to its "Normal" position. **Never attempt to align the R. F. or I. F. circuits of this receiver with the Fidelity Control knob set at any position other than the "Normal Fidelity" position, and the Automatic Frequency Control knob set at the "On" position unless specifically directed in the following paragraphs.**
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator tube, a modulated signal of 465 kilocycles from the signal generator, using a 0.1 Mfd. capacitor in series with the connection between the output terminal of the signal generator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the signal generator should be connected to either the chassis base or the ground binding post terminal.
3. Now noting from Figure 1, the alignment adjustments for the First, Second, Third, and Fourth I. F. Transformers, align the I. F. circuits in the following manner:

   Adjust the third I. F. transformer primary circuit for maximum output.

   Adjust the fourth I. F. transformer circuit for maximum output.

   Adjust the third I. F. transformer "Discriminator" circuit midway between the peaks where maximum output is obtained.

   Adjust the second I. F. transformer secondary circuit for maximum output.

   Adjust the second I. F. primary circuit for maximum output.

   Adjust the first I. F. secondary circuit for maximum output.

   Adjust the first I. F. primary circuit for maximum output.

Carefully make all the above adjustments, watching carefully the output meter and reduce the output of the test oscillator as required.

To make the final adjustment of the "Discriminator" circuit proceed as follows:

Check the position of the A. F. C. control knob which should be set to the "off" position. **Before making this circuit adjustment be sure that the I. F. Amplifier is tuned exactly to 465 kilocycles.** With the signal generator still set at a frequency of 465 kilocycles, adjust the signal generator's output control so that a signal of 50,000 to 100,000 microvolts is fed into the No. 6A8 Modulator tube. Now observe the reading of the milliammeter which is connected in series with the cathode of the No. 6J7 oscillator control tube. Rotate the A. F. C. Control knob to the "on" position, and observe whether there is any difference in the reading of the milliammeter. When this circuit is correctly adjusted, there should be no difference in the reading of the milliammeter when the A. F. C. Control knob is rotated from the "off" to the "on" position. If there is any difference in the milliammeter reading while rotating the Automatic Frequency Control knob to the "off" and "on" position, at a rate of about two cycles per second, adjust the "Discriminator" circuit by means of the screw adjustment located on the third I. F. transformer until the meter reading has the same value regardless of whether the A. F. C. Control knob is rotated to the "on" or "off" position. When this condition is obtained the "Discriminator" circuit of these receivers is properly adjusted.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

When making any aligning adjustments of these circuits, the A. F. C. Control knob should be rotated to the "off" position, the Fidelity Control knob should be set for "Normal" operation, and the "Off-On-Bass-Phonograph" Control knob should also be set for "Normal" operation.

Alignment of Ultra-Short Wave Range (Also referred to as "E" Band)

In order to align the circuits of this range, it is desirable to have a signal generator whose high frequency range will go to 60 megacycles. Such equipment, however, is rare and costly, and in most cases it will be necessary to make use of a signal generator whose high frequency range does not extend beyond 20 megacycles, using harmonics of 20 megacycles for aligning this range on 60 megacycles.

In aligning the radio frequency circuits for this range, replace the 0.1 mfd. capacitor which was placed in series with the signal generator's output lead for the I. F. alignment with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post marked "U. H. A." located on the rear of the receiver chassis. The ground terminal (or low side) of the signal generator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the "E" range position and set the signal generator's frequency and the receiver's tuning dial to 60 megacycles.
2. Adjust the aligning capacitor C-46 until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 20 megacycles and adjust the "E" range trimming loop, L-54, until maximum voltage output is obtained on the output meter. The adjustment of this loop is obtained by distorting its normally circular shape until it offers the correct inductive effect. If the oscillator does not track with the tuning dial scale at this frequency, it will be necessary to also adjust the oscillator's tuning loop.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 60 megacycles and repeat operation No. 2.

Alignment of Short-Wave Range (Also referred to as "D" Band)

In aligning the radio frequency circuits for this range use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminals of the signal generator as was used for aligning the Ultra-Short Wave Range. Connect this lead to the antenna binding post marked "A" located on the rear of the receiver chassis, and align as follows:

1. Operate the Range Switch on the receiver chassis to the "D" range position and set the signal generator's frequency and the receiver's tuning dial to 20 megacycles.
2. Adjust aligning capacitors C-45, C-22, and C-8 respectively; and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 11 megacycles and adjust aligning capacitors C-40, C-25, and C-12 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 20 megacycles and repeat operation No. 2.

Alignment of Short-Wave Range (Also referred to as "C" Band)

In aligning the radio frequency circuits for this range use the same artificial antenna and binding post on the receiver chassis as was used for aligning the "D" range.

1. Operate the Range Switch on the receiver chassis to the "C" range position and set the signal generator's frequency and the receiver's tuning dial to 10 megacycles.
2. Adjust the aligning capacitors C-44, C-21, and C-7 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 5 megacycles and adjust the aligning capacitors C-39, C-23, and C-11 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 10 megacycles and repeat operation No. 2.

Alignment of Aircraft Range (Also referred to as "B" Band)

In aligning the radio frequency circuits for this range, use the same artificial antenna and antenna binding post as was used for aligning the "C" range, and align this range as follows:

1. Operate the Range Switch on the receiver chassis to the "B" range position and set the signal generator's frequency and the receiver's tuning dial to 4.5 megacycles.
2. Adjust the aligning capacitor's C-43, C-20, and C-6 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 1.8 megacycles and adjust the aligning capacitor C-28 and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 4.5 megacycles and repeat operation No. 2.

Alignment of Standard Broadcast Range (Also referred to as "A" Band)

In aligning the radio frequency circuits for this range, replace the 400-ohm resistor in series with the signal generator's output with a 200-micro-microfarad capacitor and align this range as follows:

1. Operate the Range Switch to the "A" range position and set the signal generator's frequency and the receiver's tuning dial to 1.5 megacycles (1500 kilocycles).
2. Adjust the aligning capacitors C-42, C-19, C4, and C-5 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 0.6 megacycles (600 kilocycles) and adjust the aligning capacitor C-37; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 1.5 megacycles and repeat operation No. 2.

Adjustment of 10 Kilocycle Audio Cut-Off Filter

The adjustment of this filter is correctly made at the factory and no additional adjustment is required.

Instructions for Setting Up the A. F. C. Flash Tuning Unit

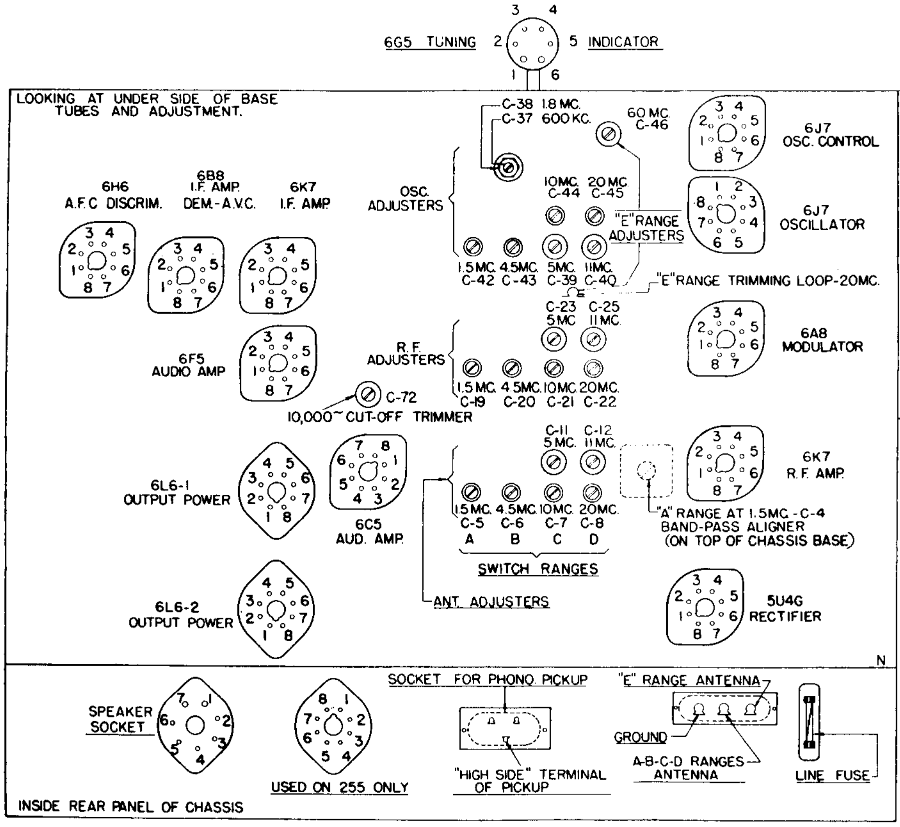
1. Remove the flash tuner lamp unit escutcheon plate by removing the four screws.
2. Remove the lists of station letters from the P-28420 package assembly which is tacked inside of the cabinet.
3. Remove the seven paper squares on which are printed the words "Tone", "Beauty", "Value", "Action", "Flash", "Tuning", and "Radio" from the square frames located on the rear side of the lamp unit escutcheon plate.
4. Remove the station letters of the seven stations which it is desired to set up in the flash tuning unit from the list of stations. It will be noted that the letters of the stations are printed on partly cut squares to facilitate ease in removing the desired letters. Insert one of these seven station letters into each frame of the flash tuner lamp unit. The recommended method of inserting these station letters into the frames of the escutcheon plate is to arrange them according to the frequency of the stations as follows:

   Looking at the front of the escutcheon plate the station having the highest frequency should appear in the top right-hand frame, and then in successive order according to frequency the remaining station letters should be inserted into the other frames; the top left-hand frame containing the station letters of the station having the lowest frequency. In inserting these letters into the frames be sure to have the letters located between two pieces of transparent material.
5. Fasten the escutcheon plate again to the lamp unit by means of the four screws. The receiver is now ready to be operated and the flash unit contactors located on the rear of the chassis base adjusted for the seven favorite stations.
6. Rotate the "On-Off-Bass-Phonograph" Control knob from its complete counter-clockwise position slightly clockwise from this position which turns the set "on" (indicated by illumination of the dial) Wait a few seconds to reach operating temperature. Check the position of the Automatic Frequency Control knob which should be rotated to the "Off" position, and set the Fidelity Control knob to the "Normal" position. Now carefully tune in the desired station having the highest frequency, watching the tuning indicator so that the receiver will be exactly tuned to this station.
7. After carefully tuning in the desired station rotate the A. F. C. Control knob to the "On" position. Now, noting from Figure 4, the sketch which shows the contactor clamping frame and knurled nut, hold the clamping frame with one hand and loosen the knurled nut with the other hand. Then move the contactor, numbered 2, so that its point is engaged between the two small rollers of the switching mechanism as also shown in Figure 4. When the point is properly engaged between the rollers, the lamp of the lamp unit which is located behind the station letters of the station being tuned in will light. When this condition is obtained, retighten the large knurled nut and at the same time securely hold the gang tuning capacitor and the contactors from rotating by means of the extended portion of the contactor clamping frame. **It is extremely important to keep the gang tuning capacitor and the contactors from rotating when tightening the large knurled nut.**
8. Now rotate the A. F. C. Control knob to the "off" position and note whether the tuning has been shifted by watching the tuning indicator. If a change is noted it will be necessary to repeat operation No. 7.
9. When no change is noticed after performing the above operations Nos. 7 and 8, the remaining six favorite stations should be set up in the same manner.

   With the A. F. C. flash tuning unit in operation, the receiver will be automatically kept in tune with any one of the seven favorite stations as long as the station is operating or provided it has no unusual fading characteristics. If a distant station which is very weak is set up in the flash tuning unit, it will be found that the Automatic Frequency Control will not hold this station if a strong signal is present in either adjacent channel. This same phenomenon will occur if two stations in adjacent channels are almost of equal signal strength with the weakest signal fading slightly; with this condition the strong signal will have a tendency to "pull in" when the receiver is tuned to the station which is slightly weaker and fading.

STROMBERG CARLSON TELEPHONE MFG. CO.

MODEL 255



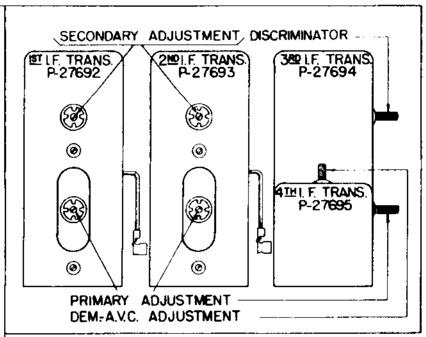


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Adjustments.

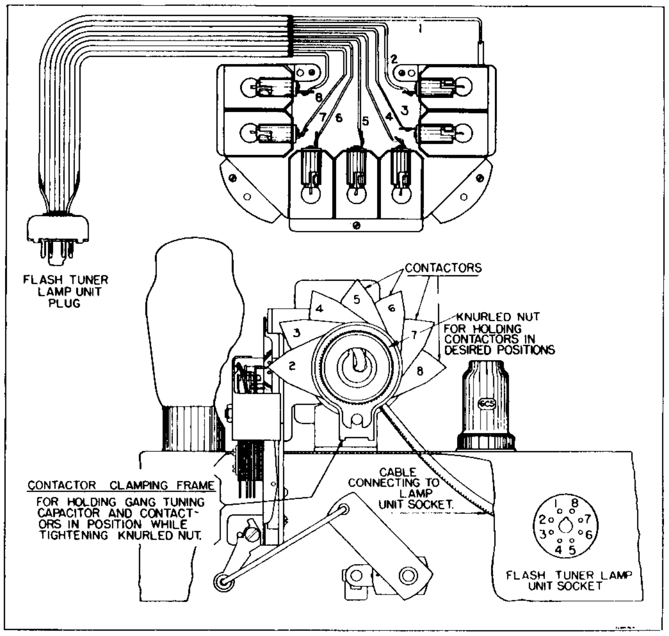


Fig. 4. Showing Flash Tuner Lamp Unit With Escutcheon Plate Removed (Top Figure) and Rear View of Receiver Showing Flash Tuner Mechanism (Bottom Figure).

PROCEDURE FOR OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

A socket having three contacts is provided on the rear of the chassis base, and is wired to the "Off-On-Bass-Phonograph" switch assembly located on the front of the receiver. A three prong plug is also inserted in the socket so that if at any time it is desired to use an electric pick-up and phonograph unit in conjunction with this receiver, it may readily be accomplished.

If the Stromberg-Carlson No. 10 Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a low capacity shielded cable between the three-prong plug furnished with the receiver and the pick-up. This shielded cable should be of the low capacity type, in order to prevent the excessive cutting of high frequencies which is caused when a shielded cable having high capacity is used. The length of the shielded cable used should be kept as short as possible.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong plug and the pick-up. The transformer should be located as near to the receiver as possible, in which case it will not be necessary to use a shielded cable.

In order to obtain the best quality of phonograph reproduction when using an electric pick-up and phonograph unit with this receiver, a Stromberg-Carlson No. 10 Record Player is recommended. This record player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit. To attach this instrument to a No. 255 Receiver, it is only necessary to remove the three-prong plug furnished with the receiver and insert the three-prong plug which comes with the unit into the three-prong socket located on the rear of the chassis base. Then, the power supply plug of the phonograph unit should be inserted into a suitable power supply receptacle, and the unit will be ready for use.

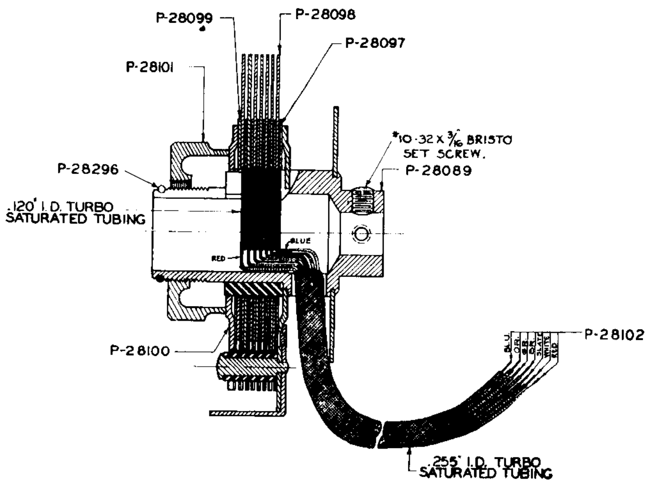
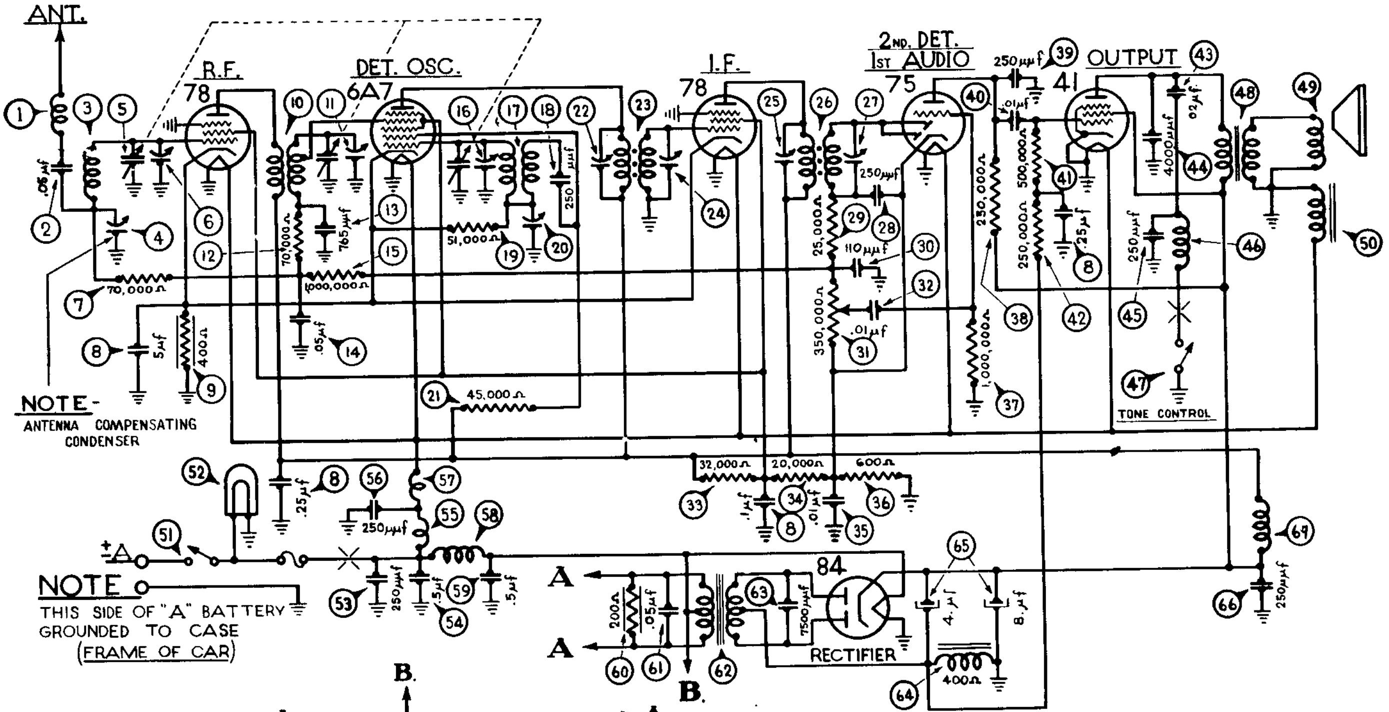
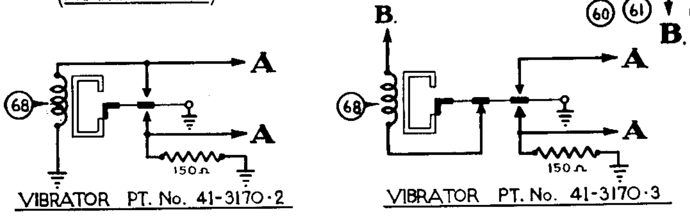


Fig. 5. Section View of Flash Tuner Contactors Assembly.

TRANSITONE AUTOMOBILE RADIO CORP.

MODEL P1417 PACKARD 115C-120C

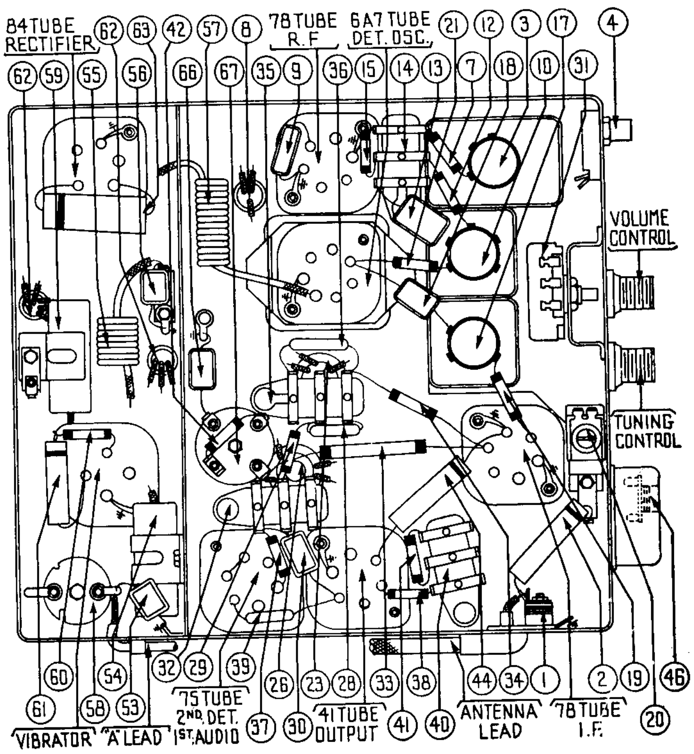




I.F. = 260 K.C.

MODEL — P-1417 PARTS LIST

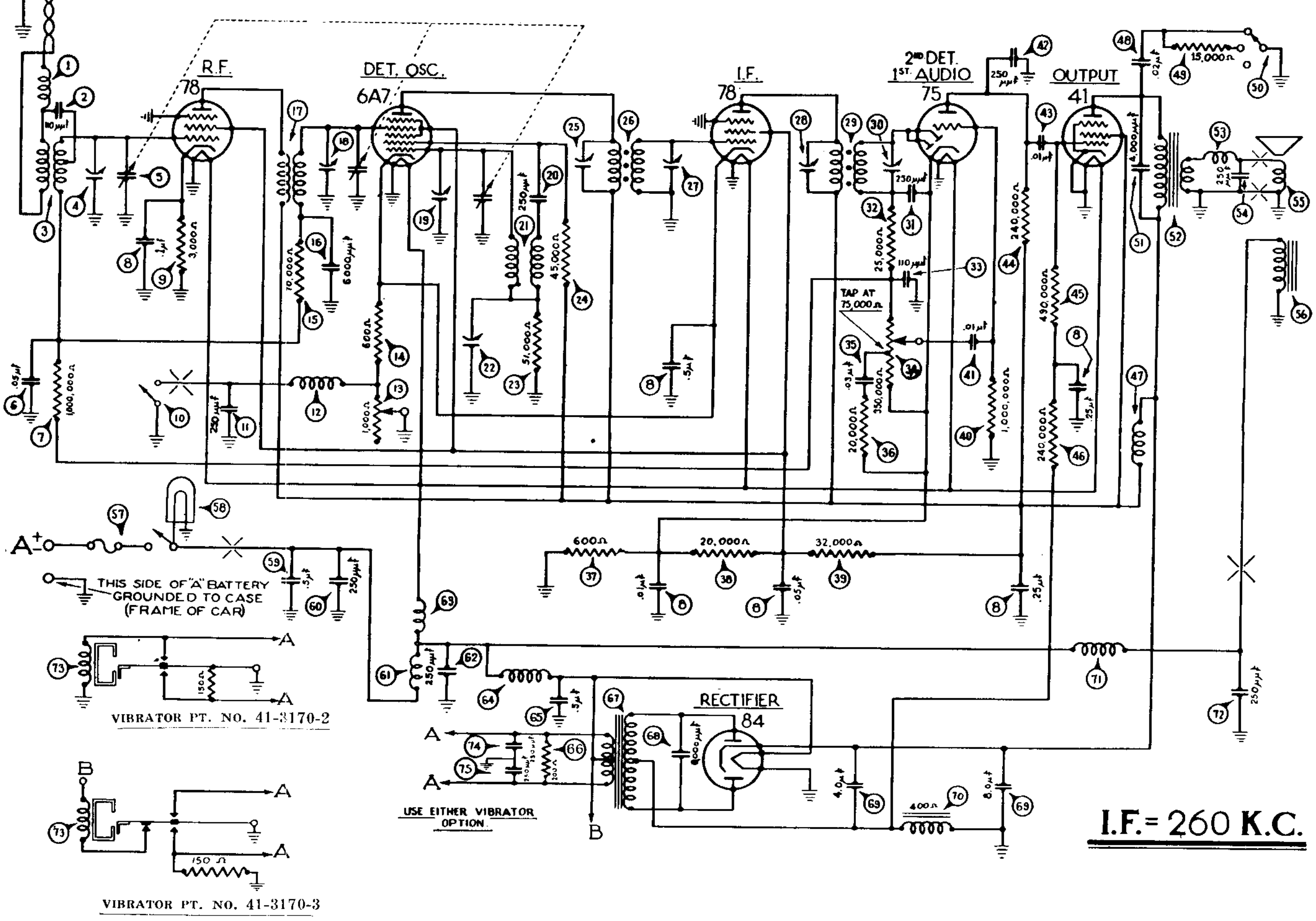
No.	Description	Part No.
(1)	Antenna choke	32-2344
(2)	Condenser (.05 mfd.)	30-4444
(3)	Antenna transformer	32-2306
*(4)	Antenna coupling condenser	31-6082
*(5)	Tuning condenser	31-1769
(6)	First padder (On tun. cond.)	
(7)	Resistor (70,000 ohms)	33-370334
(8)	Condenser (.1-.25-.25-.5 mfd)	30-4415
(9)	Resistor (400 ohms)	33-1211
(10)	R. F. transformer	32-2307
(11)	Second padder (On tun. cond.)	
(12)	Resistor (70,000 ohms)	33-370334
(13)	Condenser (765 mmfd.)	30-1069
(14)	Condenser (.05 mfd.)	3615-OSG
(15)	Resistor (1,000,000 ohms)	33-510344
(16)	Third padder (On tun. cond.)	
(17)	Oscillator transformer	32-2308
(18)	Condenser (250 mmfd.)	30-1032
(19)	Resistor (51,000 ohms)	33-351344
*(20)	Low frequency padder	31-6102
(21)	Resistor (45,000 ohms)	33-345344
(22)	Padder (Pri. 1st I. F. trans.)	
(23)	First I.F. transformer	32-2026
(24)	Padder (Sec. 1st I.F. trans.)	
(25)	Padder (Pri. 2nd I.F. trans.)	
(26)	Second I.F. transformer	32-2027
(27)	Padder (Sec. 2nd I.F. trans.)	
(28)	Condenser (250 mmfd.)	30-1032
(29)	Resistor (25,000 ohms)	33-325344
(30)	Condenser (110 mmfd.)	30-1031
(31)	Volume control (350,000 ohms)	33-5139
(32)	Condenser (.01 mfd.)	3903-OSU
(33)	Resistor (32,000 ohms)	33-332344
(34)	Resistor (20,000 ohms)	33-320334
(35)	Condenser (.01 mfd.)	3903-OSG
(36)	Resistor (600 ohms)	33-1212
(37)	Resistor (1,000,000 ohms)	33-510344
(38)	Resistor (250,000 ohms)	33-424344
(39)	Condenser (250 mmfd.)	30-1032
(40)	Condenser (.01 mfd.)	3903-OSU
(41)	Resistor (500,000 ohms)	33-449344
(42)	Resistor (240,000 ohms)	33-424344
(43)	Condenser (.02 mfd.)	30-4419
(44)	Condenser (4000 mmfd.)	30-4185
(45)	Condenser (250 mmfd.)	30-1032
(46)	Choke	32-2063
*(47)	Tone control switch	42-5603
*(48)	Output transformer	32-7495
(49)	Cone & voice coil	36-3586
*(50)	Field coil assembly	36-3597
(51)	On & Off switch assembly	42-5606
(52)	Pilot lamp	34-2040
(53)	Condenser (250 mmfd.)	30-1032
(54)	Condenser (.05 mfd.)	30-4015
(55)	"A" choke	32-1432
(56)	Condenser (250 mmfd.)	30-1032
(57)	Filament choke	32-2038
(58)	Vibrator choke	32-2039
(59)	Condenser (.5 mfd.)	30-4015
(60)	Resistor (200 ohms)	33-120344
(61)	Condenser (.05 mfd.)	30-4444
(62)	Power transformer	32-7550
(63)	Condenser (7500 mmfd.)	30-4420
(64)	Filter choke	32-7545
(65)	Filter condenser (4-8 mfd.)	30-2150
(66)	Condenser (250 mmfd.)	30-1032
(67)	"B" choke	32-1281
(68)	Vibrator (Optional)	41-3170-2 / 41-3170-3
	Four prong socket	27-6044
	Five prong socket	27-6035
	Six prong socket	27-6036
	Seven prong socket	27-6037
	Ground clamp	41-3194
	Antenna loom	38-8030
	Interference condenser	4522S
	Interference condenser	30-4007
	Distributor resistor	4851
	Fuse	7227
	Fuse insulator	27-7729
	Tuning & volume control knob	27-4313
	Tone control lever	28-7203
	Knob base	28-4184
	Tee bolt	28-6268
	Nut (Rec. mtg.)	W518A
	Tuning & volume shaft	28-8662
	Dial assembly	42-5635
	Antenna lead (on Receiver)	L-2308



NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicago.

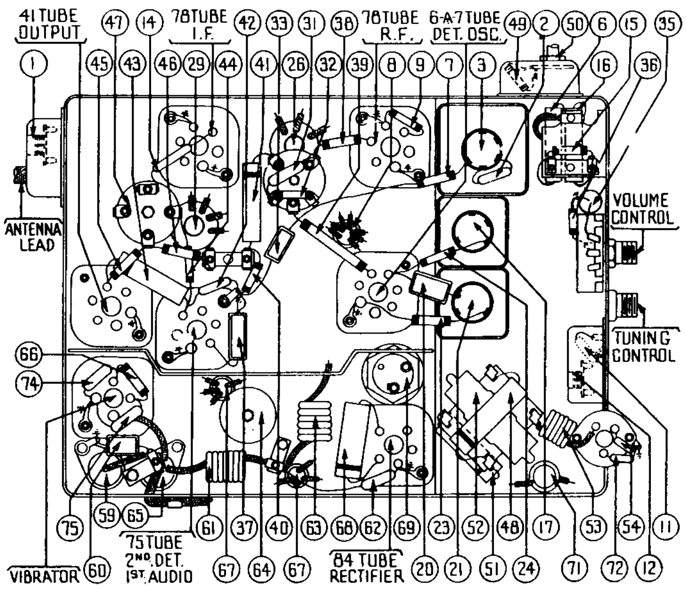
TRANSITONE AUTOMOBILE RADIO CORP.

MODEL P1430 PACKARD 115C & 120C



MODEL P-1430 PARTS LIST

No.	Description	Part No.
1	Antenna Choke	32-1372
2	Condenser (110 mmfd.)	30-1031
3	Antenna Transformer	32-2230
4	First Padder (on tun. cond.)	....
*5	Tuning Condenser	31-1912
6	Condenser (.05 mfd.)	30-4444
7	Resistor (1,000,000 ohms)	33-510344
8	Condenser (.01-.05-.1-.25-.25-.5 mfd.)	30-4478
9	Resistor (3,000 ohms)	33-230344
10	Sensitivity Switch	42-5603
11	Condenser (250 mmfd.)	30-1032
12	Choke	32-2063
13	Sensitivity Control	33-5129
14	Resistor (600 ohms)	33-1212
15	Resistor (70,000 ohms)	33-370344
16	Condenser (6,000 mmfd.)	30-4445
17	R. F. Transformer	32-2231
18	Second Padder (on tun. cond.)	....
19	Third Padder (on tun. cond.)	....
20	Condenser (250 mmfd.)	30-1032
21	Oscillator Transformer	32-2232
*22	Low Frequency Padder	31-6056
23	Resistor (51,000 ohms)	33-351344
24	Resistor (45,000 ohms)	33-345344
25	Padder (Pri. 1st I. F. Trans.)	
26	First I. F. Transformer	32-2286
27	Padder (Sec. 1st I. F. Trans.)	....
28	Padder (Pri. 2nd I. F. Trans.)	....
29	Second I. F. Transformer	32-2167
30	Padder (Sec. 2nd. I. F. Trans)	....
31	Condenser (250 mmfd.)	30-1032
32	Resistor (25,000 ohms)	33-325344
33	Condenser (110 mmfd.)	30-1031
34	Volume Control (350,000 ohms)	33-5121
35	Condenser (.03 mfd.)	30-4449
36	Resistor (20,000 ohms)	33-320344
37	Resistor (600 ohms)	33-1212
38	Resistor (20,000 ohms)	33-320344
39	Resistor (32,000 ohms)	33-332444
40	Resistor (1,000,000 ohms)	33-510344
41	Condenser (.01 mfd.)	30-4479
42	Condenser (250 mmfd.)	30-1032
43	Condenser (.01 mfd.)	30-4145
44	Resistor (240,000 ohms)	33-424344
45	Resistor (490,000 ohms)	33-449344
46	Resistor (240,000 ohms)	33-424344
47	"B" Choke	32-1281
48	Condenser (.02 mfd.)	30-4419
49	Resistor (15,000 ohms)	33-315344
*50	Tone Control Switch	42-1139
51	Condenser (4000 mmfd.)	30-4185
*52	Output Transformer	32-7721
53	Choke	32-1374
54	Condenser (250 mmfd.)	30-1032
55	Cone & Voice Coil	36-3159
*56	Field Coil Assembly	36-3513
*57	On & Off Switch	42-5606
58	Pilot Lamp	34-2039
59	Condenser (.5 mfd.)	30-4474
60	Condenser (250 mmfd.)	30-1032
61	"A" Choke	32-1374
62	Condenser (250 mmfd.)	30-1032
63	Filament Choke	32-1561
64	Vibrator Choke	32-2249
65	Condenser (.5 mfd.)	30-4474
66	Resistor (200 ohms)	33-120344
67	Power Transformer	32-7720
68	Condenser (8000 mmfd.)	30-4420
69	Filter Condenser (4-8 mfd.)	30-2168
70	Filter Choke	32-7722
71	Choke	32-2269
72	Condenser (250 mmfd.)	30-1032
73	Vibrator (Optional)	41-3170-2 41-3170-3
74	Condenser (250 mmfd.)	30-1032
75	Condenser (250 mmfd.)	30-1032
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Tuning & Volume Shaft	28-8662
	Sensitivity Shaft	28-6502
	Scale Assembly	42-5596
	Sensitivity Switch Knob	28-7203
	Tuning & Volume Knob	27-4313
	Knob Base	28-4184



No.	Description	Part No.
	Distributor Resistor	4851
	Interference Condenser	4522
	Interference Condenser	30-4007
	Fuse	7227
	Fuse Insulator	27-7729
	Tee Bolt (Rec. mtg.)	28-6268
	Nut (Rec. mtg.)	W-518A
	Stud (Speaker mtg.)	28-6088
	Nut (Speaker mtg.)	W-55A
	Ground Strap	38-6606
	Antenna Loom	38-8030
	Ground Clamp	41-3194
	Receiver Housing	38-1707

NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicago.

TRANSITONE AUTOMOBILE RADIO CORP.

MODEL P1417 — PACKARD 115C & PACKARD 120C — MODEL P1430

MODEL P1417

I. F. TRANSFORMERS AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 8).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 7.

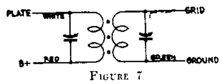


Figure 7

If replacements are ever necessary, replace the entire coil assembly, 32-2026 for the first I. F. stage and 32-2027 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL P-1417 ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER—The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR—With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F.—Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder (27) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading (See Figure 8 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder (24) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (22) for maximum reading. Readjust padders (25) and (27) with the generator lead connected to the type 6A7 tube. (See Figure 8 for location of padders).

HIGH FREQUENCY AND R. F.—After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Turn the tuning condenser plates out of mesh as far as they will go. With the tuning condenser in this position, adjust the high frequency padder (16) and the R. F. padder (11) until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

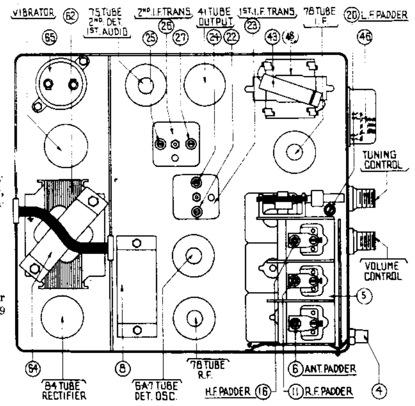


Figure 8

LOW FREQUENCY—Turn the tuning condenser plates in mesh to approximately 600 K. C., 60 on the dial scale and set the signal generator at 600 K. C. Roll the tuning condenser and adjust the low frequency padder screw (20) for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT—Turn the tuning condenser plates out of mesh as far as they will go and set the signal generator at 1550 K. C. Then adjust the high frequency padder (16) again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

ANTENNA — WHEN PADDING THE ANTENNA STAGE IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE USED.

Connect the signal generator lead to the antenna lead on the Receiver using a 280 mmfd. condenser in series between the two leads.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders (11) and (6) for the maximum reading on the output meter.

When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

MODEL P1430

I. F. TRANSFORMERS AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Figure 4).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 3.

Figure 3

If replacements are ever necessary, replace the entire coil assembly, 32-2286 for the first I. F. stage and 32-2167 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL P-1430 ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER—The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR—With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

Procedure

I. F.—Set the signal generator at exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Adjust the secondary screw padder (30) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (28) for maximum reading (See Figure 4 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser (without removing the grid cap). Adjust the secondary screw padder (27) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading. Readjust padders (28) and (30) with the generator lead connected to the type 6A7 tube. (See Figure 4 for location of padders).

HIGH FREQUENCY AND R. F.—After padding the first I. F. stage remove the generator lead from the 6A7 tube.

Set the signal generator at 1550 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser (without removing the grid cap).

Using a piece of paper approximately .006" thick as a gauge between the heel of the rotor plates and the stator plates, turn the rotor plates in mesh until they strike against the paper.

With the tuning condenser in this position adjust the high frequency padder (19) and the R. F. padder (18) until the maximum reading is obtained on the output meter. This is the true setting for 1550 K. C., 155 on the dial scale.

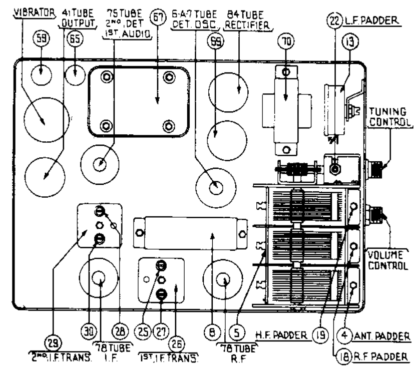


Figure 4

LOW FREQUENCY—Turn the tuning condenser plates in mesh to approximately 600 K. C., 60 on the dial scale and set the signal generator at 600 K. C. Roll the tuning condenser and adjust the low frequency padder screw (22) for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT—Turn the tuning condenser plates out of mesh to 1550 K. C. and set the signal generator at 1550 K. C. Then adjust the high frequency padder (19) again for maximum reading on the output meter.

Remove the generator lead from the 78 R. F. tube.

ANTENNA — WHEN PADDING THE ANTENNA STAGE IT IS EXTREMELY IMPORTANT THAT THE PROPER DUMMY ANTENNA BE USED.

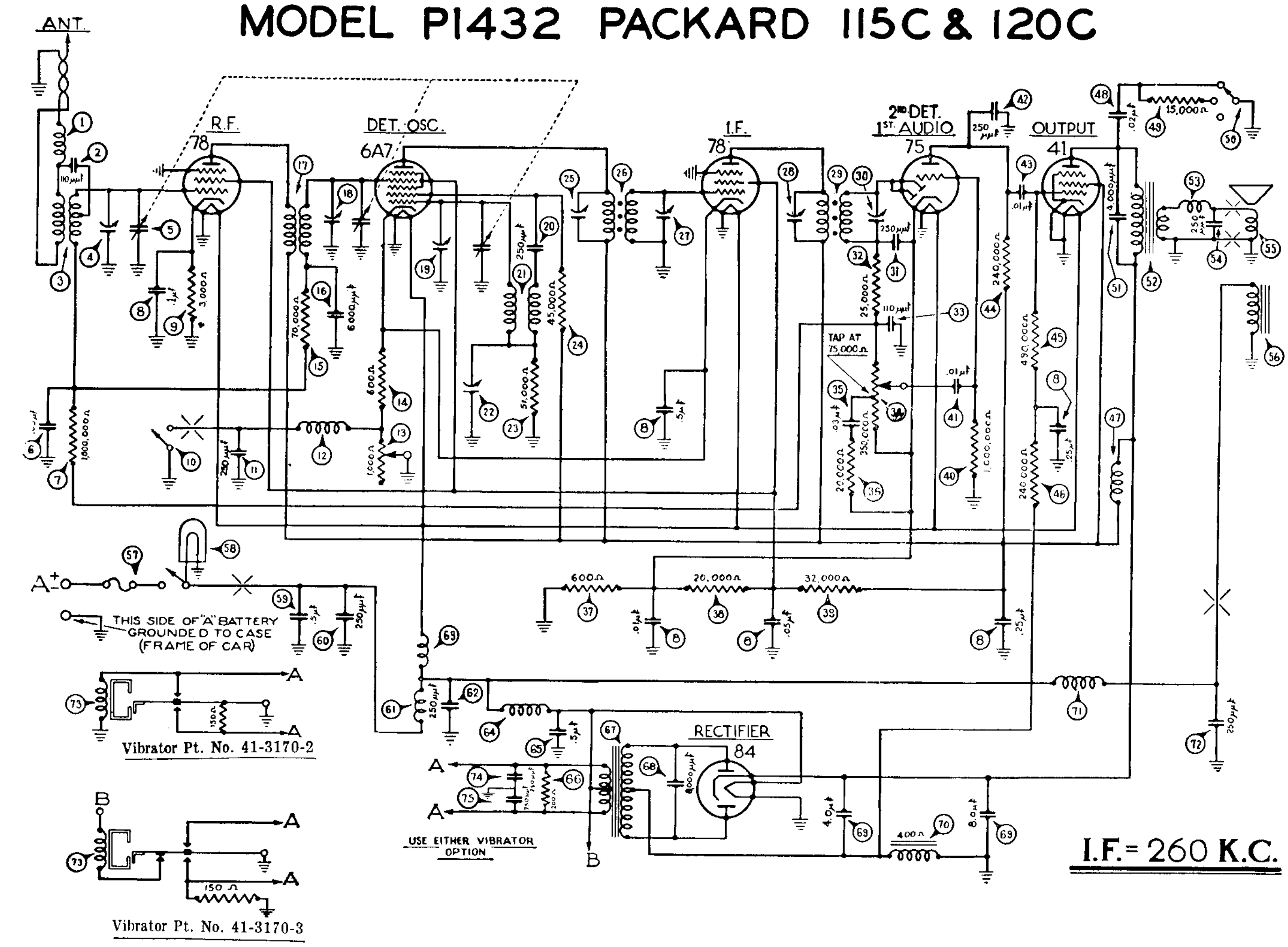
Connect the signal generator lead to the antenna lead on the Receiver using a 280 mmfd. condenser in series between the two leads.

Turn the tuning condenser to 1400 K. C. and set the generator at 1400 K. C. Adjust the padders (18) and (4) for the maximum reading on the output meter.

When the antenna stage readjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

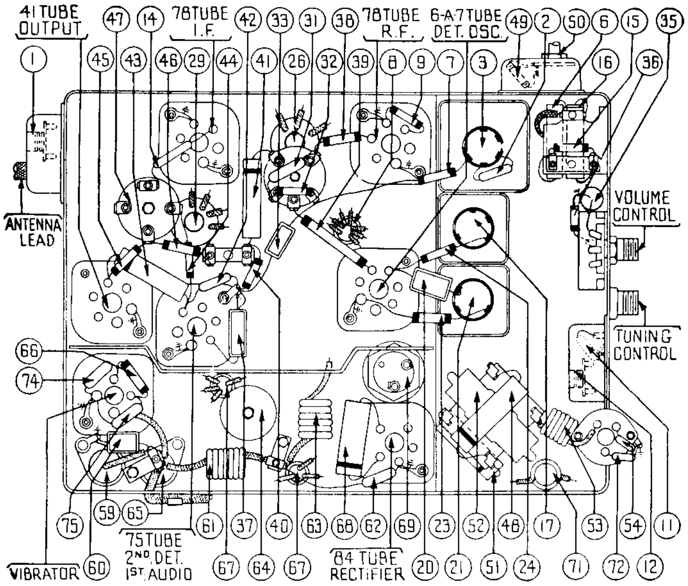
TRANSITONE AUTOMOBILE RADIO CORP.

MODEL P1432 PACKARD 115C & 120C



MODEL P-1432H PARTS LIST

No.	Description	Part No.
①	Antenna Choke	32-2063
②	Condenser (110 mmfd.)	30-1031
③	Antenna Transformer	32-2230
④	First Padder (on tun. cond.)	
*⑤	Tuning Condenser	31-1912
⑥	Condenser (.05 mfd.)	30-4444
⑦	Resistor (1,000,000 ohms)	33-510344
⑧	Condenser (.01 .05-.1-.25-.25-.5 mfd.)	30-4478
⑨	Resistor (3,000 ohms)	33-230344
⑩	Sensitivity Switch	42-5603
⑪	Condenser (250 mmfd.)	30-1032
⑫	Choke	32-2063
⑬	Sensitivity Control	33-5129
⑭	Resistor (600 ohms)	33-1212
⑮	Resistor (70,000 ohms)	33-370344
⑯	Condenser (6,000 mmfd.)	30-4445
⑰	R. F. Transformer	32-2231
⑱	Second Padder (on tun. cond.)	
⑲	Third Padder (on tun. cond.)	
⑳	Condenser (250 mmfd.)	30-1032
㉑	Oscillator Transformer	32-2232
*㉒	Low Frequency Padder	31-6056
㉓	Resistor (51,000 ohms)	33-351344
㉔	Resistor (45,000 ohms)	33-345344
㉕	Padder (Pri. 1st I.F. Trans.)	
㉖	First I. F. Transformer	32-2286
㉗	Padder (Sec. 1st I. F. Trans.)	
㉘	Padder (Pri. 2nd I. F. Trans.)	
㉙	Second I. F. Transformer	32-2167
㉚	Padder (Sec. 2nd I. F. Trans.)	
㉛	Condenser (250 mmfd.)	30-1032
㉜	Resistor (25,000 ohms)	33-325344
㉝	Condenser (110 mmfd.)	30-1031
㉞	Volume Control (350,000 ohms)	33-5121
㉟	Condenser (.03 mfd.)	30-4449
㊱	Resistor (20,000 ohms)	33-320344
㊲	Resistor (600 ohms)	33-1212
㊳	Resistor (20,000 ohms)	33-320334
㊴	Resistor (32,000 ohms)	33-332444
㊵	Resistor (1,000,000 ohms)	33-510344
㊶	Condenser (.01 mfd.)	30-4479
㊷	Condenser (250 mmfd.)	30-1032
㊸	Condenser (.01 mfd.)	30-4145
㊹	Resistor (240,000 ohms)	33-424344
㊺	Resistor (490,000 ohms)	33-449344
㊻	Resistor (240,000 ohms)	33,424344
㊼	"B" Choke	32,1281
㊽	Condenser (.02 mfd.)	30-4419
㊾	Resistor (15,000 ohms)	33-315344
*㊿	Tone Control Switch	42-1139
51	Condenser (4000 mmfd.)	30-4185
*52	Output Transformer	32-7495
53	Choke	32-1374
54	Condencer (250 mmfd.)	30-1032
55	Cone & Voice Coil	36-3159
*56	Field coil assembly	36-3513
*57	On & Off Switch	42-5606
58	Pilot Lamp	34-2039
59	Condenser (.5 mfd.)	30-4474
60	Condenser (250 mmfd.)	30-1032
61	"A" Choke	32-1374
62	Condenser (250 mmfd.)	30-1032
63	Filament Choke	32-1561
64	Vibrator Choke	32-2249
65	Condenser (.5 mfd.)	30-4474
66	Resistor (200 ohms)	33-120344
67	Power Transformer	32-7720
68	Condenser (8000 mmfd.)	30-4420
69	Filter Condenser (4-8 mfd.)	30-2168
70	Filter Choke	32-7722
71	Choke	32-2269
72	Condenser (250 mmfd.)	30-1032
73	Vibrator (Optional)	41-3170-2 41-3170-3
74	Condenser (250 mmfd.)	30-1032
75	Condenser (250 mmfd.)	30-1032
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Tuning & Volume Shaft	28-8662
	Sensitivity Shaft	28-6502
	Scale Assembly	42-5596
	Sensitivity Switch Knob	28-7203
	Tuning & Volume Knob	27-4313
	Knob Base	28-4184
	Antenna Loom Assembly	38-8030

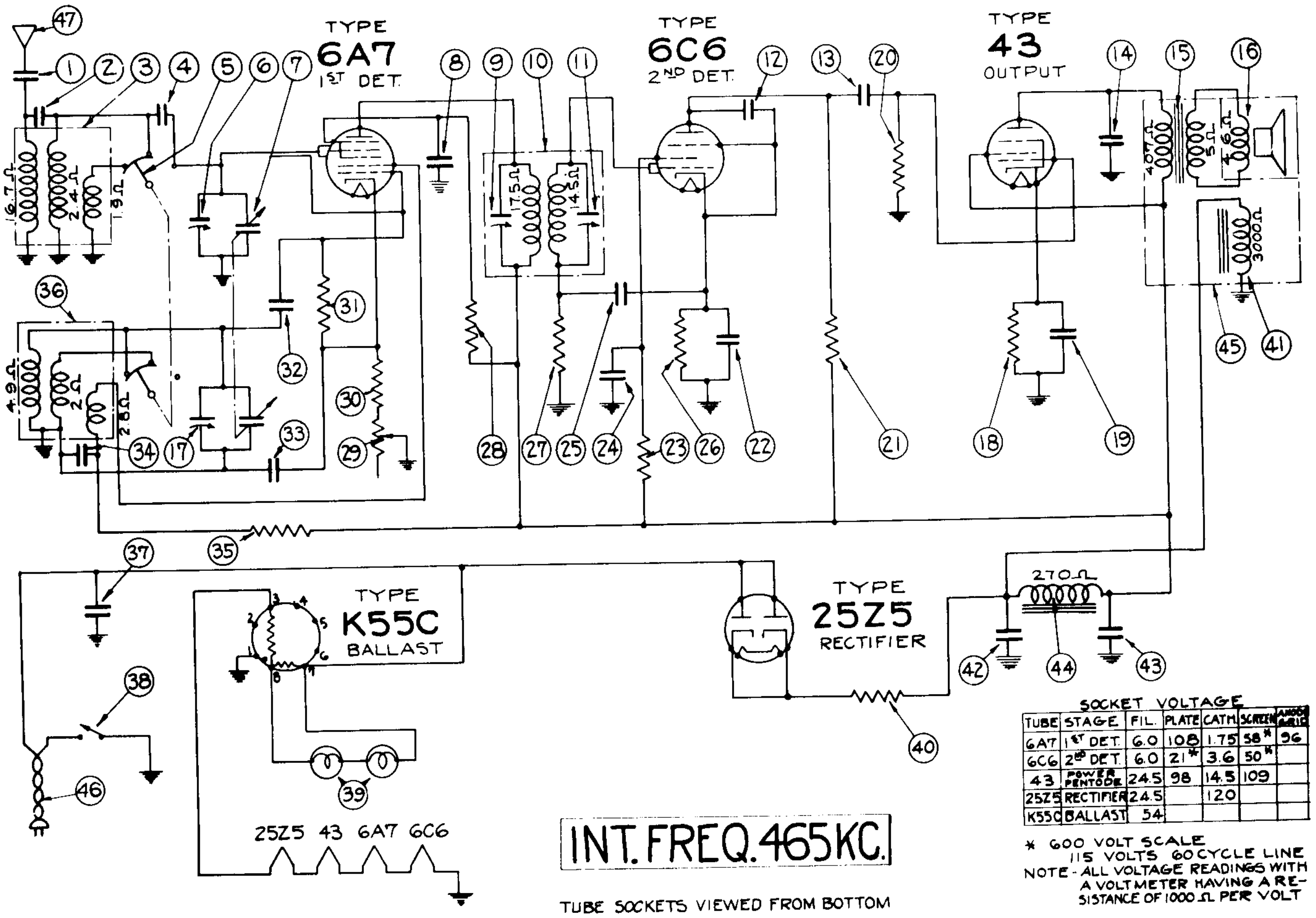


No.	Description	Part No.
	Distributor Resistor	4851
	Interference Condenser	4522
	Interference Condenser	30-4007
	Fuse	7227
	Fuse Insulator	27-7729
	Tee Bolt (Rec. mtg.)	28-6268
	Nut (Rec. mtg.)	W-518A
	Stud (Speaker mtg.)	28-6088
	Nut (Speaker mtg.)	W-55A
	Ground Strap	38-6606
	Antenna Loom	38-8030
	Ground Clamp	41-3194
	Receiver Housing	38-1707
	Switch and Lead Assembly	41-3217
	Speaker Cable	41-3235

Note: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Philadelphia or Chicago.

UNITED AMERICAN BOSCH CORP.

MODEL 604



SOCKET VOLTAGE

TUBE	STAGE	FIL.	PLATE	CATH.	SCREEN	ANODE GRID
6A7	1ST DET.	6.0	108	1.75	58*	96
6C6	2ND DET.	6.0	21*	3.6	50*	
43	POWER PENTODE	24.5	98	14.5	109	
25Z5	RECTIFIER	24.5		120		
K55C	BALLAST	54				

* 600 VOLT SCALE
115 VOLTS 60 CYCLE LINE
NOTE - ALL VOLTAGE READINGS WITH A VOLTMETER HAVING A RESISTANCE OF 1000 Ω PER VOLT

SERVICE PARTS LIST MODEL 604

These prices supersede all prevous prices and are subject to change without notice.

Dia. #	Part #	Description of Parts	List Price
1	CM 9519	.0005 mfd., mica condenser	$ .20
2	CS 9546	5 mmf., mica condenser	.20
3	RC 95197	Antenna coil assembly	1.50
4	CM 9522	.00048 mfd., mica condenser	.20
5	SW 9545	Wave change switch	.45
6		Trimmer condenser - part of CG 9547	
7	CG 9547	Tuning condenser (2 gang)	2.50
8		.05 mfd., 200 V. condenser - part of SA 105327	
9		Trimmer condenser - part of IC 9566	
10	IC 9566	I.F. coil (465 KC.)	1.50
11		Trimmer condenser - part of IC 9566	
12	CM 9519	.0005 mfd., mica condenser	.20
13	CW 4-01	.01 mfd., 400 V. condenser	.15
14	CW 4-01	.01 mfd., 400 V. condenser	.15
15	TR 9560	Output transformer	1.25
16	DM 9512	Diaphragm and voice coil assembly	1.50
17		Trimmer condenser - part of CG 9547	
18	RE 9567	600 ohm, 1/2 W. resistor	.15
19	CE 9515	12 mfd., 25 V. electrolytic condenser	.65
20	RE 9545	1/2 meg., 1/8 W. resistor	.10
21	RE 9545	1/2 meg., 1/8 W. resistor	.10
22		.05 mfd., 200 V. condenser - part of SA 105327	
23	RE 9545	1/2 meg., 1/8 W. resistor	.10
24		.05 mfd., 200 V. condenser - part of SA 105327	
25	CW 2-10	.1 mfd., 200 V. condenser	.15
26	RE 9568	25,000 ohm, 1/8 W. resistor	.10
27	RE 9530	1 meg., 1/8 W. resistor	.10
28	RE 9569	30,000 ohm, 1/8 W. resistor	.10
29	VR 9531	Volume control (10,000 ohms)	.30
30		300 ohm resistor - part of VR 9531	
31	RE 9524	50,000 ohm, 1/8 W. resistor	.10
32	CM 9513	.0001 mfd., mica condenser	.10
33		.05 mfd., 200 V. condenser - part of SA 105327	
34	CW 4-005	.005 mfd., 400 V. condenser	.15
35	RE 9527	5,000 ohm, 1/8 W. resistor	.10
36	RC 95166	Oscillator coil assembly	.70
37	CW 2-10	.1 mfd., 200 V. condenser	.15
38		Switch (On-Off) - part of VR 9531	
39	LP 9516	Dial lamp - 6.3 V. (.15 amp.)	.20
40	RE 9566	25 ohm, 1/2 W. resistor	.15
41		Speaker field coil - part of SK 9531	
42	CE 9533	12 mfd., 150 V. electrolytic condenser	.70
43	CE 9534	16 mfd., 150 V. electrolytic condenser	.70
44	SA 105311	Choke coil assembly	.95
45	SK 9531	Speaker	3.75
46	CB 9512	Line cable and plug	.50
47	KL 105344	Antenna cable	.20

Part #	Description of Parts	List Price
	MAIN ASSEMBLIES	
CH 95100	Chassis assembly	
KA 9545	Cabinet	
SK 9531	Speaker	3.75
	TUBE SOCKETS	
SO 956	Tube socket - 8 prong	.20
	TUBE SOCKETS (Cont.)	
SA 105461	Tube socket - 7 prong	$ .20
SA 104617	Tube socket - 6 prong	.20
	MISCELLANEOUS	
DS 9550	Dial scale	.55
KN 9568	Knobs	.10
SI 9565	Dial indicator (pointer)	.10
FP 101869	Felt feet	.05
SC 952	Screw for dial indicator	.05
CV 95189	Cover - front of speaker	.20
PU 9517	Large pulley on tuning condenser	.25
SH 9539	Dial drive shaft	.10
PU 9516	Small dial drive pulley	.10
BK 95193	Dial lamp bracket	.05
SO 9518	Dial lamp socket	.10
FP 105427	Dial lamp contact spring	.05
SP 9539	Spring on dial drive cord	.05
BK 95182	Electrolytic condenser mounting bracket	.05
BG 9523	Dial drive shaft bearing	.05
PR 97160	Dial drive cord (per yard)	.05
CB 95113	Line cable for 220 V. operation	2.00

MODEL 604 A2

Service parts list for Model 604 A2 is the same as for Model 604 except for the following parts:

Part #	Description of Parts	List Price
BK 95246	Bracket and dial scale	$ .75
BK 95244	Bracket (small)	.05
CV 95198	Scale cover	.35
SC 39-3	Screw	.05
WA 74084	Washer	.05

UNITED AMERICAN BOSCH CORP.

MODEL 604

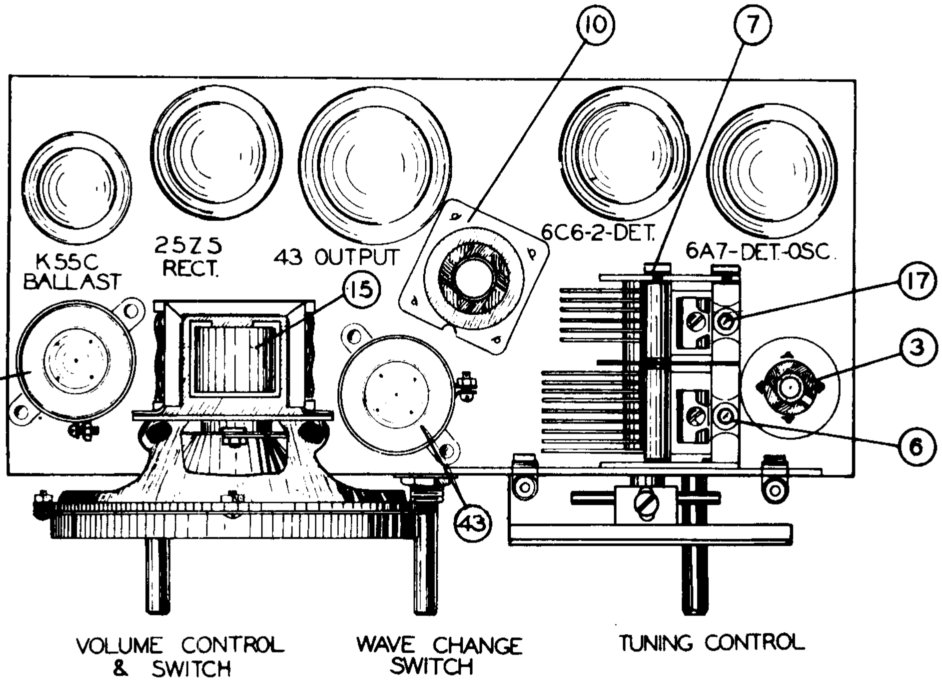


Fig. 1

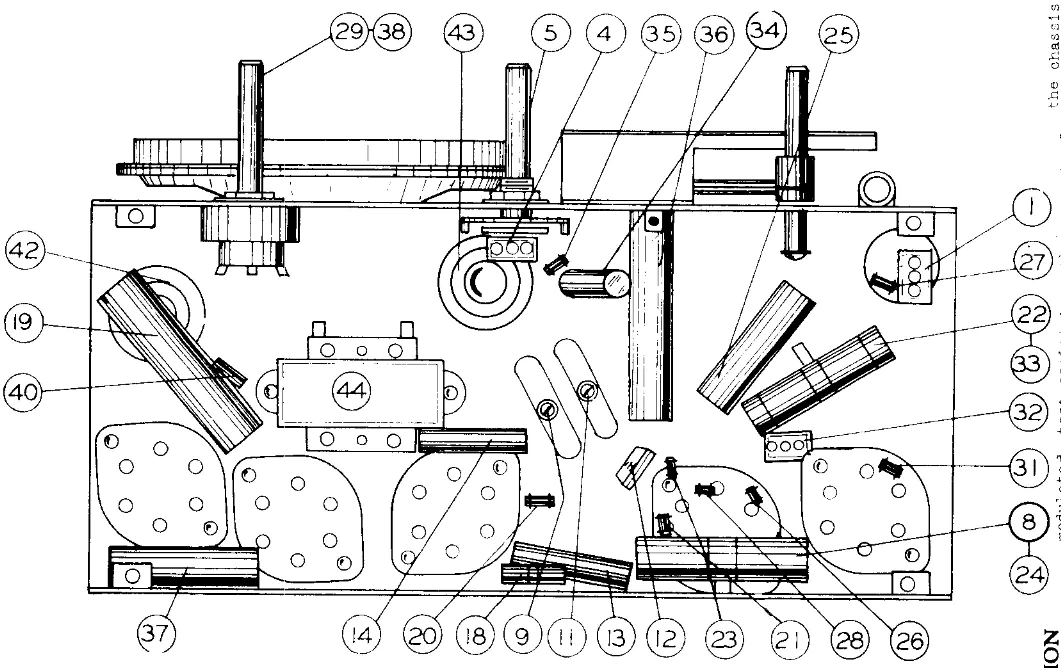


Figure No. 2

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes .. 1 #6A7, 1 #6C6, 1 #43, 1 #25Z5, 1 #K55C (Ballast) - Total 5
Power Supply Characteristics .... 105-125 volts D.C. or 105-125 volts, 50-60 cycle A.C.
Power Consumption .... 44 Watts
Total Power Output .... 1.10 Watts
Undistorted Power Output .... 0.75 Watts
Tuning Ranges .... (Broadcast Band 535 to 1525 K.C.
(Shortwave Band 1500 to 3000 K.C.
Line-Up Frequencies .... I.F. 465 K.C., 1400 K.C.

GENERAL DESCRIPTION

This model is a four-tube (plus a ballast tube), two-band superheterodyne receiver, designed to operate over the standard broadcast band extending from 535 to 1525 K.C., and a short-wave band extending from 1500 to 3000 K.C.

The receiver uses a type 6A7 tube as a first detector-oscillator, a type 6C6 as a second detector, a type 43 as a power output tube, a type 25Z5 as a rectifier and a type L55C as a ballast tube.

LINE-UP CAPACITOR ADJUSTMENTS

To properly align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied and reduced sufficiently to prevent overload as the individual circuits of the receiver are brought into alignment. A conventional output meter should be connected across the terminals of the speaker voice coil to indicate when the individual circuits are correctly aligned. The sensitivity of this meter must be sufficient to give satisfactory readings with low input signals.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, location of the various tubes and alignment condensers. Top and bottom views of the chassis are shown in Figures #1 and #2 and should be carefully studied before actual work is started.

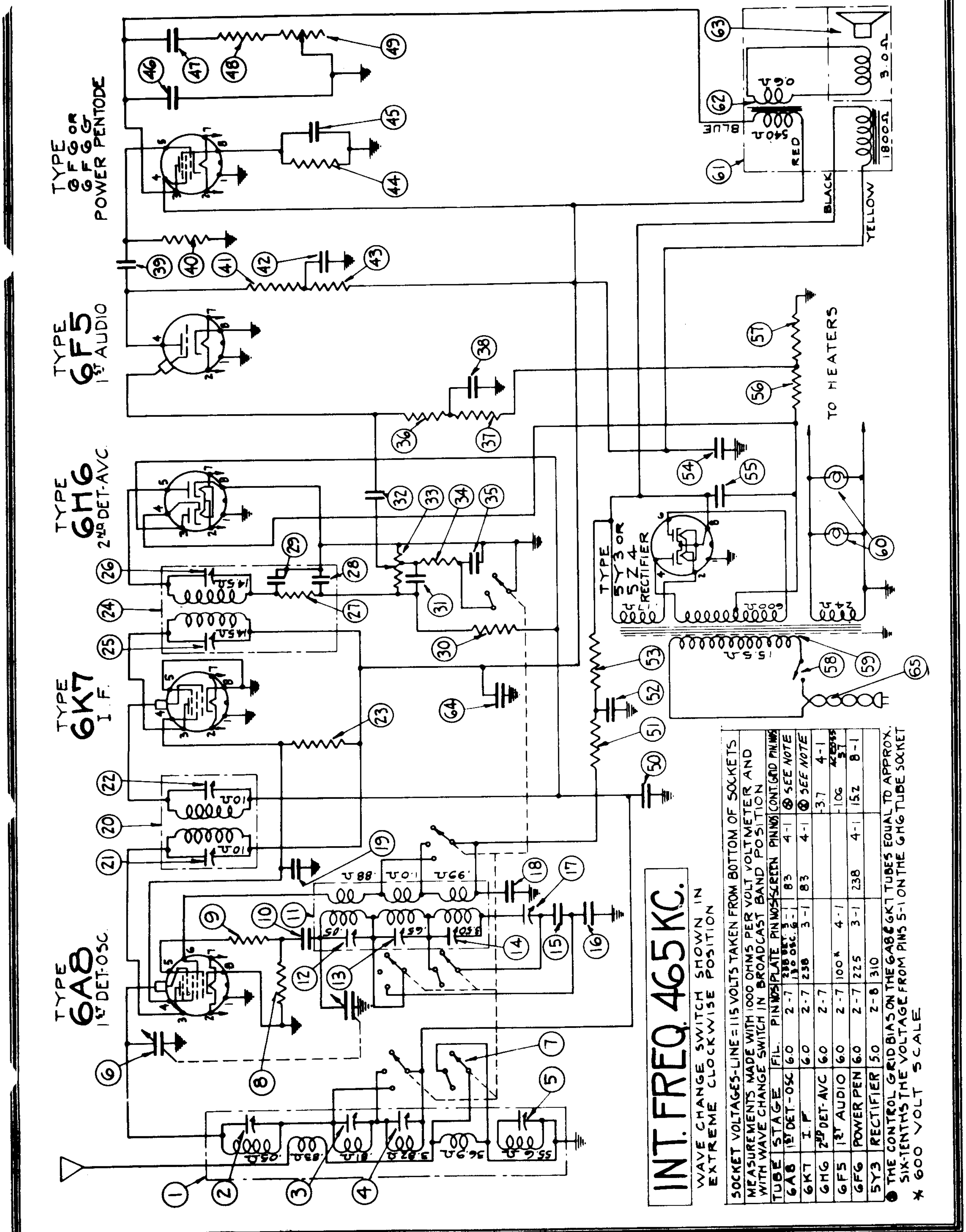
ALIGNMENT OF I.F. (465 K.C.)

1. Set the volume control to maximum position and wave change switch to standard broadcast band.
2. Connect the output meter across the voice coil terminals of the speaker.
3. Set the test oscillator to 465 K.C. and adjust its output to produce a measureable reading on the output meter when the test signal is applied to the grid of the type 6A7 first detector-oscillator tube through a 0.5 mfd. blocking condenser.
4. Adjust trimmers #9 and #11 to maximum output.

ALIGNMENT OF OSCILLATOR AND R. F.

1. Check the pointer setting to be sure that is is exactly horizontal when the tuning condenser is completely closed.
2. Set the test oscillator and dial indicator to 1400 K.C. and adjust the oscillator trimmer condenser #17 to maximum output.
3. Apply the test signal to the antenna of the receiver through a .0001 mfd. blocking condenser and adjust trimmer condenser #6 to maximum output.
4. Check sensitivity over the band.
5. Turn wave change switch to the shortwave band and check the sensitivity over scale.

UNITED AMERICAN BOSCH CORP.
MODEL 640



INT. FREQ. 465 KC.

WAVE CHANGE SWITCH SHOWN IN EXTREME CLOCKWISE POSITION

SOCKET VOLTAGES-LINE = 115 VOLTS TAKEN FROM BOTTOM OF SOCKETS. MEASUREMENTS MADE WITH 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION									
TUBE	STAGE	FIL.	PIN NOS	PLATE	PIN NOS	SCREEN	PIN NOS	CONT. GRID	PIN NOS
6A8	1st DET.-OSC	6.0	2-7	238 DET. 130 OSC.	3-1 6-1	83	4-1	⊗ SEE NOTE	
6K7	I.F.	6.0	2-7	238	3-1	83	4-1	⊗ SEE NOTE	
6H6	2nd DET-AVC	6.0	2-7					-3.7	4-1
6F5	1st AUDIO	6.0	2-7	100*	4-1			-1.06	ACROSS 57
6F6	POWER PEN	6.0	2-7	225	3-1	238	4-1	15.2	8-1
5Y3	RECTIFIER	5.0	2-8	310					

⊗ THE CONTROL GRID BIAS ON THE 6A8 & 6K7 TUBES EQUAL TO APPROX. SIX-TENTHS THE VOLTAGE FROM PINS 5-1 ON THE 6H6 TUBE SOCKET

* 600 VOLT SCALE

UNITED AMERICAN BOSCH CORP.

MODEL 640

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ..... 1 #6A8, 1 #6K7, 1 #6H6, 1 #6F5, 1 #6F6, 1 #5Y3 - Total 6
Power Supply Characteristics .... 105-125 volts, 50-60 cycle A.C.
Power Consumption .... 47 Watts
Maximum Output .... 3 Watts
Maximum Undistorted Output .... 2.4 Watts
Tuning Ranges .... (Black Band - 540 to 1550 K.C. (Green Band - 1500 to 4500 K.C. (Red Band - - 16500 to 16500 K.C.
Line-Up Frequencies .... I.F. 465 K.C., 1400 K.C., 600 K.C., 4000 K.C.

Dia. #	Part #	Description of Parts	List Price
60	LP 951	Dial lamp - 6-8 V., .30 amp.	.20
61	SK 9536	Speaker assembly	6.50
62	SA 107357	Output transformer	1.25
63	SA 106617	Diaphragm and voice coil assembly	1.15
64	CW 4-10	.1 mfd., 400 V. condenser	.15
65	CB 9519	Line cable and plug	.50
67	SA 107358	Field coil	1.75

GENERAL DESCRIPTION

This model is a six-tube, three-band, superheterodyne receiver whose circuits employ all-metal tubes. The circuit employs a type 6A8 tube as a combined first detector-oscillator, a type 6K7 tube as an intermediate frequency amplifier, a type 6H6 tube as a second detector and automatic volume control, a type 6F5 tube as a first audio frequency amplifier, a type 6F6 as an output amplifier, and a type 5Y3 tube as a rectifier.

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload, when the individual circuits of the receiver are brought into alignment. A conventional output meter should be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures #1 and #2 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (456 K.C.)

1. Set volume control to maximum position.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 K.C., and apply signal to grid of 6K7 I.F. tube through a 0.5 mfd. blocking condenser.
4. Adjust trimmers #25 and #26 to maximum output, reducing output of test oscillator as required.
5. Apply test signal to grid of 6A8 first detector-oscillator tube and adjust trimmers #21 and #22 to maximum output.
6. Apply test signal to antenna of receiver.
7. Adjust trap coil trimmer #5 to minimum output.

ADJUSTMENT OF BROADCAST BAND
(540 to 1550 K.C.)

1. Set wave change switch to standard broadcast band position.
2. Set test oscillator and dial indicator to 1400 K.C.
3. Apply the test signal to the antenna of the receiver through a .0002 mfd. blocking condenser and adjust the oscillator trimmer condenser #14 until the signal is received.
4. Adjust the preselector trimmer #4 to maximum output.
5. Set the test oscillator and dial indicator to 600 K.C. and adjust the oscillator series condenser #17 until the signal is received. Tune the variable condenser to a slightly lower frequency and readjust trimmer #17 to maximum output. If the sensitivity increases, continue this trial and error method in the same direction until no further improvement in sensitivity can be made. If the sensitivity decreases, try this adjustment at slightly higher frequencies.

ADJUSTMENT OF GREEN BAND

1. Set the wave change switch to the green band position.
2. Set the test oscillator and dial indicator to 4000 K.C. and adjust the oscillator trimmer condenser #13 until the signal is tuned in.
3. Adjust the preselector trimmer condenser #3 to maximum output.
4. Check the sensitivity and calibration over scale.

ADJUSTMENT OF RED BAND

1. Set the wave-change switch to the red band position.
2. Set the test oscillator and dial indicator to 15000 KC., and adjust the oscillator trimmer condenser #12 until the signal is received. Two positions may be found at which the signal may be tuned in. Use the position with the lower capacity trimmer setting or with the alignment screw turned farther out.
3. Adjust the preselector trimmer #2 to maximum output.
4. Check the receiver over scale for calibration and sensitivity.

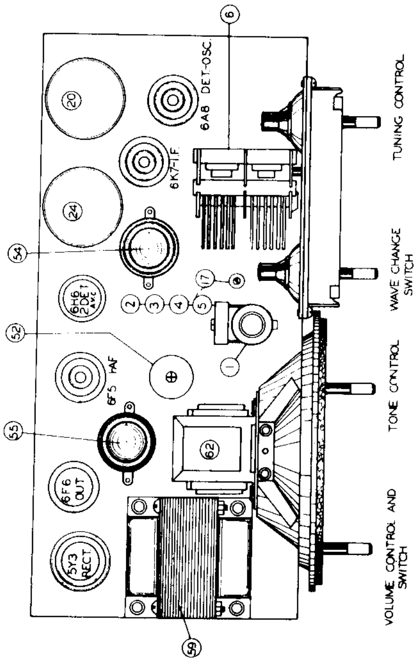


Figure No. 1

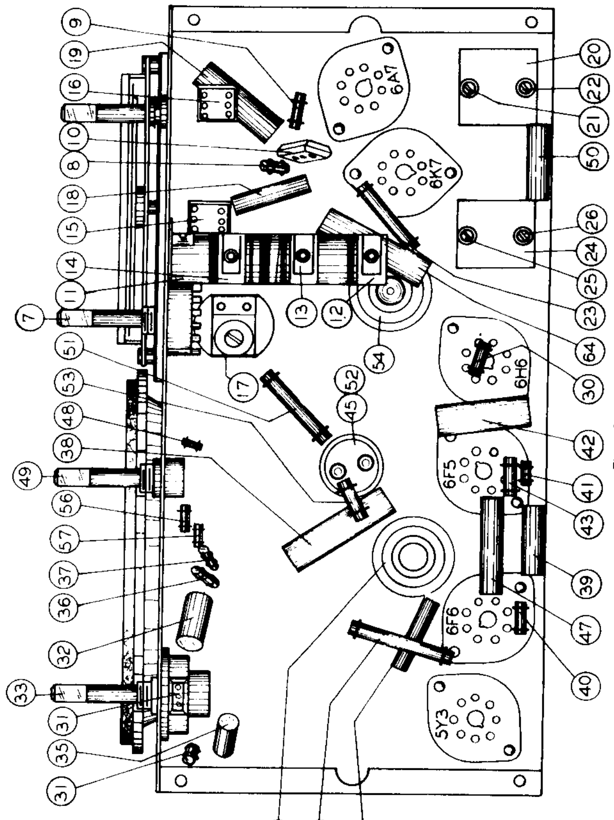


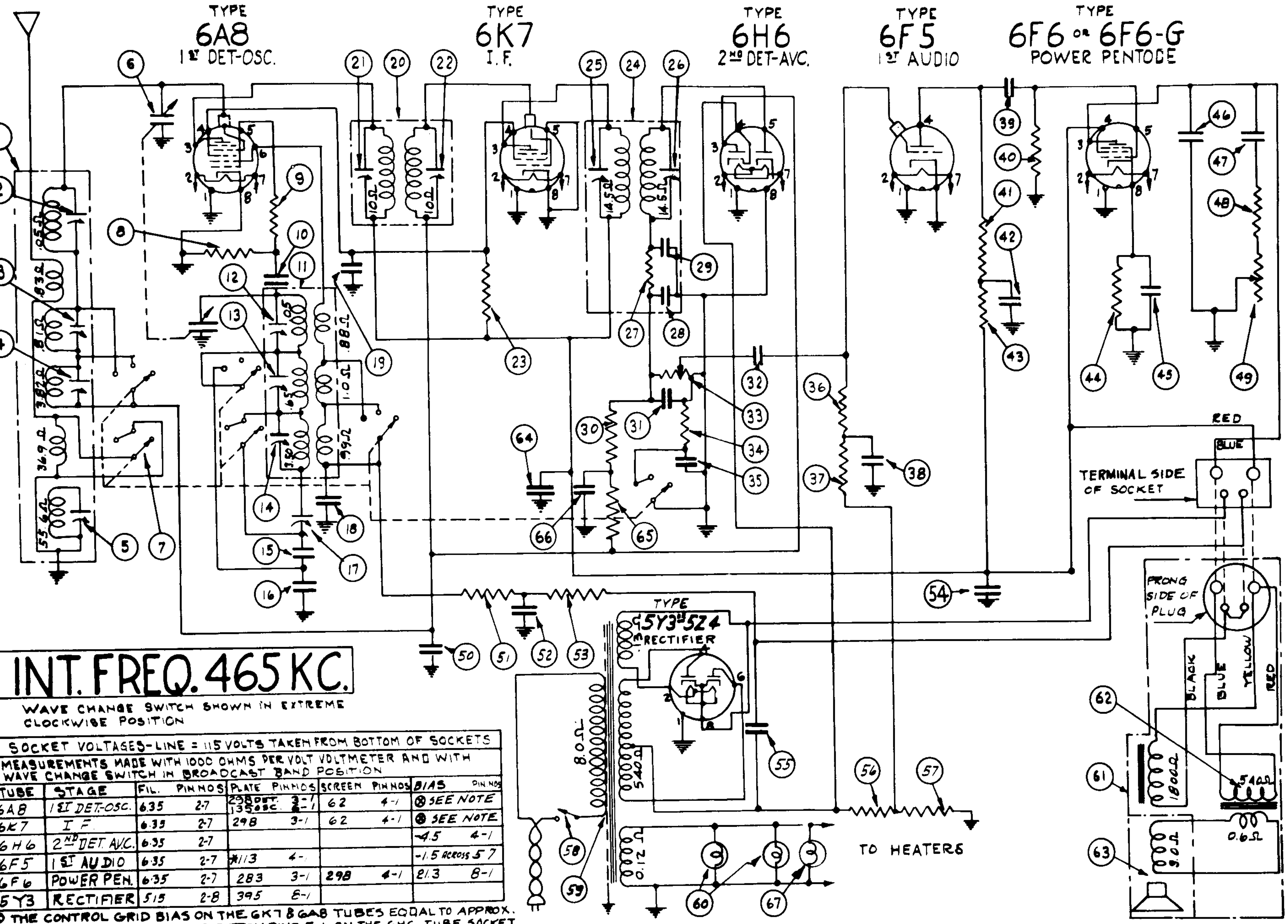
Figure No. 2

SERVICE PARTS LIST MODEL 640

These prices supersede all prevous prices and are subject to change without notice.

Dia. #	Part #	Description of Parts	List Price
1	RC 95202	Antenna coil assembly	[illegible]
2		Trimmer condenser - 4-25 mmf. - part of RC 95202	
3		Trimmer condenser - 1.5-10 mmf. - part of RC 95202	
4		Trimmer condenser - 1.5-10 mmf. - part of RC 95202	
5		Trimmer condenser - 30-30 mmf. - part of RC 95202	
6	CG 9549	Variable tuning condenser - 3-gang	[illegible]
7	SW 9548	Wave-change switch	[illegible]
8	RE 9575	50,000 ohm, 1/4 W. resistor	[illegible]
9	RE 9582	200 ohm, 1/4 W. resistor	[illegible]
10	CM 9511	.000085 mfd. mica condenser	[illegible]
11	RC 95203	Oscillator coil assembly	[illegible]
12		Trimmer condenser - 4-25 mmf. - part of RC 95203	
13		Trimmer condenser - 1.5-10 mmf. - part of RC 95203	
14		Trimmer condenser - 1.5-10 mmf. - part of RC 95203	
15	CM 9525	.0027 mfd. mica condenser	[illegible]
16	CM 9524	.0054 mfd. mica condenser	[illegible]
17	CS 9545	500-300 mmf. oscillator series condenser	.40
18	CW 4-005	.005 mfd., 400 V. condenser	.15
19	CW 2-10	.1 mfd., 200 V. condenser	[illegible]
20	IC 9572	First I.F. coil assembly - 465 KC.	[illegible]
21		Trimmer condenser - 45-135 mmf. - part of IC 9572	
22		Trimmer condenser - 45-135 mmf. - part of IC 9572	
23	SA 99777	25,000 ohm, 1 W. resistor	.20
24	IC 9574	Second I.F. coil assembly - 465 KC.	[illegible]
25		Trimmer condenser - 30-100 mmf. - part of IC 9574	
26		Trimmer condenser - 30-100 mmf. - part of IC 9574	
27		50,000 ohm, 1/8 W. resistor - part of IC 9574	
28		.0001 mfd. mica condenser - part of IC 9574	
29		.0001 mfd. mica condenser - part of IC 9574	
30	RE 9577	2 meg., 1/2 W. resistor	.15
31	CM 9519	.0005 mfd. mica condenser	.20
32	CW 4-02	.02 mfd., 400 V. condenser	.15
33	VR 9533	.5 meg. volume control	1.10
34	RE 9568	25,000 ohm, 1/4 W. resistor	[illegible]
35	CW 4-01	.01 mfd., 400 V. condenser	.15
36	RE 9574	1 meg., 1/4 W. resistor	.15
37	RE 9575	50,000 ohm, 1/4 W. resistor	.15
38	CW 2-25	.25 mfd., 200 V. condenser	.20
39	CW 4-02	.02 mfd., 400 V. condenser	.15
40	RE 9572	.5 meg., 1/4 W. resistor	.15
41	RE 9531	250,000 ohm, 1/8 W. resistor	[illegible]
42	CW 2-10	.1 mfd., 200 V. condenser	[illegible]
43	RE 9581	50,000 ohm, 1/4 W. resistor	.15
44	SA 107391	500 ohm, 1 W. resistor	.20
45	CE 9537	10 mfd., 25 V. condenser - part of CE 9537	1.25
46	CW 4-005	.005 mfd., 400 V. condenser	.15
47	CW 4-05	.05 mfd., 400 V. condenser	.15
48	RE 9550	2000 ohm, 1/4 W. resistor	.15
49	VR 9534	20,000 ohm, tone control	.55
50	CW 2-10	.1 mfd., 200 V. condenser	.15
51	SA 101722	30,000 ohm, 1 W. resistor	.20
52		4 mfd., 450 V. electrolytic condenser - part of CE 9537	
53	SA 100825	10,000 ohm, 1/2 W. resistor	.15
54	CE 9535	16 mfd., 300 V. electrolytic condenser	.75
55	CE 9536	12 mfd., 450 V. electrolytic condenser	.80
56	RE 9537	50 ohm, 1/4 W. resistor	.10
57	RE 9556	25 ohm, 1/4 W. resistor	.15
58		On-Off switch - part of VR 9533	
59	TR 9555	Power transformer - 105-125 V., 50-60 cycle	3.50

UNITED AMERICAN BOSCH CORP.
MODEL 650



INT. FREQ. 465 KC.

WAVE CHANGE SWITCH SHOWN IN EXTREME CLOCKWISE POSITION

SOCKET VOLTAGES-LINE = 115 VOLTS TAKEN FROM BOTTOM OF SOCKETS

MEASUREMENTS MADE WITH 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION

TUBE	STAGE	FIL.	PIN NOS	PLATE	PIN NOS	SCREEN	PIN NOS	BIAS	PIN NOS
6A8	1ST DET.-OSC.	6.35	2-7	298 DET. 135 OSC.	3-1 6-1	62	4-1	⊗ SEE NOTE	
6K7	I. F.	6.35	2-7	298	3-1	62	4-1	⊗ SEE NOTE	
6H6	2ND DET. AVC.	6.35	2-7					-4.5	4-1
6F5	1ST AUDIO	6.35	2-7	*113	4-1			-1.5 ACROSS	5 7
6F6	POWER PEN.	6.35	2-7	283	3-1	298	4-1	21.3	8-1
5Y3	RECTIFIER	5.15	2-8	395	8-1				

⊗ THE CONTROL GRID BIAS ON THE 6K7 & 6A8 TUBES EQUAL TO APPROX. SIX-TENTHS THE VOLTAGE FROM PINS 5-1 ON THE 6H6 TUBE SOCKET

* 600 VOLT SCALE.

UNITED AMERICAN BOSCH CORP.

MODEL 650

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ..... 1 #6A8, 1 #6K7, 1 #6H6, 1 #6F5, 1 #6F6, 1 #5Y3 - Total 6
Power Supply Characteristics .... 105-125 volts, 50-60 cycle A.C.
Power Consumption .... 62 Watts
Maximum Output .... 3.5 Watts
Maximum Undistorted Output .... 2.6 Watts
Tuning Ranges .... (White Band - 540 to 1550 KC. (Green Band - 1500 to 4500 KC. (Red Band - - 5500 to 16500 KC.
Line-Up Frequencies .... I.F. 465 KC., 1400 KC., 600 KC., 4000 KC.

GENERAL DESCRIPTION

This model is a six-tube, three-band, superheterodyne receiver whose circuits employ all-metal tubes. The circuit employs a type 6A8 tube as a combined first detector-oscillator, a type 6K7 tube as an intermediate frequency amplifier, a type 6H6 tube as a second detector and automatic volume control, a type 6F5 tube as a first audio frequency amplifier, a type 6F6 as an output amplifier, and a type 5Y3 tube as a rectifier.

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload, when the individual circuits of the receiver are brought into alignment. A conventional output meter should be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures #1 and #2 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 KC.)

1. Set volume control to maximum position, tone control to treble, wave change switch on Broadcast (White) and indicator at approximately 600 KC.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 KC., and apply signal to grid of 6K7 I.F. tube through a 0.5 mfd. blocking condenser.
4. Adjust trimmers #25 and #26 to maximum output, reducing output of test oscillator as required.
5. Apply test signal to grid of 6A8 first detector-oscillator tube and adjust trimmers #21 and #22 to maximum output.
6. Apply test signal to antenna of receiver.
7. Adjust trap coil trimmer #5 to minimum output.

ADJUSTMENT OF BROADCAST BAND (540 to 1550 KC.)

1. Set wave change switch to standard broadcast band position.
2. Set test oscillator and dial indicator to 1400 KC.
3. Apply the test signal to the antenna of the receiver through a .0002 mfd. condenser and adjust the oscillator trimmer condenser #14 until the signal is received.
4. Adjust the preselector trimmer #4 to maximum output.
5. Set the test oscillator and dial indicator to 600 KC. and adjust the oscillator series condenser #17 until the signal is received. Tune the variable condenser to a slightly lower frequency and readjust trimmer #17 to maximum output. If the sensitivity increases, continue this trial and error method in the same direction until no further improvement in sensitivity can be made. If the sensitivity decreases, try this adjustment at slightly higher frequencies.

ADJUSTMENT OF GREEN BAND

1. Set the wave change switch to the green band position.
2. Set the test oscillator and dial indicator to 4000 KC. and adjust the oscillator trimmer condenser #13 until the signal is tuned in.
3. Adjust the preselector trimmer condenser #3 to maximum output.
4. Check the sensitivity and calibration over scale.

ADJUSTMENT OF RED BAND

1. Set the wave change switch to the red band position.
2. Set the test oscillator and dial indicator to 15000 KC. and adjust the oscillator trimmer condenser #12 until the signal is received. Two positions may be found at which the signal may be tuned in. Use the position with the lower capacity trimmer setting or with the alignment screw turned farther out.
3. Adjust the preselector trimmer #2 to maximum output.
4. Check the receiver over scale for calibration and sensitivity.

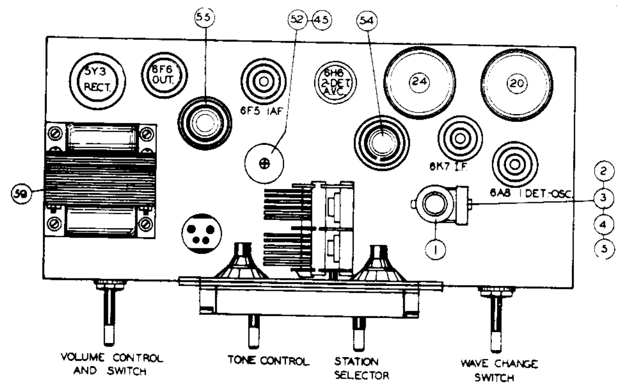


Figure No. 1

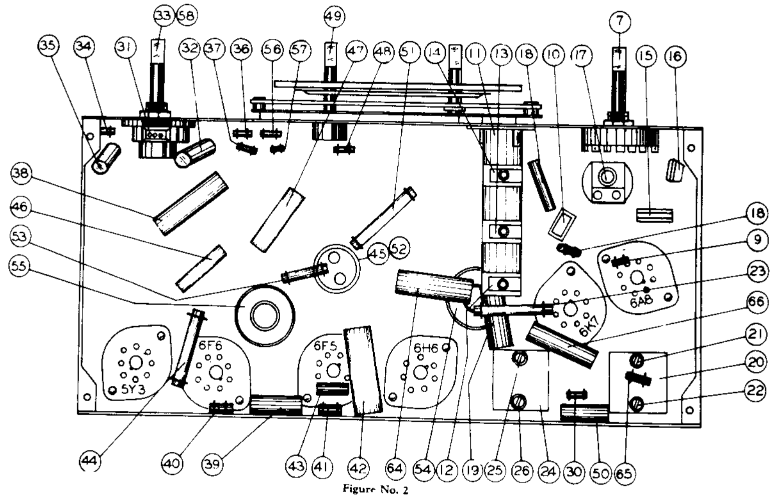


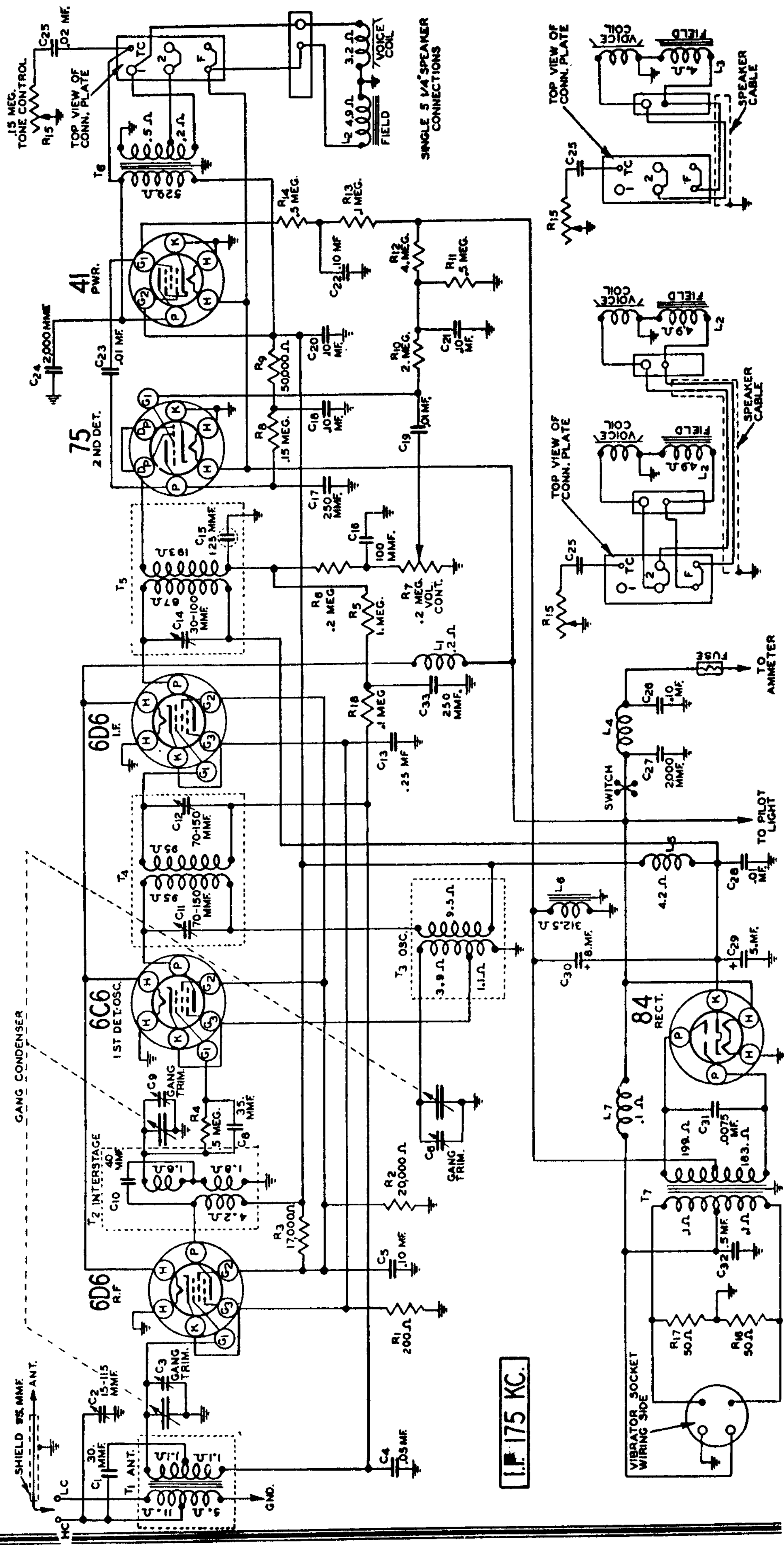
Figure No. 2

SERVICE PARTS LIST MODEL 650

These prices supersede all previous prices and are subject to change without notice.

Dia. #	Part #	Description of Parts	List Price
1	RC 95202	Antenna coil assembly	$ 2.25
2		4-25 mmf. trimmer condenser - part of RC 95202	
3		1.5-10 mmf. trimmer condenser - part of RC 95202	
4		1.5-10 mmf. trimmer condenser - part of RC 95202	
5		30-60 mmf. trimmer condenser - part of RC 95202	
6	CG 9549	Variable condenser (2 gang)	1.50
7	SW 9548	Wave change switch	1.00
8	RE 9575	50,000 ohm, 1/4 W. resistor	.15
9	RE 9582	200 ohm, 1/4 W. resistor	.15
10	CK 9511	.000065 mfd. mica condenser	.15
11	RC 95203	Oscillator coil assembly	1.75
12		4-25 mmf. trimmer condenser - part of RC 95203	
13		1.5-10 mmf. trimmer condenser - part of RC 95203	
14		1.5-10 mmf. trimmer condenser - part of RC 95203	
15	CM 9515	.0027 mfd. mica condenser	.30
16	CM 9514	.0034 mfd. mica condenser	.35
17	CS 9545	300-600 mmf. osc. series condenser	.40
18	CW 4005	.005 mfd., 400 V. condenser	.15
19	CW 2-10	.1 mfd., 200 V. condenser	.10
20	IC 9572	I.F. coil assembly (first) 465 KC.	1.35
21		45-135 mmf. trimmer condenser - part of IC 9572	
22		45-135 mmf. trimmer condenser - part of IC 9572	
23	SA 99357	40,000 ohm, 1 W. resistor	.25
24	IC 9574	I.F. coil assembly (second) 465 KC.	1.75
25		30-100 mmf. trimmer condenser - part of IC 9574	
26		30-100 mmf. trimmer condenser - part of IC 9574	
27		50,000 ohm, 1/8 W. resistor - part of IC 9574	
28		.0001 mfd. mica condenser - part of IC 9574	
29		.0001 mfd. mica condenser - part of IC 9574	
30	RE 9574	1 meg., 1/4 W. resistor	.15
31	CM 9511	.0005 mfd. mica condenser	.20
32	CW 4-02	.02 mfd., 400 V. condenser	.15
33	VR 9535	.5 meg. volume control	1.10
34	RE 9527	5,000 ohm, 1/4 W. resistor	.10
35	CW 2-05	.05 mfd., 200 V. condenser	.15
36	RE 9574	1 meg., 1/4 W. resistor	.15
37	RE 9575	50,000 ohm, 1/4 W. resistor	.15
38	CW 2-25	.25 mfd., 200 V. condenser	.20
39	CW 4-02	.02 mfd., 400 V. condenser	.15
40	RE 9572	.5 meg., 1/4 W. resistor	.15
41	RE 9531	.25 meg., 1/8 W. resistor	.10
42	CW 2-10	.1 mfd., 200 V. condenser	.15
43	RE 9581	50,000 ohm, 1/4 W. resistor	.15
44	SA 107391	500 ohm, 1 W. resistor	.20
45	CE 9537	10 mfd., 25 V. electrolytic cond.	1.25
46	CW 4-005	.005 mfd., 400 V. condenser	.15
47	CW 4-05	.05 mfd., 400 V. condenser	.15
48	RE 9550	2000 ohm, 1/4 W. resistor	.15
49	VR 9534	20,000 ohm, tone control	.55
50	CW 2-05	.05 mfd., 200 V. condenser	.15
51	RE 95116	50,000 ohm, 1 W. resistor	.20
52		4 mfd., 450 V. electrolytic cond. - part of CE 9537.	.20
53	SA 100825	10,000 ohm, 1/2 W. resistor	.15
54	CE 9535	16 mfd., 300 V. electrolytic condenser	.75
55	CE 9536	12 mfd., 450 V. electrolytic condenser	.80
56	RE 9537	50 ohm, 1/4 W. resistor	.10
57	RE 9556	25 ohm, 1/4 W. resistor	.15
58		On & Off switch - part of VR 9535	
59	TR 9557	Power transformer 105-125 V., 50-60 cycle	4.00
60	LP 951	Dial light (6-8 V., .20 amp.)	.20
61	SK 9512	Speaker assembly	10.75
62	TR 9515	Output transformer	1.85
63	DM 956	Diaphragm and voice coil assembly	1.25
64	CW 4-10	.1 mfd., 400 V. condenser	.15
65	RE 9574	1 meg., 1/4 W. resistor	.15
66	CW 2-10	.1 mfd., 200 V. condenser	.15
67	LP 9510	Dial light (6.3 V., .25 amp.)	.15
68	CB 9512	Line cable assembly	.50

WELLS GARDNER & CO.
MODEL 6C1 SERIES



CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.

SPECIFICATIONS

Power Consumption - - 7.3 Amperes at 6.3 Volts
Power Output - - - 2.4 Watts Undistorted
Sensitivity - - 0.8 Microvolts at 1 Watt Output
Selectivity - - 42 KC Broad at 1000 Times Signal
Tuning Frequency Range - - - 530 to 1581 KC
Intermediate Frequency - - - - - 175 KC
Speaker - - - - 5¼ Inch Dynamic

WELLS-GARDNER & CO.

MODEL 6L SERIES

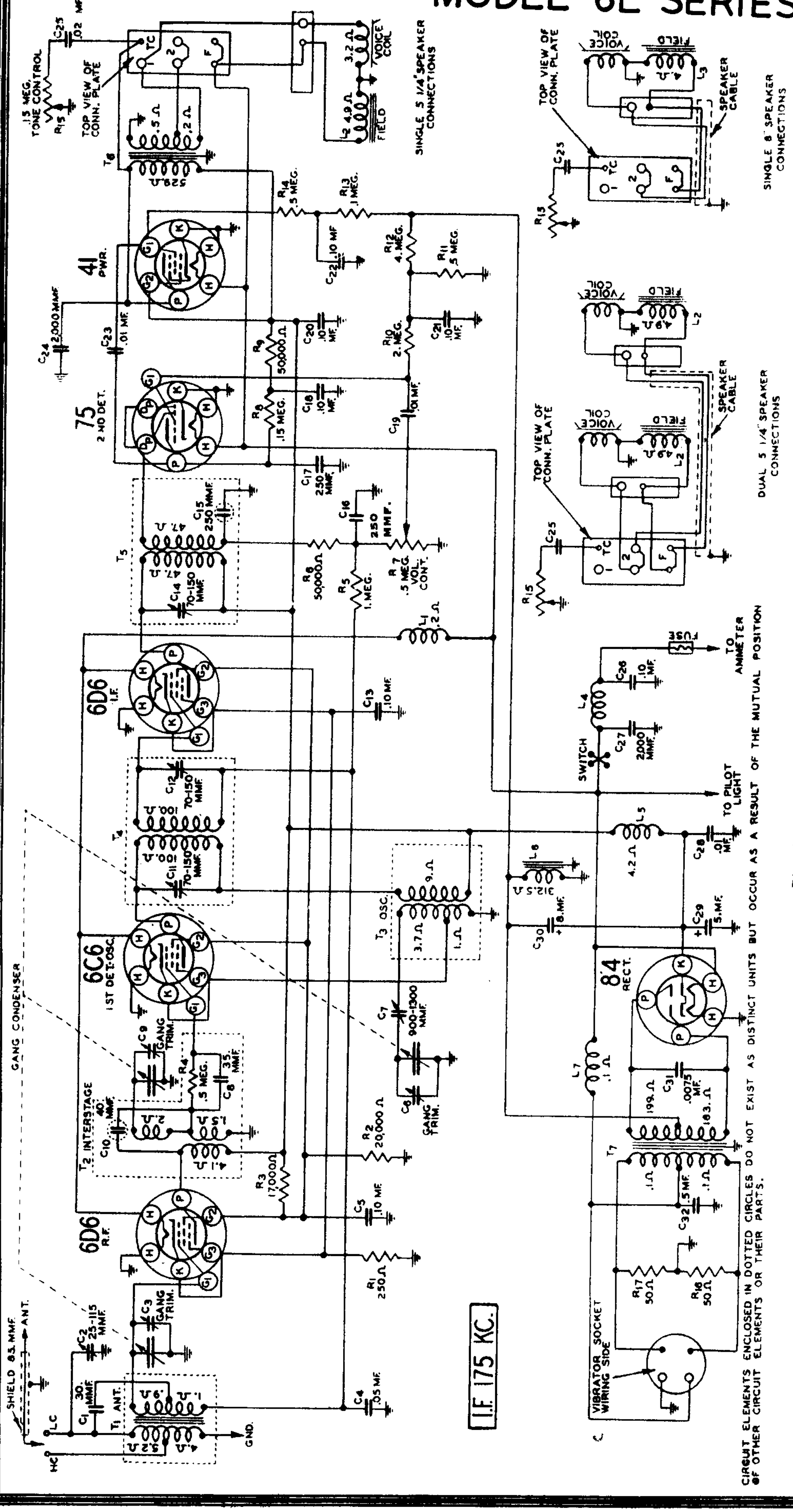


Fig. 1—Schematic Circuit Diagram

CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.

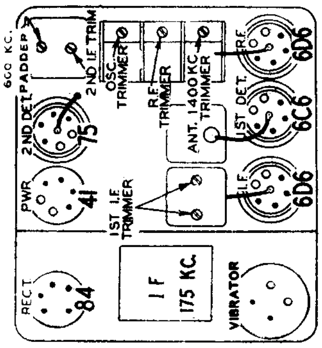


Fig. 2—Location of Tubes and Vibrator

SPECIFICATIONS

Power Consumption	7.0 Amperes at 6.0 Volts
Power Output	3 Watts Undistorted
Sensitivity	1.0 Microvolt Absolute
Selectivity	45 KC Broad at 1000 Times Signal
Tuning Frequency Range	530 to 1575 KC
Intermediate Frequency	175 KC
Speaker	5 1/4 inch Dynamic

WELLS-GARDNER & CO.
MODEL 6L SERIES

Circuit

This model is a 6 tube automobile radio covering the standard wave band. It has a tuning range as shown in the specifications above. The signal is fed through an antenna transformer with tuned secondary into a 6D6 tube which functions as an R.F. amplifier. A tapped connection is provided in the primary of the antenna transformer for installations in cars in which a high capacity antenna is used.

The output of the R.F. tube is fed through another R. F. transformer with tuned secondary into a 6C6 tube which functions as the first detector and oscillator. The oscillating circuit is tuned by the oscillator section of the gang condenser and is always resonant at a frequency 175 KC above the frequency to which the R.F. circuits are tuned.

One stage of I.F. amplification is employed using a 6D6 tube. The primary and secondary of the first I.F. transformer and the primary of the second I.F. transformer are tuned by small trimmer condensers.

A 75 dual diode-triode tube functions as a diode 2nd detector, AVC tube and a one stage audio amplifier. AVC voltage is applied to the control grid circuits of the 6D6 R.F. and I.F. tubes. The manual volume control varies the audio voltage applied to the grid of the 75 tube.

In the output stage a 41 tube is employed. A dynamic reproducer is used. Provision is made for a single roof speaker and dual speaker (chassis and roof) connections. The electrical connections for the different speaker installations are shown in the schematic. For the single 8 inch or dual 5¼ inch speakers, the tapped connection of the output transformer secondary is used.

The vibrator in the power unit interrupts the current through the primary of the power transformer. The use of a vibrating interrupter in the primary circuit and a high ratio transformer results in the application of high voltage AC to the rectifier tube plates. The 84 full wave rectifier tube, filter choke and filter condensers convert this high voltage AC into high voltage DC for the plate and screen circuits.

Alignment and Calibration

Misalignment of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the standard wave band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide accurately calibrated signals over the standard wave band and at the intermediate frequency, and an output meter are required for indicating the effect of adjustments.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the output of the signal generator through a .05 mf. condenser to the stator of the R. F. interstage section of the tuning condenser. (See Fig. 2 for location of this section.)

Connect the ground lead of the signal generator to the chassis ground.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers is shown in Fig. 2.

1575 KC Adjustment

Set the signal generator for 1575 KC.

Turn the rotor of the tuning condenser to the full open position.

If a low capacity antenna is used, connect the shielded antenna lead from the chassis through a 150 mmf. condenser to the antenna post of the signal generator. (If high capacity, use 1500 mmf.)

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 2 for location of this trimmer.

1400 KC Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the R.F. interstage and antenna 1400 KC trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Connect the output of the signal generator through a .05 mf. condenser to the control grid of the 6D6 R.F. tube.

Turn the tuning condenser rotor until maximum output is obtained. Then turn the tuning condenser rotor back and forth, at the same time adjusting the 600 KC padder (see Fig. 2) until the peak of greatest intensity is obtained.

Re-connect the output of the signal generator to the shielded antenna lead.

Adjust the 600 KC antenna trimmer to maximum. This trimmer is reached from the outside of the case see Fig. 3.

Adjusting Antenna 600 KC Trimmer

After the receiver is installed and the car antenna is connected, it will be necessary to adjust the antenna trimmer. Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained. See Fig. 3 for location of this trimmer.

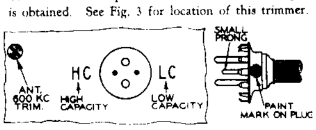


Fig. 3—Antenna Plug Insertion

Calibrating the Receiver

To calibrate the receiver, tune in a station of known frequency. At the back of the control head is the calibration screw. Remove the pilot lamp assembly. Insert a fine blade screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received. The knob must be held during this adjustment.

If the control head is inaccessible it may be calibrated by setting the pointer from the front. Remove the crystal by inserting a knife blade under the lower edge. Loosen the pointer screw, set the pointer and retighten.

General Service Data

Roof Speaker

The Ford and General Motors 1936 automobiles have provision for mounting a speaker in the car roof (Ford 5¼ inch speaker, General Motors 5¼ or 8 inch speaker). This model is so designed that roof speaker installations in those cars can readily be made.

There are three general types of speaker installation. In the first type of installation the single 5¼ inch speaker attached to the chassis cover is used. In the second type of installation a single 5¼ inch or 8 inch roof speaker is used. The third type of installation is the dual speaker mounting using two 5¼ inch speakers, one in the car roof and the other on the chassis cover. (The 8 inch and 5¼ inch speakers cannot be used together).

The electrical connections of the different speaker installations are shown in the schematic—Fig. 1. Complete information regarding the method of making the installations and the kits of parts required are in the installation manual packed with each radio.

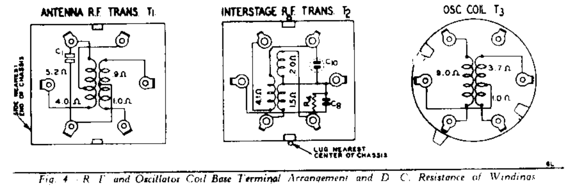


Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

Installation and Noise Suppression

The necessary information for installing this receiver and for suppression of ignition and generator noise is contained in the Installation Manual which is packed with each receiver.

Be sure that the cover is well grounded to the chassis case—clean off paint or particles of dirt which may prevent a good ground.

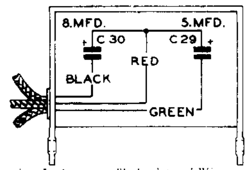


Fig. 5—Condenser Block—Internal Wiring

Voltages at Sockets

In the voltage chart are given the voltages at the sockets with all tubes in and the set in operating condition. The antenna should be disconnected.

The voltages can be read with the chassis in the case, by means of an analyzer plug.

If the chassis unit is taken out of the case all of the socket terminals can easily be reached under the chassis with test prods.

Antenna Disconnected — Battery 6 Volts Under Load

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground
6D6	R.F.	6	233	103	4.0
6C6	1st Det. & Osc.	6	233	103	
6D6	I.F.	6	233	103	4.0
75	2nd Det.	6	130		
41	Power	6	215	233	16.0(1)
84	Rectifier	6	560(2)		

(1) Grid bias read across filter choke L6
(2) Plate to Plate A.C. voltage

Replacement Parts List

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
P-3A113	Type 6D6 Tube Socket	$0.10
P-3A114	Type 6C6 Tube Socket	.10
P-3A99	Type 75 Tube Socket	.10
P-3A116	Type 41 Tube Socket	.10
P-3A128	Type 84 Tube Socket	.10
P-3A125	Vibrator Socket	.10
P-3A22	Speaker Socket (in chassis)	.20
P-3A226	Antenna Cable Socket	.10

SPEAKER

Part No.	Description	List Price
P-12A234	5¼" Dynamic Speaker	$3.05
P-13X261	Red Chassis Speaker Lead	.10
P-13X262	Green Chassis Speaker Lead	.10
P-13X263	White Tone Control Lead	.10

GENERAL

Part No.	Description	List Price
P-19A25	Vibrator Unit	$3.[illegible]
P-34X214	Chassis Case Only	3.0[illegible]
P-28X47	Spring Clamp Buttons	.[illegible]
P-34X215	Chassis Case Cover Only	1.3[illegible]
	4-32 x 3/16" Set Screws to Secure Flexible Shafts in Chassis Anchor Bushings ... Doz.	.1[illegible]
P-10A58	Tone Control Knob	.1[illegible]
P-30X14	Grid Clip Only	.1[illegible]
P-32X30	Tube Shield Base	.1[illegible]
P-32X58	Tube Shield	.1[illegible]
P-4A50	Two Lug Terminal Strip (Both lugs insulated Center mounting hole not used)	.[illegible]
P-4A61	Single Lug Terminal Strip (Mounting foot to Right of Lug)	.[illegible]
P-4A38	Single Lug Terminal Strip (Mounting foot to Left of Lug)	[illegible]

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
P-9A561	T1	Antenna Transformer and Can Assembly	$1.[illegible]
P-9A562	T2	Interstage Transformer and Can Assembly	1.[illegible]
P-9A563	T3	Oscillator Coil and Can Assembly	.9
P-9A564	T4	1st I.F. Transformer and Can Assembly	1.4[illegible]
P-9A565	T5	2nd I.F. Transformer and Can Assembly	1.60
P-51X42	T6	Output Transformer	1.10
P-51X123	T7	Power Transformer	2.95
P-9A568	L1	Filament Reactor (One Assembly)	.55
	L5	R.F. "B" Plate Reactor (One Assembly)	
P-9A566	L4	Motor Noise Reactor	.2[illegible]
P-52X42	L6	Filter Choke	.9
P-9A567	L7	Vibrator Reactor	

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
P-A94251	R1	250 Ohms	0.2	$0.15
P-B94203	R2	20,000 Ohms	0.5	.15
P-C94173	R3	17,000 Ohms	1.0	.15
P-A94504	R4	500,000 Ohms	0.2	.15
P-A95105	R5	1 Megohm	0.2	.10
P-A95503	R6	50,000 Ohms	0.2	.10
P-A95154	R8	150,000 Ohms	0.2	.10
P-A95503	R9	50,000 Ohms	0.2	.10
P-A95205	R10	2 Megohms	0.2	.10
P-A94504	R11	500,000 Ohms	0.2	.15
P-A94405	R12	4 Megohms	0.2	.15
P-A94104	R13	100,000 Ohms	0.2	.15
P-A95504	R14	500,000 Ohms	0.2	.10
P-B94500	R16	50 Ohms	0.5	.15
P-B94500	R17	50 Ohms	0.5	.15

VARIABLE

Part No.	Code	Description	List Price
P-36X216	R7	.5 Megohm Vol. Control and Switch	$0.95
P-40X207	R15	.15 Megohm Tone Control	.70

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
P-46X60	C4	.05 mf.	180	$0.15
P-46X98	C5	.10 mf.	180	.20
P-46X98	C13	.10 mf.	180	.20
P-46X105	C18	.10 mf.	500	.20
P-46X120	C19	.01 mf.	500	.15
P-46X105	C20	.10 mf.	500	.20
P-49X4	C21	.10 mf.	180	.35
	C22	.10 mf.	180	.35
P-46X120	C23	.01 mf.	500	.15
P-46X18	C25	.02 mf.	600	.15
P-46X98	C26	.10 mf.	180	.20
P-46X132	C28	.01 mf.	360	.15
P-46X177	C31	.0075 mf.	1600	.20
P-46X135	C32	.50 mf.	180	.40

ELECTROLYTIC

Part No.	Code	Capacitance	Description	List Price
P-45X210	C29	5.0 mf.	Electrolytic Block	$1.[illegible]
	C30	8.0 mf.		

MOULDED

Part No.	Code	Capacitance	List Price
P-47X66	C1	30 mmf.	$0.15
P-47X53	C8	35 mmf.	.10
P-47X52	C16	250 mmf.	.15
P-47X52	C17	250 mmf.	.15
P-47X41	C24	3000 mmf.	.20
P-47X41	C27	3000 mmf.	.20

CONDENSERS (Continued)

TRIMMER

Part No.	Code	Description	List Price
P-17A48	C2	25-115 mmf. Antenna 600 KC Trimmer	$0.20
	C3	Antenna Trimmer—Part of Gang Condenser	
	C6	Oscillator Trimmer—Part of Gang Condenser	
	C9	Interstage Trimmer—Part of Gang Condenser	
P-17A33	C11	70-150 mmf. 1st I.F. Trimmers	.40
	C12	70-150 mmf. 1st I.F. Trimmers	
P-17A46	C14	70-150 mmf. 2nd I.F. Primary Trimmer	.3[illegible]
	C7	400-1700 mmf. 600 KC Oscil. Pad. Cond.	

MISCELLANEOUS

Part No.	Code	Description	List Price
	C10	40 mmf. Integral Part of Interstage Transformer Assembly	
	C15	250 mmf. Integral Part of 2nd I.F. Transformer	
P-14A31		Three Section Gang Condenser Assembly Complete with Drive Gears	4.[illegible]

INSTALLATION ITEMS

CABLE AND FLEXIBLE SHAFT ASSEMBLIES

Part No.	Quan. Used	Description	List Price
P-18A40	1	20" Volume Control Flexible Drive Shaft	$1.10
P-18A40	1	20" Tuning Control Flexible Drive Shaft	1.10
P-18A42	1	25" Volume Control Flexible Drive Shaft	1.30
P-18A42	1	25" Tuning Control Flexible Drive Shaft	1.30
P-18A44	1	36" Volume Control Flexible Drive Shaft	1.65
P-18A44	1	36" Tuning Control Flexible Drive Shaft	1.65
P-13X252	1	Pilot Light Cable Assembly less Lamp	.65
P-13X253	1	48" Antenna Cable and Plug	.95
P-13X227	1	Battery Cable (Long Section with Fuse Receptacle)	.35
P-13X234	1	"A" Cable—Short Section Connected to Chassis (Part of Chassis Assembly)	.3[illegible]

MOUNTING BOLT ASSEMBLY

Part No.	Quan. Used	Description	List Price
P-20X5[illegible]		Double End Hexagon Bolts for Mounting Chassis to Dash	$0.1[illegible]
		5/16"-18 Spring Locknut for above Mounting	.10
P-1-X38		Flat Washers for above Mounting Assembly ... Doz.	.1[illegible]
		5/16"-18 Hexagon Nuts for above Mounting Assembly ... Doz.	.1[illegible]
		5/16" Shakeproof Lockwasher to Ground Chassis Case to Metal Dash Surface on Engine Side ... Doz.	.1[illegible]

MISCELLANEOUS MOUNTING ITEMS

Part No.	Quan. Used	Description	List Price
P-7A32	1	Pilot Light Bulb	$0.2[illegible]
P-16X14	1	20 Ampere Fuse	.10
P-16X3	1	Fuse Shield	.10
P-21A6	1	Distributor Suppressor	.35
P-48X27	1	Generator Condenser	.45
P-21A5	1	Choke-Condenser Unit (Not Shipped With Set)	1.50
P-21A7		Spark Plug Suppressor (Not Shipped With Set)	.35

CONTROL HEAD AND PLATE ASSEMBLY

Part No.	Description	List Price
*20A27	No. 4 Control Head Only with ⅜" Hex. Nut	$3.00
*20A28	Volume Control Fitting complete with Retaining Spring, ⅜" Hex. Nut and Lock Washer	.25
*	Dial Scale (Specify Name and Model Number)	.10
*15X45	Pointer	.10
	Pointer Screw 3-48 x 5/16" ... Doz.	.10
*17X13	Dial Crystal	.2[illegible]
†	Control Knobs—Specify Car, Year and Model	.25

Note: Prices of Instrument Panel Plate Kits are shown in Chart on Page 5.
* Shipped with each set.
† Shipped with Panel Kit.

ROOF SPEAKER MOUNTING KITS

1936 BUICK, CHEVROLET, PONTIAC, OLDSMOBILE

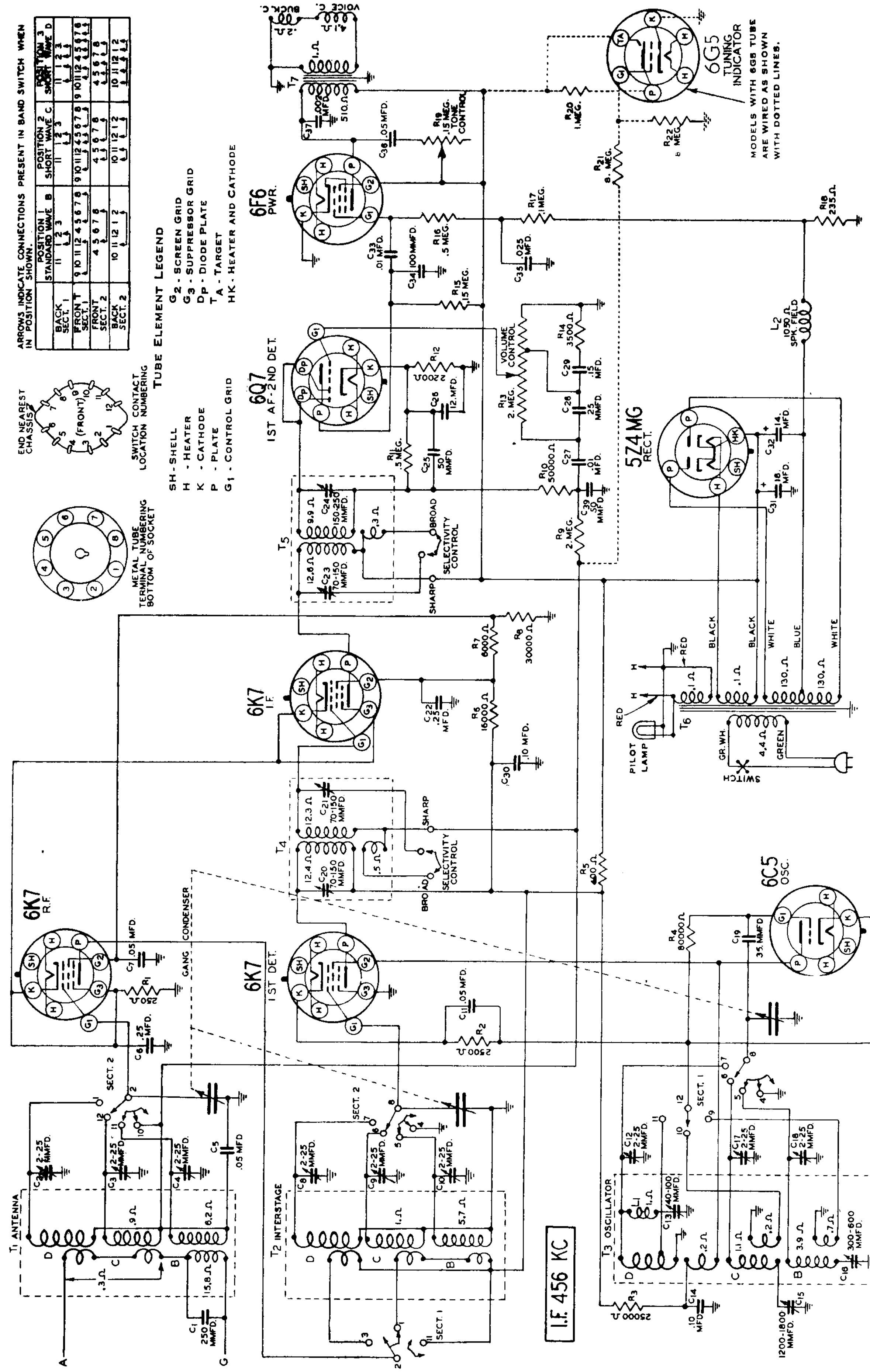
Part No.	Description	List Price
P-21A27	Speaker Kit Assembly Complete Includes	$5.35
P-12A234	5¼" Dynamic Speaker	3.05
P-23A56	Mounting Accessories Includes Trim Ring, Speaker Housing, Self Tapping Screws and Clamp Springs	2.0[illegible]
P-13X248	Speaker Cable Assembly Complete	1.05
P-21A42	Single Roof Speaker Kit less Speaker	2.30
P-9X19	Cardboard Disc—to replace Speaker removed from Chassis Cover	.10
	For Mounting Accessories and Roof Speaker Cable See Kit No. 21A27 above.	
P-21A28	Speaker Kit Assembly Complete Includes	9.05
P-12A23[illegible]	8" Dynamic Speaker	6.65
P-23A57	Mounting Accessories Includes Trim Ring and Self Tapping Screws	2.15
P-13X248	Speaker Cable Assembly Complete	1.05

1936 FORD—STANDARD AND DE LUXE

Part No.	Description	List Price
P-21A29	Speaker Kit Assembly Complete Includes	$4.15
P-12A234	5¼" Dynamic Speaker	3.05
P-23A58	Mounting Accessories — Includes Hex. Nuts, Lock Washers and Bolts	.40
P-13X248	Speaker Cable Assembly Complete	1.05
P-21A43	Single Roof Speaker Kit less Speaker	4.10
P-9X19	Cardboard Disc—to replace Speaker removed from Chassis Cover	.10
	For Mounting Accessories and Roof Speaker Cable See Kit No. 21A29 above.	

WELLS-GARDNER & CO.

MODEL 7L SERIES



NOTE: RESISTANCE VALUES NOT SHOWN ARE SMALL.

Fig. 2—Schematic Circuit Diagram

WELLS-GARDNER & CO.

MODEL 7L SERIES

SPECIFICATIONS

Power Consumption 85 Watts (At 115 volts 60 cycles)
Power Output 3 Watts Undistorted
Selectivity 28 KC Broad at 1000 times Signal (Sharp)
Intermediate Frequency 456 KC.
Speaker 8" and 10" Dynamic

Tuning Frequency Range

B Range	528 to 1730 KC.
C Range	1710 to 5800 KC.
D Range	5750 to 18300 KC.

Sensitivity

B Range	0.5 to 2 Microvolts Absolute
C Range	0.5 to 2 Microvolts Absolute
D Range	1.0 to 4 Microvolts Absolute

Circuit

This model is a three band radio with a tuning range in each band as shown in the specifications above. Three band coverage is accomplished by means of three sets of R. F. and oscillator coils and a two-section triple throw switch.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R. F. transformer assemblies and T3 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively. The band switch sections are designated as section one and section two.

The band switch completes connections to the coils in use. It also short circuits the R. F. transformer secondary and oscillator coil of lower frequency not in use.

The antenna transformer with tuned secondary feeds into a type 6K7 R. F. amplifier tube. The output of this tube is fed through the interstage R. F. transformer with tuned secondary into another 6K7 tube which functions as the 1st detector.

A separate type 6C5 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

The oscillator potential is fed into the cathode circuit of the 6K7 first detector tube. This results in the intermediate or beat frequency of 456 KC being present in the plate circuit of this tube.

Two stages of I. F. amplification are employed using 6K7 tubes. The primaries and secondaries of the first and second I. F. transformers and the primary of the 3rd I. F. transformer are tuned by small trimmer condensers.

Referring to the 1st and 2nd I. F. transformers T4 and T5 in Fig. 2, it will be noted that there is a coupling winding shown in the illustration below the primary of T4 and below the secondary of T5.

When the selectivity control is in the sharp position, the coupling windings are open circuited and the loose coupling which exists between the primary and secondary of these transformers results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary in the case of T4 is connected in series with the secondary. In the case of T5, the coupling winding which is wound under the secondary is in series with the primary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

A type 6Q7 duo-diode triode tube functions as the second detector and a one stage amplifier. The two diode plates are connected together. AVC voltage is applied through isolating resistors to the control grid circuits of the R. F. and I. F. tubes. The audio voltage developed across volume control resistor R13 is applied through the movable arm to the control grid of the 6Q7 tube.

Across the volume control resistor R13 is a filter composed of condensers C28 and C29 and resistor R14. A tap connection near the low potential end of the volume control is connected between the two condensers. At high volume settings, the filter is not effective. At the low volume settings, as the pointer approaches the tap, the higher frequencies are bypassed through condenser C29. Very high frequencies are transmitted through condenser C28 to compensate for the reduction of these frequencies. At low volume settings the low frequency amplitudes are increased as a result.

Resistance coupling is used between the first audio stage and the output stage which employs a type 6F6 output pentode tube. A type 5Z4MG (metal glass tube) full wave rectifier is used in the power unit.

The models with the tuning indicator tube are wired as shown in the schematic. This tube contains a triode and cathode ray section in one envelope.

The cathode ray is produced by the attraction of electrons from the upper end of the cathode to the coated target or anode, which is operated at a high positive potential. When this electron stream strikes the target the coating glows. The electron stream is controlled by an additional element, or control electrode, in the tube.

As a signal is tuned in, the control grid of the triode section of the 6E5 cathode ray tube becomes increasingly negative, the negative bias voltage being taken from the AVC line. The AVC voltage is reduced to a suitable value by the potentiometer arrangement of the 10 and 1.5 megohm resistors. The increased bias voltage reduces the triode plate current. This reduces the voltage drop across the 1 megohm plate resistor and raises the triode plate voltage. The triode plate is connected to the control electrode of the cathode ray section of the tube.

The shape and size of the area on the target struck by the cathode ray is governed by the voltage of the control electrode. When the signal is tuned to resonance, practically no plate current flows and the voltage of the control electrode is the same as that of the target. There is no opposition to the flow of electrons to the target. Tuning off resonance decreases the control electrode voltage and causes the darkened sector of the target to widen, because of the opposition to the flow of electrons in the direction of the control electrode.

Alignment and Calibration

Correct alignment is extremely important in connection with all wave radios. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 1800, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and *all* subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C18) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C10) and antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 600 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band).

Adjust the oscillator Range C trimmer (C17) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C9) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 1800 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band).

Adjust the oscillator Range D trimmer (C12) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C8) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

WELLS-GARDNER & CO.

MODEL 7L SERIES

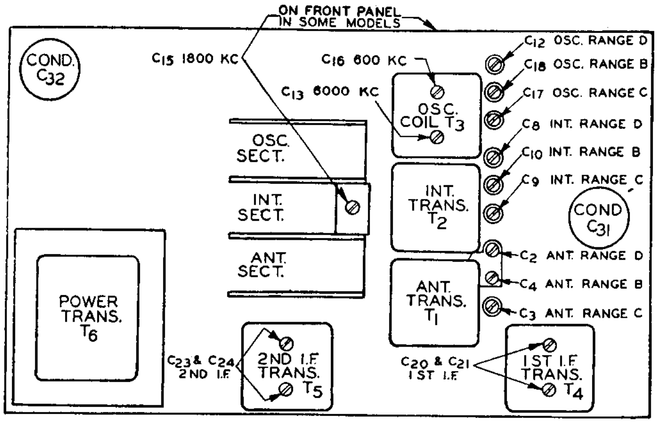


Fig. 3—Location of Trimmers

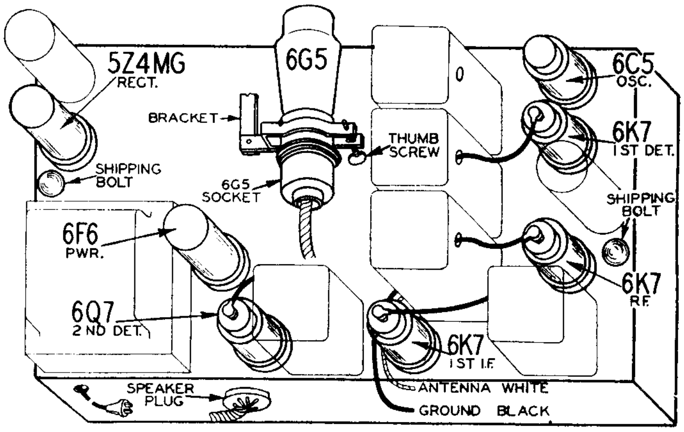


Fig. 6—Location of Tubes

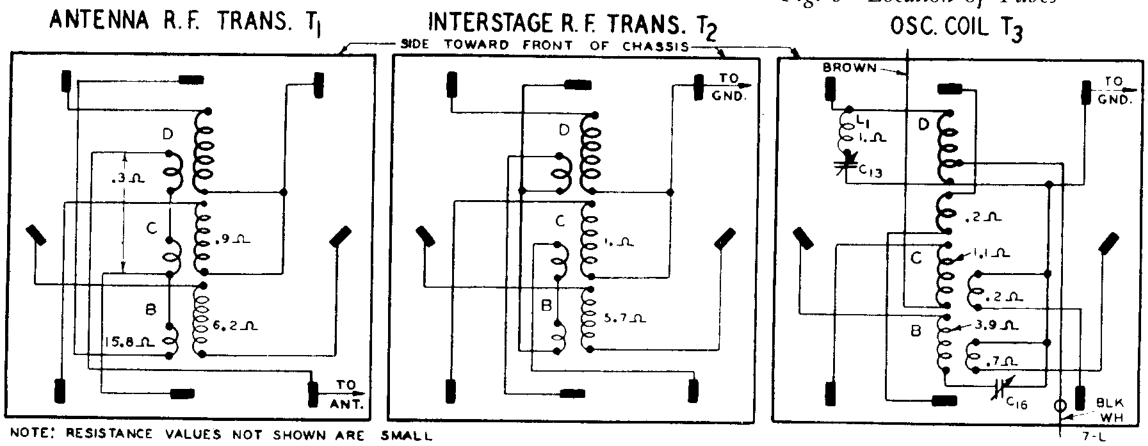


Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

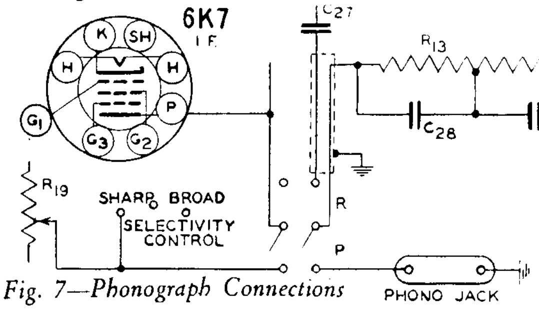


Fig. 7—Phonograph Connections

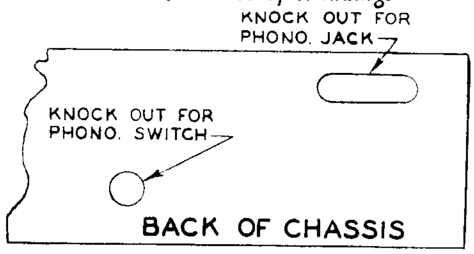


Fig. 8—Location of Phono Knockouts

Line Voltage: 115
Volume Control: Maximum

See page 1444 for location of prongs.

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	RF	0	6.1(1)	260	100	4.0	....	6.1(1)	4.0
6K7	1st Det.	0	6.1(1)	260	118	0	....	6.1(1)	9.0
6C5	Osc.	0	6.1(1)	120	...	0	....	6.1(1)	0
6K7	I F.	0	6.1(1)	260	138	4.0	....	6.1(1)	4.0
6Q7	1st A.F.—2nd Det.	0	6.1(1)	105	0	0	....	6.1(1)	1.4
6F6	Power Amp.	0	6.1(1)	238	260	18	....	6.1(1)	0
5Z4MG	Rect.	0	4.9(2)	...	680(3)	...	680(3)	....	4.9(2)

TUBE	FUNCTION	Plate to Ground	Target to Ground	Cathode to Ground	Across Heater
6E5	Tuning Indicator	30(4)	270	0	6.1 A.C.

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) A.C. voltage as read across heater terminals 2 and 8.
(3) A.C. voltage as read across terminals 4 and 6.
(4) As read with 500,000 ohm meter.

WELLS-GARDNER & CO.
MODEL 7L SERIES

General Service Data

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Voltage Chart

The voltage readings are taken with a voltmeter having a resistance of 1000 ohms per volt.

The standard metal tube socket terminal numbering system (bottom of socket) is shown in Fig. 5. On the schematic circuit diagram, Fig. 2 is a list giving the complete names of the tube elements and the corresponding symbols as used on the sockets on the schematic.

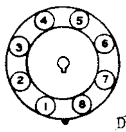


Fig. 5—Metal tube terminal numbering (bottom of socket)

DRIVE ASSEMBLY

This model uses a two-speed planetary drive. All of the early sets are equipped with a flat belt and may be identified by the $\frac{1}{4}$ inch wide belt. The later sets use the same type of drive, but have a black cord belt. This is a bronze cable with a black fabric covering. It is about 1/16 inch in diameter.

The planetary assembly is the unit that is integral with the tuning shaft. It is at the bottom of the belt. If the nut of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect. If the nut is too loose, the drive will slip in slow speed. The remedy in this case is, of course, to tighten up the nut.

Should the drive belt slip when the planetary pulley is turning, first inspect the drive drum assembly. This is the assembly which is mounted on the tuning condenser shaft. If this assembly and the tuning condenser rotor turn satisfactorily, the belt is probably too loose and a new one will be required. In the sets with the flat belt type of drive, there is an idler pulley which can be positioned, and by means of which the belt tension can be increased. In this type, therefore, the belt tension should be increased before attempting to put on a new one.

The replacement parts list shows the parts used in each type of drive and the parts common to both types.

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 2. In contact locations not used, the number applying to that particular location is not employed.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch —See Fig 8.

The phono switch must be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. Unsolder the .01 mf. condenser C27 from the volume control.

Strip about 2¾ inches of the shielding from each end of the cable furnished with the phono attachment parts. Connect one lead of the cable to the terminal on the volume control from which condenser C27 was removed. The other end of this lead is connected to the phono switch as shown in Fig. 7. The second cable lead is connected to the open end of condenser C27. Then connect the other end of this lead to the phono switch as shown in Fig. 7. Both of the shielded cable leads connected to the phono switch are connected to the switch terminals nearest the chassis base. Before connecting the cable leads to the phono switch, it will be necessary to slip a piece of varnished tubing over the portion of the cable that passes near the 6K7 1st I.F. tube socket.

Now ground the shielding by soldering it to the lugs on the chassis base. One of these lugs is located just below the planetary drive; the other is near the rear mounting foot of the gang condenser.

Complete the other connections as illustrated in Fig. 7. The lead between the tone control and the .05 mf. tubular condenser C36 mounted on the back of the chassis base, should be covered with a piece of varnished tubing.

The tin plate shield is soldered to the tone control mounting bracket in such a way that when it is bent down toward the bottom and back of the chassis it will shield the lower leads of the phono switch and the lead between the tone control and tubular condenser C36.

After making the phono connections, the I.F. stages should be realigned.

Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
P-3A211	6K7 Tube Socket	$0.15
P-3A210	6F6 Tube Socket	.15
P-3A220	6Q7 Tube Socket	.15
P-3A221	6C5 Tube Socket	.15
P-3A222	5Z4 Tube Socket	.15
P-3A58	5 Prong Speaker Socket	.10
P-13X255	Tuning Indicator Tube Socket and Cable Assembly	.65

Replacement Parts List (Continued)

SPEAKERS

P-12A211	8" Dynamic Speaker Complete with Output Transformer (T7)	5.95
P-12A221	10" Dynamic Speaker Complete with Output Transformer (T7)	6.45

KNOBS

Specify Name of Knob and Model of Receiver	Tone Control—Small Push-on Type	.15
	Volume Control—Small Push-on Type	.15
	Station Selector—Large Push-on Type	.20
	Band Selector—Large Push-on Type	.20

GENERAL

P-2X38	Felt Washers (Used behind Knobs)	.10
P-8X23	Rubber Chassis Mounting Cushions	.10
P-4A50	Two Lug Terminal Strip (Both lugs insulated—Mounting hole in center)	.10
P-4A49	Single Lug Terminal Strip (Mounting hole used)	.10
P-17X15	Glass Dial Crystal	.35
P-28X58	Crystal Retaining Ring	.15
P-2A52	2 Section, 3 Position, Band Change Switch	1.55
P-30X44	Grid Clip Only	.10
P-13X80	Line Cord and Plug	.50
P-13X214	Antenna and Ground Lead Assembly	.30

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
P-9A556	T1	Antenna Trans. and Can Assembly	$1.90
P-9A557	T2	R.F. Interstage Trans. and Can Assembly	1.85
P-9A558	T3	Oscillator Coil and Can Assembly	2.85
P-9A559	T4	1st I. F. Trans. and Can Assembly	1.60
P-9A560	T5	2nd I. F. Trans. and Can Assembly	1.65
P-53X119	T6	115 volt, 60 cycle Standard Power Transformer	3.65
P-53X110	T6	115 volt, 25 cycle Standard Power Transformer	6.10
P-53X111	T6	115-230 volt, 40-60 cycle Power Transformer	4.80
P-53X122	T6	230 volt, 50 cycle Special Transformer	4.45

DIAL AND DRIVE ASSEMBLY

DIAL ASSEMBLY

Part No.	Description	List Price
P-15A65	Dial Assembly Complete less Pilot Lamps, Pilot Lamp Sockets and Clips, Large Station and Micrometer Pointer	$3.85
P-15X59	Large Station Pointer	.25
P-15X60	Micrometer Pointer	.10
P-15X57	Small Volume or Tone Control Pointer ea.	.10
	Dial Glass only—Specify Name and Model of Radio	1.45
P-9X16	Dial Cardboard	.10
P-41X12	Pilot Light Reflectors ea.	.10
P-7A32	Pilot Light Bulb (6-8V)	.20
P-7A37	Pilot Lamp Socket and Clip ea.	.10

DRIVE ASSEMBLY

Part No.	Description	List Price
Belt Drive—May be identified by flat belt about ¼" wide		
P-24X226	Drive Drum Assembly Complete with Gears, Micrometer and Main Pointer Shaft (Mounted on Tuning Condenser Shaft)	$1.05
P-5A34A	Planetary Drive Complete with Hex Nut and Lockwasher (Tuning Shaft Assembly mounted at front of chassis base)	1.00
P-8X46	Drive Belt	.20
P-24X230	Belt Tension Idler Pulley	.10
P-20X106	Belt Tension Idler Pulley Stud, Hex Nut and Washers	.10
P-25X269A	Drive Assembly Bracket only (mounted on gang condenser)	.60
Cord Drive—May be identified by round black cord.		
P-24X239	Drive Drum Assembly Complete with Gears, Micrometer and Main Pointer Shaft (Mounted on Tuning Condenser Shaft)	$1.05
P-5A34C	Planetary Drive Complete with Hex Nut and Lockwasher (Tuning Shaft Assembly mounted at front of chassis base)	1.00
P-10X14	Black Tuning Drive Cord—Complete	.20
P-28X69	Tuning Drive Cord Tension Spring	.10
P-25X269U	Drive Assembly Bracket only (mounted on gang condenser)	.60
Parts common to both drives.		
P-28X83	Stationary Gear Spreader Spring	.10
P-28X84	Rotary Gear Spreader Spring	.10
	8" Black Drive Cord for Small Pointers doz.	.20
P-29X20	Brass Collars with Set Screws for securing above Cord to Shaft ea.	.10
P-28X44	Tension Spring for above Cords ea.	.10

CONDENSERS

Part No.	Code	Capacity	Voltage	List Price
MOLDED				
P-47X59	C1	250 mmf.		.15
P-47X53	C19	35 mmf.		.10
P-47X56	C25	50 mmf.		.10
P-47X71	C28	25 mmf.		.15
P-47X57	C34	100 mmf.		.10
P-47X56	C39	50 mmf.		.10
TUBULAR				
P-46X80	C5	.05 mf.	180	$0.15
P-46X117	C6	.25 mf.	180	.25
P-46X103	C7	.05 mf.	240	.15
P-46X80	C11	.05 mf.	180	.15
P-46X105	C14	.10 mf.	360	.20
P-46X104	C22	.25 mf.	240	.25
P-46X179	C27	.01 mf.	360	.15
P-46X178	C29	.15 mf.	180	.20
P-46X105	C30	.10 mf.	360	.20
P-46X120	C33	.01 mf.	360	.15
P-46X173	C35	.025 mf.	180	.15
P-46X108	C36	.05 mf.	600	.20
P-46X100	C37	.002 mf.	600	.15

ELECTROLYTIC

P-45X209	C26	12.0 mf.	25	Dry	.65
P-44X11	C31	18.0 mf.	300	Wet	1.10
P-44X10	C32	14.0 mf.	400	Wet	1.25

TRIMMER

P-17A45 Trimmer Strip	C2	2-25 mmf.	Range D Antenna Trimmer (15000 KC Adjustment)	.95
	C3	2-25 mmf.	Range C Antenna Trimmer (5000 KC Adjustment)	
	C4	2-25 mmf.	Range B Antenna Trimmer (1500 KC Adjustment)	
	C8	2-25 mmf.	Range D Interstage Trimmer (15000 KC Adjustment)	
	C9	2-25 mmf.	Range C Interstage Trimmer (5000 KC Adjustment)	
	C10	2-25 mmf.	Range B Interstage Trimmer (1500 KC Adjustment)	
	C12	2-25 mmf.	Range D Oscillator Trimmer (18300 KC Adjustment)	
	C17	2-25 mmf.	Range C Oscillator Trimmer (5800 KC Adjustment)	
	C18	2-25 mmf.	Range B Oscillator Trimmer (1730 KC Adjustment)	

See Part Number 17A36 for replacement of any one section.

Part No.	Code	Capacity	Voltage	List Price
P-17A35	C13	40-100 mmf.	6000 KC Oscillator Padding Cond.	.45
	C16	300-600 mmf.	600 KC Oscillator Padding Cond.	
P-17A47	C15	1200-1600 mmf.	1800 KC Oscillator Padding Cond.	.45
P-17A33	C20 C21	70-150 mmf. 70-150 mmf.	1st I.F. Trimmer Condensers	.40
P-17A34	C23 C24	70-150 mmf. 50-250 mmf.	2nd I.F. Trimmer Condensers	.40

MISCELLANEOUS

P-17A36	2-25 mmf.	(To be used for replacement of any one section of Trimmer Strip P-17A45)	.10
P-14A52	3 Gang	Condenser Less Drive Gears and Dial Assembly	4.25

RESISTORS

CARBON

Part. No.	Code	Capacity	Wattage		List Price
P-A94251	R1	250 Ohms	0.2		$0.15
P-A94252	R2	2,500 Ohms	0.2		.15
P-C94253	R3	25,000 Ohms	1.0		.15
P-A94803	R4	80,000 Ohms	0.2		.15
P-A95401	R5	400 Ohms	0.2		.10
P-D93163	R6	16,000 Ohms	2.0		.45
P-B94602	R7	6,000 Ohms	0.5		.15
P-B94303	R8	30,000 Ohms	0.5		.15
P-A95205	R9	2.0 Megohms	0.2		.10
P-A95503	R10	50,000 Ohms	0.2		$0.10
P-A94504	R11	500,000 Ohms	0.2		.15
P-A94222	R12	2,200 Ohms	0.2		.15
P-A94352	R14	3,500 Ohms	0.2		.15
P-A95154	R15	150,000 Ohms	0.2		.10
P-A95504	R16	500,000 Ohms	0.2		.10
P-A94104	R17	100,000 Ohms	0.2		.15
P-A95105	R20	1.0 Megohms	0.2		.10
P-A95106	R21	10.0 Megohms	0.2	Used with 6E5 tube only	.10
P-A95405	R22	4.0 Megohms	0.2	Used with 6E5 tube only	.10
P-A95805	R21	8.0 Megohms	.02	Used with 6G5 tube only	.10
P-A95805	R22	8.0 Megohms	.02	Used with 6G5 tube only	.10

WIRE WOUND

P-43X42	R18	235 Ohms	2.0	.25

VARIABLE

P-36X215	R13	2.0 Megohms	Tapped Volume Control and Switch	1.05
P-40X211	R19	0.15 Megohm	Tone Control and Selectivity Switch	1.10

PHONO ATTACHMENT PARTS

Part No.	Description	List Price
P-2A31	Phono Switch (Double Pole Double Throw Switch)	$0.60
P-3A12	Phono Jack	.10
P-10A36	Switch Knob	.20
P-32X77	Shield Plate 2" x 1½" x .015"	.10
	11½" of No. 748 G Shielded Cable	.10
	3" No. 6 Varnished Tubing	.10
	2" No. 2 Varnished Tubing	.10

Prices Subject to Change Without Notice

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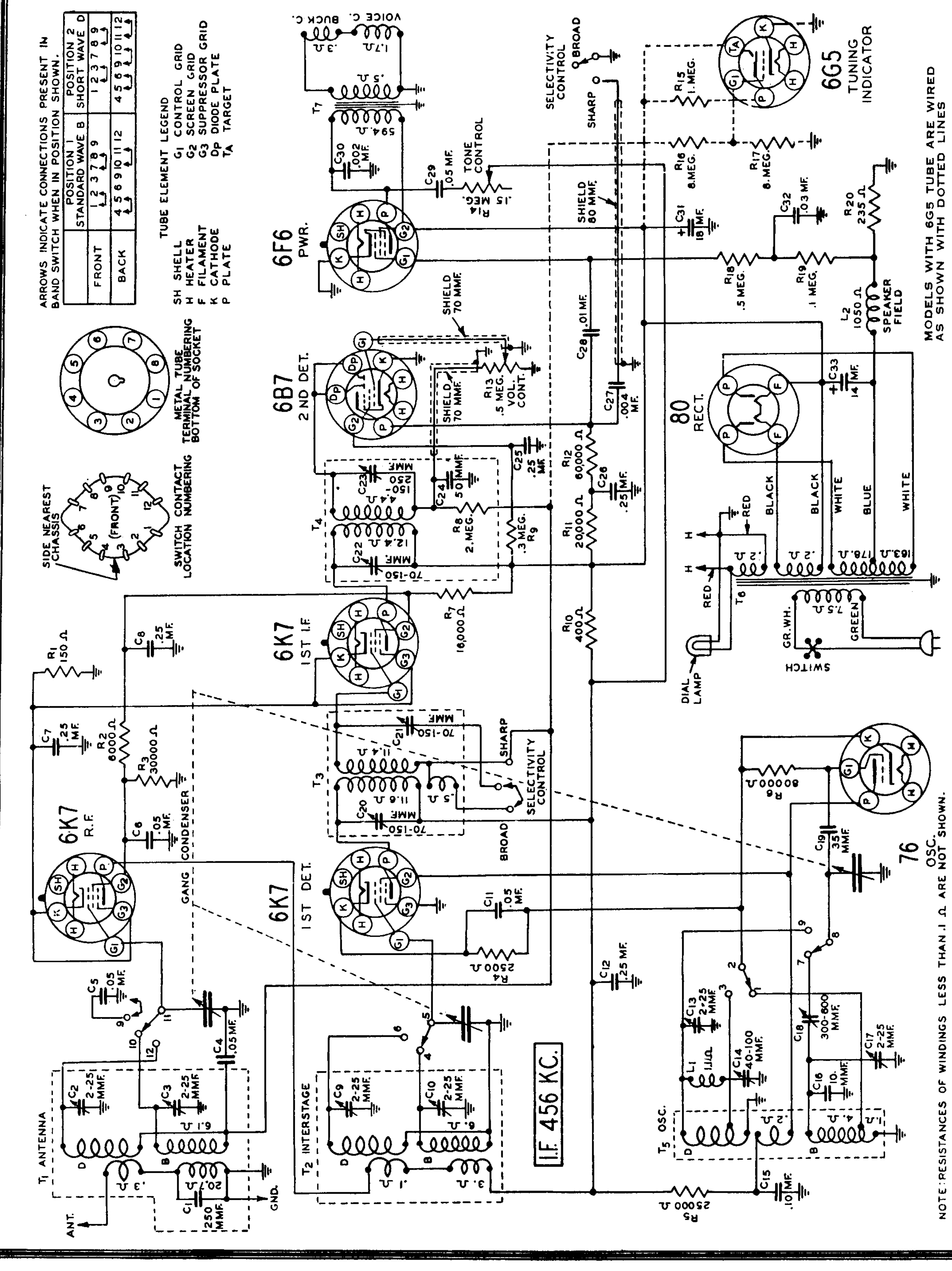

Fig. 2—Schematic Circuit Diagram

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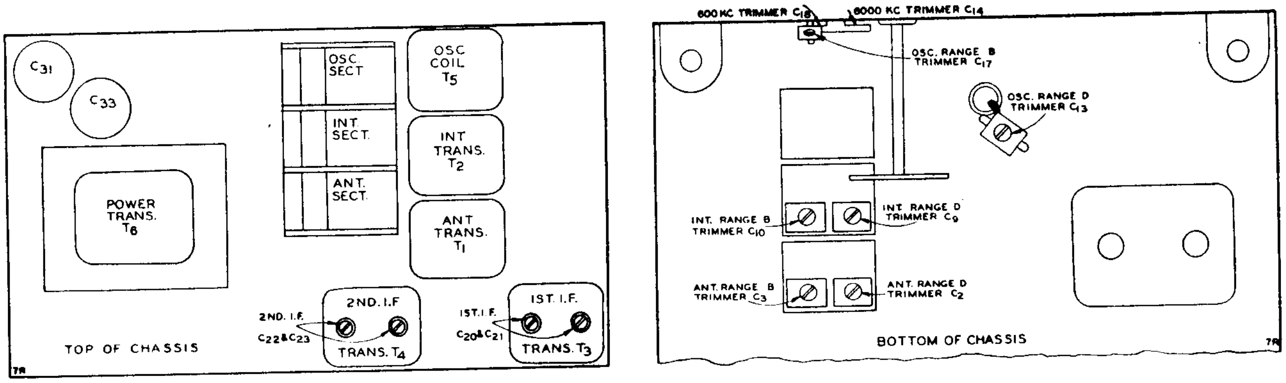


Fig. 3—Location of Trimmers

Alignment and Calibration

Alignment Procedure

Correct alignment is extremely important in connection with standard and short wave radios. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator which will provide an accurately calibrated signal at 456, 1730, 1500, 600, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the radio if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C17) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C10) and antenna Range B trimmer (C3) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (short wave band).

Adjust the oscillator Range D trimmer (C13) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage and antenna Range D trimmers it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator short wave trimmer, the 15,000 KC adjustment must be repeated.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

General Service Data

Twenty-five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

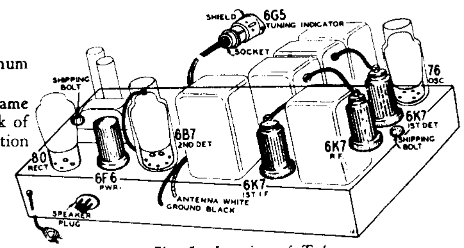


Fig. 5—Location of Tubes

A 115-230 volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 2. In contact locations not used, the number applying to that particular location is not employed.

Voltage Chart

The voltage readings are taken with a voltmeter having a resistance of 1000 ohms per volt.

The standard metal tube socket terminal numbering system (bottom of socket) is shown in Fig. 2. On the schematic circuit diagram, Fig. 2, is a list giving the complete names of the tube elements and the corresponding symbols as used on the sockets on the schematic.

VOLTAGES AT SOCKETS

Line Voltage: 115 — Antenna Shorted to Ground
Volume Control: Maximum — Band Switch: Standard Wave

Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Cathode to Ground
6K7	R.F.	6.2	245	105	2.8
6K7	1st Det.	6.2	245	105	9.0
76	Osc.	6.2	105		
6K7	1st I.F.	6.2	250	130	2.8
6B7	2nd Det.	6.2	50	35	
6F6	Output	6.2	230	250	17(1)
80	Rectifier	5.0			
				Target to Ground	
6G5	Tuning Eye	6.2	25	250	

(1) As read across resistor, R20.

WELLS-GARDNER & CO.

MODEL 7RL SERIES

SPECIFICATIONS

Power Consumption - 71 Watts (At 115 volts 60 cycles)
Power Output - - - - - - 3 Watts Undistorted
Selectivity - 28 KC Broad at 1000 times Signal (Sharp)
Intermediate Frequency - - - - - - - 456 KC.
Speaker - - - - - - - - - - - 8" Dynamic

Tuning Frequency Range
B Range .... 535 to 1730 KC.
D Range .... 5.75 to 18.3 MC.

Sensitivity
B Range Average .... .5 Microvolts Absolute
D Range Average .... 2.0 Microvolts Absolute

Circuit

This model is a two band radio with a tuning range in each band as shown in the specifications above. Two band coverage is accomplished by means of two sets of R.F. and oscillator coils and a single section double throw switch.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R.F. transformer assemblies and T5 is the oscillator coil assembly. The standard wave and short wave coils are indicated by the letters B and D respectively.

The band switch completes connections to the coils in use. When the switch is in the Range B position, the antenna, interstage and oscillator Range D secondaries are open circuited. In the Range D position, the interstage and oscillator secondaries not in use are open circuited while the antenna Range B secondary is short circuited through condenser C5 to ground.

The antenna transformer with tuned secondary feeds into a type 6K7 R.F. amplifier tube. The output of this tube is fed through the interstage R.F. transformer with tuned secondary into another 6K7 tube which functions as the 1st detector.

A separate type 76 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

One stage of I.F. amplification is employed using a 6K7 tube. The primaries and secondaries of the 1st and 2nd I.F. transformers are tuned by small trimmer condensers.

Referring to the 1st I.F. transformer T3 in Fig. 2, it will be noted that there is a coupling winding shown below the primary.

When the selectivity control is in the sharp position, the coupling winding is open circuited and the loose coupling which exists between the primary and secondary of this transformer results in high selectivity; also, the plate of the audio section of the 6B7 tube is bypassed by condenser C27.

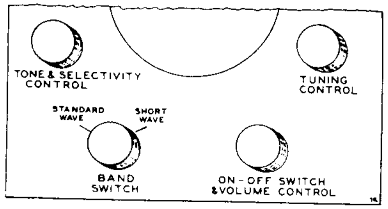


Fig. 1—Arrangement of Controls

When the selectivity control is in the broad position, the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained. Condenser C27 is open circuited in this position to avoid bypassing the higher audio frequencies.

A type 6B7 duo diode pentode tube functions as the second detector and a one stage audio amplifier. The two diode plates are connected together. AVC voltage is applied through isolating resistors to the control grid circuits of the R.F. and I.F. tubes. The audio voltage developed across volume control resistor R13 is applied through the movable arm to the control grid of the 6B7 tube. Resistance coupling is used between the first audio stage and the output stage which employs a type 6F6 output pentode tube. A type 80 full wave rectifier tube is used in the power unit.

The models with the tuning indicator tube are wired as shown in the schematic. This tube contains a triode and cathode ray section in one envelope.

The cathode ray is produced by the attraction of electrons from the upper end of the cathode to the coated target or anode which is operated at a high positive potential. When this electron stream strikes the target, the coating glows. The electron stream is controlled by an additional element, or control electrode, in the tube.

As a signal is tuned in, the control grid of the triode section of the 6G5 cathode ray tube becomes increasingly negative, the negative bias voltage being taken from the AVC line. The AVC voltage is reduced to a suitable value by the voltage divider arrangement of the 8 megohm resistors. The increased bias voltage reduces the triode plate current. This reduces the voltage drop across the 1 megohm plate resistor and raises the triode plate voltage. The triode plate is connected to the control electrode of the cathode ray section of the tube.

The shape and size of the area on the target struck by the cathode ray is governed by the voltage of the control electrode. When the signal is tuned to resonance, practically no plate current flows and the voltage of the control electrode is the same as that of the target. There is no opposition to the flow of electrons to the target. Tuning off resonance decreases the control electrode voltage and causes the darkened sector of the target to widen, because of the opposition to the flow of electrons in the direction of the control electrode.

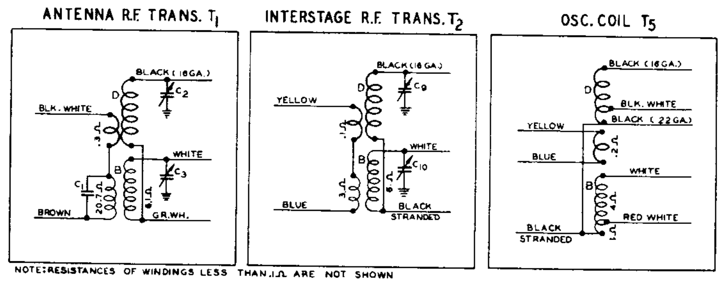


Fig. 4—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
P-3A126	76 Tube Socket	$0.10
P-3A211	6K7 Tube Socket	.15
P-3A120	6B7 Tube Socket	.15
P-3A210	6F6 Tube Socket	.15
P-3A129	80 Tube Socket	.10
P-3A58	Speaker Socket	.10
P-13X?55	Tuning Indicator Tube Socket and Cable Assembly (Used on models with tuning eye)	.65

SPEAKER

Part No.	Description	List Price
P-12A211	8" Dynamic Speaker Complete with Output Trans. (T7)	5.95

KNOBS

Part No.	Description	List Price
Specify Name of knob and Model of Radio	Tuning Control Knob	.20
	Band Switch Knob	.20
	Volume Control Knob	.20
	Tone Control Knob	.20

GENERAL

Part No.	Description		List Price
P-2X38	Felt Washers (Used behind knobs)	doz.	.10
P-4A38	Single Lug Terminal Strip		.10
P-4A50	Two Lug Terminal Strip		.10
P-4A41	Four Lug Terminal Strip		.10
P-2A63	1 Section, 2 Position, Band Change Switch		.95
P-30X14	Grid Clip Only (Glass Tube)	doz.	.10
P-30X44	Grid Clip Only (Metal Tube)	doz.	.10
P-13X80	Line Cord and Plug		.50
P-13X214	Antenna and Ground Lead Assembly		.30
P-32X69	Tube Shield (Used on models with tuning eye)		.15
P-32X70	Tube Shield Base (Used on models with tuning eye)		.10
P-32X30	Tube Shield Bases	ea.	.10
P-32X32	Tube Shields	ea.	.15
P-8X27	Rubber Cushions for Gang Condensers	ea.	.10
P-8X23	Rubber Chassis Mounting Cushions	ea.	.10
P-25X231	Mounting Feet for Chassis (Rear)	ea.	.10
P-25X221	Mounting Feet for Chassis (Front)	ea.	.10
P-17X17	Glass Crystal (Mounted in Escutcheon Plate)		.15
P-28X77	Retaining Ring (for above Crystal)		.10

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
P-9A648	T1	Antenna Transformer and Can Assembly	$2.20
P-9A649	T2	R.F. Interstage Transformer and Can Assembly	1.85
P-9A651	T3	1st I.F. Transformer and Can Assembly	1.85
P-9A652	T4	2nd I.F. Transformer and Can Assembly	2.10
P-9A650	T5	Oscillator Coil and Can Assembly	1.75
P-53X91	T6	115 Volt, 60 Cycle, Power Transformer	3.60
P-53X92	T6	115 Volt, 25 Cycle, Power Transformer	5.95
P-53X93	T6	115-230 Volt, 40-60 Cycle Power Transformer	4.95
P-53X99	T6	230 Volt, 50 Cycle, Power Transformer	4.10
P-51X31	T7	Output Transformer (Part of Speaker Assembly)	2.45
P-9A653	L1	Oscillator Tracking Coil	.25

DIAL AND DRIVE ASSEMBLY

Part No.	Description		List Price
Specify Name and Model of Radio	Dial and Drive Assembly Complete with Pointer		$2.60
	Dial Face Only (Included in above Assembly)		.60
P-15X69	Double End Pointer (Included in above Assembly)		.10
P-25X232	Mounting Bracket for Dial and Drive Assembly		.10
P-7A37	Dial Lamp Sockets and Clips	ea.	.10
P-7A32	Dial Lamps, No. 51 Bayonet Type	ea.	.20

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
P-46X80	C4	.05 mf.	180	$0.15
P-46X80	C5	.05 mf.	180	.15
P-46X103	C6	.05 mf.	240	.15
P-46X117	C7	.25 mf.	180	.25
P-46X104	C8	.25 mf.	240	.25
P-46X80	C11	.05 mf.	180	.15
P-46X121	C12	.25 mf.	360	.30
P-46X105	C15	.10 mf.	360	.20
P-46X199	C25	.25 mf.	360	.30
P-46X107	C26	.25 mf.	360	.30
P-46X114	C27	.004 mf.	600	.15
P-46X109	C28	.01 mf.	480	.15
P-46X203	C29	.05 mf.	600	.20
P-46X100	C30	.002 mf.	600	.15
P-46X110	C32	.03 mf.	180	.15

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage	List Price
P-44X11	C31	18 mf.	300 Wet	1.10
P-44X10	C33	14 mf.	400 Wet	1.25

MOLDED

Part No.	Code	Capacitance	List Price
P-47X59	C1	250 mmf.	.15
P-47X63	C16	10 mmf.	.15
P-47X53	C19	35 mmf.	.10
P-47X56	C24	50 mmf.	.10

TRIMMER

Part No.	Code	Capacitance	Description	List Price
P-17A36	C2	2-25 mmf.	Antenna Range "D" Trimmer	.10
P-17A36	C3	2-25 mmf.	Antenna Range "B" Trimmer	.10
P-17A36	C9	2-25 mmf.	Interstage Range "D" Trimmer	.10
P-17A36	C10	2-25 mmf.	Interstage Range "B" Trimmer	.10
P-17A41	C13	2-25 mmf.	Oscillator Range "D" Trimmer	.10
P-17A41	C17	2-25 mmf.	Oscillator Range "B" Trimmer	.10
P-7A35	C14	40-100 mmf.	6000 KC Trimmer	
	C18	300-600 mmf.	600 KC Trimmer	.45
P-17A33	C20	70-150 mmf.	1st I.F. Trimmers	
	C21	70-150 mmf.		.40
P-17A34	C22	70-150 mmf.	2nd I.F. Trimmers	
	C23	150-250 mmf.		.40

MISCELLANEOUS

Part No.	Description	List Price
P-14A42	3 Gang Condenser less Dial and Drive Assembly	3.85

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage		List Price
P-A94151	R1	150 Ohm	0.2		$0.15
P-B94602	R2	6000 Ohm	0.5		.15
P-B93303	R3	30,000 Ohm	0.5		.20
P-A94252	R4	2500 Ohm	0.2		.15
P-C94253	R5	25,000 Ohm	1.0		.15
P-A94803	R6	80,000 Ohm	0.2		.15
P-D93163	R7	16,000 Ohm	2.0		.45
P-A95205	R8	2 Megohm	0.2		.10
P-B94304	R9	.3 Megohm	0.5		.15
P-A95401	R10	400 Ohm	0.2		.10
P-A94203	R11	20,000 Ohm	0.2		.15
P-B94603	R12	60,000 Ohm	0.5		.15
P-A95105	R15	1 Megohm	0.2	Used on models with tuning eye	.10
P-A94805	R16	8 Megohm	0.2	Used on models with tuning eye	.15
P-A94805	R17	8 Megohm	0.2	Used on models with tuning eye	.15
P-A95504	R18	.5 Megohm	0.2		.10
P-A94104	R19	.1 Megohm	0.2		.15

WIRE WOUND

Part No.	Code	Resistance	Wattage	List Price
P-43X42	R20	235 Ohm	2.0	.25

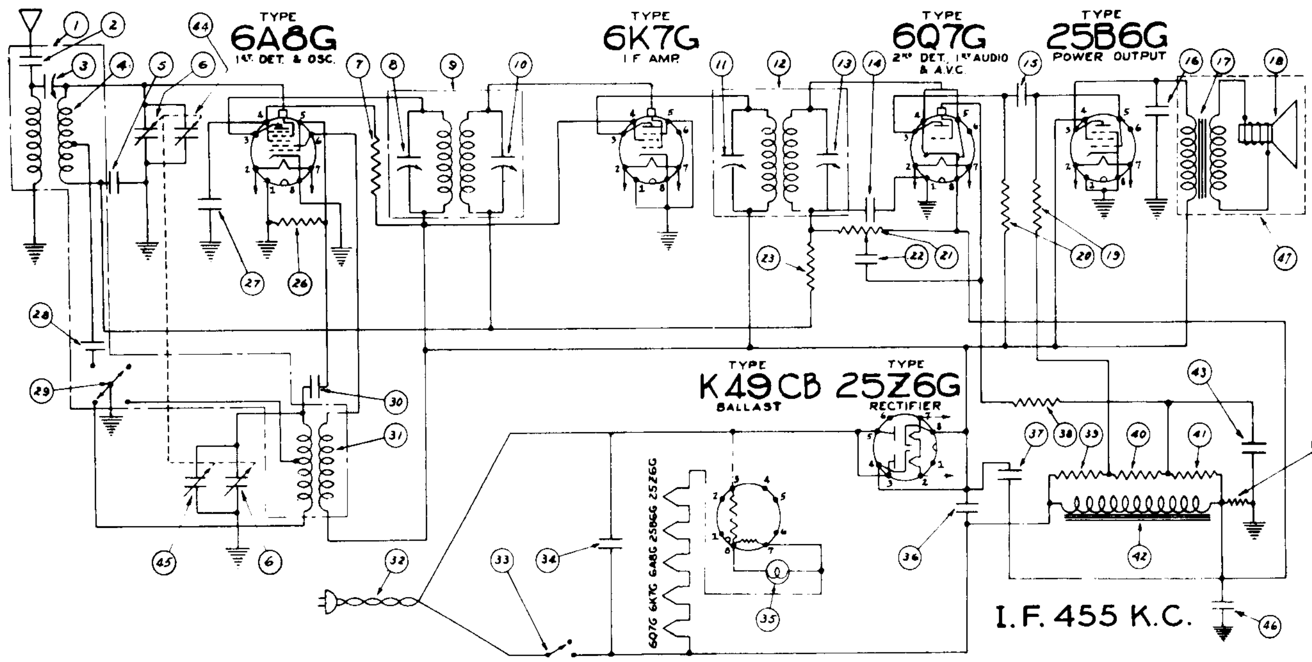
VARIABLE

Part No.	Code	Resistance	Description	List Price
P-36X205	R13	.5 Megohm	Volume Control and On-Off Switch	1.05
P-40X217	R14	.15 Megohm	Tone Control and Selectivity Switch	1.25

Prices subject to change without notice

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODEL WR-120



WINDING RESISTANCE

POS.	PRIMARY OHMS		SECONDARY OHMS	
4	24.0		2.5	B.C.
			1.5	POLICE
9	9.5		9.5	
12	18.5		18.5	
17	155			
18	4.5			
31	3.0		4.0	B.C.
			2.0	POLICE
42	375			

SOCKET VOLTAGES

TUBE	STAGE	FIL.	PIN NO	PLATE	PIN NO.	SCREEN	PIN NO.	BIAS
6A8G	1ST. DET. & OSC.	6.3	2 To 7	98	1 To 3	48	1 To 4	
6K7G	I.F. AMPLIFIER	6.3	2 To 7	98	1 To 3	98	1 To 4	
6Q7G	2ND. DET., 1ST. AUD., A.V.C.	6.3	2 To 7	52	1 To 3			-1.2
25B6G	POWER OUTPUT	25.5	2 To 7	90	1 To 3	98	1 To 4	
25Z6G	RECTIFIER	25.5	2 To 7					
K49C	BALLAST							

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes .... 1 #6A8G, 1 #6K7G, 1 #6Q7G, 1 #25B6G, 1 #25Z6G, 1 #K49CB (Ballast) - Total 6
Power Supply Characteristics ... 105-125 volts D.C., or 105-125 volts, 50-60 cycle A.C.
Power Consumption .... 48 Watts
Total Power Output .... 2.3 Watts
Undistorted Power Output .... 1.35 Watts
Tuning Ranges .... (Broadcast Band 540-1500 KC. (Short-wave Band 1500-3000 KC.
Line-Up Frequencies .... I.F. 455 KC., 1400 KC.

GENERAL DESCRIPTION

This model is a five-tube (plus a ballast tube), two-band superheterodyne receiver, designed to operate over the standard broadcast band, extending from 540 to 1500 KC., and a short-wave band extending from 1500 to 3000 KC.

The receiver uses a type 6A8G tube as a first detector-oscillator, a type 6K7G as an I.F. amplifier, a type 6Q7G as a second detector, A.V.C., and first audio, a type 25B6G as an output, a type 25Z6G as a rectifier and a K49CB as a ballast tube.

LINE-UP CAPACITOR ADJUSTMENTS

To properly align the circuits of this receiver, it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied and reduced sufficiently to prevent overload as the individual circuits of the receiver are brought into alignment. A conventional output meter should be connected across the terminals of the speaker voice coil to indicate when the individual circuits are correctly aligned. The sensitivity of the meter must be sufficient to give satisfactory reading with low input signals.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, location of the various tubes and alignment condensers.

ALIGNMENT OF I.F. (455 KC.)

1. Set the volume control to maximum position and wave-change switch to standard broadcast band.

2. Connect the output meter across the voice coil terminals of the speaker.

3. Set the test oscillator to 455 KC., and adjust its output to produce a measureable reading on the output meter when the test signal is applied to the grid of the type 6A8G first detector-oscillator tube through a 0.5 mfd. blocking condenser.

4. Adjust the four trimmer condensers on the top of the two I.F. coils (square housings) to maximum output.

ALIGNMENT OF OSCILLATOR AND R.F.

1. Check the pointer setting to be sure that it is exactly horizontal when the tuning condenser is completely closed.

2. Set the test oscillator and dial indicator to 1400 KC., and adjust the oscillator trimmer condenser (rear section of gang) to maximum output.

3. Apply the test signal to coil end of the antenna cable through a .0001 mfd. blocking condenser and adjust trimmer condenser (front section of gang) to maximum output.

4. Check sensitivity over the band.

5. Turn wave-change switch to the short-wave band and check the sensitivity over scale.

TRAP ALIGNMENT

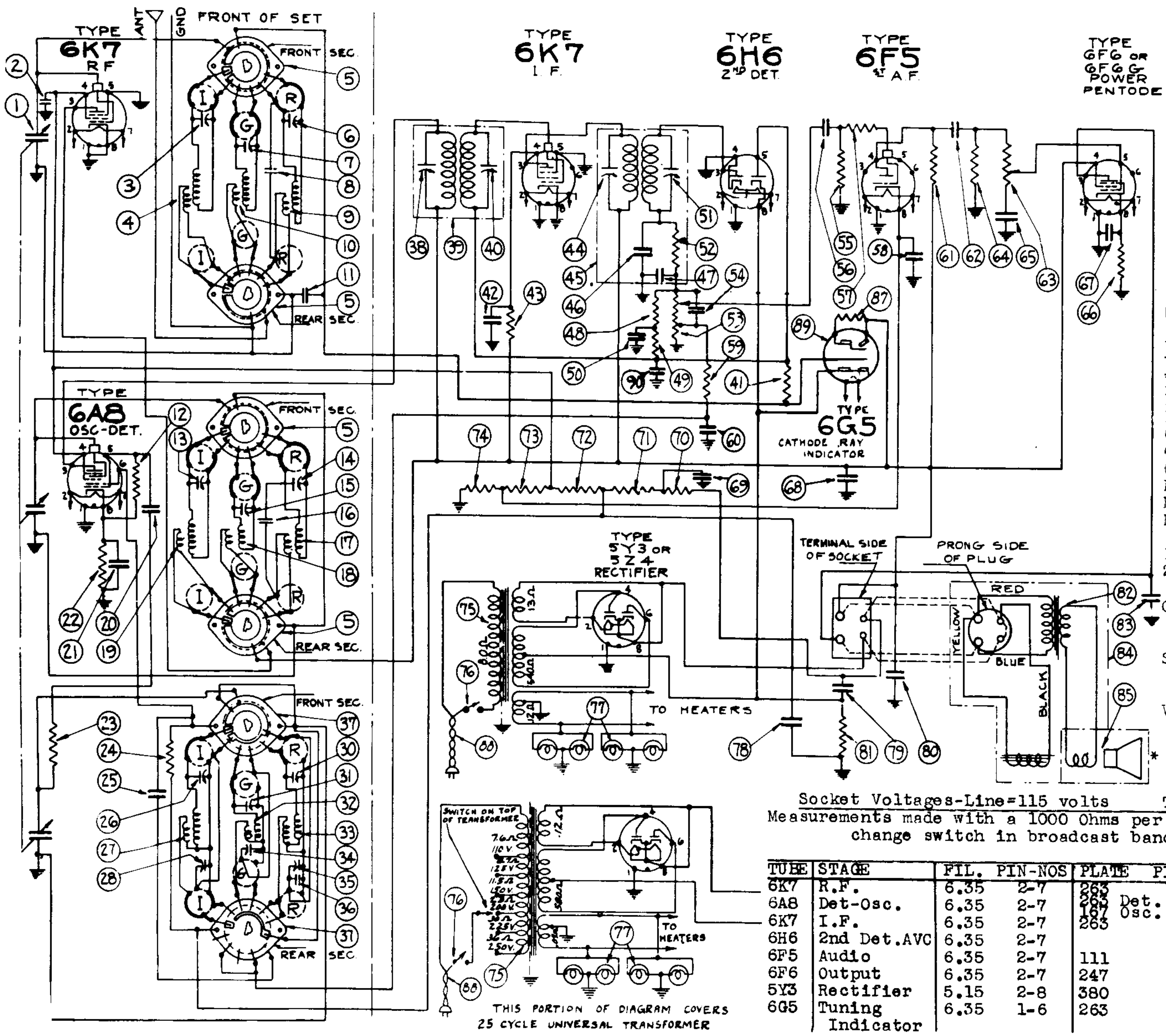
This receiver is provided with a tuned trap which can be adjusted from the bottom without removing the receiver from the cabinet. This trimmer does not need to be adjusted unless there is code interference, in which case, adjustment is made to eliminate the undesired signal.

SERVICE PARTS LIST

Dia. #	Part #	Description of Parts	List Price
1	RC 95298	Composite coil	$ 2.35
2	CW 6-005	.005 mfd., 600 V. condenser	.15
3		Trimmer condenser - part of RC 95298	
4		Preselector coil - part of RC 95298	
5	SA 105327	.05 mfd., 200 V. dual condenser	.30
6	CG 9562	Variable condenser	3.00
7	RE 3333	33,000 ohm, 1/2 W. resistor	.10
8		Trimmer condenser - 80-200 mmf. - part of IC 95107	
9	IC 95107	1st I.F. coil - 455 KC.	1.50
10		Trimmer condenser - 80-200 mmf. - part of IC 95107	
11		Trimmer condenser - 35-130 mmf. - part of IC 95108	
12	IC 95108	2nd I.F. coil - 455 KC.	1.20
13		Trimmer condenser - 35-130 mmf. - part of IC 95108	
14	CM 956	.00025 mfd. mica condenser	.20
15	CW 6-005	.005 mfd., 600 V. condenser	.15
16	CW 6-005	.005 mfd., 600 V. condenser	.15
17	TR 9588	Output transformer	1.35
18	DM 9512	Diaphragm and coil assembly	1.50
19	RE 4743	470,000 ohm, 1/2 W. resistor	.10
20	RE 2243	220,000 ohm, 1/2 W. resistor	.10
21	VR 9549	Volume control	.80
22	CW 6-005	.005 mfd., 600 V. condenser	.15
23	RE 4743	470,000 ohm, 1/2 W. resistor	.10
25	RE 1003	10 ohm, 1/2 W. resistor	.10
26	RE 4733	47,000 ohm, 1/2 W. resistor	.10
27		.05 mfd., 200 V. dual condenser - part of SA 105327	
28	CW 6-005	.005 mfd., 600 V. condenser	.15
29	SW 9556	Wave-change switch	.35
30	CM 9513	.0001 mfd. mica condenser	.10
31		Oscillator coil assembly - part of RC 95298	
32	CA 9512	Line cable	.50
33		On-off switch - part of VR 9549	
34	CW 4-05	.05 mfd., 400 V. condenser	.15
35	LP 951	Dial lamp - 6-8 V.	.20
36	CE 9559	40 mfd., 150 V. electrolytic condenser	.75
37	CE 9560	30 mfd., 150 V. electrolytic condenser	.75
38	RE 4743	470,000 ohm, 1/2 W. resistor	.10
39	RE 4743	470,000 ohm, 1/2 W. resistor	.10
40	RE 4743	470,000 ohm, 1/2 W. resistor	.10
41	RE 6833	68,000 ohm, 1/2 W. resistor	.10
42		Field coil - part of SK 9567	
43	CW 2-25	.25 mfd., 200 V. condenser	.20
44		Trimmer condenser - part of CG 9562	
45		Trimmer condenser - part of CG 9562	
46	CW 2-10	.1 mfd., 200 V. condenser	.15
47	SK 9567	Speaker	4.00

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODELS WR-212 & WR-312



D.C. RESISTANCE
Measured with wave-change switch in corresponding band position

Coil	Dia.No.	Prim.	Sec.
I-Ant.	4	18.5 Ohms	3.8 Ohms
I-R.F.	19	0.8	10.7
I-Osc.	27	1.4	3.3
G-Ant.	10	2.1	1.0
G-R.F.	18	1.8	1.0
G-Osc.	32	0.5	0.9
R-Ant.	9	0.7	0.03
R-R.F.	17	2.0	0.03
R-Osc.	33	0.5	0.03
1st I.F.	39	8.6	8.6
2nd I.F.	45	8.6	8.6
Output Trans.	82	450	0.5
Spkr. Field		1900	
Voice Coil	85	3	

I.F. 465 K.C.

Socket Voltages-Line=115 volts   Taken from bottom of sockets
Measurements made with a 1000 Ohms per volt voltmeter & with wave change switch in broadcast band position

TUBE	STAGE	FIL.	PIN-NOS	PLATE	PIN-NOS	SCREEN	PIN-NOS	BIAS	PIN-NOS
6K7	R.F.	6.35	2-7	263	3-1	94	4-1	* See note	
6A8	Det-Osc.	6.35	2-7	263 Det. / 167 Osc.	3-1 / 6-1	94	4-1	3.7	8-1
6K7	I.F.	6.35	2-7	263	3-1	103	4-1	* See note	
6H6	2nd Det.AVC	6.35	2-7					-5.5	8-1
6F5	Audio	6.35	2-7	111	4-1			1.1	8-1
6F6	Output	6.35	2-7	247	3-1	263	4-1	17.5	8-1
5Y3	Rectifier	5.15	2-8	380	8-1				
6G5	Tuning Indicator	6.35	1-6	263	2-5			* See note	

* The control grid bias on the 6K7 and 6G5 tubes equal to approximately six-tenths the voltage from pins 5-1 on the 6H6 tube socket.

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODELS WR-212 & WR-312

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ... 2 #6K7,1 #6A8,1 #6H6,1 #6F5,1 #6F6,1 #6G5,1 #5Y3 - Total 8
Power Supply .... 105 to 125 volts, 50 to 60 cycles A.C.
Power Consumption .... 60 Watts
Maximum Output .... 3.3 Watts
Maximum Undistorted Output .... 2.5 Watts
Tuning Ranges .... (White Band - 525 to 1800 KC. (Green Band - 1750 to 6000 KC. (Red Band - - 5800 to 18500 KC.
Line-Up Frequencies .. I.F.465KC.,1600KC.,570 KC.,5500 KC.,1900 KC.,17000 KC.,&6000 KC.

GENERAL DESCRIPTION

This model is an eight-tube, three-band, superheterodyne receiver designed for world-wide reception and employs the new all-metal tubes.

The circuit employs a high frequency amplifier using the new type 6K7 tube. This is followed by a combined first detector-oscillator circuit employing a 6A8 tube. These tubes with their associated circuits, (coils, variable condensers, trim condensers for R.F. and detector stages, and trim and lag condensers for the oscillators) comprise a complete assembly in compact form separately cushioned from the main chassis. This assembly is known as the "Precision Tuner". From the high frequency assembly the energy passes thru an I.F. selective transformer and to an I.F. amplifier tube (type 6K7). From here further selection takes place and the energy is sent to the diode (type 6H6) where second detection takes place and voltages are provided for automatic volume control. A first audio amplifier tube (type 6F5) follows the diode and this is further followed by a pentode power amplifier tube (type 6F6). A type 5Y3 rectifier supplies the direct current for energizing the tubes and a 6G5 ("Precision eye") acts as a tuning indicator.

REMOVING INDIVIDUAL COIL AND SWITCH SECTIONS OF PRECISION TUNER

If a component part located underneath the switch and coil assemblies of the "Precision Tuner" has to be replaced or a section of the unit has to be removed for inspection, each section can easily be removed separately. To do this proceed with care as follows:

1. Remove the two screws which fasten the mounting plate of the wave change switch shaft to the chassis. Pull switch shaft out straight.
2. Unsolder the stator and rotor leads from the gang condenser.
3. The fastening screws for the switch sections are located on top of the "Precision Tuner" and are indicated by X, Y and Z in Figure #1. Remove the corresponding screws.
4. Each individual section can then be pulled out straight.

NOTE: On the R.F. section the plate lead from the 6K7 socket will have to be unsoldered from the socket before the section can be removed. On the oscillator section the blue lead from the 6A8 detector-oscillator socket and the yellow plate supply lead to the switch will have to be unsoldered from the switch.

5. After repairs have been made, resolder the leads mentioned above and replace the section, being careful to observe that the slotted holes in the switch bracket line up with the round guide pins on the base plate of the "Precision Tuner". This is IMPORTANT as the switch shaft cannot be inserted if the switch brackets do not line up.
6. Replace the section fastening screws.
7. Resolder the stator and rotor leads on the gang condenser.
8. Replace the switch shaft and the mounting plate fastening screws. When inserting the switch shaft, be careful that all the switch discs are in the same position. Otherwise the switch shaft will not slide in. NEVER force the shaft into the switch discs. If the shaft does not slide in freely, examine the position of the slots in each switch disc.

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment. A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal. Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures #1 and #2 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 KC.)

1. Set volume control on full; turn tone control to the bass position, the wave change switch on broadcast and the dial indicator at approximately 600 KC.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 KC. and adjust its output to produce a measureable reading on output meter when test signal is applied to the grid of the 6K7 I.F. tube through a .5 mfd. blocking condenser.
4. Adjust trimmers #44 and #51 to maximum output, reducing output of test oscillator as required.
5. Apply test signal to grid of 6A8 detector-oscillator and adjust #38 and #40 to maximum output.

ADJUSTMENT OF BROADCAST BAND

1. Set wave change switch to the White or Broadcast Band position.

(Continued on next page)

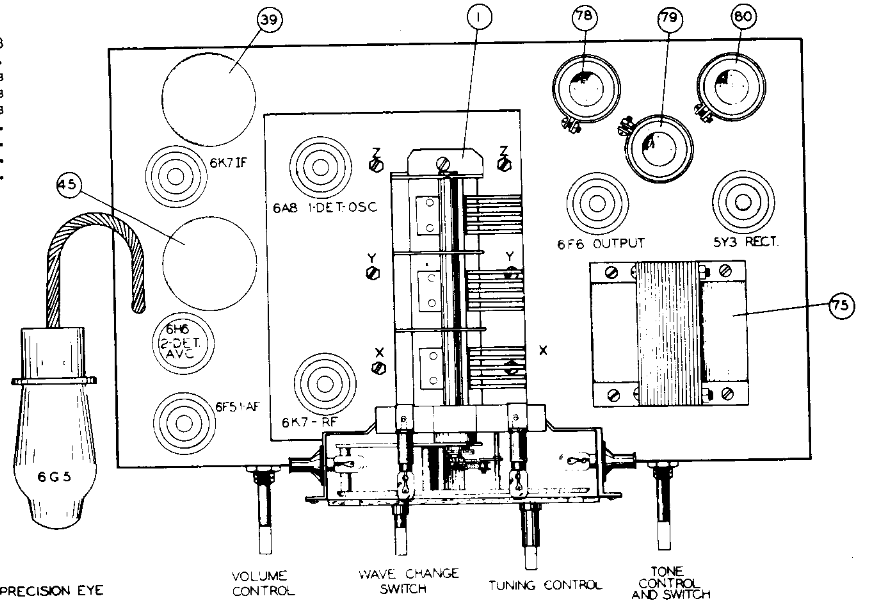


Figure No. 1

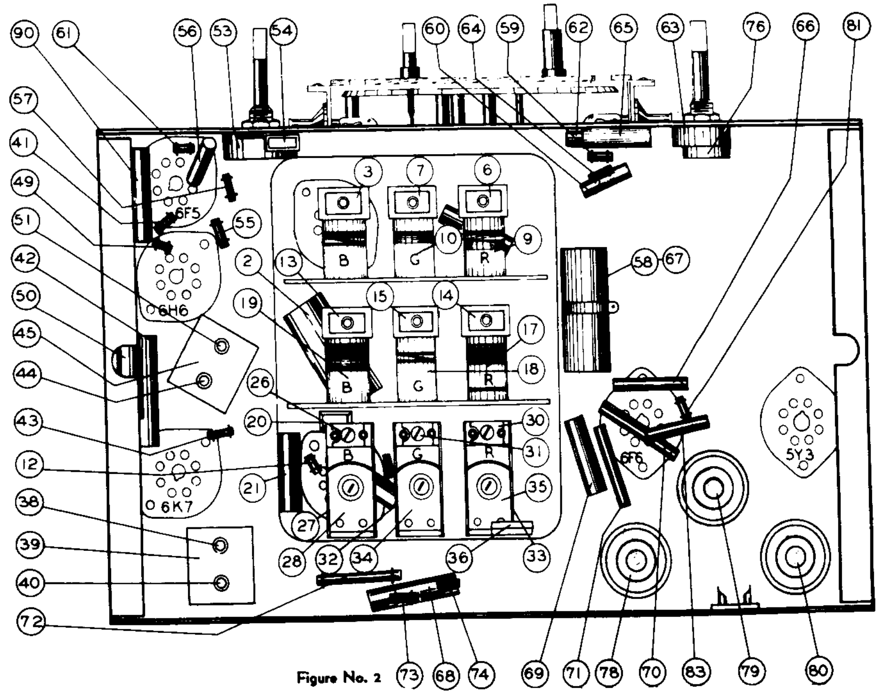


Figure No. 2

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODELS WR-212 & WR-312

(Continued from preceding page)

2. Set test oscillator and dial indicator to 1600 KC.
3. Apply test signal to antenna terminal of chassis through a .0002 mfd. series condenser and adjust #26, #13 and #3 to maximum output.
4. Set test oscillator and dial indicator to 570 KC. and adjust #28 to maximum output, at the same time rocking the variable tuning condenser.
5. Return to 1600 KC. setting with both test oscillator and dial indicator and readjust #26, #13 and #3 for accuracy.

ADJUSTMENT OF GREEN BAND

NOTE: In adjusting the two short-wave bands (Green and Red) a .0002 mfd. condenser and a 400 ohm resistor connected in series should be inserted in the high side of the test oscillator leads. This condenser-resistor combination is the approximate equivalent of a short-wave antenna.

1. Set wave change switch to the Green Band position.
2. Set test oscillator and dial indicator to 5500 KC. and adjust #31, #15 and #7 to maximum output.
3. Set test oscillator and dial indicator to 1900 KC. and adjust #34 to maximum output, at the same time rocking the variable tuning condenser.
4. Return to 5500 KC. setting and make readjustment of #31, #15 and #7.

ADJUSTMENT OF RED BAND

1. Set wave change switch to the Red Band position.
2. Set test oscillator and dial indicator to 17000 KC. and adjust #30, #14 and #6 to maximum output.
3. Set test oscillator and dial indicator to 6000 KC. and adjust #35 to maximum output, at the same time rocking the variable tuning condenser.
4. Return to 17000 KC. setting and make readjustment of #30, #14 and #6.

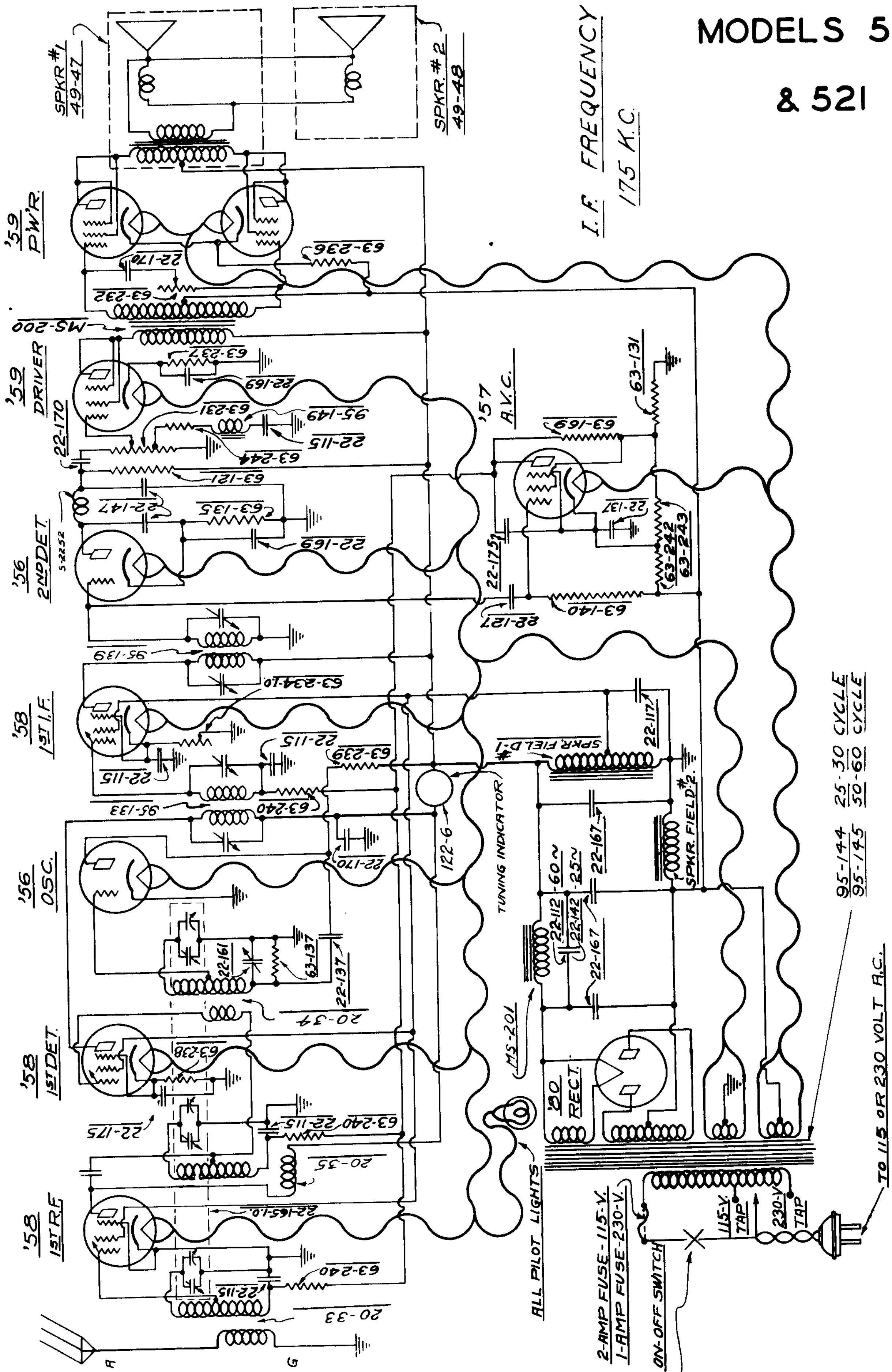
IMPORTANT: While testing or making repairs on this receiver, the chassis should not be turned upside down or on its side for any long period of time while the set is turned on as the chemicals in the electrolytic filter condenser will come out through the air vents making the condenser appear to be defective. If left in this position too long the condenser may be injured.

Dia. #	Part #	Description of Parts	List Price
1	CG 9550	Variable condenser	$ 4.50
2	CW 2-50	.5 mfd., 200 V. condenser	.25
3	CS 9554	4-30 mmf. trimmer condenser	.15
4	RC 95209	Antenna coil (broadcast)	1.00
5	SW 9553	Switch and bracket assembly - Antenna & R.F. Sections	1.40
6	CS 9554	4-30 mmf. trimmer condenser	.15
7	CS 9554	4-30 mmf. trimmer condenser	.15
8		Twisted wire - part of RC 95206	
9	RC 95206	Antenna coil - red band	.95
10	RC 95212	Antenna coil - green band	.80
11	CW 9513	.05 mfd., 200 V. condenser	.25
12	RE 9563	50,000 ohm, 1/4 W. resistor	.10
13	CS 9554	4-30 mmf. trimmer condenser	.15
14	CS 9554	4-30 mmf. trimmer condenser	.15
15	CS 9553	1.5-10 mmf. trimmer condenser	.15
16	CM 9512	6 mmf. mica condenser	.15
17	RC 95207	R.F. coil assembly - red	1.25
18	RC 95214	R.F. coil assembly - green	1.00
19	RC 95210	R.F. coil assembly (broadcast)	1.00
20	CM 9511	.000065 mfd. mica condenser	.15
21	CW 2-05	.05 mfd., 200 V. condenser	.15
22	RE 9529	300 ohm, 1/4 W. resistor	.10
23	RE 9537	50 ohm, 1/4 W. resistor	.10
24	RE 9526	5,000 ohm, 1 W. resistor (1/2 W. size)	.20
25	CW 9513	.05 mfd., 200 V. condenser	.25
26		5-25 mmf. trimmer condenser - part of CS 9540	.60
27	RC 95211	Oscillator coil (broadcast)	1.75
28		300-600 mmf. oscillator series cond. - part of CS 9540	.60
30		3-15 mmf. trimmer condenser - part of CS 9520	.75

Dia. #	Part #	Description of Parts	List Price
31		3-15 mmf. trimmer condenser - part of CS 9520	.75
32	RC 95213	Oscillator coil - green	1.75
33	RC 95208	Oscillator coil - red	2.25
34		800-1600 mmf. oscillator series cond. - part of CS 9520	.75
35		800-1600 mmf. oscillator series cond. - part of CS 9520	.75
36	CM 959	.002 mfd. mica condenser	.25
37	SW 9554	Switch and bracket assembly - oscillator section	1.50
38		80-200 mmf. trimmer condenser - part of IC 9576	
39	IC 9576	First I.F. coil assembly - 465 KC.	1.50
40		80-200 mmf. trimmer condenser - part of IC 9576	
41	RE 9573	.25 meg., 1/8 W. resistor	.10
42	CW 2-25	.25 mfd., 200 V. condenser	.20
43	SA 105277	75,000 ohm, 1/4 W. resistor	.15
44		80-200 mmf. trimmer condenser - part of IC 9577	
45	IC 9577	Second I.F. coil assembly - 465 KC.	1.85
46		100 mmf. mica condenser - part of IC 9577	
47		100 mmf. mica condenser - part of IC 9577	
48	SA 105281	1 meg., 1/4 W. resistor	.15
49	SA 105281	1 meg., 1/4 W. resistor	.15
50	CW 2-05	.05 mfd., 200 V. condenser	.15
51		80-200 mmf. trimmer condenser - part of IC 9577	
52		50,000 ohm, 1/4 W. resistor - part of IC 9577	
53	VR 9536	Volume control - .5 meg.	.85
54	CM 9519	.0005 mfd. mica condenser	.20
55	SA 105281	1 meg., 1/4 W. resistor	.15
56	CW 2-02	.02 mfd., 200 V. condenser	.15
57	RE 9584	.1 meg., 1/4 W. resistor	.15
58			.15
		12 mfd., 25 V. condenser - part of CE 9526	.90
59	SA 105249	5,000 ohm, 1/4 W. resistor	.15
60	CW 2-05	.05 mfd., 200 V. condenser	.15
61	RE 9573	.25 meg., 1/8 W. resistor	.10
62	CW 4-02	.02 mfd., 400 V. condenser	.15
63	VR 9512	Tone control - .5 meg.	1.10
64	RE 9585	.25 meg., 1/4 W. resistor	.15
65	CW 2-001	.001 mfd., 200 V. condenser	.15
66	SA 107391	500 ohm, 1 W. resistor	.20
67		12 mfd., 25 V. condenser - part of CE 9526	.90
68	CW 4-10	.1 mfd., 400 V. condenser	.15
69	CW 4-10	.1 mfd., 400 V. condenser	.15
70	SA 103835	10,000 ohm, 2 W. resistor	.25
71	SA 107572	5,000 ohm, 1 W. resistor	.20
72	SA 101404	15,000 ohm, 1 W. resistor	.20
73	SA 104966	30,000 ohm, 1/2 W. resistor	.15
74	SA 105260	300 ohm, 1/4 W. resistor	.15
75	TR 9557	Power transformer - 105-125 V., 50-60 cycle	4.00
76		Switch (On & Off) - part of VR 9512	
77	LP 9515	Dial lamp - 3.5 V., .35 amp.	.20
78	CE 9528	8 mfd., 450 V. electrolytic condenser	.80
79	CE 9536	12 mfd., 450 V. electrolytic condenser	.80
80	CE 9535	16 mfd., 300 V. electrolytic condenser	.75
81	RE 95101	37 ohm, 1/4 W. resistor	.15
82	TR 9558	Output transformer	1.25
83	CW 4-005	.005 mfd., 400 V. condenser	.15
84	SK 9511	Speaker	7.50
85	SA 107282	Diaphragm	1.15
87		1 meg., 1/4 W. resistor - part of CB 9598	
88	CB 9512	Line cable assembly	.50
89	CB 9598	"Precision eye" cable assembly	.70
90	CW 2-05	.05 mfd., 200 V. condenser	.15

ZENITH RADIO CORPORATION

MODELS 520 & 521



ZENITH RADIO CORPORATION

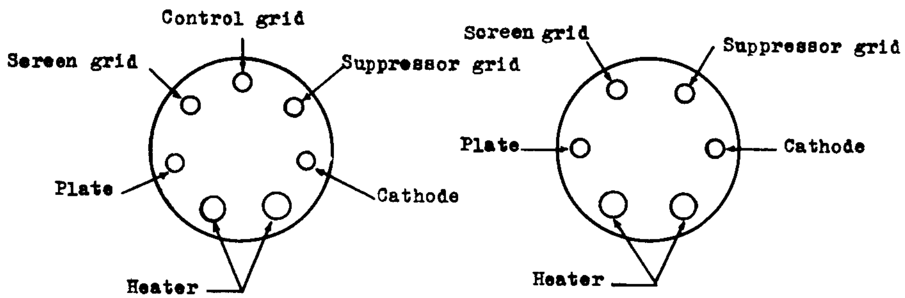
MODELS 520 & 521

VOLTAGE READINGS - MODELS 520 521

Antenna Disconnected **Meter 1000 Ohms Per Volt**

Tube Type	Position	Fil. Volt.	Plate Volt.	Cath. Volt.	Screen Volt.	Plate Current
Z-58	R.F.	2.5	220	0	100	5.2
Z-58	1st Det.	2.5	220	+2	100	3.
Z-56	Osc.	2.5	120	0	0	4.
Z-58	I.F.	2.5	220	0	100	6.
Z-56	2nd Det.	2.5	120	20	0	.75
Z-57	A.V.C.	2.5	-40	-75	-2	0
Z-59	Driver	2.5	220	+25	220	8.2
Z-59	Power	2.5	230	-65	230	25.
Z-59	Power	2.5	230	-65	230	25.
Z-80	Rect.	5.0	400*			62.5*

Line voltage 115 (Reading to Ground) **Volume control maximum**



Six and seven prong socket connections **(Bottom of socket)**

PARTS LIST

Dial and Meter Assembly

11-3	Dial Pulley String ... per ft.	$.25
26-38	Calibrated Dial Strip	.15
80-69	Dial Cord Tension Spring	.01
80-85	Volume and Tone Control Dial Tension Spring	.01
83-274	Volume Control Dial Strip	.10
83-275	Tone Control Dial Strip	.10
100-18	2.5 Volt Pilot Lamp	.12
122-5	Shadowgraph Meter	2.00

Condensers

22-112	.1 mfd 300 Volt (Filter)	.25
22-115	.1 mfd 200 Volt (5 used, see footnote)	.35
22-117	.5 " 300 " (Filter)	.50
22-137	.05 " 400 " (Oscillator Plate)	.25
22-142	.4 " 300 " (Filter, 25 Cycle Only)	.40
22-147	.0005 600 " (2nd Detector Plate)	.20
22-161	Padder	.45
22-165	Three Gang Variable	3.50
22-167	8. mfd 500 Volt (Filter)	1.50
22-169	8. " 50 " (2nd Detector Cathode, Driver Cathode, and 1st Audio Cathode)	.55
22-170	.1 " 400 " (1st Detector Plate, Audio Coupling and Tone Control)	.25

PARTS LIST

Resistors

63-121	100M Ohm 1 Watt (2nd Detector Plate)	.25
63-135	50M " 1 " (2nd Detector Cathode)	.25
63-137	250M " ½ " (Oscillator Grid)	.25
63-140	1 Meg " ½ " (A. V. C. Grid)	.25
63-169	400 " ½ " (A. V. C. Plate)	.25
63-231	Volume Control Assembly	1.25
63-232	Tone Control Assembly	.75
63-234	Sensitivity Control	.75
63-236	500 Ohm ... (Power Bias) (Wide Metal)	.25
63-237	1500 " ... (Driver Bias) (Narrow Metal)	.25
63-238	1000 " ¼ Watt (1st Detector Cathode)	.25
63-239	24M " 1 " (Oscillator Plate)	.25
63-240	1900 " ¼ " (R.F., 1st Detector & I.F. Grids)	.25
63-242	2500 " ½ " (A. V. C. Cathode)	.25
63-243	18M " 1 " (A. V. C. Cathode)	.25
63-244	500 " ¼ " (Acoustic Filter)	.25

Coils

20-33	Antenna Coil	.75
20-34	Oscillator Coil	.85
20-35	Detector Coil	1.00
S-2252	2nd Detector Plate Choke and Bracket	.50
95-133	1st I. F. Transformer (with Grid Lead)	1.25
95-139	2nd I. F. Transformer (without Grid Lead)	1.25

*22-115 R. F., 1st Detector, I. F. Grid Returns, I. F. Cathode, and Acoustic Filter.

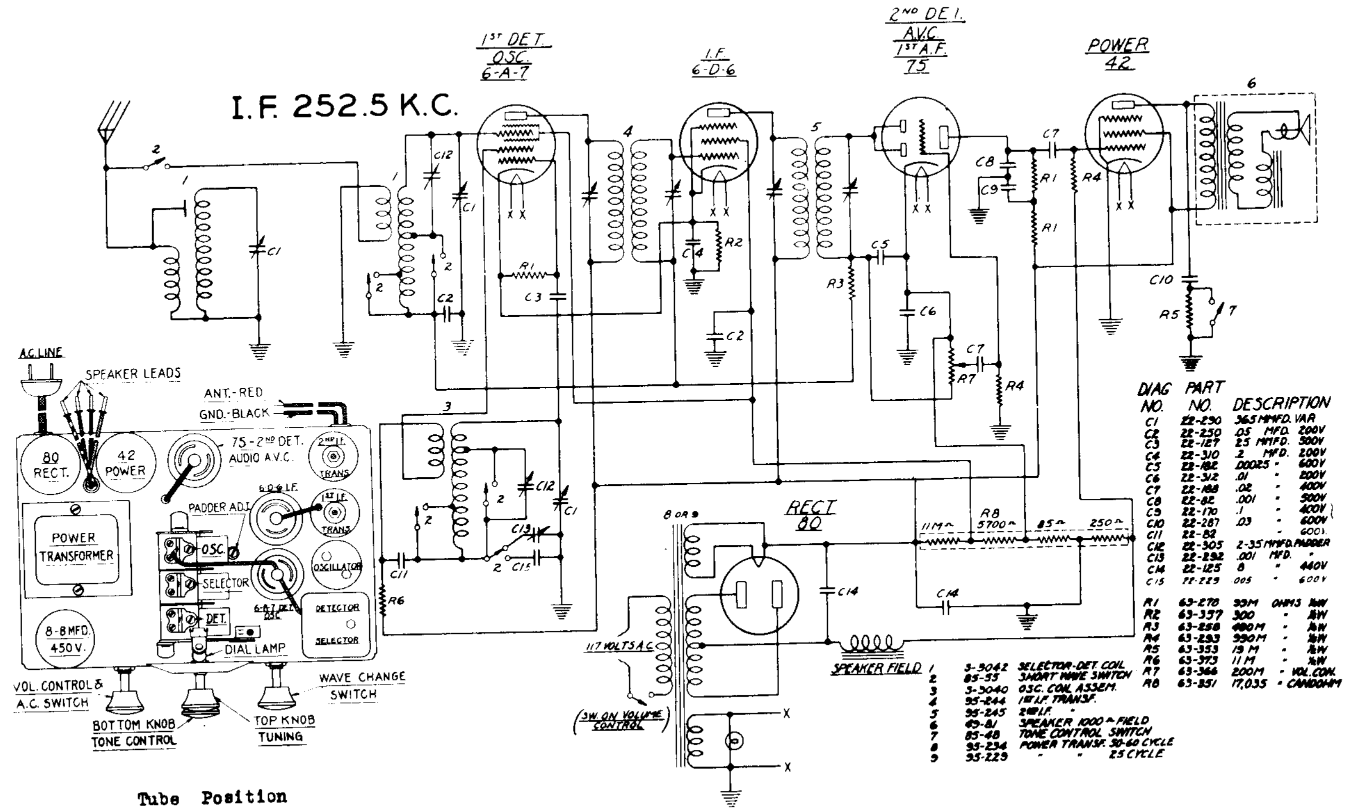
Miscellaneous

46-61	Large Control Knob	.25
46-62	Small Control Knob	.15
49-47	Dynamic Speaker with Transformer	7.00
49-48	Dynamic Speaker without Transformer	8.25
52-31	Speaker Multicord	.35
57-343	Escutcheon Plate	.50
78-56	Type 59 Socket	.15
78-57	Type 56 Socket	.15
78-58	Type 58 Socket	.15
78-59	Type 57 Socket	.15
78-60	Type 80 Socket	.15
93-167	Upper Cushion Washer for Chassis Mounting	.01
93-168	Lower Cushion Washer for Chassis Mounting	.01
95-144	115 Volt 25-30 Cycle Power Transformer	7.25
95-145	115 Volt 50-60 Cycle Power Transformer	5.00
95-149	Acoustic Filter Choke	.30
106-129	Small Tube Shield	.10
136-2	2 amp Fuse	.06
MS-200	Push Pull Input Transformer	3.50
MS-201	Power Filter Choke	3.25

ALL PRICES ARE SUBJECT TO REGULAR DISCOUNT AND CHANGE WITHOUT NOTICE

ZENITH RADIO CORPORATION

MODELS 806, S-847, 807, 850, 5504, 5505, 5506 & 5507



Tube Position

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6A7	1st Det.	5.8	5.2	0	80	-	260
	Osc.			.6	-	-	210
6D6	I.F.	5.8	5.2	0	80	5.2	260
75	2nd Det.	5.8	1.5	0	-	-	135
42	P.R.	5.8	0	-.7	260	-	245
80	RECT.	4.8	-	-	-	-	-

Line Voltage 112 — Antenna and Ground Disconnected

All measurements taken from point indicated to ground, using a 1000 ohm per volt D.C. meter (except filaments).
F - Filament; K - Cathode; g1 - Control Grid; g2 - Screen Grid; g3 - Suppressor Grid; p - Plate.

Alignment

1. Balance I.F. transformers at 252.5 K.C. with test oscillator connected to control grid of 6A7 and ground.
2. Connect test oscillator to antenna and ground leads.
3. Adjust broadcast padder (located next to gang on top of chassis) for correct dial reading at 600 K.C.
4. Adjust trimmer on oscillator section of gang for correct dial reading at 15 M.C. Adjust detector trimmers (located between gang and coil shield on top of chassis) for maximum signal.
5. Adjust oscillator trimmer (located on right side underneath chassis) for correct dial reading at 1400 K.C. - also adjust preselector and detector trimmers on gang for maximum signal.
6. Readjust broadcast padder for correct dial setting.

PARTS AND PRICES
MODEL 806
Chassis 5504
Condensers

22-82	.001	Mfd.	500 Volt (1st Audio Plate, Osc. Plate)	$ .25
22-125	8.	"	440 Volt (Filter)	1.00
22-127	25	Mmfd.	500 Volt (Osc. Grid.)	.15
22-170	.1	Mfd.	400 Volt (1st Audio bypass)	.25
22-182	.000025	"	600 Volt (A.V.C. Bypass)	.12
22-188	.02	"	400 Volt (1st & 2nd Audio Coupling)	.15
22-229	.005	"	600 Volt (Osc. Grid)	.15
22-250	.05	"	200 Volt (1st Det. I. F. Screen, A.V.C.)	.15
22-287	.03	"	600 Volt (Tone Control)	.15
22-290	Three-gang variable			3.25
22-292	Padder			.45
22-305	.35	Mmfd.	Padder (Osc. Grid)	.15
22-310	.2	Mfd.	200 Volt (1st I.F. Cathode)	.15
22-312	.01	"	200 Volt (2nd Detector Cathode)	.10

Resistors

63-258	490 M Ohms 1/4 Watt (A.V.C. Filter)	.20
63-278	99 M " 1/4 Watt (1st Adio Plate, Osc. Grid)	.20
63-293	990 M " 1/4 Watt (Power & 1st Audio Grid)	.20
63-351	Candohm Voltage Divider	.65
63-353	19 M Ohms 1/4 Watt (Tone Control)	.20
63-357	300 " 1/4 Watt (I.F. Cathode & 1st Detector Cathode)	.20
63-366	Volume Control and Switch	.90
63-373	11 M Ohms 1/4 Watt (Osc. Plate)	.25

Coils

S-3048	Oscillator Coil and Shield Assembly	1.00
S-3049	Selector Coil and Shield Assembly	1.75
95-227	1st I. F. Transformer Complete with Shield	1.50
95-230	2nd I. F. Transformer " " "	1.50

MODEL S-847
Chassis 5507

Same as Chassis 5504 less #49-81 Speaker and with #49-79 Speaker Added

49-79	8" Dynamic Speaker	8.00
	Cone and Voice Coil for #49-79 Speaker	2.50
	Output Transformer " " " "	2.00
	Field Coil " " " "	2.00

MODEL 807
Chassis 5506

Same as Chassis 5504 less S-3061 Dial, 46-82 Knobs and 57-436 Escutcheon and addition of the following:

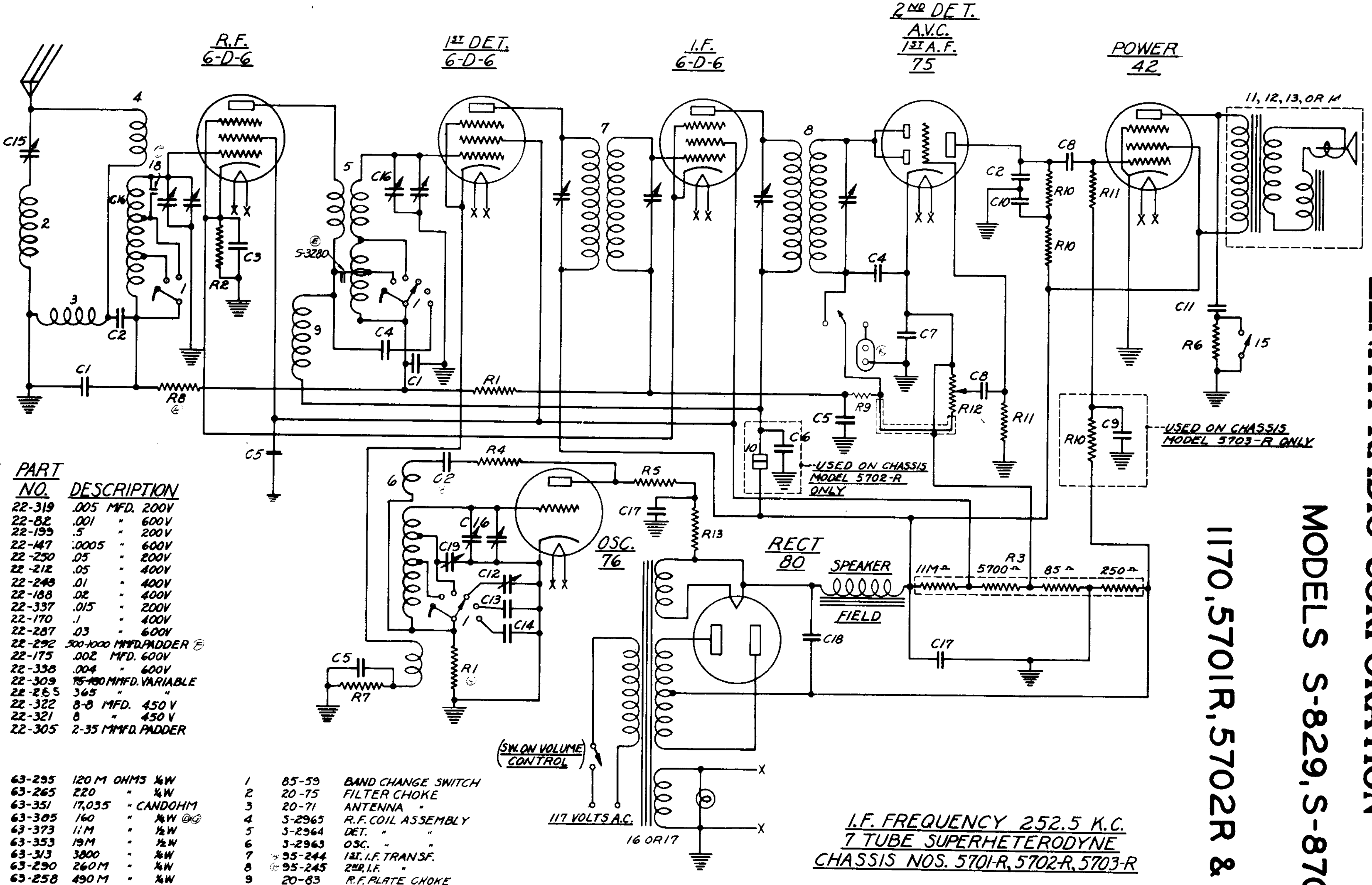
12-372	Tuning Shaft, Bracket and Frame Assembly	.65
26-54	Dial Scale	.25
27-5	Celluloid Drive Disc and Hub Assembly	.25
46-87	Small Knob (1 used)	.10
46-88	Large Knob (3 used)	.10
57-435	Escutcheon Plate for Airplane Dial	.40
59-27	Pointer for Dial	.15
73-22	Set Screw for 27-5	.03
93-207	Cork Cushion Washer for Glass	.05
92-3	Glass for Dial	.20

MODEL 850
Chassis 5505

Same as Chassis 5506 less 49-81 Speaker and addition of 49-79 Speaker

ZENITH RADIO CORPORATION

MODELS S-829, S-870, S-871, 1170, 5701R, 5702R & 5703R



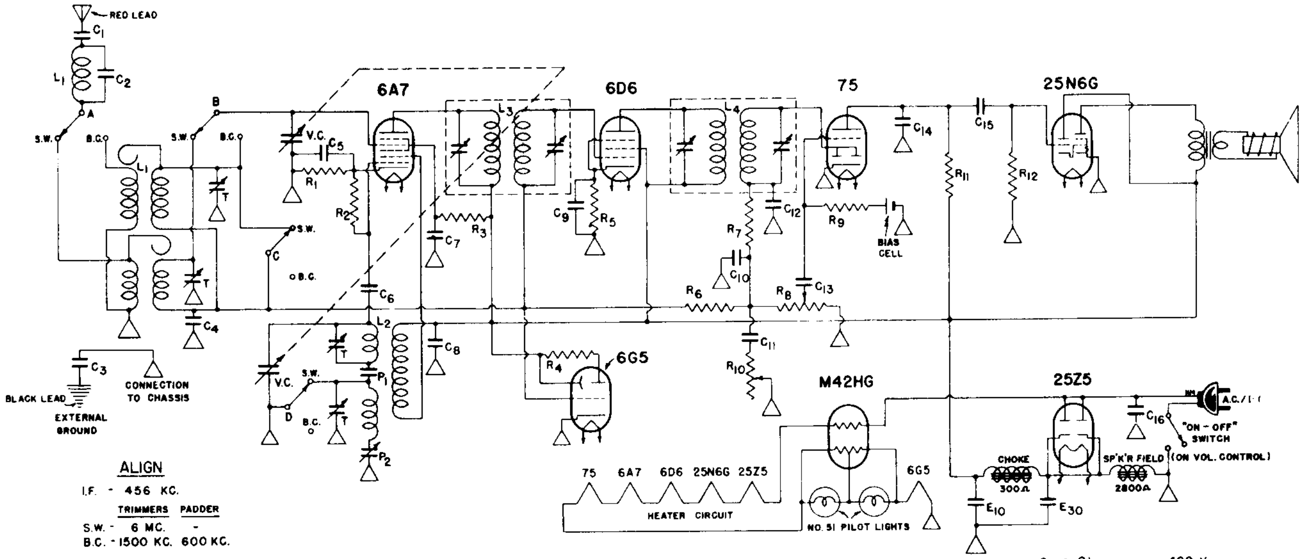
I.F. FREQUENCY 252.5 K.C.
7 TUBE SUPERHETERODYNE
CHASSIS NOS. 5701-R, 5702-R, 5703-R

DIAG NO.	PART NO.	DESCRIPTION
C1	22-319	.005 MFD. 200V
C2	22-82	.001 " 600V
C3	22-199	.5 " 200V
C4	22-147	.0005 " 600V
C5	22-250	.05 " 200V
C6	22-212	.05 " 400V
C7	22-248	.01 " 400V
C8	22-188	.02 " 400V
C9	22-337	.015 " 200V
C10	22-170	.1 " 400V
C11	22-287	.03 " 600V
C12	22-292	500-1000 MMFD. PADDER Ⓕ
C13	22-175	.002 MFD. 600V
C14	22-338	.004 " 600V
C15	22-309	15-180 MMFD. VARIABLE
C16	22-265	365 " "
C17	22-322	8-8 MFD. 450 V
C18	22-321	8 " 450 V
C19	22-305	2-35 MMFD. PADDER
R1	63-295	120 M OHMS ¼W
R2	63-265	220 " ¼W
R3	63-351	17,035 " CANDOHM
R4	63-305	160 " ¼W ⒹⒼ
R5	63-373	11 M " ½W
R6	63-353	19 M " ½W
R7	63-313	3800 " ¼W
R8	63-290	260 M " ¼W
R9	63-258	490 M " ¼W
R10	63-278	99 M " ¼W
R11	63-293	990 M " ¼W
R12	63-338	200 M OHMS VOL. CON.
R13	63-388	19 M " 1W.

18-3-3280 APPROX. 10 MMFD. COUP. COND.

1	85-59	BAND CHANGE SWITCH
2	20-75	FILTER CHOKE
3	20-71	ANTENNA "
4	S-2965	R.F. COIL ASSEMBLY
5	S-2964	DET. " "
6	S-2963	OSC. " "
7	95-244	1ST. I.F. TRANSF.
8	95-245	2ND. I.F. "
9	20-83	R.F. PLATE CHOKE
10	122-8	SHADOW METER
11	49-76	6" SPEAKER
12	49-86	8" "
13	49-97	12" "
14	49-98	12" AUDITORIUM SPEAKER
15	85-56	TONE CONTROL SWITCH
16	95-234	POWER TRANSF. 50-60 CYCLE
17	95-229	" " 25 CYCLE

AIR-KING PRODUCTS COMPANY, INC.
MODEL 725



R_1 - 250 OHM 1/4 WATT
R_2 - 50,000 " " "
R_3 - 35,000 " " "
R_4 - 1,000,000 " " "
R_5 - 300 " " "
R_6 - 1,000,000 " " "
R_7 - 50,000 " " "
R_8 - 500,000 " VOL. CONTROL
R_9 - 750,000 " 1/4 WATT
R_{10} - 500,000 " TONE CONTROL
R_{11} - 300,000 " 1/4 WATT
R_{12} - 1,000,000 " " "

SWITCHES A,B,C,D, - 4 POLE DOUBLE THROW WAVE BAND SWITCH.

L_1 - COMBINATION ANTENNA-WAVE TRAP COIL
L_2 - COMBINATION OSCILLATOR COIL
L_3 - 456 KC. INPUT I.F.
L_4 456 KC. OUTPUT I.F.

P_1 - 1600 MMF. MICA PADDER
P_2 - 500 MMF. MAX. PADDER

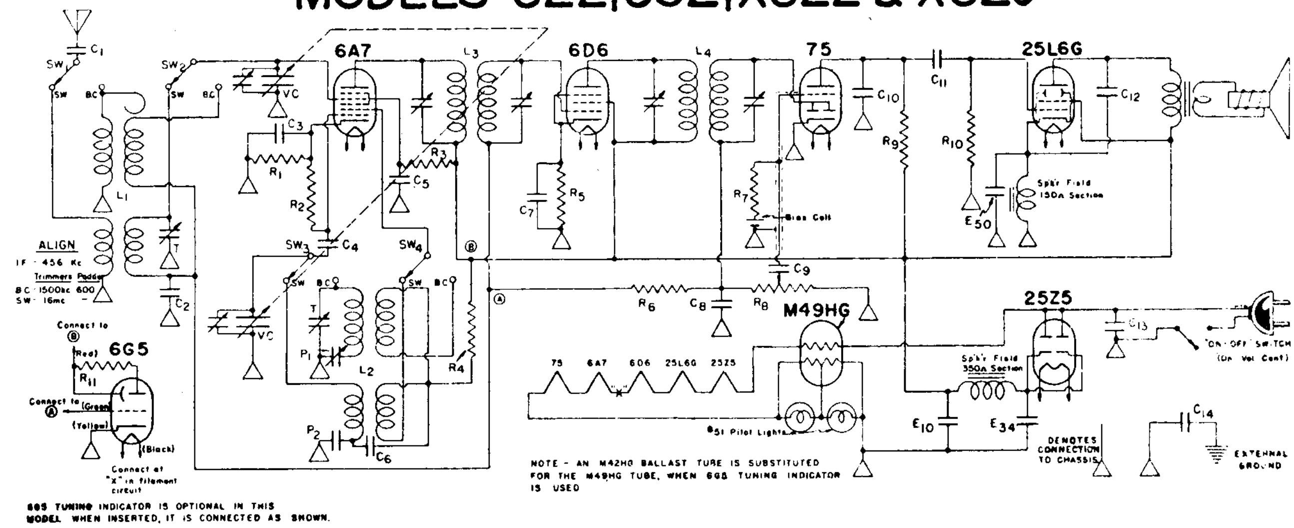
E_{10} - 10 MFD. 150 V.W.
E_{30} - 30 " " "

V.C. - 410 MMF. MAX. VARIABLE COND.

T - 3-35 MMF. TRIMMER

C_1 - .01 - 400 V.
C_2 - .00048 - MICA
C_3 - .05 - 400 V.
C_4 - .05 - "
C_5 - .1 - 200 V.
C_6 - .0001 - MICA
C_7 - .02 - 200 V.
C_8 - .02 - "
C_9 - .1 - "
C_{10} - .0001 - MICA
C_{11} - .005 - 600 V.
C_{12} - .0001 - MICA
C_{13} - .02 - 200 V.
C_{14} - .0001 - MICA
C_{15} - .02 - 200 V.
C_{16} - .1 - 400 V.

MODELS 822, 832, X822 & X826



R_1 - 250 OHM 1/4 WATT
R_2 - 50,000 " " "
R_3 - 35,000 " " "
R_4 - 4,500 " " "
R_5 - 400 " " "
R_6 - 3,000,000 " " "
R_7 - 1,000,000 " " "
R_8 - 500,000 " VOL CONTROL
R_9 500,000 " 1/4 WATT
R_{10} - 500,000 " " "
R_{11} - 1,000,000 " " "

$SW_{1,2,3,4}$ - 4 POLE DOUBLE THROW WAVE BAND SWITCH

L_1 - COMB. ANTENNA COIL
L_2 - COMB. OSCILLATOR COIL
L_3 - 456 KC INPUT I.F.
L_4 - 456 KC OUTPUT I.F.

P_1 - 500 MMF MAX
P_2 - .0034 MFD. MICA

E_{10} - 10 MFD 150 VW.
E_{34} - 34 MFD " "
E_{50} - 50 MFD 15 "

V.C - 410 MMF MAX VARIABLE

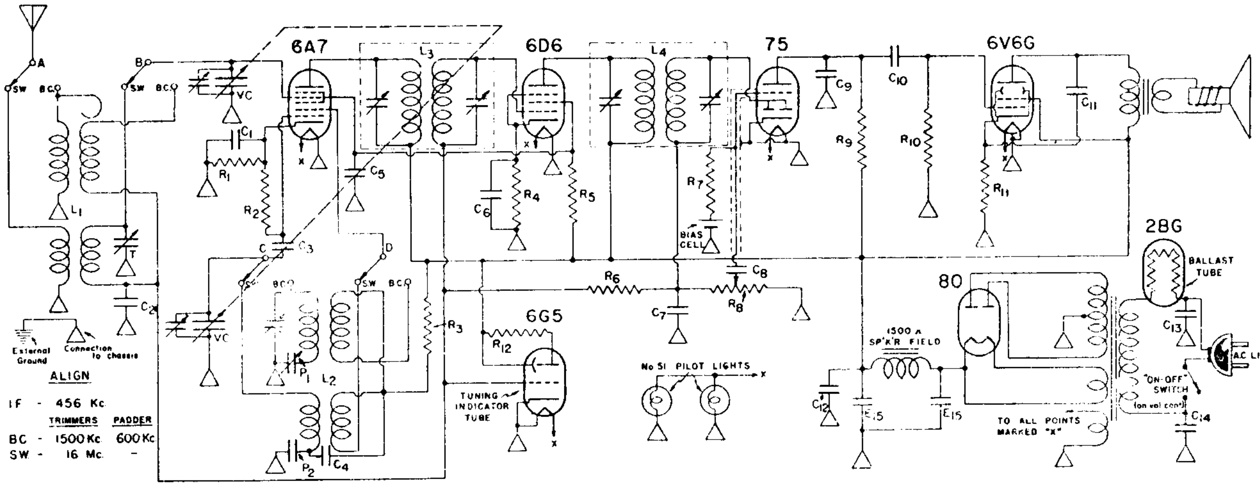
T - 3-35 MMF TRIMMER

C_1 - .005 400 V
C_2 - .05 200 V
C_3 - .05 200 V
C_4 - .0001 MICA
C_5 - .02 400 V
C_6 - .02 400 V
C_7 - .05 200 V
C_8 - .00025 MICA
C_9 - .02 400 V
C_{10} - .00025 MICA
C_{11} - .02 400 V
C_{12} - .01 400 V
C_{13} - .05 400 V
C_{14} - .05 400 V

The frequency ranges covered are: Standard broadcast 540 to 1740 kc. Foreign Short Wave 5.7 to 18.7 meg.

AIR-KING PRODUCTS COMPANY, INC.

MODELS 823 & 833



R_1	250	OHM	1/4	WATT
R_2	50,000	"	"	"
R_3	20,000	"	"	"
R_4 -	400	"	"	"
R_5 -	35,000	"	"	"
R_6 -	6,000,000	"	"	"
R_7 -	1,000,000	"	"	"
R_8 -	500,000	"	VOL. CONTROL	
R_9 -	500,000	"	1/4	WATT
R_{10} -	500,000	"	"	"
R_{11}	300	"	1/2	"
R_{12} -	1,000,000	"	1/4	"

SWITCHES A,B,C,D - Four Pole Double Throw Wave Band Switch

L_1 COMBINATION ANT COIL
L_2 - COMBINATION OSC COIL
L_3 - 456 Kc INPUT I.F.
L_4 - 456 Kc OUTPUT I.F.

VC - 410 MMF. MAX VAR COND.

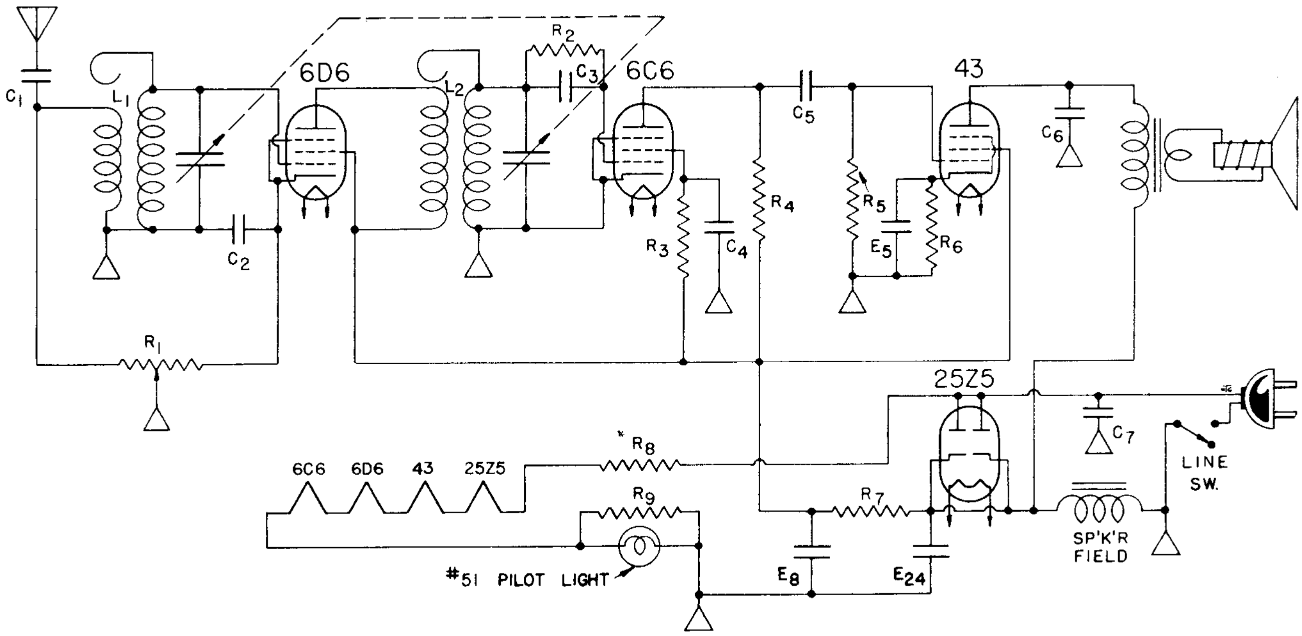
T 3-35 MMF TRIMMERS

P_1 - 500 MMF MAX PADDER
P_2 - 3400 MMF FIXED PADDER

C_1	05	200 V.
C_2	.05	"
C_3	.0001	MICA
C_4	02	400 V.
C_5	05	200 V.
C_6	05	"
C_7	00025	MICA
C_8	02	400 V
C_9	.00025	MICA
C_{10}	.02	400 V.
C_{11}	01	"
C_{12}	.05	"
C_{13}	02	"
C_{14}	02	"

The frequency ranges covered are: Standard broadcast 540 to 1740 kc. Foreign Short Wave 5.7 to 18.7 meg.

MODELS 1001 & 2001



R_1 -	25,000	OHM	VOL. CONTROL		
R_2 -	3,000,000	"	$\frac{1}{4}$	WATT	
R_3 -	6,000,000	"	"	"	
R_4 -	1,000,000	"	"	"	
R_5 -	750,000	"	"	"	
R_6 -	650	"	$\frac{1}{2}$	WATT	
R_7 -	4 500	"	"	"	
R_8 -	165	"	IN LINE CORD		
R_9 -	31	"	3	WATT	

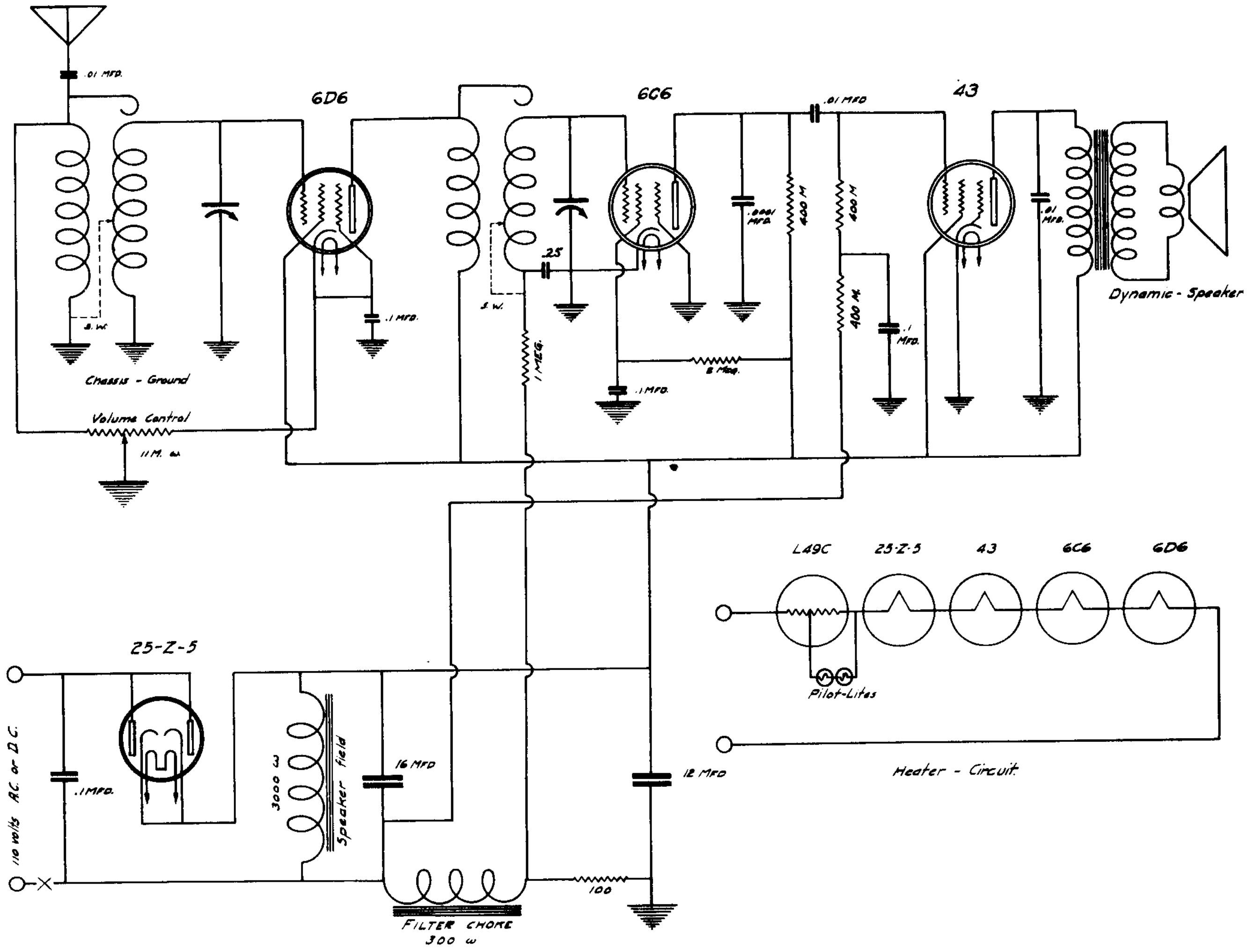
L_1 - ANTENNA COIL
L_2 - R.F. COIL

E_8 -	8	MFD.	150 V.
E_{24} -	24	"	150 V.
E_5 -	5	"	25 V.

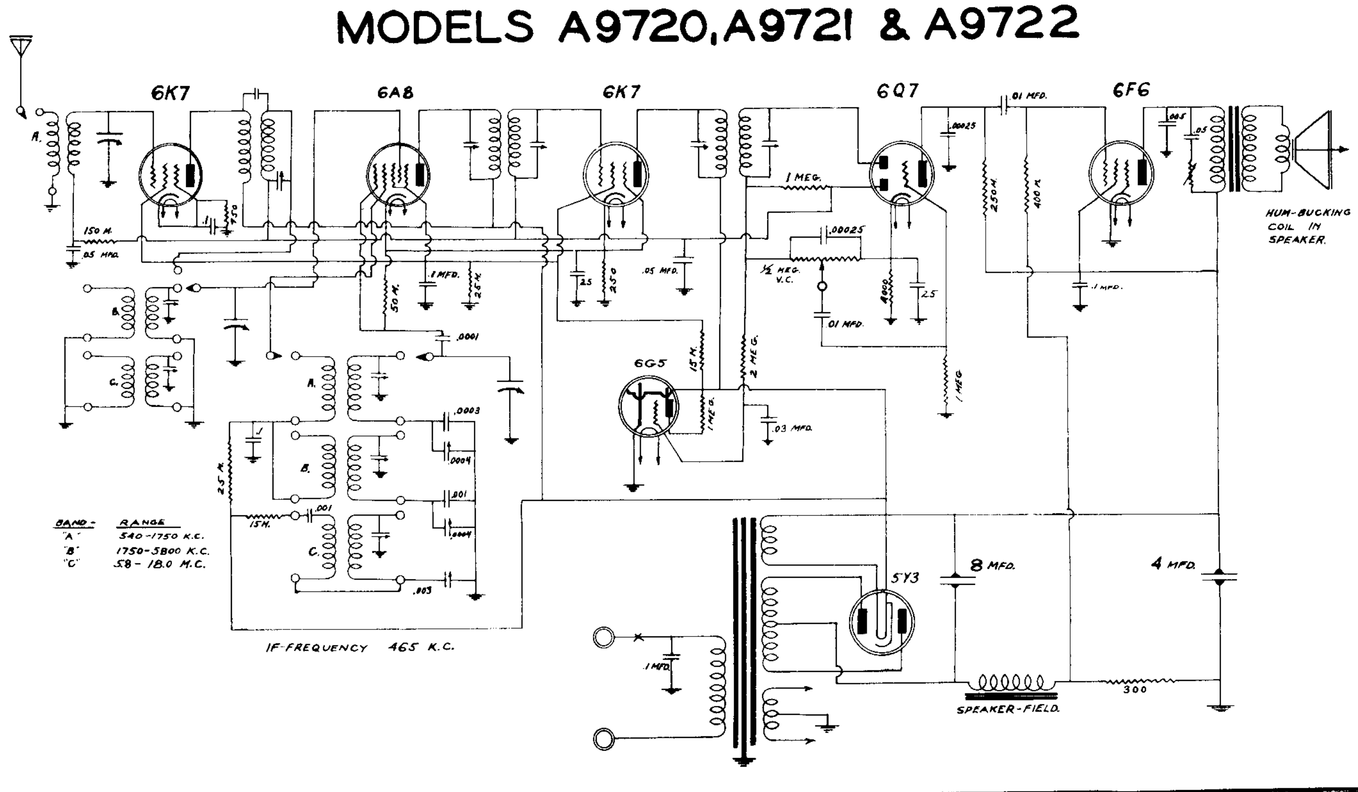
C_1 -	.005	- 400 V.
C_2 -	.02	- 200 V.
C_3 -	.005	- 400 V.
C_4 -	.02	- 200 V.
C_5 -	.02	- 200 V.
C_6 -	.01	- 200 V.
C_7 -	.1	- 400 V.

ALLIED RADIO CORPORATION

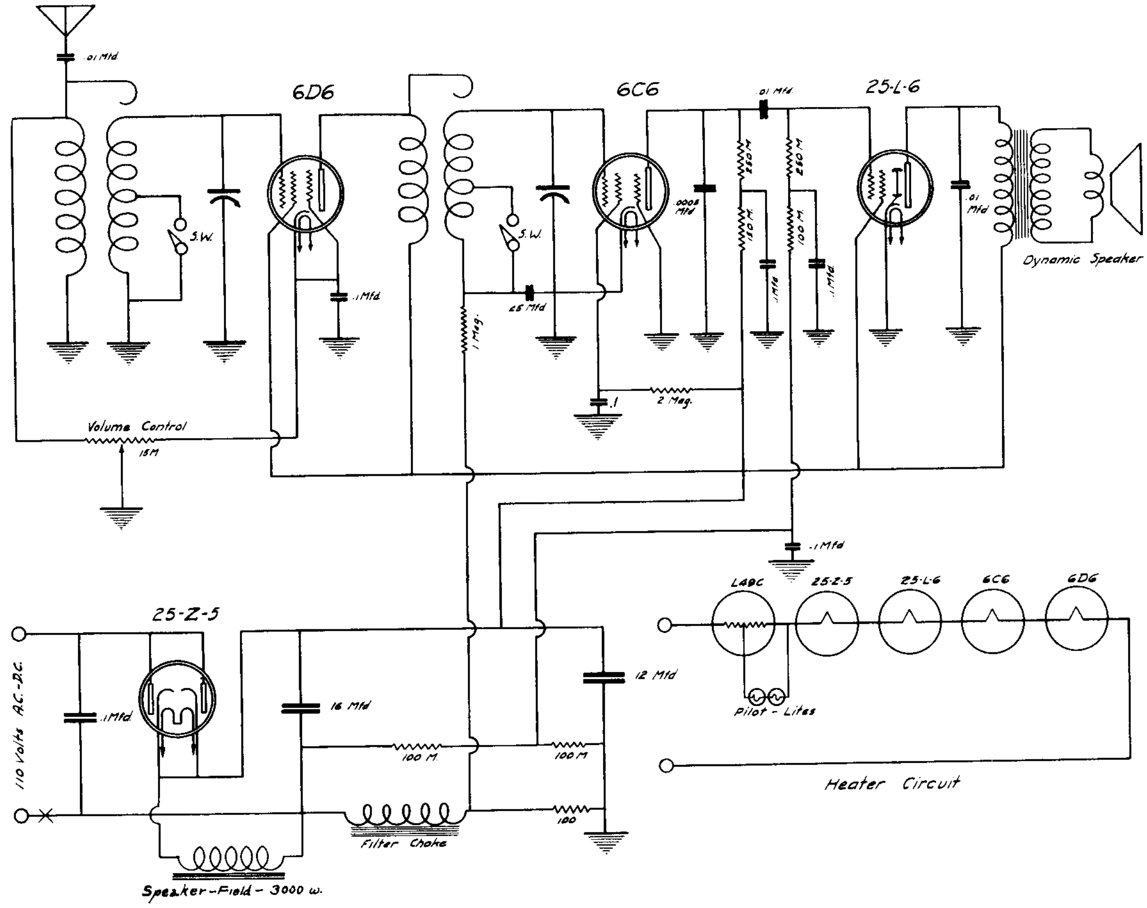
MODELS A9701, A9702, A9703, A9704, A9715, A9716, A9717 & A9718



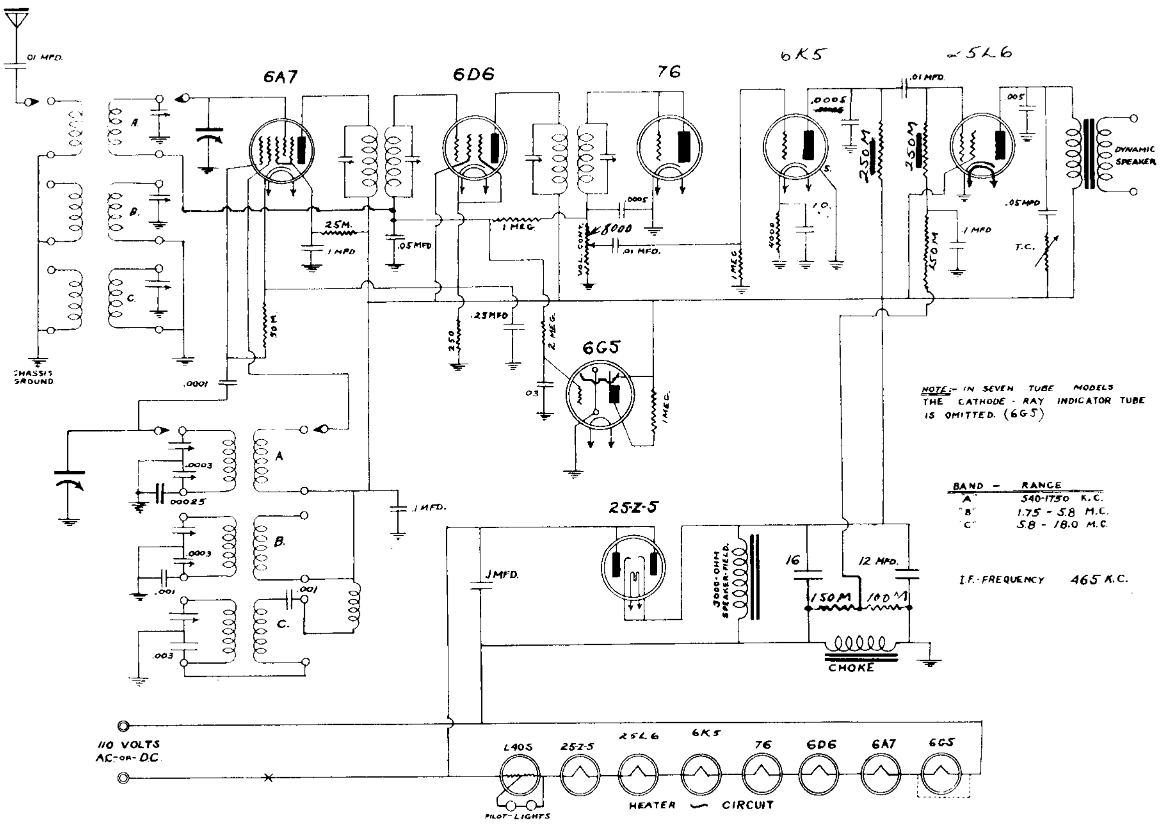
MODELS A9720, A9721 & A9722



ALLIED RADIO CORPORATION
MODEL A9706

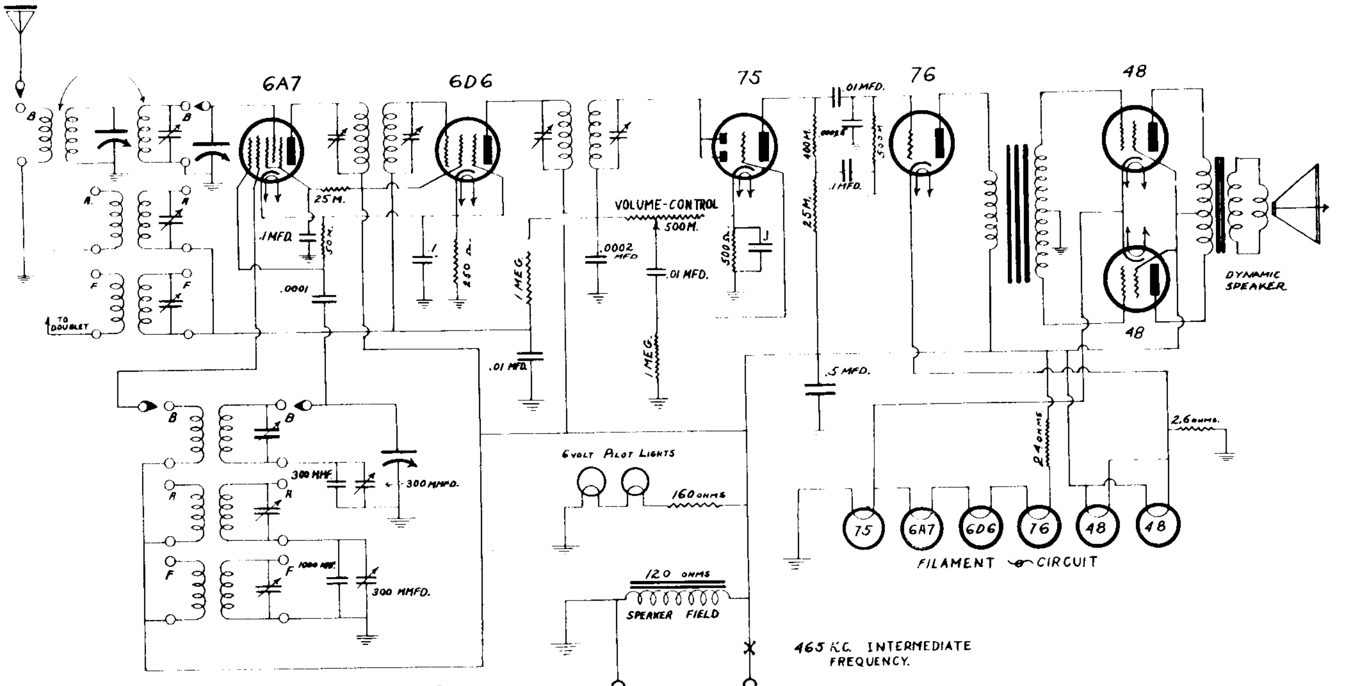


MODELS A9710, A9710E, A9711, A9711E, A9712 & A9712E



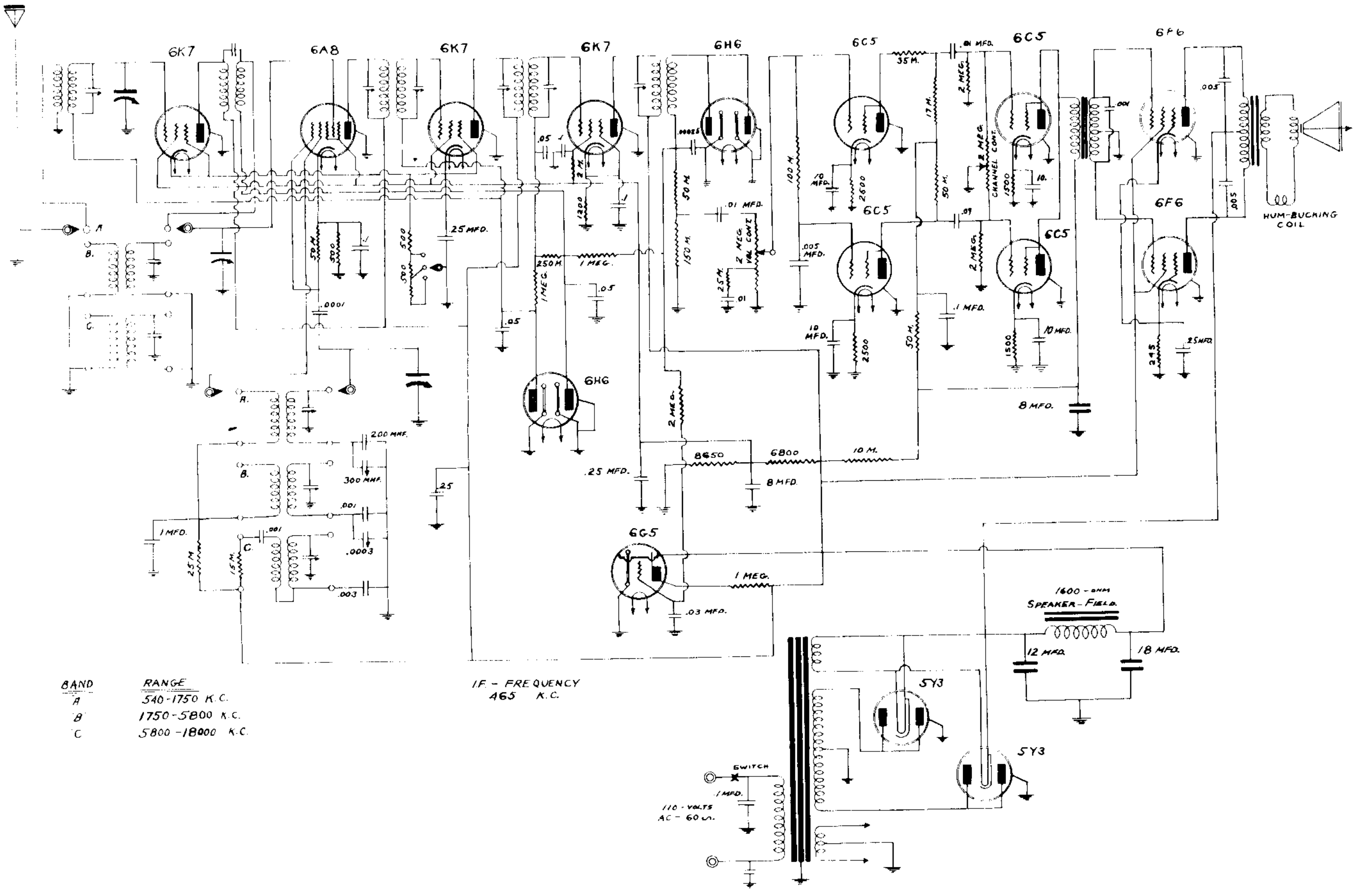
ALLIED RADIO CORPORATION

MODELS A9724, A9725 & A9726



BAND	FREQUENCY RANGE
"B" BROADCAST	540 KC. - 1710 K.C.
"A" AMATEUR	1700 KC. - 5500 K.C.
"F" FOREIGN	5.5 MEG. - 16.5 MEGACYCLES

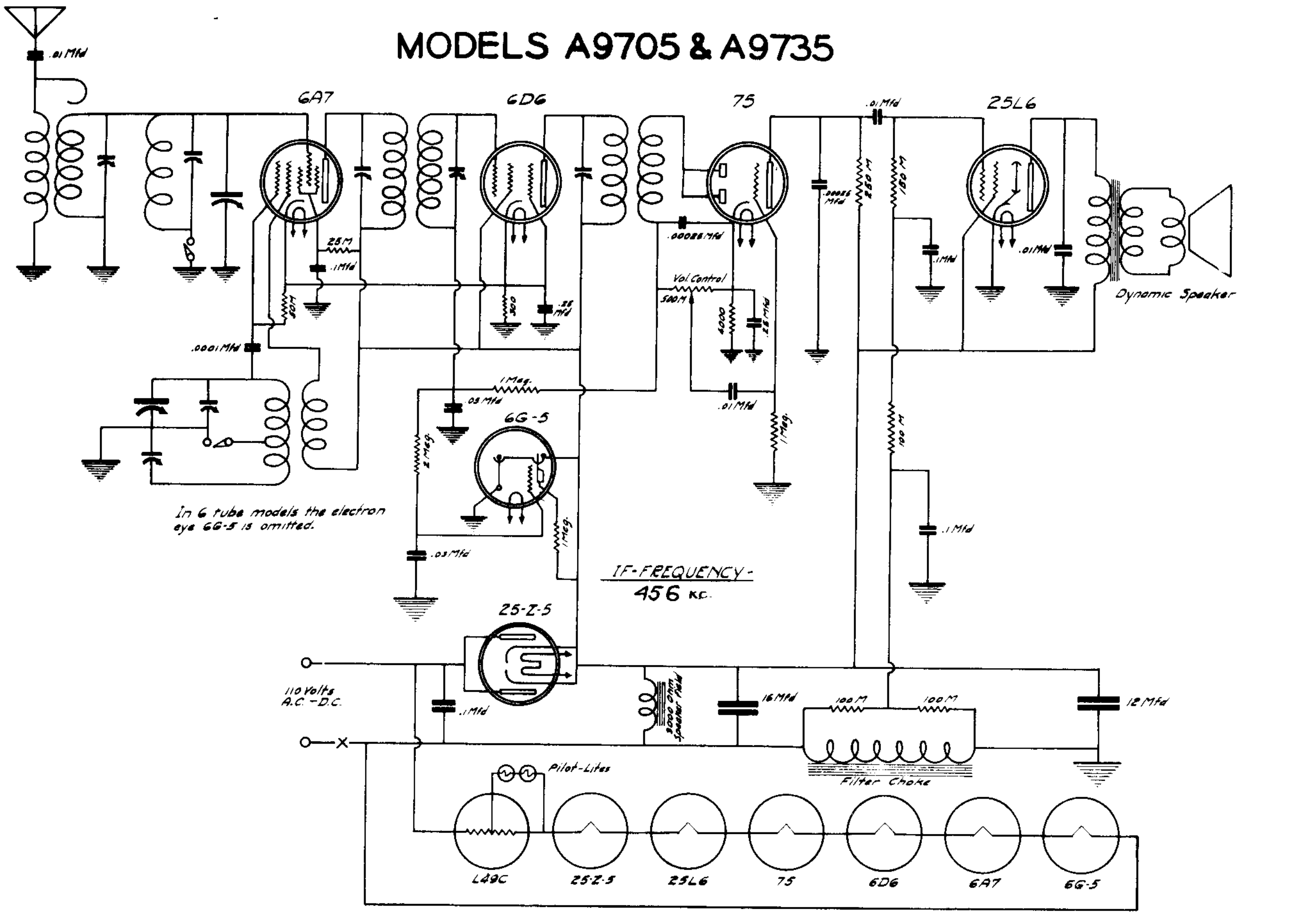
MODELS A9733 & A9734

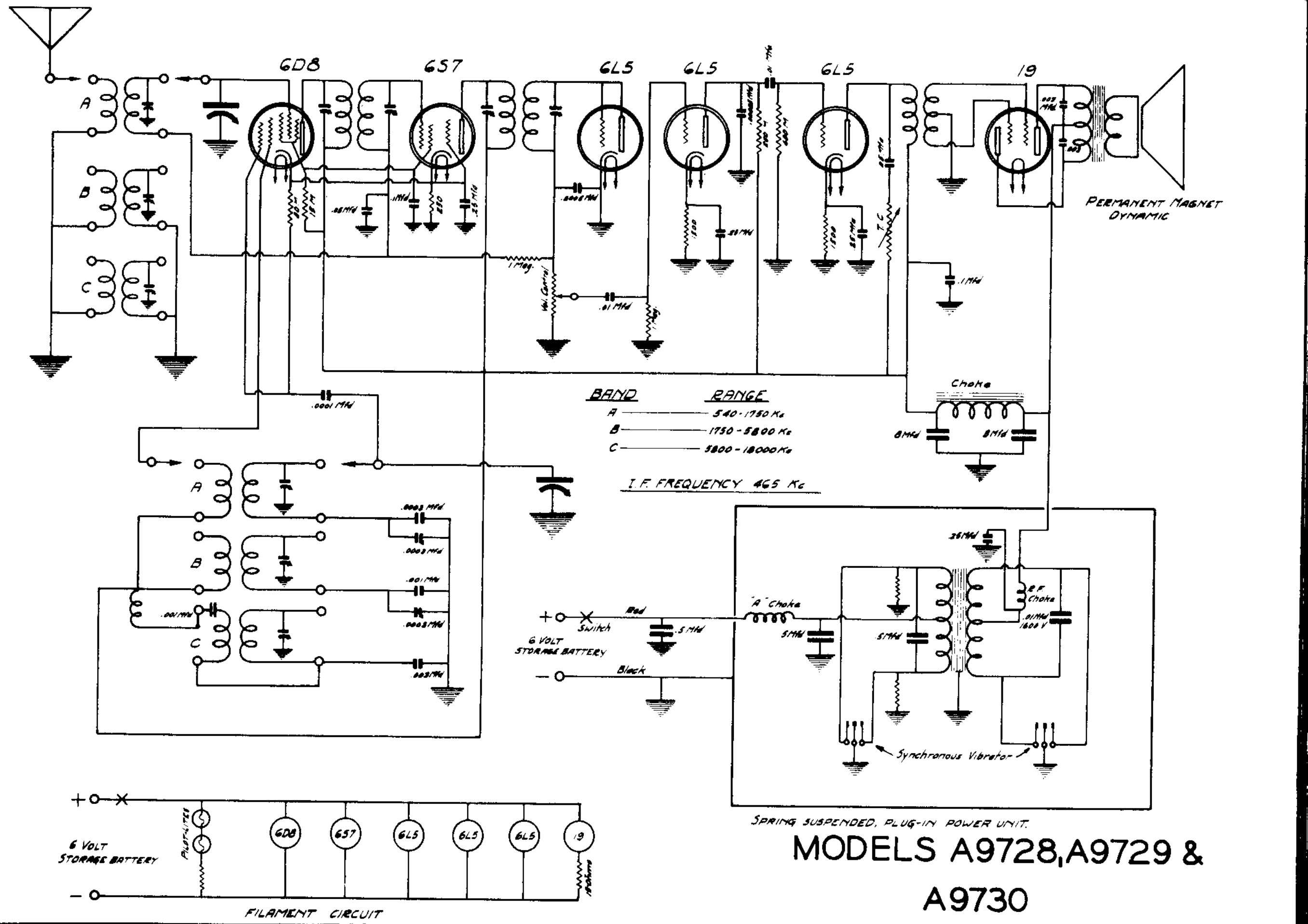


BAND	RANGE
A	540-1750 K.C.
B	1750-5800 K.C.
C	5800-18000 K.C.

ALLIED RADIO CORPORATION

MODELS A9705 & A9735

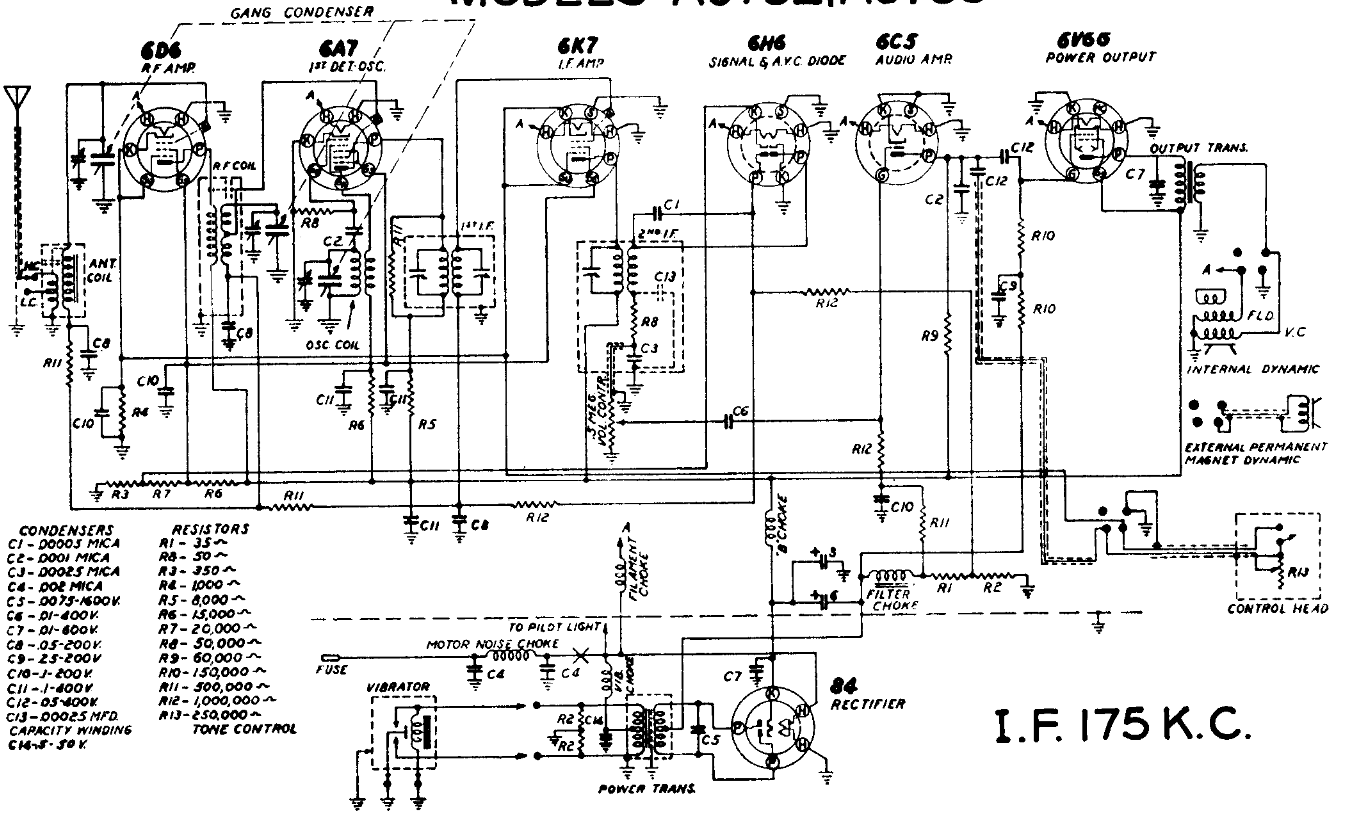




MODELS A9728, A9729 & A9730

ALLIED RADIO CORPORATION

MODELS A9782, A9783 & B7

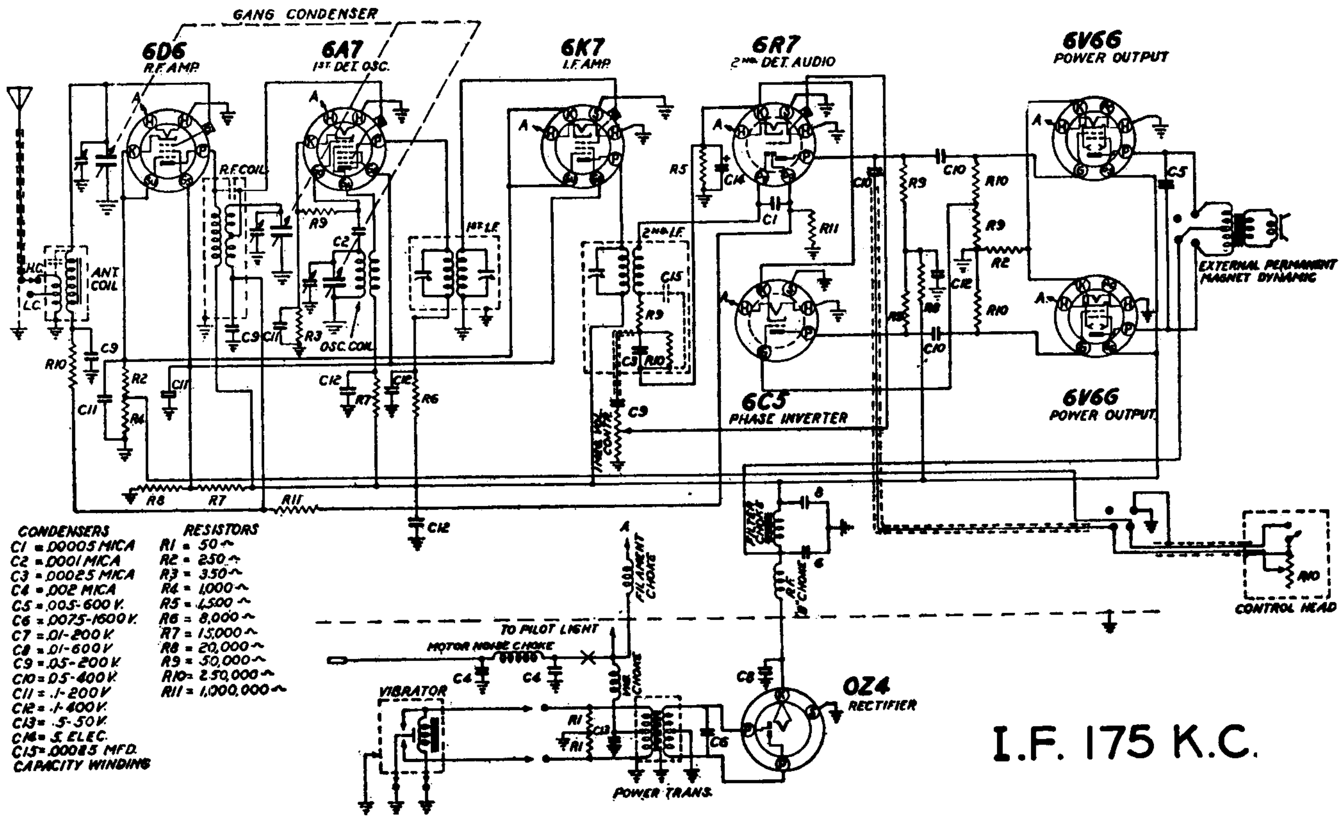


CONDENSERS
C1 - .00005 MICA
C2 - .0001 MICA
C3 - .00025 MICA
C4 - .002 MICA
C5 - .0075-1600V.
C6 - .01-400V.
C7 - .01-600V.
C8 - .05-200V.
C9 - .25-200V
C10 - .1-200V.
C11 - .1-400V.
C12 - .05-400V.
C13 - .00025 MFD. CAPACITY WINDING
C14 - .5-50V.

RESISTORS
R1 - 35 ~
R8 - 50 ~
R3 - 350 ~
R4 - 1,000 ~
R5 - 8,000 ~
R6 - 15,000 ~
R7 - 20,000 ~
R8 - 50,000 ~
R9 - 60,000 ~
R10 - 150,000 ~
R11 - 500,000 ~
R12 - 1,000,000 ~
R13 - 250,000 ~ TONE CONTROL

I.F. 175 K.C.

MODELS A9784 & B8



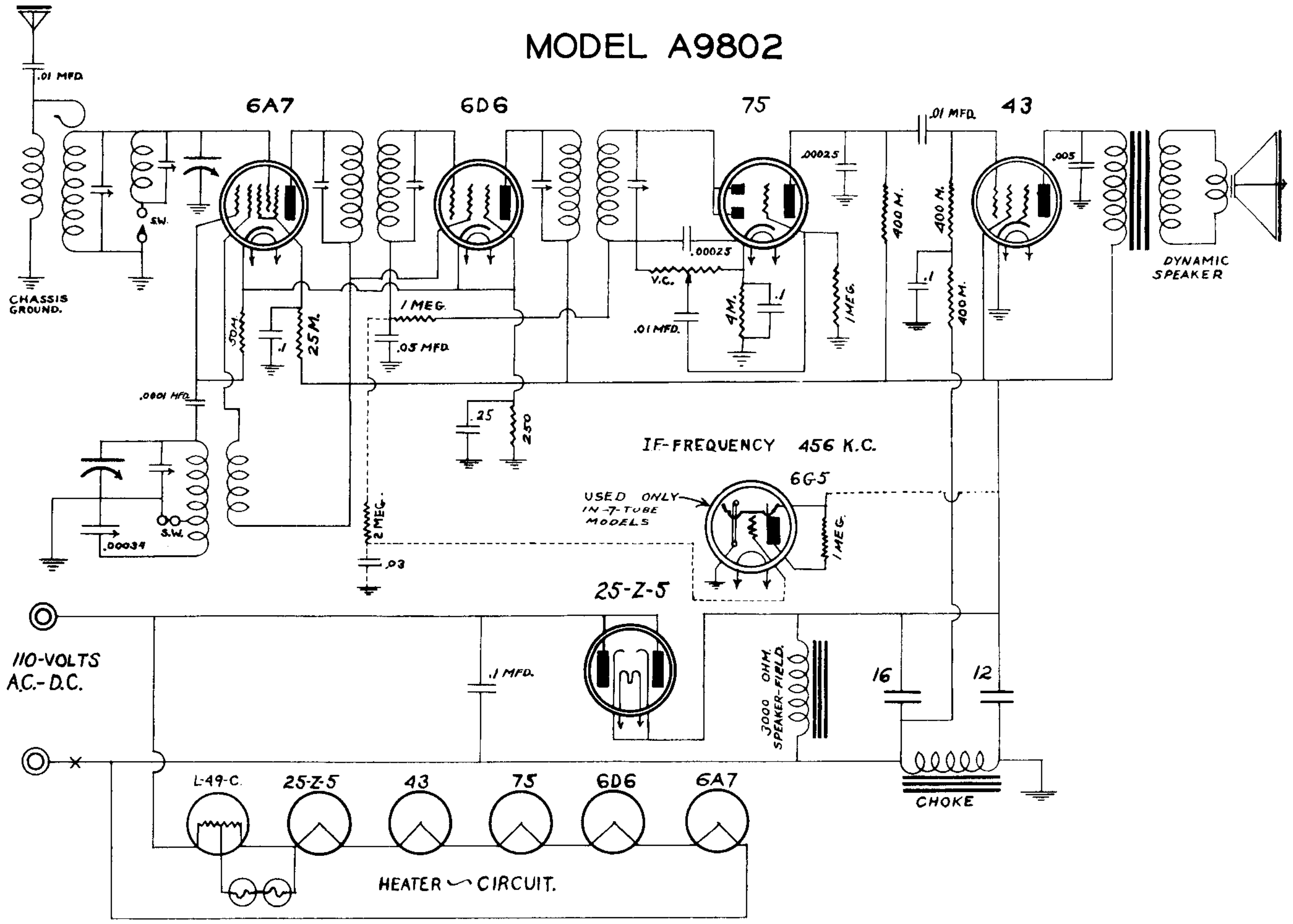
CONDENSERS
C1 = .00005 MICA
C2 = .0001 MICA
C3 = .00025 MICA
C4 = .002 MICA
C5 = .005-600 V.
C6 = .0075-1600 V.
C7 = .01-200 V.
C8 = .01-600 V
C9 = .05-200 V.
C10 = .05-400 V.
C11 = .1-200 V
C12 = .1-400 V.
C13 = .5-50 V.
C14 = .5 ELEC.
C15 = .00085 MFD. CAPACITY WINDING

RESISTORS
R1 = 50 ~
R2 = 250 ~
R3 = 350 ~
R4 = 1,000 ~
R5 = 4,500 ~
R6 = 8,000 ~
R7 = 15,000 ~
R8 = 20,000 ~
R9 = 50,000 ~
R10 = 250,000 ~
R11 = 1,000,000 ~

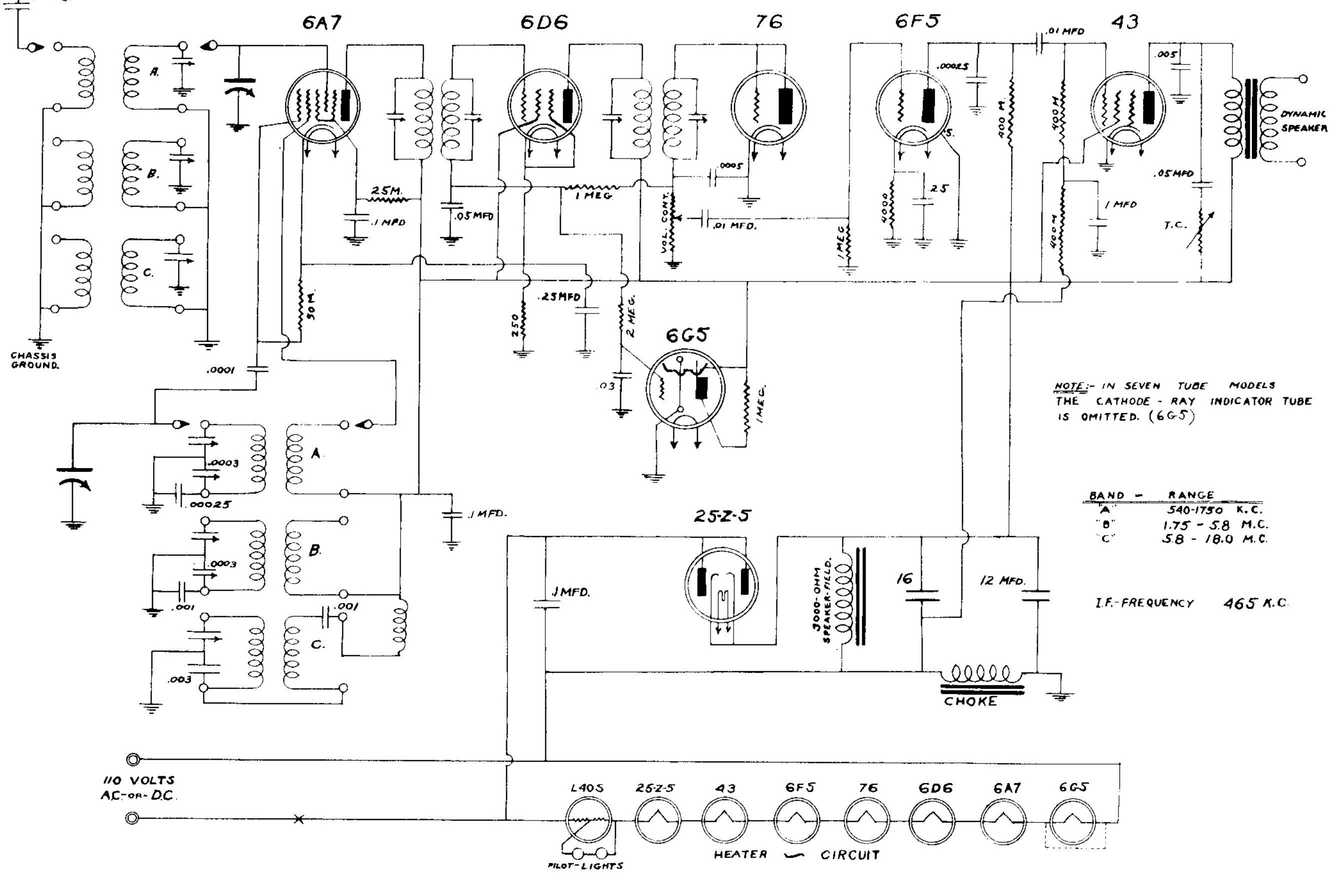
I.F. 175 K.C.

