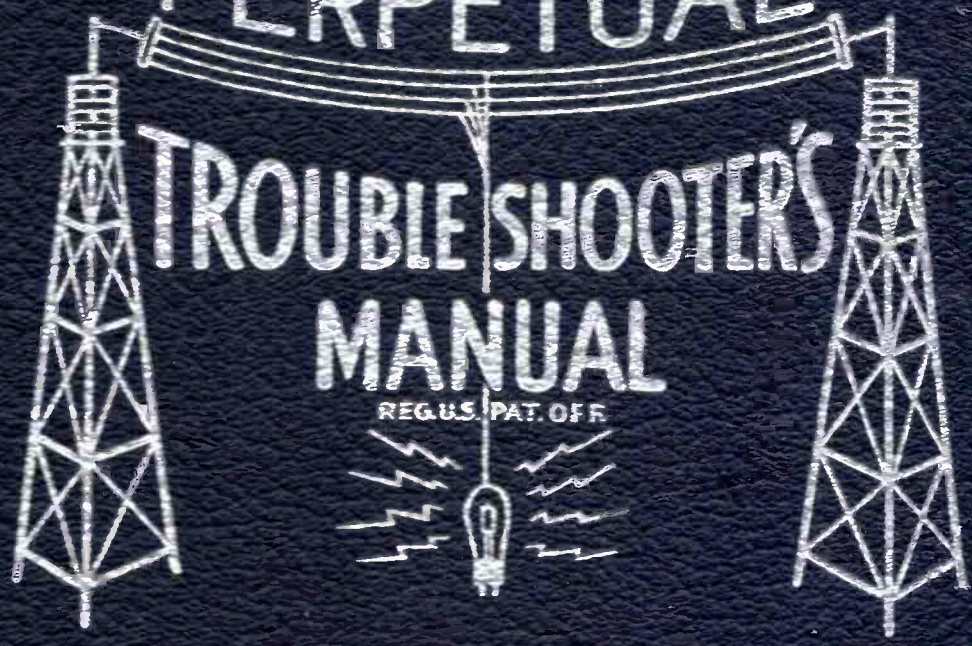


VOLUME XVI

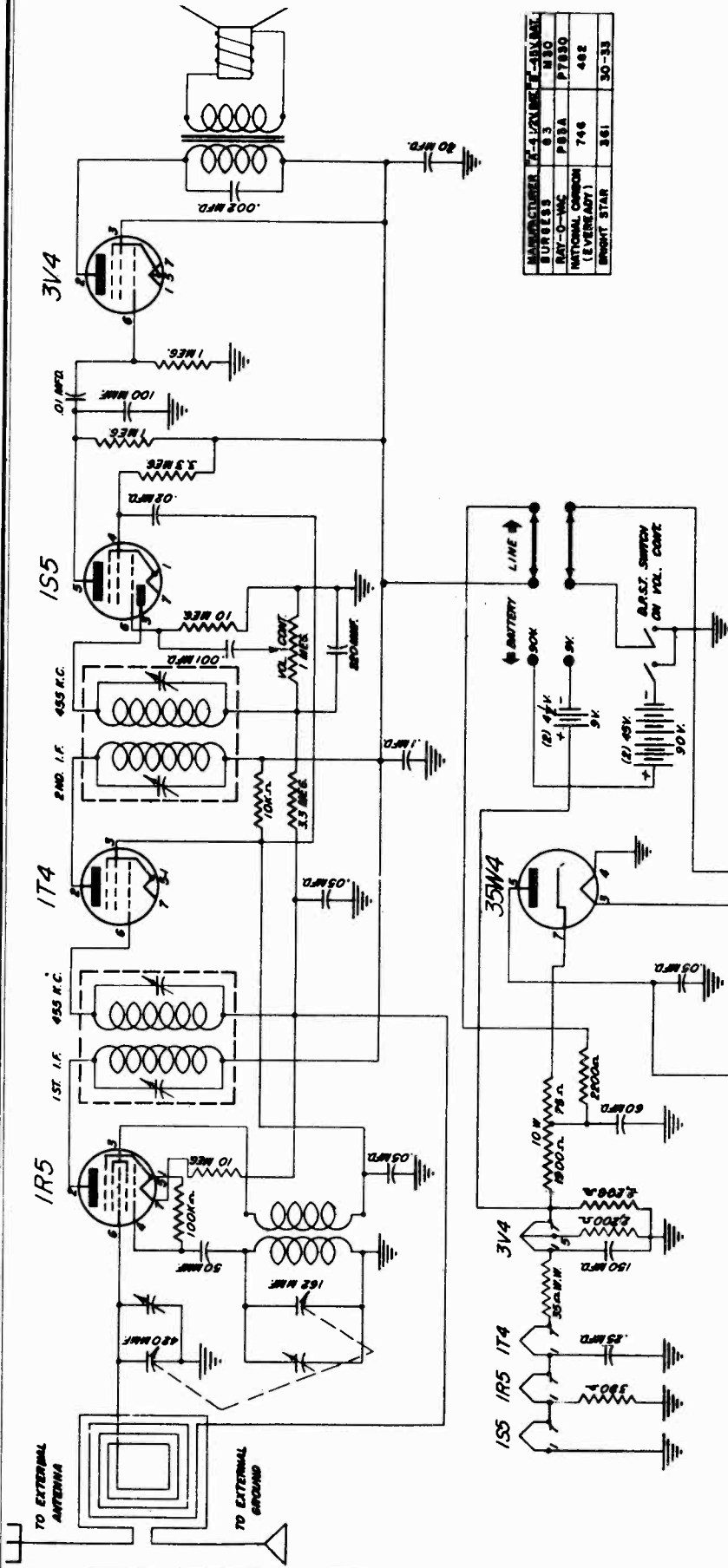
PERPETUAL



JOHN F. RIDER

DEWALD RADIO MFG. CORP.

MODEL A-507

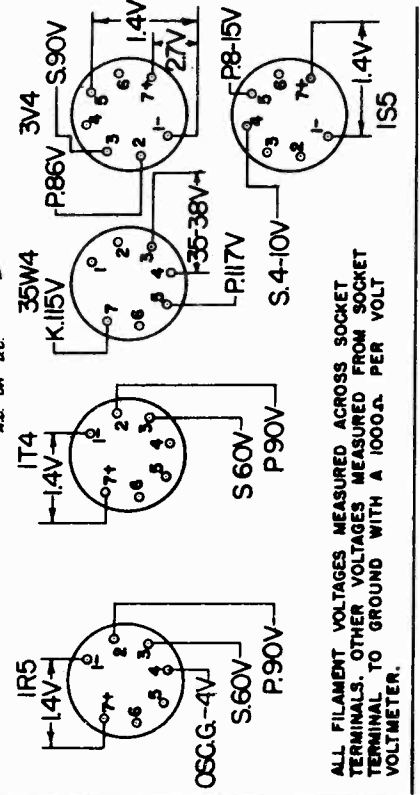
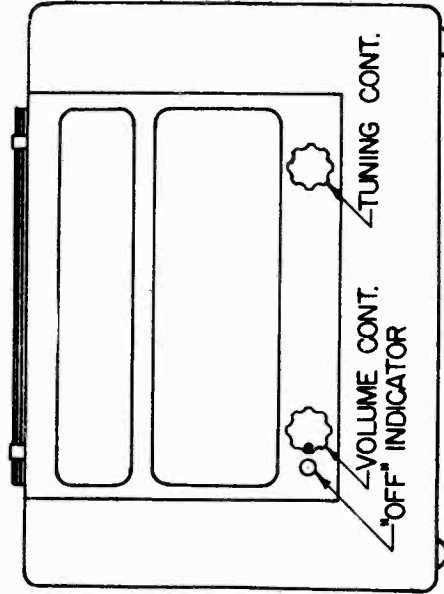


MANUFACTURER	1T-4	1S5	3V4
BURBESS	63	M30	
RAY-O-WAC	P83A	P7830	
NATIONAL CORP.	(EVENREADY)	746	482
BRIGHT STAR	361	30-33	

MODEL A-507

PARTS

- 5002 Res. Line Cord
- 5003 Battery Cable
- 9001 Dial Scale
- 7001 Speaker
- 8019 Slide Switch
- 4044-1 Plain Knob
- 4044-2 Indicator Knob
- 9025 Pointer
- 1019-1 Dual Tuned I. F.
- 1019-2 2nd Det. I. F.
- 1021 Antenna Loop
- 1020 Osc. Coil
- 2003 2 Gang Var. Cond.
- 2013 Comb. Electrolytic
- 3006 Volume Control
- 3007 1975 ohm. Res.

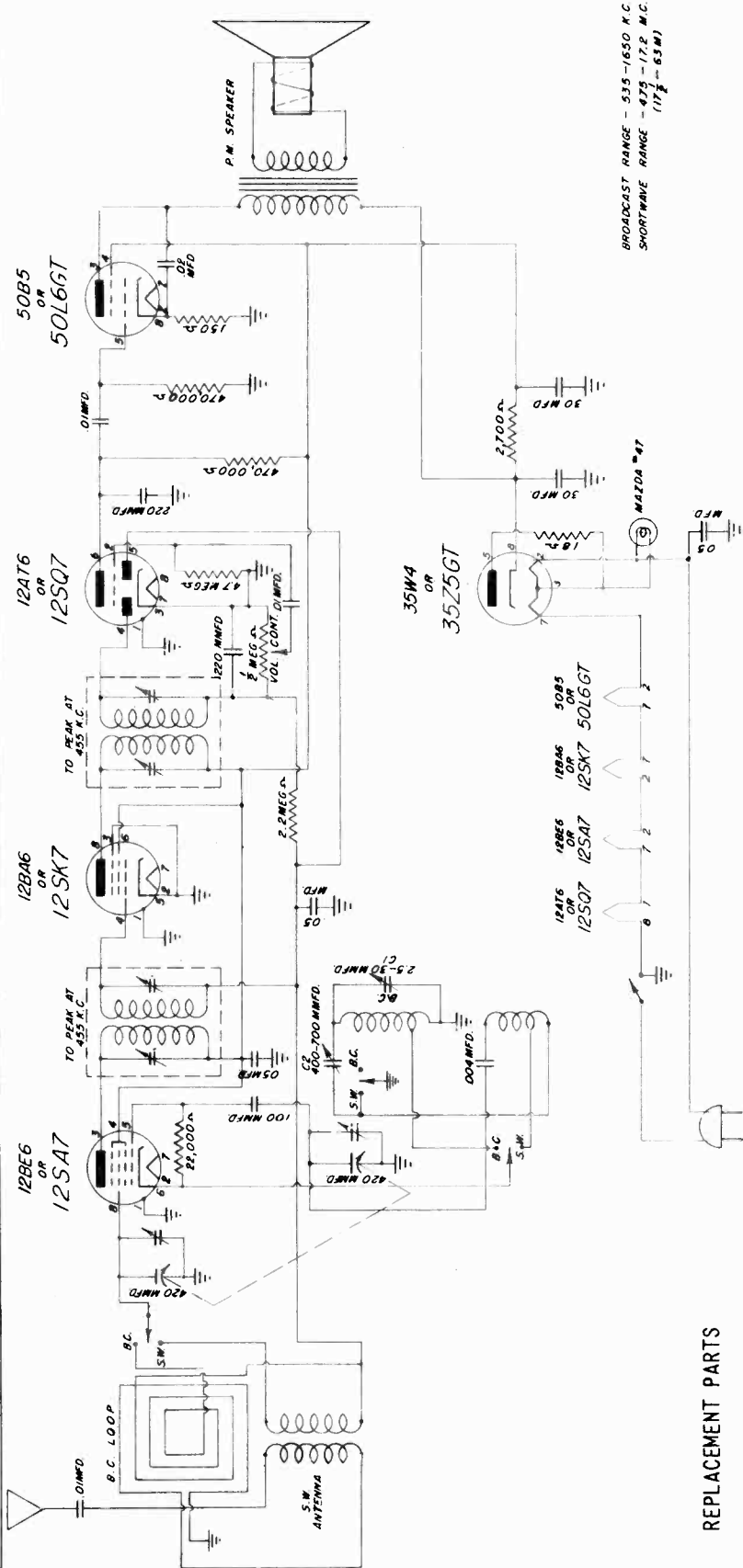


ALL FILAMENT VOLTAGES MEASURED ACROSS SOCKET TERMINALS. OTHER VOLTAGES MEASURED FROM SOCKET TERMINAL TO GROUND WITH A 1000Ω PER VOLT VOLTMETER.

BOTTOM VIEW OF CHASSIS

MODEL A-509

DEWALD RADIO MFG. CORP.



REPLACEMENT PARTS

- 1016 loop ant.
- 1017 B.C. oscillator coil
- 1018 S.W. oscillator coil
- 1009 S.W. ant. coil
- 1000 1st I.F. coil
- 1002 2nd detector I.F. coil
- 2014 variable condenser
- 2002 comb. electrolytic
- 2000 paper condenser
- 3000 1/4 W. resistor
- 3003 1/2 W. resistor
- 3004 2 W. resistor
- 6003 dial scale
- 9001 dial back plate
- 8001 pilot lamp assembly
- #47 pilot lamp
- #20 dial cord
- 9762 drive spring
- 9818 bushing
- 9000 shaft
- 7000 speaker
- 8017 wave band switch
- 5000 line cord
- 2011 padder condenser
- 3002 comb. volume control

TO 105-125V
40-60
UNLESS OTHERWISE SPECIFIED

IF MINIATURE USE

- TUBES
- 1 35Z5GT
- 1 50L6GT
- 1 12SA7
- 1 12RA6
- 1 12SK7

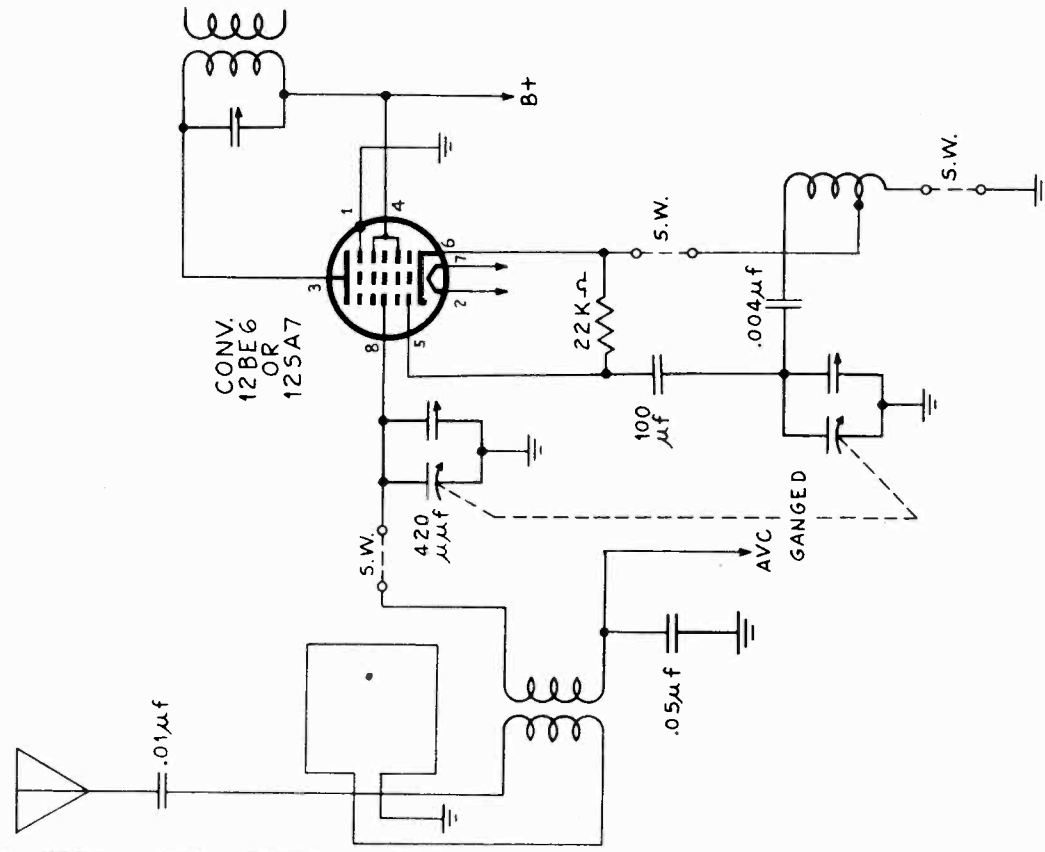
- CABINET 4004
- KNOB 4037
- BACK 4018

BROADCAST RANGE - 535-1650 K.C.
SHORTWAVE RANGE - 425-17.2 M.C.
(117 1/2 - 63 M)

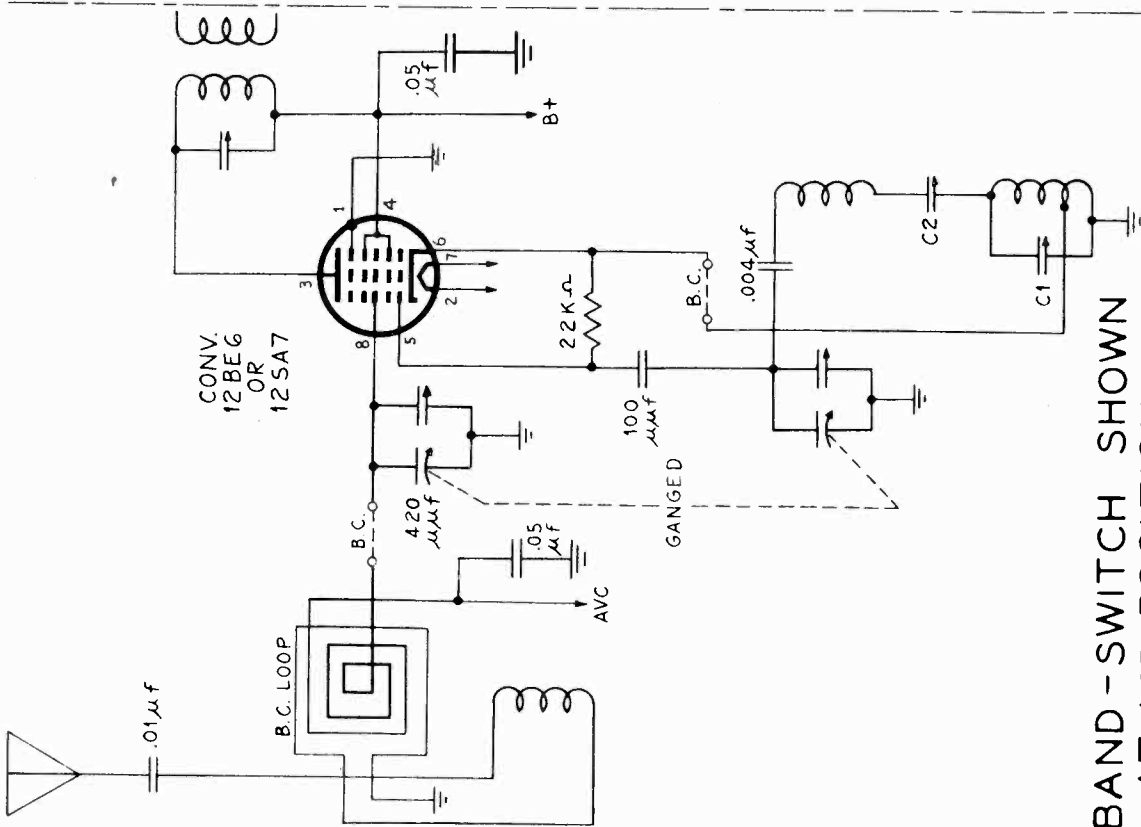
To calibrate receiver connect the output of signal generator in series with a 200 MMFD fixed condenser to the flexible antenna lead attached to the loop antenna. Connect the low side of signal generator through a 1/10 mfd. condenser to receiver chassis. The wave band switch should be in the broadcast position. Adjust signal generator to 455 Kilocycles and adjust both I.F. transformers for maximum signal. Open the receiver variable condenser for minimum capacity. Turn the band switch to short wave position. Set signal generator at 17.2 Megacycles. Peak oscillator section of receiver condenser for maximum signal. Next set signal generator at 16 Megacycles. Tune in this signal. Adjust R.F. section of receiver variable condenser for maximum signal strength. The low frequency end of the dial is automatically adjusted by a fixed padder condenser. Next turn band switch to broadcast position. Rotate drive shaft until variable condenser is in minimum capacity position. Adjust signal generator to 1050 Kilocycles. Adjust the broadcast oscillator trimmer screw (C-1) until maximum signal from generator is heard. To adjust the signal generator and receiver to 600 Kilocycles. Peak the broadcast padder (C-2) for maximum output. The variable condenser should be rocked during the operation. Keep the signal generator output as low as possible when making all of these measurements. It is extremely necessary in making the short wave adjustments, that the fundamental oscillator signal be tuned in and not the image frequency, which will fall below the fundamental.

DEWALD RADIO MFG. CORP.

MODEL A-509



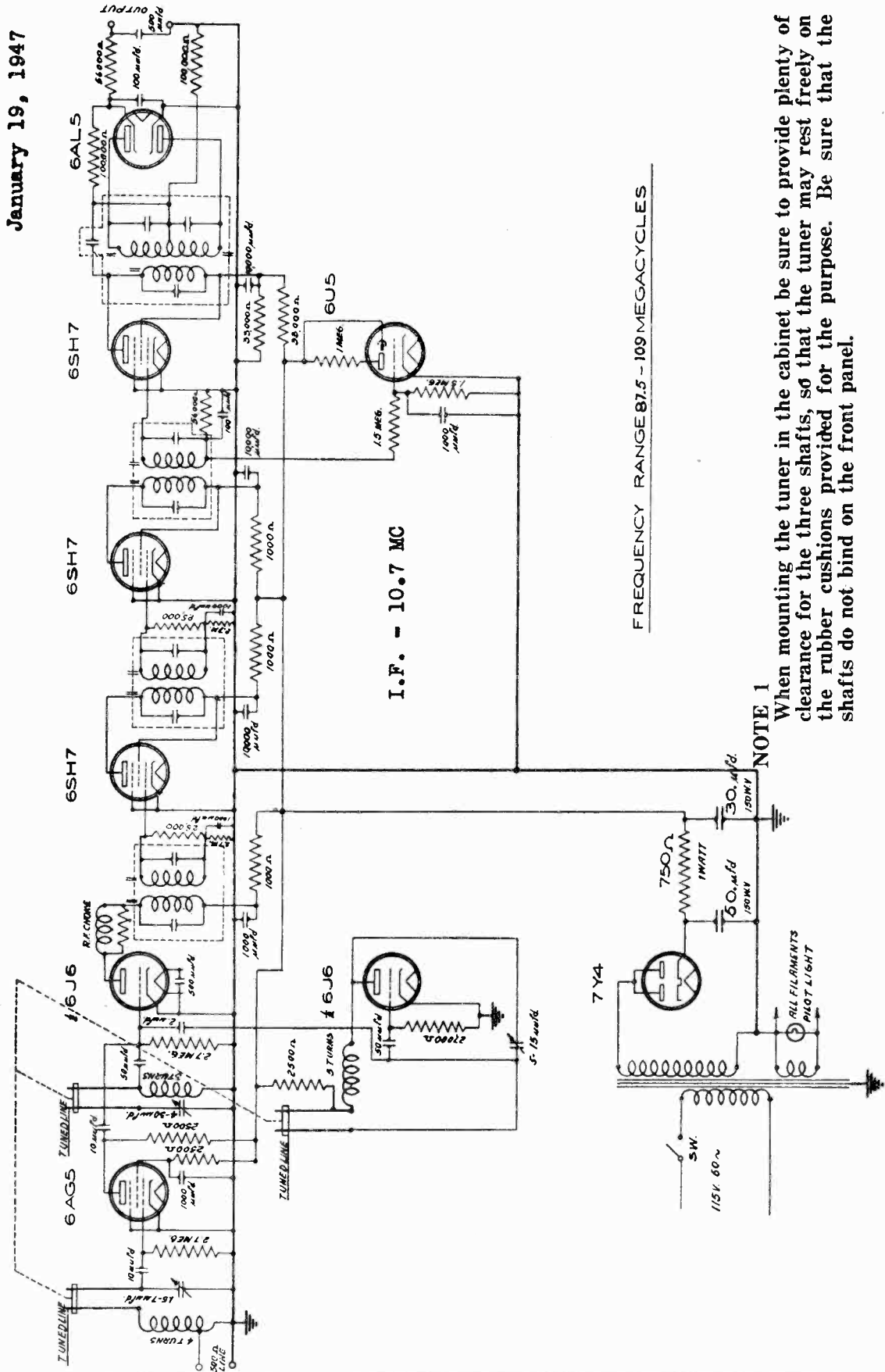
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
SHORT WAVE BAND
4.75 - 17.2 MC.



BAND-SWITCH SHOWN
AT 1ST POSITION
BROADCAST BAND
535-1650 KC.

EDWARD'S FM RADIO CORP.

January 19, 1947



FREQUENCY RANGE 87.5 - 109 MEGACYCLES

I.F. - 10.7 MC

NOTE 1

When mounting the tuner in the cabinet be sure to provide plenty of clearance for the three shafts, so that the tuner may rest freely on the rubber cushions provided for the purpose. Be sure that the shafts do not bind on the front panel.

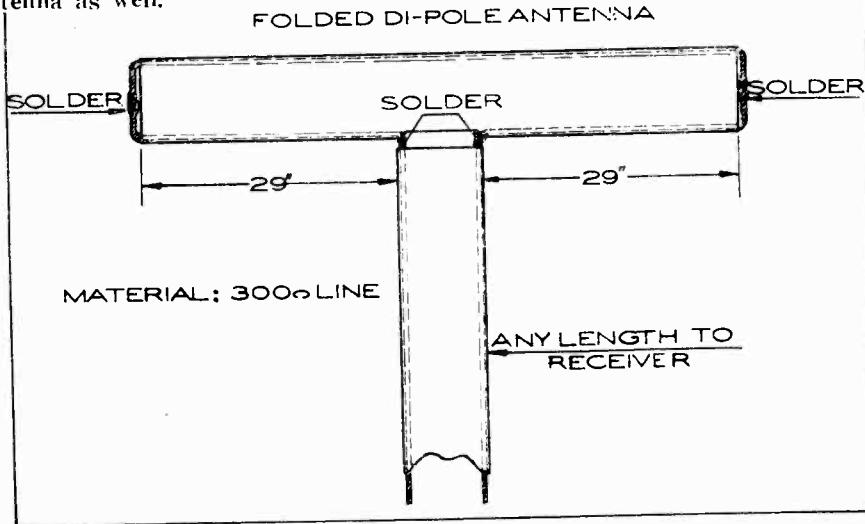
NOTE 2

The tuning lines are lubricated at the factory for best contact and smoother dial operation. Normally this lubricant will not have to be replaced. However, should it be desired to lubricate the rods, use a dab of General Cement Co. "Lube-Rex on each rod.

FM TUNER

EDWARD'S FM RADIO CORP.

In most metropolitan locations an indoor antenna may be all that is necessary. This by all means should be tried first, unless a suitable F.M. type outdoor antenna is already available. A very satisfactory indoor antenna may be improvised from a piece of 300 ohm flat type transmission line. (Same material as the antenna connection coming out from the tuner.) Cut the piece to a length of 60 inches. Then short circuit both ends. Then in the exact center cut one side of the line and use the two resulting ends to connect to the antenna line coming from the tuner. The antenna may be fastened to a molding or to a piece of wood with thumb tacks. (See diagram.) It is also advisable to try positioning the antenna at various angles and positions, so as to favor most desired stations. This applies to an outdoor antenna as well.



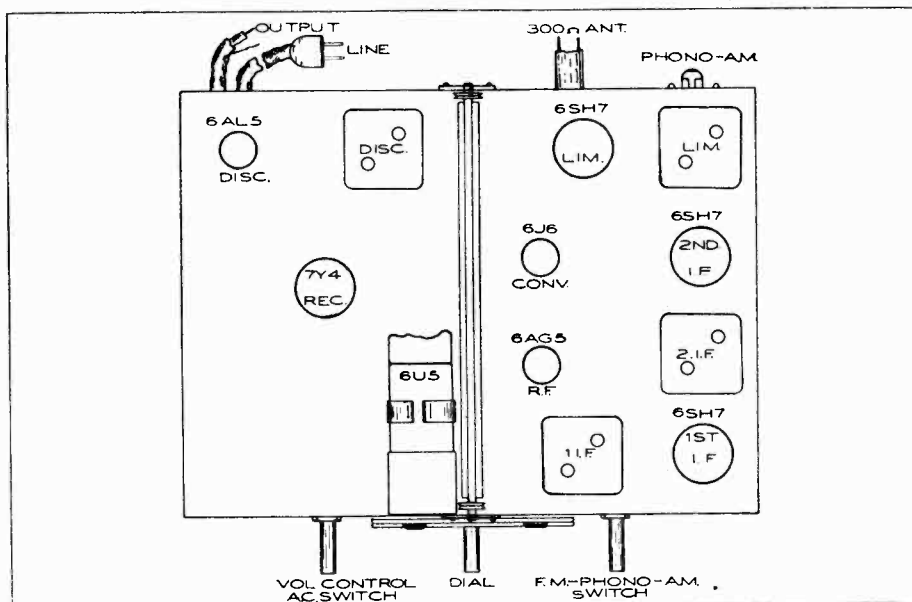
If this indoor antenna should prove unsatisfactory for your location, any standard half wave di-pole F.M. outdoor antenna may be used. A 300 ohm transmission line should be used to couple to the tuner.

Any high quality audio system may be employed. Connection can be made to the phono connection provided for on most better radio receivers. Volume may be controlled either directly at the tuner by means of the volume control provided for on the receiver or amplifier, whichever is more convenient. A phono input is provided in the rear of the tuner. The selector switch in the front may be used to switch from F.M. to phono, all connections then being permanent. If desired an A.M. tuner may be connected to the rear phono jack instead of a phono pickup.

After the tuner is in operation for about 10 minutes each time it is turned on it may be necessary to retune to compensate for a slight temperature rise drift. This will not be necessary thereafter. Tuning should be so done as to get maximum closing of the target on the 6U5 tuning eye mounted directly on the dial. However the ear should be the final judge of the exact dial position. This point will always be in the region of maximum tuning eye closing.

The output line is high impedance 500,000 ohms.

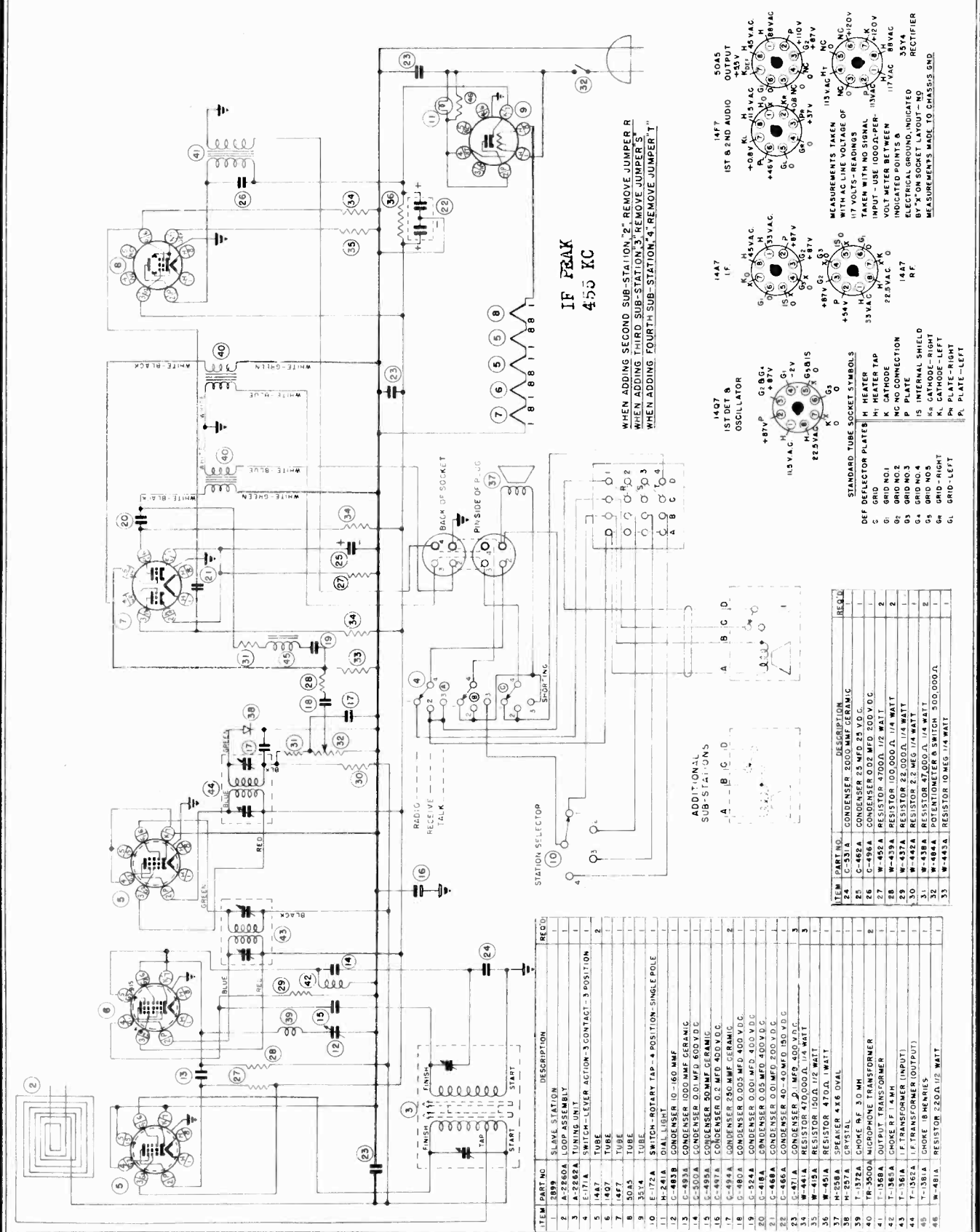
It should be ascertained that the 6J6 and 6AG5 miniature tubes mounted under the chassis are firmly in their sockets before attempting to operate the tuner.



ELECTRONIC LABORATORIES, INC.

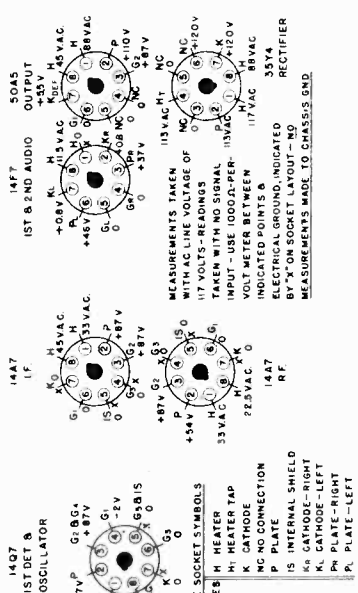
Radio Utiliphone,

MODEL 76RU,
Chassis 2865



ITEM	PART NO.	DESCRIPTION	REQ'D
1	28960A	SLAVE STATION	1
2	28960A	COMPASS UNIT	1
3	E-176A	SWITCH-LEVER ACTION-3 CONTACT-3 POSITION	1
4	E-176A	SWITCH-LEVER ACTION-3 CONTACT-3 POSITION	2
5	1447	TUBE	1
6	1447	TUBE	1
7	5045	TUBE	1
8	5045	TUBE	1
9	E-172A	SWITCH-ROTARY TAP-4 POSITION-SINGLE POLE	1
10	E-172A	SWITCH-ROTARY TAP-4 POSITION-SINGLE POLE	1
11	M-241A	OIAL LIGHT	1
12	C-483B	CONDENSER 10-160 MMF	1
13	C-493A	CONDENSER 1000 MMF CERAMIC	1
14	C-300A	CONDENSER 0.01 MFD 600 V D.C.	1
15	C-499A	CONDENSER 30 MMF CERAMIC	1
16	C-487A	CONDENSER 0.2 MFD 400 V D.C.	1
17	C-489A	CONDENSER 230 MMF CERAMIC	2
18	C-480A	CONDENSER 0.005 MFD 400 V D.C.	1
19	C-324A	CONDENSER 0.001 MFD 400 V D.C.	1
20	C-488A	CONDENSER 0.05 MFD 400 V D.C.	1
21	C-486A	CONDENSER 0.01 MFD 200 V D.C.	1
22	C-486A	CONDENSER 0.01 MFD 200 V D.C.	1
23	C-471A	CONDENSER 1 MFD 400 V A.C.	3
24	W-441A	RESISTOR 150 Ω 1/2 WATT	1
25	W-451A	RESISTOR 470 Ω 1 WATT	1
26	M-258A	SPEAKER 4 X 6 OVAL	1
27	M-257A	CRYSTAL	1
28	T-1372A	CHOKE R.F. 30 MH	1
29	TR-3500A	MICROPHONE TRANSFORMER	2
30	T-1362A	CHOKE R.F. 1.4 MH	1
31	T-1361A	I.F. TRANSFORMER (INPUT)	1
32	T-1361A	I.F. TRANSFORMER (OUTPUT)	1
33	T-1361A	I.F. TRANSFORMER (INPUT)	1
34	T-1361A	I.F. TRANSFORMER (OUTPUT)	1
35	W-481A	RESISTOR 2.2 Ω 1/4 WATT	1
36	W-481A	RESISTOR 2.2 Ω 1/4 WATT	1
37	W-481A	RESISTOR 2.2 Ω 1/4 WATT	1
38	W-481A	RESISTOR 2.2 Ω 1/4 WATT	1
39	W-481A	RESISTOR 2.2 Ω 1/4 WATT	1
40	W-481A	RESISTOR 2.2 Ω 1/4 WATT	1
41	W-481A	RESISTOR 2.2 Ω 1/4 WATT	1
42	W-481A	RESISTOR 2.2 Ω 1/4 WATT	1
43	W-481A	RESISTOR 2.2 Ω 1/4 WATT	1
44	W-481A	RESISTOR 2.2 Ω 1/4 WATT	1
45	W-481A	RESISTOR 2.2 Ω 1/4 WATT	1
46	W-481A	RESISTOR 2.2 Ω 1/4 WATT	1

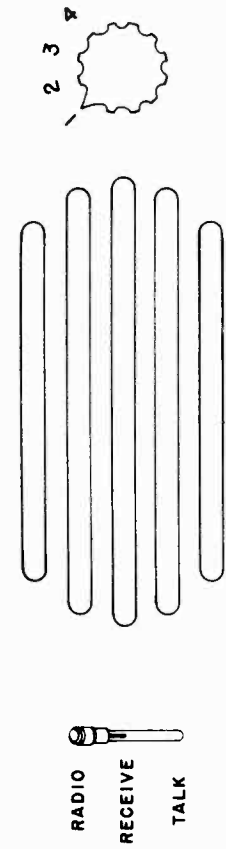
WHEN ADDING SECOND SUB-STATION, 2, REMOVE JUMPER R
WHEN ADDING THIRD SUB-STATION, 3, REMOVE JUMPER S
WHEN ADDING FOURTH SUB-STATION, 4, REMOVE JUMPER T



DEF	STANDARD TUBE SOCKET SYMBOLS
DEFLECTOR PLATES	H HEATER TAP
C	GRID
G	GRID NO. 1
O	GRID NO. 2
Q	GRID NO. 3
R	GRID NO. 4
S	GRID NO. 5
G	GRID-LEFT
L	GRID-RIGHT
P	PLATE-LEFT
R	PLATE-RIGHT

Radio Utiliphone,
MODEL 76RU,
Chassis 2865

ELECTRONIC LABORATORIES, INC.



VOLUME, ON-OFF Turn knob to the right to turn Radio-Utiliphone on. A click will be heard - wait 30 seconds for tubes to heat. Continue to turn the knob to the right to increase volume. The Volume, ON-OFF switch must be turned on to operate both the radio, and the utiliphone.

DIAL Standard Broadcast Bank - 540 to 1620 Kilocycles. Calibrated in kilocycles. Shadow indicator behind moving dial.

TUNING Radio Turn knob until desired station is heard. Rotate slowly back and forth until signal is strongest and clearest. Reduce or increase signal by using the volume control.

RADIO-RECEIVE-TALK SWITCH
This is a lever switch with a fixed position at "Radio" and "Receive", and a spring return from "Talk" to "Receive". To operate the radio, set the switch to the position marked "Radio".

To talk on the utiliphone, push the lever to "Talk" and hold in position while talking. To listen, release lever and let it swing back to "Receive" position.

SUB-STATION SELECTOR SWITCH
This is a four position switch with positions marked 1, 2, 3, and 4 indicating sub-stations 1, 2, 3, and 4 respectively. Set the sub-station selector switch for the desired station.

Model 7S Sub-Stations are each equipped with a push-to-talk switch, which is normally in the listen position. In order to talk from any sub-station, this switch must be depressed and held down while talking.

IF THE RADIO-UTILIPHONE FAILS TO OPERATE

FIRST- Check power supply by connecting a lamp to the outlet, or by connecting the radio-utiliphone in another socket.

SECOND - When used on DC, if the radio does not operate, even though the tubes are lighted, reverse the plug in the socket to provide correct polarity.

THIRD - See if tubes are lighted after the radio-utiliphone has been turned on for almost a minute. Tubes in the Electronic Model 76RU are connected so that if one tube is loose in its socket, or defective, none of the tubes will light.

See that tubes are pushed into sockets. If they still fail to light, have them checked by your local radio dealer.

IF THE UTILIPHONE FAILS TO OPERATE, but the radio does operate, check the following:

FIRST - Check the setting of the sub-station selector switch.

SECOND - Check for loose interconnecting wires.

THIRD - Check for correct connections between stations. Example: - Be sure the same wire is connected from Row 1 - Terminal "A" to Station 1 - Terminal "A", etc.

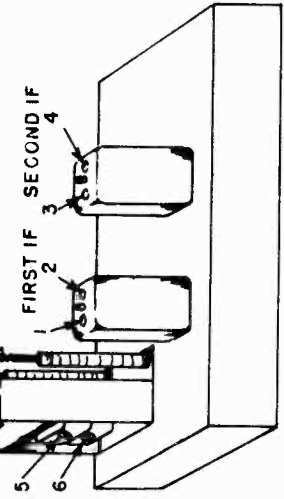
Any difficulties that are not corrected by following the above instructions should be referred to a competent serviceman.

SERVICE DATA - ALIGNMENT NOTES

A. MECHANICAL ALIGNMENT:- The following mechanical adjustments should be made before alignment:

1. Rotate shaft of tuning unit until carriage is against top stop position.
2. Space oscillator coil slug 1-5/32" out from top of oscillator coil form.
3. Space R.F. coil slug 1-29/64" out from top end of R.F. coil winding. (Note - The distance 1 and 2 should be measured from mounted end of the slug.)
4. Adjust screw on trimmer of wave trap towards open position so that condenser plates are open at least 1/32".

SEE NOTE (OSCILLATOR COIL)



ELECTRONIC LABORATORIES, INC.

Radio Utiliphone,
MODEL 76RU,
Chassis 2865

B. I.F. ALIGNMENT PROCEDURE

1. Feed I.F. frequency from the signal generator through a 0.01 mfd condenser to the control grid of the R. F. tube.
2. No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting.
3. Turn volume control full on.
4. Make preliminary I.F. adjustment with signal level approximately 50 Mv.
5. Tune I.F. trimmers for maximum signal, reducing I.F. signal input to coupling loop to keep output voltage less than 0.5 V.
6. When maximum output has been secured, adjust trimmer condenser in the I.F. trap (under chassis) by turning clockwise to the minimum signal.

C. R.F. ALIGNMENT PROCEDURE

1. Volume control full on.
2. Adjust tuning unit to top stop position.
3. Feed 1620 kc signal into external loop. Hold audio output below 0.5 V. Adjust the oscillator trimmer condenser to maximum output.
4. Move slugs in by means of tuning dial so that pointer is approximately 1" from the stop end, and a signal received from the external loop on a frequency of 1400 kc. Adjust lower trimmer (R.F. trimmer) to maximum output. Reduce R.F. input to keep signal output voltage below 0.5 V.
5. Rotate tuning shaft until pointer is approximately 1" from the other end of the scale. Feed to the external loop a test signal at 700 kc. Adjust the R.F. coil slug by rotation in the Tinnerman nut to maximum output.

NOTE: Alternately adjust R.F. trimmer and R. F. slug until maximum output is reached at both 1400 KC and 700 KC as instructed in paragraphs C4 and C5.

CAUTION: Extreme care should be taken in the 700 kc. position to make sure that the tuner carriage is not moved by the adjusting tools or hand pressure on the slug screw. Carriage should not be held against the frame, but should be allowed to assume its normal position when adjusting the R.F. coil slug.

SPECIFICATIONS

Power consumption..... 35 Watts
(At 117 volts AC Supply)
Power Output- 1.1 Watts 10% Distortion
1.6 Watts Max.
Selectivity----49 KC Broad at
1000 times Signal
Intermediate Frequency..... 455 KC
Speaker..... 4"x6" Oval
Tuning Frequency Range..540 to 1620 KC
Sensitivity (For .05 Watt output-external
Antenna) 15 microvolts average

ALIGNMENT PROCEDURE-

Volume Control-Maximum All Adjustments.

Signal Generator which will provide an accurately calibrated signal at test frequencies as listed.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

Output Indicating Meter; Non-Metallic Screwdriver.

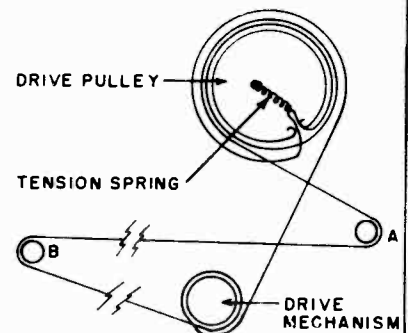
The equipment in column at right is required for Aligning:

Dummy Antennas-.01 mf., and 400 ohms.

SIGNAL GENERATOR			DUMMY ANTENNA	TUNER SETTING	TRIMMER ADJUSTMENT (SEE DIAGRAM)	NOTES
FREQUENCY SETTING	ANTENNA CONNECTION	COUPLING				
I.F. 455 KC	Grid of RF tube 14A7	Ground generator to chassis	0.01 mfd	Out	Adjust for Max. 1, 2, 3 and 4	
I.F. 455 KC	Grid of RF tube 14A7	Ground generator to chassis	0.01 mfd	Out	Trim condenser under chassis for Min. output.	If it is found that regeneration prevails when the loop antenna is put in its normal position close to the tubes, then the under chassis trimmer is incorrectly set, and should be adjusted to prevent the regenerative condition.
1620 KC	Inductive Coupling to Loop	Loop coupling with leads brought out	400 ohms in series with Antenna & Gnd. leads	Out	Adjust Osc. #5 for Max. Signal	
1400 KC	Inductive Coupling to Loop	Loop coupling with leads brought out	400 ohms in series with Antenna & Gnd. leads	Dial set for 1400KC	Adjust RF trimmer #6 for Max. Signal	
700 KC	Inductive Coupling to Loop	Loop Coupling with leads brought out	400 ohms in series with Antenna & Gnd. leads	Dial set for 700KC	Adjust RF tuning core #7 for Max. Signal (care should be taken not to disturb carriage position of tuner)	Alternately adjust R.F. trimmer and R.F. slug until maximum output is reached at both 1400 KC and 700 KC as instructed above.

