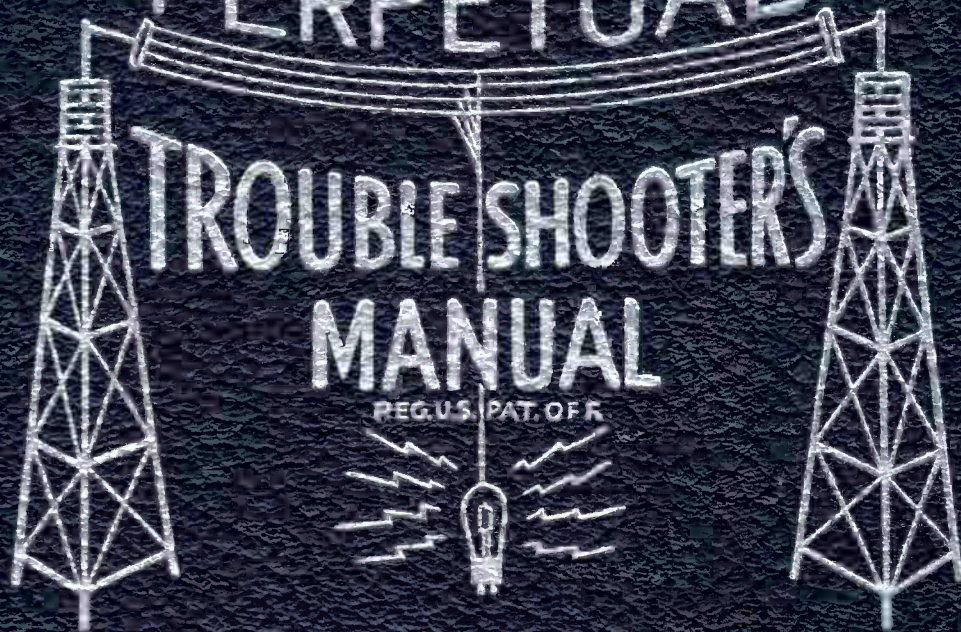


VOLUME XVIII

PERPETUAL



JOHN F. RIDER

PERPETUAL
TROUBLE SHOOTER'S MANUAL

Reg. U. S. Pat. Off.

VOLUME XVIII



JOHN F. RIDER PUBLISHER, INC.

480 Canal Street

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THE RADIO AMATEUR'S BEAM POINTER GUIDE
INSTALLATION AND SERVICING OF LOW POWER PUBLIC ADDRESS SYSTEMS
INSIDE THE VACUUM TUBE
CATHODE-RAY TUBE AT WORK
SERVICING SUPERHETERODYNES
SERVICING RECEIVERS BY MEANS OF RESISTANCE MEASUREMENT

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ADMIRAL CORPORATION

GENERAL NOTES FOR
TILT-OUT CHASSIS

CHASSIS REMOVAL (For Servicing)

Due to the type of chassis mounting used, removal of the entire tilt-out door assembly (with receiver chassis attached) simplifies removal of the receiver chassis. The receiver chassis can then be easily removed from its shock mountings. Removal is a little "tricky" but can be done most readily as described below:

Disconnect all cables and leads to the chassis.

Remove the screw and washer (#1 in figure 1) from both tilt-out spring studs (2), one on each side of the tilt-out assembly. Slip the tilt-out springs (3) off their respective studs. Unscrew the ends of the tie-bar (4). The tie-bar then hangs free on the copper braid used to bond it to the chassis.

Stand at the end of the cabinet (adjacent to the radio compartment) with left hand on the door handle at the front and with right hand in the radio compartment near the back of the chassis and grasping a long screwdriver as shown in Fig. 2.

With the left hand, pull the assembly out to one half of its full tilt-out position. With the screwdriver, pry both tilt-out arms (#5 in Fig. 2) off their studs (#6). Using the screwdriver blade, push the tilt-out arms toward the front of the cabinet (against bracket #7.) The assembly will move downward a slight amount from its original mounting position. The tilt-out assembly can now be removed from the front of the cabinet by tipping it forward and then pulling it straight out. CAUTION: In models having record storage compartments below the receiver, the record storage compartment door MUST be closed during the actual process of removing the radio tilt-out door assembly.

CHASSIS REPLACEMENT

Install chassis on the tilt-out assembly, making sure the chassis shock mounting is assembled exactly as shown in Fig. 3. Be sure that the grommets shown in Fig. 3 are in place on the chassis bracket and that the chassis bracket does not touch the tilt-out arm.

Make sure the rubber strips (#8) are in place.

To replace the assembly, grasp it with both hands and move it into place in the cabinet, in the tilted or open position.

Then continue to hold the assembly in place by grasping the door handle with the left hand. Now pull the assembly slowly toward its closed position. At the same time with the screwdriver in the right hand, spring the tilt-out arms (#5) inwardly until they clear the studs. The assembly will move downward and into the cabinet with the tilt-out arms in the position shown in Fig. 2.

Then lift the assembly by lifting the handle with the left hand and the tilt-out arms with the right hand. One at a time slip each tilt-out arm into place on its stud.

Replace the tie-bar (#4) and tilt-out springs (#3). Reconnect the leads and cables to the chassis.

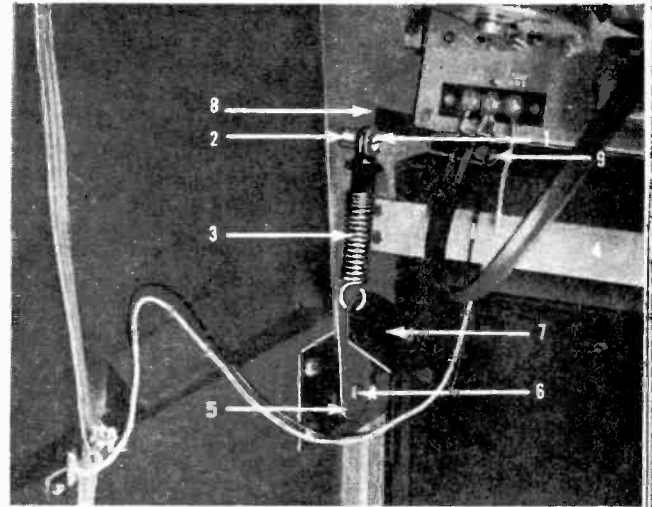


Fig. 1. Receiver Tilt-Out Mounting

Ref. No.	Description	Part No.
1	#6-32 x 1/4" Screw	
2	Stud	Part of #5
3	Spring, Adjusting (for chassis mtg.)	19A 15-2
4	Tie-Bar (for receiver chassis mtg.)	15B 160
5	{ Door Arm, left (near center of cab.)	A1440
	{ Door Arm, right (near center of cab.)	A1441
6	Stud	Part of #7
	{ Door Bracket, left (near center of cab.)	A1438
	{ Door Bracket, right (nearest side of cab.)	A1439
8	Rubber Channel (3/8 x 1/2 x 2 3/8" over-all)	12A 9-1
9	Bumper, Rubber—For radio-chassis (some models only)	12A 3-6

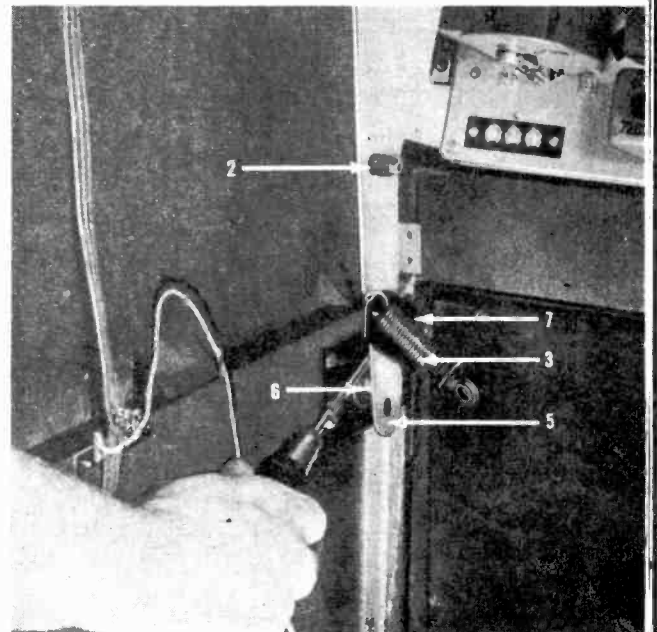


Fig. 2. Receiver Tilt-Out Mounting

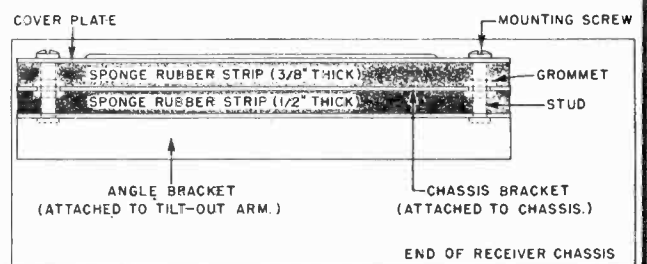


Fig. 3. Chassis Shock-Mounting

MODELS 4D11, 4D12, 4D13, CHASSIS 4D1

ADMIRAL CORPORATION

RESISTORS

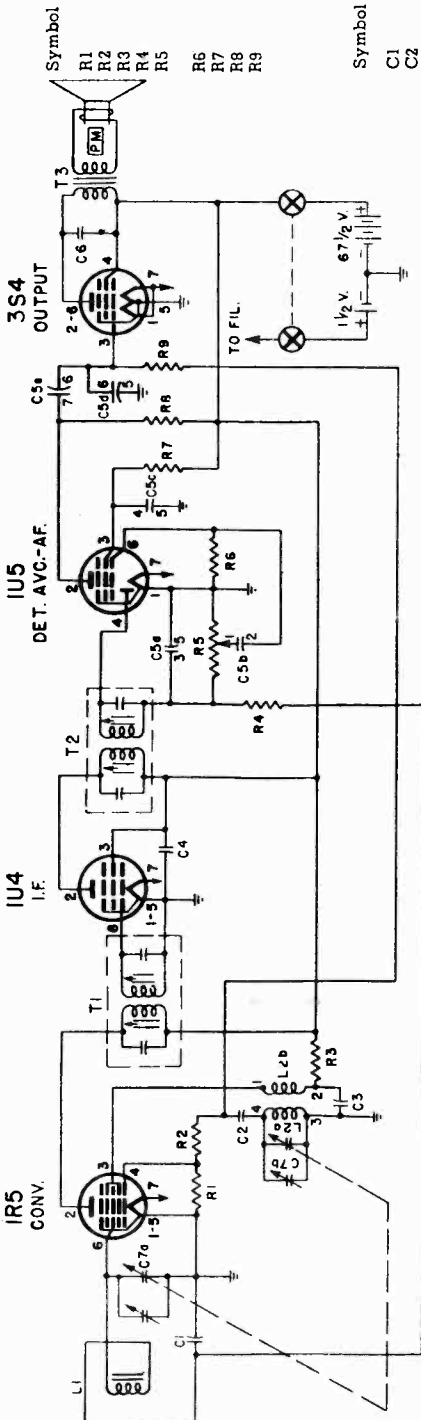
Part No.	Value
47,000 Ohms, 1/4 Watt	60B 3-473
560 Ohms, 1/4 Watt	60B 2-561
10,000 Ohms, 1/4 Watt	60B 3-103
3.3 Megohms, 1/4 Watt	60B 3-335
1 Megohm Volume Control and Switch SW1	75B 1-22
10 Megohms, 1/4 Watt	60B 3-106
4.7 Megohms, 1/4 Watt	60B 3-475
1 Megohm, 1/4 Watt	60B 3-105
2.2 Megohms, 1/4 Watt	60B 3-225

CONDENSERS

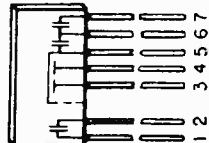
Symbol	Value	Part No.
C1	.01 mfd., 600 Volts, Paper	64B 1-10
C2	.0001 mfd., Ceramic	65B 6-3
C3	.1 mfd., 200 Volts, Paper	64B 1-30
C4	.25 mfd., 200 Volts, Paper	64B 1-28
C5a	150 mmfd., Ceramic	Bulplate
C5b	.002 mfd., Ceramic	63A 2
C5c	.006 mfd., Ceramic	* See Schematic
C5d	100 mmfd., Ceramic	Schematic
C5e	.005 mfd., Ceramic	Schematic
C6	.002 mfd., 600 Volts, Paper	64B 1-14
C7a	0 to 354 mmfd., Gang	68B 13
C7b	0 to 107.2 mmfd., Gang	68B 13

COILS, TRANSFORMERS, ETC.

Symbol	Description	Part No.
L1	Antenna, Loop	69B 38
L2a	Coil, Oscillator	69A 39-1
L2b	Transformer, 1st I.F.	72B 28-1
T1	Transformer, 2nd I.F.	72B 28-1
T2	Transformer, Output	98A 13
T3	Speaker (3 1/2" PM) & Output Transformer	78C 33
SW1	Switch, On-Off	Part of R5

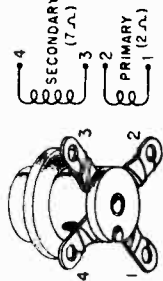


BULPLATE



NOTE: C5a, C5b, C5c, C5d and C5e are contained in a single unit (Bulplate). The numbers next to the C5 condenser plates on the schematic correspond to the lead numbers as shown on the drawing of the "BULPLATE" (see inset). If sections of this unit should open or short it will not be necessary to replace the entire Bulplate. Replace the bad section with a condenser of proper value. Note that leads 5 and 6 are common to more than one section.

OSCILLATOR COIL



NOTE: Some microphonic howling may occur on strong signals if the volume control is turned beyond the overload point. The following changes have been made in late production because some "B" batteries, with high internal resistance, may cause squealing at normal volume levels.

- (a) Condenser C3 (.005 mfd. 600 volt, oscillator plate bypass) has been replaced with a .1 mfd. 200 volt condenser.
- (b) Condenser C6 (.002 mfd. 600 volt, 3S4 late bypass) has been returned to the screen grid (pin 4) rather than to ground.
- (c) The speaker leads have been reversed, the red lead has been

connected to the plate and the blue lead to the screen of the 3S4. For early production chassis which do not have the above changes, the same results can usually be secured by adding 4 mfd. 200 volt electrolytic condenser from B+ to chassis. Be sure the condenser is connected in the circuit on the set side of the on-off switch. Do not connect it to the battery side of the switch or the inherent leakage of the condenser will appreciably shorten the "B" battery life.

CABINET PARTS

Description	Part No.
Cabinet (Includes Body, Handle & Escutcheon)	
Maroon (4D11)	34D 16-5
Ebony (4D12)	34D 16-10
Ivory (4D13)	34D 16-15
Cabinet Base	
Maroon (4D11)	34D 16-2
Ebony (4D12)	34D 16-7
Ivory (4D13)	34D 16-12
Handle (includes two drive lock pins)	
Maroon (4D11)	34D 16-3
Ebony (4D12)	34D 16-8
Ivory (4D13)	34D 16-13

CABINET PARTS (Continued)

Description	Part No.
Knob, Tuning	
Maroon (4D11)	33B 29-1
Ebony (4D12)	33B 29-3
Ivory (4D13)	33B 29-5
Knob, Volume Control	
Maroon (4D11)	33B 29-2
Ebony (4D12)	33B 29-4
Ivory (4D13)	33B 29-6
Grill Cloth	36B 3-6
Washer, Felt (used under Knobs)	5A 4-7

MISCELLANEOUS

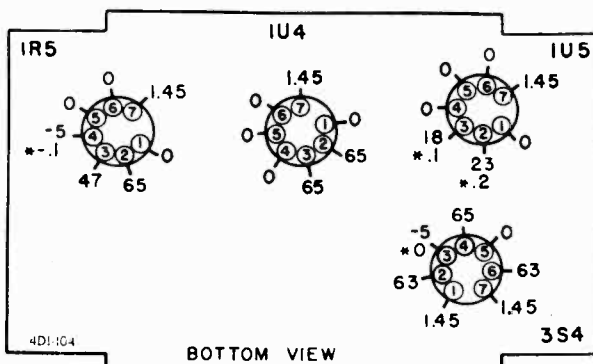
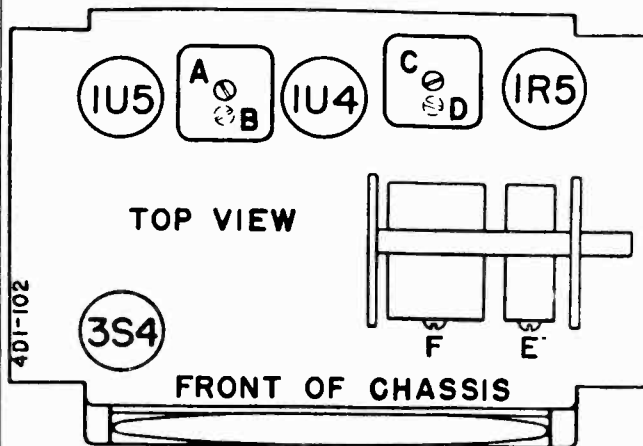
Description	Part No.
Clip (with leads) for "B" Battery	90A 5-1
Compression Ring for knob	19A 31-2
Contact Plate for "A" Battery	15A 261
Grommet, Fibre (for "A" Battery)	12A 13-4
Snap Button, Antenna	19A 1-3-2
Tube Socket	87A 3-4
Wing Nut	2A 5-5
Screw, No. 8-32x2 1/4	80-2750-C2-2

ALIGNMENT PROCEDURE

1. Remove chassis from cabinet.
2. Install a fresh set of batteries.
3. Connect Output Meter across Voice Coil.
4. Turn Receiver Volume Control full on.
5. Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed as outlined in chart below.
6. Repeat adjustments to insure good results.

Step	Dummy Antenna in Series with Signal Generator	Connection of Signal Generator (High Side)	Signal Generator Frequency	Receiver Gang Setting	Trimmer Description	Trimmer Designation	Type of Adjustment
1	.1 Mfd.	Stator Lug, Left Section of Tuning Condenser (Antenna Stator)	455 K.C.	Tuning Gang Wide Open	2nd I.F. 1st I.F.	A, B C, D	Maximum Deflection; then repeat
2	.1 Mfd.	Stator Lug, Left Section of Tuning Condenser (Antenna Stator)	1630 K.C.	Tuning Gang Wide Open	Oscillator	E	Maximum Deflection
3	No physical connection between generator and set.	Loop radiator (or place generator lead close enough to receiver loop to obtain adequate signal)	1400 K.C.	Tune in Generator Signal	Antenna	F	Maximum Deflection

TUBE AND TRIMMER LOCATION



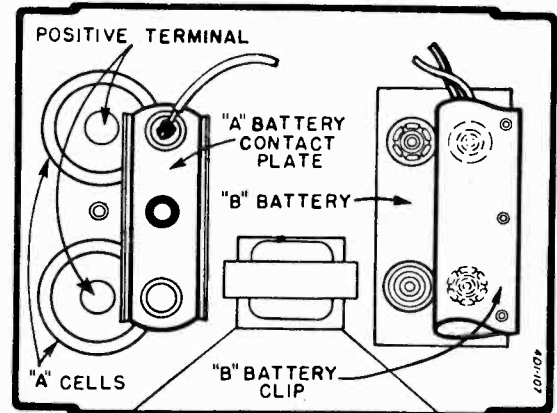
BATTERY REPLACEMENT

"A BATTERY": two flashlight cells (1-5/16 x 2-3/8 inches) Ensign F2, Burgess No. 2, Eveready 950 or equivalent.

"B BATTERY": one Ensign B67, Burgess XX45, Eveready 467 or equivalent.

"A" Battery life about 15 hours.

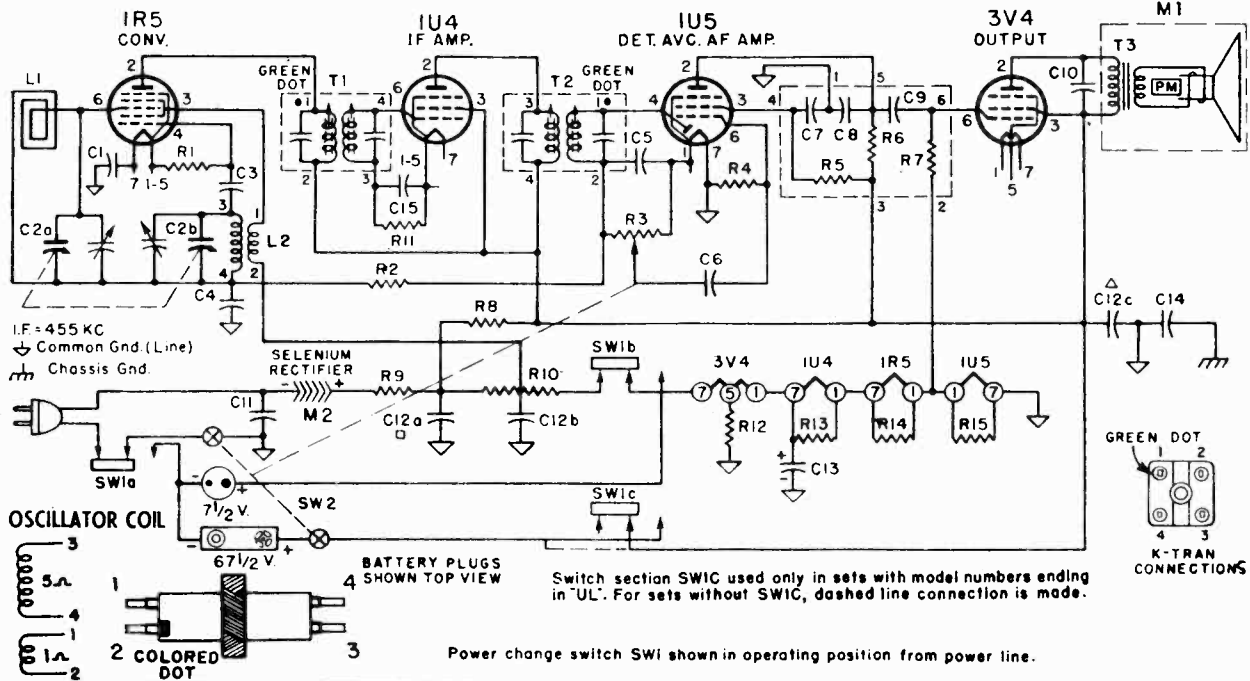
"B" Battery life about 30 hours.



Install both "A" cells with the positive terminal against removable contact plate.

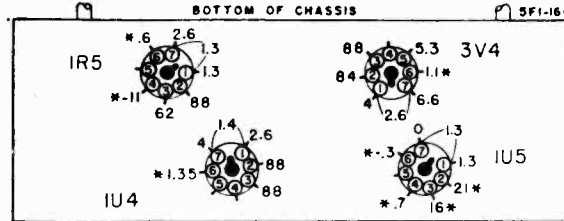
VOLTAGE DATA

- Readings made between point indicated and chassis.
- Measured using a fresh set of batteries.
- Turned to low frequency end, no signal.
- Voltages measured with Vacuum-Tube Voltmeter.
- A second voltage reading (marked with an asterisk *) indicates readings made with a 1000 ohm-per-volt meter when use of this instrument would result in appreciably lower readings.



VOLTAGE DATA

- Voltage readings taken between tube socket terminals and B minus (metal shell of electrolytic condenser).
- Dial set to low frequency, no signal, and volume control minimum.
- Measurements made from 117 volts AC line. If measured from DC line, voltages may be slightly lower.
- Voltage readings taken with a vacuum tube voltmeter. Socket terminals marked with an asterisk * indicate much lower voltage or zero voltage if measured with a 1000 ohm-per-volt meter.
- If measurements are made on battery operation, tube filament and B plus voltages will vary with the condition of the batteries. These voltages will equal the terminal voltage of the A or B battery less the voltage drop through components.



* If taken with a 1000 ohm-per-volt meter, readings will be lower or zero.

RESISTORS

Symbol	Description	Part No.
R1	100,000 Ohms, 1/4 Watt	60B 27-104
R2	3.3 Megohms, 1/4 Watt	60B 27-335
R3	1 Megohm, Volume Control and On-Off Switch	75B 1-21
R4	10 Megohms, 1/4 Watt	60B 27-106
R5	4.7 Megohms	60B 27-106
R6	1 Megohm	60B 27-106
R7	2.2 Megohms	60B 27-106
R8	2,700 Ohms, 1 Watt	60B 14-272
R9	47 Ohms, 1 Watt	60B 14-470
R10	2,400 Ohms, 2.5 Watt (Tapped Candelohm)	61A 5-3
R11	10 Megohms, 1/4 Watt (R11 not used in early production)	60B 27-106
R12	2,200 Ohms, 1/4 Watt	60B 26-222
R13	390 Ohms, 1/4 Watt	60B 26-391
R14	180 Ohms, 1/4 Watt	60B 26-181
R15	120 Ohms, 1/4 Watt	60B 26-121

CONDENSERS

Symbol	Description	Part No.
C1	.25 mfd., 200 Volts, Paper	64B 1-28
C2a	Gang, 420 mfd. (max)	68B 14
C2b	Gang, 126 mfd. (max)	68B 14
C3	100 mfd., Ceramic	65B 6-3
C4	.01 mfd., 400 Volts, Paper	64B 1-25
C5	100 mfd., Ceramic	65B 6-3
C6	.001 mfd., Ceramic (tolerance -0%, +20%)	65B 6-41
C7	.005 mfd., Ceramic	65B 6-41
C8	100 mfd., Ceramic	65B 6-41
C9	.005 mfd., Ceramic	65B 6-41
C10	.001 mfd., Ceramic (tolerance -0%, +20%)	65B 6-41

+C7, C8, R5, R6, R7 are contained in a multiple-unit component called a couplate (part number 63A4-3). Although a defective section of the couplate can sometimes be replaced by individual components, we recommend replacing the entire couplate.

Note that numerals 1, 2, 3, 4, 5, and 6 shown at schematic connections, correspond to couplate lead numbers printed on body of couplate directly above the leads.

COILS, TRANSFORMERS, ETC.

Symbol	Description	Part No.
C11	.05 mfd., 400 Volts, Paper	64B 1-22
C12a	30 mfd., 150 Volts	67C 7-1
C12b	20 mfd., 150 Volts	67C 7-1
C12c	20 mfd., 150 Volts	67C 7-1
C13	100 mfd., 25 Volts, Paper	67A 4-6
C14	.1 mfd., 200 Volts, Paper	64B 1-30
C15	.001 mfd., Ceramic (tolerance -0%, +20%) (C15 not used in early production)	65B 6-41
L1	Antenna, Loop	69B 40
L2	Coil, Oscillator	69A 59
T1	Transformer, 1st I.F.	72B 28-11
T2	Transformer, 2nd I.F.	72B 28-11
T3	Transformer, Output	98A 21
M1	Speaker (4" PM) and Output Transformer	78B 34-2
M2	Rectifier, Selenium	93A 1-4
SW1	Switch, Power Change DPDT, for "N" models. 4PDT, for "UL" models.	77A 19-2 77A 19-1
SW2	Switch, On-Off	(Part of R3)
	Couplate (Includes C7, C8, C9, R5, R6, R7)	63A4-3

PLASTIC CABINET PARTS

Description	Part No.
Body, Cabinet (less all other parts)	
Maroon 5F11	34D 20-1
Ebony 5F12	34D 20-5
Lid, Cabinet (less all other parts)	
Maroon 5F11	34D 20-2
Ebony 5F12	34D 20-6

MISCELLANEOUS

Description	Part No.
Cover, Antenna (for inside lid)	
Maroon 5F11	34D 20-4
Ebony 5F12	34D 20-8
Escutcheon & Grille (front)	
Maroon 5F11	23C 32-1
Ebony 5F12	23C 32-2
Handle, Carrying (less all other parts)	
Maroon 5F11	34D 20-3
Ebony 5F12	34D 20-7
Knobs	
"Volume" Maroon 5F11	33B 30-1
"Tuning" Maroon 5F11	33B 30-2
"Volume" Ebony 5F12	33B 30-3
"Tuning" Ebony 5F12	33B 30-4
Baffle Board, Speaker	43A 57
Bracket, Battery Support	15A 286
Bracket, Chassis Support	15A 288
Bag, Waxed Paper Shipping	45A 4-7
Carton and Fillers	44B 111
Catch Pin, Lid (on Monogram)	23B 31-2
Clip, "B" Battery	90A 5-2
Clip, IF Transformer Mounting	72B 28-10
Contact Strip, Antenna	10A 11-1
Cover, Chassis (metal)	15B 267
Cover and Latch Assembly (Metal Cabinet Bottom)	AB141
Grille Cloth (7 1/2" x 4 1/4")	36B 3-7
Hinge and Bracket, Cover (Left Side)	A1660
Hinge and Bracket, Cover (Right Side)	A1661
Monogram (Admiral)	23B 31-1
Pin Tip (for Antenna Leads)	86A 2-1
Plate, Electrolytic Mounting	67A 2-1
Plug, "A" Battery	88A 4-6
Painter, Dial Tuning	25A 29-1
Shield Plate (for Selenium Rectifier)	15A 304
Snap Buttons	13A 1-3-47
Speed Nut (Monogram mounting)	2B 10-23-68
Speed Nut ("U" type)	2A 9-5
Spring, Lid Catch Pin	19A 29
Tube Socket	87A 3-4

ALIGNMENT PROCEDURE

- Use battery power for alignment if fresh batteries are available.
- When using AC power, an isolation transformer should be used if available. If not using an isolating transformer, connect a .1 mfd. condenser in series with the signal generator low side to B minus of radio chassis.
- Connect loop antenna and maintain same relative position as when in cabinet.
- Set volume control full on.
- Connect output meter across speaker voice coil.
- Use lowest setting of signal generator capable of producing adequate output meter indication and then proceed as outlined below.
- Repeat adjustments to insure good results.

NOTE

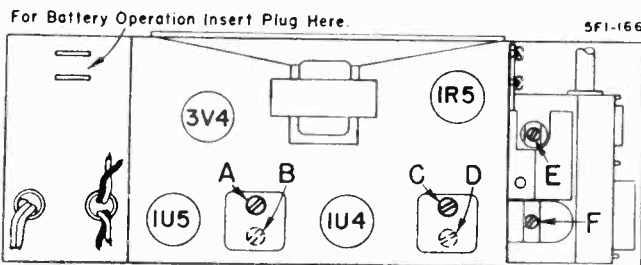
To avoid splitting the slotted head of powdered iron core tuning slugs in I.F. transformer, use an alignment tool with a screw driver blade $\frac{1}{8}$ " wide.

Step	Dummy Antenna in Series with Signal Generator	Connection of Signal Generator (High Side)	Signal Generator Frequency	Receiver Gang Setting	Trimmer Description	Trimmer Designation	Type of Adjustment
1	.001 mfd. when using A. C. .1 mfd. when using Battery	Tuning condenser, antenna stator	455 KC	Gang fully open	2nd IF 1st IF	A, B C, D (see note below)	Maximum output
2	.001 mfd. when using A. C. .1 mfd. when using Battery	Tuning condenser, antenna stator	1620 KC	Gang fully open	Oscillator (on gang)	E	Maximum output
Install chassis in cabinet. Connect loop antenna.							
3	Loop of several turns of wire, or place generator lead close to receiver loop for adequate signal.	No physical connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna (on gang)	F	Maximum output

Mount dial pointer. Set pointer at 1400 KC with gang condenser tuned to 1400 KC signal.

NOTE: Adjustments B and D are made from underside of chassis.

TUBE AND TRIMMER LOCATION



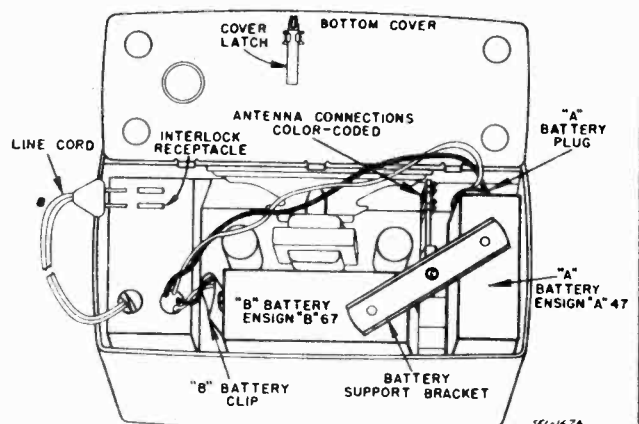
REPLACEMENT OF BATTERIES

Use replacement A and B batteries of the following types:
A Battery: Ensign A47 or equivalent.
B Battery: Ensign B67, Burgess XX45, Eveready 467 or equivalent.

Electrical characteristics of recommended batteries for these models provide for equal life for both the A and B batteries. A batteries may give satisfactory performance as low as 5.5 volts; B batteries as low as 49.5 volts. Replace batteries when reception is weak and voltage has dropped below values given above.

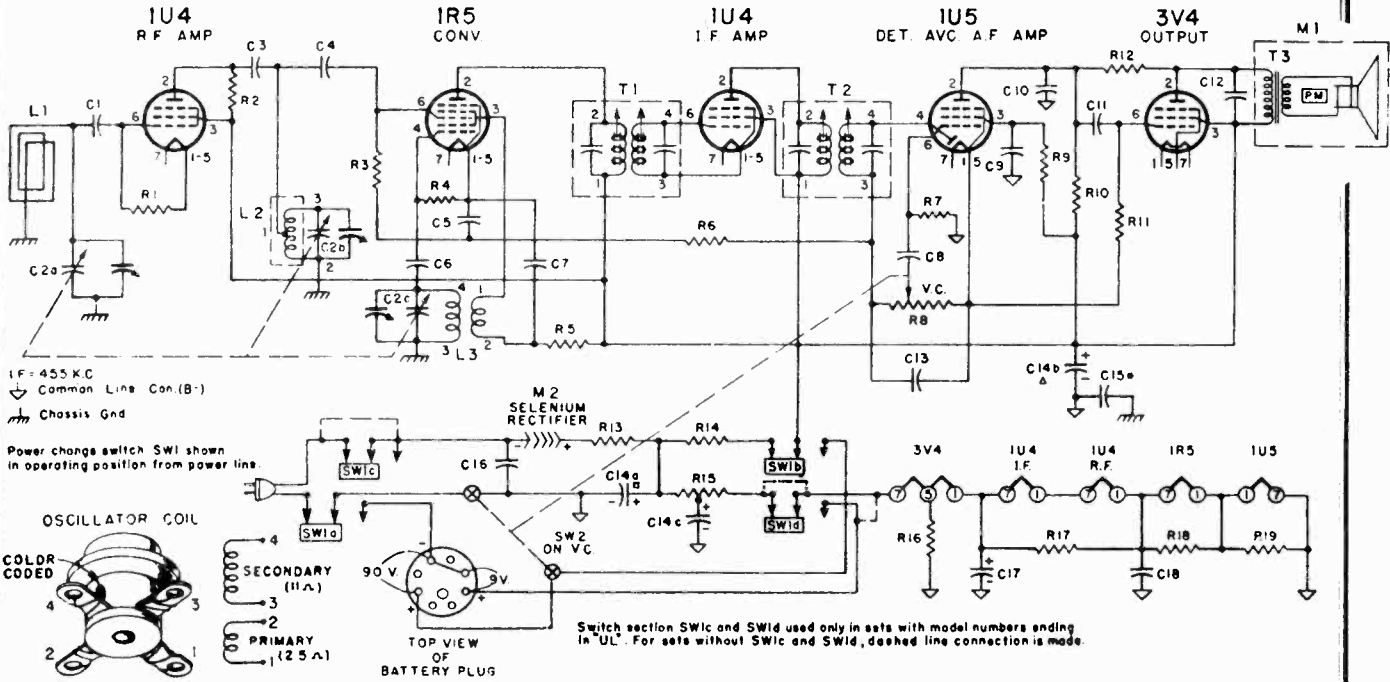
To install replacement batteries, slide the cover latch and open the hinged bottom cover. Then remove the screw which holds the battery support bracket in place. This bracket holds the batteries in place.

Remove the clip which fastens to the "B" battery by means of snap buttons. Remove the "A" battery plug and replace the batteries. Connect the new batteries and re-install the battery support bracket.



PRODUCTION CHANGE

In later production, knobs with longer shanks were used to eliminate the possibility of the knobs sticking or rubbing. The dial pointer has also been modified for use with this revised knob.



VOLTAGE DATA

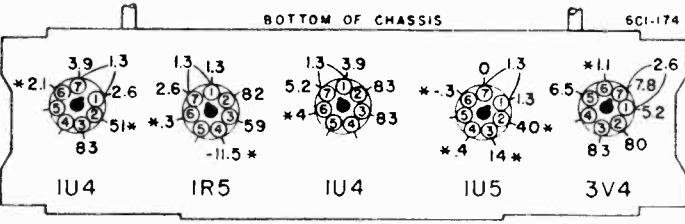
Voltage readings taken between tube socket terminals and B minus (metal shell of electrolytic condenser).

Dial set to low frequency, no signal, and volume control minimum.

Measurements made from 117 volts AC line. If measured from DC line, voltages may be slightly lower.

Voltage readings taken with a vacuum tube voltmeter. Socket terminals marked with an asterisk * indicate much lower voltage or zero voltage if measured with a 1000 ohm-per-volt meter.

If measurements are made on battery operation, tube filament and B plus voltages will vary with the condition of the batteries. These voltages will equal the terminal voltage of the A or B battery minus the voltage drop through components.



* If taken with a 1000 ohm-per-volt meter, readings will be lower or zero.

RESISTORS

Symbol	Description	Part No.
R1	2.2 Megohms, 1/4 Watt	60B 27-225
R2	27,000 Ohms, 1/4 Watt	60B 26-273
R3	1 Megohm, 1/4 Watt	60B 27-105
R4	100,000 Ohms, 1/4 Watt	60B 27-104
R5	8,200 Ohms, 1/4 Watt	60B 26-822
Note: In some sets, R5 was 10,000 Ohms; other sets used pair of 18,000 Ohm resistors in parallel.		
R6	3.3 Megohms, 1/4 Watt	60B 27-335
R7	10 Megohms, 1/4 Watt	60B 27-106
R8	1 Megohm, Volume Control and On-Off Switch	75B 1-26
R9	4.7 Megohms, 1/4 Watt	60B 27-475
R10	470,000 Ohms, 1/4 Watt	60B 27-474
R11	2.2 Megohms, 1/4 Watt	60B 27-225
R12	5.6 Megohms, 1/4 Watt	60B 26-565
R13	47 Ohms, 1 Watt	60B 14-470
R14	2,700 Ohms, 1 Watt	60B 14-272
R15	2,400 Ohms, 2 1/2 Watt Tapped Cathodm	61A 5-3
R16	1,500 Ohms, 1/4 Watt	60B 26-152
R17	820 Ohms, 1/4 Watt	60B 26-821
R18	220 Ohms, 1/4 Watt	60B 26-221
R19	150 Ohms, 1/4 Watt	60B 26-151

CONDENSERS

Symbol	Description	Part No.
C3	250 mmfd., Ceramic	65B 6-5
C3a	Gang, 420.0 mmfd. (max.) Ant. Section	
C2b	Gang, 193.8 mmfd. (max.) RF Section	68B 10
C2c	Gang, 90.0 mmfd. (max.) Osc. Section	

Symbol	Description	Part No.
C3	100 mmfd., Ceramic	65B 6-3
C4	250 mmfd., Ceramic	65B 6-5
C5	100 mmfd., Ceramic	65B 6-3
C6	.05 mfd., 200 Volts, Paper	64B 1-32
C7	.001 mfd., Ceramic (tolerance -0%, +20%)	65B 6-41
C8	.005 mfd., 600 Volts, Paper	64B 1-12
C9	.05 mfd., 200 Volts, Paper	64B 1-32
C10	100 mmfd., Ceramic	65B 6-3
C11	.005 mfd., 600 Volts, Paper	64B 1-12
C12	.001 mfd., Ceramic (tolerance 0%, ±20%)	65B 6-41
C13	250 mmfd., Ceramic	65B 6-5
C14a	30 mfd., 150 Volts	
C14b	40 mfd., 150 Volts	Elect. 67C 7-52
C14c	20 mfd., 150 Volts	
C15	.18 mfd., 200 Volts, Paper	64A 2-2
Note: In sets with model numbers ending in "UL", C15 is .1 mfd., 400 V.		
C16	.05 mfd., 400 Volts, Paper	64B 1-22
C17	100 mfd., 25 Volts, Elect.	67A 4-6
C18	.25 mfd., 200 Volts, Paper	64B 1-28

COILS, TRANSFORMERS, ETC.

Symbol	Description	Part No.
L1	Antenna Loop	69B 61
L2	Coil, RF	69B 58
L3	Coil, Oscillator	69A 57
T1	Transformer, 1st IF	72B 55
T2	Transformer, 2nd IF	72B 56
T3	Transformer, Output	98A 21
M1	Speaker (4" x 6" PM) and Output Transformer	78B 38-1
M2	Rectifier, Selenium	93A 1-4
SW1	Switch, Power Change	77A 19-2
	DPDT, for "N" models	77A 19-1
SW2	Switch, On-Off (Part of R8)	

PLASTIC CABINET PARTS

Description	Part No.
Body, Cabinet (less all other parts)	34D 21-1
Lid, Cabinet (less all other parts)	34D 21-2
Cover, Antenna (for inside lid)	34D 21-3
Escutcheon & Grille (front)	23D 33-1
Handle, Carrying (less all other parts)	34D 21-4
Knobs	
"Volume"	33B 35-1
"Tuning"	33B 35-2

MISCELLANEOUS

Baffle Board, Speaker	43A 52
Bag, Waxed Paper Shipping	45A 4-8
Carton and Fillers	44B 113
Catch Pin, Lid (on Monogram)	23B 31-2
Clip, Antenna	90A 2-3
Cover & Hinge Assembly, Bottom	A1773
Cover, Chassis (metal)	15C 301
Grille Cloth (10 1/2" x 4 1/2")	36B 3-11
Hinge and Bracket, Cover (Right side)	A1670
Hinge and Bracket, Cover (Left side)	A1669
Hinge and Spring (Bottom Cover)	37A 14
Monogram, Admiral	23B 31-1
Plate, Electrolytic Mounting	67A 2-1
Plug, Battery	88A 3-3
Pointer, Dial Tuning	25A 32
Snap Button	13A 1-1-47
Speed Nut (for Battery Strap)	2A 9-5
Speed Nut (Monogram mounting)	2B 10-23-68
Spring, Lid Catch Pin	19A 29
Tube Socket	87A 3-4

ALIGNMENT PROCEDURE

- Use battery power for alignment if fresh batteries are available.
- When using AC power, an isolation transformer should be used if available. If not using an isolating transformer, connect a .1 mfd. condenser in series with the signal generator low side to B minus of radio chassis.
- Connect loop antenna and maintain same relative position as when in cabinet.
- Set volume control full on.
- Connect output meter across speaker voice coil.
- Use lowest output setting of signal generator capable of producing adequate output meter indication and then proceed as outlined below.
- Repeat adjustments to insure good results.

NOTE

To avoid splitting the slotted head of powdered iron core tuning slugs in I.F. transformer, use an alignment tool with a screw driver blade 1/8" wide.

Step	Dummy Antenna in Series with Signal Generator	Connection of Signal Generator (High Side)	Signal Generator Frequency	Receiver Gang Setting	Trimmer Description	Trimmer Designation	Type of Adjustment
1	.001 mfd. when using A. C. .1 mfd. when using Battery	Grid of 1R5 (Pin 6)	455 KC	Gang fully open	2nd IF 1st IF	A, B, C, D (see note below)	Maximum output
2	.001 mfd. when using A. C. .1 mfd. when using Battery	Grid of 1R5 (Pin 6)	1620 KC	Gang fully open	Oscillator (on gang)	E	Maximum output
3	.001 mfd. when using A. C. .1 mfd. when using Battery	Tuning condenser, antenna stator	1400 KC	Tune in generator signal	R. F. (on gang)	F	Maximum output
Install chassis in cabinet. Connect loop antenna.							
4	Loop of several turns of wire, or place generator lead close to receiver loop for adequate signal.	No physical connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna (on gang)	G	Maximum output

Mount dial pointer. Set pointer at 1400 K.C. with gang condenser tuned to 1400 K.C. signal.

NOTE: Adjustments B and D are made from underside of chassis.

REPLACEMENT OF BATTERY PACK

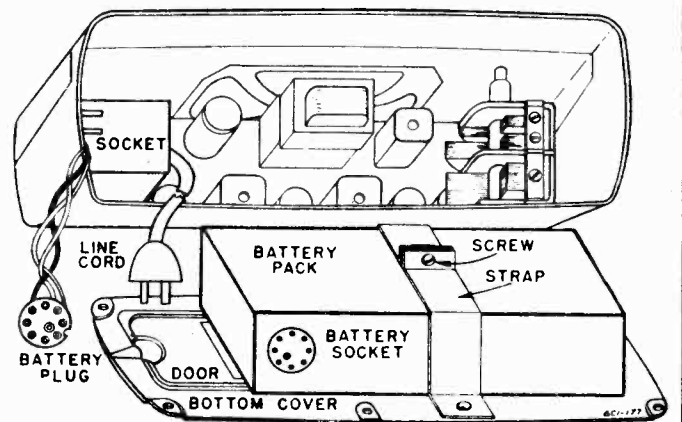
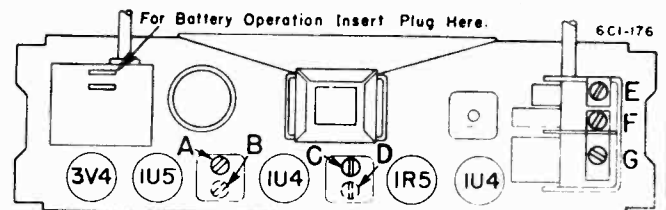
Replace A-B battery pack with Ensign type AB50 pack, Ray-O-Vac AB994, General 60A-6F6-5, Burgess F6A60 or other equivalent.

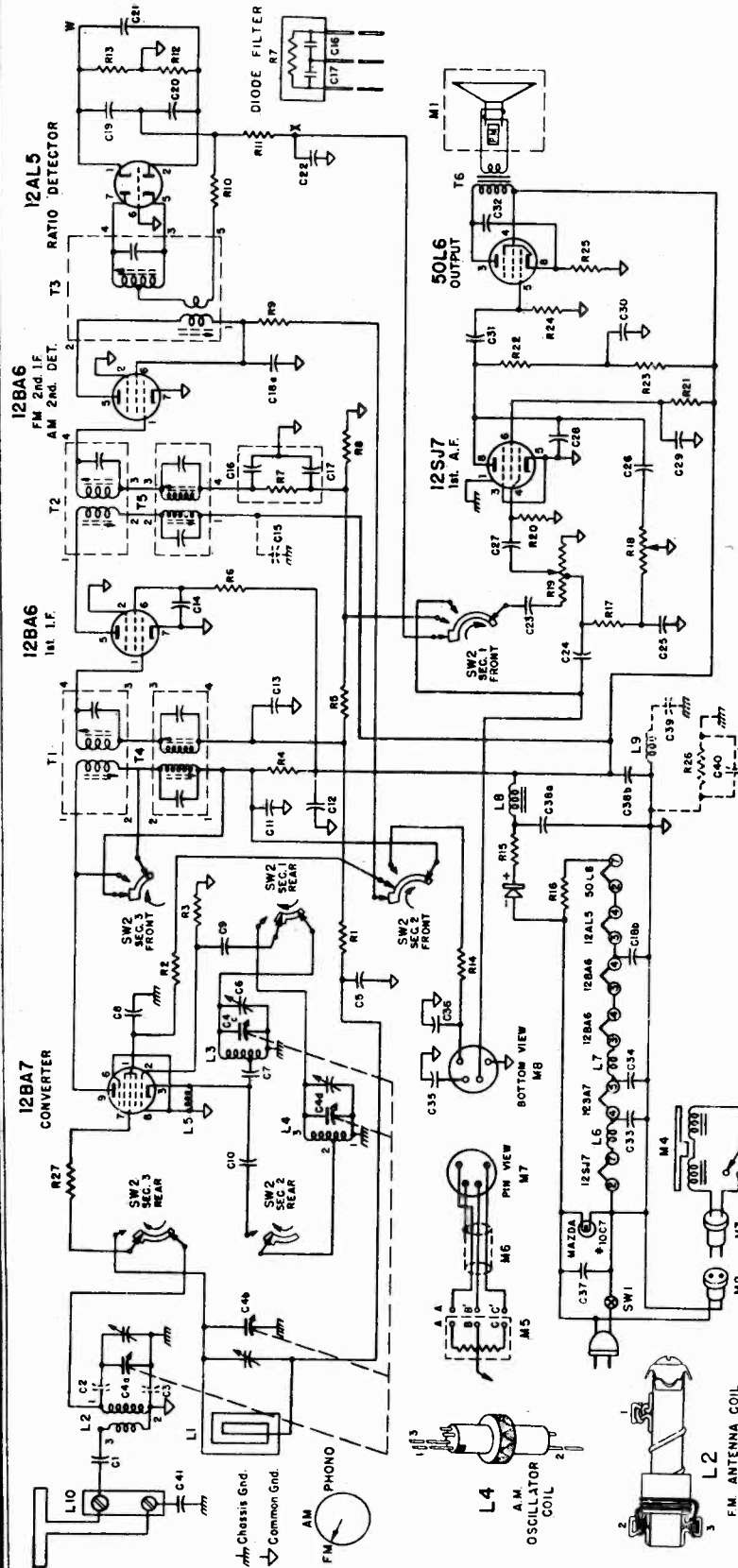
Electrical characteristics of the recommended battery packs provide for equal life for both the A and B sections. The A section may give satisfactory performance as low as 6.6 volts, the B section as low as 60 volts. Replace battery pack when reception is weak and voltage has dropped below values given above.

To install a replacement battery pack, first remove the six screws that hold the metal bottom cover to the cabinet. (See illustration.) The battery pack is strapped to the bottom cover and will come out when the cover is removed. Pull out the battery plug, loosen the screw which holds the battery strap tight, and slide out the old battery pack.

Slip a new battery pack into place, tighten the screw which tightens the strap around the battery, plug in the battery plug and re-install the bottom cover.

TUBE AND TRIMMER LOCATION





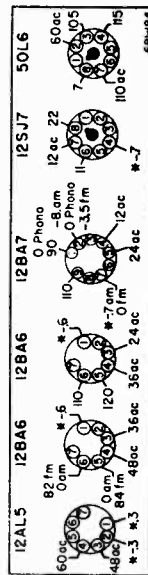
RECORD CHANGER SERVICE DATA

Complete service information and parts list for the record changer is contained in a separate manual. Check record changer for model number. Refer to the proper manual for all record changer service information.

In case of distortion or low volume on phono operation only, check as follows:

1. Replace cartridge and check operation. Cartridge resistance should be from 0.3 to 2 megohms.
2. With the volume control at maximum, touch the needle with the finger. If a loud hum is heard, then the circuit from the needle to the grid of the audio amplifier tube is not open or shorted. If hum is not heard, check the circuit from "B" to the grid. (See schematic.)
3. If a hum is heard, check the voltage across outer terminals "A," and "C" on the bottom of cartridge. Generally, it should measure from 80 to 100 volts D.C. If it does not, check the circuit for fault.

VOLTAGE DATA



* If taken with a 1000 ohm-per-volt meter, readings will be lower or zero.

- Line Voltage 117.
- Voltages measured with a vacuum tube voltmeter.
- Voltages read between socket terminals and B minus (terminal of ON-OFF switch).
- Band switch in FM position.
- Dial turned to low frequency end.
- Volume Control-minimum.

IMPORTANT PRELIMINARY ALIGNMENT STEPS

In FM alignment, it is essential that every step be followed. Especially important is picking the center of the IF curve (step 4 in the FM-IF alignment instructions). During this portion of the alignment it is necessary to tune the signal generator very carefully; it may necessitate having to estimate the dial readings to a tenth of a division.

Under normal operating conditions or use, misalignment of RF or IF circuits with age will be slight. Lack of sensitivity and poor tone quality may be due to causes other than alignment. Do not attempt to realign the receiver until all other possible causes have first been thoroughly investigated.

If complete alignment is necessary, it is essential that proper sequence be followed as tabulated in the alignment chart. However, if only the AM band or a portion

of the FM circuit are to be aligned, proceed from that point on the chart being sure to follow all remaining steps.

Adjustments made to FM-IF's at 10.7 MC, will require realignment of AM-IF slug adjustments.

Check pointer position. With tuning gang closed, the tip of the pointer clip should be over the 1/16" circular punch at the extreme left end of the dial background (see stringing diagram).

Use an isolation transformer if available, otherwise connect a .1 mfd. condenser in series with low side of signal generator and attach to B minus of chassis.

Be sure both the set and the signal generator are thoroughly warmed up before starting alignment.

FM I.F. AND RATIO DETECTOR ALIGNMENT

- Keep output indicator leads well separated from signal generator leads and chassis wiring.
- Band switch in FM position (fully to the left).
- While peaking IF's, keep reducing signal generator output so VTVM reading is approximately +1.5 volts DC with exception of Step #5.
- To avoid splitting the slotted head of iron core tuning slugs in the IF transformers, use an insulated alignment tool with a 1/8" wide screwdriver blade. Do not exert undue pressure as threads of slugs may strip.
- Speaker must be connected during alignment.
- FM antenna disconnected during alignment.

Before proceeding, be sure to follow all steps listed above, under "Important Preliminary Alignment Steps."

	Connect Signal Generator	Generator Frequency	Receiver Dial Setting	Output Indicator and Special Connections	Adjust as Follows (very carefully)
1	Thru .001 cond. to 2nd IF grid (pin #1 of 12BA6 2nd IF)	10.7 MC unmodulated.	Tuning gang wide open	Connect VTVM (DC probe) from point "W" to B minus ("Y"). (See Fig. 7.)	"A" (ratio detector primary) for maximum reading on VTVM.
2	**Thru .001 cond. to 1st IF grid (pin #1 of 12BA6 1st IF)	"	"	" "	Iron cores "B" and "C" (2nd IF trans.) for maximum reading on VTVM.
3	High side FM antenna terminal	"	"	" "	Iron cores "D" and "E" for maximum on VTVM. Re-adjust A, B, C, D, E, for maximum. (Keep reducing generator output to keep VTVM at 1.5 volts)
4	"	a. Reduce output of signal generator until VTVM reads exactly +1.5 volts DC. b. Tune generator frequency above 10.7 MC until VTVM reads exactly +1.0 volt. Note exact generator frequency. Extreme care in reading this is essential. c. Tune generator frequency below 10.7 MC until VTVM reads exactly +1.0 volt. Note exact generator frequency. Extreme care in reading this is essential. d. Add generator frequency in step c to generator frequency in step b and divide by 2. The result is the center frequency of the IF curve to be used in step 5. See example on next page. e. Tune generator frequency above and below 10.7 MC and note voltage reading on VTVM at different frequency points until you have a good impression of the shape of the selectivity curve. If you have two peaks as in Figures 5 or 6, note readings (voltage) of both peaks. If one peak is over 20% higher than the other one, it will be necessary to realign IF's. A selectivity curve that would require realignment is illustrated by Figure 6.			
5	"	Center of IF selectivity curve per step 4d above. See "EXAMPLE" on next page.	Tuning gang wide open	Connect VTVM (DC probe) from point "X" to B minus ("Y"). (See Fig. 7.)	Iron core "F" (ratio detector secondary) for zero voltage reading on VTVM. (The correct zero point is located between a positive and a negative maximum.)

If any adjustments were very far off, it is desirable to repeat steps 3, 4 and 5.

**Do not feed I.F. signal into converter grid as this will cause mis-alignment.

SETTING SIGNAL GENERATOR TO CENTER OF I.F. SELECTIVITY CURVE

CAUTION: Due to the difficulty of setting a signal generator to the accuracy required by this operation, extreme care must be exercised in making each setting. Otherwise, improper alignment of the ratio detector and consequent audio distortion will result.

EXAMPLE: (See Figures 1 and 2)

Voltage reading in Step 4a is + 1.5 volts.

Generator frequency on low side of 10.7 MC for a reading of + 1 volt DC = 10.640 MC.

Generator frequency on high side of 10.7 MC for a reading of + 1 volt DC = 10.800 MC.

Center frequency is obtained by adding 10.640 and 10.800, then dividing by 2. For these readings it will be 10.72 MC.

Set generator frequency to 10.72 MC as this is center of selectivity curve as shown in Figure 2.

Note: Numerical vernier dial readings may be used instead of MC.

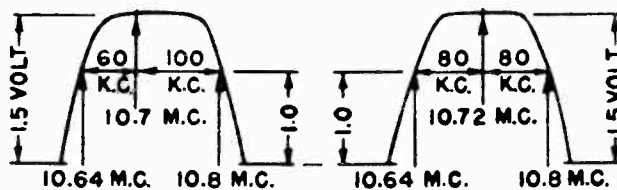


Fig. 1

Fig. 2

TYPICAL SELECTIVITY CURVES

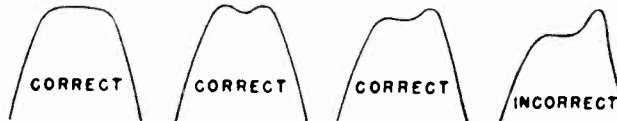


Fig. 3

Fig. 4

Fig. 5

Fig. 6

FM RF ALIGNMENT PROCEDURE

	Connect Signal Generator	Generator Frequency	Receiver Dial Setting	Output Indicator and Connections	Adjust as Follows
6	Thru 270 ohm carbon resistor to high side FM antenna terminal	109 MC† (unmodulated).	Tuning gang wide open	Connect VTVM (DC probe) from point "W" to ground.	*G for maximum VTVM reading.
7		102 MC† (unmodulated).	102 MC	"	*Tune in generator signal on receiver. Adjust H for max. VTVM reading.

* It is advisable to adjust generator output so VTVM readings do not exceed approximately + 1.5 V. DC after peaking.
 † If your signal generator does not reach this frequency, use harmonics as described in "FM Alignment Equipment."

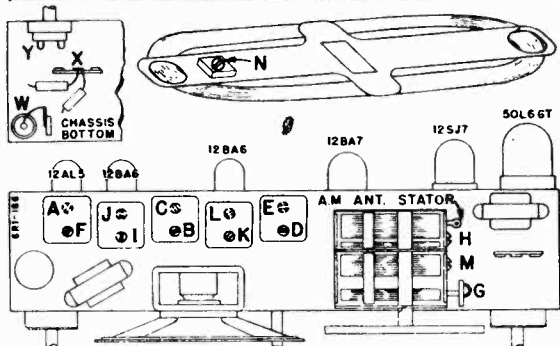
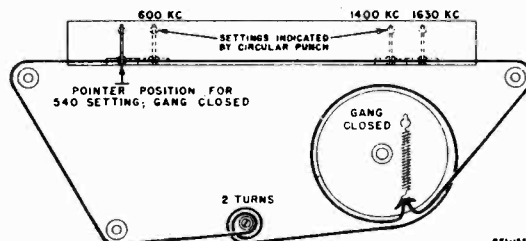


Fig. 7. Trimmer Location



With the gang fully closed, the tip of the pointer clip should be in line with the 1/16" circular punch at the extreme left end of the dial background.

Fig. 8. Dial Stringing and Pointer Setting

AM ALIGNMENT PROCEDURE

- Use regular output meter connected across speaker voice coil.
- Turn receiver Volume Control full on; Tone Control full treble.
- AM loop antenna must be connected and placed in the same relative position to the chassis as when in cabinet.
- Use lowest output setting of signal generator that gives a satisfactory reading on meter.

	Connect Signal Generator	Dummy Antenna Between Radio and Signal Generator	Signal Generator Frequency	Receiver Dial Setting	Adj. Trimmers in Following Order to Max.
Set Band Switch to Broadcast Position (center) and be sure to follow instructions under heading "Important Preliminary Alignment Steps." Loop antenna must be connected.					
1	Gang condenser antenna stator	.1 MFD	455 KC	Tuning gang wide open	I, J, K, L
2	AM Antenna Stator	Direct connection	1620 KC	Tuning gang wide open	M
Install chassis and AM loop in cabinet.					
3	Place generator lead close to loop of set to obtain adequate signal. No actual connection (signal by radiation).		1400 KC	Tune in signal	N

RESISTORS

Symbol	Description	Part No.
R1	470,000 Ohms, 1/4 Watt	60B 2-474
R2	1,000 Ohms, 1/4 Watt	60B 2-102
R3	22,000 Ohms, 1/4 Watt	60B 2-223
R4	470 Ohms, 1/4 Watt	60B 2-471
R5	470,000 Ohms, 1/4 Watt	60B 2-474
R6	1,000 Ohms, 1/4 Watt	60B 2-102
R7	47,000 Ohms, 1/4 Watt	60B 2-224
R8	220,000 Ohms, 1/4 Watt	60B 2-224
R9	1,000 Ohms, 1/4 Watt	60B 2-102
R10	390 Ohms, 1/4 Watt	60B 2-391
R11	27,000 Ohms, 1/4 Watt	60B 2-273
R12	6,800 Ohms, 1/4 Watt, 5%	60B 1-682
R13	6,800 Ohms, 1/4 Watt, 5%	60B 1-682
R14	100,000 Ohms, 1/4 Watt	60B 2-104
R15	33 Ohms, 1 Watt	60B 14-330
R16	47 Ohms, 1 Watt	60B 14-470
R17	27,000 Ohms, 1/4 Watt	60B 2-273
R18	2 Megohms Tone Control and ON-OFF Switch SW2	75B 1-12
R19	1 Megohm Volume Control (Tapped at 500,000 Ohms)	75B 2-12
R20	4.7 Megohms, 1/4 Watt	60B 3-475
R21	1.8 Megohms, 1/4 Watt	60B 3-185
R22	470,000 Ohms, 1/4 Watt	60B 2-474
R23	47,000 Ohms, 1/4 Watt	60B 2-473
R24	470,000 Ohms, 1/4 Watt	60B 2-474
R25	150 Ohms, 1/2 Watt	60B 8-151
R26	150,000 Ohms, 1/2 Watt	60B 2-154
R27	10 Ohms, 1/2 Watt	60B 2-100

(Added in later production to prevent parasitic oscillations.)

CONDENSERS

C1	200 mmfd., Ceramic	65B 9-15
C2	.0015 mfd., Ceramic	65B 9-63
C3	.005 mfd. min., Ceramic	65A 10-1
C4a	15 mmfd. (max.), FM RF	A1814
C4b	485.8 mmfd. (max.), AM RF	
C4c	15 mmfd. (max.), FM osc.	Gang
C4d	142.6 mmfd. (max.), AM Osc.	
C5	.01 mfd., 400 Volts, Paper	64B 1-25
C6	3-12 mmfd. Trimmer (Silver mica)	66A 19-2
C7	50 mmfd., Ceramic	65B 6-4
C8	.005 mfd. min., Ceramic	65A 10-1
C9	35 mmfd., 10% Zero Temp. Coeff., Ceramic	65B 6-57
C10	.005 mfd. min., Ceramic	65A 10-1
C11	.005 mfd. min., Ceramic	65A 10-1
C12	.005 mfd. min., Ceramic	65A 10-1
C13	.005 mfd. min., Ceramic	65A 10-1
C14	.01 mfd. (min.), Ceramic	65A 10-3

† Part of enclosed Diode Filter Unit 63A3-1. This unit consists of R7, C16, C17 (see schematic). If a section of the unit becomes defective, it may be replaced with a component of proper value.

§ Used only in sets with model numbers ending in "UL".

FM SERVICE

Much of FM service is similar to the usual service necessary for AM receivers such as voltage analysis, parts replacement, etc. The chief differences arise because of the considerably higher frequencies used in FM operation, and because of the different type of second detector needed in FM.

Before attempting to service the 6R1 chassis, read the description of the Ratio Detector on page 2 of the 9A1 service manual.

The higher frequencies involved means that more care must be exercised in location and length of leads. Leads tend to act as small inductances or capacities at high frequency and hence may appreciably alter the electrical characteristics of a circuit. For this reason, ground connections should always be maintained as originally made in the set. Also note that in certain circuits, the type by-pass condenser used is critical at the high FM frequencies. When replacing condensers it is important that they be replaced with condensers of identical capacity values, tolerances, temperature coefficients and construction. For example: C19 is a 100 mmfd ± 5%, — .00075 temperature coefficient, ceramic capacitor. If defective it should be replaced with a 100 mmfd ± 5%, — .00075 temperature coefficient, ceramic capacitor.

CAUTION

Do not connect a ground wire to the 6R1 radio chassis.

Symbol	Description	Part No.
§C15	.005 mfd. min., Ceramic	65A 10-1
C16	100 mmfd., Mica	
C17	100 mmfd., Mica	
C18a	.004 mfd. min., Dual Ceramic	65A 17-1
C18b	.004 mfd. min., Dual Ceramic	65A 17-1
C19	100 mmfd. 5%, — .00075 Temp. Coeff., Ceramic	65B 6-7
C20	100 mmfd. 5%, — .00075 Temp. Coeff., Ceramic	65B 6-7
C21	4 mfd., 50 Volts, Elect.	67A 4-8
C22	.002 mfd., 600 Volts, Paper	64B 1-14
C23	.001 mfd., Ceramic	65B 9-31
C24	500 mmfd., Ceramic	65B 9-24

(Used in early production only; removed to prevent detuning on FM.)

C25	.005 mfd., 600 Volts, Paper	64B 1-12
C26	.002 mfd., 600 Volts, Paper	64B 1-14
C27	.01 mfd., 400 Volts, Paper	64B 1-25
C28	50 mmfd., Ceramic	65B 6-4
C29	.1 mfd., 200 Volts, Paper	64B 1-30
C30	.1 mfd., 200 Volts, Paper	64B 1-30
C31	.01 mfd., 400 Volts, Paper	64B 1-25
C32	.01 mfd., 400 Volts, Paper	64B 1-25
C33	.0015 mfd. min., Ceramic	65A 14-2
C34	.0015 mfd. min., Ceramic	65A 14-2
C35	.01 mfd., 400 Volts, Paper	64B 1-25
C36	.18 mfd., 200 Volts, Paper	64A 2-2
C37	.05 mfd., 200 Volts, Paper	64B 1-32
C38a	70 mfd., 150 Volts Elect.	67C 6-40
C38b	30 mfd., 150 Volts Elect.	67C 6-40
§C39	.1 mfd., 200 Volts, Paper	64B 1-30
§C40	.01 mfd. min., Ceramic	65A 10-3
C41	.0015 mfd. min., Ceramic	65A 14-2

(Used only in sets with model numbers ending in "N".)

COILS, TRANSFORMERS, ETC.

L1	Antenna, Loop (AM)	69B 73
L2	Coil, RF (FM)	69A 68
L3	Coil, Oscillator (FM)	69A 69
L4	Coil, Oscillator (AM)	69A 20-3
L5	Choke, Cathode RF	AA139-5
L6	Choke, Heater RF	73A 2-3
L7	Choke, Heater RF	73A 2-3
L8	Choke, Filter	74A 15-2
§L9	Coil, IF Trap (Approx. 5 turns (18") of solid No. 22 hook-up wire wound on C39. Solder one end to inside foil lead of C39.)	
L10	Antenna, Bullt in FM	AB155
T1	Transformer, 1st IF (FM)	72B 64
T2	Transformer, 2nd IF (FM)	72B 65
T3	Transformer, Ratio Detector	72B 39
T4	Transformer, 1st IF (AM)	72B 66

Symbol	Description	Part No.
T5	Transformer, 2nd IF (AM)	72B 65
T6	Transformer, Output	79A 14-2
M1	Speaker 5" P.M. Dynamic	78B 39-1
M2	Socket and Leads, Phono-Motor	89A 6-1
M8	Socket, Phono input	88A 8-6
M9	Rectifier, Selenium	93A 1-2
SW1	Switch, On-Off	Part of R18
SW2	Switch, Band (FM, AM, Phono)	77B 22

PHONOGRAPH PARTS

Note—See Record Changer Manual for complete parts list.