ALLIED RADIO CORPORATION

MODEL A9802

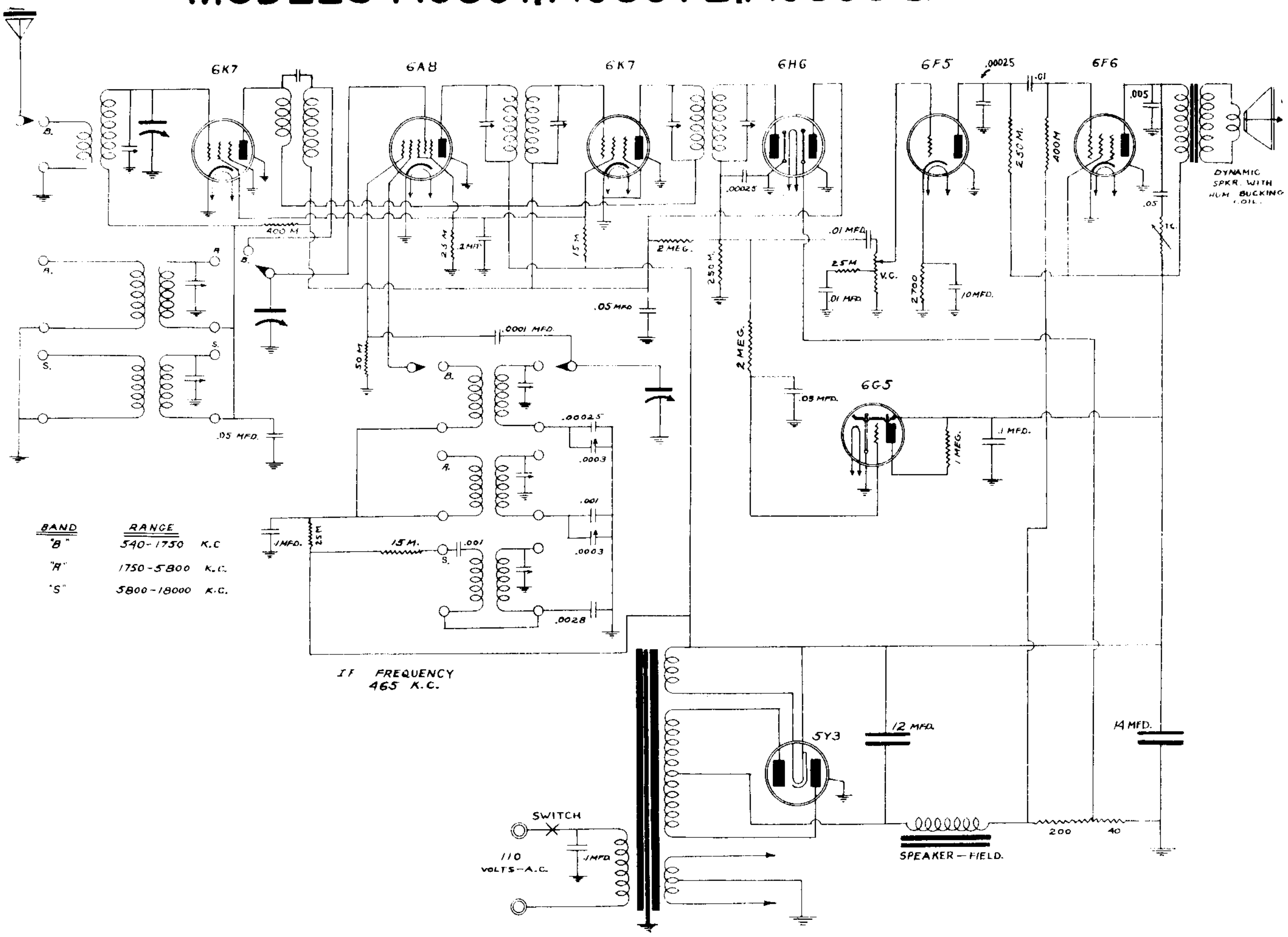


MODELS A9805, A9805E, A9806 & A9806E

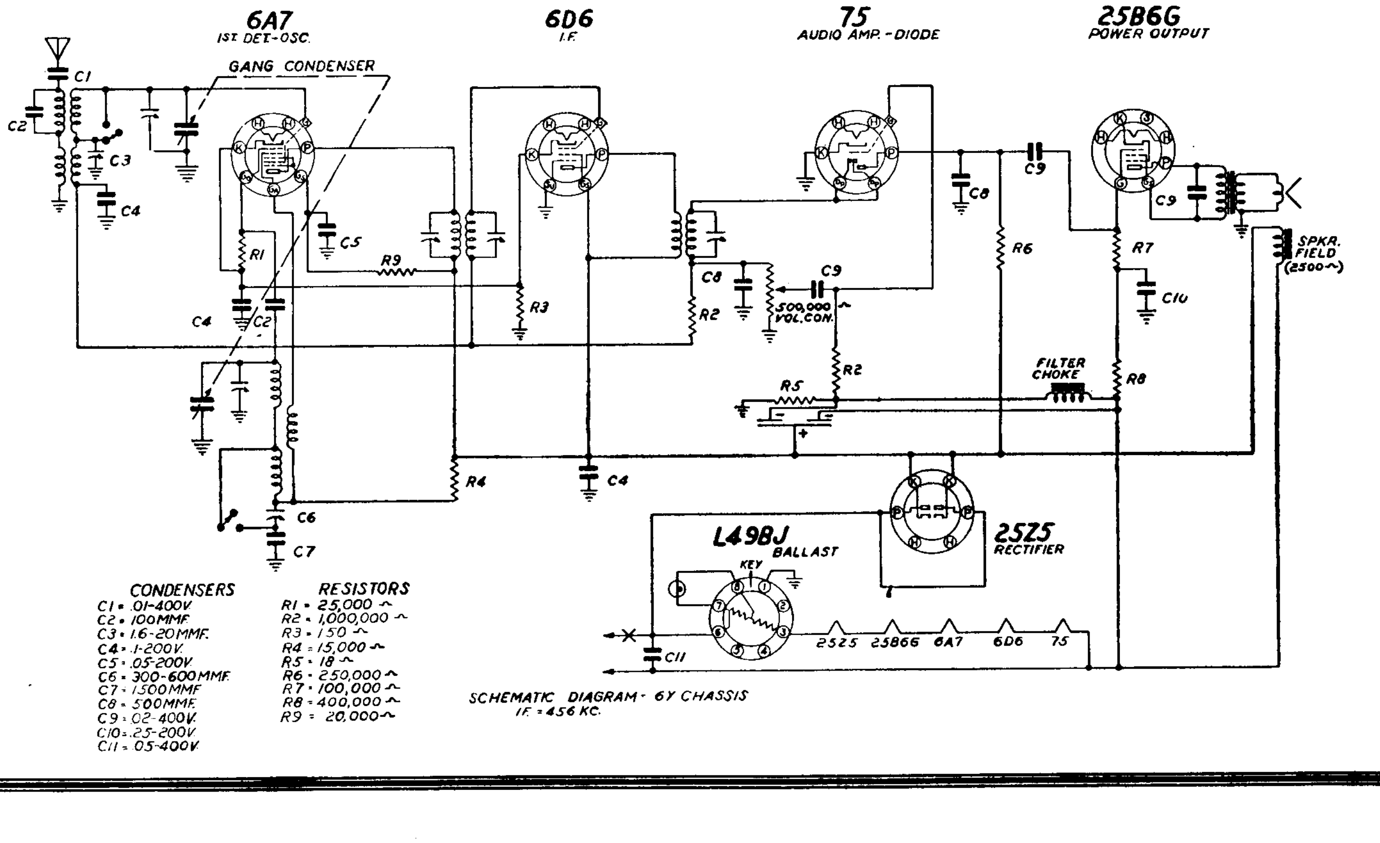


ALLIED RADIO CORPORATION

MODELS A9807, A9807E, A9808 & A9808E

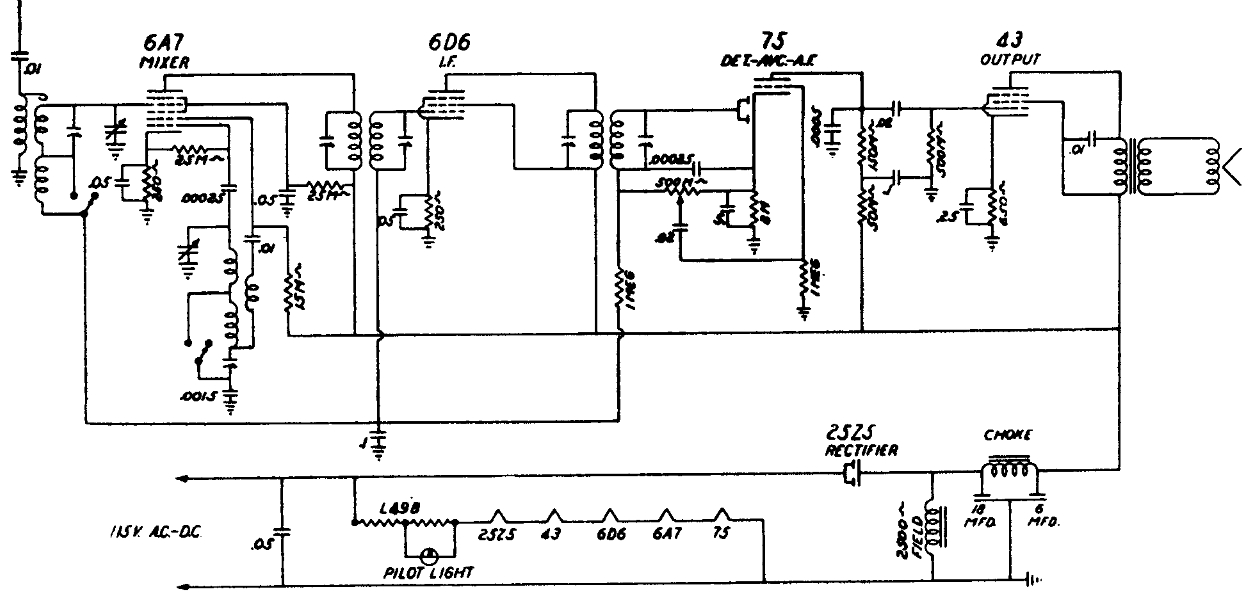


MODELS 6Y, A10502 & A10503



ALLIED RADIO CORPORATION

MODELS A9851 & B2



SCHEMATIC DIAGRAM
B2 CHASSIS
6 TUBE AC.-DC. 2 BAND — B.C.- 540 TO 1720 KC. / S.W. 2000 TO 7000 KC
I F = 456 KC.
SWITCH SHOWN IN B.C. POSITION

This receiver is designed to operate over two tuning ranges. Upper band which covers the broadcast range, extends from 545 to 1750 kilocycles (175 to 550 meters), lower band which covers Police, Aviation, and the International 49 Meter Foreign Band.

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, and 6000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, the Short Wave Band may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tubes (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the ouput meter.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna lead (Blue) through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the rear gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak.

Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R.F. section. The padding condenser is located on the right hand end of the chassis near the 6A7 tube.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Band.

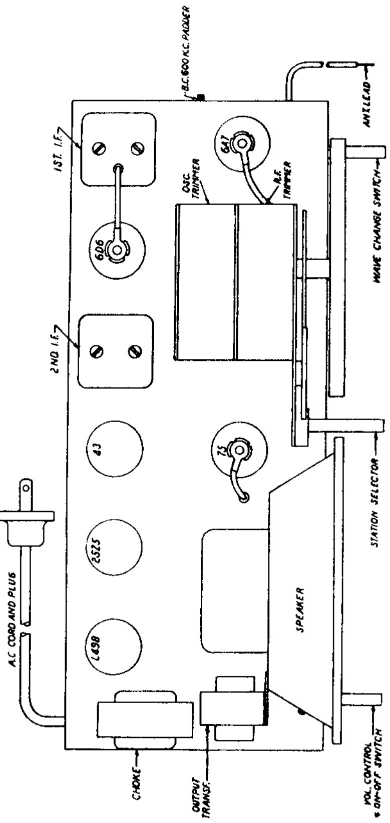
SHORT WAVE BAND There is only one adjustment to be made in the alignment of the Short Wave Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary.

Set the dial pointer to 600 KC (also the test oscillator) and adjust the antenna and antenna trimmer to resonance. The short wave band coils are under the chassis and are located at the right front corner along side of wave band switch.

IMPORTANT: This is the only adjustment necessary for the Short Wave Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Short Wave Band, otherwise the Broadcast Band will be thrown out of alignment.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 6000 KC.

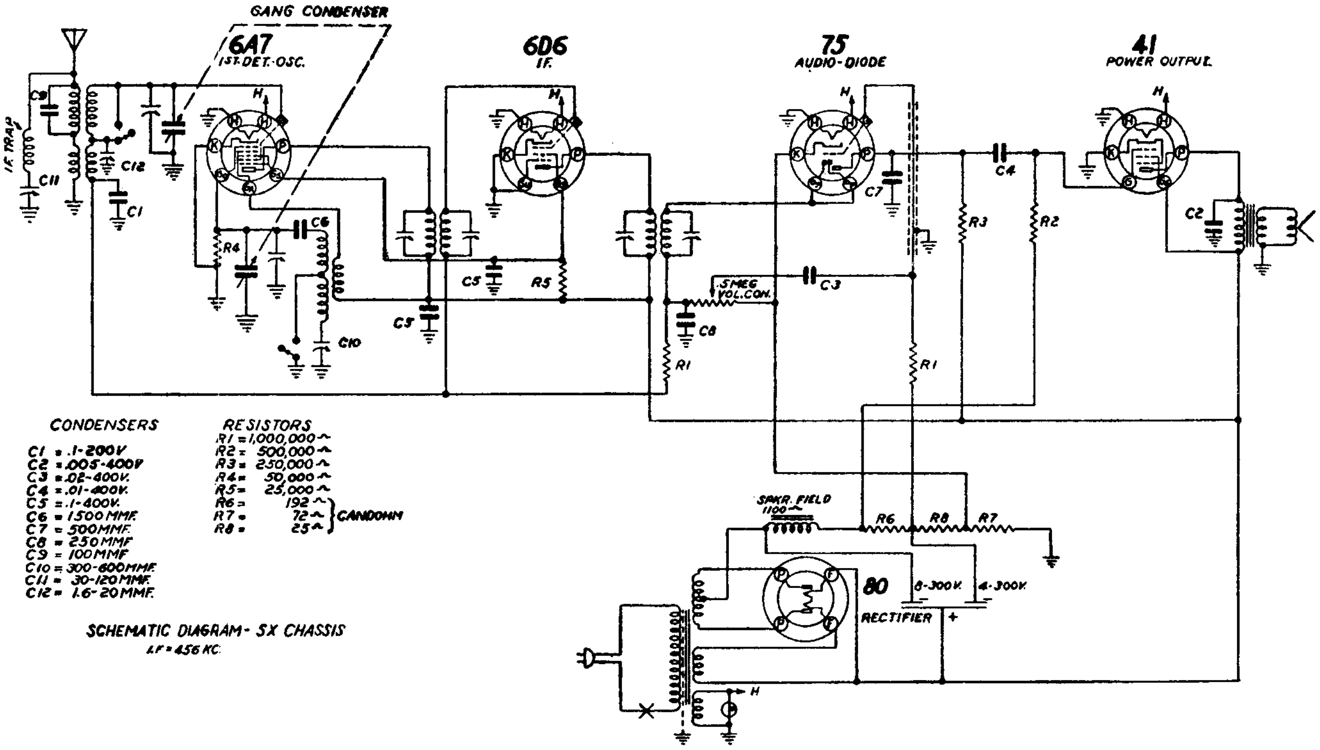
This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and MUST ALWAYS BE DONE BEFORE attempting to align the Short Wave Band.



Part No.	Description	Part No.	Description	Part No.	Description
P189	1st I. F. Transformer	P559	25Z5 Tube Socket	P417	50,000 Ohm ¼ Watt Resistor
P190	2nd I. F. Transformer	P947	L49B Tube Socket	P418	150,000 Ohm ¼ Watt Resistor
P948	Antenna Coil	P928	Speaker With Output	P137	500,000 Ohm ¼ Watt Resistor
P949	Oscillator Coil	P929	AC Cord & Plug	P162	1 Megohm ¼ Watt Resistor
P841	Choke Coil	P930	Knob	P142	.10 - 200 Volt Condenser
P913	Wave Change Switch	P921	Pointer	P143	.02 - 400 Volt Condenser
P911	2 Gang Variable Condenser	P922	Dial Scale	P147	.00025 Mica Condenser
P912	Volume Control with Switch	P923	Dial Glass	P148	.05 - 200 Volt Condenser
P617	Padding Condenser	P124	Pilot Light	P276	.10 - 400 Volt Condenser
P544	Small Trimmer Condenser	P136	250 Ohm ¼ Watt Resistor	P335	.01 - 600 Volt Condenser
P194	Tube Shield	P953	650 Ohm ½ Watt Resistor	P336	.0005 Mica Condenser
P195	Tube Shield Cap	P168	8,000 Ohm ¼ Watt Resistor	P927	.0015 Mica Condenser
P506	6A7 Tube Socket	P258	15,000 Ohm ¼ Watt Resistor	P304	5.0 - 30 Volt Electrolytic Condenser
P521	75 Tube Socket	P419	20,000 Ohm ¼ Watt Resistor	P337	18-6 Mfd.-200 Volt Electrolytic Condenser
P560	43 Tube Socket	P166	25,000 Ohm ¼ Watt Condenser	P141	.25 - 200 Volt Condenser

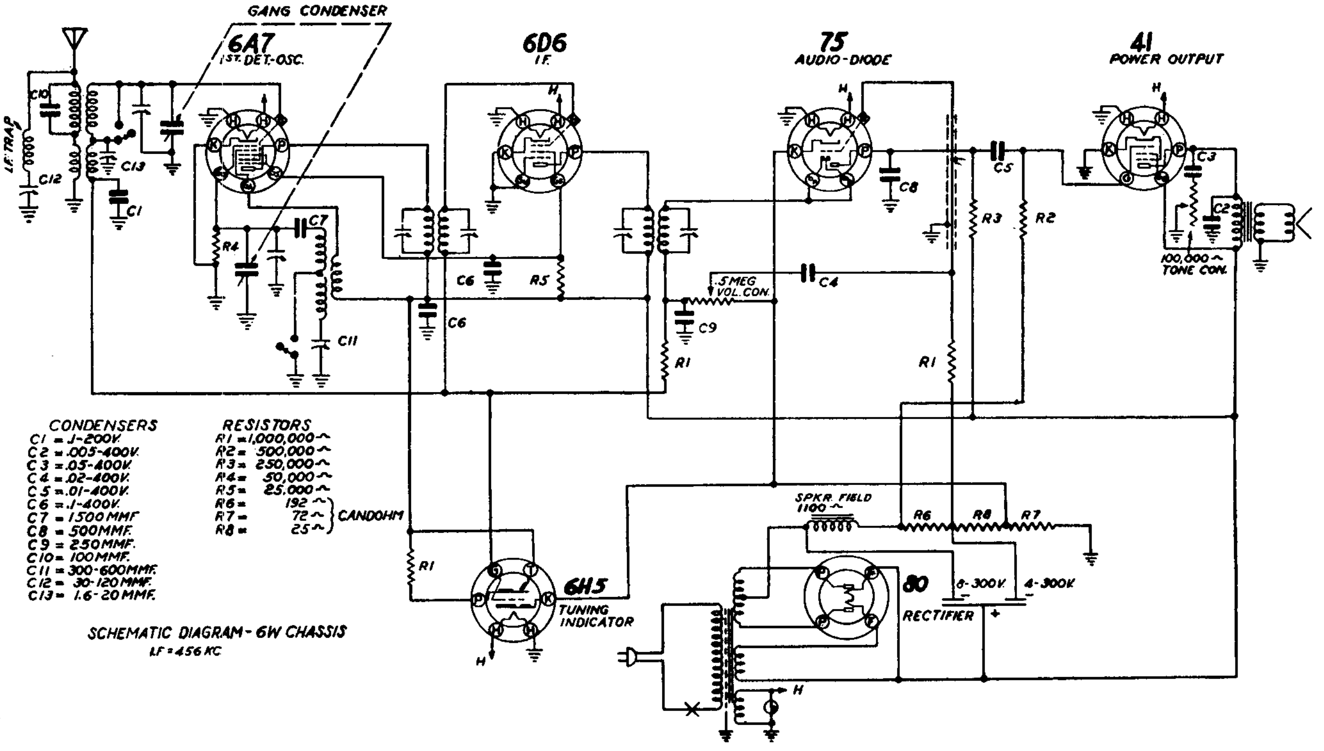
ALLIED RADIO CORPORATION

MODELS 5X & A10505



SCHEMATIC DIAGRAM - 5X CHASSIS
I.F = 456 KC.

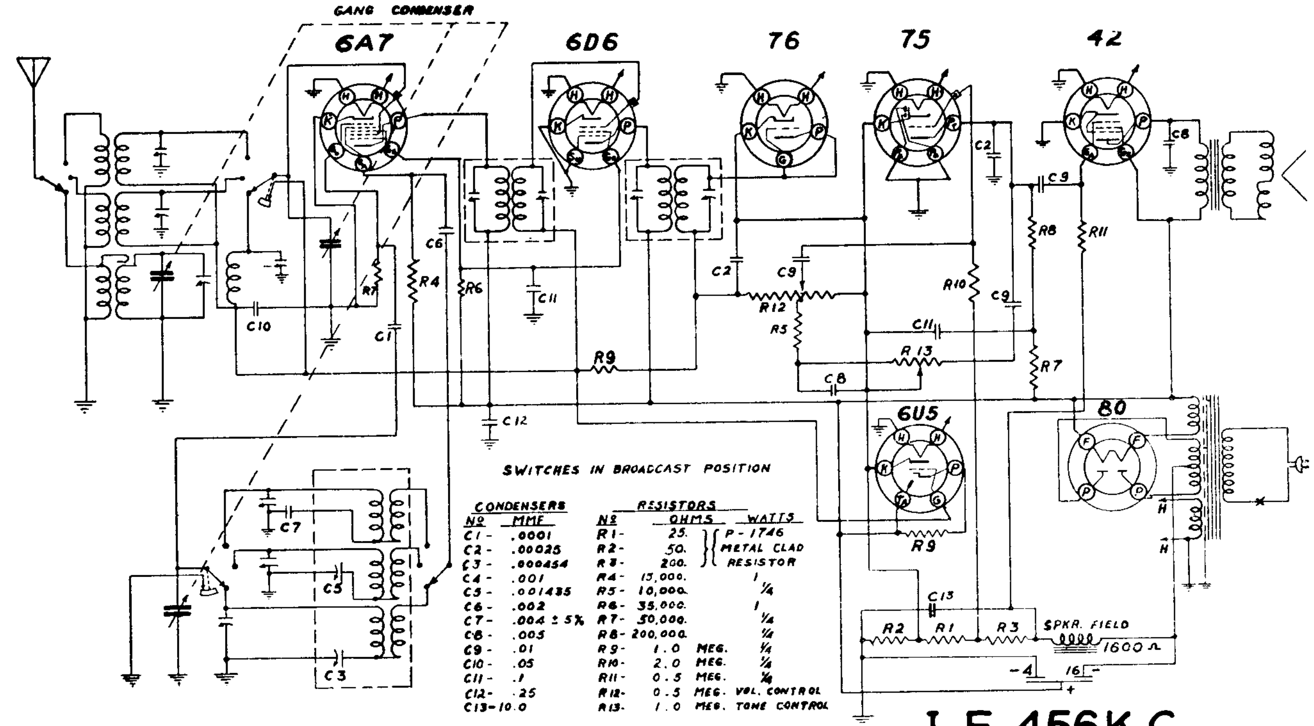
MODELS 6W & A10506



SCHEMATIC DIAGRAM - 6W CHASSIS
I.F = 456 KC

ALLIED RADIO CORPORATION

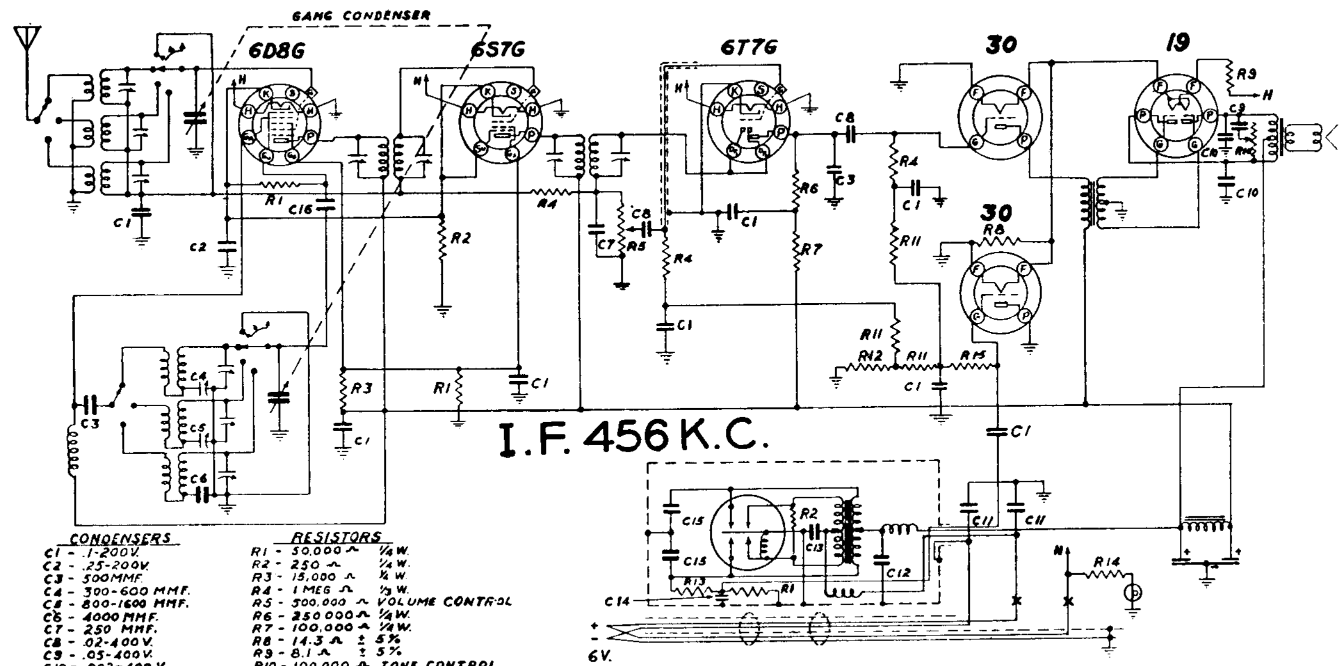
MODELS 7M & A10507



SWITCHES IN BROADCAST POSITION

CONDENSERS Nº	MMF	RESISTORS Nº	OHMS	WATTS
C1 -	.0001	R1 -	25.	P-1746 METAL CLAD RESISTOR
C2 -	.00025	R2 -	50.	P-1746 METAL CLAD RESISTOR
C3 -	.000454	R3 -	200.	P-1746 METAL CLAD RESISTOR
C4 -	.001	R4 -	15,000.	1
C5 -	.001435	R5 -	10,000.	1/4
C6 -	.002	R6 -	35,000.	1
C7 -	.004 ± 5%	R7 -	50,000.	1/4
C8 -	.005	R8 -	200,000.	1/4
C9 -	.01	R9 -	1.0 MEG.	1/4
C10 -	.05	R10 -	2.0 MEG.	1/4
C11 -	.1	R11 -	0.5 MEG.	1/4
C12 -	.25	R12 -	0.5 MEG.	VOL. CONTROL
C13 -	10.0	R13 -	1.0 MEG.	TONE CONTROL

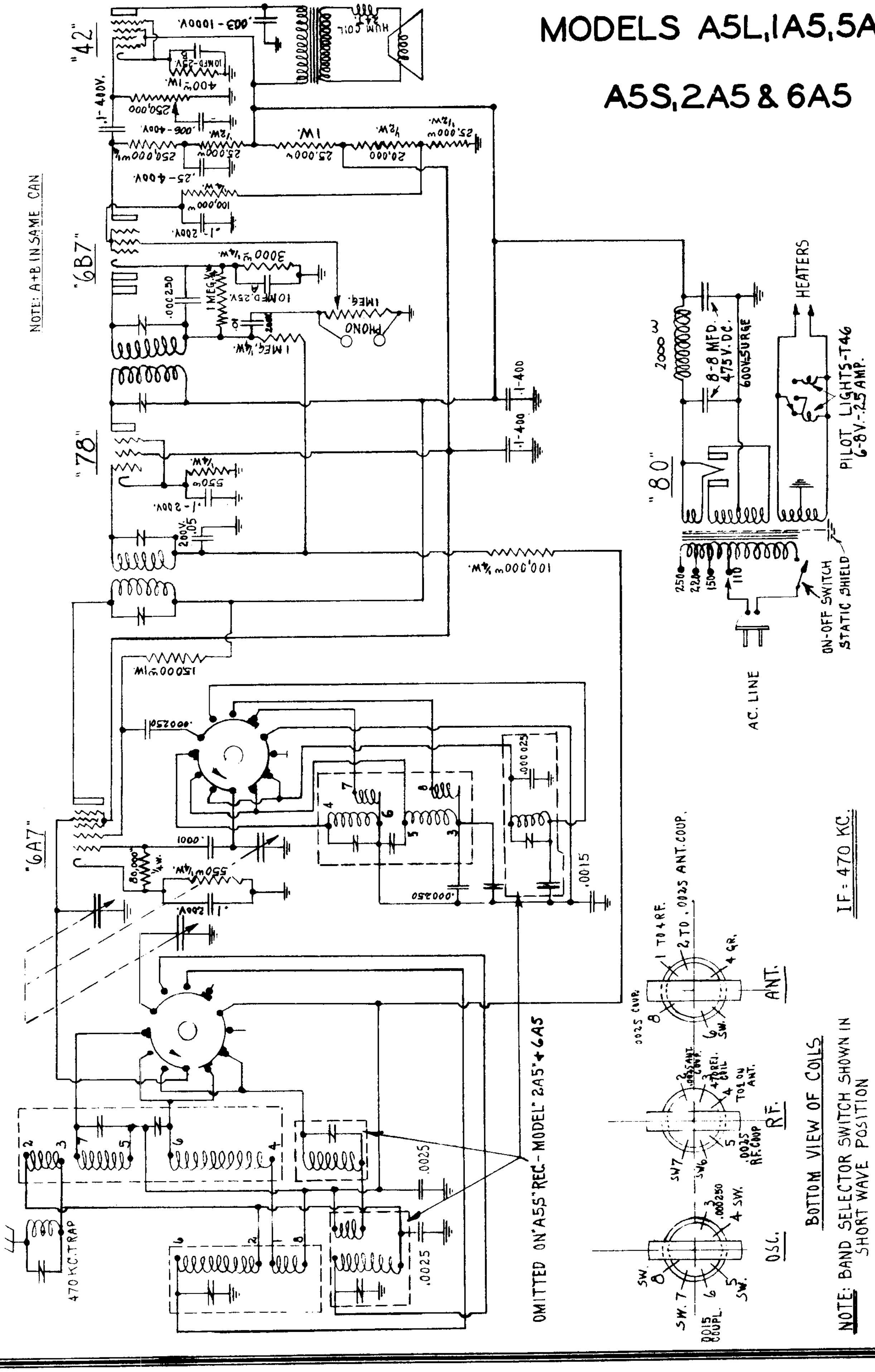
MODELS 6P & A10508



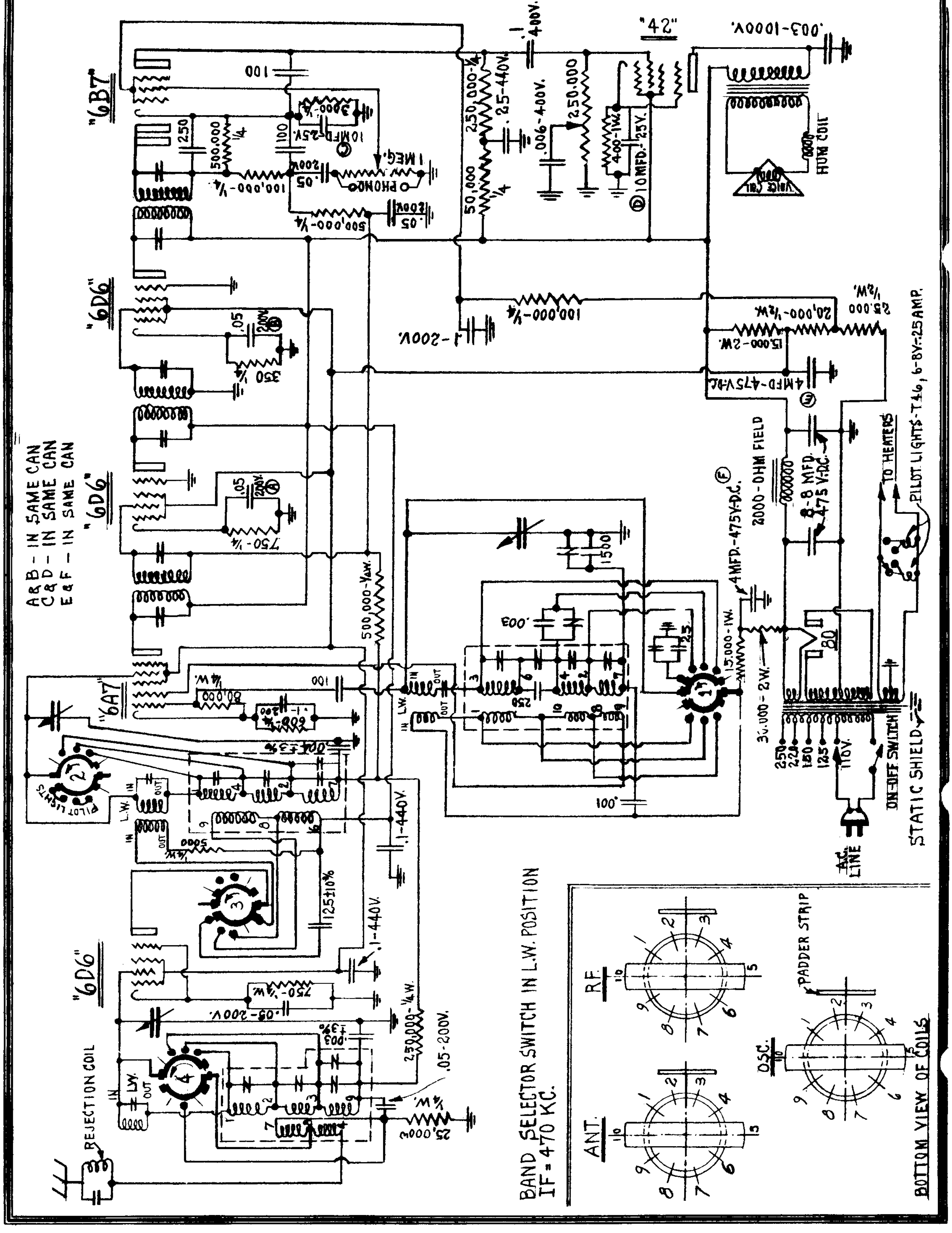
CONDENSERS	RESISTORS
C1 - .1-200V.	R1 - 50,000 Ω 1/4 W.
C2 - .25-200V.	R2 - 250 Ω 1/4 W.
C3 - 500 MMF.	R3 - 15,000 Ω 1/4 W.
C4 - 300-600 MMF.	R4 - 1 MEG Ω 1/3 W.
C5 - 800-1600 MMF.	R5 - 500,000 Ω VOLUME CONTROL
C6 - 4000 MMF.	R6 - 250 000 Ω 1/4 W.
C7 - 250 MMF.	R7 - 100,000 Ω 1/4 W.
C8 - .02-400 V.	R8 - 14.3 Ω ± 5%
C9 - .05-400 V.	R9 - 8.1 Ω ± 5%
C10 - .002-400 V.	R10 - 100,000 Ω TONE CONTROL
C11 - .005-400 V.	R11 - 500,000 Ω 1/4 W.
C12 - .01-600 V.	R12 - 70,000 Ω 1/4 W.
C13 - .5-10 V.	R13 - 200,000 Ω 1/4 W.
C14 - .05-200 V.	R14 - 70. Ω ± 10%
C15 - .01-1000 V.	R15 - 600,000 Ω 1/8 W.
C16 - 100 MMF.	

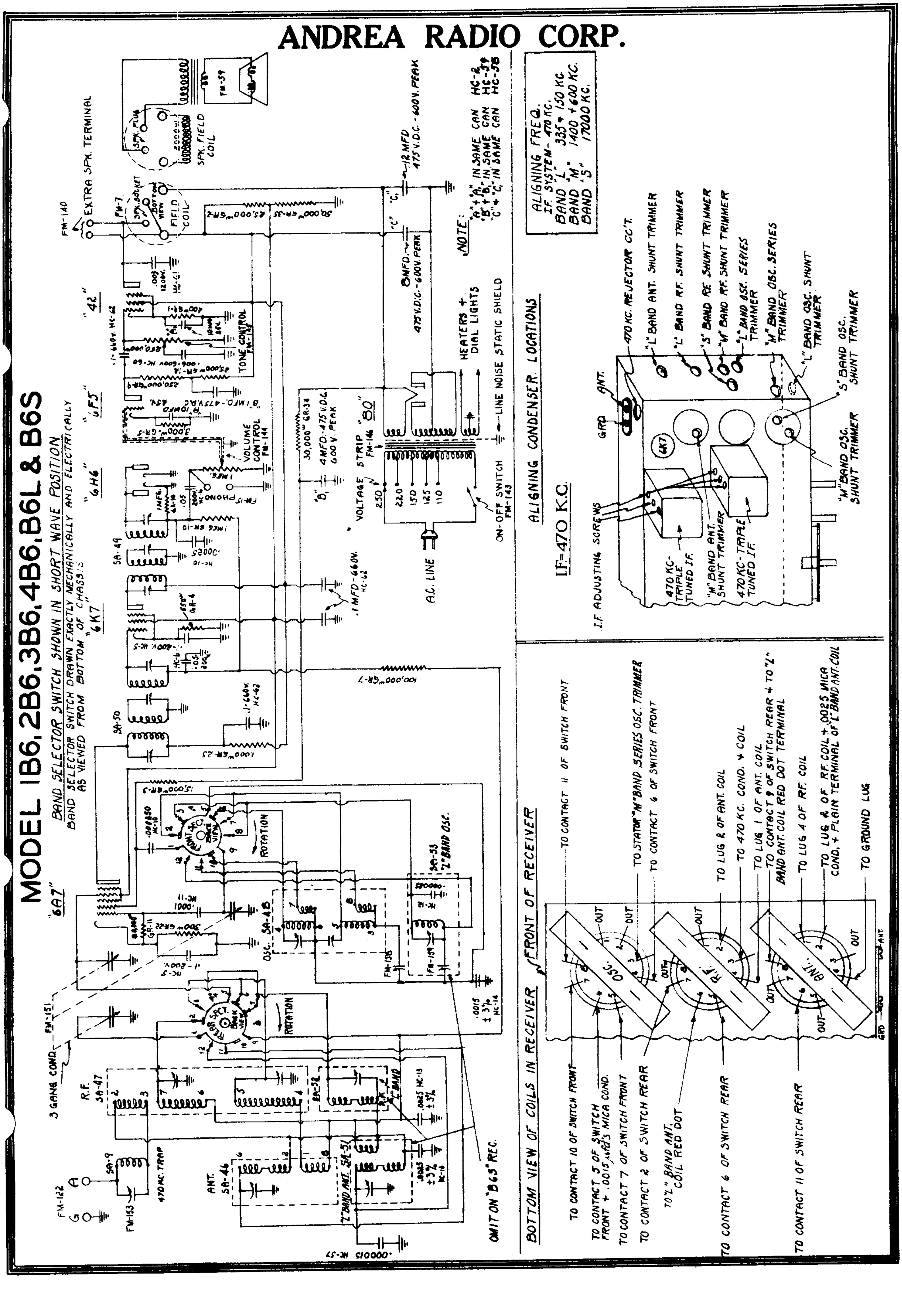
ANDREA RADIO CORP.

MODELS A5L, 1A5, 5A5, A5S, 2A5 & 6A5

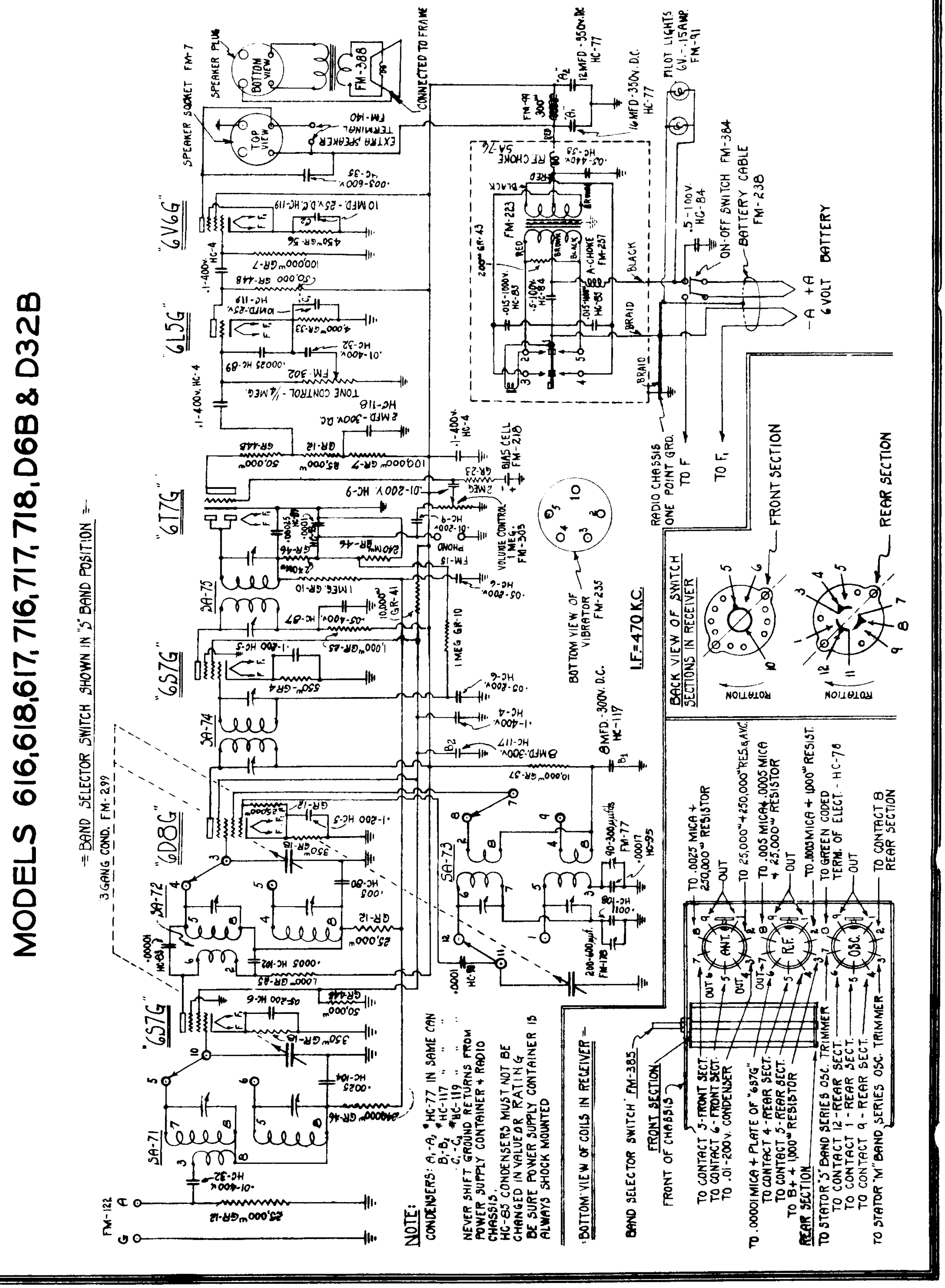


ANDREA RADIO CORP.
MODELS A7L, 1A7 & 3A7



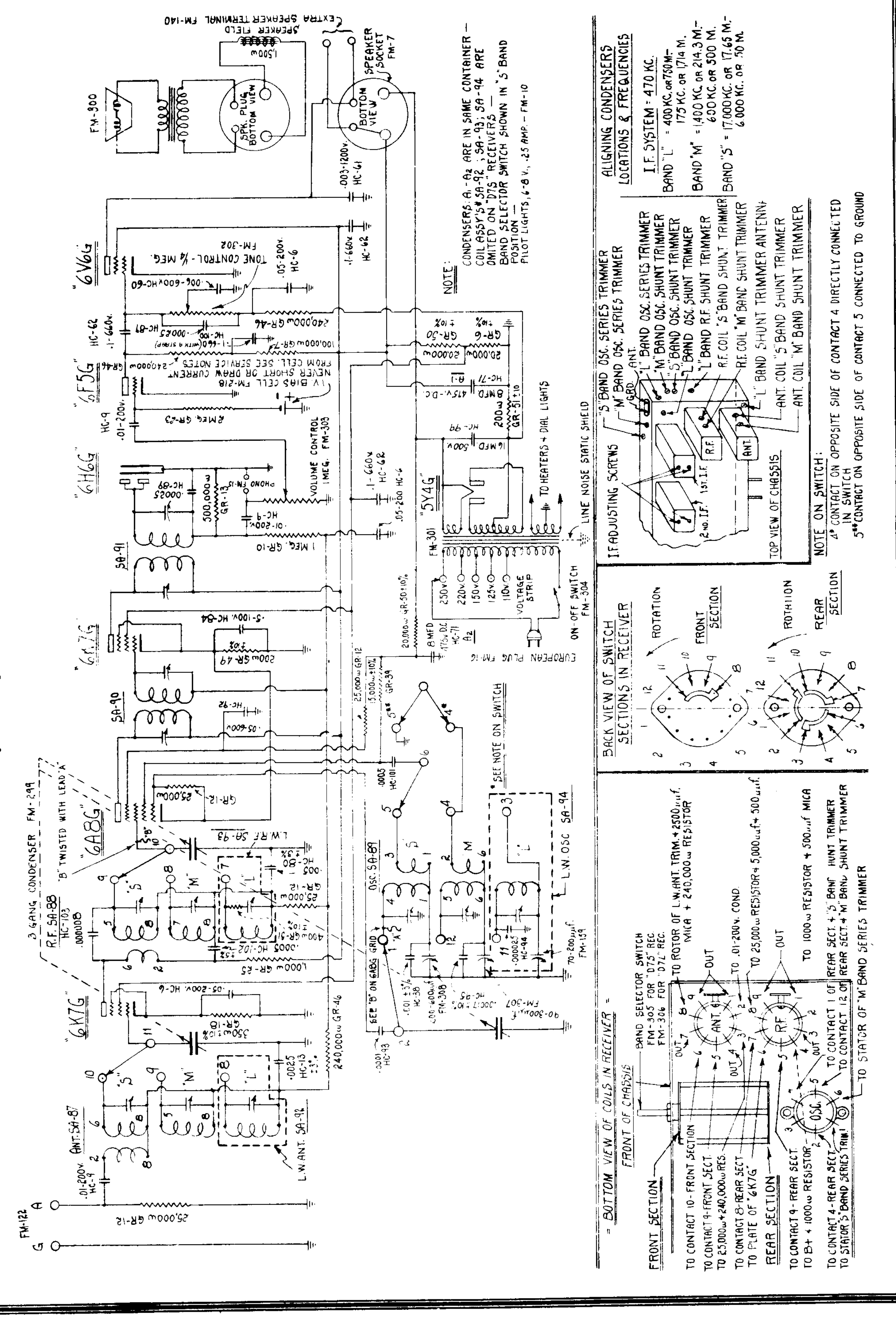

ANDREA RADIO CORP.
MODEL 1B6, 2B6, 3B6, 4B6, B6L & B6S
BAND SELECTOR SWITCH SHOWN IN SHORT WAVE POSITION
BAND SELECTOR SWITCH DRAWN EXACTLY MECHANICALLY AND ELECTRICALLY AS VIEWED FROM BOTTOM OF CHASSIS
"6A7"
"6K7"
"6H6"
"6F5"
"42"
"80"
EXTRA SPK. TERMINAL
SPK. FIELD COIL
FIELD COIL
VOLUME CONTROL FM-144
TONE CONTROL
PHONO
VOLTAGE STRIP FM-146
A.C. LINE
ON-OFF SWITCH FM-143
LINE NOISE STATIC SHIELD
HEATERS + DIAL LIGHTS
3 GANG COND.
470 KC. TRAP
ROTATION
OMIT ON "B6S" REC.
NOTE: "A" + "A1" IN SAME CAN HC-2; "B" + "B1" IN SAME CAN HC-59; "C" + "C1" IN SAME CAN HC-58
ALIGNING FREQ.
IF. SYSTEM - 470 KC.
BAND "L" 335 + 150 KC.
BAND "M" 1400 + 600 KC.
BAND "S" 17000 KC.
ALIGNING CONDENSER LOCATIONS
I.F. = 470 K.C.
I.F. ADJUSTING SCREWS
470 KC. REJECTOR CC'T.
"L" BAND ANT. SHUNT TRIMMER
"L" BAND RF. SHUNT TRIMMER
"S" BAND RF. SHUNT TRIMMER
"M" BAND RF. SHUNT TRIMMER
"L" BAND OSC. SERIES TRIMMER
"M" BAND OSC. SERIES TRIMMER
"L" BAND OSC. SHUNT TRIMMER
"S" BAND OSC. SHUNT TRIMMER
"M" BAND OSC. SHUNT TRIMMER
"M" BAND ANT. SHUNT TRIMMER
470 KC-TRIPLE TUNED I.F.
BOTTOM VIEW OF COILS IN RECEIVER
FRONT OF RECEIVER
TO CONTACT 10 OF SWITCH FRONT
TO CONTACT 11 OF SWITCH FRONT
TO CONTACT 5 OF SWITCH FRONT + .0015 MFD'S MICA COND.
TO STATOR "M" BAND SERIES OSC. TRIMMER
TO CONTACT 7 OF SWITCH FRONT
TO CONTACT 6 OF SWITCH FRONT
TO CONTACT 2 OF SWITCH REAR
TO LUG 2 OF ANT. COIL
TO "L" BAND ANT. COIL RED DOT
TO 470 KC. COND. + COIL
TO LUG 1 OF ANT. COIL
TO CONTACT 9 OF SWITCH REAR + TO "L" BAND ANT. COIL RED DOT TERMINAL
TO CONTACT 6 OF SWITCH REAR
TO LUG 4 OF RF. COIL
TO LUG 2 OF RF. COIL + .0025 MICA COND. + PLAIN TERMINAL OF "L" BAND ANT. COIL
TO CONTACT 11 OF SWITCH REAR
TO GROUND LUG

ANDREA RADIO CORP.



ANDREA RADIO CORP.

MODELS D7L,1D7,3D7,5D7,7D7, D7S,2D7,4D7,6D7,6D7&8D7



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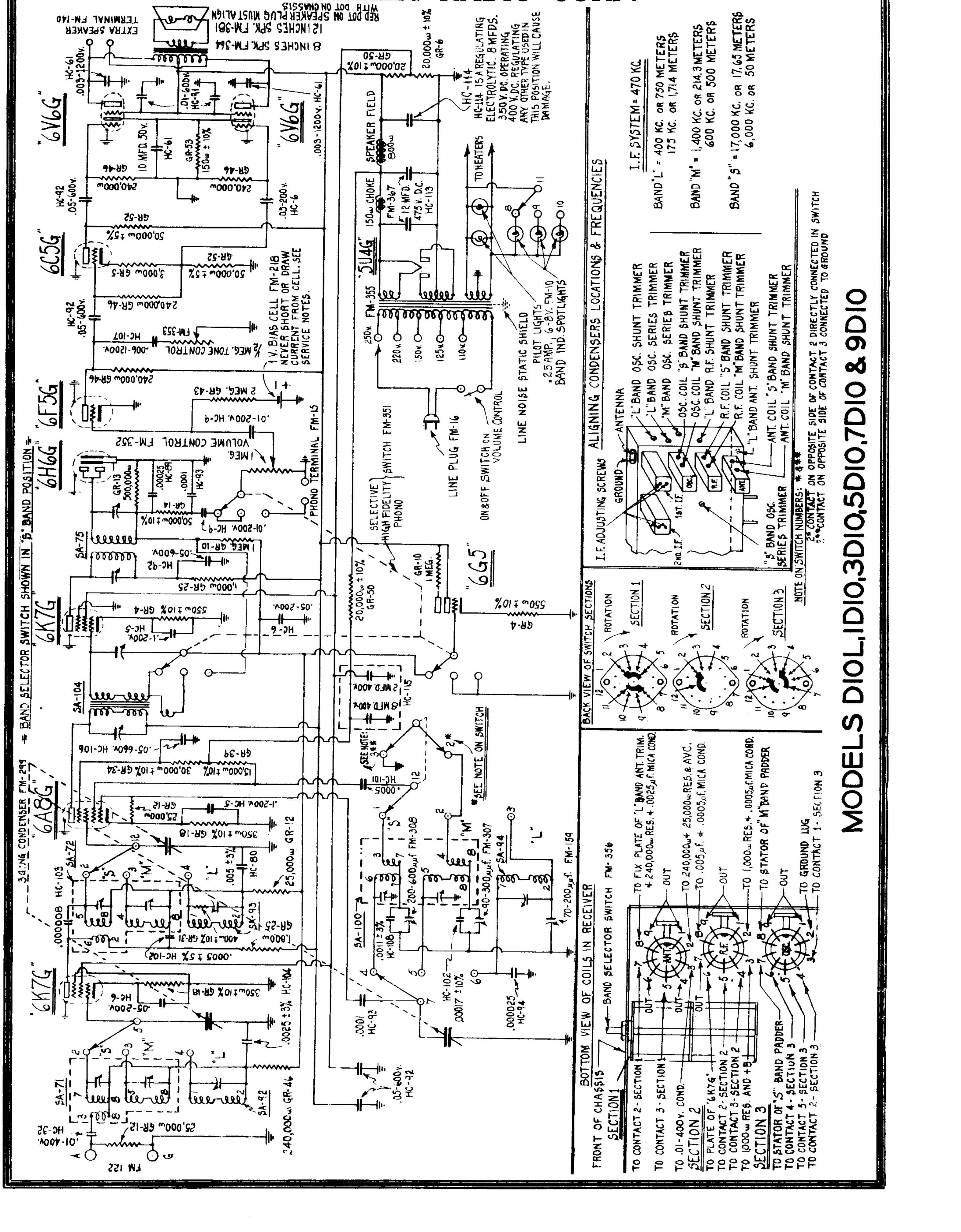

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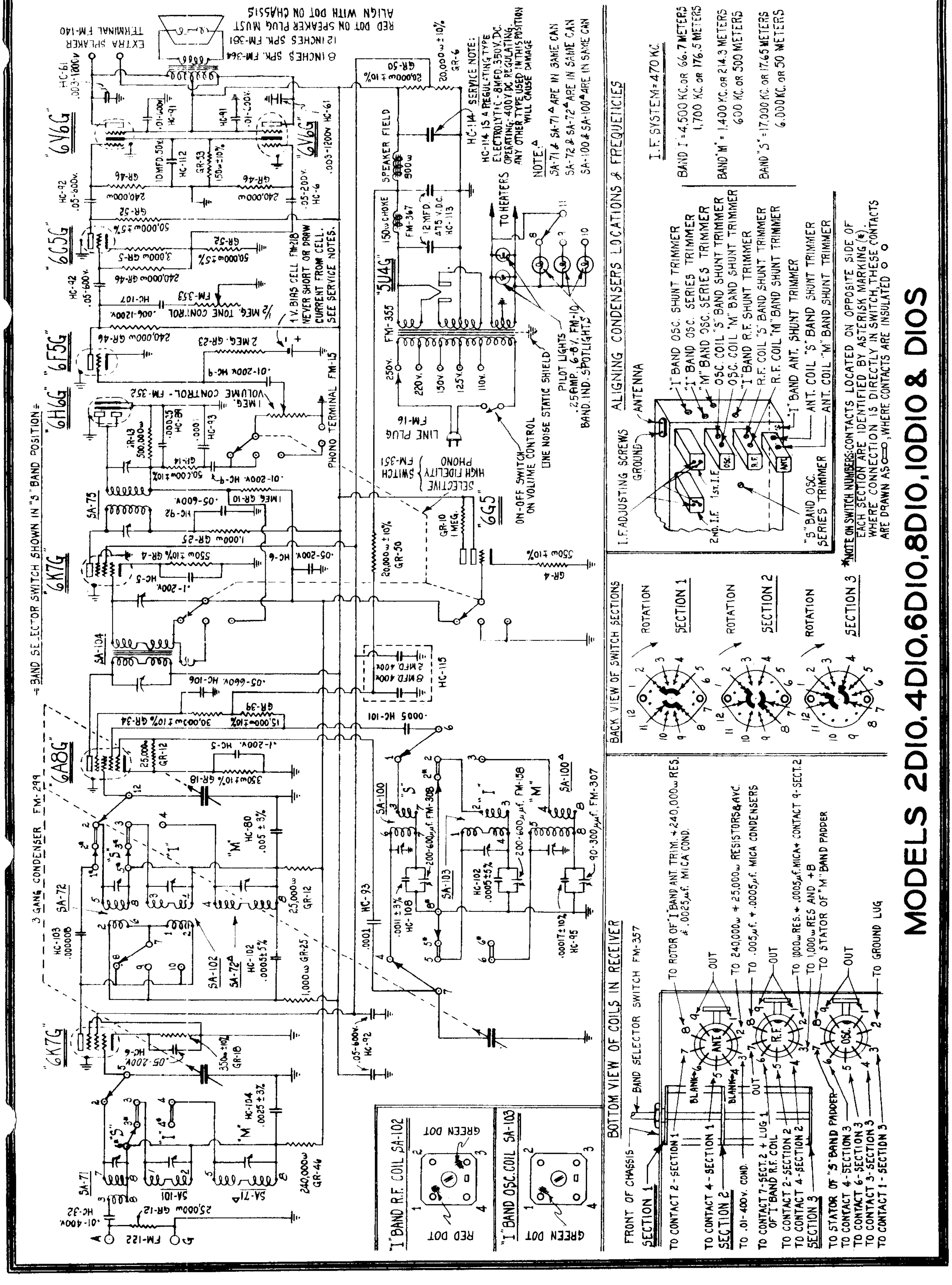
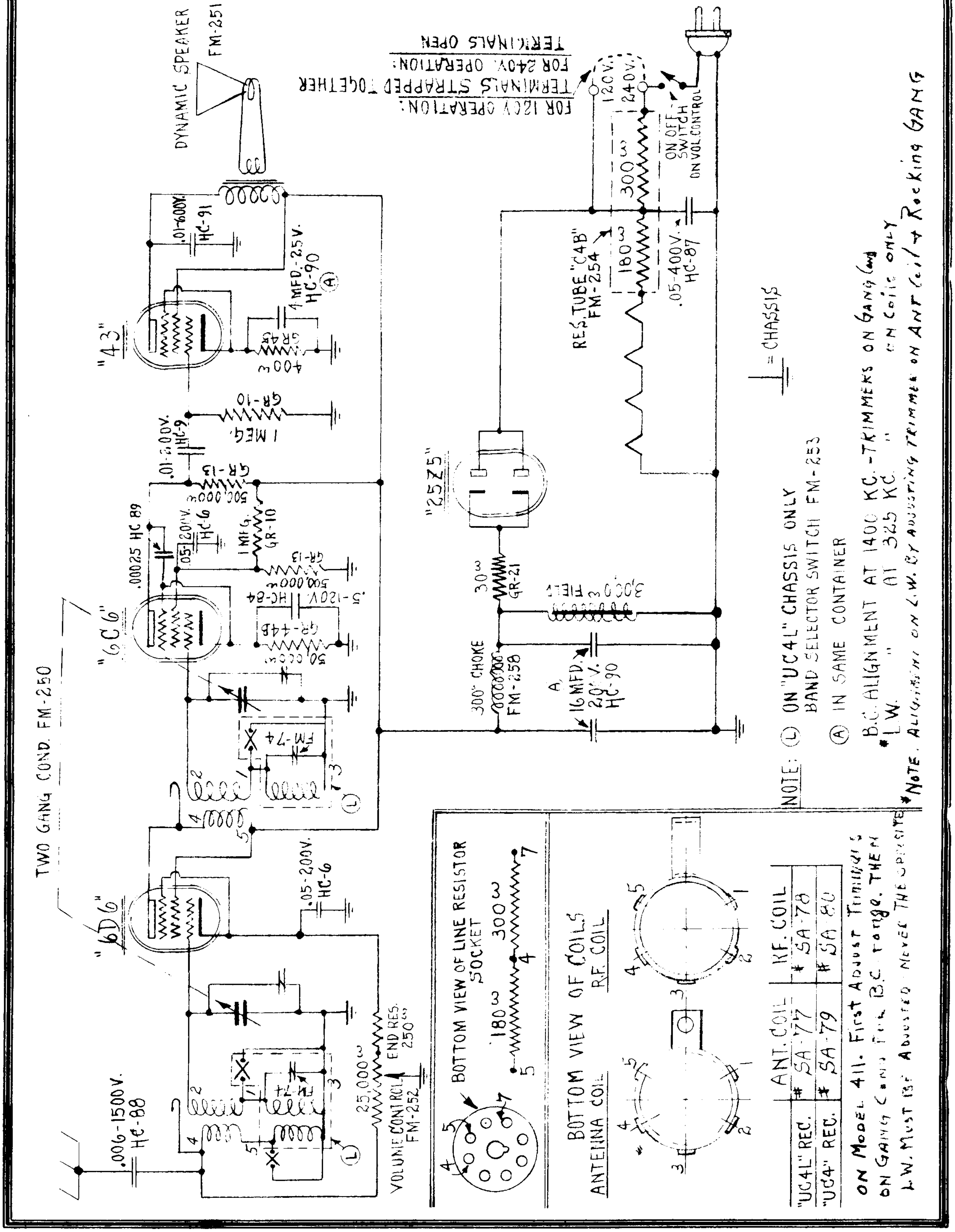
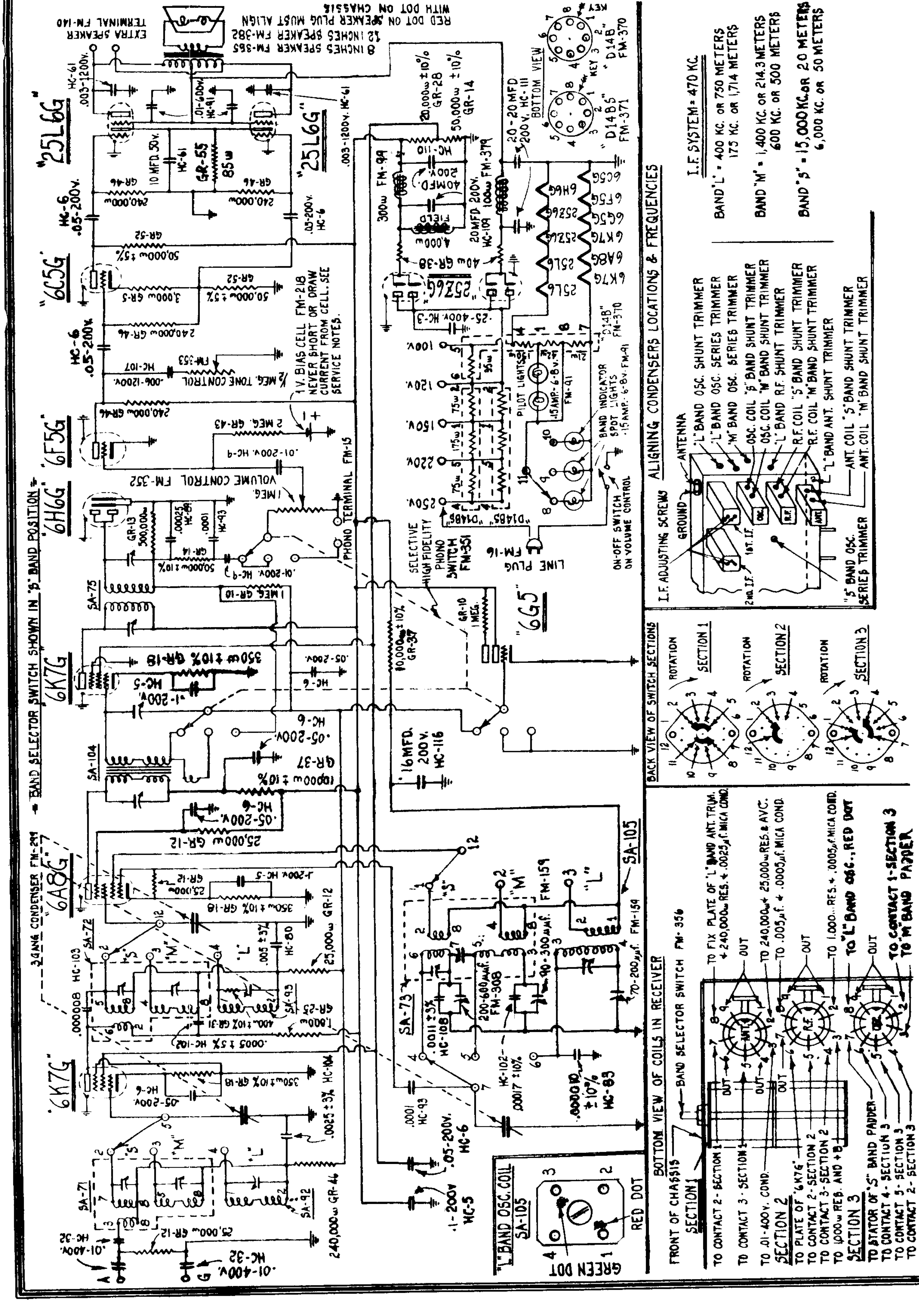


ANDREA RADIO CORP.
MODELS 410, UC4, 411 & UC4L

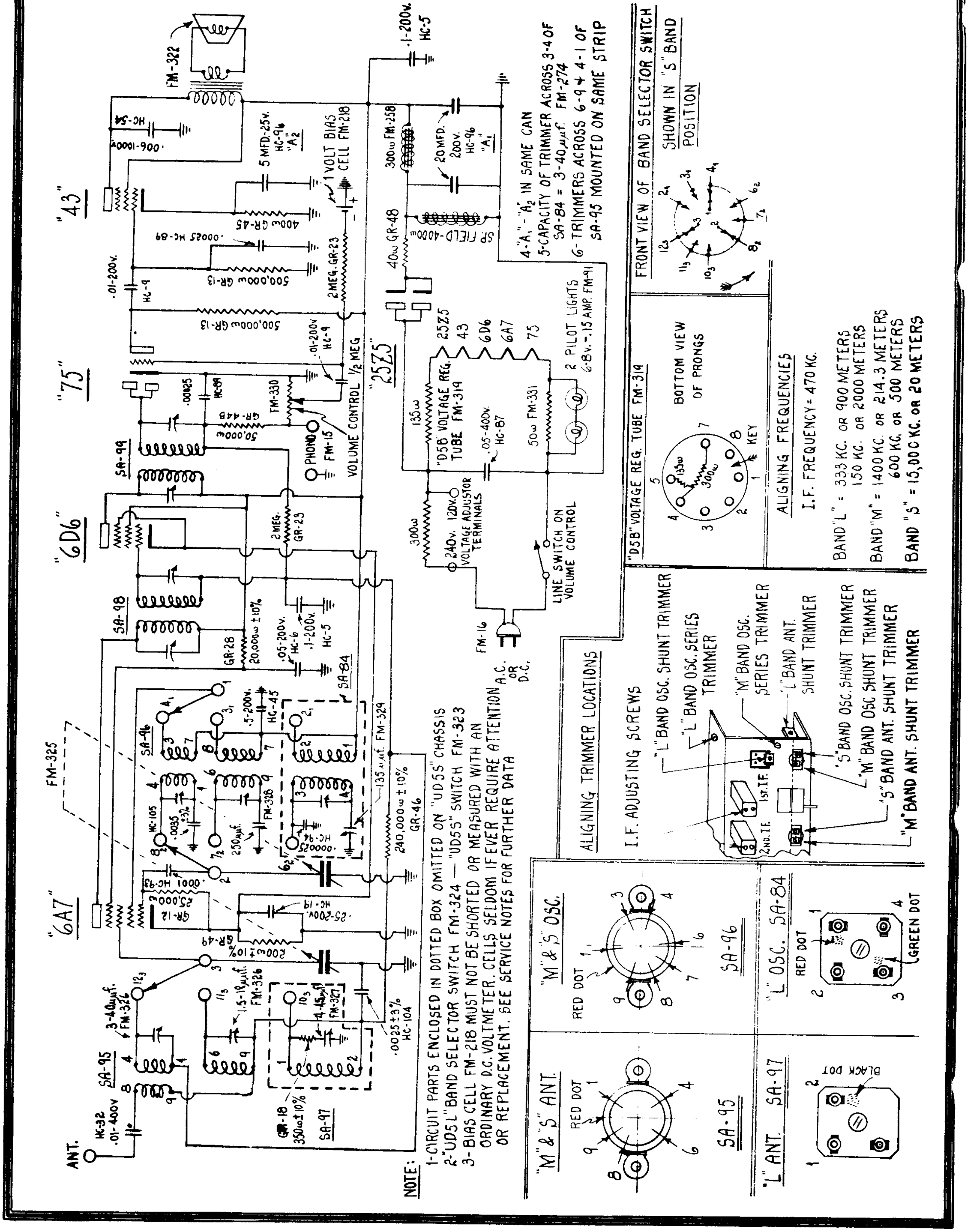


ANDREA RADIO CORP.



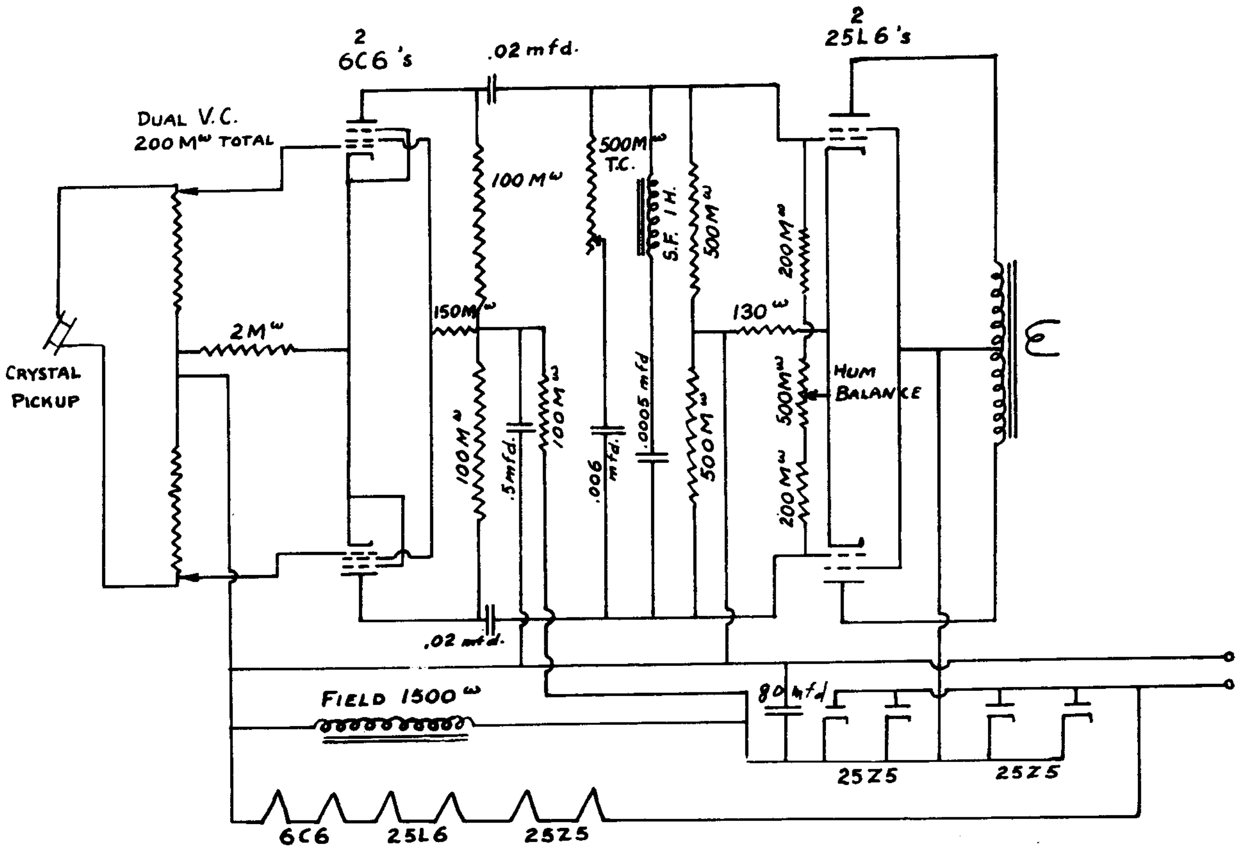
MODELS UD14L,1401,1403,1405,1407,1409,UD14S,1402,1404,1406,1408,1410.

ANDREA RADIO CORP.
MODELS 520, UD5S, 521 & UD5L

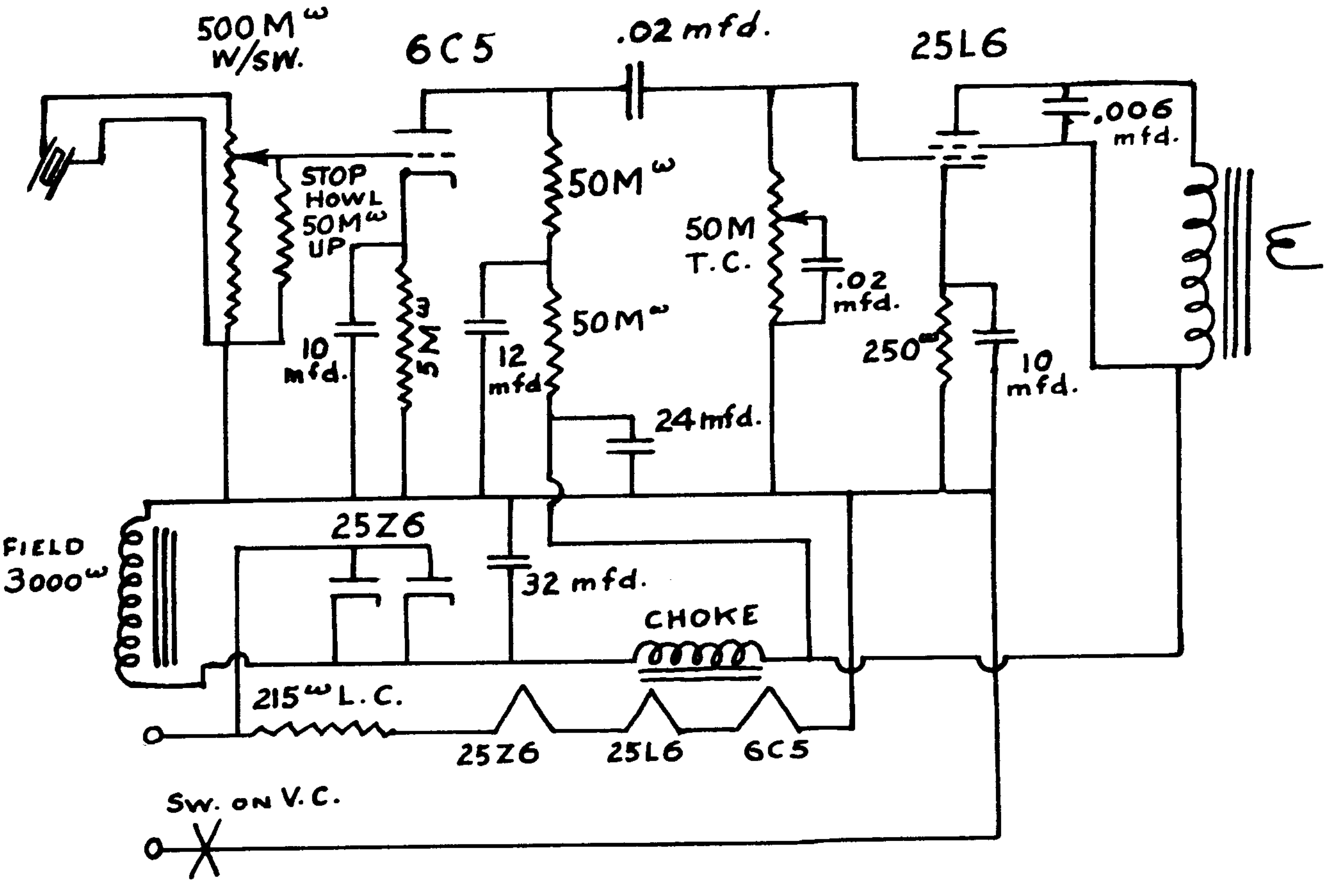


ANSLEY RADIO CORP.

MODELS D1,D1A,D16 & D20 AMPLIFIERS

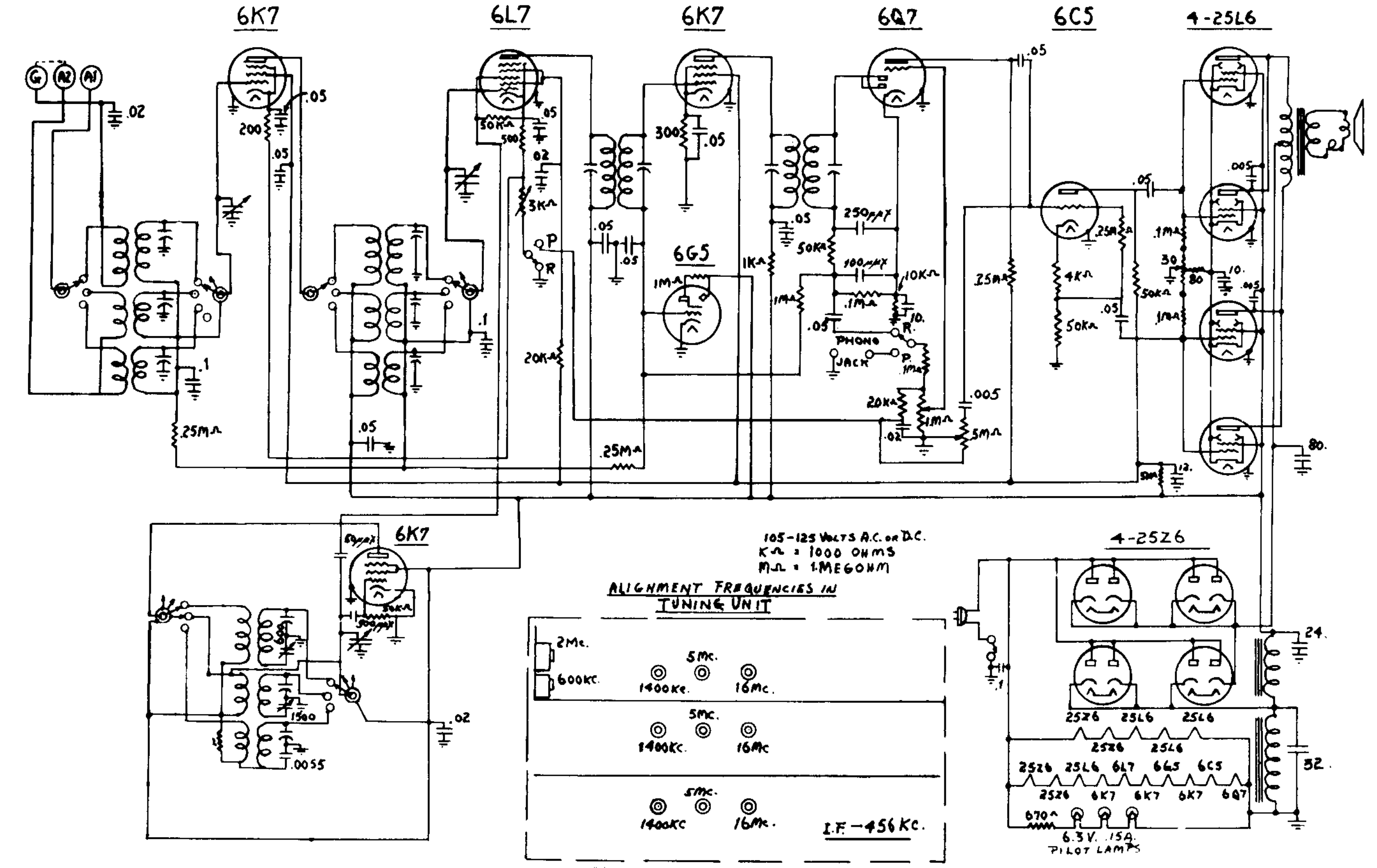


MODEL D26 AMPLIFIER

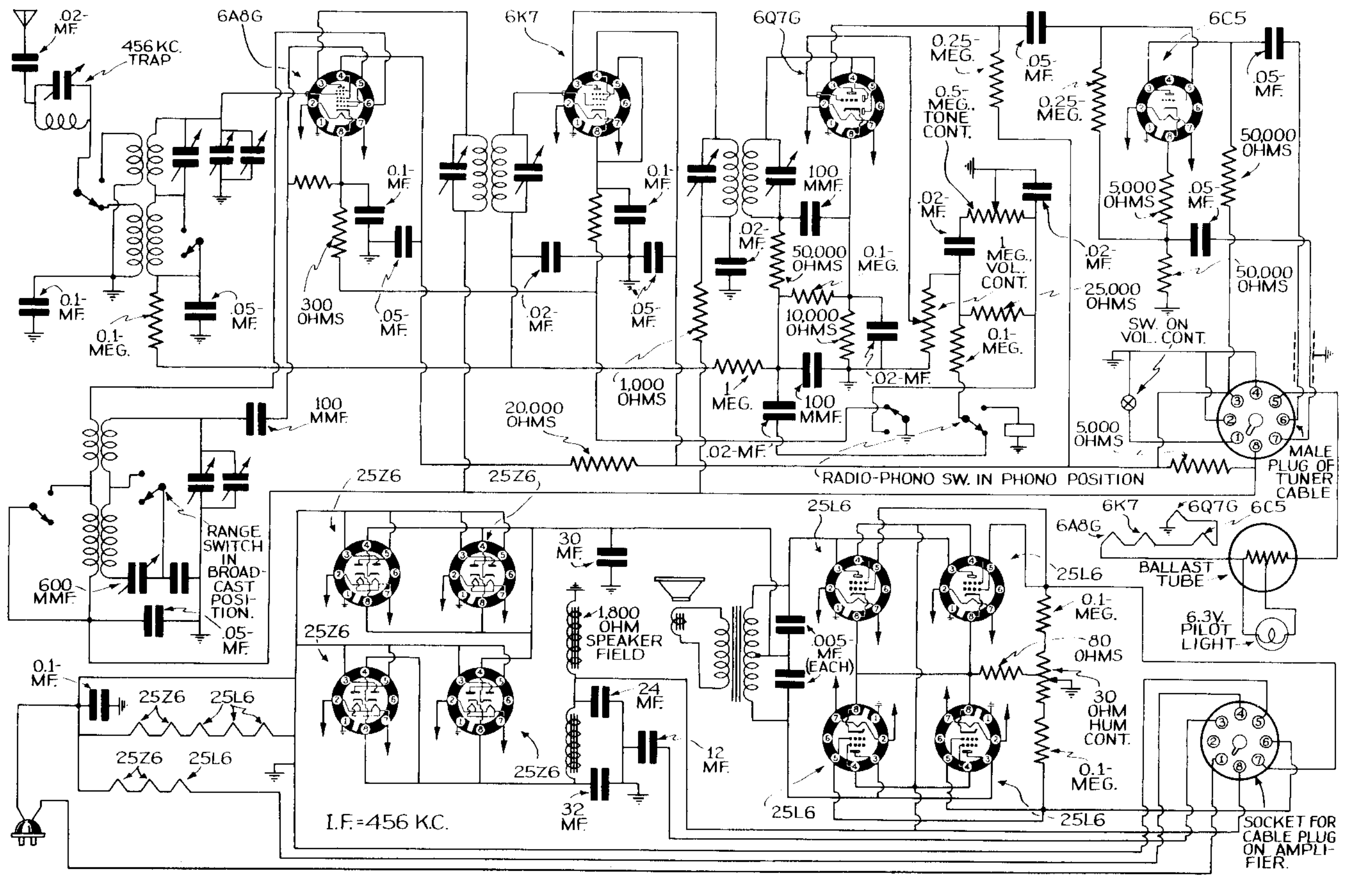


ANSLEY RADIO CORP.

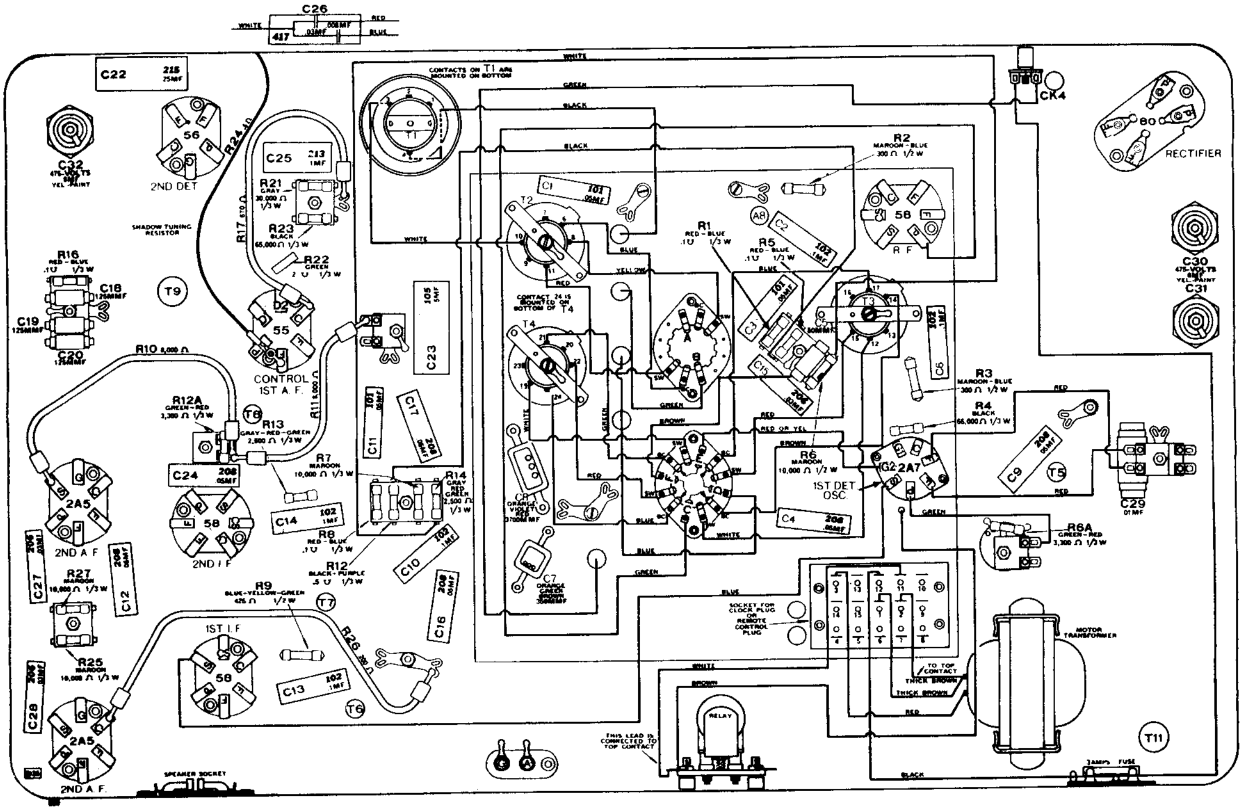
MODELS D14 D24 & D25

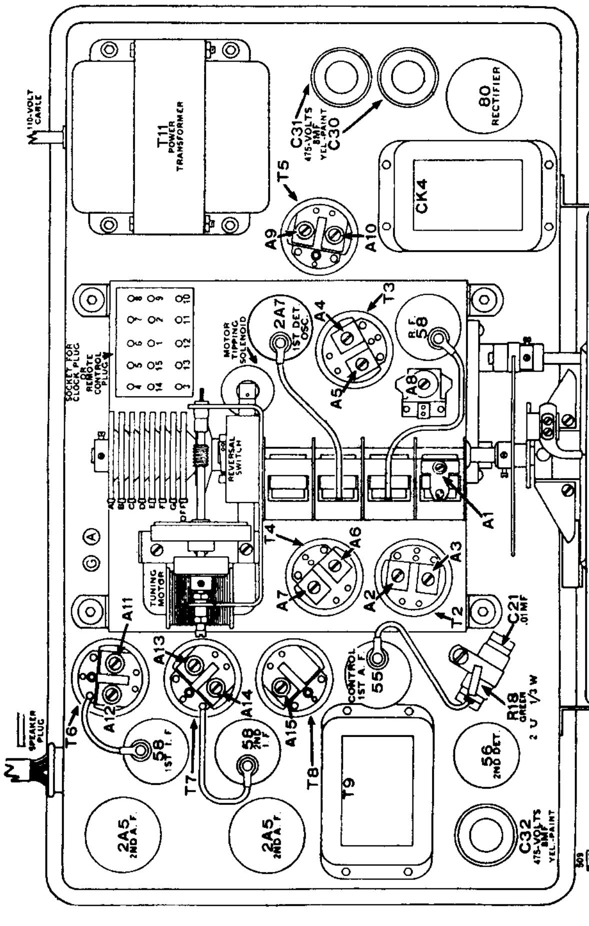


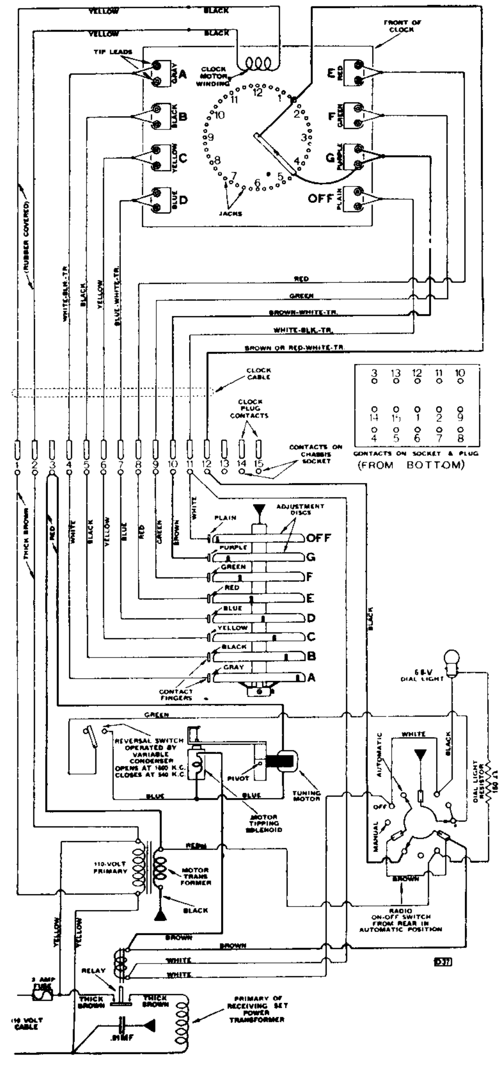
MODELS D21 & D22



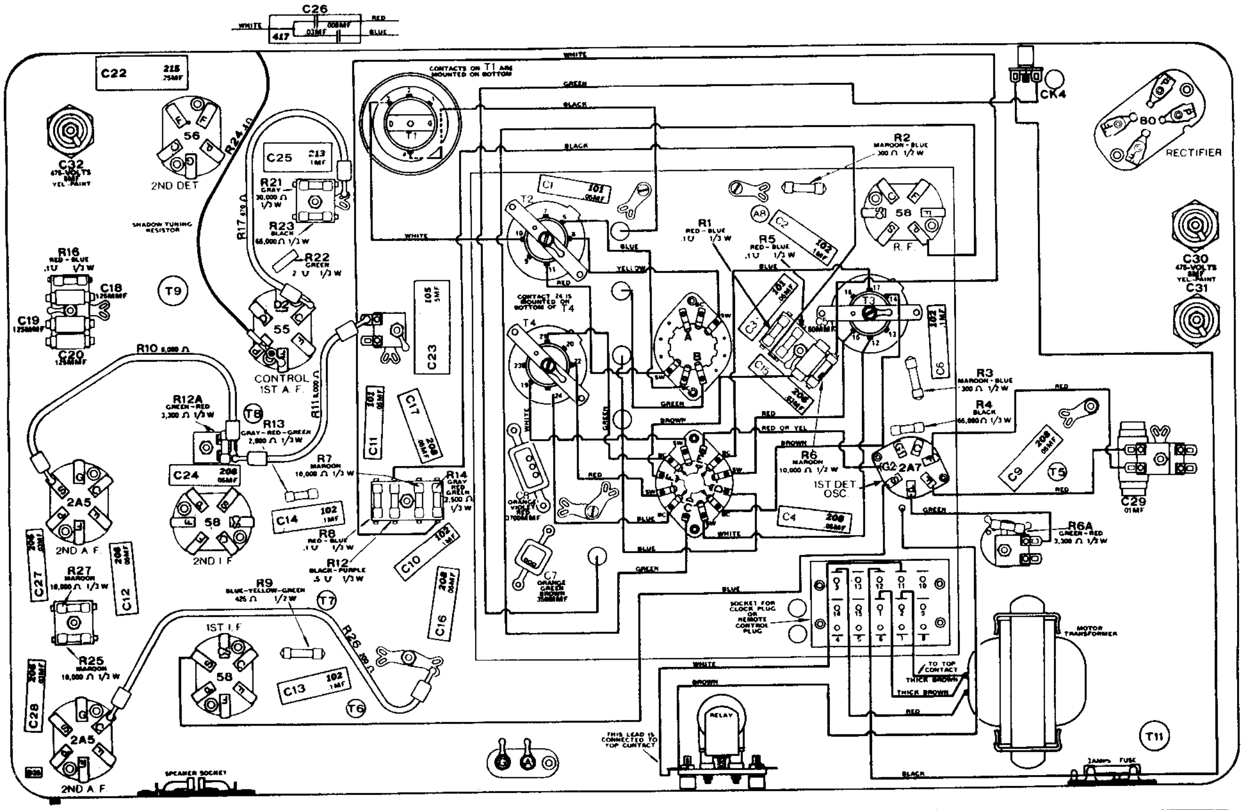
ATWATER KENT MFG. CO.
MODEL 509

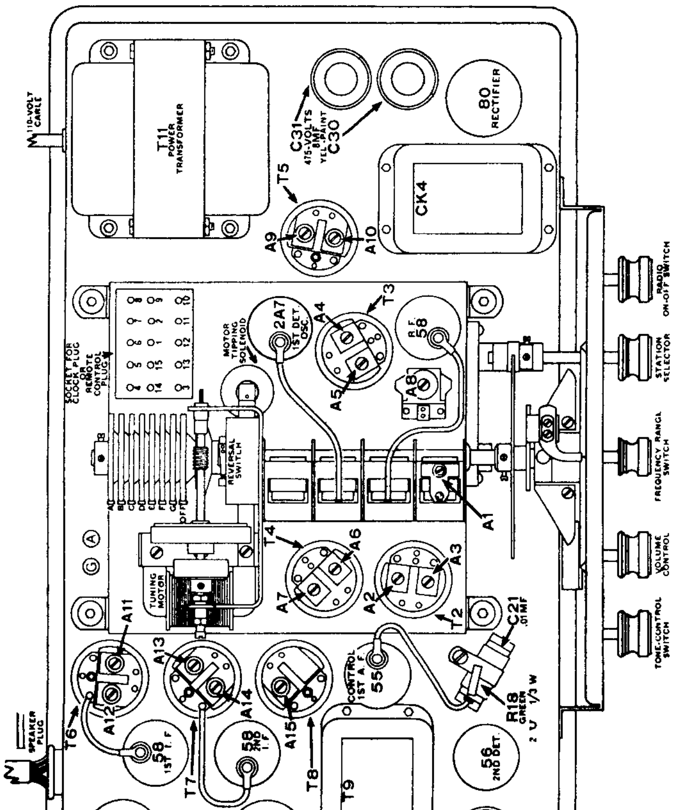


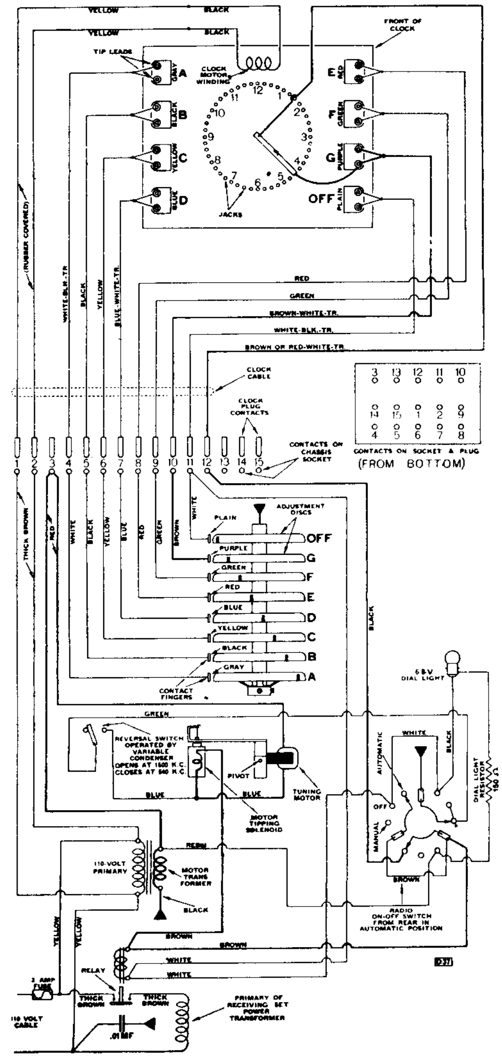




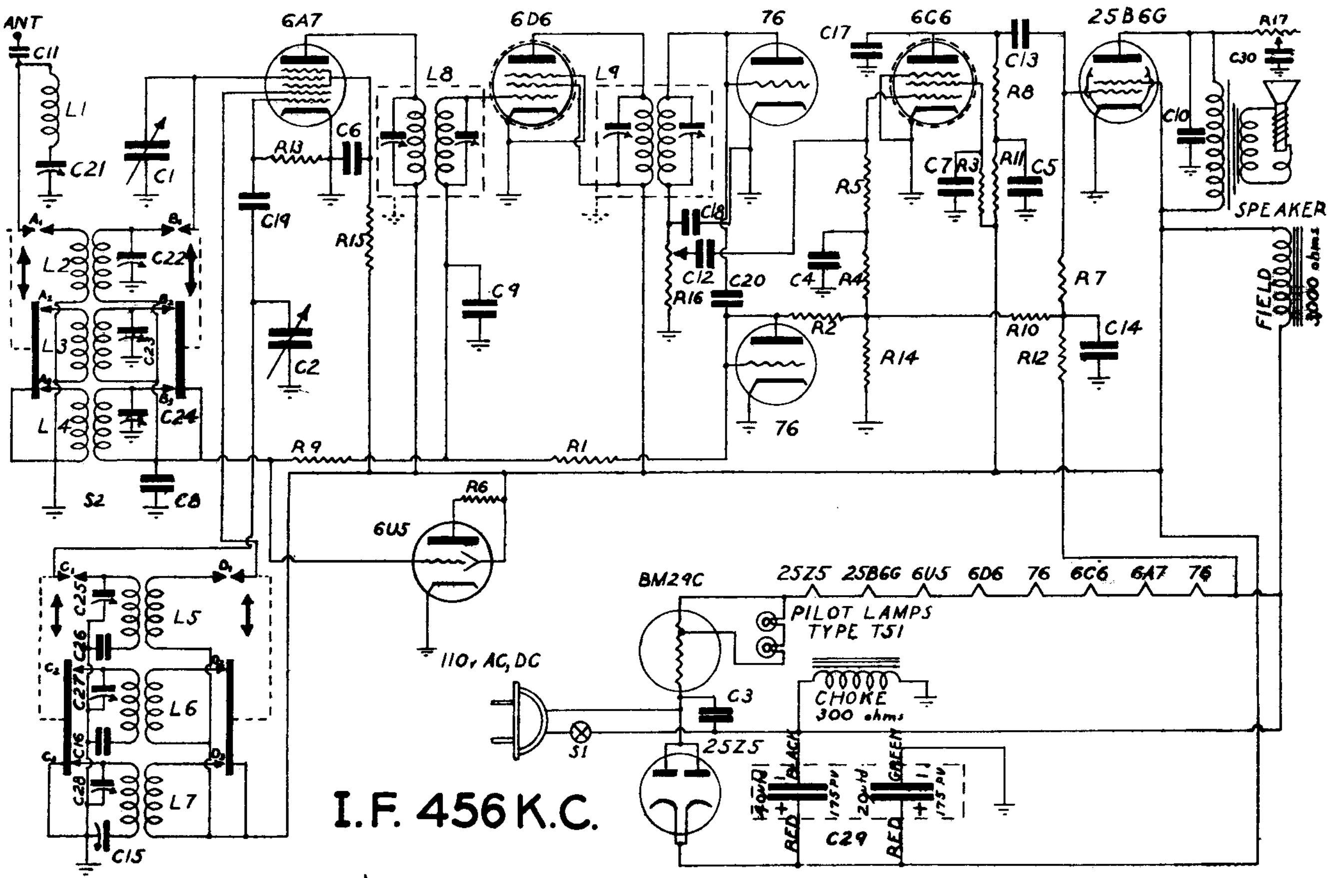
ATWATER KENT MFG. CO.
MODEL 509

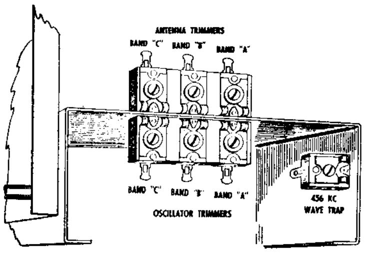






AUTOMATIC RADIO MFG. CO.. Inc.
MODEL 850





End view of chassis showing location of Trimmer Condensers

FREQUENCY RANGES AND SERVICES INCLUDED

BAND 'A'—549 KC to 1555KC	Standard Domestic Broadcast
BAND 'B'—2.23 MC to 6.36 MC	Police, Amateur, Aviation, Domestic and Foreign 49 Meter Broadcasts
BAND 'C'—5.75 MC to 16.6 MC	Domestic and Foreign Short Wave Broadcasts (49, 31, 25, and 19 meters)

ALIGNMENT PROCEDURE

I. F. Alignment. The intermediate frequency to which this set should be adjusted is 456 KC. To align the intermediate frequency transformers properly, a signal generator emitting a signal of 456 KC should be coupled to the signal control grid of the 6A7 tube through a .5 mfd condenser. An output meter should be connected across the voice coil of the speaker. The four trimmers mounted internally in the top of the two I. F. cans should be adjusted to resonance. The output of the signal generator should be attentuated so as to provide the weakest signal necessary to produce a .5 volt deflection on the output meter when resonance is achieved.

R. F. Alignment. Rotate the band switch to the extreme counter-clockwise or "A" band position. Set the receiver dial at 1400 KC. Advance the volume control to maximum. Adjust the signal generator to 1400 KC and feed this signal to the receiver by connecting a 200 mmfd fixed condenser between the signal generator lead and the receiver antenna lead. With a weak signal adjust the band "A" oscillator trimmer to resonance. Then adjust band "A" antenna trimmer for maximum response. Rotate both the receiver dial and signal generator dial to 600 KC. Adjust the padder condenser to resonance. This adjustment is located on the top of the chassis pan between the composite broadcast and short wave antenna coil and the variable condenser. It will be necessary to repeat both the high frequency trimming and low frequency padding adjustments to insure correct alignment. In making final adjustments it is desirable that the signal generator output be attentuated sufficiently so that the output meter connected across the speaker voice coil does not greatly exceed .5 volt deflection at maximum response.

Rotate the band switch clockwise to the intermediate or "B" band position. Replace the 200 mmfd condenser in the signal generator output lead with a 400 ohm resistor. Set the receiver and the signal generator to 5.5 megacycles. Adjust the "B" band oscillator trimmer and then the "B" band antenna trimmer to resonance, at all times keeping the signal output from the generator as low as practical.

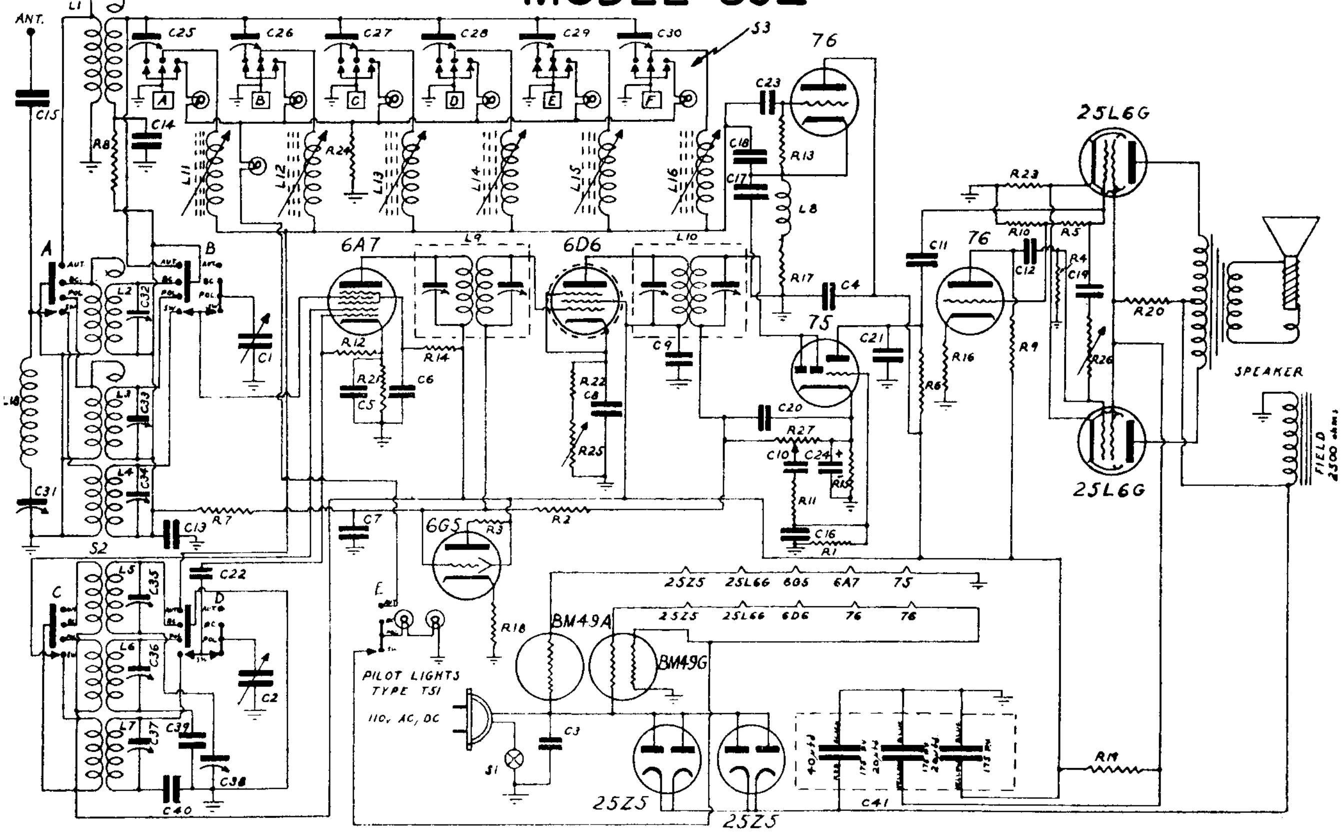
Rotate the band switch to the extreme clockwise or "C" band position. Set the receiver and signal generator to 15 megacycles as indicated on their respective dials. Adjust the "C" band oscillator trimmer and then the "C" band antenna trimmer to resonance. It is of particular importance in making these adjustments that the receiver should not be tuned to the image instead of the desired signal. This difficulty can largely be avoided by extreme attentuation of the signal generator output.

The normal alignment of this receiver requires that its oscillator operate at a frequency 456 KC higher than that of the tuner. The simplest way of distinguishing the correct operating point on the oscillator trimmer from the image response point is to start with the trimmer screw set down fairly tight, then to slowly turn the screw out. First one response and then a second will be heard. The second response is the correct one. If only one response is heard over the whole trimmer range, it will be the correct one.

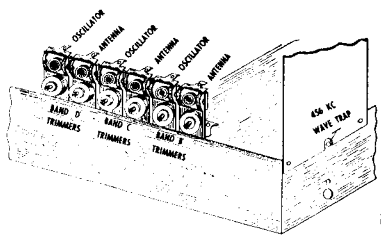
456 KC Trap Alignment. In regions adjacent to commercial radio telegraph transmitters code interference is often experienced because of the seepage of these code signals through the intermediate frequency system. A wave trap is incorporated in this receiver to eliminate this condition. To adjust this trap circuit a 456 KC signal should be fed from the signal generator into the antenna circuit of the receiver. This signal should be of a fairly high order. Adjust the wave trap trimmer condenser until minimum response is obtained.

SCHEMATIC LOCATION	DESCRIPTION	PART NO.	LIST PRICE
L1	Wave Trap	LC50	$0.50
L2, L4	Composite Broadcast and Short Wave Antenna Coil	BSA136	1.00
L3	Police Antenna Coil	PA136	.60
L5	Short Wave Oscillator Coil	SO136	.55
L6	Police Oscillator Coil	PO136	.60
L7	Broadcast Oscillator Coil	BO136	.60
L8	1st I.F. Transformer	LC110	.80
L9	2nd I.F. Transformer	LC112	.80
———	Speaker	SD30	4.25
C1, C2	2 Section Variable Condenser	CV31	1.80
C3, C4, C5, C6, C7	Fixed Condensers .1mfd—200v	———	.20
C8, C9	Fixed " .05mfd—200v	———	.20
C10	Fixed " .005mfd—600v	———	.20
C11	Fixed " .002mfd—600v	———	.20
C12, C13, C30	Fixed " .02mfd—400v	———	.20
C14	Electrolytic Condensers 5mfd—35v	———	.40
C15	Variable Padder 550mmfd	———	.40
C16	Fixed Padder—Mica 1580mmfd	———	.25
C26	Fixed Padder—Paper 3275mmfd	———	.25
C17, C18	Mica Condensers 200mmfd	———	.20
C19, C20	Mica " 100mmfd	———	.20
C21	Trimmer Condenser 3–30mmfd	———	.20
C22, C23, C24	3 Section Trimmer Condenser	TX39	.50
C25, C27, C28	3 Section Trimmer Condenser	TX39	.50
C29	Electrolytic Condenser	CE22	1.40
S1	Line Switch (On Volume Control)	———	——
S2 (A, B, C, D)	Band Selector Switch	S22	1.50
R1, R2	Resistors 2 megohms—¼ watt	———	.15
R3, R4, R5	" 1 megohm—¼ watt	———	.15
R6	" 1 megohm—1/10 watt	———	.15
R7	" ½ megohm—¼ watt	———	.15
R8, R9	" ¼ megohm—¼ watt	———	.15
R10	" 150,000 ohms—¼ watt	———	.15
R11, R12	" 100,000 ohms—¼ watt	———	.15
R13	" 50,000 ohms—¼ watt	———	.15
R14, R15	" 25,000 ohms—¼ watt	———	.15
R16	Volume Control 250,000 ohms	RV29	.80
R17	Tone Control 500,000 ohms	RV31	.75

AUTOMATIC RADIO MFG. CO., Inc.
MODEL 892



FREQUENCY RANGES AND SERVICES INCLUDED



End view of chassis showing location of Trimmer condensers.

BAND 'A'	540 KC to 1520 KC	Standard Domestic Broadcast. Automatic Selector Control
BAND 'B'	547 KC to 1560 KC	Standard Domestic Broadcast Dial Control
BAND 'C'	2.19 MC to 6.5 MC	Police, Amateur Aviation, Domestic and Foreign 49 Meter Broadcasts
BAND 'D'	5.8 MC to 15.6 MC	Domestic and Foreign Short Wave Broadcasts (49, 31, 25, and 19 meters)

ALIGNMENT PROCEDURE

I. F. Alignment. The intermediate frequency to which this set should be adjusted is 456 KC. To align the intermediate frequency transformers properly, a signal generator emitting a signal of 456 KC should be coupled to the signal control grid of the 6A7 tube through a .5 mfd condenser. An output meter should be connected across the voice coil of the speaker. The four trimmers mounted internally in the top of the two I. F. cans should be adjusted to resonance. The output of the signal generator should be attentuated so as to provide the weakest signal necessary to produce a .5 volt deflection on the output meter when resonance is achieved.

R. F. Alignment. Rotate the band switch to position "B". This is the position which is second from the extreme counter-clockwise (Automatic) position. Set the receiver dial at 1400 KC. Advance the volume control to maximum. Adjust the signal generator to 1400 KC and feed this signal to the receiver by connecting a 200 mmfd fixed condenser between the signal generator lead and the receiver antenna lead. With a weak signal adjust the band "B" oscillator trimmer to resonance. Then adjust band "B" antenna trimmer for maximum response. Rotate both the receiver dial and signal generator dial to 600 KC. Adjust the padder condenser to resonance. This adjustment is located on the top of the chassis pan mid-way between the "B" band oscillator coil and the first I. F. Transformer. It will be necessary to repeat both the high frequency trimming and low frequency padding adjustments to insure correct alignment. In making final adjustments it is desirable that the signal generator output be attentuated sufficiently so that the output meter connected across the speaker voice coil does not greatly exceed .5 volt deflection at maximum response.

Rotate the band switch clockwise to the third or "C" band position. Replace the 200 mmfd condenser in the signal generator output lead with a 400 ohm resistor. Set the receiver and the signal generator to 5.5. megacycles. Adjust the "C" band oscillator and then the "C" band antenna trimmer to resonance, at all times keeping the signal output from the generator as low as practical.

Rotate the band switch to the extreme clockwise or "D" band position. Set the receiver and signal generator to 14 megacycles as indicated on their respective dials. Adjust the "D" band oscillator trimmer and then the "D" band antenna trimmer to resonance. It is of particular importance in making these adjustments that the receiver should not be tuned to the image instead of the desired signal. This difficulty can largely be avoided by extreme attentuation of the signal generator output.

The normal alignment of this receiver requires that its oscillator operate at a frequency 456 KC higher than that of the tuner. The simplest way of distinguishing the correct operating point on the oscillator trimmer from the image response point is to start with the trimmer screw set down fairly tight, then to slowly turn the screw out. First one response and then a second will be heard. The second response is the correct one. If only one response is heard over the whole trimmer range, it will be the correct one.

456 KC Trap Alignment. In regions adjacent to commercial radio telegraph transmitters code interference is often experienced because of the seepage of these code signals through the intermediate frequency system. A wave trap is incorporated in this receiver to eliminate this condition. To adjust this trap circuit a 456 KC signal should be fed from the signal generator into the antenna circuit of the receiver. This signal should be of a fairly high order. Adjust the wave trap trimmer condenser until minimum response is obtained.

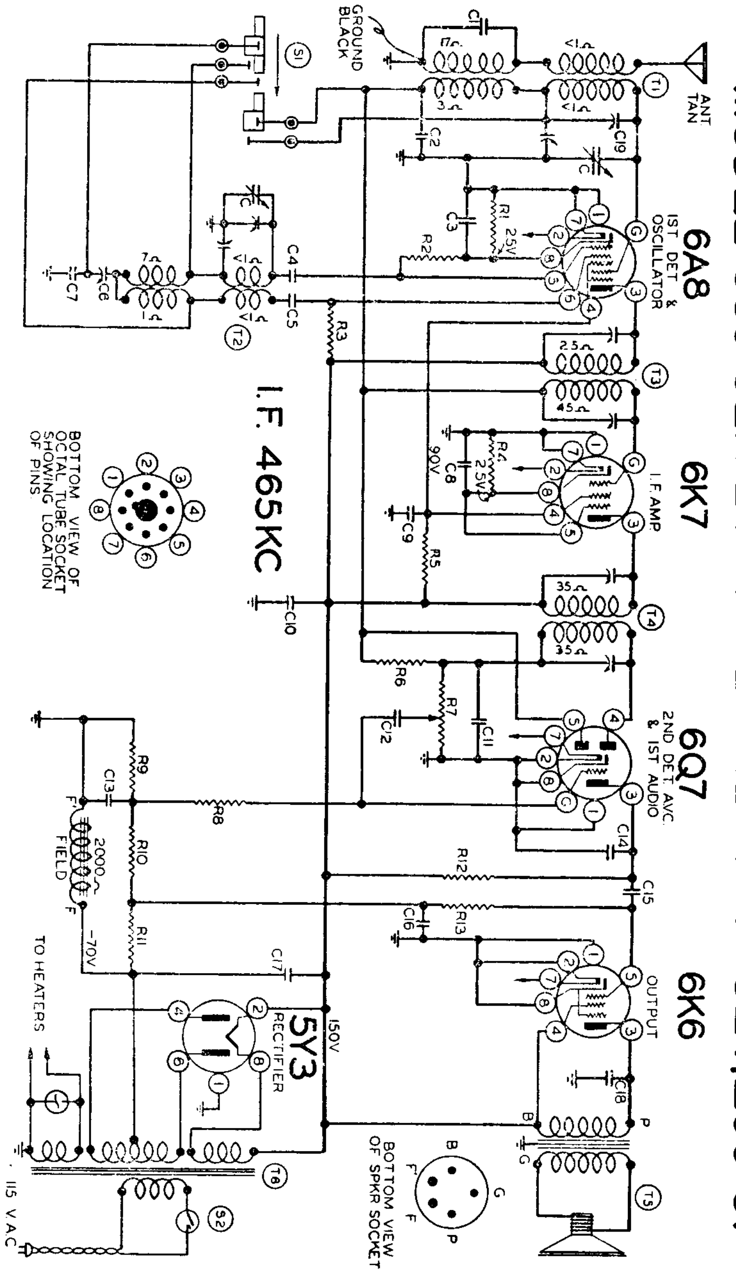
REPLACEMENT PARTS LIST

All orders for replacement parts must indicate both the serial number and model number of the chassis in addition to the part number and description of the item desired.

SCHEMATIC LOCATION	DESCRIPTION	PART NO.	LIST PRICE
L1	Broadcast Antenna Coil (Automatic Unit	BA130	$0.60
L2	Broadcast Antenna Coil	BA10	.60
L3	Police Band Antenna	PA137	.60
L4	Short Wave Antenna	SA137	.60
L5	Broadcast Oscillator Coil	BO137	.60
L6	Police Oscillator Coil	PO137	.55
L7	Short Wave Oscillator Coil	SO137	.55
L8	R.F. Choke	L135	.40
L9	1st I.F. Transformer	LC110	.80
L10	2nd I.F. Transformer	LC112	.80
L11, 12, 13, 14, 15, 16	Automatic Selector Oscillator Coil Assembly	XL6	2.75
L18	Wave Trap	LC50	.50
----	Speaker	SD29	8.00
S1	Line Switch (On Vol. Control)	----	----
S2	Band Selector Switch	S21	1.20
S3	Automatic Selector Switch Assembly	S20	2.75
C1, C2	2 Section Variable Condenser	CV29	1.80
C3, 4, 5, 6, 7, 8, 9	Fixed Condensers .1mfd--200v	----	.20
C10, 11, 12	Fixed " .01mfd--400v	----	.20
C13, C14	Fixed " .05mfd--200v	----	.20
C15	Fixed " .002mfd--600v	----	.20
C16	Mica " 100mmfd	----	.20
C17, C18	Toothpick " 1000mmfd	----	.30
C19	Fixed " 1000mmfd	----	.20
C20, 21, 22, 23	Mica " 200mmfd	----	.20
C24	Electrolytic Condenser 5mfd--35v	----	.40
C25, C26	Dual Trimmer	CT12	.25
C27, C28	" "	CT13	.25
C29, C30	" "	CT14	.25
C31	Single Trimmer (3–30mmfd)	----	.20
C32, 33, 34, 35, 36, 37	Six Section Trimmer	CT17	.50
C38	Variable Padder 550mmfd	----	.40
C39	Fixed " 1175mmfd	----	.25
C40	Fixed " 3350mmfd	----	.25
C41	Electrolytic Condenser	CE24	1.50
R1, R2	Resistors 2 megohms- ¼ Watt	----	.15
R3	" 1 megohm- 1/10 Watt	----	.15
R4, R5, R6	" ½ megohm- ¼ Watt	----	.15
R7	" ¼ megohm- ¼ Watt	----	.15
R8, R9, R10	" 100,000 ohms- ¼ Watt	----	.15
R11, R12, R13	" 50,000 ohms- ¼ Watt	----	.15
R14	" 25,000 ohms- ¼ Watt	----	.15
R15	" 15,000 ohms ¼ Watt	----	.15
R16	" 5,000 ohms ¼ Watt	----	.15
R17, R18, R19	" 1,000 ohms- ¼ Watt	----	.15
R20, R21	" 250 ohms- ¼ Watt	----	.20
R23	" 75 ohms--1 Watt		.25
R24	" 60 ohms--1 Watt	----	.25
R22, R25	Sensitivity Control 6000 ohms	RV28	.75
R26	Tone Control 500,000 ohms	RV17	.75
R27	Volume Control 250,000 ohms	RV24	.80

BELMONT RADIO CORPORATION

MODEL 589 SERIES A SERIAL No. 7H827,200 UP



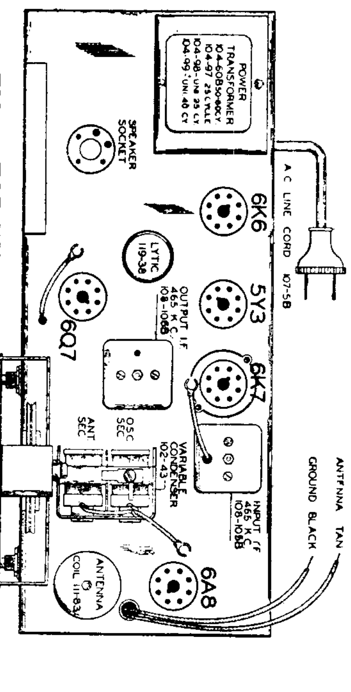


FIG. 1—TOP VIEW

VOLUME ON & OFF TUNING BAND SWITCH

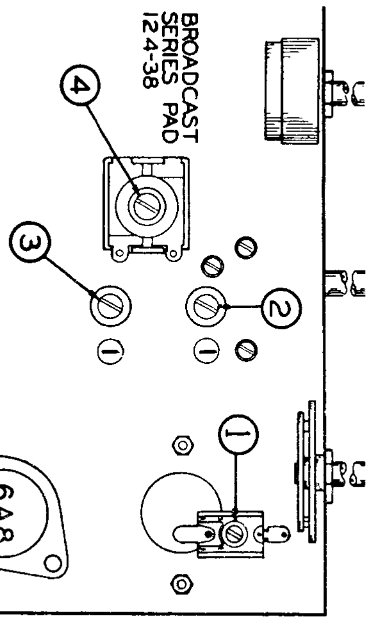


FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

Service Data for Service Men

DESCRIPTION:

The tube complement of this chassis consists of the following octal base glass tubes which are interchangeable with metal tubes:

1—Type 6A8G Pentagrid mixer, first detector-oscillator
1—Type 6K7G Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6Q7G duplex diode triode second detector, A.V.C. and audio.
1—Type 6K6G—pentode output amplifier
1—Type 5Y3G or 5W4—high vacuum rectifier.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 110, 130, and 230 volts, (see parts list).

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS:

CAUTION: No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as defective tubes, poor installations, open or grounded antenna systems, defective condensers and resistors.

In order to properly align this chassis, an oscillator (generator) is necessary.

All adjustments should be made with a non-metallic screw driver.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and screen terminals of the type 6K6G output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-106B Output I.F. Transformer
Part No. 108-105B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser in its minimum capacity position, plates entirely out of mesh, make the following adjustments.
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7G tube, and adjust the output I.F. transformer (No. 108-106B) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7G to grid cap of 6A8G and adjust input I.F. transformer (No. 108-105B) to resonance.

SHORT WAVE BAND ALIGNMENT:
5.5 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the antenna and ground leads, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator trimmer to resonance.
   This adjustment is the trimmer mounted on the top of rear section of the variable gang condenser (see Fig. 1, top view).
   (b) Adjust short wave antenna trimmer (Adjustment Number 1), to resonance (see Fig. 3, bottom view).

BROADCAST BAND ALIGNMENT:
535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground leads make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 3, see bottom view of chassis, Fig. 3).
   (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (adjustment number 2), to resonance.
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 4), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

LIST OF REPAIR PARTS

Part No.	Circuit Diagram Reference	Description
		CONDENSERS
100-1	C9	.1 x 400 volt Tubular Condenser
100-11	C12	.01 x 400 volt Tubular Condenser
	C3, C8	
100-20	C13, C16	.1 x 200 volt Tubular Condenser
100-22	C2	.05 x 200 volt Tubular Condenser
100-25	C5	.002 x 600 volt Tubular Condenser
100-26	C15	.02 x 200 volt Tubular Condenser
100-37	C18	.03 x 600 volt Tubular Condenser
	C10	
119-38	C17	5 Mfd x 200 w. v. - 5 Mfd x 250 w. v. Electrolytic Filter Condenser.
124-38	C6	Series Padder Condenser (600 mmf)
124-39B	C19	Trimmer Condenser for Antenna Coil (2-25 mmf)
129-2	C14	.0005 Mica - Type Mt - 20%
	C1	
129-5	C11	.0001 Mica - Type Mt - 20%
129-39	C4	.00005 Mica - Type Mt - 20%
129-54	C7	.003 Mica - Type Mt - 20%
		RESISTORS
130-3	R13	500M ohm - 1/3 watt - 20%
130-4	R6, R8	3 Meg ohm - 1/3 watt - 20%
130-9	R12	200M ohm - 1/3 watt - 20%
130-12	R2	50M ohm - 1/3 watt - 20%
130-17	R3	10M ohm - 1/3 watt 20%
130-46	R11	800M ohm - 1/3 watt - 20%
130-49	R5	15M ohm - 1/3 watt - 20%
130-80	R10	150M ohm - 1/3 watt - 10%
130-83	R1	300M ohm - 1/3 watt - 10%
130-93	R4	450M ohm - 1/3 watt - 10%
130-176	R9	20M ohm - 1/3 watt - 10%
		COILS
108-106B	T4	Output I.F. Coil Assembly complete with can
108-105B	T3	Input I.F. Coil Assembly complete with can
111-66	T2	Oscillator Coil Assembly complete
111-83	T1	Antenna Coil Assembly complete with can
		SOCKETS
121-8		Five Prong Socket — Marked "SPKR"
121-12		Seven Prong Socket — Marked "6K7"
121-15		Five Prong Socket — Marked "5Y3"
121-22		Eight Prong Socket — Marked "6A8"
121-26		Seven Prong Socket — Marked "6Q7"
121-71		Seven Prong Socket — Marked "6K6"
		TRANSFORMERS
104-60B	T6	Power Transformer - 105-125 volts 50-60 Cycle
104-97		Power Transformer - 105-125 volts 25 Cycle
104-98		Power Transformer - Universal Type - 25-60 Cycle
104-99		Power Transformer - Universal Type - 40-60 Cycle
		SPEAKER
[illegible]	T5	Six inch Dynamic (2000 ohm field)
		MISCELLANEOUS
101-71	R7, S2	Volume Control and Switch (1 meg ohm)
102-43		Two Gang Variable Condenser
107-5B		Line Cord and Plug
124-38	C6	Series Padder Condenser
124-39B	C19	Antenna Coil Trimmer Condenser
125-37	S1	Band Change Switch
128-65		Bakelite Knob with Spring
128-66		Springs for 128-65 Knob

All resistors and mica condensers are RMA color coded—specify value and/or resistor or condenser (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance.

Tolerance percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None

When ordering condensers, specify part number, model and/or capacity (per schematic diagram) and model number.

When ordering parts, always specify part and model number as well as serial number of chassis.

WHEN ORDERING SPEAKER PARTS: CONES, FIELD COILS, OUTPUT TRANSFORMERS, SPECIFY PART NUMBER OF SPEAKER AND MAKE.

DIAL PARTS LIST—MODEL 589

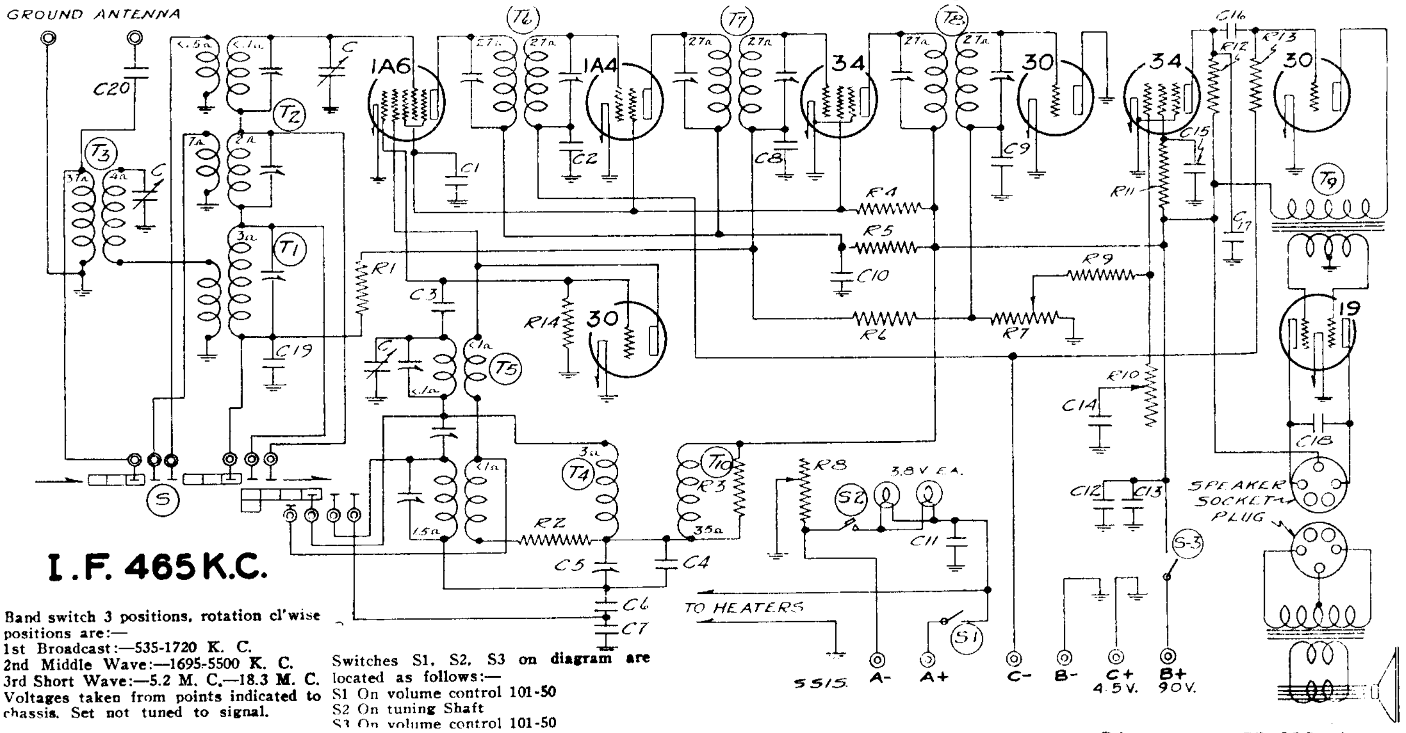
Part No.	DESCRIPTION	
	ASSEMBLIES	
117-126	Dial Bracket Assembly - Including	
	1—No. 117-122	Dial Scale Bracket
	1—No. 117-123	Bracket Brace
	1—No. 117-125	Tuning Shaft Bushing
	1—No. 112-248	Tuning Shaft
	1—No. 117-116	Drive Pulley

DIAL PARTS ONLY

Part No.	Description
107-38	Pilot Light Socket
107-97	6-8 Volt Pilot Light (Bayonet Base)
112-199	Dial Drum Including 117-84 Bushing and Set Screw
112-305	Dial Scale (Calibrated) Celluloid
112-160C	Pointer with No. 132-19 Screw and Washer
120-9	Black Irish Linen String
112-247	Crystal for Dial
120-97	Coil Take-up Spring for Dial Drive String
131-43	Cinch Button for Fastening Dial Scale

BELMONT RADIO CORPORATION

MODEL 822 "SERIAL № 6K411,500 & UP"



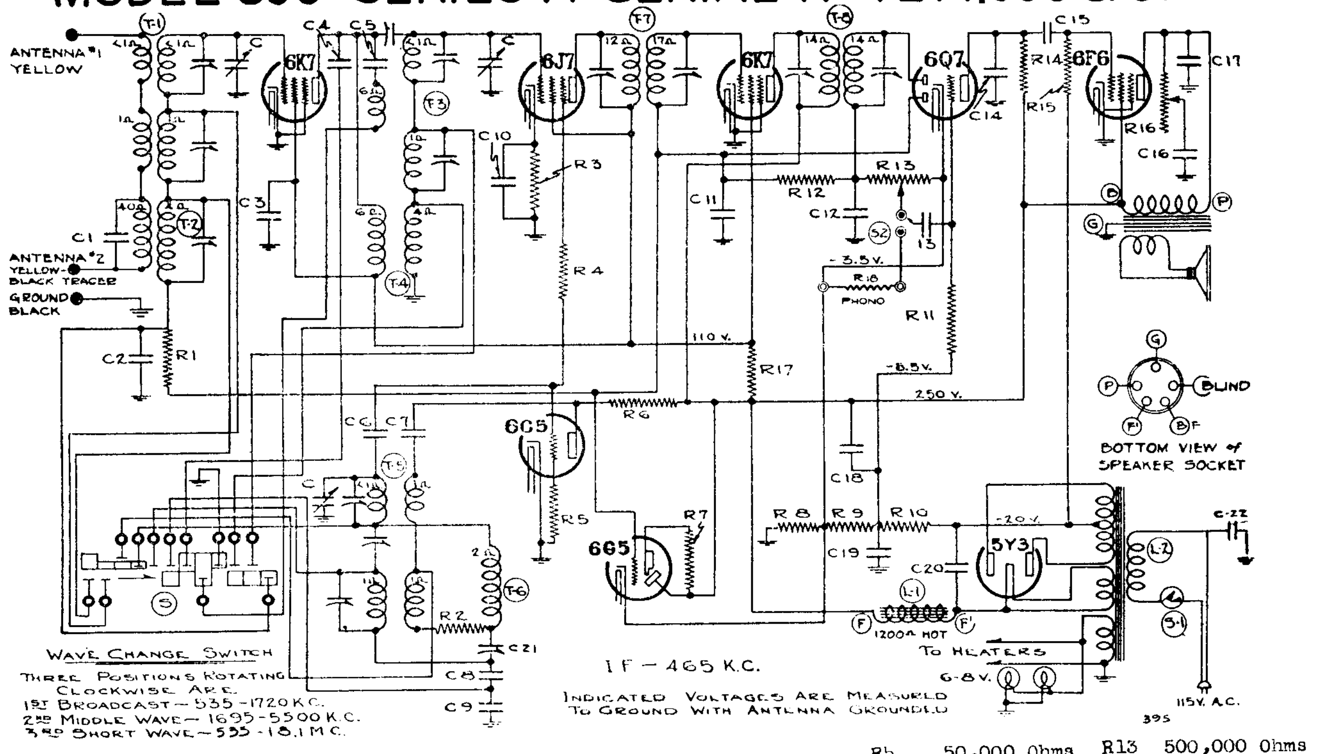
I. F. 465 K.C.

Band switch 3 positions, rotation cl'wise positions are:—
1st Broadcast:—535-1720 K. C.
2nd Middle Wave:—1695-5500 K. C.
3rd Short Wave:—5.2 M. C.—18.3 M. C.
Voltages taken from points indicated to chassis. Set not tuned to signal.

Switches S1, S2, S3 on diagram are located as follows:—
S1 On volume control 101-50
S2 On tuning Shaft
S3 On volume control 101-50

CONDENSERS		C2, C8		C7	.003 MF mica	R14	50,000 Ohms
C11	1.0 MF X 120 V	C15, C19	.05 MF X 200 V	C6	.0034 MF mica	R6, R11	
C1	.25 MF X 200 V	C18	.002 MF X 600 V	C4	.00055 MF mica	R13	1 Meg Ohm
C13	.25 MF X 200 V	C12	8 MF X 200 V			R1	100,000 Ohms
C14, C16		C17	.001 MF mica		RESISTORS	R2	50 Ohms
C20	.01 MF X 400 V	C9	.00025 MF mica	R12	250,000 Ohms	R5	1500 Ohms
C10	.1 MF X 200 V	C3	.00004 MF mica	R3, R9		R4	7500 Ohms

MODEL 890 SERIES A "SERIAL № 7E77,600 & UP"



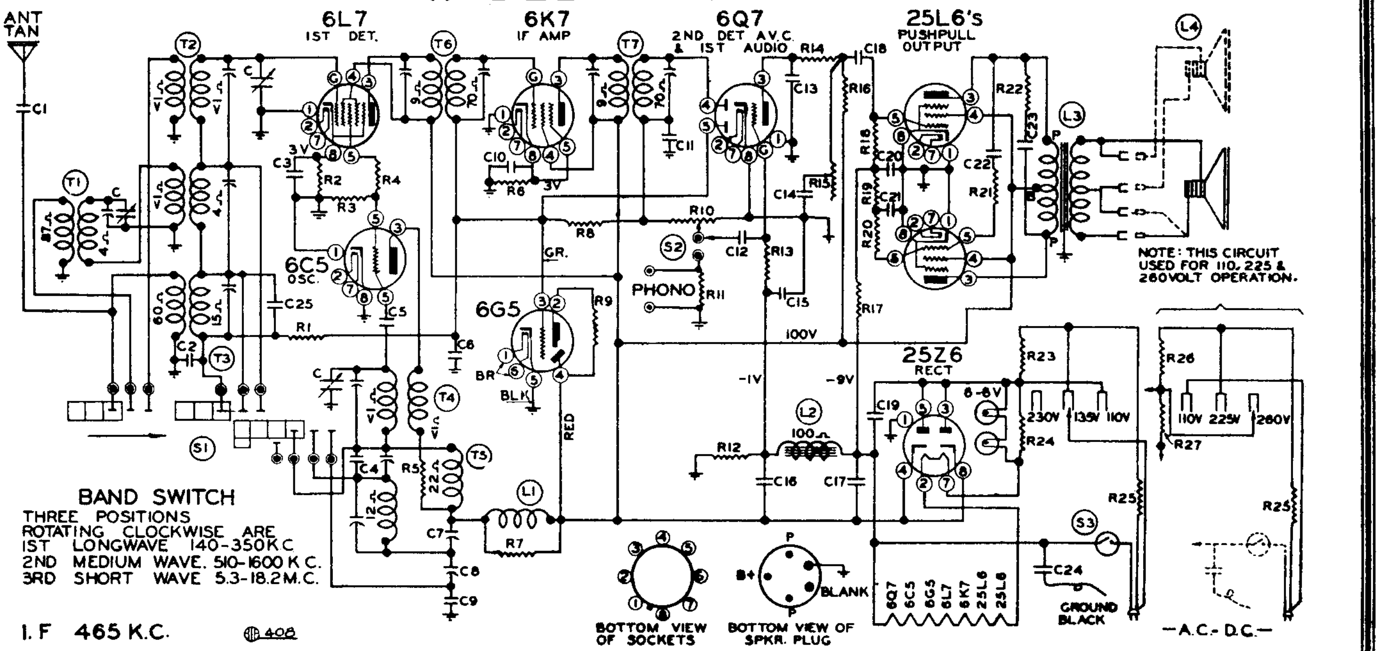
WAVE CHANGE SWITCH
THREE POSITIONS ROTATING CLOCKWISE ARE.
1ST BROADCAST — 535-1720 K.C.
2ND MIDDLE WAVE — 1695-5500 K.C.
3RD SHORT WAVE — 535-18.1 M.C.

I F — 465 K.C.

INDICATED VOLTAGES ARE MEASURED TO GROUND WITH ANTENNA GROUNDED

CONDENSERS		C7	.002 MF X600 V	C14	.0005 mica	C21	Series Pad	R5	50,000 Ohms	R13	500,000 Ohms
C1	.001 MF mica	C8	.004 mica	C15	.01 MF X400 V	C22	.02 MF X600 V	R6	10,000 Ohms	R14	100,000 Ohms
C2	.05 MF X200 V	C9	.002 mica	C16	.025 MF X600 V		RESISTORS	R7	1 megohm	R15	500,000 Ohms
C3	.25 MF X400 V	C10	.1 MF X200 V	C17	.002 MF X600 V	R1	100,000 Ohms	R8	55 Ohms	R16	50,000 Ohms
C4	.003 MF mica	C11	.02 MF X400 V	C18	8.0 MF X400 V	R2	150 Ohms	R9	30 Ohms	R17	10,000 Ohms
C5	.00005 Mica	C12	.001 mica	C19	.1 MF X200 V	R3	2500 Ohms	R10	240 Ohms	R18	100,000 Ohms
C6	.00004 mica	C13	.01 MF X400 V	C20	8.0 MF X275 V	R4	150 Ohms	R11	3 megohm	Note:	R8-R9 and R10
								R12	2 megohm		in one unit

BELMONT RADIO CORPORATION
MODELS 848 & 849



BAND	DIAL SCALE	FREQUENCY RANGE	
Long Wave	Outer Scale	350 to 140 K.C. (Kilocycles)	860-2150 Meters
Medium Wave	Center Scale	1600 to 510 K.C. (Kilocycles)	187- 588 Meters
Short Wave	Inner Scale	18.2 to 5.3 M.C. (Megacycles)	16.5-56.5 Meters

I. F. Frequency 465 K. C.
(645.1 Meters)

— SERVICE DATA FOR SERVICE MEN

DESCRIPTION:

The tube complement of this chassis consists of the following metal and octal base glass tubes which are interchangeable with metal tubes:

The type and function of each tube is as follows:

1—Type 6L7 Pentagrid Mixer, First Detector.
1—Type 6C5 Oscillator.
1—Type 6K7 Remote Cut-Off Pentode, I. F. Amplifier (465 K.C.)
1—Type 6Q7 Duplex Diode Triode Second Detector, A.V.C. and First Audio.
2—Type 25L6 Output Pentodes in Push Pull.
1—Type 25Z6 High Vacuum Rectifier.
1—Type 6G5 Cathode-Ray Tuning Indicator.
(Note:—6G5 available in all glass only.)

POWER SUPPLY:

This receiver is supplied for operation on 110-135-230 volts, or 110-225-260 volts, A.C. (any cycle) or D.C.

Three taps are provided for mains voltages. These taps are accessible upon removing the plate fastened with two wing nuts to back of chassis.

Set the tap at the voltage supplied by the local power company.

This is important.

If set does not operate in one minute on Direct Current reverse plug in receptacle.

SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages as indicated on diagram are measured with 110 volt A.C. or D.C. mains.

With special mains voltages select tap nearest to actual mains voltage at time voltage measurements are to be made.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS:

Dummy Antennas:

The following dummy antennas are used in aligning the receiver, and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Medium and long wave) — Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

TEST FREQUENCIES USED:

	Kilocycles	Meters
I. F.	465	645.1
Long Wave	150	2000
	350	860
	325	925
Medium Wave	600	500
	1400	214
	1600	187
Short Wave	6000	50.0
	17000	17.6
	18200	16.5

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

CAUTION:

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the four bolts by which it is fastened.

ALIGNING I.F. TRANSFORMERS:
(465 K.C.) (645.1 Meters)

Part No. 108-73 Output I. F. Transformer.
Part No. 108-88 Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the medium wave position, (center of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-73) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6L7 and adjust input I.F. transformer (No. 108-88) to resonance.
   (c) With oscillator still connected to 6L7, readjust output I.F. transformer (108-73) if necessary.

ALIGNMENT PROCEDURE:

The following adjustments to be made after the I.F.'s have been aligned as explained above.

SHORT WAVE BAND ALIGNMENT:
16.5 Meters (18.2 Mc.) to 56.5 Meters (5.3 Mc.)

1. With band changing switch in the short wave position extreme right of its rotation, and with the gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Set external oscillator to 16.5 meters (18.2 Mc.) and adjust short wave oscillator trimmer (adjustment number 3, see Fig. 3) to resonance.
   (b) Re-set external oscillator to 17.6 meters (17.0 Mc.) and pick up signal by rotating gang condenser. Adjust short wave antenna trimmer (adjustment number 6) to resonance.
   (c) Re-set external oscillator to 50 meters (6.0 Mc.) and check for sensitivity.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 18.3 megacycle signal appears near 17.4 megacycles.

MEDIUM BAND ALIGNMENT:
588 Meters (510 K.C.) to 187 Meters (1600 K.C.)

1. With band changing switch in the medium wave position, center of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 187 meters (1600 K.C.) and adjust medium wave oscillator trimmer to resonance (adjustment number 2; see bottom view of coil assembly. Fig. 3.)
   (b) Re-set external oscillator to 214 meters (1400 K.C.), rotate variable gang condenser and pick up signal. Adjust medium wave antenna trimmer (Adjustment number 5) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 500 meters (600 K.C.), and adjust medium wave series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 300 meters (1000 K.C.) **Under no circumstances bend plates of variable condenser sections to correct tracking.**

IMPORTANT: This band must be completely rechecked after the long wave band has been adjusted.

LONG WAVE BAND ALIGNMENT:
860 Meters (350 K.C.) to 2150 Meters (140 K.C.)

1. With band changing switch in the long wave position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 860 meters (350 K.C.), and adjust long wave oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly. Fig. 3.)
   (b) Re-set external oscillator to 925 meters (325 K.C.), rotate variable gang condenser and pick up signal. Adjust long wave antenna trimmer (Adjustment number 4) to resonance.
   (c) Re-set external oscillator to 2000 meters (150 K.C.), and adjust long wave series pad to resonance by rotating condenser to approximately 2000 meters, rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

IMPORTANT: This band must be completely rechecked after the medium wave band has been rechecked.

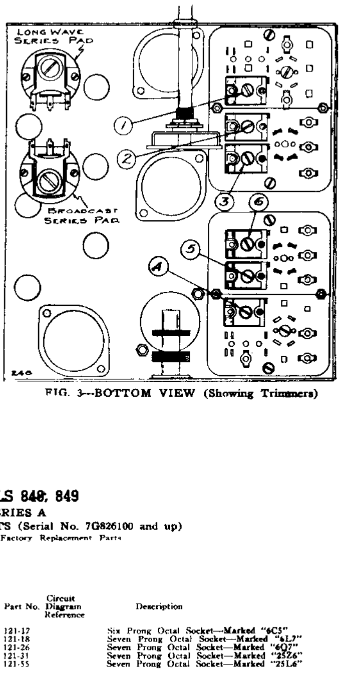


FIG. 3—BOTTOM VIEW (Showing Trimmers)

MODELS 848, 849
SERIES A
LIST OF REPAIR PARTS (Serial No. 7G826100 and up)
Use Only Genuine Factory Replacement Parts

Part No.	Circuit Diagram Reference	Description
		CONDENSERS
100-6	C15	.25 x 200 volt tubular condenser
100-9	C10, C12	.05 x 200 volt tubular condenser
100-11	C1, C18	.01 x 400 volt tubular condenser
100-19	C14, C22, C23	.006 x 600 volt tubular condenser
100-20	C21	.1 x 200 volt tubular condenser
100-22	C2, C3	.05 x 200 volt tubular condenser
100-26	C6	.02 x 400 volt tubular condenser
100-36	C24	.01 x 1400 volt tubular condenser
100-39	C19	.1 x 400 volt tubular condenser
100-43	C20	.25 x 200 volt tubular condenser
119-30	C16, C17	Dual 26 mfd. electrolytic filter
124-31	C7	Long Wave Series Pad—300 mmf. W.C.
124-32	C8	Medium Wave Series Pad—565 mmf. W.C.
129-3	C25	.0002 Mica—Type MT—20%
129-21	C11	.0002 Mica—Type MT—20%
129-2	C13	.0005 Mica—Type MT—20%
129-39	C5	.00005 Mica—Type MT—20%
129-54	C9	.003 Mica—Type MW—2½%
129-67	C4	.00004 Mica—Type MT—10%
		RESISTORS
106-30	R26, R27	100 ohm, 40 ohm Metal Clad Resistor—For 110-225-260 Volt Operation
106-41	R23, R24	65 ohm, 40 ohm Metal Clad Resistor—For 110-135-230 Volt Operation
107-48	R25	250 ohm Special Line Cord with European Plug
130-4	R8	3 Megohm—1/3 watt—20%—Carbon
130-7	R20	40M ohm—1/3 watt—10%—Carbon
130-11	R18, R19	250M ohm—1/3 watt—20%—Carbon
130-12	R3, R7	50M ohm—1/3 watt—20%—Carbon
130-19	R13	1 meg ohm—1/3 watt—20%—Carbon
130-20	R1, R11	100M ohm—1/3 watt—20%—Carbon
130-22	R22	5M ohm—1/3 watt—20%—Carbon
130-27	R5	50 ohm—1/3 watt—20%—Carbon
130-54	R2, R6	500 ohm—1/3 watt—20%—Carbon
130-60	R4	100 ohm—1/3 watt—20%—Carbon
130-66	R14	75M ohm—1/3 watt—10%—Carbon
130-100	R16	150M ohm—1/3 watt—20%—Carbon
130-102	R17, R21	500M ohm—1/3 watt—10%—Carbon
		COILS
108-73	T7	Output I.F. Coil Complete with can
108-88	T6	Input I.F. Coil Complete with can
110-47	T5	Long Wave Oscillator Coil Assembly Complete less can
110-49	T4	Short Wave and Medium Wave Oscillator Coil Assembly Complete less can
111-62	T1	Pre-Selector Coil Assembly Complete
111-64	T2	Short Wave and Medium Wave Antenna Coil Assembly Complete less can
111-61	T3	Long Wave Antenna Coil Assembly Complete less can
		SOCKETS
121-8		Five Prong Socket—Marked "Spkr"
121-12		Seven Prong Octal Socket—Marked "6K7"
121-17		Six Prong Octal Socket—Marked "6C5"
121-18		Seven Prong Octal Socket—Marked "6L7"
121-26		Seven Prong Octal Socket—Marked "6Q7"
121-31		Seven Prong Octal Socket—Marked "25Z6"
121-55		Seven Prong Octal Socket—Marked "25L6"
		CHOKE COILS
105-47	L2	Filter Choke Coil (100 ohms)
123-3	L1	"B" Choke R.F. Circuit
		SPEAKERS
114-82	L3	Eight inch Permanent Magnet Dynamic with 12 inch Cord and Plug
114-83	L3	Eight inch Permanent Magnet Dynamic with 20 inch Cord
114-84	L4	Eight inch Permanent Magnet Dynamic Extension Speaker—6 ohm Voice Coil
		MISCELLANEOUS
101-46	R10, S3	Volume Control and Switch (1 meg ohm)
101-56	R15	Tone Control (300M ohm)
102-47	C	Variable Condenser — 3 Gang
105-47	L2	Filter Choke Coil (100 ohms)
107-48	R25	250 ohm Special Line Cord
112-169		Phono-Radio Indicator Plate
115-35		Shield Can for Antenna, Oscillator Coils
115-54		Mains Cover Plate
121-30		Three Prong Socket Assembly for Mains Taps
121-57		Phono Jack Assembly
124-31	C7	Long Wave Series Padder Condenser
124-32	C8	Medium Wave Series Padder Condenser
125-17	S1	Band Change Switch
125-22	S2	Phono-Radio Toggle Switch
128-51		Wood Knob (Spring Type)
133-24		Wing Nut for Mains Cover Plate (115-54)

All resistors and mica condensers are RMA color coded—specify value and/or resistor or condenser (per schematic diagram) and model number. Mica condensers are coded with an additional dot indicating tolerance:

Tolerance percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None

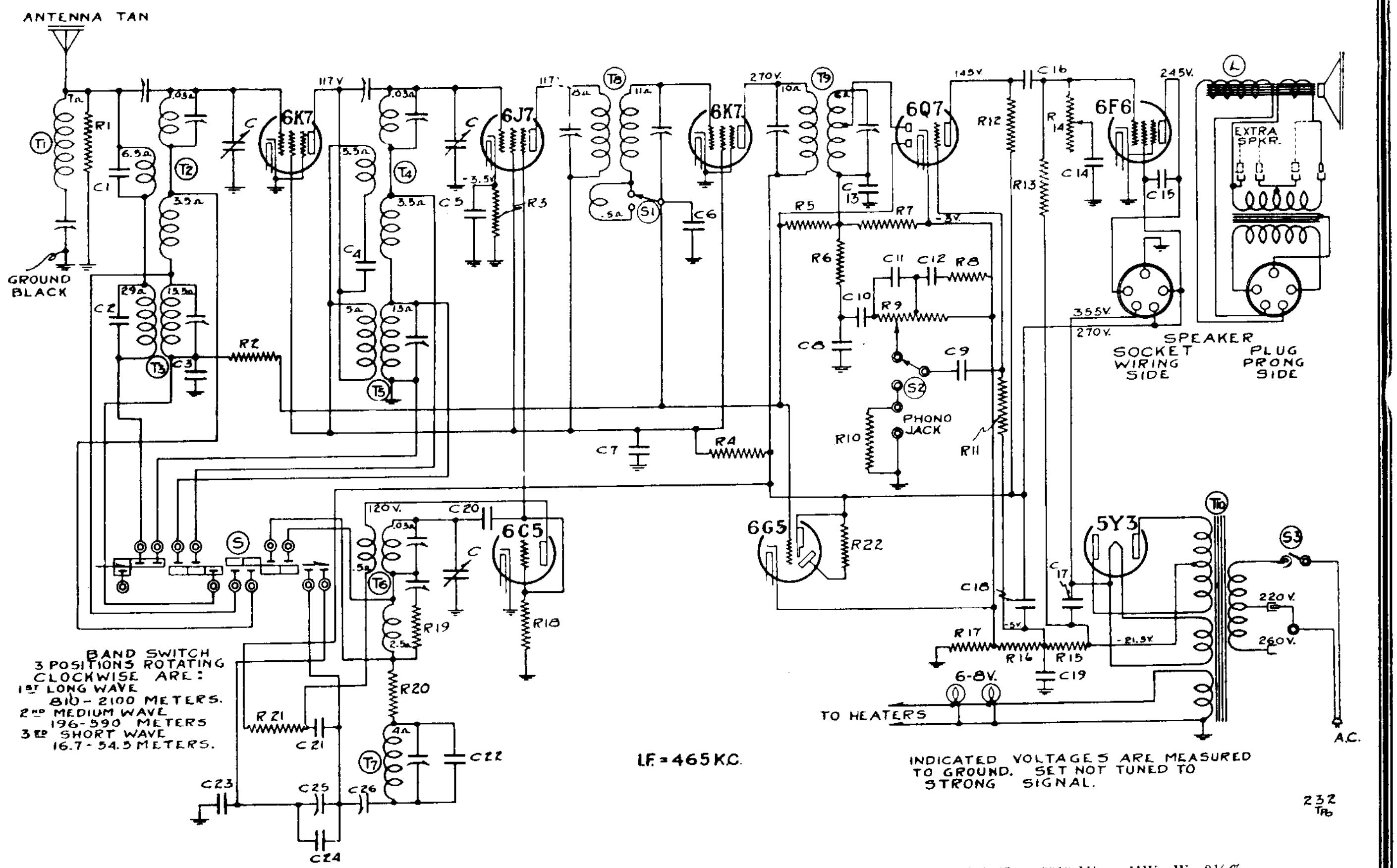
When ordering condensers, specify part number, model and/or capacitor (per schematic diagram) and model number.

When ordering parts, always specify part and model number as well as serial number of chassis.

WHEN ORDERING SPEAKER PARTS: CONES, FIELD COILS, OUTPUT TRANSFORMERS, SPECIFY PART NUMBER OF SPEAKER AND MAKE.

BELMONT RADIO CORPORATION

MODEL 856 SERIES A SERIAL № 6G315,150 UP



RESISTORS

No.	Part No.	Description
R1	130-36	10M Ohm 1/3 Watt—20% - 50 Volt Carbon
R2	130-20	100M Ohm 1/3 Watt—20%— 50 Volt Carbon
R3	130-43	2500 Ohm 1/3 Watt—20%— 20 Volt Carbon
R4	130-88	10M Ohm 2 Watt—20%—Wire Wound
R5	130-3	500M Ohm 1/3 Watt—20%—100 Volt Carbon
R6	130-20	100M Ohm 1/3 Watt—20%— 50 Volt Carbon
R7	130-11	250M Ohm 1/3 Watt—20%— 50 Volt Carbon
R8	130-22	5M Ohm 1/3 Watt—20%— 10 Volt Carbon
R9	101-47	1 Meg Ohm—Volume Control
R10	130-12	50M Ohm 1/3 Watt—20%— 20 Volt Carbon
R11	130-38	2 Meg Ohm 1/3 Watt 20%—100 Volt Carbon
R12	130-20	100M Ohm 1/3 Watt—20%— 50 Volt Carbon
R13	130-3	500M Ohm 1/3 Watt—20%—100 Volt Carbon
R14	101-38	100M Ohm—Tone Control
R15	106-27	220 Ohm—Muter Strip
R16	106-27	28 Ohm—Muter Strip
R17	106-27	38 Ohm—Muter Strip
R18	130-12	50M Ohm 1/3 Watt 20%— 20 Volt Carbon
R19	130-60	100 Ohm 1/3 Watt—20%— 10 Volt Carbon
R20	130-27	50 Ohm 1/3 Watt—20%— 3 Volt Carbon
R21	130-25	19M Ohm 1.2 Watt—20%—150 Volt Carbon
R22	130-110	1 Meg Ohm 1/10 Watt—10%—100 Volt Carbon

NOTE: R15, R16, and R17 are in one unit—No. 106-27

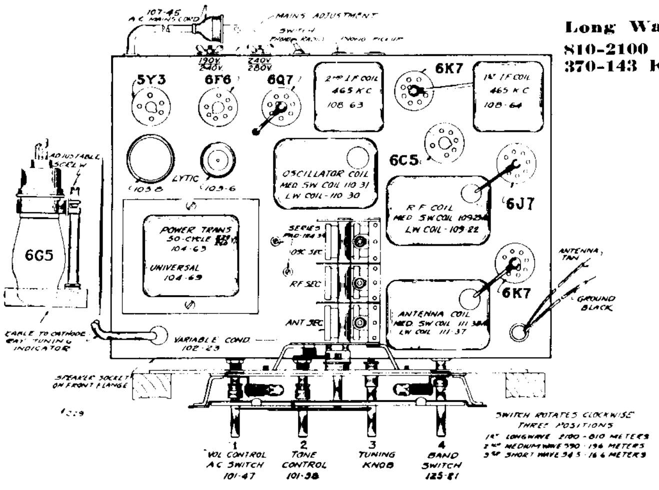
CONDENSERS

C1	129-41	.0024 Mica—MW—W—10%
C2	129-1	.001 Mica—MT—O—20%
C3	100-9	.05 x 200 Volt—25%
C4	129-42	.0036 Mica—MW—W—5%
C5	100-14	.1 x 200 Volt—20%
C6	100-9	.05 x 200 Volt—25%
C7	100-41	.25 x 400 Volt—20%
C8	129-60	.00015 Mica—MT—O—20%
C9	100-11	.01 x 400 Volt—25%
C10	100-9	.05 x 200 Volt—25%
C11	129-2	.0005 Mica—MT—O—20%
C12	100-9	.05 x 200 Volt—25%
C13	129-5	.0001 Mica—MT—O—20%
C14	100-26	.02 x 400 Volt—25%
C15	100-32	.0005 x 1000 Volt—20%
C16	100-11	.01 x 400 Volt—25%
C17	103-8	14 mfd. x 400 Volt Electrolytic
C18	103-6	8 mfd. x 350 Volt Electrolytic
C19	100-42	.25 x 200 Volt—20%
C20	129-68	.00003 Mica—MT—O—20%
C21	100-13	.05 x 400 Volt—25%
C22	129-40	.0001 Mica—MT—O—10%
C23	129-37	.0019 Mica—MW—W—2½%
C24	129-57	.0005 Mica—MT—O—5%
C25	124-33	Adjustable Condenser 200 mmf. Work. Cap.
C26	124-33	Adjustable Condenser 340 mmf. Work. Cap.

NOTE: C25 and C26 are in one unit—No. 124-33

MISCELLANEOUS PARTS

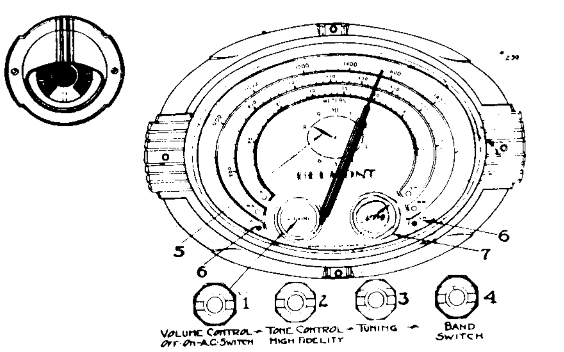
C	102-23	One Section of Three Gang Condenser
T1	108-50	Wave Trap Coil and Trimmer
T2	111-38A	M.W. and S.W. Antenna Coil
T3	111-37	L.W. Antenna Coil
T4	109-23A	M.W. and S.W. R.F. Coil
T5	109-22	L.W. R.F. Coil
T6	110-31	M.W. and S.W. Oscillator Coil
T7	110-30	L.W. Oscillator Coil
T8	108-64	Input I.F. 465 Kc.
T9	108-63	Output I.F. 465 Kc.
T10	104-63	Power Transformer 50 Cycle
L	114-46	8 In. Speaker (Field Resistance 1250 Ohms)
S	125-21	Band Switch
S1	101-38	High Fidelity Switch on Tone Control
S2	125-22	Phono-Radio Switch
S3	101-47	On and Off Switch on Volume Control



TOP VIEW—FIG. 1

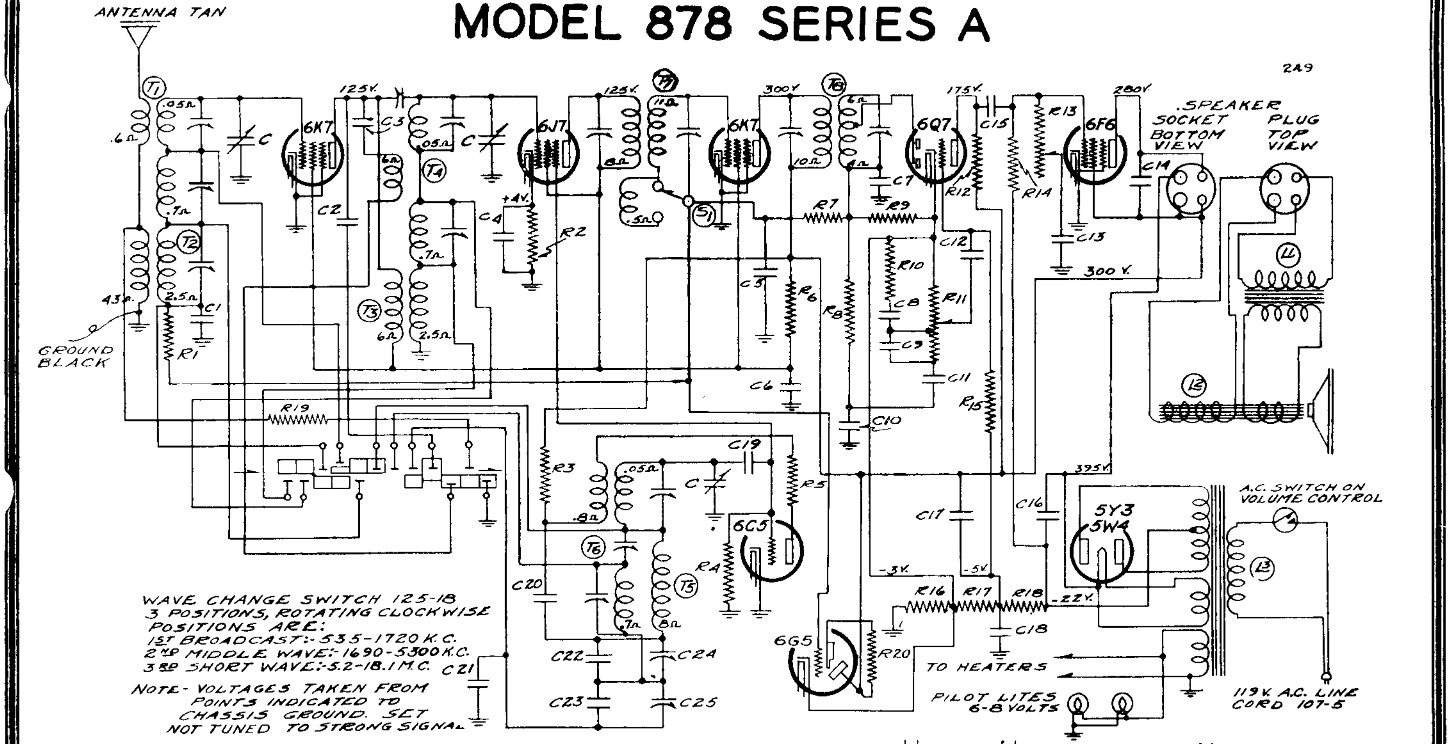
TUNING RANGE—

Long Wave Band	Medium Wave Band	Short Wave Band
810-2100 Meters	196-590 Meters	16.6-54.5 Meters
370-143 Kilocycles	1530-508 Kilocycles	18.1-5.5 Megacycles



FRONT VIEW—FIG. 3

BELMONT RADIO CORPORATION
MODEL 878 SERIES A



I.F. 465 K.C.

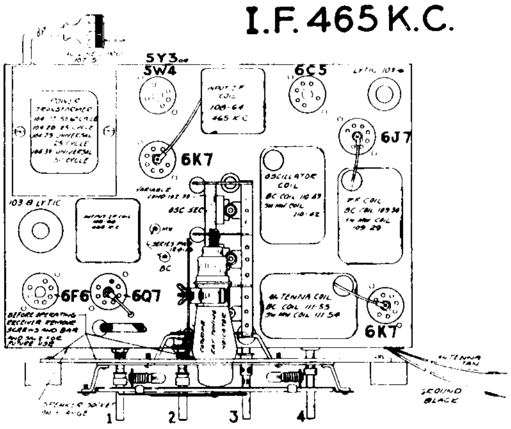


FIG. 3—TOP VIEW

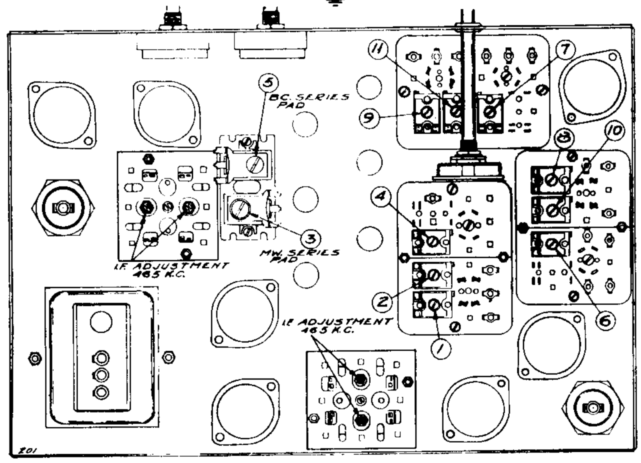
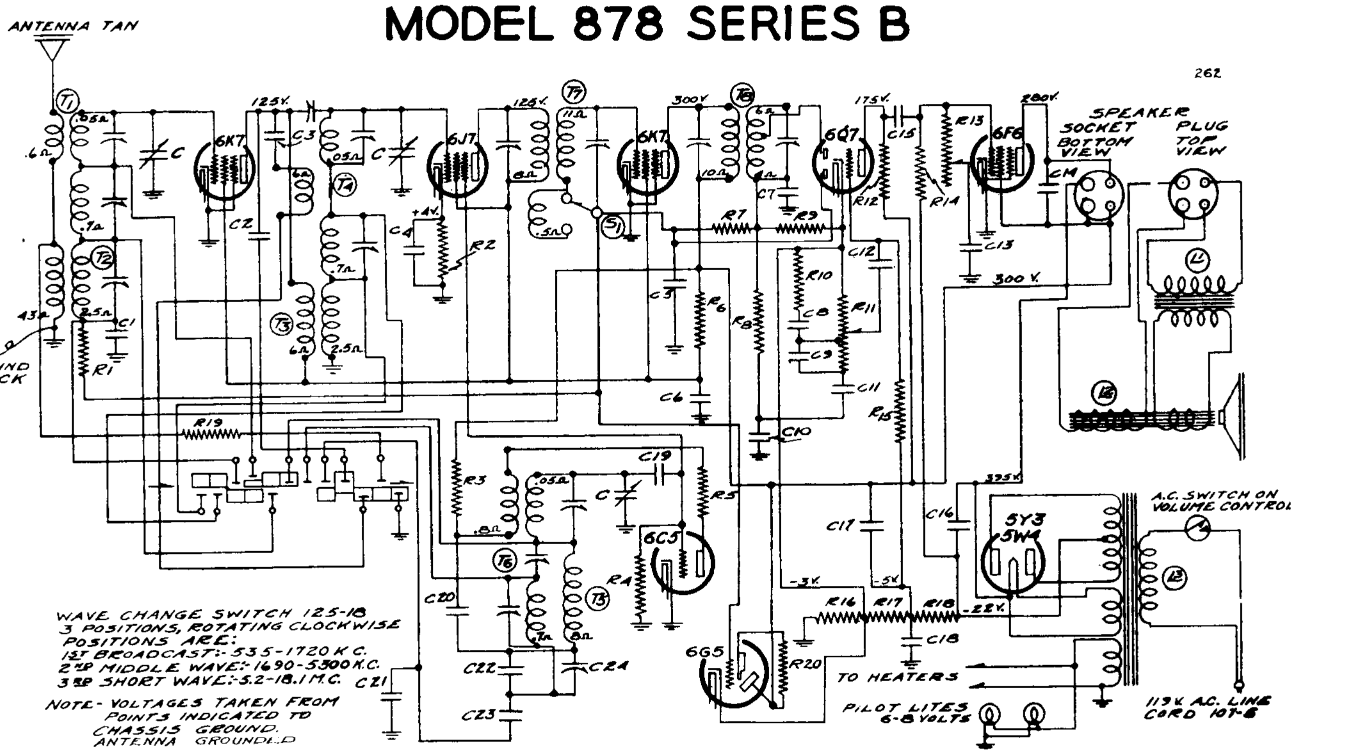


FIG. 1—BOTTOM VIEW SHOWING TRIMMERS

BELMONT RADIO CORPORATION
MODEL 878 SERIES B



DESCRIPTION

The tube complement of this chassis is as follows:

1—Type 6K7 Remote cut-off pentode R.F. amplifier
1—Type 6J7—pentode first detector.
1—Type 6C5 Oscillator
1—Type 6K7 Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6Q7 duplex diode pentode second detector, A.V.C. and audio.
1—Type 6F6—pentode output amplifier.
1—Type 5Y3 or 5W4—high vacuum rectifier.
1 Type 6G5 Cathode Ray Tuning Indicator.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 108, 127, 150, 225, and 260 volts, (see instructions) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 119 volts on the primary of the power transformer.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS
Dummy Antennas

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3"

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Intermediate and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and screen terminals of the type 6F6 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

CAUTION:

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the four bolts by which it is fastened.

ALIGNING I.F. TRANSFORMERS (465 K.C.)

Part No. 108-63 Output I.F. Transformer
Part No. 108-64 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the underside of chassis (see bottom view, Fig. 1).

1. With volume control full on, (the extreme right of its rotation), the wave changing switch in the broadcast position, (extreme left of its rotation), the tone control on "Hi" part of the sharp position (as much right rotation as possible without operating the Hi Fidelity switch), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

(a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, located between the two I.F. transformers, and adjust the output I.F. transformer 108-63 to resonance.

(b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6J7 and adjust input I.F. transformer (108-64) to resonance.

(c) With oscillator still connected to 6J7, re-adjust output I.F. transformer if necessary.

ALIGNMENT PROCEDURE

The following adjustments to be made after the I.F.'s have been aligned as explained above.

BROADCAST BAND ALIGNMENT:

1. With band changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 600 kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:

(a) Adjust broadcast series pad (adjustment number 3) to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the 108-63 output I.F. transformer. See top view, Fig. 3

(b) Re-set external oscillator to 1400 K.C., move dial pointer to 1400 K.C. and adjust oscillator (adjustment number 4), R.F. (adjustment number 6) and antenna (adjustment number 7) to resonance. See bottom view for location of these adjustments, Fig. 1.

(c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

NOTE: IT IS EXTREMELY NECESSARY IN MAKING ALL OF THESE ADJUSTMENTS THAT THE FUNDAMENTAL OSCILLATOR SIGNAL BE TUNED IN AND NOT THE IMAGE FREQUENCY WHICH WILL FALL BELOW THE FUNDAMENTAL.

SHORT WAVE BAND ALIGNMENT:

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

(a) Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 1), short wave R.F. (adjustment number 8) and short wave antenna (adjustment number 9) to resonance.

(b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

MIDDLE WAVE BAND ALIGNMENT:

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5 M.C. and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

(a) Rotate condenser, pick up signal and adjust middle wave R.F. (adjustment number 10), middle wave antenna (adjustment number 5) and middle wave oscillator (adjustment number 2) to resonance.

(b) Re-check broadcast alignment and if it is found necessary to re-adjust either R.F. or antenna trimmers, repeat the 17 M.C. short wave and 5 M.C. middle wave adjustments.

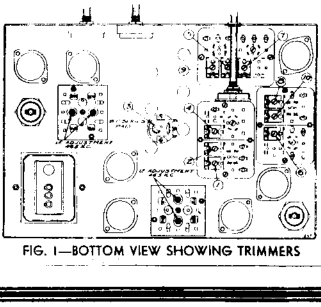


FIG. 1—BOTTOM VIEW SHOWING TRIMMERS

REPAIR PARTS LIST—MODEL 878—SERIES B

Serial No. 6J392500 to 6J392999 and from 6J393100 and up

Use only genuine factory replacement parts

Part No.	DESCRIPTION	Circuit Diagram Reference	List Price Each
	CONDENSERS		
100-9	.05 x 200 V. Tubular Condenser	C1, C4, C5, C8	.25
100-11	.01 x 400 V. Tubular Condenser	C12, C15	.25
100-13	.05 x 400 V. Tubular Condenser	C20	.25
100-22	.05 x 200 V. Tubular Condenser	C11	.25
100-26	.02 x 400 V. Tubular Condenser	C13	.25
100-32	.0005 x 1000 V. Condenser	C14	.25
100-41	.25 x 400 V. Tubular Condenser	C6	.35
100-46	.25 x 200 V. Tubular Condenser	C18	.35
103-6	8 mfd. x 350 V. Electrolytic	C17	.85
103-8	14 mfd. x 400 V. Electrolytic	C16	1.35
129-2	.0005 Mica Type MT 20%	C9	.25
129-5	.0001 Mica Type MT 20%	C7	.25
129-31	.000025 Mica Type MT 15%	C19	.25
129-39	.00005 Mica Type MT 20%	C3	.25
129-55	.0034 Mica Type MW 2½%	C23	.35
129-57	.0005 Mica Type MT 5%	C22	.25
129-59	.0003 Mica Type MT 5%	C2	.25
129-60	.00015 Mica Type MT 20%	C10	
129-69	.0023 Mica Type MW 2½%	C21	.35
	RESISTORS		
130-3	500M ohm 1/3 Watt 20% 100 V. Carbon	R14	.20
130-11	250M ohm 1/3 Watt 20% 50 V. Carbon	R9	.20
130-12	50M ohm 1/3 Watt 20% 20 V. Carbon	R4	.20
130-20	100M ohm 1/3 Watt 20% 50 V. Carbon	R1, R8, R12	.20
130-22	5M ohm 1/3 Watt 20% 10 V. Carbon	R10	.20
130-27	50 ohm 1/3 Watt 20% Carbon	R19	.20
130-38	2 Megohm 1/3 Watt 20% 100 V. Carbon	R7, R13	.20
130-43	2500 Megohm 1/3 Watt 20% 20 V. Carbon	R2	.20
130-60	100 ohm 1/3 Watt 20% 10 V. Carbon	R5	.20
130-77	10M ohm 1.0 Watt 20% 300 V. Carbon	R3	.20
130-88	10M ohm 2.0 Watt 20% Wire Wound	R6	.40
130-110	1 Megohm 1/10 Watt 10% 100 V. Carbon	R20	.30
106-27	38, 28, 220 ohm Metal Clad Muter Resistor	R16, R17, R18	.50
	COILS		
108-63	Output I.F. Coil Assembly Complete, less can	T8	1.50
108-64	Input I.F. Coil Assembly Complete, less can	T7	1.65
109-29	**Mid-Wave & Short-Wave R.F. Coil Assembly** Complete, less can	T4	1.50
109-30	Broadcast R.F. Coil As. Com., less can	T3	1.00
110-42	**Mid-Wave & Short Wave Oscillator Coil Assembly** Complete, less can	T6	1.25
110-43	Broadcast Oscillator Coil As. Com., less can	T5	.50
111-54	**Mid-Wave & Short-Wave Antenna coil Assembly** Complete, less can	T1	1.50
111-55	Broadcast Antenna Coil As. Com., less can	T2	1.00
	TRANSFORMERS		
104-27	50/60 Cycle Power Transformers	L3	4.50
104-28	25 Cycle Power Transformer		7.00
104-29	Universal—25 Cycle Primary		7.50
104-30	Universal—40 Cycle Primary		7.00
104-69	Universal 50 Cycle Primary		6.50

Part No.	DESCRIPTION	Circuit Diagram Reference	List Price Each
	SOCKETS		
121-9	Four-Prong Type "Spkr."		.10
121-12	Seven-Prong Type "6K7"		.10
121-13	Seven-Prong Type "6J7"		.10
121-26	Seven-Prong Type "6Q7"		.10
121-14	Seven-Prong Type "6F6"		.15
121-29	Five-Prong Type "5Y3—5W4"		.16
121-17	Six-Prong Type "6C5"		.10
	SPEAKERS		
114-36	Eight Inch Dynamic Speaker (1250 ohm Field)		6.50
114-37	Ten Inch Dynamic Speaker (1250 ohm Field)		7.50
	MISCELLANEOUS		
101-38	Tone Control & Fidelity Switch (100M ohm)	R13, S1	1.35
101-47	Volume Control & Switch (1 Megohm)	R11	1.25
102-35	Three-Gang Variable Condenser	C	5.00
107-5	**Line Cord & Plug**		.50
115-35	**Antenna, Oscillator and R.F. Shield**		.15
115-36	**I.F. Shield**		.15
124-34	Broadcast Series Pad 200 mmf.	C24	.35
125-18	Band Switch	S	.90
163-2	**Rubber Chassis Cushions**		.03
128-51	Wood Knob with Spring		.15

All resistors and mica condensers are RMA color coded—specify value and/or resistor or condenser (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None.

When ordering condensers, specify part number, model and/or capacitor (per schematic diagram) and model number.

When ordering parts, always specify part and model number as well as serial number of chassis.

All prices quoted are list and are subject to the usual trade discounts.

Prices subject to change without notice.

Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

WE CANNOT SUPPLY SPEAKER PARTS, CONES, TRANSFORMERS, OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $2.00 NET, IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.

DIAL PARTS LIST MODEL 878B

Part No.	DESCRIPTION	List Price Each
	ASSEMBLIES	
112-188	Dial Plate Assembly Including: 1 No. 117-17A Dial Plate; 1 No. 117-11 Dial Bracket; 1 No. 117-21A Bushing; 4 No. 162-4 Rivets	.75
112-189	Switch Assembly Including: 1 No. 117-16 Band Indicator Arm; 1 No. 117-15 Link (small); 1 No. 117-14 Elbow; 1 No. 117-13 Link (large); 1 No. 131-26 Washer; 1 No. 162-8 Rivets; 1 No. 117-35A Stud for link; 1 No. 131-39 Horseshoe Spring Washer; 1 No. 131-30 Spring Washer; Pcl. Celluloid	.30
112-190	Switch Arm Assembly Including: 1 No. 117-12 Switch Arm; 1 No. 117-35 Switch Arm Bushing; 2 No. 131-3 Set Screws	.10
112-191	Tone Indicator Assembly Including: 1 No. 117-178 Celluloid Disc; 1 No. 117-5 Disc Bushing; 1 No. 120-54 Coil Spring; Fish Line	.60
112-192	Volume Indicator Assembly Including: 1 No. 117-178 Celluloid Disc; 1 No. 117-5 Disc Bushing; 1 No. 120-54 Coil Spring; Fish Line	.60

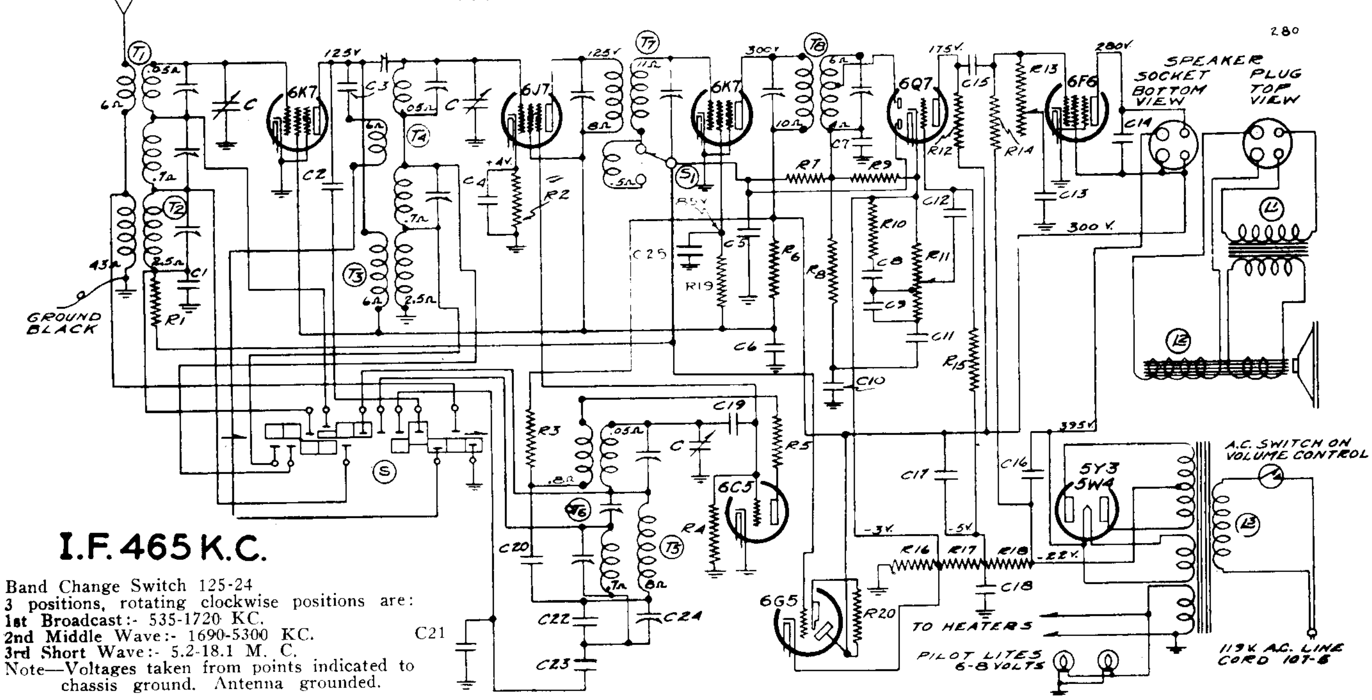
Part No.	DESCRIPTION (DIAL PARTS ONLY)	List Price Each
[illegible]	Tuning Shaft	.45
[illegible]	Metal Oval Escutcheon Only	1.35
[illegible]	Dial Pointer with 132-8 Screw	.20
[illegible]	Oval Glass Crystal Only	.35
[illegible]	Oval Glass Retaining Ring	.10
[illegible]	Background Plate Gasket	.10
117-176	Drive Belt	.20
117-179	Band Spread Pointer	.10
117-180	Glass Dial Scale	.60
107-46	Right Pilot Light Bracket and Socket	.10
107-47	Left Pilot Light Bracket and Socket	.10
115-65	Tuning Indicator Paper Tube Shield	.01
107-14	6.8 Volt, T-46 Pilot Light	.10
117-20A	Drive Belt Pulley	.05
117-28A	Tone and Volume Shaft	.05
117-33A	Stud for Switch	.03
117-39	Drive Belt Take-up Pulley	.03
117-57	Tuning Indicator Holder	.25
117-64	Background Plate	.25
117-73	Reflector Plate	.10
117-74	Bushing	.10
120-53	Drive Belt Take-up Coil Spring	.05
131-30	Spring Washer	.03
131-31	Spring Washer	.01
131-33	Glass Dial Retaining Clips	.025
154-3	Set Screw	.015

CATHODE-RAY TUNING INDICATOR PARTS

Part No.	DESCRIPTION	List Price Each
107-43	Cable and Socket Assembly (With 130-110 Resistor)	$0.75
117-57	Holder and Clamp	.25

BELMONT RADIO CORPORATION

MODEL 879 SERIES A



I.F. 465 K.C.

Band Change Switch 125-24
3 positions, rotating clockwise positions are:
1st Broadcast:- 535-1720 KC.
2nd Middle Wave:- 1690-5300 KC.
3rd Short Wave:- 5.2-18.1 M. C.
Note—Voltages taken from points indicated to chassis ground. Antenna grounded.

C21

ALIGNING INSTRUCTIONS
Dummy Antennas

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Intermediate and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and screen terminals of the type 6F6 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

CAUTION:

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the four bolts by which it is fastened.

ALIGNING I.F. TRANSFORMERS (465 K.C.)

Part No. 108-63 Output I.F. Transformer
Part No. 108-64 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the underside of chassis (see bottom view, Fig. 1).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), the tone control on "Hi" part of the sharp position (as much right rotation as possible without operating the Hi Fidelity switch), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, located between the two I.F. transformers, and adjust the output I.F. transformer 108-63 to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6J7 and adjust input I.F. transformer (108-64) to resonance.
   (c) With oscillator still connected to 6J7, re-adjust output I.F. transformer if necessary.

ALIGNMENT PROCEDURE

The following adjustments to be made after the I.F.'s have been aligned as explained above.

BROADCAST BAND ALIGNMENT:

1. With band changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 600 kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:
   (a) Adjust broadcast series pad (adjustment number 3) to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the 108-63 output I.F. transformer. See top view, Fig. 3.
   (b) Re-set external oscillator to 1400 K.C., move dial pointer to 1400 K.C. and adjust oscillator (adjustment number 4), R.F. (adjustment number 6) and antenna (adjustment number 7) to resonance. See bottom view for location of these adjustments, Fig. 1.
   (c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

NOTE: IT IS EXTREMELY NECESSARY IN MAKING ALL OF THESE ADJUSTMENTS THAT THE FUNDAMENTAL OSCILLATOR SIGNAL BE TUNED IN AND NOT THE IMAGE FREQUENCY WHICH WILL FALL BELOW THE FUNDAMENTAL.

SHORT WAVE BAND ALIGNMENT:

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 1), short wave R.F. (adjustment number 8) and short wave antenna (adjustment number 9) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

MIDDLE WAVE BAND ALIGNMENT:

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5 M.C. and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

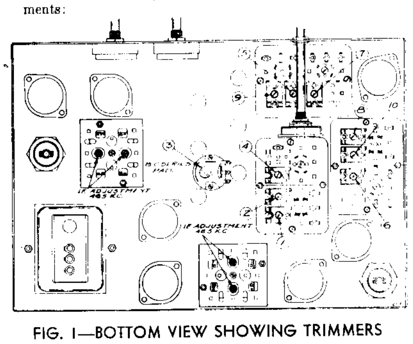


FIG. 1—BOTTOM VIEW SHOWING TRIMMERS

   (a) Rotate condenser, pick up signal and adjust middle wave R.F. (adjustment number 10), middle wave antenna (adjustment number 5) and middle wave oscillator (adjustment number 2) to resonance.
   (b) Re-check broadcast aligument and if it is found necessary to re-adjust either R.F. or antenna trimmers, repeat the 17 M.C. short wave and 5 M.C. middle wave adjustments.

REPAIR PARTS LIST—MODEL 879—SERIES A

Serial No. 6J392500 to 6J392999 and from 6J393100 and up

Part No.	DESCRIPTION	Circuit Diagram Reference	List Price Each
	CONDENSERS		
100-9	.05 x 200 V. Tubular Condenser	C1, C4, C5, C8	.25
100-11	.01 x 400 V. Tubular Condenser	C12, C15, C25	.25
100-13	.05 x 400 V. Tubular Condenser	C20	.25
100-22	.05 x 200 V. Tubular Condenser	C11	.25
100-26	.02 x 400 V. Tubular Condenser	C13	.25
100-32	.0005 x 1000 V. Condenser	C14	.25
100-41	.25 x 400 V. Tubular Condenser	C6	.35
100-46	.25 x 200 V. Tubular Condenser	C18	.35
103-6	8 mfd. x 350 V. Electrolytic	C17	.85
103-8	14 mfd. x 400 V. Electrolytic	C16	1.35
129-2	.0005 Mica—Type MT—20%	C9	.25
129-5	.0001 Mica—Type MT—20%	C7	.25
129-31	.000025 Mica—Type MT—15%	C19	.25
129-39	.00005 Mica—Type MT 20%	C3	.25
129-55	.0034 Mica Type MW 2½%	C23	.35
129-57	.0005 Mica Type MT—5%	C22	.25
129-59	.0003 Mica Type MT 5%	C2	.25
129-60	.00015 Mica—Type MT—20%	C10	.25
129-69	.0023 Mica Type MW 2½%	C21	.35
	RESISTORS		
130-3	500 M ohm 1/3 Watt—20%—100 V. Carbon	R14	.20
130-11	250M ohm—1/3 Watt—20%—50 V. Carbon	R9	.20
130-12	50M ohm—1/3 Watt—20%—20 V. Carbon	R4	.20
130-20	100M ohm 1/3 Watt—20%—50 V. Carbon	R1, R8, R12	.20
130-22	5M ohm—1/3 Watt—20%—10 V. Carbon	R10	.20
130-38	2 Megohm—1/3 Watt 20% 100 V. Carbon	R7, R15	.20
130-43	2500 Megohm 1/3 Watt 20% 20 V. Carbon	R2	.20
130-60	100 ohm—1/3 Watt—20%—10 V. Carbon	R5	.20
130-76	30M ohm—1/3 Watt 20% 10 V. Carbon	R19	.20
130-77	10M ohm 1.0 Watt—20% 100 V. Carbon	R3	.20
130-88	10M ohm—2.0 Watt—20%—Wire Wound	R6	.40
130-110	1 Megohm 1/10 Watt—10%—100 V. Carbon	R20	.20
106-27	38, 28, 220 ohm Metal Clad Muter Resistor	R16, R17, R18	.50
	COILS		
108-63	Output I.F. Coil Assembly Complete, less can	T8	1.50
108-64	Input I.F. Coil Assembly Complete, less can	T7	1.65
109-29	Mid-Wave & Short-Wave R.F. Coil Assembly Complete, less can	T4	1.50
109-30	Broadcast R.F. Coil As. Com., less can	T3	1.00
110-42	Mid-Wave & Short-Wave Oscillator Coil Assembly Complete, less can	T6	1.25
110-43	Broadcast Oscillator Coil As. Com., less can	T5	.50
111-54	Mid-Wave & Short-Wave Antenna coil Assembly Complete, less can	T1	1.50
111-55	Broadcast Antenna Coil As. Com., less can	T2	1.00
	TRANSFORMERS		
104-27	50/60 Cycle Power Transformers	L3	4.50
104-28	25 Cycle Power Transformer		7.00
104-29	Universal—25 Cycle Primary		7.50
104-30	Universal—40 Cycle Primary		7.00
104-69	Universal—50 Cycle Primary		6.50
	SOCKETS		
121-9	Four-Prong Type "Spkr."		.10
121-12	Seven-Prong Type "6K7"		.15
121-13	Seven-Prong Type "6J7"		.15
121-26	Seven Prong Type "6Q7"		.15
121-14	Seven-Prong Type "6F6"		.15
121-29	Five-Prong Type "5Y3—5W4"		.10
121-17	Six-Prong Type "6C5"		.15
	SPEAKERS		
114-36	Eight Inch Dynamic Speaker (1250 ohm Field)		6.50
114-37	Ten Inch Dynamic Speaker (1250 ohm Field)		7.50
	MISCELLANEOUS		
101-61	Tone Control & Fidelity Switch (100M ohm)	R13, S1	1.25
101-60	Volume Control & Switch (1 Megohm)	R11	1.25
107-57	Three-Gang Variable Condenser	C	5.00
107-5	Line Cord & Plug		.50
115-35	Antenna, Oscillator and R.F. Shield		.15
115-36	I.F. Shield		.15
124-31	Broadcast Series Pad 200 mmf.	C24	.35
125-21	Band Switch	S	.75
163-2	Rubber Chassis Cushions		.03
128-51	Wood Knob with Spring		.15

All resistors and mica condensers are RMA color coded—specify value and/or resistor or condenser (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None.

When ordering condensers, specify part number, model and/or capacitor (per schematic diagram) and model number.

When ordering parts, always specify part and model number as well as serial number of chassis.

All prices quoted are list and are subject to the usual trade discounts

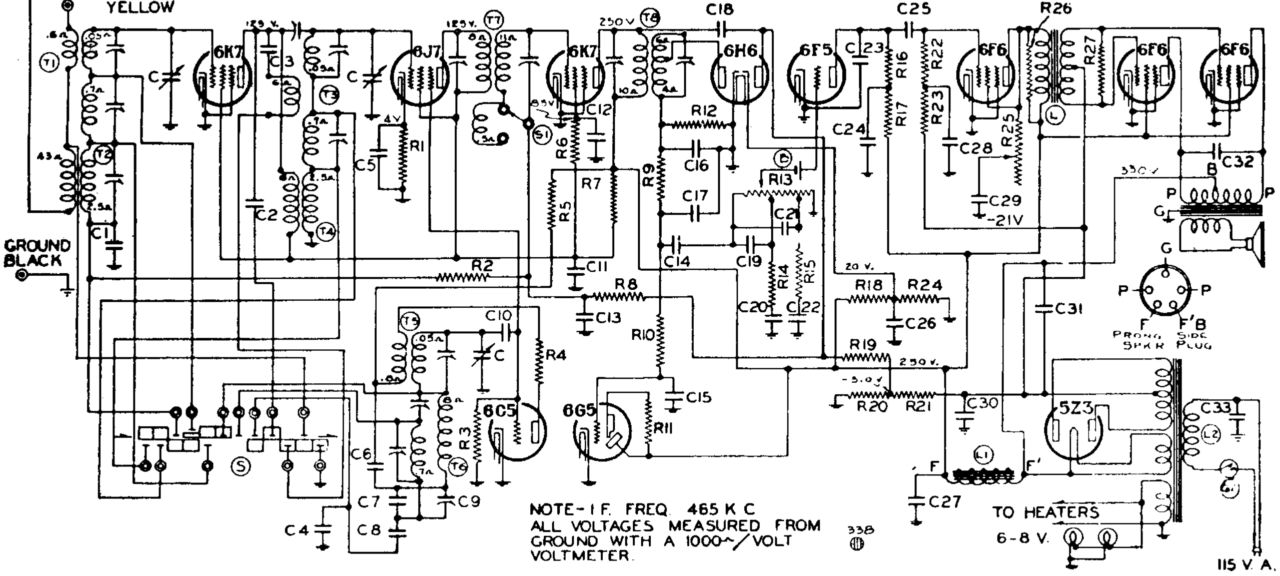
Prices subject to change without notice.

Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

WE CANNOT SUPPLY SPEAKER PARTS, CONES, TRANSFORMERS, OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $2.00 NET, IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.

BELMONT RADIO CORPORATION

MODEL 1170B SERIAL Nº 7C561,750 & UP



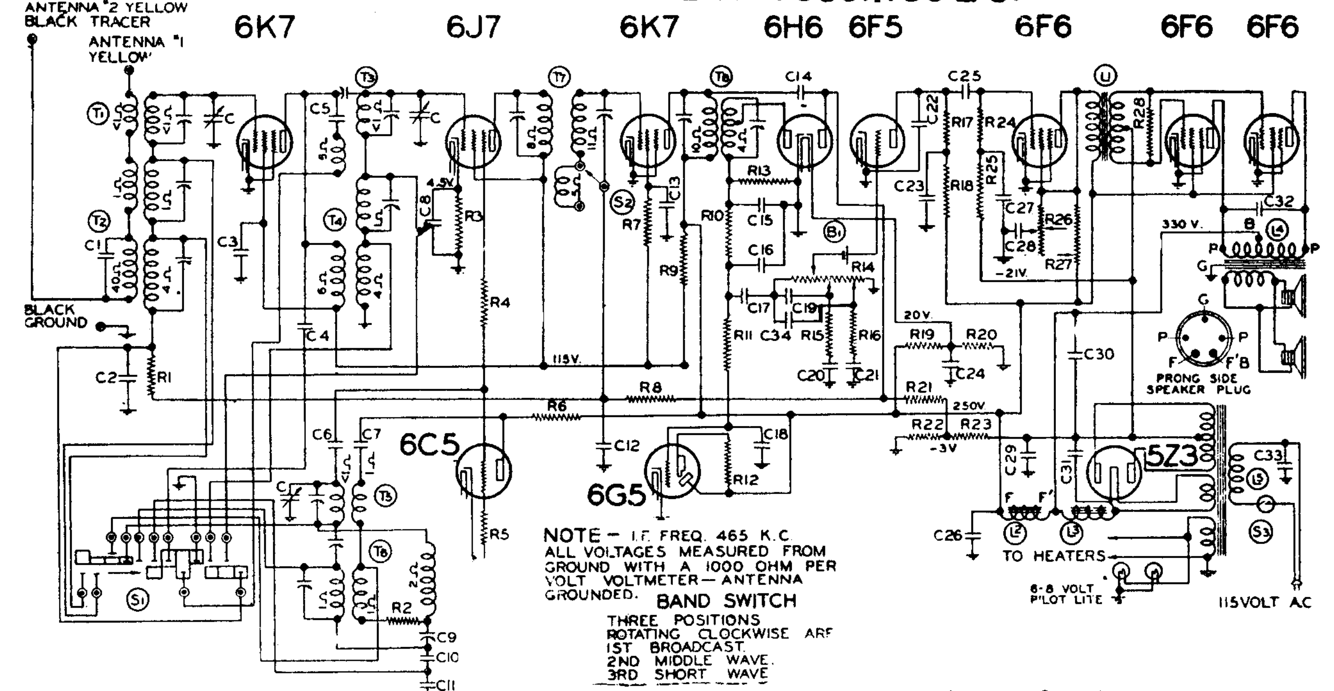
CONDENSERS

C1	.05 MF X 200 V
C2	.003 MF Mica
C3	.00005 MF Mica
C4	.0023 MF Mica
C5	.05 MF X 200 V
C6	.05 MF X 400 V
C7	.0005 MF Mica
C8	.0034 MF Mica
C9	200 MMF Working Cap. Adjustable Pad
C10	.000025 MF Mica
C11	.25 MF X 400 V
C12	.01 MF X 400 V
C13	.05 MF X 200 V
C14	.05 MF X 200 V
C15	.01 MF X 400 V
C16	.00015 MF Mica
C17	.00015 MF Mica
C18	.00002 MF Mica
C19	.0005 MF Mica
C20	.05 MF X 200 V
C21	.00015 MF Mica
C22	.05 MF X 200 V
C23	.0001 MF Mica
C24	.1 MF X 200 V
C25	.05 MF X 400 V
C26	.006 MF X 600 V
C27	14 MF X 400 V
C28	.1 MF X 200 V
C29	.1 MF X 600 V
C30	.1 MF X 200 V
C31	30 MF X 450 V
C32	.0005 MF X 1000 V
C33	.02 MF X 600 V

RESISTORS

R1	2500 Ohms
R2	100,000 Ohms
R3	50,000 Ohms
R4	100 Ohms
R5	10,000 Ohms
R6	30,000 Ohms
R7	10,000 Ohms
R8	1 Megohm
R9	100,000 Ohms
R10	3 Megohm
R11	1 Megohm
R12	100,000 Ohms
R13	1 Megohm
R14	5,000 Ohms
R15	3,000 Ohms
R16	100,000 Ohms
R17	100,000 Ohms
R18	100,000 Ohms
R19	500,000 Ohms
R20	30 Ohms
R21	175 Ohms
R22	250,000 Ohms
R23	250,000 Ohms
R24	10,000 Ohms
R25	5,000 Ohms
R26	20,000 Ohms
R27	20,000 Ohms

MODEL 1174 SERIAL Nº 7C561,750 & UP



CONDENSERS

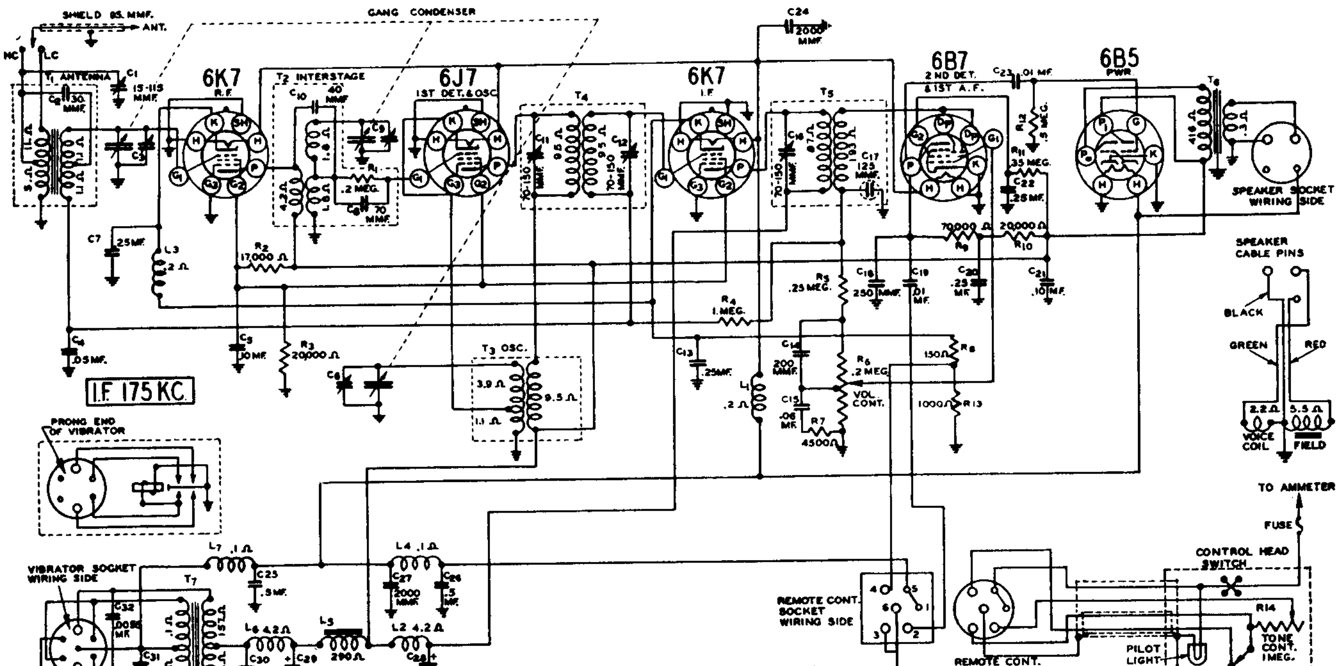
C	3 gang variable condenser
C1	.001 MF Mica
C2	.05 MF X 200 V
C3	.25 MF X 400 V
C4	.0003 MF Mica
C5	.00005 MF Mica
C6	.00005 MF Mica
C7	.002 MF X 600 V
C8	.1 MF X 200 V
C9	.00074 MF Series Pad
C10	.004 MF Mica
C11	.002 MF Mica
C12	.05 MF X 200 V
C13	.01 MF X 400 V
C14	.00002 MF Mica
C15	.00015 MF Mica
C16	.00015 MF Mica
C17	.05 MF X 200 V
C18	.01 MF X 400 V
C19	.0005 MF Mica
C20	.05 MF X 200 V
C21	.05 MF X 200 V
C22	.0001 MF Mica
C23	.1 MF X 200 V
C24	.006 MF X 600 V
C25	.05 MF X 400 V
C26	14. MF X 400 V
C27	.1 MF X 200 V
C28	.1 MF X 600 V
C29	.1 MF X 200 V
C30	30 MF X 450 V
C31	8 MF lytic 475 w.v
C32	.0005 MF X 1000 V
C33	.02 MF X 600 V
C34	.00015 MF Mica

RESISTORS

R1	100,000 Ohms
R2	150 Ohms
R3	2500 Ohms
R4	100 Ohms
R5	50,000 Ohms
R6	15,000 Ohms
R7	30,000 Ohms
R8	1 megohm
R9	10,000 Ohms
R10	100,000 Ohms
R11	3 megohm
R12	1 megohm
R13	100,000 Ohms
R14	1 megohm
R15	5,000 Ohms
R16	3,000 Ohms
R17	100,000 Ohms
R18	100,000 Ohms
R19	100,000 Ohms
R20	10,000 Ohms
R21	500,000 Ohms
R22	27 Ohms
R23	175 Ohms
R24	250,000 Ohms
R25	250,000 Ohms
R26	Tone Control
R27	20,000 Ohms
R28	20,000 Ohms

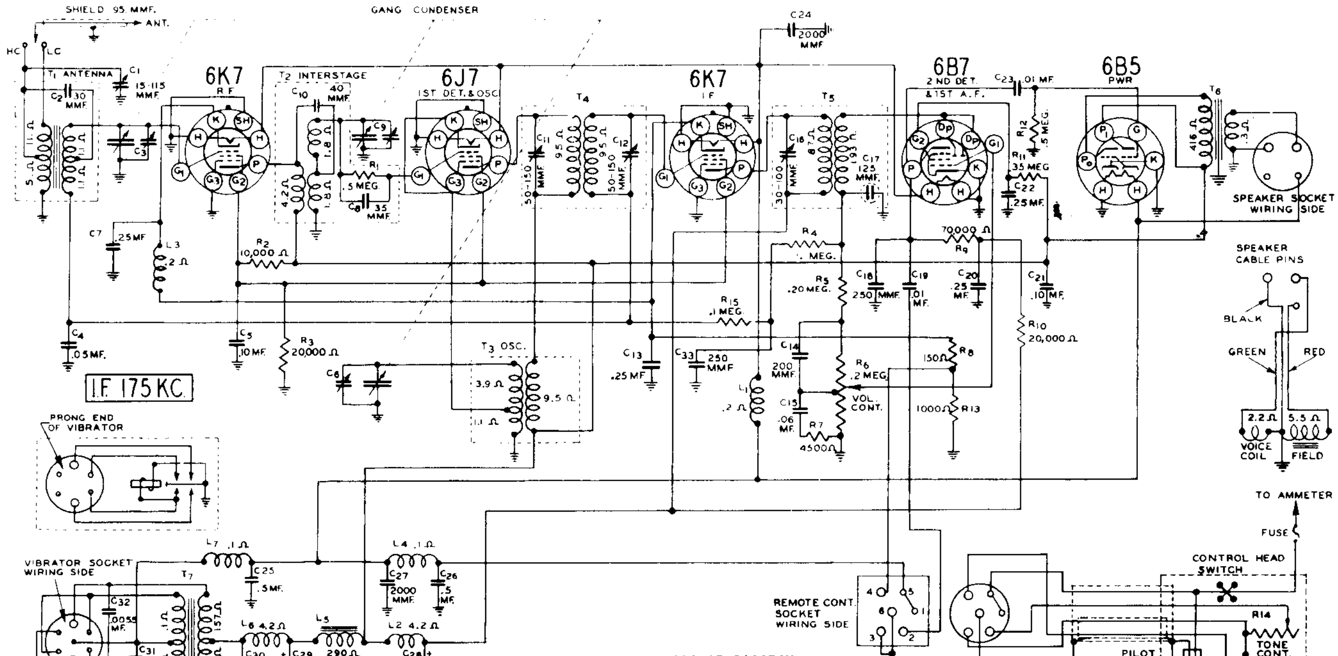
R22 and R23 in one unit

CADILLAC MOTOR CAR CO.
MODEL 5X SERIES A&B



SCHEMATIC CIRCUIT DIAGRAM
MODEL 5X — A SERIES ONLY

CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.



SCHEMATIC CIRCUIT DIAGRAM
MODEL 5X — B AND LATER SERIES

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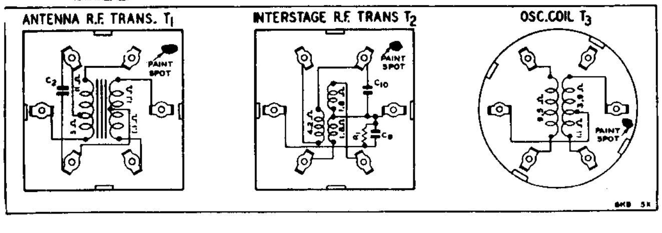


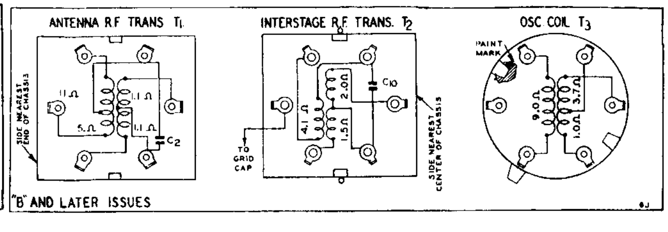
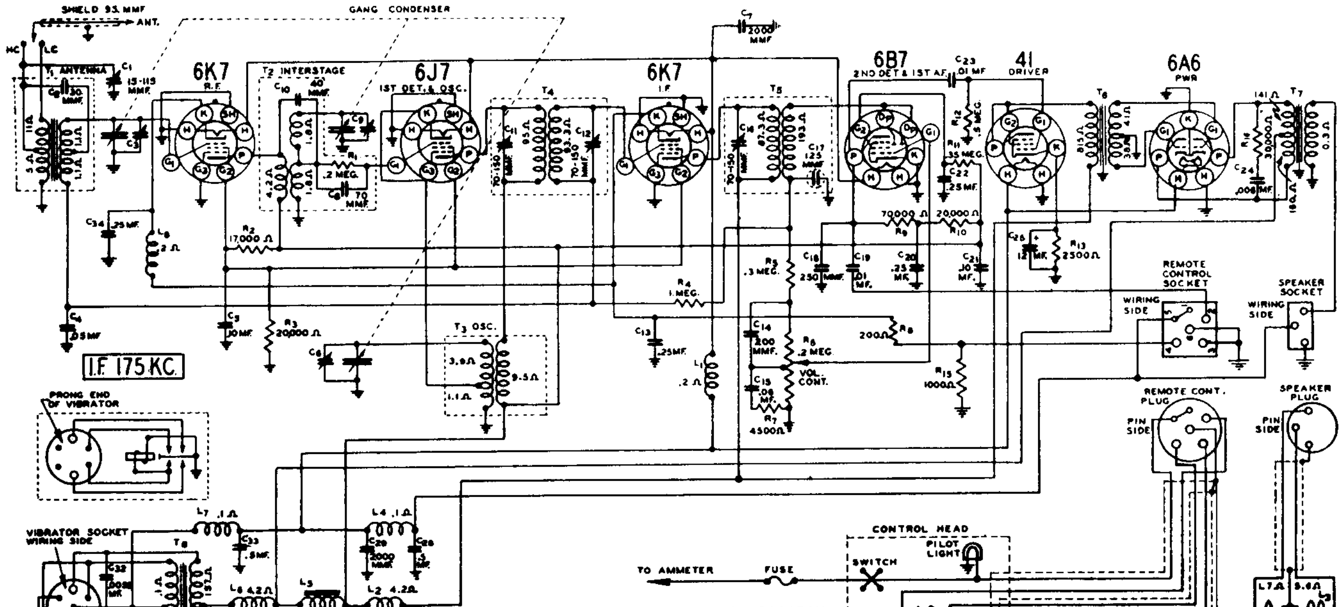


FIG. 2 R.F. AND OSCILLATOR COIL BASE TERMINAL ARRANGEMENT WITH D.C. RESISTANCE OF WINDINGS CADILLAC 1937 STANDARD RADIO MODEL 5X A SERIES

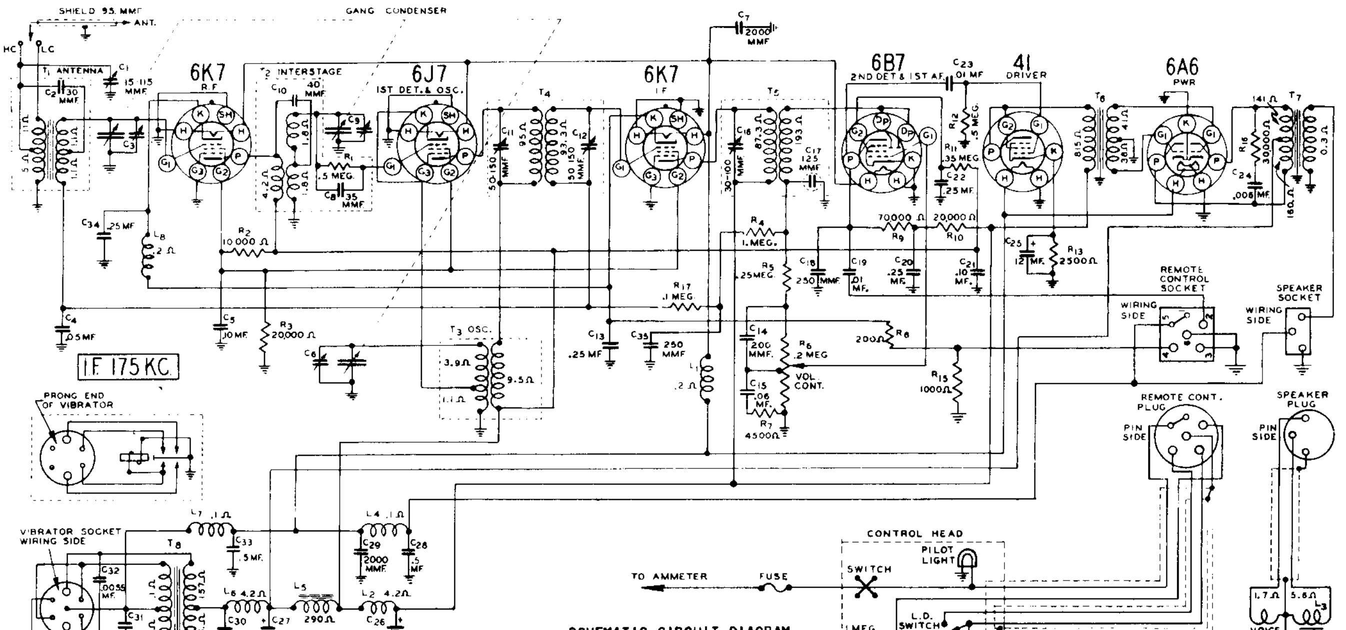
FIG. 3 R.F. AND OSCILLATOR COIL BASE TERMINAL ARRANGEMENT WITH D.C. RESISTANCE OF WINDINGS CADILLAC 1937 STANDARD RADIO MODEL 5X — B AND LATER SERIES

CADILLAC MOTOR CAR CO.

MODEL 6KB SERIES A & B



SCHEMATIC CIRCUIT DIAGRAM
MODEL 6KB — A SERIES



SCHEMATIC CIRCUIT DIAGRAM
CADILLAC 1937 MASTER RADIO
MODEL 6KB — B AND LATER SERIES

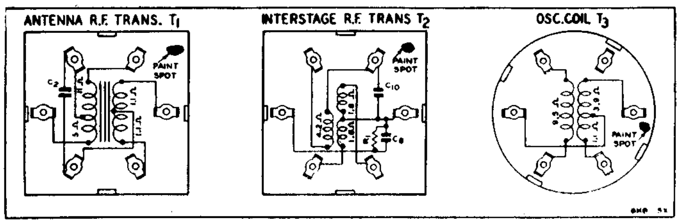


FIGURE 2 R.F. AND OSCILLATOR COIL BASE TERMINAL ARRANGEMENT WITH D.C. RESISTANCE OF WINDINGS — A SERIES RADIOS

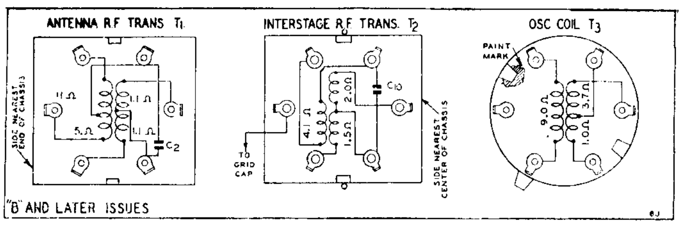
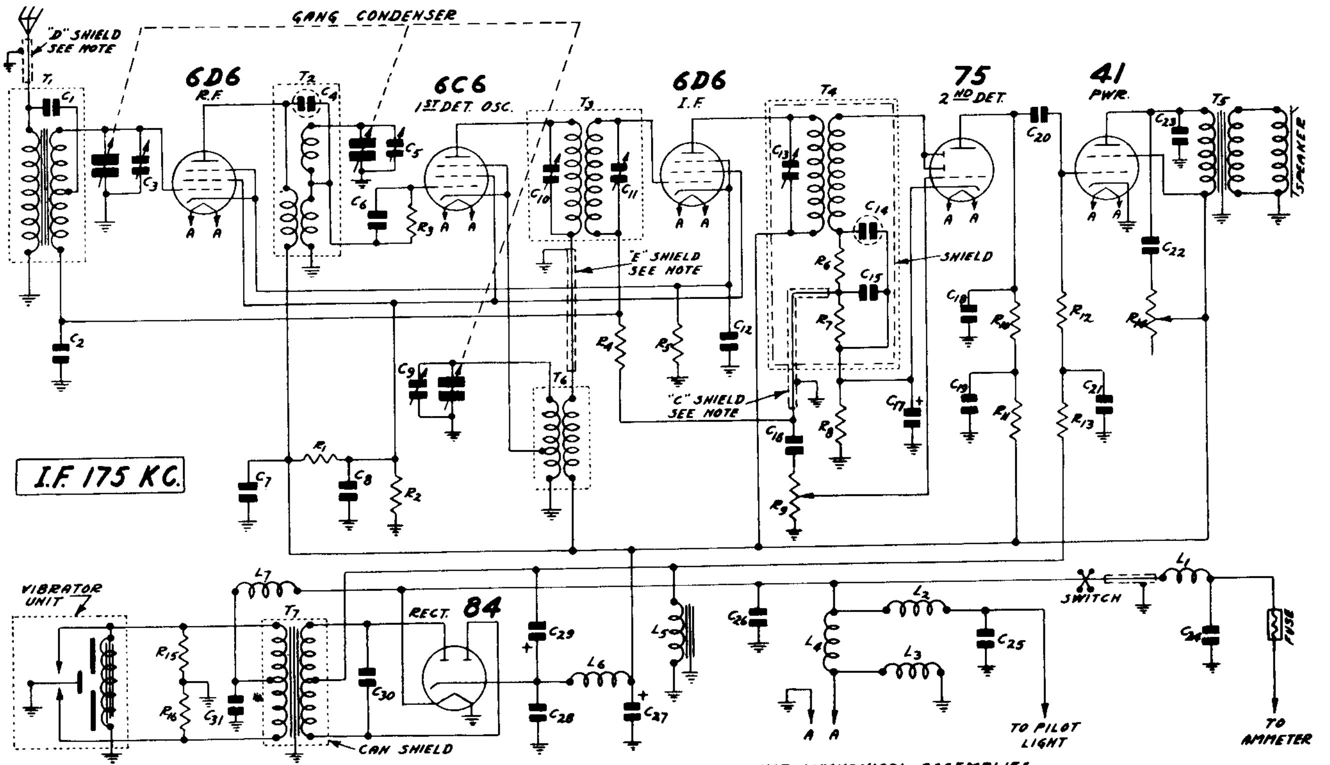


FIGURE 3 R.F. AND OSCILLATOR COIL BASE TERMINAL ARRANGEMENT WITH D.C. RESISTANCE OF WINDINGS — B AND LATER SERIES

CADILLAC MOTOR CAR CO.
MODEL 6R



GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.
THE CAPACITY OF "C" SHIELD IS 37 MMF. THE CAPACITY OF "D" SHIELD IS 85 MMF AND THE CAPACITY OF "E" SHIELD IS 15 MMF.

SCHEMATIC CIRCUIT DIAGRAM

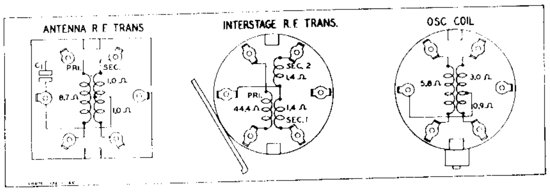


FIGURE 1. R.F. AND OSCILLATOR COIL BASE TERMINAL ARRANGEMENT WITH D.C. RESISTANCE OF WINDINGS

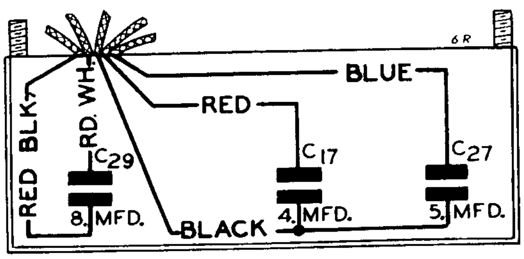


FIGURE 2. CONDENSER BLOCK — INTERNAL WIRING

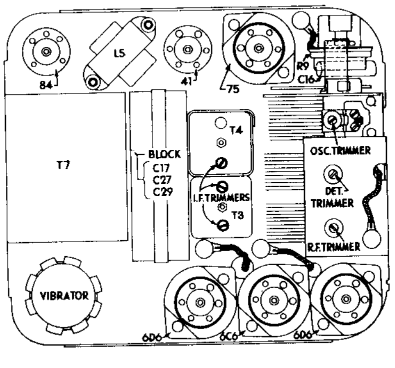


FIGURE 3. PARTS LAYOUT — TOP VIEW CADILLAC 1936 STANDARD RADIO MODEL 6R

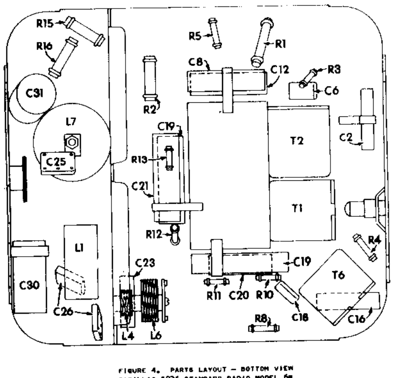


FIGURE 4. PARTS LAYOUT — BOTTOM VIEW CADILLAC 1936 STANDARD RADIO MODEL 6R

SPECIFICATIONS

Sensitivity at 50 milliwatts output -	1.0 microvolt
Power Output	[illegible] watts
Power Consumption	6.5 amperes at 6.3 volts
Selectivity	45 KC at 1000 times signal
Range	530 to 1650 KC
Speaker	6" Dynamic self contained
IF peak	175 KC

TUBE COMPLEMENT

Quantity	Type	Function
1	6D6	R. F. Amplifier
1	6C6	Detector-Oscillator
1	6D6	IF Amplifier
1	75	Second Detector, AVC, first audio
1	41	Power Amplifier
1	84	Full wave rectivier

CIRCUIT

This model is a 6 tube automobile receiver covering the standard wave band. It has a tuning range as shown in the specifications above. The signal is fed through an antenna transformer with tuned secondary into a 6D6 tube which functions as an R.F. Amplifier. The output of this tube is fed through another R.F. transformer with tuned secondary into a 6C6 tube which functions as the first detector and oscillator. The oscillating circuit is tuned by the oscillator section of the gang condenser and is always resonant at a frequency 175 KC above the frequency to which the R.F. circuits are tuned.

One stage of I.F. amplification is employed using a 6D6 tube. The primary and secondary of the first I.F. transformer and the primary of the second I.F. transformer are tuned by small trimmer condensers.

A 75 dual diode-triode tube functions as a diode 2nd detector, A.V.C tube and a one stage audio amplifier. A.V.C. voltage is applied to the control grid circuits of the 6D6 R.F. and I.F. tubes. The manual volume control varies the audio voltage applied to the grid of the 75 tube.

In the output stage a 41 tube is employed. A dynamic reproducer is used.

The vibrator in the power unit interrupts the current through the primary of the power transformer. The use of a vibrating interrupter in the primary circuit and a high ratio transformer results in the application of high voltage A.C. to the rectifier tube plates. The 84 full wave rectifier tube, filter choke, and filter condensers convert this high voltage A.C. into high voltage D.C. for the plate and screen circuits.

ALIGNMENT PROCEDURE

A signal generator that will provide accurately calibrated signals over the standard wave band and at the intermediate frequency, and an output meter are required for indicating the effect of adjustments.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I.F. ADJUSTMENT

Set the signal generator for a signal of 175 KC.

Connect the antenna lead of the signal generator through a .05 mfd condenser to the stator of the 1st detector section of the tuning condenser. (See Fig. 3 for location of this section.) This can be done by pushing a wire or conductor between the stator plates or by extending an insulated wire through the hole in the shield over the stator and pushing the wire through the hole in the lug which extends up from the insulated stator assembly.

Connect the ground lead of the signal generator to the chassis ground.

Short out the oscillator section of the tuning condenser.

Set the volume control at the maximum position.
Attenuate the signal from the signal generator to prevent the leveling-off action of the A.V.C.
Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers is shown in Fig. 3.

(Continued on next page)

CADILLAC MOTOR CAR CO.

MODEL 6R

(Continued from preceding page)

1650 KC ADJUSTMENT

Set the signal generator for 1650 KC.

Turn the rotor of the tuning condenser to the full open position.

Connect the shielded antenna lead from the chassis through a 150 mmf. condenser to the antenna post of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the trimmer of the oscillator section of the three gang condensers until maximum output is obtained. See Fig. 3 for location of this trimmer.

1400 KC ADJUSTMENT

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st detector and antenna trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

ADJUSTING ANTENNA TRIMMER

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 KC. with the volume control about three-fourths on. Remove the cover of the chassis case. The antenna trimmer is on the center tuning condenser section - - See Fig. 3. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION: Do not turn any of the other trimmer adjusting screws for this adjustment.

VOLTAGE AT SOCKETS

Antenna Disconnected — Battery 6 Volts under Load

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground	Cathode Current M.A.
6D6	R.F. Amp.	5.8	220	90	4.5	6.3
6C6	1st Det. Osc.	5.8	220	90	0	2.4
6D6	I.F. Amp.	5.8	220	90	4.5	3.3
75	2nd Det.	5.8	130(1)		1.2	0.3
41	Power	5.8	210	220	16(2)	25.5
84	Rectifier	5.8				50.0

(1) With 250,000 OHM Meter
(2) As read across filter choke

D.C. RESISTANCE OF WINDINGS

Following are the D.C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Winding	Code	D.C. Resistance in OHMS
Antenna Transformer	T1	
Primary Winding		8.7
Secondary Winding - Either Portion		1.0
Interstage Transformer	T2	
Primary Winding		44.4
Secondary Winding - Either Portion		1.4
1st I.F. Transformer	T3	
Primary Winding		93.5
Secondary Winding		97.6
2nd I.F. Transformer	T4	
Primary Winding		44.1
Secondary Winding		49.6
Dynamic Speaker		
Output Transformer Primary	T5	416.6
Output Transformer Secondary	T5	Small
Speaker Field	L3	5.3
Speaker Voice Coil		Small
Oscillator Coils	T6	
Grid Coil		
Long Portion		3.0
Short Portion		0.9
Plate Coil		5.8
Power Transformer	T7	
Primary Winding		
Center Tap to Inside		Small
Center Tap to Outside		Small
Secondary Winding		
Center Tap to Inside		200.
Center Tap to Outside		200.
Motor Noise Reactor	L1	Small
Pilot Light Line Reactor	L2	Small
Filament Reactor	L4	Small
Filter Choke	L5	312.5
R.F. "B" Plate Reactor	L6	4.1
Vibrator Filter Reactor	L7	Small

REPLACEMENT PARTS LIST

Part No.	Description	List Price
3A113	6D6 Tube Socket	.10
3A114	6C6 Tube Socket	.10
3A116	41 Tube Socket	.10
3A99	75 Tube Socket	.10
3A128	84 Tube Socket	.10
3A125	Vibrator Socket	.10
1409533	Vibrator -- First Series	4.50
1419201	Vibrator -- Second Series	4.50
1418412	Spring Clamp Buttons	.10
	8-32 X 1/8 Set Screws	Doz. .15
1418150	6" Dynamic Speaker with Output Transformer	5.75
13X222	Speaker Socket & Cable Assembly	.55
10A58	Tone Control Knob	.10
1418413	Tube Shield Base	.10
1418414	Tube Shield	.15
30X14	Grid Grip Only	.10

TRANSFORMERS & COILS

Part No.	Code	Description	List Price
1418415	T1	Antenna Coil Less Shield Can	1.55
1A25		Shield Can for Antenna Coil	.20
1418416	T2	Interstage R.F. Coil & Can Assembly	1.75
1418417	T3	First I.F. Coil & Can Assembly	1.55
1418418	T4	Second I.F. Coil & Can Assembly	2.00
1418420	T5	Output Transformer Only	1.25
1418419	T6	Oscillator Coil & Can Assembly	.85
53X108	T7	Power Transformer	5.15
9A444	L1	Motor Noise Reactor	.30
9A448	L2	Pilot Light Reactor	.10
9A446	L4	Filament Reactor	.35
52X42	L5	Filter Choke	.90
9A447	L6	R.F. Choke	.15
9A445	L7	Vibrator Filter Reactor	.50

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	List Price
47X67	C1	21 MMFD	180	Moulded	.15
46X153	C2	.05 MFD	180	Tubular	.20
	C4	40 MMFD	Part of Interstage R.F. Coil Assy.		
1418421	C6	35 MMFD	600	Moulded	.10
49X3	C7	.1 MFD	360	Tubular	.45
	C20	.01 MFD	350	Tubular	
49X2	C8	.1 MFD	180	Tubular	.45
	C12	.1 MFD	180	Tubular	
17A33	C10	70-150 MMFD	First I.F. Trimmers		.40
	C11	70-150 MMFD			
17A43	C13	70-150 MMFD	Second I.F. Trimmer		.30
	C14	250 MMFD	Part of Second IF Assembly		
47X65	C15	250 MMFD	600 V	Moulded	.15
46X120	C16	.01 MFD	360	Tubular	.15
1418422	C17	4. MFD	25	Electrolytic Block	2.55
	C27	5. MFD	350		
	C29	8. MFD	350		
47X52	C18	250 MMFD	600	Moulded	.15
49X1	C19	.1 MFD	360	Tubular	.50
	C21	125 MFD	180	Tubular	
46X136	C22	[illegible]	600	Tubular	.20
46X100	C23	.002 MFD	600	Tubular	.15
46X135	C24	.5 MFD	180	Tubular	.40
47X41	C25 & 26	2000 MMFD	600	Moulded	.20
46X120	C28	.01 MFD	360	Tubular	.15
56X134	C30	.0075 MFD	1600	Tubular	.25
46X135	C31	.5 MFD	180	Tubular	.40
11A58		Three Gang Tuning Condenser with Drive Gear Assembly - 8 to 1 Ratio			5.60
		C3-5-9 Trimmers are a Part of Tuning Condensers			

RESISTORS

Part No.	Code	Resistance	Voltage	Type	List Price
C94173	R1	17000 ohms	1.	Carbon	.15
B94203	R2	20000 ohms	.5	Carbon	.15
A95504	R3-7-12	500000 ohms	.2	Carbon	.10
A95105	R4	1 megohm	.2	Carbon	.10
A94351	R5	350 ohm	.2	Carbon	.15
A95503	R6-11	50000 ohm	.2	Carbon	.10
A94602	R8	6000 ohm	.5	Carbon	.15
1418359	R9	2 megohm	Volume Control & Switch		1.15
A95154	R10	150000 ohm	.2	Carbon	.10
A95204	R13	100000 ohm	.2	Carbon	.10
1418423	R14	150000 ohm	Tone Control		.70
B94500	R15-16	50 ohm	.5	Carbon	.15

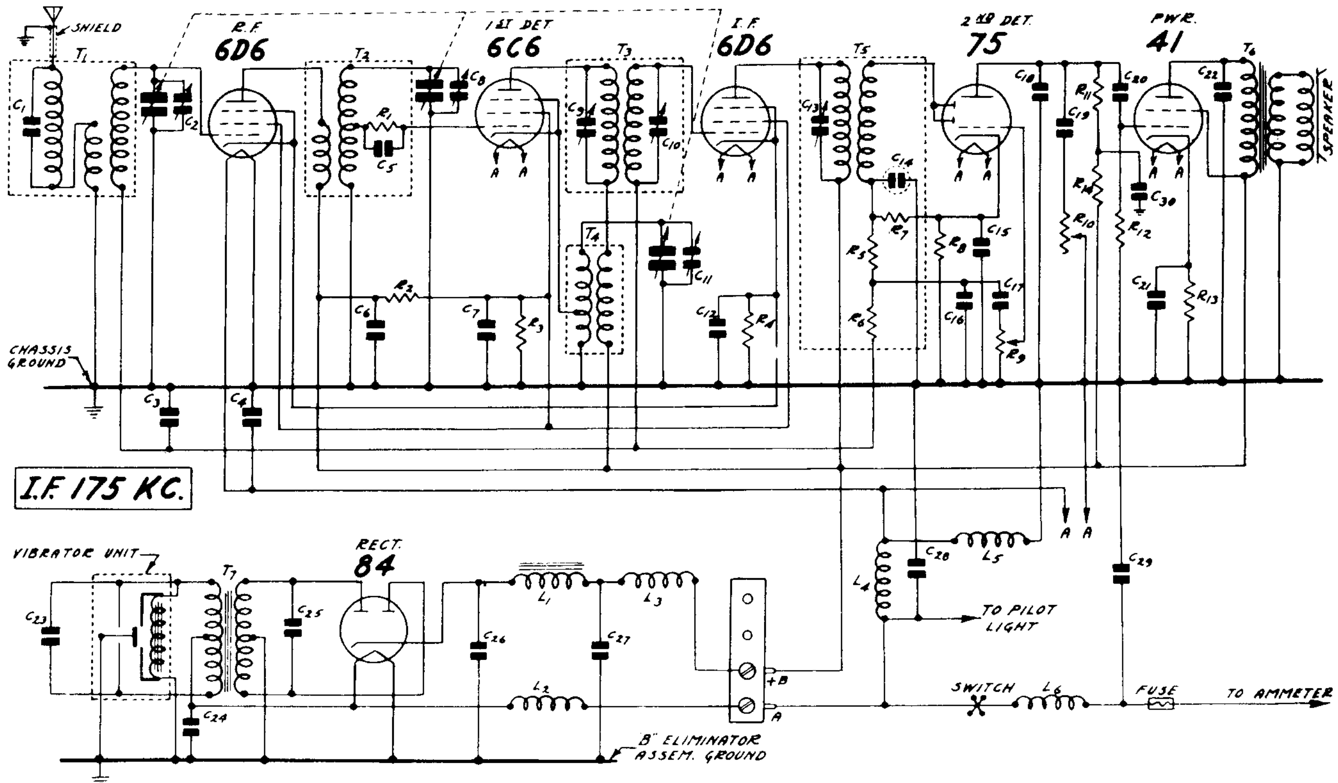
INSTALLATION ITEMS

Part No.	Description	List Price
1416450	Fused "A" Lead	.35
106653	20 AMP. Fuse	.10
1845913	Fuse Insulator	.10
1416437	Pilot Light Lead Complete	.80
1416282	Chassis Mounting Bracket	.55
133094	5/16 - 18 x 3/4" R.H. Machine Screws	Doz. .15
120214	5/16 Lock Washer	Doz. .10
1411769	Spacer Washers 1/8" thick	Doz. .10
1415269	Spacer for Mounting Stud	Each .10
138489	3/8 Shock Proof Lock Washer	Doz. .10
120377	3/8 x 16 Hex. Nut	Doz. .30
128066	3/8 Spring Lock Nut	Doz. .10

COMPONENT PARTS

Part No.	Description	List Price
1416591	Chassis in case complete with tubes & speaker	40.00
1561455	Control Head	7.50
1415132	Escutcheon Plate	1.50
1414957	Knob	.25

CADILLAC MOTOR CAR CO.
MODEL 6S



NOTE:
GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.

FIGURE 4 SCHEMATIC CIRCUIT DIAGRAM

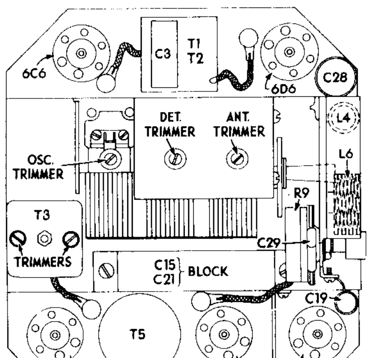


FIGURE 2 PARTS LAYOUT, TOP VIEW

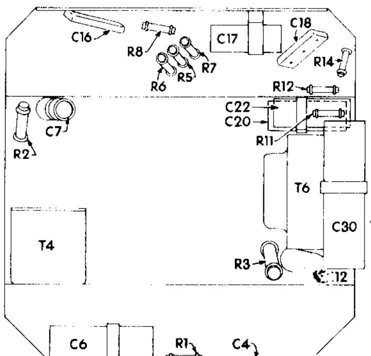


FIGURE 3 PARTS LAYOUT, BOTTOM VIEW

I.F. Peak - 175 KC

TUBE COMPLEMENT

Quantity	Type	Function
1	6D6	R.F. Amplifier
1	6C6	Detector - Oscillator
1	6D6	I.F. Amplifier
1	75	Second detector, 1st audio and A.V.C.
1	41	Output amplifier
1	84	Full wave rectifier

CIRCUIT

The circuit consists of a 6D6 R.F. stage, a 6C6 1st detector-oscillator stage, a 6D6 I.F. stage, a 75 dual diode-triode tube which functions as a diode 2nd detector and a triode 1st audio stage, and a single 41 output stage. An 84 full wave rectifier is used in the power unit. The intermediate frequency is 175 KC. The diode current establishes a drop across a resistor which is used as additional bias voltage for the R.F. and I.F. tubes giving automatic volume control action. The manual volume control varies the audio voltage to the gird of the 75 tube.

ALIGNMENT PROCEDURE

A signal generator that will provide accurately calibrated signals over the standard wave band and at the intermediate frequency and an output meter are required for indicating the effect of adjustments.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I.F. Adjustment

Remove chassis from case.
Establish ground connection between chassis and power supply.
Reconnect A and B wires from power supply to chassis.
Set the signal generator for a signal of 175 KC.

Connect the antenna lead of the signal generator through a .05 mf. condenser to the stator of the 1st detector (center) section of the tuning condenser. This can be done by pushing a wire or conductor between the stator plates or by extending an insulated wire through the hole in the lug which extends up from the insulated stator assembly.

Connect the ground lead of the signal generator to the chassis ground.

Short out the oscillator section of the tuning condenser.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the leveling off axtion of the A.V.C.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers are shown in Fig. 2.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser to the full open position.

Connect the shielded antenna lead from the chassis through a 250 mmf. condenser to the antenna post of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained -- see Fig. 2 for location of this trimmer.

1400 KC Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st detector and antenna trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

ADJUSTING ANTENNA TRIMMER

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1300 and 1400 KC. with the volume control about three-fourths on. Remove the cover of the chassis case. The antenna trimmer is the trimmer condenser closest to the terminal strip -- See Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION -- Do not turn any of the other trimmer adjusting screws for this adjustment.

CALIBRATING THE RECEIVER

After installing the receiver in the car the control unit or flexible shaft will probably cause the setting of the dial pointer to change. The receiver may then be recalibrated as follows: Tune in a station of known frequency at about the center of the dial. Then loosen the set screw which secures the station selector knob to the shaft.

The station selector shaft is made up of two sections -- an inner and an outer shaft. By loosening the set screw in the station selector knob one turn, the knob and the outer shaft are disengaged from the inner shaft. The inner shaft is directly connected to the tuning condenser in the chassis.

(Continued on next page)

CADILLAC MOTOR CAR CO.

MODEL 6S

(Continued from preceding page)

By turning the station selector knob it will be found that the dial scale can be adjusted without disturbing the tuning of the receiver. Turn the knob until the dial scale is exactly at the frequency of the station which has been tuned in.

Retighten the set screw in the station selector knob.

VOLTAGES AT SOCKETS

On the voltage chart are given the voltages at the sockets with all tubes in and the set in operating condition. The antenna should be disconnected.

The voltages can be read with the chassis in the case, by means of an analyzer plug.

If the chassis unit is taken out of the case all of the socket terminals can easily be reached under the chassis with test prods.

If the chassis is taken out, a jumper wire must be connected from the chassis base to the metal wall of the "B" power unit, in order to complete the ground circuit.

VOLTAGES AT SOCKETS

Antenna Disconnected - Voltage at Battery 6.1

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground	Normal Plate M.A.
6D6	R.F.	5.8	218	100	5.2	5.8
6C6	1st Det. and Osc.	5.8	218	100		2.0
6D6	I.F.	5.8	218	100	5.2	5.8
75	2nd Det.& 1st A.F.	5.8	160 (1)		1.4	2.8
41	Output	5.8	210	220	16.0	16.0
84	Rectifier	5.8				20.0 per plate

Speaker Field .... 1.15 Amperes "B" Unit .... 300 Amperes
Chassis .... 1.50 Amperes Pilot Lamp .... 0.1 Amperes

(1) Measured on 1000 V. Scale (1000 Ohms per Volt)

D.C. RESISTANCE OF WINDINGS

Following are the D.C. resistances of the various windings in the chassis:

Item	Code	D.C. Resistance In Ohms
Antenna Trans. Primaries in series	T1	6.3
Antenna Trans. Secondary	T1	2.5
R. F. Interstage Trans. Pri.	T2	4.5
R. F. Interstage Trans. Sec.	T2	
(Center Tap to inside)		1.8
(Center Tap to ground)		1.3
1st I. F. Trans. Primary	T3	58.
1st I. F. Trans. Secondary	T3	58.
Oscillator Cathode Coil (Total)	T4	3.
Oscillator Plate Coil	T4	6.
2nd I.F. Trans. Primary	T5	46.
2nd I.F. Trans. Secondary	T5	46.
Output Trans. Primary	T6	440.
Output Trans. Sec. & Voice coil in parallel	T6	.4
Power Trans. Primary	T7	.3
Power Trans. Secondary	T7	500.
Filter Choke	L1	300.
Filament Reactor	L2	Small
R.F. "B" Choke	L3	3.5
Pilot Light Choke Assembly	L4	Small
Speaker Field	L5	5.
Motor Noise Choke	L6	Small

CHANGES IN EARLY MODELS

In the early models, resistor R14, and condenser C30, were not used. In these models resistor R11 was rated at 200,00 Ohms.

The capacity range of the 1st I.F. Trimmer Condensers, C9 and C10 was from 130 to 300 mmf. in the early models.

"B" UNIT PARTS

Part No.	Code	Description	List Price
9A268	L3	R.F. Choke	.10
9A374	L2	Filament Reactor	.50
53X72	T7	Power Transformer	3.20
52X27	L1	Filter Choke	1.00
1409533		Vibrator	4.50
3A127		Vibrator Socket	.10
3A128		84 Tube Socket	.10
4A42		Two Lug Insulated Terminal Strip	.10
4A17		One Lug Insulated Terminal Strip	.10
1418358		Condenser Block C-26 and C-27	2.10
46X89		1.65 mfd. 180 Volt Tubular Condenser C-24	.80
46X88		.01 mfd. 1800 Volt Tubular Condenser C-25	.30
47X93		.5 mfd. 180 Volt Tubular Condenser C-28	.35

TRANSFORMATION AND COILS

1418351	T6	Output Transformer	1.65
1418352	T1	Antenna Coil Assembly less Shield Can	.90
1418353	T2	R.F. Interstage Coil Assy. less Shield Can	1.25
1A23		Dual Shield Can for above Two Coils	.30
1418354	T3	First I.F. Coil Complete	1.70
1418355	T4	Oscillator Coil Assy. Complete	.60
1418356	T5	Second I.F. Coil Assembly Complete	2.05
9A375	L4	Pilot Light Choke Assembly	.15
9A373	L6	"A" Choke	.25
9A268	L3	R.F. Choke	.10
9A374	L2	Filament Reactor	.50
53X72	T7	Power Transformer	3.20
52X27	L1	Filter Choke	.90

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	List Price
47X54	C1	.0005 MFD.	600	Moulded	.15
46X80	C8	.05 MFD.	180	Tubular	.15
47X50	C4	.003 MFD.	600	Moulded	.25
47X53	C5	.000035 MFD.	600	Moulded	.10
46X81	C6	.10	400	Tubular	.25
46X83	C7	.10	180	Tubular	.25
17A32	C9 C10	70-150 MMF. 70-150 MMF.	First I.F. Trimmer Condensers		.50
46X82	C12	.10 MFD.	180	Tubular	.25
17A18	C13 C14	70-140 MMF. .00025 MFD.	Second I.F. Trimmer Parts of Second I.F. Coil Assy.		.35
1418357	C15 C21	12. MFD. 12. MFD.	25 25	Electrolytic Block	1.05
47X52	C16 & 18	.00025	600	Moulded	.15
46X84	C17	.01	180	Tubular	.15
46X92	C19	.006	600	Tubular	.20
46X86	C20	.01	400	Tubular	.20
46X85	C22	.002	600	Tubular	.20
46X93	C23	.5	180	Tubular	.35
46X89	C24	1.65	180	Tubular	.80
46X88	C25	.01	1800	Tubular	.30
1418358	C26 C27	6. 8.	350 350	Electrolytic Block	2.10
46X93	C28	.5	180	Tubular	.35
47X50	C29	.003	600	Moulded	.25
46X94	C30	.25	300	Tubular	.30
14A39		Three Gang tuning Condenser with Trimmers			4.20

RESISTORS

Part No.	Code	Resistance	Watts	Type	List Price
A95504	R1-7-12	500,000 OHM	.2	Carbon	.10
B94153	R2	15,000 OHM	.5	Carbon	.15
B94203	R3	20,000 OHM	.5	Carbon	.15
43X41	R4 R13	450 OHM 800 OHM	.2 .5	Armoured Wire Wound	.30
A95503	R5	50,000 OHM	.2	Carbon	.10
A95105	R6	1. MEG OHM	.2	Carbon	.10
A95752	R8	7,500 OHM	.2	Carbon	.10
1418359	R9	2. MEG OHM		Volume Control and Switch	1.15
1418360	R10	300,000 OHM		Tone Control	.75
A95154	R11	150,000 OHM	.2	Carbon	.10
A95530	R14	50,000 OHM	.2	Carbon	.10

REPLACEMENT PARTS LIST

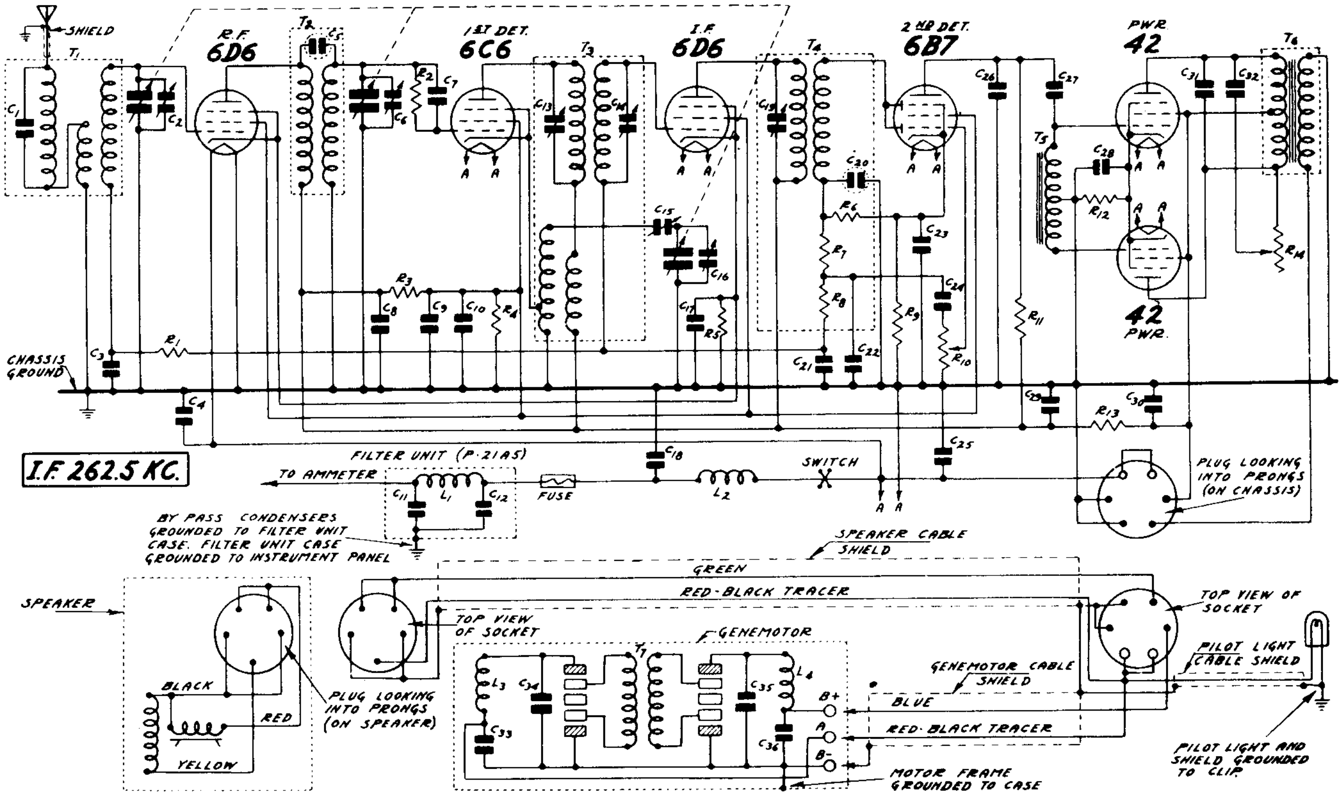
MISCELLANEOUS

Part No.	Description	List Price
3A114	6C6 Tube Socket	.10
3A113	6D6 Tube Socket	.10
3A116	41 Tube Socket	.10
3A99	75 Tube Socket	.10
13X53	A Cable attached to set	.30
3A108	Pilot Light Jack	.10
3A136	Large pin Jack for Antenna Lead	.10
4A46	2 Lug Terminal Strip	.10
4A48	"A" and "B" Power Terminal Strip	.10
4A38	1 Lug Terminal	.10
	Tone Control Knob	.10
29X16	Flexible Shaft Anchor Bushing	.25
20X27	Anchor Bushing Clamping Nut	.10
20X28	Flexible Nut for Anchor Bushing	.10
20X61	8/32 Wing Nuts (Doz.)	.15
1419274	6" Dynamic Speaker	4.25

CONTROL UNIT PARTS

Part No.	Description	List Price
1412902	Control Head with Knobs	7.50
1406272	Knob	.25
18A12	Flexible Cable Clamp	.10
58X59	Dial Strip	.25
1413319	Flexible Tuning Shaft	2.00
1413658	Flexible Volume Control Shaft	2.00

CADILLAC MOTOR CAR CO.
MODEL 6T



NOTE:
THE WIRE SHIELD, VOICE COIL AND FIELD RETURN SOLDERED TOGETHER. THE FRAME OF SPEAKER MUST BE ELECTRICALLY CONNECTED TO SHIELD.
GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.

FIGURE 5. SCHEMATIC CIRCUIT DIAGRAM

REPLACEMENT PARTS LIST

MISCELLANEOUS

Part No.	Description	List Price
3A112	42 Tube Socket	.10
3A113	6D6 Tube Socket	.10
3A114	6C6 Tube Socket	.10
3A120	6B7 Tube Socket	.10
32X36	Tube Shield Base	.10
4A39	Three Lug Terminal Strip	.10
32X38	Tube Shield	.15
4A30	Two Lug Terminal Strip	.10
6A200	6 Prong Power and Speaker Plug	.10
32X39	Tube Shield Grounding Clip	.10
29X16	Flexible Shaft Anchor Bushings	.25
20X27	Anchor Bushing Clamping Nut	.10
20X28	Anchor Bushing Grip Nut	.10
19X13	Flat Washer Used with Anchor Bushing	.10 doz.
10A20	Tone Control Knob	.10
13X53	Shielded "A" Cable	.30
30X1	Cable Clamp	.10 doz.
32X47	Form Fitting Tube Shield	.10
24A2	Chassis Case and Cover Assembly Complete	4.40
20X8	Wing Nuts	.20 doz.
1411549	"A" Filter Unit	1.50

"B" POWER UNIT ASSEMBLY

1412778	Genemotor Complete	20.00
4A37	Two Lug Terminal Strip	.10
9A361	"A" Choke L3	.40
9A268	"B" Choke L4	.10
45X202	12 MFD. 350 Volt Electrolytic Condenser C36	1.75
46X76	.1 MFD. 400 Volt Tubular Condenser C-35	.30
46X77	.5 MFD. 140 Volt Tubular Condenser C-33 & 34	.40

TRANSFORMERS & COILS

Part No.	Code	Description	List Price
9A359	T 1	Antenna Coil Less Shield Can	.75
9A363	T 2	R F Interstage Coil Less Shield Can	.80
1A18		Dual Shield Can Assy. for Above Coils	.25
1418344	T 3	Oscillator & First I.F. Assy. Complete	3.20
1418345	T 4	Second I.F. Assy. Complete	1.85
1418346	T 5	Tuned Impedance Unit	2.30
1418347	T 6	Output Transformer	1.70
9A362	L 2	"A" Choke	.15
9A361	L 3	"A" Choke	.40
9A268	L 4	"B" Choke	.10

RESISTORS

Part No.	Code	Resistance	Watts	Type	List Price
A95253	R 1	25000 Ohm	.2	Carbon	.10
A95105	R 2 & 8	1 Megohm	.2	Carbon	.10
C94153	R 3	15000 Megohm	1.	Carbon	.15
C94203	R 4	20000 Ohm	1.	Carbon	.15

RESISTORS - (Cont.)

Part No.	Code	Resistance	Watts	Type	List Price
B94501	R 5	500 ohm	.5	Flex. Wire Wound	.10
A95504	R 6	500,000 ohm	.2	Carbon	.10
A95503	R 7	50,000 ohm	.2	Carbon	.10
A95102	R 9	1000 ohm	.2	Carbon	.10
1418359	R 10	2. Megohm		Volume Control & Switch	1.15
B95303	R 11	30,000 ohm	.5	Carbon	.15
E94751	R 12	750 ohm	3.	Flex.Wire Wound	.15
E95202	R 13	2000 ohm	3.	Carbon	.30
1418360	R 14	400,000 ohm		Tone Control	.75

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	List Price
47X39	C 1	.00025 Mfd	600	Moulded	.15
46X75	C 3	.05 Mfd	200	Tubular	.20
47X50	C 4	.003 Mfd	600	Moulded	.25
	C 5	8.5 Mmfd	Part of Interstage R.F.Coil Assy.		
47X40	C 7	35 Mmfd	600	Moulded	.10
1418348	C 8	.1 Mfd	300	Condenser Block	1.85
	C 9	.1 Mfd	300		
	C 17	.2 Mfd	200		
	C 21	.05 Mfd	200		
	C 27	.25 Mfd	300		
	C 30	.1 Mfd	400		
1418349	C 10	4. Mfd	150	Electrolytic Block	1.35
	C 23	4. Mfd	150		
	C 11	.01 Mfd	120	Part of A Filter Unit	
	C 12	.01 Mfd	120		
17A10	C 13	40-100 Mmfd	First I.F. Trimmer Condenser		.50
	C 14	40-100 Mmfd			
17A7	C 15	450-950 Mmfd	Oscillator Padding Con.		.55
47X50	C 18	.003 Mfd		Moulded	.25
17A9	C 19	40-100 Mmfd	Second I.F. Trimmer		.35
	C 20	.00025 Mfd	Part of Second I.F.Assy.		
47X39	C 22 & 26	.00025 Mfd	600	Moulded	.15
46X72	C 24	.01 Mfd	200	Tubular	.20
47X50	C 25	.003 Mfd	600	Moulded	.25
1418350	C 28	10. Mfd	25	Electrolytic Block	1.40
	C 29	5. Mfd	300		
46X73	C 31	.002 Mfd	600	Tubular	.20
46X74	C 32	.01 Mfd	600	Tubular	.25
46X78	C 33 & 34	.05 Mfd	140	Tubular	.40
46X76	C 35	.1 Mfd	400	Tubular	.30
45X202	C 36	12. Mfd	350	Electrolytic	1.75
14A37	Three Gang Tuning Condenser				4.25
	C2, C6, C16 Trimmers are a part of 14A37 Tuning Condenser				

GENERAL CABLE ASSEMBLIES

Part No.	Description	List Price
1413868	General Cable Assembly Complete	3.25
13X54	Pilot Lamp Cable Only	.30
7A29	Pilot Lamp Socket & Spring Clip	.10
119453	6-8 Volt Pilot Lamp	.10
13X201	Shielded Eliminator Cable Only	.60

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CADILLAC MOTOR CAR CO.

MODEL 6T

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GENERAL CABLE ASSEMBLIES - (Cont.)

Part No.	Description	List Price
13X202	Shielded Speaker Cable Only	.55
3A201	Five Prong Socket & Cap Assy. for Speaker Cable	.35
3A200	Six Prong Socket for Above Cable Assembly	.10
6X4	Grommet for Cable Plug	.10
1413914	A Cable for Rear Installation	1.75

CONTROL UNIT PARTS

1412902	Control Head Complete	7.50
35X33	Control Box Only	.65
35X34	Control Box Cover	.40
1405271	Control Bushing	.20
1406272	Knob	.25
28X3	Lock Spring	.10
18A12	Flexible Cable Clamp	.10
29X20	Brass Collar	.10
58X59	Dial Strip	.25

SPEAKER PARTS

Flat Dash Mountings

1411698	Speaker Complete	15.00
12A201	10" Dynamic Speaker Only	10.00
14X201	Speaker Case	4.25
6A201	5prong Cable Plug	.10
14X18	Screen	.70
25X200	Mounting Bracket	.75

Side Mounting

1413637	Speaker Complete	15.00
12A201	10" Dynamic Speaker Only	10.00
14X203	Speaker Case	5.25
14X18	Screen	.70
25X118	Mounting Bracket	1.25
6A201	5prong Plug	.10

Rear Installation

1413900	8" Speaker Complete with Cable & Plug	15.00
1413638	Receiver chassis in case complete with tubes	25.00

SPECIFICATIONS

Sensitivity - 1.5 microvolts at 50 milliwatts output
Frequency Range - 550 to 1650 KC
Speaker - 8" and 10" dynamic, voice coil impedance 2.8 OHMS. Field resistance 5.4 OHMS.
Power consumed at 6 volts - 7 amperes
- Chassis 2.3 amps
- Genemotor 3.5 amps
- Speaker Field 1.1 amps
- Pilot Light .1 amp

TUBE COMPLEMENT

Quantity	Type	Function
1	6D6	R. F. Amplifier
1	6C6	Detector Oscillator
1	6D6	I.F. Amplifier
1	6B7	Second Detector, AVC, First Audio
2	42	Audio output amplifier- push pull

I.F. Peak 262.5 KC

ALIGNMENT PROCEDURE

A calibrated signal generator, an output meter and a non-metallic screw driver are necessary for proper alignment. The output meter may be connected across the voice coil winding or thru a .1 mfd condenser to each plate of the output tubes. If the meter is connected across the voice coil winding, be sure and open the voice coil circuit at the speaker.

I.F. ADJUSTMENT

(A) Connect the antenna lead of the signal generator thru an .05 mfd condenser to the rotor plates of the detector (center) section of the gang condenser. Connect the ground lead of the generator to the chassis. Turn the condenser all the way out and short out the oscillator section of the gang condenser. Turn volume control to full on position.
(B) Set the signal generator at 262.5 KC. Attenuate the signal to prevent the leveling off action of the AVC.
(C) Adjust the three I.F. trimmers for maximum output as indicated by the output meter. See Fig. 1 for location of these trimmers.

1650 KC ADJUSTMENT

(A) Connect the antenna lead of the signal generator thru a 250 mfd. condenser to the antenna terminal of the receiver.
(B) Set the signal generator at 1650 KC. Turn the rotor of the tuning condenser all the way out.
(C) Adjust the trimmer of the oscillator section of the gang condenser for maximum output. See Fig. 2 for location of trimmers.

1400 KC ADJUSTMENT

(A) Set the signal generator at 1400 KC.
(B) Turn the condenser rotor until maximum output is obtained.
(C) Adjust the antenna and detector trimmers for maximum output. Do not change the setting of the oscillator trimmer.

600 KC ADJUSTMENT

(A) Set the signal generator at 600 KC.
(B) Turn the tuning condenser rotor until maximum output is obtained.
(C) Slowly rock the tuning condenser back and forth over the signal, at the same time adjusting the oscillator, padding condenser (Fig. 1.) for greatest output.
(D) Set the generator at 1400 KC and recheck the antenna and detector trimmers for maximum output. Do not change the setting of the oscillator trimmer.

ADJUSTING THE ANTENNA TRIMMER

After the receiver is installed in the car, tune in a weak signal between 1200 and 1400 KC and adjust the antenna trimmer for maximum output. See Figure 3 for location of this timmer.

VOLTAGE MEASUREMENT

Antenna Disconnected - Battery 6 Volts under Load

VOLTAGES AT SOCKETS

Tube Tube	Function Function	Heater Heater	Plate to Chassis	Screen to Chassis	Cathode to Chassis	Plate Current
6D6	R.F.	5.8	192	90	3.3	4.5 ma
6C6	Det-Osc.	5.8	192	90		4.0
6D6	I.F.	5.8	192	90	3.3	4.5
6B7	2 Det.	5.8	90	90	3.5	2.7
42	Power	5.8	230	235	24.0	16.0

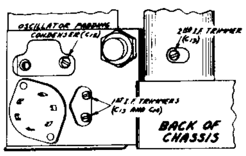


FIGURE 1. LOCATION OF TRIMMER CONDENSERS

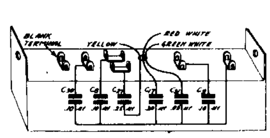


FIGURE 2. CONDENSER BLOCK

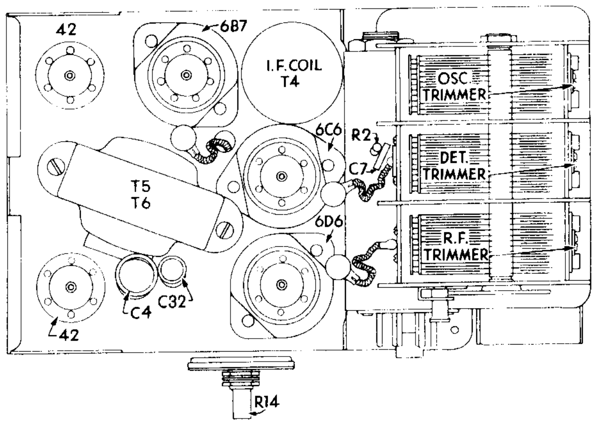


FIGURE 3. PARTS LAYOUT - TOP VIEW

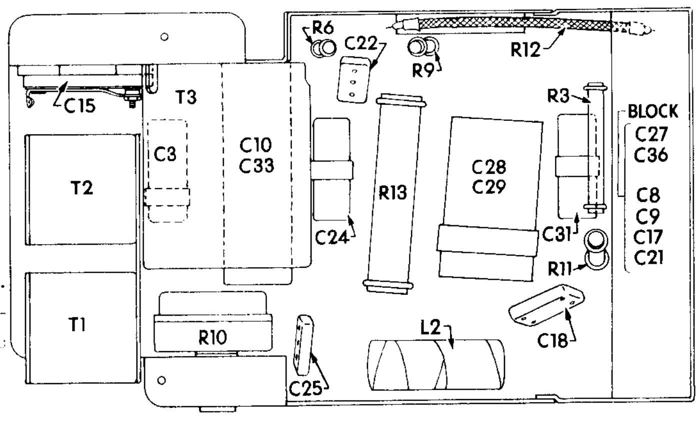
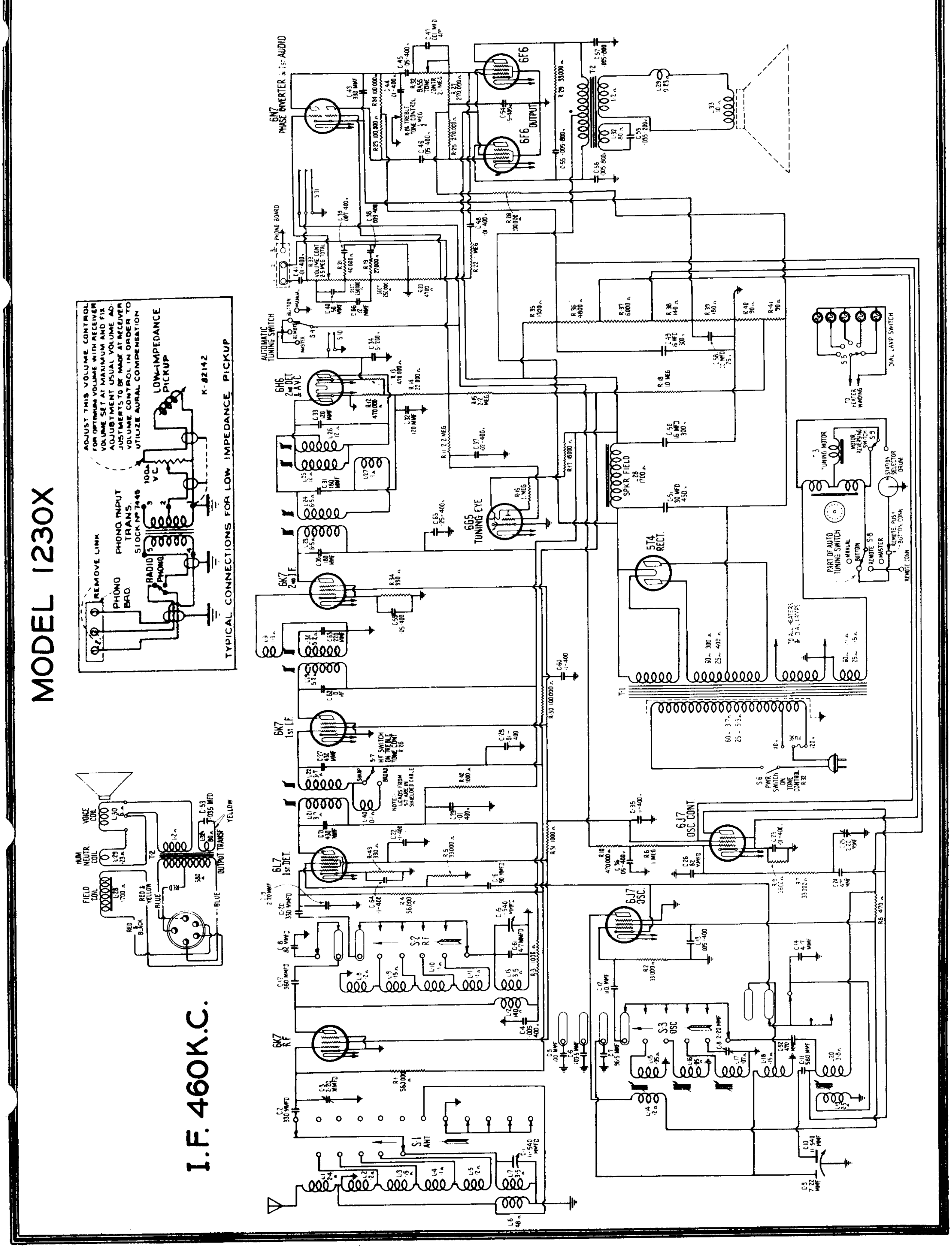


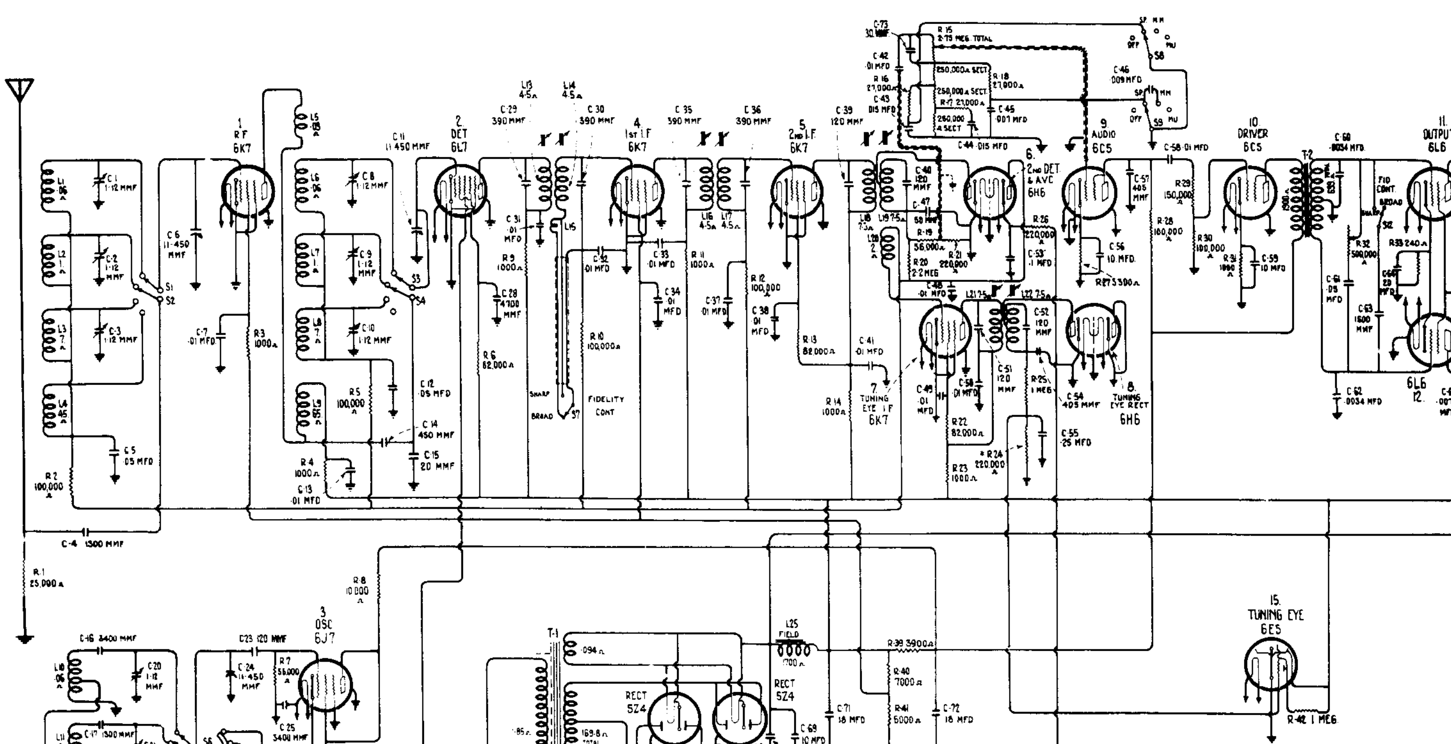
FIGURE 4. PARTS LAYOUT - BOTTOM VIEW

CANADIAN WESTINGHOUSE CO., Ltd.



CANADIAN WESTINGHOUSE CO., Ltd.

MODEL W-1516-X



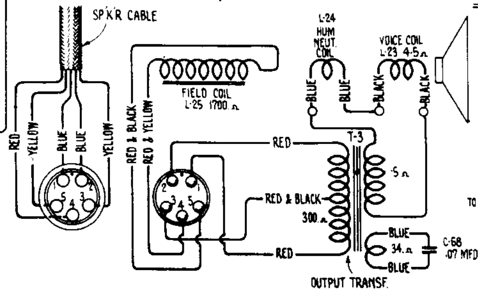
NOTE:- RANGE SELECTOR SHOWN IN SHORT WAVE POSITION

Schematic Circuit Diagram

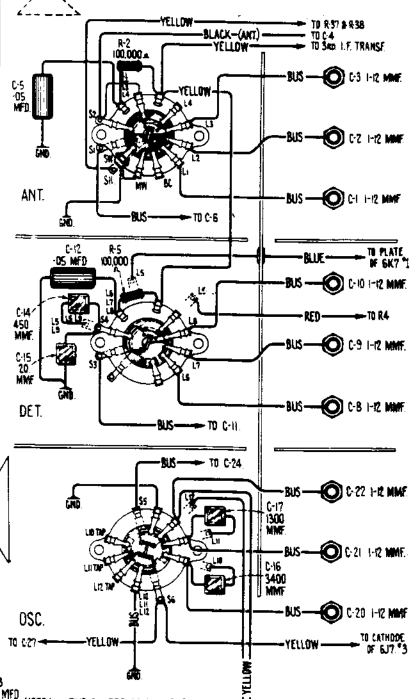
Note 1:---On early production the heater winding was grounded at center top instead of at one side (W-6 C 5 driver socket).

Note 2:---Resistor R 24 may be either 150,000, 175,000 or 220,000 ohms. Replace with value indicated by color code. The value of this resistor controls the action of the W-6 E 5 indicator tube.

I.F. 460K.C.



Reproducer Wiring Diagram



NOTE:- THE SIX TERMINALS SHOWN DOTTED ARE FASTENED TO THE COIL TUBE ONLY.

SWITCH SECTIONS ARE SHOWN IN M.W. POSITION

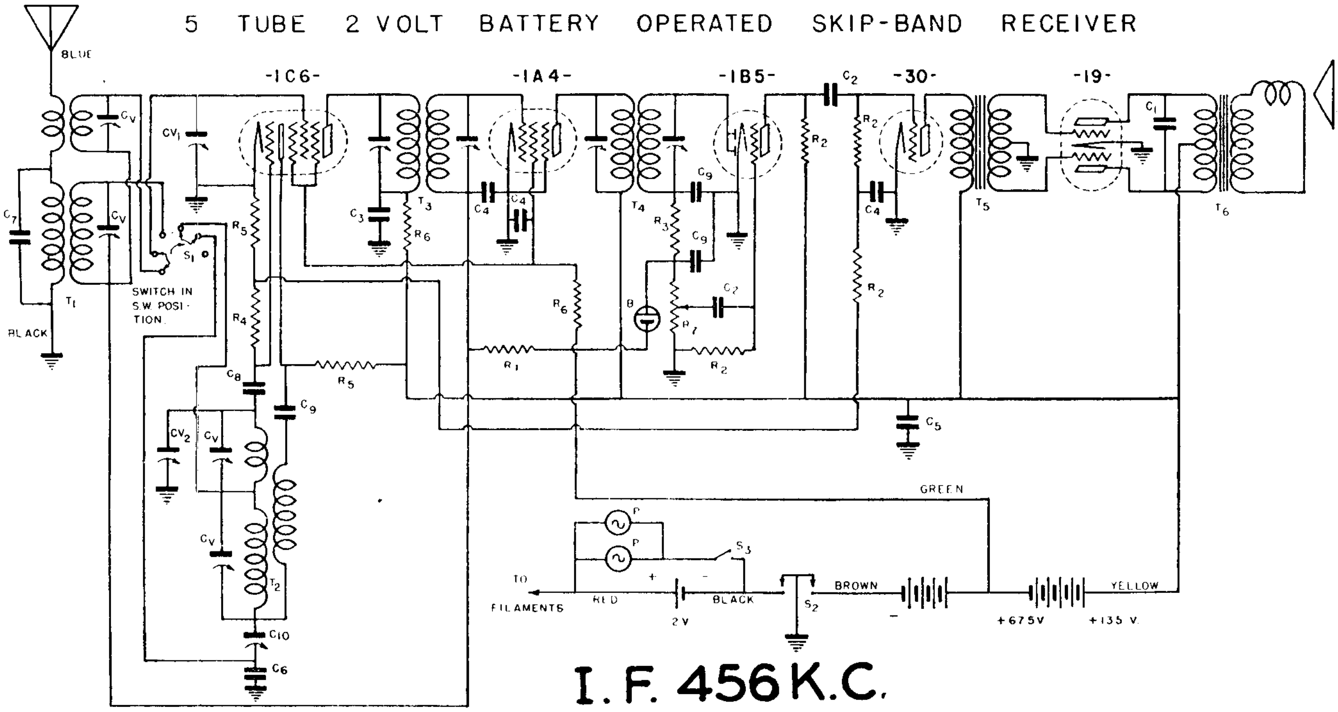
Range Selector Wiring Diagram

CLIMAX RADIO & TELEVISION CO., Inc.

MODEL A.J.

MODEL A. J.

5 TUBE 2 VOLT BATTERY OPERATED SKIP-BAND RECEIVER

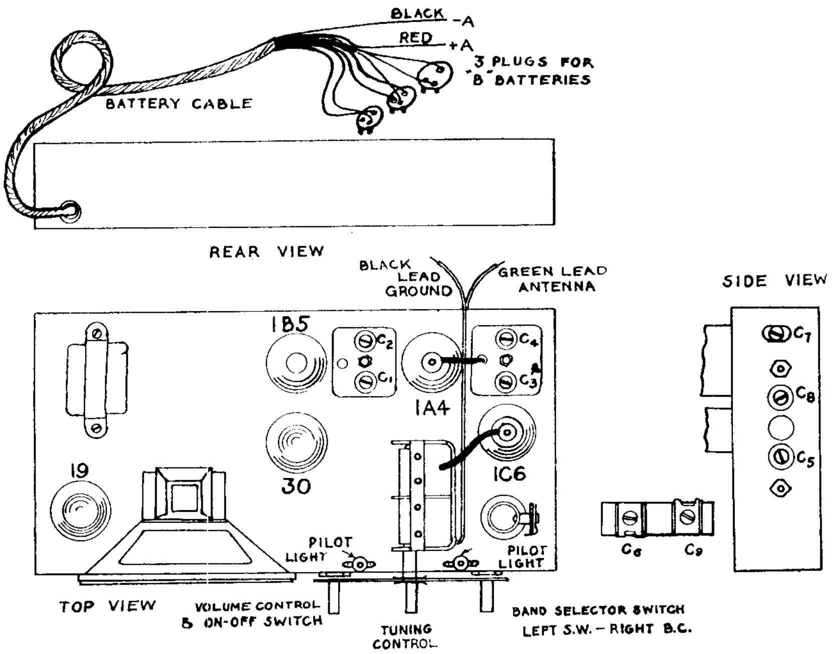


I. F. 456 K.C.

LEGEND	OUR PART NO	DESCRIPTION
C_1	218	.002 MFD 600 V TUBULAR CONDENSER
C_2	211	.01 MFD 400 V TUBULAR CONDENSER
C_3	212	.05 MFD 200 V TUBULAR CONDENSER
C_4	203	.1 MFD 200 V TUBULAR CONDENSER
C_5	204	.25 MFD 200 V TUBULAR CONDENSER
C_6	410	.0018 MFD MICA CONDENSER
C_7	412	50 MMFD MICA CONDENSER
C_8	400	100 MMFD MICA CONDENSER
C_9	401	250 MMFD MICA CONDENSER
C_{10}	507	5 PLATE PADDING CONDENSER

LEGEND	OUR PART NO	DESCRIPTION
CV_{1-2}	612	2 GANG VARIABLE CONDENSER
Cv	500	5-30 MMFD TRIMMER CONDENSER
R_1	119	1 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_2	117	$\frac{1}{2}$ MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_3	113	50,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	111	25,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_5	109	10,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_6	134	2,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	2009C	500,000 VOLUME CONTROL
P	2901	MAZDA #40 PILOT LIGHTS

LEGEND	OUR PART NO	DESCRIPTION
T_1	1225	SKIP-BAND ANTENNA COIL
T_2	1412	SKIP-BAND OSCILLATOR COIL
T_3	1503	INPUT I F TRANSFORMER
T_4	1507	DIODE I F TRANSFORMER
T_5	1019	INTERSTAGE TRANSFORMER
T_6	IN 815	P. M. DYNAMIC SPEAKER TRANSFORMER
S_1	1920	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
S_3	—	PILOT LIGHT ECONOMIZER SWITCH
B	3000	BIAS BUTTON



CHASSIS LAYOUT

ALIGNMENT PROCEDURE

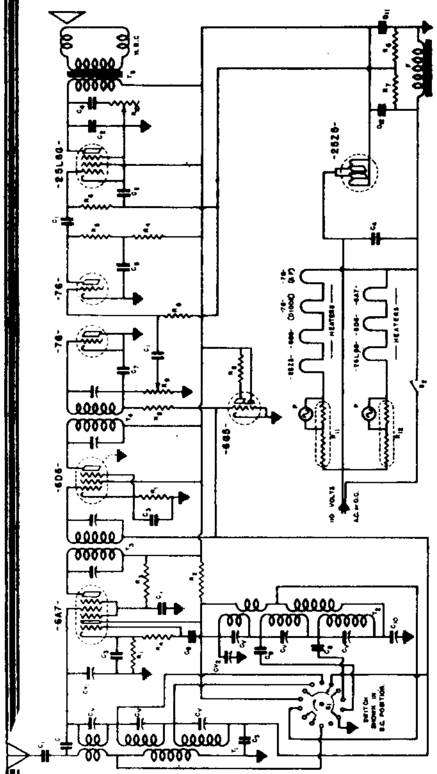
If at any tme it becomes necessary to realign this receiver, the following procedure should be employed: Set pointer so it is perfectly horizontal when the variable condenser is fully engaged. Connect the green antenna lead in series with a 200 mmfd. mica condenser to the output of the signal generator. Connect the black lead to the ground lead of the signal generator. Set the signal generator to 456 K.C. and turn the variable condenser on the receiver until the plates are completely intermeshed. Turn the selector switch to the Broadcast position and set the volume control knob to maximum. Connect an output meter between the plate and screen of the 42 output tube. Adjust trimmers C1, C2, C3 and C4 for maximum output as indicated by the meter. At all times keep the output control on the signal generator turned down as low as possible so as to obtain only a very small reading on the output meter. (At larger inputs the automatic volume control system may tend to obscure the correct adjustment.) Next set the signal generator to 1400 K.C., and turn the dial of the receiver to correspond to that frequency. Adjust trimmer C8 for maximum reading of the output meter and then adjust C6 to secure final adjustment. Next rotate the receiver dial to about 600 K.C. and set the signal generator at the same frequency. Adjust trimmer C7 while rocking the condenser back and forth until maximum output results. If it is necessary to turn that adjustment screw more than about one turn, it will be necessary to repeat the adjustment at 1400 K.C. again. This completes the alignment of the Broadcast band.