DRIVE CORD REPLACEMENT

Turn the tuner to the fully open position. Use a new cord 41" long and tie one end to the tension spring. Fasten the other end of the tension spring to the drive pulley. Pass cord through slot in pulley ring; add spring tension and continue one and one-half turns counterclockwise over top of pulley. Then pass cord around idler pulley A, starting over top and going around clockwise. Pass cord over idler pulley B, starting over top and going around counter clockwise. Wind one full turn counterclockwise around drive mechanism. Then wind one full turn counterclockwise around drive pulley, pass through slot in pulley and tie string to tension spring. Cut off excess string. Attach dial pointer to cord.



MODEL 76RU

ELECTRONIC LABORATORIES, INC.

INSTALLATION
CONNECTION, MODEL 76RU
RADIO-UTILIPHONE AND
MODEL 7S SUB-STATIONS

Model 76RU Radio-Utiliphone and Model 7S Sub-Stations are interconnected by using the four-conductor wire furnished. (Additional lengths, up to approximately 500 feet may be used. This is available in 50 foot lengths.) The wire supplied with the equipment is color coded for convenience in making connections. Connections on each unit are made to screws on the terminal boards provided. (See connection diagram.)

The terminal board on the Sub-Station is located on the back of the cabinet, and on the radio-utiliphone, it is located on the back of the chassis inside of the cabinet. Remove four screws in the corners of the back cover. The back cover may then be pulled away from the cabinet far enough to permit access to the terminal board.

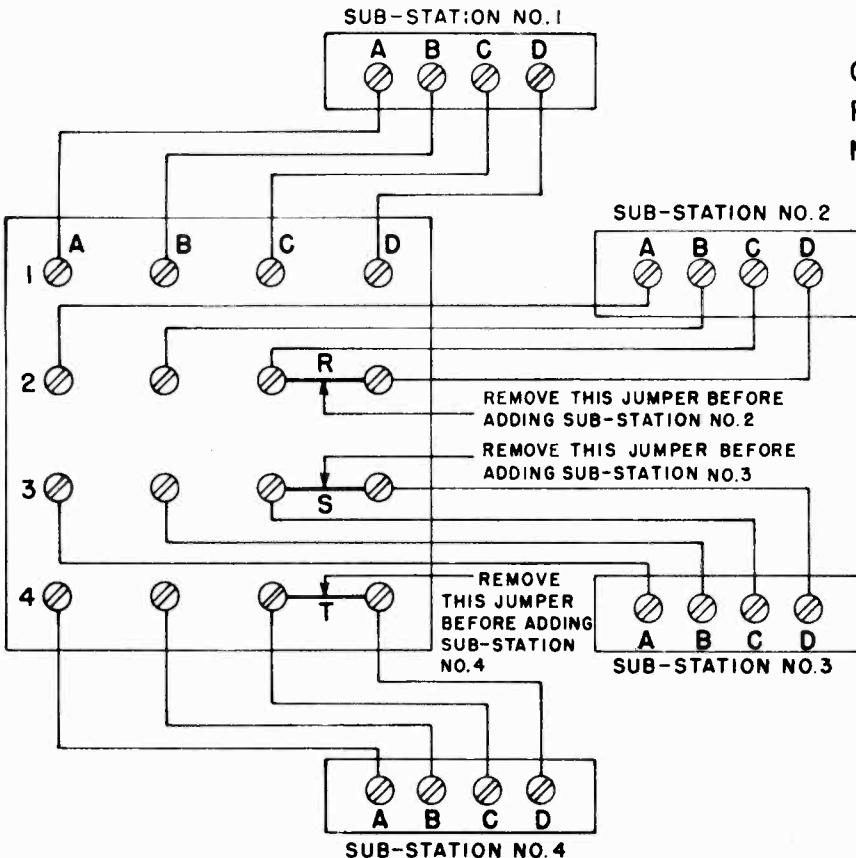
Wires must be clean and free of insulation before making connections. To insure a good connection, the wire should be wrapped completely around the screw terminal. Screw should then be tightened so that wires are held securely in place. Faulty connections of any kind may interfere with operation.

TO CONNECT ONE SUB-STATION

Sub-Stations must always be connected in sequence as marked on the terminal board. If two sub-stations are used, they must be connected to the terminals marked "1" and "2". Before connecting station No. 2, remove jumper "R" (refer to connection diagram). Then connect wires between terminals #2A, #2B, #2C, and #2D and Terminals A, B, C, and D of No. 2 sub-station. IF ONE STATION IS LATER REMOVED, THE REMAINING STATION MUST THEN BE CONNECTED TO THE TERMINALS MARKED "1", AND JUMPER "R" MUST BE REPLACED.

Three sub-stations must be connected to terminals #1, #2 and #3. Before connecting station #3, remove jumper "S" (refer to connection diagram). Then connect wires between terminals #3A, #3B, #3C and #3D, and terminals A, B, C, and D of No. 3 sub-station. If the third station is later removed, the two remaining stations must be connected to terminals marked "1" and "2", and jumper "S" must be replaced.

Before connecting station No. 4, remove jumper "T" (refer to connection diagram). Then connect wires between terminals #4A, #4B, #4C, and #4D, and terminals A, B, C, and D of No. 4 sub-station. If fourth station is later removed, the three remaining stations must be connected to terminals #1, #2 and #3, and jumper "T" must be replaced.



TO CONNECT TWO OR MORE SUB-STATIONS

The Model 76RU Radio-Utiliphone is supplied, by the manufacturer, set up to operate one sub-station. If more than one sub-station is to be installed, be sure to read all instructions before starting to connect the stations.

Terminal board on the 76RU, is marked 1, 2, 3, 4, and A, B, C, D. The numbers 1, 2, 3, and 4 indicate stations, the letters A, B, C and D indicate the four terminals which are to be used for connections to the sub-stations.

Stations must be connected in sequence as marked. IF ONLY ONE STATION IS TO BE USED, IT MUST BE CONNECTED TO THE SET OF TERMINALS MARKED "1".

THE SAME WIRE MUST BE CONNECTED BETWEEN TERMINALS HAVING THE SAME MARKINGS:-

- Terminal 1A (on Model 76RU) to Terminal A on No. 1 Sub-Station
 - Terminal 1B (on Model 76RU) to Terminal B on No. 1 Sub-Station
 - Terminal 1C (on Model 76RU) to Terminal C on No. 1 Sub-Station
 - Terminal 1D (on Model 76RU) to Terminal D on No. 1 Sub-Station
- Be certain that jumpers R, S, and T are in place per diagram.

LINE VOLTAGE

Model 76RU Radio Utiliphone operates only on a power supply of 105-125 volts AC, 50 to 60 cycles, or 105-125 volts DC. If in doubt about your line voltage, check with your local power company before connecting the Radio-Utiliphone.

If there seems to be an excessive amount of hum when operating the radio on AC, reverse the position of the line plug in the socket.

On DC operation, if the radio does not operate within one minute after it is connected, reverse the position of the line plug in the socket.

Model 7S Sub-Station requires no electrical power connection.

LOCATION

If two units are located in the same room and are too close together, they may "sing" due to acoustic feedback. By experimenting, it is possible to change the position of the units to that this feedback is eliminated.

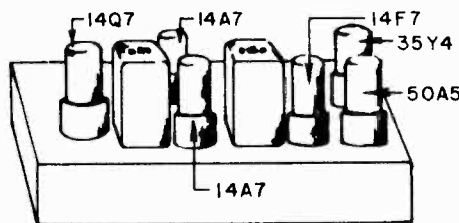
TUBES AND DIAL LAMP

The type and position of tubes are shown in illustration.

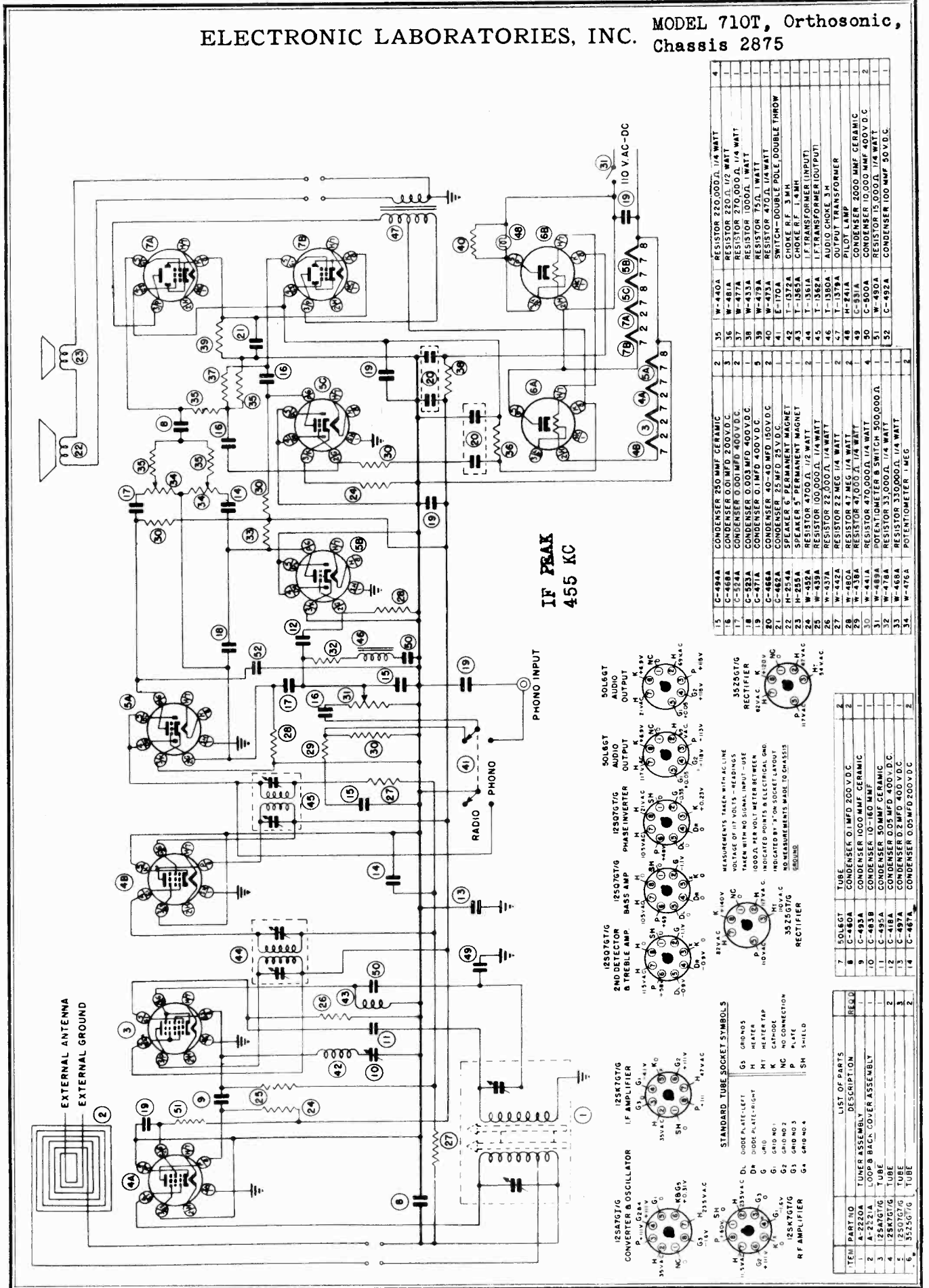
All tubes and the dial lamp MUST be in the socket to operate the radio-utiliphone.

CAUTION - If a dial lamp burns out, it should be replaced at once. A hole in the bottom of the cabinet provides access to the dial lamp so that it may be replaced without removing chassis from the cabinet.

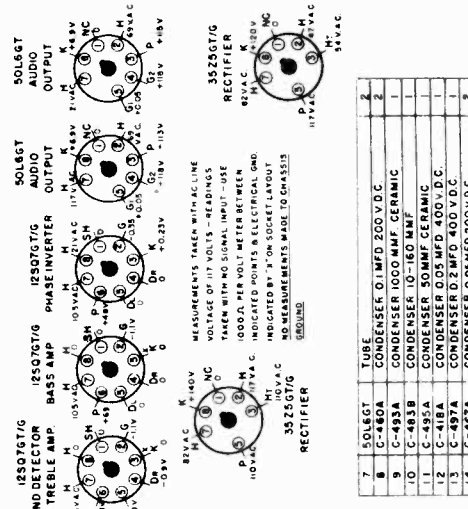
Use only a #47 dial lamp.



ELECTRONIC LABORATORIES, INC. MODEL 710T, Orthosonic,
Chassis 2875



IF PEAK
455 KC



STANDARD TUBE SOCKET SYMBOLS

1	15V 50	SH
2	15V 50	SH
3	15V 50	SH
4	15V 50	SH
5	15V 50	SH
6	15V 50	SH
7	15V 50	SH
8	15V 50	SH
9	15V 50	SH
10	15V 50	SH
11	15V 50	SH
12	15V 50	SH
13	15V 50	SH
14	15V 50	SH
15	15V 50	SH
16	15V 50	SH
17	15V 50	SH
18	15V 50	SH
19	15V 50	SH
20	15V 50	SH
21	15V 50	SH
22	15V 50	SH
23	15V 50	SH
24	15V 50	SH
25	15V 50	SH
26	15V 50	SH
27	15V 50	SH
28	15V 50	SH
29	15V 50	SH
30	15V 50	SH
31	15V 50	SH
32	15V 50	SH
33	15V 50	SH
34	15V 50	SH
35	15V 50	SH
36	15V 50	SH
37	15V 50	SH
38	15V 50	SH
39	15V 50	SH
40	15V 50	SH
41	15V 50	SH
42	15V 50	SH
43	15V 50	SH
44	15V 50	SH
45	15V 50	SH
46	15V 50	SH
47	15V 50	SH
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49	15V 50	SH
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51	15V 50	SH
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88	15V 50	SH
89	15V 50	SH
90	15V 50	SH
91	15V 50	SH
92	15V 50	SH
93	15V 50	SH
94	15V 50	SH
95	15V 50	SH
96	15V 50	SH
97	15V 50	SH
98	15V 50	SH
99	15V 50	SH
100	15V 50	SH

LIST OF PARTS

ITEM	PART NO	DESCRIPTION	REQD
1	A-2220A	TUNER ASSEMBLY	1
2	A-2221A	LOOP BACK COVER ASSEMBLY	1
3	125A7G7/G	TUBE	2
4	12SK7G7/G	TUBE	3
5	12SQ7G7/G	TUBE	1
6	35Z5G7/G	TUBE	2

15	C-4924A	CONDENSER 750 MMF CERAMIC	2
16	C-4924A	CONDENSER 750 MMF CERAMIC	2
17	C-5224A	CONDENSER 0.001 MFD 400V D.C.	2
18	C-5224A	CONDENSER 0.001 MFD 400V D.C.	2
19	C-471A	CONDENSER 0.1 MFD 400V D.C.	5
20	C-4624A	CONDENSER 40-40 MFD 50V D.C.	2
21	C-4624A	CONDENSER 25 MFD 25V D.C.	1
22	H-2544	SPEAKER 5" PERMANENT MAGNET	1
23	H-2554	SPEAKER 5" PERMANENT MAGNET	1
24	W-4324	RESISTOR 4700 OHM 1/2 WATT	2
25	W-4324	RESISTOR 4700 OHM 1/2 WATT	2
26	W-4374	RESISTOR 22,000 OHM 1/4 WATT	1
27	W-4324	RESISTOR 22 MEG 1/4 WATT	2
28	W-4804	RESISTOR 47 MEG 1/4 WATT	2
29	W-4324	RESISTOR 4700 OHM 1/4 WATT	1
30	W-4804	RESISTOR 470,000 OHM 1/4 WATT	4
31	W-4804	POTENTIOMETER 8 SWITCH 500,000 OHM	1
32	W-4784	RESISTOR 33,000 OHM 1/4 WATT	1
33	W-4624	RESISTOR 330,000 OHM 1/4 WATT	2
34	W-4764	POTENTIOMETER 1 MEG	2
35	W-4804	RESISTOR 220,000 OHM 1/4 WATT	1
36	W-4714	RESISTOR 220 OHM 1/2 WATT	1
37	W-4334	RESISTOR 270,000 OHM 1/4 WATT	1
38	W-4334	RESISTOR 1000 OHM 1 WATT	1
39	W-4794	RESISTOR 75 OHM 1 WATT	1
40	W-4734	RESISTOR 470 OHM 1/4 WATT	1
41	E-1704	SWITCH-DOUBLE POLE DOUBLE THROW	1
42	T-13724	CHOKE R.F. 3 M H	1
43	T-13654	CHOKE R.F. 1.4 M H	1
44	T-13614	I.F. TRANSFORMER (INPUT)	1
45	T-13624	I.F. TRANSFORMER (OUTPUT)	1
46	T-13904	AUDIO CHOKE 3 M H	1
47	T-13794	OUTPUT TRANSFORMER	1
48	H-2414	ILLUMINATED CONDENSER 1000 MMF CERAMIC	1
49	C-4904	CONDENSER 10,000 MMF 400V D.C.	2
50	C-4904	CONDENSER 10,000 MMF 400V D.C.	2
51	W-4904	RESISTOR 15,000 OHM 1/4 WATT	1
52	C-4924A	CONDENSER 100 MMF 50V D.C.	1

MODEL 710T

ELECTRONIC LABORATORIES, INC.

DIAL Standard Broadcast Band. 540 to 1620 Kilocycles. Calibrated in channel numbers. Add a zero to the dial number to obtain the kilocycle number.

VOLUME, ON-OFF Turn knob to the right to turn radio on. A click will be heard - wait 30 seconds for tubes to heat. Continue to turn the knob to the right to increase the volume.

This control acts as a master volume control after treble and bass response has previously been set by the treble and bass controls. If the treble and bass controls are both turned completely off (counter-clockwise) there will be no volume to the final amplifier and therefore no sound will be heard.

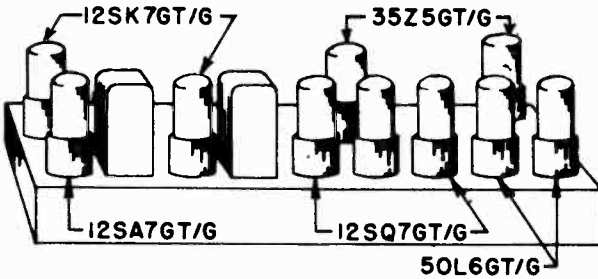
TUNING Turn knob until desired station is heard. Rotate slowly back and forth until signal is strongest and clearest. Reduce or increase signal by using the volume control.

TUBES AND DIAL LAMP The type and position of tubes are shown in illustration.

All tubes and the dial lamp MUST be in the socket to operate the radio.

CAUTION - If a dial lamp burns out, it should be replaced at once. A hole in the bottom of the cabinet provides access to the dial lamp so that it may be replaced without removing chassis from the cabinet.

Use only a No. 47 dial lamp



MECHANICAL ALIGNMENT:- The following mechanical adjustments should be made before alignment:

1. Rotate shaft of tuning unit until carriage is against top stop position.
2. Space oscillator coil slug 1-5/32" out from top of oscillator coil form.
3. Space R.F. coil slug 1-29/64" out from top end of R.F. coil winding.
(Note:-The distance 1 and 2 should be measured from mounted end of the slug)
4. Adjust screw on trimmer of wave trap towards open position so that condenser plates are open at least 1/32".

BASS This control adjusts the volume output from the bass amplifier. For balanced reception, this control should be turned completely on (clockwise). If less than normal is desired, the bass response can be lowered by turning the knob counter-clockwise until desired response is obtained.

TREBLE This control adjusts the volume output from the treble amplifier. For balanced reception, this control should be turned completely on (clockwise). If less treble response than normal is desired, or if unusually noisy reception conditions are encountered, this control should be turned counter-clockwise until desired response is obtained.

TREBLE AND BASS CONTROLS Since these controls actually regulate the volume output of separate channels, it should be noted that if both bass and treble controls are turned to the off position, there will be no output from the speaker regardless of the position of the master volume control.

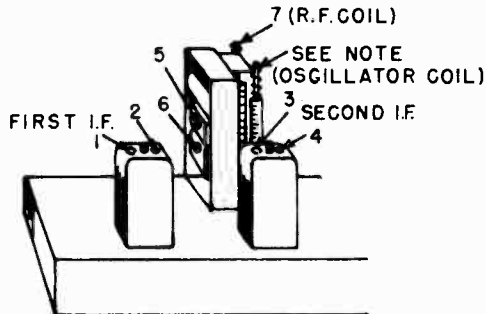
ANTENNA A High Q Loop Antenna is built into the cabinet of the Electronic Model 710T Orthosonic Radio. No other antenna is usually required for reception of local or powerful stations. Since directional effects are obtained by using only the built-in loop antenna, the signal pickup may be increased and interference from nearby stations decreased, by changing the position of the radio until the signal is at a maximum.

LINE VOLTAGE

Electronic Model 710T Orthosonic Radio operates only on a power supply of 105-125 volts A.C. 50 to 60 cycles, or 105-125 volts D.C. If in doubt about your line voltage, check with your local power company before connecting the radio.

If there seems to be an excessive amount of hum when operating the radio on A.C., reverse the position of the line plug in the socket.

On D.C. operation, if the radio does not operate within one minute after it is connected, reverse the position of the line plug in the socket.



CONTROLS



ORTHO SONIC



ELECTRONIC LABORATORIES, INC.

I.F. ALIGNMENT PROCEDURE

1. Feed I.F. frequency from the signal generator through a 0.01 mfd condenser to the control grid of the R. F. tube.
2. No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting.
3. Turn volume control full on.
4. Make preliminary I.F. adjustment with signal level approximately 50 Mv.
5. Tune I.F. trimmers for maximum signal, reducing I.F. signal input to coupling loop to keep output voltage less than 0.7 V.
6. When maximum output has been secured, adjust trimmer condenser in the I.F. trap by turning clockwise to the minimum signal.

R.F. ALIGNMENT PROCEDURE

1. Volume control full on.
2. Adjust tuning unit to top stop position.
3. Feed 1620 kc signal into external loop. Hold audio output below 0.7 V. Adjust the oscillator trimmer condenser to maximum output.
4. Move slugs in by means of tuning dial so that pointer is approximately 1" from the stop end, and a signal received from the external loop on a frequency of 1400 kc. Adjust lower trimmer (R.F. trimmer) to maximum output. Reduce R.F. input to keep signal output voltage below 0.7 V.
5. Rotate tuning shaft until pointer is approximately 1" from the other end of the scale. Feed to the external loop a test signal at 700 kc. Adjust the R.F. coil slug by rotation in the Tinnerman nut to maximum output.

NOTE: Alternately adjust R.F. trimmer and R.F. slug until maximum output is reached at both 1400 kc. and 700 kc. as instructed in paragraphs C4 and C5.

CAUTION: Extreme care should be taken in the 700 kc. position to make sure that the tuner carriage is not moved by the adjusting tools or hand pressure on the slug screw. Carriage should not be held against the frame, but should be allowed to assume its normal position when adjusting the R.F. coil slug.

SPECIFICATIONS

Power consumption..... 60 Watts
 (At 117 volts AC Supply)
 Power Output- 3.5 Watts Max.
 2.5 Watts 10% Distortion
 Selectivity----45 KC Broad at
 1000 times Signal
 Intermediate Frequency..... 455 KC
 Speakers.....4 1/2" PM Dynamic
 6" PM Dynamic
 Tuning Frequency Range..540 to 1620 KC
 Sensitivity (For .05 Watt output-external Antenna) 10 microvolts average

ALIGNMENT PROCEDURE

Volume Control-Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The equipment in column at right is required for Aligning:

Signal Generator which will provide an accurately calibrated signal at test frequencies as listed.

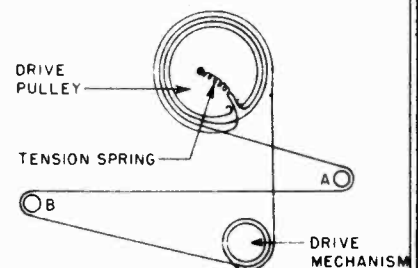
Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas-.01 mf., and 400 ohms.

SIGNAL GENERATOR			DUMMY ANTENNA	TUNER SETTING	TRIMMER ADJUSTMENT (SEE DIAGRAM)	NOTES
FREQUENCY SETTING	ANTENNA CONNECTION	COUPLING				
I.F. 455 KC	Grid of RF tube 12SK7 GTG	Ground generator to chassis	0.01 mfd	Out	Adjust for Max. 1, 2, 3 and 4	No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting
I.F. 455 KC	Grid of RF tube 12SK7 GT/G	Ground generator to chassis	0.01 mfd	Out	Trim condenser under chassis for Min. output.	If it is found that regeneration prevails when the loop antenna is put in its normal position close to the tubes, then the under chassis trimmer is incorrectly set, and should be adjusted to prevent the regenerative condition.
1620 KC	Inductive Coupling to Loop	Loop coupling with leads brought out	400 ohms in series with Antenna & Gnd. leads	Out	Adjust Osc. #5 for Max. signal	
1400 KC	Inductive Coupling to Loop	Loop coupling with leads brought out	400 ohms in series with Antenna & Gnd. leads	Dial set for 1400KC	Adjust RF trimmer #6 for Max. Signal.	
700 KC	Inductive Coupling to Loop	Loop Coupling with leads brought out	400 ohms in series with Antenna & Gnd. leads	Dial set for 700KC	Adjust RF tuning core #7 for Max. Signal (care should be taken not to disturb carriage position of tuner)	Alternately adjust R.F. trimmer and R.F. slug until Maximum output is reached at both 1400 KC and 700 KC as instructed above.

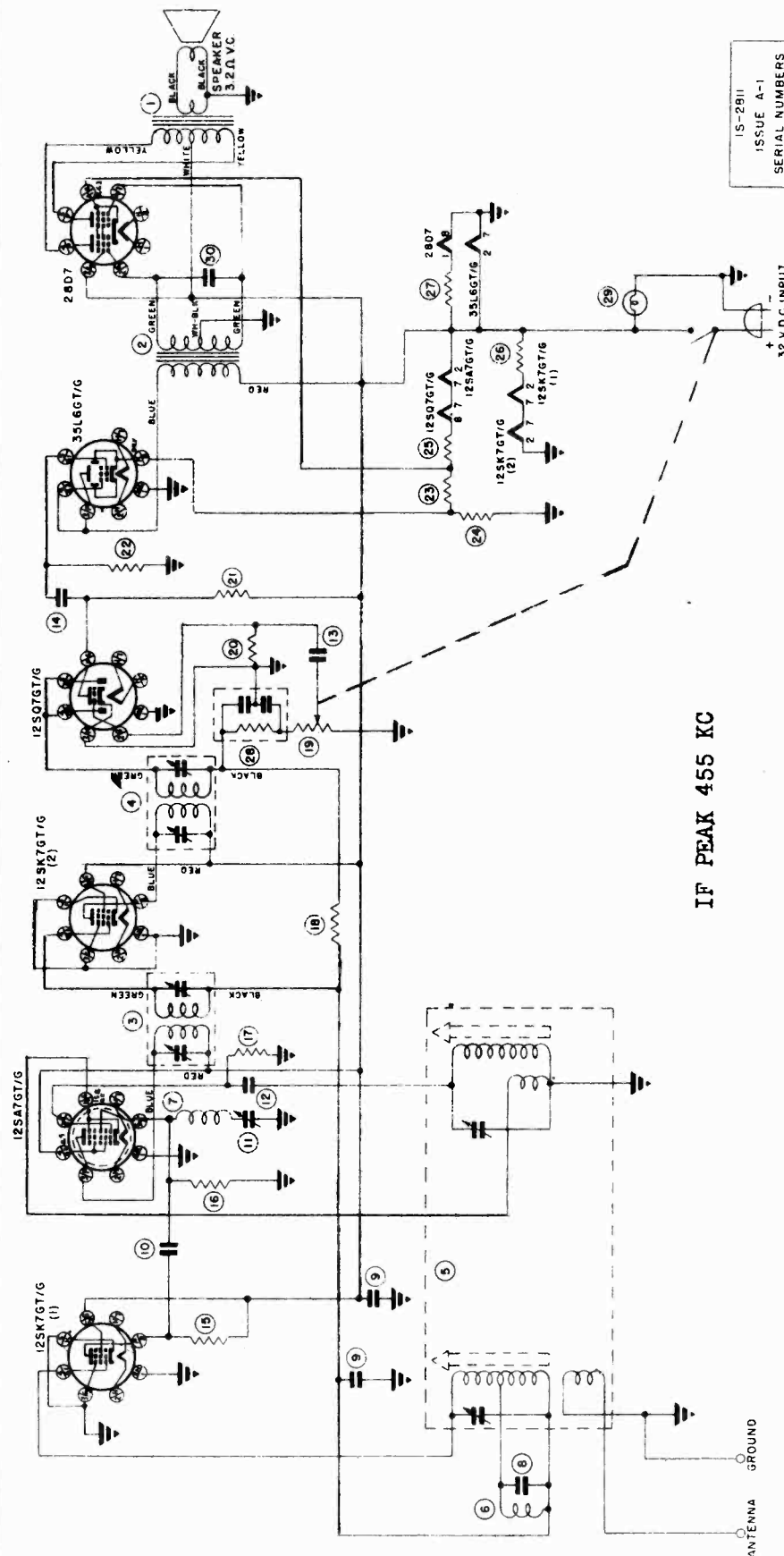
DRIVE CORD REPLACEMENT

Turn the tuner to the fully open position. Use a new cord 50" long and tie one end to the tension spring. Fasten the other end of the tension spring to the drive pulley. Pass cord through slot in pulley ring; add spring tension and continue one and one-half turns counterclockwise over top of pulley. Then pass cord around idler pulley A, starting over top and going around clockwise. Pass cord over idler pulley B, starting over top and going around counter clockwise. Wind one full turn counterclockwise around drive mechanism. Then wind one full turn counterclockwise around drive pulley, pass through slot in pulley and tie string to tension spring. Cut off excess string. Attach dial pointer to cord.



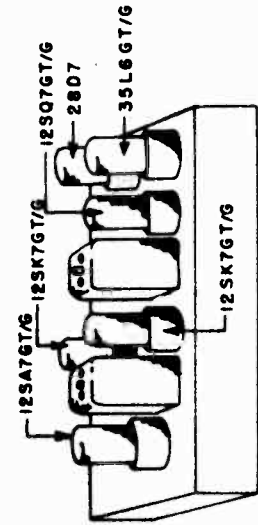
MODEL 2811

ELECTRONIC LABORATORIES, INC.



IS-2811
ISSUE A-1
SERIAL NUMBERS
505,001 AND UP

IF PEAK 455 KC



15	W-432A	RESISTOR 4700Ω 1/2 WATT
16	W-442A	RESISTOR 2.2 MEGΩ 1/4 WATT
17	W-437A	RESISTOR 22,000Ω 1/4 WATT
18	W-417A	RESISTOR 1 MEGΩ 1/2 WATT
19	W-444A	POTENTIOMETER & SWITCH 500,000Ω
20	W-443A	RESISTOR 10 MEGΩ 1/4 WATT
21	W-440A	RESISTOR 220,000Ω 1/4 WATT
22	W-441A	RESISTOR 470,000Ω 1/4 WATT
23	W-78B	RESISTOR 5.1Ω 1/2 WATT
24	W-494A	RESISTOR 15Ω 2 WATT
25	W-175A	RESISTOR 22Ω 1 WATT
26	W-493A	RESISTOR 47Ω 1 WATT
27	W-150A	RESISTOR 10Ω 2 WATT
28	A-2297A	DIODE FILTER UNIT
29	H-266A	DIAL LIGHT-36 VOLT
30	C-524A	CONDENSER 0.001 MFD 400 V.D.C.

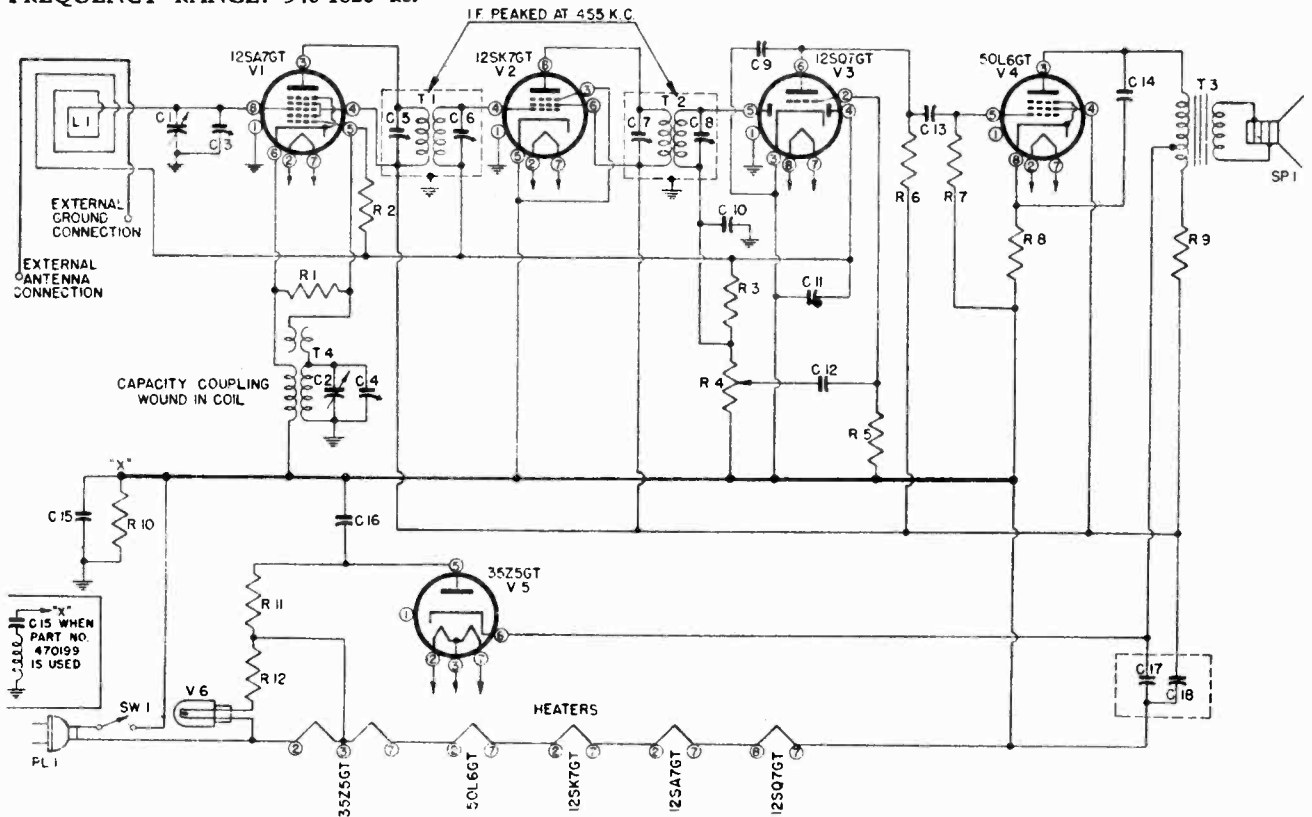
ITEM	PART NO.	DESCRIPTION	REQ'D
1	T-1385A	OUTPUT TRANSFORMER	1
2	T-1386A	DRIVER TRANSFORMER	1
3	T-1387A	I.F. TRANSFORMER	1
4	T-1387B	I.F. TRANSFORMER	1
5	A-2309A	TUNER ASSEMBLY	1
6	T-1387C	CHOKES 304 MICROHENRIES	1
7	T-1372 A	CHOKES 3 MILLIHENRIES	1
8	C-941A	CONDENSER 12 MMF CERAMIC	2
9	C-460A	CONDENSER 0.1 MFD 200 V.D.C.	1
10	C-493A	CONDENSER 1000 MMF - CERAMIC	1
11	C-463B	CONDENSER 10-160 MMF	1
12	C-495A	CONDENSER 50 MMF - CERAMIC	1
13	C-480A	CONDENSER 0.005 MFD 400 V.D.C.	1
14	C-468A	CONDENSER 0.01 MFD 200 V.D.C.	1

EMERSON RADIO & PHONO. CORP.

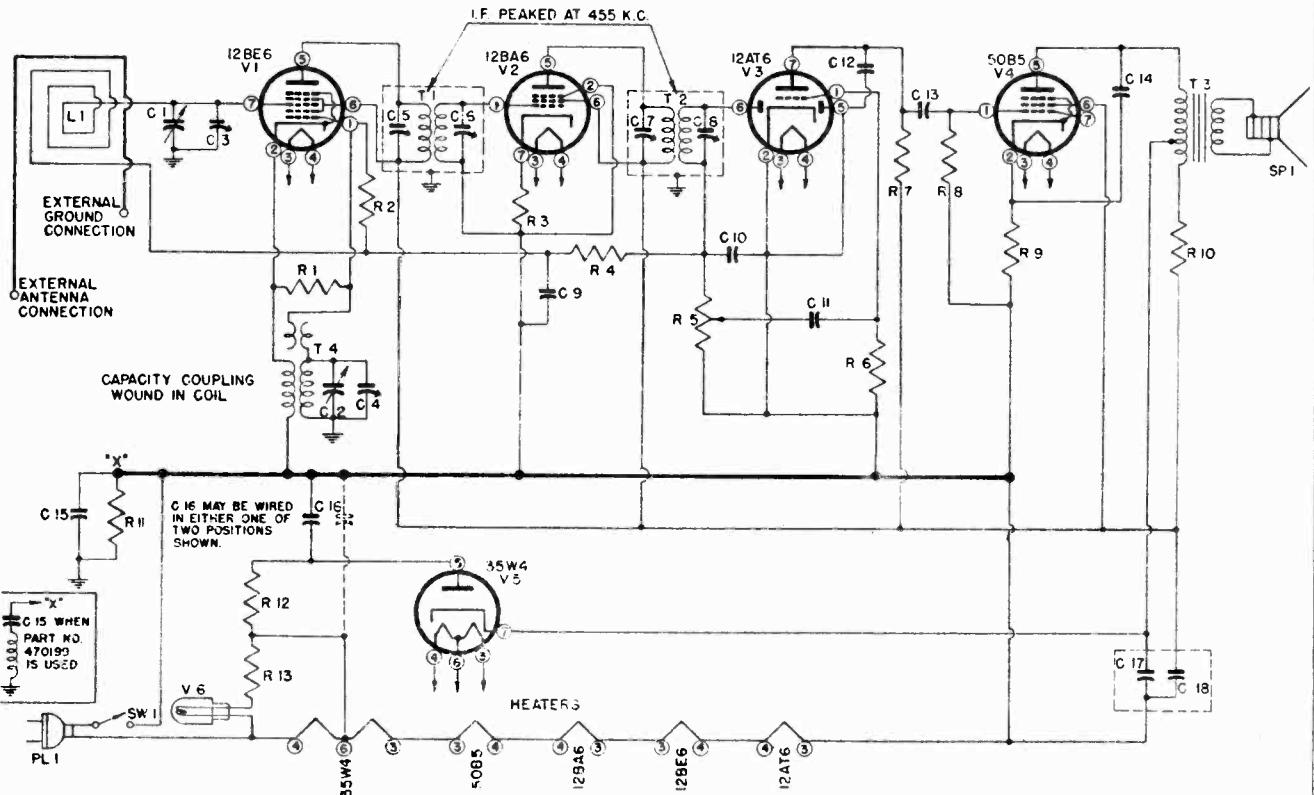
MODELS 503, 510, 510A, 520, 539
Chassis 120000, 120029, 120030,
120032, 120035, 120044

TYPE: Single-band superheterodyne.

FREQUENCY RANGE: 540-1620 kc.



Schematic Circuit Diagram of Chassis Models 120000, 120029, 120030, 120044



Schematic Circuit Diagram of Chassis Models 120032, 120035

MODELS 503, 510, 510A, 520, 539
 MODELS 507, 509, 518, 522, 535
 MODELS 525, 552
 MODELS 543, 544

EMERSON RADIO & PHONO. CORP.

ALL MODELS

An oscillator with frequencies of 455, 600 and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Plug the receiver into the power supply outlet in such a way that the ground side of the power line is connected to the receiver B—.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the right of the variable condenser. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis between the variable condenser and the speaker. The trimmers are accessible through holes in the top of the can.

The trimmer for the antenna and the trimmer for the oscillator coil are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil is located underneath the chassis. The loop antenna acts as the antenna coil.

The following voltage readings are d-c measurements taken from B— (line switch) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. Line voltage for these readings was 117 volts, 60 cycles, a.c. Measurements made with 117 volts d.c. will be lower than those given below. Take readings with the volume control set at minimum and the variable condenser closed.

TUBE	PIN NUMBER							
	1	2	3	4	5	6	7	8
12SA7			89	89	*—10			*—1.6
12SK7				*—1.6		89		89
12SQ7		*—0.7		*—1.6	—0.5	37.5		
50L6GT			110	89				6.2
35Z5GT				116		116		117
12BE6	*—8.0				92	92	*—1.3	
12BA6					92	92	1.7	
12AT6	*—0.6					*—0.45	*44	
50B5		5.65			110	92		
35W4	115						115	

I-f Alignment

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 455 kc to the converter grid (stator of the r-f section of the variable condenser) through a 0.1 mfd. condenser and adjust the four i-f trimmers for maximum response.

R-f Alignment

1. Connect the oscillator to a coil composed of three to four turns of wire wound in a circle approximately 12" in diameter. This coil should be held parallel to and in line with the loop antenna of the receiver at a distance of 15 to 20 inches.
2. Radiate a signal at 1425 kc, set the dial indicator to 1425 kc, and adjust the trimmers on the variable condenser for maximum response.
3. Radiate a 600 kc signal and tune in the signal on the receiver. Adjust the loose outside turn of the loop antenna for maximum response. This loose turn may be moved to either side of the center. Fasten it in the position which gives maximum response.
4. Repeat steps 2 and 3 until no further improvement is evident.

* Not supplied separately.
 † Specify part number when ordering.

CABINET AND DIAL PARTS

MODEL--507, 509, 518, 522, 535

140015	Cabinet (Model 507)	531009	Drive pulley
140016	Cabinet (Model 509)	280003	Drive shaft
140034	Cabinet (Model 518)	520499	Dial backplate (Models 507, 509, 518, 522)
140007	Cabinet (Model 522)	520024	Dial backplate (Model 535)
140070	Cabinet (Model 535)	520350	Dial crystal, stamped (Models 507, 509, 522), or
450060	Back, molded (Model 507)	520190	Dial crystal, stamped (Models 507, 509, 522)
450080	Back, molded (Models 509, 518)	520440	Dial crystal (Model 518)
450050	Back, molded (Model 522)	520025	Dial crystal (Model 535)
560110	Back masonite (Model 507)	525080	Dial pointer (Models 507, 509, 518, 522)
560220	Back, masonite (Models 509, 518)	525130	Dial pointer (Model 535)
560120	Back, masonite (Model 522)	411040	Pointer hub (Model 535)
575047	Back, wood (Model 535)		
450000	Handle		
460140	Knob (Models 507, 518, 535)		
460470	Knob (Model 509)		
460150	Knob (Model 522)		

MODELS 503, 510, 510A, 520, 539

EMERSON RADIO & PHONO. CORP.

CHASSIS 120000, 120029, 120030, 120044

Schematic Symbol	†Part No.	DESCRIPTION	Schematic Symbol	†Part No.	DESCRIPTION
C1, C2	900170	Two-gang variable condenser (chassis 120000)	L1	700200	Loop antenna, or
C1, C2	900319	Two-gang variable condenser (chassis 120030 and 120044)	L1	700210	Loop antenna
C1, C2	900290	Two-gang variable condenser (chassis 120029)	*PL1		Plug, part of line cord
*C3, C4		Trimmers, part of variable condenser	R1	310810	22,000 ohms, ¼ watt resistor
*C5, C6, } C7, C8 }		Trimmers, part of i-f transformers	R2, R5	397000	15 meg., ½ watt resistor
C9	920170	0.001 mfd., 600 volt condenser	R3	321330	3.3 meg., ¼ watt resistor
C10	910000	0.00022 mfd. mica condenser	R4	390010	0.5 meg. volume control
C11	920040	0.1 mfd., 200 volt condenser	R6, R7	321130	470,000 ohms, ¼ watt resistor
C12	920010	0.002 mfd., 600 volt condenser	R8	340290	150 ohms, ½ watt resistor
C13, C14	920020	0.02 mfd., 400 volt condenser	R9	370490	1,000 ohms, 1 watt resistor
C15	920050	0.2 mfd., 200 volt condenser, or	R10	321050	220,000 ohms, ¼ watt resistor
C15	470199	0.2 mfd., 200 volt assembly (used only with midget i-f transformers 720525 and 720529)	R11	340050	15 ohms, ½ watt resistor
C16	920030	0.05 mfd., 400 volt condenser	R12	340010	10 ohms, ½ watt resistor
C17, C18	925009	50-50 mfd., 150 volt dual electrolytic condenser	SP1	180000	P.M. speaker
L1	700000	Loop antenna, or	*SW1		Line switch on volume control
			T1	720000	First i-f transformer, or
			T1	720525	First i-f transformer, midget
			T2	720100	Second i-f transformer, or
			T2	720529	Second i-f transformer, midget
			T3	734000	Output transformer
			T4	716010	Oscillator coil
				583010	Line cord

CHASSIS 120032, 120035

C1, C2	900319	Two-gang variable condenser	R1	310810	22,000 ohms, ¼ watt resistor
*C3, C4		Trimmers, part of variable condenser	R2, R6	397000	15 meg., ½ watt resistor
*C5, C6, } C7, C8 }		Trimmers, part of i-f transformers	R3	340310	180 ohms, ½ watt resistor
C9	920040	0.1 mfd., 200 volt condenser	R4	321290	2.2 meg., ¼ watt resistor
C10	910000	0.00022 mfd. mica condenser	R5	390010	0.5 meg. volume control
C11	920010	0.002 mfd., 600 volt condenser	R7, R8	321130	470,000 ohms, ¼ watt resistor
C12	920170	0.001 mfd., 600 volt condenser	R9	340290	150 ohms, ½ watt resistor
C13, C14	920020	0.02 mfd., 400 volt condenser	R10	370490	1,000 ohms, 1 watt resistor
C15	920050	0.2 mfd., 200 volt condenser, or	R11	321050	220,000 ohms, ¼ watt resistor
C15	470199	0.2 mfd., 200 volt assembly (used only with midget i-f transformers 720525 and 720529)	R12	340050	15 ohms, ½ watt resistor
C16	920030	0.05 mfd., 400 volt condenser	R13	340010	10 ohms, ½ watt resistor
C17, C18	925009	50-50 mfd., 150 volt dual electrolytic condenser	SP1	180000	P.M. speaker
L1	700000	Loop antenna, or	*SW1		Line switch on volume control
L1	700210	Loop antenna	T1	720000	First i-f transformer, or
*PL1		Plug, part of line cord	T1	720525	First i-f transformer, midget
			T2	720100	Second i-f transformer, or
			T2	720529	Second i-f transformer, midget
			T3	734000	Output transformer
			T4	716010	Oscillator coil
				583010	Line cord

CABINET AND DIAL PARTS

* Not supplied separately.