M3	Plug, AC Phono-Motor	88B 8-1
M4	Motor, 60 Cycles 115 Volts AC	407B 3-2
M5	Cartridge and Needle, Pickup	A1372-13
M6	Cable, Pickup (3 conductor)	89A 18-4
M7	Plug, Pickup Cable	88A 8-5
SW3	Switch, Motor On-Off	408A 1

(See caution in changer manual)

Centerpost (includes speed-nut)	G400B 137-1
Idler Wheel (407B 3-2 Motor)	G400A 23
Idler Wheel (407B 1-2 Motor)	G400A 57

CABINET PARTS

Bracket, Dial Scale Mtg.	15A 169
Cabinet, Plastic	
Bottom Less Lid	34D 11-12
Lid only	34D 11-13
Dial Scale, Glass	21B 51
Escutcheon Overlay	23C 23-2
Grille Cloth and Baffle	A1688
Hinge	37A 8-1
Knobs, Radio	
"Volume" and "Tone"	33A 21-5
"Tuning"	33B 34-2
"Radio-Phono"	33B 34-1
Rubber Strip, Dial Scale Mtg. (8 1/2")	12A 9-3
Spring Clip, FM Antenna Mtg.	19A 44
Stay Arm, Lid	37A 9-1

MISCELLANEOUS

Background, Dial	22B 9-2
Bracket, Tuning Sleeve	15A 289
Bracket, Dial Light	15A 369
Carton and Fillers	44B 112
Dial Card	50A 1-3
Pilot Light, Mazda No. 10C7	81A 2-2
Pilot Light, Socket and Leads	82A 9-1
Pointer, Dial	25A 21-1
Sleeve, Tuning (Brass)	27A 61
Spring, Dial Drum Tension	19B 1-3
Washer, Felt ("Volume" and "Tone")	5A 4-8
Washer, Felt (Center Knob)	5A 4-9

FM ALIGNMENT EQUIPMENT

The model 6R1 chassis should be aligned only with an AM signal generator and a vacuum tube voltmeter. Any standard brand vacuum tube voltmeter with a DC scale of not over 5 volts is suitable. A 3-volt zero center scale is desirable. A signal generator with a frequency range up to 110 MC. is desirable. It is possible however, to align the receiver with a signal generator going to 20 or 30 megacycles, by using the harmonics of these lower frequencies. To do this merely set the signal generator dial as follows and align exactly as explained in the alignment instructions.

Where alignment chart specifies 109 MC., set signal generator to highest available frequency of the following:

109. MC	27.25 MC
54.50 MC	21.80 MC
36.33 MC	18.17 MC

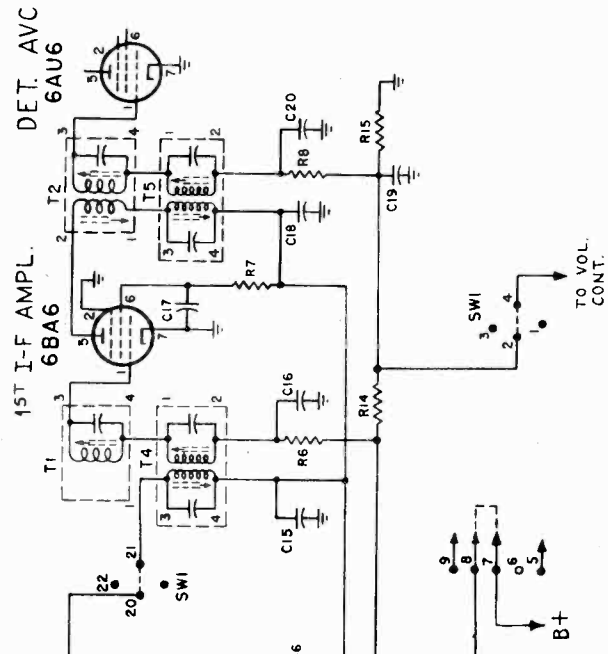
Where alignment chart specifies 102 MC., set signal generator to highest available frequency of the following:

102. MC	25.50 MC
51. MC	20.40 MC
34. MC	17. MC

Signal generators which do not tune to 110 MC or whose harmonics are not strong enough, cannot be used for FM alignment.

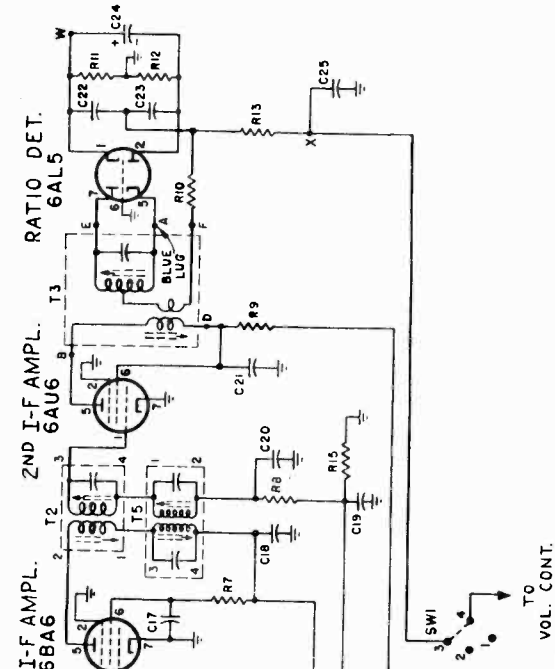
CLARI - SKEMATIX

Registered Trademark

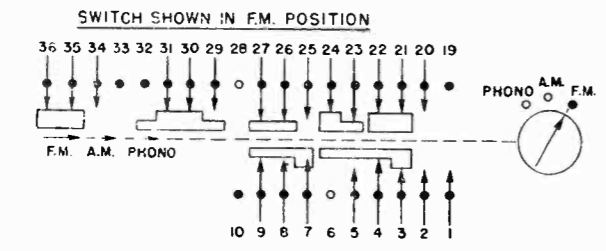
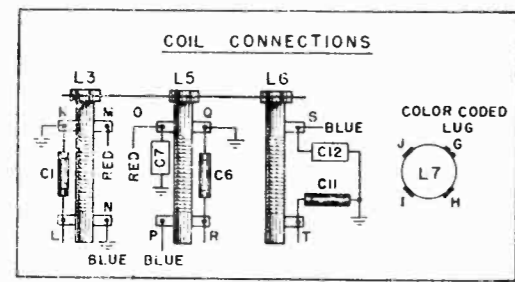
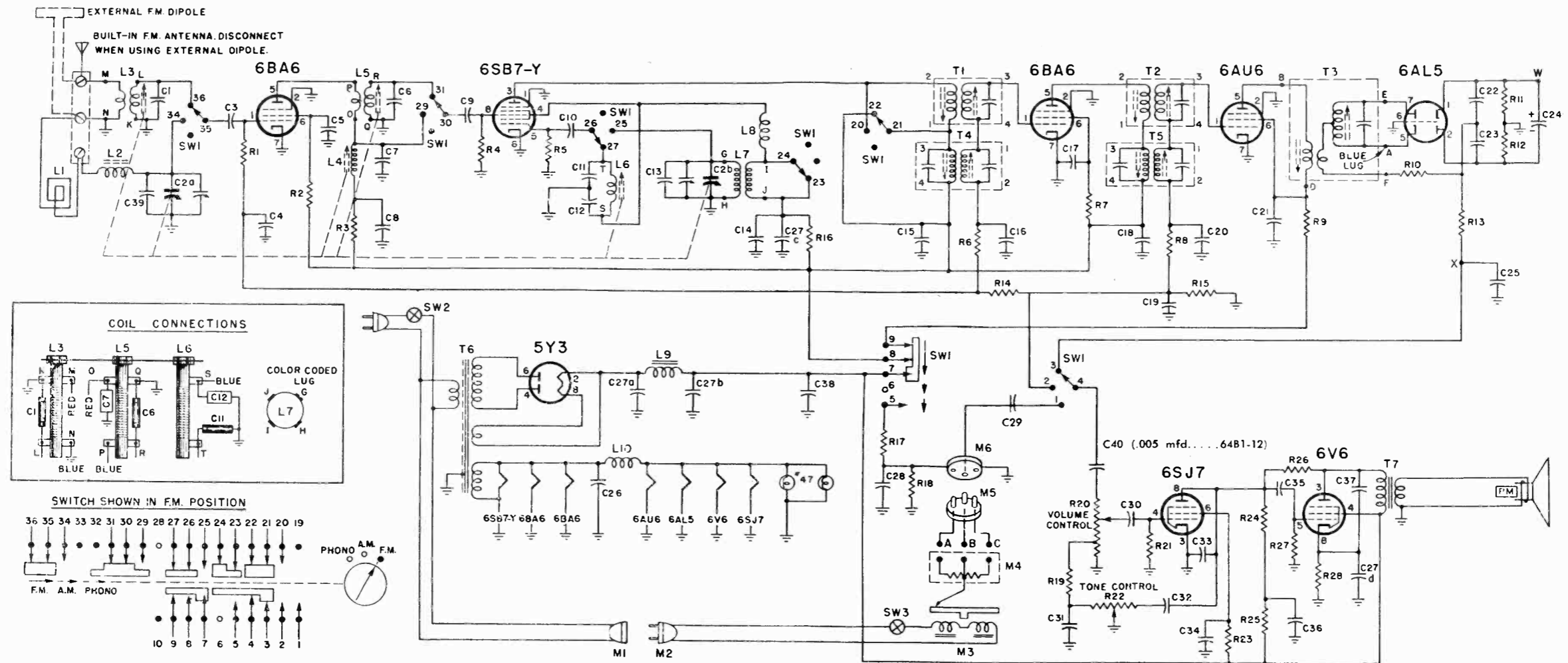


BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
BROADCAST BAND

NOTE :
1ST POSITION (PHONO)
NOT SHOWN.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
F M BAND



NOTE: Lettered and numbered terminals in illustrations correspond to identical designations in the schematic.

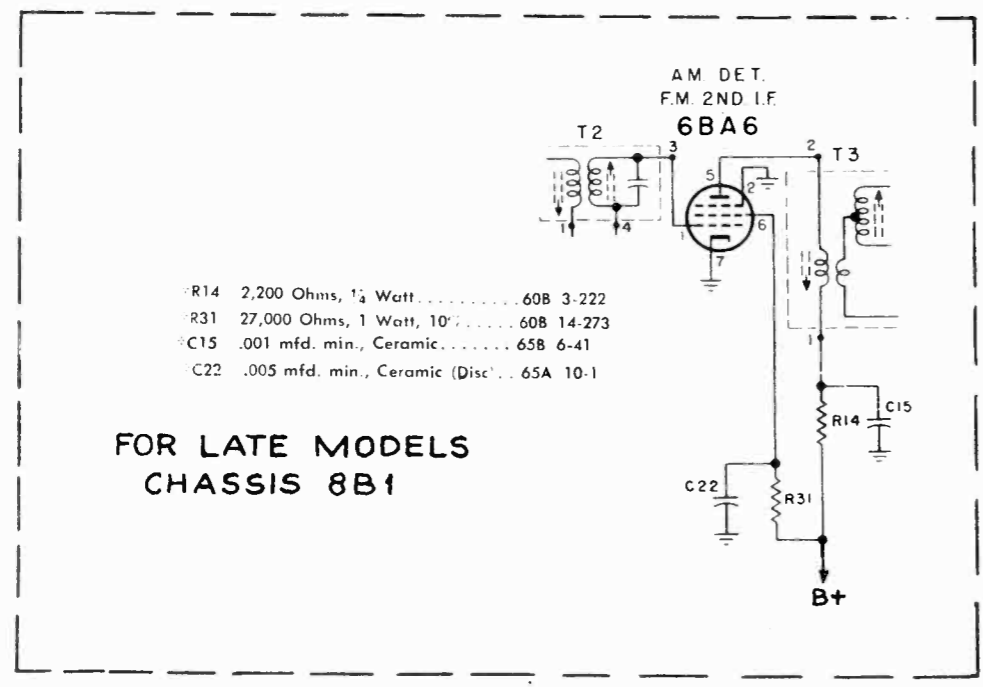
VOLTAGE CHART

- Measured on 117 Volt A.C. line.
- Volume control turned low.
- No station tuned in. Dial turned to low frequency end.
- Voltages measured between point indicated and chassis.
- Voltages measured with a vacuum-tube voltmeter. Many readings will be lower if measured with a 1000 ohm-per-volt meter.
- Readings with bandswitch in F.M. position.

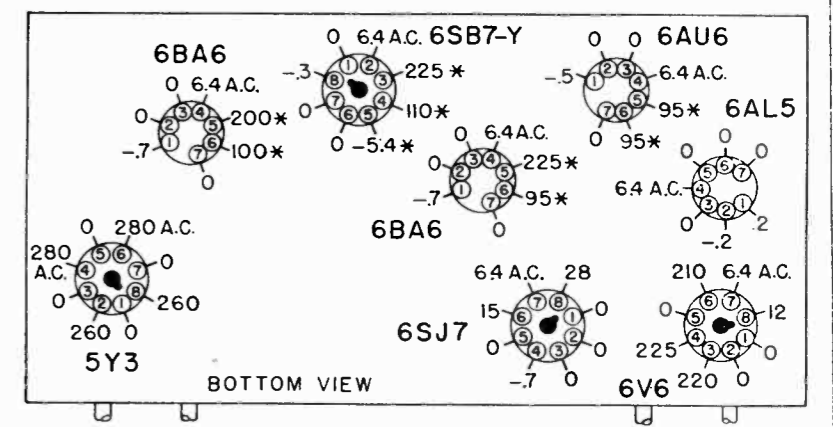
CIRCUIT DESCRIPTION

FM Second IF Amplifier, AM Second Detector
 A 6AU6 tube is used as a second IF amplifier for FM operation. Self-bias is developed in the grid resistor (R15 and R8 in series) of this stage. Since this DC bias voltage is dependent on signal strength, it is used for AVC purposes.

In the AM setting of the band switch, plate and screen voltages are removed from this tube. The grid and cathode of this tube then function as an AM second detector (diode) and AVC tube in a conventional manner.



- R14 2,200 Ohms, 1/4 Watt..... 60B 3-222
- R31 27,000 Ohms, 1 Watt, 10%..... 60B 14-273
- C15 .001 mfd. min., Ceramic..... 65B 6-41
- C22 .005 mfd. min., Ceramic (Disc)... 65A 10-1



*If voltages are measured with band switch in phono position, reading will be zero or practically zero.

IMPORTANT PRELIMINARY ALIGNMENT STEPS

- With the gang open, the pointer should be at the position as shown in the stringing diagram, that is, the tip of the pointer should point to the space between the "AM KC" lettering on the dial scale. If the pointer is in a different position, move it by hand while keeping the gang open.
- Check the set screws that hold the tuning drum to the shaft to see that they are tight and that the drum has not slipped on the shaft. The correct position of the drum can be seen on the stringing diagram.
- With the gang wide open, all FM tuning slugs should be 3/8 inch out of their coil forms. The AM-RF tuning slug (adjustment "O" in the trimmer location diagram) should be 1 inch out of its coil form. If there is any serious deviation, or if there has been any tampering, turn the adjusting screw until this distance is corrected. (See paragraph on tuning slug replacement.)

FM IF AND RATIO DETECTOR ALIGNMENT

- Solder output indicator leads in place and keep them well separated from signal generator leads and chassis wiring.
- Band switch in FM position (red signal at MC on dial).
- While peaking IF's, keep reducing signal generator output so VTVM reading is approximately +1.5 volts DC with exception of Step #5.
- Speaker must be connected during alignment.

I.F. SLUG INFORMATION

To avoid splitting the slotted head of the powdered iron core tuning slug in the I. F. transformers, use a screw-driver with a blade 1/8" wide for I.F. alignment.

Under normal operating conditions, mis-alignment of slug-tuned circuits with age is slight. Therefore, re-alignment of the I.F. transformers should be accomplished by only a slight adjustment of the slugs.

Due to the probability of breaking off the wire leads on the coils, slug replacement in the AM-IF transformers is not recommended. Replace entire IF transformer.

The slug-tuning cores in the FM-IF transformers can be replaced. Remove the transformer from the chassis and the unit from its case. The top slug can then be removed from the coil form. The top slug must first be removed in order to remove the bottom slug. The bottom slug will then pass through the length of the coil form and out the top. (The slug will not pass through the bottom end of the coil form).

For slug replacement in the ratio detector transformer, see the I.F. slug information on page 9 of the 9A1 service manual.

Before proceeding, be sure to follow all steps listed above, under "Important Preliminary Alignment Steps." Steps 1 and 2 may be omitted if set is not badly out of alignment so signal comes through in Step 3

	Connect Signal Generator	Generator Frequency	Receiver Dial Setting	Output Indicator and Special Connections	Adjust as Follows (very carefully)
1	Thru .01 cond. to 2nd IF grid (Pin #1 of 6AU6 2nd IF)	10.7 MC unmodulated.	Tuning gang wide open	Connect 3300 ohm carbon resistors across secondaries of both FM-IF transformers. Connect VTVM (DC probe) from point "W" to ground. (See Fig. 7.)	"A" (ratio detector primary) for maximum reading on VTVM.
2	Thru .01 cond. to 1st IF grid (Pin #1 of 6BA6 1st IF)	"	"	"	Iron cores "B" and "C" (2nd IF trans.) for maximum reading on VTVM.
3	To pin # 1 of 6BA6 R.F. amplifier**	"	"	If not enough IF signal comes thru during this step, ground pin #5 on the 6SR7-Y. Leave generator set at 10.7 MC until step 4c.	Iron cores "D" and "E" for maximum on VTVM. Re-adjust A, B, C, D, E, for maximum. (Keep reducing generator output to keep VTVM at 1.5 volts).
4	"	"	"	a. Remove 3300 ohm resistors from IF transformers. b. Reduce output of signal generator until VTVM reads exactly +1.5 volts DC. c. Tune generator frequency above 10.7 MC until VTVM reads exactly +1.0 volt. Note exact generator frequency. Extreme care in reading this is essential. d. Tune generator frequency below 10.7 MC until VTVM reads exactly +1.0 volt. Note exact generator frequency. Extreme care in reading this is essential. e. Add generator frequency in step c to generator frequency in step d and divide by 2. The result is the center frequency of the IF curve to be used in step 5. See example on next page. f. Tune generator frequency above and below 10.7 MC and note voltage reading on VTVM at different frequency points until you have a good impression of the shape of the selectivity curve. If you have two peaks as in Figures 5 or 6, note readings (voltage) of both peaks. If one peak is over 20% higher than the other one, it will be necessary to realign IF's. A selectivity curve that would require realignment is illustrated by Figure 6.	
5	"	Center of IF selectivity curve per step 4e above. See "EXAM-PL.E" on next page.	Set pointer to upper limit on dial.	Connect VTVM (DC probe) from point "X" to ground. (See Fig. 7.)	Iron core "F" (ratio detector secondary) for zero voltage reading on VTVM. (The correct zero point is located between a positive and a negative maximum.)

If any adjustments were very far off, it is desirable to repeat steps 3, 4 and 5.
**Do not feed I.F. signal into converter grid as this will cause mis-alignment.

F.M. ALIGNMENT

The model 8B1 chassis should be aligned only with an AM signal generator and a vacuum tube voltmeter. Any standard brand vacuum tube voltmeter with a DC scale of not over 5 volts is suitable. A 3-volt zero center scale is desirable. A signal generator with a frequency range up to 110 MC. is desirable. It is possible however, to align the receiver with a signal generator going to 20 or 30 megacycles, by using the harmonics of these lower frequencies. To do this merely set the signal generator dial as follows and align exactly as explained in the alignment instructions.

Where alignment chart specifies 109 MC., set signal generator to highest available frequency of the following:

109. MC	27.25 MC
54.50 MC	21.80 MC
36.33 MC	18.17 MC

Where alignment chart specifies 104 MC., set signal generator to highest available frequency of the following:

104. MC	26.00 MC
52.00 MC	20.80 MC
34.67 MC	17.33 MC

Signal generators which do not tune to 110 MC or whose harmonics are not strong enough, cannot be used for FM alignment.

In FM alignment, it is essential that every step be followed. Especially important is picking the center of the I.F. curve (step 4 in the FM-IF alignment instructions). During this portion of the alignment it is necessary to tune the signal generator very carefully; it may necessitate having to estimate the dial readings to a tenth of a division.

TRIMMER IDENTIFICATION CHART

Trimmer Symbol	Function
A... T3	Discriminator transformer
B... T2	2nd IF transformer (FM)
C... T2	2nd IF transformer (FM)
D... T1	1st IF transformer (FM)
E... T1	1st IF transformer (FM)
F... T3	Discriminator transformer
G... L6	FM oscillator coil
H... L5	FM RF coil
I... L3	FM antenna coil
J... T5	2nd IF transformer (AM)
K... T5	2nd IF transformer (AM)
L... T4	1st IF transformer (AM)
M... T4	1st IF transformer (AM)
N... C2b	AM oscillator trimmer
O... L4	AM RF coil
P... C2a	AM antenna trimmer

POINTER SETTING

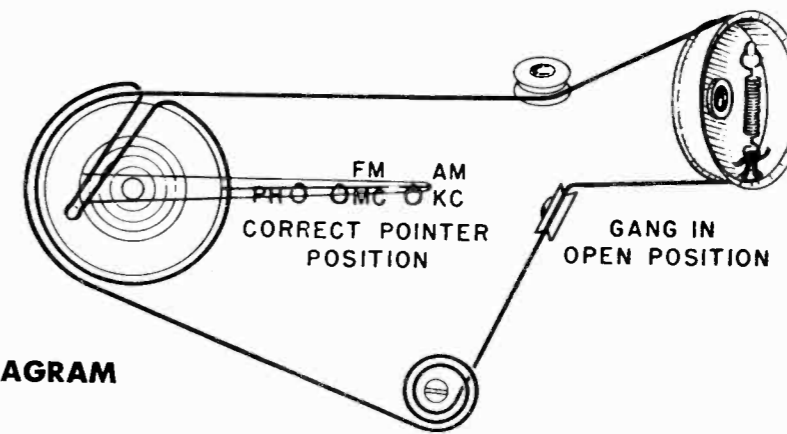
With the gang open, the pointer should be at the position as shown in the stringing diagram, that is, the tip of the pointer should point to the space between the "AM KC" lettering on the dial scale. If the pointer is in a different position, move it by hand while keeping the gang open.

REPLACING TUNING SLUGS

With the gang wide open, all three FM tuning slugs should be 3/8 inch out of their coil forms. The AM-RF tuning slug (adjustment "O" in the trimmer location diagram) should be 1 inch out of its coil form.

If it becomes necessary to change a tuning slug, proceed as follows: Set the gang to its wide open position. Unsolder and remove the old slug. Set the slug adjusting screw about half way down. Place the new slug in its correct position. Solder in place making sure that it does not slip during the operation and that the slug wire is straight.

Realignment is necessary after slug replacement.



STRINGING DIAGRAM

SETTING SIGNAL GENERATOR TO CENTER OF IF SELECTIVITY CURVE

CAUTION: Due to the difficulty of setting a signal generator to the accuracy required by this operation, extreme care must be exercised in making each setting. Otherwise, improper alignment of the ratio detector and consequent audio distortion will result.

EXAMPLE: (See Figures 1 and 2.)

Voltage reading in Step 4b is + 1.5 volts.

Generator frequency on low side of 10.7 MC for a reading of + 1 volt DC = 10.640 MC.

Generator frequency on high side of 10.7 MC for a reading of + 1 volt DC = 10.800 MC.

Center frequency is obtained by adding 10.640 and 10.800, then dividing by 2. For these readings it will be 10.72 MC.

Set generator frequency to 10.72 MC as this is center of selectivity curve as shown in Figure 2.

Note: Numerical vernier dial readings may be used instead of MC.

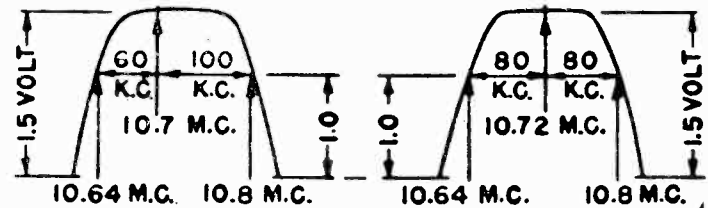


FIGURE 1.

FIGURE 2.

TYPICAL SELECTIVITY CURVES

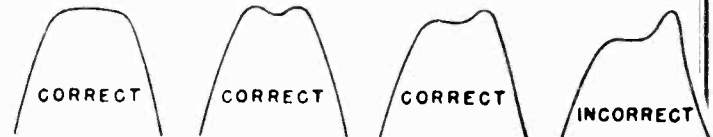


FIGURE 3.

FIGURE 4.

FIGURE 5.

FIGURE 6.

TRIMMER LOCATION

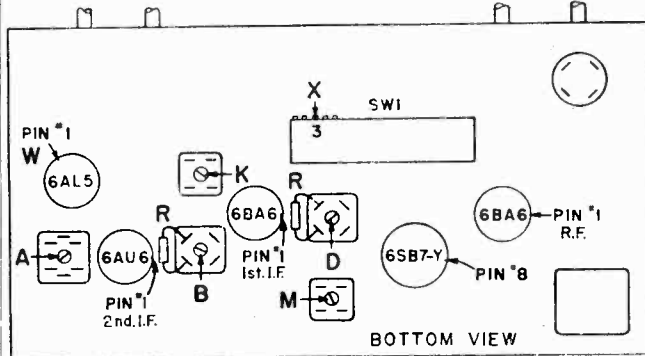


Fig. 7

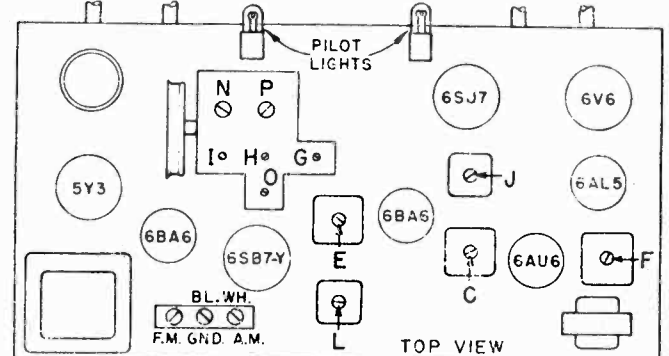


Fig. 8

FM RF ALIGNMENT PROCEDURE

	Connect Signal Generator	Generator Frequency	Receiver Dial Setting	Output Indicator and Connections	Adjust as Follows
6	Thru 250 ohms to FM ant. terminal.	109 MC† (unmodulated).	Tuning gang wide open	Connect VTVM (DC probe) from point "W" to ground.	*G for maximum VTVM reading.
7	"	104 MC† (unmodulated).	104 MC	"	*Tune in generator signal on receiver. Adjust H and I for max. VTVM reading.

* It is advisable to adjust generator output so VTVM readings do not exceed approximately + 1.5 V. DC after peaking.
 † If your signal generator does not reach this frequency, use harmonics as described in "FM Alignment"

AM ALIGNMENT PROCEDURE

- Use regular output meter connected across voice coil.
- Be sure both the set and the signal generator are thoroughly warmed up before starting alignment.
- Turn receiver Volume Control full on.
- Use lowest output setting of signal generator that gives a satisfactory reading on meter.

	Connect Signal Generator	Dummy Antenna Between Radio and Signal Generator	Signal Generator Frequency	Receiver Dial Setting	Adj. Trimmers in Following Order to Max.
1	6SB7-Y (Pin #8)	.1 MFD	455 KC	Tuning gang wide open	J, K, L, M
2	To loop ant. terminal	Direct connection	1620 KC	Tuning gang wide open	N
3	To loop ant. terminal	Direct connection	1400 KC	Tune in signal	O
Set Receiver Chassis on table next to back of cabinet. Connect Loop Antenna to Receiver.					
4	To loop ant. terminal	10 MMFD (Or wrap several turns of generator lead around white loop lead.)	1400 KC	Tune in signal	P

MODEL 7C64,
CHASSIS 8B1

ADMIRAL CORPORATION

RESISTORS

Symbol	Description	Part No.
R1	470,000 Ohms, 1/2 Watt	608 3-474
R2	27,000 Ohms, 1/2 Watt	608 14-273
R3	2,000 Ohms, 1/2 Watt	608 3-222
R4	56,000 Ohms, 1/2 Watt	608 2-563
R5	22,000 Ohms, 1/2 Watt	608 3-223
R6	470,000 Ohms, 1/2 Watt	608 3-474
R7	27,000 Ohms, 1/2 Watt	608 14-273
R8	47,000 Ohms, 1/2 Watt	608 3-473
R9	15,000 Ohms, 2 Watt	608 21-153
R10	390 Ohms, 1/2 Watt	608 2-391
R11	6,800 Ohms, 5/8 Watt	608 1-682
R12	6,800 Ohms, 5/8 Watt	608 3-682
R13	27,000 Ohms, 1/2 Watt	608 1-270
R14	470,000 Ohms, 1/2 Watt	608 3-474
R15	220,000 Ohms, 1/2 Watt	608 3-224
R16	15,000 Ohms, 2 Watt	608 21-153
R17	120,000 Ohms, 1/2 Watt	608 2-124
R18	100,000 Ohms, 1/2 Watt	608 2-104
R19	47,000 Ohms, 1/2 Watt	608 3-473
R20	2 Megohms Volume Control (tapped at 1 Megohm. Includes Switch SW2)	758 2-3
R21	4.7 Megohms, 1/2 Watt	608 3-475
R22	2 Megohms Tone Control	755 1-20
R23	2.2 Megohms, 1/2 Watt	608 3-225
R24	470,000 Ohms, 1/2 Watt	608 3-474
R25	47,000 Ohms, 1/2 Watt	608 3-473
R26	3.3 Megohms, 1/2 Watt	608 3-335
R27	470,000 Ohms, 1/2 Watt	608 3-474
R28	390 Ohms, 1/2 Watt	608 14-391

TRANSFORMERS, COILS, ETC.

Symbol	Description	Part No.
T1	Transformer, 1st I.F. (F.M.)	728 37
T2	Transformer, 2nd I.F. (F.M.)	728 38
T3	Slugs (used in T1 and T2)	A 31-19
T4	Transformer, Discriminator	728 27
T5	Transformer, 1st I.F. (A.M.)	71C 1-22
T6	Transformer, 2nd I.F. (A.M.)	728 28-12
T7	Transformer, Power	728 28-12
T8	Transformer, Output	79A 5
L1	Speaker 10" P.M. Dynamic	788 26
L2	Loop Antenna (A.M. 11')	95A 18-2
L3	Coil, Loop Loading (A.M.)	69A 25
L4	Coil, Antenna (F.M.)	69A 23
L5	Coil, R.F. (A.M.)	A 1475
L6	Slug (used in L4)	71C 1-2
L7	Coil, Oscillator (F.M.)	69A 21
L8	Coil, Oscillator (F.M.)	69A 22
L9	Coil, Oscillator (A.M.)	71C 1-25
L10	Choke, Oscillator (F.M.)	69A 24
L11	Choke, Filter	73A 1
L12	Choke, R.F. (Approx. 10 turns of solid #22 hook-up wire wound on C26)	74A 10
SW1	Switch, Band (F.M., AM, Phono)	77B 14
SW2	Switch, Power	(Part of R20)
SW3	Switch, Phono Motor (Part of record changer assembly)	G400A 162

CONDENSERS

Symbol	Description	Part No.
C1	30 mmfd., ±2% Zero Temp. Coeff. Silver Ceramic	65B 6-31
C2a	440 mmfd. (max.) An-tenna Section	65B 6-31
C2b	160 mmfd. (max.) Osc.	Cond. Gang 68B 8
C3	50 mmfd., Ceramic	65B 6-4
C4	.05 mfd., 200 Volts, Paper	648 1-32
C5	.01 mfd., Ceramic (Disc)	65A 10-1
C6	22 mmfd., ±2% Zero Temp. Coeff. Silver Ceramic	65B 6-30
C7	.955 mmfd., ±3% Mica	65B 1-51
C8	1 mfd., 400 Volts, Paper	648 1-20
C9	50 mmfd., Ceramic	65B 6-4
C10	50 mmfd., Ceramic	65B 6-4
C11	45 mmfd., ±2% — 00015 Temp. Coeff. Silver Ceramic	65B 6-32
C12	180 mmfd., ±5% Mica	65B 1-29
C13	10 mmfd., Ceramic	65B 6-24
C14	.01 mfd., Ceramic (Disc)	65A 10-1
C15	.01 mfd., Ceramic (Disc)	65A 10-1
C16	.01 mfd., 400 Volts, Paper	648 1-25
C17	.01 mfd., Ceramic (Disc)	65A 10-1
C18	.01 mfd., Ceramic (Disc)	65A 10-1
C19	.001 mfd., Ceramic	65B 6-3
C20	.001 mfd., Ceramic	65B 6-3
C21	.001 mfd., Ceramic (Disc)	65A 10-1
C22	.001 mfd., 5% Ceramic	65B 6-7
C23	.001 mfd., 5% Ceramic	65B 6-7
C24	4 mfd., 150 Volts, Electrolytic	67A 4-2
C25	.002 mfd., 600 Volts, Paper	648 1-14
C26	.01 mfd., 400 Volts, Paper	648 1-25
C27a	30 mfd., 350 Volts	Elect. 67C 7-10
C27b	30 mfd., 350 Volts	Elect. 67C 7-10
C27c	30 mfd., 350 Volts	Elect. 67C 7-10
C27d	20 mfd., 25 Volts	648 1-29
C28	2 mfd., 200 Volts, Paper	648 1-15
C29	.001 mfd., 600 Volts, Paper	648 1-15
C30	.005 mfd., 600 Volts, Paper	648 1-15
C31	.01 mfd., 400 Volts, Paper	648 1-25
C32	.01 mfd., 400 Volts, Paper	648 1-25
C33	50 mmfd., Ceramic	65B 6-4
C34	.05 mfd., 400 Volts, Paper	648 1-22
C35	.005 mfd., 600 Volts, Paper	648 1-12
C36	.1 mfd., 400 Volts, Paper	648 1-20
C37	.01 mfd., 600 Volts, Paper	648 1-10
C38	.05 mfd., 400 Volts, Paper	64 B 1-22
C39	15 mmfd., Ceramic	65B 6-18

TUNER PARTS

Description	Part No.
Ball Bearing (2 used with top plate)	30A 1-1
Drum and Cam Assembly	A1502
Grommet, Osc. Coil (L6) Mounting (L3 and L5) Mounting	12A 1-15
Grommet, R.F. Coil (L4) Mounting	12A 1-14
Insulator, Mounting Plate (for AM-RF coil slug adjusting screw)	12A 1-12
Insulator, Mounting Plate (for FM coils)	32A 50
Insulator, Mounting Plate (for FM slug adjusting screws)	32A 52
Screw, Slug Adjusting	32A 51
Slug Drive (top plate) Assembly	27A 4
Spring, Slug Drive Plate Tension	A1503
Spring, Slug Drive Plate Tension	19B 1-13

Spring Washer (for Tuning Shaft)..... 4A 5-3-0
Tuning Shaft..... 28A 1-5
Washer ("C" for Tuning Shaft)..... 4A 4-1-0

PHONOGRAPH PARTS
Note: See RC170A record changer manual for complete parts list.

Symbol	Description	Part No.
M1	Cable and Socket, Phono Motor	89A 6-6
M2	Plug, AC Phono Motor (Male)	88A8-1
M3	Motor	407B 3-2
M4	Cartridge & Needle, Pickup	A1372
M5	Pickup Cable & Plug Assembly	A1415
M6	Socket, Phono Pickup	38A 5-8
Centerpost Drive Disc Assembly (under Turntable)	G400A 179	
Idle Wheel (407B3 Motor)	G400A 23	
Idle Wheel (407B1 Motor)	G400A 57	
Nut, Wing (for fastening record changer during shipment)	2A 5-9-2	
Shoulder Eye Bolt (for Tilt Out Spring)	1A 87-1	
Strip, Sponge Rubber (1/16x1/2x1')	12A 5-5	
Tilt Out Hinge Assembly (Pickup Arm Side)	AC118-2	
Tilt Out Hinge Assembly (Record Support Side)	AC118-1	
Tilt Out Spring (2 1/2" long)	19A 15-1	
Tilt Out Tie Bar	15B 126	
Tilt Out Tie Rod	28A 22	

DIAL PARTS

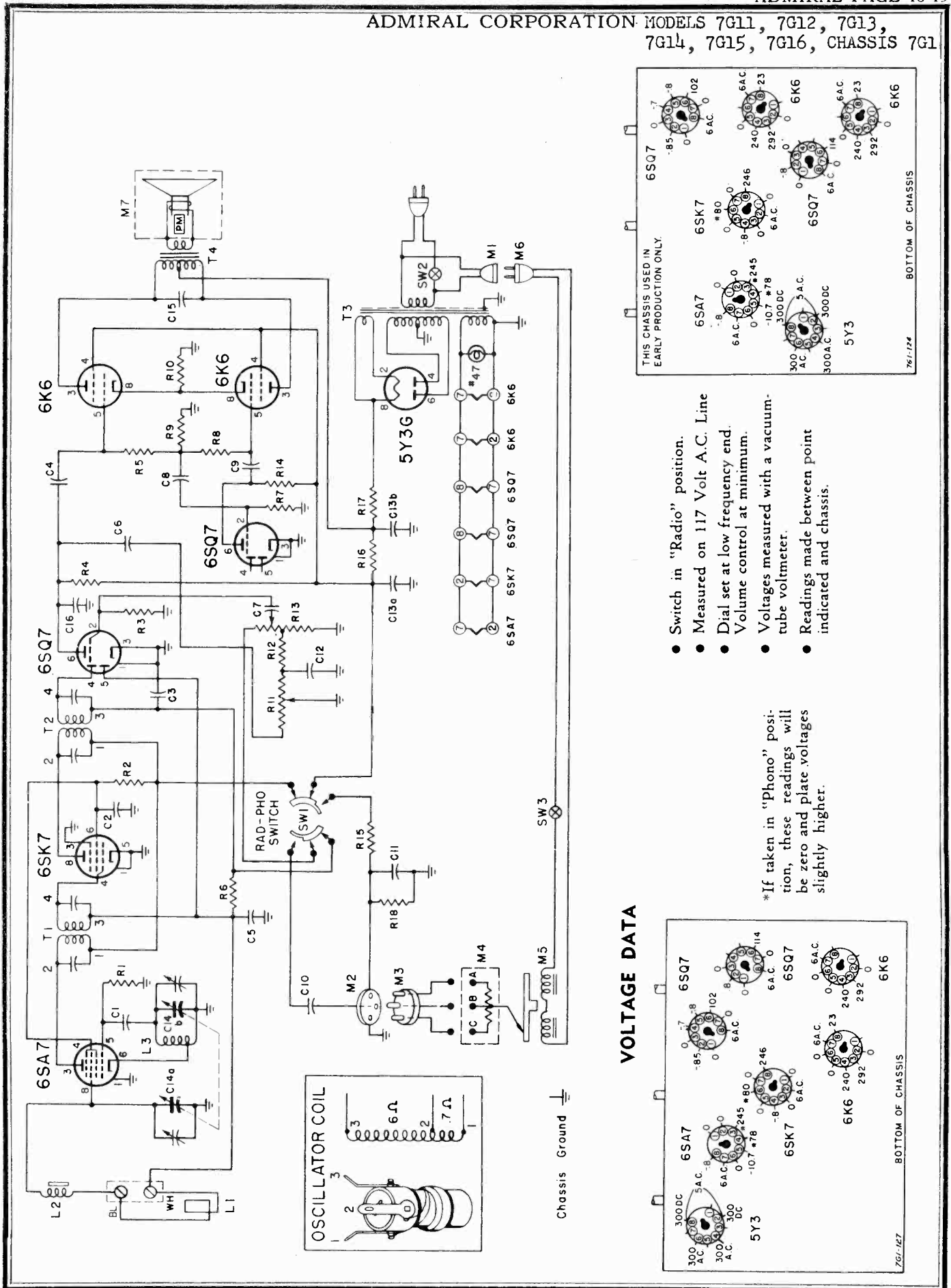
Description	Part No.
Bracket, Dial Background Mounting	158 141
Dial Bulb	47
Dial Bulb Socket (with leads)	82A 3-3
Dial Card (36")	50A 1-3
Dial Pointer	A1487
Dial Scales and Indicator Assembly (Drum and Hub Assembly (Pointer Shaft))	A1504
Dial Escutcheon and Window (less rectangular insert)	23E 20-1
Escutcheon Insert	23C 25-1
Indicator Arm and Hub (on Band Switch Shaft)	A1508
Indicator Link	15A 176
Lever Arm (band switch drive)	A1493
Painter Shaft	28A 19
Pulley Bracket Assembly	A1496
Shaft, Band Switch	28B 21-2
Snap Button (used with Indicator Link)	13A 1-4-47
Spring, Band Switch Shaft	18A 14
Spring, Dial Card	19B 1-7
Spring, Hair Pin (for Painter Shaft)	19A 22-0
Spring Washer (for Painter Shaft)	4A 6-11-0
Washer ("C" used with Band Switch)	4A 4-3-0

MISCELLANEOUS

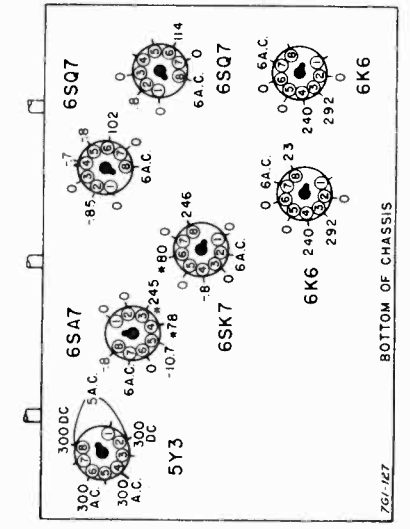
Description	Part No.
Hinge, Butt (Radio Comp.) (pair for 7C64W, 7C64M)	98A 31-14
Hinge, Butt (Radio Comp.) (pair for 7C64B)	98A 31-16
Hinge, Butt (Record Comp.) (pair for 7C64W, 7C64M)	98A 31-15
Hinge, Butt (Record Comp.) (pair for 7C64B)	98A 31-17
*Cabinet, Walnut (7C64W)	35E 64-1
*Cabinet, Mahogany (7C64M)	35E 64-2
*Cabinet, Bland (7C64B)	35E 64-3
Chassis Shock Mounting (with "L" bracket)	A1490
Compartment Door Catch and Strike Plate	98A 31-18
Door, Record Storage Comp. (less grille, lining and hardware) for 7C64M	98A 31-5
Door, Record Storage Comp. (less grille, lining and hardware) for 7C64W	98A 31-4
Door, Record Storage Comp. (less grille, lining and hardware) for 7C64B	98A 31-6
*Door, Radio and Phono Tilt-Out (pair for 7C64M)	98A 31-2
*Door, Radio and Phono Tilt-Out (pair for 7C64W)	98A 31-1
*Door, Radio and Phono Tilt-Out (pair for 7C64B)	98A 31-3
Door Handle, Record Storage Comp. (for 7C64W, 7C64M)	98A 31-10
Door Handle, Record Storage Comp. (for 7C64B)	98A 31-12
Door Handle, Radio and Phono Comp. (for 7C64M, 7C64W)	98A 31-9
Comp. (for 7C64B)	98A 31-11
Grille Cloth	33A 13-4
Hinge, Knife (concealed type; pair for 7C64W, 7C64M)	98A 31-8
Metal Grille (Speaker and Compartment)	98A 31-7
Screw, Chassis Mounting (1/4"-20x1 1/2")	1A 98-11-2
Set Screw, #6-32x 1/2" (used with Dial and Tuning Assembly Hubs)	1A 5-54
Socket, Miniature Tube	87A 3-4
Socket, Octal	87A 5-1
Speaker, 10" P.M. Dynamic	788 28
Transmission Line (300 Ohms for Outdoor F.M. Antenna. Order length needed)	95A 16-5
Washer (Felt for Knobs)	5A 4-2
Washer, Flat (Chassis Mounting)	48 1-142-2
Washer, Lock (Chassis Mounting)	3B 1-7-2

*Supplied only if old part cannot be repaired. When ordering, describe condition of old part in detail.

ADMIRAL CORPORATION MODELS 7G11, 7G12, 7G13, 7G14, 7G15, 7G16, CHASSIS 7G1

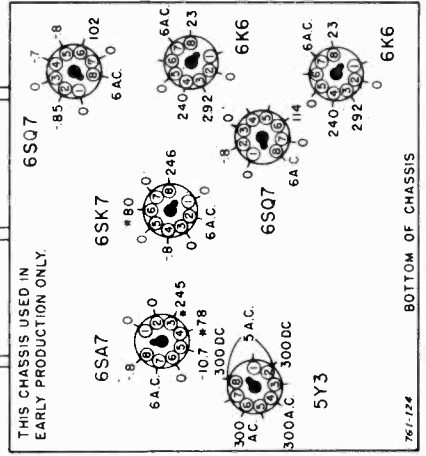


VOLTAGE DATA



- Switch in "Radio" position.
- Measured on 117 Volt A.C. Line
- Dial set at low frequency end.
- Volume control at minimum.
- Voltages measured with a vacuum-tube voltmeter.
- Readings made between point indicated and chassis.

*If taken in "Phono" position, these readings will be zero and plate voltages slightly higher.



ALIGNMENT PROCEDURE

- Connect a low range output meter across terminals of speaker voice coil.
- Turn receiver volume control to maximum; tone control to full treble.
- Align dial pointer for proper setting, as illustrated in dial cord stringing and pointer setting diagram.
- Allow 10 or 15 minutes for both signal generator and receiver to warm up.
- Use lowest generator input signal, capable of producing an adequate output meter indication. Proceed with alignment as outlined, being sure to use an alignment tool or screwdriver, having the proper size blade, so as to avoid damage to IF tuning slugs.
- Repeat adjustments to insure good results.

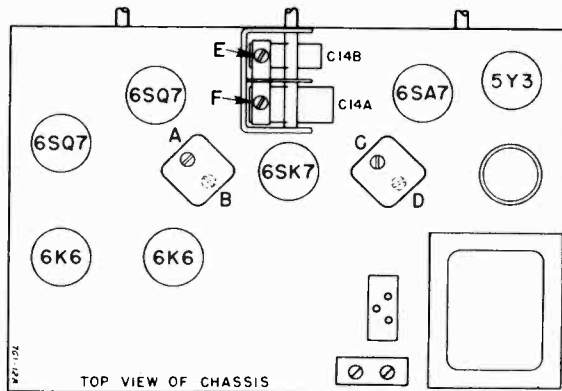
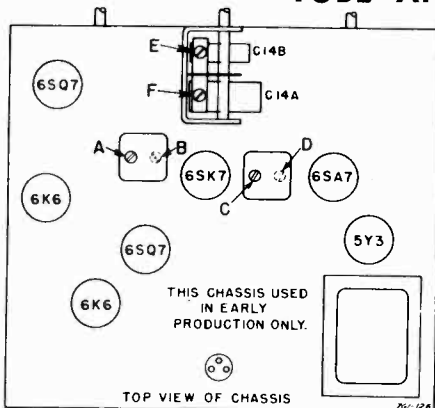
Step	Dummy Antenna in Series with Signal Generator	Connection of Signal Generator (High Side)	Signal Generator Frequency	Receiver Gang Setting	Trimmer Description	Trimmer Designation	Type of Adjustment
1	.1 mfd. condenser	Stator lug, antenna section of tuning condenser	455 KC	Gang fully open	2nd IF and 1st IF	A, B, C & D	Peak for maximum output
2	.1 mfd. condenser	Stator lug, antenna section of tuning condenser	1600 KC	Gang set at 1600 KC	Oscillator (on gang)	E	Peak for maximum output

Set Receiver Chassis on table next to back of cabinet. Connect Loop Antenna to Receiver.

3	Place generator lead close to loop of set to obtain adequate signal	No physical connection (signal by radiation)	1400 KC	Tune in generator signal	Antenna (on gang)	F	Peak for maximum output
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Note: The B and D adjustments must be made from the underside of the chassis.

TUBE AND TRIMMER LOCATIONS

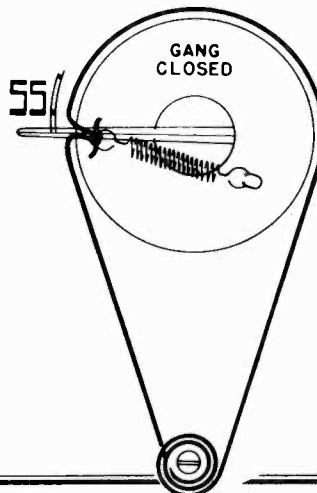


RADIO TILT-OUT DOOR ADJUSTMENT (For radio tilt-out models only)

If the door on the radio tilt-out assembly is shifted to one side, readjustment of the tilt-out arm will correct the difficulty. If the tilt-out door is too far to the right, the right-hand tilt-out arm can be sprung. If the door is too far to the left, the left-hand arm can be sprung. The tilt-out arms are sprung by holding the lower end of the arm against its bracket and prying the arm toward the chassis with a screwdriver. The screwdriver is used as a lever between the tilt-out arm and the side of the radio compartment.

In the event that the bottom edge of the radio tilt-out door rubs, it can be planed off slightly. Care must be exercised in doing this in order that the door is not marred. Hold the plane flat against the beveled bottom edge of the door while planing off a small amount.

POINTER ADJUSTMENT



With the gang fully closed, the center line of the pointer should line up with the ends of the two parallel lines that are inside of and below "55" on the dial scale (see diagram). If it does not, move the pointer by hand to the proper position while keeping the gang closed.

ADMIRAL CORPORATION MODELS 7G11, 7G12, 7G13, 7G14, 7G15, 7G16

RESISTORS

Symbol	Description	Part No.
R1	22,000 Ohms, 1/2 Watt, 10%	60B 8-223
R2	15,000 Ohms, 2 Watt, 10%	60B 20-153
R3	4.7 Megohms, 1/2 Watt, 10%	60B 8-475
R4	270,000 Ohms, 1/2 Watt, 10%	60B 8-274
R5	270,000 Ohms, 1/2 Watt, 10%	60B 8-274
R6	1 Megohm, 1/2 Watt, 10%	60B 8-105
R7	4.7 Megohms, 1/2 Watt, 10%	60B 8-475
R8	270,000 Ohms, 1/2 Watt, 10%	60B 8-274
R9	270,000 Ohms, 1/2 Watt, 10%	60B 8-274
R10	680 Ohms, 2 Watt	60B 20-681
R11	2 Megohms Tone Control (includes Switch SW2)	75B 1-24
R12	27,000 Ohms, 1/2 Watt, 10%	60B 8-273
R13	1 Megohm Volume Control (tapped at 1/2 Megohm)	75B 2-10
R14	270,000 Ohms, 1/2 Watt, 10%	60B 8-274
R15	100,000 Ohms, 1/2 Watt, 10%	60B 8-104
R16	1,800 Ohms, 2 Watt	60B 20-182
R17	30 Ohms, 5 Watts, Wire	61A 1-6
R18	120,000 Ohms, 1/2 Watt, 10%	60B 8-124

CONDENSERS

C1	.50 mmfd., Ceramic	65B 6-4
C2	.1 mfd., 400 Volts, Paper	64B 1-20
C3	250 mmfd., Ceramic	65B 6-5
C4	.02 mfd., 400 Volts, Paper	64B 1-24
C5	.1 mfd., 200 Volts, Paper	64B 1-30
C6	.005 mfd., 600 Volts, Paper	64B 1-12
C7	.02 mfd., 600 Volts, Paper	64B 1-14
C8	.02 mfd., 400 Volts, Paper	64B 1-24
C9	.02 mfd., 400 Volts, Paper	64B 1-24
C10	.02 mfd., 600 Volts, Paper	64B 1-14
C11	.25 mfd., 200 Volts, Paper	64B 1-28
C12	.02 mfd., 400 Volts, Paper	64B 1-24
C13a	30 mfd., 350 Volts	
C13b	30 mfd., 350 Volts	
C14a	387.7 mmfd. (max.)	67C 6-22
C14b	108.0 mmfd. (max.)	
C15	.002 mfd., 600 Volts, Paper	64B 1-14
C16	500mmfd., Ceramic	65B 6-6

COILS, TRANSFORMERS, ETC.

L1	Loop Antenna (10 ft.)	95A 18-3
L2	Coil, Loop Loading	69A 53
L3	Coil, Oscillator	69A 52
T1	Transformer, 1st IF (slug tuned)	72B 52
T2	Transformer, 2nd IF (slug tuned)	72B 53
T3	Transformer, Power	80B 1
T4	Transformer, Speaker Output	79A 37
M7	Speaker 10" PM	78B 37
SW1	Switch, Radio-Phono	77A 16-3
SW2	Switch, On-Off	Part of R11
SW3	Switch, Phono-Motor On-Off (see changer manual)	

DIAL and TUNING DRIVE PARTS

Description	Part No.
Dial Bulb (#47)	81A 1-8
Dial Cord	50A 1-3
Dial Escutcheon and Window	23D 29-1
Dial Scale and Bracket Assembly	A1707
Pointer, Dial (including spring clip)	A1665
Sleeve, Dial Tuner (Brass)	27A 45
Socket, Dial Bulb	82A 8-4
Spring, Dial Cord	19B 1-3

PHONOGRAPH PARTS

M1	Socket and Leads, Phono-Motor	89A 6-6
M2	Socket, Phono Pickup	88A 5-8
M3	Plug and Cable, Pickup	A1624
M4	Cartridge and Needle, Pickup	A1372
M5	Motor	407B 3-2
M6	Plug, Motor (Male)	88A 8-1
Centerpost	G400B 137-1	
Drive Disc (under Turntable)	G400A 252	
Idle Wheel (407B3 Motor)	G400A 23	
Idle Wheel (407B1 Motor)	G400A 57	
Shoulder Eye Bolt (for Tilt-Out Spring)	1A 87-1	
Strip, Sponge Rubber (1 1/8" x 1/4" x 1")	12A 5-5	
Tilt-Out Hinge Assembly (closest to Pickup Arm)	AC118-2	
Tilt-Out Hinge Assembly (farthest from Pickup Arm)	AC118-1	
Tilt-Out Spring (2 1/4" long)	19A 15-1	
Tilt-Out Tie Bar	15B 126	
Tilt-Out Tie Rod	28A 22	
Wing Nut (for fastening record changer during shipment)	2A 5-9-2	

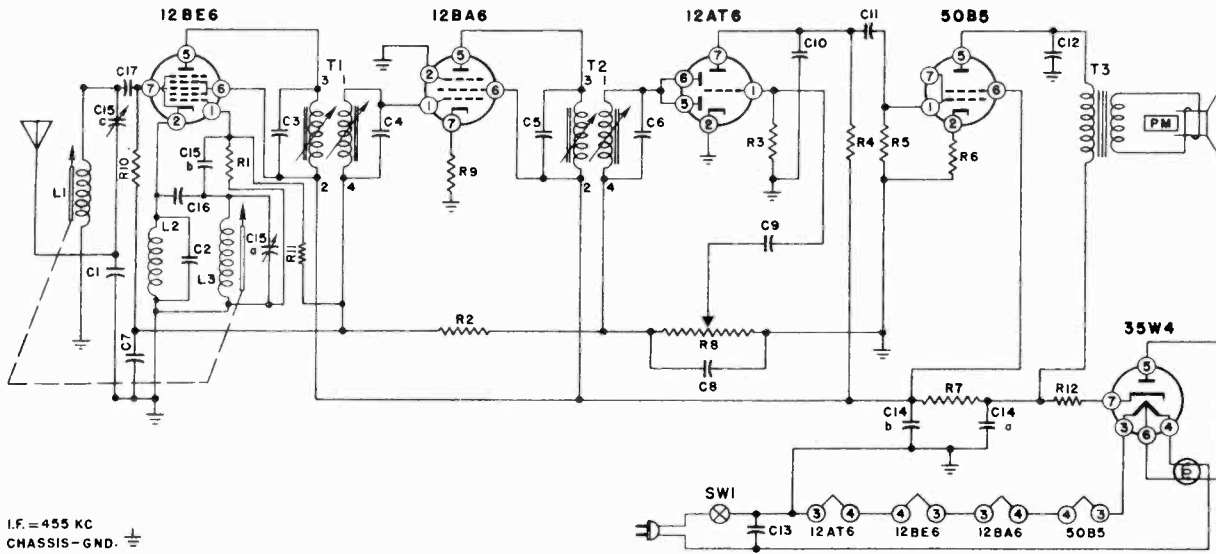
MISCELLANEOUS

Description	Part No.
*Cabinet	35E 76-1
Walnut (7G11)	35E 76-2
Mahogany (7G12)	35E 79-1
Walnut (7G14)	35E 79-2
Mahogany (7G15)	35E 79-3
Blond (7G16)	
Carton, complete with fillers for 7G11, 7G12 for 7G14, 7G15, 7G16	44B 108
	44B 102
*Door, Radio and Phono Tilt-Out pair for Walnut (7G11)	98A 41-4
pair for Mahogany (7G12)	98A 41-5
pair for Walnut (7G14)	98A 42-1
pair for Mahogany (7G15)	98A 42-2
pair for Blond (7G16)	98A 42-3
*Door, Record Compartment, complete for Walnut (7G11)	98A 41-7
for Mahogany (7G12)	98A 41-8
Door Arm (near center of cabinet; see #5 in Fig. 1)	A1440
Door Arm (nearest side of cabinet; see #5 in Fig. 1)	A1441
Door Bracket (near center of cabinet; see #7 in Fig. 1)	A1438
Door Bracket (nearest side of cabinet; see #7 in Fig. 1)	A1439
Door Catch and Strike Plate for Record Compartment Door	98A 41-9
Door Handle (Tilt-Out Doors) for Walnut (7G11), Mahog. (7G12)	98A 23-1

MISCELLANEOUS

Description	Part No.
Door Hinge, Record Storage Compartment for Walnut (7G11) Mahog. (7G12)	98A 41-11
Door Knob, Record Storage Compartment for Walnut (7G11), Mahog. (7G12)	98A 41-12
Door Knob (Tilt-Out Doors) for Wal. (7G14), Mahog. (7G15) for Blond (7G16)	33A 33-1
	33A 33-2
Grille Cloth for Wal. (7G11), Mahog. (7G12) for Wal. (7G14), Mahog. (7G15) for Blond (7G16)	98A 41-15
	98A 42-4
	98A 42-5
Knobs, Radio "Volume", and "On-Off Tone"	33A 13-4
"Radio-Phono" (inner dual knob)	33B 31-1
"Tuning" (outer dual knob)	33B 31-2
Medallion Block (Grille) for Walnut (7G14)	98A 38-14
for Mahogany (7G15)	98A 38-15
for Blond (7G16)	98A 38-16
Rubber Channel for Radio Tilt-Out Brackets on 7G11, 7G12 (2 1/8" x 1 1/2" x 1/8" overall)	12A 9-1
for Dial Scale (inner edge; 2 9/16")	12A 20-3
Rubber Strip, Sponge for Chassis Mounting on 7G11, 7G12 (5 1/2" x 1 1/2" x 1/8")	12A 11
for Chassis Mounting on 7G11, 7G12 (5 1/2" x 1 1/2" x 1/2")	12A 11-1
for Door Block on 7G11, 7G12 (1 1/2" x 1/2" x 1/8")	12A 5-4
for Door Panel on 7G11, 7G12 (12 1/8" x 3/8" x 1/8")	12A 5-9
for Tilt-Out Record Changer Bumper on 7G14, 7G15, 7G16 (1 1/4" x 1/4" x 1/8")	12A 5-5
Shoulder Eye Bolt for adjusting Phono Tilt-Out Spring	1A 87-1
for adjusting Radio Tilt-Out Spring (7G11, 7G12)	1A 87-2
Socket, Octal Tube	87A 5-1
Socket, Phono (M2)	88A 5-8
Spring, Tilt-Out Mechanism Adjusting for Phono (7G11, 7G12)	19A 15-1
	19A 15-2
Spring, Hairpin for Radio Tilt-Out (7G11, 7G12)	19A 2-5
Terminal Board, Antenna (mounted on cabinet)	10B 1-32
Tie Bar, Tilt-Out Mechanism for Phono (7G11, 7G12)	15B 126
	15B 160-2
Transmission Line, 4 Wire 10" Length — AM Antenna	95A 18-2
Washer, Felt (Radio) for "Volume", "On-Off" Knobs for "Tuning" (outer dual knob)	5A 4-2
	5A 4-8
Washer, Fibre for "Radio-Phono" (inner dual knob)	5A 1-25

*Supplied only if old part cannot be repaired. When ordering, describe condition of old part in detail.



I.F. = 455 KC
CHASSIS - GND.

ALIGNMENT PROCEDURE

Check tuning mechanism and pointer adjustment to see that the pointer travels to each pointer travel stop I and J (see stringing diagram). With the pointer at J, adjust G and H until the tuning slugs extend 1-1/8" out of their coil forms.

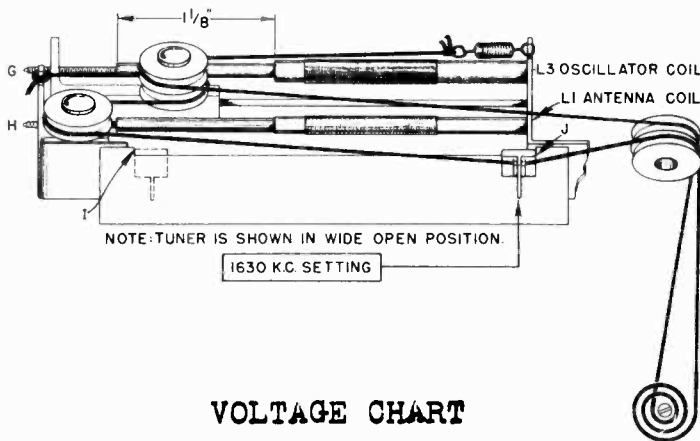
Set receiver tuning mechanism at J (wide open) and volume control full on. Connect an output meter (with series DC blocking condenser) from the 50B5 plate (pin #5) to chassis. Connect signal generator output to the 12BE6 grid (pin #7) through .1 mfd.

Set generator to 455 KC and adjust slugs at top and bottom of both round I.F. transformers for maximum.

Connect signal generator to receiver antenna lead through 100 mmfd. and set generator to 1630 KC. Adjust oscillator trimmer (nearest end of chassis) for maximum. Set generator to 540 KC, set receiver tuning mechanism closed and adjust G (oscillator slug) for maximum. Repeat both adjustments.

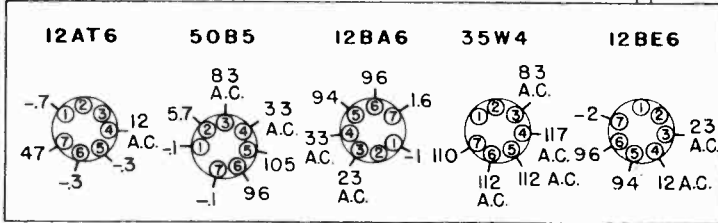
Set generator to 1630 KC, set receiver tuning mechanism at J and adjust antenna trimmer (one inch from end of chassis) for maximum. Set generator to 1300 KC, tune in generator on receiver and adjust H (antenna slug) for maximum. Repeat both adjustments.

STRINGING & ALIGNMENT DIAGRAM



VOLTAGE CHART

90 V. AC. LINE • USE VTVM • MEASURE TO CHASSIS



Symbol	CONDENSERS	Part No.
C1	.00035 Mfd. Mica	.65B 5-24
C2	.002 Mfd. Mica	.65B 5-37
C3	.105 Mmfd. Ceramic	.65B 6-9
C4	.105 Mmfd. Ceramic	.65B 6-9
C5	.105 Mmfd. Ceramic	.65B 6-9
C6	.105 Mmfd. Ceramic	.65B 6-9
C7	.05 Mfd. 150 Volts	.64A 4-3
C8	.00025 Mfd. 500 Volts	.64A 3-3
C9	.002 Mfd. 500 Volts	.64A 3-6
C10	.0005 Mfd. 500 Volts	.64A 3-4
C11	.005 Mfd. 500 Volts	.64A 3-9
C12	.002 Mfd. 500 Volts	.64A 3-6
C13	.05 Mfd. 400 Volts	.64A 4-1
C14a	30 Mfd. 150 Volts) Electrolytic	.67A 11
C14b	20 Mfd. 150 Volts)	
C15a	150 Mmfd. (Osc.)	
C15b	120 Mmfd. (Osc.)	.66A 14
C15c	140 Mmfd. (ant.)	
C16	75 Mmfd. Ceramic	.65B 6-11
C17	100 Mmfd. Ceramic	.65B 6-3

Symbol	COILS AND TRANSFORMERS	Part No.
L1	Coil, Antenna	.A1105-3
L2	Coil, Cathode Choke	.A1103-7
L3	Oscillator Coil Assembly	.A1101-3
T1	Transformer, I.F., 1st.	.72B 14
T2	Transformer, I.F., 2nd.	.72B 14
T3	Output Transformer	.79A 2

Symbol	RESISTORS	Part No.
R1	22,000 Ohms 1/4 Watt	.60B 26-223
R2	1 Megohm 1/4 Watt	.60B 26-105
R3	10 Megohms 1/4 Watt	.60B 26-106
R4	220,000 Ohms 1/4 Watt	.60B 26-224
R5	550,000 Ohms 1/4 Watt	.60B 26-564
R6	180 Ohms 1 Watt	.60B 28-1
R7	1,000 Ohms 1 Watt	.60B 28-5
R8	1/2 Megohm Volume Control & ON-OFF Switch	.75B 1-4
R9	330 Ohms 1/4 Watt	.60B 26-331
R10	1.5 Megohms 1/4 Watt	.60B 26-155
R11	3.3 Megohms 1/4 Watt	.60B 26-335
R12	33 Ohms 1 Watt	.60B 28-6

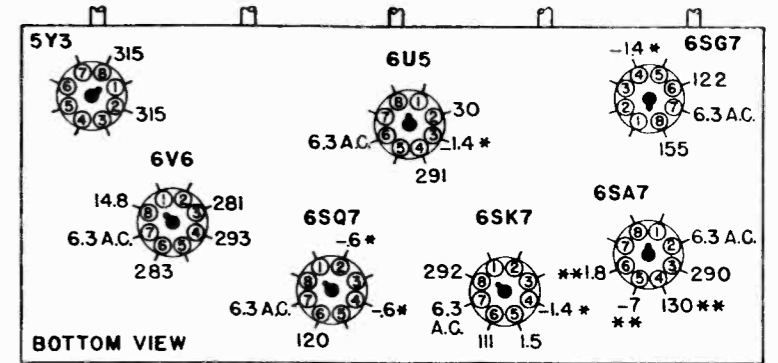
Description	MISCELLANEOUS	Part No.
Spring, Dial Cord Tension		.19A 1-4
Spring, Hairpin for Coil Mounting		.19A 2-1
Tuner Assembly, Complete		.A1170
Washer ("C"), for tuning shaft		.4A 4-1

Description	MISCELLANEOUS	Part No.
Cabinet, Ivory (7T03E)		.340 4-1
Cabinet, Mahogany (7T03M)		.34C 4-2
Cabinet, Black (7T03C)		.34C 4-3
Cabinet, Back (includes line connector and cord)		.A1412
Carriage Slug Mounting (with pulley)		.98A 36-1
Dial Background		.22A 6
Dial Cord (24")		.50A 1-3
Dial Pointer		.25A 17
Dial Scale		.21B 3
Guide Rod, Slug Travel		.28A 5
Knob, Ivory		.33A 3-3
Knob, Mahogany		.33A 3-2
Knob, Black only		.33A 3-5
Pilot Light Bulb #47		.81A 1-8
Plug, A.C., Male (assembly includes chassis back-plate)		.A1169
Plug, Coil Mounting		.32A 3-1
Shaft, Tuning		.28A 4-1
slug, Tuning (specify color code of old slug)		.71B 1-1
Socket, Pilot Light and Leads 10" long		.82A 2-1
Socket, Tube		.87A 3-3
Speaker		.78B 11
Speaker Grille Overlay (Ivory)		.23C 1-1
Speaker Grille Overlay (Red)		.23C 1-2
Speaker Grille Overlay (Green)		.23C 1-3
Speed Nut, for Guide Rod		.2A 10-1

ADMIRAL CORPORATION

MODELS 7T09-S, 7T09-X, 7C74, CHASSIS 7A1, 7A1A, 7A1B

VOLTAGE CHART



* Practically zero if readings are taken with 1000 ohm-per-volt meter. ** Zero or practically zero if readings are taken in phono position.

- Measured on 117 Volt A. C. Line.
No station tuned in. Dial turned to low frequency end.
Radio readings with bandswitch in broadcast position (Band #1).
Readings taken in phono position will be approximately the same except for those indicated with a double asterisk (**).

MISCELLANEOUS—Continued

Table with 2 columns: DESCRIPTION and PART No. listing various mechanical and electrical parts like washers, springs, and shafts.