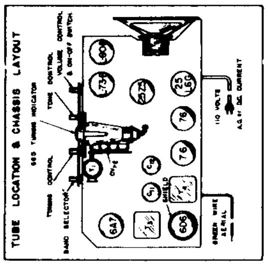
Next, substitute a 400 ohm carbon resistor for the series mica condenser between the receiver and the signal generator and set the switch to the short wave position. Rotate the receiver dial to 14M.C. and set the signal generator to the same frequency. Adjust trimmer C5 to resonance and then increase the generator frequency to 14.9M.C. and observe if the signal can be heard without changing the receiver dial setting. If it can be heard, then the image is properly placed and the signal generator should again be set to 14 M.C.. Adjust trimmer C9 for final adjustment.

CLIMAX RADIO & TELEVISION CO., Inc.

MODEL ASE

9 TUBE 3 BAND AC-DC SUPERHETERODYNE RECEIVER



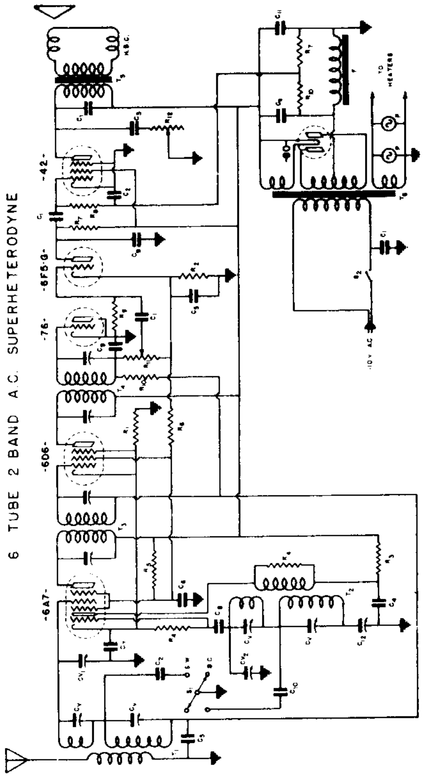


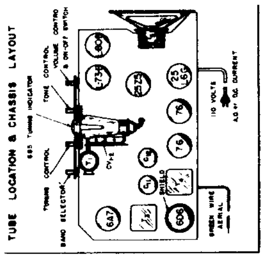
LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD.-400 V. TUBULAR CONDENSER
C_2	216	.02 MFD.-400 V. TUBULAR CONDENSER
C_3	203	.1 MFD.-200 V. TUBULAR CONDENSER
C_4	210	.1 MFD.-400 V. TUBULAR CONDENSER
C_5	204	.25 MFD.-200 V. TUBULAR CONDENSER
C_6	400	.0001 MFD. MICA CONDENSER
C_7	401	.00025 MFD. MICA CONDENSER
C_8	410	.0018 MFD. MICA CONDENSER
C_9	406	.0046 MFD. MICA CONDENSER
C_{10}	607	5 PLATE PADDING CONDENSER
C_{11}	314	10 MFD. 160 W.V. WET ELECTROLYTIC COND
C_{12}	311	20 MFD. 160 W.V. WET ELECTROLYTIC COND
CV_{1-2}	630	2 GANG VARIABLE CONDENSER
C_V	500	5-30 MMFD. TRIMMER CONDENSER
S_1	1915	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
F	IN 817	450 OHM SPEAKER FIELD
P	2901	MAZDA #44 PILOT LIGHTS

LEGEND	OUR PART NO.	DESCRIPTION
R_1	103	250 OHM [illegible] WATT CARBON RESISTOR
R_2	108	5000 OHM [illegible] WATT CARBON RESISTOR
R_3	109	10,000 OHM [illegible] WATT CARBON RESISTOR
R_4	113	50,000 OHM [illegible] WATT CARBON RESISTOR
R_5	115	100,000 OHM [illegible] WATT CARBON RESISTOR
R_6	116	250,000 OHM [illegible] WATT CARBON RESISTOR
R_7	117	500,000 OHM [illegible] WATT CARBON RESISTOR
R_8	119	1 MEGOHM [illegible] WATT CARBON RESISTOR
R_9	2009	500,000 OHM VOLUME CONTROL
R_{10}	2021	TONE CONTROL
R_{11}	2922	L-73-6 BALLAST TUBE
R_{12}	2923	L-80-5 BALLAST TUBE
T_1	1233	ANTENNA COIL
T_2	1415	OSCILLATOR COIL
T_3	1503	1 ST I.F. TRANSFORMER
T_4	1507	2 ND. I.F. TRANSFORMER
T_5	IN 817	SPEAKER TRANSFORMER
C	—	CONDENSER IN ANTENNA COIL

MODEL AX

6 TUBE 2 BAND A.C. SUPERHETERODYNE



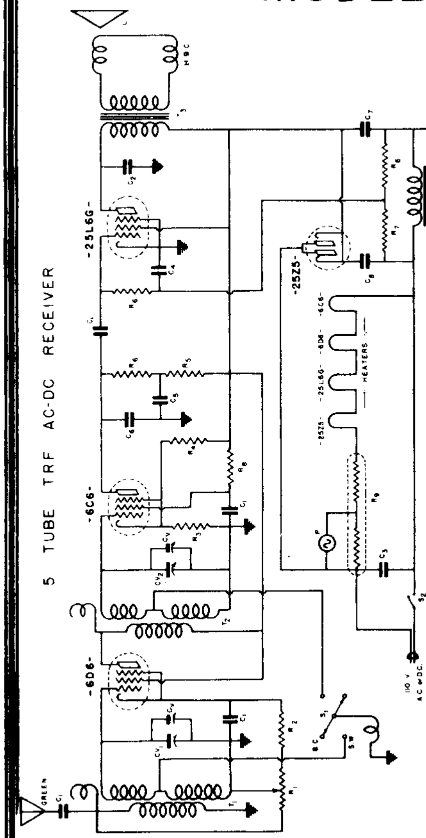


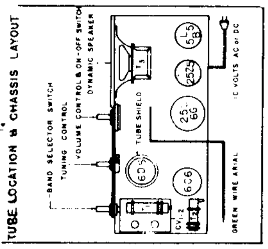
LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD.-400 V. TUBULAR CONDENSER
C_2	216	.02 MFD.-400 V. TUBULAR CONDENSER
C_3	203	.1 MFD.-200 V. TUBULAR CONDENSER
C_4	210	.1 MFD.-400 V. TUBULAR CONDENSER
C_5	204	.25 MFD.-200 V. TUBULAR CONDENSER
C_6	400	.0001 MFD. MICA CONDENSER
C_7	401	.00025 MFD. MICA CONDENSER
C_8	410	.0018 MFD. MICA CONDENSER
C_9	406	.0046 MFD. MICA CONDENSER
C_{10}	607	5 PLATE PADDING CONDENSER
C_{11}	314	10 MFD. 160 W.V. WET ELECTROLYTIC COND
C_{12}	311	20 MFD. 160 W.V. WET ELECTROLYTIC COND
CV_{1-2}	630	2 GANG VARIABLE CONDENSER
C_V	500	5-30 MMFD. TRIMMER CONDENSER
S_1	1915	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
F	IN 817	450 OHM SPEAKER FIELD
P	2901	MAZDA #44 PILOT LIGHTS

LEGEND	OUR PART NO.	DESCRIPTION
R_1	103	250 OHM [illegible] WATT CARBON RESISTOR
R_2	108	5000 OHM [illegible] WATT CARBON RESISTOR
R_3	109	10,000 OHM [illegible] WATT CARBON RESISTOR
R_4	113	50,000 OHM [illegible] WATT CARBON RESISTOR
R_5	115	100,000 OHM [illegible] WATT CARBON RESISTOR
R_6	116	250,000 OHM [illegible] WATT CARBON RESISTOR
R_7	117	500,000 OHM [illegible] WATT CARBON RESISTOR
R_8	119	1 MEGOHM [illegible] WATT CARBON RESISTOR
R_9	2009	500,000 OHM VOLUME CONTROL
R_{10}	2021	TONE CONTROL
R_{11}	2922	L-73-6 BALLAST TUBE
R_{12}	2923	L-80-5 BALLAST TUBE
T_1	1233	ANTENNA COIL
T_2	1415	OSCILLATOR COIL
T_3	1503	1 ST I.F. TRANSFORMER
T_4	1507	2 ND. I.F. TRANSFORMER
T_5	IN 817	SPEAKER TRANSFORMER
C	—	CONDENSER IN ANTENNA COIL

MODEL AL

5 TUBE TRF AC-DC RECEIVER



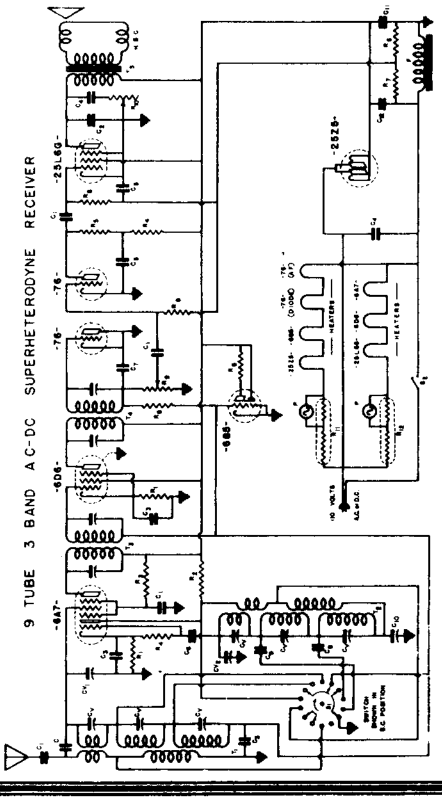


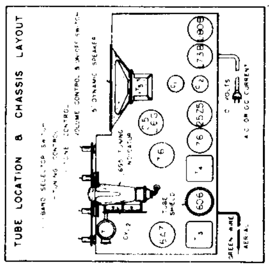
LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD 400 V TUBULAR CONDENSER
C_2	216	.018 MFD 400 V TUBULAR CONDENSER
C_3	206	.05 MFD. 400 V TUBULAR CONDENSER
C_4	215	.06 MFD. 200 V. TUBULAR CONDENSER
C_5	204	.25 MFD 200 V. TUBULAR CONDENSER
C_6	401	.00025 MICA CONDENSE
C_7	312	10 MFD DRY ELECTROLYTIC CONDENSER
C_8	324	20 MFD DRY ELECTROLYTIC CONDENSER
P	2902	MAZDA #46 PILOT LIGHT
CV_{1-2}	628	2 GANG VARIABLE CONDENSER
C_V	—	5-30 MMFD COMPENSATORS
T_1	1227	B.C & S.W ANTENNA COIL
T_2	1318	B.C & S.W INTERSTAGE COIL
T_3	IN 814	SPEAKER OUTPUT TRANSFORMER

LEGEND	OUR PART NO.	DESCRIPTION
R_1	2008	10,000 OHM VOLUME CONTROL
R_2	—	450 OHMS, Minimum on Volume Control
R_3	105	1000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	112	25,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_5	115	100,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_6	116	250,000 OHM $\frac{1}{2}$ WATT CARBON RESISTOR
R_7	117	500,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_8	120	3 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_9	2903	L-55-B BALLAST TUBE
T_4	IN 814	SPEAKER FIELD, 400 OHMS
S_1	1919	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
L	814	5" DYNAMIC SPEAKER

MODEL ATE

9 TUBE 3 BAND AC-DC SUPERHETERODYNE RECEIVER





LEGEND	OUR PART NO.	DESCRIPTION
C_1	211	.01 MFD.-400 V. TUBULAR CONDENSER
C_2	216	.02 MFD.-400 V. TUBULAR CONDENSER
C_3	203	.1 MFD.-200 V. TUBULAR CONDENSER
C_4	210	.1 MFD.-400 V. TUBULAR CONDENSER
C_5	204	.25 MFD.-200 V. TUBULAR CONDENSER
C_6	400	.0001 MFD. MICA CONDENSER
C_7	401	.00025 MFD. MICA CONDENSER
C_8	410	.0018 MFD. MICA CONDENSER
C_9	406	.0046 MFD. MICA CONDENSER
C_{10}	607	5 PLATE PADDING CONDENSER
C_{11}	314	10 MFD. 160 W.V. WET ELECTROLYTIC COND
C_{12}	311	20 MFD. 160 W.V. WET ELECTROLYTIC COND
CV_{1-2}	630	2 GANG VARIABLE CONDENSER
C_V	500	5-30 MMFD. TRIMMER CONDENSER
S_1	1915	BAND SELECTOR SWITCH
S_2	—	LINE SWITCH ON VOLUME CONTROL
F	IN 817	450 OHM SPEAKER FIELD
P	2901	MAZDA #44 PILOT LIGHTS

LEGEND	OUR PART NO.	DESCRIPTION
R_1	103	250 OHM [illegible] WATT CARBON RESISTOR
R_2	108	5000 OHM [illegible] WATT CARBON RESISTOR
R_3	109	10,000 OHM [illegible] WATT CARBON RESISTOR
R_4	113	50,000 OHM [illegible] WATT CARBON RESISTOR
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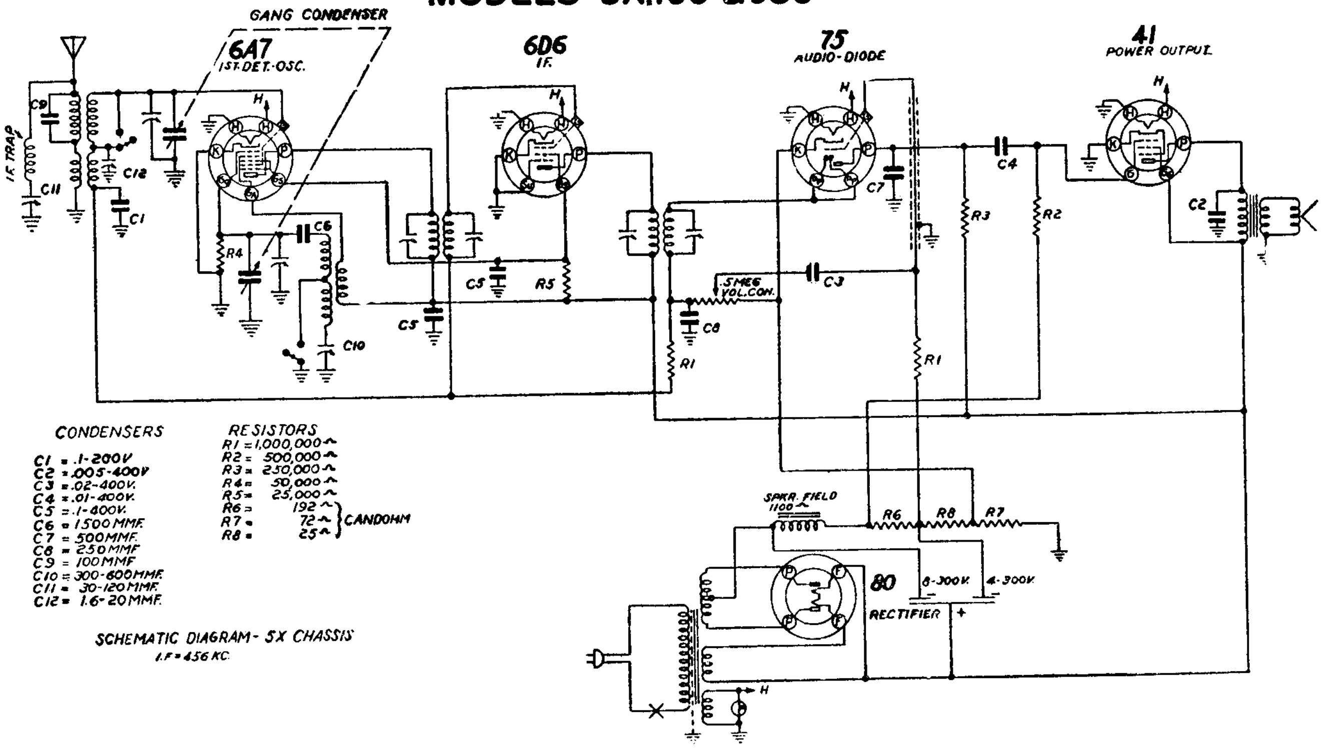
R_8	119	1 MEGOHM [illegible] WATT CARBON RESISTOR
R_9	2009	500,000 OHM VOLUME CONTROL
R_{10}	2021	TONE CONTROL
R_{11}	2922	L-73-6 BALLAST TUBE
R_{12}	2923	L-80-5 BALLAST TUBE
T_1	1233	ANTENNA COIL
T_2	1415	OSCILLATOR COIL
T_3	1503	1 ST I.F. TRANSFORMER
T_4	1507	2 ND. I.F. TRANSFORMER
T_5	IN 817	SPEAKER TRANSFORMER
C	—	CONDENSER IN ANTENNA COIL

CONTINENTAL RADIO & TELEVISION CORP.

MODELS 5X.160 & 980



SCHEMATIC DIAGRAM - 5X CHASSIS
I.F = 456 KC.

This receiver is designed to operate over two tuning ranges. Upper band which covers the broadcast range, extends from 535 to 1750 kilocycles (175 to 550 meters), lower band which covers Police, Aviation, and the International 49 Meter Foreign Band.

P162	1 Megohm ¼ Watt Resistor	P164	.01 Mfd. 400V Condenser
P417	50,000 Ohm ¼ Watt Resistor	P142	.1 Mfd. 200V Condenser
P166	25,000 Ohm ¼ Watt Resistor	P1194	.005 Mfd. 400V Condenser
P1594	Dial Glass	P336	.0005 Mfd. Mica Condenser
P1671	Knob	P817	.00025 Mfd. Mica Condenser
P1670	Knob	P317	500,000 Ohm ¼ Watt Resistor
P1647	Small Trimmer Condenser	P139	250,000 Ohm ¼ Watt Resistor

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, and 6000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, the Short Wave Band may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. Align all four I.F. trimmers to peak or maximum reading on the output meter. The four trimmers are located in the two I.F. cans on the top of the chassis.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna lead (Blue) through a .0002 mfd. mica condenser to give the equivalent of a normal antenna. Set the receiver pointer to 1400 KC and adjust the front gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the rear trimmer of the gang condenser to peak.

Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R.F. section. The padding condenser is located on the front apron of the chassis.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 K.C.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Band.

SHORT WAVE BAND There is only one adjustment to be made in the alignment of the Short Wave Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary.

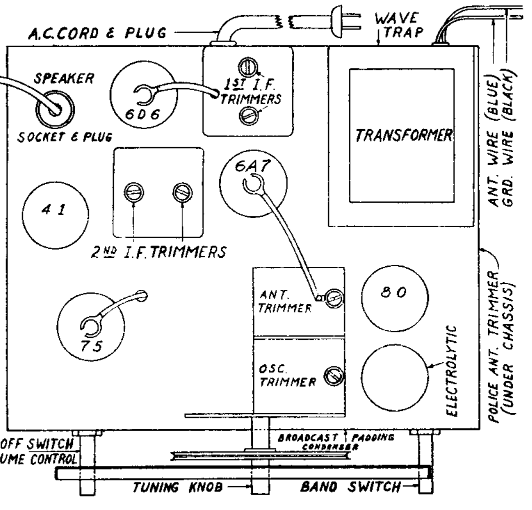
Set the test oscillator to 6000 KC and start rotating the tuning condenser from the high frequency end of the dial until the signal of the test oscillator is heard. Adjust the trimmer on the antenna coil located under the chassis to give maximum signal. Be sure to align the antenna coil on the first signal heard as the condenser is turned from the high frequency end of the dial.

IMPORTANT: This is the only adjustment necessary for the Short Wave Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Short Wave Band, otherwise the Broadcast Band will be thrown out of alignment.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 6000 KC.

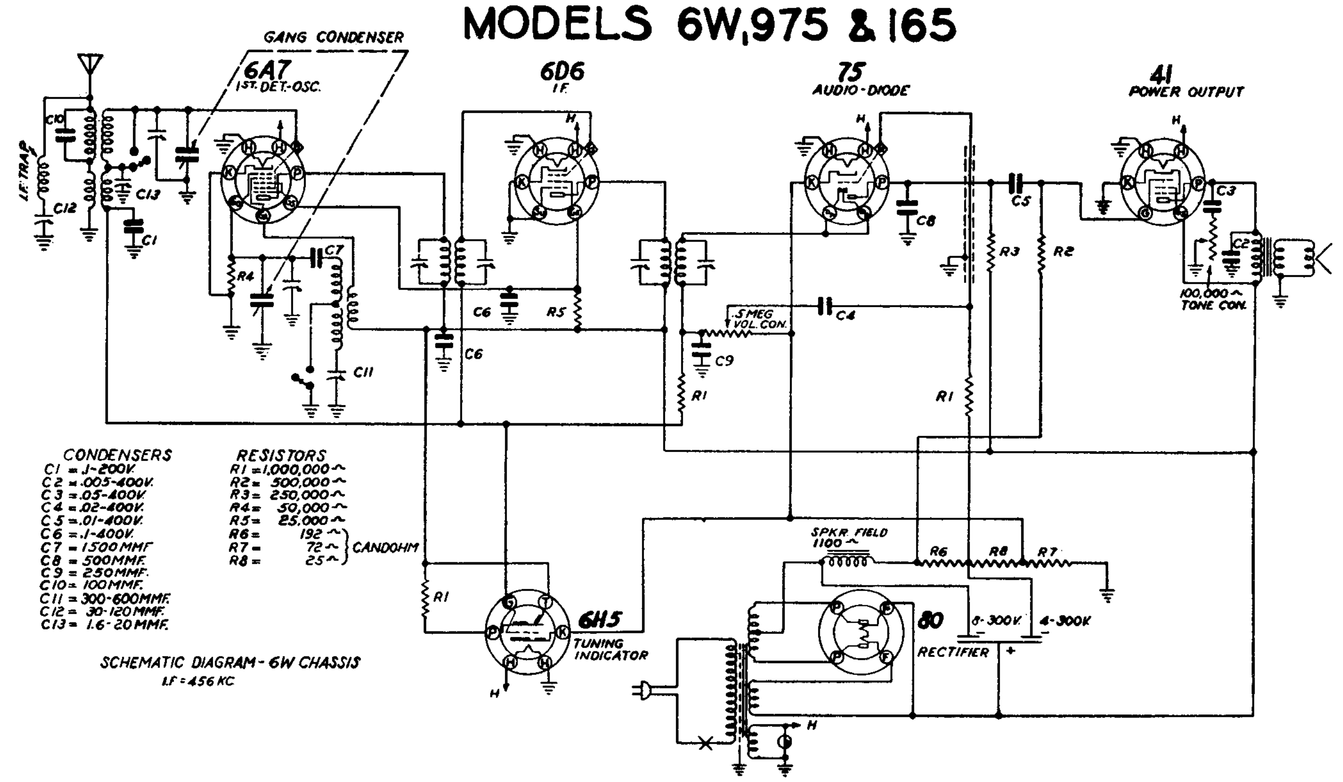
P1368	4 Prong Socket	P1581	Oscillator Coil
P1277	Type 41 Socket	P1574	Mica Condenser .0015 Mfd. 50%
P521	Type 75 Socket	P1582	Antenna Coil
P492	Type 80 Socket	P1557	Riveted Mica Condenser
P506	Type 6A7 Socket	P1583	Dial Scale
P536	Type 6D6 Socket	P1584	Pointer
P617	Padding Condenser	P1503	Pilot Light Socket

P1576	Candohm Resistor	P1504	Pilot Light Bulb
P1577	Trimmer Cond. with Bracket	P914n	Power Transformer
P1578	Gang Condenser	P929	AC Cord and Plug
P916	1st I.F. Transformer Coil	P1591	Electrolytic Condenser
P1579	Volume Control and Switch	P917	2nd I.F. Transformer
P143	.02 Mfd. 400V Condenser	P1455	Tube Shield
P1580	Band Change Switch	P276	.1 Mfd. 400V Condenser



CONTINENTAL RADIO & TELEVISION CORP.

MODELS 6W, 975 & 165



This receiver is designed to operate over two tuning ranges. Upper band which covers the broadcast range, extends from 535 to 1750 kilocycles (175 to 550 meters), lower band which covers Police, Aviation, and the International 49 Meter Foreign Band.

P1368	4 Prong Socket	P817	.00025 Mfd. Mica Condenser
P1277	Type 41 Socket	P336	.005 Mfd. Mica Condenser
P521	Type 75 Socket	P1194	.005 Mfd. 400V Condenser
P492	Type 80 Socket	P142	.1 Mfd. 200V Condenser
P506	Type 6A7 Socket	P164	.01 Mfd. 400V Condenser
P536	Type 6D6 Socket	P276	.1 Mfd. 400V Condenser
P617	Padding Condenser	P916	1st I.F. Transformer Coil
P1576	Candohm Resistor	P1579	Volume Control and Switch
577	Trimmer Cond. with Bracket	P143	.02 Mfd. 400V Condenser
578	Gang Condenser	P1580	Band Change Switch
563	Dial Pointer	P1581	Oscillator Coil
541	Dial Scale	P1582	Antenna Coil
542	Tone Control	P1557	Riveted Mica Condenser
14	.05 Mfd. 400V Condenser	P1503	Pilot Light Socket
543	Escutcheon	P1504	Pilot Light Bulb
572	Selector Knob		
P1673	Tone Knob	914n	Power Transformer
P1674	Volume Knob	P929	AC Cord and Plug
P1675	Band Switch Knob	P1591	Elec. Condenser
P166	25,000 Ohm ¼ Watt Resistor	P917	2nd I.F. Transformer
P417	50,000 Ohm ¼ Watt Resistor	P1455	Tube Shield
P162	1 Megohm ¼ Watt Resistor	P1645	Magic Eye Socket & Cable Assembly
P139	250,000 Ohm ¼ Watt Resistor	P1574	.0015 Mica Condenser
P137	500,000 Ohm ¼ Watt Resistor		

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, and 6000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, the Short Wave Band may be aligned.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna lead (Blue) through a .0002 mfd. mica condenser to give the equivalent of a normal antenna. Set the receiver pointer to 1400 KC and adjust the front gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the rear trimmer of the gang condenser to peak.

Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R.F. section. The padding condenser is located on the front apron of the chassis.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 K.C.

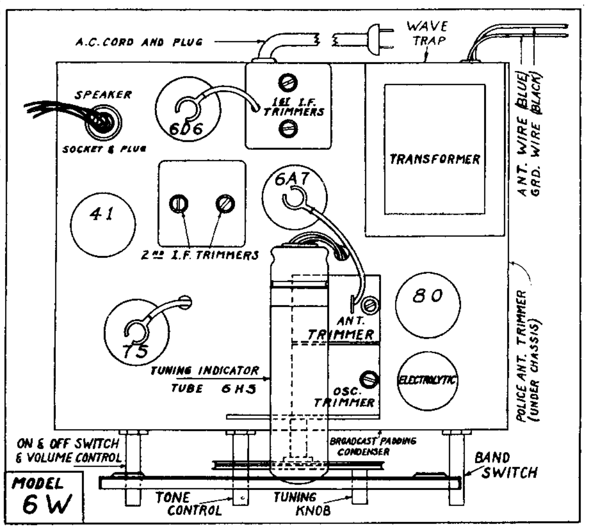
This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Band.

SHORT WAVE BAND There is only one adjustment to be made in the alignment of the Short Wave Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary.

Set the test oscillator to 6000 KC and start rotating the tuning condenser from the high frequency end of the dial until the signal of the test oscillator is heard. Adjust the trimmer on the antenna coil located under the chassis to give maximum signal. Be sure to align the antenna coil on the first signal heard as the condenser is turned from the high frequency end of the dial.

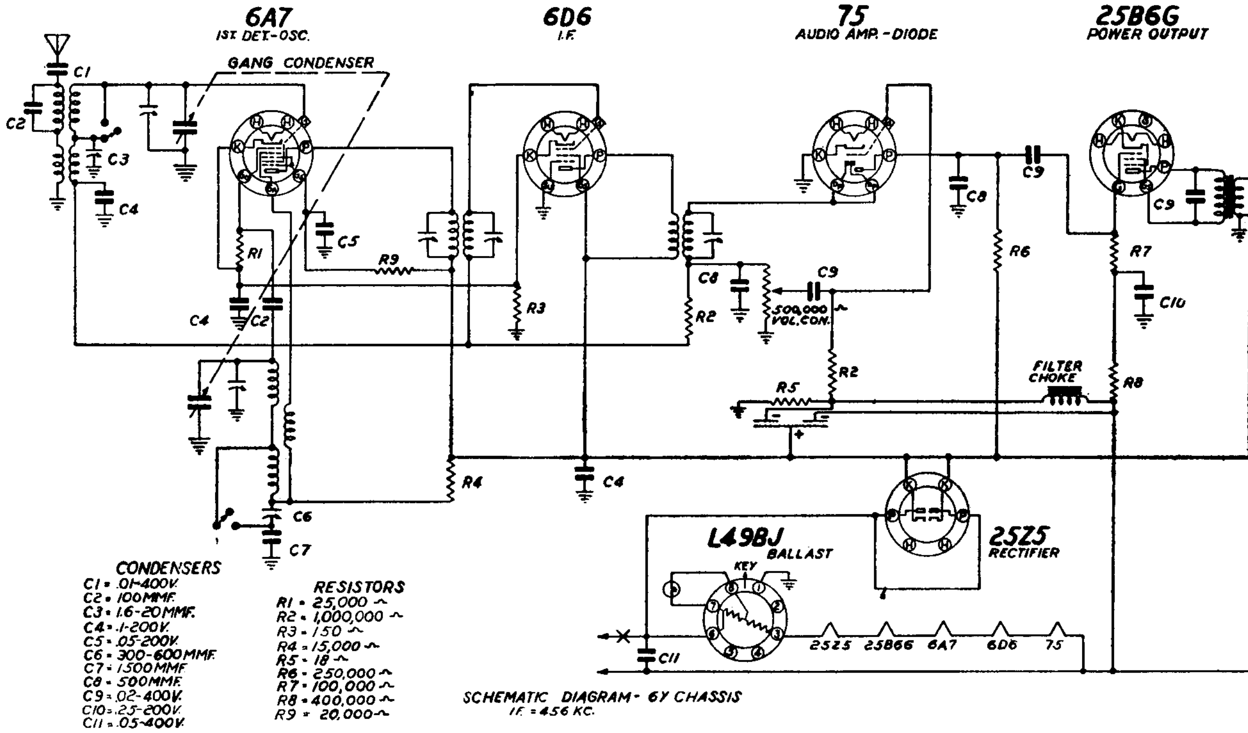
IMPORTANT: This is the only adjustment necessary for the Short Wave Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Short Wave Band, otherwise the Broadcast Band will be thrown out of alignment.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 6000 KC.



CONTINENTAL RADIO & TELEVISION CORP.

MODELS 6Y, 150, 155, 985 & 990



SCHEMATIC DIAGRAM - 6Y CHASSIS
I.F. = 456 KC.

This receiver is designed to operate over two tuning ranges. Upper band which covers the broadcast range, extends from 535 to 1760 kilocycles (171 to 560 meters), lower band which covers Police, Aviation, and the International 49 Meter Foreign Band.

ALIGNMENT DATA AND SERVICING

GENERAL DATA The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, and 6000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, the Short Wave Band may be aligned.

I.F. ALIGNMENT Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tubes (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground if the test oscillator is not grounded to one side of the power line. In case one side is not connected to ground, connect a large condenser from ground on the test oscillator to ground of the chassis. Align all three I.F. trimmers to peak or maximum reading on the output meter. The three trimmers are located as follows: two are located in the I.F. can on top of the chassis, and the third is located on the front apron of the chassis and is the left hand section of the double trimmer.

BROADCAST BAND ALIGNMENT Adjust the oscillator to 1400 KC and connect the output to the antenna lead (Blue) through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the rear gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak.

Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the pre-selector or R.F. section. The padding condenser is located on the right hand side of the double trimmer on the front of the chassis.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Band.

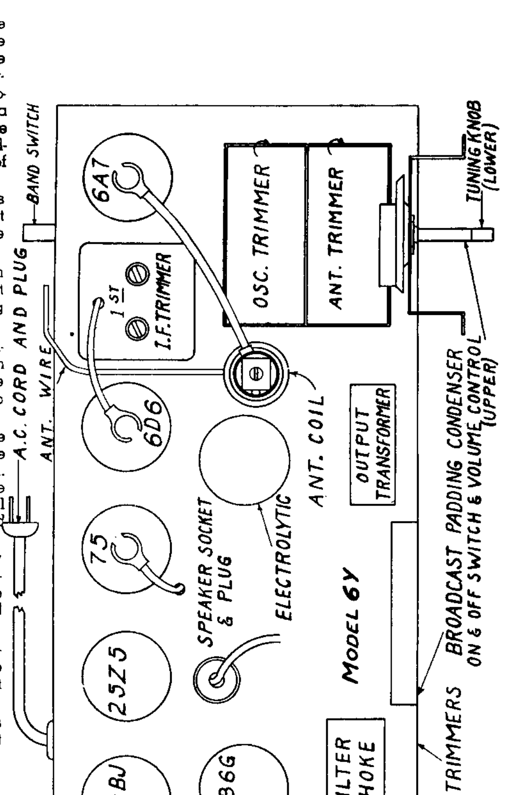
SHORT WAVE BAND There is only one adjustment to be made in the alignment of the Short Wave Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary.

Set the test oscillator to 600 KC and start rotating the tuning condenser from the high frequency end of the dial until the signal of the test oscillator is heard. Adjust the trimmer on top of the antenna coil to give maximum signal. Be sure to align the antenna coil on the first signal heard as the condenser is turned from the high frequency end of the dial.

IMPORTANT: This is the only adjustment necessary for the Short Wave Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Short Wave Band, otherwise the Broadcast Band will be thrown out of alignment.

Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and MUST ALWAYS BE DONE BEFORE attempting to align the Short Wave Band.



P506	Socket, Type 6A7
P521	Socket, Type 75
P536	Socket, Type 6D6
P559	Socket, Type 25Z5
P1549	Socket, Type L49BJ
P1550	Socket, Type 25B6G
P530	Tube Shield
P1647	Trimmer
P916	1st I.F. Transformer
P829	AC Cord & Plug
P1489	Pointer
P1491	Dial Glass
P1496	Rubberized Belt
P1497	Takeup Spring
P1498	Drive Bushing
P1503	Pilot Light Socket
P1504	Pilot Light Bulb
P1508	Baffle Board
P1560	Speaker
P1561	Electrolytic Condenser
P1562	Band Change Switch
P1568	Knob, (Specify Color)
P1656	20 Antenna Cord

CONDENSERS

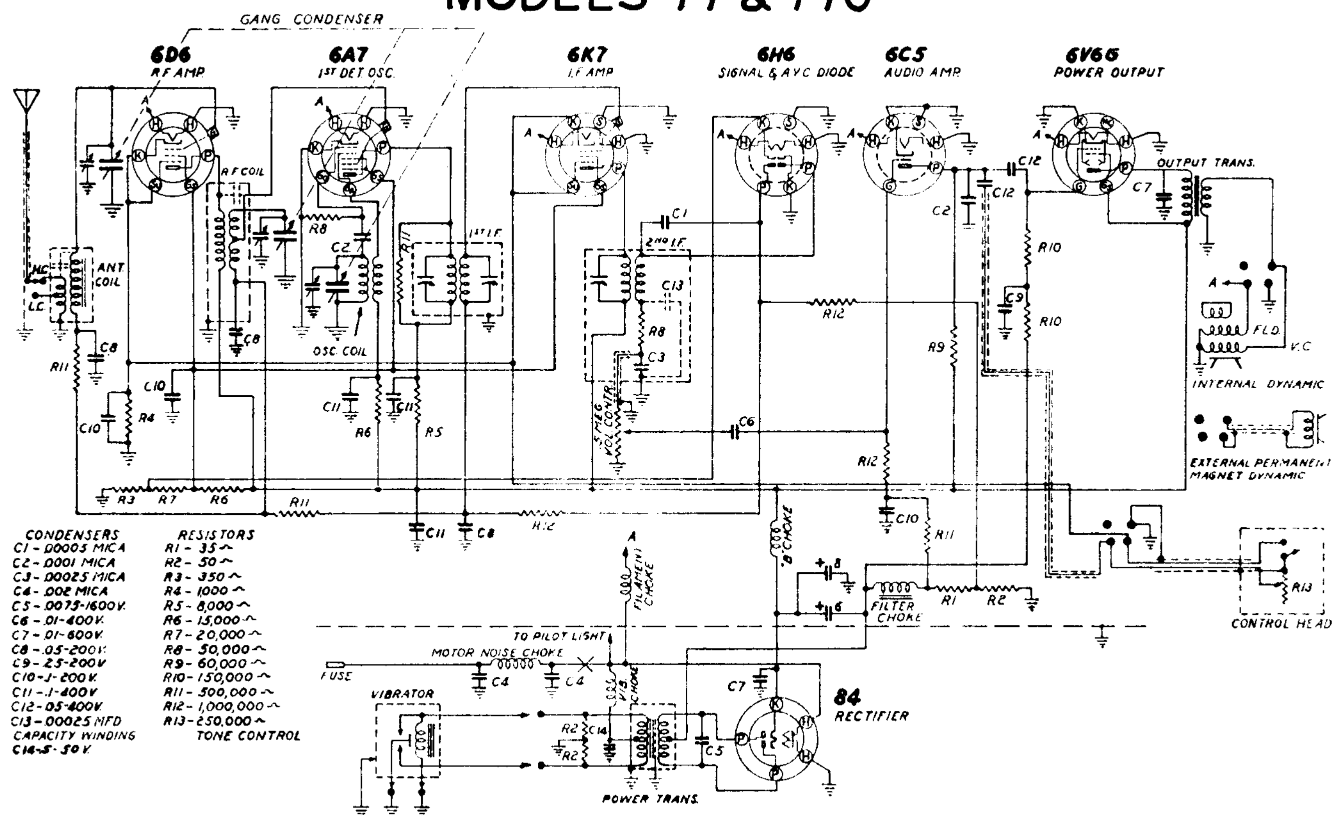
P141	.25 Mfd. 200 V
P142	.1 Mfd. 200 V
P143	.02 Mfd. 200 V
P148	.05 Mfd. 200 V
P164	.01 Mfd. 400 V
P334	.05 Mfd. 400 V
P336	.0005 Mica Condenser
P480	.0001 Mica Condenser
P1574	.0015 plus or 5% Mica Condenser
P1557	Riveted Mica Condenser
P1542	Gang Condenser
P1543	Dial Scale
P1551	Iron Core Filter Choke
P1552	Output Transformer
P1555	Volume Control & Switch
P1556	Antenna Coil
P1558	2nd I.F. Transformer
P1559	Oscillator Coil

RESISTORS

P1567	Candohm Resistor
P166	25,000 1/4 Watt
P419	20,000 1/4 Watt
P1568	150 1/3 Watt
P139	250,000 1/4 Watt
P162B	1 Megohm 1/3 Watt
P1564	100,000 Ohm 1/3 Watt
P1565	400,000 Ohm 1/3 Watt
P1566	15,000 Ohm 1/3 Watt

CONTINENTAL RADIO & TELEVISION CORP.

MODELS 77 & 770



ALIGNMENT DATA AND SERVICING

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 175, 600 and 1400 K.C., and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignment should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) transformers should be alligned properly as the first step.

I.F. ALIGNMENT. Adjust the test oscillator to 175 K.C. and connect the output directly to the grid of the first detector tube (6A7), without the use of any series condenser or resistor; the omission of series condenser and resistor to block out the AVC action. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second I.F. transformers to peak or maximum reading on the output meter.

OSCILLATOR ALIGNMENT. Adjust the test oscillator to 1400 K.C. and connect the output to the antenna through a .0001 mfd. mica condenser to give the equivalent of a low capacity type average auto antenna. Set the dial pointer to 1400 K.C. and adjust the oscillator trimmer to peak. (Front section of gang condenser.)

R.F. ALIGNMENT. The next step is to adjust the center and rear trimmers of the gang condenser to peak. The center section of the gang condenser tunes the antenna amplifier stage (6D6 tube), and the rear condenser section tunes the detector grid coil of the 6A7 tube.

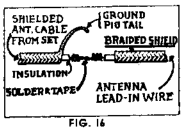


FIG. 16

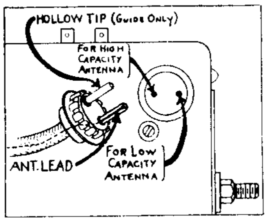


FIG. 17

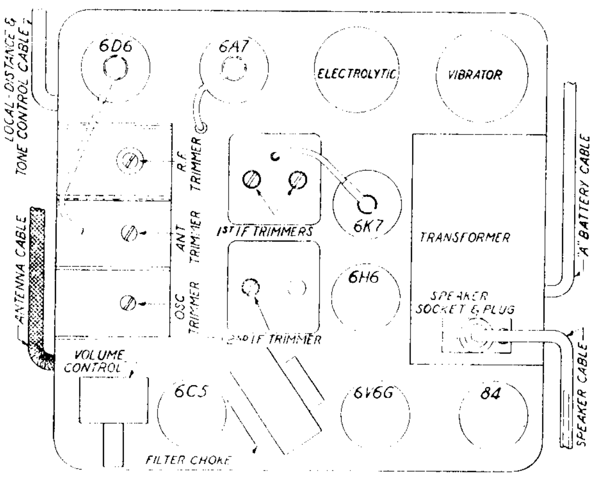


FIG. 18

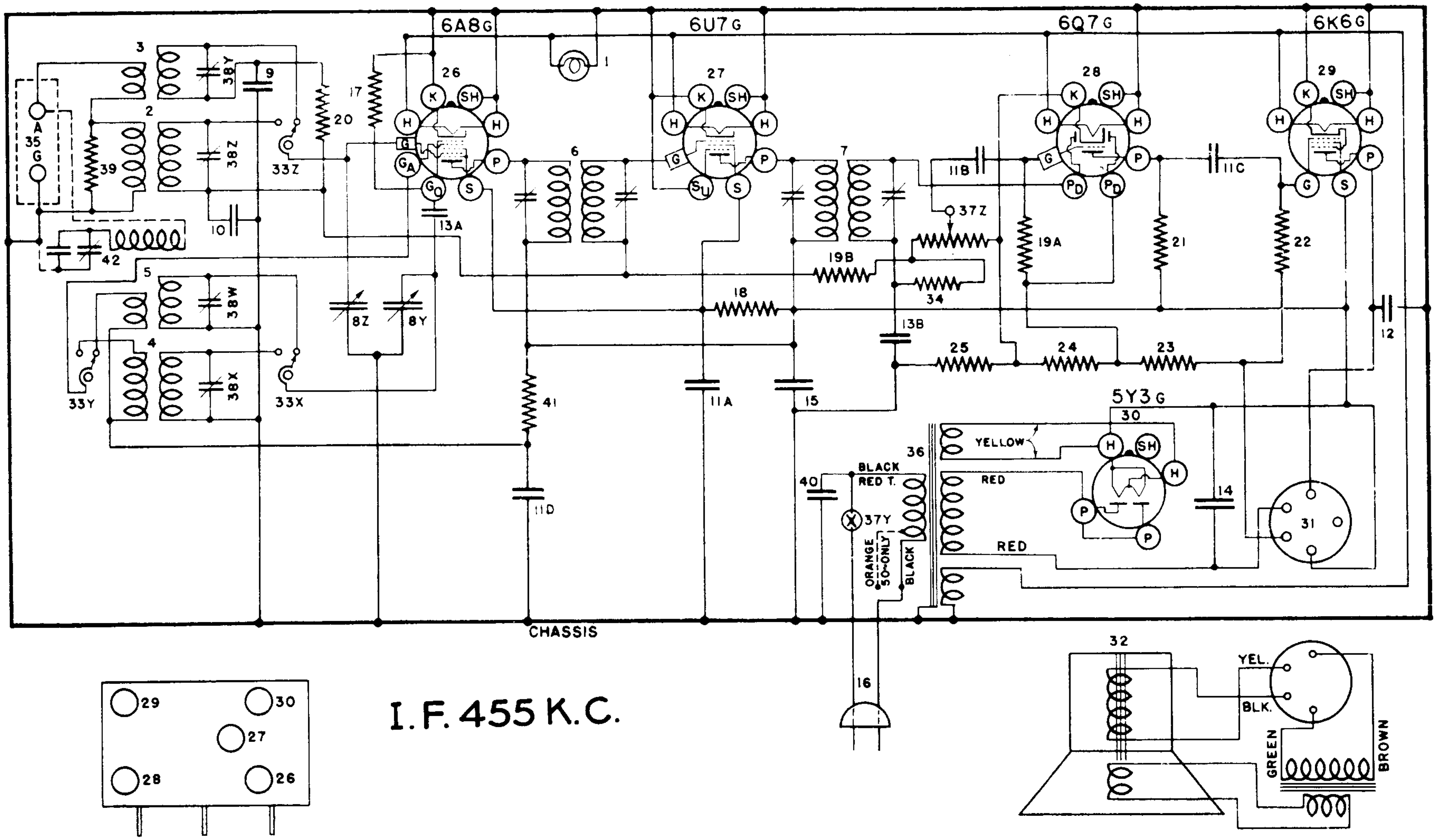
REPLACEMENT PARTS LIST

Part No.	Description
P536.	6D6 Socket.
P506.	6A7 Socket.
P824.	Vib. Socket.
P489.	6K7 Socket.
P490.	6H6 Socket.
P522.	6C5 Socket.
P1374.	6V6G Socket.
P815.	No. 84 Socket.
P852.	Pilot Light Socket.
P805.	Antenna Socket.
P1368.	Speaker Socket.
P1278.	Gang Condenser.
P1279.	Motor Noise Choke.
P1370.	B Filter Choke.
P1280.	1st I.F. Transformer.
P1281.	Filament Choke.
P854.	R.F. B Choke.
P1319.	Hash Choke Coil.
P1292.	Antenna Coil.
P1371.	Volume Control.
P1286.	Out Put Audio Transformer.

Part No.	Description
P1375.	Transformer.
P1289.	4 Prong Speaker Socket.
P1414.	Vibrator Unit.
P1293.	Electrolytic Condenser.
P1376.	2nd I.F. Transformer.
P1291.	R.F. Interstage Coil.
P836.	Oscillator Coil.
P1377.	Candohm Resistor.
G5207.	6 in. Dynamic Speaker.
P831.	Fuse.
P870.	Antenna Cable.
P806.	Generator Condenser.
P1300.	Ammeter Condenser.
P1388.	Control Head.
P851.	Drive Cable.
P1445.	External Speaker.
P1402.	External Speaker Cable.
P1378.	60,000 ohm ¼ watt Insulated.
P418A.	150,000 ohm ¼ watt Insulated.
P1308.	350 ohm ¼ watt Insulated.
P162A.	1 Meg. ohm ¼ watt Insulated.

Part No.	Description
P137A.	500,000 ohm ¼ watt Insulated.
P1380.	8,000 ohm ¼ watt Insulated.
P417A.	50,000 ohm ¼ watt Insulated.
P1381.	1,000 ohm ¼ watt Insulated.
P417.	50,000 ohm ¼ watt Insulated
P1379.	20,000 ohm 1 watt Insulated.
P1309.	15,000 ohm ½ watt Insulated.
P1310.	15,000 ohm 1½ watt Insulated
P1324.	50 ohm ½ watt Insulated.
P817.	.00025 mica.
P480.	.0001 mica.
P1382.	.00005 mica.
P335.	.01—600V Condenser.
P1383.	.10-200—.05-400 Condenser.
P1315.	.25-200—.10-400 Condenser.
P1384.	.05-400—.05-200 Condenser.
P1314.	.10-400—.05-200 Condenser.
P1317.	.10-400—.05-200 Condenser.
P1385.	.10-200—.10-400 Condenser.
G867.	.0075-1600V Condenser.
P813.	.50-50V Condenser.
P818.	.002 mica Condenser.

THE CROSLEY RADIO CORPORATION
MODELS 517 "ABOVE SERIAL № 4032103", 547 "ABOVE SERIAL № 4338750" & 5517



TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	K	G	Ga
6A8G	Oscillator-Modulator	6.3	160	115	0	-1.2	160
6U7G	I-F Amplifier	6.3	160	115	0	-1.2	—
6Q7G	Diode Detector & A-F Amplifier	6.3	80	—	2.5	-2.5	—
6K6G	Output	6.3	160	160	0	-5.0	—
5Y3G	Rectifier	5.0	—	—	225	—	—

Power output approximately 2 watts.
Power consumption approximately 40 watts at 117.5 volts.
Voltage drop across speaker field 35 volts.

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt 500 volt d. c. voltmeter (except filaments) with the receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range a. c. voltmeter (approximately 0-10 volts). Readings may vary plus or minus 10% of values given

THE CROSLEY RADIO CORPORATION

MODELS 517 "ABOVE SERIAL No 4032103", 547 "ABOVE SERIAL No 4338750" & 5517

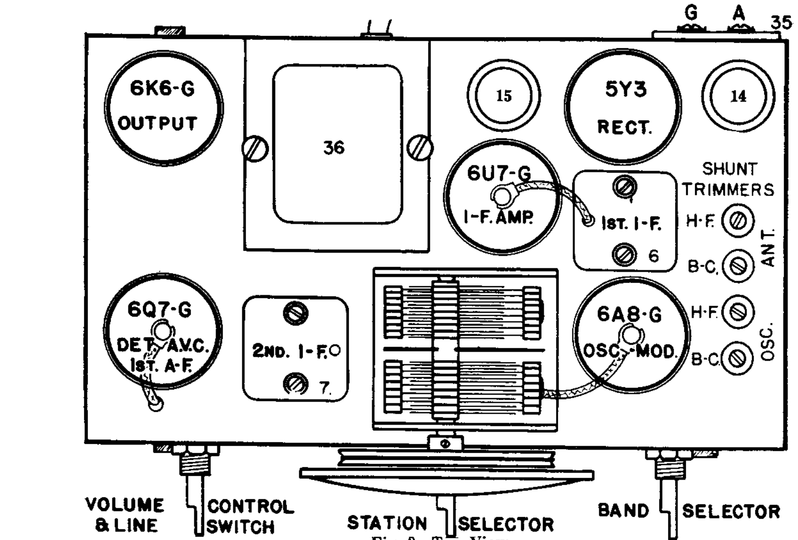
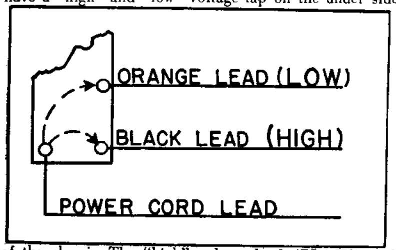


Fig. 2 Top View

Tuning Range:
540-1725 Kilocycles or 555-173 Metres
5.9-15.3 Megacycles or 51-18 Metres

50 CYCLE POWER TRANSFORMER ADJUSTMENT

Receivers equipped with a 50 cycle power transformer have a "high" and "low" voltage tap on the under side



of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

The accompanying illustration shows the connections for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and output meter.

CONNECTING OUTPUT METER

Connect the output meter to P and S of the 6K6G output tube. Be certain that the meter is protected from d. c. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

Tuning I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8G tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh and turn the volume control knob to the right (ON).

(c) Turn the band selector switch to the left (Broadcast Band).

(d) Set the signal generator to 455 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F transformer for maximum output. See Fig. 2.

(f) Adjust both trimmers located on the top of the 1st I-F transformer for maximum output.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

Aligning The R-F Amplifier.

When aligning the R-F amplifier the output lead from the signal generator is connected to the antenna (A) terminal of the receiver. For the Broadcast Band a .00025 mfd. condenser should be connected in series with the output lead of the signal generator and for the High Frequency Band a 400 ohm carbon resistor should be used in place of the condenser.

(a) With the station selector adjusted so that the tuning condenser plates are completely out of mesh and the band selector switch set for the band being aligned, adjust the "OSC" shunt trimmer so that the MINIMUM CAPACITY SIGNAL ¶ (C), is heard. It is not necessary that the receiver tune through this signal.

(b) Adjust the station selector so that the SHUNT ALIGNMENT signal is tuned-in with maximum output. Then adjust the "ANT" shunt trimmer for maximum output. Readjust the station selector slightly so that the generaor signal is tuned-in with maximum output and check the adjustment of the "ANT" trimmer. DO NOT READJUST THE "OSC" TRIMMER.

NOTE 1: When shunt aligning the High Frequency Band care should be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this, increase the output of the signal generator 10 times, or more, and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct frequency.

NOTE 2: If at any time the H-F coils are replaced, it may be necessary to vary the inductance of the "OSC" coil by moving the cross-over turn of wire at the gap to make the set track at the 6 megacycle end. Moving the turn toward the short end of the coil will decrease the inductance and moving it toward the long end will increase the inductance. If the signal is weak at 6 megacycles, a similar slight change in the inductance of the "ANT" coil should bring up the signal strength. THIS IS A CRITICAL OPERATION AND SHOULD NOT BE DONE ON ANY SET UNLESS CHANGING COILS MAKES IT NECESSARY.

(C) SIGNAL INPUT FREQUENCIES

	Minimum Capacity	Shunt Alignment
American Broadcast Band	1725 Kilocycles	1400 Kilocycles
High Frequency Band	15400 Kilocycles	15000 Kilocycles

WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximatly 455 kilocycles. This assembly is located on the underneath side of the chassis and consists of a coil, a fixed condenser and a trimmer condenser as illustrated by dotted lines in the Wiring diagram.

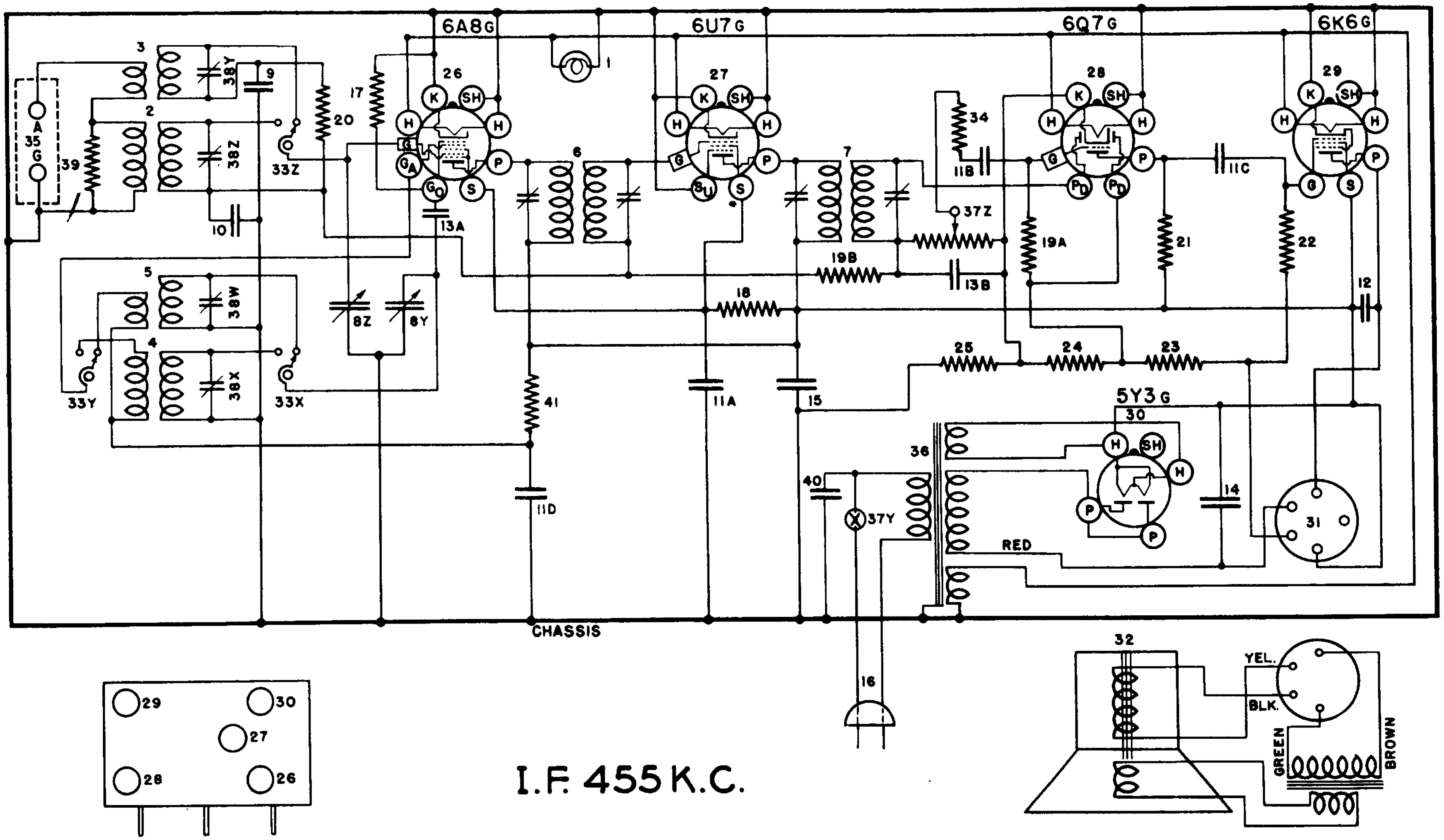
The wave trap should not be adjusted until all other adjustments have been made. To make the adjustment, feed a 455 kilocycle signal from the signal generator through a .00025 mfd. condenser into the antenna terminal of the receiver. With the band selector switch turned to the Broadcast Band position, the gang condenser open and the volume control full on, adjust the trimmer condenser on the wave trap for minimum output.

Should the interfering station be operating on a frequency of slightly more or less than 455 kilocycles, the exact frequency should be determined with the aid of the signal generator. Then, instead of feeding a 455 kilocycle signal into the receiver the exact frequency of the interfering signal should be used. If it is not possible to determine the exact frequency of the interfering signal the antenna may be attached to the receiver and the receiver tuned to the position where the interfering signal is most noticeable. Then adjust the wave trap for minimum interference.

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1	W —43567	Dial Light Bulb
	G2 —44252	Light Socket Assy.
2	G132—32000	Ant. Coil, 1725-540 Kc.
3	G133—32000	Ant. Coil, 6-15 Mc.
4	G132—32002	Osc. Coil, 1725-540 Kc.
5	G133—32002	Osc. Coil, 6-15 Mc.
6	G138—32004	1st I-F Assy., 455 Kc.
7	G139—32004	2nd I-F Assy., 455 Kc.
8	G37 —33001	2 Section Gang Cond. (517)
8	G38 —33001	2 Section Gang Cond. (547) Quiktune
	B —44286C	Dial Face (517)
	B —44290	Dial Face (547) Quiktune
	W —44001A	Face Support Ring (517)
	W —43778B	Face Support Ring (547) Quiktune
	W —43550A	Pointer (517 only)
	W —40486	Pointer Mtg. Screw (517)
	W —44285	Paper Dial Mask
	—44267	Metal Dial Mask
	B —43544D	Dial Mtg. Bracket
	G1 —43564	Pulley and Hub Assy.
	—44134	Drive Shaft
	W —43542B	Drive Shaft Bracket
	W —43549	Shaft Retaining Ring
	—41582	Drive Cable
	W —43561	Tension Spring (Cable)
	D —44781	Dial Face (Glass) (5517)
	W —44085B	Dial Mask (5517)
	C —44082E	Dial Glass Support (5517)
	W —44084A	Glass Support Ring (5517)
	W —44299	Pointer (5517)
	W —635C	Pointer Spacer (5517)
	W —44833	Pointer Mtg. Screw (5517)
	—41582	Drive Cord (18 inches) (5517)
9	G12 —34002	Condenser, .000500 Mf. Molded
10	W —36541	Condenser, .02 Mf. 160 V.
11ABCD	W —28621	Condenser, .02 Mf. 200 V.
12	W —23191A	Condenser, .01 Mf. 400 V.
13AB	G1 —34002	Condenser, .00025 Mf. Molded
14	W —44012	Condenser, 16 Mf. 250 V. Electrolytic
15	W —43450	Condenser, 16 Mf. 200 V. Electrolytic
16	B —44004	Power Cord and Plug
17	—33390	Resistor, 30,000 Ohm ¼W. Carb.
18	—24990	Resistor, 25,000 Ohm ¼W. Carb.
19AB	—36688	Condenser, 3 Megohm ¼W. Carb.
20	—21455	Resistor, 300,000 Ohm ¼W. Carb.
21	—35601	Resistor, 300,000 Ohm ¼W. Ins. Carb.
22	—23785	Resistor, 500,000 Ohm ¼W. Ins. Carb.
23	W —25937	Resistor, 275 Ohm ½W. Flex.
24	W —23012A	Resistor, 40 Ohm ½W. Flex.
25	W —25357	Resistor, 75 Ohm ¾W. Flex.
26	G156—36400	Socket, Type 6A8
27	G171—36400	Socket, Type 6U7
28	G160—36400	Socket, Type 6Q7
29	G172—36400	Socket, Type 6K6
30	G173—36400	Socket, Type 5Y3
	W —40911	Tube Shield
31	G103—28807	Speaker Socket
	W —43552	Speaker Plug Clamp
	—44681	Speaker Plug
	6K	Cab., Vertical Table (517)
	7KD	Cab., Vertical Table (517)
	7AC	Cab., Vertical Table (517) Superseding 6K and 7KD
	6FF	Cab., Horizontal Table (517) Export Only
	7H	Cab., Horizontal Table (517)
	7AE	Cab., Horizontal Table (517 and 547) Superseding 7H and 7HA
	7B	Cab., Horizontal Table (517) Moulded Front
	7M	Cab., Console (517 and 547)
	7MB	Cab., Console (5517)
	7MA	Cab., Console (517)
	6KA	Cab., Vertical Table (547)
	7AD	Cab., Vertical Table (547) Superseding 6KA
	7HA	Cab., Horizontal Table (547)
32	257BP11"B"	Speaker, Spec. No. 51-A-5 (Cab.—6K, 6KD, 7AC, 6KA and 7AD)
	—42927	V. C. and Cone Assy. for 257BP11"B"
	—41473	Output Trans. for 257BP11"B"
	—43539	Cone Mtg. Ring for 257BP11"B"
	257BP18"B"	Speaker, Spec. No. 51-A-8 (Cab.—7H, 7AE, 7HA and 7B)
	—42927	V. C. and Cone Assy. for 257BP18"B"
	—43539	Cone Mtg. Ring for 257BP18"B"
	—43986	Output Trans. for 257BP18"B"
	462CP11"M"	Speaker, Spec. No. 1-D-971 (Cab.—6FF)
	—40405	V. C. and Cone Assy. for 462CP11"M"
	—43989	Output Trans. for 462CP11"M"
	—43988	Field Coil for 462CP11"M"
	464BP15"M"	Speaker, Spec. No. 1-D-1017 (Cab.—7M, 7MA and 7MB)
	—43993	V. C. and Cone Assy. for 464BP15"M"
	—43995	Output Trans. for 464BP15"M"
	—43994	Field Coil for 464BP15"M"
33	W —43448A	Band Selector Switch
34	—35600	Resistor, 100,000 Ohm ¼W. Ins. Carb.
35	G1 —26719	Ant. and Gnd. Terminal Assy.
36	—43479	Power Trans., 110 V. 60 Cy.
	—43569A	Power Trans., 110 V. 50 Cy.
	—43480A	Power Trans., 110 V. 25 Cy.
	—43570A	Power Trans., 220 V. 50 Cy.
	—43481A	Power Trans., 220 V. 25 Cy.
37Z	—43449A	Volume Control, 1 Meg.
37Y		Line Switch
38	W —41247A	4 Section Shunt Trimmer Cond. Assy.
39	22196	Resistor, 20,000 Ohm ¼W. Carb.
40	W —30805	Condenser, .01 Mf. 400 V.
41	—30137	Resistor, 3,500 Ohm ¼W. Carb.
	W —43553	Rubber Mtg. Foot (Chassis)
	W —44381B	Knob (3) 6K, 6FF, 7AC, 7AE, 7B, 7H, 7KD, 7MA, (7M-517)
	—44268A	Escutcheon—6FF, 7AC, 7AE, 7B, (7M-517)
	B —44226B	Escutcheon—7MB Cab.
	W —44380B	Knob (3) 7MB Cab.
	G1 —43724	Escutcheon (Quiktune) Assy. (547)
	W —43878A	Celluloid Disc. (Brown) (547)
	W —44956	Celluloid Disc (clear), package of 12
	W —43769	Arrow Head Screw (547)
	B —43898A	Escutcheon—7KD Cab.
42	G165—32004	Wave Trap
	W —44288	Escutcheon—7MA Cab.
	W —43625	Knob (2) 6KA, 7HA, 7AD, (7AE-547) Cab.
	W —43220	Knob (1) 6KA, 7HA, 7AD, (7AE-547) Cab.
	W —43939	Knob (3) 7M Cab. (547)

THE CROSLEY RADIO CORPORATION
MODELS 517, 547, FIVER & TELETUNE FIVER



I.F. 455 K.C.

MODELS - 517 & 547

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between tube socket contacts and chassis. Voltage readings taken with a 1,000 ohm per volt, 500 volt voltmeter (except filaments) with receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A-C voltmeter (Approximately 0 to 10 volts). Voltage limits may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	K	G	Ga
6A8G	Oscillator-Modulator	6.3	160	115	0	-1.2	160
6U7G	I-F Amplifier	6.3	160	115	0	-1.2	—
6Q7G	Diode Det & A-F Amplifier	6.3	80	—	2.5	-2.5	—
6K6G	Output	6.3	160	160	0	-5.0	—
5Y3	Rectifier	5.0	—	—	225	—	—

Power output approximately 2 watts.
Power consumption approximately 40 watts at 117.5 volts.
Voltage drop across speaker field 36 volts.

THE CROSLEY RADIO CORPORATION

MODELS 517 547 FIVER & TELETUNE FIVER

Crosley radio receivers employing the Model 517 and 547 chassis are designed for operation on an ALTERNATING CURRENT power supply. The tuning range of the receivers is divided into two bands as follows:

540 -1725 kilocycles (American Broadcast Band)
6 - 15 megacycles (High Frequency Band)

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to P and S of the 6K6G Output Tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8G tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh and turn the volume control knob to the right (ON).

(c) Turn the band selector switch to the right (High Frequency).

(d) Set the signal generator to 455 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F Transformer for maximum output. (Fig. 2).

(f) Adjust both trimmers located on top of the 1st I-F Transformer for maximum output.

(g) Check operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier

When aligning the R-F Amplifier the output lead from the signal generator should be connected through a dummy antenna to the "ANT" terminal of the receiver. For the broadcast band the dummy antenna should be a .00025 mfd. condenser and for the high frequency band this condenser should be replaced by a 400 ohm (Non Inductive) carbon resistor.

(a) Set the band selector switch to the Broadcast Band.

(b) Set the signal generator to 1725 kilocycles.

(c) Open the condenser gang all the way.

(d) Adjust the "OSC" trimmer condenser for the B-C Band (38X) for maximum output.

(e) Set the signal generator to 1400 kilocycles.

(f) Tune the receiver to the generator signal for maximum output (appx. 140 on the dial).

(g) Adjust the "ANT" trimmer condenser for the B-C Band (38Z) for maximum output. DO NOT READJUST THE "OSC" TRIMMER AT 1400 KILOCYCLES.

(h) Repeat operations (f) and (g) alternately until no further improvement in output can be obtained.

(i) Set the band selector switch to the H-F Band.

(j) Set the signal generator to 15,400 kilocycles.

(k) Open the condenser gang all the way.

(l) Adjust the "OSC" trimmer condenser for the H-F Band (38W) for maximum output.

(m) Set the signal generator to 15,000 kilocycles.

(n) Tune the receiver to the generator signal for maximum output (appx. 15 on the dial).

(o) Adjust the "ANT" trimmer condenser for the H-F Band (38Y) for maximum output. DO NOT READJUST THE "OSC" TRIMMER AT 15,000 KILOCYCLES.

(p) Repeat operations (n) and (o) alternately until no further improvement in output can be obtained.

NOTE: If at any time the H-F coils in this receiver are replaced, it may be necessary to vary the inductance of the "OSC" coil by moving the cross-over turn of wire at the gap to make the set track at the 6 megacycle end. Moving the turn toward the short end of the coil will decrease the inductance and moving it toward the long end will increase the inductance. If the signal is weak at 6 megacycles, a similar slight change in the inductance of the "ANT" coil should bring up the signal strength. THIS IS A CRITICAL OPERATION AND SHOULD NOT BE DONE ON ANY SET UNLESS CHANGING COILS MAKES IT NECESSARY.

NOTE: When aligning the high frequency band care should be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this, increase the output of the signal generator approximately 10 times and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles below the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct dial setting.

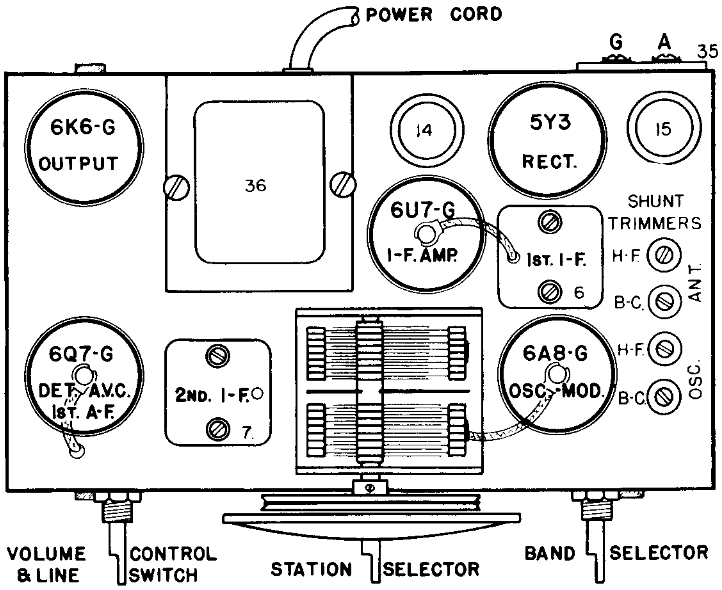
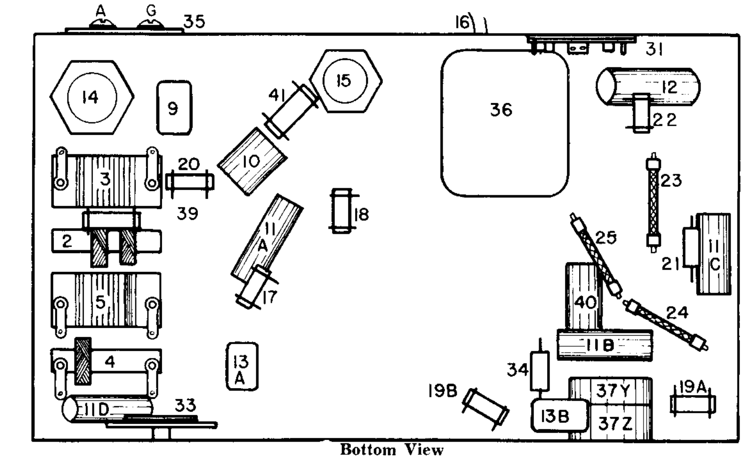


Fig. 2 Top View



Bottom View

PARTS LIST

Figures in first column refer to parts in Diagrams

Item No.		Part No.	Description	Item No.		Part No.	Description
1	W	43567	Bulb Dial Light	30	G173	36400	Socket Type 5Y3
	W	43568	Light Bracket		W	10911	Tube Shield
2	G132	32000	Ant. Coil, B. C.	31	G103	28807	Socket Speaker
3	G133	32000	Ant. Coil, H. F.	32		257BP11 "B"	Speaker, Spec. No. 51-A-5
4	G132	32002	Osc. Coil, B. C.				(Cab. 6K & 7KA)
5	G133	32002	Osc. Coil, H. F.			42927	Cone for 257BP11 "B" Speaker
6	G136	32004	1st I-F Assembly			44473	O. P. Trans. for 257BP11 "B" Spkr.
7	G137	32004	2nd I-F Assembly			43539	Cardb'd Ring for 257BP11 "B" Spkr.
8	G33	33001	2 Sect. Var. Tuning Cond. (547 only)			257BP18 "B"	Speaker, Spec. No. 51-A-8
8	G31	33001	2 Sect. Var. Tuning Cond. (517 only)				(Cab. 7H & 7HA)
	B	43551	Dial Face (517 only)			42927	Cone for 257BP18 "B" Speaker
	B	43729	Dial Face (Tel. Tun. Dial only)			43986	O. P. Trans. for 257BP18 "B" Spkr.
	W	43694	Disc Center of Dial			43539	Cardb'd Ring for 257BP18 "B" Spkr.
	W	43693	Mask Ring (Dial)			462CP11 "M"	Spkr., Spec. No. 1-D-971 (Cab. 6FF)
	W	43778	Dial Support Ring			40105	Cone for 462CP11 "M" Speaker
	B	43544	Dial Glass Support			43989	O. P. Trans. for 462CP11 "M" Spkr.
	G1	43564	Pulley Assembly			43988	Field Coil for 462CP11 "M" Spkr.
	W	43548	Drive Shaft			464BP15 "M"	Spkr., Spec. No. 1-D-1017 (Cab. 7M)
	W	43549	Retaining Ring			43993	Cone for 464BP15 "M" Speaker
	W	43550	Pointer (517 only) Dial Drive			43994	Field Coil for 464BP15 "M" Spkr.
	W	43542A	Drive Shaft Bracket			43995	O. P. Trans. for 464BP15 "M" Spkr.
	W	43561	Drive Cable Spring	33	W	43448	Switch Band Selector
		41582	Drive Cable	34		36761	Resistor 40,000 Ohm 1/4 W.
9	G12	34002	Condenser .0005 Mf. H.F. Osc. Ser.	35	G1	26719	Ant. and Ground Terminal Board
10		36541	Condenser .02 Mf. 160 V.	36		43479	Power Trans. 110 V. 60 Cy.
11ABCD	W	28621	Condenser .02 Mf. 200 V.			43480	Power Trans. 110 V. 25 Cy.
12	W	34647	Condenser .01 Mf. 400 V.			43481	Power Trans. 220 V. 25 Cy.
13AB	G1	34002	Condenser .00025 Mf. Molded	37Z		43449	Volume Control, 1 Megohm
14	W	44081	Condenser 16 Mf. 250 V.	37Y			Line Switch
15	W	43450	Condenser 16 Mf. 200 V.	38Z			Trimmer Cond. B. C. Ant.
16	B	33907A	Power Cord and Plug	38Y	W	41247A	Trimmer Cond. H. F. Ant.
17		21237A	Resistor 60,000 Ohm 1/4 W.	38X			Trimmer Cond. B. C. Osc.
18		24814	Resistor 7,000 Ohm 1/4 W.	38W			Trimmer Cond. H. F. Osc.
19AB		36688	Resistor 3 Megohm 1/4 W.	39		22196	Resistor 20,000 Ohm 1/4 W.
20		21455	Resistor 300,000 Ohm 1/4 W.	40	W	30805	Condenser .01 Mf. 400 V.
21		35701	Resistor 300,000 Ohm 1/4 W.	41		30137	Resistor 3,500 Ohm 1/4 W.
22		23785	Resistor 500,000 Ohm 1/4 W.		G1	43724	Tel. Tun. Escutcheon
23	W	28589	Resistor 350 Ohm 1/2 W. Flex.		W	43769	Pointer Cabinet (517 only)
24	W	33012A	Resistor 40 Ohm 1/2 W. Flex.		W	43551	Knob (1 required) Small
25	W	24537	Resistor 60 Ohm 1/2 W. Flex.		W	43625	Knob (2 required) Large
26	G159	36400	Socket Type 6A8		W	43553	Rubber Mtg. Foot
27	G171	36400	Socket Type 6U7		W	43552	Clamp Speaker Plug
28	G160	36400	Socket Type 6Q7		W	43726	Celluloid Disc (517 only)
29	G172	36400	Socket Type 6K6				

THE CROSLEY RADIO CORPORATION

MODEL 537

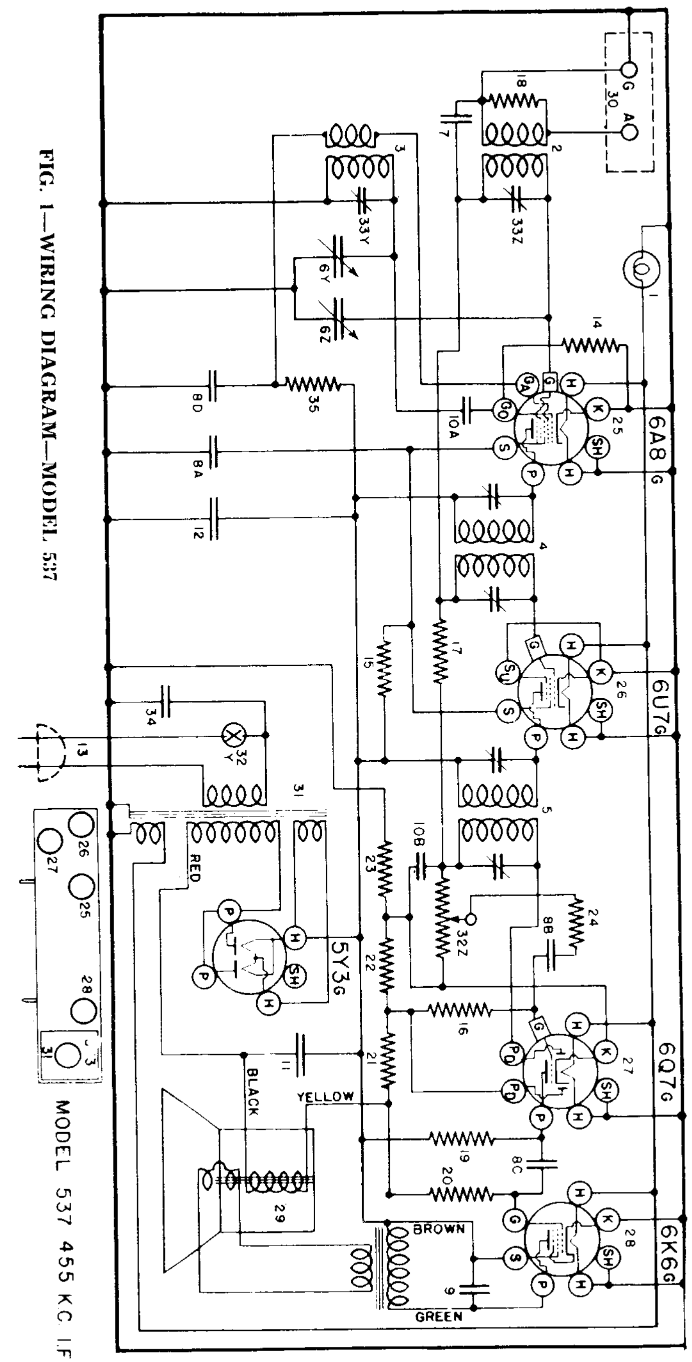


FIG. 1—WIRING DIAGRAM—MODEL 537

MODEL 537 455 KC I.F

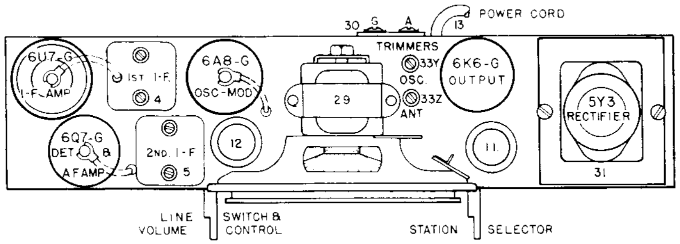


Fig. 2 Top View 537

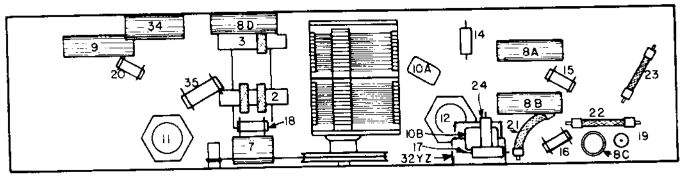


Fig. 3 Bottom View 537

SPECIFICATIONS

This model Crosley radio chassis is especially designed for installation in Crosley Shelvador electric refrigerators. It should be operated only from an ALTERNATING CURRENT power supply as specified on the Model Label which is fastened to the inside of the refrigerator top.

The tuning range of the receiver is from 540 to 1725 kilocycles or 555 to 173 metres.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between tube socket contacts and chassis. Voltage readings taken with a 1000 ohm per volt, 500 volt voltmeter (except filaments) with receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A.C. voltmeter (approximately 0-10 volts). Voltage limits may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	K	G	Ga
6A8G	Oscillator-Modulator	6.3	160	115	0	1.2	160
6U7G	I-F Amplifier	6.3	160	115	0	1.2	
6Q7G	Diode Det & A-F Amplifier	6.3	80		2.5	2.5	
6K6G	Output	6.3	160	160	0	5.0	
5Y3	Rectifier	5.0	—		225		

Power output approximately 2 watts.
Power consumption approximately 40 watts at 117.5 volts.
Voltage drop across speaker field 36 volts.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary, the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter across the "P" and "S" terminals of the 6K6G output tube. Be certain that the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through .02 mfd. condenser to the top cap of the 6A8G tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely in mesh and turn the volume control knob to the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust both trimmers located on top of the 2nd I-F transformer for maximum reading on the output meter. (Fig. 2).

(e) Adjust both trimmers located on top of the 1st I-F transformer for maximum output.

(f) Check operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier

When aligning the R-F amplifier the output lead from the signal generator should be connected through a .00025 mfd. condenser to the "ANT" terminal of the receiver.

(a) Set the signal generator to 1725 kilocycles.

(b) Open the condenser gang all the way.

(c) Adjust the "OSC" trimmer condenser (33Y) for maximum output.

(d) Set the signal generator to 1400 kilocycle.

(e) Tune the receiver to the generator signal for maximum output (appx. 140 on the dial).

(f) Adjust the "ANT" trimmer condenser (33Z) for maximum output. DO NOT READJUST THE "OSC" TRIMMER AT 1400 KILOCYCLES.

(g) Repeat operations (e) and (f) alternately until no further improvement in output can be obtained.

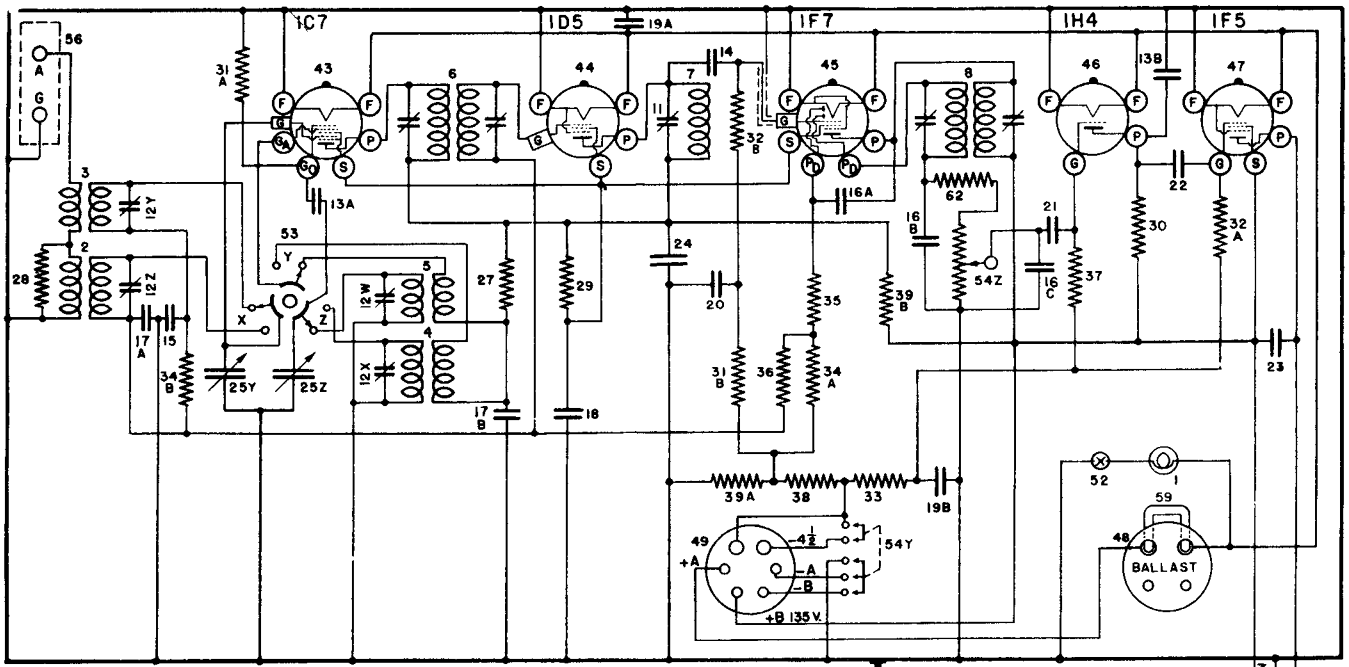
PARTS LIST — MODEL 537

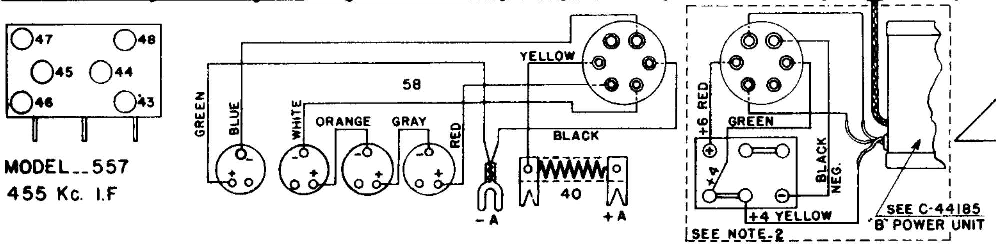
Figures in first column refer to parts in Diagrams

Item No.		Part No.	Description
1	W	43567	Bulb - Dial Light
	W	43568	Bracket - Dial Light
2	G132	32000	Ant. Coil
3	G132	32002	Osc. Coil
4	G144	32001	1st I-F Assembly
5	G145	32004	2nd I-F Assembly
6	G33	33001	2 Section Var. Cond. Gang
	G2	43564	Pulley Assembly
	C	43763	Dial Glass—Calibrated
	W	43779	Mask - Dial
	W	43739	Support - Dial
		41582	Cable - Cond. Drive
	W	43761	Spring - Cable Tension
	W	43740	Shaft - Drive
	W	41611	Retaining Ring - Drive Shaft
	W	43770	Pointer
7	W	36541	Condenser .02 Mf. 160 V.
8A D	W	28621	Condenser .02 Mf. 200 V.
9	W	34647	Condenser .006 Mf. 400 V.
10AB	G1	34002	Condenser .00025 Mf. 200 V.
11	W	41081	Condenser 16 Mf. 250 V.
12	W	43450	Condenser 16 Mf. 200 V.
13	B	43742	Power Cord and Plug
14		21237A	Resistor 60,000 Ohm ¼ W. Carb.
15		24814	Resistor 7,000 Ohm ¼ W. Carb.
16		26577	Resistor 3 Megohm ¼ W. Carb.
17		36688	Resistor 3 Megohm ¼ W. Ins.
18		22196	Resistor 20,000 Ohm ¼ W. Carb.
19		35601	Resistor 300,000 Ohm ¼ W. Ins.
20		23785	Resistor 500,000 Ohm ¼ W. Carb.
21	W	28589	Resistor 350 Ohm ½ W. Flex.
22	W	23012A	Resistor 40 Ohm ½ W. Flex.
23	W	24537	Resistor 60 Ohm ½ W. Flex.
24		35761	Resistor 40,000 Ohm ¼ W. In.
25	G156	36400	Socket Type 6A8
26	G171	36400	Socket Type 6U7
27	G160	36400	Socket Type 6Q7
28	G172	36400	Socket Type 6K6
	W	40911	Tube Shield
	W	27981	Base—Tube Shield
29		260BL9 "B"	Speaker Spec. No. 50-A-1
		41472	Cone for 260BL9 "B" Speaker
		43943	O. P. Trans. for 260BL9 "B" Spkr.
		43540	Cardb'd Ring for 260BL9 "B" Spkr
	G1	25719	Ant. and Ground Term. Assembly
		43748	Power Trans. 50-60 Cy. 110 V.
30		43747	Power Trans. 25 Cy. 110 V.
31		43733	Vol. Cont. 1 Meg. Line Switch
32Z	A	37986A	2 Sect. Shunt Trimmer
32Y	W	30805	Condenser .01 Mf. 400 V.
33		30137	Resistor 3,500 Ohm ¼ W.
34	G2	43788	Grille Cloth Assy. - HC9-Cab.
35	G3	43788	Grille Cloth Assy. - HE9-Cab.
	W	43789	Escutcheon—Cab-Mod. HC 50 & 60
	W	43790	Escut.—Cab.-Mod. HE 43, 50 & 61
	C	43782	Escut. - Cab.-Mod. HE 71 & HC 71
	W	43764	Knob
	B	437-3	Bottom Cover

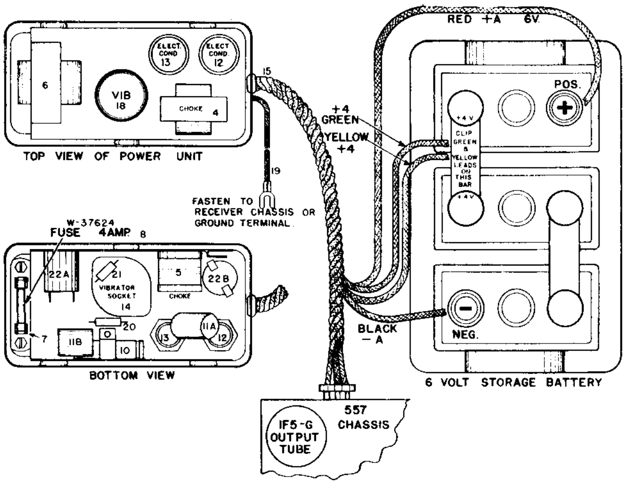
THE CROSLEY RADIO CORPORATION

MODELS 557 & 117





—WIRING DIAGRAM—MODEL 557



Model 117 Six Volt Power Supply

Item No.	Part No.	Description
1	W —37188	Dial Light Bulb, 2 V. .06 Amp.
	G6 —27134	Light Brkt. Assy.
2	G132—32000	Ant. Coil, B. C.
3	G133—32000	Ant. Coil, H. F.
4	G132—32002	Osc. Coil, B. C.
5	G133—32002	Osc. Coil, H. F.
6	G151—32004	1st I-F Assy., 455 Kc.
7	G150—32004	2nd I-F Plate Coil Assy., 455 Kc.
8	G160—32004	3rd I-F Assy., 455 Kc.
9		NONE
10		NONE
11	W —44142A	2nd I-F Trimmer Condenser
12	W —41247A	4 Section Trimmer Condenser
13AB	G1 —34002	Condenser, .00025 Mf. Molded
14	G3 —34002	Condenser, .0005 Mf. Molded
15	G12 —34002	Condenser, .0005 Mf. Molded
16ABC	G2 —34002	Condenser, .0001 Mf. Molded
17AB	W —36541	Condenser, .02 Mf. 160 V.
18	W —29910A	Condenser, .25 Mf. 200 V.
19AB	W —37732	Condenser, .3 Mf. 160 V.
20	W —24049C	Condenser, .1 Mf. 200 V.
21	W —28621	Condenser, .02 Mf. 200 V.
22	W —27216	Condenser, .05 Mf. 200 V.
23	W —25435	Condenser, .003 Mf. 400 V.
24	W —44012	Condenser, 16 Mf. 250 V.
25	G37 —33001	2 Section Var. Tun. Cond.
	W —44414B	Glass Dial Face
	W —44285	Dial Mask (Paper)
	W —44267	Dial Mask (Metal Disc)
	W —44001A	Dial Support Ring
	B —44150A	Dial Support Bracket
	W —43550	Dial Pointer
	G1 —43564	Pulley Assy.
	W —44130	Drive Shaft
	W —43561	Cable Tension Spring
	—41582	Drive Cable - 17¼ Inches
	W —40186	Pointer Mounting Screw
26		NONE
27	—36317	Resistor, 10,000 Ohm ¼ W.
28	—36760	Resistor, 20,000 Ohm ¼ W.
29	—33390	Resistor, 30,000 Ohm ¼ W.
30	—36761	Resistor, 40,000 Ohm ¼ W.
31AB	—35928	Resistor, 60,000 Ohm ¼ W.
32AB	—36319	Resistor, 75,000 Ohm ¼ W.
33	—35600	Resistor, 100,000 Ohm ¼ W.
34AB	—35601	Resistor, 300,000 Ohm ¼ W.
35	—36322	Resistor, 500,000 Ohm ¼ W.
36	—35602	Resistor, 1 Megohm ¼ W.
37	—35927	Resistor, 2 Megohm ¼ W.
38	W —27503	Resistor, 1,400 Ohm ¾ W. Flex.
39AB	W —23013	Resistor, 2,000 Ohm 1¼ W. Flex.
40	G7 —23300	Resistor, .70 Ohm (Air Cell Series)
43	G1 —43900	Socket, Type 1C7
44	G2 —43900	Socket, Type 1D5
45	G7 —43900	Socket, Type 1F7
46	G4 —43900	Socket, Type 1H4
47	G6 —43900	Socket, Type 1F5
48	G95 —28807	Socket Ballast
	W —40911	Tube Shield
49	G21 —28807	Socket (Power Cable)
50		NONE
51		NONE

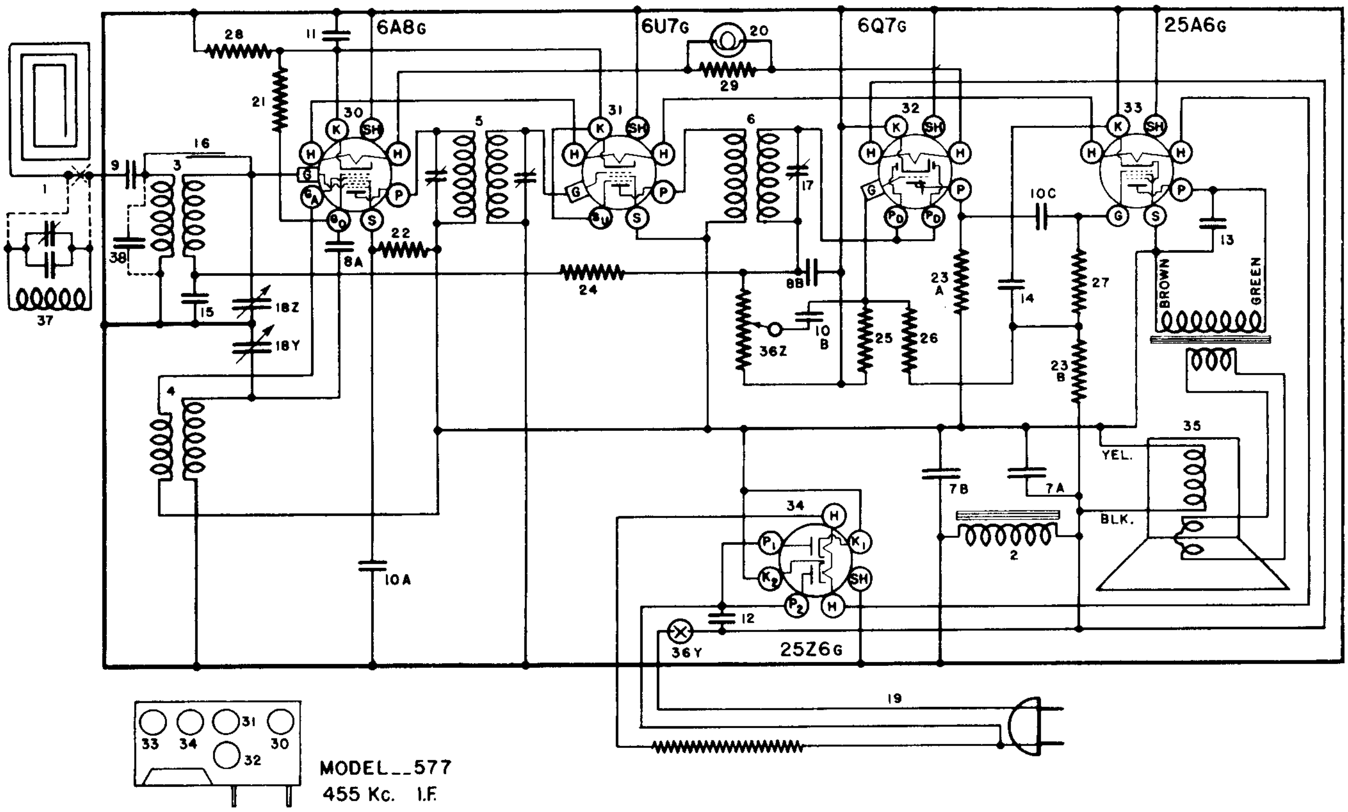
Item No.	Part No.	Description
52	MG12—44140	Dial Light Switch and Brkt. Assy.
53	W —43448A	Band Selector Switch
54Z	43854A	Volume Control (1 Meg.)
54Y	43854A	Batt. Switch
55	31PJ3 "A"	Speaker, Spec. No. R-6000, C8 and D2, 6"
	—41434	V. C. and Cone Assy. for 31PJ3 "A" Spkr.
	—41453	Output Trans. for 31PJ3 "A" Spkr.
	—41458	Cone Mounting Ring for 31PJ3 "A" Spkr.
	41PJ3 "A"	Speaker, Spec. No. R-8000, B2, 8"
	—41452	V. C. and Cone Assy. for 41PJ3 "A" Spkr.
	—41459	Cone Mounting Ring for 41PJ3 "A" Spkr.
	41457	Output Trans. for 41PJ3 "A" Spkr.
56	G1 26719	Ant. and Gnd. Terminal Assy.
57		NONE
58	C 44149A	Battery Cable
59	W 41968B	Ballast Sock. Jumper Wire
60	W 44118	Ballast Tube
61	W 44854	Speaker Cable
62	35930	Resistor, 200,000 Ohm ¼ W.
	7D	Cabinet —Table
	—7MA	Cabinet —Console
	W 44197	Knob —Lower —Dial Light Switch
	W 41221	Knob —Upper —Station Selector
	W 41605	Knob —V. C. and Band Switch
	W 43553	Rubber Mtg. Foot
	44268A	Escutcheon
	44195	Grille —for 7D Cab.
	—43932	Grille —for 7MA Cab.

Parts List For 117 Convertor

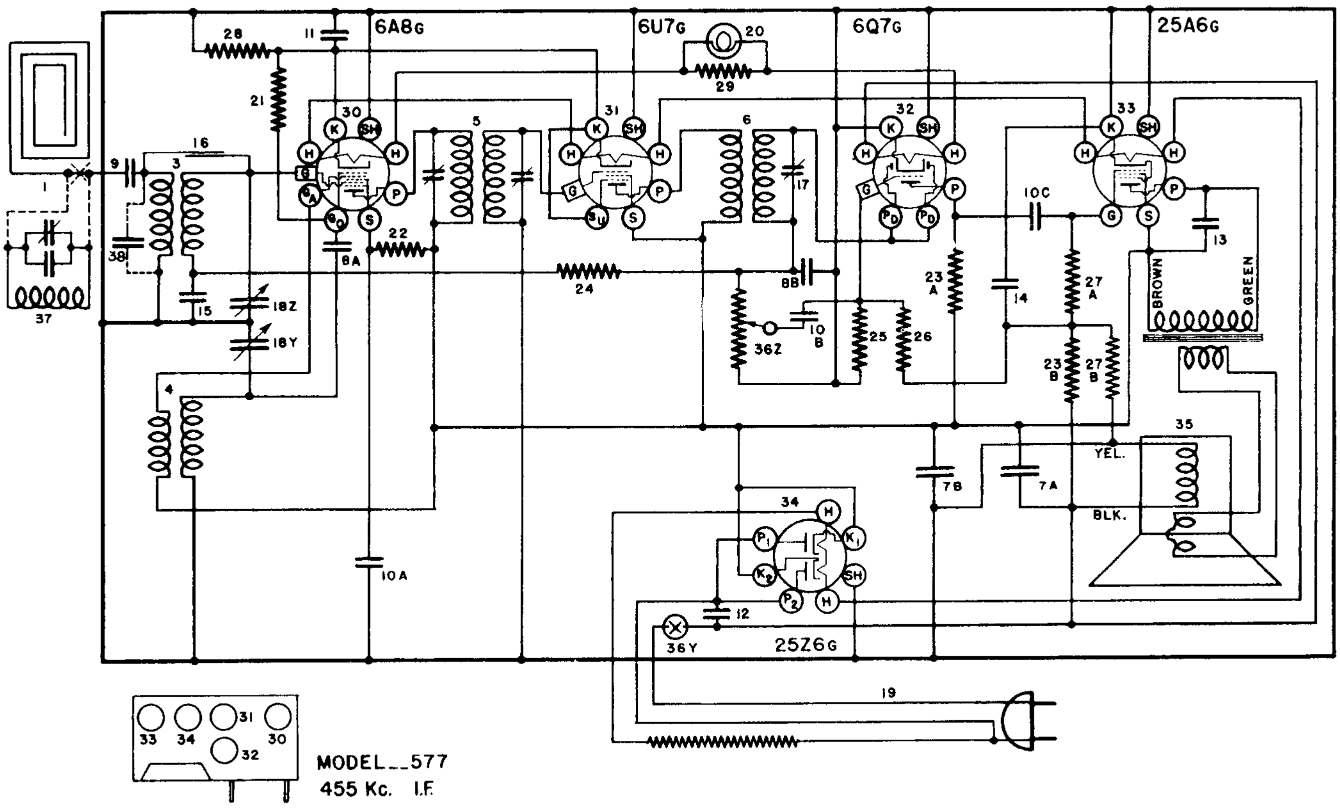
1	C —44133	Chassis Pan
2	C —44138	Case Body
3	W —44132A	Cover
4	G76 —24628	"B" Filter Choke
5	G23 —28067	"A" Filter Choke
6	G16 —32769	Power Transformer
7	G4 —33339	Fuse Panel Assy.
8	W —37624	Fuse (4 Amp.)
9		NONE
10	W —31632A	Condenser, .01 Mf. 1,000 V.
11AB	W —35936	Condenser, .05 Mf. 200 V.
12	W —44131B	Condenser, 20 Mf. 150 V.
13	W —44217	Condenser, 16 Mf. 200 V.
14	G92 —28807	Socket for Vibrator
15	C —44139	Cable and Plug
16AB	—34903	Batt. Clip —Pos.
17AB	—34904	Batt. Clip —Neg.
18	W —44145	Vibrator —4 Volt
	W —44446	Gnd. Clip —Vibrator
19	G122 —34403	Bonded Lead
	W —3328	Grommet
20	—38915	Resistor, 100 Ohm ½W.
21	—38977	Resistor, 220 Ohm ½W.
22AB	W —50161	Condenser, .5 Mf. 120 V.
	W —44186	Cushion Strap
	W —44264	End Plate 1¼" x ⅜" (2)

THE CROSLEY RADIO CORPORATION

MODELS 577 & 577 ABOVE SERIAL № 1417950



—WIRING DIAGRAM—MODEL 577



—WIRING DIAGRAM—MODEL 577—Serial numbers above 1417950

THE CROSLEY RADIO CORPORATION

MODELS 577 & 577 ABOVE SERIAL № 1417950

SPECIFICATIONS

This model Crosley radio is designed for operation on 100 to 125 volt electric circuits, either AC or DC. The tuning range is from 535 to 1725 kilocycles (550 to 173 metres).

CIRCUIT DESCRIPTION

Five octal base glass tubes are employed in a superheterodyne circuit which consists of a combination oscillator-modulator tube, 455 kilocycle I-F amplifier, pentode output and power supply. The 6Q7G tube serves as the detector and 1st A-F amplifier and supplies AVC voltage to the grid of the 6A8G tube. The bias voltage for the 6A8G and 6U7G tubes is obtained across a 165 ohm resistor, item 28. The bias for the 6Q7G and 25A6G tubes is obtained across the "B" filter choke, item 2, before serial No. 1417951 and across the speaker field after this number. A resistance type power supply cord is used to provide the proper heater voltage to the tubes. The filaments of the tubes are wired in series. A .05 mfd. condenser, item 12, is connected across the power supply leads to reduce electrical interference from that source.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 100 ohm per volt, 250 volt voltmeter (except filaments) with the volume control full "ON" and no signal input. The filament voltages should be measured with an accurate low range voltmeter. When measured on a 117.5 volt AC line voltage limits may vary plus or minus 10% of the values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	Su	K	Go	Ga
6A8G	Oscillator-Modulator	6.3	105	60	....	3	-12	105
6U7G	I-F Amplifier	6.3	105	105	3	3	—	—
6Q7G	Det. AVC, A-F Amplifier	6.3	105	—	—	0	—	—
25A6G	Output	25.0	100	105	—	0	—	—
25Z6G	Rectifier	25.0	117.5	—	—	110	—	—

Power output approximately 1 watt.
Power consumption approximately 60 watts.
Voltage drop across speaker field 110 volts.
All voltages except filaments will be approximately 10% lower if measured on 117.5 volts DC power supply.

ALIGNMENT PROCEDURE

The chassis of this receiver is connected to one side of the power supply and for this reason all test equipment should be thoroughly insulated in order that the power supply will not become short circuited while aligning the receiver.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 25A6G output tube. Be certain that the meter is protected from DC by connecting a condenser (.1 mfd. or larger not electrolytic) in series with one of the leads.

Tuning the I-F Amplifier to 455 Kilocycles.

(a) Disconnect the antenna roll from the receiver and connect the output of the signal generator through a 50 mmf. condenser to the antenna connection on the receiver. Do not use a ground return from the signal generator unless it is found to be absolutely necessary. If it is found to be necessary, a small condenser (approximately .001 mfd.) should be connected in series with the ground terminal of the signal generator and the receiver chassis. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh and turn the volume control to the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust the 2nd I-F trimmer condenser. Item 17, located at the rear of the chassis, for maximum reading on the output meter.

(e) Adjust the trimmer condensers located on the 1st I-F transformer for maximum output.

(f) Repeat operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

Aligning the R-F Amplifier.

(a) Set the signal generator to 1725 kilocycles.

(b) With the condenser gang turned to the minimum capacity position, adjust the trimmer condenser on the "OSC" section of the gang so that the 1725 kilocycle signal is heard. It is not necessary that the receiver tune through this signal.

(c) Set the signal generator to 1400 kilocycles.

(d) Tune-in the 1400 kilocycle signal in the region of 140 on the dial for maximum output.

(e) Adjust the trimmer condenser located on the "ANT" section of the gang for maximum output.

Note: Do not readjust the "OSC" trimmer.

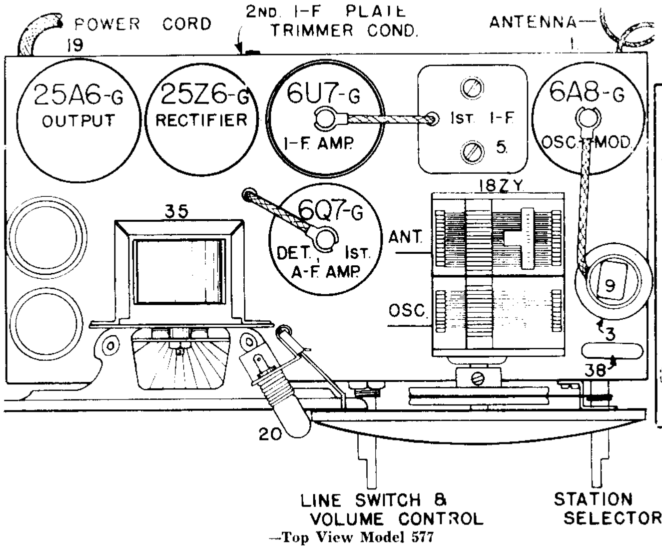
(f) Repeat operations (d) and (e) for more accurate adjustments.

WAVE TRAP

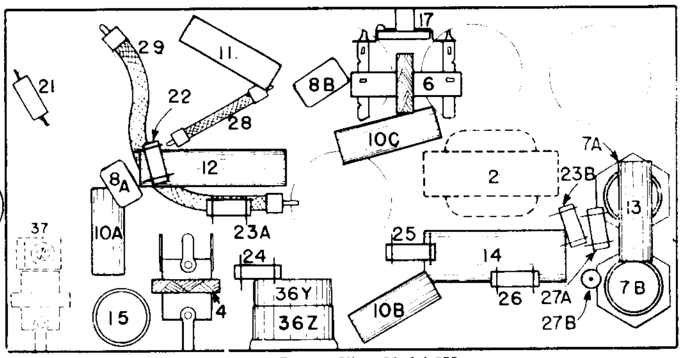
Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 kilocycles. This assembly is located on the underneath side of the chassis and consists of a coil, a fixed condenser and a trimmer condenser as illustrated by dotted lines in the Wiring diagram.

The wave trap should not be adjusted until all other adjustments have been made. To make the adjustment, feed a 455 kilocycle signal from the signal generator through a 50 mmf. condenser into the antenna terminal of the receiver. With the band selector switch turned to the Broadcast Band position, the gang condenser open and the volume control full on, adjust the trimmer condenser on the wave trap for MINIMUM output.

Should the interfering station be operating on a frequency of slightly more or less than 455 kilocycles, the exact frequency should be determined with the aid of the signal generator. Then, instead of feeding a 455 kilocycle signal into the receiver the exact frequency of the interfering signal should be used. If it is not possible to determine the exact frequency of the interfering signal the antenna may be attached to the receiver and the receiver tuned to the position where the interfering signal is most noticeable. Then adjust the wave trap for minimum interference.



—Top View Model 577



Bottom View Model 577

Item	Part No.	Description
1	W —31765B	Antenna Roll
2	G 16—29535	"B" Filter Choke (Before Serial No. 1417951)
3	G144—32000	Ant. Coil
4	G147—32002	Osc. Coil
5	G158—32004	1st I-F Assy.
6	G159—32004	2nd I-F Coil Assy.
7A	W —43280	Condenser 25 Mf. 150 V.
7B	W —43280	Condenser 25 Mf. 150 V.
8A	G 1—34002	Condenser .00025 Mf. Molded
8B	G 1—34002	Condenser .00025 Mf. Molded
9	G 3—34002	Condenser .0005 Mf. Molded
10A	W —28621	Condenser .02 Mf. 200 V.
10B	W —28621	Condenser .02 Mf. 200 V.
10C	W —28621	Condenser .02 Mf. 200 V.
11	W —32380	Condenser .05 Mf. 200 V.
12	W —23615	Condenser .05 Mf. 400 V.
13	W —30323	Condenser .01 Mf. 200 V.
14	W —34712	Condenser .25 Mf. 160 V.
15	W —35936	Condenser .05 Mf. 160 V.
16		
17	W —44142	2nd I-F Trimmer
	W —28129	Spacer (Mtg. W-44142)
18	G 43—33001	2 Sect. Var. Tuning Cond.
	B —44400C	Dial Face (Glass)
	B —44307A	Dial Glass Brkt.
	W —44285	Dial Mask (Paper)
	—44267	Dial Mask (Metal)
	W —44001A	Dial Support Ring
	W —44306	Drive Shaft Bracket
	W —44918	Drive Shaft
	W —43549	Ret. Ring (Shaft)
	G 3—43564	Pulley & Hub Assy.
	41582	Drive Cord
	W —43561	Drive Cord Spring
	W —43550A	Pointer
	W —40486	Screw FS20 Pointer Mtg.
19	B 44192	Power Cord & Plug
	B —30772B	Power Cord & Plug for adapting set to 220 V. Power Sup
20	W —44337	Dial Light 6-8 V.
	G 6—27134	Socket Assy. Dial L.
21	—35928	Resistor 60.00 Ohm ¼ W
22	—21453	Resistor 40,000 Ohm 1/3 W
23A	—21455	Resistor 300,000 Ohm 1/3 W.
23B	—21455	Resistor 300,000 Ohm 1/3 W.
24	34883	Resistor 2 Megohm 1/3 W.
25	21454	Resistor 1. Megohm 1/3 W.
26	33490	Resistor 10. Megohm 1/3 W.
27A	23785	Resistor 500,000 Ohm 1/3 W.
27B	—23785	Resistor 500,000 Ohm 1/3 W. (After Serial No. 1417950)
28	W 21964	Resistor 165 Ohm ½ W. Flex
29	W 44396	Resistor 40 Ohm 3½ W. Flex
30	G156 36400	Socket Type 6A8
31	G171 36400	Socket Type 6U7
32	G160 36400	Socket Type 6Q7
33	G161 36400	Socket Type 25A6
34	G162 36400	Socket Type 25Z6
	W 40911	Tube Shield
35	255BL6"Q"	Speaker Spec. No. 23393 (2000 Ohm Field) Used Before Serial No. 1417951.
	43464	V. C. & Cone Assy } Used On 255BL6 273BL6 'Q' Only
	43465	Output Transformer } Used On 255BL6 273BL6 'Q' Only
	43466	Cone Mtg. Ring } Used On 255BL6 273BL6 'Q' Only
	B 44374A	Baffle Board
	273BL6"Q"	Speaker Spec. No. 26253 (525 Ohm Field) Used After Serial No. 1417950
36Z	43449	Vol. Control ½ Meg.
36Y	43449	On-Off Switch
37	G169—32004	Wave Trap Assy.
38	G 5—34002	Condenser .00005 Mf Molded
	7 DC	Cabinet
	—44330	Grille Cloth
	—44268A	Escutcheon
	W —44381B	Knob
	B —44373A	Cabinet Back

THE CROSLEY RADIO CORPORATION

MODELS 1313 & 1336

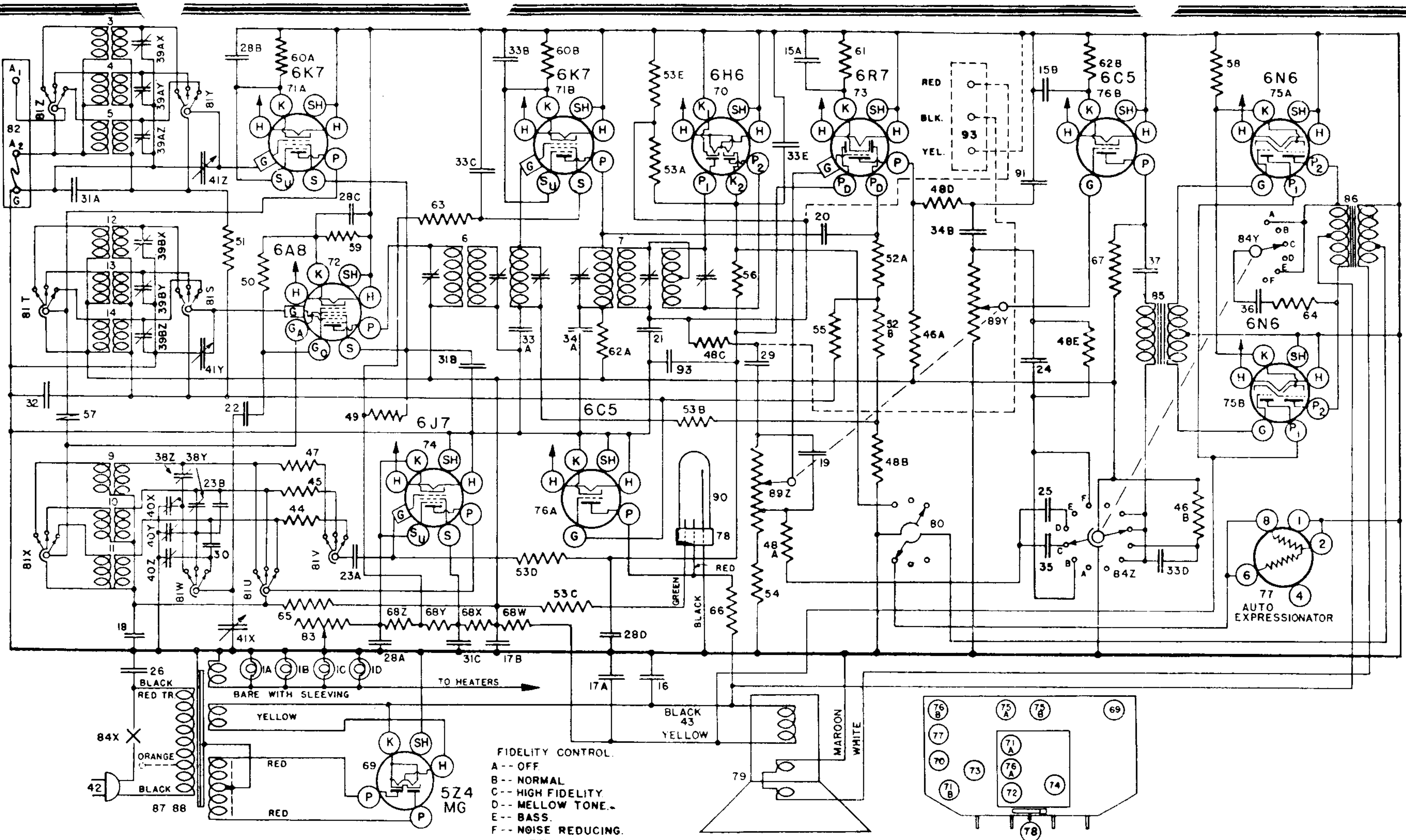


Fig. 1. Circuit Diagram

I.F. 450 K.C.

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt, 500 volt D.C. meter (except filaments) with the receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A.C. voltmeter. Readings may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P_1	P_2	S	Su	K	Ga	Go
6K7	R-F Amplifier	6.3	235	—	106	2.2	2.2	—	—
6A8	Oscillator-Modulator	6.3	235	—	106	—	3.1	140	-6 to -12
6J7	AFC Control	6.3	140	—	137	6.5	6.5	—	—
6K7	I-F Amplifier	6.3	225	—	100	2.7	2.7	—	—
6H6	AFC Detector	6.3	0	—	—	—	0	—	—
6R7	Diode and 1st A-F Amplifier	6.3	85	—	—	—	2.1	—	—
6C5	A-F Driver	6.3	150	—	—	—	5.0	—	—
6N6	(2) Output	6.3	235	340	—	—	5.2	—	—
6C5	Tuning Indicator Amplifier	6.3	100–200	—	—	—	0	—	—
5Z4	Rectifier	5.0	—	—	—	—	350	—	—
W42419A	Tuning Indicator Tube	—	100–200	150	—	—	0	—	—
W41187	Expander Tube	Varies with power output.							

Voltage drop across speaker field 105 volts.
Power output approximately 25 watts.
Power consumption approximately 135 watts.
All readings taken on 117.5 volt power supply.

THE CROSLEY RADIO CORPORATION

MODELS 1313 & 1336

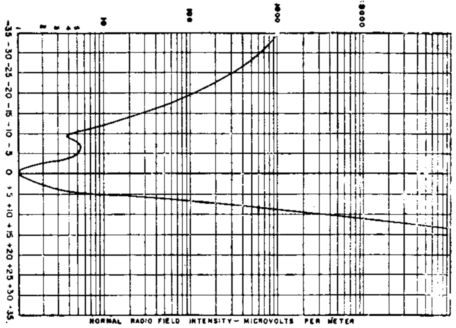


Fig. 5

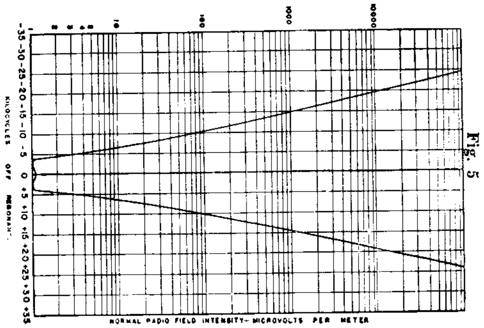


Fig. 6

Figures in first column refer to parts in **Diagrams.**

Item No.	Part No.	Description
1ABCD	W —37922	Dial Light Bulb
	G 3—37965	Dial Light Socket
	W —40570	Dial Light Shield
2	W —41187	Auto Expressionator Tube
3	G 94—32000	Antenna Coil, B. C. B.
4	G108—32000	Antenna Coil, Pol. B.
5	G107—32000	Antenna Coil, H. F. B.
6	G 90—32004	1st I-F Assembly
7	G126—32004	2nd I-F Assembly
9	G 97—32002	Osc. Coil, B. C. B.
10	G 96—32002	Osc. Coil, Pol. B.
11	G 95—32002	Osc. Coil, H. F. B.
12	G 68—32001	R. F. Coil, B.C.B.
13	G 75—32001	R. F. Coil, Pol. B.
14	G 74—32001	R. F. Coil, H. F. B.
15AB	W —41598	Condenser, 50 Mf. 25V.
16	W —36055	Condenser, 35 Mf. 400V.
17AB	W —36057	Condenser, 40 Mf. 300V.
18	G 18—34000	Condenser, 5600 Mmf. 300V.
19	G 5—34002	Condenser, .000050 Mf. 200V.
20	G 10—34002	Condenser, .000050 Mf. 300V.
21	G 2—34002	Condenser, .0001 Mf. 200V.
22	G 6—34002	Condenser, .000025 Mf. 200V.
23AB	G 3—34002	Condenser, .0005 Mf. 200V.
24	W 34713	Condenser, .006 Mf. 160V.
25	W —41461	Condenser, .0014 Mf. 200V.
26	W —30805	Condenser, .01 Mf. 400V.
27		NONE
28ABCD	W —36541	Condenser, .02 Mf. 160V.
29	W —28621	Condenser, .02 Mf. 200V.
30	W —41209	Condenser, .048 Mf. 200V.
31ABC	W —35936	Condenser, .05 Mf. 200V.
32	W —32380	Condenser, .05 Mf. 200V.
33ABCDE	W —27216	Condenser, .05 Mf. 200V.
34AB	W —32780B	Condenser, .05 Mf. 400V.
35	W —35758	Condenser, .008 Mf. 400V.
36	W —22688	Condenser, .1 Mf. 400V.
37	W —42554	Condenser, .12 Mf. 160V.
38	—41218	B. C. and Pol. Osc. Series Trimmer
39AB	W —37891A	3 Section Shunt Trimmer
40	W —35951A	3 Section Shunt Trimmer
41	G 47—33002	3 Gang Var. Tuning Cond.
	MG12—42411	Dial Drive Assembly, Complete
	C —42421	Dial Glass (Calibrated)
	—42325	Dial Drive Unit only
	W —41144	Dial Hand (Long)
	W —42180	Dial Hand (Short)
	W —40486	Screw, Hand Mtg.
	E —13648	R.H. Indicator Flipper (Phan. Cont.)
	E 13647	L.H. Indicator Flipper (Fidelity Cont.)
	W —42308	Indicator Control Pulley (2)
	—43080	R.H. Indicator Cont. Cable Assy.
	—43081	L.H. Indicator Cont. Cable Assy.
	—40638	Band Indic. Cont. Cable
	—41157	Drive Belt
	—40537	Flexible Coupling
42	B —33906A	Power Cord and Plug
43	G 2—37918	Speaker Cable
44	—36760	Resistor, 20,000 Ohm ¼W.
45	—33390	Resistor, 30,000 Ohm ¼W.
46AB	—35928	Resistor, 60,000 Ohm ¼W.
47	—34019	Resistor, 75,000 Ohm ¼W.
48ABCDE	35600	Resistor, 100,000 Ohm ¼W.
49	— 6705	Resistor, 3,500 Ohm 1W.
50	—35930	Resistor, 200,000 Ohm ¼W.
51	35601	Resistor, 300,000 Ohm ¼W.
52AB	—36321	Resistor, 400,000 Ohm ¼W.
53ABCDE	—36322	Resistor, 500,000 Ohm ¼W.
54	—21454	Resistor, 1 Megohm ¼W.
55	—36176	Resistor, 1.3 Megohm ¼W.
56	—36688	Resistor, 3. Megohm ¼W.
57	G101—34403	R. F. Neutralizing Condenser
58	W —32926	Resistor, 100 Ohm 3W. Flex.
59	W —25937	Resistor, 275 Ohm ½W. Flex.
60AB	W —28589	Resistor, 350 Ohm ½W. Flex.
61	W —22514	Resistor, 750 Ohm ½W. Flex.
62AB	W —21452	Resistor, 1100 Ohm ¾W. Flex.
63	W —23013	Resistor, 2000 Ohm 1¼W. Flex.
64	W —23907	Resistor, 750 Ohm 1½W. Flex.
65	— 4921C	Resistor, 10,000 Ohm 1W.
66	W —42418A	Resistor, 30,000 Ohm 4W.
67	—36952	Resistor, 30,000 Ohm 1W.
68Z	W —41966	Resistor, 4,000 Ohm (Candohm)
68Y		Resistor, 1,000 Ohm (Candohm)
68X		Resistor, 3,000 Ohm (Candohm)
68W		Resistor, 200 Ohm (Candohm)
69	G154—36400	Socket Type, 5Z4
70	G155—36400	Socket Type, 6H6
71AB	G151—36400	Socket Type, 6K7
72	G156—36400	Socket Type, 6A8
73	G164—36400	Socket Type, 6R7
74	G157—36400	Socket Type, 6J7
75AB	G165—36400	Socket Type, 6N6
76AB	G152—36400	Socket Type, 6C5
77	G167—36400	Auto Expressionator
78	G 1—42584	Neon Tube Socket Assembly
	W —42589	Neon Tube Cover
	—42592	Cover Rubber Gasket
79	734CJ4 "M"	Speaker Spec. 1-D-437
	—41603	Cone Assembly (For above Spk.)
	41601	Field Coil (For above Spk.)
80	W —41029	Phantom Cont. Switch
81	C —41235	Band Select. Switch
82	G 27—26719	Ant. and Gnd. Terminal Assembly
83	W —41287	300 Ohm ½W. A-F-C Bias Resistor
84	B —42295A	Fidelity and Line Switch
85	G 2—37995	A-F Transformer
86	G 60—24628	Out-Put Transformer
87	—42557	Power Trans. 60 Cy. 110V.
	—43008	Power Trans. 25 Cy. 110V.
	—43088	Power Trans. 50 Cy. 110V.
	—43089	Power Trans. 50 Cy. 220V.
89Z	—41375B	Vol. Cont. 3 Meg. Tap 1 Meg.
89Y		Vol. Cont. 1 Meg.
90	W —42419A	Neon Tuning Indic. Tube
91	G 5—34005	Condenser, .00005 Mf. 300V.
92	G 37—26719	Phono Terminal
93	W —24049	Condenser, .1 Mf. 200V.
Type A	C —41219	Escutcheon
	B —41232	Escutcheon Lens
	B —41233	Escutcheon Retaining Spring
	B —41234	Lens Retaining Spring
	—43134A	Escutcheon
Type B	C —42044	Escutcheon Lens
	C —42043	Escutcheon Rubber Ring
	— 7670	Escutcheon Mtg. Screw
	W —37339	Knob, V. C. and Station Sel.
	W —40192B	Knob, Band Sel. and Phantom Cont.
	W —42490	Knob, Fidelity Control
	W —36117	Rubber Mtg. Foot
	W —40230B	Emblem
	W —32620	Nut, Emblem Mtg.
	— 6-Q	Cabinet

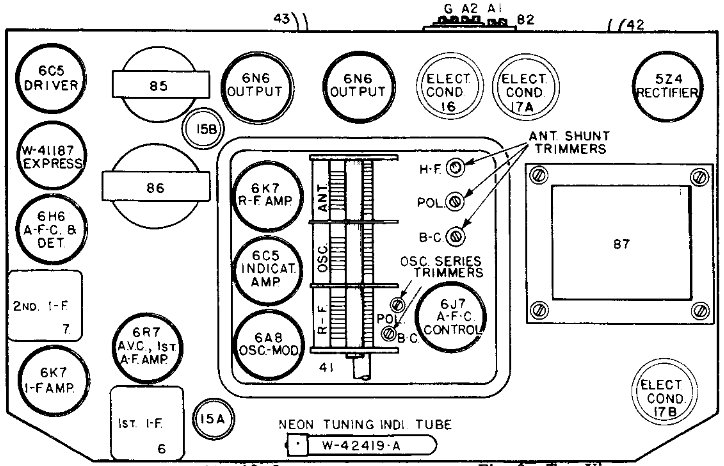


Fig. 2. Top View

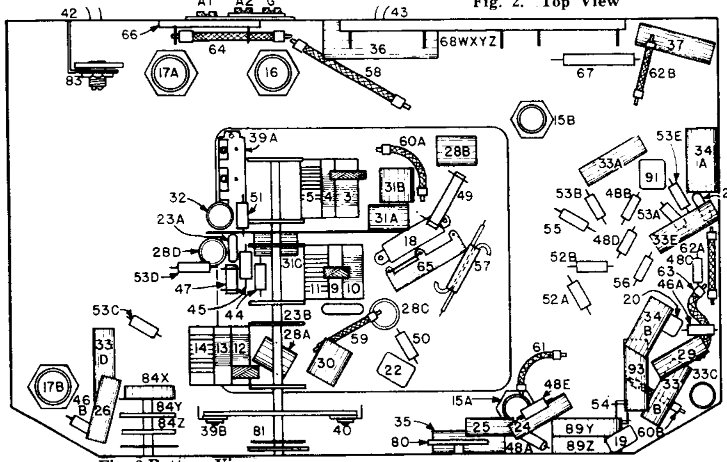
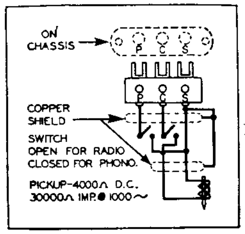
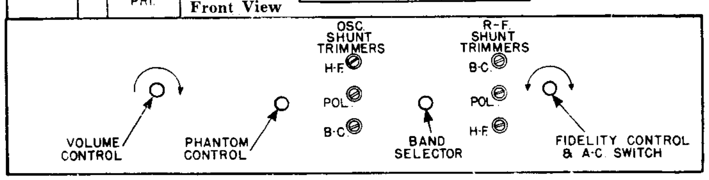


Fig. 3 Bottom View



Phonograph Pickup



Front View

THE CROSLEY RADIO CORPORATION

MODEL 1516

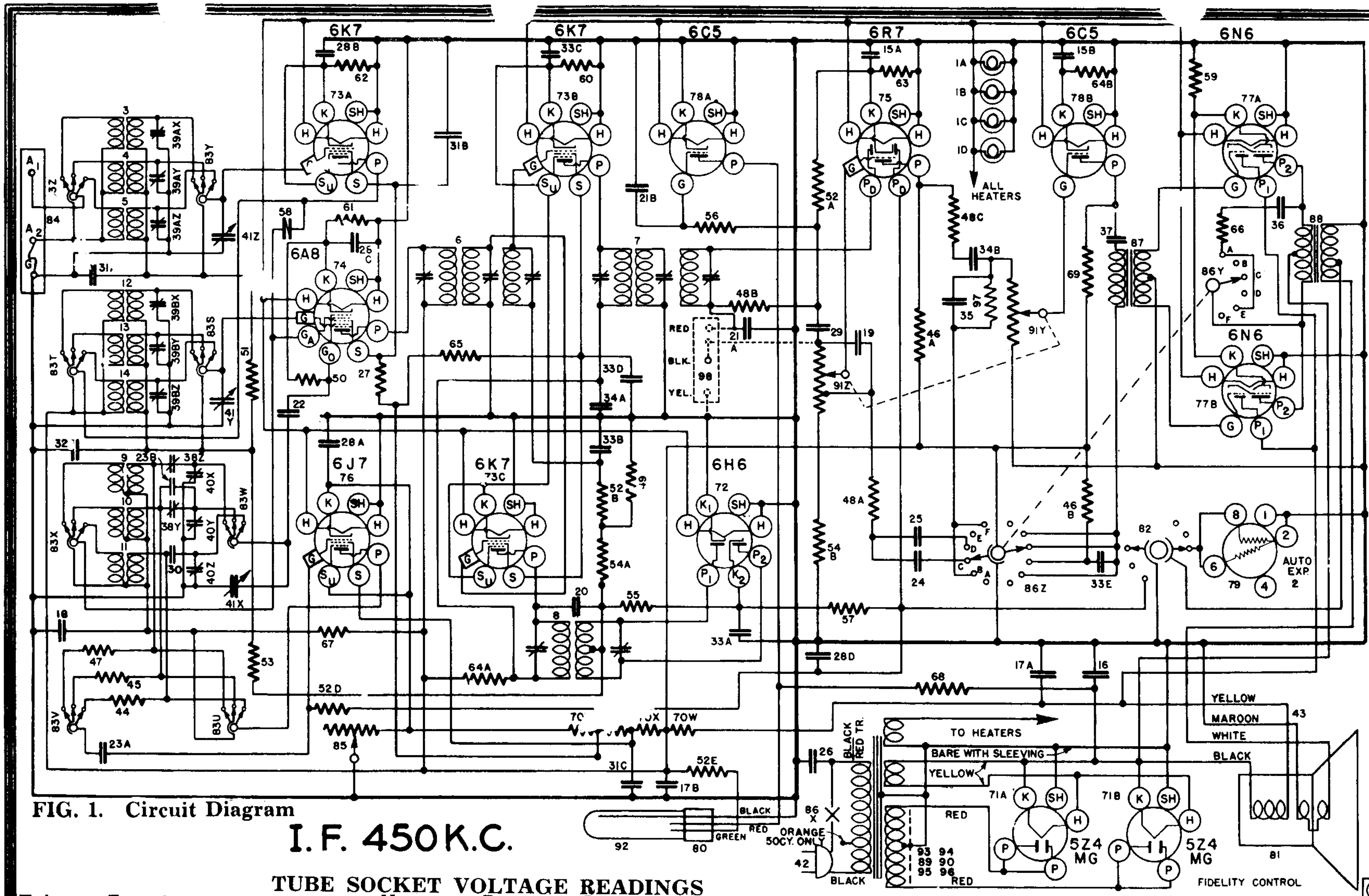
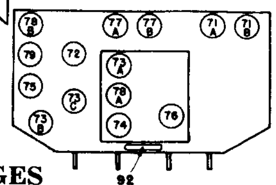


FIG. 1. Circuit Diagram

I. F. 450 K.C.



TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P_1	P_2	S	Su	K	Ga	Go
6K7	R-F Amplifier	6.3	238	—	105	2.5	2.5	—	—
6A8	Oscillator-Modulator	6.3	238	—	105	—	2.5	170	-5 to -12
6J7	AFC Control	6.3	170	—	130	—	5.8	—	—
6K7	I-F Amplifier	6.3	220	—	105	3.0	3.0	—	—
6K7	AFC Diode and I-F Amplifier	6.3	220	—	100	3.0	3.0	—	—
6H6	AFC Detector	6.3	—	—	—	—	—	—	—
6R7	Diode and 1st A-F Amplifier	6.3	80	—	—	—	2.0	—	—
6C5	A-F Driver	6.3	220	—	—	—	6.8	—	—
6N6	(2) Output	6.3	238	350	—	—	2.6	—	—
5Z4	(2) Rectifiers	5.0	—	—	—	—	350	—	—
6C5	Tuning Indicator Amplifier	6.3	150	—	—	—	0	—	—
W—42419A	Neon Tuning Tube	—	150	—	—	—	0	—	—

W—41187 Auto-Expressionator Tube. Varies with power output
Voltage drop across speaker field 112 volts.
Power output approximately 25 watts.
Power consumption approximately 142 watts.
All readings taken on 117.5 volt power supply.

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt, 500 volt D.C. meter (except filaments) with the receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A.C. voltmeter. Readings may vary plus or minus 10% of values given.

THE CROSLEY RADIO CORPORATION

MODEL 1516

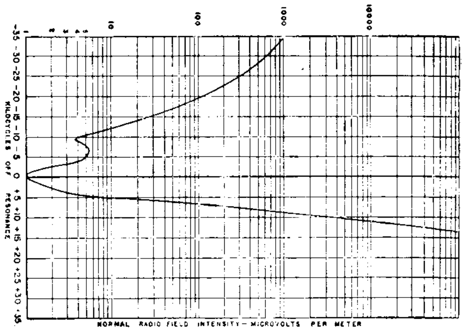


Fig. 5

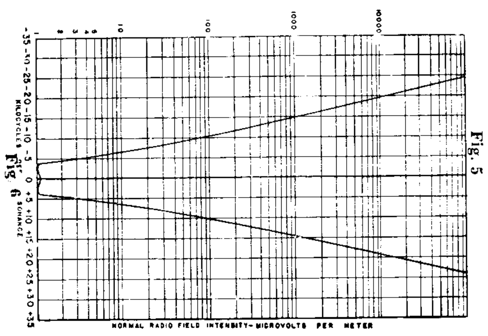


Fig. 6

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1ABCD	W -37922	Dial Light Bulb
	W --40570	Dial Light Shield
2	W -41187	Auto-Expressionator Tube
3	G 94—32000	Antenna Coil B. C. B.
4	G108- 32000	Antenna Coil Pol. B.
5	G107—32000	Antenna Coil H. F. B.
6	G107- 32004	1st I-F Assembly
7	G 91 -32004	2nd I-F Assembly
8	G108— 32004	A-F-C I-F Assembly
9	G 97 -32002	Oscillator Coil B. C. B.
10	G 96—32002	Oscillator Coil Pol. B.
11	G 95- 32002	Oscillator Coil H. F. B.
12	G 68—32001	R-F Coil B. C. B.
13	G 75—32001	R-F Coil Pol. B.
14	G 74 --32001	R-F Coil H. F. B.
15AB	W —41598	Condenser, 50 Mf. 25V.
16	W -36055	Condenser, 35 Mf. 400V.
17AB	W --36057	Condenser, 40 Mf. 300V.
18	G 18 34000	Condenser, 5600 Mmf.
19	G 5 --34002	Condenser, .00005 Mf. 200V.
20		NONE
21AB	G2 --34002	Condenser, .0001 Mf. 200V.
22	G6 - 34002	Condenser, .000025 Mf. 200V.
23AB	G3 -34002	Condenser, .0005 Mf. 200V.
24	W --35758	Condenser, .008 Mf. 400V.
25	W 41461	Condenser, .0014 Mf. 200V.
26	W -30805	Condenser, .01 Mf. 400V.
27	6705	Resistor, 3500 Ohm. 1W.
28ABCD	W —36541	Condenser, .02 Mf. 160V.
29	W -28621	Condenser, .02 Mf. 200V.
30	W 41209	Condenser, .048 Mf. 200V.
31ABC	W --35936	Condenser, .05 Mf. 200V.
32	W 32380	Condenser, .05 Mf. 200V.
33ABCDE	W 27216	Condenser, .05 Mf. 200V.
34AB	W 32780B	Condenser, .05 Mf. 400V.
35	W --28904	Condenser, .004 Mf. 200V.
36	W 22688	Condenser, .1 Mf. 400V.
37	W --42554	Condenser, .12 Mf. 160V.
38Z	--41218	B. C. Osc. Series Trimmer
38Y		Pol. Osc. Series Trimmer
38AB	W 37891	3 Section Shunt Trimmer Cond.
40	W --35951	3 Section Shunt Trimmer Cond.
41	G47 33002	3 Gang Var. Tuning Cond.
	MG12 42425	Dial Drive Assembly Complete
	42421	Dial Glass (Calibrated)
	42325B	Drive Unit only
	42598A	Dial Mask (Paper Backing)
	41144	Hand (Long Dial)
	42180	Hand (Short Dial)
	W 40486	Screw (Hand Mounting)
	E 13648	R. H. (Mystic Hand) Flipper
	F 13647	L. H. (Fidelity) Flipper
	W -43080	Flipper Control Cable Assembly
	W 42308A	Flipper Cont. Cable Pulley
	-40638	Band Indic. Cont. Cable
	40537	Flexible Coupling Unit
	41157	Drive Belt
42	B 33905A	Power Cord and Plug
43	G2 37918	Speaker Cable
44	36760	Resistor, 20,000 Ohm. $\frac{1}{4}$W.
45	33390	Resistor, 30,000 Ohm. $\frac{1}{4}$W.
46AB	36761	Resistor, 40,000 Ohm. $\frac{1}{4}$W.
47	34019	Resistor, 75,000 Ohm. $\frac{1}{4}$W.
48ABC	35600	Resistor, 100,000 Ohm. $\frac{1}{4}$W.
49	35929	Resistor, 150,000 Ohm. $\frac{1}{4}$W.
50	-35930	Resistor, 200,000 Ohm. $\frac{1}{4}$W.
51	35601	Resistor, 300,000 Ohm. $\frac{1}{4}$W.
52ABCDE	-36322	Resistor, 500,000 Ohm. $\frac{1}{4}$W.
53	--38623	Resistor, 750,000 Ohm. $\frac{1}{4}$W.
54AB	35602	Resistor, 1 Megohm. $\frac{1}{4}$W.
55	--36176	Resistor, 1.3 Megohm. $\frac{1}{4}$W.
56		NONE
57	—36688	Resistor, 3 Megohm. $\frac{1}{4}$W.
58	G101 34403	R-F Neutralizing Cond.
59	W -23012A	Resistor, 40 Ohm. $\frac{3}{4}$W. Flex.
60	W --35467	Resistor, 220 Ohm. $\frac{1}{2}$W. Flex.
61	W -25937	Resistor, 275 Ohm. $\frac{1}{2}$W. Flex.
62	W ---28589	Resistor, 350 Ohm. $\frac{1}{2}$W. Flex.
63	W --28106	Resistor, 500 Ohm. $\frac{1}{2}$W. Flex.
64AB	W --21452	Resistor, 1100 Ohm. $\frac{3}{4}$W. Flex.
65	W 23013	Resistor, 2000 Ohm. $1\frac{1}{4}$W. Flex.
66	W --23907	Resistor, 750 Ohm. $1\frac{1}{2}$W. Flex.
67	4921C	Resistor, 10000 Ohm. 1W.
68	W ---42418	Resistor, 30000 Ohm. 4W.
69	36952	Resistor, 30000 Ohm. 1W.
70Z	W - 41966	Resistor, 4000 Ohm. Candohm
70Y		Resistor, 1000 Ohm. Candohm
70X		Resistor, 3000 Ohm. Candohm
70W		Resistor, 200 Ohm. Candohm
71AB	G154 36400	Socket Type 5Z4
72	G155 -36400	Socket Type 6H6
73ABC	G151 36400	Socket Type 6K7
74	G156 -36400	Socket Type 6A8
75	G164 36400	Socket Type 6R7
76	G157—36400	Socket Type 6J7
77AB	G165 36400	Socket Type 6N6
78AB	G152--36400	Socket Type 6C5
79	G167 36400	Auto-Expressionator Socket
80	G2 42584	Tuning Indic. Socket
81	734CJ4 "M"	Speaker Spec. 1-D-437
	41603	Cone Assembly for above Speaker
	41601	Field Coil for above Speaker
82	W -41029B	Phantom Control Switch
83	41235A	Band Selector Switch
84	G27 26719	Ant. and Gnd. Terminal Assembly
85	W 41287	A-F-C Bias Control, 300 Ohm. $\frac{1}{2}$W.
86	B 42295A	Fidelity and Line Switch
87	G2 37995	A-F Driver Transformer
88	G62 24628	Out-Put Transformer
89	G1 37900	Power Transformer, 60 Cy. 110V.
(93)	G5 37900	Power Transformer, 25 Cy. 110V.
(94)	G6 37900	Power Transformer, 50 Cy. 220V.
(95)	G7 37900	Power Transformer, 50 Cy. 110V.
(96)	G8 37900	Power Transformer, 25 Cy. 220V.
90	G2 37900	Power Transformer, Universal
91Z	41375	Vol. Control, 3 Meg., Tap. .3 Meg.
91Y		Vol. Control, 1 Meg.
92	W 42419	Neon Tuning Indic. Tube
97	21237A	Resistor, 60,000 Ohm. $\frac{1}{4}$W.
98	G37 26719	Phono. Terminal Assembly
	C 43134A	Escutcheon
	C 42044	Lens, Escutcheon
	42043	Escutcheon Rubber Mounting
	W 36117	Rubber Mounting Foot
	W 42490	Knob (Fidelity)
	W 37339	Knob (Station and Volume)
	W 40192	Knob (Band Sel. and A-F-C)
	W 40230B	Emblem
	W 32620	Nut, Emblem Mounting
	W 35922	Grille Clothe
	6-R	Cabinet

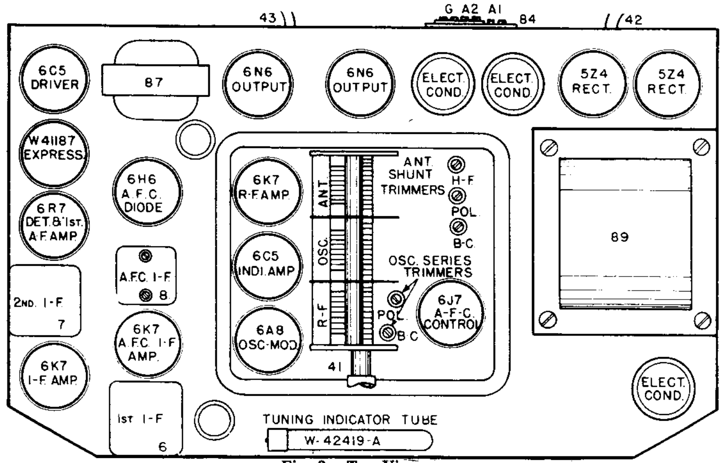


Fig. 2. Top View

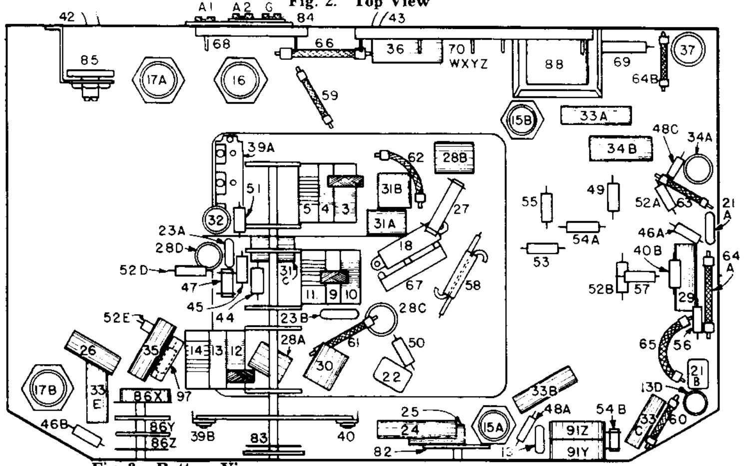
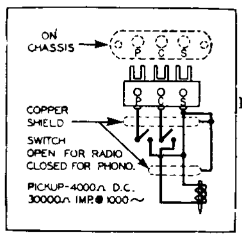


Fig. 3. Bottom View



Phonograph Pickup

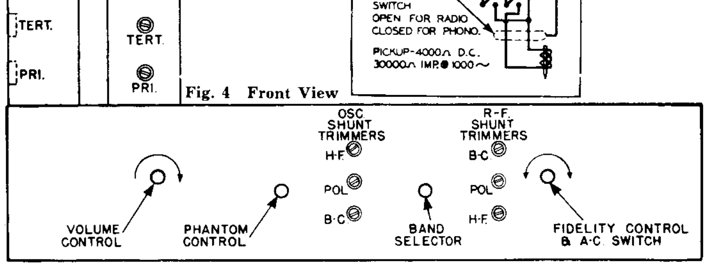
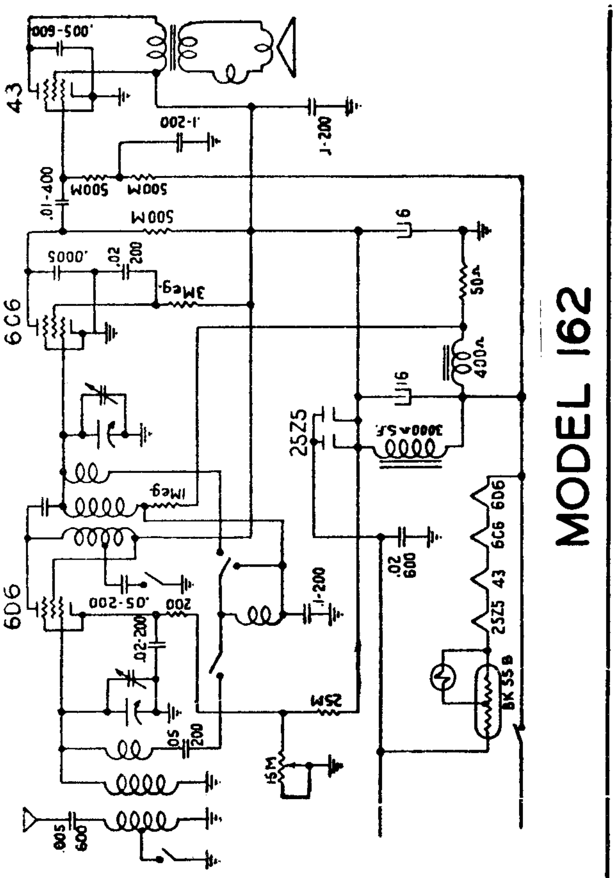
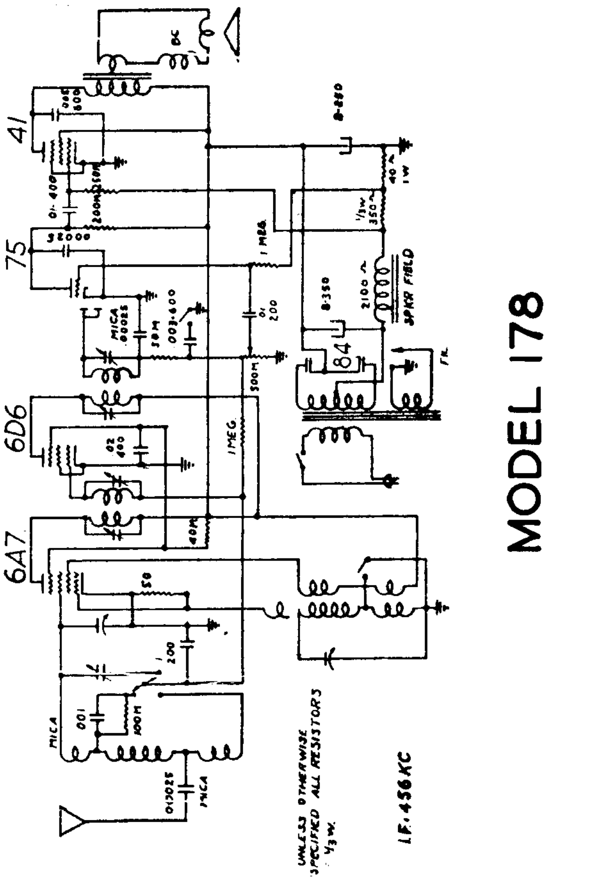


Fig. 4 Front View

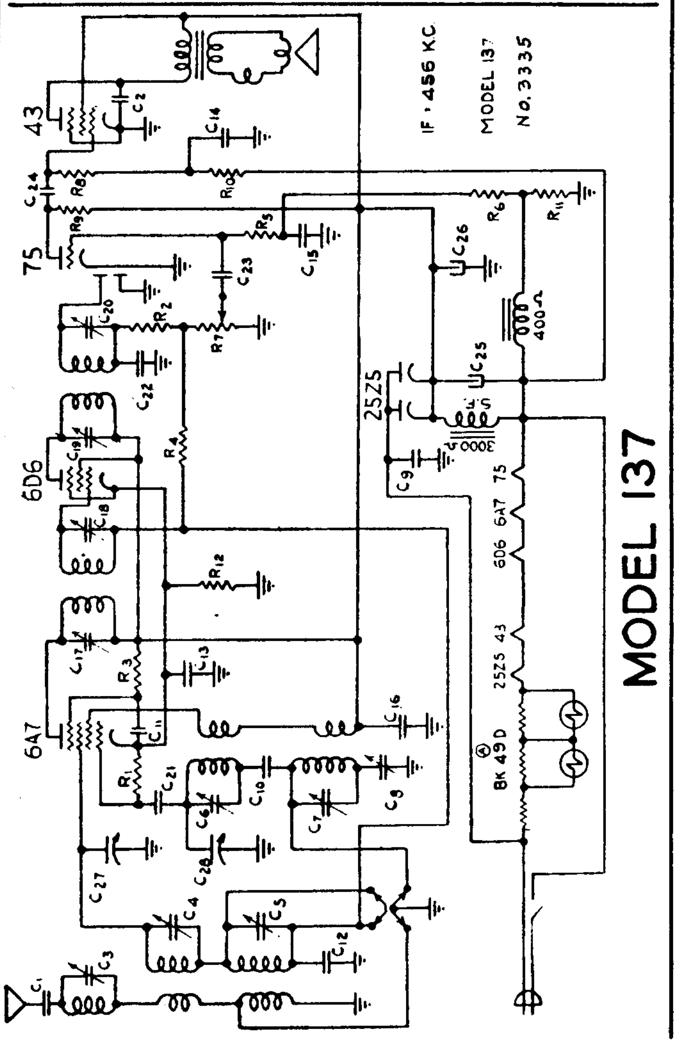
DETROLA RADIO AND TELEVISION CORPORATION



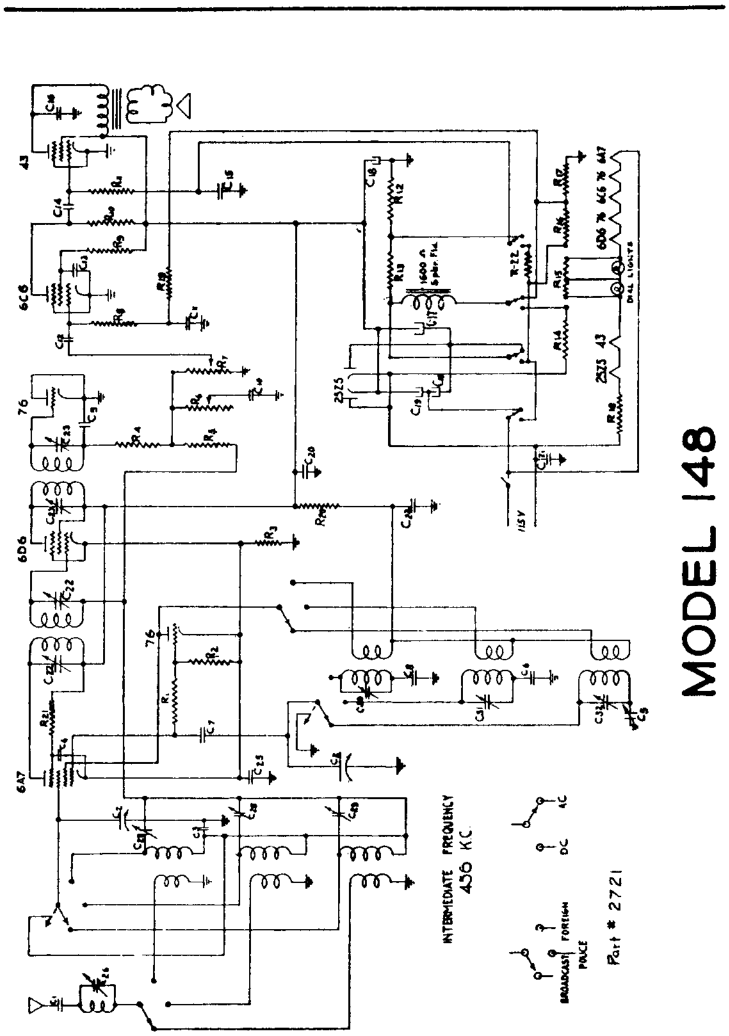
MODEL 162



MODEL 178

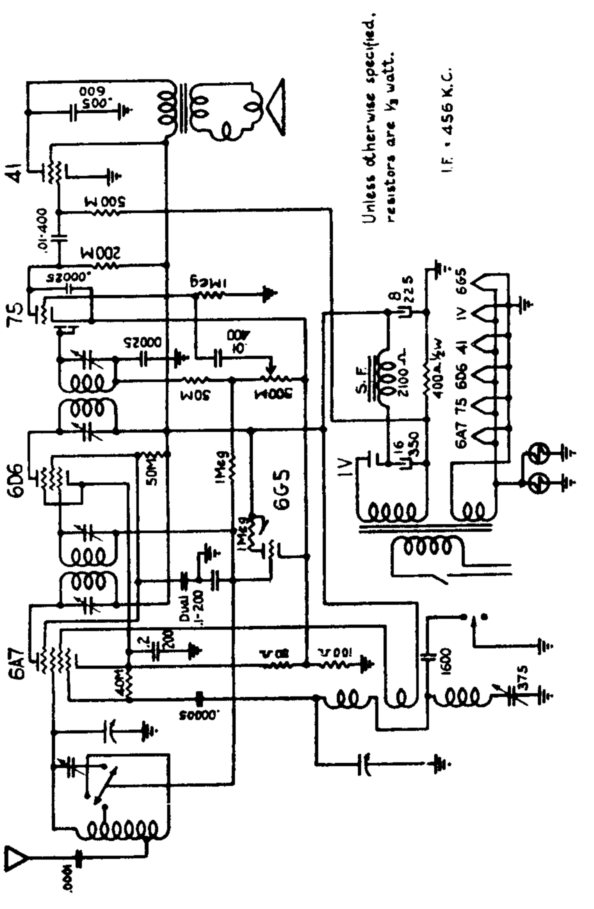


MODEL 137

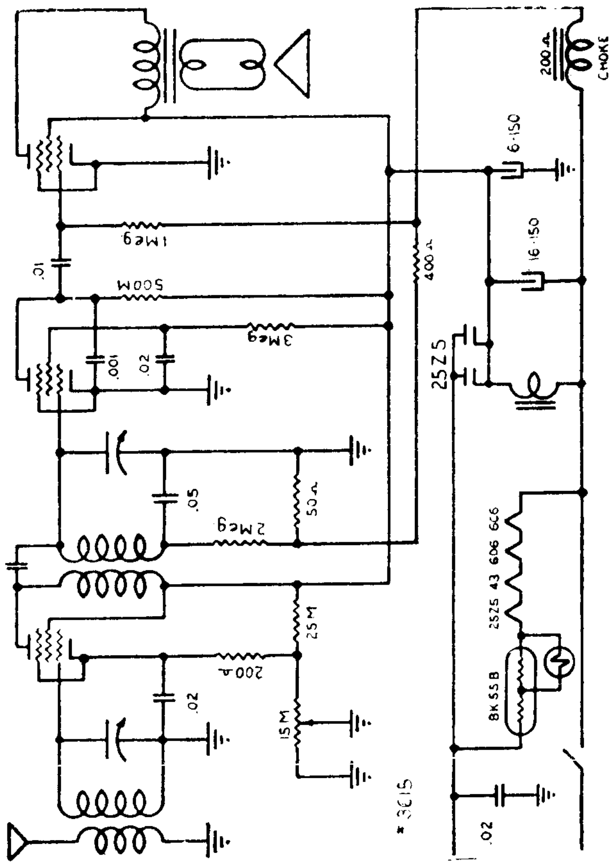


MODEL 148

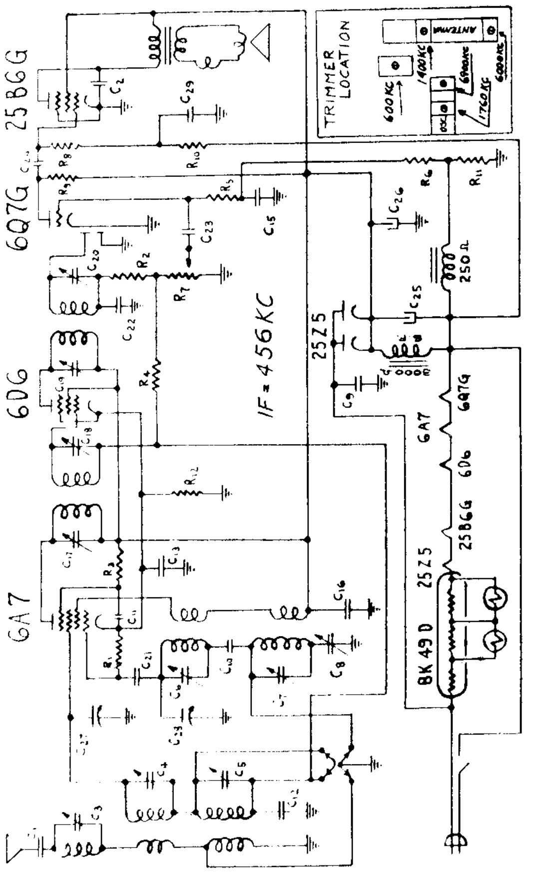
DETROLA RADIO AND TELEVISION CORPORATION



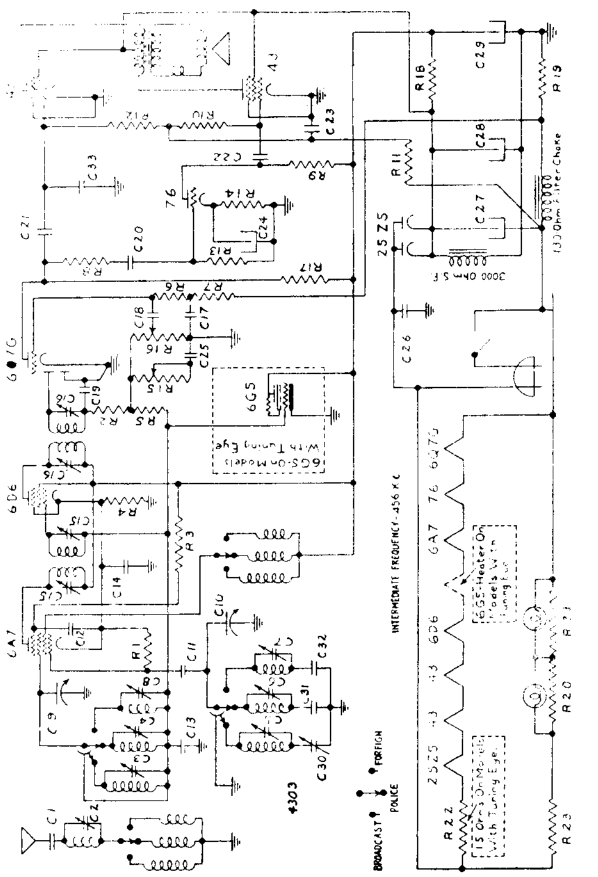
MODEL 149A



MODEL 158



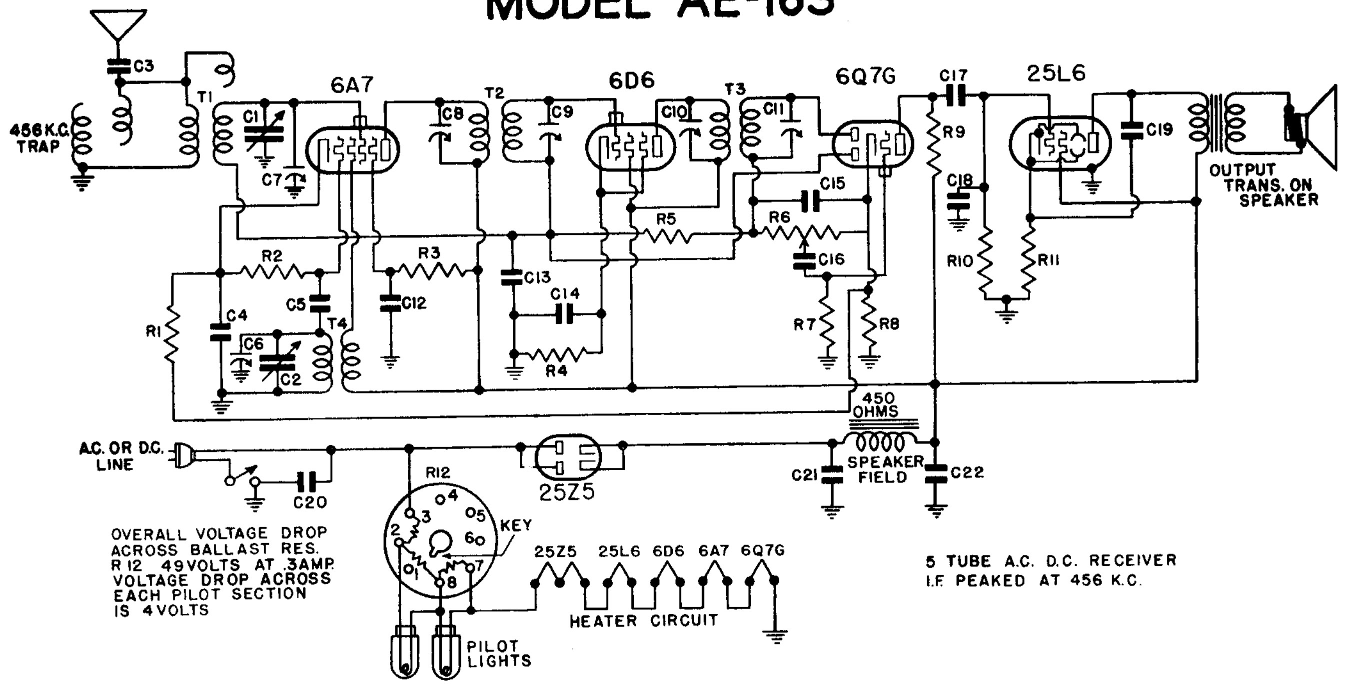
MODELS 167 & 177



MODEL 169

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL AE-163



REPLACEMENT PARTS

List Price is Effective as of April 1st, 1937 (Subject to change without notice)

*ITEM	PART No.	DESCRIPTION	PRICE
T1	3FT-280	Antenna coil with 456 kc wave trap	$1.10
T2	4ET-350	456 kc first i-f transformer	1.15
T3	4ET-351	456 kc second i-f transformer	1.15
T4	3FT-281	Oscillator coil	.50
R1	3RR-276	310 ohm ½ watt wire-wound molded resistor	.16
R2	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3	ZZR-196	30,000 ohm ¼ watt carbon resistor	.16
R4	3CR-295	410 ohm ½ watt wire-wound molded resistor	.16
R5, R7	HR-42	2 megohm ¼ watt carbon resistor	.16
R6	ZZR-190A	Volume control—600,000 ohms	1.10
R8	3CR-294	240 ohm ½ watt wire-wound molded resistor	.16
R9	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R10	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R11	3FR-293	140 ohm ½ watt wire-wound molded resistor	.16
R12	3CR-241	Plug in type ballast resistor	.80
C1, C2	4EC-340	Two-gang variable condenser	3.05
C3	3HC-274	0.002 mf 600 volt tubular condenser	.20
C4, C12	AC-6	0.1 mf 200 volt tubular condenser	.20
C5, C15, C18	NC-70A	0.0002 mf mica condenser	.20
†C6, C7	—	Trimmer, part of variable condenser	
†C8, C9	—	Trimmer, part of first i-f transformer	
†C10, C11	—	Trimmer, part of second i-f transformer	
C13	BC-12	0.05 mf 200 volt tubular condenser	.20
C14	FC-29	0.02 mf 200 volt tubular condenser	.20
C16	CCC-127	0.01 mf 200 volt tubular condenser	.20
C17, C19	LC-65	0.02 mf 400 volt tubular condenser	.20
C20	2VC-242A	0.1 mf 400 volt molded type paper condenser	.20
C21, C22	3CC-261	20 mf 150 volt wet electrolytic condenser	.90
—	4ES-258	5½" dynamic speaker	5.00
—	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
—	4EZ-551	Dial face	.80
—	4EZ-531	Dial drive belt	.15
—	4EZ-553	Dial drive shaft	.10
—	3JZ-375	Dial drive shaft bushing	.10
—	3JZ-376	Dial drive shaft pulley	.10
—	3CZ-339	Idler pulley	.05
—	3SZ-457	Idler pulley spring	.05
—	3CZ-341	Condenser shaft pulley	.10
—	3FZ-353	Dial pointer	.10
—	3CZ-360B	Escutcheon with crystal	1.06

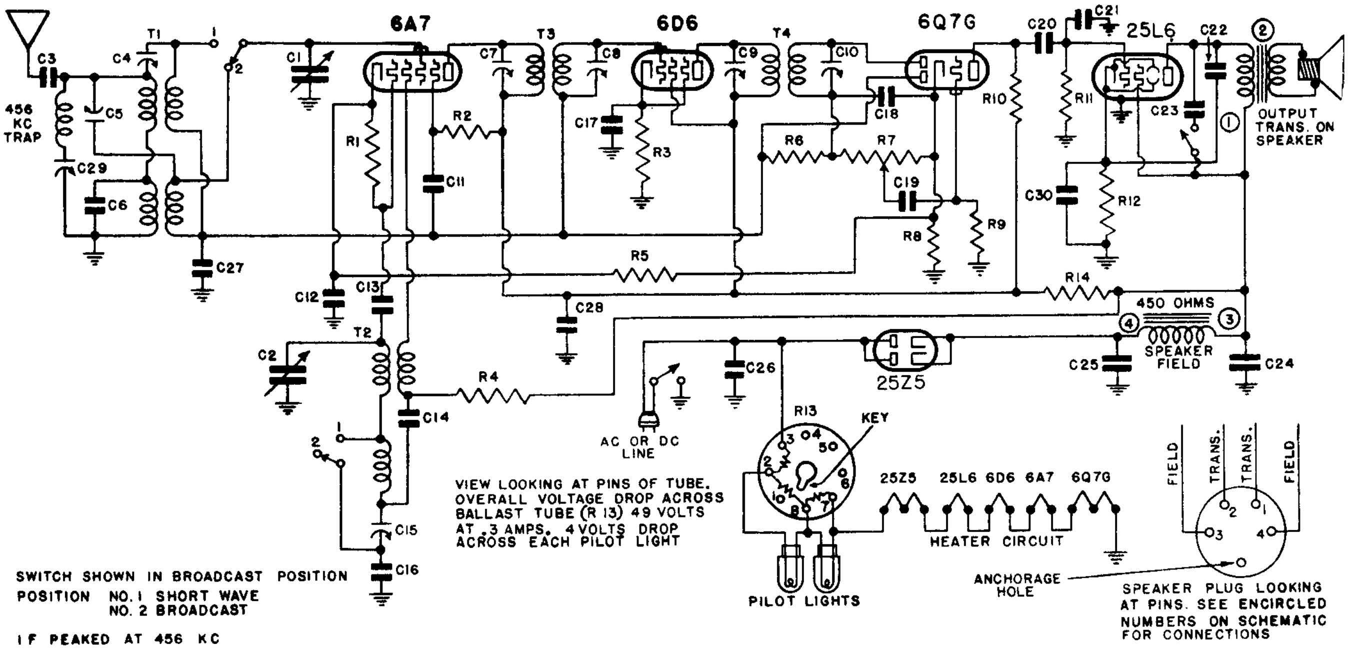
When ordering replacement parts specify part numbers.

*Item number locates the article on the schematic diagram.
†These trimmers cannot be supplied separately.

PRODUCTION CHANGES

In receivers bearing serial numbers below 1,121,800.
A C19 was connected from the plate of the 25L6 tube to B plus.

MODEL AH-162



REPLACEMENT PARTS

*ITEM	PART No.	DESCRIPTION	PRICE
T1	4HT-360	Two-band antenna coil with 456 kc wave trap	$1.70
T2	4HT-361	Two-band oscillator coil	1.10
T3	4ET-350A	Double-tuned 456 kc first i-f transformer	1.15
T4	4ET-351A	Double-tuned 456 kc second i-f transformer	1.15
R1	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R2	ZZR-196	30,000 ohm ¼ watt carbon resistor	.16
R3	3CR-295	410 ohm ½ watt wire-wound molded resistor	.16
R4	LR-65	10,000 ohm ¼ watt carbon resistor	.16
R5	3RR-276	310 ohm ½ watt wire-wound molded resistor	.16
R6	HR-42	2 megohm ¼ watt carbon resistor	.16
R7	3ZR-288	Volume control with line switch—500,000 ohms	1.05
R8, R14	3CR-294	240 ohm ½ watt wire-wound molded resistor	.16
R9	KR-57	1 megohm ¼ watt carbon resistor	.16
R10	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R11	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R12	3FR-293	140 ohm ½ watt wire-wound molded resistor	.16
R13	3CR-241	Plug-in ballast resistor	.80
C1, C2	4HC-343	Two-gang variable condenser	3.35
C3, C11	3HC-274	0.002 mf, 600 volt tubular condenser	.20
†C4, C5, C29	—	Trimmer, part of antenna coil assembly.	
C6	HC-133A	0.000025 mf mica condenser	.20
†C7, C8	—	Trimmer, part of first i-f transformer.	
†C9, C10	—	Trimmer, part of second i-f transformer.	
C14	KC-58	0.01 mf, 400 volt tubular condenser	.20
C12, C28	AC-6	0.1 mf, 200 volt tubular condenser	.20
C13	AAC-106A	0.00005 mf mica condenser	.20
C15	2NC-231	Single adjustable padding condenser range—300 to 600 mmf	.50
C16	3LC-327	0.0018 mf mica condenser	.30
C17, C19	FC-29	0.02 mf, 200 volt tubular condenser	.20
C20	LC-65	0.02 mf, 400 volt tubular condenser	.20
C18, C21	AC-7A	0.00025 mf mica condenser	.20
C22	QQC-173	0.015 mf, 600 volt tubular condenser	.20
C23	EC-23	0.03 mf, 400 volt tubular condenser	.20
C24, C25	4HC-348	Dual 20 mf, 150 volt, dry electrolytic condenser in cardboard container	1.50
C26	3EC-326A	0.05 mf, 400 volt molded type paper condenser	.20
C27	BC-12	0.05 mf, 200 volt tubular condenser	.20
C30	IC-43A	5 mf, 25 volt tubular dry electrolytic condenser	.90
—	TTS-111K	Wave-band switch	.60
—	4HS-262	5½" dynamic speaker	6.15
—	3ES-256	Tone control switch	.60
—	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.30
—	4HZ-561	Dial face	1.15
—	3LZ-403	Drive belt for dial assembly	.15
—	3CZ-337	Drive shaft and pulley for dial assembly	.10
—	3CZ-339	Idler pulley for dial assembly	.05
—	4HZ-562	Idler spring for dial assembly	.05
—	3CZ-341	Condenser shaft pulley	.10
—	3SZ-436	Dial pointer	.10
—	3SZ-438A	Escutcheon with crystal	1.85

When ordering replacement parts specify part numbers.

*Item number locates the article on the schematic diagram.
†These trimmers cannot be supplied separately.

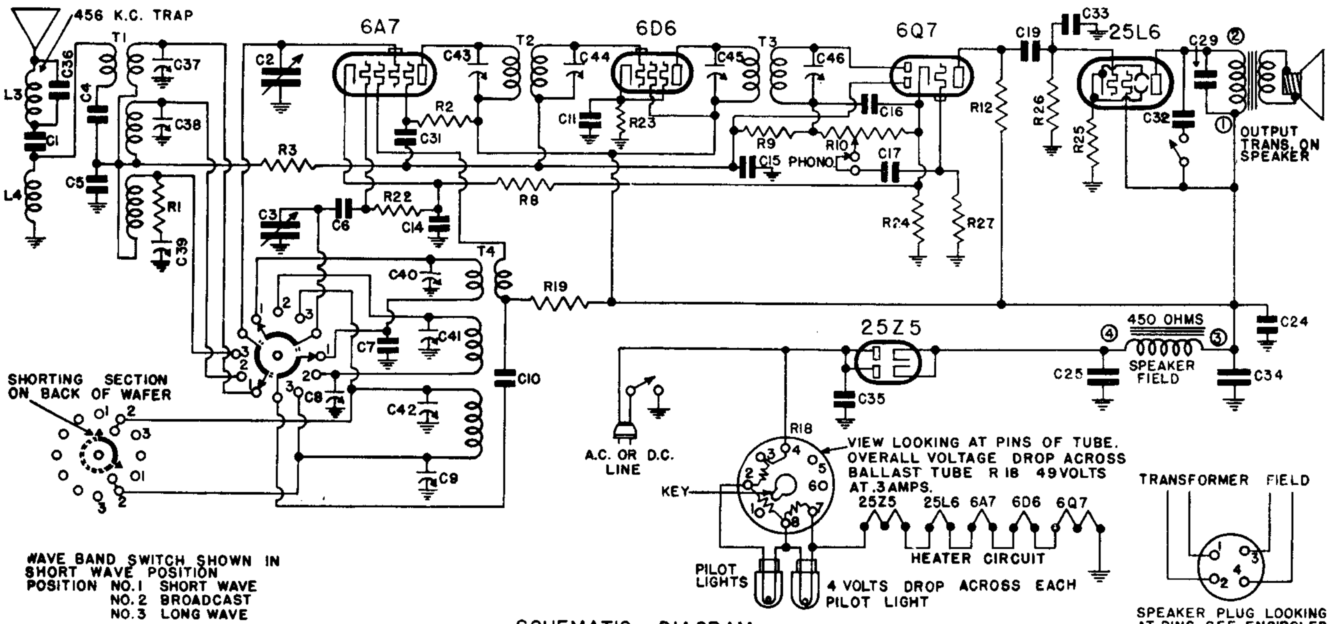
PRODUCTION CHANGES

In receivers bearing serial numbers below 1, 102, 142, C11 was an .01 mf, 400 volt tubular condenser.

In receivers bearing serial numbers below 1, 149, 148, C22 was connected from plate to B plus

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS AP, AP-171, AP-173, AP-174, AP-176, AP-180 & AP-185



SCHEMATIC DIAGRAM

I.F. PEAKED AT 456 K.C.
5 TUBE A.C. D.C. RECEIVER

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully re-aligned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. When operating the receiver on d.c., it may be necessary to reverse the line plug for correct polarity.
4. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.
5. The color coding of the i-f transformers is as follows:
   Grid—green   Grid return—black
   B plus—red   Plate—blue
6. An electrical phonograph pick-up may be connected to this receiver for playing records. Connections to this receiver may be made at the "phono" jack which is located on the rear wall of the receiver chassis. A separate volume control of the potentiometer type is necessary in addition to the phonograph pick-up. The two pick-up lead wires should be connected to the two outside terminals of this volume control. A lead from the center terminal should be plugged into the right-hand hole in the phono jack. A lead from one of the outside terminals of the volume control should be plugged into the other hole in the phono jack. The leads to be plugged in the jack should be fitted with tips. The volume control in the receiver should be turned down to the zero volume position when operating the phonograph. The required over-all resistance of the separate volume control will, of course, depend on the type of phonograph pick-up to be used. A matching input transformer must be used if the pick-up is of the low impedance type. In this case the volume control is connected to the secondary of the transformer. It is important that the phonograph leads be removed from the jack when it is desired to operate the receiver for ordinary radio reception.
7. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. For reduction of noise and achievement of high efficiency on all frequency ranges the Emerson All-Wave High-Fidelity Antenna, Model W-78, and the Emerson All-Wave Antenna System, Model W-89, are recommended. Instructions for the installation of these antennas are supplied with each kit.
   In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.

Tube Data

The tube complement is as follows:
- 1—6A7 pentagrid oscillator-modulator
- 1—6D6 first i-f amplifier
- 1—6Q7 diode detector, a.v.c., audio amplifier
- 1—25L6 beam power output
- 1—25Z5 dual half-wave rectifier
- 1—3CR-241 ballast tube.

Voltage rating: 105-125 volts, a.c. or d.c.
Current drain: 0.4 amp.
Frequency range: 150 to 375 kc, 540 to 1600 kc, 5.7 to 17.5 mc.

NOTE: Octal-base tubes may be replaced with either metal or octal-base glass tubes.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	110	34	2.4	67	6.3
6D6	110	110	4.2	—	6.3
6Q7	45	—	1.2	—	6.3
25L6	100	110	7.0	—	25
25Z5	—	—	135.0	—	25

Voltage across speaker field—25 volts.
The overall voltage drop across the resistors in the ballast tube is 49 volts.
The voltage drop across each pilot light section in the ballast tube is 4 volts.

ADJUSTMENTS

An oscillator with frequencies of 150, 350, 456, 600, 1500 and 15,000 kc should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Use a standard dummy antenna when aligning either the long-wave or medium-wave bands. A .0002 mf condenser may be used as a substitute. When aligning the short-wave band use a 400 ohm dummy antenna (a 400 ohm resistor in series with antenna lead).

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Always use as weak a test signal as possible during alignment.

Never leave a trimmer with its outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Location of Coils and Trimmers

The two i-f transformers are located on top of the chassis deck. The second i-f transformer is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of the cans.

The dual adjustable padding condenser is mounted on the left side of the front chassis wall.

The antenna coils for the three bands are wound on one form and mounted underneath the chassis deck directly behind the adjustable padding condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the medium-wave antenna trimmer. The central trimmer is the short-wave antenna trimmer. The trimmer farthest from the front of the chassis is the long-wave antenna trimmer.

The oscillator coils for the three bands are wound on one form and mounted underneath the chassis deck near the variable condenser. The trimmers for these coils are also accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the medium-wave oscillator trimmer. The central trimmer is the short-wave oscillator trimmer. The trimmer farthest from the front of the chassis is the long-wave oscillator trimmer.

I-f Alignment

Rotate the wave-band switch to the medium-wave (central) position and set the variable condenser to minimum. Feed 456 kc to the grid cap of the 6A7 tube. Adjust the four i-f trimmers for maximum response.

Long-Wave Alignment

With the wave-band switch at long-wave (clockwise) position set the dial pointer at 150 and feed 150 kc to antenna. Adjust the long-wave series padder (hex nut on dual padder) for maximum response. Move pointer to 350 and feed 350 kc to antenna. Adjust the long-wave oscillator trimmer then the long-wave antenna trimmer for maximum response. Reset pointer to 150, feed 150 kc and rock (rotate back and forth through a small arc) the variable condenser while adjusting long-wave series padder for maximum response. Reset pointer to 350, feed 350 kc and check alignment. If readjustment is necessary return to 150 kc and repeat entire procedure.

Medium-Wave Alignment

Set switch at medium-wave (central) position and dial pointer at 600. Feed 600 kc to antenna and adjust medium-wave series padder (slotted screw on dual padder) for maximum response. Move pointer to 1500, feed 1500 kc and adjust medium-wave oscillator trimmer and then the medium-wave antenna trimmer for maximum response. Reset pointer to 600 feed 600 kc and rock variable condenser while readjusting medium-wave series padder for maximum response. Reset pointer to 1500, feed 1500 kc and check alignment. If readjustment is necessary return to 600 and repeat entire procedure.

Short-Wave Alignment

Set wave-band switch at short-wave (counter-clockwise) position. Set pointer at 15, feed 15 megacycles to antenna and adjust short-wave oscillator trimmer and then short-wave antenna trimmer for maximum response.

REPLACEMENT PARTS LIST

List Price ea. Effective as of Aug. 15th, 1937 (Subject to change without notice.)

*Item	Part No.	DESCRIPTION	PRICE
L3	2ZT-268	456 kc wave-trap	.75
L4	3ET-299	R-f choke—5 millihenries	.55
T1	3ET-297	Three-band antenna coil	2.05
T2	2NT-230	456 kc first i-f transformer	1.35
T3	2NT-231	456 kc second i-f transformer	1.35
T4	3ET-298	Three-band oscillator coil	1.90
R1	TTR-201	3,000 ohm ¼ watt carbon resistor	.16
R2	3ER-263	60,000 ohm ¼ watt carbon resistor	.16
R3, R12	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R8	AAR-119	300 ohm ½ watt wire-wound resistor	.16
R9, R27	KR-57	1 megohm ¼ watt carbon resistor	.16
R10	2NR-214D	Volume control with switch—250,000 ohms	1.20
R18	3CR-241	Plug-in type ballast resistor	.80
R19	LR-60	20,000 ohm ¼ watt carbon resistor	.16
R22	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R23	3CR-295	410 ohm ½ watt wire-wound resistor	.16
R24	3CR-294	240 ohm ½ watt wire-wound resistor	.16
R25	3FR-293	140 ohm ½ watt wire-wound resistor	.16
R26	KR-56	500,000 ohm ¼ watt carbon resistor	.16
C1, C4, C10, C17	FC-29	0.02 mf, 200 volt tubular condenser	.20
C2, C3	4HC-343A	Two-gang variable condenser	3.65
C5	2ZC-253	0.0025 mf mica condenser	.30
C6	AAC-106A	0.00005 mf mica condenser	.20
C7	3EC-286	0.0024 mf mica condenser	.30
C8, C9	2ZC-257	Dual adjustable padding condenser C8—250 to 500 mmf. C9—100 to 200 mmf.	.65
C11, C14, C24	AC-6	0.1 mf, 200 volt tubular condenser	.20
C15	BC-12	0.05 mf, 200 volt tubular condenser	.20
C16, C33	AC-7A	0.00025 mf mica condenser	.20
C19	LC-65	0.02 mf, 400 volt tubular condenser	.20
C25	3CC-261	20 mf, 150 volt wet electrolytic condenser	.90
C29	QQC-173	0.015 mf, 600 volt tubular condenser	.20
C31	KC-58	0.01 mf, 400 volt tubular condenser	.20
C32	EC-28	0.03 mf, 400 volt tubular condenser	.20
C34	3CC-337	40 mf, 150 volt wet electrolytic condenser	.90
C35	3EC-326A	0.05 mf, 400 volt molded type paper condenser	.20
C36		0.0015 mf mica condenser, part of wave trap assembly.	
†C37, C38, C39		Trimmer, part of antenna coil assembly.	
†C40, C41, C42		Trimmer, part of oscillator assembly.	
†C43, C44		Trimmer, part of first i-f transformer assembly.	
†C45, C46		Trimmer, part of second i-f transformer assembly.	
	4PS-271	6½" dynamic speaker	5.50
	4PS-299	10" dynamic speaker	9.50
	3ES-218	Wave-band switch	1.10
	3ES-256	Tone-control switch	.50
	XL-9	Pilot light, 6.3 volt, .25 amp., Mazda No. 46	.20
	4PZ-615	Dial face	1.20
	3LZ-403	Dial drive belt	.15
	3CZ-337P	Dial drive shaft and pulley	.10
	3CZ-339	Idler pulley	.05
	4HZ-562	Idler pulley spring	.05
	3CZ-341	Condenser shaft pulley	.10
	4RZ-592	Dial pointer	.25
	4RZ-595	Escutcheon with crystal	1.95

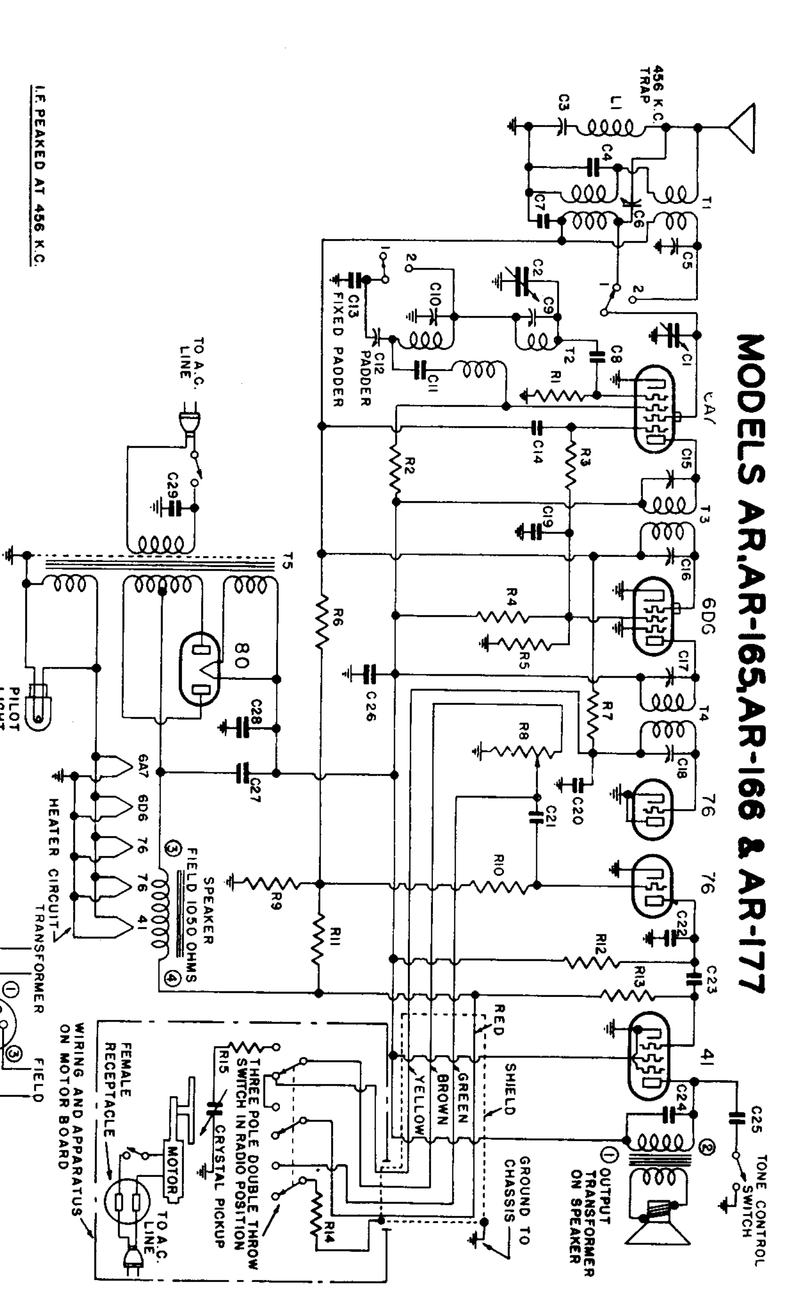
When ordering replacement parts specify part numbers.

*Item number locates the article on the schematic diagram.

†These condensers are part of coil assemblies and cannot be supplied separately.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS AR, AR-165, AR-166 & AR-177



I.F. PEAKED AT 456 K.C.

WAVE BAND SWITCH SHOWN IN BROADCAST POSITION
POSITION NO 1 BROADCAST
NO 2 SHORT WAVE

6 TUBE AC RECEIVER

BELOW SERIAL No. 1326200

SPEAKER PLUG LOOKING AT PINS. SEE ENCIRCLED NUMBERS ON SCHEMATIC FOR CONNECTIONS.

PRODUCTION CHANGES

Model AR-165 receivers differ from the schematic diagram as follows:

a. C27 is a 12 mf, 450 volt dry electrolytic condenser, part no. 3LC-314.
b. C28 is a 24 mf, 400 volt dry electrolytic condenser, part no. 3ZC-341.
c. A .25 mf, 200 volt condenser is connected from the screen-grid of the 6D6 i-f amplifier to ground.

In receivers bearing serial numbers below 1,200,100:

a. C1 and C2 was variable condenser part no. 4HC-343B and the dial face used with this condenser was part no. 4RZ-580.

In receivers bearing serial number below 1,326,200:

The 6½" speaker was part no 4RS-270B.
The 10" speaker was part no. 4TS-281.
The tone control switch was part no. 2TS-145E.

Receivers bearing serial numbers below 1,327,843 did not use the automatic stop. A manual switch part no. 3LS 232 was used instead—price \$.70.

REPLACEMENT PARTS

List Price ea. Effective as of Oct. 1st, 1937 (Subject to change without notice)

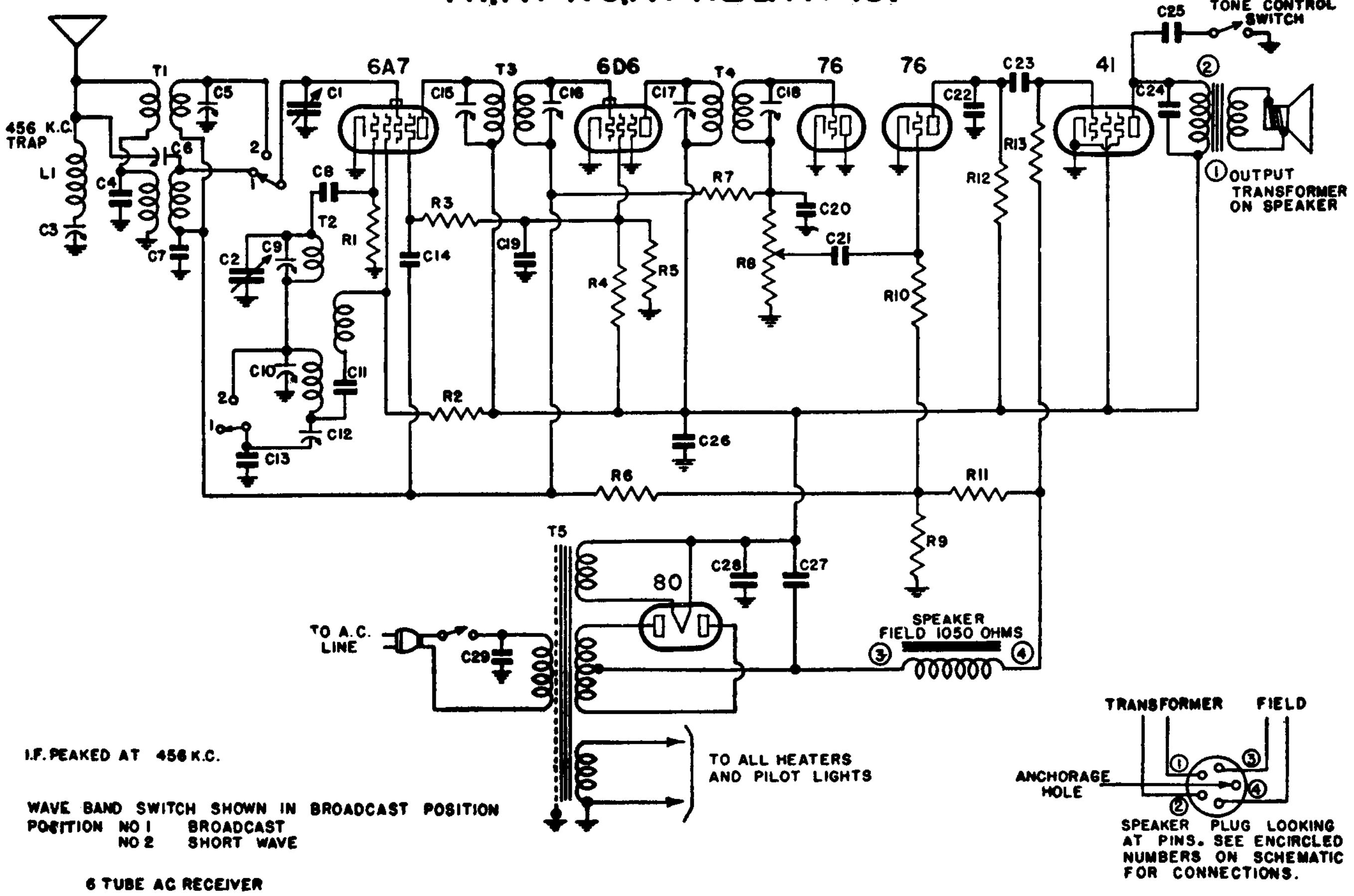
*ITEM Schematic No. 1	Schematic No. 2	PART No.	DESCRIPTION	PRICE
T1, L1	T1, L1	3CT-289A	Two band antenna coil and 456 kc wave-trap	$1.80
T2	T2	3CT-290A	Two band oscillator coil	1.35
T3	T3	3ZT-342	456 kc first i-f transformer	1.50
T4	T4	2NT-231	456 kc second i-f transformer	1.35
T5	T5	3ZT-345	Power transformer	4.45
R1, R15	R1	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R2	R2	3BR-247	40,000 ohm ¼ watt carbon resistor	.16
R3	—	LR-65	10,000 ohm ¼ watt carbon resistor	.16
R4	R4	BR-12	25,000 ohm 1 watt carbon resistor	.16
R5	R5	3LR-265	40,000 ohm ½ watt carbon resistor	.16
R6	—	NNR-220	3 megohm ¼ watt carbon resistor	.16
R7	R7	HR-42	2 megohm ¼ watt carbon resistor	.16
R8	R8	3ZR-288	Volume control with line switch—500,000 ohms	1.05
R9	—	3VR-270	90 ohm ½ watt wire-wound resistor	.16
R10	—	3RR-274	5 megohm ¼ watt carbon resistor	.16
R11	—	4RR-316	210 ohm 1 watt wire-wound resistor	.16
R12, R14	R12	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R13	{R13, R23} {R24, R25}	KR-56	500,000 ohm ¼ watt carbon resistor	.16
—	R14	3AR-250	3,500 ohm ¼ watt carbon resistor	.16
—	R15	LLR-154	75,000 ohm ¼ watt carbon resistor	.16
—	R17	KR-55	250,000 ohm ¼ watt carbon resistor	.16
—	R18	3RR-275	10 megohm ¼ watt carbon resistor	.16
—	R19, R21	4RR-319	175 ohm 1 watt wire-wound resistor	.16
—	R20	3CR-281	45 ohm ½ watt wire-wound resistor	.16
—	R22	KR-57	1 megohm ¼ watt carbon resistor	.16
†C1, C2	†C1, C2	4HC-343A	Two-gang variable condenser	3.65
‡C3, C5, C6	‡C3, C5, C6	—	Trimmer, part of antenna coil.	
C4, C8	C4, C8	AAC-106A	0.00005 mf mica condenser	.20
C7, C19	C7	BC-12	0.05 mf, 200 volt tubular condenser	.20
‡C9, C10	‡C9, C10	—	Trimmer, part of oscillator coil.	
C11, C14	C11	KC-58	0.01 mf, 400 volt tubular condenser	.20
C12	C12	2NC-231	Single adjustable padding condenser. Range: 300 to 600 mmf	.50
C13	C13	3EC-267	0.0042 mf mica condenser	.40
‡C15, C16	‡C15, C16	—	Trimmer, part of first i-f transformer.	
‡C17, C18	‡C17, C18	—	Trimmer, part of second i-f transformer.	
C20	C20	AC-7A	0.00025 mf mica condenser	.20
C21	—	HC-34	0.006 mf, 600 volt tubular condenser	.20
C22	C22	IC-47	0.0005 mf mica condenser	.20
C23	—	LC-65	0.02 mf, 400 volt tubular condenser	.20
C24	—	ZC-115	0.006 mf, 1000 volt tubular condenser	.20
C25	C36	2TC-189	0.015 mf, 1000 volt tubular condenser	.20
C26	C26	EEC-132	0.1 mf, 400 volt tubular condenser	.20
†C27	†C27	2NC-246	16 mf, 450 volt wet electrolytic condenser	1.20
†C28	†C28	2NC-247	16 mf, 405 volt wet electrolytic condenser	1.20
C29	C29	3LC-297A	0.01 mf, 400 volt molded type paper condenser	.20
—	C30	LLC-150	0.004 mf, 600 volt tubular condenser	.20
—	C31	BC-13	0.25 mf, 200 volt tubular condenser	.20
—	C32	AC-6	0.1 mf, 200 volt tubular condenser	.20
—	C33, C35	EC-23	0.03 mf, 400 volt tubular condenser	.20
—	C34	FC-29	0.02 mf, 200 volt tubular condenser	.20
—	C37, C38	3HC-274	0.002 mf, 600 volt tubular condenser	.20
—	C39	IC-47A	0.0005 mf mica condenser	.20
		TTS-111K	Wave-band switch	.60
		†3ES-256	Tone control switch	.50
		†4RS-301	Automatic stop for motor	2.50
		3LS-211	Phono-radio switch	1.00
		†4RS-297	6½" dynamic speaker	5.75
		†4RS-298	10" dynamic speaker	8.75
		XL-9	Pilot light, 6.3 volt, .25 amp. Mazda No. 46	.20
		3LPM-3	110 volt a.c. phonograph motor	23.45
		3ZZ-564	Crystal pickup	18.00
		4RZ-685	Phonograph record album	2.10
		†4FZ-596A	Dial face (formerly 4FZ-596)	1.20
		3LZ-403A	Dial drive belt	.15
		3CZ-337B	Dial drive shaft and pulley	.10
		3CZ-339	Idler pulley	.05
		4HZ-562	Idler pulley spring	.05
		3CZ-341	Condenser shaft pulley	.10
		4RZ-592	Dial pointer	.25
		3SZ-438C	Escutcheon with crystal (*Note*: When this escutcheon is ordered, four screws, part No. 4TMS-159, must also be ordered. The old escutcheon, part No. 4RZ-595, did not require these screws.)	1.95

When ordering replacement parts specify part numbers.

*Item number locates the article on the schematic diagram.
†See production changes.
‡These trimmer condensers are part of the coil assemblies and can not be supplied separately.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS AR-171, AR-173, AR-174, AR-176, AR-180, AR-185, AR, AT, AT-170, AT-172 & AT-181



I.F. PEAKED AT 456 K.C.

WAVE BAND SWITCH SHOWN IN BROADCAST POSITION
POSITION NO 1 BROADCAST
NO 2 SHORT WAVE

6 TUBE AC RECEIVER

GENERAL NOTES

1. The receiver should never be turned on with either the speaker plug or the 41 tube out of its respective socket, since the rapid rise in rectifier voltage will damage the electrolytic condenser.
2. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.
3. The color coding of the i-f transformers is as follows:
   Grid—green; Grid return—black
   B plus—red; Plate—blue.
4. The color coding of the power transformer is as follows:
   Primary—two black leads
   High-voltage secondary—two red leads
   High-voltage secondary center tap—red and yellow lead
   6.3 volt secondary—two green leads
   5 volt secondary—two yellow leads.
5. The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the wave-band switch) with the screw adjustment accessible through a hole in the top of the chassis. The short-wave band has a fixed padder, C13 on schematic. When replacing this fixed padder be careful to use a condenser which has a capacity within 2% of the specified value, otherwise the short-wave coils may not track.
6. With a few exceptions, the color coding of the general wiring is as follows:
   Plate—blue; Cathode—white or yellow
   B plus—red; Grid—green
   Screen—brown; Fil. and ground—black.
7. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraph station the wave-trap trimmer may be readjusted until the response from the interfering station is at a minimum.
8. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. For reduction of noise and achievement of high efficiency on all frequency ranges the Emerson All-Wave High-Fidelity Antenna, Model W-78, and the Emerson All-Wave Antenna System, Model W-89, are recommended. Instructions for the installation of these antennas are supplied with each kit.
   In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.
9. On the AT models, if for any reason the automatic dial assembly has been taken apart, care should be taken in re-aligning the circular button housing with the variable condenser. With the circular housing in the extreme clockwise position, the variable condenser should be about 5 degrees open from the maximum capacity position. (Five degrees is about 3/32" between the rotor plate tie-bar and the edges of the stator plates on the variable condenser.)

Tube Data

The tube complement is as follows:
1—6A7, pentagrid oscillator-modulator.
1—6D6, i-f amplifier.
1—76, diode detector and a.v.c. (behind second i-f transformer).
1—76, audio amplifier.
1—41, pentode power output.
1—80, full-wave rectifier.

VOLTAGE ANALYSIS

Readings should be taken with a 1,000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal.

The line voltage for these readings was 117.5 volts, 60 cycles a.c.

Tube	*Plate*	*Screen*	*Osc. Plate*	*Cathode*	*Fil.*
6A7 osc.-mod.	244	62	118	0	6.3 a.c.
6D6 i-f amp.	244	85	—	0	6.3 a.c.
76 detector a.v.c.	0	—	—	0	6.3 a.c.
76 a-f amp.	85	—	—	0	6.3 a.c.
41 output	226	244	—	0	6.3 a.c.

Voltage across speaker field—65.

Voltage at 80 filament to B minus (center-tap of high-voltage winding on power transformer)—325.

The grid bias for all the tubes is developed across the resistors R9 and R11 (see schematic). The total voltage measured across R9 and R11 should be 15 volts, and is the bias for the 41 tube. The voltage measured across R9 should be 5 volts. To check the bias on the 6A7 and 6D6 tubes, measure the values of resistors R6, R7 and R8 (see schematic).

PRODUCTION CHANGES

Model AR-174 receivers differ from the schematic diagram as follows:
a. C27 is a 12 mf, 450 volt dry electrolytic condenser, part no. 3LC-314.
b. C28 is a 24 mf, 400 volt dry electrolytic condenser, part no. 3ZC-341.
c. A .25 mf, 200 volt condenser is connected from the screen-grid of the 6D6 i-f amplifier to ground.

In receivers bearing serial numbers below 1,200,100:
a. C1 and C2 was a two-gang variable condenser, part no. 4HC-343B and the dial face used with this condenser was part no. 4RZ-580.

*Item number locates the article on the schematic diagram.
†See production changes.
‡These trimmer condensers are part of the coil assemblies and can not be supplied separately.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600 and 16,000 kc should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

If the circuit is at all disturbed, both the broadcast and short-wave bands must be realigned.

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Always use as weak a test signal as possible during alignment.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The second i-f is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of the cans.

The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the 6A7 tube) with the screw adjustment accessible through a hole in the front of the chassis.

The antenna coils for the broadcast and short-wave bands and the 456 kc wave trap are wound on one form and mounted underneath the chassis deck directly behind the adjustable padding condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the short-wave antenna trimmer. The central trimmer is the broadcast antenna trimmer. The trimmer nearest the rear of the chassis is the 456 kc wave trap.

The oscillator coils for the broadcast and short-wave bands are wound on one form and mounted underneath the chassis deck near the variable condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is for the short-wave oscillator coil and the trimmer farthest from the front is for the broadcast oscillator coil.

I-f and Wave-trap Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 456 kc, through a 0.02 mf paper condenser, to the grid cap of the 6A7 tube (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna through a standard dummy antenna (a 0.0002 mica condenser may be substituted) and adjust the wave-trap trimmer (farthest from front on left side of the chassis) for *minimum* response. (See General Notes.)

Short-Wave Alignment for Model AR (Alignment of the short-wave band should precede broadcast alignment)

Use a 400 ohm dummy antenna (a 400 ohm non-inductive resistor in series with the test oscillator antenna lead) when aligning the short-wave coils. Rotate the wave-band switch to the short-wave (counter-clockwise) position, and set the dial indicator exactly at 16 megacycles. Feed 16,000 kc to the antenna and adjust the short-wave oscillator trimmer (nearest the front beside variable condenser) for maximum response, and then adjust the short-wave antenna trimmer (nearest the front on the left side of the chassis) for maximum response. Be very careful to choose the minimum capacity peak on the oscillator trimmer.

Broadcast Alignment for Model AR

By adding a cipher to each figure on the broadcast band calibration for the Model AR, this scale can be made to read directly in kilocycles.

Use a standard dummy antenna in aligning the broadcast coils. (A .0002 condenser may be substituted.) Rotate the wave-band switch to the broadcast (clockwise) position. Set the dial indicator at 600 kc on the dial and feed 600 kc. Adjust the broadcast series padder (in corner near 6A7 tube) for maximum response. Move the dial pointer to 1600 kc on the dial and feed 1600 kc. Adjust the broadcast oscillator trimmer (farthest from front beside the variable condenser) for maximum response and then adjust the broadcast antenna trimmer (central trimmer at left side of chassis). Return pointer to 600, feed 600 kc and readjust the broadcast series padder, rocking the variable condenser (rotate the variable condenser shaft back and forth through a small arc) for maximum response.

Alignment Procedure for Model AT

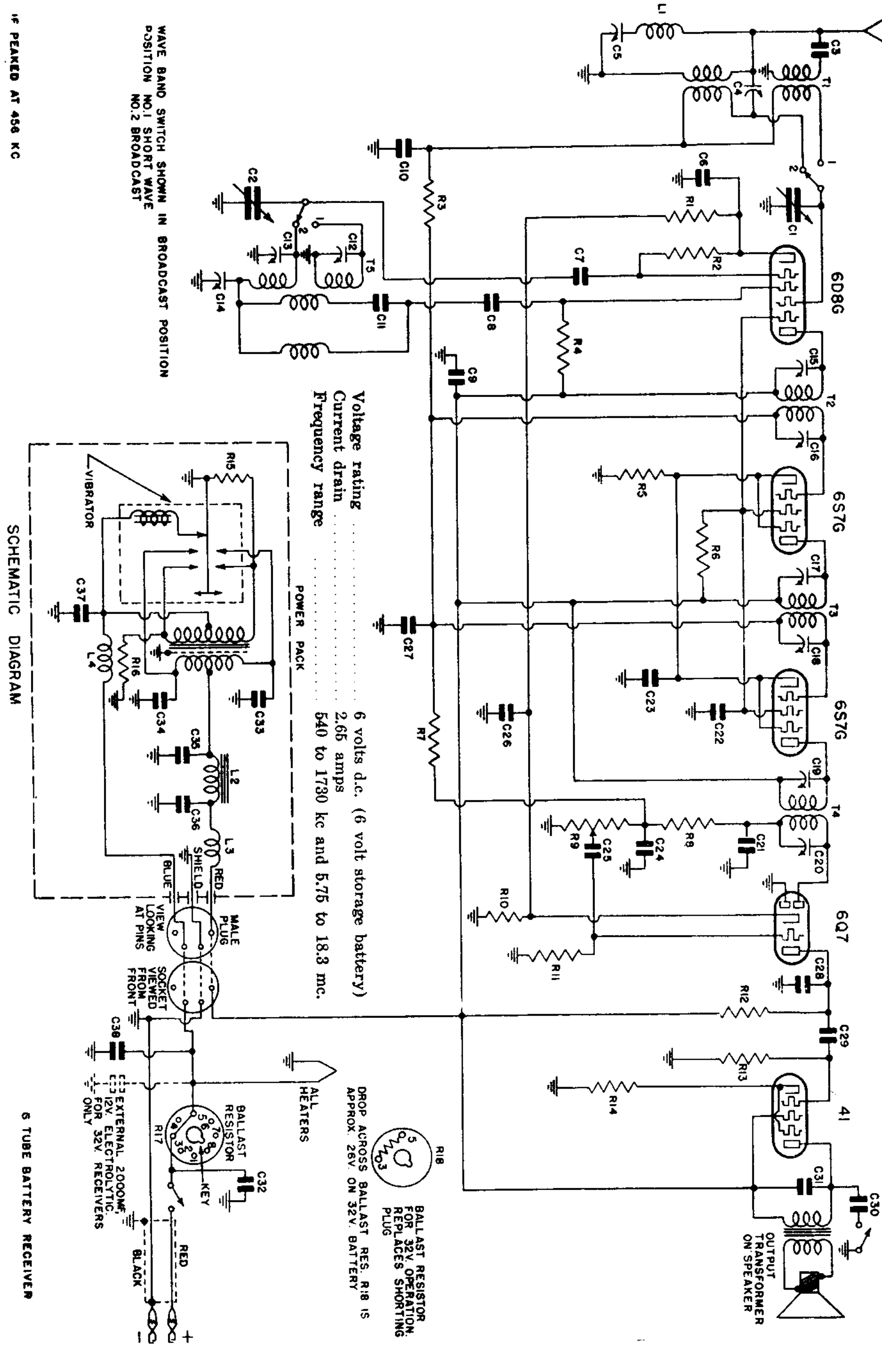
In order to align the Model AT, it will first be necessary to fasten a short, stiff piece of wire to a fixed part of the chassis in such a way that when the variable condenser is set at minimum capacity, the wire will point to the heavy vertical line at the high frequency end of the dial scale.

Thereafter, using this wire as an indicator, the alignment procedure will be the same as that outlined above for the Model AR.

*Item	Part No.	DESCRIPTION	PRICE
T1, L1	3CT-289A	Two-band antenna coil and 456 kc wave-trap	$1.80
T2	3CT-290A	Two-band oscillator coil	1:25
T3	3ZT-342	456 kc first i-f transformer	1.50
T4	2NT-231	456 kc second i-f transformer	1.35
T5	3ZT-345	Power transformer	4.45
R1	KR-53	50,000 ohm, 1/4 watt carbon resistor	.16
R2	3BR-247	40,000 ohm, 1/4 watt carbon resistor	.16
R3	LR-65	10,000 ohm, 1/4 watt carbon resistor	.16
R4	BR-12	25,000 ohm, 1 watt carbon resistor	.16
R5	3LR-265	40,000 ohm, 1/2 watt carbon resistor	.16
R6	NNR-220	3 megohm, 1/4 watt carbon resistor	.16
R7	HR-42	2 megohm, 1/4 watt carbon resistor	.16
R8	3ZR-288	Volume control with line switch—for Chassis AR—500,000 ohms	1.05
	4TR-303	Volume control with line switch—for Chassis AT—500,000 ohms	1.05
R9	3VR-270	90 ohm, 1/2 watt wire-wound resistor	.16
R10	3RR-274	5 megohm, 1/4 watt carbon resistor	.16
R11	4RR-316	210 ohm, 1 watt wire-wound resistor	.16
R12	KR-54	100,000 ohm, 1/4 watt carbon resistor	.16
R13	KR-56	500,000 ohm, 1/4 watt carbon resistor	.16
†C1, C2	4HC-343A	Two-gang variable condenser—for Chassis AR	3.65
	4TC-356	Two-gang variable condenser—for Chassis AT	4.10
‡C3, C5, C6		Trimmer, part of antenna coil.	
C4, C8	AAC-106A	0.00005 mf mica condenser	.20
C7, C19	BC-12	0.05 mf, 200 volt tubular condenser	.20
‡C9, C10		Trimmer, part of oscillator coil.	
C11, C14	KC-58	0.01 mf, 400 volt tubular condenser	.20
C12	2NC-231	Single adjustable padding condenser. Range: 300 to 600 mmf	.50
C13	3EC-267	0.0042 mf mica condenser	.40
‡C15, C16		Trimmer, part of first i-f transformer.	
‡C17, C18		Trimmer, part of second i-f transformer.	
C20	AC-7A	0.00025 mf mica condenser	.20
C21	HC-34	0.006 mf, 600 volt tubular condenser	.20
C22	IC-47	0.0005 mf mica condenser	.20
C23	LC-65	0.02 mf, 400 volt tubular condenser	.20
C24	ZC-115	0.006 mf, 1000 volt tubular condenser	.20
C25	2TC-189	0.015 mf, 1000 volt tubular condenser	.20
C26	EEC-182	0.1 mf, 400 volt tubular condenser	.20
†C27	2NC-246	16 mf, 450 volt wet electrolytic condenser	1.20
†C28	2NC-247	16 mf, 405 volt wet electrolytic condenser	1.20
C29	3LC-297A	0.01 mf, 400 volt molded type paper condenser	.20
	2TS-145E	Tone control switch for Chassis AR	.35
	2TS-145G	Tone control switch for Chassis AT	.40
	TTS-111K	Wave-band switch for Chassis AR	.60
	TTS-111N	Wave-band switch for Chassis AT	.55
	4RS-270B	6½" dynamic speaker	5.50
	4TS-231	10" dynamic speaker	8.00
	XL-9	Pilot light 6.3 volt, .25 amp., Mazda No. 46	.20

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS AS & AS-179



Voltage rating		6 volts d.c. (6 volt storage battery)
Current drain		2.65 amps
Frequency range		540 to 1730 kc and 5.75 to 18.3 mc.

REPLACEMENT PARTS LIST

List Price ea. Effective as of Aug. 15th, 1937 (Subject to change without notice)

*Item	Part No.	DESCRIPTION	PRICE
T1	4ST-394	Two-band antenna coil	$2.00
T2	4ET-350C	456 kc first i-f transformer	1.15
T3	4ET-350A	456 kc second i-f transformer	1.15
T4	4FT-382B	456 kc third i-f transformer	1.20
T5	4ST-395	Two-band oscillator coil	1.60
T6	4ST-383	Power transformer	3.80
R1	4ER-286	510 ohm ½ watt wire-wound resistor	.16
R2	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R3	HR-42	2 megohm ¼ watt carbon resistor	.16
R4	LR-65	10,000 ohm ¼ watt carbon resistor	.16
R5, R14	4SR-315	640 ohm ½ watt wire-wound resistor	.16
R6	ZZR-196	30,000 ohm ¼ watt carbon resistor	.16
R7	KR-57	1 megohm ¼ watt carbon resistor	.16
R8	LLR-152	150,000 ohm ¼ watt carbon resistor	.16
R9	3HR-240	Volume control with line switch—500,000 ohms	1.20
R10	3CR-294	240 ohm ½ watt wire-wound resistor	.16
R11	KR-56	500,000 ohm ¼ watt carbon resistor	.16
R12	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R13	KR-55	250,000 ohm ¼ watt carbon resistor	.16
R15, R16	4SR-314	90 ohm 1 watt wire-wound resistor	.16
C1, C2	4UC-351	Two-gang variable condenser	4.25
C3, C7, C11	AAC-106A	.00005 mf mica condenser	.20
†C4, C5	——	Trimmer, part of antenna coil.	
C6, C22, C23	AC-6	.1 mf, 200 volt tubular condenser	.20
C8	KC-58	.01 mf, 400 volt tubular condenser	.20
C9	BBC-131	.9 mf, 200 volt tubular condenser	.50
C10	3EC-267	.0042 mf mica condenser	.40
†C12, C13	——	Trimmer, part of oscillator coil.	
C14	2NC-231	Adjustable padding condenser. Range—300 to 600 mmf	.50
†C15, C16, C17, C18, C19, C20	——	Trimmer, part of i-f transformers.	
C21, C24, C28	AC-7A	.00025 mf mica condenser	.20
C25	FC-29	.02 mf, 200 volt tubular condenser	.20
C26, C27	BC-12	.05 mf, 200 volt tubular condenser	.20
C29	LC-65	.02 mf, 400 volt tubular condenser	.20
C30	LLC-150	.004 mf, 600 volt tubular condenser	.20
‡C31	HC-34	.006 mf, 600 volt tubular condenser	.20
C32	AAC-114	.001 mf, mica condenser	.20
C33, C34	ZC-99	.02 mf, 1000 volt tubular condenser	.25
C35, C36	4SC-355	Two-section dry electrolytic condenser C35—8 mf, 200 volts. C36—12 mf, 200 volts.	1.45
C37	3VC-322	.5 mf, 50 volt tubular condenser	.55
C38	BC-13	.25 mf, 200 volt tubular condenser	.20
L2	ZZT-196A	Iron-core filter choke	.90
L3	OOT-166A	R-f "B" choke	.35
L4	ZT-98F	R-f "A" choke	.45
	‡4SS-278	Dynamic speaker, complete	7.40
	2TS-145E	Tone control switch	.35
	TTS-111K	Wave-band switch	.60
	4SW-91	Battery cable	1.40
	4SZ-669	Dial face	1.20
	3LZ-403	Dial drive belt	.15
	4FZ-602	Dial drive shaft and pulley	.20
	3CZ-339	Idler pulley	.05
	4FZ-603	Idler spring	.10
	4UZ-604	Condenser shaft pulley	.15
	4RZ-592	Dial pointer	.25
	4RZ-595	Dial escutcheon with crystal	1.95
	4SV-11	Synchronous vibrator	4.55

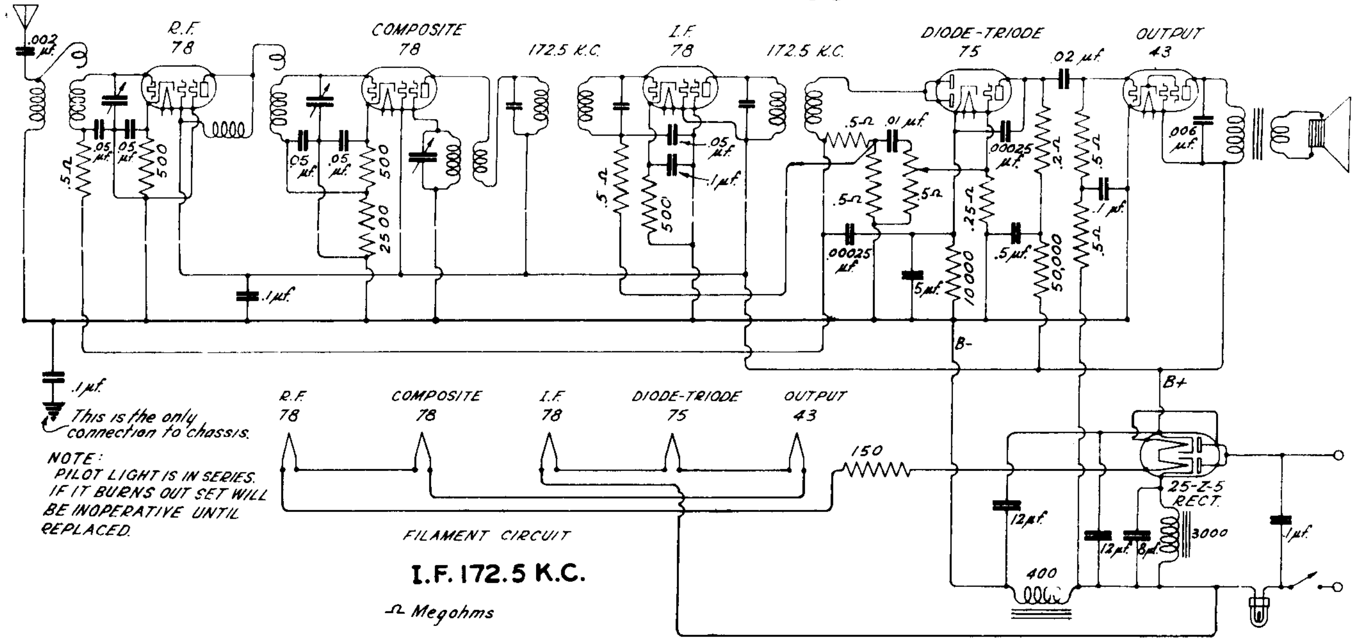
When ordering replacement parts specify part numbers.

*Item number locates the article on the schematic diagram.
†These trimmer condensers are part of the coil assemblies and can not be supplied separately.
‡See production changes.

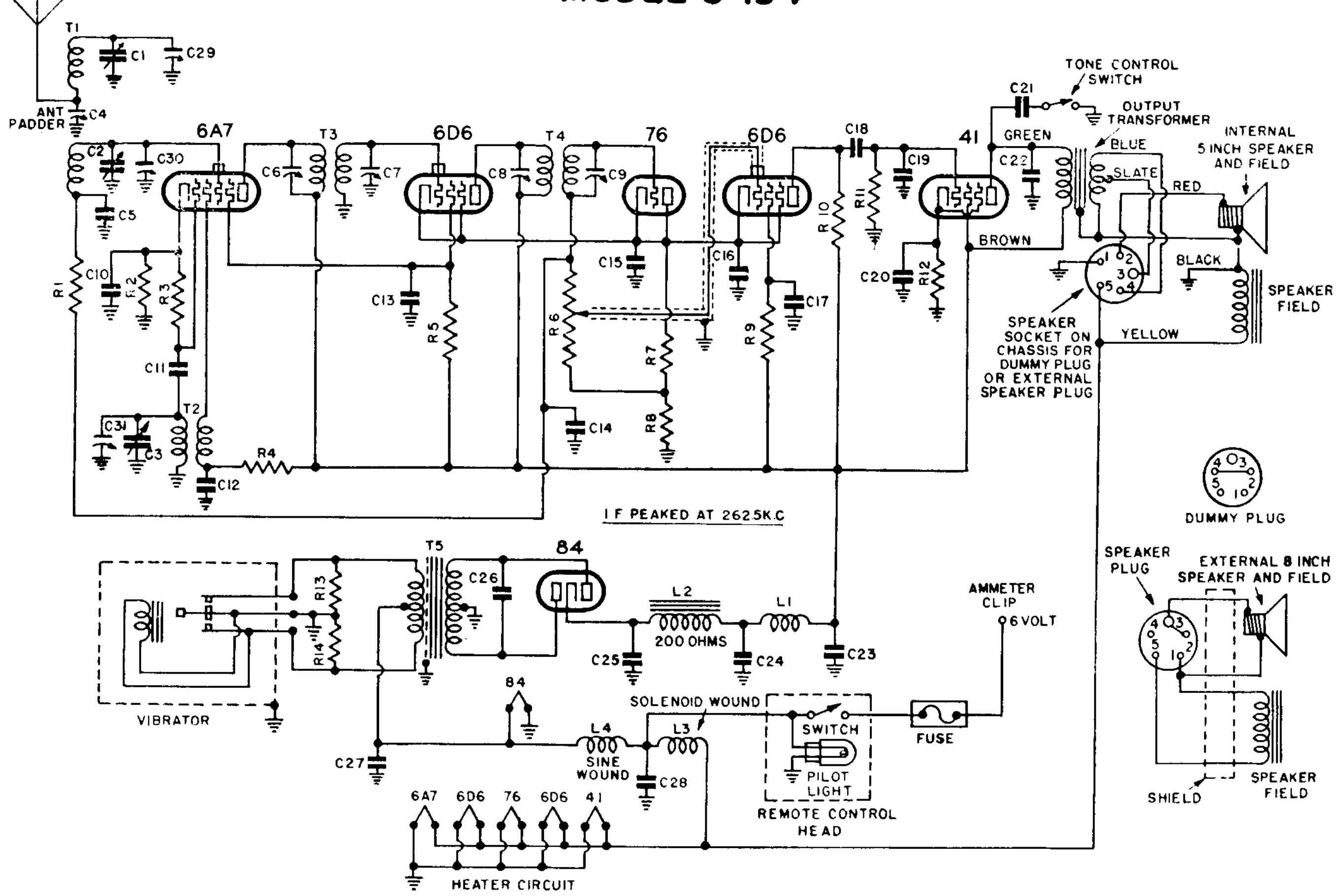
‡Production changes: In sets bearing serial numbers below 1,294,700, C31 was a .002 mf, 600 volt condenser. In sets bearing serial numbers below 1,294,000 the speaker was part number 4FS-274.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS T6 & 35



MODEL U-154



REPLACEMENT PARTS

*ITEM	PART NO.	DESCRIPTION
T1	3UT-331	Preselector coil
T2	3UT-325	Oscillator coil
T3	3UT-332	262 kc first i-f transformer
T4	3UT-333	262 kc second i-f transformer
T5	3UT-334	Power transformer
L1	OOT-166	1 millihenry r-f choke
L2	3VT-229	Iron-core filter choke
L3	OOT-167B	"A" choke solenoid
L4	3VT-328	"A" choke sine wound
R1	HR-42	2 megohm ¼ watt carbon resistor
R2	3UR-282	860 ohm ½ watt wire-wound resistor
R3	3VR-272	60,000 ohm ¼ watt carbon resistor
R4	LR-60	20,000 ohm ¼ watt carbon resistor
R5	LLR-154	75,000 ohm ¼ watt carbon resistor
R6	3VR-267	Volume control—1 megohm
R7	3DR-239	250 ohm ½ watt wire-wound resistor
R8	3UR-273	750 ohm ½ watt wire-wound resistor
R9	KR-57	1 megohm ¼ watt carbon resistor
R10	LLR-152	150,000 ohm ¼ watt carbon resistor
R11	KR-56	500,000 ohm ¼ watt carbon resistor
R12	3VR-271	510 ohm 1 watt wire-wound resistor
R13, R14	3VR-270	90 ohm ½ watt wire-wound resistor
C1, C2, C3	3VC-319	Three-gang variable condenser
†C4		Padder condenser part of 3UT-331 preselector coil assembly.
C5, C10	FC-29	0.02 mf, 200 volt tubular condenser
†C6, C7		Trimmer part of 3UT-332 first i-f coil assembly.
†C8, C9		Trimmer part of 3UT-333 second i-f transformer assembly.
C11, C12 C14, C19, C28	AC-7A	0.00025 mf mica condenser
C13, C15, C17	BC-12	0.05 mf, 200 volt tubular condenser
C16	IC-43A	5 mf, 25 volt dry electrolytic condenser
C18	LC-65	0.02 mf, 400 volt tubular condenser
C20, C24, C25	3VC-320A	Dry electrolytic condenser block C20, 20 mf—35 volt. C24, 8 mf—350 volt. C25, 8 mf—350 volt
C21	3DC-272	0.015 mf, 600 volt tubular condenser with mounting strap
C22	3VC-324	0.003 mf, 600 volt tubular condenser
C23	EEC-132	0.1 mf, 400 volt tubular condenser
C26	3UC-225	0.0075 mf, 2000 volt condenser
C27	3VC-222	0.5, mf, 50 volt tubular condenser
	OOC-164	Special 0.5 mf ammeter condenser
	OOC-165	Special 0.5 mf generator condenser
	3US-235	5" dynamic speaker
	3VS-247	8" dynamic speaker
	OOS-108A	Tone control switch
	OOW-53A	Shielded antenna lead
	OOZ-165	Distributor suppressor
	3VV-10	Non-synchronous vibrator
	3VZ-540	Tuning control cable
	3VZ-541	Volume control cable
‡C29, C30, C31		Trimmer, part of variable condenser.

WHEN ORDERING REPLACEMENT PARTS SPECIFY PART NUMBER

*Item number locates the article on the schematic diagram.

†These trimmer condensers are part of coil assemblies and cannot be supplied separately.

‡These trimmer condensers cannot be supplied separately.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS X, X-146, X-178, X-183
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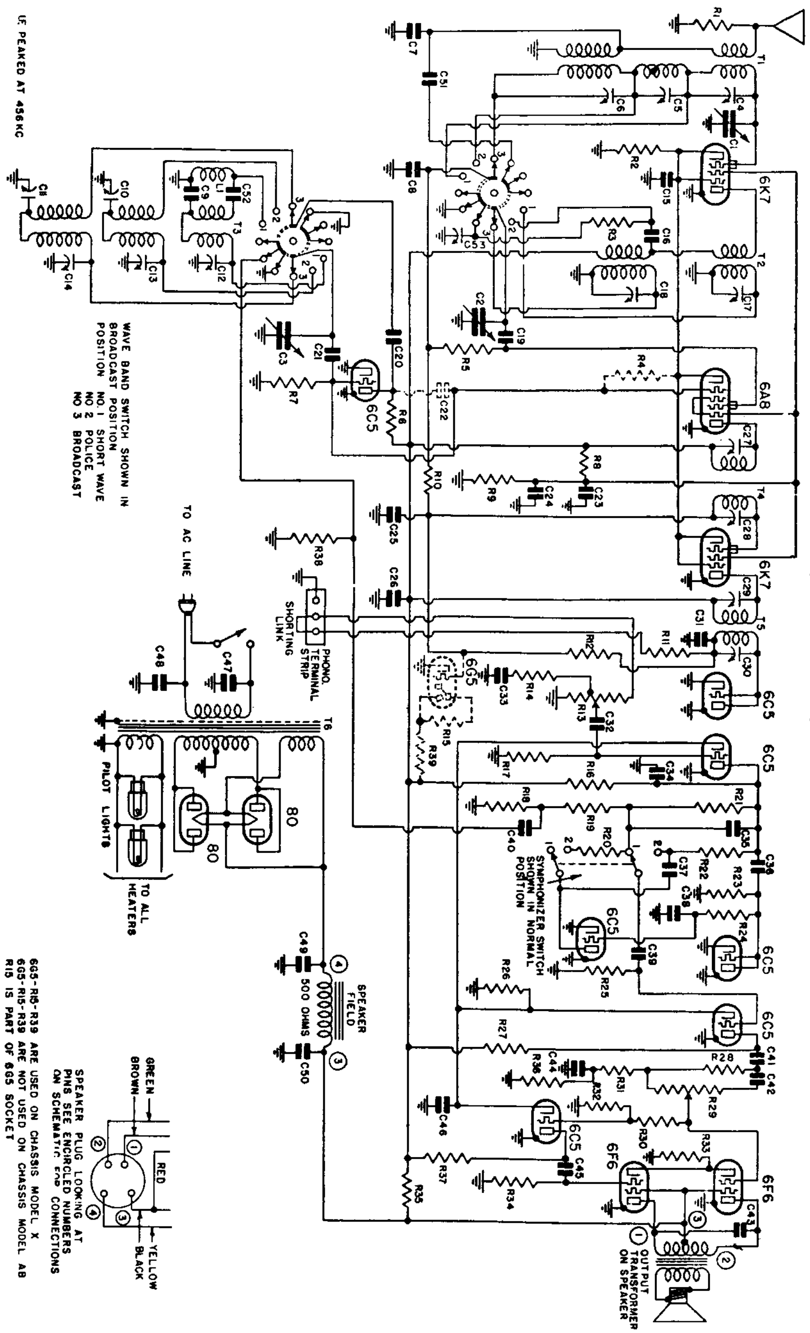


REPLACEMENT PARTS

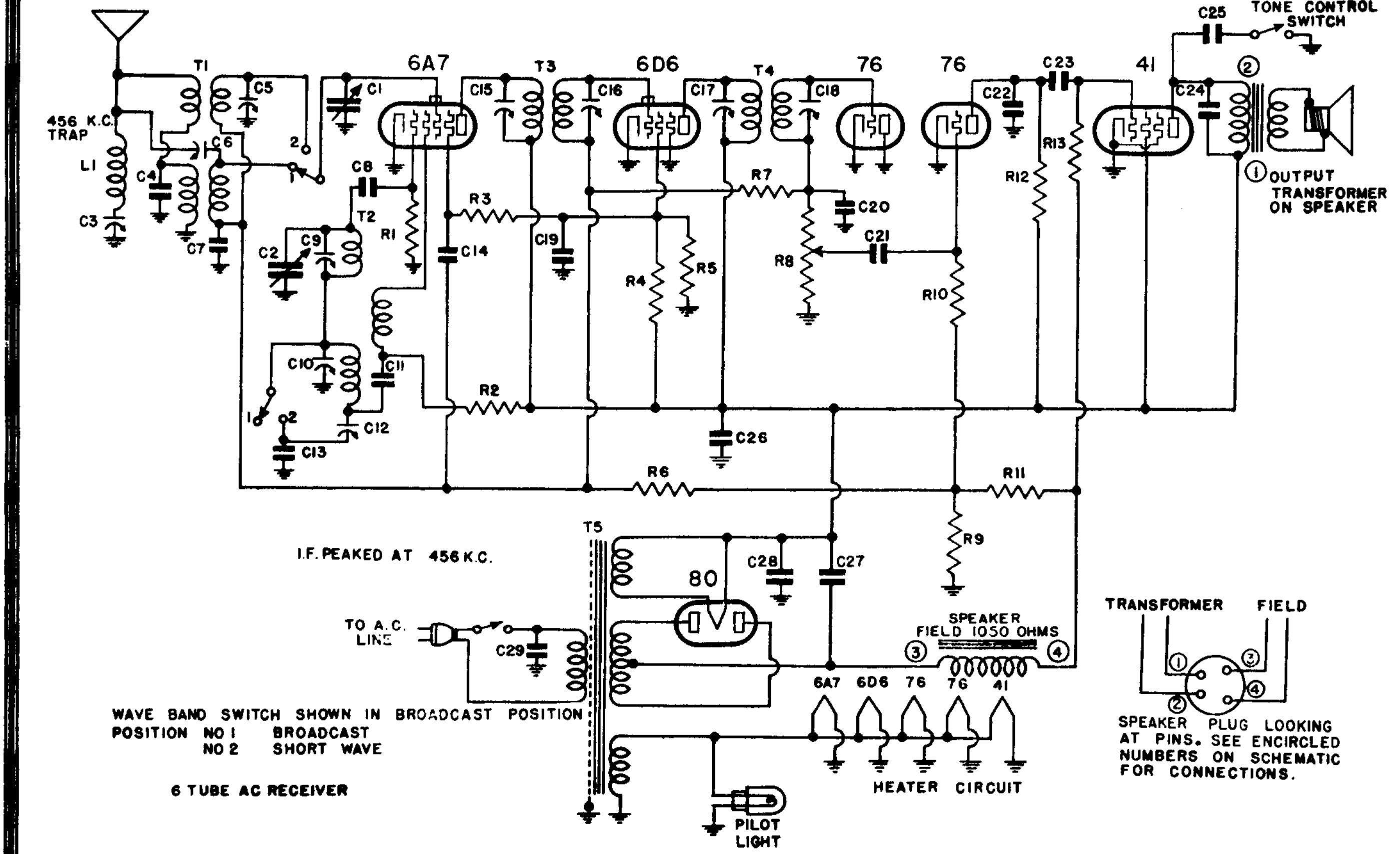
*Item	Part No.	DESCRIPTION	List Price as. Effective as of Oct. 1st, 1937 (Subject to change without notice) PRICE
T1	4BT-396	Three-band antenna coil (See Production Changes)	$2.05
T2	4BT-397	Three-band interstage coil (See Production Changes)	1.80
T3	4BT-398	Three-band oscillator coil (See Production Changes)	1.95
T4	3BT-269	456 kc first i-f transformer	2.00
T5	3AT-261	456 kc second i-f transformer	1.90
T6	3XT-338	Power transformer	6.90
L1	4BT-399	Oscillator choke (See Production Changes)	.25
R1, R14, R31	LR-64	5,000 ohm, ¼ watt carbon resistor	.16
R2	3VR-270	90 ohm, ½ watt wire-wound resistor	.16
R3	LR-60	20,000 ohm, ¼ watt carbon resistor	.16
R4, R7, R10, R11, R16, R18, R27, R28, R37	KR-53	50,000 ohm, ¼ watt carbon resistor	.16
R5, R23, R25	KR-57	1 megohm, ¼ watt carbon resistor	.16
R6	BR-12	25,000 ohm, 1 watt carbon resistor (See Production Changes)	.16
R8	3BR-246	10,000 ohm, 2 watt carbon resistor	.28
R9	2TR-225	12,000 ohm, 2 watt carbon resistor	.28
R12, R17, R22	HR-42	2 megohm, ¼ watt carbon resistor	.16
R13	3XR-287	Volume control—500,000 ohms	.90
R15		1 megohm resistor in 6G5 socket (See Production Changes)	.16
R19	KR-63	15,000 ohm, ¼ watt carbon resistor	.16
R20, R36	LR-61	200,000 ohm, ¼ watt carbon resistor	.16
R21	LLR-154	75,000 ohm, ¼ watt carbon resistor	.16
R24	NNR-220	3 megohm, ¼ watt carbon resistor	.16
R26	YR-96	1,500 ohm, ¼ watt carbon resistor	.16
R29	3XR-277	Tone control with line switch—500,000 ohms	1.00
R30, R34	KR-56	500,000 ohm, ¼ watt carbon resistor	.16
R32	NR-66	35,000 ohm, ¼ watt carbon resistor	.16
R33	3XR-278	220 ohm, 2 watt wire-wound resistor	.16
R35	3XR-283	1,500 ohm, 2 watt carbon resistor	.28
R38	OR-73	25,000 ohm, ¼ watt carbon resistor	.16
R39	GR-31	20,000 ohm, ¼ watt carbon resistor (See Production Changes)	.16
C1, C2, C3	4BC-361	Three-gang variable condenser with gear train for dial (See Production Changes)	7.75
†C4, C5, C6		Trimmer, part of antenna coil.	
C7, C52	AAC-106A	0.00005 mf mica condenser (See Production Changes)	.20
C8	BC-12	0.05 mf, 200 volt tubular condenser	.20
C9	3EC-267	0.0042 mf mica condenser (See Production Changes)	.40
C10, C11	3SC-309	Dual adjustable padding condenser C10—1,200 to 2,000 mmf C11—300 to 600 mmf	.95
†C12, C13, C14		Trimmer, part of oscillator coil.	
C15, C38	BC-13	0.25 mf, 200 volt tubular condenser	.20
C16	LC-65	0.02 mf, 400 volt tubular condenser (See Production Changes)	.20
†C17, C18, C53		Trimmer, part of interstage coil.	
C19, C31	EC-24A	0.0001 mf mica condenser	.20
C20, C32, C37, C42, C51	KC-58	0.01 mf, 400 volt tubular condenser	.20
C21, C22	IIC-133A	0.000025 mf mica condenser (See Production Changes)	.20
C23	YC-98A	4 mf, 150 volt tubular dry electrolytic condenser	1.05
C24, C33	AC-6	0.1 mf, 200 volt tubular condenser	.20
C25	FC-29	0.02 mf, 200 volt tubular condenser	.20
C26, C36, C41	EEC-132	0.1 mf, 400 volt tubular condenser	.20
†C27, C28		Trimmer, part of first i-f transformer.	
†C29, C30		Trimmer, part of second i-f transformer.	
C34, C35	IC-47A	0.0005 mf mica condenser	.20
C39	LC-65	0.02 mf, 400 volt tubular condenser	.20
C40	EC-19	0.5 mf, 200 volt tubular condenser	.35
C43	NNC-214	0.002 mf, 1000 volt tubular condenser	.20
C44	3XC-331	0.015 mf, 400 volt tubular condenser	.20
C45	LC-64	0.05 mf, 400 volt tubular condenser	.20
C46	IC-43A	5 mf, 25 volt tubular dry electrolytic condenser	.90
C47, C48	3LC-297A	0.01 mf, 400 volt molded type paper condenser	.20
C49, C50	3XC-329	30 mf, 400 volt wet electrolytic condenser	1.45
	3XS-237	Dynamic speaker complete	13.75
	3XS-238	Wave-band switch	1.90
	2AS-137A	Symphonizer switch	.90
	XL-9 or	Pilot light, 6.3 volt, .25 amp., Mazda No. 46. Screw type base	.20
	4BL-94	Pilot light, 6.3 volt, .25 amp., Mazda No. 44. Bayonet type base	.20
	3XD-46	Metal plate for dial face	.60
	3XM-277	Dial bracket	.20
	3XZ-678	Dial face (See Production Changes)	1.30
	3CZ-339	Idler pulley	.05
	3XZ-537	Idler pulley spring	.05
	3AZ-371	Dial drive belt	.20
	3SZ-436	Frequency indicating pointer (screw-type)	.10
	3XZ-612	Frequency indicating pointer (push-on type)	.30
	3AZ-367A	Band-spread pointer	.10
	3XZ-497	Dial drive shaft and pulley	.30
	3XZ-538	Drive shaft bushing	.10
	3XZ-684	Electron Ray socket and cable with 1 meg. resistor (See Production Changes)	.80
	3AZ-407	Electron Ray escutcheon	.20
	3AZ-406C	Dial escutcheon with crystal	1.65

When ordering replacement parts specify part numbers.

*Item number locates the article on the schematic diagram.
†These trimmer condensers are part of the coil assemblies and cannot be supplied separately.

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS Z-117, Z-122, Z-133, Z-135, Z-141, Z-150, Z-159 & Z-160



GENERAL NOTES

1. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
2. The receiver should never be turned on with either the speaker plug or the 41 tube out of their sockets, since the rapid rise in rectifier voltage would damage the electrolytic condensers.
3. The pilot light may be replaced by slipping the push-on socket off the dial and unscrewing the bulb. It is not necessary to remove either the dial or chassis from cabinet.
4. In replacing chassis in cabinet do not tighten mounting screws so much that chassis will not float freely, and do not allow any part of the dial assembly to touch the cabinet. Do not push control knobs on so far that they touch the cabinet front panel. If these precautions are not observed the receiver may become microphonic.
5. The color coding of the 3ZT-345 power transformer leads is as follows: (See production changes for color coding of power transformer previously used.)
   Primary—two black leads — 6.3 v. sec.—two green leads
   High voltage sec.—two red leads — 5 v. sec.—two yellow leads
   High voltage sec. center tap—red and yellow
6. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. The Emerson All-Wave Antenna is especially designed for high efficiency and reduction of noise on all frequency ranges. Complete instructions for the installation of this antenna are supplied with each kit.

Tube Data

The tube complement is as follows:

1—6A7, pentagrid oscillator-modulator.
1—6D6, i-f amplifier.
1—76, diode detector and a.v.c. (behind second i-f transformer).
1—76, audio amplifier.
1—41, pentode power output.
1—80, full-wave rectifier.

Voltage rating .... 105-125 volts, 60 cycle a.c.
Power consumption . 55 watts
Frequency ranges . . 540 to 1730 kc and 5.6 to 18 megacycles

VOLTAGE ANALYSIS

Readings should be taken with a 1,000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal.

The line voltage for these readings was 117.5 volts, 60 cycles a.c.

Tube	*Plate*	*Screen*	*Osc. Plate*	*Cathode*	*Fil.*
6A7 osc.-mod.	244	62	118	0	6.3 a.c.
6D6 i-f amp.	244	85	—	0	6.3 a.c.
76 detector a.v.c.	0	—	—	0	6.3 a.c.
76 a-f amp.	85	—	—	0	6.3 a.c.
41 output	226	244	—	0	6.3 a.c.

Voltage across speaker field—65.

Voltage at 80 filament to B minus (center-tap of high-voltage winding on power transformer)—325.

The grid bias for all the tubes is developed across the resistors R9 and R11 (see schematic). The total voltage measured across R9 and R11 should be 15 volts, and is the bias for the 41 tube. The voltage measured across R9 should be 5 volts. To check the bias on the 6A7 and 6D6 tubes, measure the values of resistors R6, R7 and R8 (see schematic).

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600 and 16,000 kc should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

If the circuit is at all disturbed, both the broadcast and short-wave bands must be realigned.

The set's oscillator is higher in frequency than the signal, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely.

Always use as weak a test signal as possible during alignment.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The second i-f is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of the cans.

The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the 6A7 tube) with the screw adjustment accessible through a hole in the front of the chassis.

The antenna coils for the broadcast and short-wave bands and the 456 kc wave trap are wound on one form and mounted underneath the chassis deck directly behind the adjustable padding condenser. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the short-wave antenna trimmer. The central trimmer is the broadcast antenna trimmer. The trimmer nearest the rear of the chassis is the 456 kc wave trap.

The oscillator coils for the broadcast and short-wave bands are wound on one form and mounted underneath the chassis deck near the variable condenser. The trimmer for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is for the short-wave oscillator coil and the trimmer farthest from the front is for the broadcast oscillator coil.

I-f and Wave-trap Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 456 kc, through a 0.02 mf paper condenser, to the grid cap of the 6A7 tube (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response. Feed 456 kc to the antenna through a standard dummy antenna (a 0.0002 mica condenser may be substituted) and adjust the wave-trap trimmer (farthest from front on left side of the chassis) for *minimum* response. (See General Notes.)

Short-Wave Alignment (Alignment of the short-wave band should precede broadcast alignment)

Use a 400 ohm dummy antenna (a 400 ohm non-inductive resistor in series with the test oscillator antenna lead) when aligning the short-wave coils. Rotate the wave-band switch to the short-wave (counter-clockwise) position, and set the dial pointer exactly at 16 megacycles. Feed 16,000 kc to the antenna and adjust the short-wave oscillator trimmer (nearest the front beside variable condenser) for maximum response, and then adjust the short-wave antenna trimmer (nearest the front on the left side of the chassis) for maximum response. Be very careful to choose the minimum capacity peak on the oscillator trimmer.

Broadcast Alignment

Use a standard dummy antenna in aligning the broadcast coils. (A .0002 condenser may be substituted.) Rotate the wave-band switch to the broadcast (clockwise) position. Set the dial pointer at 60 and feed 600 kc. Adjust the broadcast series padder (in corner near 6A7 tube) for maximum response. Move the dial pointer to 160 and feed 1600 kc. Adjust the broadcast oscillator trimmer (farthest from front beside the variable condenser) for maximum response and then adjust the broadcast antenna trimmer (central trimmer at left side of chassis). Return pointer to 60, feed 600 kc and re-adjust the broadcast series padder, rocking the variable condenser (rotate the variable condenser shaft back and forth through a small arc) for maximum response.

REPLACEMENT PARTS

*Item	Part No.	DESCRIPTION	PRICE
T1, L1	3CT-289A	Two-band antenna coil and 456 kc wave trap	$1.80
T2	3CT-290A	Two-band oscillator coil	1.35
T3	3ZT-342	456 kc first i-f transformer	1.50
T4	2NT-231	456 kc second i-f transformer	1.35
†T5	3ZT-345	Power transformer	4.45
R1	KR-53	50,000 ohm, ¼ watt carbon resistor	.16
R2	3BR-247	40,000 ohm, ¼ watt carbon resistor	.16
R3	LR-65	10,000 ohm, ¼ watt carbon resistor	.16
R4	BR-12	25,000 ohm, 1 watt carbon resistor	.16
R5	3LR-265	40,000 ohm, ½ watt carbon resistor	.16
R6	NNR-220	3 megohm, ¼ watt carbon resistor	.16
R7	HR-42	2 megohm, ¼ watt carbon resistor	.16
R8	3ZR-288	Volume control with line switch—500,000 ohms	1.05
R9	3VR-270	90 ohm, ½ watt wire-wound resistor	.16
R10	3RR-274	5 megohm, ¼ watt carbon resistor	.16
R11	3ZR-289	210 ohm, ½ watt wire-wound resistor	.16
R12	KR-54	100,000 ohm, ¼ watt carbon resistor	.16
R13	KR-56	500,000 ohm, ¼ watt carbon resistor	.16
C1, C2	3EC-284	Two-gang variable condenser	3.65
‡C3, C5, C6		Trimmer, part of antenna coil.	
C4, C8	AAC-106A	0.00005 mf mica condenser	.20
C7, C19	BC-12	0.05 mf, 200 volt tubular condenser	.20
‡C9, C10		Trimmer, part of oscillator coil.	
C11, C14	KC-58	0.01 mf, 400 volt tubular condenser	.20
C12	2NC-231	Single adjustable padding condenser. Range: 300 to 600 mmf	.50
C13	3EC-267	0.0042 mf mica condenser	.40
‡C15, C16		Trimmer part of first i-f transformer.	
‡C17, C18		Trimmer part of second i-f transformer.	
C20	AC-7A	0.00025 mf mica condenser	.20
C21	HC-34	0.006 mf, 600 volt tubular condenser	.20
C22	IC-47	0.0005 mf mica condenser	.20
C23	LC-65	0.02 mf, 400 volt tubular condenser	.20
C24	ZC-115	0.006 mf, 1000 volt tubular condenser	.20
C25	2TC-189	0.015 mf, 1000 volt tubular condenser	.20
C26	EEC-132	0.1 mf, 400 volt tubular condenser	.20
†C27	2NC-246	16 mf, 450 volt wet electrolytic condenser	1.20
†C28	2NC-247	16 mf, 405 volt wet electrolytic condenser	1.20
C29	3LC-297A	0.01 mf, 400 volt molded type paper condenser	.20
	2TS-145E	Tone control switch	.35
	TTS-111K	Wave-band switch	.60
	2NS-122	6" dynamic speaker	5.60
	3BS-191	8" dynamic speaker	8.80
	3BS-233	8" dynamic speaker	8.80
	3LS-199	10" dynamic speaker	8.25
	XL-9	Pilot light 6.3 volt, .25 amp., Mazda No. 46	.20
	3ZZ-520	Dial face	.75
	3CZ-336A	Dial drive belt	.10
	3CZ-337	Dial drive shaft and pulley	.10
	3CZ-339	Idler pulley	.05
	3CZ-340	Idler pulley spring	.05
	3CZ-341	Condenser shaft pulley	.10
	3FZ-353	Dial pointer	.10
	3CZ-350	Escutcheon with crystal	1.05

List Price Effective as of Feb. 1st., 1937 (Subject to change without notice)

PRODUCTION CHANGES

Early Model Z-150 receivers differed from the schematic diagram as follows:

a. C27 is a 12 mf, 450 volt dry electrolytic condenser.
b. C28 is a 8 mf, 450 volt dry electrolytic condenser.
c. A 50,000 ohm ¼ watt carbon resistor, by-passed to chassis with a .1 mf, 400 volt condenser, is used as an R-C filter between B plus and the plate resistor (R12) of the 76 a-f amplifier.
d. A 8 mf, 150 volt dry electrolytic condenser is connected from the screen-grid of the 6D6 i-f amplifier to ground.

Later Model Z-150 receivers differ from the schematic diagram as follows:

a. C27 is a 12 mf, 450 volt dry electrolytic condenser.
b. C28 is a 24 mf, 400 volt dry electrolytic condenser.
c. A .25 mf, 200 volt condenser is connected from the screen-grid of the 6D6 i-f amplifier to ground.

In receivers bearing serial numbers below 1,072,650:

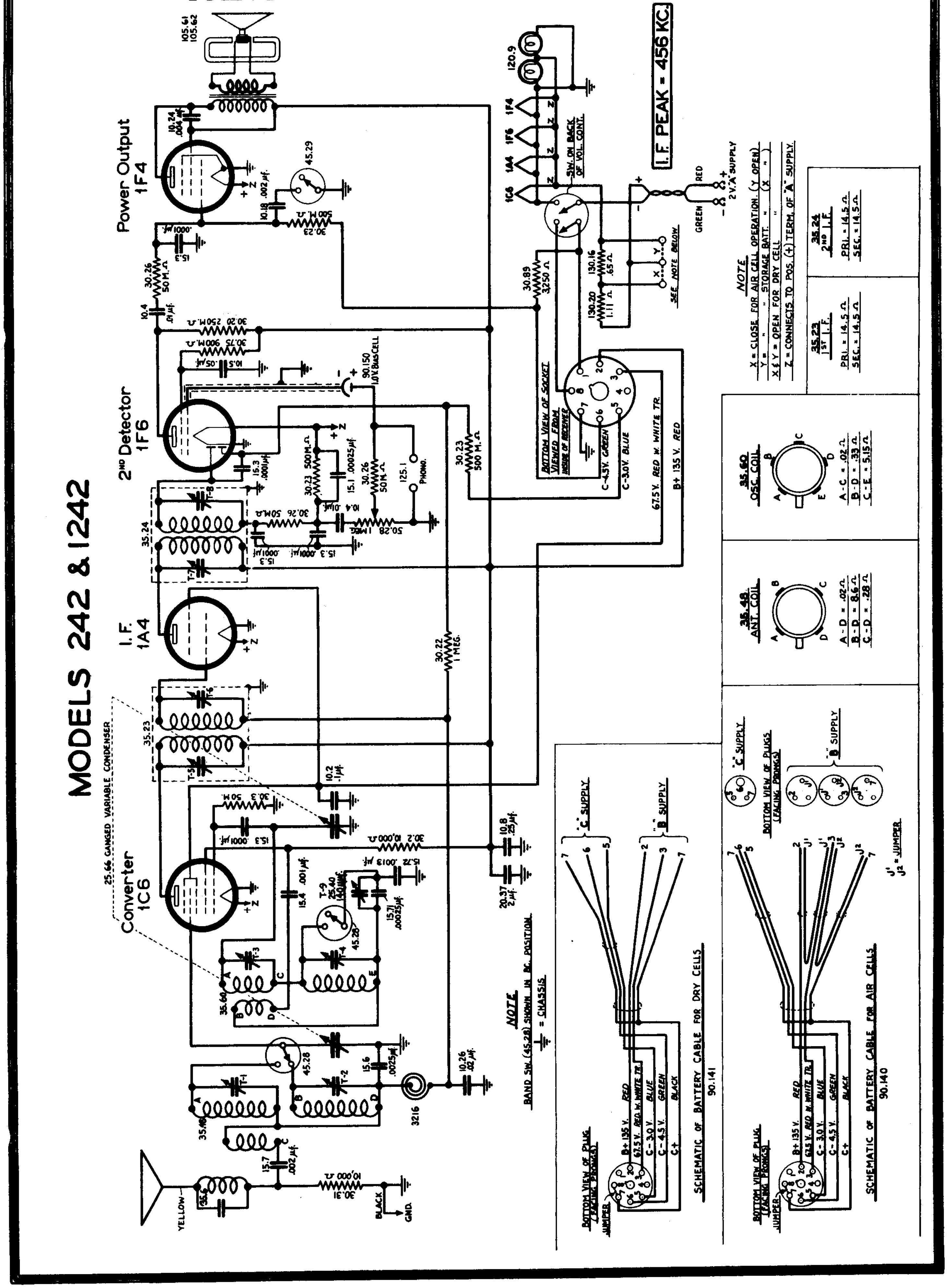
a. The power transformer is part No. 2NT-233. The color coding of this transformer is as follows:
   Primary—two green leads — 6.3 volt secondary—two blue leads
   High voltage secondary—two black leads — 5 volt secondary—two red leads.
   High voltage secondary center tap—yellow lead.

*Item number locates the article on the schematic diagram.

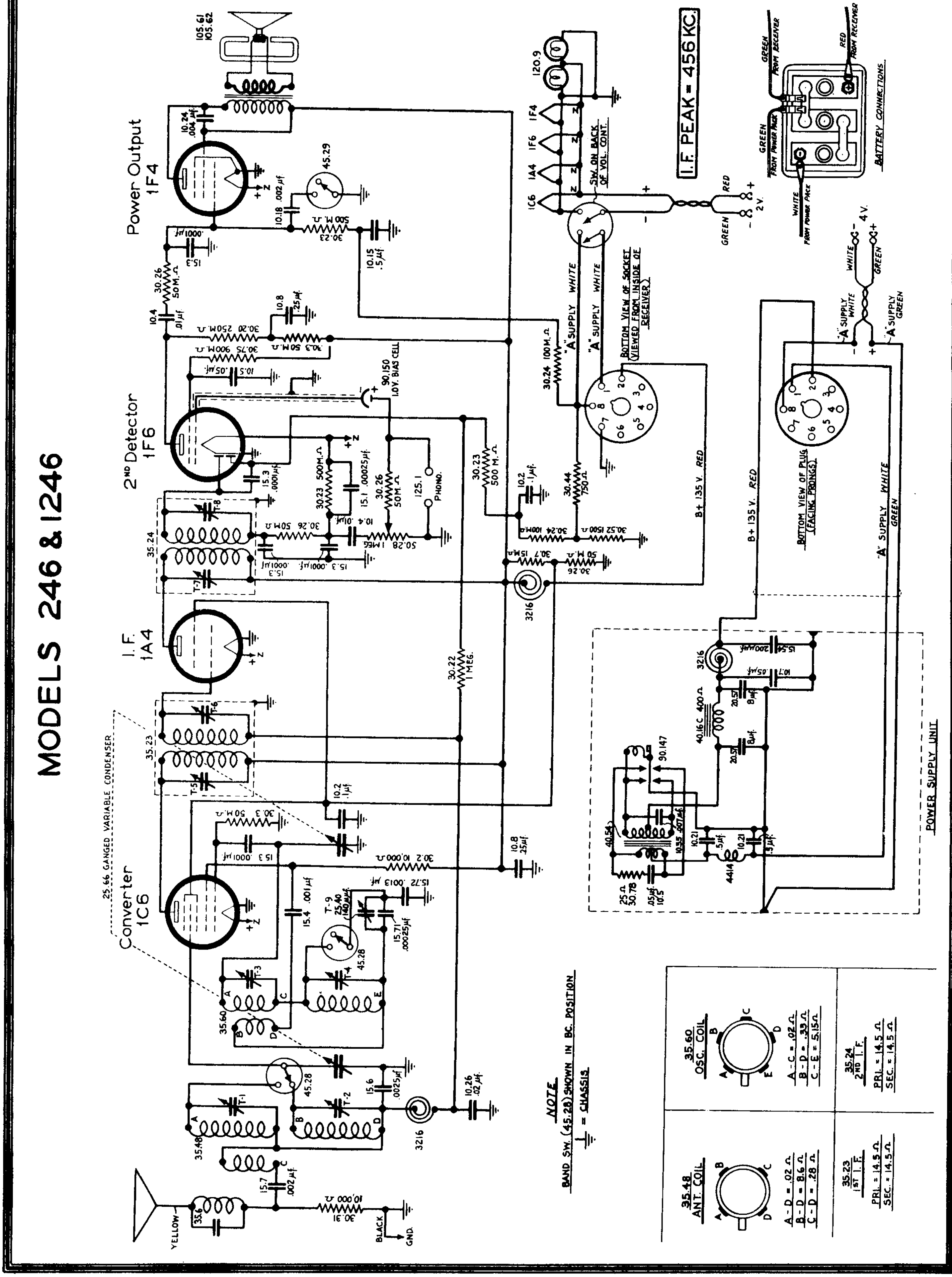
†See production changes.

‡These trimmer condensers are part of the coil assemblies and can not be supplied separately.

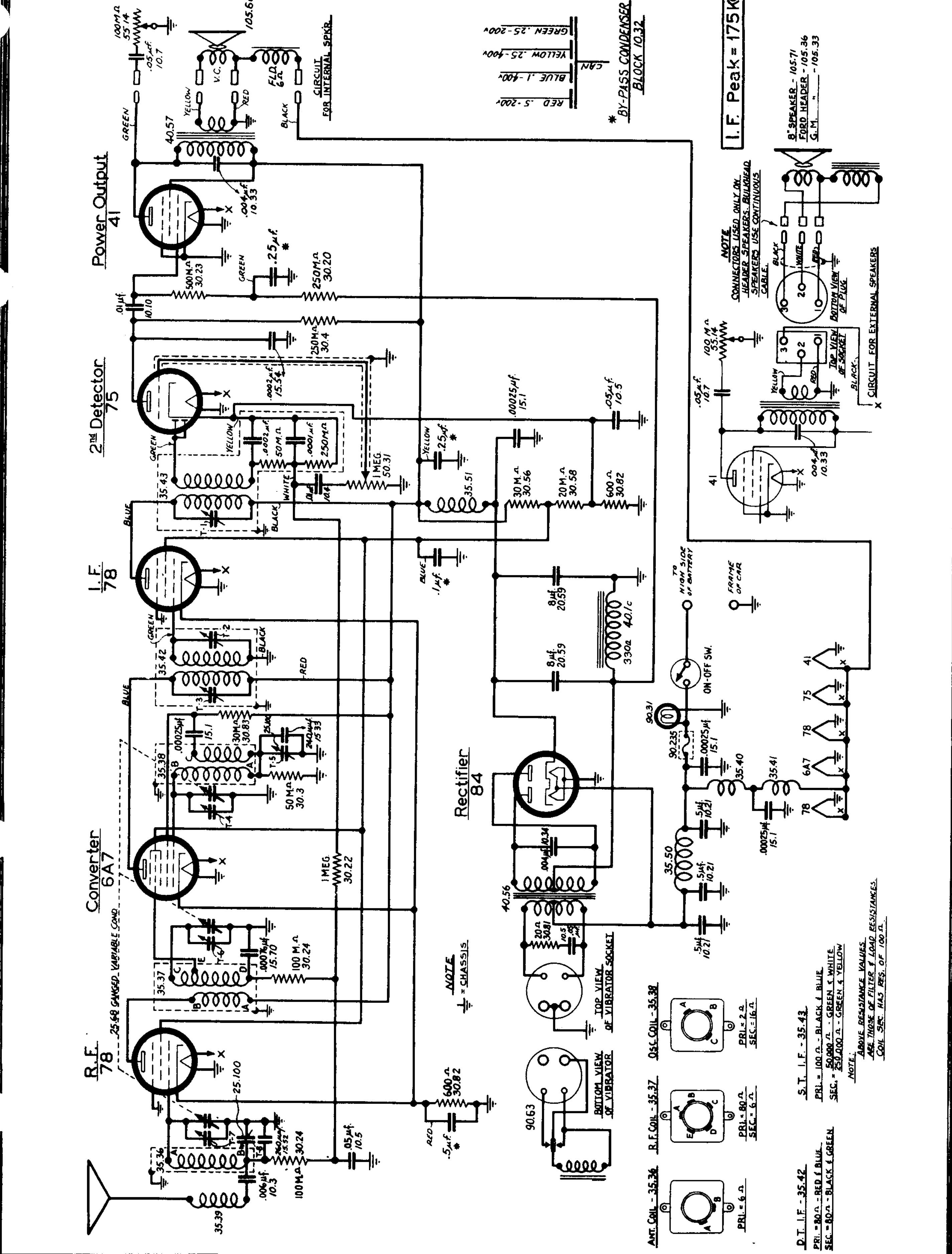
FADA RADIO AND ELECTRIC COMPANY



FADA RADIO AND ELECTRIC COMPANY

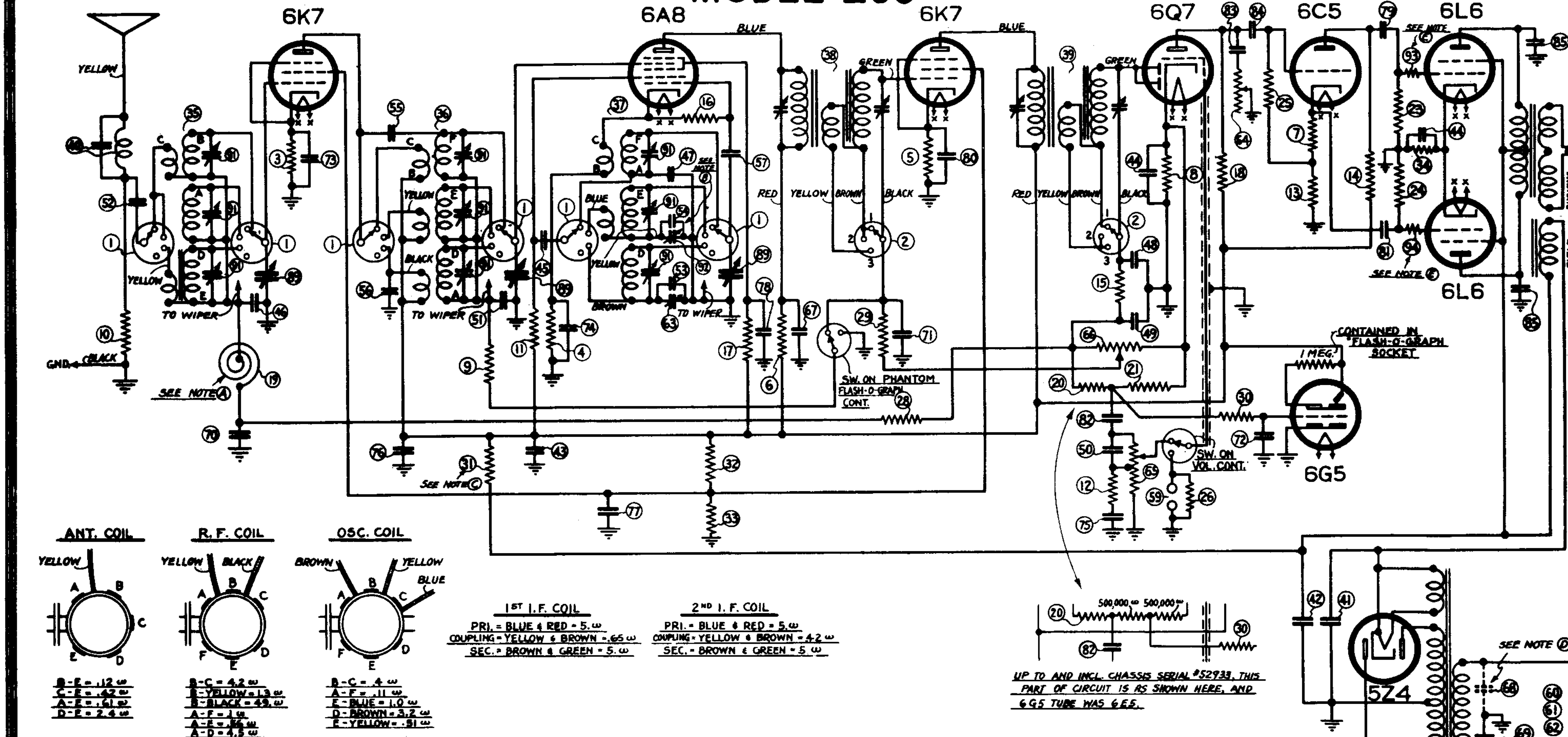


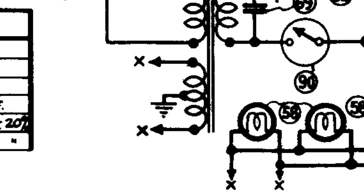
FADA RADIO AND ELECTRIC COMPANY
MODEL 267 SERIES



FADA RADIO AND ELECTRIC COMPANY

MODEL 290





REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	45.34	BAND SWITCH	23	30.23	CARB. RES. - 500,000 OHMS 1/3 W. ± 20	45	15.7	MICA COND. - .002 MF. ± 10%	67	10.7	TUBULAR COND. - .05 MF. 400 V.	89	25.61	VARIABLE COND.
2	45.32	SELECTIVITY SWITCH - I.F.	24	30.23	" " 500,000 " " "	46	15.5	" " .002 " 3	68	10.7	" " .05 " 400 "	90		ON-OFF SW. ON TONE CONT.
3	30.45	CARB. RES. - 250 OHMS 1/3 W. ± 10%	25	30.23	" " 500,000 " " "	47	15.62	" " .004 " 5	69	10.7	" " .05 " 400 "	91		MIN. ADJ. ON COILS
4	30.45	" " 250 " " " "	26	30.23	" " 500,000 " " "	48	15.3	" " .0001 " 10	70	10.26	" " .02 " 200 "	92	25.64	PADDING COND. - 110-250 MMF.
5	30.46	" " 350 " " " "	27			49	15.3	" " .0001 " "	71	10.26	" " .02 " 200 "	93	30.70	CARB. RES. - 130 OHMS 1/3 W. ± 20%
6	30.38	" " 1000 " " " 20	28	30.28	" " 2,000,000 " " "	50	15.3	" " .0001 " "	72	10.26	" " .02 " 200 "	94	30.70	" " 130 " " " "
7	30.57	" " 3000 " " " 10	29	30.28	" " 2,000,000 " " "	51	15.6	" " .0025 " 3	73	10.5	" " .05 " 200 "			
8	30.1	" " 5000 " " " "	30	30.28	" " 2,000,000 " " "	52	15.2	" " .0005 " 10	74	10.5	" " .05 " 200 "			
9	30.2	" " 10000 " " " "	31	30.77	" " 2,000 " 2W. 10	53	15.52	" " .00026 " 5	75	10.5	" " .05 " 200 "			
10	30.31	" " 10,000 " " " 20	32	30.13	" " 20,000 " 1W. "	54	15.68	" " .0007 " 5	76	10.9	" " .1 " 400 "			
11	30.31	" " 10,000 " " " "	33	30.56	" " 30,000 " " "	55	15.16	" " 3 MMF. 10	77	10.9	" " .1 " 400 "			
12	30.58	" " 20,000 " " " 10	34	30.61	" " 340 " 2W. "	56	15.61	" " 35 " 5	78	10.9	" " .1 " 400 "			
13	30.59	" " 27,000 " " " "	35	35.15	ANTENNA COIL	57	15.10	" " 50 " 10	79	10.9	" " .1 " 400 "			
14	30.10	" " 30,000 " " " "	36	35.16	R.F. "	58	120.3	PILOT LTS. 6-8 V. .15 A.	80	10.2	" " .1 " 200 "			
15	30.26	" " 50,000 " " " 20	37	35.17	OSCILLATOR "	59	125.1	PHONO JACK	81	10.2	" " .1 " 200 "			
16	30.8	" " 100,000 " " " 10	38	35.18	1ST I.F. "	60	40.46	POWER TRANS. 115 V. 50-60 ~	82	10.4	" " .01 " 200 "			
17	30.3	" " 50,000 " " " "	39	35.19	2ND I.F. "	61	40.47	" " 115 V. 25 ~	83	10.10	" " .01 " 400 "			
18	30.53	" " 200,000 " " " 20	40	35.6	WAVE TRAP	62	40.48	" " TAP. PRI. 110-130-150 220-250 V.	84	10.10	" " .01 " 400 "			
19	35.16	CHOKE COIL - 2.8 MH.	41	20.51	ELECTRO. COND. - 12 MF. 475 W.V.	63	25.49	PADDING COND. - 70 MMF.	85	10.17	" DUAL " .001 " 600 "			
20	30.5	CARB. RES. 500,000 OHMS 1/3 W. ± 10	42	20.4	" " 8 " 450 "	64	55.11	TONE CONTROL - 1/2 MEG. WITH ON-OFF SW.	86	105.40	SPEAKER (MODEL 290 T)			
21	30.6	" " 1,000,000 " " " "	43	20.45	" " 6 " 450 "	65	50.25	VOLUME " 1 MEG. - TAPPED @ 50,000 ω	87	105.41	" (" 290 C)			
22			44	20.44	" DUAL " 10-10 " 25 "	66	50.24	PHANTOM FLASH-O-GRAPH CONT.	88	105.42	" (" 290 CK)			

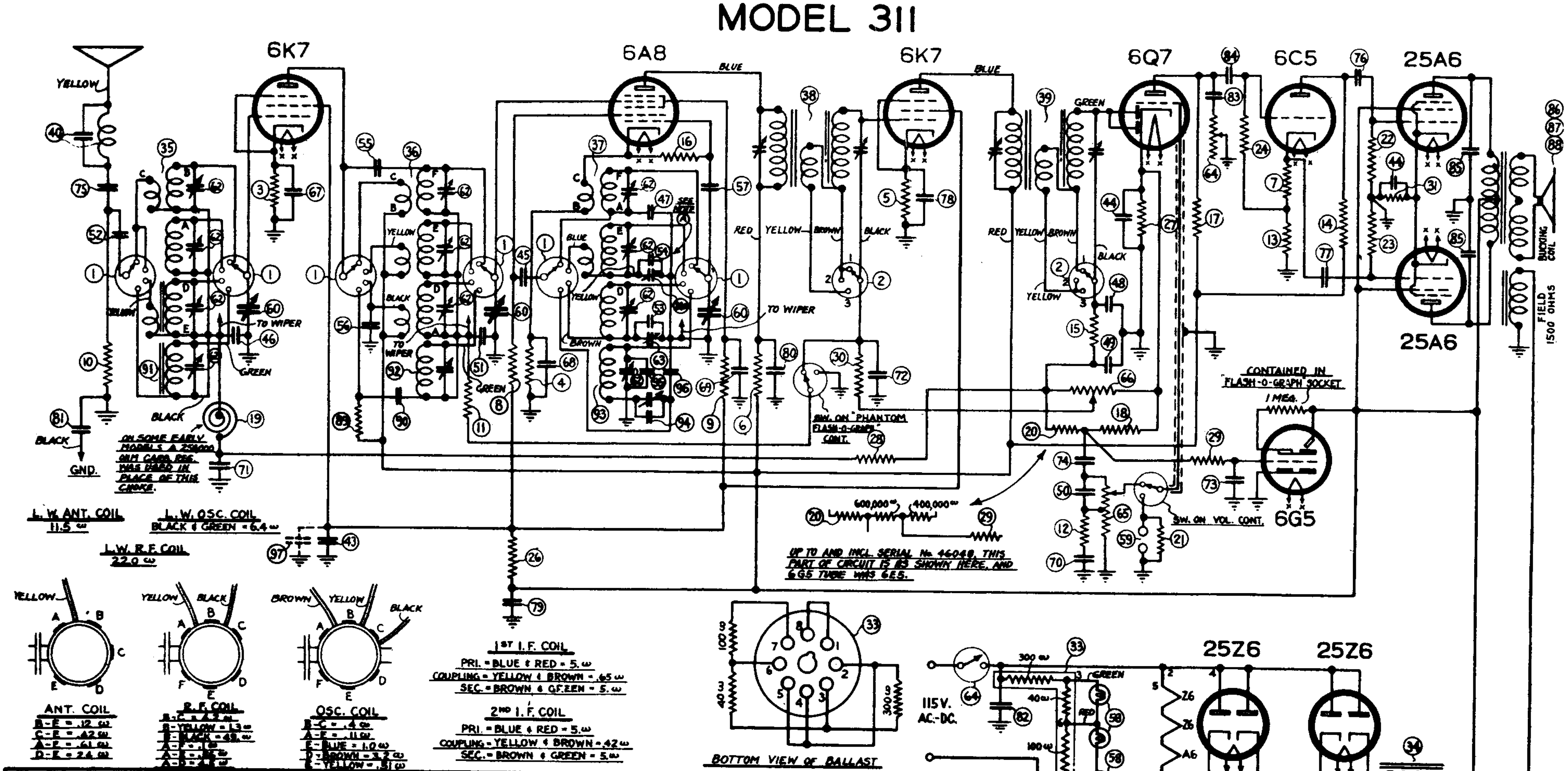
NOTE:
BAND SW. SHOWN IN S. W. POSITION.
I.F. SELECTIVITY SW. " " SHARP "
I. F. TO BE ALIGNED " " "
POS. #1 (SHARP), POS. #2 (BROAD), POS. #3 (HI-FIDELITY)
= CHASSIS

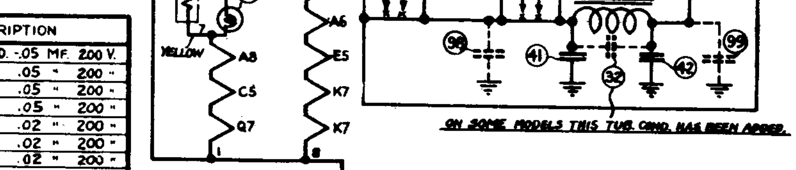
I. F. = 456 KC.

NOTE (A) - ON SOME EARLY MODELS, A 250,000 OHM RES. WAS USED IN PLACE OF THIS CHOKE.
NOTE (B) - ON SOME EARLY MODELS, REF. No. 54 WAS .00093 MF. MICA COND. AND REF. No. 92 WAS NOT USED.
NOTE (C) - ON SOME EARLY MODELS, REF. No. 31 WAS 1 WATT.
NOTE (D) - ON SOME EARLY MODELS, THIS COND. IS USED.
NOTE (E) - ON CHASSIS WITH SERIAL No. 72532 & UP, (93) & (94) ARE ADDED.