† Specify part numbers when ordering

807000	Pilot light	520470	Dial crystal, printed (Chassis 120030, 120035)
280103	Drive shaft	460140	Knob (Model 503)
520019	Dial backplate, 320° dial numbers (Chassis 120000)	460470	Knob (Models 510, 539)
520500	Dial backplate, 180° dial numbers (Chassis 120029)	460150	Knob (Model 520)
412600	Dial backplate, plain (Chassis 120035, 120030)	450230	Ivory plastic front, square holes, (Model 520)
410004	Dial backplate, plain (Chassis 120032, 120044)	450250	Ivory plastic front, round holes, (Model 520)
520513	Dial face, paper (Chassis 120032, 120044)	450330	Black plastic front, square holes, (Model 510)
525010	Pointer (Chassis 120000, 120029)	450350	Black plastic front, round holes, (Model 510)
525090	Pointer (Chassis 120030, 120032, 120035, 120044)	140001	Cabinet (Model 503)
520080	Dial crystal (Chassis 120000, 120029, 120032, 120044)	140000	Cabinet (Model 520)
		140005	Cabinet (Model 510, 510A)
		140069	Cabinet (Model 539)

The color coding of the i-f transformer leads is as follows:

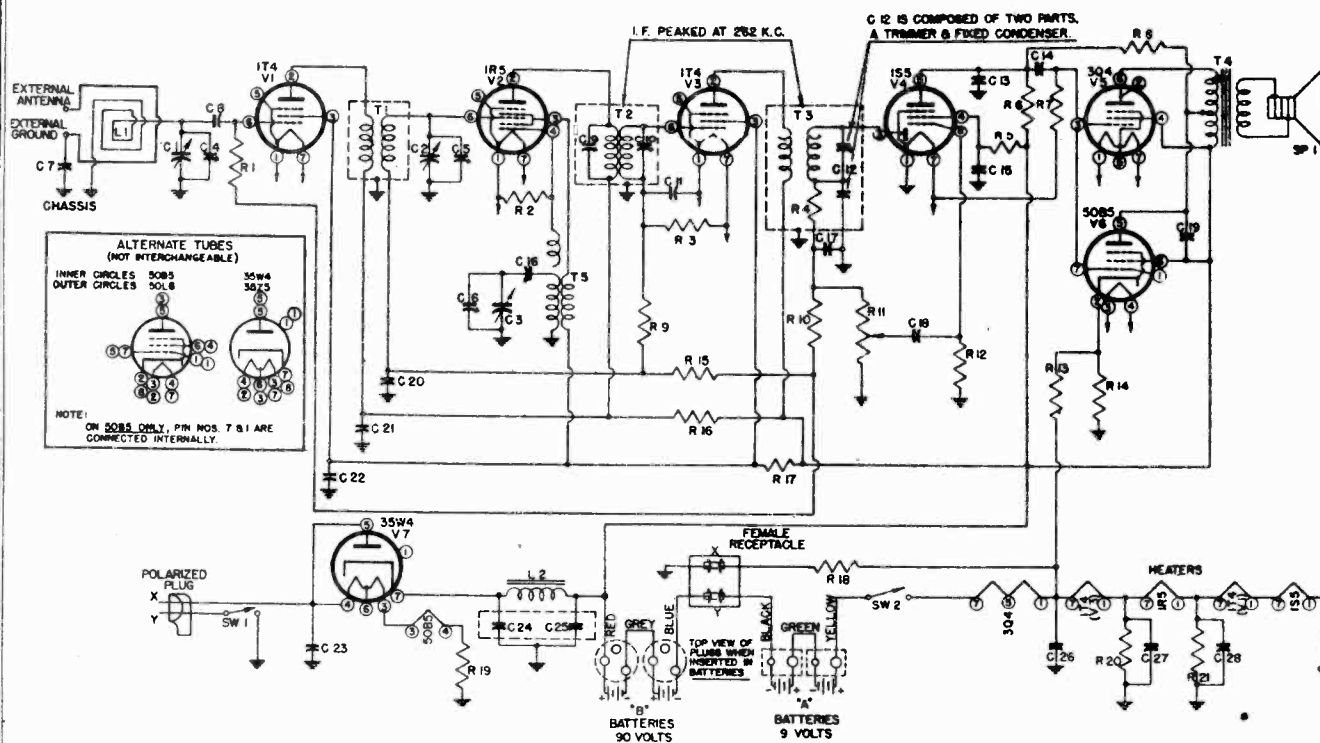
Grid—green
Grid return—black

Plate—blue
B+—red

Chassis 120000, 120029, 120030, 120044 use metal or glass tubes. Chassis 120032 and 120035 use miniature tubes. Model 510A only uses chassis 120035.

MODEL 505
Chassis 120020

EMERSON RADIO & PHONO. CORP.



Schematic Circuit Diagram Model 505, Chassis 120020

Chassis 120020

C1, C2, } C3	900080	Three-gang variable condenser	R2	310970	100,000 ohms, 1/4 watt resistor
*C4, C5, } C6		Trimmers, part of variable condenser	*R4		47,000 ohms, 1/4 watt resistor
C7, C18	920010	0.002 mfd., 600 volt condenser	R6, R7	321130	470,000 ohms, 1/4 watt resistor
C8, C11	920060	0.05 mfd., 200 volt condenser	R8	311250	1.5 meg., 1/4 watt resistor
*C9, C10		Trimmers, part of first i-f transformer	R10	321290	2.2 meg., 1/4 watt resistor
*C12		Trimmer and fixed condenser, part of second i-f transformer	R11	390020	0.5 meg. volume control
C13	910050	0.0004 mfd. mica condenser	R12	321450	10 meg., 1/4 watt resistor
C14, C21	920020	0.02 mfd., 400 volt condenser	R13	310130	33 ohms, 1/4 watt resistor
C15, C19	920090	0.01 mfd., 400 volt condenser	R14	310730	10,000 ohms, 1/4 watt resistor
C16	900110	Padding condenser	R16	340630	3,900 ohms, 1/2 watt resistor
C17	910010	0.00011 mfd. mica condenser	R17	340770	15,000 ohms, 1/2 watt resistor
C20, C22, } C28	920100	0.02 mfd., 200 volt condenser	R18	340510	1,200 ohms, 1/2 watt resistor
C23	920030	0.05 mfd., 400 volt condenser	R19	394110	213 ohms, 6 watt resistor
C24, C25	925050	20-40 mfd., 150 volt dual electrolytic condenser	R20	310570	2,200 ohms, 1/4 watt resistor
C26	925090	100 mfd., 25 volt electrolytic condenser	SP1	310450	680 ohms, 1/4 watt resistor
C27	920110	0.25 mfd., 100 volt condenser	*SW1	180006	P.M. speaker
L1	700090	Loop antenna	*SW2		Line switch on volume control
L2	737010	Filter choke	T1	713000	Battery switch on volume control
R1, R3, } R5, R9 } R15	311330	3.3 meg., 1/4 watt resistor	T2	720170	R.F. coil
			T3	720410	First i-f transformer
			T4	734140	Second i-f transformer
			T5	716030	Output transformer
					Oscillator coil

The cabinet is designed to house the complete set of batteries. The battery complement should be as follows:

Battery Type	Number Required	Eveready Part No.	Rayovac Part No.	Burgess Part No.
4 1/2 volt "A"	2	746 (plug-in type)	P83A or EM-83 (plug-in type)	3G (plug-in type)
45 volt "B"	2	482 Minimax (plug-in type)	—	—

EMERSON RADIO & PHONO. CORP.

MODELS 505, 523
Chassis 120020, 120041

An oscillator with frequencies of 262, 600 and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible, turning down the output of the test oscillator as the alignment of the receiver progresses.

Plug the receiver into the power supply in such a way that the ground side of the power line is connected to the receiver B—.

Location of Coils and Trimmer Adjustments

The oscillator coil (T5) is located beneath the chassis. The trimmer for the oscillator (C6) is on the middle section of the variable condenser.

The interstage coil (T1) is the shielded coil located under the chassis. Its trimmer (C5) is on the front section of the variable condenser.

The trimmer for the loop antenna (C4) is on the last section of the variable condenser (the section nearest the loop).

The i-f transformers are mounted on top of the chassis. The first i-f transformer (T2) is mounted next to the loop. The second i-f transformer (T3) is mounted next to the dial.

The series padder, C10 for chassis 120002 and C16 for chassis 120020 and 120041, is located on the chassis near the 1T4 tube.

I-f Alignment

Rotate the variable condenser to the minimum capacity position. Feed 262 kc to the converter grid and adjust the three i-f trimmers for maximum response. The signal should be fed through a 0.1 mfd. condenser.

Interstage Alignment

1. Set the dial indicator to 1425 kc, feed 1425 kc to the r-f grid, and adjust the oscillator and interstage trimmers for maximum response.
2. Set the dial indicator to 600 kc, feed 600 kc to the r-f grid, and adjust the oscillator padding trimmer by rocking in the signal for maximum response.
3. Repeat steps 1 and 2 until no further improvement is possible.

The color coding of the i-f transformer leads is as follows:

Grid—green Plate—blue
Grid return—black B+—red

CABINET AND DIAL PARTS

525090	Pointer	520200	Escutcheon (Model 523)
410929	Pointer hub	140002	Cabinet (Model 505)
531009	Drive pulley	140053	Cabinet (Model 523)
280133	Drive shaft	460470	Knob, black
520039	Dial backplate (Model 505)	460140	Knob, brown
520505	Dial backplate (Model 523)	450001	Handle, or
460040	Dial crystal (Model 505)	450280	Handle
520080	Dial crystal (Model 523)		

* Not supplied separately.

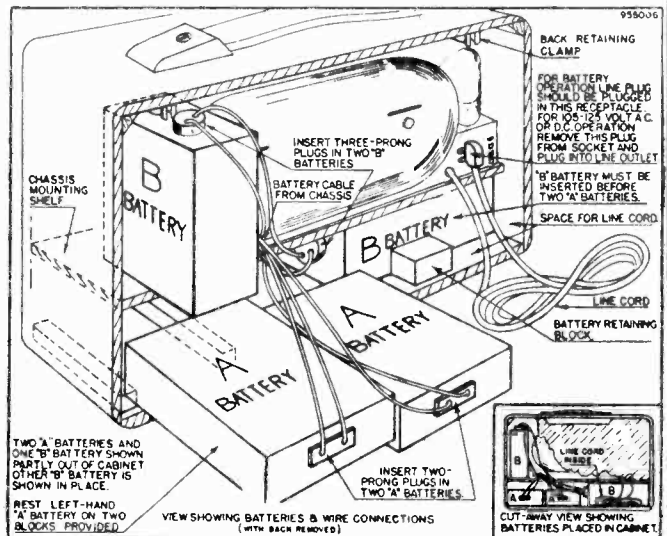
† Specify part numbers when ordering. When in doubt of chassis or model also include complete serial number.

Loop Alignment

Connect the test oscillator to a coil composed of three or four turns of wire wound in a loop approximately 12" in diameter. This coil should be held parallel to and in line with the receiver's loop at a distance of 15 to 20 inches.

1. Radiate a signal at 1425 kc, tune in the signal on the receiver, and adjust the loop trimmer for maximum response.
2. Radiate signal at 600 kc, tune in the signal on the receiver, and adjust the loose outside turn of the loop antenna for maximum response. This loose turn may be moved to either side of the center. Fasten it in the position which gives maximum response.
3. Repeat steps 1 and 2 until no further improvement is possible.

Battery Installation



External Antenna

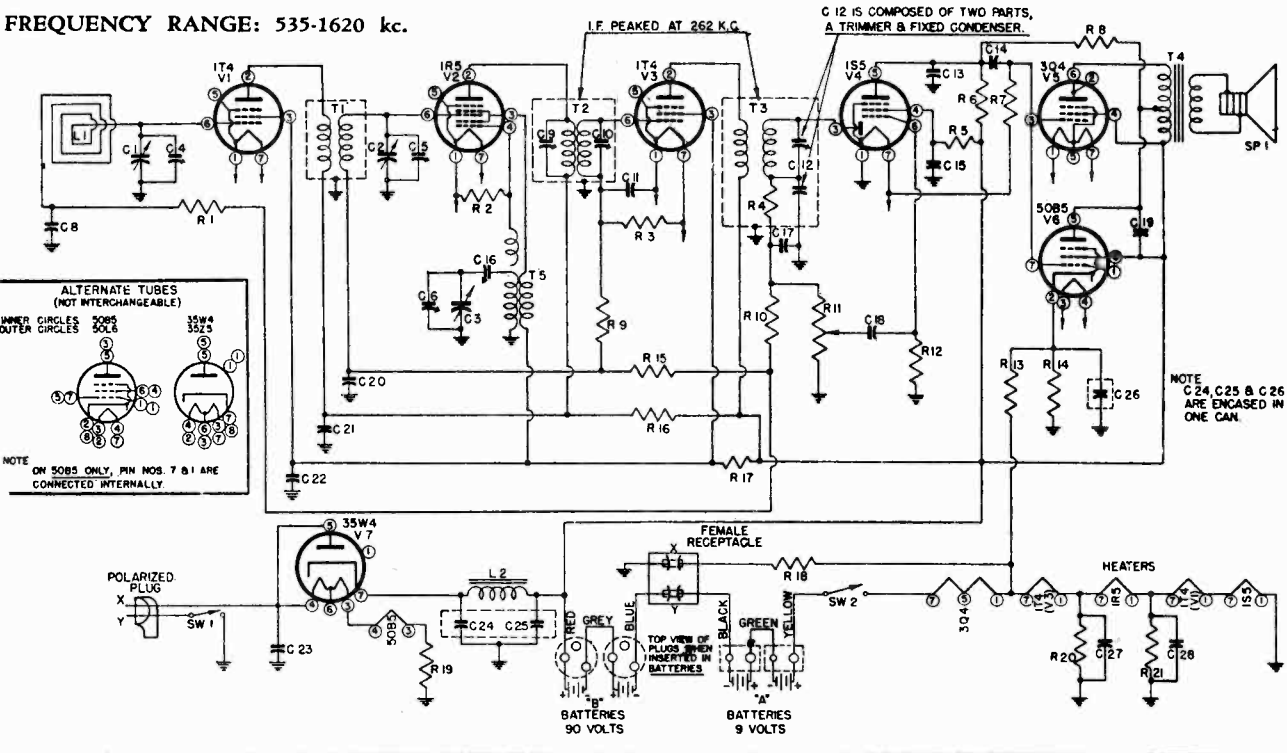
For loop antennas that do not have external antenna connection, wind one turn of insulated wire around or across the loop. Connect one end to an outside aerial. Connect the other end of a good ground or to chassis through a 0.002 mfd. condenser.

MODELS 505, 523
Chassis 120041

EMERSON RADIO & PHONO. CORP.

TYPE: Three-way (battery, a.c.-d.c.) portable superheterodyne.

FREQUENCY RANGE: 535-1620 kc.



Schematic Circuit Diagram Models 505-523, Chassis 120041

Chassis 120041

Schematic Symbol	†Part No.	DESCRIPTION	Schematic Symbol	†Part No.	DESCRIPTION
C1, C2, C3	900080	Three-gang variable condenser	*R4		47,000 ohms, 1/4 watt resistor, part of second i-f transformer
*C4, C5, C6		Trimmers, part of variable condenser	R6, R7	321130	470,000 ohms, 1/4 watt resistor
C8, C14, C20, C21, C22, C28	920020	0.02 mfd., 400 volt condenser	R8	311250	1.5 meg., 1/4 watt resistor
*C9, C10		Trimmers, part of first i-f transformer	R10	321290	2.2 meg., 1/4 watt resistor
C11	920060	0.05 mfd., 200 volt condenser	R11	390020	0.5 meg. volume control
*C12		Trimmer and fixed condenser, part of second i-f transformer	R12	321450	10 meg., 1/4 watt resistor
C13	910050	0.0004 mfd. mica condenser	R13	310130	33 ohms, 1/4 watt resistor
C15, C19	920090	0.01 mfd., 400 volt condenser	R14	310730	10,000 ohms, 1/4 watt resistor
C16	900110	Padding condenser	R16	340630	3,900 ohms, 1/2 watt resistor
C17	910010	0.00011 mfd. mica condenser	R17	340770	15,000 ohms, 1/2 watt resistor
C18	920010	0.002 mfd., 600 volt condenser	R18	340510	1,200 ohms, 1/2 watt resistor
C23	920030	0.05 mfd., 400 volt condenser	R19	394110	213 ohms, 6 watt resistor, or
C24, C25, C26	925210	Electrolytic condenser: C24, C25—20-40 mfd., 150V.; C26—100 mfd., 25 V.	R19	394170	213 ohms, 10 watt resistor
C27	920110	0.25 mfd., 100 volt condenser	R20	310570	2,200 ohms, 1/4 watt resistor
L1	700233	Loop antenna	R21	310450	680 ohms, 1/4 watt resistor
L2	737067	Filter choke	SP1	180012	P.M. speaker
R1, R3, R5, R9, R15	311330	3.3 meg., 1/4 watt resistor	*SW1		Line switch on volume control
R2	310970	100,000 ohms, 1/4 watt resistor	*SW2		Battery switch on volume control
			T1	713012	R.F. coil
			T2	720500	First i-f transformer, or
			T2	720510	First i-f transformer
			T3	720490	Second i-f transformer, or
			T3	720520	Second i-f transformer
			T4	734150	Output transformer
			T5	716030	Oscillator coil

Model 505 uses chassis 120002, 120020, 120041. Model 523 uses chassis 120041.

IMPORTANT—Where excessive tube burn-out is encountered, the 50B5 tube should be replaced *only* with a new Emerson tube bearing the designation 274 on the tube base.

POWER CONSUMPTION: 30 watts (line operation).

CURRENT DRAIN:

"A" Battery—0.053 amp.

"B" Battery—0.013 amp.

EMERSON RADIO & PHONO. CORP.

MODELS 505, 523
MODELS 525, 552

MODEL--505, 523

The following voltage readings are d-c measurements taken with a line voltage of 117 volts, 60 cycles from B— (chassis) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. The readings with the volume control set at minimum and the variable condenser closed. All voltages are d.c. positive unless indicated otherwise. Voltages for 3Q4 are given for battery operation only. Readings for 50L6 and 35Z5 can be determined from 50B5 and 35W4 by referring to schematic diagram for proper pin connections.

Chassis 120002

TUBE TYPE	PIN NUMBER							
	1	2	3	4	5	6	7	8
1T4	1.2	88	56		1.2	*0.3	2.4	
1R5	2.4	88	56	-8	2.4	*1.5	3.7	
1T4	3.7	98	56		3.7	*2.3	4.9	
1S5			*0.3	*19	*50	*0.2	1.2	
3Q4	4.9	92	*1.1	98	4.9	92	4.9	
117N7			92	*1.1	98	6.25		125

Chassis 120020

TUBE TYPE	PIN NUMBER						
	1	2	3	4	5	6	7
1T4	1.32	90	50		1.32	*-0.2	2.55
1R5	2.55	90	50	*-7.0	2.55		3.85
1T4	3.85	98	50		3.85	*1.9	5.25
1S5			*0.35	*24	*46	*0.1	1.32
3Q4	6.1	88	*1.2	90	7.6	88	9.0
50B5	1.2	6.6	83AC	33AC	90	98	*1.2
35W4	1.32		83AC	117AC	117AC	108AC	129

Chassis 120041

TUBE TYPE	PIN NUMBER						
	1	2	3	4	5	6	7
1T4	1.32	90	50		1.32	*-0.2	2.55
1R5	2.55	90	50	*-7.0	2.55		3.85
1T4	3.85	98	50		3.85	*1.9	5.25
1S5			*0.35	*24.0	46.0	*0.1	1.32
3Q4	6.1	88	*1.2	90	7.6	88	9.0
50B5	1.2	6.6	33AC	83AC	90	98.0	1.2
35W4			83AC	117AC	117AC	108AC	129

MODEL-- 525, 552

VOLTAGE ANALYSIS

The following voltage readings are d-c measurements taken from B— (line switch) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. Line voltage for these readings was 117 volts, 60 cycles, a.c. Take readings with the volume control set at minimum and the variable condenser closed.

TUBE	PIN NUMBER							
	1	2	3	4	5	6	7	8
12SA7			89	89	*-10			*-1.6
12SK7				*-1.6		89		89
12SQ7		*-0.7		*-1.6	-0.5	37.5		
50L6GT			110	89				6.2
35Z5GT				116		116		117

CABINET AND DIAL PARTS

807000	Dial light	520080	Crystal
507217	Dial light socket	520200	Escutcheon
531059	Drive pulley	140052	Cabinet (Model 525)
280103	Drive shaft	140102	Cabinet (Model 552)
520500	Dial backplate	460470	Knob
525010	Dial pointer	430300	Knob, with indicator dot

† Specify part numbers when ordering.

* Not supplied separately.

POWER CONSUMPTION:

30 watts for the receiver.
20 watts for the phono motor.

The color coding of the i-f transformer leads is as follows:

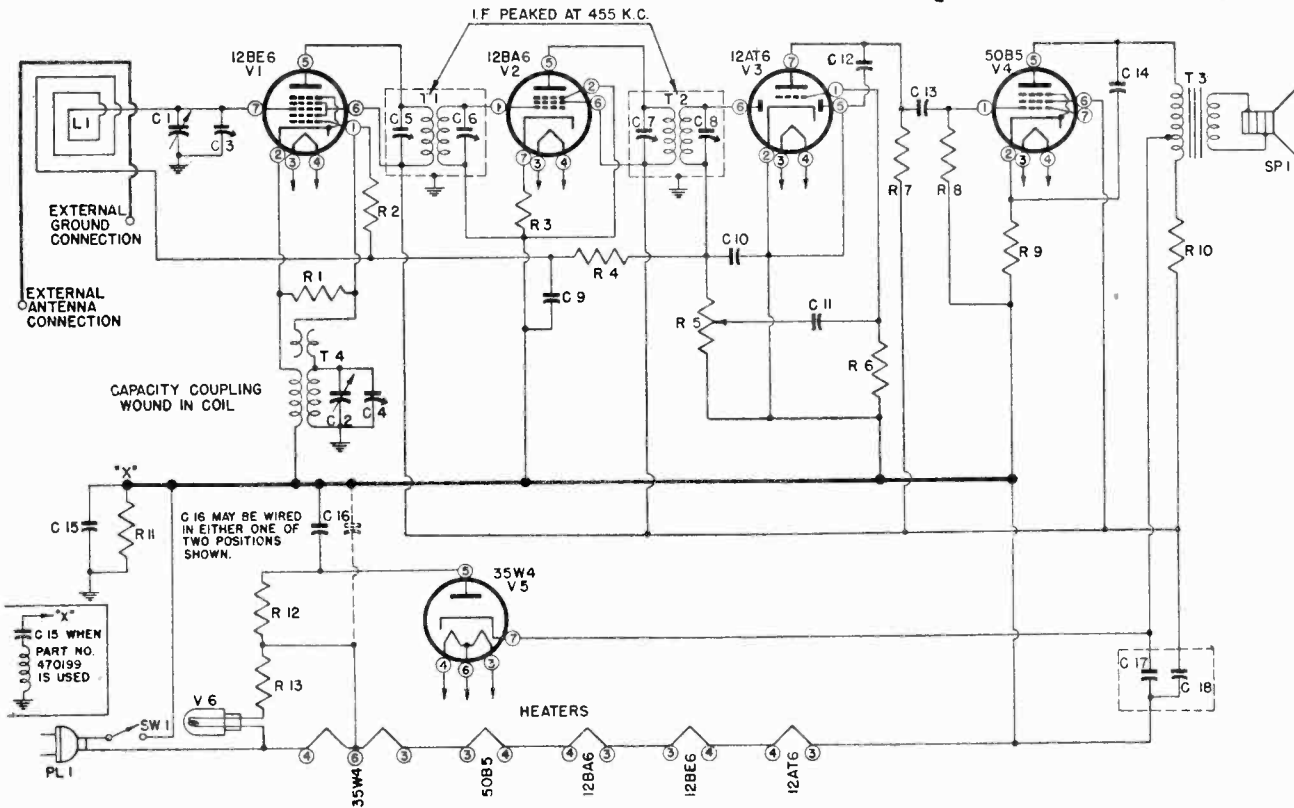
Grid return—black Plate—blue
Grid—green B+—red

MODELS 507, 509, 518, 522, 535
Chassis 120004, 120045

EMERSON RADIO &
PHONO. CORP.

TYPE: Single-band superheterodyne.

FREQUENCY RANGE: 540-1620 kc.



Schematic Circuit Diagram for Chassis 120004 and 120045

CHASSIS 120004 AND 120045

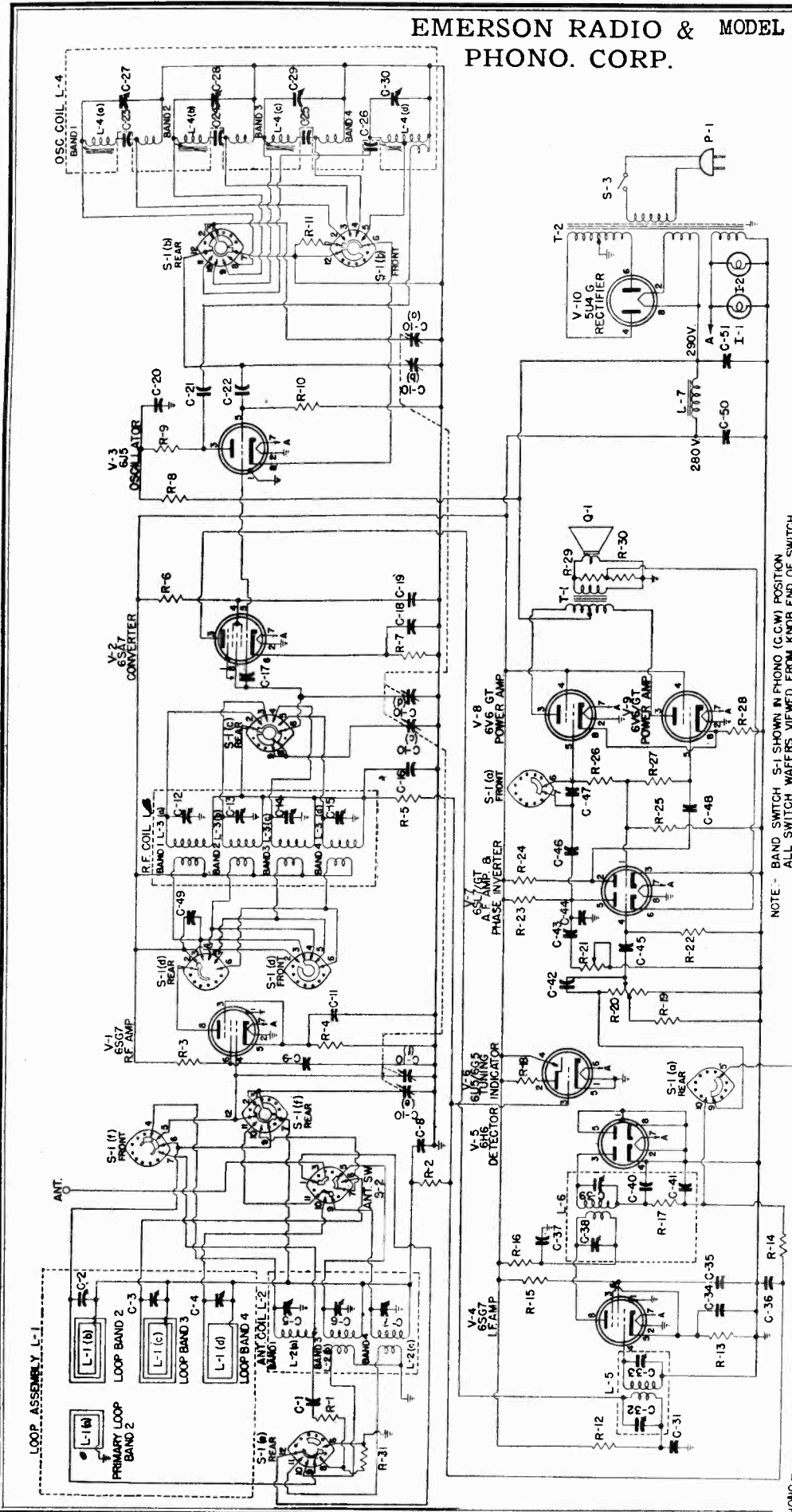
C1, C2	900160	Two-gang variable condenser	R1	310810	22,000 ohms, 1/4 watt resistor
*C3, C4		Trimmers, part of variable condenser	R2, R6	397000	15 meg., 1/2 watt resistor
*C5, C6, C7, C8		Trimmers, part of i-f transformers	R3	340310	180 ohms, 1/2 watt resistor
C9	920040	0.1 mfd., 200 volt condenser	R4	321290	2.2 meg., 1/4 watt resistor
C10	910000	0.00022 mfd. mica condenser	R5	390000	0.5 meg. volume control
C11	920010	0.002 mfd., 600 volt condenser	R7, R8	321130	470,000 ohms, 1/4 watt resistor
C12	920240	0.0005 mfd., 600 volt condenser	R9	340290	150 ohms, 1/2 watt resistor
C13, C14	920020	0.02 mfd., 400 volt condenser	R10	370490	1,000 ohms, 1 watt resistor
C15	920050	0.2 mfd., 200 volt condenser (Used when T1 and T2 are 720000 and 720100 respectively), or	R11	321050	220,000 ohms, 1/4 watt resistor
C15	479199	0.2 mfd., 200 volt condenser (Used when T1 and T2 are 720525 and 720529 respectively)	R12	340050	15 ohms, 1/2 watt resistor
C16	920030	0.05 mfd., 400 volt condenser	R13	340010	10 ohms, 1/2 watt resistor
C17, C18	925009	50-50 mfd., 150 volt dual electrolytic condenser, or	SP1	180000	P.M. speaker
C17, C18	925000	30-50 mfd., 150 volt dual electrolytic condenser	*SW1		Line switch on volume control
L1	700000	Loop antenna, or	T1	720000	First i-f transformer, or
L1	700200	Loop antenna	T1	720525	First i-f transformer, midget
*PL1		Power plug, part of line cord	T2	720100	Second i-f transformer, or
			T2	720529	Second i-f transformer, midget
			T3	734000	Output transformer
			T4	716010	Oscillator coil
				807000	Pilot light, Mazda No. 47
				507090	Pilot light socket
				583010	Line cord

The color coding of the i-f transformer leads is as follows:

Grid—green
Grid return—black

Plate—blue
B+—red

EMERSON RADIO & MODEL 524, Chassis 120011
 PHONO. CORP. 524-2, Chassis 120022



NOTE - BAND SWITCH S-1 SHOWN IN PHONO (C.C.W.) POSITION
 ALL SWITCH WAFERS VIEWED FROM KNOB END OF SWITCH.

TYPE OF TUBES:

- 2—6SG7, pentode r-f amplifier and i-f amplifier
- 1—6SA7, pentagrid modulator
- 1—6J5, triode oscillator
- 1—6H6, diode detector, a.v.c
- 1—6SL7, dual triode audio amplifier and inverter
- 2—6V6GT, beam power push-pull output
- 1—5U4G, rectifier
- 1—6U5/6G5, tuning indicator

POWER SUPPLY: 50-60 cycle A.C.

VOLTAGE RATING:

- Model 524—105-125 volts
- Model 524-2—105-125 volts and 210-250 volts
- POWER CONSUMPTION:** 100 watts

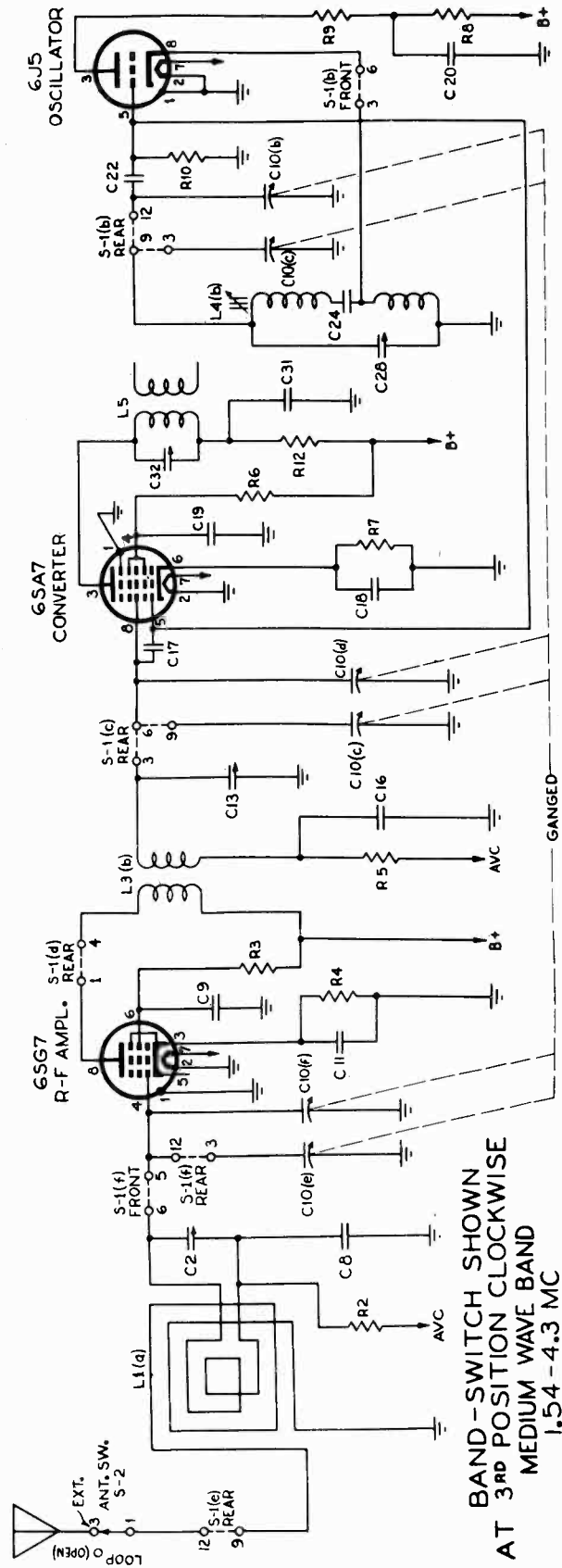
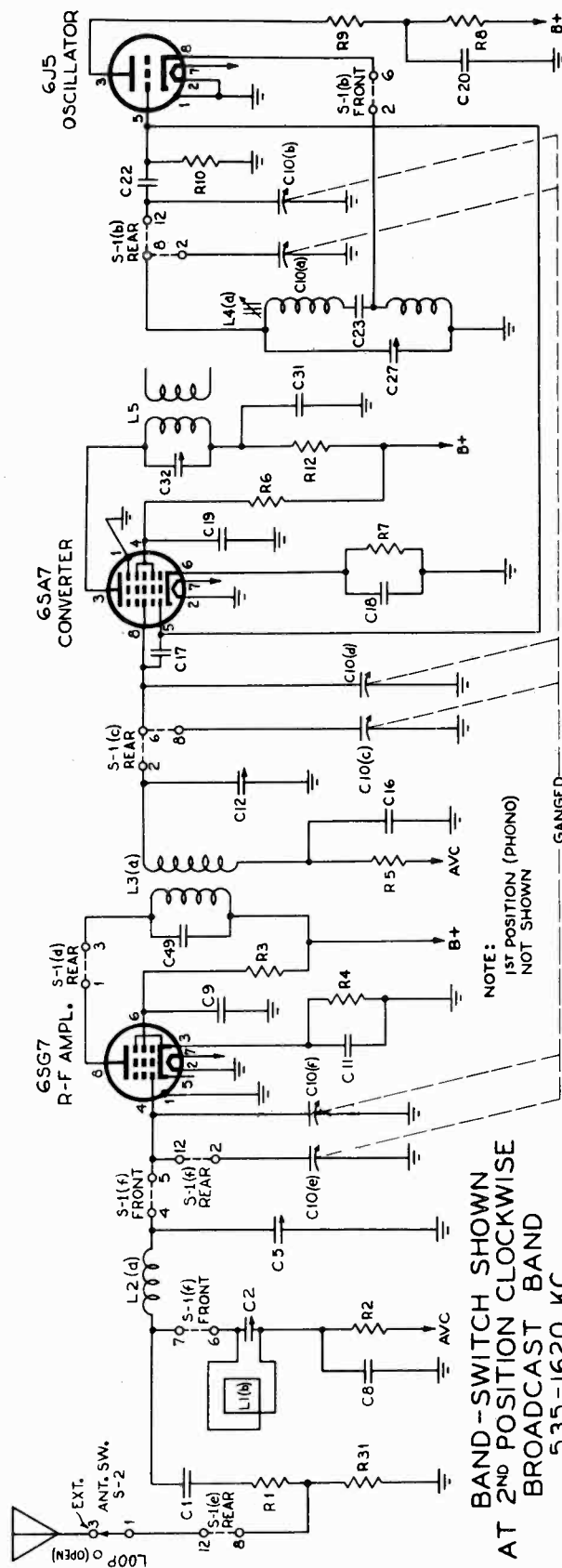
TYPE: Four band superheterodyne.

FREQUENCY RANGE:

- Broadcast—535-1620 Kilocycles (185-560 Meters)
- Medium Wave—1.54-4.3 Megacycles (69.8-195 Meters)
- Short Wave—4.15-10.4 Megacycles (28.9-72.3 Meters)
- Short Wave—10.1-22.7 Megacycles (13.2-29.7 Meters)

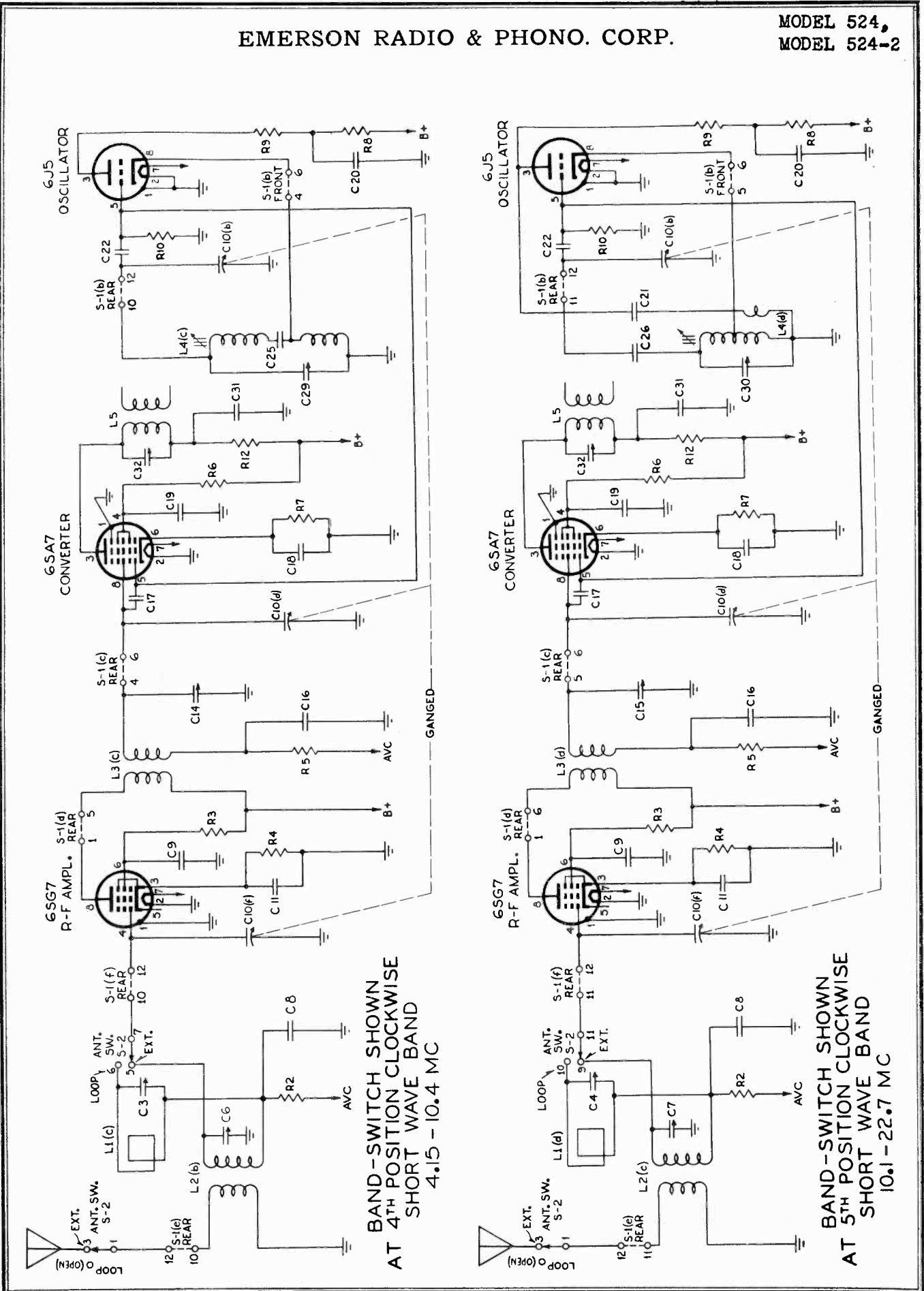
MODEL 524
MODEL 524-2

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MODEL 524,
MODEL 524-2



MODEL 524
MODEL 524-2

EMERSON RADIO & PHONO. CORP.

ADJUSTMENTS

A signal generator or oscillator is required, containing the following radio frequencies, amplitude modulated:

R-f Alignment

- 455 kc for intermediate frequencies
- Band 1—600 kc, 1000 kc, 1500 kc
- Band 2—1600 kc, 2.5 mc, 4 mc
- Band 3—4.5 mc, 6 mc, 10 mc
- Band 4—11 mc, 13 mc, 22 mc

An output meter should be connected across the voice coil of the speaker (3.5 ohms).

Always use as weak a test signal as possible when aligning receiver.

Location of Coils and Trimmer Adjustments

The first i-f transformer is adjacent to the 6SG7 i-f tube, V-4. The trimmers are accessible through the top of the shield can.

The second i-f transformer is adjacent to the 6H6 tube. The trimmers are accessible through the top of the shield can.

The antenna transformer for all bands is located at the rear of the chassis behind the variable condenser. Trimmers for three bands are located on the top of the transformer for external antenna operation. For loop operation, the trimmers are located on the loop accessible from the back of the cabinet.

The r-f and amplifier transformer is located on the side of the chassis toward the rear. Adjustments for all four bands are located on the top of the shield can.

The oscillator transformer is located at the side of the chassis toward the front. There are two adjustments on this stage for each band. Four iron cores protrude from the top of the shield and four trimmer adjustments are located on the side of the shield.

I-f Alignment

1. Set variable condenser to highest frequency and range switch to broadcast position.
2. Apply 455 kc to converter stator terminal in center section of variable condenser.
3. Adjust all four trimmers of the two i-f transformers to maximum on output meter.

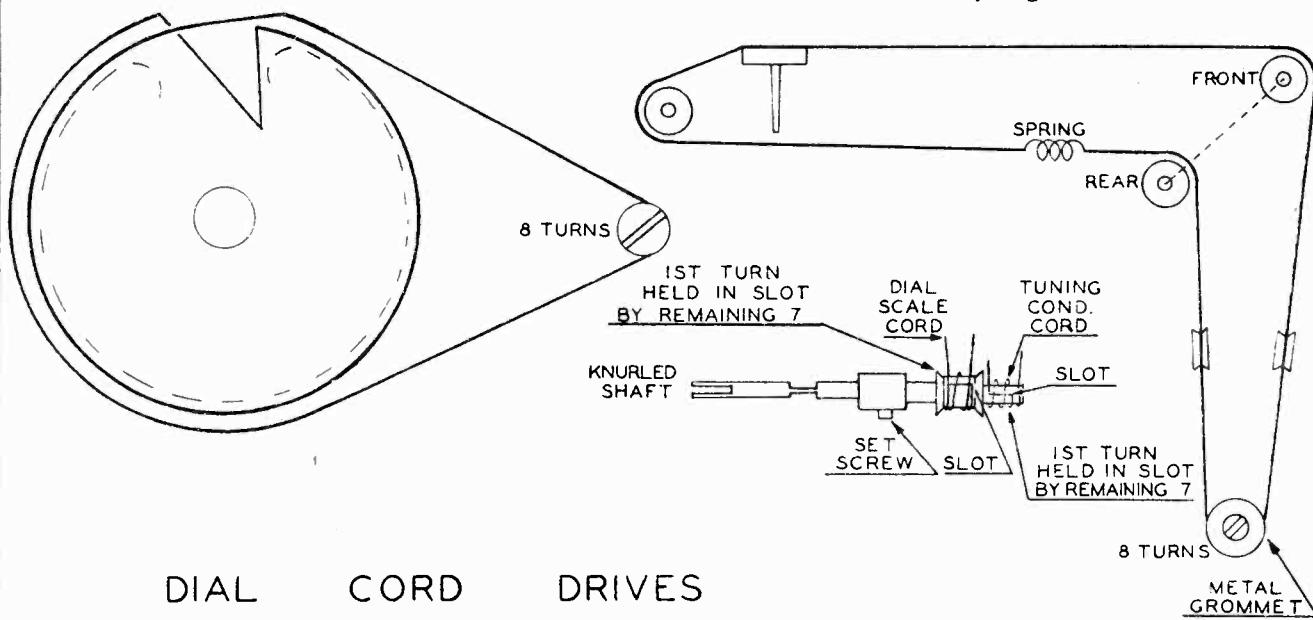
1. For Band 1 (540-1620 kc): Set rear antenna and loop switch to antenna position. Apply strong 1500 kc signal through 200 mfd. dummy antenna to antenna binding post in cabinet back. Set pointer to 1500 kc on dial and adjust oscillator trimmer to maximum on output meter. Reduce signal to normal output in the output meter and adjust r-f trimmer and antenna trimmer to maximum on output meter. Set pointer to 600 kc. apply 600 kc signal and adjust iron core to maximum on output meter by "rocking" variable condenser slightly to "track" oscillator with antenna and r-f. With 1500 kc applied, reset pointer at 1500 kc, and readjust only the oscillator trimmer.