Parts listed below used in Model 7C74 only.

PHONOGRAPH PARTS

Table with 2 columns: DESCRIPTION and PART No. listing parts for a record changer, including cartridges, pulleys, and dial scales.

DIAL PARTS

Table with 2 columns: DESCRIPTION and PART No. listing parts for the dial assembly, including brackets, scales, and indicator arms.

MISCELLANEOUS

Table with 2 columns: DESCRIPTION and PART No. listing various miscellaneous components like speaker sockets, plugs, and screws.

TUNER PARTS

Table with 2 columns: DESCRIPTION and PART No. listing parts for the tuner mechanism, including shafts, washers, and springs.

COILS, TRANSFORMERS, Etc.

Table with 2 columns: DESCRIPTION and PART No. listing various coils and transformers used in the radio circuit.

CONDENSERS—Continued

Table with 2 columns: SYMBOL, DESCRIPTION, and PART No. listing various types of capacitors used in the circuit.

COILS, TRANSFORMERS, Etc.—Cont.

Table with 2 columns: SYMBOL, DESCRIPTION, and PART No. continuing the list of coils and transformers.

RESISTORS

Table with 2 columns: SYMBOL, DESCRIPTION, and PART No. listing various resistors used in the radio circuit.

CONDENSERS

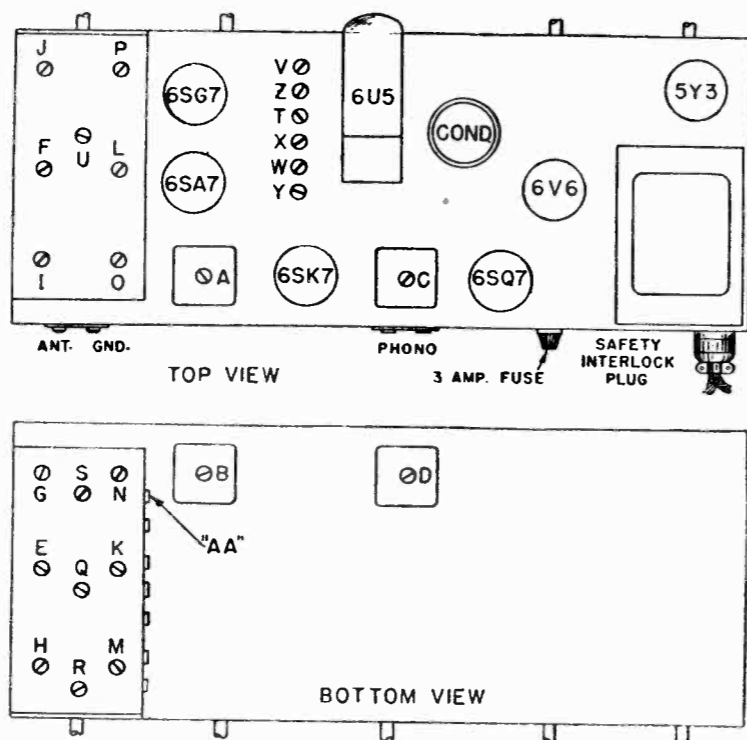
Table with 2 columns: SYMBOL, DESCRIPTION, and PART No. listing various types of capacitors.

- Measured on 117 Volt A. C. Line.
No station tuned in. Dial turned to low frequency end.
Radio readings with bandswitch in broadcast position (Band #1).

TRIMMER IDENTIFICATION CHART

Trimmer	Symbol	Function
A, B	T1	1st I.F. transformer
C, D	T2	2nd I.F. transformer
E	C49	Osc. trimmer (Band #1)
F	L8	Osc. slug (Band #1)
G	C21	R.F. trimmer (Band #1)
H	C6	Antenna trimmer (Band #1)
I	L1	Antenna slug (Band #1)
J	L5	R.F. slug (Band #1)
K	C47	Osc. trimmer (Band #4)
L	L10	Osc. slug (Band #4)
M	C7	Antenna trimmer (Band #4)
N	C-16	R.F. trimmer (Band #4)
O	L4	R.F. Slug (Band #4)
P	L3	Antenna Slug (Band #4)
Q	L9	Osc. shunt coil slug (Band #5)
R	L2	Ant. shunt coil slug (Band #5)
S	L6	R.F. shunt coil slug (Band #5)
T	C50	Oscillator trimmer (Band #2)
U	L7	Oscillator slug (Band #2)
V	C4	Antenna trimmer (Band #2)
W	C19	R.F. trimmer (Band #2)
X	C52	Oscillator trimmer (Band #3)
Y	C18	R.F. trimmer (Band #3)
Z	C2	Antenna trimmer (Band #3)

TUBE AND TRIMMER LAYOUT

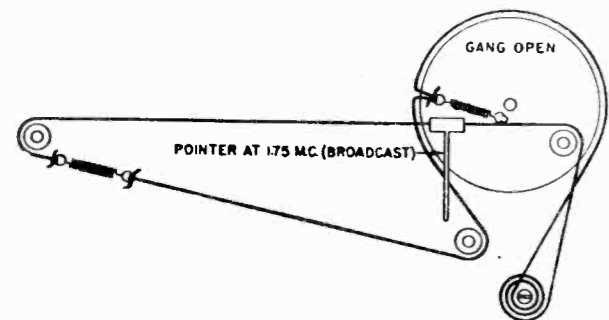


POINTER ADJUSTMENT

Turn the tuning control knob clockwise until tuning gang is wide open. The pointer should now be at 1.75 Mc. (end of dial scale). If it is not, move it to 1.75 Mc. without turning the tuning control knob. Then proceed with alignment.

REPLACING TUNING SLUGS

Set the gang to its wide open position, unsolder and remove the old slug. Set the slug-adjusting screw about half way down. Place the new slug in position. The slugs indicated as I, F, and J (in the trimmer layout diagram) should be 1-5/16" out of their coil forms. The slugs, O, L, and P, should be 1-3/16" out of their coil forms. The slug U should be 1/8" out of its coil form.



CHASSIS REMOVAL FOR MODEL 7C74

Due to the type of mounting, the chassis mounting board and receiver chassis are removed from the cabinet as a unit. This is done as follows: Remove the tuning knobs. Remove all cabinet wiring and cable connections from the receiver chassis. Remove the tube from the phono preamplifier chassis to prevent possible breakage. With the tilt-out assembly in the closed position, remove the four screws that secure the wood chassis mounting board to the back of the tilt-out door. The chassis will now be free to come down against the tie-bar just below the chassis. Pull the bottom edge of the chassis toward the rear of the cabinet and let the chassis down so that the tuning shafts clear the panel.

CHASSIS REPLACEMENT FOR MODEL 7C74

Insert the chassis back into the cabinet with the wood mounting board toward the front of the cabinet. The mounting board and receiver chassis should be tipped toward the front of the cabinet. Insert the tuning shafts in their respective holes in the panel. Move the bottom edge of the chassis mounting board forward against the back of the tilt-out door. Move the chassis up to its normal position and reinsert the mounting screws. Replace the tuning knobs.

IMPORTANT

The 7C74 radio-phono console is intended for 110 volt, 60 cycle operation only. Operation on any other line frequency will result in improper phono turntable speed and possible damage to the receiver. Operation on higher line voltages will result in burning out the phono motor.

ALIGNMENT PROCEDURE

- Check all screws and set screws on tuner to eliminate possibility of backlash. The correct position of the dial drum can be seen in the stringing diagram.
- With the gang wide open, the stop on the rear of the dial must rest against the upper stop post.
- Check slug positioning, with gang wide open. The slugs indicated as I, F, and J should be 1 5/16" out of their coil forms. The slugs O, L, and P should be 1 3/16" out of their coil forms. The slug U should be 1/8" out of its coil form. If there is any serious deviation or if there has been any tampering, turn the adjusting screws until this distance is corrected.
- Connect output meter across voice coil.
- Be sure both the set and the signal generator are thoroughly warmed up before starting alignment.
- Turn receiver Volume Control full on.
- Use lowest output setting of signal generator that gives a satisfactory reading on meter.
- Proceed as outlined below.

Step	Connect Signal Generator To	Signal Generator Frequency	Receiver Dial Setting	Trimmer and Type of Adjustment
1	Set Band Change Switch to Broadcast Position (Band #1).			
2	Thru .1 mfd. to point "AA" (bottom view, trimmer location diagram).	455 K.C.	1.75 Mc.	A, B, C, D to maximum output
3	Before proceeding to step 3, check pointer as outlined under paragraph headed "Pointer Adjustment." Leave Band Change Switch in Broadcast Position (Band #1).			
4	Antenna terminal at rear of chassis with 200 mmfd. in series.	1.75 Mc.	1.75 Mc.	E, G, H to maximum output
5	Same as above	1.3 Mc.	1.3 Mc.	F to maximum output
6	Same as above	1.0 Mc.	Tune in Signal	I, J to maximum output
7	Set Band Change Switch to Band #4.			
8	Antenna terminal at rear of chassis with 400 ohms in series.	17.5 Mc.	17.5 Mc.	K Adjust to bring in signal and check for image with signal generator at 18.41 Mc. See NOTE A below.
9	Same as above	14.5 Mc.	14.5 Mc.	L Adjust to bring in signal and check for image with signal generator at 15.41 Mc. See NOTE A below.
10	Same as above	17.5 Mc.	Tune in Signal	M to maximum output
11	Same as above	17.5 Mc.	Tune in Signal	N "Rock" as per NOTE B below
12	Same as above	14.5 Mc.	Tune in Signal	P to maximum output
13	Same as above	14.5 Mc.	Tune in Signal	O "Rock" as per NOTE B below
14	Set Band Change Switch to Band #5.			
15	Same as above	19. Mc.	19. Mc.	Q Adjust to bring in signal and check for image with signal generator at 19.91 Mc. See NOTE A below.
16	Same as above	19. Mc.	Tune in Signal	R to maximum output
17	Same as above	19. Mc.	Tune in Signal	S "Rock" as per NOTE B below
18	Set Band Change Switch to Band #2.			
19	Same as above	4.25 Mc.	4.25 Mc.	T Adjust to bring in signal and check for image with signal generator at 5.16 Mc. See NOTE A below.
20	Same as above	3.8 Mc.	3.8 Mc.	U Adjust to bring in signal and check for image with signal generator at 4.71 Mc. See NOTE A below, and "Rock" as per NOTE B below.
21	Same as above	4.25 Mc.	Tune in Signal	V to maximum output
22	Same as above	4.25 Mc.	Tune in Signal	W to maximum output
23	Set Band Change Switch to Band #3.			
24	Same as above	8.6 Mc.	8.6 Mc.	X Adjust to bring in signal and check for image with signal generator at 9.51 Mc. See NOTE A below.
25	Same as above	7. Mc.	Tune in Signal	Z to maximum output
26	Same as above	7. Mc.	Tune in Signal	Y "Rock" as per NOTE B below

NOTE A: Image check. Trimmers referred to this note can have two peaks. Check to see if proper peak was obtained by leaving receiver dial at its setting and retuning signal generator to frequency indicated in chart above. If image is not heard at or near indicated point, realign to other peak and recheck image.

NOTE B: Trimmers referred to this note should first be adjusted to maximum. Then try to increase output by detuning trimmer slightly and retuning signal generator dial until maximum output meter reading is secured.

ADMIRAL CORPORATION MODELS 8C11, 8C12, 8C13,
8C14, 8C15, 8C16, 8C17,
CHASSIS 8C1

ALIGNMENT PROCEDURE

FM ALIGNMENT EQUIPMENT

The model 8C1 chassis should be aligned only with an AM signal generator and a vacuum tube voltmeter. Any standard brand vacuum tube voltmeter with a DC scale of not over 5 volts is suitable. A 3-volt zero center scale is desirable. A signal generator with a frequency range up to 110 MC. is desirable. It is possible however, to align the receiver with a signal generator going to 20 or 30 megacycles, by using the harmonics of these lower frequencies. To do this merely set the signal generator dial as follows and align exactly as explained in the alignment instructions.

Where alignment chart specifies 109 MC., set signal generator to highest available frequency of the following:

109. MC	27.25 MC
54.50 MC	21.80 MC
36.33 MC	18.17 MC

Where alignment chart specifies 102 MC., set signal generator to highest available frequency of the following:

102. MC	25.50 MC
51. MC	20.40 MC
34. MC	17. MC

Signal generators which do not tune to 110 MC or whose harmonics are not strong enough, cannot be used for FM alignment.

POINTER SETTING

With the gang closed, the pointer should be at the position as shown in the stringing diagram (Fig. 4), that is, the bottom edge of the pointer should line up with the top of the "MC" lettering on the dial scale. If the pointer is in a different position, move it by hand while keeping the gang closed.

TRIMMER IDENTIFICATION CHART

Trimmer Symbol	Function
A . . . T3 . . .	Ratio Detector transformer
B . . . T2 . . .	2nd IF transformer (FM)
C . . . T2 . . .	2nd IF transformer (FM)
D . . . T1 . . .	1st IF transformer (FM)
E . . . T1 . . .	1st IF transformer (FM)
F . . . T3 . . .	Ratio Detector transformer
G . . . C38 . . .	FM oscillator trimmer
H . . . C5b . . .	FM RF trimmer
I . . . T5 . . .	2nd IF transformer (AM)
J . . . T5 . . .	2nd IF transformer (AM)
K . . . T4 . . .	1st IF transformer (AM)
L . . . T4 . . .	1st IF transformer (AM)
M . . . C5d . . .	AM oscillator trimmer
N . . . C5a . . .	AM antenna trimmer

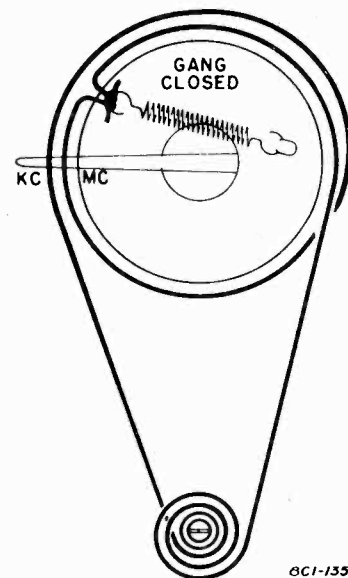


Fig. 4. Stringing Diagram

IMPORTANT PRELIMINARY ALIGNMENT STEPS

In FM alignment, it is essential that every step be followed. Especially important is picking the center of the I.F. curve (step 4 in the FM-I.F. alignment instructions). During this portion of the alignment it is necessary to tune the signal generator very carefully; it may necessitate having to estimate the dial readings to a tenth of a division.

- Check the set screws that hold the tuning drum to the shaft to see that they are tight and that the drum has not slipped on the shaft. The correct position of the drum can be seen in the stringing diagram.
- With the gang closed, the pointer should be at the position as shown in the stringing diagram, that is, the bottom edge of the pointer should line up with the top of the "MC" lettering on the dial scale. If the pointer is in a different position, move it by hand while keeping the gang closed.
- Be sure both the set and the signal generator are thoroughly warmed up before starting alignment.

MODELS 8C11, 8C12, 8C13, 8C14, ADMIRAL CORPORATION
8C15, 8C16, 8C17, CHASSIS 8C1

FM I.F. AND RATIO DETECTOR ALIGNMENT

- Keep output indicator leads well separated from signal generator leads and chassis wiring.
- Band switch in FM position (fully to the left).
- While peaking IF's, keep reducing signal generator output so VTVM reading is approximately +1.5 volts DC with exception of Step #5.
- Speaker must be connected during alignment.
- FM antenna disconnected during alignment.

I.F. SLUG INFORMATION

To avoid splitting the slotted head of the powdered iron core tuning slug in the I.F. transformers, use a screw-driver with a blade 1/8" wide for I.F. alignment.

Under normal operating conditions, mis-alignment of slug-tuned circuits with age is slight. Therefore, re-alignment of the I.F. transformers should be accomplished by only a slight adjustment of the slugs.

Before proceeding, be sure to follow all steps listed above, under "Important Preliminary Alignment Steps."

	Connect Signal Generator	Generator Frequency	Receiver Dial Setting	Output Indicator and Special Connections	Adjust as Follows (very carefully)
1	Thru .001 cond. to pin # 1 of 6BA6 RF amplifier**	10.7 MC unmodulated.	Tuning gang wide open	Connect VTVM (DC probe) from point "W" to ground. (See Fig. 11.)	"A" (ratio detector primary) for maximum reading on VTVM.
2	"	"	"	" "	Iron cores "B" and "C" (2nd IF trans.) for maximum reading on VTVM.
3	"	"	"	" "	Iron cores "D" and "E" for maximum on VTVM. Re-adjust A, B, C, D, E, for maximum. (Keep reducing generator output to keep VTVM at 1.5 volts).
4	"	a. Reduce output of signal generator until VTVM reads exactly +1.5 volts DC. b. Tune generator frequency above 10.7 MC until VTVM reads exactly +1.0 volt. Note exact generator frequency. Extreme care in reading this is essential. c. Tune generator frequency below 10.7 MC until VTVM reads exactly +1.0 volt. Note exact generator frequency. Extreme care in reading this is essential. d. Add generator frequency in step c to generator frequency in step d and divide by 2. The result is the center frequency of the IF curve to be used in step 5. See example on next page. e. Tune generator frequency above and below 10.7 MC and note voltage reading on VTVM at different frequency points until you have a good impression of the shape of the selectivity curve. If you have two peaks as in Figures 9 or 10, note readings (voltage) of both peaks. If one peak is over 20% higher than the other one, it will be necessary to realign IF's. A selectivity curve that would require realignment is illustrated by Figure 10.			
5	"	Center of IF selectivity curve per step 4d above. See "EXAM- PLE" on next page.	Tuning gang wide open	Connect VTVM (DC probe) from point "X" to ground. (See Fig. 11.)	Iron core "F" (ratio detector secondary) for zero voltage reading on VTVM. (The correct zero point is located between a positive and a negative maximum.)

If any adjustments were very far off, it is desirable to repeat steps 3, 4 and 5.
**Do not feed I.F. signal into converter grid as this will cause mis-alignment.

FM RF ALIGNMENT PROCEDURE

	Connect Signal Generator	Generator Frequency	Receiver Dial Setting	Output Indicator and Connections	Adjust as Follows
6	FM ant. terminal.	109 MC† (unmodulated).	Tuning gang wide open	Connect VTVM (DC probe) from point "W" to ground.	*G for maximum VTVM reading.
7	"	102 MC† (unmodulated).	102 MC	"	*Tune in generator signal on receiver. Adjust H for max. VTVM reading

* It is advisable to adjust generator output so VTVM readings do not exceed approximately + 1.5 V. DC after peaking.
† If your signal generator does not reach this frequency, use harmonics as described in "FM Alignment"

ADMIRAL CORPORATION MODELS 8C11, 8C12, 8C13, 8C14
8C15, 8C16, 8C17, CHASSIS 8C1

SETTING SIGNAL GENERATOR TO CENTER OF I.F. SELECTIVITY CURVE

CAUTION: Due to the difficulty of setting a signal generator to the accuracy required by this operation, extreme care must be exercised in making each setting. Otherwise, improper alignment of the ratio detector and consequent audio distortion will result.

EXAMPLE: (See Figures 5 and 6)

Voltage reading in Step 4a is + 1.5 volts.

Generator frequency on low side of 10.7 MC for a reading of + 1 volt DC = 10.640 MC.

Generator frequency on high side of 10.7 MC for a reading of + 1 volt DC = 10.800 MC.

Center frequency is obtained by adding 10.640 and 10.800, then dividing by 2. For these readings it will be 10.72 MC.

Set generator frequency to 10.72 MC as this is center of selectivity curve as shown in Figure 6.

Note: Numerical vernier dial readings may be used instead of MC.

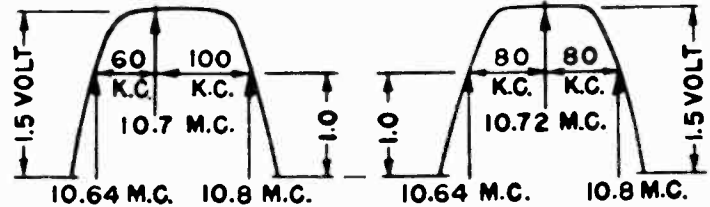


Fig. 5

Fig. 6

TYPICAL SELECTIVITY CURVES

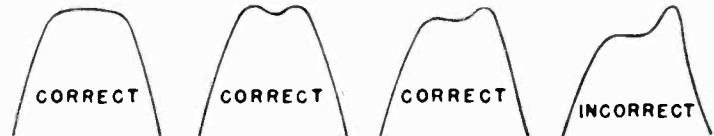


Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

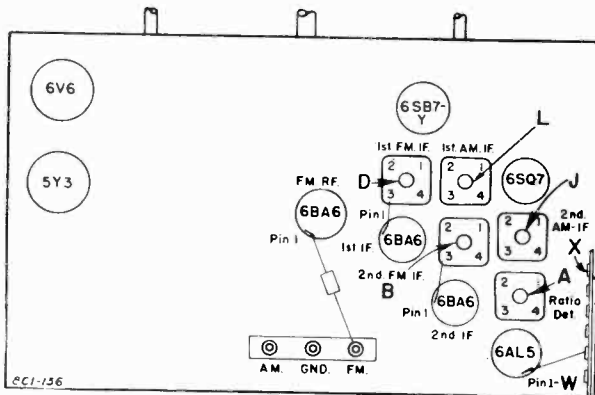


Fig. 11. Bottom Trimmer Location

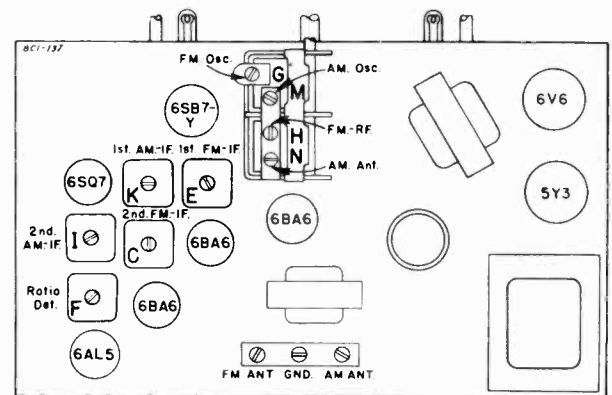


Fig. 12. Top Trimmer Location

AM ALIGNMENT PROCEDURE

- Use regular output meter connected across speaker voice coil.
- Turn receiver Volume Control full on; Tone Control full treble.
- Band Switch in center position.
- Use lowest output setting of signal generator that gives a satisfactory reading on meter.

	Connect Signal Generator	Dummy Antenna Between Radio and Signal Generator	Signal Generator Frequency	Receiver Dial Setting	Adj. Trimmers in Following Order to Max.
Set Band Switch to Broadcast Position (center) and be sure to follow instructions under heading "Important Preliminary Alignment Steps." Loop antenna can be disconnected from chassis in Steps 1 and 2.					
1	6SB7-Y (Pin #8)	.1 MFD	455 KC	Tuning gang wide open	I, J, K, L
2	To loop ant. terminal	Direct connection	1620 KC	Tuning gang wide open	M
Set Receiver Chassis on table next to back of cabinet. Connect Loop Antenna to Receiver.					
3	Place generator lead close to loop of set to obtain adequate signal. No actual connection (signal by radiation).		1400 KC	Tune in signal	N

MODELS 8C11, 8C12, 8C13, 8C14, ADMIRAL CORPORATION
8C15, 8C16, 8C17, CHASSIS 8C1

RESISTORS

Symbol	Description	Part No.
R1	390 Ohms, 1/4 Watt	60B 2-391
R2	470,000 Ohms, 1/4 Watt	60B 2-474
R3	22,000 Ohms, 1 Watt	60B 14-223
R4	1 Megohm, 1/4 Watt	60B 3-105
R5	47,000 Ohms, 1/4 Watt	60B 2-473
R6	47,000 Ohms, 1/4 Watt	60B 2-473
R7	15,000 Ohms, 2 Watt	60B 20-153
R8	470 Ohms, 1/4 Watt	60B 2-471
R9	470,000 Ohms, 1/4 Watt	60B 2-474
R10	27,000 Ohms, 1 Watt	60B 14-273
R11	470 Ohm, 1/4 Watt	60B 2-471
*R12	47,000 Ohms, 1/4 Watt	
R13	220,000 Ohms, 1/4 Watt	60B 2-224
R14	220,000 Ohms, 1/4 Watt	60B 2-224
R15	15,000 Ohms, 2 Watt	60B 20-153
R16	27,000 Ohms, 1/4 Watt	60B 2-273
R17	390 Ohms, 1/4 Watt	60B 2-391
R18	27,000 Ohms, 1 Watt	60B 14-273
R19	6,800 Ohms, 1/4 Watt, 5%	60B 1-682
R20	6,800 Ohms, 1/4 Watt, 5%	60B 1-682
R21	120,000 Ohms, 1/4 Watt	60B 2-124
R22	100,000 Ohms, 1/4 Watt	60B 2-104
R23	47,000 Ohms, 1/4 Watt	60B 2-473
R24	2 Megohms Tone Control (Includes ON-OFF Switch SW2) 75B	1-24
R25	1 Megohm Volume Control (Tapped at 500,000 Ohms) 75B	2-10
R26	10 Megohms, 1/4 Watt	60B 3-106
R27	22,000 Ohms, 1/4 Watt	60B 2-223
R28	470,000 Ohms, 1/4 Watt	60B 2-474
R29	470,000 Ohms, 1/4 Watt	60B 2-474
R30	390 Ohms, 1 Watt	60B 14-391

*Part of enclosed Diode Filter Unit 63A3-1. This unit consists of R12, C17, C18 (see schematic). If a section of the unit becomes defective, replace with component of proper value.

CONDENSERS

Symbol	Description	Part No.
C1	105 mmfd., 5%, -00075 Temp. Coeff. Ceramic	65B 6-9
C2	.01 mfd., 400 Volts, Paper	64B 1-25
C3	.0015 mfd., "Hi-K" Ceramic	65A 14-1
C4	140 mmfd., 3%, Silver Mica	65B 1-26
C5a	486 mmfd. (max.), AM RF	Gang Cond.
C5b	15 mmfd. (max.), FM RF	
C5c	15 mmfd. (max.), FM Osc.	
C5d	143 mmfd. (max.), AM Osc.	
C6	22 mmfd., 5%, Ceramic	65B 6-47
C7	7 mmfd., ±1 mmfd., -00047 Temp. Coeff., Ceramic	65B 6-45
C8	.01 mfd., 400 Volts, Paper	64B 1-25
C9	35 mmfd., 5%, Ceramic	65B 6-46
C10	105 mmfd., 5%, -00075 Temp. Coeff. Ceramic	65B 6-9
C11	7 mmfd., ±1 mmfd., -00047 Temp. Coeff., Ceramic	65B 6-45
C12	.0015 mfd., "Hi-K" Ceramic	65A 14-1
C13	.01 mfd., 400 Volts, Paper	64B 1-25
C14	.01 mfd., 400 Volts, Paper	64B 1-25
C15	.005 mfd. min., Ceramic (Disc)	65A 10-1
C16	.01 mfd., 400 Volts, Paper	64B 1-25
*C17	100 mmfd., Mica	
*C18	100 mmfd., Mica	
C19	.01 mfd., 400 Volts, Paper	64B 1-25
C20	.005 mfd. min., Ceramic (Disc)	65A 10-1
C21	105 mmfd., 5%, -00075 Temp. Coeff., Ceramic	65B 6-9
C22	4 mfd., 150 Volts, Electrolytic	67A 4-2
C23	105 mmfd., 5%, -00075 Temp. Coeff., Ceramic	65B 6-9
C24	.002 mfd., 600 Volts, Paper	64B 1-14

Symbol	Description	Part No.
C25a	30 mfd., 350 Volts	Elect. 67C 6-25
C25b	30 mfd., 350 Volts	
C25c	20 mfd., 25 Volts	
C26	.01 mfd., 400 Volts, Paper	64B 1-25
C27	.2 mfd., 200 Volts, Paper	64B 1-29
C28	.001 mfd., 600 Volts, Paper	64B 1-15
C29	.005 mfd., 600 Volts, Paper	64B 1-12
C30	500 mmfd., 10%, Mica	65B 5-27
C31	.005 mfd., 600 Volts, Paper	64B 1-12
C32	.01 mfd., 400 Volts, Paper	64B 1-25
C33	.1 mfd., 400 Volts, Paper	64B 1-20
C34	.01 mfd., 400 Volts, Paper	64B 1-25
C35	200 mmfd., 20%, Ceramic	65B 7-21
C36	.01 mfd., 400 Volts, Paper	64B 1-25
C37	.005 mfd., 600 Volts, Paper	64B 1-12
C38	2 1/2 to 6 mmfd., Trimmer, Silver Ceramic	66A 24-2

*Part of enclosed Diode Filter Unit 63A3-1. This unit consists of R12, C17, C18 (see schematic). If a section of the unit becomes defective, replace with component of proper value.

COILS, TRANSFORMERS, ETC.

Symbol	Description	Part No.
L1	Antenna, FM (90" of #22 wire)	
L2	Antenna, Loop (AM)	95A 24-2
L3	Choke, RF	AB103-33
L4	Coil, Loop Loading (AM)	69A 56
L5	Coil, RF (FM)	69A 55
L6	Coil, Oscillator (FM)	69A 54
L7	Coil, Oscillator (AM)	69A 20-1
L8	Choke, Filter	74A 10
L9	Choke, Filament Approx. 10 turns (18") of solid #22 hook-up wire wound on C26 Solder one end to inside foil lead of C26	
T1	Transformer, 1st IF (FM)	72B 37
T2	Transformer, 2nd IF (FM)	72B 38
T3	Transformer, Ratio Detector	72B 39
T4	Transformer, 1st IF (AM)	72B 54
T5	Transformer, 2nd IF (AM)	72B 49
T6	Transformer, Power	80B 5
T7	Transformer, Output	79A 9
M7	Speaker 10" P.M. Dynamic	78B 28
SW1	Switch, Band (FM, AM, Phono)	77B 18
SW2	Switch, Power	Part of R24
SW3	Switch, Phono Motor (see Record Changer Manual)	
	Diode Filter (consists of R12, C17 and C18)	63A 3-1

DIAL PARTS

Description	Part No.
Dial Bulb, #47	81A 1-8
Dial Bulb Socket (with leads)	82A 8-3
Dial Cord (18")	50A 1-3
Dial Escutcheon and window (Radio)	23D 29-2
Dial Escutcheon, Television (8C11, 8C12, 8C13 only)	23D30-1
Dial Pointer, Plastic	A1685
Dial Scale Assembly	A1676
Drum and Hub Assembly	A-1318
Rubber Channel (Inner edge of Dial Scale - 29 1/2")	12A 20-3
Set Screw, Dial Drum, 8-32x1/4"	1A 5-59-0
Spring, Dial Cord	19B 1-3
Sleeve, Dial Tuning (brass)	27A 45

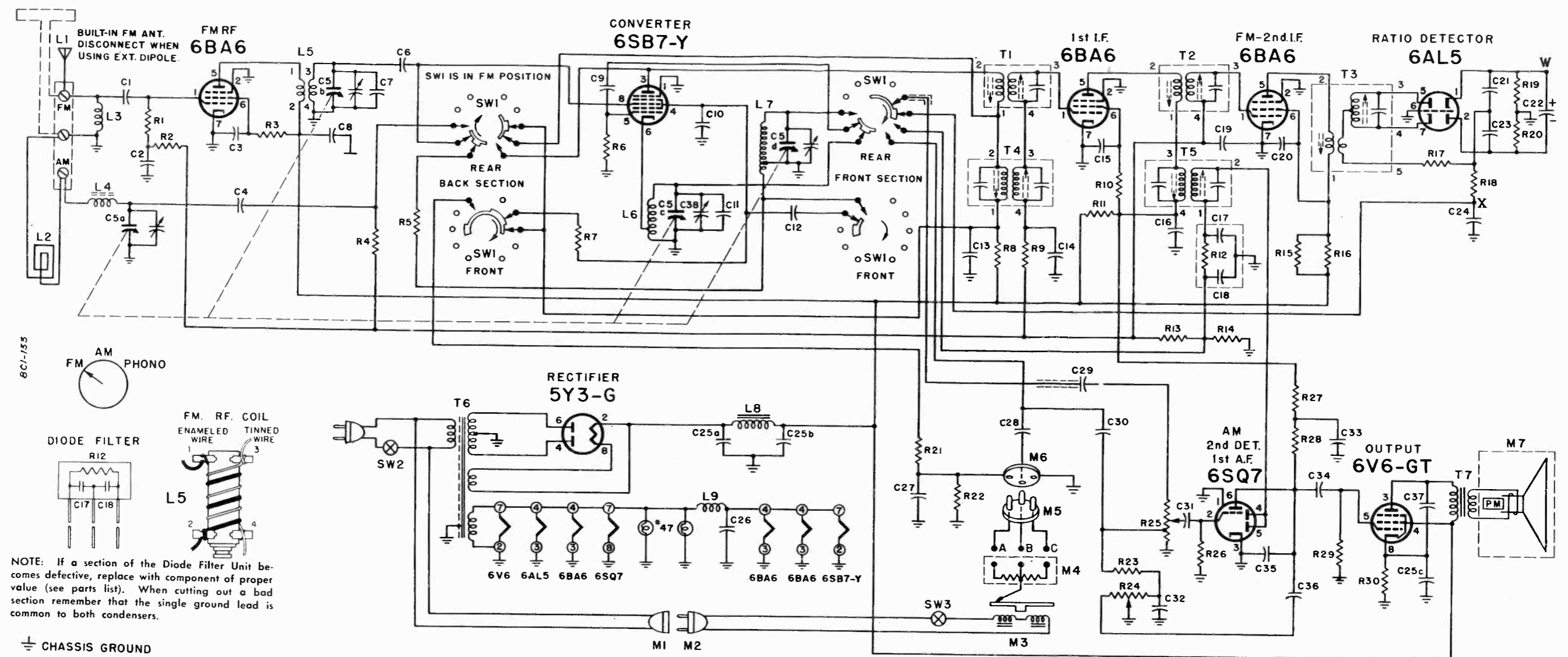
PHONOGRAPH PARTS

Note: See RC181 Record Changer

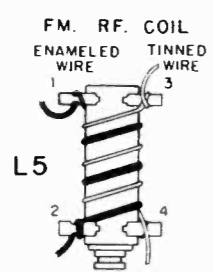
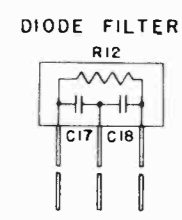
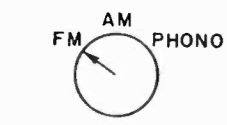
Symbol	Description	Part No.
M1	Cable and Socket, Phono Motor Phono Motor Extension Cable (used on 8C11, 8C12, 8C13)	89A 6-6 89A 6-32

ADMIRAL CORPORATION

MODELS 8C11, 8C12, 8C13, 8C14, 8C15, 8C16, 8C17, CHASSIS 8C1



8C1-153



NOTE: If a section of the Diode Filter Unit becomes defective, replace with component of proper value (see parts list). When cutting out a bad section remember that the single ground lead is common to both condensers.

⊥ CHASSIS GROUND

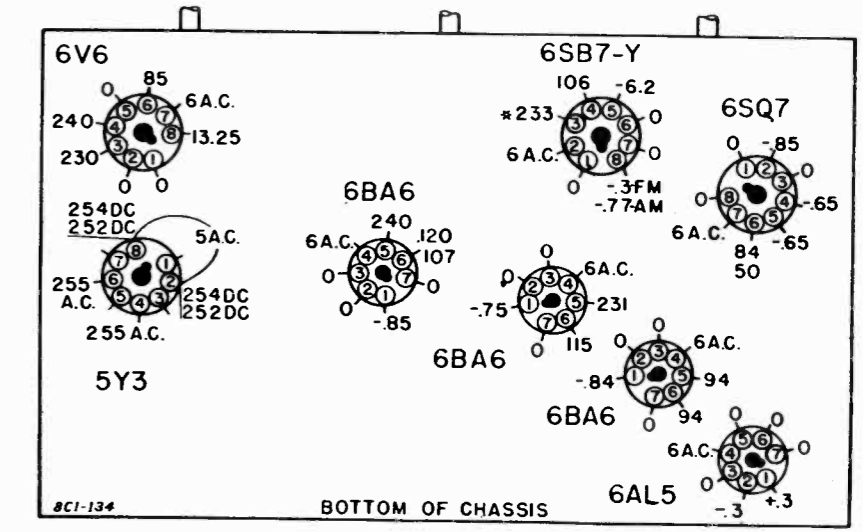
MISCELLANEOUS

Description	Part No.
*Cabinet	
Walnut (8C11)	35E 80-1
Mahogany (8C12)	35E 80-2
Blond (8C13)	35E 80-3
Walnut (8C14)	35E 76-1
Mahogany (8C15)	35E 76-2
Mahogany (8C17)	35E 82-1
Carton complete with fillers for 8C14, 8C15	44B 108
for 8C17	44B 109
Carton complete with fillers, less crate (for 8C11, 8C12, 8C13)	44B 115
Crate, less carton (for 8C11, 8C12, 8C13)	44B 117
*Door, Radio or Phono Tilt-Out	
pair for Walnut (8C1)	98A 41-1
pair for Mahogany (8C12)	98A 41-2
pair for Blond (8C13)	98A 41-3
pair for Walnut (8C14)	98A 41-4
pair for Mahogany (8C15)	98A 41-5
pair for Mahogany (8C17)	98A 41-6
*Door, Record Compartment Complete for Walnut (8C14)	98A 41-7
for Mahogany (8C15)	98A 41-8
Door Arm (near center of cabinet; see Ref. =5 in Fig. 1)	A1440

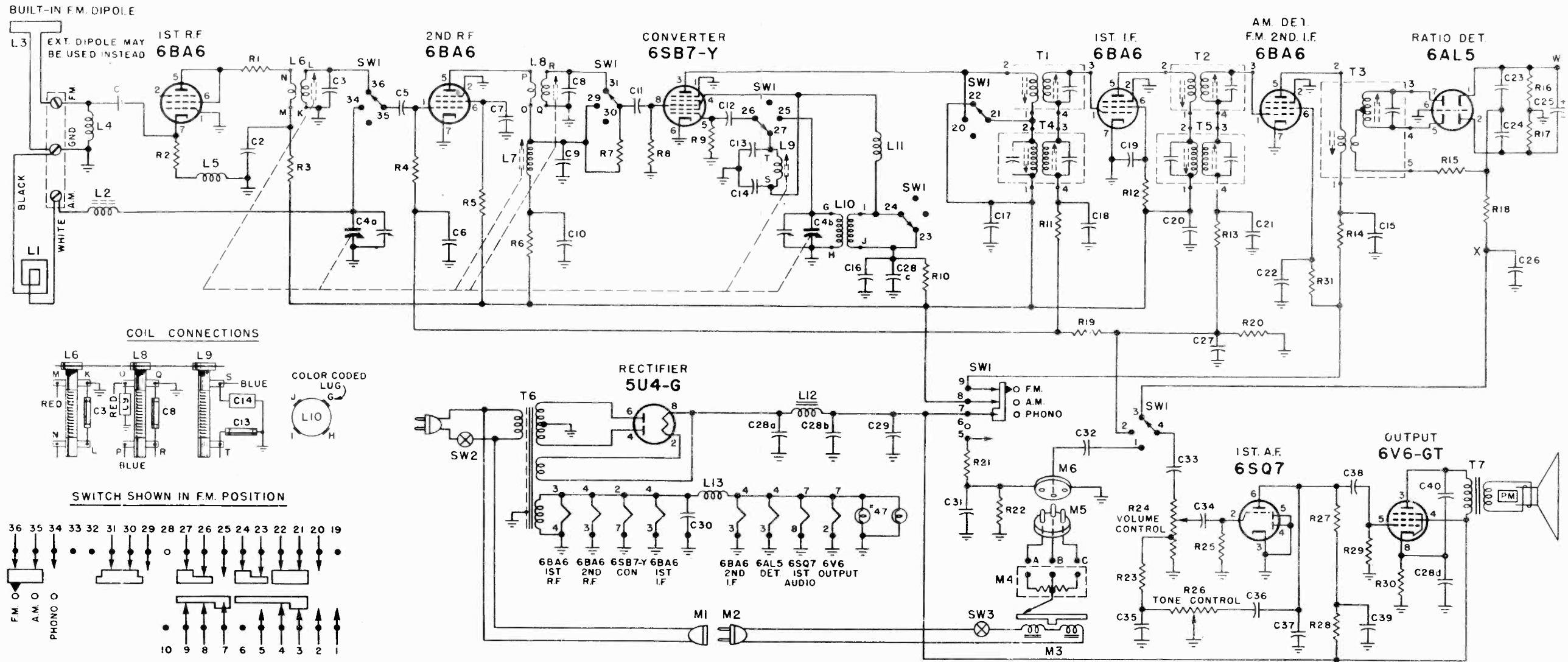
Door Arm (nearest side of cabinet; see Ref. =5 in Fig. 1)	A1441
Door Bracket (near center of cabinet; see Ref. =7 in Fig. 1)	A1438
Door Bracket (nearest side of cabinet; see Ref. =7 in Fig. 1)	A1439
Door Catch and Strike Plate for Record Compartment Door	98A 41-9
Door Handle (Tilt-Out Doors) for Walnut (8C11), Mahogany (8C12 and 8C17)	33A 33-1
for Blond (8C13)	33A 33-2
for Walnut (8C14) & Mahogany (8C15)	98A 41-10
Door Hinge, Record Storage Compartment for Walnut (8C14) & Mahogany (8C15)	98A 41-11
Door Knob, Record Storage Compartment for Walnut (8C14) & Mahogany (8C15)	98A 41-12
Grille, Metal for Walnut (8C11), Mahogany (8C12) and Blond (8C13)	36A 7-3
Grille Cloth for Walnut (8C11) & Mahogany (8C12)	98A 41-13
for Blond (8C13)	98A 41-14
for Walnut (8C14) & Mahogany (8C15)	98A 41-15
for Mahogany (8C17)	98A 41-16
Grammet, Rubber for mounting Chassis	12A 1-11

VOLTAGE CHART

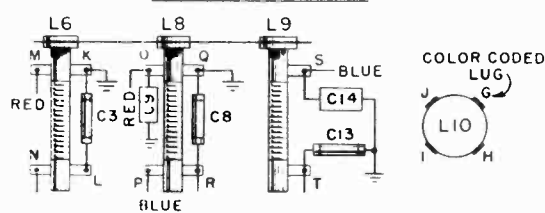
- Line Voltage 117.
- Voltages measured with a vacuum tube voltmeter. Second voltage readings and A.C. voltages measured with a 1000 ohm-per-volt meter.
- Voltages read between socket terminals and ground, unless otherwise indicated.
- Band switch in FM position.
- Dial turned to low frequency end.
- Volume Control—minimum.



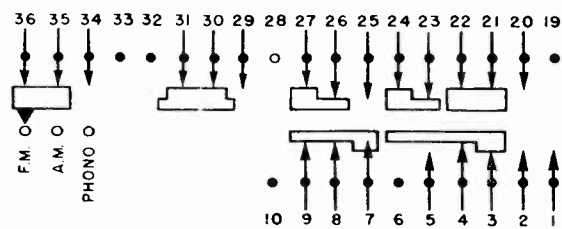
*If measured with band switch in phono position, reading will be zero.



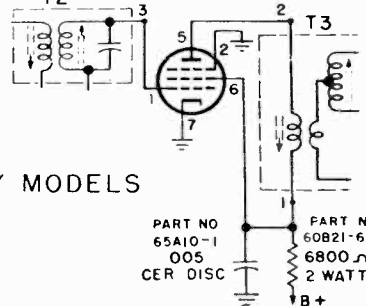
COIL CONNECTIONS



SWITCH SHOWN IN F.M. POSITION



AM. DET.
F.M. 2ND. I.F.
6AU6



EARLY MODELS

Early models used a 6AU6 tube for the AM detector FM 2nd I.F. in place of the 6BA6 tube shown in the schematic. Connections of the 6AU6 tube are shown above.

CAUTION: The two tubes are not interchangeable.

FM SERVICE

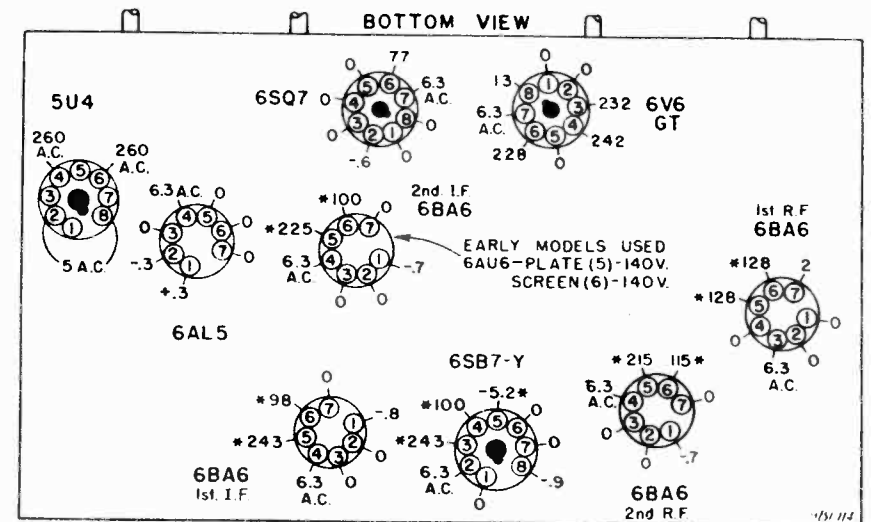
Much of FM service is similar to the usual service necessary for AM receivers such as voltage analysis, parts replacement, etc. The chief differences arise because of the considerably higher frequencies used in FM operation, and because of the different type of second detector needed in FM.

The higher frequencies involved means that more care must be exercised in location and length of leads. Leads tend to act as small inductances or

capacities at high frequency and hence may appreciably alter the electrical characteristics of a circuit. For this reason, ground connections should always be maintained as originally made in the set. Also note that in certain circuits, the type by-pass condenser used is critical at the high FM frequencies. When replacing condensers it is important that they be replaced with condensers of identical capacity values, tolerances, temperature coefficients and construction. For example: C3 is a 22 mmfd $\pm 2\%$, zero temperature coefficient, ceramic capacitor. If defective it should be replaced with a 22 mmfd $\pm 2\%$, zero temperature coefficient, ceramic capacitor.

VOLTAGE CHART

- Line Voltage 117.
- Voltages measured with a vacuum tube voltmeter. Many readings will be lower if measured with a 1000 ohm-per-volt meter.
- Voltages read between socket terminals and ground, unless otherwise indicated.
- Band switch in FM position.
- Dial turned to low frequency end.
- Volume Control—minimum.



*If voltages are measured with band switch in phono position, reading will be zero or practically zero.

RECORD CHANGERS: Admiral Model RC-170A, RCD.CH. 16-1
Admiral Model RC-181, RCD.CH. 18-1

9B1 CIRCUIT DESCRIPTION

Two stages of RF amplification using 6BA6 tubes are used for FM. For AM sufficient gain is obtained by using one RF stage only and so the input is to the 2nd 6BA6 RF tube.

The band switch short circuits the 1st I.F. FM primary when in the AM position and short circuits the 1st I.F. AM primary when in the FM position.

A 6BA6 tube is used in a second stage of I.F. amplification for FM operation. Self-bias is developed in the grid resistor (R13 and R20 in series) of this stage. Since this DC bias voltage

is dependent on signal strength, it is used for AVC purposes. In the AM setting of the band switch, plate and screen voltages are removed from this tube. The grid and cathode then function as an AM second detector (diode) and AVC tube in a conventional manner. (In early models a 6AU6 tube was used in place of this 6BA6 tube.)

Ratio Detector and Grounded-Grid RF Amplifier

The ratio detector circuit and grounded-grid 1st RF amplifier are the same as used in the 9A1 chassis. Reference can be made to the 9A1 service manual for description of these circuits.

ALIGNMENT PROCEDURE

FM ALIGNMENT

The model 9B1 chassis should be aligned only with an AM signal generator and a vacuum tube voltmeter. Any standard brand vacuum tube voltmeter with a DC scale of not over 5 volts is suitable. A 3-volt zero center scale is desirable. A signal generator with a frequency range up to 110 MC. is desirable. It is possible however, to align the receiver with a signal generator going to 20 or 30 megacycles, by using the harmonics of these lower frequencies. To do this merely set the signal generator dial as follows and align exactly as explained in the alignment instructions.

Where alignment chart specifies 109 MC., set signal generator to highest available frequency of the following:

109. MC	27.25 MC
54.50 MC	21.80 MC
36.33 MC	18.17 MC

Where alignment chart specifies 104 MC., set signal generator to highest available frequency of the following:

104. MC	26.00 MC
52.00 MC	20.80 MC
34.67 MC	17.33 MC

Signal generators which do not tune to 110 MC or whose harmonics are not strong enough, cannot be used for FM alignment.

In FM alignment, it is essential that every step be followed. Especially important is picking the center of the I.F. curve (step 4 in the FM-I.F. alignment instructions). During this portion of the alignment it is necessary to tune the signal generator very carefully; it may necessitate having to estimate the dial readings to a tenth of a division.

POINTER SETTING

With the gang open, the pointer should be at the position as shown in the stringing diagram (Fig. 4), that is, the tip of the pointer should point to the space between the "AM KC" lettering on the dial scale. If the pointer is in a different position, move it by hand while keeping the gang open.

TRIMMER IDENTIFICATION CHART

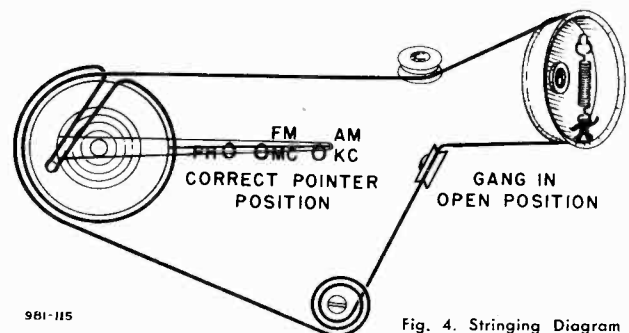
Trimmer Symbol	Function
A ... T3	Discriminator transformer
B ... T2	2nd IF transformer (FM)
C ... T2	2nd IF transformer (FM)
D ... T1	1st IF transformer (FM)
E ... T1	1st IF transformer (FM)
F ... T3	Discriminator transformer
G ... L9	FM oscillator coil
H ... L8	FM 2nd RF coil
I ... L6	FM 1st RF coil
J ... T5	2nd IF transformer (AM)
K ... T5	2nd IF transformer (AM)
L ... T4	1st IF transformer (AM)
M ... T4	1st IF transformer (AM)
N ... C4b	AM oscillator trimmer
O ... L7	AM RF coil
P ... C4a	AM antenna trimmer

REPLACING TUNING SLUGS

With the gang wide open, all three FM tuning slugs should be 3/8 inch out of their coil forms. The AM-RF tuning slug (adjustment "0" in the trimmer location diagram) should be 1 inch out of its coil form.

If it becomes necessary to change a tuning slug, proceed as follows: Set the gang to its wide open position. Unsolder and remove the old slug. Set the slug adjusting screw about half way down. Place the new slug in its correct position. Solder in place making sure that it does not slip during the operation and that the slug wire is straight.

Realignment is necessary after slug replacement.



9B1-115

Fig. 4. Stringing Diagram

MODELS 9B14, 9B15,
9B16, CHASSIS 9B1

ADMIRAL CORPORATION

IMPORTANT PRELIMINARY ALIGNMENT STEPS

With the gang open, the pointer should be at the position as shown in the stringing diagram, that is, the tip of the pointer should point to the space between the "AM KC" lettering on the dial scale. If the pointer is in a different position, move it by hand while keeping the gang open.

Check the set screws that hold the tuning drum to the shaft to see that they are tight and that the drum has

not slipped on the shaft. The correct position of the drum can be seen in the stringing diagram.

With the gang wide open, all FM tuning slugs should be 3/8 inch out of their coil forms. The AM-RF tuning slug (adjustment "O" in the trimmer location diagram) should be 1 inch out of its coil form. If there is any serious deviation, or if there has been any tampering, turn the adjusting screw until this distance is corrected. (See paragraph on tuning slug replacement.)

FM I.F. AND RATIO DETECTOR ALIGNMENT

Solder output indicator leads in place and keep them well separated from signal generator leads and chassis wiring.

Band switch in FM position (red signal at MC on dial).

While peaking IF's, keep reducing signal generator output so VTVM reading is approximately +1.5 volts DC with exception of Step #5.

Speaker must be connected during alignment.

FM antenna disconnected during alignment.

I.F. SLUG INFORMATION

To avoid splitting the slotted head of the powdered iron core tuning slug in the I.F. transformers, use a screw-driver with a blade 1/8" wide for I.F. alignment.

Under normal operating conditions, mis-alignment of slug-tuned circuits with age is slight. Therefore, re-alignment of the I.F. transformers should be accomplished by only a slight adjustment of the slugs.

Before proceeding, be sure to follow all steps listed above, under "Important Preliminary Alignment Steps." Steps 1 and 2 may be omitted if set is not badly out of alignment so signal comes through in Step 3.

	Connect Signal Generator	Generator Frequency	Receiver Dial Setting	Output Indicator and Special Connections	Adjust as Follows (very carefully)
1	Thru .01 cond. to 2nd IF grid (Pin #1 of 2nd IF)	10.7 MC unmodulated.	Tuning gang wide open	Connect 3300 ohm carbon resistors across secondaries of both FM-IF transformers. Connect VTVM (DC probe) from point "W" to ground. (See Fig. 11.)	"A" (ratio detector primary) for maximum reading on VTVM.
2	Thru .01 cond. to 1st IF grid (Pin #1 of 6BA6 1st IF)	"	"	" "	Iron cores "B" and "C" (2nd IF trans.) for maximum reading on VTVM.
3	To pin # 1 of 6BA6 2nd R.F. amplifier**	"	"	If not enough IF signal comes thru during this step, ground pin #5 on the 6SB7-Y. Leave generator set at 10.7 MC until step 4c.	Iron cores "D" and "E" for maximum on VTVM. Re-adjust A, B, C, D, E, for maximum. (Keep reducing generator output to keep VTVM at 1.5 volts).
4	"			a. Remove 3300 ohm resistors from IF transformers. b. Reduce output of signal generator until VTVM reads exactly +1.5 volts DC. c. Tune generator frequency above 10.7 MC until VTVM reads exactly +1.0 volt. Note exact generator frequency. Extreme care in reading this is essential. d. Tune generator frequency below 10.7 MC until VTVM reads exactly +1.0 volt. Note exact generator frequency. Extreme care in reading this is essential. e. Add generator frequency in step c to generator frequency in step d and divide by 2. The result is the center frequency of the IF curve to be used in step 5. See example on next page. f. Tune generator frequency above and below 10.7 MC and note voltage reading on VTVM at different frequency points until you have a good impression of the shape of the selectivity curve. If you have two peaks as in Figures 9 or 10, note readings (voltage) of both peaks. If one peak is over 20% higher than the other one, it will be necessary to realign IF's. A selectivity curve that would require realignment is illustrated by Figure 10.	
5	"	Center of IF selectivity curve per step 4e above. See "EXAM- PLE" on next page.	Set pointer to upper limit on dial.	Connect VTVM (DC probe) from point "X" to ground. (See Fig. 11.)	Iron core "F" (ratio detector secondary) for zero voltage reading on VTVM. (The correct zero point is located between a positive and a negative maximum.)

If any adjustments were very far off, it is desirable to repeat steps 3, 4 and 5.

**Do not feed I.F. signal into converter grid as this will cause mis-alignment.

SETTING SIGNAL GENERATOR TO CENTER OF I.F. SELECTIVITY CURVE

CAUTION: Due to the difficulty of setting a signal generator to the accuracy required by this operation, extreme care must be exercised in making each setting. Otherwise, improper alignment of the ratio detector and consequent audio distortion will result.

EXAMPLE: (See Figures 5 and 6)

Voltage reading in Step 4b is + 1.5 volts.

Generator frequency on low side of 10.7 MC for a reading of + 1 volt DC = 10.640 MC.

Generator frequency on high side of 10.7 MC for a reading of + 1 volt DC = 10.800 MC.

Center frequency is obtained by adding 10.640 and 10.800, then dividing by 2. For these readings it will be 10.72 MC.

Set generator frequency to 10.72 MC as this is center of selectivity curve as shown in Figure 6.

Note: Numerical vernier dial readings may be used instead of MC.

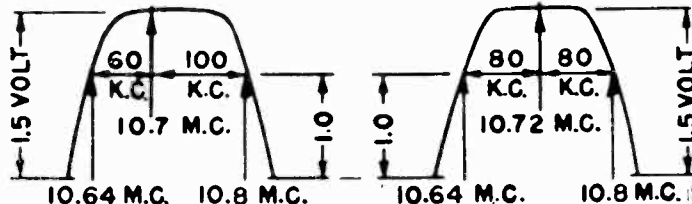


Fig. 5

Fig. 6

TYPICAL SELECTIVITY CURVES

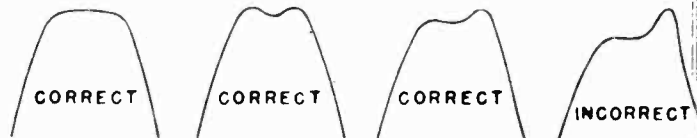


Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

FM RF ALIGNMENT PROCEDURE

	Connect Signal Generator	Generator Frequency	Receiver Dial Setting	Output Indicator and Connections	Adjust as Follows
6	Thru 250 ohms to FM ant. terminal.	109 MC† (unmodulated).	Tuning gang wide open	Connect VTVM (DC probe) from point "W" to ground.	*G for maximum VTVM reading.
7	"	104 MC† (unmodulated).	104 MC	"	*Tune in generator signal on receiver. Adjust H and I for max. VTVM reading.

* It is advisable to adjust generator output so VTVM readings do not exceed approximately + 1.5 V. DC after peaking.
 † If your signal generator does not reach this frequency, use harmonics as described in "FM Alignment"

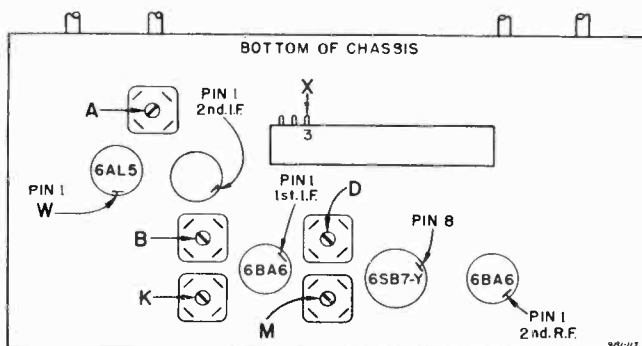


Fig. 11. Bottom Trimmer Location

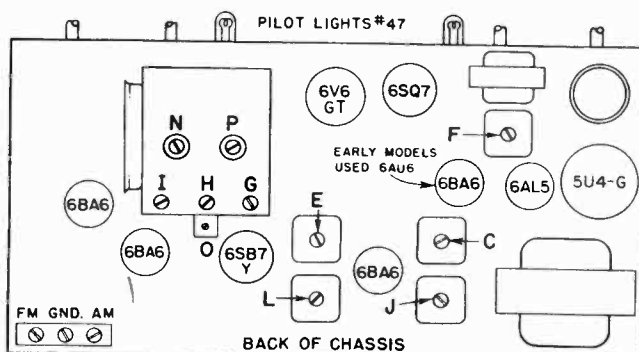


Fig. 12. Top Trimmer Location

AM ALIGNMENT PROCEDURE

- Use regular output meter connected across voice coil.
- Be sure both the set and the signal generator are thoroughly warmed up before starting alignment.
- Turn receiver Volume Control full on.
- Use lowest output setting of signal generator that gives a satisfactory reading on meter.

	Connect Signal Generator	Dummy Antenna Between Radio and Signal Generator	Signal Generator Frequency	Receiver Dial Setting	Adj. Trimmers in Following Order to Max.
Set Band Switch to Broadcast Position (center) and be sure to follow instructions under heading "Important Preliminary Alignment Steps." Loop antenna can be disconnected from chassis in Steps 1, 2 and 3.					
1	6SB7-Y (Pin #8)	.1 MFD	455 KC	Tuning gang wide open	J, K, L, M
2	To loop ant. terminal	Direct connection	1620 KC	Tuning gang wide open	N
3	To loop ant. terminal	Direct connection	1400 KC	Tune in signal	O
Set Receiver Chassis on table next to back of cabinet. Connect Loop Antenna to Receiver.					
4	To loop ant. terminal	10 MMFD (Or wrap several turns of generator lead around white loop lead.)	1400 KC	Tune in signal	P

RESISTORS

Symbol	Description	Part No.
R1	10 Ohms, 1/4 Watt	60B 27-100
R2	100 Ohms, 1/2 Watt, 10%	60B 8-101
R3	6,800 Ohms, 2 Watt	60B 21-682
R4	470,000 Ohms, 1/4 Watt	60B 3-474
R5	27,000 Ohms, 1 Watt, 10%	60B 14-273
R6	2,200 Ohms, 1/4 Watt	60B 3-222
R7	2.2 Megohms, 1/4 Watt	60B 27-225
R8	56,000 Ohms, 1/4 Watt, 10%	60B 2-563
R9	22,000 Ohms, 1/2 Watt	60B 3-223
R10	15,000 Ohms, 2 Watt	60B 21-153
R11	470,000 Ohms, 1/4 Watt	60B 3-474
R12	27,000 Ohms, 1 Watt, 10%	60B 14-273
R13	220,000 Ohms, 1/4 Watt	60B 3-224
R14	2,200 Ohms, 1/4 Watt	60B 3-222
R15	390 Ohms, 1/4 Watt, 10%	60B 2-391
R16	6,800 Ohms, 1/4 Watt, 5%	60B 1-682
R17	6,800 Ohms, 1/4 Watt, 5%	60B 1-682
R18	27,000 Ohms, 1/4 Watt	60B 3-273
R19	470,000 Ohms, 1/4 Watt	60B 3-474
R20	100,000 Ohms, 1/4 Watt, 10%	60B 2-104
R21	120,000 Ohms, 1/4 Watt, 10%	60B 2-124
R22	100,000 Ohms, 1/4 Watt, 10%	60B 2-104
R23	47,000 Ohms, 1/4 Watt	60B 3-473
R24	1 Megohm Volume Control (Tapped at 1/2 Megohm. Includes Switch SW2)	75B 2-9
R25	4.7 Megohms, 1/4 Watt	60B 3-475
R26	2 Megohms Tone Control	75B 1-23
R27	470,000 Ohms, 1/4 Watt	60B 3-474
R28	47,000 Ohms, 1/4 Watt	60B 3-473
R29	470,000 Ohms, 1/4 Watt	60B 3-474
R30	390 Ohms, 1 Watt, 10%	60B 14-391
R31	27,000 Ohms, 1 Watt, 10%	60B 14-273

See article on early models at right of schematic—

CONDENSERS

Symbol	Description	Part No.
C1	.001 mfd. min., Ceramic	65B 6-41
C2	.001 mfd. min., Ceramic	65B 6-41
C3	22 mfd., ±2%, Zero Temp. Coeff. Ceramic	65B 6-30
C4a	387.7 mfd. (max.) Antenna Section Osc. Section	Gang Cond. 68B 17
C4b	126 mfd. (max.)	65B 6-4
C5	50 mfd., Ceramic	65B 6-4
C6	.05 mfd., 400 Volts, Paper	64B 1-22
C7	.005 mfd. min., Ceramic (Disc)	65A 10-1
C8	17 mfd., ±2%, Zero Temp. Coeff. Ceramic	65B 6-42
C9	955 mfd., ±3%, Mica	65B 1-51
C10	1 mfd., 400 Volts, Paper	64B 1-20
C11	50 mfd., Ceramic	65B 6-4

Symbol	Description	Part No.
C12	50 mfd., Ceramic	65B 6-4
C13	45 mfd., ±2%, —00015 Temp Coeff. Ceramic	65B 6-32
C14	180 mfd., ±3%, Mica	65B 1-29
C15	.001 mfd. min., Ceramic	65B 6-41
C16	.005 mfd. min., Ceramic (Disc)	65A 10-1
C17	.005 mfd. min., Ceramic (Disc)	65A 10-1
C18	.001 mfd. min., Ceramic	65B 6-41
C19	.005 mfd. min., Ceramic (Disc)	65A 10-1
C20	.005 mfd. min., Ceramic (Disc)	65A 10-1
C21	100 mfd., Ceramic	65B 6-3
C22	.005 mfd. min., Ceramic (Disc)	65A 10-1
C23	100 mfd., 5%, Ceramic	65B 6-7
C24	100 mfd., 5%, Ceramic	65B 6-7
C25	4 mfd., 150 Volts, Electrolytic	67A 4-2
C26	.002 mfd., 600 Volts, Paper	64B 1-14
C27	100 mfd., Ceramic	65B 6-3
C28a	30 mfd., 350 Volts	Elect. 67C 7-10
C28b	30 mfd., 350 Volts	
C28c	10 mfd., 350 Volts	Elect. 64B 1-20
C28d	20 mfd., 25 Volts	
C30	.005 mfd. min., Ceramic (Disc)	65A 10-1
C31	2 mfd., 200 Volts, Paper	64B 1-29
C32	.001 mfd. min., Ceramic	65B 6-41
C33	.005 mfd., 600 Volts, Paper	64B 1-12
C34	.01 mfd., 400 Volts, Paper	64B 1-25
C35	.01 mfd., 400 Volts, Paper	64B 1-25
C36	.005 mfd., 600 Volts, Paper	64B 1-12
C37	50 mfd., Ceramic	65B 6-4
C38	.005 mfd., 600 Volts, Paper	64B 1-12
C39	1 mfd., 400 Volts, Paper	64B 1-20
C40	.005 mfd., 600 Volts, Paper	64B 1-12

See article on early models at right of schematic—

TRANSFORMERS, COILS, ETC.