FADA RADIO AND ELECTRIC COMPANY

MODEL 311





REF. No.	PART No.	DESCRIPTION
1	45.34	BAND SWITCH
2	45.32	SELECTIVITY SWITCH
3	30.45	CARB. RES. - 250 OHMS ½ W. ± 10%
4	30.45	" " 250 " " " "
5	30.63	" " 300 " " " "
6	30.35	" " 1000 " " " 20
7	30.15	" " 2000 " " " 10
8	30.1	" " 5000 " " " "
9	30.2	" " 10000 " " " "
10	30.31	" " 10,000 " " " 20
11	30.31	" " 10,000 " " " "
12	30.58	" " 20,000 " " " 10
13	30.59	" " 27,000 " " " "
14	30.10	" " 30,000 " " " "
15	30.26	" " 50,000 " " " 20
16	30.8	" " 100,000 " " " 10
17	30.66	" " 150,000 " " " 20
18	30.62	" " 400,000 " " " 10
19	54.09	CHOKE COIL - 20. MH.
20	30.20	CARB. RES. 250,000 OHMS ½ W. ± 20
21	30.23	" " 500,000 " " " "
22	30.23	" " 500,000 " " " "

REF. No.	PART No.	DESCRIPTION
23	30.23	CARB. RES. - 500,000 OHMS ½ W. ± 20
24	30.23	" " 500,000 " " "
25	30.67	" " 600,000 " " 10
26	30.12	" " 4,000 " " "
27	30.65	" " 4,400 " " "
28	30.28	" " 2,000,000 " " "
29	30.28	" " 2,000,000 " " "
30	30.28	" " 2,000,000 " " "
31	30.43	" " 315 " 1 W. 10
32	10.30	TUBULAR COND. - .75 MF 200 V.
33	115.17	BALLAST RES. - 40 - 100 - 300 OHMS
34	40.3A	CHOKE COIL - 200 OHMS
35	35.15	ANTENNA "
36	35.16	R.F. "
37	35.17	OSCILLATOR "
38	35.18	1ST I.F. "
39	35.19	2ND I.F. "
40	35.6	WAVE TRAP
41	20.47	ELECTRO. COND. - 32 MF 100 W.V.
42	20.47	" " 16 " 100 "
43	20.25	" " 8 " 100 " tub.
44	20.44	" DUAL " 10-10 " 25 " "

REF. No.	PART No.	DESCRIPTION
45	15.7	MICA COND. - .002 MF. ± 10%
46	15.5	" " .002 " 3
47	15.62	" " .004 " 5
48	15.3	" " .0001 " 10
49	15.3	" " .0001 " "
50	15.3	" " .0001 " "
51	15.6	" " .0025 " 3
52	15.2	" " .0005 " 10
53	15.52	" " .00026 " 5
54	15.68	" " .0007 " 5
55	15.16	" " 3 MMF. 10
56	15.61	" " 35 " 5
57	15.10	" " 50 " 10
58	120.3	PILOT LTS. - 6-8 V. .15 A.
59	125.1	PHONO JACK
60	25.61	VARIABLE COND.
61		ON-OFF SW. ON VOL. CONT.
62		MIN. ADJ. ON COILS
63	25.49	PADDING COND. - 70 MMF.
64	55.11	TONE CONTROL - ½ MEG.
65	50.25	VOLUME - 1 MEG. TAPPED @ 50,000 ω
66	50.24	PHANTOM FLASH-O-GRAPH CONTROL 1 MEG.

REF. No.	PART No.	DESCRIPTION
67	10.5	TUBULAR COND. - .05 MF. 200 V.
68	10.5	" " .05 " 200 "
69	10.5	" " .05 " 200 "
70	10.5	" " .05 " 200 "
71	10.26	" " .02 " 200 "
72	10.26	" " .02 " 200 "
73	10.26	" " .02 " 200 "
74	10.4	" " .01 " 200 "
75	10.4	" " .01 " 200 "
76	10.2	" " .1 " 200 "
77	10.2	" " .1 " 200 "
78	10.2	" " .1 " 200 "
79	10.2	" " .1 " 200 "
80	10.2	" " .1 " 200 "
81	10.23	" " .006 " 200 "
82	10.9	" " .1 " 400 "
83	10.10	" " .01 " 400 "
84	10.10	" " .01 " 400 "
85	10.17	" DUAL " .001 " 600 "
86	105.44	SPEAKER - 1500 ω (MODEL 211 T)
87	105.45	" " (" 211 C)
88	105.46	" " (" 211 CK)
88A	25.64	PADDING COND. - 110 - 250 MMF.

REF. No.	PART No.	DESCRIPTION
89	30.2	CARB. RES. - 10,000 OHMS ½ W. ± 10%
90	15.3	MICA COND. - .0001 MF. ± 10%
91	35.20	L.W. ANT. COIL
92	35.21	L.W. R.F. "
93	35.22	L.W. OSC. "
94	15.58	MICA. COND. - .00018 MF. ± 5%
95	15.10	" " 50 MMF
96	15.2	" " .0005 MF. ± 5%

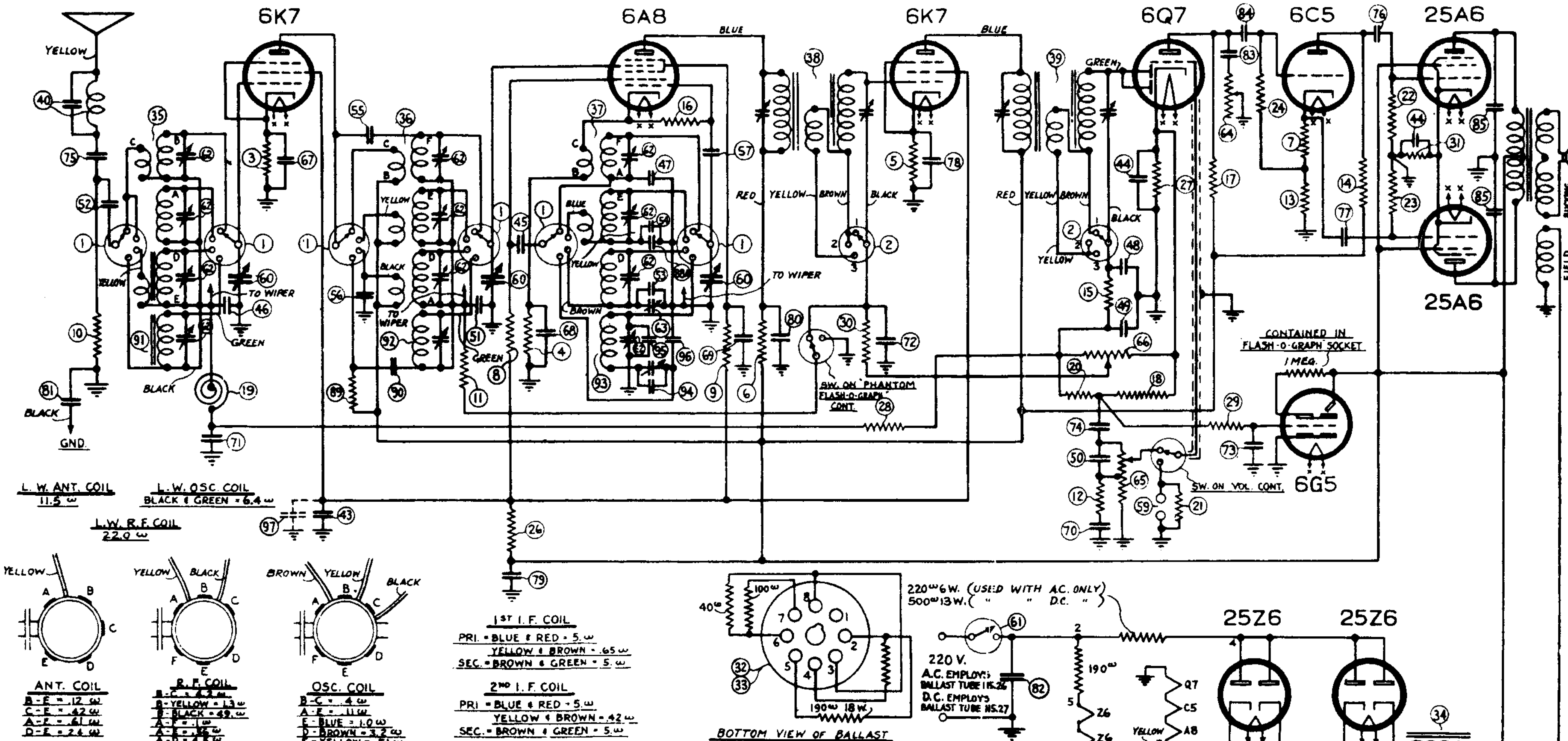
NOTE Ⓐ - ON SOME EARLY MODELS, REF. No. 51 WAS .00023 MF. MICA COND. & REF. No. 88A WAS NOT USED.

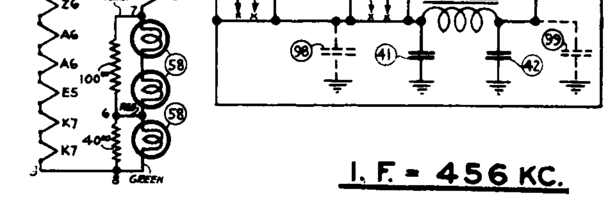
NOTE:
BAND SW. SHOWN IN S.W. POSITION.
SELECTIVITY SW. " " SHARP "
I.F. TO BE ALIGNED " " "
POS. #1 (SHARP). POS. #2 (BROAD). POS. #3 (HI-FIDELITY)
⏚ = CHASSIS.
97 98 99 ELECTRO. COND. 8 MF. 100 W.V. (FOR 25 CYCLE OPERATION ONLY)

I. F. = 456 KC.

FADA RADIO AND ELECTRIC COMPANY

MODEL 311 220V





L.W. ANT. COIL
11.5 ω

L.W. OSC. COIL
BLACK & GREEN - 6.4 ω

L.W. R.F. COIL
22.0 ω

1ST I.F. COIL
PRI. - BLUE & RED - 5. ω
YELLOW & BROWN - .65 ω
SEC. - BROWN & GREEN - 5. ω

2ND I.F. COIL
PRI. - BLUE & RED - 5. ω
YELLOW & BROWN - .42 ω
SEC. - BROWN & GREEN - 5. ω

ANT. COIL
B-E = .12 ω
C-E = .42 ω
A-E = .61 ω
D-E = 2.4 ω

R.F. COIL
B-C = 4.3 ω
B-YELLOW = 1.3 ω
B-BLACK = 49. ω
A-F = .1 ω
A-E = .36 ω
A-D = 4.3 ω

OSC. COIL
B-C = .4 ω
A-E = .11 ω
E-BLUE = 1.0 ω
D-BROWN = 3.2 ω
E-YELLOW = .51 ω

REF. No.	PART No.	DESCRIPTION
1	45.34	BAND SWITCH
2	45.32	SELECTIVITY SWITCH
3	30.45	CARB. RES. - 250 OHMS 1/3 W ±10%
4	30.45	" " 250 " " " "
5	30.63	" " 300 " " " "
6	30.35	" " 1000 " " " 20
7	30.15	" " 2,000 " " " 10
8	30.1	" " 5000 " " " "
9	30.2	" " 10000 " " " "
10	30.31	" " 10,000 " " " 20
11	30.31	" " 10,000 " " "
12	30.58	" " 20,000 " " " 10
13	30.59	" " 27,000 " " " "
14	30.10	" " 30,000 " " " "
15	30.26	" " 50,000 " " " 20
16	30.8	" " 100,000 " " " 10
17	30.66	" " 150,000 " " " 20
18	30.6	" " 1,000,000 " " " 10
19	5409	CHOKE COIL - 20. MH.
20	30.20	CARB. RES. 250,000 OHMS 1/3 W. ± 20
21	30.23	" " 500,000 " " " "
22	30.23	" " 500,000 " " " "
23	30.23	CARB. RES - 500,000 OHMS 1/3 W ± 20
24	30.23	" " 500,000 " " "
25		
26	30.12	" " 4,000 " " "
27	30.65	" " 4,400 " " "
28	30.28	" " 2,000,000 " " "
29	30.28	" " 2,000,000 " " "
30	30.28	" " 2,000,000 " " "
31	30.43	" " 315 " 1 W. 10
32	115.26	BALLAST RES. - 40ω-100ω-190ω 18W.-220ω 6W.
33	115.27	" " " " " " 500ω 13W.
34	40.3A	CHOKE COIL - 200 OHMS
35	35.15	ANTENNA "
36	35.16	R. F. "
37	35.17	OSCILLATOR "
38	35.18	1ST I. F. "
39	35.19	2ND I. F. "
40	35.6	WAVE TRAP
41	20.54	ELECTRO. COND. 32 MF. 175 WV
42	20.54	" " 16 " 175 "
43	20.55	" " 8 175 " tub.
44	20.44	" DUAL " 10 10 " 25 " "
45	15.7	MICA COND. - .002 MF. ± 10%
46	15.5	" " .002 " 3
47	15.62	" " .004 " 5
48	15.3	" " .0001 " 10
49	15.3	" " .0001 " "
50	15.3	" " .0001 " "
51	15.6	" " .0025 " 3
52	15.2	" " .0005 " 10
53	15.52	" " .00026 " 5
54	15.63	" " .00093 " 3
55	15.16	" " 3. MMF 10
56	15.61	" " 35. " 5
57	15.10	" " 50. " 10
58	120.3	PILOT LTS. - 6-8 V. .15 A.
59	125.1	PHONO JACK
60	25.61	VARIABLE COND.
61		ON - OFF SW ON TONE CONT.
62		MIN. ADJ ON COILS
63	25.49	PADDING COND. - 70 MMF
64	55.11	TONE CONTROL - 1/2 MEG.
65	50.25	VOLUME " 1 MEG. TAPPED @ 50,000 ω
66	50.24	PHANTOM FLASH-O-GRAPH CONTROL 1 MEG.
67	10.5	TUBULAR COND. - .05 MF 200 V.
68	10.5	" " .05 " 200 "
69	10.5	" " .05 " 200 "
70	10.5	" " .05 " 200 "
71	10.26	" " .02 " 200 "
72	10.26	" " .02 " 200 "
73	10.26	" " .02 " 200 "
74	10.4	" " .01 " 200 "
75	10.4	" " .01 " 200 "
76	10.2	" " .1 " 200 "
77	10.2	" " .1 " 200 "
78	10.2	" " .1 " 200 "
79	10.2	" " .1 " 200 "
80	10.2	" " .1 " 200 "
81	10.23	" " .006 " 200 "
82	10.9	" " .1 " 400 "
83	10.10	" " .01 " 400 "
84	10.10	" " .01 " 400 "
85	10.17	" DUAL " .001 " 600 "
86	105.55	SPEAKER 3400 ω (MODEL 211 T)
87	105.56	" " (" 211 C)
88	105.57	" " (" 211 CK)
88A	25.64	PADDING COND. - 110 - 250 MMF.
89	30.2	CARB. RES. - 10,000 OHMS 1/3 W. ± 10%
90	15.3	MICA COND. - .0001 MF. ± 10%
91	35.20	L.W. ANT. COIL
92	35.21	L.W. R.F. "
93	35.22	L.W. OSC. "
94	15.58	MICA. COND. - .00018 MF. ± 5%
95	15.10	" " 50 MMF
96	15.2	" " .0005 MF. + 5%

NOTE:
BAND SW. SHOWN IN S.W. POSITION.
SELECTIVITY SW. " " SHARP "
I. F. TO BE ALIGNED " " "
POS. #1 (SHARP). POS. #2 (BROAD). POS. #3 (HI-FIDELITY)
⏚ = CHASSIS

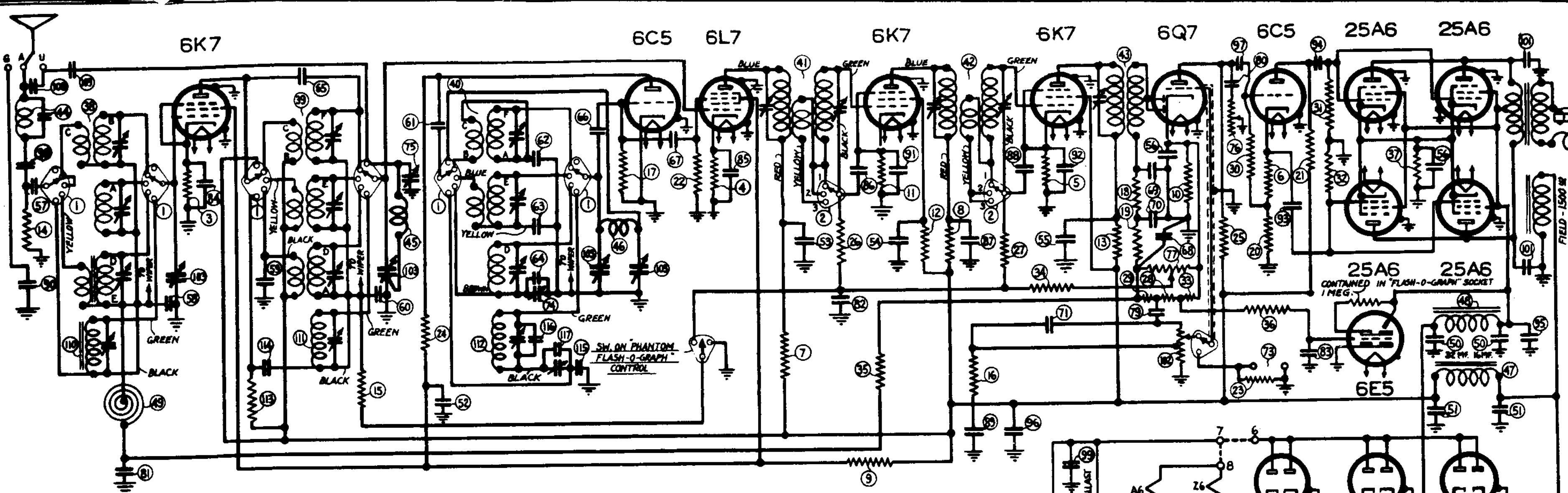
97 98 99 ELECTRO. COND. - 8 MF. 100 W.V. (FOR 25 CYCLE OPERATION ONLY (PART NO. 20.25)

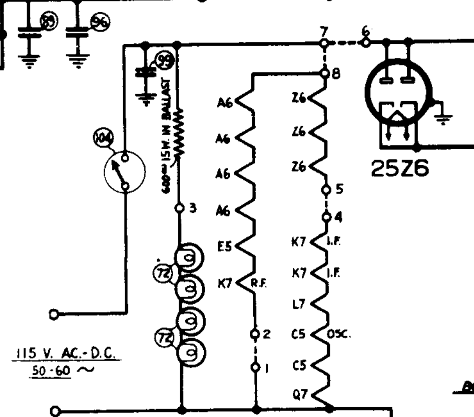
I. F. = 456 KC.

FADA RADIO AND ELECTRIC COMPANY

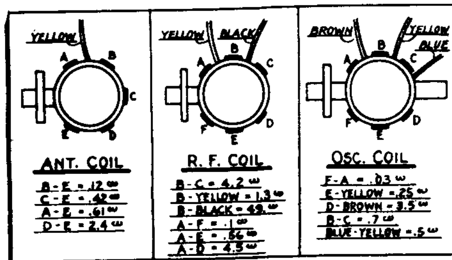
MODEL 316

UP TO SERIAL No. 60,182





115 V. AC.-D.C.
50-60 ~



ANT. COIL	R. F. COIL	OSC. COIL
B-E = .12 ω	B-C = 4.2 ω	F-A = .03 ω
C-E = .42 ω	B-YELLOW = 1.3 ω	E-YELLOW = .25 ω
A-E = .61 ω	B-BLACK = 49. ω	D-BROWN = 3.5 ω
D-E = 2.4 ω	A-F = .1 ω	B-C = .7 ω
	A-E = .56 ω	BLUE-YELLOW = .5 ω
	A-D = 4.5 ω	

L.W. ANT. COIL 11.5 ω

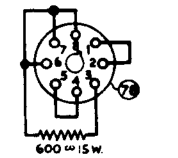
L.W. R.F. COIL 22.0 ω

L.W. OSC. COIL BLACK & GREEN = 5.0 ω

I. F. COILS	PRI.	COUPLING	SEC.
1ST	BLUE & RED - 8 ω	YELLOW & BROWN - .09 ω	BROWN & GREEN - 8 ω
2ND	" " - 8 ω	" " - .10 ω	" " - 8 ω
3RD	" " - 8 ω		" " - 8 ω

NOTE:
BAND SW. SHOWN IN BAND "A" POSITION.
I.F. SELECTIVE SW. - SHARP "
I.F. TO BE ALIGNED " "
POS. #1 (SHARP) POS. #2 (BROAD) POS. #3 (HI-FIDELITY).
⏚ = CHASSIS.

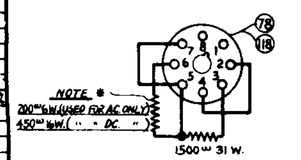
I.F. 456 K.C.



BOTTOM VIEW OF BALLAST

220 Volt

A.C.-D.C. Models



NOTE *
200 ω 6W. (USED FOR AC ONLY)
450 ω 16W. (" " DC ")
1500 ω 31 W.

BOTTOM VIEW OF BALLAST

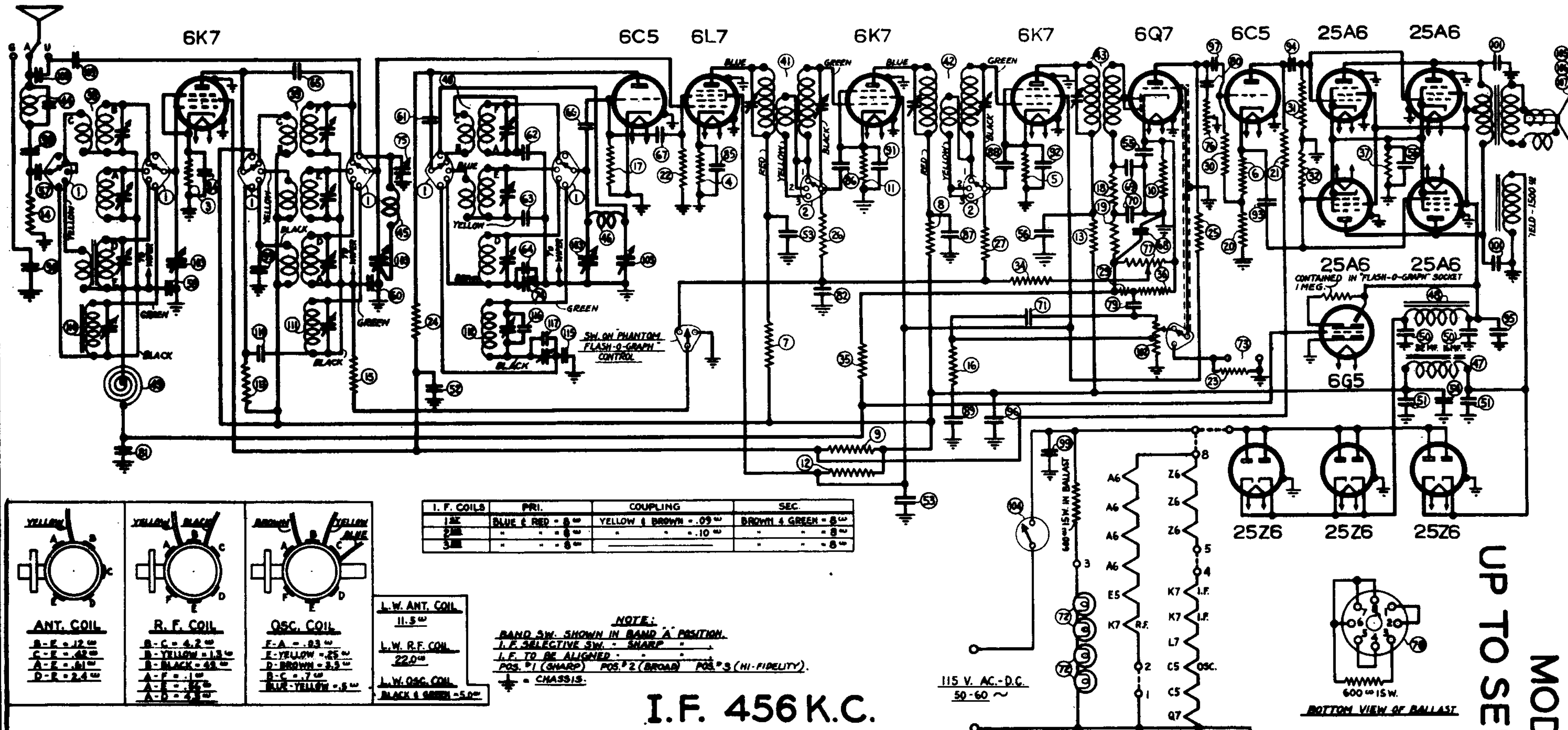
FOR 220 V. AC. OPERATION, USE REF. No. 78
" 220 V. DC. " " " 118

REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	45.36	BAND SW.	25	30.40	CARB. RES. - 150,000 OHMS 1/3 W. ± 10%	49	3216	COIL - R. F. CHOKE - 2.3 MH.	73	125.1	PHONO JACK	97	10.10	TUBULAR COND. - .01 MF. 400 V.
2	45.32A	SELECTIVITY SW.	26	30.20	" " 250,000 " " " " 20	50	20.47	ELECTRO. COND. - 32-16 MF. 100 W.V.	74	25.40	PADDING COND. - 140 MMF.	98	10.10	" " .01 " 400 "
3	30.45	CARB. RES. - 250 OHMS 1/3 W. ± 10%	27	30.20	" " 250,000 " " " " "	51	20.52	" " 24-24 " 100 "	75	25.49	" " 70 "	99	10.9	" " .1 " 400 "
4	30.48	" " 350 " " " " "	28	30.62	" " 400,000 " " " " 10	52	20.25	" " 8 MF. 100 W.V. TUB.	76	55.13	TONE CONTROL - 1/2 MEG.	100		
5	30.15	" " 2,000 " " " " "	29	30.5	" " 500,000 " " " " "	53	20.53	" " 2 " 100 " "	77	50.24	FLASH-O-GRAPH CONTROL - 1 MEG.	101	10.17	" DUAL " .001 " 600 "
6	30.15	" " 2,000 " " " " "	30	30.23	" " 500,000 " " " " 20	54	20.53	" " 2 " 100 " "	78	115.19	BALLAST RES. - 600 ω 15 W.	102	50.25	VOLUME CONTROL - 1 MEG. TAPPED AT [illegible]
7	30.64	" " 2,000 " " " " 20	31	30.23	" " 500,000 " " " " "	55	20.53	" " 2 " 100 " "	79	10.4	TUBULAR COND. - .01 MF. 200 V.	103	25.63	VARIABLE COND.
8	30.64	" " 2,000 " " " " "	32	30.23	" " 500,000 " " " " "	56	20.44	" " 10-10 " 25 " "	80	10.4	" " .01 " 200 "	104	45.37	ON-OFF SW. (LINE)
9	30.12	" " 4,000 " " " " 10	33	30.67	" " 600,000 " " " " 10	57	15.2	MICA COND. - .0005 MF. ± 10%	81	10.26	" " .02 " 200 "	105	105.52	SPEAKER - 1500 ω (MODEL 216T)
10	30.65	" " 4400 " " " " "	34	30.28	" " 2,000,000 " " " " 20	58	15.5	" " .002 " " 3	82	10.26	" " .02 " 200 "	106	105.53	" " (" 216C)
11	30.1	" " 5,000 " " " " "	35	30.28	" " 2,000,000 " " " " "	59	15.61	" " 35 MMF. " 5	83	10.26	" " .02 " 200 "	107	105.54	" " (" 216CK)
12	30.36	" " 5,000 " " " " 20	36	30.28	" " 2,000,000 " " " " "	60	15.6	" " .0025 MF. " 3	84	10.5	" " .05 " 200 "	108	15.9	MICA COND. - 10 MMF. ± 10%
13	30.36	" " 5,000 " " " " "	37	30.74	" " 230 " 2 " " 10	61	15.7	" " .002 " 10	85	10.5	" " .05 " 200 "	109	15.9	" " 10 " " "
14	30.31	" " 10,000 " " " " "	38	35.15	COIL - ANT.	62	15.32	" " .0056 " 5	86	10.5	" " .05 " 200 "	110	35.20	L. W. ANT. COIL
15	30.31	" " 10,000 " " " " "	39	35.16	" R.F.	63	15.69	" " .0018 " 3	87	10.5	" " .05 " 200 "	111	35.21	L. W. R.F. "
16	30.58	" " 20,000 " " " " 10	40	35.31	" OSC.	64	15.66	" " .0005 " 5	88	10.5	" " .05 " 200 "	112	35.33	L. W. OSC. "
17	30.11	" " 25,000 " " " " "	41	35.25	" 1ST I.F.	65	15.16	" " 3 MMF. ± 1/2 MMF.	89	10.5	" " .05 " 200 "	113	30.2	CARB. RES. - 10,000 OHMS - 1/3 W. ± 10%
18	30.11	" " 25,000 " " " " "	42	35.26	" 2ND I.F.	66	15.10	" " 50 " " 10%	90	10.3	" " .006 " 400 "	114	15.3	MICA COND. - .0001 MF. ± 10%
19	30.11	" " 25,000 " " " " "	43	35.27	" 3RD I.F.	67	15.10	" " 50 " " "	91	10.2	" " .1 " 200 "	115	15.2	" " .0005 " " "
20	30.59	" " 27,000 " " " " "	44	35.6	" WAVE TRAP	68	15.3	" " .0001 MF. " "	92	10.2	" " .1 " 200 "	116	15.23	" " .00007 " " 5
21	30.10	" " 30,000 " " " " "	45	35.28	" U.H.F. ANT.	69	15.3	" " .0001 " " "	93	10.2	" " .1 " 200 "	117	15.53	" " .00043 " " "
22	30.3	" " 50,000 " " " " "	46	35.29	" " OSC.	70	15.3	" " .0001 " " "	94	10.2	" " .1 " 200 "	118		
23	30.23	" " 500,000 " " " " 20	47	40.1	" CHOKE - 330 ω	71	15.3	" " .0001 " " "	95	10.2	" " .1 " 200 "	119		
24	30.1	" " 5,000 " " " " 10	48	40.52	" " 100 ω	72	120.3	PILOT LTS. - 6-8 V. .15 A.	96	10.2	" " .1 " 200 "	120		

FADA RADIO AND ELECTRIC COMPANY

MODEL 316

UP TO SERIAL № 60,183



I.F. COILS	PRI.	COUPLING	SEC.
1ST	BLUE & RED - 8 ω	YELLOW & BROWN - .09 ω	BROWN & GREEN - 8 ω
2ND	" " - 8 ω	" " - .10 ω	" " - 8 ω
3RD	" " - 8 ω		" " - 8 ω

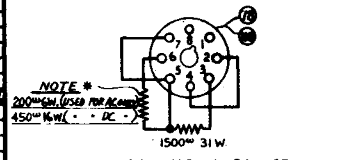
I.F. 456 K.C.

REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	45.36	BAND SW.	25	30.40	CARB. RES. - 150,000 OHMS ½ W. ± 10%	49	54.09	COIL - R.F. CHOKE - 20. MH.	73	125.1	PHONO JACK	97	10.10	TUBULAR COND. - .01 MF. 400 V.
2	45.32A	SELECTIVITY SW.	26	30.20	" " 250,000 " " " " 20	50	20.47	ELECTRO. COND. - 32-16 MF. 100 W.V.	74	25.40	PADDING COND. - 140 MMF.	98	10.10	" " .01 " 400 "
3	30.46	CARB. RES. - 250 OHMS ½ W. ± 10%	27	30.20	" " 250,000 " " " " "	51	20.52	" " 24-24 " 100 "	75	25.49	" " 70 "	99	10.9	" " .1 " 400 "
4	30.48	" " 350 " " " " "	28			52	20.23	" " 8 MF. 100 W.V. TUB.	76	55.13	TONE CONTROL - ½ MEG.	100		
5	30.15	" " 2,000 " " " " "	29	30.5	" " 500,000 " " " " 10	53	20.25	" " 8 " 100 " "	77	50.24	FLASH-O-GRAPH CONTROL - 1 MEG.	101	10.17	" DUAL " .001 " 600 "
6	30.15	" " 2,000 " " " " "	30	30.23	" " 500,000 " " " " 20	54	20.27	" " 16 " 100 " "	78	115.19	BALLAST RES. - 600 ω 15 W.	102	50.25	VOLUME CONTROL - 1 MEG. [illegible]
7	30.64	" " 2,000 " " " " 20	31	30.23	" " 500,000 " " " " "	55	20.44	" " 10-10 " 25 " "	79	10.4	TUBULAR COND. - .01 MF. 200 V.	103	25.63	VARIABLE COND.
8	30.64	" " 2,000 " " " " "	32	30.23	" " 500,000 " " " " "	56	10.5	TUBULAR COND. - .05 MF. 200 V.	80	10.4	" " .01 " 200 "	104	45.37	ON-OFF SW. (LINE)
9	30.12	" " 4,000 " " " " 10	33			57	15.2	MICA COND. - .0005 MF. ± 10%	81	10.26	" " .02 " 200 "	105	105.52	SPEAKER - 1500 ω (MODEL 216T)
10	30.65	" " 4400 " " " " "	34	30.28	" " 2,000,000 " " " " 20	58	15.5	" " .002 " " 3	82	10.26	" " .02 " 200 "	106	105.53	" " (" 216C)
11	30.1	" " 5,000 " " " " "	35	30.28	" " 2,000,000 " " " " "	59	15.61	" " 35 MMF. " 5	83	10.5	" " .05 " 200 "	107	105.54	" " (" 216CK)
12	30.2	" " 10,000 " " " " 10	36	30.6	" " 1,000,000 " " " " "	60	15.6	" " .0025 MF. " 3	84	10.5	" " .05 " 200 "	108	15.9	MICA COND. - 10 MMF. ± 10%
13	30.36	" " 5,000 " " " " 20	37	30.74	" " 250 " 2 " " 10	61	15.7	" " .002 " 10	85	10.5	" " .05 " 200 "	109	15.9	" " 10 " " "
14	30.31	" " 10,000 " " " " "	38	35.15	COIL - ANT.	62	15.32	" " .0056 " 5	86	10.5	" " .05 " 200 "	110	35.20	L. W. ANT. COIL
15	30.31	" " 10,000 " " " " "	39	35.16	" R.F.	63	15.69	" " .0018 " 3	87	10.5	" " .05 " 200 "	111	35.21	L. W. R.F. "
16	30.[illegible]	" " 20,000 " " " " 10	40	35.31	" OSC.	64	15.66	" " .0005 " 5	88	10.5	" " .05 " 200 "	112	35.33	L. W. OSC. "
17	30.11	" " 25,000 " " " " "	41	35.25	" 1ST I.F.	65	15.16	" " 3 MMF. ± ½ MMF.	89	10.5	" " .05 " 200 "	113	30.2	CARB. RES. - 10,000 OHMS ½ W. ± 10%
18	30.11	" " 25,000 " " " " "	42	35.26	" 2ND I.F.	66	15.10	" " 50 " " 10%	90	10.3	" " .006 " 400 "	114	15.3	MICA COND. - .0001 MF. ± 10%
19	30.11	" " 25,000 " " " " "	43	35.27	" 3RD I.F.	67	15.10	" " 50 " " "	91	10.2	" " .1 " 200 "	115	15.2	" " .0005 " " "
20	30.59	" " 27,000 " " " " "	44	35.6	" WAVE TRAP	68	15.3	" " .0001 MF. " "	92	10.2	" " .1 " 200 "	116	15.23	" " .00007 " " 5
21	30.10	" " 34,000 " " " " "	45	35.28	" U.H.F. ANT.	69	15.3	" " .0001 " " "	93	10.2	" " .1 " 200 "	117	15.53	" " .00048 " " "
22	30.5	" " 50,000 " " " " "	46	35.29	" " OSC.	70	15.3	" " .0001 " " "	94	10.2	" " .1 " 200 "	118		
23	30.[illegible]	" " 500,000 " " " " 20	47	40.1	" CHOKE - 330 ω	71	15.3	" " .0001 " " "	95	10.2	" " .1 " 200 "	119		
24	30.1	" " 5,000 " " " " 10	48	40.52	" " 100 ω	72	120.3	PILOT LTS. - 6-8 V. .15 A.	96	10.2	" " .1 " 200 "	120		

600 ω 15 W.

BOTTOM VIEW OF BALLAST

220 Volt
A.C.-D.C. Models

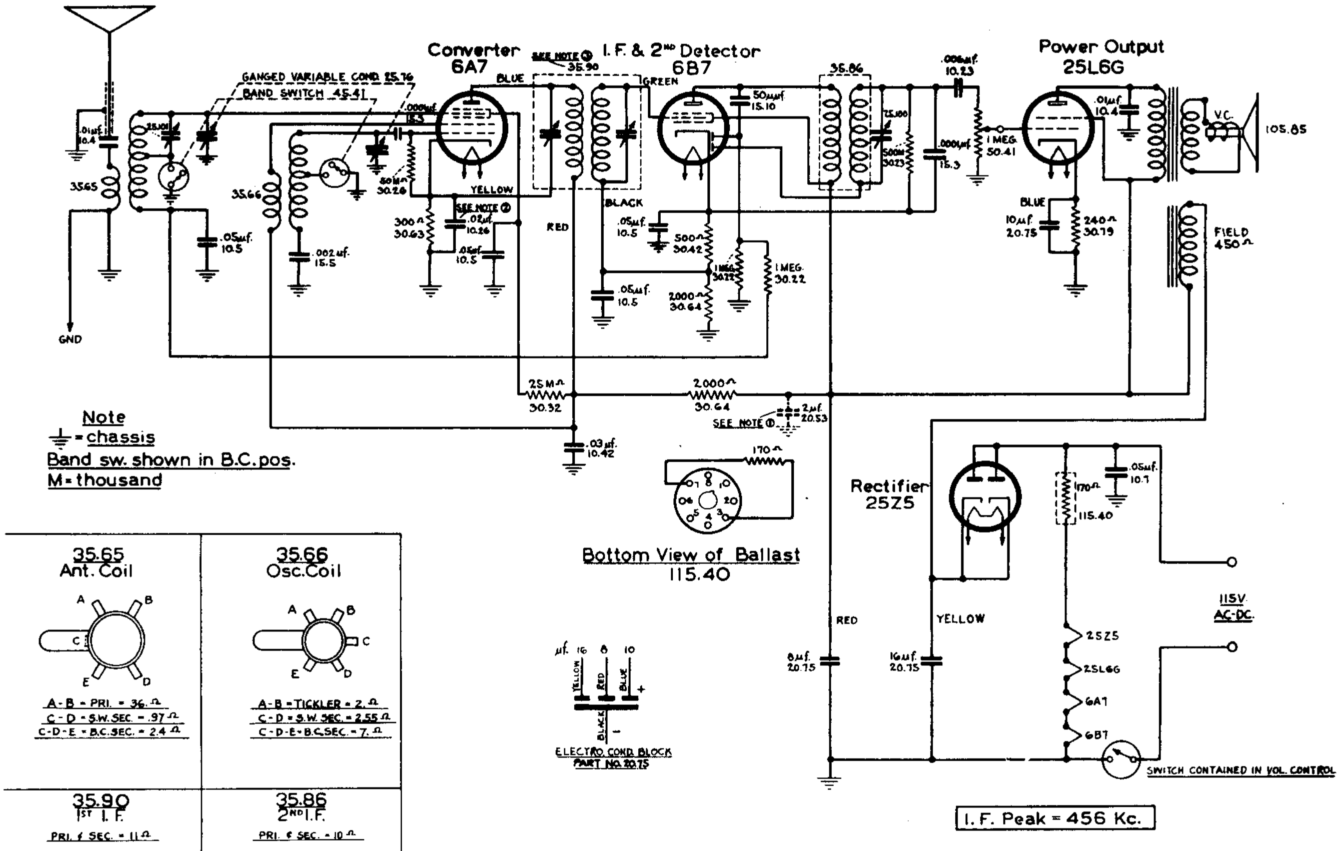


BOTTOM VIEW OF BALLAST

FOR 220 V. AC. OPERATION, USE REF. No. 78
" 220 V. DC. " " " " 106

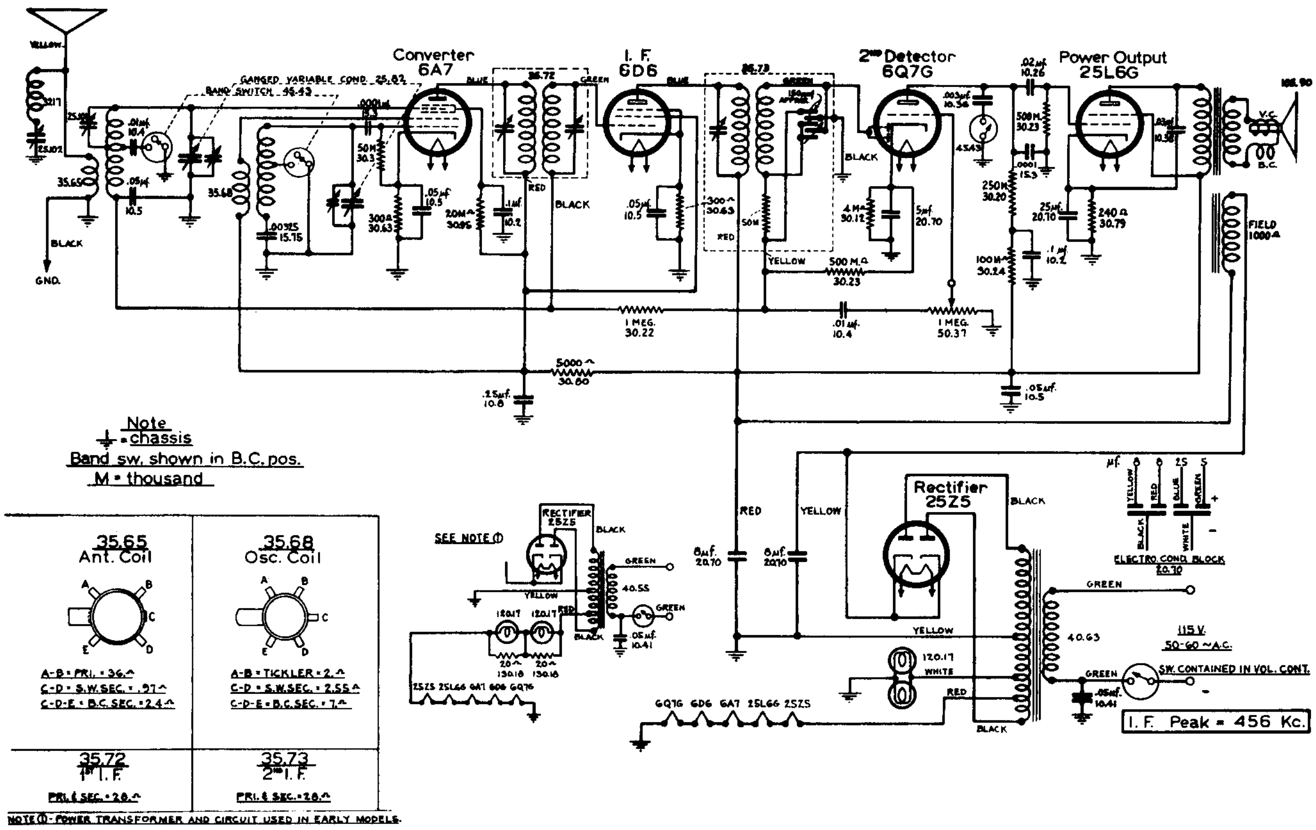
FADA RADIO AND ELECTRIC COMPANY

MODEL 350



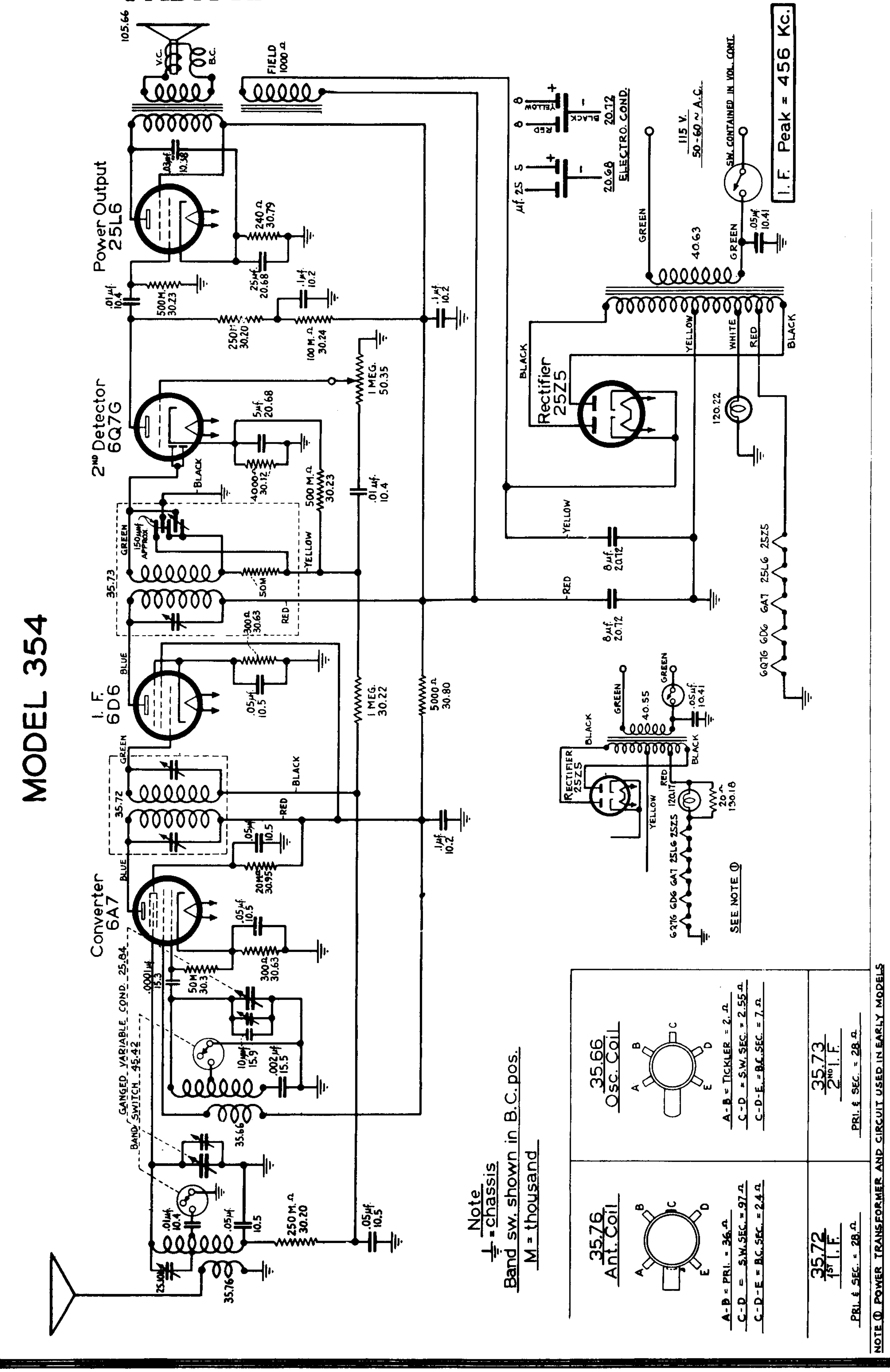
NOTE ① 2 μf ELECTROLYTIC, PART NO. 20.53 IS USED ON EARLY MODELS IN CONJUNCTION WITH PART NO. 20.63
NOTE ② ON SOME MODELS .03 μf CONDENSER, PART NO. 10.42 IS USED IN PLACE OF .02 μf PART NO. 10.26
NOTE ③ ON EARLY MODELS, I.F. TRANS. PART NO. 35.44 IS USED IN PLACE OF PART NO. 35.90

MODEL 351



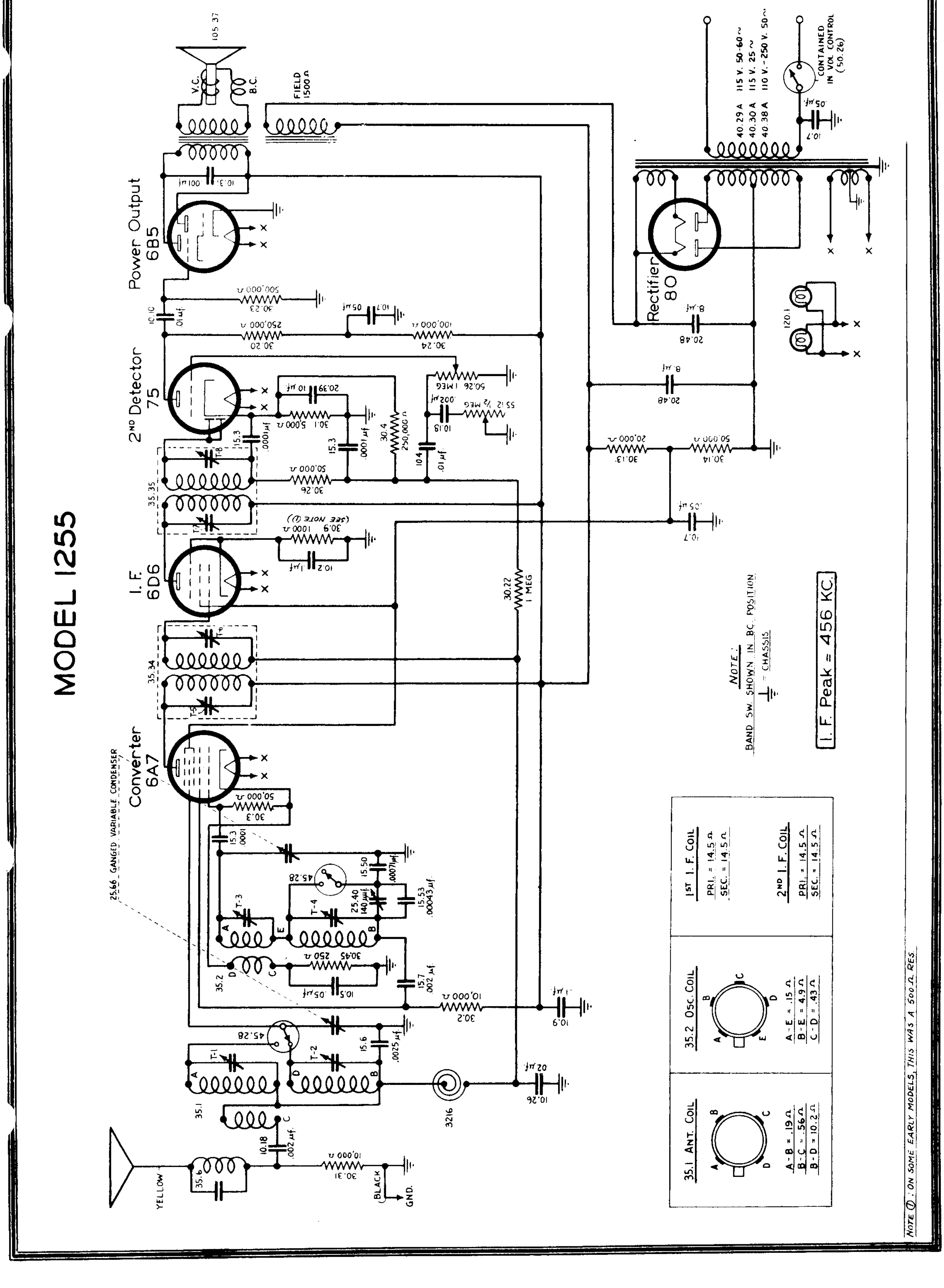
NOTE ① - POWER TRANSFORMER AND CIRCUIT USED IN EARLY MODELS.

FADA RADIO AND ELECTRIC COMPANY



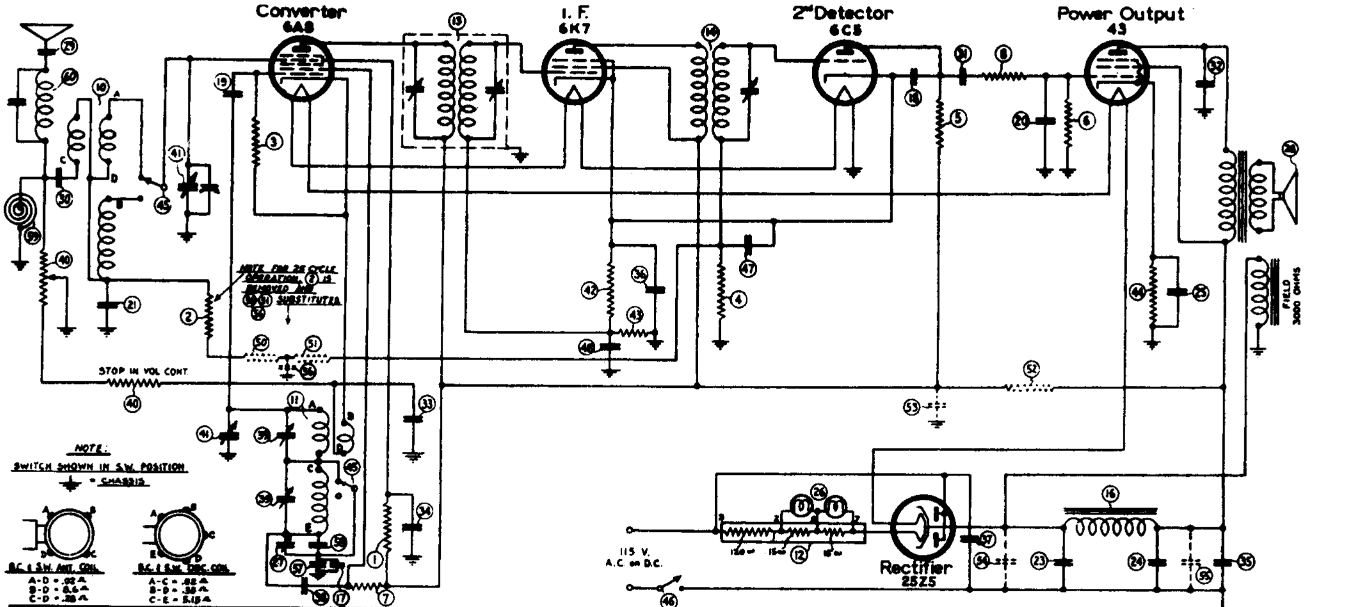
FADA RADIO AND ELECTRIC COMPANY

MODEL 1255



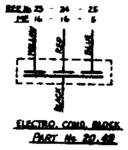
FADA RADIO AND ELECTRIC COMPANY

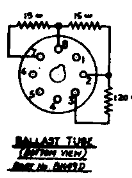
MODEL 1262



REF No	PART No	DESCRIPTION	REF No	PART No	DESCRIPTION	REF No	PART No	DESCRIPTION	REF No	PART No	DESCRIPTION
1	30.21	CARB RES - 30,000 OHMS - ½W ±20%	23	20.49	ELECTRO COND BLOCK - 16 MFD 100 W.V.	45	45.31	BAND SWITCH	53	20.25	TUBULAR ELECTRO. COND. - 8 MFD 100 W.V.
2	30.20	" " 250,000 " " "	24	20.49	" " " 16 - 100 "	46		ON-OFF SW ON VOL. CONT. (40)	54	20.25	" " " 8 " " "
3	30.3	" " 50,000 " " " 10%	25	20.49	" " " 5 - 25 "	47	10.4	TUBULAR COND. - .01 MFD. - 200 V.	55	20.25	" " " 8 " " "
4	30.22	" " 1 MEG. " " 20%	26	120.3	PILOT LIGHTS 6.8V. .15 A	48	10.5	" " .05 " " "	56	10.8	" COND. - .25 MFD. - 200 V.
5	30.25	" " 500,000 " " " "	27	25.46	PADDING COND - 140 MMFD.	49			57	15.62	MICA COND. - .004 MFD. ± 5%
6	30.23	" " 500,000 " " " "	28	105.21	SPEAKER - 3000 OHMS	50	30.24	CARB. RES - 100,000 OHMS - ½W ±20%	58	15.83	" " - .00024 - ± 5%
7	30.36	" " 5,000 " " " "	29	10.18	TUBULAR COND - .002 MFD. - 200 V	51	30.24	" " 100,000 " " "	59	32.16	CHOKE COIL - 2.3 MH.
8	30.26	" " 50,000 " " " "	30	10.18	" " .002 " " "	52	30.30	" " 1400 " " " 10%	60	35.47	WAVE TRAP COIL
9			31	10.4	" " .01 " " "						
10	35.100	B.C. & S.W. ANT. COIL	32	10.4	" " .01 " " "						
11	35.11	" " OSC. "	33	10.5	" " .05 " " "						
12	BK499	BALLAST RES. - 120-15-15 OHMS	34	10.5	" " .05 " " "						
13	7879	D.T. I.F. COIL	35	10.5	" " .05 " " "						
14	4336	S.T. I.F. "	36	10.1	" " .35 " " "						
15			37	10.7	" " .05 " 400 "						
16	40.60	CHOKE COIL - 400 OHMS	38	10.23	" " .006 " 200 "						
17	15.21	MICA COND. - .003 MFD. ± 5%	39	25.14	TRIMMERS - 3-30 MMF						
18	15.2	" " .0005 " 10	40	50.22	VOLUME CONT. - 10,000 OHM - WITH [illegible]						
19	15.3	" " .0001 " "	41	25.58	VARIABLE COND						
20	15.3	" " .0001 " "	42	30.45	CARB RES - 250 OHMS - ½W ±10%						
21	15.6	" " .0025 " 3%	43	30.46	" " 350 " " "						
22	16.7	TUBULAR COND - .05 " 400 V.	44	30.47	" " 625 " ½ " "						

I. F. PEAK - 456 KC.



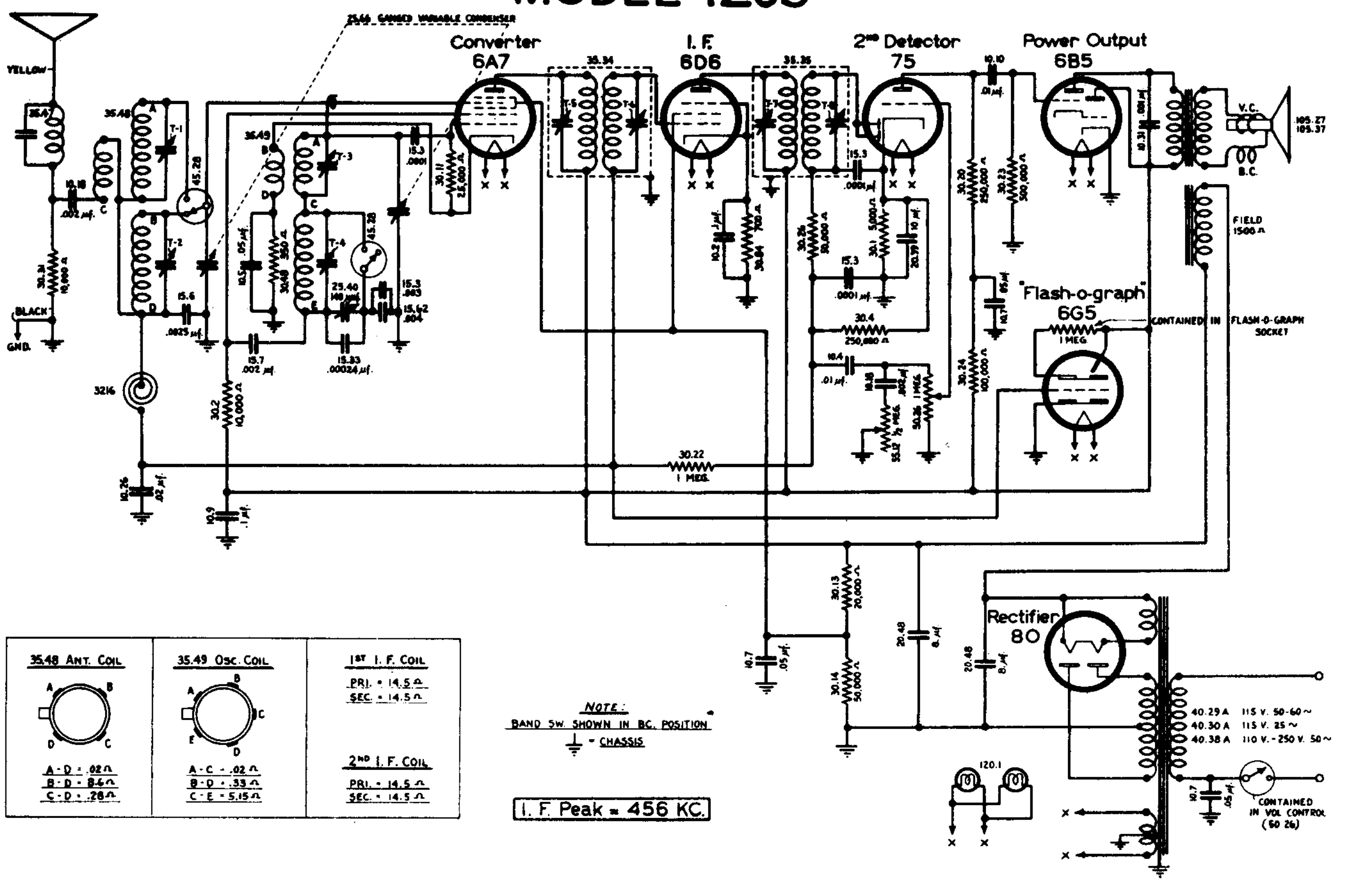


D.T. I.F. COIL
PRI. = 16 OHMS
SEC. = 15.5 "

S.T. I.F. COIL
PRI. = 24.5 OHMS
SEC. = 24.5 "

NOTE
REF. Nos. 50-51-52-53-54-55-56 ARE FOR 25 CYCLE OPERATION ONLY AND ARE SHOWN IN DOTTED LINES.

MODEL 1265



35.48 ANT. COIL
A-D = .02 Ω
B-D = 8.6 Ω
C-D = .28 Ω

35.49 OSC. COIL
A-C = .02 Ω
B-D = .33 Ω
C-E = 5.15 Ω

1st I. F. COIL
PRI. = 14.5 Ω
SEC. = 14.5 Ω

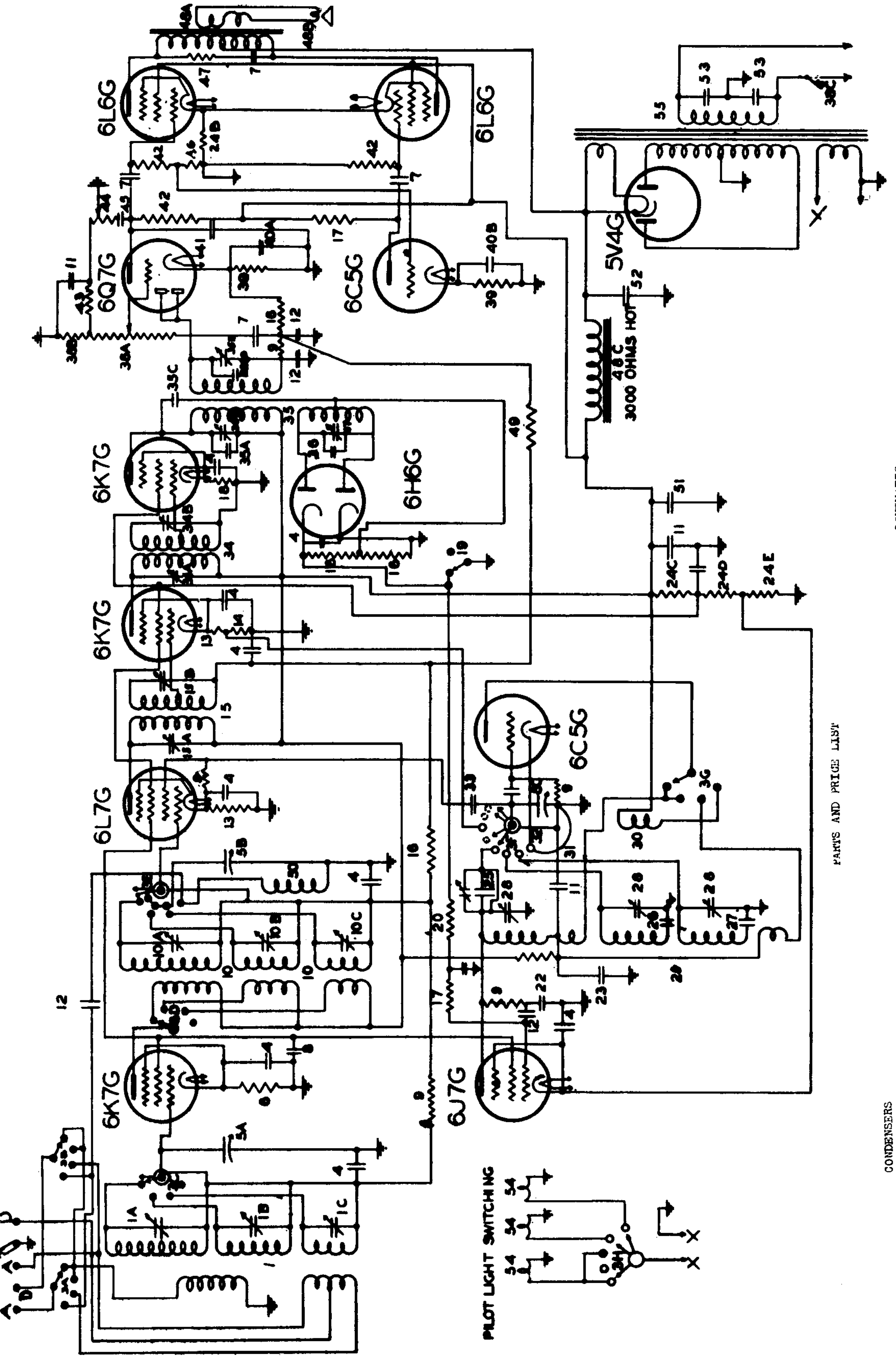
2nd I. F. COIL
PRI. = 14.5 Ω
SEC. = 14.5 Ω

NOTE:
BAND SW. SHOWN IN B.C. POSITION
= CHASSIS

I. F. Peak = 456 KC.

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODEL 12A



PARTS AND PRICE LIST

CONDENSERS

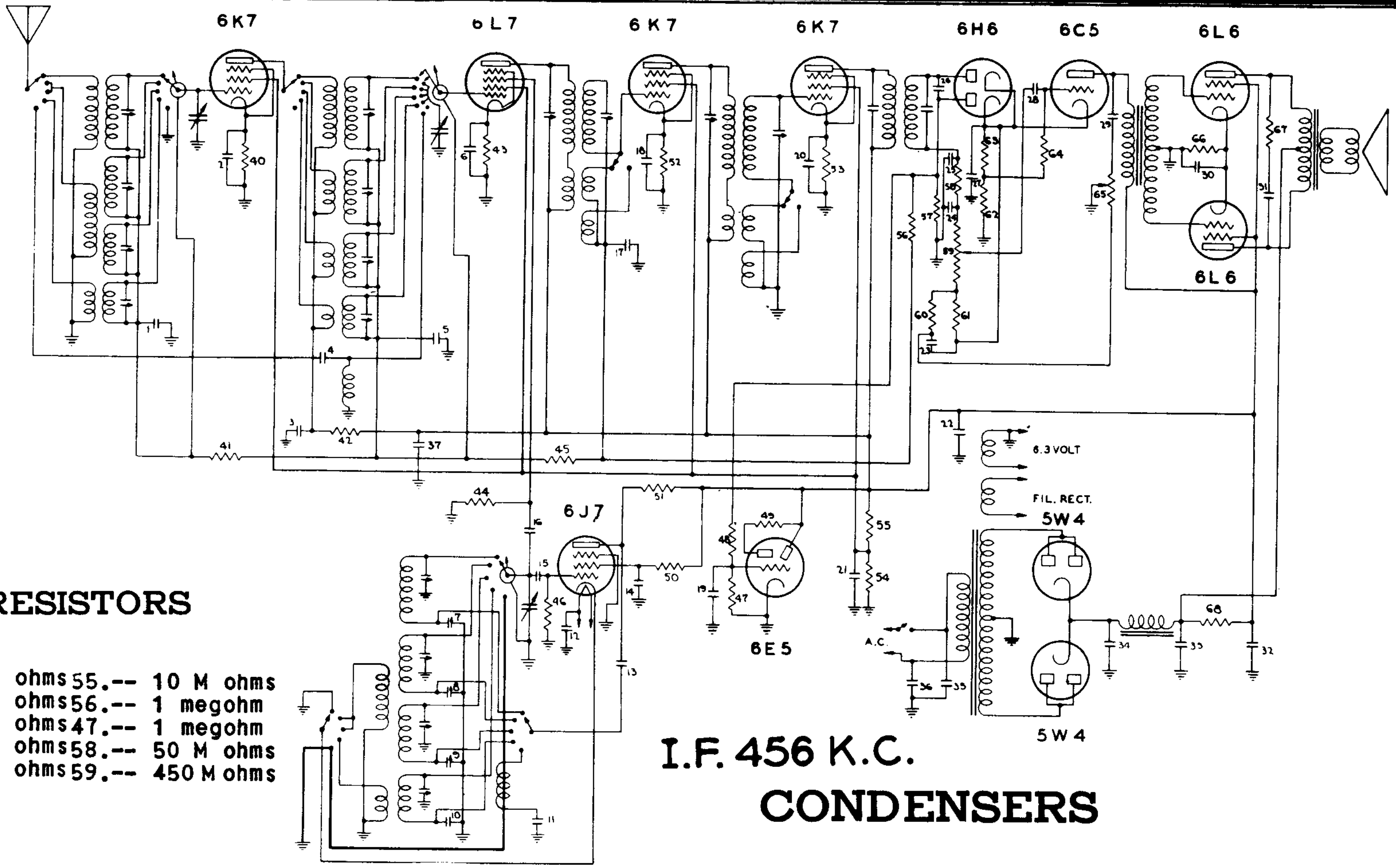
PART NUMBER	SCHEMATIC REFERENCE NUMBER	DESCRIPTION	PRICE LIST
211-3	52	Electrolytic 16-500 mf	$1.40
214-1	51	Electrolytic 18-300 mf	1.10
210-2	23	Electrolytic 8-300 mf	.80
261-2	22	Mica 20 mmf	.18
260-5	33	Mica 50 mmf	.18
263-5	36	Mica 50 mmf. (+ or --30%	.25
260-7	12	Mica 100 mmf	.18
262-1	25	Mica 490 mmf	.35
260-13	41	Mica 500 mmf	.20
260-18	8	Mica 1000 mmf	.20
261-23	27	Mica 4000 mmf	.30
251-1	53	Moulded .01-600 mf	.18
250-15	7	.02-600 V	.18
250-16	45	.03-600 V	.18
250-39	10	.05-200 V	.18
250-22	11	.1-400 V	.18
231-4	40 A&B	Electrolytic 5-5 25 V	.85

RESISTORS

PART NUMBER	SCHEMATIC REFERENCE NUMBER	DESCRIPTION	PRICE LIST
330-1	24 A to E	Candohm Resistor 24A....3,000 ohm section 24B.... 222 ohm section 24C....4,800 ohm section 24D....5,550 ohm section 24E.... 250 ohm section	$1.00
308-34	47	5600 ohm 2 watt	.20
301-10	6	300 ohm ½ watt	.15
301-11	13	470 ohm ½ watt	.15
301-14	18	1500 ohm ½ watt	.15
301-15	14	2200 ohm ½ watt	.15
301-16	43	3300 ohm ½ watt	.15
301-17	39	4700 ohm ½ watt	.15
301-20	46	15,000 ohm ½ watt	.15
301-23	9	47,000 ohm ½ watt	.15
301-25	17	100,000 ohm ½ watt	.15
301-27	42	220,000 ohm ½ watt	.15
301-29	16	470,000 ohm ½ watt	.15
301-31	49	1 megohm ½ watt	.15
301-33	20	2.2 megohm ½ watt	.15

FAIRBANKS, MORSE & CO., HOME APPLIANCE DIVISION

MODELS 12C6 & 120



I.F. 456 K.C.

RESISTORS

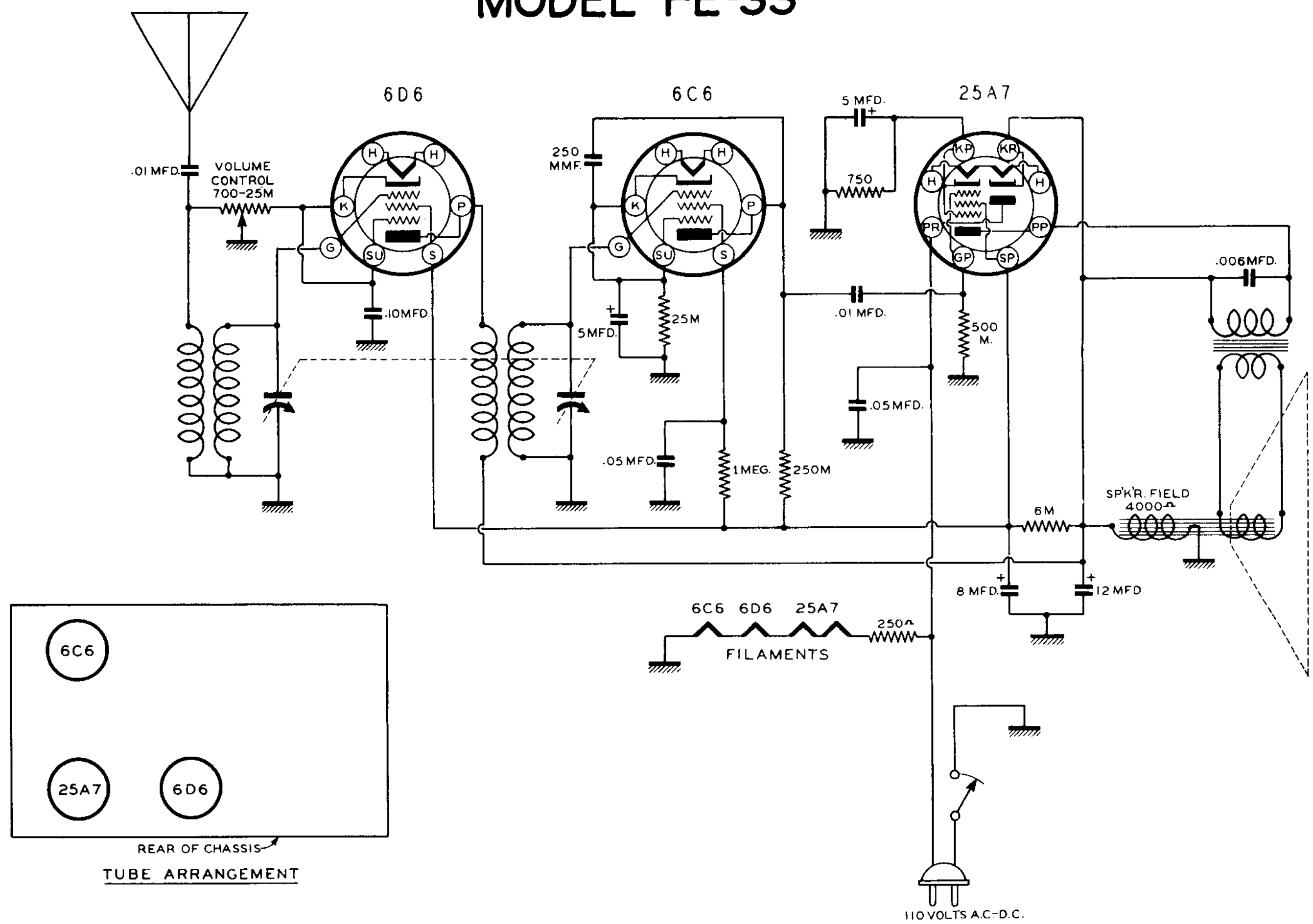
40.--	300 ohms	55.--	10 M ohms
41.--	50 M ohms	56.--	1 megohm
42.--	200 ohms	47.--	1 megohm
43.--	500 ohms	58.--	50 M ohms
44.--	50 M ohms	59.--	450 M ohms
45.--	50 M ohms	60.--	3 M ohms
46.--	50 M ohms	61.--	50 M ohms
47.--	2 megohms	62.--	5 M ohms
48.--	2 megohms	63.--	5 M ohms
49.--	1 megohm	64.--	500 M ohms
50.--	2 M ohms		
51.--	10 M ohms	65.--	500 M ohms
52.--	300 ohms	66.--	200 ohms
53.--	300 ohms	67.--	10 M ohms
54.--	50 M ohms	68.--	2 M ohms

CONDENSERS

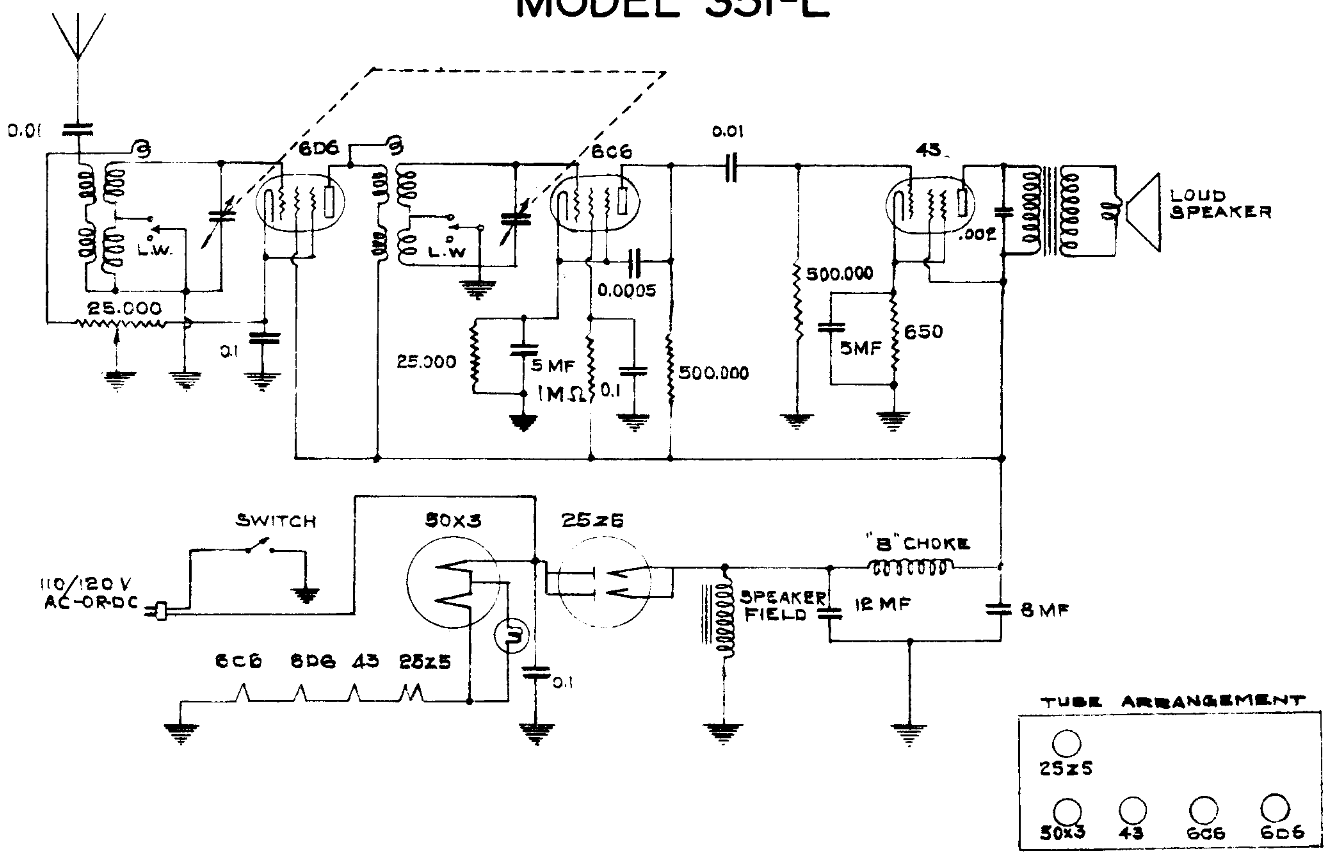
1.--	.05 mfd.	11.--	200 mmfd.	21.--	.1 mfd.	31.--	.02 mfd.
2.--	.05 mfd.	12.--	500 mmfd.	22.--	.1 mfd.	32.--	30 mfd.
3.--	.1 mfd.	13.--	1000 mmfd.	23.--	.1 mfd.	33.--	8 mfd.
4.--	100 mmfd.	14.--	500 mmfd.	24.--	100 mmfd.	34.--	16 mfd.
5.--	.05 mfd.	15.--	100 mmfd.	25.--	100 mmfd.	35.--	.01 mfd.
6.--	.05 mfd.	16.--	50 mmfd.	26.--	25 mmfd.	36.--	.01 mfd.
7.--	220 mmfd.	17.--	.05 mfd.	27.--	10 mfd.	37.--	.1 mfd.
8.--	750 mmfd.	18.--	.05 mfd.	28.--	.01 mfd.		
9.--	1800 mmfd.	19.--	.1 mfd.	29.--	.03 mfd.		
10.--	4000 mmfd.	20.--	.05 mfd.	30.--	.1 mfd.		

FREED EISEMANN RADIO CORP.

MODEL FE-33

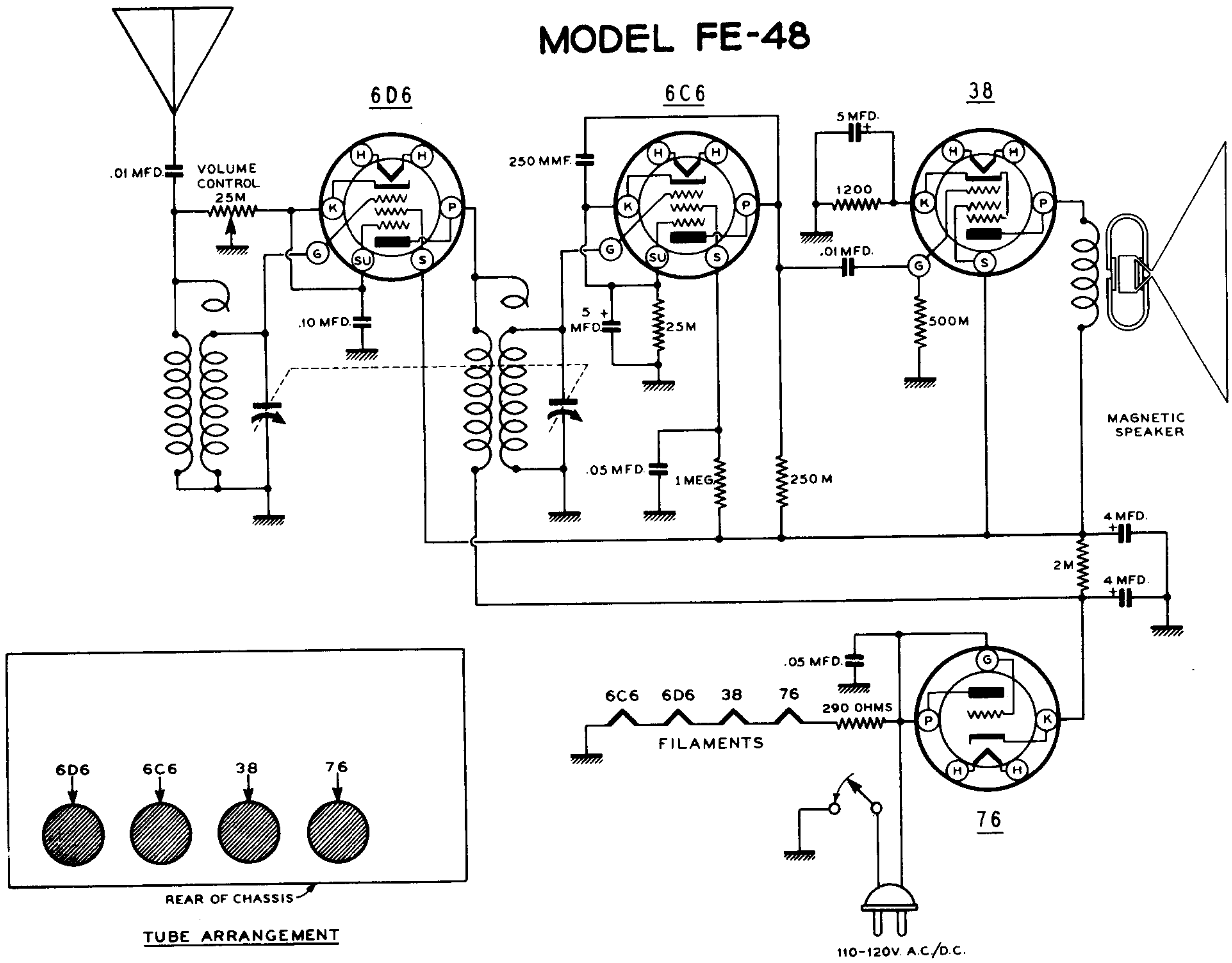


MODEL 351-L

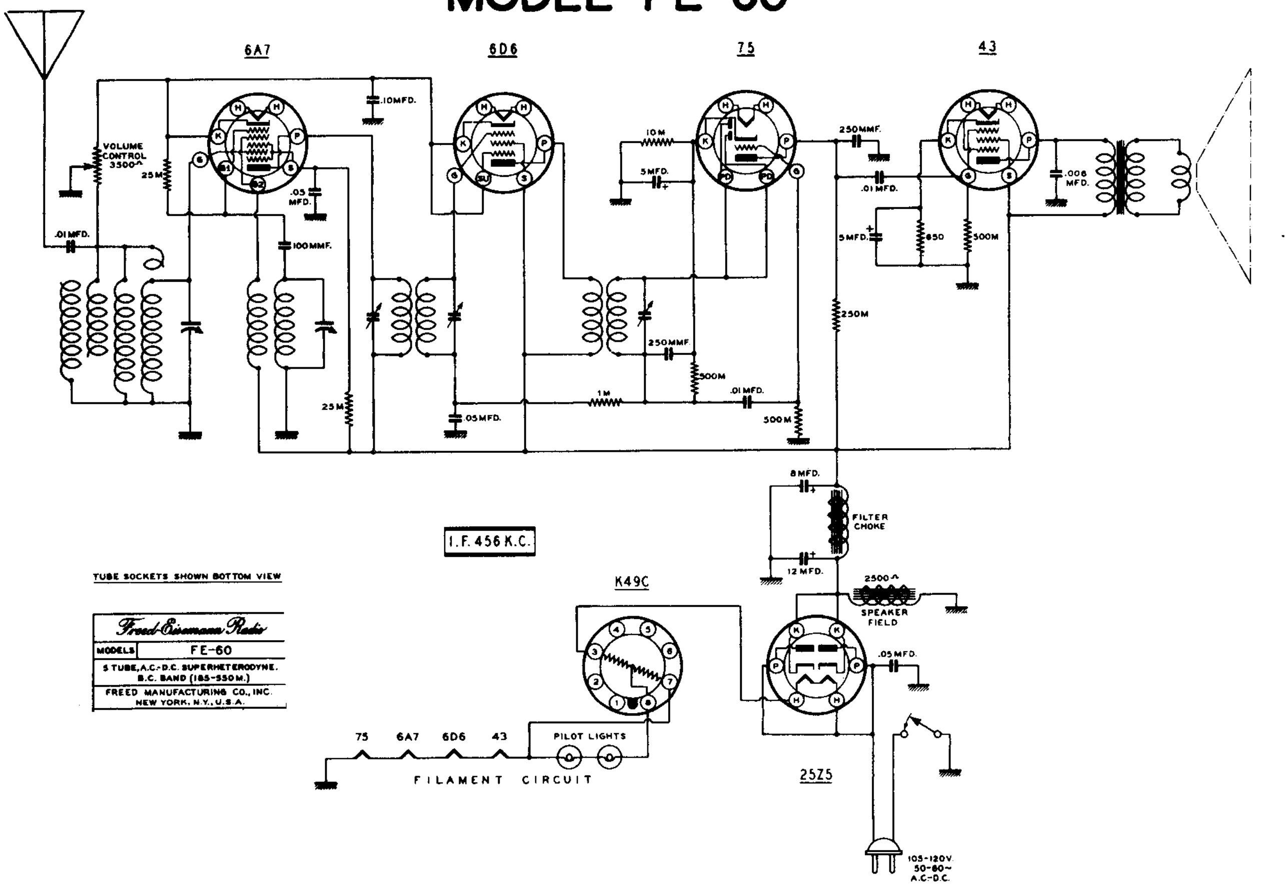


FREED EISEMANN RADIO CORP.

MODEL FE-48

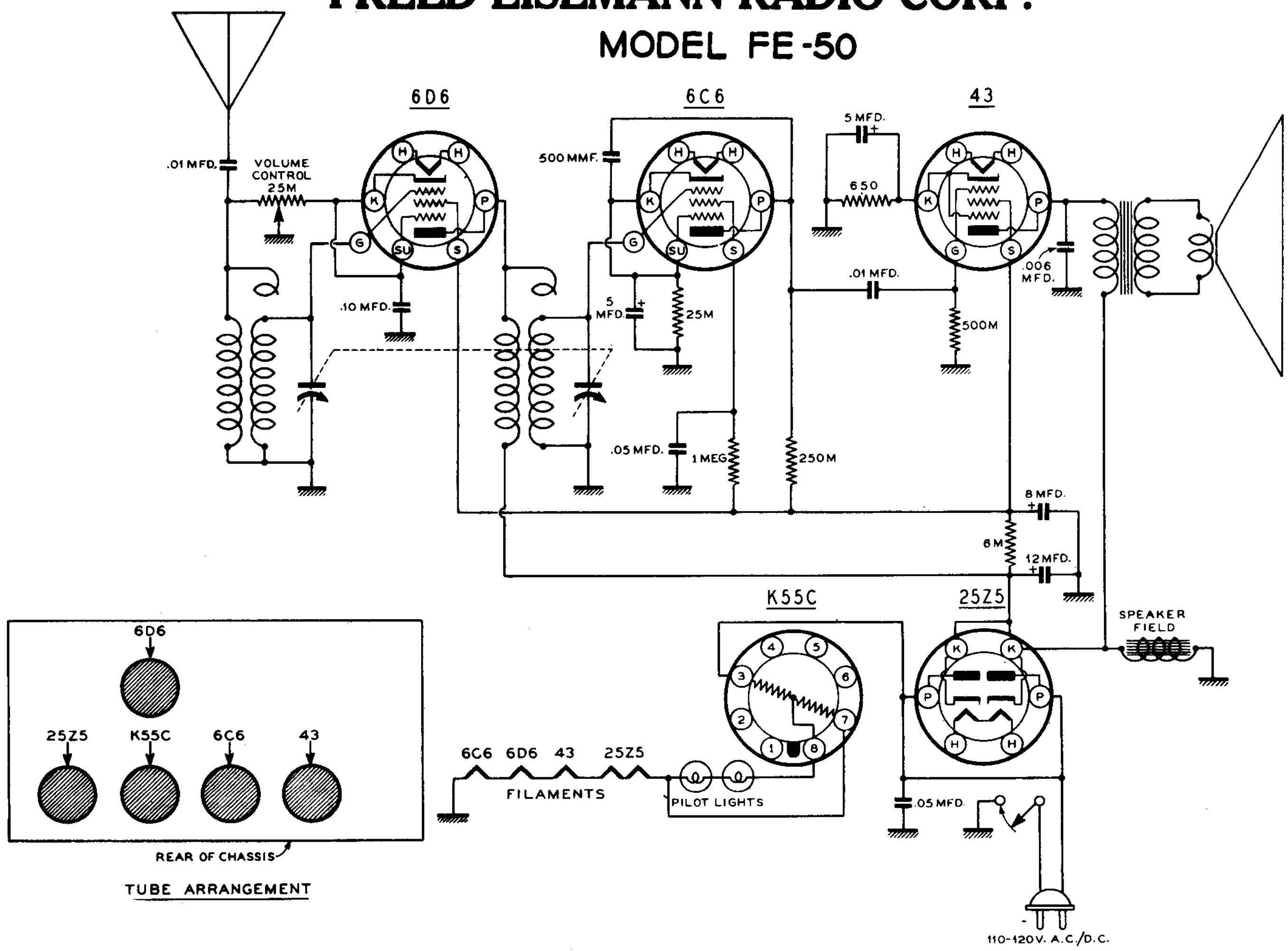


MODEL FE-60

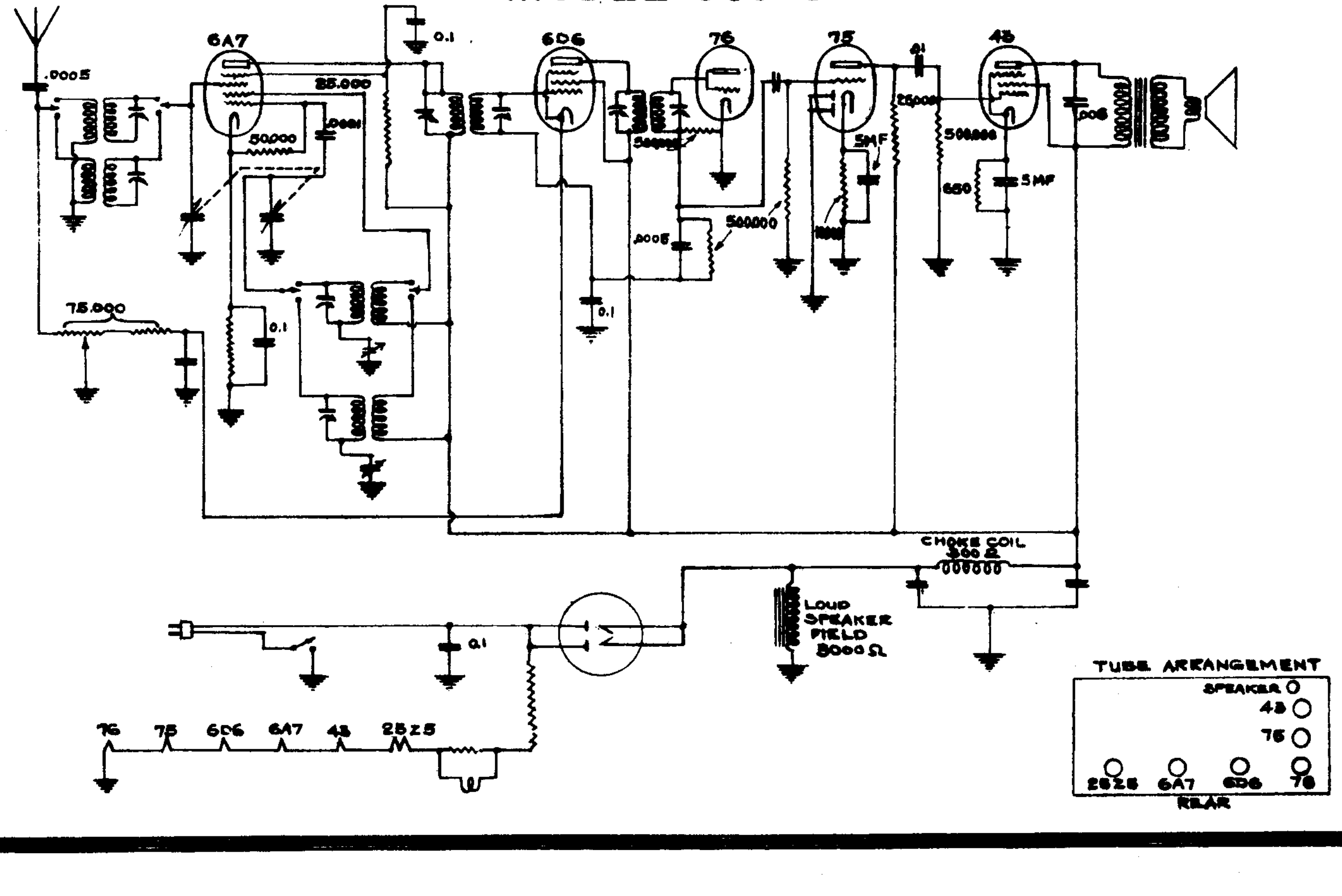


FREED EISEMANN RADIO CORP.

MODEL FE-50

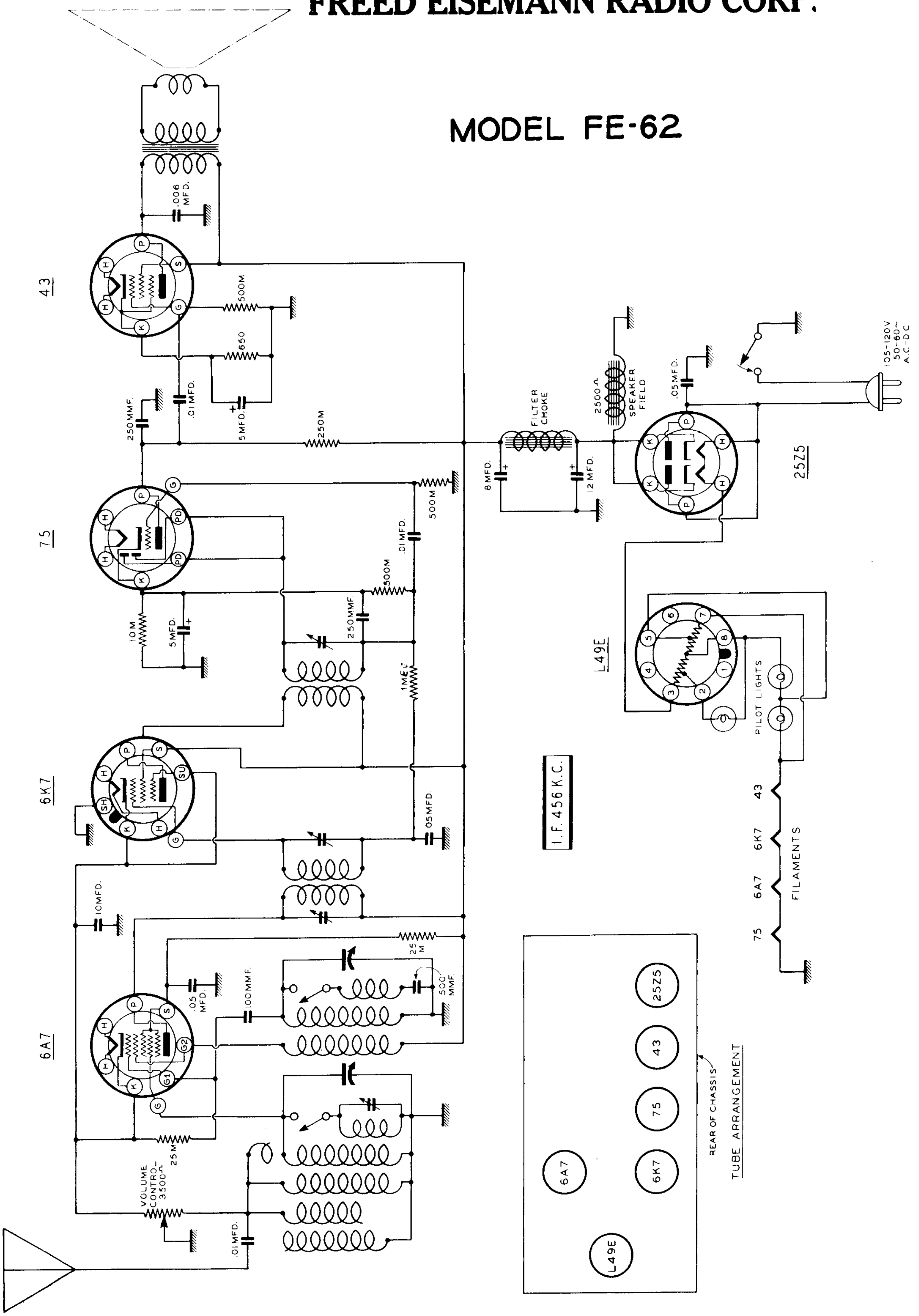


MODEL 369-S



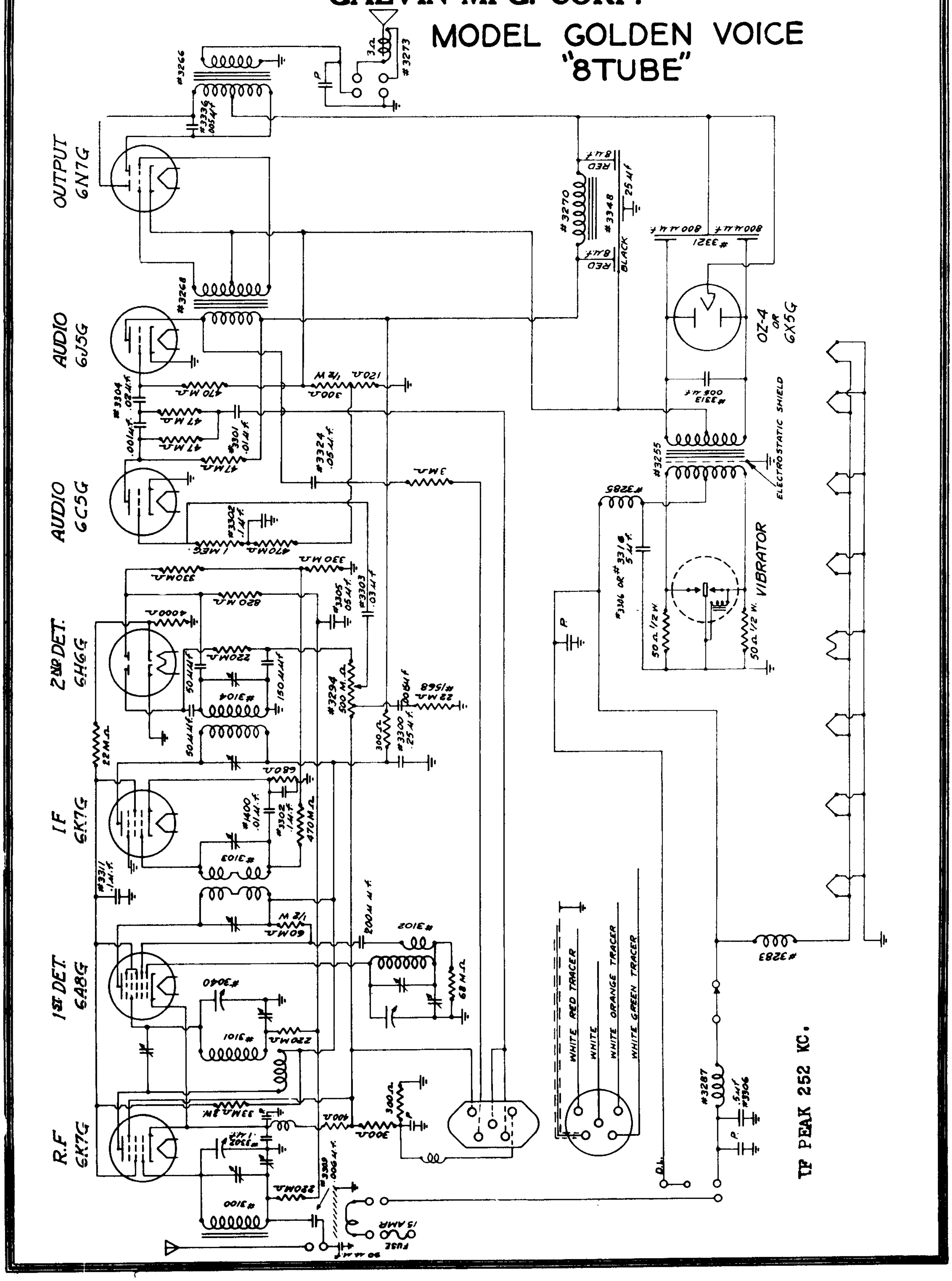
FREED EISEMANN RADIO CORP.

MODEL FE-62



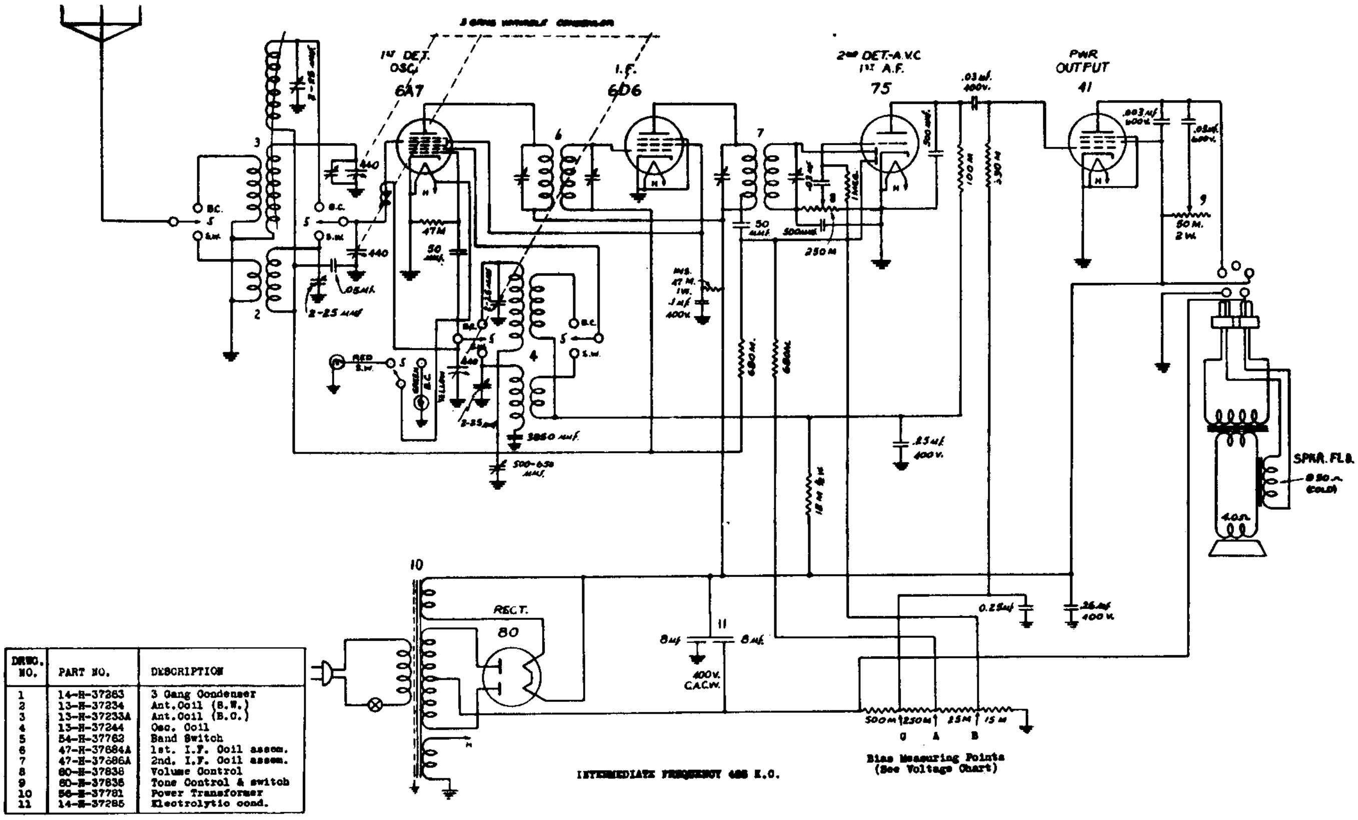
GALVIN MFG. CORP.

MODEL GOLDEN VOICE "8TUBE"



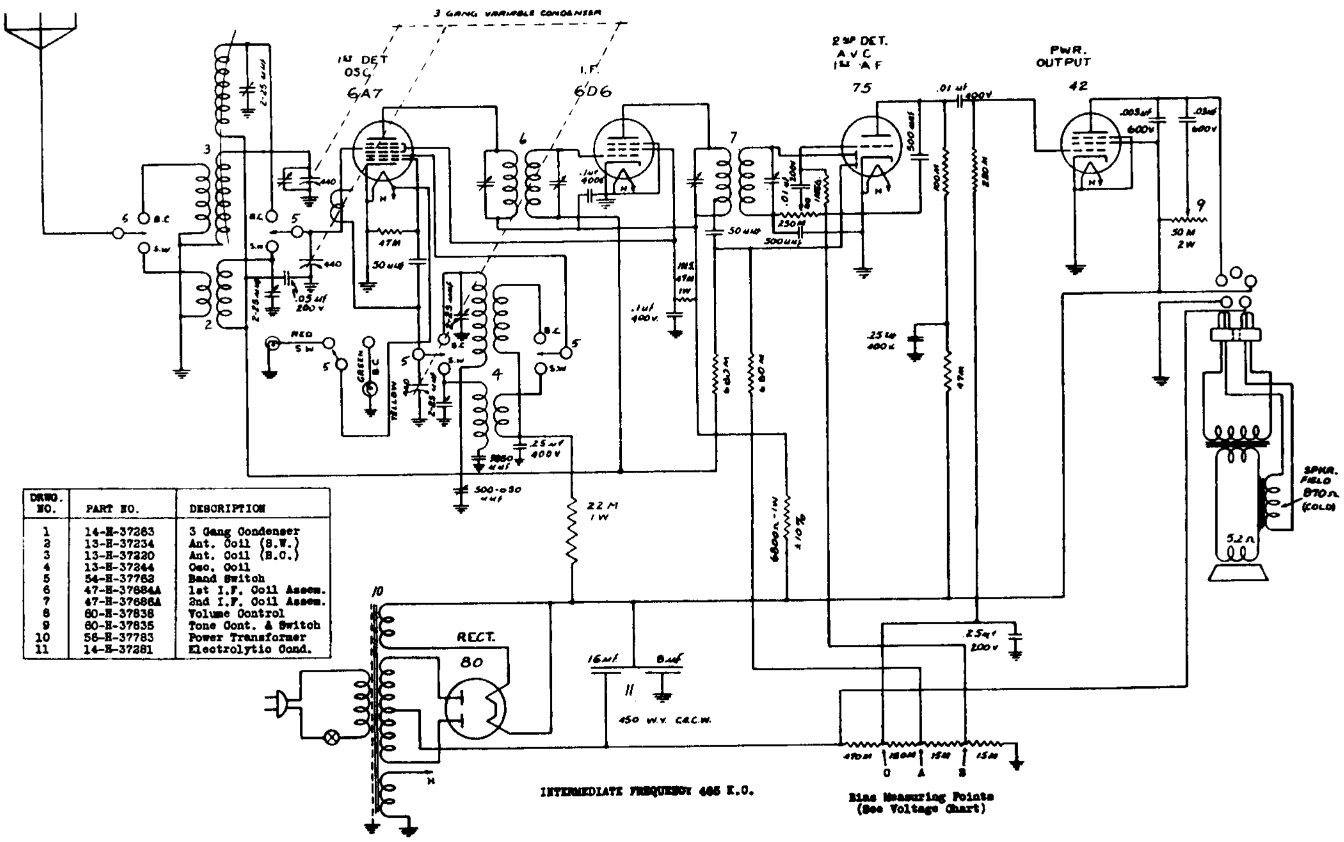
GALVIN MFG. CORP.

MODELS 5T & 5-1



DRWG. NO.	PART NO.	DESCRIPTION
1	14-H-37263	3 Gang Condenser
2	13-H-37234	Ant.Coil (S.W.)
3	13-H-37233A	Ant.Coil (B.C.)
4	13-H-37244	Osc. Coil
5	54-H-37762	Band Switch
6	47-H-37684A	1st. I.F. Coil assem.
7	47-H-37686A	2nd. I.F. Coil assem.
8	60-H-37838	Volume Control
9	60-H-37836	Tone Control & switch
10	56-H-37781	Power Transformer
11	14-H-37285	Electrolytic cond.

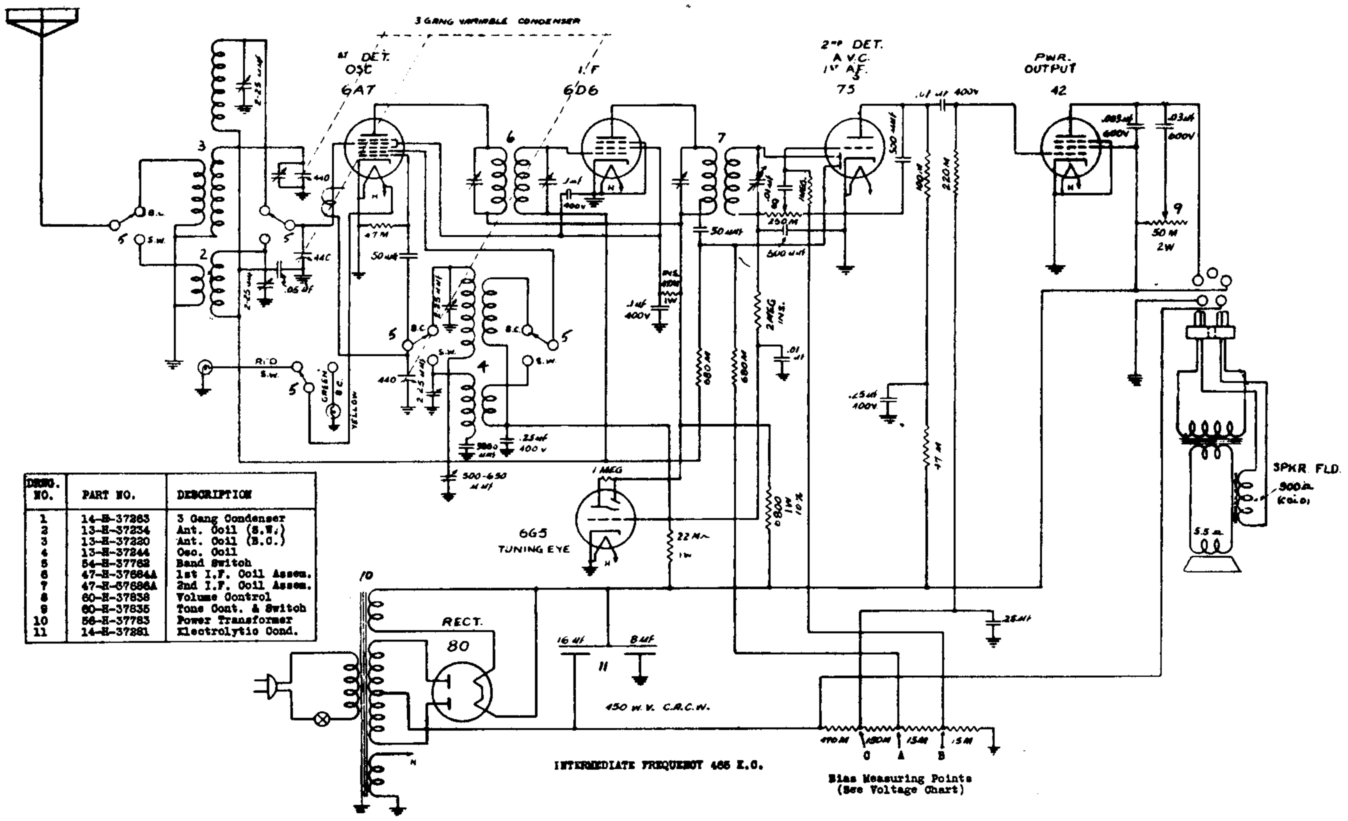
MODELS 5T1, 5T2, 5Y & 5-2



DRWG. NO.	PART NO.	DESCRIPTION
1	14-H-37263	3 Gang Condenser
2	13-H-37234	Ant. Coil (S.W.)
3	13-H-37220	Ant. Coil (B.C.)
4	13-H-37244	Osc. Coil
5	54-H-37763	Band Switch
6	47-H-37684A	1st I.F. Coil Assem.
7	47-H-37686A	2nd I.F. Coil Assem.
8	60-H-37838	Volume Control
9	60-H-37835	Tone Cont. & Switch
10	56-H-37783	Power Transformer
11	14-H-37281	Electrolytic Cond.

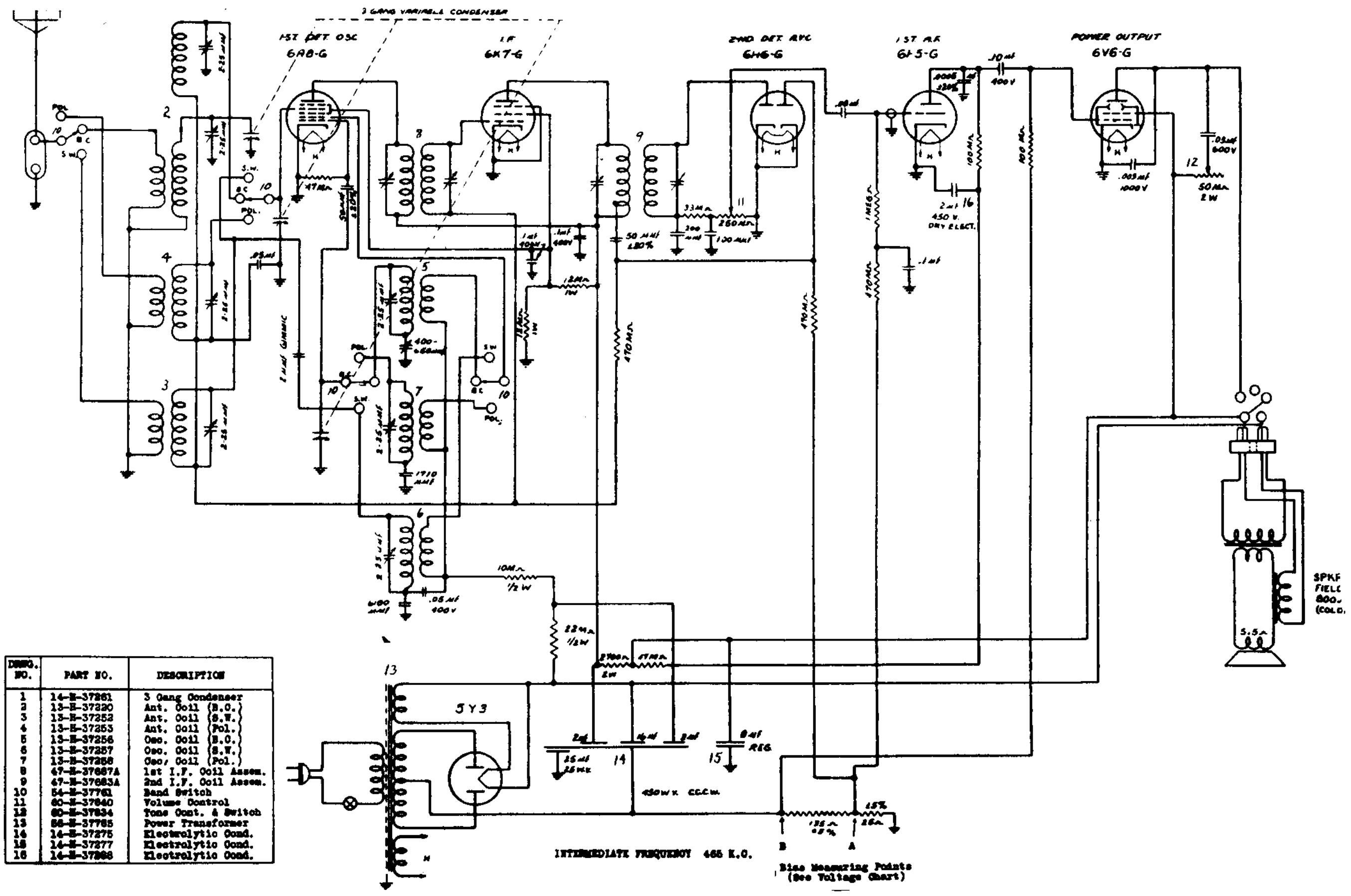
GALVIN MFG. CORP.

MODELS 6A & 6-1



DRWG. NO.	PART NO.	DESCRIPTION
1	14-H-37263	3 Gang Condenser
2	13-H-37234	Ant. Coil (S.W.)
3	13-H-37220	Ant. Coil (B.C.)
4	13-H-37244	Osc. Coil
5	54-H-37762	Band Switch
6	47-H-37684A	1st I.F. Coil Assem.
7	47-H-37686A	2nd I.F. Coil Assem.
8	60-H-37838	Volume Control
9	60-H-37835	Tone Cont. & Switch
10	56-H-37783	Power Transformer
11	14-H-37281	Electrolytic Cond.

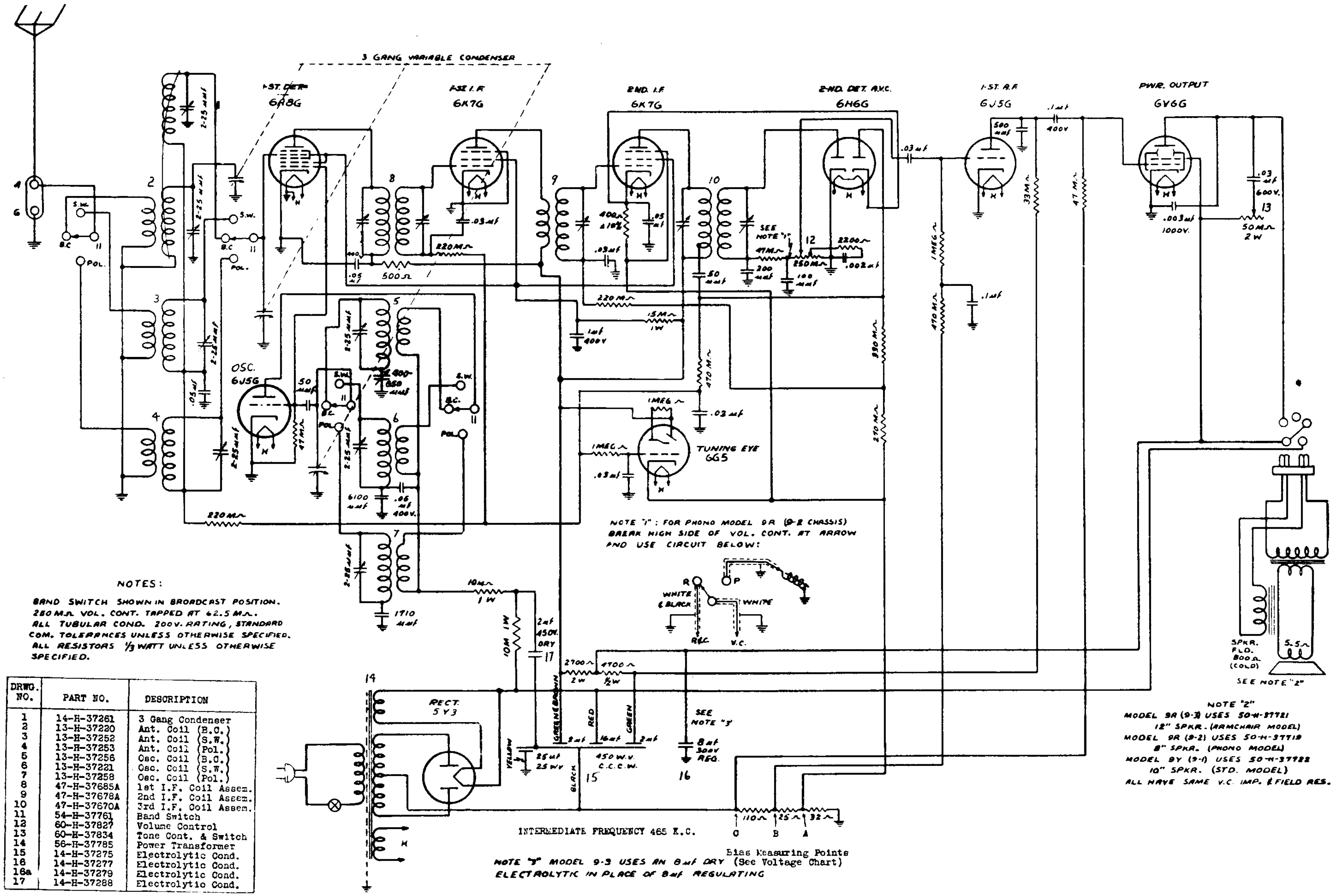
MODELS 6T, 6Y & 6-2



DRWG. NO.	PART NO.	DESCRIPTION
1	14-H-37261	3 Gang Condenser
2	13-H-37220	Ant. Coil (B.C.)
3	13-H-37252	Ant. Coil (S.W.)
4	13-H-37253	Ant. Coil (Pol.)
5	13-H-37256	Osc. Coil (B.C.)
6	13-H-37257	Osc. Coil (S.W.)
7	13-H-37258	Osc. Coil (Pol.)
8	47-H-37687A	1st I.F. Coil Assem.
9	47-H-37683A	2nd I.F. Coil Assem.
10	54-H-37761	Band Switch
11	60-H-37840	Volume Control
12	60-H-37834	Tone Cont. & Switch
13	56-H-37765	Power Transformer
14	14-H-37275	Electrolytic Cond.
15	14-H-37277	Electrolytic Cond.
16	14-H-37266	Electrolytic Cond.

GALVIN MFG. CORP.

MODELS 9A, 9R, 9Y, 9-1, 9-2 & 9-3



NOTE "1": FOR PHONO MODEL 9R (9-2 CHASSIS) BREAK HIGH SIDE OF VOL. CONT. AT ARROW AND USE CIRCUIT BELOW:

NOTES:

BAND SWITCH SHOWN IN BROADCAST POSITION.
250 MΩ VOL. CONT. TAPPED AT 62.5 MΩ.
ALL TUBULAR COND. 200V. RATING, STANDARD COM. TOLERANCES UNLESS OTHERWISE SPECIFIED.
ALL RESISTORS 1/3 WATT UNLESS OTHERWISE SPECIFIED.

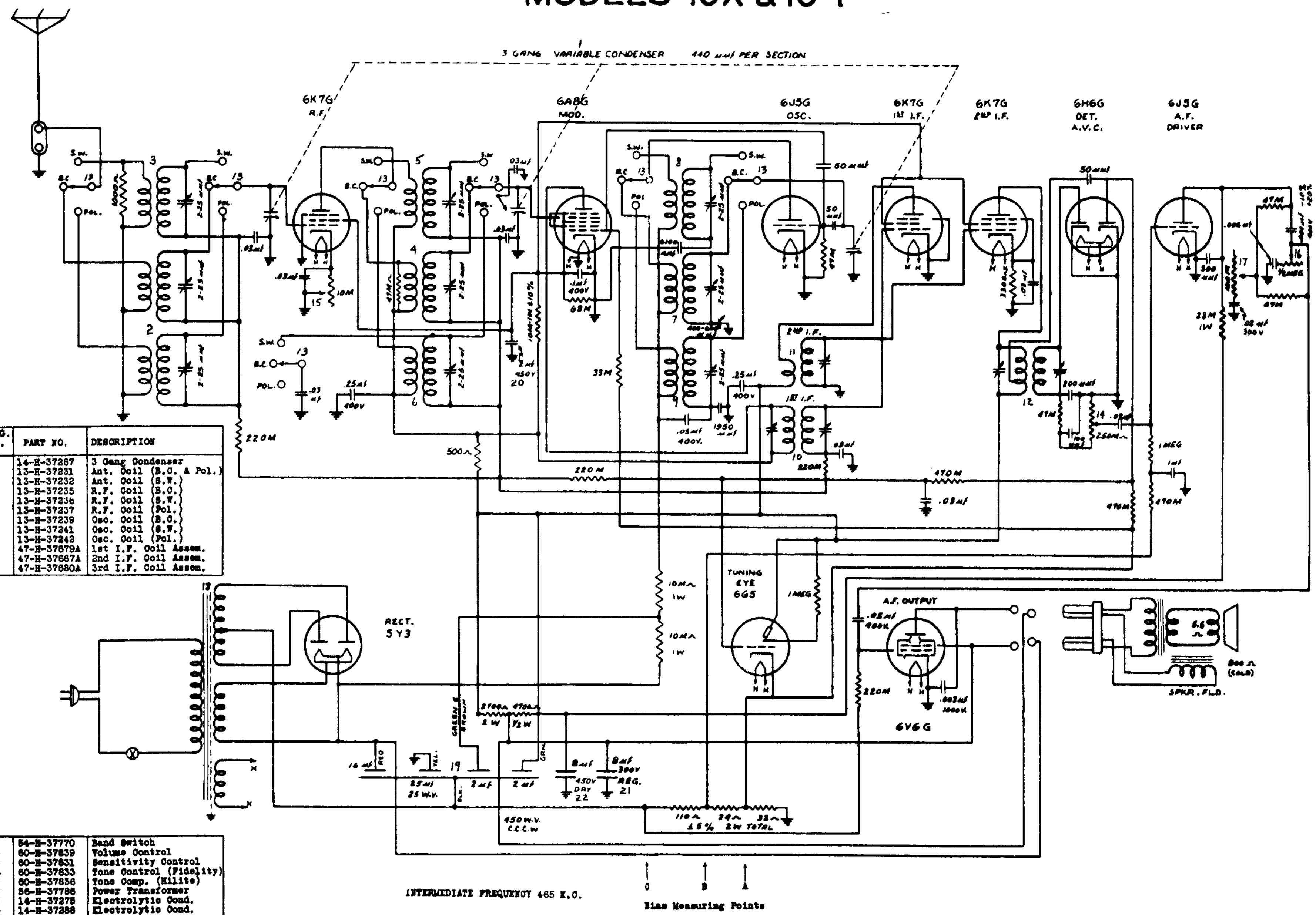
NOTE "2"
MODEL 9A (9-3) USES 50-H-37721 12" SPKR. (ARMCHAIR MODEL)
MODEL 9R (9-2) USES 50-H-37719 8" SPKR. (PHONO MODEL)
MODEL 9Y (9-1) USES 50-H-37722 10" SPKR. (STD. MODEL)
ALL HAVE SAME V.C. IMP. & FIELD RES.

NOTE "3" MODEL 9-3 USES AN 8 uf DRY ELECTROLYTIC IN PLACE OF 8 uf REGULATING

DRWG. NO.	PART NO.	DESCRIPTION
1	14-H-37261	3 Gang Condenser
2	13-H-37220	Ant. Coil (B.C.)
3	13-H-37252	Ant. Coil (S.W.)
4	13-H-37253	Ant. Coil (Pol.)
5	13-H-37256	Osc. Coil (B.C.)
6	13-H-37221	Osc. Coil (S.W.)
7	13-H-37258	Osc. Coil (Pol.)
8	47-H-37685A	1st I.F. Coil Assem.
9	47-H-37678A	2nd I.F. Coil Assem.
10	47-H-37670A	3rd I.F. Coil Assem.
11	54-H-37761	Band Switch
12	60-H-37827	Volume Control
13	60-H-37834	Tone Cont. & Switch
14	56-H-37785	Power Transformer
15	14-H-37275	Electrolytic Cond.
16	14-H-37277	Electrolytic Cond.
16a	14-H-37279	Electrolytic Cond.
17	14-H-37288	Electrolytic Cond.

GALVIN MFG. CORP.

MODELS 10X & 10-1

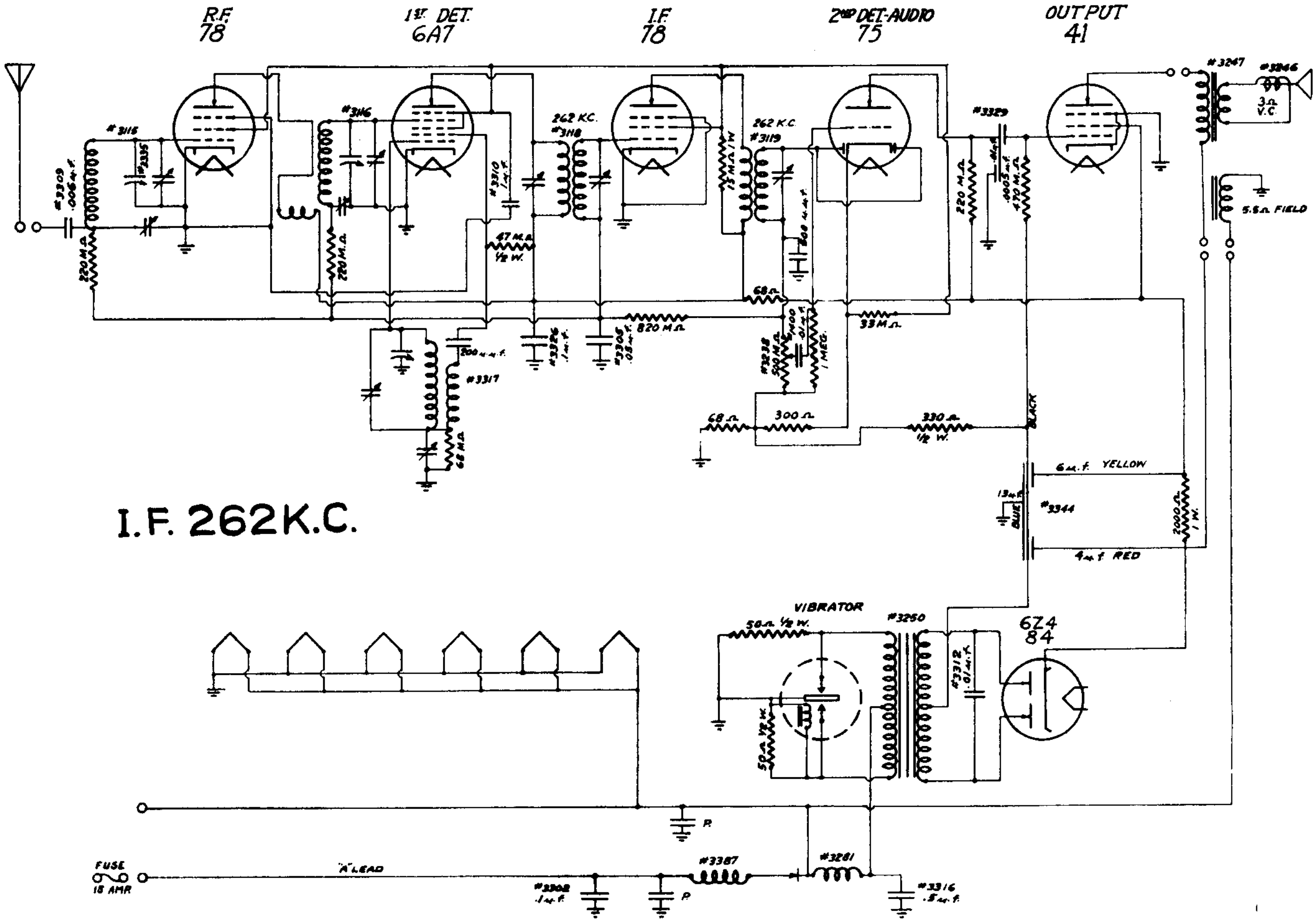


DRWG. NO.	PART NO.	DESCRIPTION
1	14-H-37267	3 Gang Condenser
2	13-H-37231	Ant. Coil (B.C. & Pol.)
3	13-H-37232	Ant. Coil (S.W.)
4	13-H-37235	R.F. Coil (B.C.)
5	13-H-37236	R.F. Coil (S.W.)
6	13-H-37237	R.F. Coil (Pol.)
7	13-H-37239	Osc. Coil (B.C.)
8	13-H-37241	Osc. Coil (S.W.)
9	13-H-37242	Osc. Coil (Pol.)
10	47-H-37679A	1st I.F. Coil Assem.
11	47-H-37687A	2nd I.F. Coil Assem.
12	47-H-37680A	3rd I.F. Coil Assem.
13	54-H-37770	Band Switch
14	60-H-37839	Volume Control
15	60-H-37831	Sensitivity Control
16	60-H-37833	Tone Control (Fidelity)
17	60-H-37836	Tone Comp. (Hilite)
18	56-H-37786	Power Transformer
19	14-H-37275	Electrolytic Cond.
20	14-H-37288	Electrolytic Cond.
21	14-H-37277	Electrolytic Cond.
22	14-H-37279	Electrolytic Cond.

INTERMEDIATE FREQUENCY 465 K.C.

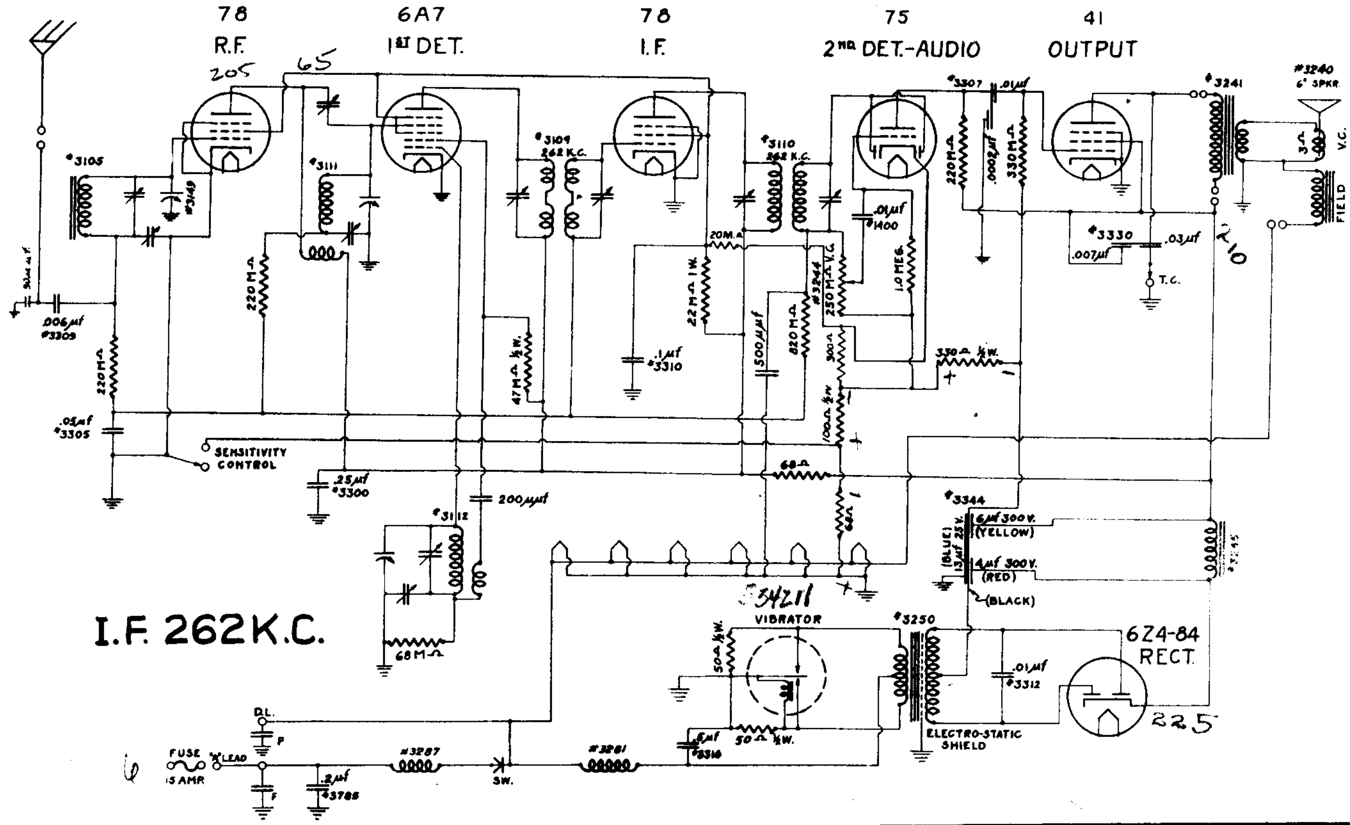
GALVIN MFG. CORP.

MODEL 35



I.F. 262K.C.

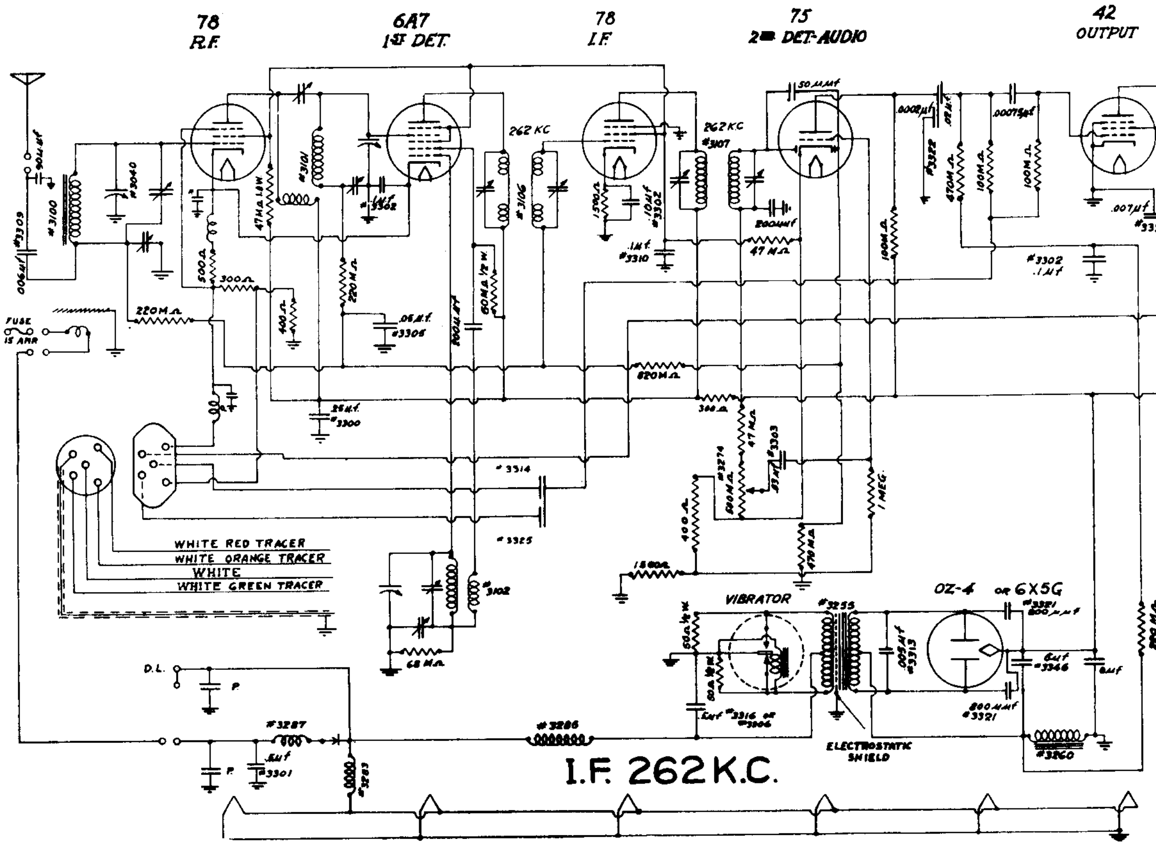
MODEL 45



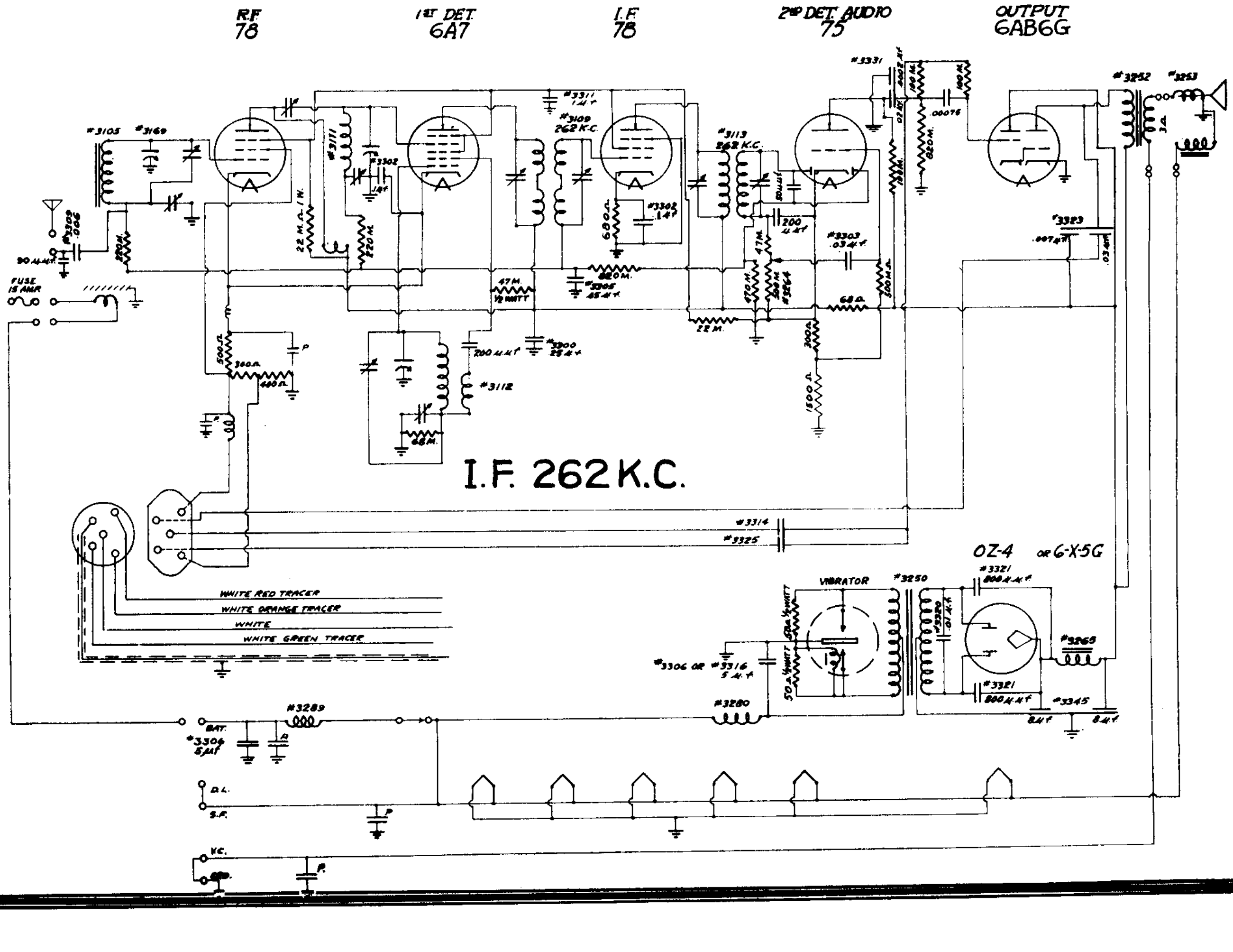
I.F. 262K.C.

GALVIN MFG. CORP.

MODEL 70

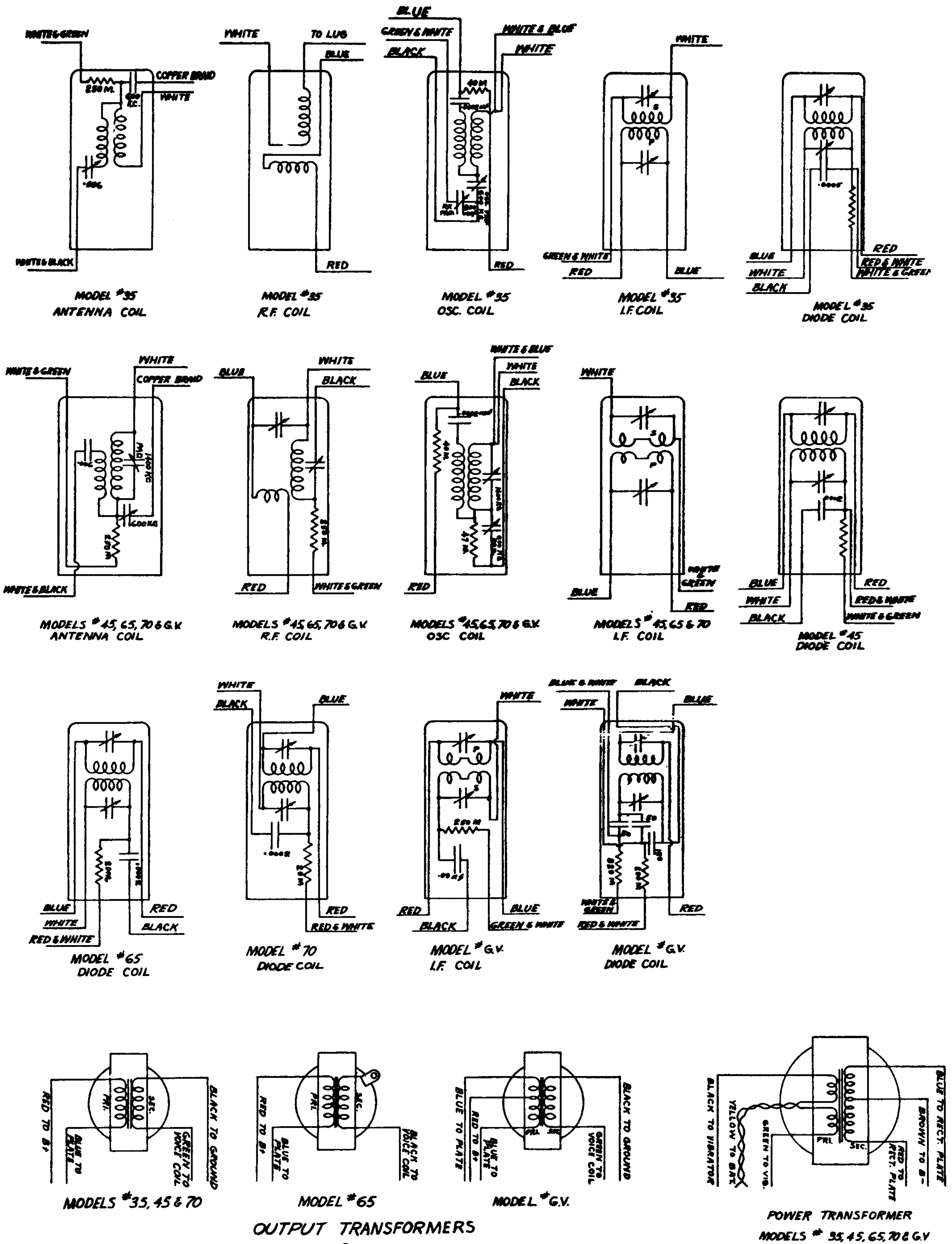


MODEL 65



GALVIN MFG. CORP.

MODELS 35,45,65,70 & GOLDEN VOICE "8 TUBE"

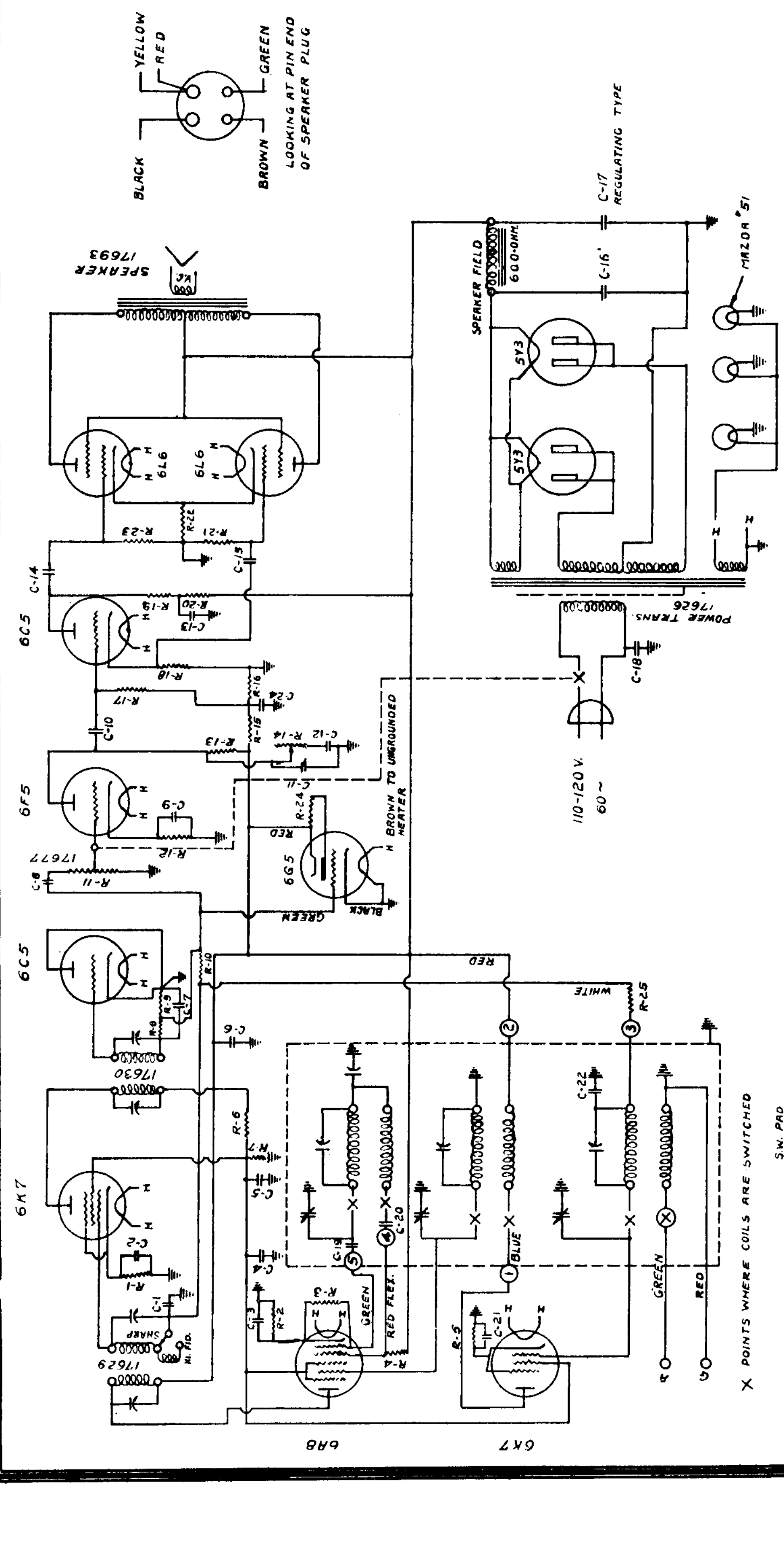


1937 Motorola UNIT COLOR CODE

GAMBLE-SKOGMO INC.

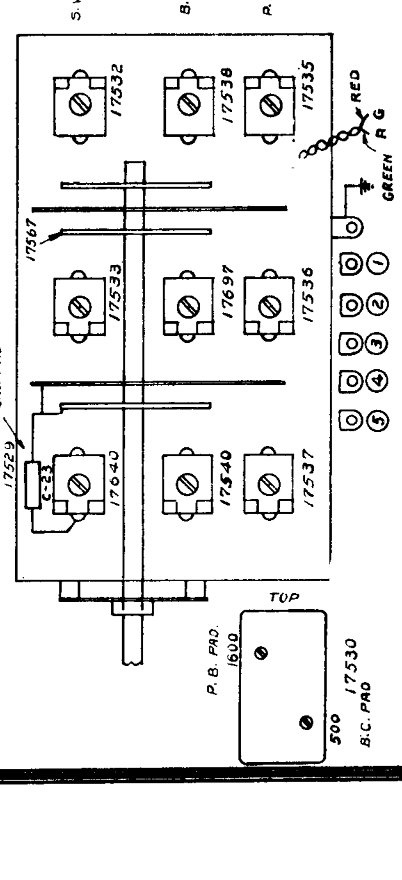
MODEL 11B

Ⓐ R-22 TO BE 225 OHM. AFTER SERIAL # 2100



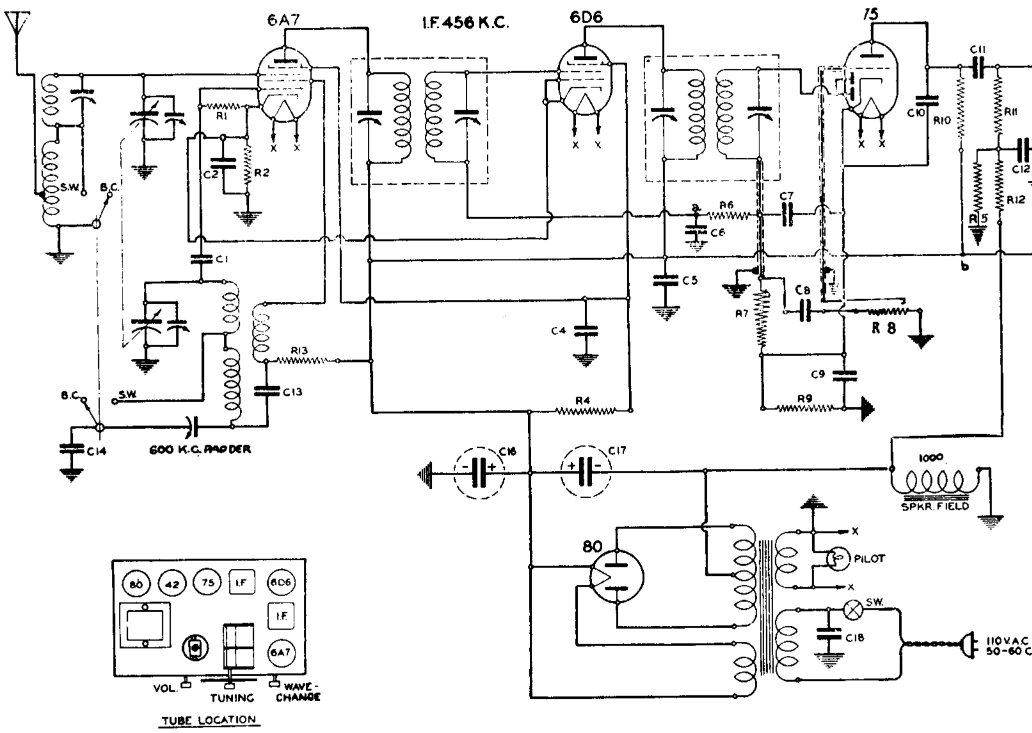
C-1	.05	200 V.	C-15	.05	400 V.	R-1	300 OHM	R-15	500K OHM
C-2	.05	200 V.	C-16	16	475 V. ELECT.	R-2	400 OHM	R-16	50K OHM
C-3	.05	200 V.	C-17	16	300 V. ELECT.	R-3	50 K OHM	R-17	500K OHM
C-4	8	250 V. DRY ELECT.	C-18	.05	400 V.	R-4	20 K OHM	R-18	25 K OHM
C-5	.1	400 V.	C-19	.0001	MICA	R-5	500 OHM	R-19	25 K OHM
C-6	.25	400 V.	C-20	.0025	MICA	R-6	25 K OHM 1 W.	R-20	100 K OHM
C-7	.0002	MICA	C-21	.05	200 V.	R-7	50 K OHM 1 W.	R-21	250K OHM
C-8	.05	200 V.	C-22	.02	400 V.	R-8	50 K OHM	R-22	175 OHM Ⓐ
C-9	10.	25 V. ELECT.	C-23	.00325	MICA.	R-9	250K OHM	R-23	250 K OHM
C-10	.05	400 V.	C-24	.5	150 V.	R-10	1 MEG OHM	R-24	1 MEG OHM (IN SOC.)
C-11	.0005	600 V.				R-11	500K VOL. CON.	R-25	100 K OHM
C-12	.01	600 V.				R-12	7500 OHM		
C-13	.5	400 V.				R-13	250K OHM		
C-14	.05	400 V.				R-14	500K TONE CON. 17678		

I.F. FREQUENCY 456 K.C.
B.C. FREQUENCY 540 K.C. TO 1740 K.C.
P.W. FREQUENCY 1680 K.C. TO 5.6 M.C.
S.W. FREQUENCY 5.5 M.C. TO 18.1 M.C



CHANGE NOTE FOR HUM REDUCTION: R-20 changed to 50K ohms (50,000 ohms). R-13 connected to junction of R-19 and R-20 instead of B+.
After Serial 929

GAMBLE-SKOGMO INC.
MODEL 510



LEGEND							
C1	.0001	MFD	Mica	R1	50M	Ohms	1/3W
C2	.25	"	200V	R2	330	"	"
				R4	25M	"	1W
C4	.1	"	400V	R5	190M	"	1/3W
C5	.1	"	600V	R6	1 Meg.	"	"
C6	.05	"	200V	R7	250M	"	"
C7	.00025	"	Mica	R8	500M	"	"
C8	.01	"	600V	R9	4500	"	"
C9	10	"	25V	R10	250M	"	"
C10	.00025	"	Mica	R11	500M	"	"
C11	.01	"	600V	R12	600M	"	"
C12	.1	"	200V	R13	10M	"	1/2W
C13	.001	"	Mica				
C14	.002	"	Mica				
C15	.004	"	600V				
C16	8	"	450V				
C17	8	"	450V				
C18	.1	"	400V				

SERVICE INSTRUCTIONS

In case of faulty operation of the receiver, first make sure that the antenna and ground are in good condition and properly attached to the receiver. Then determine if any of the tubes are faulty. In case of trouble within the receiver itself, the circuit diagram shown on the opposite page will be useful to the service man in locating and correcting the trouble.

I. F. Alignment:

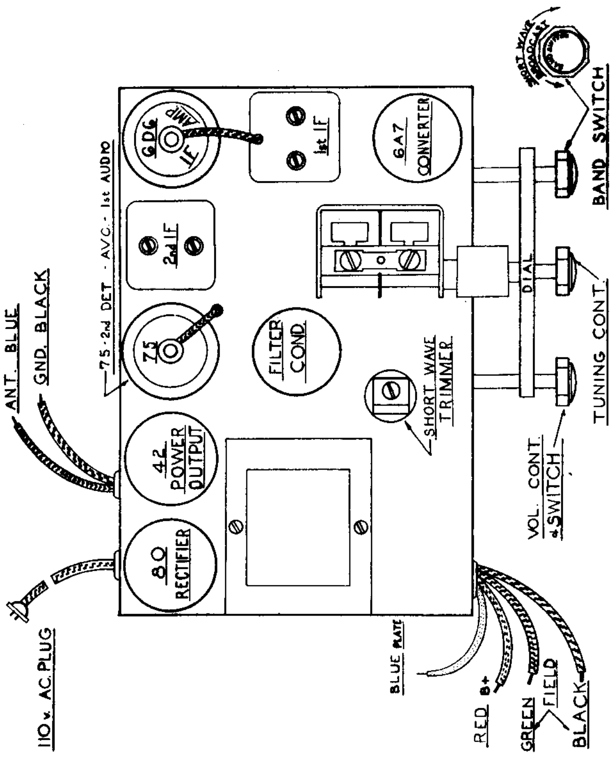
Connect a test oscillator or signal generator through a .1 mfd. condenser to the grid of the 6A7 tube and set the oscillator to 456 KC. Use an output meter connected to the speaker if possible, to obtain the most accurate adjustments. Peak each I.F. stage to maximum response, reducing the output of the oscillator as far as possible for final adjustments.

R. F. Alignment:

With the test oscillator set to 1720 KC and connected to the antenna wire of the receiver through a .00025 mfd condenser, switch the receiver to the broadcast band and set the pointer at the end of travel on the right (at the 1700 KC end). Adjust the rear trimmer on the top of the variable condenser, for maximum gain. Then set the test oscillator at 1400 KC and tune in this signal on the receiver as though tuning a station. If an adjustment at this point is necessary on your set, you will have a trimmer condenser to adjust on top of the variable condenser at the front; this is adjusted for maximum gain.

Now adjust the test oscillator to 600 KC and tune in this signal. Adjust the padder condenser (which is adjusted through the right hand end of the chassis) in the following manner: turn the dial slowly and repeatedly back and forth across the signal while adjusting the padder. Adjust for maximum gain.

Now switch the receiver to short wave. With the test oscillator set at 6 megacycles, tune in this signal on the receiver. Then adjust the short wave trimmer (which is located on top of the coil above the chassis) for maximum gain.



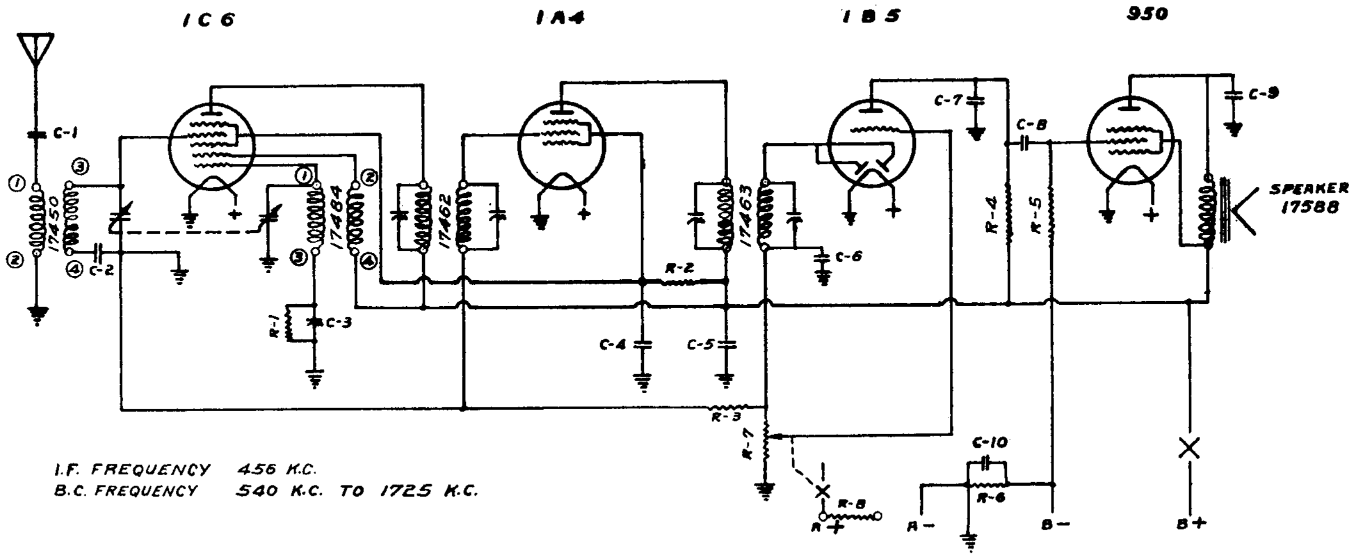
PARTS LIST — 5 Tube A. C. Superheterodyne

1924	2 gang condenser	$1.72
8036	Power Transformer	2.20
2443	Volume Control	.75
6922	Switch	.52
1154	Antenna Coil	.48
1155	Oscillator Coil	.40
1123	1st I. F.	.88
1124	2nd I. F.	.88
1846	Filter Condenser	1.36
243	Pilot Lite Bracket	.08
8901	No. 40 Pilot Lite	.18
6850	4 Prong Socket	.10
6852	6 Prong Socket Each	.10
6853	7 Prong Socket	.10
2006	Padder	.28
2050	Trimmer	.10
7104	Tube Shield Base } Per Set	.12
7105	Tube Shield }	
1500	.001—20%	.14
1501	.0001—20%	.10
1509D	.002—5%	.20
1504	.00025—20%	.12
6017	1 Meg. 1/3 W 20% Resistor	.06
6018	½ Meg. 1/3 W 20% Resistor	.06
6024	¼ Meg. 1/3 W 20% Resistor	.06
6025	50 M. 1/3 W 20% Resistor	.06
6058	330 Ohms 1/3 W 10% Resistor	.08
6057	4500 Ohms 1/3 W 20% Resistor	.06
6059	190 M. 1/3 W 5% Resistor	.08
6060	600 M. 1/3 W 5% Resistor	.08
6105	10 M. ½ W 20% Resistor	.08
6117	25 M. ½ W 20% Resistor	.08
1600	.1—200 V Bypass Condenser	.12
1601	.1—400 V. Bypass Condenser	.12
1615	10 mfd. 35 V. Bypass Condenser	.35
1604	.01—600 V. Bypass Condenser	.14
1614	.25—200 V. Bypass Condenser	.16
1622	.05—200 V. Bypass Condenser	.12
1603	.01—400 V. Bypass Condenser	.09
1651	.004—600 V. Bypass Condenser	.12
	Dial (order by name and description)	1.64
7946A	Speaker	3.16
5218	Knobs	.12

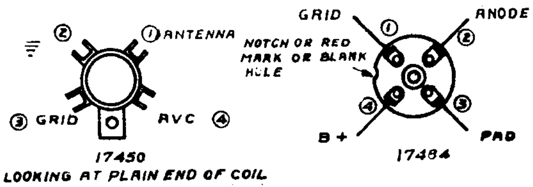
TUBES
80
42
75
6A7
6D6

GAMBLE-SKOGMO INC.

MODEL 540



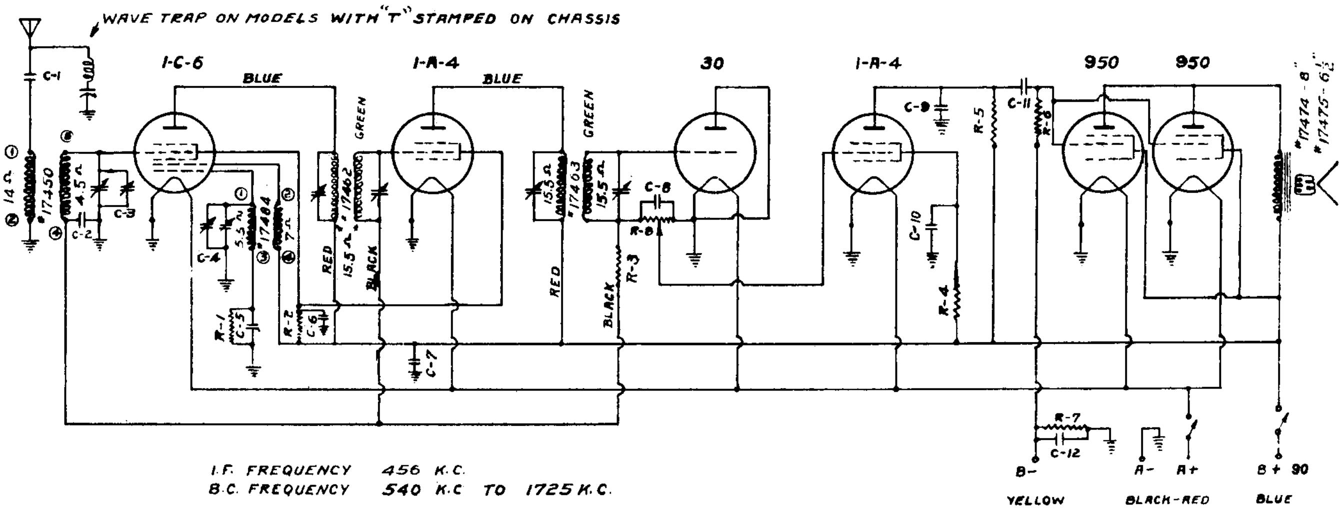
I.F. FREQUENCY 456 K.C.
B.C. FREQUENCY 540 K.C. TO 1725 K.C.



C-1	.01	200V.
C-2	.05	200 V.
C-3	500MMF.	PAD
C-4	.05	200 V.
C-5	.25	200 V.
C-6	.0005	600 V.
C-7	.0005	600 V.
C-8	.01	200 V.
C-9	.002	600 V.
C-10	10 [illegible] 25V. ELECTROLYTIC	

R-1	50000	OHMS
R-2	15 000	OHMS
R-3	2000 000	OHMS
R-4	250 000	OHMS
R-5	1000000	OHMS
R-6	400	OHMS
R-7	500 000	OHMS VOL. CONT. #17589
R-8	2.5 V. WIRE WOUND USE WHEN SET IS USED WITH 3 V. A BATTERY OR 4 DRY CELLS CONNECTED SERIES PARALLEL	

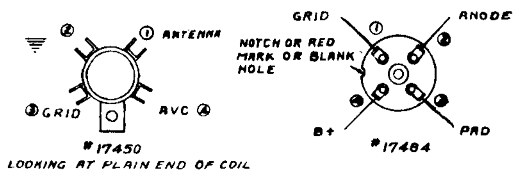
MODEL 650-A-B-C BATTERY



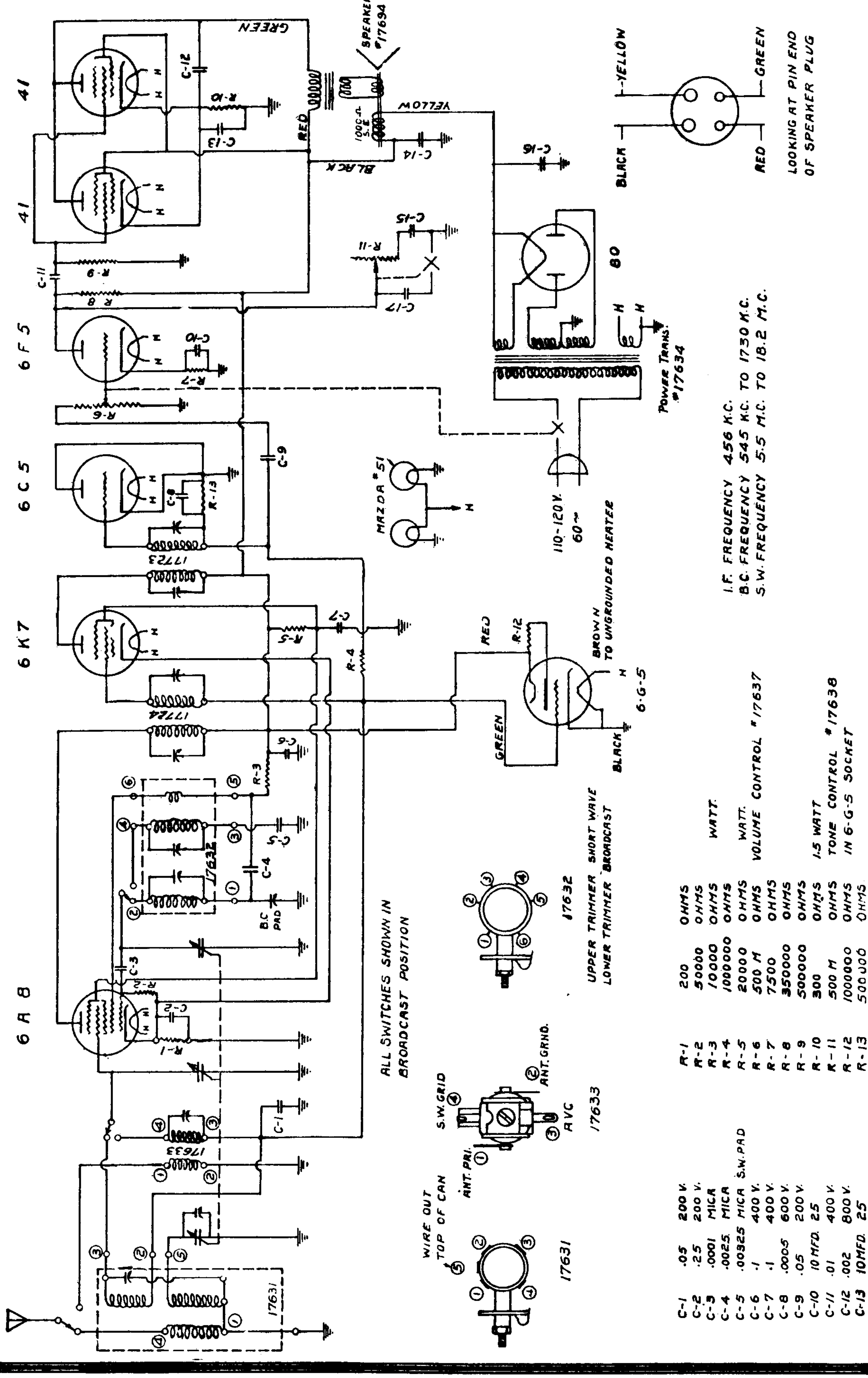
I.F. FREQUENCY 456 K.C.
B.C. FREQUENCY 540 K.C TO 1725 K.C.

C-1	.01	200 V.
C-2	.05	200 V.
C-3, C-4	.00037 TUNING COND.	
C-5	.0005	PAD
C-6	.05	200 V
C-7	.25	200 V.
C-8	.0005	600 V.
C-9	.0005	600 V.
C-10	.05	200V.
C-11	.01	200V.
C-12	10 MFD. 25 V. ELECT.	

R-1	50,000
R-2	15,000
R-3	2-MEG
R-4	500,000
R-5	100,000
R-6	1 MEG.
R-7	450
R-8	500,000 VOL. CONTROL #17451



GAMBLE-SKOGMO INC.
MODEL 810



I.F. FREQUENCY 456 K.C.
B.C. FREQUENCY 545 K.C. TO 1730 K.C.
S.W. FREQUENCY 5.5 M.C. TO 18.2 M.C.

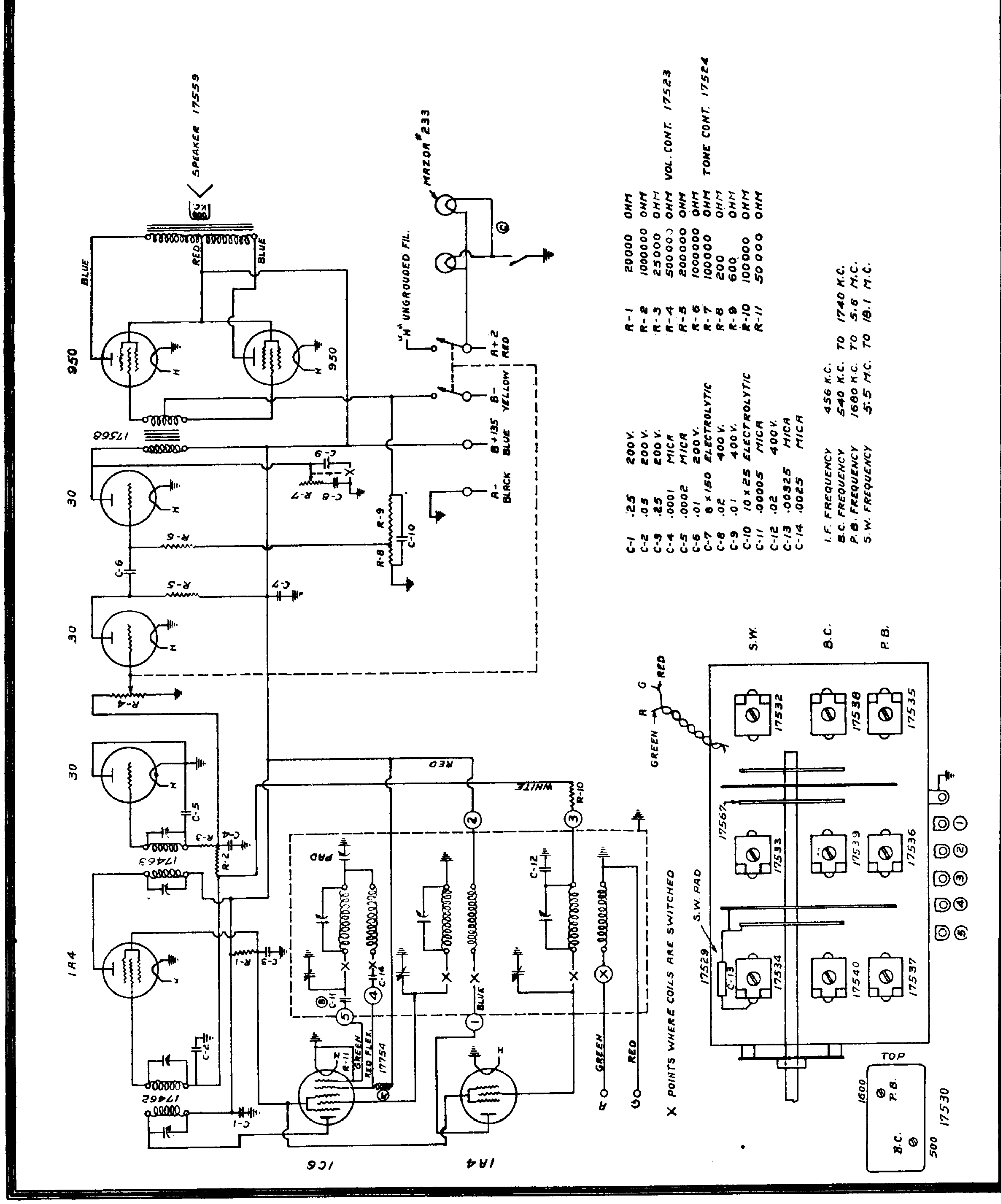
R-1	200	OHMS	
R-2	50000	OHMS	
R-3	10000	OHMS	WATT.
R-4	1000000	OHMS	
R-5	20000	OHMS	WATT.
R-6	500 M	OHMS	VOLUME CONTROL #17637
R-7	7500	OHMS	
R-8	350000	OHMS	
R-9	500000	OHMS	
R-10	300	OHMS	1.5 WATT
R-11	500 M	OHMS	TONE CONTROL #17638
R-12	1000000	OHMS	IN 6-G-5 SOCKET
R-13	500000	OHMS	

C-1	.05	200 V.	
C-2	.25	200 V.	
C-3	.0001	MICA	
C-4	.0025	MICA	
C-5	.00325	MICA	S.W. PAD
C-6	.1	400 V.	
C-7	.1	400 V.	
C-8	.0005	600 V.	
C-9	.05	200 V.	
C-10	10 MFD.	25	
C-11	.01	400 V.	
C-12	.002	800 V.	
C-13	10 MFD.	25	
C-14	16 MFD	300 V. REG.	
C-15	.01	400 V.	
C-16	16 MFD	475 V.	
C-17	.005	400 V.	

GAMBLE-SKOGMO INC.

MODEL 850B

(A) 17754 CHOKE AFTER SERIAL #650 WAS 15000 OHM
(B) C-11 CONDENSER AFTER SERIAL #2000 WAS .0001 OHM
(C) PILOT LIGHTS ADDED AFTER SERIAL #2100

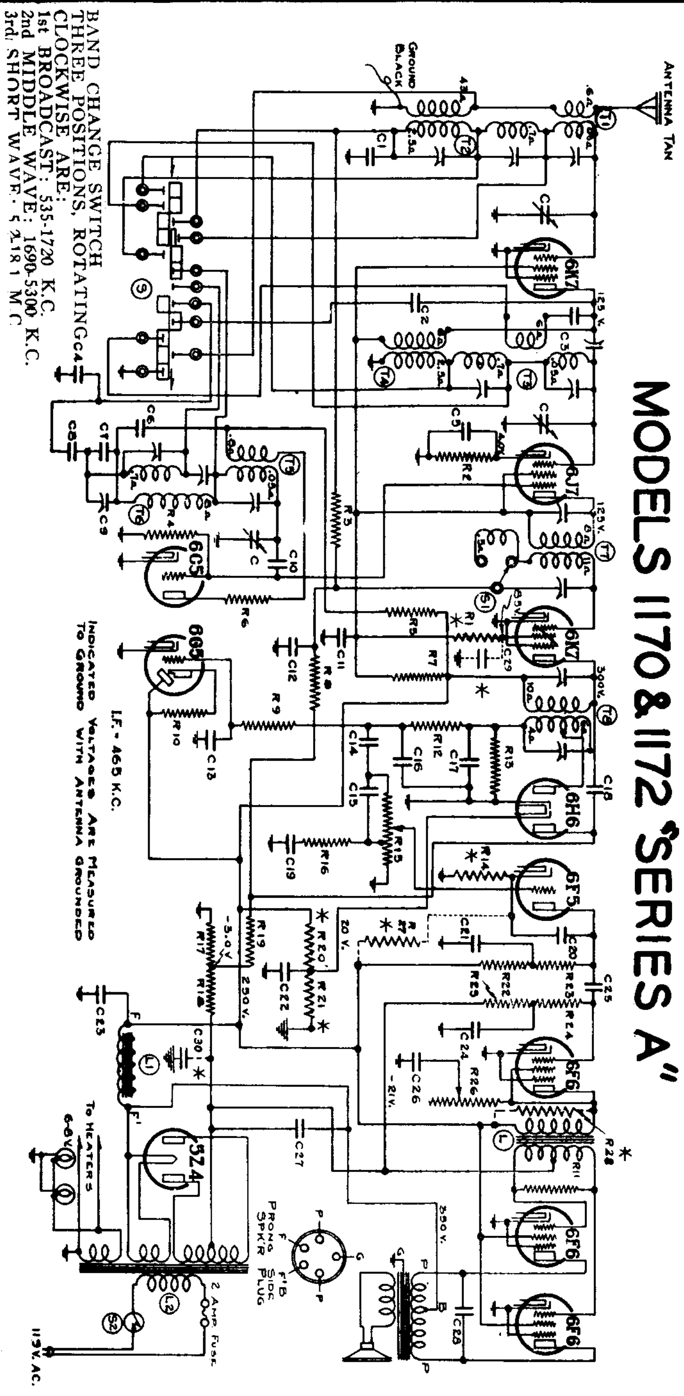


C-1	.25	200 V.	
C-2	.05	200 V.	
C-3	.25	200 V.	
C-4	.0001	MICA	
C-5	.0002	MICA	
C-6	.01	200 V.	
C-7	8 x 150	ELECTROLYTIC	
C-8	.02	400 V.	
C-9	.01	400 V.	
C-10	10 x 25	ELECTROLYTIC	
C-11	.00005	MICA	
C-12	.02	400 V.	
C-13	.00325	MICA	
C-14	.0025	MICA	

R-1	20000	OHM	
R-2	1000000	OHM	
R-3	25000	OHM	
R-4	500000	OHM	VOL. CONT. 17523
R-5	200000	OHM	
R-6	1000000	OHM	
R-7	100000	OHM	TONE CONT. 17524
R-8	200	OHM	
R-9	600	OHM	
R-10	100000	OHM	
R-11	50000	OHM	

I.F. FREQUENCY	456 K.C.		
B.C. FREQUENCY	540 K.C.	TO	1740 K.C.
P.B. FREQUENCY	1680 K.C.	TO	5.6 M.C.
S.W. FREQUENCY	5.5 M.C.	TO	18.1 M.C.

GAMBLE-SKOGMO INC.
MODELS 1170 & 1172 "SERIES A"



BAND CHANGE SWITCH
THREE POSITIONS, ROTATING
CLOCKWISE ARE:
1st BROADCAST: 535-1720 K.C.
2nd MIDDLE WAVE: 1690-5300 K.C.
3rd: SHORT WAVE: 5.2-18.1 M.C.

DESCRIPTION

The tube complement of this chassis is as follows:
1—Type 6K7 Remote cut-off pentode R.F. amplifier
1—Type 6J7 Pentode first detector
1—Type 6C5 Oscillator
1—Type 6K7 Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6H6 Duplex diode second detector and A.V.C.
1—Type 6F5 First audio amplifier
1—Type 6F6 Triode driver stage
2—Type 6F6 Class AB Output pentodes in push-pull
1—Type 5Z4 High vacuum rectifier
1—Type 6G5 Cathode Ray Tuning Indicator.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 108, 127, 150, 225, and 260 volts, (see instructions) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

SERVICE NOTES

NOTE: DeLuxe Model 1172 differs only from the Model 1170 in that dual speakers and a de luxe console cabinet are used. Both chasses are identical and the circuit diagram, the alignment procedure and the parts list contained in this manual apply to both models.

Attention is called to the circuit diagram contained in this manual. Several minor changes were made during production of these models to correct certain conditions. These changes are shown on the circuit diagram in dotted lines and explained in detail. Some of the chassis were equipped with 5Z3 rectifier tubes in place of the 5Z4 and do not have a fuse assembly in the power line.

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 115 volts on the primary of the power transformer.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

This chassis is protected against damage from faulty tubes or abnormal line conditions by a fuse in the primary circuit.

If when set is turned on pilot lights do not light, look for a blown fuse.

This fuse is made accessible for replacement by removing fuse cover located on back flange of chassis, replace only with a 2 ampere fuse. If replacement fuse blows out, check tubes, (particularly 5Z4 rectifier) circuit, repair or replace defective tubes or parts.

NEVER ATTEMPT TO REPLACE FUSE WITHOUT FIRST DISCONNECTING POWER.

NEVER REPLACE WITH FUSE OTHER THAN 2 AMPERE RATING.

ALIGNING INSTRUCTIONS
Dummy Antennas

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Intermediate and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

CAUTION:

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the four bolts by which it is fastened.

ALIGNING I.F. TRANSFORMERS (465 K.C.)

Part No. 108-63 Output I.F. Transformer
Part No. 108-64 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the underside of chassis (see bottom view Fig. 1).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), the tone control on "Hi" part of the sharp position (as much right rotation as possible without operating the Hi Fidelity switch), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   - (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, located between the two I.F. transformers, and adjust the output I.F. transformer 108-63 to resonance.
   - (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6J7 and adjust input I.F. transformer (108-64) to resonance.
   - (c) With oscillator still connected to 6J7, re-adjust output I.F. transformer if necessary.

ALIGNMENT PROCEDURE

The following adjustments to be made after the I.F.'s have been aligned as explained above.

BROADCAST BAND ALIGNMENT:

1. With band changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 600 kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:
   - (a) Adjust broadcast series pad (adjustment number 3) to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the 108-63 output I.F. transformer. See top view, Fig. 3.
   - (b) Re-set external oscillator to 1400 K.C., move dial pointer to 1400 K.C. and adjust oscillator (adjustment number 4), R.F. (adjustment number 6) and antenna (adjustment number 7) to resonance. See bottom view for location of these adjustments, Fig. 1.
   - (c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

NOTE: IT IS EXTREMELY NECESSARY IN MAKING ALL OF THESE ADJUSTMENTS THAT THE FUNDAMENTAL OSCILLATOR SIGNAL BE TUNED IN AND NOT THE IMAGE FREQUENCY WHICH WILL FALL BELOW THE FUNDAMENTAL.

SHORT WAVE BAND ALIGNMENT:

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   - (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 1), short wave R.F. (adjustment number 8) and short wave antenna (adjustment number 9) to resonance.
   - (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

MIDDLE WAVE BAND ALIGNMENT:

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5 M.C. and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   - (a) Rotate condenser, pick up signal and adjust middle wave R.F. (adjustment number 10), middle wave antenna (adjustment number 5) and middle wave oscillator (adjustment number 2) to resonance.
   - (b) Re-check broadcast alignment and if it is found necessary to re-adjust either R.F. or antenna trimmers, repeat the 17 M.C. short wave and 5 M.C. middle wave adjustments.

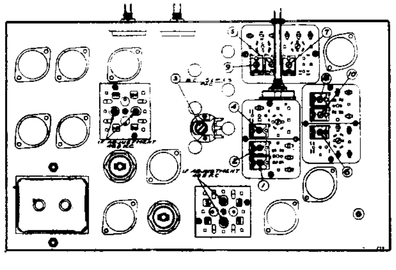


FIG. 1—BOTTOM VIEW SHOWING TRIMMERS

REPAIRS PARTS LIST

Part No.	DESCRIPTION	Circuit Diagram Reference	List Price Each
	CONDENSERS		
100-9	.05 x 200 Volt Tubular	C1, C5, C12, C19	$0.25
100-11	.01 x 400 Volt Tubular	C13, C29	.25
100-13	.05 x 400 Volt Tubular	C6, C25	.25
100-19	.006 x 600 Volt Tubular	C22	.25
100-20	.1 x 200 Volt Tubular	C21, C24, C30	.25
100-22	.05 x 200 Volt Tubular	C14	.25
100-32	.0005 x 1000 Volt Condenser	C28	.25
100-41	.25 x 400 Volt Tubular (with Bracket)	C11	.35
100-45	.1 x 600 Volt Tubular	C26	.35
103-8	14 mfd. x 400 Volt Electrolytic	C23	1.35
103-10	30 mfd. x 450 Volt Electrolytic	C27	1.35
129-3	.00002 Mica—Type MT—20%	C18	.25
129-5	.0001 Mica—Type MT—20%	C20	.25
129-12	.00025 Mica—Type MT—20%	C15	.25
129-31	.000025 Mica—Type MT—15%	C10	.25
129-39	.00005 Mica—Type MT—20%	C3	.25
129-55	.0034 Mica—Type MT—2½%	C8	.35
129-57	.0005 Mica—Type MT—5%	C7	.25
129-59	.0003 Mica—Type MT—5%	C2	.25
129-60	.00015 Mica—Type MT—20%	C16, C17	.25
129-69	.0023 Mica—Type MT—2½%	C4	.35
	RESISTORS		
130-3	500M Ohm—1/3 Watt—20%—100 V. Carbon	R19	.20
130-4	3 meg Ohm—1/3 Watt—20%—20 V. Carbon	R9	.20
130-12	50M Ohm—1/3 Watt—20%—20 V. Carbon	R4	.20
130-19	1 meg Ohm—1/3 Watt—20%—20 V. Carbon	R8	.20
130-20	100M Ohm—1/3 Watt—20%—50 V. Carbon	R3, R12, R13, R22, R23	.20
130-21	20M Ohm—1/3 Watt—20%—20 V. Carbon	R11	.20
130-22	5M Ohm—1/3 Watt—20%—10 V. Carbon	R16	.20
130-76	30M Ohm—1/3 Watt—20%—Carbon	R1	.20
130-45	250M Ohm—1/3 Watt—20%—20 V. Carbon	R24, R25	.20
130-60	100 Ohm—1/3 Watt—20%—10 V. Carbon	R6	.20
130-70	500 Ohm—1/3 Watt—10%—Carbon	R14	.20
130-77	10M Ohm—1 Watt—20%—100 V. Carbon	R5	.20
130-82	10M Ohm—1/3 Watt—10%—Carbon	R21	.20
130-88	10M Ohm—2 Watt—20%—Wire Wound	R7	.40
130-129	2500 Ohm—1/3 Watt—10%—10 V. Carbon	R2	.20
130-130	100M Ohm—½ Watt—10%—Carbon	R20, R27	.20
130-131	20M Ohm—½ Watt—10%—Carbon	R28	.20
130-110	1 meg Ohm—1/10 Watt—10%—Carbon	R10	.20
106-31	(30 Ohm, R17) (175 Ohm, R18) Metal Clad Resistor	R17, R18	.40
	COILS		
108-63	Output I.F. Coil Assembly Complete, Less Can	T8	1.50
108-64	Input I.F. Coil Assembly Complete, Less Can	T7	1.65
109-29	Mid-Wave and Short-Wave R.F. Coil Assembly Complete, Less Can	T3	1.50
109-30	Broadcast R.F. Coil Assembly Complete, Less Can	T4	1.00
110-42	Mid-Wave and Short-Wave Oscillator Coil Assembly Complete, Less Can	T5	1.25
110-43	Broadcast Oscillator Coil Assembly Complete, Less Can	T6	.50
111-54	Mid-Wave and Short-Wave Antenna Coil Assembly Complete, Less Can	T1	1.50
111-55	Broadcast Antenna Coil Assembly Complete, Less Can	T2	1.00
	TRANSFORMERS		
104-72	50/60 Cycle Power Transformer	L2	4.00
104-74	Universal—50/60 Cycle Primary		6.00
104-75	25 Cycle Power Transformer		7.00
104-76	Universal—25 Cycle Primary		7.50
104-77	Universal—40 Cycle Primary		6.00
	SOCKETS		
121-8	Five-Prong Socket Marked "Spkr"		.10
121-12	Seven-Prong Socket Marked "6K7"		.15
121-13	Seven-Prong Socket Marked "6J7"		.15
121-14	Seven-Prong Socket Marked "6F6"		.15
121-16	Five-Prong Socket Marked "5Z4"		.10
121-17	Six-Prong Socket Marked "6C5"		.15
121-19	Seven-Prong Socket Marked "6H6"		.15
121-33	Five-Prong Socket Marked "6F5"		.10
121-34	Four-Prong Socket Marked "5Z3"		.10
	SPEAKER FOR MODEL 1170		
114-47C	Twelve Inch Dynamic (Field 1225 Ohms)	L1	8.50
	SPEAKERS FOR MODEL 1172		
114-53	Twelve Inch Dynamic, with Special Voice Coil for Dual Speaker Operation		8.50
114-54	Ten Inch Permanent Magnet Dynamic		10.00
	MISCELLANEOUS		
101-40	Tone Control and Fidelity Switch (5M Ohm)	R26, S1	1.35
101-47	Volume Control and Switch (1 Meg Ohm)	R15, S2	1.25
102-35	Three-Gang Variable Condenser	C	5.00
107-5	Line Cord and Plug		.50
115-35	Antenna, Oscillator and R.F. Shield Can		.15
115-36	I.F. Shield Can		.15
105-33	Input Audio Transformer	L	1.35
115-54	Fuse Cover		.05
113-47	Fuse Clip Assembly		.15
125-18	Band Switch	S	.90
124-34	Single J Padder 200 mmf	C9	.35
131-34	2 Amp. Fuse Type 3AG		.10
128-51	Wood Knob with Spring		.15

All resistors and mica condensers are RMA color coded—specify value and/or resistor or condenser (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None

When ordering condensers, specify part number, model and/or capacitor (per schematic diagram) and model number.

When ordering parts, always specify part and model number as well as serial number of chassis.

All prices quoted are list and are subject to the usual trade discounts.

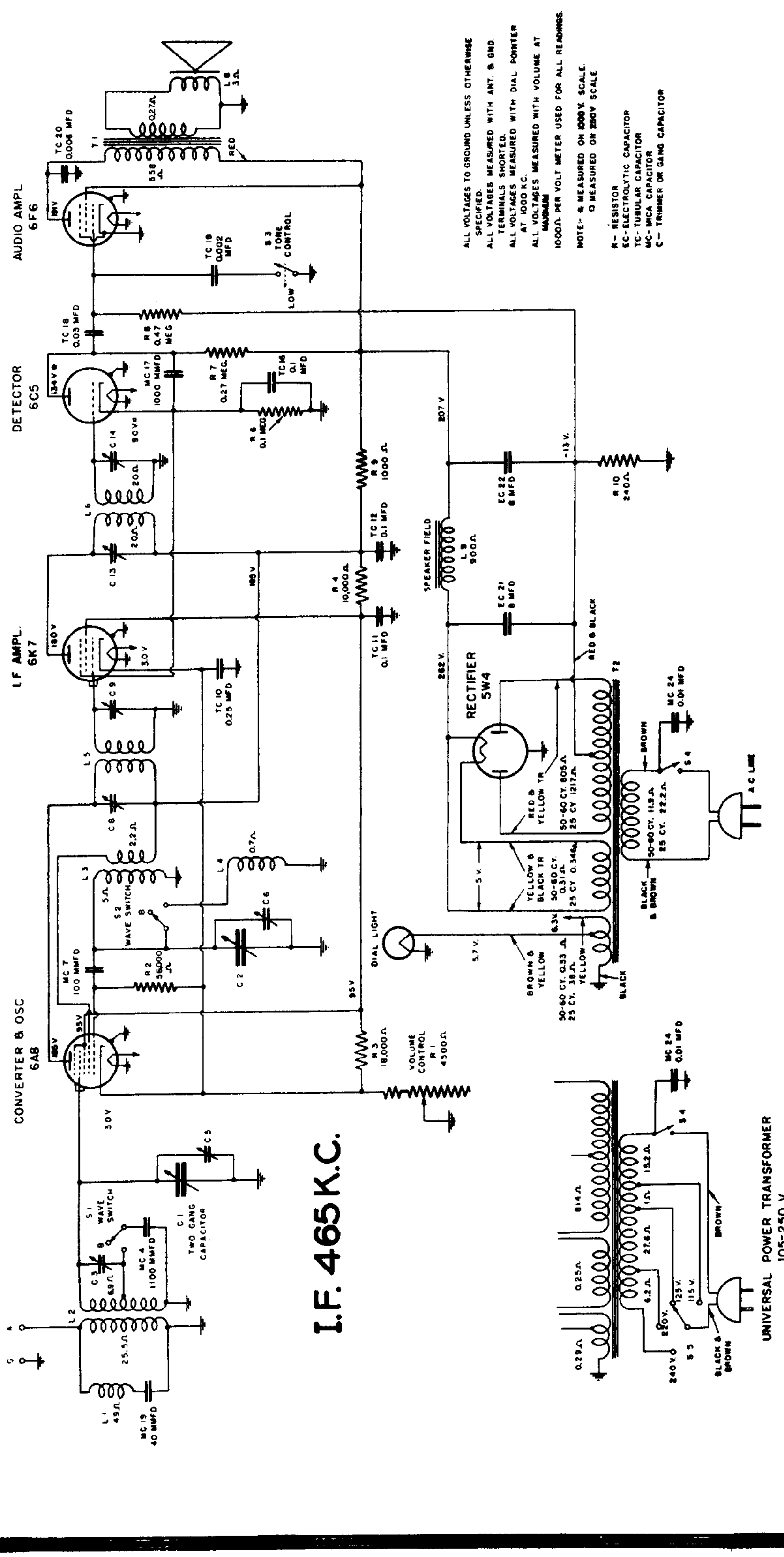
Prices subject to change without notice.

Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

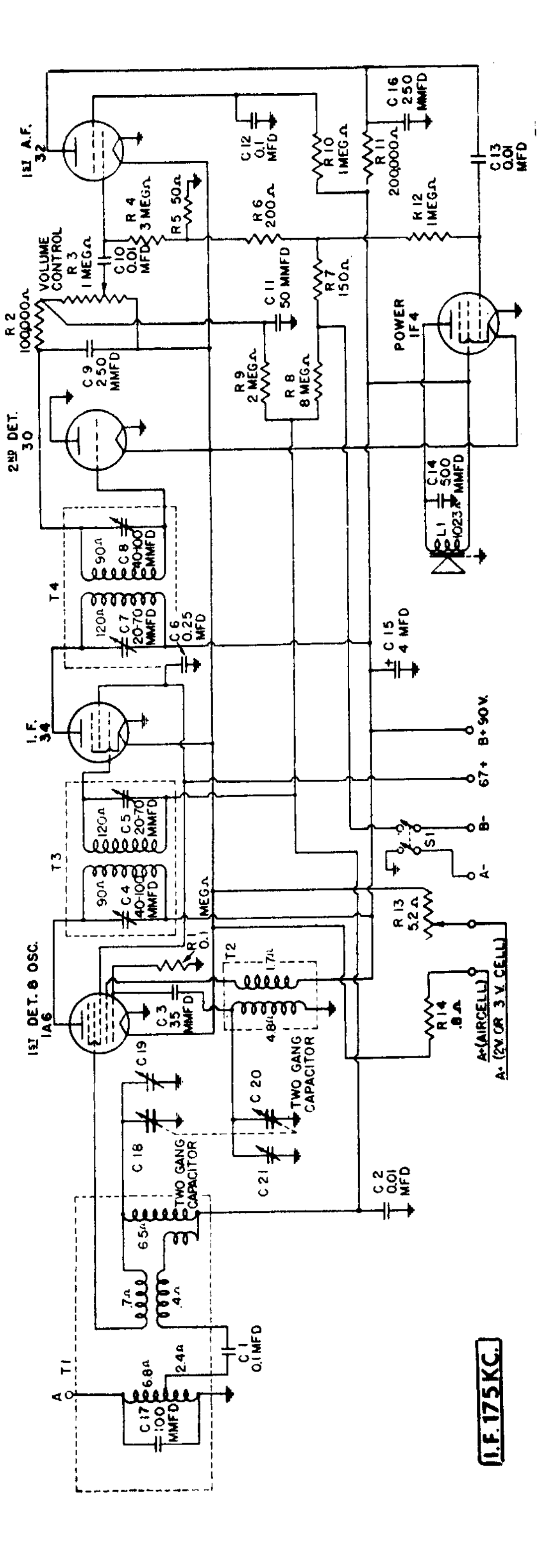
WE CANNOT SUPPLY SPEAKER PARTS, CONES, TRANSFORMERS, OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $2.50 NET, IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.

GENERAL ELECTRIC COMPANY

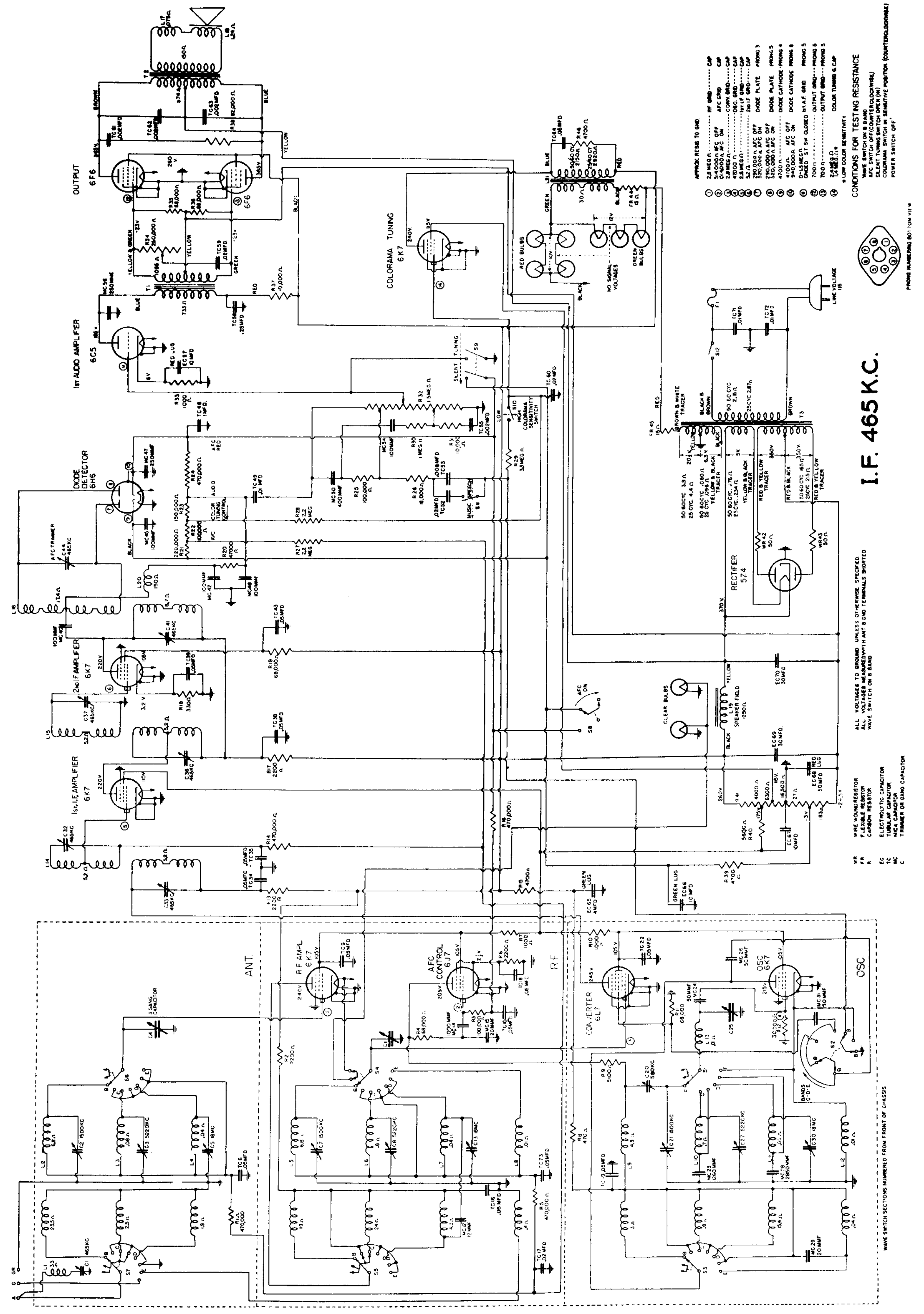
MODELS E50 & E52



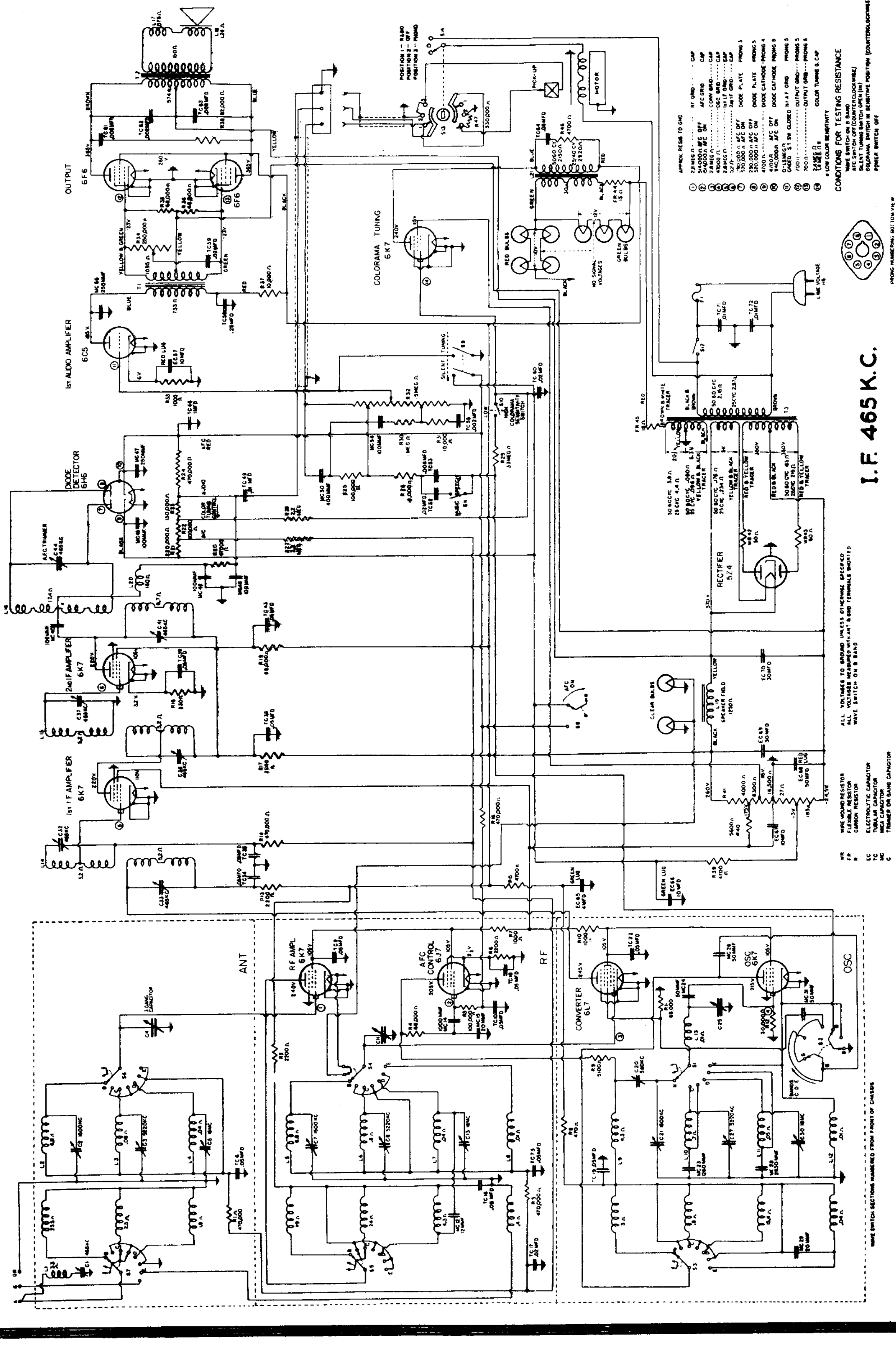
MODEL U50



GENERAL ELECTRIC COMPANY
MODEL E-126

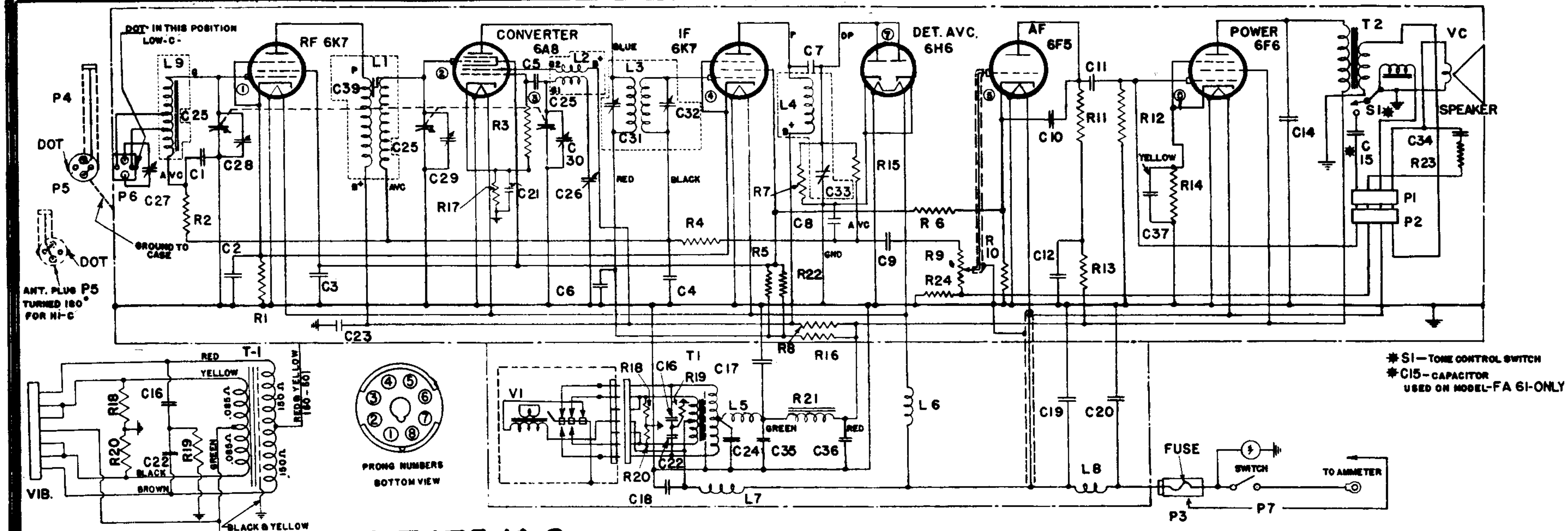


GENERAL ELECTRIC COMPANY
MODEL E-129



Schematic Circuit Diagram

GENERAL ELECTRIC COMPANY
MODELS FA-60 & FA-61



POWER TRANSFORMER CONNECTIONS

I.F. 175 K.C.

AVERAGE SOCKET VOLTAGES

Tube		Plate to Ground Volts DC	Screen Grid to Ground Volts DC	Cathode to Ground Volts DC	Heater Volts DC	Cathode Current M.A.
6K7 R.F.		200	97	3.4	6.3	5.8
6A8	Oscillator	200	..	..	6.3	9.5
	Converter	210	97	4.		
6K7 I.F.		200	97	3.4	6.3	5.8
6F5 1st A.F.		147	..	1.5	6.3	0.3
6F6 Output		231	251	15.6	6.3	37

Filter Input Voltage—265
Filter Output Voltage—251

Total Plate Current 63 M.A.

Storage Battery 6.4 volts—no signal input—1000 ohms per volt meter—dial pointer at 54.

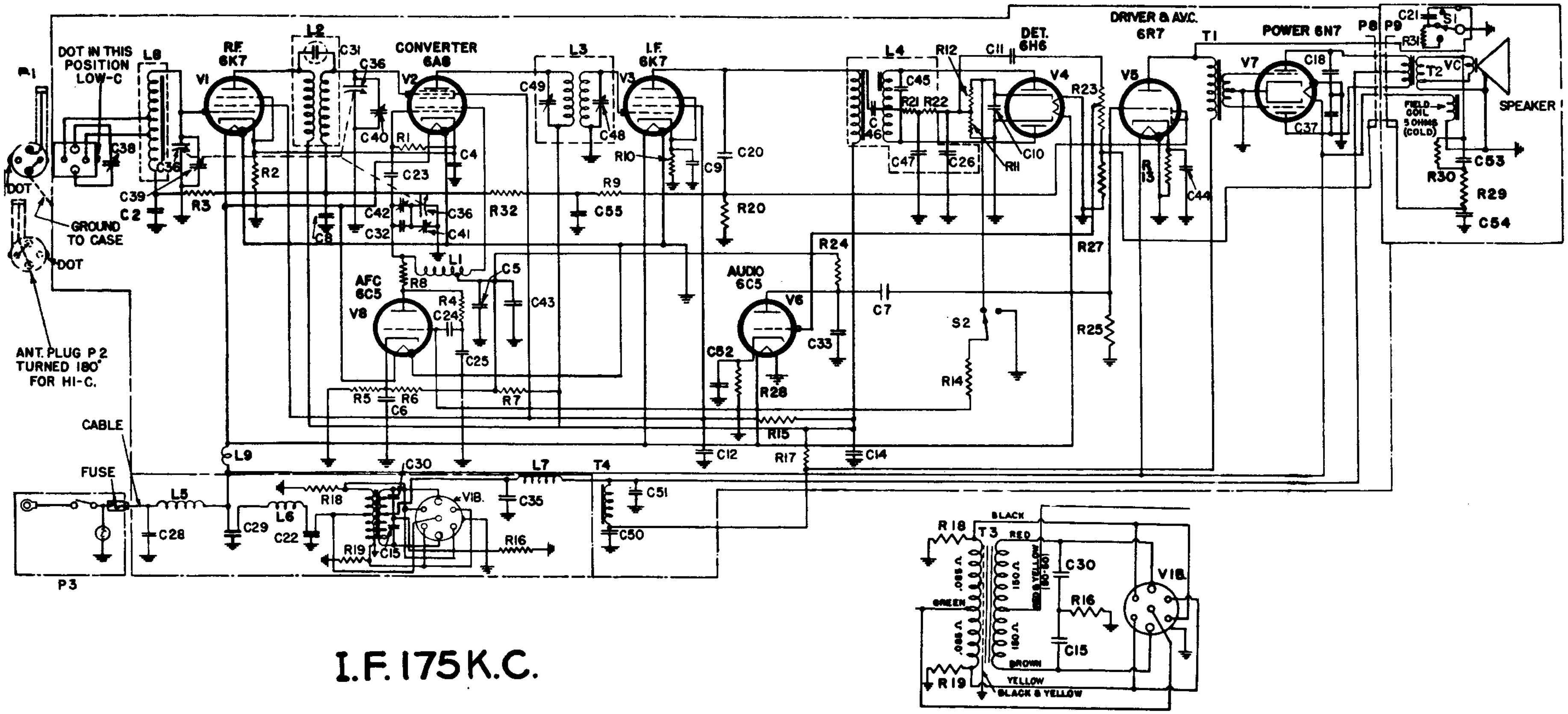
APPROX. RESISTANCE MEASUREMENTS

	Resistance (to ground)	Tube	Tube Prong
(1)	1.79 Meg.	6K7 R.F.-Signal-Grid	Cap.
(2)	1.69 Meg.	6A8 Converter Signal-Grid	Cap.
(3)	47,000 ohms	6A8 Converter Osc.-Grid	Prong #6
(4)	1.69 Meg.	6K7 I.F. Signal-Grid	Cap.
(5)	2,700 ohms (Vol. Cont. down)	6F5 Audio-Grid	Cap.
	1 Meg. (Vol. Cont. up)	6F5 Audio-Grid	Cap.
(6)	.47 Meg.	6F6 Output-Grid	Prong #5
(7)	.22 Meg.	6H6 Diode-Plates	Prongs #3 & #5

SYMBOL	DESCRIPTION
C-1	.05 MFD 200 V
C-2	0.1 MFD 100 V
C-3	0.1 MFD 200 V
C-4	.05 MFD 200 V
C-5	100 MMF 500 V
C-6	0.1 MFD 400 V
C-7	100 MMF 500 V
C-8	100 MMF 500 V
C-9	0.01 MFD 200 V
C-10	250 MMF 500 V
C-11	0.02 MFD 400 V
C-12	0.1 MFD 400 V
C-14	.002 MFD 600 V
C-15	.008 MFD 200 V
C-16	0.02 MFD 1500 V D.C.
C-17	0.5 MFD 400 V
C-18	0.5 MFD 120 V
C-19	0.5 MFD 120 V
C-20	.002 MFD 500 V
C-21	.05 MFD 200 V
C-22	0.02 MFD 1500 V D.C.
C-23	.25 MFD 400 V
C-24	0.1 MFD 400 V
C-25	3 - GANG
C-26	500-1000 MMF
C-27	150-500 MMF
C-28	25 MMF MICA
C-29	25 MMF MICA
C-30	25 MMF MICA
C-31	200-350 MMF
C-32	50-150 MMF

SYMBOL	DESCRIPTION
C-33	20-45 MMF
C-34	.05 MFD 200 V
C-35	5 MFD 450 V)
C-36	8 MFD 450 V)
C-37	10 MFD 20 V)
C-39	10 MMF Approx.
R-1	270 OHMS 1/2W
R-2	0.1 OHMS 1/2W
R-3	47,000 OHMS 1/2W
R-4	1.0 MEG 1/2W
R-5	22,000 OHMS 1W
R-6	27,000 OHMS 1/2W
R-7	220,000 OHMS 1/2W
R-8	3,300 OHMS 1W
R-9	1 MEG
R-10	390 OHMS 1/2W
R-11	150,000 OHMS 1/2W
R-12	0.47 MEG 1/2W
R-13	47,000 OHMS 1/2W
R-14	430 OHMS 1W
R-15	470,000 OHMS 1/2W
R-16	3,900 OHMS 1W
R-17	390 OHMS 1/2W
R-18	270 OHMS 1/2W
R-19	47 OHMS 1/2W
R-20	270 OHMS 1/2W
R-21	Filter Reactor
R-22	27,000 OHMS 1W
R-23	22,000 OHMS 1/2W
R-24	2,700 OHMS 1/2W

GENERAL ELECTRIC COMPANY
MODEL FA-80



POWER TRANSFORMER

C2	.05 MF	200 V
C4	.25 MF	100 V
C5	.1 MF	400 V
C6	.1 MF	100 V
C7	.05 MF	400 V
C8	.05 MF	200 V
C9	.1 MF	100 V
C10	.5 MF	100 V
C11	.02 MF	200 V
C12	.1 MF	400 V
C14	.1 MF	400 V
C15	.02 MF	1500 V
C18	.01 MF	600 V
C20	250 MMF	
C21	0.1 MF	400 V
C22	.5 MF	120 V
C23	100 MMF	
C24	500 MMF	

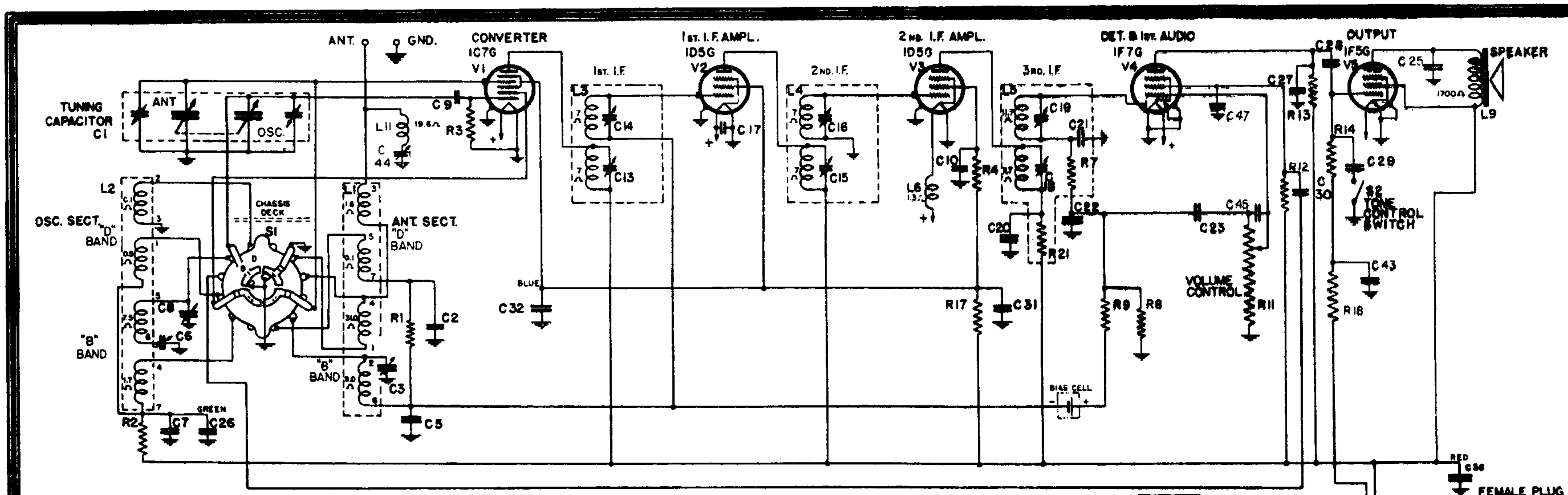
C25	15 MMF	
C26	250 MMF	
C28	2000 MMF	
C29	.5 MF	120 V
C30	.02 MF	1500 V
C31	12 MMF	
C32	500 MMF	
C33	500 MMF	
C35	.1 MF	400 V
C36	18-408 MMF EACH SECTION	
C37	.01 MF	600 V
C38	150-500 MMF	
C39	25 MMF	
C40	25 MMF	
C41	25 MMF	
C42	300-350 MMF	
C43	10 MF	300 V
C44	10 MF	25 V

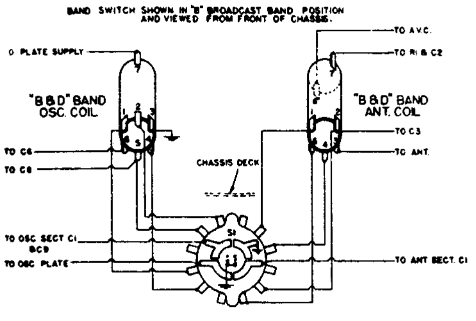
C45	55.5 MMF	
C46	100 MMF	
C47	250 MMF	
C48	95 MMF	
C49	75 MMF	
C50	5 MF	450 V
C51	8 MF	450 V
C52	.5 MF	100 V
C53	.05 MF	200 V
C54	0.1 MF	100 V
C55	250 MMF	

R1	47,000 ohms	½W
R2	220 ohms	½W
R3	220,000 ohms	½W
R4	39,000 ohms	½W
R5	1800 ohms	½W
R6	39,000 ohms	1W
R7	1800 ohms	½W
R8	9,100 ohms	½W
R9	680,000 ohms	½W
R10	560 ohms	½W
R11	510,000 ohms	½W
R12	510,000 ohms	½W
R13	1,000 ohms	½W
R14	470,000 ohms	½W
R15	15,000 ohms	2W
R16	47 ohms	½W
R17	1200 ohms	5W
R18	100 ohms	1½W
R19	100 ohms	1½W
R20	1 meg	½W
R21	100,000 ohms	½W
R22	47,000 ohms	½W
R23	1 meg	
R24	22,000 ohms	½W
R25	100,000 ohms	½W
R27	5,600 ohms	½W
R28	1,500 ohms	½W
R29	5,600 ohms	½W
R30	100,000 ohms	½W
R31	8,200 ohms	½W
R32	220,000 ohms	½W

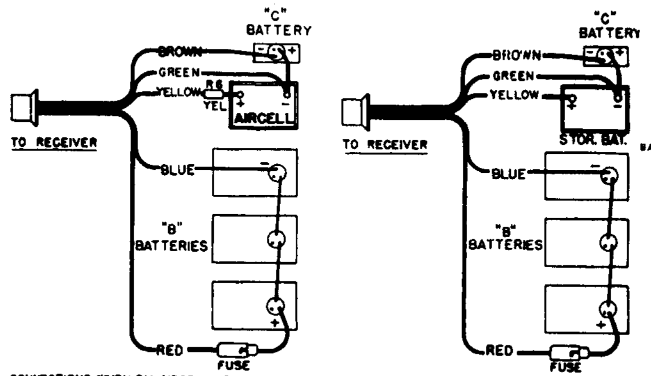
GENERAL ELECTRIC COMPANY

MODELS FB-52, FB-56, FB-53 & FB-57





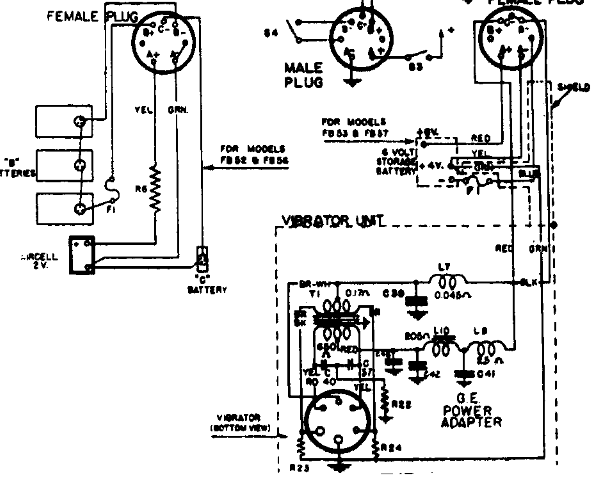
R.F. COIL & BAND SWITCH ASSEMBLY
COIL LUG NUMBERS AGREE WITH CORRESPONDING NUMBERS AS SHOWN ON SCHEMATIC DIAGRAM. (FRONT VIEW)



CONNECTIONS WHEN 2V. AIRCELL IS USED

CONNECTIONS WHEN 2V. STORAGE BATT. IS USED

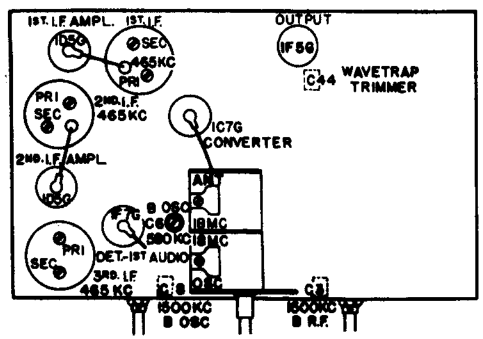
Battery Connections Models FB-52, FB-56



Symbol	Description	Symbol	Description	Symbol	Description	Symbol	Description
C2	.0045 MFD	C21	250 MMF	C42	16 MFD *	R12	1 MEG ohm
C3	3-45 MMF	C22	250 MMF	C43	.05 MFD *	R13	270,000 ohms
C5	.1 MFD	C23	.001 MFD	C44	75 MMF	R14	470,000 ohms
C6	300-500 MMF	C25	.0045 MFD	C45	100 MMF	R17	33,000 ohms
C7	.05 MFD	C26	4 MFD	C46	.05 MFD *	R18	100,000 ohms
C8	3-45 MMF	C27	250 MMF	C47	.003 MFD	R21	2,200 ohms
C9	75 MMF	C28	.01 MFD			R22	82 ohms *
C10	.05 MFD	C29	.003 MFD	R1	100,000 ohms	R23	82 ohms *
C13	200-350 MMF	C30	.1 MFD	R2	10,000 ohms	R24	82 ohms *
C14	200-350 MMF	C31	.1 MFD	R3	47,000 ohms		
C15	200-350 MMF	C32	.4 MFD	R4	10,000 ohms		
C16	200-350 MMF	C36	.8 MFD	R6	.55 ohms #		
C17	.5 MFD	C37	.03 MFD *	R7	68,000 ohms		
C18	190 MMF	C39	.5 MFD *	R8	220,000 ohms		
C19	190 MMF	C40	.03 MFD *	R9	2.2 MEG ohms		
C20	.1 MFD	C41	.06 MFD *	R11	2 MEG ohms		

* Used on Models FB53 & FB57 only

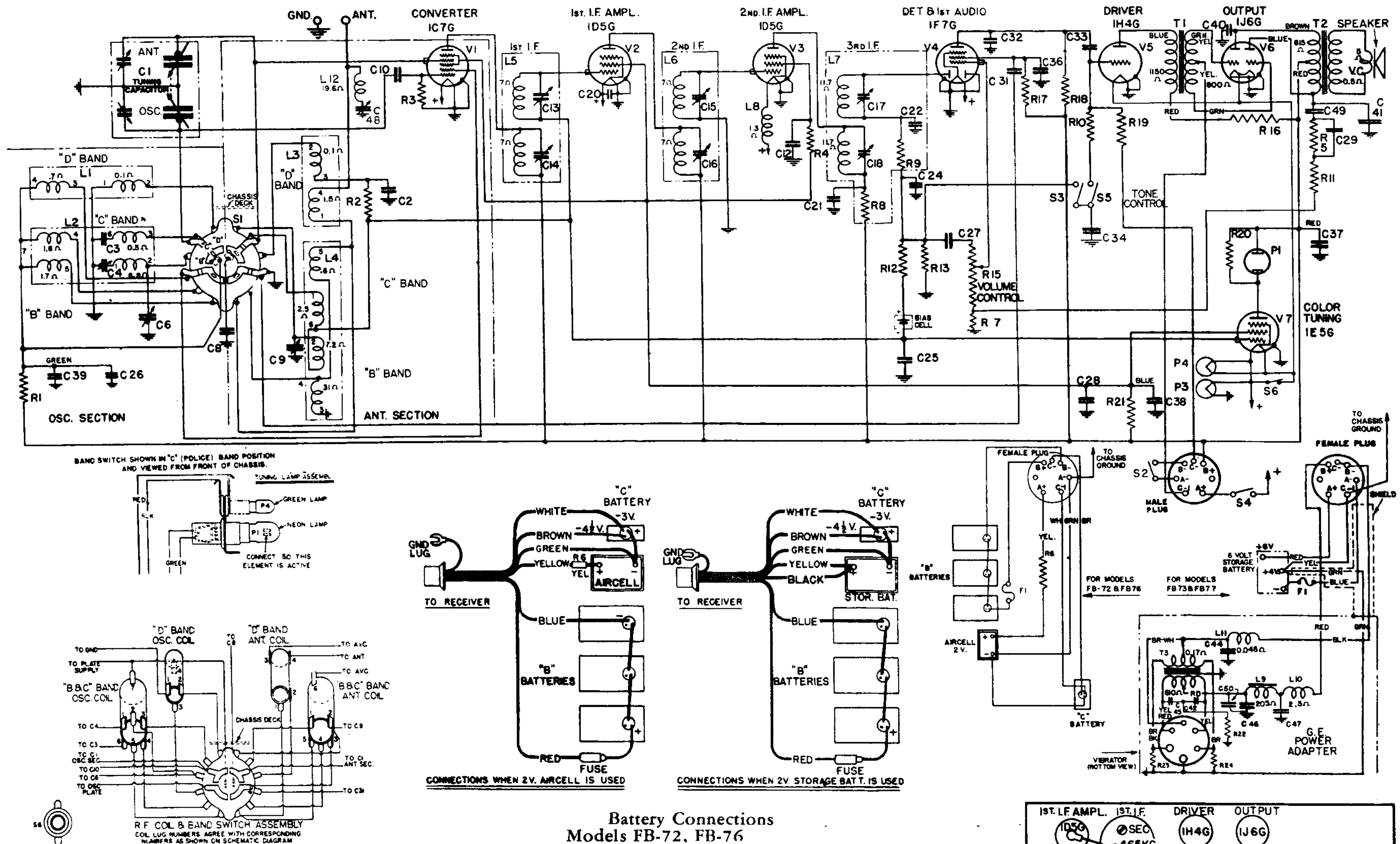
Used on Models FB52 & FB56 only



Chassis Layout and Trimmer Locations

GENERAL ELECTRIC COMPANY

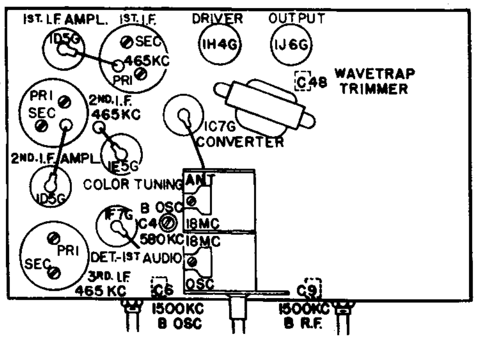
MODELS FB-72, FB-76, FB-73 & FB-77



Battery Connections
Models FB-72, FB-76

Symbol	Description	Symbol	Description	Symbol	Description	Symbol	Description	Symbol	Description
C2	.0045 MF	C18	190 MMF	C34	.003 MF	C49	.05 MF	R12	2.2 Meg ohms
C3	1300 MMF	C20	.5 MF	C36	.004 MF	C50	.05 MF *	R13	220,000 ohms
C4	300-500 MMF	C21	.1 MF	C37	8 MF	R1	10,000 ohms	R15	3 Meg ohms
C6	5-45 MMF	C22	250 MMF	C38	4 MF	R2	100,000 ohms	R16	4,800 ohms
C8	.01 MF	C24	250 MMF	C39	4 MF	R3	47,000 ohms	R17	1 Meg ohm
C9	5-45 MMF	C25	.1 MF	C40	.008 MF	R4	10,000 ohms	R18	220,000 ohms
C10	75 MMF	C26	.05 MF	C41	.008 MF	R5	330,000 ohms	R19	1.8 Meg ohm
C12	.05 MF	C27	.01 MF	C42	.03 MF *	R6	.35 ohms #	R20	120,000 ohms
C13	200-350 MMF	C28	.1 MF	C44	.5 MF *	R7	1,000 ohms	R21	33,000 ohms
C14	200-350 MMF	C29	.01 MF	C45	.03 MF *	R8	2,200 ohms	R22	82 ohms *
C15	200-350 MMF	C31	.1 MF	C46	16 MF *	R9	68,000 ohms	R23	82 ohms *
C16	200-350 MMF	C32	250 MMF	C47	.05 MF *	R10	220,000 ohms	R24	82 ohms *
C17	190 MMF	C33	.001 MF	C48	75 MMF	R11	270,000 ohms		

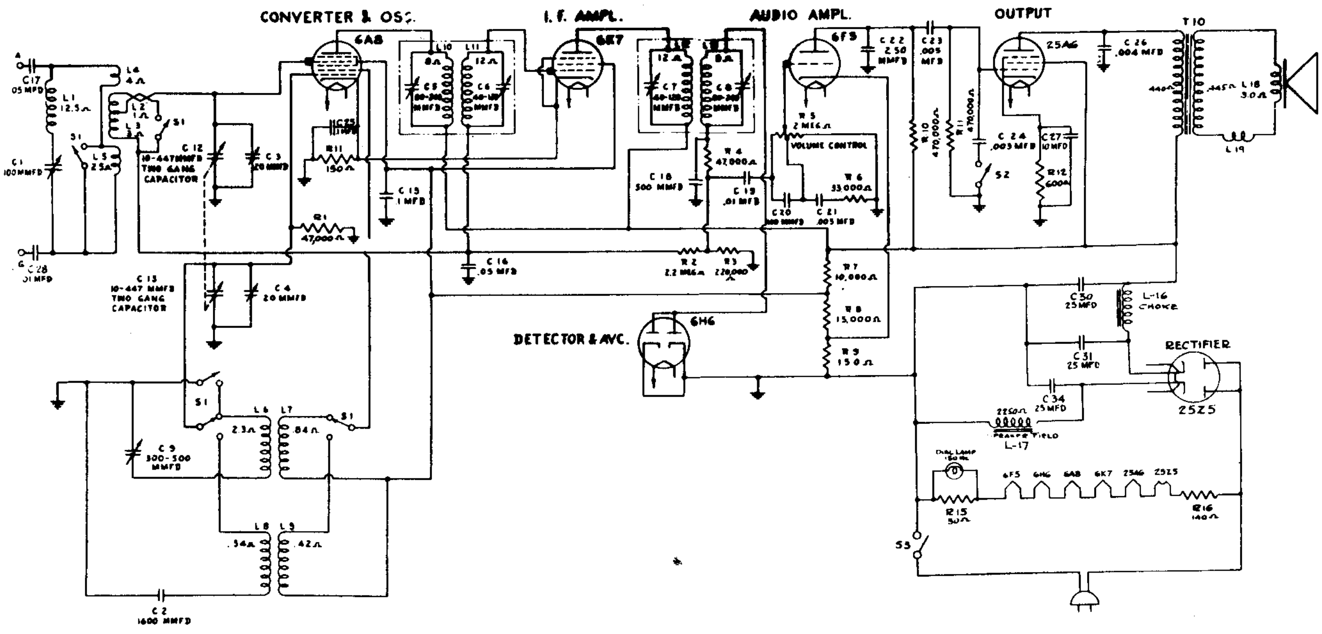
\# Used on Models FB72 & FB76 only. * Used on Models FB73 & FB77 only.



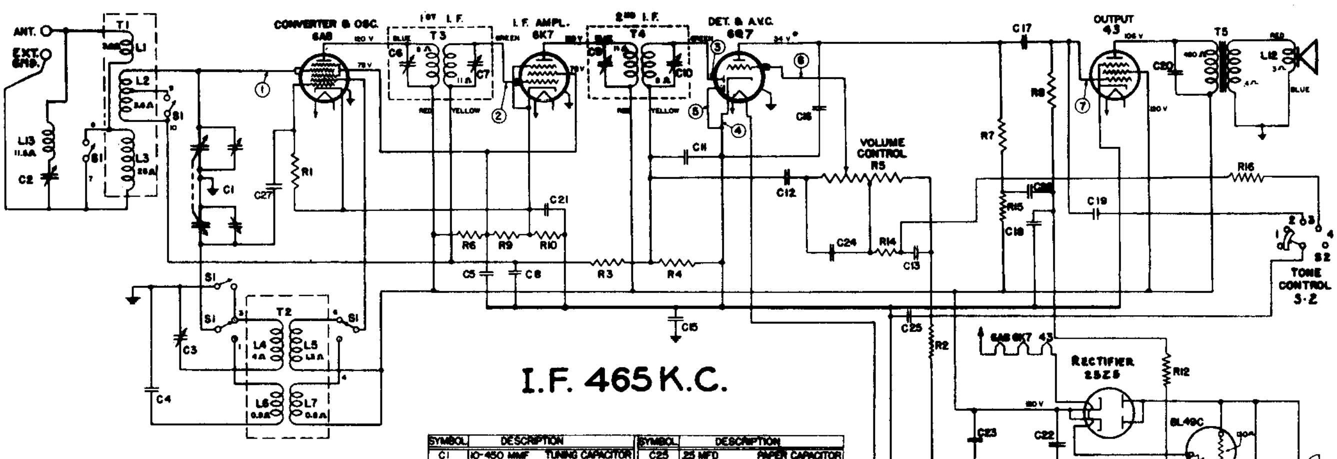
Chassis Layout and Trimmer Locations

GENERAL ELECTRIC COMPANY

MODEL FD-61



MODELS FD-62 & FD-625



I.F. 465 K.C.

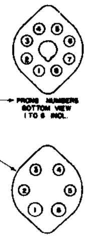
CONDITIONS OF TEST

WAVE SWITCH ON B BAND
POWER SWITCH OFF

APPROX. RESISTANCE MEASURMENTS

	RESISTANCE TO -B	TUBE	TUBE PRONG
①	2.67 MEG OHM	CONV. GRID	CAP
②	2.67 MEG OHM	I.F. GRID	CAP
③	470000 OHMS	DIODE PLATE	PRONG 5
④	CONNECTED TO -B	DIODE CATHODE	PRONG 6
⑤	CONNECTED TO -B	DIODE PLATE	PRONG 4
⑥	470000 Ω TO 2.47 MEG Ω	A.F. GRID	CAP
⑦	560000 OHMS	OUTPUT GRID	PRONG 4

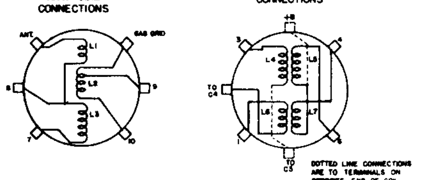
PRONG NUMBERS BOTTOM VIEW 1 TO 8 INCL.



SYMBOL	DESCRIPTION		SYMBOL	DESCRIPTION	
C1	10-450 MMF	TUNING CAPACITOR	C25	.25 MFD	PAPER CAPACITOR
C2	50-100 MMF	TRIMMER	C26	.05 MFD	PAPER CAPACITOR
C3	300-500 MMF	PADDER	C27	50 MMF	MICA CAPACITOR
C4	1600 MMF	MICA			
C5	.01 MFD	PAPER			
C6	100-230 MMF	TRIMMER			
C7	50-136 MMF	TRIMMER			
C8	.05 MFD	PAPER			
C9	50-135 MMF	TRIMMER	R1	47000 Ω	CARBON RESISTOR
C10	100-230 MMF	TRIMMER	R2	470000 Ω	
C11	250 MMF	MICA	R3	2.2 MEG. Ω	
C12	.01 MFD	PAPER	R4	470000 Ω	CARBON RESISTOR
C13	.0045 MFD		R5	2 MEG. Ω	VOLUME CONTROL
C14	.02 MFD		R6	4700 Ω	CARBON RESISTOR
C15	.25 MFD	PAPER	R7	330000 Ω	
C16	250 MMD	MICA	R8	330000 Ω	
C17	.01 MFD	PAPER	R9	15000 Ω	
C18	.05 MFD		R10	150 Ω	
C19	.002 MFD		R11	18 Ω	
C20	.005 MFD		R12	220000 Ω	
C21	.25 MFD	PAPER	R13	330 Ω	
C22	50 MFD	DRY ELEC.	R14	33000 Ω	
C23	50 MFD	DRY ELEC.	R15	150000 Ω	
C24	100 MMF	MICA CAPACITOR	R16	33000 Ω	CARBON RESISTOR

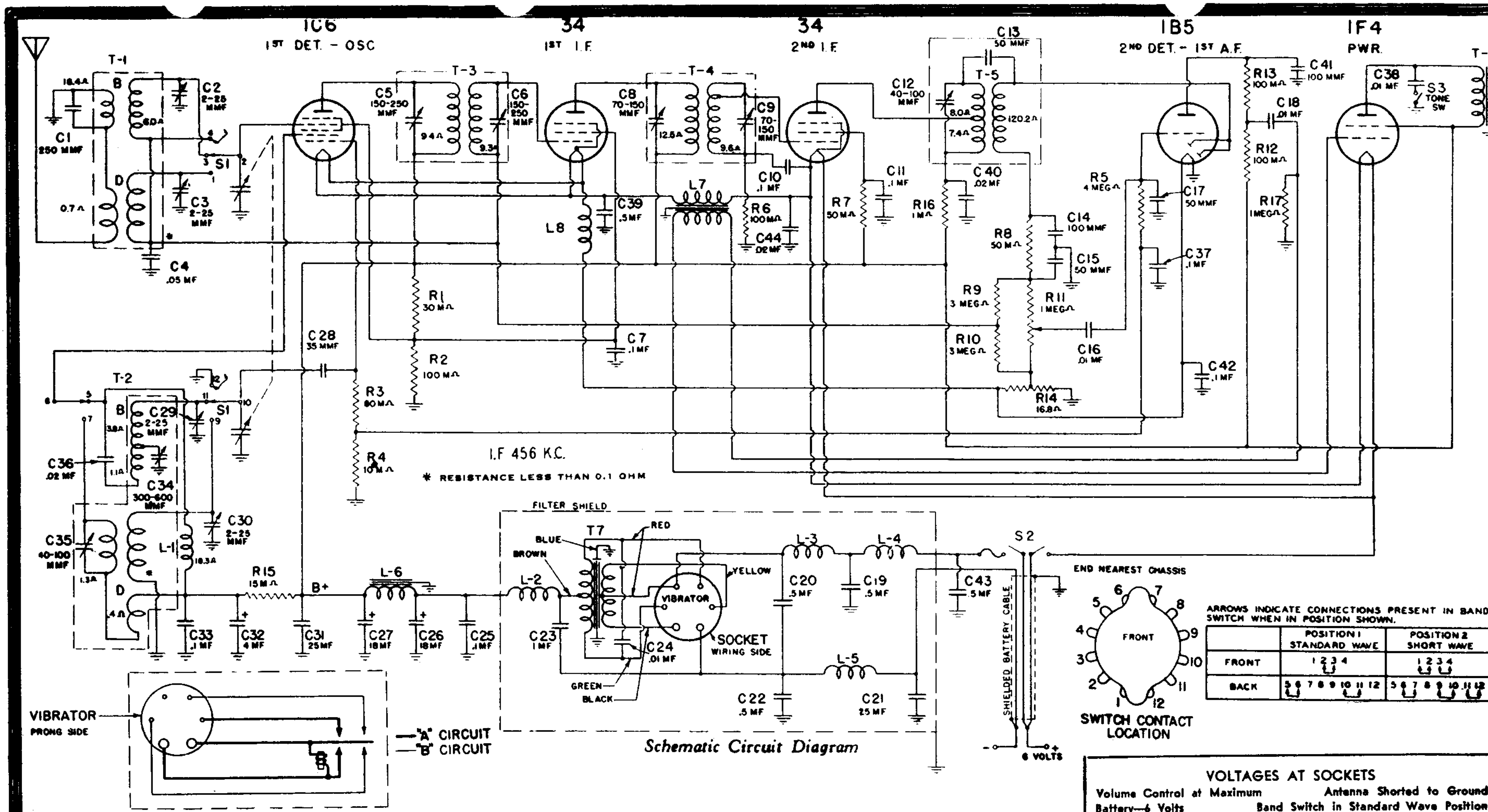
ANT. COIL CONNECTIONS

OSC. COIL CONNECTIONS



DOTTED LINE CONNECTIONS ARE TO TERMINALS ON OPPOSITE END OF COIL

GENERAL ELECTRIC COMPANY
MODELS U51 & U55



Schematic Circuit Diagram

SWITCH CONTACT LOCATION

ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE	POSITION 2 SHORT WAVE
FRONT	1 2 3 4	1 2 3 4
BACK	5 6 7 8 9 10 11 12	5 6 7 8 9 10 11 12

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground
Battery—6 Volts — Band Switch in Standard Wave Position

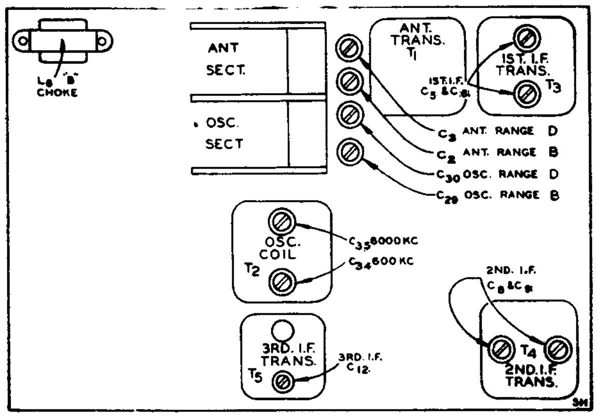
Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Bias Voltage
1C6	1st Det.-Osc.	2.0	140 110(1)	55	1.1(2)
34	1st I.F.	2.0	140	55	1.1(2)
34	2nd I.F.	2.0	140	75	4.0
1B5	2nd Det. 1st A.F.	2.0	75		3.0(3)
1F4	Power	2.0	135	140	4.0

(1) Anode Grid to ground.
(2) As read from negative filament leg to center tap of R14.
(3) As read across Resistor R4 (using 100,000 ohm meter). This voltage is subject to considerable variation depending on band and frequency setting.

SPECIFICATIONS

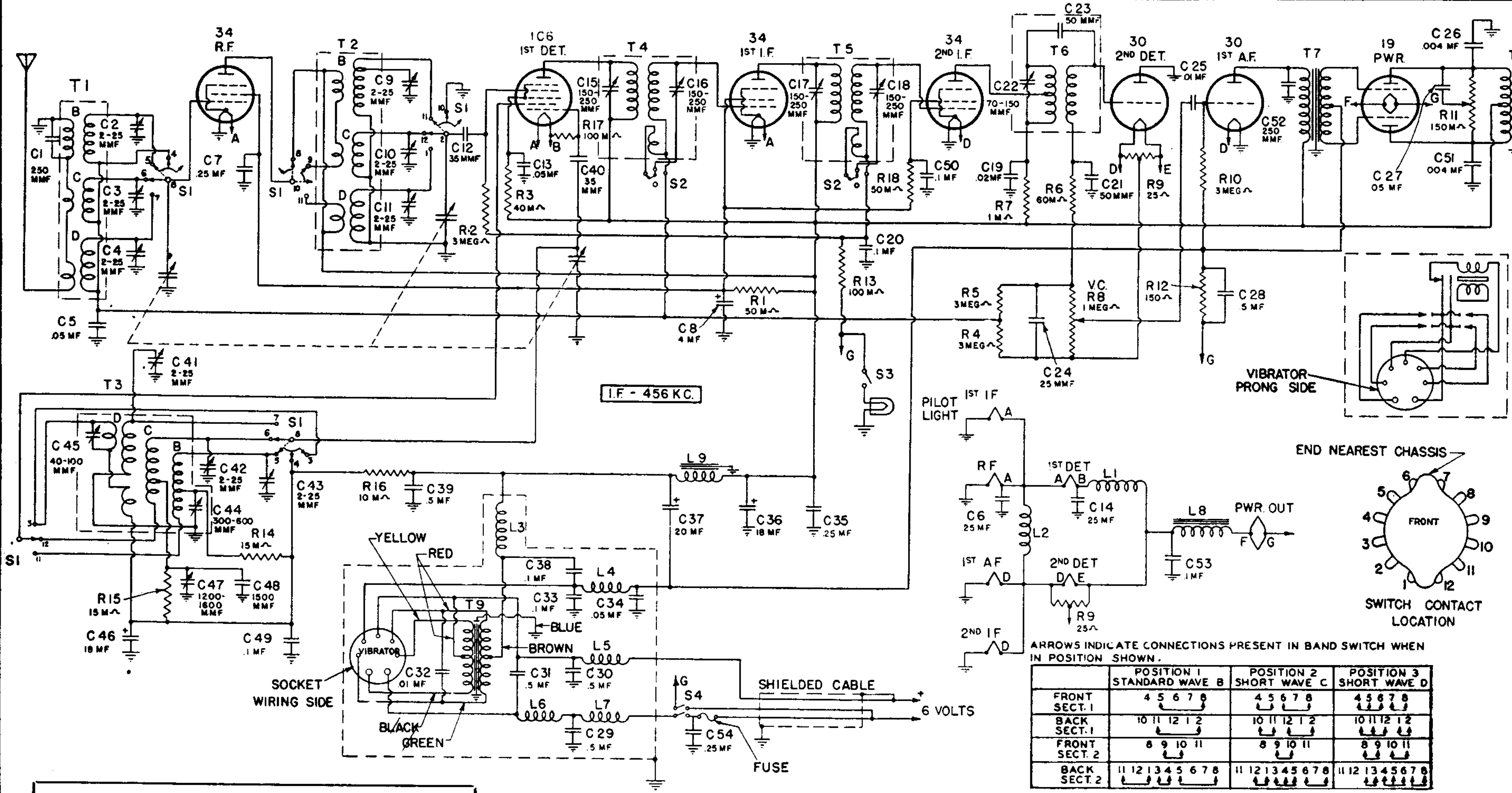
Power Consumption - 1.1 Amperes at 6.3 Volts
Power Output - - - - - 0.35 Watt Undistorted
Speaker - - - - - 6 inch P.M. Dynamic—Model U51
8 inch P.M. Dynamic—Model U55

Intermediate Frequency - - - - - - - 456 KC
Tuning Frequency Range
B Range........................ 528 to 1730 KC
D Range........................ 5650 to 16000 KC



Location of Trimmers

GENERAL ELECTRIC COMPANY
MODELS U70 & U75



ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE B	POSITION 2 SHORT WAVE C	POSITION 3 SHORT WAVE D
FRONT SECT. 1	4 5 6 7 8	4 5 6 7 8	4 5 6 7 8
BACK SECT. 1	10 11 12 1 2	10 11 12 1 2	10 11 12 1 2
FRONT SECT. 2	8 9 10 11	8 9 10 11	8 9 10 11
BACK SECT. 2	11 12 1 3 4 5 6 7 8	11 12 1 3 4 5 6 7 8	11 12 1 3 4 5 6 7 8

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground
Battery - 6 Volts — Band Switch in Standard Wave Position

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Bias Voltage See Notes
34	R.F.	2.0	145	55	1.0(1)
1C6	1st Det.-Osc.	2.0	145 90(2)	60	2 (3)
34	1st I.F.	2.0	145	55	1.0(1)
34	2nd I.F.	2.0	140	90	4.0(3)
30	2nd Det.	2.0			
30	1st A.F.	2.0	140		9 (4)
19	Power	2.0	140		5 (5)

(1) As read from negative filament leg to tap of resistor R9.
(2) Anode grid to ground.
(3) As read from negative filament leg to A—.
(4) Total voltage drop from negative filament leg to low potential end of resistor R12.
(5) As read across resistor R12.

SPECIFICATIONS

Power Consumption - 1.4 Amperes at 6.3 Volts
Power Output - - - - - 1.1 Watt Undistorted
Speaker - - - - - 6 inch P.M. Dynamic—Model U70
8 inch P.M. Dynamic—Model U75

Intermediate Frequency - - - - - - - 456 KC.
Tuning Frequency Range
B Range .... 528 to 1730 KC.
C Range .... 2300 to 6700 KC.
D Range .... 6500 to 18400 KC.

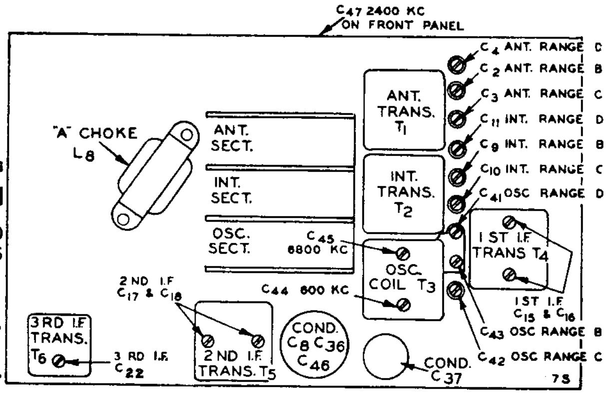
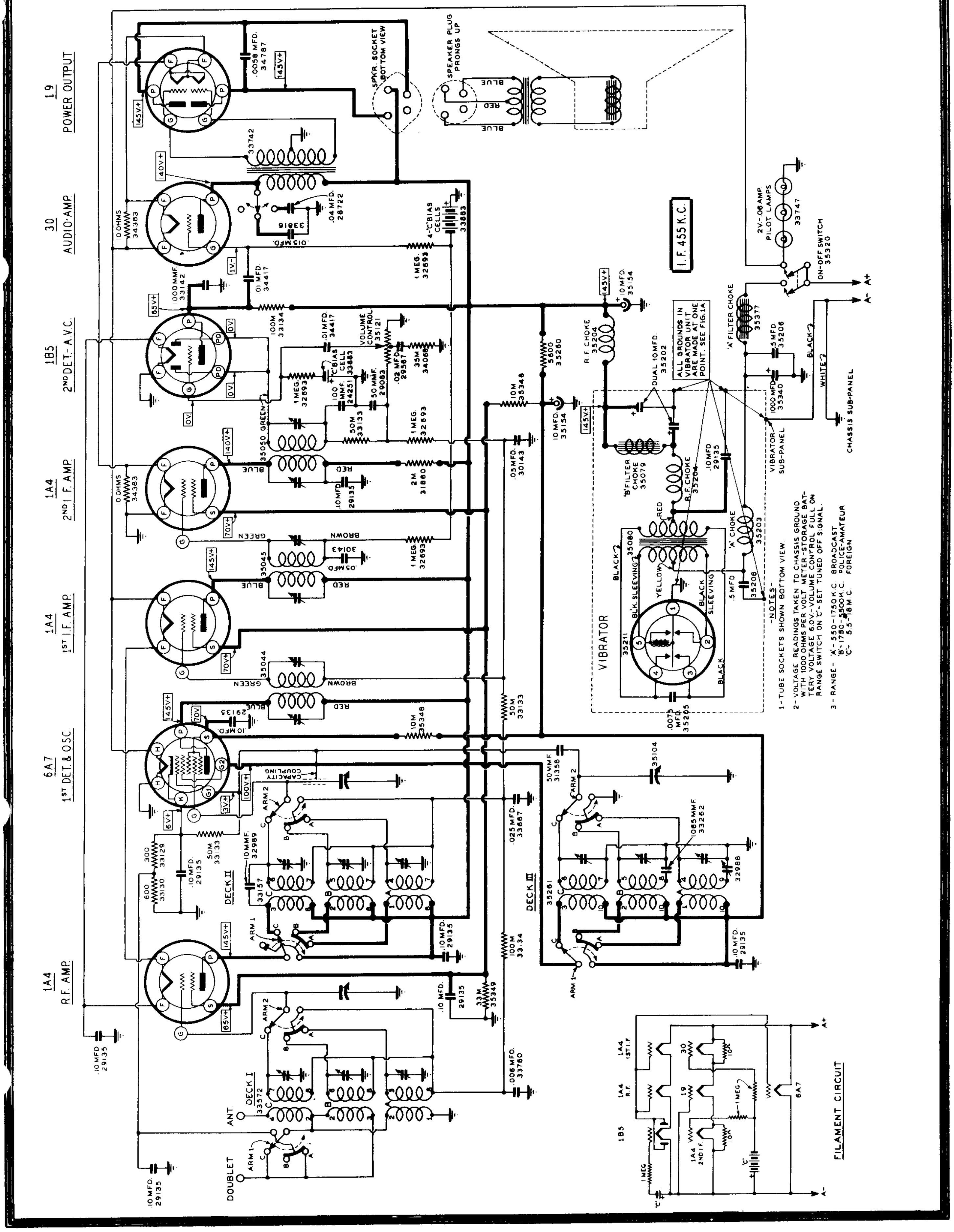


Fig. 3—Location of Trimmers

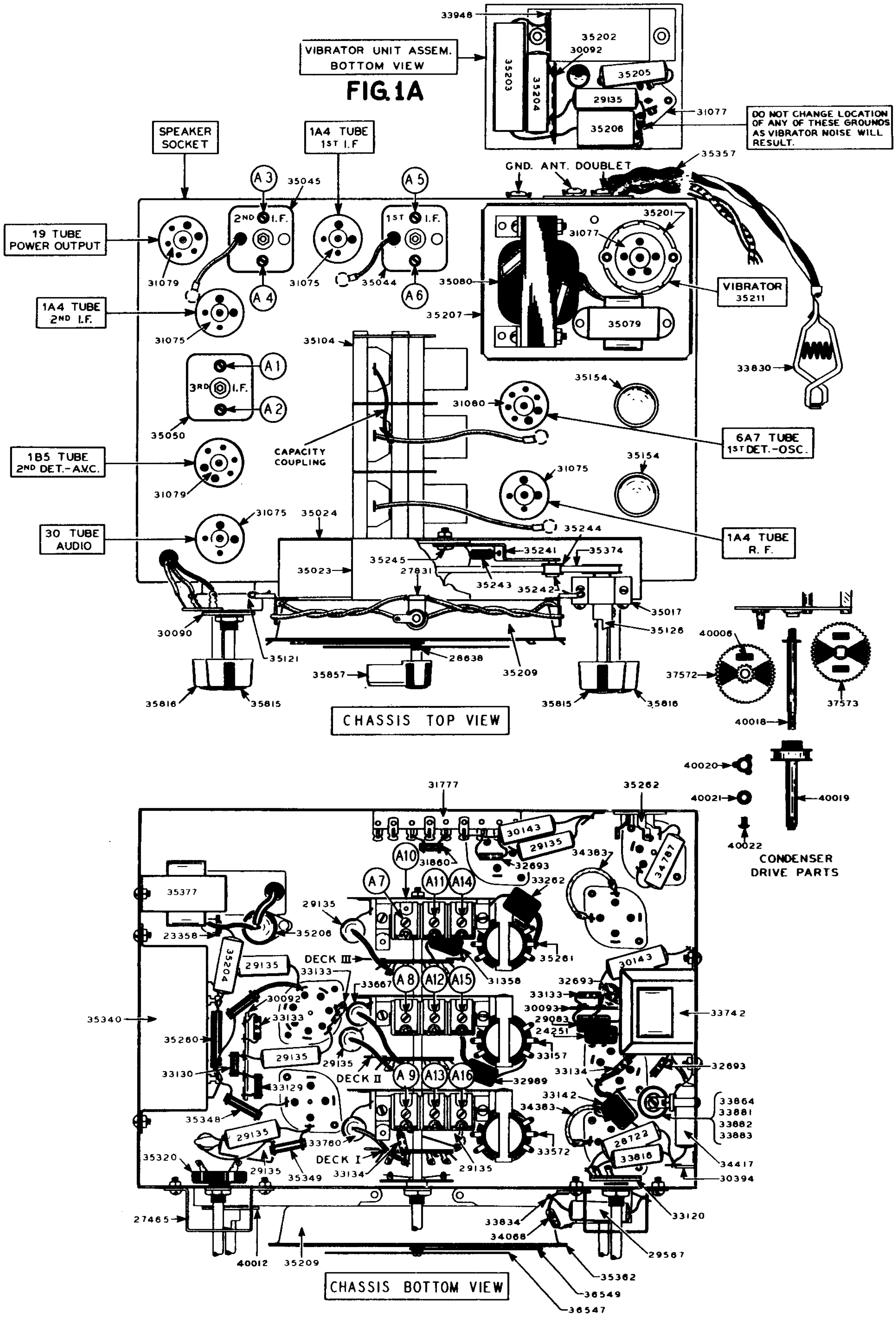
GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 7NB & 711

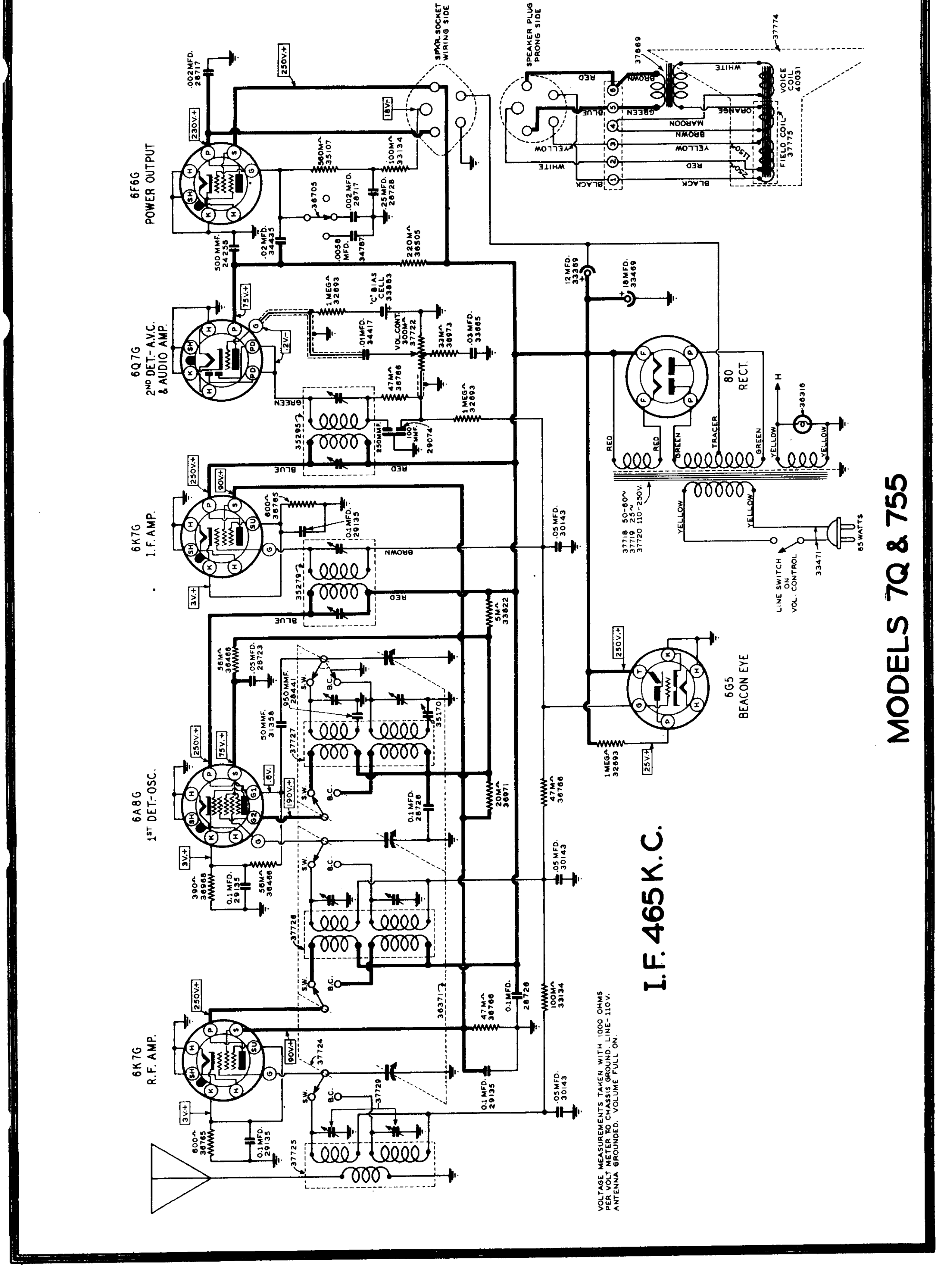


GENERAL HOUSEHOLD UTILITIES COMPANY

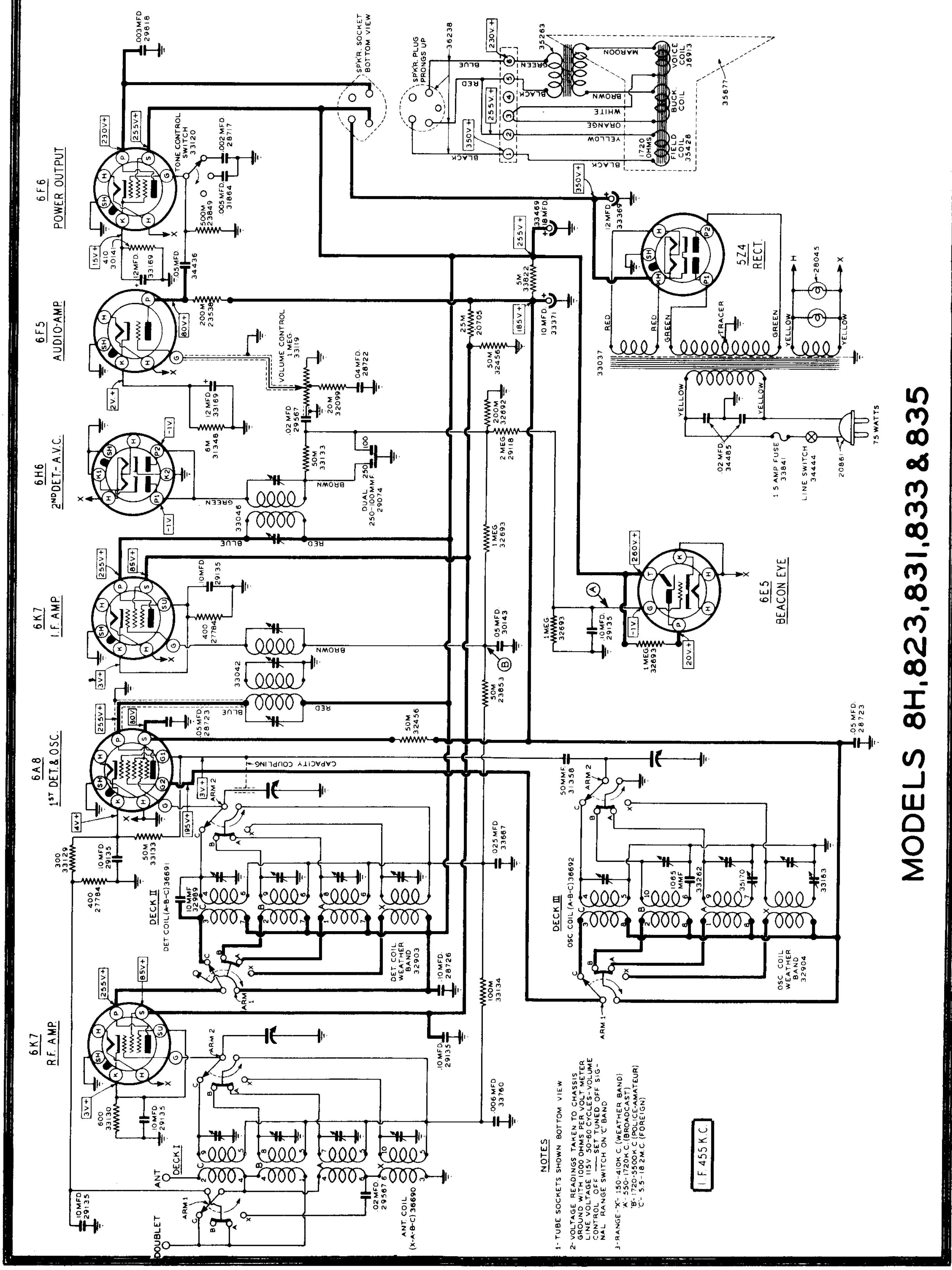
MODELS 7NB & 711



GENERAL HOUSEHOLD UTILITIES COMPANY

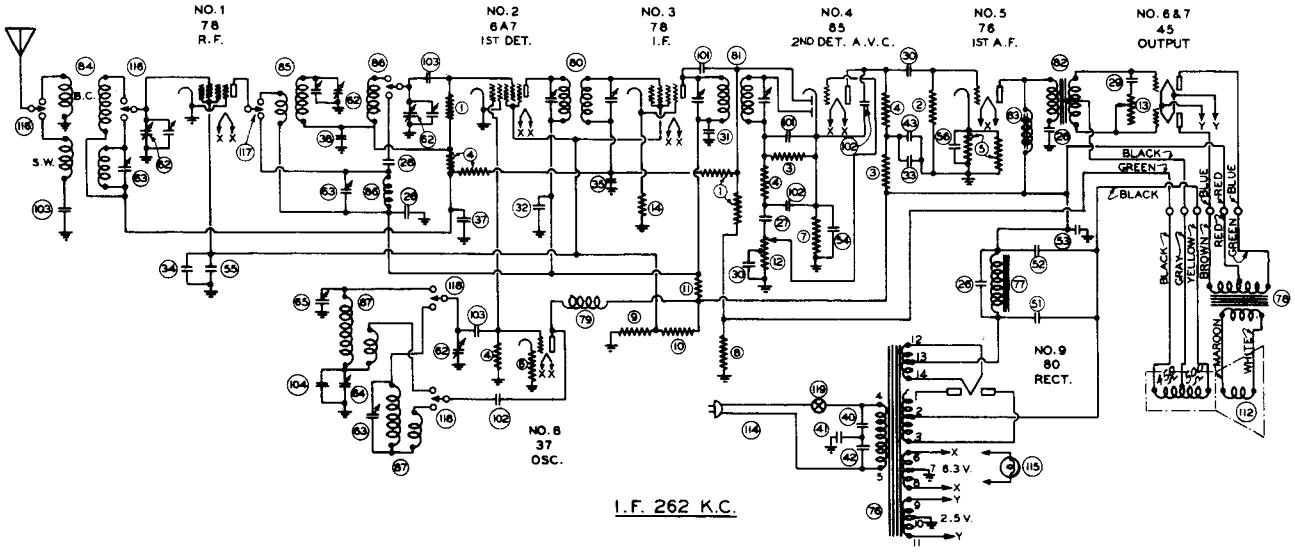


GENERAL HOUSEHOLD UTILITIES COMPANY

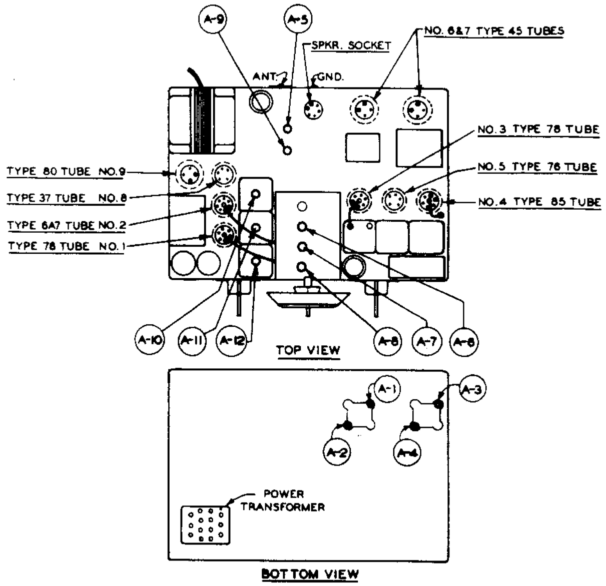


GENERAL HOUSEHOLD UTILITIES COMPANY

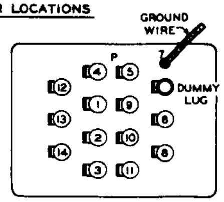
MODELS 9C & 921



I.F. 262 K.C.



TUBE LAYOUT & TRIMMER LOCATIONS



POWER TRANSFORMER CONNECTIONS

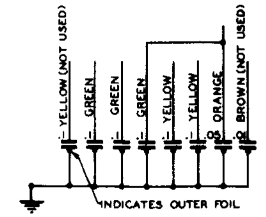


DIAGRAM OF BY-PASS CONDENSER #28050

Note—
Prices subject to change without notice.
Complete speakers may not be returned for credit.

RESISTORS

ITEM	PART NO.	DESCRIPTION	NO. REQ.	PRICE
1	23849	500 M. Ohms	3	.20
2	23998	250 M. Ohms	1	.20
3	23370	100 M. Ohms	2	.20
4	23853	50 M. Ohms	5	.20
5	30186	600 M. Ohms	2	.20
6	27784	400 M. Ohms	1	.20
7	27447	4 M. Ohms } Candohm	1	.30
8	27447	30 Ohms } Candohm		
9	27540	27.5 M Ohms } Candohm	1	.65
10	27540	14 M. Ohms } Candohm		
11	28302	1 M. Ohm Candohm	1	.30
12	27687	Volume Control	1	1.15
13	28316	Tone Control	1	.75
14	27490	1 M. Ohms	1	.20

PAPER CONDENSERS

ITEM	PART NO.	DESCRIPTION	NO. REQ.	PRICE
26	28726	0.1 Mfd. 400 V.	2	.25
27	29453	0.01 Mfd. 400 V.	1	.25
28	29567	0.02 Mfd. 400 V.	1	.25
29	28717	0.002 Mfd. 700 V.	1	.25
30	28720	0.005 Mfd. 700 V.	2	.30
31	28050	0.1 Mfd. 300 V.	1	2.00
32		0.1 Mfd. 300 V.	1	
33		0.1 Mfd. + 0.05 Mfd.	1	
34		0.1 Mfd. 200 V.	1	
35		0.1 Mfd. 200 V.	1	
37	27790	0.1 Mfd. 300 V. } Small Can	1	.80
38		0.1 Mfd. 300 V. } Small Can	1	
40	28043	0.01 Mfd. 500 V. } Small Can	1	.80
41		0.01 Mfd. 500 V. } Small Can	1	
42		0.01 Mfd. 500 V. } Small Can	1	
43	28725	0.08 Mfd. 400 V.	1	

ELECTROLYTIC CONDENSERS

ITEM	PART NO.	DESCRIPTION	NO. REQ.	PRICE
51	27710	8 Mfd. 475 V.	1	1.15
52	27711	8 Mfd. 475 V.	1	1.10
53	29562	18 Mfd. 300 V.	1	1.25
54	27670	8 Mfd. 25 V.	1	1.60
55		8 Mfd. 475 V.	1	
56	24789	4 Mfd. 25 V.	1	.60

ADJUSTABLE CONDENSERS

ITEM	PART NO.	DESCRIPTION	NO. REQ.	PRICE
62	31605	Variable Cond.	1	7.50
63	30131	S.W. Trimmer	3	.35
64	27542	Osc. Trimmer (600)	1	.60
65	27382	Osc. Trimmer (1400)	1	.35
	31604	Var. Cond. & Drive Assem.	1	8.75

TRANSFORMERS & CHOKES

ITEM	PART NO.	DESCRIPTION	NO. REQ.	PRICE
76	27767	Power Transformer	1	10.50
77	28051	Filter Choke	1	2.65
79	29539	R.F. Choke	1	.60
80	31606	1st I.F. Transformer	1	3.00
81	31607	2nd I.F. Transformer	1	3.00
82	28052	Input Transformer	1	3.00
83	28053	Audio Choke	1	1.75
84	31594	Ant. Coil	1	2.75
85	31592	Det. Coil	1	1.75
86	31598	Bi-Selector	1	1.50
87	31596	Osc. Coil	1	2.00

MICA CONDENSERS

ITEM	PART NO.	DESCRIPTION	NO. REQ.	PRICE
101	24251	100 Mmf.	2	.15
102	24487	250 Mmf.	3	.20
103	29083	50 Mmf.	3	.20
104	29074	250 Mmf. & 100 Mmf.	1	.30

SPEAKER PARTS.