2. Bands 2, 3 and 4: Repeat same procedure as on Band 1 using following frequencies for alignment:

	High frequency	Low frequency
Band 2	4 mc	1.7 mc
Band 3	10 mc	5 mc
Band 4	20 mc	11 mc

3. For loop circuit adjustments operate antenna-loop switch to loop position and adjust trimmers on loop at high-frequency alignment points of each band. Use a few turns of wire about six to eight inches in diameter, connected to oscillator and placed approximately 18 inches away from receiver loop as coupling device to radiate a signal into loop. It is not necessary to readjust r-f or oscillator for loop circuit adjustment since they do not change from antenna adjustment indicated above.

4. It should be noted that oscillator frequency on all bands is 455 kc (i-f frequency) above carrier frequency as indicated on dial scale. Stator of each gang of variable condenser is composed of two separate sections. The two sections are connected in parallel on Bands 1 and 2. Bands 3 and 4 use only largest section.



EMERSON RADIO & PHONO. CORP.
REPLACEMENT PARTS LIST

MODEL 524
MODEL 524-2

Schematic Symbol	†Part No.	DESCRIPTION	Schematic Symbol	†Part No.	DESCRIPTION
C1	910180	0.001 mfd., 500 volt mica condenser	L1	700110	Loop assembly
*C2, C3, {		Trimmers, part of loop assembly	L2	710020	Antenna coil
C4			L3	713010	R-F coil
*C5, C6, {		Trimmers, part of antenna coil	L4	716110	Oscillator coil
C7			L5	720330	First i-f transformer
C8, C16	920060	0.05 mfd., 200 volt condenser	L6	720340	Second i-f transformer
C9, C19, {			L7	737030	Filter choke
C35, C43, {	920210	0.01 mfd., 600 volt condenser	P1	583180	Line cord and plug
C46, C48			Q1	180024	P.M. speaker
C10a, b, {			R1	310430	560 ohms, 1/4 watt resistor
c, d, e, f, {	900200	Three-gang variable condenser	R2, R5, {		
C11, C18, {			R25	321050	0.22 meg., 1/4 watt resistor
C34	920040	0.1 mfd., 200 volt condenser	R3, R15	370910	56,000 ohms, 1 watt resistor
*C12, C13, {		Trimmers, part of r-f coil	R4, R13	320290	150 ohms, 1/4 watt resistor
C14, C15 }			R6	397080	22,000 ohms, 2 watt resistor
C17	915040	0.68 mmfd., 500 volt ceramic condenser	R7	310350	270 ohms, 1/4 watt resistor
C20	925030	16 mfd., 300 volt electrolytic condenser	R8, R9	340650	4,700 ohms, 1/2 watt resistor
C21	910170	0.003 mfd., 500 volt mica condenser	R10	310810	22,000 ohms, 1/4 watt resistor
C22, C42, {			R11	320730	10,000 ohms, 1/4 watt resistor
C44, C49 }	910100	0.0001 mfd., 500 volt mica condenser	R12, R31	320650	4,700 ohms, 1/4 watt resistor
C23	915030	0.00056 mfd. silver mica condenser	R14	321210	1 meg., 1/4 watt resistor
C24	915020	0.0015 mfd. silver mica condenser	R16	310650	4,700 ohms, 1/4 watt resistor
C25	915010	0.003 mfd. silver mica condenser	*R17		4,700 ohms, 1/4 watt resistor, part of second i-f transformer
C26	915000	0.0068 mfd. silver mica condenser	*R18		1 meg., 1/4 watt resistor, part of tuning indicator socket cable
*C27, C28, {		Trimmers, part of oscillator coil	R19	310830	27,000 ohms, 1/4 watt resistor
C29, C30 }			R20	390070	0.5 meg., 1/2 watt volume control
C31, C37	920270	0.05 mfd., 600 volt condenser	R21	390360	0.5 meg., 1/2 watt volume control, or
*C32, C33		Trimmers, part of first i-f transformer	R21	390080	0.5 meg., 1/2 watt volume control
C36	920090	0.01 mfd., 400 volt condenser	R22	321450	10 meg., 1/4 watt resistor
*C38, C39		Trimmers, part of second i-f transformer	R23, R24	351050	0.22 ohms, 1/2 watt resistor
*C40, C41		50 mmfd. condenser, part of second i-f transformer	R26, R27	311050	0.22 ohms, 1/4 watt resistor
C45	920230	0.005 mfd., 600 volt condenser	R28	394140	180 ohms, 2 watt wire-wound resistor
C47	920240	0.0005 mfd., 600 volt condenser	R29	320410	470 ohms, 1/4 watt resistor
C50	925010	40 mfd., 400 volt electrolytic condenser	R30	310070	18 ohms, 1/4 watt resistor
C51	925220	40 mfd., 400 volt electrolytic condenser	S1	510280	7-wafer, 5-position band switch
I1, I2	807020	Pilot light, Mazda No. 44	S2	510290	3-pole double throw antenna switch
			*S3		Line switch, part of volume control R20
			T1	734160	Output transformer
			T2	730000	Power transformer (Chassis 120011)
			T2	730010	Power transformer (Chassis 120022)

CABINET AND DIAL PARTS

140004	Cabinet	280043	Drive shaft pulley
620030	Knob	411361	Dial bracket
620012	Knob, with indicator dot	520006	Dial glass
587040	Drive cord spring	470035	Dial bracket assembly (left)
525110	Pointer	470032	Dial bracket assembly (right)
280023	Drive shaft	507219	Dial light assembly
280033	Clutch shaft		

* Not supplied separately.

† Specify part numbers when ordering. When in doubt of chassis or model also include complete serial number.

VOLTAGE ANALYSIS

The following voltage readings are d-c measurements taken from B— (line switch) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings. Readings indicated by an asterisk (*) are a.c. Line voltage is 117.5 volts, 60 cycles a.c. Set volume control at minimum and variable condenser to 1000 kc.

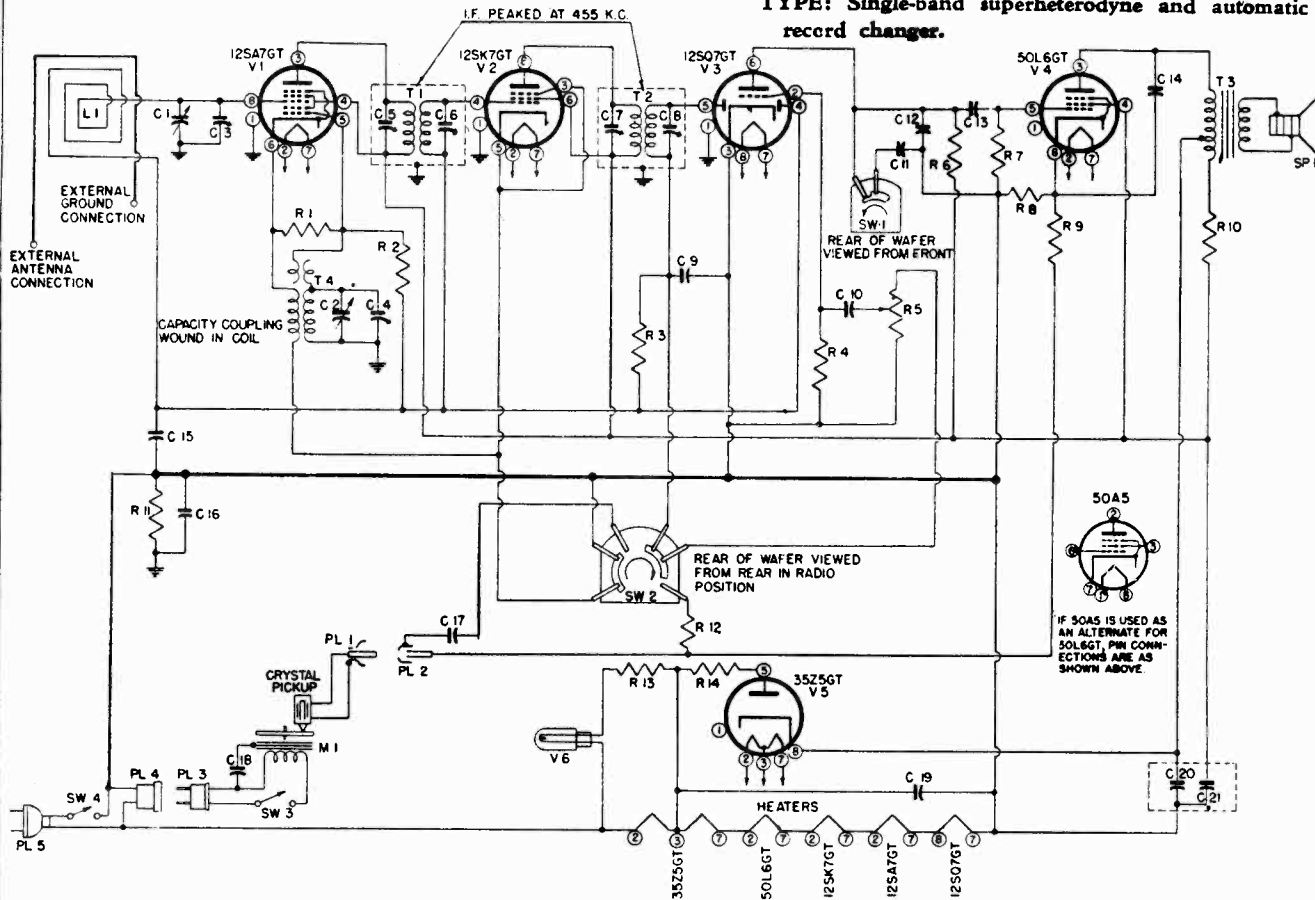
TUBE	PIN NUMBER							
	1	2	3	4	5	6	7	8
6SG7(V1)			1.6		1.6	130	*6.3	280
6SA7			275	90	-0.02	2.4	*6.3	
6J5			215		-0.02		*6.3	
6SG7(V4)			1.5		1.5	120	*6.3	280
6H6			-0.04				*6.3	
6SL7		70		-0.04	60			*6.3
6V6(V8, V4)			285	280			*6.3	17
5U4G		290		*285		*285		290

Voltage readings for 6U5/6G5 measured at lead terminals are as follows: black—0; green— -0.04; red—280; brown—0; black—6.3.

MODELS 525,552
Chassis 120037

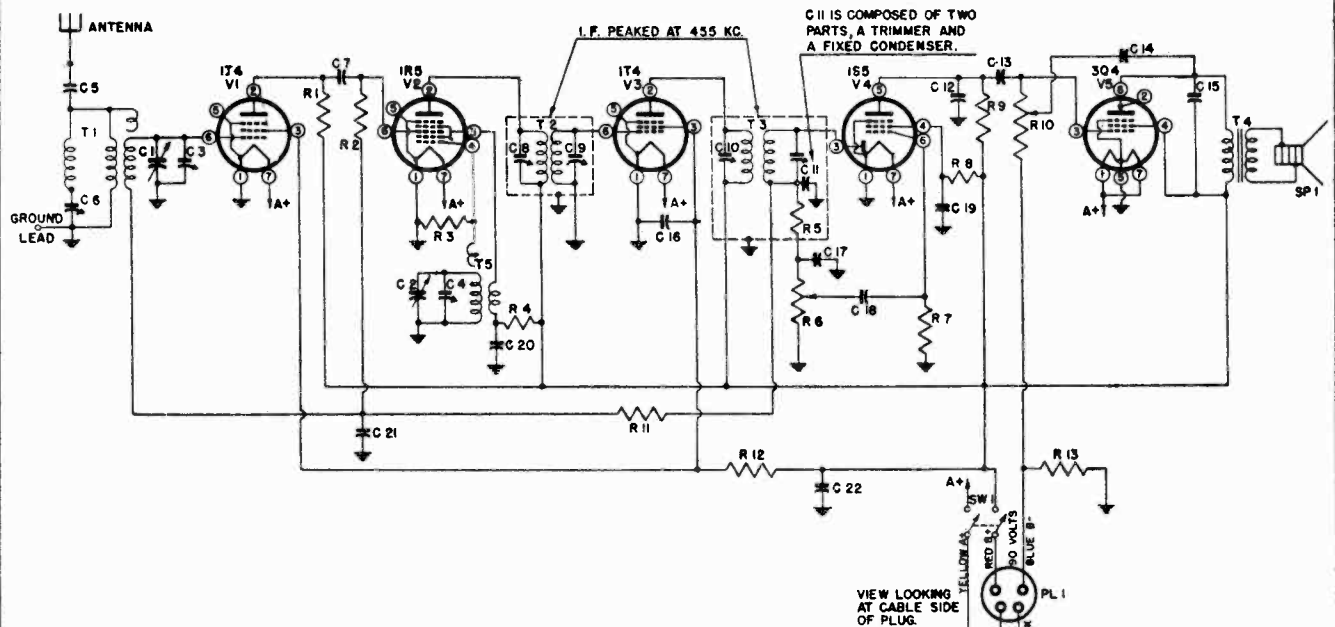
EMERSON RADIO & PHONOGRAPH CORP.

TYPE: Single-band superheterodyne and automatic record changer.



Schematic Symbol	†Part No.	DESCRIPTION	Schematic Symbol	†Part No.	DESCRIPTION
C1, C2	900290	Two-gang variable condenser	PL2	508010	Pickup socket
*C3, C4		Trimmers, part of variable condenser	*PL3		Polarized male plug, part of record changer
*C5, C6, C7, C8 }		Trimmers, part of i-f transformers	PL4	585070	Female plug and cable
C9	910000	0.00022 mfd. mica condenser	*PL5		Power plug, part of line cord
C10	920010	0.002 mfd., 600 volt condenser	R1	310810	22,000 ohms, ¼ watt resistor
C11	920515	0.002 mfd., 400 volt condenser	R2, R4	397000	15 meg., ½ watt resistor
C12	920240	0.0005 mfd., 600 volt condenser	R3	321330	3.3 meg., ¼ watt resistor
C13, C14	920020	0.02 mfd., 400 volt condenser	R5	390010	0.5 meg. volume control
C15	920040	0.1 mfd., 200 volt condenser	R6, R7	321130	470,000 ohms, ¼ watt resistor
C16	920050	0.2 mfd., 200 volt condenser (used only when T1 and T2 are 720000 and 720100 respectively)	R8	340290	150 ohms, ½ watt resistor
C17, C19	920030	0.05 mfd., 400 volt condenser	R9	321290	2.2 meg., ¼ watt resistor
C18	922090	0.05 mfd., 400 volt condenser (used up to serial No. 8,550,551), or	R10	370490	1,000 ohms, 1 watt resistor
C18	922101	0.05 mfd., 400 volt condenser (used after serial No. 8,550,551)	R11	321050	220,000 ohms, ¼ watt resistor
C20, C21	925267	30-50 mfd., 150 volt dual electrolytic condenser (used up to serial No. 8,550,551), or	R12	321210	1 meg., ¼ watt resistor
C20, C21	925110	30-50 mfd., 150 volt dual electrolytic condenser (used after serial No. 8,550,551)	R13	340010	10 ohms, ½ watt resistor
L1	700000	Loop antenna, or	R14	340050	15 ohms, ½ watt resistor
L1	700200	Loop antenna, or	SP1	180000	P.M. speaker
L1	700210	Loop antenna	SW1	510130	Tone control switch
M1	819019	Automatic record changer	SW2	510390	Phono-radio switch
PL1	505040	Connector plug	*SW3		Motor switch, part of record changer
			*SW4		Line switch on volume control
			T1	720000	First i-f transformer, or
			T1	720525	First i-f transformer
			T2	720100	Second i-f transformer, or
			T2	720529	Second i-f transformer
			T3	734200	Output transformer
			T4	716010	Oscillator coil

EMERSON RADIO & PHONO. CORP. MODELS 531, 532, 533 Chassis 120040



Schematic Symbol	†Part No.	DESCRIPTION	Schematic Symbol	†Part No.	DESCRIPTION
C1, C2	900070	Two-gang variable condenser	R2	321130	470,000 ohms, ¼ watt resistor
*C3, C4		Trimmers, part of variable condenser	R3	320970	100,000 ohms, ¼ watt resistor
C5, C15	920170	0.001 mfd., 600 volt condenser	*R5		47,000 ohms, ¼ watt resistor, part of second i-f transformer
*C6		Trimmer, part of antenna transformer	R6	390180	0.5 meg. volume control
C7, C12	910000	0.00022 mfd. mica condenser	R7	321450	10 meg., ¼ watt resistor
*C8, C9, C10		Trimmers, part of i-f transformer	R8, R11	321330	3.3 meg., ¼ watt resistor
*C11		Trimmer and fixed condenser, part of second i-f transformer	R9	321210	1 meg., ¼ watt resistor
C13, C16, C19, C20	920100	0.02 mfd., 200 volt condenser	R10	390280	0.4 meg. tone control
C14	910250	0.00005 mfd. mica condenser	R12	310770	15,000 ohms, ¼ watt resistor
C17	910010	0.00011 mfd. mica condenser	R13	310410	470 ohms, ¼ watt resistor
C18	920515	0.002 mfd., 400 volt condenser	SP1	180008	P.M. speaker
C21	920040	0.1 mfd., 200 volt condenser	SW1	510401	Battery switch, or
C22	925003	16 mfd., 150 volt electrolytic condenser	SW1	510001	Battery switch
PL1	585311	Battery plug and cable assembly, or	T1	710001	Antenna transformer and trap
PL1	585312	Battery plug and cable assembly	T2	720530	First i-f transformer
R1, R4	310730	10,000 ohms, ¼ watt resistor	T3	720531	Second i-f transformer
			T4	734203	Output transformer
			T5	716001	Oscillator coil

Battery replacement — Replace battery pack with one of the following types: Eveready No. 748 or No. 758, Rayovac No. AB82, Burgess No. 17GD60, General No. 60D10L, or Bright Star No. 6105.

* Not supplied separately.

† Specify part numbers when ordering.

MODELS 531, 532, 533

EMERSON RADIO & PHONOGRAPH CORP.

The following voltage readings are d-c measurements from tube socket pin to chassis. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. All voltages are positive unless otherwise indicated.

TUBE	PIN NUMBER						
	1	2	3	4	5	6	7
1T4(V1)		55	52	82		*-3	1.5
1R5		82	57	*-11.0		*-4	1.5
1T4(V3)		82	52			*-4	1.5
1S5		-6.2	*-.45	*18	10	*-.3	1.5
3Q4		80.0	*-6.2	82	1.5	80	

An oscillator with frequencies of 455, 600, and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible, turn down the output of the test oscillator as the alignment of the receiver progresses.

I-f and Trap Alignment

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 455 kc to the grid (pin 6) of the 1R5 tube through a 0.1 mfd. condenser.
3. Adjust the four i-f trimmer screws (C8, C9, C10, C11) for maximum response. Feed 455 kc to the antenna through a standard dummy antenna (a 0.002 mfd. condenser may be used as a substitute) and adjust the wave-trap trimmer for minimum response.

The color coding of the i-f transformer leads is as follows:

- Grid—green
- Plate—blue
- Grid return—black
- B+—red

Location of Coils and Trimmer Adjustments

The oscillator coil (T5) is located beneath the chassis. The trimmer for the oscillator (C4) is on the front section of the variable condenser.

The trimmer for the antenna (C3) is on the rear section of the variable condenser.

The i-f transformers are mounted on top of the chassis. The first i-f transformer (T2) is mounted in back of the speaker. The second i-f transformer (T3) is mounted next to the output transformer.

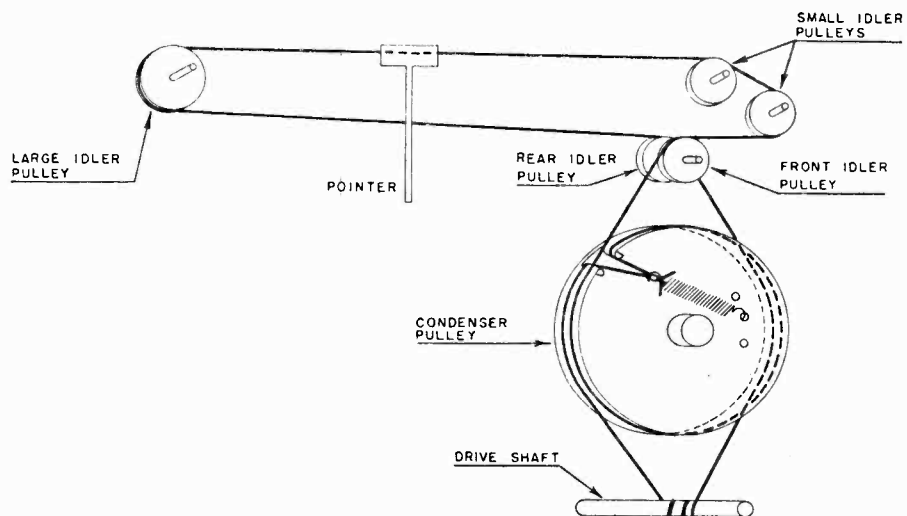
The 455 kc wave-trap is part of the antenna coil assembly, which is located on the underside of the chassis.

R-f Alignment

Feed 1620 kc through a standard broadcast dummy antenna to the antenna lead (A 0.0002 mfd. condenser may be used as a substitute). Adjust oscillator trimmer (C4). Move pointer to 1425 kc and feed 1425 kc signal. Adjust antenna trimmer (C3) for maximum response.

CABINET AND DIAL PARTS

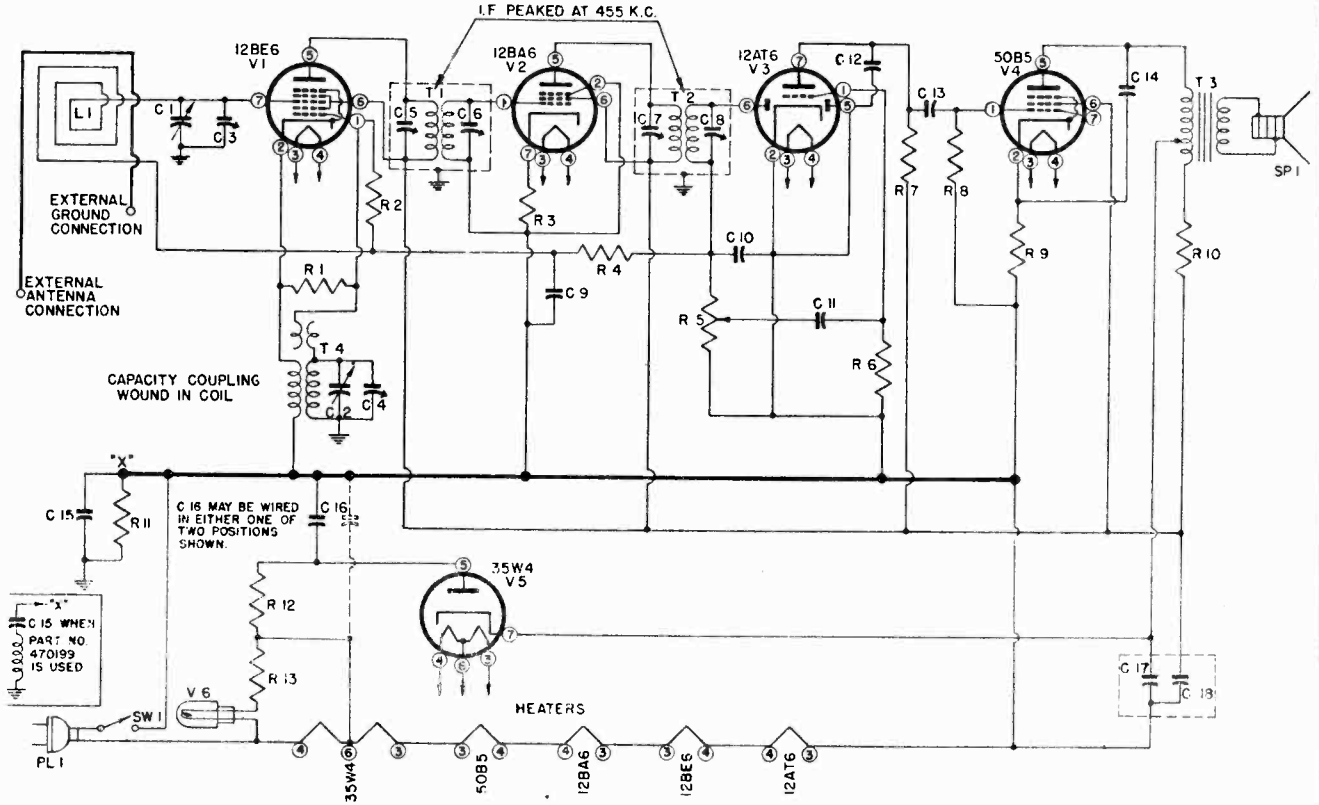
- 560190 Rear cover (Model 533)
- 280313 Drive shaft
- 520360 Dial backplate
- 520450 Dial Glass
- 525012 Dial pointer
- 140062 Cabinet (Model 531)
- 140029 Cabinet (Model 532)
- 140051 Cabinet (Model 533)
- 460140 Knob (Model 531)
- 460470 Knob (Model 532, 533)
- 560200 Rear cover (Model 532)



CUT-AWAY VIEW SHOWING METHOD OF STRINGING PULLEYS.

EMERSON RADIO & PHONOGRAPH CORP.

MODELS 543, 544
Chassis 120046



Schematic Circuit Diagram Chassis 120046

CHASSIS 120046

C1, C2	900013	Two-gang variable condenser	R2, R6	397000	15 meg., 1/2 watt resistor
*C3, C4		Trimners, part of variable condenser	R3	340310	180 ohms, 1/2 watt resistor
*C5, C6, C7, C8		Trimners, part of i-f transformers	R4	321290	2.2 meg., 1/4 watt resistor
C9	920040	0.1 mfd., 200 volt condenser	R5	390015	0.5 meg. volume control
C10	910000	0.00022 mfd. mica condenser	R7, R8	321130	470,000 ohms, 1/4 watt resistor
C11	920010	0.002 mfd., 600 volt condenser	R9	340290	150 ohms, 1/2 watt resistor
C12	920240	0.0005 mfd., 600 volt condenser	R10	370490	1,000 ohms, 1 watt resistor
C13, C14	920020	0.02 mfd., 400 volt condenser	R11	321050	220,000 ohms, 1/4 watt resistor
C15	920050	0.2 mfd., 200 volt condenser (used when T1 and T2 are 720000, and 720100 respectively), or	R12	340050	15 ohms, 1/2 watt resistor
C15	470199	0.2 mfd., 200 volt assembly (used when T1 and T2 are 720525 and 720529 respectively)	R13	340010	10 ohms, 1/2 watt resistor
C16	920030	0.05 mfd., 400 volt condenser	SP1	180000	P.M. speaker
C17, C18	925009	50-50 mfd., 150 volt dual electrolytic condenser	*SW1		Line switch on volume control
L1	700000	Loop antenna	T1	720000	First i-f transformer, or
*PL1		Power plug, part of line cord	T1	720525	First i-f transformer, midget
R1	310810	22,000 ohms, 1/4 watt resistor	T2	720100	Second i-f transformer, or
			T2	720529	Second i-f transformer, midget
			T3	734000	Output transformer
			T4	716010	Oscillator coil
				583010	Pilot light
				807000	Line cord
				507090	Pilot light socket

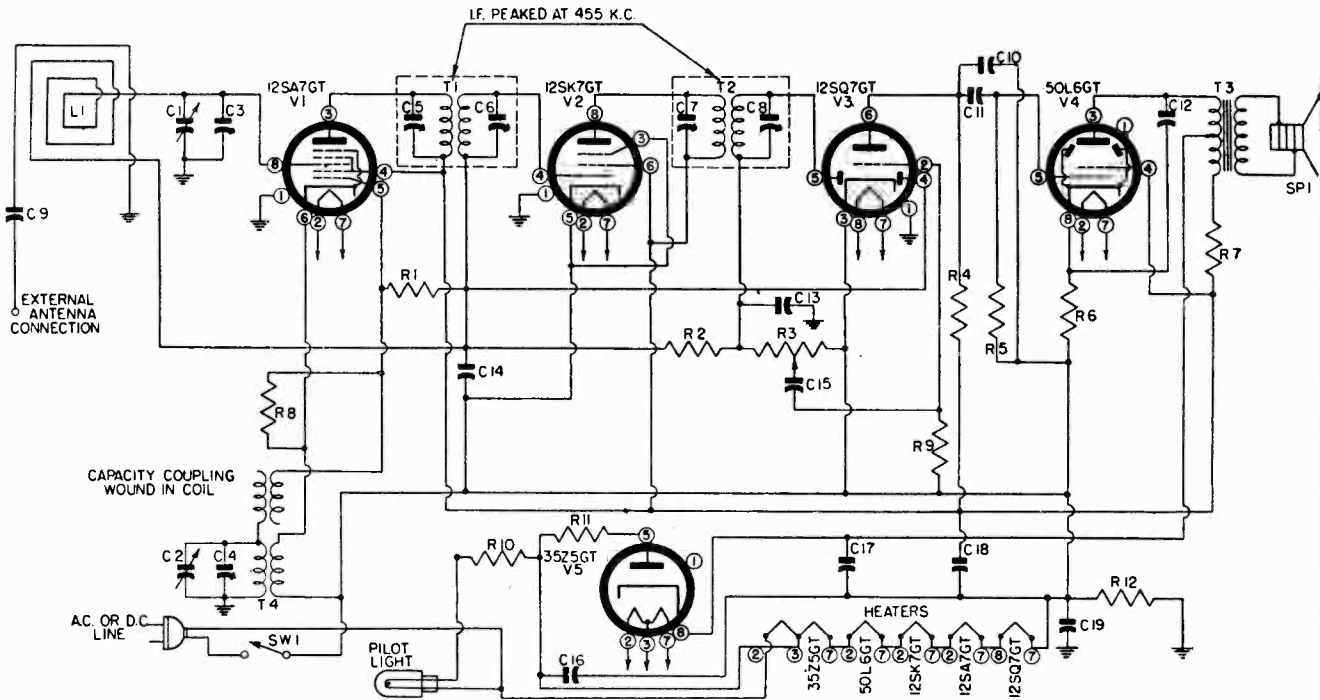
CABINET AND DIAL PARTS

280024	Drive shaft	140082B	Cabinet, black
520033	Dial face	410090	Metal grille
525015	Dial pointer	520034	Dial crystal
140080B	Cabinet, ivory	460470	Knob

MODELS 543,544
Chassis 120052

EMERSON RADIO & PHONOGRAPH CORP.

TYPE: Single-band superheterodyne.
FREQUENCY RANGE: 540-1620 kc.



Schematic Circuit Diagram Chassis 120052

CHASSIS 120052

Schematic Symbol	†Part No.	DESCRIPTION	Schematic Symbol	†Part No.	DESCRIPTION
C1, C2	900160	Two-gang variable condenser	R3	390015	0.5 meg. volume control
*C3, C4		Trimmer, part of variable condenser	R4, R5	321130	470,000 ohms, ¼ watt resistor
*C5, C6, C7, C8		Trimmers, part of i-f transformers	R6	340290	150 ohms, ½ watt resistor
C9, C15	920010	0.002 mfd., 600 volt condenser	R7	370490	1000 ohms, 1 watt resistor
C10	920240	0.0005 mfd., 600 volt condenser	R8	310810	22,000 ohms, ¼ watt resistor
C11, C12	920020	0.02 mfd., 400 volt condenser	R10	340010	10 ohms, ½ watt resistor
C13	910000	0.00022 mfd. mica condenser	R11	397040	15 ohms, 1 watt wire-wound resistor
C14	920040	0.1 mfd., 200 volt condenser	R12	321050	220,000 ohms, ¼ watt resistor
C16	920030	0.05 mfd., 400 volt condenser	SP1	180000	P.M. speaker
C17, C18	925000	30-50 mfd., 150 volt dual electrolytic condenser	*SW1		Line switch on volume control
C19	920050	0.02 mfd., 200 volt condenser	T1	720000	First i-f transformer
L1	700000	Loop antenna, or	T2	720100	Second i-f transformer
L1	700200	Loop antenna	T3	734000	Output transformer
R1, R9	397000	15 meg., ¼ watt resistor	T4	716010	Oscillator coil
R2	321330	3.3 meg., ¼ watt resistor		583010	Line cord
				807000	Pilot light
				507090	Pilot light socket

† Specify part numbers when ordering.
* Not supplied separately.

The color coding of the i-f transformer leads is as follows:

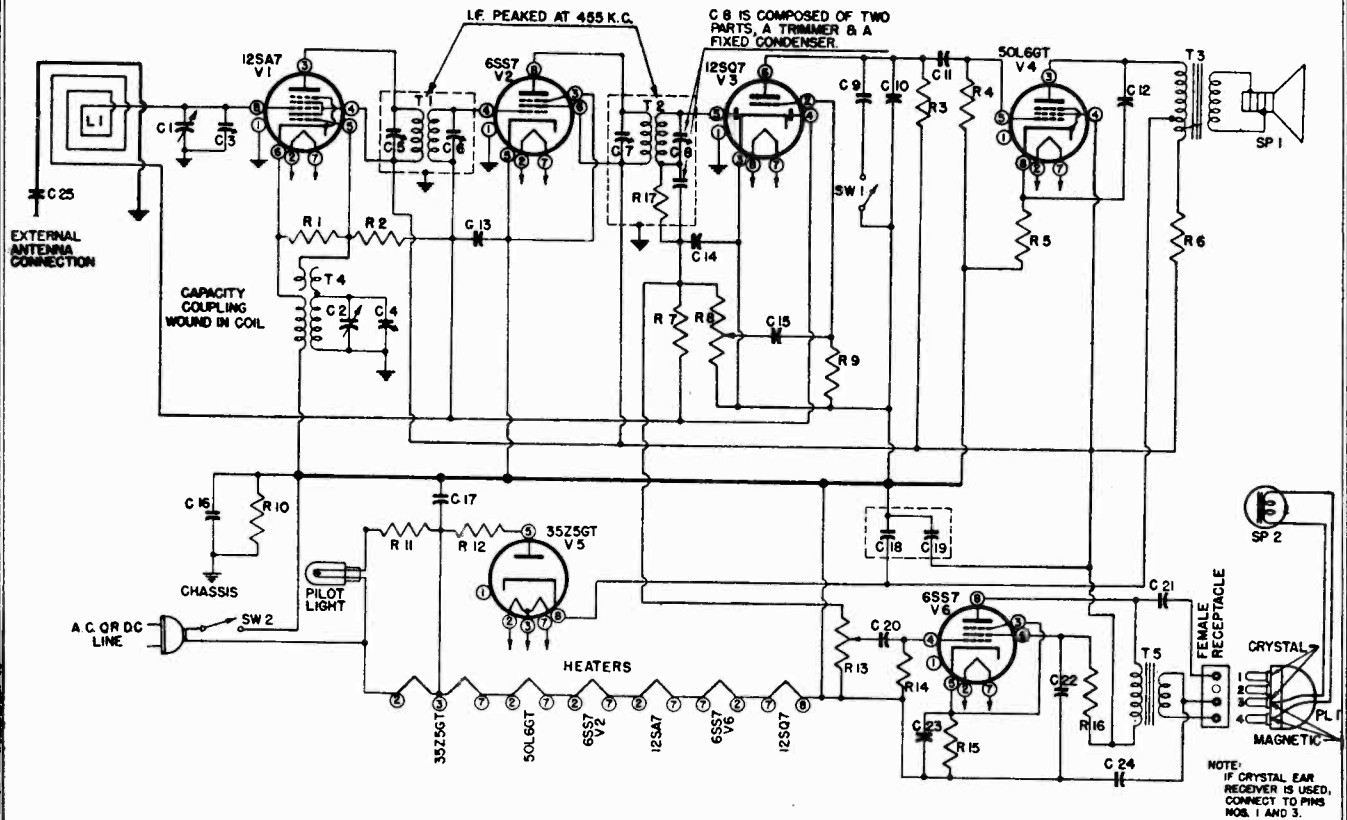
Grid—green Plate—blue
Grid return—black B+—red

EMERSON RADIO & PHONOGRAPH CORP.

MODELS 1002, 1003
Chassis 129003

TYPE: Single-band superheterodyne with hearing aid receiver.

FREQUENCY RANGE: 540-1620 kc.



Schematic Symbol	Part No.	DESCRIPTION	Schematic Symbol	Part No.	DESCRIPTION
C1, C2	900070	Two-gang variable condenser	R13	390180	0.5 meg. volume control (sets below 8,767,450), or
*C3, C4		Trimmers, part of variable condenser	R13	390014	2 meg. volume control (sets 8,767,450 and higher)
*C5, C6, C7, C8		Trimmers, part of i-f transformers	R15	340410	470 ohms, 1/2 watt resistor
C9, C15, C20, C25	920010	0.002 mfd., 600 volt condenser	R16	351050	220,000 ohms, 1/2 watt resistor (sets below 8,767,450), or
C11, C12, C21	920240	0.0005 mfd., 600 volt condenser	R16	340970	100,000 ohms, 1/2 watt resistor (sets 8,767,450 and higher)
C13	920040	0.1 mfd., 200 volt condenser	SP1	180008	P.M. speaker
C14	910010	0.00011 mfd. mica condenser	SP2	829001	Telex ear receiver (name imprinted), or
C16	920050	0.2 mfd., 200 volt condenser	SP2	829002	American Earphone ear receiver (no imprint)
C17, C24	920030	0.05 mfd., 400 volt condenser	SW1	510120	Tone control switch
C18, C19	925011	50-50 mfd., 150 volt dual electrolytic condenser	*SW2		Line switch on volume control
C22	920060	0.05 mfd., 200 volt condenser	T1	720380	First i-f transformer
C23	925180	10 mfd., 25 volt electrolytic condenser	T2	720390	Second i-f transformer
L1	700000	Loop antenna	T3	734080	Output transformer (used with speaker)
R1	340810	22,000 ohms, 1/2 watt resistor	T4	716070	Oscillator coil (sets below 8,767,450), or
R2, R9	397000	15 meg., 1/2 watt resistor	T4	716005	Oscillator coil (sets 8,767,450 and higher)
R3, R4	351130	470,000 ohms, 1/2 watt resistor	T5	734001	Output transformer (used with ear receiver)
R5	340290	150 ohms, 1/2 watt resistor		807000	Pilot light
R6	370490	1000 ohms, 1 watt resistor		507215	Pilot light socket
R7, R14	351330	3.3 meg., 1/2 watt resistor		583150	Line cord
R8	390190	0.5 meg. volume control			
R10	351050	220,000 ohms, 1/2 watt resistor			
R11	340010	10 ohms, 1/2 watt resistor			
R12	340050	15 ohms, 1/2 watt resistor			

MODELS 1002, 1003

EMERSON RADIO & PHONOGRAPH CORP.

An oscillator with frequencies of 455, 600 and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Plug the receiver into the power supply outlet in such a way that the ground side of the power line is connected to the receiver B—

R-f Alignment

1. Connect the oscillator to a coil composed of three or four turns of wire wound in a circle approximately 12" in diameter. This coil should be held parallel to and in line with the loop antenna of the receiver at a distance of 15 to 20 inches.
2. Radiate a signal at 1425 kc, set the dial indicator to 1425 kc, and adjust the trimmers on the variable condenser (C3, C4) for maximum response.
3. Radiate a 600 kc signal and tune in the signal on the receiver. Adjust the loose outside turn of the loop antenna for maximum response. This loose turn may be moved to either side of the center. Fasten it in the position which gives maximum response.
4. Repeat steps 2 and 3 until no further improvement is evident.

Location of Coils and Trimmer Adjustments

The first i-f transformer (T1) is mounted on top of the chassis deck at the rear and to the right of the variable condenser. The trimmers (C5, C6) are accessible through holes in the top of the can.

The second i-f transformer (T2) is mounted on top of the chassis to the right of the speaker. The trimmers (C7, C8) are accessible through holes in the top of the can.

The trimmer for the antenna (C3) and the trimmer for the oscillator coil (C4) are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil (T4) is located underneath the chassis. The loop antenna acts as the antenna coil.

I-f Alignment

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 455 kc to the converter grid (stator of the r-f section of the variable condenser) and adjust the four i-f trimmers (C5, C6, C7, C8) for maximum response.

The color coding of the i-f transformer leads is as follows:

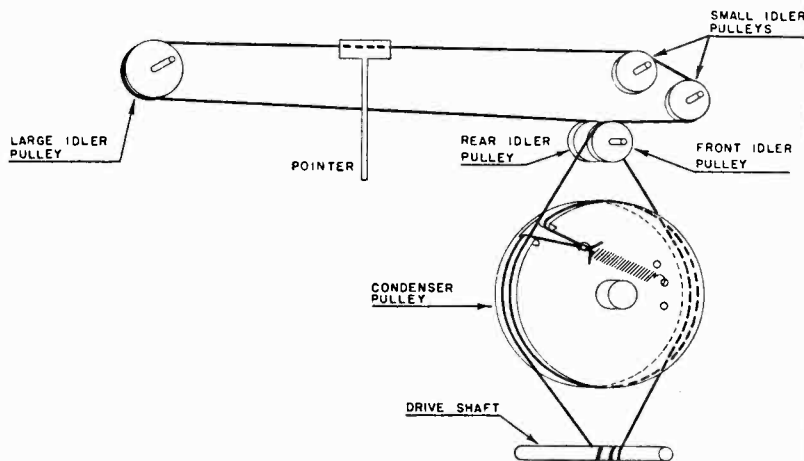
- Grid—green
- Grid return—black
- Plate—blue
- B+—red

The following voltage readings are d-c measurements taken from B— (line switch) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. Line voltage for these readings was 117 volts, 60 cycles, a.c. Measurements made with 117 volts d.c. will be lower than those given below. Take readings with the volume control set at minimum and the variable condenser closed.

TUBE	PIN NUMBER							
	1	2	3	4	5	6	7	8
12SA7			89	89	*.10			
6SS7 (V2)				*-1.6		89		*-1.6
12SQ7		*-0.7		*-1.6	*-0.5	*52.0		89
50L6GT			110	89				6.2
35Z5GT				116				117
6SS7 (V6)			1.4		1.4	*40.0		89

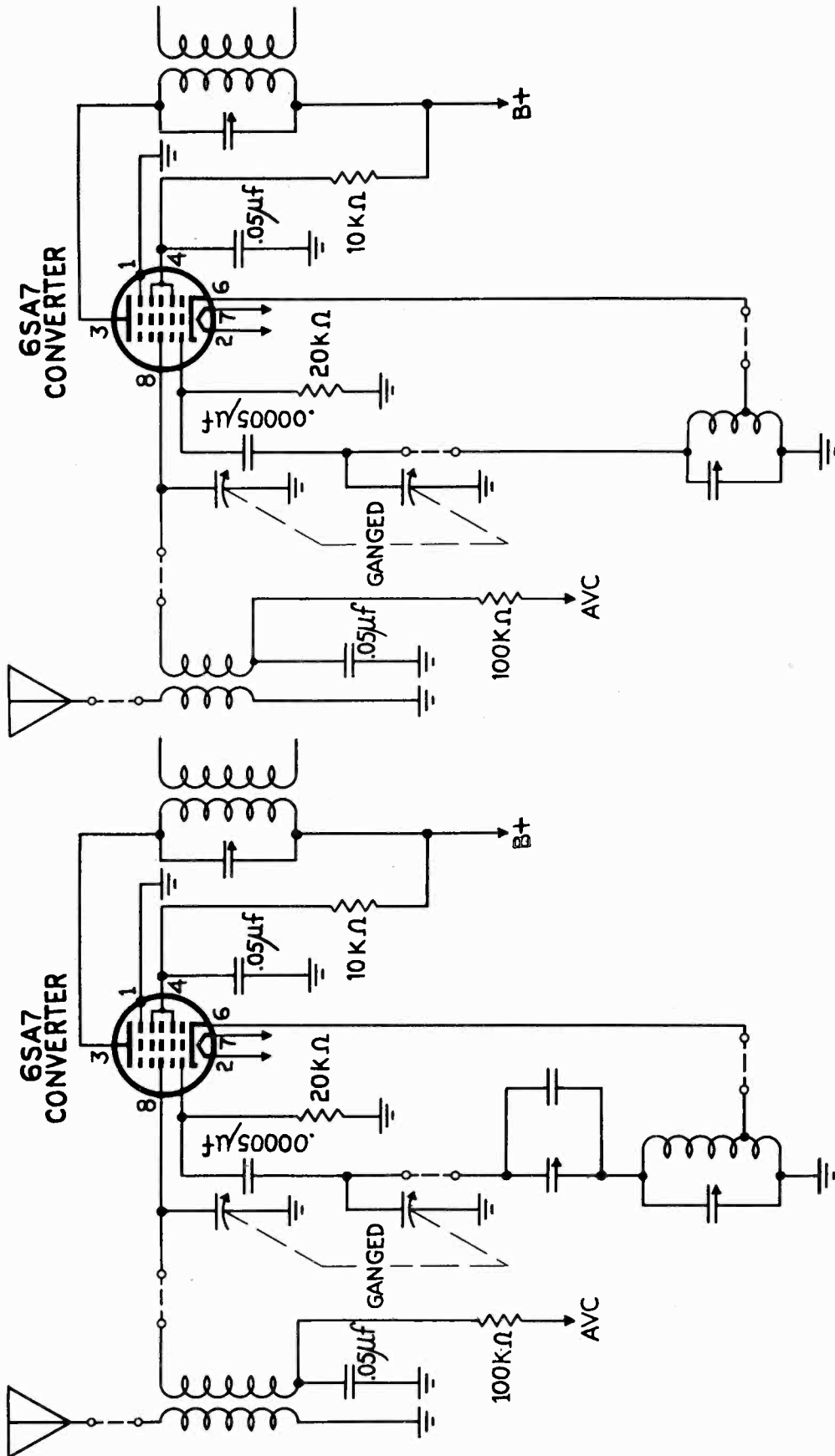
CABINET, DIAL AND ACCESSORY PARTS

- 520480 Dial backplate
- 280313 Drive shaft
- 520450 Dial glass
- 525012 Pointer
- 140029 Cabinet (Model 1002)
- 560101 Cabinet back (Model 1002)
- 460470 Knob (Model 1002)
- 140054 Cabinet (Model 1003)
- 460140 Knob (Model 1003)
- 470222 Plug and cable with ear receiver, complete
- 585315 Plug and cable (for ear receiver 829001)
- 585122 Plug and cable (for ear receiver 829002)
- 508115 Socket for ear receiver plug
- 460005 Ear mold, or
- 460006 Ear mold
- 505057 Plug, less cover and screw
- 505058 Plug cover
- 204116 Machine screw
- 470220 Under-pillow speaker, with plug
- 829003 Under-pillow speaker, less plug



CUT-AWAY VIEW SHOWING METHOD OF STRINGING PULLEYS.