T1	Transformer, 1st I.F. (F.M.)	72B 37
T2	Transformer, 2nd I.F. (F.M.)	72B 38
T3	Transformer, Discriminator	72B 39
T4	Transformer, 1st I.F. (A.M.)	72B 48
T5	Transformer, 2nd I.F. (A.M.)	72B 49
T6	Transformer, Power	80B 9
T7	Transformer, Output	79A 9
L1	Speaker 12" P.M. Dynamic	78B 35
L2	Loop Antenna—A.M.	95A 18-2
L3	Coil, Loop Loading—A.M.	69A 45
L4	Antenna F.M.—Folded Dipole	AB128
L5	F.M. Coupling Coil	AB103-33
L6	Cathode Choke	AB103-35
L7	Coil, 1st R.F.—F.M.	69A 46
L8	Coil, R.F.—A.M.	A1475
L9	Coil, 2nd R.F.—F.M.	71C 1-2
L10	Coil, Oscillator—F.M.	69A 47
L11	Coil, used in L6, L8, L9	69A 48
L12	Coil, Oscillator—A.M.	71C 1-25
L13	Coil, Oscillator plate F.M.	69A 42
L14	Choke, Oscillator plate F.M.	73A 1

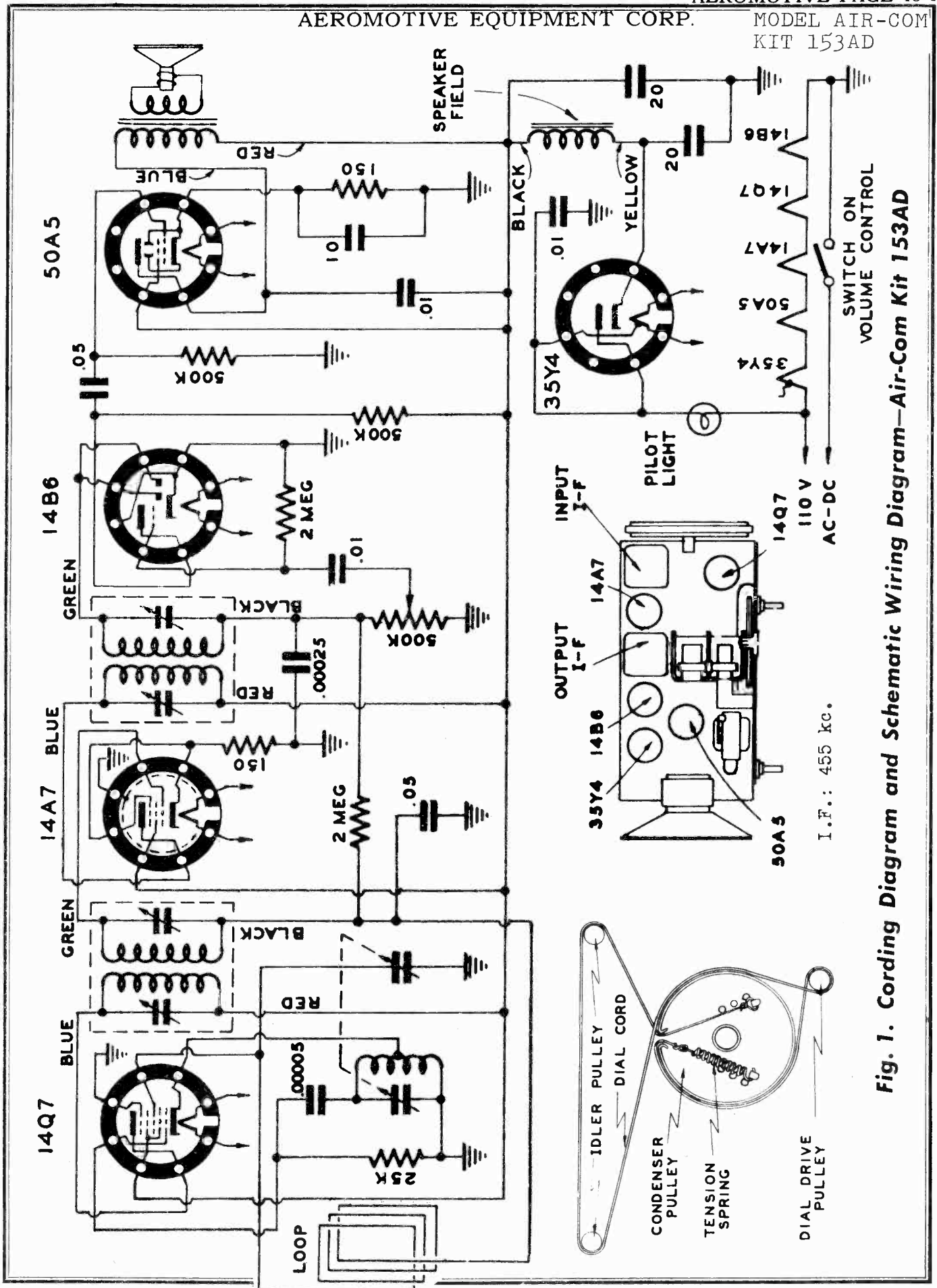
Symbol	Description	Part No.
L12	Choke, Filter	74A 13
L13	Choke, R.F.	73A 1
SW1	Switch, Band (FM, AM, Phono)	77B 14
SW2	Switch, Power	(see record change)
SW3	Switch, Phono Motor (manuals)	(see record change)

DIAL PARTS

Description	Part No.
Bracket, Dial Background Mounting	15B 274
Dial Bulb, #47	81A 1-8
Dial Bulb Socket (with leads)	82A 8-7
Dial Cord (36")	50A 1-3
Dial Pointer	A1487
Dial Scale and Indicator Assembly	A1506
Drum and Hub Assembly (Pointer Shaft)	A1504
Dial Escutcheon and Window (less rectangular insert)	23E 20-1 23C 25-1
Escutcheon Insert	A1508
Indicator Arm and Hub (on Band Switch Shaft)	15A 176
Indicator Link	A1493
Lever Arm (band switch drive)	28A 19-1
Pointer Shaft	A1496
Pulley Bracket Assembly	28B 21-3
Shaft, Band Switch	13A 1-4-47
Snap Button (used with Indicator Link)	12A 5-8
Sponge Rubber (inside edge of dial scale)	18A 14
Spring, Band Switch Shaft	19B 1-7
Spring, Dial Cord	19A 2-2-0
Spring, Hair Pin (for Pointer Shaft)	4A 6-11-0
Spring Washer (for Pointer Shaft)	4A 4-6-0
Washer ("C" used with Band Switch)	4A 4-6-0

TUNER PARTS

Description	Part No.
Ball Bearing (2 used with top plate)	30A 1-1
Damping Bar	32A 69
Drum and Cam Assembly	A1502
Grammet, Osc. Coil (L9) Mounting	12A 1-15
Grammet, R.F. & Antenna Coil (L6 and L8) Mounting	12A 1-14
Grammet, R.F. Coil (L7) Mounting	12A 1-12
Insulator, Mounting Plate (for AM-RF coil slug adjusting Screw)	32A 50
Insulator, Mounting Plate (for FM coils)	32A 52
Insulator, Mounting Plate (for FM slug adjusting screws)	32A 51
Screw, Slug Adjusting	27A 4
Slug Drive (top plate) Assembly	A1503
Spring, Slug Drive Plate Tension	19B 1-13
Spring Washer (for Tuning Shaft)	4A 5-3-0
Tuning Shaft	28A 1-6
Washer ("C" for Tuning Shaft)	4A 4-6-0



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Fig. 1. Cording Diagram and Schematic Wiring Diagram—Air-Com Kit 153AD

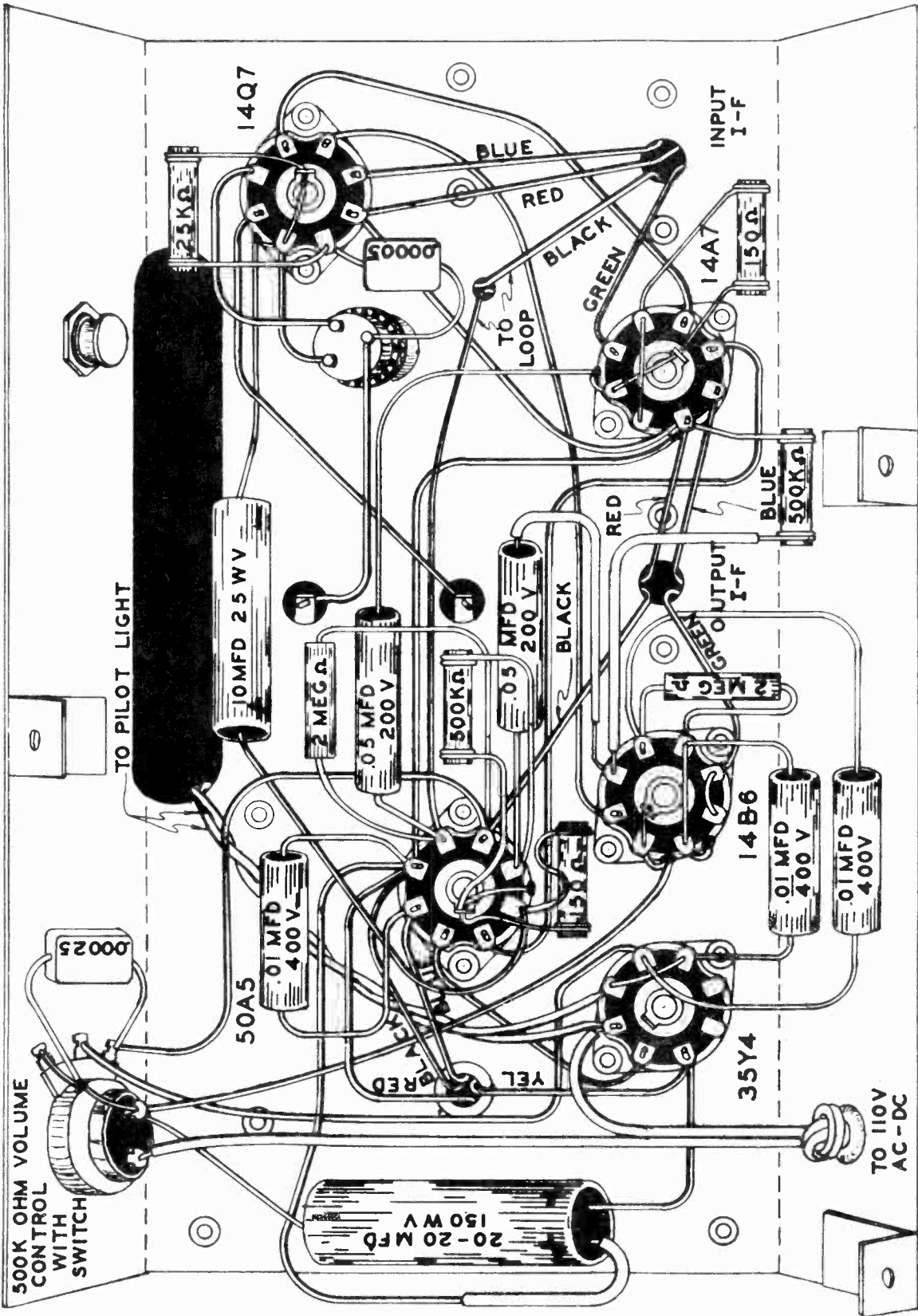
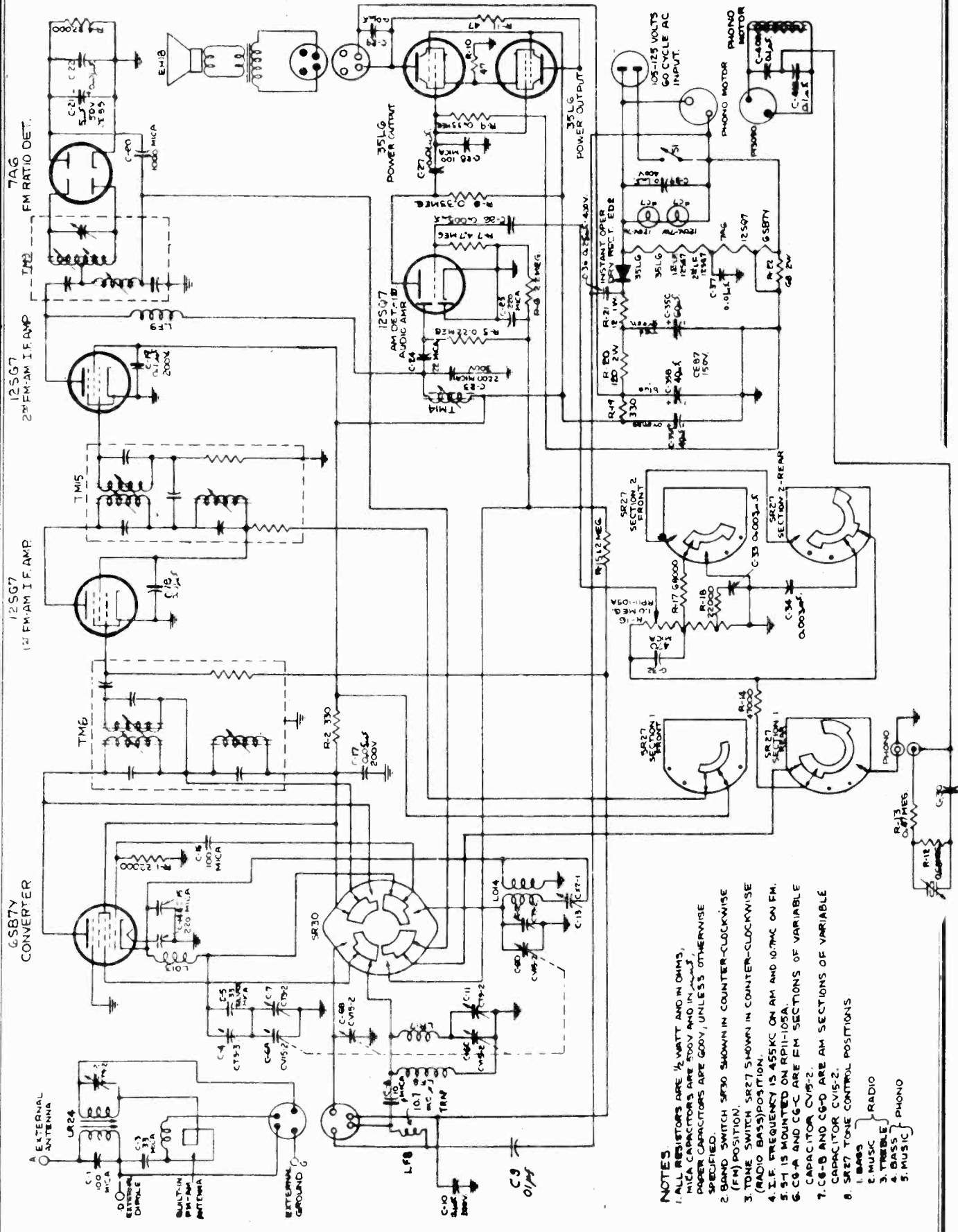


Fig. 2. Pictorial Wiring Diagram—Air-Com Kit 153AD



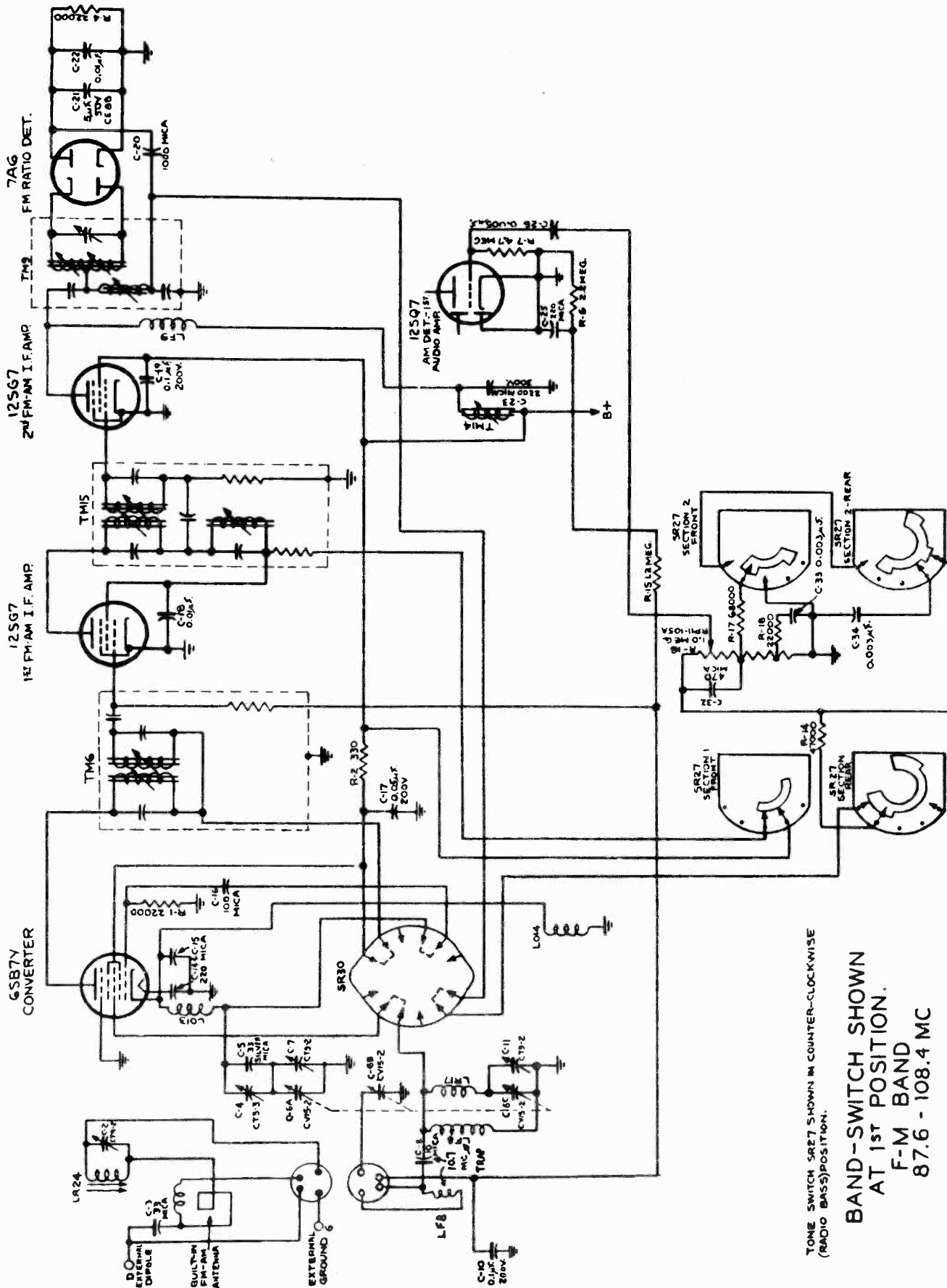
- NOTES**
1. ALL RESISTORS ARE 1/2 WATT AND IN OHMS, MICA CAPACITORS ARE 200V AND IN μμF, PAPER CAPACITORS ARE 500V, UNLESS OTHERWISE SPECIFIED.
 2. BAND SWITCH SR27 SHOWN IN COUNTER-CLOCKWISE (FM) POSITION.
 3. TONE SWITCH SR27 SHOWN IN COUNTER-CLOCKWISE (RADIO BASS) POSITION.
 4. I.F. FREQUENCY IS 455KC ON AM AND 10.7MC ON FM.
 5. I.F. IS MOUNTED ON RP11-105A.
 6. C6-A AND C6-C ARE FM SECTIONS OF VARIABLE CAPACITOR CV15-2.
 7. C6-B AND C6-D ARE AM SECTIONS OF VARIABLE CAPACITOR CV15-2.
 8. SR27 TONE CONTROL POSITIONS:
 - 1. BASS
 - 2. MUSIC
 - 3. TREBLE
 - 4. BASS
 - 5. MUSIC

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Crescent Model C-250, RCD.CH. 18-1
V-M Model 800, RCD.CH. 17-1

CLARI - SKEMATIX

Registered Trademark



TONE SWITCH SR27 SHOWN IN COUNTER-CLOCKWISE (RADIO BAND) POSITION.

**BAND-SWITCH SHOWN AT 1st POSITION.
F-M BAND
87.6 - 108.4 MC**

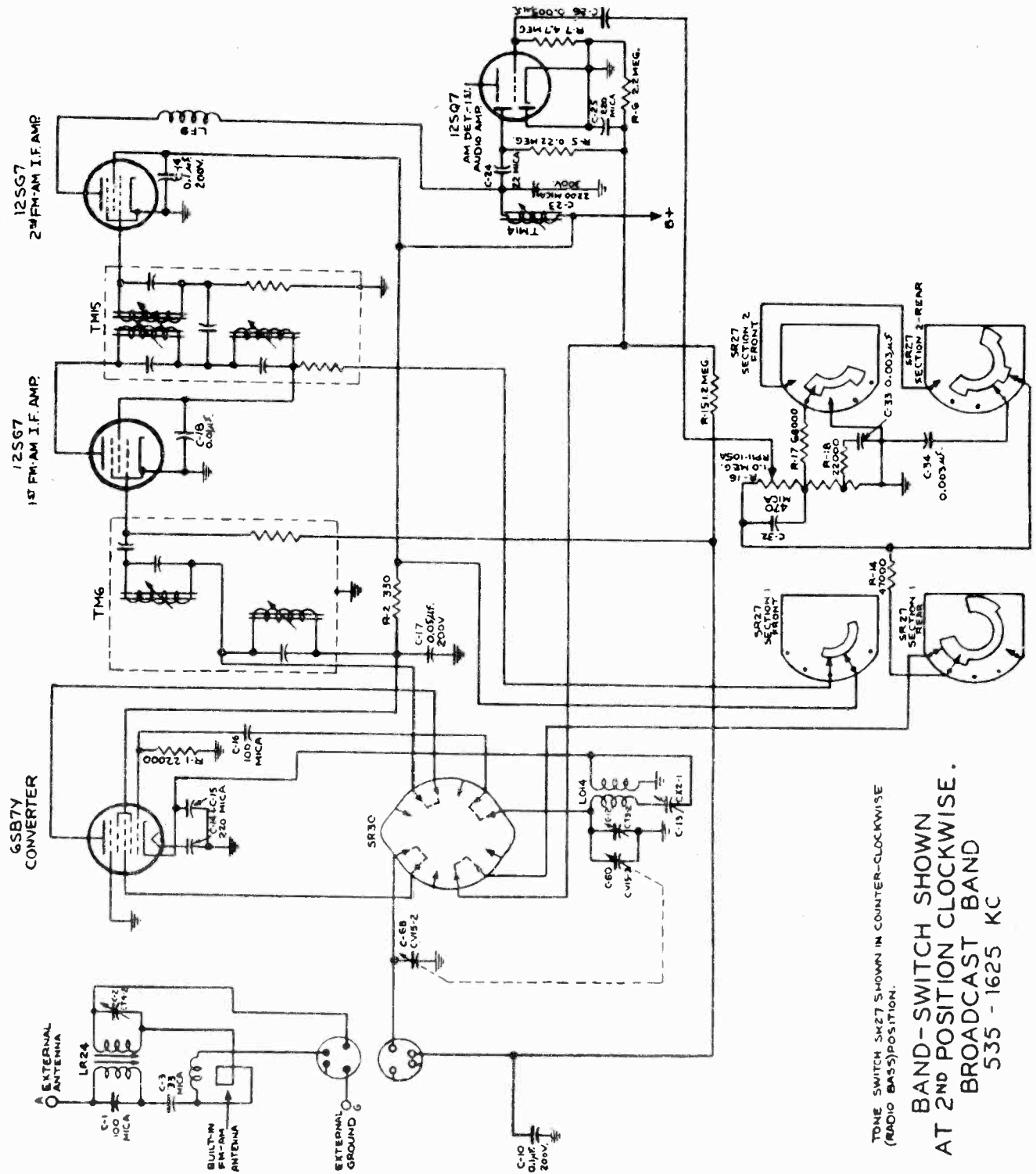
CLARI-SKEMATIX

Registered Trademark

AFF RET PAGE 18-3

AFFILIATED RETAILERS, INC.

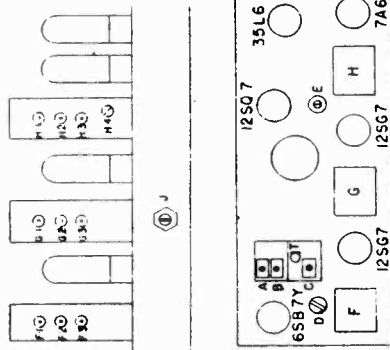
MODEL R-727



TONE SWITCH SK27 SHOWN IN COUNTER-CLOCKWISE (RADIO BASS) POSITION.
 BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE.
 BROADCAST BAND
 535 - 1625 KC

ALIGNMENT PROCEDURE:

Dummy Antenna	Signal Generator Connection	Signal Generator Frequency	Band Switch Position	Radio Dial Setting	Adjust	Remarks
0.01 MFD	Terminal T	455 KC AM	Broadcast	1625 KC	E G-1 F-1	Adjust for maximum output Repeat for fine adjustment
0.01 MFD	Pin 4 of 12SG7 2nd FM-AM IF with FM Signal Gen.	10.7 MC FM	FM	108 MC	H-2	Adjust for maximum output (Broad adjustment)
0.01 MFD	"	10.7 MC FM	FM	108 MC	H-4	Adjust for maximum output
0.01 MFD	"	10.7 MC AM	FM	108 MC	H-1 or H-3	Adjust whichever is required for minimum output
						Repeat last two steps for fine adjustment until settings for maximum FM output coincide with settings for minimum AM output.
	Pin 8 of 6SB7Y Converter	10.7 MC FM	FM	108 MC	G-3 — G-2	Adjust for maximum output
		"	FM	108 MC	F-3 — F-2	Adjust for maximum output
			Broadcast	535 KC	Pointer	Repeat last two steps for fine adjustment
	"A" Post on Cabinet	600 KC AM	"	600 KC	J and Core on Ant. Coil in Cab.	Adjust pointer to reference mark
	"	1550 KC AM	"	1550 KC	B and trimmer on Ant. Coil	Adjust for maximum output
300 OHM Resistor	"	92 MC FM	FM	92 MC	D	Adjust for maximum output
"	"	106 MC FM	FM	106 MC	A and C	Adjust for maximum output



Alignment: No attempt should be made to realign this receiver until it has been determined that a poor tube or some local condition is not responsible for faulty reception. The following is a list of the minimum equipment necessary to realign this receiver.

In the following alignment procedure the high side of the signal generator is connected to the terminal indicated in the "Signal Generator Coupling" column below. The ground side of the signal generator is connected directly to the chassis. The output meter should be connected across the voice coil of the speaker for all measurements.

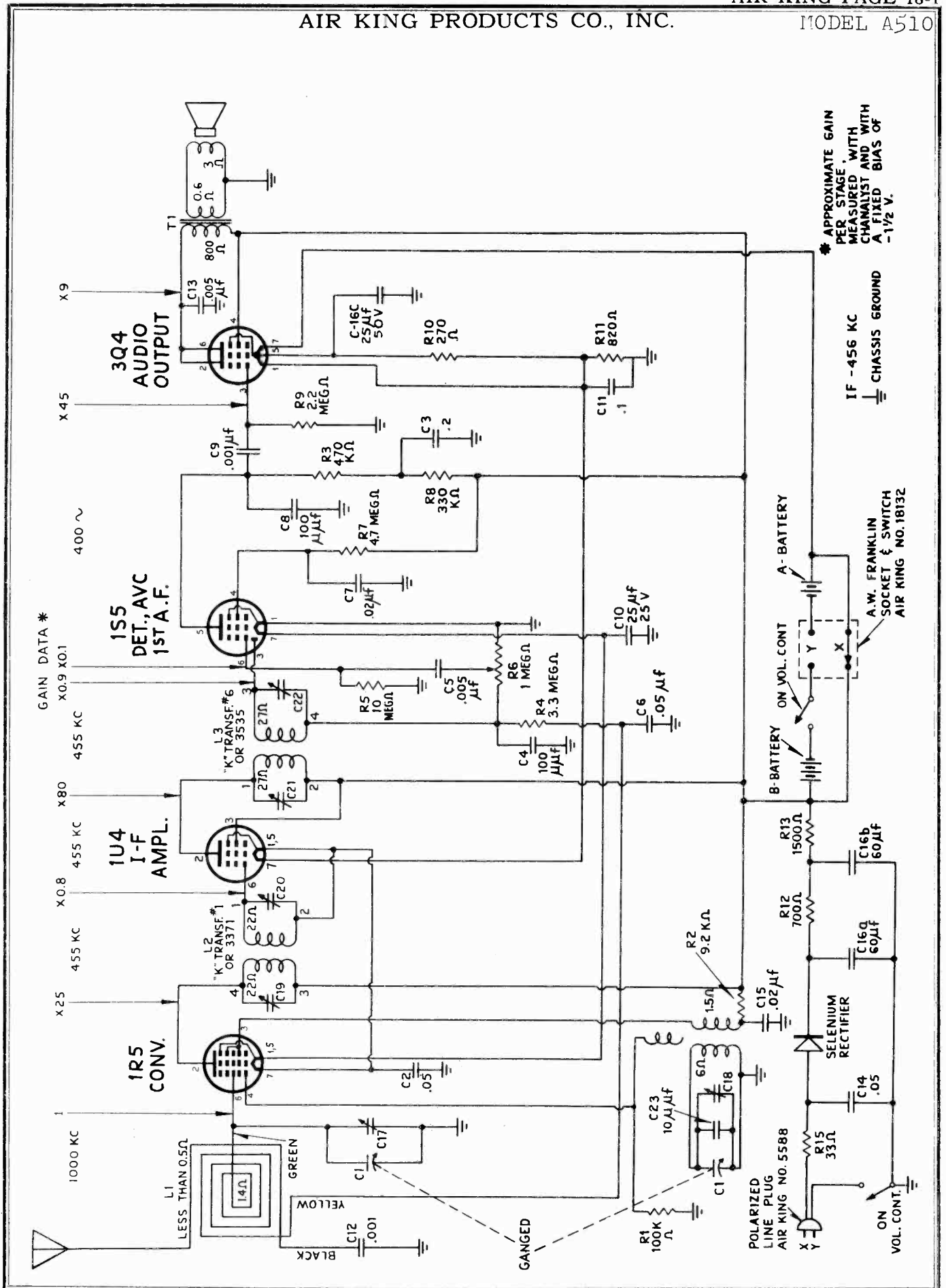
1—AM signal generator covering 455 KC, 600 KC, 1550 KC and 10.7 MC

2—FM signal generator covering 10.7 MC, 92 MC and 106 MC

3—Output meter, rectifier type, approximately 0 to 2 volts RMS

In adjusting the radio frequency trimmers and padders it is advisable to "rock" the variable capacitor gang slightly across the signal being delivered by the signal generator until that particular signal has been accurately peaked.

4—Dummy antennas
 100MMFD Mica Capacitor
 300 Ohm Resistor
 0.01 MFD Capacitor



MODEL A510

AIR KING PRODUCTS CO., INC.

TUBE	PIN	VTVM	20,000 OHM/V	1,000 OHM/V	RESISTANCE
1RS CONVERTER	1	1.3	1.3	1.3	14 OHM
	2	84	84	84	1.6K
	3	60	60	60	9.5K
	4				
	550KC	-12	-5	-1.3	95K
	1600KC	-17	-7	-2.5	95K
	5	1.3	1.3	1.3	14 OHM
1U4 IF AMP	6	-0.2	0	0	4.4 MEG.
	7	3.3	3.3	3.3	24 OHM
	1	3.3	3.3	3.3	24 OHM
	2	84	84	84	1.6K
	3	84	84	84	1.6K
	4	84	84	84	1.6K
	5	3.3	3.3	3.3	24 OHM
1S5 DET A.V.C. 1st AF	6	3.3	3.3	3.3	48 OHM
	7	4.8	4.8	4.8	34 OHM
	1	0	0	0	0
	2	60	60	60	350K
	3	0.4	-0.2	0	850K
	4	20	16	2	4.4 MEG
	5	25	22	7	800K
3Q4 AUDIO OUTPUT	6	-0.2	0	0	10 MEG
	7	1.7	1.7	1.7	14 OHM
	1	4.8	4.8	4.8	34 OHM
	2	84	84	84	2.2K
	3	0	0	0	1.7 MEG
	4	86	86	86	150 OHM
	5	6.2	6.2	6.2	44 OHM
SELENIUM RECTIFIER	6	84	84	84	2.2K
	7	7.8	7.8	7.8	55 OHM
	K	130	130	130	2.2K

ALL VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO CHASSIS GROUND, AND WITH A LINE VOLTAGE OF 116 V.A.C.

IF ALIGNMENT

CONNECT AN OUTPUT METER ACROSS THE VOICE COIL. CONNECT THE SIGNAL GENERATOR TO THE STANDARD HAZELTINE LOOP MODEL 1150 AND COUPLE LOOSELY TO THE RECEIVER LOOP.

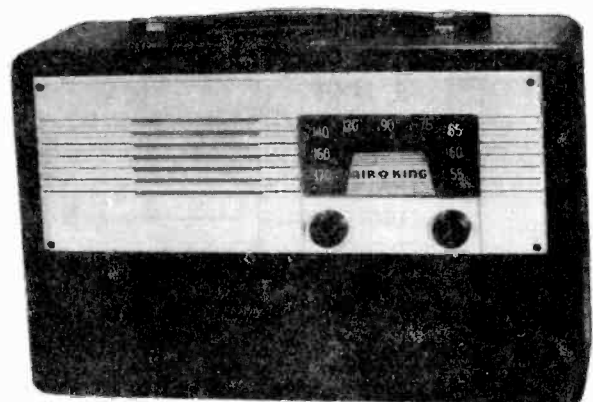
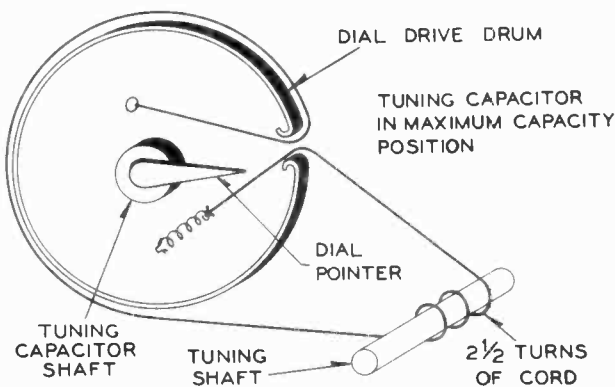
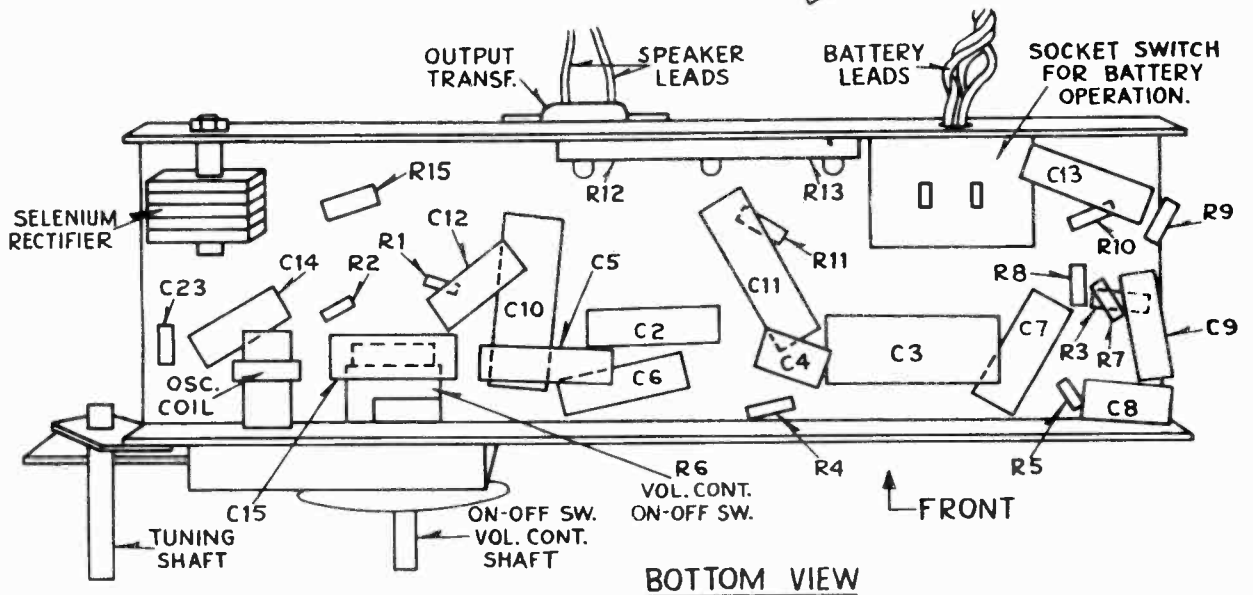
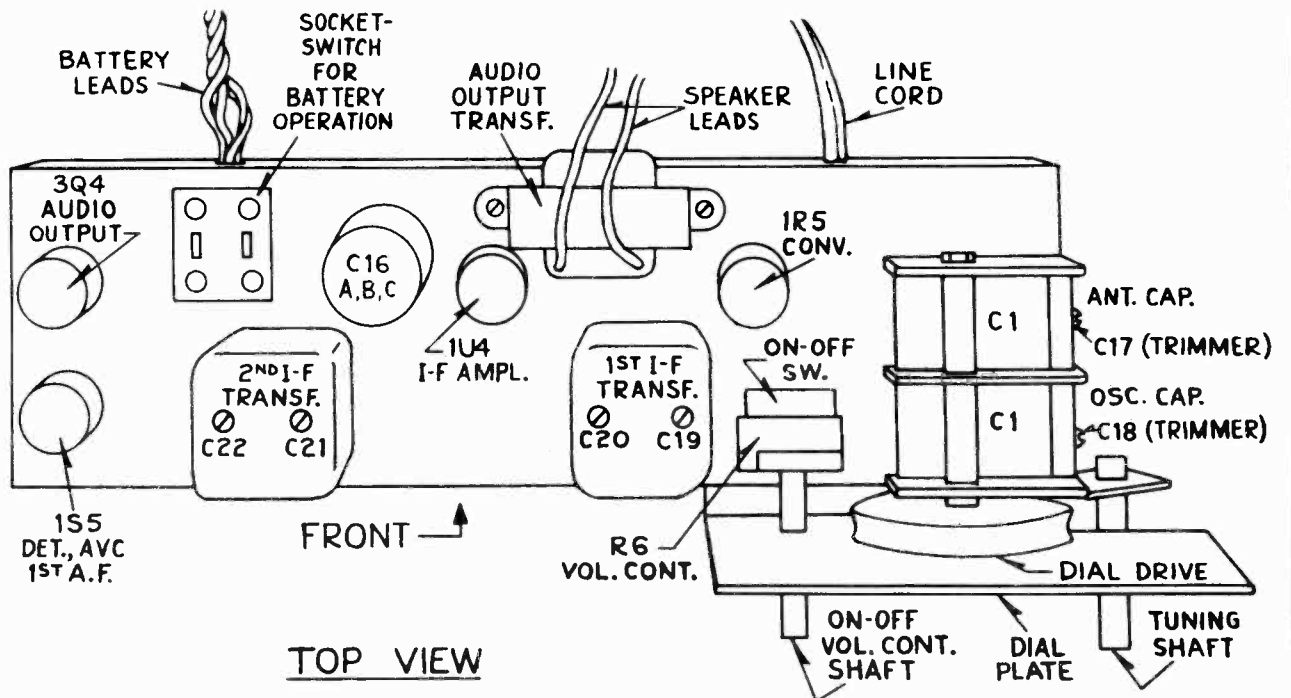
SET THE SIGNAL GENERATOR TO 455KC AND FULLY MESH THE RECEIVER TUNING CAPACITOR.

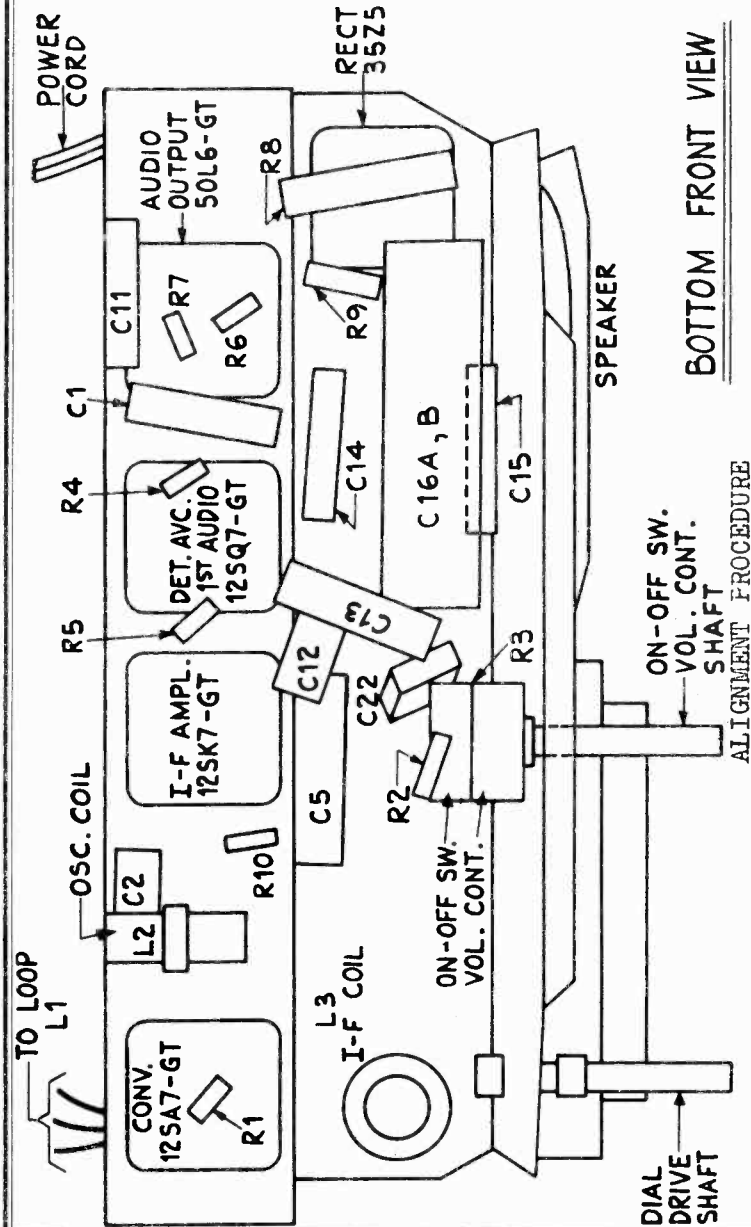
KEEP THE RECEIVER VOLUME CONTROL AT MAX. AND THE OUTPUT OF THE SIGNAL GENERATOR SUFFICIENT TO GIVE A READABLE DEFLECTION ON THE OUTPUT METER. ADJUST IF TRIMMERS C22, C21, C20, C19 FOR MAX.

RF OSC. ALIGNMENT

KEEPING THE SAME SETUP AS USED FOR IF ALIGNMENT. SET THE SIGNAL GENERATOR FOR 1600KC AND ADJUST OSC. TRIMMER C18 FOR MAX. OUTPUT.

SET THE SIGNAL GENERATOR AND RECEIVER FOR 1400KC AND ADJUST ANTENNA TRIMMER C17 FOR MAX. OUTPUT.





IF ALIGNMENT

CONNECT OUTPUT METER ACROSS THE VOICE COIL. CONNECT THE SIGNAL GENERATOR TO THE STANDARD HAZELTINE LOOP MODEL 1150 AND COUPLE IT LOOSELY TO THE RECEIVER LOOP.

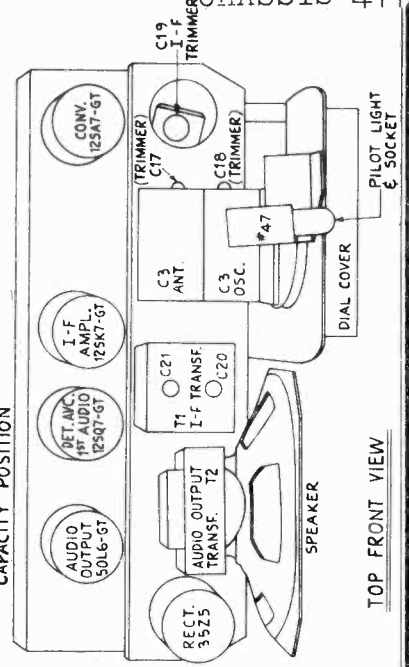
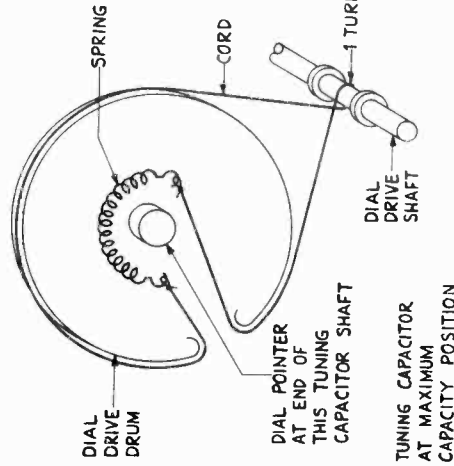
SET THE SIGNAL GENERATOR TO 455KC, AND FULLY MESH THE RECEIVER TUNING CAPACITOR.

KEEP THE RECEIVER VOLUME CONTROL AT MAX. AND THE OUTPUT OF THE SIGNAL GENERATOR SUFFICIENT TO GIVE A READABLE DEFLECTION ON THE OUTPUT METER. ADJUST FOR MAX. I.F. TRIMMERS C21, C20, C19.

RF ALIGNMENT

KEEPING THE SAME SETUP AS USED FOR THE IF ALIGNMENT, SET THE SIGNAL GENERATOR TO 1600 KC AND ADJUST FOR MAX. OSCILLATOR TRIMMER C18.

SET THE SIGNAL GENERATOR AND RECEIVER TO 1400 KC AND ADJUST ANTENNA TRIMMER C17 FOR MAX. OUTPUT.

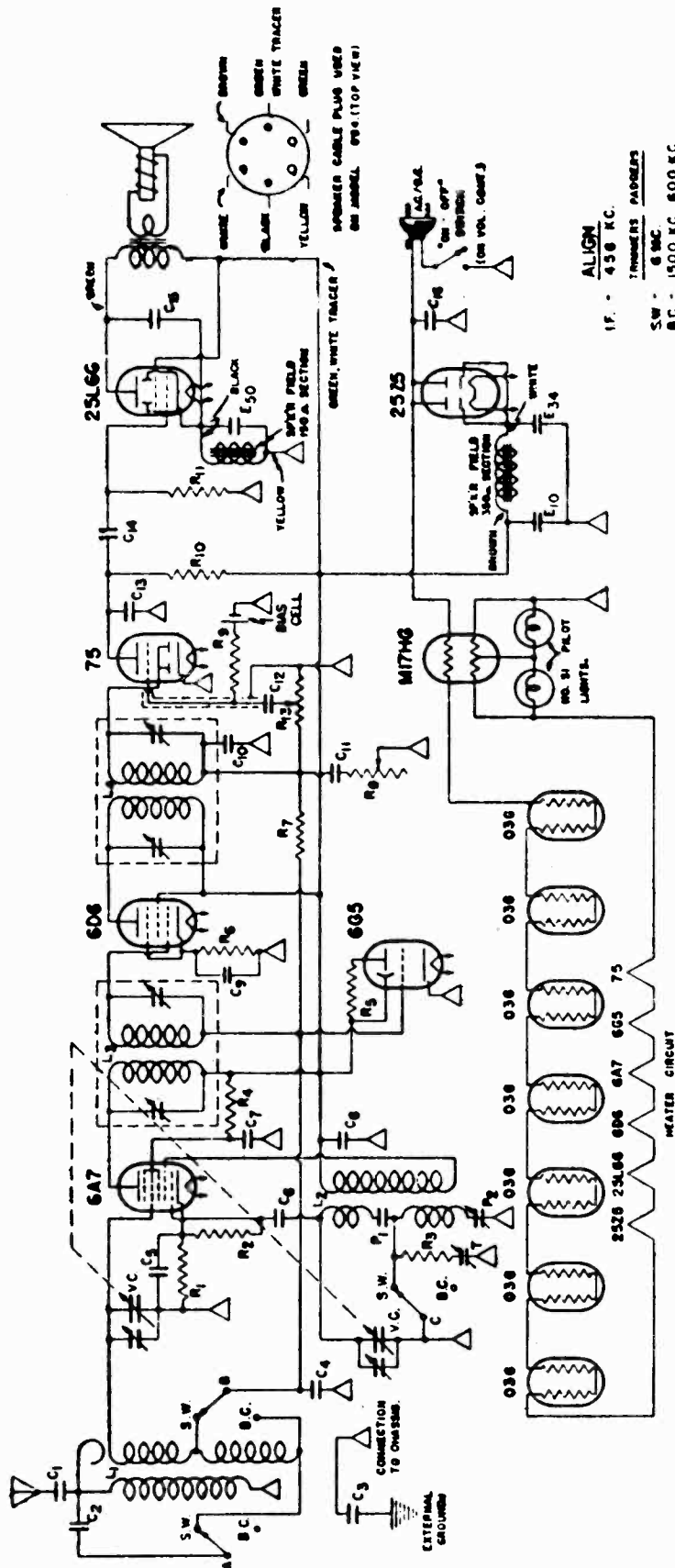


MODELS A511, A512,
CHASSIS 477

AIR KING PRODUCTS CO., INC.

TUBE	PIN	VTVM	20,000 OHM/V	1,000 OHM/V	RESISTANCE	
12SA7 CONV	1	0	0	0	0	
	2	AC	AC	AC	38 OHM	
	3	86	86	86	OVER 500K	
	4	86	86	86	OVER 500K	
	5	550KC	-4.8	-4.2	-0.3	20K
		1600KC	-5.2	-4.6	-0.3	20K
	6	0	0	0	0.5 OHM	
	7	AC	AC	AC	28 OHM	
	8	-1.5	-0.7	-0.3	2.4 MEG	
12SK7 IF AMPL	1	0	0	0	0	
	2	AC	AC	AC	28 OHM	
	3	0	0	0	0	
	4	-2.2	-1.2	-0.6	3.7 MEG	
	5	0	0	0	0	
	6	86	86	86	OVER 500K	
	7	AC	AC	AC	14 OHM	
	8	86	86	86	OVER 500K	
12SQ7 DET AVC 1st AUDIO	1	0	0	0	0	
	2	-1.2	-0.9	-0.6	4.4 MEG.	
	3	0	0	0	0	
	4	-1	-0.7	-0.4	470K	
	5	-1	-0.7	-0.4	470K	
	6	56	54	20	OVER 500K	
	7	AC	AC	AC	14 OHM	
	8	0	0	0	0	
50L6 AUDIO OUTPUT	1	0	0	0	0	
	2	AC	AC	AC	86 OHM	
	3	115	115	115	OVER 500K	
	4	86	86	86	OVER 500K	
	5	0	0	0	1.1 MEG.	
	6	0	0	0	INFINITE	
	7	AC	AC	AC	38 OHM	
	8	6	6	6	180 OHM	
35W4 RECT	1	--	--	--	--	
	2	AC	AC	AC	110 OHM	
	3	AC	AC	AC	110 OHM	
	4	--	--	--	--	
	5	AC	AC	AC	128 OHM	
	6	--	--	--	--	
	7	AC	AC	AC	86 OHM	
	8	120	120	120	OVER 500K	

ALL VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO CHASSIS GROUND
WITH A LINE VOLTAGE OF 116V AC.

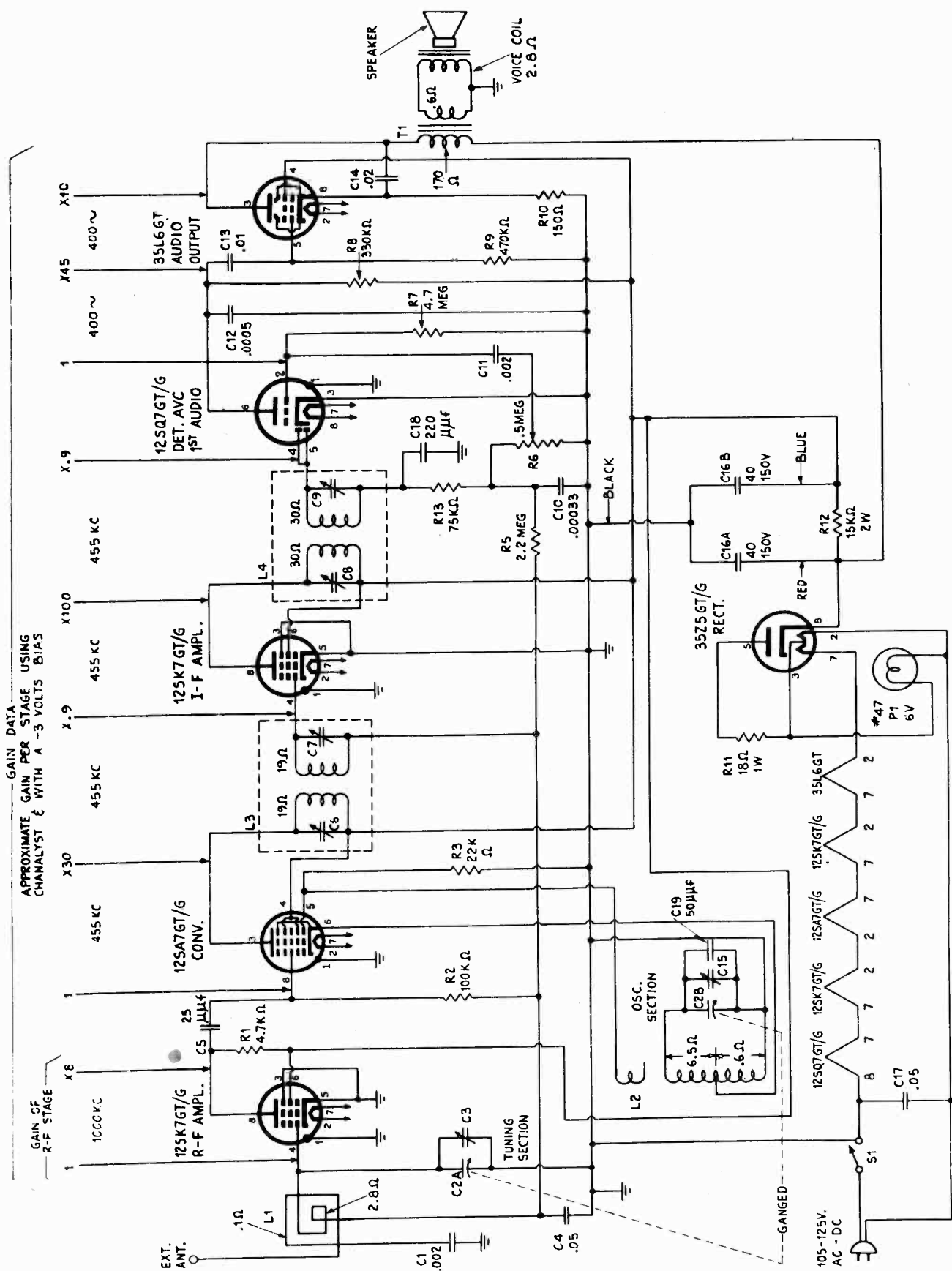


C1	005	400 V
C2	005	-
C3	05	-
C4	05	500 V
C5	05	-
C6	0001	MICA
C7	07	400 V
C8	05	200 V
C9	05	-
C10	00025	MICA
C11	005	400 V
C12	02	-
C13	00025	MICA
C14	02	400 V
C15	01	-
C16	05	-

- L1 - COMBINATION ANTENNA COIL
- L2 - COMBINATION OSCILLATOR COIL
- L3 - 456 K.C. INPUT I.F.
- L4 - 456 K.C. OUTPUT I.F.
- P1 - 1380 MMF MICA PADDER
- P2 - 500 MMF MAX PADDER
- E50 - 50 MFD 15 V.W.
- E10 - 10 - 150 -
- E34 - 34 - - -
- V.C. - 410 MMF MAX. VARIABLE COND
- T - 3-35 MMF TRIMMER

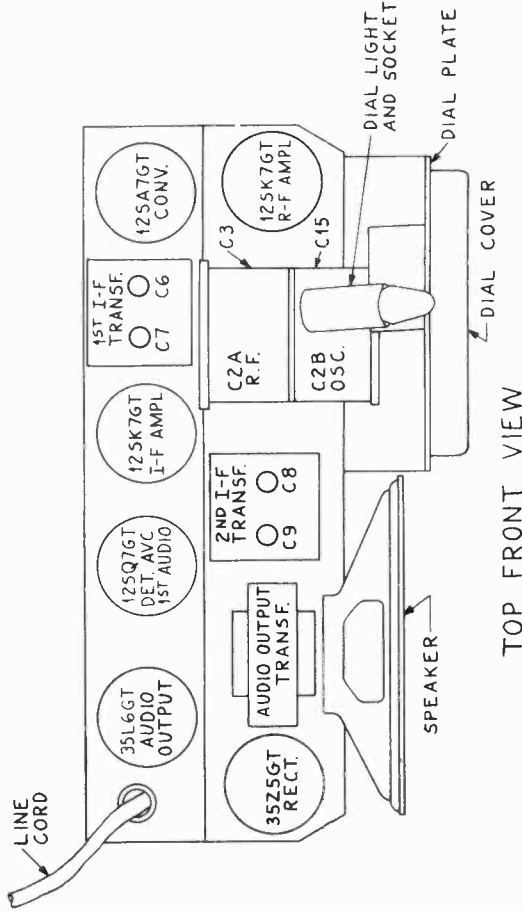
R1	250 OHM	1/4 WATT
R2	50,000	-
R3	85	-
R4	35,000	-
R5	1,000,000	-
R6	400	-
R7	3,000,000	-
R8	500,000	1/4 WATT
R9	750,000	1/4 WATT
R10	500,000	-
R11	500,000	-
R12	500,000	VCL. CONTROL

SWITCHES A,B,C, 3 POLE DOUBLE THROW WAVE BAND SWITCH.

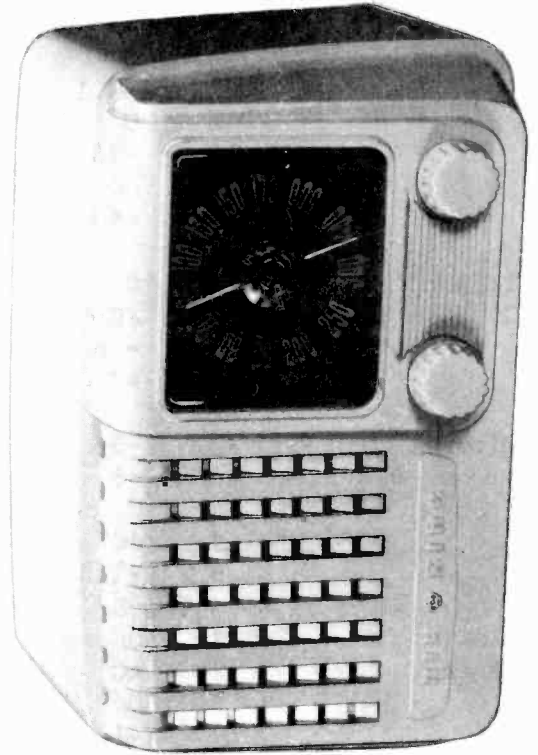


RF ALIGNMENT

KEEPING THE SAME SETUP AS USED FOR THE IF ALIGNMENT, SET THE SIGNAL GENERATOR AT 1600 KC AND ADJUST FOR MAXIMUM OSCILLATOR TRIMMER C15. SET THE SIGNAL GENERATOR AND RECEIVER FOR 1400 KC AND ADJUST ANTENNA TRIMMER C3 FOR MAXIMUM OUTPUT.

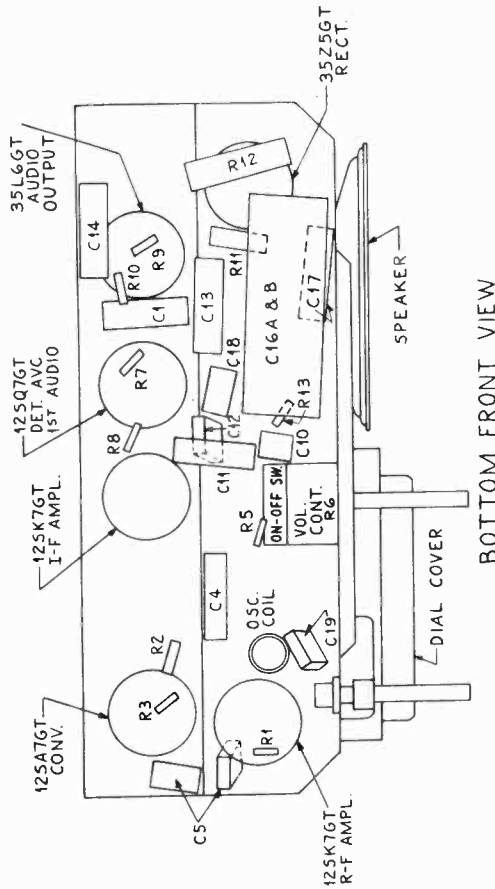


TOP FRONT VIEW

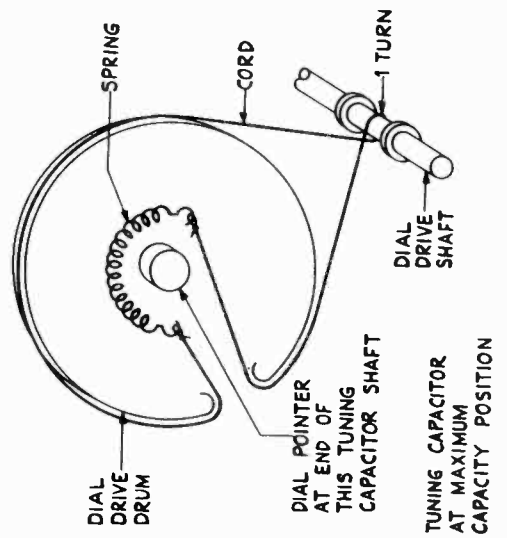


IF ALIGNMENT

CONNECT OUTPUT METER ACROSS THE VOICE COIL. CONNECT THE SIGNAL GENERATOR TO THE STANDARD HAZELTINE LOOP MODEL 1150 AND COUPLE IT LOOSELY TO THE RECEIVER LOOP. SET THE SIGNAL GENERATOR TO 455 KC AND FULLY MESH THE RECEIVER TUNING TRIMMER C3 FOR MAXIMUM OUTPUT. KEEP RECEIVER VOLUME CONTROL AT MAXIMUM AND THE OUTPUT OF THE SIGNAL GENERATOR SUFFICIENT TO GIVE A READABLE DEFLECTION ON THE OUTPUT METER. ADJUST FOR MAXIMUM IF TRIMMERS C9, C8, C7, C6.



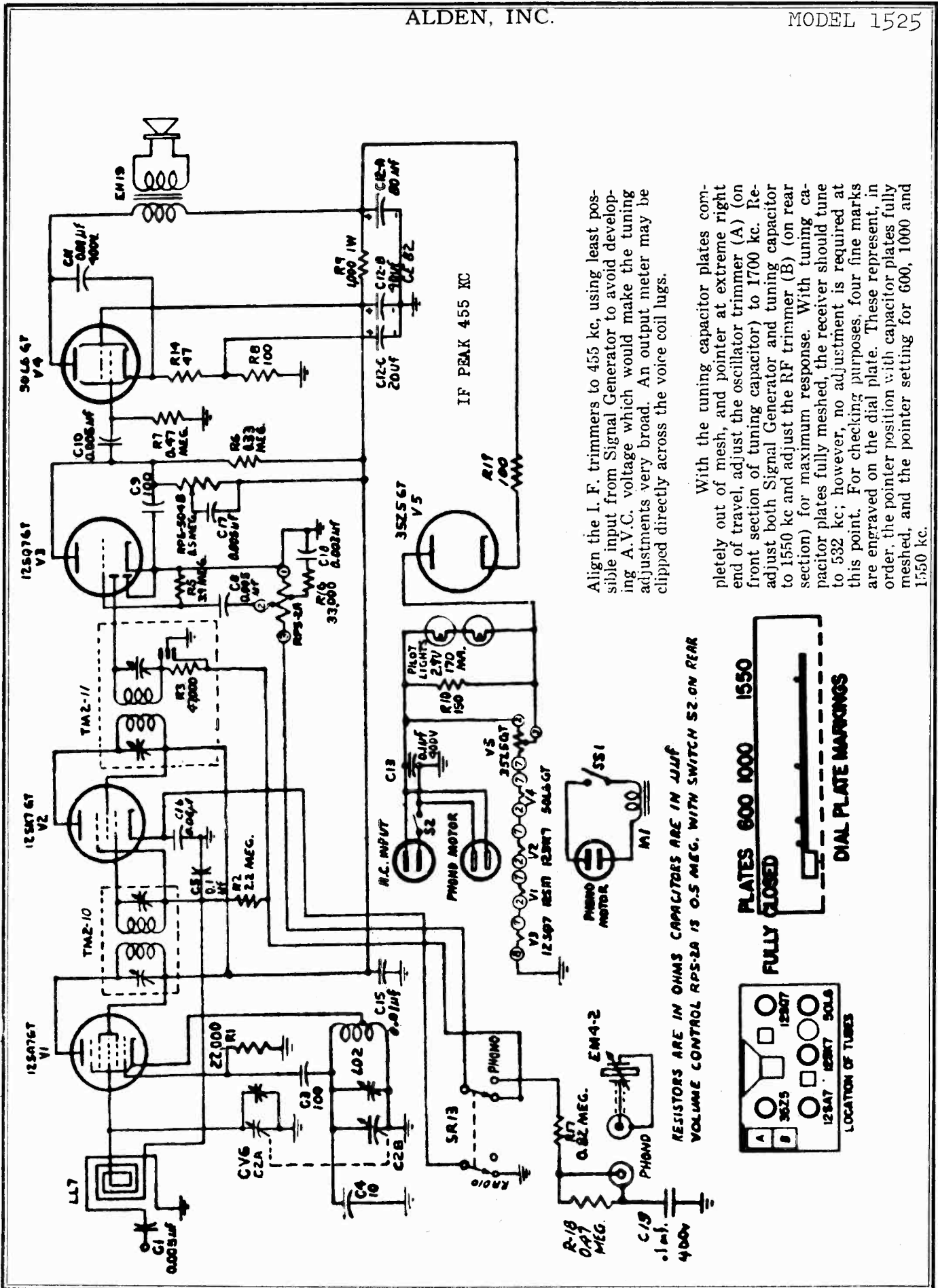
BOTTOM FRONT VIEW



MODEL 4706

AIR KING PRODUCTS CO., INC.

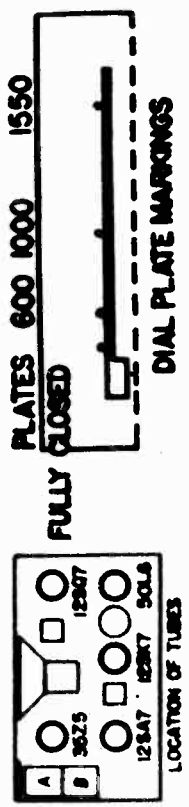
TUBE	PIN	VTVM	20,000 OHM	1,000 OHM	RESISTANCE
			V	V	
12SK7 RF AMP.	1	0	0	0	0
	2	AC	AC	AC	80 OHM
	3	0	0	0	0
	4	-0.1	-0.5	-0.2	2.5 MEG
	5	0	0	0	0
	6	+76	+76	+76	OVER 500 K
	7	AC	AC	AC	65 OHM
	8	+40	+40	+40	OVER 500 K
12SA7 CONV.	1	0	0	0	0
	2	AC	AC	AC	40 OHM
	3	+76	+76	+76	OVER 500 K
	4	+76	+76	+76	OVER 500 K
	5				
OSC. VOLT	550 KC	-5	-4	-1.6	20 K
	1600 KC	-6	-5	-2.2	20 K
	6	0	0	0	0.6 OHM
	7	AC	AC	AC	50 OHM
	8	-1.3	-0.5	-0.2	2.8 MEG
12SK7 IF AMP.	1	0	0	0	0
	2	AC	AC	AC	32 OHM
	3	0	0	0	0
	4	-1.3	-0.5	-0.2	2.6 MEG
	5	0	0	0	0
	6	+76	+76	+76	OVER 500 K
	7	AC	AC	AC	16 OHM
	8	+76	+76	+76	OVER 500 K
12SQ7 DET. AVC 1st AF	1	0	0	0	0
	2	-1.1	-0.6	-0.4	4.6 MEG
	3	0	0	0	0
	4	-1.3	-0.6	-0.4	400 K
	5	-1.3	-0.6	-0.4	400 K
	6	+52	+50	+18	OVER 500 K
	7	AC	AC	AC	16 OHM
	8	0	0	0	0
35L6 AUDIO OUTPUT	1	0	0	0	0
	2	AC	AC	AC	100 OHM
	3	+115	+115	+115	OVER 500 K
	4	+76	+76	+76	OVER 500 K
	5	0	0	0	460 K
	6	0	0	0	INFINITE
	7	AC	AC	AC	55 OHM
	8	+4	+4	+4	170 OHM
35Z5	1	--	--	--	--
	2	AC	AC	AC	120 OHM
	3	AC	AC	AC	118 OHM
	4	--	--	--	--
	5	AC	AC	AC	140 OHM
	6	--	--	--	--
	7	AC	AC	AC	90 OHM
	8	+120	+120	+120	OVER 500 K



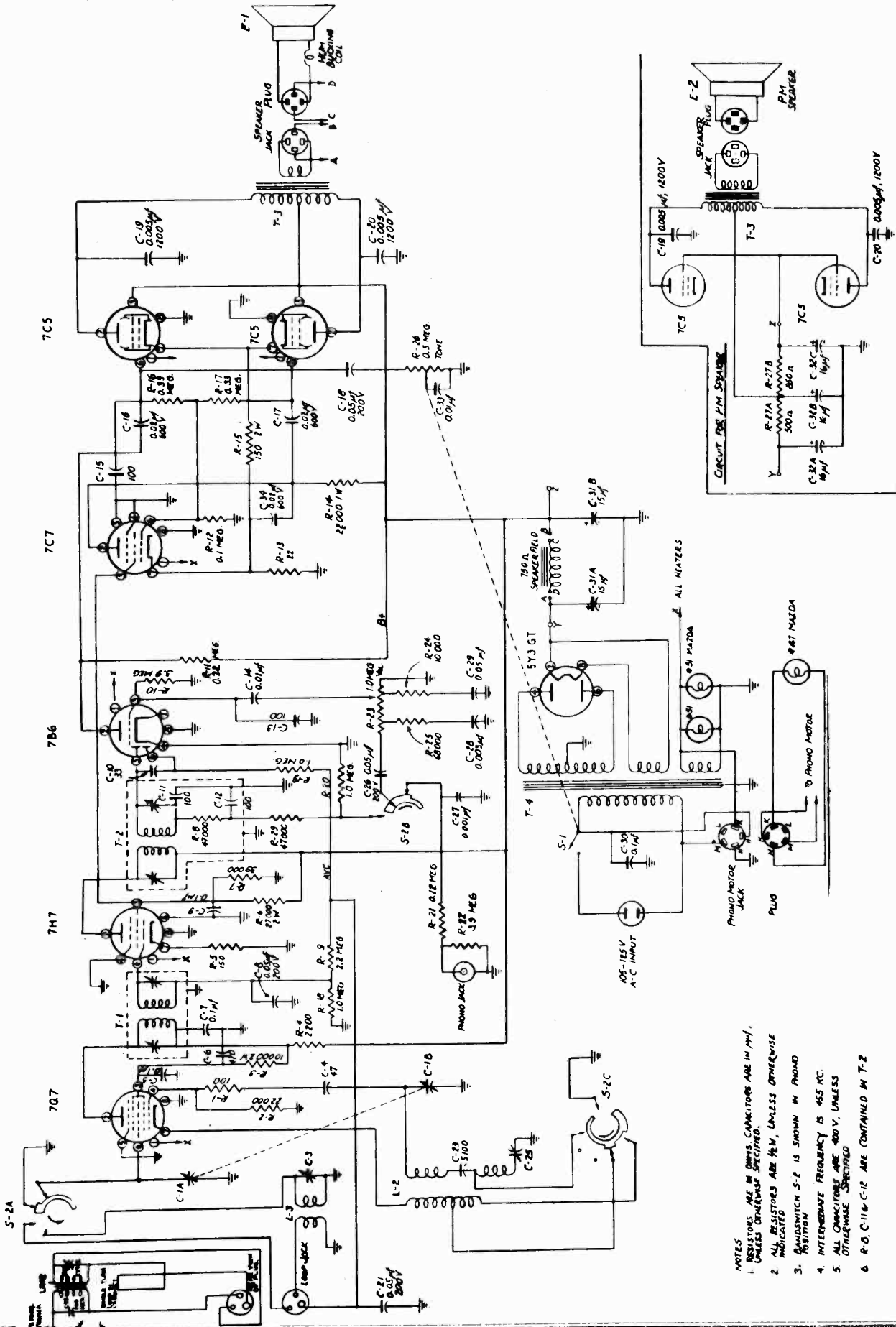
Align the I. F. trimmers to 455 kc, using least possible input from Signal Generator to avoid developing A.V.C. voltage which would make the tuning adjustments very broad. An output meter may be clipped directly across the voice coil lugs.