ITEM	PART NO.	DESCRIPTION	NO. REQ.	PRICE
78	31621	Output Transformer	1	2.00
112	31582	108C4 Spkr. Complete	1	11.50
	27565	Speaker Cable Assem.	1	.95
	32227	Spkr. Pot & Pole Assem.	1	1.15
	32228	Spkr. Clamp	1	.10
	20045	Term. Strip Cover	1	.15
	20047	Terminal Strip	1	.10
	27240	Cone Mounting Gasket	1	.10
	32008	Cone & Voice Coil Assembly	1	3.10
	31617	Field Coil Assem.	1	3.30
	27216	Transformer Bracket	1	.20

MISCELLANEOUS

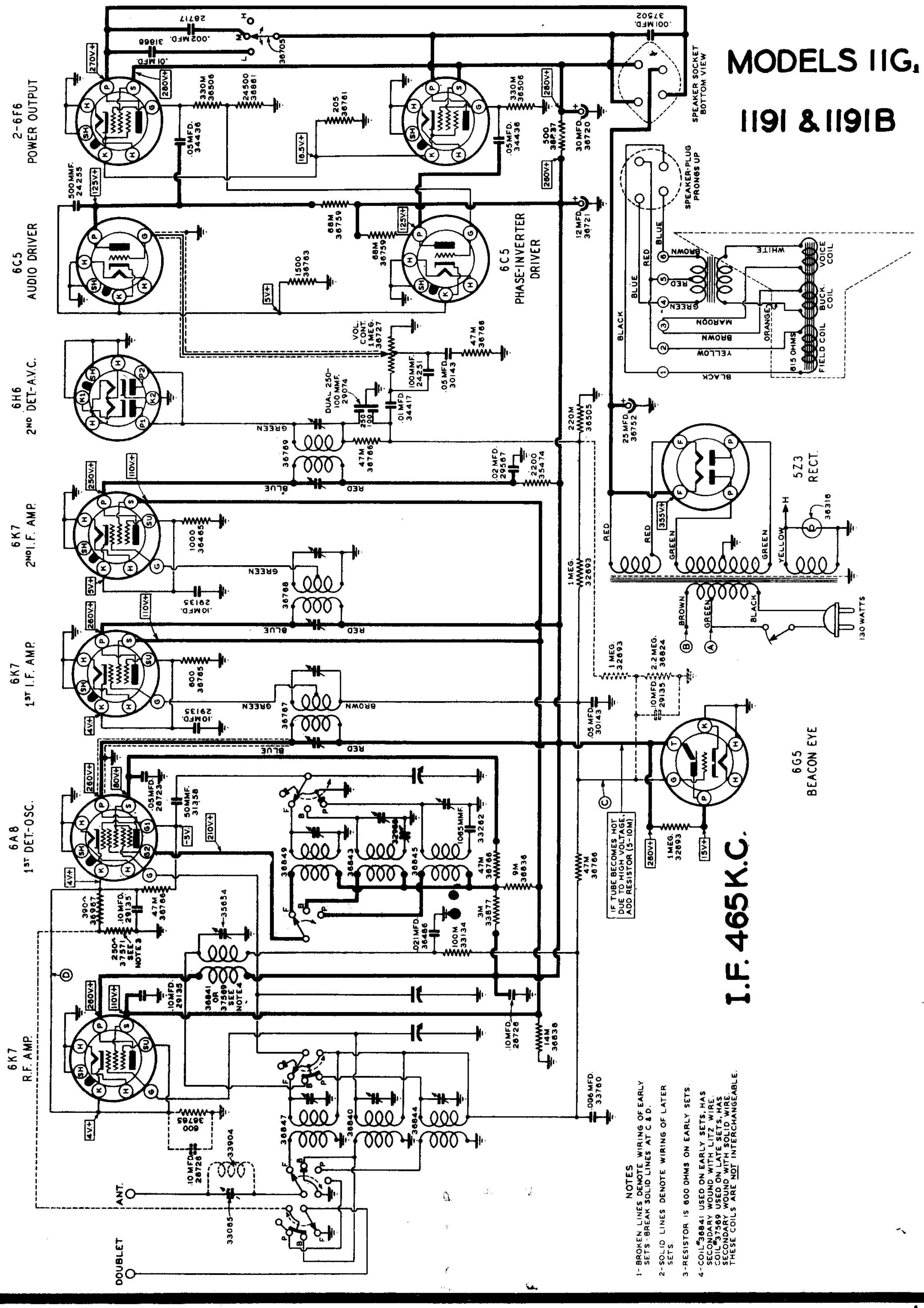
ITEM	PART NO.	DESCRIPTION	NO. REQ.	PRICE
	31613	Resistor Panel Assem.	1	
	31586	Var. Cond. Cover Assem.	1	
	29832	Tube Shield Body	4	.15
	31215	Tube Shield Cap	4	.10
	27455	Tube Shield	1	.15
	28900	Tube Shield	1	.26
	27141	Escutcheon	1	
	63838	Felt Washer 15/16 O.D.	1	.01
	27508	Push-on Knob	1	.20
	63839	Felt Washer 3/4 O.D.	3	.01
	27492	Push-on Knob	2	.15
	27667	Set Screw Knob	1	.20

MISCELLANEOUS

ITEM	PART NO.	DESCRIPTION	NO. REQ.	PRICE
	31079	6-Prong Socket	3	.15
	31078	5-Prong Socket	2	.10
	31076	4-Prong Socket	3	.10
	26256	Tube Shield Base	6	.05
	31080	7-Prong Socket	1	.15
	27488	6-Prong Socket (Spkr.)	1	.15
	22333	Ant. Binding Post Assem.	1	.10
	23358	Vert. Terminal Assem.	1	.05
	31424	Electro. Insul. Shield	2	
	27478	Ground Term.	1	.02
	31205	Electrolytic Insul.	1	.05
	31590	Triple Coil Can	1	.75
	27260	Drive Shaft	1	.05
	27617	Drive Drum & Bushing	1	.50
	27254	Drive Drum Spring	1	.05
	27297	String & Eyelet Assem.	1	.10
	27299	Dial Pointer & Brkt.	1	.15
	21312	Term. Assem.	1	.15
116	31589	Range Switch Deck I	1	2.50
117		" " Deck II	1	
118		" " Deck III	1	
114	20861	Line Cord	1	.95
115	28045	6-8V. Pilot Light	1	.15
119		Line Switch (on Vol. Cont.)		
	23358	Vert. Term. Assem.	1	.05
	27388	Shield & Eyebolt Assem.	1	.30
	27283	" " " "	1	.35
	28326	Thumb Screw	1	.04
	31611	Dial Chart Assem.	1	
	20962	Grid Cap	4	.02

GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 11G, 1191 & 1191B

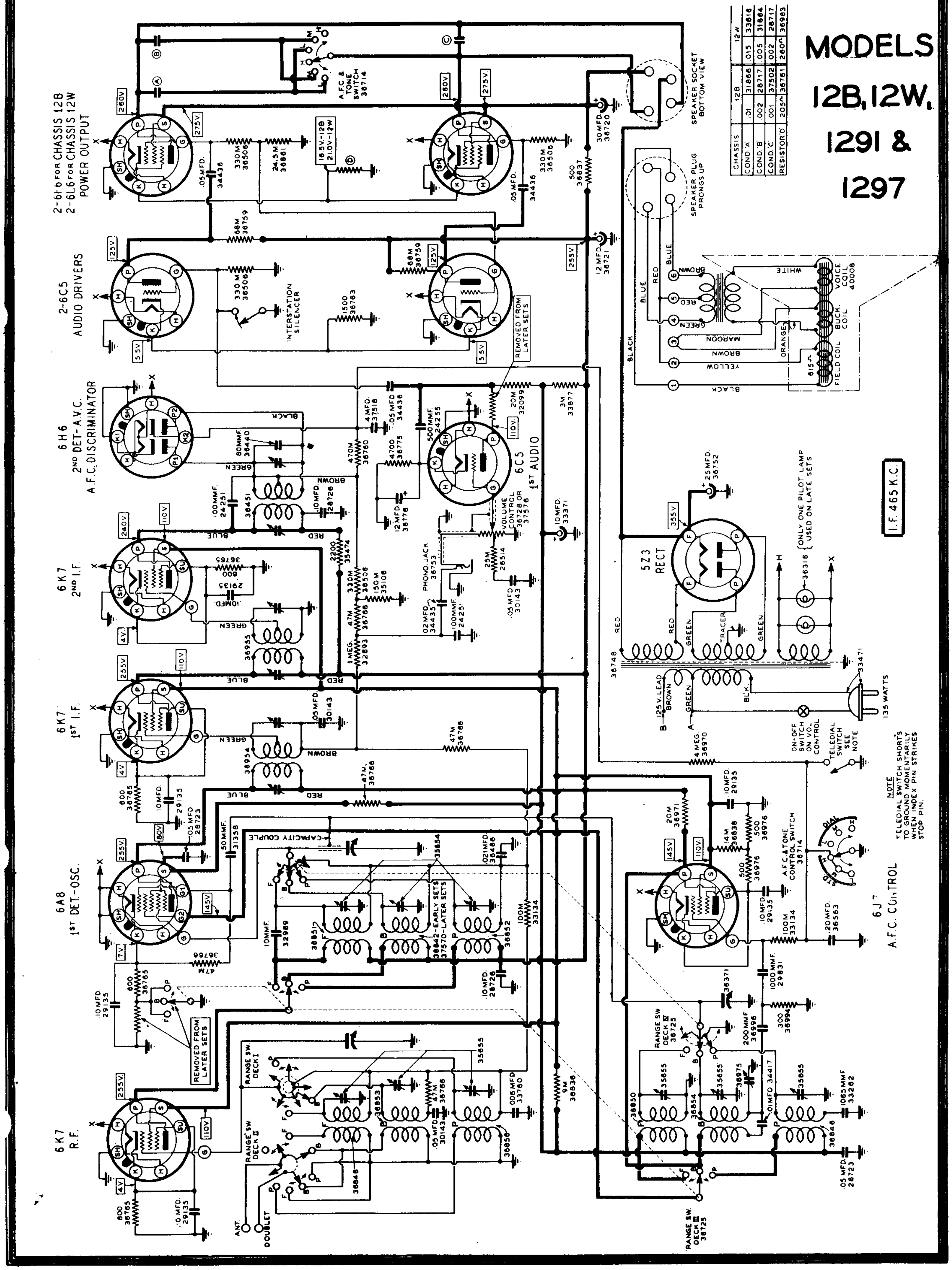


NOTES
1- BROKEN LINES DENOTE WIRING OF EARLY SETS - BREAK SOLID LINES AT C & D.
2- SOLID LINES DENOTE WIRING OF LATER SETS
3- RESISTOR IS 600 OHMS ON EARLY SETS.
4- COIL 36841 USED ON EARLY SETS, HAS SECONDARY WOUND WITH LITZ WIRE. COIL 37569 USED ON LATE SETS, HAS SECONDARY WOUND WITH SOLID WIRE. THESE COILS ARE NOT INTERCHANGEABLE.

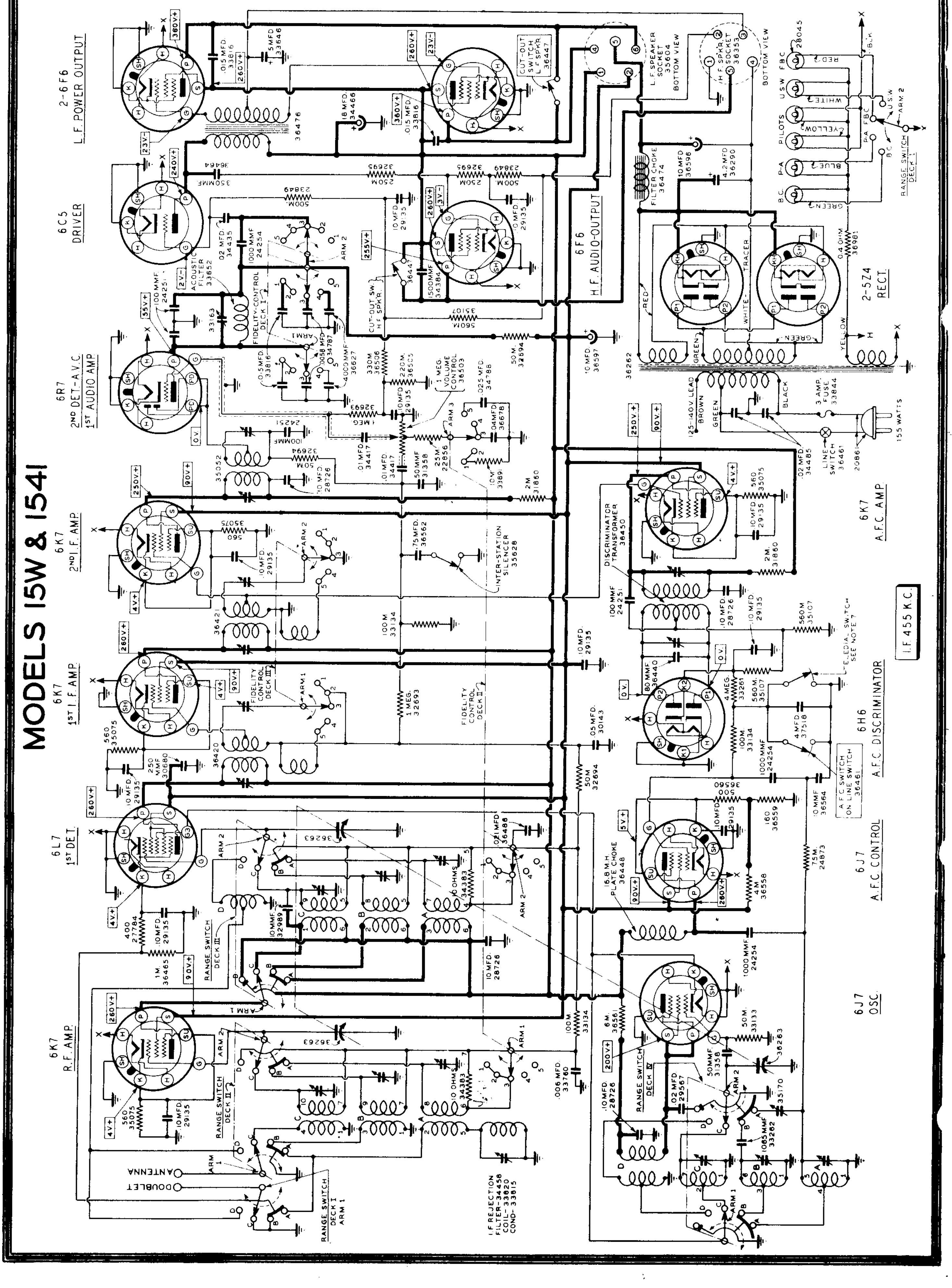
GENERAL HOUSEHOLD UTILITIES COMPANY

MODELS 12B, 12W, 1291 & 1297

CHASSIS	12B		12W	
COND. 'A'	.01	31866	.015	33816
COND. 'B'	.002	28717	.005	31864
COND. 'C'	.001	37502	.002	28717
RESISTOR 'D'	205Ω	36761	260Ω	36983

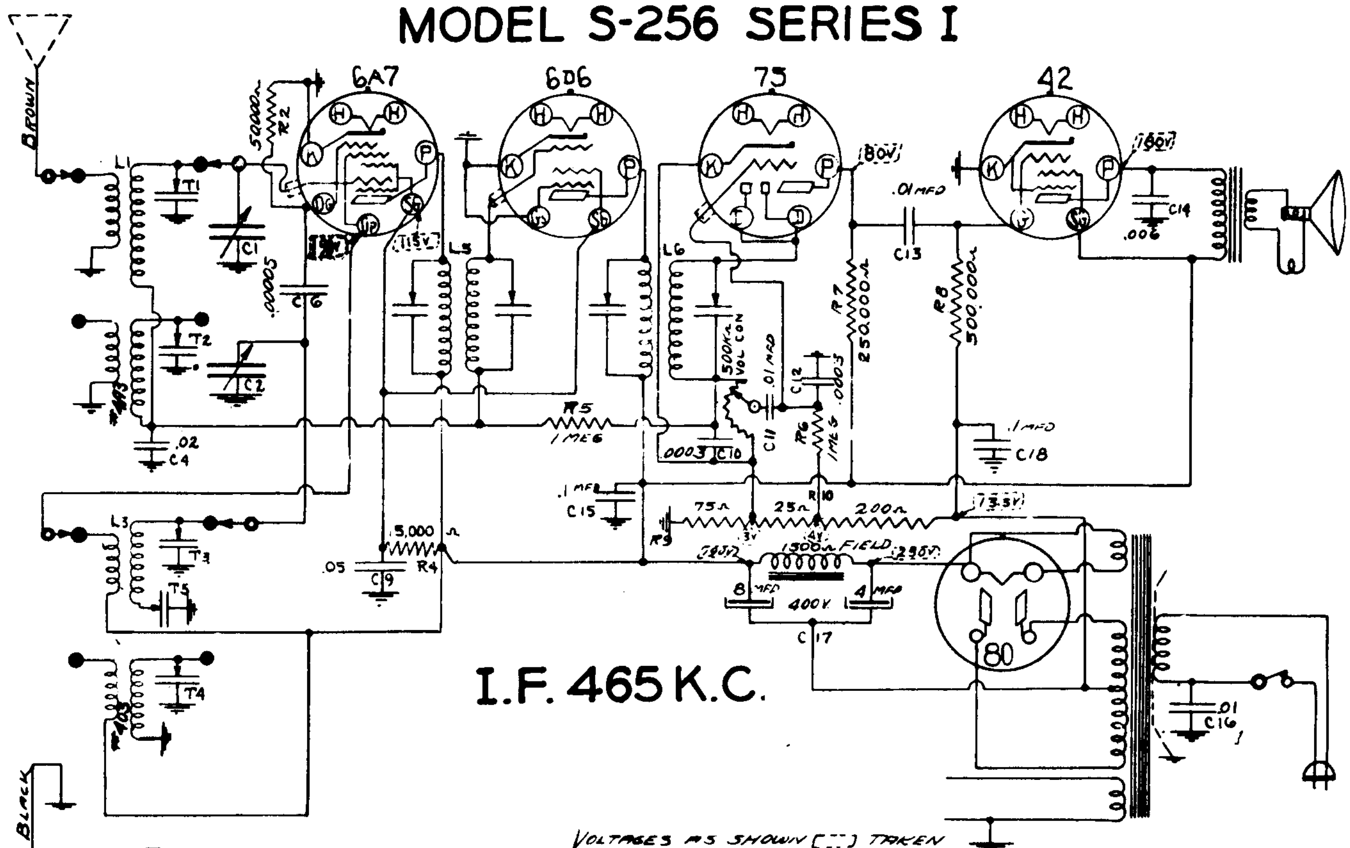


GENERAL HOUSEHOLD UTILITIES COMPANY



HOWARD RADIO COMPANY

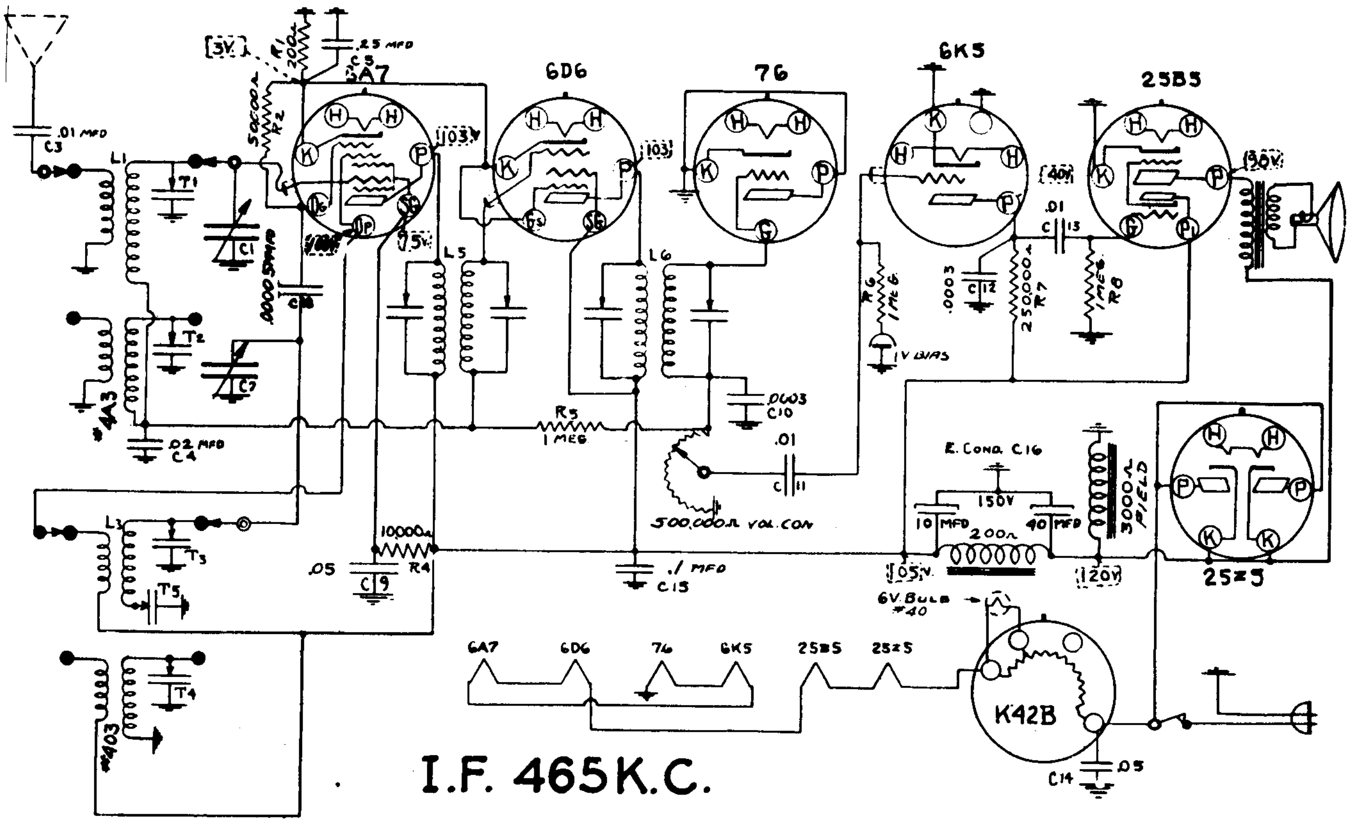
MODEL S-256 SERIES I



Two Bands -
(1) - 540 TO 1700KC BROADCAST.
(2) - 5.5 TO 18MC SHORTWAVE

VOLTAGES AS SHOWN [ ] TAKEN FROM GROUND, LINE VOLTAGE - 117 V. A.C.

MODEL S-259 SERIES I

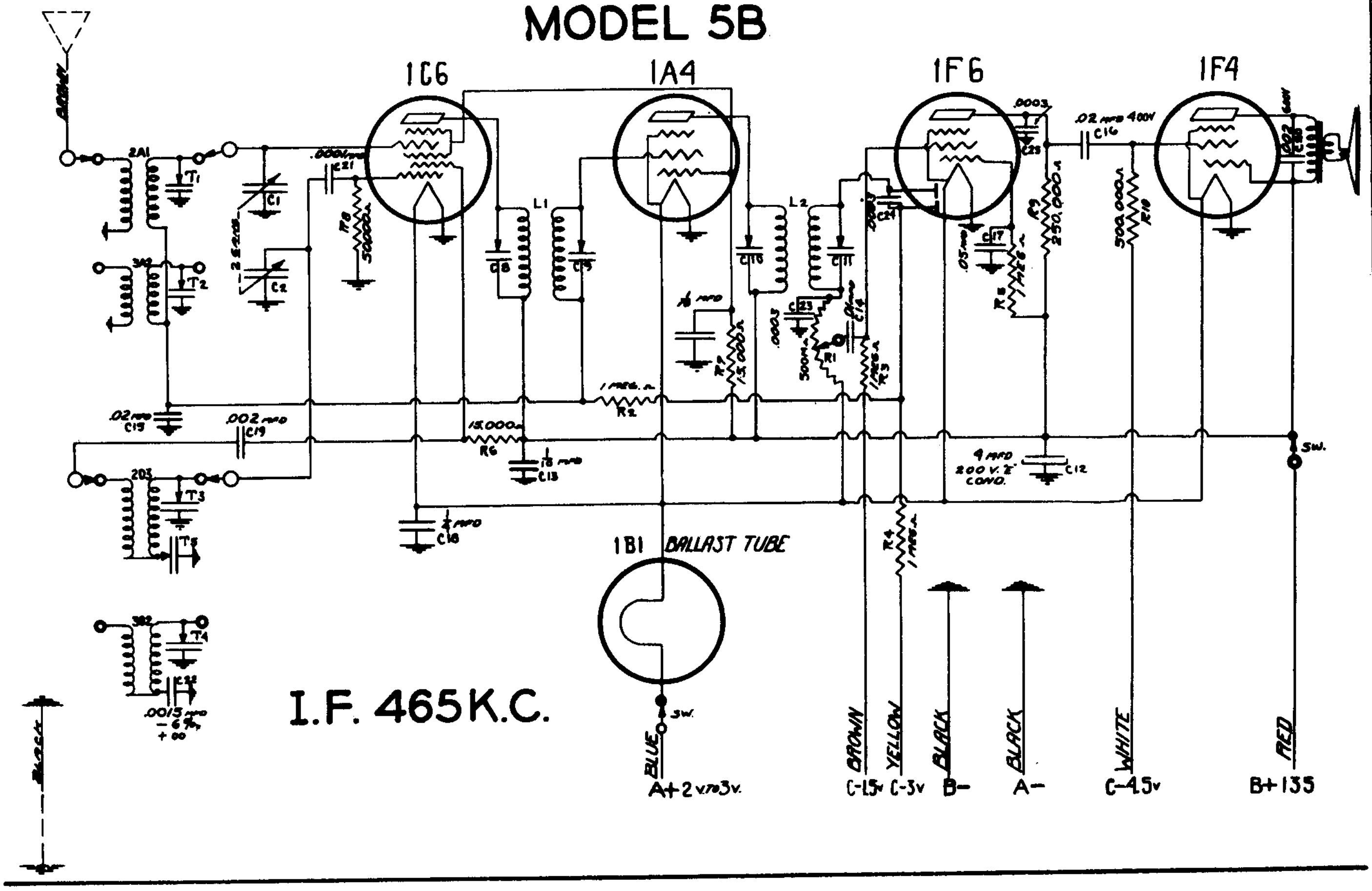


TWO BANDS:-
(1) 540 To 1700KC - BROADCAST
(2) 5.5MC To 18MC - SHORTWAVE

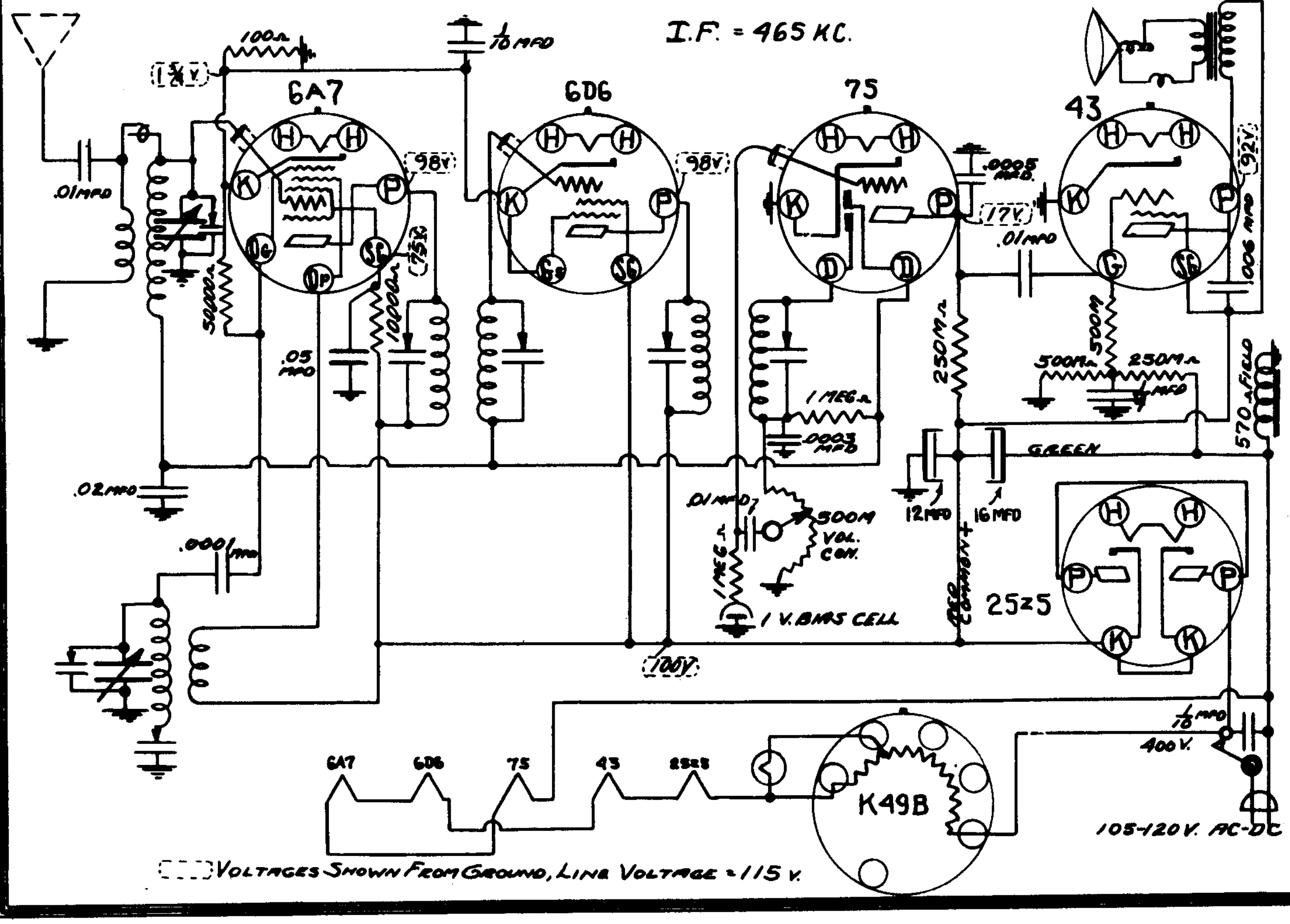
VOLTAGES AS SHOWN [ ] TAKEN FROM GROUND, LINE VOLTAGE - 117 V. A.C.

HOWARD RADIO COMPANY

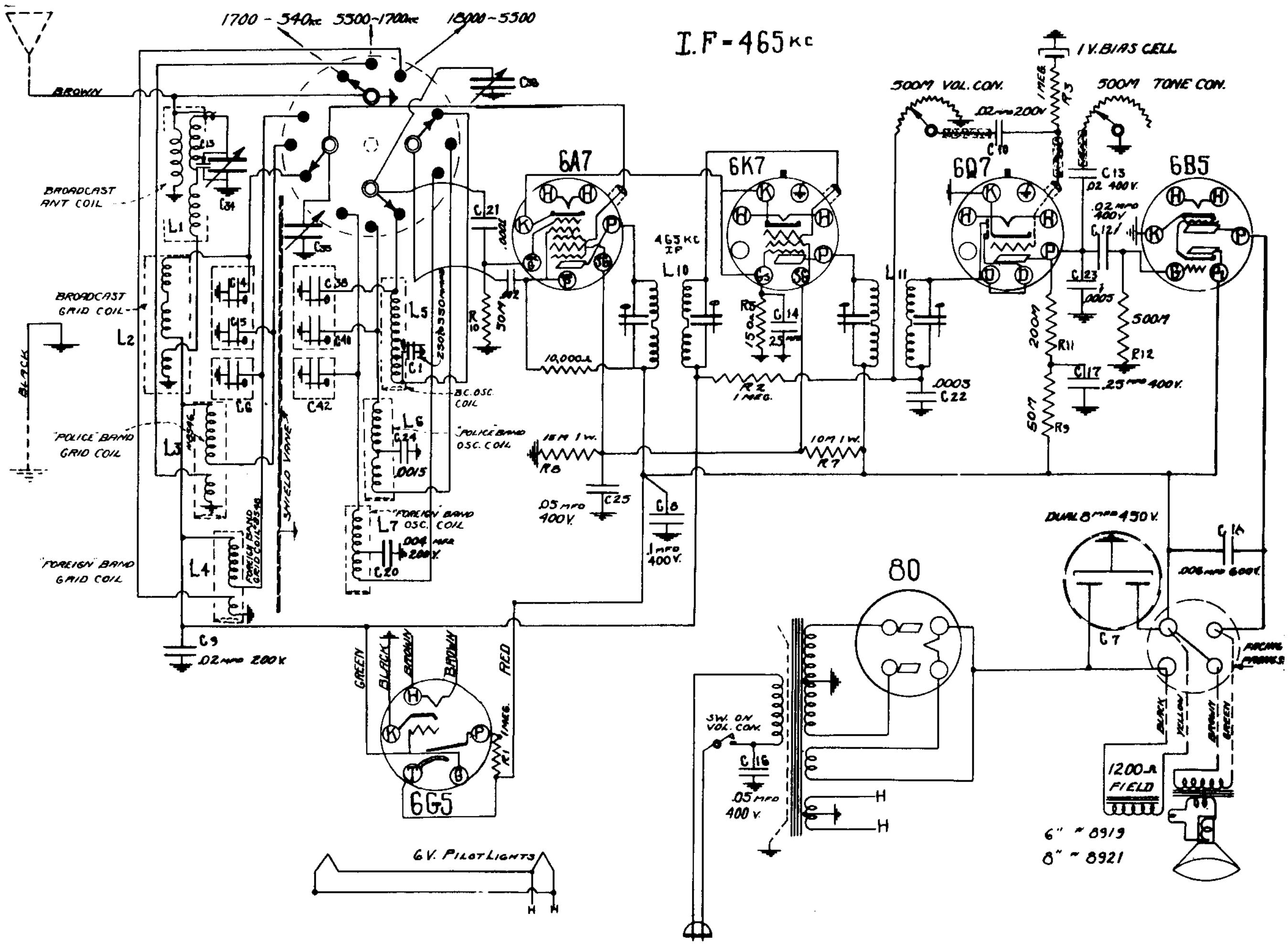
MODEL 5B



MODEL 56 SERIES I



HOWARD RADIO COMPANY
MODEL 68



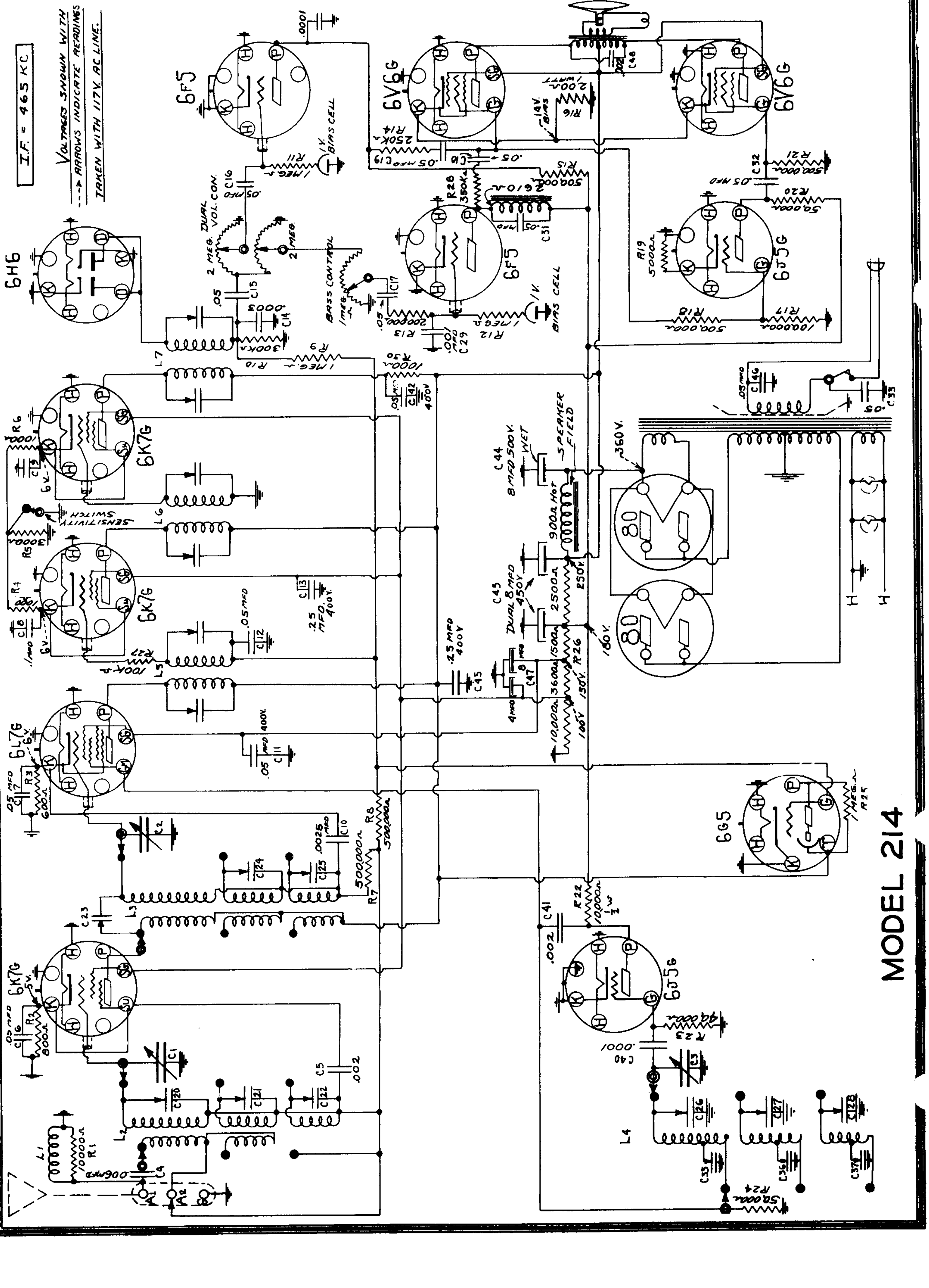
REPLACEMENT PARTS AND PRICE LIST

PART NO.	SCHEMATIC LOCATION	DESCRIPTION	LIST PRICE
7601		Bias Cell - 1 Volt	.30
201	L5	Coil - B.C. Oscillator	.80
201	L2	Coil - B.C. Grid	.80
301	L6	Coil - Police Band, Oscillator	.80
3A1	L3	Coil - Police Band Antenna	.80
402	L7	Coil - Foreign Band, Oscillator	.80
4A2	L4	Coil - Foreign Band, Antenna	.80
2A2	L1	Coil - Broadcast, Antenna	.80
22-936		Coil - 1st I.F. Assembly	1.30
23-936		Coil - 2nd I.F. Assembly	1.30
8216	C1	Condenser - Padding - 5 Plate	.40
8218-2	C4,C5,C38,C40	Condenser - Trimmer - 2 Section	.40
8218-3	C6,C42	Condenser - Trimmer - 1 Section	.20
8117-2	C34,C35,C36	Condenser - Variable, 3 Gang	3.60
8826	C7	Condenser - Dual 8 Mfd. 450 V. Electrolytic	1.95
2756	C8	Condenser - .1 Mfd. 400 Volt	.20
3513	C9,C10	Condenser - .02 Mfd. 200 Volt	.16
3517	C11,C12	Condenser - .02 Mfd. 400 Volt	.20
2183	C15	Condenser - .05 Mfd. 200 Volt	.16
2757	C16,C25	Condenser - .05 Mfd. 400 Volt	.20
2758	C17	Condenser - .25 Mfd. 400 Volt	.20
3515	C18	Condenser - .006 Mfd. 600 Volt	.20
3518	C20	Condenser - .004 Mfd. 200 Volt	.20
1801	C19	Condenser - .001 Mfd. Mica	.20
2366	C21	Condenser - .0001 Mfd. Mica	.16
8304	C22	Condenser - .0003 Mfd. Mica	.16
2280	C23	Condenser - .0005 Mfd. Mica	.16
3005	C24	Condenser - .0015 Mfd. Mica - 8% ≠ 00	.20

PART NO.	SCHEMATIC LOCATION	DESCRIPTION	LIST PRICE
2475	C14	Condenser - .25 Mfd. 200 Volt	.16
6229		Control - Volume and Switch	1.00
6223		Control - Tone	.95
1552		Cord - A.C. Line and Plug	.32
4089		Dial Card - Calibrated	.64
4059		Dial Hand	.12
4048		Dial Glass	.35
5715		Escutcheon	.96
8642		Tuning Tube Fixture	.35
6022		Tuning Tube Cable & Socket	.75
3188		Drive Disc - 3-3/8 O.D.	.25
4073		Drive Disc and Hub 3" O.D.	.45
460		Grid Cap	.05
7114		Knob - 3 Color Band, coded	.25
7115		Knob - "Station Selector", coded	.25
7116		Knob - "Volume" - "Off", coded	.25
7117		Knob - "Tone", coded	.25
1919		Lamp - Dial - 6 Volt	.12
3335	R1,R2,R3	Resistor - 1 Megohom 1/4 Watt	.11
1817	R5	Resistor - 150 Ohm 1/4 Watt	.11
3349	R6	Resistor - 10M Onm 1/2 Watt	.12
2777	R7	Resistor - 10M Ohm 1 Watt	.16
2362	R8	Resistor - 15M Ohm 1 Watt	.16
1843	R9,R10	Resistor - 50M Ohm 1/2 Watt	.12
3325	R11	Resistor - 200M Ohm 1/4 Watt	.11
3328	R12	Resistor - 500M Ohm 1/4 Watt	.11
3245		Socket - Pilot Light	.15
2744		Socket - 4 Prong	.12
2746		Socket - 6 Prong	.14
2747		Socket - 7 Prong	.14
6008		Socket - 8 Prong. Metal Tube Type	.16
8919		Speaker - 6 Inch	5.40
8921		Speaker - 8 Inch	6.40
5819		Switch - Wave Band 3 Position	1.05
4204		Transformer - Power	3.60
6631		Tube Shield Assembly & Ground Ring	.16
6515-A		Wing Screw	.14

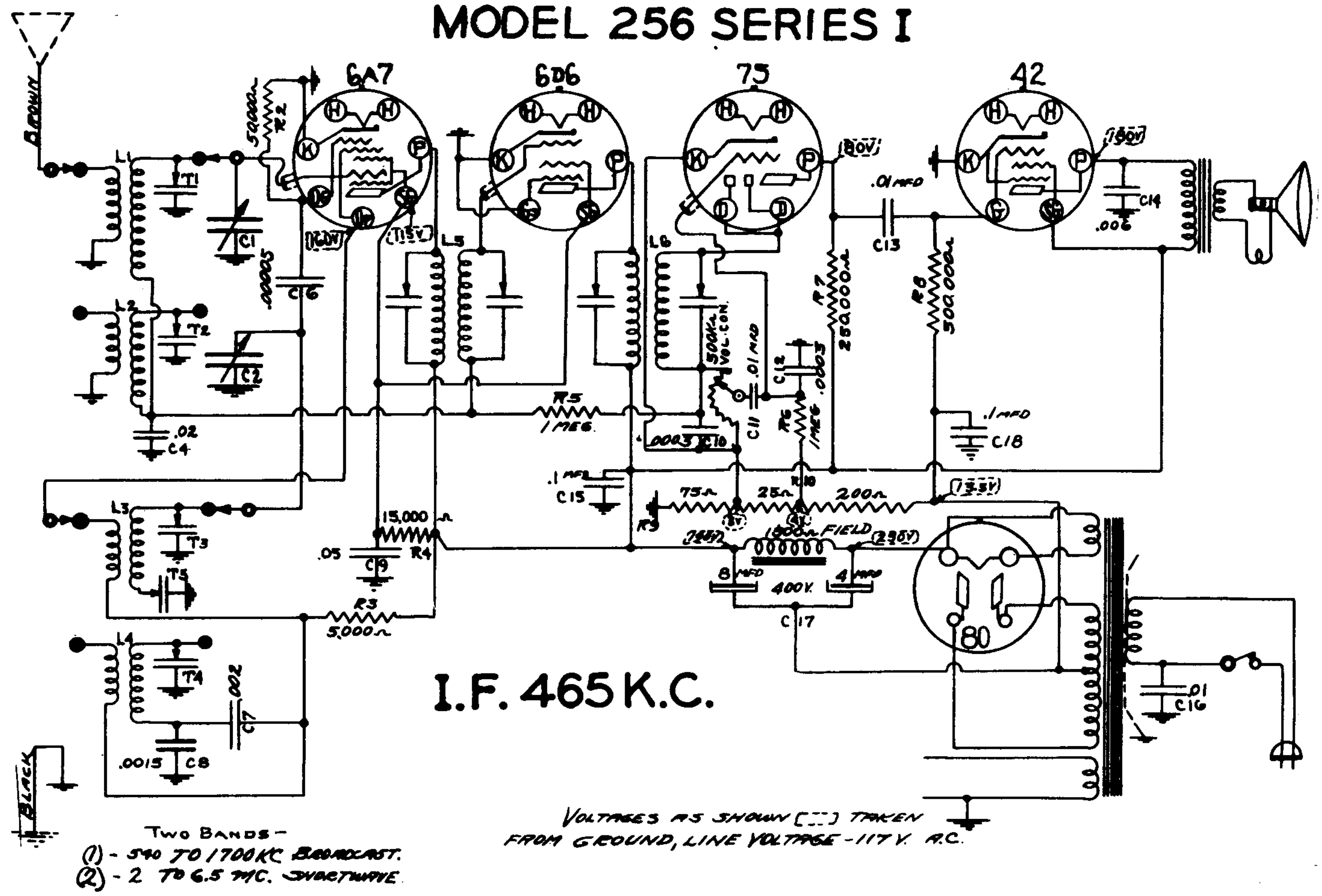
NOTE: When ordering speaker parts such as cone, transformer or the field it is necessary that the number on the back of the speaker be specified.

HOWARD RADIO COMPANY

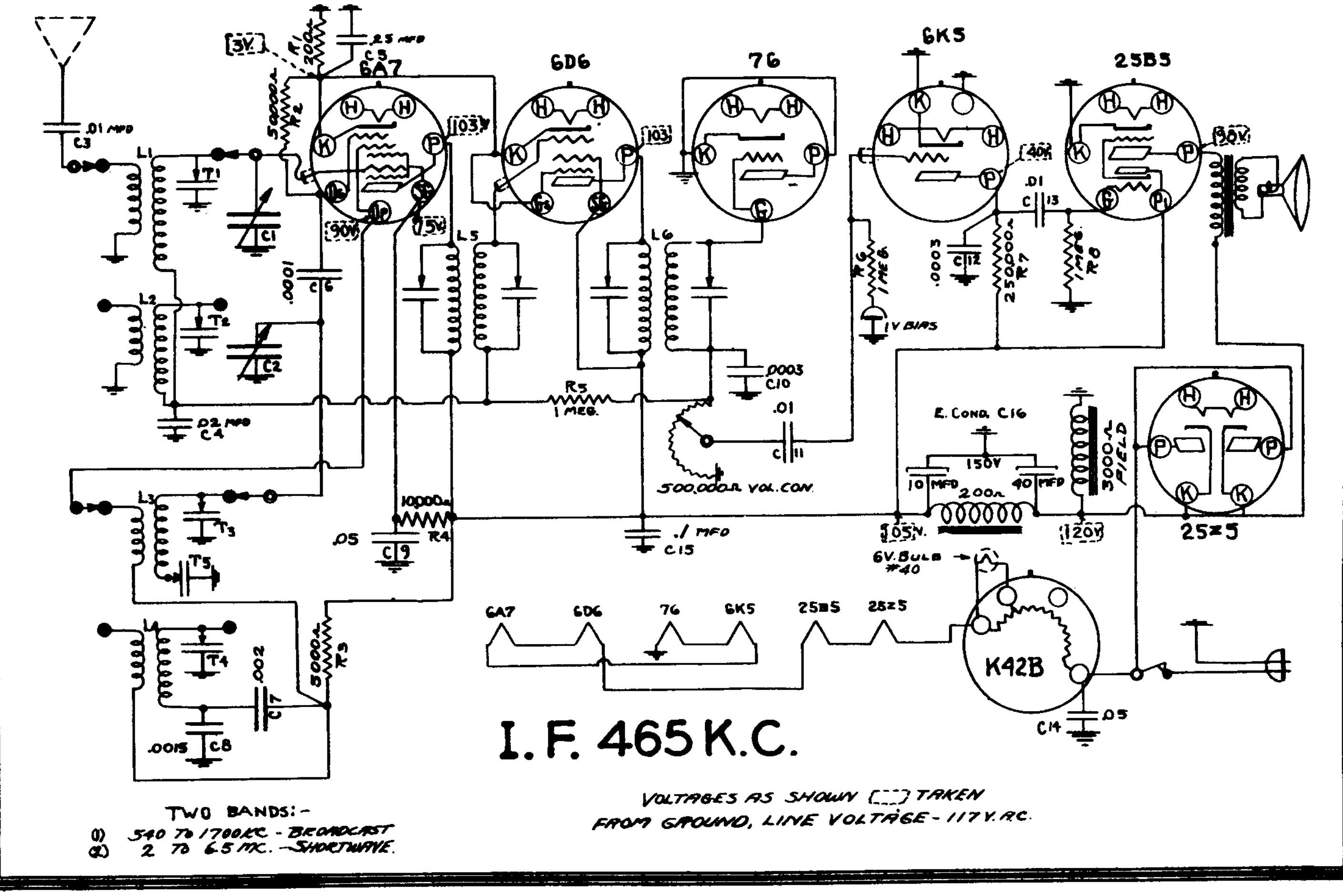


HOWARD RADIO COMPANY

MODEL 256 SERIES I

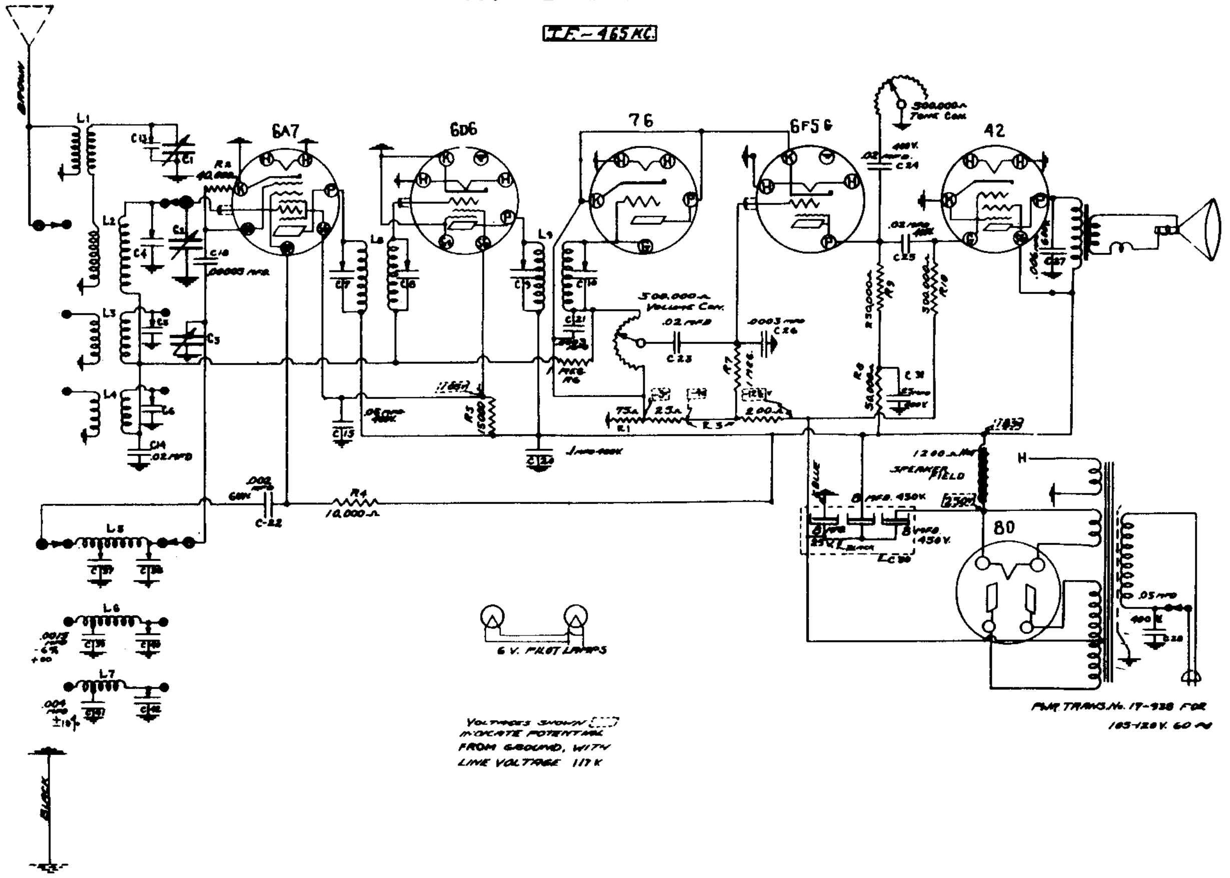


MODEL 259 SERIES I



HOWARD RADIO COMPANY

MODEL 266



REPLACEMENT PARTS AND PRICE LIST

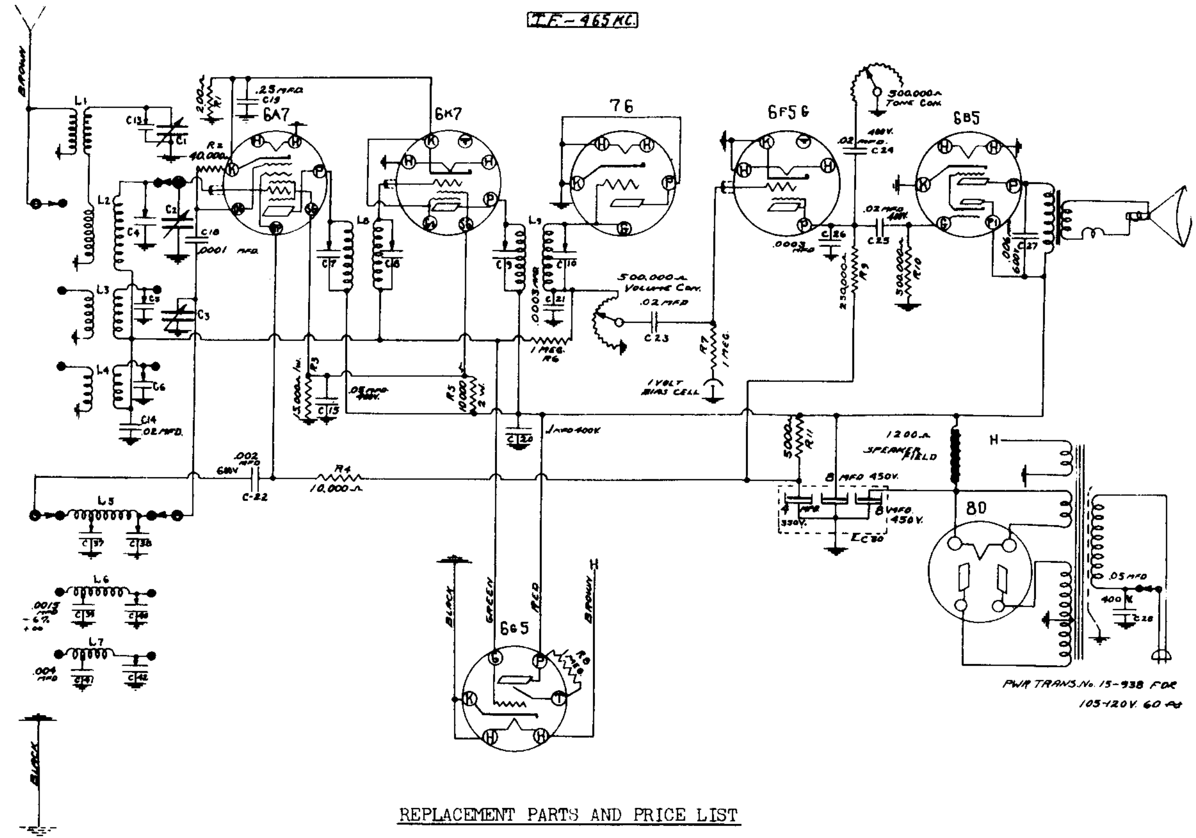
PART NO.	SCHEMATIC LOCATION	DESCRIPTION	LIST PRICE
203	L5	Coil - B. C. Oscillator	$ .80
201	L2	Coil - B. C. Grid	.80
301	L6	Coil - Police Band, Oscillator	.80
3A1	L3	Coil - Police Band, Antenna	.80
402	L7	Coil - S. W. Oscillator	.80
4A2	L4	Coil - S. W. Antenna	.80
2A2	L1	Coil - B. C. Antenna	.80
22-936	L8	Coil - 1st I. F. Assembly	1.30
23-936	L9	Coil - 2nd I. F. Assembly	1.30
8216	C37	Condenser - Padding - 5 Plate	.40
8218-3	C6, C42	Condenser - Trimmer - 1 Section	.20
8218-2	C4, C5, C38, C40	Condenser - Trimmer - 2 Section	.40
8116-A	C1, 2, 3	Condenser - Variable, 3 Gang	3.50
24-266	C30	Condenser - 3 Section, Electrolytic	1.50
2319		Condenser - .1 Mfd. 200 Volt	.16
2756	C20	Condenser - .1 Mfd. 400 Volt	.20
3513	C14, 23	Condenser - .02 Mfd. 200 Volt	.16
3517	C25, 24	Condenser - .02 Mfd. 400 Volt	.20
2757	C28, 15	Condenser - .05 Mfd. 400 Volt	.20
2475	C31	Condenser - .25 Mfd. 400 Volt	.16
3516	C22	Condenser - .002 Mfd. 600 Volt	.16
3518	C41	Condenser - .004 Mfd. 400 Volt	.20
3515	C27	Condenser - .006 Mfd. 600 Volt	.16
3005	C39	Condenser - .0015 Mfd. Mica - 6% + 00	.20
8304	C21, 26	Condenser - .0003 Mfd. Mica	.16
3410	C18	Condenser - .00005 Mfd. Mica	.16
19-281		Control - Volume and Switch - 500M Ohm	1.00
1552		Cord - A. C. Line and Plug	.32
20-310		Dial Card - Calibrated	.50
5-427		Dial Glass - 5-7/8" dia.	.35
8-328		Drive Disc - .020" Pyralin	.30

PART NO.	SCHEMATIC LOCATION	DESCRIPTION	LIST PRICE
16-720		Drive Shaft Assembly	.30
14-352		Bezel - Trim for Cabinet	.40
460		Grid Cap - Large	.05
3-199		Grid Cap - Small	.05
10-490		Knob - "Band Switch", Coded	.25
7115		Knob - "Station Selector", Coded	.25
7116		Knob - "Volume"	.25
1919-A		Lamp - Dial, 6 Volt	.12
3335	R6, 7	Resistor - 1 Megohm 1/3 Watt	.11
3377	R1	Resistor - 75 Ohm 1/3 Watt, wire wound	.20
2-325	R3	Resistor - 225 Ohm, Tapped Candohm	.25
3349	R4	Resistor - 10M Ohm 1/2 Watt	.12
2362	R5	Resistor - 15M Ohm 1 Watt	.16
3376	R2	Resistor - 40M Ohm 1/3 Watt	.11
1843	R8	Resistor - 50M Ohm 1/3 Watt	.11
3355	R9	Resistor - 250M Ohm 1/3 Watt	.11
2763	R10	Resistor - 500M Ohm 1/3 Watt	.11
5-426		Rubber Band - For Dial Glass	.02
966		Rubber Bushing - Chassis Mounting	.04
6-768		Socket - Pilot Light	.15
2744		Socket - 4 Prong	.12
2745		Socket - 5 Prong	.14
2746		Socket - 6 Prong	.14
2747		Socket - 7 Prong	.14
6008		Socket - 8 Prong - Metal Tube Type	.16
15-914		Switch - Wave Band	1.10
17-938		Transformer - Power, 115 V. 60 Cycle	2.50
6601		Tube Shield	.16
6515-2		Wing Screw - Cabinet Mounting	.04
8919		Speaker - 6" - 1200 Ohm	4.50
8924		Speaker - 12" - For Console	8.50

NOTE: When ordering speaker parts such as cone, transformer or the field it is necessary that the number on the back of the speaker be specified.

HOWARD RADIO COMPANY

MODEL 268



REPLACEMENT PARTS AND PRICE LIST

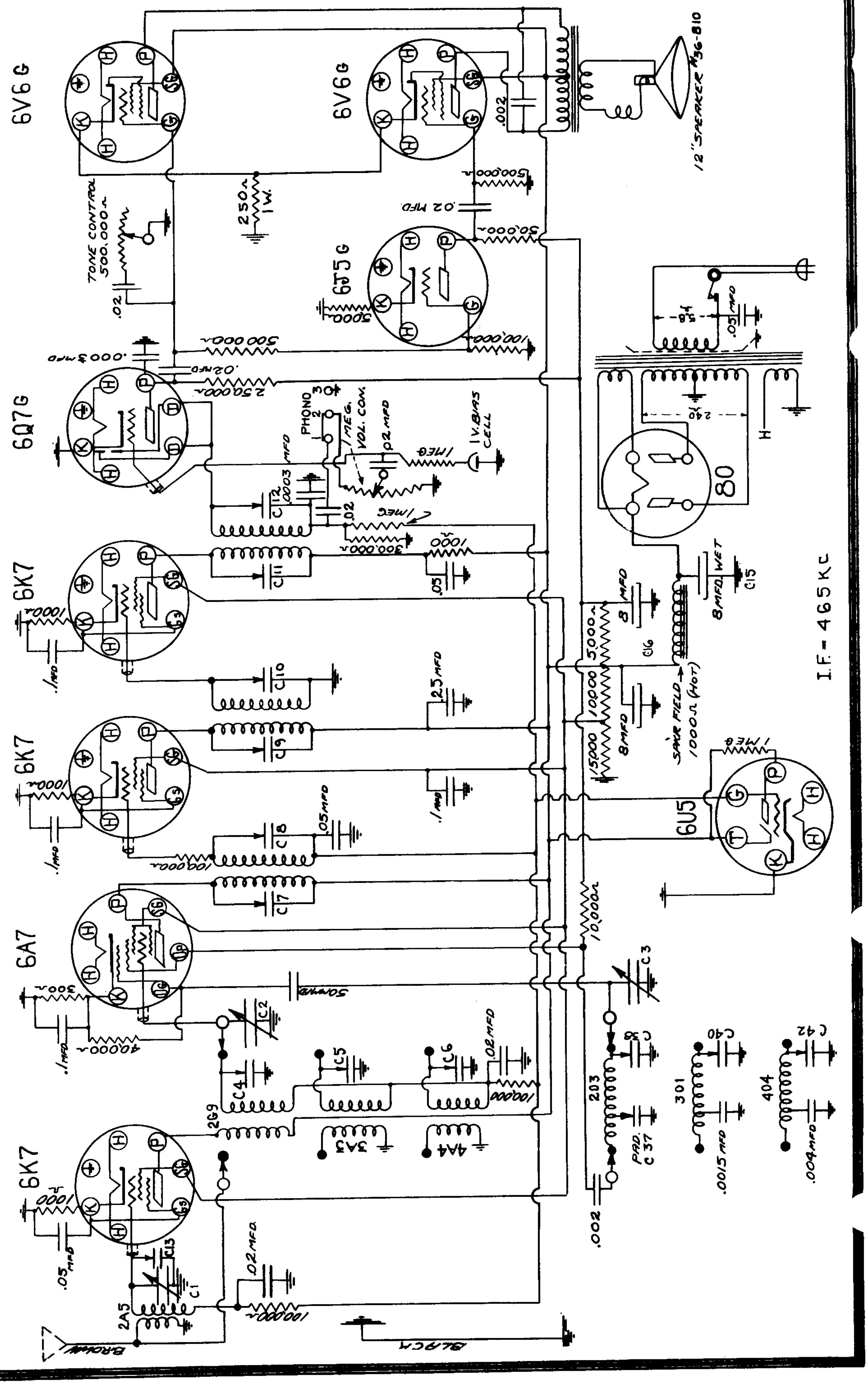
PART NO.	SCHEMATIC LOCATION	DESCRIPTION	LIST PRICE
7601		Bias Cell - 1 Volt	.30
203	L5	Coil - B.C. Oscillator	.80
2G1	L2	Coil - B.C. Mixer	.80
2A2	L1	Coil - B.C. Antenna	.80
301	L6	Coil - Police Band, Oscillator	.80
3A1	L3	Coil - Police Band, Grid	.80
402	L7	Coil - H.F. Band, Oscillator	.80
4A2	L4	Coil - H.F. Band, Grid	.80
22-936	L8	Coil - 1st I.F. Assembly	1.30
23-936	L9	Coil - 2nd I.F. Assembly	1.30
8216	C37	Condenser - Padding, 5 Plate	.40
8226-1	C6,C42	Condenser - Trimmer, 1 Section	.35
8226-2	C4,C5,C38 C40	Condenser - Trimmer, 2 Section	.70
8117-2	C1,C2,C3	Condenser - Variable, 3 Gang	3.60
19-266	C30	Condenser - 3 Section, Electrolytic	1.95
2756	C20	Condenser - .1 Mfd. 400 Volt	.20
3517	C23,C24,C25	Condenser - .02 Mfd. 400 Volt	.20
3513	C14	Condenser - .02 Mfd. 200 Volt	.16
2757	C15,C28	Condenser - .05 Mfd. 400 Volt	.20
2475	C19	Condenser - .25 Mfd. 200 Volt	.16
3516	C22	Condenser - .002 Mfd. 400 Volt	.20
3518	C41	Condenser - .004 Mfd. 400 Volt	.20
3515	C27	Condenser - .006 Mfd. 600 Volt	.16
2366	C18	Condenser - .0001 Mfd. Mica	.16
8304	C21,C26	Condenser - .0003 Mfd. Mica	.16
3005	C39	Condenser - .0015 Mfd. Mica - 6% ≠ 00	.16
6229		Control - Volume and switch	1.00

PART NO.	SCHEMATIC LOCATION	DESCRIPTION	LIST PRICE
6223		Control - Tone	.95
1552		Cord - A.C. Line and Plug	.32
4089		Dial Card - Calibrated	.64
4059		Dial Hand	.12
4048		Dial Glass	.35
5715		Escutcheon	.96
8642		Tuning Tube Fixture	.35
6022-2		Tuning Tube Cable and Socket	.75
3188		Drive Disc - 3-3/8 O.D.	.25
4073		Drive Disc and Hub - 3" O.D.	.45
460		Grid Cap	.05
7114		Knob - Band, 3 Color, Coded	.25
7115		Knob - "Station Selector", Coded	.25
7116		Knob - "Volume" - "Off", Coded	.25
7117		Knob - "Tone", Coded	.25
1919		Lamp - Dial - 6 Volt	.12
3335	R6,R7	Resistor - 1 Megohm 1/3 Watt	.11
3340	R1	Resistor - 200 Ohm 1/3 Watt	.11
3354	R11	Resistor - 5,000 Ohm 1/2 Watt	.12
3349	R4	Resistor - 10M Ohm 1/2 Watt	.12
3337	R5	Resistor - 10M Ohm 2 Watt	.25
3376	R2	Resistor - 40M Ohm 1/3 Watt	.11
3355	R9	Resistor - 250M Ohm 1/3 Watt	.11
2651	R10	Resistor - 500M Ohm 1/2 Watt	.12
3245		Socket - Pilot Light	.15
2744		Socket - 4 Prong	.12
2745		Socket - 5 Prong	.14
2747		Socket - 7 Prong	.14
6008		Socket - 8 Prong - Metal Tube	.16
5820		Switch - Wave Band, 3 Position	1.10
15-938		Transformer - Power	3.75
6601		Tube Shield	.16
6515-2		Wing Screw - Cabinet Mounting	.04
966		Grommet - Rubber - Cabinet Mounting	.04
8919		Speaker - 6"	4.50
		Speaker Transformer	2.00

NOTE: When ordering speaker parts such as cone, transformer or the field it is necessary that the number on the back of the speaker be specified.

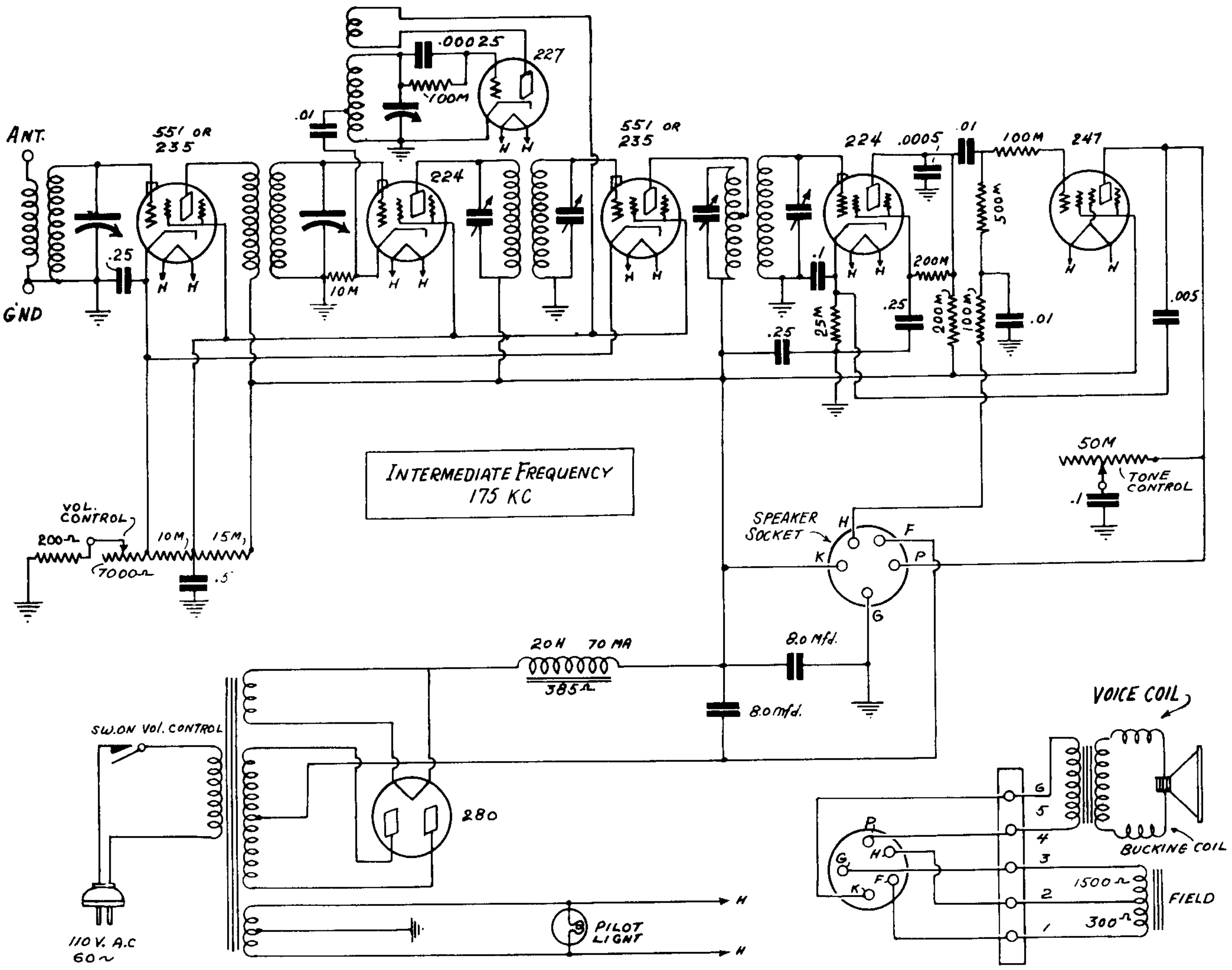
HOWARD RADIO COMPANY

MODELS 318 & 325

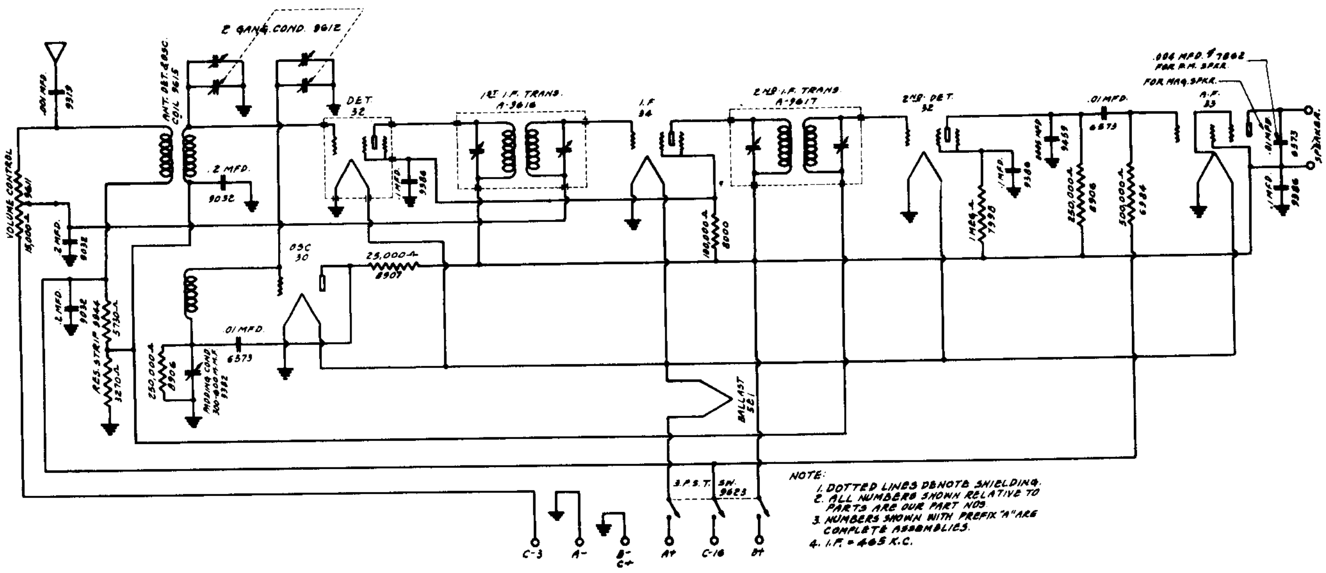


LAFAYETTE RADIO MFG. CO.

MODEL FIRESIDE Nº1

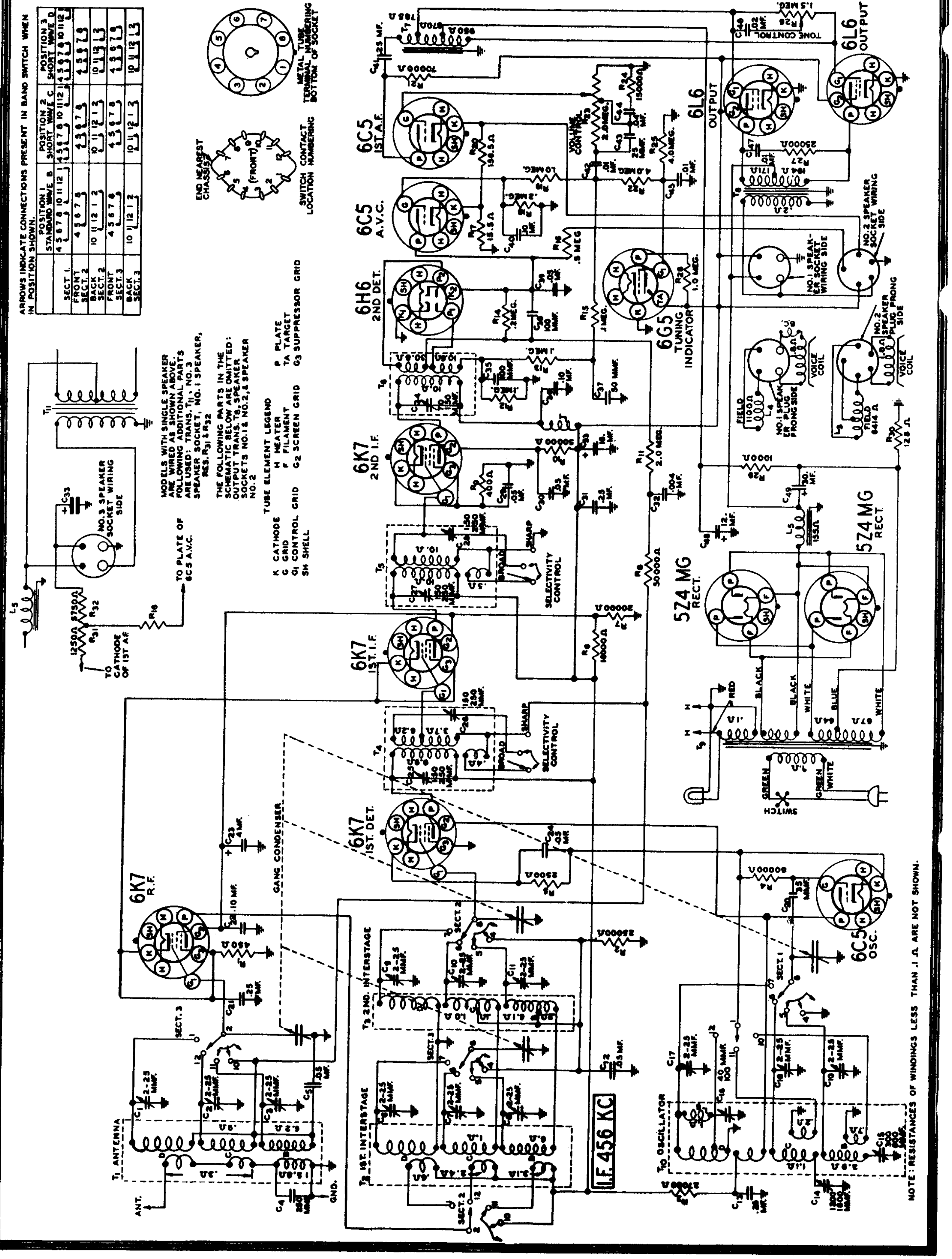


MODEL F-20



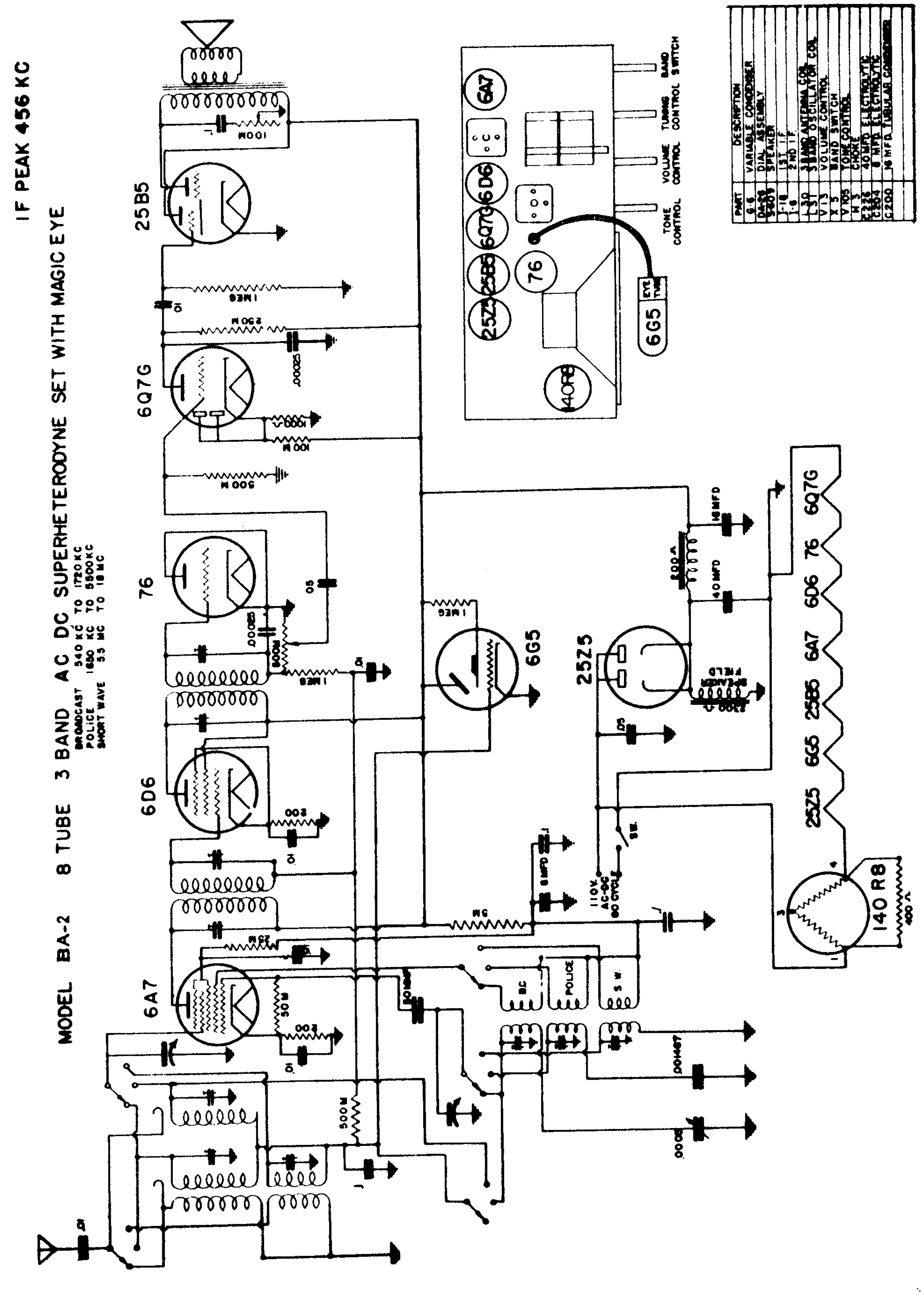
LAFAYETTE RADIO MFG. CO.

MODELS B-97 & B-98



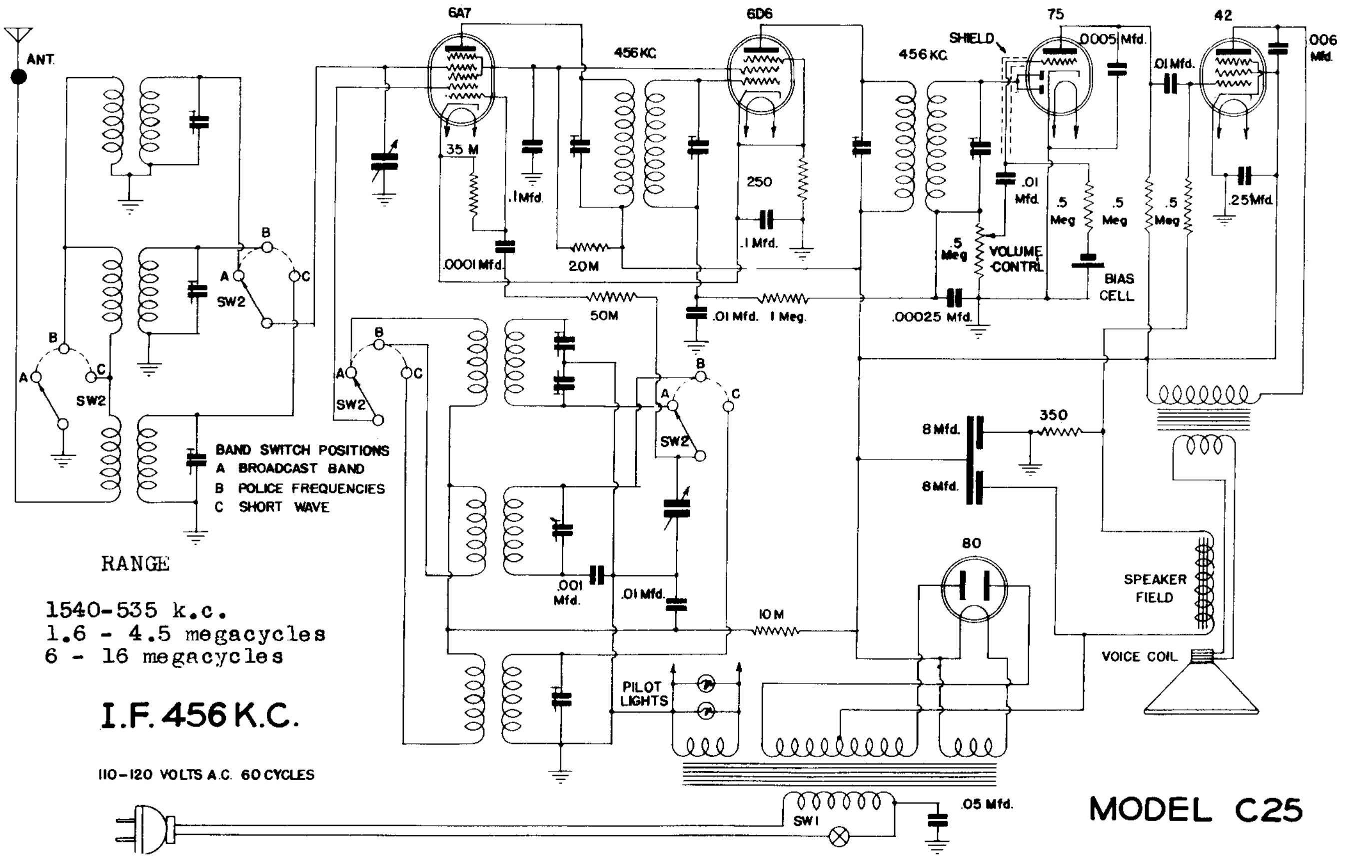
LAFAYETTE RADIO MFG. CO.

MODEL BA-2

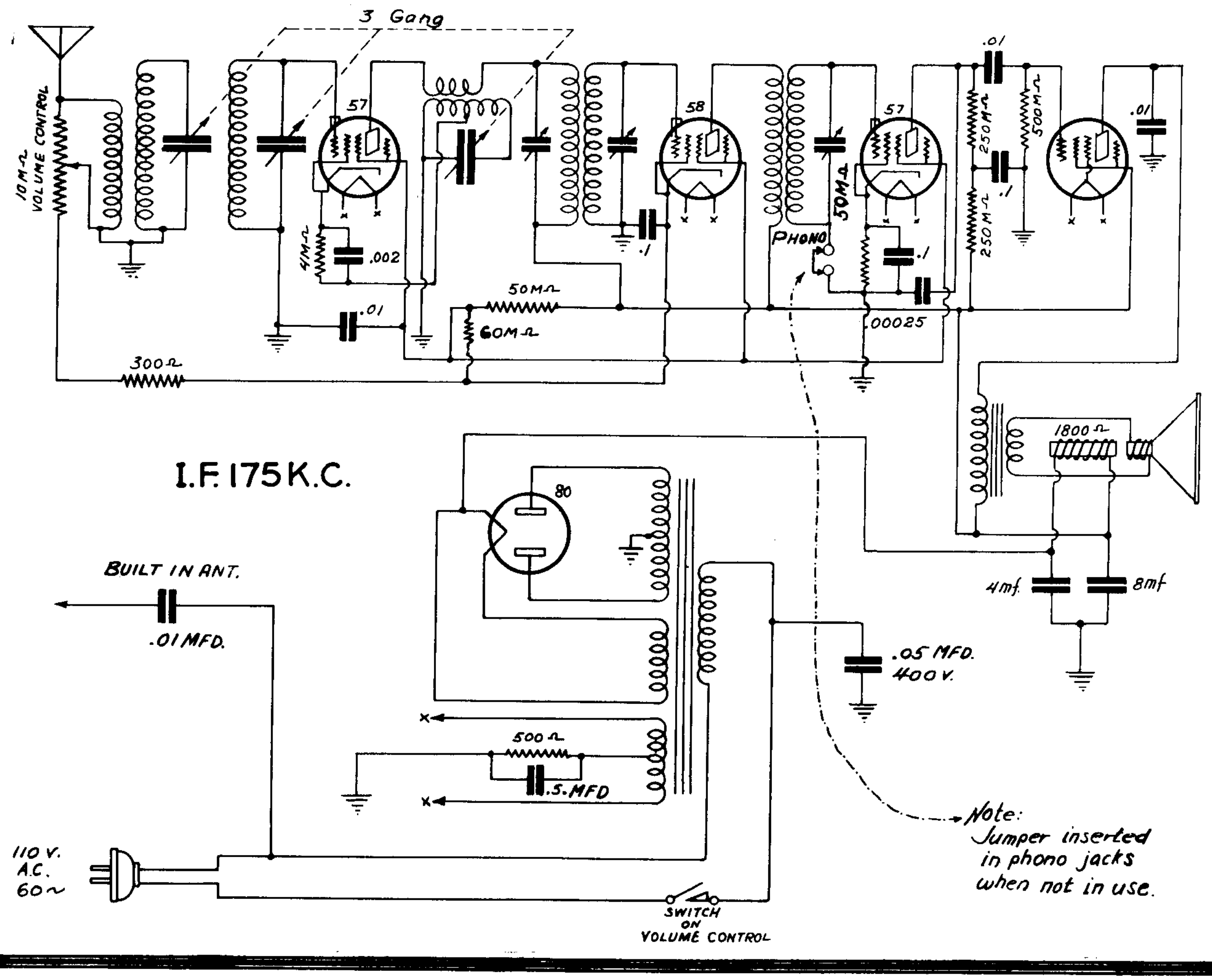


PART	DESCRIPTION
G-6	VARIABLE CONDENSER
DA-26	DIAL ASSEMBLY
5609	SPEAKER
I-18	1ST I.F.
I-6	2ND I.F.
L30	3 BAND ANTENNA COIL
L31	3 BAND OSCILLATOR COIL
V 13	VOLUME CONTROL
X 5	BAND SWITCH
V 105	TONE CONTROL
H 3	CHOKE
C226	40 MFD ELECTROLYTIC
C204	8 MFD ELECTROLYTIC
C200	16 MFD TUBULAR CONDENSER

LAFAYETTE RADIO MFG. CO.

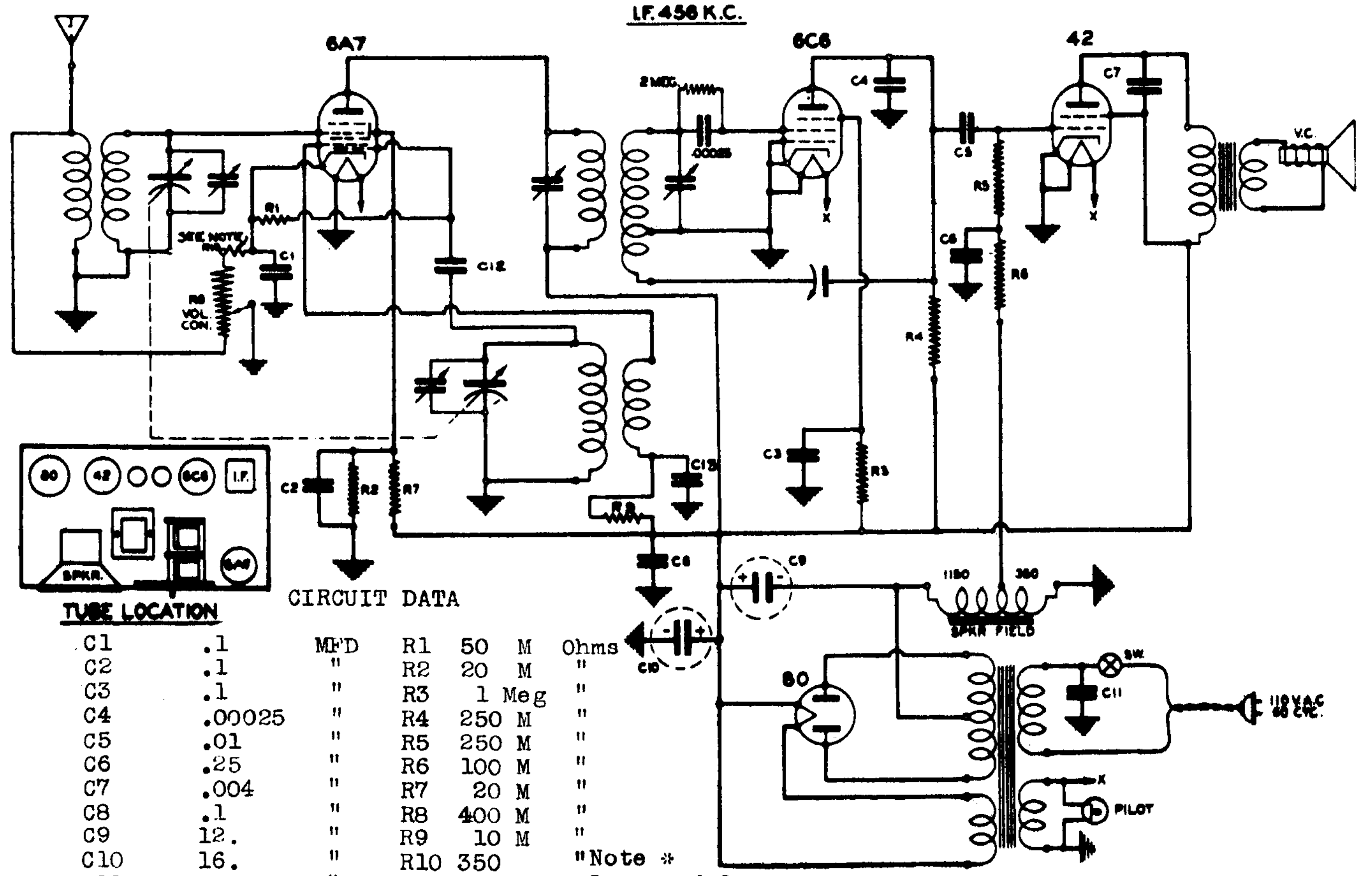


MODEL M71



LAFAYETTE RADIO MFG. CO.

MODEL D-10

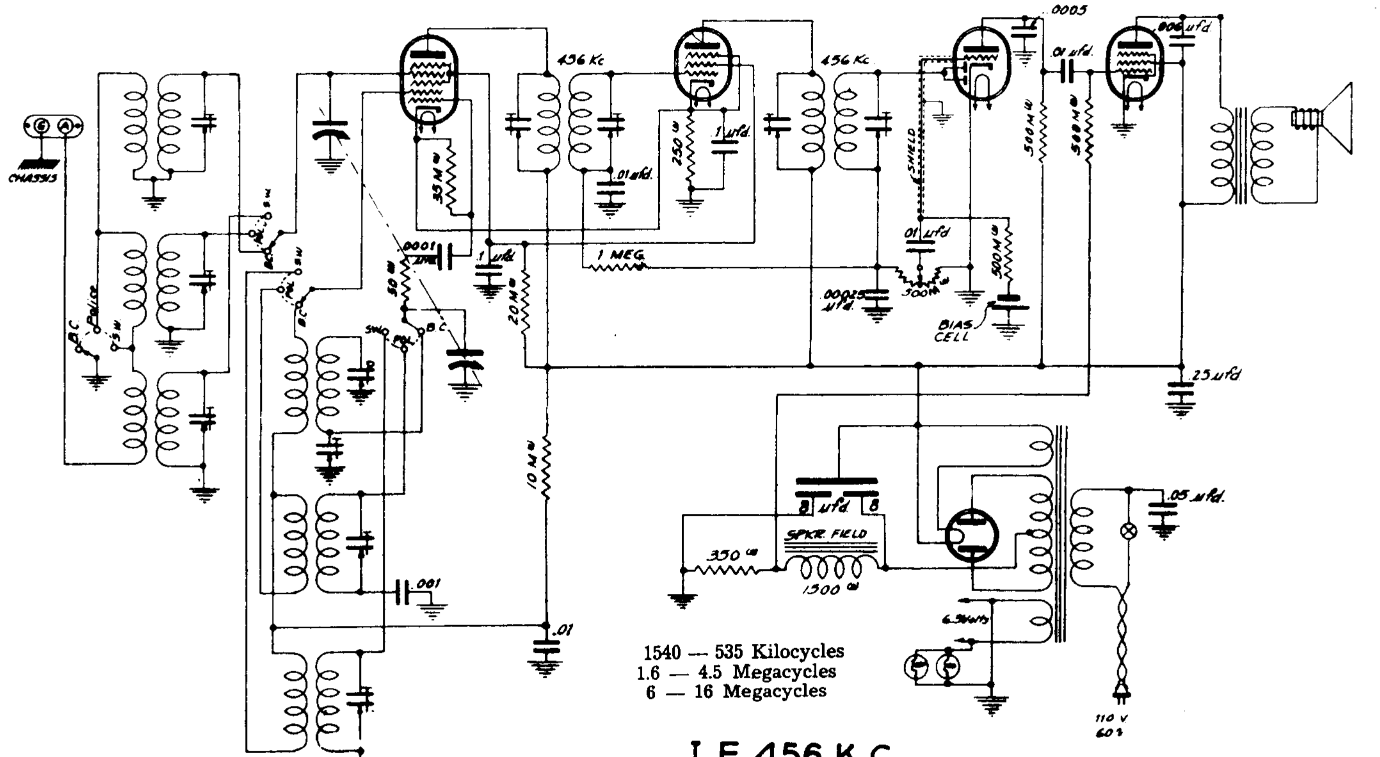


CIRCUIT DATA

C1	.1	MFD	R1	50 M	Ohms
C2	.1	"	R2	20 M	"
C3	.1	"	R3	1 Meg	"
C4	.00025	"	R4	250 M	"
C5	.01	"	R5	250 M	"
C6	.25	"	R6	100 M	"
C7	.004	"	R7	20 M	"
C8	.1	"	R8	400 M	"
C9	12.	"	R9	10 M	"
C10	16.	"	R10	350	
C11	.1	"			
C12	.00001	"			
C13	.1	"			

"Note *
Some models have 350 ohms
Res. incorporated in vol.
cont.

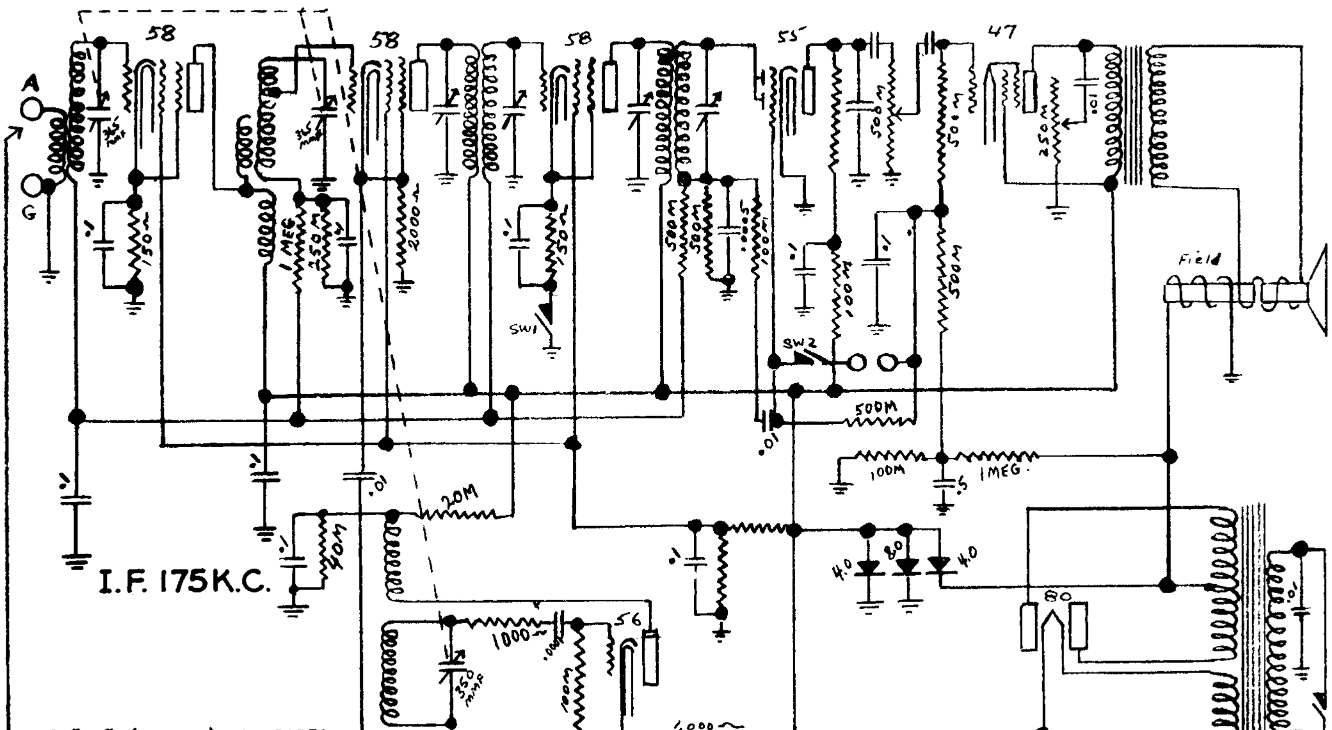
MODEL D-11



1540 — 535 Kilocycles
1.6 — 4.5 Megacycles
6 — 16 Megacycles

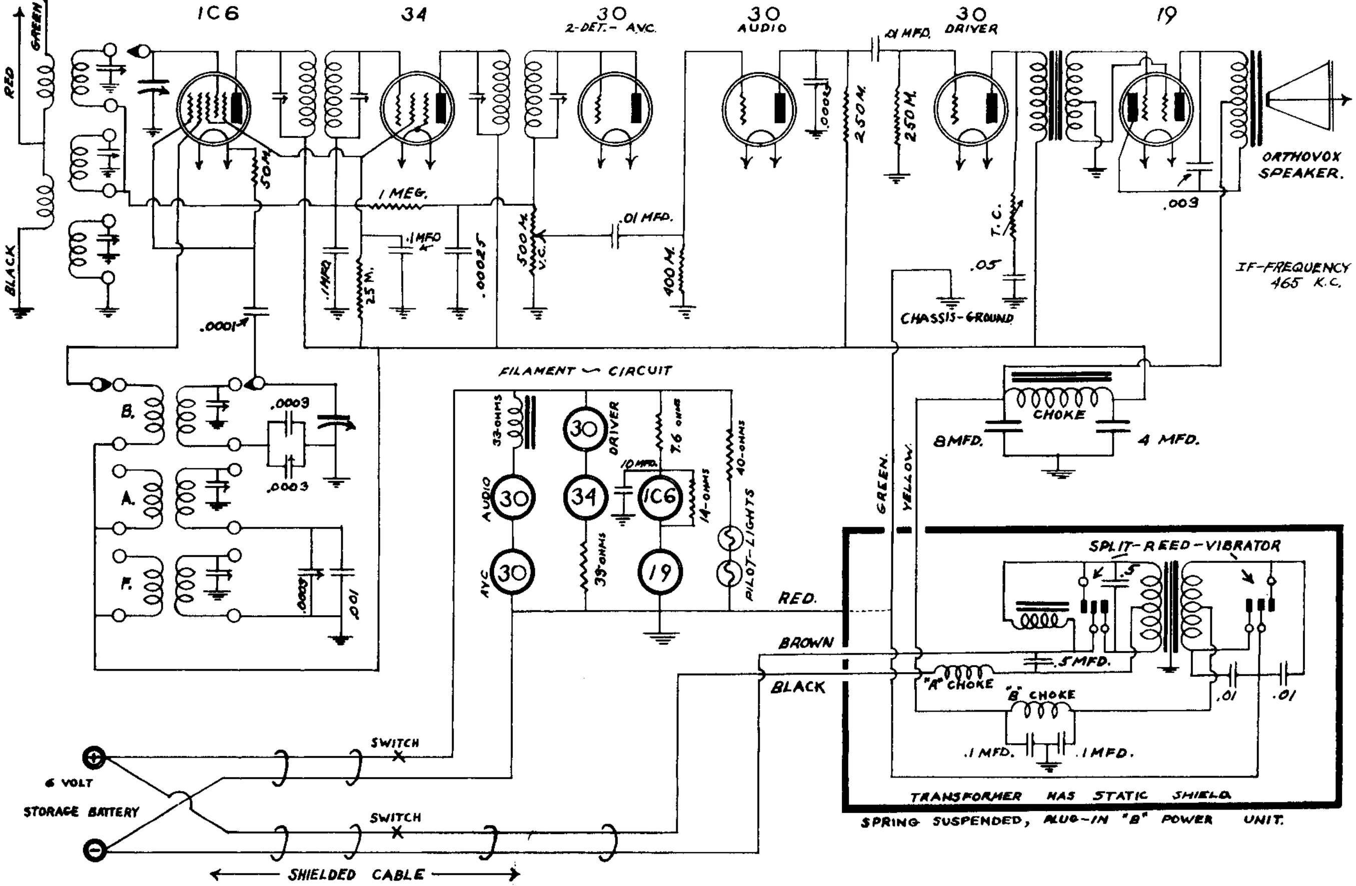
I. F. 456 K.C.

LAFAYETTE RADIO MFG. CO.
MODELS M35, M37 & M53

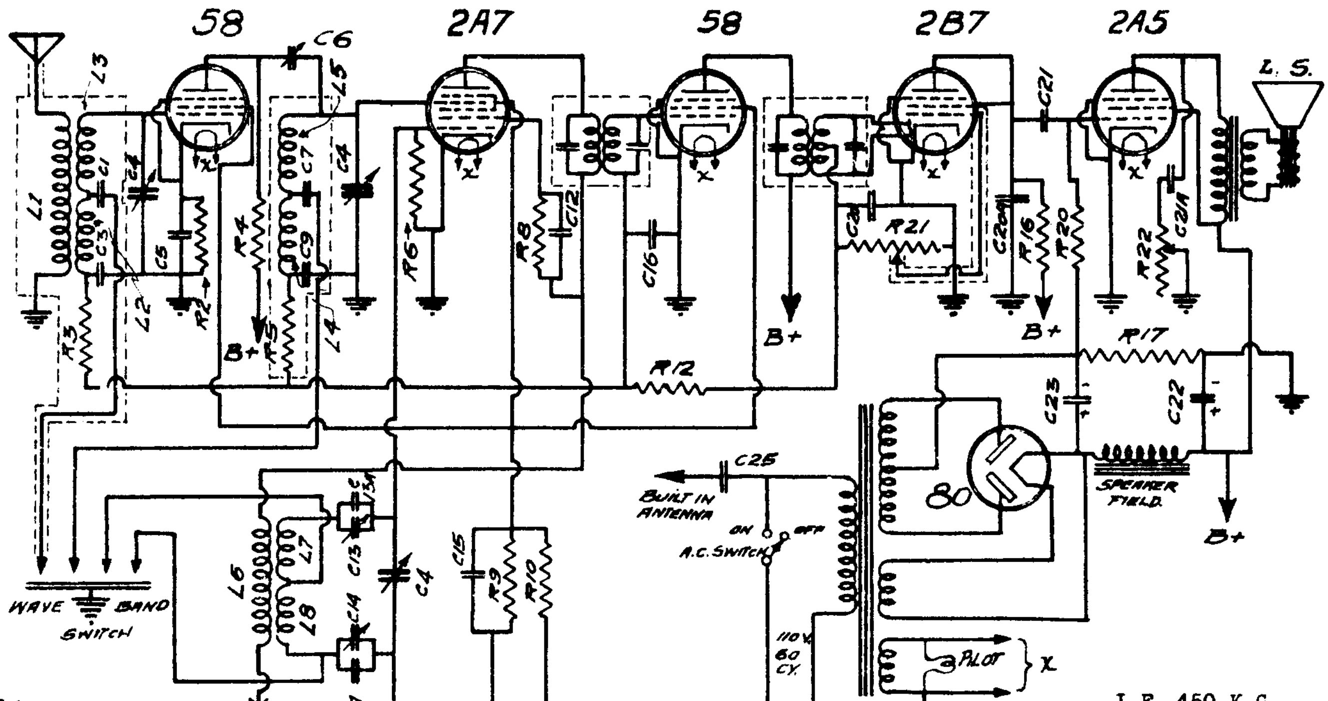


SW 1 "ON" (CLOSED) FOR RADIO
"OFF" (OPEN) FOR PHONOGRAPH
SW 2 (CLOSED) FOR PHONOGRAPH
(OPEN) FOR RADIO

MODEL M44
6-TUBE-BATTERY-SUPERHET
6 VOLT STORAGE BATTERY OPERATION



MIDWEST RADIO CORP.
MODEL 6-34 AL

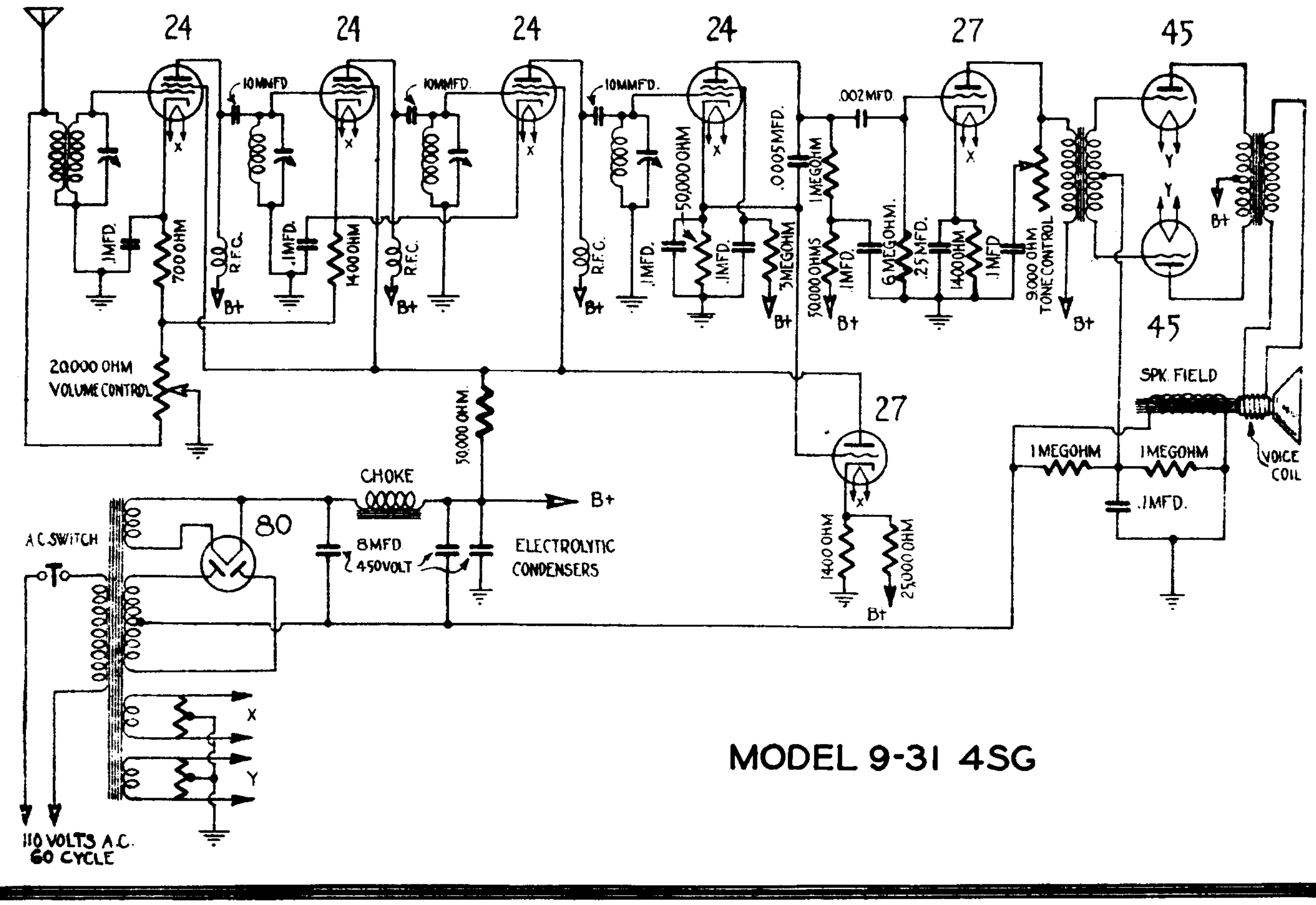


C1 - .05 MFD - 200V.
C3 - .05 " - 200V
C4 - 360 MMFD - TUNING CONDENSER
C5 - .05 MFD - 200V
C6 - 35 MMFD - TRIMMER
C7 - .05 MFD - 200V.
C9 - .05 " - 200V.
C12 - .05 " - 200V
C13 - 350 MMFD - PADDER
C13A 1500 " MICA
C14 - 360 MMFD - PADDER
C14A 500 " MICA

C15 - .05 MFD - 200V
C16 .05 " - 200V
C20 250 MMFD - MICA - SINGLE
C20A 250 " " " SINGLE
C21 .06 MFD - 400V
C21A .05 " 400V
C22 8 " - 450 } ELECTRO.
C23 8 " 450 }

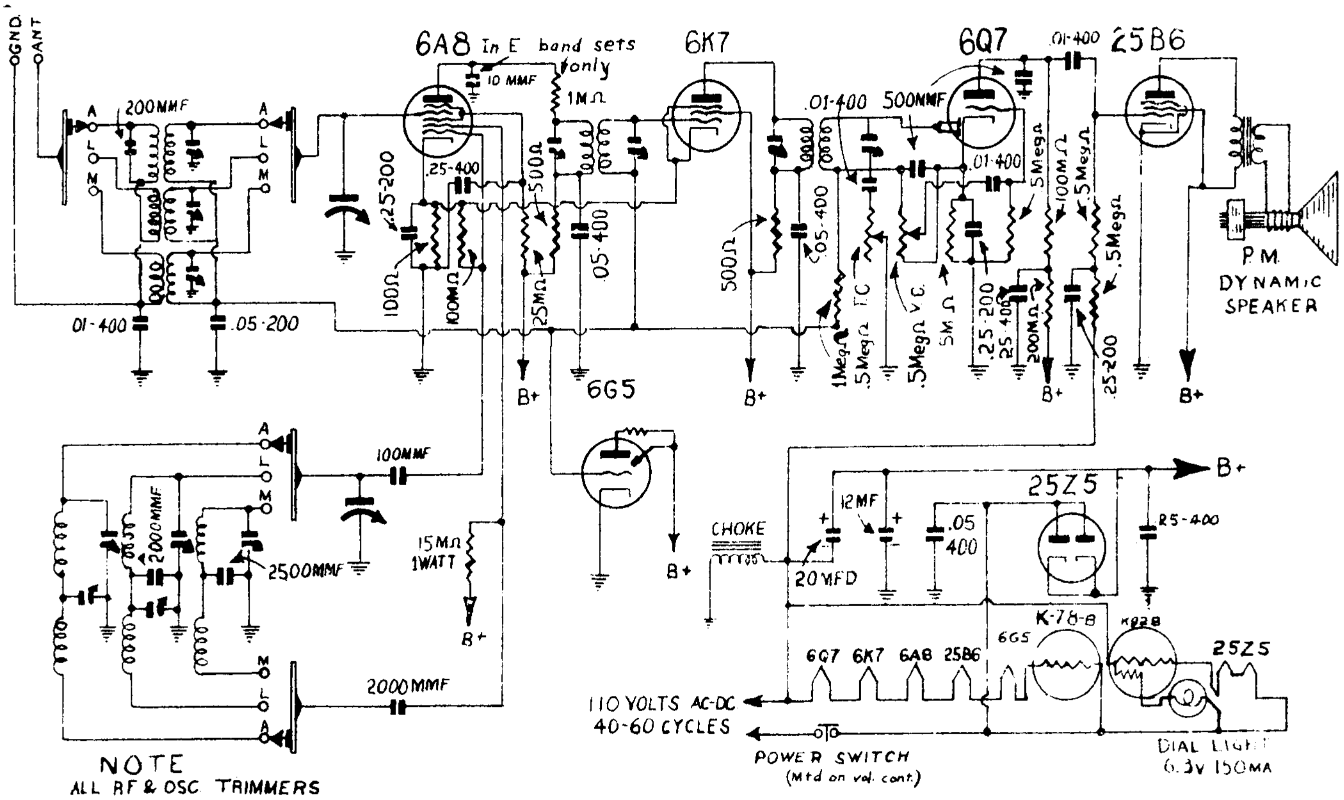
C25 250 MMFD - MICA
R2 - 1000 Ω - ½ W.
R3 500 000 Ω - ¼ W.
R4 75 000 Ω - ¼ W.
R5 500 000 Ω - ¼ W.
R6 50 000 Ω - ¼ W.
R8 25 000 Ω - ¼ W.

R9 50 000 Ω - ¼ W.
R10 31 000 Ω - ½ WATT
R12 500 000 Ω - ¼ "
R16 200 000 Ω ¼ "
R17 350 Ω 1 WATT FLEX
R20 500 000 Ω ¼ W.
R21 500 000 Ω - VOLUME CONTROL
R22 50 000 Ω - TONE "



MODEL 9-31 4SG

MIDWEST RADIO CORP.
MODEL 8-38 A.C.-D.C.



NOTE
ALL RF & OSC TRIMMERS ARE 45MMFD MAX CAP
OSC. PADDERS ARE 500MMFD. MAX. CAP.

E-BAND NOTE

In sets having long wave band, E (long wave) band coil replaces L band coil. Colpitts oscillator is used - no tickler coil. No fixed padder is used. Variable padder is 140MMFD Max Cap in place of 500 MMFD. RF filter is added in plate circuit of 6A8.

I.F.=456KC.

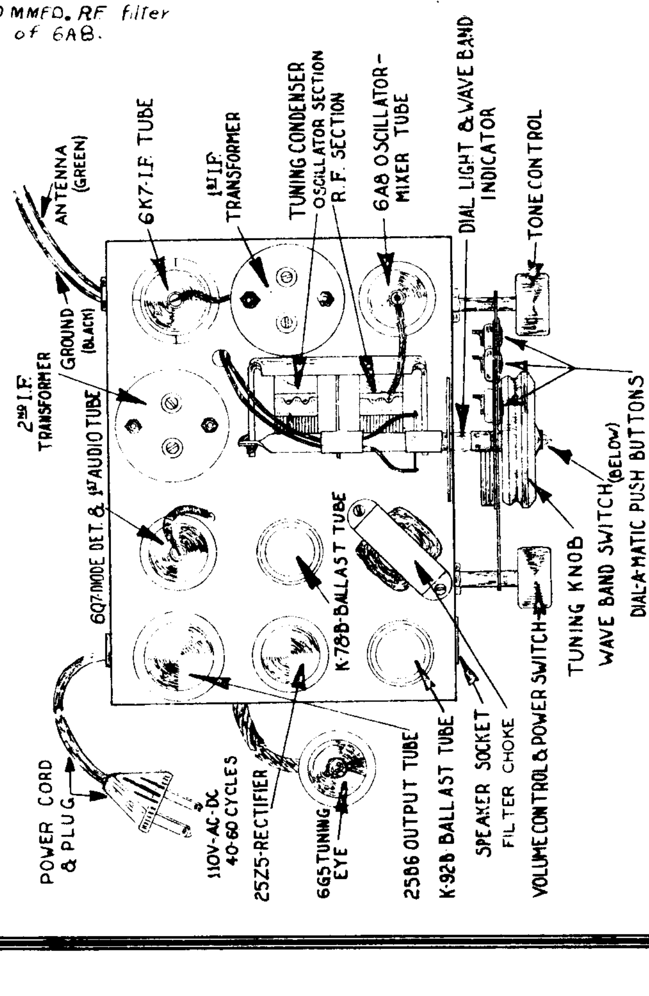
1938 - 8 TUBE AC-DC MIDWEST RECEIVER

OPERATING VOLTAGES

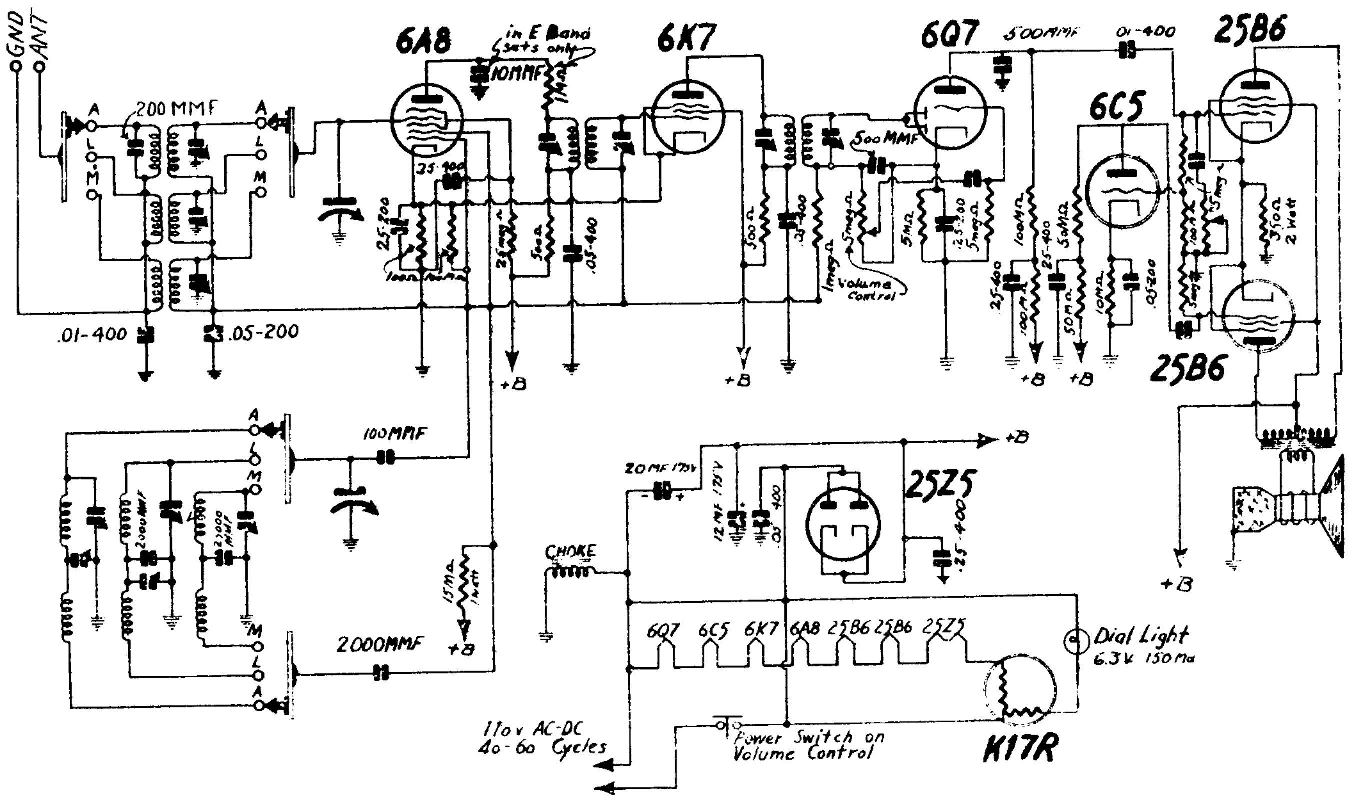
Note:- These voltages were taken with no signal input and with the volume control **off.**

TUBE	PLATE	SCREEN	SUPPRESSOR	CATHODE	HEATER
6A8 Mic-Osc.	100	50	Internal Connection	1.5	6.3
6K8 1st I.F.	95	100	1.5	1.5	6.3
2nd Det. 6Q7 1st Audio	25				6.3
2536 Output	90	100	Internal Connection		25
25Z5 Rectifier	115AC			100	25
6G5 Tuning Ind.	95				6.3
K 92B-Ballast	85 V. drop				
K 78B-Ballast	60 V. drop				

All voltages taken with 110 V. line voltage and 1000 ohm per volt meter.



MIDWEST RADIO CORP.
MODEL 8-38 A.C.-D.C. EXPORT



NOTE

All R.F. & Osc. trimmers are 45 MMFD Maximum Capacity. Osc. padders are 500MMFD Maximum Capacity. E Band Padder 150 MMFD Maximum Capacity.

E BAND NOTE

• In sets having long wave band E (long wave) band coil replaces L band coil. The oscillator is connected colpitts.

I.F. = 456 KC

1938 EXPORT - 8 TUBE AC-DC MIDWEST RECEIVER

OPERATING VOLTAGES

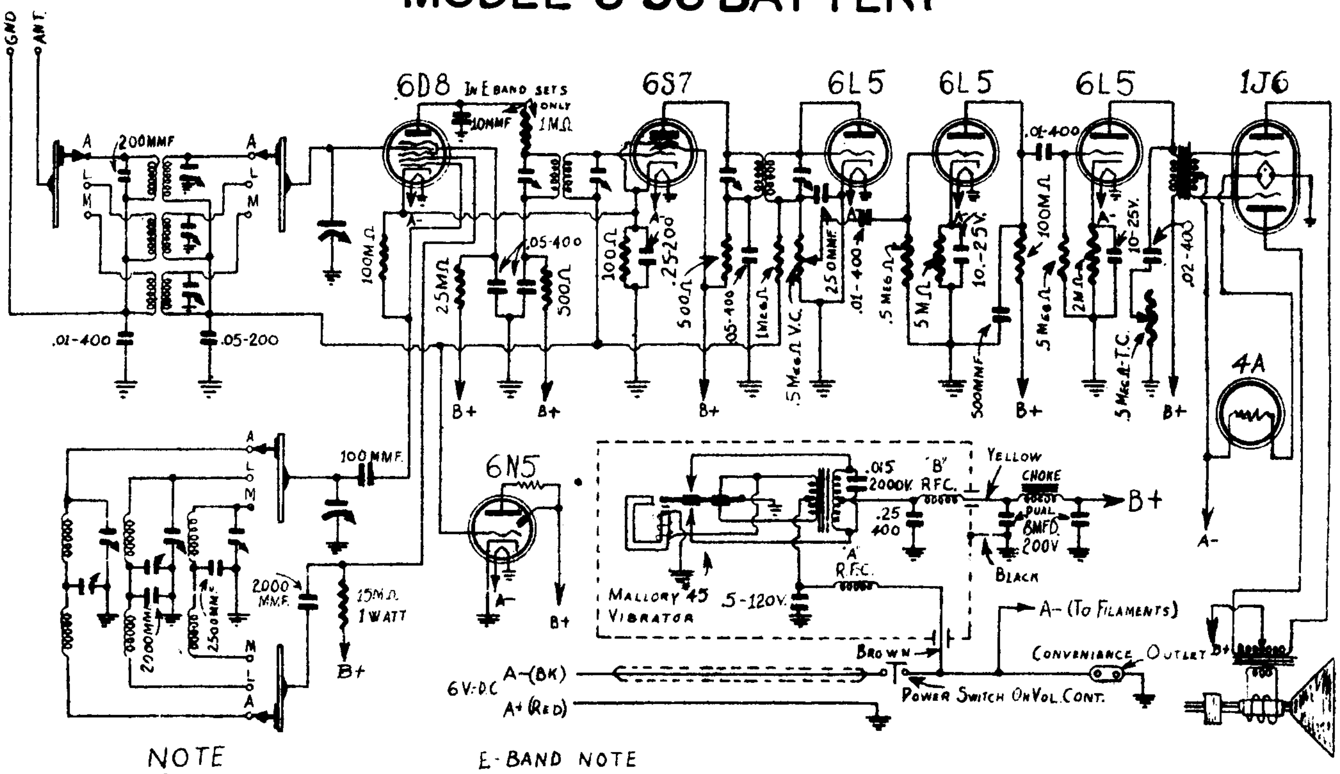
Note:- These voltages were taken with no signal input and with the volume control off.

TUBE		PLATE	SCREEN	SUPPRESSOR	CATHODE	HEATER
6A8	Mixer-Osc.	54* 94	50	.2	1	4.5
6K7	I.F. Amp.	90	94	1	1	4.5
6Q7	Diode Audio	30			.6	4.5
6C5	Phase Invertor	42			2.2	4.5
25B6	Output	90	100		15	22
25Z5	Rectifier	100				22
K17	Ballast	40 V. drop				

*Plate #2

All voltages taken with 110 V. line voltage and 1000 ohm per volt meter

MIDWEST RADIO CORP.
MODEL 8-38 BATTERY



NOTE

ALL R.F. AND OSC. TRIMMERS ARE 45 MMFD. MAX. CAP. OSC. PADDERS ARE 500 MMFD. MAX. CAP.

E-BAND NOTE

IN SETS HAVING LONG WAVE BAND, E (LONG WAVE) BAND COIL REPLACES L BAND COIL. COLPITTS OSCILLATOR IS USED—NO TICKLER COIL. NO FIXED PADDER IS USED. VARIABLE PADDER IS 140 MMFD. MAX. CAP. IN PLACE OF 500 MMFD. R.F. FILTER IS ADDED IN PLATE CIRCUIT OF 6D8.

I.F. = 456 KC.

1938 DOMESTIC - 8 TUBE BATTERY MIDWEST RECEIVER

OPERATING VOLTAGES

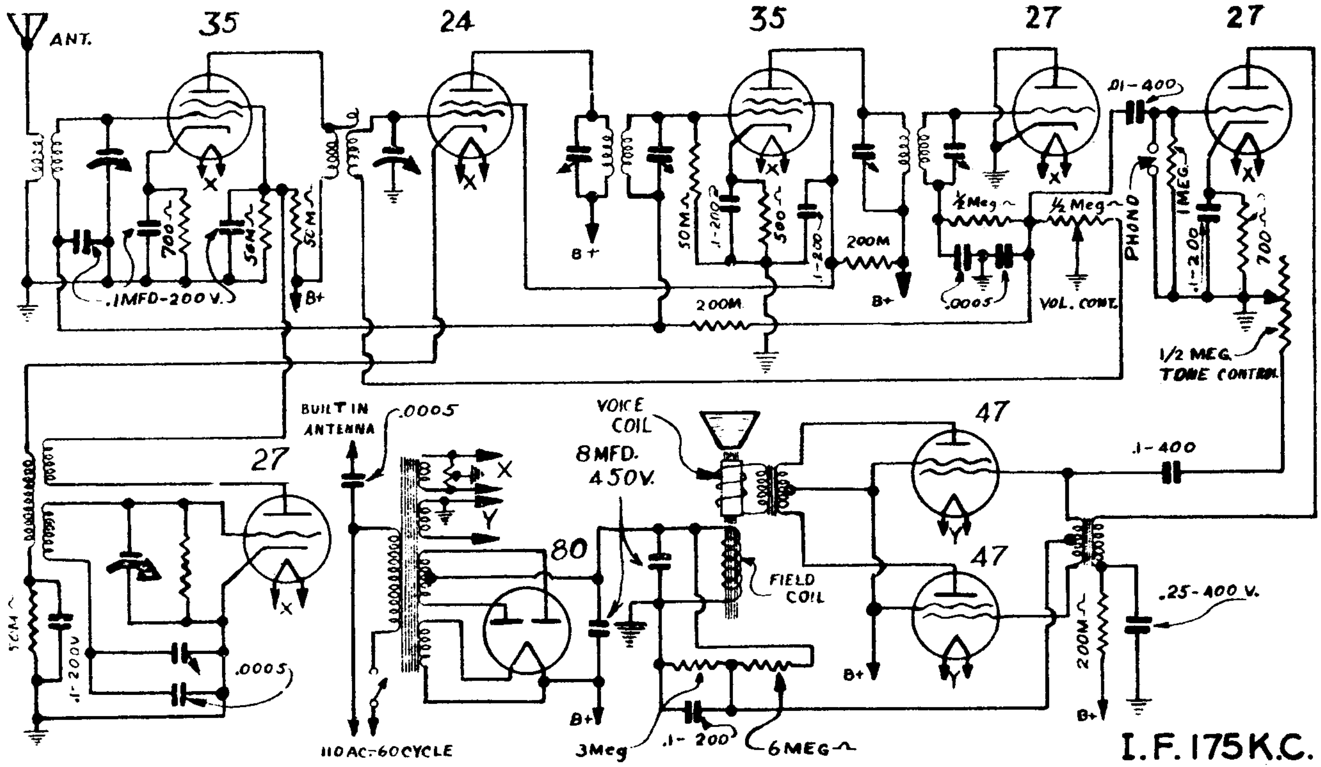
Note:- These voltages were taken with no signal input and with the volume control off.

TUBE	PLATE	SCREEN	SUPPRESSOR	CATHODE	HEATER
6D8 Mixer-Osc.	70* 134	58	.2	1.2	5.6
6S7 I.F. Amp.	134	58	1.2	1.2	5.6
6L5 2nd Det.					5.6
6L5 1st Audio	134			5.4	5.6
6L5 Phase Inv.	50	130		3	5.6
1J6 Output	134				2
6G5 Tuning Eye	136				5.6
#4A Ballast	4 V. Drop				

* Plate #2

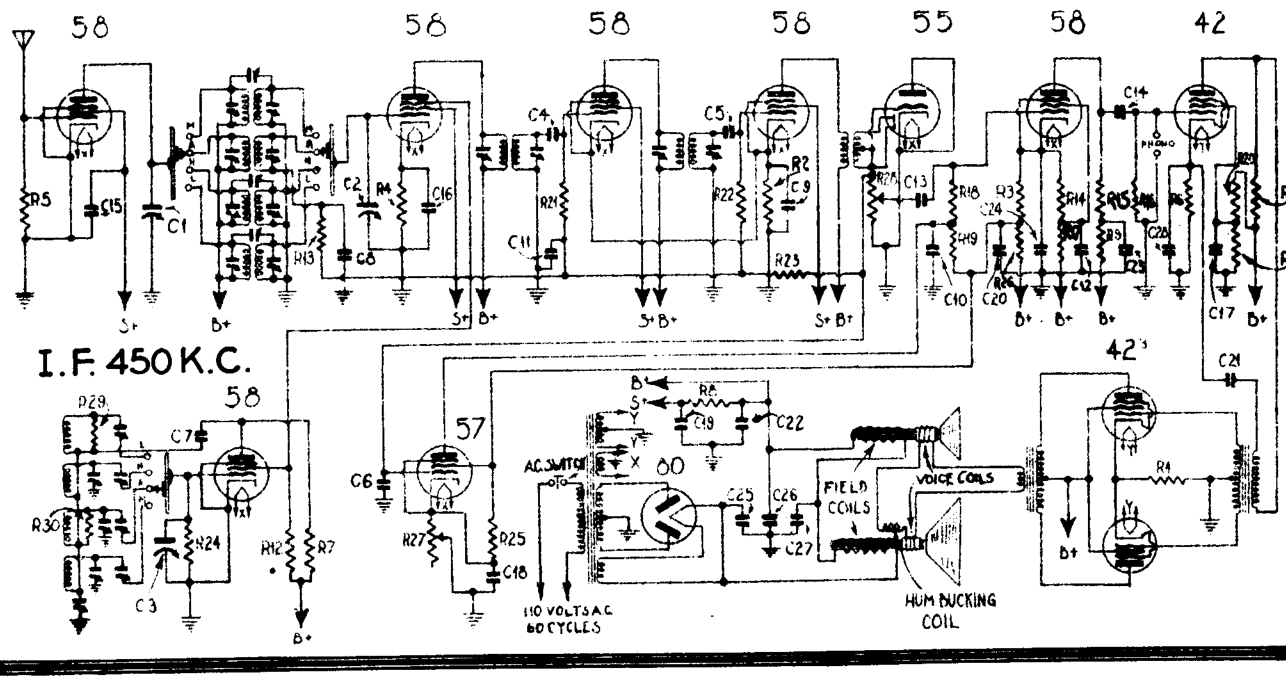
MIDWEST RADIO CORP.

MODEL 9-32

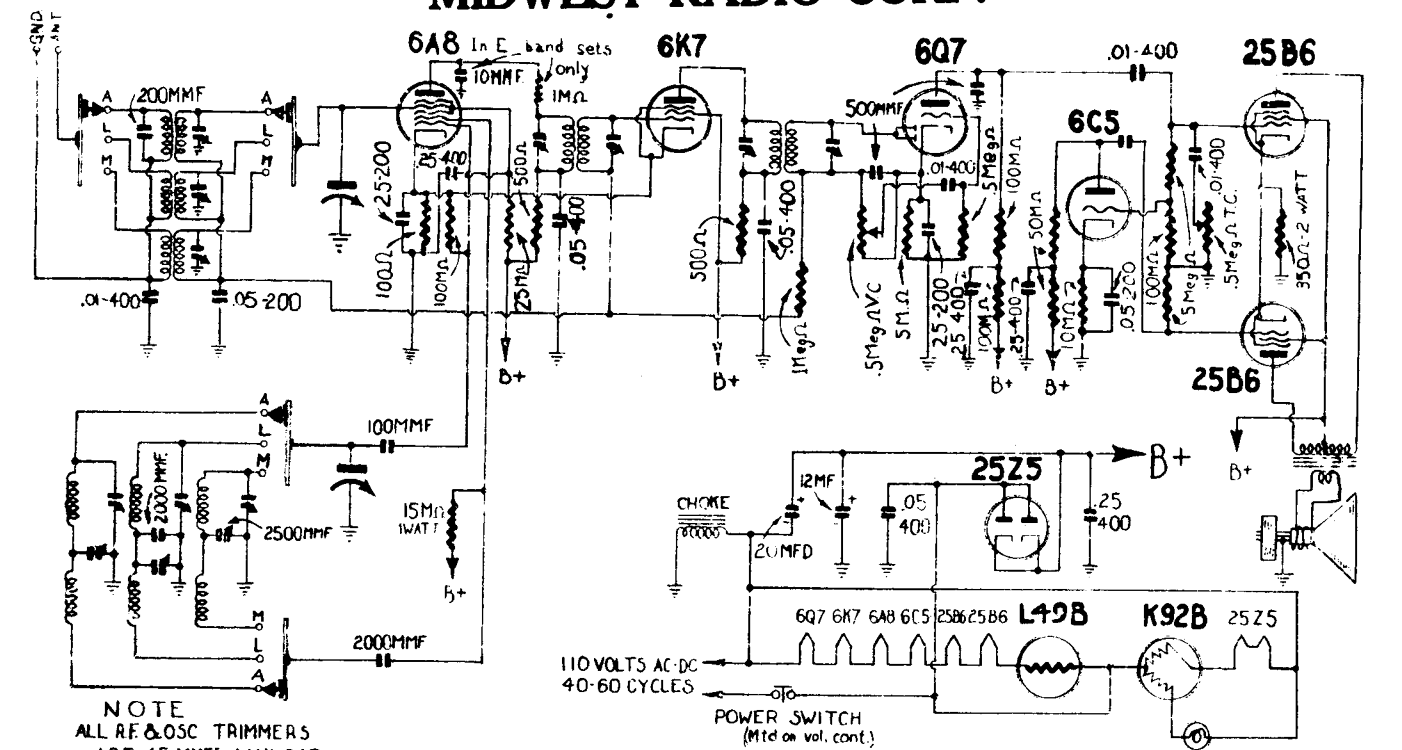


MODEL 12-33

CONDENSERS			RESISTORS		
C1 TUNING CONDENSER	C11 .05MFD - 200V.	C21 .25MFD 400V.	R1 210-OHM FLEXIBLE	R11 - 50,000-OHM .5WATT	R21-490,000-OHM .5WATT
C2 " "	C12 " - 400V.	C22 " "	R2 700-OHM "	R12-150,000-OHM "	R22 " "
C3 " "	C13 " "	C23 1.MFD - 300V.	R3 " "	R13-200,000-OHM "	R23 " "
C4 250MMFD MICA	C14 " "	C24 .5MFD - 200V.	R4 1000 OHM "	R14 " "	R24 3MEGOHM "
C5 " "	C15 .1MFD 200V.	C25 8MFD WET-ELECT.	R5 50,000-OHM .25WATT	R15 " "	R25-10,000 OHM-1WATT
C6 500MMFD "	C16 " "	C26 " DRY "	R6 5,000 OHM .5WATT	R16 " "	R26-15000-OHM-.5WATT
C7 .002 MFD "	C17 " "	C27 " " "	R7 19,000-OHM "	R17 " "	R27-1,000-OHM VARIABLE
C8 .05MFD. 200V.	C18 " "	C28 25MFD-25V. "	R8 31,000-OHM "	R18 " "	R28-500,000-OHM VOL. CONT.
C9 " "	C19 " "		R9 " "	R19 " "	R29-31,000-OHM
C10 " "	C20 " 300V.		R10 " "	R20 " "	R30-50,000 OHM



MIDWEST RADIO CORP.



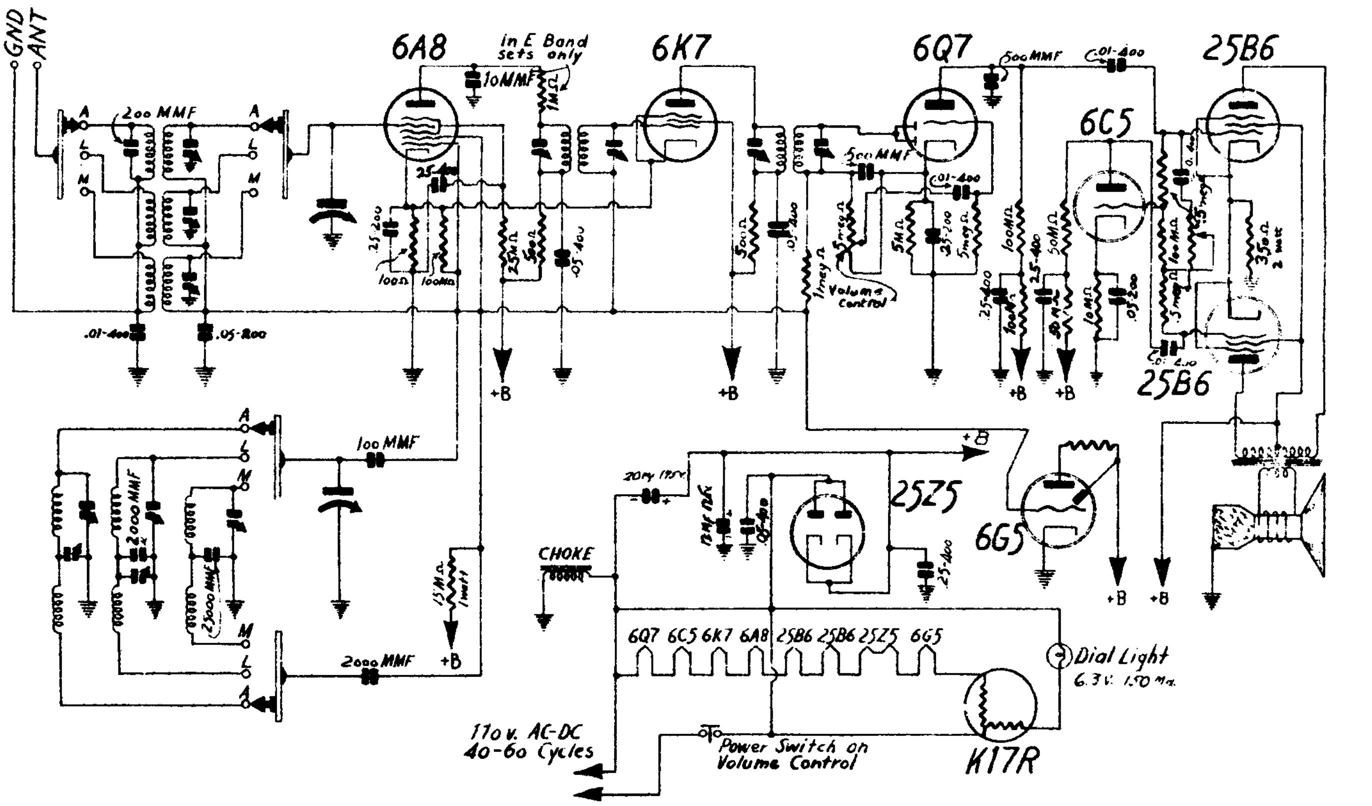
NOTE
ALL R.F. & OSC TRIMMERS ARE 45 MMFD. MAX. CAP.
OSC PADDERS ARE 500MMFD. MAX. CAP.

~ E-BAND NOTE ~

In sets having long wave band, E (long wave) band coil replaces L band coil.- Colpitts oscillator is used —no tickler coil - No fixed padder is used.-Variable padder is 140MMFD Max Cap in place of 500MMFD. - R.F. filter is added in plate circuit of 6A8.

I.F. 456K.C.

MODEL 9-38 A.C.-D.C.



NOTE

- All R.F. & Osc. trimmers are 45 MMFD Maximum Capacity.
- Osc. padders are 500MMFD Maximum Capacity.
- E Band Padder 150 MMFD Maximum Capacity.

E BAND NOTE

- In sets having long wave band E (long wave) band coil replaces L band coil. The oscillator is connected colpitts.

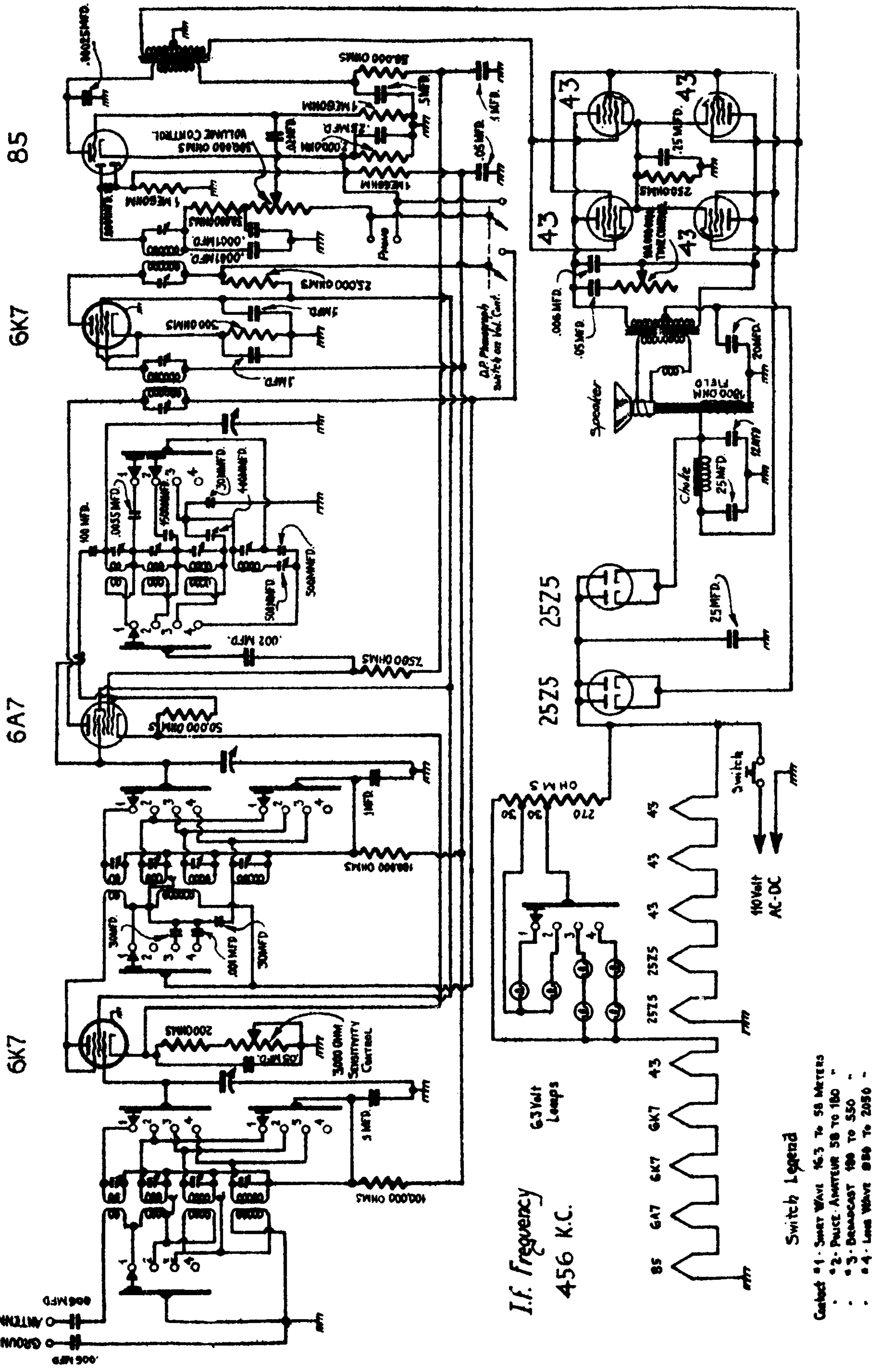
I.F. = 456KC

MODEL 9-38 A.C.-D.C.

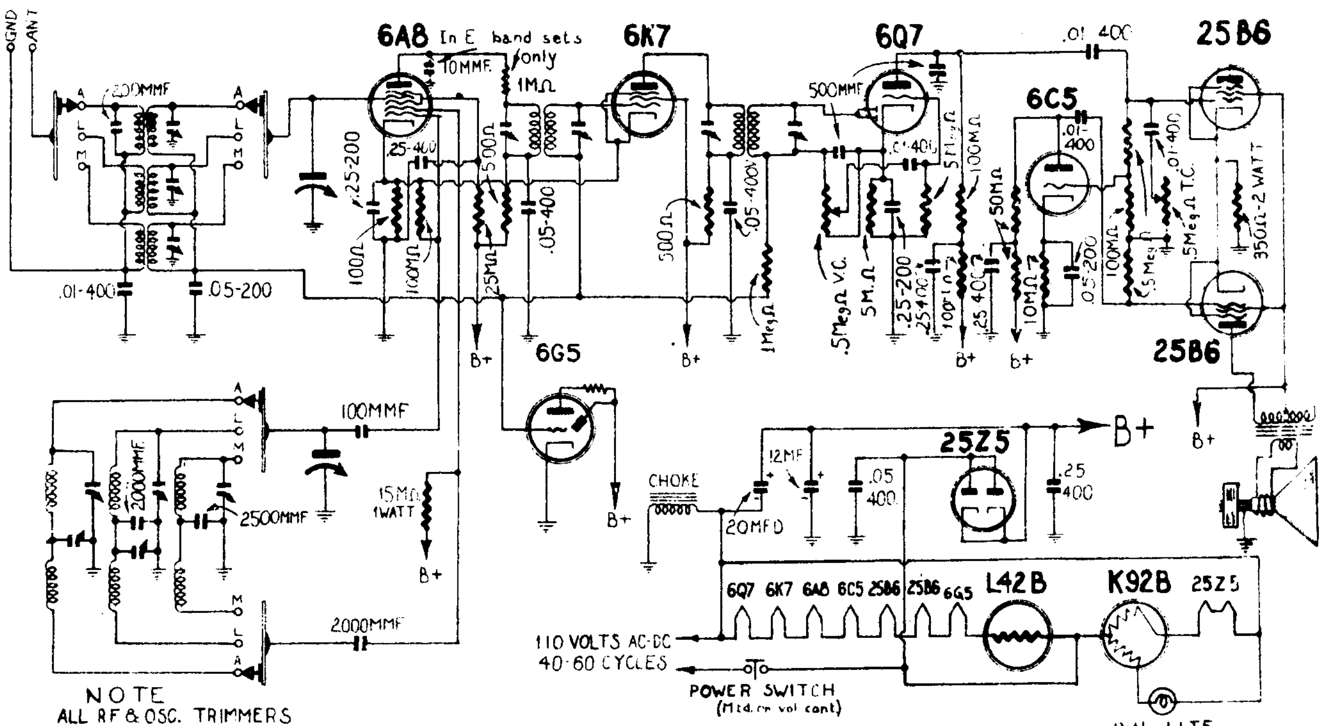
EXPORT

MIDWEST RADIO CORP.

MODEL 10-37 A.C.-D.C.



MIDWEST RADIO CORP.
MODEL 10-38A.C.-D.C.



NOTE
ALL RF & OSC. TRIMMERS ARE 45 MMFD MAX. CAP.
OSC PADDERS ARE 500MMFD MAX. CAP.

I.F.=456K.C.

E-BAND NOTE

In sets having long wave band, E (long wave) band coil replaces L band coil. Colpitts oscillator is used—no tickler coil. No fixed padder is used. Variable padder is 140MMFD Max. Cap. in place of 500MMFD. R.F. filter is added in plate circuit of 6A8

1938 DOMESTIC - 10 TUBE AC-DC MIDWEST RECEIVER

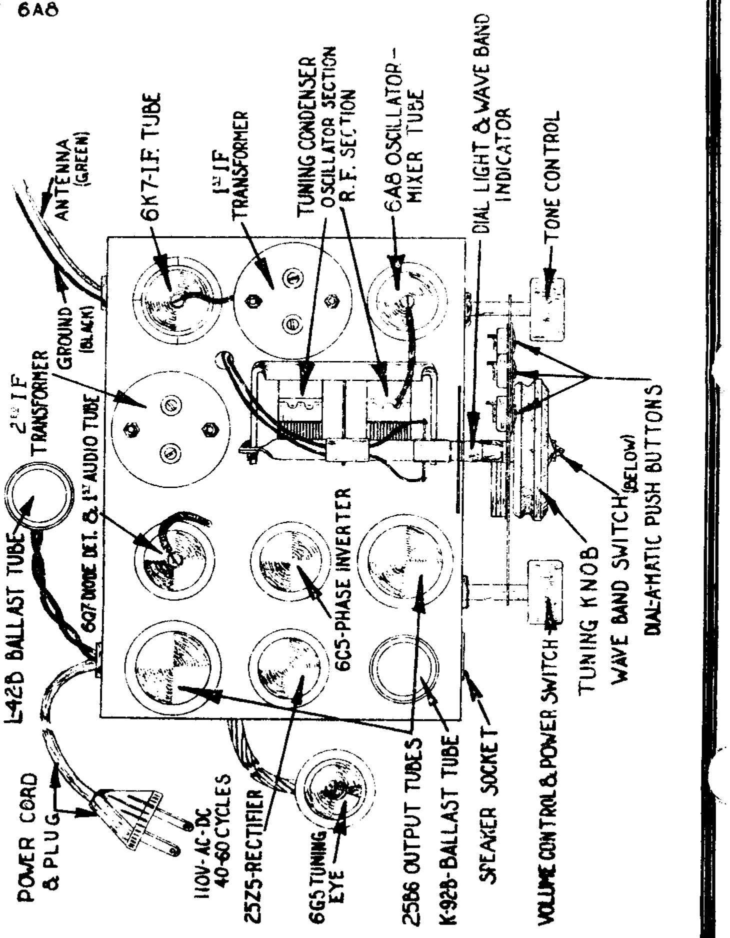
OPERATING VOLTAGES

Note:- These voltages were taken with no signal input and with the volume control off.

TUBE	PLATE	SCREEN	SUPPRESSOR	CATHODE	HEATER
6A8 Mixer-Osc.	54* 94	50	.2	1	5.6
6K7 I.F. Amp.	90	94	1	1	5.6
6Q7 2nd Det.	30			.6	5.6
6C5 Phase Inv.	42			2.2	5.6
25B6 Outputs	90	94		16	22
25Z5 Rectifier	94				22
K92B Ballast	85 V. drop				
L49B Ballast	40 V. drop				
6G5 Tuning Eye	94				5.6

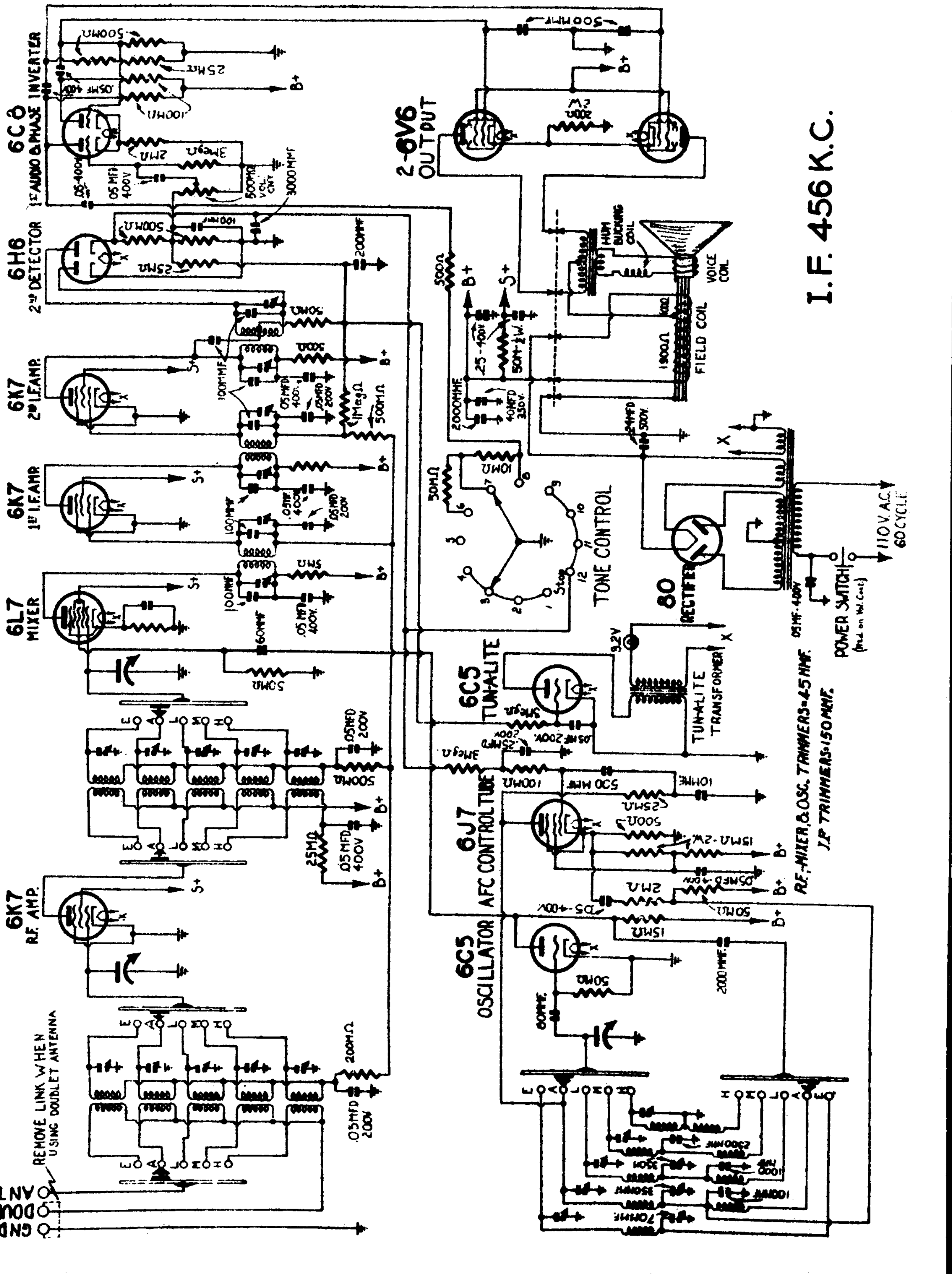
* Plate #2

All voltages taken with 110 V. line voltage and 1000 ohm per volt meter.

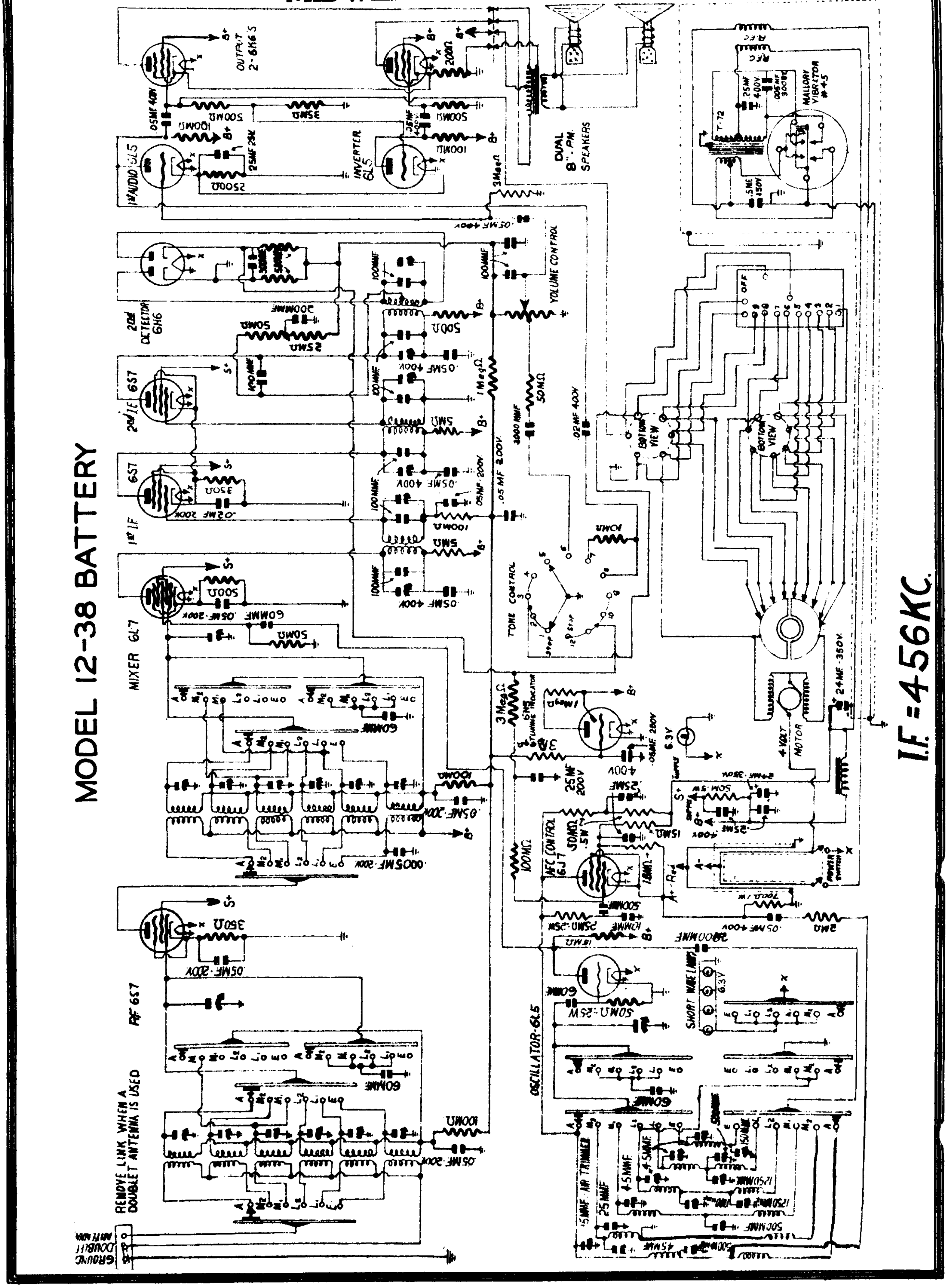


MIDWEST RADIO CORP.

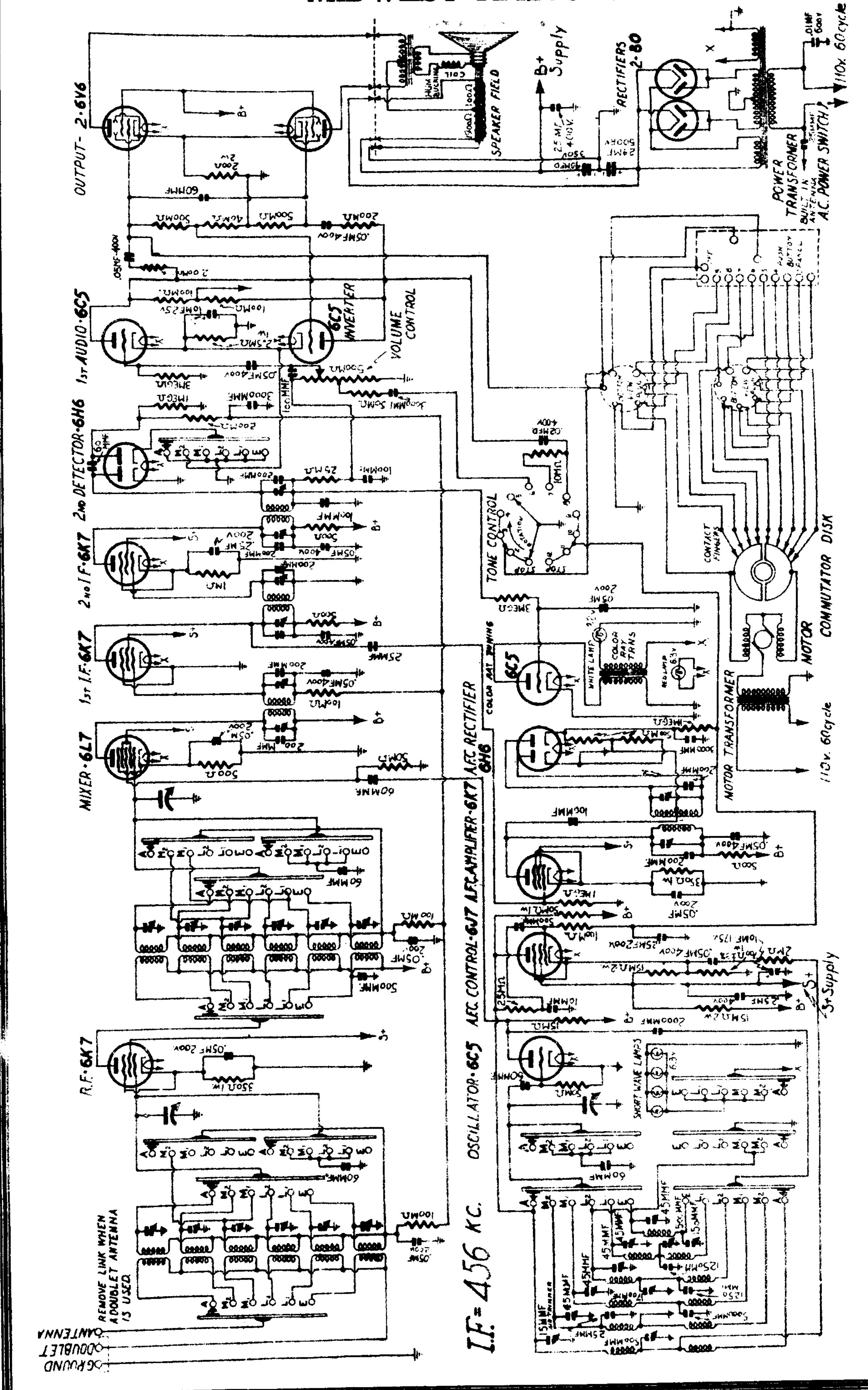
MODEL 12-38



MIDWEST RADIO CORP.



MIDWEST RADIO CORP.



MODEL 16-38

MIDWEST RADIO CORP.

MODEL 18-36A "INT."

CONDENSERS

C1	30MMFD.	TRIMMERS
C2	"	"
C3	"	"
C4	"	"
C5	"	"
C6	"	"
C7	"	"
C8	"	"
C9	"	"
C10	"	"
C11	"	"
C12	"	"
C13	"	"
C14	"	"
C15	"	"
C16	"	"
C17	"	"
C18	"	"

C19	I.F. TRIMMERS	
C20	"	
C21	"	
C22	"	
C23	"	
C24	"	
C25	A.V.C. TRIMMER	
C26	70 MMFD.	PADDER
C27	120 MMFD.	"
C28	365 MMFD.	"
C29	365 MMFD.	TUNING CONDENSER
C30	"	TUNING CONDENSER
C31	"	TUNING CONDENSER
C32	"	TUNING CONDENSER
C33	10 MMFD.	MICA
C34	25 MMFD.	"
C35	75 MMFD.	"
C36	"	"

C37	75 MMFD	MICA
C38	"	"
C39	"	"
C40	"	"
C41	"	"
C42	100 MMFD.	"
C43	250 MMFD.	"
C44	"	"
C45	"	"
C46	"	"
C47	"	"
C48	1600 MMFD	"
C49	2000 MMFD.	"
C50	.01 MFD.	200 VOLT
C51	.02 MFD.	"
C52	.05 MFD.	"
C53	"	"
C54	"	"

C55	.05 MFD.	200 VOLT
C56	"	"
C57	"	"
C58	"	"
C59	"	"
C60	"	"
C61	"	400 VOLT
C62	"	"
C63	"	"
C64	"	"
C65	"	"
C66	"	"
C67	.25 MFD.	200 VOLT
C68	"	"
C69	"	400 VOLT

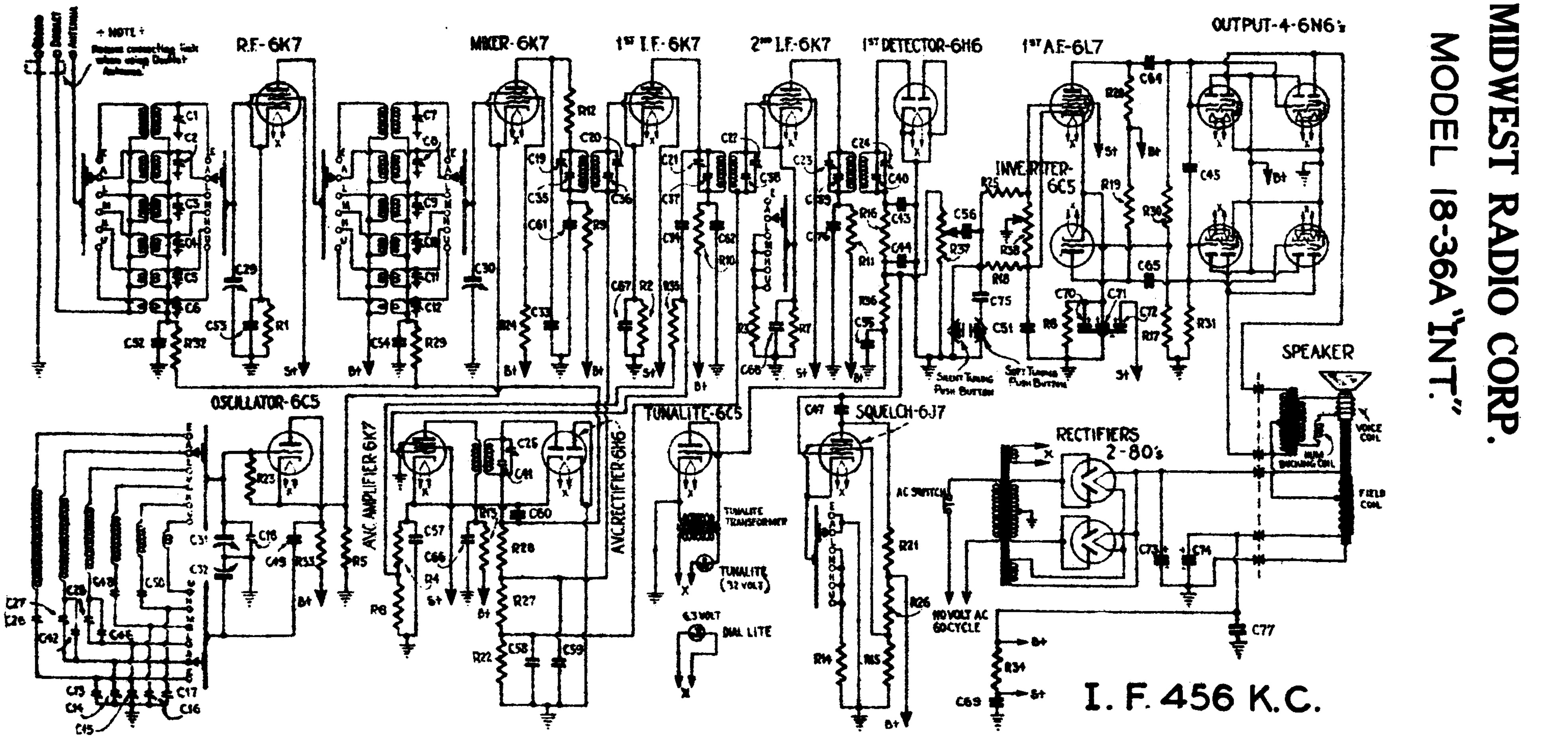
C70	25. MFD. 25 VOLT DRY
C71	" " "
C72	8. MFD. 100 VOLT "
C73	20 MFD. 500 VOLT WET
C74	40 MFD. 350 VOLT "
C75	.05 MFD. 200 VOLT
C76	" 400 VOLT
C77	.25 MFD. 400 VOLT

ELECTROLYTIC

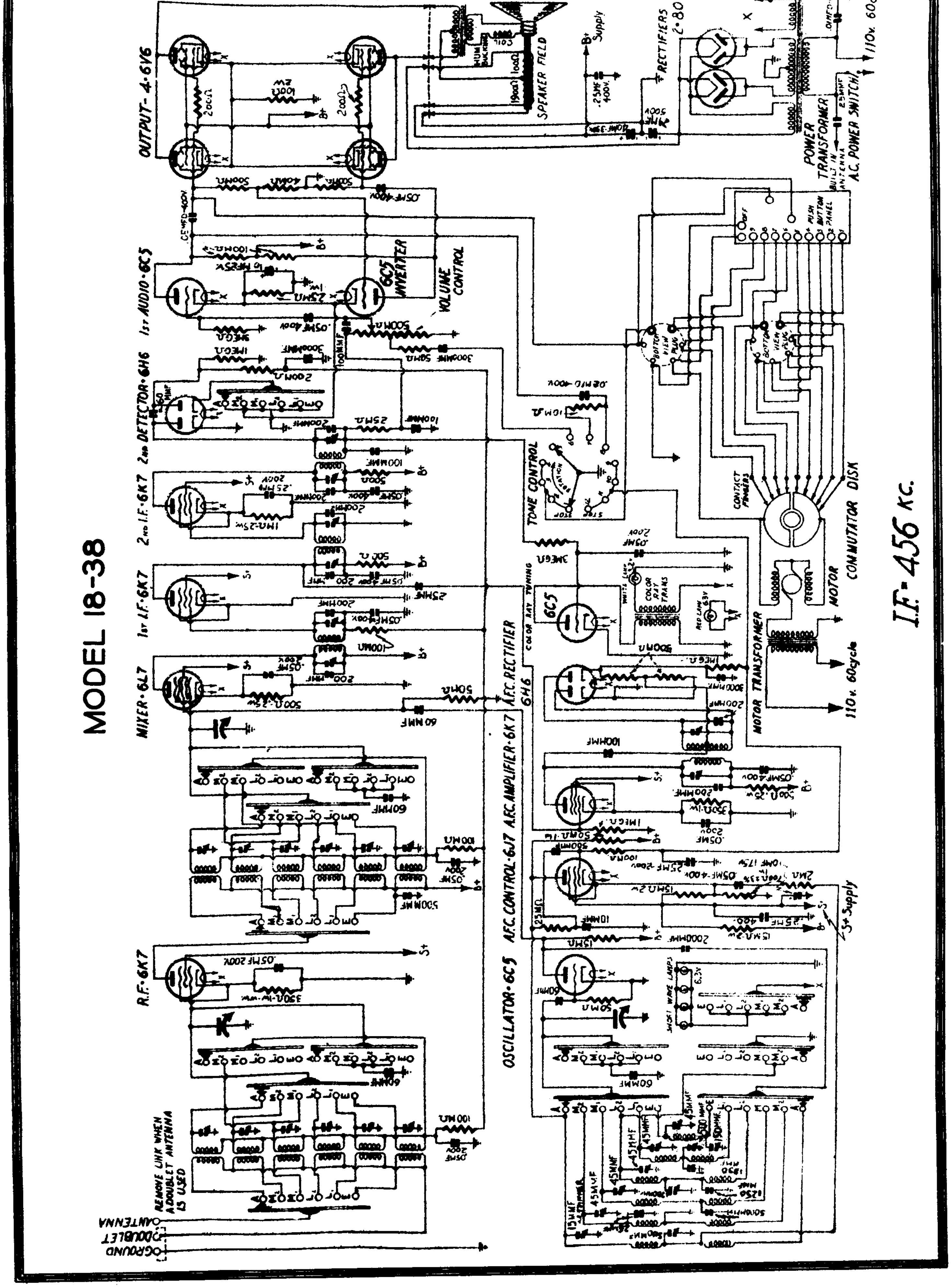
RESISTORS

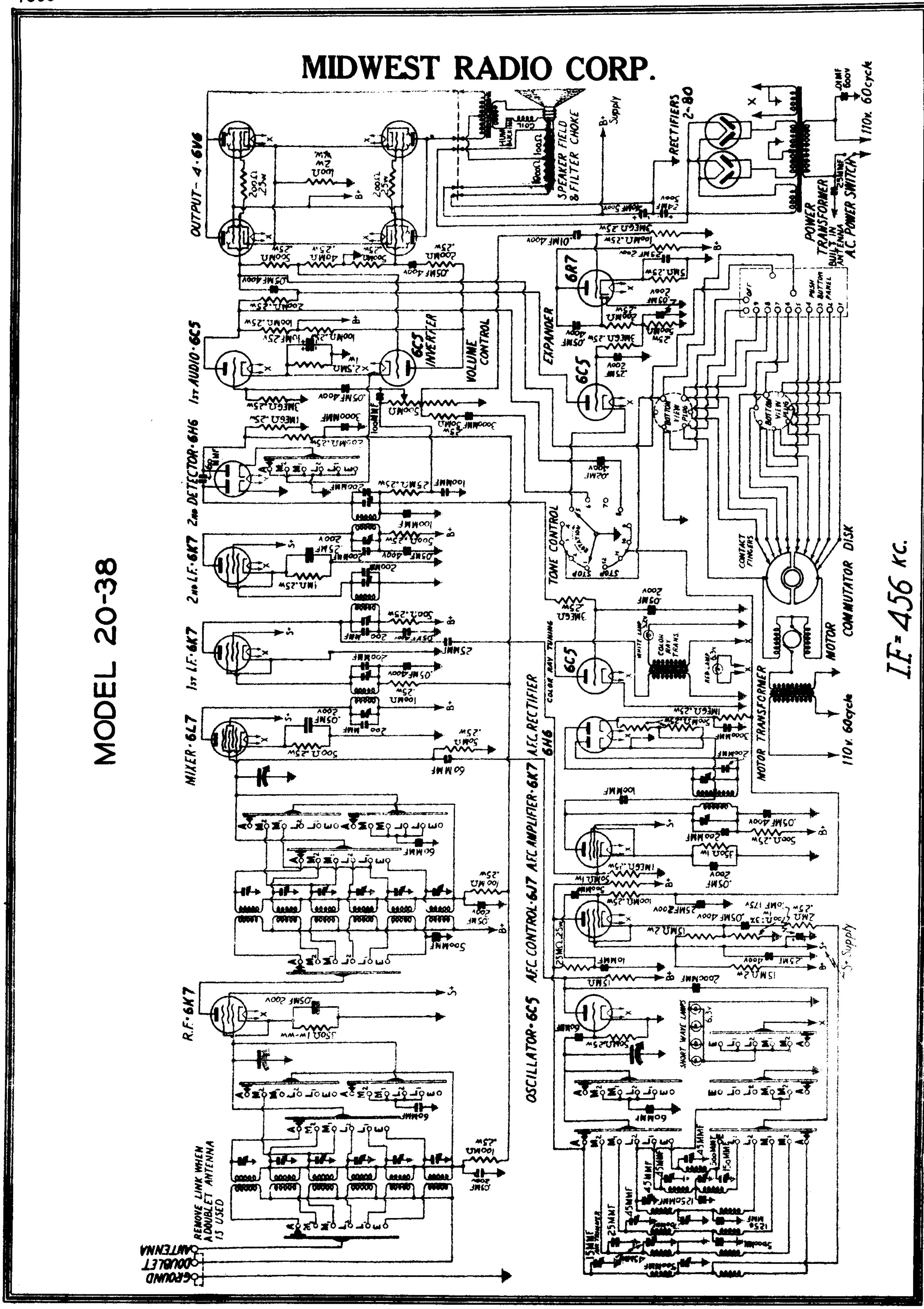
R1	350 OHMS	WIRE WOUND
R2	"	"
R3	"	"
R4	"	"
R5	500 OHMS	.25 WATT
R6	1,000 OHMS	"
R7	"	"
R8	2,000 OHMS	"
R9	3,000 OHMS	"
R10	"	"
R11	"	"
R12	"	"
R13	"	"
R14	"	"
R15	25,000 OHMS	"
R16	"	"
R17	30,000 OHMS	"
R18	100,000 OHMS	"
R19	"	"

R20	100,000 OHMS	.25 WATT
R21	"	"
R22	"	"
R23	"	"
R24	200,000 OHMS	"
R25	"	"
R26	"	"
R27	"	"
R28	"	"
R29	600,000 OHMS	"
R30	"	"
R31	"	"
R32	"	"
R33	50,000 OHMS	.5 WATT
R34	"	"
R35	1 MEGOHM	.25 WATT
R36	3 MEGOHM	"
R37	500,000 OHM VOLUME CONTROL	
R38	" TONE CONTROL	



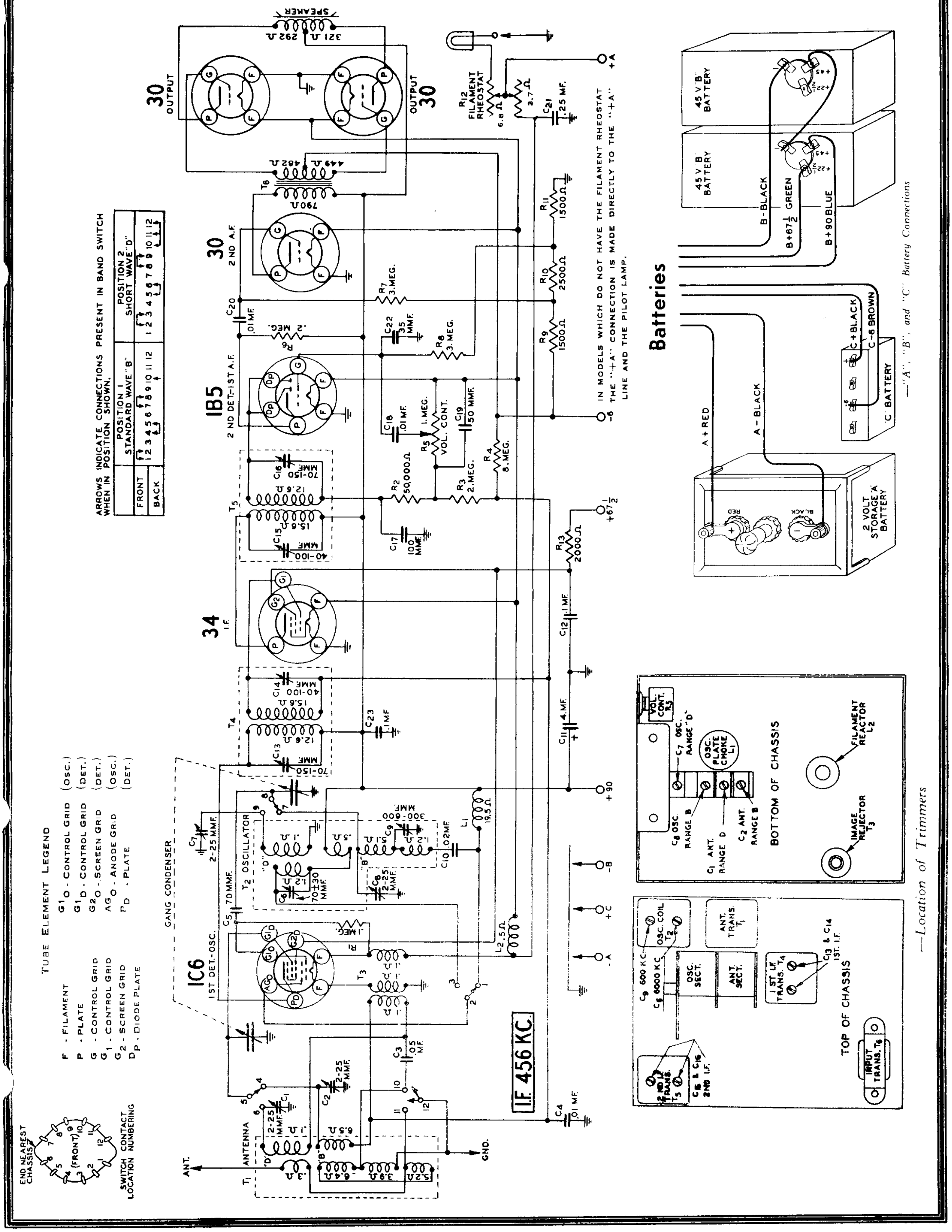
MIDWEST RADIO CORP.




MIDWEST RADIO CORP.
MODEL 20-38
I.F.=456 KC.
OUTPUT-4-6V6
1st AUDIO-6C5
6C5 INVERTER
VOLUME CONTROL
DETECTOR-6H6
2nd DETECTOR
2nd I.F.-6K7
1st I.F.-6K7
MIXER-6L7
R.F.-6K7
OSCILLATOR-6C5
A.F.C. CONTROL-6J7
A.F.C. AMPLIFIER-6K7
A.F.C. RECTIFIER 6H6
COLOR RAY TUNING
EXPANDER
6R7
6C5
TONE CONTROL
SPEAKER FIELD & FILTER CHOKE
RECTIFIERS 2-80
POWER TRANSFORMER
BUILT IN ANTENNA
A.C. POWER SWITCH
110v. 60cycle
PUSH BUTTON PANEL
CONTACT FINGERS
COMMUTATOR DISK
MOTOR
MOTOR TRANSFORMER
SHORT WAVE LAMPS
REMOVE LINK WHEN A DOUBLET ANTENNA IS USED
ANTENNA
DOUBLET
GROUND

MONTGOMERY WARD & CO.

MODELS 62-326, 62-336, 62-426 & 62-436



MONTGOMERY WARD & CO.

MODELS 62-326, 62-336, 62-426 & 62-436

SPECIFICATIONS

Input Voltages and Currents
"A" Battery - - - - - - 2 Volts—.42 Amperes
"B" Batteries - 90 & 67½ Volts—11.5 to 25.5 Ma.
"C" Battery - - - - - - - - - - - 6 Volts

Power Output - - - 400 Milliwatts Undistorted

Selectivity - - 30 KC Broad at 1000 Times Signal

Intermediate Frequency - - - - - - 456 KC

Speaker - - - 6 inch Magnetic—Mantel Models
8 inch Magnetic—Console Models

Tuning Frequency Range
B Range - - - - - - - - - 528 to 1730 KC
D Range - - - - - - - - - 5650 to 16,000 KC

Sensitivity
B Range Average - 25 to 35 Microvolts Absolute
D Range Average - 25 to 60 Microvolts Absolute

Alignment and Calibration

Alignment Procedure

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 16,000, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use **a non-metallic screwdriver for the adjustments.** The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the radio to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 7.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the radio through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C8) until maximum output is obtained. The location of this trimmer is shown in Fig. 7.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

Adjust the antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer (C9) until the peak of greatest intensity is obtained. See Fig. 7 for location of this trimmer.

Range D Alignment

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC. It may be necessary to increase the input signal to hear the image

16,000 KC Adjustment

Set the signal generator for 16,000 KC.

Connect the antenna lead of the radio through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (short wave band).

Adjust the oscillator Range D trimmer (C7) until maximum output is obtained. See Fig. 7 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the antenna Range D trimmer (C1) to maximum. When adjusting this trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC (C6) trimmer until the peak of greatest intensity is obtained. See Fig. 7 for location of this trimmer.

General Service Data

Tubes

The tubes used in this receiver are of the 2 volt series. All of them are of the filament or directly heated types. All of them have a 2 volt filament and should not be connected to a power supply not intended for this type of tube. **Maximum filament voltage range is 1.8 to 2.0 volts. Operation of the tubes at under or over this value will be injurious to the tubes and may affect operation of the receiver.**

Voltages

Check the voltages at the sockets to see if correct values are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together. The volume control should be turned to the right or maximum position.

All of the voltage readings as shown in the chart are read with a 1,000 ohm-per-volt meter. As high a range as possible should be used. In general, the higher the resistance of the meter, the more accurate the reading will be.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition. These voltages are typical of the sets but will vary slightly with variations in individual receivers, tubes, test equipment used and battery voltages.

VOLTAGES AT SOCKETS
Volume Control at Maximum — Antenna Shorted to Ground — Band Switch in Standard Wave Position

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Grid to Ground
1C6	1st Det.-Osc.	2.0	90 90(1)	60	6(2)
34	I.F.	2.0	90	60	6(2)
1B5	2nd Det.-1st A.F.	2.0	30(3)		1.5(4)
30	2nd A.F.	2.0	90		4.0(5)
30	Power	2.0	90		6

(1) Anode Grid to ground.
(2) As read at "C" Battery.
(3) As read with 500,000 ohm meter.
(4) As read from negative end of R11 to ground.
(5) As read from negative end of R10 to ground.

Replacement Parts List

RETAIL STORES: Order any parts from division superintendent at Chicago or Oakland, on stock order.

Return defective parts to division superintendent only.

There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts please be sure to mention the model number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	Selling Price
P-3A64	30 Tube Socket	$0.06
P-3A65	34 Tube Socket	.06
P-3A230	1B5 Tube Socket	.06
P-3A203	1C6 Tube Socket	.06

SPEAKERS

Part No.	Description	Selling Price
P-12A217	6" Magnetic Speaker	2.84
P-12A218	8" Magnetic Speaker	3.16
P-13X212	Speaker Cable and Socket Assembly	.30

KNOBS

Part No.	Description	Selling Price
P-10A69	Volume Control Knob	.08
P-10A72	Tuning Control Knob	.08
P-10A74	Band Switch Knob	.08

GENERAL

Part No.	Description	Selling Price
P-8X23	Rubber Chassis Mounting Cushions	.04
P-32X49	Tube Shield—Large	.10
P-32X32	Tube Shield—Small	.08
P-32X18	Tube Shield Base—Large	.04
P-32X30	Tube Shield Base—Small	.04
P-2X38	Felt Washers (Used behind Knobs) ea.	.04
P-17X16	Glass Dial Crystal	.10
P-28X67	Crystal Retaining Ring	.06
P-2A55	1 Section, 2 Position, Band Change Switch	.36
P-4A49	Single Lug Terminal Strip (Mounting Hole Used)	.04
P-30X14	Grid Clip only	.04
P-13X214	Antenna and Ground Lead Assembly	.14
P-13X266	A, B and C Battery Cable	.50

TRANSFORMERS AND COILS

Part No.	Code	Description	Selling Price
P-9A543	T1	Antenna Trans. and Can Assembly	$1.02
P-9A544	T2	Oscillator Coil and Can Assembly	1.22
P-9A548	T3	Image Rejector	.18
P-9A545	T4	1st I. F. Trans. and Can Assembly	.72
P-9A546	T5	2nd I. F. Trans. and Can Assembly	.72
P-50X33	T6	Input Transformer	.62
P-9A547	L1	Oscillator Plate Choke	.18
P-9A612	L2	Filament Choke Coil	.10

DIAL AND DRIVE ASSEMBLY

DIAL ASSEMBLY

Part No.	Description	Selling Price
P-15A64	Dial Bracket Assembly, Less Pilot Lamp, Pilot Light Socket and Spring Clip, Pointer, and On-Off Indicator Assembly	$0.70
P-15X48	Pointer	.04
P-25A77	On-Off Indicator Disc Assembly	.08
P-7A40	Pilot Lamp	.06
P-7A8	Pilot Light Socket and Spring Clip	.06
P-25A94	Pilot Light Spring Contact Assembly (on drive shaft)	.10

DIAL AND DRIVE ASSEMBLY (Continued)

DRIVE ASSEMBLY

Part No.	Description	Selling Price
P-5A32	Drive Bracket Assembly, less Drive Drum and Pointer Shaft	$0.16
P-24X225	Drive Drum and Pointer Shaft (Mounted on Tuning Condenser Shaft)	.22
	20" Black Tuning Drive Cord doz.	.22
P-28X27	Tuning Drive Cord Tension Spring	.04
	8" On-Off Indicator Drive Cord doz.	.10
P-29X20	Brass Collar with Set Screw for Securing above Cord to Shaft	.04
P-28X44	On-Off Indicator Cord Tension Spring	.04

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	Selling Price
P-46X80	C3	.05 mf.	180	$0.08
P-46X188	C4	.01 mf.	180	.08
P-46X187	C10	.02 mf.	180	.08
P-46X98	C12	.1 mf.	180	.10
P-46X124	C18	.01 mf.	180	.08
P-46X124	C20	.01 mf.	180	.08
P-46X197	C21	.25 mf.	180	.12
P-46X98	C23	.1 mf.	180	.10

ELECTROLYTIC

Part No.	Code	Capacitance	Voltage	Selling Price
P-45X212	C11	4.0 mf.	100 Dry	.32

MOLDED

Part No.	Code	Capacitance	Selling Price
P-47X62	C5	70 mmf.	.06
P-47X57	C17	100 mmf.	.06
P-47X56	C19	50 mmf.	.06
P-47X53	C22	35 mmf.	.06

TRIMMER

Part No.	Code	Description	Selling Price
P-17A52	C1 C2 C7 C8	2-25 mmf. Range "D" Antenna Trimmer 2-25 mmf. Range "B" Antenna Trimmer 2-25 mmf. Range "D" Oscillator Trimmer 2-25 mmf. Range "B" Oscillator Trimmer	.22
P-17A35	C6 C9	40-100 mmf. 6000 KC Trimmer 300-600 mmf. 600 KC Trimmer	.22
P-17A51	C13 C14	70-150 mmf. 40-100 mmf. 1st I. F. Trimmer	.18
P-17A51	C15 C16	70-150 mmf. 40-100 mmf. 2nd I. F. Trimmer	.18

MISCELLANEOUS

Part No.	Description	Selling Price
P-14A54	2 Gang Condenser less Drive Drum and Dial Assembly	$1.20

RESISTORS

CARBON

Part No.	Code	Resistance	Watts	Selling Price
P-A95104	R1	100,000 Ohm	0.2	$0.06
P-A95503	R2	50,000 Ohm	0.2	.06
P-A94205	R3	2.0 Megohm	0.2	.08
P-A94805	R4	8.0 Megohm	0.2	.08
P-A95204	R6	200,000 Ohm	0.2	.06
P-A95306	R7	3.0 Megohm	0.2	.06
P-A95305	R8	3.0 Megohm	0.2	.06
P-A94152	R9	1,500 Ohm	0.2	.08
P-A94252	R10	2,500 Ohm	0.2	.08
P-A94152	R11	1,500 Ohm	0.2	.08
P-A95202	R13	2,000 Ohm	0.2	.06

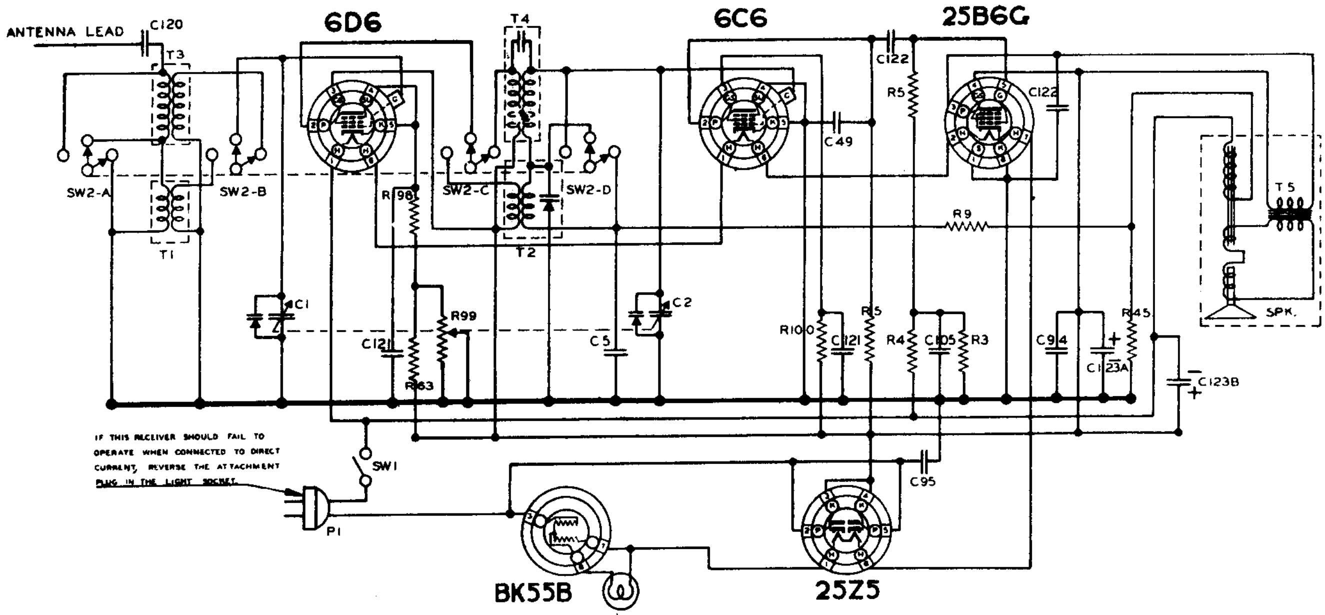
VARIABLE

Part No.	Code	Description	Selling Price
P-36X218	R5	1.0 Megohm Volume Control and On-Off Switch	.50
P-43X55	R12	3.7 Ohm / 6.8 Ohm Filament Rheostat	.24

Prices subject to change without notice

NOBLITT-SPARKS INDUSTRIES, Inc.

MODEL 508



IF THIS RECEIVER SHOULD FAIL TO OPERATE WHEN CONNECTED TO DIRECT CURRENT, REVERSE THE ATTACHMENT PLUG IN THE LIGHT SOCKET.

RESISTORS

R	OHM	W	PART NO.
3	100K	1/4	17-2068
4	200K	1/4	17-2069
5	500K	1/4	17-2070
9	1MEG.	1/4	17-2080
45	25	1/2	17-14043
63	25K	1/4	17-14049
96	200	1/4	17-14130
99	15K	V.C.	17-14150
100	3MEG.	1/4	17-14161

CONDENSERS

C	CAPACITY	VOLT	PART NO.
1	TWO-GANG		17-15722
2	VARIABLE		
5	.05	200	17-14015
49	.0025	800	17-14063
94	.1	200	17-14115
95	.02	600	17-14125
105	.25	200	17-14131
120	.00[illegible]	400	17-4206
121	.02	200	17-22144A
122	.01	400	17-2169
123A	8	150	17-14160
123B	16	150	

TRANSFORMERS

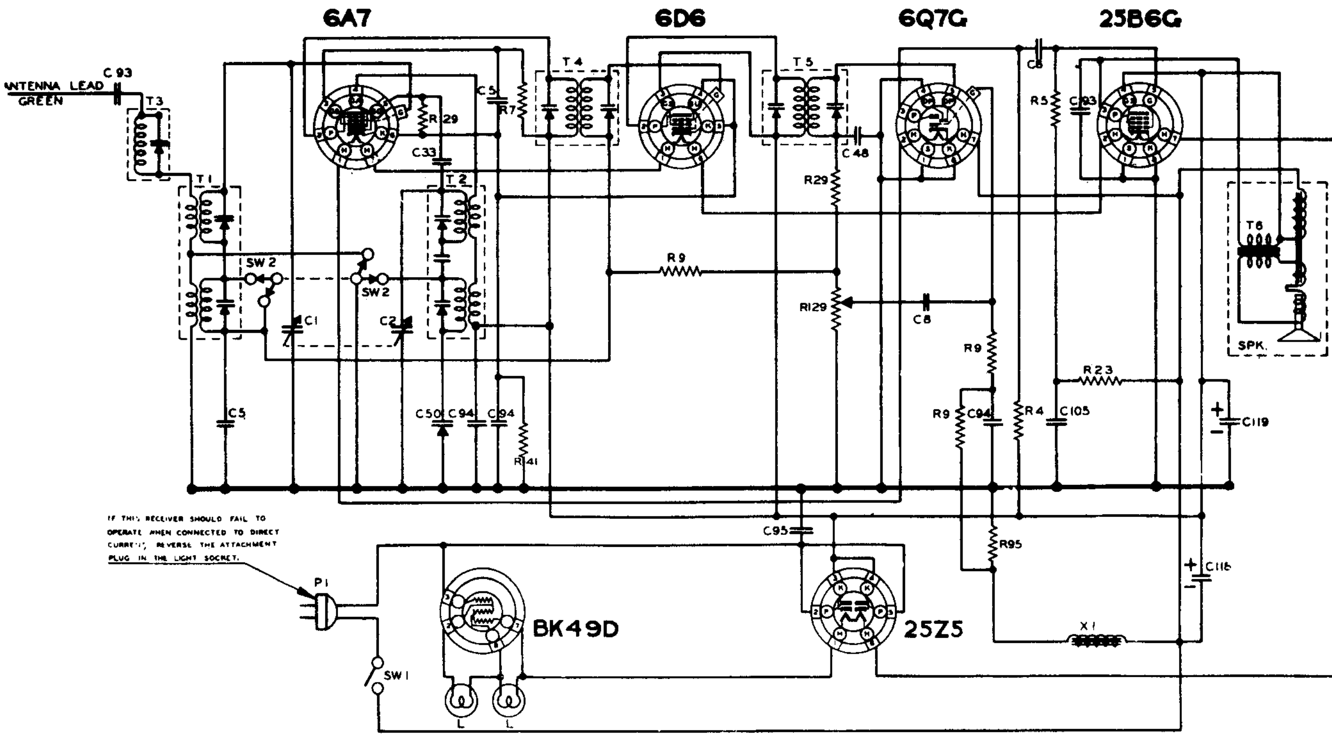
T	TYPE	PART NO.
1	SHORTWAVE ANTENNA	17-13828
2	SHORTWAVE R.F. COIL	17-13829
3	BROADCAST ANTENNA	17-13830
4	BROADCAST R.F. COIL	17-13831
5	OUTPUT TRANS.	17-13834

MISCELLANEOUS

SYMBOL	DESCRIPTION	PART NO.
SPK.	DYNAMIC SPEAKER	17-13833
L	PILOT LIGHT T-40 MAZDA	——
P1	LINE CORD & PLUG ASSEMBLY	17-15791
SW1	LINE SWITCH - PART OF R99	——
SW2	BAND SWITCH	17-13832

"A" BAND - BALANCE AT 1400 K.C.
CHECK AT 600 K.C.
"B" BAND - BALANCE AT 3.5 M.C.
CHECK AT 1.7 M.C.

MODEL 608



IF THIS RECEIVER SHOULD FAIL TO OPERATE WHEN CONNECTED TO DIRECT CURRENT, REVERSE THE ATTACHMENT PLUG IN THE LIGHT SOCKET.

RESISTORS

R	OHM	W	PART NO.
4	200K	1/4	17-2069
5	500K	1/4	17-2070
7	20K	1/2	17-2072
9	1MEG.	1/4	17-2080
23	250K	1/4	17-3011
29	50K	1/4	17-2060
41	100	1/4	17-14052
95	20	1/2	17-14152
129	500K	V.C.	17-13817

CONDENSERS

C	CAPACITY	VOLT	PART NO.
1	TWO-GANG		17-15721
2	VARIABLE		
5	.05	200	17-14015
6	.01	600	17-14016
33	.00005	600	17-14047
46	.00025	600	17-4207
93	.005	600	17-14114
94	.1	200	17-14115
95	.02	600	17-14125
105	.25	200	17-14131
116	16	150	17-14153
119	24	150	17-14154
50	.0004-.0006		17-14070

TRANSFORMERS & CHOKES

T-X	TYPE	PART NO.
T	TRANSFORMERS	
1	ANTENNA COIL	17-13818
2	OSCILLATOR COIL	17-13819
3	WAVE TRAP	17-13820
4	FIRST I.F. COIL	17-13821
5	SECOND I.F. COIL	17-13822
6	OUTPUT TRANS	17-13824
X	CHOKES	
1	FILTER	17-13825

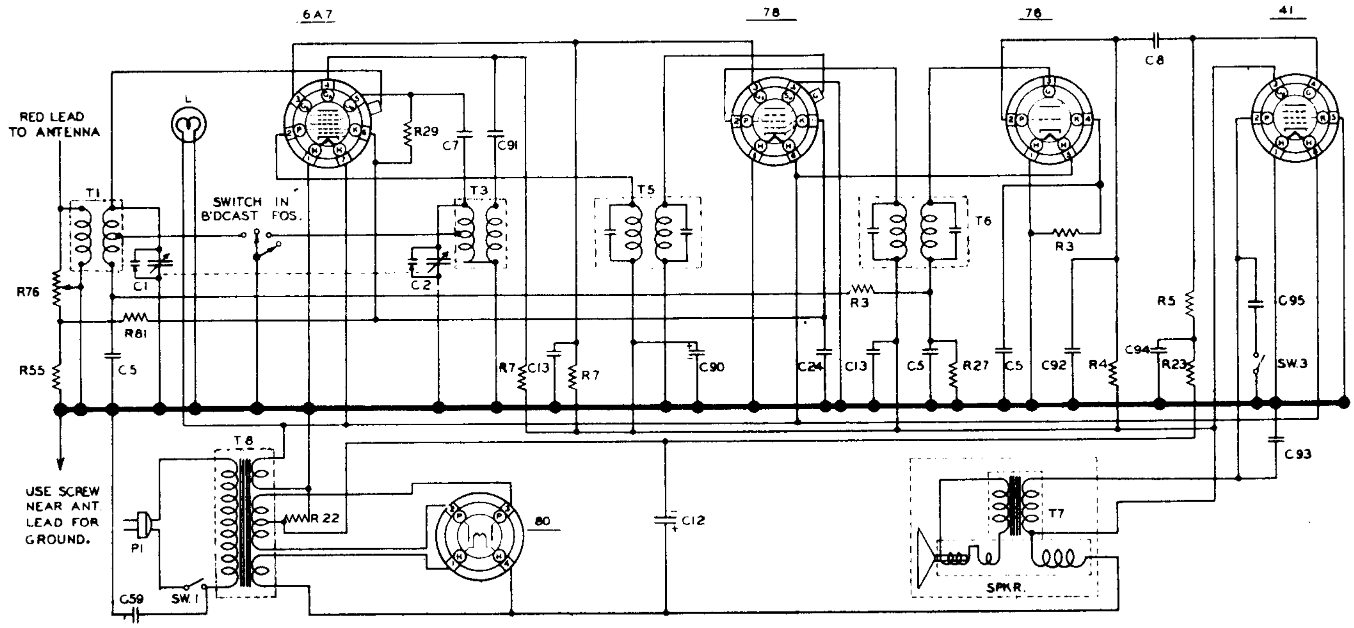
MISCELLANEOUS UNITS

SYMBOL	DESCRIPTION	PART NO
L	T-40 MAZDA PILOT LIGHT	——
P1	LINE CORD	17-15791
SPK	DYNAMIC SPEAKER & OUTPUT TRANS ASSM.	17-13823
SW1	SWITCH - PART OF R85	——
SW2	BAND SWITCH	17-13826

I.F. PEAK 456 K.C.
"A" BAND - BALANCE AT 1400K.C.
PAD AT 600 K.C.
"B" BAND - BALANCE AT 5. M.C.
CHECK AT 2. M.C.

NOBLITT-SPARKS INDUSTRIES, Inc.

MODELS 518, 518A, 568 & 568A



RESISTORS

R	OHM	W	PART NO.
3	100M	1/4	17-2068
5	500M	1/4	17-2070
7	20M	1/2	17-2072
23	250M	1/4	17-301[illegible]
27	2 MEG	1/4	17-47[illegible]
29	50M	1/4	17-2060
37	300	1/4	17-14033
41	100	1/4	17-14082
55	2500	1/4	17-2087
76	10M	VC	17-13864
78	270	1	17-14110
81	150	1/4	17-14114
22	300	1	17-4724
4	200M	1/4	17-2069

CAPACITORS

C	CAPACITY	VOLT	PART NO.
1	2 GANG		17-15717
2	VARIABLE		
5	.05	200	17-14015
7	.0001	600	17-2084
8	.01	600	17-14016
12	8.0 ELECT	475	17-14001
13	1 UF	300	17-14044
24	.5	800	17-14040
59	.01	400	17-14615
88	.02	800	17-14105
90	8 UF REG	335	17-14111
91	.002	600	[illegible]
92	.001	600	17-14113
93	.005	600	17-14114
94	.1	200	17-14115
95	.02	800	17-14125

TRANSFORMERS

T	TYPE	PART NO.
1	ANTENNA COIL	00-13658
3	OSCILLATOR COIL	00-13[illegible]
5	1ST. I.F. TRANSFORMER	00-13647
6	2ND. I.F. TRANSFORMER	00-13648
7	OUTPUT TRANSFORMER	17-13867
8	POWER TRANSFORMER	00-13870

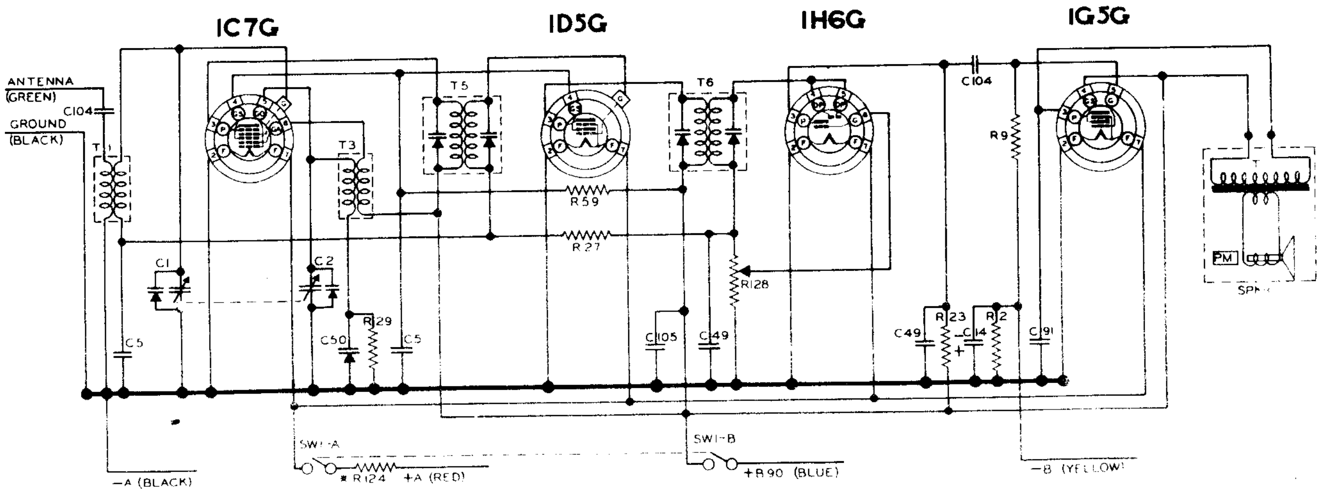
MISCELLANEOUS

SYMBOL	DESCRIPTION	PART NO.
SW 1	SWITCH - ON VOLUME CONTROL - SEE R76	17-13654
SW 2	BAND SWITCH	17-13652
SPK.	DYNAMIC SPEAKER ASSEMBLY	17-13655
L	DIAL LIGHT	17-13804
P1	POWER CORD AND PLUG ASSEMBLY	17-13781
SW3	TONE SWITCH	17-13861

I.F. PERMATUNE-AT 456 KC.
BALANCE AT 1400 KC.

NOTE THERE ARE NO ADJUSTMENTS ON THIS RECEIVER FOR THE POLICE BAND

MODEL 578B



* NOTE USE R124 FOR AIRCELL (2.5 VOLT)
USE R125 FOR 3.0 VOLT A BATTERY OR DRY CELL

RESISTORS

R	OHM	W	PART NO.
2	400	1/4	17-4762
9	1M	1/4	17-2080
23	250K	1/4	17-301[illegible]
27	2M	1/4	17-4788
29	50K	1/4	17-2060
59	15K	1/4	17-4191
124	1.25		17-14144
125	2.7		17-14145
128	500K	V.C.	17-13869

CONDENSERS

C	CAPACITY	VOLT	PART NO.
1	TWO-GANG		17-13870
2	VARIABLE		
5	.05	200	17-14015
14	12	25	17-140058
49	.0005	800	17-14083
50	800MMF MAX	PAD	17-14070
91	.002	600	17-14112
104	.01	200	17-14208
105	.25	200	17-14131

TRANSFORMERS

T	TRANSFORMER	PART NO.
1	ANTENNA COIL	17-450
3	OSCILLATOR COIL	17-464
5	FIRST I.F. COIL	17-462
6	SECOND I.F. COIL	17-463
7	OUTPUT TRANS.	17-1380

MISCELLANEOUS UNITS

SYMBOL	DESCRIPTION	PART NO.
SPKR	PERMANENT MAGNET DYNAMIC SPEAKER	[illegible]
SW1-A	FILAMENT SWITCH SEE R128	
SW1-B	+B SWITCH SEE R128	

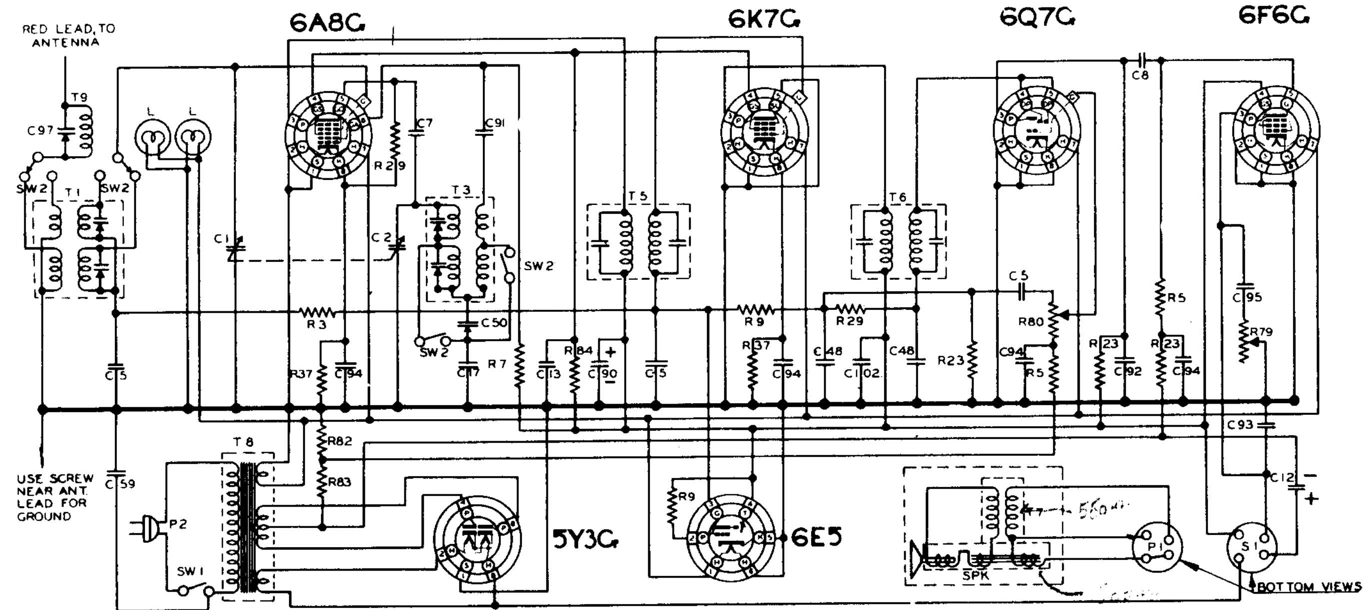
I.F. PEAK 456 K.C.

BALANCE AT 1400 K.C.

PAD AT 600 K.C.

NOBLITT-SPARKS INDUSTRIES, Inc.

MODELS 618, 618A, 628 & 628CS



NOTE: C103 REPLACES C12 & C90 ON 628CS

RESISTORS

R	OHM	W	PART NO		R	OHM	W	PART NO	
[illegible]	400	1/4	17-4762		83	240	1	17-14118	
3	100K	1/4	17-2068		84	30K	1	17-14119	
5	500K	1/4	17-2070						
7	20K	1/2	17-2072						
8	40K	1/2	17-2078						
9	1MEG	1/4	17-2080						
23	250K	1/4	17-3011						
29	50K	1/4	17-2060						
37	300	1/4	17-14033						
79	100K	T.C.	17-13667						
80	1MEG	VC	17-13655						
82	30	1/4	17-14117						

CONDENSERS

C	CAPACITY	VOLT	PART NO		C	CAPACITY	VOLT	PART NO	
1	TWO-GANG		17-15716		90	8 OREG	336	17-16111	
2	VARIABLE				91	.002	600	17-14112	
5	.05	200	17-14015		92	.001	600	17-14113	
7	.0001	600	17-2084		93	.005	600	17-14114	
8	.01	600	17-14016		94	.1	200	17-14115	
12	8.0 ELECT	475	17-14001		95	.02	600	17-14125	
13	.1	300	17-14046		97	.0007-.0013		17-4181-1	
17	.005	600	17-14029		102	25	300	17-14129	
48	.00025	600	17-4207		103	8-8 ELECT.	475	17-14130	
50	.0004-.0006		17-14070						
59	.01	400	17-14815						

TRANSFORMERS

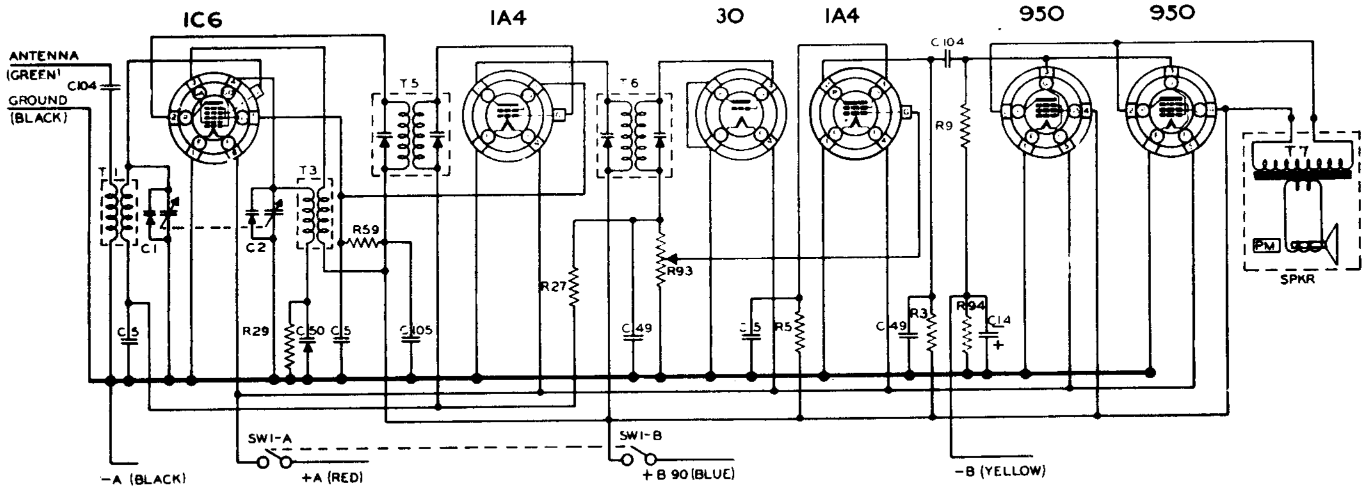
T	TYPE	PART NO.	
1	ANTENNA COIL	00-13696	
3	OSCILLATOR COIL	00-13697	
5	1ST I.F. TRANSFORMER	00-13726	
6	2ND I.F. TRANSFORMER	00-13727	
7	OUTPUT TRAN 618	17-13693	
7	OUTPUT TRAN 618A-628	17-13695	
8	POWER TRANSFORMER	00-13702	
9	WAVE TRAP COIL	00-13698	

MISCELLANEOUS

SYMBOL	DESCRIPTION	PART NO	
SW 1	AC SWITCH SEE R79	17-13667	
SW 2	BAND SWITCH (SHOWN IN BROADCAST POSITION)	17-13686	
L	DIAL LIGHT	17-13504	
S1	SPEAKER SOCKET	17-13249	
P1	SPEAKER PLUG		
P2	LINE CORD & PLUG ASSEMBLY	17-15791	
SPK	SPEAKER 618	17-13692	
SPK	SPEAKER 618A 628 & 628CS	17-13694	

I.F. PERMATUNE AT 455 K.C.
BROADCAST BALANCE AT 1400 K.C. PAD AT 600 K.C.
SHORTWAVE BALANCE AT 15 M.C. CHECK AT 7 M.C.

MODELS 618B & 628B



RESISTORS

R	OHMS	W	PART NO.		R	OHMS	W	PART NO.	
3	100K	1/4	17-2068						
5	500K	1/4	17-2070						
9	1M	1/4	17-2080						
27	2M	1/4	17-4700						
29	50K	1/4	17-2060						
59	15K	1/4	17-4191						
93	500K	V.C.	17-13784						
94	450	1/4	17-14180						

CONDENSERS

C	CAPACITY	VOLT	PART NO		C	CAPACITY	VOLT	PART NO	
1	TWO-GANG		17-354						
2	VARIABLE								
5	.05	200	17-14015						
14	12 M F	25	17-14005						
49	.0005	600	17-14083						
50	800 MMF MAX	PAD	17-14070						
104	.01	200	17-4208						
105	.25	200	17-14131						

CHOKES & TRANSFORMERS

T	TYPE	PART NO	
7	TRANSFORMER		
1	ANTENNA COIL	17-450	
3	OSCILLATOR COIL	17-464	
5	FIRST I.F. COIL	17-462	
6	SECOND I.F. COIL	17-463	
7	OUTPUT TRANS.	17-[illegible]	

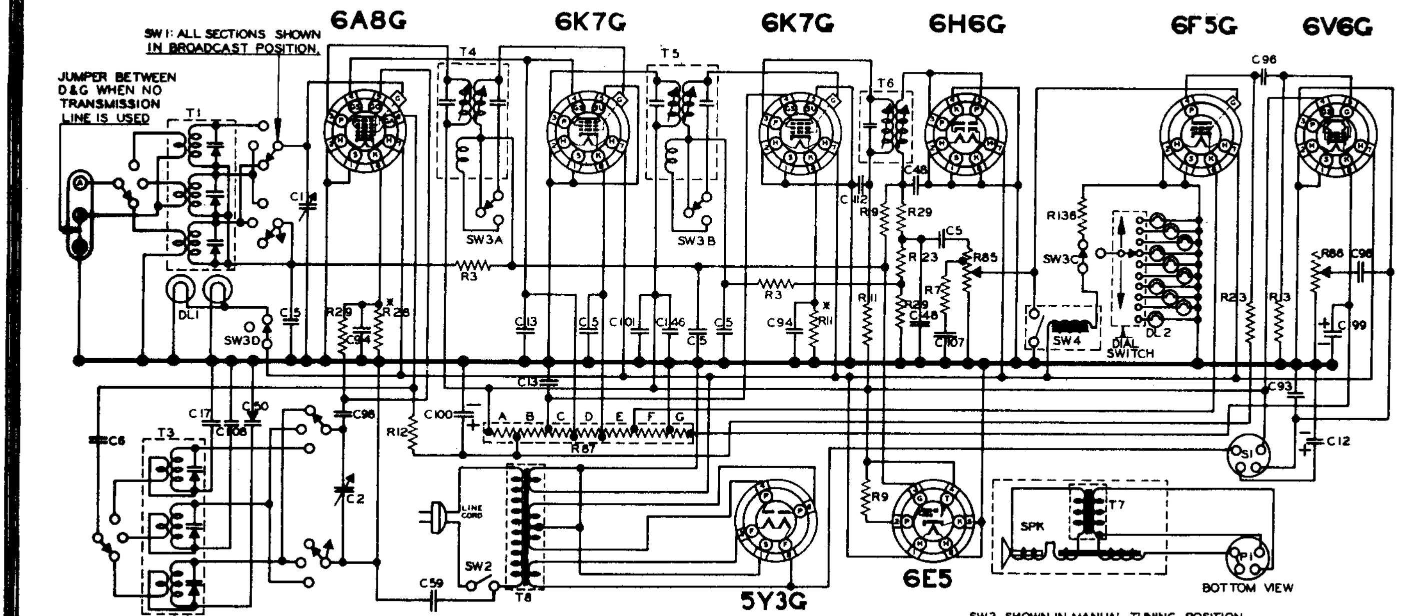
MISCELLANEOUS UNITS

SYMBOL	DESCRIPTION	PART NO.	
SPKR	PERMANENT MAG. DYNAMIC 618B	KI-7834	
SPKR	PERMANENT MAGNET DYNAMIC 628B	KI-[illegible]	
SW1-A	FILAMENT SWITCH - SEE R93		
SW1-B	+B SWITCH - SEE R93		

I.F. PEAK 456 K.C.
BALANCE AT 1400 K.C.
PAD AT 600 K.C.

NOBLITT-SPARKS INDUSTRIES, Inc.

MODEL 818AT



NOTE: R8 MAY BE VARIED FROM 400 TO 2000 OHMS TO CONTROL SENSITIVITY.

SW3 SHOWN IN MANUAL TUNING POSITION

NOTE
R87
A-1666 OHMS
B-4286 "
C-1060 "
D-3890 "
E- 225 "
F- 55 "
G- 240 "

RESISTORS

R	OHM	W	PART NO.		R	OHM	W	PART NO.	
3	100K	1/4	17-2066						
7	20K	1/2	17-2072						
9	1M	1/4	17-2080						
11	2K	1/4	17-4202						
12	10K	1/4	17-4275						
23	250K	1/4	17-3011						
28	1500	1/4	17-4205						
29	50K	1/4	17-2060						
85	500K	V.C.	17-13712						
86	100K	T.C.	17-13713						
87	TAPPED		17-14127	SEE NOTE					
136	5	2	17-14207						

CONDENSERS

C	CAPACITY	VOLT	PART NO.		C	CAPACITY	VOLT	PART NO.	
1	TWO-GANG		17-14971		99	50 ELECT.	15	17-14123	
2	VARIABLE				100	8 ELECT	300	17-14124	
5	.05	200	17-14015		101	16 REG.	300	17-14126	
6	.002	600	17-2063		107	.03	200	17-14133	
12	8 ELECT.	475	17-14001		108	.0013 ±2%	600	17-14134	
13	.1	300	17-14046		112	.05	400	17-14139	
17	.005 +10% -5%	600	17-14029		146	.25	300	17-14208	
48	.00025	600	17-4207						
50	.0006 MAXFAD.		17-14070						
90	.01	400	17-14613						
93	.005	600	17-14114						
94	.1	200	17-14115						
96	.05	600	17-14121						
98	.000075	600	17-14122						

TRANSFORMERS

T	TYPE	PART NO.	
1	ANTENNA COIL	00-15730	
2			
3	OSCILLATOR COIL	00-15731	
4	FIRST I.F. TRANS.	00-15737	
5	SECOND I.F. TRANS.	00-15738	
6	THIRD I.F. TRANS.	00-15739	
7	OUTPUT TRANS. 818AT	17-15735	
7	OUTPUT TRANS. 828AT	17-13721	
8	POWER TRANS.	00-15703	

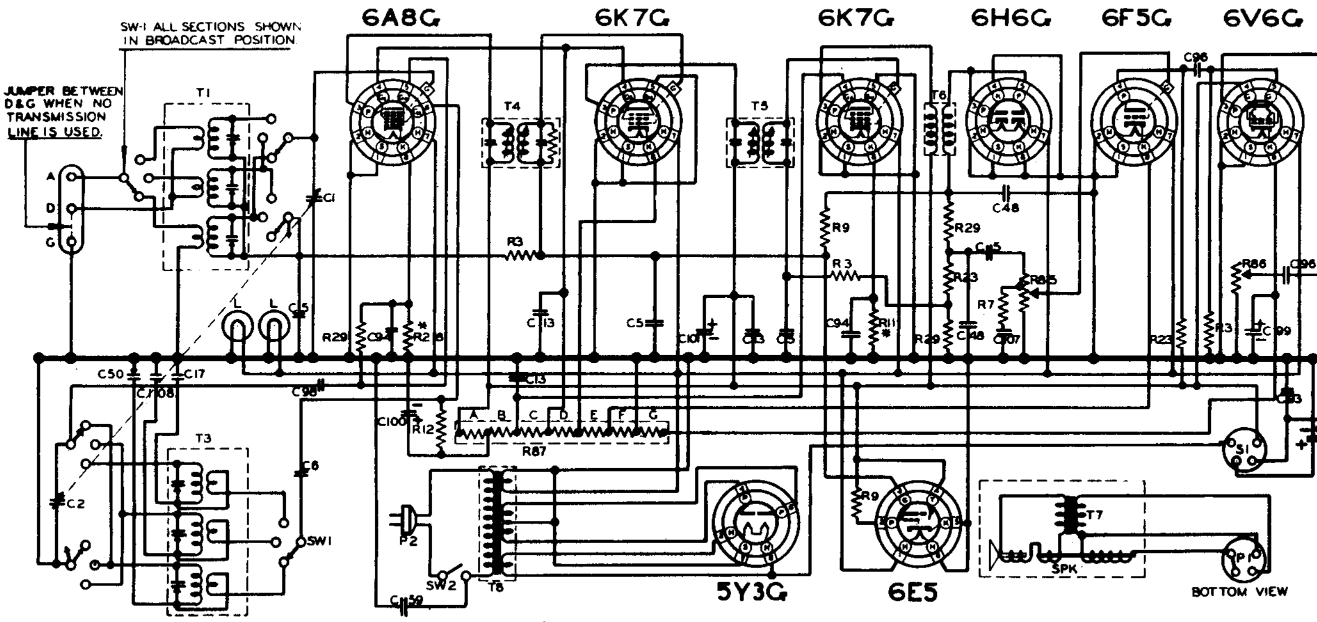
MISCELLANEOUS

SYMBOL	DESCRIPTION	PART NO.	
SPK	12" SPEAKER FOR MODEL 818AT	17-15734	
SPK	10" SPEAKER FOR MODEL 828AT	17-13720	
S1	SPEAKER SOCKET	17-13249	
P1	SPEAKER PLUG	SEE SPK	
DL1	DIAL LIGHT	17-13604	
DL2	DIAL LIGHT	17-15746	
SW1	BAND SWITCH	17-13728	
SW2	LINE SWITCH - SEE R86	17-13713	
SW3	MANUAL -AUTOMATIC TUNING SWITCH	17-15748	
SW4	RELAY	17-15747	

I.F. PEAK 455 K.C.

3 BANDS:
- BALANCE 1.5 M.C. PAD .60 M.C.
- BALANCE 4.7 M.C. CHECK 2.0 M.C.
- BALANCE 15.0 M.C. CHECK 6.0 M.C.

MODELS 818 & 828



NOTE: R8 MAY BE VARIED FROM 400 TO 2000 OHMS TO CONTROL SENSITIVITY.

NOTE
R 87
A - 1666 OHMS
B - 4285 "
C - 1060 "
D - 3690 "
E - 225 "
F - 55 "
G - 240 "

RESISTORS

R	OHM	W	PART NO		R	OHM	W	PART NO.	
3	100K	1/4	17-2066		11	2K	1/4	17-4202	
7	20K	1/2	17-2072		28	1500	1/4	17-4205	
9	1MEG	1/4	17-2080						
12	10K	1/4	17-4275						
23	250K	1/4	17-3011						
29	50K	1/4	17-2060						
37	300	1/4	17-14033						
85	500K	VC.	17-13712						
86	100K	TC	17-13713						
87	TAPPED		17-14127	SEE NOTE					

CONDENSERS

C	CAPACITY	VOLT	PART NO.		C	CAPACITY	VOLT	PART NO	
1	2-GANG		17-15718		96	.05	600	17-14121	
2	VARIABLE				98	.000075	600	17-14122	
5	.05	200	17-14015		99	50 ELECT.	15	17-14123	
6	.002	600	17-2063		100	8. ELECT.	300	17-14124	
					101	16 REG.	300	17-14126	
12	8. ELECT.	475	17-14001		107	.03	200	17-14133	
13	.1	300	17-14046		108	.0013 ±2%	600	17-14134	
17	.005 +10% -5%	600	17-14029						
50	.0006 MAX.FAD.		17-14070						
48	.00025	600	17-4207						
90	.01	400	17-14615						
93	.005	600	17-14114						
94	.1	200	17-14115						
95	.02	600	17-14125						

TRANSFORMERS

T	TYPE	PART NO.	
1	ANTENNA COIL	00-13724	
2			
3	OSCILLATOR COIL	00-13725	
4	1ST I.F. TRANS.	00-13746	
5	2ND I.F. TRANS.	00-13747	
6	3RD I.F. TRANS.	00-13752	
7	OUTPUT TRANS. 818	17-13729	
7	OUTPUT TRANS. 828	17-13721	
8	POWER TRANS.	00-13703	

MISCELLANEOUS

SYMBOL	DESCRIPTION	PART NO.	
SPK.	8" SPEAKER FOR MODEL 818	17-13738	
SPK	10" SPEAKER FOR MODEL 828	17-13720	
S1	SPEAKER SOCKET	17-13249	
P1	SPEAKER PLUG		
P2	LINE CORD & PLUG	17-15701	
L	DIAL LIGHT	17-13604	
SW 1	BAND SWITCH	17-13728	
SW 2	LINE SWITCH - SEE R86	17-13713	

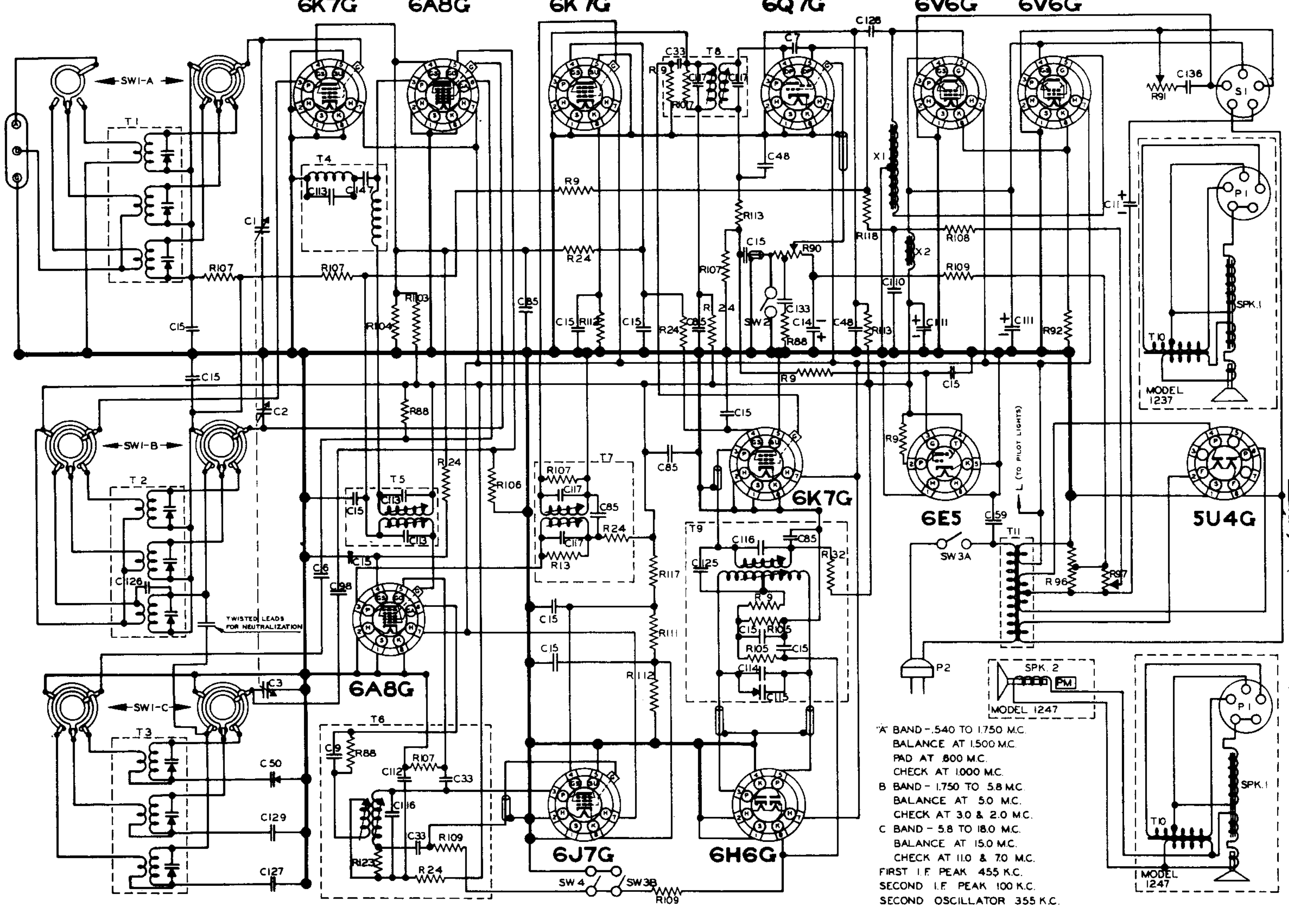
I.F. PEAK 455 K.C.

3 BANDS:
- BALANCE 1.5 M.C. PAD .60 M.C.
- BALANCE 4.7 M.C. CHECK 2.0 M.C.
- BALANCE 15.0 M.C. CHECK 6.0 M.C.

NOBLITT-SPARKS INDUSTRIES, Inc.

MODELS 1237, 1247 & 1247A

FOR RECEIVERS BEARING SERIAL NUMBERS: L70001A TO L71200A ALSO L75001A TO L75310A.



RESISTORS

R	OHM	W	PART NO.	R	OHM	W	PART NO.
9	1M	¼	17-2080	113	250K	¼	17-14178
13	75K	¼	17-2087	117	20K	1	17-14182
24	1K	¼	17-2065	118	300K	¼	17-14183
32	3K	¼	17-2090	123	100	¼	17-14188
88	18K	¼	17-14135				
90	500K	V.C.	17-13795				
91	100K	T.C.	17-13796				
92	150	2	17-14141				
96	35	1	17-14156				
97	900	VAR.	17-14157				
103	8K	10	17-14164				
104	10K	2	17-14165				
105	50K	¼	17-14169				
106	50K	¼	17-14171				
107	100K	¼	17-14172				
108	200K	¼	17-14173				
109	500K	¼	17-14174				
111	20K	½	17-14176				
112	500	¼	17-14177				

CONDENSERS

C	CAPACITY	VOLT	PART NO.	C	CAPACITY	VOLT	PART NO.
1	THREE		17-15720	110	.1	200	17-14137
2	GANG			111	16	400	17-14138
3	VARIABLE			112	.05	400	17-14139
6	.002	600	17-2063	113	.0002	600	17-14143
7	.0001	600	17-2064	114	.0003	600	17-14148
9	.001	600	17-4292	115	.00007	600	17-14149
11	16	475	17-14002	116	.0005	600	17-14151
14	12	25	17-14005B	117	.0004	600	17-14142
15	.05	200	17-14036				
				125	.00001	600	17-14166
				126	.000035	600	17-14167
33	.00005	600	17-14247	127	.0032	600	17-14168
48	.00025	600	17-4207	128	.03	600	17-14170
50	PADDER	600	17-14070	129	.0011	600	17-4700
59	.01	400	17-14615	130	2-20 MMF	600	17-13926
85	.1	400	17-14101	133	.03	200	17-14193
88	.02	600	17-14105	136	.04	600	17-14196
98	.003075	600	17-14122	147	.0005	600	17-14215

TRANSFORMERS

T	TYPE	PART NO.
1	ALLWAVE ANTENNA TR.	00-13776
2	ALLWAVE RF COIL	00-13777
3	ALLWAVE OSC. COIL	00-13778
4	455 K.C. BAND PASS	00-13853
5	455 K.C. I.F. COIL	00-13779
6	355 K.C. OSC. COIL	00-13782
7	100 K.C. I.F. INPUT	00-13780
8	100 K.C. I.F. OUTPUT	00-13781
9	100 K.C. DISCRIMINATOR	00-13783
10	OUTPUT TRANS. 1237	17-13723
10	OUTPUT TRANS. 1247	17-13790
11	POWER TRANS.	00-13774

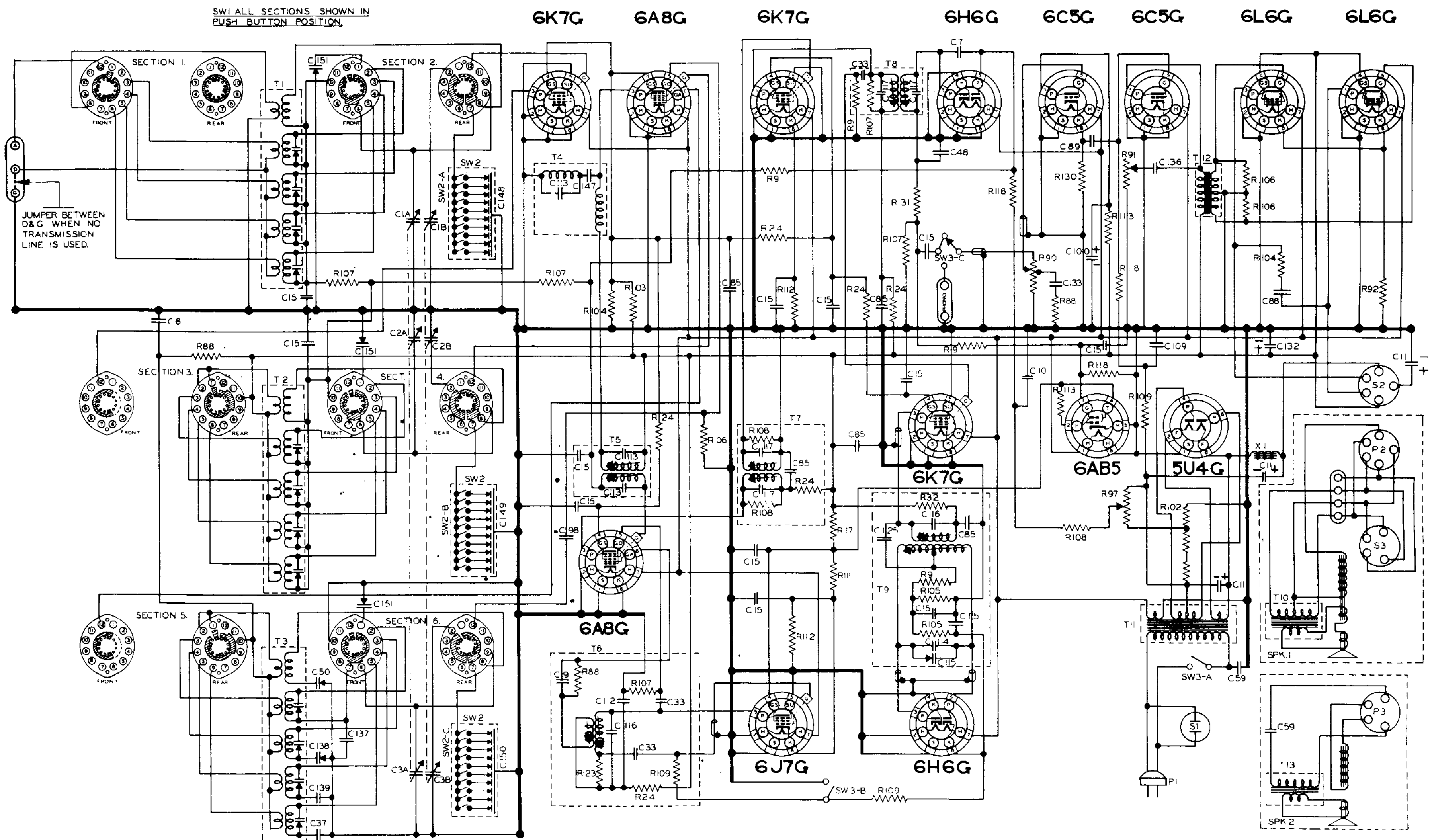
CHOKES

X	TYPE	PART NO.
1	AUDIO INPUT	00-13068
2	"B" FILTER	00-13775

MISCELLANEOUS UNITS

SYMBOL	DESCRIPTION	PART NO.
SW1	BAND SWITCH ASSEMBLY	17-13749
SW2	PART OF DIAL ASSEMBLY	SEE BELOW
SW3	AC & AFC "ON-OFF" SWITCH	17-13797
SW4	PART OF DIAL ASSEMBLY	SEE BELOW
S1	SPEAKER SOCKET	17-4153
P1	SPEAKER PLUG	——
P2	PLUG & LINE CORD ASSEMBLY	17-15791
SPK.1	DYNAMIC SPEAKER - MODEL 1237	17-13722
SPK.1	DYNAMIC SPEAKER - MODEL 1247	17-13789
SPK.2	P.M. DYNAMIC SPEAKER - MODEL 1247	17-13791
	COMPLETE DIAL ASSEMBLY	29-13786
L	DIAL LIGHT - MAZDA NO. 50 SCREW BASE	17-13792
L	DIAL LIGHT - MAZDA NO. 51 BAYONET TYPE	17-13904

NOBLITT-SPARKS INDUSTRIES, Inc.
MODELS 1427 & 1427D



RESISTORS							
R	OHM	W	PART NO	R	OHM	W	PART NO
9	1M	1/4	17-2080	117	20K	1	17-14182
11	2K	1/4	17-4202	118	300K	1/4	17-14183
13	75K	1/4	17-2087	123	100	1/4	17-14186
24	1K	1/4	17-2085	130	10K	1/3	17-14197
32	3K	1/4	17-2090	131	30K	1/3	17-14198
88	8K	1/4	17-14135				
90	500K	V.C.	17-13795				
91	100K	T.C.	17-13796				
92	150	2	17-14141				
97	900	VAR	17-14157				
102	40-2W	TAP	17-14163				
103	8K	10	17-14164				
104	10K	2	17-14165				
105	50K	1/4	17-14169				
106	50K	1/4	17-14171				
107	100K	1/4	17-14172				
108	200K	1/4	17-14173				
109	500K	1/4	17-14174				
111	20K	1/2	17-14176				
112	500	1/4	17-14177				
113	250K	1/4	17-14178				

CONDENSERS												
C	CAPACITY		VOLT	PART NO	C	CAPACITY	VOLT	PART NO	C	CAPACITY	VOLT	PART NO
1A	LARGE	SECTION ONE	VARIABLE CONDENSER	17-5723	109	.25	200	17-14136				
1B	SMALL				110	.1	200	17-14137				
2A	LARGE	SECTION TWO			112	.05	400	17-14139				
2B	SMALL				113	.0002	600	17-14143				
3A	LARGE	SECTION THREE			114	.0003	600	17-14148				
3B	SMALL				115	.00007	600	17-14149				
6	.002		800	17-2083	116	.0005	800	17-14151				
7	.0001		800	17-2084	117	.0004	600	17-14142				
9	.00		600	17-4292	125	.0000	800	17-14166				
11	16.		475	17-14002	132	30. REG	300	17-14192				
15	.05		200	17-14036	133	.03	200	17-14193				
33	.00005		600	17-14047	136	.04	600	17-14196				
37	.004		800	17-14053	137	.0015	600	17-14199				
48	.00025		600	17-14207	138	PADDER	600	17-14200				
50	PADDER		600	17-14070	139	.00155	800	17-14201				
59	.01		400	17-14815	147	.0005	800	17-14215				
85	.1		400	17-14101	148	STRIP OF 10 PADDERS		17-14209				
86	.02		600	17-14105	149	STRIP OF 10 PADDERS		17-14210				
89	.05		600	17-14106	150	STRIP OF 10 PADDERS		17-14211				
98	.000075		800	17-14122	151	.5-35 M.M.F.	PADDER	17-14216				
100	8.0		300	17-14124								

TRANSFORMERS		
T	TYPE	PART NO
1	ALLWAVE ANT. COIL	00-13858
2	ALLWAVE R.F. COIL	00-13859
3	ALLWAVE OSC. COIL	00-13860
4	455 K.C. BAND PASS	00-13853
5	455 K.C. I.F. COIL	00-13779
6	355 K.C. OSC. COIL	00-13782
7	100 K.C. I.F. INPUT	00-13780
8	100 K.C. I.F. OUTPUT	00-13781
9	100 K.C. DISCRIMINATOR	00-13783
10	OUTPUT TRANS.	17-13788
11	POWER TRANS.	00-13788
12	INPUT TRANS.	00-13852
13	OUTPUT TRANS.	17-14973

CHOKES		
X	TYPE	PART NO
1	"B" CHOKE	00-11386

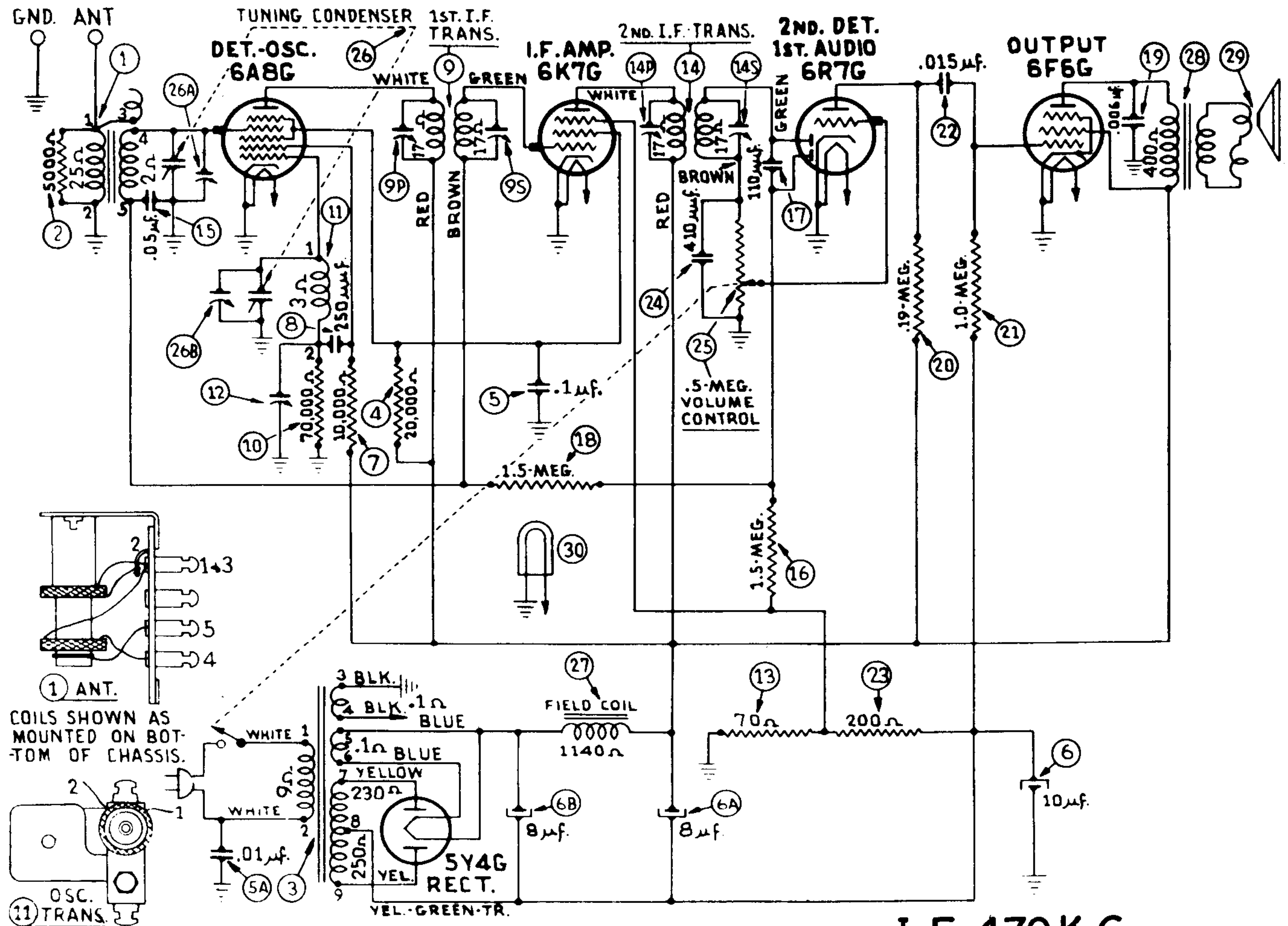
MISCELLANEOUS UNITS		
SYMBOL	DESCRIPTION	PART NO
SA	BAND SWITCH ASSEMBLY	17-13572
SW2ABC	PUSH BUTTON SWITCH (LESS PADDERS)	17-1358
SW2	PUSH BUTTON SWITCH ASSY (WITH PADDERS)	29-13576
SW3	AC-AFC & PHONO "ON-OFF" SWITCH	17-1383
S1	AC RECEPTACLE	17-1376
S2	SPEAKER SOCKET	17-14153
S3	SPEAKER SOCKET (PART OF SPK 1)	SEE BELOW
P1	PLUG & LINE CORD ASSEMBLY	17-13579
P2	SPEAKER PLUG (PART OF SPK 1)	SEE BELOW
P3	SPEAKER PLUG (PART OF SPK 2)	SEE BELOW
SPK1	DYNAMIC SPEAKER 12"	17-13787
SPK2	DYNAMIC SPEAKER 6"	17-13785

"A" BAND - 535 TO 1600 M.C. - BALANCE AT 1400 M.C.
CHECK AT 1000 M.C. - PAD AT 600 M.C.
"B" BAND - 1575 TO 4750 M.C. - BALANCE AT 4.2 M.C.
CHECK AT 3.0 M.C. - CHECK AT 1.8 M.C.
"C" BAND - 4725 TO 740 M.C. - BALANCE AT 7.0 M.C.
CHECK AT 6.0 M.C. - PAD AT 5.0 M.C.
"D" BAND - 735 TO 11.6 M.C. - BALANCE AT 1.0 M.C.
CHECK AT 9.5 M.C. - CHECK AT 8.0 M.C.
"E" BAND - 11.5 TO 18.2 M.C. - BALANCE AT 17.0 M.C.
CHECK AT 15.0 M.C. - CHECK AT 12.0 M.C.

FIRST I.F. PEAK 455 K.C.
SECOND I.F. PEAK 100 K.C.
SECOND OSCILLATOR 355 K.C.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-93



Schematic Diagram, Model 37-93

I. F. 470 K.C.

Replacement Parts — Model 37-93

Schem. No.	Description	Part No.	List Price
1	Ant. Transformer	32-2329	$1.00
2	Resistor (5000 ohms)	33-250339	.20
3	Power Transformer 115 volts 50 to 60 cycles	32-7780	3.60
	Power Transformer 110/220 volts 50 to 60 cycles	32-7782	4.00
4	Resistor (20,000 ohms, 1 watt)	33-320439	.20
5	Condenser (.01, .1 mfd. Dual Bakelite)	4989FG	
6	Elect. Cond. (8, 8, 10 mfd.)	30-2073	3.15
7	Resistor (10,000 ohms ½ watt)	33-310339	.20
8	Condenser (250 mmfd. mica)	30-1032	.25
9	1st I. F. Transformer Assembly	32-2457	
10	Resistor (70,000 ohms, ½ watt)	33-370339	.20
11	Oscillator Trans. Assembly	32-2330	.90
12	Compensator (osc. series)	Part of (11)	
13	Resistor (70 ohms ½ watt)	33-070339	.20
14	2nd I. F. Transformer Assembly	32-2459	
15	Condenser (.05 mfd. tubular)	30-4444	.20
16	Resistor (1.5 ohms, ½ watt)	33-515339	.20
17	Condenser (110 mmfd. mica)	33-1031	.20
18	Resistor (1.5 ohms, ½ watt)	33-515339	.20
19	Condenser (.006 mfd. tubular)	30-4445	.20
20	Resistor (190,000 ohms, ½ watt)	33-419339	.20
21	Resistor (1 megohm, ½ watt)	33-510339	.20
22	Condenser (.015 mfd. Bakelite)	3793SU	.35
23	Resistor (200 ohms Bakelite)	33-1210	.20
24	Condenser (410 mmfd. mica)	30-1000	$0.25
25	Volume Control	33-5193	1.45
26	Tuning Condenser	31-1932	2.75
27	Field Coil Assembly	36-3243	2.40
28	Output Trans.	32-7019	.85
29	Cone and Voice Coil Assembly	36-3014	1.00
	Cabinet	10227B	
	Cable A. C.	L-2183	.40
	Cable (Speaker)	L-2610	.20
	Dial Scale	27-5280	.15
	Dial Pointer	27-7933	.01
	Knob (Tuning and Volume)	27-4282	.10
	Mtg. Bolt	40-5790	
	Shield (1st I. F.)	38-7763	.20
	Shield (2nd I. F.)	38-8146	
	Shield (Tube)	28-2726	.10
	Socket (8 prong)	27-6058	.11
	Socket (7 prong)	27-6057	.11
	Speaker SB2	36-1127	5.75
	Terminal Panel, (R. F. Trans.)		
	Vernier Drive Assembly	45-2171	
	Washer Felt	27-7807	.50 C

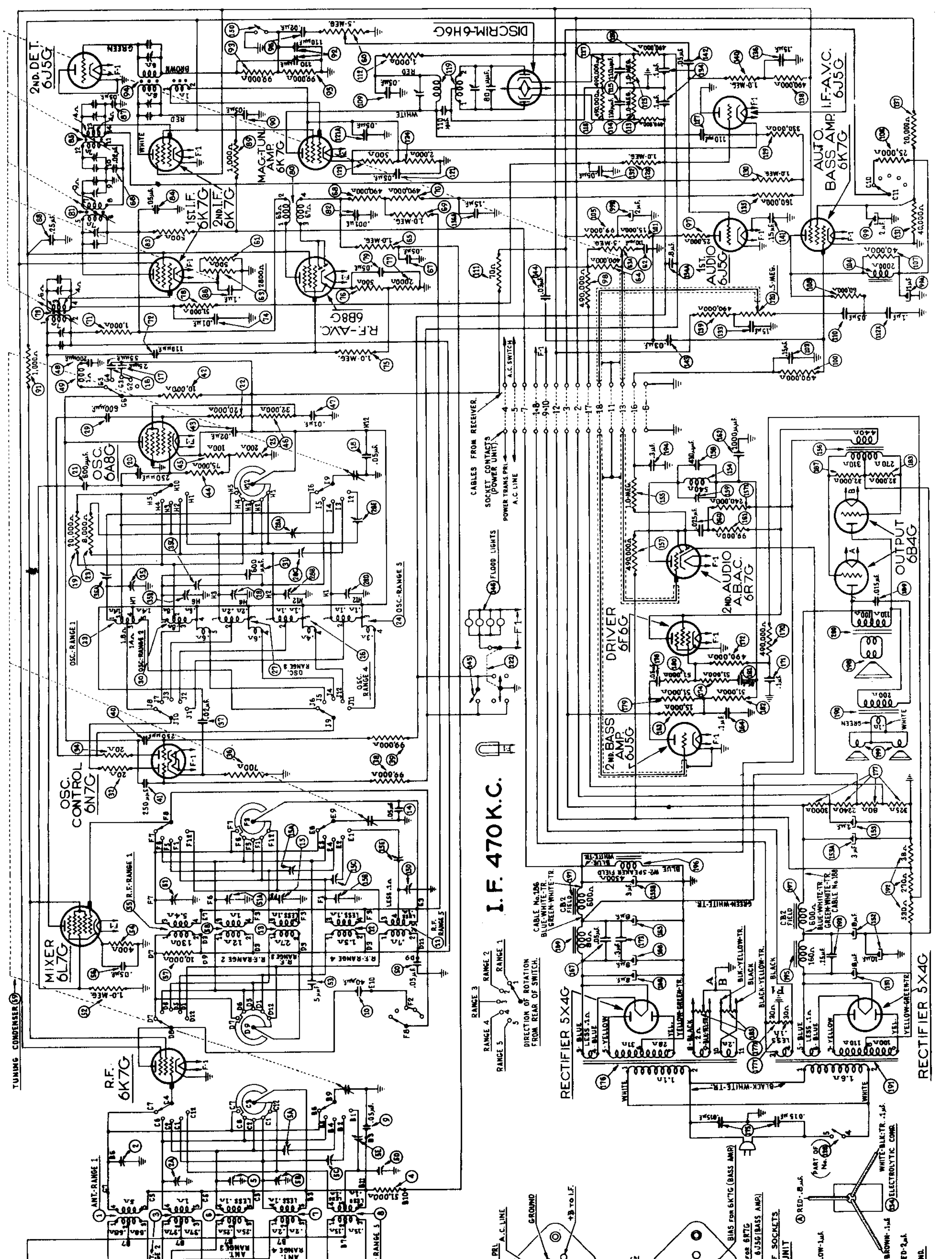
CABINET PARTS

	Baffle & Silk Assembly	40-5988	.30

NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

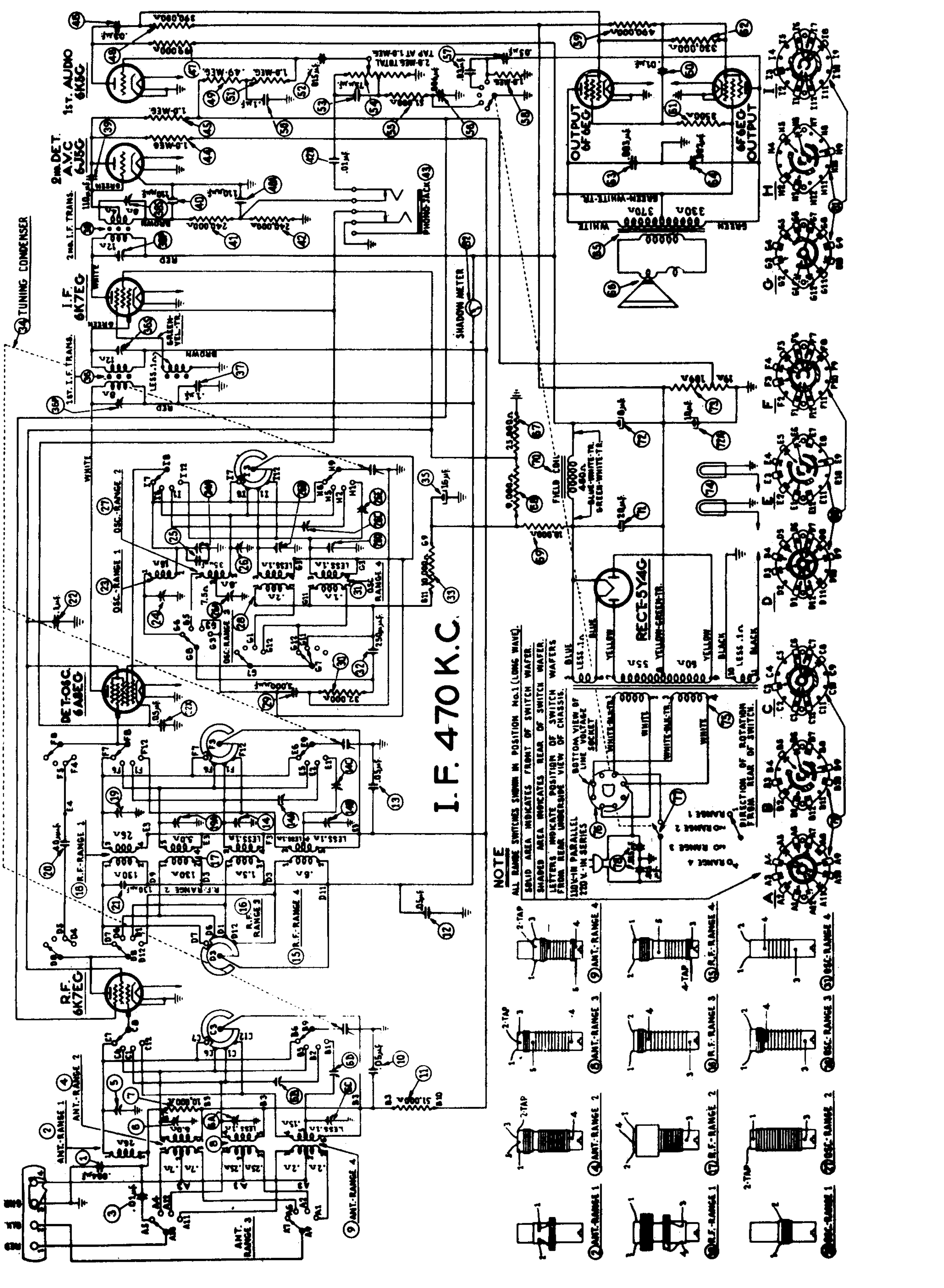
MODEL 37-690



NOTE: See page 237 before servicing this set.

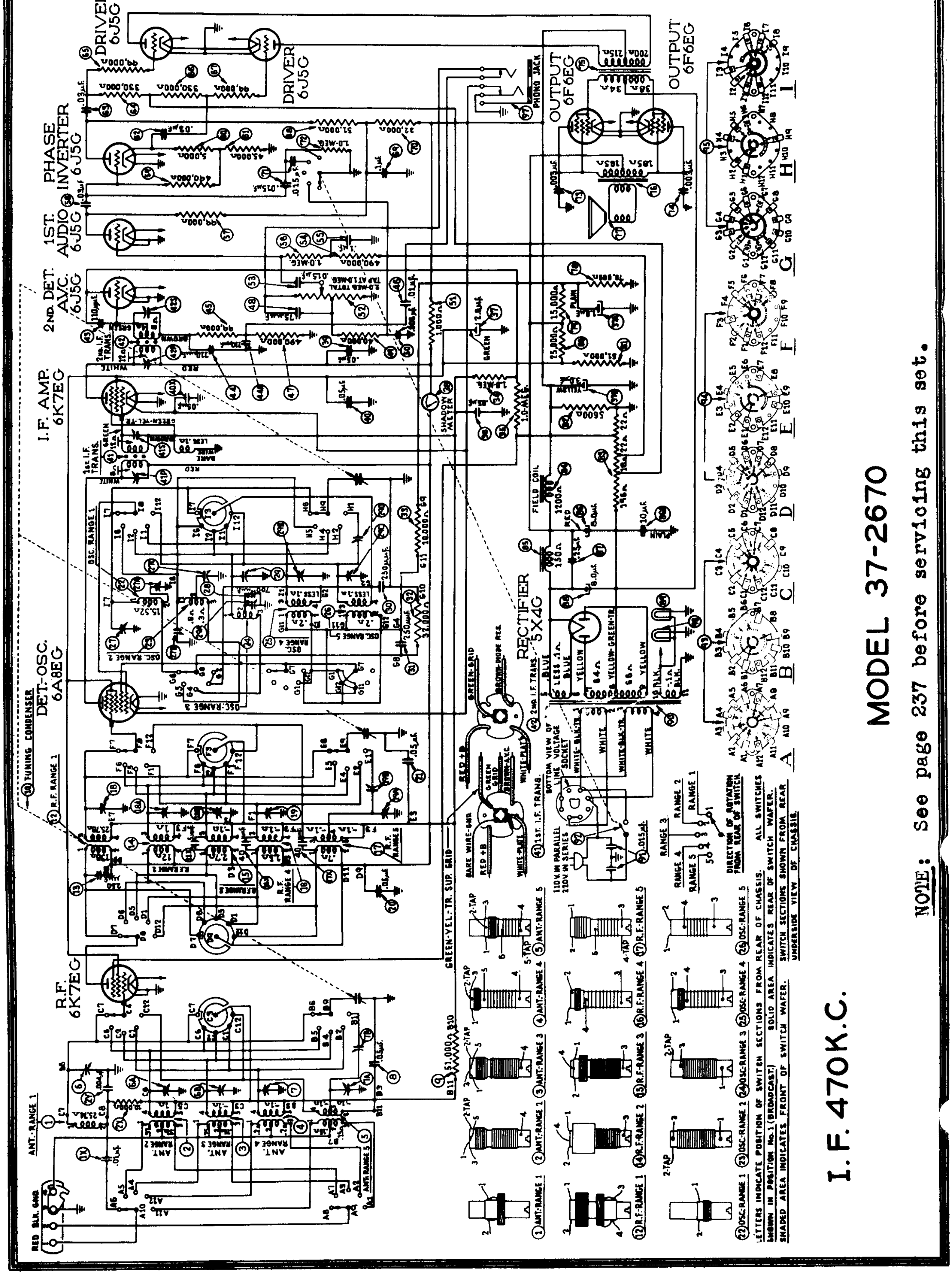
PHILCO RADIO & TELEVISION CORPORATION

MODEL 37-2650



NOTE: See page 237 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

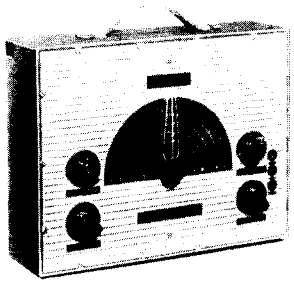


PHILCO RADIO & TELEVISION CORP.

NOTES on ADJUSTING 1938 PHILCO RECEIVERS

and Instructions for "SETTING UP" Local Stations on Cone-Centric Automatic Tuning Models —

SIGNAL GENERATOR AND "STATION SETTER"



The Philco Model "077" AC operated All-Wave Signal Generator was developed by Philco engineers in conjunction with the 1938 Philco Radio sets, and is therefore the correct instrument to use in making adjustments on these as well as Philco receivers previous to 1938 models.

(For adjusting battery operated sets, or wherever "AC" is not available, the Model "088" battery operated Philco Signal Generator is recommended.)

"Setting up" of the special local stations named on the dial of the 1938 "Cone-centric" tuning Philcos, requires the use of an accurate signal generator unaffected by temperature, climate or line voltage variation. The Model "077" was developed primarily to take care of this requirement.

SETTING STATIONS ON CONE-CENTRIC TUNING MODELS

The 1938 Philco Models 4, 7 and 22, are equipped with a special type of automatic tuning known as "Cone-centric" tuning. Each receiver is supplied with a special dial on which a dozen or so of the popular nearby stations are marked in large black letters, in addition to the regular scales on the dial.

When the receiver is shipped, a temporary "dummy" dial is installed at the factory. When the dealer installs the set, he must remove this temporary dial, and install the permanent one in such a way that the marked stations will be tuned in perfectly when the pointer is turned to them by using the automatic tuning feature.

The instructions below cover this procedure.

Fig. 1—Connecting Station Setter Output Lead to Wire on Tuning Condenser

I.—Installing the Special Local Dial

A. Remove the tuning handle spring shipping clamp. The knurled dial bezel and glass is now removed by turning counter-clockwise until it is released, and then pulling it from the housing.

B. Remove the Station Finder Pointer by pulling it off the shaft. This pointer is keyed in its correct position on the shaft. Do not turn the pointer as you take it off.

C. Remove the round dial retaining spring and the dial furnished with the receiver.

D. Place the special local dial in position. The square index slot at the top of the dial must align with the index at the top of the dial drum.

E. Replace the round dial retaining spring; pointer and bezel. With the new special dial in place the adjustment of the stations is as follows:

II.—Setting Station Stops for Automatic Tuning

A. Remove the Philco High Efficiency Aerial from the receiver. Turn the receiver "On-Off" Switch to the first position and adjust

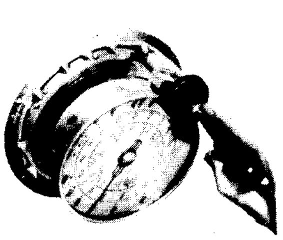


Fig. 2—Tuning Handle and Wrench Engaging stop

range switch for operation on the broadcast band.

Pull the tuning handle knob all the way out and turn handle until dial pointer is at 540 K.C. There are three positions of the tuning knob: "Out," "Intermediate" and "In." The "Out" position is for silent tuning between stations. The "Intermediate" position is for manual tuning and the "In" position when automatically tuning a station. Set the knob in the "Intermediate" position by pressing in about ⅛ of an inch. The proper point will be indicated by a slight click.

B. *Clip the output lead of the Model 077 Station Setter to the insulation on the wire that is soldered to the middle section of the tuning condenser gang of Model 38-4 (see Fig. 1). In Model 38-7 the lead is clipped to the insulation on the wire that is soldered to the rear section (nearest the back of the radio) of the tuning condenser. Connect the ground connection of the output lead to radio chassis. See note given below for attaching output lead on Model 38-22.

C. Plug the output leads of the Station Setter into the "High" and "Gnd" jack, and turn the "Attenuator" control to maximum.

D. The Philco Model 077 Station Setter "Band Switch" is turned to Range "B" and the modulation control turned to "Mod. Off."

E. Now slowly turn Station Setter Indicator to 470 K.C. As the indicator is turned there will be two points at which a high pitched swish will be heard, one above and one below the 470 K.C. mark. Center the indicator between these two points. When the indicator is correctly centered, minimum high pitch swish will be heard.

F. Connect the Philco High Efficiency Aerial to the receiver. Transfer the Station Setter output lead clip to the insulation of the grid lead of the "I.F." tube. (See Fig. 1.) The chassis shown in this figure is Model 38-4. In Models 38-7 and 38-22 this "I.F." lead is located on the can directly in back of the 6A8G tube.

G. Swing tuning handle to the extreme clockwise position—pointer at 1700 K.C.—then press the tuning handle all the way in and swing it counter-clockwise (pointer moves towards low frequency end) until it hits the first station stop. Now pull the knob out and move it to the right about ¼ of an inch, then press in again. The handle should then engage the first stop.

1. With the knob engaging the stop insert the Philco Wrench Part No. 45-2475 into the hole of the tuning knob until it engages the stop head (see Fig. 2).
2. Turn the wrench counter-clockwise about a half turn to loosen screw. When the screw is loose rotate the tuning handle until the station pointer is at the first station printed on the dial at the high frequency end of scale. Be careful to keep the tuning handle and wrench pressed in against the station stop so that the stop moves along its track to the position it is to occupy for automatically tuning the station.

H. As the Station Finder hand approaches the desired station a whistle will be heard —first very shrill and then gradually getting lower in frequency as the station is tuned in.

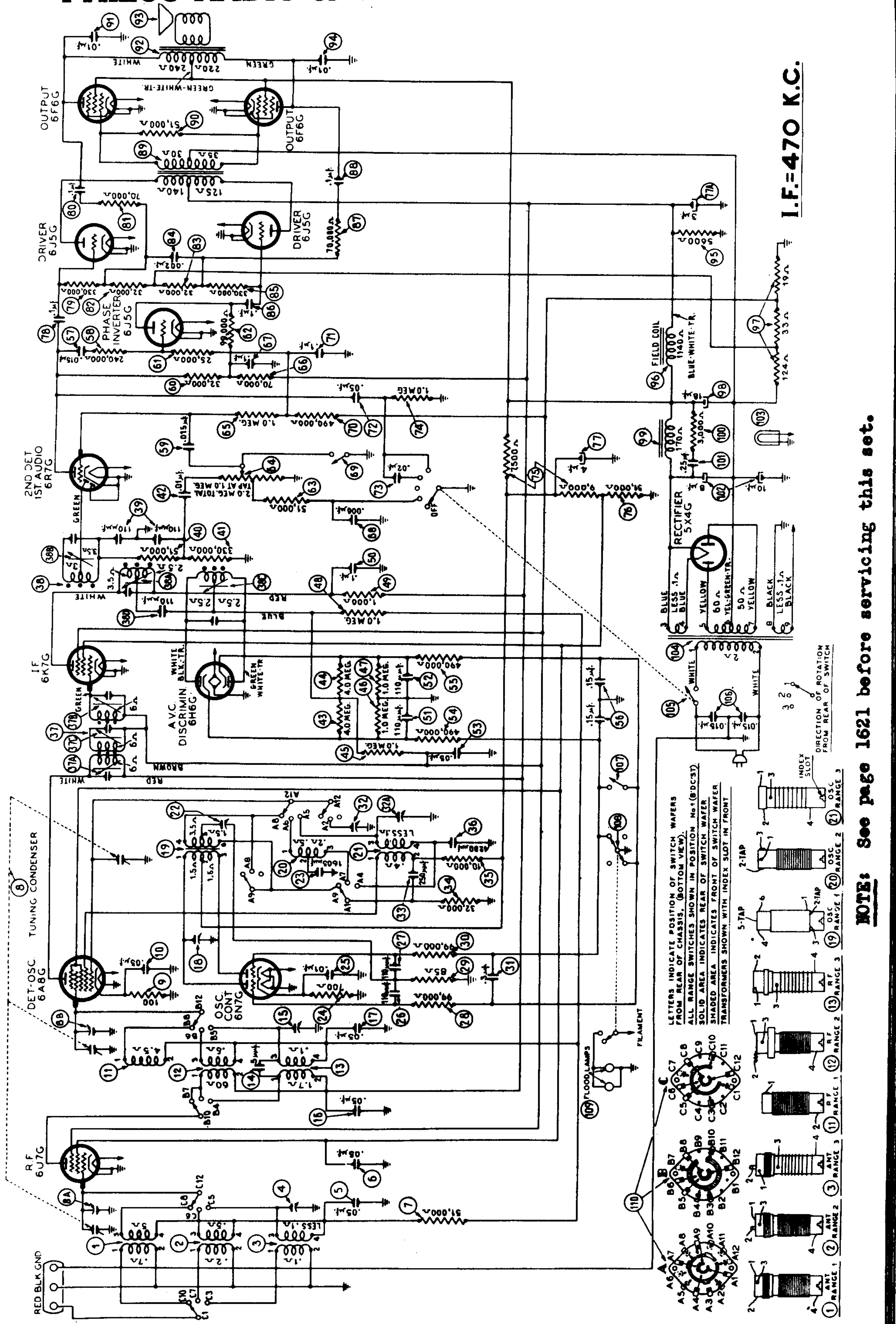
1. When the whistle is first heard, tune with slow-speed Station Selector knob.
2. At the exact point at which the station is perfectly tuned, this low frequency whistle will no longer be heard. This is the exact point at which the station indexing stop must be locked.
3. When this point is reached, turn the wrench clockwise and lock the stop in position, being careful when tightening screw that the station is not detuned, which would cause whistle to reappear.
4. If the whistle reappears after tightening screw, repeat the above procedure (H).

After setting up the first station, the same procedure given under "G" and "H" is used for the other stations.

*When aligning Model 38-22, a set transformer, Part No. 32-2763, should be connected between the Station Setter and receiver. Five terminals are provided on the transformer for this purpose. Connect the Station Setter output lead to No. 1 terminal and the output lead ground connection to terminal No. 2. Terminal No. 3 is connected to the receiver ground terminal and terminal No. 5 to the grid lead of the tube.