"clarified schematics"

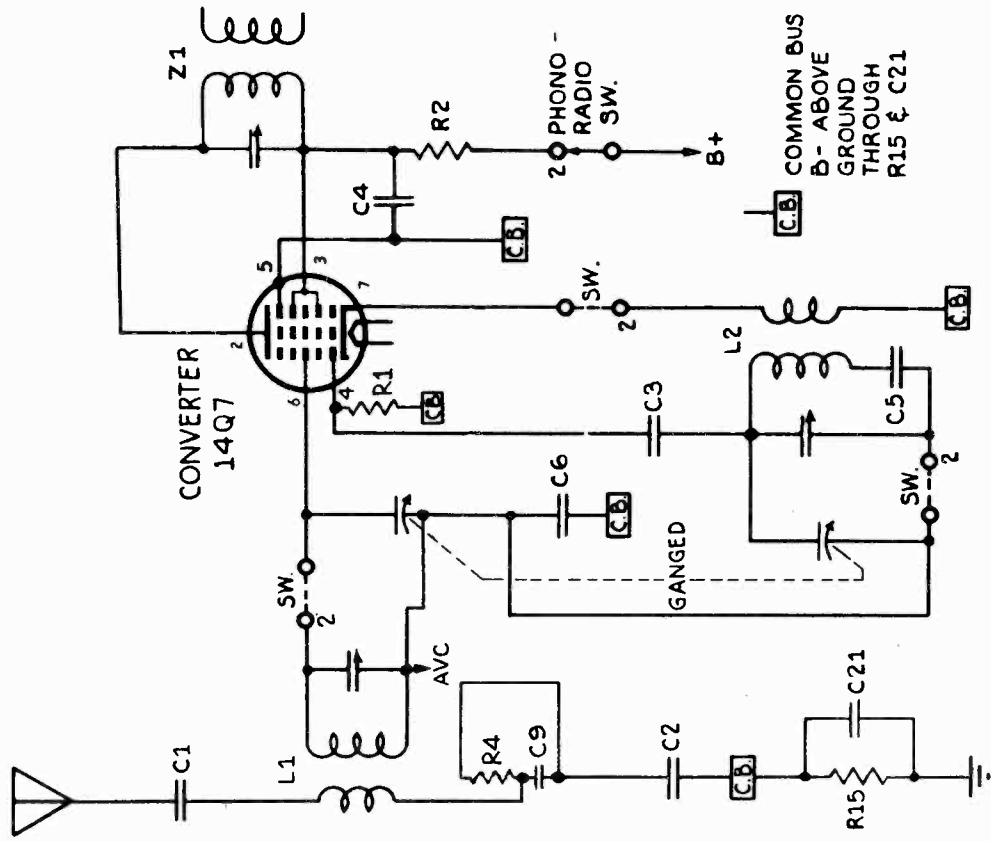


BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
550-1700 KC.

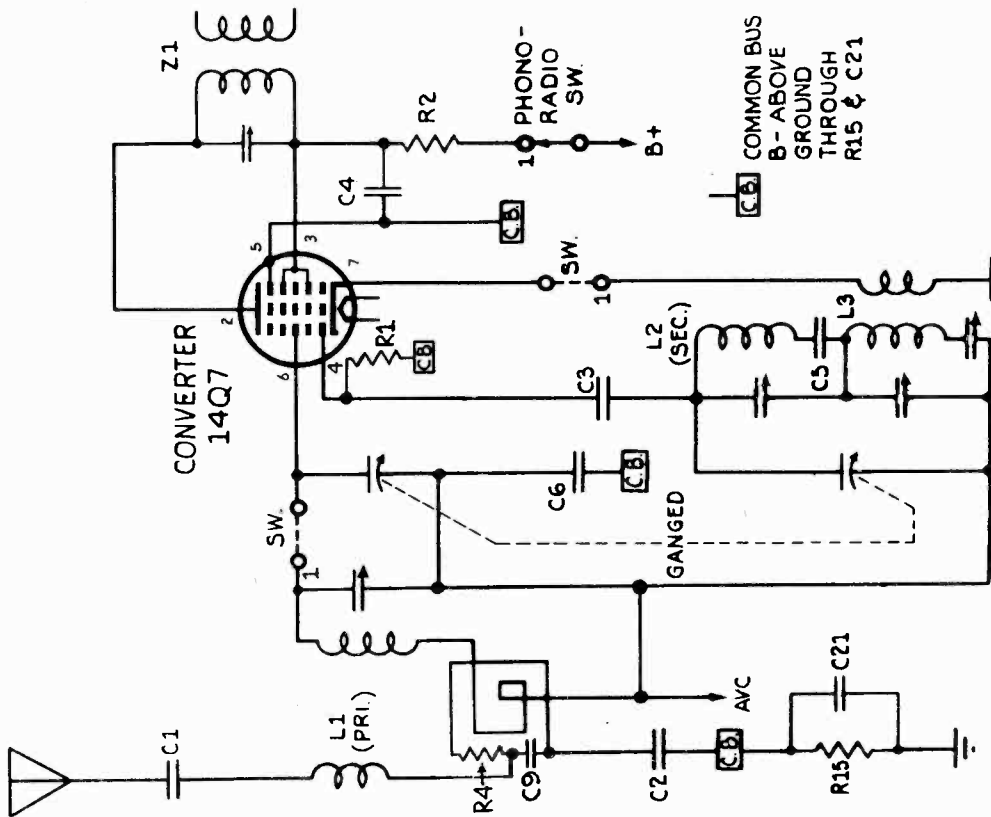
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
SHORT WAVE BAND
4.7-20 MC.

"clarified schematics"

ESPEY MFG. CO. INC.

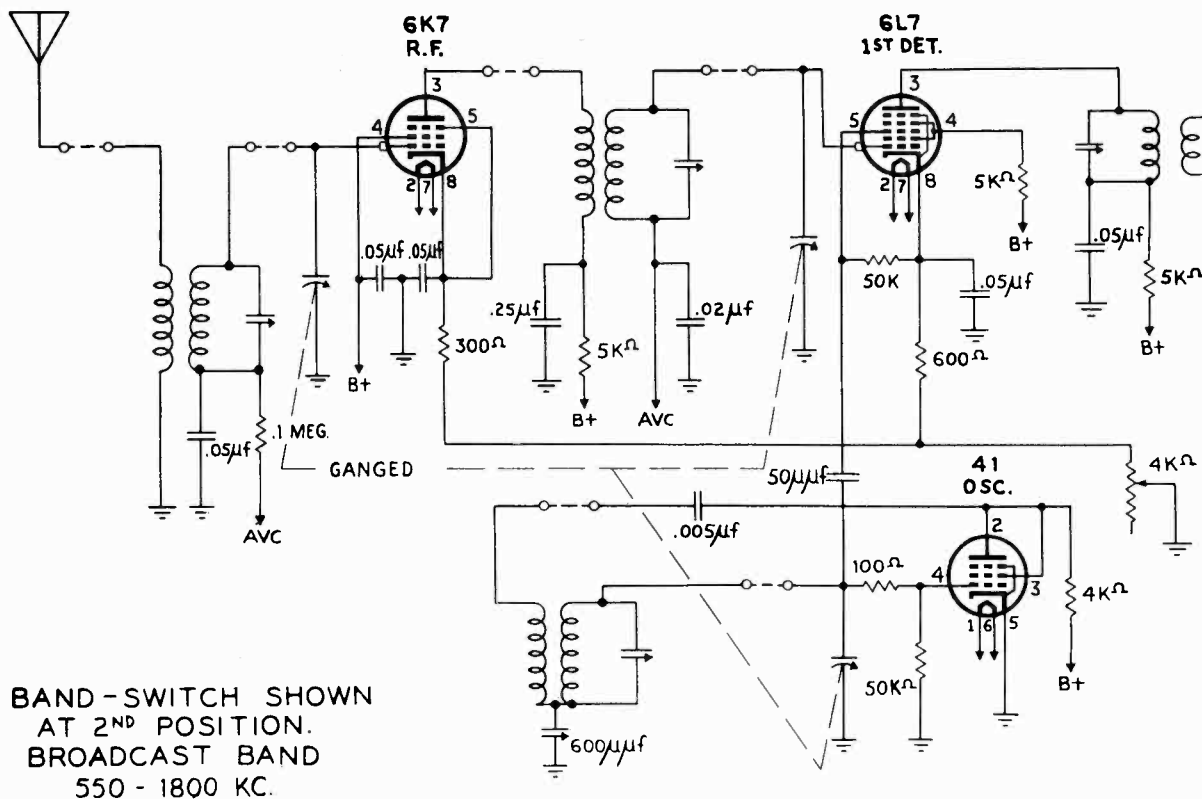
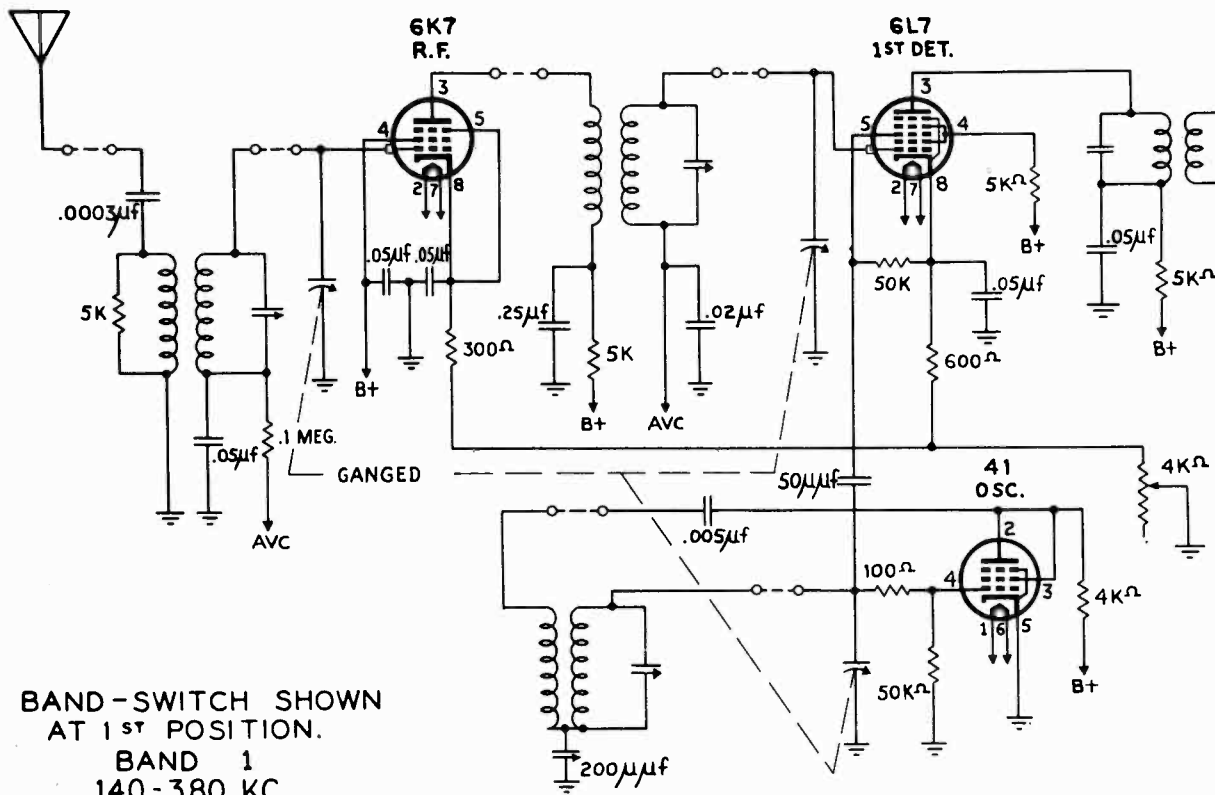


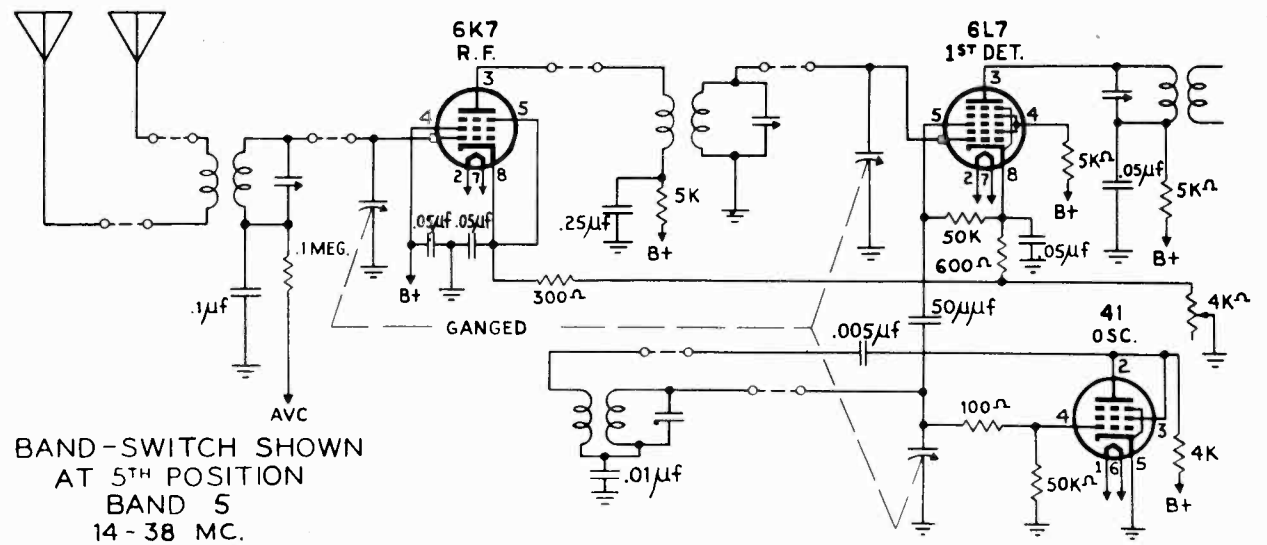
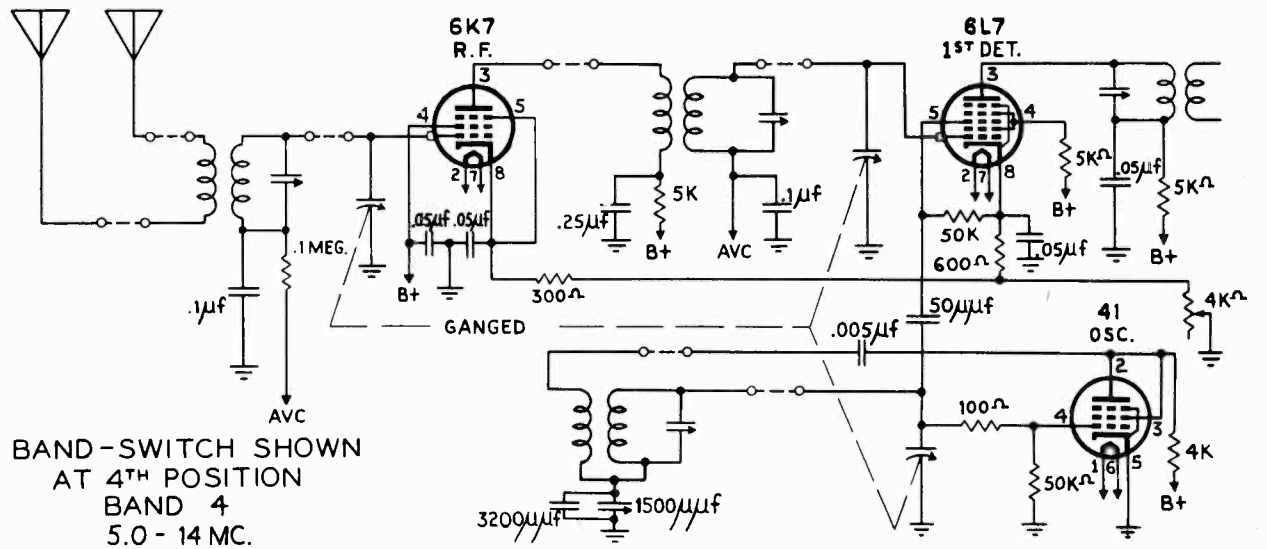
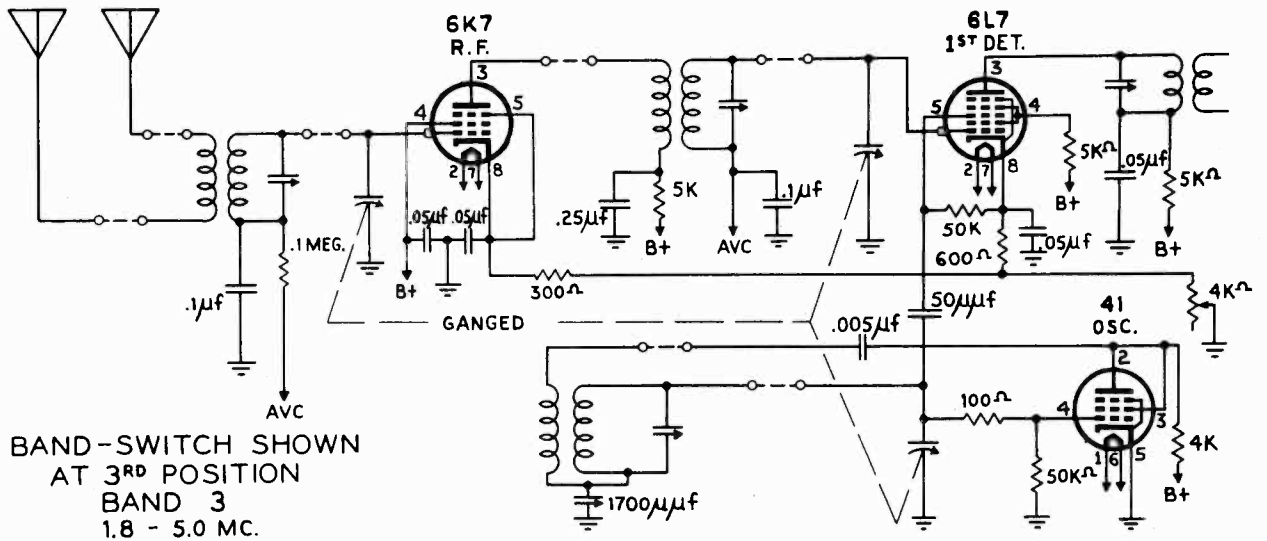
BAND - SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND
5.5 - 18 MC.



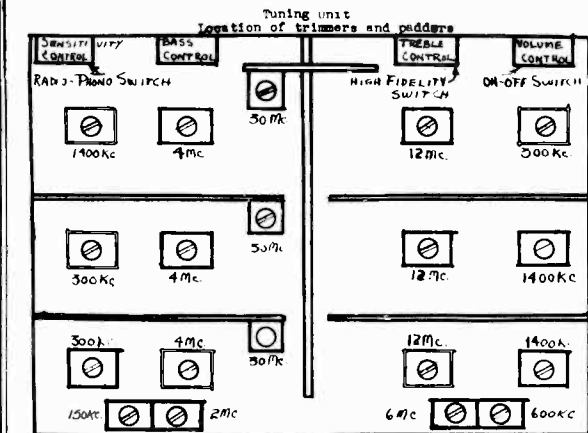
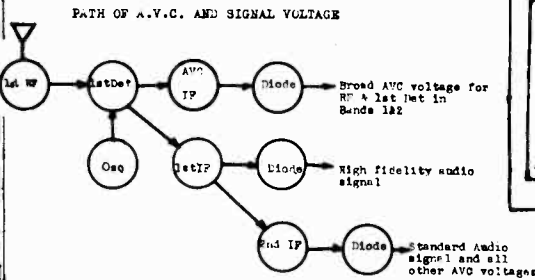
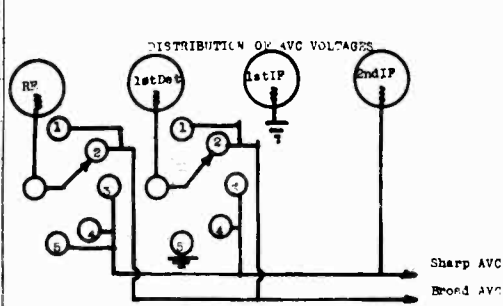
BAND - SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND

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MODEL 5181



NUMERALS INDICATE FREQUENCIES AT WHICH THE VARIOUS TRIMMERS AND PADDERS ARE ADJUSTED.

ALIGNMENT WITH OUTPUT METER

- Short either side of the broadcast K. F. coil trimmer to ground. Remove the first detector (6L7) grid cap and apply a 456 K. C. modulated signal. The fidelity switch must be in the sharp position (left). Remove the oscillator tube (41). Align the trimmers of the third, second and first I. F. transformers for maximum output in the order given.
- Amplified A. V. C. and Band 2 adjustment:
Put the cap back on the 6L7. Place the 41 in its socket. Set dial at 1400 K. C. Feed 1400 K. C. signal from the generator to the set. Adjust oscillator, R. F. and antenna trimmers for maximum signal. Remove the short from the Broadcast K. F. coil trimmer being careful not to alter the setting of either the set or generator. Set both A. V. C. I. F. trimmers for minimum output. Now turn dial to 600 K. C. and feed a 600 K. C. signal from generator and adjust padder while rocking variable slightly back and forth for best adjustment. Repeat 1400 adjustment.

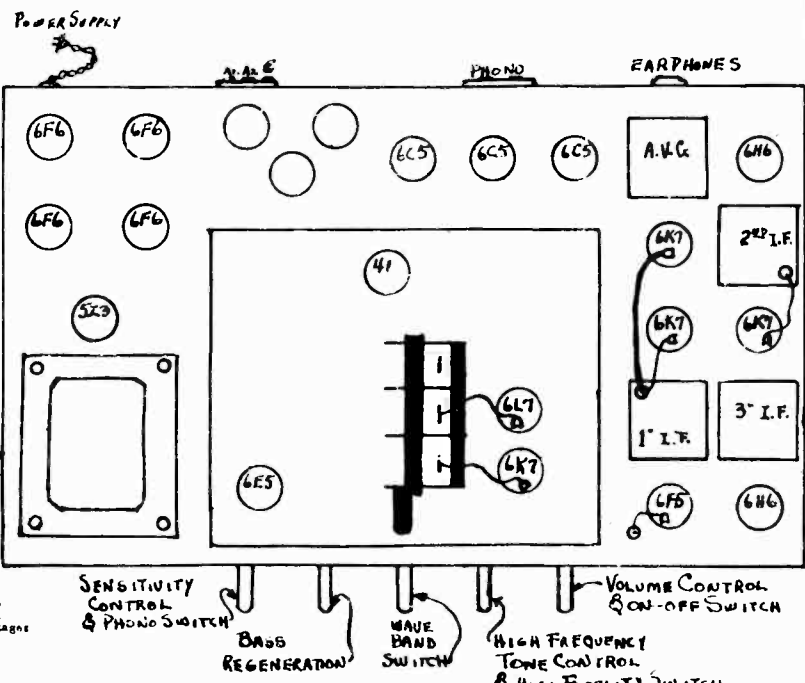
ADJUSTMENT OF OTHER BANDS

Band 1

Oscillator, R. F., and antenna trimmers are adjusted at 300 K. C. The padder is adjusted at 150 K. C. Repeat 300 K. C. adjustment.

Band 3

Oscillator, R. F., and antenna trimmers are adjusted at 4 M. C. The padder is adjusted at 2 K. C. Repeat 4 M. C. adjustment.



Socket Voltage Readings

Tube	Heater Volts	Meter 1000 ohms per volt			
		Max. Sensitivity	S. G.	Cathode	Plate
6K7 R. F.	6.3	76	1.7	250	6
6L7 1st Det.	6.3	76	2.2	220	4
41 Osc.	6.3		0	160	17
6K7 1st I. F.	6.3	90	2.4	230	8
6K7 2nd I. F.	6.3	90	2	210	7
6K7 A.V.C.	6.3	90	2.2	230	7
6F5 1st audio	6.3		.8	70	2
6G5 Phase inverter	6.3		2.1	65	1
6E5 2nd audio	6.3		6.6	230	6
6G6 3rd audio	6.3	Bias 38 V	0	340	24
5Z3 Rectifier	5		3.0	AMS 400-400	140
6G5 Tuning Eye	6.3		0	90	3

Voltage Rating: 105-125 Volts A. C. 50-60 Cycles

Power Consumption: 100 Watts

Type and Number of Tubes: 4-6K7, 4-6F6, 3-6G5, 2-6H6, 1-5Z3, 1-6F5, 1-6L7, 1-6E5, 1-41

Frequency Ranges: Band 1 140-380 K. C.

Band 2 550-1800 K. C.

Band 3 1800-5000 K. C.

Band 4 5000-14,000 K. C.

Band 5 14,000-38,000 K. C.

Alignment Frequencies: 150, 300, 456, 600, 1400, 2000, 4000, 6000, 16,000, 30,000 K. C.

Band 4

Oscillator, R. F., and antenna trimmers are adjusted at 12 M. C. The padder is adjusted at 6 M. C. Repeat 12 M. C. adjustment.

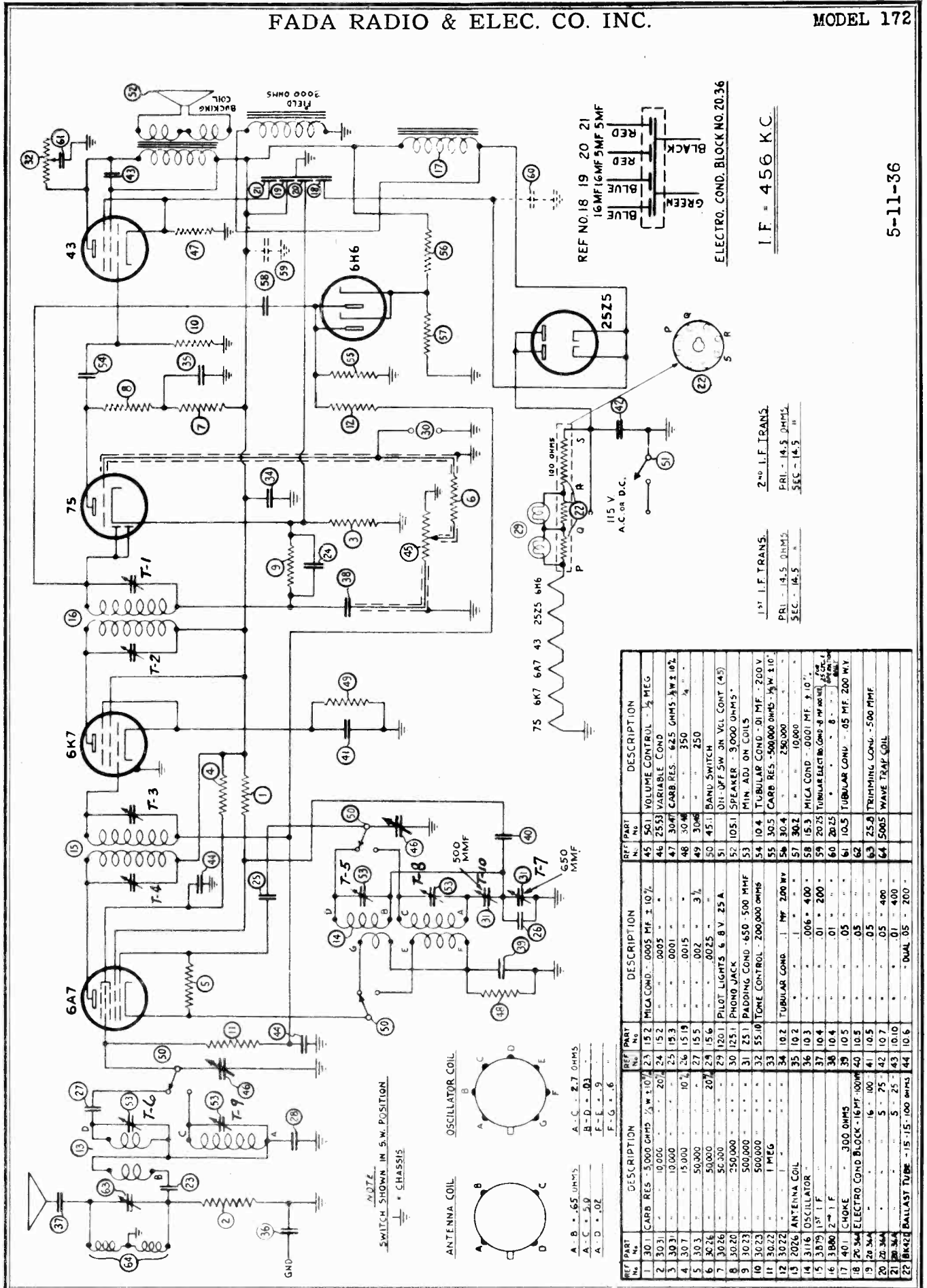
Band 5

Oscillator, R. F., and antenna trimmers are adjusted at 30 M. C. The padder on this band is fixed.

It is of the utmost importance when making all adjustments to keep the output of the generator just high enough to give a reasonable deflection on the output meter. If strong signals are used in alignment, your adjustments will be of very little value. This does not apply to the amplified A. V. C. adjustments where a strong signal is necessary.

FADA RADIO & ELEC. CO. INC.

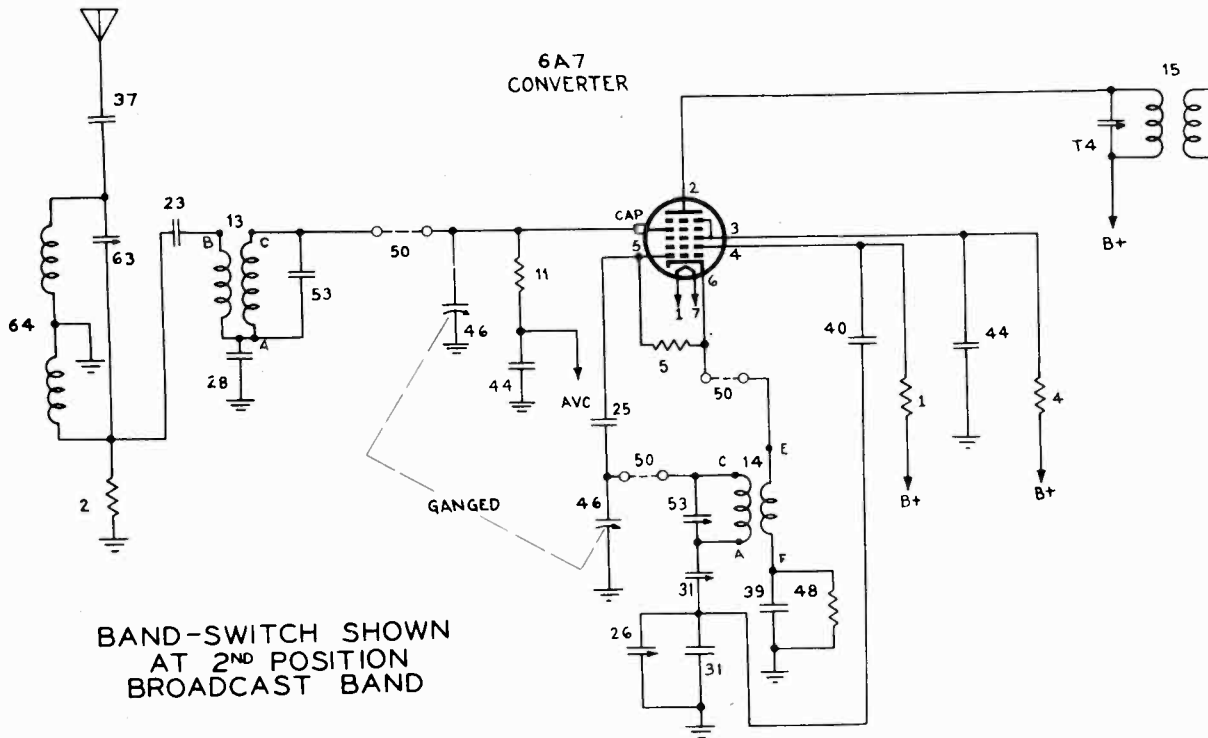
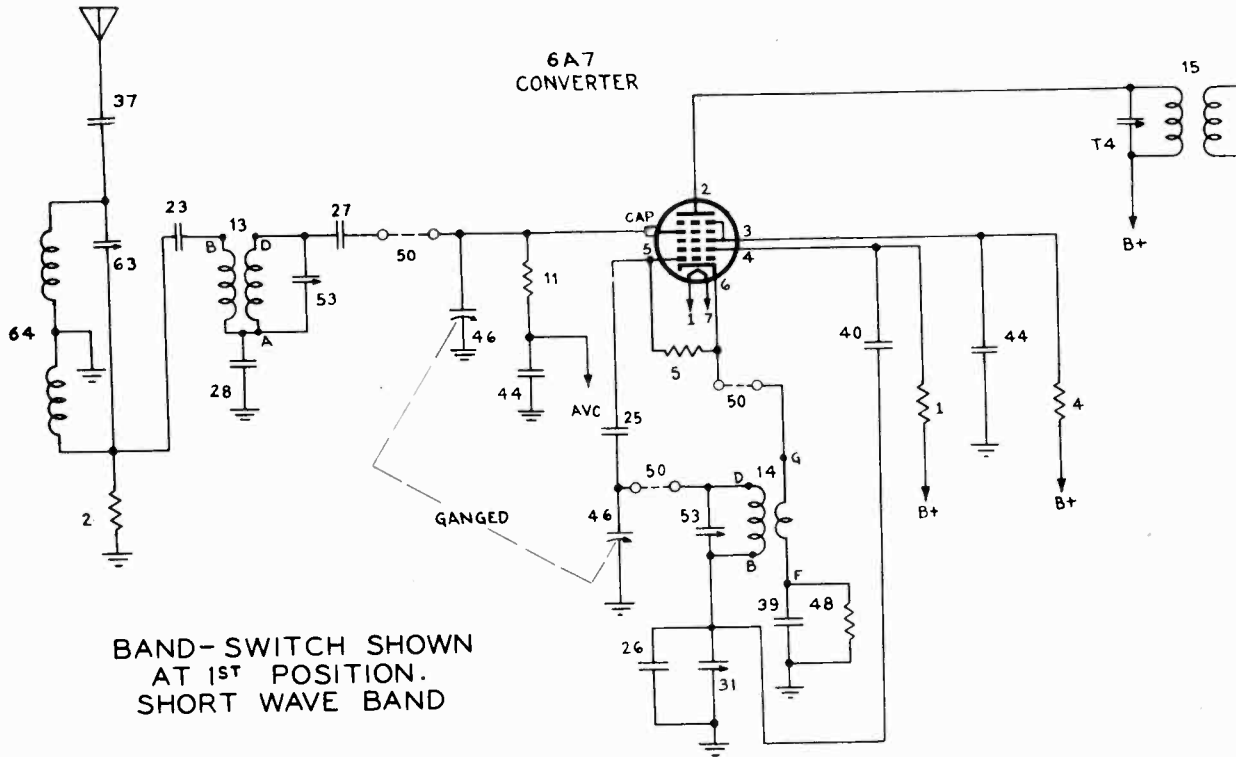
MODEL 172



©John F. Rider

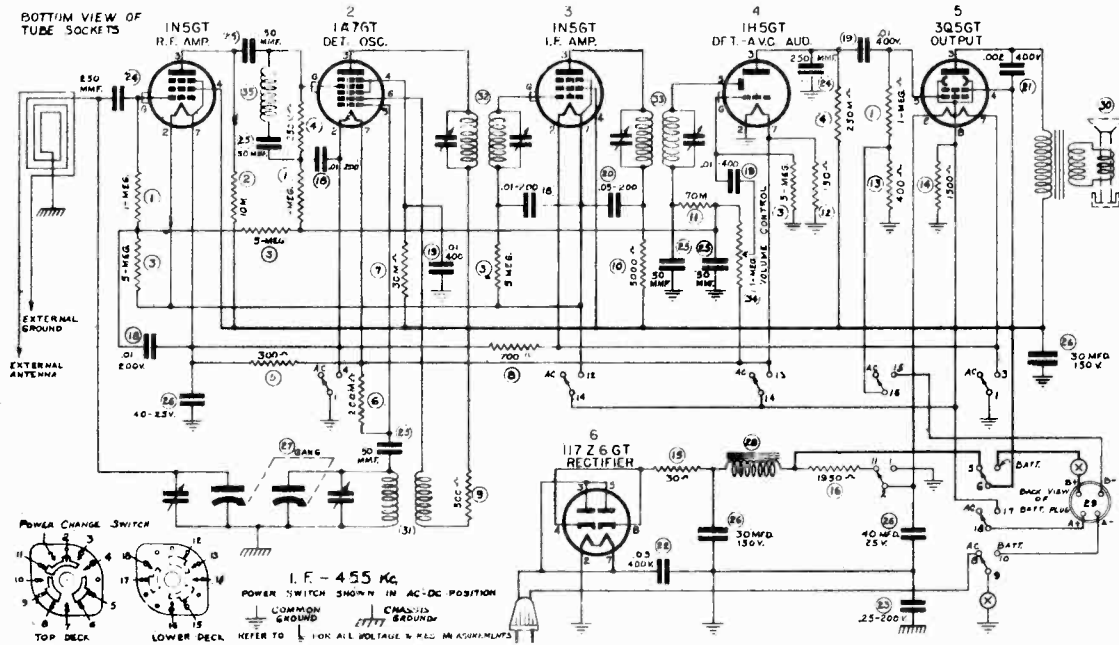
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FARNSWORTH TELEV. & RADIO CORP.

MODEL BT-68



WATTS
VOLTAGE

AT 117 VOLTS A.C.
A.C.

30
105-125

Ref. No.	Old Part No.	New Part No.	DESCRIPTION	List Price
1	771-24	77218	1 Meg 1/2 Watt	\$.15
2	771-14	77212	10 M Ohms 1/2 Watt	.15
3	773-27	77272	4.7 Megs 1/2 Watt	.15
4	773-21	77216	220 M Ohms 1/2 Watt	.15
5	77-90	77260	330 Ohms 1/2 Watt	.15
6	77-89	77216	220 M Ohms 1/2 Watt	.15
7	77-85	77267	33 M 1/2 Watt	.15
8	77-83	77262	1000 Ohms 1/2 Watt	.15
9	77-94	77261	470 Ohms 1/2 Watt	.15
10	77-93	77211	4700 Ohms 1/2 Watt	.15
11	77-88	77214	100 M Ohms 1/2 Watt	.15
12	774-1	77234	150 Ohms 1/2 Watt Wire Wound	.15
13	77-81	77261	470 Ohms 1/2 Watt	.15
14	771-10	77263	1500 Ohms 1/2 Watt	.15
15	77-79	77257	33 Ohms 1/2 Watt	.15
16	77-86	77086	1950 Ohms 5 Watt	.50
17	253-2	25215	.1 Mfd. 600 V.	.15
18	25-94	25194	.01 Mfd. 600 V.	.15
19	255-1	25194	.01 Mfd. 600 V.	.15
20	256-1	25196	.05 Mfd. 600 V.	.15
21	255-4	25185	.002 Mfd. 600 V.	.15
22	255-2	25196	.05 Mfd. 600 V.	.25
23	256-3	25054	.25 Mfd. 200 V.	.25
24	253-2	25187	250 M. M. F. Mica	.15
25	253-5	25193	50 M. M. F. Mica	.15
26	25-61	25061	Elec. Condenser 2-30 Mfd.—150 V., 2-40 Mfd. 25 V.	1.60
27	26-64	26064	Gang Tuning Condenser	2.40
28	38-202	38202	Choke	.90
29	80-70	80070	Battery Plug	.10
30	81-70	81070	Speaker and Output Transformer	4.30
31	38-197	38197	Oscillator Coil	.50
32	38-199	38199	1st. I. F. Transformer	1.30
33	38-201	38201	2nd. I. F. Transformer	1.60
34	78-27	78027	Volume Control 1 Meg	1.10
35	38-198	38198	Wave Trap Coil	.45
	90-43	90043	Power Change Switch	1.50
	59-66	59066	Knobs	.15
	31-89	31089	Dial Scale	.20
	11-83	11083	Dial Pointer	.15
	27-137	27137	Line Cord	.35
	56-411	56411	Escutcheon	1.35

Prices subject to change without notice.

FARNSWORTH TELEV. & RADIO CORP.

THIS SIX TUBE AC-DC OR FIVE TUBE BATTERY OPERATED PORTABLE RECEIVER HAS A BUILT IN LOOP ANTENNA. AN OUTSIDE ANTENNA MAY BE CONNECTED BY LOOSENING THE SCREW IN THE LOWER RIGHT HAND CORNER OF THE BACK COVER. A GROUND SHOULD BE CONNECTED TO THE SCREW IN THE LOWER LEFT HAND CORNER WHEN AN OUTSIDE ANTENNA IS USED.

ALIGNMENT

A SIGNAL GENERATOR CALIBRATED AT 455 Kc., 1400 Kc., AND 1730 Kc., IS NECESSARY TO PROPERLY ALIGN THIS RECEIVER. AFTER ALIGNING THE I.F. STAGES, REPLACE RECEIVER IN CABINET AND FASTEN LOOP IN NORMAL POSITION BEFORE ALIGNING THE R.F. END THROUGH THE OPENINGS IN THE END OF THE CABINET. THESE OPENINGS ARE CLOSED BY SNAP FASTENERS. THE OSCILLATOR TRIMMER IS NEAREST THE FRONT PANEL AND THE LOOP TRIMMER IS DIRECTLY BEHIND IT.

TABULATION FOR ALIGNMENT

STEPS	USE IN SERIES WITH GENERATOR	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	TO OBTAIN
1.	.02MFD IN EACH LEAD CONNECT HIGH SIDE OF GENERATOR TO GRID CAP OF 1A7G TUBE	455 Kc.	QUIET POINT	2ND I.F. TRIMMERS	TOP OF I.F. TRANS.	MAXIMUM OUTPUT
				1ST I.F. TRIMMERS		
2.	Loop**	1730 Kc.	MINIMUM	OSCILLATOR TRIMMER*	SEE NOTE BELOW	
3.	Loop**	1400 Kc.	1400 Kc. & ROCK GANG	LOOP TRIMMER*		

*SEE PRECEDING PARAGRAPH FOR LOCATION OF TRIMMERS.

**LOOP TO CONSIST OF FIVE TO TEN TURNS OF INSULATED WIRE WOUND ON A THREE OR FOUR INCH FORM TO BE CLOSELY COUPLED TO THE LOOP ANTENNA IN THE RECEIVER.

SUGGESTED BATTERY 1 GENERAL 60A-4L 1 RAY-O-VAC AB-87
1 BURGESS 6FA-60

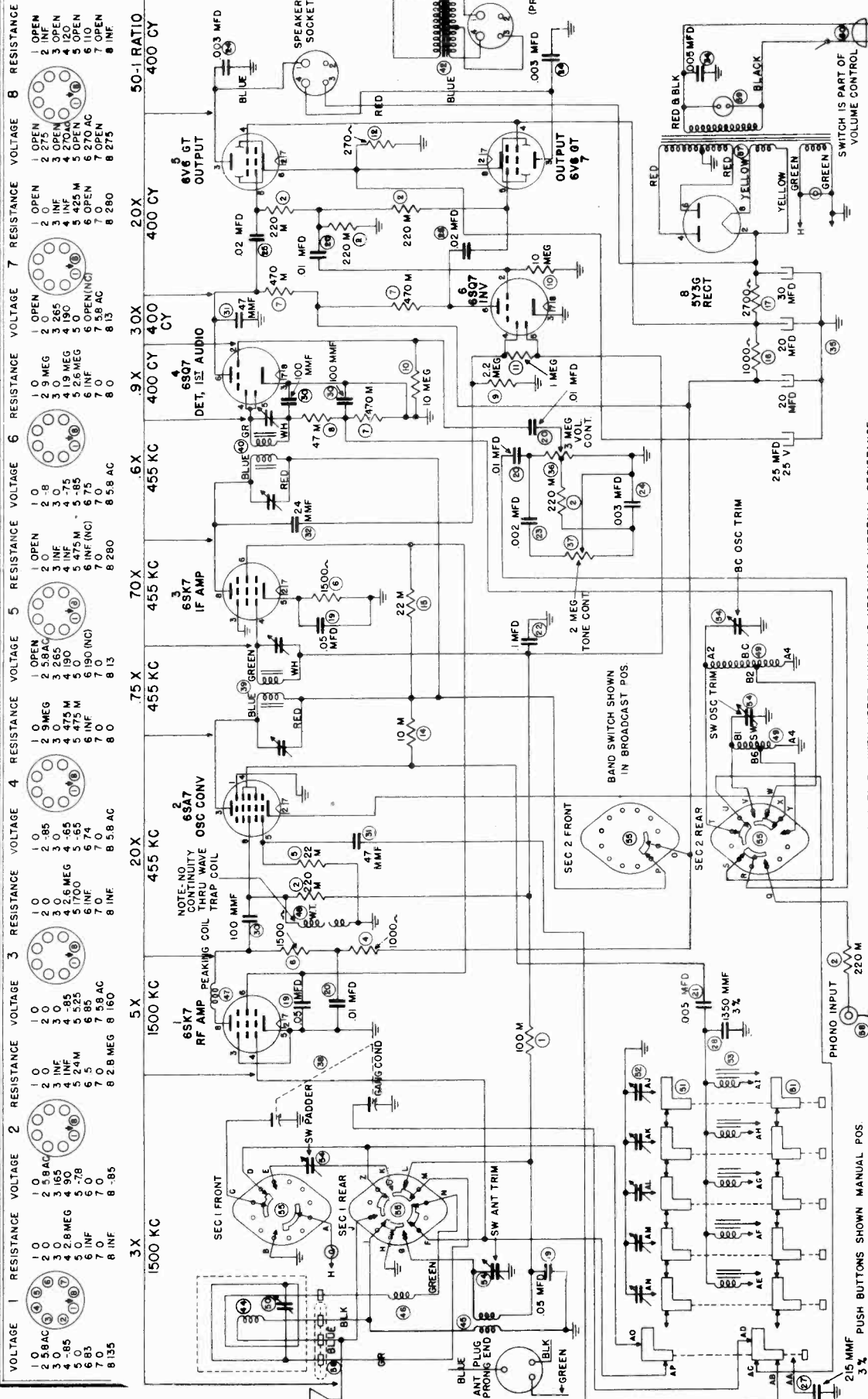
VOLTAGE AND RESISTANCE DATA

	1	2	3	4	5	6	7	8	Cap.
1 - 1N5GT									
Volts	open	4.2	97	100	0	16	2.8	open	1.8
Res.	open	61	3500	2500	0	6 meg.	40	open	1.5 meg.
2 - 1A7GT									
Volts	open	2.8	100	64	1.8	100	1.4	100	1.8
Res.	open	40	2500	2500	200M	2500	22	2500	1.5 meg.
3 - 1N5GT									
Volts	0	5.6	100	100	open	0	4.2	open	0
Res.	open	80	2500	2500	0	0	61	0	5 meg.
4 - 1H5GT									
Volts	open	0	47	0	0	47	1.4	open	0
Res.	open	0	1 meg.	0	1 meg.	1 meg.	22	open	5 meg.
5 - 3Q5GT									
Volts	open	8.4	93	100	0	open	5.6	9	
Res.	open	9.5	2500	2000	1 meg.	open	80	75	
6 - 117Z6GT									
Volts	open	117 AC	117 AC	123	117 AC	0	0	123	
Res.	open	500	500	2500	500	0	0	2500	

NOTES: On d-c voltage readings meter should have internal resistance of at least 10 megohms. Readings taken with no signal. Line voltage 117 V. A. C.