With the tuning capacitor plates completely out of mesh, and pointer at extreme right end of travel, adjust the oscillator trimmer (A) (on front section of tuning capacitor) to 1700 kc. Re-adjust both Signal Generator and tuning capacitor to 1550 kc and adjust the RF trimmer (B) (on rear section) for maximum response. With tuning capacitor plates fully meshed, the receiver should tune to 532 kc; however, no adjustment is required at this point. For checking purposes, four fine marks are engraved on the dial plate. These represent, in order, the pointer position with capacitor plates fully meshed, and the pointer setting for 600, 1000 and 1550 kc.

RESISTORS ARE IN OHMS CAPACITORS ARE IN μ UF
VOLUME CONTROL RPS-2A IS 0.5 MEG. WITH SWITCH S2 ON REAR



MODEL 1561



- NOTES
1. RESISTORS ARE IN OHMS, CAPACITORS ARE IN MF, UNLESS OTHERWISE SPECIFIED.
 2. ALL RESISTORS ARE 1/2 W., UNLESS OTHERWISE INDICATED.
 3. RADIO SWITCH S-2 IS SHOWN IN PHONO POSITION.
 4. INTERMEDIATE FREQUENCY IS 455 KC.
 5. ALL CAPACITORS ARE 400 V., UNLESS OTHERWISE SPECIFIED.
 6. R-0, C-11 & C-12 ARE CONTAINED IN T-2.

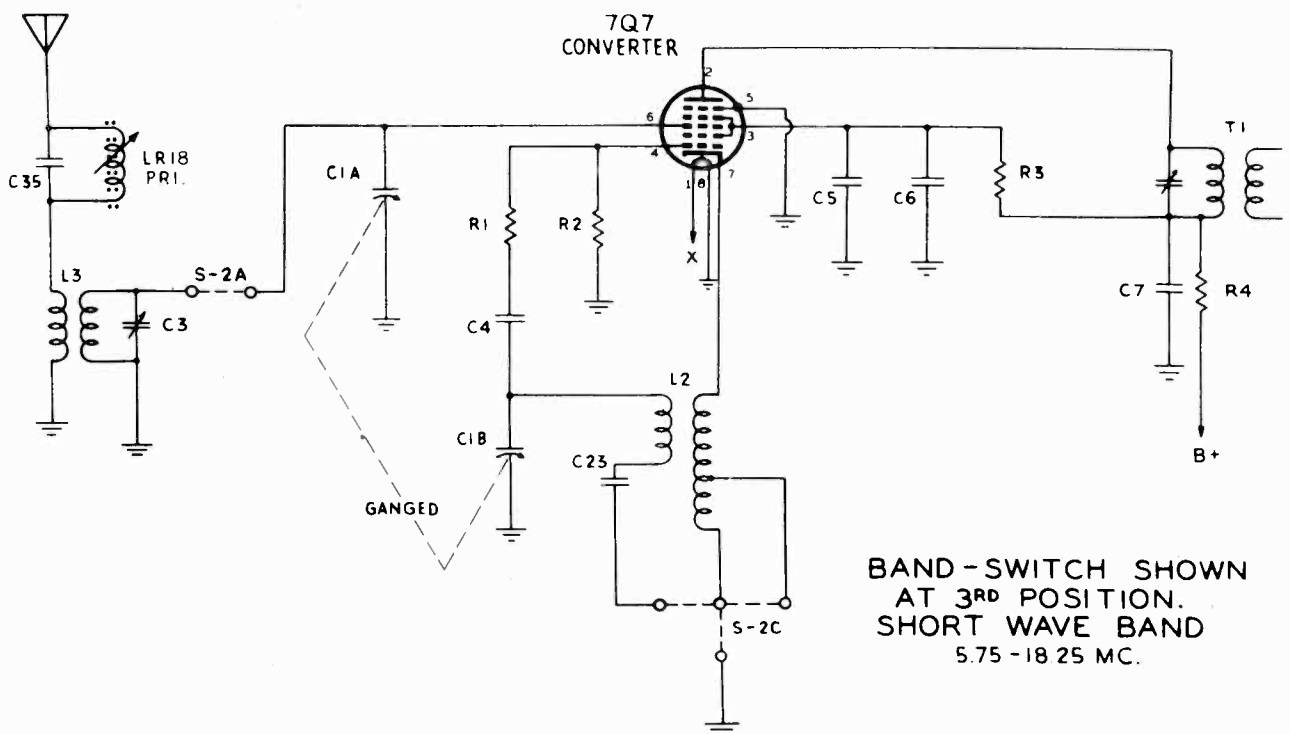
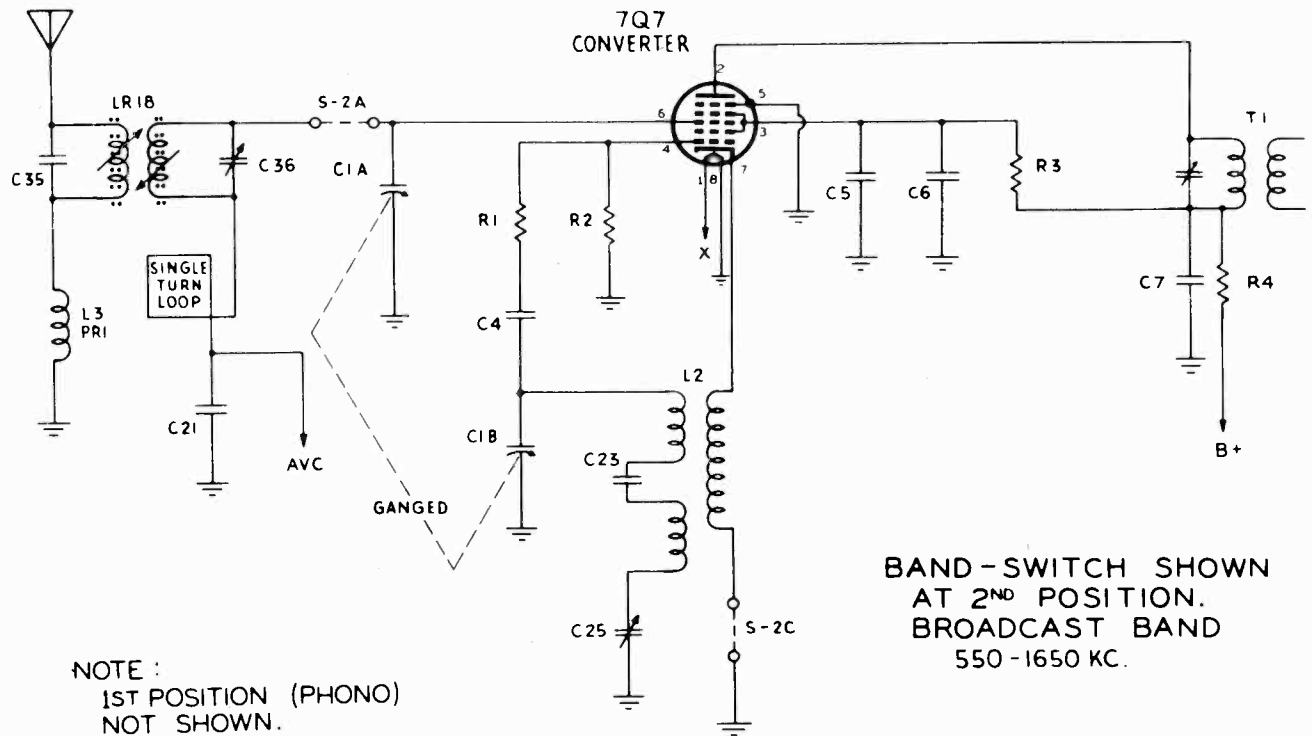
CLARI-SKEMATIX

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ALDEN PAGE 18-3

ALDEN, INC.

MODEL 1561



Alignment: No attempt should be made to realign this receiver until it has been determined that a poor tube, or some local condition is not responsible for faulty reception. The Signal Generator may be connected through a 0.01 mf capacitor (used as a dummy antenna) to the lug on R. F. section (A) of tuning capacitor. Connect ground clip of generator directly to chassis. Align the I. F. trimmers to 455 K.C., using least possible input from the Signal Generator to avoid developing A.V.C. voltage which would make the tuning adjustments very broad. An output meter may be clipped across the voice coil lugs.

To align broadcast R. F. trimmers, remove the 0.01 mf capacitor and connect the Signal Generator leads to two or three turns of heavy wire, forming a self-supporting loop of about 7 or 8 inches diameter placed about a foot away from the receiver's loop antenna. Again, use the least possible input from the Signal Generator. With the tuning plates completely out of mesh and the pointer at the extreme right end of travel, adjust the broadcast oscillator trimmer, on the under side of the chassis, to 1650 K.C. With tuning capacitor fully meshed adjust the padder on the chassis deck to 535 K.C. Readjust both Signal Generator and tuning capacitor to 1550 K.C. and adjust the R. F. trimmer on the loop for maximum response.

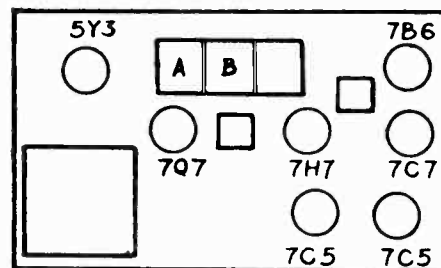
To align the short wave band connect the Signal Generator through a 0.01 mf capacitor and a 400 ohm resistor in series (used as a dummy antenna) to the antenna connection on the loop antenna. With the tuning capacitor plates completely out of mesh, and pointer at the extreme right end of travel, adjust the short wave oscillator trimmer (on the under side of the chassis) to 18.25 megacycles. Re-adjust both Signal Generator and tuning capacitor to 16 megacycles and adjust short wave antenna coil trimmer for maximum response. With tuning capacitor fully meshed, the receiver should tune to 5.75 megacycles, however, no adjustment is required at this point.

For checking purposes five marks are engraved on the front of the dial plate. These represent, in order, the pointer position with the capacitor plates fully meshed and the pointer settings for 600 kc, 8 mc, 16 mc, and 1550 kc.

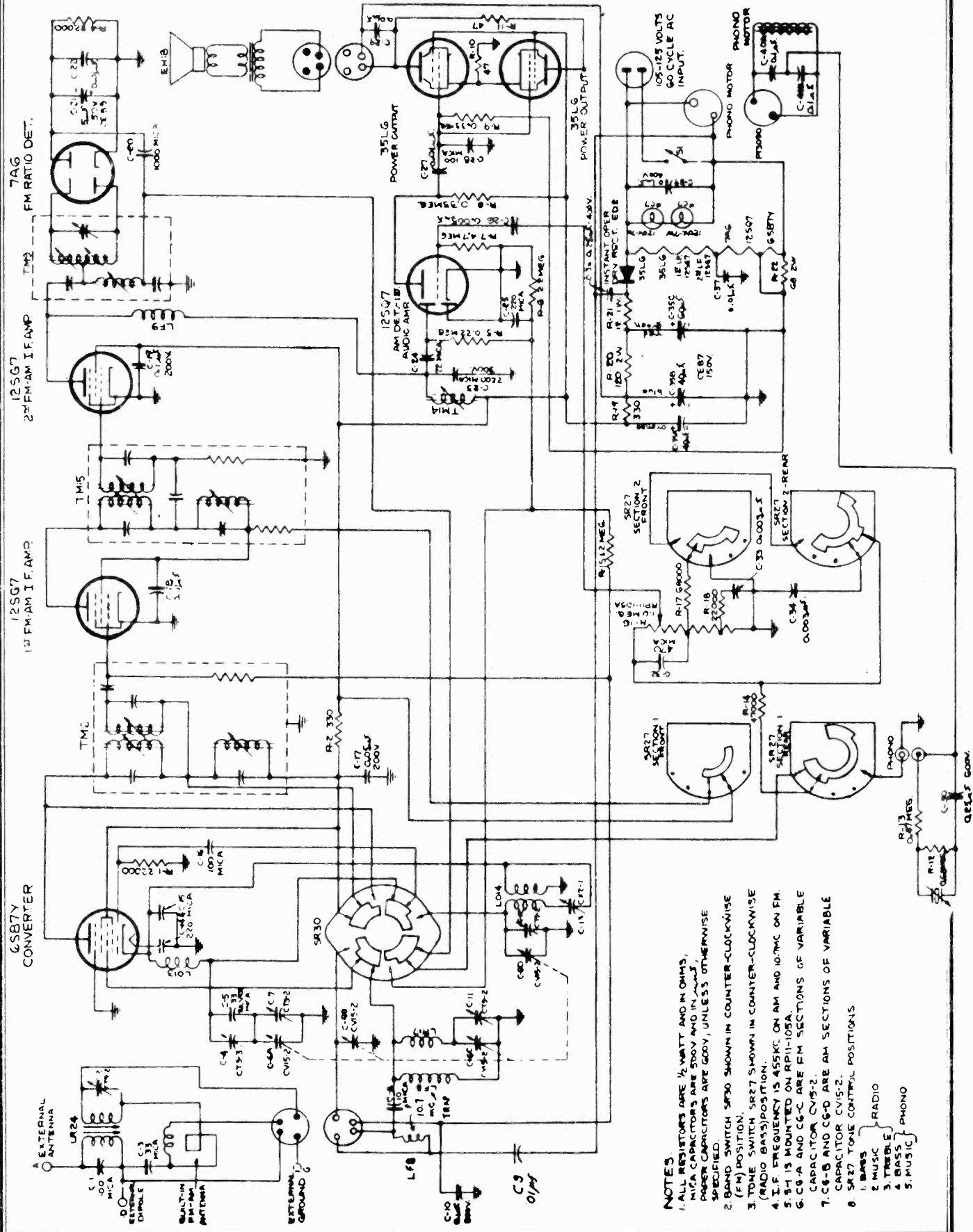
Pushbuttons: To set pushbuttons remove pushbutton knobs. This will expose a set screw on the shaft of each pushbutton. Starting at one end push a pushbutton down and loosen its set screw. Set the bandswitch to the broadcast position. Hold the pushbutton down and tune the manual tuning control to the station to which the pushbutton is to be set. Still holding the pushbutton down tighten its set screw. The pushbutton may now be released and its knob replaced. It will now select the station to which it was set. The other pushbuttons may be set in a similar manner.

REPLACEMENT PARTS LIST

Circuit Symbol	Part Number	Item	Description
C-1 A & B	CV-9	Capacitor	Variable 2-gang, Push-button
C-2	CT1-1	Capacitor	Trimmer 1.5—15 MMF
C-3	CT1-2	Capacitor	Trimmer 2.2—40 MMF
C-22	CT1-2	Capacitor	Trimmer 2.2—40 MMF
C-23	CT1-2	Capacitor	Trimmer 2.2—40 MMF
C-25	CX2-1	Capacitor	Padder
E-1	EH-9	Speaker	10" Electrodynamic
E-2	EH-14	Speaker	10" P.M.
L-1	LL-9	Loop Antenna	
L-2	LO-4	Oscillator Coil Assembly	Broadcast & S.W. Osc. Coils
L-3	LR-4	S.W. Antenna Coil	
R-23	RP8-105	Potentiometer	1 Meg. with 2 taps, Volume Control
R-26	RP5-2	Potentiometer	0.5 Meg. with switch, Tone Control
R-27 A & B	RW3-1	Resistor	Wirewound 1350 Ohms 17 watt tapped at 500 Ohms
S-2 A, B & C	SR-9	Bandswitch	
T-1	TM2-4	Transformer	I. F. Input
T-2	TM2-5	Transformer	I. F. Output
T-3	TA-8	Transformer	Push-pull speaker output
T-4	TP-9	Transformer	Power



TUBE LOCATION



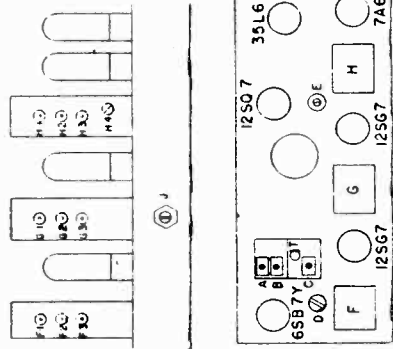
- NOTES:**
1. ALL RESISTORS ARE 1/2 WATT AND IN OHMS, UNLESS OTHERWISE SPECIFIED.
 2. BAND SWITCH SR30 SHOWN IN COUNTER-CLOCKWISE (FM) POSITION.
 3. TONE SWITCH SR27 SHOWN IN COUNTER-CLOCKWISE (RADIO BASS) POSITION.
 4. I.F. FREQUENCY IS 455KC ON AM AND 107MC ON FM.
 5. 5-11 IS MOUNTED ON RP11-105A.
 6. CG-A AND CG-C ARE FM SECTIONS OF VARIABLE CAPACITOR CV15-2.
 7. CG-B AND CG-D ARE AM SECTIONS OF VARIABLE CAPACITOR CV15-2.
 8. SR27 TONE CONTROL POSITIONS:
 - 1. BASS
 - 2. MUSIC
 - 3. TREBLE
 - 4. BASS
 - 5. MUSIC

MODEL 1636L

ALDEN, INC.

ALIGNMENT PROCEDURE:

Dummy Antenna	Signal Generator Connection	Signal Generator Frequency	Band Switch Position	Radio Dial Setting	Adjust	Remarks
0.01 MFD	Terminal T	455 KC AM	Broadcast	1625 KC	E G-1 F-1	Adjust for maximum output Repeat for fine adjustment
0.01 MFD	Pin 4 of 12SG7 2nd FM-AM IF with FM Signal Gen.	10.7 MC FM	FM	108 MC	H-2	Adjust for maximum output (Broad adjustment)
0.01 MFD	"	10.7 MC FM	FM	108 MC	H-4	Adjust for maximum output
0.01 MFD	"	10.7 MC AM	FM	108 MC	H-1 or H-3	Adjust whichever is required for minimum output Repeat last two steps for fine adjustment until settings for maximum FM output coincide with settings for minimum AM output.
0.01 MFD	Pin 8 of 6SB7Y Converter	10.7 MC FM	FM	108 MC	G-3 — G-2	Adjust for maximum output
0.01 MFD	"	"	FM	108 MC	F-3 — F-2	Adjust for maximum output
100 MMFD	"A" Post on Cabinet	600 KC AM	Broadcast	535 KC	Pointer	Repeat last two steps for fine adjustment
"	"	1550 KC AM	"	600 KC	J and Core on Ant. Coil in Cab.	Adjust pointer to reference mark
300 OHM Resistor	"	92 MC FM	FM	1550 KC	B and trimmer on Ant. Coil	Adjust for maximum output
"	"	106 MC FM	FM	92 MC	D	Adjust for maximum output
"	"	"	FM	106 MC	A and C	Adjust for maximum output



Alignment: No attempt should be made to realign this receiver until it has been determined that a poor tube or some local condition is not responsible for faulty reception. The following is a list of the minimum equipment necessary to realign this receiver.

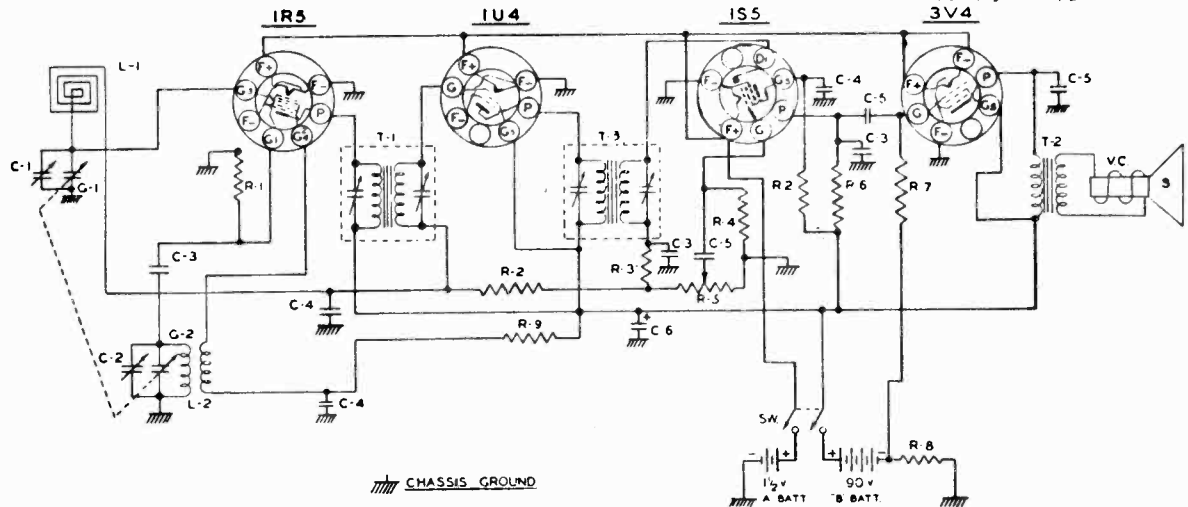
In the following alignment procedure the high side of the signal generator is connected to the terminal indicated in the "Signal Generator Coupling" column below. The ground side of the signal generator is connected directly to the chassis. The output meter should be connected across the voice coil of the speaker for all measurements.

- 1—AM signal generator covering 455 KC, 600 KC, 1550 KC and 10.7 MC
- 2—FM signal generator covering 10.7 MC, 92 MC and 106 MC
- 3—Output meter, rectifier type, approximately 0 to 2 volts RMS
- 4—Dummy antennas
 - 100MMFD Mica Capacitor
 - 300 Ohm Resistor
 - 0.01 MFD Capacitor

In adjusting the radio frequency trimmers and padders it is advisable to "rock" the variable capacitor gang slightly across the signal being delivered by the signal generator until that particular signal has been accurately peaked.

ALDEN, INC.

MODELS 1755, 1756,
1757, 1758



ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment. A signal generator is required having the following frequencies: 455 KC and 1400 KC. An output meter should be connected across the speaker.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD. condenser. The ground lead from the generator may be connected to any spot on the metal chassis. Turn the gang condenser to complete minimum capacity. Set the generator to 455 KC. Adjust the movable trimmers in the IF cans, until a maximum reading is noted on the output meter.

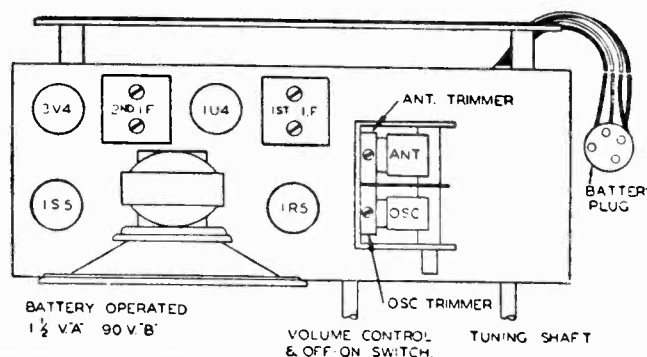
The volume control of the receiver should be turned to maximum during the IF and all subsequent alignment and the generator output as low as possible to prevent the AVC from working and giving false readings.

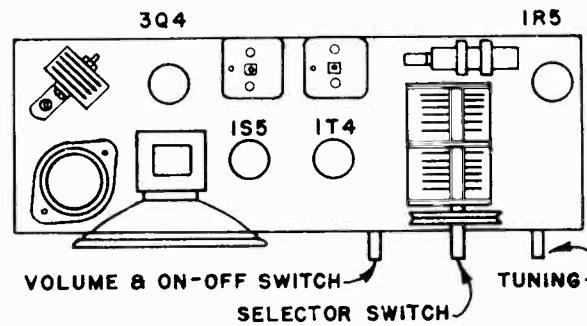
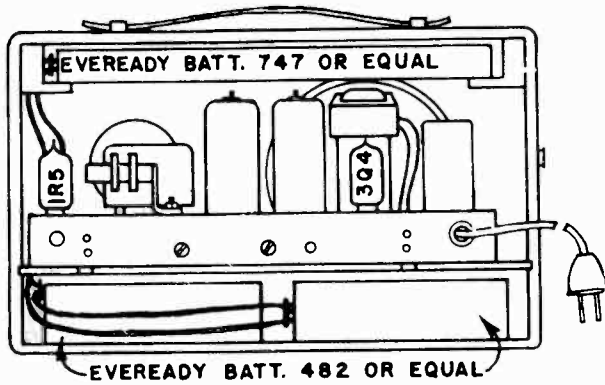
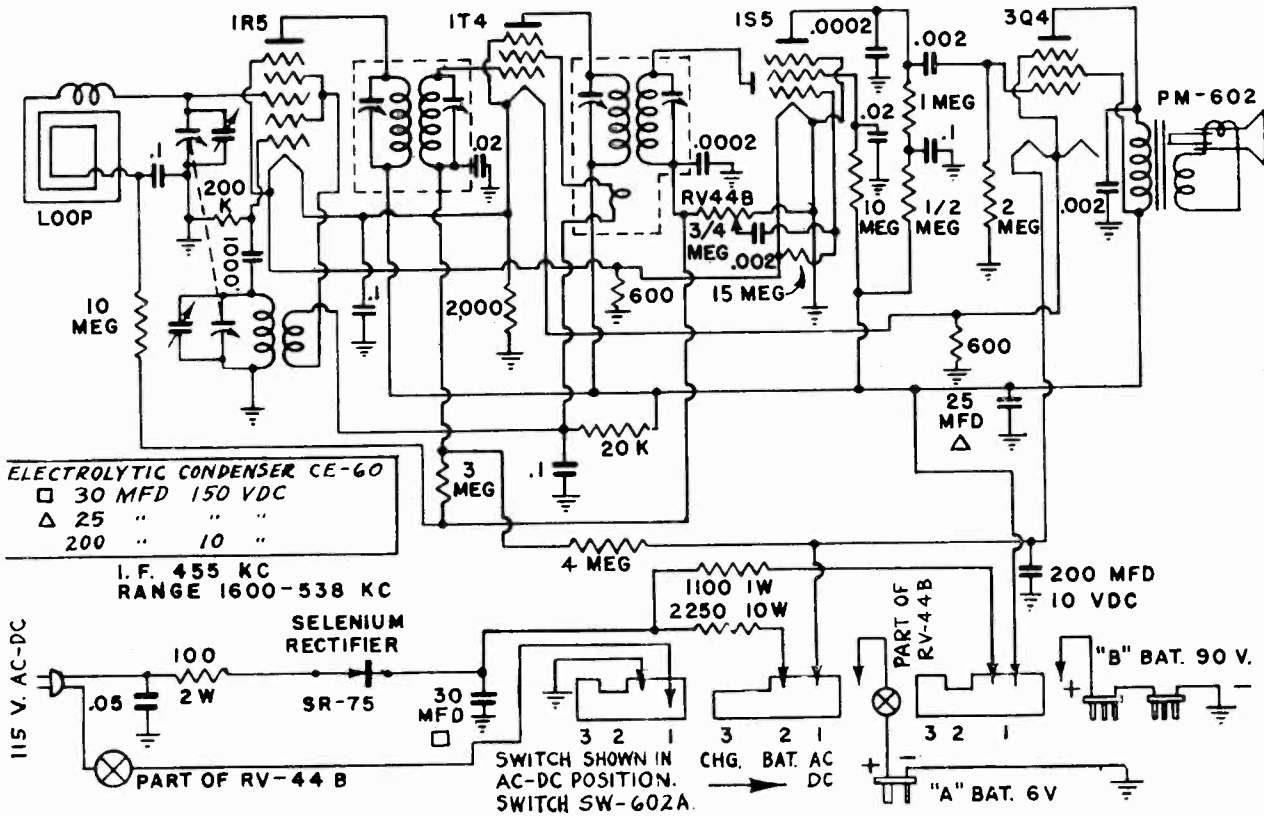
SECOND STEP: With the leads from the generator still connected as in IF alignment, adjust the generator to 400 KC. Set the dial pointer to 1400 KC on the dial scale. Adjust the oscillator trimmer until the signal is tuned in.

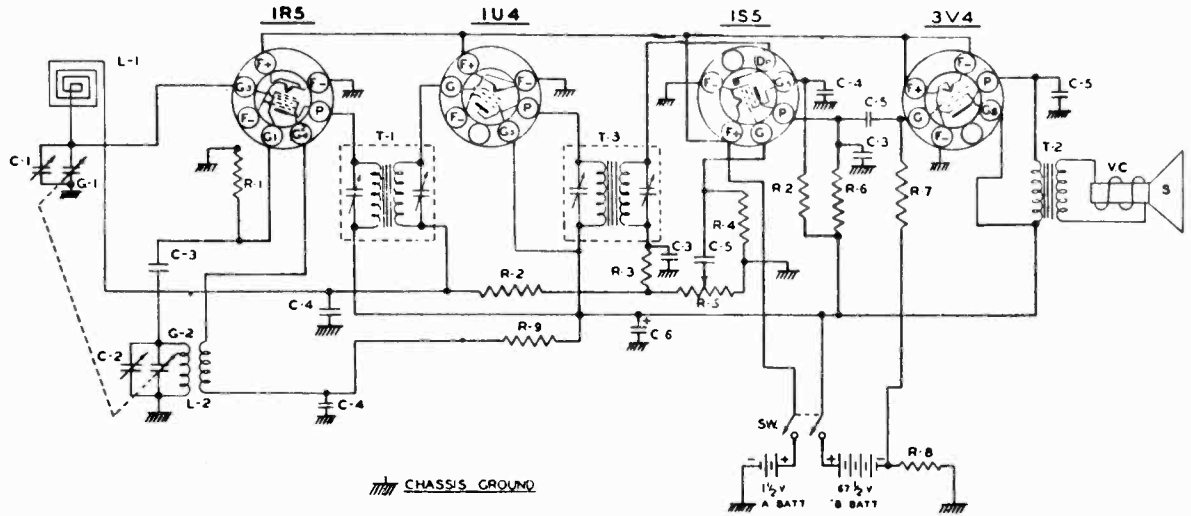
THIRD STEP: Remove the generator leads from the condenser. Connect the hot lead from the generator through a 200 MMFD. condenser to one of the leads which project from the back of the loop antenna. Connect the ground lead of the generator to the remaining lead. With the generator and the receiver still tuned to 1400 KC, adjust the antenna trimmer until a maximum reading is noted on the output meter.

PART NO	DESCRIPTION
IR-20	R-1 220M Ω RESISTOR 1/2W 20%
IR-23	R-2 33MEG RESISTOR 1/2W 20%
IR-31	R-3 82M Ω RESISTOR 1/2W 10%
IR-3	R-4 10MEG RESISTOR 1/2W 20%
VC-8	R-5 1MEG VOLUME CONTROL
IR-12	R-6 1MEG RESISTOR 1/2W 20%
IR-13	R-7 2.2MEG RESISTOR 1/2W 20%
IR-39	R-8 620 Ω RESISTOR 1/2W 20%
IR-37	R-9 10M Ω RESISTOR 1/2W 20%
TC-7	C-1 ANT TRIMMER
	C-2 OSC TRIMMER ON GANG
MC-2	C-3 100MMFD MICA CONDENSER
PC-7	C-4 .01 MFD 400 V CONDENSER
PC-6	C-5 .005MFD 60V V CONDENSER
EC-7	C-6 20MFD 80WV ELECTROLYTIC
GC-5	C-1 GANG CONDENSER
LL-5	L-1 LOOP ANTENNA
LO-12	L-2 OSC COIL
LI-5	T-1 IF TRANSFORMER INPUT
	SW DPST SWITCH ON VOLUME CONTROL
	T-2 SPEAKER TRANSFORMER
SPK-5	VC VOICE COIL
	S PW SPEAKER
LI-4	I-3 IF TRANSFORMER OUTPUT
TU 30	IR5 IU4-155-3V4

TUBE AND TRIMMER LOCATION







ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment. A signal generator is required having the following frequencies: 455 KC and 1400 KC. An output meter should be connected across the speaker.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD. condenser. The ground lead from the generator may be connected to any spot on the metal chassis. Turn the gang condenser to complete minimum capacity. Set the generator to 455 KC. Adjust the movable iron cores in the IF cans. These IF adjustments are made in the top and in the bottom of the can under the chassis. Adjust the cores until a maximum reading is noted on the output meter.

The volume control of the receiver should be turned to maximum during the IF and all subsequent alignment and the generator output as low as possible to prevent the AVC from working and giving false readings.

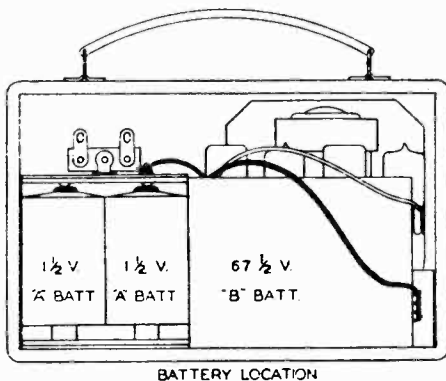
SECOND STEP: With the leads from the generator still connected as in IF alignment, adjust the generator to 1400 KC. Set the dial pointer to 1400 KC on the dial scale. Adjust the oscillator trimmer until the signal is tuned in.

THIRD STEP: Remove the generator leads from the gang condenser. Replace the chassis in the cabinet. Loosely couple the generator to the receiver loop by making a complete turn over the outside of the cabinet. With the receiver and the generator still set at 1400 KC increase the generator output. Adjust the Antenna trimmer through the back of the chassis until a maximum signal is noted on the output meter.

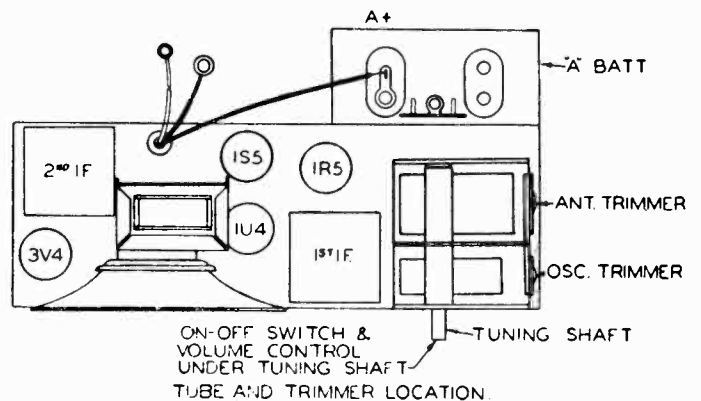
No further adjustment should be necessary as the coils and gang condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

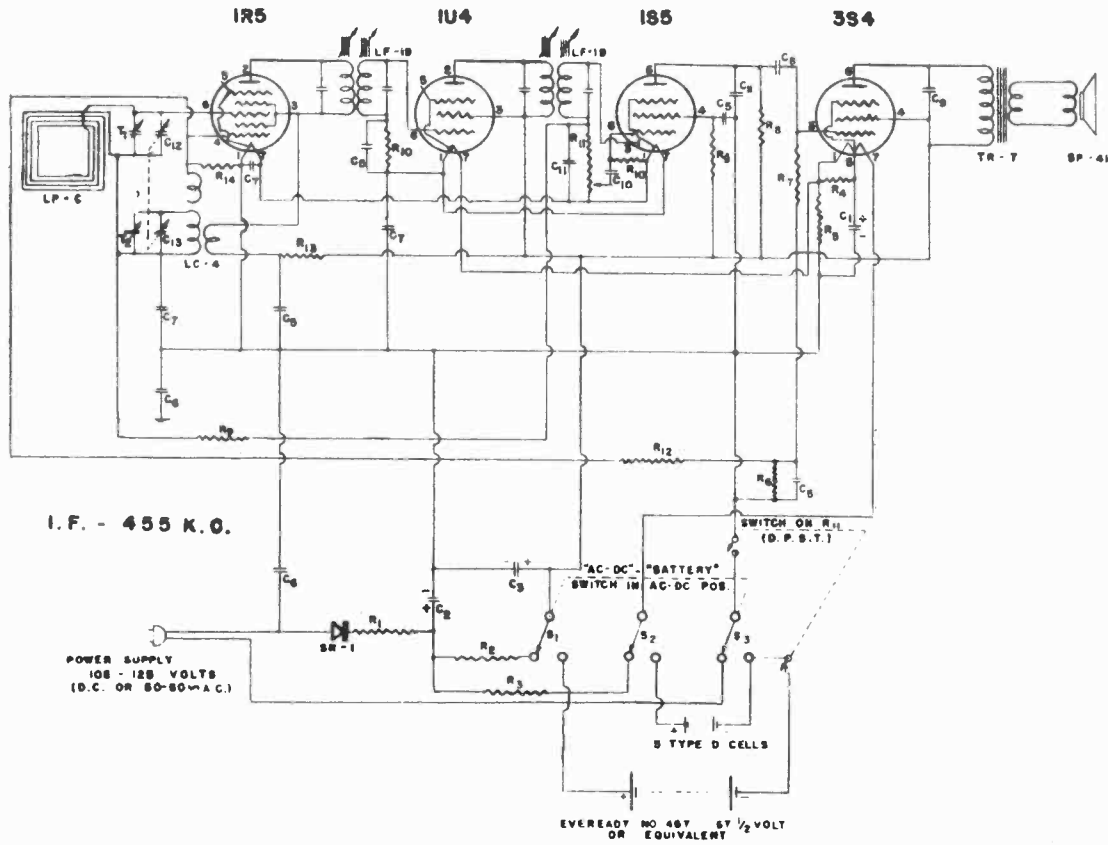
NOTE: When the antenna trimmer is adjusted at 1400 KC., the chassis as well as the "A" and "B" batteries must be in normal position in the cabinet to reflect the proper loop impedance.

PART NO	DESCRIPTION
IR-20	R-1 220M Ω RESISTOR 1/2W 20%
IR-23	R-2 33MEG RESISTOR 1/2W 20%
IR-31	R-3 82M Ω RESISTOR 1/2W 10%
IR-3	R-4 10MEG RESISTOR 1/2W 20%
VC-8	R-5 1MEG VOLUME CONTROL
IR-12	R-6 1MEG RESISTOR 1/2W 20%
IR-13	R-7 2.2MEG RESISTOR 1/2W 20%
IR-39	R-8 670 Ω RESISTOR 1/2W 5%
IR-37	R-9 10M Ω RESISTOR 1/2W 20%
TC-7	C-1 ANT. TRIMMER
MC-2	C-2 OSC TRIMMER ON GANG
PC-7	C-3 100MMFD MICA CONDENSER
PC-8	C-4 .01 MFD 400 V. CONDENSER
PC-6	C-5 .005MFD 600 V CONDENSER
EC-7	C-6 20MFD 80V ELECTROLYTIC
GC-4	G-1 GANG CONDENSER
LL-1B	L-1 LOOP ANTENNA
LO-16	L-2 OSC. COIL
L1-3	T-1 IF TRANSFORMER INPUT
SW	DPST SWITCH ON VOLUME CONTROL
SPK-8	T-2 SPEAKER TRANSFORMER
L1-4	VC VOICE COIL
TU-30	S PM SPEAKER
	T-3 IF TRANSFORMER OUTPUT
	IR5 IU4 IS5 3V4

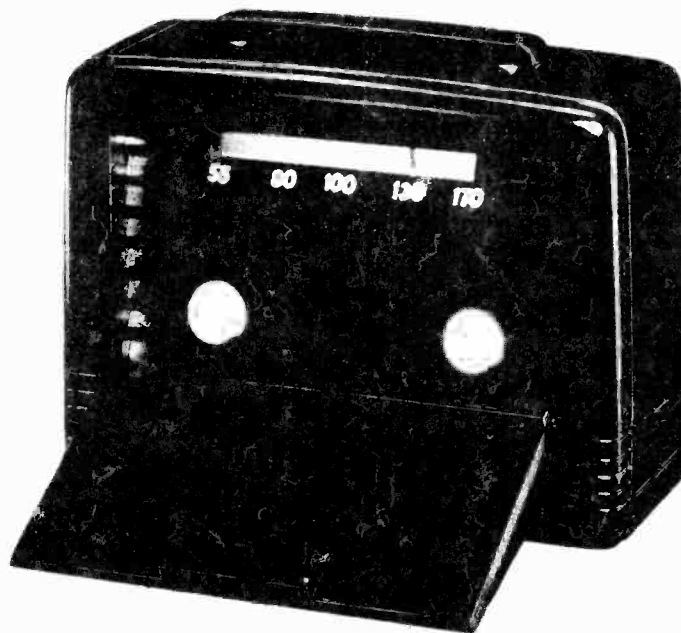


BATTERY LOCATION



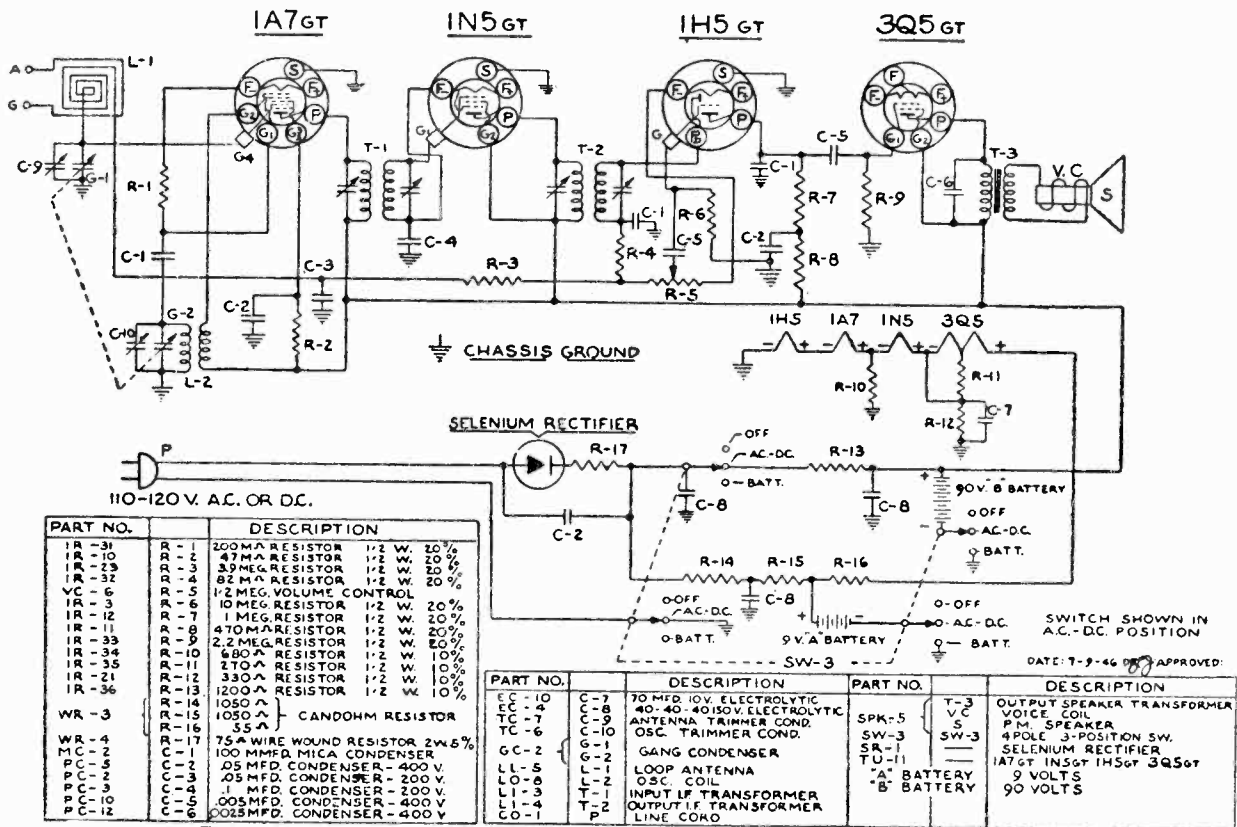


ITEM	DESCRIPTION	PART NUMBER
C ₁	125 MFD 10VOLT } ELECTROLYTIC	CE 12
C ₂ , C ₃	25 MFD. 150 VOLT } CONDENSER	
C ₄	.05 MFD. 400 VOLT PAPER CONDENSER	CP 503-1
C ₅	.01 MFD. 150 VOLT PAPER CONDENSER	CP 103-2
C ₆	.1 MFD. 200 VOLT PAPER CONDENSER	CP 104-2
C ₇	.05 MFD. 150 VOLT PAPER CONDENSER	CP 503-2
C ₈	.002 MFD. 150 VOLT PAPER CONDENSER	CP 202-1
C ₉	.005 MFD. 400 VOLT PAPER CONDENSER	CP 502-2
C ₁₀	.001 MFD. 150 VOLT PAPER CONDENSER	CP 102-1
C ₁₁	.0001 MFD. 300 VOLT MICA CONDENSER	CM 101-1
C ₁₂ , C ₁₃	VARIABLE CONDENSER	CY 10
LC-4	INDUCTOR COIL	LC 4
LF-19	I.F. TRANSFORMER	LF 19
LP-C	ANTENNA LOOP	LP 6
R ₁	55 OHM 2 WATT 10% RESISTOR	RW 550-5
R ₂	7500 OHM 1 WATT 10% RESISTOR	RC 752-B
R ₃	2700 OHM 1/2 WATT 5% RESISTOR	RP 1
R ₄	470 OHM 1/2 WATT RESISTOR	RC 471-1
R ₅	320 OHM 1/2 WATT 10% RESISTOR	RC 321-2
R ₆	870,000 OHM 1/2 WATT 10% RESISTOR	RC 274-E
R ₇	5.2 MEG. 1/2 WATT RESISTOR	RC 525-1
R ₈	1 MEG. 1/2 WATT RESISTOR	RC 105-1
R ₉	3.3 MEG. 1/2 WATT RESISTOR	RC 335-1
R ₁₀	10 MEG. 1/2 WATT RESISTOR	RC 105-1
R ₁₁	1 MEG. POTENTIOMETER WITH SWITCH	VC 6
R ₁₂	1 MEG 1/2 WATT 10% RESISTOR	RC 105-2
R ₁₃	15,000 OHM 1/2 WATT RESISTOR	RC 153-1
R ₁₄	100,000 OHM 1/2 WATT 10% RESISTOR	RC 104-E
S ₁ , S ₂ , S ₃	3 POLE SINGLE THROW SWITCH	SW 3
SP-41	SPEAKER	SP 41
TR-7	OUTPUT TRANSFORMER	TR 7
SR-1	SELENIUM RECTIFIER	SR 1
T ₁ , T ₂	TRIMMERS OR VARIABLE	



ALLIED RADIO CORP.

MODEL 4B-170



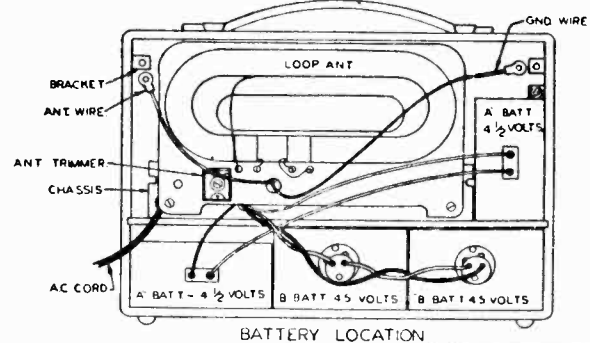
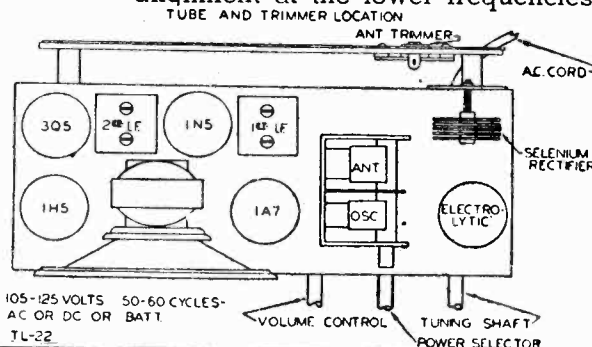
Remove chassis from cabinet for alignment.

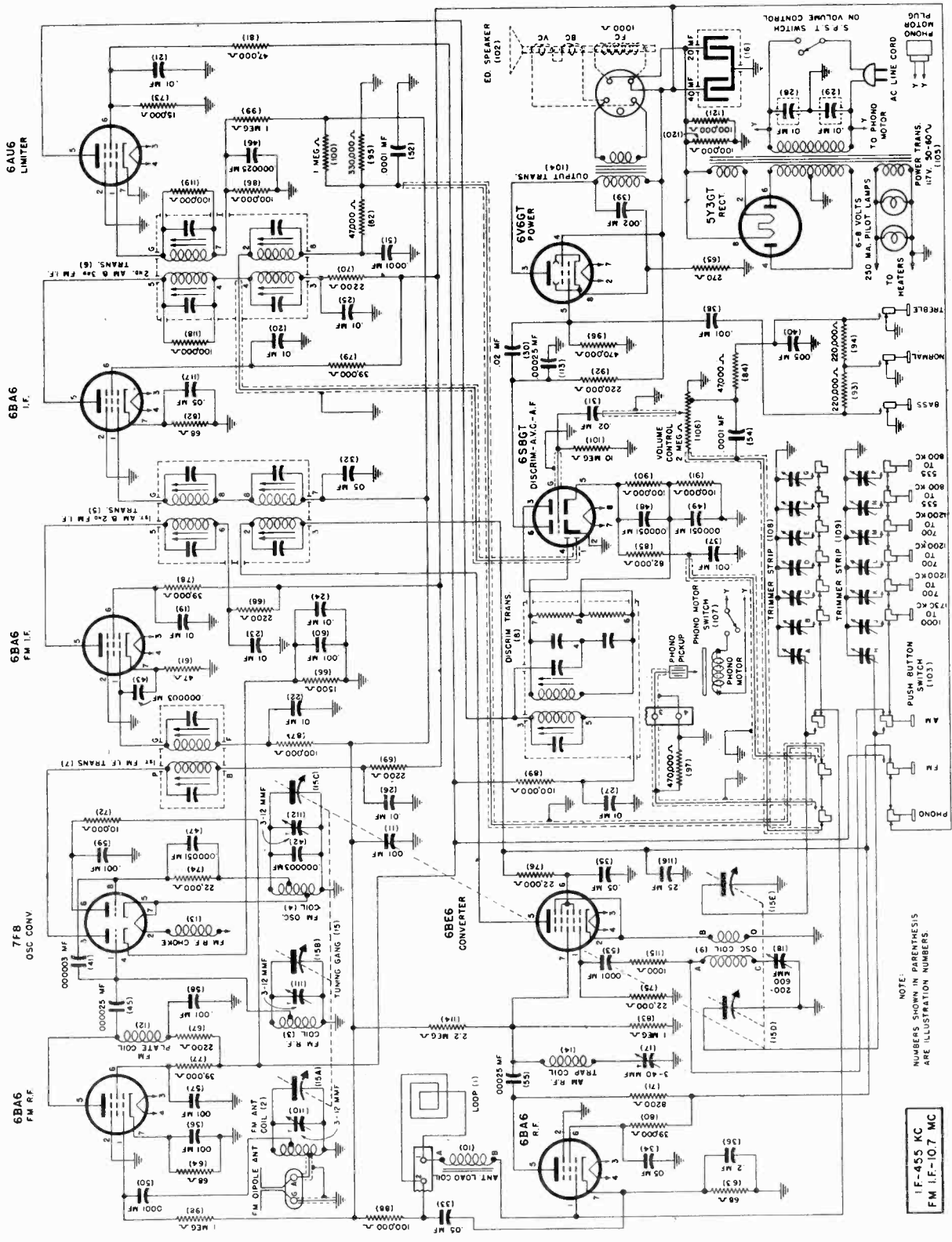
A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the metal frame of the gang condenser. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the top of the oscillator section of the gang condenser. Adjust this trimmer until the 1720 KC signal is tuned in.

THIRD STEP: Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the antenna lead wire that projects from the back of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the back of the loop antenna. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.





NOTE:
 NUMBERS SHOWN IN PARENTHESIS
 ARE ILLUSTRATION NUMBERS.

IF-455 KC
 FM I.F.-10.7 MC

FM ALIGNMENT

Instructions for Alignment of the Frequency Modulation I. F. Transformers, Discriminator, Oscillator, R. F. and Antenna Circuits, with AM equipment generally available to the service man.

The equipment necessary for this procedure consists of the following: D.C. Vacuum Tube Voltmeter of the Volt-Ohmyst Type. An AM Signal Generator that will supply:

- (1) A 10.7 M.C. Signal for I. F. alignment.
- (2) A 105 M.C. and 109 M.C. Signal—a Signal Generator that only goes up to 30 M.C. but which has sufficient fourth harmonics present in the carrier could be used for this purpose.

THE GENERATOR USED NEED NOT BE FREQUENCY MODULATED.

IT IS ALWAYS DESIRABLE TO ALIGN THE "AM" I. F. TRANSFORMERS BEFORE MAKING ANY OF THE "FM" I. F. ADJUSTMENTS, and to RECHECK "AM" I. F. TRIMMERS AFTER COMPLETING "FM" I. F. ADJUSTMENTS.

BE SURE TO MAKE THE "FM" ADJUSTMENTS IN THE ORDER GIVEN BELOW.

- (1) PROCEDURE FOR ALIGNMENT OF FM DISCRIMINATOR TRANSFORMER:

- (A) Connect the Voltmeter from Pin No. 5 of the 6S8GT tube to chassis.
- (B) With a .002 Mfd. Isolation Condenser in series with hot Signal Generator lead, connect generator from Pin No. 1 of the 6AU6 Limiter tube to chassis.
- (C) Set Signal Generator to EXACTLY 10.7 M. C.
- (D) Adjust 10.7 M. C. Discriminator Primary Trimmer for MAXIMUM reading on Voltmeter.
- (E) Leave Signal Generator set at 10.7 M. C. and modulate with a 400 cycle note.
- (F) Adjust 10.7 M. C. Secondary Discriminator Trimmer for MINIMUM 400 CYCLE RESPONSE IN THE SPEAKER. IMPORTANT: The reading on the Voltmeter should be ZERO. MINIMUM AUDIO RESPONSE WILL BE RATHER CRITICAL IN ADJUSTMENT.

- (G) To check adjustment, swing Signal Generator to one side of 10.7 M. C. until MAXIMUM reading is obtained on Voltmeter and NOTE FREQUENCY and VOLTAGE READING. Then swing Signal Generator to the opposite side of 10.7 M. C. until MAXIMUM reading is obtained on Voltmeter and AGAIN NOTE VOLTAGE AND FREQUENCY READINGS. The two Voltmeter readings should be similar within 3 DB. and the two Signal frequency readings should be a reasonably equal distance from 10.7 M. C. The difference in K.C. between the center frequency and one side should not exceed the difference between the center frequency and the other side by more than 50 K. C.

NOTE: If reliable FM Generator is available at 10.7 M.C., the procedure outlined in Paragraph (G) will be simplified by aligning to the proper pattern on an Oscilloscope. 100 K. C. deviation should be used.

CAUTION: Care should be taken to align the I. F. stages at the EXACT same center frequency as the Discriminator Coil. Switching from FM to AM on some generators may shift the carrier frequency somewhat.

- (2) PROCEDURE FOR ALIGNMENT OF "FM" I. F. TRANSFORMERS:

- (A) Connect the Voltmeter from the junction of the two 1 Megohm Resistors, (Illus. 99 and 100) to chassis.
- (B) Connect Signal Generator to Input Grid (Pin No. 1) of 7F8 Converter tube.
- (C) Set Signal Generator to EXACTLY 10.7 M. C.—if possible, mark the position where this occurs right on the Generator's calibrated dial because this becomes a reference point in checking for proper FM I. F. alignment.
- (D) Adjust each of the 1st, 2nd and 3rd FM I. F. Transformers' 10.7 M. C. trimmers for MAXIMUM reading on Voltmeter. KEEP OUTPUT OF SIGNAL GENERATOR SO THAT A READING OF APPROXIMATELY 2 to 4 VOLTS IS OBTAINED ON THE VOLTMETER.
- (E) After all the above FM I. F. Transformer Trimmer adjustments have been correctly completed, MAKE A NOTE OF THE READING ON THE VOLTMETER.
- (F) Next, detune the signal generator to a slightly HIGHER frequency (higher than the 10.7 reference frequency), until the Voltmeter reads ONE-HALF of the figure noted in (E) above, and MAKE A NOTE OF THE GENERATOR FREQUENCY AT WHICH THIS OCCURS.
- (G) Now, detune the signal generator to a LOWER frequency (lower than the 10.7 reference frequency), until the Voltmeter again reads ONE-HALF the original figure noted in (E), and AGAIN NOTE THE GENERATOR FREQUENCY AT WHICH THIS OCCURS.

The difference between the two above frequencies obtained in (F) and (G), the one lower than 10.7 M. C. reference point and the one higher, is the "Half-amplitude" Band width of the FM-I. F. system. These two frequencies (F) and (G), should be somewhat uniformly spaced on either side of the 10.7 M. C. (C) reference frequency. A SLIGHT DIFFERENCE IS NOT SERIOUS. Only when one is more than twice as far as the other from the 10.7 M. C. reference frequency, or when there is a double peak, is the discrepancy serious. Assuming the FM I. F. Transformers have been properly adjusted, a double peak, or extremely one-sided "half-amplitude" band width, is usually caused by regeneration or a defective FM I. F. Transformer.

- (3) PROCEDURE FOR THE ALIGNMENT OF THE "FM" ANTENNA, R.F., AND OSCILLATOR CIRCUITS:
 - (A) Leave Voltmeter connected as it was for FM I. F. Alignment.
 - (B) Connect the hot Signal Generator lead through a 300 Ohm Resistor to the FM Antenna Post, marked "ANT" on back of chassis, and the other lead to the post marked "GND".
 - (C) Set Signal Generator so that it will deliver a modulated 108 M. C. signal. If the generator available is not de-

AM ALIGNMENT PROCEDURE

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. Make the adjustment marked (1) first, (2) next.

Before starting alignment:

- (A) Check tuning dial adjustment by turning gang condenser until plates reach maximum capacity stop (completely in mesh) at which point the dial pointer must be exactly even with the last line at the low frequency end of the AM dial calibration. If dial pointer does not point exactly to last line move to correct position.
- (B) Use an accurately calibrated test oscillator with some type of output measuring device.
- (C) WHEN ADJUSTING THE 1730 KC OSCILLATOR TRIMMER, THE 455 KC TRIMMER, remove chassis from cabinet and disconnect the loop connection wires from the set. Attach a 1 megohm resistor across these connections and feed output of test oscillator across the 1 megohm resistor.
- (D) THE 1400 KC LOOP ANTENNA TRIMMER and 600 KC PADDER should be adjusted only after all other adjustments have been made and with the set mounted in the cabinet, and the loop in position. When aligning the 1400 KC Antenna Trimmer and 600 KC Padder, couple test oscillator to receiver loop by: (1) make loop consisting of five to ten turns of No. 20 to No. 30 size wire, wound on a 2" or 3" form; (2) connect this loop across output of test oscillator; (3) place test oscillator loop near radio loop. **BE SURE THAT NEITHER LOOP MOVES WHILE ALIGNING.**

Steps	TEST OSCILLATOR				Refer to parts layout diagram for location of trimmers mentioned below:
	Place band switch for operation on:	Set receiver dial to:	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	
1	AM Band position	Any point where no interfering signal is received	Exactly 455 K. C.	0.2 Mfd. Condenser	High side to AM-Osc. stator plates of tuning condenser (15D). Low side to frame of condenser through .01 Mfd. condenser.
2	AM Band position	Rotate gang condenser to maximum capacity	Exactly 455 K. C.	.00025 Condenser	See Paragraph (C) above.
		Exactly 1730 K. C.	Exactly 1730 K. C.		
		Approx. 1400 K. C.	Approx. 1400 K. C.		
		Approx. 600 K. C.	Approx. 600 K. C.		See Paragraph (D) above.
					Adjust 455 K. C. trap trimmer for MINIMUM 455 K. C. Signal. Adjust 1730 K. C. oscillator trimmer for maximum output. Adjust 1400 K. C. AM Ant. trimmer for maximum output. While rocking gang condenser, adjust 600 K. C. oscillator padder for maximum output.