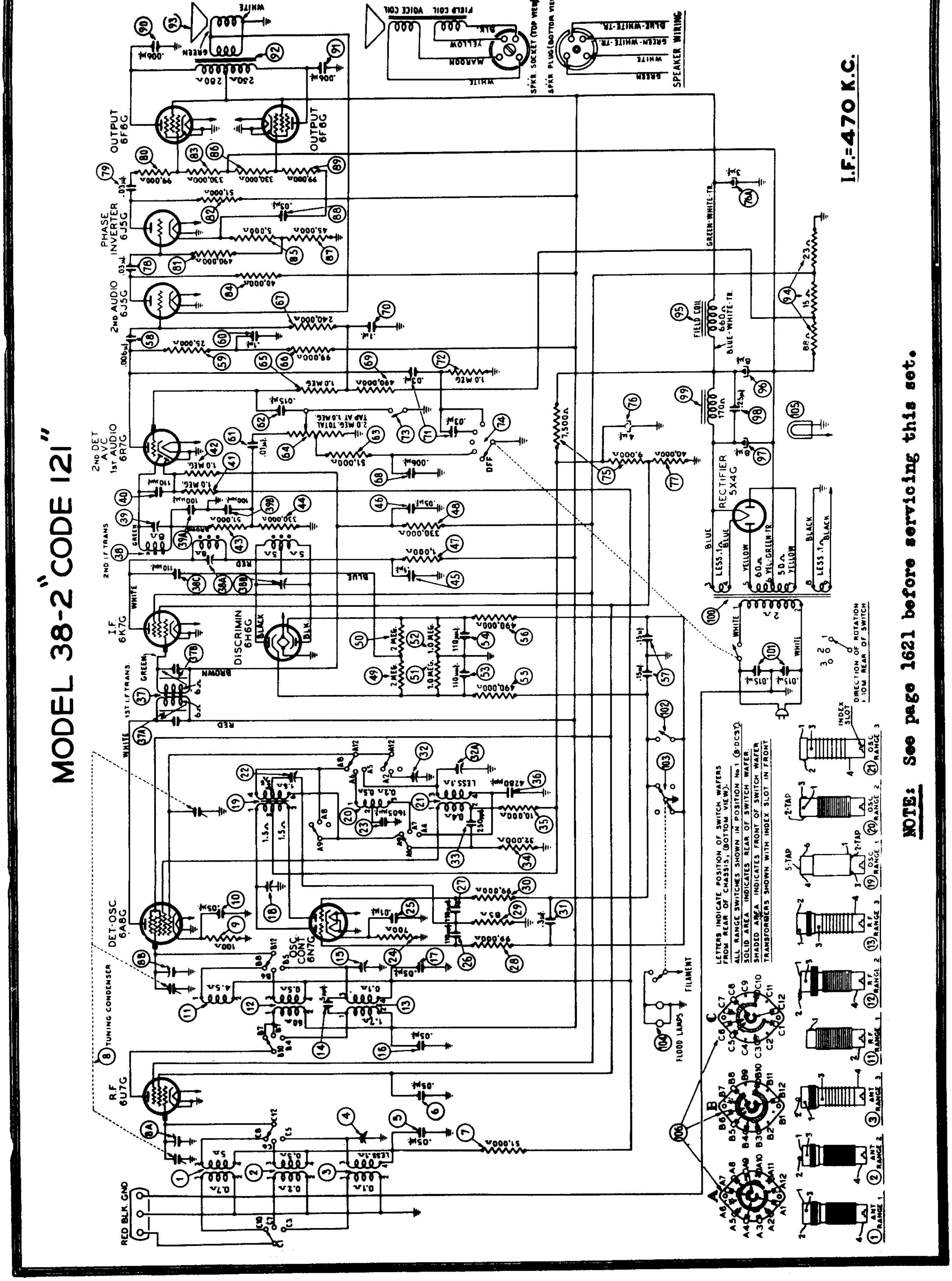
PHILCO RADIO & TELEVISION CORPORATION

MODEL 38-1 "CODE 121"



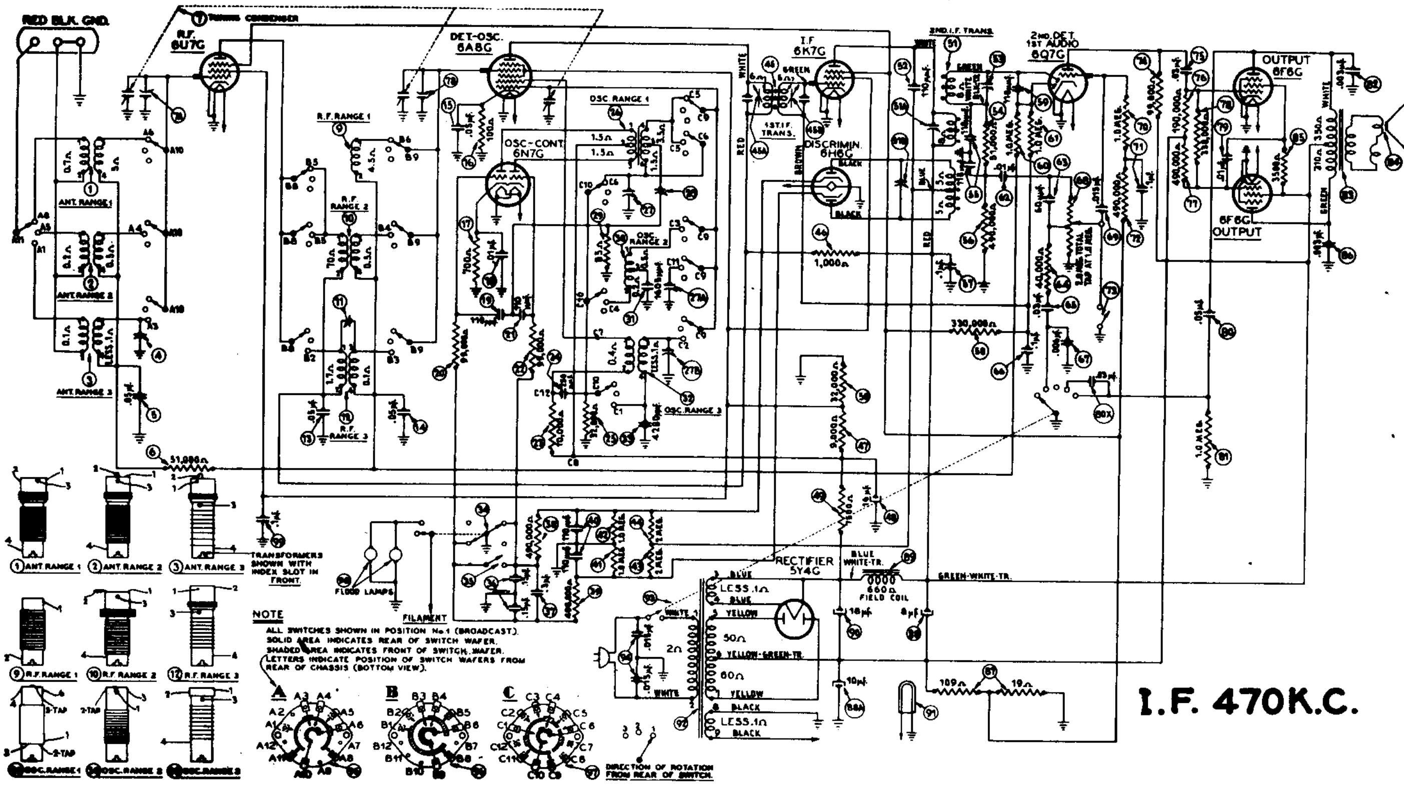
NOTE: See page 1621 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

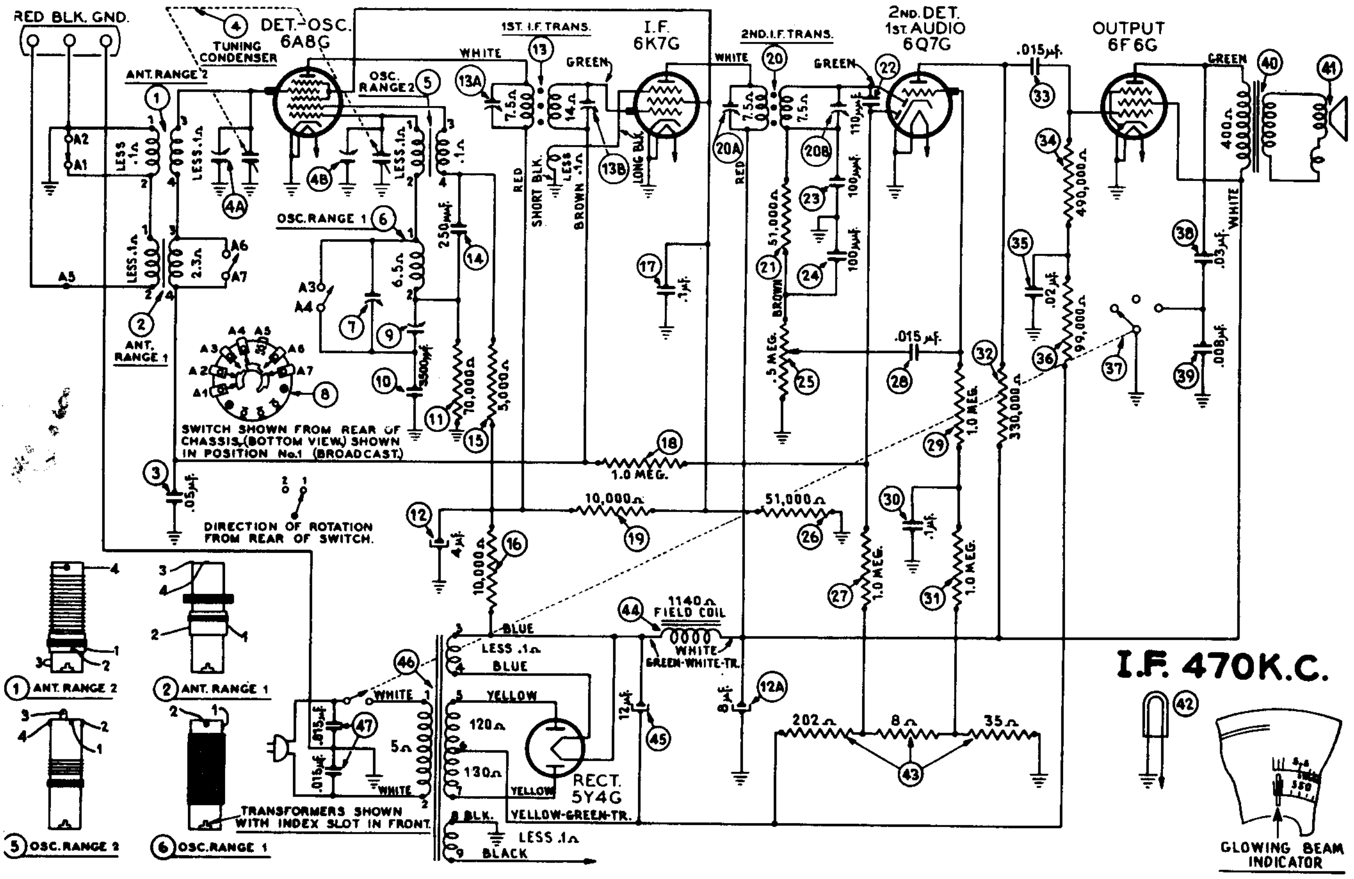


PHILCO RADIO & TELEVISION CORPORATION

MODEL 38-3 "CODE 121"



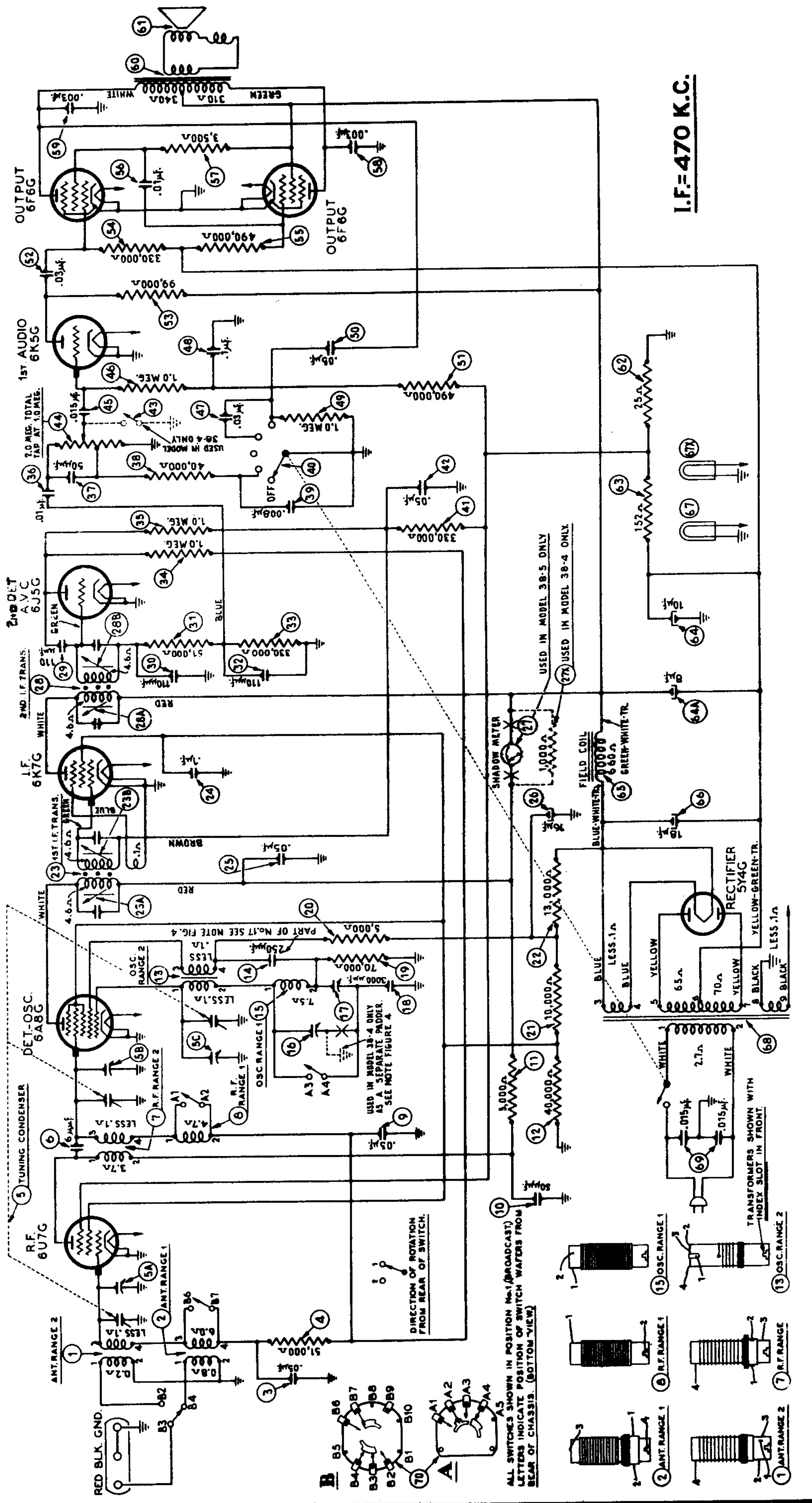
MODEL 38-10 "CODE 121"



NOTE: See page 1621 before servicing this set.

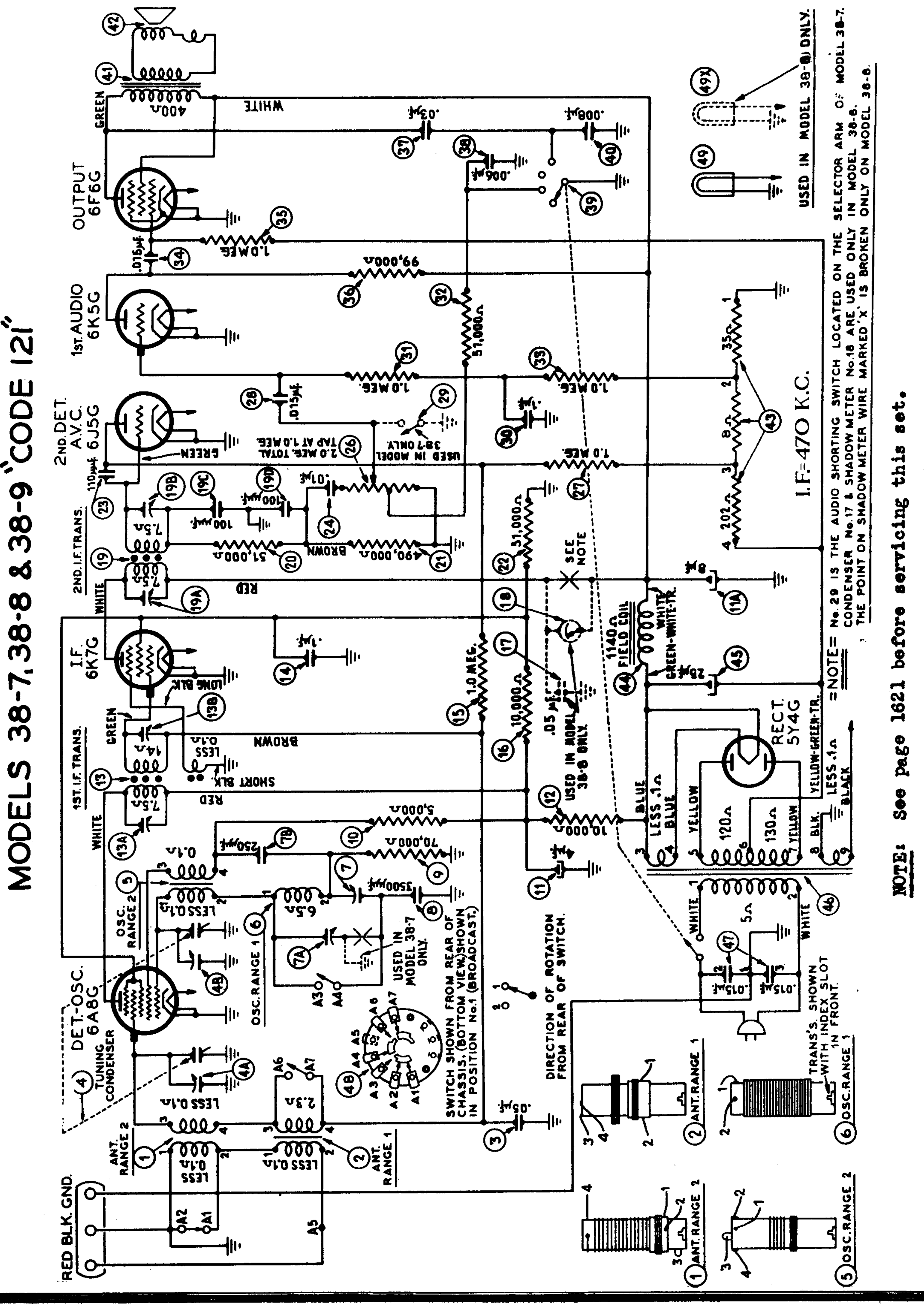
PHILCO RADIO & TELEVISION CORPORATION

MODELS 38-4 & 38-5 "CODE 121"



NOTE: See page 1621 before servicing this set.

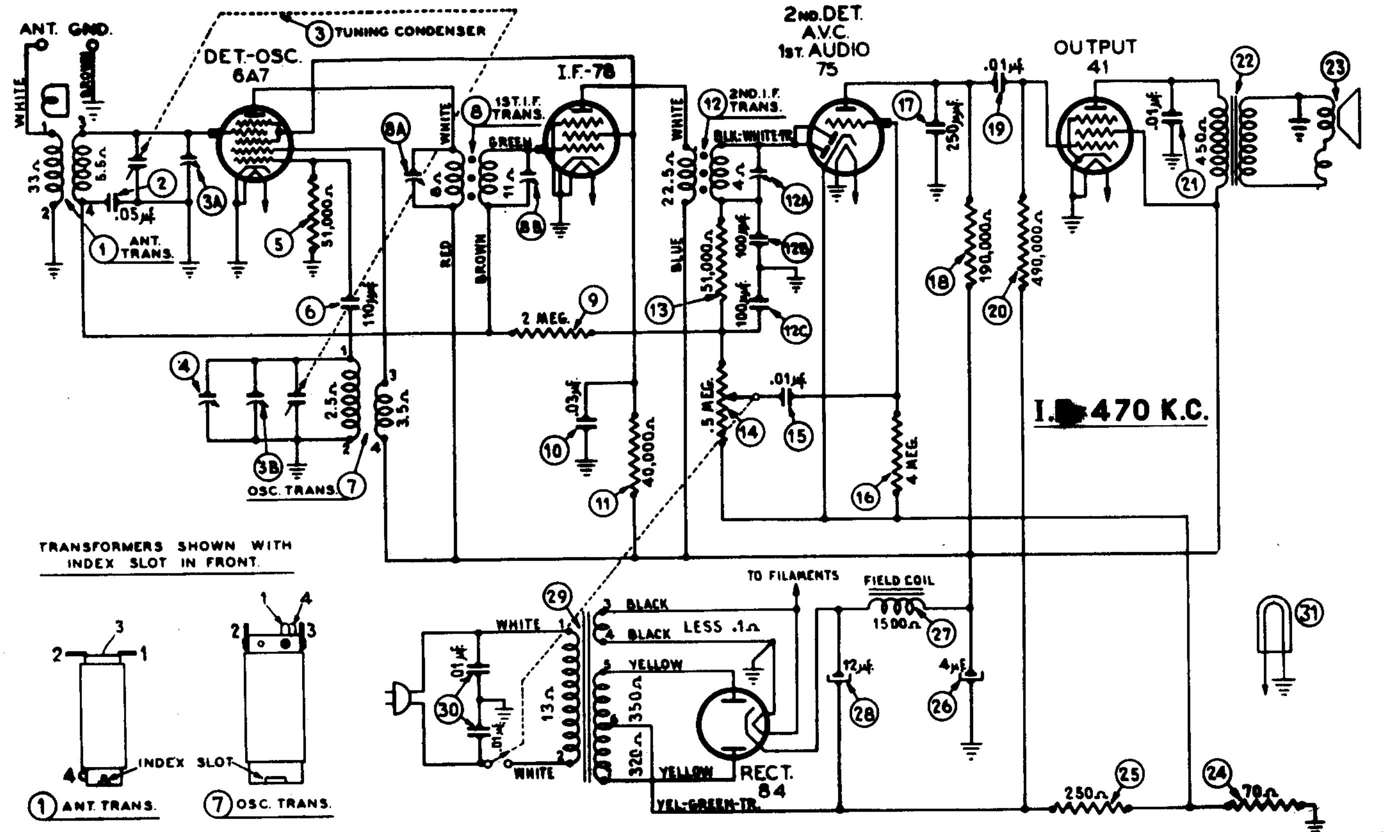
PHILCO RADIO & TELEVISION CORPORATION



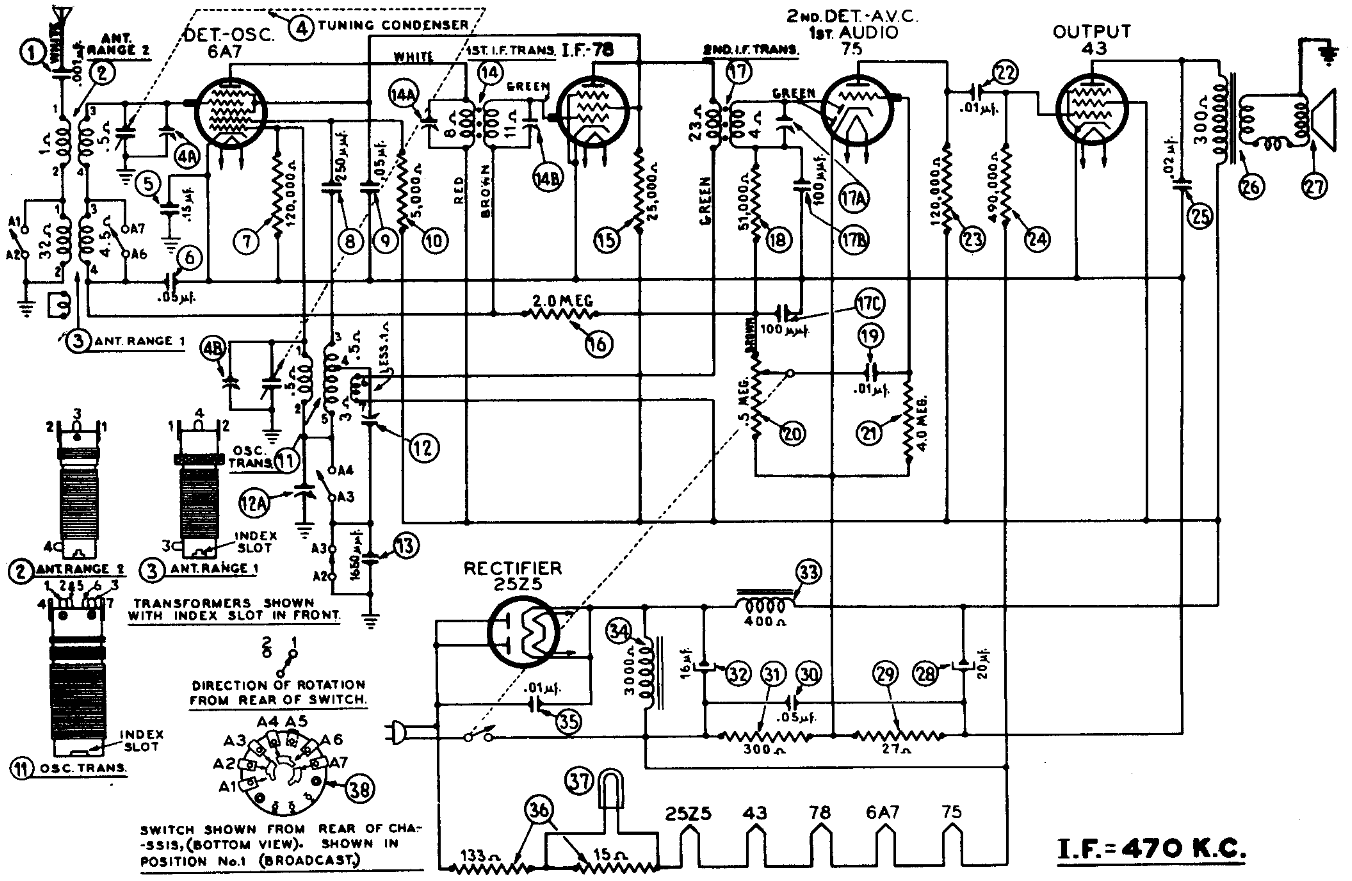
NOTE: See page 1621 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 38-12 "CODE 121"



MODEL 38-14 "CODES 121 & 124"

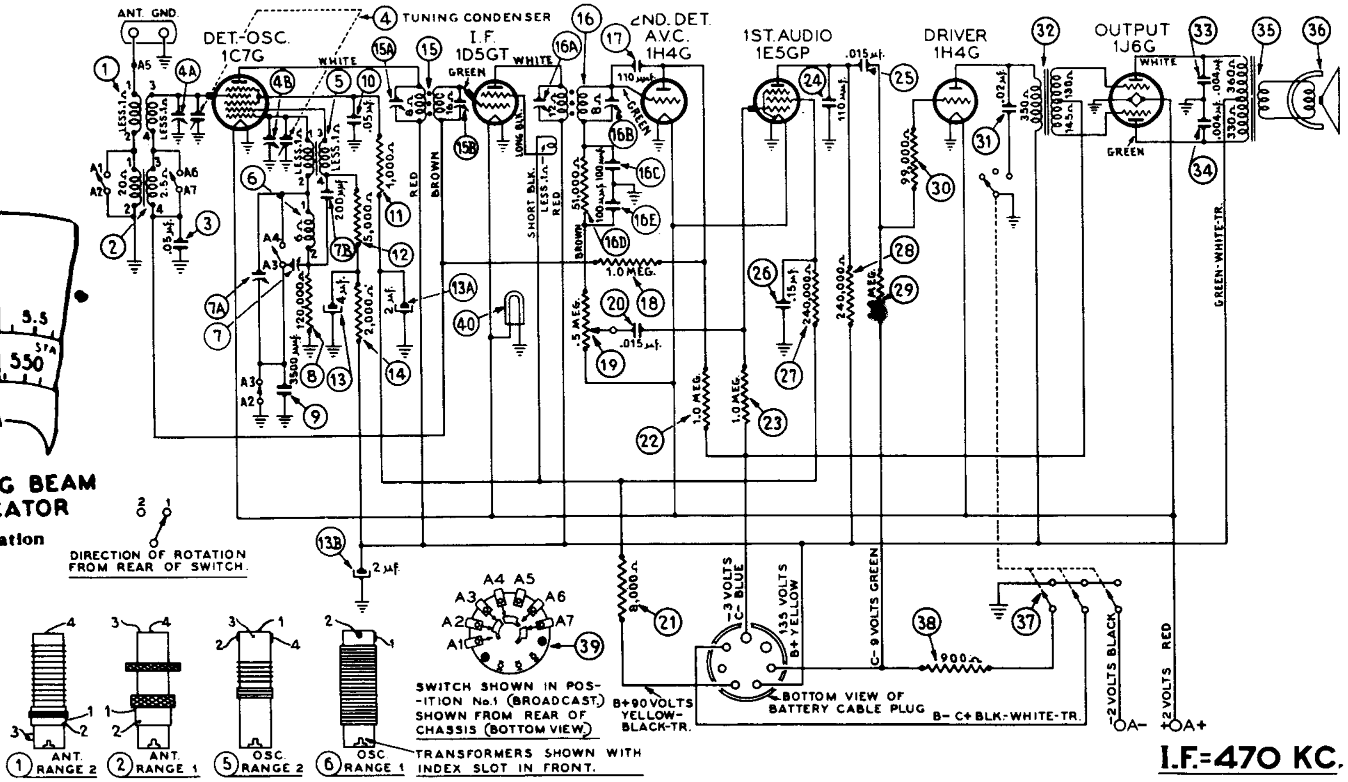


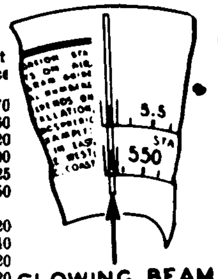
NOTE: See page 1621 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 38-38 "CODE 121"

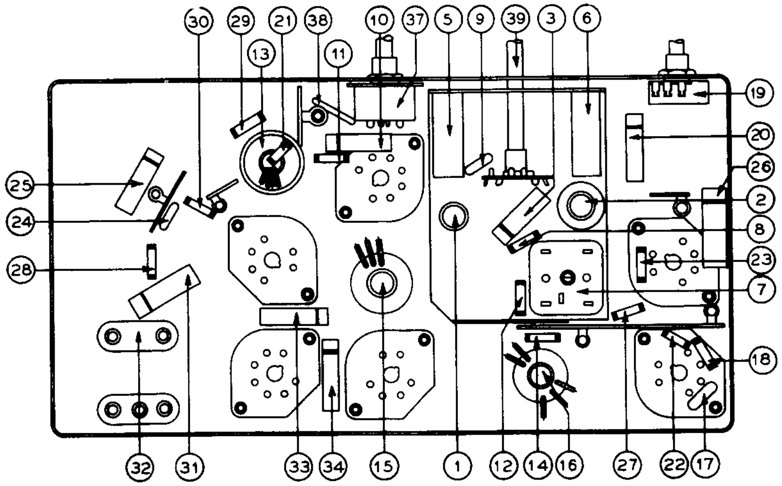
I.F.=470 KC.





GLOWING BEAM INDICATOR

Dial Calibration



Replacement Parts

Schem. No.	Description	Part No.	List Price
1	Antenna Transformer Range (2)	32-2558	$0.70
2	Antenna Transformer Range (1)	32-2667	1.60
3	Condenser (0.5 µf, tubular)	30-4519	.20
4	Tuning Condenser	31-2025	5.00
5	Oscillator Coil Range (2)	32-2668	1.25
6	Oscillator Coil Range (1)	32-2559	.50
7	Padding Condenser	31-6188	
8	Resistor (120,000 Ω, ½ W.)	33-412339	.20
9	Condenser (3500 µµf, Mica)	30-1094	.40
10	Condenser (.05 µf, tubular)	30-4444	.20
11	Resistor (1000 Ω ½ W.)	33-210339	.20
12	Resistor (5000 Ω, ½ W.)	33-250339	.20
13	Electrolytic Condenser (4—2—2 µf)	30-2241	1.50
14	Resistor (2000 Ω, ½ W.)	33-220339	.20
15	First I. F. Transformer	32-2664	2.20
16	Second I. F. Transformer	32-2666	2.20
17	Condenser (110 µµf, Mica)	30-1031	.20
18	Resistor (1 megohm, ½ W.)	33-510339	.20
19	Volume Control	33-5234	1.00
20	Condenser (.015 µf tubular)	30-4358	.20
21	Resistor (8000 Ω, ½ W.)	33-280339	.20
22	Resistor (1 megohm, ½ W.)	33-510339	.20
23	Resistor (1 megohm, ½ W.)	33-510339	.20
24	Condenser (110 µµf, Mica)	30-1031	.20
25	Condenser (.015 µf, tubular)	30-4515	.20
26	Condenser (.15 µf, tubular)	30-4191	.25
27	Resistor (240,000 Ω, ½ W.)	33-424339	.20
28	Resistor (240,000 Ω, ½ W.)	33-424339	.20
29	Resistor (1 megohm, ½ W.)	33-510339	.20
30	Resistor (99,000 Ω, ½ W.)	33-399339	.20
31	Condenser (.02 µf, tubular)	30-4215	.20
32	Input Transformer	32-7637	2.00
33	Condenser (.004 µf, tubular)	30-4456	.20
34	Condenser (.004 µf, tubular)	30-4456	.20
35	Output Transformer	32-7758	1.50
36	Cone and Voice Coil Assembly	36-3540	1.00
37	Power and Tone Switch	42-1351	
38	Resistor (900 Ω, 1 W.)	33-1223	.20
39	Range Switch	42-1358	.75
40	Pilot Light	34-2150	.22
	Cable (Battery)	41-3198	1.40
	Cable (Speaker)	41-3326	.40
	Clip (Mtg. R. F. Trans.)	28-5002	
	Dial	27-5333	.60
	Dial Washer	27-4598	.03
	Dial Clamp	27-5089	
	Knob (Tuning)	27-4330	
	Knob (Vernier)	27-4331	
	Knob (Tone, Volume)	27-4332	
	Mtg. Rubber (Chassis)	27-4564	
	Mtg. Rubber (Tuning Condenser)	27-4599	
	Mtg. Rubber (Screen Bracket)	27-4570	
	Screen	27-5320	
	Shield (Tube)	28-2725	
	Socket Assembly (Pilot Lamp)	38-9002	
	Socket (6 prong)	27-6086	.11
	Socket (7 prong)	27-6087	.11
	Terminal Panel (Ant.)	38-8849	.10
	Vernier Drive Assembly	31-2072	1.00

Schem. No.	Description	Part No.	List Price
	MODEL 38-38T		
	Bezel Frame Assembly	40-6124	$0.90
	Bezel Gasket	27-8311	.01
	Bezel Glass	27-8298	.05
	Bezel Ring	28-5078	.55
	Speaker KR-26	36-1353	10.00
	MODEL 38-38 K, X		
	Bezel Frame Assembly	40-6128	1.05
	Bezel Gasket	27-8313	.01
	Bezel Glass	27-8300	.06
	Bezel Ring	28-5080	.70
	Speaker (HR-20)	36-1351	
	Battery (A)	172R	
	Battery (B)	41-8007	

NOTE: See page 1621 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 38-39 CODE 121"

Replacement Parts

Schem. No.	Description	Part No.	List Price
1	Transformer, Antenna Short Wave	32-2558	$0.70
2	Transformer, Antenna Broadcast	32-2667	1.60
3	Condenser (.05 μf—.05 μf)	30-4489	.35
4	Resistor (70 Ω, ½ Watt)	33-070339	.20
5	Wave Switch	42-1358	.75
6	Tuning Condenser Assembly	31-2065	
7	Transformer, Oscillator Short Wave	32-2668	1.25
8	Transformer, Oscillator Broadcast	32-2559	.50
9	Padder	31-6188	.50
10	Resistor (5000 Ω, ½ Watt)	33-250339	.20
11	Resistor (120,000 Ω, ½ Watt)	33-412339	.20
12	Condenser, Mica (3500 μμf)	30-1094	.40
13	Condenser, (.05 μf)	30-4444	.20
14	Resistor (2000 Ω, ½ Watt)	33-220339	.20
15	Electrolytic Condenser	30-2226	
16	I. F. Transformer, First	32-2664	2.20
17	Resistor (1.5 megohms, ½ Watt)	33-515339	.20
18	Resistor (600 Ω, ½ Watt)	33-1235	.20
19	I. F. Transformer, Second	32-2666	2.20
20	Resistor (51,000 Ω, ½ Watt)	33-351339	.20
21	Condenser, Mica (110 μμf)	30-1031	.20
22	Resistor (11.7 Ω, ½ Watt)	33-1264	.20
23	Condenser (.015 μf)	30-4515	.20
24	Condenser (.1 μf)	30-4122	.20
25	Condenser (.01 μf)	30-4479	.20
26	Resistor (240,000 Ω, ½ Watt)	33-424339	.20
27	Resistor (240,000 Ω, ½ Watt)	33-424339	.20
28	Resistor (1 megohm, ½ Watt)	33-510339	.20
29	Resistor (99,000 Ω, ½ Watt)	33-399339	.20
30	Resistor (2.0 megohms, ½ Watt)	33-520339	.20
31	Volume Control (.5 megohm)	33-5234	1.00
32	Resistor (20 Ω, ½ Watt)	33-1265	.20
33	Resistor (16.4 Ω, ½ Watt)	33-1266	.20
34	Bias Cell Assembly	38-7275	.20
35	Resistor (25,000 Ω, ½ Watt)	33-325339	.20
36	Resistor (4,000 Ω, ½ Watt)	33-240239	.20
37	Transformer—Push-pull Input	32-7637	2.00
38	Condenser (.02 μf)	30-4215	.20
39	Resistor (8.3 Ω, ½ Watt)	33-1268	.20
40	Transformer—Output	32-7758	
41	Cone & Voice Coil Assembly (KR26)	36-3540	1.00
	Cone & Voice Coil Assembly (HR20)	36-3797	
42	Dial Lamp	34-2150	.22
43	Resistor (16.7 Ω, ½ Watt)	33-1267	.20
44	Power Switch Tone Control	42-1363	1.00
45	Choke	32-7543	1.35
46	Condenser, (0.002 μf tubular)	30-4177	.25
47	Vibrator	41-3222	5.25
48	Power Transformer	32-7682	2.20
49	Condenser (.01 μf)	30-4381	.25
50	Choke ("B")	32-1932	.25
51	Choke ("A")	32-1954	.40
52	Condenser, Mica .250 μμf	5858	.25
53	Condenser, (.5 μf)	30-4296	.60
54	Condenser, (.5 μf)	30-4296	.60
55	Condenser, (.5 μf)	30-4296	.60
56	Choke	32-2247	
57	Condenser, (600 μμf) mica	30-1049	.25

MODEL 38-39 (Code 121)

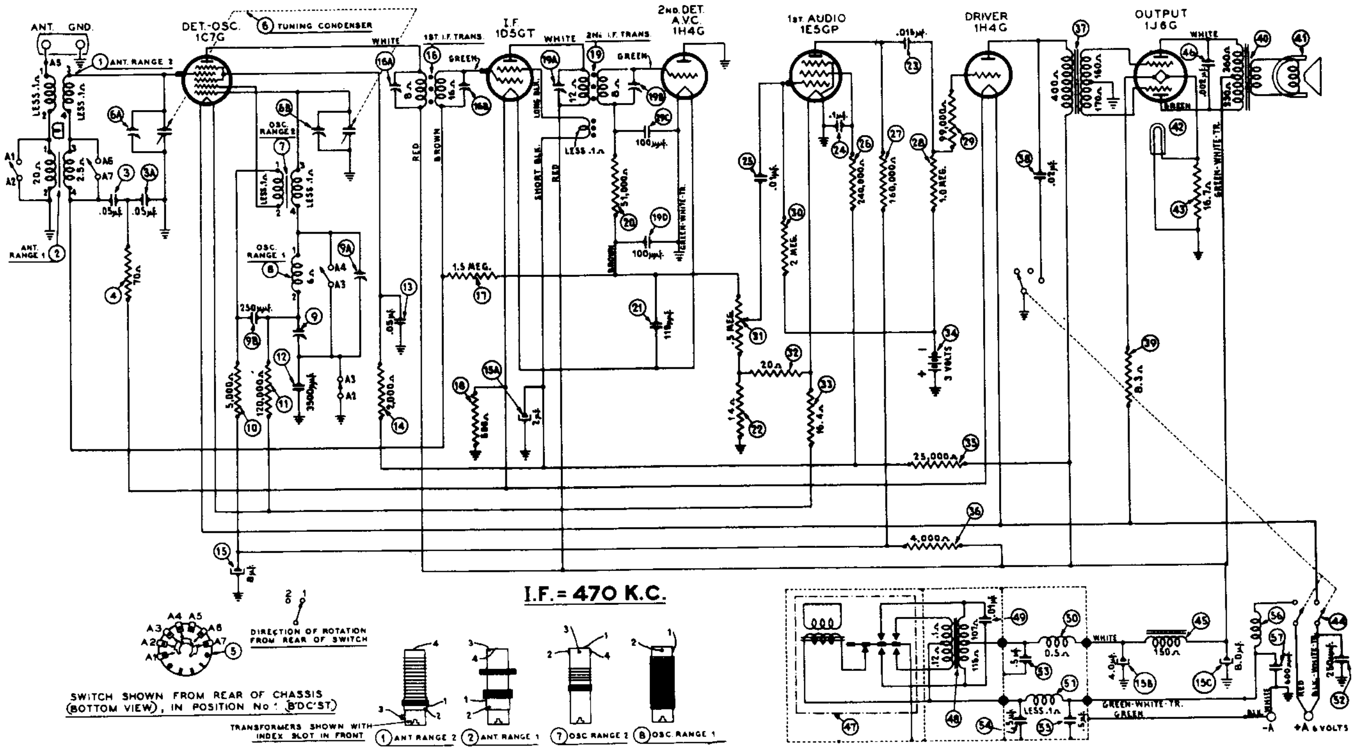
Schem. No.	Description	Part No.	List Price
	Cable (Vibrator Unit)	41-3328	
	Cable (Battery)	41-3204	
	Cable (Speaker)	41-3326	.40
	Clip (R. F. Coils)	28-5002	.02
	Dial	27-5333	
	Dial Washer	27-4598	.03
	Dial Clamp	28-5089	.03
	Knob (Tuning)	27-4330	.10
	Knob (Tuning Vernier)	27-4331	.10
	Knob (Tone & Volume)	27-4332	
	Mtg. Panel (Bias Cell)	38-9104	
	Mtg. Corner (Chassis)	27-4564	.10
	Mtg. Rubber (Vibrator) (Small)	27-4307	
	Mtg. Rubber (Vibrator, Assem.) (large)	27-4585	
	Mtg. Rubber (Vibrator) (Square)	27-4287	
	Mtg. Sleeve (Vibrator)	28-6521	
	Mtg. Screw (Vibrator)	W-614	
	Shield (Vibrator)	38-8022	
	Shield (Tube)	28-2726	$0.10
	Screen	27-5320	.75
	Socket (Pilot Lamp)	38-9006	
	Socket (6 prong)	27-6086	.11
	Socket (7 prong)	27-6087	.11
	Socket (Vibrator)	27-6036	
	Terminal Panel (Ant.)	38-8849	.10
	Vernier Drive	31-2072	1.00
	Vibrator Socket Assembly	41-3327	

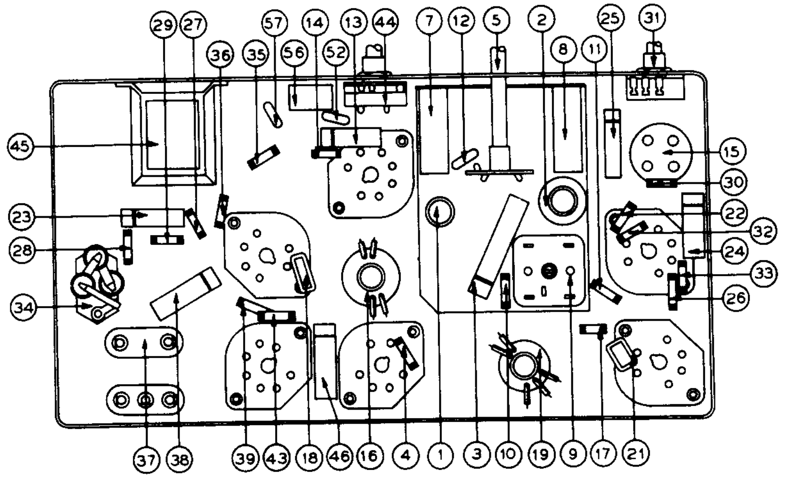
MODEL 38-39X and K CABINETS

Description	Part No.	List Price
Speaker H. R. 20	36-1351	
Bezel Frame Assembly	40-6128	1.05
Bezel Basket	27-8313	.01
Bezel Glass	27-8300	.06
Bezel Ring	28-5080	.70
Battery	116R	

MODEL 38-39T CABINET

Description	Part No.	List Price
Bezel Frame Assembly	40-6124	.90
Bezel Gasket	27-8311	.01
Bezel Glass	27-8298	.05
Bezel Ring	28-5078	.55
Speaker KR-26	36-1353	10.00





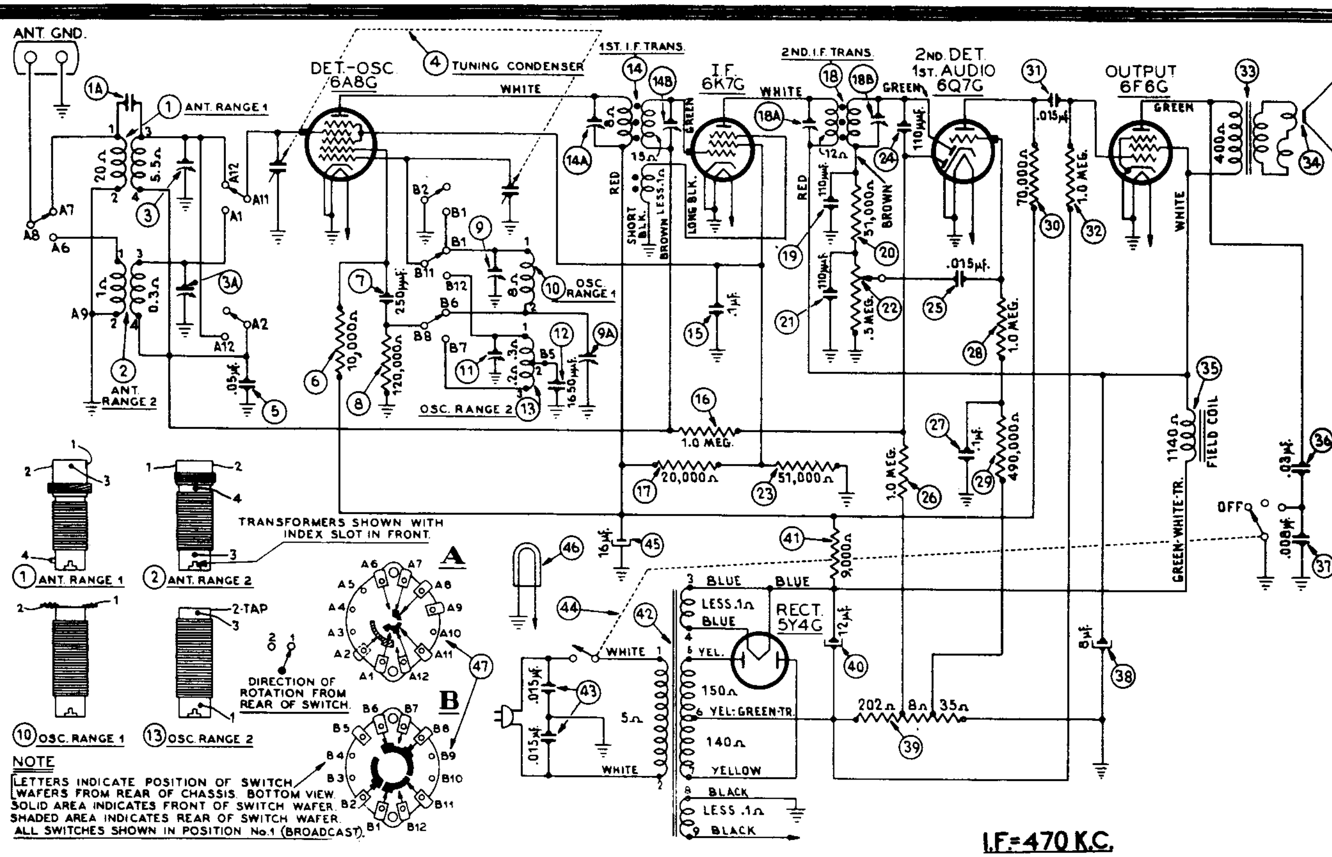
NOTE: See page 1621 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

MODEL 38-60 "CODE 125"

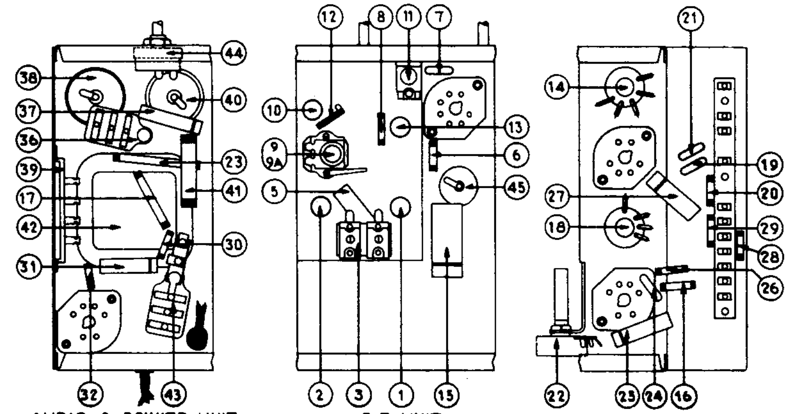
Replacement Parts

Schem. No.	Description	Part No.	List. Price
1	Antenna transformer (range 1)	32-2588	$1.00
2	Antenna transformer (range 2)	32-2246	.70
3	Compensator (2 section)	31-6093	.40
4	Tuning condenser	31-1826	3.00
5	Condenser (.05 mf. tubular)	30-4444	.20
6	Resistor (10,000 ohms, ½ watt)	33-310339	.20
7	Condenser (250 mmf. mica)	30-1032	.25
8	Resistor (120,000 ohms, ½ watt)	33-412339	.20
9	Compensator (2 section)	31-6100	.40
10	Oscillator transformer (range 1)	32-2380	.50
11	Compensator	31-6101	.20
12	Condenser (1650 mmf.)	31-6096	.40
13	Oscillator transformer (range 2)	32-2121	.70
14	I. F. Transformer (first)	32-2580	2.20
15	Condenser (.1 mf. tubular)	30-4455	.25
16	Resistor (1 meg., ½ watt)	33-510339	.20
17	Resistor (20,000 ohms, 1 watt)	33-320439	.20
18	Second I. F. transformer	32-2582	2.20
19	Condenser (110 mmf.) Part of 18		
20	Resistor (51,000 ohms)	33-351339	.20
21	Condenser (110 mmf.) Part of 18		
22	Volume control	33-5157	1.00
23	Resistor (51,000 ohms, 1 watt)	33-351439	.20
24	Condenser (110 mmf. mica)	30-1031	.20
25	Condenser (.015 mf. tubular)	30-4358	.20
26	Resistor (1 meg., ½ watt)	33-510339	.20
27	Condenser (.1 mf. tubular)	30-4122	.20
28	Resistor (1 meg., ½ watt)	33-510339	.20
29	Resistor (490,000 ohms, ½ watt)	33-449339	.20
30	Resistor (70,000 ohms, ½ watt)	33-370339	.20
31	Condenser (.015 mf. tubular)	30-4226	.20
32	Resistor (1 meg., ½ watt)	30-510339	.20
33	Output transformer (S7)	32-7019	.85
34	Cone and voice coil assembly	36-3157	1.00
35	Field coil assembly (S7)	36-3039	3.50
36	Condenser (.03 mf. bakelite)	8328-SU	.35
37	Condenser (.008 mf. tubular)	30-4317	.20
38	Condenser (8 mf. electrolytic)	30-2211	
39	Bias resistor (wire wound)	33-3316	
40	Condenser (12 mf. electrolytic)	30-2210	
41	Resistor (9000 ohms, 2 watts)	33-290539	.30
42	Power transformer		
	115 volts, 50-60 cycle	32-7583	4.50
	115 volts, 25-40 cycle	32-7584	6.50
	115/230 volts, 50-60 cycle	32-7585	6.50
43	Condenser (.015 mf.-.015 mf. dual bakelite)	3793-DG	.40
44	Tone control and off-on switch	42-1180	.75
45	Condenser (16 mf. electrolytic)	30-2212	
46	Pilot lamp	34-2039	.07
47	Range switch	42-1333	
	Cable Speaker	L-2181	.25
	Cable A. C.	L-2778	
	Dial	27-5196	.45
	Dial Hub	28-7152	.10
	Dial Clamp	28-2837	.10
	Dial Set Screw	W-1506	2.00 C
	Knob (Tuning)	27-4321	.10
	Knob (Tone & Volume)	27-4332	.10
	Pilot Lamp Socket Assembly	38-7706	.35
	Screen Bracket Assembly	31-1878	.25
	Speaker S7	36-1009	5.75
	Shaft (Vol. Cont.)	38-8058	.12
	Shaft Spring	28-4117	.40 C
	Shaft Clip	28-4394	.01
	Socket (6 prong)	27-6086	



I.F.=470 K.C.

Schem. No.	Description	Part No.	List Price
	Socket (7 prong)	27-6087	
	Vernier Drive Assembly	31-1863	
	F CABINET		
	Baffle & Silk	40-6142	
	Bezel Assembly	40-6130	$1.00
	Bezel Gasket	27-8312	.01
	Bezel Glass	27-8299	.06
	Bezel Ring	28-5079	.60
	B CABINET		
	Baffle & Silk	40-6093	
	Bezel Plate & Frame	40-6117	.90
	Bezel Gasket	27-8311	.01
	Bezel Glass	27-8298	.05
	Bezel Ring	27-5078	.55

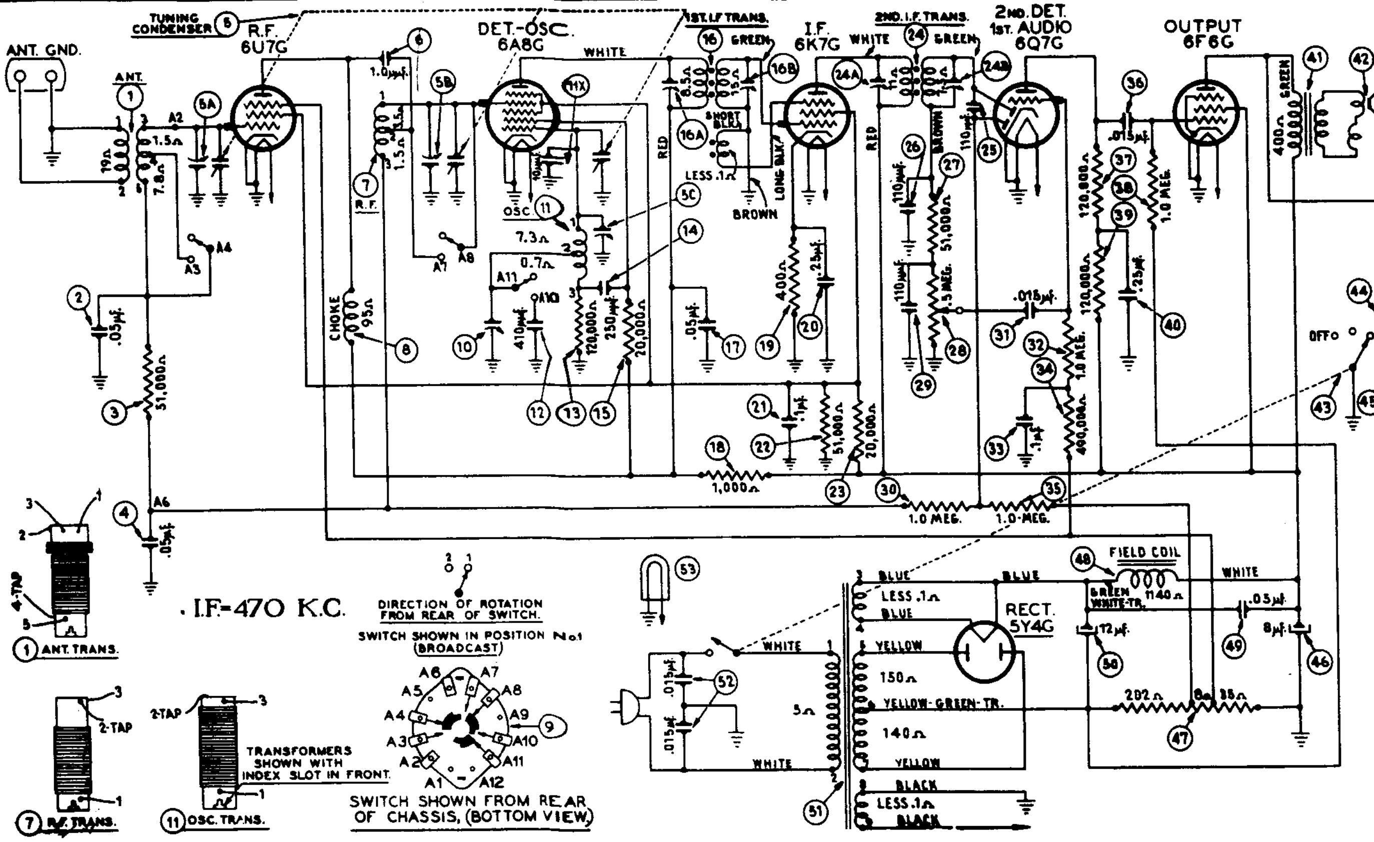


AUDIO & POWER UNIT — R.F. UNIT — I.F. UNIT

NOTE: See page 1621 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

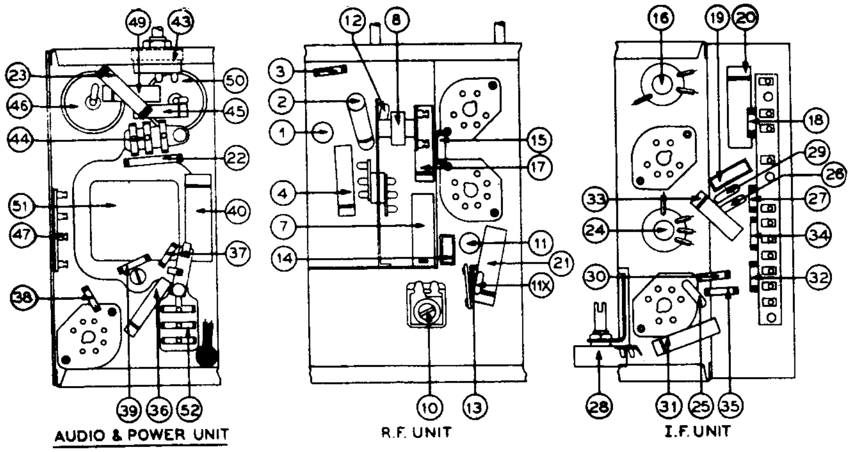
MODEL 38-89 "CODE 125"



Replacement Parts

Schem. No.	Description	Part No.	List Price
1	Antenna transformer	32-2592	
2	Condenser (0.05 mf. tubular)	30-4519	$0.20
3	Resistor (51,000 ohms, ½ watt)	33-351339	.20
4	Condenser (0.05 mf. tubular)	30-4519	.20
5	Tuning Condenser assembly	31-2033	
6	Condenser (1.0 mmf. twisted wire)		
7	R. F. transformer	32-2128	.70
8	R. F. choke coil	32-2139	.35
9	Wave Switch	42-1334	
10	Compensator	31-6056	.55
11X	Condenser (10 mmf. mica)	30-1065	.20
11	Oscillator transformer	32-2120	1.00
12	Condenser (410 mmf. mica)	30-1000	.25
13	Resistor (120,000 ohms, ½ watt)	33-412339	.20
14	Condenser (250 mmf. mica)	30-1032	.25
15	Resistor (20,000 ohms, ½ watt)	33-320339	.20
16	1st I. F. transformer	32-2580	2.20
17	Condenser (0.05 mf. tubular)	30-4123	.20
18	Resistor (1,000 ohms, ½ watt)	33-210339	.20
19	Resistor (400 ohms, 1 watt, wire wound)	33-1211	.20
20	Condenser (0.25 mf. tubular)	30-4446	.25
21	Condenser (0.1 mf. tubular)	30-4455	.25
22	Resistor (51,000 ohms, ½ watt)	33-351, 339	.20
23	Resistor (20,000 ohms, ½ watt)	33-320, 339	.20
24	2nd I. F. transformer	32-2582	2.20
25	Condenser (110 mmf. mica)	30-1031	.20
26	Condenser (110 mmf. mica)	30-1031	.20
27	Resistor (51,000 ohms, ½ watt)	33-351,339	.20
28	Volume Control	33-5157	1.00
29	Condenser (110 mmf. mica)	30-1031	.20
30	Resistor (1.0 meg., ½ watt)	33-510, 339	
31	Condenser (0.015 mf. tubular)	30-4358	.20
32	Resistor (1.0 meg., ½ watt)	33-510, 339	.20
33	Condenser (0.1 mf. tubular)	30-4122	.20
34	Resistor (490,000 ohms, ½ watt)	33-449, 339	.20
35	Resistor (1.0 meg., ½ watt)	33-510, 339	.20
36	Condenser (0.015 mf. tubular)	30-4226	.20
37	Resistor (120,000 ohms, ½ watt)	33-412, 339	.20
38	Resistor (1.0 meg., ½ watt)	33-510, 339	.20
39	Resistor (120,000 ohms, ½ watt)	33-412, 339	.20
40	Condenser (0.25 mf. tubular)	30-4449	.20
41	Output transformer	32-7019	.85
42	Cone and voice coil assembly (S16)	36-3014	1.00
	Cone and voice coil assembly (HS3)	36-3796	
43	Tone control and power switch	42-1180	
44	Condenser (0.03 mf. bakelite)	8328-SU	.35
45	Condenser (0.008 mf. tubular)	30-4317	.20
46	Condenser (electrolytic, 8 mf.)	30-2211	
47	Bias resistor	33-3284	.30
48	Field coil assembly (S16)	36-3664	
	Field coil assembly (HS3)	36-3928	
49	Condenser (0.05 mf. tubular)	30-4020	.20
50	Condenser (electrolytic, 12 mf.)	30-2210	
51	Power transformer (115 v., 50-60 cycles)	32-7583	4.50
	(115 v., 25-40 cycles)	32-7584	6.50
	(115/230 v., 50-60 cycles)	32-7585	6.50
52	Condensers (0.015 mf. dual bakelite)	3793-DG	.40
53	Pilot Lamp	34-2064	.07
	Cable (Power)	L-2778	
	Cable (Speaker)	L-2181	.25
	Dial	27-5204	.35
	Dial Hub	28-7152	.10
	Dial Clamp	28-2837	.10
	Dial Set Screws	W-1506	2.00c
	Knob (Tuning)	27-4321	.10
	Knob (Vol., Range, Tone)	27-4332	.10
	Mtg. Spacer Bushing	27-4359	.02
	Mtg. Rubber Chassis	5189	.03
	Pilot Lamp Assembly	38-7706	.35
	Screen Bracket assembly	31-1878	

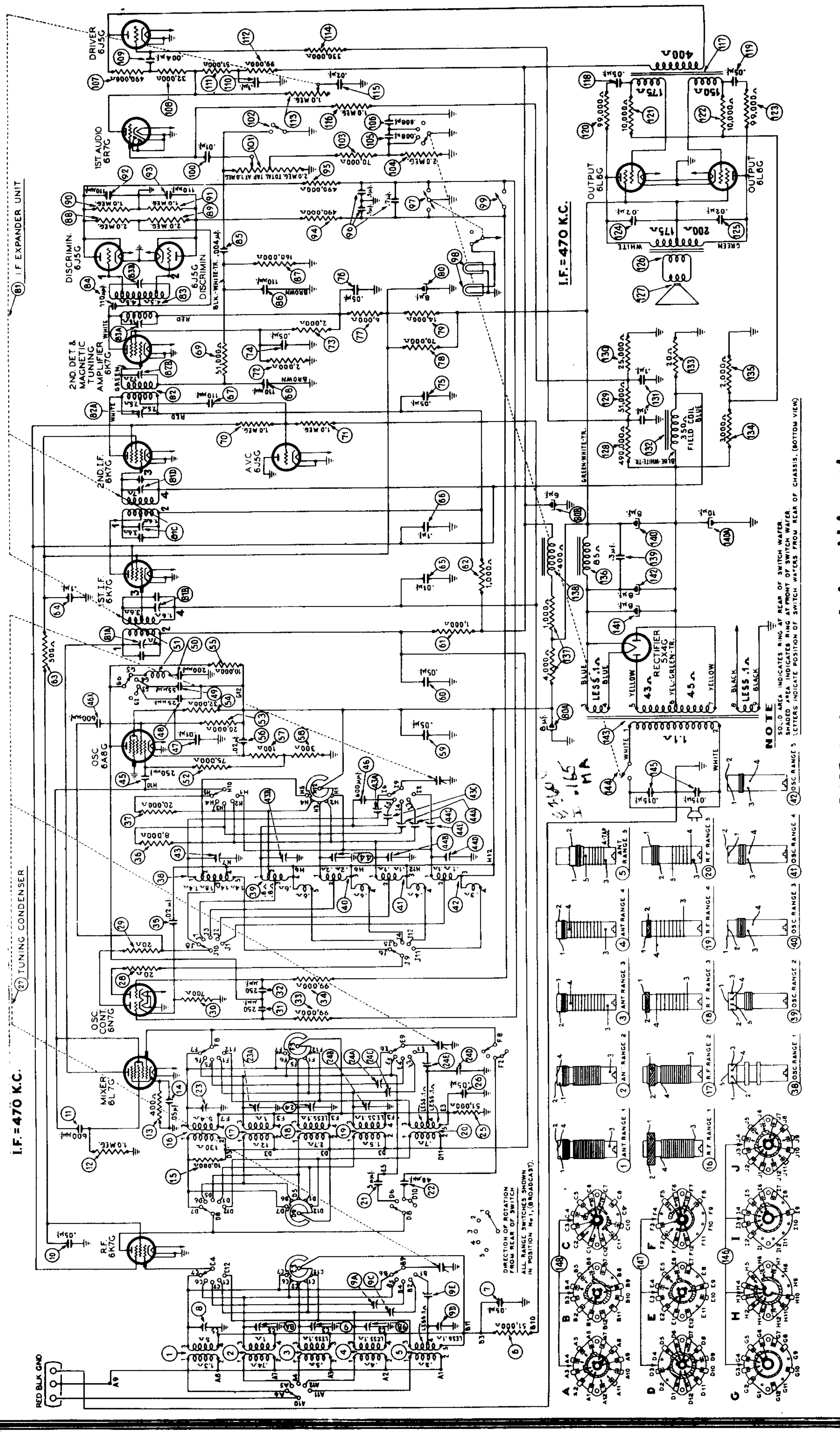
Description	Part No.	List Price
Shield Tube, Round	28-5031	
Shield Tube, Square	28-2726	$0.10
Shield Base (Tube)	27-5030	.35
Shaft (Volume Control)	38-8058	.12
Socket 7 prong	27-6087	
Socket 6 prong	27-6086	
"K" CABINET		
Baffle & Silk	40-6139	
Bezel Frame & Plate	40-6130	1.00
Bezel Gasket	27-8312	.01
Bezel Glass	27-8299	.06
Bezel Ring	28-5079	
Speaker (HS3)	36-1350	
"B" CABINET		
Baffle & Silk Assembly	40-6093	
Bezel Frame & Plate Assembly	40-6117	.90
Bezel Gasket	27-8311	.01
Bezel Glass	27-8298	.05
Bezel Ring	28-5078	
Speaker (S16)	36-1225	5.75



NOTE: See page 1621 before servicing this set.

PHILCO RADIO & TELEVISION CORPORATION

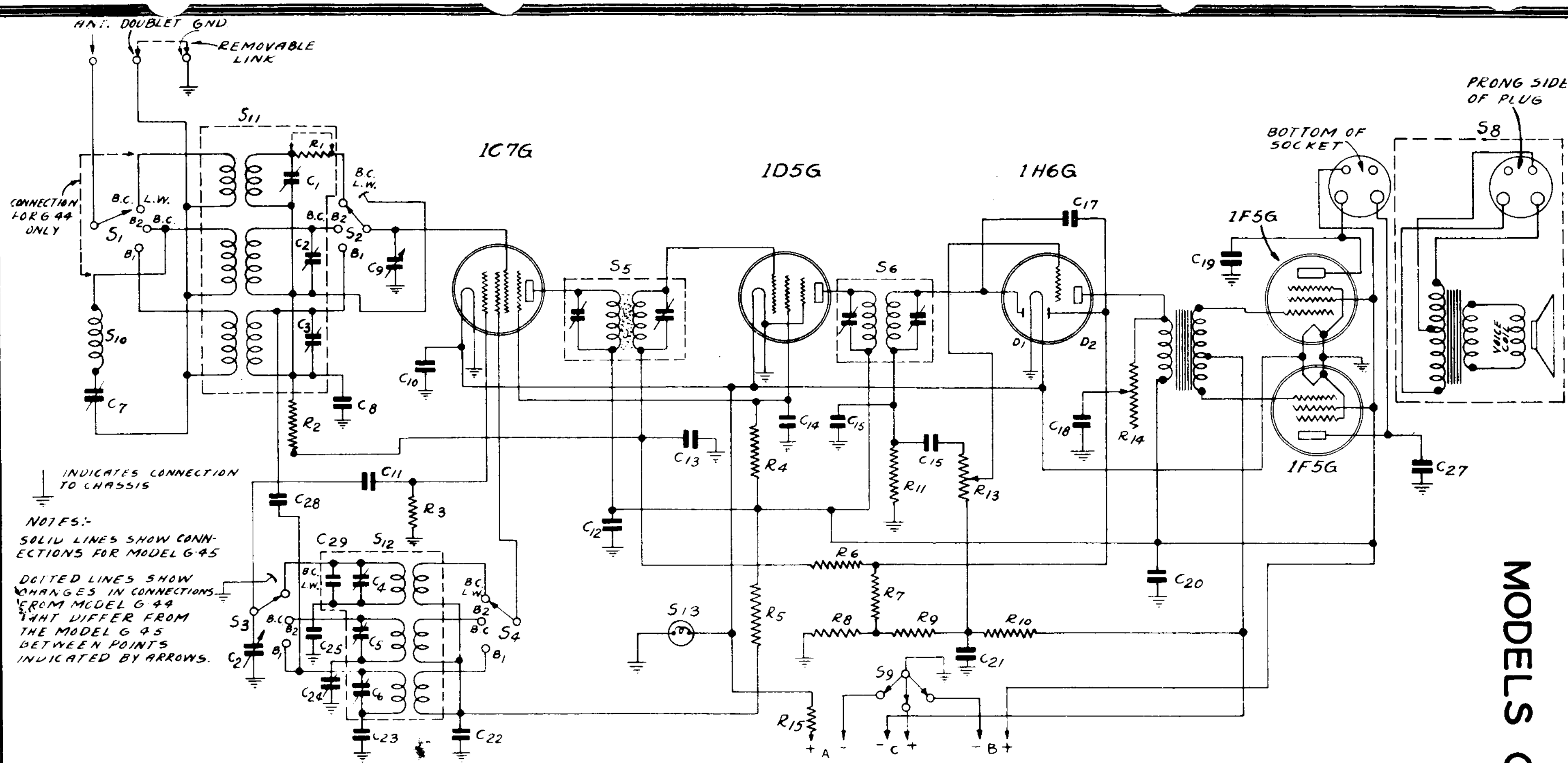
MODEL 38-116 "CODE 121"



NOTE: See page 1621 before servicing this set.

PILOT RADIO CORPORATION

MODELS G-44 & G-45



INDICATES CONNECTION TO CHASSIS

NOTES:-
SOLID LINES SHOW CONNECTIONS FOR MODEL G-45

DOTTED LINES SHOW CHANGES IN CONNECTIONS FROM MODEL G 44 THAT DIFFER FROM THE MODEL G 45 BETWEEN POINTS INDICATED BY ARROWS.

I.F. 456 K.C.

CONDENSERS FOR MODEL G-45		
C1 C2 C3	78022 A	ANT. TRIMMER STRIP ASS'Y.
C4 C5 C6	78030	OSC. TRIMMER STRIP ASS'Y.
C7	7.503 F	35-100 MFD. PADDER
C8 C13 C22	22055 I	.05 MFD. 200V. PAPER
C9 C26	79332	2 GANG CONDENSER
C10 C14	22055-F	.25 MFD. 200V. PAPER
C11 C17	27723-0	50 MMFD. MICA
C12	22055-S	.5 MFD. 200 V. PAPER
C15	28016-0	100 MMFD. MICA
C16 C18	22055-A	.5 MFD. 200V. PAPER
C19 C27	22055 AD	.002 MFD. 1000V. PAPER
C20	71203	8 MFD. 200V. ELEC. COND.
C21	22481	10 MFD. 25 V. ELEC. COND.
C23	28107-W	.003 MFD. MICA.
C24 C25	72355 G	300-600 & 30 150-MMFD. DUAL PADDER
C28	71525 A	NEUT. COND. ASS'Y.
C29	28101-0	.000015 MFD. MICA (G 45 ONLY)

CONDENSERS FOR MODEL G 44 SAME AS G 45 EXCEPT FOLLOWING		
C24	27741 W	1150 MMFD. MICA
C25	71503-A	250-500 MMFD PADDER COND.

RESISTORS FOR MODEL G 45		
R1	13080	50 OHMS 1/4 WATT CARBON
R2	13031	100,000 OHMS 1/4 WATT CARBON
R3 R10	13164	50,000 OHMS 1/4 WATT CARBON
R4	13199	22,000 OHMS 1/4 WATT CARBON
R5	13133	3,000 OHMS 1/4 WATT CARBON
R6 R7	13001	1 MEGOHM 1/4 WATT CARBON
R8 R9	13030	10000 OHMS 1/4 WATT CARBON
R11	13024	500 000 OHMS 1/4 WATT CARBON
R13	74297	MEGOHM VOL CONTROL
R14	78846	100 000 OHMS TONE CONTROL
R15	79529	.5 OHMS 2 WATT FLEX. LEAD RES.

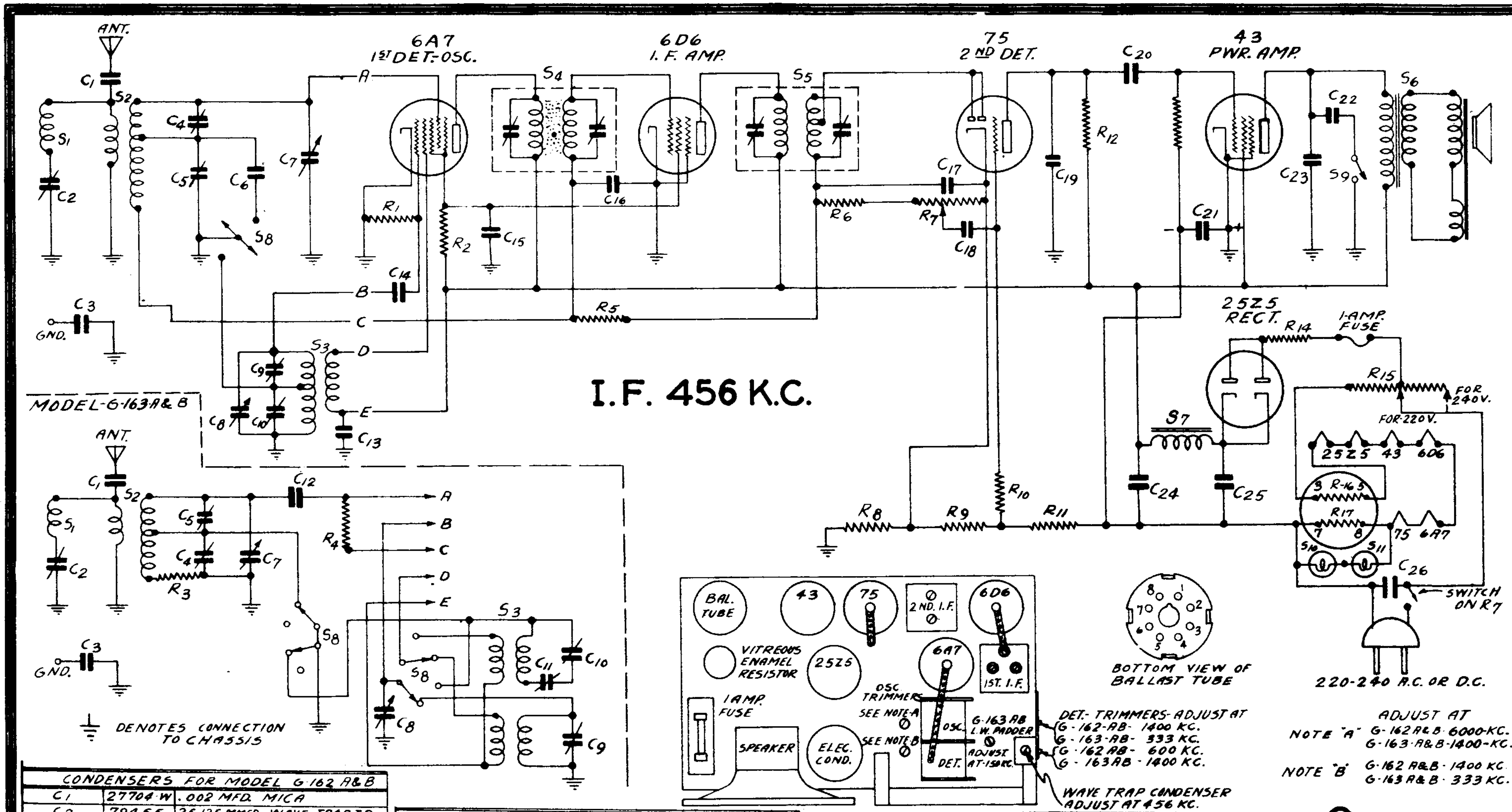
RES. FOR MODEL G 44 SAME AS G 45 EXCEPT FOLLOWING		
R1	13080	NOT USED ON G 44

MISC FOR MODEL G 45		
S1 S2 S3 S4	79327	BAND SWITCH ASS'Y
S5	73108-A	1ST. I.F. TRANS ASS'Y
S6	73094	2ND I.F. TRANS. ASS'Y
S7	79325	AUDIO TRANS. ASS'Y
S8	40826	8" P.M. SPEAKER
S10	73029 A	WAVE TRAP COIL ASS'Y
S11	73091	ANT. COIL & CAN ASS'Y
S12	73092	OSC. COIL & CAN ASS'Y
S13	72127	2V. .06 AMP. PILOT

MISC FOR G 44 SAME AS G 45 EXCEPT FOLLOWING		
S11	73089	ANT. COIL & CAN ASS'Y
S12	79090	OSC. COIL & CAN ASS'Y.

PILOT RADIO CORPORATION

MODELS G-162A, G-126B, G-163A & G-163B



CONDENSERS FOR MODEL G-162 A&B		
C1	27704-W	.002 MFD. MICA
C2	79455	25-125 MMFD. WAVE TRAP TR.
C3	22055-R	.005 MFD. 1000V. PAPER
C4 C5	70969-J	TRIMMER MIXER
C6	28108-W	.001 MFD. MICA
C7 C8	79432	2 GANG CONDENSER
C9 C10	70969-E	TRIMMER OSC.
C13	22055-L	.1 MFD. 400V. PAPER
C14	27723-O	.00005 MFD. MICA
C15 C16	22055-I	.05 MFD. 200V. PAPER
C17 C19	27701-W	.00025 MFD. MICA
C18 C20	22055-W	.01 MFD. 400V. PAPER
C21	22481	10 MFD. 25V. ELEC.
C22	22055-AJ	.03 MFD. 600V. PAPER
C23 C26	22055-U	.01 MFD. 1000V. PAPER
C24	85027	12 MFD. 250V. ELEC.
C25		16 MFD. 250V. ELEC.

COND. FOR G-163A&B SAME AS G-162 A&B PLUS FOLLOWING		
C11	79431-A	30 TO 100 MMFD. PADDER
C12	27701-W	.00025 MFD. MICA

RESISTORS FOR MODEL G-162 A&B		
R1 R6	13164	50,000 OHMS 1/4 WATT CARBON
R2	13075	15,000 OHMS 1/2 WATT CARBON
R5 R10	13007	2 MEGOHMS 1/4 WATT CARBON
R7	79540	250,000 OHMS VOL. CONTROL & SW.
R8	13080	50 OHMS 1/4 WATT CARBON
R9	13206	16 OHMS 1/4 WATT CARBON
R11	13036	200 OHMS 1 WATT CARBON
R12	13171	250,000 OHMS 1/4 WATT CARBON
R13	13024	500,000 OHMS 1/4 WATT CARBON
R14	13207	100 OHMS 1 WATT CARBON
R15	83029	VITREOUS ENAM. WIRE W. RES. 310 OHMS TAPPED AT 240 OHMS
R16	81967	210 OHMS (IN BALLAST TUBE)
R17		80 OHMS (IN BALLAST TUBE)

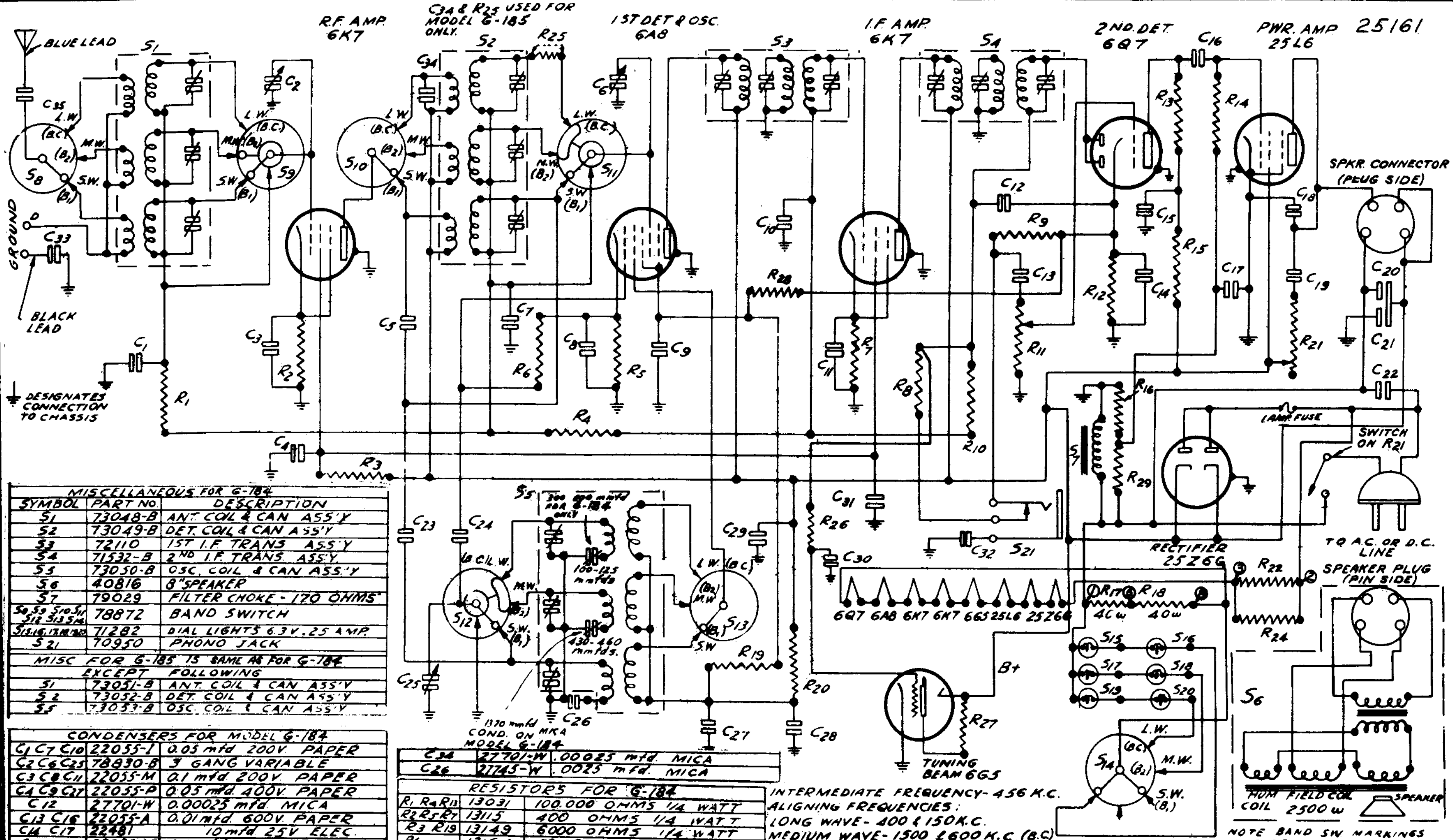
RES. FOR G-163A&B SAME AS G-162A&B PLUS FOLLOWING		
R3	13080	50 OHMS 1/4 WATT CARBON
R4	13024	500,000 OHMS 1/4 WATT CARBON

MISC. FOR MODEL G-162 A&B		
S1	73029-B	WAVE TRAP COIL ASS'Y.
S2	73099	ANT. COIL ASS'Y. (G-162A&B ONLY)
S3	73100	OSC. COIL ASS'Y. (G-162A&B ONLY)
S4	73108-A	1ST I.F. TRANS. ASS'Y.
S5	73104	2ND I.F. TRANS. ASS'Y.
S6 S7	40835	5" A.C.-D.C. SPKR. 1100-OHM FIELD
S8	79430	BAND SWITCH (G-162 A&B ONLY)
S9	72049	TONE CONTROL SWITCH
S10 S11	72151	6.3 V. 150 MA. PILOT LAMPS

MISC. FOR 162A&B SAME AS 162A&B EXCEPT THE FOLLOWING		
S2	73101	ANT. COIL. ASS'Y. (G-163 A&B ONLY)
S3	73102	OSC. COIL. ASS'Y. (G-163 A&B ONLY)
S8	79434	BAND SW. (G-163 A&B ONLY)

PILOT RADIO CORPORATION

MODELS G184 & G-185

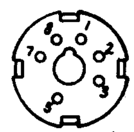


MISCELLANEOUS FOR G-184		
SYMBOL	PART NO.	DESCRIPTION
S1	73048-B	ANT. COIL & CAN ASS'Y
S2	73049-B	DET. COIL & CAN ASS'Y
S3	72110	1ST I.F. TRANS. ASS'Y
S4	71532-B	2ND I.F. TRANS. ASS'Y
S5	73050-B	OSC. COIL & CAN ASS'Y
S6	40816	8" SPEAKER
S7	79029	FILTER CHOKE - 170 OHMS
S8 S9 S10 S11 S12 S13 S14	78872	BAND SWITCH
S15,16,17,18,19,20	71282	DIAL LIGHTS 6.3 V. .25 AMP.
S21	70950	PHONO JACK
MISC. FOR G-185 IS SAME AS FOR G-184 EXCEPT FOLLOWING		
S1	73051-B	ANT. COIL & CAN ASS'Y
S2	73052-B	DET. COIL & CAN ASS'Y
S5	73053-B	OSC. COIL & CAN ASS'Y

CONDENSERS FOR MODEL G-184		
C1 C7 C10	22055-I	0.05 mfd 200V. PAPER
C2 C6 C25	78830-B	3 GANG VARIABLE
C3 C8 C11	22055-M	0.1 mfd. 200V. PAPER
C4 C9 C27	22055-P	0.05 mfd. 400V. PAPER
C12	27701-W	0.00025 mfd. MICA
C13 C16	22055-A	0.01 mfd. 600V. PAPER
C14 C17	22481	10 mfd. 25V. ELEC.
C15	22055-AE	.25 mfd. 400V PAPER
C33	22055-R	.005 mfd. 1000V PAPER
C19	22055-AB	.1 mfd. 600V. PAPER
C20	85007	40 mfd. 150V. (BLACK) ELECTRO.
C21	85007	40 mfd. 150V. (PLAIN) ELECTRO.
C28 C31	85008	8-8 mfd. 150V. ELECTROLYTIC
C22 C18	22055-U	0.01 mfd. 1000V. PAPER
C24	27723-U	.00005 mfd. MICA
C26	27742-W	.0023 mfd. MICA
C23	71525-A	NEUTRALIZING
C5	27737-U	.00001 mfd. MICA
C32	22055-S	0.5 mfd. 200V. PAPER
C30	22055-H	.02 mfd. 200 V. PAPER
C29	22066-L	.1 mfd. 400 V. PAPER
C35	27712-W	.0005 MFD. MICA
CONDENSERS FOR G-185 ARE SAME AS FOR G-184 EXCEPT FOLLOWING.		
C34	27701-W	.00025 mfd. MICA
C26	27745-W	.0025 mfd. MICA

RESISTORS FOR G-184		
R1 R4 R13	13031	100,000 OHMS 1/4 WATT
R2 R5 R7	13115	400 OHMS 1/4 WATT
R3 R19	13149	6000 OHMS 1/4 WATT
R6	13164	50,000 OHMS 1/4 WATT
R8 R9	13043	150,000 OHMS 1/4 WATT
R10 R26	13001	1,000,000 OHMS 1/4 WATT
R11	78714	750,000 OHMS VOL. CONTROL
R12	13003	300 OHMS 1/4 WATT
R27	13024	500,000 OHMS 1/4 WATT
R16	13194	400,000 OHMS 1/4 WATT
R17, R18	81963	40 OHMS
R22	81963	100 OHMS
R20	13073	3000 OHMS 1/2 WATT
R21	78821	10,000 OHMS TONE CONT. & SW.
R24	83012	400 OHMS WIRE WOUND 2 WATT
R14, R29	13171	250,000 OHMS 1/4 WATT
R15	13031	100,000 OHMS 1/4 WATT
R28	13116	12,000 OHMS 1/4 WATT
RESISTORS FOR G-185 SAME AS FOR G-184 EXCEPT FOLLOWING.		
R25	13029	250 OHMS 1/4 WATT

INTERMEDIATE FREQUENCY- 456 K.C.
ALIGNING FREQUENCIES:
LONG WAVE- 400 & 150 K.C.
MEDIUM WAVE- 1500 & 600 K.C. (B.C.)
SHORT WAVE- 17.4 MEGACYCLES (B1)
SHORT WAVE- 6 " (B2)

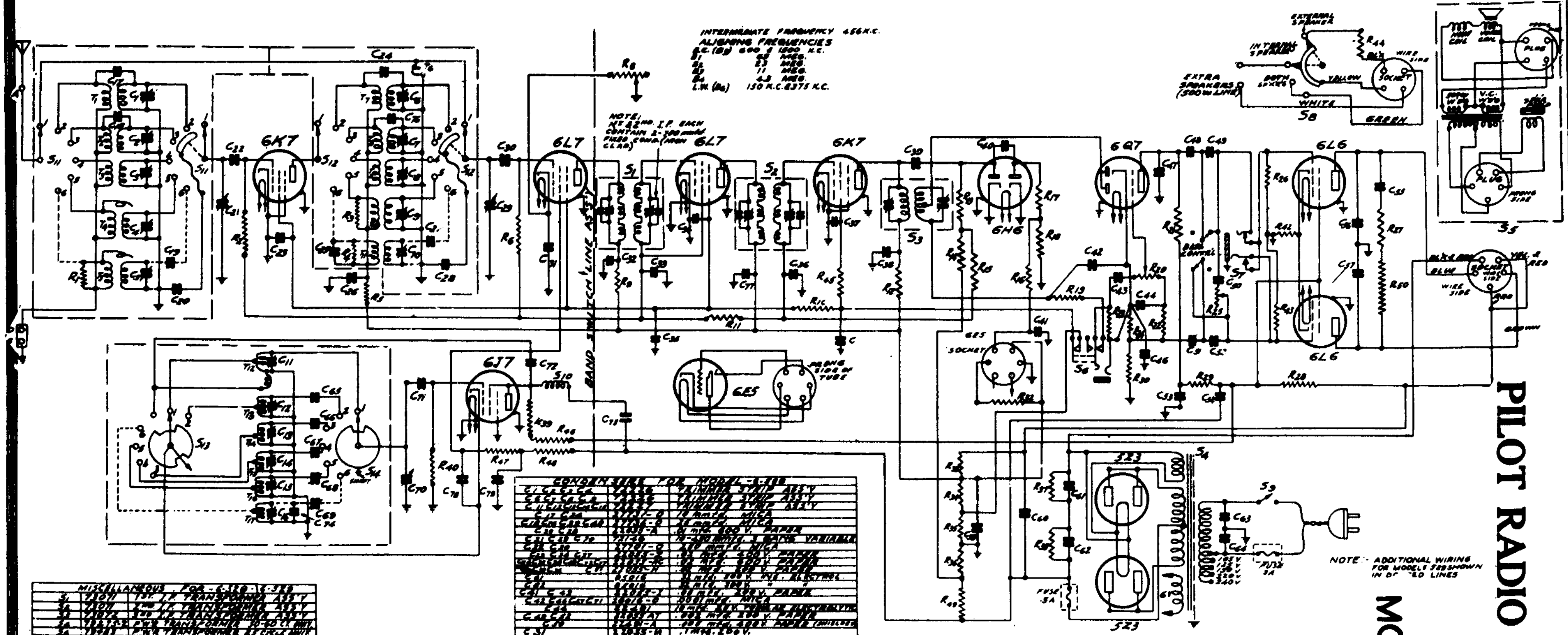


PART Nº 81963 (BOTTOM)
NOTE: FIGURES IN CIRCLES REFER TO PIN Nº.

I. F. 456 K.C.

PILOT RADIO CORPORATION

MODELS G528 & G529



RESISTORS FOR MODEL G-528		
R2 R6	72213	300,000 OHMS 1/4 WATT I.R.C.
R3	72210	4000 OHMS 1/4 WATT I.R.C.
R5 R10 R12	13028	1000 OHMS 1/4 WATT CARBON
		OHMS 1/4 WATT CARBON
R8	79778	15,000 OHMS WIRE WD SENSY CNTL
R9	13133	3,000 OHMS 1/4 WATT CARBON
R11 R37 R39	13031	100,000 OHMS 1/4 WATT CARBON
[illegible] R18 R23	13001	1,000,000 OHMS 1/4 WATT CARBON
R19	13148	30,000 OHMS 1/4 WATT CARBON
R20	79171	750,000 OHMS VOLUME CONTROL
R21 R30	13164	50,000 OHMS 1/4 WATT CARBON
[illegible]	13171	250,000 OHMS 1/4 WATT CARBON
R24	13133	2,500 OHMS 1/4 WATT CARBON
R25	79176	750,000 OHMS TONE CONTROL
R27 R50	13801	10,000 OHMS 1 WATT CARBON
R28	13146	500 OHMS 1/2 WATT CARBON
R45	13148	6,000 OHMS 1/4 WATT CARBON
R47	13148	30,000 OHMS 1/4 WATT CARBON
R36, R49	13156	11 OHMS 1 WATT CARBON
R38, R40	72215	3,000 OHMS 1 WATT I.R.C.
R40	72207	30,000 OHMS 1/4 WATT I.R.C.
R48	13116	15,000 OHMS 1/4 WATT CARBON
R29	13074	25,000 OHMS 1/4 WATT CARBON
R46	83025	10 OHM 20 WATT WIRE WOUND

RESISTORS FOR MODEL G-529	SAME AS G-528 EXCEPT FOLLOWING	
R1	72211	5,000 OHMS 1/4 WATT I.R.C.
R2	72216	2,000 OHMS 1/4 WATT I.R.C.

ADDITIONAL RESISTORS FOR MODELS G-528 & G-529		
R31	83034 (7,470 ohms)	1,800 OHMS
R34		3,850 OHMS " "
R33		1,600 OHMS " "
R42		120 OHMS

CONDENSERS FOR MODEL G-528		
C1 C2 C3 C4	[illegible]	TRIMMER STRIP ASS'Y
C5 C6 C7 C8	[illegible]	TRIMMER STRIP ASS'Y
C11 [illegible]	[illegible]	TRIMMER STRIP ASS'Y
C17 C24	[illegible]	10 mmfd. MICA
[illegible]	[illegible]	25 mmfd. MICA
C30 C38	[illegible]-A	.01 mfd. 600 V. PAPER
C21 C23 C70	[illegible]	10-390 mmfd. 3 GANG VARIABLE
C32 C40	[illegible]	250 mmfd. MICA
C33 C34 C37	[illegible]	.05 mfd. 400 V. PAPER
[illegible]	[illegible]	.05 mfd. 200 V. PAPER
[illegible] C44	[illegible]	.02 mfd. 400 V. PAPER
C41	85016	[illegible] mfd. 200 V. ELECTROLYTIC
C42	85016	[illegible] mfd. 200 V. " "
C31 C43	[illegible]	.01 mfd. 400 V. PAPER
[illegible]	[illegible]	.0001 mfd. MICA
C46	[illegible]	10 mfd. 25V. TUBULAR ELECTROLYTIC
C48 C49	[illegible]	.005 mfd. 200 V. PAPER
C50	[illegible]	.005 mfd. 400 V. PAPER (SHIELDED)
C51	[illegible]	.1 mfd. 200 V.
C52	[illegible]	.01 mfd. 1000 V. PAPER
C56 C57	[illegible]-AA	.005 mfd. 1600 V. PAPER
C59	[illegible]-W	.0001 mfd. MICA
C63 C64	[illegible]	.01 mfd. [illegible] V. PAPER
C65	[illegible]-W	[illegible] mfd. MICA
C66	[illegible]-W	[illegible] mfd. MICA
C67	[illegible]-W	[illegible] mfd. MICA
C68	[illegible]	[illegible] mmfd. PADDER
C53	85013	8 mfd. 450 V. ELECTROLYTIC
C54		4 mfd. 450 V. "
C55		8 mfd. 450 V. "
C58		4 mfd. 450 V. "
CONDENSERS FOR MODEL G-529 SAME AS G-528 EXCEPT FOLLOWING		
[illegible]	[illegible]	TRIMMER STRIP ASS'Y
[illegible]	[illegible]	TRIMMER STRIP ASS'Y
[illegible]	[illegible]	TRIMMER STRIP ASS'Y
C19 C27	[illegible]-A	.01 mfd. 600 V. PAPER
C28	[illegible]	150 mmfd. MICA
C74	[illegible]	25 mmfd. MICA
C68 C69	[illegible]	200-300 & 30-175 mmfd. DUAL PADDER

ADDITIONAL CONDENSERS FOR MODELS G-528 & G-529		
C60	85018	4 mfd. 475 V. ELECTROLYTIC
C61		4 mfd. 475 V. "
C62		4 mfd. 475 V. "
C71	[illegible]	.00005 mfd. MICA
C78	[illegible]	.1 mfd. 200 V. PAPER

(1) R-46 WAS 83024 - 6 OHMS 20 WATTS E.F. 4/8/37
(2) G-528 WAS MODEL 555 G-529 WAS MODEL 556 [illegible]
(3) C-47 WAS TYPE "O" E.F. 4/18/36
(4) R1 WAS 600 OHMS & IN CARB. [illegible] CONNECTED [illegible]

MISCELLANEOUS FOR G-528 & G-529		
S1	71071	1ST I.F. TRANSFORMER ASS'Y
S2	71071	2ND I.F. TRANSFORMER ASS'Y
S3	71072	3RD I.F. TRANSFORMER ASS'Y
S4	[illegible]	P'W'R TRANSFORMER [illegible]
S4	[illegible]	P'W'R TRANSFORMER [illegible]
S4		P'W'R TRANSFORMER
S5	40021	10" SPEAKER
S5		10" SPEAKER
S5		10" SPEAKER
S6	73173	PHONO JACK
S7	72130	HEADPHONE JACK
S8	73210	EXTRA SPEAKER SWITCH ASS'Y
S9	79175	POWER SWITCH ON VOL. CONT.
S10	73073	R.F. CHOKE
S11	[illegible] (G-528)	ANT. SEC. BAND SWITCH
S12		DET. SEC. BAND SWITCH
S13	79193 (G-529)	OSC. CATHODE SEC. BAND SW.
S14		OSC. GRID SEC. BAND SW.

R.F. COILS FOR MODEL G-528		
T1	73076	ANT. COIL ASS'Y FOR BAND 2
[illegible]	71077	ANT. COIL ASS'Y FOR BANDS 3 & 5
[illegible]	71080	ANT. COIL ASS'Y FOR BANDS 4 & 6
T6 T7	71075	DET. COIL ASS'Y FOR BANDS 1 & 2
T8 T10	71078	DET. COIL ASS'Y FOR BANDS 3 & 5
T9 T11	71081	DET. COIL ASS'Y FOR BANDS 4 & 6
T12 T13	71076	OSC. COIL ASS'Y FOR BANDS 1 & 2
T14 T16	71079	OSC. COIL ASS'Y FOR BANDS 3 & 5
T15 T17	71082	OSC. COIL ASS'Y FOR BANDS 4 & 6

R.F. COILS FOR MODEL G-529 SAME AS G-528 EXCEPT [illegible]		
[illegible]		
T2	[illegible]	ANT. COIL ASS'Y FOR BAND [illegible]
T8	[illegible]	DET. COIL ASS'Y FOR BAND [illegible]
T12	[illegible]	OSC. COIL ASS'Y FOR BAND [illegible]

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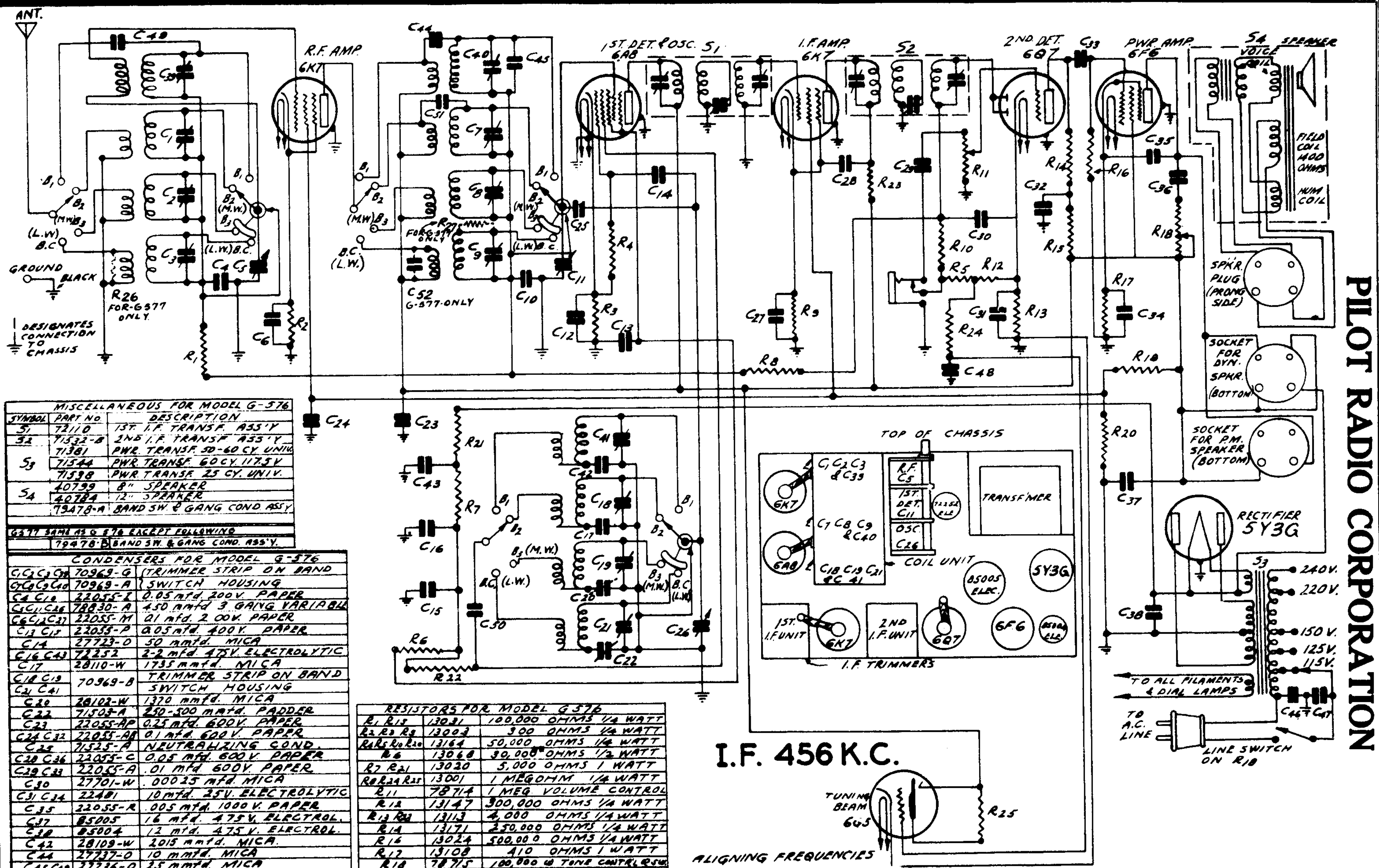

I.F. 456 K.C.

ALIGNING FREQUENCIES

BROADCAST – 1500 & 600 K.C. LONG WAVE 150 & 400 K.C.
BAND 3 – 6 MEGACYCLES
BAND 2 – 14 "
BAND 1 – 24 "

MISCELLANEOUS FOR MODEL G-576		
SYMBOL	PART NO.	DESCRIPTION
S_1	72110	1ST. I.F. TRANSF. ASS'Y
S_2	71532-B	2ND I.F. TRANSF. ASS'Y
S_3	71381	PWR. TRANSF. 50-60 CY. UNIV.
	71544	PWR. TRANSF. 60 CY. 117.5 V
	71538	PWR. TRANSF. 25 CY. UNIV.
S_4	40799	8" SPEAKER
	40784	12" SPEAKER
	79478-A	BAND SW. & GANG COND. ASS'Y
G577 SAME AS G 576 EXCEPT FOLLOWING		
	79478-B	BAND SW. & GANG COND. ASS'Y.

CONDENSERS FOR MODEL G-576		
$C_1 C_2 C_3 C_{39}$	70969-G	TRIMMER STRIP ON BAND
$C_7 C_8 C_9 C_{40}$	70969-A	SWITCH HOUSING
$C_4 C_{10}$	22055-I	0.05 mfd. 200V. PAPER
$C_5 C_{11} C_{26}$	78830-A	450 mmfd 3 GANG VARIABLE
$C_6 C_{12} C_{27}$	22055-M	.01 mfd. 200V. PAPER
$C_{13} C_{15}$	22055-P	0.05 mfd. 400V. PAPER
C_{14}	27723-0	50 mmfd. MICA
$C_{16} C_{43}$	72252	2-2 mfd. 475V. ELECTROLYTIC
C_{17}	28110-W	1735 mmfd. MICA
$C_{18} C_{19}$	70969-B	TRIMMER STRIP ON BAND
$C_{21} C_{41}$		SWITCH HOUSING
C_{20}	28102-W	1370 mmfd. MICA
C_{22}	71503-A	250-500 mmfd. PADDER
C_{23}	22055-AP	0.25 mfd. 600V. PAPER
$C_{24} C_{32}$	22055-AB	0.1 mfd. 600V. PAPER
C_{25}	71525-A	NEUTRALIZING COND.
$C_{28} C_{36}$	22055-C	0.05 mfd. 600V. PAPER
$C_{29} C_{33}$	22055-A	.01 mfd. 600V. PAPER
C_{30}	27701-W	.00025 mfd. MICA
$C_{31} C_{34}$	22481	10 mfd. 25V. ELECTROLYTIC
C_{35}	22055-R	.005 mfd. 1000V. PAPER
C_{37}	85005	16 mfd. 475V. ELECTROL.
C_{38}	85004	12 mfd. 475V. ELECTROL.
C_{42}	28109-W	2015 mmfd. MICA.
C_{44}	27737-0	10 mmfd. MICA
$C_{45} C_{49}$	27736-0	25 mmfd. MICA
$C_{46} C_{47}$	78503	.01 mfd. 1000V. PAPER DUAL
C_{48}	22055-H	.02 mfd. 200V. PAPER
C_{50}	22055-A	.01 mfd. 600V. PAPER
C_{51}	27737-0	10 mmfd. MICA
G-577 SAME AS G-576 EXCEPT FOLLOWING		
$C_{20} C_{22}$	71577-J	250-500 & 50-175 MMFD. (DUAL PADDER)
C_{52}	27701-0	250 MMFD. MICA

RESISTORS FOR MODEL G 576		
$R_1 R_{15}$	13031	100,000 OHMS 1/4 WATT
$R_2 R_3 R_9$	13003	300 OHMS 1/4 WATT
$R_4 R_5 R_{10} R_{20}$	13164	50,000 OHMS 1/4 WATT
R_6	13068	30,000 OHMS 1/2 WATT
$R_7 R_{21}$	13020	5,000 OHMS 1 WATT
$R_8 R_{24} R_{25}$	13001	1 MEGOHM 1/4 WATT
R_{11}	78714	1 MEG. VOLUME CONTROL
R_{12}	13147	300,000 OHMS 1/4 WATT
$R_{13} R_{23}$	13113	4,000 OHMS 1/4 WATT
R_{14}	13171	250,000 OHMS 1/4 WATT
R_{16}	13024	500,000 OHMS 1/4 WATT
R_{17}	13108	410 OHMS 1 WATT
R_{18}	78715	100,000 w TONE CONTROL & SW.
R_{19}	13092	30,000 OHMS 1 WATT
R_{22}	13179	15,000 OHMS 2 WATTS
G-577 SAME AS G-576 PLUS FOLLOWING.		
R_{26}	13164	50,000 OHMS 1/4 WATT CARBON
R_{27}	13029	250 OHMS 1/4 WATT CARBON

MODELS G576 & G577

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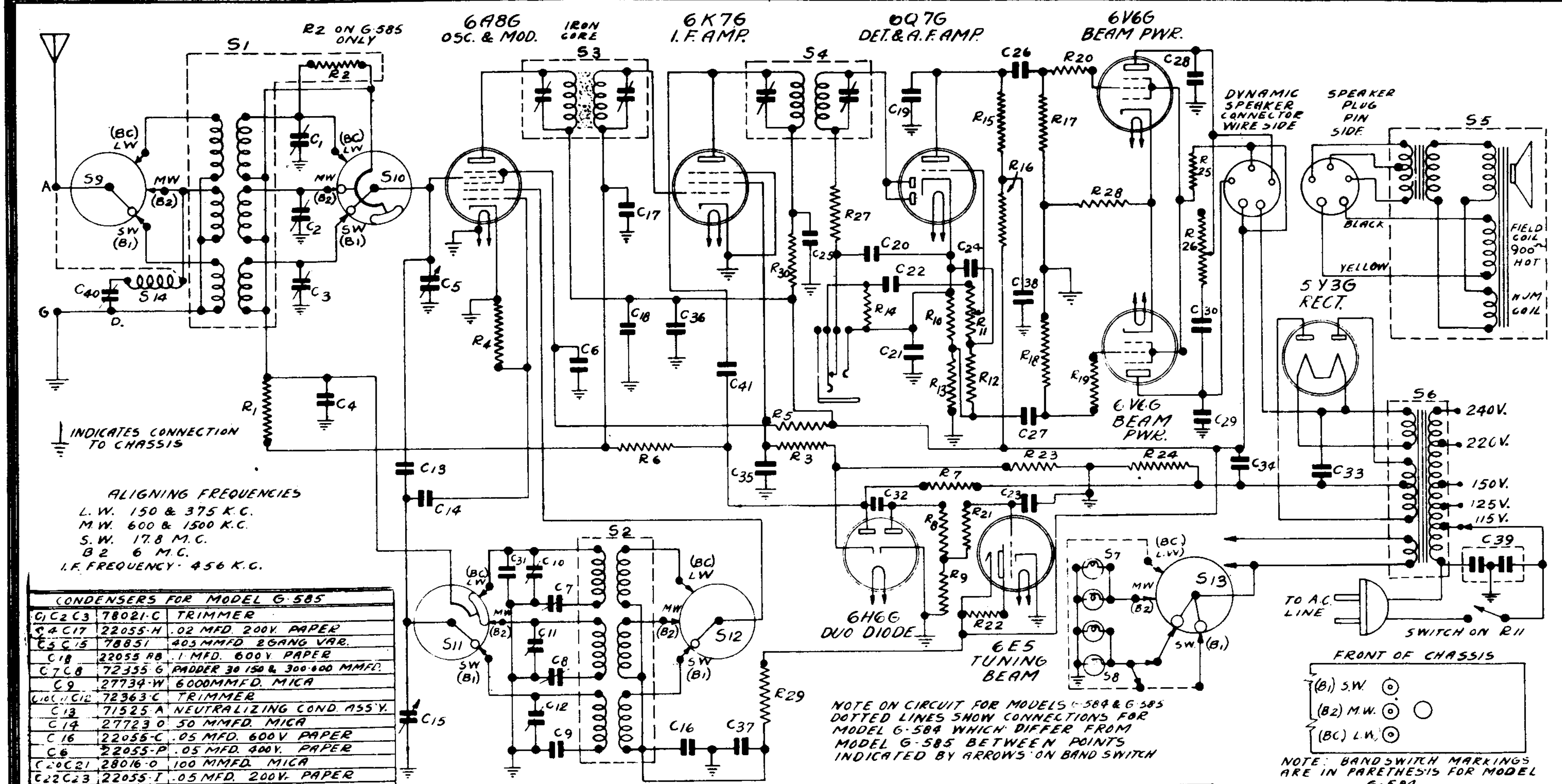
MODELS G-584 & G-585



INDICATES CONNECTION TO CHASSIS

ALIGNING FREQUENCIES
L.W. 150 & 375 K.C.
M.W. 600 & 1500 K.C.
S.W. 17.8 M.C.
B2 6 M.C.
I.F. FREQUENCY - 456 K.C.

NOTE ON CIRCUIT FOR MODELS G-584 & G-585 DOTTED LINES SHOW CONNECTIONS FOR MODEL G-584 WHICH DIFFER FROM MODEL G-585 BETWEEN POINTS INDICATED BY ARROWS ON BAND SWITCH

NOTE: BANDSWITCH MARKINGS ARE IN PARETHESIS FOR MODEL G-584

CONDENSERS FOR MODEL G-585		
C1 C2 C3	78021-C	TRIMMER
C4 C17	22055-H	.02 MFD. 200V. PAPER
C5 C15	78851	405 MMFD. 2 GANG VAR.
C18	22055 AB	.1 MFD. 600V. PAPER
C7 C8	72355 G	PADDER 30 150 & 300-600 MMFD.
C9	27734-W	6000 MMFD. MICA
C10 C11 C12	72363-C	TRIMMER
C13	71525 A	NEUTRALIZING COND. ASS'Y.
C14	27723 0	50 MMFD. MICA
C16	22055-C	.05 MFD. 600V. PAPER
C6	22055-P	.05 MFD. 400V. PAPER
C20 C21	28016-0	100 MMFD. MICA
C22 C23	22055-I	.05 MFD. 200V. PAPER
C24	22481	10 MFD. 25V. ELEC.
C25 C26	22055 AC	.02 MFD. 600V. PAPER
C27	22055-Z	.02 MFD. 400V. PAPER
C28 C29	22055 AL	.002 MFD. 1000V. PAPER
C30	22055 AC	.02 MFD. 600V. PAPER
C33	85024	16 MFD. 450V. ELEC.
C34		8 MFD. 450V. ELEC.
C31 C32 C41	27736-0	25 MMFD. MICA
C35	85025	8 MFD. 450V. ELEC.
C36		8 MFD. 250V. ELEC.
C37 C38		4-4 MFD. 250V. ELEC.
C39	78503	.01-.01 MFD. SHIELDED PAPER 1000V
C40	71503-F	35 100 MMFD. PAPPER
C19	28016-W	100 MMFD. MICA

CONDENSERS FOR MODEL G-584 SAME AS G-585 EXCEPT FOLLOWING		
C7	71503-A	250-500 MMFD. PADDER
C8	27732-W	1600 MMFD. MICA.
C31	27736-0	NOT USED ON G-584

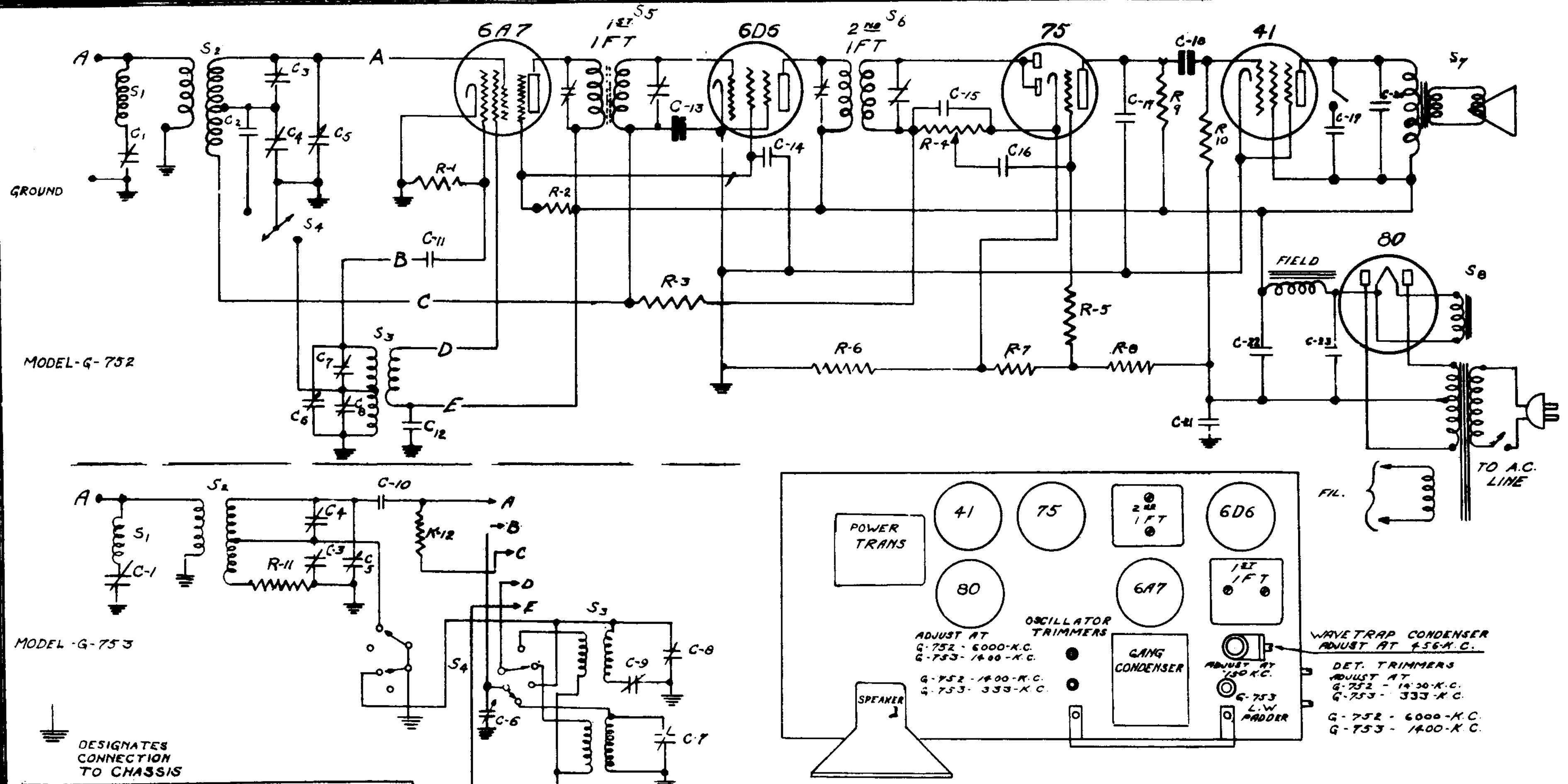
RESISTORS FOR MODELS G-584 & G-585		
R1 R13 R15	13031	100,000 OHMS 1/4 WATT CARBON
R2	13029	500,000 OHMS 1/4 WATT CARBON (G-585 ONLY)
R17 R18	13024	500,000 OHMS 1/4 WATT CARBON
R19 R20	13115	400 OHMS 1/4 WATT CARBON
R16	13074	20,000 OHMS 1/4 WATT CARBON
R10	13195	2,500 OHMS 1/4 WATT CARBON
R12 R14	13171	250,000 OHMS 1/4 WATT CARBON
R6 R7	13007	2 MEGOHM 1/4 WATT CARBON
R8 R9 R21	13001	1 MEGOHM 1/4 WATT CARBON
R22	13001	1 MEGOHM 1/4 WATT CARBON
R11	79492	750,000 OHM VOL. CONT. & SWITCH
R3	13129	15,000 OHMS 1 WATT CARBON
R4	13164	50,000 OHMS 1/4 WATT CARBON
R5	13201	10,000 OHMS 2 WATT CARBON
R23	13029	250 OHMS 1/4 WATT CARBON
R24	13188	23 OHMS 1 WATT CARBON
R25	13028	1,000 OHMS 1/4 WATT CARBON
R26	79493	30,000 OHMS TONE CONTROL
R27	13148	30,000 OHMS 1/4 WATT CARBON
R28	83026	150 OHMS 3 WATT WIRE WOUND
R29	13052	6,000 OHMS 1/2 WATT CARBON
R30	13149	6,000 OHMS 1/4 WATT CARBON

MISC. FOR MODEL G585		
S1	73110	ANT. COIL ASS'Y.
S2	73112	OSC. COIL ASSY.
S3	73108 B	1ST. I.F. TRANS ASS'Y.
S4	73103	2ND. I.F. TRANS ASS'Y.
S5	40831	8" H.C. SPEAKER
		PWR. TRANS. ASS'Y. 60~ 117.5V.
S6	79491	" " 60~ UNIV.
S7 S8	78889	DIAL LAMPS 6.3 V. .2 AMP.
S9 S10 S11 S12 S13	72367-C	BAND SWITCH
S14		WAVE TRAP COIL ASS'Y.

MISC FOR MODEL G 584 SAME AS G 585 EXCEPT THE FOLLOWING		
S1	73109	ANT. COIL ASSY.
S2	73111	OSC. COIL ASS'Y.

I.F. 456 K.C.

PILOT RADIO CORPORATION



INTERMEDIATE FREQUENCY - 456-K.C.
ALIGNING FREQUENCIES:

MODEL-G-752
BROADCAST - 1400 K.C.
SHORT WAVE - 6000 K.C.

MODEL-G-753
LONG WAVE - 333-150-K.C.(900-2000-M)
MEDIUM WAVE - 1400-K.C. (214-M)

CONDENSERS FOR MODEL-G-752		
DESIGNATION	PART NO.	DESCRIPTION
C-1	79455	25-125 MMFD. WAVETRAP TRIMMER
C-2	28100-W	.001 MFD. MICA
C-3-C-4	70969-J	TRIMMER MIXER
C-5-C-6	79432	GANG CONDENSER
C-7-C-8	70969-E	TRIMMER OSCILLATOR
C-11	27723-0	.00005 MFD. MICA
C-12-C-14	22055-L	.1 MFD. 400 V. PAPER
C-13	22055-I	.05 MFD. 200 V. PAPER
C-15	27712-W	.0005 MFD. MICA
C-16	22055-W	.01 MFD. 400 V. PAPER
C-18	22055-Z	.02 MFD. 400 V. PAPER
C-19	22058-U	01 MFD. 1000 V. PAPER
C-20	22055-R	.005 MFD 1000 V. PAPER
C-22-C-23	85022	8-8 MFD 400V. ELECTROLYTIC

CONDENSERS FOR MODEL-G-753-SAME AS-G-752 EXCEPT FOLLOWING		
C-9	79431-A	30-100 MMFD PADDER
C-10	27701-Q	250 MMFD. MICA
C-21	22481	10 MFD. 25V. ELECTROLYTIC COND.
C-12		OMITTED ON MODEL-G-753
C-17	27726-W	.0002 MFD. MICA

CARBON RESISTORS FOR MODEL-G-752		
DESIGNATION	PART NO.	DESCRIPTION
R-1	13164	50,000-OHM 1/4 WATT-CARBON RESISTOR
R-2	13092	30,000-OHM-1-WATT- " "
R-3	13001	1 MEG. 1/4 WATT " "
R-4	13024	500,000-OHM, VOLUME CONTROL
R-5	13007	2 MEG. - 1/4 WATT-CARBON RESISTOR
R-6	13257	100-OHM - 1/4 WATT. CARBON RESISTOR
R-7	13189	30-OHM - 1/4 WATT " "
R-8	13096	200-OHM - 1/2 WATT
R-9	13171	250,000-OHM - 1/4 WATT " "
R-10	13024	500,000-OHM - 1/4 WATT " "

CARBON RESISTORS FOR MODEL-G-753-SAME AS-752 EXCEPT FOLLOWING		
R-11	13080	50-OHM - 1/4 WATT-CARBON RES.
R-12	13024	500,000-OHM - 1/4 WATT " "

MISCELLANEOUS FOR MODEL-G-752		
S-1	73029-B	WAVETRAP COIL
S-2	73099-	ANTENNA COIL ASS'Y
S-3	73100	OSCILLATOR COIL ASS'Y
S-4	79430	BAND SWITCH
S-5	73108-A	FIRST I.F. TRANS. ASS'Y.
S-6	73103	SECOND I.F. TRANS ASS'Y
S-7	40830	5" LOUDSPEAKER
S-8	79428	POWER TRANSFORMER

MISCELLANEOUS FOR MODEL-G-753-SAME AS FOR MODEL-G-752-EXCEPT FOLLOWING		
S-2	73101	ANTENNA COIL ASS'Y
S-3	73102	OSCILLATOR COIL ASS'Y
S-4	79454	BAND SWITCH
S-6	73104	SECOND I.F. TRANS ASS'Y

MODELS G752 & G753

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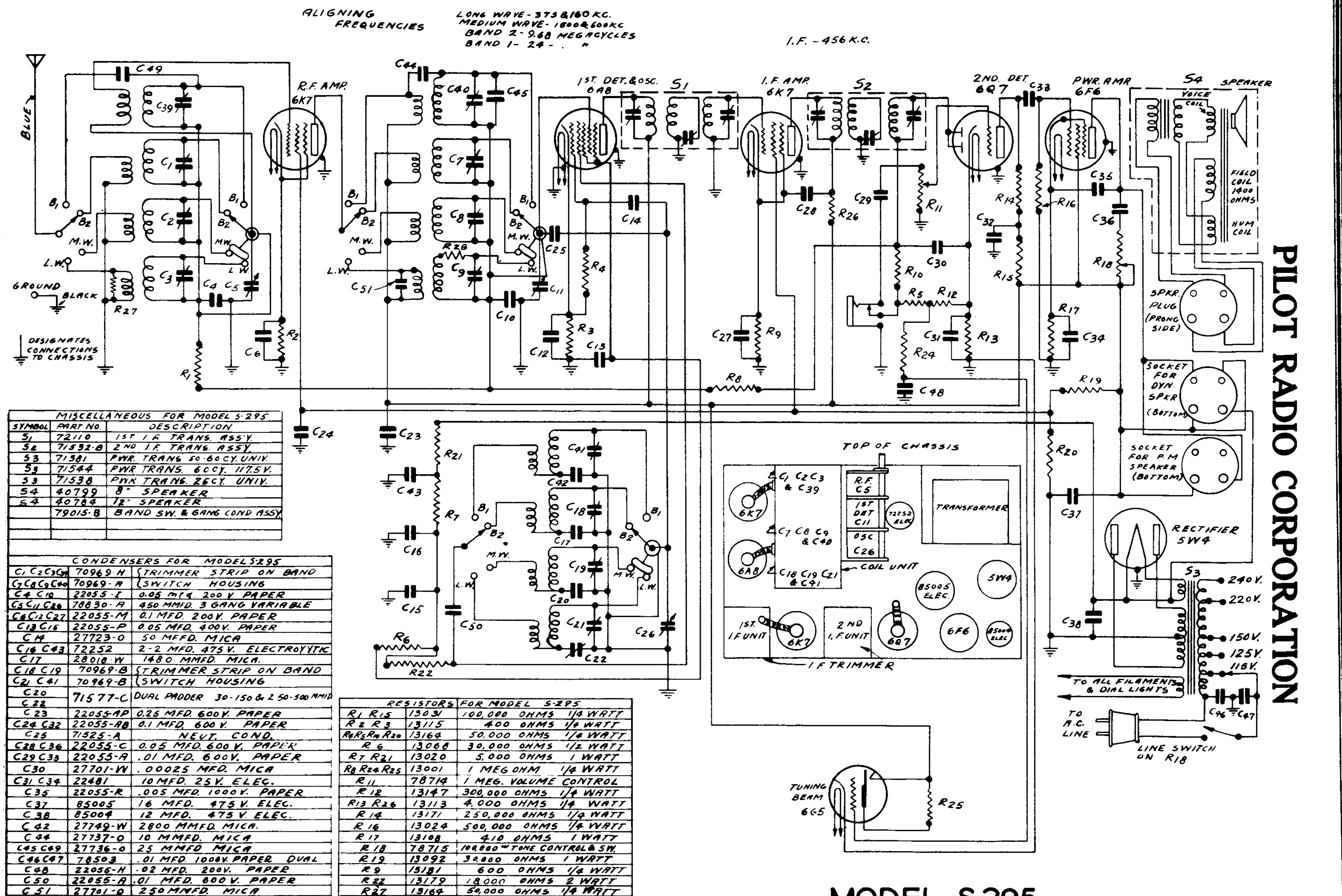


MODEL S295

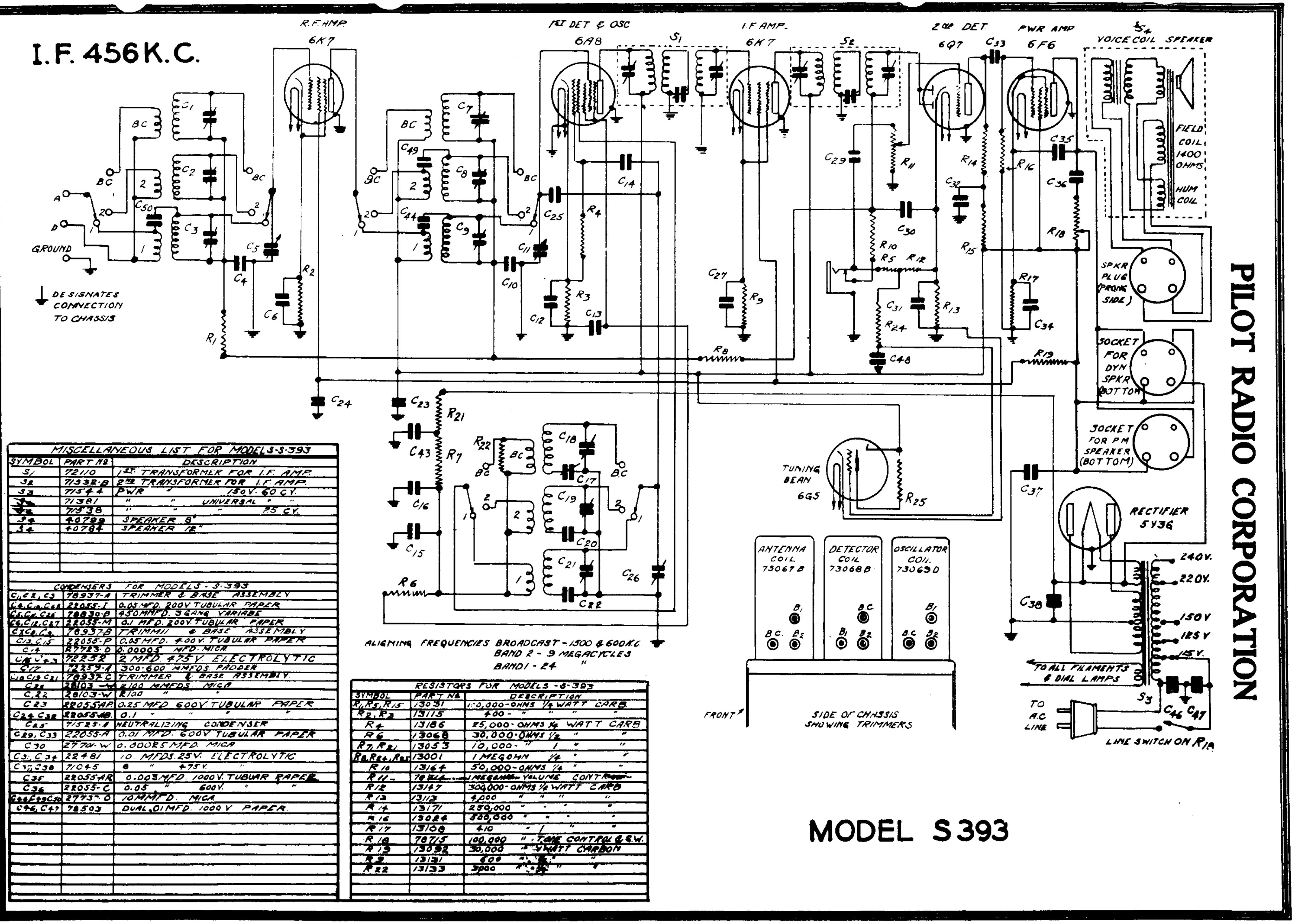
MISCELLANEOUS FOR MODEL S-295		
SYMBOL	PART NO.	DESCRIPTION
S_1	72110	1ST. I.F. TRANS. ASS'Y.
S_2	71532-B	2ND I.F. TRANS. ASS'Y.
S3	71581	PWR. TRANS. 50-60 CY. UNIV.
S_3	71544	PWR. TRANS. 60 CY. 117.5 V.
S3	71538	PWR. TRANS. 25 CY. UNIV.
S4	40799	8" SPEAKER
S4	40784	12" SPEAKER
	79015-B	BAND SW. & GANG COND ASSY.

CONDENSERS FOR MODEL S-295		
C_1 C_2 C_3 C_{39}	70969-H	TRIMMER STRIP ON BAND
C_7 C_8 C_9 C_{40}	70969-A	SWITCH HOUSING
C_4 C_{10}	22055-I	0.05 MFD. 200 V. PAPER
C_5 C_{11} C_{26}	78830-A	450 MMFD. 3 GANG VARIABLE
C_6 C_{12} C_{27}	22055-M	0.1 MFD. 200 V. PAPER
C_{13} C_{15}	22055-P	0.05 MFD. 400 V. PAPER
C14	27723-0	50 MFFD. MICA
C_{16} C_{43}	72252	2-2 MFD. 475 V. ELECTROYYTIC
C17	28018-W	1480 MMFD. MICA.
C_{18} C_{19}	70969-B	TRIMMER STRIP ON BAND
C_{21} C_{41}	70969-B	SWITCH HOUSING
C20 C22	71577-C	DUAL PADDER 30-150 & 250-500 MMFD
C23	22055-AP	0.25 MFD. 600 V. PAPER
C24 C32	22055-AB	0.1 MFD. 600 V. PAPER
C25	71525-A	NEUT. COND.
C28 C36	22055-C	0.05 MFD. 600 V. PAPER
C29 C33	22055-A	.01 MFD. 600 V. PAPER
C30	27701-W	.00025 MFD. MICA
C31 C34	22481	10 MFD. 25 V. ELEC.
C35	22055-R	.005 MFD. 1000 V. PAPER
C37	85005	16 MFD. 475 V. ELEC.
C38	85004	12 MFD. 475 V. ELEC.
C42	27749-W	2800 MMFD. MICA.
C44	27737-0	10 MMFD. MICA
C45 C49	27736-0	25 MMFD MICA
C46 C47	78503	.01 MFD. 1000 V. PAPER DUAL
C48	22056-H	.02 MFD. 200 V. PAPER
C50	22055-A	.01 MFD. 600 V. PAPER
C51	27701-0	250 MMFD. MICA

RESISTORS FOR MODEL S-295		
R_1 R_{15}	13031	100,000 OHMS 1/4 WATT
R_2 R_3	13115	400 OHMS 1/4 WATT
R_4 R_5 R_{10} R_{20}	13164	50,000 OHMS 1/4 WATT
R_6	13068	30,000 OHMS 1/2 WATT
R_7 R_{21}	13020	5,000 OHMS 1 WATT
R_8 R_{24} R_{25}	13001	1 MEG OHM 1/4 WATT
R_{11}	78714	1 MEG. VOLUME CONTROL
R12	13147	300,000 OHMS 1/4 WATT
R13 R26	13113	4,000 OHMS 1/4 WATT
R14	13171	250,000 OHMS 1/4 WATT
R16	13024	500,000 OHMS 1/4 WATT
R17	13108	410 OHMS 1 WATT
R18	78715	100,000 Ω TONE CONTROL & SW.
R19	13092	30,000 OHMS 1 WATT
R9	13181	600 OHMS 1/4 WATT
R22	13179	18,000 OHMS 2 WATT
R27	13164	50,000 OHMS 1/4 WATT
R28	13029	250 OHMS 1/4 WATT

PILOT RADIO CORPORATION

MODEL S393

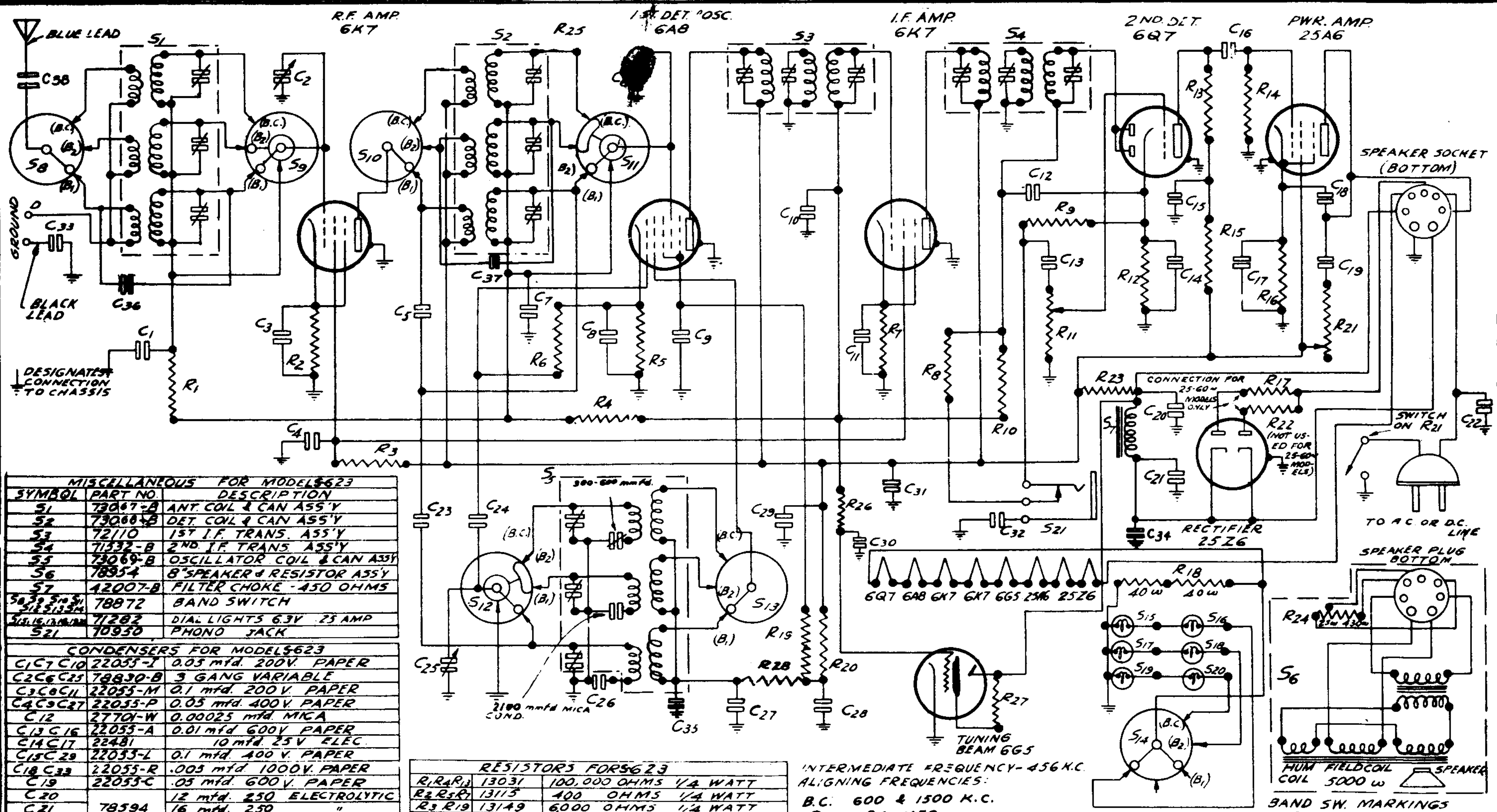


ALIGNING FREQUENCIES BROADCAST - 1500 & 600 K.C.
BAND 2 - 9 MEGACYCLES
BAND 1 - 24 "

MISCELLANEOUS LIST FOR MODELS-S-393		
SYMBOL	PART No.	DESCRIPTION
S1	72110	1ST TRANSFORMER FOR I.F. AMP.
S2	71532-B	2ND TRANSFORMER FOR I.F. AMP.
S3	71544	PWR " 150V. 60 CY.
S3	71381	" " UNIVERSAL " "
S3	71538	" " " 25 CY.
S4	40799	SPEAKER 8"
S4	40784	SPEAKER 12"
CONDENSERS FOR MODELS - S-393		
C1, C2, C3	78937-A	TRIMMER & BASE ASSEMBLY
C4, C10, C48	22055-I	0.05 MFD. 200V TUBULAR PAPER
C5, C11, C26	78830-B	450 MMFD. 3 GANG VARIABE
C6, C12, C27	22055-M	0.1 MFD. 200V. TUBULAR PAPER
C7, C8, C9	78937-B	TRIMMII & BASE ASSEMBLY
C13, C15	22055-P	0.05 MFD. 400V. TUBULAR PAPER
C14	27723-O	0.00005 MFD. MICA
C16, C43	72252	2 MFD. 475V. ELECTROLYTIC
C17	72259-A	300-600 MMFDS. PADDER
C18, C19, C21	78937-C	TRIMMER & BASE ASSEMBLY
C20	28103-W	2100 MMFDS. MICA
C22	28103-W	2100 " "
C23	22055-AP	0.25 MFD 600V TUBULAR PAPER
C24, C32	22055-AB	0.1 " " " "
C25	71525-A	NEUTRALIZING CONDENSER
C29, C33	22055-A	0.01 MFD. 600V TUBULAR PAPER
C30	27701-W	0.00025 MFD. MICA
C31, C34	22481	10 MFDS. 25V. ELECTROLYTIC
C37, C38	71045	8 " 475V. "
C35	22055-AR	0.003 MFD. 1000V. TUBUAR PAPER
C36	22055-C	0.05 " 600V. " "
C44, C49, C50	27737-O	10 MMFD. MICA
C46, C47	78503	DUAL .01 MFD. 1000V PAPER.

RESISTORS FOR MODELS - S-393		
SYMBOL	PART No.	DESCRIPTION
R1, R5, R15	13031	100,000-OHMS 1/4 WATT CARB.
R2, R3	13115	400- " " " "
R4	13186	25,000-OHMS 1/4 WATT CARB
R6	13068	30,000-OHMS 1/2 " "
R7, R21	13053	10,000- " 1 " "
R8, R24, R25	13001	1 MEGOHM 1/4 " "
R10	13164	50,000-OHMS 1/4 " "
R11	78 [illegible]	1 MEGOHM VOLUME CONTROL
R12	13147	300,000-OHMS 1/4 WATT CARB
R13	13113	4,000 " " " "
R14	13171	250,000 " " " "
R16	13024	500,000 " " " "
R17	13108	410 " 1 " "
R18	78715	100,000 " TONE CONTROL & S.W.
R19	13092	30,000 " 1/2 WATT CARBON
R9	13131	600 " [illegible] " "
R22	13133	3000 " [illegible] " "

PILOT RADIO CORPORATION



MISCELLANEOUS FOR MODEL S623		
SYMBOL	PART NO.	DESCRIPTION
S1	73067-B	ANT. COIL & CAN ASS'Y
S2	73068-B	DET. COIL & CAN ASS'Y
S3	72110	1ST I.F. TRANS. ASS'Y
S4	71532-B	2ND. I.F. TRANS. ASS'Y
S5	73069-B	OSCILLATOR COIL & CAN ASS'Y
S6	78954	8" SPEAKER & RESISTOR ASS'Y
S7	42007-B	FILTER CHOKE - 450 OHMS
S8 S9 S10 S11 S12 S13 S14	78872	BAND SWITCH
S15,16,17,18,19,20	71282	DIAL LIGHTS 6.3V .25 AMP
S21	70950	PHONO JACK

CONDENSERS FOR MODEL S623		
C1 C7 C10	22055-T	0.05 mfd. 200V. PAPER
C2 C6 C25	78830-B	3 GANG VARIABLE
C3 C8 C11	22055-M	0.1 mfd. 200 V. PAPER
C4 C9 C27	22055-P	0.05 mfd. 400 V. PAPER
C12	27701-W	0.00025 mfd. MICA
C13 C16	22055-A	0.01 mfd 600V PAPER
C14 C17	22481	10 mfd. 25V ELEC.
C15 C29	22055-L	0.1 mfd. 400 V. PAPER
C18 C33	22055-R	.005 mfd. 1000V. PAPER
C19	22055-C	.05 mfd. 600 V. PAPER
C20	78594	12 mfd. 250 ELECTROLYTIC
C21		16 mfd. 250 "
C28		4 mfd. 250 "
C22	22055-U	0.01 mfd. 1000V. PAPER
C24	27723-0	.00005 mfd. MICA
C26	28103-W	.0021 MFD. MICA
C23	71525-A	NEUTRALIZING
C5	27737-0	.00001 mfd. MICA
C32	22055-S	0.5 mfd. 200V. PAPER
C35	85013	4 mfd. 250V. ELEC.
C30	22055-H	.02 mfd. 200V. PAPER
C-31	85013	12 MFD. 250 V. ELEC.
C36 C37	27737-0	10 MMFD. MICA
C34	22055-C	.05 MFD. 600V. PAPER
C38	22055-R	.005 MFD. 1000V. PAPER

RESISTORS FOR S623		
R1 R4 R13	13031	100,000 OHMS 1/4 WATT
R2 R5 R7	13115	400 OHMS 1/4 WATT
R3 R19	13149	6000 OHMS 1/4 WATT
R6 R8 R15	13164	50,000 OHMS 1/4 WATT
R9	13147	300,000 OHMS 1/4 WATT
R10 R26 R27	13001	1,000,000 OHMS 1/4 WATT
R11	78714	750,000 ω VOL. CONTROL
R12	13149	6000 OHMS 1/4 WATT
R14	13024	500,000 OHMS 1/4 WATT
R16	13192	440 OHMS 1 WATT
R17 R22	13077	100 OHMS 1/2 WATT
R18	83002	80 OHMS TAPPED AT 40 ω
R20	13086	2000 OHMS 1/2 WATT
R21	78715	100,000 OHMS TONE CONT. & SW.
R23	78610	2500 OHMS 3 WATTS WIRE W'D
R24	83010	455 ω TAPPED AT 25 ω " "
R28	13028	1000 OHMS 1/4 WATT

INTERMEDIATE FREQUENCY - 456 K.C.
ALIGNING FREQUENCIES:

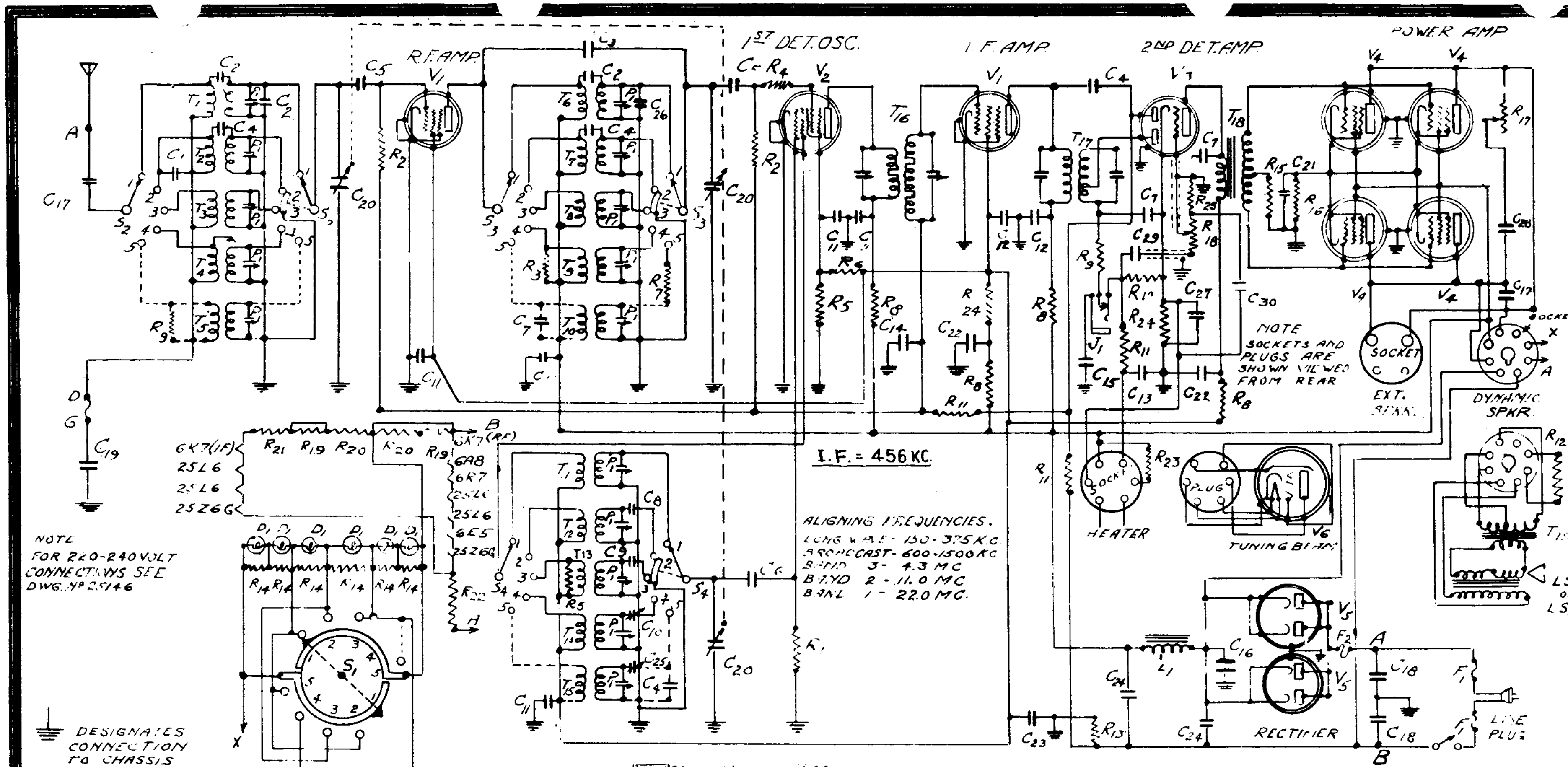
B.C. 600 & 1500 K.C.
B_1 24 MEG.
B_2 9 MEG.

CONDENSERS FOR MODEL S623J (25-60~)		
SAME AS FOR MODEL S623 EXCEPT FOLLOWING:		
C20	85012	12 MFD. 250V. ELECTRO.
C35		4 " 250V. "
C31		12 " 250V. "
C21	85010	34 MFD. 250V. ELECTRO.
C28		4 " 250V. "

RESISTORS FOR MODEL S623J (25-60~)		
SAME AS FOR MODEL S623 EXCEPT FOLLOWING:		
R17	83013	100 OHMS 2 WATTS WIRE W'ND
R22		NOT USED

MODELS S623 & S623J

PILOT RADIO CORPORATION



No. of Part			
1	R_1	72214	50,000-OHMS-¼ WATT IRC
2	R_2	72213	500,000-OHMS ¼ WATT IRC
1	R_3	72211	5,000 " " "
1	R_4	75804	15 OHMS ¼ WATT FLEXIBLE
2	R_5	13074	20,000-OHMS-¼ WATT CARB
1	R_6	13149	6,000 " ¼ "
1	R_7	13029	[illegible] " ¼ " 305 ONLY
4	R_8	13028	1,000 ¼ CARBON
[illegible]	R_9	13164	50,000 " ¼ " "
	R_{10}	13141	300,000 " ¼ " "
3	R_{11}	13007	2 MEGOHMS ¼ " "
1	R_{12}	83017	540 OHMS 22W. WIRE WOUND
	R_{13}	13198	16 OHMS, WATT CARB
1	R_{14}	83016	90 OHMS 6 SECTION WIRE WOUND
1	R_{15}	13030	10,000 OHMS WATT CARB
1	R_{16}	83014	650 OHMS 2 W. WIRE WOUND
1	R_{17}	79209	[illegible]
1	R_{18}	78669	2 MEGOHMS VOL. & S.W.
	R_{19}	83020 (1-REQ)	60-OHMS VITREOUS
	R_{20}		28-OHMS ENAMELED
	R_{21}		40-OHMS RESISTOR
	R_{22}		20-OHMS
1	R_{23}	13024	50,000-OHMS ¼ WATT
2	R_{24}	13012	500-OHMS ¼ WATT
	R_{25}	13131	100,000-OHMS-¼ W. CARB.

P_1	72226-X304	R.F. COIL TRIM'R ASS'Y 3-35 mmf
P	72227-X305	R.F. COIL TRIM'R ASS'Y 3-35 mmf
C_1	28016-O	.0001 MF MICA COND. TYPE O
C_2	27737-O	.00001
C_3		.000002 MFD.
C_4	27736-O	.000025 MF. MICA COND. TYPE O
C_5	27701-O	.00025 " " " "
C_6	28016-W	.0001 " " W
C_7	27701-W	.00025 " "
C_8	27747-W	.0026 " " " " "
C_9	27748-W	.00130 " " " " "
C_{10}	71583-D	300-700 mmf [illegible]
C_{10}	71577-C	PADDER [illegible] X-305 ONLY
C_{11}	22055-Z	.02 MFD. 400V. PAPER COND
C_{12}	22055-W	.01 MFD. " "
C_{13}	22055-I	.05 " 200V. " "
C_{14}	22055-H	.02 " "
C_{15}	22055-S	[illegible] " " "
C_{16}	22055-C	.05 MF 600V. PAPER COND.
C_{17}	22055-R	.005 1000V " "
C_{18}	78503	DUAL .01 MF 1000V. "
C_{19}	22055-U	.01 MFD. 1000V. PAPER
C_{20}	72146	10-470 mmfd VAR. A.R. COND.
C_{21}	85002	30 MF 25 V. ELECTR. "
C_{22}	78688	10-10 MF. 150V. "
C_{23}		" " "
C_{24}	85014	40 " " "
C_{26}	71577-C	PADDER IN MOD. X305 [illegible]

C_{26}	28101-W	15 MMFD MICA [illegible]
C_{27}	22481	10 MFD 25 V. ELEC. [illegible]
C_{28}	22055-AB	.1 MFD 600V PAPER COND.
C_{29}	22491-B	.01 MFD 600V PAPER COND. (SHIELDED)
C_{30}	22055-F	.25 MFD 200V PAPER COND.
$T_1 T_3$	73032	BANDS 1 & 3 ANT. COILS
$T_2 T_4$	73035	" 2 & 4 " "
T_5	73038	" 5 " "
$T_6 T_8$	73033	" 1 & 3 DET. "
$T_7 T_9$	73036	" 2 & 4 " "
T_{10}	73039	" 5 " "
$T_{11} T_{13}$	73034	" 1 & 3 OSC "
$T_{12} T_{14}$	73037	" 2 & 4 " "
T_{15}	73040	" 5 " "
T_{16}	73030	1ST I.F. TRANS. [illegible]
T_{17}	73031	2ND
T_{18}	73064	AUDIO INPUT " 1-4
T_{19}	PART OF 40866	OUTPUT TRANS. ON LOUDSPEAKER
J_1	70950	PHONO. INPUT JACK
F_1	70053-E	3 AMP. FUSE (2 REQ)
F_2	70053-L	¼ AMP FUSE (1 REQ)
F_2	70053-K	¼ AMP FUSE [illegible]

S_1	78753 (MOD. X304) OR 78754 MOD. X305	LIGHTING FRONT SECT. BAND S.W.
S_2		ANT. 2ND "
S_3		DET. 3RD "
S_4		OSC. (REAR) "
S_5	PART OF 78669	LINE SWITCH (ON VOL. CONT.)
L_1	79208	FILTER CHOKE - SHY. 50 OHMS
V_1	71966	TYPE 6K7 VACUUM TUBE (2 REQ)
V_2	71961	" 6A8 " "
V_3	81961	" 6R7 " "
V_4	81964	" 25L6 " (2-REQ)
V_5	72001	" 25Z6G " (2-REQ)
V_6	71993	" 6E5 " (FOR 100V. OPER'N)

D_1	78889	6.3V. 2A PILOT LAMP (WHITE BEAD) 6-REQ.
LS_1	40822	10" DYNAMIC (LOUD SPEAKER) (400 OHM FIELD)
LS_2	40823	12" " "

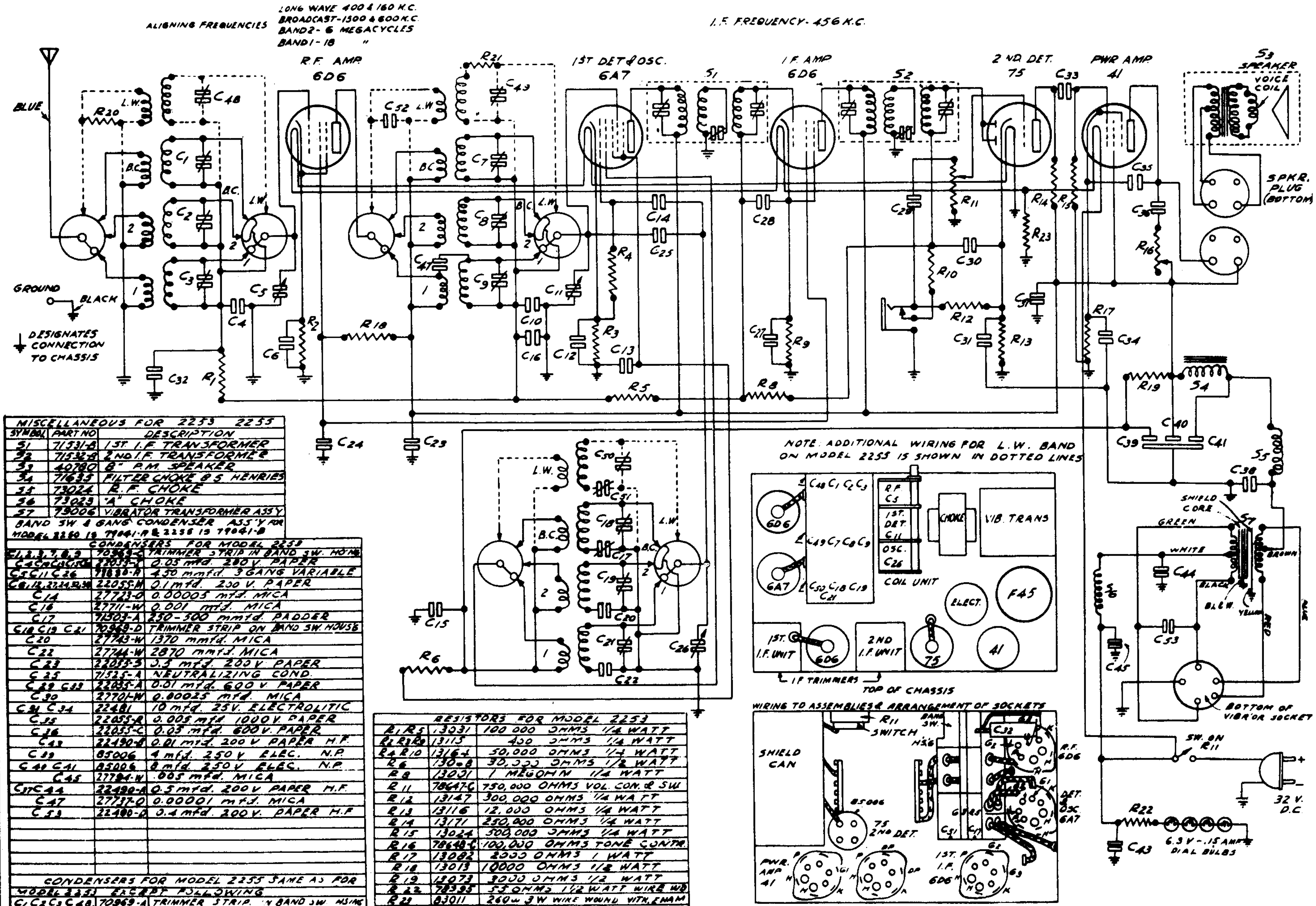
Part	No. Req.
C_1	1
C_2	4
C_3	1
C_4	3-304, 4-305
C_5	2
C_6	1
C_7	3-304, 3-305
C_8	1
C_9	
C_{10}	1-304 ONLY
C_{11}	5
C_{12}	2
C_{13}	1
C_{14}	1
C_{15}	1
C_{16}	1
C_{17}	2
C_{18}	1
C_{19}	1
C_{20}	1
C_{21}	1
C_{22}, C_{23}	1
C_{24}	1
C_{25}	1-305 ONLY

T_5 (P.) T_{10} (P.) T_{10} (P.) 1-C_4, 1-C_5, R_7, 1-R_9, C_{25} TO BE OMITTED IN MODEL X304.

NOTE. ADDITIONAL WIRING FOR LONG WAVE BAND ON MODEL X305 IS SHOWN IN DOTTED LINES

MODELS X304 & X305

PILOT RADIO CORPORATION



MISCELLANEOUS FOR 2253 2255		
SYMBOL	PART NO	DESCRIPTION
S1	71531-B	1ST. I.F. TRANSFORMER
S2	71532-B	2ND I.F. TRANSFORMER
S3	40780	8" P.M. SPEAKER
S4	71635	FILTER CHOKE 8.5 HENRIES
S5	73024	R.F. CHOKE
S6	73023	"A" CHOKE
S7	73006	VIBRATOR TRANSFORMER ASS'Y
BAND SW. & GANG CONDENSER ASS'Y FOR MODEL 2250 IS 79041-A & 2256 IS 79041-B		

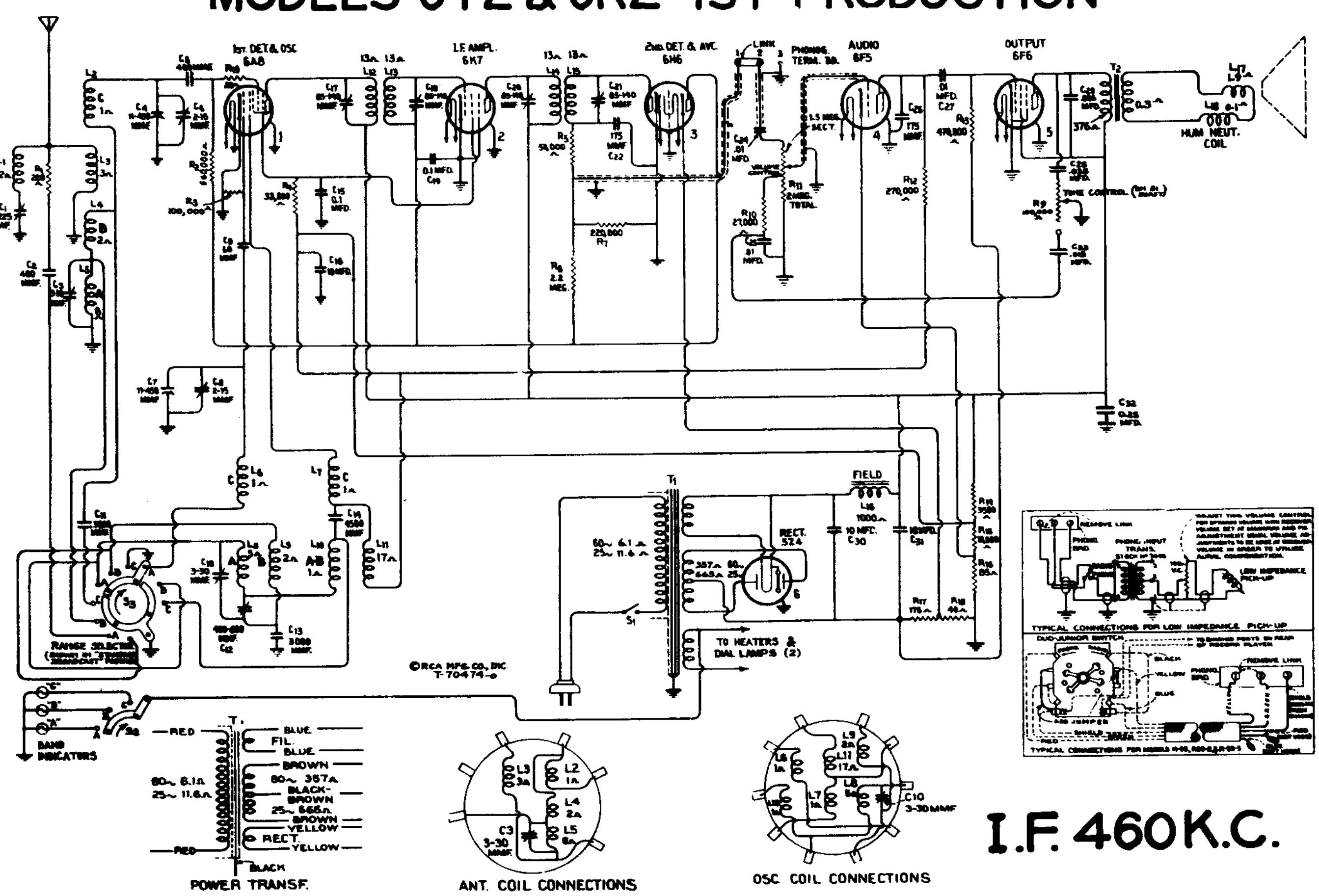
CONDENSERS FOR MODEL 2253		
C1,2,3,7,8,9	70969-C	TRIMMER STRIP IN BAND SW. HO'NG
C4C8C13C15	22055-Y	0.05 mfd. 200 V. PAPER
C5C11C26	71830-A	450 mmfd. 3 GANG VARIABLE
C6,12,27,24,32,36	22055-M	0.1 mfd. 200 V. PAPER
C14	27723-O	0.00005 mfd. MICA
C16	27711-W	0.001 mfd. MICA
C17	71303-A	250-500 mmfd. PADDER
C18 C19 C21	70969-D	TRIMMER STRIP ON BAND SW. HOUS'G
C20	27743-W	1370 mmfd. MICA
C22	27744-W	2870 mmfd. MICA
C23	22055-S	0.5 mfd. 200 V. PAPER
C25	71525-A	NEUTRALIZING COND.
C29 C33	22055-A	0.01 mfd. 600 V. PAPER
C30	27701-W	0.00025 mfd. MICA
C31 C34	22481	10 mfd. 25V. ELECTROLITIC
C35	22055-R	0.005 mfd. 1000 V. PAPER
C36	22055-C	0.05 mfd. 600 V. PAPER
C43	22490-B	0.01 mfd. 200 V PAPER H.F.
C39	85006	4 mfd. 250 V ELEC. N.P.
C40 C41	85006	8 mfd. 250 V ELEC. N.P.
C45	27794-W	.005 mfd. MICA
C37 C44	22490-A	0.5 mfd. 200 V PAPER H.F.
C47	27737-O	0.00001 mfd. MICA
C53	22490-D	0.4 mfd. 200 V. PAPER H.F.
CONDENSERS FOR MODEL 2255 SAME AS FOR MODEL 2253 EXCEPT FOLLOWING		
C1 C2 C3 C48	70969-A	TRIMMER STRIP IN BAND SW. HSING
C7 C8 C9 C49	70969-A	" " " " " "
C17 C51	71577-C	DUAL PADDER 250-500 & 30-150 mmfd.
C18 C19 C21 C50	70969-B	TRIMMER STRIP IN BAND SW. H'NG
C52	27701-O	0.00025 mfd. MICA

RESISTORS FOR MODEL 2253		
R1 R5	13031	100 000 OHMS 1/4 WATT
R2 R3 R9	13115	400 OHMS 1/4 WATT
R4 R10	13164	50,000 OHMS 1/4 WATT
R6	130-8	30,000 OHMS 1/2 WATT
R8	13031	1 MEGOHM 1/4 WATT
R11	78647-C	750,000 OHMS VOL. CON. & SW.
R12	13147	300,000 OHMS 1/4 WATT
R13	13116	12,000 OHMS 1/4 WATT
R14	13171	250,000 OHMS 1/4 WATT
R15	13024	500,000 OHMS 1/4 WATT
R16	78648-C	100,000 OHMS TONE CONTR.
R17	13082	2000 OHMS 1 WATT
R18	13013	10000 OHMS 1/2 WATT
R19	13073	3000 OHMS 1/2 WATT
R22	78395	55 OHMS 1 1/2 WATT WIRE WD.
R23	83011	260 Ω 3W WIRE WOUND VITR. ENAM
RESISTORS FOR MODEL 2255 SAME AS FOR MODEL 2253 EXCEPT FOLLOWING		
R20	13164	50,000 OHMS 1/4 WATT
R21	13029	250 OHMS 1/4 WATT

MODELS X2253 & X2255

RCA MANUFACTURING CO., Inc.

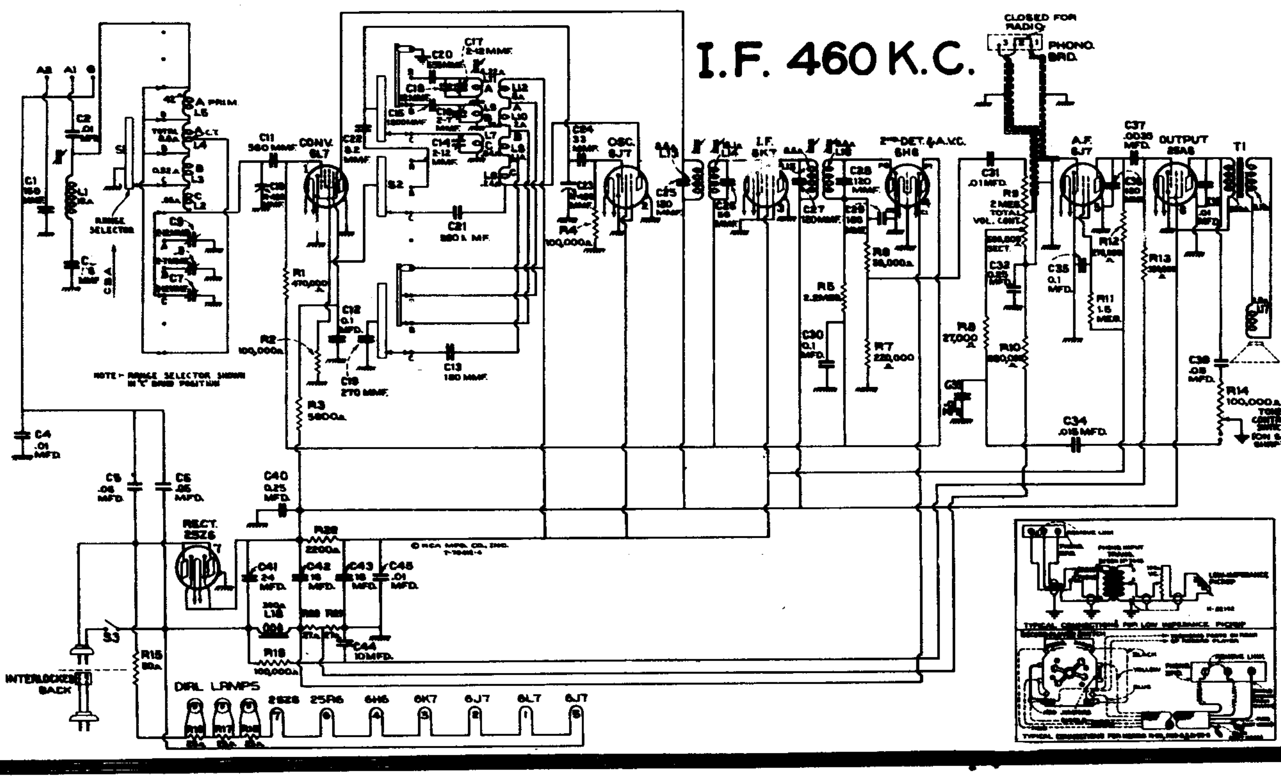
MODELS 6T2 & 6K2 1ST PRODUCTION



NOTICE!! MODEL 6K2 2ND PRODUCTION

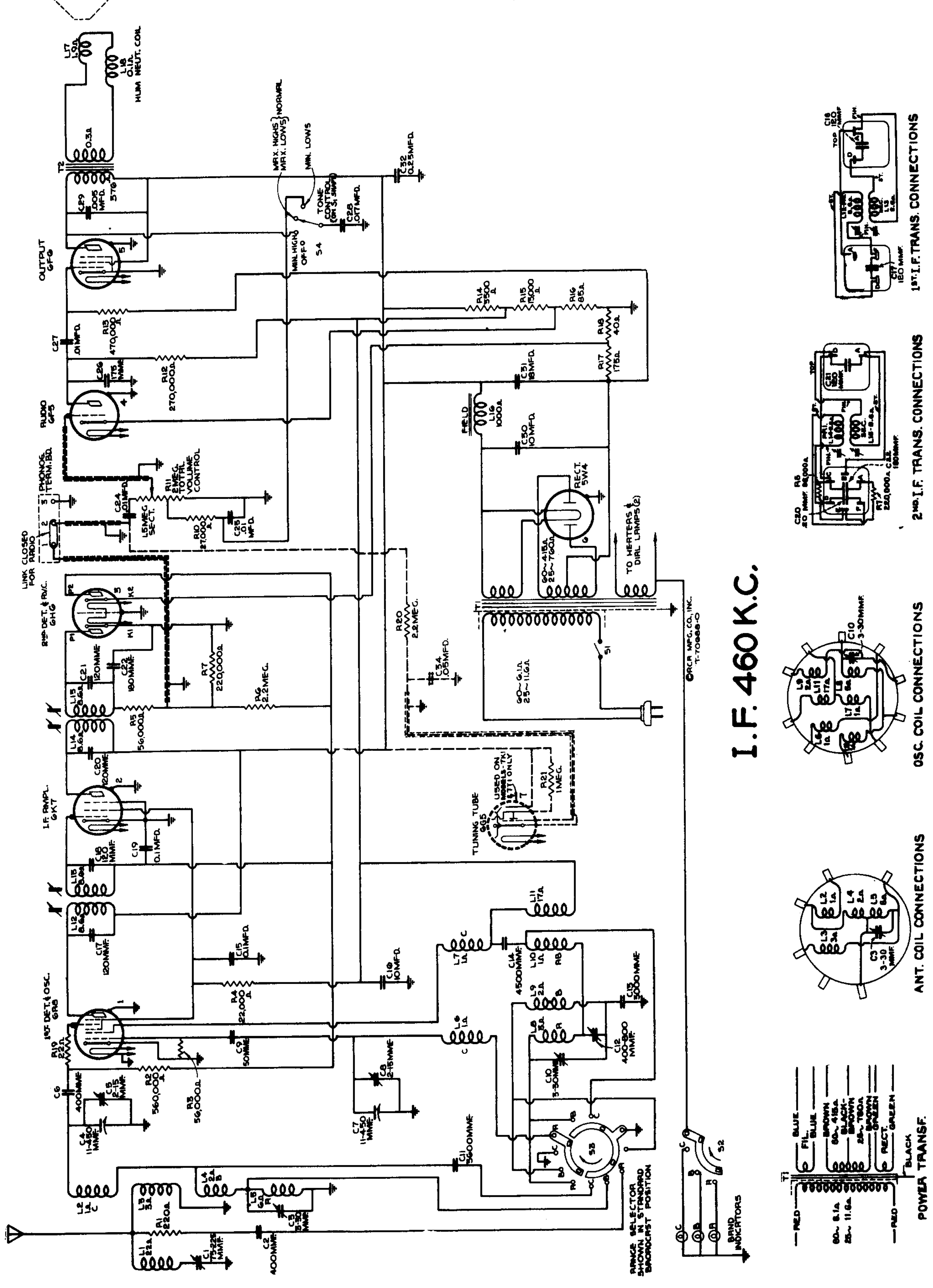
These receivers are similar to Model 6K2 (first production) except for the i-f transformers, loudspeaker, and a few component parts. Visual inspection of the i-f transformers will readily identify these receivers. Service Data for Model 6K2 are directly applicable to these receivers except the information contained herein. The primary adjustments for the i-f transformers are located on the bottom of the transformers while the secondary adjustments are located on top.

MODEL 7X



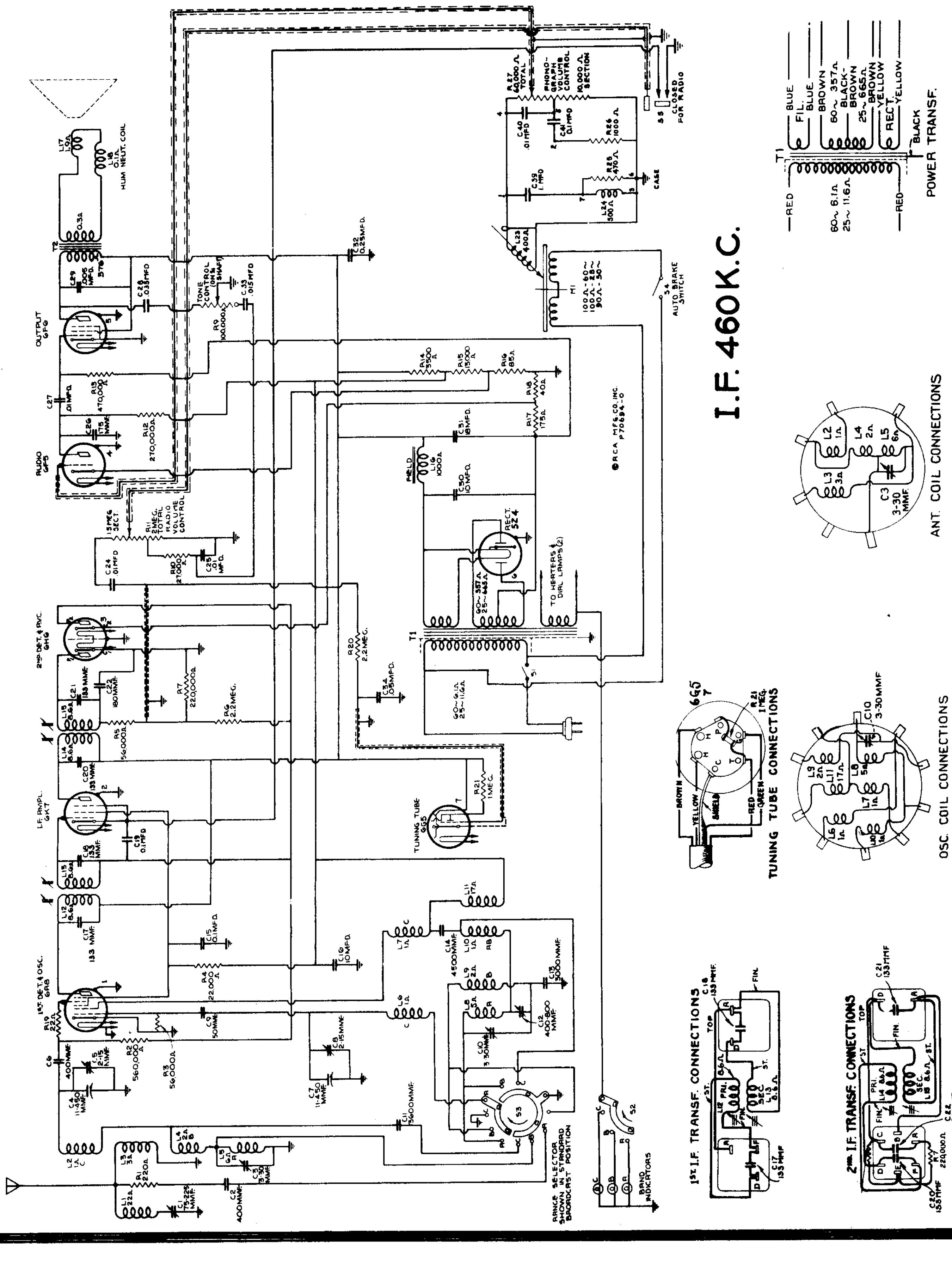
RCA MANUFACTURING CO., Inc.

MODELS 6K3, 7T1 & 7K1



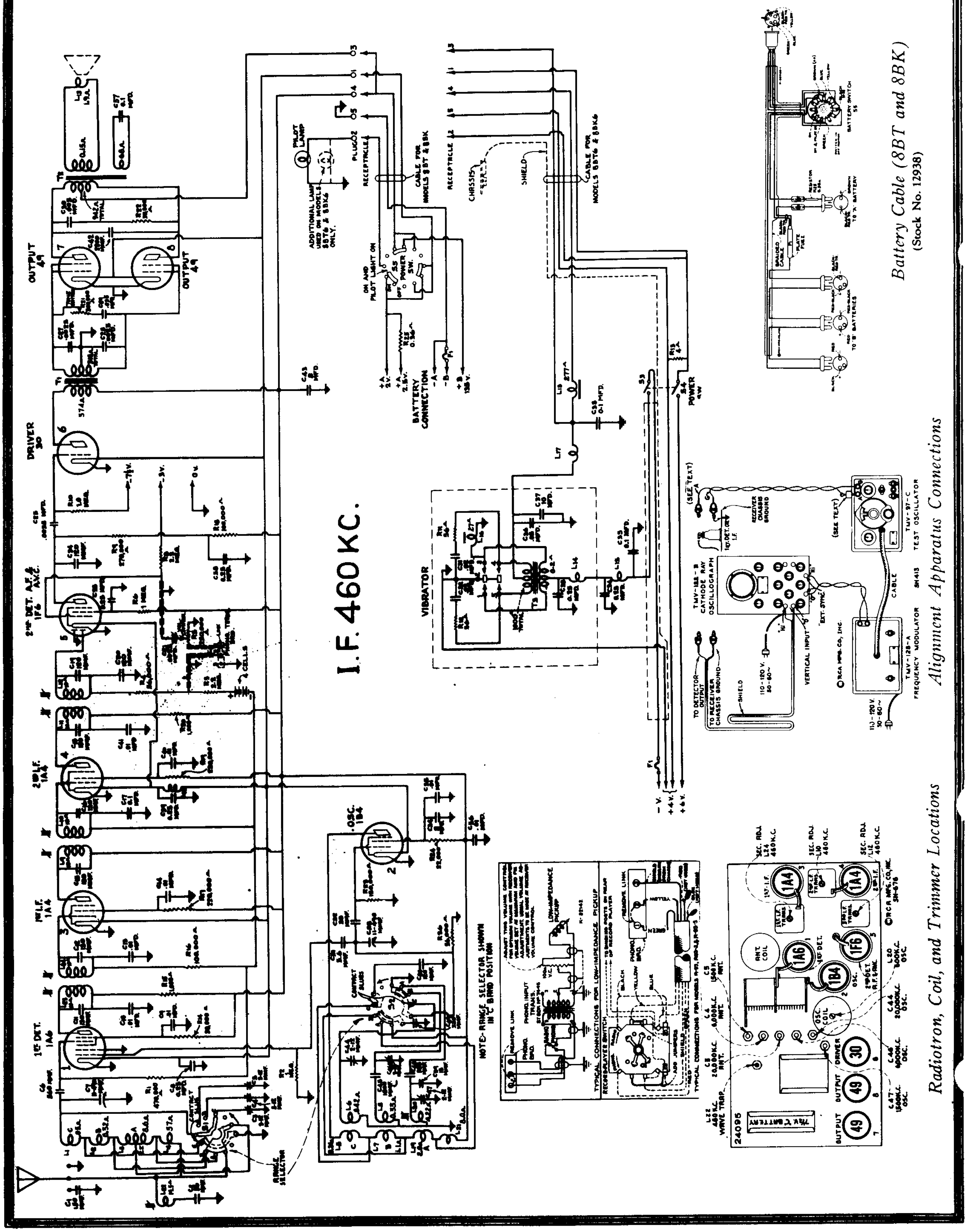
RCA MANUFACTURING COMPANY, Inc.

MODEL 7U2



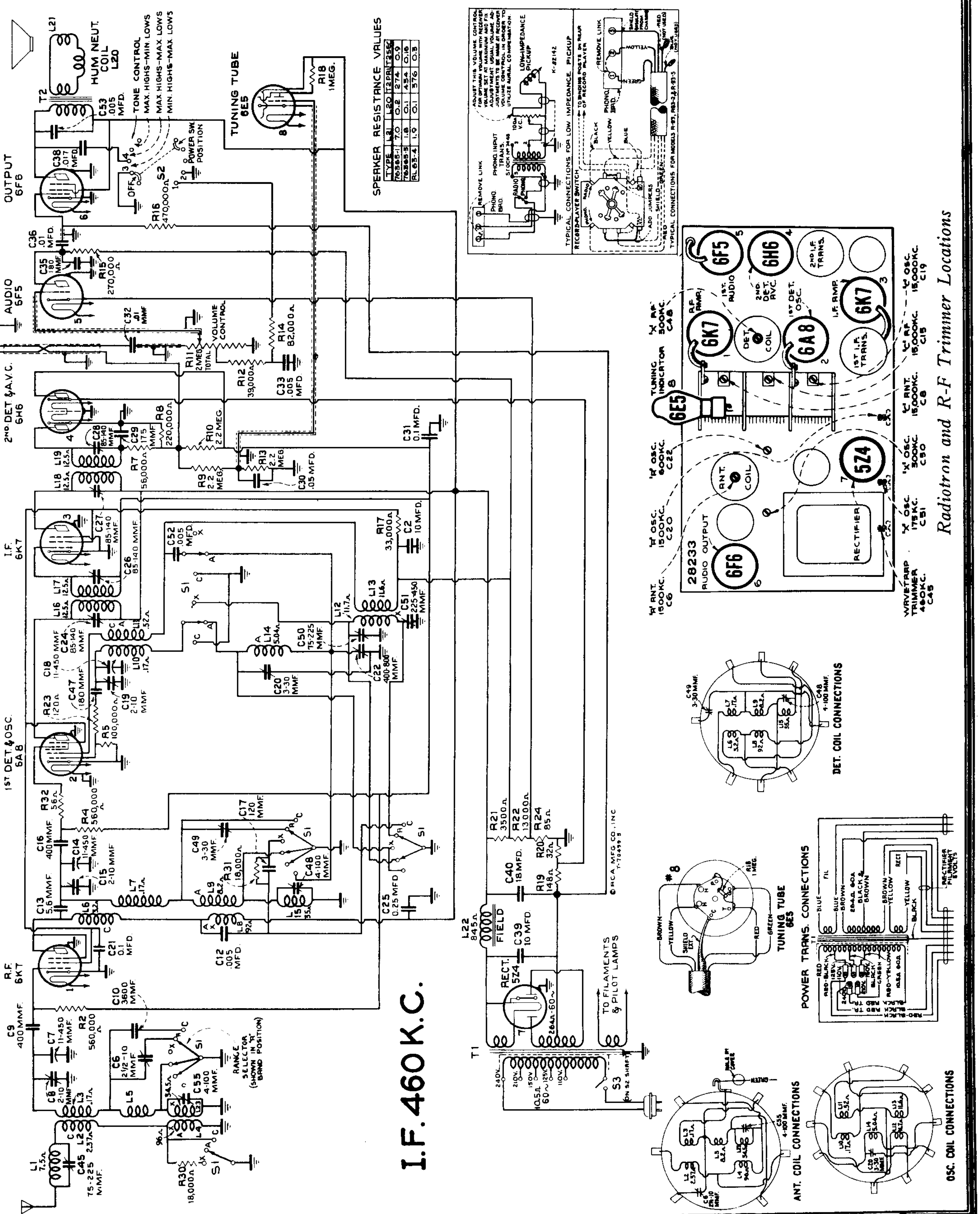
RCA MANUFACTURING COMPANY, Inc.

MODELS 8BT, 8BK, 8BT6 & 8BK6



RCA MANUFACTURING COMPANY, Inc.

MODELS 8T2, 8T11 & 8K11

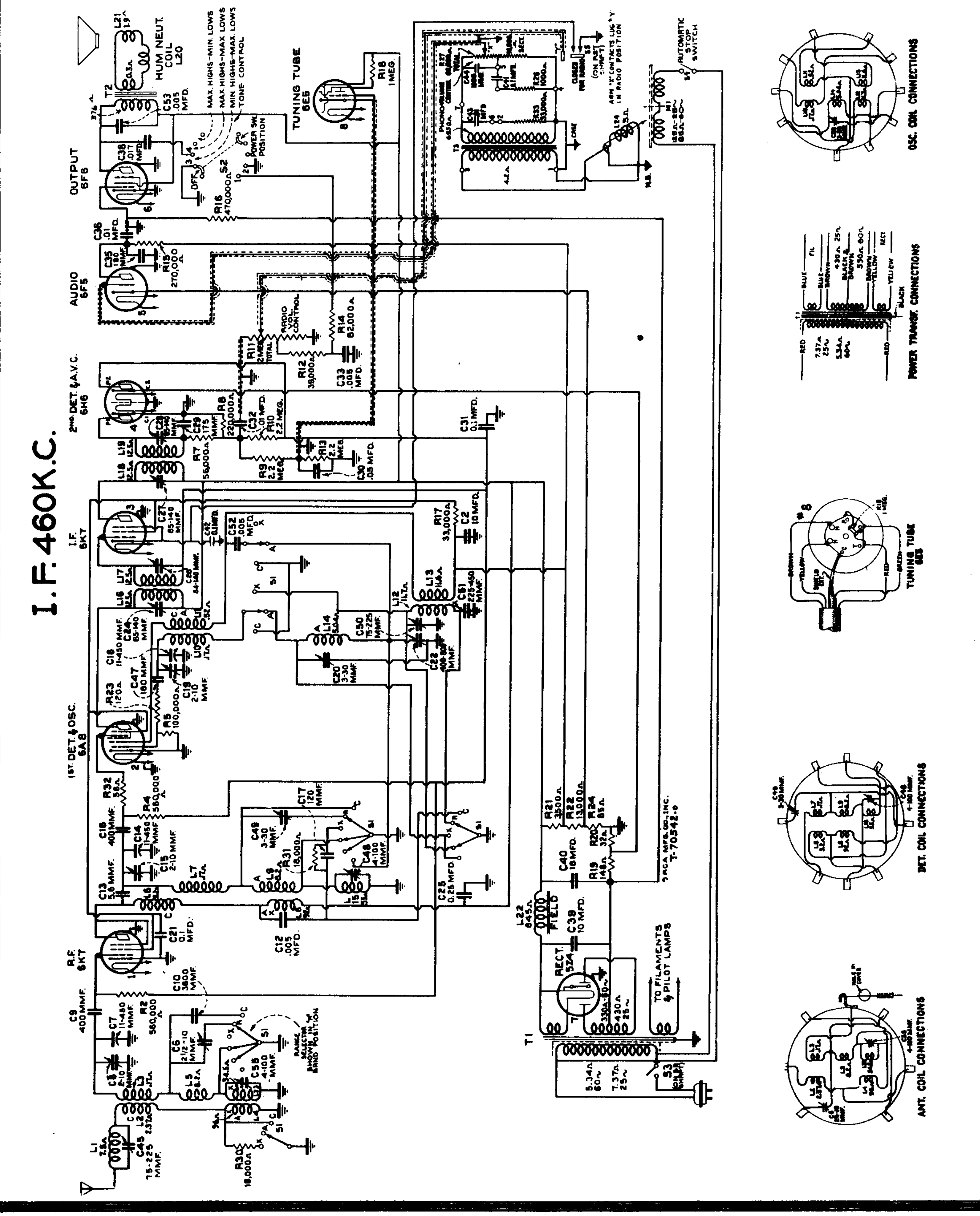


SPEAKER RESISTANCE VALUES

TYPE	L21	L20	T2 PRI.	T2 SEC.
76565-1	7.0	0.2	274	0.9
76565-5	1.8	0.1	454	0.16
RL 63-4	1.9	0.1	376	0.3

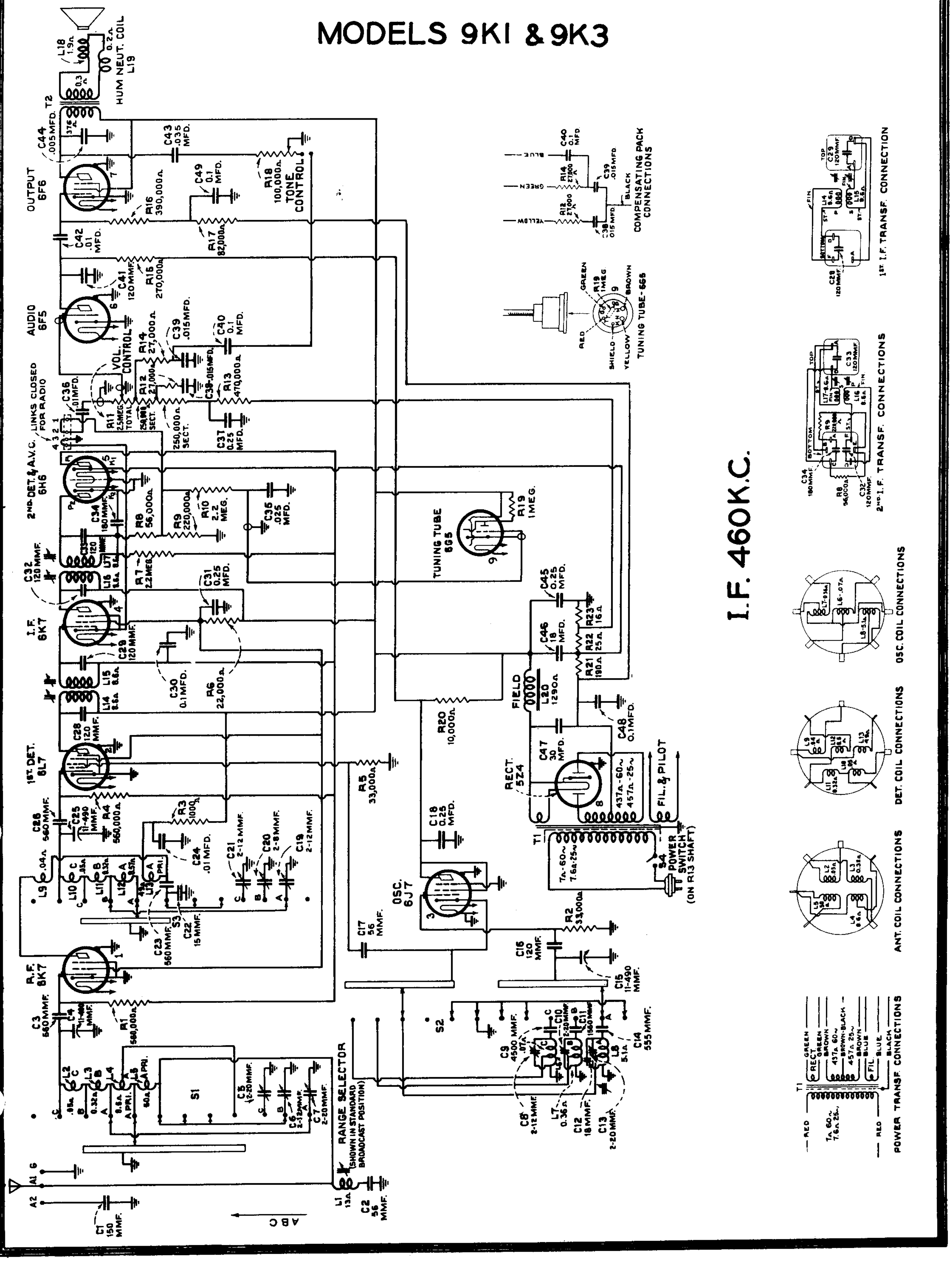
RCA MANUFACTURING COMPANY, Inc.

MODEL 8U2



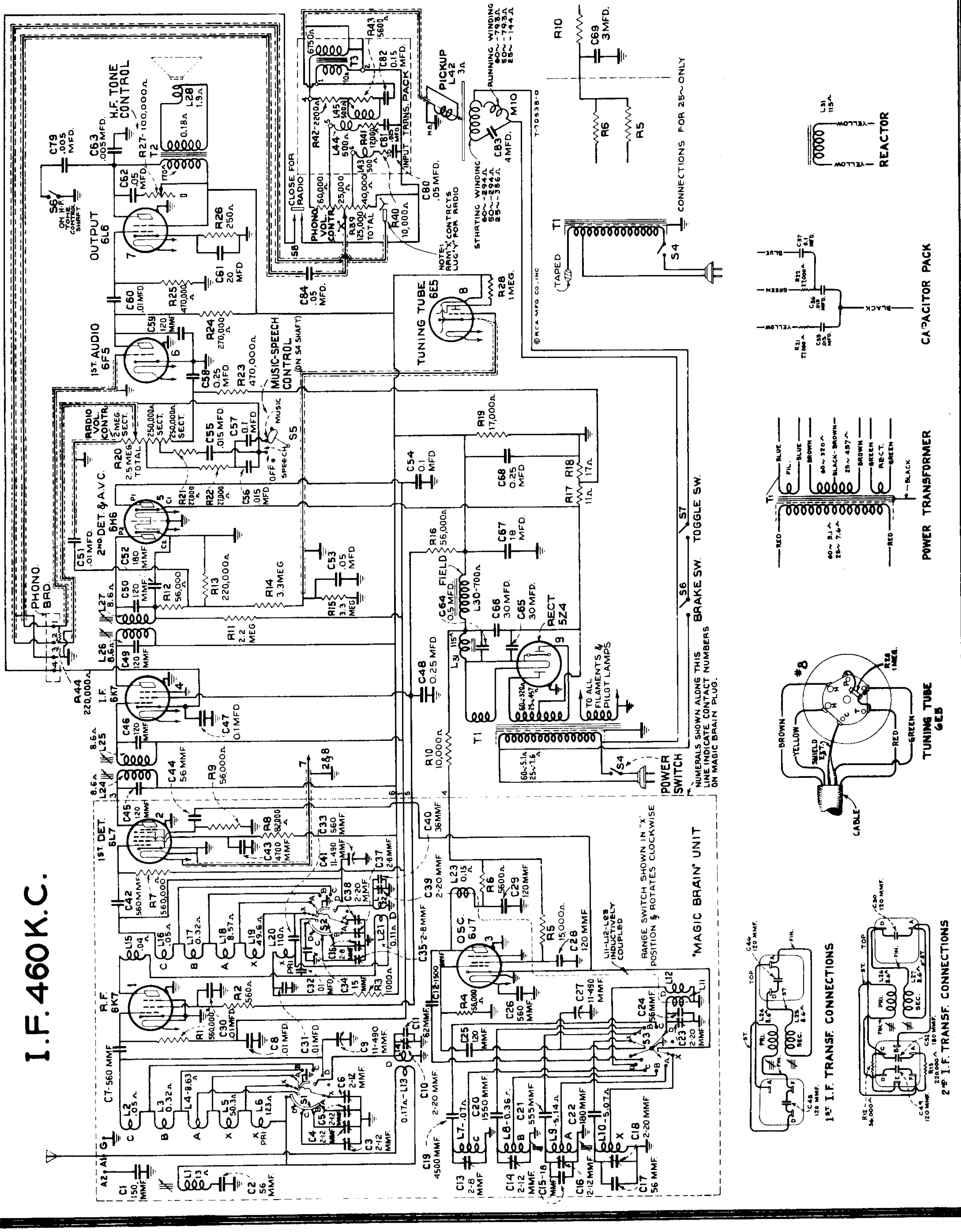
RCA MANUFACTURING COMPANY, Inc.

MODELS 9K1 & 9K3



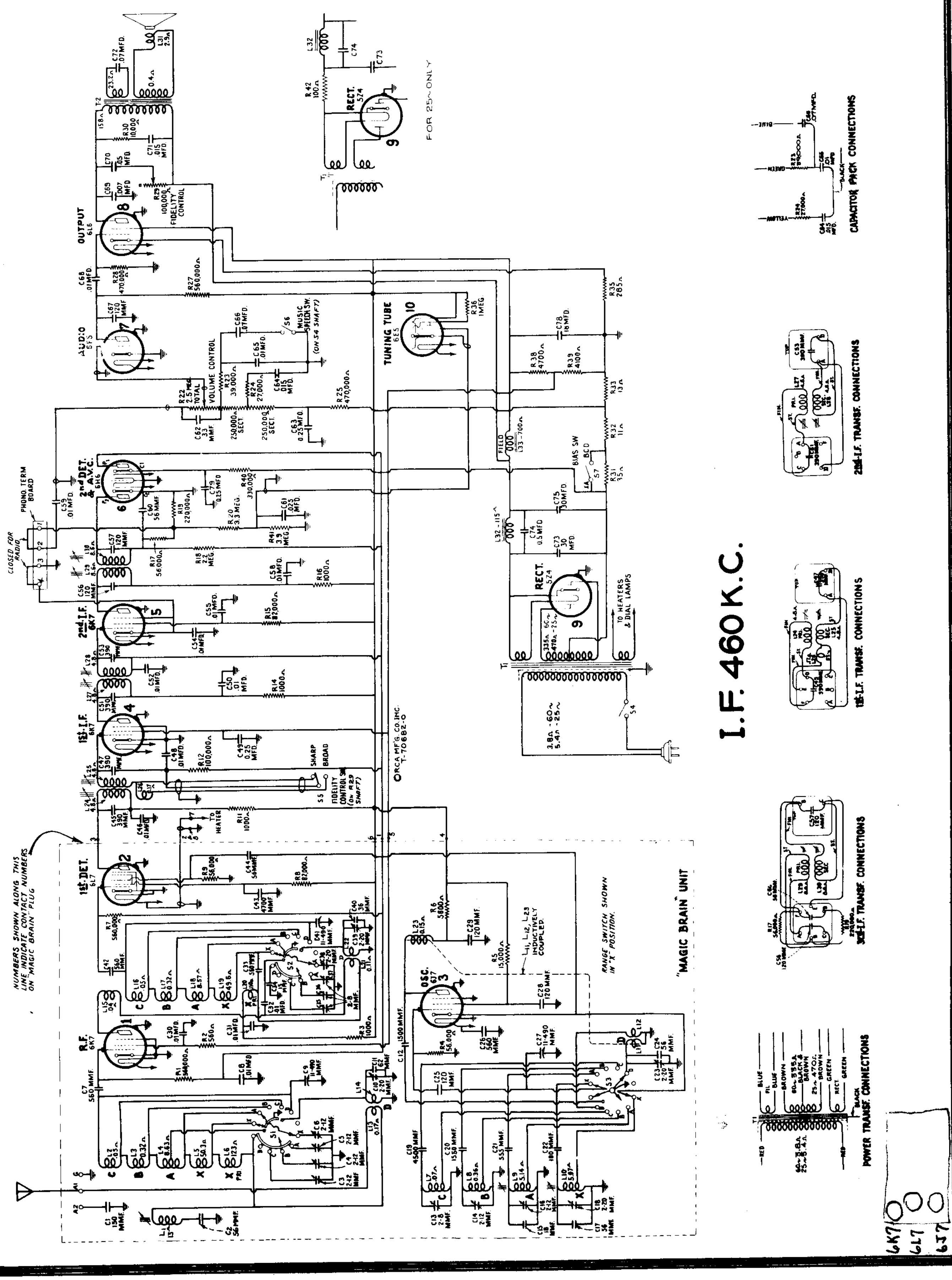
RCA MANUFACTURING COMPANY, Inc.

MODELS 9U & 9U2



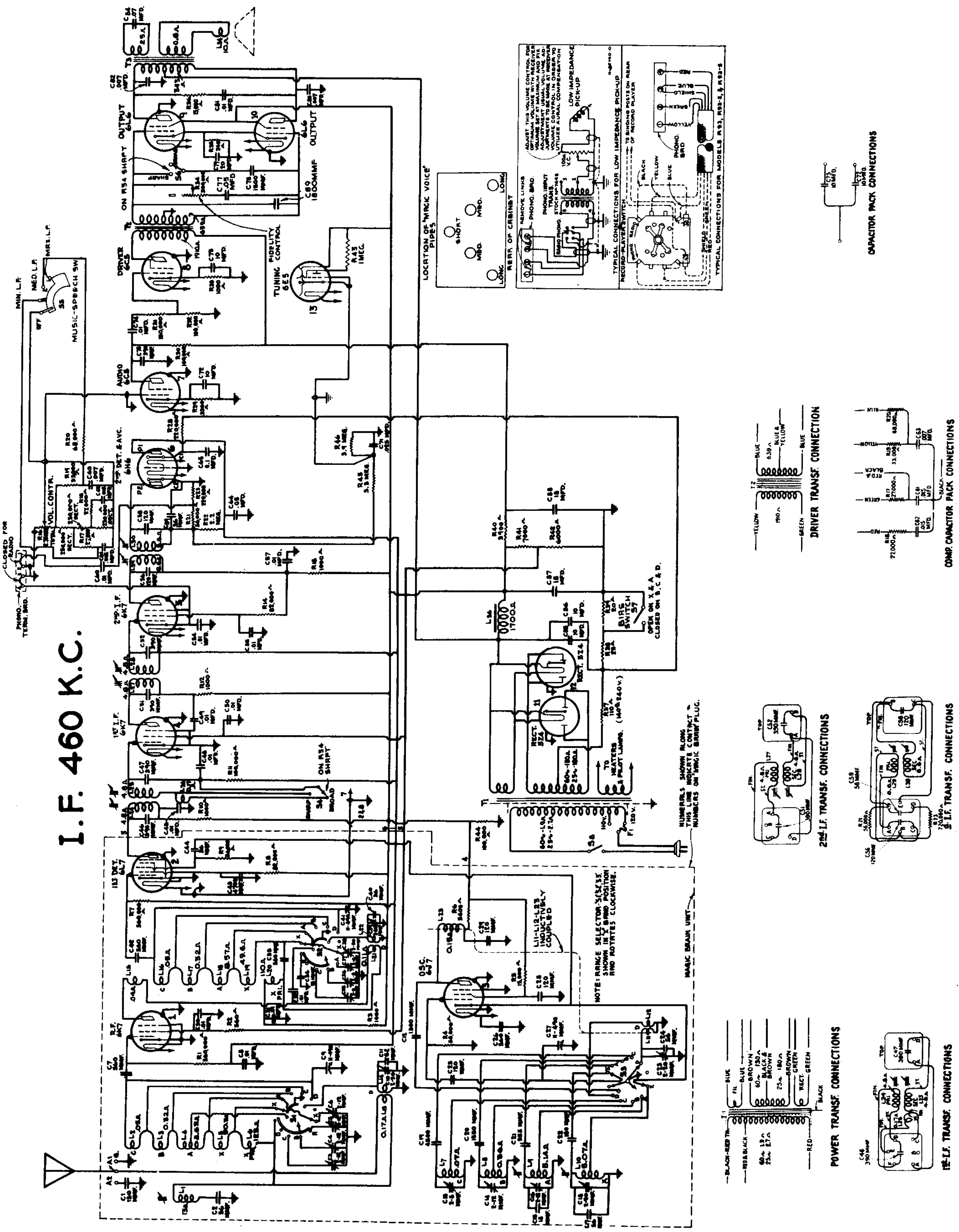
RCA MANUFACTURING COMPANY, Inc.

MODELS 10K1 & 10T



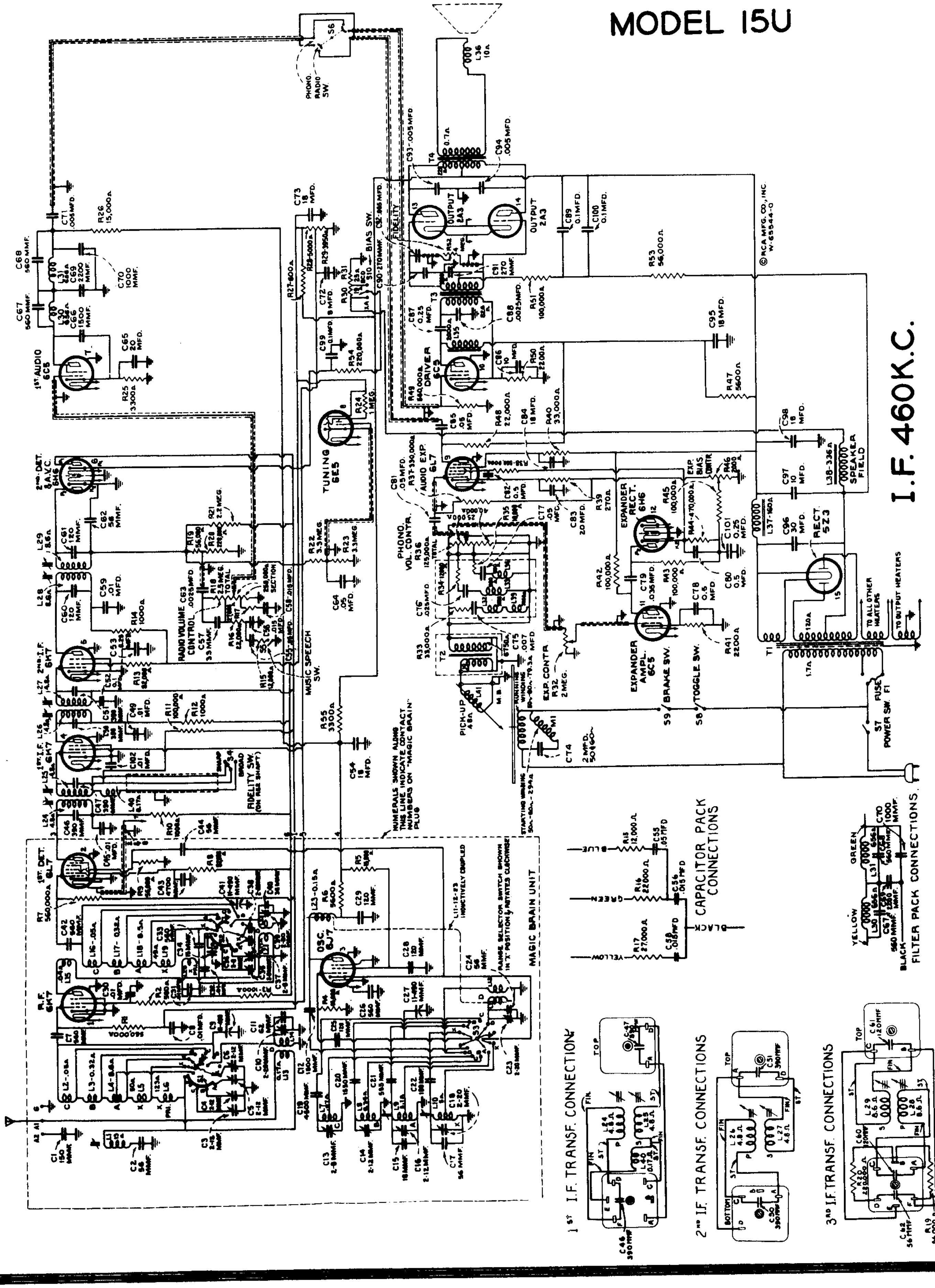
RCA MANUFACTURING CO., Inc.

MODEL 13K

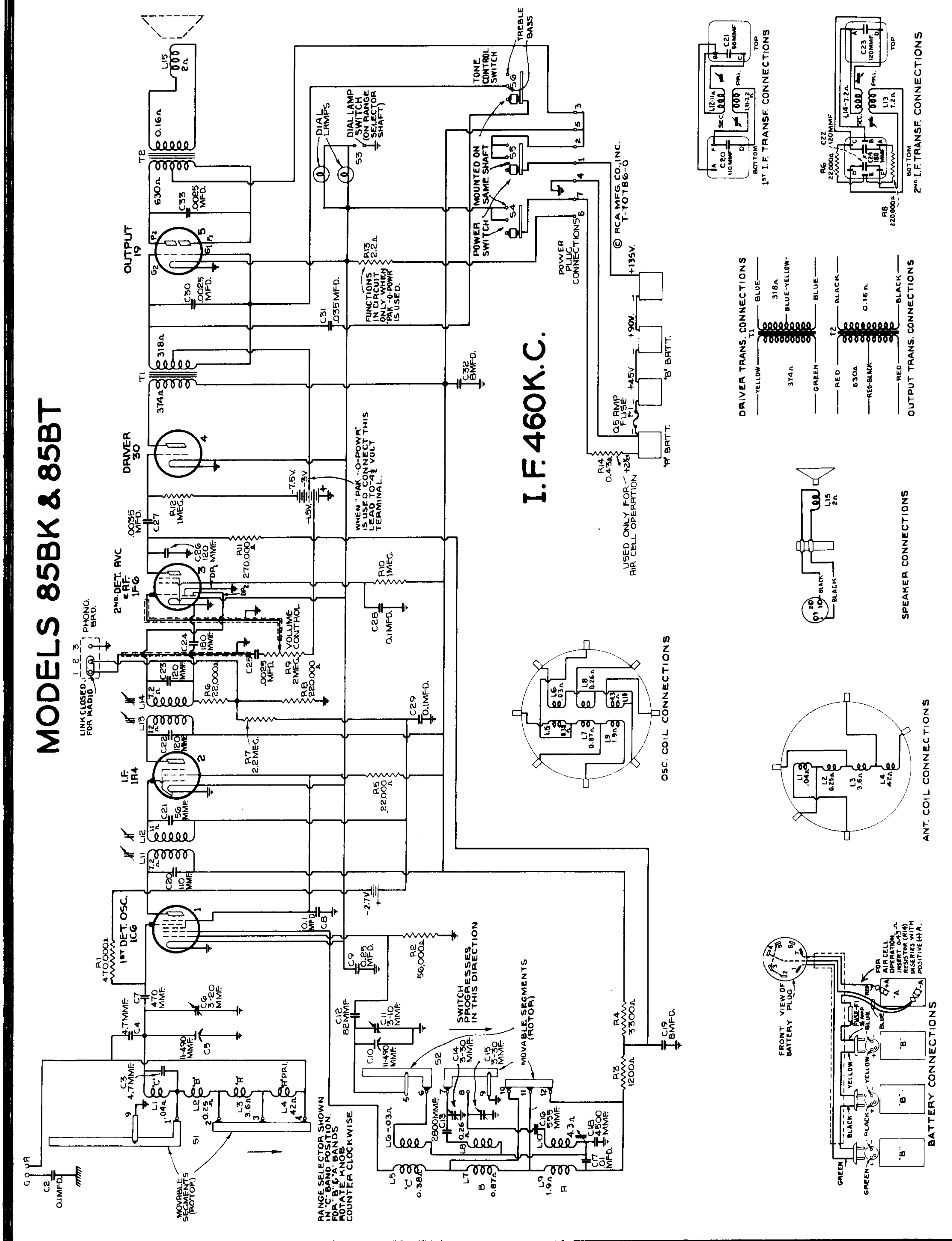


RCA MANUFACTURING COMPANY, Inc.

MODEL 15U

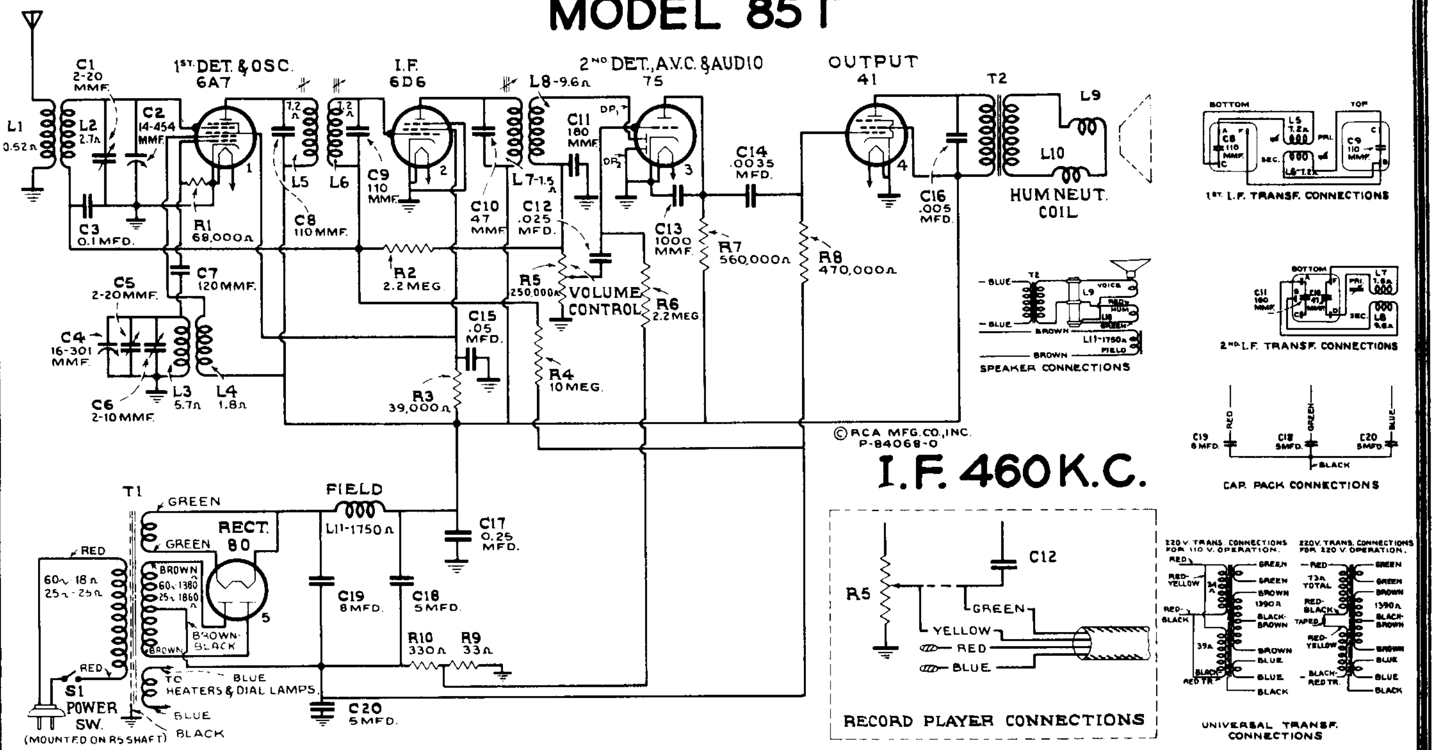


RCA MANUFACTURING CO., Inc.



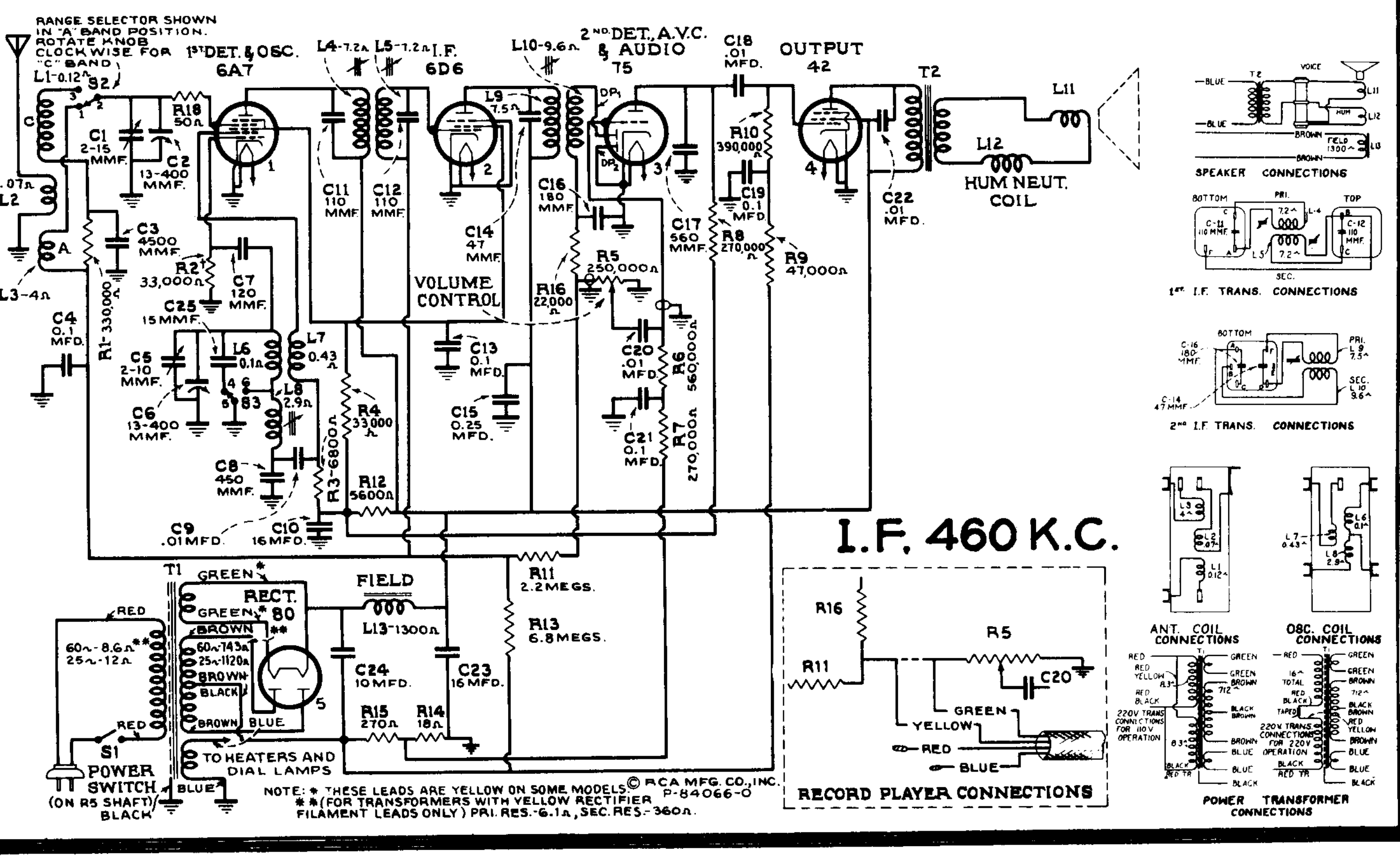
RCA MANUFACTURING CO., Inc.

MODEL 85T



I.F. 460 K.C.

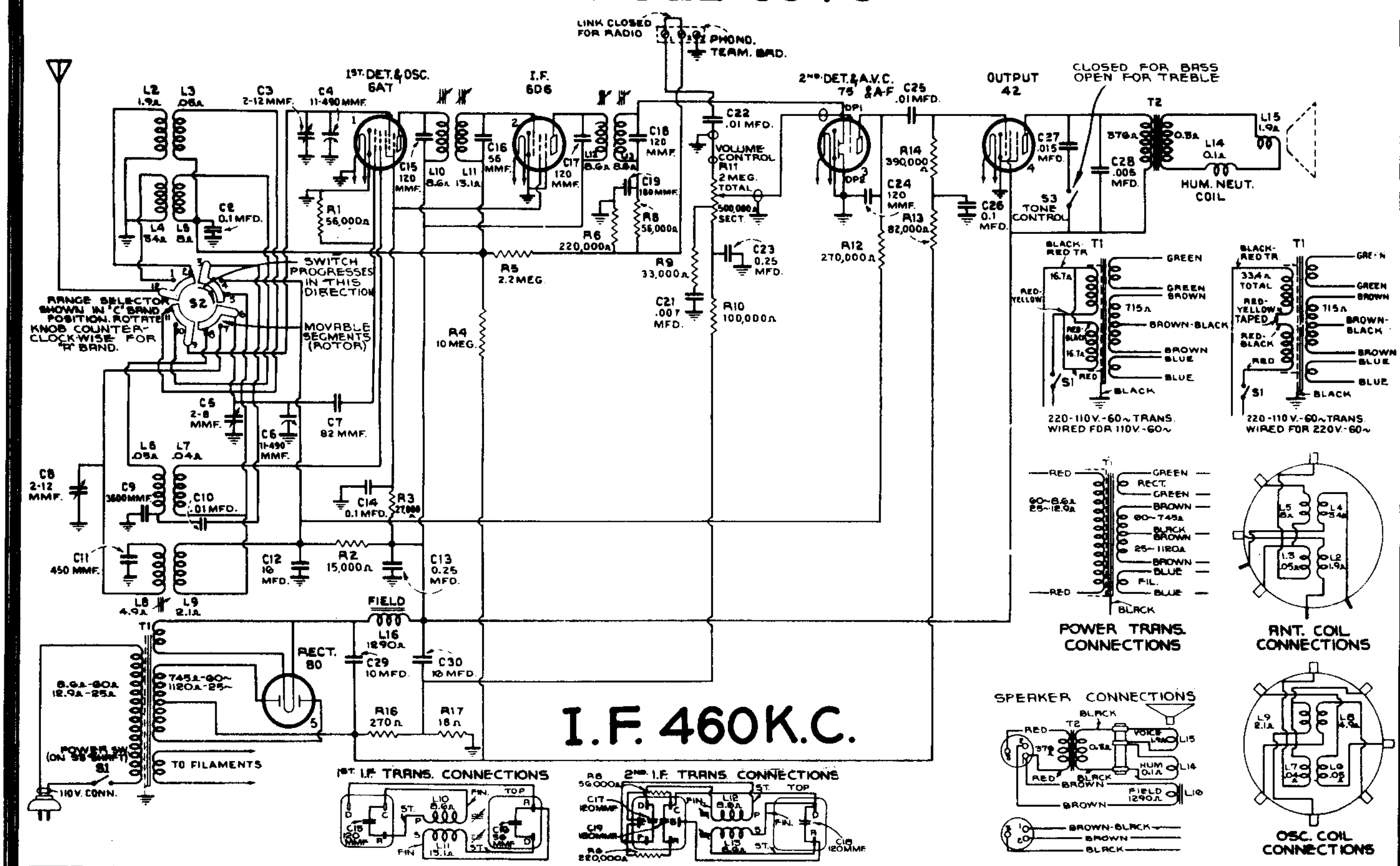
MODEL 85T1



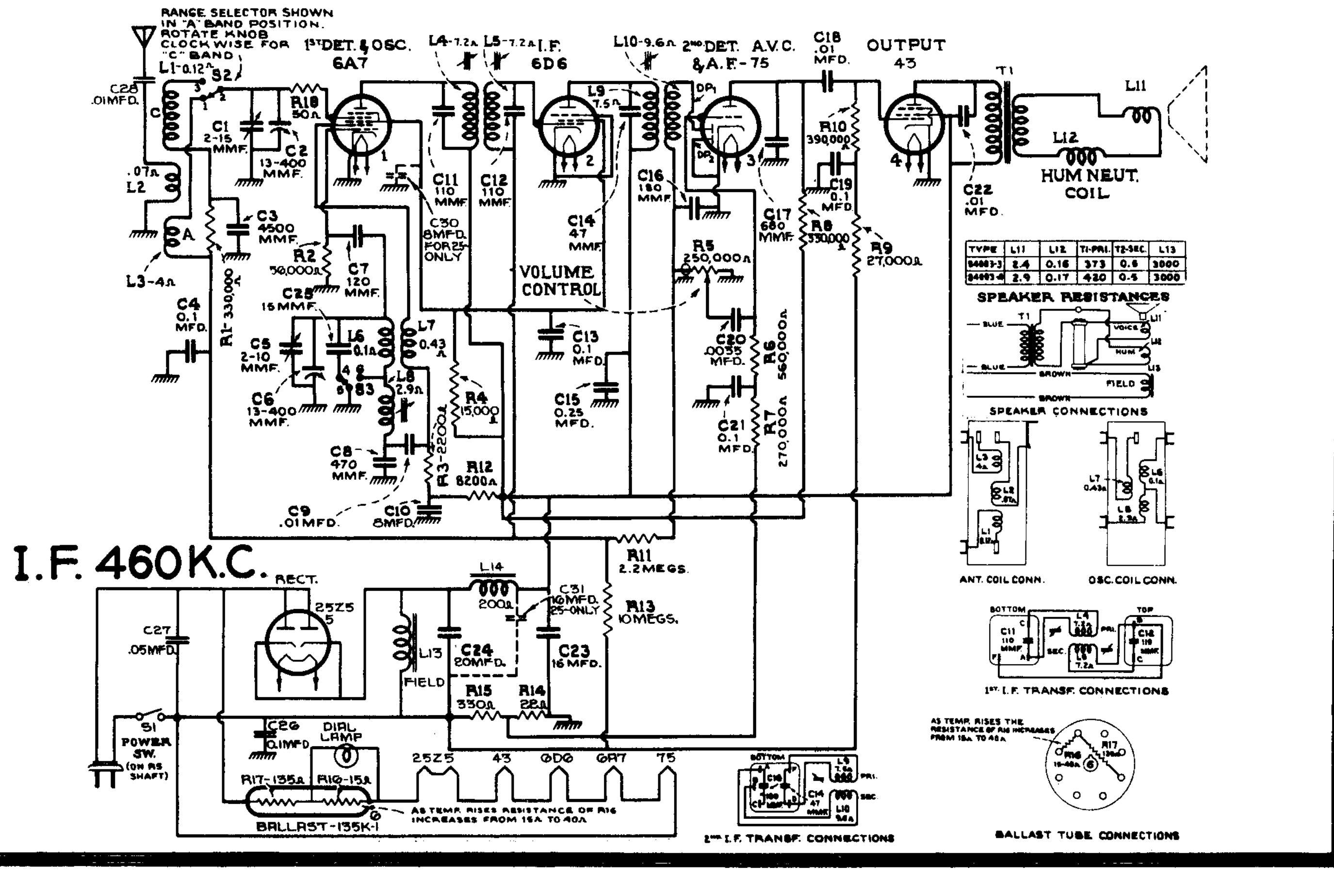
I.F. 460 K.C.

RCA MANUFACTURING COMPANY, Inc.

MODEL 85T5



MODEL 86X

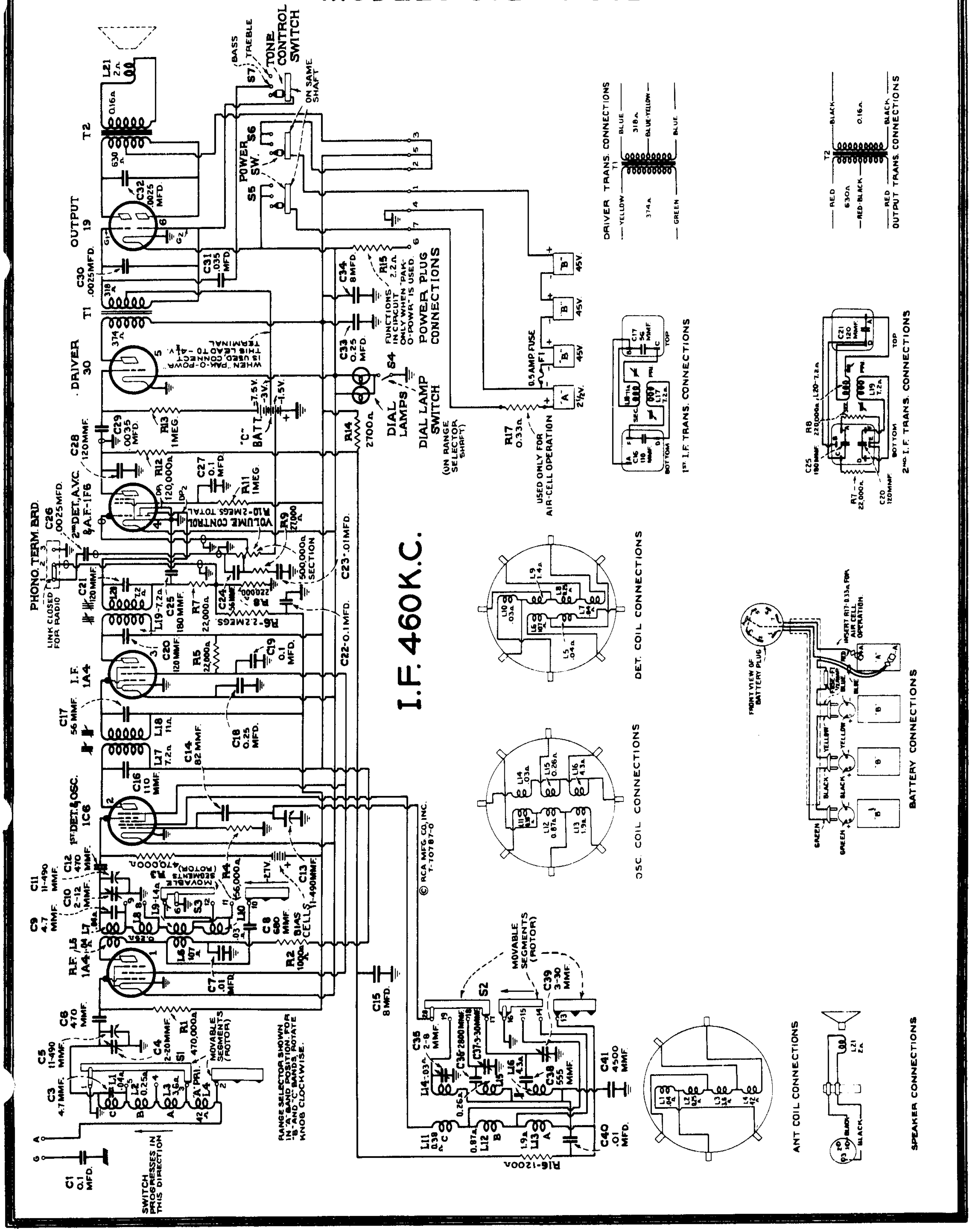


TYPE	L11	L12	T1-PRI.	T2-SEC.	L13
[illegible]	2.4	0.16	373	0.6	3000
[illegible]	2.9	0.17	420	0.5	3000

SPEAKER RESISTANCES

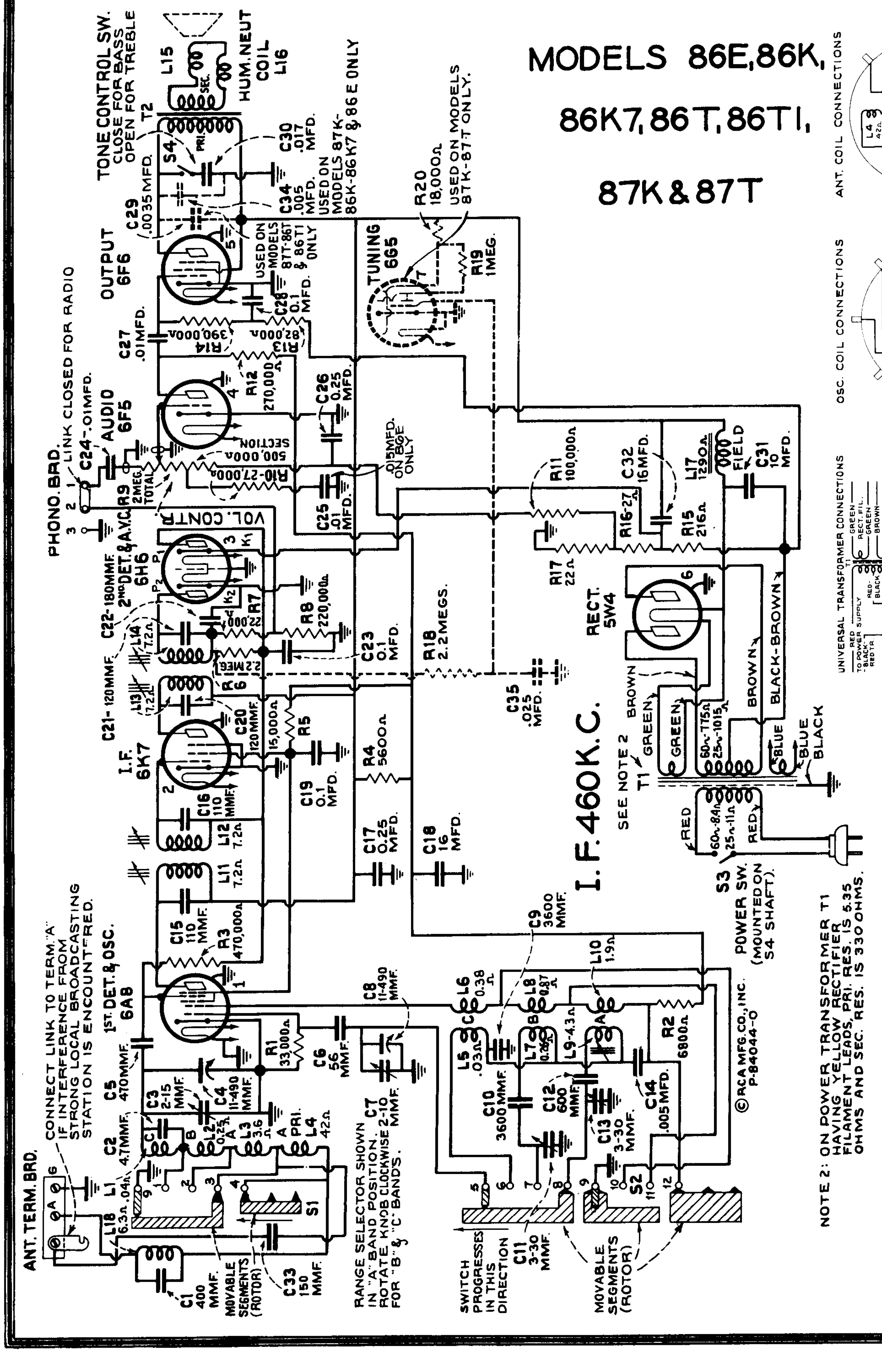
RCA MANUFACTURING CO., Inc.

MODELS 86BK & 86BT

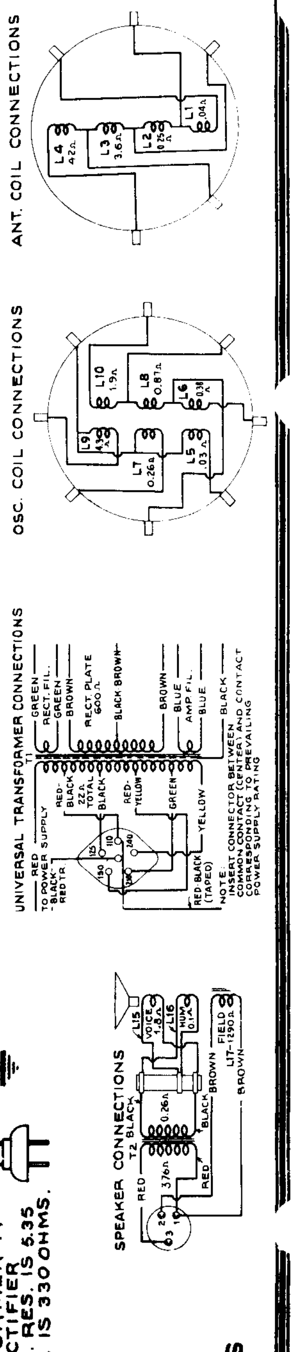


RCA MANUFACTURING CO., Inc.

MODELS 86E, 86K, 86K7, 86T, 86T1, 87K & 87T



NOTE 2: ON POWER TRANSFORMER T1 HAVING YELLOW RECTIFIER FILAMENT LEADS, PRI. RES. IS 5.35 OHMS AND SEC. RES. IS 330 OHMS.

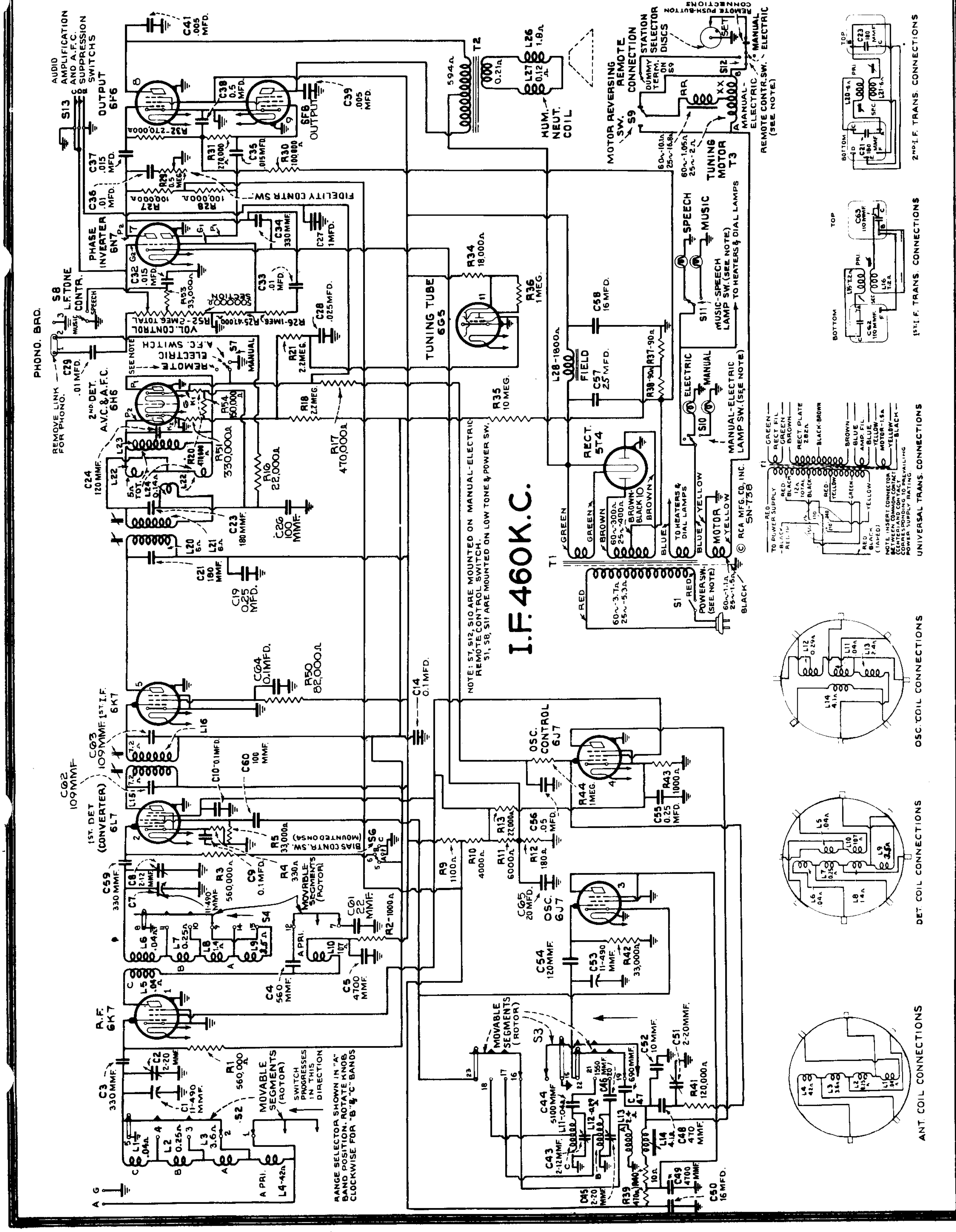


TYPE	L15	L16	T2-PRI.	T2-SEC.
RL-70E-1	1.8	0.1	376	0.26
84001-3	2.4	0.16	520	0.37
84001-6	4.5	0.22	700	0.50

SPEAKER RESISTANCE VALUES

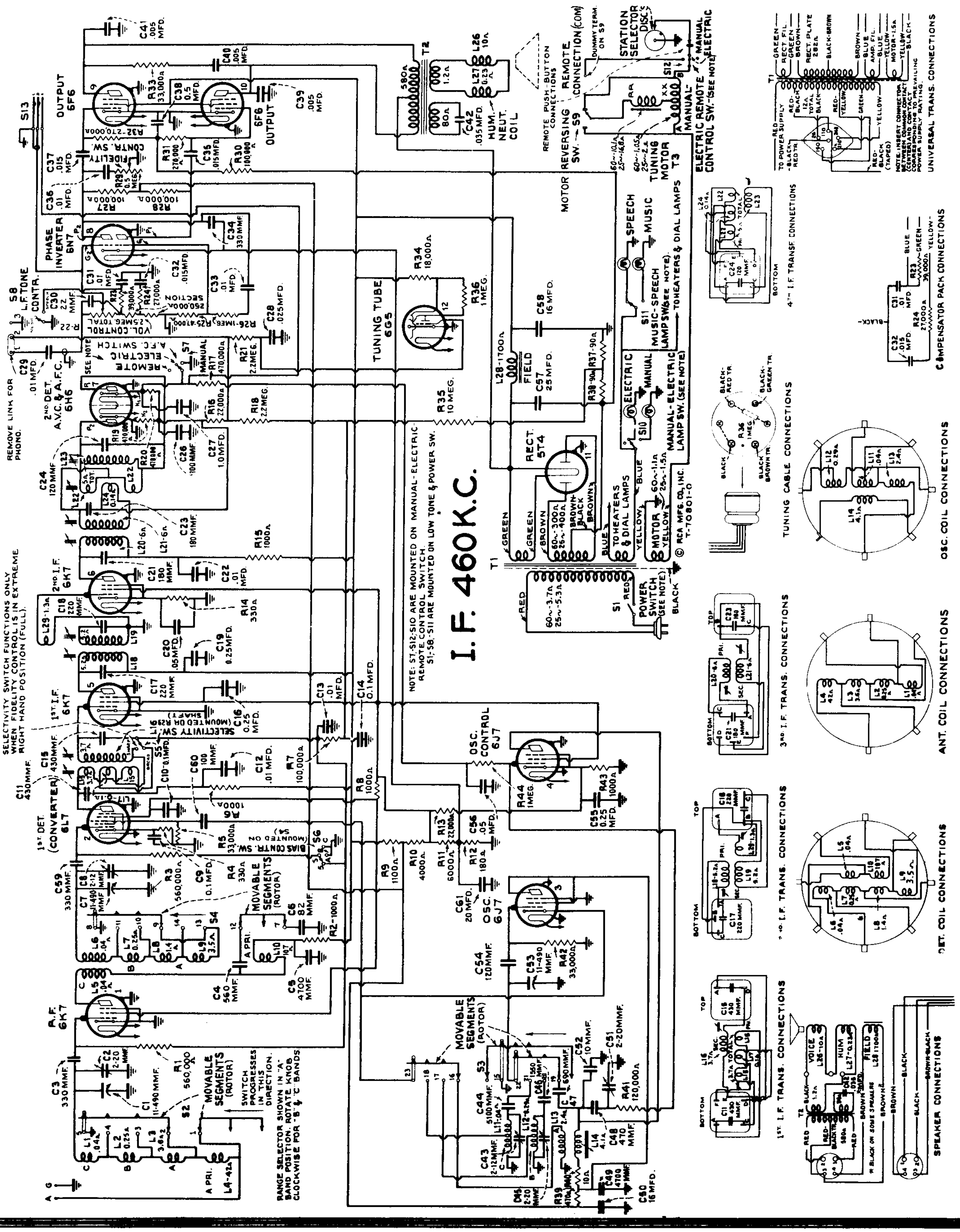
RCA MANUFACTURING CO., Inc.

MODEL 811K



RCA MANUFACTURING CO., Inc.

MODEL 812K



SEARS, ROEBUCK & CO.

MODELS 1986, 1987, 4403, 4463, 4464, 4484, 4563, 4564 & 4584

"CHASSIS No. 101,407"

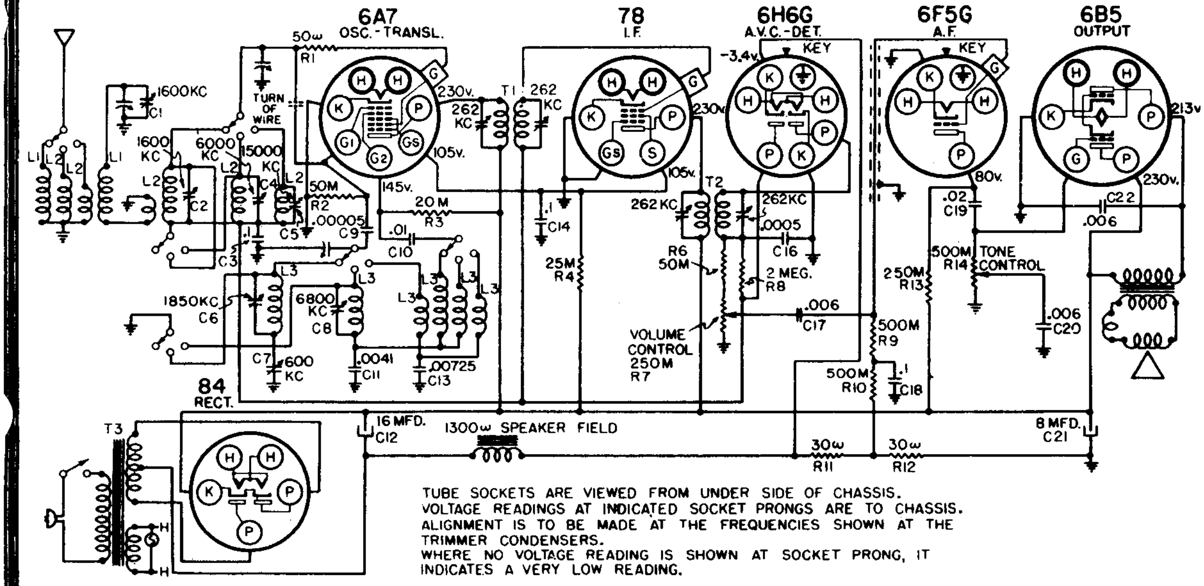


FIG. 1

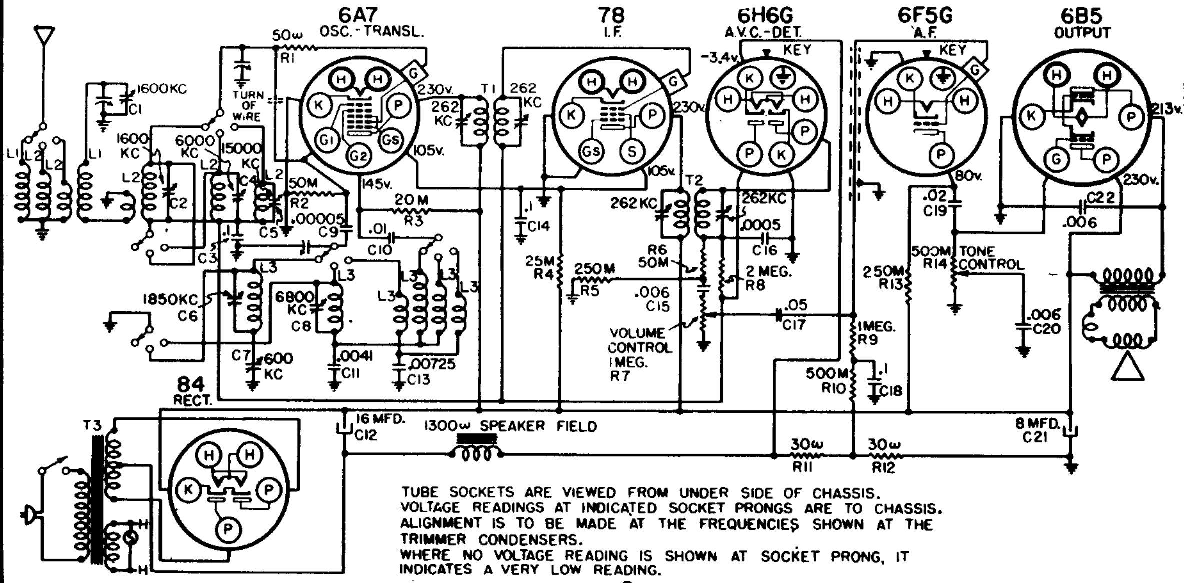


FIG. 2

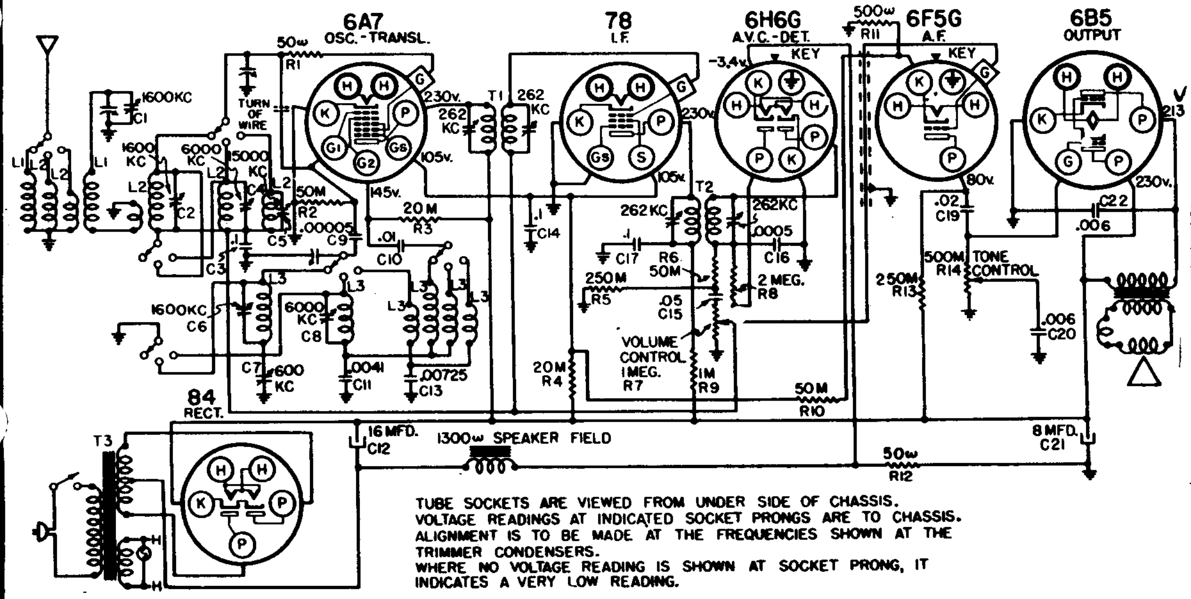


FIG. 3

DIFFERENCES IN VOLUME CONTROL CIRCUITS:

Earlier production used a 250M ohm volume control and the circuit shown in Fig. 1. In later production, shown in the circuit of Fig. 2, the volume control value was changed to one megohm. Also, R5 and C15 were added; the value of C17 changed from .006 to .05; the value of R9 changed from 500M ohms to one megohm. The effect of this change is to remove the DC diode current from the volume control to prevent noisy operation of the control.

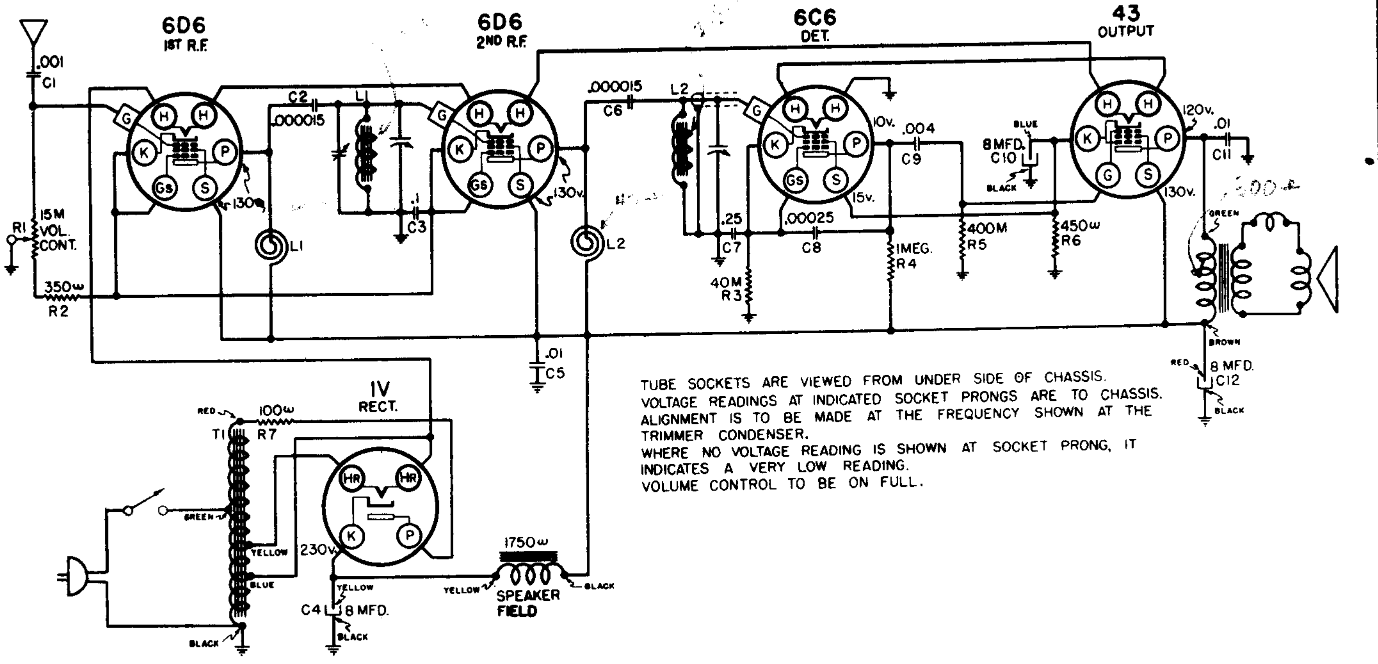
CHASSIS MARKED 407P AND LATER:

Chassis that are rubber stamped 407P or any later letter incorporate the circuit shown in Fig. 3. The differences as compared to Fig. 2 are:

C15 changed from .006 mfd. to .05 mfd.
C17 changed from .05 mfd. to .1 mfd. and its location changed.
The resistors R9, R10, and R11 shown in Fig. 2 were removed.
A new 1M ohm resistor was added and R9 designation assigned to it.
A new 50M ohm resistor was added and R10 designation assigned to it.
A new 500 ohm resistor was added and R11 designation assigned to it.
R4 changed from 25M ohms to 20M ohms.

These changes were made to provide more uniform operation with different makes of tubes.

SEARS, ROEBUCK & CO.
MODELS 4414, 4415, 4500, 4505 & 4506
"CHASSIS № 101,393"



GENERAL INFORMATION

THE ANTENNA:

An attached antenna wire is supplied with the receiver. It should be uncoiled and extended as far from the radio as possible. If interference between stations is encountered, uncoil the antenna only far enough to obtain satisfactory reception, free of interference. In locations remote from broadcasting stations additional pick-up can be had by connecting the end of the antenna to a conventional outdoor antenna leadin.

THE POWER TRANSFORMER:

An auto-transformer is used, instead of the usual power transformer having separate primary and secondary windings. For this reason, under certain conditions the chassis may be 115 volts above ground potential.

THE FILAMENT CIRCUIT:

All of the tubes, except the 1V, are connected in series. Accordingly, if any one tube burns out the others will not light. It is necessary to replace only the burned out tube; the others then will light.

CAUTION:

For the reason stated in the previous paragraph, care must be taken not to allow any grounded object to come in contact with the chassis while it is plugged into the line. The chassis is insulated from the metal bottom cover of the cabinet by means of rubber grommets.

SERVICE FIRST-AID

EVERY GOOD SERVICEMAN CHECKS ALL TUBES AND THE ANTENNA SYSTEM FIRST

DEFECT	GENERALLY CAUSED BY	REMEDY
Dead Receiver	No current at outlet.	Check outlet for current and be sure power cord plug is making good contact.
	Defective "On-Off" switch.	Replace
	Open or short circuit in set.	Repair or replace
Poor Sensitivity and Volume	Insufficient antenna pick-up.	Connect to outdoor antenna
	Defective tube	Replace
	Receiver out of alignment	Follow alignment procedure
Station Interference	Receiver located near powerful stations.	Do not uncoil all of the antenna.
Poor Tone	Overloading	Reduce Volume Control setting.
	Speaker out of adjustment	Replace or repair
Hum	Defective electrolytic (C4,C10,C12)	Replace electrolytic Reverse Power Plug
Oscillation	Antenna lead coiled around or near set.	Run antenna wire away from the set.

ALIGNMENT PROCEDURE

The receiver need not be taken out of the cabinet for alignment.

Either a broadcast signal of about 1400 kc or a test oscillator signal may be used. If a broadcast signal is used, the antenna of the receiver should be extended as in a normal installation. If a test oscillator signal is used, a wire should be connected to the test oscillator output and run parallel to but insulated from the receiver's antenna wire. The generator ground connection should be connected to ground.

Tune in the 1400 kc signal and adjust the trimmer for maximum loud speaker response. This can be done most accurately if the Volume Control setting is reduced to give a low volume level. The variable should be rocked a degree or two during the adjustment. The location of this trimmer is shown in the Location of Parts diagram. It is accessible, when the chassis is in the cabinet, through the hole in the plate at the bottom of the cabinet. An insulated screw driver should be used since the chassis may be above ground potential, as explained previously.

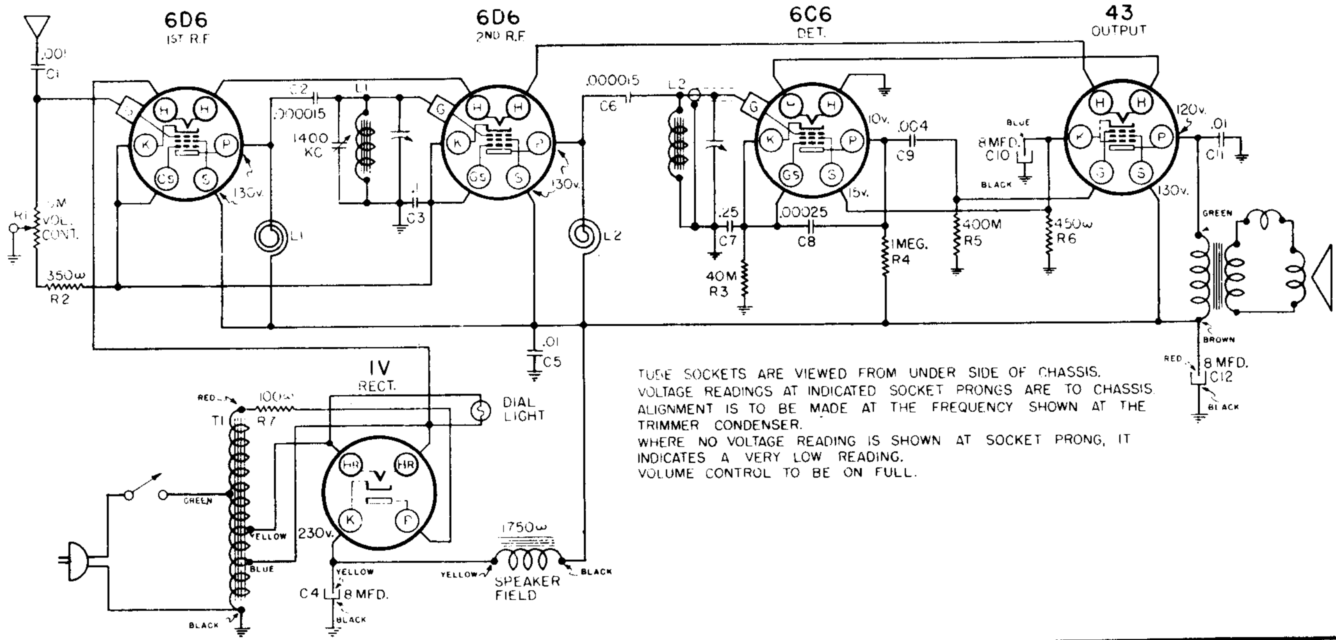
SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	LIST PRICE
	1015514737	Antenna Cord - White	.14
	1015514030	Antenna Cord - Black	.14
	1015514723	Antenna Cord - Brown	.14
	1015414200	Button - Snap, variable condenser shield mtg.	.02
	10160143181	Cabinet - Ivory (with grille cloths)	5.55
	10160145341	Cabinet - Brown (with grille cloths	3.35
	10160140281	Cabinet - Black (with grille cloths)	3.35
	1015411032	Clip - Grid	.01
	10160145351	Cloth - Grille, front, ivory, with paper baffle	.18
	10160143191	Cloth - Grille, front, brown, with paper baffle	.18
	10160147401	Cloth - Grille, front, gold, with paper baffle	.18
	10160140641	Cloth - Grille, front, white, with paper baffle	.18
	1016014536	Cloth - Grille, rear, ivory	.05
	1016014320	Cloth - Grille, rear, brown	.05
	1016014741	Cloth - Grille, rear, gold	.05
	1016014273	Cloth - Grille, rear, white	.05
L1,C2,L2, C6	1012814032	Coil - RF	.79
	1011614035	Condenser - Variable	1.77
C4,C10,C12	1012014036	Condenser - Electrolytic, triple, dry	1.22
C7		Condenser - .25 mfd. 200 volts	.18
C3		Condenser - .1 mfd. 200 volts	.16
C5,C11		Condenser - .01 mfd. 400 volts	.08
C9		Condenser - .004 mfd. 400 volts	.08
C1		Condenser - .001 mfd. 400 volts	.08
C8		Condenser - .00025 mfd. mica	.09
R1	1012414034	Control - Volume, with "On-Off" switch	.70
	1015514739	Cord - Line, white	.37
	1015514721	Cord - Line, brown	.37
	1015514061	Cord - Line, black	.37
	1016014051	Cover - Cabinet bottom	.22
	1015414052	Grommet - Chassis mounting	.12
	1013914735	Knob - Tuning, ivory, black lettered calibration	.23
	1013914736	Knob - Tuning, ivory, gold lettered calibration	.23
	1013914040	Knob - Tuning, white	.23
	1013914323	Knob - Tuning, brown	.23
	1013914039	Knob - Volume, black	.06
	1013914537	Knob - Volume, brown	.06
	1013914322	Knob - Volume, ivory	.06
R4		Resistor - 1 megohm, 1/3 watt	.15
R5		Resistor - 400M ohms, 1/3 watt	.15
R3		Resistor - 40M ohms, 1/3 watt	.15
R6		Resistor - 450 ohms, 1 watt, flexible	.17
R2		Resistor - 350 ohms, 1/3 watt	.15
R7		Resistor - 100 ohms, 1 watt, flexible	.17
	1015313115	Shield - Tube, Coat	.06
	101188315	Socket - 4 prong	.06
	101188092	Socket - 6 prong	.07
	1015814058	Speaker - 5", Dynamic. (Rounded yoke bolted to face plate)	3.07
	1015814048	Speaker - 5", Dynamic. (One piece rectangular yoke and face plate	3.07
	1015814873	Transformer - For 1015814058 speaker	*
	1015814870	Transformer - For 1015814048 speaker	*
T1	1011014062	Transformer - Auto, power	1.38

* Price on application

WHEN NO PART NUMBER IS ASSIGNED ORDER BY DESCRIPTION AND RATING

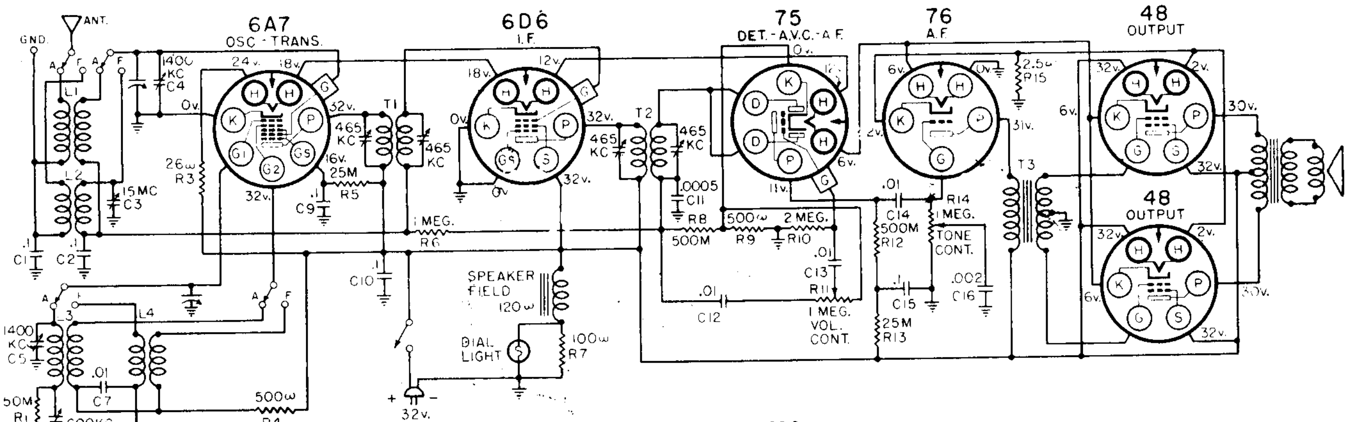
SEARS, ROEBUCK & CO.

MODEL 4416 "CHASSIS No 101.446"



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT THE TRIMMER CONDENSER.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.
VOLUME CONTROL TO BE ON FULL.

MODELS 4429, 4449, 4529 & 4519 "CHASSIS No 101,437"



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
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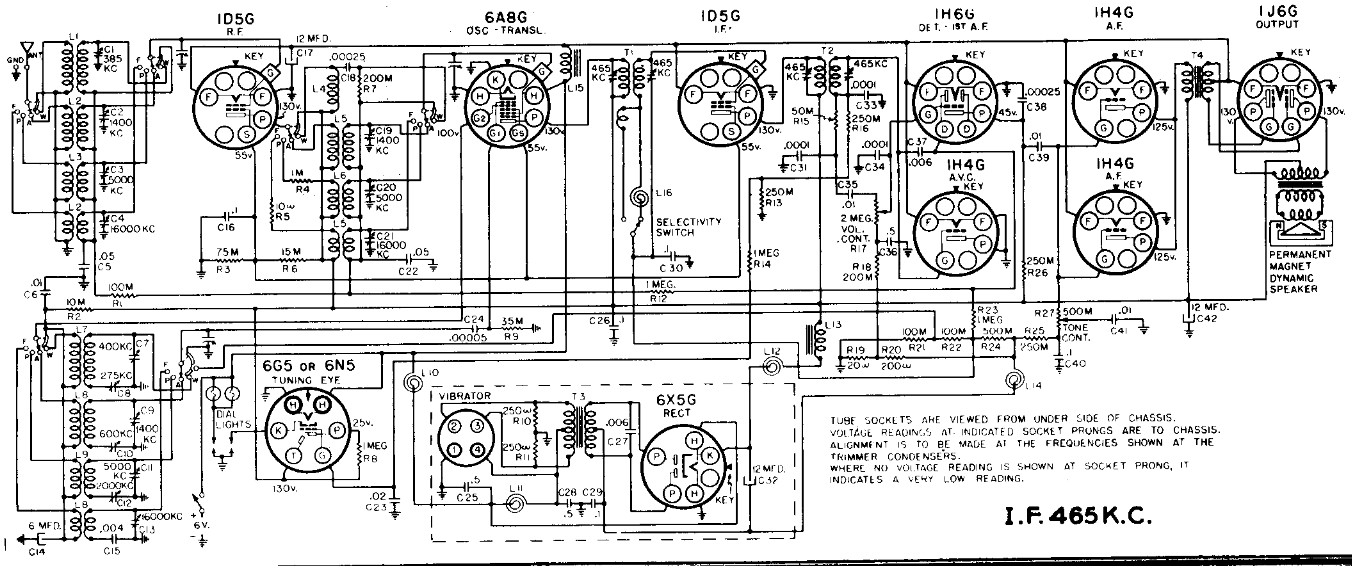
I.F. 465K.C.

MODELS 4450 & 4550 "CHASSIS No 101.420"

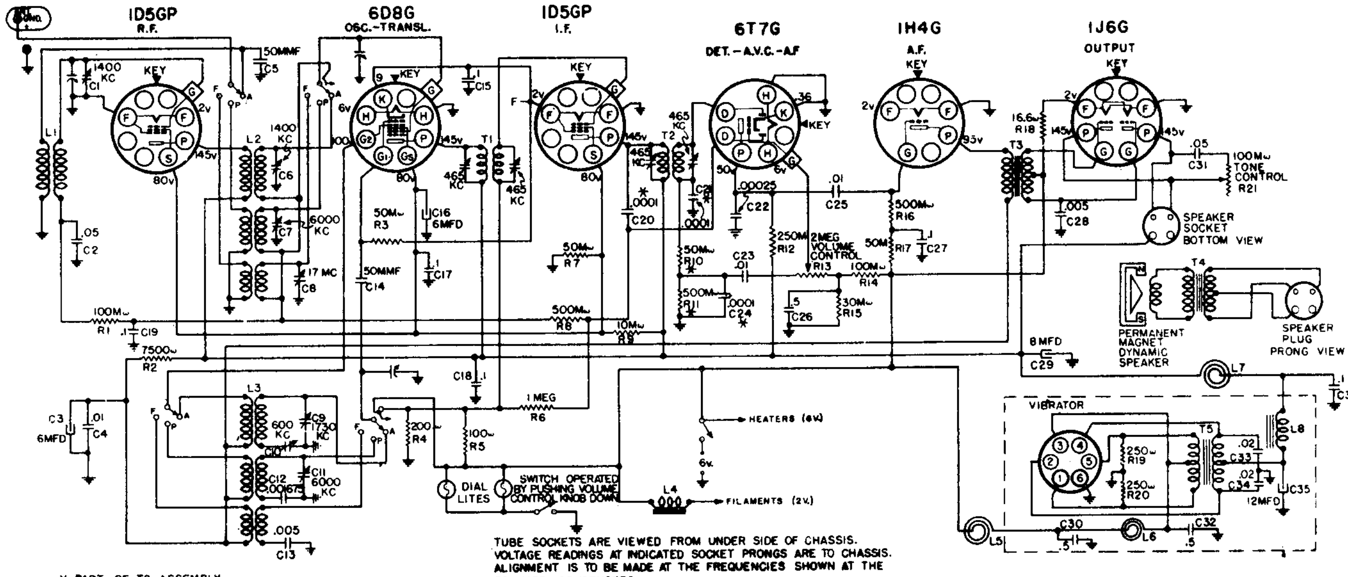


TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.

I.F. 465K.C.

SEARS, ROEBUCK & CO.

MODELS 4419, 4459, 4519 & 4559 "CHASSIS No 101,449"

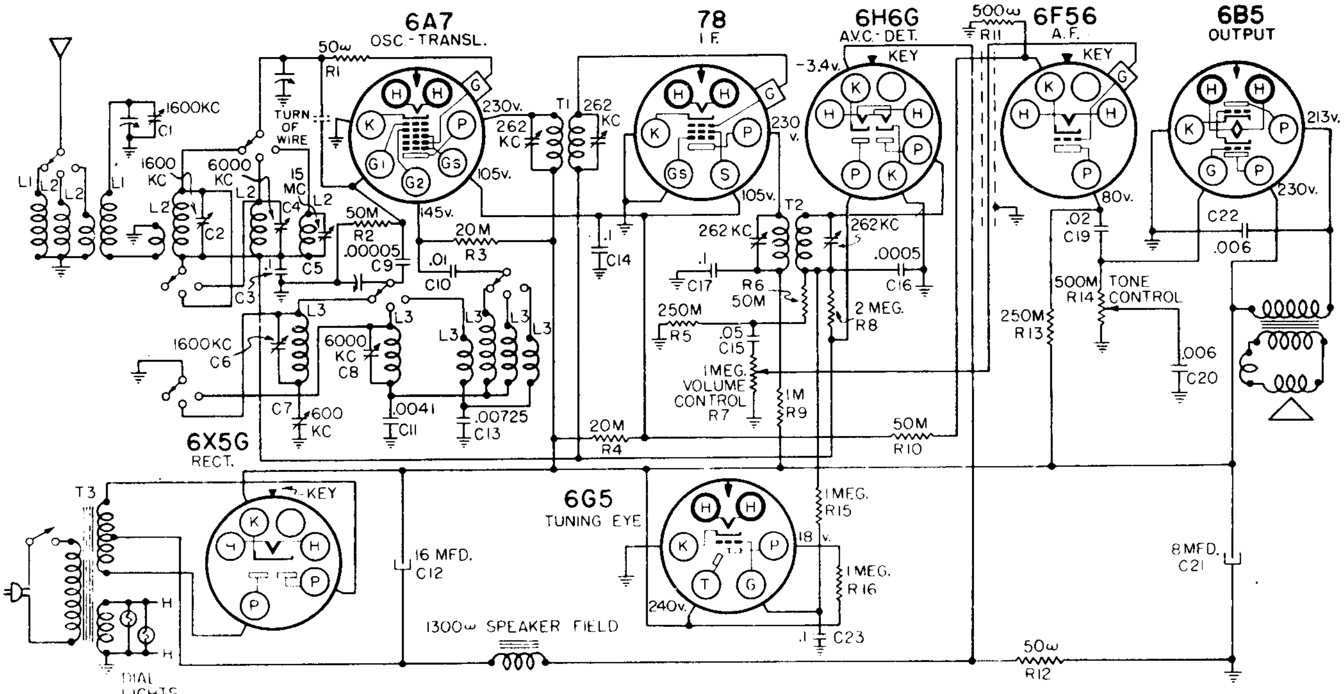


TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.
FIGURES AT CATHODES INDICATE CATHODE CURRENT IN MILLIAMPERES

* PART OF T2 ASSEMBLY

I.F. 465 K.C.

MODELS 4569 & 4589 "CHASSIS No 101,445"



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
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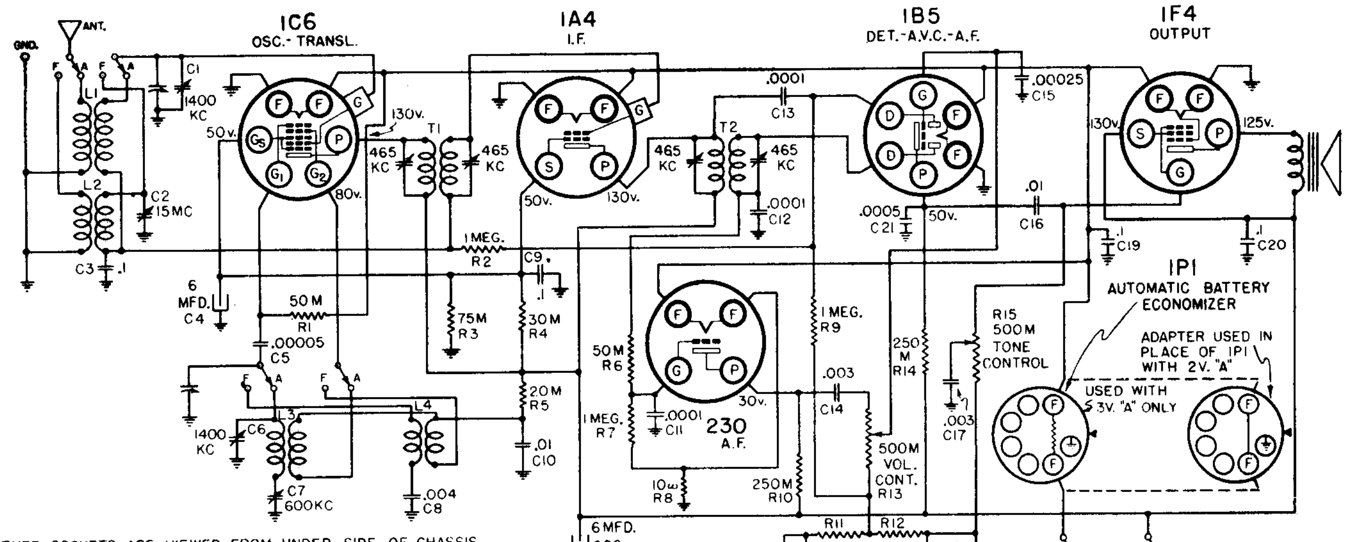
I.F. 262 K.C.

SEARS, ROEBUCK & CO.

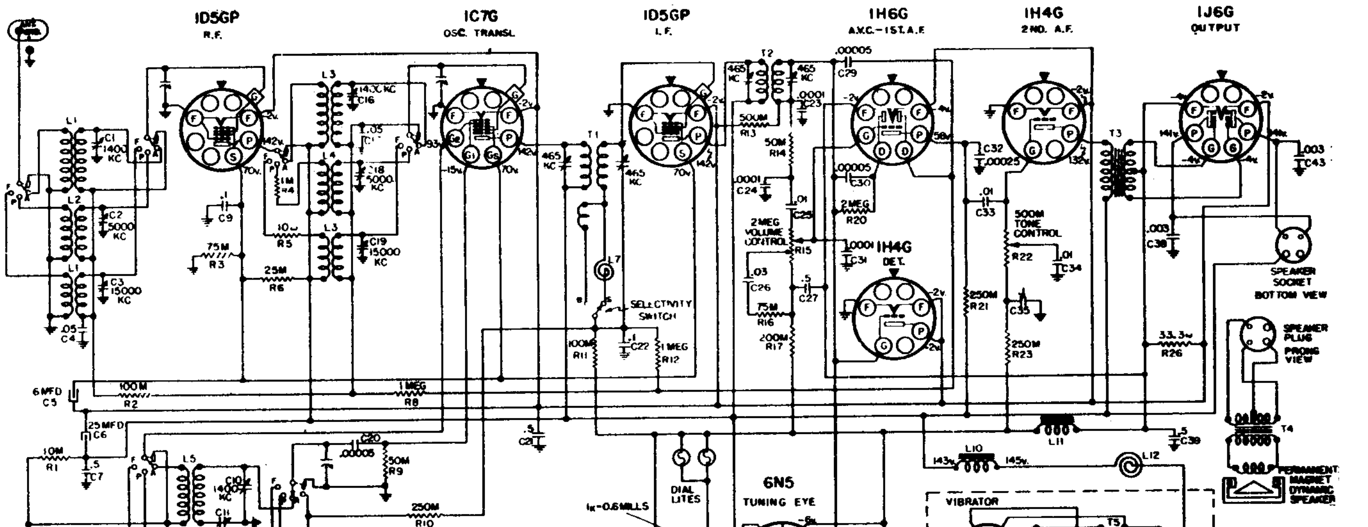
MODELS 4422, 4423, 4524A, 4532 & 4542A "CHASSIS No 101.438"



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READING AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS. WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG INDICATES A VERY LOW READING.