MODELS EK-C81, EK-C82, FARNSWORTH TELEV. & RADIO CORP.
EK-O83, EK-C81

Chassis
C-156, C-157,
C-193



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RECORD CHANGER : Farnsworth P-51, RCD. CH. P.15-1

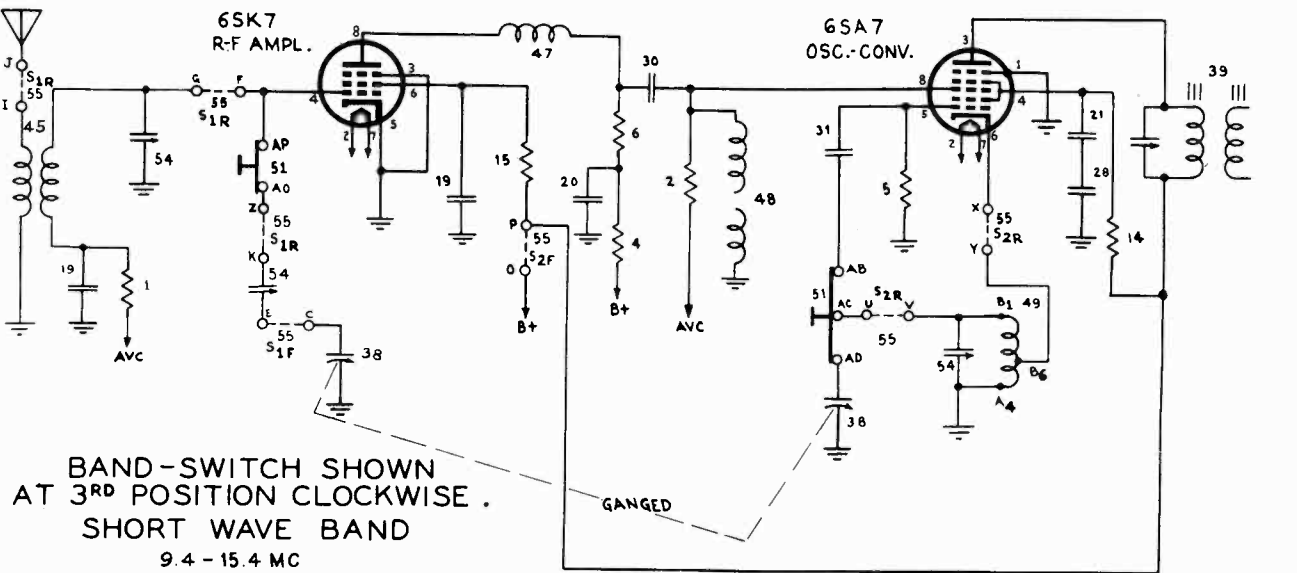
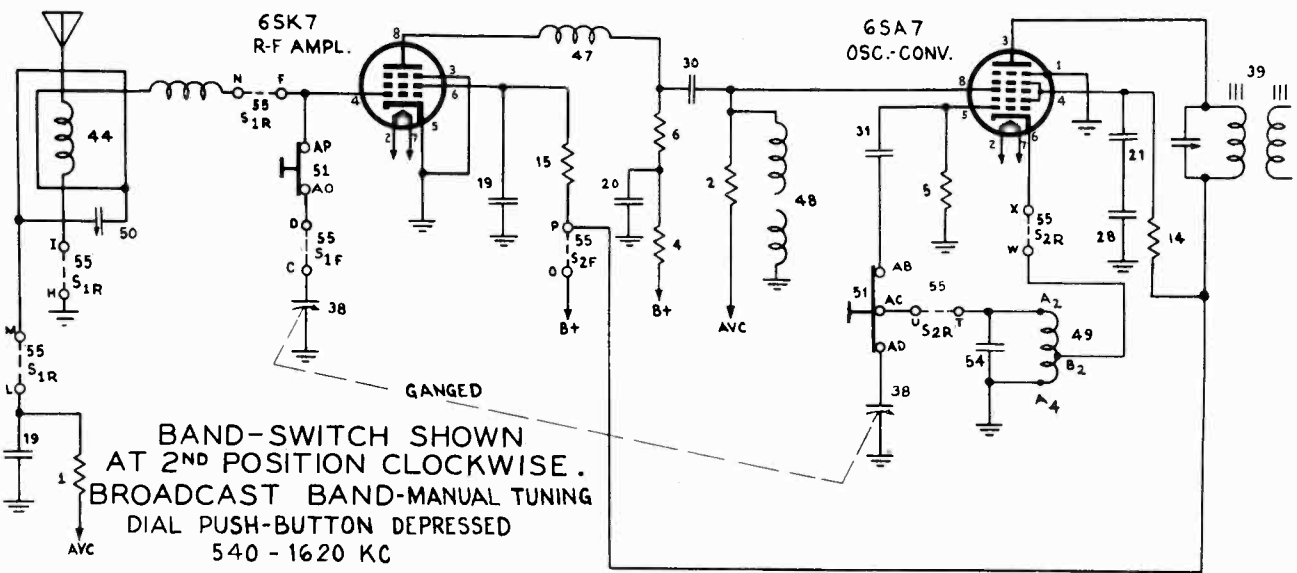
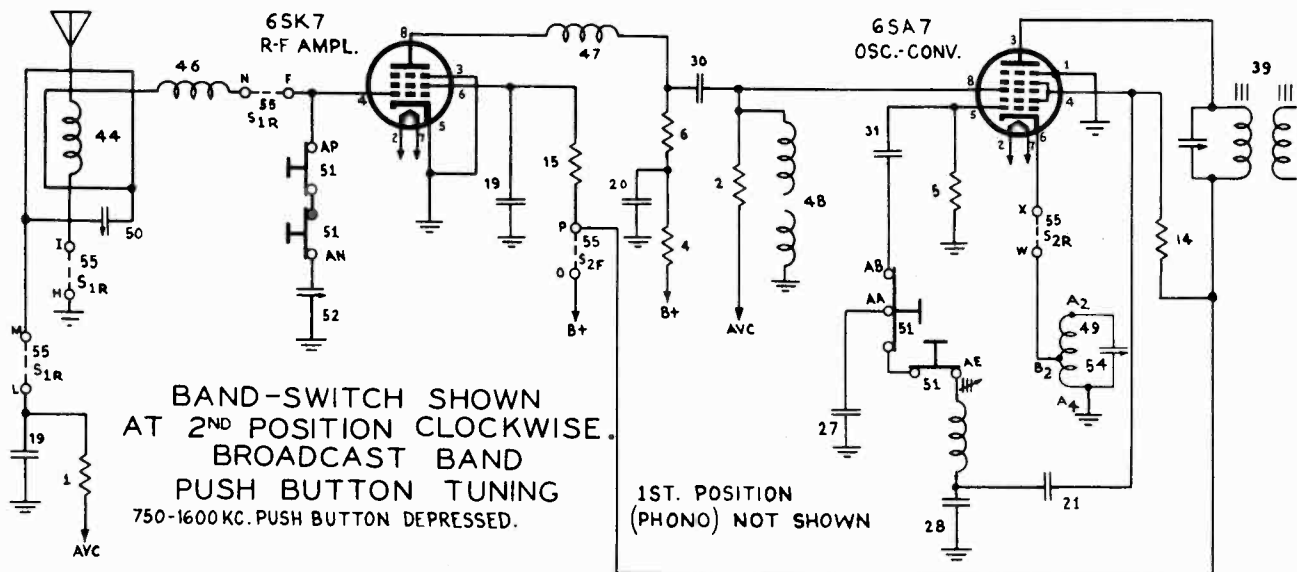
MODEL	CHASSIS	Tube	Power	Frequency
EK-081	C-156	Eight Tube A. C. Two Band Superheterodyne	Watts	90
EK-082	C-157	Broadcast Band	At 117 Volts A.C.	105-125
EK-083	C-193	Short Wave Band	Volts	A. C.
EK-681	C-156	Intermediate Frequency	455 Kc.	

ALL READINGS TAKEN WITH METER HAVING 10 MEGOHMS INTERNAL RESISTANCE
115 V AC 60 CYCLES

ELECTRICAL SPECIFICATIONS

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MODELS EK-081, EK-082, FARNSWORTH TELEV. & RADIO CORP.
EK-083, EK-681



MODELS GK-140. FARNSWORTH TELEV. & RADIO CORP.
 GK-141.
 GK-142, GK-143, GK-144,
 Preliminary

FM GAIN MEASUREMENTS

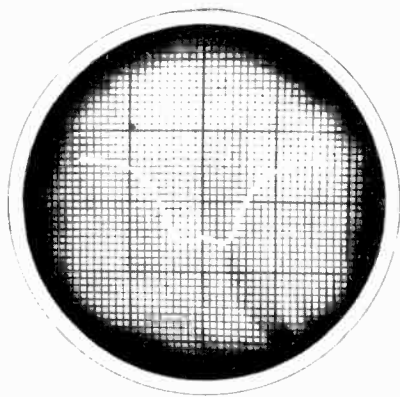
EQUIPMENT REQUIRED

FM Signal Generator, modulated at 400 cycles,
 22.5 Kc deviation.

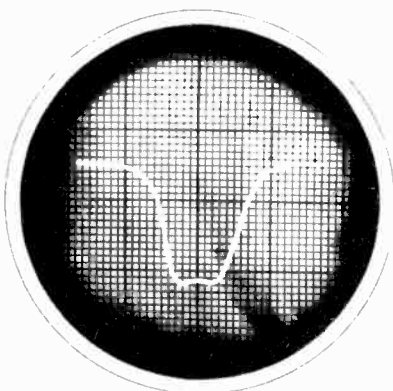
Output Meter.

Output meter connected across secondary of out-
 put transformer, 4 ohms impedance. Signal gen-
 erator connected at gang capacitor. Volume con-
 trol, Bass control and Treble control at maximum.

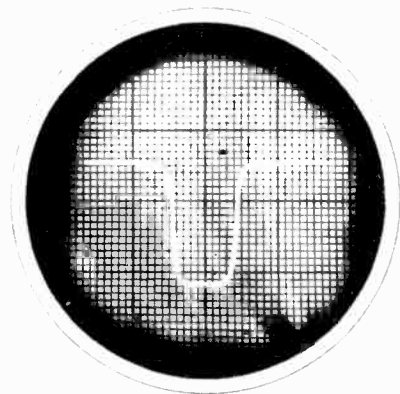
SIGNAL GENER- ATOR TO	DUMMY	MICROVOLTS INPUT	OUTPUT	GAIN
Ant.	330 ohms	20	.5 watt	1.5X
RF	.1 Mfd.	30	.5 watt	
Conv. Grid	.1 Mfd.	130	.5 watt	4.33X



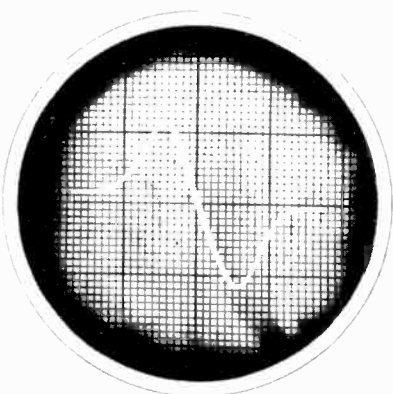
(1)



(2)



(3)



(4)

F-M
 ALIGNMENT
 OSCILLOGRAMS

These curves were obtained under ideal conditions and show curves to be expected. They should be duplicated as nearly as practicable.



FARNSWORTH TELEV. & RADIO CORP.

MODELS
GK-140, GK-141,
GK-142, GK-143, GK-144,
Preliminary

SETTING STATION TUNING BUTTONS
Allow the set to warm up for about one-half hour before beginning to set the push buttons.
Make a list of the eight stations to be set up.
Move the program switch to proper band for the station to be set up.
Select a push button for this station.
Remove the push button, exposing the push button lock screw.

Firmly tighten the push button locking screw.
CAUTION—Do not use a large handle screw driver as damage may result. We recommend type of screw driver used for knob setscrew.

Continue setting each button the same way.
After all the stations are set up, replace the push buttons and place the station call letter tab found in the call letter kit on the proper button.

CAUTION

When setting up push buttons it is well to select a time when the stations are not carrying "Chain" programs as adjustments might be made on the wrong stations.

Alignment of AM Bands

EQUIPMENT REQUIRED

A calibrated signal generator having fundamental frequencies from 455 Kc to 15 MC. In addition to the signal generator a crystal calibrator is a great convenience.

The indicating device for showing correct alignment may be a high resistance A.C. voltmeter, a vacuum tube voltmeter or a Cathode Ray oscilloscope.

The A.C. voltmeter can be used either across the voice coil of the loud speaker or if the meter range is high enough, from plate to plate in the output stage (don't forget a condenser (0.1 Mfd.) to keep

12. Connect 4 MFD electrolytic capacitor that was previously disconnected, and take off load resistor on discriminator primary.

13. Connect oscilloscope to audio output terminal of discriminator. There are several points where contact can be made and can be identified as the circuit connected to the terminal on the terminal board (nearest the discriminator transformer) to which the shielded lead is connected.

14. With sweep signal input to converter grid, align discriminator transformer for conventional discriminator pattern, as in Fig. 4.

15. Connect signal generator to converter tube grid through .1MFD capacitor. An unmodulated signal input of 65 microvolts at 10.7 Mc should develop .55 volt rise on the AVC line with voltohyst connected to AVC line through 1 megohm resistor.

Alternate FM IF Alignment Procedure

Equipment necessary: RF Signal Generator and Vacuum tube voltmeter.

1. Connect V.T.V.M. from ground to audio lead of ratio detector (discriminator). Connect generator tuned to 10.7 mc. to grid of third FM IF tube through 0.1MFD capacity. Use minimum signal necessary for good indication in all following:

2. Turn secondary slug of ratio detector transformer (top slug) out as far as it will turn.
3. Tune primary for maximum output.
4. Connect generator to grid of second FM IF tube.
5. Tune primary and secondary of third FM IF transformer for maximum output.

6. Connect generator to grid of first FM IF tube.

7. Tune primary and secondary of second FM IF transformer for maximum output.

8. Connect generator to converter grid through 10,000 ohm resistor and 0.1 MFD capacitor.

9. Tune primary and secondary of first FM IF transformer for maximum output.

10. Tune secondary of ratio detector transformer for zero or minimum output.

11. The FM IF system should now be aligned. Tuning the signal generator equal amounts on each side 10.7 mc should produce equal deflections of opposite polarity on the VTVM. Deflections unequal by more than 10 per cent or so indicate inaccurate alignment.

FM RF Alignment

1. Equipment Required:
a. RF Signal Generator. Range 88 to 108 MC.
b. Output Meter.

c. Insulated Screw Driver.
2. Connect RF signal generator in series with 400 ohm carbon resistor to "high" side of FM antenna socket. Connect output meter across voice coil of speaker.

3. Set tuning control for pointer to calibrate at the equivalent of half way between channels 300 and 301.

4. Apply 108 MC Signal.

5. Set converter and antenna trimmers at minimum capacity.

6. Adjust oscillator trimmer by tuning from maximum capacity to first signal that is heard, and peak for maximum output.

7. Adjust antenna and converter trimmers for maximum output.

8. Set tuning controls so dial pointer calibrates at the equivalent of half way between channels 200 and 201.

9. Apply 88 MC signal.

10. Adjust oscillator, converter, and antenna slugs to maximum output.

11. Repeat operations 3 to 10 inclusive.
NOTE: The degree of adjustment required in the tuning of the oscillator slug will determine the number of times operations 3 to 10 must be repeated until no further gain in sensitivity is obtained.

12. Carefully tune across the entire FM band for the observation of the dead or weak spots that may be a resultant of improper alignment or defective components. This can be determined by carefully noting the degree of receiver noise, that is, high noise generally is accompanied by good sensitivity.

Oscilloscope Alignment FM Band

FM IF ALIGNMENT

1. Equipment Required: Oscilloscope, 10.7 MC sweep generator, voltohyst, and RF signal generator.

2. Set band switch in FM position.

3. Make connection from vertical deflection amplifier of oscilloscope to pin #3 of 6B6 discriminator tube. Make certain that the 4MFD electrolytic condenser is disconnected from this same circuit. It is necessary that the lead to the oscilloscope be shielded, of low total capacity, and connection to receiver isolated by means of a 1 meg resistor.

4. Connect sweep generator to last FM IF grid through a .1 MFD coupling capacitor.

5. Load primary of discriminator transformer with resistor of approximately 3000 ohms. Back out secondary slug (top slug) as far as it will turn. Align primary (bottom slug) to obtain curve similar to figure 1. This does not constitute a final alignment of discriminator, but is a convenient expedient to assist in I.F. alignment.

6. Shift connection of sweep signal generator to the grid of the second FM IF tube.
NOTE: As alignment moves from stage to stage, reduce input instead of reducing oscilloscope gain.

7. Align third FM IF transformer for a symmetrical flat top pattern. (Fig. 2)

8. Shift signal generator to the grid of the first IF tube.

9. Align second IF transformer in same manner as described in Section 7

Note that the width of the nose of the curve is the same as before, but the sides have become steeper, as in Fig. 3.

10. Connect the signal generator to the grid of the converter tube grid in series with 10,000 ohm resistor and a .1MFD capacitor, or loosely couple by stray capacity of an insulated wire.

11. Align first FM IF transformer in the same manner as in Section 7.
Note that the sides of the curve have further steepened, but that the nose of the curve has retained approximately the same width as in Fig. 3.

FEDERAL TEL. & RADIO CORP.

MODEL E1025TB

POWER OUTPUT RATING: For 105-125 v. operation: Undistorted 1.1 watts; maximum 1.5 watts. For 210-250 v. operation: undistorted 1.9 watts; maximum 2.8 watts.

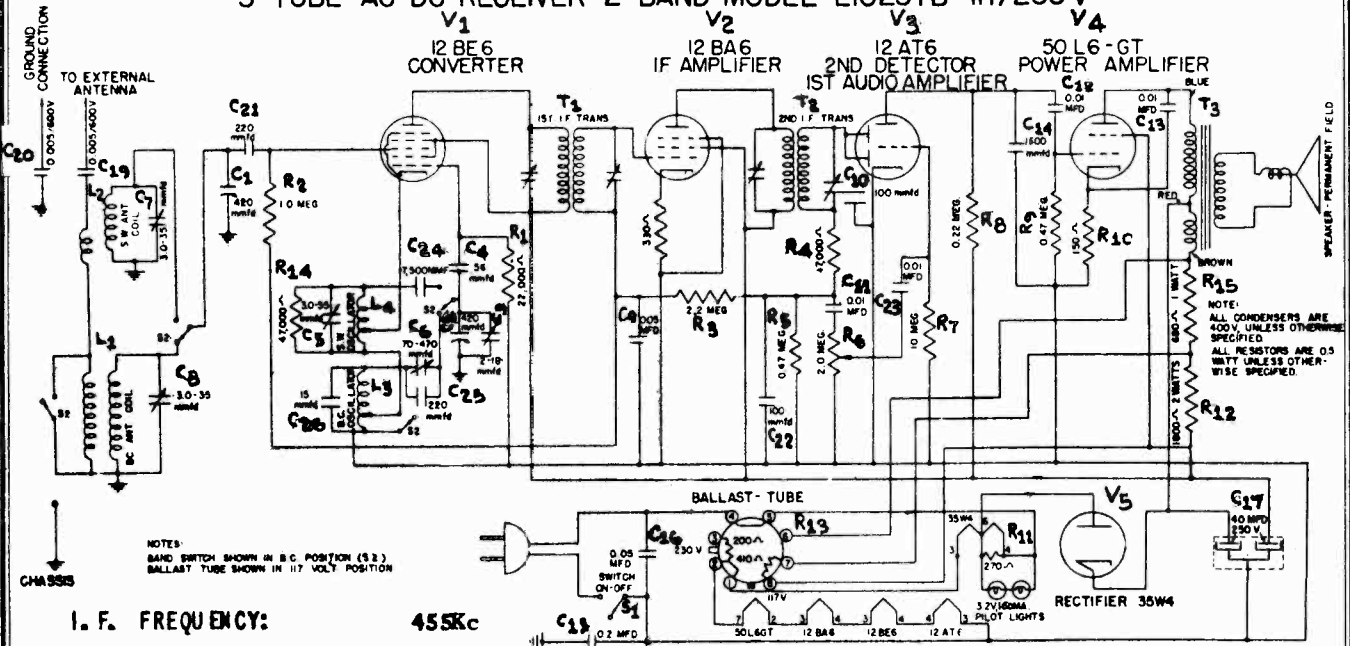
VOICE COIL IMPEDANCE: 3.2 ohms at 400 cycles.

POWER REQUIREMENTS: 30 Watts at 105-125 volts 50-60 cycles AC, or 105-125 volts DC. 60 Watts at 210-250 volts, 50-60 cycles AC, or 210-250 volts DC.

TUNING RANGES: Broadcast Band 540-1600 kilocycles (555-188 m) International Short Wave Band 6-18 megacycles (50-16.65 m). External.

ANTENNA:

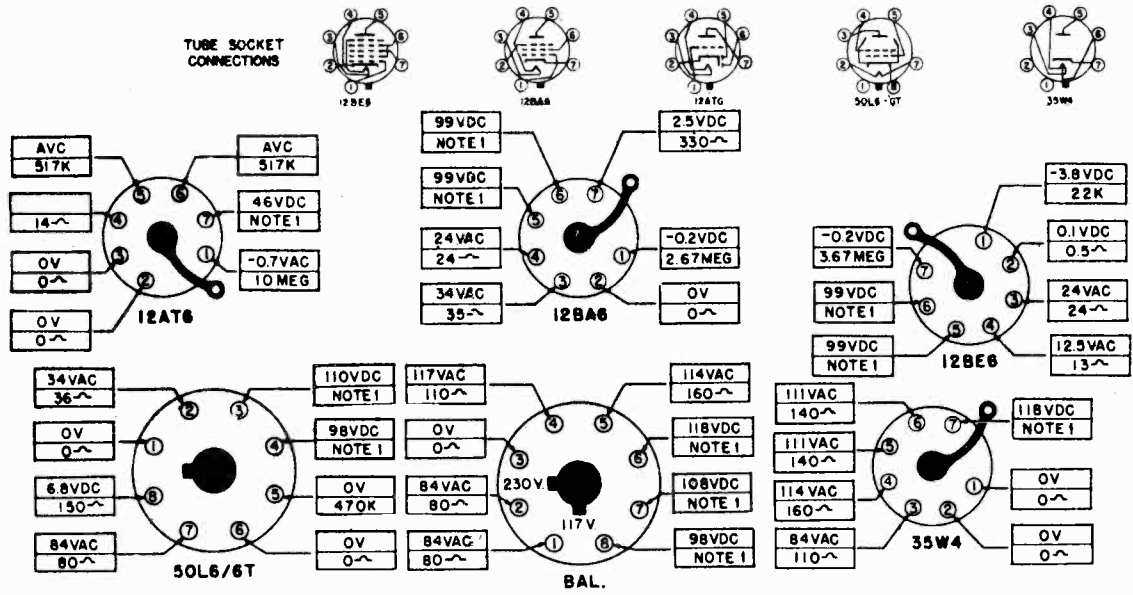
5 TUBE AC-DC RECEIVER-2 BAND-MODEL E1025TB-117/235V



I. F. FREQUENCY:

455Kc

TUBE SOCKET CONNECTIONS

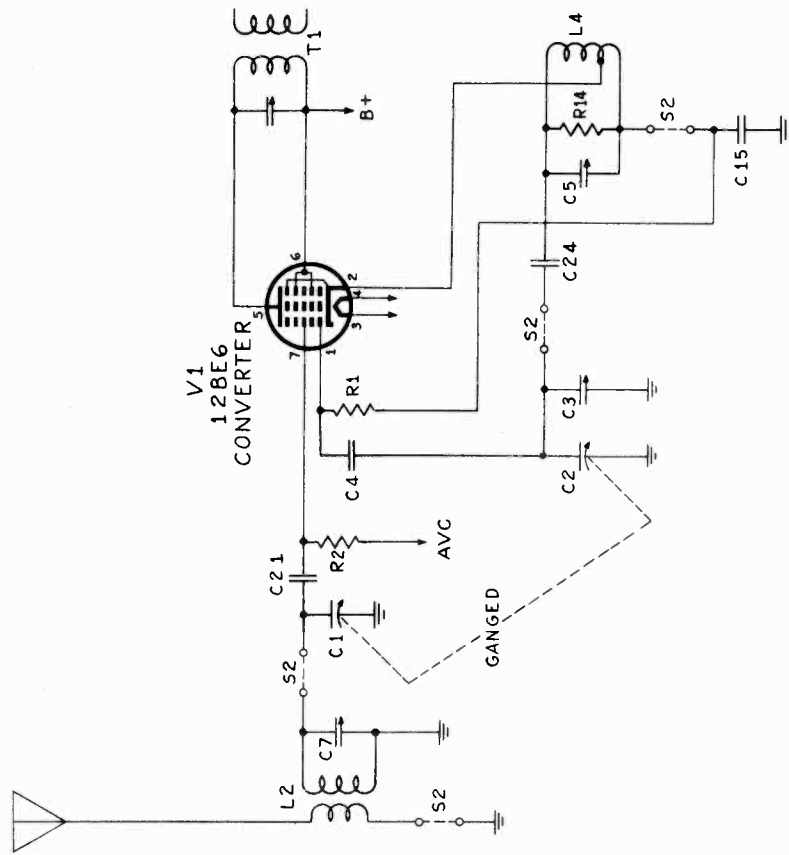


NOTE 1: RESISTANCE READINGS AT THESE POINTS WILL VARY SINCE THEY ARE IN SERIES WITH THE LEAKAGE RESISTANCE OF THE ELECTROLYTIC CONDENSERS WHICH IS SUBJECT TO CHANGE.

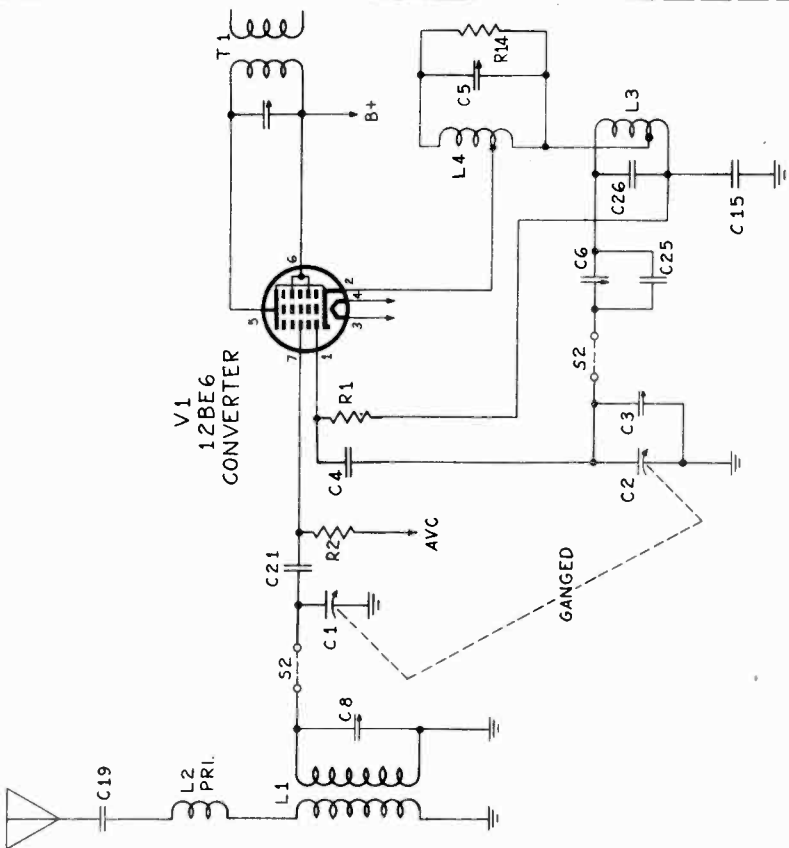
Voltage and Resistance Analysis Chart

Resistance readings at these points will vary since they are in series with the leakage resistance of the electrolytic condensers which is subject to changes. All D.C. measurements were made with a meter having a sensitivity of 20,000 ohms per volt. Ac measurements taken at 1000 ohms per volt. Measured values are from socket pin to circuit ground (pin #3 of 12AT6 socket). Tolerances of component values make possible a variation of 20% in readings indicated in chart. Socket connections are shown as bottom views.

"clarified schematics"



BAND - SWITCH SHOWN
AT 2ND POSITION
SHORT WAVE BAND
6-18 MC.



BAND - SWITCH SHOWN
AT 1ST POSITION
BROADCAST BAND
540-1600 KC.

ALIGNMENT INSTRUCTIONS

Punch marks are provided on the dial back plate at 600 Kc, 900 Kc, 1500 Kc and 1600 Kc for alignment purposes.

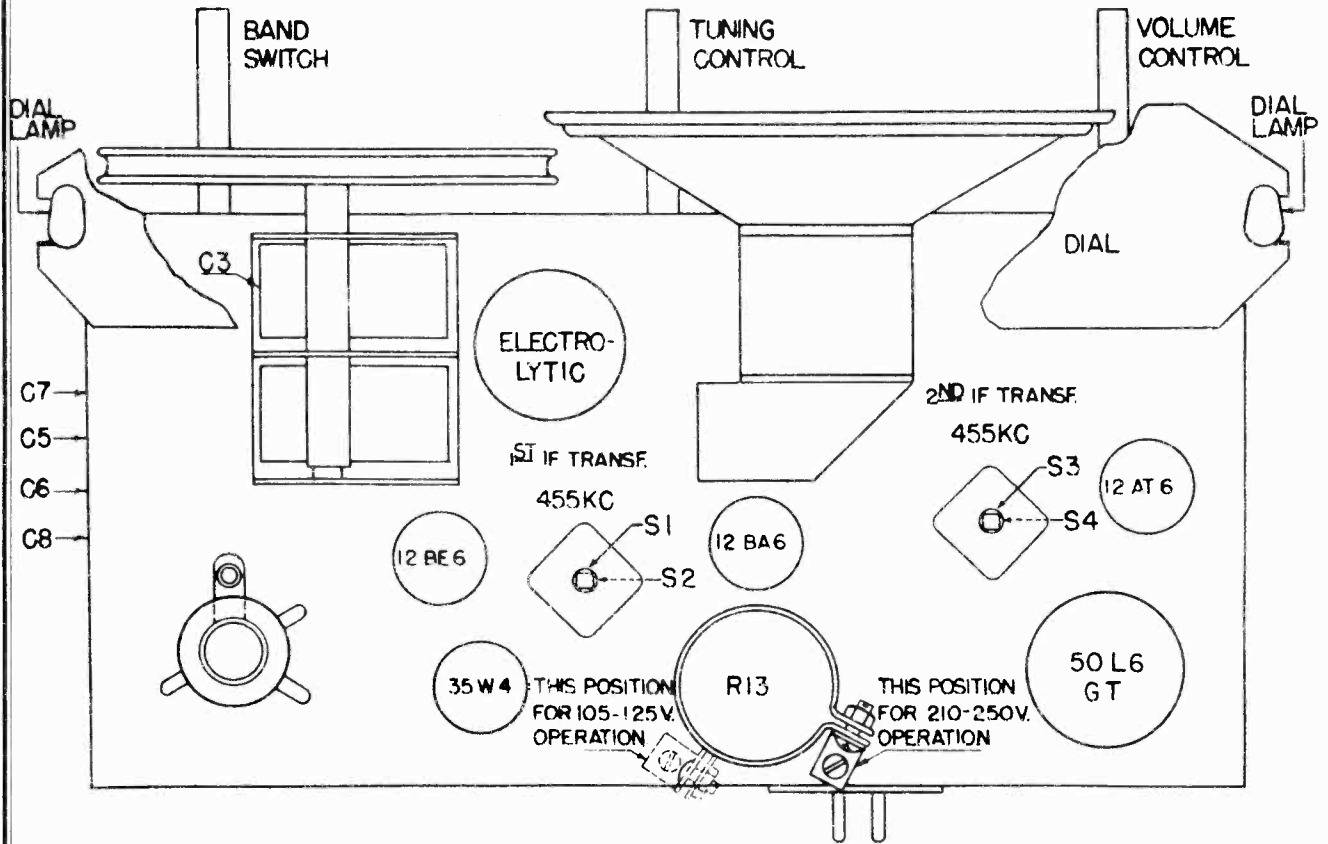
With tuning condenser fully open, set dial pointer to the 1600 Kc punch mark.

Connect output meter across voice coil terminals on speaker frame.

Connect low side of signal generator lead through a .1 mfd coupling condenser to chassis ground.

Connect high side of generator through proper dummy antenna to external antenna lead.

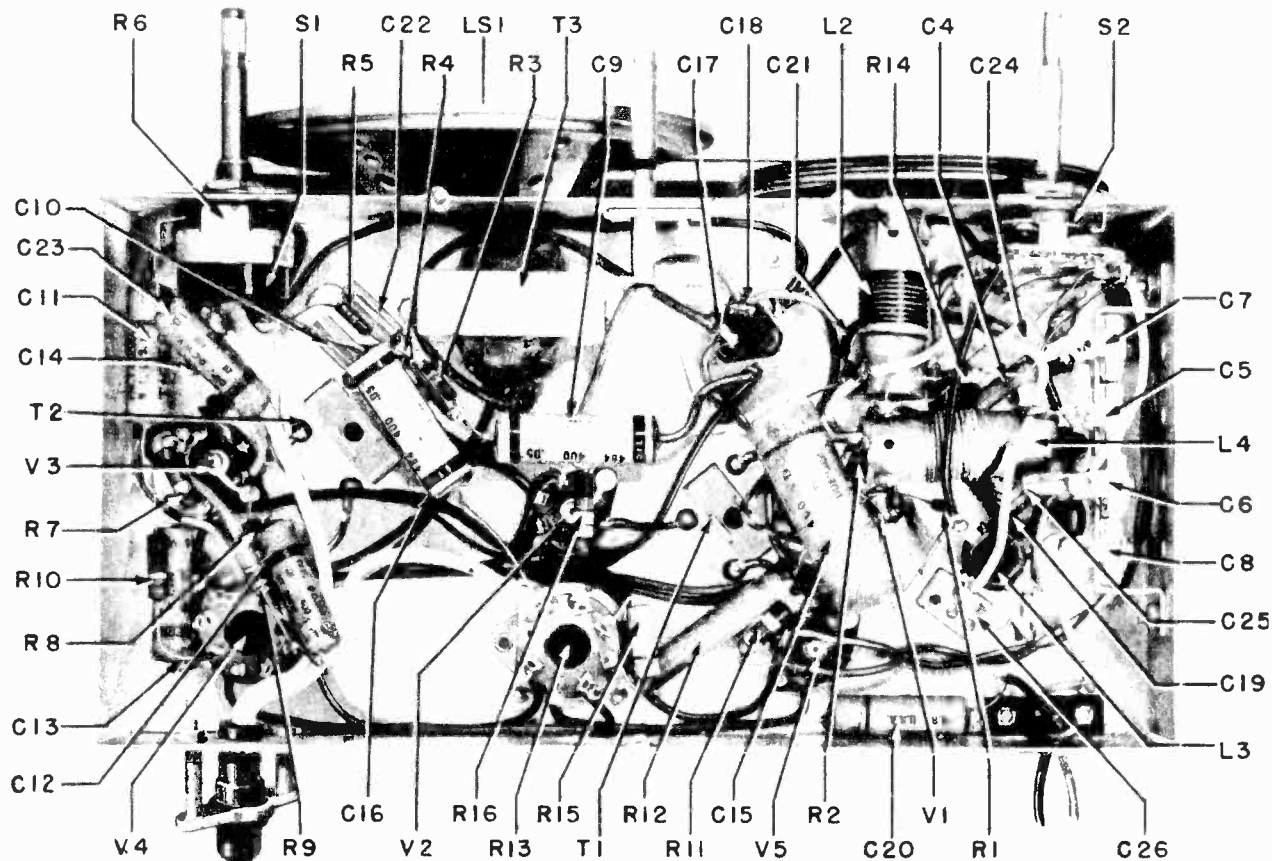
Keep signal generator output at lowest practical level and make the following adjustments for maximum output meter reading in each case.



Top View of Chassis Showing Alignment Adjustment Positions

ALIGNMENT CHART

DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	ADJUSTMENT POINTS
.1 MFD	455 Kc	B.C.	Tuning Condenser Fully Open	S1, S2, S3, S4
200 MMFD	1600 Kc	B.C.	Tuning Condenser Fully Open	C3
200 MMFD	1500 Kc	B.C.	1500Kc	C8
200 MMFD	600 Kc	B.C.	Rock at 600 Kc	C6
200 MMFD	900 Kc	B.C.	900 Kc	Check Osc. Crossover
400 OHMS	18 Mc	S.W.	Tuning Condenser Fully Open	C5
400 OHMS	17 Mc	S.W.	1500 Kc	C7



SCHEMATIC NO. OF PART

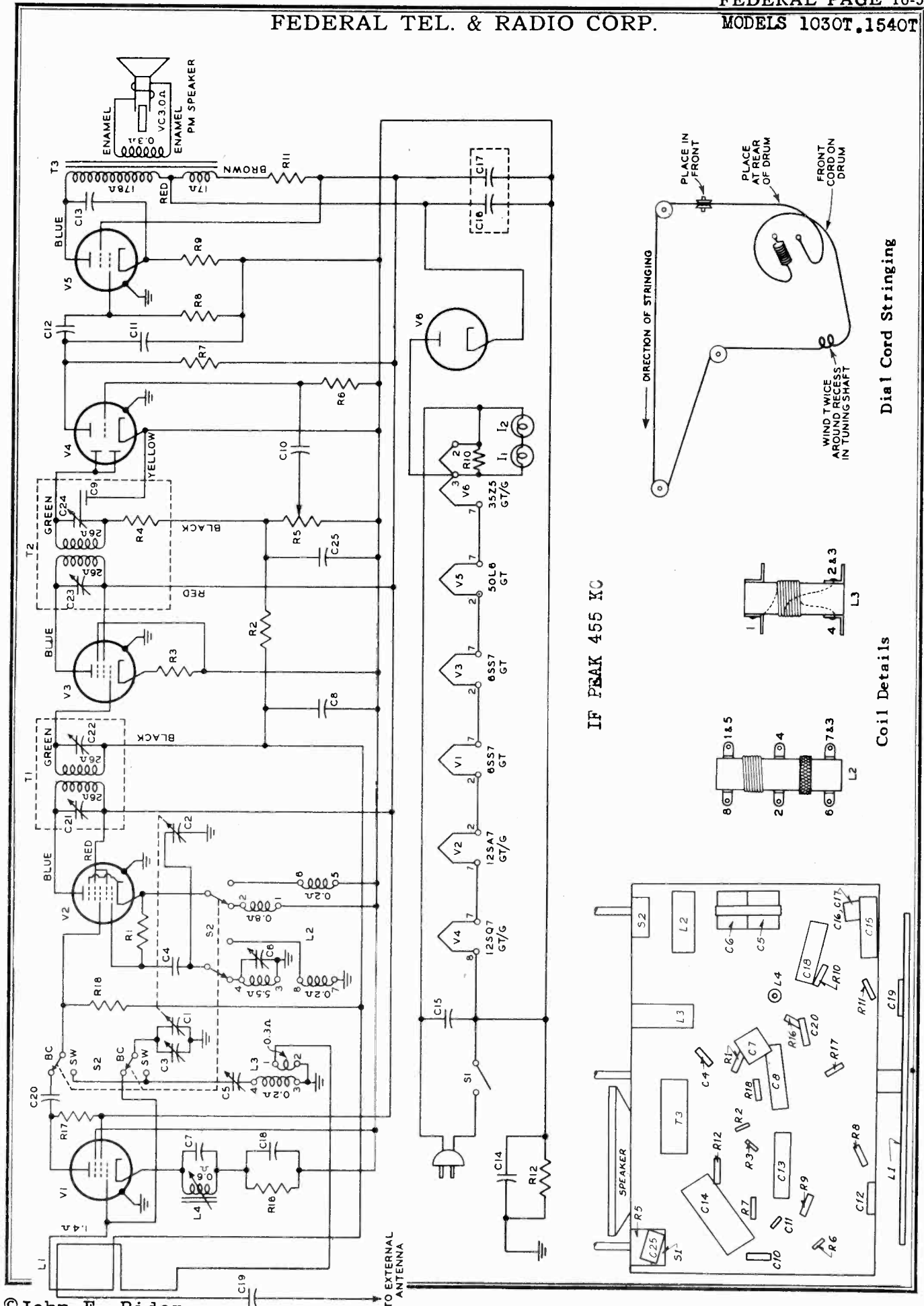
DESCRIPTION

SCHEMATIC NO. OF PART

DESCRIPTION

C1	2 Gang Variable
C2	Part of C1
C3	Part of C2
C4	56 mmfd Mica 10% 500 V D.C. Working
C5	Compression Trimmer 3.0-35 mmfd
C6	Compression Trimmer 70-470 mmfd (Part of C5)
C7	Compression Trimmer 3.0-35 mmfd (Part of C5)
C8	Compression Trimmer 3.0-35 mmfd (Part of C5)
C9	.05 mfd., Tubular, Paper, 400 V D.C. Working
C10	100 mmfd Ceramic, 20%, (Part of T2)
C11	.01 mfd., Paper, Tubular, 400 V D.C. Working
C12	.01 mfd., Paper, Tubular, 400 V D.C. Working
C13	.01 mfd., Paper, Tubular, 400 V D.C. Working
C14	.0015 mfd., Paper, Tubular, 400 V D.C. Working
C15	.2 mfd., Paper, Tubular, 400 V D.C. Working
C16	.05 mfd, Paper, Tubular, 400 V D.C. Working
C17	Electrolytic 2 Section Common Cathode 40 mfd. 250 DCV, Sect. 1 40 mfd. 250 DCV, Sect. 2
C18	Part of C17
C19	.005mfd., Paper, Tubular 600 V D.C. Working
C20	.005 mfd., Paper, Tubular 600 V D.C. Working
C21	220 mmfd., mica, 20% 500 V D.C. Working
C22	100 mmfd, mica, 20% 500 V D.C. Working

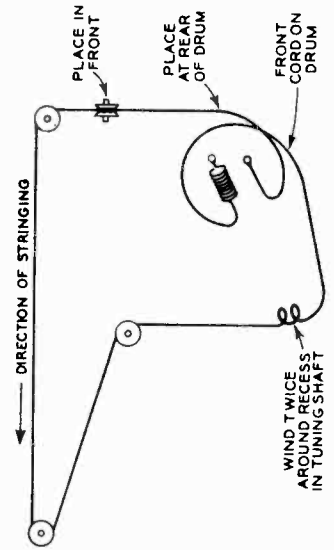
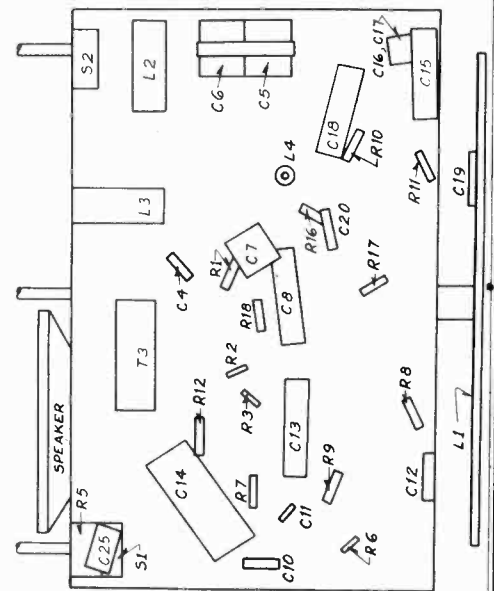
C23	.01 mfd., Paper, Tubular, 400 V D.C. Working
C24	7500 mmfd., mica, 10% 500 V D.C. Working
C25	220 mmfd., mica, 10% 500 V D.C. Working
C26	15 mmfd., mica, 10% 500 V D.C. Working
11, 12	3.2 V 160 MA. Miniature Bayonet Base
L1	Pri. Inductance 3600 uh, Sec. Inductance 203.5 uh 1%
L2	Sec. Inductance 1.5 uh, 3%
L3	Sec. Inductance, 98.5 uh, 1%
L4	Sec. Inductance, 1.4 uh, 3%
LS1	5" P.M., 3.2 ohm V.C.
R1	22000 ohms, 20% 1/2 watt carbon
R2	1.0 megohm, 20% 1/2 watt carbon
R3	2.2 megohm, 20% 1/2 watt carbon
R4	47000 ohms, 20% 1/2 watt carbon (Part of T2)
R5	0:47 megohm, 20% 1/2 watt carbon
R6	2.0 megohm, Taper 0.2 megohm at 1/2 rotation, with "ON-OFF" Switch
R7	10.0 megohm, 20% 1 1/2 watt carbon
R8	0.22 megohm, 20%, 1/2 watt carbon
R9	0.47 megohm, 20%, 1/2 watt carbon
R10	150 ohms, 10%, 1/2 watt carbon
R11	270ohms, 10%, 1/2 watt carbon
R12	1800ohms, 5%, 2 watt carbon
R13	410/200 ohms
R14	47000 ohms, 20%, 1/2 watt carbon
R15	680 ohms, 5% 1 watt carbon
R16	330 ohms, 10%, 1/2 watt carbon
S1	Part of R6
S2	Wafer Switch
T1	Double Tuned, 455 Kc
T2	Double Tuned, 455 Kc
T3	Fri. Imp. 2500 ohms, Sec. Imp. 3.2 ohms, Humblecking Winding
V1	12BE6
V2	12BA6
V3	12AT6
V4	50L6-GT
V5	35W4



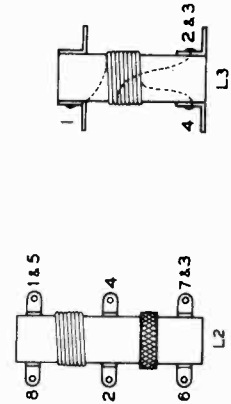
©John F. Rider

TO EXTERNAL ANTENNA

IF PEAK 455 KC

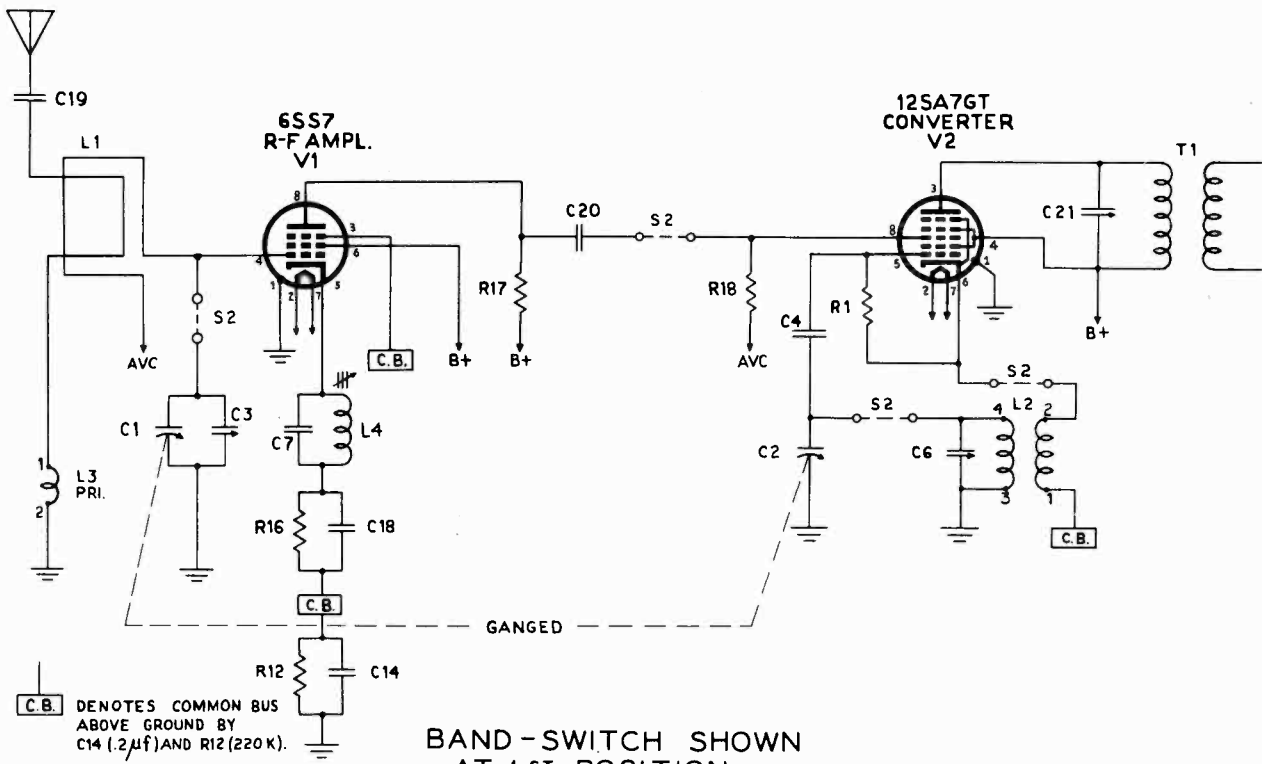


Dial Cord Stringing

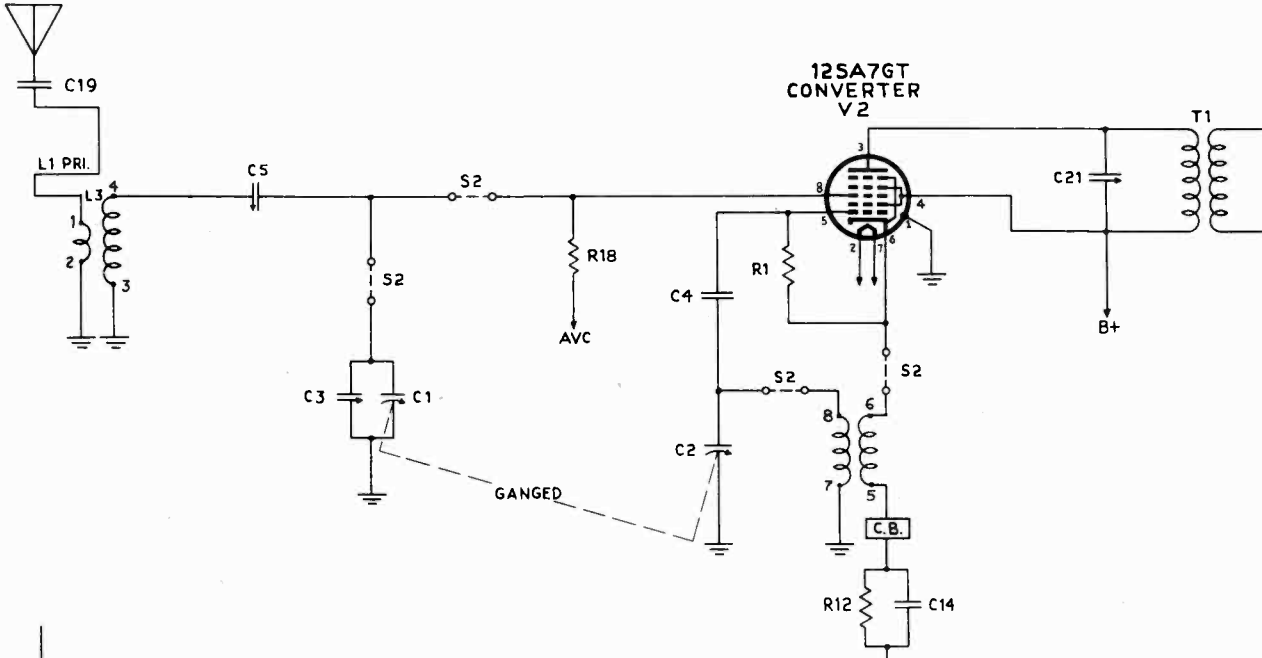


Coil Details

"clarified schematics"



[C.B.] DENOTES COMMON BUS
ABOVE GROUND BY
C14 (.2 μ f) AND R12 (220 K).