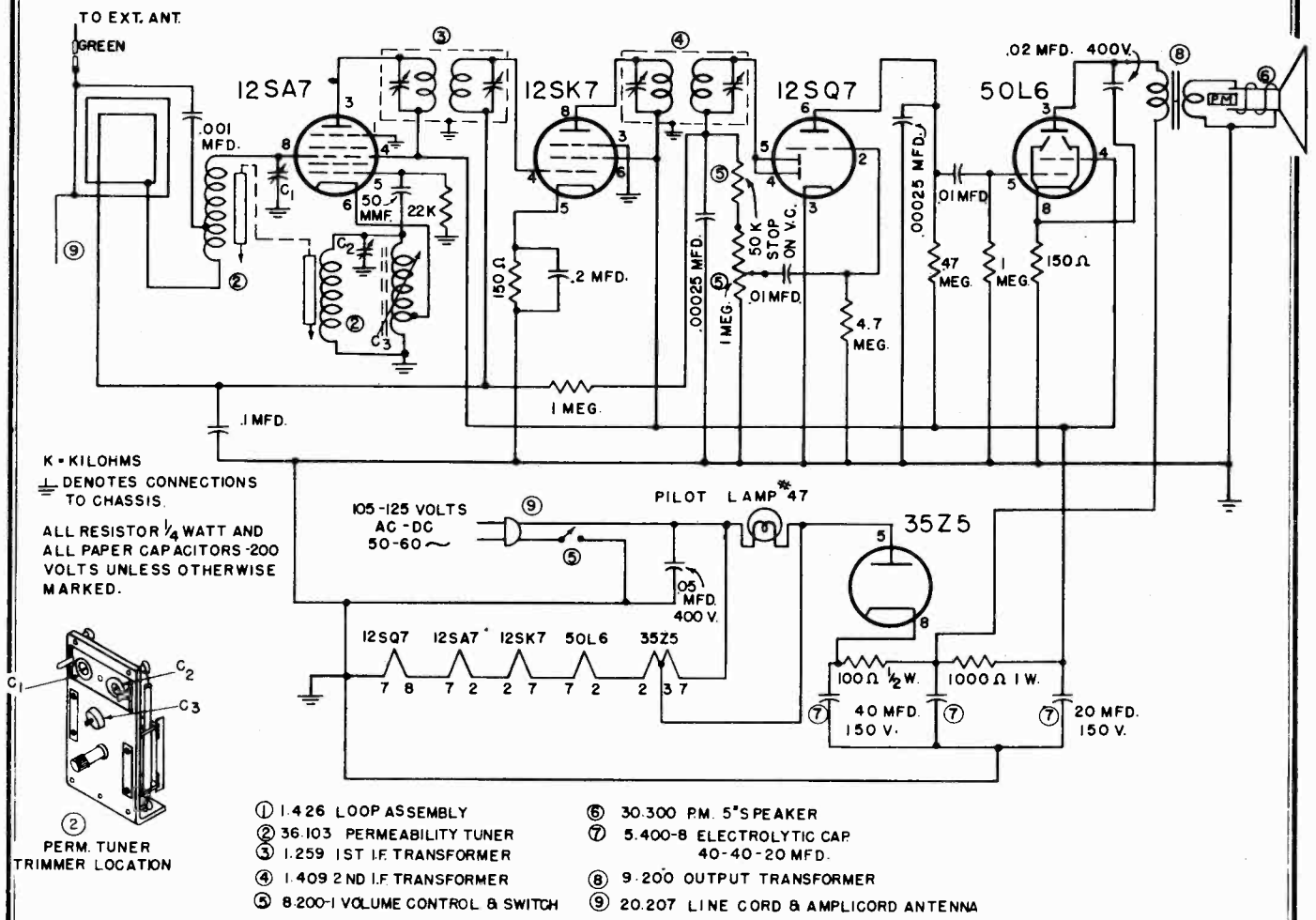
MODEL 10C-249

PARTS LIST

Illus. No.	Part No.	Part Name	Description	Illus. No.	Part No.	Part Name	Description
1	20E235	Antenna	Loop	62	27E680-2	Resistor	Carbon, 68 Ohm 1/2 Watt
2	2E48	Coil	FM Antenna	63	27E680-2	Resistor	Carbon, 68 Ohm 1/2 Watt
3	2E49	Coil	FM R.F.	64	27E680-2	Resistor	Carbon, 68 Ohm 1/2 Watt
4	2E50	Coil	FM Osc.	65	27E271-3	Resistor	Carbon, 270 Ohm 1 Watt
5	20E216	Coil	1st AM & 2nd FM I.F. Trans.	66	27E152-2	Resistor	Carbon, 1,500 Ohm 1/2 Watt
6	20E217	Coil	2nd AM & 3rd FM I.F. Trans.	67	27E222-2	Resistor	Carbon, 2,200 Ohm 1/2 Watt
7	20E218	Coil	1st FM I.F. Trans.	68	27E222-2	Resistor	Carbon, 2,200 Ohm 1/2 Watt
8	20E219	Coil	Discriminator	69	27E222-2	Resistor	Carbon, 2,200 Ohm 1/2 Watt
9	20E221	Coil	Oscillator	70	27E222-2	Resistor	Carbon, 2,200 Ohm 1/2 Watt
10	20E222	Coil	Ant. Loading	71	27E822-3	Resistor	Carbon, 10,000 Ohm 1/2 Watt
11	23E2012	Condenser	Fixed Ceramic, .001 Mfd.	72	27E103-3	Resistor	Carbon, 22,000 Ohm 1/2 Watt
12	2E52	Coil	FM Plate	73	27E153-2	Resistor	Carbon, 22,000 Ohm 1/2 Watt
13	2E53	Coil	FM R.F. Choke	74	27E223-2	Resistor	Carbon, 22,000 Ohm 1/2 Watt
14	2E19	Coil	455 KC Trap	75	27E223-2	Resistor	Carbon, 22,000 Ohm 1/2 Watt
15	2E27	Coil	Tuning Gang	76	27E223-2	Resistor	Carbon, 22,000 Ohm 1/2 Watt
16	24E27	Condenser	Elect. Dry 20-40 Mfd. 400 V	77	27E223-2	Resistor	Carbon, 22,000 Ohm 1/2 Watt
17	24E3	Condenser	Trimmer, 3-40 MMF	78	27E223-2	Resistor	Carbon, 22,000 Ohm 1/2 Watt
18	24E16	Condenser	Padder, 200-600 MMF	79	27E223-2	Resistor	Carbon, 22,000 Ohm 1/2 Watt
19	23E411	Condenser	Fixed Paper, .01 Mfd. 400 V	80	27E223-2	Resistor	Carbon, 22,000 Ohm 1/2 Watt
20	23E411	Condenser	Fixed Paper, .01 Mfd. 400 V	81	27E223-2	Resistor	Carbon, 22,000 Ohm 1/2 Watt
21	23E411	Condenser	Fixed Paper, .01 Mfd. 400 V	82	27E473-2	Resistor	Carbon, 39,000 Ohm 1/2 Watt
22	23E411	Condenser	Fixed Paper, .01 Mfd. 400 V	83	27E473-2	Resistor	Carbon, 39,000 Ohm 1/2 Watt
23	23E411	Condenser	Fixed Paper, .01 Mfd. 400 V	84	27E105-2	Resistor	Carbon, 47,000 Ohm 1/2 Watt
24	23E2004-5	Condenser	Fixed Paper, .01 Mfd. 400 V	85	27E473-2	Resistor	Carbon, 47,000 Ohm 1/2 Watt
25	23E411	Condenser	Fixed Paper, .01 Mfd. 400 V	86	27E104-2	Resistor	Carbon, 82,000 Ohm 1/2 Watt
26	23E411	Condenser	Fixed Paper, .01 Mfd. 400 V	87	27E104-2	Resistor	Carbon, 82,000 Ohm 1/2 Watt
27	23E411	Condenser	Fixed Paper, .01 Mfd. 400 V	88	27E104-2	Resistor	Carbon, 100,000 Ohm 1/2 Watt
28	23E250	Condenser	Fixed Paper, .01 Mfd. 150 V	89	27E104-2	Resistor	Carbon, 100,000 Ohm 1/2 Watt
29	23E250	Condenser	Fixed Paper, .01 Mfd. 150 V	90	27E104-2	Resistor	Carbon, 100,000 Ohm 1/2 Watt
30	23E411	Condenser	Fixed Paper, .01 Mfd. 400 V	91	27E104-2	Resistor	Carbon, 100,000 Ohm 1/2 Watt
31	23E411	Condenser	Fixed Paper, .01 Mfd. 400 V	92	27E104-2	Resistor	Carbon, 100,000 Ohm 1/2 Watt
32	23E411	Condenser	Fixed Paper, .01 Mfd. 400 V	93	27E104-2	Resistor	Carbon, 100,000 Ohm 1/2 Watt
33	23E411	Condenser	Fixed Paper, .01 Mfd. 400 V	94	27E224-2	Resistor	Carbon, 100,000 Ohm 1/2 Watt
34	23E416	Condenser	Fixed Paper, .05 Mfd. 200 V	95	27E224-2	Resistor	Carbon, 220,000 Ohm 1/2 Watt
35	23E416	Condenser	Fixed Paper, .05 Mfd. 200 V	96	27E224-2	Resistor	Carbon, 220,000 Ohm 1/2 Watt
36	23E416	Condenser	Fixed Paper, .05 Mfd. 200 V	97	27E224-2	Resistor	Carbon, 220,000 Ohm 1/2 Watt
37	23E2014-10	Condenser	Fixed Paper, .05 Mfd. 400 V	98	27E474-2	Resistor	Carbon, 220,000 Ohm 1/2 Watt
38	23E204	Condenser	Fixed Paper, .05 Mfd. 400 V	99	27E105-2	Resistor	Carbon, 330,000 Ohm 1/2 Watt
39	23E605	Condenser	Fixed Paper, .05 Mfd. 400 V	100	27E105-2	Resistor	Carbon, 330,000 Ohm 1/2 Watt
40	23E208	Condenser	Fixed Paper, .05 Mfd. 400 V	101	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
41	23E20	Condenser	Fixed Paper, .05 Mfd. 400 V	102	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
42	23E20	Condenser	Fixed Paper, .05 Mfd. 400 V	103	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
43	23E13	Condenser	Fixed Paper, .05 Mfd. 400 V	104	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
44	23E13	Condenser	Fixed Paper, .05 Mfd. 400 V	105	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
45	23E13	Condenser	Fixed Paper, .05 Mfd. 400 V	106	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
46	23E13	Condenser	Fixed Paper, .05 Mfd. 400 V	107	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
47	23E2	Condenser	Fixed Paper, .05 Mfd. 400 V	108	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
48	23E2	Condenser	Fixed Paper, .05 Mfd. 400 V	109	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
49	23E2	Condenser	Fixed Paper, .05 Mfd. 400 V	110	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
50	23E10	Condenser	Fixed Paper, .05 Mfd. 400 V	111	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
51	23E11	Condenser	Fixed Paper, .05 Mfd. 400 V	112	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
52	23E11	Condenser	Fixed Paper, .05 Mfd. 400 V	113	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
53	23E11	Condenser	Fixed Paper, .05 Mfd. 400 V	114	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
54	23E11	Condenser	Fixed Paper, .05 Mfd. 400 V	115	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
55	23E42	Condenser	Fixed Paper, .05 Mfd. 400 V	116	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
56	23E42	Condenser	Fixed Paper, .05 Mfd. 400 V	117	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
57	23E2012	Condenser	Fixed Paper, .05 Mfd. 400 V	118	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
58	23E2012	Condenser	Fixed Paper, .05 Mfd. 400 V	119	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
59	23E2012	Condenser	Fixed Paper, .05 Mfd. 400 V	120	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
60	23E2012	Condenser	Fixed Paper, .05 Mfd. 400 V	121	27E105-2	Resistor	Carbon, 470,000 Ohm 1/2 Watt
61	27E470-2	Resistor	Carbon, 47 Ohm 1/2 Watt				

MISCELLANEOUS PARTS

Part No.	Part Name	Description
64E9	Antenna	FM Di. Pole
7E116	Back	For Cabinet
53E128	Call Letters	Complete Set Station Call Letter Sheets
53E129	Call Letters	"AM-FM," "Phone," "High," "Med," "Bass" on Sheet
36E29	Dial Scale	Calibrated Scale
20E270-6	Dial Shaft	Drive Shaft Assembly
20E253-10	Dial Cord	Drive Cord
65E2	Dial Spring	Tension Spring for Dial Cord
20E174-4	Dial Printer	Dial Indicator
48E3	Dial Escutcheon	Fits around Dial Scale and Push Buttons for 296M
48E3-2	Dial Escutcheon	Fits around Dial Scale and Push Buttons for 296B
40E2	Dial Light	Part No. 40E2
37E27-12	Knob	Marked "Tuning" for Model 296M
37E27-14	Knob	Marked "Off-On-Vol." for Model 296M
37E27-34	Knob	Marked "Tuning" for Model 296B
37E27-35	Knob	Marked "Off-On-Vol." for Model 296B
37E46	Knob	Push Button
17E21-2	Plug	2 Prong for Phono-Motor
18E4-2	Post	4 Post Binding
18E4-3	Post	2 Post Binding
17E11	Slide Rail	For Record Changer
17E27	Socket	For Pilot Light
20E184	Socket	2 Contact, Female, for Phono Motor



MODEL 125-P SCHEMATIC DIAGRAM

LINE VOLTAGE: This receiver is designed for operation on 105-125 Volts, 50-60 Cycles, either Alternating or Direct Current (AC-DC).

POWER CONSUMPTION 30 Watts.

TUNING RANGE: Broadcast: 545 to 1620 Kilocycles (185 to 550 meters).

DIAL: The Dial Scale is calibrated in Kilocycles times 10 to correspond with newspaper or periodical listings.

TUBES: The tubes used and their functions are as follows:

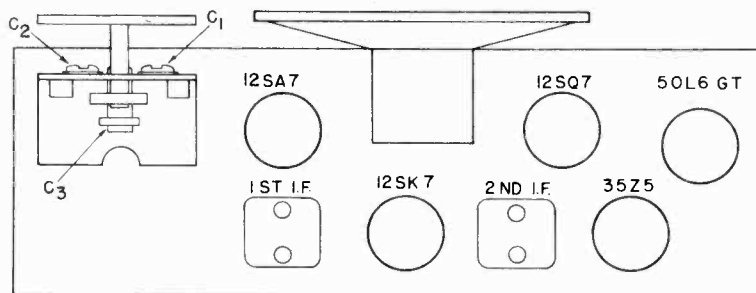
- | | |
|-----------------------|------------------------------------|
| 12SA7 Converter | 12SQ7 Detector, Avc and Audio Amp. |
| 12SK7 I. F. Amplifier | 50L6GT Beam Power Amplifier |
| | 35Z5GT Rectifier |

CAUTION: If this receiver is operated on D. C. (Direct Current), and you cannot obtain reception although the tubes are lighted, reverse the line cord to obtain the correct polarity. Objectionable hum or noise may also be eliminated on A. C. operation by reversing the line cord plug.

ALIGNMENT: Should it become necessary at any time to check the alignment of this receiver, proceed as follows:

- (1) Set the Signal Generator to 455 KC and connect to the Antenna Trimmer (C1) of the Permeability Tuner. Connect the Signal Generator ground lead to the chassis. Connect a suitable Output Meter across the Speaker Voice Coil Connections. Turn the Volume Control to the maximum position. Turn the Permeability Tuner to the extreme clockwise position (cores out of coils).
- (2) Adjust the trimmers located at the top of the first and second I. F. Transformers for maximum output as indicated on the Output Meter.
- (3) Set the Signal Generator to 1620 KC and loosely couple through a 2 or 3 turn loop to the receiver loop.
- (4) With the Permeability Tuner set at the extreme clockwise position (cores out of coils), tune in the 1620 KC signal by means of the Oscillator Trimmer (C2).
- (5) Set the Signal Generator to 1500 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer (C1) on the Permeability Tuner for maximum output.
- (6) Set the Signal Generator to 600 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Oscillator Shunt Coil (C3) for maximum response while "rocking" the Signal Generator. Recheck the High Frequency Oscillator Trimmer (C2) and re-peak the Antenna Trimmer (C1) for maximum response.

Note: Oscillator and Antenna Coil Saddles have been set and adjusted at the factory. Do not attempt to readjust the Oscillator or Antenna Coil Saddles during the above alignment procedure or serious mis-tracking will occur, resulting in loss of sensitivity at various points in the band.

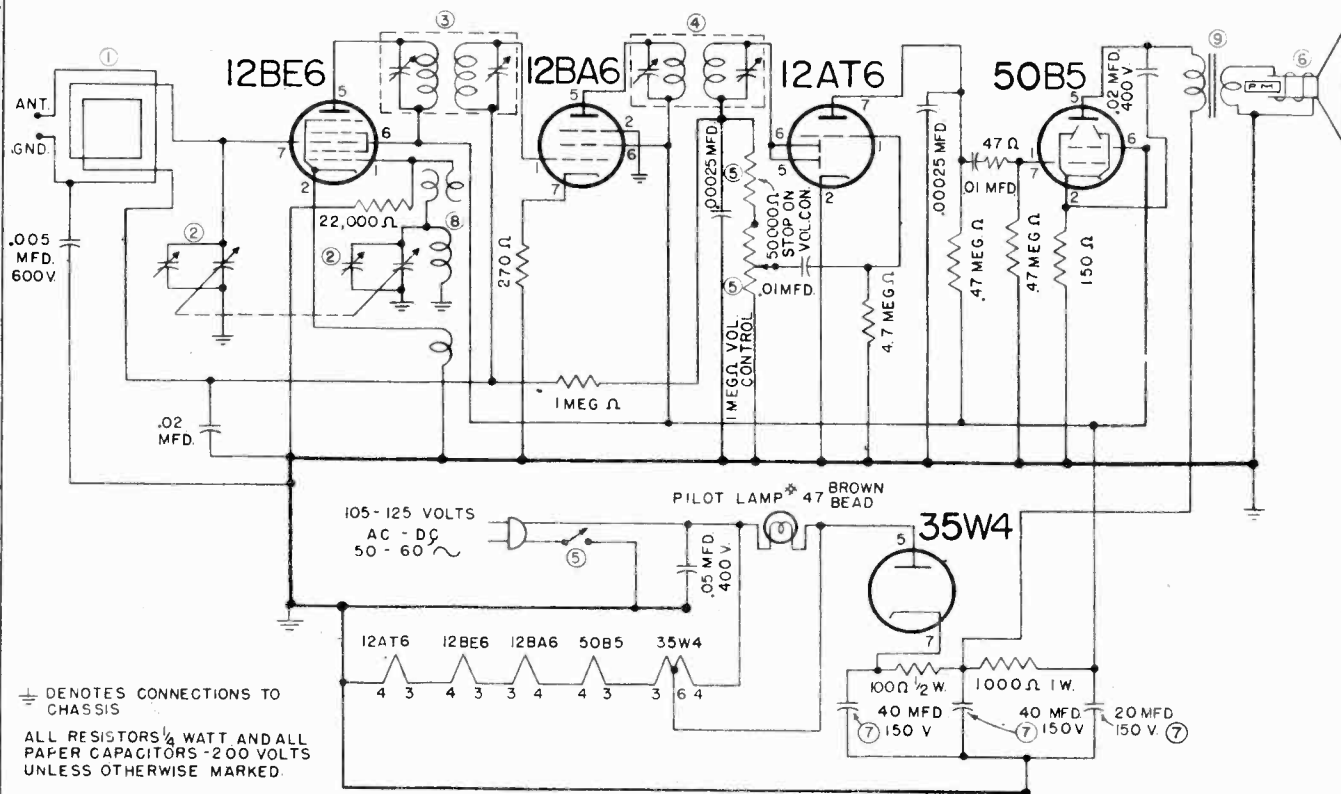


TRIMMER AND TUBE LOCATION DIAGRAM

INSTALLATION: The Model 125-P is complete in every detail for efficient and immediate operation. A self-contained Loop Antenna is included, which will give excellent results in most locations. Due to the directional properties of the Loop, it may be advantageous to turn the receiver to the left or right in noisy locations for maximum signal and minimum noise. A best position for reception can always be found. The "Amplificord" Antenna which is part of the line cord should be fully extended for reception of weak stations. In unfavorable locations where distant reception is required, a well-constructed outside antenna may be used, and connected to the Green wire labeled "Ant." at the rear of the Loop.

ASSOCIATED MERCHANDISING CORP.

MODEL 125Z



⊥ DENOTES CONNECTIONS TO CHASSIS
 ALL RESISTORS 1/2 WATT AND ALL PAPER CAPACITORS - 200 VOLTS UNLESS OTHERWISE MARKED.

I-F - 455 K.C

- | | |
|-------------------------------|---------------------------------------|
| ① 1.403 LOOP ASSEMBLY | ⑤ 8.200-1 VOLUME CONTROL & SWITCH |
| ② 2.163 2 GANG VARIABLE COND. | ⑥ 30.300 P.M. 5" SPEAKER |
| ③ 1.259 1ST I.F. TRANSFORMER | ⑦ 5.415 ELECTROLYTIC CAP 40-40-20 MFD |
| ④ 1.409 2ND I.F. TRANSFORMER | ⑧ 1.4 G2-1 OSCILLATOR COIL |
| | ⑨ 9.200 OUTPUT TRANSFORMER |

LINE VOLTAGE: This receiver is designed for operation on 105-125 Volts, 50-60 Cycles, either Alternating or Direct Current (AC-DC).

POWER CONSUMPTION: 30 Watts.

TUNING RANGE: Broadcast: 540 to 1650 Kilocycles (180 to 555 meters).

DIAL: The Dial Scale is calibrated in Kilocycles times 10 to correspond with newspaper or periodical listings.

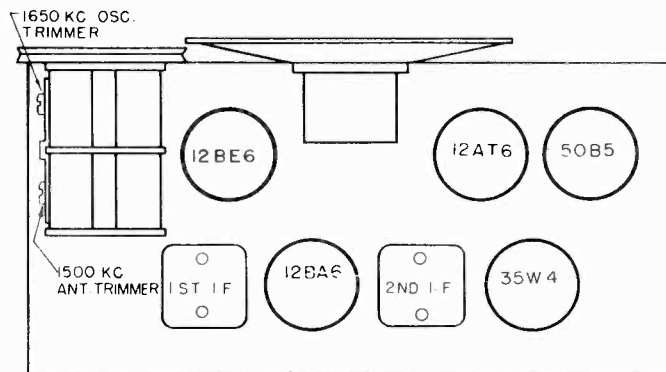
TUBES: The tubes used and their functions are as follows:

- | | |
|-----------------------|------------------------------------|
| 12BE6 Converter | 12AT6 Detector, Avc and Audio Amp. |
| 12BA6 I. F. Amplifier | 50B5 Beam Power Amplifier |
| | 35W4 Rectifier |

CAUTION: If this receiver is operated on D. C. (Direct Current), and you cannot obtain reception although the tubes are lighted, reverse the line cord plug to obtain the correct polarity. Objectionable hum or noise may also be eliminated on A. C. operation by reversing the line cord plug.

ALIGNMENT: Should it become necessary at any time to check the alignment of this receiver, proceed as follows:

- (1) Set the Signal Generator to 455 KC and connect to the Stator Lug on the rear section of the Variable Capacitor. Connect the Signal Generator ground lead to the chassis. Connect a suitable output meter across the Speaker Voice Coil Connections. Turn the Volume Control to the maximum position. Turn the Variable Capacitor to the extreme clockwise position.
- (2) Adjust the trimmers located at the top of the first and second I. F. Transformers for maximum output as indicated on the output meter.
- (3) Loosely couple the Signal Generator Ground Lead to the loop and set to 1650 KC.
- (4) With the Variable Capacitor set at the extreme clockwise position, tune in the 1650 KC signal by means of the Oscillator Trimmer on the Variable Capacitor (front section).
- (5) Set the Signal Generator to 1500 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer on the Variable Capacitor (rear section) for maximum output. No other adjustments are necessary.

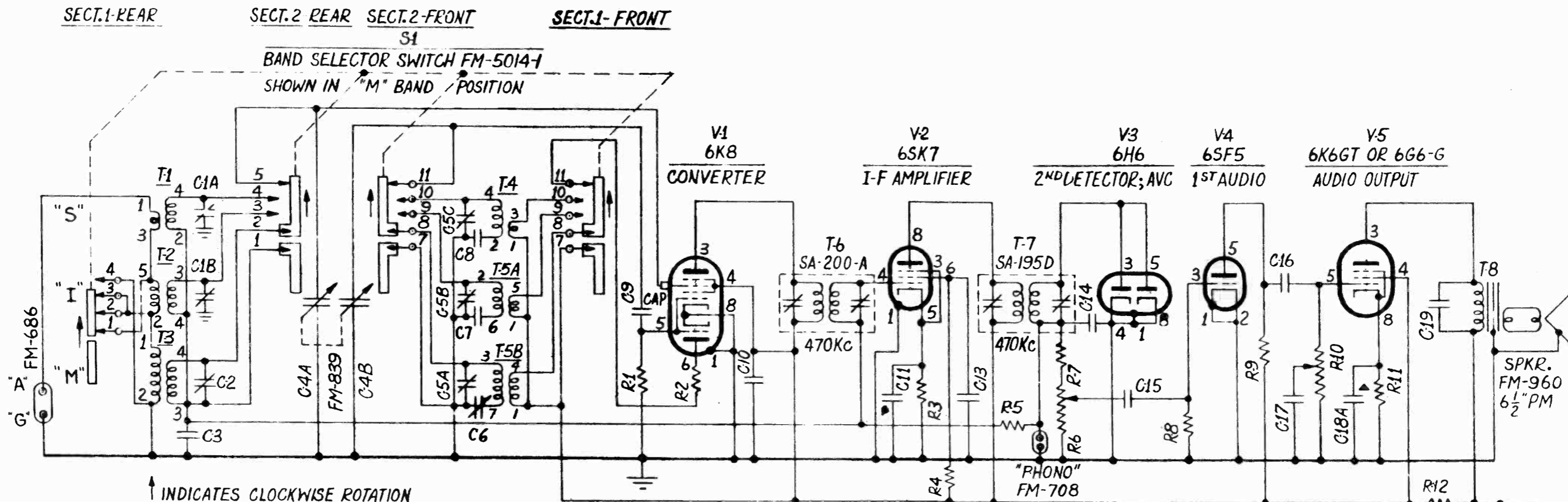


MODEL 125-Z

TRIMMER AND TUBE LOCATION DIAGRAM

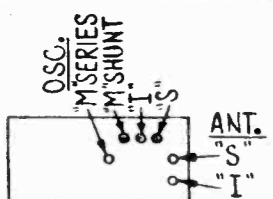
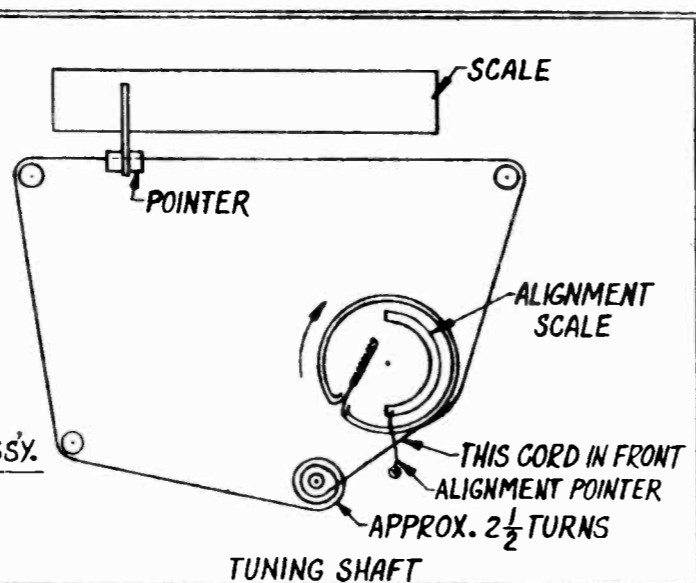
INSTALLATION: The Model 125-Z is complete in every detail for efficient and immediate operation. A self-contained Loop Antenna is included, which will give excellent results in most locations. Due to the directional properties of the Loop, it may be advantageous to turn the receiver to the left or right in noisy locations for maximum signal and minimum noise. A best position for reception can always be found. In unfavorable locations where distant reception is required, a well-constructed outside antenna may be used, and connected to the *Green* wire labeled "Ant." at the rear of the Loop. A water or gas pipe may be used as a ground and connected to the *Black* wire labeled "Gnd." at the rear of the Loop.

MINOR REASONS FOR FAILURE TO FUNCTION: Defective tubes, defective Volume Control and On-Off Switch, line cord reversed on D.C., defective line cord plug.



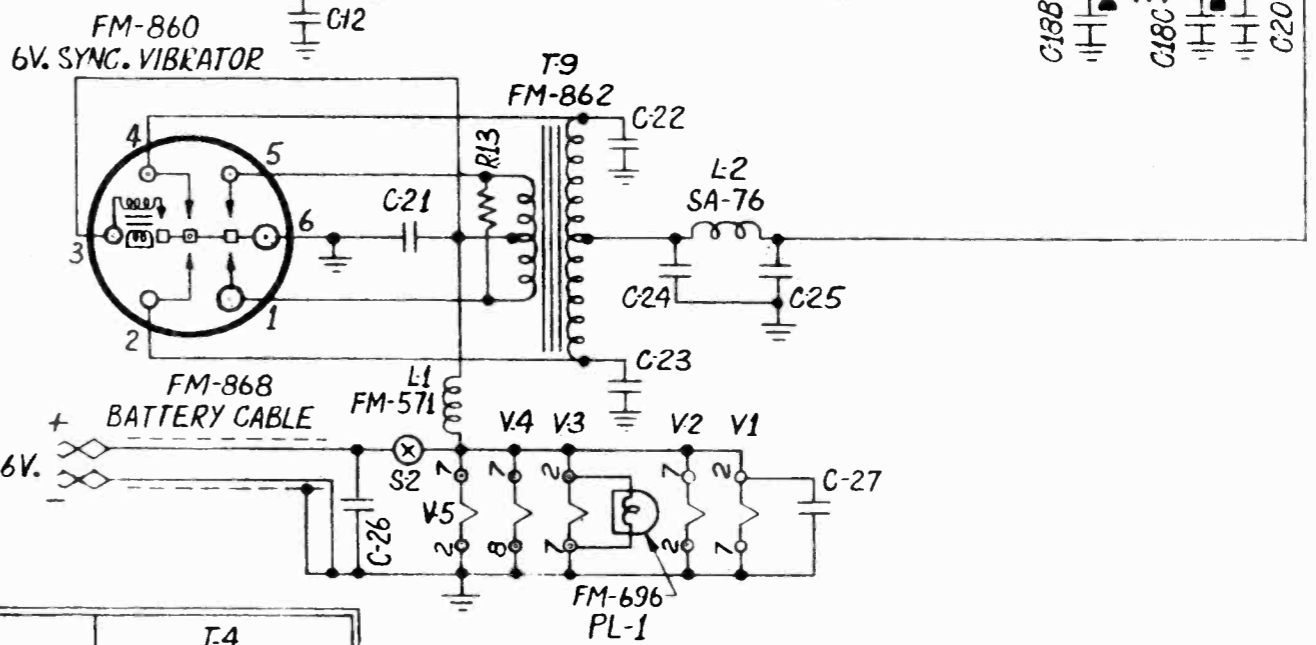
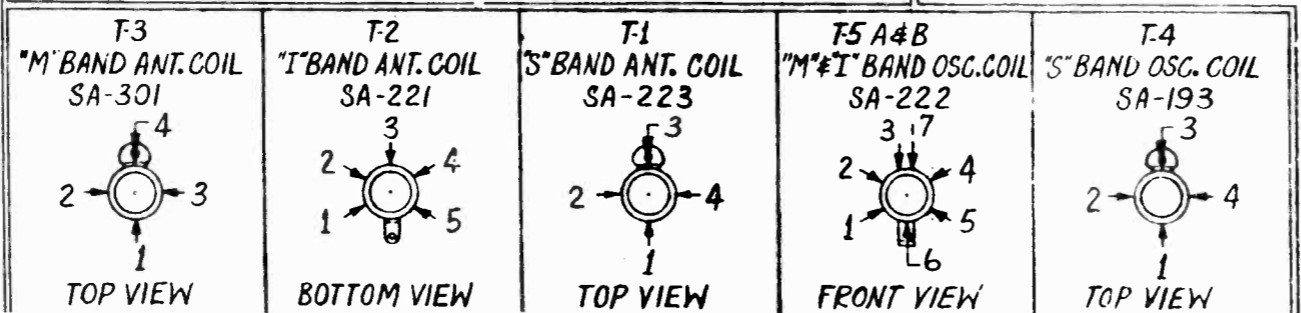
↑ INDICATES CLOCKWISE ROTATION

ALIGNMENT FREQUENCIES		
BAND	EXACT ALIGNMENT	CIRCULAR SCALE DIVISIONS
"M"	600Kc-500 METERS 1500Kc-200 METERS	15.5 88.5
"I"	6Mc - 50 METERS	80.5
"S"	22Mc 13.6 METERS	83.0

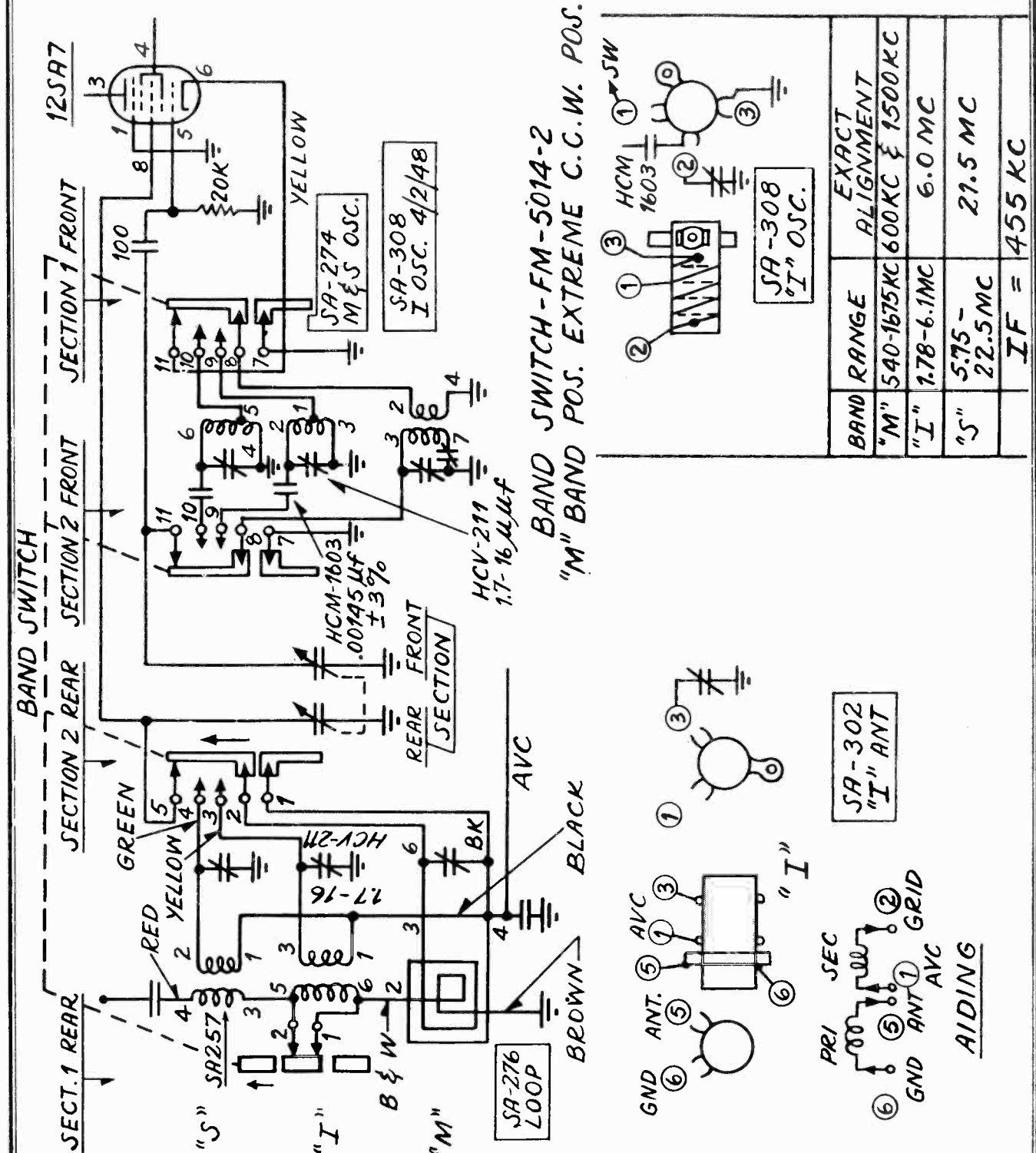


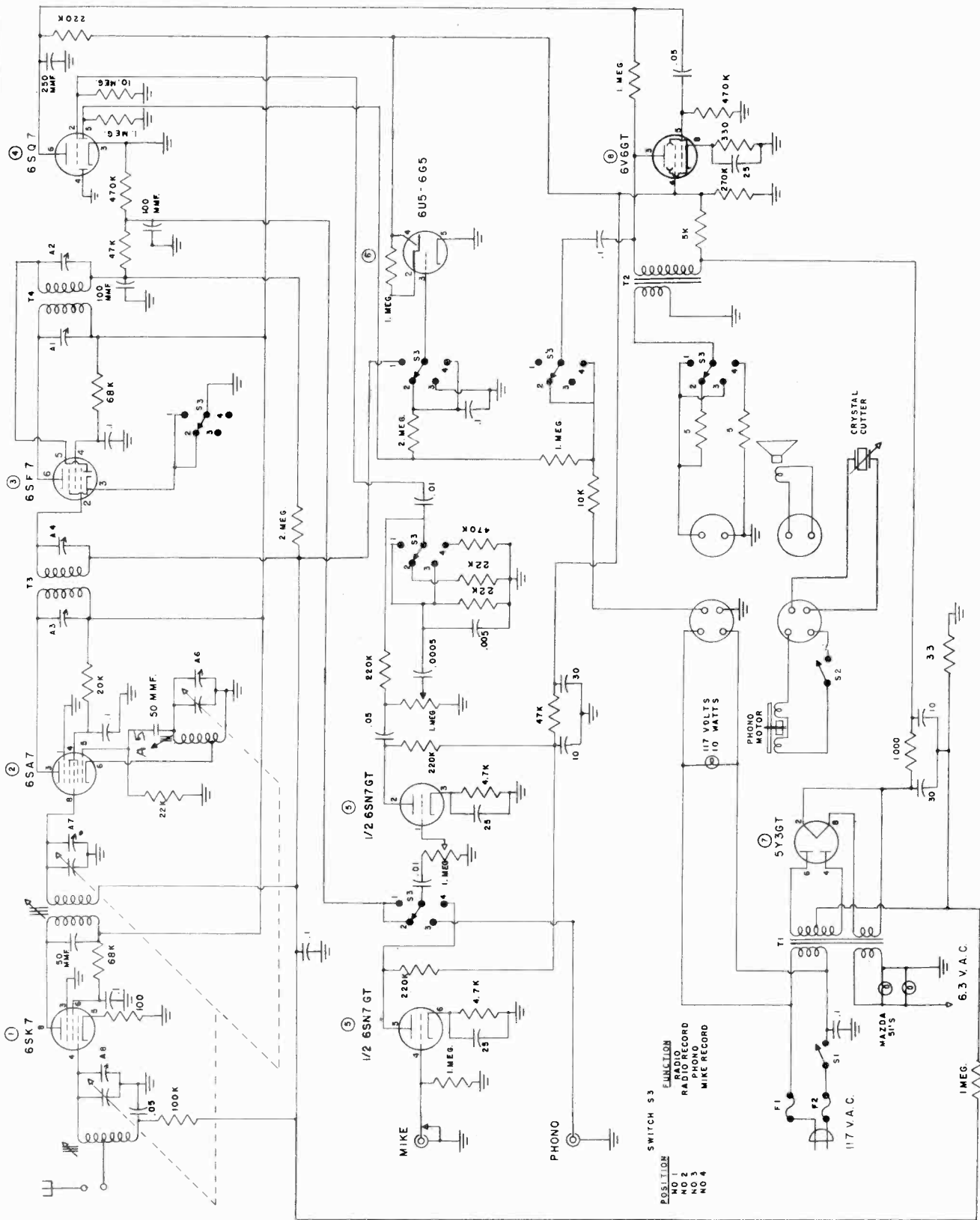
FRONT TOP VIEW

TRIMMER LOCATION
NOTE: "M" ANT. TRIMMER LOCATED ON SA-301



Ref. No.	Description	Part No.	Ref. No.	Description	Part No.
C-1A	DUAL MIDGET TRIMMER.	3-30 m.nfds	R-1	BROWN BEAD	FM-696
C-1B	SINGLE SECTION TRIMMER.	2-50uuf.	R-2	25,000 OHMS ±20%	GR-12
C-2	TUR. PAPER CAP.	.05 MFD. 200V	R-3	200 OHMS ±10%	GR-49
C-3	2 SECTION GANG COND.		R-4	150 OHMS ±10%	GRC-202
C-4A			R-5	22,000 OHMS ±10%	GR-201
C-4B			R-6	2.0 MEGOHMS ±20%	GR-23
C-5A	3 SECTION TRIMMER COND.	3-.40 uuf.	R-7	VOLUME CONTROL	FM-5015
C-5B			R-8	COMPLETE WITH S-1	GR-44B
C-5C			R-9	50,000 OHMS ±20%	GR-108
C-6	SINGLE MTG. TRIMMER.	.430 uuf Oper.	R-10	10 MEG.	GR-46
C-7	MOLDED MICA CAP.	.0015 MFD.	R-11	240,000 OHMS ±20%	FM-5016
C-8	MOLDED MICA CAP.	.005 MFD. ±3%	R-12	470 OHMS ±10%	GRC-213
C-9	MOLDED MICA CAP.	.0001 MFD.	R-13	1000 OHMS ±10%	GRC-231
C-10	TUB. PAPER CAP.	.95 MFD. 600V		200 OHMS ±10%	GR-43
C-11	TUB. PAPER CAP.	0.1 MFD. 200V	S-1	BAND SELECTOR SWITCH	FM-5014-1
C-12	TUB. PAPER CAP.	0.1 MFD. 400V	S-2	2 SECTIONS - 3 POS.	
C-13	TUB. PAPER CAP.	0.05 MFD. 200V		ON-OFF SWITCH (ON REAR OF R-6)	
C-14	MOLDED MICA CAP.	.00025 MFD.	T-1	"S" BAND ANTENNA TRANSFORMER	SA-223
C-15	TUB. PAPER CAP.	.002 MFD. 600V	T-2	"I" BAND ANTENNA TRANSFORMER	SA-221
C-16	TUB. PAPER CAP.	.05 MFD. 200V	T-3	"M" BAND ANTENNA TRANSFORMER	SA-301
C-17	TUB. PAPER CAP.	.006 MFD. 600V	T-4	"S" BAND OSCILLATOR TRANSFORMER	SA-193
C-18A	ELECTROLYTIC CAP.	20 MFD. 25V	T-5A	"I" BAND OSCILLATOR TRANSFORMER	SA-222
C-18C		20 MFD. 450V	T-5B	"M" BAND OSCILLATOR TRANSFORMER	
C-19	TUB. PAPER CAP.	.002 MFD. 500V	T-6	470 Kc. AMPLIFIER IF TRANSFORMER	SA-200A
C-20	DRY ELECTROLYTIC	20 MFD. 250V	T-8	470 Kc. DIODE IF TRANSFORMER	SA-195D
C-21	TUB. PAPER CAP.	.5 MFD. 100V	T-9	OUTPUT TRANSFORMER ON SPKR.	FM-862
C-22	TUB. PAPER CAP.	.01 MFD. 600V	V-1	5K8	
C-23	TUB. PAPER CAP.	.01 MFD. 600V	V-2	6SK7	
C-24	TUB. PAPER CAP.	.05 MFD. 440V	V-3	6X6	
C-25	TUB. PAPER CAP.	.01 MFD. 500V	V-4	6SF5	
C-26	MOLDED MICA CAP.	.005 MFD. ±20%	V-5	6X5GT	
C-27				6 V. SYNCHRONOUS VIBRATOR	FM-950
L-1	60 uh "A" F-F CHOKE	FM-571			FM-850
L-2	5.5 mh "B" R-F CHOKE	SA-75			
PL-1	PILOT LIGHT C-8 V 0.15A				





SPECIFICATIONS

117 Volts 60 Cycle AC ONLY -- 130 watts.

8 Multi-Purpose Tubes Including Rectifier Giving 13 Tube Efficiency.

Built-in Antenna.

6 x 9 oval Alnico V speaker.

Broad Band Bass Boost with Treble Control.

TUBES USED

6SK7--R.F. Amplifier

6SN7 GT -- Microphone Pre-amplifier and Audio Amplifier

6SA7--Mixer

6SF7--I.F. Amplifier, Diode Detector and Automatic Volume Control

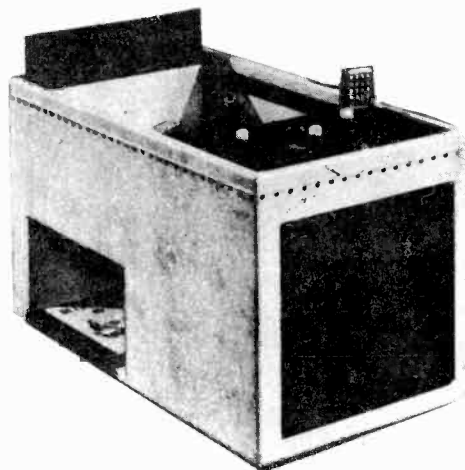
6V6 GT -- Power Output Amplifier

6SQ7--Audio Amplifier and Volume Indicator Rectifier

5Y3 GT -- Power Rectifier

6U5/6G5 -- Tuning Eye and volume level Indicator

Changer Compartment light - 10 watt, 117 volt, double contact, candelabra, bayonet - Mazda No. 10C7-DC

TUNING EYE

The 6U5/6G5 magic eye tube located in the center of the dial is used as a tuning indicator when the selector switch is in the RADIO position. The tuning knob should be adjusted to cause the eye opening to be narrowest for perfect tuning. When the selector switch is in the RADIO RECORD or VOICE RECORD positions, this tube functions as a volume level indicator. It is not operative in the PHONO position.

Alignment Instructions

Step	Dummy Ant.	Signal Generator Coupling	Signal Generator Frequency	S3 Switch Pos.	Radio Dial Setting	Output Meter	Adjust	Remarks
1	.05mfd	High side to ant. jack low side to chassis	455 KC	Radio	Tuning Cap. fully open	Across voice coil	A1:A2	Adjust for maximum output.
2	.05mfd	"	"	"	"	"	A3:A4	"
3	See note	See note	540 KC	"	Tuning cap. fully closed	"	A5	"
4	"	"	1720 KC	"	Tuning cap. fully open	"	A6	Adjust for maximum output. Repeat steps 3 and 4 until desired range is secured.
5	"	"	1400 KC	"	Tune for maximum output	"	A7	Adjust for maximum output. Rock tuning capacitor while adjusting
6	"	"	1400 KC	"	"	"	A8	"

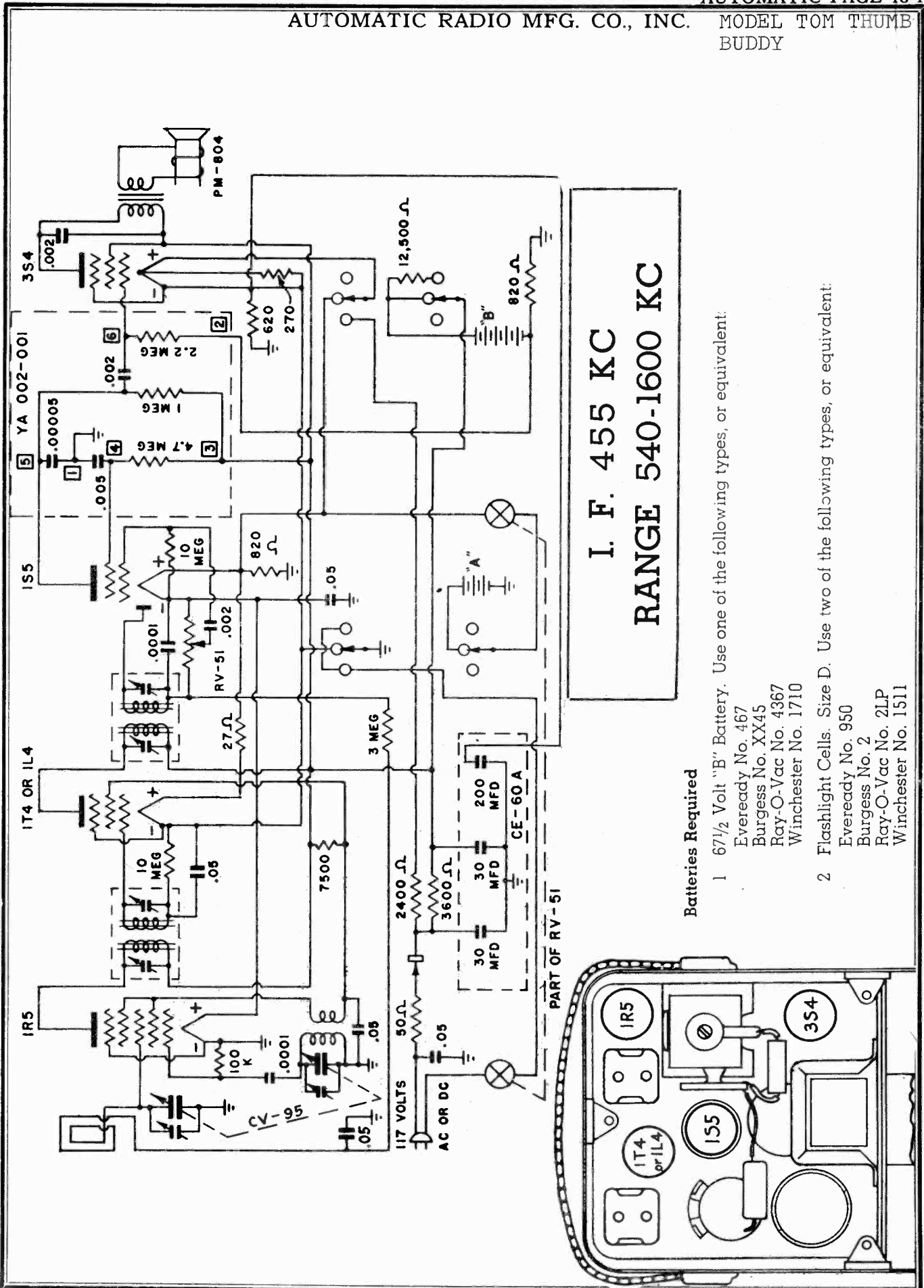
NOTE: Make all RF adjustments with a dummy antenna, which consists of a piece of wire approximately 8 feet long, connected to the antenna jack. Signal generator should be connected to a short length of wire placed several inches from the dummy antenna.

Voltage Table

No.	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7	0V	0V	0V	AVC	.75VDC	100VDC	6.3VAC	185VDC
2	6SA7	0V	0V	185VDC	65VDC	*-7VDC	-----	6.3VAC	AVC
3	6SF7	0V	AVC	0V	90VDC	-----	185VDC	6.3VAC	0V
4	6SQ7	0V	*-.8V	0V	-----	-----	110VDC	6.3VAC	0V
5	6SN7GT	-----	45VDC	2.2VDC	-----	45VDC	2.2VDC	6.3VAC	0V
6	6U5	6.3VAC	35VDC	AVC	185VDC	0V	0V	-----	370VDC
7	5Y3GT	-----	370VDC	-----	350VAC	-----	350VAC	-----	-----
8	6V6GT	0V	0V	305VDC	190VDC	-----	-----	6.3VAC	10VDC

Conditions

1. SWITCH S3 in radio position, volume control at normal listening level, broadcast signal being received.
2. All DC voltage measurements except those marked with an asterisk are at 20,000 ohms per volt. Voltages marked with an asterisk obtained with a VTVM.
3. AVC voltage will vary with strength of received signal.
4. Voltage readings are from socket pin to chassis.



I. F. 455 KC
RANGE 540-1600 KC

Batteries Required

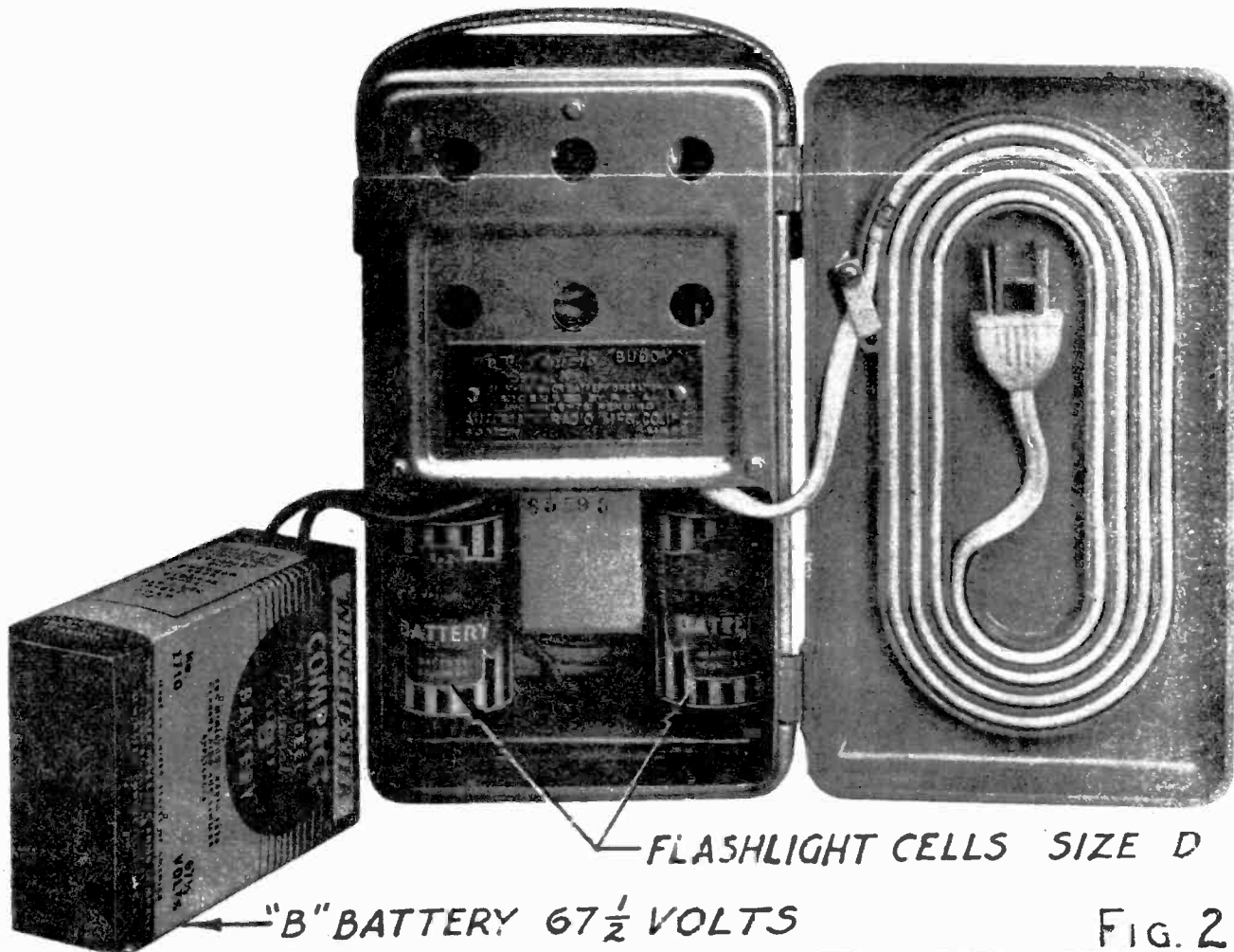
- 1 67 1/2 Volt "B" Battery. Use one of the following types, or equivalent:
 Eveready No. 467
 Burgess No. XX45
 Ray-O-Vac No. 4367
 Winchester No. 1710
- 2 Flashlight Cells. Size D. Use two of the following types, or equivalent:
 Eveready No. 950
 Burgess No. 2
 Ray-O-Vac No. 2LP
 Winchester No. 1511

MODEL TOM THUMB
BUDDY

AUTOMATIC RADIO MFG. CO., INC.



FIG. 1



FLASHLIGHT CELLS SIZE D

"B" BATTERY 67 1/2 VOLTS

FIG. 2

BATTERY INSTALLATION INSTRUCTIONS**Flashlight Cell Installation**

- 1.) Open Back door.
- 2.) Insert flashlight cells on each side of speaker frame as indicated in figure 2.

"B" Battery Installation

- 1.) Snap connector strip over "B" battery terminals.
- 2.) Insert bottom end of "B" battery to the extreme right under frame of back cover.
- 3.) Drop top of battery into position over flashlight cells.
- 4.) Slide battery slightly to the left to locate centrally under back door frame.

NOTE: "B" battery can be removed by lifting top of battery by the connector strip terminal leads and reversing the above procedure.

Batteries that have become badly swollen can be taken out by removing the back cover and door assembly.

BATTERY CHARGING

The "Charge" feature contained in this model is only applied to the "B" battery. The inexpensive flashlight cells are not subjected to a charge.

Failure of the radio to operate on battery power will first be due to exhausted flashlight cells. The radio will operate again on battery power when these cells have been replaced.

The "B" battery under normal operating conditions without charge will last approximately three times as long as the flashlight cells.

The normal operating life of the "B" battery can be extended from two to three times with charging as outlined below.

The following procedure should be followed when a battery charge is required. (Refer to figure 1 for switch detail.)

1. Plug power line cord into AC or DC 117 Volt power line.
2. Turn "Off-On" Volume knob to the right until a click is heard.
3. Slide 3-position Operation Selector Switch to "AC-DC" position. If radio operates, power outlet is working satisfactorily.
4. Slide 3-position Operation Selector Switch to "Charge" position. The battery is now on charge.

The best possible performance on battery operation can be realized if the battery is periodically charged for about as long a period as it has been in use, rather than wait until it has run down. For example, if the radio has been operated for four hours on battery, it should be on charge for at least four hours afterwards. In this manner the quality and sensitivity of the radio will be at a maximum since the fully charged "B" battery will insure "new battery" performance.

This charge can be repeated many times until finally the "B" battery is completely dissipated and will no longer respond to a charge.

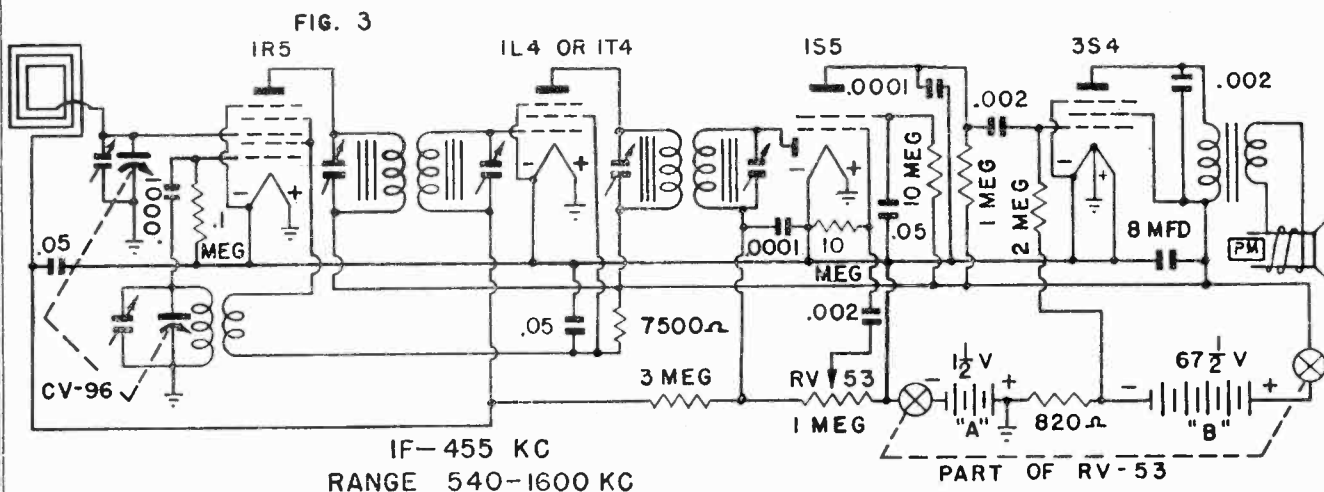
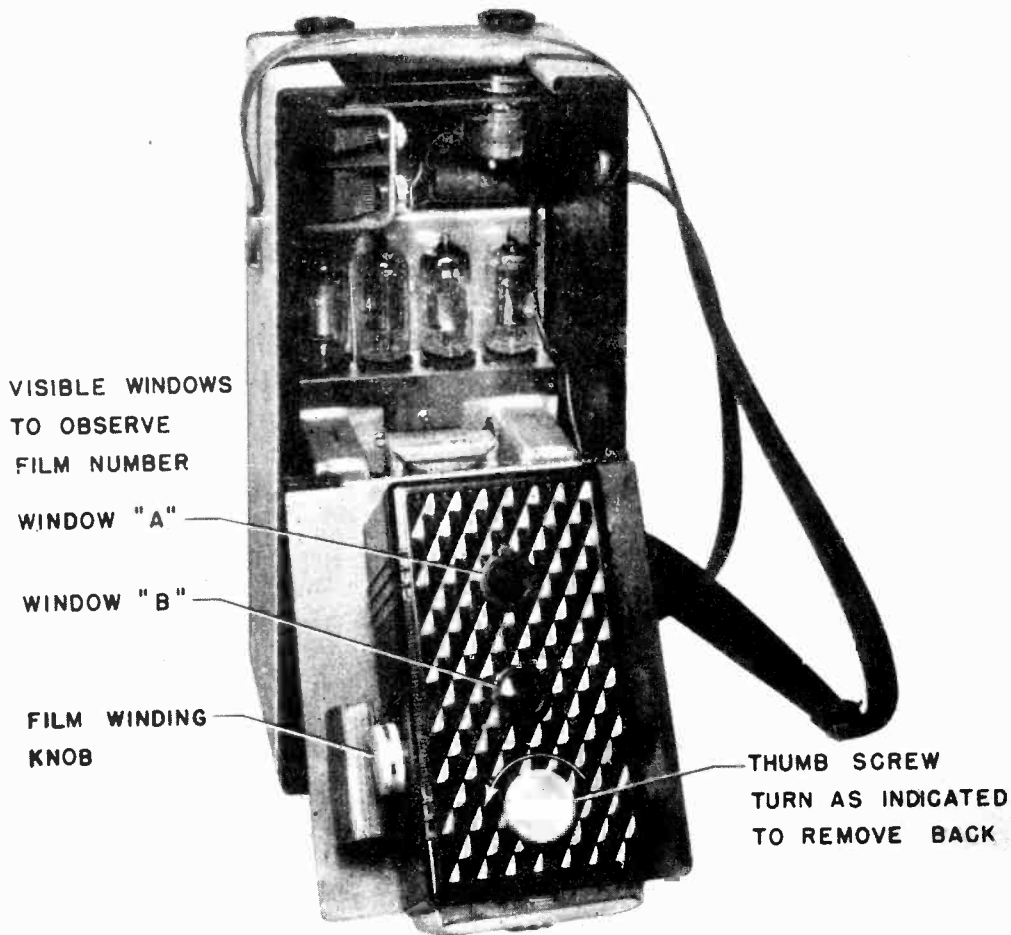
DO NOT REPLACE "B" BATTERY UNTIL RADIO FAILS TO OPERATE ON BATTERY POWER WITH NEW FLASHLIGHT CELLS.

Power Line Cord

The Power line cord is contained in the spiral groove on the inside of the back cover. For "AC-DC" or "Charge" operation, remove plug from post holder and unwind required length of cord necessary to reach available outlet. Wind back in spiral groove when not in use. If entire length of cord has been unwound, start rewinding from outside groove and work in towards the center. Put plug back into post holder.

**THE FOLLOWING PROCEDURE SHOULD BE FOLLOWED
TO REMOVE CHASSIS FROM CABINET FOR REPAIRING**

- 1.) Remove knobs.
- 2.) Remove tri-mount snap fasteners securing loop cover (contained in front door) and unsolder loop leads.
- 3.) Remove three screws holding back frame and cover assembly in position.
- 4.) Slip off back frame and cover assembly.
- 5.) Remove cabinet body.
- 6.) Remove the mounting screws that secure chassis to three mounting brackets.
- 7.) Slide chassis out carefully spreading mounting brackets slightly if necessary.



**THE FOLLOWING PROCEDURE SHOULD BE FOLLOWED TO REMOVE CHASSIS
FROM CABINET FOR REPAIRING.**

1. Remove knobs.
2. Remove bottom screw on back located below tuning dial window.
3. Remove back by dropping down slightly and lifting out.
4. Remove license label.
5. Unsolder speaker and bottom battery terminal leads.
6. Swing camera down.
7. Remove screw located in center of terminal board.
8. Drop chassis carefully so that control shafts clear inside top of cabinet and swing out.

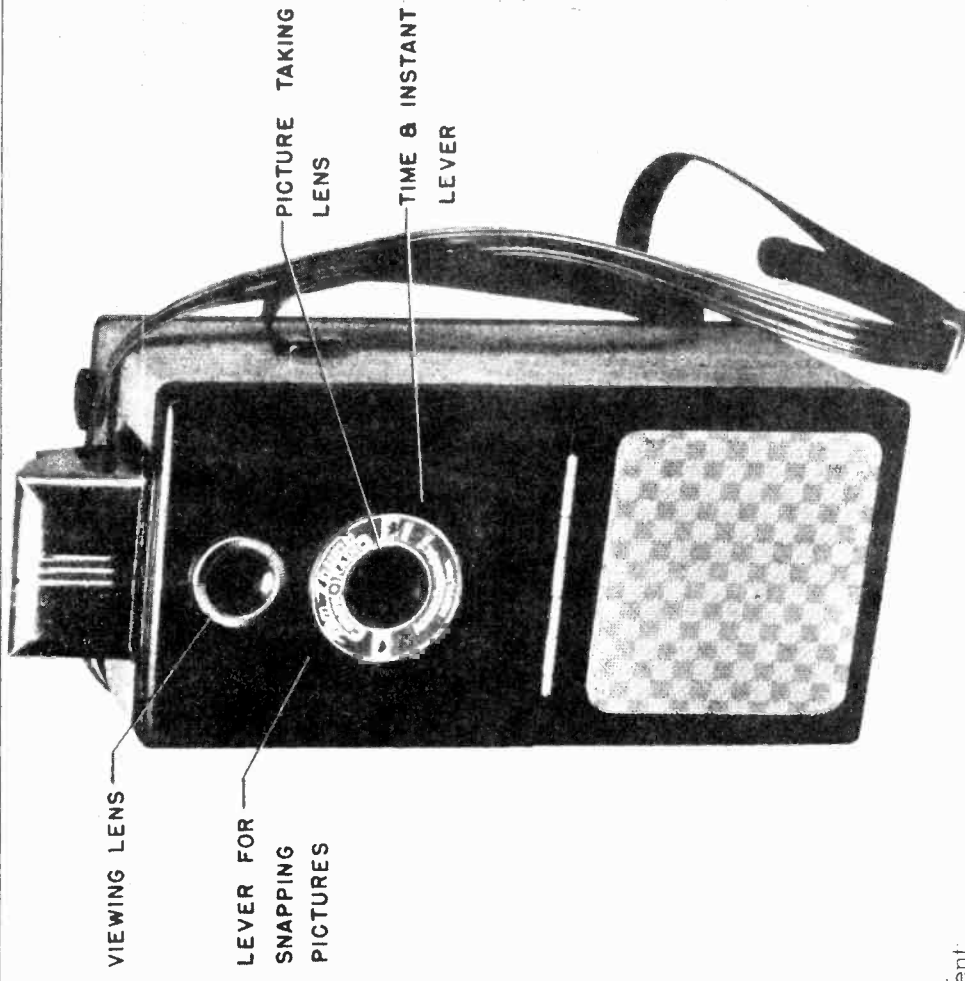


FIG. 1

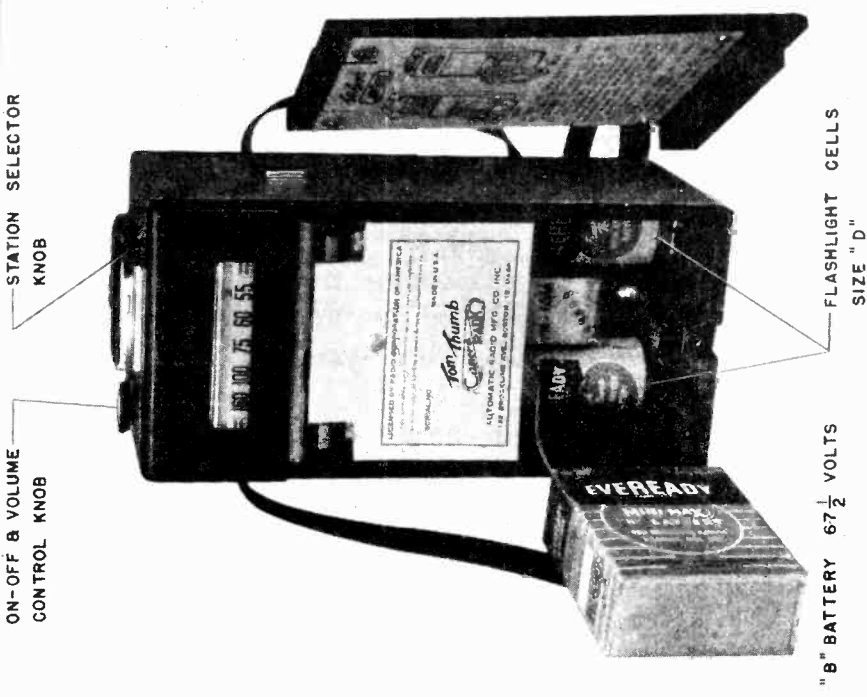


FIG. 2

Batteries Required

1 67 1/2 Volt "B" Battery. Use one of the following types, or equivalent:

- Eveready No. 467
- Burgess No. XX45
- Ray-O-Vac No. 4367
- Winchester No. 1710

2 Flashlight Cells, Size D. Use two of the following types, or equivalent:

- Eveready No. 950
- Burgess No. 2
- Ray-O-Vac No. 2LP
- Winchester No. 1511

BATTERY INSTALLATION (See Figure 2)

1. Remove bottom screw on back located below tuning dial window.
2. Remove back by dropping down slightly and lifting out.
3. Insert flashlight cells on each side of speaker frame as indicated in Figure 2.
4. Snap connector strip over "B" Battery terminals.
5. Place "B" battery over flashlight cells (See Fig. 2).
6. Replace Back.

NOTE: This radio cannot operate with back removed.

MODEL TOM THUMB
CAMERA

AUTOMATIC RADIO MFG. CO., INC.

FILM REQUIRED FOR CAMERA:**AGFA A8 OR EASTMAN 127 OR EQUIVALENT.****TO LOAD AND UNLOAD CAMERA (See Figure 3)**

Facing tuning dial, place thumb on camera top cover with other fingers on radio side and push camera away from knobs. An unlocking click will be heard as the camera hinges down and exposes all the necessary adjustments. Turn thumb screw to the left to remove back cover.

Always load and unload camera in shaded place, never in bright sunlight! Insert slotted end of spool into the winding knob at the top of camera. Then place film in empty receptacle at extreme opposite end. Fit ends of spool into the grooves (under film retainer spring). Push the roll down into the grooves which hold the roll. Then break seal on film and pull end towards empty spool. Thread end of film through widest side of slot in empty spool. Turn winding knob two or three times until paper rolls on empty spool. Replace back of camera. Be sure thumb screw is turned as far as it will go to be sure cover is on as tightly as possible.

TO WIND FILM

Suspend Camera-Radio in front of operator by means of adjustable shoulder strap so that camera lens faces subject to be photographed. Unlock camera by pushing camera top away from knobs as mentioned previously. The camera will hinge down and expose necessary controls.

Turn winding knob slowly and watch film pass red window "A". When the figure "1" appears in the center of Window "A", you are ready to take the first picture. Swing camera back into position again pressing the camera firmly towards the knobs until a slight click is heard. This indicates that the camera is properly locked in place. After taking this picture swing camera down again exposing control and wind knob slowly until figure "1" appears in red window "B". Then take second picture. After this picture is taken, turn knob until figure "2" appears in window "A". After snapping the picture, turn knob until figure "2" appears in window "B". In this manner 2 pictures are taken for each number appearing on the film roll — one in window "A", one in window "B". When number "8" appears in the center of window "B", you have taken 16 pictures. When you have taken all of the pictures, keep turning knob in same direction until the complete roll of film including the red paper is all wound on the top spool.

TO REMOVE FILM

Open back of camera as when loading. Then press down on spring holding film roll and lift out spool of film. Now, seal roll with piece of gummed paper attached to end of roll so that it will not unroll.

HOW TO TAKE PICTURES

Open cover at top by placing thumb and forefinger on bottom of cover and lift upward. Look down into ground glass enclosed under cover. Point lens of camera at object you want to photograph. Object you see reflected there will appear on your finished picture. By moving camera closer or further from object, you can gauge the proportions and size desired in finished print. When ready to photograph, hold camera steady; then press lever firmly and picture has been taken. **NOTE:** Always have sun behind you with object being photographed facing sun!

SHUTTER

The shutter has been carefully adjusted to give you maximum excellent results for all standard shots! It has also been regulated to enable you to take clear, clean photographs of landscapes, groups, portraits, and "action shots." To adjust shutter for instant or time exposure, merely move indicator at left of camera to either INST. or TIME.

FOR INSTANTANEOUS PICTURES

Move indicator to INST. Grasp Camera-Radio firmly. Sight object to be photographed in ground glass view finder. **HOLD CAMERA-RADIO STEADY.** Then press shutter lever down firmly, and the picture is taken.