I.F. 465 K.C.

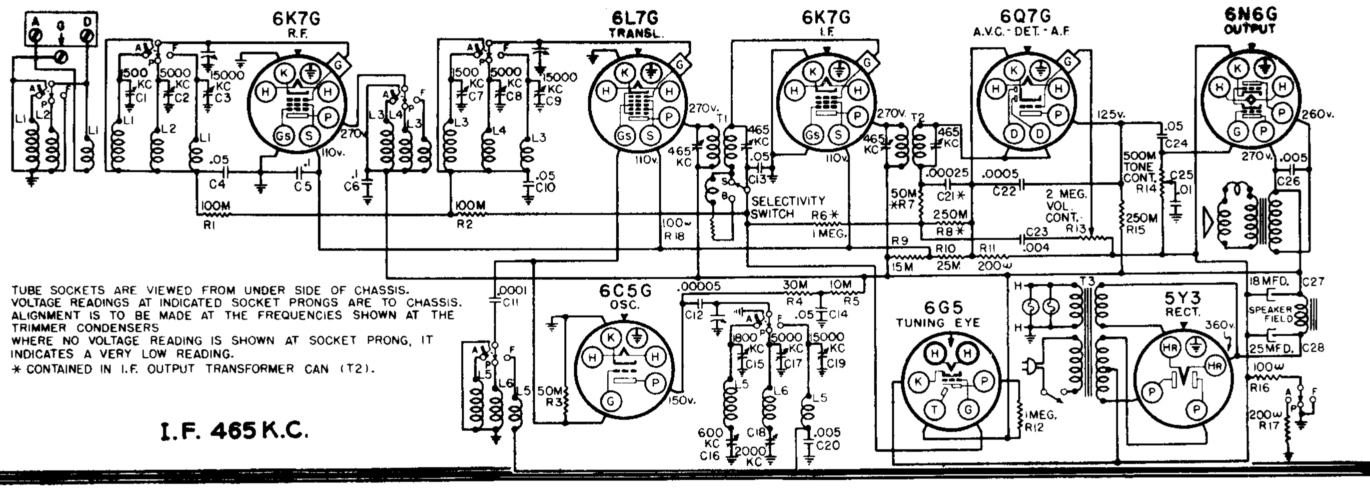
MODELS 4441 & 4451 "CHASSIS No 101.450"



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS. WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.

I.F. 465 K.C.

MODELS 4465, 4485, 4565 & 4585 "CHASSIS No 101.410"

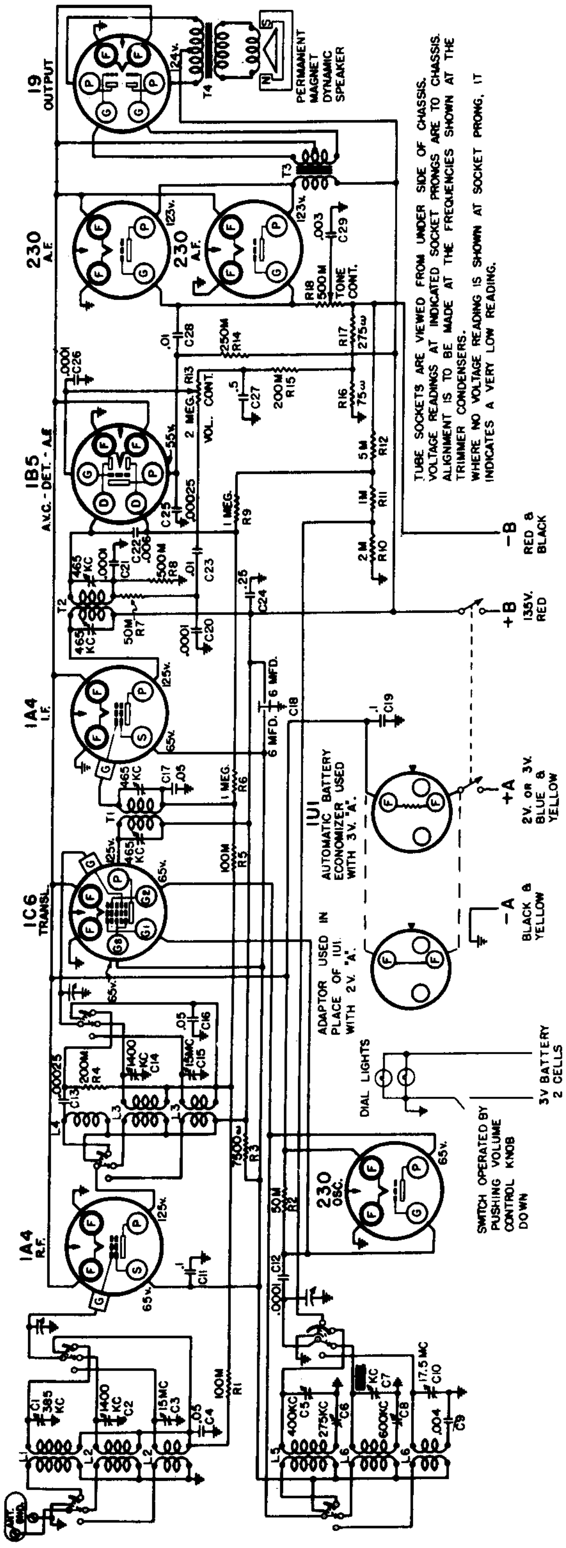


TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS. WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.
* CONTAINED IN I.F. OUTPUT TRANSFORMER CAN (T2).

I.F. 465 K.C.

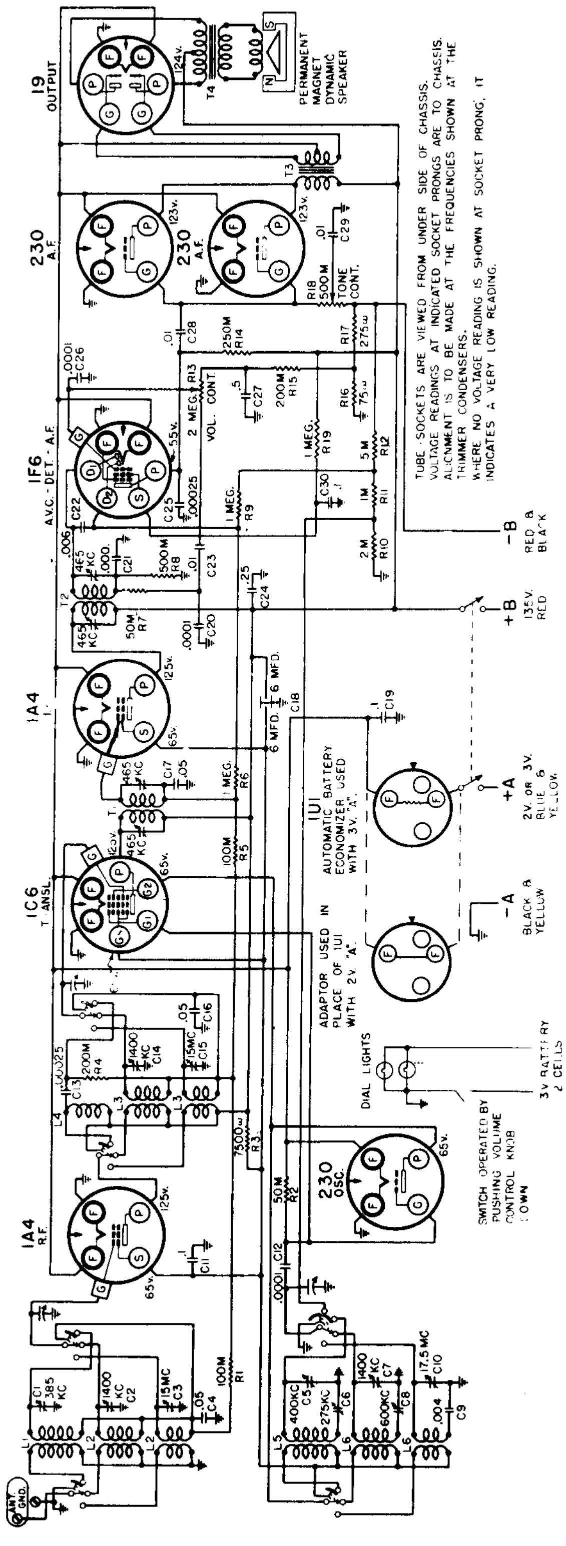
SEARS, ROEBUCK & CO.

MODELS 4426, 4427, 4446, 4447, 4526 & 4546 "CHASSIS No 101,417"



- WIRING DIAGRAM

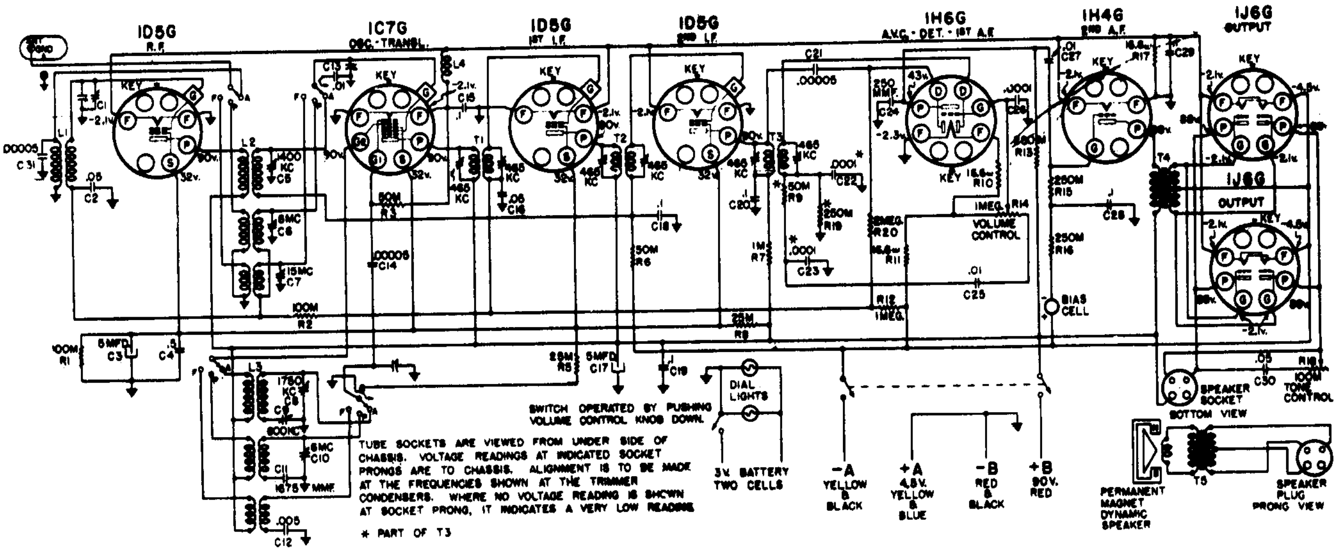
MODELS 4426A, 4526A & 4546A "CHASSIS No 101,417A"

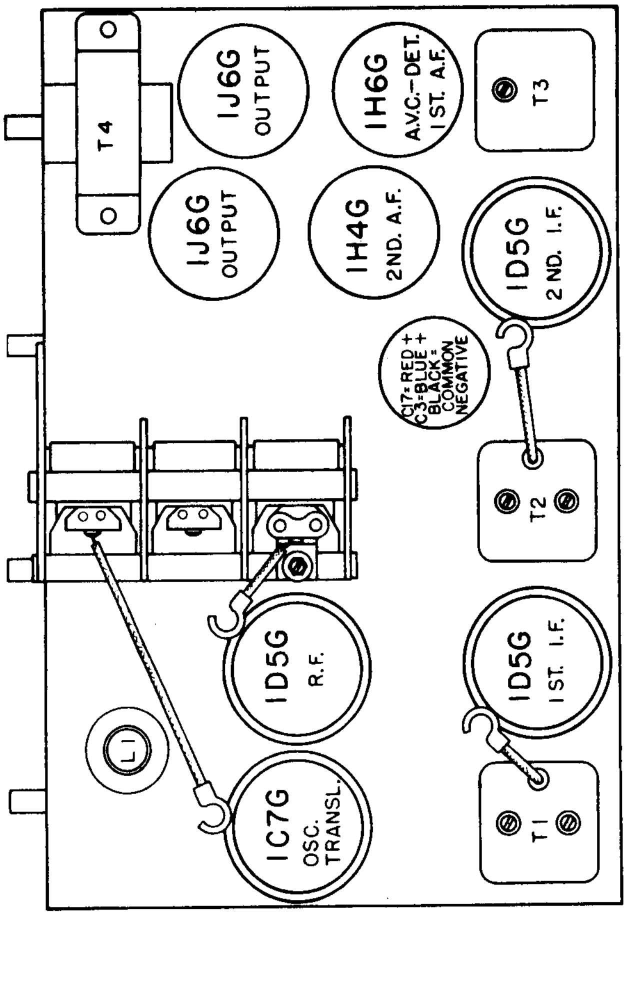


- WIRING DIAGRAM

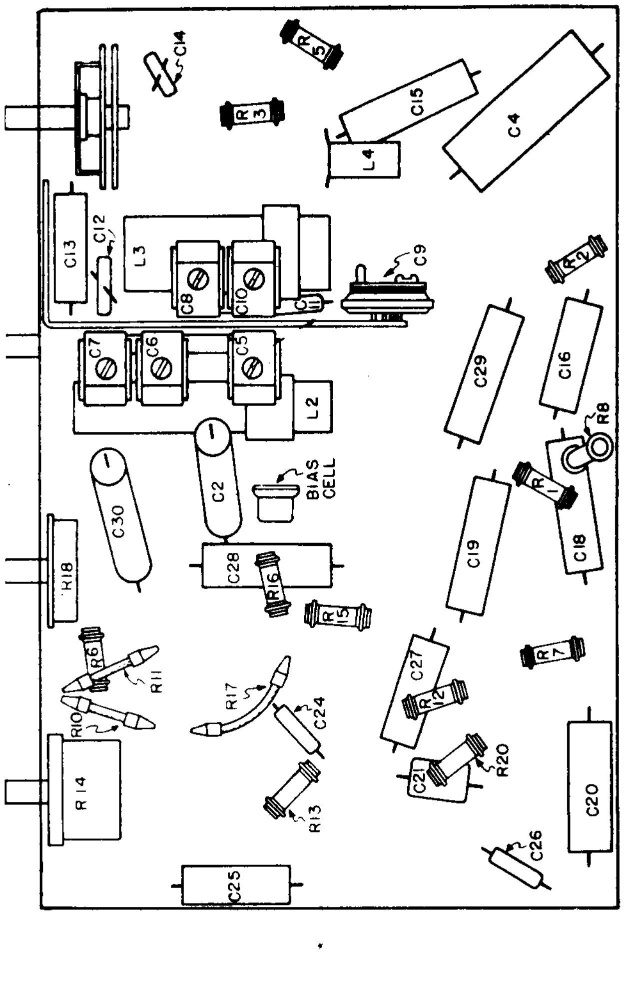
SEARS, ROEBUCK & CO.

MODELS 4439, 4440, 4455, 4456 & 4539 "CHASSIS No 101,448"





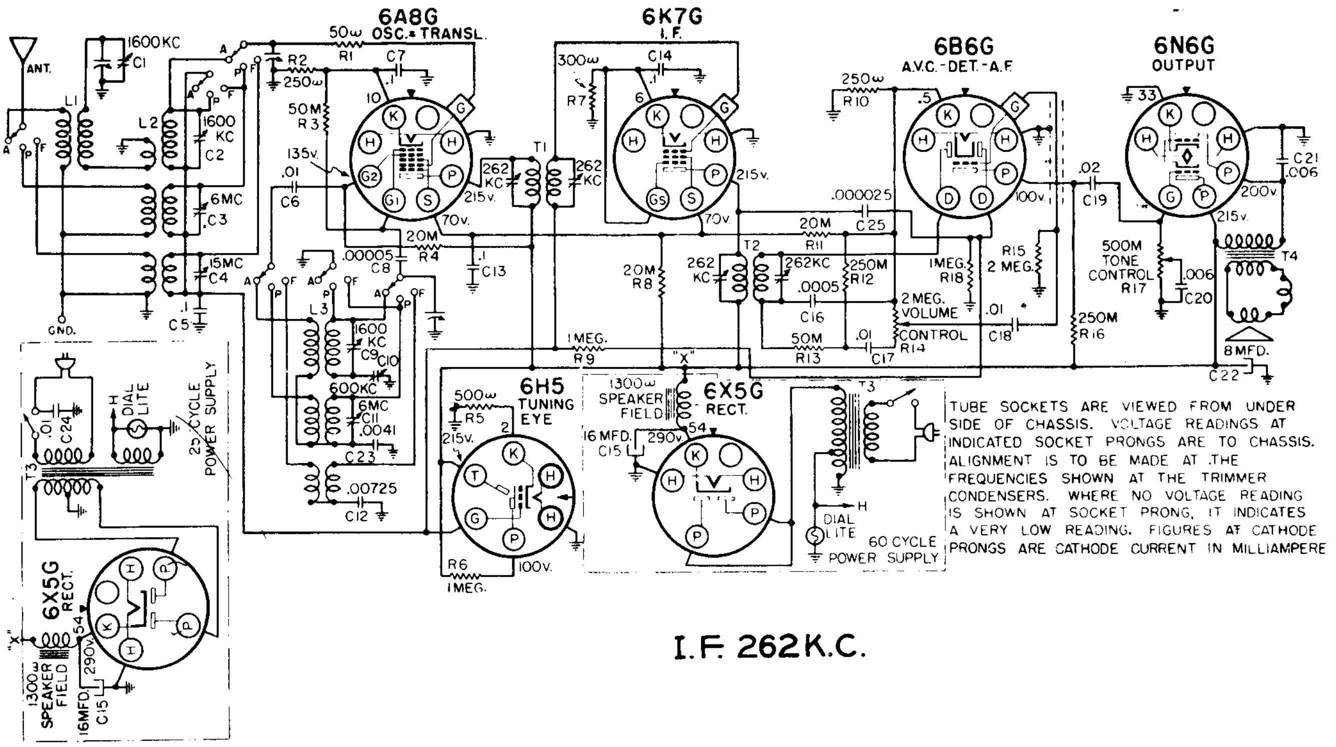
LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

SEARS, ROEBUCK & CO.

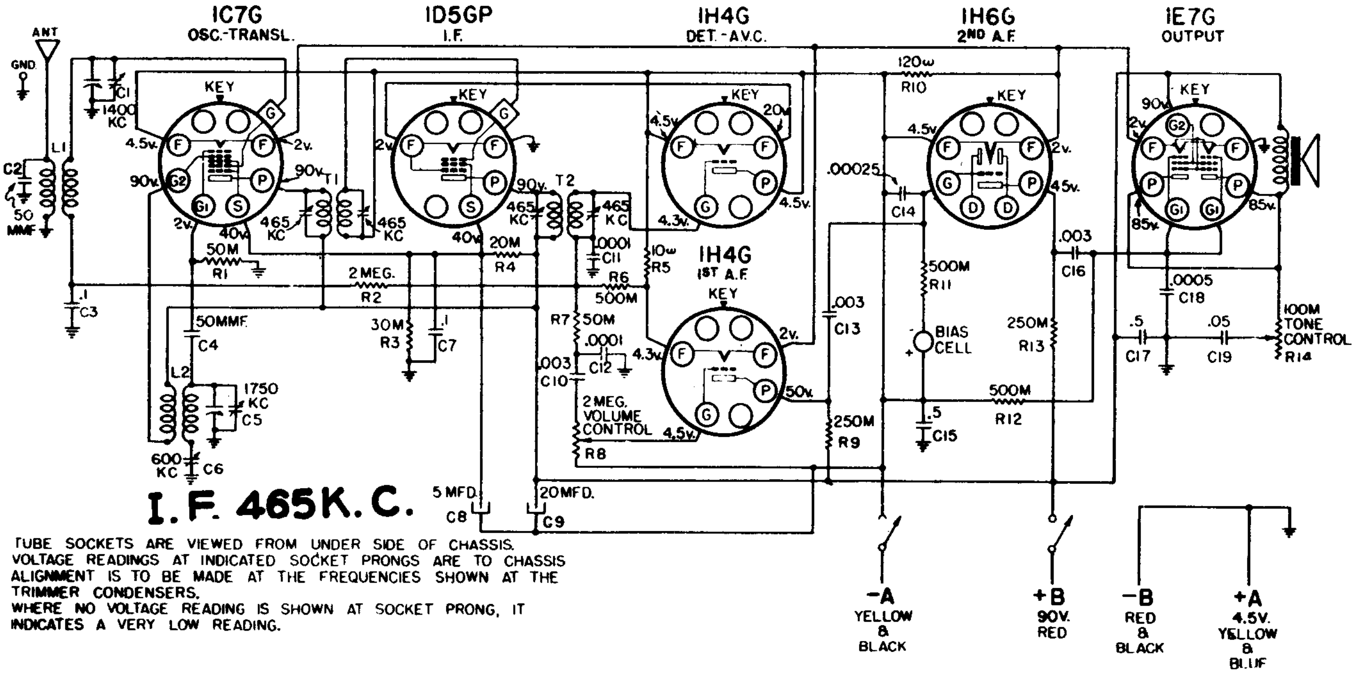
MODELS 4468, 4470 & 4490 "CHASSIS No 101,454"



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS. WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING. FIGURES AT CATHODE PRONGS ARE CATHODE CURRENT IN MILLIAMPERE

I.F. 262 K.C.

MODELS 4498, 4499 & 4598 "CHASSIS No 101,465"

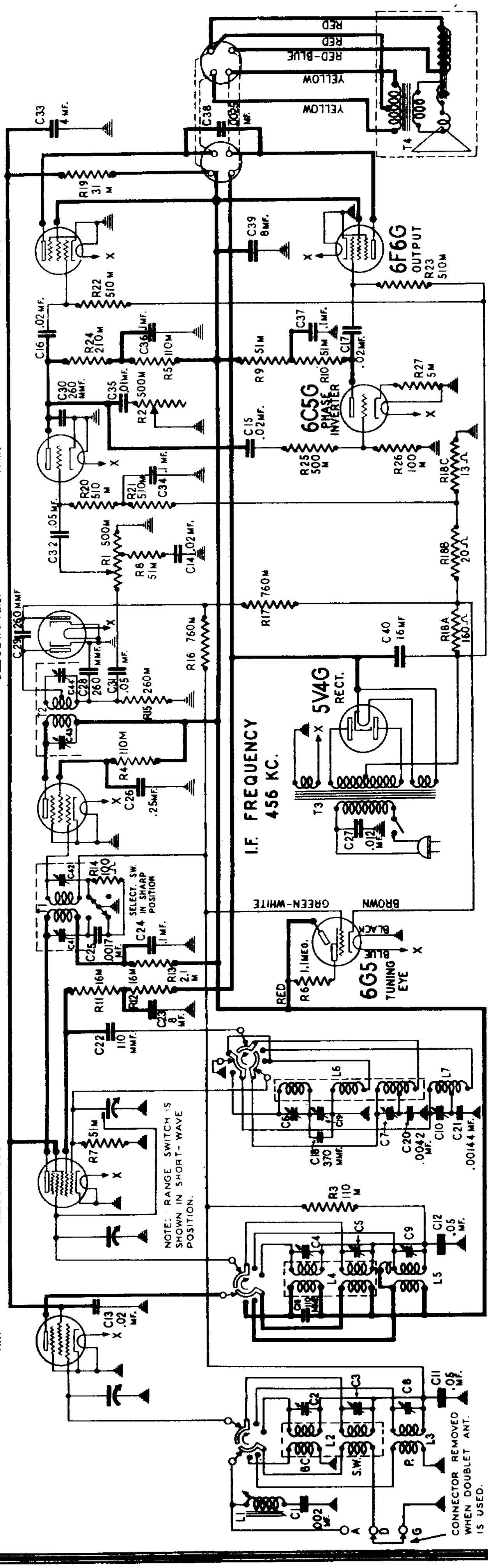


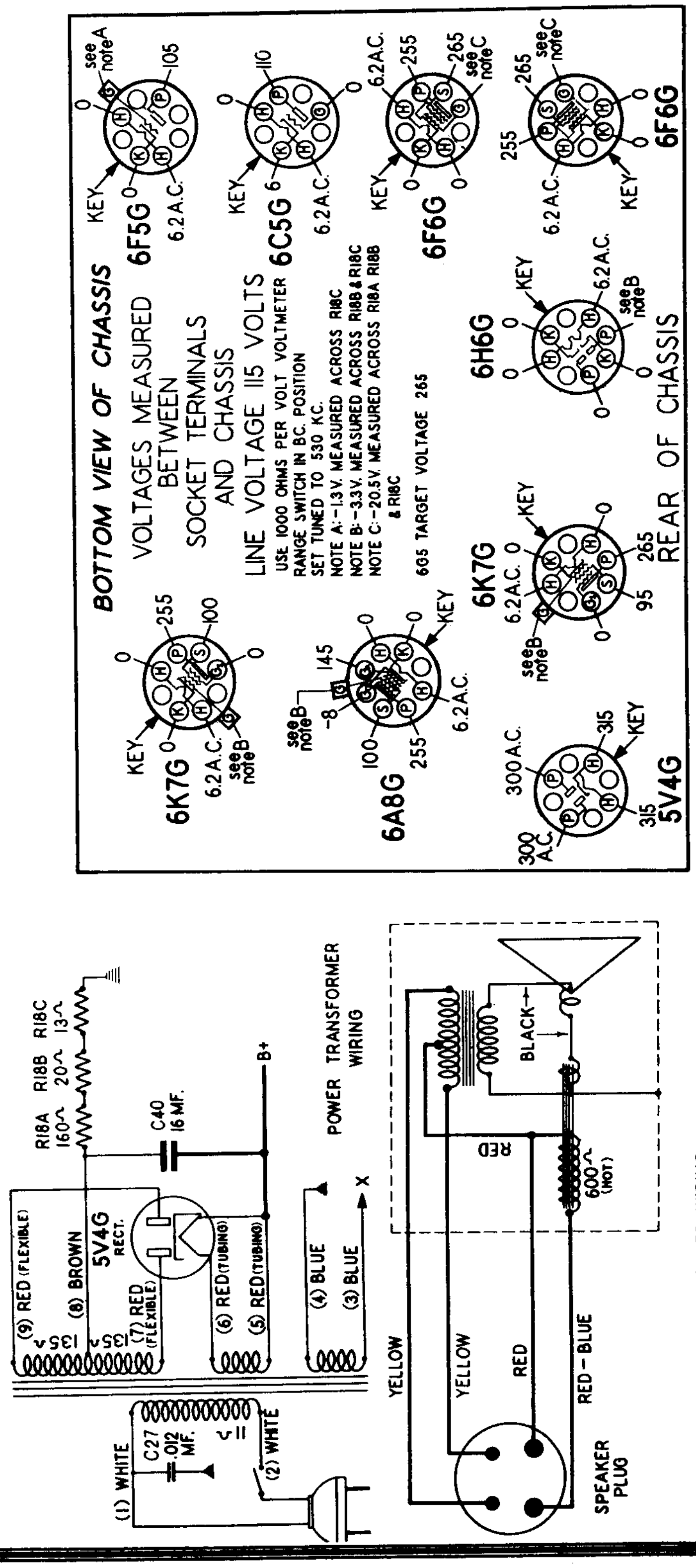
I.F. 465 K.C.

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.

SEARS, ROEBUCK & CO.

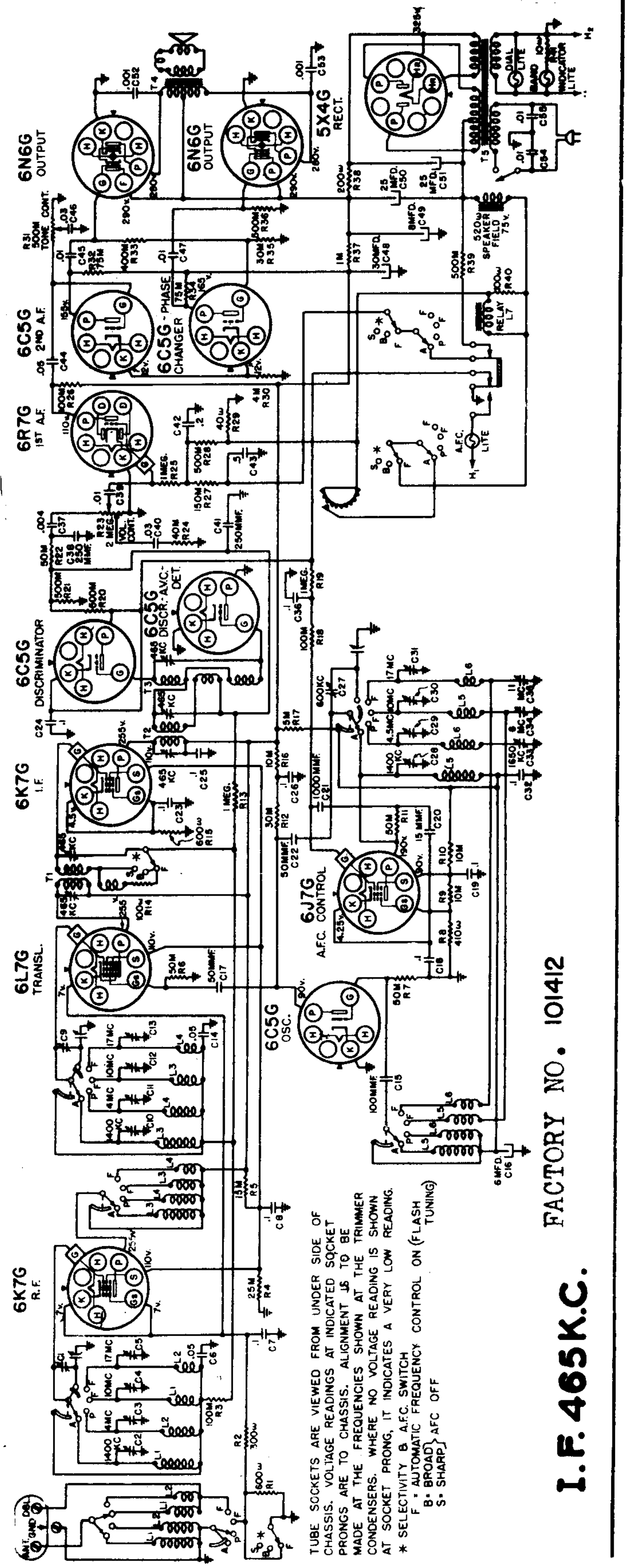
MODELS 4486, 4586, 4586A & 4586B "CHASSIS No 100,156"



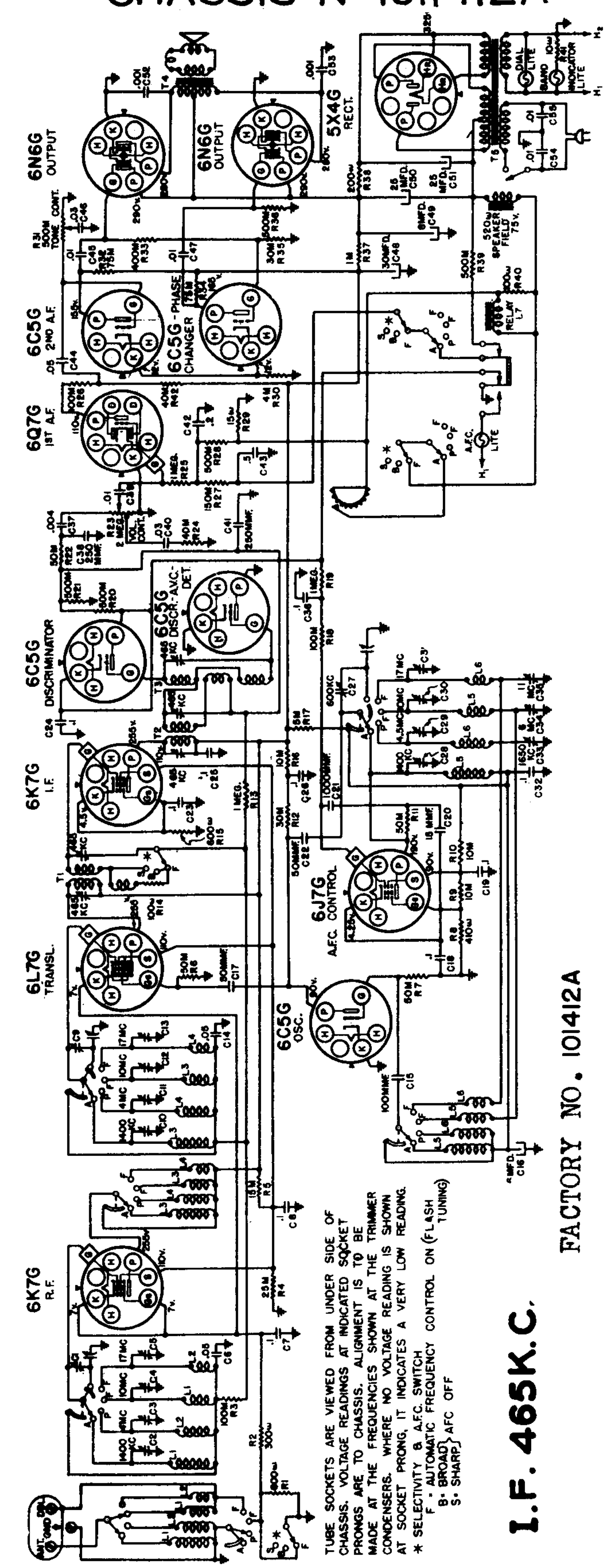


SEARS, ROEBUCK & CO.

MODELS 4488 & 4588 "CHASSIS Nº 101,412"



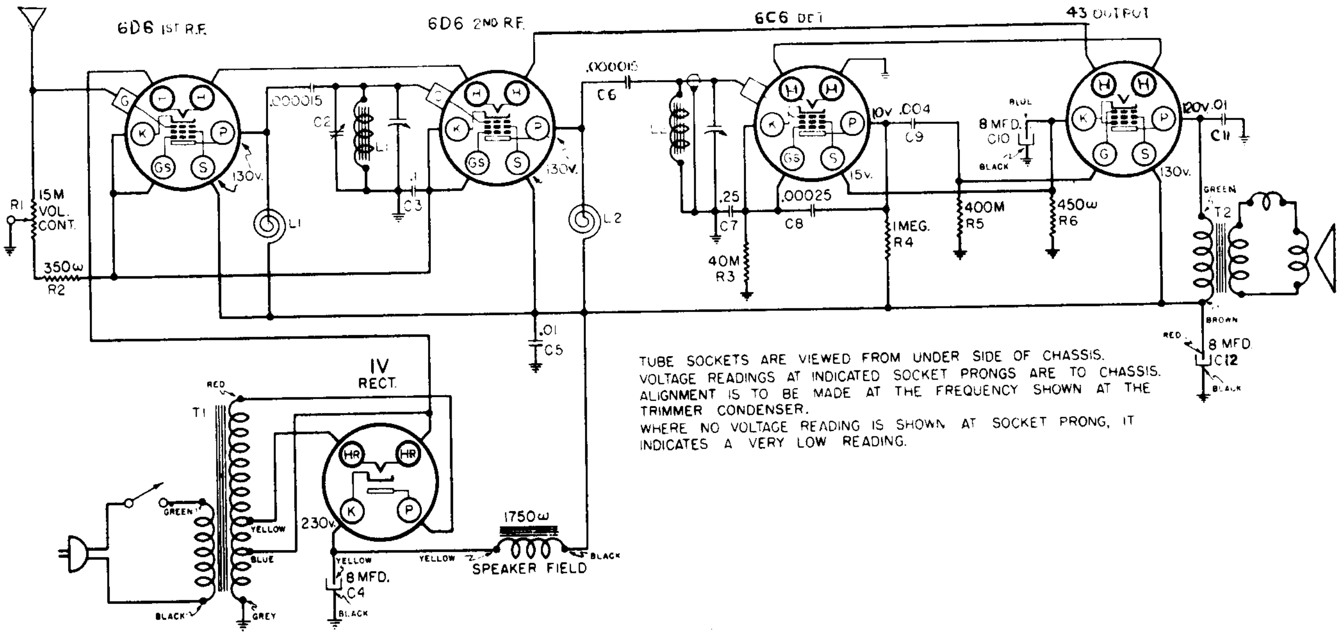
MODELS 4488A & 4588A "CHASSIS Nº 101,412A"



The 101412 chassis is used in Models 4488 and 4588. The 101412A chassis is used in Models 4488A and 4588A. The 101412 uses a 6R7G in the first AF stage. The 101412A uses a 6Q7G first AF tube. The schematics for both types of chassis are shown

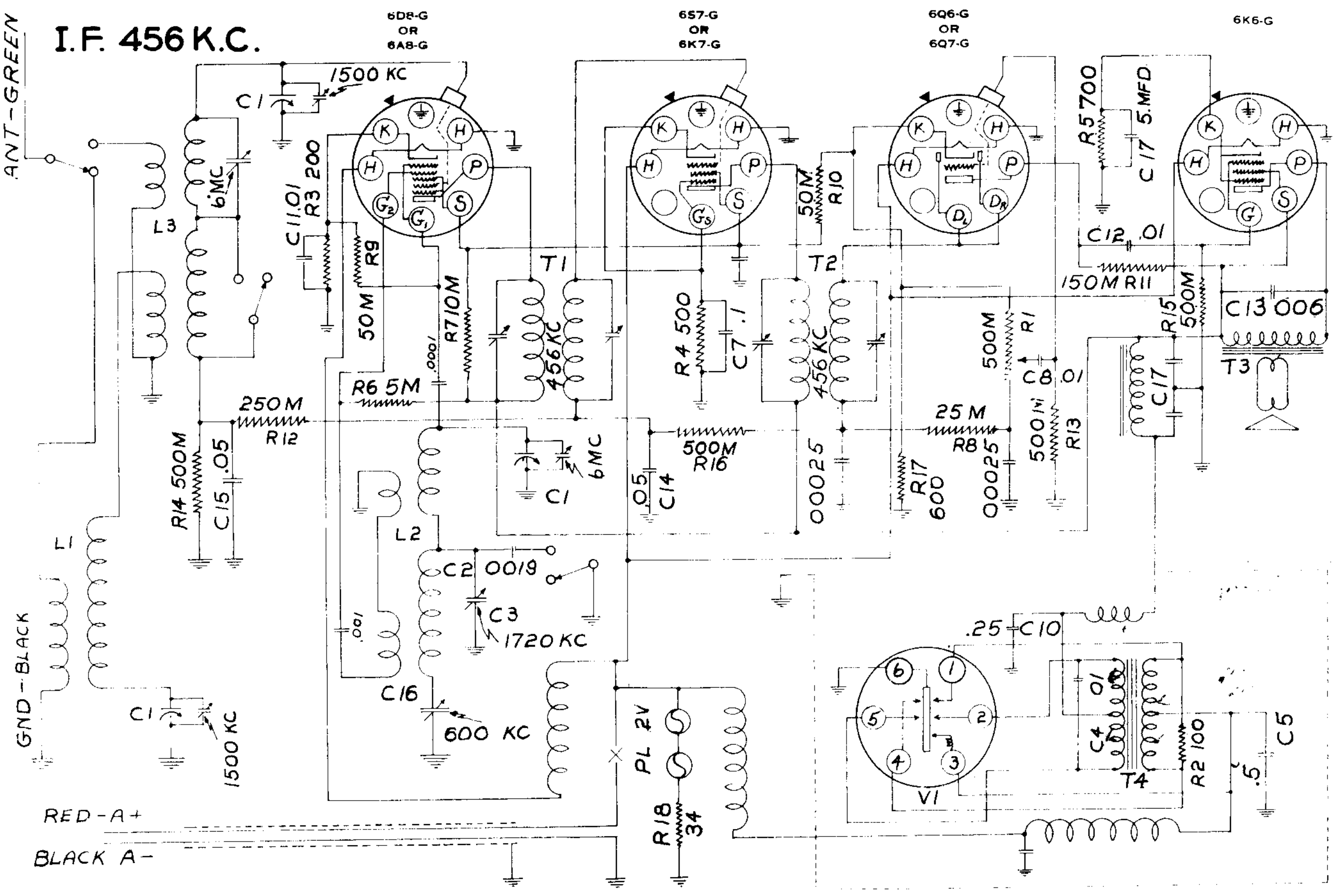
SEARS, ROEBUCK & CO.

MODELS 4501, 4503 & 4507 "CHASSIS No. 101,426"



MODELS 4521, 4421 & 4434 "CHASSIS No. 104,127"

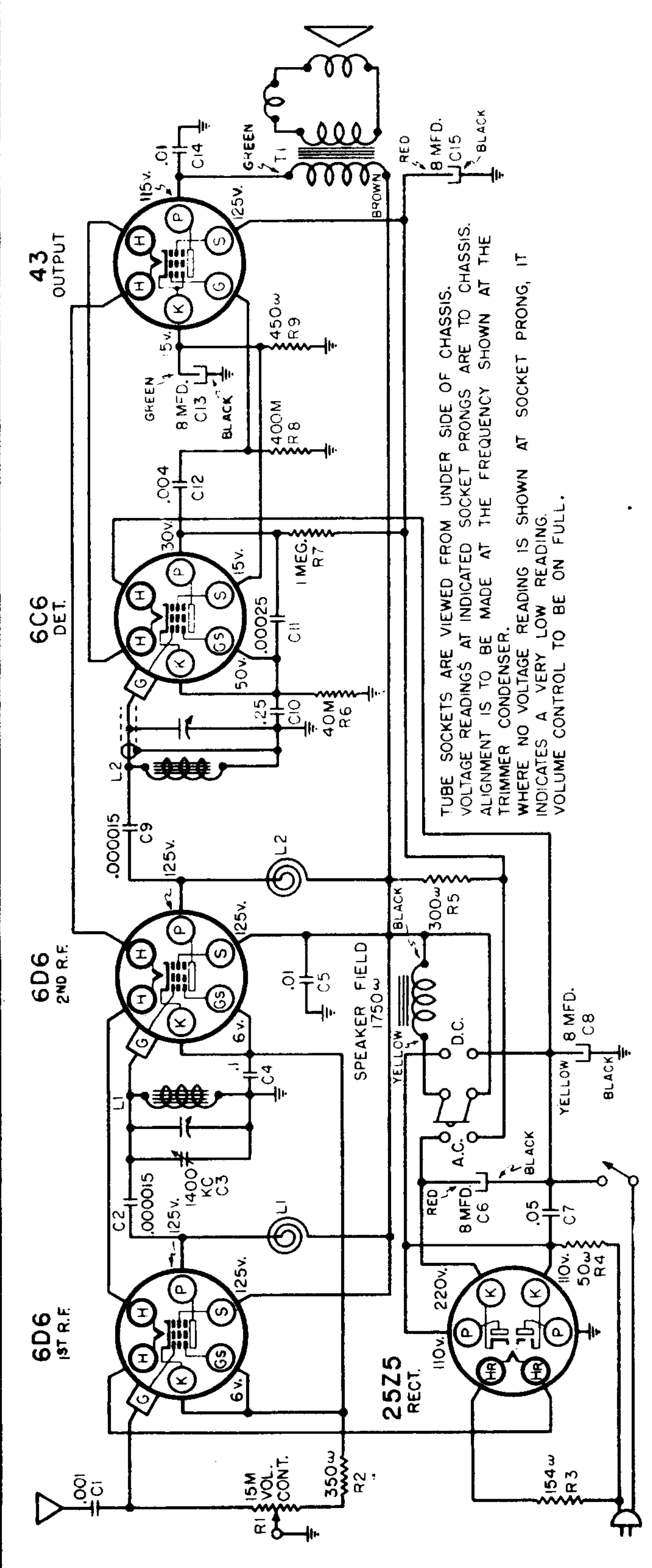
I.F. 456 K.C.



SEARS, ROEBUCK & CO.

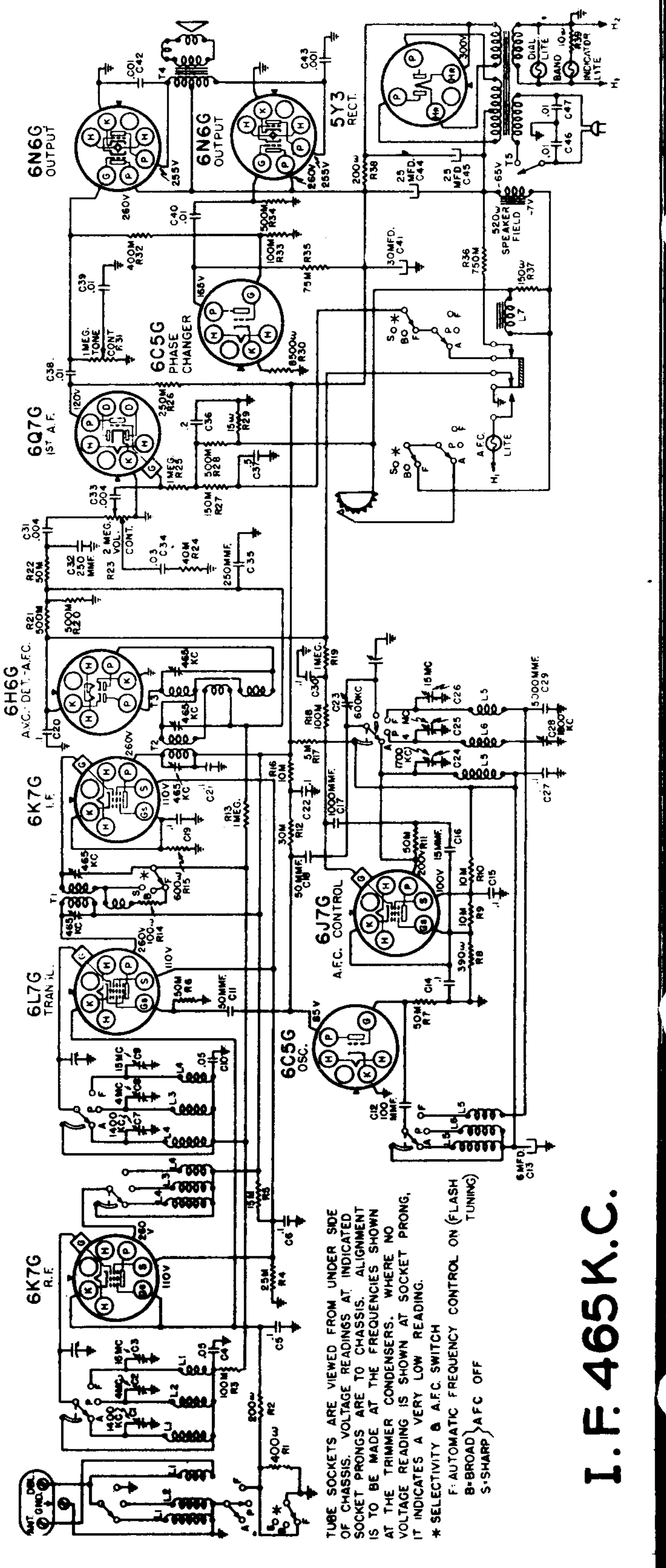
MODELS 4502, 4504 & 4508

"CHASSIS No. 101,427



MODEL 4587

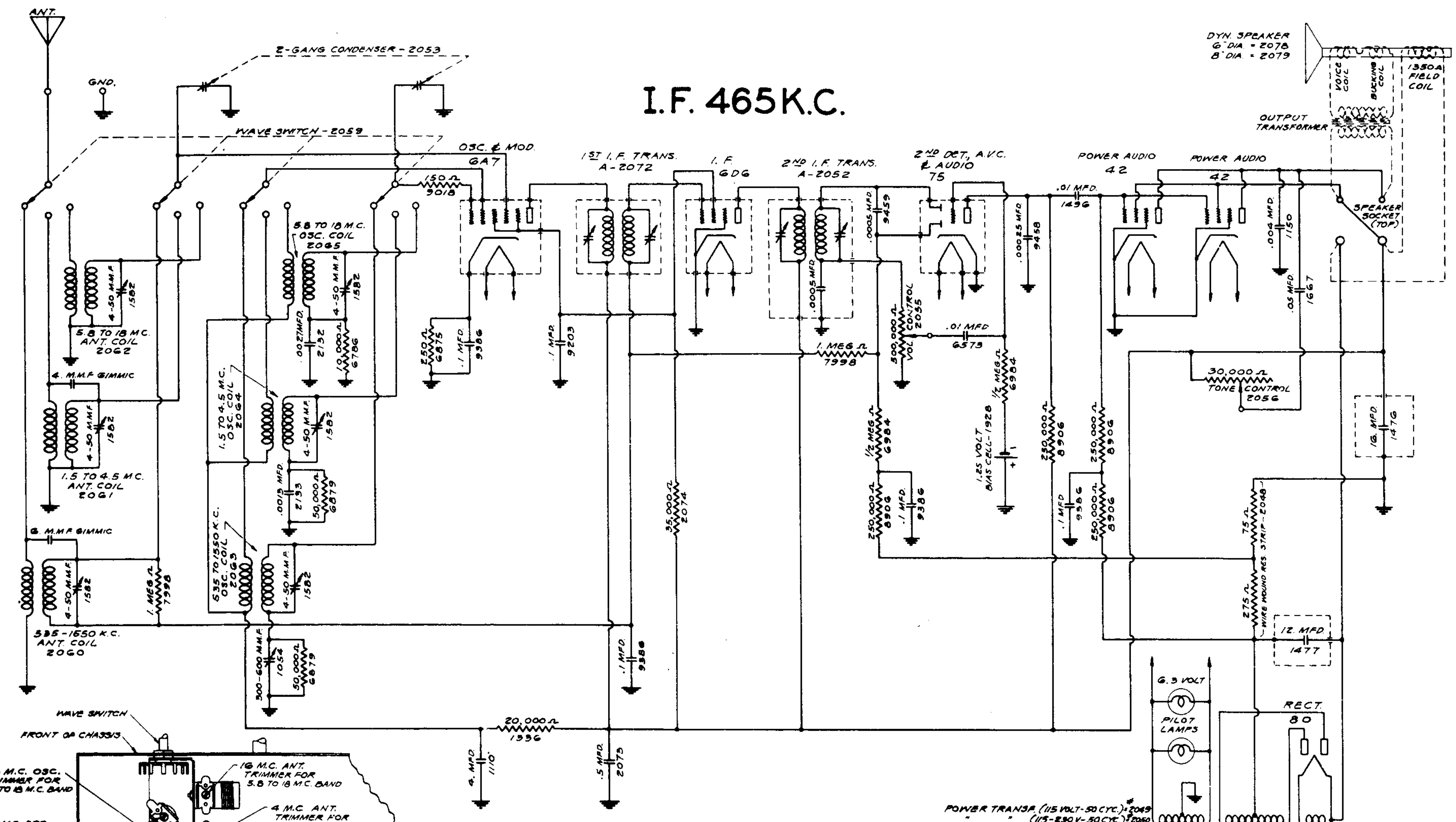
"CHASSIS No. 101,411"

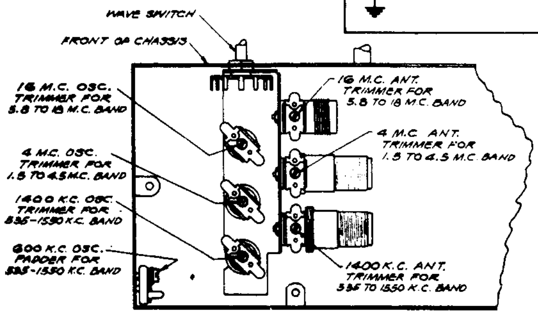


SENTINEL RADIO CORP.

MODEL 19A

I.F. 465 K.C.





BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS & PADDER

VOLTAGE TABLE

LINE : 115 VOLUME : FULL ON

TUBE		FIL.	PLATE	SCREEN	CATHODE	GRID NO. 1	GRID NO. 2	GRID 3 & 5
6D6	I. F. AMPLIFIER	6	220	95				
6A7	OSCILLATOR & 1ST DETECTOR	6	220		2	1.5	145	95
75	2ND DETECTOR DIODE AVC & TRIODE	6	75*					
42	OUTPUT	6	195	220				
42	OUTPUT	6	195	220				
80	RECTIFIER	4.85						

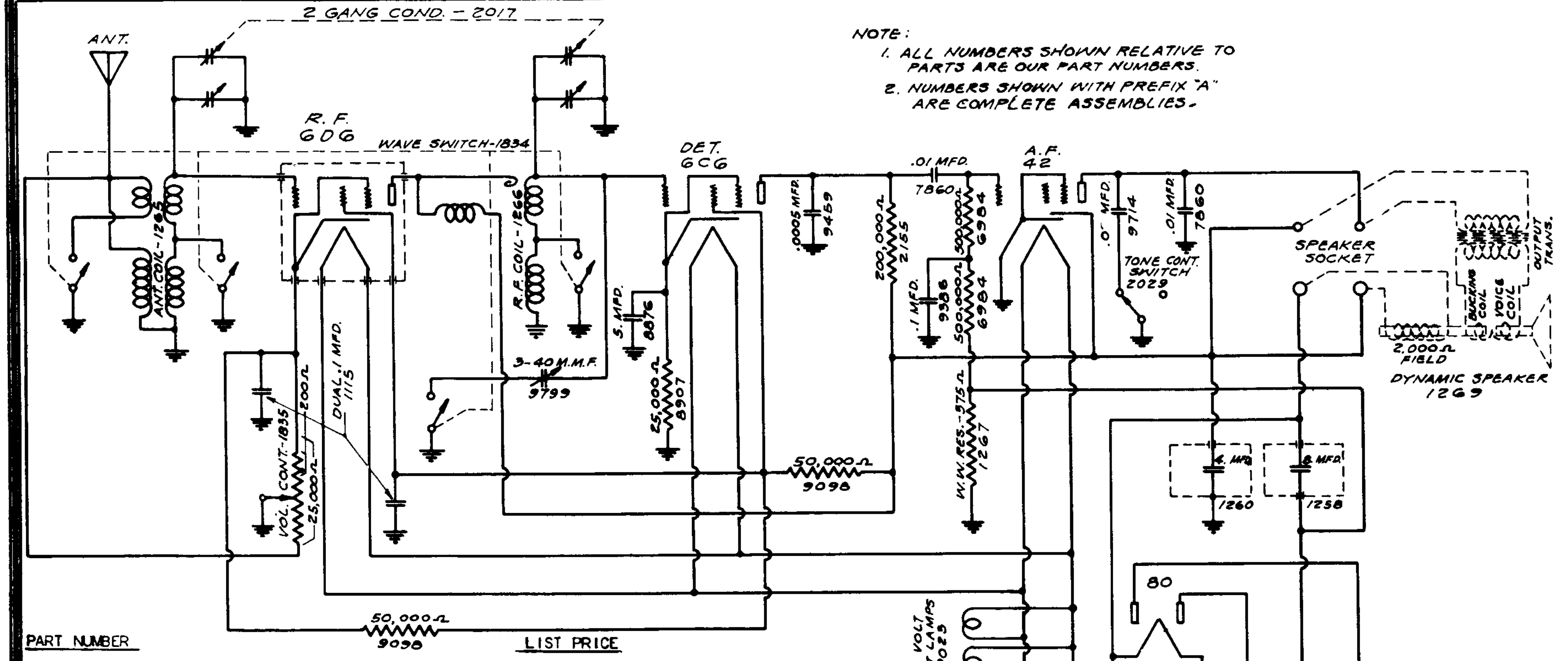
58 M.A. TOTAL DRAIN.

READ ALL VOLTAGES FROM SOCKET TO CHASSIS UNLESS OTHERWISE SPECIFIED.

* TRIODE PLATE. COMPARATIVE VOLTAGE ONLY. THE VOLTMETER IS IN SERIES WITH A HIGH RESISTANCE AND IS THEREFORE NOT THE TRUE VOLTAGE APPLIED.

SENTINEL RADIO CORP.

MODEL 30A



PART NUMBER		LIST PRICE
1265	ANTENNA COIL	$1.27
1266	R. F. COIL	1.27
2017	TWO GANG CONDENSER	2.25
9799	TRIMMER CONDENSER	.15
2105	DIAL ASSEMBLY (SPECIFY REQUIRED NAME)	2.00
1834	WAVE SWITCH	.47
9023	PILOT LIGHT LAMP BULB 6.3 VOLTS	.19
1251	POWER TRANSFORMER	3.20
1258	8 MFD. WET ELECTROLYTIC CONDENSER	1.16
1260	4 MFD. WET ELECTROLYTIC CONDENSER	1.02
8876	5 MFD. DRY ELECTROLYTIC CONDENSER	.85
1835	VOLUME CONTROL	1.15
2029	TONE CONTROL	.36
1267	WIRE WOUND RESISTOR STRIP	.24
6984	500,000 OHM 1/3 WATT RESISTOR	.19
8906	250,000 OHM 1/3 WATT RESISTOR	.19
9098	50,000 OHM 1/3 WATT RESISTOR	.19
8907	25,000 OHM 1/3 WATT RESISTOR	.19
9459	.0005 MFD. MICA MOULDED CONDENSER	.21
1155	DUAL .1 MFD. 200 VOLT CONDENSER	.35
9386	.1 MFD. 200 VOLT CONDENSER	.19
7860	.01 MFD. 400 VOLT CONDENSER	.17
9714	.02 MFD. 400 VOLT CONDENSER	.18
1740	15/16" KNOB	.22
1739	13/16" KNOB	.22
1269	DYNAMIC SPEAKER	5.25

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

VOLTAGE TABLE

LINE VOLTAGE : 115
VOLUME CONTROL : FULL ON
WAVE BAND : BROADCAST

TUBE		FILAMENT	PLATE	SCREEN	CATHODE
6C6	RADIC FREQUENCY	6	225	85	2
6D6	DETECTOR	6	105*	85	3.5
42	OUTPUT	6	200	225	15**
80	RECTIFIER	4.9			

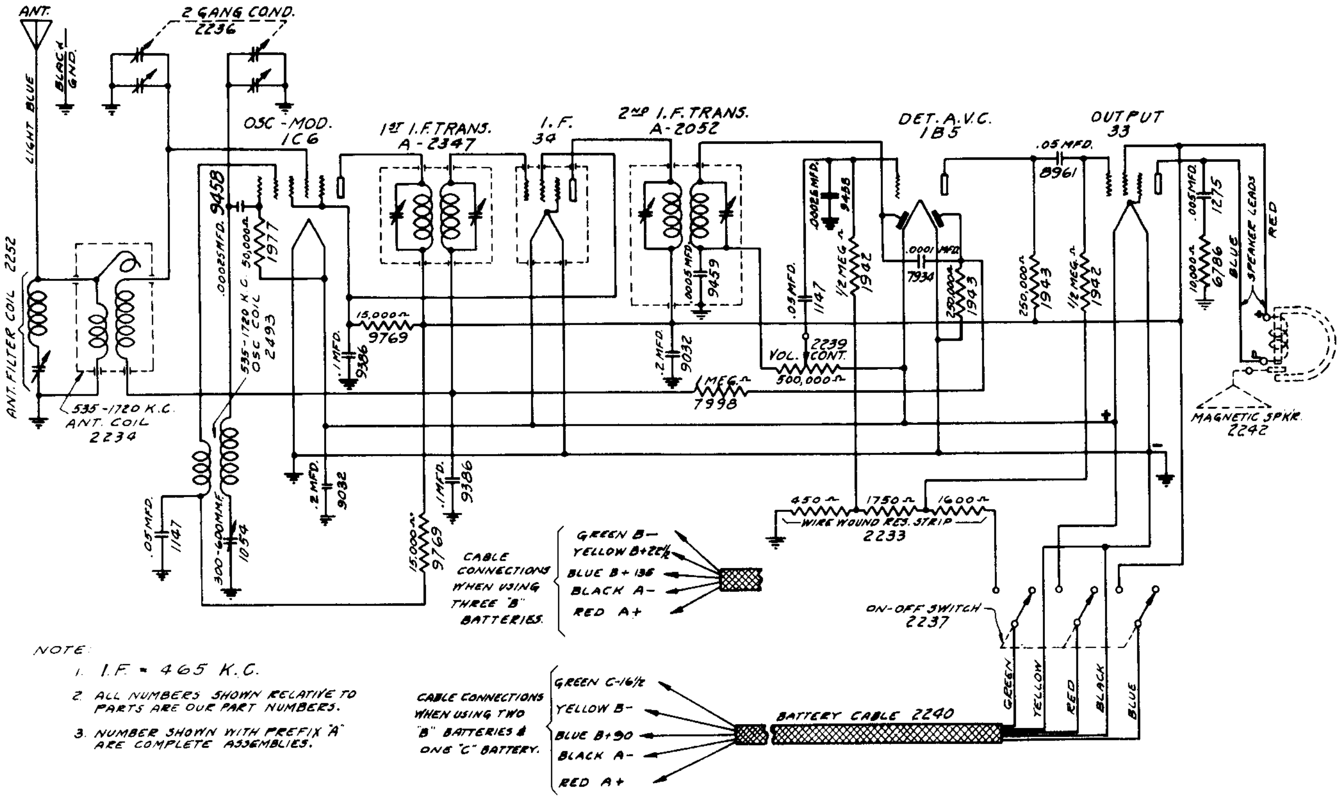
READ ALL VOLTAGES FROM SOCKET PRONG TO GROUND UNLESS OTHERWISE SPECIFIED. (EXCEPT FILAMENT)

** READ FROM 375 OHM RESISTOR #1267 TO GROUND.

* COMPARATIVE VOLTAGE IS NOT TRUE VOLTAGE APPLIED.

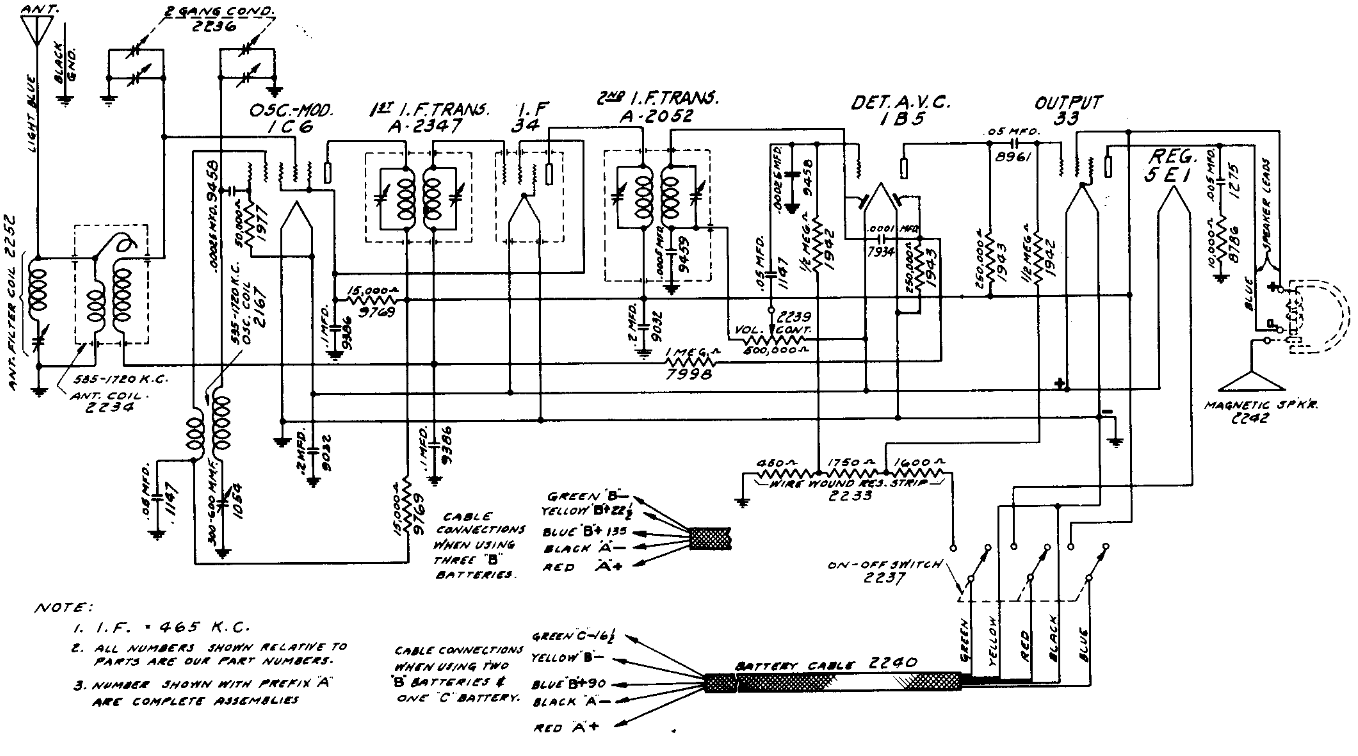
SENTINEL RADIO CORP.

MODEL 32B



NOTE:
1. I.F. = 465 K.C.
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
3. NUMBER SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.

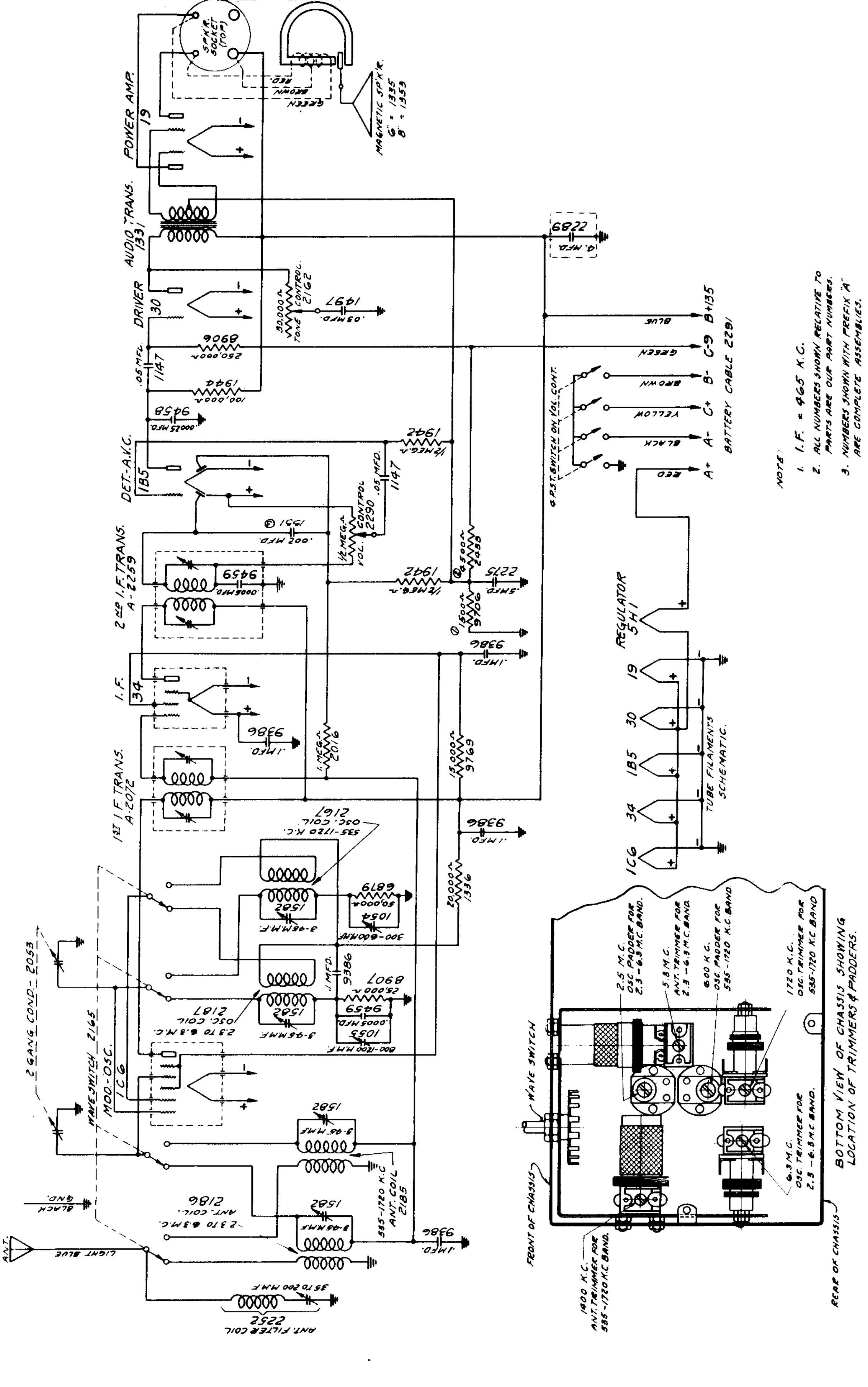
MODEL 37B



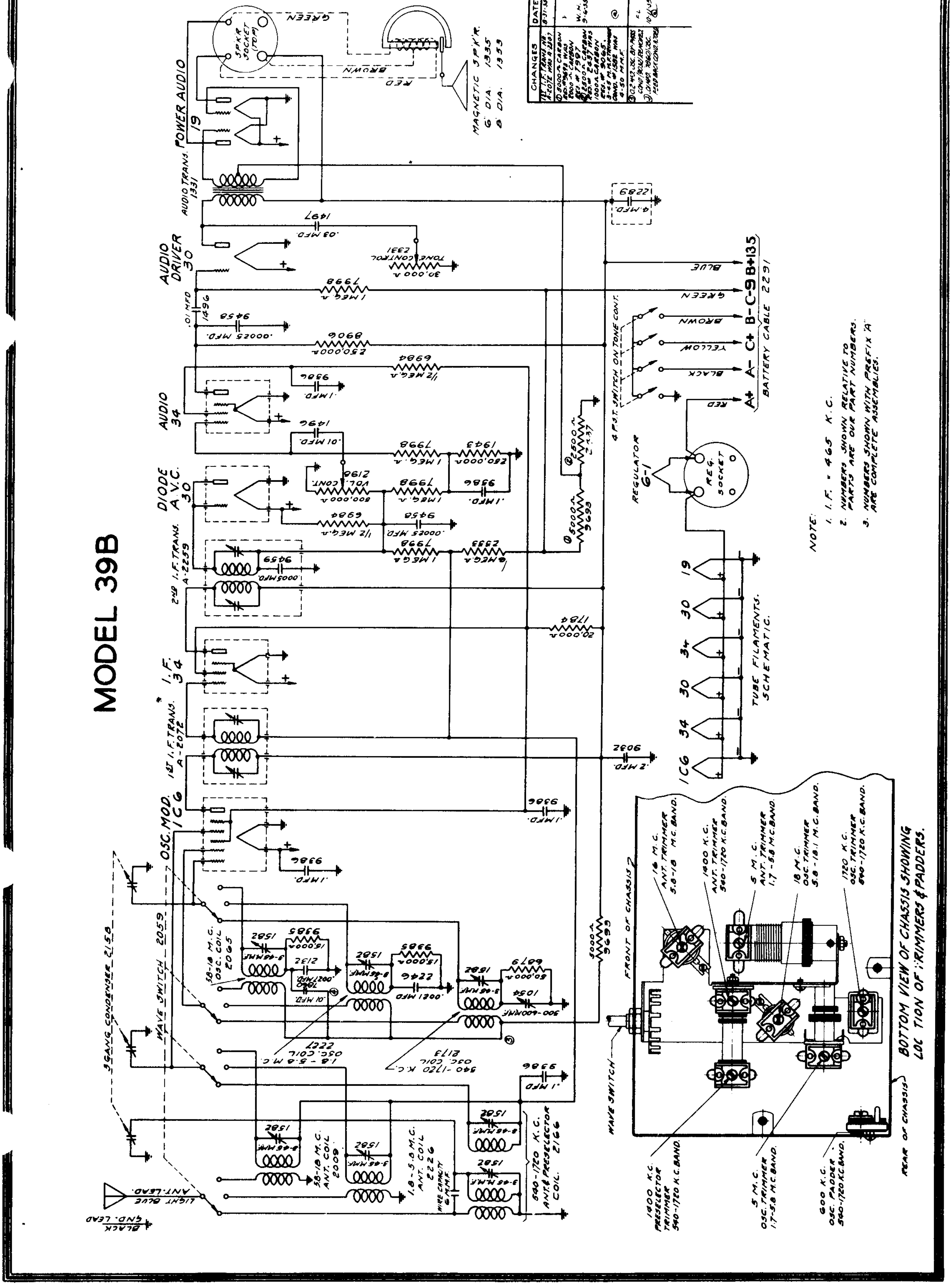
NOTE:
1. I.F. = 465 K.C.
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
3. NUMBER SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES

SENTINEL RADIO CORP.

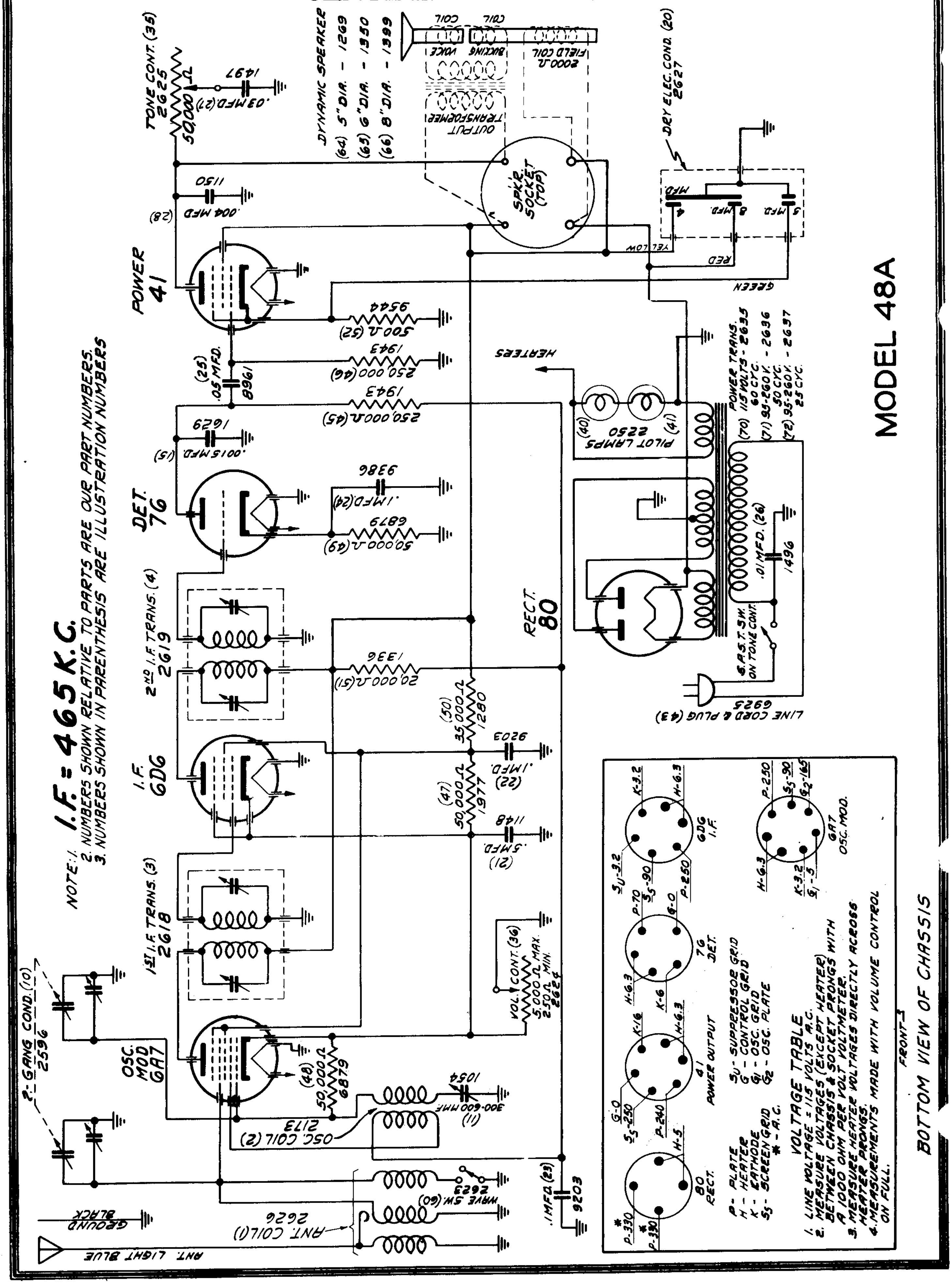
MODEL 38B



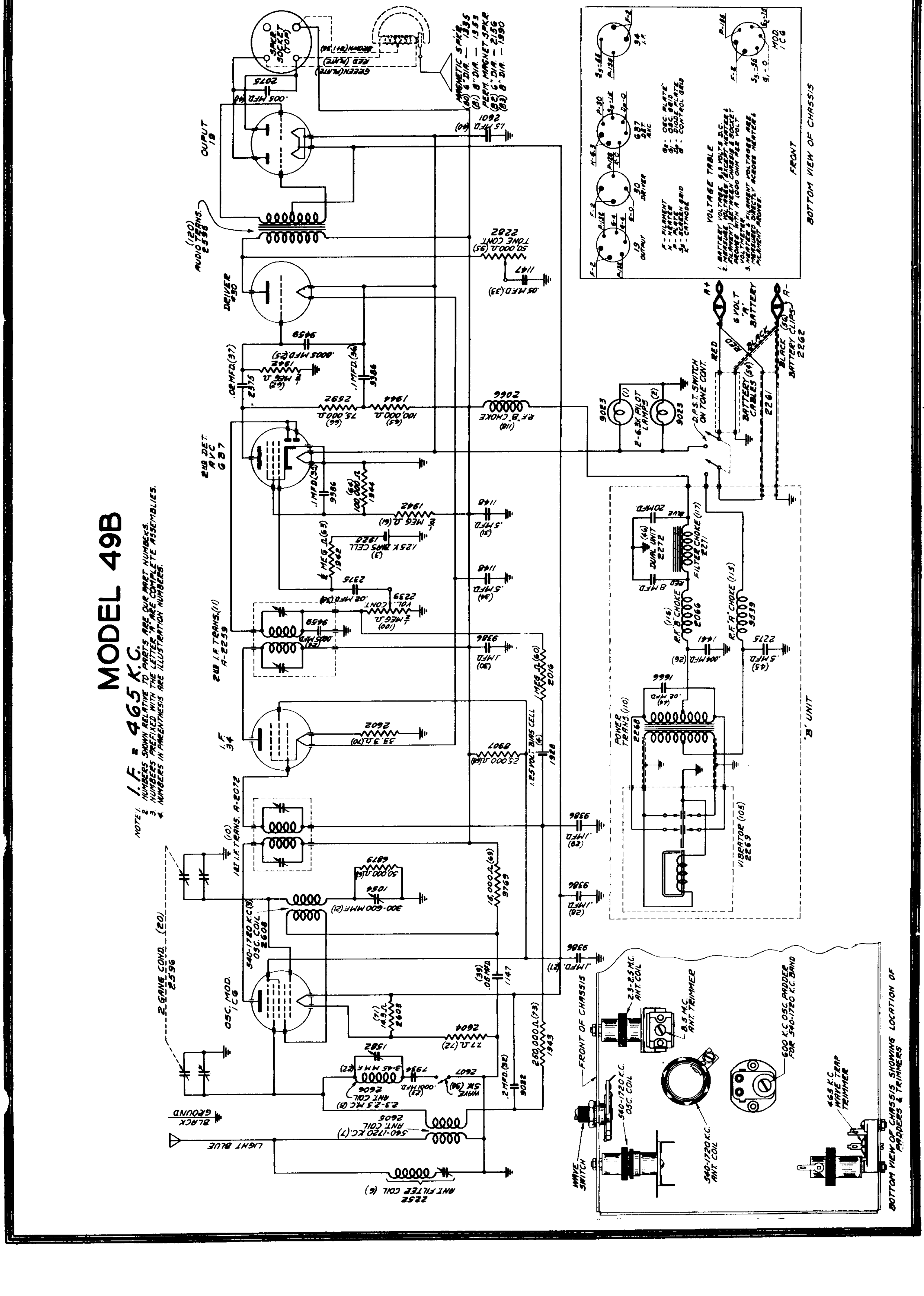
SENTINEL RADIO CORP.



SENTINEL RADIO CORP.

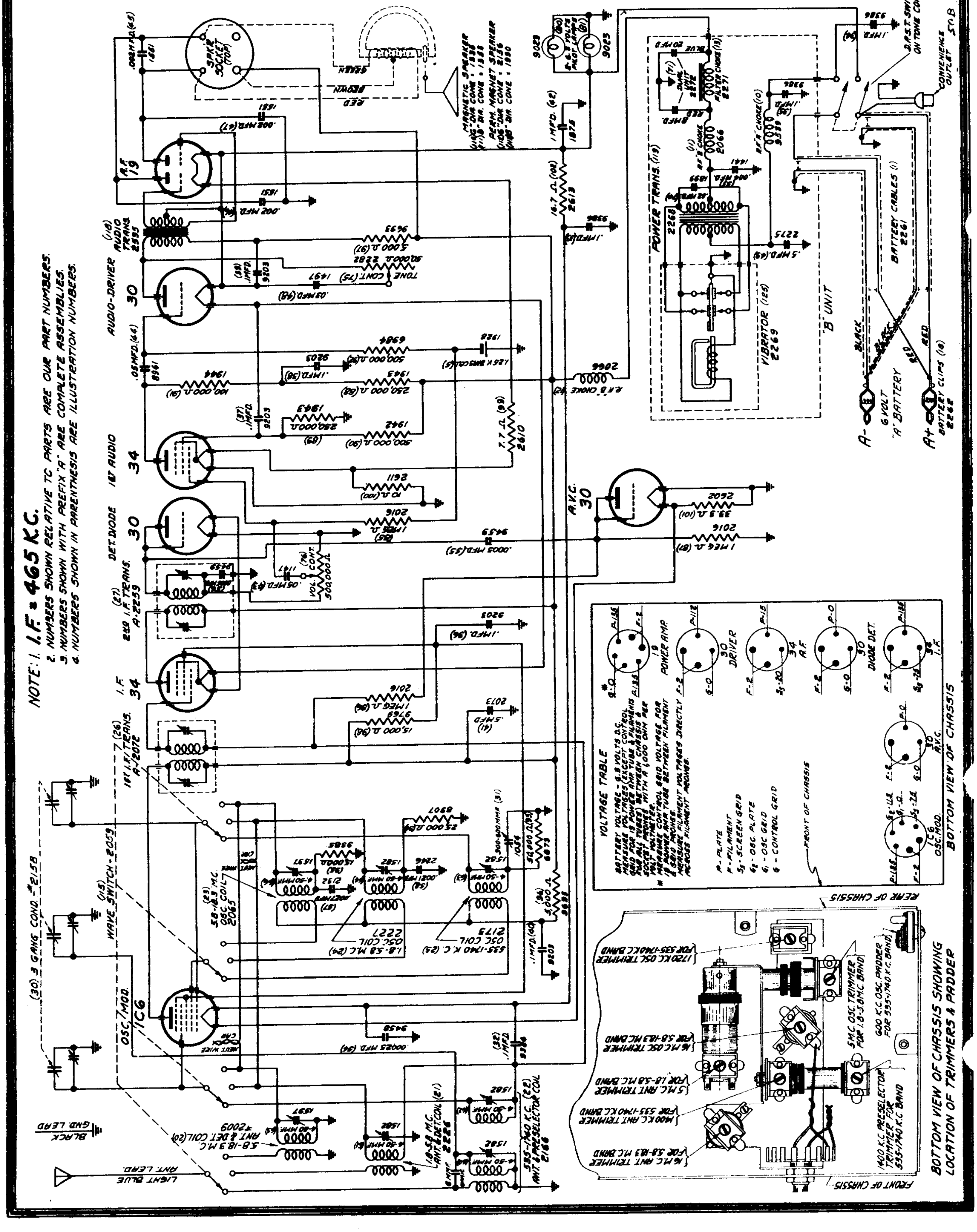


SENTINEL RADIO CORP.

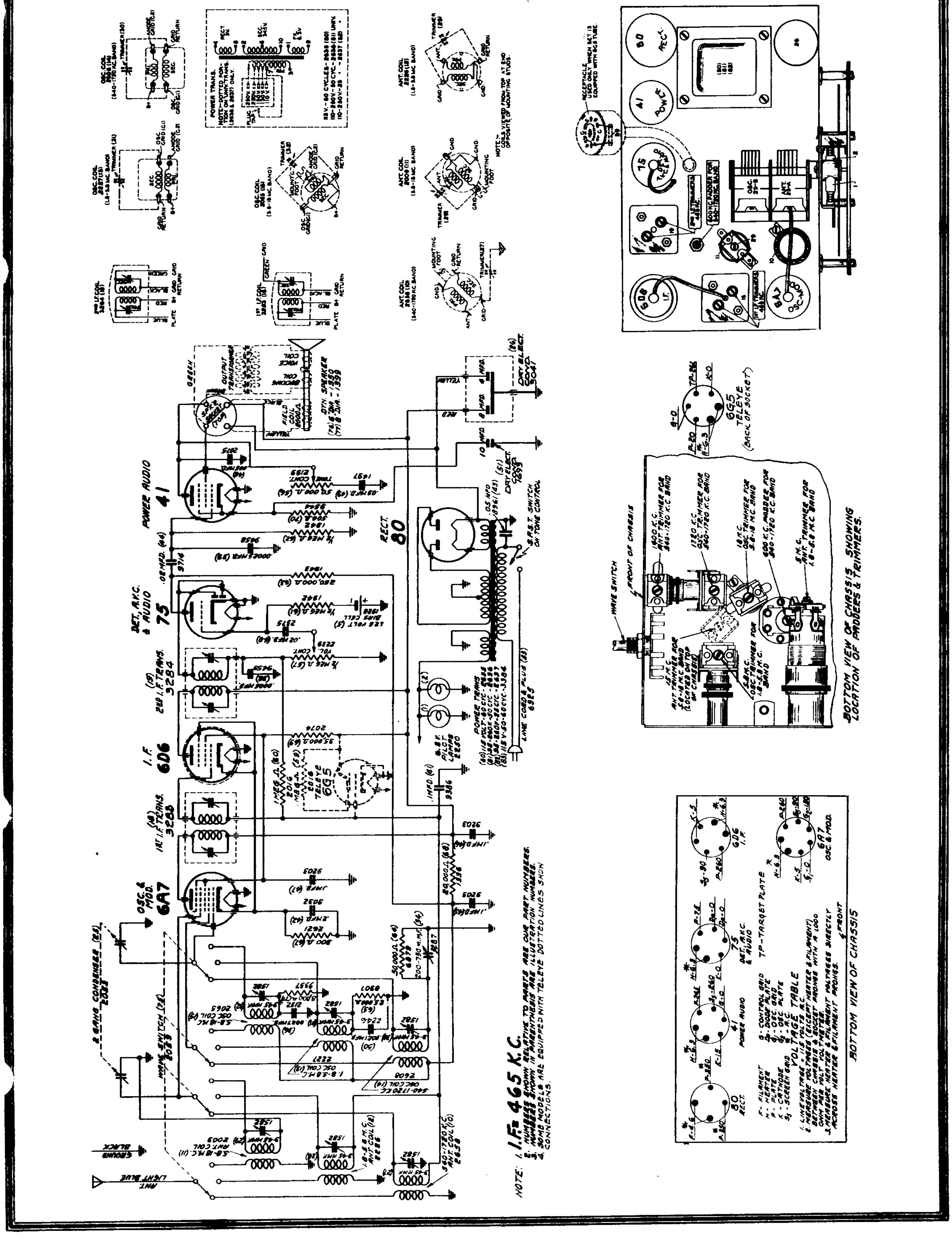


SENTINEL RADIO CORP.

MODEL 50B

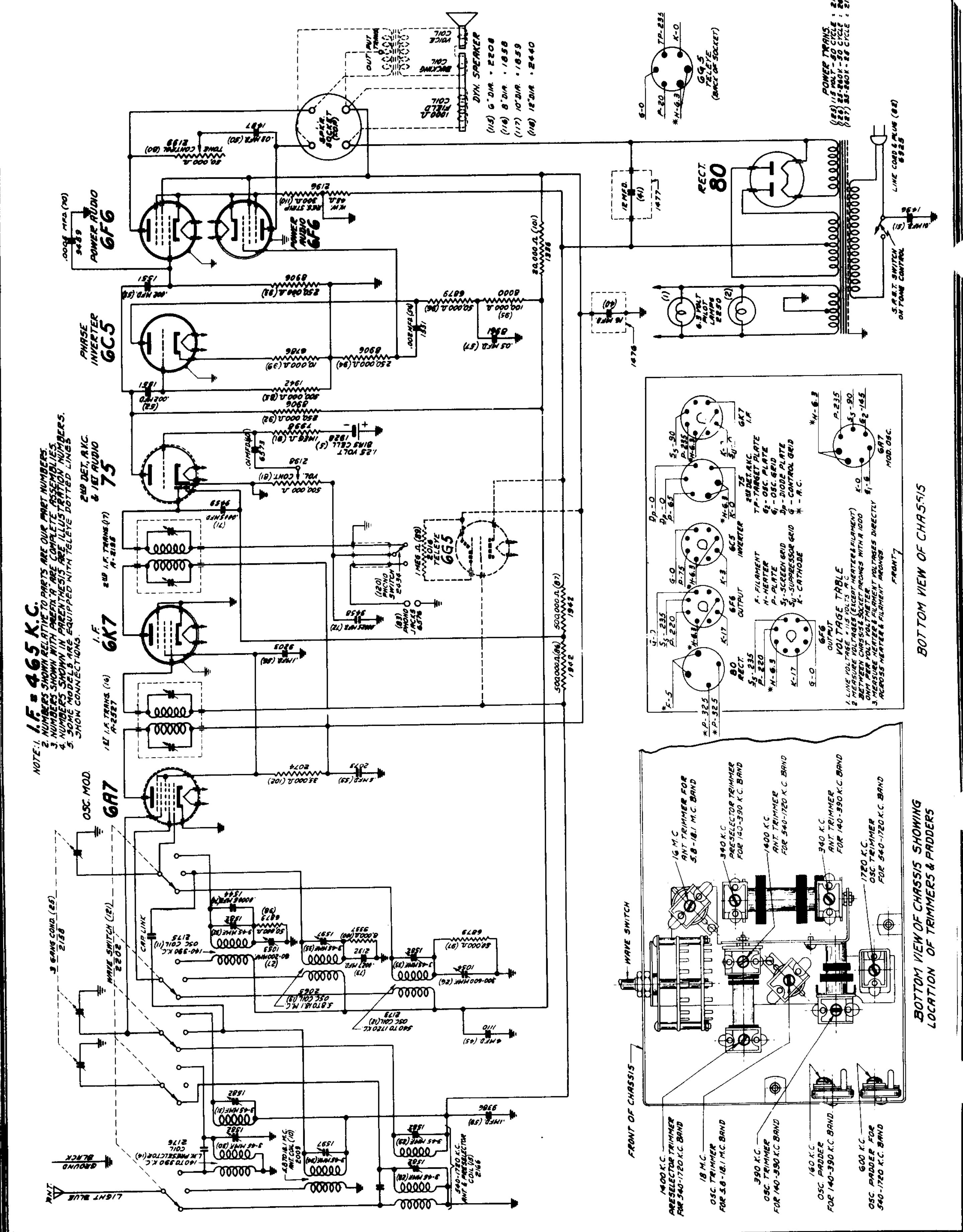


SENTINEL RADIO CORP.
MODELS 52A & 52AE



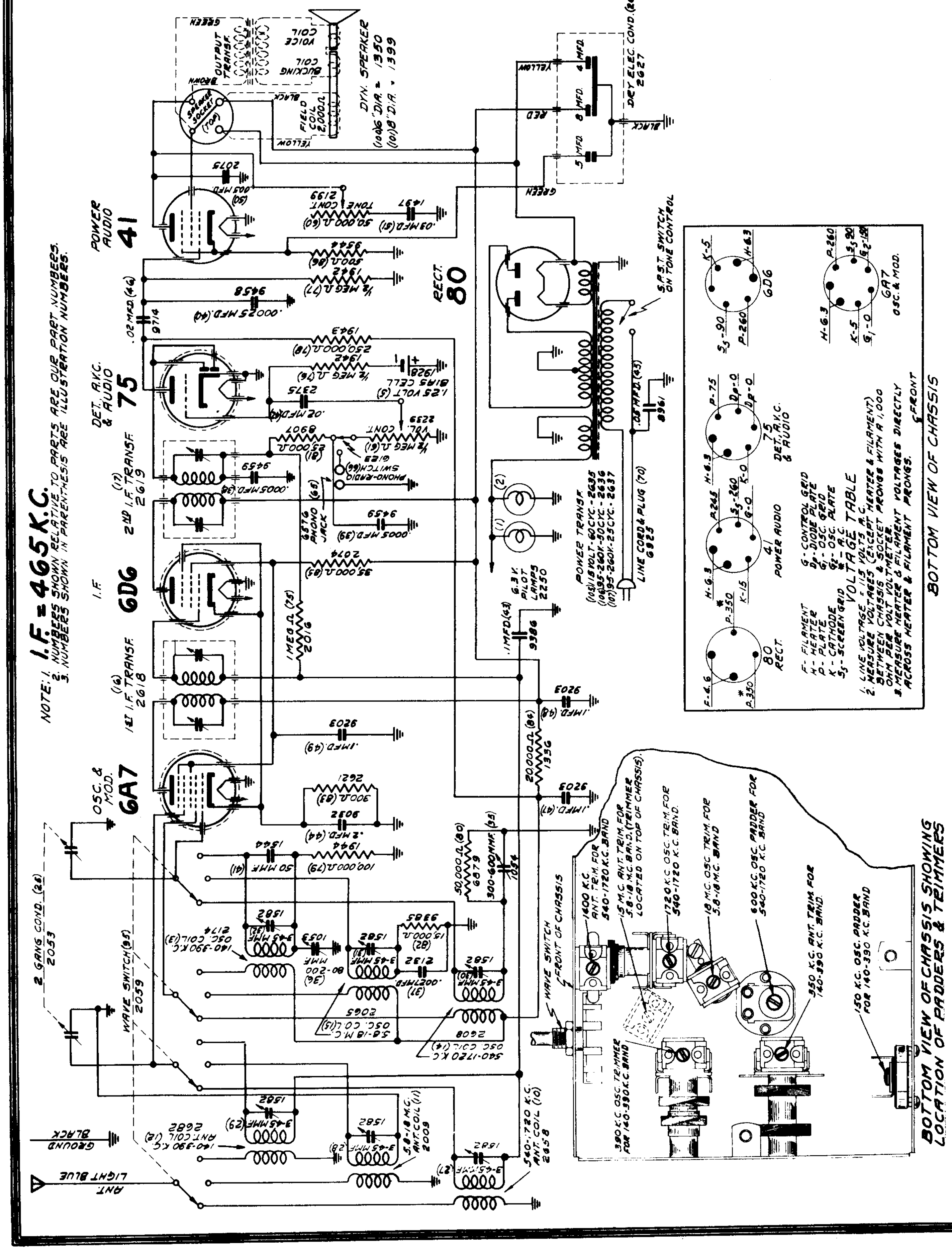
SENTINEL RADIO CORP.

MODELS 53A & 53AE

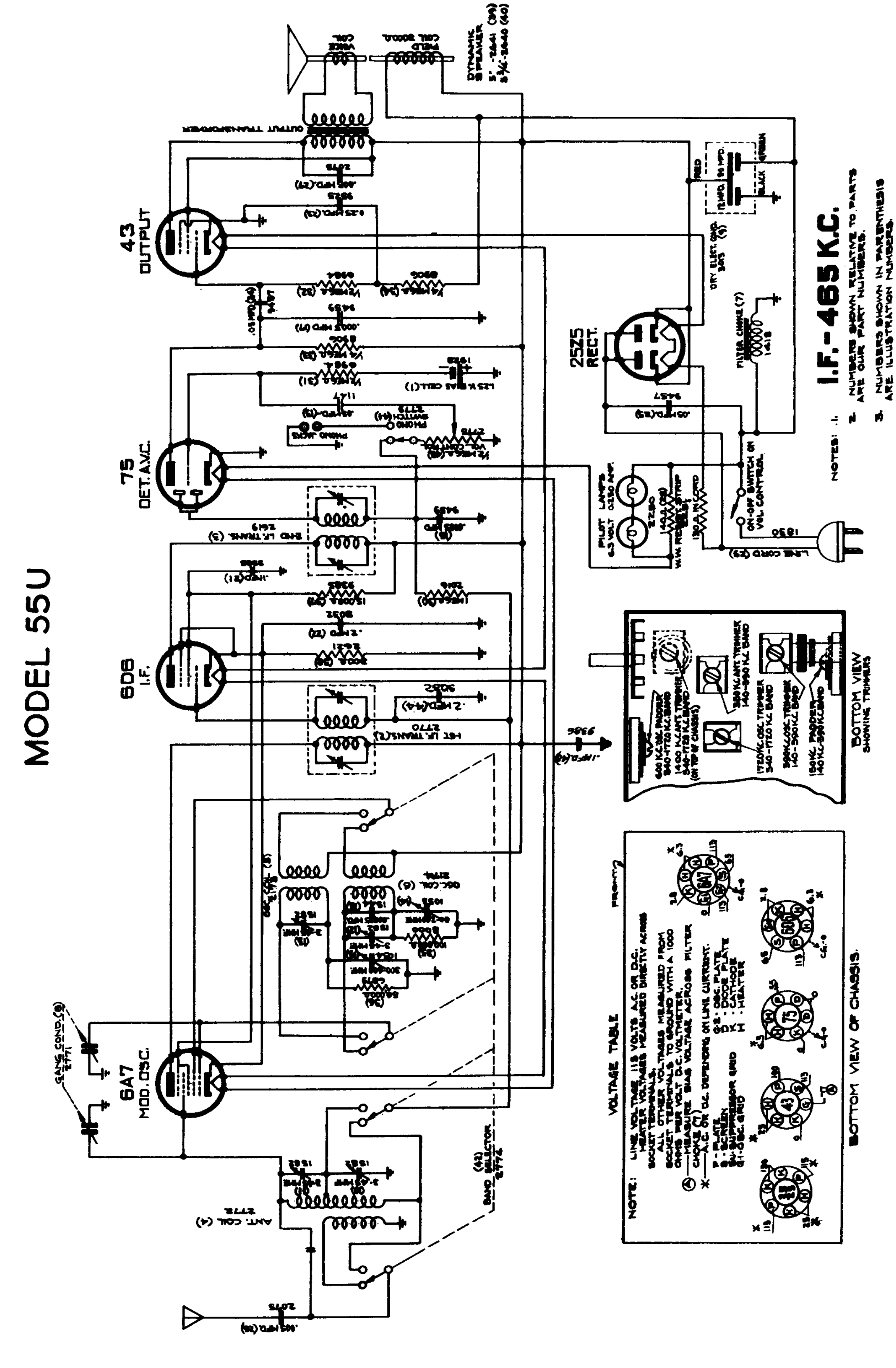


SENTINEL RADIO CORP.

MODEL 54A

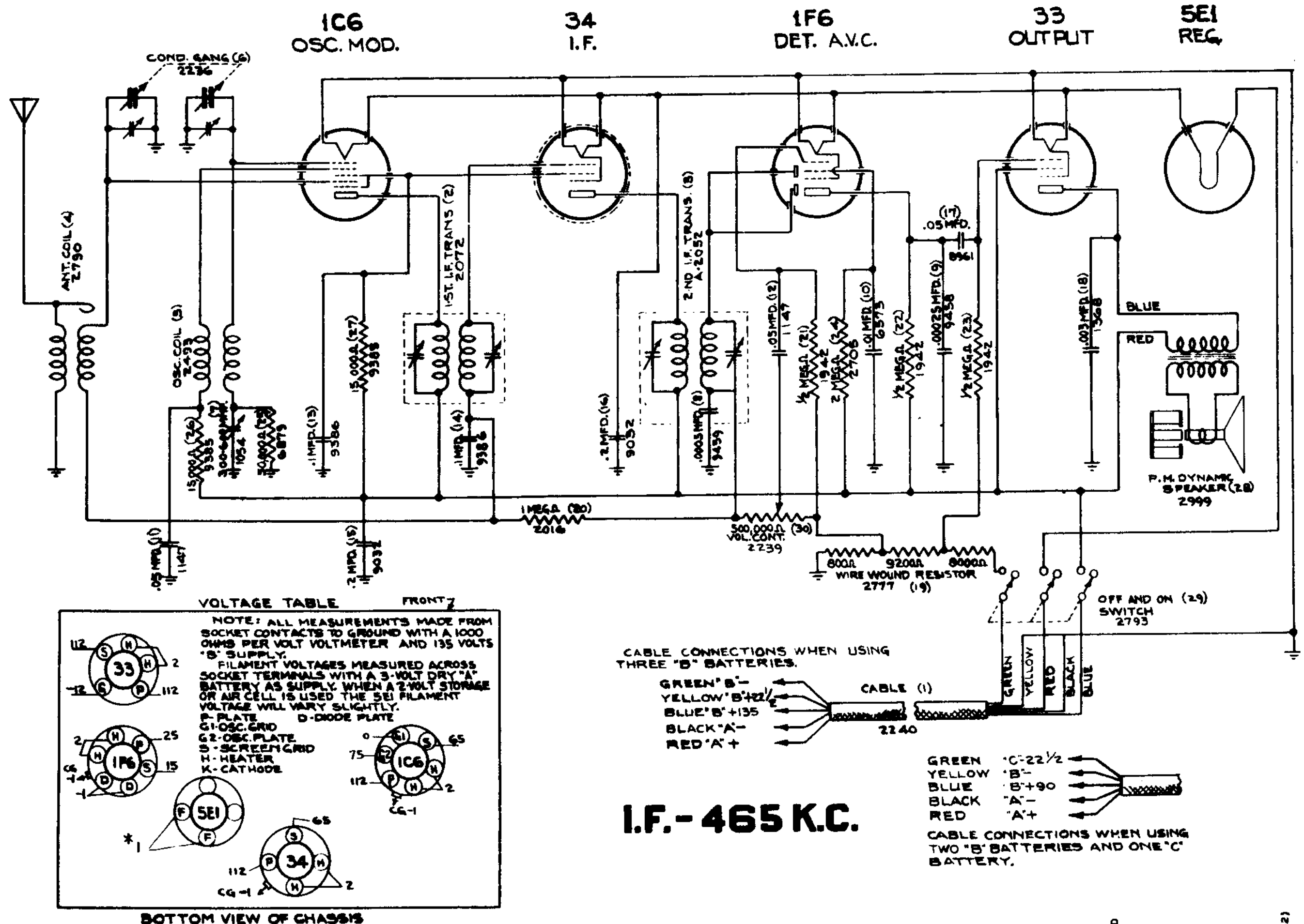


SENTINEL RADIO CORP.



SENTINEL RADIO CORP.

MODEL 60B



I.F.-465 K.C.

Lack of sensitivity, selectivity or poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, improperly connected or low batteries, open or grounded bias resistor, bypass condenser, inadequate or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

NOTE: BE SURE TO FOLLOW PROCEDURE CAREFULY WHEN ALIGNING, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT.

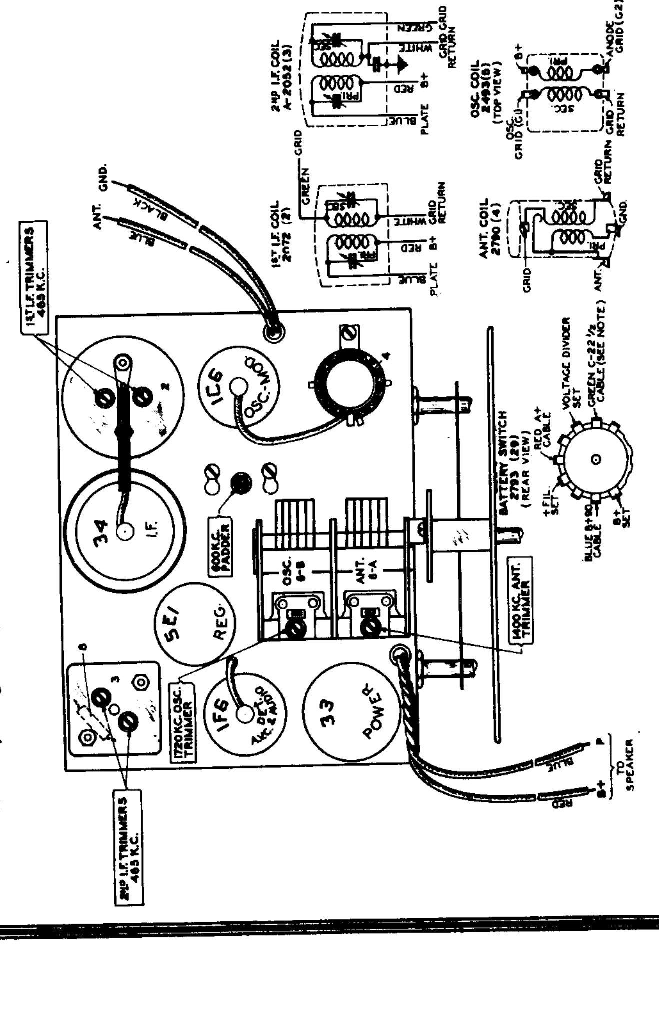
IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

ALIGNING I. F. STAGE AT 465 KILOCYCLES:

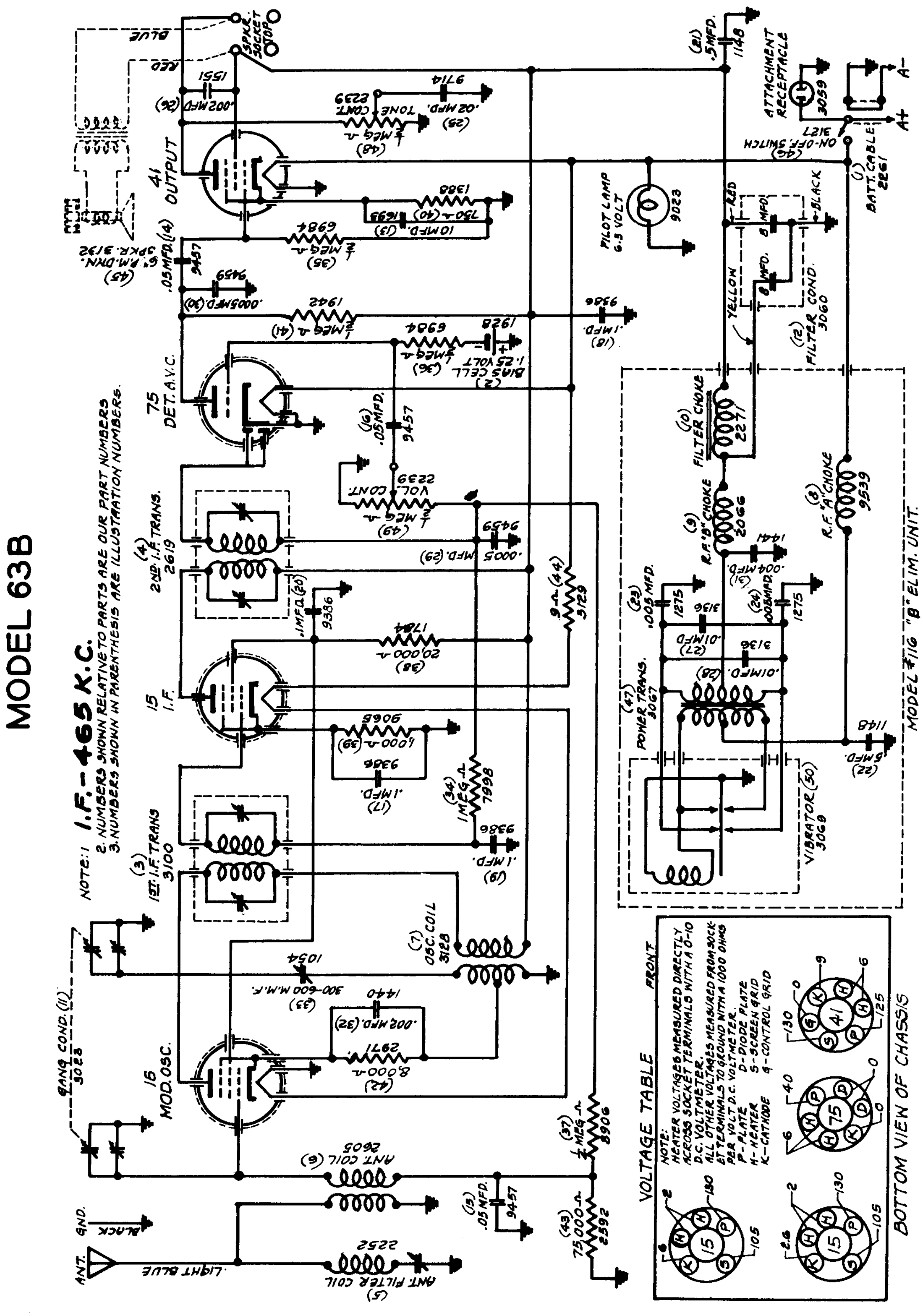
(a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead of the test oscillator to the grid cap of the 1C6 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.
(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.
(c) Peak each of the second I. F. transformer trimmers.
(d) Peak each of the first I. F. transformer trimmers.
To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING ANTENNA AND OSCILLATOR CIRCUIT:

(a) Remove test oscillator lead from grid of the 1C6 tube and attach it to the receiver antenna lead through a .00025 Mfd. series condenser.
(b) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.
(c) Set receiver dial and test oscillator frequency to EXACTLY 1720 kilocycles.
(d) Bring in 1720 KC test oscillator signal to maximum output by adjusting the trimmer condenser mounted on top of the oscillator section of the gang condenser.
Looking at the front of the receiver the rear section of the gang condenser is the oscillator section.
(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.
(f) Adjust trimmer on top of the front section gang condenser (antenna section) for maximum 1400 kilocycle test signal response.
(g) Tune receiver dial and set test oscillator frequency to approximately 600 kilocycles.
(h) While rocking the tuning condenser back and forth adjust 600 KC oscillator padder condenser which is accessible through the hole in the top of the chassis adjacent to the gang condenser for maximum 600 kilocycle signal response.

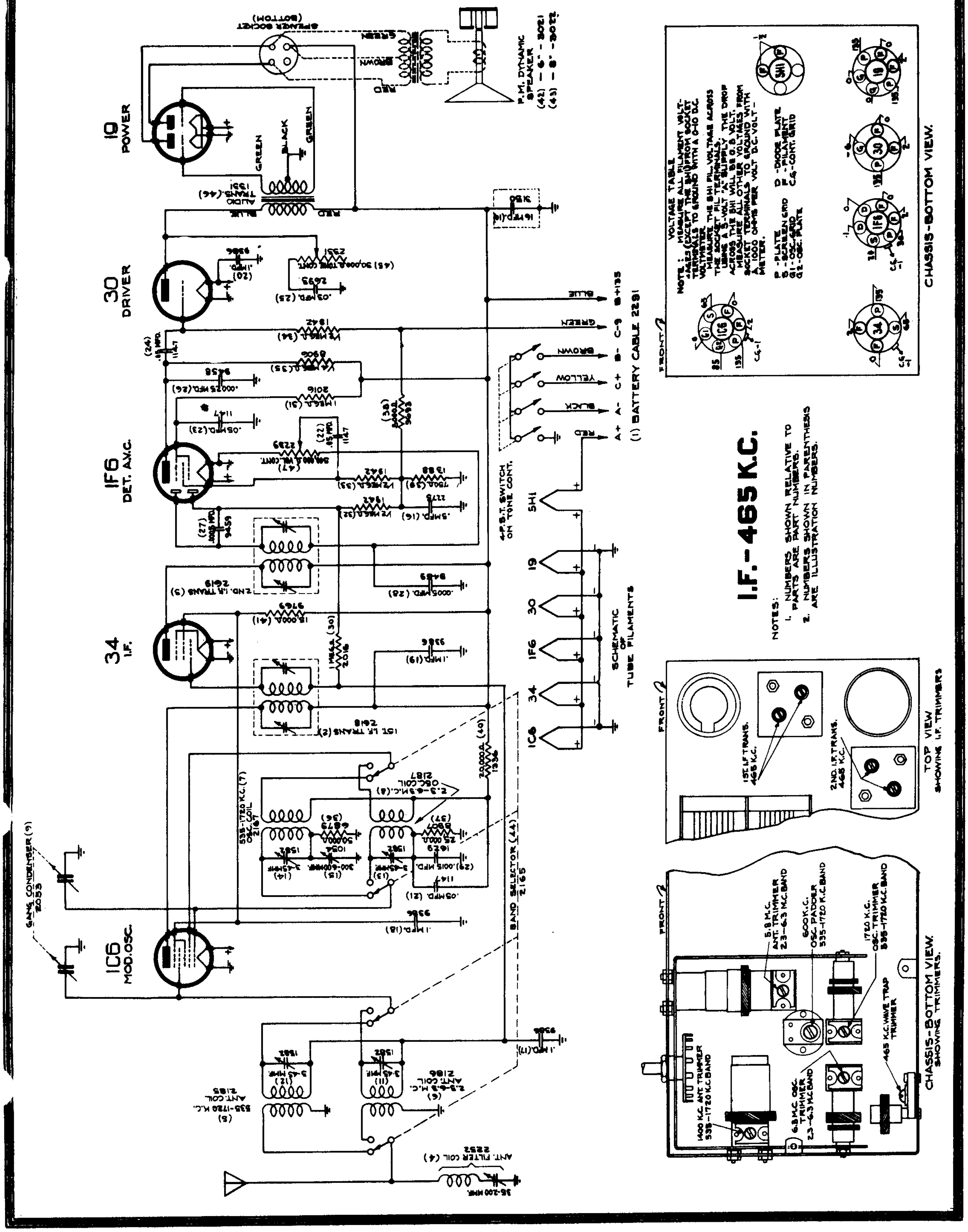


SENTINEL RADIO CORP.

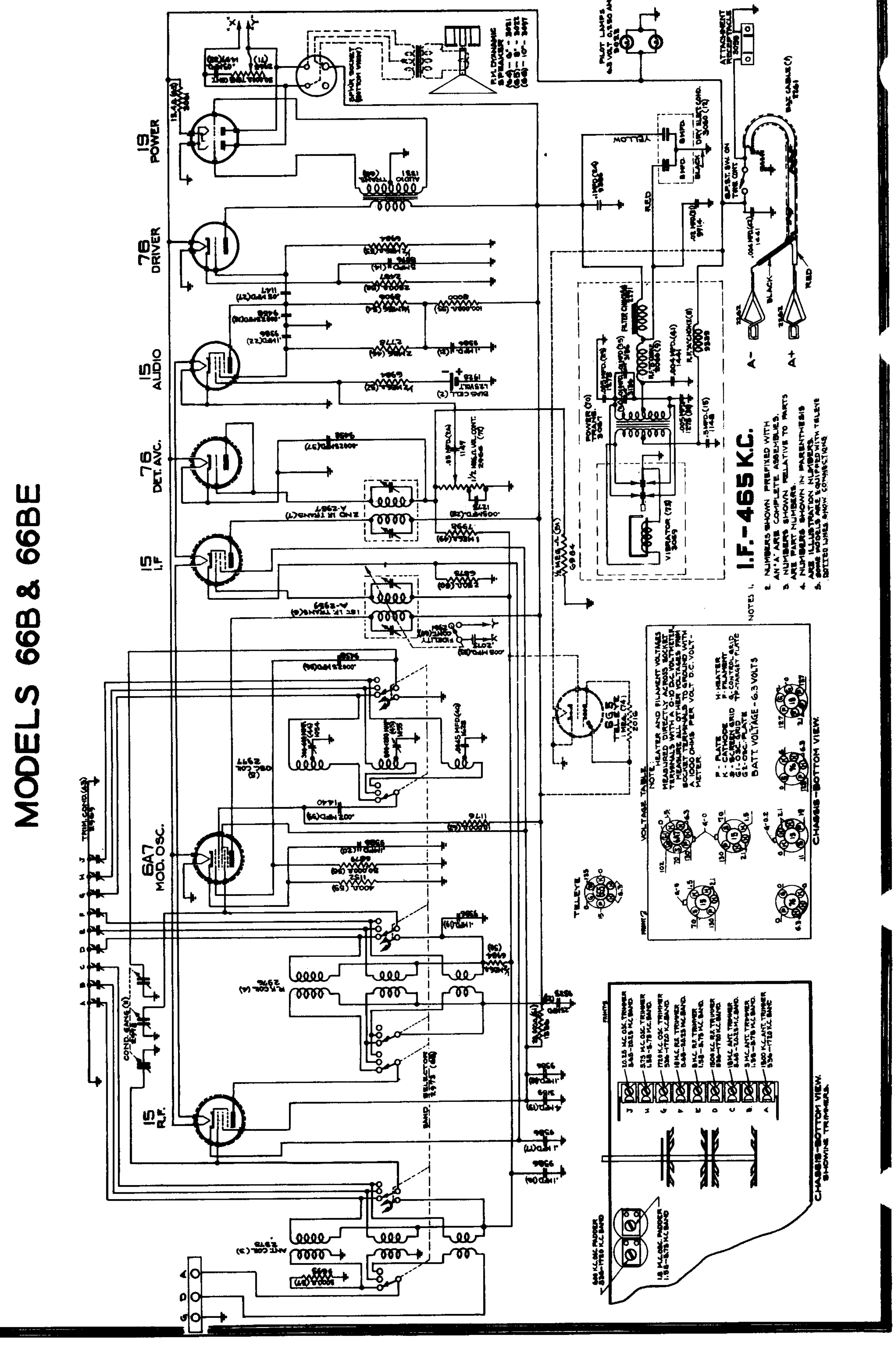


SENTINEL RADIO CORP.

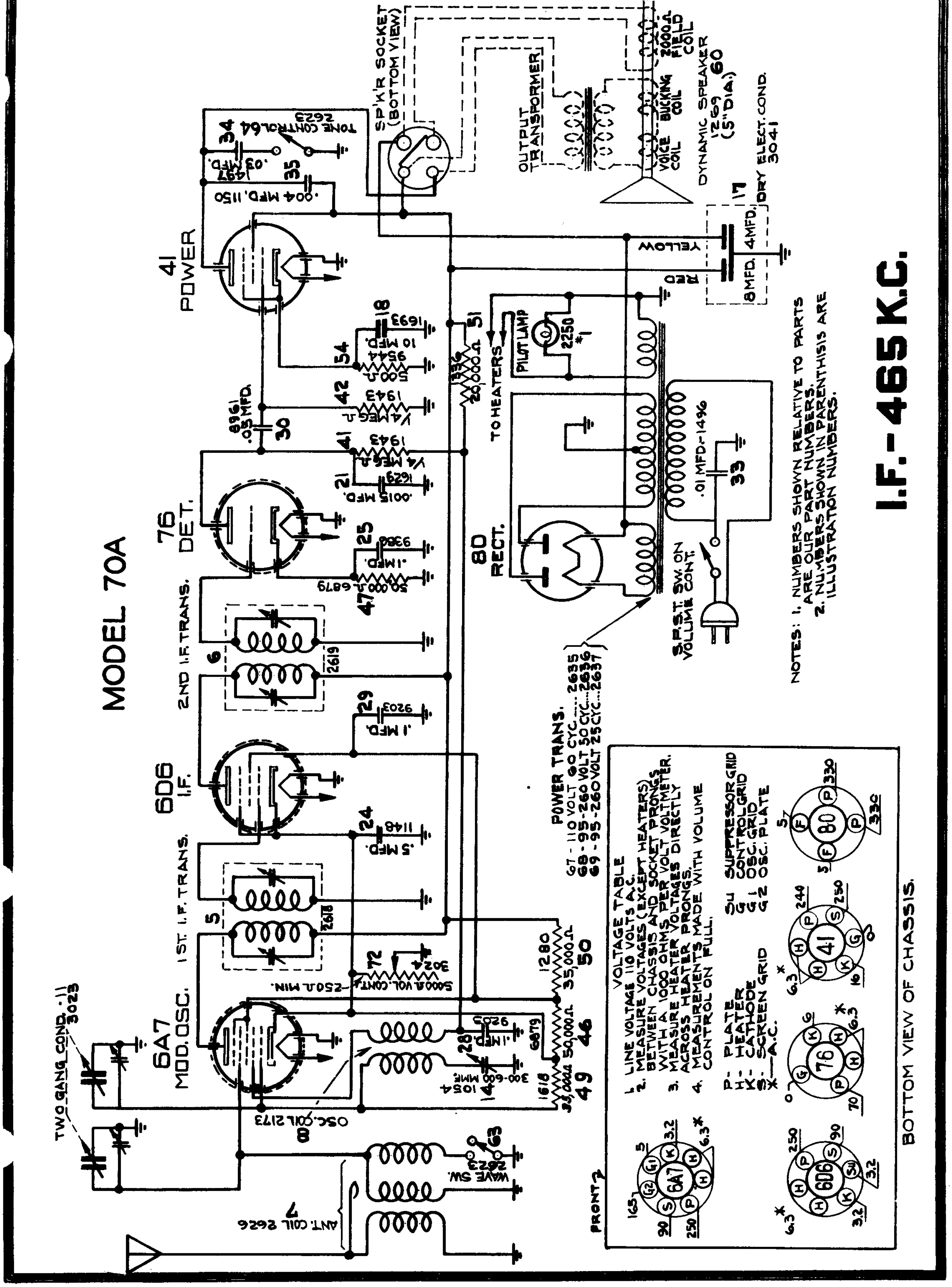
MODEL 65B



SENTINEL RADIO CORP.

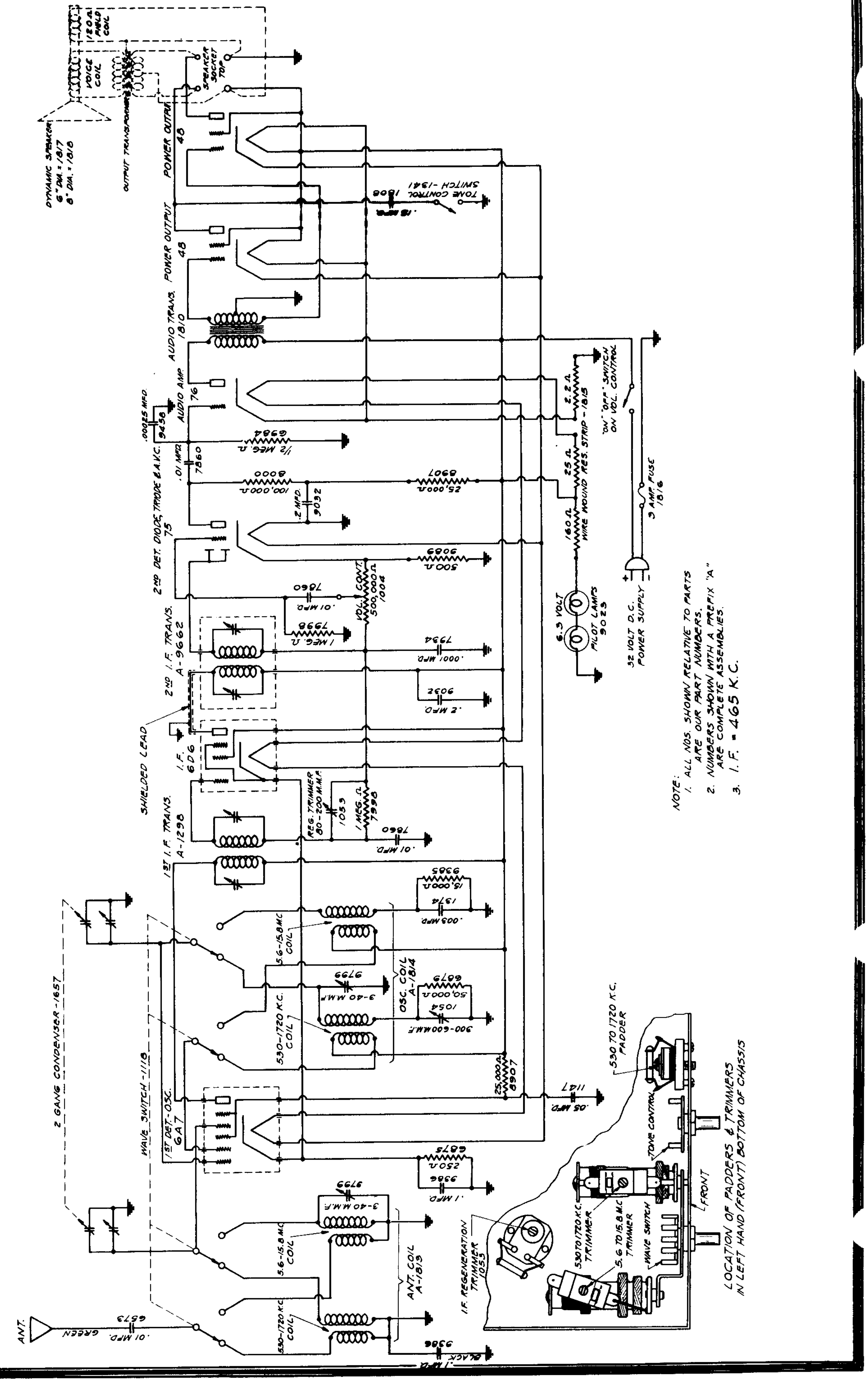


SENTINEL RADIO CORP.



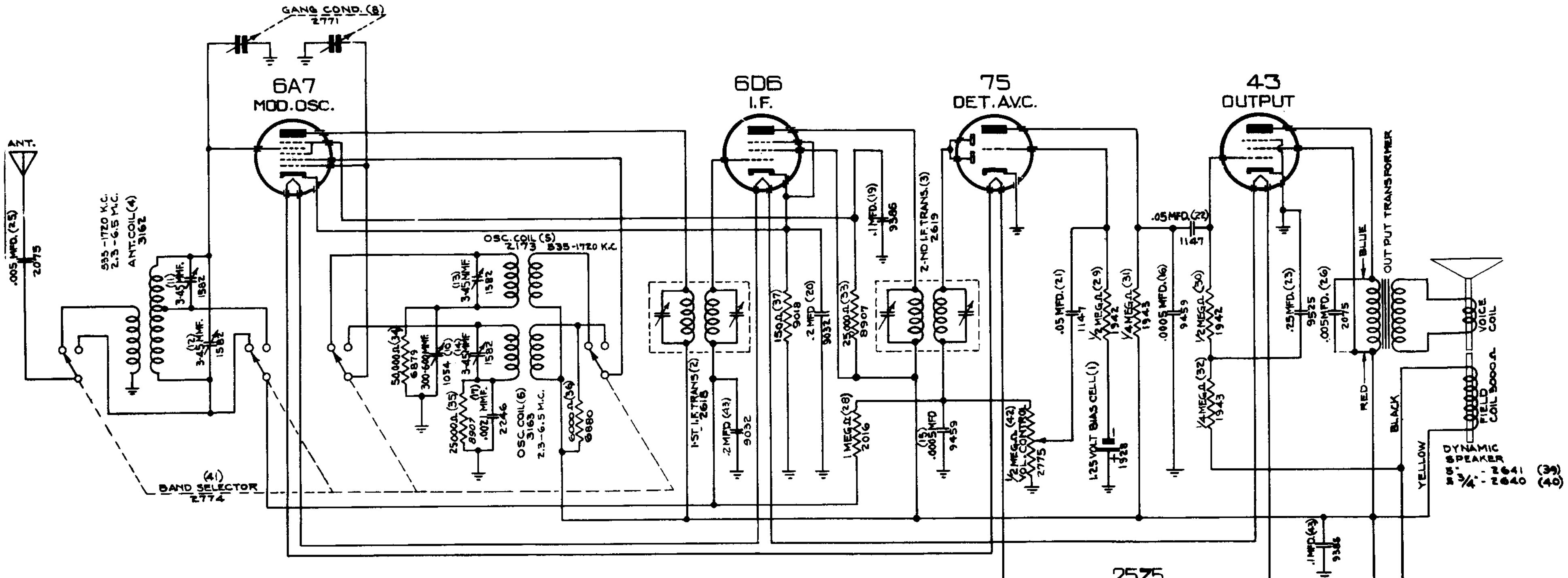
SENTINEL RADIO CORP.

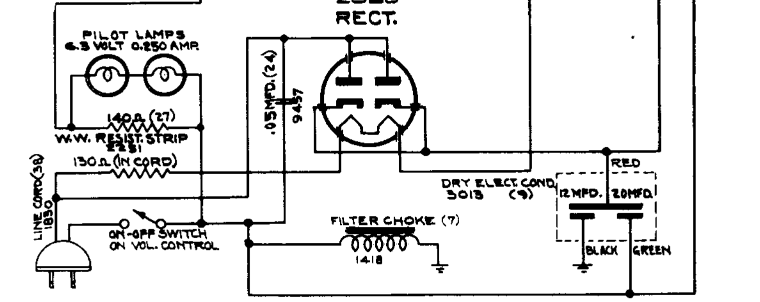
MODEL 6900



SENTINEL RADIO CORP.

MODEL 71U

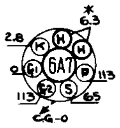


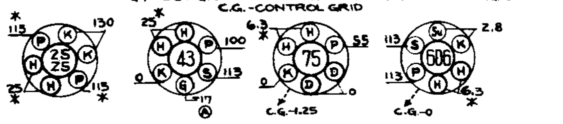


VOLTAGE TABLE	FRONT

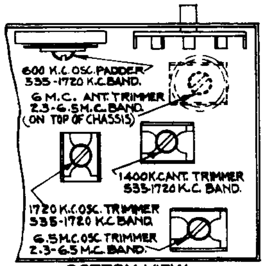
NOTE: LINE VOLTAGE 115 VOLTS A.C. OR D.C. 50-60 CYCLES
HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHMS PER VOLT D.C. VOLTMETER.
Ⓐ — MEASURE BIAS VOLTAGE ACROSS FILTER CHOKE (7).
* — A.C. OR D.C. DEPENDING ON LINE CURRENT.

P - PLATE
S - SCREEN GRID
SU - SUPPRESSOR GRID
G1 - OSC. GRID
G2 - OSC. PLATE
D - DIODE PLATE
K - CATHODE
H - HEATER
C.G. - CONTROL GRID





BOTTOM VIEW OF CHASSIS



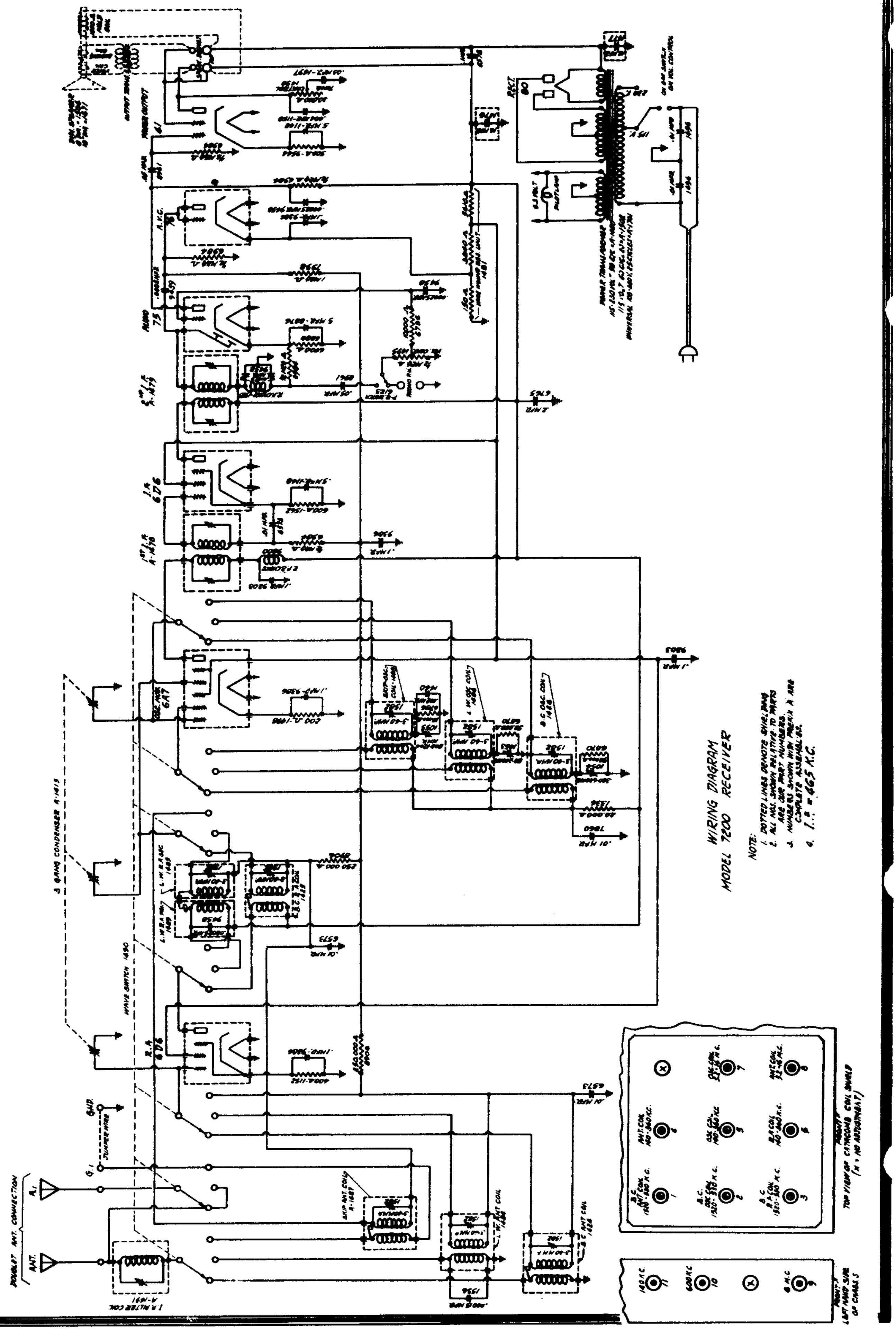
BOTTOM VIEW SHOWING TRIMMERS

NOTES: 1. **I.F.-465 K.C.**

2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

SENTINEL RADIO CORP.

MODEL 7200

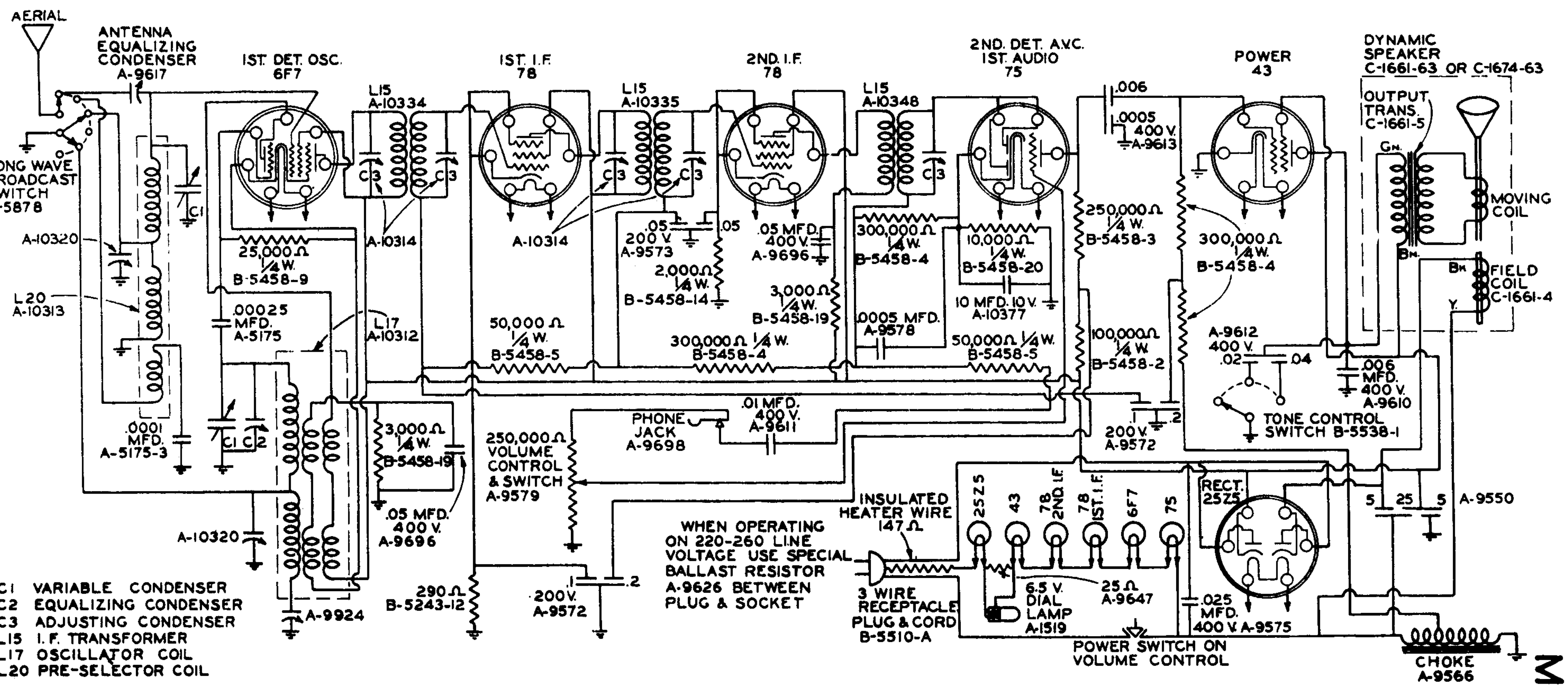


SPARKS-WITHINGTON COMPANY

MODELS 63 & 63AX

COMBINATION BROADCAST BAND (200-570 METERS) - LONG WAVE BAND (1000-2000 METERS)

A.C.-D.C. SUPERHETERODYNE RECEIVER



C1 VARIABLE CONDENSER
C2 EQUALIZING CONDENSER
C3 ADJUSTING CONDENSER
L15 I.F. TRANSFORMER
L17 OSCILLATOR COIL
L20 PRE-SELECTOR COIL

INTERMEDIATE FREQUENCY 456 KC.

CHANGES IN MODEL 63 SCHEMATIC DIAGRAM

Resistor Part B-6061-1 (50 ohm, 2 watt, wire wound) added. Connects in series with 25Z5 plate lead shown nearest choke Part A-9566 in schematic diagram.

VOLTAGE ANALYSIS

Tube	Location	Plate Volts	Plate Ma.	Screen Grid Volts	Control Grid Volts	Grid. Res. to Preceed. Plate (Ohms)	Resistance to Ground (Ohms) Plate	Screen	C. Grid	Cathode
6F7	Triode Osc.	100	3	—	**	† ***	†	—	25,000	3,000
	Pentode Mixer	100	3.5	100	—10.		†	†	Nearly Zero	
78	1st I-F Stage	100	6	100	—2.5	†	†	†	610,000	290
78	2nd I-F Stage	100	2	100	—5.	†	†	†	610,000	2,000
75	Diode Det.-AVC	—	—	—	—	—	310,000	—	—	10,000
	Triode A-F	40	.17	—	—1.3	†	†	—	250,000	
43	Power Stage	95	20	100	—17.	†	†	†	600,000	0
25Z5	"B+" Cathode	125*	45	—	—	—	—	—	—	†
	Speaker Field Cathode	90	30	—	—	—	—	—	—	3,600

CONTINUITY CHART

Line Voltage 120

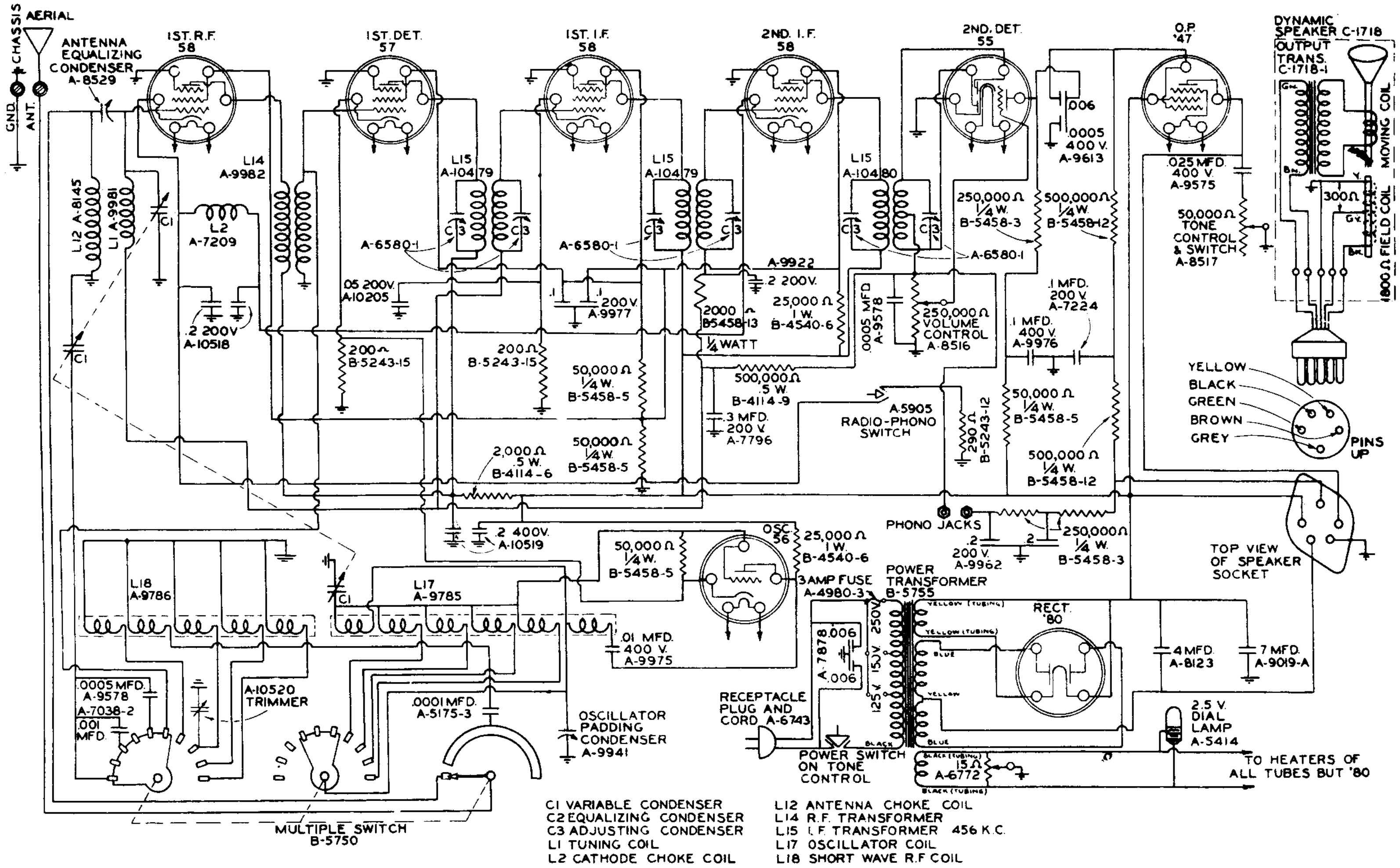
Position of Volume Control—Full with Antenna Disconnected

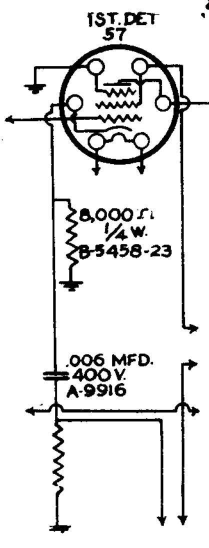
Position of Band Selector Switch—Broadcast

NOTES: Allow 15% + or — on all measurements.
All heater voltages: 6.3, except 43 Power and 25Z5 Rectifier: 25 volts.
* Cathode to power switch.
** Grid leak bias.
*** Grid to plate in 6F7 Triode Oscillator.
† Values depend upon leakage resistance of large electrolytic condenser sections.

SPARKS-WITHINGTON COMPANY

MODELS 75AX, 475AX & 478AX





CHANGES IN MODEL 75-AX, 475-AX and 478-AX SCHEMATIC DIAGRAM

Resistor 8,000 ohms, B-5458-23 and condenser .006 mfd., A-9916, added to cathode circuit of Type 57 1st Detector tube

VOLTAGE ANALYSIS

Tube	Location	Plate Volts	Plate Ma.	Screen Grid Volts	Control Grid Volts	Resistance to Ground (Ohms) Plate	Screen	C. Grid	Cathode
58	R-F Stage	245.	6.5	120.	—4.5	77,000	50,000	750,000	290
57	1st Detector	245.	—	52.	—1.9	77,000	100,000	12	200
56	Oscillator	105.	—	—	—1.9	100,000	—	50,000	200
58	1st I-F Stage	255.	5.0	52.	—1.0	75,000	100,000	750,000	200
58	2nd I-F Stage	255.	6.0	120.	—4.5	75,000	50,000	750,000	290
55	Diode Det.-A.V.C.	—	—	—	—	250,000	—	—	0
	Triode Audio	15.	0.75	—	—	375,000	—	250,000	
47	Power Stage	245.	21.0	255.	—20.0	75,000	75,000	1,000,000	7.5
80	Rectifier	355†	—	—	—	—	—	—	—

Line Voltage 120

Position of Voltage Compensator 125

Position of Tone Control—Full

NOTES: Allow 15% + or — on all measurements.
All heater voltages: 2.5, except 80 Rectifier: 5.0 volts.
†As read on 800 volt scale of A-C meter in Jewell 444 Set Analyzer (per plate).

CONTINUITY CHART

Position of Volume Control—Full with Antenna Disconnected

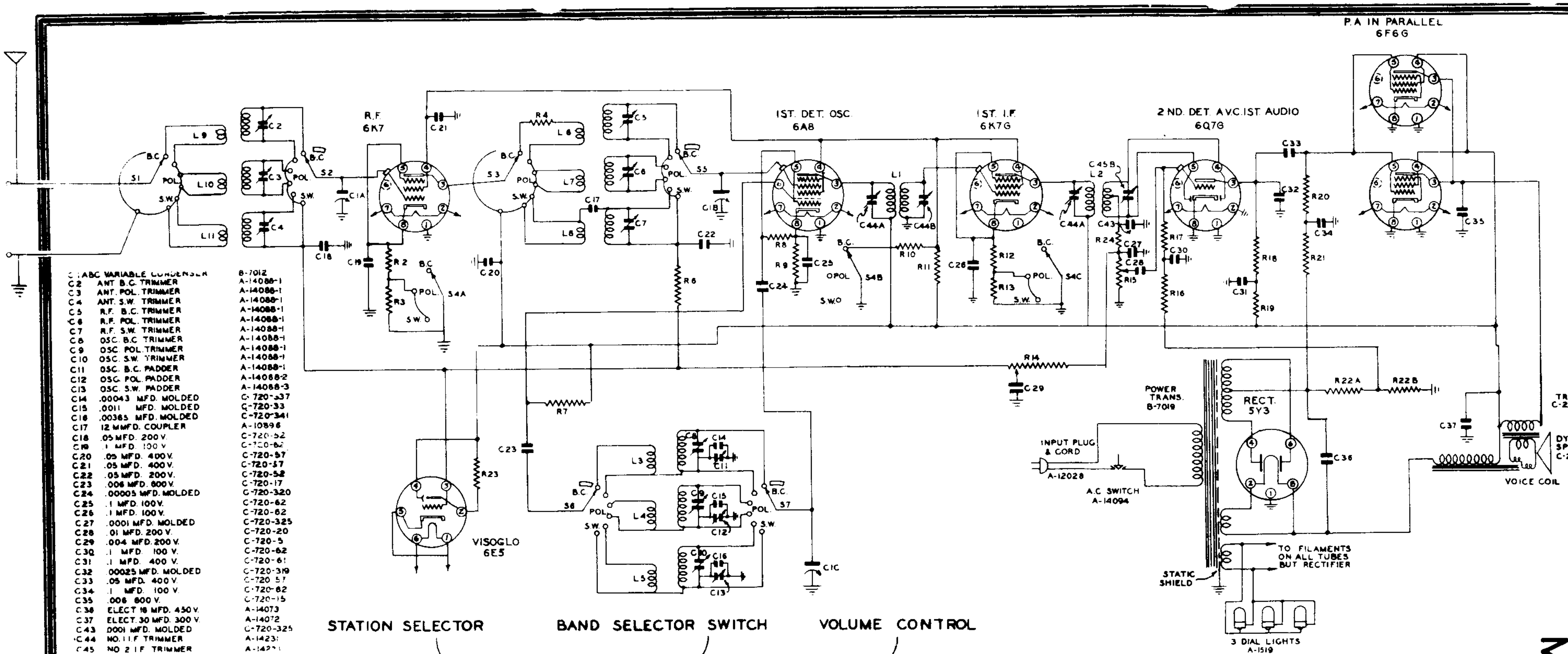
Position of Band Selector Switch—Broadcast

Position of Radio-Phonograph Switch—Radio

NOTE: The 8,000 ohm Resistor (B-5458-23) and .006 mfd. condenser (A-9916) are included in the Type 57 1st Detector circuit as above in all chassis having light brown color tuning scales. These receivers will have —3.0 volts on Type 57 control grid instead of —1.9 and 8,000 ohms cathode resistance to ground instead of 200 ohms as shown in the above table.

SPARKS-WITHINGTON COMPANY

MODEL 867



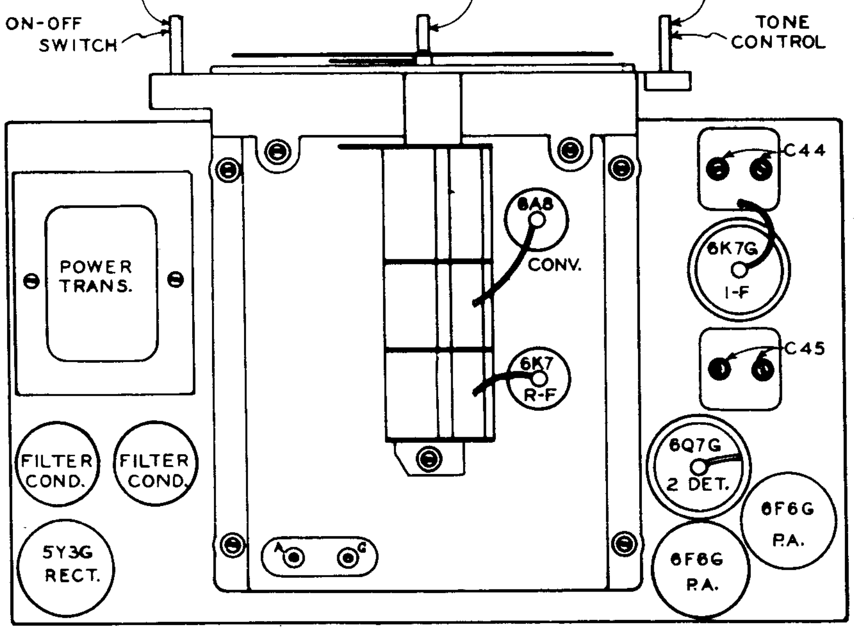
C1ABC	VARIABLE CONDENSER	B-7012
C2	ANT. B.C. TRIMMER	A-14088-1
C3	ANT. POL. TRIMMER	A-14088-1
C4	ANT. S.W. TRIMMER	A-14088-1
C5	R.F. B.C. TRIMMER	A-14088-1
C6	R.F. POL. TRIMMER	A-14088-1
C7	R.F. S.W. TRIMMER	A-14088-1
C8	OSC. B.C. TRIMMER	A-14088-1
C9	OSC. POL. TRIMMER	A-14088-1
C10	OSC. S.W. TRIMMER	A-14088-1
C11	OSC. B.C. PADDER	A-14088-1
C12	OSC. POL. PADDER	A-14088-2
C13	OSC. S.W. PADDER	A-14088-3
C14	.00043 MFD. MOLDED	C-720-337
C15	.0011 MFD. MOLDED	C-720-33
C16	.00365 MFD. MOLDED	C-720-341
C17	12 MMFD. COUPLER	A-10896
C18	.05 MFD. 200 V.	C-720-52
C19	.1 MFD. 100 V.	C-720-62
C20	.05 MFD. 400 V.	C-720-57
C21	.05 MFD. 400 V.	C-720-57
C22	.05 MFD. 200 V.	C-720-52
C23	.006 MFD. 600 V.	C-720-17
C24	.00005 MFD. MOLDED	C-720-320
C25	.1 MFD. 100 V.	C-720-62
C26	.1 MFD. 100 V.	C-720-62
C27	.0001 MFD. MOLDED	C-720-325
C28	.01 MFD. 200 V.	C-720-20
C29	.004 MFD. 200 V.	C-720-5
C30	.1 MFD. 100 V.	C-720-62
C31	.1 MFD. 400 V.	C-720-61
C32	.00025 MFD. MOLDED	C-720-319
C33	.05 MFD. 400 V.	C-720-57
C34	.1 MFD. 100 V.	C-720-62
C35	.006 600 V.	C-720-15
C36	ELECT. 16 MFD. 450 V.	A-14073
C37	ELECT. 30 MFD. 300 V.	A-14072
C43	.0001 MFD. MOLDED	C-720-325
C44	NO. 1 I.F. TRIMMER	A-14231
C45	NO. 2 I.F. TRIMMER	A-14231

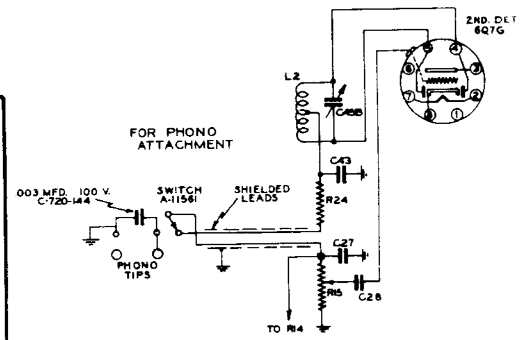
R2	270Ω .25 W.	C-2795-55B
R3	1,000Ω .25 W.	C-2795-62B
R4	2200Ω .1 W.	C-2794-66B
R6	100,000Ω .25 W.	C-2795-25B
R7	22,000Ω .5 W.	C-2796-78C
R8	56,000Ω .25 W.	C-2795-83B
R9	330Ω .25 W.	C-2795-56B
R10	22,000Ω .5 W.	C-2795-78C
R11	15,000Ω 2 W.	C-2798-187A
R12	270Ω .25 W.	C-2795-55B
R13	470Ω .25 W.	C-2795-56B
R14	500,000Ω TONE CONTROL	A-14089
R15	250,000Ω VOLUME CONTROL	A-14075
R16	1 MEGOHM .25 W.	C-2795-98B
R17	560,000Ω .25 W.	C-2795-95B
R18	270,000Ω .25 W.	C-2795-91B
R19	100,000Ω .25 W.	C-2795-25B
R20	270,000Ω .25 W.	C-2795-91B
R21	270,000Ω .25 W.	C-2795-91B
R22	CANDOHM R22A 197Ω, R22B 28Ω	A-14081
R23	1 MEGOHM .25 W.	C-2795-98B
R24	58,000Ω .25 W.	C-2795-83B

L1	NO. 1 I.F. TRANS.	A-12064-12
L2	NO. 2 I.F. TRANS.	A-12989-2
L3	B.C. OSC. COIL	A-14241-1
L4	POL. OSC. COIL	A-14241-2
L5	S.W. OSC. COIL	A-14241-3
L6	B.C. R.F. COIL	A-14242-1
L7	POL. R.F. COIL	A-14242-2
L8	S.W. R.F. COIL	A-14242-3
L9	B.C. ANT. COIL	A-14243-1
L10	POL. ANT. COIL	A-14243-2
L11	S.W. ANT. COIL	A-14243-3

NO. FROM BACK OF SET

S1	ANT. PRI. SECTION
S2	ANT. SEC. SECTION
S3	R.F. PRI. SECTION
S4A, S4B, S4C	BIAS AND SCREEN SECTION
S5	R.F. SEC. SECTION
S6	OSC. PLATE SECTION
S7	OSC. GRID SECTION



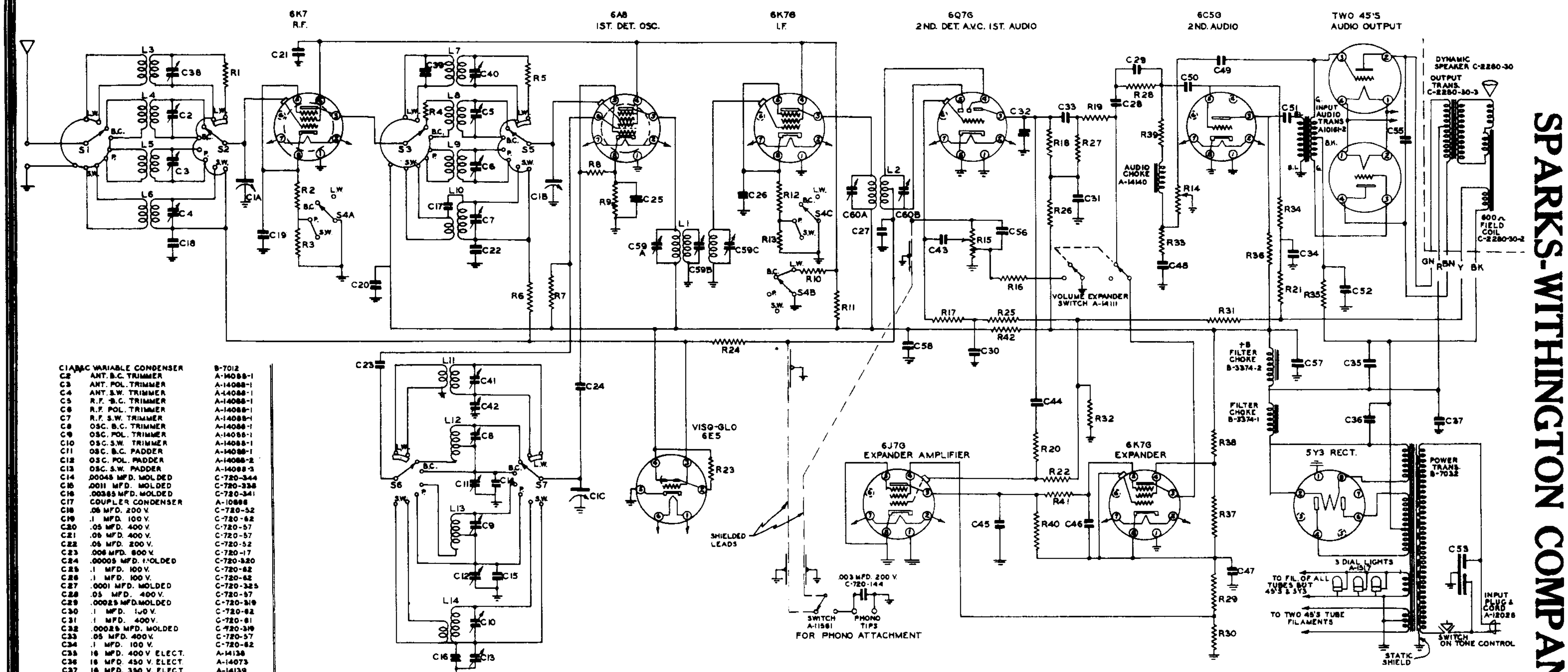


I.F. 456 K.C.

SPARKS-WITHINGTON COMPANY

MODEL 1167

INTERMEDIATE FREQUENCY 456 K.C.



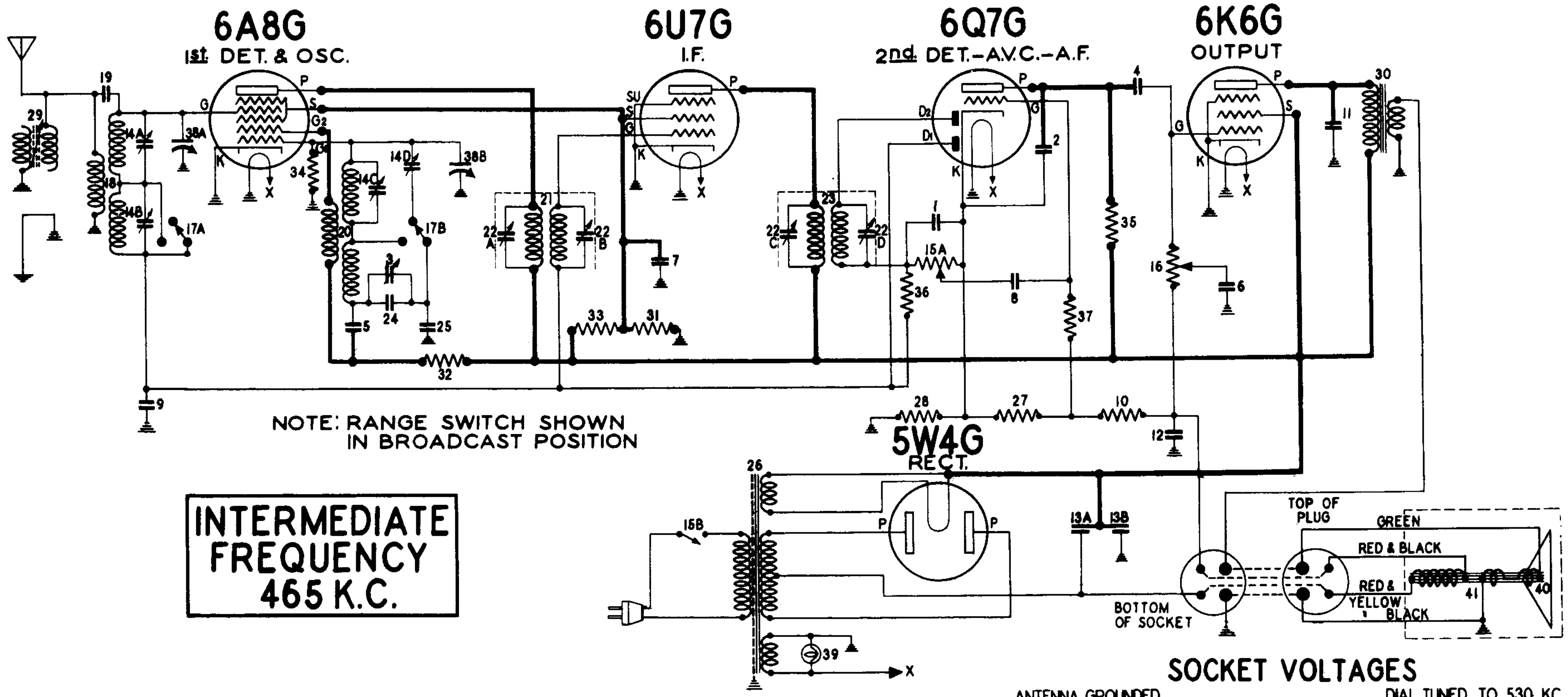
C1A,B&C	VARIABLE CONDENSER	B-7012
C2	ANT. B.C. TRIMMER	A-14088-1
C3	ANT. POL. TRIMMER	A-14088-1
C4	ANT. S.W. TRIMMER	A-14088-1
C5	R.F. B.C. TRIMMER	A-14088-1
C6	R.F. POL. TRIMMER	A-14088-1
C7	R.F. S.W. TRIMMER	A-14088-1
C8	OSC. B.C. TRIMMER	A-14088-1
C9	OSC. POL. TRIMMER	A-14088-1
C10	OSC. S.W. TRIMMER	A-14088-1
C11	OSC. B.C. PADDER	A-14088-1
C12	OSC. POL. PADDER	A-14088-2
C13	OSC. S.W. PADDER	A-14088-3
C14	.00045 MFD. MOLDED	C-720-344
C15	.0011 MFD. MOLDED	C-720-338
C16	.00365 MFD. MOLDED	C-720-341
C17	COUPLER CONDENSER	A-10886
C18	.05 MFD. 200 V.	C-720-52
C19	.1 MFD. 100 V.	C-720-62
C20	.05 MFD. 400 V.	C-720-57
C21	.05 MFD. 400 V.	C-720-57
C22	.05 MFD. 200 V.	C-720-52
C23	.006 MFD. 600 V.	C-720-17
C24	.00005 MFD. MOLDED	C-720-320
C25	.1 MFD. 100 V.	C-720-62
C26	.1 MFD. 100 V.	C-720-62
C27	.0001 MFD. MOLDED	C-720-325
C28	.05 MFD. 400 V.	C-720-57
C29	.00025 MFD. MOLDED	C-720-319
C30	.1 MFD. 100 V.	C-720-62
C31	.1 MFD. 400 V.	C-720-61
C32	.00025 MFD. MOLDED	C-720-319
C33	.05 MFD. 400 V.	C-720-57
C34	.1 MFD. 100 V.	C-720-62
C35	16 MFD. 400 V. ELECT.	A-14138
C36	16 MFD. 450 V. ELECT.	A-14073
C37	16 MFD. 350 V. ELECT.	A-14139
C38	ANT. L.W. TRIMMER	A-14088-1
C39	.00025 MFD. MOLDED	C-720-319
C40	R.F. L.W. TRIMMER	A-14088-1
C41	OSC. L.W. TRIMMER	A-14088-1
C42	OSC. L.W. PADDER	A-14088-3
C43	.05 MFD. 200 V.	C-720-52
C44	.006 MFD. 600 V.	C-720-17
C45	.3 MFD. 200 V.	C-720-91
C46	.2 MFD. 200 V.	C-720-87
C47	.5 MFD. 200 V.	C-720-104
C48	.001 MFD. 400 V.	C-720-136
C49	.01 MFD. 400 V.	C-720-25
C50	.01 MFD. 200 V.	C-720-20
C51	.2 MFD. 400 V.	C-720-86
C52	.3 MFD. 200 V.	C-720-91
C53	.006 .006 MFD. 600 V.	C-720-150
C55	.01 MFD. 600 V.	C-720-105
C56	.00025 MFD. MOLDED	C-720-319
C57	25 MFD. 325 V. ELECT.	A-14184
C58	.1 MFD. 400 V.	C-720-81
C59A,B&C	NO. 1 I.F. TRIMMER	A-14152
C60A&B	NO. 2 I.F. TRIMMER	A-14375

R1	100 Ω	.1 W.	C-2794-50B
R2	270 Ω	.25 W.	C-2795-55B
R3	1000 Ω	.25 W.	C-2795-62B
R4	2200 Ω	.1 W.	C-2794-66B
R5	100 Ω	.1 W.	C-2794-50B
R6	100 000 Ω	.25 W.	C-2795-25B
R7	22 000 Ω	.5 W.	C-2796-78C
R8	56 000 Ω	.25 W.	C-2795-83B
R9	330 Ω	.25 W.	C-2795-56B
R10	22 000 Ω	.5 W.	C-2796-78C
R11	15 000 Ω	2 W.	C-2798-187A
R12	270 Ω	.25 W.	C-2795-55B
R13	470 Ω	.25 W.	C-2795-58B
R14	TONE CONTROL & A.C. SWITCH		A-14137
R15	VOLUME CONTROL		A-14110
R16	56 000 Ω	.25 W.	C-2795-83B
R17	. MEGOHM	.25 W.	C-2795-98B
R18	270 000 Ω	.25 W.	C-2795-91B
R19	100 000 Ω	.25 W.	C-2795-25B
R20	1 MEGOHM	.25 W.	C-2795-98B
R21	270 000 Ω	.25 W.	C-2795-91B
R22	470 000 Ω	.25 W.	C-2795-94B
R23	1 MEGOHM	.25 W.	C-2795-98B
R24	1 MEGOHM	.25 W.	C-2795-98B
R25	470 000 Ω	.25 W.	C-2795-94B
R26	56 000 Ω	.25 W.	C-2795-83B
R-27	680 000 Ω	.25 W.	C-2795-96B
R-28	120 000 Ω	.25 W.	C-2795-87B
R29	8200 Ω	1 W.	C-2797-181A
R30	2400 Ω	.5 W.	C-2796-168A
R31	27 OHMS	.25 W.	C-2795-121B
R32	27 OHMS	.25 W.	C-2795-121B
R33	100 000 Ω	.25 W.	C-2795-25B
R-34	470 000 Ω	.25 W.	C-2795-94B
R35	56 000 Ω	.25 W.	C-2795-83B
R36	27 000 Ω	1 W.	C-2797-79A
R37	750 OHMS	.25 W.	C-2795-156B
R38	27 000 Ω	2 W.	C-2798-193A
R-39	27000 Ω	.25 W.	C-2795-79B
R-40	470 000 Ω	.25 W.	C-2795-94B
R41	1 MEGOHM	.25 W.	C-2795-98B
R42	910 OHM	2 W.	C-2798-156A

L1	NO. 1 IF COIL	A-14149
L2	NO. 2 IF COIL	A-12989-2
L3	ANT. L.W. COIL	A-14243-4
L4	ANT. B.C. COIL	A-14243-1
L5	ANT. POL. COIL	A-14243-2
L6	ANT. S.W. COIL	A-14243-3
L7	R.F. L.W. COIL	A-14242-4
L8	R.F. B.C. COIL	A-14242-1
L9	R.F. POL. COIL	A-14242-2
L10	R.F. S.W. COIL	A-14242-3
L11	OSC. L.W. COIL	A-14241-4
L12	OSC. B.C. COIL	A-14241-1
L13	OSC. POL. COIL	A-14241-2
L14	OSC. S.W. COIL	A-14241-3

	NO. FROM BACK OF SET
S1	ANT. PRI. SECTION
S2	ANT. SEC. SECTION
S3	R.F. PRI. SECTION
S4A	R.F. BAIS SECTION
S4B	SCREEN SECTION
S4C	I.F. BAIS SECTION
S5	R.F. SEC. SECTION
S6	OSC. PRI. SECTION
S7	OSC. SEC. SECTION

STEWART-WARNER CORPORATION
MODELS R-180 & 1801 TO 1809

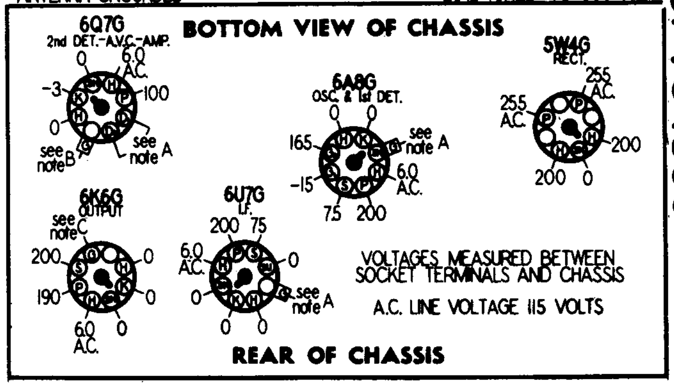


NOTE: RANGE SWITCH SHOWN IN BROADCAST POSITION

INTERMEDIATE FREQUENCY 465 K.C.

SOCKET VOLTAGES

ANTENNA GROUNDED DIAL TUNED TO 530 KC.



IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The bias for the control grids of the 6A8-G, 6U7-G and the diode plates of the 6Q7-G is -3 volts measured across resistor 28.

NOTE B: The bias for the control grid of the 6Q7-G triode section is -5 volts measured across resistors 27 and 28.

NOTE C: The bias for the control grid of the 6K6-G tube is -14 volts measured across resistors 10, 27 and 28.

MODEL R-180 PARTS LIST

(SEE OPPOSITE SIDE FOR OTHER PARTS)

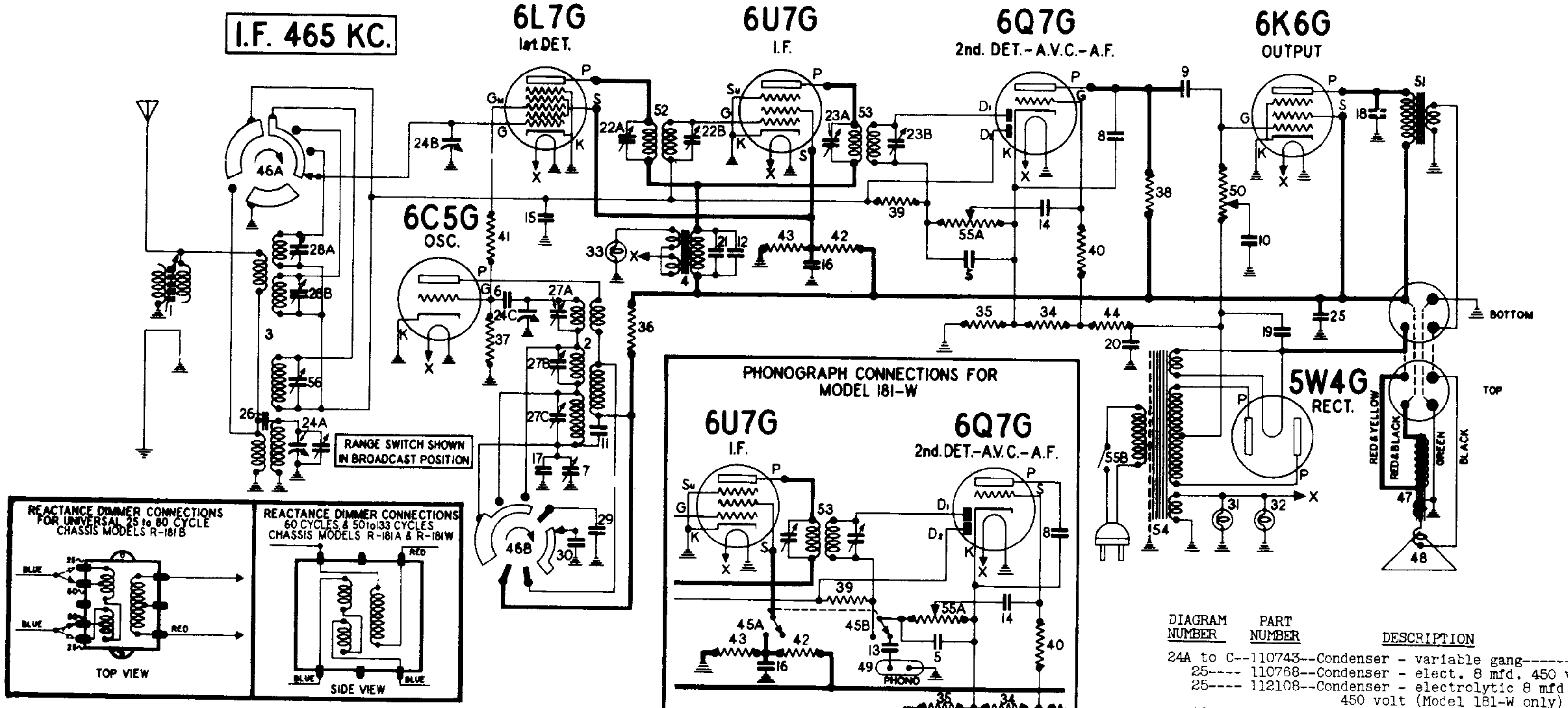
DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1-2	83539	Condenser - mica 260 mmfd.	$ .20
3	85285	Condenser - padding	.40
4-5-6	88030	Condenser - paper .01 mfd. 400 volt	.25
7	88046	Condenser - paper .1 mfd. 150 volt	.25
8	88189	Condenser - paper .05 mfd. 200 volt	.25
9	88534	Condenser - paper .05 mfd. 150 volt	.25
10	88583	Resistor - wire wound 240 ohms 1 watt	.15
11	89826	Condenser - paper .004 mfd. 750 volts	.24
12	110377	Condenser - elect. 10 mfd. 25 volts	.80
	112113	Condenser - electrolytic 10 mfd. 50 volt (Model 180-W)	1.50
13A-13B	110497	Condenser - elect. (Sect. A-8 mfd.) (Sect. B-8 mfd.)	1.50
	112359	Condenser - electrolytic dual 8 mfd. (Model 180-W)	1.50
14A to D	110498	Condenser - trimmer strip	.75
15A-15B	110503	Volume control - 1 meg. with off-on sw.	1.25
16	110504	Tone control - 500,000 ohms	.95
17A-17B	110505	Switch - range	.90
18	110506	Coil - antenna	1.15
19	110510	Condenser - wire 3 mmfd.	.12
20	110512	Coil - oscillator	.85
21	110514	Transformer - 1st I.F.	2.00
22A to D	110516	Condenser - trimmer strip (for I.F. trans.)	.58
23	110520	Transformer - 2nd I.F.	2.00
24	111127	Condenser - mica 520 mmfd. (3%)	.24
25	110523	Condenser - mica 1,980 mmfd. (3%)	.32

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
26	110524	Transformer - power 115 volt 60 cycle	$4.20
	111956	Transformer - power 115 volt 25 cycle (Model 180-B)	7.00
	112022	Transformer - power 105-250 volt 50-133 cycle (Model 180-W)	7.75
27	110534	Resistor - wire wound 40 ohm 1/2 watt	.12
28	110535	Resistor - wire wound 75 ohm 1/2 watt	.12
29	110536	Coil - wave trap	1.02
30	110537	Transformer - output (Model 180A-180B)	1.50
	112100	Transformer - output (Model 180-W)	1.25
31	110571	Resistor - carbon 12,000 ohm 1/2 watt	.15
32	110550	Resistor - carbon 10,000 ohm 1/2 watt	.15
33	110551	Resistor - carbon 15,000 ohm 1 watt	.12
34	110552	Resistor - carbon 47,000 ohm 1/4 watt	.12
35	110553	Resistor - carbon 220,000 ohm 1/4 watt	.12
36-37	110554	Resistor - carbon 1 megohm 1/4 watt	.12
38A-38B	110600	Condenser - variable gang	3.50
39	110629	Lamp - pilot, 6.3 volt - .25 amp.	.22
40	110932	Cone - and voice coil assembly (for 275-A speaker) (Model 1801)	1.70
	110944	Cone - voice coil assembly (for R-278-A speaker) (Model 1803-1805)	1.60
	110946	Cone - and voice coil assembly (for R-285-A speaker) (Model 1802)	1.90
41	R-275-A	Speaker - dynamic (5 inch) (Model 1801)	6.50
	R-278-A	Speaker - dynamic (8 inch) (1803-1805)	8.50
	R-285-A	Speaker - dynamic (8 inch) (Model 1802)	9.00

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

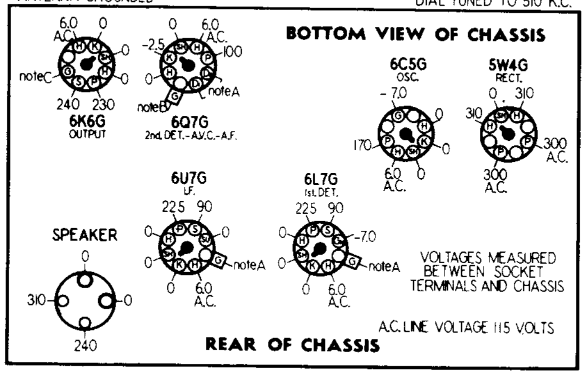
STEWART-WARNER CORPORATION

MODELS R-181 & 1811 TO 1819



SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 510 K.C.



IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The bias for the control grids of the 6L7G, 6U7G, and the diode plates of the 6Q7G is -2.5 volts measured across resistor number 35.

NOTE B: The bias for the control grid of the 6Q7G is -4 volts measured across resistors 34 and 35.

NOTE C: The bias for the control grid of the 6K6G output tube is -16 volts measured across resistors 34, 35, and 44.

MODEL R-181 PARTS LIST

(SEE OPPOSITE SIDE FOR OTHER PARTS)

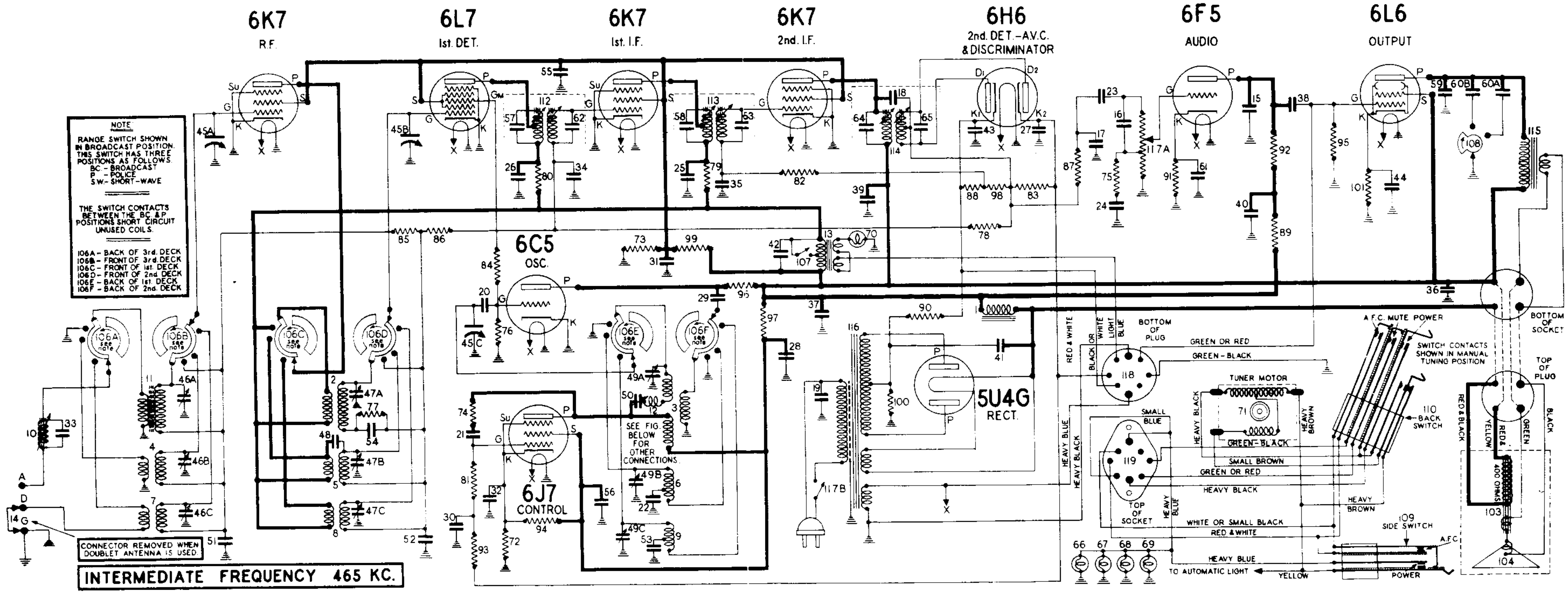
DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	110536	Coil - antenna trap	$1.02
2	110860	Coil - Osc. (Less trimmers)	1.40
3	110881	Coil - assembly (antenna & preselector) with trimmer	3.00
4	110786	Coil - dimmer reactor (60 cycle)	2.25
	110996	Coil - reactance dimmer (25 to 80 cycle) (Model 181-B only)	3.00
	112152	Coil - reactance dimmer (for 181-W only)(50 to 133 cycle)	2.50
5	83539	Condenser - mica 260 mmfd.	.20
6	85061	Condenser - mica 51 mmfd.	.15
7	85285	Condenser - padding	.40
8	85394	Condenser - mica 510 mmf.	.25
9	88026	Condenser - paper .02 mfd.-400 V.	.25
10-11	88030	Condenser - paper .01 mfd.-400 V.	.25
12-13	88046	Condenser - paper .1 mfd. 150 V.	.25
14	88189	Condenser - paper .05 mfd.-200 V.	.25
15	88534	Condenser - paper .05 mfd.-150 V.	.25
16	89421	Condenser - paper .1 mfd.-200 V.	.25
17	89564	Condenser - mica 345 mmfd. (3%)	.40
18	89826	Condenser - paper .004 mfd. - 750 volt (used in early production	.24
	111214	Condenser - paper .01 mfd. 600 volt (used in late production	.24
19	89937	Condenser - elect. 30 mfd.-450 V.	1.60
20-21	110377	Condenser - elect. 10 mfd.-25 volt	.80
	112113	Condenser - elect. 10 mfd. 50 volt (for model 181-W only)	.85
22A to B, 23A to B	110516	Condenser - trimmer strip (for I.F. transformer)	.58

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
24A to C	110743	Condenser - variable gang	4.50
25	110768	Condenser - elect. 8 mfd. 450 volt	1.25
25	112108	Condenser - electrolytic 8 mfd. 450 volt (Model 181-W only)	1.30
26	110850	Condenser - wire 7 mmf.	.18
27A to C	110859	Condenser - trimmer (3 section for osc. coil)	.65
28A to B	110882	Condenser - trimmer (2 section for ant. coil)	.44
29	110906	Condenser - mica .00332 mfd.(3%)	.40
30	110907	Condenser - mica 980 mmfd. (3%)	.30
31-32	110629	Lamp - dial: 6.3 volt - .25 amps	.15
33	110911	Lamp - dim. reactor 2.5 V., .5 amp.	.15
34	88465	Resistor - wire wd. 25 ohm ½ watt	.15
35	110534	Resistor - wire wd. 40 ohm ½ watt	.12
36	110550	Resistor - carbon 10,000 ohm ½ watt	.15
37	110552	Resistor - carbon 47,000 ohm ½ watt	.12
38	110553	Resistor - carbon 220,000 ohm ½ W.	.12
39-40	110554	Resistor - carbon 1 megohm ¼ watt	.12
41	110560	Resistor - carbon 100 ohm ¼ watt	.12
42	110561	Resistor - carbon 15,000 ohm 2 W.	.30
43	110562	Resistor - carbon 22,000 ohm ½ W.	.12
44	110872	Resistor - wire wd. 160 ohm 1 watt	.12
45A to B	84404	Switch - phono toggle(model 181-W)	1.10
46A to B	110856	Switch - range	1.20
47	R-276-A	Speaker -dyn. 6"(models 1812-1811)	6.00
	R-279-A	Speaker - dynamic 10" (model 1815)	8.00
48	110942	Cone - Spkr. & voice coil assem. for R-276 spkr.)	1.20
	110945	Cone - and voice coil assem. (for R-279-A spkr.)	1.80
49	89709	Terminal strip - phono(model 181W)	.15
50	110767	Tone control - (500,000 ohm)	.80
51	110789	Transformer - output (model 181-A or 181-B)	1.65
	112105	Transformer - output (Model 181-W)	1.65
52	110851	Transformer - 1st I.F.	1.85
53	110853	Transformer - 2nd I.F.	1.65
54	110862	Transformer - power (115 V. 60 C)	5.00
	112076	Transformer - power (115 V. 25 C)	7.50
	112119	Transformer-Power 100-240 V. 50-133~	7.75
55A to B	110766	Volume control - 1 megohm (with on-off switch)	.90
56	110864	Condenser - trimmer (single section for antenna coil)	.24

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STEWART-WARNER CORPORATION

MODELS R-184 & 1841 TO 1849



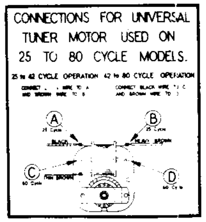
INTERMEDIATE FREQUENCY 465 KC.

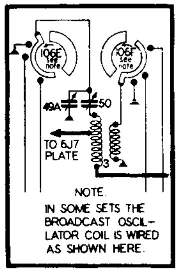
MODEL R-184 PARTS LIST

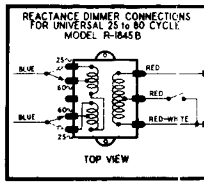
(SEE OPPOSITE SIDE FOR OTHER PARTS)

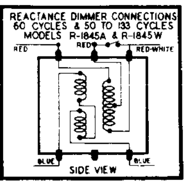
DIAGRAM NUMBER	DESCRIPTION	LIST PRICE
1	112097--Choke - Filter (for model R-184-A only)	$1.40
	112327--Choke - Filter (for model R-184-W only)	[illegible]
2	111056--Coil - R. F. (broadcast)	1.25
3	111057--Coil - oscillator (broadcast)	[illegible]
4	111058--Coil - antenna (police)	[illegible]
5	111059--Coil - R. F. (police)	[illegible]
6	111060--Coil - oscillator (police)	[illegible]
7	111062--Coil - antenna (short-wave)	.90
8	111063--Coil - R. F. (short-wave)	[illegible]
9	111064--Coil - oscillator (short-wave)	.85
10	111079--Coil - wave trap	1.20
11	111103--Coil - antenna (broadcast)	1.82
12	[illegible]--Coil - compensating inductance	[illegible]
13	[illegible]--Coil - reactance dimmer (60 cycle models only)	[illegible]
	112204--Coil - reactance dimmer (25 to 80 cycle for model R-184-B only)	[illegible]
	112326--Coil - reactance dimmer (for model R-184-W only)	[illegible]
14	95321--Connector - ground	[illegible]
15-16-17-18	[illegible]--Condenser - mica, [illegible] mmf.	.20
19	85976--Condenser - .012 mfd. - 1000 volt	.40
20	85061--Condenser - mica, [illegible] mmfd.	[illegible]
21	85394--Condenser - mica, 510 mmf.	.25
22	85467--Condenser - mica, [illegible] mmfd. (5%)	[illegible]
23	86189--Condenser - paper .05 mfd. - [illegible] volt	[illegible]
24-25-26-27-28-29	[illegible]--Condenser - paper .01 mfd. - [illegible] volt	[illegible]
30	86146--Condenser - paper .1 mfd. - 150 volt	.25
31	86191--Condenser - paper .1 mfd. - 300 volt	.25
32	86193--Condenser - paper .25 mfd. - 150 volt	[illegible]
33	86205--Condenser - mica, 2100 mmfd.	.35
34-35	86534--Condenser - paper .05 mfd. - 150 volt	.25
36-37	111463--Condenser - electrolytic 16 mfd. - 450 volt	[illegible]
38	111252--Condenser - paper .05 mfd. - 400 volt	[illegible]
39-40	89682--Condenser - paper .1 mfd. - 400 volt	.25
41	[illegible]--Condenser - electrolytic 20 mfd. - [illegible] volt	[illegible]
42-43-44	[illegible]--Condenser - electrolytic 10 mfd. - 25 volt	.80
	112113--Condenser - elect. 10 mfd. 50 volt (for model 184-W only)	.85
45A to 45C	[illegible]--Condenser - variable gang	6.25
46A to 46C, 47A to 47C	111076--Condenser - trimmer (3 section, for R.F. or antenna (all bands)	[illegible]
48	111080--Condenser - 3 mmfd. (wire)	[illegible]
49A to 49C	111085--Condenser - trimmer (3 section, for oscillator (all bands)	[illegible]
50	[illegible]--Condenser - pad (single section)	[illegible]
51-52	[illegible]--Condenser - low loss .05 mfd. 150 volt	[illegible]
53	111122--Condenser - mica, 3580 mmfd. (3%)	.48
54	111123--Condenser - mica, [illegible] mmfd. (5%)	.65
55-56	112467--Condenser - electrolytic 4 mfd. 200 volt (used on model R-184-W only)	.80
	111298--Condenser - electrolytic 4 mfd. 200 volt	.75
57-58	111342--Condenser - mica, 200 mmfd. (5%)	.18
59	89826--Condenser - paper .004 mfd. - 750 volt	.24
60A - 60B	111384--Condenser - shielded (Section A - .02 mfd. - 600 volt) (Section B - .03 mfd. - 600 volt)	.85
61	[illegible]--Condenser - electrolytic 10 mfd. 25 volt	[illegible]
	112113--Condenser - electrolytic 10 mfd. 50 volt (for model 184-W only)	.85
62-63-64-65	[illegible]--Condenser - mica 220 mmfd. (5%)	.20
66-67-68-69	110629--Lamp - [illegible] volt - .25 amps.	.15
70	110911--Lamp - dimmer reactor 2.5 volt .5 amp.	.15
71	111380--Motor - 6 volt - [illegible] cycles	4.40
	112354--Motor - [illegible] volt, 25 to [illegible] cycles	[illegible]
72	112096--Resistor - wire wound [illegible] ohm 1/2 watt	.12
73	110551--Resistor - carbon 15,000 ohm 1 watt	.15
74	110599--Resistor - carbon [illegible] ohm 1/4 watt	.12
75	110566--Resistor - carbon [illegible] ohm 1/4 watt	.12
76	110552--Resistor - carbon [illegible] ohm 1/4 watt	.12
77	[illegible]--Resistor - carbon 220,000 ohm 1/4 watt	.12
78	110554--Resistor - carbon 1 megohm 1/4 watt	.12
79-80	[illegible]--Resistor - carbon [illegible] ohm 1/4 watt	.12
81-82-83	[illegible]--Resistor - carbon 470,000 ohm 1/4 watt	.12
84	[illegible]--Resistor - carbon 100 ohm 1/4 watt	.12
85-86-87-88	[illegible]--Resistor - carbon 100,000 ohm 1/4 watt	.12
89	[illegible]--Resistor - carbon 47,000 ohm 1/4 watt	.12
90	[illegible]--Resistor - carbon 4700 ohm 1/4 watt	.12
91	[illegible]--Resistor - carbon 3900 ohm 1/4 watt	.12
92	[illegible]--Resistor - carb. [illegible],000 ohm ¼ watt	.12
93	[illegible]--Resistor - carbon 2.2 megohm 1/4 watt	.12
94	[illegible]--Resistor - carbon 12,000 ohm - 2 watt	[illegible]
95	[illegible]--Resistor - carbon 220,000 ohm 1/4 watt	.12
96	110592--Resistor - carbon 22,000 ohm 1 watt	[illegible]
97	[illegible]--Resistor - carbon 18,000 ohm 3 watt	.20
98	110594--Resistor - carbon 390,000 ohm 1/4 watt	.12
99	[illegible]--Resistor - carbon 15,000 ohm 3 watt	.25
100	111515--Resistor - wire wound 27 ohm 1/2 watt (5%)	.12
101	111514--Resistor - wire wound 170 ohm 2 watt	.15
102	[illegible]--R. F. unit - coils, range switch, gang & trimmers - complete	25.00
103	R-261-A--Speaker - dynamic 12 inch	10.00
104	111490--Cone - voice coil assem. for R-261 spkr.	2.50
105A - 105B	84404--Switch - phono toggle	1.10
106A - 106F	[illegible]--Switch - range	3.30
107	111218--Switch - for reactance dimmer	.28
108	111381--Switch - tone control	.55
109	[illegible]--Switch - multiple contact (above tuning shaft)	.95
110	112564--Switch - at rear	1.25
111	89709--Terminal Strip - phono (for model R-184-W only)	.15
112	[illegible]--Transformer - 1st I.F.	2.70
113	[illegible]--Transformer - 2nd I.F.	2.00
114	[illegible]--Transformer - I.F. discriminator	2.70
115	[illegible]--Transformer - output (for Model R-184-A and R-184-B only)	1.75
	112326--Transformer - output (for 184-W only)	[illegible]
116	111447--Transformer - power 115 volt-60 cycle	8.00
	112176--Transformer - power 115 volt-25 cycle	11.00
	112300--Transformer - power 100 to 240 volt - 50 to 133 cycles	11.00
117A-117B	111358--Volume control - 1 meg. (with off-on switch)	1.40

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.





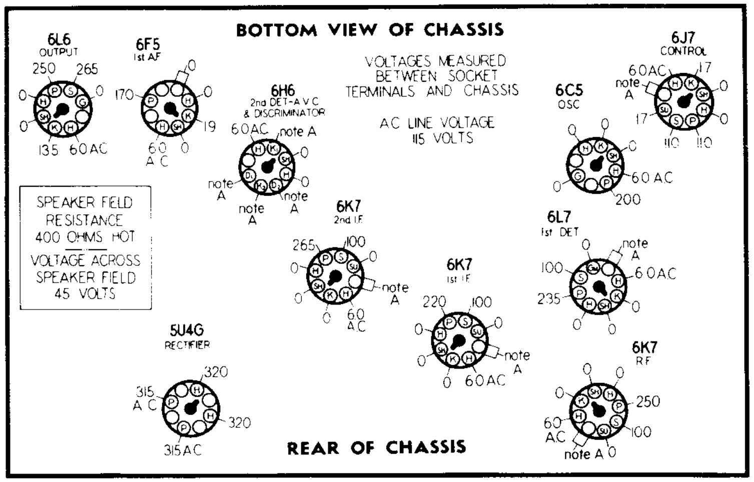




ANTENNA GROUNDED

SOCKET VOLTAGES

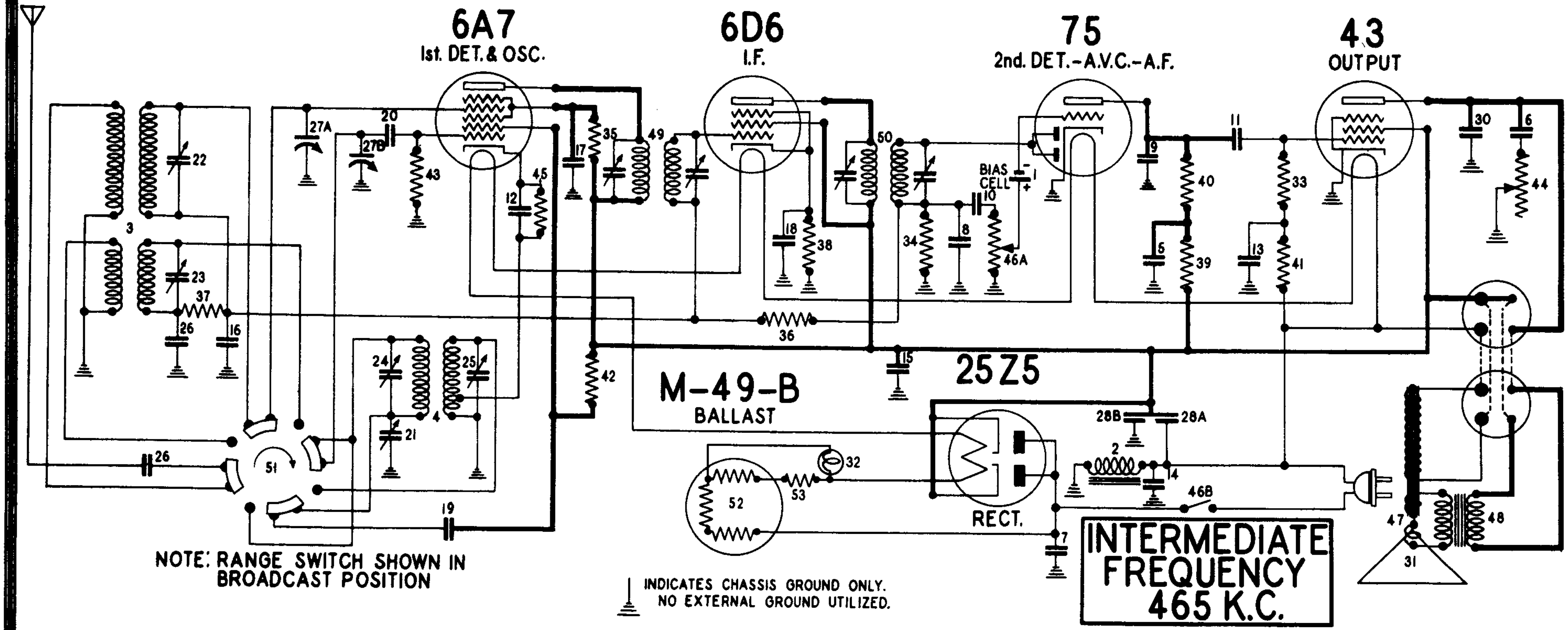
DIAL TUNED TO 525 KC



IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6L7 1st Det., 6K7 R.F., 6K7 1st I.F, and 6K7 2nd I.F. tubes, also the voltage on the 6H6 diodes and cathodes and the control grid of the 6J7, is -7.6 volts measured across resistor number 100.

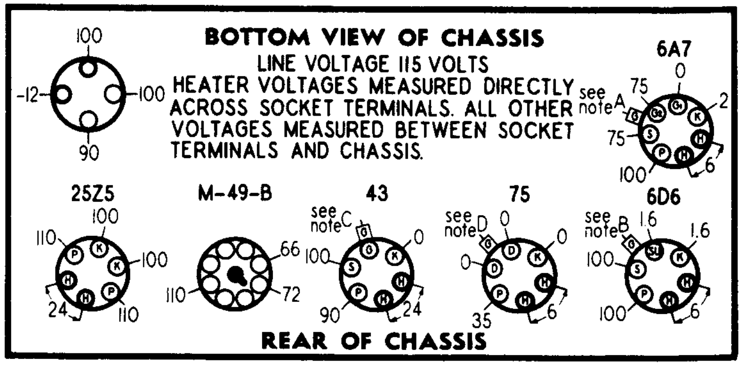
STEWART-WARNER CORPORATION



SOCKET VOLTAGES

ANTENNA GROUNDED

DIAL TUNED TO 540 KC.



IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.
NOTE A: The self bias of the control grid of the 6A7 is -2 volts measured across resistor 45.
NOTE B: The self bias of the control grid of the 6D6 is -1.6 volts measured across resistor 38.
NOTE C: The bias on the control grid of the 43 is -12 volts measured across the filter choke 2.
NOTE D: The bias on the grid of the triode section of the 75 is -1 volts supplied by a bias cell. CAUTION:- Use only a very high resistance voltmeter when checking this voltage, otherwise the cell may be damaged.

MODEL R-188 PARTS LIST

(SEE OPPOSITE SIDE FOR OTHER PARTS)

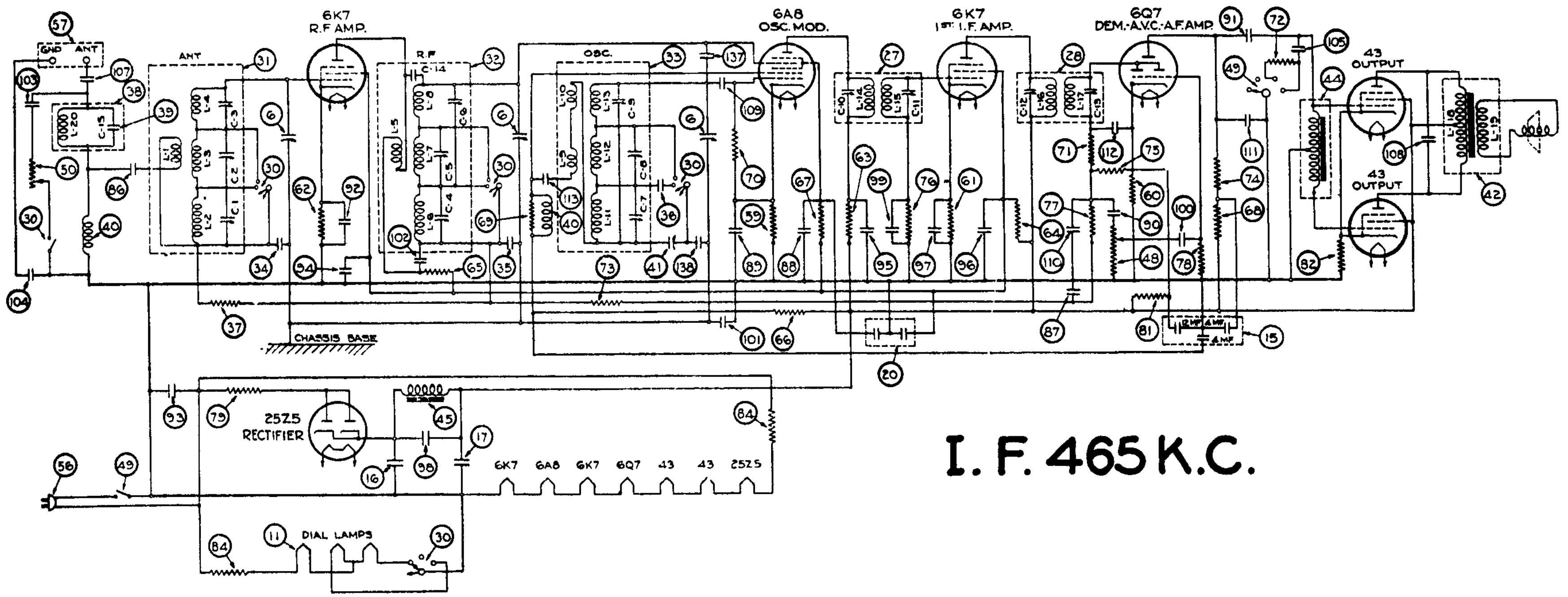
DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	89849	Cell - bias (1.25 volt)	$.22
2	112266	Choke - filter	1.50
3	112267	Coil - antenna	1.50
4	112268	Coil - oscillator	1.50
5	67297	Condenser - paper .25 mfd. 200 volt	.40
6-7	67338	Condenser - paper .05 mfd. 600 volt	.35
8-9	81157	Condenser - mica 250 mmfd.	.30
10-11-12	83437	Condenser - paper .05 mfd. 200 volt	.30
13	89962	Condenser - paper .2 mfd. 200 volt	.23
14-15-16 17-18	83974	Condenser - paper .1 mfd. 200 volt	.25
19	84200	Condenser - mica .004 mfd.	.50
20	83109	Condenser - mica 100 mmfd.	.20
21	112048	Condenser - padding (200-600 mmfd.)	.60
22-23 24-25	112213	Condenser - trimmer (3-45 mmfd.)	.25
26	112215	Condenser - mica .0045 mfd.	.50
27A-27B	112269	Condenser - variable gang	3.60
28A-28B	112270	Condenser - electrolytic (Sect. A-40 mfd. 150 volt) (Sect. B- 8 mfd. 150 volt)	2.40
29-30	112271	Condenser - paper .005 mfd. 400 volt	.25
31	112463	Cone & voice coil assem. for 8" spkr.	3.00
	112383	Cone & voice coil assem. for 6" spkr.	2.75
32	84058	Lamp - pilot 6.3 volt .2 amp.	.15
33-34	67262	Resistor - carbon 1/2 meg. 1/4 watt	.12
35	67580	Resistor - carbon 6000 ohms 1/4 watt	.25
36-37	67939	Resistor - carbon 1 meg. 1/2 watt	.25
38	81153	Resistor - carbon 150 ohms 1 watt	.25
39-40-41	81161	Resistor - 250,000 ohms 1/2 watt	.20
42	83285	Resistor - carbon 10,000 ohms 1/2 w.	.25
43	67260	Resistor - carbon 100,000 ohms 1/4 w.	.15
44	112056	Resistor - tone control 50,000 ohms	1.05
45	112272	Resistor - carbon 250 ohms 1/3 watt	.15
46A-46B	112275	Resistor - volume control 1/2 meg. (with on-of switch)	1.48
47	112462	Speaker - dynamic 8"	9.50
	112273	Speaker - dynamic 6"	7.50
48	112384	Transformer - output	2.00
49	112058	Transformer - 1st I.F.	2.00
50	112059	Transformer - 2nd I.F.	2.00
51	112274	Switch - range	1.05
52	M-49-B	Tube - ballast	1.25
53	112248	Resistor - wire wound 15.4 ohm 1 watt	.25

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

MODELS R-188 & 1881 TO 1889

STROMBERG CARLSON TELEPHONE MFG. CO.

MODELS 126-H & 126-L



I. F. 465 K.C.

REPLACEMENT PARTS

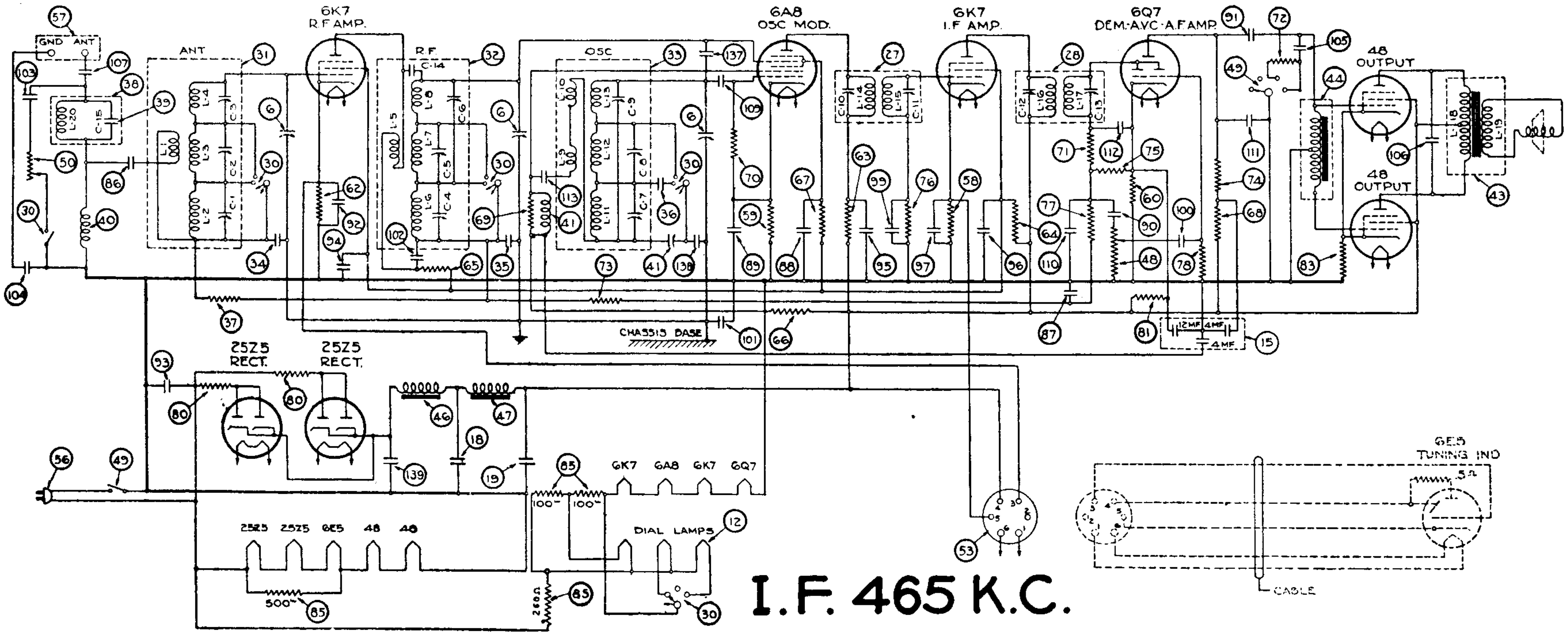
Item Number	Piece Number	Part
		Dial Assembly
5	26848	Gang Tuning Capacitor Assembly
6	26414	Lamp Socket Assembly
8	26852	Bracket (Chassis Spacer)
9	26059	Pilot Lamp
11	25952	Electrolytic Capacitor Assembly, 4 Mf., 150 Volts; 4 Mf., 150 Volts; 12 Mf., 25 Volts
15	26164	
16	26163	Electrolytic Capacitor, 40 Mf.
17	26163	Electrolytic Capacitor, 40 Mf.
20	26872	Electrolytic Capacitor Assembly (Two 4 Mf.)
27	26141	1st I. F. Transformer
28	25506	2nd I. F. Transformer
30	26864	Range Switch
31	25510	Coil Assembly, Antenna
32	25511	Coil Assembly, R. F.
33	25512	Coil Assembly, Oscillator
34	25488	Capacitor, .002 Mf.
35	25527	Capacitor, .0027 Mf.
36	25490	Capacitor, .0038 Mf.
37	26383	Resistor, Type "EI", .1 Megohm
38	25513	Coil Assembly (Wave Trap)
39	25488	Capacitor .002 Mf.
40	25814	Coil Assembly, R. F. Choke, 5 Millihenrys
41	26047	Capacitor, Oscillator Series Aligner
42	26855	Transformer, Audio Output
44	26865	Transformer, Audio Input
45	25936	Choke Assembly (Filter of Rectifier)
48	26114	Potentiometer (Volume Control)
49	26271	Switch ("Off-On" and Tone Control)
50	26095	Potentiometer (Sensitivity Control)
51	26499	Knob (For Sensitivity Control)
52	22974	Socket, 6 Prong
54	25539	Socket, 8 Prong
56	24268	Cord, Power Supply
59	26326	Resistor, Type "E", 270 Ohms
60	26327	Resistor, Type "E", 330 Ohms
61	26329	Resistor, Type "E", 470 Ohms
62	26331	Resistor, Type "E", 680 Ohms
63	26333	Resistor, Type "E", 1000 Ohms
64	26333	Resistor, Type "E", 1000 Ohms
65	26345	Resistor, Type "E", 10,000 Ohms
66	26333	Resistor, Type "E", 1000 Ohms
67	26345	Resistor, Type "E", 10,000 Ohms
69	26350	Resistor, Type "E", 27,000 Ohms
70	26353	Resistor, Type "E", 47,000 Ohms
71	26353	Resistor, Type "E", 47,000 Ohms
72	26353	Resistor, Type "E", 47,000 Ohms
73	26357	Resistor, Type "E", .1 Megohm
74	26362	Resistor, Type "E", .27 Megohm
75	26365	Resistor, Type "E", .47 Megohm
76	26365	Resistor, Type "E", .47 Megohm
77	26369	Resistor, Type "E", 1 Megohm
78	26373	Resistor, Type "E", 2.2 Megohms
79	25911	Resistor, Type "B", 50 Ohms
81	26408	Resistor, Type "C", 27,000 Ohms
82	26869	Resistor, Type "B", 310 Ohms
84	25914	Resistor, Voltage Divider
86	25150	Capacitor Assembly, .02 Mf.
87	25150	Capacitor Assembly, .02 Mf.
88	25150	Capacitor Assembly, .02 Mf.
89	25150	Capacitor Assembly, .02 Mf.
90	25150	Capacitor Assembly, .02 Mf.
91	25150	Capacitor Assembly, .02 Mf.
93	25150	Capacitor Assembly, .02 Mf.
94	24402	Capacitor Assembly, .1 Mf.
95	24402	Capacitor Assembly, .1 Mf.
96	24402	Capacitor Assembly, .1 Mf.
97	24402	Capacitor Assembly, .1 Mf.
98	26890	Capacitor Assembly, .3 Mf.
99	24405	Capacitor Assembly, .04 Mf.
100	24405	Capacitor Assembly, .04 Mf.
101	25389	Capacitor Assembly, .2 Mf.
102	25481	Capacitor Assembly, .002 Mf.
103	25149	Capacitor Assembly, .01 Mf.
104	25149	Capacitor Assembly, .01 Mf.
105	26151	Capacitor Assembly, .005 Mf.
107	25583	Capacitor Assembly, .006 Mf.
108	26151	Capacitor Assembly, .005 Mf.
109	24559	Capacitor, Type "O", 100 Mmf.
110	24559	Capacitor, Type "O", 100 Mmf.
111	24559	Capacitor, Type "O", 100 Mmf.
112	24559	Capacitor, Type "O", 100 Mmf.
113	25487	Capacitor, Type "W", .001 Mf.
137	26417	Capacitor (Gimmick)
138	25489	Capacitor, .00125 Mf.

MISCELLANEOUS PARTS

Piece Number	Part
26302	Knob (For Volume Control)
26385	Knob (For Range Switch)
26384	Knob (For Off-On-Switch and Tone Control)
26305	Knob (For Large Portion of Tuning Shaft)
26306	Knob (For Vernier Portion of Tuning Shaft)

STROMBERG CARLSON TELEPHONE MFG. CO.

MODELS 127-H & 127-M



I.F. 465 K.C.

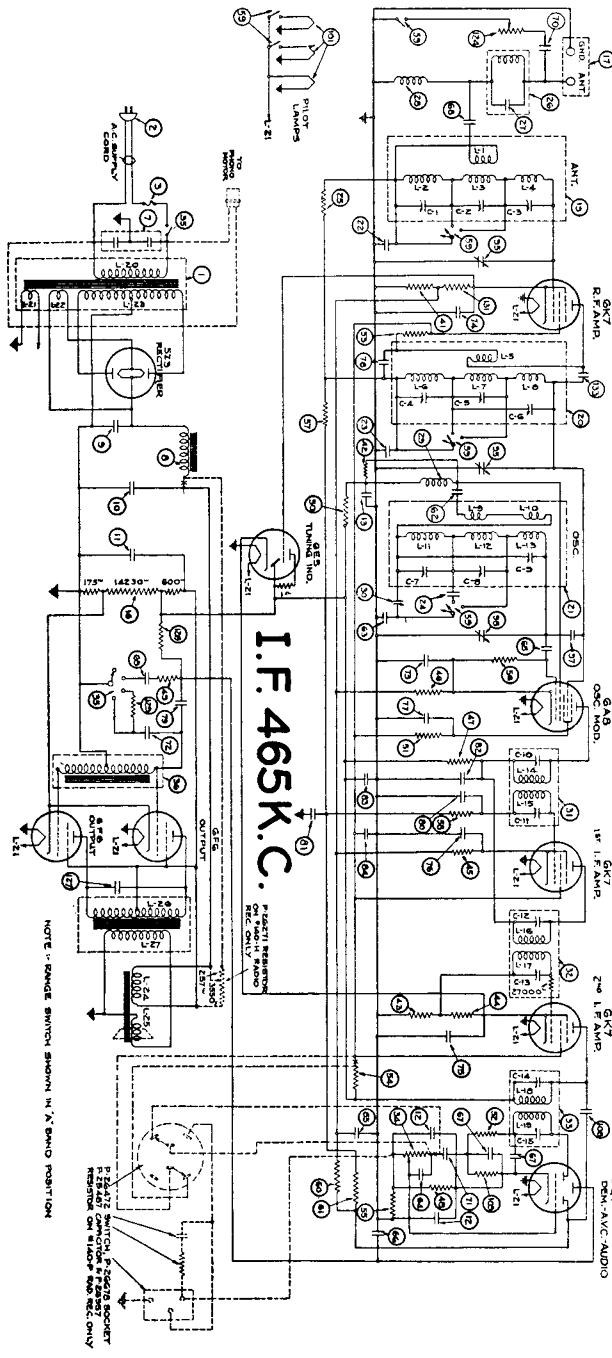
REPLACEMENT PARTS

Item Number	Piece Number	Part
5	26848	Dial Assembly
6	26414	Gang Tuning Capacitor Assembly
7	26850	Lamp Socket Assembly
9	26059	Bracket (Chassis Spacer)
12	26287	Pilot Lamp
15	26164	Electrolytic Capacitor Assembly, 4 Mf., 150 Volts; 4 Mf., 150 Volts; 12 Mf., 25 Volts
18	26162	Electrolytic Capacitor, 25 Mf.
19	26162	Electrolytic Capacitor, 25 Mf.
27	26141	1st I. F. Transformer
28	25506	2nd I. F. Transformer
30	26864	Range Switch
31	25510	Coil Assembly, Antenna
32	25511	Coil Assembly, R. F.
33	25512	Coil Assembly, Oscillator
34	25488	Capacitor, .002 Mf.
35	25527	Capacitor, .0027 Mf.
36	25490	Capacitor, .0038 Mf.
37	26383	Resistor, Type "EI", .1 Megohm
38	25513	Coil Assembly (Wave Trap)
39	25488	Capacitor, .002 Mf.
40	25814	Coil Assembly, R. F. Choke, 5 Millihenrys
41	26047	Capacitor, Oscillator Series Aligner
43	26857	Transformer, Audio Output
44	26865	Transformer, Audio Input
46	26859	Choke Assembly (Filter of Rectifier)
47	26861	Choke Assembly (Filter of Rectifier)
48	26114	Potentiometer (Volume Control)
49	26271	Switch ("Off-On" and Tone Control)
50	26095	Potentiometer, Sensitivity Control
51	26499	Knob (For Sensitivity Control)
53	22974	Socket, 6 Prong
55	25539	Socket, 8 Prong
56	24268	Cord, Power Supply
58	26324	Resistor, Type "E", 180 Ohms
59	26326	Resistor, Type "E", 270 Ohms
60	26327	Resistor, Type "E", 330 Ohms
62	26331	Resistor, Type "E", 680 Ohms
63	26333	Resistor, Type "E", 1000 Ohms
64	26333	Resistor, Type "E", 1000 Ohms
65	26345	Resistor, Type "E", 10,000 Ohms
66	26333	Resistor, Type "E", 1000 Ohms
67	26345	Resistor, Type "E", 10,000 Ohms
68	26345	Resistor, Type "E", 10,000 Ohms
69	26350	Resistor, Type "E", 27,000 Ohms
70	26353	Resistor, Type "E", 47,000 Ohms
71	26353	Resistor, Type "E", 47,000 Ohms
72	26353	Resistor, Type "E", 47,000 Ohms
73	26357	Resistor, Type "E", .1 Megohm
75	26365	Resistor, Type "E", .47 Megohm
76	26365	Resistor, Type "E", .47 Megohm
77	26369	Resistor, Type "E", 1 Megohm
78	26373	Resistor, Type "E", 2.2 Megohms
80	25911	Resistor, Type "B", 50 Ohms
81	26408	Resistor, Type "C", 27,000 Ohms
83	26870	Resistor, Flexible, 155 Ohms
85	26871	Resistor, "B" Voltage Divider
86	25150	Capacitor Assembly, .02 Mf.
87	25150	Capacitor Assembly, .02 Mf.
88	25150	Capacitor Assembly, .02 Mf.
89	25150	Capacitor Assembly, .02 Mf.
90	25150	Capacitor Assembly, .02 Mf.
91	25150	Capacitor Assembly, .02 Mf.
92	25150	Capacitor Assembly, .02 Mf.
93	25150	Capacitor Assembly, .02 Mf.
94	24402	Capacitor Assembly, .1 Mf.
95	24402	Capacitor Assembly, .1 Mf.
96	24402	Capacitor Assembly, .1 Mf.
97	24402	Capacitor Assembly, .1 Mf.
99	24405	Capacitor Assembly, .04 Mf.
100	24405	Capacitor Assembly, .04 Mf.
101	25389	Capacitor Assembly, .2 Mf.
102	25481	Capacitor Assembly, .002 Mf.
103	25149	Capacitor Assembly, .01 Mf.
104	25149	Capacitor Assembly, .01 Mf.
105	26151	Capacitor Assembly, .005 Mf.
106	25149	Capacitor Assembly, .01 Mf.
107	25533	Capacitor Assembly, .006 Mf.
109	24559	Capacitor, Type "O", 100 Mmf.
110	24559	Capacitor, Type "O", 100 Mmf.
111	24559	Capacitor, Type "O", 100 Mmf.
112	24559	Capacitor, Type "O", 100 Mmf.
113	25487	Capacitor, Type "W", .001 Mf.
137	26417	Capacitor (Gimmick)
138	25489	Capacitor, .00125 Mf.
139	27014	Electrolytic Capacitor, 40 Mf.

MISCELLANEOUS PARTS

Piece Number	Part
26491	Plug (For Tri-Focal Tuning Unit Cable)
26365	Resistor, Type "E", .47 Megohm (Used at Socket of No. 6E5 Tube)
26302	Knob (For Volume Control).
26385	Knob (For Range Switch)
26384	Knob (For Off-On-Tone Control)
26305	Knob (For Large Portion of Tuning Shaft)
26306	Knob (For Vernier Portion of Tuning Shaft)

STROMBERG CARLSON TELEPHONE MFG. CO.
MODELS 140-H, 140-HB, 140-K, 140-L, 140-KB, 140-LB, 140-P & 140-PB



REPLACEMENT PARTS

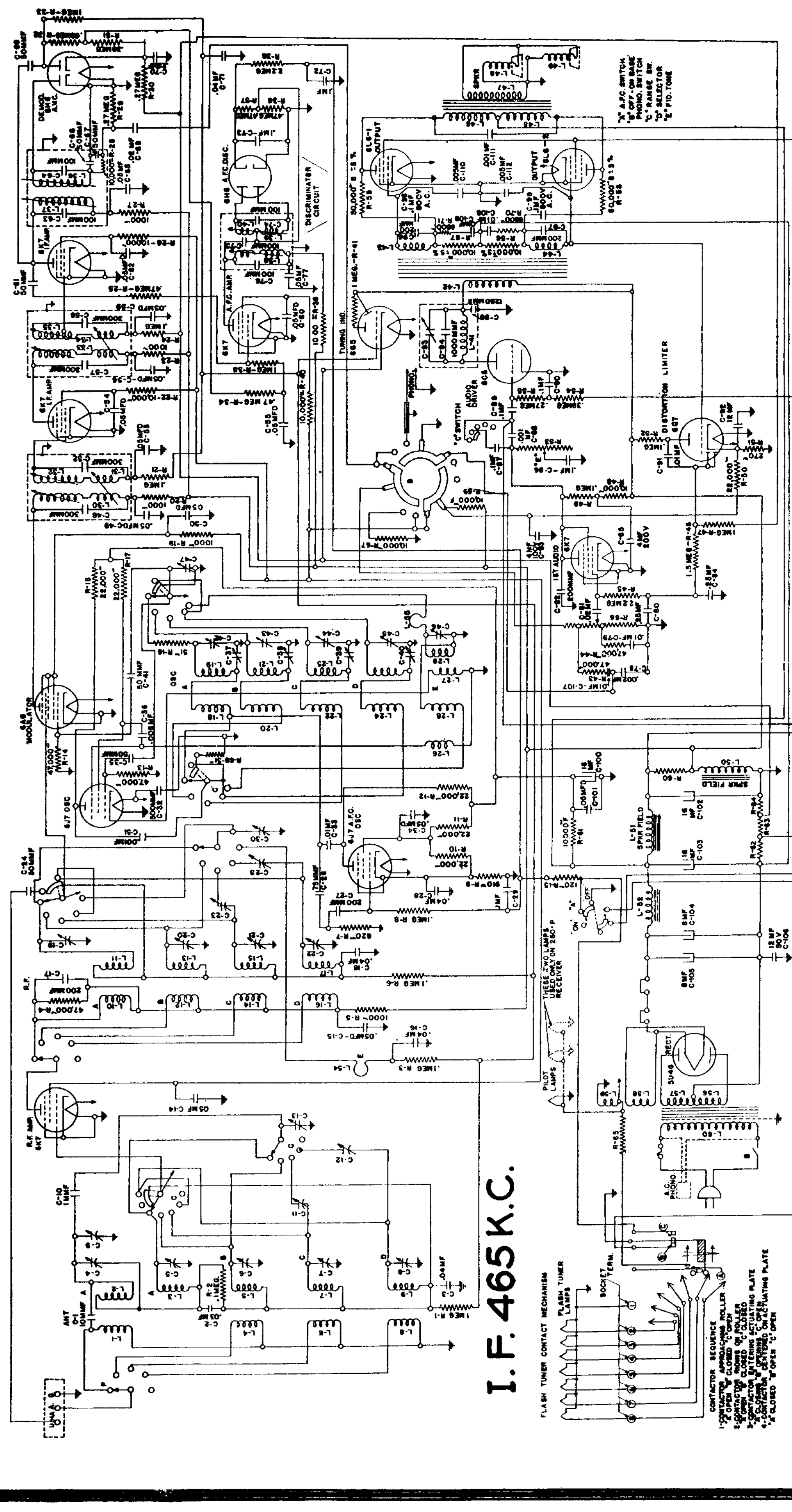
Item Number	Piece Number	Part
1	25434	Power Transformer (50 to 60 Cycles Chassis)
1	25435	Power Transformer (25 to 60 Cycles Chassis)
2	24268	Cord (A. C. Power Supply)
3	23150	Fuse (2 Amperes)
7	21535	Capacitor Assembly (2—.01 Capacitors)
8	26260	Choke Assembly (Rectifier Filter)
9	22757	Electrolytic Capacitor (50 to 60 Cycles Chassis)
9	26510	Electrolytic Capacitor (25 to 60 Cycles Chassis)
10	22789	Electrolytic Capacitor (50 to 60 Cycles Chassis)
10	26511	Electrolytic Capacitor (25 to 60 Cycles Chassis)
11	25458	Electrolytic Capacitor, 16 Mf.
12	26048	Electrolytic Capacitor, Dual, 10 Mf.
13	25788	Electrolytic Capacitor, 1 Mf.
14	26059	Bracket (Chassis Spacer)
16	25437	Resistor, "B" Voltage Divider
19	25510	Coil Assembly, Antenna
20	25511	Coil Assembly, R. F.
21	25512	Coil Assembly, Oscillator
22	25488	Capacitor, .002 Mf.
23	25527	Capacitor, .0027 Mf.
24	25490	Capacitor, .0038 Mf.
25	26383	Resistor, Type "EI", .1 Megohm
26	25513	Coil Assembly, Wave Trap
27	25488	Capacitor, .002 Mf.
28	25814	Coil Assembly, R. F. Choke Coil
29	25814	Coil Assembly, R. F. Choke Coil
30	26047	Oscillator Series Aligning Capacitor
31	26266	1st I. F. Transformer Assembly
32	26269	2nd I. F. Transformer Assembly
33	26270	3rd I. F. Transformer Assembly
34	26114	Potentiometer (Volume Control)
35	26404	Switch ("Off-On" and Tone Control)
36	26272	Transformer Assembly, Audio
37	26274	Transformer Assembly, Output
38	22988	Socket, 4 Prong
39	23517	Socket, 7 Prong
40	25539	Socket, 8 Prong
41	26324	Resistor, Type "E", 180 Ohms
42	26350	Resistor, Type "E", 27,000 Ohms
43	26328	Resistor, Type "E", 390 Ohms
44	26329	Resistor, Type "E", 470 Ohms
45	26329	Resistor, Type "E", 470 Ohms
46	26330	Resistor, Type "E", 560 Ohms
47	26330	Resistor, Type "E", 560 Ohms
48	26340	Resistor, Type "E", 3,900 Ohms
49	26350	Resistor, Type "E", 27,000 Ohms
50	26350	Resistor, Type "E", 27,000 Ohms
51	26345	Resistor, Type "E", 10,000 Ohms
52	26345	Resistor, Type "E", 10,000 Ohms
53	26345	Resistor, Type "E", 10,000 Ohms
54	25526	Resistor, Type "E", 15,000 Ohms
55	26353	Resistor, Type "E", 47,000 Ohms
56	26353	Resistor, Type "E", 47,000 Ohms
57	26357	Resistor, Type "E", .1 Megohm
58	26357	Resistor, Type "E", .1 Megohm
59	26264	Range Switch
60	26369	Resistor, Type "E", 1 Megohm
61	26369	Resistor, Type "E", 1 Megohm
62	25487	Capacitor, .001 Mf.
63	25489	Capacitor, .00125 Mf.
64	24166	Capacitor, 25 Mmf.
65	24559	Capacitor, 100 Mmf.
66	24559	Capacitor, 100 Mmf.
67	26512	Capacitor, 2—100 Mmf.
68	25150	Capacitor Assembly, .02 Mf.
69	25149	Capacitor Assembly, .01 Mf.
70	25149	Capacitor Assembly, .01 Mf.
71	25150	Capacitor Assembly, .02 Mf.
72	25150	Capacitor Assembly, .02 Mf.
73	25150	Capacitor Assembly, .02 Mf.
74	25150	Capacitor Assembly, .02 Mf.
75	25483	Capacitor Assembly, .1 Mf.
76	25483	Capacitor Assembly, .1 Mf.
77	25483	Capacitor Assembly, .1 Mf.
78	25481	Capacitor Assembly, .002 Mf.
79	24405	Capacitor Assembly, .04 Mf.
80	24405	Capacitor Assembly, .04 Mf.
81	24405	Capacitor Assembly, .04 Mf.
82	24994	Capacitor Assembly, .05 Mf.
83	24994	Capacitor Assembly, .05 Mf.
84	24994	Capacitor Assembly, .05 Mf.
85	24994	Capacitor Assembly, .05 Mf.
95	26276	Gang Tuning Capacitor
97	26417	Capacitor Assembly (Gimmick)
101	26287	Pilot Lamp
108	24560	Capacitor, 50 Mmf.
109	26362	Resistor, Type "E", 270,000 Ohms
124	26695	Potentiometer (Sensitivity Control)
126	26499	Knob (For Sensitivity Control)
127	24461	Capacitor, .004 Mf.
128	26357	Resistor, Type "E", .1 Megohm
129	26341	Resistor, Type "E", 4700 Ohms
131	26329	Resistor, Type "E", 470 Ohms

MISCELLANEOUS PARTS

Piece Number	Part
26250	Cone Assembly (For P-26170 Speaker)
25492	Cone Assembly (For P-26171 Speaker)
26043	Plug (For Loud Speaker Cable)
26369	Resistor, Type "E", 1 Megohm (Used at Socket of No. 6E5 Tube)
26147	Pilot Lamp Socket
26303	Knob (For Volume Control. Used only on No. 140-H Receiver)
26302	Knob (For Volume Control. Used on Nos. 140-K, 140-L, and 140-P Receivers)
26307	Knob (For "Stations" Selector Control Shaft. Used only on No. 140-H Receiver)
26305	Knob (For "Stations" Selector Control Shaft. Used on Nos. 140-K, 140-L, and 140-P Receivers)
26308	Knob (For "Vernier" Stations Selector Control Shaft. Used only on No. 140-H Receiver)
26306	Knob (For "Vernier" Stations Selector Control Shaft. Used on Nos. 140-K, 140-L, and 140-P Receivers)
26390	Knob (For Range Switch. Used only on No. 140-H Receiver)
26389	Knob (For Range Switch. Used on Nos. 140-K, 140-L, and 140-P Receivers)
26298	Knob (For "Off-On" Switch and Tone Control. Used only on No. 140-H Receiver)
26384	Knob (For "Off-On" Switch and Tone Control. Used on Nos. 140-K, 140-L, and 140-P Receivers)
26697	Knob (For Radio-Phono Control. Used only on No. 140-P Receivers)

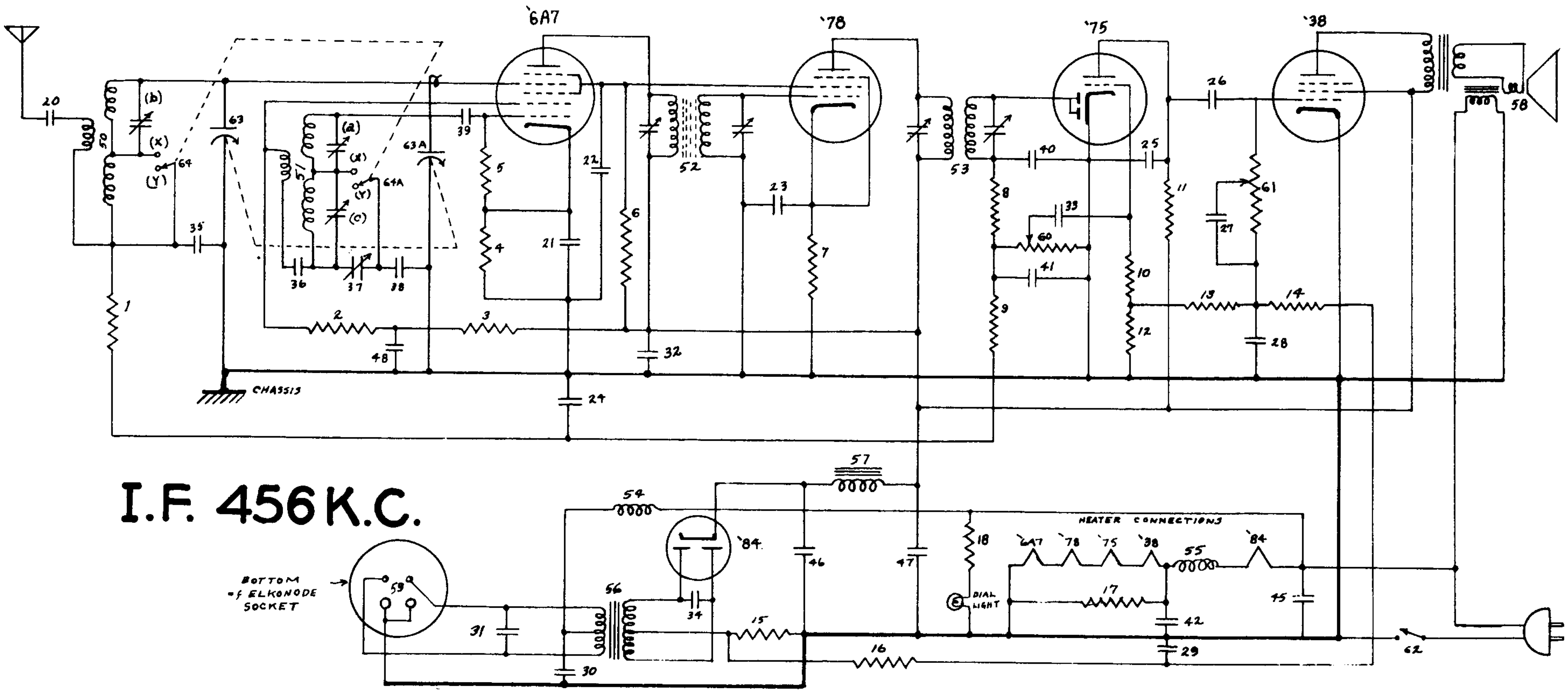
STROMBERG CARLSON TELEPHONE MFG. CO.

MODELS 260-L, 260-LB, 260-P & 260-PB



L. TATRO PRODUCTS CORP.

MODELS O-4626 & P-4626



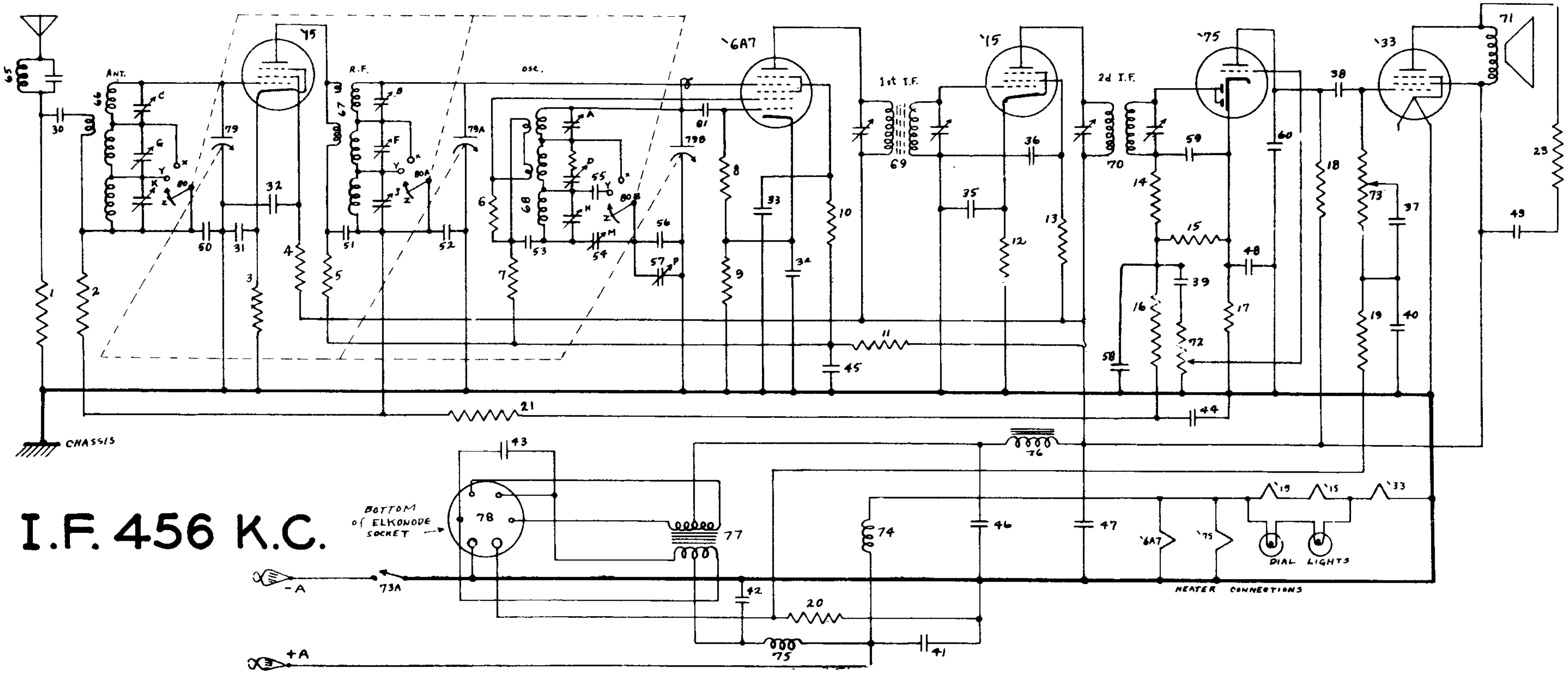
I.F. 456 K.C.

PARTS LIST

No.	Part No.	Description
1	2L-44	100M ohms 1/4 watt
2	2L-26	7500 ohms 1/4 watt
3	2L-31	20M ohms 1/4 watt
4	2L-14	450 ohms 1/4 watt
5	2L-37	50M ohms 1/4 watt
6	2L-33	30M ohms 1/4 watt
7	2L-14	450 ohms 1/4 watt
8	2L-32	50M ohms 1/4 watt
9	2L-57	1 Meg ohm 1/4 watt
10	2L-57	1 Meg ohm 1/4 watt
11	2L-49	250M ohm 1/4 watt
12	2L-44	100M ohm 1/4 watt
13	2L-57	1 Meg ohm 1/4 watt
14	2L-44	100 M ohms 1/4 watt
15	2L-17B	800 ohms 1 watt
16	2L-44	100M ohms 1/4 watt
17	1L-11F	125 Ohms 10 watt
18	1L-13F	200 ohms 10 watt
19		
20	3L-16	.02 MFD 400 V. paper
21	3L-18	.10 MFD 400 V. paper
22	3L-18	.10 MFD 400 V. paper
23	3L-18	.10 MFD 400 V. paper
24	3L-16	.02 MFD 400 V. paper
25	3L-23	.0005 MFD 600 V. paper
26	3L-16	.02 MFD 400 V. paper
27	3L-40	.005 MFD 600 V. paper
28	3L-9H	.25 MFD 200 V. paper
29	3L-9H	.25 MFD 200 V. paper
30	3L-59S	.5 MFD 120 V. paper
31	3L-9H	.25 MFD 200 V. paper
32	3L-18	.10 MFD 400 V. paper
33	3L-16	.02 MFD 600 V. paper
34	3L-42	.005 MFD 1600 V. paper
35	5L-13	.0025 MFD Mica
36	5L-10	.0015 MFD Mica
37	6L-1	ADJUSTABLE Mica
38	5L-10	.0015 MFD Mica
39	5L-2	.0001 MFD Mica
40	5L-2	.0001 MFD Mica
41	5L-2	.0001 MFD Mica
42	5L-10	.0015 MFD Mica
43		
44		
45	4L-14	20 MFD 40V. N.P. Electrolytic
46	4L-3	8 MFD 450 V. Electrolytic
47	4L-3	8 MFD 450 V. Electrolytic
48	4L-1	8 MFD 250 V. Electrolytic
49		
50	8L-15	Antenna Coil
51	8L-16	Oscillator Coil
52	8L-25	I.F.Transformer 456 K.C.
53	8L-3	I.F.transformer 456 K.C.
54	8L-23	R.F. Choke
55	8L-20	R.F. Choke
56	9L-2	Power Transformer
57	9L-11	Filter Choke
58	18L-4	Dynamic Speaker
59	25L-26	Elkonode Socket Assembly
60	10L-1	Volume Control
61	10L-11	Tone Control
62		Part of Item 61
63	7L-4	Variable Condenser
63A		Part of Item 63
64	16L-3	Selector Switch
64A		Part of Item 64

L. TATRO PRODUCTS CORP.

MODELS W6236, X6236 & Y6236



PARTS LIST

No.	Part No.	Description
1	2L-27	10M ohms 1/4 watt
2	2L-44	100M ohms 1/4 watt
3	2L-17	800 ohms 1/4 watt
4	2L-49	250M ohms 1/4 watt
5	2L-25	15M ohms 1/4 watt
6	2L-31	20M ohms 1/4 watt
7	2L-27	10M ohms 1/4 watt
8	2L-37	50M ohms 1/4 watt
9	2L-16	600 ohms 1/4 watt
10	2L-33	30M ohms 1/4 watt
11	2L-26	7500 ohms 1/4 watt
12	2L-15	500 ohms 1/4 watt
13	2L-44	100M ohms 1/4 watt
14	2L-37	50M ohms 1/4 watt
15	2L-53	500M ohms 1/4 watt
16	2L-57	1 Meg ohm 1/4 watt
17	2L-24	5000 ohms 1/4 watt
18	2L-49	250M ohms 1/4 watt
19	2L-53	500M ohms 1/4 watt
20	2L-178	800 ohms 1 watt
21		
22		
23	2L-31A	20M ohms 1/2 watt
24		
25		
26		
27		
28		
29		
30	3L-16	.02 Mfd. 400 V.Paper
31	3L-17	.05 Mfd. 400 V.Paper
32	3L-17	.05 Mfd. 400 V.Paper
33	3L-16	.02 Mfd. 400 V.Paper
34	3L-17	.05 Mfd. 400 V.Paper
35	3L-18	.10 Mfd. 400 V.Paper
36	3L-18	.10 Mfd. 400 V.Paper
37	3L-40	.005 Mfd.600 V.Paper
38	3L-16	.02 Mfd. 400 V.Paper
39	3L-16	.02 Mfd. 400 V.Paper
40	3L-50	1.0 Mfd. 200 V.Paper
41	3L-595	0.5 Mfd. 120 V.Paper
42	3L-595	0.5 Mfd. 120 V.Paper
43	3L-44H	0.5 Mfd. 160 V. Paper
44		
45	4L-1	8.0 Mfd. 250 V. Electrolytic
46	4L-1	8.0 Mfd. 250 V. Electrolytic
47	4L-1	8.0 Mfd. 250 V. Electrolytic
48	4L-6	20.0 Mfd. 6 V. Electrolytic
49	3L-25	.01 Mfd. 600 V. Paper
50	5L-12	.002 Mfd. Mica
51	5L-12	.002 Mfd. Mica
52	5L-13	.0025 Mfd. Mica
53	5L-7	.001 Mfd. Mica
54	6L-8	6 plate variable (Mica)
55	5L-19	.0096 Mfd. Mica
56	5L-26	.0009 Mfd. Mica
57	6L-7	4 plate variable (Mica)
58	5L-2	.0001 Mfd. Mica
59	5L-2	.0001 Mfd. Mica
60	5L-2	.0001 Mfd. Mica
61	5L-2	.0001 Mfd. Mica
62		
63		
64		
65	8L-22	456 K.C. IF Trap
66	8L-37	Antenna Trans.
67	8L-38	R.F. Trans.
68	8L-39	Osc. Trans.
69	8L-24	IF Trans. 456 K.C.
70	8L-26	IF Trans. 456 K.C.
71	18L-9	Speaker
72	10L-5	Volume Control
73	10L-15	Tone Control
73A		Part of Item 73
74	8L-21	R. F. Choke
75	8L-4	R. F. Choke
76	9L-11	Filter Choke
77	9L-4	Power Trans.
78	25L-25	Elkonode Socket Assembly
79	7L-3	Variable Condenser
79A		Part of Item 79
79B		Part of Item 79
80	16L-2	Selector Switch
80A & B		Parts of Item 80

TRANSITONE AUTOMOBILE RADIO CORP.

MODELS L-1427, L-1429 & L-1460

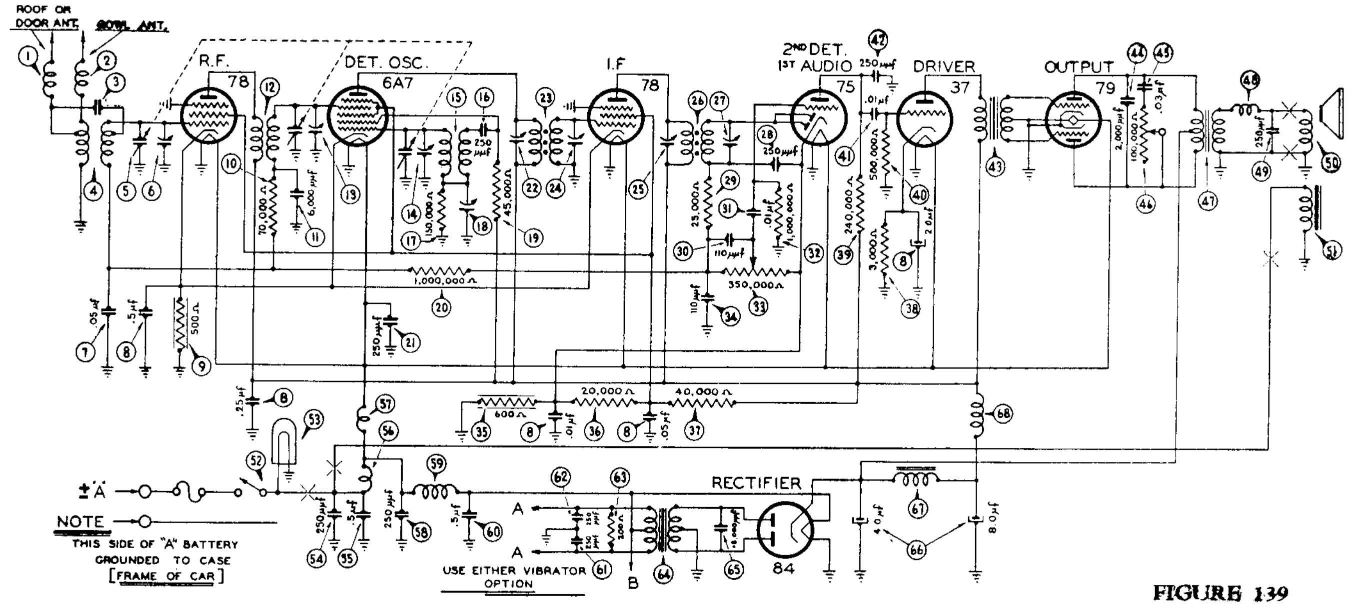
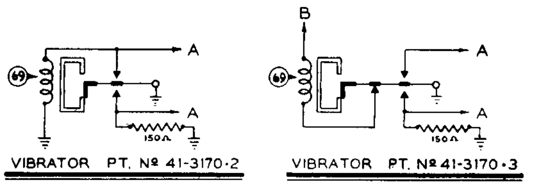


FIGURE 139



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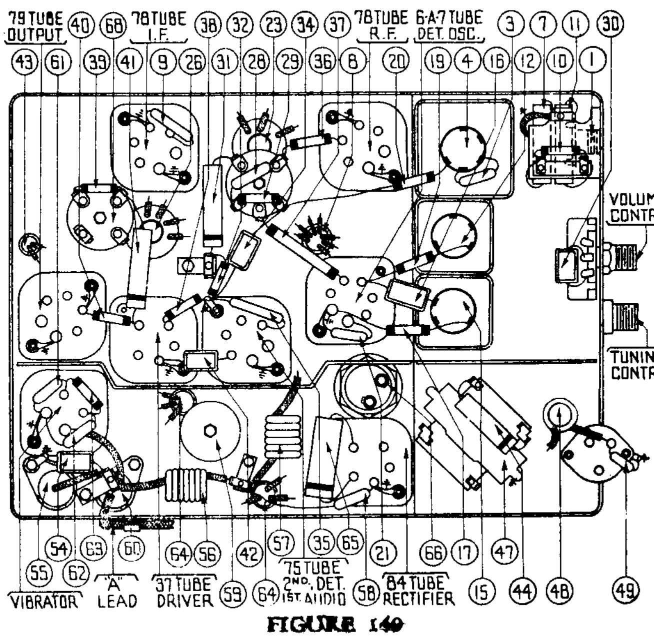


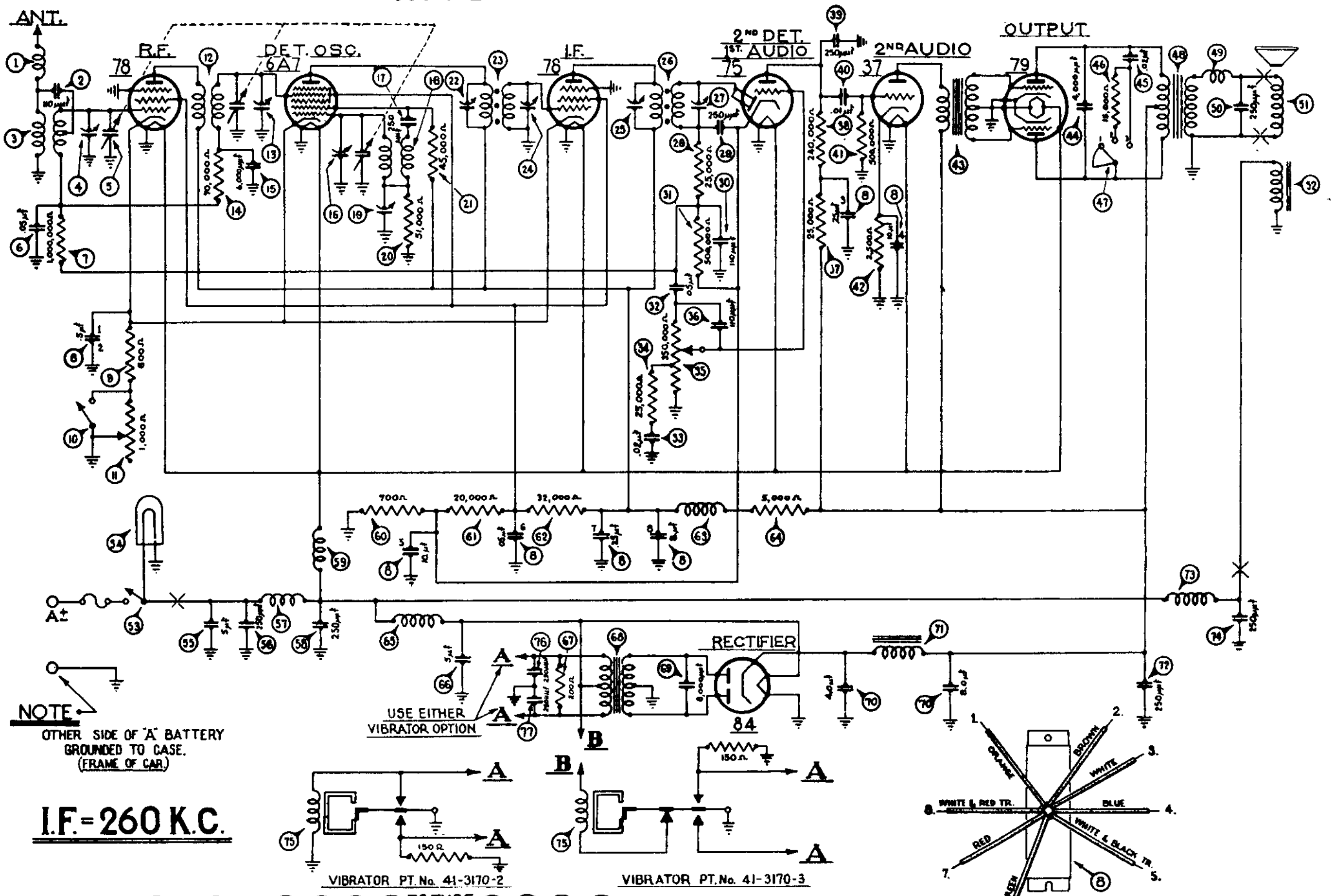
FIGURE 140

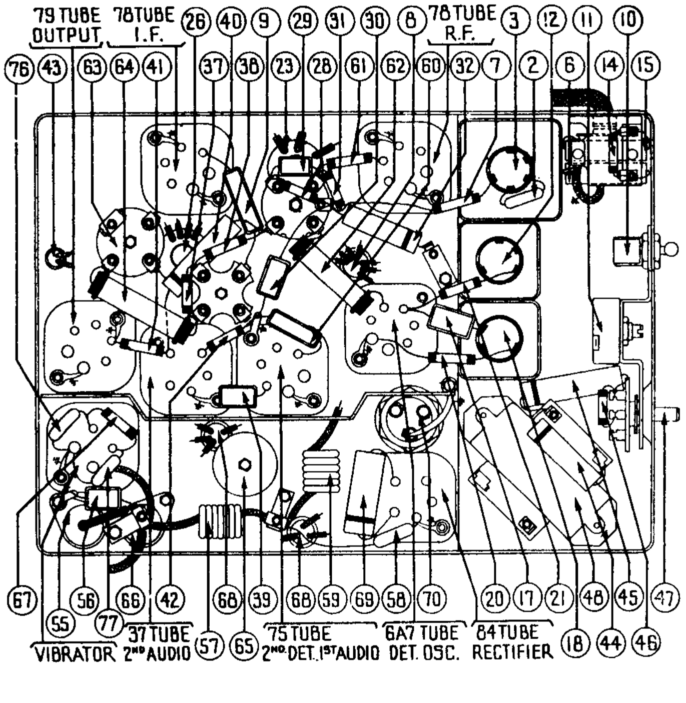
The circuit for the Model L-1429 is the same as for the L-1427.

PARTS LIST

No.	Description	Part No.
1	Antenna Choke	38-8106
2	Antenna Choke	38-8106
3	Condenser (50 mmfd.)	30-1029
4	Antenna Transformer	32-2517
5	Tuning Condenser	31-1984
6	First Padder (on Tun. Cond.)	
7	Condenser (.05 mfd.)	30-4444
	(.01-.05-.25-.5-2 mfd.)	30-4493
8	Condenser (.01-.05-.25-.5-2 mfd.)	30-4493
9	Resistor (500 ohms)	33-1213
10	Resistor (70,000 ohms)	33-370344
11	Condenser (6000 mmfd.)	30-4445
12	R. F. Transformer	32-2231
13	Second Padder (on Tun. Cond.)	
14	Third Padder (on Tun. Cond.)	
15	Oscillator Transformer	32-2232
16	Condenser (250 mmfd.)	30-1032
17	Resistor (150,000 ohms)	33-415344
18	Low Frequency Padder	31-6056
19	Resistor (45,000 ohms)	33-345344
20	Resistor (1,000,000 ohms)	33-510344
21	Condenser (250 mmfd.)	30-1032
22	Padder (Pri. 1st I.F. Trans.)	
23	First I. F. Transformer	32-2286
24	Padder (Sec. 1st I.F. Trans.)	
25	Padder (Pri. 2nd I.F. Trans.)	
26	Second I. F. Transformer	32-2167
27	Padder (Sec. 2nd I.F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (110 mmfd.)	30-1031
31	Condenser (.01 mfd.)	30-4479
32	Resistor (1,000,000 ohms)	33-510344
33	Volume Control (350,000 ohms)	33-5202
34	Condenser (110 mmfd.)	30-1031
35	Resistor (600 ohms)	33-1212
36	Resistor (20,000 ohms)	33-320344
37	Resistor (40,000 ohms)	33-340444
38	Resistor (3000 ohms)	33-230344
39	Resistor (240,000 ohms)	33-424344
40	Resistor (500,000 ohms)	33-449344
41	Condenser (.01 mfd.)	30-4145
42	Condenser (250 mmfd.)	30-1032
43	Input Transformer	32-7779
44	Condenser (2000 mmfd.)	30-4177
45	Condenser (.03 mfd.)	30-4447
46	Tone Control (100,000 ohms)	33-5141
47	Output Transformer (L-1427)	32-7778
17	Output Transformer (L-1429)	32-7788
48	Choke	32-1432
49	Condenser (250 mmfd.)	30-1032
50	Cone & Voice Coil	36-3159
51	Field Coil Assembly	36-3513
	Speaker Assembly (A-44)	36-1326
52	On & Off Switch	42-5617
53	Pilot Lamp	34-2040
54	Condenser (250 mmfd.)	30-1032
55	Condenser (.5 mfd.)	30-4474
56	"A" Choke	32-1374
57	Filament Choke	32-1604
58	Condenser (250 mmfd.)	30-1032
59	Vibrator Choke	32-2537
60	Condenser (.5 mfd.)	30-4474
61	Condenser (250 mmfd.)	30-1032
62	Condenser (250 mmfd.)	30-1032
63	Resistor (200 ohms)	33-120344
64	Power Transformer	32-7720
65	Condenser (8000 mmfd.)	30-4420
66	Filter Condenser (4-8 mfd.)	30-2167
67	Filter Choke	32-7722
68	"B" Choke	32-1281
69	Vibrator (OPTIONAL)	41-3170-2 41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Fuse	7227
	Fuse Insulator	27-7729
	Water Gauge Condenser	30-4007
	Generator Condenser	30-4181
	Oil Gauge Condenser	30-4307
	Gas Gauge Condenser	30-4663
	Distributor Condenser	30-4404
	Plate (Rec. Mtg.)	28-3734
	Screw (Rec. Mtg.)	W-1614
	Speaker Cable	41-3260
	Adapter Plate	42-5691
	Wrench	28-4380
	Tuning Shaft	28-8704
	Volume Shaft	28-8700
	Tone Control Shaft	28-8701
	Scale Assembly	42-5666
	Pilot Lamp Assembly	38-7734
	Tuning & Volume Knob	27-4426
	Tone Control Knob	27-4427
	Receiver Housing	38-8565

TRANSITONE AUTOMOBILE RADIO CORP.
MODELS P1421 & P1422





CHANGES — "Run Numbers" are stamped on the chassis sub-base for identification. These "Run Numbers" are changed consecutively as major changes are made in the Reciever wiring and parts.

RUN No. 2 — Condenser (67) removed (.01 mfd.). Add a resistor, Part No. 33-120344 (200 ohms) across the primary of the Power Transformer (68). Add two 250 mmfd. condensers — Part No. 30-1032 — in series across the primary of the Power Transformer (68). Ground the center top of these two condensers.

The circuit of the Model P-1422 is identical to the Model P-1421 with the following exceptions:—

One side of the pilot lamp is connected between choke (73) and condenser (74) and the other side to ground.

The on-off switch is connected between choke (57) and (58) and condenser (58).

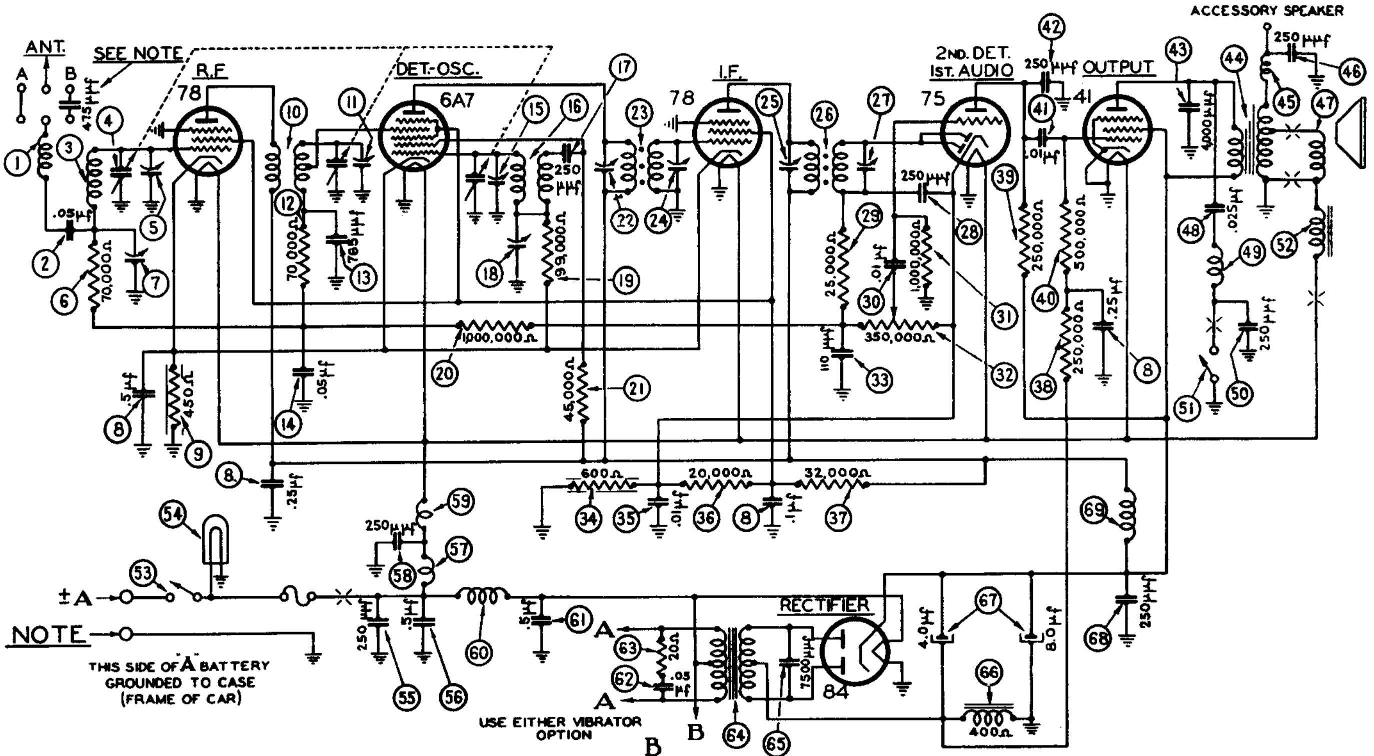
PARTS LIST

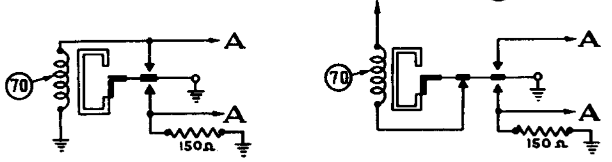
No.	Description	Part No.
1	Antenna Choke	38-8074
2	Condenser (110 mmfd.)	30-1031
3	Antenna Transformer	32-2230
4	First Padder (on tun. cond.)	....
5	Tuning Condenser	31-1913
6	Condenser (.05 mfd.)	30-4444
7	Resistor (1,000,000 ohms)	33-510344
8	Condenser (.05-.25-.25-.5-8-10-10 mfd.)	30-4473
9	Resistor (600 ohms)	33-1212
10	Sensitivity Control Switch	42-1225
11	Sensitivity Control	33-5129
12	R. F. Transformer	32-2231
13	Second Padder (on tun. cond.)	....
14	Resistor (70,000 ohms)	33-370344
15	Condenser (6000 mmfd.)	30-4445
16	Third padder (on tun. cond.)	....
17	Condenser (250 mmfd.)	30-1032
18	Oscillator Transformer	32-2232
19	Low Frequency Padder	31-6056
20	Resistor (51,000 ohms)	33-351344
21	Resistor (45,000 ohms)	33-345344
22	Padder (Pri. 1st I. F. trans.)	....
23	First I. F. Transformer	32-2252
24	Fadder (Sec. 1st I. F. Trans.)	....
25	Padder (Pri. 2nd I. F. Trans.)	....
26	Second I. F. Transformer	32-2167
27	Padder (Sec. 2nd I. F. Trans.)	....
28	Resistor (25,000 ohms)	33-325344
29	Condenser (250 mmfd.)	30-1032
30	Condenser (110 mmfd.)	30-1031
31	Resistor (500,000 ohms)	33-449344
32	Condenser (.05 mfd.)	30-4444
33	Condenser (.02 mfd.)	30-4215
34	Resistor (25,000 ohms)	33-325344
35	Volume Control & Coupling Assembly (350,000 ohms)	38-7968
36	Condenser (110 mmfd.)	30-1031
37	Resistor (25,000 ohms)	33-325344
38	Resistor (240,000 ohms)	33-424344
39	Condenser (250 mmfd.)	30-1032
40	Condenser (.01 mfd.)	30-4145
41	Resistor (500,000 ohms)	33-449344
42	Resistor (2500 ohms)	33-225344
43	Input Transformer	32-7681
44	Condenser (4000 mmfd.)	30-4185
45	Condenser (.02 mfd.)	30-4495
46	Resistor (15,000 ohms)	33-315344

No.	Description	Part No.
47	Tone control switch	42-1139
48	Output Trans. (P1421)	32-7684
48	Output Trans. (P1422)	32-7727
49	Choke	32-2[illegible]9
50	Condenser (250 mmfd.)	30-1032
51	Cone & Voice Coil (P1421)	36-3159
51	Cone & Voice Coil (P1422)	36-3586
52	Field Coil (P1421)	36-3513
52	Field Coil (P1422)	32-9263
53	On & Off Switch	42-1156
54	Pilot Lamp	34-2040
55	Condenser (.5 mfd.)	30-4474
56	Condenser (250 mmfd.)	30-1032
57	"A" Choke	32-1374
58	Condenser (250 mmfd.)	30-1032
59	Filament Choke	32-1561
60	Resistor (700 ohms)	33-1220
61	Resistor (20,000 ohms)	33-320344
62	Resistor (32,000 ohms)	33-332543
63	"B" Choke	32-1281
64	Resistor (5000 ohms)	33-250543
65	Vibrator Choke	32-2249
66	Condenser (.5 mfd.)	30-4474
67	Resistor (200 ohms)	33-120344
68	Power Transformer	32-7683
69	Condenser (8000 mmfd.)	30-4420
70	Filter Condenser (4-8 mfd.)	30-2167
71	"B" Filter Choke	32-7710
72	Condenser (250 mmfd.)	30-1032
73	Choke	32-2268
74	Condenser (250 mmfd.)	30-1032
75	Vibrator OPTIONAL	41-3170-2
	Vibrator OPTIONAL	41-3170-3
76	Condenser (250 mmfd.)	30-1032
77	Condenser (250 mmfd.)	30-1032
	Inductive Suppressor	32-2250
	Interference Condenser (gen.)	30-4475
	Interference Condenser (dome light)	30-4476
	Interference Condenser	30-4477
	Dial	27-5247
	Tuning Shaft	28-8656
	Volume Shaft	28-8657
	Pilot Lamp Assembly	38-6750
	Switch & Lead Assembly	41-3217
	Antenna Lead	L-2259
	Ammeter Lead	38-6595
	Rivet (switch mtg.)	W-1589
	Receiver Housing	38-7997

TRANSITONE AUTOMOBILE RADIO CORP.

MODEL 827





VIBRATOR PART NO 41-3170-2 VIBRATOR PART NO. 41-3170-3

I.F.=260KC

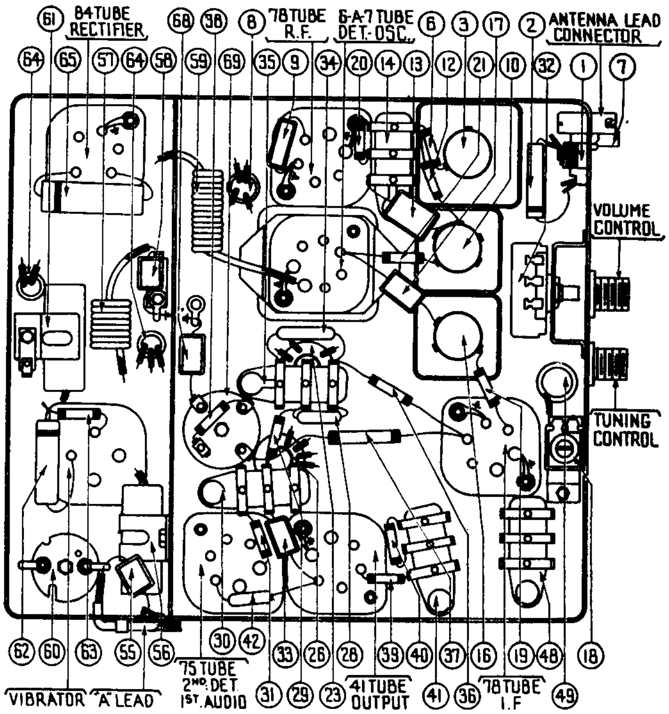
NOTE: When the Receiver is installed in a car having a top antenna, under-car antenna, spare wheel antenna or antenna having a similarly low relative capacitance (50 mmf. to 450 mmf.) use connector plug in "A".

When the Receiver is installed in a car having a metal insert top antenna, insulated door antenna, insulated trunk cover antenna or antenna having similarly high relative capacitance (450 mmf. to 2500 mmf.) use condenser plug in "B".

MODEL 827 PARTS LIST

No.	Description	Part No.
1	Antenna Choke	38-8651
2	Condenser (.05 mfd.)	30-4444
3	Antenna Transformer	32-2516
4	Tuning Condenser	31-1930
5	First Padder (on tun. cond.)	
6	Resistor (70,000 ohms)	33-370344
7	Antenna Compensating Condenser	31-6082
8	Condenser (.1-.25-.25-.5 mfd.)	30-4415
9	Resistor (450 ohms)	33-1218
10	R. F. Transformer	32-2307
11	Second Padder (on tun. cond.)	
12	Resistor (70,000 ohms)	33-370344
13	Condenser (765 mmfd.)	30-1069
14	Condenser (.05 mfd.)	3615-0SG
15	Third Padder (on tun. cond.)	
16	Oscillator Transformer	32-2308
17	Condenser (250 mmfd.)	30-1032
18	Low Frequency Padder	31-6102
19	Resistor (99,000 ohms)	33-399344
20	Resistor (1,000,000 ohms)	33-510344
21	Resistor (45,000 ohms)	33-345344
22	Padder (Pri. 1st I.F. Trans.)	
23	First I. F. Transformer	32-2026
24	Padder (Sec. 1st I. F. Trans.)	
25	Padder (Pri. 2nd I.F. Trans.)	
26	Second I. F. Transformer	32-2027
27	Padder (Sec. 2nd I.F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (.01 mfd.)	3903-0SU
31	Resistor (1,000,000 ohms)	33-510344
32	Volume Control (350,000 ohms)	33-5148
33	Condenser (110 mmfd.)	30-1031
34	Resistor (600 ohms)	33-1212
35	Condenser (.01 mfd.)	3903-0SG
36	Resistor (20,000 ohms)	33-320344
37	Resistor (32,000 ohms)	33-332434
38	Resistor (250,000 ohms)	33-424344
39	Resistor (250,000 ohms)	33-424344
40	Resistor (500,000 ohms)	33-449344
41	Condenser (.01 mfd.)	3903-0SU
42	Condenser (250 mmfd.)	30-1032
43	Condenser (4000 mmfd.)	30-4185

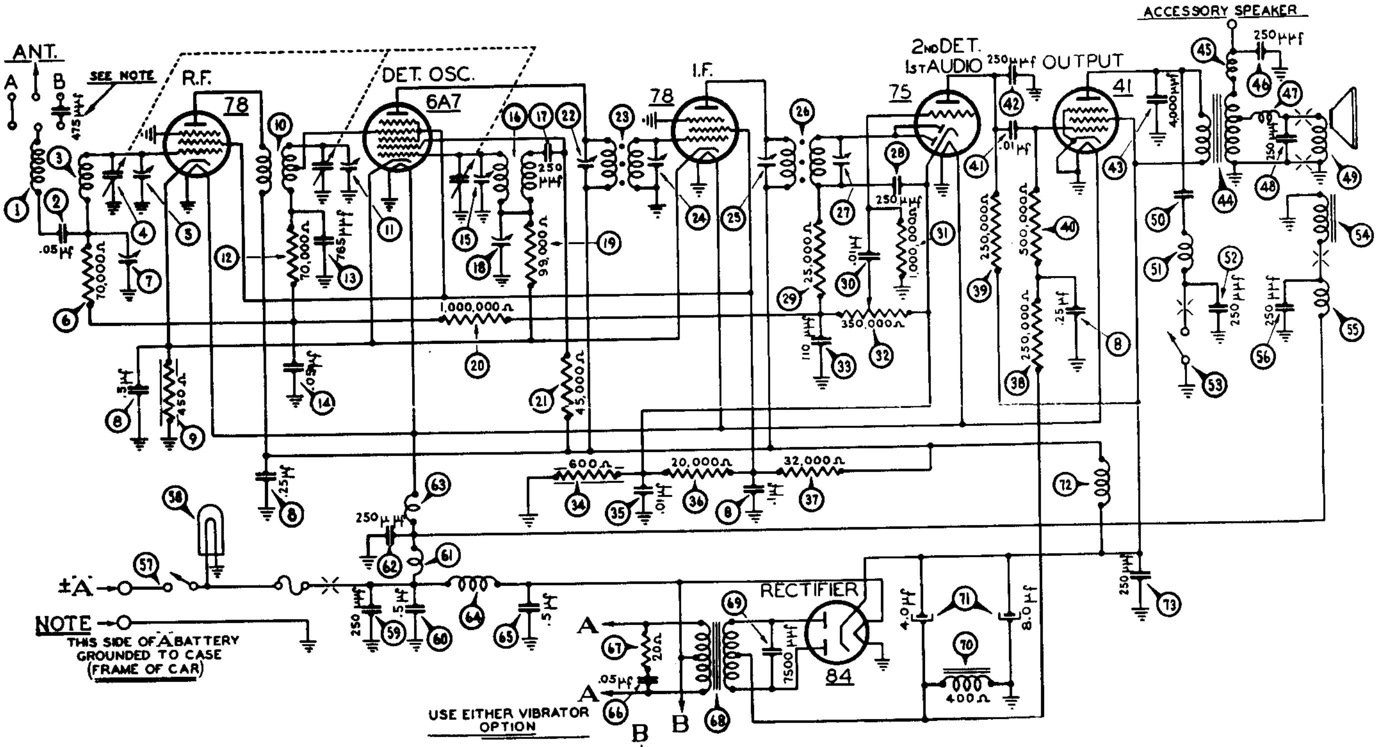
No.	Description	Part No.
44	Output Transformer	32-7815
45	Choke	32-1374
46	Condenser (250 mmfd.)	30-1032
47	Cone & Voice Coil	36-3586
48	Condenser (.025 mfd.)	7653-0SU
49	Choke	32-1464
50	Condenser (250 mmfd.)	30-1032
51	Tone Control Switch	42-1225
52	Field Coil Assembly	36-3597
	Complete Speaker (CD)	36-1267
53	On & Off Switch	42-1318
54	Pilot Lamp	34-2040
55	Condenser (250 mmfd.)	30-1032
56	Condenser (.5 mfd.)	30-4015
57	"A" Choke	32-1604
58	Condenser (250 mmfd.)	30-1032
59	Filament Choke	32-2535
60	Vibrator Choke	32-2039
61	Condenser (.5 mfd.)	30-4015
62	Condenser (.05 mfd.)	30-4444
63	Resistor (20 ohms)	33-020344
64	Power Transformer	32-7550
65	Condenser (7,500 mmfd.)	30-4420
66	Filter Choke	32-7545
67	Filter Condenser (4-8 mfd.)	30-2150
68	Condenser (250 mmfd.)	30-1032
69	"B" Choke	32-1281
70	Vibrator (OPTIONAL)	41-3170-2 41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Tuning & Volume Knob	27-4521
	On & Off Knob	27-4525
	Pilot Lamp Assembly	38-7734
	Scale Assembly	42-5714
	Tuning & Volume Shaft	28-8740
	Tone Control Shaft	L-2767
	Control Assembly	42-5713
	Distributor Resistor	33-1196
	Interference Condenser	30-4007
	Antenna Condenser	30-4412
	Antenna Connector	28-6423
	Insulator	27-8199
	Fuse	7227

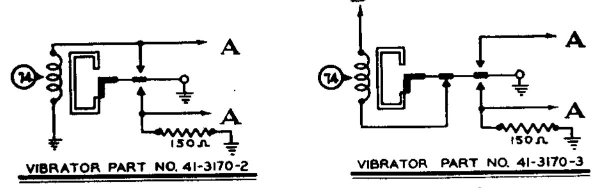


No.	Description	Part No.	No.	Description	Part No.
	Fuse Insulator	27-7729		Nut	W-518
	Tee Bolt	28-6161		Receiver Housing	38-8571

TRANSITONE AUTOMOBILE RADIO CORP.

MODEL 827K





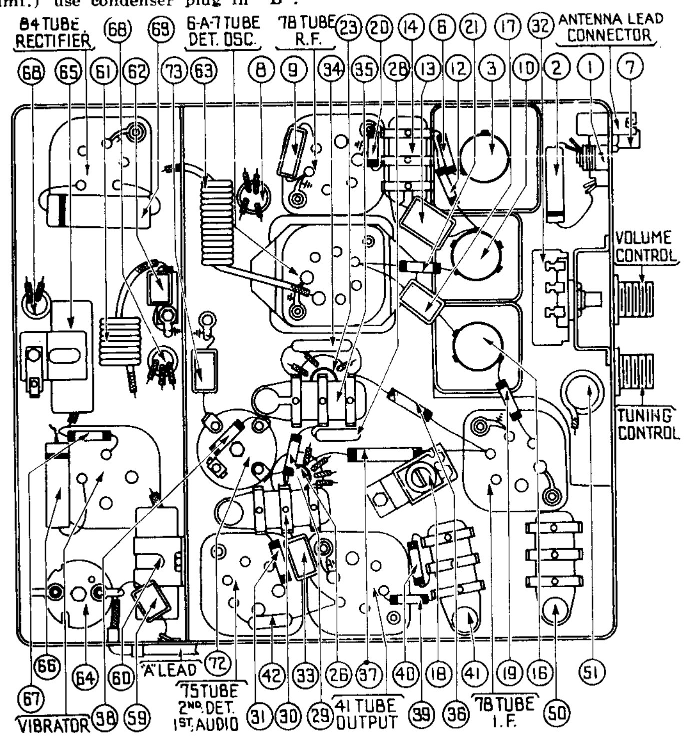
I.F.= 260 KC.