[C.B.] DENOTES COMMON BUS
ABOVE GROUND BY
C14 (.2 μ f) AND R12 (220K).

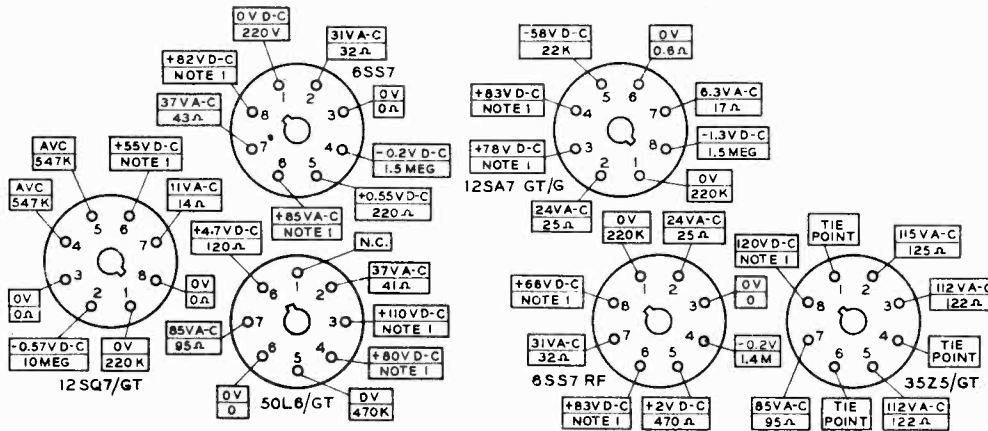


Fig. 4. Voltage and Resistance Analysis Chart

1. Resistance readings at these points will vary since they are in series with the leakage resistance of the electrolytic condensers which is subject to change.
2. All D.C. measurements were made with a meter having a sensitivity of 20,000 ohms per volt. A.C. measurements were made with a 1000 ohms per voltmeter.
3. Measured values are from socket pin to circuit ground. (pin 8 of 12SQ7 socket).
4. Tolerances of component values make possible a variation of $\pm 20\%$ in readings indicated in chart.
5. Socket connections are shown as bottom views.

SCHEMATIC NO. OF PART	NAME OF PART	DESCRIPTION	FUNCTION
C 1	Capacitor	2 Gang variable	Ant. Tuning
C 2	"	Part of C 1	OSC: Tuning
C 3	"	Part of C 1	Ant. Trimmer
C 4	"	100 mmfd mica $\pm 10\%$ 500 v D.C. working	osc Grid coupling
C 5	"	Compression trimmer 70-470 mmf	S. W. Padder
C 6	"	Compression trimmer 1.6-18 mmf(part of C 5)	B.C. trimmer
C 7	"	3000 mmfd mica $\pm 10\%$ 500 v D.C. working	I.F. trap
C 8	"	.05 mfd, tubular, paper, 400 v D.C. working	AVC bypass
C 9	"	125 mmfd mica, $\pm 25\%$ part of T2	Diode load bypass
C 10	"	.01 mfd, paper, tubular 400 v D.C. working	1st audio coupling
C 11	"	.0015 mfd, mica $\pm 20\%$ 500 V C.C. working	1st audio plate bypass
C 12	"	.01 mfd, paper tubular 400 v D.C. working	2nd audio coupling
C 13	"	.01 mfd, paper tubular 400 v D.C. working	Output tube Plate bypass
C 14	"	.2 mfd paper tubular 400 v D.C. working	Line bypass
C 15	"	.05 mfd paper dielectric 400 v D.C. working	Line bypass
C 16	"	Electrolytic, 2 section Common cathode 40 mfd 150 DCWV Sect. 1 40 mfd 150 DCWV Sect. 2	Filter
C 17	"	Part of C 16	Filter
C 18	"	.1 mfd, paper, tubular 400 v D.C. working	Cathode bypass, rf tube
C 19	"	.002 mfd, paper, tubular, 600 v D.C. working	External Ant. Coupling
C 20	"	470 mmf. mica $\pm 20\%$ 500 v D.C. working	Coupling, Grid of convertor tube
C 21	"	Part of T1	I.F. Trimmer
C 22	"	Part of T1	" " "
C 23	"	Part of T2	" " "
C 24	"	Part of T2	" " "
C 25	"	100 mmf. mica $\pm 10\%$ 500 v D.C. working	Volume Control bypass
I1, I2	Lamp	3.2 v, 160 ma. miniature bayonet base	Dial light
L1	Inductor	200.5 uh ± 1 uh; dist. cap. 12mmf max.	Loop Antenna
L2	"	2 band osc coil assy.	Oscillator Coil
L3	"	SW. RF Coil	Antenna Coil
L4	"	Slug tuned, variation 30-55 uh $\pm 10\%$	I.F. Trap
LS1	Speaker	5" p.m., 3.2 ohm v.c.	Speaker
R1	Resistor	22000 ohms $\pm 20\%$ 1/2 watt carbon	Oscillator grid
R2	"	1.0 megohm $\pm 20\%$, 1/2 watt carbon	AVC Coupling
R3	"	220 ohms $\pm 20\%$, 1/2 watt carbon	I.F. Cathode
R4	"	47000 ohms, $\pm 20\%$, 1/2 watt carbon Part of T2	Volume control decoupling
R5	Potentiometer	500,000 ohms taper 50,000 ohms at 1/2 rotation, with "on-off" switch	Volume control
R6	Resistor	10.0 megohm $\pm 20\%$, 1/2 watt carbon	1st audio grid
R7	Resistor	0.22 megohm $\pm 20\%$, 1/2 watt carbon	1st Audio plate
R8	"	0.47 megohm $\pm 20\%$, 1/2 watt carbon	Output tube grid
R9	"	120 ohms $\pm 10\%$, 1/2 watt carbon	Output tube cathode
R10	"	270 ohms $\pm 10\%$, 1/2 watt carbon	Pilot light shunt
R11	"	1500 ohms $\pm 5\%$, 1 watt carbon	Filter
R12	"	220,000 ohms $\pm 20\%$, 1/2 watt carbon	Chassis return
R16	"	470 ohms $\pm 20\%$, 1/2 watt carbon	Cathode R.F. tube
R17	"	4700 ohms $\pm 20\%$, 1/2 watt carbon	Plate R.F. tube
R18	"	0.1 megohm $\pm 20\%$, 1/2 watt carbon	Grid of Mixer tube
S1	Switch	Part of R5	"On-Off"
S2	"	4 pole, 2 position	Band-Switch
T1	Transformer	Double tuned, 455 kc.	I.F. input
T2	"	"	I.F. output
T3	"	Primary Impedance 2500 ohms, secondary 3.2 ohms, with humberking winding	Audio output
V1	Tube	6SS7 or 6SS7/GT	R.F. amplifier
V2	"	12SA7/GT/G	Converter
V3	"	6SS7 or 6SS7/GT	I.F. amplifier
V4	"	12SQ7/GT	2nd Det. 1st audio
V5	"	50L6/GT	Power output
V6	"	35Z5/GT	Rectifier

POWER REQUIREMENTS: 30 Watts at 105-125 Volts AC, 50-60 Cycles or 105-125 Volts DC.
 TUNING RANGE: 2 Bands. American Broadcast 550-1600 KC.
 International Short Wave 5.6-15.5 MC.
 ANTENNA: Built in loop with facilities for connection to external antenna.

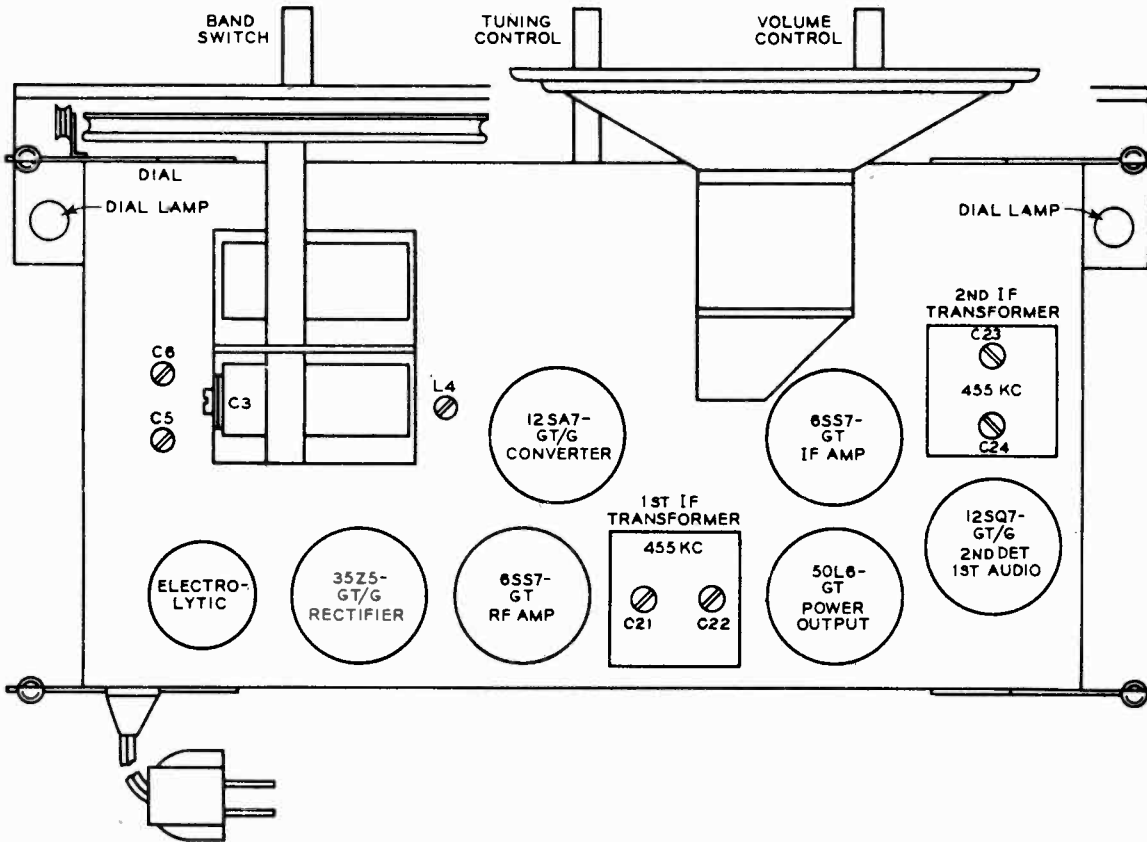


Fig. 1. Top View of Chassis showing Alignment Adjustment Positions.

ALIGNMENT INSTRUCTIONS

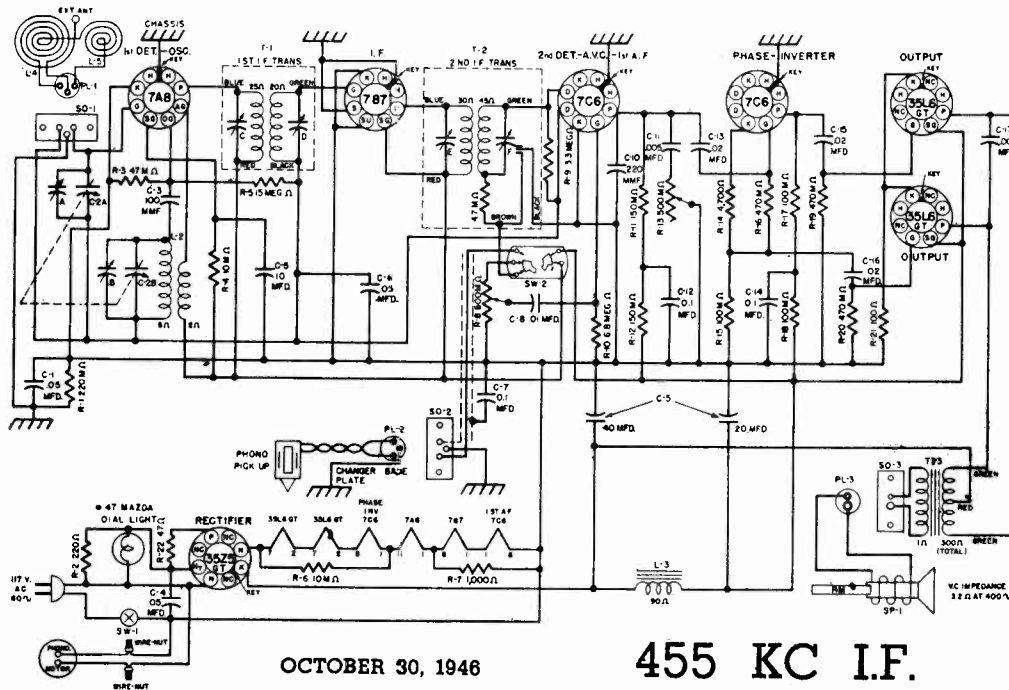
Punch marks are provided on the dial back plate at 600kc, 1000 kc, 1400 Kc and 1600 Kc for alignment purposes.
 With tuning condenser completely open, set dial pointer to 1600 Kc punch mark.
 Connect output meter across voice coil terminals on speaker frame.
 Connect low side of signal generator lead thru a 0.1 mfd coupling condenser to chassis ground.
 Connect high side of generator thru proper dummy antenna to the receiver external antenna connection.
 Keep signal generator output at lowest practical level and proceed according to table below.

ALIGNMENT CHART

DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	ADJUSTMENT POINTS	OUTPUT METER READING
0.1 MFD.	455 Kc	B.C.	Tuning Condenser Open	C24, C23, C22, C21	Max.
0.1 MFD.	455 Kc	B.C.	Tuning Condenser Open	L4	Min.
200 MMFD.	1600 Kc	B.C.	Tuning Condenser Open	C6	Max.
200 MMFD.	1400 Kc	B.C.	1400 Kc	C3	Max.
200 MMFD.	600 Kc	B.C.	600 Kc	L1	Max.
				(Check, adjust if necessary)	
400 ohms	6 Mc	S.W.	6 Mc	C5	Max.

THE FIRESTONE TIRE & RUBBER CO.

MODEL 4-A-17



OCTOBER 30, 1946

455 KC I.F.

ALL SOCKETS AND PLUGS SHOWN FROM PIN END VIEW
ALL SWITCHES SHOWN IN COUNTERCLOCKWISE POSITION, SHAFT END VIEW

SYMBOL	PART NO.	DESCRIPTION	LIST PRICE
CAPACITORS			
C-1	BD410503	Capacitor—.05 Mfd., 400 volt.	.35
C-2A, B	C-57243-1	Capacitor—Variable gang	4.50
C-3	BM74A101	Capacitor—Mica 100 Mmfd. ± 20%	.35
C-4	BD410503	Capacitor—.05 Mfd., 400 volt.	.35
C-5	A-58154	Capacitor—Electrolytic 40-20-10 Mfd., 150 volt.	1.60
C-6	BD210503	Capacitor—.05 Mfd., 200 volt.	.30
C-7	BD410104	Capacitor—.01 Mfd., 400 volt.	.40
C-8	BD410103	Capacitor—.01 Mfd., 400 volt.	.40
C-10	BM74A221	Capacitor—Mica 220 Mmfd. ± 20%	.40
C-11	BD610902	Capacitor—.005 Mfd., 600 volt.	.30
C-12	BD410104	Capacitor—.01 Mfd., 400 volt.	.40
C-13	BD410203	Capacitor—.02 Mfd., 400 volt.	.30
C-14	BD410104	Capacitor—.01 Mfd., 400 volt.	.40
C-15	BD410203	Capacitor—.02 Mfd., 400 volt.	.30
C-16	BD410203	Capacitor—.02 Mfd., 400 volt.	.30
C-17	BD610502	Capacitor—.005 Mfd., 600 volt.	.30
RESISTORS			
R-1	BR17B224	Resistor—Carbon, 220,000 Ohms, 1/2 watt.	.15
R-2	BR17C221	Resistor—Carbon, 220 Ohms, 1/2 watt.	.15
R-3	BR17B473	Resistor—Carbon, 47,000 Ohms, 1/2 watt.	.15
R-4	BR17B103	Resistor—Carbon, 10,000 Ohms, 1/2 watt.	.15
R-5	BR17B156	Resistor—Carbon, 15 Meg., 1/2 watt.	.15
R-6	BR17E103	Resistor—Carbon, 10,000 Ohms, 1 watt.	.15
R-7	BR17B102	Resistor—Carbon, 1,000 Ohms, 1/2 watt.	.15
R-8	B-56142-1	Control—Dual Potentiometer, with switch 500,000 Ohms, (V. C.)	2.25
R-9	BR17B335	Resistor—Carbon, 3.3 Meg., 1/2 watt.	.15
R-10	BR17B685	Resistor—Carbon, 6.8 Meg., 1/2 watt.	.15
R-11	BR17B154	Resistor—Carbon, 150,000 Ohms, 1/2 watt.	.15
R-12	BR17B154	Resistor—Carbon, 150,000 Ohms, 1/2 watt.	.15
R-13	B-56142-1	Control—500,000 Ohms, (T. C.) part of R-8.	.15
R-14	BR17B472	Resistor—Carbon, 4,700 Ohms, 1/2 watt.	.15
R-15	BR17B104	Resistor—Carbon, 100,000 Ohms, 1/2 watt.	.15
R-16	BR17B474	Resistor—Carbon, 470,000 Ohms, 1/2 watt.	.15
R-17	BR17B104	Resistor—Carbon, 100,000 Ohms, 1/2 watt.	.15
R-18	BR17B104	Resistor—Carbon, 100,000 Ohms, 1/2 watt.	.15
R-19	BR17B474	Resistor—Carbon, 470,000 Ohms, 1/2 watt.	.15
R-20	BR17B474	Resistor—Carbon, 470,000 Ohms, 1/2 watt.	.15
R-21	BR16C101	Resistor—Carbon, 100 Ohms, ± 10% 1/2 watt.	.15
R-22	BR17G470	Resistor—Carbon, 47 Ohms ± 20% 2 watt.	.30

SYMBOL	PART NO.	DESCRIPTION	LIST PRICE
COILS AND TRANSFORMERS			
L-4, 5	D-57259	Loop Antenna assembly	\$1.00
L-2	B-56143	Coil—Oscillator assembly	*
L-3	B-51726-1	Filter Choke, 80 ma.	2.00
T-1	B-51010-3	Transformer—1st I.F.	2.00
T-2	B-51011-3	Transformer—2nd I.F.	2.50
T-3	B-57253-1	Transformer—Output	1.50
OTHER ELECTRICAL PARTS			
SW-1		Switch—power part of R-8 and R-13.	
SW-2	B-56156-1	Switch—Radio-Phono	1.00
SP-1	C-57272	Speaker—6" x 9" Permanent Magnet	*
	A-6158	Lamp—Dial Mazda No. 47	.15
MISCELLANEOUS PARTS			
	B-57275-1	Background for dial	*
	A-54848	Bushing—Strain relief (power cord)	.20
	A-56155	Bushing—Tuning control shaft	.15
	E-57270-1	Cabinet	*
	B-51330-1	Channel rubber—mtg. for Dial scale	.04
	B-55402-1	Dial Cable assembly (includes clips at end of cable)	.25
	B-57269-1	Dial scale—plastic	*
	B-51427-2	Grommet—rubber; mtg. for variable gang.	.05
	B-51124-1	Knob—Volume & switch, tuning or radio-phon	.15
	B-56138-1	Knob—Tone Control	.15
	BN751V02	Palnut—No. 3/4-32; for mtg. controls	.02
	BN770S02	Palnut—No. 10-24; for mtg. record changer	.01
	A-57271	Plug—3 Prong—Phono pick-up connection	.15
	B-55130-9	Pointer	.15
	B-58069-1	Power Cord	.75
	BP934G02	Screw—No. 4 x 1 1/2"; for mtg., loop & back	.03
	BP928N02	Screw—No. 8 x 1 1/2"; for mtg., chassis	.03
	BS016S09	Screw—No. 10-24 x 1 1/2"; for mtg. record changer	.04
	A-56136	Shaft—tuning control	*
	A-54726	Socket—octal base	.20
	A-54900	Socket—octal base	.25
	A-57273	Socket—3 Prong; Phono pick-up & loop antenna	.20
	A-57258	Socket—2 Prong; speaker connection	.15
	A-6182-5	Socket—dial lamp (with leads)	.15
	A-51331	Spring—Mtg., for channel rubbers	.10
	A-51787	Spring—dial cable tension	.07
	A-50147	Spring—conical; for mtg., record changer	.10
	BF13NT05	Washer—flat; for mtg., record changer	.02
	B-50156-1	Washer—rubber; for mtg., record changer	.04
	A-54492	Washer—"C"; tuning shaft	.02
	A-1089	Washer—cup; variable gang mtg.	.05
	B-50964-3	Washer—phono motor power connection	.03

MODEL 4-A-17

THE FIRESTONE TIRE & RUBBER CO.

1. The chassis, record changer and loop should remain in their normal position in the cabinet when making loop adjustment.
2. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, slide pointer along dial cord to correct position.
3. Connect output meter across speaker voice coil.
4. Connect the ground of signal generator to B.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.
6. Radio-Phono switch in Radio position.

FREQUENCY RANGE:

540-1600 KC.

POWER SUPPLY

117 volts
60 cycles A.C.
55 watts (including changer)

POWER OUTPUT:

Undistorted—1.6 watts
Maximum —2.2 watts

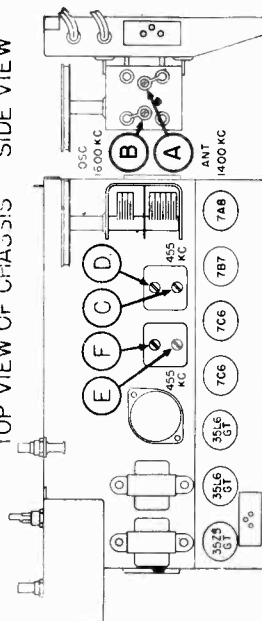
SPEAKER:

6 x 9 elliptical type PM
Voice coil impedance—
3.2 ohms at 400 cycles

NOTE: For best results, it is advisable to use an isolation transformer between the 117 V. AC line and AC input to receiver.

DUMMY ANT.	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER LETTER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
0.1 Mfd. Condenser	7A8 Grid	455 KC	Any point where it does not affect the signal	F-E D-C	2nd IF 1st IF	Adjust for maximum output. Then repeat adjustment.
0.1 Mfd. Cor.enser	7A8 Grid	1620 KC	Gang condenser completely out of mesh.	B	Oscillator	Adjust for maximum output.
RMA Loop		1400 KC	Tuned to 1400 kc Generator signal	A	Loop Antenna	Adjust for maximum output.

TOP VIEW OF CHASSIS SIDE VIEW



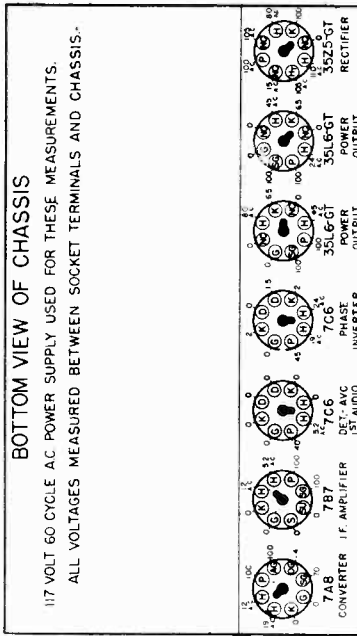
SOCKET VOLTAGES

MEASURED WITH VOLTMETER HAVING SENSITIVITY OF 1000 OHMS PER VOLT
TONE CONTROL IN CLOCKWISE POSITION
VOLUME ON FULL WITH NO SIGNAL

RADIO-PHONO SWITCH IN RADIO POSITION DIAL TUNED TO 540 KC

BOTTOM VIEW OF CHASSIS

117 VOLT 60 CYCLE AC POWER SUPPLY USED FOR THESE MEASUREMENTS.
ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.

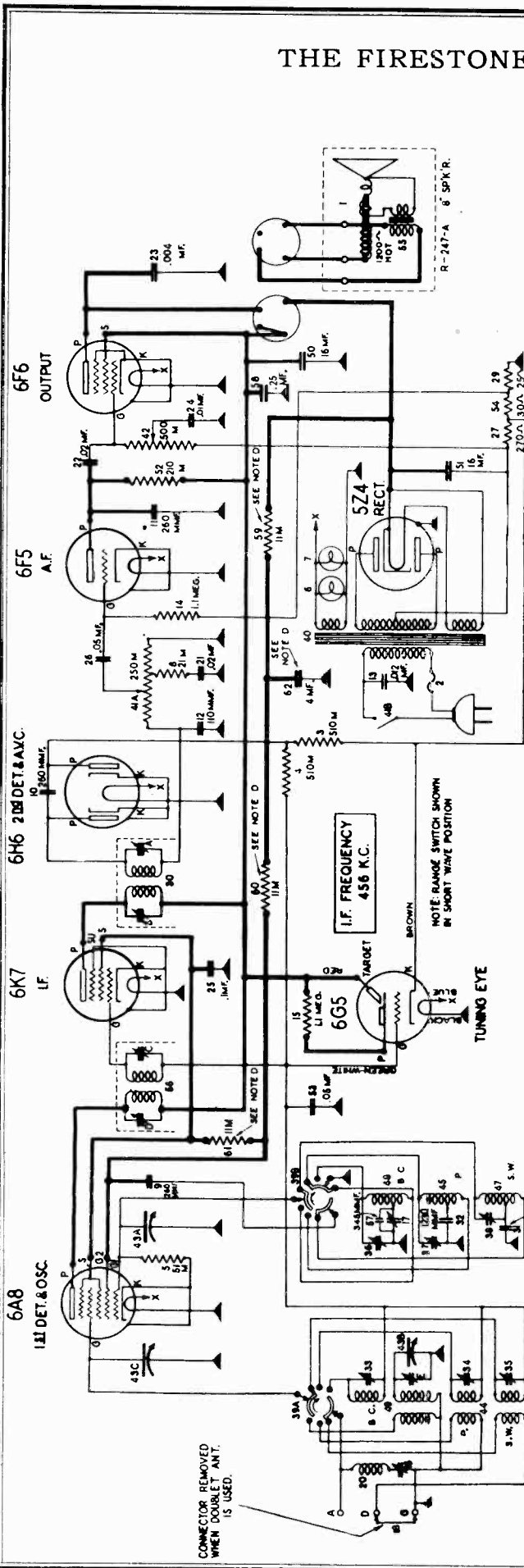


REAR OF CHASSIS



THE FIRESTONE TIRE & RUBBER CO.

MODELS 7379-1, 7405-3, 7406-1



NOTE D: In receivers having serial numbers below 453,400 resistors 59, 60, and 61 are omitted and the screen grids of the 6K7 and 6A8 receive their current through a 26,000 ohm 1/4 watt resistor which is connected to the screen grid of the 6F6. The anode grid of the 6A8 is connected in series with a 21,000 ohm 1/4 watt resistor to the screen grid of the 6F6. Condenser 62 (4 mfd. 250 V.) is also omitted.

NOTE B: The grid bias for the 6A8, 6K7, and the anode voltage of the A.V.C. section of the 6H6 is -3.0 volts measured across resistors 29 and 54.

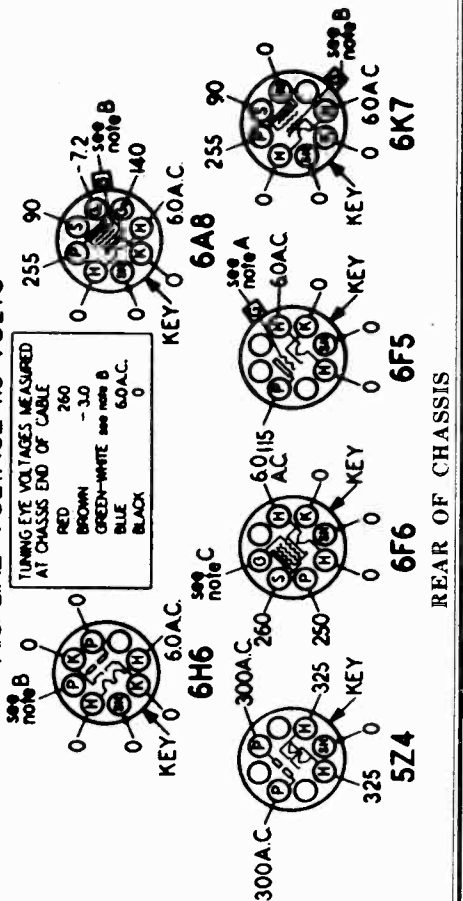
NOTE C: The grid bias for the 6F6 output tube is -17.0 volts measured across resistors 29, 54 and 27.

IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The grid bias for the 6F5 is -1.3 volts measured across resistor 29.

SOCKET VOLTAGES

VOLUME CONTROL ON FULL
 RANGE SWITCH SET ON BROADCAST POSITION DIAL TUNED TO 530 KC.
 BOTTOM VIEW OF CHASSIS
 VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS
 AC LINE VOLTAGE 115 VOLTS



THE FIRESTONE TIRE & RUBBER CO.

MODELS 7379-1, 7405-3, 7406-1

89423 Dial scale 1.80
89432 Escutcheon for tuning eye60

PARTS LIST

Diagram Part Number	Description	List Price
1	R-247-A 8-inch Dynamic Speaker	\$9.00
2	IMPORTANT Fuse, 1 ampere (USE THIS SIZE ONLY)	
3-4	83072 510,000 ohm 1/2 watt carbon resistor	.15
5	83080 51,000 ohm 1/2 watt carbon resistor	.15
6-7	83278 Pilot lamp, 6-8 volt	.20
8	83286 21,000 ohm 1/2 watt carbon resistor	.15
9-10-11	83539 260 mmfd. mica condenser	\$0.20
12	83783 110 mmfd. mica condenser	.16
13	83976 .012 mfd. 1,500 V. shielded capacitor	.15
14-15	84235 1 1/2 mfd. 1/2 watt carbon resistor	.35
16	85285 Wave trap trimmer	.20
17	85286 Padding trimmer	.40
18	85321 Ground connector	.01
20	88014 Wave trap coil	.50
21-22	88026 .02 mfd. 400 volt paper capacitor	.30
23	89826 104 mfd. 750 volt paper capacitor	.24
24	89030 .01 mfd. 400 V. paper capacitor	.30
25	84046 1 mfd. 150 V. paper capacitor	.30
26	88189 .06 mfd. 200 volt paper capacitor	.35
27	88463 270 ohm 1 watt carbon resist.	.15
29	88465 25 ohm 1/2 watt wire wound resistor	.15
30	88468 2nd I.F. transformer	2.40
31	88472 3860 mmfd. mica condenser	.35
32-34-35	88473 1230 mmfd. mica condenser	.25
36-37-38	88477 Trimmer condenser	.12
39A-39B	88480 Range switch	1.90
40	88481 Power transformer, 115 V. 60 cycle	5.00
40	89216 Power transformer, 100 to 240 V.—25 to 133 cycles	11.50
41A	88487 Volume control (250,000 ohm) A.C. line switch	\$1.25
41B	88488 Volume control (500,000 ohm) A.C. line switch	5.40
42	88493 Theatrical speaker	5.40
43A to C	88499 Antenna coil (police)	.85
44	88501 Oscillator coil (police)	.65
45	88502 Antenna coil (S.W.)	.80
46	88504 Oscillator coil (S.W.)	.80
48	88506 Antenna coil (P.C.)	1.50
49	88507 Antenna coil (P.C.)	1.00
50	88511 1 mfd. 300 volt electrolytic condenser	1.10
51	88512 16 mfd. 100 volt electrolytic condenser	1.10
52	88532 210,000 ohm 1/2 watt carbon resistor	.12
53	88534 .06 mfd. 150 volt condenser (low loss)	.25
54	88613 1/2 watt wire wound resistor	.15
55	88529 Output transformer (on R-247-A speaker)	2.00
56	88446 1st I.F. transformer, 100 to 240 V.	2.40
57	89554 240 V.—25 to 133 cycles	11.50
58	89553 25 mmfd. mica condens.	.25
59-60	89751 11,000 ohm 1/2 watt carbon resistor	.30
61	89753 11,000 ohm 1/2 watt carbon resistor	.12
62	89755 4 mfd. 260 volt electrolytic condenser	1.00

Prices Subject To Change Without Notice.

line detuning No. 10 and returning the dial until the output meter deflection is a maximum.

Band No. 3 Calibration and Alignment

Turn the range switch to the extreme counter-clockwise position. Be sure the D and G terminals on the antenna terminal strip are connected together.

Set the test oscillator to 16 MC. and turn the receiver dial pointer to exactly 16 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 11 for maximum output. Check to see that it has been adjusted to the proper peak by tuning the receiver to approximately 15.1 MC. A repeat signal should be heard at this point. If none is present, even with greatly increased oscillator output, retune the receiver to 16 MC. and adjust trimmer No. 11 to the proper peak with the trimmer screw farther out.

Carefully tune the receiver to the signal and adjust trimmer No. 12 to a peak. Then try to increase the output by detuning the trimmer slightly and returning the dial until a maximum output meter deflection is secured. Check the adjustment by tuning the receiver to the image at about 15.1 MC. The image should be much weaker than the 16 MC. signal. If the signal at 15.1 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 12 is not set to the proper peak. Turn the trimmer in a set or so, then readjust as above.

MISCELLANEOUS PARTS NOT SHOWN ON CIRCUIT DIAGRAM

Part Number	Description	List Price
67590	Flat steel mix. washer	\$0.01
84428	Rubber chassis mtg. bushing	.03
84493	No. 10 x 1/4 chassis mtg. screw	.03
84606	Flat washer (for knobs)	.01
84730	Ground connector for G.D.A. strip	.20
85232	Fuse mounting	.01
88055	Fuse cover	.06
88057	Speaker socket	.12
89119	Tuning eye cable & plug	1.50
89474	Knob; tuning and tone control	.20
89475	Knob; range switch	.20
89476	Knob; volume control	.20

TUNING DRIVE AND DIAL PARTS

Part Number	Description	List Price
82978	Dial lamp	\$0.15
83564	Pointer and stud assembly	.12
88743	Dial drive shaft	.15
88744	Dial drive shaft retainer spring	.06
88745	Dial ring and bracket assembly (for edge lighting)	.30
88748	Dial disc and bushing assembly	.01
88956	Escutcheon for H.H. screw for escutcheon (each)	1.65
88958	Escutcheon (each)	.05
89283	Pilot lamp socket	.10
89284	Pilot lamp shield	.02
89285	Dial background	.12

Broadcast Band Calibration and Alignment

With the gang condenser in full mesh, the dial pointer should be on the white horizontal line below 530 KC. on the dial scale.

Turn the range switch to the extreme clockwise position and connect the test oscillator output to the A and G terminals of the receiver with a 400 ohm carbon resistor in series with the A terminal and the oscillator output.

Adjust the test oscillator to exactly 1,500 KC. and turn the receiver dial pointer to 1,500 KC. on the tuning dial. To calibrate the dial, adjust trimmer No. 5 for maximum output.

Carefully tune the receiver to the signal and adjust trimmers Nos. 6 and 7 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 8 for maximum output. Then try to increase the output meter reading by detuning No. 8 slightly and returning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and returning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though dial may be slightly off calibration at 600 KC.

Wave-Trap Adjustment

The wave-trap adjusting trimmer, No. 13, is located on the back of the chassis. Leave the test oscillator connected to the A and G terminals through a 400 ohm resistor and set the oscillator at 456 KC. Then adjust the wave-trap trimmer No. 13 for minimum output. If some particular station with a frequency near 456 KC. causes code interference, it may be desirable to adjust the wave-trap on the actual frequency of the interfering station.

Check the adjustment of trimmers 5, 6, and 7 at 1,500 KC.

Band No. 2 Calibration and Alignment

Turn the range switch to the center position. Adjust the test oscillator to exactly 5.0 MC. and turn the receiver dial pointer to exactly 5.0 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 9 for maximum output. If two peaks are found, the proper one is that with the trimmer screw farthest out.

Carefully tune the receiver to the signal and adjust trimmer No. 10 for maximum output. Then try to increase the output by detuning No. 10 slightly and returning the receiver dial. Con-

CALIBRATION AND ALIGNMENT

Aligning Equipment

For proper alignment, an output meter and an accurately calibrated oscillator with a tuning range from 456 KC. to 16 MC. are required.

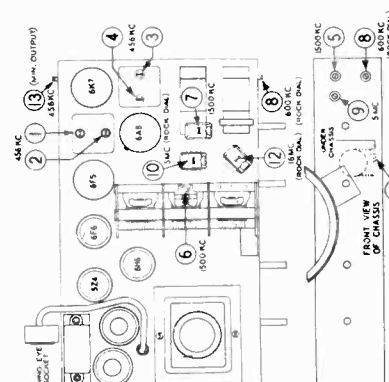
Connect the output meter from the plate of the output tube to chassis. A convenient point to make the plate connection is to the yellow wire on the speaker socket.

Aligning the I. F. Amplifier

Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (fully clockwise).

Connect the test oscillator output leads to the 6A8 control grid and chassis with a .1 mfd. condenser in series with the oscillator output. Set the oscillator to exactly 456 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

Adjust the four I.F. trimmers Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.

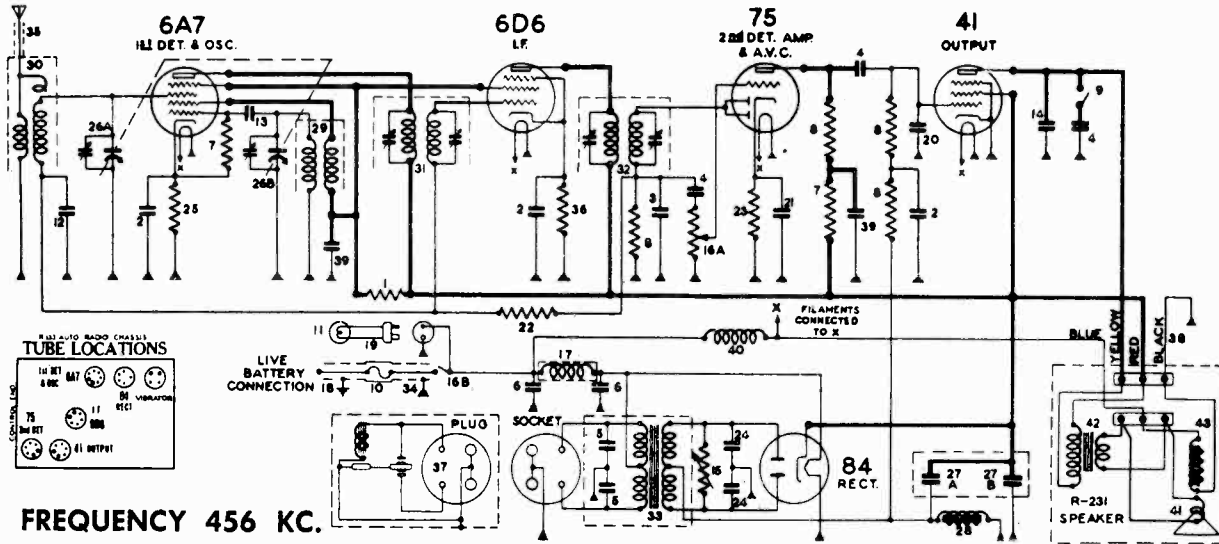


TRIMMER LOCATIONS

Trimmer Number	Alignment Frequency
1	456 KC.
2	456 KC.
3	456 KC.
4	456 KC.
5	1,500 KC.
6	1,500 KC.
7	1,500 KC.
8	600 KC.
9	5 MC.
10	5 MC.
11	16 MC.
12	16 MC.
13	456 KC.

MODEL 7383-4

THE FIRESTONE TIRE & RUBBER CO.



I.F. FREQUENCY 456 KC.