TIME EXPOSURE

Move indicator to "TIME". Place Camera-Radio on a solid support (a table or bench) so that Camera-Radio will not move. (Never hold Camera-Radio in hands for time shot.) **Then press shutter lever and hold down until you have counted the required number of seconds for exposure desired.** (Five seconds usually being ample, depending upon lighting conditions.) Then picture is completed. . . . If you wish to return to INST. daylight shots, push lever back to INST.

IMPORTANT: To obtain best results, subject to be photographed should be at least 8 feet away from camera.

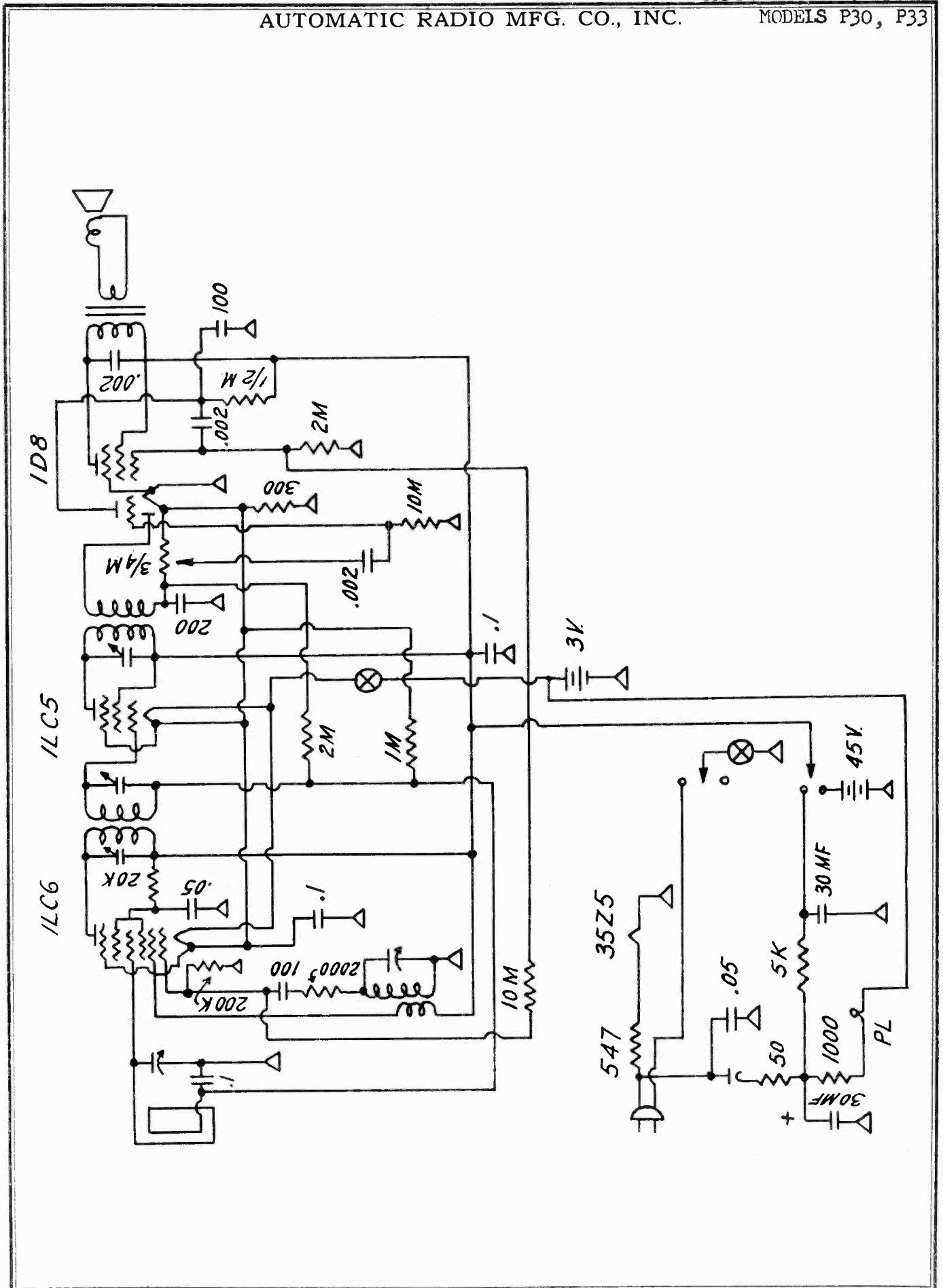
"LARGER" CONTACT PRINTS

Most photo finishers throughout the country are equipped with contact enlargement printers that produce approximately 3 1/4"x4" prints from the negatives you get with this camera.

Retail prices for these enlarged prints vary in different sections of the United States. However, in most cases they cost only slightly more than ordinary quality prints. See your dealer for further information.

INSTRUCTIONS

- Be sure lenses are clean. Use soft, clean cloth.
- Keep interior of camera free from dust.
- Be sure cover is tightly closed before taking picture.
- Be sure film is wound as tightly as possible before opening camera to remove film.

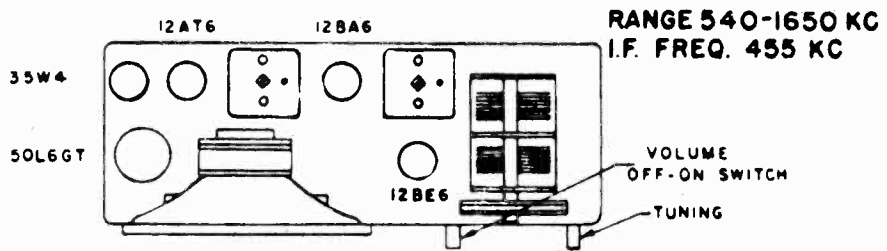
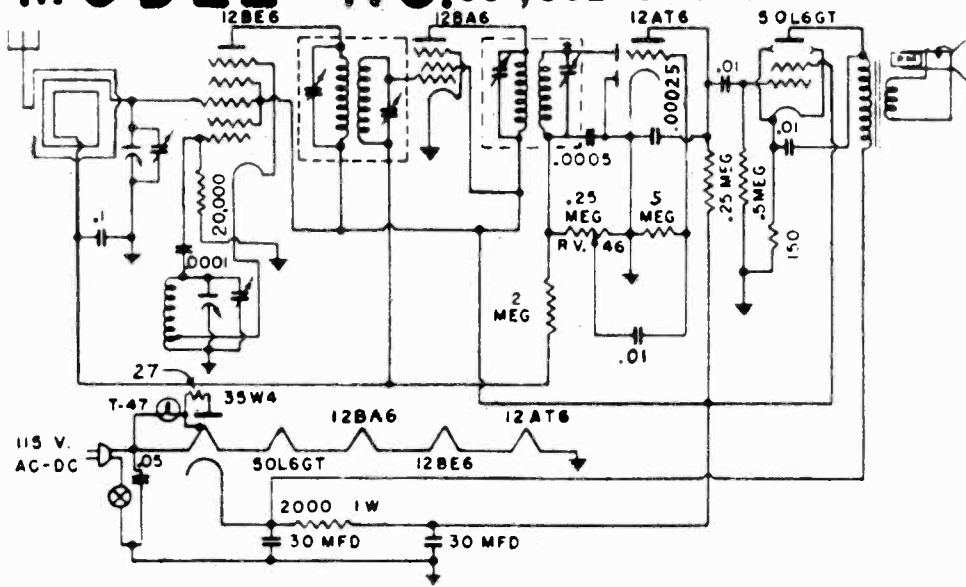


MODELS 801, 802
803, SERIES B

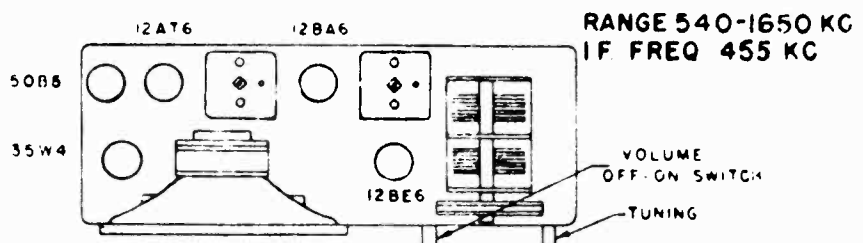
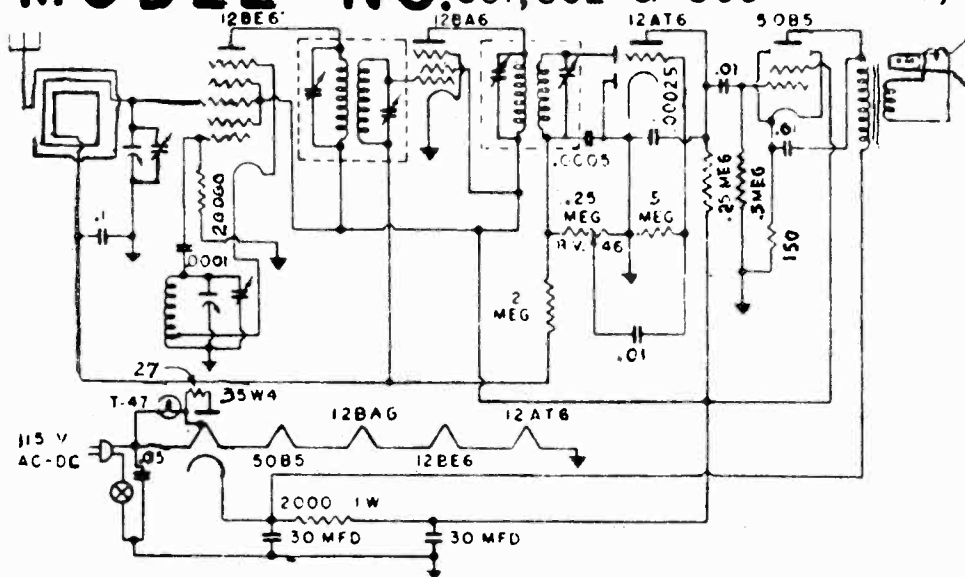
AUTOMATIC RADIO MFG. CO., INC.

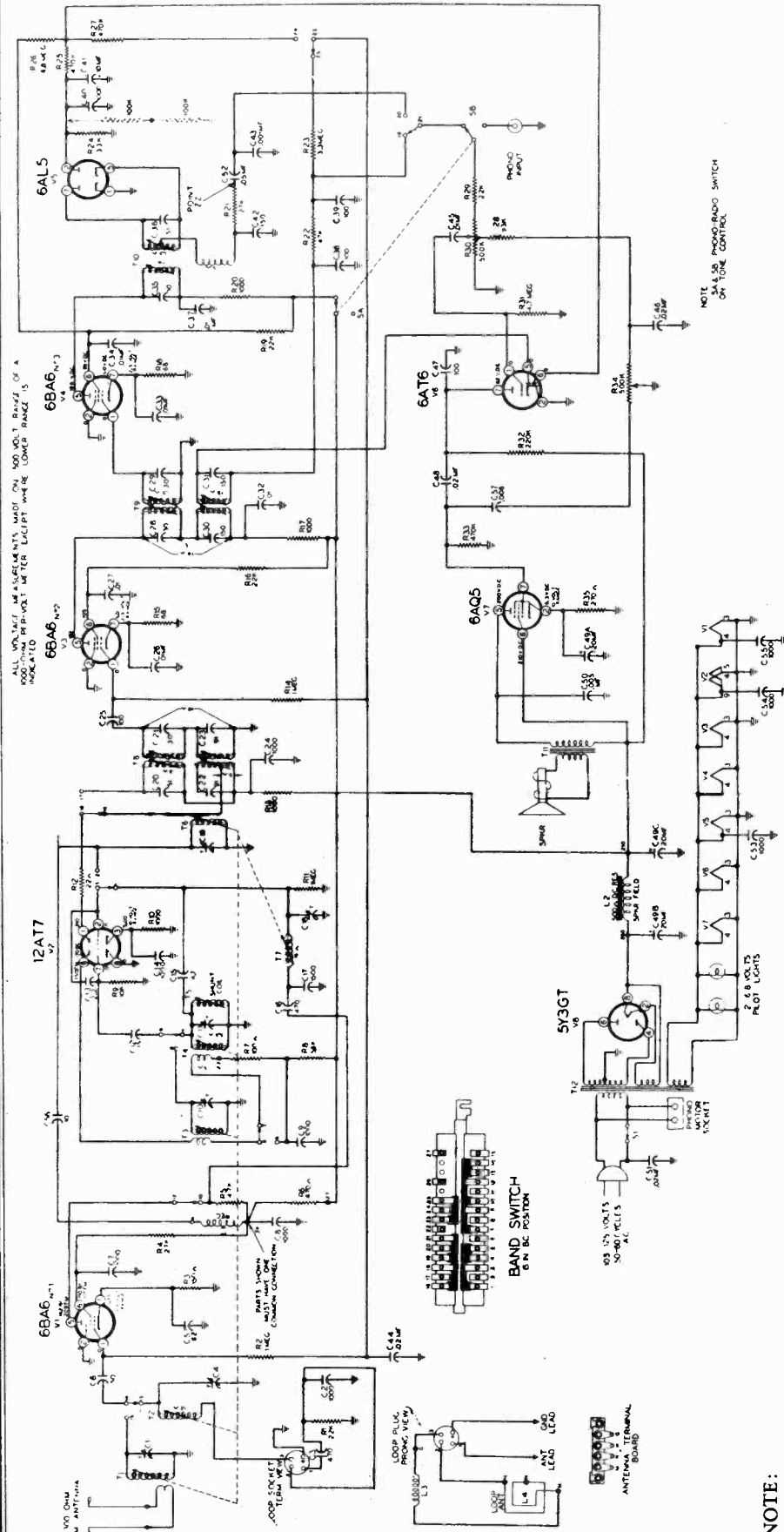
MODELS 801,
802, 803

MODEL NO. 801, 802 & 803



MODEL NO. 801, 802 & 803 (SERIES B)





NOTE:

The two 100K ohm resistors in series from Pin No.2 to ground are connected as shown only when aligning the FM - I.F. Refer to FM - I.F. alignment procedure.

On some sets R12, 22 ohms, C-9B1-42 is replaced with C-9B1-45, a 39 ohm resistor.

On some sets C24, 40, 53 Part No. C-8G-13016 (uninsulated type) is replaced with an insulated type, same value, Part No. C-8G-13201.

ELECTRICAL SPECIFICATIONS

Power Supply 105 to 125 volts, AC, 60-cycles; Chassis only 75 watts. With phono operation 100 watts.

Frequency Ranges...Broadcast Band—535 to 1620 kc. FM Band—88 to 108 mc.

Intermediate Freq....AM - 455 kc.; FM - 10.7 mc. **Selectivity**.....AM - 42 kc. broad at 1000 times signal, measured at 1000 kc. I.F. FM - 200 kc. broad at 2 times down.

Power Output.....2 watts, 10% distortion. 4 watts maximum.

Loud Speaker.....10" electrodynamic. Voice coil impedance 3.2 ohms, 400 cycles.

AM Sensitivity.....(For .5 watt output with external antenna)—5 microvolts average.

FM Sensitivity.....(For .5 watt output)—25 microvolts average.

Tube and Lamp Complement

6BA6, FM—AM R.F. stage.
12AT7, FM—AM oscillator and mixer.

6BA6, FM—AM 1st I.F.
6BA6, FM—2nd I.F.

6AL5, FM ratio detector.
6AT6, AM detector.

A.F. AMP. and A.V.C.
6AQ5, Audio output.
5Y3, rectifier.
T-44 dial lamp (2 used).

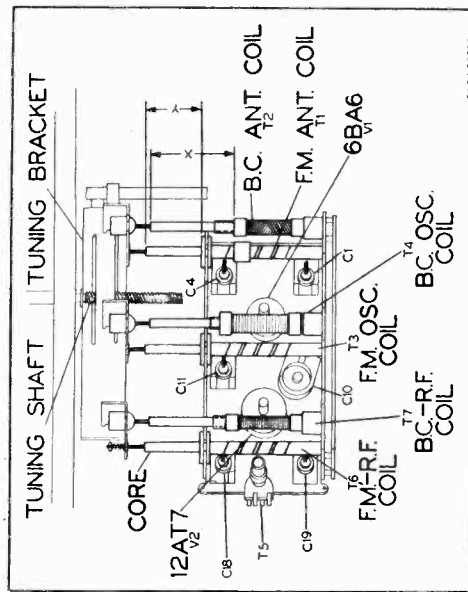
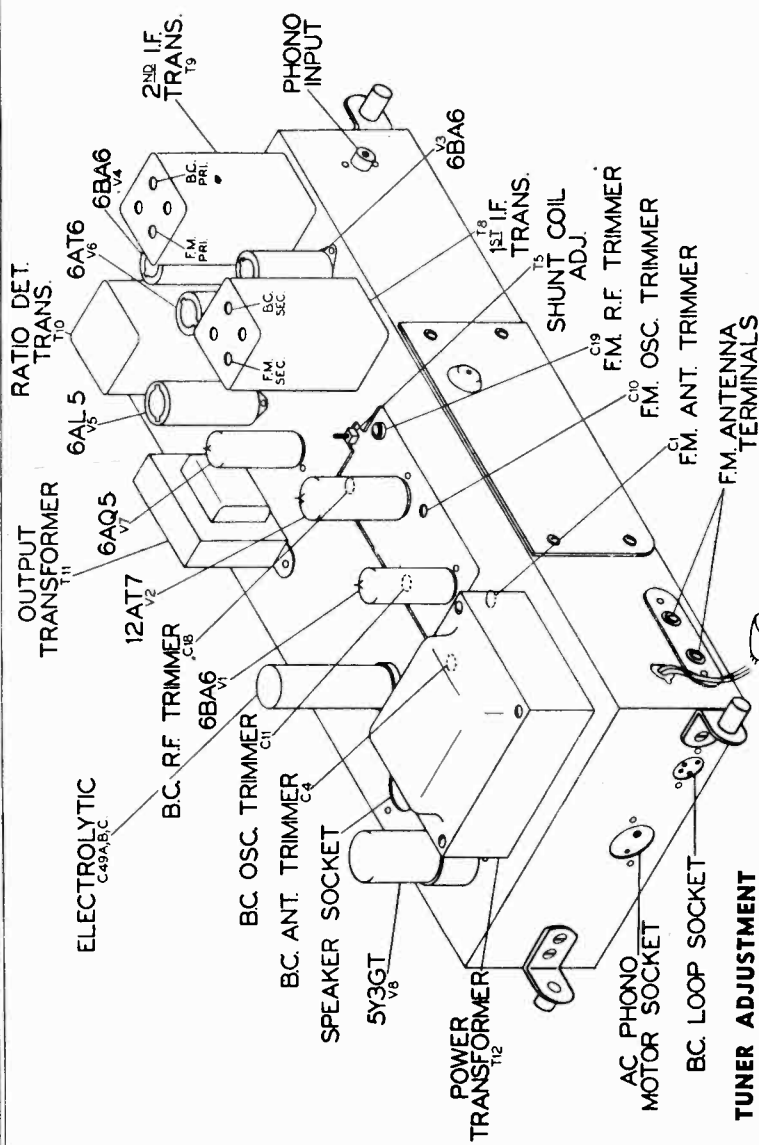
wherever possible, the use of an out-side "folded dipole" aerial with a 300-ohm line lead-in. The aerial must be installed according to the directions furnished with it. The radio is shipped from the factory with the built-in FM aerial connected to the two screws labeled "F.M. Antenna Terminals", (See Chassis View). To connect the lead-in from the out-side FM aerial, remove the two wires from the built-in FM antenna and connect the twin lead-in wire to the two screws. Either wire of the twin lead-in can be connected to either screw. A ground connection is not required for the FM reception, but may occasionally be helpful. The ground wire should be connected to the black lead at the rear of the chassis.

It should be remembered in conjunction with the erection of an FM folded dipole aerial that the signal strength from an FM transmitting station is less and less at greater distances from the transmitter and that FM reception is hardly ever possible beyond "line of sight" distances between transmitting and receiving aerials. This maximum limit is usually about 45 miles but consistently satisfactory reception is frequently limited to 30 miles or less depending on the height of transmitting and receiving aerials and the intervening terrain.

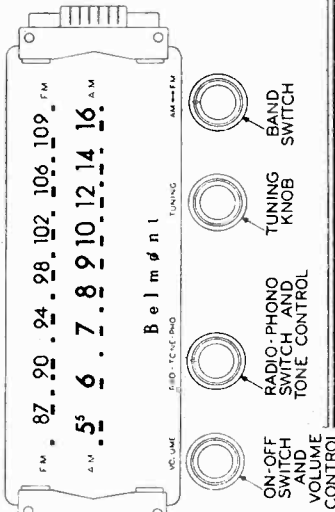
Broadcast Aerial — In locations remote from broadcasting stations or where receiving conditions are poor, an outside antenna, 50 to 75 feet long including lead-in, will give best results.

Connect the antenna lead-in wire to the tan wire extending out of the rear of the radio chassis.

If an external antenna is used, an external ground should also be used. The ground wire (black) should be connected with a clamp to a well-cleaned water pipe or to a metal rod driven several feet into the earth.



TUNER ADJUSTMENT
With tuner all the way out, dimension "X" should be 1 1/2 inches. "Y" should be 1-1/16 inches. "X" is from the end of the slug to edge of the coil winding. Check these dimensions before R.F. alignment is attempted of either the AM or FM Band. No slug adjustment should be necessary since the slugs are properly set at the factory.



FM Aerial — The noise-reducing capabilities of FM are noticeably greater when strong FM signals are obtained. Therefore, we recommend,

ALIGNMENT PROCEDURE

FM Band Section I.F. and R.F.

A non-metallic alignment tool must be used.

IMPORTANT—No alignment of the FM section of this radio should be attempted unless you are positive that the circuits are in need of adjustment and you have the necessary equipment. All components used in this radio

are extremely stable and the tuned circuits should require no adjustment over a long period of time.

NOTE—The following alignment is based on the use of the new Simpson vacuum tube volt-meter which has a "floating ground". In other

words, the meter, when used as a vacuum tube volt-meter can have both the positive and negative sides connected to points above ground and still give true readings.

A standard AM signal generator is required.

FM - I. F. ALIGNMENT

Band Switch in FM Position. Dummy Antenna .1 Mfd.

SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	VACUUM TUBE VOLT METER CONNECTION TO RADIO	ADJUSTMENTS TO BE MADE	ADJUST FOR
10.7 Mc. Use about .1 volt	Pin No. 1 of 6BA6 No. 3 and ground	Pin No. 2 of 6AL5 and ground	Primary of T10	Resonance should be about 3 volts
10.7 Mc. Use about .1 volt	Pin No. 1 of 6BA6 No. 3 and ground	See note "A"	Secondary of T10	Zero. Use zero center scale See note "B"
10.7 Mc. Use about 3300 microvolts	Pin No. 1 of 6BA6 No. 2 and ground	Pin No. 2 of 6AL5 and ground	Primary and Secondary of T9 10.7 m.c. windings See top and bottom views.	Resonance should be about 3 volts
10.7 Mc. Use about 200 microvolts	Pin No. 2 of 12AT7 and ground	Pin No. 2 of 6AL5 and ground	Primary and Secondary of 10.7 m.c. windings of T8 See top and bottom views.	Resonance should be about 3 volts

NOTES ON FM—I.F. ALIGNMENT

NOTE "A." Connect two resistors, 100K OHMS each, from Pin No. 2 of 6AL5 to ground. These resistors must be matched within 5%. Connect as shown in dotted lines on schematic diagram. Connect vacuum tube volt-meter between the mid-

point of the resistors and point zz.

NOTE "B." If T10 has been tampered with, it is possible that no crossover point will be found at first. Careful adjustment of both primary and secondary is necessary.

GENERAL: Input signals should be adjusted to give approximately 3 volts. The ratio detector is operating at a reasonable level at this point and will give the truest indication of correct alignment with the procedure specified.

FM - R. F. ALIGNMENT

Check center of pointer so that it coincides with the marker to the extreme right on the calibration strip when iron cores are all the way out. For adjustment, see dial mechanism illustration.

SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	DUMMY ANTENNA	ADJUST	VACUUM TUBE VOLT METER CONNECTION TO RADIO	ADJUST
100 Mc. Use about 25 microvolts	FM Antenna Terminals See note	300 ohms	C10 Osc. C19 R. F. C1 Ant.	Pin No. 2 of 6AL5 and Ground	Resonance about 3 volts

NOTE: If a signal generator with the above fundamental frequency is not available, it is sometimes possible to use harmonics. Use extreme care in picking harmonics. An alternate procedure is to use a local station carrier of known frequency to align the FM Band and to use the vacuum tube volt-meter

as above for resonance indication. A weak carrier, however, will not produce 3 volts.

NOTE: Connect 300 ohms in series with hot side of generator and connect to one screw. Connect cold side of generator to other screw.

ALIGNMENT PROCEDURE

Broadcast Band Section I.F. and R.F.

The alignment procedure below includes the sensitivities at the inputs of various stages. All signal input values are based on an output of 1/2 watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm resistor across the secondary winding of the output transformer. A reading of 1.3 volts AC across this resistor will be approximately equivalent to a 1/2-watt output with the speaker con-

nected. The volume control must be set at maximum. The tone control must be set for maximum treble.

The signal source must be an accurately calibrated signal generator capable of supplying the frequencies designated, modulated 30% with a 400-cycle audio signal. A 400 cycle audio signal is required for the audio measurement. Variations in sensitivities of plus or minus 25% are usually permissible.

AM - I. F. ALIGNMENT

Band Switch in AM Position. Tune Set to 1400 Kc. Dummy Antenna .1 Mfd.

SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	ADJUSTMENTS TO BE MADE	ADJUST FOR
455 Kc. Use 2400 microvolts	Pin No. 1 of 6BA6 No. 2 and ground	Primary and Secondary of T9 AM windings. See top and bottom views.	Maximum output. Should be 1/2 watt.
455 Kc. Use 70 microvolts	Pin No. 2 of 12AT7 and ground	Primary and Secondary of T8 AM windings. See top and bottom views.	Maximum output. Should be 1/2 watt.
400 cycles. Use 60 millivolts	Hot end of volume control and ground	None	Maximum output. Should be 1/2 watt.

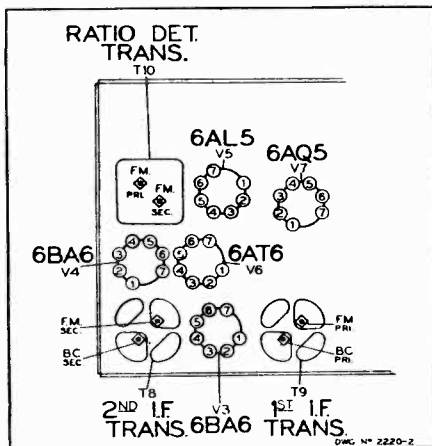
BROADCAST BAND - R. F. ALIGNMENT

Check center of pointer so that it coincides with the marker to the extreme right on the calibration strip when iron cores are all the way out. For adjustment, see dial mechanism illustration.

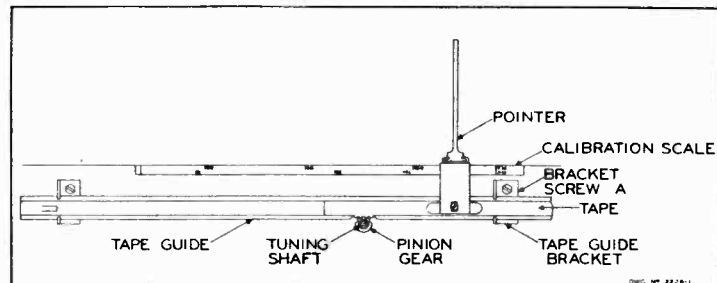
SIGNAL GENERATOR FREQ.	CONNECTION TO RADIO	DUMMY ANTENNA	ADJUST
1620 Kc.	AM Antenna and Ground	200 mmf.	C11 Osc. trimmer for maximum
535 Kc.	AM Antenna and Ground	200 mmf.	T5 for maximum 1/2 watt
1620 Kc. Use 5 microvolts	AM Antenna and Ground	200 mmf.	C4 and C18 for max. 1/2 watt. See note

NOTE: Re-check first two adjustments after this adjustment because of inter-locking effects.

Procedure for disassembly and assembly of dial mechanism.

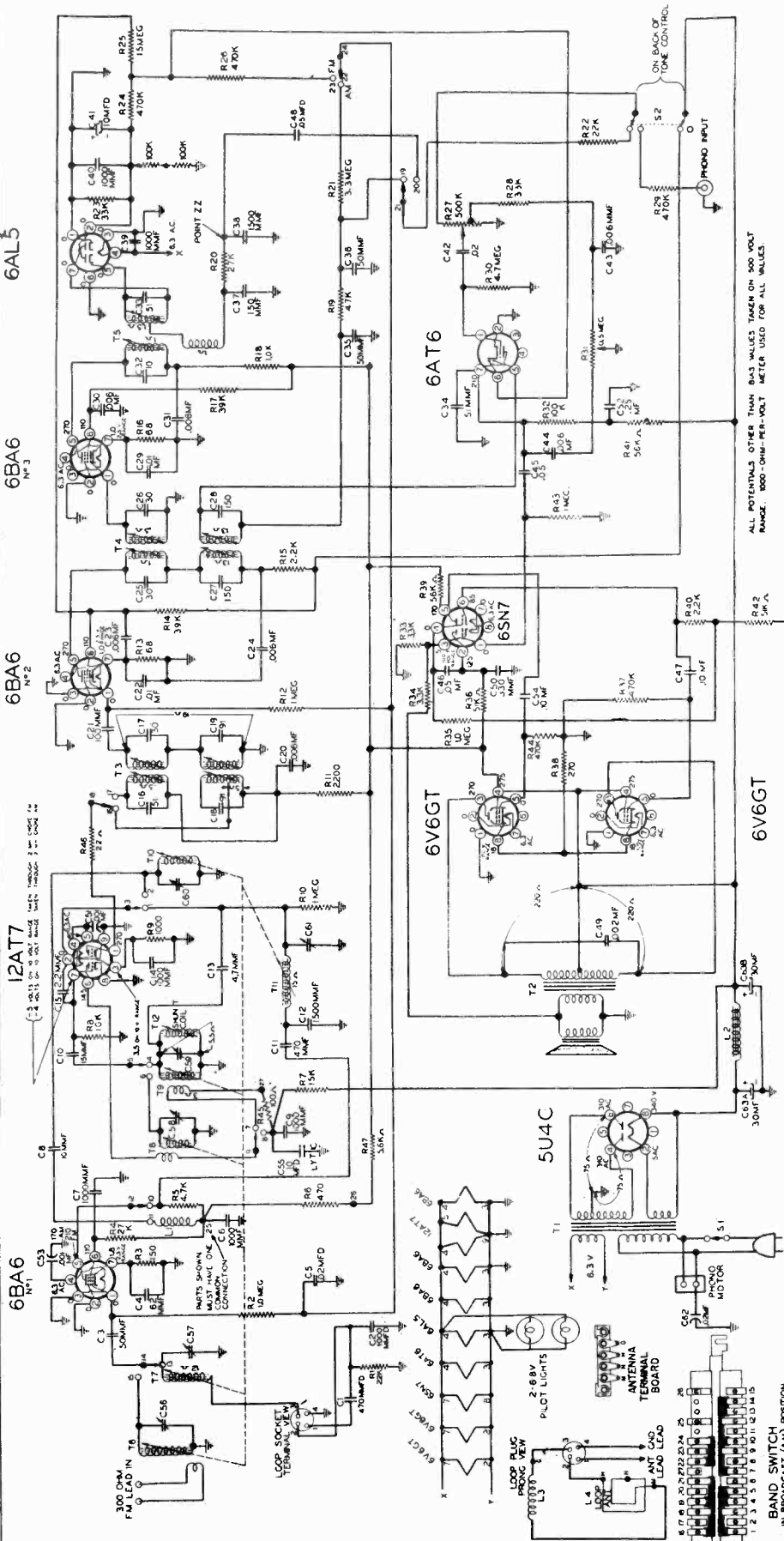


TO ALIGN POINTER—Loosen bracket screw "A". Then tape guide bracket can be moved up to allow proper meshing of tape teeth with pinion gear. Re-adjust bracket to eliminate backlash.



REPLACEMENT PARTS LIST

Ref. No.	Part No.	Description	Qty. Used	Ref. No.	Part No.	Description	Qty. Used
TUNER CHASSIS PARTS							
Condensers							
C10	A-8E-13575	Trimmer condenser	1	C22, 23	C-8G-12160	91 mmf, ceramic, 5%	2
C1, 4, 11, 19, 18	A-2M-12618	Trimmer cond. plate	5	C20	C-8G-13026	51 mmf, ceramic, 5%	1
C3, 16	C-8G-11732	470 mmf ±20%	2	C30, 31	C-8G-13025	150 mmf, ceramic, 5%	2
C2	C-8G-13695	1000 mmf, ±20%	1	C21, 28, 29	C-8G-12159	30 mmf, ceramic, 5%	3
C8, 7, 9, 14, 54, 55	C-8G-13201	1000 mmf, +20%—10%	6	C35	C-8G-11789	10 mmf, ceramic	1
C5	C-8G-13018	62 mmf, ±10%	1	C36	C-8G-11891	51 mmf, ceramic	1
C17	C-8G-11731	1500 mmf, ±20%	1	Resistors			
C12	C-8G-13017	15 mmf, +10%	1	R30, S1	A-10A-13114	Volume control (500K ohms) and switch	1
C6	C-8G-11484	50 mmf, ±10%	1	R34, SA, SB	A-11A-13115	Tone control (500K ohms) and radio-phono switch	1
C56	C-8G-11789	10 mmf, ±10%	1	R32	C-9B1-27	220K ohms, 1/2 watt, 20%	1
C15	A-8G-12495-6	4.7 mmf, ±20%	1	R15, 18	C-9B1-48	68 ohms, 1/2 watt, 10%	2
C13	A-8G-12495-4	2.2 mmf, ±20%	1	R14	C-9B1-31	1 megohm, 1/2 watt, 20%	1
C44	C-8D-11304	.02 mfd, 200 volts, ±20%	1	R19, 16	C-9B2-78	22K ohms, 1 watt, 10%	2
Resistors				R24, 28	C-9B1-80	33K ohms, 1/2 watt, 10%	2
R4	C-9B2-79	27K ohms, 1 watt, 10%	1	R21	C-9B1-79	27K ohms, 1/2 watt, 10%	1
R1	C-9B1-21	22K ohms, 1/2 watt, 20%	1	R8	C-9B2-71	5600 ohms, 1 watt, 10%	1
R3	C-9B1-52	150 ohms, 1/2 watt, 10%	1	R22	C-9B1-23	47K ohms, 1/2 watt, 20%	1
R5	C-9B1-17	4700 ohms, 1/2 watt, 20%	1	R29	C-9B1-21	22K ohms, 1/2 watt, 20%	1
R6	C-9B1-11	470 ohms, 1/2 watt, 20%	1	R31	C-9B1-35	4.7 megohms, 1/2 watt, 20%	1
R9	C-9B1-19	10K ohms, 1/2 watt, 20%	1	R25, 27, 33	C-9B1-29	470K ohms, 1/2 watt, 20%	3
R2, 11	C-9B1-31	1 megohm, 1/2 watt, 20%	2	R35	C-9B1-55	270 ohms, 1/2 watt, 10%	1
R10	C-9B1-62	1000 ohms, 1/2 watt, 10%	1	R26	C-9B1-36	6.8 megohms, 1/2 watt, 20%	1
R23	C-9B1-34	3.3 megohms, 1/2 watt, 20%	1	R13, 20, 17	C-9B1-13	1000 ohms, 1/2 watt, 20%	3
R7	C-9B1-50	100 ohms, 1/2 watt, 10%	1	Coils			
R12	C-9B1-42	22 ohms, 1/2 watt, 10%	1	T8	C-13A-13009	Input I.F. transformer, combination 455 kc. and 10.7 mc.	1
Coils				T9	C-13B-13014	Second I.F. transformer, combination, 455 kc. and 10.7 mc.	1
T3	B-13D-13027	FM oscillator coil assembly	1	T10	C-203-11745-1	Ratio detector coil assembly 10.7 mc.	1
T1	B-13E-13028	FM antenna coil assembly	1	L3	A-16A-13243	Loop loading coil	1
T6	B-13C-13029	FM R.F. coil assembly	1	L4	B-14MA-11066-10	Loop antenna ribbon	1
T4	B-13D-13030	AM oscillator coil assembly	1	Transformers			
T2	B-13E-13031	AM ant. coil assembly	1	T12	B-12A-13120	Power transformer, primary, 50-60 cycles. 105-125 volts A.C.	1
T7	B-13C-13032	AM R.F. coil assembly	1	T11	B-12C-13556	Output transformer, for speaker	1
L1	A-16A-13033	Choke coil assembly	1	Speaker			
T5	B-13D-12974	AM osc. shunt coil assembly	1	L2	B-18B-14140	Electrodynamic speaker, 10-inch, less output transformer	1
Miscellaneous				Miscellaneous			
	B-208-13553	Band change slide switch	1	C-30A-14499	Dial scale		1
	or			B-5B-13978-37	Knob, mahogany, "Tone and Volume"		2
	B-201-12967	Band change slide switch	1	B-5B-13978-14	Knob, walnut, "Tone and Volume"		2
	A-15B-12997	7 prong, min., tube socket	1	B-5B-13737-37	Knob, mahogany, "Tuning and Bandswitch"		2
	A-15B-13430	9 prong, min., tube socket	1	B-5B-13737-14	Knob, walnut, "Tuning and Bandswitch"		2
	A-200-12912	Drive bracket assembly	1	B-5C-15078-37	Escutcheon side pieces, mahogany		2
	A-25A-13019	Core grommets, for AM band	3	B-5C-15078-14	Escutcheon side pieces, walnut		2
	A-3M-13020	Insert for core grommet	3	B-14M-11479	Line cord and plug		1
	A-49A-12394	Spiral spring for FM cores	3	A-3A-12933	Band switch shaft		1
	B-2D-12316	Tape guide	1	A-55C-12935	Ball bearing		1
	B-2J-12922	Rack tape, with teeth and pointer bracket A-2D-11194	1	B-47A-12458-2	Pilot lite and bracket assembly		1
	B-2G-10588	Pointer	1	A-46A-11739	Pilot lite, 6-8 volts, T-44		2
	A-200-15059	Drive, pinion and lead screw assembly	1	A-15C-13174	Miniature socket, 7 prong		5
	A-200-15004	Guide and pointer bracket	1	A-15B-10440	Octal socket, 8 prong		1
MAIN CHASSIS PARTS				A-19B-12644	Loop antenna socket		1
Condensers				B-7B-13050	FM terminal strip		1
C49B, 49C, 49A	A-8C-13555	Electrolytic, 20—20 x 350 volts; 20 x 25 volts	1	A-15B-11538	Speaker socket		1
C50	C-8D-10935	.005 mf x 600 volts	1	A-19B-12468	Phono motor socket		1
C26, 27, 32, 33, 34, 37, 45	C-8D-10761	.01 mf x 400 volts, 20%	7	A-19B-12170	Phono input socket		1
C57	C-8D-10785	.006 mf x 600 volts, 20%	1	A-25A-13818	Chassis rubber grommet		4
C41	A-8C-13132	Electrolytic, 10 mf x 50 volts	1	RECORD CHANGER			
C43	C-8D-10787	.001 x 600 volts, 20%	1	B-201-14063-1	C10M Changer with Webster Retracto cartridge		1
C52	C-8D-10770	.05 x 200 volts, 20%	1	Webster Retracto	Crystal cartridge with needle		1
C51, 46	C-8D-10774	.02 x 400 volts, 20%	2				
C48	C-8J-11321	.02 x 600 volts, 20%	1				
C25, 47	C-8G-13131	100 mmf, ceramic, 10%	2				
C24, 40, 53	C-8G-13201	1000 mmf, ceramic, 20%	3				
C42	C-8F3-229	150 mmf, mica, 5%	1				
C38, 39	A-8F-13127	.0001 mf, dual mica, 20%	1				



NOTE: The two 100K ohm resistors in series from PIN No. 2 to ground are connected as shown only when aligning the FM I. F. Refer to FM I. F. alignment procedure.

NOTE: On some sets R46—22 ohm resistor is replaced with a 39 ohm resistor, Part No. C-9B1-45.

ELECTRICAL SPECIFICATIONS

- Power Supply**..... 105 to 125 volts, AC, 60-cycles; Chassis only 122 watts. With phono operation 150 watts.
- Frequency Range**.... Broadcast Band—535 to 1620 kc. FM—Band 88 to 108 mc.
- Intermediate Freq.**.. AM-455 kc; FM-10.7 mc.
- Selectivity**..... AM-48 kc. broad at 1000 times signal, measured at 1000 kc. I.F. FM-180 kc. broad at 2 times down. I.F. FM-320 kc. broad at 10 times down.

- AM Sensitivity**..... (For .5 watt output with external antenna)—3 microvolts average.
- FM Sensitivity**..... (For .5 watt output)—10 microvolts average.
- Power Output**..... 8 watts, 10% distortion. 10 watts maximum.
- Loud Speaker**..... 12" electrodynamic. Voice coil impedance 3.2 ohms, 400 cycles.
- Tube and Lamp Complement**..... 6BA6, FM—AM R.F. stage. 12AT7, FM—AM oscillator and mixer. 6BA6, FM—AM—1st I.F. 6BA6, FM—2nd I.F.

- 6AL5, FM—ratio detector.
- 6AT6, AM detector.
- A. F. AMP. and A.V.C.
- 6SN7, Push-Pull. Driver and phase inverter.
- 5U4G, rectifier.
- 6V6, output.
- 6V6, output.
- T-44 dial lamp (2 used).

Automatic changer..

Russell C-10 with P-93 Cartridge.

ALIGNMENT PROCEDURE

FM Band Section I.F. and R.F.

A non-metallic alignment tool must be used.

IMPORTANT— No alignment of the FM section of this radio should be attempted unless you are positive that the circuits are in need of adjustment and you have the necessary equipment. All components used in this radio

are extremely stable and the tuned circuits should require no adjustment over a long period of time.

NOTE—The following alignment is based on the use of the new Simpson vacuum tube voltmeter which has a "floating ground". In other

words, the meter, when used as a vacuum tube volt-meter, can have both the positive and negative sides connected to points above ground and still give true readings. A standard AM signal generator is required.

FM - I. F. ALIGNMENT

Band Switch in FM Position. Dummy Antenna .1 Mjd.

SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	VACUUM TUBE VOLT METER CONNECTION TO RADIO	ADJUSTMENTS TO BE MADE	ADJUST FOR
10.7 Mc. Use about .1 volt	Pin No. 1 of 6BA6 No. 3 and ground	Pin No. 2 of 6AL5 and ground	Primary of T5	Resonance should be about 3 volts
10.7 Mc. Use about .1 volt	Pin No. 1 of 6BA6 No. 3 and ground	See note "A"	Secondary of T5	Resonance should be about 3 volts
10.7 Mc. Use about 3300 microvolts	Pin No. 1 of 6BA6 No. 2 and ground	Pin No. 2 of 6AL5 and ground	Primary and Secondary of T4 10.7 m.c. windings See top and bottom views	Zero. Use zero center scale See note "B"
10.7 Mc. Use about 200 microvolts	Pin No. 2 of 12AT7 and ground	Pin No. 2 of 6AL5 and ground	Primary and Secondary of 10.7 m.c. windings of T3 See top and bottom views	Resonance should be about 3 volts

NOTES ON FM — I. F. ALIGNMENT

NOTE "A" Connect two resistors, 100K OHMS each, from Pin No. 2 of 6AL5 to ground. These resistors must be matched within 5%. Connect as shown in dotted lines on schematic diagram. Connect vacuum tube voltmeter between the mid-

point of the resistors and point zz.

NOTE "B" If T5 has been tampered with, it is possible that no crossover point will be found at first. Careful adjustment of both primary and secondary is necessary.

GENERAL Input signals should be adjusted to give approximately 3 volts. The ratio detector is operating at a reasonable level at this point and will give the truest indication of correct alignment with the procedure specified.

FM - R. F. ALIGNMENT

*Check pointer so that the right hand edge of the pointer skirt coincides with the right hand edge of marker to the extreme right when iron cores are all the way out.
For Adjustment, see dial mechanism illustration.*

SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	DUMMY ANTENNA	ADJUST	VACUUM TUBE VOLT METER CONNECTION TO RADIO	ADJUST TO
100 Mc. Use about 10 microvolts	FM Antenna Terminals See note	300 ohms	C58 Osc. C60 R. F. C56 Ant.	Pin No. 2 of 6AL5 and Ground	Resonance about 3 volts

NOTE: If a signal generator with the above fundamental frequency is not available, it is sometimes possible to use harmonics. Use extreme care in picking harmonics. An alternate procedure is to use a local station carrier of known frequency to align the FM Band and to use the vacuum tube volt-meter

as above for resonance indication. A weak carrier, however, will not produce 3 volts.

NOTE: Connect 300 ohms in series with hot side of generator and connect to one screw. Connect cold side of generator to other screw.

ALIGNMENT PROCEDURE

Broadcast Band Section I.F. and R.F.

The alignment procedure below includes the sensitivities at the inputs of various stages. All signal input values are based on an output of 1/2 watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm resistor across the secondary winding of the output transformer. A reading of 1.3 volts AC across this resistor will be approximately equivalent to a 1/2-watt output with the speaker con-

nected. The volume control must be set at maximum. The tone control must be set for maximum treble.

The signal source must be an accurately calibrated signal generator capable of supplying the frequencies designated, modulated 30% with a 400-cycle audio signal. A 400 cycle audio signal is required for the audio measurement. Variations in sensitivities of plus or minus 25% are usually permissible.

AM - I. F. ALIGNMENT

Band Switch in AM Position. Tune Set to 1400 Kc. Dummy Antenna .1 Mfd.

SIGNAL GENERATOR FREQUENCY	CONNECTION TO RADIO	ADJUSTMENTS TO BE MADE	ADJUST FOR
455 Kc. Use 1000 microvolts	Pin No. 1 of 6BA6 No. 2 and ground	Primary and Secondary of T4 AM windings See top and bottom views	Maximum output Should be 1/2 watt
455Kc. Use 30 microvolts	Pin No. 2 of 12AT7 and ground	Primary and Secondary of T3 AM windings See top and bottom views	Maximum output Should be 1/2 watt
400 cycles. Use 28 millivolts	Hot end of volume control and ground	None	Maximum output Should be 1/2 watt

BROADCAST BAND - R. F. ALIGNMENT

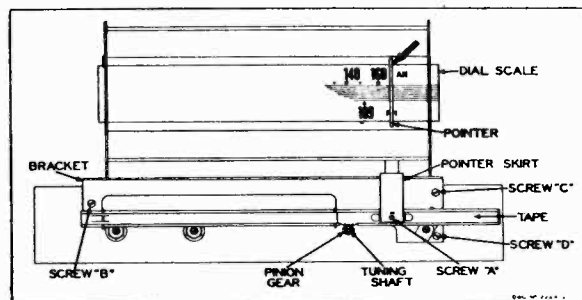
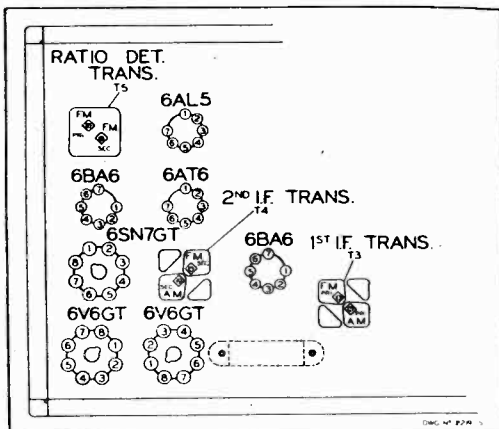
Check pointer so that the right hand edge of the pointer skirt coincides with the right hand edge of marker to the extreme right when iron cores are all the way out.

For Adjustment, see dial mechanism illustration.

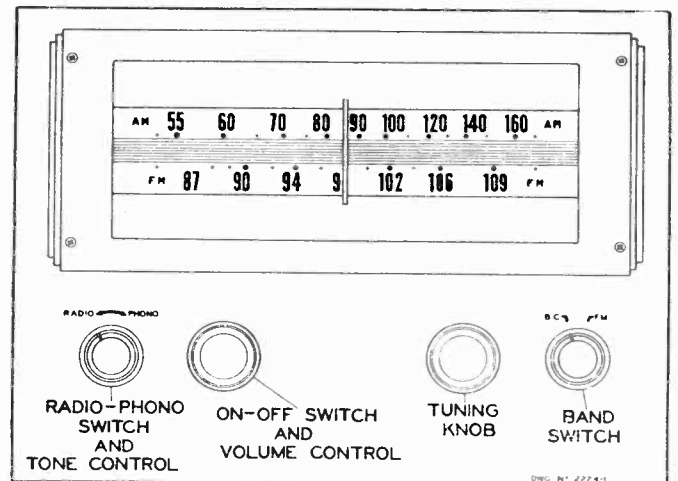
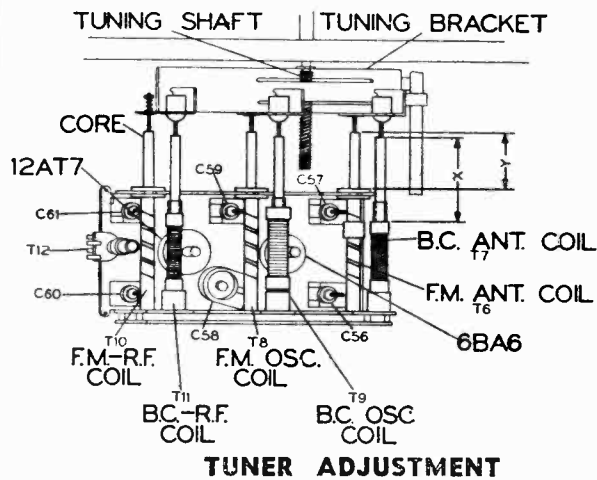
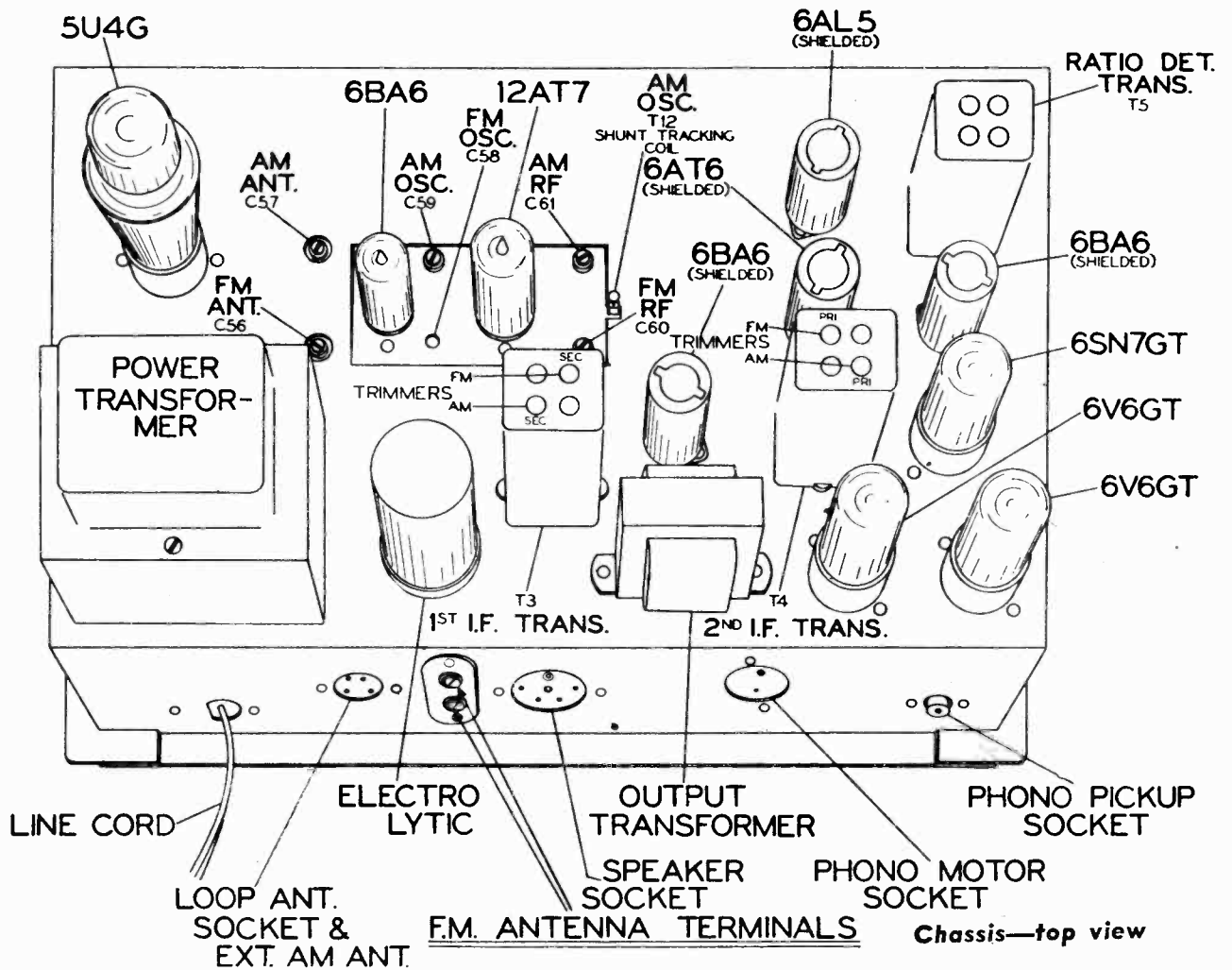
SIGNAL GENERATOR FREQ.	CONNECTION TO RADIO	DUMMY ANTENNA	ADJUST
1620 Kc.	AM Antenna and Ground	200 mmf.	C59 Osc. trimmer for maximum
535 Kc.	AM Antenna and Ground	200 mmf.	T12 for maximum 1/2 watt
1620 Kc. Use 3 microvolts	AM Antenna and Ground	200 mmf.	C57 and C61 for max. 1/2 watt. See note

NOTE: Re-check first two adjustments after this adjustment because of inter-locking effects.

Procedure for disassembly and assembly of dial mechanism



Loosen screws "C" and "D" so that teeth of tape can be properly meshed with pinion gear to give proper pointer travel.

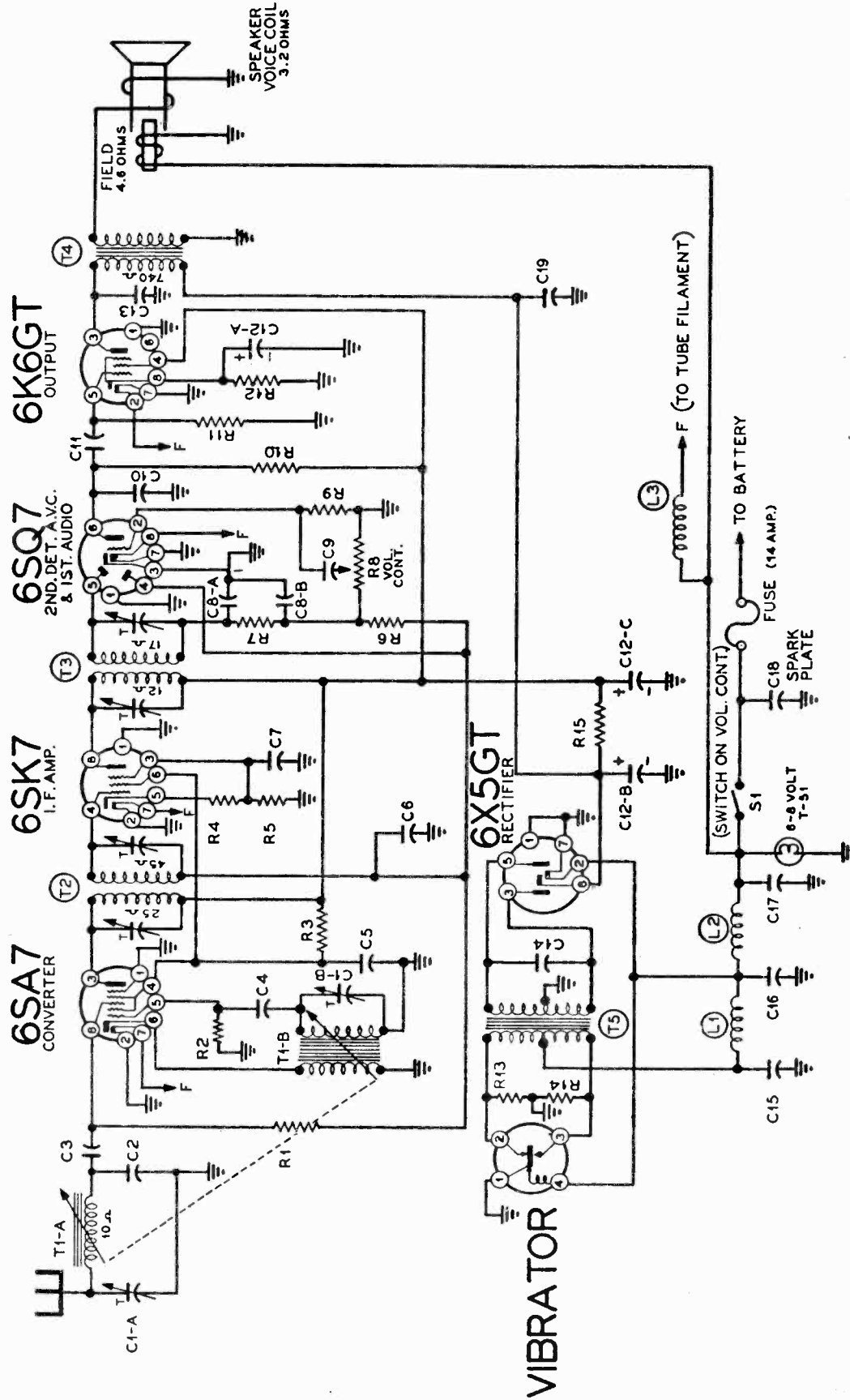


With tuner all the way out, dimension "X" should be 1½ inches. "Y" should be 1-1/16 inches. "X" is from the end of the slug to edge of the coil winding. Check these dimensions before R.F. alignment is attempted of either the AM or FM Band. No slug adjustment should be necessary since the slugs are properly set at the factory.

REPLACEMENT PARTS LIST

Ref. No.	Part No.	Description	Qty. Used
TUNER PARTS			
Condensers			
C58	A-8E-13575	Trimmer condenser	1
C56, 57, 59, 60, 61	A-2M-12618	Trimmer cond. plate	5
C1, C11	C-8G-11732	470 mmf, $\pm 20\%$	2
C2	C-8G-13695	1000 mmf, $\pm 20\%$	1
C6, 7, 9, 14, 51, 53	C-8G-13201	1000 mmf, $\pm 20\%$ -10%	6
C4	C-8G-13018	62 mmf, $\pm 10\%$	1
C12	C-8G-11731	1500 mmf, $\pm 20\%$	1
C10	C-8G-13017	15 mmf, $\pm 10\%$	1
C3	C-8G-11484	50 mmf, $\pm 10\%$	1
C8	C-8G-11789	10 mmf, $\pm 10\%$	1
C13	A-8G-12495-6	4.7 mmf, $\pm 20\%$	1
C15	A-8G-12495-4	2.2 mmf, $\pm 20\%$	1
C5	C-8D-11304	.02 mfd. 200 volts, $\pm 20\%$	1
Resistors			
R4	C-9B2-79	27K ohms, 1 watt, 10%	1
R1	C-9B1-21	22K ohms, $\frac{1}{2}$ watt, 20%	1
R3	C-9B1-52	150 ohms, $\frac{1}{2}$ watt, 10%	1
R5	C-9B1-17	4700 ohms, $\frac{1}{2}$ watt, 20%	1
R6	C-9B1-11	470 ohms, $\frac{1}{2}$ watt, 20%	1
R8	C-9B1-19	10K ohms, $\frac{1}{2}$ watt, 20%	1
R2, R10	C-9B1-31	1 megohm, $\frac{1}{2}$ watt, 20%	2
R9	C-9B1-62	1000 ohms, $\frac{1}{2}$ watt, 10%	1
R21	C-9B1-34	3.3 megohms, $\frac{1}{2}$ watt, 20%	1
R45	C-9B1-50	100 ohms, $\frac{1}{2}$ watt, 10%	1
R46	C-9B1-42	22 ohms, $\frac{1}{2}$ watt, 10%	1
Coils			
T8	B-13D-13027	FM oscillator coil assembly	1
T6	B-13E-13028	FM antenna coil assembly	1
T10	B-13C-13029	FM R.F. coil assembly	1
T9	B-13D-13030	AM oscillator coil assembly	1
T7	B-13E-13031	AM antenna coil assembly	1
T11	B-13C-13032	AM R.F. coil assembly	1
L1	A-16A-13033	Choke coil assembly	1
T12	B-13D-12974	AM osc. shunt coil assembly	1
Miscellaneous			
	B-208-13553	Band change slide switch	1
	or		
	B-201-12967	Band change slide switch	1
	A-15B-12997	7 prong, min. tube socket	1
	A-15B-13430	9 prong, min. tube socket	1
	N-200-13802	Pointer guide and bracket assembly	1
	A-3A-12308-1	Lead screw	1
	A-3J-12309	Pinion gear for lead screw	1
	A-49A-13447	Tension spring for lead screw	1
	A-25A-13019	Core grom., for AM band	3
	A-3M-13020	Insert for core grommet	3
	A-49A-12394	Spiral spring for FM cores	3
	C-2D-12990	Tape guide	1
	B-2J-13006	Rack, with teeth, with A-2D-11194 bracket	1
	A-5M-13741	Pointer	1
	32F6SE-5274	6-32x $\frac{1}{4}$ " screw to mount pointer	1
MAIN CHASSIS PARTS			
Condensers			
63A, 63B	B-8C-11629	Electrolytic condenser, dual, 50-30 x 450 volts	1
C21	C-8G-11734	100 mmf, 20%, ceramic	1
C37	C-8F3-229	150 mmf, mica	1
C38	C-8G-13059	1500 mmf, ceramic	1
C34	C-8G-13060	51 mmf, ceramic	1
C20, 23, 24, 30, 31, 43, 44	C-8D-10785	.006 mf x 600 volts, paper	7
C22, C29	C-8D-10761	.01 mf x 400 volts, paper	2
C45, 46	C-8D-10813	.05 mf x 400, paper	2
C55	A-8C-12154	Electrolytic condenser 10 mf x 450 volts	1
C49	C-8D-10789	.002 mf x 600 volts, paper	1
C39, 40	C-8G-13201	1000 mmf, ceramic	2
C41	A-8C-13132	Electrolytic condenser, 10 mf x 50 volts	1
C62	C-8J-11321	.02 mf x 600 volts	1
C48	C-8D-10770	.05 mf x 200 volts	1
C50	C-8G-11741	330 mmf, ceramic	1
C42	C-8D-11304	.02 mf x 200 volts	1

Ref. No.	Part No.	Description	Qty. Used
C52	C-8D-13439	.25 mf x 400 volts	1
C47, 54	C-8D-10760	.1 mf x 400 volts	2
C35, 36	A-8F-13047	50 mmf, dual, mica	1
C32	C-8G-11789	10 mmf, ceramic, 10%	1
C33	C-8G-11891	51 mmf, ceramic, 5%	1
C27, 28	C-8G-13025	150 mmf, ceramic	2
C17, 25, 26	C-8G-12159	30 mmf, ceramic	3
C18, 19	C-8G-12160	91 mmf, ceramic	2
C16	C-8G-13026	51 mmf, ceramic	1
Resistors			
R27	A-10A-13001	Volume control (500K) and switch	1
R31	A-11A-12988	Tone control (500K) and radio-phono switch	1
R32	C-9B1-86	100K ohms, $\frac{1}{2}$ watt, 10%	1
R29, 44	C-9B1-94	470K ohms, $\frac{1}{2}$ watt, 10%	2
R39, 41	C-9B1-83	56K ohms, $\frac{1}{2}$ watt, 10%	2
R33, 34	C-9B1-68	3300 ohms, $\frac{1}{2}$ watt, 10%	2
R30	C-9B1-35	4.7 megohms, $\frac{1}{2}$ watt, 20%	1
R23, 28	C-9B1-80	33K ohms, $\frac{1}{2}$ watt, 10%	2
R20	C-9B1-79	27K ohms, $\frac{1}{2}$ watt, 10%	1
R22	C-9B1-78	22K ohms, $\frac{1}{2}$ watt, 20%	1
R13, 16	C-9B1-48	68 ohms, $\frac{1}{2}$ watt, 10%	2
R14, 17	C-9B2-81	39K ohms, 1 watt, 10%	2
R24, 26, 37	C-9B1-29	470K ohms, $\frac{1}{2}$ watt, 20%	3
R25	C-9B1-302	15 megohms, $\frac{1}{2}$ watt, 10%	1
R19	C-9B1-23	47K ohms, $\frac{1}{2}$ watt, 20%	1
R7	C-9B4-76	15K ohms, 2 watts, 10%	1
R12, 35, 43	C-9B1-31	1 megohm, $\frac{1}{2}$ watt, 20%	3
R40	C-9B1-66	2200 ohms, $\frac{1}{2}$ watt, 10%	1
R36, 42	C-9B1-200	51K ohms, $\frac{1}{2}$ watt, 5%	2
R38	C-9B4-55	270 ohms, 2 watts, 10%	1
R47	C-9B1-71	5600 ohms, $\frac{1}{2}$ watt, 10%	1
R18	C-9B1-13	1000 ohms, $\frac{1}{2}$ watt, 20%	1
R15, 11	C-9B2-15	2200 ohms, 1 watt, 20%	2
Coils			
T3	C-13A-13009-1	Input I.F. transformer, combination 455 kc. and 10.7 mc	1
T4	C-13B-13014-1	Output transformer, combination 455 kc. and 10.7 mc	1
T5	C-203-11745-1	Ratio det. coil assembly 10.7 mc	1
L3	A-16A-13243	Loop loading coil	1
L4	B-14MA-11066	Loop antenna—B.C. Band	1
Transformers			
T2	B-12C-13042	Output trans. for speaker	1
	B-12A-13038	Power transformer, primary, 50-60 cycles, 105-125 volts, AC	1
Speaker			
	B-18B-13043	Electrodynamic speaker, 12" less output transformer	1
Miscellaneous			
	C-30B-13943	Dial glass	1
	B-30A-13734	Dial scale	1
	B-5B-13738-37	Knob, small, with dot, mahogany	2
	B-5B-13737-37	Knob, large, without dot, mahogany	2
	B-2G-13596	Escutcheon	1
	B-14M-11479	A.C. line cord	1
	A-3A-13003	Switch shaft	1
	A-2D-12983	Detent bracket (U shaped on front of set)	1
	A-43D-12934	"U" speed clip	1
	A-55C-12935	Ball Bearing	1
	A-2D-13004	Switch activator bracket	1
	A-47A-13801	Pilot lite assembly	1
	A-46A-11739	Pilot lite, 6-8 volts, T-44	2
	A-15C-10717	7 prong, min., tube socket	4
	A-15B-10440	8 prong, octal, socket	4
	A-19B-12644	Antenna socket	1
	A-7B-13050	FM dipole, 2-screw strip	1
	A-15B-11538	Speaker socket	1
	A-19B-12468	Phono motor socket	1
	A-19B-12170	Phono input socket	1
RECORD CHANGER			
	B-201-14063	Record changer (Russell C-10) with P-93 cartridge	1
	P-93	Crystal cartridge	1



Power Supply..... 6 volts D.C.
Frequency Range..... 530 to 1600 kc.
Intermediate Freq...... 455 kc.
Tuning..... Two permeability-tuned circuits.
Antenna System..... Adjustable to accommodate various car antennae capacities.

Speaker..... 5-inch; electro dynamic voice coil impedance 3.2 ohms.
Power Output..... 1 watt undistorted; 1.6 watts maximum.
Sensitivity..... 20 microvolts average for 500-mil-liwatt output.
Selectivity..... 50 kc broad at 1000 times signal at 1000 kc.