NOTE: When the Receiver is installed in a car having a top antenna, under-car antenna, spare wheel antenna or antenna having a similarly low relative capacitance (50 mmf. to 450 mmf.) use connector plug in "A".

When the Receiver is installed in a car having a metal insert top antenna, insulated door antenna, insulated trunk cover antenna or antenna having similarly high relative capacitance (450 mmf. to 2500 mmf.) use condenser plug in "B".

MODEL 827K PARTS LIST

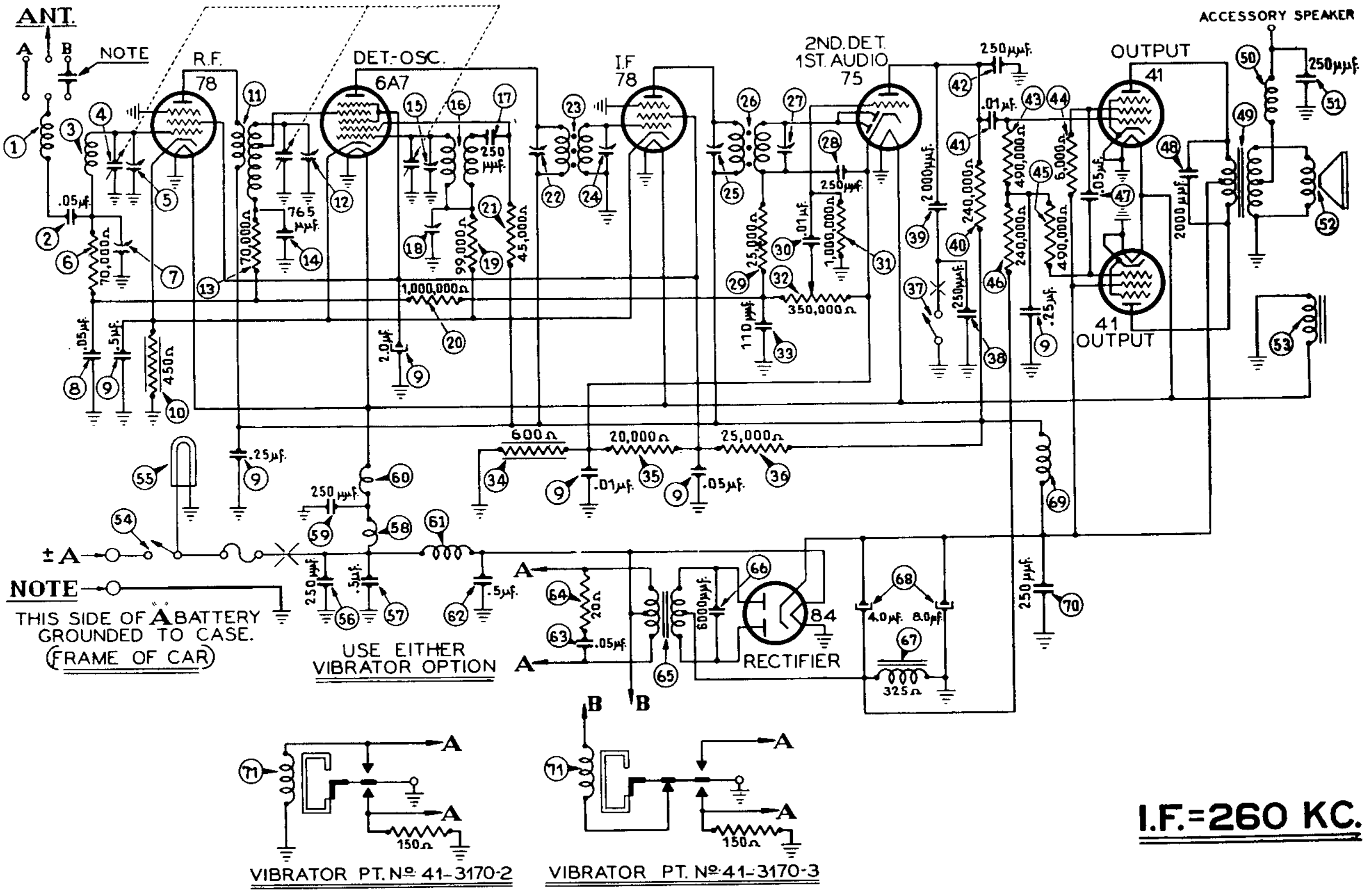
No.	Description	Part No.
1	Antenna Choke	38-8651
2	Condenser (.05 mfd.)	30-4444
3	Antenna Transformer	32-2516
4	Tuning Condenser	31-1930
5	First Padder (on Tun. Cond.)	
6	Resistor (70,000 ohms)	33-370344
7	Antenna Compensating Condenser	31-6082
8	Condenser (.1-.25-.25-.5 mfd.)	30-4415
9	Resistor (450 ohms)	33-1218
10	R. F. Transformer	32-2307
11	Second Padder (on Tun. Cond.)	
12	Resistor (70,000 ohms)	33-370344
13	Condenser (765 mmfd.)	30-1069
14	Condenser (.05 mfd.)	3615-0SG
15	Third Padder (on Tun. Cond.)	
16	Oscillator Transformer	32-2308
17	Condenser (250 mmfd.)	30-1032
18	Low Frequency Padder	31-6102
19	Resistor (99,000 ohms)	33-399344
20	Resistor (1,000,000 ohms)	33-510344
21	Resistor (45,000 ohms)	33-345344
22	Padder (Pri. 1st I.F. Trans.)	
23	First I. F. Transformer	32-2026
24	Padder (Sec. 1st I.F. Trans.)	
25	Padder (Pri. 2nd I.F. Trans.)	
26	Second I. F. Transformer	32-2027
27	Padder (Sec. 2nd I.F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (.01 mfd.)	3903-0SU
31	Resistor (1,000,000 ohms)	33-510344
32	Volume Control (350,000 ohms)	33-5148
33	Condenser (110 mmfd.)	30-1031
34	Resistor (600 ohms)	33-1212
35	Condenser (.01 mfd.)	3903-0SG
36	Resistor (20,000 ohms)	33-320344
37	Resistor (32,000 ohms)	33-332434
38	Resistor (250,000 ohms)	33-424344
39	Resistor (250,000 ohms)	33-424344
40	Resistor (500,000 ohms)	33-449344
41	Condenser (.01 mfd.)	3903-0SU
42	Condenser (250 mmfd.)	30-1032
43	Condenser (4000 mmfd.)	30-4185
44	Output Transformer	32-7816
45	Choke	32-1374
46	Condenser (250 mmfd.)	30-1032
47	Choke	32-2535
48	Condenser (250 mmfd.)	30-1032
49	Cone & Voice Coil	36-3159
50	Condenser (.025 mfd.)	7653-0SU
51	Choke	32-1464
52	Condenser (250 mmfd.)	30-1032
53	Tone Control Switch	42-1225
54	Field Coil Assembly	36-3513
	Complete Speaker (A47)	36-1331
55	Choke	32-1930
56	Condenser (250 mmfd.)	30-1032
57	On & Off Switch	42-1318
58	Pilot Lamp	34-2040
59	Condenser (250 mmfd.)	30-1032
60	Condenser (.5 mfd.)	30-4015
61	"A" Choke	32-1604
62	Condenser (250 mmfd.)	30-1032
63	Filament Choke	32-2535
64	Vibrator Choke	32-2039
65	Condenser (.5 mfd.)	30-4015
66	Condenser (.05 mfd.)	30-4444
67	Resistor (20 ohms)	33-020344
68	Power Transformer	32-7550
69	Condenser (7500 mmfd.)	30-4420
70	Filter Choke	32-7545
71	Filter Condenser (4-8 mfd.)	30-2150
72	"B" Choke	32-1281
73	Condenser (250 mmfd.)	30-1032
74	Vibrator (OPTIONAL)	41-3170-2 41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Tuning & Volume Knob	27-4521
	On & Off Knob	27-4525
	Pilot Lamp Assembly	38-7734
	Scale Assembly	42-5714
	Tuning & Volume Shaft	28-8740
	Tone Control Shaft	L-2767
	Distributor Resistor	33-1196
	Interference Condenser	30-4007
	Antenna Condenser	30-4412
	Antenna Connector	28-6423
	Insulator	27-8199
	Fuse	7227



No.	Description	Part No.	No.	Description	Part No.
	Fuse Insulator	27-7729		Receiver Housing	38-8573
	Tee Bolt (Rec. Mtg.)	28-6161		Stud (Speaker Mtg.)	6122
	Nut (Rec. Mtg.)	W518		Nut (Speaker Mtg.)	W55

TRANSITONE AUTOMOBILE RADIO CORP.

MODEL 828

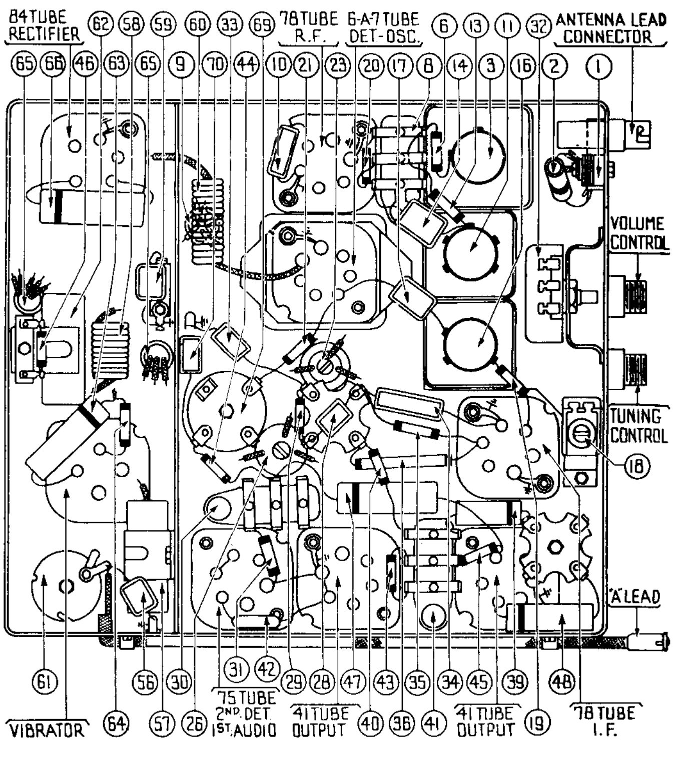


NOTE: When the Receiver is installed in a car having a top antenna, under-car antenna, spare wheel antenna or antenna having a similarly low relative capacitance (50 mmf. to 450 mmf.) use connector plug in "A".

When the Receiver is installed in a car having a metal insert top antenna, insulated door antenna, insulated trunk cover antenna or antenna having similarly high relative capacitance (450 mmf. to 2500 mmf.) use condenser plug in "B".

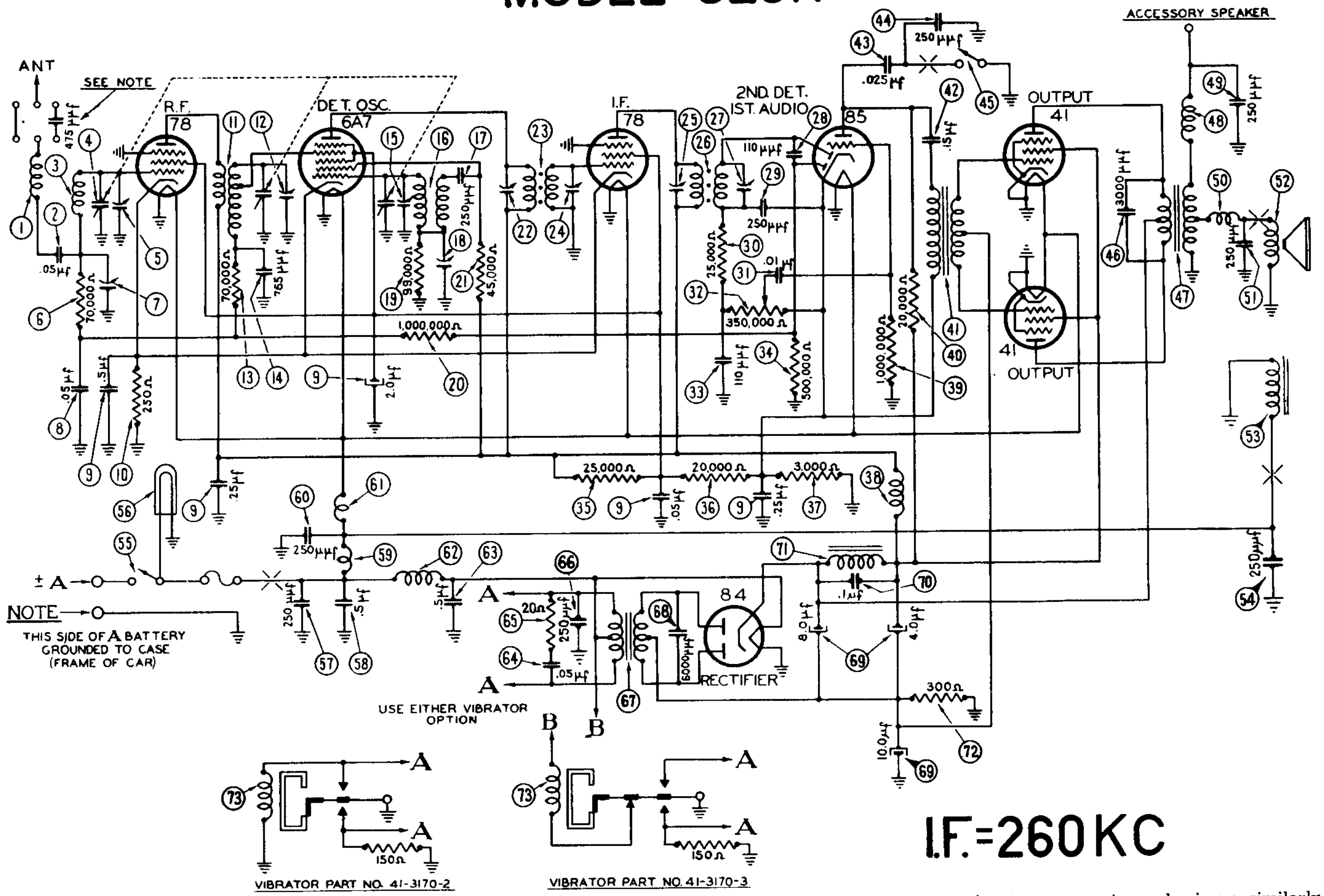
MODEL 828 PARTS LIST

No.	Description	Part No.
1	Antenna Choke	38-8651
2	Condenser (.05 mfd.)	30-4444
3	Antenna Transformer	32-2516
4	Tuning Condenser	31-1930
5	First Padder (on Tun. Cond.)	
6	Resistor (70,000 ohms)	33-370344
7	Antenna Compensating Condenser	31-6082
8	Condenser (.05 mfd.)	3615-0SG
9	Condenser (.01-.05-.25-.25-.5-2 mfd.)	30-4510
10	Resistor (450 ohms)	33-1218
11	R. F. Transformer	32-2307
12	Second Padder (on Tun. Cond.)	
13	Resistor (70,000 ohms)	33-370344
14	Condenser (765 mmfd.)	30-1069
15	Third Padder (on Tun. Cond.)	
16	Oscillator Transformer	32-2308
17	Condenser (250 mmfd.)	30-1032
18	Low Frequency Padder	31-6102
19	Resistor (99,000 ohms)	33-399344
20	Resistor (1,000,000 ohms)	33-510344
21	Resistor (45,000 ohms)	33-345344
22	Padder (Pri. 1st I. F. Trans.)	
23	First I. F. Transformer	32-2026
24	Padder (Sec. 1st I.F. Trans.)	
25	Padder (Pri. 2nd I.F. Trans.)	
26	Second I. F. Transformer	32-2027
27	Padder (Sec. 2nd I.F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-325344
30	Condenser (.01 mfd.)	3903-0SU
31	Resistor (1,000,000 ohms)	33-510344
32	Volume Control (350,000 ohms)	33-5148
33	Condenser (110 mmfd.)	30-1031
34	Resistor (600 ohms)	33-1212
35	Resistor (20,000 ohms)	33-320344
36	Resistor (25,000 ohms)	33-325444
37	Tone Control Switch	42-1225
38	Condenser (250 mmfd.)	30-1032
39	Condenser (2000 mmfd.)	30-4177
40	Resistor (240,000 ohms)	33-424344
41	Condenser (.01 mfd.)	3903-0SU
42	Condenser (250 mmfd.)	30-1032
43	Resistor (490,000 ohms)	33-449344
44	Resistor (6,000 ohms)	33-260344
45	Resistor (490,000 ohms)	33-449344
46	Resistor (240,000 ohms)	33-424344
47	Condenser (.05 mfd.)	30-4454
48	Condenser (2000 mmfd.)	30-4177
49	Output Transformer	32-7818
50	Choke	32-1464
51	Condenser (250 mmfd.)	30-1032
52	Cone & Voice Coil	36-3586
53	Field Coil Assembly	36-3597
	Complete Speaker (CB)	36-1203
54	On & Off Switch	42-1318
55	Pilot Lamp	34-2040
56	Condenser (250 mmfd.)	30-1032
57	Condenser (.5 mfd.)	30-4015
58	"A" Choke	32-1604
59	Condenser (250 mmfd.)	30-1032
60	Filament Choke	32-2535
61	Vibrator Choke	32-2039
62	Condenser (.5 mfd.)	30-4015
63	Condenser (.05 mfd.)	30-4444
64	Resistor (20 ohms)	33-020344
65	Power Transformer	32-7821
66	Condenser (6000 mmfd.)	30-4512
67	Filter Choke	32-7822
68	Filter Condenser (4-8 mfd.)	30-2150
69	"B" Choke	32-1281
70	Condenser (250 mmfd.)	30-1032
71	Vibrator (OPTIONAL)	41-3170-2 41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Tuning & Volume Knob	27-4521
	On & Off Knob	27-4525
	Pilot Lamp Assembly	38-7734
	Scale Assembly	42-5714
	Tuning & Volume Shaft	28-8740
	Tone Control Cable	L-2767
	Control Assembly	42-5713
	Distributor Resistor	33-1196
	Interference Condenser	30-4007
	Antenna Condenser	30-4412
	Antenna Connector	28-6423
	Insulator	27-8199
	Fuse	7227
	Fuse Insulator	27-7729
	Tee Bolt	28-6161
	Nut	W518
	Receiver Housing	38-8571



TRANSITONE AUTOMOBILE RADIO CORP.

MODEL 828K



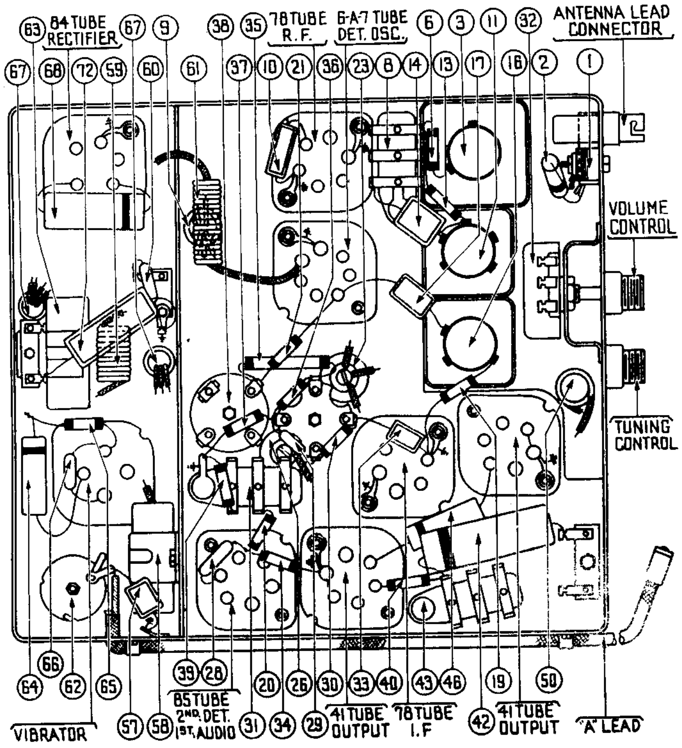
I.F.=260KC

NOTE: When the Receiver is installed in a car having a top antenna, under-car antenna, spare wheel antenna or antenna having a similarly low relative capacitance (50 mmf. to 450 mmf.) use connector plug in "A".

When the Receiver is installed in a car having a metal insert top antenna, insulated door antenna, insulated trunk cover antenna or antenna having similarly high relative capacitance (450 mmf. to 2500 mmf.) use condenser plug in "B".

MODEL 828K PARTS LIST

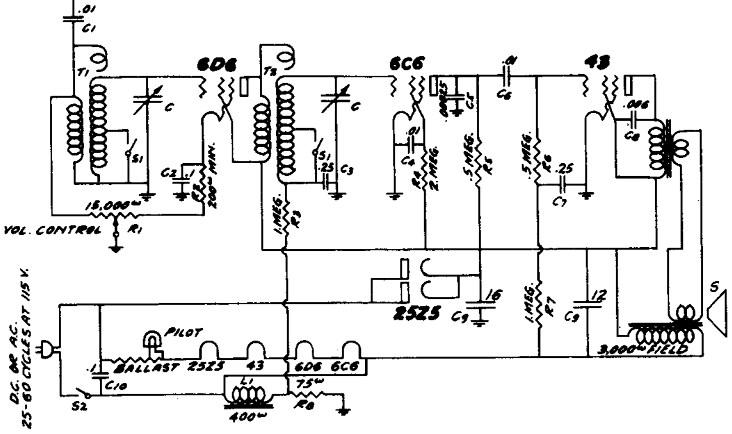
No.	Description	Part No.
1	Antenna Choke	38-8532
2	Condenser (.05 mfd.)	30-4444
3	Antenna Transformer	32-2516
4	Tuning Condenser	31-1770
5	First Padder (on tun. cond.)	
6	Resistor (70,000 ohms)	33-370344
7	Antenna Compensating Condenser	31-6082
8	Condenser (.05 mfd.)	3615-0SG
9	Condenser (.05-.25-.25-.5-2 mfd.)	30-4513
10	Resistor (250 ohms)	33-1259
11	R. F. Transformer	32-2307
12	Second Padder (on tun. cond.)	
13	Resistor (70,000 ohms)	33-370344
14	Condenser (765 mmfd.)	30-1069
15	Third Padder (on tun. cond.)	
16	Oscillator Transformer	32-2308
17	Condenser (250 mmfd.)	30-1032
18	Low Frequency Padder	31-6102
19	Resistor (99,000 ohms)	33-399344
20	Resistor (1,000,000 ohms)	33-510344
21	Resistor (45,000 ohms)	33-345344
22	Padder (Pri. 1st I.F. Trans.)	
23	First I. F. Transformer	32-2026
24	Padder (Sec. 1st I.F. Trans.)	
25	Padder (Pri. 2nd I.F. Trans.)	
26	Second I. F. Transformer	30-2034
27	Padder (Sec. 2nd I.F. Trans.)	
28	Condenser (110 mmfd.)	30-1031
29	Condenser (250 mmfd.)	30-1032
30	Resistor (25,000 ohms)	33-325344
31	Condenser (.01 mfd.)	3903-0SU
32	Volume Control (350,000 ohms)	33-5148
33	Condenser (110 mmfd.)	30-1031
34	Resistor (500,000 ohms)	33-449344
35	Resistor (25,000 ohms)	33-325444
36	Resistor (20,000 ohms)	33-320344
37	Resistor (3,000 ohms)	33-230344
38	"B" Choke	32-1281
39	Resistor (1,000,000 ohms)	33-510344
40	Resistor (20,000 ohms)	33-320344
41	Input Transformer	32-7828
42	Condenser (.15 mfd.)	30-4505
43	Condenser (.025 mfd.)	7653-0SU
44	Condenser (250 mmfd.)	30-1032
45	Tone Control Switch	42-1225
46	Condenser (3000 mmfd.)	30-4469
47	Output Transformer	32-7829
48	Choke	32-1464
49	Condenser (250 mmfd.)	30-1032
50	Choke	32-2269
51	Condenser (250 mmfd.)	30-1032
52	Cone & Voice Coil	36-3159
53	Field Coil Assembly	36-3513
	Complete Speaker (A48)	36-1332
54	Condenser (250 mmfd.)	30-1032
55	On & Off Switch	42-1318
56	Pilot Lamp	34-2040
57	Condenser (250 mmfd.)	30-1032
58	Condenser (.5 mfd.)	30-4015
59	"A" Choke	32-1604
60	Condenser (250 mmfd.)	30-1032
61	Filament Choke	32-2535
62	Vibrator Choke	32-2039
63	Condenser (.5 mfd.)	30-4015
64	Condenser (.05 mfd.)	30-4444
65	Resistor (20 ohms)	33-020344
66	Condenser (250 mmfd.)	30-1032
67	Power Transformer	32-7821
68	Condenser (6000 mmfd.)	30-4512
69	Filter Condenser (4-8-10 mfd.)	30-2213
70	Condenser (.1 mfd.)	30-4455
71	Filter Choke	32-7827
72	Resistor (300 ohms)	33-1258
73	Vibrator (OPTIONAL)	41-3170-2 41-3170-3
	Four Prong Socket	27-6044
	Five Prong Socket	27-6035
	Six Prong Socket	27-6036
	Seven Prong Socket	27-6037
	Tuning & Volume Knob	27-4521
	On & Off Knob	27-4525
	Pilot Lamp Assembly	38-7734
	Scale Assembly	42-5714
	Tuning & Volume Shaft	28-8740
	Tone Control Cable	L-2767
	Control Assembly	42-5713
	Distributor Resistor	33-1196
	Interference Condenser	30-4007
	Antenna Condenser	30-4412
	Antenna Connector	28-6423
	Insulator	27-8199
	Fuse	7227

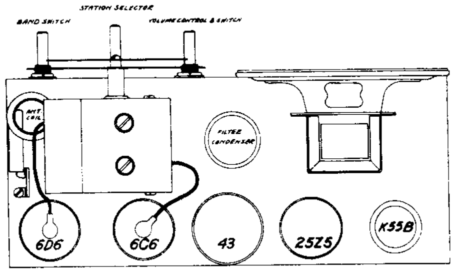


No.	Description	Part No.	No.	Description	Part No.
	Fuse Insulator	27-7729		Nut	W518
	Tee Bolt	28-6161		Receiver Housing	38-8710

TRAV-LER RADIO & TELEVISION CORP.

MODEL 521



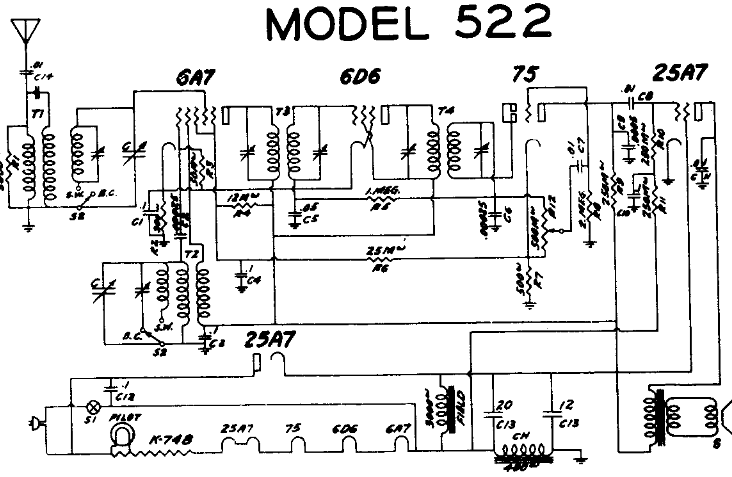


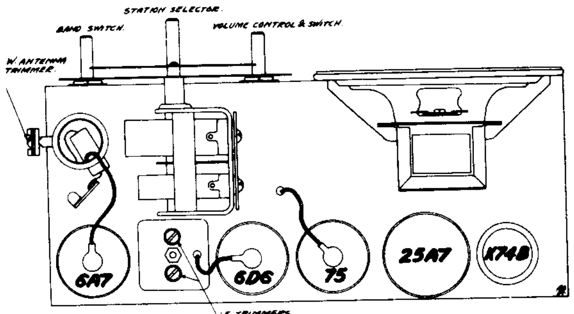
TUBE LAYOUT.

REPLACEMENT PARTS LIST.

REPLACEMENT PARTS LIST			
In Ordering Always State Model, Part No. & Description			
Part #	Description	Letter	List Price
3000-B	Speaker	S	$ 3.50
3202-A	Variable Condenser	C	2.15
3505-A	Antenna Coil	T1	.70
3803-A	R.F. Coil	T2	.70
4103-A	Volume control & switch	R1,R2,S2	.95
4602-A	Band Switch	S1	.55
4802-A	Electrolytic Condenser	C9	1.40
4601-B	Antenna Cord		.20
4461-B	Pilot Light		.15
4551-C	Line Cord		.20
5201-A	Choke	L1	.75
	Tubular Condenser .01 mfd.	C1,C4,C6	.10
	" " .1 mfd.	C2,C10	.10
	" " .25 mfd.	C3,C7	.15
	" " .006 mfd.	C8	.15
	Mica " .00025 mfd.	C5	.10
	Fixed Resistor ½ watt 1 meg.	R3,R7	.10
	" " " " 2 meg.	R4	.10
	" " " " .5 meg.	R5,R6	.10
	" " " " 75Ω	R8	.10

MODEL 522





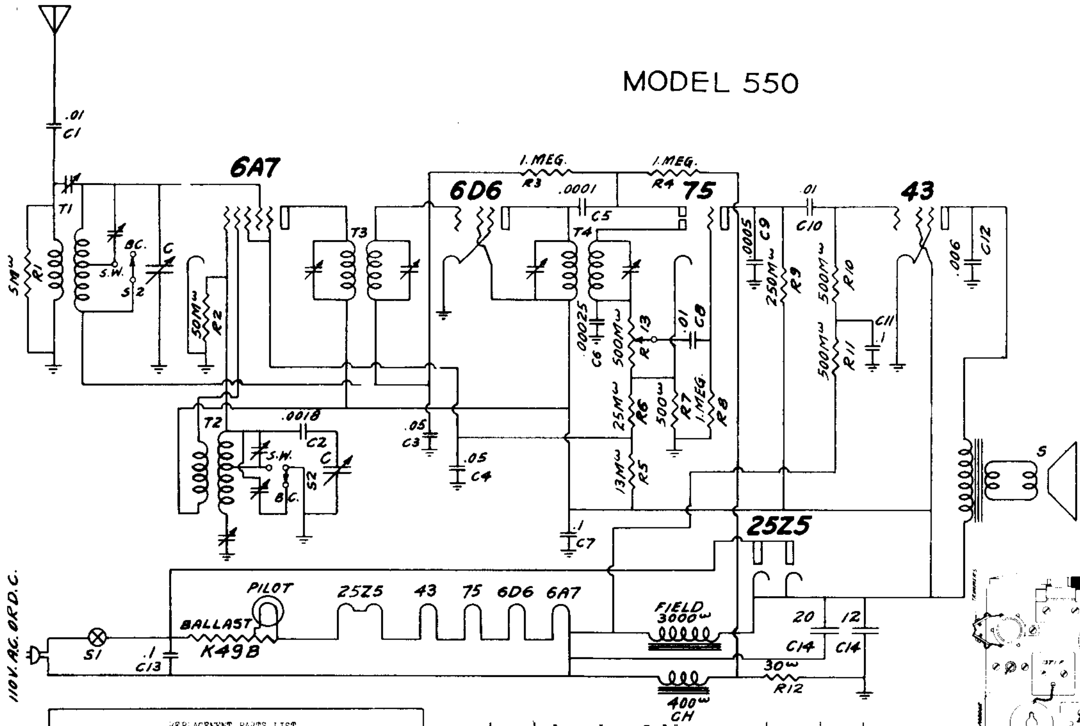
TUBE LAYOUT

REPLACEMENT PARTS LIST

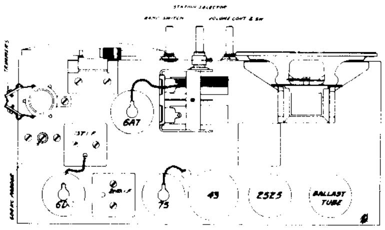
REPLACEMENT PARTS LIST			
In Ordering Always State Model, Part No. & Description			
Part #	Description	Letter	List Price
3507-A	Antenna Coil	T1	.70
3508-A	Oscillator Coil	T2	.70
5708-A	1st I.F. Coil	T3	1.05
5707-A	2nd I.F. Coil	T4	1.05
5201-B	Choke	CH	.75
4461-B	Pilot Bulb		.15
3000-C	Loud Speaker	S	3.50
4551-B	Line Cord		.20
4106-A	Volume Control & Switch	R12,S1	1.00
4602-B	Band Switch	S2	.60
3206-A	Tuning Condenser	C	2.10
	Mica Condenser .00025 MF.	C2,C6	.10
	Mica Condenser .0005 MF.	C9	.10
	Tubular Condenser .1 MF. 200 V.	C1,C3,C4	.10
		C10,C12	
	Tubular Condenser .05 MF. 200 V.	C5 C14	.10
	" " .01 " "	C7,C8,C11	.10
4801-B	Filter Condenser 20 & 12 MF.	C13	1.25
	Resistor 5000Ω ½ Watt	R1	.10
	" 300Ω " "	R2	.10
	" 50MΩ "	R3	.10
	" 12MΩ " "	R4	.10
	" 1. meg. ½ Watt	R5	.10
	" 25MΩ " "	R6	.10
	" 500Ω " "	R7	.10
	" 2. meg. " "	R8	.10
	" 250MΩ " "	R9,R10,R11	.10
4601-C	Antenna Cord		.20

TRAV-LER RADIO & TELEVISION CORP.

MODEL 550



I. F. 456 K.C.



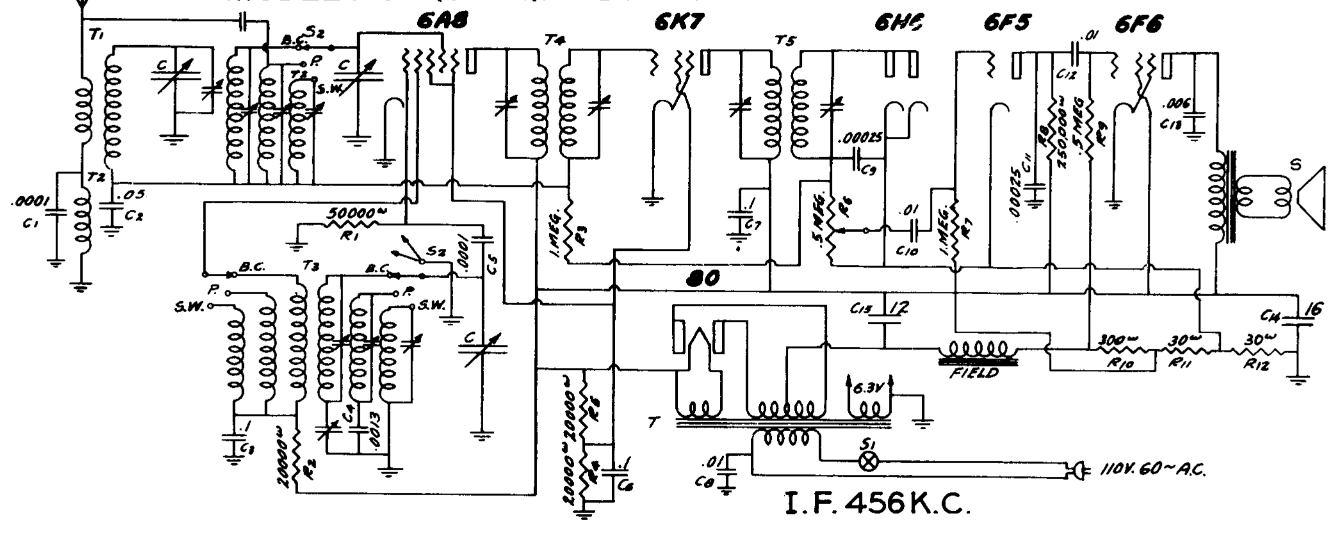
I.F. PEAK 456 KC.

TUBE LAYOUT.

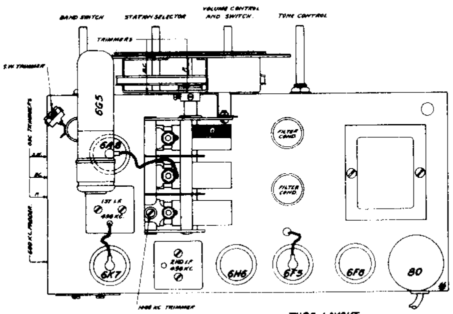
REPLACEMENT PARTS LIST
IN ORDERING ALWAYS STATE MODEL, PART NO. & DESCRIPTION

PART #	DESCRIPTION	LETTER	LIST PRICE
3506-B	Antenna Coil	T1	.75
6502-B	Osc. Coil	T2	.50
5704-C	1st I.F. Coil	T3	1.10
6706-C	2nd I.F. Coil	T4	1.10
3006-A	Loud Speaker	S	3.50
5201-D	Choke	CH	.75
4604-B	Band Switch	S2	.75
4106-B	Volume Control & SW	R13 & S1	1.10
3204-B	Tuning Condenser	C	1.25
	Fixed Resistor 5M" ¼ Watt	R1	.10
	" " 50M" " "	R2	.10
	" " 1 Meg" "	R3,R4,R5	.10
	" " 13M" " "	R5	.10
	" " 25M" " "	R6	.10
	" " 500" " "	R7	.10
	" " 250M" " "	R9	.10
	" " 500M" " "	R10,R11	.10
	" " 30" " "	R12	.10
	Mica Condenser .0018 MF.	C2	.15
	" " .0001 "	C5	.10
	" " .00025"	C6	.10
	" " .0005 "	C9	.10
	Tubular Condenser .01 MF. 200 v.	C1,C8	.10
	" " .01 MF. 400 v.	C10	.10
	" " .05 MF. 200 v.	C3,C4	.10
	" " .1 MF. 200 v.	C7,C11,C13	.10
	" " .006 MF. 600 v.	C12	.10
4807-A	Filter Condenser 20-12 MF.	C14	1.20
4451-G	Pilot Bulb		.15
4563-B	Line Cord		.30
6503-A	Dial (Complete)		1.70
	Cabinet		7.50

MODELS 635,635M,135 & 135M



I. F. 456 K.C.



TUBE LAYOUT.

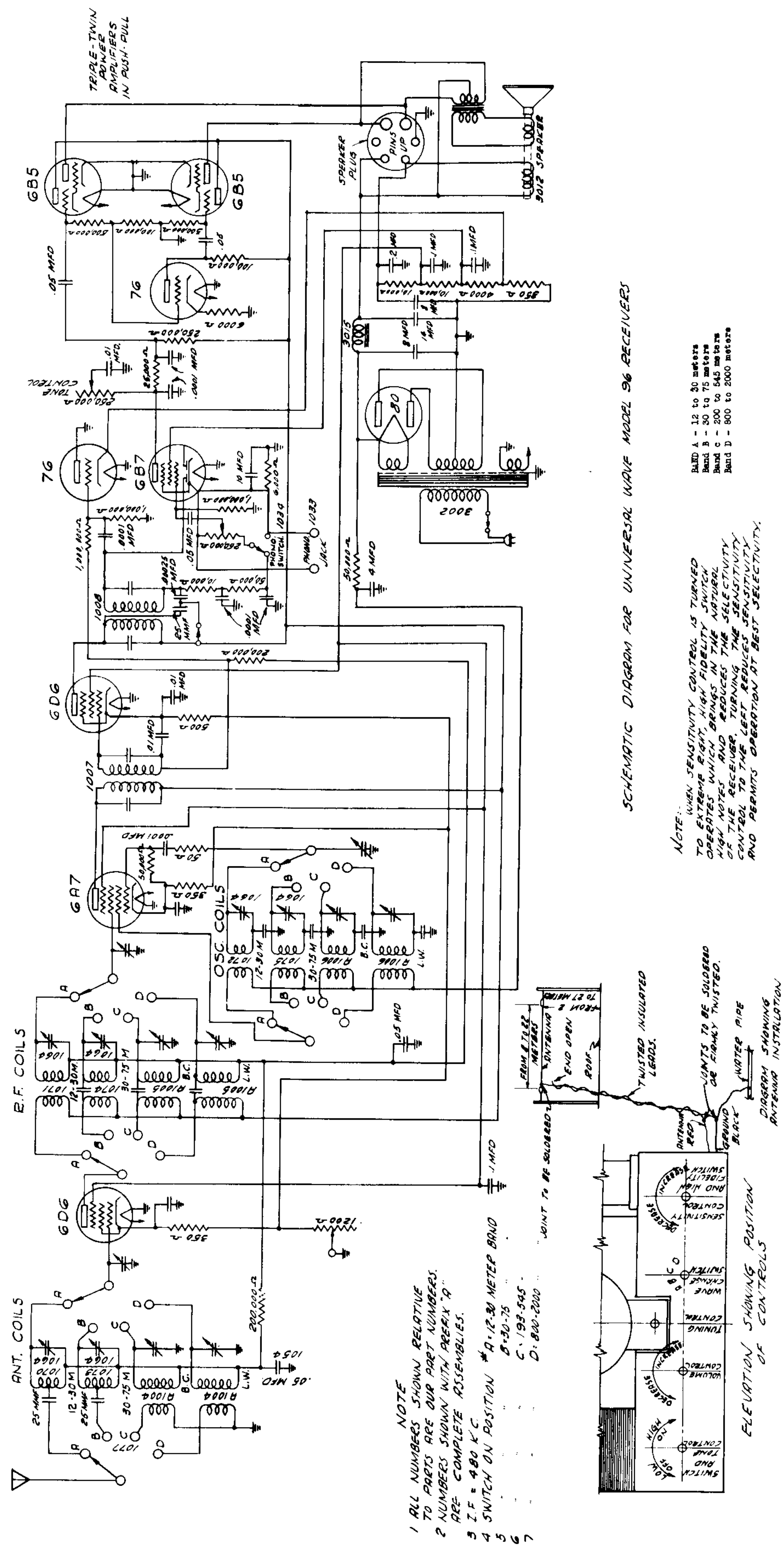
REPLACEMENT PARTS LIST

IN ORDERING ALWAYS STATE MODEL, PART NO. & DESCRIPTION

PART #	DESCRIPTION	LETTER	LIST PRICE
3509-A	Ant. & R. F. Transformer	T1	.75
3610-A	S.W. Transformer	T2	1.50
5504-A	Osc. Transformer	T3	1.80
5704-B	1st I.F. Transformer	T4	1.10
5705-B	2nd I.F. Transformer	T5	1.10
	Tubular Condenser .05 MF.	C2	.10
	" " .1 MF.	C3,C6,C7	.10
	" " .01 MF.	C8,C10,C12	.10
	" " .006 MF.	C13	.10
	Mica Condenser .0001 MF.	C1,C5	.15
	" " .0013 MF.	C4	.15
	" " .00025 MF.	C9,C11	.15
4806-B	Filter Condenser 16 MF.	C14	.80
4804-B	" " 12 MF.	C15	.70
	Fixed Resistor 50,000" ¼ Watt	R1	.10
	" " 20,000" " "	R2	.10
	" " 1. meg. " "	R3,R7	.10
	" " ¼ meg. " "	R8	.10
	" " ½ " " "	R9	.10
	" " 20,000" ½ "	R4,R5	.15
6651-B	Armored Resistor 300".30".30"	R10,R11,R12	.50
4109-A	Volume Control & Switch	R6,S1	1.10
4605-A	Band Switch	S2	1.10
3004-A	Loud Speaker	S	4.20
6903-A	Power Transformer	T	3.80
3207-A	Tuning Condenser	C	4.50
4555-A	Line Cord		.30
6502-A	Dial Complete		4.00

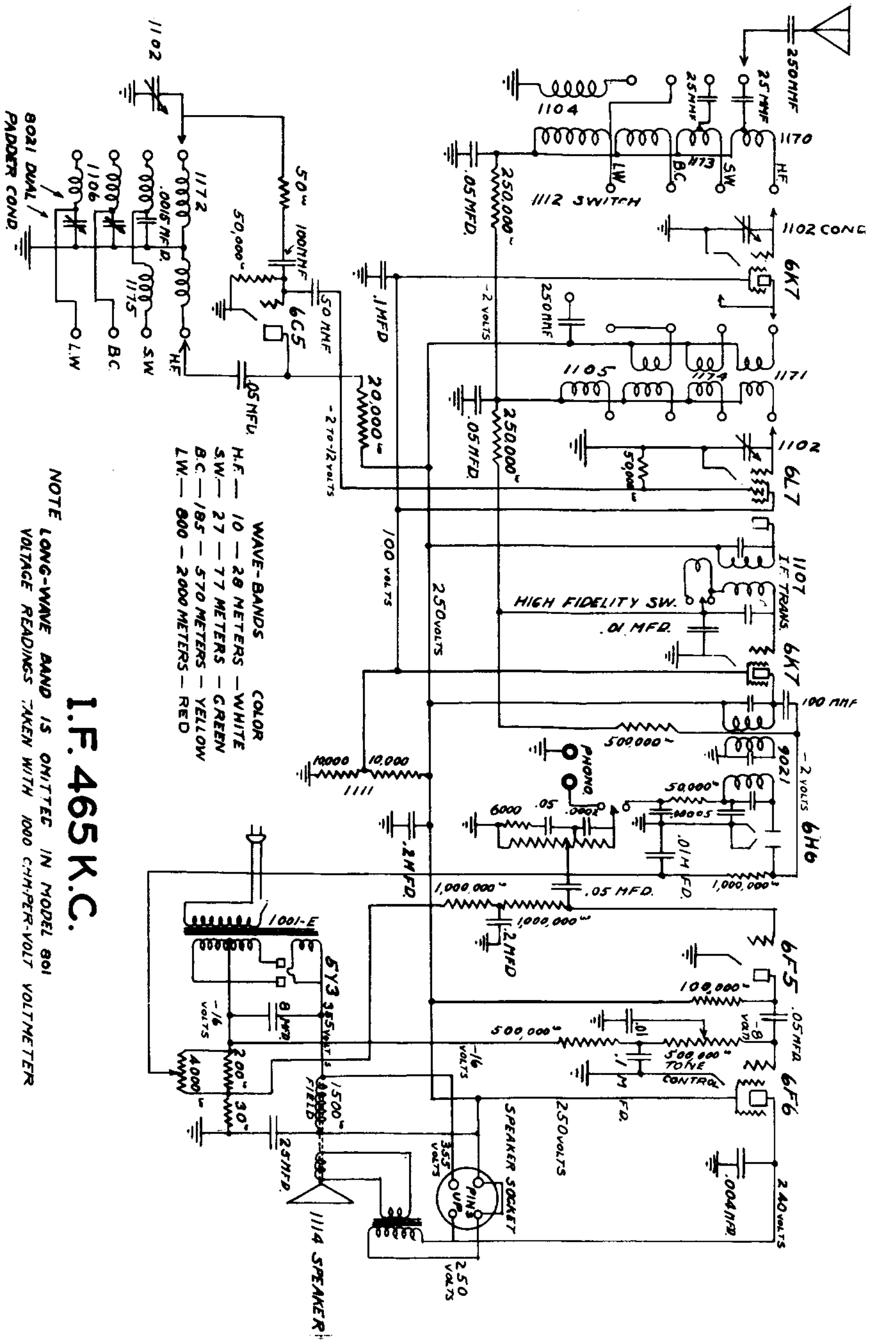
ULTRAMAR MANUFACTURING CORPORATION

MODEL 96



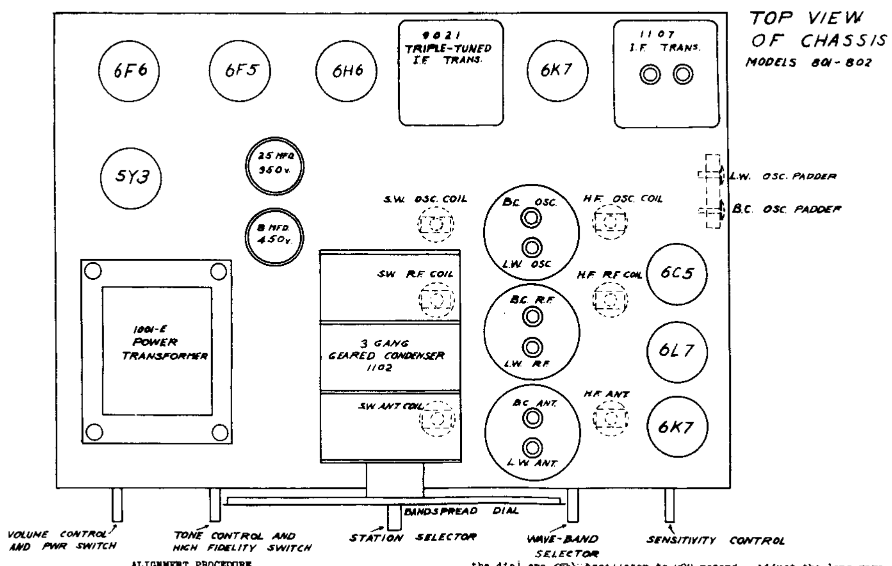
ULTRAMAR MANUFACTURING CORPORATION

MODELS 801 & 802



I.F. 465 K.C.

NOTE LONG-WAVE BAND IS OMITTED IN MODEL 801
VOLTAGE READINGS TAKEN WITH 1000 OHM-PER-VOLT VOLTMETER



ALIGNMENT PROCEDURE

Realignment of this receiver should never be necessary unless one of the coils has been changed. Lack of sensitivity, selectivity, and poor tone quality may be due to defective tubes, speaker or condensers, insufficient or excessive antenna, open or grounded resistors, etc. If an I.F. tube is replaced, it is necessary to realign the I.F. transformers.

A calibrated oscillator such as Model 180, covering the ranges from 20 to 2,000 meters and an output meter (connected between plate and screen prongs of the 6F6 tube) will be required. Use low values of output to prevent false readings due to the operation of the automatic volume control while aligning.

The output meter may also be connected across the two small prongs of the speaker plug.

INTERMEDIATE STAGE ALIGNMENT

1. Connect the output of the test oscillator to the grid of the 6L7 converter tube and connect a 1 megohm resistor from this grid to the chassis. Connect the ground side of the oscillator (the shielding) to the receiver chassis.

2. Set the test oscillator to 465 K.C. Refer to Curve B on the Calibration chart to obtain the proper setting of the test oscillator.

3. Set the tone control to the left. Align the output intermediate frequency transformer by turning the top screw at the rear of the output I.F. transformer until maximum response is obtained on the output meter. Adjust the other trimmer screws in the same manner.

4. Adjust the input intermediate frequecy transformer in the same manner.

ALIGNMENT OF TUNING CIRCUITS

5. Connect the output of the test oscillator to the antenna lead of the receiver through a .00025 M.F.D. condenser and connect the ground side (shielding) to the chassis.

6. Set the wave change switch to the long-wave position (Red). Set the dial and test oscillator to 900 meters. Adjust the long-wave oscillator trimmer until the signal is brought in. If no signal is heard, then adjust the long-wave padder. See diagram of chassis for location of trimmer and padder condensers.

7. Then adjust the long-wave antenna and R.F. trimmers for maximum response. Set the dial and test oscillator to 1800 meters and adjust the long-wave padder for maximum response while rocking the gang condenser. By rocking the gang is meant tuning to a point just above and just below the test oscillator frequency while making some other adjustment. Return to 900 meters and repeat the entire procedure.

8. Set the wave change switch to the broadcast position (Yellow). Set the dial and test oscillator to 214 meters (1400 K.C.) and adjust the B.C. oscillator, R.F. and antenna trimmers till maximum response is obtained. Set the dial and test oscillator to 600 K.C. and adjust the B.C. padder condenser while rocking the gang till maximum response is obtained.

9. Set the wave change switch to the high frequency band (Short-wave Green). Substitute a 400 ohm resistor for the .00025 M.F.D. condenser in the antenna circuit. Set the dial and test oscillator to 30 meters (10 megacycles). Stand the receiver on end and adjust the 30 meter oscillator coil (located to the right of switch when viewed from bottom) till the signal is brought in. Stop at the first peak. Screwing the trimmer down still more will give another peak which is the image and must not be used. To make certain the set is not tuned to the image, set the test oscillator to 11 megacycles and if another signal is received, then the set is correctly tuned. Reset the test oscillator to 30 meters and adjust the R.F. and antenna trimmers for maximum response, while rocking the gang. Set the dial and test oscillator to 75 meters and check for sensitivity.

10. Set the wave-change switch to the ultra-high frequency band (White). Set the test oscillator and dial to 11 meters (27.3 megacycles). Adjust the oscillator trimmer till the signal is brought in. Continue on through to the second peak. The image signal will now be found at 26.3 megacycles if the oscillator trimmer adjustment is correct. Reset the dial to 11 meters and adjust the R.F. and antenna trimmers for maximum response while rocking the gang.

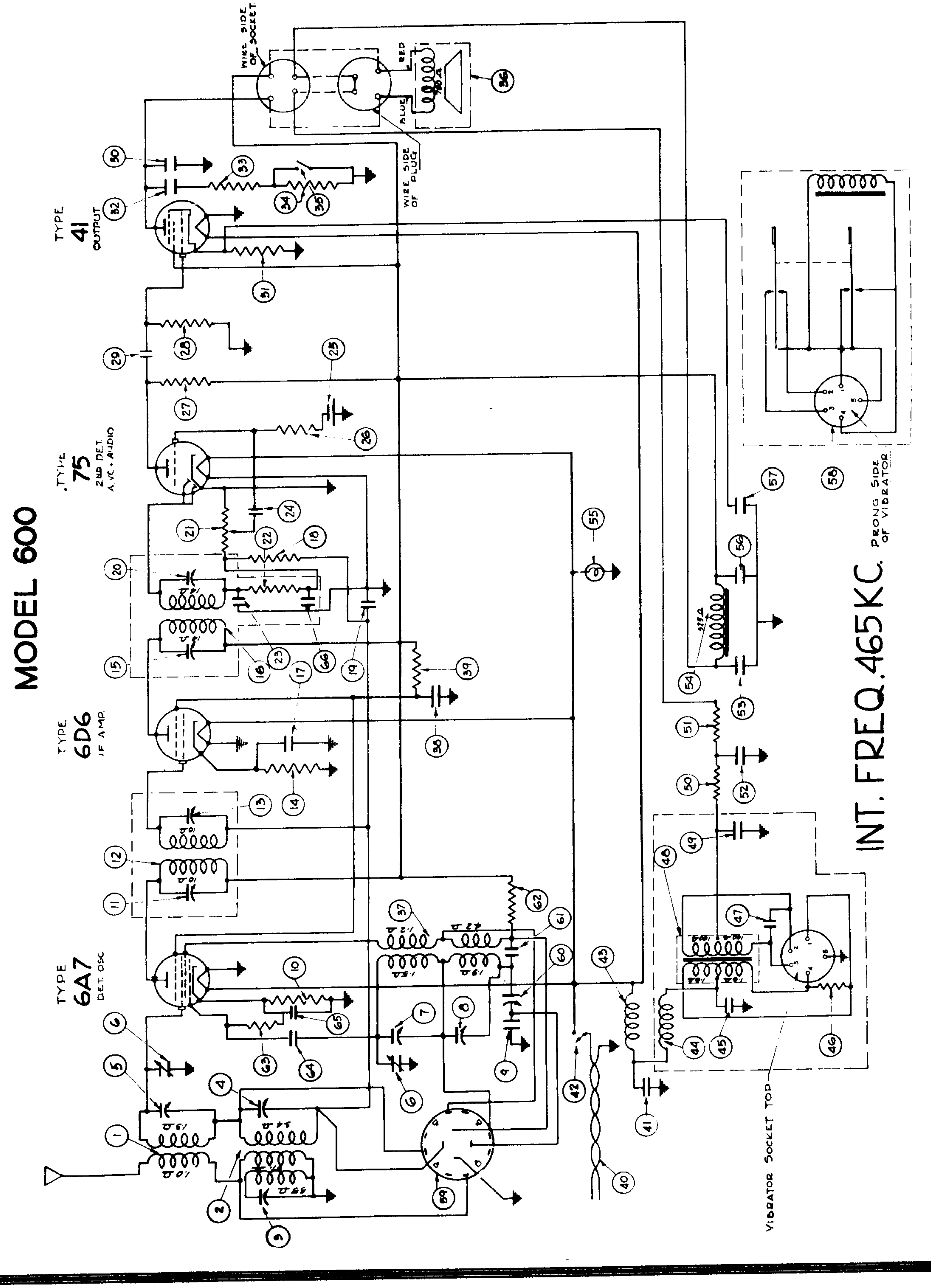
Set the dial and test oscillator to 26 meters and check for sensitivity.

PARTS LIST

PART NO.	DESCRIPTION	PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
1001-E	Universal Transformer	1110	Volume Control and switch		
1102	3 Gang Geared Condenser	1114-A	Sensitivity Control		250,000 ohm 1/3 watt
*1104	B.C. & L.W. Antenna Coil	1034	Phono-radio switch		100,000 ohms 1/3 watt
*1105	B.C. & L.W. R.F. Coils	1111	Candohm Resistor		50,000 ohms 1/3 watt
*1106	B.C. & L.W. Oscillator Coils	1112	3 Gang Switch		6,000 ohms 1/3 watt
1107	Iron Core Expanded I.F.	1113	Band Indicator		50 ohms 1/3 watt
9021	Triple Tuned Output I.F.	1114	8-1/2 inch Dynamic Speaker		20,000 ohms 1 watt
1108	6-1/2 inch dial assembly	Condensers	25 MFD 350V wet electrolytic condenser	Mica	25 M.M.F.
*802-4	4 Band Translucent Scale		8 MFD 450V wet electrolytic condenser	Condensers	50 M.M.F.
*8021	Dual Padder Condenser				100 M.M.F.
1064	Isolantite Trimmer		2/10 400V Cub Condenser		250 M.M.F.
1170	H.F. Antenna Coil (10 to 28 meters)		2/10 200V Cub Condenser		.0015 M.F.D.
1171	H.F. R.F. Coil (10-28 meters)		1/10 400V Cub Condenser		
1172	H.F. Oscillator Coil (10-28 meters)		1/10 200V Cub Condenser		FOR MODEL 801 ONLY
1173	S.W. Antenna Coil (27-77 meters)		.05 400V Cub Condenser	1183	B.C. Antenna Coil
1174	S.W. R.F. Coil (27-77 meters)		.01 400V Cub Condenser	1184	B.C. R.F. Coil
1175	S.W. Oscillator Coil (27-77 meters)		.004 800V Cub Condenser	1185	B.C. Oscillator Coil
1109	Tone Control and S.P. D.T. Swtich	Resistors	1 megohm 1/3 watt	1038-C	300-600 M.M.F. padder condenser
			500,000 ohm 1/3 watt	801-3	3-band translucent scale

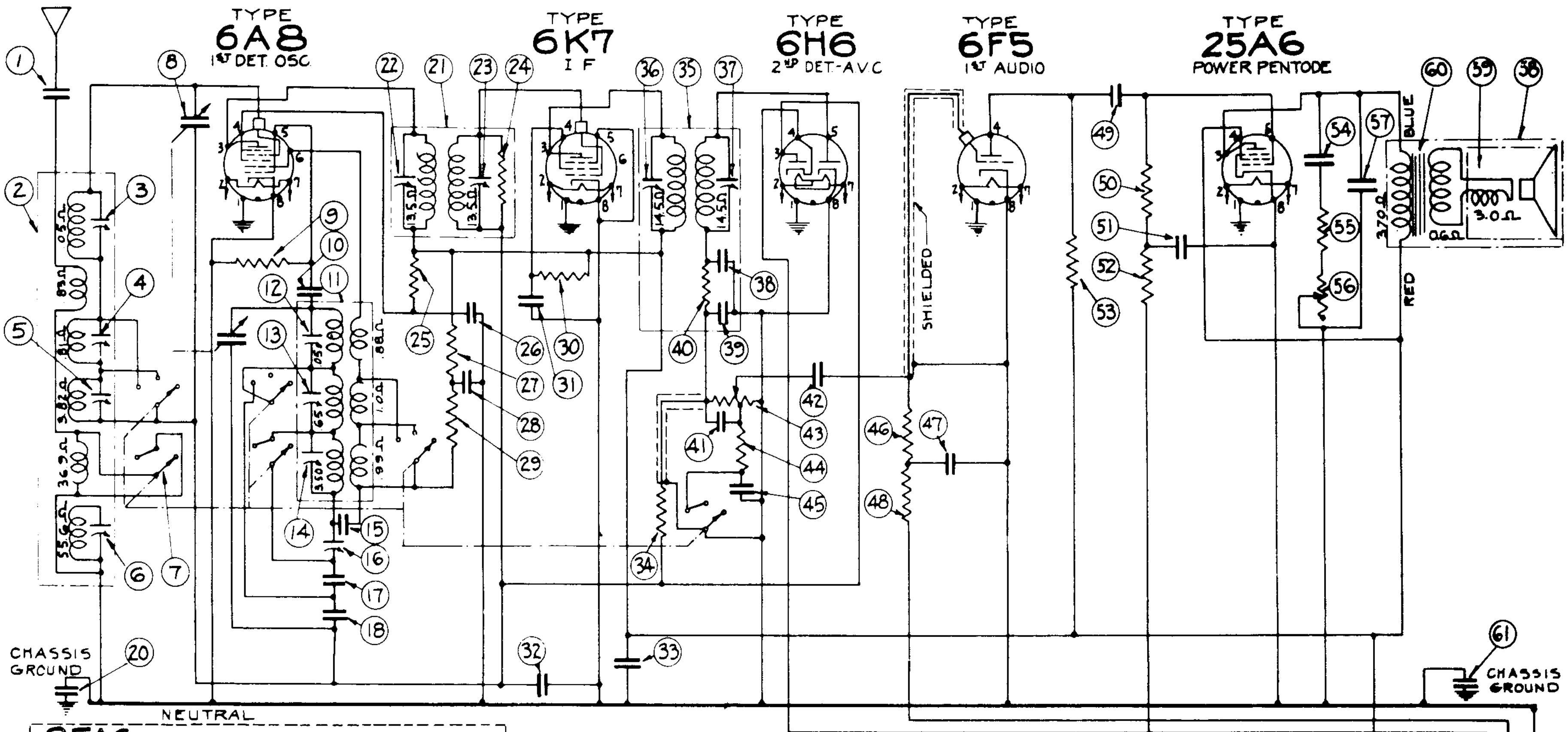
*Used only on Model 802

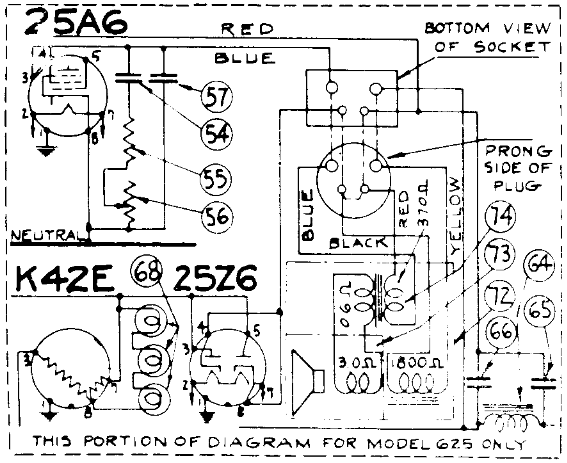
UNITED AMERICAN BOSCH CORPORATION



UNITED AMERICAN BOSCH CORPORATION

MODELS 620 & 625





INT. FREQ. 465KC.

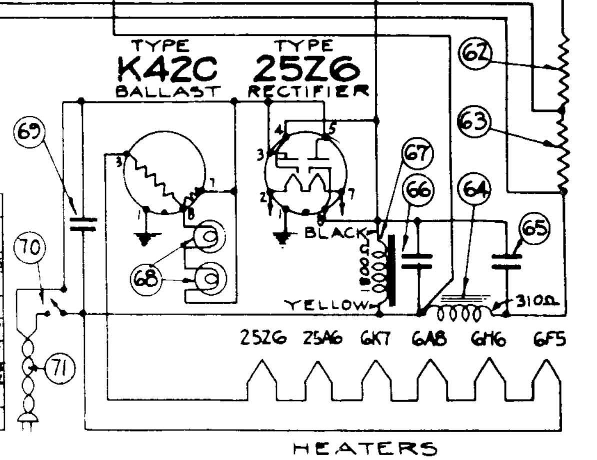
WAVE CHANGE SWITCH SHOWN IN EXTREME CLOCKWISE POSITION

SOCKET VOLTAGES-LINE=115 VOLTS TAKEN FROM BOTTOM OF SOCKETS

MEASUREMENTS MADE WITH 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION

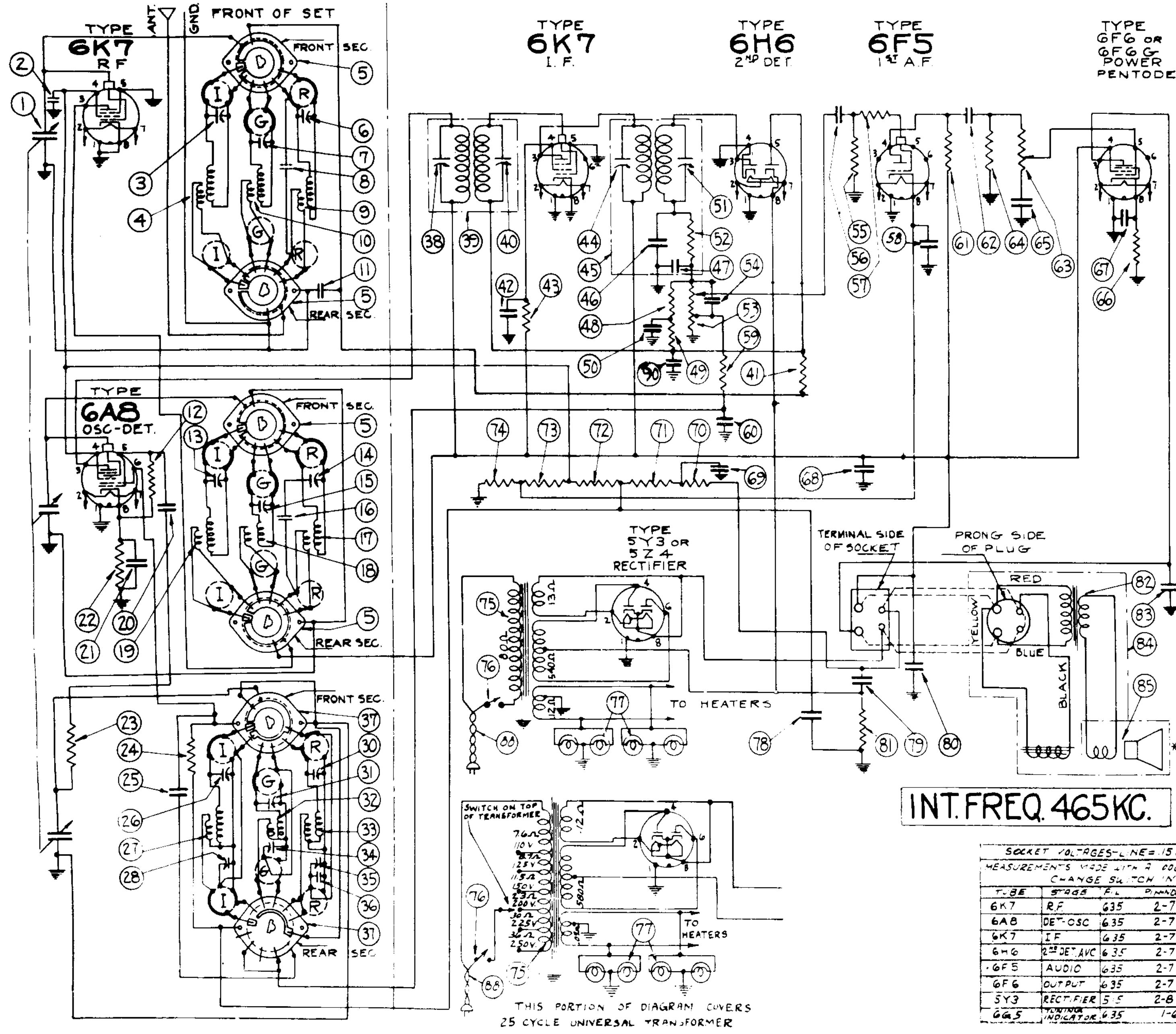
TUBE	STAGE	FIL	PIN NOS	PLATE	PIN NOS	SCREEN	PIN NOS	CONT GRID	PT. NOS
6A8	1ST DET-OSC	61	2-7	105 DET 80 OSC.	3-8 6-8	58	4-8		
6K7	I F	60	2-7	105	3-8	70	4-8		
6H6	2ND DET-AVC	595	2-7					-2.07	ACROSS 62-63
6F5	1ST AUDIO	595	2-7	55*	4-8			-0.68	ACROSS 62
25A6	POWER PEN	244	2-7	94	3-8	105	4-8	-17.5	ACROSS 64-63-62
25Z6	RECTIFIER	246	2-7	.05	4 TO NEUTRAL				

* 600 VOLT SCALE



UNITED AMERICAN BOSCH CORPORATION

MODELS 660C & 660T



INT. FREQ. 465 KC.

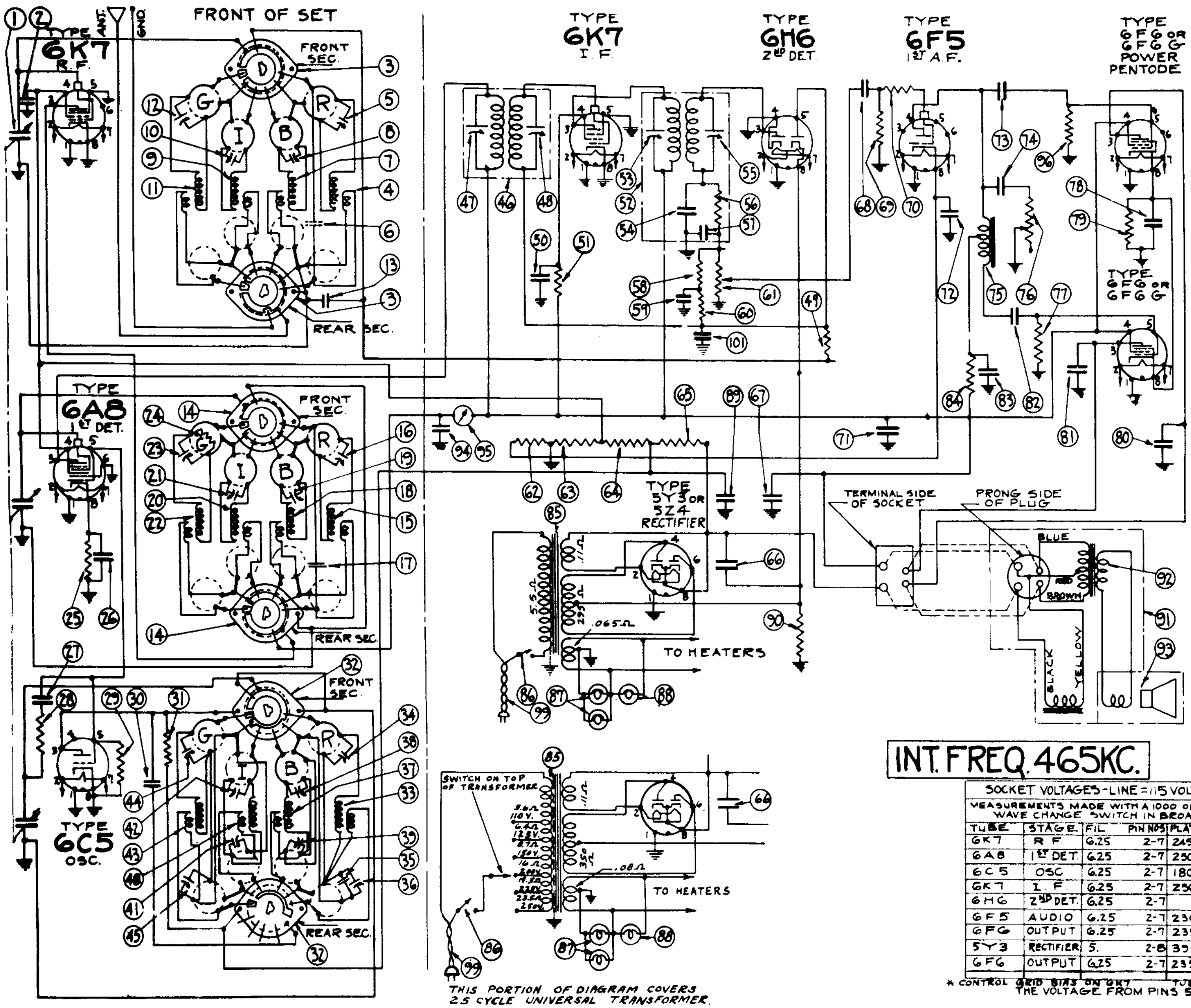
DC RESISTANCE MEASURED WITH WAVE-CHANGE SWITCH IN CORRESPONDING BAND POSITION			
COIL	DIA Nº	PRIM	SEC
I-ANT	4	8.5Ω	3.8Ω
I-RF	9	0.8	10.7
I-OSC	27	.4	2.3
G-ANT	10	2.1	1.0
G-RF	18	1.8	1.0
G-OSC	32	0.8	0.9
R-ANT	9	0.7	0.03
R-RF	17	2.0	0.03
R-OSC	33	0.5	0.03
1ST IF	39	8.6	8.6
2ND IF	45	8.6	8.6
OUTPUT TRANS	82	450	0.5
SPKR FIELD		900	
VOICE COIL	85	3	

SOCKET VOLTAGES—LINE = 115 VOLTS TAKEN FROM BOTTOM OF SOCKETS. MEASUREMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION									
TUBE	STAGE	FIL.	PIN NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	BIAS	PIN NOS.
6K7	R.F.	6.35	2-7	263	3-1	94	4-1	* SEE NOTE	
6A8	DET-OSC	6.35	2-7	263 DET. 167 OSC.	3-1 6-1	94	4-1	3.7	8-1
6K7	I.F.	6.35	2-7	263	3-1	103	4-1	* SEE NOTE	
6H6	2ND DET. AVC	6.35	2-7					-5.5	8-1
6F5	AUDIO	6.35	2-7	111	4-1			1.1	8-1
6F6	OUTPUT	6.35	2-7	247	3-1	263	4-1	17.5	8-1
5Y3	RECTIFIER	5.5	2-8	380	8-1				
6G5	TUNING INDICATOR	6.35	1-6	263	2-5			* SEE NOTE	

* THE CONTROL GRID BIAS ON THE 6K7 & 6G5 TUBES EQUAL TO APPROXIMATELY SIX-TENTHS THE VOLTAGE FROM PINS 5- ON THE 6H6 TUBE SOCKET.

UNITED AMERICAN BOSCH CORPORATION

MODELS 670C & 670S



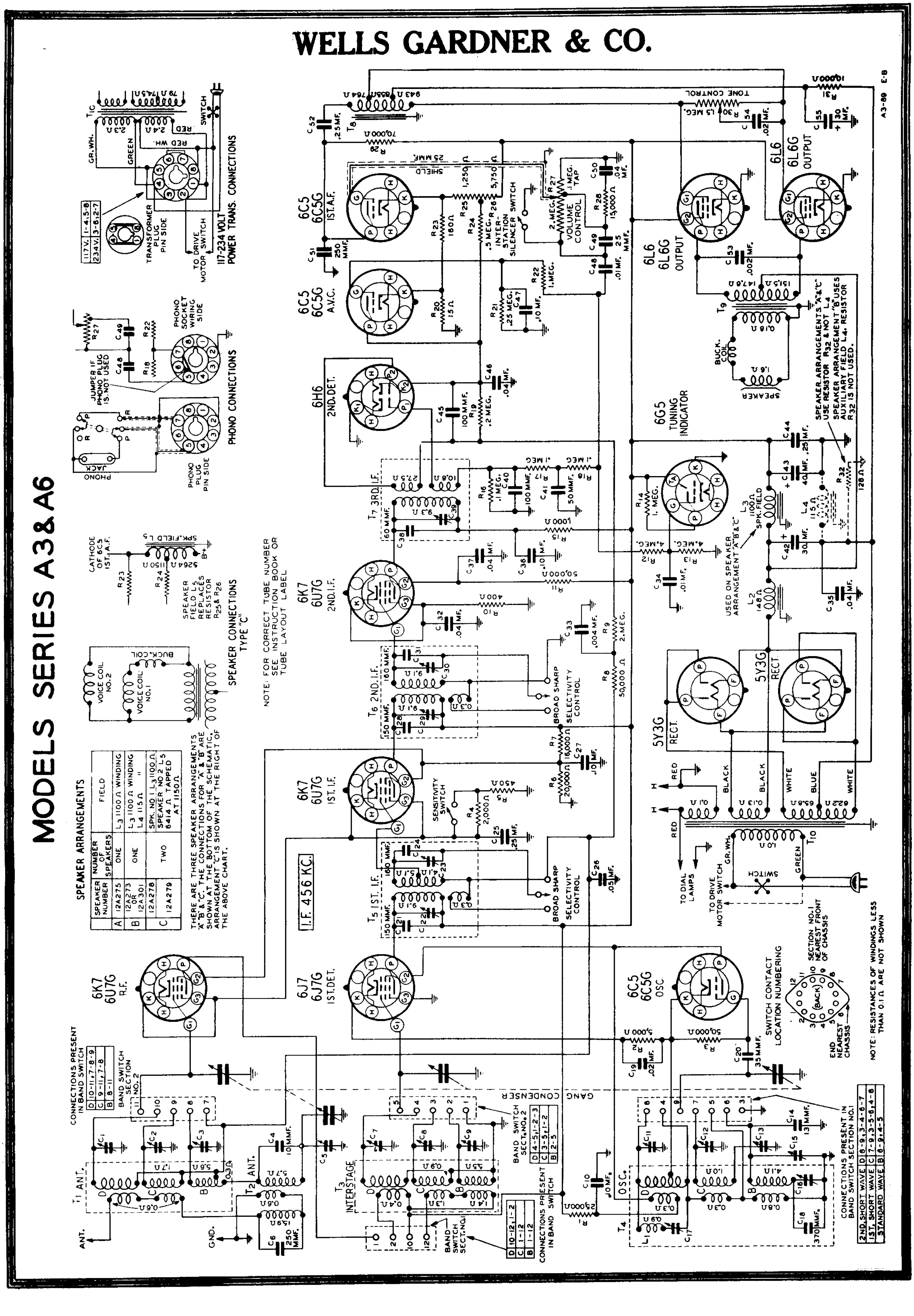
INT. FREQ. 465KC.

D.C. RESISTANCE — MEASURED WITH WAVE CHANGE SWITCH IN CORRESPONDING BAND POSITION			
COIL	DIA. NO.	PRIM.	SEC.
G-ANT	11	120	20
G-R.F.	22	11	20
G-OSC.	43	6	8
I-ANT.	9	18.5	3.8
I-R.F.	20	0.8	10.7
I-OSC.	40	1.4	3.3
B-ANT.	7	2.1	1.0
B-R.F.	18	1.8	1.0
B-OSC.	37	0.5	0.9
R-ANT	4	0.7	.003
R-R.F.	15	2.0	.003
R-OSC	33	0.5	.003
1ST I.F.	46	8.6	8.6
2ND I.F.	52	8.6	8.6
INTERSTAGE TRANS.	75	4200	9000
OUTPUT TRANS.	92	[illegible]	.03
SPKR FIELD		1800	
VOICE COIL	93	3.2	

SOCKET VOLTAGES-LINE=115 VOLTS TAKEN FROM BOTTOM OF SOCKETS — MEASUREMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER & WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION									
TUBE	STAGE	FIL.	PIN NOS	PLATE	PIN NOS	SCREEN	PIN NOS	BIAS	PIN NOS
6K7	R.F.	6.25	2-7	245	3-1	100	4-1	* SEE NOTE	
6A8	1ST DET.	6.25	2-7	250	3-1	100	4-1	2.4	8-1
6C5	OSC	6.25	2-7	180	3-1				
6K7	I.F.	6.25	2-7	250	3-1	105	4-1	* SEE NOTE	
6H6	2ND DET.	6.25	2-7					5.1	8-1
6F5	AUDIO	6.25	2-7	230	4-1			1.5	8-1
6F6	OUTPUT	6.25	2-7	235	3-1	250	4-1	21.5	8-1
5Y3	RECTIFIER	5.	2-8	395	8-1				
6F6	OUTPUT	6.25	2-7	235	3-1	250	4-1	21.5	8-1

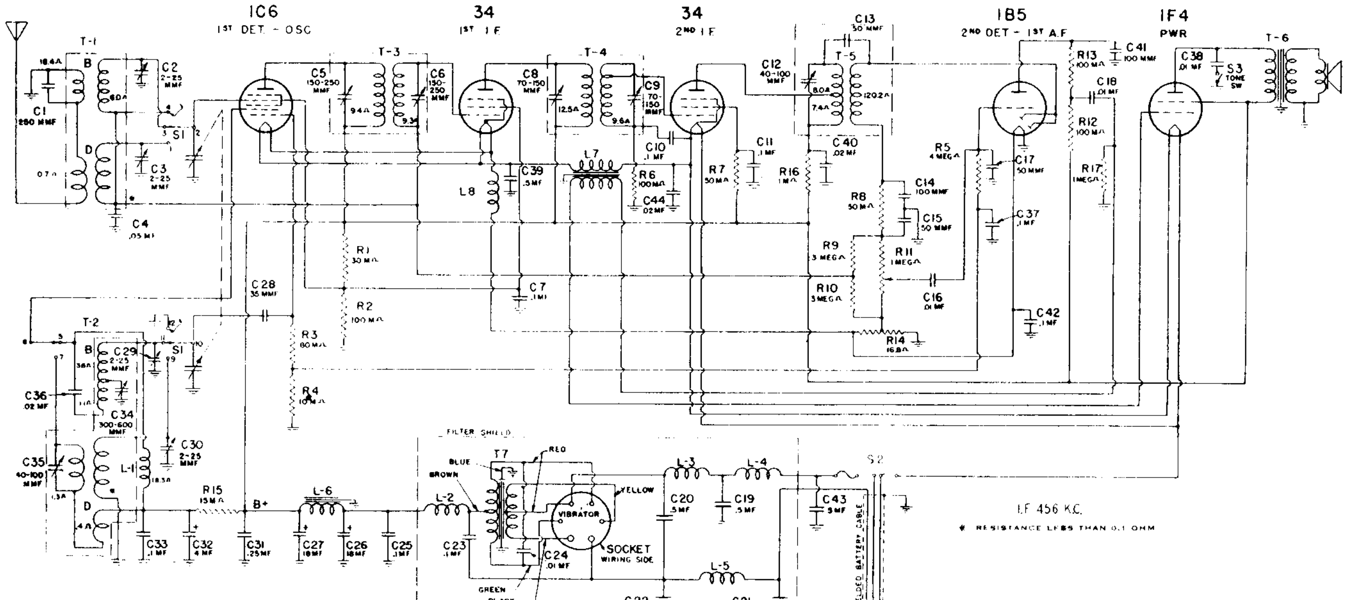
* CONTROL GRID BIAS ON 6K7 TUBE IS EQUAL TO APPROX. SIX-TENTHS THE VOLTAGE FROM PINS 5-1 ON THE 6H6 TUBE SOCKET.

WELLS GARDNER & CO.



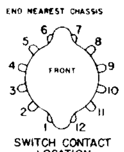
WELLS GARDNER & CO.

MODEL 5H SERIES AUTO RADIO

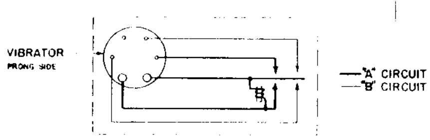


ARROWS INDICATE CONNECTIONS PRESENT IN AND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE	POSITION 2 SHORT WAVE
FRONT	1 2 3 4	1 2 3 4
BACK	5 6 7 8 9 10 11 12	5 6 7 8 9 10 11 12



SWITCH CONTACT LOCATION



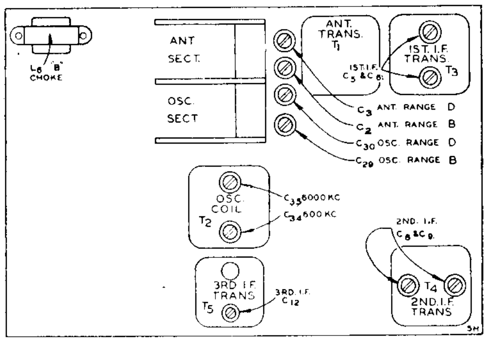
SPECIFICATIONS

Power Consumption - 1.1 Amperes at 6.3 Volts

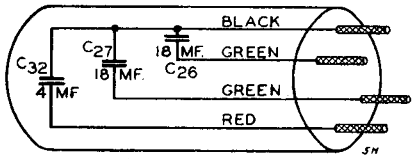
Intermediate Frequency - - - - - - 456 KC

Tuning Frequency Range

B Range.......................... 528 to 1730 KC
D Range.......................... 5650 to 16000 KC



Location of Trimmers



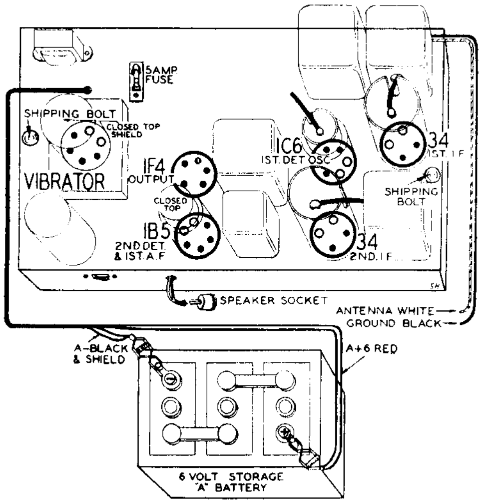
Electrolytic Condenser Internal Connections

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground
Battery—6 Volts — Band Switch in Standard Wave Position

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Bias Voltage
1C6	1st Det.-Osc.	2.0	140 110(1)	55	1.1(2)
34	1st I.F.	2.0	140	55	1.1(2)
34	2nd I.F.	2.0	140	75	4.0
1B5	2nd Det. 1st A.F.	2.0	75		3.0(3)
1F4	Power	2.0	135	140	4.0

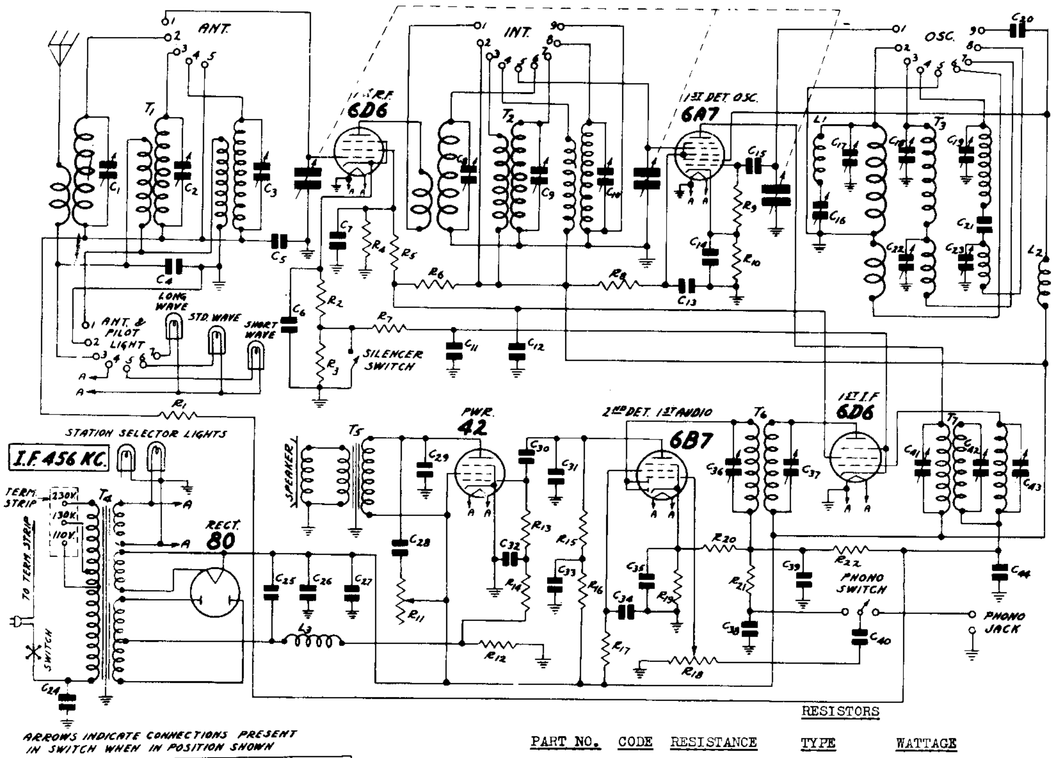
(1) Anode Grid to ground.
(2) As read from negative filament leg to center tap of R14.
(3) As read across Resistor R4 (using 100,000 ohm meter). This voltage is subject to considerable variation depending on band and frequency setting.

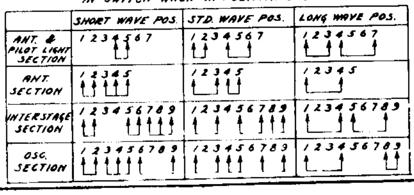


Tube Arrangement and Battery Connections

WELLS GARDNER & CO.

MODEL 6C SERIES





VOLTAGES AT SOCKETS

INPUT - 110 VOLTS - 60 CYCLE

ANTENNA SHORTED TO GROUND

(Silencer Switch Down)

Type of Tube	Function	Heater Voltage	Plate to Cathode	Screen to Cathode	Gnd. to Cathode	Normal Plate M. A.
6D6	R. F.	6.3	250	100	6.0	8.0
6A7	1st Det. & Osc.	6.3	250(1) 250(2)	100	3.0	3.4(1) 3.6(2)
6D6	I. F.	6.3	250	125	6.5	9.5
6B7	2nd Det. & 1st.A.F.	6.3	55	60	3.0	2.5
'42	Power Output	6.3	235	250	17(3)	33
'80	Rectifier	5.0	700V. A.C. pl.to pl.			40 Per Plate

(1) Plate
(2) Anode Grid
(3) Grid bias as measured across R 12

This receiver covers three bands, the range of each being as follows:

Band Coverage

LONG WAVE	STANDARD WAVE	SHORT WAVE
145 to 380 Kilocycles 2069 to 789.5 Meters	505 to 1520 Kilocycles 594. to 197.4 Meters	5.84 to 18.0 Megacycles 51.4 to 16.7 Meters

RESISTORS

PART NO.	CODE	RESISTANCE	TYPE	WATTAGE	LIST
P A95204	R1	200,000 Ohm.	Carbon	0.2	.15
P A93401ww	R2	400 Ohm.	Wire Wound	0.2	.15
P B95252	R3	2,500 Ohm.	Carbon	0.5	.15
P B94303	R4	30,000 Ohm.	Carbon	0.5	.15
P B95502	R5	5,000 Ohm.	Carbon	0.5	.15
P C93153	R6	15,000 Ohm.	Carbon	1.0	.15
P A93451ww	R7	450 Ohm.	Wire Wound	0.2	.15
P B94703	R8	70,000 Ohm.	Carbon	0.5	.15
P A94104	R9	100,000 Ohm.	Carbon	0.2	.15
P A93351ww	R10	350 Ohm.	Wire Wound	0.2	.15
P 97014	R11	150,000 Ohm.	Tone Control		.75
P 98015	R12	235 Ohm.	Wire Wound	2.0	.15
P A95504	R13	500,000 Ohm.	Carbon	0.2	.15
P A95104	R14	100,000 Ohm.	Carbon	0.2	.15
P B94603	R15	60,000 Ohm.	Carbon	0.5	.15
P A95203	R16	20,000 Ohm.	Carbon	0.2	.15
P A94254	R17	250,000 Ohm.	Carbon	0.2	.15
P 96018	R18	2 Megohm.	Volume Control		1.05
P A94801	R19	800 Ohm.	Carbon	0.2	.15
P A94504	R20	500,000 Ohm.	Carbon	0.2	.15
P A95503	R21	50,000 Ohm.	Carbon	0.2	.15
P A95205	R22	2 Megohm.	Carbon	0.2	.15

CONDENSERS

PART NO.	CODE	CAPACITY	VOLTAGE	TYPE	LIST
P 2260	C1	2-25 mmf		Sh.W.Antenna Trimmer	.20
P 2260	C2	2-25 mmf		Std.W. " "	.20
P 2260	C3	2-25 mmf		L.W. " "	.20
P 81817	C4	250 mmfd		Moulded	.15
P 81125	C5	.05 mfd	200 V	Tubular	.20
	(C6	.05 mf	140 V)		
	(C7	.05 mf	200 V)		
	(C11	.25 mf	140 V)		
	(C12	.10 mf	300 V)		
P 82603	(C27	.10 mf	400 V)	Condenser Block	2.40
	(C33	.25 mf	400 V)		
	(C34	.25 mf	400 V)		
	(C40	.05 mf	140 V)		
P 2260	C8	2-25 mmf		Sh.W.R.F.Interstage Trimmer	.20
P 2260	C9	2-25 mmf		Std.W.R.F. " "	.20
P 2260	C10	2-25 mmf		L.W.R.F. " "	.20
P 81127	C13	.10 mfd	300 V	Tubular	.20
P 81079	C14	.25 mfd	200 V	Tubular	.25
P 81819	C15	35 mmfd		Moulded	.15
P 2263	C16&C22	40-100 mfd &300-500 mmfd		Double Trimmer	.65
P 2260	C17	2-25 mmf		Sh.W.Oscillator Trimmer	.20
P 2260	C18	2-25 mmf		Std.W. " "	.20
P 2260	C19	2-25 mmf		L.W.Oscillator Trimmer	.20
P 81071	C20	.05 mfd	400 V	Tubular	.20
P 81817	C21	250 mmfd		Moulded	.15
P 2103	C23&C41	200-50 mmfd. ea.		Double Trimmer	.60
P 81042	C25	14 mfd	400 V	Wet Elec.(Insltd Mtg.)	1.45
P 81043	C26	18 mfd	300 V	Wet Elec.(Gnd Mtg.)	1.30
	(C28	.05	600 V)		
	(C29	.002	600 V)		
P 82604	(C30	.01	400 V)	Condenser Block	1.20
	(C31	.002	600 V)		
P 81128	C32	.03 mfd	200 V	Tubular	.20
P 81003	C35	12 mfd	25 V	Dry Electrolytic	.75
P 2252	(C36	150-250 mmf)		2nd I.F.Trimmers	.65
	(C37	150-250 mmf)			
P 81818	C38	100 mmfd		Moulded	.15
P 81817	C39	250 mmfd		Moulded	.15
P 2252	(C42	150-250 mmf		1st I.F.Trimmers	.65
	(C43	150-250 mmf			
P 81076	(C44	.05 mfd	200 V	Tubular	.20
P 82501		3 Section Gang Condenser			2.85

WELLS GARDNER & CO.

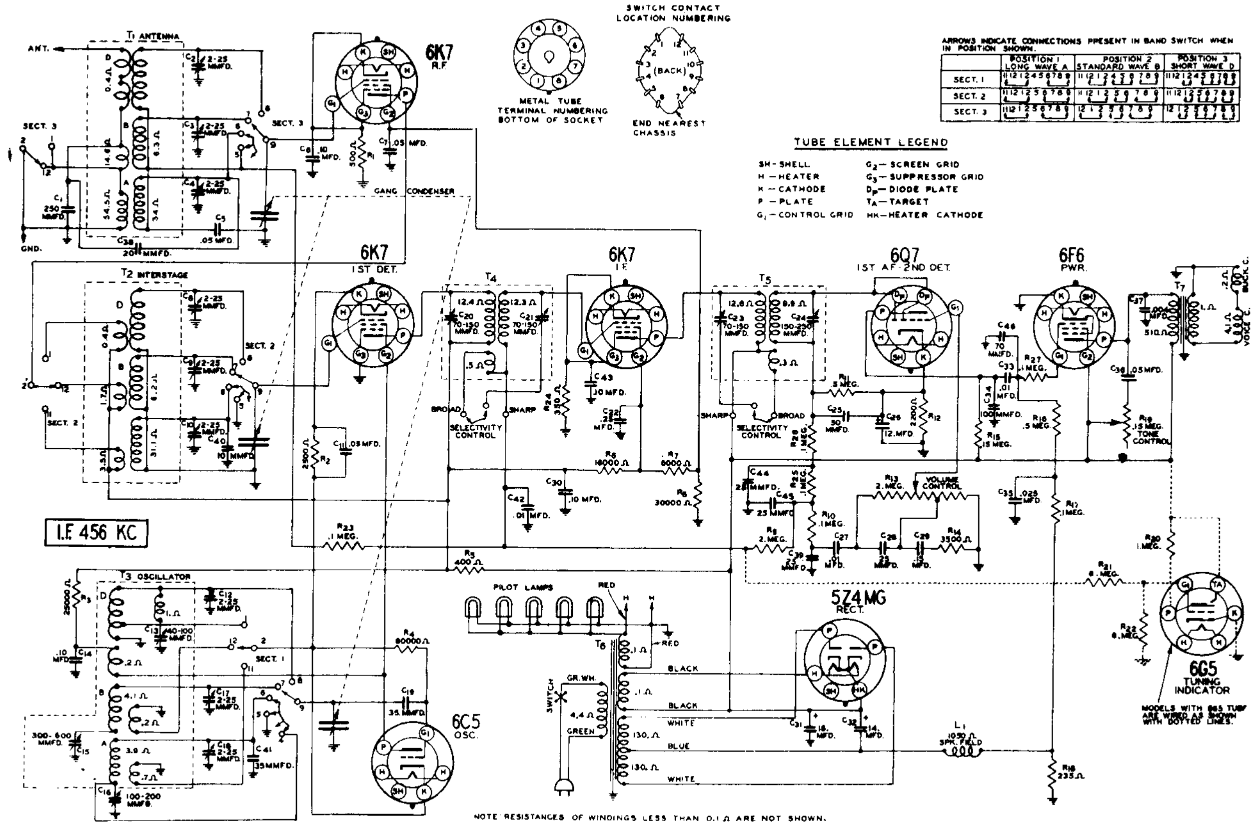
MODELS 7F & 7FL SERIES

SPECIFICATIONS

Power Consumption .. 85 Watts (At 115 volts 60 cycles)
Power Output .... 3 Watts Undistorted
Selectivity.... 28 KC Broad at 1000 times Signal (Sharp)
Intermediate Frequency .... 456 KC.
Speaker .... 8" and 10" Dynamic

Tuning Frequency Range
A Range .... 148 to 380 KC.
B Range .... 528 to 1730 KC.
D Range .... 5750 to 18300 KC.

Sensitivity
A Range .... 0.5 to 2 Microvolts Absolute
B Range .... 0.5 to 2 Microvolts Absolute
D Range .... 1.0 to 4 Microvolts Absolute

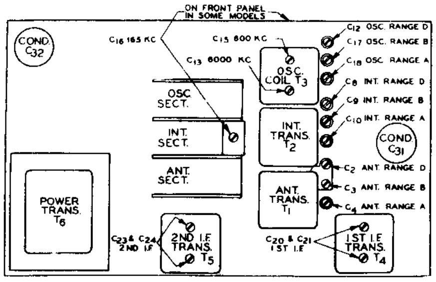


NOTE RESISTANCES OF WINDINGS LESS THAN 0.1 Ω ARE NOT SHOWN.

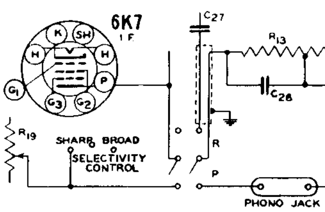
Line Voltage: 115 | Antenna Shorted to Ground
Volume Control: Maximum | Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	RF..........	0	6.1(1)	260	100	4.0	....	6.1(1)	4.0
6K7	1st Det..........	0	6.1(1)	260	118	0	....	6.1(1)	9.0
6C5	Osc..........	0	6.1(1)	120	...	0	....	6.1(1)	0
6K7	I F..........	0	6.1(1)	260	138	4.0	....	6.1(1)	4.0
6Q7	1st A.F.—2nd Det....	0	6.1(1)	105	0	0	....	6.1(1)	1.4
6F6	Power Amp..........	0	6.1(1)	238	260	18	....	6.1(1)	0
5Z4MG	Rect..........	0	4.9(2)	...	680(3)	...	680(3)	....	4.9(2)
6G5	Tuning Indicator	Plate to Ground 30(4)		Target to Ground 270		Cathode to Ground 0		Across Heater 6.1 A.C.	

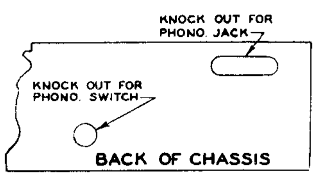
(1) A.C. voltage as read across heater terminals 2 and 7.
(2) A.C. voltage as read across heater terminals 2 and 8.
(3) A.C. voltage as read across terminals 4 and 6.
(4) As read with 500,000 ohm meter.



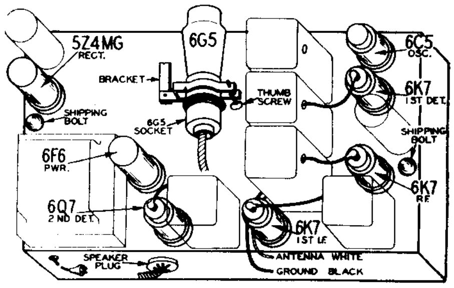
—Location of Trimmers



-Phonograph Connections



—Location of Phono Knockouts

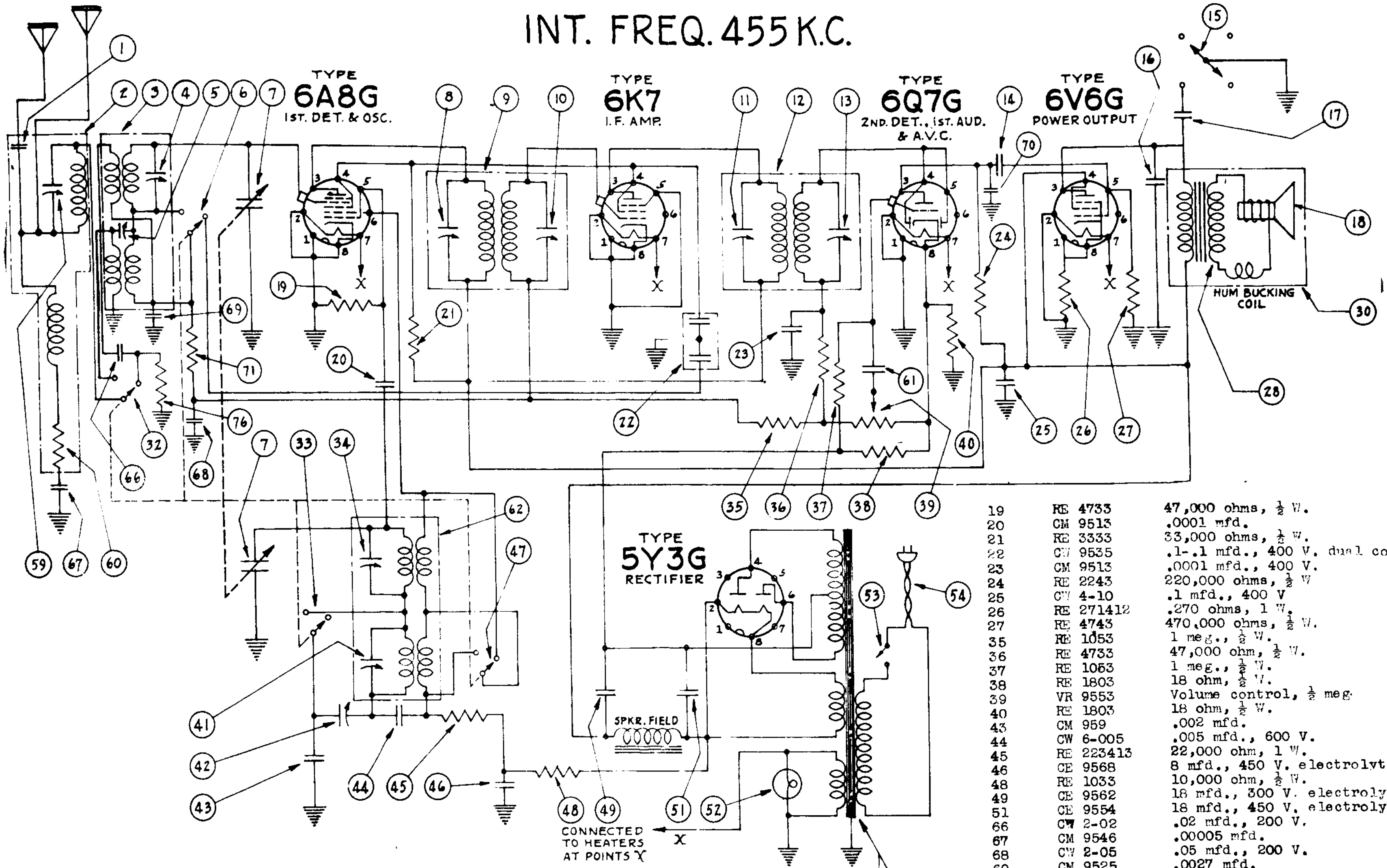


—Location of Tubes

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODEL WR-224

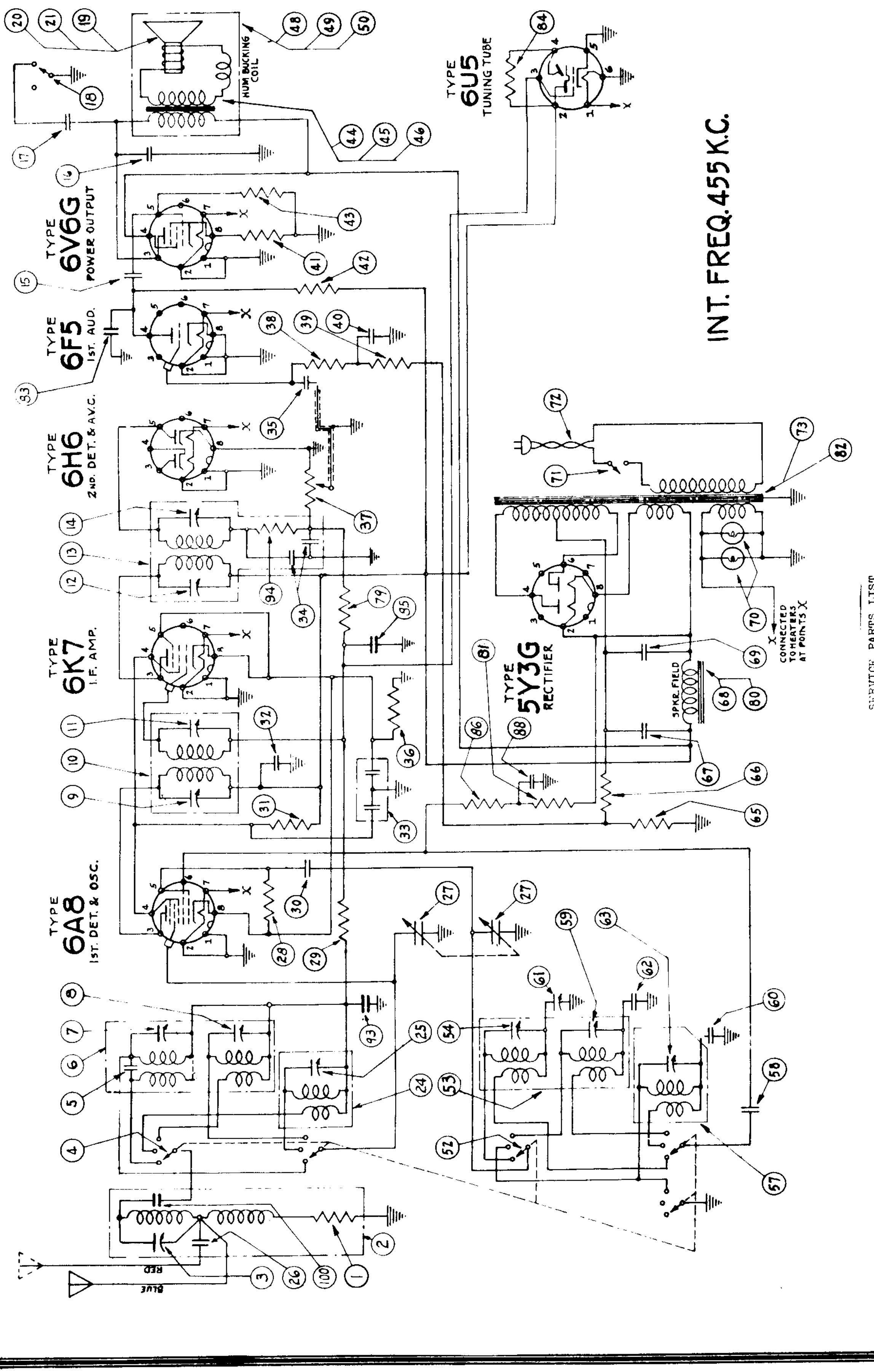
INT. FREQ. 455 K.C.



1	CM 9546	.00005 mf.
2	RC 95296	Wave trap coil assembly
3	RC 95300	Antenna coil assembly
6,32 33,47	SW 9574	Switch (wave change)
7	CG 9565	Variable condenser
8		Trimmer Condenser
16	CW 6-01	.01 mfd., 600 V.
17	CW 6-05	.05 mfd., 600 V.
9	IC 95109	1st I.F. coil assembly (455 KC.)
10		Trimmer Condenser
11		Trimmer Condenser
12	IC 95110	2nd I.F. coil assembly (455 KC.)
14	CW 6-005	.005 mfd., 600 V.

19	RE 4733	47,000 ohms, ½ W.
20	CM 9513	.0001 mfd.
21	RE 3333	33,000 ohms, ½ W.
22	CW 9535	.1-.1 mfd., 400 V. dual condenser
23	CM 9513	.0001 mfd., 400 V.
24	RE 2243	220,000 ohms, ½ W
25	CW 4-10	.1 mfd., 400 V
26	RE 271412	.270 ohms, 1 W.
27	RE 4743	470,000 ohms, ½ W.
35	RE 1053	1 meg., ½ W.
36	RE 4733	47,000 ohm, ½ W.
37	RE 1053	1 meg., ½ W.
38	RE 1803	18 ohm, ½ W.
39	VR 9553	Volume control, ½ meg.
40	RE 1803	18 ohm, ½ W.
43	CM 959	.002 mfd.
44	CW 6-005	.005 mfd., 600 V.
45	RE 223413	22,000 ohm, 1 W.
46	CE 9568	8 mfd., 450 V. electrolytic
48	RE 1033	10,000 ohm, ½ W.
49	CE 9562	18 mfd., 300 V. electrolytic
51	CE 9554	18 mfd., 450 V. electrolytic
66	CW 2-02	.02 mfd., 200 V.
67	CM 9546	.00005 mfd.
68	CW 2-05	.05 mfd., 200 V.
69	CM 9525	.0027 mfd.
70	CW 6-001	.001 mfd., 600 V.
71	RE 4743	470,000 ohm, ½ W.
76	RE 1033	10,000 ohm, ½ W.
60	RE 1033	10,000 ohm, ½ W.
61	CW 6-005	.005 mfd., 600 V

WESTINGHOUSE ELECTRIC SUPPLY COMPANY
MODELS WR-226, WR-326 & WR-338

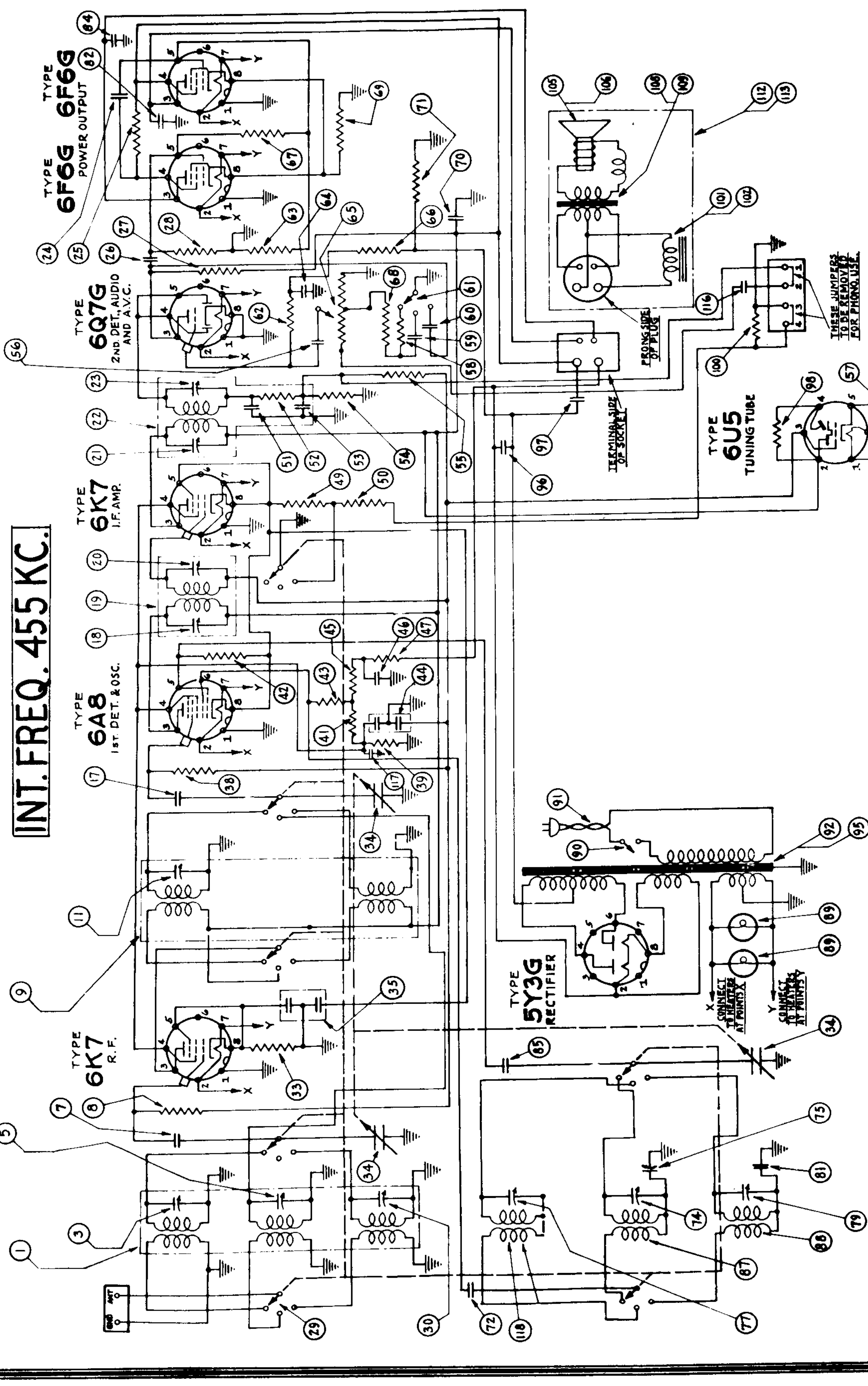


SERVICE PARTS LIST

	PART #	DESCRIPTION	
1	RE 3333	33,000 ohm, ½ W resistor	$ .10
5		.000005 mfd. mica condenser	
15	CW 4-02	.02 mfd., 400 V. condenser	.15
16	CW 6-005	.005 mfd., 600 V. condenser	.15
17	CW 6-05	.05 mfd., 600 V. condenser	.15
26		.005 mfd. mica condenser	
28	RE 4733	47,000 ohm, ½ W. resistor	.10
29	RE 2243	22,000 ohm, ½ W. resistor	.10
30	CM 9545	.00005 mfd. mica condenser	.15
31	RE 4733	47,000 ohm, ½W. resistor	.10
32	CW 4-10	.1 mfd., 400 V. condenser	.15
33	CW 9535	.1 - .1 mfd., 400 V. dual condenser	.30
34		.0001-.0001 mfd. condenser - part of IC 95114.	
35	CW 2-02	.02 mfd., 200 V. condenser	.15
36	RE 2213	220 ohm, ½ W. resistor	.10
37	VR 9548	Volume control - .5 meg.	.80
38	RE 1053	1 meg., ½W. resistor	.10
39	RE 4743	470,000 ohms, ½W. resistor	.10
40	CW 4-05	.05 mfd., 400 V. condenser	.15
41	RE 2713	270 ohm, ½W. resistor	.10
42	RE 2243	220,000 ohm, ½W. resistor	.10
43	RE 4743	470,000 ohm, ½W. resistor	.10
62	CM 959	.002 mfd. mica condenser	.25
60	CM 9547	.0016 mfd. mica condenser	.25
65	RE 1503	15 ohm, ½W. resistor	.10
66	RE 2703	27 ohm, ½W. resistor	.10
67	CE 9562	18 mfd., 300 V. electrolytic condenser	.80
69	CE 9554	18 mfd., 450 V. electrolytic condenser	.85
79	RE 4743	470,000 ohm, ½ W. resistor	.10
81	RE 3333	33,000 ohm, ½ W. resistor	.10
83	CW 6-001	.001 mfd., 600 V. condenser	.15
84		1 meg., ¼ W. resistor - part of CB 95152.	
85	CW 4-05	.05 mfd., 400 V. condenser	.15
86	RE 1033	10,000 ohm, ½ W. resistor	.10
88	CE 9568	8 Mfd., 450 V. electrolytic condenser	.70
93	CW 4-05	.05 mfd., 400 V. condenser	.15
94		47,000 ohm, ½ W. resistor - part of IC 95114.	
100	CM 959	.002 mfd. mica condenser	.25

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODELS WR-228 & WR-328



7 CM 9519 .0005 mfd.
8 RE 2743 270,000 ohm, ½ W.
17 CM 9519 .0005 mfd.
24 CW 4-01 .01 mfd., 400 V.
25 RE 1023 1000 ohm, ½ W.
26 CW 4-02 .02 mfd., 400 V.
27 RE 1043 100,000 ohm, ½ W.
28 RE 1843 180,000 ohm, ½ W.
33 RE 3913 390 ohm, ½ W.
35 CW 9535 .1 mfd.-.1 mfd., 400 V. dual
38 RE 2743 270,000 ohm, ½ W.

39 RE 6833 68,000 ohm, ½ W.
41 RE 1033 10,000 ohm, ½ W.
42 RE 4733 47,000 ohm, ½ W.
43 RE 4723 4700 ohm, ½ W.
44 CW 9535 .1 mfd.-.1 mfd., 400 V. dual
45 RE 1035 2 10,000 ohm, 2 W.
46 CE 9568 8 mfd., 450 V. electrolytic
47 RE 6825 2 6800 ohm, 2 W.
49 RE 1513 150 ohm, ½ W.
50 RE 1513 150 ohm, ½ W.

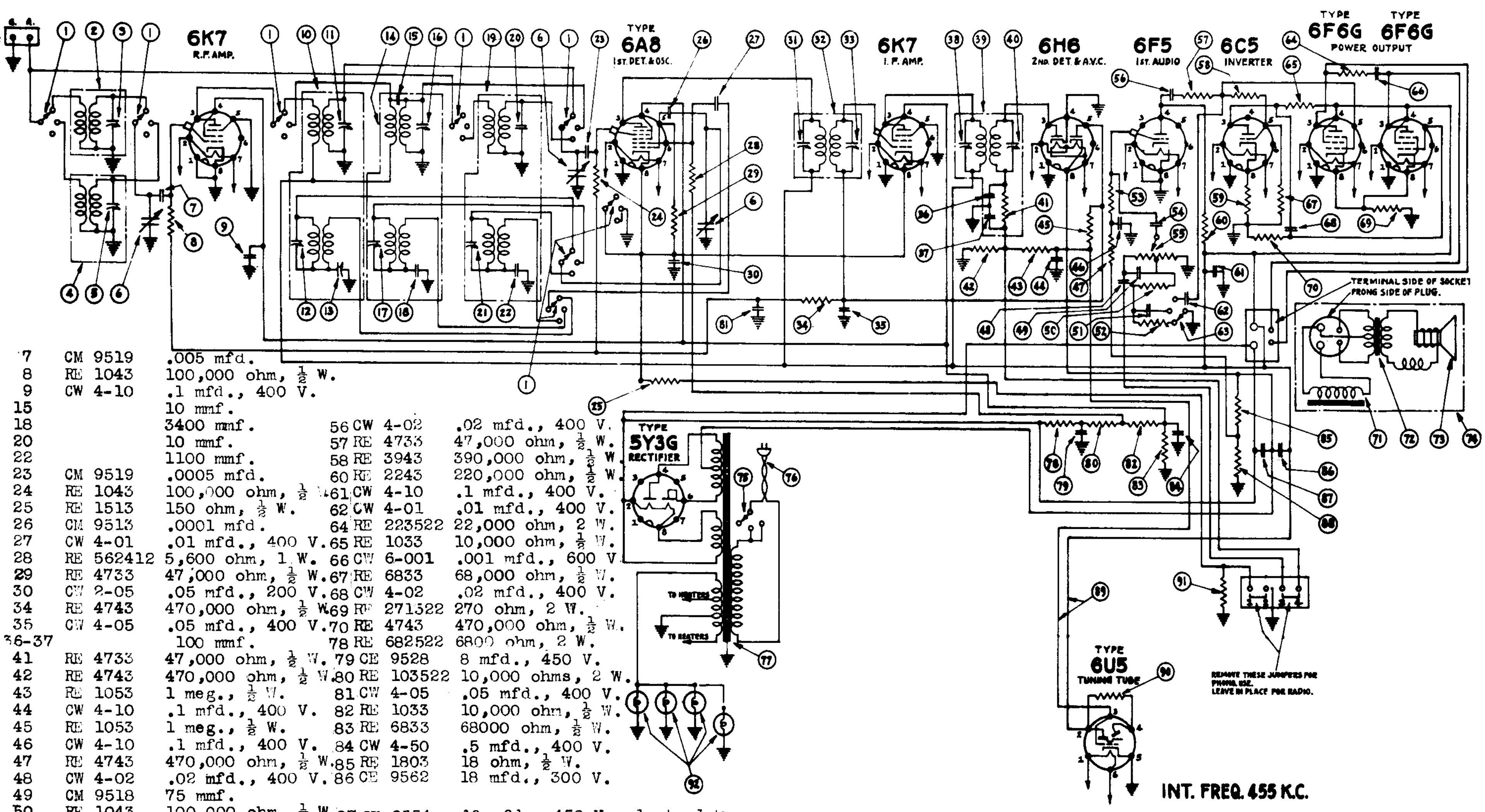
51 CM 9513 .0001 mfd.
52 RE 4733 47,000 ohm, ½ W.
53 CM 9513 .0001 mfd.
54 RE 4743 470,000 ohm, ½ W.
55 RE 4743 470,000 ohm, ½ W.
56 CW 4-02 .02 mfd., 400 V.
57 RE 2713 270 ohm, ½ W.
58 RE 1043 100,000 ohm, ½ W.
59 CW 6-002 .002 mfd., 600 V.

60 CW 4-02 .02 mfd., 400 V.
62 RE 2253 2.2 meg., ½ W.
63 RE 4743 470,000 ohm, ½ W.
64 CW 2-10 .1 mfd., 200 V.
65 VR 9556 2 meg., mid-tapped volume control
66 RE 4743 470,000 ohm, ½ W.
67 RE 3343 330,000 ohm, ½ W.
68 RE 1043 100,000 ohm, ½ W.
69 RE 2715 2 270 ohm, 2 W.
70 CW 4-10 .1 mfd., 400 V
71 RE 1803 18 ohm, ½ W.
72 CW 6-005 .005 mfd., 600 V.
74 B.C. oscillator trimmer

75 CE 9585 B.C. oscillator lag condenser
81 CE 9545 4050 mfd.
82 CW 6-002 .002 mfd., 600 V.
84 CW 6-002 .002 mfd., 600 V.
96 CE 9554 18 mfd., 450 V. electrolytic
97 CE 9562 18 mfd., 300 V. electrolytic
98 RE 1053 1 meg., ½ W.
100 RE 1033 10,000 ohm, ½ W.
116 CW 4-02 .02 mfd., 400 V.
117 CW 9525 1 mfd., 200 V.

WESTINGHOUSE ELECTRIC SUPPLY COMPANY

MODEL WR-330



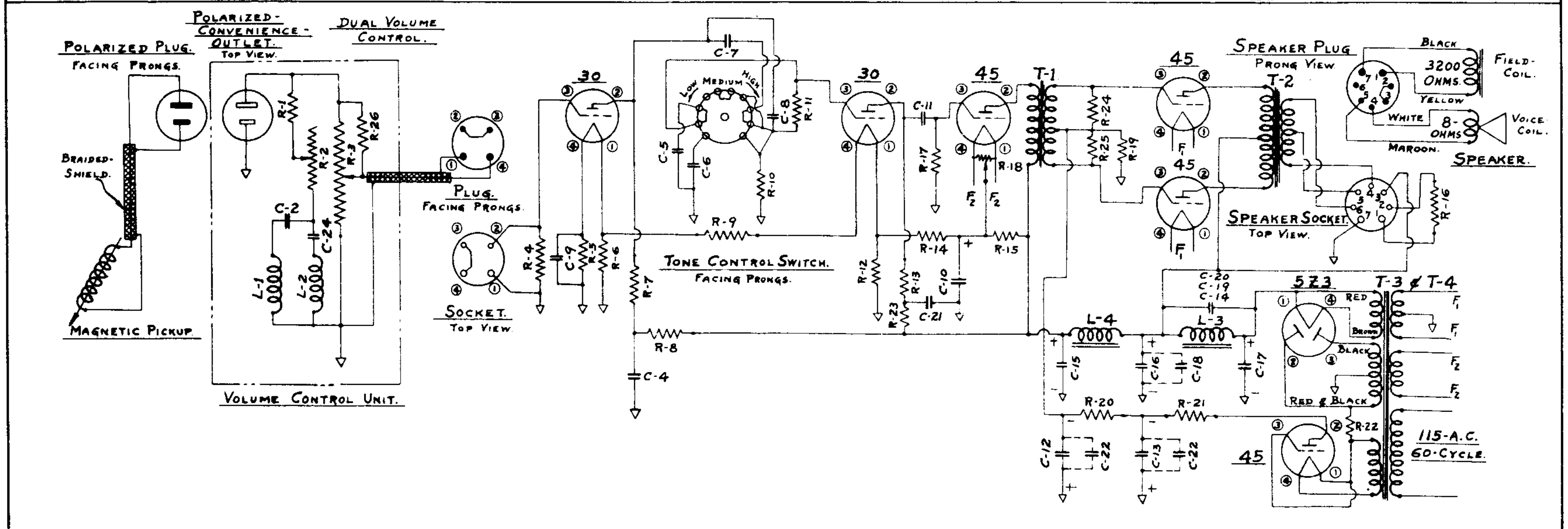
7	CM 9519	.005 mfd.	
8	RE 1043	100,000 ohm, ½ W.	
9	CW 4-10	.1 mfd., 400 V.	
15		10 mmf.	
18		3400 mmf.	
20		10 mmf.	
22		1100 mmf.	
23	CM 9519	.0005 mfd.	
24	RE 1043	100,000 ohm, ½ W.	
25	RE 1513	150 ohm, ½ W.	
26	CM 9513	.0001 mfd.	
27	CW 4-01	.01 mfd., 400 V.	
28	RE 562412	5,600 ohm, 1 W.	
29	RE 4733	47,000 ohm, ½ W.	
30	CW 2-05	.05 mfd., 200 V.	
34	RE 4743	470,000 ohm, ½ W.	
35	CW 4-05	.05 mfd., 400 V.	
36-37		100 mmf.	
41	RE 4733	47,000 ohm, ½ W.	
42	RE 4743	470,000 ohm, ½ W.	
43	RE 1053	1 meg., ½ W.	
44	CW 4-10	.1 mfd., 400 V.	
45	RE 1053	1 meg., ½ W.	
46	CW 4-10	.1 mfd., 400 V.	
47	RE 4743	470,000 ohm, ½ W.	
48	CW 4-02	.02 mfd., 400 V.	
49	CM 9518	75 mmf.	
50	RE 1043	100,000 ohm, ½ W.	
51	CW 6-002	.002 mfd., 600 V.	
52	RE 1043	100,000 ohm, ½ W.	
53	RE 2253	2.2 meg., ½ W.	
54	CW 4-02	.02 mfd., 400 V.	
55	VR 9555	2 meg. - mid tapped volume control	

56	CW 4-02	.02 mfd., 400 V.	
57	RE 4733	47,000 ohm, ½ W.	
58	RE 3943	390,000 ohm, ½ W.	
60	RE 2243	220,000 ohm, ½ W.	
61	CW 4-10	.1 mfd., 400 V.	
62	CW 4-01	.01 mfd., 400 V.	
64	RE 223522	22,000 ohm, 2 W.	
65	RE 1033	10,000 ohm, ½ W.	
66	CW 6-001	.001 mfd., 600 V.	
67	RE 6833	68,000 ohm, ½ W.	
68	CW 4-02	.02 mfd., 400 V.	
69	RE 271522	270 ohm, 2 W.	
70	RE 4743	470,000 ohm, ½ W.	
78	RE 682522	6800 ohm, 2 W.	
79	CE 9528	8 mfd., 450 V.	
80	RE 103522	10,000 ohms, 2 W.	
81	CW 4-05	.05 mfd., 400 V.	
82	RE 1033	10,000 ohm, ½ W.	
83	RE 6833	68000 ohm, ½ W.	
84	CW 4-50	.5 mfd., 400 V.	
85	RE 1803	18 ohm, ½ W.	
86	CE 9562	18 mfd., 300 V.	
87	CE 9554	18 mfd., 450 V.	electrolytic
88	RE 1803	18 ohm, ½ W.	
90		1 meg.	
91	RE 223522	22,000 ohm, 2 W	

RUDOLPH WURLITZER MFG. CO.

MODELS 316.416.616.716 & 616A

PICKUP-*24707	VOLUME CONTROL-*177-AM. PART Nº 24298.	AMPLIFIER-*771. 25-CYCLE-*24368 40-CYCLE-*24370 60-CYCLE-*24274	SPEAKERS FOR *616-A. JENSEN-*27359 MAGNAVOX-*27374
316; 416 SPEAKERS 616; 716. JENSEN-*26923. MAGNAVOX-*26409.			



ITEM	PART Nº	VALUE	REMARKS	ITEM	PART Nº	VALUE	REMARKS	ITEM	PART Nº	VALUE	REMARKS	ITEM	PART Nº	VALUE	REMARKS.
RESISTORS								CONDENSERS				C-19	24363	1. - MFD.	FOR 25-30-CYCLE
R-1	22530	1,000-OHMS	±10% 1/4 WATT	R-19	23012	5,000-OHMS	±5% 10-WATT	C-1				C-20	24364	.5-MFD.	FOR 40-CYCLE
R-2	22765	12,000-OHMS	±15% VOLUME CONTROL	R-20	23011	2,000-OHMS	±5% 10-WATT	C-2	20665	.25-MFD.	±10% 200-VOLT	C-21	24321	2. -MFD.	450-VOLT
R-3		150,000-OHMS	±15% VOLUME CONTROL	R-21	23011	2,000-OHMS	±5% 10-WATT	C-3				C-22	23021	8-8-MFD.	FOR 25-30-CYCLE
R-4	20750	500,000-OHMS	±20% 1/4 WATT	R-22	23013	3,500-OHMS	±5% 10-WATT	C-4	24321	2. MFD.	450-VOLT	C-23			
R-5	22354	65-OHMS	±5% 1/2 WATT	R-23	23084	25,000-OHMS	±10% 1/4-WATT	C-5	24280	.00075-MFD.	+40%-20% MICA	C-24	22241	.002-MFD.	±10% MICA.
R-6	22323	2,000-OHMS	±10% 1-WATT	R-24	26358	7,000-OHMS	±10% 1/2-WATT	C-6	22241	.002-MFD.	±10% MICA	CHOKES.			
R-7	21938	100,000-OHMS	±10% 1/4 WATT	R-25	26358	7,000-OHMS	±10% 1/2-WATT	C-7	21993	.05-MFD.	±20% 400-VOLT	L-1	21693	540-MILLIHENRIES	CHOKE COIL
R-8	21939	50,000-OHMS	±10% 1/4 WATT	R-26	21939	50,000-OHMS	±10% 1/4-WATT	C-8	26560	.004-MFD.	±10% 600-VOLT	L-2	24305	290-MILLIHENRIES	CHOKE COIL
R-9	23014	100-OHMS	±5% 1/2 WATT					C-9	24279	10. MFD.	25-VOLT	L-3	21550	8.75-HENRIES	*1-FILTER CHOKE
R-10	20750	500,000-OHMS	±20% 1/4 WATT					C-10	24775	25. MFD.	150-VOLT	L-4	23017	2-HENRIES	*2-FILTER CHOKE
R-11	20266	75,000-OHMS	±10% 1/4 WATT					C-11	21736	.1 MFD	±20% 400-VOLT				
R-12	22323	2,000-OHMS	±10% 1-WATT					C-12	23021	8. MFD.	150-VOLT				
R-13	23208	60,000-OHMS	±10% 1/2 WATT					C-13		8. MFD.	150-VOLT				
R-14	23015	575-OHMS	BLEEDER-4-WATT					C-14	20665	.25 MFD.	FOR 60-CYCLE.	TRANSFORMERS.			
R-15		9,000-OHMS	BLEEDER-30-WATT					C-15	21720	25. MFD.	450-VOLT	T-1	21548		AUDIO INPUT
R-16		2,500-OHMS	BLEEDER-33-WATT					C-16	22325	6. MFD.	500-VOLT	T-2	23019		AUDIO OUTPUT
R-17	20728	250,000-OHMS	±20% 1/4-WATT					C-17		4. MFD.	600-VOLT	T-3	24527	60-CYCLE	POWER.
R-18	20445	20-OHMS	HUM CONTROL					C-18	21720	25. MFD.	FOR 25 & 40-CYCLE	T-4	24526	25-CYCLE	POWER.

VOLTAGES AND CURRENTS OF MODEL-*771-AMPLIFIER. ALL MEASUREMENTS MADE WITH LINE VOLTAGE 115-VOLTS.

ALL VOLTAGES MEASURED WITH 1,000-OHMS PER VOLT VOLTMETER.

AVERAGE PLATE VOLTAGE MEASURED FROM PLATE + TO CHASSIS –.		AVERAGE PLATE CURRENT:–		AVERAGE GRID VOLTAGE MEASURED FROM GRID TO FILAMENT.		AVERAGE FILAMENT VOLTAGE:–	
OUTPUT -45	355-VOLTS D.C.	OUTPUT -45	28.0-M.A.D.C.	OUTPUT -45	87-VOLTS D.C.	RECTIFIER 5Z3	5.0-VOLTS A.C.
DRIVER -45	327-VOLTS D.C.	DRIVER -45	38.0-M.A.D.C.	DRIVER -45	40-VOLTS D.C.	OUTPUT -45	2.5-VOLTS A.C.
-30	175-VOLTS D.C.	-30	2.1-M.A.D.C.			DRIVER -45	2.5-VOLTS A.C.
-30	80-VOLTS D.C.	-30	1.5-M.A.D.C.			-30	2.1-VOLTS D.C.

AVERAGE VOLTAGES ACROSS SPEAKER FIELDS AND ELECTROLYTIC CONDENSERS.

3200-OHM SPEAKER FIELD VOLTAGE MEASURED FROM *1-CONTACT TO *7-CONTACT ON SPEAKER SOCKET 205-VOLTS D.C.

2500-OHM AUXILIARY SPEAKER FIELD VOLTAGE MEASURED FROM *1-CONTACT TO *3-CONTACT ON SPEAKER SOCKET 155-VOLTS D.C.

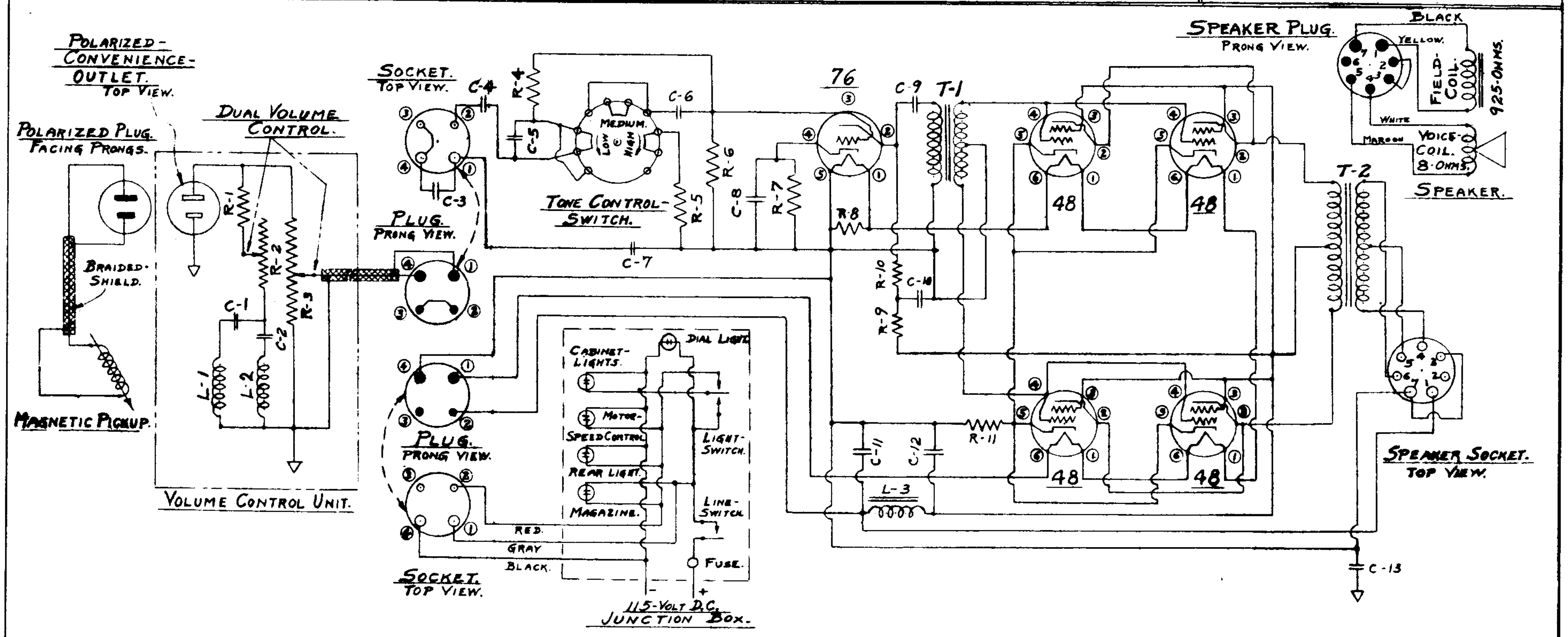
C-17	ELECTROLYTIC	385-VOLTS D.C.
C-16	ELECTROLYTIC	360-VOLTS D.C.
C-15	ELECTROLYTIC	355-VOLTS D.C.

FROM RECTIFIER -45-PLATE – TO CHASSIS + 150-VOLTS D.C.

RUDOLPH WURLITZER MFG. CO.

MODELS 316, 416, 616 & 716 DC

PICKUP - PART Nº 24707.	VOLUME CONTROL-#157AM-PART Nº 26374	AMPLIFIER-#751.-PART Nº 26367.	SPEAKER. PART Nº 27156.



ITEM.	PART Nº	VALUE.	REMARKS.	
		RESISTORS.		
R-1	22530	1,000 - OHM	± 10 %	1/4 - WATT
R-2	26378	7,500 OHM	DUAL V.C. REAR SECT.	
R-3		150,000 OHM	DUAL V.C. PANEL SECT.	
R-4	21939	50,000 - OHM	± 10 %	1/4 - WATT.
R-5	21998	35,000 - OHM	± 10 %	1/4 - WATT.
R-6	20855	150,000 - OHM	± 10%	1/4 - WATT.
R-7	22529	2,000 - OHM	± 10%	1/4 - WATT
R-8	22851	63 - OHM	± 5%	10 - WATT
R-9	21997	50.000 - OHM	± 10%	1/2 - WATT
R-10	21938	100,000 - OHM	± 10%	1/4 - WATT

ITEM	PART Nº	VALUE	REMARKS.	
R-11	22851	63 - OHM	± 5%	10 - WATT
R-12				
R-13				
R-14				
R-15				
R-16				
R-17				
		CONDENSERS.		
C-1	22241	.002 - MFD.	± 10 %	MICA.
C-2	20665	.25 - MFD.	± 10% - 200 - W. VOLTS.	
C-3	22241	.002 - MFD.	± 10%	MICA.

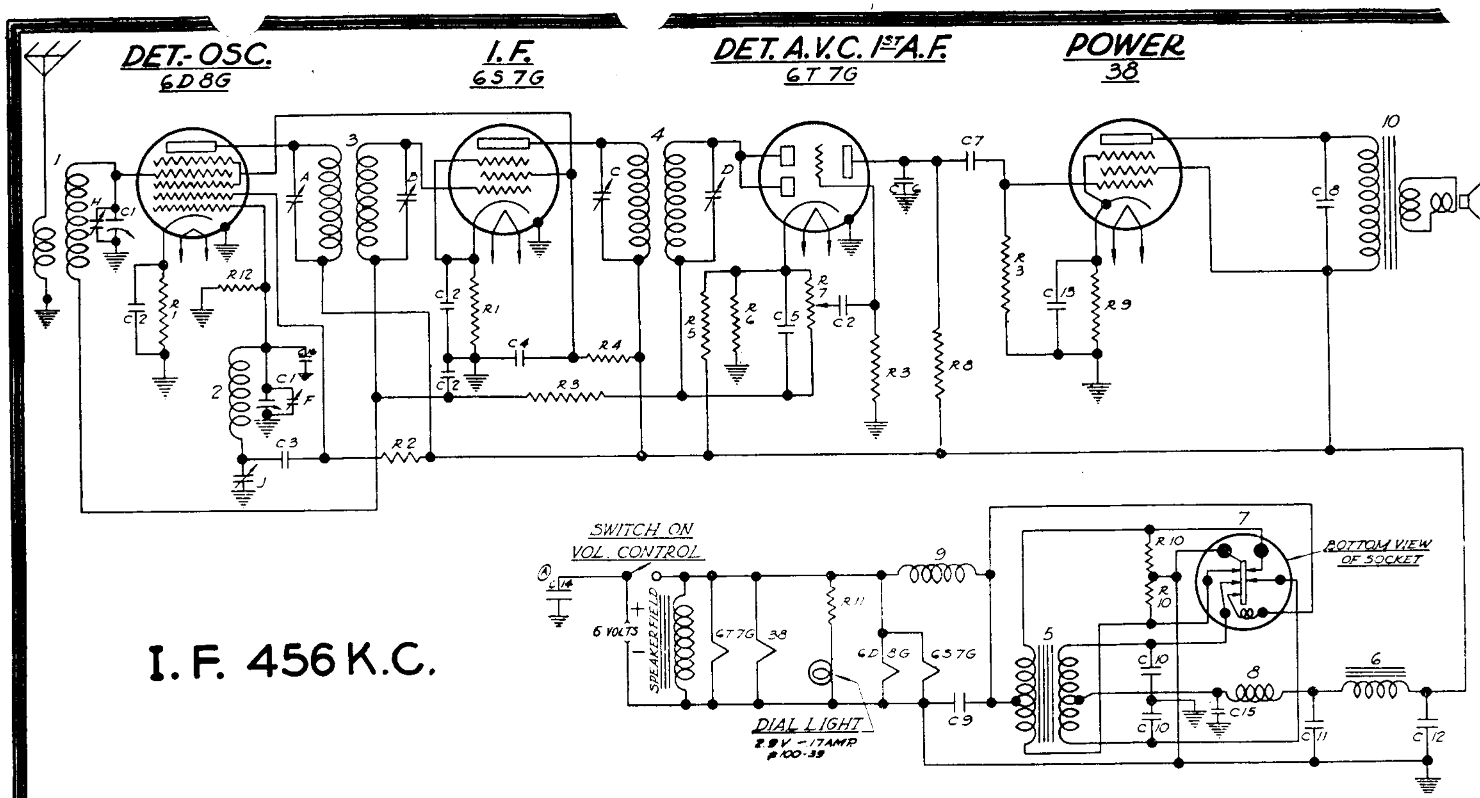
ITEM	PART Nº	VALUE	REMARKS	
C-4	24329	.1 - MFD.	± 10%	200 - W. VOLTS
C-5	26372	.0075 - MFD	± 10%	200 - W. VOLTS
C-6	26372	.0075 - MFD.	± 10%	200 - W. VOLTS.
C-7	24363	1.0 - MFD.	± 10%	200 - W. VOLTS
C-8	24279	10. - MFD.	ELEC.	25 - W. VOLTS
C-9	21736	.1 - MFD.	± 20%	400 - W. VOLTS
C-10	22535	.75 - MFD.	-10% +20%	200 - W. VOLTS
C-11	22865	2.0 - MFD		200 - W. VOLTS.
C-12		1.0 - MFD.		200 - W. VOLTS
C-13	21736	.1 - MFD.	± 20%	400 - W. VOLTS
C-14				

ITEM	PART Nº	VALUE	
C-15			
		SPEAKER.	
	26394	FIELD - 925 - OHMS	VOICE COIL - 8 - OHM
		CHOKES.	
L-1	24305	290 - MILLHENRIES	AIR CORE
L-2	21693	540 - MILLHENRIES	AIR CORE
L-3	22866	1.35 - HENRIES.	POWER FILTER
		TRANSFORMERS.	
T-1	22867	AUDIO	INPUT
T-2	22864	AUDIO	OUTPUT
T-3			

VOLTAGES AND CURRENTS OF MODEL-#751-AMPLIFIER. ALL MEASUREMENTS MADE WITH LINE VOLTAGE 115-VOLTS D.C.
ALL VOLTAGES MEASURED WITH 1000-OHMS PER VOLT VOLTMETER.

AVERAGE PLATE VOLTAGE MEASURED FROM PLATE + TO CONTACT #7-ON SPEAKER SOCKET.		AVERAGE PLATE CURRENT:-		AVERAGE BIAS VOLTAGE MEASURED FROM CATHODE OF TUBE TO #7-CONTACT ON SPEAKER SOCKET.		AVERAGE FILAMENT VOLTAGE:-	
-48	110-VOLTS D.C.	-48	48.0-M.A.	-48	16.0-VOLTS D.C.	-48	27.5-VOLTS D.C.
-76	20-VOLTS D.C.	-76	.6-M.A.	-76	1.0-VOLT D.C.	-76	6.1-VOLTS D.C.

ZENITH RADIO CORPORATION
MODELS 4-B-231 & 5409



I.F. 456 K.C.

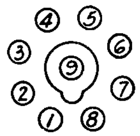
DIAG No	PART No	DESCRIPTION	
C-1	22-406	TWO GANG VARI COND.	
C-2	22-250	.05 MFD.	200V.
C-3	22-358	.002 MFD.	600V.
C-4	22-243	.01 MFD.	400V.
C-5	22-162	.0001 MFD.	600V.
C-6	22-147	.0005 MFD.	600V.
C-7	22-212	.05 MFD.	400V.
C-8	22-492	.002 MFD.	600V.
C-9	22-199	.5 MFD.	200V.
C-10	22-455	.01 MFD.	1200V.
C-11	22-582	2 MFD. ELECTROLYTIC	250V.
C-12		8 MFD. ELECTROLYTIC	250V.
C-13		10 MFD. ELECTROLYTIC	25 V.
C-14	22-350	.25 MFD.	200V.
C-15	22-170	.1 MFD.	400V.
R-1	63-632	560 OHM	1/4W±10
R-2	63-150	10 M OHM	1/2W±20
R-3	63-271	1 MEGOHM	1/4W±20
R-4	63-681	56 M	1/2W±10
R-5	63-160	100 M	1/2W±10
R-6	63-634	820 OHM	1/4W±10
R-7	63-547	400 MOHM VOLUME CONTROL	
R-8	63-597	470 MOHM	1/4W±20
R-9	63-418	1500 OHM	1/2W±10
R-10	63-577	100 OHM	1/4W±20
R-11	63-800	26 OHM WIREWOUND	1W±5
R-12	63-593	47 MOHM	1/4W±20
C-16	22-585	5 MMFD CERAMIC	
1	S-5215	ANT. COIL & SHIELD ASSEM.	
2	S-4662	OSCIL. COIL ASSEMBLY	
3	95-443	1ST I.F. TRANSFORMER	
4	95-444	2ND I.F. TRANSFORMER	
5	95-445	POWER TRANSFORMER	
6	95-298	POWER CHOKE	
7	190-6	VIBRATOR	
8	20-82	R.F. CHOKE	
9	S-2778	R.F. CHOKE	
10		SPEAKER TRANSFORMER	
		VARIABLE TRIMMERS	
A		1ST I.F. TRANSF. PRIMARY	
B		1ST I.F. TRANSF. SECONDARY	
C		2ND I.F. TRANSF. PRIMARY	
D		2ND I.F. TRANSF. SECONDARY	
F		BROADCAST OSCIL. (ON GANG)	

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5	" " "	200 Mmfd.	1500	"	1500	FG	Repeat 3 & 4.

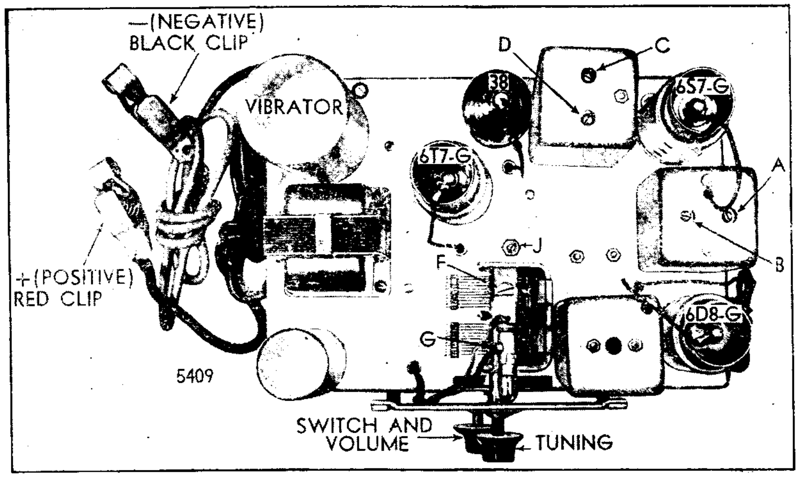
SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6D8	Converter Osc.	0	0	147	98	—9	114	6.3	2	0
6S7	I. F.	0	6.3	146	98	1.5	—	0	1.5	0
6T7	2nd Det. 1st Aud.	0	0	27	—1	—1	—	6.3	.8	0
		H	Ep	Es	Ek	H	Eg			
38	Power	0	143	148	6.5	6.3	0			



BOTTOM VIEW OF SOCKET

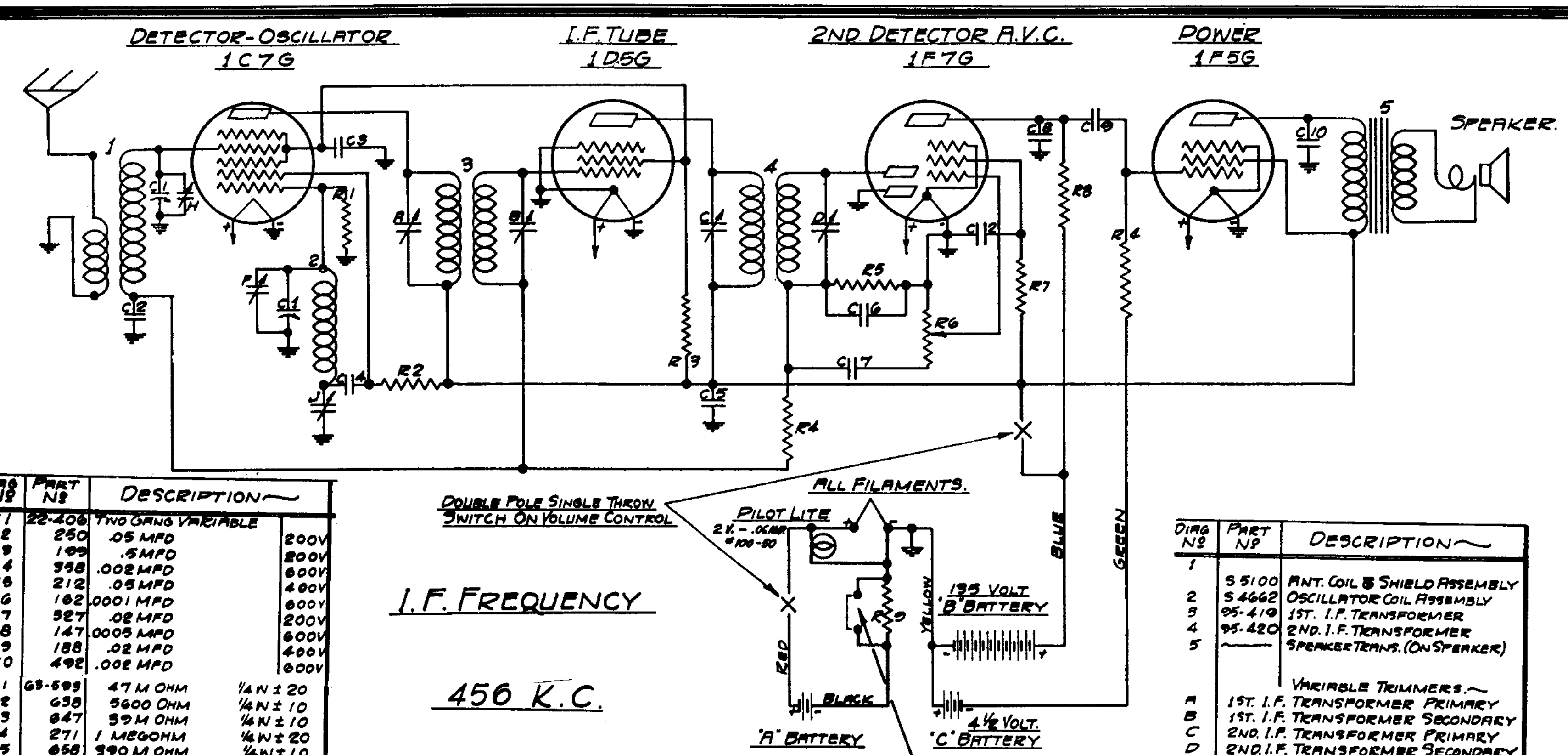
All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Battery consumption 2.2 Amp. Power output .84W.



LOCATION OF TRIMMERS

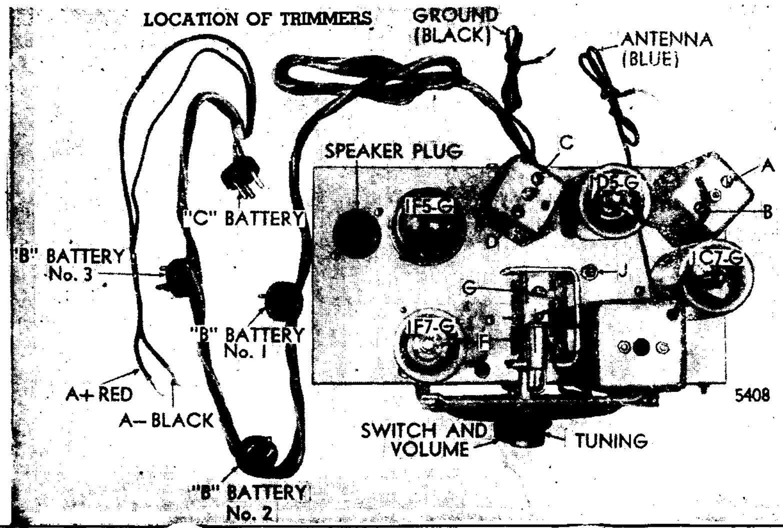
ZENITH RADIO CORPORATION

MODELS 4-F-227 & 5408



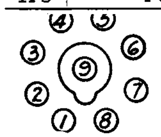
DIAG. NO.	PART NO.	DESCRIPTION—	
C1	22-406	TWO GANG VARIABLE	
C2	250	.05 MFD	200V
C3	199	.5 MFD	200V
C4	358	.002 MFD	600V
C5	212	.05 MFD	400V
C6	162	.0001 MFD	600V
C7	327	.02 MFD	200V
C8	147	.0005 MFD	600V
C9	188	.02 MFD	400V
C10	492	.002 MFD	600V
R1	63-593	47 M OHM	¼W ± 20
R2	638	5600 OHM	¼W ± 10
R3	647	39 M OHM	¼W ± 10
R4	271	1 MEGOHM	¼W ± 20
R5	658	390 M OHM	¼W ± 10
R6	548	1 MEGOHM VOLUME CONTROL	
R7	441	1 MEGOHM	¼W ± 10
R8	657	330 M OHM	¼W ± 10
R9	684	.64 OHM (WIREWOUND)	¼W ± 10

DIAG. NO.	PART NO.	DESCRIPTION—
1	S 5100	ANT. COIL & SHIELD ASSEMBLY
2	S 4662	OSCILLATOR COIL ASSEMBLY
3	95-419	1ST. I.F. TRANSFORMER
4	95-420	2ND. I.F. TRANSFORMER
5	———	SPEAKER TRANS. (ON SPEAKER)
		VARIABLE TRIMMERS.—
A		1ST. I.F. TRANSFORMER PRIMARY
B		1ST. I.F. TRANSFORMER SECONDARY
C		2ND. I.F. TRANSFORMER PRIMARY
D		2ND. I.F. TRANSFORMER SECONDARY
F		BROADCAST OSCILLATOR (ON GANG)
H		ANTENNA BROADCAST (ON GANG)
J		#22-519 OSCILLATOR PADDER.



SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
1C7	Converter Osc.	—	2	136	42	—6	116	0	—	0
1D5	I. F.	—	2	136	42	—	—	0	—	0
1F7	2nd Det. 1st Audio	—	2	15	0	—.5	11	0	—	0
1F5	Power	—	2	130	136	—.5	—	0	—	—



BOTTOM VIEW OF SOCKET

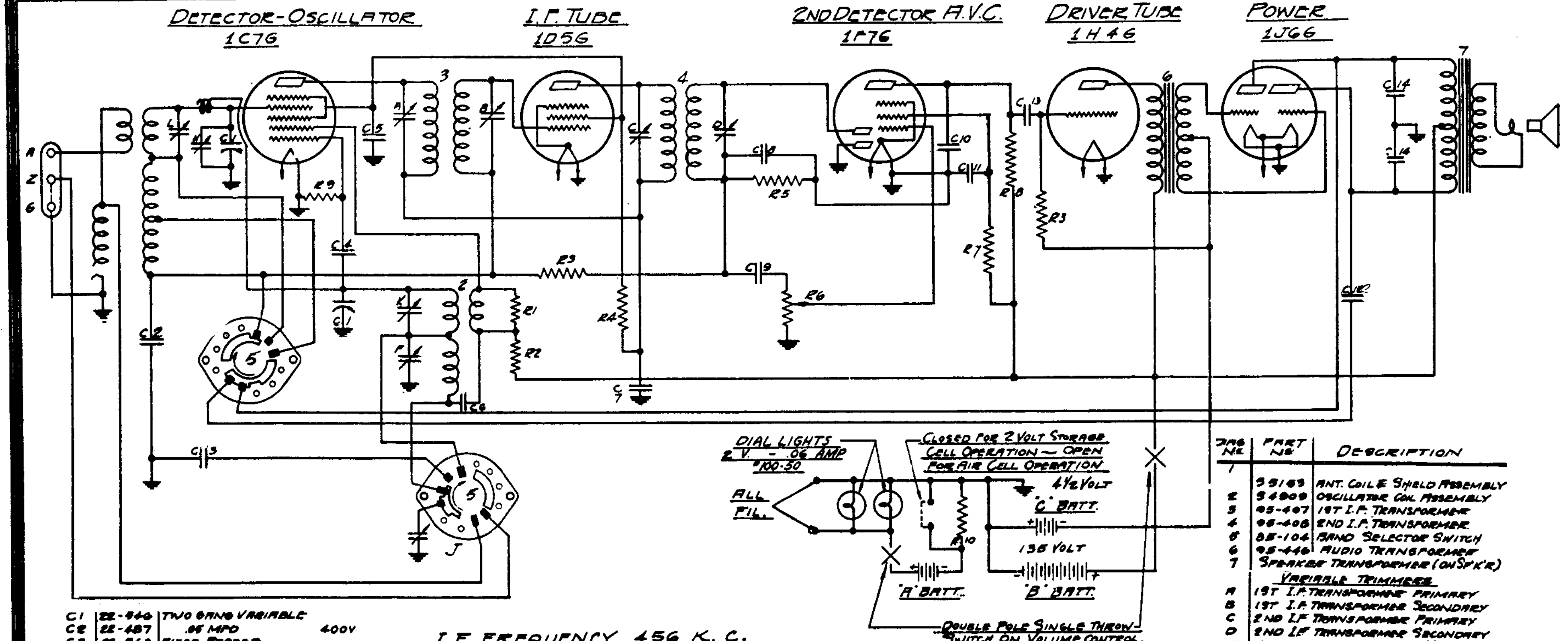
All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. "A" consumption .42 Amp. "B" consumption 19 M.A. Power output .75W.

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Algm't.
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Algm't of Ant.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5	" " "	200 Mmfd.	1500	"	1500	FG	Rpt. 3 & 4

ZENITH RADIO CORPORATION

MODELS 5-F-233, 5-F-251 & 5522



C1	22-546	TWO GANG VARIABLE	
C2	22-487	.05 MFD	400V
C3	22-563	FIXED PADDER	
C4	22-280	50 MMFD	600V
C5	22-199	.5 MFD	200V
C6	22-358	.002 MFD	600V
C7	22-170	.1 MFD	400V
C8	22-162	.0001 MFD	600V
C9	22-327	.02 MFD	200V
C10	22-147	.0005 MFD	500V
C11	22-250	.05 MFD	200V
C12	22-171	.05 MFD	600V
C13	22-188	.02 MFD	400V
C14	22-492	.002 MFD	600V

I.F. FREQUENCY 456 K. C.

R1	63-580	10 M OHM	1/4W ±20
R2	63-638	5600 OHM	1/4W ±10
R3	63-271	1 MEGOHM	1/4W ±20
R4	63-648	47 M OHM	1/4W ±10
R5	63-668	390 M OHM	1/4W ±10
R6	63-541	1 MEG OHM VOLUME CONTROL	
R7	63-441	1 MEGOHM	1/4W ±10
R8	63-657	330 M OHM	1/4W ±10
R9	63-646	33 M OHM	1/4W ±10
R10	63-612	34 OHM (WIREWOUND)	1/4W ±10

MODEL	SPEAKER
5F-233	49-162 — 6"
5F-251	49-164 — 8"

DWG. No.	PART No.	DESCRIPTION
1	55163	ANT. COIL & SHIELD ASSEMBLY
2	54809	OSCILLATOR COIL ASSEMBLY
3	95-407	1ST I.F. TRANSFORMER
4	95-406	2ND I.F. TRANSFORMER
5	85-104	BAND SELECTOR SWITCH
6	95-446	AUDIO TRANSFORMER
7		SPEAKER TRANSFORMER (ON SP'K'R)
		VARIABLE TRIMMERS
A		1ST I.F. TRANSFORMER PRIMARY
B		1ST I.F. TRANSFORMER SECONDARY
C		2ND I.F. TRANSFORMER PRIMARY
D		2ND I.F. TRANSFORMER SECONDARY
F		BROADCAST OSCILLATOR (SEE NOTE)
H		ANTENNA BROADCAST (ON GANG)
J		#22-519 BROADCAST PADDER
K		SHORT WAVE OSCILLATOR (SEE NOTE)
L		SHORT WAVE DETECTOR #22-305

NOTE:- TRIMMERS F & K MOUNTED ON BAKELITE STRIP PART #85-405

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
1C7	Converter Osc.	—	2	137	41	-5	116	0	—	0
1D5	I. F.	—	2	137	41	—	—	0	—	0
1F7	2nd Det. A.V.C. 1st Audio	—	2	14	0	0	11	0	—	0
1H4	2nd Audio	—	0	126	—	-.5	—	2	—	—
1J6	Power	—	0	136	-1.5	-1.5	136	2	—	—

④ ⑤ ⑥ ⑦ ⑧ ① ② ③ ⑨

BOTTOM VIEW OF SOCKET

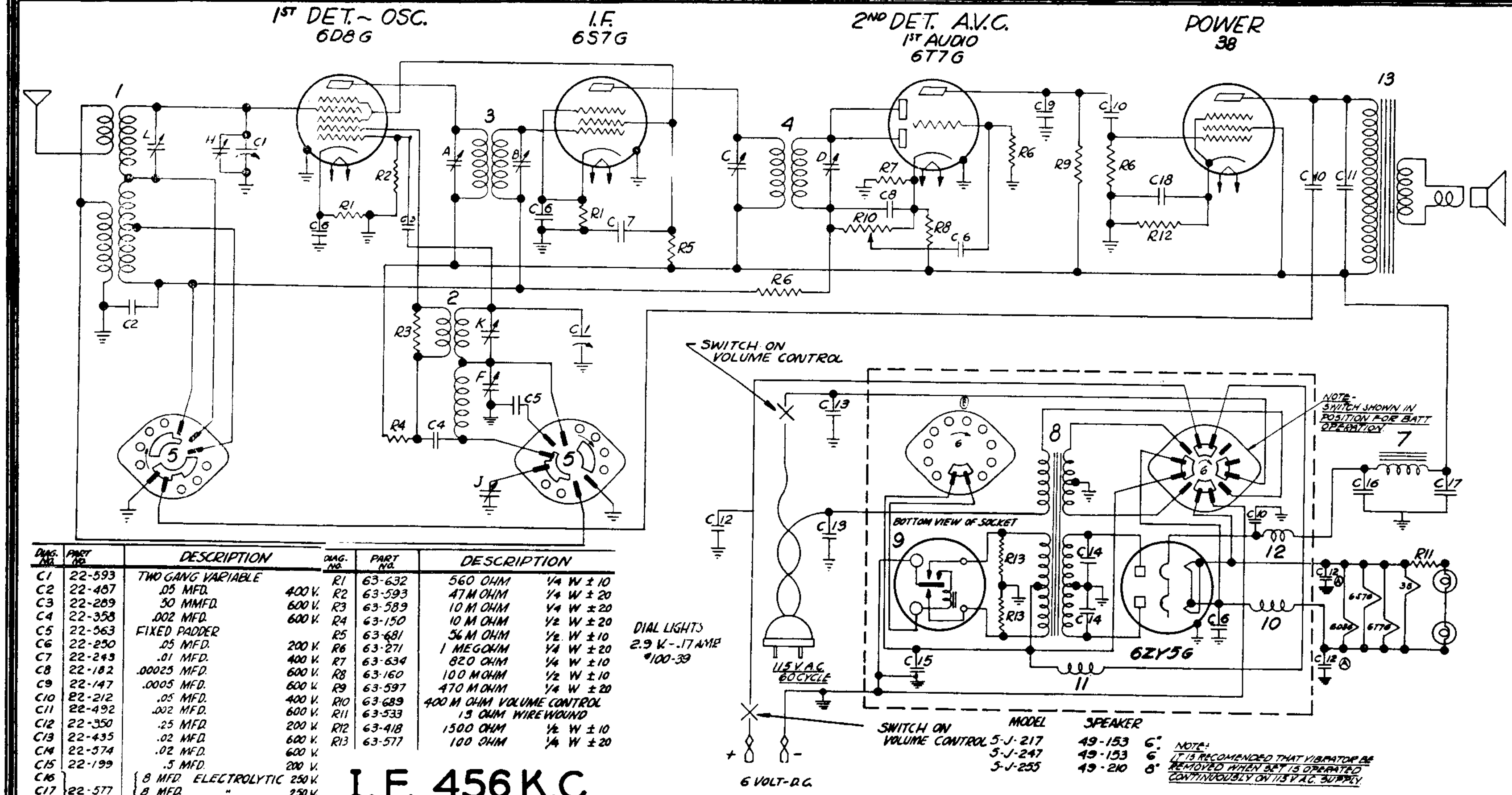
All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. "A" consumption .66 Amp. "B" consumption 19 M.A. Power output 1.75W.

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5				"		FG	Repeat 3 & 4.
6	Rec. Ant. Lead	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
7	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output

ZENITH RADIO CORPORATION

MODELS 5-J-217, 5-J-247, 5-J-255 & 5524



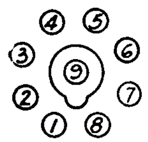
DIAG. NO.	PART NO.	DESCRIPTION	
C1	22-593	TWO GANG VARIABLE	
C2	22-487	.05 MFD.	400 V.
C3	22-289	50 MMFD.	600 V.
C4	22-358	.002 MFD.	600 V.
C5	22-563	FIXED PADDER	
C6	22-250	.05 MFD.	200 V.
C7	22-243	.01 MFD.	400 V.
C8	22-182	.00025 MFD.	600 V.
C9	22-147	.0005 MFD.	600 V.
C10	22-212	.05 MFD.	400 V.
C11	22-492	.002 MFD.	600 V.
C12	22-350	.25 MFD.	200 V.
C13	22-435	.02 MFD.	600 V.
C14	22-574	.02 MFD.	600 V.
C15	22-199	.5 MFD.	200 V.
C16	22-577	8 MFD. ELECTROLYTIC	250 V.
C17	22-577	8 MFD. "	250 V.
C18	22-577	10 MFD. "	25 V.

DIAG. NO.	PART NO.	DESCRIPTION	
R1	63-632	560 OHM	1/4 W ± 10
R2	63-593	47 M OHM	1/4 W ± 20
R3	63-589	10 M OHM	1/4 W ± 20
R4	63-150	10 M OHM	1/2 W ± 20
R5	63-681	56 M OHM	1/2 W ± 10
R6	63-271	1 MEGOHM	1/4 W ± 20
R7	63-634	820 OHM	1/4 W ± 10
R8	63-160	100 M OHM	1/2 W ± 10
R9	63-597	470 M OHM	1/4 W ± 20
R10	63-689	400 M OHM VOLUME CONTROL	
R11	63-533	13 OHM WIREWOUND	
R12	63-418	1500 OHM	1/2 W ± 10
R13	63-577	100 OHM	1/4 W ± 20

I.F. 456 K.C.

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6D8	Converter Osc.	0	0	129	42.5	—2	110	6.3	1.5	0
6S7	I. F.	0	0	130	42.5	1.5	—	6.3	1.5	0
6T7	2nd Det. A.V.C. 1st Audio	0	0	23	.1	.1	—	6.3	.5	0
6ZY5G	Rect.	0	6.3	—3.5	—	—3.5	—	0	140	—
		H	P	S	K	H	G			
38	Power	0	124	129	12	6.3	0			



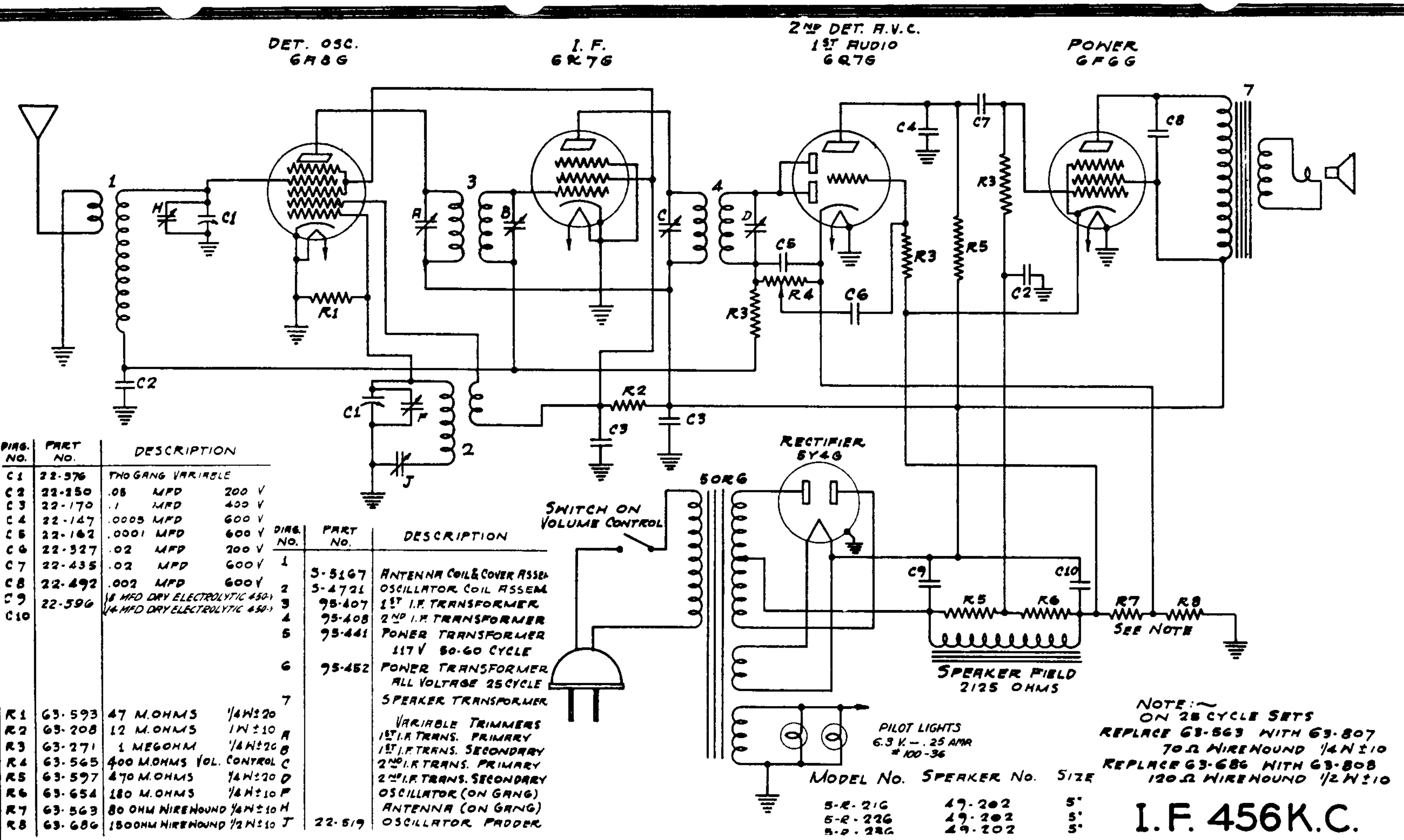
BOTTOM VIEW OF SOCKET

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 16W. Battery voltage 6.3V consumption 2.1 Amp. Power Output .84W.

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output.
5				"		FG	Repeat 2 & 3.
6	Rec. Ant. Lead	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
7	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output.

ZENITH RADIO CORPORATION
MODELS 5-R-216, 5-R-226, 5-R-236 & 5526

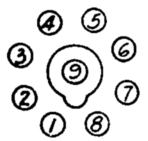


DIAG. NO.	PART NO.	DESCRIPTION
C1	22-576	TWO GANG VARIABLE
C2	22-250	.05 MFD 200 V
C3	22-170	.1 MFD 400 V
C4	22-147	.0005 MFD 600 V
C5	22-162	.0001 MFD 600 V
C6	22-327	.02 MFD 200 V
C7	22-435	.02 MFD 600 V
C8	22-492	.002 MFD 600 V
C9	22-596	8 MFD DRY ELECTROLYTIC 450-V
C10		4 MFD DRY ELECTROLYTIC 450-V
R1	63-593	47 M.OHMS 1/4 W ±20
R2	63-208	12 M.OHMS 1 W ±10
R3	63-271	1 MEGOHM 1/4 W ±20
R4	63-565	400 M.OHMS VOL. CONTROL
R5	63-597	470 M.OHMS 1/4 W ±20
R6	63-654	180 M.OHMS 1/4 W ±10
R7	63-563	80 OHM WIREWOUND 1/4 W ±10
R8	63-686	150 OHM WIREWOUND 1/2 W ±10

DIAG. NO.	PART NO.	DESCRIPTION
1	5-5167	ANTENNA COIL & COVER ASSEM.
2	5-4721	OSCILLATOR COIL ASSEM.
3	95-407	1ST I.F. TRANSFORMER
4	95-408	2ND I.F. TRANSFORMER
5	95-441	POWER TRANSFORMER 117 V 50-60 CYCLE
6	95-452	POWER TRANSFORMER ALL VOLTAGE 25 CYCLE
7		SPEAKER TRANSFORMER
		VARIABLE TRIMMERS
A		1ST I.F. TRANS. PRIMARY
B		1ST I.F. TRANS. SECONDARY
C		2ND I.F. TRANS. PRIMARY
D		2ND I.F. TRANS. SECONDARY
F		OSCILLATOR (ON GANG)
H		ANTENNA (ON GANG)
J	22-519	OSCILLATOR PADDER

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Converter Osc.	0	6	204	82	11	82	0	0	—.1
6K7	I.F.	0	6	204	82	0	—	0	0	—.1
6Q7	2nd Det. AVC 1st Audio	0	0	38	—2	—2	—	6	—2	—2
6F6	Power	0	0	198	205	—2.5	—	6	—3.5	—
5Y4	Rect.	0	...	AC	—	AC	—	208	208	—



BOTTOM VIEW OF SOCKET

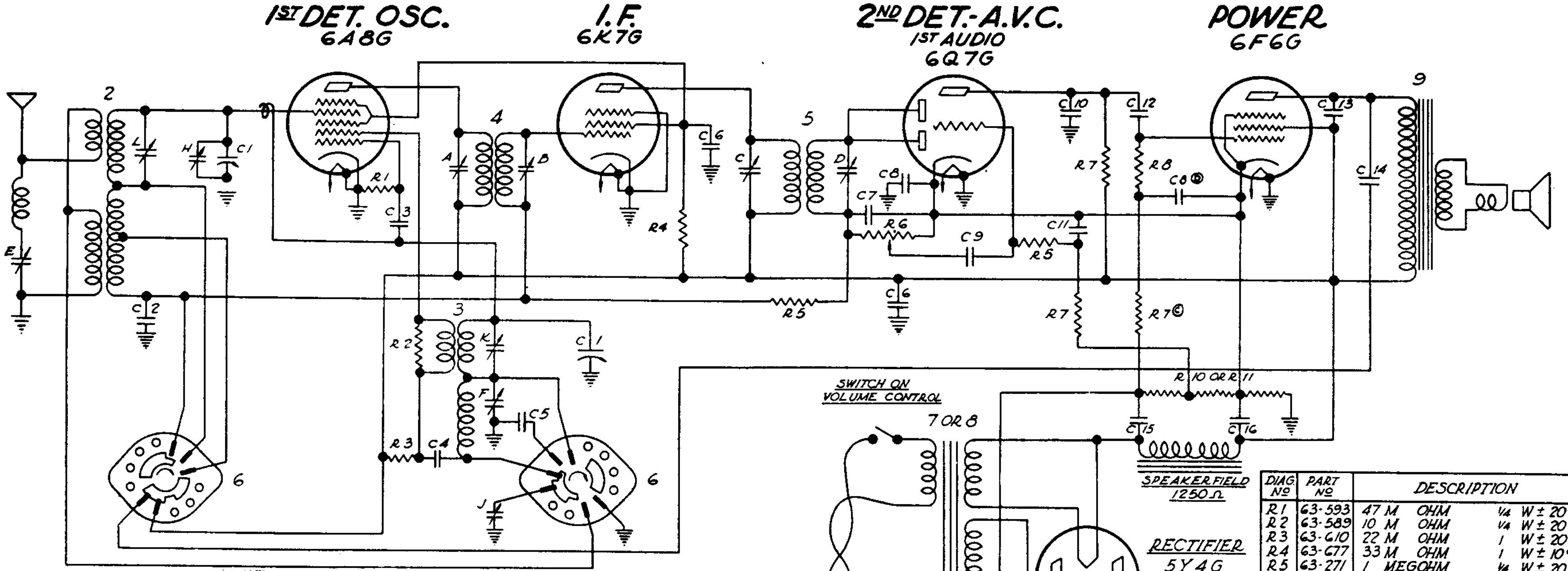
All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 50W. Power output 3.5W.

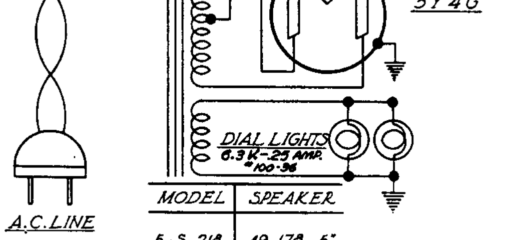
ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj for max. outpu
5	" " "	200 Mmfd.	1500	"	1500	FG	Repeat 3 & 4.

ZENITH RADIO CORPORATION

MODELS 5-S-201, 5-S-218, 5-S-220, 5-S-228, 5-S-237, 5-S-250, 5-S-252 & 5521





DIAG No	PART No	DESCRIPTION	
C1	22-546	TWO GANG VARIABLE	
C2	22-407	.05 MFD.	400V.
C3	22-127	25 MMFD.	600V.
C4	22-358	.002 MFD.	600V.
C5	22-563	FIXED PADDER	
C6	22-170	.1 MFD.	400V.
C7	22-162	.0001 MFD.	600V.
C8	22-185	.01 MFD.	200V.
C9	22-327	.02 MFD.	200V.
C10	22-147	.0005 MFD.	600V.
C11	22-190	.1 MFD.	200V.
C12	22-435	.02 MFD.	600V.
C13	22-492	.002 MFD.	600V.
C14	22-171	.05 MFD.	600V.
C15	22-596	8 MFD DRY ELECTROLYTIC	450V
C16		4 MFD DRY ELECTROLYTIC	450V

	VARIABLE TRIMMERS
A	1ST I.F. TRANS. PRIMARY
B	1ST I.F. TRANS. SECONDARY
C	2ND I.F. TRANS. PRIMARY
D	2ND I.F. TRANS. SECONDARY
E	#22-570 WAVE TRAP
F	BROADCAST OSCILLATOR (SEE NOTE)
H	ANTENNA BROADCAST (ON GANG)
J	#22-519 BROADCAST PADDER
K	SHORT WAVE OSCILLATOR (SEE NOTE)
L	SHORT WAVE DETECTOR #22-305

TRIMMERS F & K MOUNTED ON BAKELITE STRIP #22-408

MODEL	SPEAKER
5-S-218	49-178 5"
5-S-220	49-178 5"
5-S-228	49-178 5"
5-S-237	49-180 6"
5-S-250	49-179 8"
5-S-252	49-208 10"

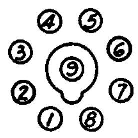
DIAG No	PART No	DESCRIPTION
R1	63-593	47 M OHM ¼ W ± 20%
R2	63-589	10 M OHM ¼ W ± 20%
R3	63-610	22 M OHM 1 W ± 20%
R4	63-677	33 M OHM 1 W ± 10%
R5	63-271	1 MEGOHM ¼ W ± 20%
R6	63-565	400 M OHM VOLUME CONTROL
R7	63-296	220 M OHM ¼ W ± 20%
R8	63-597	470 M OHM ¼ W ± 20%
R10	63-613	3 SECTION CANDOHM 50-60 ~
R11	63-806	3 SECTION CANDOHM 25 ~
1		WAVE TRAP COIL MOUNTED ON ANTENNA COIL ASSEMBLY
2	S-4934	ANT COIL & SHIELD ASSEMBLY
3	S-4909	OSCILLATOR COIL ASSEMBLY
4	95-407	1ST I.F. TRANSFORMER
5	95-408	2ND I.F. TRANSFORMER
6	85-104	BAND SELECTOR SWITCH
7	95-406	POWER TRANSFORMER 117 VOLT 50-60 CYCLE
8	95-452	POWER TRANSFORMER ALL VOLTAGE 25 CYCLE
9		SPEAKER TRANSFORMER

I.F. 456 K.C.

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Converter Osc.	0	6.3	244	97	—9	149	0	0	—.5
6K7	I. F.	0	6.3	246	97	0	—	0	0	—.5
6Q7	2nd Det. AVC 1st Audio	0	0	71	—2.5	—2.5	—	6.3	—2.5	—2.5
6F6	Power	0	0	231	246	—3.5	—	6.3	—2.5	—
5Y4	Rect.	0	—	AC	—	AC	—	316	316	—

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 65W. Power Output 4.5W.



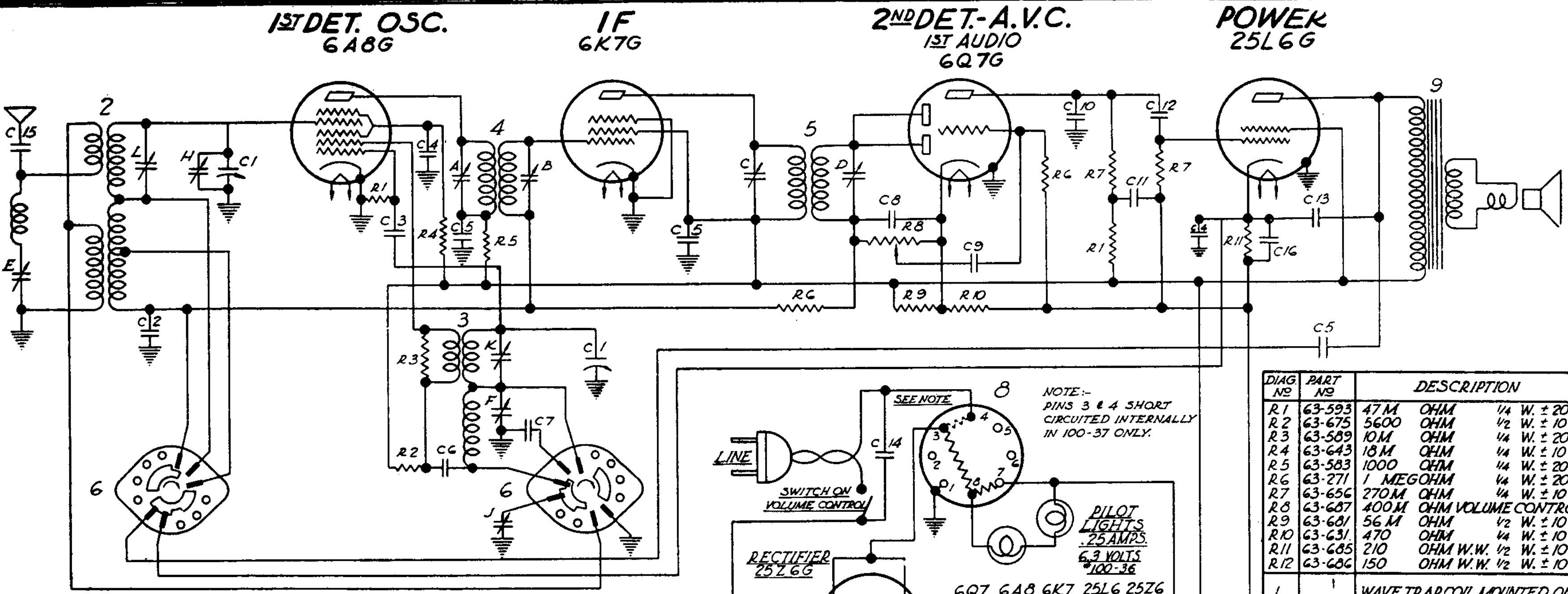
BOTTOM VIEW OF SOCKET

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	456	"	600	E	See Note
3	" " "	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
4	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
5	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output.
6				"		FG	Repeat 3 & 4.
7	Rec. Ant. Lead	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
8	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output.

NOTE: If receiver is used in a location subject to code interference adjust wave trap (E) for minimum interference with antenna connected and receiver operating in broadcast band.

ZENITH RADIO CORPORATION
MODELS 6-D-202, 6-D-219, 6-D-221, 6-D-238 & 5639



Diag. No.	Part No.	Description
C1	22-567	TWO GANG VARIABLE
C2	22-467	.05 MFD. 400 V.
C3	22-127	25 MMFD. 600 V.
C4	22-250	.05 MFD. 200 V.
C5	22-212	.05 MFD. 400 V.
C6	22-358	.002 MFD. 600 V.
C7	22-563	FIXED PADDER
C8	22-162	.0001 MFD. 600 V.
C9	22-327	.02 MFD. 200 V.
C10	22-147	.0005 MFD. 600 V.
C11	22-190	.1 MFD. 200 V.
C12	22-188	.02 MFD. 400 V.
C13	22-196	.01 MFD. 600 V.
C14	22-455	.01 MFD. 1200 V.
C15	22-492	.002 MFD. 600 V.
C16	22-560	10 MFD. ELECTROLYTIC 25 V.
C17	22-560	16 " " 150 V.
C18	22-560	35 " " 150 V.

I.F. 456 K.C.

	VARIABLE TRIMMERS
A	1ST I.F. TRANS. PRIMARY
B	1ST I.F. TRANS. SECONDARY
C	2ND I.F. TRANS. PRIMARY
D	2ND I.F. TRANS. SECONDARY
E	#22-570 WAVE TRAP
F	BROADCAST OSCILLATOR (SEE NOTE)
H	ANTENNA BROADCAST (ON GANG)
J	#22-519 BROADCAST PADDER
K	SHORT WAVE OSCILLATOR (SEE NOTE)
L	SHORT WAVE DETECTOR (SEE NOTE)

NOTE:- TRIMMERS F, K, & L MOUNTED ON BAKELITE STRIP # 22-324

Model	Speaker
6-D-219	49-189 5"
6-D-221	49-189 5"

Diag. No.	Part No.	Description
R1	63-593	47 M OHM 1/4 W. ± 20%
R2	63-675	5600 OHM 1/2 W. ± 10%
R3	63-589	10 M OHM 1/4 W. ± 20%
R4	63-643	18 M OHM 1/4 W. ± 10%
R5	63-583	1000 OHM 1/4 W. ± 20%
R6	63-271	1 MEGOHM 1/4 W. ± 20%
R7	63-656	270 M OHM 1/4 W. ± 10%
R8	63-687	400 M OHM VOLUME CONTROL
R9	63-681	56 M OHM 1/2 W. ± 10%
R10	63-631	470 OHM 1/4 W. ± 10%
R11	63-685	210 OHM W.W. 1/2 W. ± 10%
R12	63-686	150 OHM W.W. 1/2 W. ± 10%
1		WAVE TRAP COIL MOUNTED ON ANTENNA COIL ASSEMBLY
2	S-5055	ANT. COIL & SHIELD ASSEMBLY
3	S-4909	OSCILLATOR COIL ASSEMBLY
4	95-407	1ST I.F. TRANSFORMER
5	95-406	2ND I.F. TRANSFORMER
6	85-104	BAND SELECTOR SWITCH
7	95-410	POWER CHOKE
8	100-37	BALLAST TUBE 115 V.
	100-55	" " 125 V.
	100-56	" " 150 V.
	100-57	" " 175 V.
	100-58	" " 200 V.
	100-59	" " 220 V.
	100-60	" " 250 V.
9		SPEAKER TRANSFORMER

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Converter Osc.	0	AC	102	55	—1	85	AC	0	—.1
6K7	I.F.	0	AC	104	104	9	—	AC	0	—.1
6Q7	2nd Det. AVC 1st Audio	0	AC	24	—1	—1	—	AC	—1	—1
25L6	Power	0	AC	94	104	—.5	—	AC	—4	—
25Z6	Rect.	0	AC	AC	119	AC	—	AC	119	—
	Ballast									

BOTTOM VIEW OF SOCKET

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 55W. Power output 1.75W.

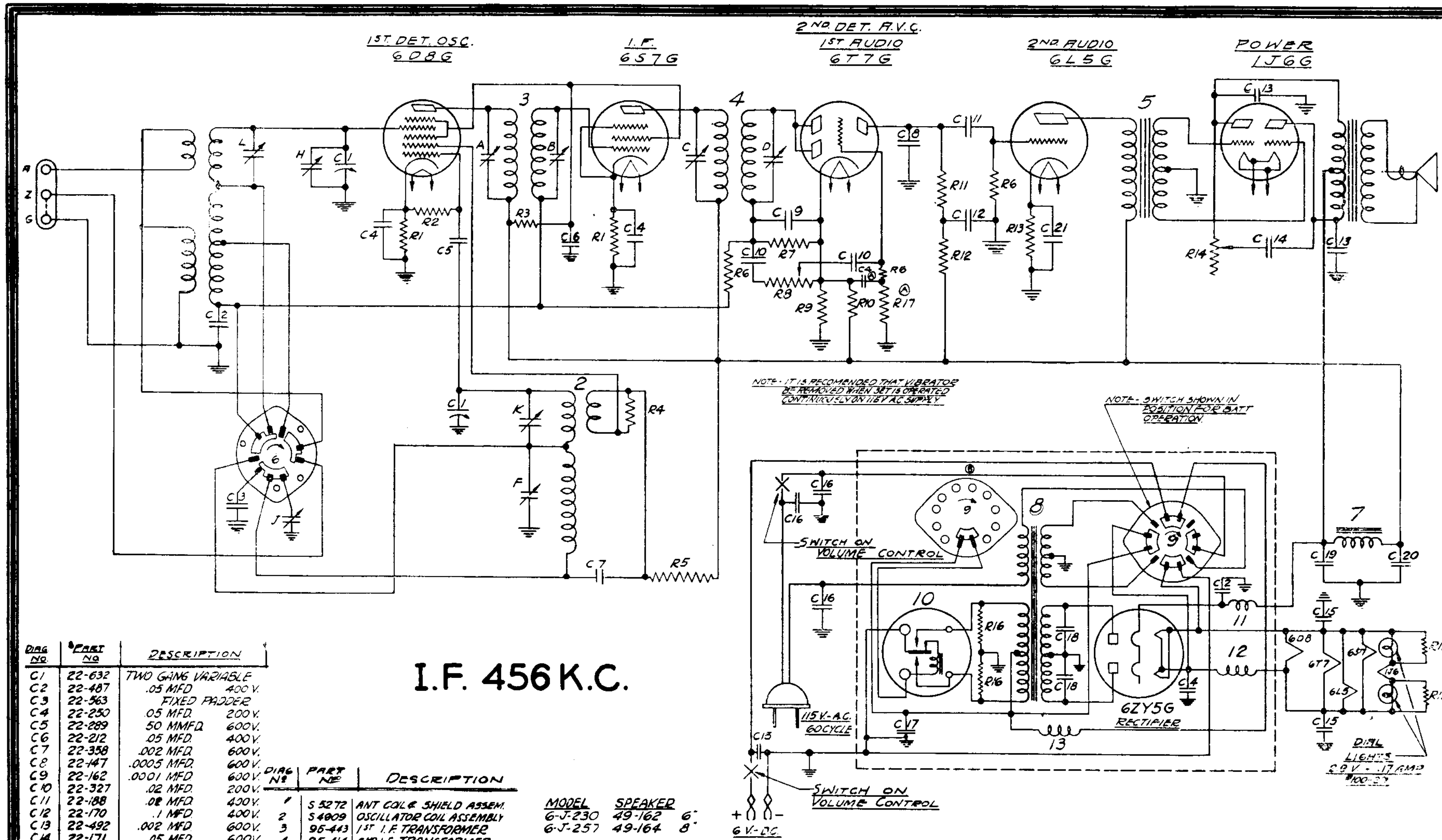
ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	456	"	600	E	See Note
3	" " "	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
4	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
5	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
6						FG	Repeat 3 & 4
7	" " "	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
8	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output

NOTE: If receiver is used in a location subject to code interference adjust wave trap (E) for minimum interference with antenna connected and receiver operating in broadcast band.

ZENITH RADIO CORPORATION

MODELS 6-J-230, 6-J-257 & 5642



I.F. 456 K.C.

DIAG NO.	PART NO.	DESCRIPTION
C1	22-632	TWO GANG VARIABLE
C2	22-487	.05 MFD 400 V.
C3	22-563	FIXED PADDER
C4	22-250	.05 MFD. 200 V.
C5	22-289	50 MMFD. 600 V.
C6	22-212	.05 MFD. 400 V.
C7	22-358	.002 MFD. 600 V.
C8	22-147	.0005 MFD. 600 V.
C9	22-162	.0001 MFD 600 V.
C10	22-327	.02 MFD. 200 V.
C11	22-188	.02 MFD. 400 V.
C12	22-170	.1 MFD 400 V.
C13	22-492	.002 MFD 600 V.
C14	22-171	.05 MFD. 600 V.
C15	22-350	.25 MFD 200 V.
C16	22-435	.02 MFD 600 V.
C17	22-199	.5 MFD. 200 V.
C18	22-574	.02 MFD. 600 V
C19	22-577	8 MFD. ELECTROLYTIC 250 V.
C20	22-577	8 MFD ELECTROLYTIC 250 V
C21	22-577	10 MFD. ELECTROLYTIC 25 V.
R1	63-632	560 OHM 1/4W ± 10
R2	63-593	47 M OHM 1/4W ± 20
R3	63-681	56 M OHM 1/2W ± 10
R4	63-589	10 M OHM 1/4W ± 20
R5	63-150	10 M OHM 1/2W ± 20
R6	63-271	1 MEGOHM 1/4W ± 20
R7	63-658	390 M OHM 1/4W ± 10
R8	63-798	1 MEGOHM VOLUME CONT.
R9	63-634	820 OHM 1/4W ± 10
R10	63-160	100 M OHM 1/2W ± 10
R11	63-597	470 M OHM 1/4W ± 20
R12	63-656	270 M OHM 1/4W ± 10
R13	63-797	2200 OHM 1/2W ± 10
R14	63-521	50 M OHM TONE CONTROL
R15	63-801	21 OHM WIREWOUND 1/2W
R16	63-577	100 OHM 1/4W ± 20
R17	63-596	330 M OHM 1/4W ± 20

DIAG NO.	PART NO.	DESCRIPTION
1	S 5272	ANT COIL & SHIELD ASSEM.
2	S 4909	OSCILLATOR COIL ASSEMBLY
3	95-443	1ST I.F. TRANSFORMER
4	95-414	2ND I.F. TRANSFORMER
5	95-446	AUDIO TRANSFORMER
6	85-112	BAND SELECTOR SWITCH
7	95-324	POWER CHOKE
8	95-425	POWER TRANS.
9	85-125	POWER SWITCH
10	190-11	VIBRATOR
11	20-82	R.F. CHOKE
12	S 2778	R.F. CHOKE ASSEMBLY
13	S 5043	R.F. CHOKE ASSEMBLY

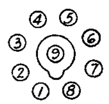
	VARIABLE TRIMMERS
A	1ST I.F. TRANSFORMER PRIMARY
B	1ST I.F. TRANSFORMER SECONDARY
C	2ND I.F. TRANSFORMER PRIMARY
D	2ND I.F. TRANSFORMER SECONDARY
F	BROADCAST OSCILLATOR (SEE NOTE)
H	ANTENNA BROADCAST (ON GANG)
J	#22-519 BROADCAST PADDER
K	SHORT WAVE OSC. (SEE NOTE)
L	SHORT WAVE DET. (SEE NOTE)

NOTE - TRIMMERS F, K, & L ARE MOUNTED ON BAKELITE STRIP #22-625

MODEL	SPEAKER	
6-J-230	49-162	6"
6-J-257	49-164	8"

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6D8	Converter Osc.	0	0	125	35	—1	97	6.3	1.5	0
6S7	I.F.	0	0	124	35	1	—	6.3	1	0
6T7	2nd Det. AVC 1st Audio	0	0	15	.1	.1	-	6.3	.5	0
6L5	2nd Audio	0	0	120	—	0	-	6.3	.2	—
1J6	Power	0	3	137	0	0	137	1	0	—
5ZY5	Rect.	0	6.3	AC	-	AC	--	0	140	—



BOTTOM VIEW OF SOCKET

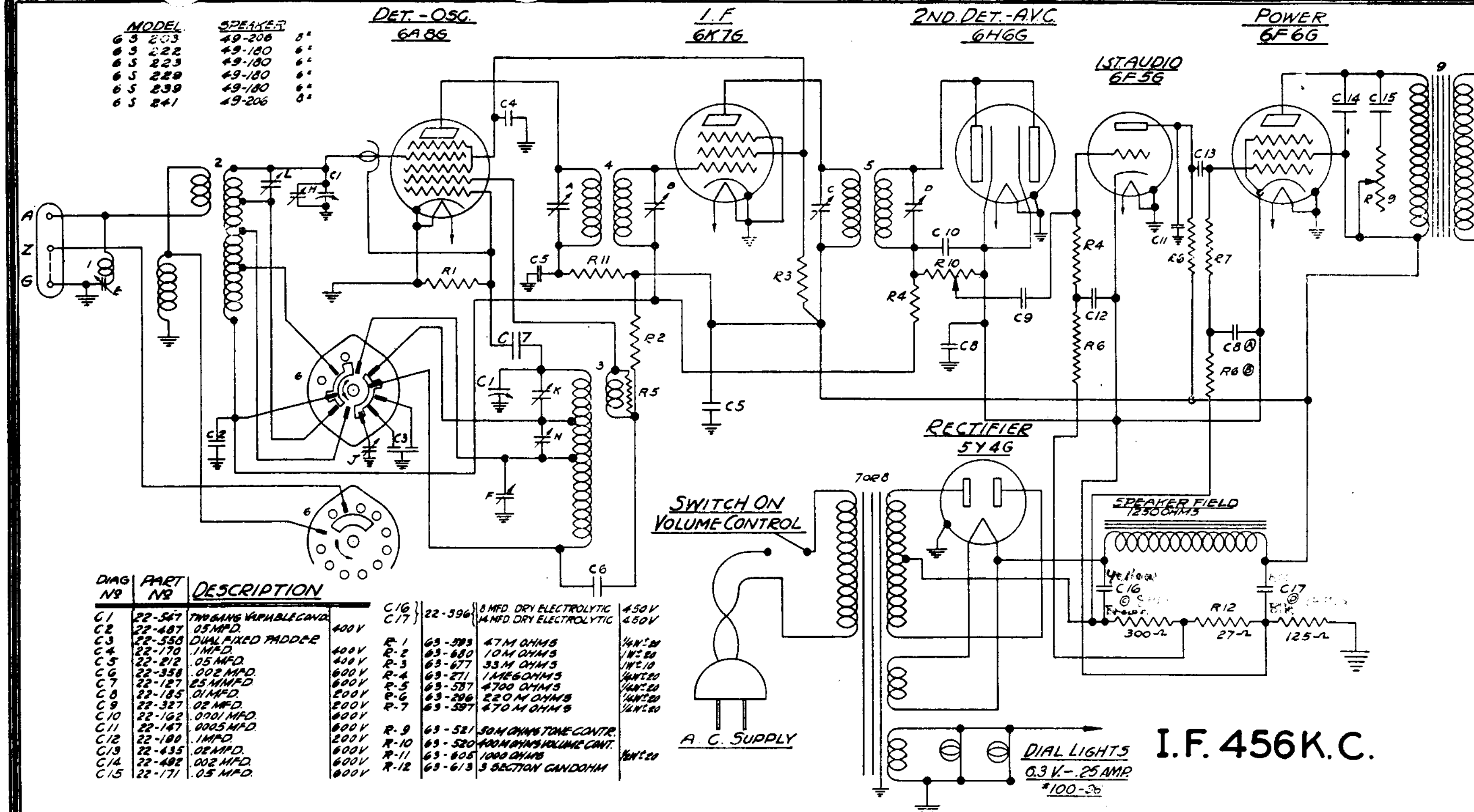
All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 17W. Battery voltage 6.3V consumption 2.04 Amp. Power output 1.75W.

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5				"		FG	Repeat 3 & 4
6	Rec. Ant. Lead	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
7	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output

ZENITH RADIO CORPORATION

MODELS 6-S-203, 6-S-222, 6-S-223, 6-S-229, 6-S-239, 6-S-241 & 5638



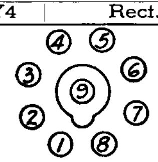
I.F. 456 K.C.

MODEL	SPEAKER	
6 S 203	49-206	8"
6 S 222	49-180	6"
6 S 223	49-180	6"
6 S 229	49-180	6"
6 S 239	49-180	6"
6 S 241	49-206	8"

DIAG No	PART No	DESCRIPTION	
C1	22-547	TWO GANG VARIABLE COND.	
C2	22-487	.05 MFD.	400V
C3	22-558	DUAL FIXED PADDER	
C4	22-170	.1 MFD.	400V
C5	22-212	.05 MFD.	400V
C6	22-358	.002 MFD.	600V
C7	22-127	25 MMFD.	600V
C8	22-185	.01 MFD.	200V
C9	22-327	.02 MFD.	200V
C10	22-162	.0001 MFD.	600V
C11	22-147	.0005 MFD.	600V
C12	22-180	.1 MFD.	200V
C13	22-435	.02 MFD.	600V
C14	22-492	.002 MFD.	600V
C15	22-171	.05 MFD.	600V
C16 / C17	22-596	8 MFD. DRY ELECTROLYTIC / 14 MFD. DRY ELECTROLYTIC	450V / 450V
R-1	63-583	47M OHMS	1/4W±20
R-2	63-680	10M OHMS	1W±20
R-3	63-677	33M OHMS	1W±10
R-4	63-271	1 MEGOHMS	1/4W±20
R-5	63-587	4700 OHMS	1/4W±20
R-6	63-296	220M OHMS	1/4W±20
R-7	63-597	470M OHMS	1/4W±20
R-9	63-521	50M OHMS TONE CONTR.	
R-10	63-520	400M OHMS VOLUME CONT.	
R-11	63-605	1000 OHMS	1/2W±20
R-12	63-613	3 SECTION CANDOHM	

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Converter Osc.	0	6.1	245	83	—9	200	0	0	—.1
6K7	I.F.	0	6.1	247	83	0	--	0	0	—.1
6H6	2nd Det. AVC	0	0	—2	—2	—2	--	6.1	—2	--
6F5	1st Audio	0	0	—	114	—	—	6.1	—2	—2
6F6	Power	0	0	231	247	—3.5	—	6.1	—2	—
5Y4	Rect.	0	—	AC	—	AC	—	322	322	—



BOTTOM VIEW OF SOCKET

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 65W. Power Output 4.5W.

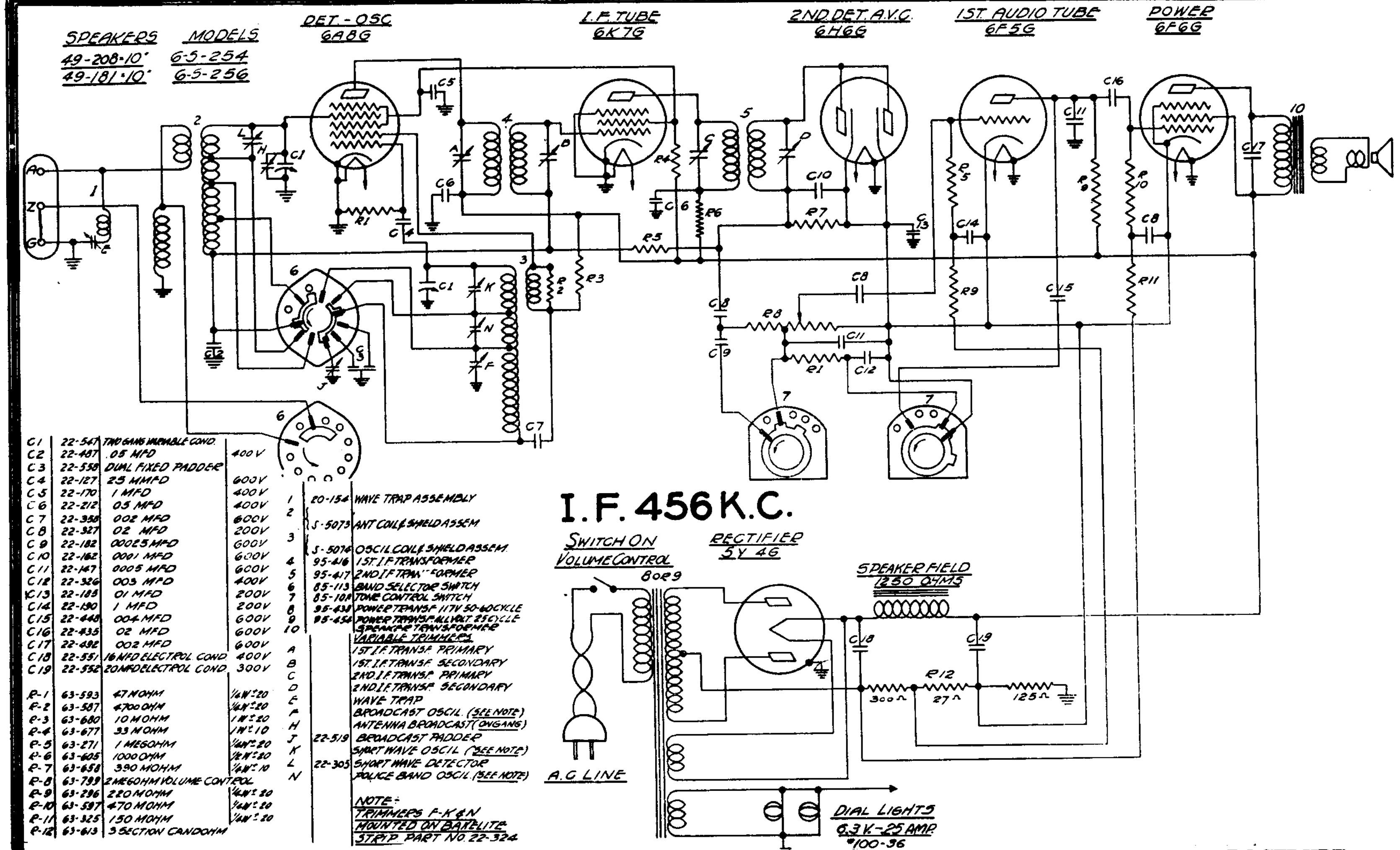
ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	456	"	600	E	See Note
3	" " "	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
4	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
5	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
6	" " "	200 Mmfd.				FG	Repeat 3 & 4
7	" " "	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
8	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output
9	" " "	400 Ohms	5500	Police	5500	N	Rock gang & adj. for max. output

NOTE: If receiver is used in a location subject to code interference adjust wave trap (E) for minimum interference with antenna connected and receiver operating in broadcast band.

ZENITH RADIO CORPORATION

MODELS 6-S-254, 6-S-256 & 5644



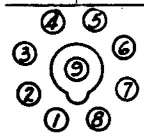
C1	22-547	TWO GANG VARIABLE COND.	
C2	22-487	.05 MFD	400V
C3	22-558	DUAL FIXED PADDER	
C4	22-127	25 MMFD	600V
C5	22-170	.1 MFD	400V
C6	22-212	.05 MFD	400V
C7	22-358	.002 MFD	600V
C8	22-327	.02 MFD	200V
C9	22-182	.00025 MFD	600V
C10	22-162	.0001 MFD	600V
C11	22-147	.0005 MFD	600V
C12	22-326	.003 MFD	400V
C13	22-185	.01 MFD	200V
C14	22-190	.1 MFD	200V
C15	22-448	.004 MFD	600V
C16	22-435	.02 MFD	600V
C17	22-492	.002 MFD	600V
C18	22-551	16 MFD ELECTROL COND.	400V
C19	22-552	20 MFD ELECTROL COND.	300V
R-1	63-593	47 MOHM	1/4W ±20
R-2	63-587	4700 OHM	1/4W ±20
R-3	63-680	10 MOHM	1W ±20
R-4	63-677	33 MOHM	1W ±10
R-5	63-271	1 MEGOHM	1/4W ±20
R-6	63-605	1000 OHM	1/2W ±20
R-7	63-658	390 MOHM	1/4W ±10
R-8	63-799	2 MEGOHM VOLUME CONTROL	
R-9	63-296	220 MOHM	1/4W ±20
R-10	63-597	470 MOHM	1/4W ±20
R-11	63-325	150 MOHM	1/4W ±20
R-12	63-613	3 SECTION CANDOHM	

1	20-154	WAVE TRAP ASSEMBLY
2	S-5073	ANT COIL & SHIELD ASSEM
3	S-5074	OSCIL. COIL & SHIELD ASSEM.
4	95-416	1ST I.F. TRANSFORMER
5	95-417	2ND I.F. TRANSFORMER
6	85-113	BAND SELECTOR SWITCH
7	85-108	TONE CONTROL SWITCH
8	95-438	POWER TRANSF. 117V 50-60 CYCLE
9	95-454	POWER TRANSF. ALL VOLT 25 CYCLE
10		SPEAKER TRANSFORMER
		VARIABLE TRIMMERS
A		1ST I.F. TRANSF. PRIMARY
B		1ST I.F. TRANSF. SECONDARY
C		2ND I.F. TRANSF. PRIMARY
D		2ND I.F. TRANSF. SECONDARY
E		WAVE TRAP
F		BROADCAST OSCIL. (SEE NOTE)
H		ANTENNA BROADCAST (ON GANG)
J	22-519	BROADCAST PADDER
K		SHORT WAVE OSCIL. (SEE NOTE)
L	22-305	SHORT WAVE DETECTOR
N		POLICE BAND OSCIL. (SEE NOTE)

NOTE:- TRIMMERS F-K & N MOUNTED ON BAKELITE STRIP PART NO. 22-324

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Converter Osc.	0	6.2	246	90	—9	190	0	0	—.5
6K7	I.F.	0	6.2	237	90	0	—	0	0	—.5
6H6	2nd Det. A.V.C.	0	0	—2.5	—2	—2.5	—	6.2	—2	—
6F5	1st Audio	0	0	—	104	—	—	6.2	—2	—2
6F6	Power	0	0	231	243	—3	—	6.2	—2	—
5Y4	Rect.	0	—	AC	—	AC	—	314	314	—



BOTTOM VIEW OF SOCKET

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 65W. Power output 4.5W.

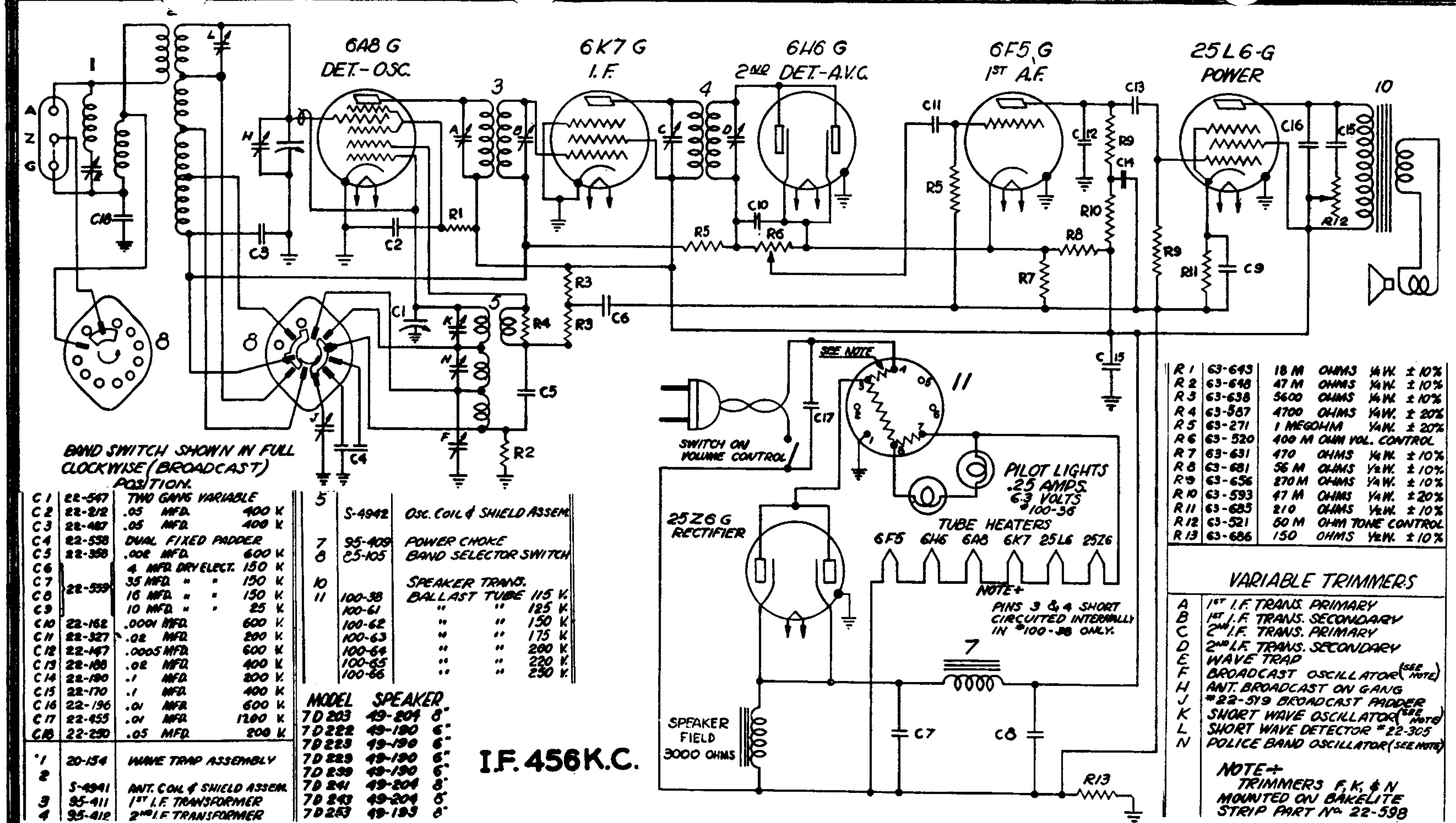
ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	456	"	600	E	See Note
3	" " "	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
4	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
5	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
6	" " "	200 Mmfd.				FG	Repeat 3 & 4
7	" " "	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
8	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output
9	" " "	400 Ohms	5500	Police	5500	N	Rock gang & adj. for max. output

NOTE: If receiver is used in a location subject to code interference adjust wave trap (E) for minimum interference with antenna connected and receiver operating in broadcast band.

ZENITH RADIO CORPORATION

MODELS 7-D-203, 7-D-222, 7-D-223, 7-D-229, 7-D-239, 7-D-241, 7-D-243, 7-D-253 & 5710



C 1	22-547	TWO GANG VARIABLE	
C 2	22-212	.05 MFD.	400 V.
C 3	22-407	.05 MFD.	400 V.
C 4	22-558	DUAL FIXED PADDER	
C 5	22-358	.002 MFD.	600 V.
C 6	22-559	4 MFD. DRY ELECT.	150 V.
C 7		35 MFD. " "	150 V.
C 8		16 MFD. " "	150 V.
C 9		10 MFD. " "	25 V.
C 10	22-162	.0001 MFD.	600 V.
C 11	22-327	.02 MFD.	200 V.
C 12	22-147	.0005 MFD.	600 V.
C 13	22-188	.02 MFD.	400 V.
C 14	22-190	.1 MFD.	200 V.
C 15	22-170	.1 MFD.	400 V.
C 16	22-196	.01 MFD.	600 V.
C 17	22-455	.01 MFD.	1200 V.
C 18	22-250	.05 MFD.	200 V.
*1	20-154	WAVE TRAP ASSEMBLY	
2	S-4941	ANT. COIL & SHIELD ASSEM.	
3	95-411	1ST I.F. TRANSFORMER	
4	95-412	2ND I.F. TRANSFORMER	

5	S-4942	OSC. COIL & SHIELD ASSEM.
7	95-409	POWER CHOKE
8	85-105	BAND SELECTOR SWITCH
10		SPEAKER TRANS.
11	100-38	BALLAST TUBE 115 V.
	100-61	" " 125 V.
	100-62	" " 150 V.
	100-63	" " 175 V.
	100-64	" " 200 V.
	100-65	" " 220 V.
	100-66	" " 250 V.

MODEL	SPEAKER	
7D 203	49-204	8"
7D 222	49-190	6"
7D 223	49-190	6"
7D 229	49-190	6"
7D 239	49-190	6"
7D 241	49-204	8"
7D 243	49-204	6"
7D 253	49-193	8"

R 1	63-643	18 M OHMS 1/4 W.	± 10%
R 2	63-648	47 M OHMS 1/4 W.	± 10%
R 3	63-638	5600 OHMS 1/4 W.	± 10%
R 4	63-587	4700 OHMS 1/4 W.	± 20%
R 5	63-271	1 MEGOHM 1/4 W.	± 20%
R 6	63-520	400 M OHM VOL. CONTROL	
R 7	63-631	470 OHMS 1/4 W.	± 10%
R 8	63-681	56 M OHMS 1/2 W.	± 10%
R 9	63-656	270 M OHMS 1/4 W.	± 10%
R 10	63-593	47 M OHMS 1/4 W.	± 20%
R 11	63-685	210 OHMS 1/2 W.	± 10%
R 12	63-521	50 M OHM TONE CONTROL	
R 13	63-686	150 OHMS 1/2 W.	± 10%

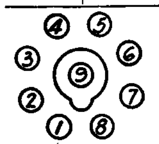
VARIABLE TRIMMERS

A	1ST I.F. TRANS. PRIMARY
B	1ST I.F. TRANS. SECONDARY
C	2ND I.F. TRANS. PRIMARY
D	2ND I.F. TRANS. SECONDARY
E	WAVE TRAP
F	BROADCAST OSCILLATOR (SEE NOTE)
H	ANT. BROADCAST ON GANG
J	#22-519 BROADCAST PADDER
K	SHORT WAVE OSCILLATOR (SEE NOTE)
L	SHORT WAVE DETECTOR #22-305
N	POLICE BAND OSCILLATOR (SEE NOTE)

NOTE+ TRIMMERS F, K, & N MOUNTED ON BAKELITE STRIP PART No. 22-598

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Converter Osc.	0	AC	104	63	—5.5	74	AC	0	—.1
6K7	I.F.	0	AC	104	104	0	—	AC	0	—.1
6H6	2nd Det. A.V.C.	0	AC	—1.5	—1	—1.5	—	AC	—1	—
6F5	1st Audio	0	AC	—	24	—	—	AC	—1	—1.5
25L6	Power	0	AC	99	100	—.5	—	AC	4.5	—
25Z6	Rect.	0	AC	AC	119	AC	—	AC	119	—
	Ballast									



BOTTOM VIEW OF SOCKET

All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected. Line voltage 117V. Consumption 55W. Power output 1.75W.

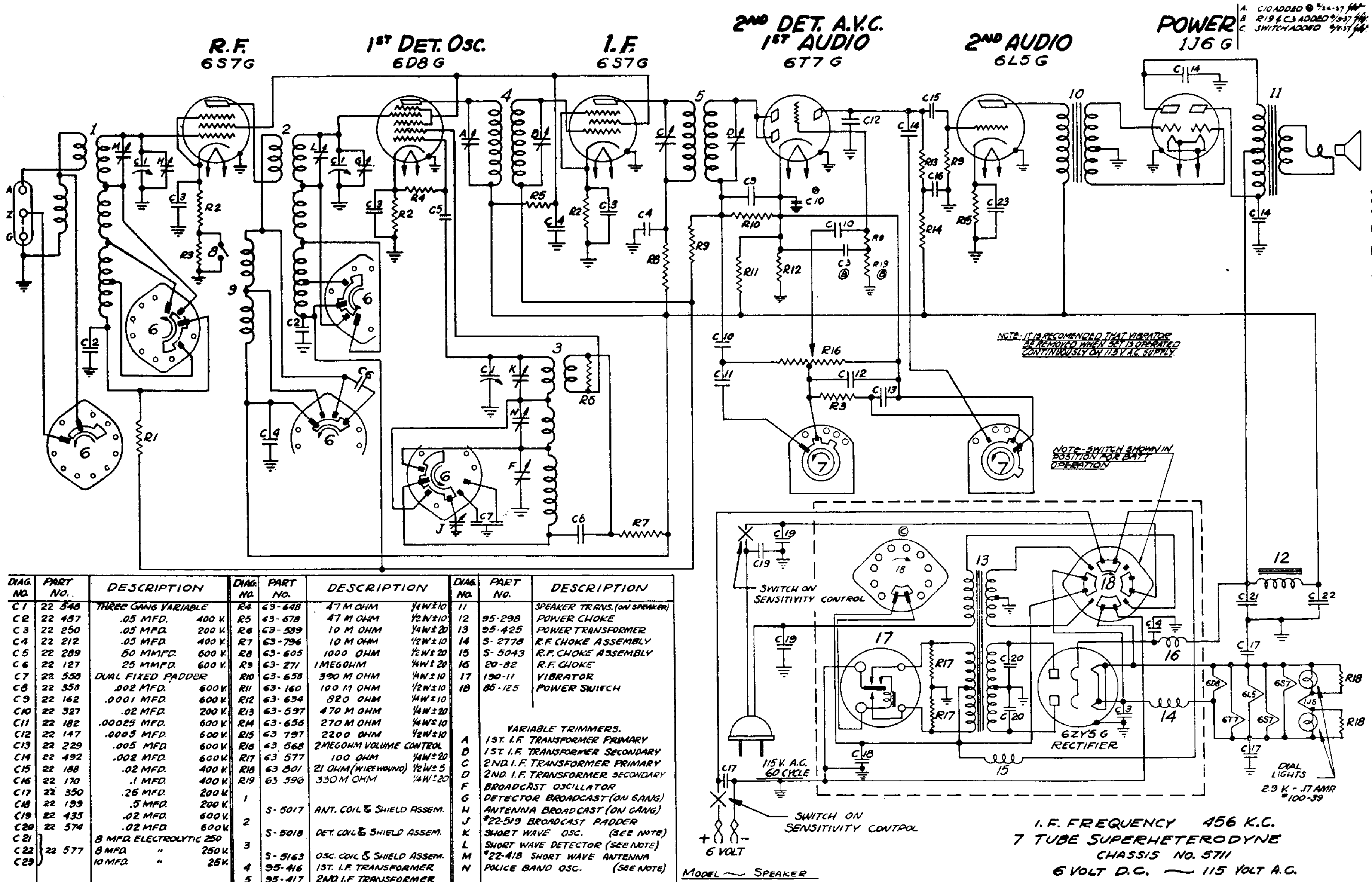
ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	456	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	456	"	600	E	See Note
3	" " "	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
4	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
5	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
6	" " "	200 Mmfd.		"		FG	Repeat 3 & 4
7	" " "	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
8	" " "	400 Ohms	16500	S.W.	16500	L	Rock gang & adj. for max. output
9	" " "	400 Ohms	5500	Police	5500	N	Rock gang & adj. for max. output

NOTE: If receiver is used in a location subject to code interference adjust wave trap (E) for minimum interference with antenna connected and receiver operating in broadcast band.

ZENITH RADIO CORPORATION

MODELS 7-J-232, 7-J-259 & 5711



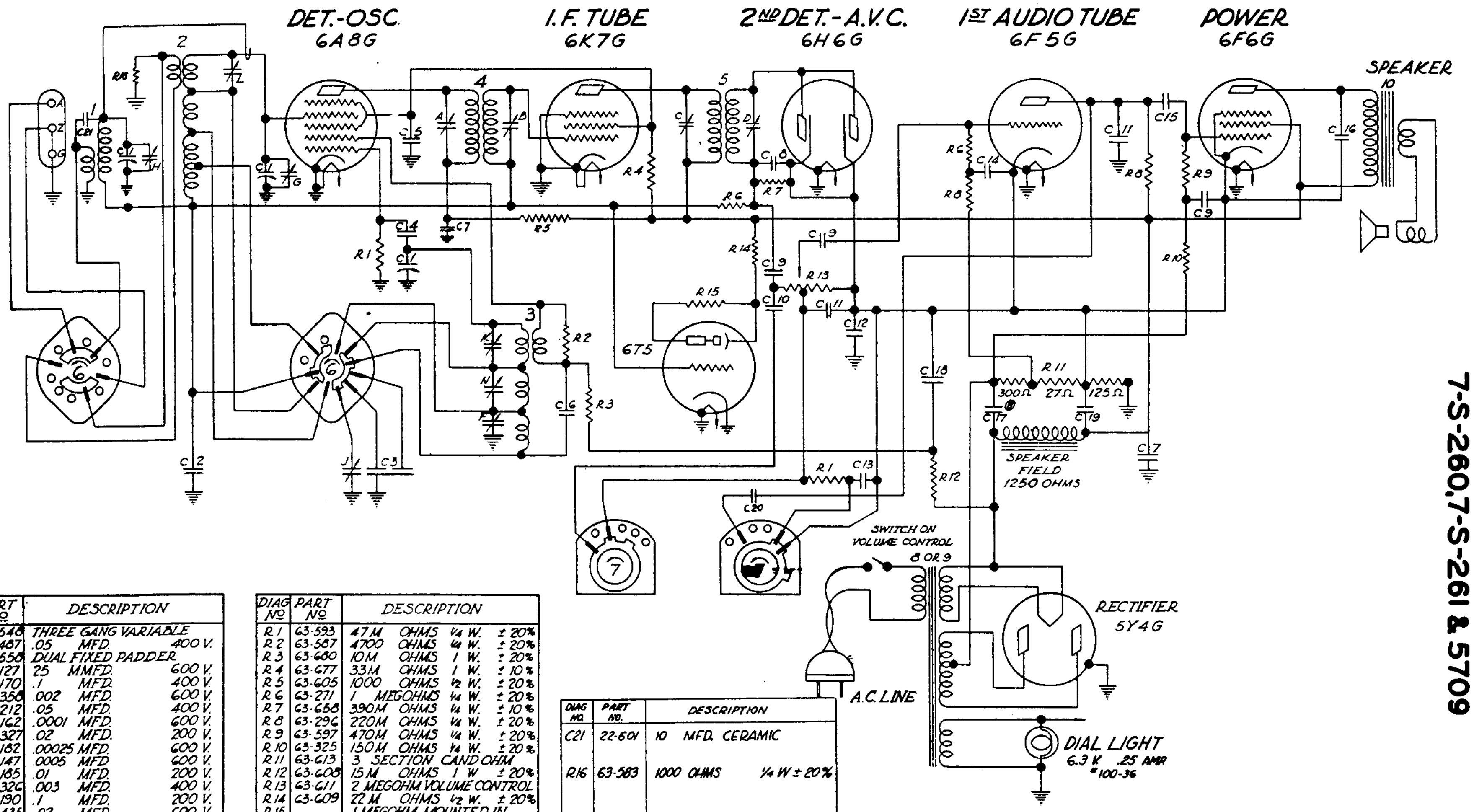
I.F. FREQUENCY 456 K.C.
7 TUBE SUPERHETERODYNE
CHASSIS NO. 5711
6 VOLT D.C. — 115 VOLT A.C.

MODEL	SPEAKER
7J-232	49-207 ~ 8"
7J-259	49-198 ~ 10"

DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C1	22 548	THREE GANG VARIABLE	R4	63-648	47 M OHM ¼W±10	11		SPEAKER TRANS. (ON SPEAKER)
C2	22 487	.05 MFD. 400 V.	R5	63-678	47 M OHM ½W±10	12	95-298	POWER CHOKE
C3	22 250	.05 MFD. 200 V.	R6	63-539	10 M OHM ¼W±20	13	95-425	POWER TRANSFORMER
C4	22 212	.05 MFD. 400 V.	R7	63-796	10 M OHM ½W±10	14	S-2778	R.F. CHOKE ASSEMBLY
C5	22 289	50 MMFD. 600 V.	R8	63-605	1000 OHM ½W±20	15	S-5043	R.F. CHOKE ASSEMBLY
C6	22 127	25 MMFD. 600 V.	R9	63-271	1 MEGOHM ¼W±20	16	20-82	R.F. CHOKE
C7	22 558	DUAL FIXED PADDER	R10	63-658	390 M OHM ¼W±10	17	190-11	VIBRATOR
C8	22 358	.002 MFD. 600 V.	R11	63-160	100 M OHM ½W±10	18	85-125	POWER SWITCH
C9	22 162	.0001 MFD. 600 V.	R12	63-634	820 OHM ¼W±10			
C10	22 327	.02 MFD. 200 V.	R13	63-597	470 M OHM ¼W±20			
C11	22 182	.00025 MFD. 600 V.	R14	63-656	270 M OHM ¼W±10			VARIABLE TRIMMERS.
C12	22 147	.0005 MFD. 600 V.	R15	63 797	2200 OHM ½W±10	A		1ST. I.F. TRANSFORMER PRIMARY
C13	22 229	.005 MFD. 600 V.	R16	63 568	2 MEGOHM VOLUME CONTROL	B		1ST. I.F. TRANSFORMER SECONDARY
C14	22 492	.002 MFD. 600 V.	R17	63 577	100 OHM ¼W±20	C		2ND. I.F. TRANSFORMER PRIMARY
C15	22 188	.02 MFD. 400 V.	R18	63 801	21 OHM (WIREWOUND) ½W±5	D		2ND. I.F. TRANSFORMER SECONDARY
C16	22 170	.1 MFD. 400 V.	R19	63 596	330 M OHM ¼W±20	F		BROADCAST OSCILLATOR
C17	22 350	.25 MFD. 200 V.	1			G		DETECTOR BROADCAST (ON GANG)
C18	22 199	.5 MFD. 200 V.		S-5017	ANT. COIL & SHIELD ASSEM.	H		ANTENNA BROADCAST (ON GANG)
C19	22 435	.02 MFD. 600 V.	2			J		#22-519 BROADCAST PADDER
C20	22 574	.02 MFD. 600 V.		S-5018	DET. COIL & SHIELD ASSEM.	K		SHORT WAVE OSC. (SEE NOTE)
C21	22 577	8 MFD. ELECTROLYTIC 250	3			L		SHORT WAVE DETECTOR (SEE NOTE)
C22	22 577	8 MFD. " 250 V.		S-5163	OSC. COIL & SHIELD ASSEM.	M		#22-418 SHORT WAVE ANTENNA
C23	22 577	10 MFD. " 25 V.	4	95-416	1ST. I.F. TRANSFORMER	N		POLICE BAND OSC. (SEE NOTE)
			5	95-417	2ND I.F. TRANSFORMER			
			6	85-103	BAND SELECTOR SWITCH			NOTE:~
			7	85-108	TONE CONTROL SWITCH			TRIMMERS F, K, L, & N
R1	63 595	100 M OHM ¼W±20	8	85-117	SENSITIVITY SWITCH			MOUNTED ON BAKELITE STRIP
R2	63 632	560 OHM ¼W±10	9	20-135	R.F. CHOKE			PART #22-549
R3	63 593	47 M OHM ¼W±20	10	95-446	AUDIO TRANSFORMER			

ZENITH RADIO CORPORATION

MODELS 7-S-204, 7-S-232, 7-S-240, 7-S-242, 7-S-258, 7-S-260, 7-S-261 & 5709



DIAG №.	PART №.	DESCRIPTION
C1	22-548	THREE GANG VARIABLE
C2	22-487	.05 MFD. 400 V.
C3	22-558	DUAL FIXED PADDER
C4	22-127	25 MMFD. 600 V.
C5	22-170	.1 MFD. 400 V.
C6	22-358	.002 MFD. 600 V.
C7	22-212	.05 MFD. 400 V.
C8	22-162	.0001 MFD. 600 V.
C9	22-327	.02 MFD. 200 V.
C10	22-182	.00025 MFD. 600 V.
C11	22-147	.0005 MFD. 600 V.
C12	22-185	.01 MFD. 200 V.
C13	22-326	.003 MFD. 400 V.
C14	22-190	.1 MFD. 200 V.
C15	22-435	.02 MFD. 600 V.
C16	22-627	.002 MFD. Ⓐ 1000 V.
C17	22-569	12 MFD. ELECTOLYTIC 450 V.
C18	22-562	2 MFD. " 450 V.
C19		16 MFD. " 450 V.
C20	22-448	.004 MFD. 600 V.
1	3-4780	ANTENNA COIL ASSEMBLY
2	3-5054	DETECTOR COIL & SHIELD ASSEM.
3	S-4969	OSCILLATOR COIL & SHIELD ASSEM.
4	95-416	1ST I.F. TRANS.
5	95-417	2ND I.F. TRANS.
6	85-110	BAND SELECTOR SWITCH
7	85-108	TONE CONTROL SWITCH
8	95-418	POWER TRANS - 117 V. 50-60 CYCLE
9	95-451	POWER TRANS - ALL VOLTAGE 25 CYCLE
10		SPEAKER TRANSFORMER

DIAG №.	PART №.	DESCRIPTION
R1	63-593	47 M OHMS 1/4 W. ± 20%
R2	63-587	4700 OHMS 1/4 W. ± 20%
R3	63-680	10 M OHMS 1 W. ± 20%
R4	63-677	33 M OHMS 1 W. ± 10%
R5	63-605	1000 OHMS 1/2 W. ± 20%
R6	63-271	1 MEGOHMS 1/4 W. ± 20%
R7	63-658	390 M OHMS 1/4 W. ± 10%
R8	63-296	220 M OHMS 1/4 W. ± 20%
R9	63-597	470 M OHMS 1/4 W. ± 20%
R10	63-325	150 M OHMS 1/4 W. ± 20%
R11	63-613	3 SECTION CAND OHM
R12	63-608	15 M OHMS 1 W ± 20%
R13	63-611	2 MEGOHM VOLUME CONTROL
R14	63-609	22 M OHMS 1/2 W. ± 20%
R15		1 MEGOHM MOUNTED IN TUNING TUBE SOCKET

VARIABLE TRIMMERS

A	1ST I.F. TRANS PRIMARY
B	1ST I.F. TRANS SECONDARY
C	2ND I.F. TRANS PRIMARY
D	2ND I.F. TRANS SECONDARY
F	BROADCAST OSCILLATOR (SEE NOTE)
G	DETECTOR BROADCAST (ON GANG)
H	ANTENNA BROADCAST (ON GANG)
J	#22-519 BROADCAST PADDER
K	SHORT WAVE OSCILLATOR (SEE NOTE)
L	SHORT WAVE DETECTOR (SEE NOTE)
N	POLICE BAND OSCILLATOR (SEE NOTE)

NOTE:- TRIMMERS F, K, L, & N MOUNTED ON BAKELITE STRIP #22-549

DIAG NO.	PART NO.	DESCRIPTION
C21	22-601	10 MFD. CERAMIC
R16	63-583	1000 OHMS 1/4 W ± 20%

SPEAKERS		MODELS
49-203	8"	7-S-232
49-206	8"	7-S-240
49-206	8"	7-S-242
49-181	10"	7-S-258
49-195	12"	7-S-260
49-195	12"	7-S-261

I.F. - FREQUENCY 456 K.C.

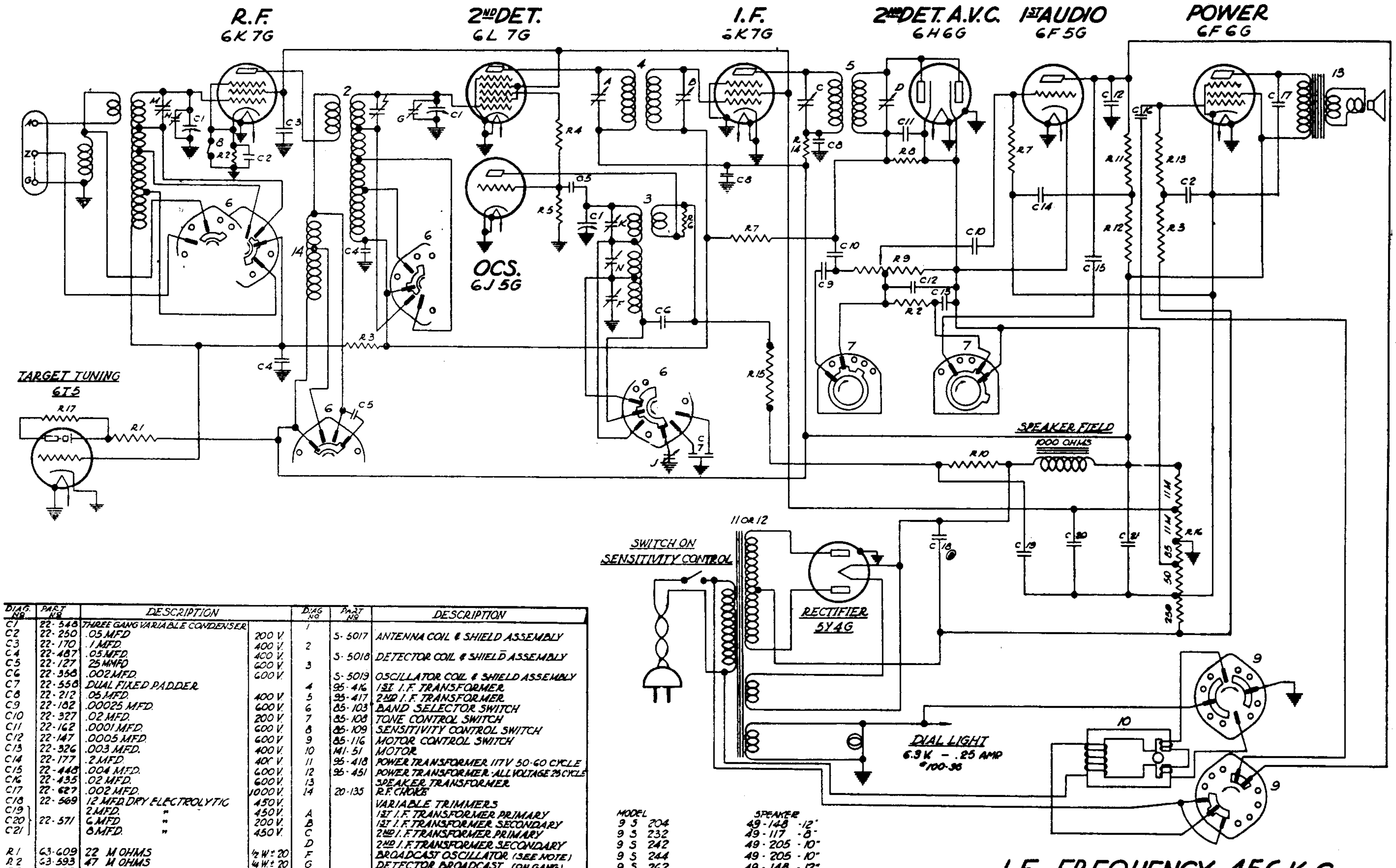
7 TUBE SUPERHETERODYNE

3 BAND

CHASSIS № 5709

ZENITH RADIO CORPORATION

MODELS 9-S-203, 9-S-232, 9-S-242, 9-S-244, 9-S-262, 9-S-263, 9-S-264 & 5905



DIAG. NO	PART NO	DESCRIPTION	
C1	22-548	THREE GANG VARIABLE CONDENSER	
C2	22-250	.05 MFD	200 V.
C3	22-170	.1 MFD.	400 V.
C4	22-487	.05 MFD.	400 V.
C5	22-127	25 MMFD	600 V.
C6	22-358	.002 MFD.	600 V.
C7	22-558	DUAL FIXED PADDER	
C8	22-212	.05 MFD.	400 V.
C9	22-182	.00025 MFD.	600 V.
C10	22-327	.02 MFD.	200 V.
C11	22-162	.0001 MFD.	600 V.
C12	22-147	.0005 MFD.	600 V.
C13	22-326	.003 MFD.	400 V.
C14	22-177	.2 MFD.	400 V.
C15	22-448	.004 MFD.	600 V.
C16	22-435	.02 MFD.	600 V.
C17	22-627	.002 MFD.	1000 V.
C18	22-569	12 MFD. DRY ELECTROLYTIC	450 V.
C19	22-571	2 MFD. "	450 V.
C20	22-571	6 MFD "	200 V.
C21	22-571	8 MFD. "	450 V.
R1	63-609	22 M OHMS	½ W. ± 20
R2	63-593	47 M OHMS	¼ W. ± 20
R3	63-595	100 M OHMS	¼ W. ± 20
R4	63-581	470 OHMS	¼ W. ± 20
R5	63-645	27 M OHMS	¼ W. ± 10
R6	63-586	3300 OHMS	¼ W. ± 20
R7	63-271	1 MEGOHMS	¼ W. ± 20
R8	63-658	390 M OHMS	¼ W. ± 10
R9	63-568	2 MEGOHM VOLUME CONTROL	
R10	63-608	15 M OHMS	1 W. ± 20
R11	63-296	220 M OHMS	¼ W. ± 20
R12	63-654	180 M OHMS	¼ W. ± 10
R13	63-597	470 M OHMS	¼ W. ± 20
R14	63-605	1000 OHMS	½ W. ± 20
R15	63-680	10 M OHMS	1 W. ± 20
R16	63-570	5 SECTION CANDOHM	
R17		1 MEGOHM MOUNTED IN TUNING TUBE SOCKET	

DIAG NO	PART NO	DESCRIPTION
1	S-5017	ANTENNA COIL & SHIELD ASSEMBLY
2	S-5018	DETECTOR COIL & SHIELD ASSEMBLY
3	S-5019	OSCILLATOR COIL & SHIELD ASSEMBLY
4	95-416	1ST I.F. TRANSFORMER
5	95-417	2ND I.F. TRANSFORMER
6	85-103	BAND SELECTOR SWITCH
7	85-108	TONE CONTROL SWITCH
8	85-109	SENSITIVITY CONTROL SWITCH
9	85-116	MOTOR CONTROL SWITCH
10	M1-51	MOTOR
11	95-418	POWER TRANSFORMER 117V 50-60 CYCLE
12	95-451	POWER TRANSFORMER - ALL VOLTAGE 25 CYCLE
13		SPEAKER TRANSFORMER
14	20-135	R.F. CHOKE
		VARIABLE TRIMMERS
A		1ST I.F. TRANSFORMER PRIMARY
B		1ST I.F. TRANSFORMER SECONDARY
C		2ND I.F. TRANSFORMER PRIMARY
D		2ND I.F. TRANSFORMER SECONDARY
F		BROADCAST OSCILLATOR (SEE NOTE)
G		DETECTOR BROADCAST (ON GANG)
H		ANTENNA BROADCAST (ON GANG)
J	22-519	BROADCAST PADDER
K		SHORT WAVE OSCILLATOR (SEE NOTE)
L		SHORT WAVE DETECTOR (SEE NOTE)
M	22-418	SHORT WAVE ANTENNA
N		POLICE BAND OSCILLATOR (SEE NOTE)

NOTE:- TRIMMERS F, K, L & N MOUNTED ON BAKELITE STRIP PART Nº 22-549

MODEL	SPEAKER
9 S 204	49-148 -12"
9 S 232	49-117 -8"
9 S 242	49-205 -10"
9 S 244	49-205 -10"
9 S 262	49-148 -12"
9 S 263	49-148 -12"
9 S 264	49-148 -12"

I.F.-FREQUENCY 456 K.C.

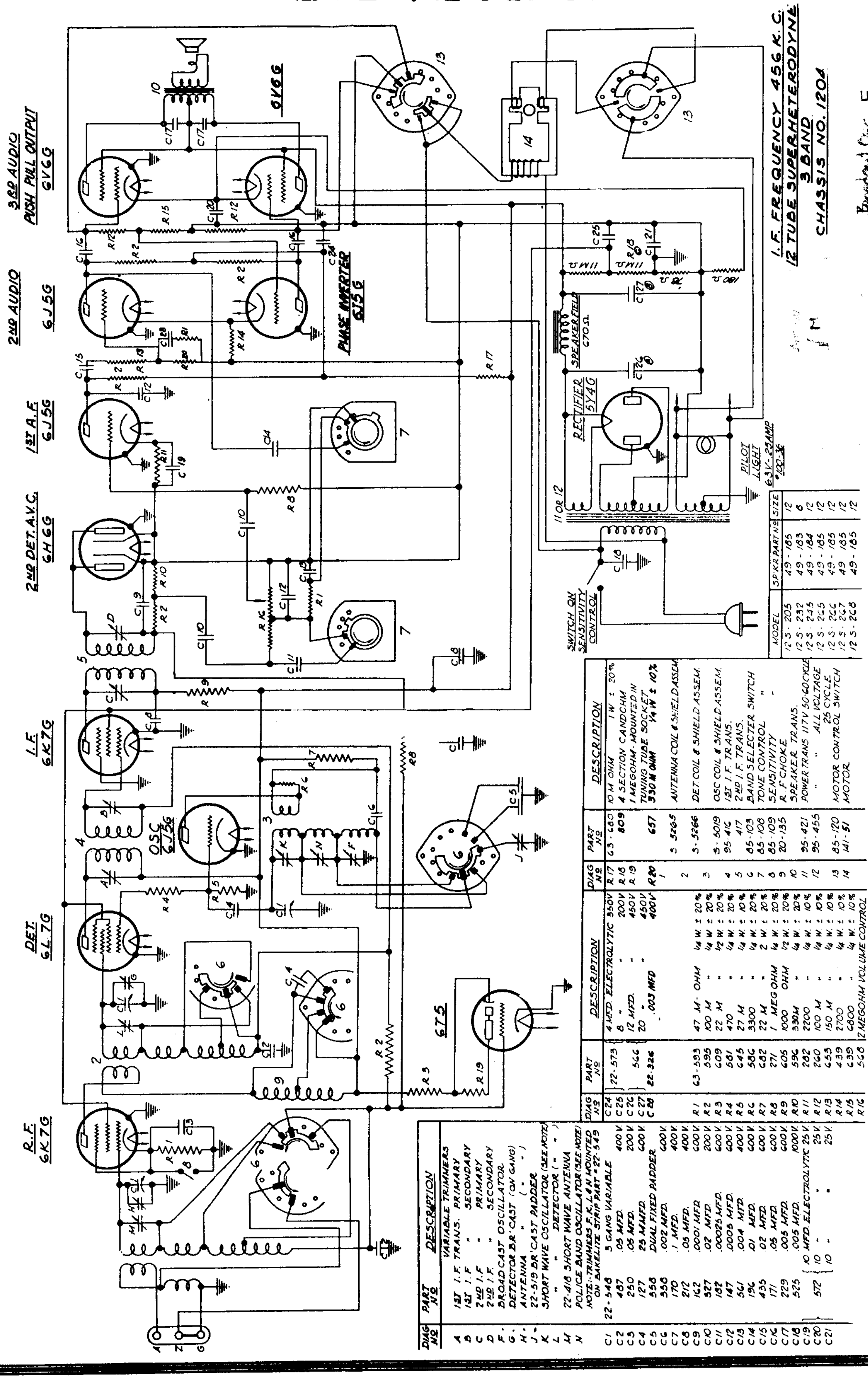
9 TUBE SUPERHETERODYNE

3 BAND

CHASSIS Nº 5905

ZENITH RADIO CORPORATION

MODELS 12-S-205, 12-S-232, 12-S-245, 12-S-265, 12-S-266, 12-S-267, 12-S-268 & 1204



I.F. FREQUENCY 456 K.C.
12 TUBE SUPERHETERODYNE
3 BAND
CHASSIS NO. 1204

DIAG NO	PART NO	DESCRIPTION	
		VARIABLE TRIMMERS	
A		1ST I.F. TRANS. PRIMARY	
B		1ST I.F " SECONDARY	
C		2ND I.F " PRIMARY	
D		2ND I.F. " SECONDARY	
F.		BROADCAST OSCILLATOR	
G.		DETECTOR BR'CAST (ON GANG)	
H.		ANTENNA " (" ")	
J.		22-519 BR'CAST PADDER	
K		SHORT WAVE OSCILLATOR (SEE NOTE)	
L		" " DETECTOR (" ")	
M		22-418 SHORT WAVE ANTENNA	
N		POLICE BAND OSCILLATOR (SEE NOTE)	
		NOTE:- TRIMMERS F, K, L & N MOUNTED ON BAKELITE STRIP PART # 22-549	
C1	22-548	3 GANG VARIABLE	
C2	487	.05 MFD.	400 V.
C3	250	.05 MFD.	200 V.
C4	127	25 MMFD.	600 V.
C5	558	DUAL FIXED PADDER	
C6	358	.002 MFD.	600 V.
C7	170	.1 MFD.	400 V.
C8	212	.05 MFD.	400 V.
C9	162	.0001 MFD.	600 V.
C10	327	.02 MFD.	200 V.
C11	182	.00025 MFD.	600 V.
C12	147	.0005 MFD.	600 V.
C13	561	.004 MFD.	400 V.
C14	196	.01 MFD.	600 V.
C15	435	.02 MFD.	600 V.
C16	171	.05 MFD.	600 V.
C17	229	.005 MFD.	600 V.
C18	525	.005 MFD.	1000 V.
C19	572	10 MFD. ELECTROLYTIC	25 V.
C20	572	10 " "	25 V.
C21	572	10 " "	25 V.

DIAG NO	PART NO	DESCRIPTION	
C24	22-573	4 MFD. ELECTROLYTIC	350V
C25	22-573	8 " "	200V
C26	566	12 MFD. "	450V
C27	566	20 " "	450V
C28	22-326	.003 MFD	400V
R1	63-593	47 M-OHM	1/4 W. ± 20%
R2	595	100 M "	1/4 W ± 20%
R3	609	22 M "	1/2 W. ± 20%
R4	581	470 "	1/4 W. ± 20%
R5	645	27 M "	1/4 W. ± 10%
R6	586	3300 "	1/4 W. ± 20%
R7	682	22 M "	2 W. ± 20%
R8	271	1 MEGOHM	1/4 W. ± 20%
R9	605	1000 OHM	1/2 W. ± 20%
R10	596	330M "	1/4 W. ± 20%
R11	282	2200 "	1/4 W. ± 10%
R12	260	100 M "	1/4 W. ± 10%
R13	653	150 M "	1/4 W. ± 10%
R14	439	2700 "	1/4 W. ± 10%
R15	639	6800 "	1/4 W. ± 10%
R16	568	2 MEGOHM VOLUME CONTROL	

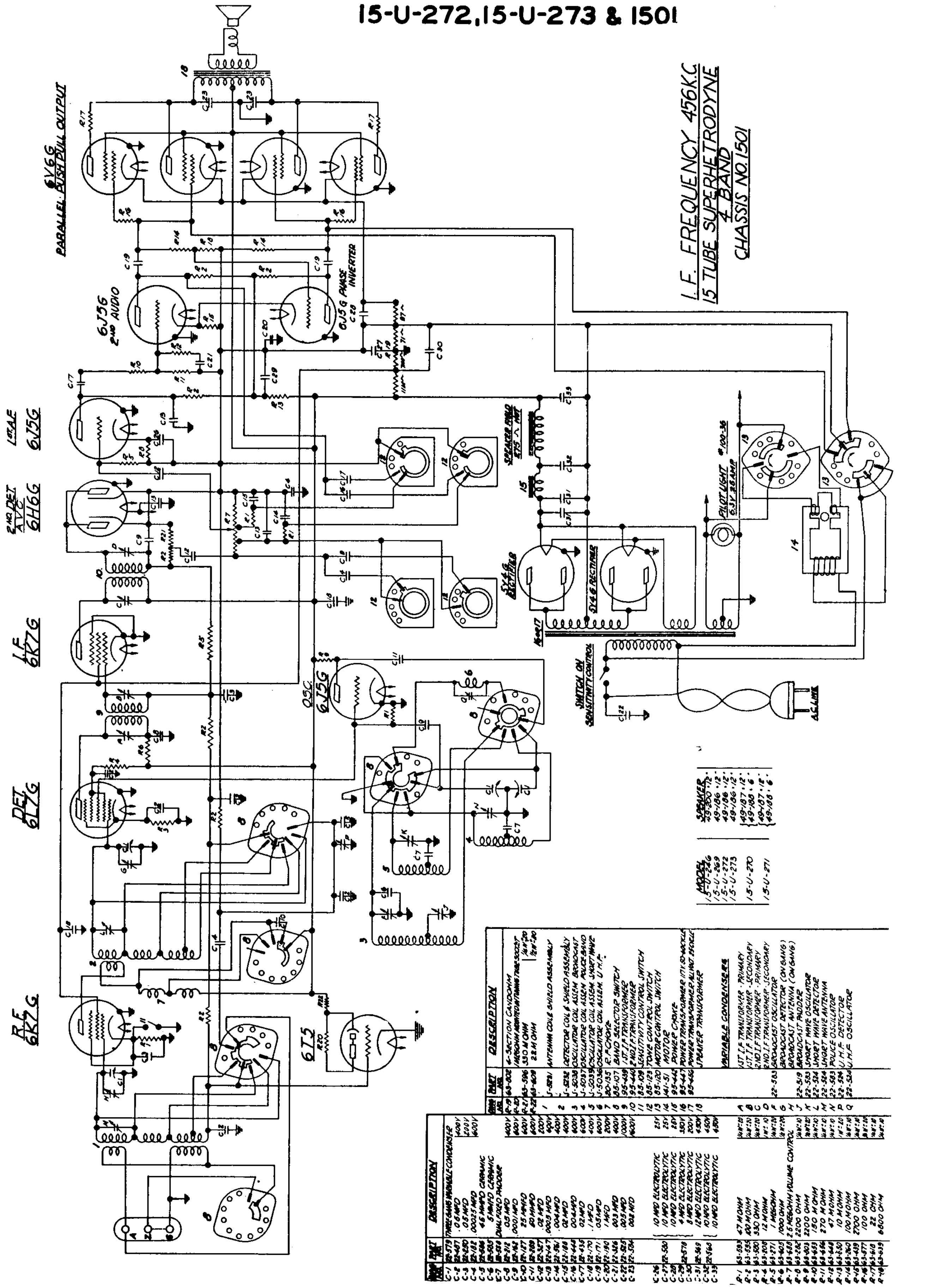
DIAG NO	PART NO	DESCRIPTION
R17	63-680	10 M OHM 1 W ± 20%
R18	809	4 SECTION CANDOHM
R19		1 MEGOHM - MOUNTED IN TUNING TUBE SOCKET
R20	657	330 M OHM 1/4 W ± 10%
1	S 5265	ANTENNA COIL & SHIELD ASSEM.
2	S-5266	DET COIL & SHIELD ASSEM.
3	S-5019	OSC COIL & SHIELD ASSEM.
4	95-416	1ST I.F. TRANS.
5	417	2ND I.F. TRANS.
6	85-103	BAND SELECTER SWITCH
7	85-108	TONE CONTROL "
8	85-109	SENSITIVITY "
9	20-135	R.F CHOKE
10		SPEAKER TRANS.
11	95-421	POWER TRANS 117V 50-60 CYCLE
12	95-455	" " ALL VOLTAGE 25 CYCLE
13	85-120	MOTOR CONTROL SWITCH
14	141-51	MOTOR

MODEL	SPKR PART NO	SIZE
12 S-205	49-185	12
12 S-232	49-183	6
12 S-245	49-184	12
12 S-265	49-185	12
12 S-266	49-185	12
12 S-267	49 185	12
12 S-268	49-185	12

Broadcast Osc F
Police Osc N
S.W. Osc K
600 Osc J

ZENITH RADIO CORPORATION

MODELS 15-U-246, 15-U-269, 15-U-270, 15-U-271, 15-U-272, 15-U-273 & 1501



DWG. NO.	PART NO.	DESCRIPTION	
C-1	22-579	THREE GANG VARIABLE CONDENSER	
C-2	22-487	.06 MFD	400V
C-3	22-250	.05 MFD	200V
C-4	22-182	.00025 MFD	600V
C-5	22-586	4.6 MMFD CERAMIC	
C-6	22-585	5 MMFD CERAMIC	
C-7	22-558	DUAL FIXED PADDER	
C-8	22-212	.05 MFD	400V
C-9	22-162	.0001 MFD	600V
C-10	22-127	25 MMFD	600V
C-11	22-269	60 MMFD	600V
C-12	22-327	.02 MFD	200V
C-13	22-147	.0005 MFD	400V
C-14	22-561	.004 MFD	400V
C-15	22-188	.02 MFD	400V
C-16	22-448	.004 MFD	600V
C-17	22-435	.02 MFD	600V
C-18	22-170	.1 MFD	400V
C-19	22-171	.05 MFD	600V
C-20	22-190	1 MFD	200V
C-21	22-326	.003 MFD	400V
C-22	22-525	.005 MFD	1000V
C-23	22-584	.002 MFD	1600V
C-26		10 MFD ELECTROLYTIC	25V
C-27	22-580	10 MFD ELECTROLYTIC	25V
C-28		10 MFD ELECTROLYTIC	25V
C-29	22-578	4 MFD ELECTROLYTIC	350V
C-30		8 MFD ELECTROLYTIC	200V
C-31	22-569	12 MFD ELECTROLYTIC	450V
C-32	22-566	10 MFD ELECTROLYTIC	450V
C-33		10 MFD ELECTROLYTIC	450V
R-1	63-593	47 M OHM	1/4W:20
R-2	63-595	100 M OHM	1/4W:20
R-3	63-580	330 OHM	1/4W:20
R-4	63-208	12 M OHM	1W:10
R-5	63-271	1 MEGOHM	1/4W:20
R-6	63-605	1000 OHM	1/2W:20
R-7	63-688	2.5 MEGOHM VOLUME CONTROL	
R-8	63-282	2200 OHM	1/4W:10
R-9	63-603	2200 OHM	1/2W:20
R-10	63-653	150 M OHM	1/4W:10
R-11	63-656	270 M OHM	1/4W:10
R-12	63-648	47 M OHM	1/4W:10
R-13	63-630	10 M OHM	1W:20
R-14	63-260	100 M OHM	1/4W:10
R-15	63-439	2700 OHM	1/4W:10
R-16	63-577	100 OHM	1/2W:20
R-17	63-618	22 OHM	1/4W:10
R-18	63-639	6800 OHM	1/4W:10

DWG. NO.	PART NO.	DESCRIPTION	
R-19	63-602	4-SECTION CANDOHM	
R-20		1 MEGOHM MOUNTED IN TUNING TUBE SOCKET	
R-21	63-596	330 M OHM	1/4W:20
R-22	63-609	2.2 M OHM	1/2W:20
1	S-5281	ANTENNA COIL & SHIELD ASSEMBLY	
2	S-5232	DETECTOR COIL & SHIELD ASSEMBLY	
3	S-5038	OSCILLATOR COIL ASSEM. BROADCAST	
4	S-5037	OSCILLATOR COIL ASSEM. POLICE BAND	
5	S-5039	OSCILLATOR COIL ASSEM. SHORT WAVE	
6	S-5036	OSCILLATOR COIL ASSEM. U.H.F.	
7	20-135	R.F. CHOKE	
8	85-107	BAND SELECTOR SWITCH	
9	95-439	1ST. I.F. TRANSFORMER	
10	95-440	2ND. I.F. TRANSFORMER	
11	85-109	SENSITIVITY CONTROL SWITCH	
12	85-123	TONE CONTROL SWITCH	
13	85-120	MOTOR CONTROL SWITCH	
14	141-51	MOTOR	
15	95-442	POWER CHOKE	
16	95-447	POWER TRANSFORMER 117V. 50-60 CYCLE	
17	95-456	POWER TRANSFORMER ALL VOLT. 25 CYCLE	
18		SPEAKER TRANSFORMER	

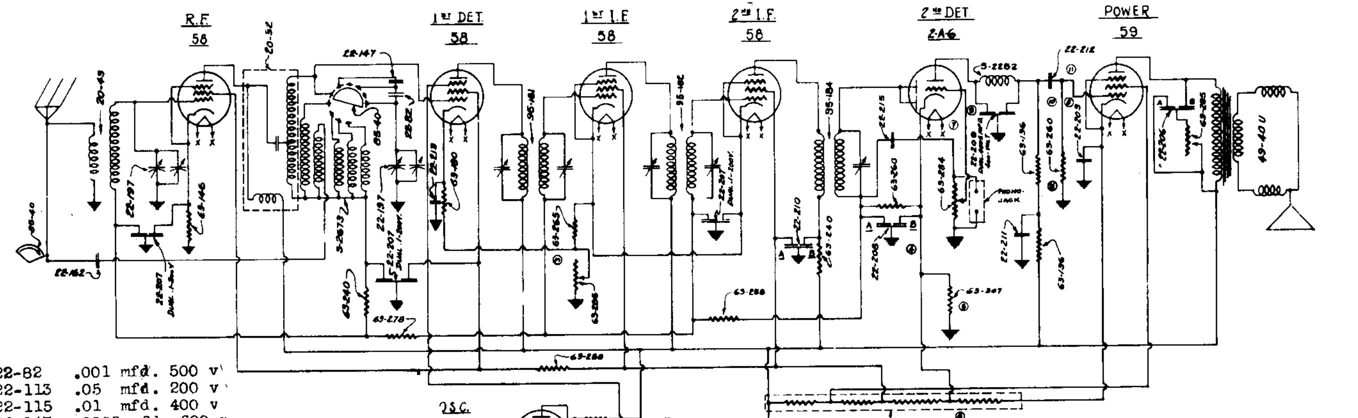
VARIABLE CONDENSERS

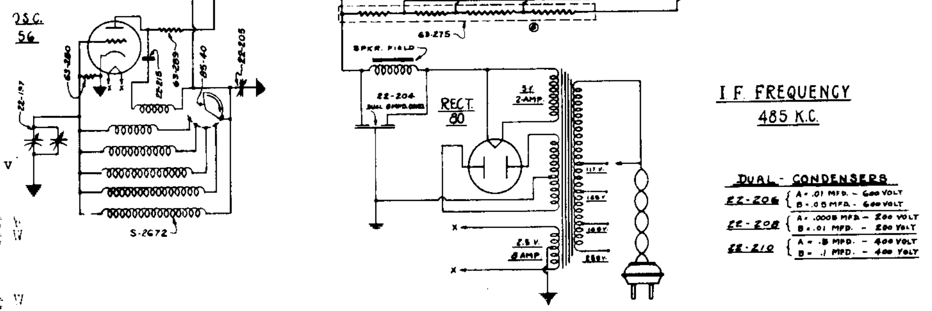
DWG. NO.	PART NO.	DESCRIPTION
A		1ST. I.F. TRANSFORMER - PRIMARY
B		1ST. I.F. TRANSFORMER - SECONDARY
C		2ND. I.F. TRANSFORMER - PRIMARY
D		2ND. I.F. TRANSFORMER - SECONDARY
F	22-583	BROADCAST OSCILLATOR
G		BROADCAST DETECTOR (ON GANG)
H		BROADCAST ANTENNA (ON GANG)
J	22-519	BROADCAST PADDER
K	22-583	SHORT WAVE OSCILLATOR
L	22-524	SHORT WAVE DETECTOR
M	22-524	SHORT WAVE ANTENNA
N	22-583	POLICE OSCILLATOR
P	22-524	U.H.F. DETECTOR
Q	22-524	U.H.F. OSCILLATOR

MODEL	SPEAKER
15-U-246	49-200 · 12"
15-U-269	49-186 · 12"
15-U-272	49-186 · 12"
15-U-273	49-186 · 12"
15-U-270	49-187 · 12" 49-188 · 6"
15-U-271	49-187 · 12" 49-188 · 6"

ZENITH RADIO CORPORATION

MODELS 258, 268, 278, 280, 281, 289, 478, 558, 568, 578, 589, 590 & 2051

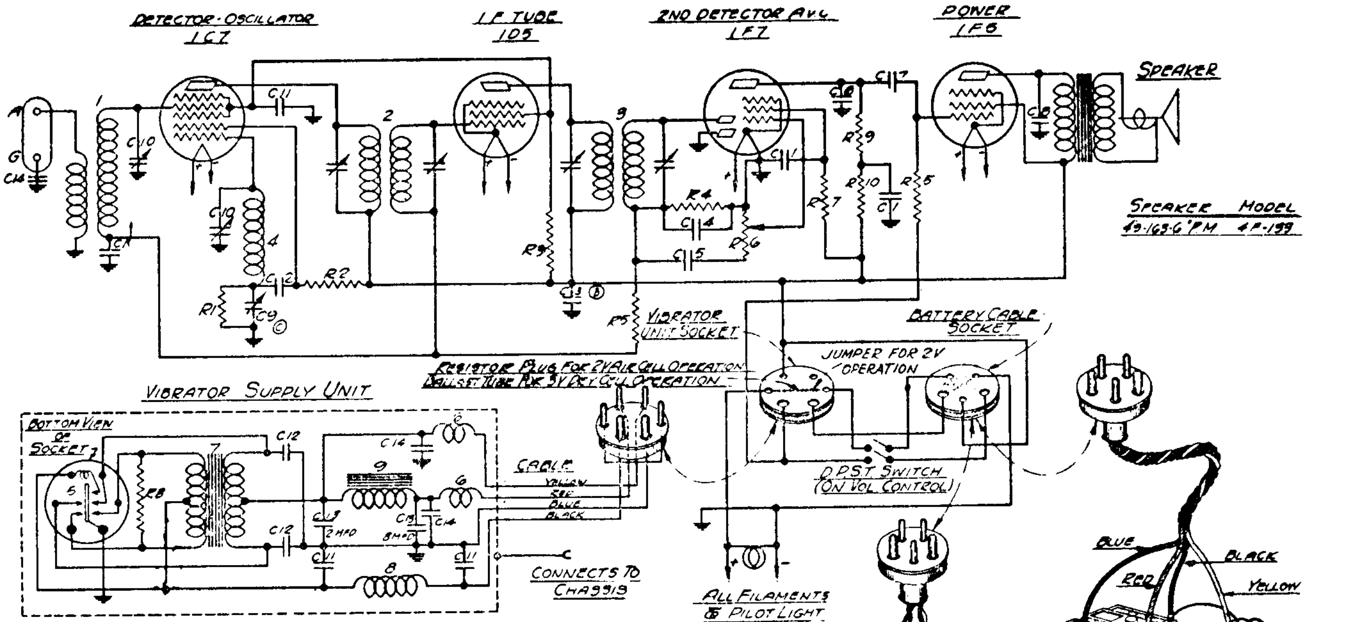




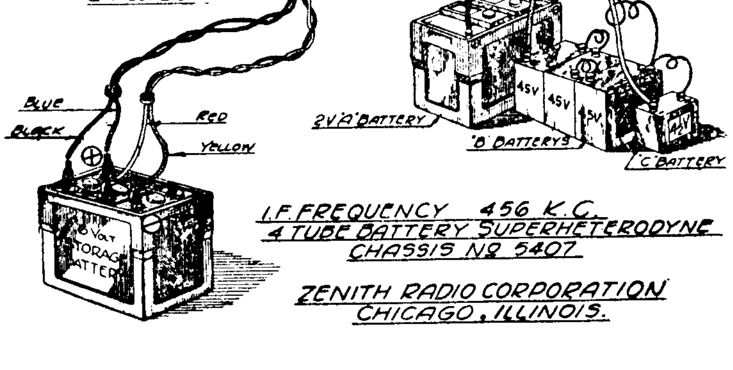
22-82	.001 mfd. 500 v
22-113	.05 mfd. 200 v
22-115	.01 mfd. 400 v
22-147	.0005 mfd. 600 v
22-162	.0001 mfd. 500 v
22-203	10. mfd. 25 volt.
22-204	Dual 8 mfd. 500 v
22-206	Dual .01 mfd 600 v
22-207	Dual .1 mfd. 200 v
22-208	Dual .01 & .0005 mf
22-209	Dual .01 mfd. 400 V
22-210	Dual .1 & .5 mfd 400 v
22-211	.1 mfd. 300 v
22-212	.05 mfd. 400 v

63-136	50,000 ohm ½ W	63-278	99,000 ohm ¼ W
63-146	2,000 ohm ½ W	63-280	49,000 ohm ¼ W
63-180	1,000 ohm ½ W	63-284	500,000 ohm
63-240	1900 ohm ¼ W	63-285	50,000 ohm
63-258	490,000 ohm ¼ W	63-286	50,000 ohm
63-260	100,000 ohm ¼ W	63-288	19,000 ohm ¼ W
63-265	220,000 ohm ½ W	63-289	29,000 ohm 1 W
63-271	1 meg ohm ¼ W	63-307	40,000 ohm 1 W
63-275	15,500 ohm		

MODEL 4F-133



DIAG Nº	PART Nº	DESCRIPTION		DIAG Nº	PART Nº	DESCRIPTION
C1	22-250	05 MFD	200V	1	S-4712	ANTENNA COIL ASSEM
C2	486	0012 MFD	600V	2	95-379	1ST I F TRANSFORMER
C3	350 (B)	25 MFD.	200V	3	95-380	2ND I F TRANSFORMER
C4	239	50 MMFD	600V	4	S-4662	OSCILLATOR COIL ASSEM
C5	327	02 MFD	200V	5	190-8	VIBRATOR
C6	182	00025	600V	6	20-140	R F CHOKE
C7	188	02 MFD	400V	7	95-381	POWER TRANSFORMER
C8	229	005 MFD	600V	8	S-2776	R.F. CHOKE ASSEMBLY
C9	519	200-550 MMFD PADDER		9	95-345	FILTER CHOKE
C10	406	2 GANG VARIABLE				
C11	199	8 MFD	200V			
C12	455	01-MFD (TUBULAR)	200V			
C13	327	2-8 MFD DRY ELEC	250V			
C14	243	01 MFD (TUBULAR)	400V			
R1	63-280	49 M OHM	¼ W			
R2	961	5 M OHM	¼ W			
R3	399	40 M OHM	¼ W			
R4	481	400 M OHM	¼ W			
R5	293	990 M OHM	¼ W			
R6	548	1 MEGOHM VOL CONT & SW				
R7	441	1 MEGOHM	¼ W			
R8	394	200 OHM	½ W			
R9	400	250 M OHM	¼ W			
R10	278	99 M OHM	¼ W			

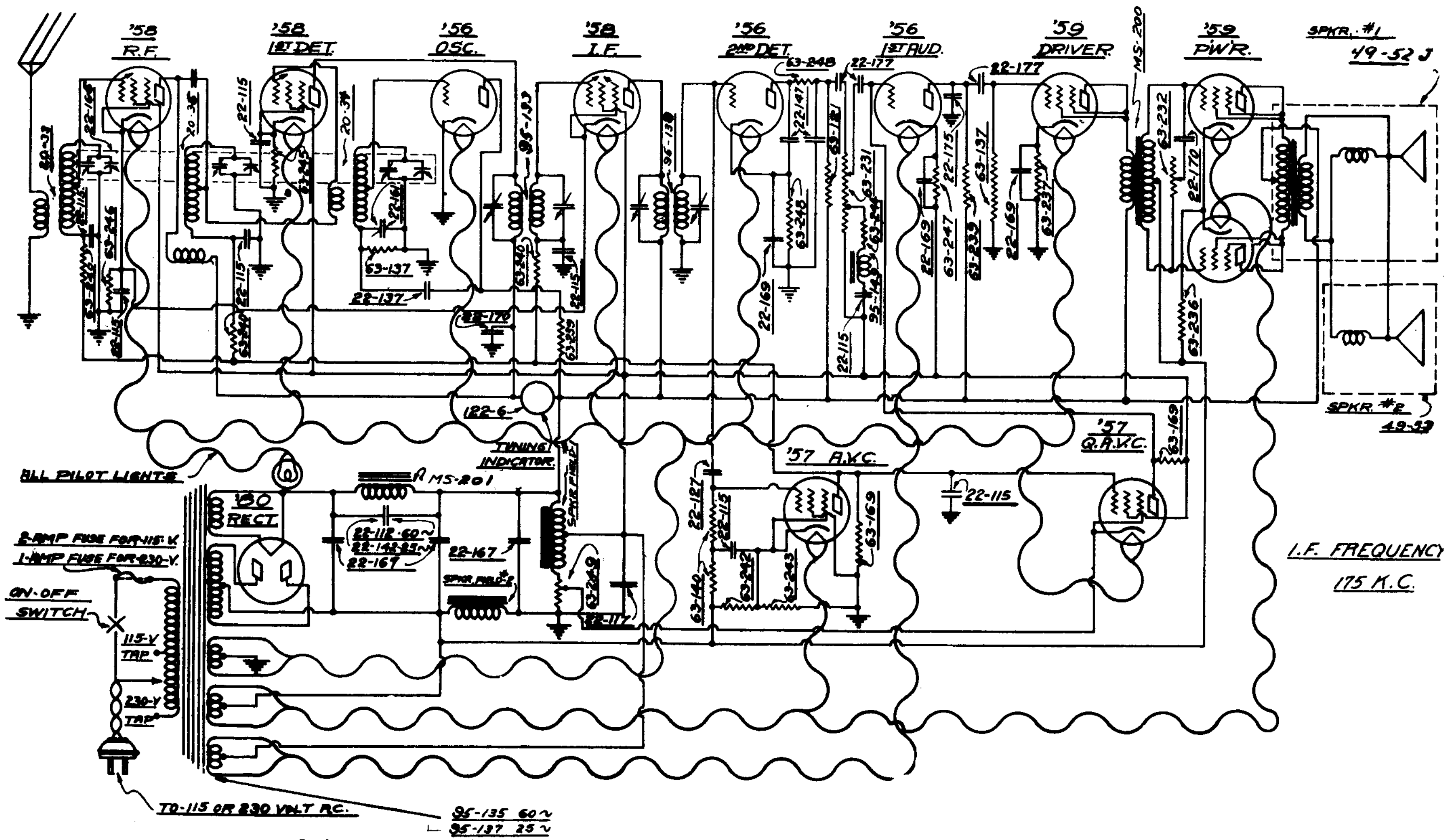


I.F. FREQUENCY 456 K.C.
4 TUBE BATTERY SUPERHETERODYNE
CHASSIS Nº 5407

ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS.

ZENITH RADIO CORPORATION

MODELS 530, 531, 533, 603, 612, 617, 620, 623 & 2038



Condensers

22-112	.1 mfd	300 volt	...(Filter)		.25
*22-115	.1 "	200 "	...(Eight Used, See Below)		.35
22-117	.5 "	300 "	...(Filter)		.50
22-127	.000025	600 "	...(A.V.C. Grid)		.35
22-137	.05 mfd	400 "	...(Oscillator Plate)		.25
22-142	.4 "	300 "	...(Filter 25 Cycle Only)		.40
22-147	.0005"	600 "	...(2nd Detector Plate)		.20
22-161	Padder				.45
22-165	Three Gang Variable				3.50
22-167	8. mfd	500 volt	...(Filter)		1.50
22-169	8. "	50 "	...(2nd Det. Cathode, Driver Cathode & 1st Audio Cathode)		.55
22-170	.1 "	400 "	...(1st Det. Plate, Tone Control)		.25
22-175	.002 "	500 "	...(1st Audio Plate)		.25
22-177	.2 "	400 "	...(2nd Det. Plate, 1st Audio Grid, 1st Audio Plate)		.25

Resistors

63-121	100M ohm	1 watt	...(2nd Detector Plate)	.25
63-137	250M "	¼ "	...(Driver Grid)	.25
63-140	1 meg"	½ "	...(A.V.C. Grid & Cathode)	.25
63-169	400 "	½ "	...(A.V.C. & Q.A.V.C. Plate)	.25
63-231	Volume Control & Switch Assembly			1.40
63-232	Tone Control			.75
63-236	500 ohm		...(Wide Metal) (Power Tube Bias)	.25
63-237	1500 "		...(Narrow Metal) (Driver Tube Bias)	.25
63-239	24M "	1 watt	...(Osc. & 1st Audio Plate)	.25
63-240	1900 "	¼ "	...(R.F. 1st Det. & I.F. Grids)	.25
63-242	2500 "	½ "	...(A.V.C. Cathode)	.25
63-243	18M "	1 "	...(A.V.C. Cathode)	.25
63-244	500 "	¼ "	...(Acoustic Filter)	.25
63-245	1500 "	¼ "	...(1st Detector Cathode)	.25
63-246	150 "	¼ "	...(R.F. Cathode)	.25
63-247	8M "	¼ "	...(1st Audio Cathode)	.25
63-248	50M "	1 "	...(2nd Det. Plate & Cathode)	.25
63-249	Sensitivity & Quiet Control			.75

*22-115 R.F. 1st Detector, I.F. Grid Returns, A.V.C. Plate, A.V.C. Cathode, 1st Detector Cathode, R.F. Cathode, and Acoustic Filter.