Diag. No.	Part No.	DESCRIPTION	List Price	Diag. No.	Part No.	DESCRIPTION	List Price
1	66875	16,000 ohm 1 watt carbon resistor	\$.50	11	83278	Pilot lamp	\$.15
2	81630	.1 mfd. 100 volt paper condenser	.30	12	83353	.05 mfd. 100 volt paper condenser	.30
3	81812	.00051 mfd. mica condenser	.25	13	83539	.00026 mfd. mica condenser	.25
4	83007	.02 mfd. 600 volt paper condenser	.35	14	83706	.006 mfd. 600 volt condenser	.35
5	83058	.25 mfd. 100 volt paper condenser	.35	15	83725	0-500,000 globar resistor	.45
6	83063	.5 mfd. 100 volt paper condenser	.45	16A } 83728	Volume control	1.20	
7	83080	51,000 ohm 1/4 watt resistor	.20	16B }	On-Off Switch		
8	83082	260,000 ohm 1/4 watt resistor	.20	17	83730	R. F. Choke	.25
9	83179	Tone Control switch	.30	18	83777	Battery lead and fuse housing	.50
10	83207	Fuse	.05	19	83778	Light cable and plug assembly	.50

Diag. No.	Part No.	DESCRIPTION	List Price	Part No.	DESCRIPTION	List Price
20	83783	.00011 mfd. mica condenser	\$.16	17166	Mounting nut	\$.05
21	83803	12 mfd. 15 volt electrolytic condenser	.80	83144	15,000 ohm spark plug suppressor	.35
22	84235	1.1 meg. 1/4 watt resistor	.20	83145	10,000 ohm distributor suppressor	.35
23	84240	4000 ohm 1/4 watt resistor	.20	83319	Fuse insulator tube	.02
24	84850	.03 mfd. 750 volt paper condenser	.25	83737	Top cover knurled nuts	.06
25	84888	300 ohm 1/2 watt resistor	.20	84981	Tube shield section	.08
26A } 84958	Two-gang variable condenser with shaft coupling	4.50	84982	Tube shield section (slotted)	.08	
26B }			84983	Spring ring	.02	
27A } 84961	4 mfd. 400 volt electrolytic condenser	2.50	84984	Case assembly (less covers)	3.50	
27B }			84987	Speaker grille cloth	.12	
			84990	Single hole mounting plate	.80	
			84991	Bottom cover	1.00	
			84992	Top cover	1.00	
			85012	Mounting bolt	.06	
			85026	Dash support washer	.05	
28	84962	Filter choke	1.25	15214	Long mtg. strap screw No. 10-32x1 1/4"	\$.01
29	84963	Oscillator coil assembly	1.00	81214	Flexible casing set screw	.02
30	84969	Antenna coil and shield assembly	1.25	83919	Bezel and glass assembly	.50
31	84972	1st I.F. transformer assembly	2.75	83920	Pilot light button assembly	.25
32	84974	2nd I.F. transformer assembly	2.75	84067	Steering column mtg. bracket	.25
33	84975	Power transformer	3.50	84484	Knob (volume and tuning)	.14
34	84977	Battery lead and cap (to chassis)	.34	85000	Remote control head (less shafts)	6.00
35	84978	Antenna lead	.40	85011	Complete accessories for installation	5.00
36	84979	250 ohm 1/2 watt resistor	.15	85016	Dial face	.25
37	84995	Vibrator	5.00			
38	85027	Speaker cable	.30			
39	85029	.1 mfd. 300 volt paper condenser	.40			
40	85048	Filament R.F. Choke	.25			
41	85376	Diaphragm and voice coil assembly	2.00			
42	85378	Output transformer	2.00			
43	85379	Field coil	1.25			

FLEXIBLE SHAFTS

Part No.	DESCRIPTION	List Price
84996	Tuning shaft, 24 inches long	\$.150
84998	Volume control shaft, 24 inches long	.150
85104	Tuning shaft, 36 inches long	2.00
85105	Volume control shaft, 36 inches long	2.00
85107	Tuning shaft, 30 inches long	2.00
85108	Volume control shaft, 30 inches long	2.00

THE FIRESTONE TIRE & RUBBER CO.

POWER SUPPLY PROTECTIVE RESISTOR

The filter system and the rectifier tube are protected against breakdown during the warming-up period by the Globar resistor (No. 15 in the circuit diagram) which is connected across the high voltage secondary of the power transformer. This resistor drops rapidly in resistance as the voltage across it rises, so that it acts as a load on the power transformer during the warm-up period and keeps the voltage below the danger point until the tubes are heated and take their normal current. Because of its unique voltage characteristics, the Globar resistor cannot be tested with an ordinary ohmmeter, since it will show a resistance of several megohms.

CALIBRATION AND ALIGNMENT

A good modulated oscillator and a sensitive output meter are necessary for the proper calibration and alignment of this receiver. The output of the oscillator must be adjustable to give a very weak signal which will not actuate the A.V.C. of the receiver. The output meter must be sensitive enough to give sufficient reading with such a weak signal.

The output meter should be connected from the 41 plate to ground through a .25 mfd. condenser or across the voice coil, depending upon its sensitivity. A convenient point at which to connect to the 41 plate is the yellow lead terminal on the speaker terminal strip.

During all calibration and alignment adjustments, keep the volume control full on.

I. F. ALIGNMENT

The I.F. trimmers are located on the top of the I.F. transformers and may be reached by removing the top cover. The modulated oscillator should be set to exactly 456 K.C. and connected from the 6A7 control grid to ground. Adjust the oscillator output to give about half-scale reading of the output meter. Tune the set to make certain that no station or signal is tuned in since this would affect the output meter reading. Adjust all four I.F. trimmers to give maximum output reading.

In adjusting the I.F. transformer trimmers, it is desirable to use a bakelite screw driver or one having only a small metal tip. After the I.F. trimmers have been aligned once, go back and repeat the procedure, since any adjustment of one will affect the others to some extent.

R. F. ALIGNMENT

With the test oscillator set to approximately 1400 KC., tune the set very carefully for maximum output.

Adjust the output of the test oscillator to the minimum value which will give sufficient output meter deflection. Adjust the trimmer nearest to the shaft end of the gang condenser to give maximum output meter reading.

DIAL CALIBRATION

The dial of the Auto Radio is calibrated in kilocycles except that the last two zeros have been omitted. Inasmuch as changes in the position of the flexible shafts may cause the calibration to vary, the set should be calibrated when the arrangement of the shafts has been completed. Calibration is accomplished as follows:

Tune in a station of known frequency between 800 and 1100 KC. Insert a screw driver in the slotted end of the dial shaft projecting through the back of the control head. Hold the tuning control knob so that the station remains tuned in properly and by turning the screw driver adjust the dial pointer so that it indicates the exact station frequency.

If the set is badly out of calibration, such that it calibrates correctly at one part of the dial but not at another, it is necessary to adjust the oscillator shunt trimmer as explained below. In order to reach this trimmer the chassis will have to be removed from the case as follows.

- (1) Remove the flexible shafts and dismount the receiver.
- (2) Remove the four terminals of the speaker cable from the speaker.
- (3) Remove the black antenna lead from the coil and unsolder the coil shield grounding braid.
- (4) Remove the blue dial light lead from the socket terminal.
- (5) Remove the yellow tone control lead from the tone control switch.
- (6) Remove the six slotted chassis fastening screws and slide the chassis out of the case.

Connect a .00025 mfd. condenser in series with the output lead of the test oscillator and the antenna lead lug on the antenna coil and connect the ground lead of the test oscillator to the chassis. Set the test oscillator to exactly 600 KC. Tune the radio set to maximum volume and set the dial to read exactly 6.0 (600 KC.). Then set the test oscillator to exactly 1400 KC. Turn the tuning knob until the dial pointer indicates 14.0 (1400 KC.). Adjust the oscillator shunt trimmer (on the gang condenser second from the control end) until the meter indicates maximum output. Then adjust the other gang condenser trimmer as directed under the R.F. alignment.

MODEL 7402-6
MODEL 7383-4

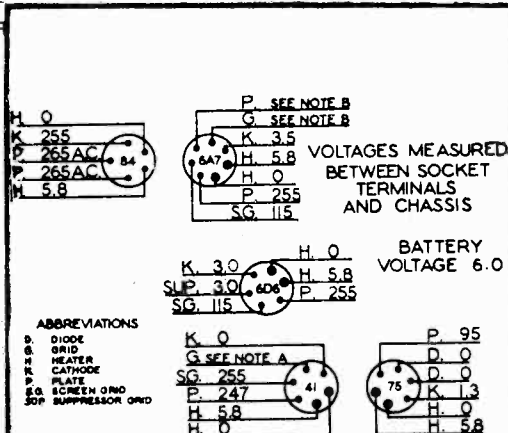
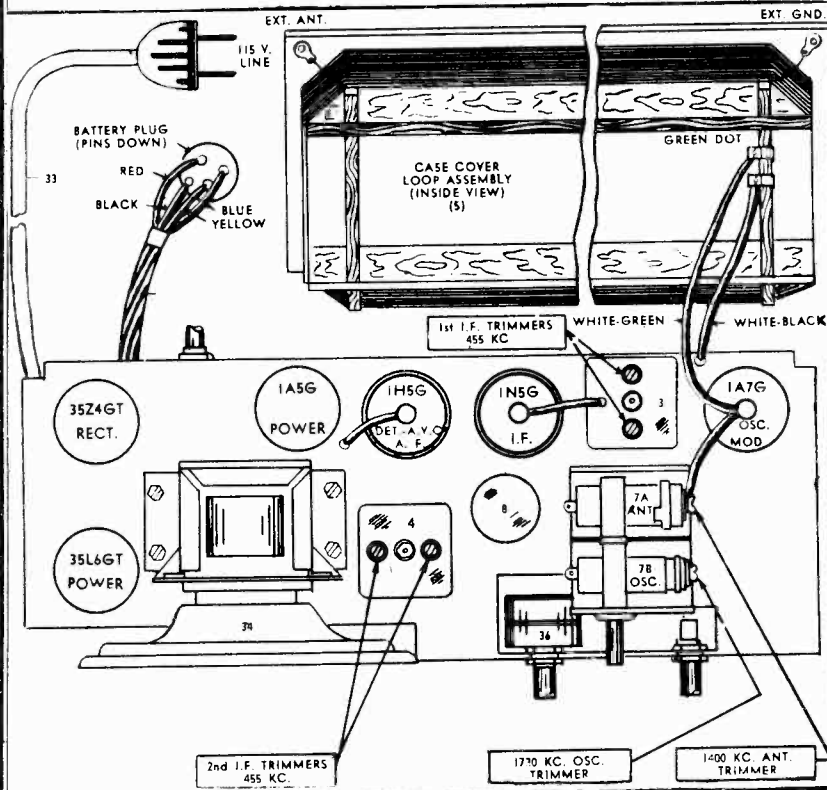
THE FIRESTONE TIRE & RUBBER CO.

Illus. No.	Part No.	Part Name	Description	List Price
1	11824	Cable	Battery with four prong plug	\$0.35
2	10832	Choke	Filter	.85
3	10768	Coil	1st I.F. Transformer	1.05
4	10769	Coil	2nd I.F. Transformer	1.10
5	11830	Loop	Antenna Assembly complete with frame	1.75
6	11813	Coil	Oscillator	.65
7	11814	Condenser	Tuning Two Gang	1.65
8	11822	Condenser	Tubular Dry Electrolytic (40-40) Mfd. 150 Volt & 20 Mfd. 25-Volt)	1.15
9	9981	Condenser	Tubular .2 Mfd. 200 Volt	.29
10	1151	Condenser	Tubular .1 Mfd. 200 Volt	.20
11	1151	Condenser	Tubular .1 Mfd. 200 Volt	.20
12	1147	Condenser	Tubular .05 Mfd. 200 Volt	.19
13	1147	Condenser	Tubular .05 Mfd. 200 Volt	.19
14	1147	Condenser	Tubular .05 Mfd. 200 Volt	.19
15	1368	Condenser	Tubular .003 Mfd. 400 Volt	.17
16	1368	Condenser	Tubular .003 Mfd. 400 Volt	.17
17	10762	Condenser	Tubular .002 Mfd. 400 Volt	.19
18	9457	Condenser	Tubular .05 Mfd. 400 Volt	.18
19	9458	Condenser	Mica .00025 Mfd.	.21
20	9458	Condenser	Mica .00025 Mfd.	.21
21	7934	Condenser	Mica .0001 Mfd.	.21
22	2705	Resistor	Carbon 2 Megohm 1/2 Watt	.19
23	7998	Resistor	Carbon 1 Megohm 1/2 Watt	.19
24	2673	Resistor	Carbon 750,000 Ohm 1/2 Watt	.19
25	6984	Resistor	Carbon 500,000 Ohm 1/2 Watt	.19
26	3534	Resistor	Carbon 75,000 Ohm 1/2 Watt	.19
27	9693	Resistor	Carbon 5,000 Ohm 1/2 Watt	.19
28	6875	Resistor	Carbon 250 Ohm 1/2 Watt	.19

Illus. No.	Part No.	Part Name	Description	List Price
29	9018	Resistor	Carbon 150 Ohm 1/2 Watt	\$.019
30	1408	Resistor	Wire Wound, Flexible 25 Ohm 1 1/2 Watt	.19
31	10858	Resistor	Wire Wound, Flexible 200 Ohm 2 Watt	.22
32	11823	Resistor	Wire Wound 1700 and 20 Ohm	.45
33	11825	Resistor	Line Cord	.90
34	11821	Speaker	P.M. Dynamic 5"	4.00
35	11815	Switch	Voltage Selector	.90
36	11112	Vol. Control	With D.P.S.T. Switch	.90

MISCELLANEOUS PARTS

11304	Bulb	6-8 Volt .150 Amp. Type No. 47	\$0.10
11816	Dial Scale	Calibrated Scale	.40
8184	Dial Cord	9" of 18 Lb. Drive Cord	.10
10679	Dial Pointer	For Dial	.15
11084	Dial Shaft	Drive Shaft	.15
8117	Dial Shaft "C"		
	Washer	Retainer Washer	.02
11818	Dial Crystal	For Dial	.25
11819	Dial Plate	Metal Front Plate over Dial	.40
10884	Indicator Plate	Marked "AC-DC"—"OFF"—"BATT"	.10
10787	Knob	For Tuning and Volume Controls	.08
10907	Knob	For Voltage Selector Control	.10
10850	Plug	4 Prong for Battery	.10



BOTTOM VIEW OF CHASSIS

MODEL 7383-4

NOTE A: The actual bias on the grid of the 41 tube is -23 volts which must be measured from chassis to the ungrounded filter choke terminal. Due to the high resistance of the grid leak, the voltmeter will show only about -1 volt at the grid.

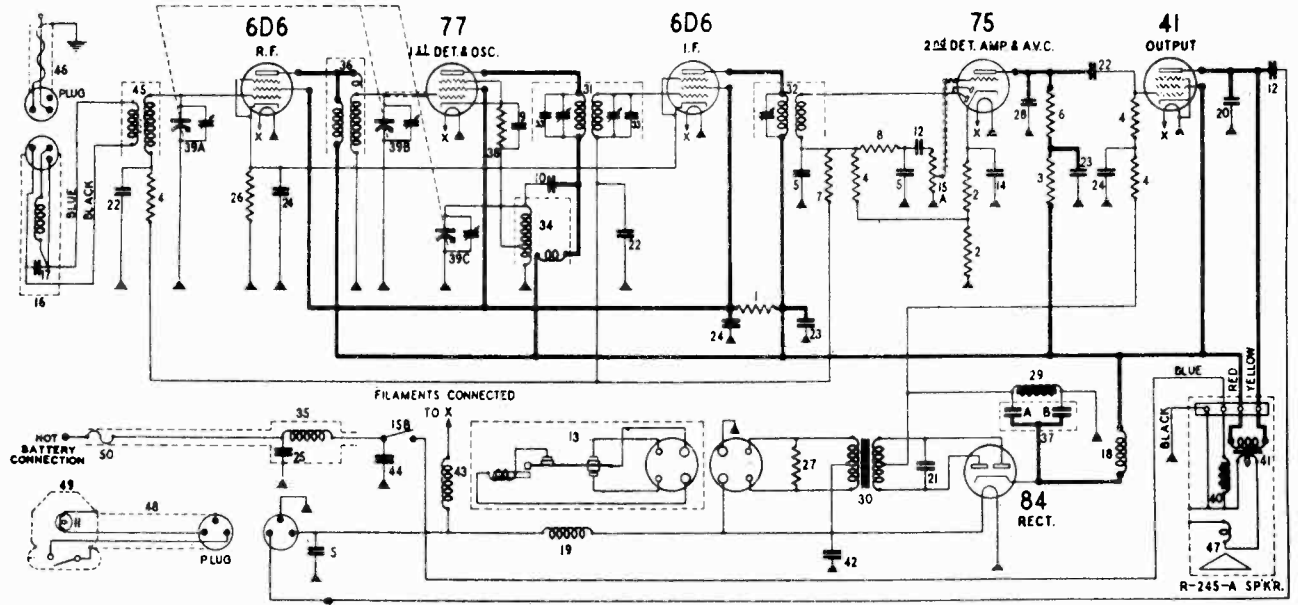
NOTE B: The oscillator grid voltage varies from about -3 at 1500 KC. to -5.0 at 530 KC. The oscillator anode voltage may vary from 115 at 1500 KC. to 120 at 530KC.

IMPORTANT: Use high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon range of meter. Make allowance for battery voltage variations.

THE FIRESTONE TIRE & RUBBER CO.

MODEL 7396-1

MODEL 4-A-17



I. F. FREQUENCY 177.5 KC.

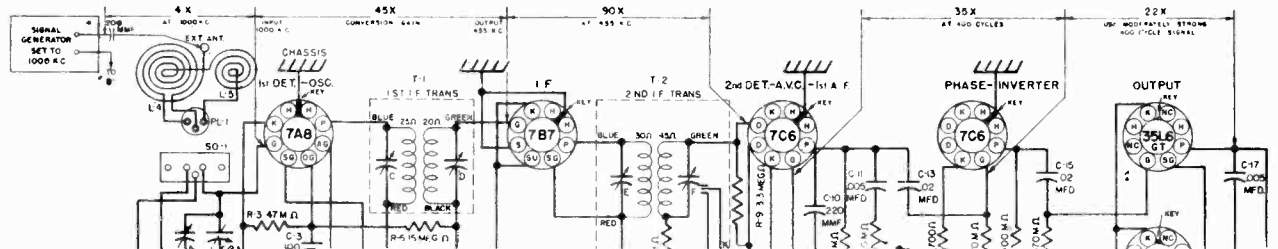
MODEL 7396-1

MODEL 4-A-17

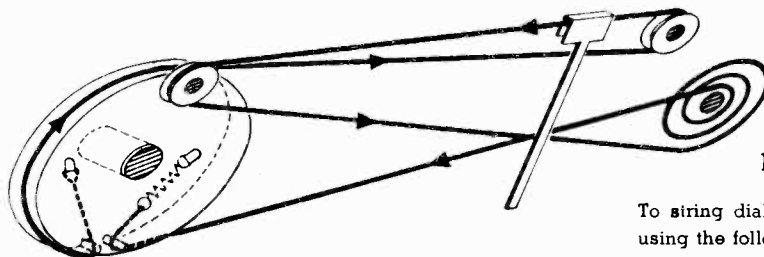
APPROXIMATE STAGE GAIN

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 1000 KC signal with 400 cycle modulation (use nearby frequency if local station interferes).
2. Be sure radio is carefully tuned to generator signal. (Use weak signal for sharp tuning.)
3. When using a "channel" type instrument, carefully tune it for maximum output at desired frequency before making measurements.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.



DIAL AND POINTER
DRIVE CABLE ARRANGEMENT

To string dial cable, set gang condenser to fully meshed position, using the following parts:

- A-51726-1 Spring, cable
- B-55402-1 Cable assembly

MODEL 7396-1

THE FIRESTONE TIRE & RUBBER CO.

the set screw in the knob shaft, and by rotating the knob shaft, turn the pointer until it indicates the frequency of the station which has been tuned in. Then re-tighten the set screw and replace the knob. If the set is used with a dash control head other than that for the Ford, calibrate as follows:

Turn the knob to the right as far as it will go, and then turn it to the end in the other direction. It is necessary to continue to turn the knob after the dial pointer reaches the end stop, until the knob will turn no farther. If the set is badly out of calibration, so that when the dial reads correctly at the low frequency end, it is off at the high frequency end, it will be necessary to adjust the oscillator trimmer as explained below. The oscillator shunt trimmer is located on the oscillator section of the gang condenser which can be reached when the receiver bottom cover is removed. Connect a .00025 mfd. mica condenser in series with the output of the test oscillator and the antenna lead of the receiver. This condenser is essential to the proper adjustment of the antenna stage. Set the test oscillator to exactly 600 KC. Tune the receiver to maximum output. If the control head is of the steering column or Ford dash control type, calibrate at the low end of the dial by setting the pointer to read exactly 60 (600 KC.).

Set the test oscillator to exactly 1400 KC. Turn the gang condenser by means of the tuning knob until the dial pointer indicates 140 (1400 KC.). Adjust the oscillator shunt trimmer (on gang condenser section third from shaft end) for maximum output. Adjust the two trimmers nearest the shaft end as explained under R.F. alignment.

R. F. ALIGNMENT

With the test oscillator set to approximately 1400 KC., tune the set very carefully for maximum output.

Adjust the output of the test oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading.

CALIBRATION AND ALIGNMENT

A good modulated oscillator and a sensitive output meter are necessary for proper calibration and alignment of the R.F. and I.F. stages of this receiver. The output of the test oscillator must be adjustable to give a very weak signal which will not actuate the A.V.C. of the receiver. The output meter must be sensitive enough to give sufficient reading with such a weak signal.

The output meter may be conveniently connected between the chassis and the yellow lead terminal on pilot light and tone control lead socket. You will find that the yellow lead is connected through an .02 mfd. condenser to the plate of the 41 output tube. However, if the output meter is suitable, it should be connected across the speaker voice coil. During all calibration and alignment adjustments, keep the volume control full on.

I. F. ALIGNMENT

The I.F. trimmers are located on top of the I.F. transformers which may be reached by removing the receiver top cover. Pull out the antenna plug. The test oscillator should be set to exactly 177.5 KC. and connected from the control grid of the 77 to ground. Adjust the test oscillator output to give about half-scale reading of the output meter. Tune the set to make certain that no station signal is tuned in, since this would affect the output meter reading. Adjust all three I.F. trimmers to give maximum output reading.

In adjusting the I.F. transformer trimmers, it is desirable to use a bakelite screw driver or one having only a small metal tip. After the I.F. trimmers have been aligned once, go back and repeat the procedure, since any adjustment of one will affect the others to some extent.

DIAL CALIBRATION

The dial of the control head is calibrated in kilocycles except that one zero is omitted. Sets using the steering column control head or the Ford dash control head are calibrated as follows:

Tune in a station of known frequency between 800 and 1100 KC. Loosen the set screw in the right hand knob and remove the knob. Loosen

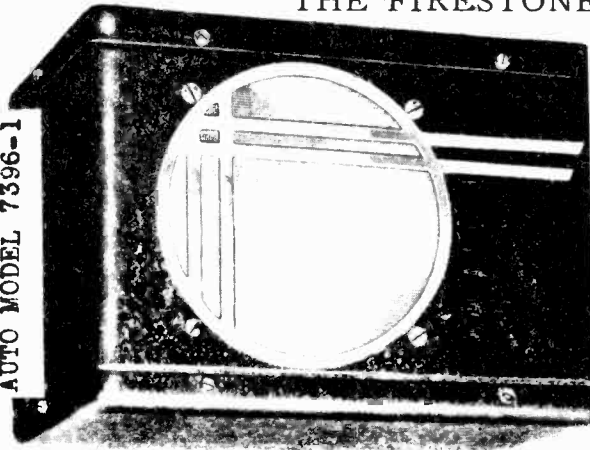
Part No.	Description	Price
49	88364 Control head less shell, knobs and shafts	3.50
50	88365 Fuse, 10 amperes	.05
	83777 Battery lead and fuse housing	.50
PARTS NOT SHOWN ON CIRCUIT DIAGRAM		
	INSTALLATION PARTS	
Part No.	Description	List Price
20	12412 Split lockwasher for receiver mounting	\$0.02
25	17166 Hex nut for receiver mounting 1/2" - 13	.05
29	84990 Receiver mounting plate	.60
30	85012 Receiver mounting bolt, 1/2" - 13x2"	.06
20	88326 Complete accessories for installation	3.28
20	88335 Shakeproof lockwasher for receiver mounting	.04
20	88336 Large flat washer for receiver mounting	.04
MISCELLANEOUS PARTS		
83377	Fuse insulator tube	.02
80	88169 Battery lead and fuse housing	.35
1.20	88161 Tube shield half section (short)	.08
1.20	88162 Tube shield half section (long)	.08
.20	88164 Tube shield cap (long)	.06
.40	88165 Tube shield cap (short)	.06
.25	88297 Speaker mounting screw No. 8 - 32 special head	.02
.35	88319 Self tapping screw No. 8x1/2" for receiver cover mtg.	.02
.40	88321 Receiver case assembly (less covers)	.50
.35	88327 Antenna cable	1.10
.60	88330 Receiver case cover with tube location label	1.00
.15	88350 Interference filter condenser with bracket, .5 mfd., 150 V.	.70
STEERING COLUMN CONTROL HEAD PARTS		
88333	Shell for control head (right-hand mounting)	.50
88334	Bracket for control head mounting	.50
88337	Shell mounting screw No. 1 - 72 R.H.M.S.	.01
88338	Knob for control head	\$0.25
88339	Pilot light and tone control cable with plug and socket	.90
88385	Extra length pilot light and tone control cable with plug and socket (43")	1.00
88410	Shell for control head (left-hand mounting)	.50
FLEXIBLE SHAFTS		
88406	18" tuning and volume control shaft	2.00
88407	24" tuning and volume control shaft	1.50
88408	30" tuning and volume control shaft	2.00
88409	36" tuning and volume control shaft	2.00
SPECIAL ACCESSORIES		
88422	Ford distributor condenser	.70
88429	Distributor suppressor	.35
88430	Done light filter	1.00
88431	Shielded boom with connector tip for antenna lead-in	.40
Prices subject to change without notice.		
CEILING PRICES - A retail outlet must not sell at prices higher than those allowed by OPA Price Regulations. The suggested selling prices herein may not be charged by any retailer if his ceiling on any item is below the prices herein.		

Diag. No.	Part No.	Description	Price
1	66023	60,000 ohm 1 watt carbon resistor	\$0.25
2	67203	2,000 ohm 1/2 watt carbon resistor	.25
3	83080	51,000 ohm 1/2 watt carbon resistor	.25
4	83082	260,000 ohm 1/2 watt carbon resistor	.29
5	83539	260 mmfd. mica condenser	.20
6	84198	110,000 ohm 1/2 watt carbon resistor	.25
7	84235	1.1 megohm 1/2 watt carbon resistor	.30
8	84238	11,000 ohm 1/2 watt carbon resistor	.20
9	84282	.001 mfd. mica condenser	.25
10	84833	70 mfd. mica condenser	.20
11	85296	Pilot lamp 6.8 ohm (bayonet base)	.18
12	88026	.02 mfd. 400 volt paper condenser	.30
13	88156	Vibrator	3.50
14	88170	10 mfd. 25 volt electrolytic condenser	.80
15A } 15B }	88171	Volume control 500,000 ohm } Line switch }	1.20
16	88172	Antenna Filter	1.20
17	88173	50 mmfd. mica condenser	.40
18	88181	R. F. choke coil	.25
19	88183	R. F. choke coil (to vibrator)	.25
20	88185	.006 mfd. 600 volt paper condenser	.35
21	88187	.01 mfd. 1500 volt paper condenser	.40
22	88189	.05 mfd. 200 volt paper condenser	.35
23	88191	1 mfd. 300 volt paper condenser	.35
24	88193	1.25 mfd. 150 volt paper condenser	.35
25	88196	.5 mfd. 150 volt paper condenser	.35
26	88203	600 ohm 1/2 watt carbon resistor	.15
27	88204	210 ohm 1/2 watt carbon resistor	.15
28	88205	.0021 mfd. mica condenser	\$0.35
29	88210	Filter choke	1.25
30	88213	Power transformer	3.50
31	88222	1st I.F. transformer	2.75
32	88223	2nd I.F. transformer	2.60
33	88233	110 mmfd. mica condenser	.25
34	88234	Oscillator coil and shield assembly	1.50
35	88239	"A" filter	1.00
36	88250	R.F. coil and shield assembly	1.50
37A } 37B }	88256	Electrolytic condenser } 4 mfd. 350 volt } Electrolytic condenser } 8 mfd. 350 volt }	2.40
38	88257	9,600 ohm 1/2 watt carbon resistor	1.5
39 A to C	88258	Three gang variable condenser	6.00
40	88274	Field coil and housing (for R-246-A spkr.)	2.50
41	88276	Output transformer	2.00
42	88285	1.25 mfd. 150 volt paper condenser	.80
43	88289	R.F. choke (to filaments)	.20
44	88298	.25 mfd. 150 volt paper condenser (low reactance)	.40
45	88312	Antenna coil and shield assembly (iron core)	2.00
46	88327	Antenna cable and plug	1.10
47	88328	Diagram and shell assembly (R-246-A spkr.)	2.10
48	88339	Pilot light and tone control cable with plug	.90

THE FIRESTONE TIRE & RUBBER CO.

MODEL 7403-1
MODEL 7396-1

AUTO MODEL 7396-1



Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED. OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT, THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. con-

denser. The ground on the test oscillator should be connected to the ground buss, indicated in circuit diagram. Align all four I.F. trimmers to peak or maximum reading on the output meter.

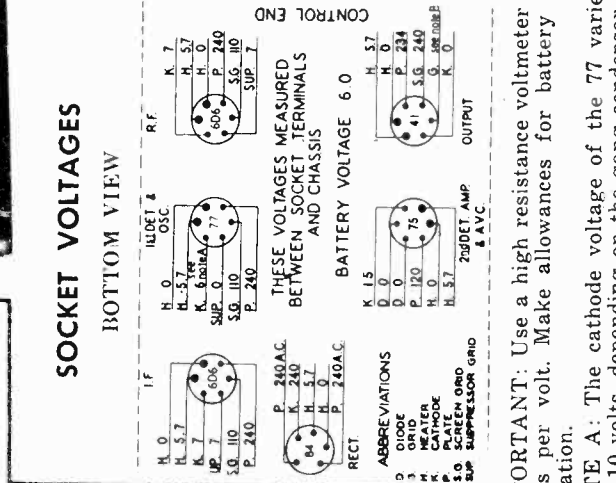
BROADCAST BAND ALIGNMENT. Remove the chassis from the cabinet and set on a bench, taking care that no metal is near the loop. Do not make this setup on a metal bench.

Connect the test oscillator to the antenna of the set through a 200 mfd. (.0002) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

Diag No.	Part No.	Description	Price	Diag No.	Part No.	Description	Price
C-9	N-1376	.02 mfd. 400 V.	20%	R-10	N-1264	500,000 Ohm .5 W.	20%
C-10	N-3658	{ 40 mfd. 150 W. V. } { 40 mfd. 150 W. V. } Electrolytic	1.10	R-11	N-3663	150 Ohm .5 W.	10%
C-11	N-1346	.05 mfd. 400 V.	40	R-12	N-1377	200,000 Ohm .5 W.	20%
C-12	N-3080	.22 mfd. 200 V.	.70	R-13	N-3819	1,200 Ohm 1 W.	10%
C-13	N-1345	.05 mfd. 200 V.	40	R-14	N-1742	25 Ohm .5 W.	20%
R-1	N-3814	15,000 Ohm .5 W.	.20	R-15	N-3869	30 Ohm 1 W.	10%
R-2	N-3964	2,000 Ohm .5 W.	.20	R-16	N-1377	200,000 Ohm .5 W.	20%
R-3	N-1260	50,000 Ohm .5 W.	.20	R-17	N-1262	1 Megohm .5 W.	20%
R-4	N-1627	20,000 Ohm .5 W.	.20	N-3784	Antenna Loop Coil		.90
R-5	N-1263	10 Megohm .5 W.	.20	N-3298	Oscillator Coil		.70
R-6	N-1682	3 Megohm .5 W.	.20	N-3816	1st I.F. Transformer		1.20
R-7	N-1460	30,000 Ohm .5 W.	.20	N-3804	2nd I.F. Transformer		1.20
R-8	N-4076	0.5 Megohm Volume Control	2.25	N-3782	Output Transformer		1.00
R-9	N-2189	4 Megohm .5 W.	.20	N-3781	5" P. M. Speaker		3.75
N-1958	Rubber line cord		0.45	N-4025	2 Gang Condenser		3.00
N-3812	Wood dowel spacers—loop mounting		\$.80	N-4054	Dial scale (glass)		.50
N-3795	Screw—6-32x2 1/4" round head		.10	N-4055	Dial background plate		.80
N-3642	Washer—6-32x2 1/4" round head		.12	N-4053	Dial pointer		.50
N-4687	Cabinet back		.65	N-3787	Dial drive shaft		.50
N-4749	Knobs		.20	N-3238	Dial drive shaft bushing		.40
N-4386	Clips—dial scale fastening		.10	N-3243	"C" Washer—dial drive shaft retainer		.07
N-4696	Speaker baffle		.16	N-2655	Dial drive string		.10
N-4697	Grille cloth		.22	N-3925	Dial drive spring		.10
				N-4075	Dial lamp socket		.50

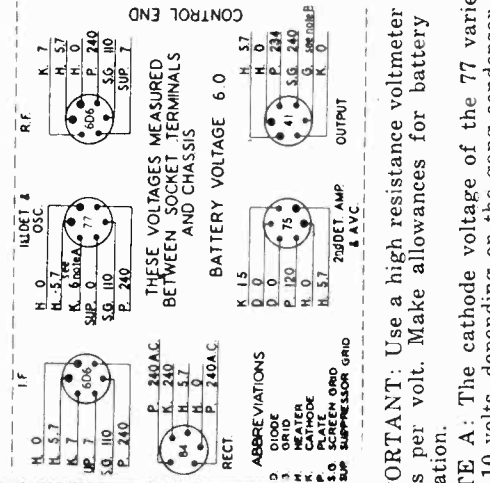
MODEL 7403-1

List Price	Description	List Price
\$ 0.20	500,000 Ohm .5 W.	\$ 0.20
.20	150 Ohm .5 W.	.20
.20	200,000 Ohm .5 W.	.20
.30	1,200 Ohm 1 W.	.20
.20	25 Ohm .5 W.	.20
.30	30 Ohm 1 W.	.20
.20	200,000 Ohm .5 W.	.20
.20	1 Megohm .5 W.	.20
.90	Antenna Loop Coil	.90
.70	Oscillator Coil	.70
1.20	1st I.F. Transformer	1.20
1.20	2nd I.F. Transformer	1.20
1.00	Output Transformer	1.00
3.75	5" P. M. Speaker	3.75
3.00	2 Gang Condenser	3.00



SOCKET VOLTAGES

BOTTOM VIEW



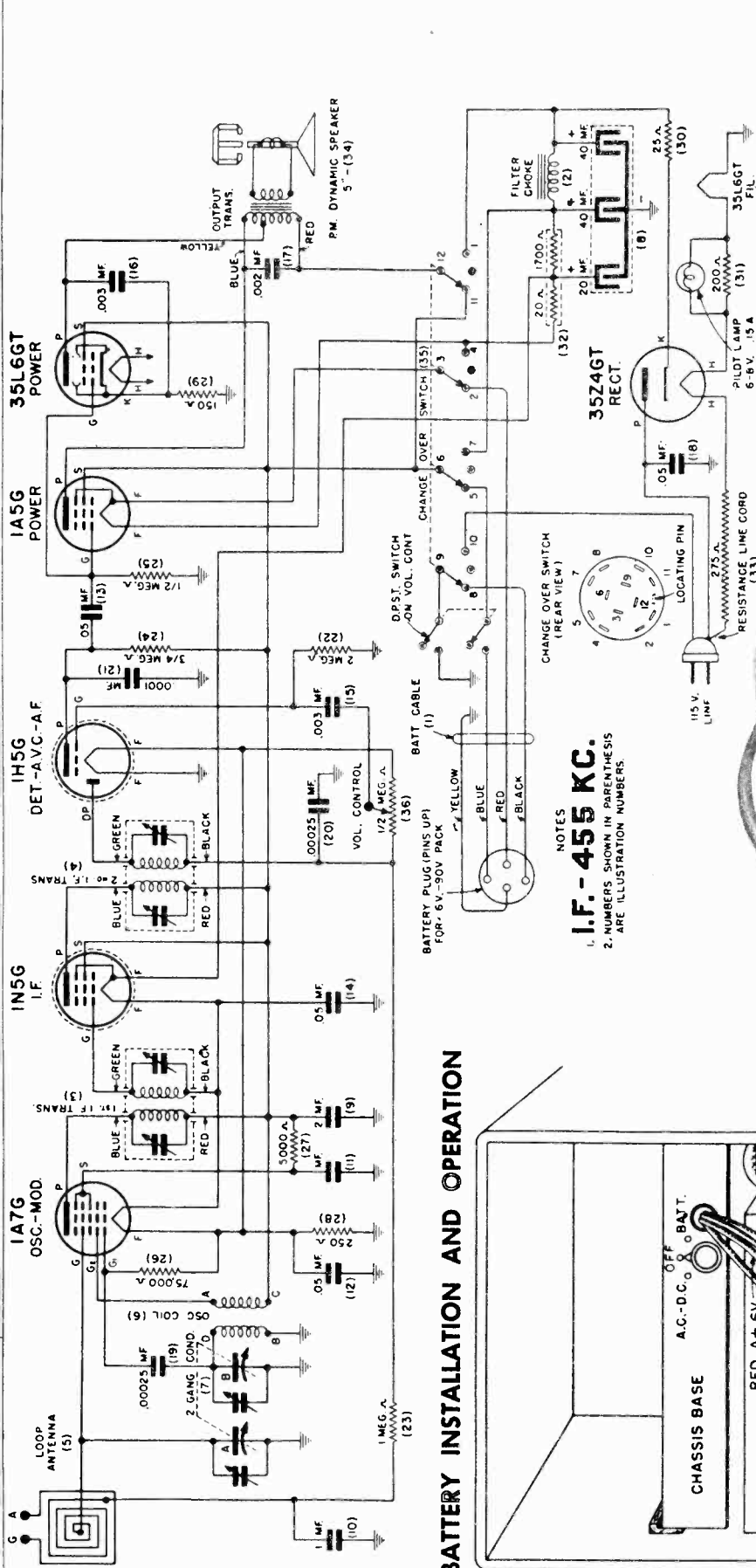
IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt. Make allowances for battery voltage variation.

NOTE A: The cathode voltage of the 77 varies from 6 to 10 volts, depending on the gang condenser setting.

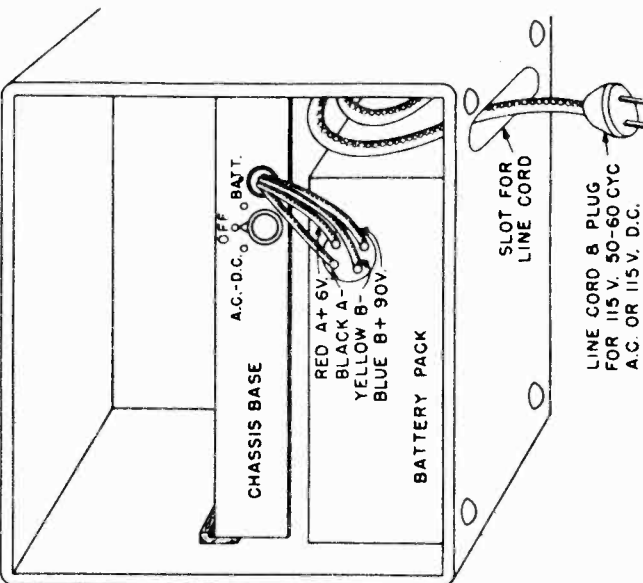
NOTE B: The grid bias on the 41 output tube is —18 volts, measured from the chassis to the ungrounded filter choke terminal.

MODEL 7402-6, Roamer

THE FIRESTONE TIRE & RUBBER CO.



BATTERY INSTALLATION AND OPERATION

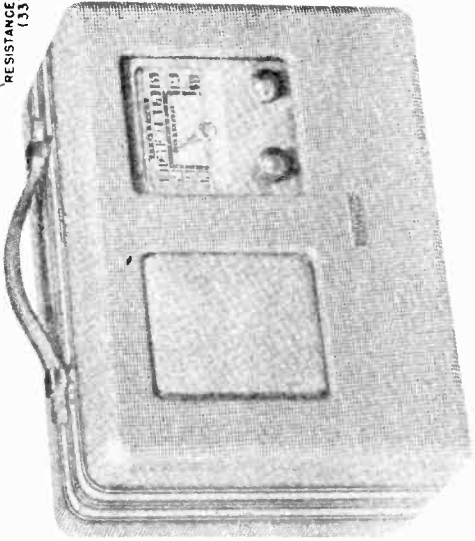


WHEN USING AN EXTERNAL AERIAL A GROUND MUST BE PLACED UNDERNEATH THE SCREW IN THE UPPER LEFT HAND CORNER OF CABINET BACK.

I.F. - 455 KC.
 1. NUMBERS SHOWN IN PARENTHESES
 2. ARE ILLUSTRATION NUMBERS.

NOTE: The special heat dissipating line cord used will become warm when the set is in operation. To provide maximum ventilation remove all of the line cord from the receiver cabinet and stretch it out to its full length before operating the set. When disconnecting the line cord from light supply receptacle do not pull on the line cord as this may damage it, but grasp the plug attached to the end of the cord and pull outward on this.

Do not lengthen or shorten line cord.
 ALWAYS PLACE LINE CORD INSIDE CABINET WHEN NOT IN USE.



THE FIRESTONE TIRE & RUBBER CO. MODEL 7402-6, Reamer

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment, check tuning dial adjustment by: turn gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.

Use an accurately calibrated test oscillator with some type of output measuring device.

BEFORE ALIGNING, PLACE LOOP AN-

TENNA AND THE BATTERY IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

When adjusting 1730 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to terminals on bottom of cabinet back.

Couple test oscillator to receiver loop by:

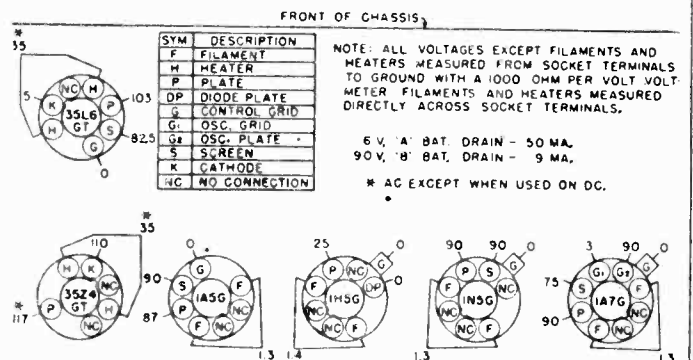
- (a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three-inch form and attach across output of test oscillator.
- (b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below—and:
	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
(1) Exactly 1730 K.C.	Exactly 1730 K.C.	None	Use small loop to couple test oscillator to receiver loop	Adjust 1730 K.C. oscillator trimmer for maximum output.
(2) Approx. 1400 K.C.	Exactly 1400 K.C.	None	Use small loop to couple test oscillator to receiver loop	Adjust 1400 K.C. antenna trimmer for maximum output.
I. F. Any point where no interfering signal is received	455 K.C.	.02 MFD condenser	High side to grid terminal of 1A7G tube Low side to chassis DO NOT REMOVE CAP.	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.

SHOULD THE RECEIVER FAIL TO OPERATE CHECK FOR:

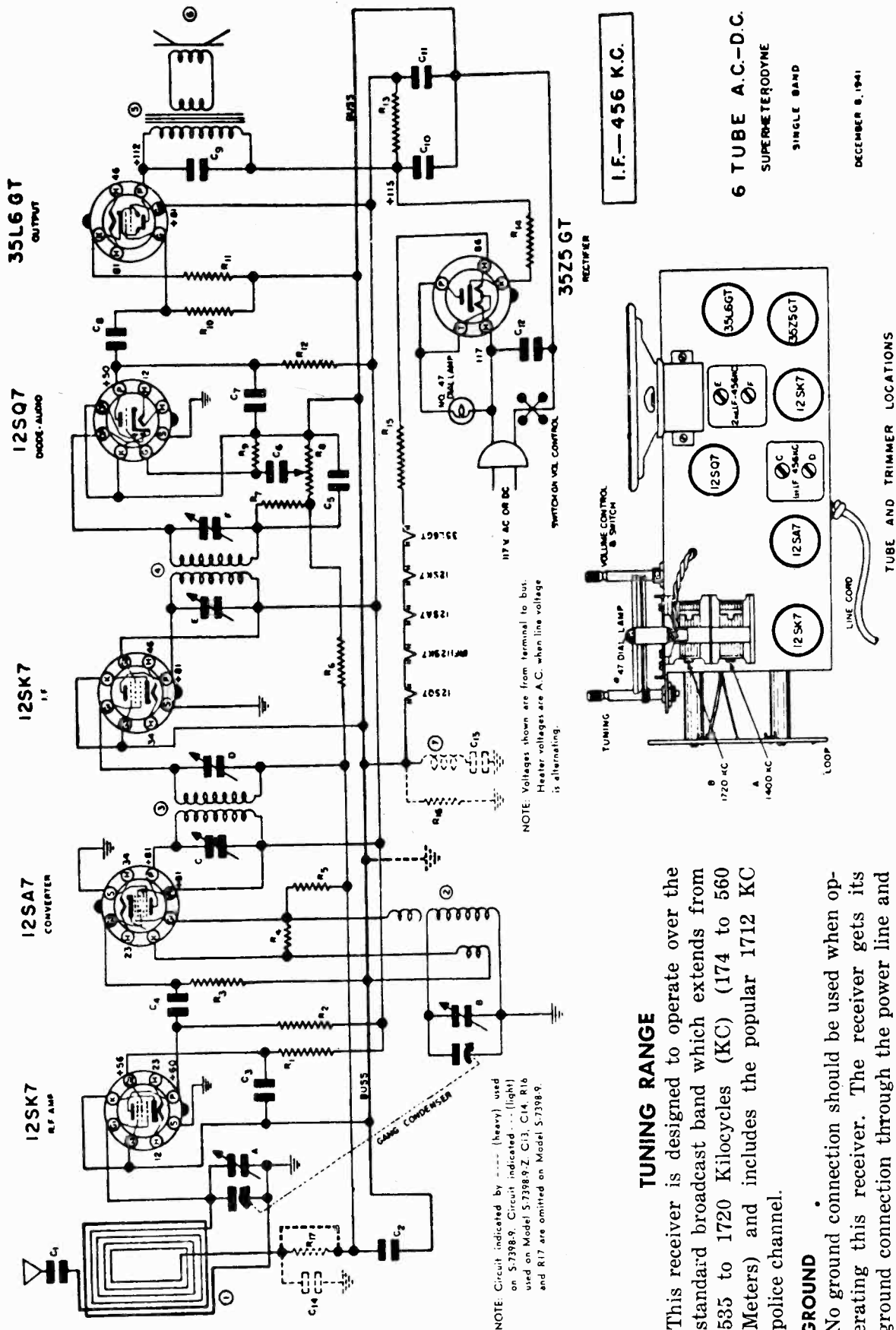
1. Weak battery.
2. A defective tube.
3. Tubes not properly inserted in tube sockets.
4. Grid caps not properly inserted on grid terminals on top of tubes.
5. Set may not be in correct position—rotate radio to point of greatest volume.
6. If set is being operated in an isolated district, an external aerial may be required.

A NOTICEABLE REDUCTION IN RECEIVER VOLUME, assuming that all tubes are in good condition, can generally be attributed to a low battery that should be replaced.



MODEL 7403-1, Brilliantone

THE FIRESTONE TIRE & RUBBER CO.



TUNING RANGE

This receiver is designed to operate over the standard broadcast band which extends from 535 to 1720 Kilocycles (KC) (174 to 560 Meters) and includes the popular 1712 KC police channel.

GROUND

No ground connection should be used when operating this receiver. The receiver gets its ground connection through the power line and any external connection to the chassis may cause a short circuit and consequent damage.