ALIGNMENT PROCEDURE

(Refer to Chassis View)

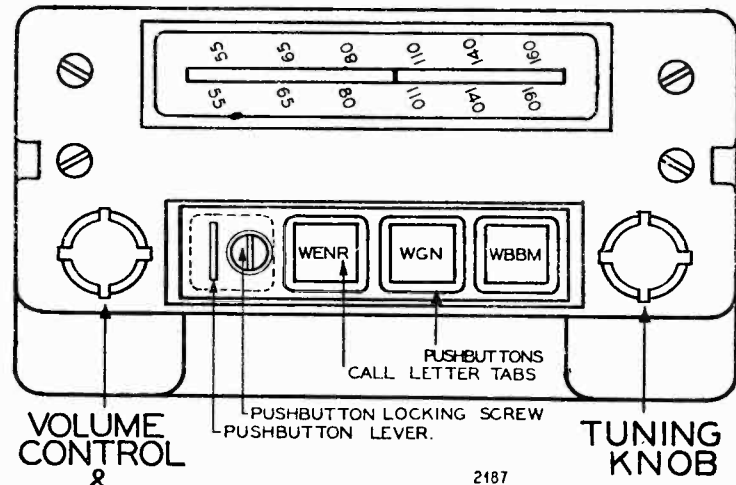
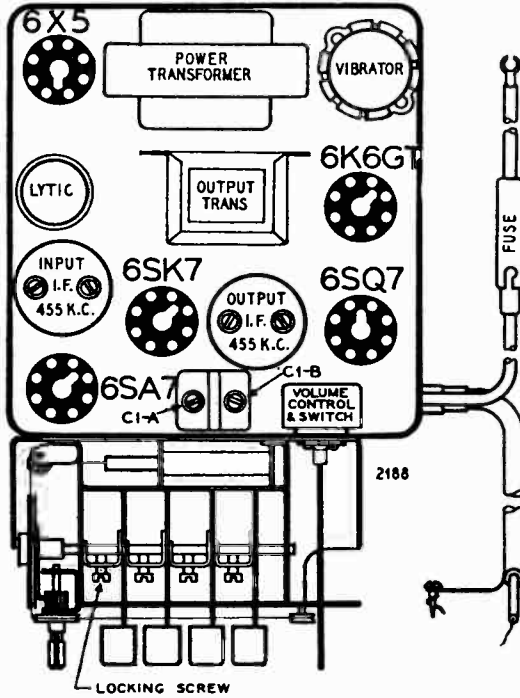
- Output meter across 3.2-ohm output load.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.
- Volume control at maximum for all adjustments.
- Connect ground post of signal generator to radio chassis.

BAND	SIGNAL GENERATOR				ADJUSTMENT Adjust for Max. Output
	Frequency	Dummy Antenna	Connection to Radio	Ground Connection	
I.F.	455 kc	.1 mfd.	Pin #4 Grid 6SK7 Tube	Chassis	Adjust Trimmers of T3 output I.F.
I.F.	455 kc	.1 mfd.	Pin #8 Grid 6SA7 Tube	Chassis	Adjust Trimmers of T2 input I.F.
Broadcast Band	1600 kc	30 mmfd.	Antenna Lead	Chassis	Adjust Trimmers C1-B Oscillator and C1-A Antenna.
Broadcast Band	1400 kc	30 mmfd.	Antenna Lead	Chassis	*Slide Antenna Coil lengthwise for max. output by means of a screw driver.
Broadcast Band	1600 kc	30 mmfd.	Antenna Lead	Chassis	**Adjust Antenna Trimmer C1-A to maximum output.

*This adjustment will seldom be necessary in service work as the Antenna Coil is adjusted and sealed in place at the factory. The necessity of this adjustment can be checked quickly by tuning set to a 1400 kc. signal and adjusting C1-A. If a large increase in output is noted the Antenna Coil should be adjusted.

**If Antenna Coil is adjusted, C1-A should be readjusted at 1600 kc. These two adjustments (Antenna Trimmer C1-A and Antenna Coil) should be repeated until no further improvement is noted.

NOTE: At 1600 kc., the Oscillator Core should extend 31/32 inch from the edge of the Coil Form.

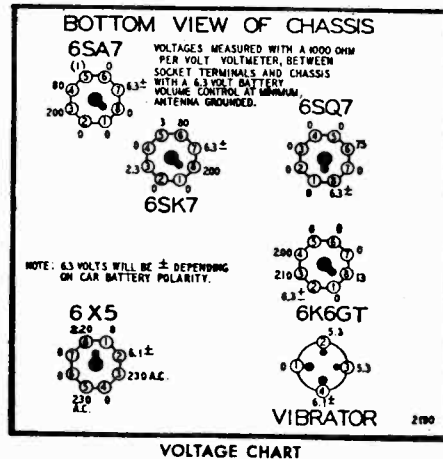


CHASSIS VIEW—Showing tube location, trimmers, and the pushbutton locking-screws.

SETTING THE PUSHBUTTONS

Press the first pushbutton lever in firmly and the locking screw will show up in the hole. Unscrew the locking screw several turns to the left with a screw driver. Hold the pushbutton lever pressed in firmly and tune in the desired station. With the pushbutton lever still pressed in, tighten the pushbutton locking screw. Continue to set up the other three pushbuttons in the same manner. Replace the pushbuttons on the levers and insert the call letters. Stations may be changed whenever desired by pulling one or all of the pushbuttons off and re-setting to any desired station as outlined above.

NOTE: In some cars the dial will be mounted vertically. However the controls will be in the same relative position.



VOLTAGE CHART

MOUNTING LOCATIONS

The chart below shows the mounting positions for cars back to 1939. Most cars previous to 1939 will require under-dash mounting.

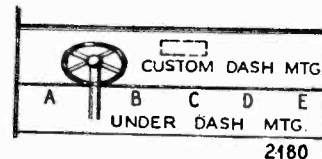
To use the chart, note the position letters for the required car, then refer to the small drawing for the location of the letter or letters. The word dash indicates that the radio will fit the dash, similar to a custom installation. The

following pages show the method of dash installation on cars requiring no dash panel kits.

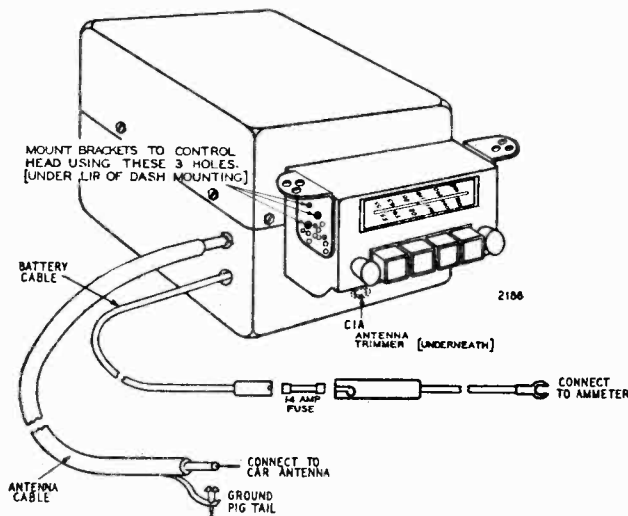
The 1941, 1942 and 1946 Ford; the 1941, 1942 and 1946 Pontiac; and the 1942 and 1946 Mercury will take a dash installation, but require panel kits for mounting and trim. Instructions for mounting the radio and panel kit are included with each panel kit, however, refer to this manual for connections and motor noise suppression.

Make of Car	1946	1942	1941	1940	1939
Buick	C	C	C	C - D	C
Cadillac			B - C		
Chevrolet	Dash - C	Dash - C	Dash - C	C - E	D - E
Chrysler	Dash	Dash	Dash	Dash	C
De Soto	Dash	Dash	Dash	Dash—B - D	C
Dodge	Dash A	Dash - A	Dash - B	Dash—B - D - E	C
Ford	*Dash	*Dash	*Dash - C	B - D	B
Hudson	D - E	C - D - E	C - D - E	C - E	B - C - D
Lincoln	B - C - D	B - C - D	None		
Mercury	*Dash	*Dash	*Dash	A - B - D	B
Nash	C	C	C	A - C	E
Oldsmobile	C - D - E	A - C - E	A - D - E -	***C - with Add. C Brkt.	
Packard	C - D	C - D	C - D	D - E	D - E
Plymouth	Dash	Dash	Dash	Dash—B - D	C
Pontiac	*Dash - D - E	*Dash - D - E	*Dash—D - E	C - D - E	C - D - E
Studebaker	C	C	C	C	C
Americar		**Dash - B - D - E	**Dash		

- *Use special dash mounting plate.
- **Cut dial opening as per dimensions shown on Willy's Americar drawing on page 4.
- ***Oldsmobile 1940. The radio can be mounted under the dash below the plastic portion, however, it must be supported by a metal strap. Another rear mounting strap, Part No. 115713 will be suitable. Bolt the radio to the metal strap and bolt the strap to the metal dash panel lip.



Universal Under Dash Mounting



This view shows the battery cable, antenna and ground cable and the two mounting brackets at the side of the tuning dial which are used to mount the radio to the underlip of the dash. These brackets are packed with the kit of hardware and should be fastened to the chassis using the holes shown in solid black. They are then bolted to the underlip of the dash and the rear mounting strap used as shown in the Chevrolet installation. Under Dash Mounting must be used on cars not shown as Dash Mounting in the chart above.

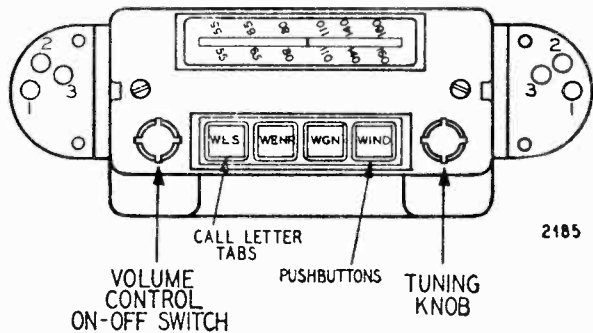
1941, 1942 and 1946 Chevrolet

FOR CHEV. MOUNTING
USE HOLES MARKED
[1]

FOR PONTIAC MOUNTING
USE HOLES MARKED
[2]

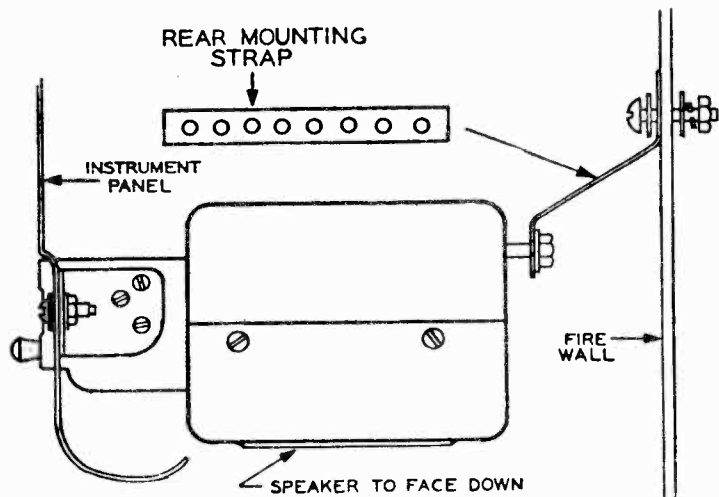
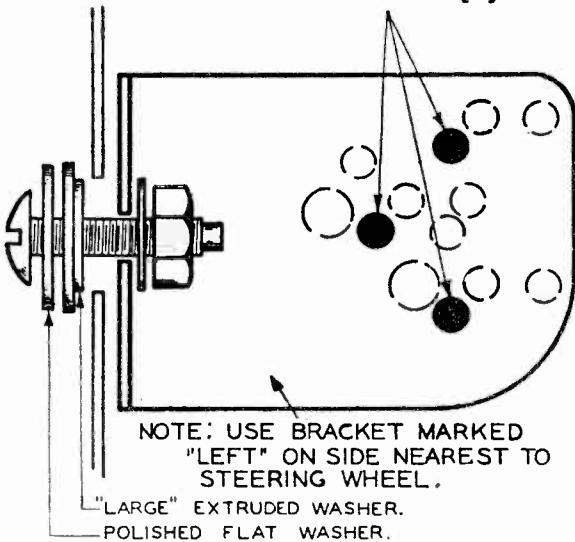
FOR FORD MOUNTING
USE HOLES MARKED
[3]

This view shows how the chassis is mounted to the dash. The rear mounting strap (in the kit of hardware) should be bent as shown and used to support the chassis at the back. The two front mounting brackets should be fastened to the chassis using the solid black holes as shown. Lay the bracket on the left hand drawing and the black circles will show through the holes to be used. The two holes marked No. 1 in the front brackets, as shown in the Dial View Drawing, should be used to bolt the chassis to the dash.



DIAL VIEW WHEN MOUNTED

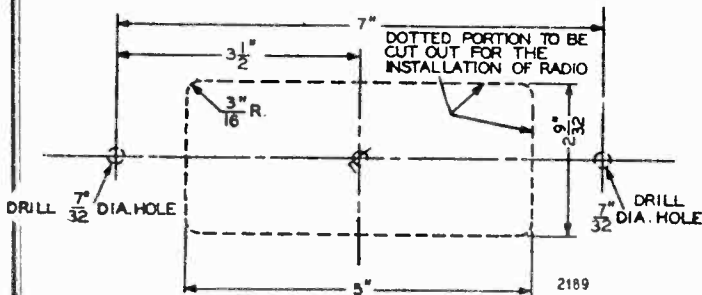
MOUNT BRACKETS TO CONTROL HEAD USING THESE [3] HOLES.



NOTE: Mount Chassis as shown with the speaker face down. Be sure to use rear mounting strap.

1941 and 1942 Americar Models (Willys)

Remove the panel from the left side of the dash and cut an opening, using the dimensions below. Mount the chassis the same as in the Chevrolet installation.



FINAL CONNECTIONS

The antenna cable should be connected and the shield grounded to the car body.

Connect the battery cable to the hot side of the ammeter behind the instrument panel and then insert the fuse in the cable receptor.

ANTENNA TRIMMER
(See Chassis View)

The input circuit has been especially designed to be used with a low capacity antenna of the fish pole or whip type.

Truetone antennas are especially designed to be used with this radio.

Tune in a station on the high frequency end of the dial and adjust the antenna trimmer for maximum volume. A weak station which does not fade is best for this adjustment.

IMPORTANT (ALL INSTALLATIONS)

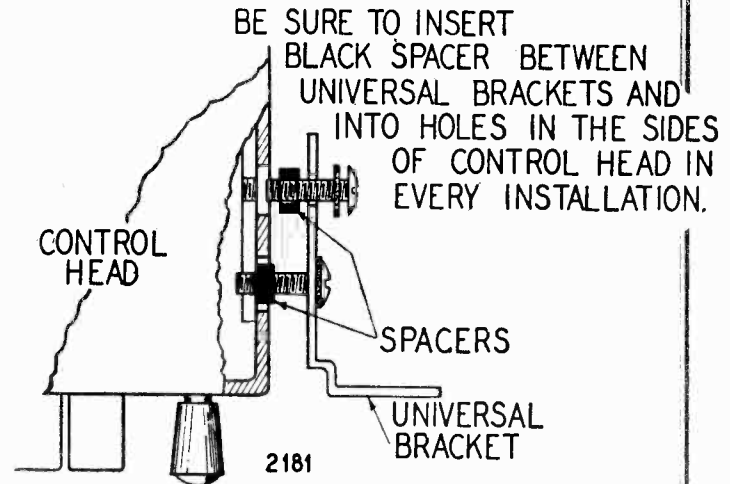
Two universal mounting brackets are supplied with the kit of hardware and are mounted in various positions on the chassis for installation in or under the dash of different cars.

In all installations it is very important that the black metal spacers be used between the front mounting brackets and the side of the chassis. The spacers must fit into the holes in the side of the chassis. They are packed in the kit of hardware.

Be sure to draw the rear mounting strap up tight so that it holds the chassis rigid.

In some installations it may be necessary to adjust the antenna trimmer before bolting the chassis to the dash.

Two pairs of extruded washers are supplied for use when bolting the chassis to the dash. Be sure the washers seat properly in the dash mounting holes and use the pair which fits the holes snugly.

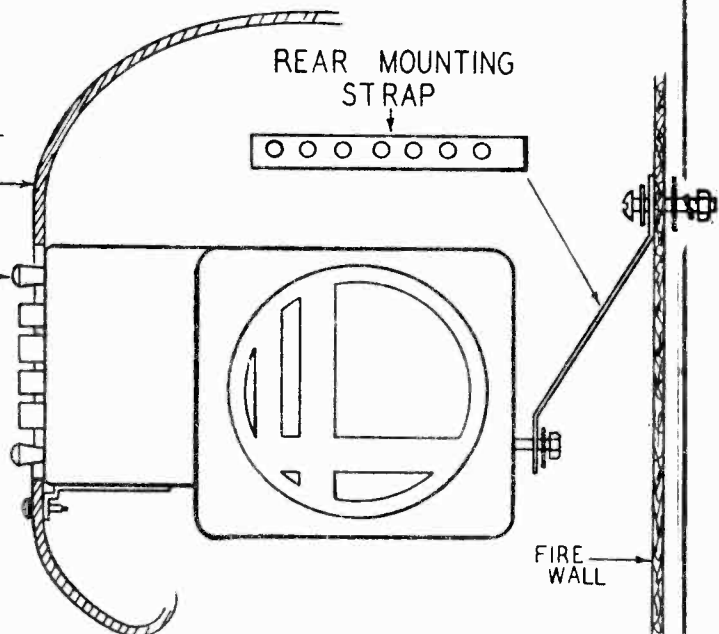
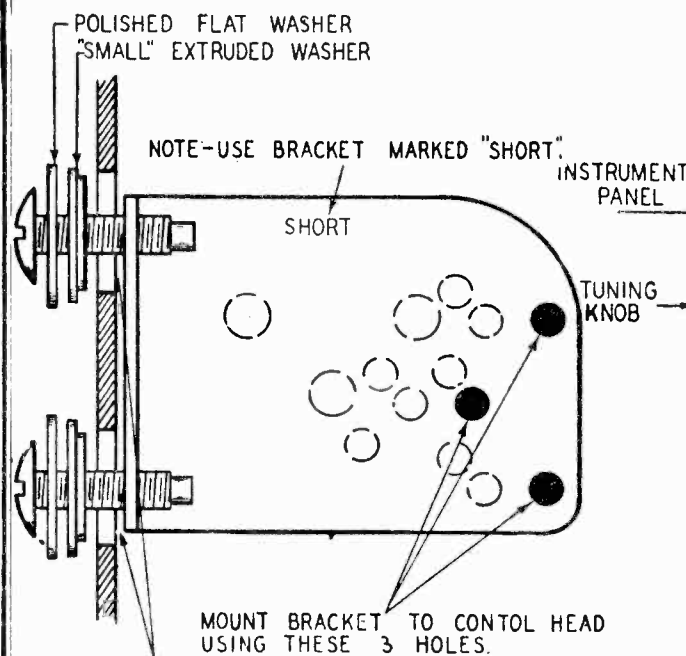
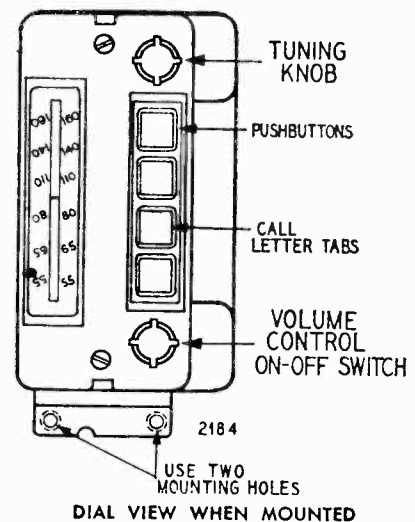


Dash Panel Mounting

1940, 1941, 1942 and 1946 Models of Chrysler, De Soto, Dodge, Plymouth

Mount the chassis as shown with the dial vertical. A special bracket marked "short" is supplied with the kit of hardware. Mount this bracket to the chassis, using the solid black holes shown in the left hand drawing. Note that the chassis should be mounted with the tuning knob at the top. It may be necessary in some installations to reverse the bolt in the cowl lever to prevent it from hitting the speaker grill. On Plymouth cars remove Pal nut behind dash at top of dial opening so the dial will come up flush.

The call letters must be carefully trimmed to fit the push-buttons horizontally. Be sure to use the black spacers pictured above when mounting the front (short) bracket.



ON 1941 DODGE INSERT CARDBOARD WASHERS SUPPLIED IN HARDWARE KIT

NOTE: Lay the bracket on drawing above to identify holes. Bracket NOTE: Mount Chassis as shown — Be sure to use Rear Mounting Strap. when mounted will of course be at bottom of tuner.

ELIMINATING MOTOR NOISE

GENERATOR CONDENSER

A Generator Condenser must be connected in all cases from the battery terminal of the generator to the Generator frame.

This condenser must not be connected across the field winding terminal on late cars which use Automatic Cutouts.

It is advisable that you find out from your local car dealers where the manufacturer recommends the condenser be connected for each make of car.

DISTRIBUTOR SUPPRESSOR

A Distributor Suppressor is required in practically all cases, except Ford V8's where none is used. The high tension lead must be removed from the distributor head and the suppressor inserted in its place. The high tension lead is then plugged into the suppressor.

AMMETER CONDENSER

A .5 Mfd. by pass condenser should be connected from one ammeter terminal to a good ground on the instrument panel. Usually this condenser plus the generator condenser and distributor suppressor will remove all objectionable ignition noise.

ELECTRICAL ACCESSORIES

If the above procedure has not reduced the noise sufficiently, it will be necessary to continue by passing sources of noise.

Accessories such as lighters, electric motor heaters, horns, light switches, automatic relays, electrical gauges such as oil, water and gas are often a source of interference. In these cases the procedure is to try a condenser from ground to various accessories until the interference is eliminated, then install the condensers in those places permanently. Spark intensifiers should not be used.

HIGH AND LOW TENSION LEADS

In many cars the low tension battery leads, etc., are grouped together with the high tension wires. These leads will very often pick up motor noise and feed it into the receiver through the battery circuit. In cases such as these it will be necessary to separate the low tension from the high tension wires and run them through another hole if they run from the engine compartment up to the instrument panel. This condition is particularly true on the V-8 Ford as the battery and primary leads run through a special tube which also houses the high tension leads. Shield and ground these leads.

IGNITION COILS

In cars where the ignition coil is located on the back side of the instrument panel it is often necessary to use an additional condenser. It must be installed from the battery side of the ignition coil to the closest ground on the instrument panel.

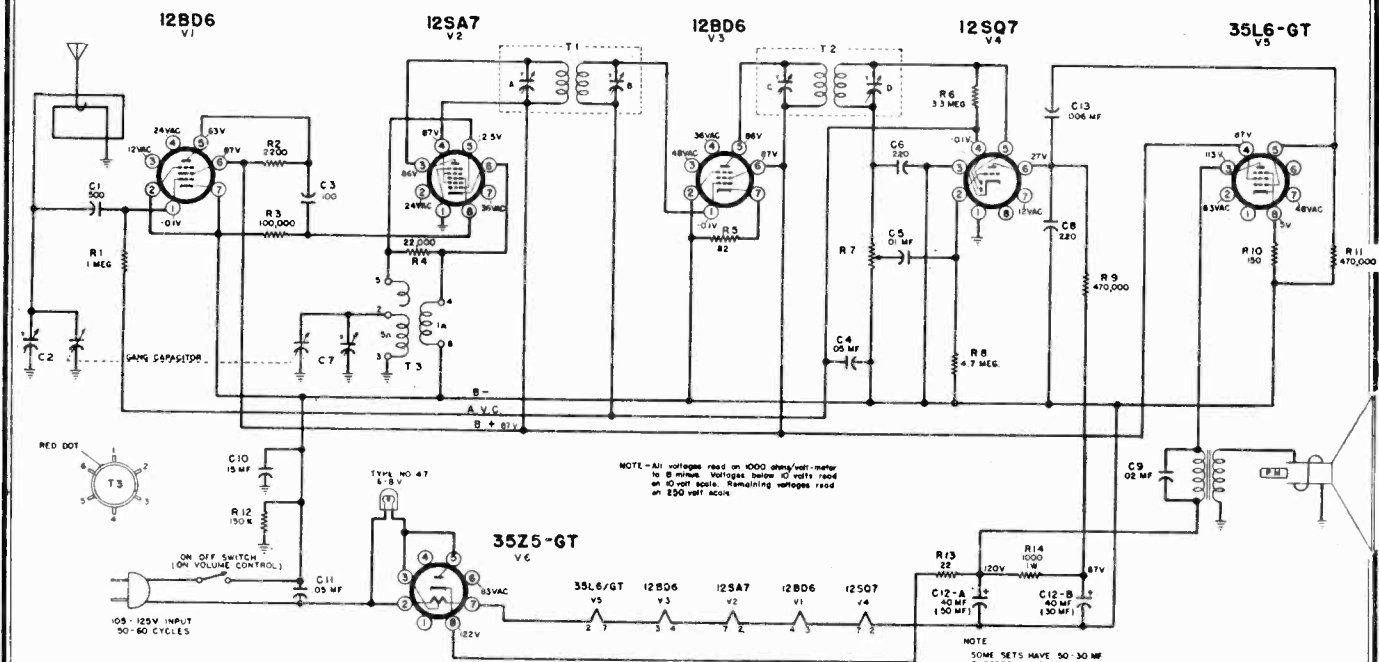
Short leads are very important. Where coils are mounted either on the instrument panel or in the driver's compartment, it may be necessary to shield the high tension lead from the coil to the distributor.

Part No.	Schematic Diagram Reference	Description	No. Used in Set
CONDENSERS			
100-26	C9	.02 x 400 Volt Tubular	1
100-87	C13	.01 x 600 Volt Tubular	1
100-13	C6	.05 x 400 Volt Tubular	1
100-20	C7	.1 x 200 Volt Tubular	1
100-9	C5	.05 x 200 Volt Tubular	1
100-125	C14	.0035 x 1600 Volt Tubular	1
100-25	C11	.002 x 600 Volt Tubular	1
100-31	C15, C16, C17	.5 x 120 Volt Oval Type	3
100-81		.5 Mfd. Generator Cond.	1
100-82		.5 Mfd. Ammeter Cond.	1
119-105	C12 A-B-C	Electrolytic Filter Condenser—20 Mfd. x 25 Volt; 15 Mfd. x 350 Volt; 15 Mfd. x 350 Volt	1
124-187	C1-A-B	Ant. and Osc. Dual Trimmer	1
129-161	C8A-B	.0001 Dual Mica—10%	1
129-2	C3, C10	.0005 Mica Type—20%	2
129-188	C2	.00008 Mica Type—3%	1
129-21	C4	.0002 Mica Type—20%	1
129-12	C19	.00025 Mica Type—20%	1
11749B	C18	Spark Plate	1
RESISTORS			
C-9B1-35	R9	4.7 Megohm, 1/2 Watt—20%	1
C-9B1-27	R10	220K Ohm, 1/2 Watt—20%	1
C-9B1-29	R11	470K Ohm, 1/2 Watt—20%	1
C-9B1-60	R12	680 Ohm, 1/2 Watt—10%	1
C-9B1-34	R6	3.3 Megohm, 1/2 Watt—20%	1
C-9B1-23	R7	47K Ohm, 1/2 Watt—20%	1
C-9B1-31	R1	1 Megohm, 1/2 Watt—20%	1
C-9B1-22	R2	33K Ohm, 1/2 Watt—20%	1
C-9B2-76	R3	15K Ohm, 1 Watt—10%	1
C-9B2-64	R15	1500 Ohm, 1 Watt—10%	1
C-9B1-50	R13, R14	100 Ohm, 1/2 Watt—10%	2
C-9B1-52	R4	150 Ohm, 1/2 Watt—10%	1
C-9B1-56	R5	330 Ohm, 1/2 Watt—10%	1
COILS			
108139B	T2	Input I.F. Coil	1
108211	T3	Output I.F. Coil	1
C-211-10961		Permeability Tuning Unit Complete with Ant. and Osc. Coils	1
T1-A; T1-B			1
10566	L3	"A" Choke No. 16 Wire	1
10568	L1-L2	"A" Choke No. 18 Wire	2
TRANSFORMERS			
104295	T5	Power Transformer	1
B-12C-10235	T4	Output Transformer for Speaker	1

Part No.	Schematic Diagram Reference	Description	No. Used in Set
SPEAKER			
B-18B10236		Five Inch Electrodynamic Speaker. Less Output Transformer	1
VIBRATOR UNIT			
12629		Plug-in Vibrator Unit	1
DIAL AND TUNER PARTS			
A-6D-10740		Dial Scale	1
D-4B-10750		Escutcheon	1
1121029		Set of Station Call Letters	1
128773-45		Knob—For Tuning and Volume	2
115860		Shaft for Volume Control	1
128766-45		Pushbuttons	4
1121027		Pointer	1
A-53A-10989		String for Pointer	1
120442		Tension Spring for Pointer String	1
1121026		Diffuser for Dial	1
A-2M-7758		Snap-in Rivet to Fasten Diffuser	2
107400		Socket Assembly for Pilot Lite	1
10797		6-8 Volt Lite. Type T-51	1
115807		Pushrod—For Pushbuttons	4
115799		"U" Cam—With Set Screw	4
120-184		Return Spring—For Pushrods	4
117924		Tuning Shaft	1
117311		Pinion Gear—Drives Crown Gear	1
13623		Drum Assembly Complete with 115800 Crown Gear	1
120441		Tension Spring for Slug String	1
MISCELLANEOUS			
107360B		Antenna Cable	1
107244		Ammeter Cable	1
131225		Fuse—14 Amp.—Type SFE	1
115713		Mounting Strap Bracket	1
115808		Case Mounting Bracket—Left	1
115809		Case Mounting Bracket—Right	1
115810		Case Mounting Bracket—Short Left	1
117929		Mounting Spacer	6
132293		No. 10-32 x 3/4 Fancy Head Screw	2
131145		Flat Steel Washer—For Above Screw	2
131403		Extruded Washer for Chevrolet 1941-42-46	2
131397		Extruded Washer for Dodge—DeSoto—Plymouth—Chrysler 1940-41-42-46	2
13625		Complete Kit of Mounting Hardware Including Brackets, Condensers, Screws, etc.	1
131-50		Buzz, Clips—for case	10

BELMONT RADIO CORP.

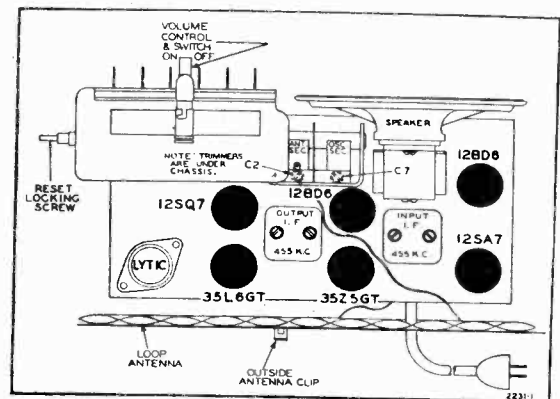
MODEL 6D130
SERIES A



- Tuning range 530 to 1650 Kc.
- Intermediate frequency 455 Kc.
- Power consumption 35 Watts
- Sensitivity (for 0.05 watt output) 40 microvolts average
- Selectivity 55 Kc. broad at 1000 x signal at 1000 Kc.
- Power output (in voice coil)
 - Undistorted 0.8 watt
 - Maximum 1.0 watt
- Voice coil impedance 3.2 ohms

NOTE: On some sets slug tuned I. F.'s are used instead of trimmer tuned I. F.'s. 108-140Q and 108-145H are trimmer tuned. B-13A-12023-1 and B-13B-12022-1 are slug tuned. The slug tuned I. F.'s are tuned from the top and bottom (secondary on top, primary on bottom).

When trimmer tuned I. F.'s are used, R5 is 270 ohms.



Chassis View, showing tube locations

ALIGNMENT PROCEDURE

- No aligning adjustments should be attempted until all other possible causes of trouble have been checked.
- Chassis must be removed from cabinet for proper alignment. Slight adjustments of the oscillator and antenna circuits can be made, without removing the chassis, through two holes provided on the bottom of the cabinet. The two adjustment screws can be reached with a long insulated screwdriver.
- It is important that during alignment the loop antenna

- be maintained at the same distance from the chassis as when the chassis is installed in the cabinet.
- Turn volume control to maximum for all adjustments.
- Connect ground post of signal generator to B- of radio through a 0.1 mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.

Band	Signal Generator Frequency Setting	Dummy Antenna	Connection to Radio	Tuning Condenser Setting	Adjust for Maximum Output (see chassis view)
I.F.	455 Kc.	0.1 mfd.	Grid of 12SA7	Rotor full open (plates out of mesh)	4 trimmers on input and output I.F. transformers
Broadcast	1650 Kc.	0.1 mfd.	Grid of 12SA7	Rotor full open (plates out of mesh)	Oscillator trimmer C7 on bottom of radio
	1400 Kc.	None	See note A	Set dial at 1400 Kc.	Antenna trimmer C2 on bottom of radio

Note A: Lay output lead of generator in back of loop antenna. Turn up generator output. Loop antenna will pick up energy.

MODEL 6D130
SERIES A

BELMONT RADIO CORP.

IMPORTANT!

This receiver, unless otherwise marked, must be operated on an AC voltage of 105 to 125 volts, 50 to 60 cycles, or on a DC voltage of 105 to 125 volts. If you are in doubt as to the voltage of your power supply, consult your local power company. **DO NOT INSERT THE PLUG IN THE POWER RECEPTACLE UNLESS YOU ARE SURE THAT THE CORRECT VOLTAGE IS AVAILABLE.** Receivers of this same model which are for use on voltages other than those specified above are so marked.

SETTING THE PUSHBUTTONS

The pushbuttons may be used, after proper adjustment, for the automatic tuning of any six stations which you select. They can be set up in any order.

1. Turn on the radio. Allow it to warm up for at least one minute.
2. Push out the call letters of the six stations from the call-letter sheet supplied with this manual.
3. Insert one call-letter tab in the rectangular opening in each of the pushbuttons, in any sequence. Press an acetate tab (supplied in small envelope) into each of the pushbuttons.
4. With the screwdriver supplied, check to see that the locking screw in the center of the tuning knob (see illustration) is loose. If it is not, turn it several turns to the left (counterclockwise).
5. Press the first pushbutton down *all the way*. With one hand hold the button down *firmly* and with the other carefully tune in the desired station. Release the pushbutton.
6. Follow this procedure for each of the five other buttons, adjusting each one for a different station.
7. Rotate the tuning knob on the side of the cabinet as far to the right as it will go. Tighten the locking screw in the center of the knob. **IT IS IMPORTANT THAT THIS SCREW BE TIGHTENED VERY FIRMLY.**
8. The pushbuttons are now properly set for automatic tuning. Any of the six stations may now be tuned in simply by pressing the proper button down as far as it will go. If it is desired to reset any of the buttons for a new station, loosen the locking screw in the center of the tuning knob, set the pushbutton as described above, and re-tighten the locking screw.

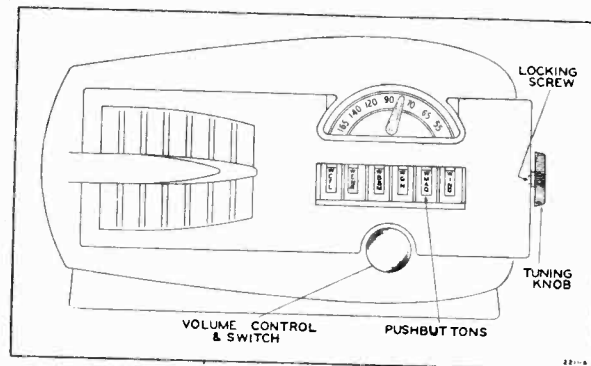
ANTENNA AND GROUND

The antenna (aerial) built into the rear of the cabinet is sufficient for receiving programs from strong local stations and from powerful nearby stations. This antenna may be somewhat directional, that is, reception is improved when the antenna is facing in certain directions. Therefore tune in a station and try the radio in several positions.

In locations remote from broadcasting stations or where receiving conditions are poor, an outside antenna, 50 to 75 feet long, will give best results. The antenna should be erected as high as possible, as far from surrounding objects as is practical, and at right angles to street car lines and power lines. Connect the antenna lead-in wire to the antenna clip at the rear of the radio

Periodic inspection of the antenna is recommended to make sure that all connections are clean and tight and that the antenna is well insulated from the ground at all points.

No ground wire is required with this radio.



1. Check the power at the receptacle by inserting the plug of a lamp cord and noticing whether the lamp lights. If the radio is being operated on direct current, try reversing the plug of the radio line cord.

2. If an outside antenna is being used, check all connections to be sure they are clean and tight. Make sure that the antenna is insulated from the ground at all points.

3. Take out the tubes and have them tested. The tubes may be removed as follows: First disconnect the line cord from the power receptacle. Then remove the four buttons which hold the back of the cabinet in place. Unclip the two leads connected to the loop antenna on the inside of the back. Remove each tube by holding it near its base, rocking it back and forth, and pulling upward. **WHEN REPLACING TUBES, BE SURE THAT THE TYPE NUMBER OF EACH TUBE CORRESPONDS TO THE TYPE NUMBER STAMPED ON THE CHASSIS ALONGSIDE THE TUBE SOCKET.**

If for any reason it is found necessary to remove the chassis, proceed as follows: Make sure the line cord is disconnected from the power receptacle. Remove the back as described above. Pull the volume knob off its shaft. Unscrew the locking screw in the center of the tuning knob and pull the tuning knob off its shaft. Remove the four chassis mounting screws from the bottom of the cabinet. Move the chassis toward the back of the cabinet so that the control shafts and tuner assembly clear the holes. The chassis can then be slipped out. After the chassis is replaced the automatic pushbuttons will probably have to be reset.

APPLYING POWER TO RADIO

Insert the line plug in the power receptacle. If no sound is heard after one minute, and the set is operating on direct current (DC), reverse the plug. If the set is operating on alternating current (AC), a low steady hum may be noticeable after the set warms up. Reverse the plug and notice whether or not there is any difference. Leave the plug in the position which gives less hum.

The power consumption of this radio is 35 watts, slightly less than that of a 40-watt electric light bulb.

Ref. No.	Part No.	Description
Condensers		
C-12A, C-12B	A-8C-11375	Filter cond., 40 mfd., x 40 mfd., x 150 volts
	or	
	A-8C-15030	Filter cond., 40 mfd., x 40 mfd., x 150 volts
	or	
	A-8C-15262	Filter cond., 50 mfd., x 30 mfd., x 150 volts
C4	C-8D-10770	.05 x 200 volts, tubular
C9	C-8D-10774	.02 x 400 volts, tubular
C5	C-8D-11738	.01 x 200 volts, tubular
C11	C-8D-10813	.05 x 400 volts, tubular
C10	C-8D-10953	.15 x 400 volts, tubular
C13	C-8D-10785	.006 x 600 volts, tubular
C6, C8	C-8G-11733	220 mmf., ceramic
C1	C-8G-11822	500 mmf., ceramic
C3	C-8G-11734	100 mmf., ceramic

Ref. No.	Part No.	Description
Resistors		
R14	C-9B2-62	1000 ohms, 1 watt, 10%
R9, R11	C-9B1-94	470K ohms, 1/2 watt, 20%
R8	C-9B1-35	4.7 megohms, 1/2 watt, 20%
R6	C-9B1-34	3.3 megohms, 1/2 watt, 20%
R4	C-9B1-78	2.2K ohms, 1/2 watt, 20%
R13	C-9B1-42	22 ohms, 1/2 watt, 10%
R3	C-9B1-25	100K ohms, 1/2 watt, 20%
R2	C-9B1-66	2200 ohms, 1/2 watt, 10%
R12	C-9B1-26	150K ohm, 1/2 watt, 20%
R1	C-9B1-31	1 megohm, 1/2 watt, 20%
R10	C-9B1-52	150 ohms, 1/2 watt, 10%
R5	C-9B1-49	82 ohms, 1/2 watt, 10%
	or	
	C-9B1-55	270 ohms, 1/2 watt, 10%

Ref. No.	Part No.	Description
Coils		
	C-13E-15280 or	Loop antenna assembly, complete
	C-13E-15293	on back
T3	B-13D-15277	Oscillator coil
T1	108-140Q or	Input I. F. coil in can, 455 Kc.
	B-13A-12023-1	
T2	108-145H or	Output I. F. coil in can, 455 Kc.
	B-13B-12022-1	

Part No.	Description
Sockets	
A-15C-15189	7-prong, tube socket
121171	8-prong socket, laminated
121216	Socket base, bakelite
A-47A-11470	Pilot light socket assembly

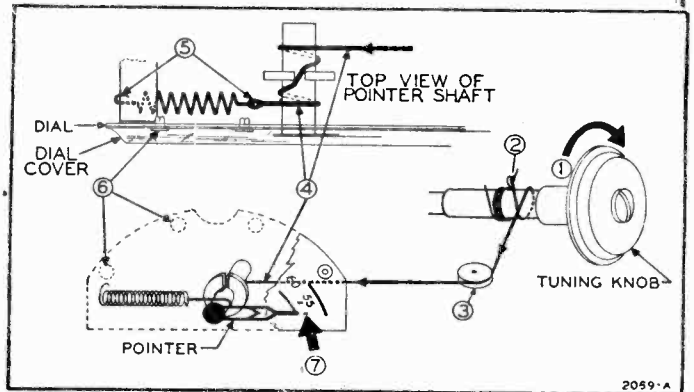
REPLACING DIAL POINTER DRIVE CORD

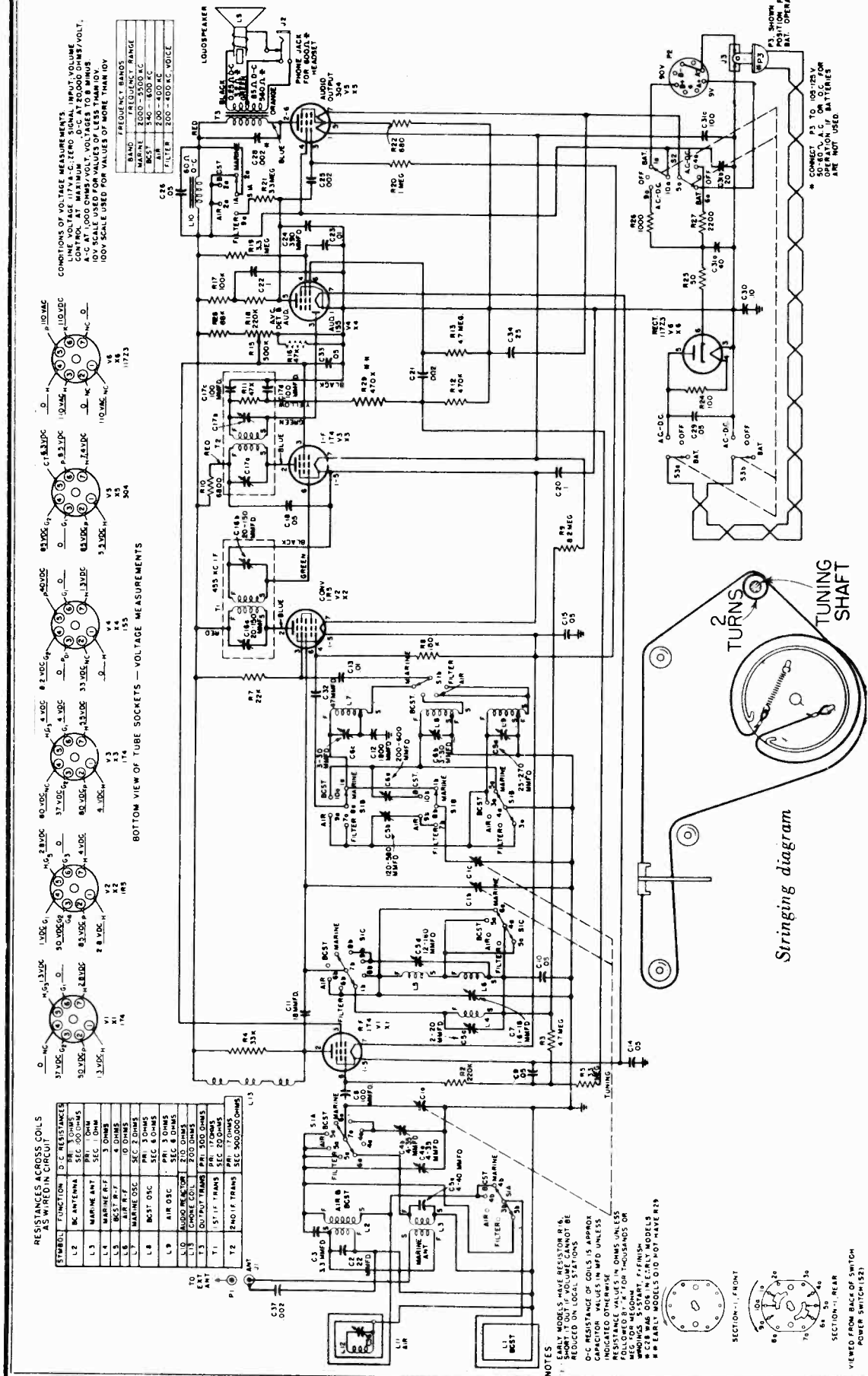
Six inches of cord are required in the set. Use a piece slightly longer so that knots may be tied at each end. Numbers below correspond to circled numbers in diagram.

1. Rotate tuning knob to extreme clockwise position. This closes tuning condenser. Knob should remain in this position until installation is completed.
2. Tie cord to loop in spring as shown. Wind cord one turn around shaft in direction shown.
3. Pass cord over idler pulley.
4. Pass cord over pointer shaft; wind it one turn around shaft; pass it through key washer; wind it one more turn around shaft.
5. Hook spring over end of dial support. Tie cord to spring. **IMPORTANT:** Before tying knot stretch spring enough so that full contraction of spring will rotate pointer shaft at least one-half turn.
6. Remove dial crystal by removing Cinch buttons.
7. Make sure tuning knob is in extreme clockwise position. Then rotate pointer clockwise, against friction of shaft, until it is in horizontal position, as shown.

Ref. No.	Part No.	Description
Speaker		
	114197	5-inch, P.M. speaker
	B-12C-15278	Output transformer for speaker
Dial Parts		
	115448	End plate (right hand bracket)
	115448C	End plate (left hand bracket)
	115146	Cams
	115143	Key washer (13 used on cam shaft)
	117528	Brass spacer (1 used on cam shaft)
	117602	Brass spacer (4 used on cam shaft)
	131181	Spring washers for locking collar
	117604	Locking collar
	117600	Level shaft
	115361	Lever with roller
	120283	Return spring for levers
	115449B	Dial bracket assembly
	112785	Pointer
	A-53A-10989	Drive cord, 6 inches used
	A-49A-11087	Spring on tuning shaft, for cord
	A-3N-11086	Spacer under above spring
	120143	Take-up spring for drive cord
	B-6D-10241-2	Dial scale
	112-659-1	Crystal, clear, for dial scale
	A-2M-7758	Cinch buttons for fastening scale to bracket
	117833	Brass spacer (for spacing pointer from dial)

Ref. No.	Part No.	Description
Miscellaneous		
	10798	Line cord and plug
R7	101218 or	Volume control and switch,
	A-10A-10626	1 megohm
C1-A, C1-B	B-8A-10211	2-gang, variable condenser
	107249	Pilot light bulb, type T-47
	134123	Rubber bumper (bottom of cab.)
	13141	Cinch buttons, to cover trimmer holes in cabinet
	B-5B-14298-8	Pushbuttons (6 used), Ivory
	A-23L-11900	Station call letters, set
	A-6C-14299	Acetate tabs for call letters
	5C-15128-9	Cabinet, bakelite, ivory color
	128-686-8	Knob, volume, ivory color
	A-5B-10994-9	Knob, tuning, ivory color
	A-3F-10995	Locking screw for tuning knob
	120388	Locking spring for tuning knob
	A-2H-10996	Reset key
	5C-15128-36	Cabinet, walnut
	128-686-37	Knob, volume, walnut
	A-5B-10994-36	Knob, tuning, walnut
	B-5B-14298-37	Pushbuttons, walnut



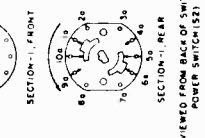


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Model PAR-80 does not have resistor R16.
 Selectivity—Bandwidth at 10 X down; 15 kc for 1000 kc, 22 kc for 300 kc, 19 kc for 3500 kc.
 Standard Audio Output—Approximately 150 milliwatts. Speaker integral with receiver.

Tube Complement—1T4 R-F, IR5 Converter, 1T4 1-F, 1S5 Detector, AVC and First Audio, 3Q4 Audio Output, 117Z3 Rectifier.

NOTES
 1. EARLY MODELS HAVE RESISTOR R16. SHORT IT OUT IF VOLUME CANNOT BE REDUCED ON LOCAL STATIONS.
 2. RESISTANCE VALUES IN OHMS UNLESS INDICATED OTHERWISE.
 3. CAPACITANCE VALUES IN P.F. UNLESS INDICATED OTHERWISE.
 4. RESISTANCE VALUES IN OHMS UNLESS INDICATED OTHERWISE.
 5. RESISTANCE VALUES IN OHMS UNLESS INDICATED OTHERWISE.
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MODELS PAR-80,
PAR-80A

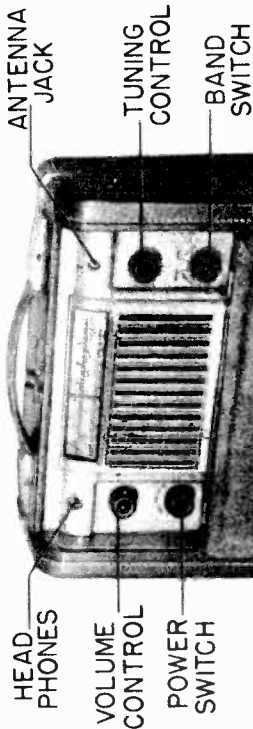
BENDIX RADIO DIV.

receiver can be operated on AC, DC, or from a self-contained Bendix Battery Pack AB225, or equivalent. Battery must provide B supply of 90V and A supply of 9V, 8 prong plug, and dimensions not greater than 10 1/2" x 3 1/4" x 4 1/8". Line cord must be plugged into battery switch located in cabinet rear compartment before receiver can be operated on battery power. An external antenna is required for Marine band reception, and will improve reception on other bands as well. Attach antenna to plug at upper left of front panel. Headphones with 600 ohm impedance may be used, and when plugged into jack at upper right of front panel, disconnect speaker from circuit.

SENSITIVITY measurements made for 50 mw output, using Hazeltine standard loop (24" spacing) for the broadcast and air bands and using RMA standard dummy antenna for the marine band.

Freq.	Approx. Sens.	Freq.	Approx. Sens.
1475 KC	20 uv/M	400 KC	15 uv/M
1000 KC	25 uv/M	2000 KC	50 uv
580 KC	40 uv/M	3000 KC	25 uv
200 KC	45 uv/M	5000 KC	20 uv
300 KC	25 uv/M		

Model PAR-80A only.



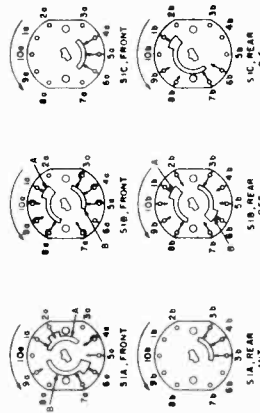
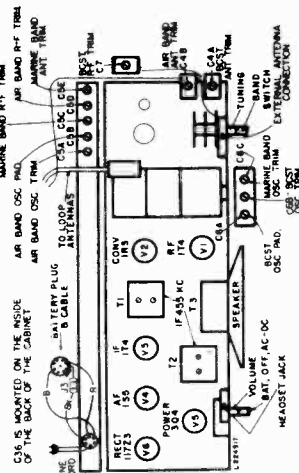
Model PAR 80

SPECIFICATIONS

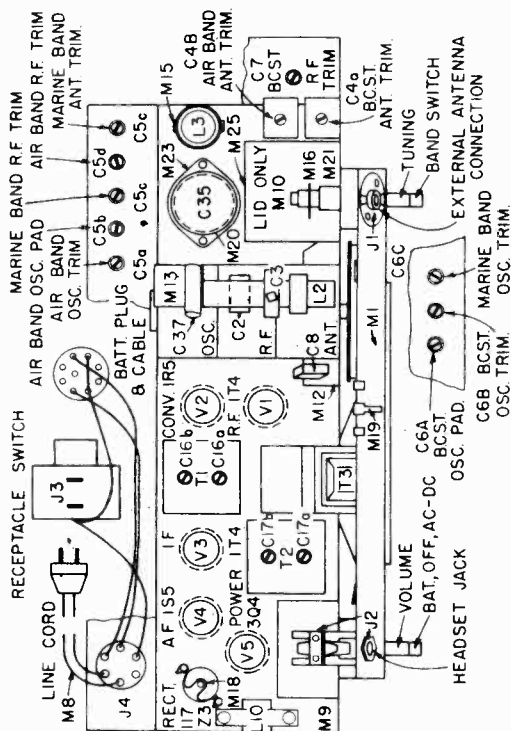
- Power Requirements
 - (a) 105 - 125 DC or 60 cycle AC
 - (b) Bendix Battery Pack AB225
- Power Consumption
 - 19 Watts
- Tuning Frequency Range
 - Air Band 200 - 400 KC
 - Broadcast Band 540 - 1600 KC
 - Marine Band 2000 - 5500 KC
- Immediate Frequency
 - 455 KC
- Power Output
 - Maximum .320 Watts
- Tube Complement
 - 2-1T4, 1-1R5, 1-1S5, 1-3Q4
- Total 5, Plus 117Z3 Rectifier
- Loudspeaker
 - 5" diameter PM

GENERAL

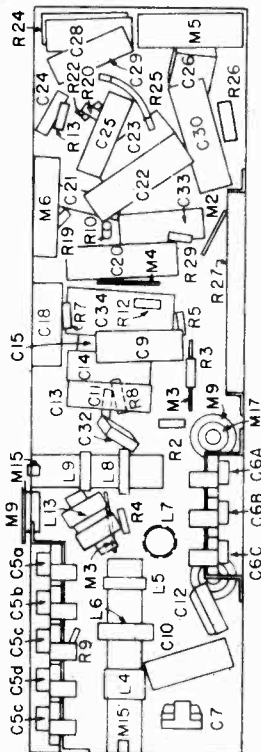
The Bendix Radio Model Par 80 provides reception of the Air, Standard Broadcast, and Marine bands. The Filter position of the band switch selects Air Band (200-400 KC) for voice reception with minimum interference from A and N code signals or the 1020 cycle tone. This



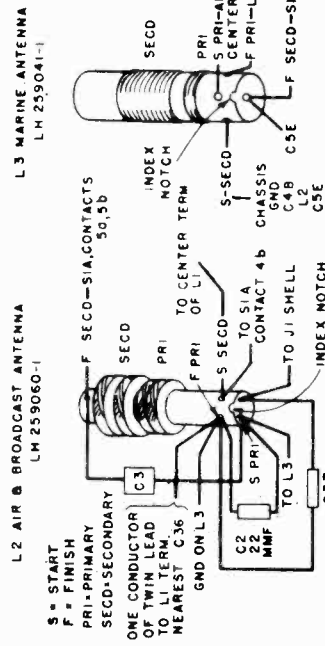
MODEL PAR-80 ONLY



Trimmer Location Diagram



Component Diagram Bottom View



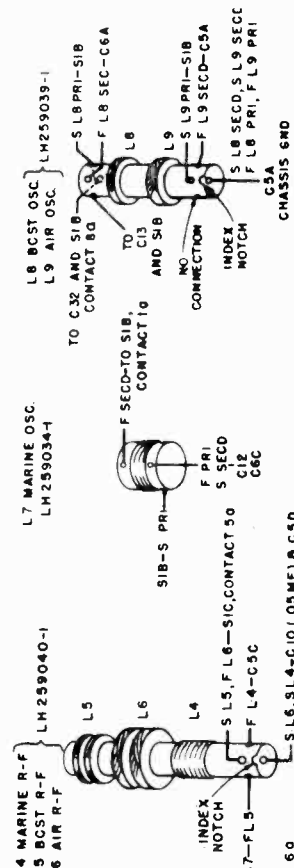
L224705

ALIGNMENT PROCEDURE

Connect line cord plug to 117V, 60 cycle AC power source. Use full volume and set signal generator to produce .05 W (9.38V, AC) or less of receiver output to prevent AVC action. Plug output meter (560-600 ohms impedance) or AC meter (shunted by 560-600 ohms) into phone jack. Use 30% modulated AM signal for RF alignment.

ALIGNMENT CHART

INPUT FREQ.	THROUGH	T0	BAND SWITCH POSITION (Circuit)	DIAL POINTER POSITION	ADJUSTMENTS	REMARKS
455 KC	.01 mf or Larger	Pin #4 V2, IKS	BCST. (IF)	High end of band	C17a, C17b, C16b, C16a	Adjust for Max.
5500 KC	400 ohms	J1	Marine (RF)	5500 KC	C4, C5c, C5c	Adjust for Max.
Adjustment of the BCST. Trimmers, RF and AMT., will necessitate adjustment of AIR Trimmers, RF and AMT.						
1550 KC	100 mmf	J1	BCST. (RF)	1550 KC	C4b, C7, C4a	Adjust for Max.
600 KC	100 mmf	J1	BCST. (RF)	600 KC	C4a	Rock tuning control for Max. output
1550 KC	100 mmf	J1	BCST. (RF)	1550 KC	C4b, C7, C4a	Adjust for Max.
400 KC	100 mmf	J1	Air (RF)	400 KC	C5a, C5d, C4b	Adjust for Max.
200 KC	100 mmf	J1	Air (RF)	200 KC	C5b	Rock tuning control for Max. output
400 KC	.001 mf	J1	Air (RF)	400 KC	C5a, C5d, C4b	Adjust for Max.
455 KC	100 mmf	J1	Air (IF Trap)	High end of band	C3b	Adjust for Minimum



Coil Connections

MODEL PAR-80

REPLACEMENT PARTS LIST

Stock Number	Symbol Number	Description	Stock Number	Symbol Number	Description
ELECTRICAL COMPONENTS					
CV0C07	(C1a,b,c)	CAPACITOR—Variable 3 Sections	CS0M06+	(M9)	COVER—Switch Shield
CM5A05	(C2)	CAPACITOR—Mica 22 mmf 500V	CS0M07	(M10)	COVER—Bandswitch Shield
CC9A16+	(C3)	CAPACITOR—Ceramic 3.3 mmf	DS0E02		DIAL—Scale, Marine, Bdct. & Air
CT2A16	(C4a,b)	CAPACITOR—Antenna Trimmer	GRO500+	(M11)	GROMMET—Rubber Shockmount
CT5A01	(C5a,b,c,d,e)	CAPACITOR—Trimmer	HB0M01+	(M12)	BRACKET—Variable Capacitor Mtg.
CT3A01	(C6a,b,c)	CAPACITOR—Trimmer	HB0M99	(M13)	BRACKET—Coil Mtg.
CT1A19+	(C7)	CAPACITOR—Trimmer 1.6-18mmf	HC0C00+	(M14)	CLIP—Coil Mtg.
CM5A22+	(C8)	CAPACITOR—Mica 100 mmf 500V	HC0C02+	(M15)	CLIP—Coil Mtg.
CP2T40+	(C9,10,14,15, 18,29,33)	CAPACITOR—Paper .05 mfd—10% +30% 200V	HC0C03+		CLAMP—Dial Cable
CM6A16	(C11)	CAPACITOR—Mica 18 mmf ±10% 500V	HC0C13+		CLIP—IF 2nd
CM6E64	(C12)	CAPACITOR—Mica 1800 mmf ±10% 500V	HC0S00+	(M16)	CLIP—Spring (Tuning Shaft)
CP2T31+	(C13,23)	CAPACITOR—Paper .01 mfd—10% +20% 200V	HRO501+		RIVET—Shoulder (.171 x .118)
CT2A06+	(C16a,b)	CAPACITOR—Trimmer	HS0C00+		SPRING—Coil (Dial Cable)
CT3A00+	(C17a,b,c,d)	CAPACITOR—Trimmer	HS6F01+	(M17)	SPACER—Tuning Cond. Mtg.
CP2T51+	(C20,22,30)	CAPACITOR—Paper .1 mfd—10% +20% 200V	HS0X09+	(M18)	SPRING—Tube Retainer
CP2T12+	(C21,25)	CAPACITOR—Paper .002 mfd—10% +20% 200V	HZ0S00+		STUD—Trimount (Dial Scale)
CM6A48	(C24)	CAPACITOR—Mica 390 mmf ±10% 500V	ID0M26	(M19)	INDICATOR—Metal Dial (Pointer)
CP0M40	(C26)	CAPACITOR—Paper .05 mfd ±10% 120V	IM0P03		INSULATOR—Bandswitch Mtg.
CP6T12+	(C28,37)	CAPACITOR—Paper .002 mfd—20% +40% 600V	IT0C02	(M20)	INSULATOR—Paper Tube (Elec. Cap)
CE3A04	(C31a,b,c)	CAPACITOR—Electrolytic (40-20 mfd) (100 mfd)	IT0P00		INSULATOR—Flexible Tubing (Vinylite)
CM5A14+	(C32)	CAPACITOR—Mica 47 mmf 500V	JR1003	(J2)	JACK—Midget, Phone 1 Contact
CE1T00+	(C34)	CAPACITOR—Electrolytic 25 mfd 25 YDC	JP8000+	(J4)	PLUG—Bat. 8 Contact
CT1A21	(C36)	CAPACITOR—Trimmer, Mica 12-160 mmf	JR2008+	(J3)	RECEPTACLE—Line Cord Switch (Bat.)
RC22A224M+	(R2,18)	RESISTOR—Comp. 220K ¼W	JR1500+	(J1)	RECEPTACLE—1 Pin Single Contact Ant.
RC22A475K	(R3,13)	RESISTOR—Comp. 4.7 meg ±10% ¼W	MB0B00+	(M21)	BEARING—Brass (Tuning Shaft)
RC22A333M+	(R4)	RESISTOR—Comp. 33K ¼W	MP0100+		PULLEY—Idler Fiber
RC22A335M+	(R5,19,21)	RESISTOR—Comp. 3.3 meg ¼W	MS0T12+	(M22)	SHAFT—Tuning
RC22A223M+	(R7)	RESISTOR—Comp. 22K ¼W	PI0C00+	(M23)	PLATE—Cap. Insulator Mtg.
RC22A104M+	(R8,17)	RESISTOR—Comp 100K ¼W	PI0P04+	(M24)	PLATE—Line Cord
RC22A825K	(R9)	RESISTOR—Comp. 8.2 meg ±10% ½W	SM0B03+		SHIELD—Metal Base Tube
RC22A682M+	(R10)	RESISTOR—Comp. 6.8K ¼W	SM0C04	(M25)	SHIELD—Band Switch
RC22A473M+	(R11)	RESISTOR—Comp. 47K ¼W	SM0T04+	(M26)	SHIELD—Tube
RC22A474M+	(R12,29)	RESISTOR—Comp. 470K ¼W	S07M11		SOCKET—Miniature, 7 Prong
RV0C09	(R15)	RESISTOR—Pot. .5 meg ±30%	WF0100+	(M27)	WASHER—Insulating Ant. Jack
RC22A105M+	(R20)	RESISTOR—Comp. 1 meg ¼W	X50C16		INSULATOR—Shielding Switch
RC22A681K	(R22)	RESISTOR—Comp. 680 ohms ±10% ¼W			
RC24A101M+	(R24)	RESISTOR—Comp. 100 ohms 1W	BZ0D23+		CABINET COMPONENTS
RW1A09	(R25)	RESISTOR—Wirewound 50 ohms 1W	BZ0D28+		BAFFLE—Grille
RC24A102M+	(R26)	RESISTOR—Comp. 1000 ohms 1W	GC0D01+		BAFFLE—Speaker Chipboard
RW0D00+	(R27)	RESISTOR—Wirewound 2.2K ±10%	G0F050		GASKET—Dial Cork
RC23A683K+	(R28)	RESISTOR—Comp. 68K ±10% ½W	GZ0C07		GASKET—Felt Speaker
T10C03+	(T1)	TRANSFORMER—IF 1st	HB0M61+		GRILLE—Cloth
T10D04+	(T2)	TRANSFORMER—IF 2nd	HC0S64+		BRACKET—Mtg. Latch & Carry Strap
TA0017	(T3)	TRANSFORMER—Output	HH0S03+		CLIP—Spring Latch Pin
LA0S00	(L2)	COIL—Antenna (Bdct. & Air)	HK0R00+		HOUSING—Battery Switch
LA0C01	(L3)	COIL—SW Ant.	HN9S02		RING—Knob Retainer Spring
LJ0S00	(L4,5,6)	COIL—RF (Marine, Air, Bdct.)	HP0M04+		NUB—Speed (Om. Grille)
L06C01	(L7)	COIL—SW Oscillator	HP0P12		GUIDE—Top Center
L06S00	(L8,9)	COIL—Oscillator (Bdct. & Air)	HS0C73+		PIN—Latch Hinge
LF0100	(L10)	COIL—Choke (Audio)	HS0F14+		SPRING—Latch Coil
LF0A95	(L13)	COIL—Choke, RF 20mh	HS0F15+		SPACER—Right, Flat Strap Assy.
ALOZ17	(L1)	ANTENNA—Loop AM	HS0S17		SPACER—Left, Flat Strap Assy.
ALOZ16	(L11)	ANTENNA—Loop, Long Wave	HZ0C01+		STUD—Latch Pin
T10W00	(L12)	TRAP—IF Wave	HZ0C02+		LATCH—Right
SP5R00+		SPEAKER—5" PM	HZ0C02+		LATCH—Left
SR4F00	(S1)	SWITCH—Band 4 Position, 3 Section	HZ0C10		LATCH—Top Section
SR3B00+	(S2,3)	SWITCH—Rotary 2 Pole, 3 Position	HZ0L03		HANDLE—Leather
MECHANICAL COMPONENTS					
AD0C08	(M1)	ASSEMBLY—Dial Back Plate	IM0A00		INSULATOR—Mtg. Shelf Cover
BT1S01+	(M2)	BOARD—Terminal (1 Lug, 1 Mtg.)	IM0P01		INSULATOR—Paper, Battery Switch
BT2S00+	(M3)	BOARD—Terminal (2 Lug, 1 Mtg.)	IM0P02		INSULATOR—Paper, Battery Switch
BT3S01+	(M4)	BOARD—Terminal (3 Lug, 1 Mtg.)	JP1002+		PLUG—1 Contact Ant.
BT3S07+	(M5)	BOARD—Terminal (3 Lug, 1 Mtg.)	KB0R00		KNOB—Control, Index (Red)
BT3S08	(M6)	BOARD—Terminal (3 Lug, 1 Mtg.)	KC0R01		KNOB—Control (Red)
CD0N02	(M7)	CABLE—Dial	NE0B01		NAMEPLATE—Bendix (Brass)
CL2A07+	(M8)	CORD—Line AC	PI0R00		PLATE—Loop Retainer (Paper)
			PI0R01		PLATE—Wave Trap Retainer (Paper)
			PZ0M01		PANEL—Front
			ZW6P01		CABINET—

†Used on previous models

‡Complete assembly—see separate manual for proper code.

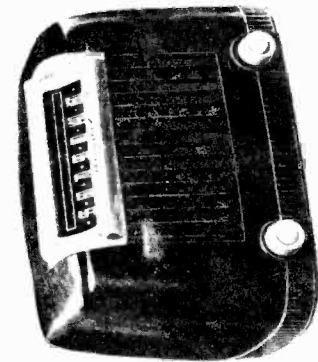
BENDIX RADIO DIV.

MODEL PAR-80A

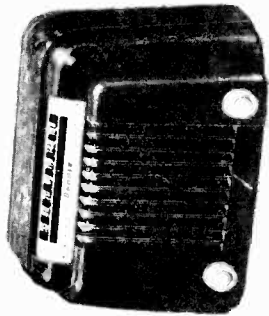
Circuit Symbols	Description
	CAPACITORS
C1a, C1b, C1c	Three-sect var min 11 mmf, increment C 420 mmf for ea sect, ant sect front, osc sect rear (NH260025-1)
C2	22 mmf $\pm 20\%$, 500v dcw, mica (CH267500-220)
C3	3.3 mmf $\pm 20\%$, 500v dcw, ceramic, orange code band, part of L2. (CH267007-003)
C4a, C4b	4-35mmf ea sect, 2 sect (CH260039-1)
C5a, C5b, C5c, C5d, C5e	5 sect trimmer: 25-270 mmf, 120-580 mmf, 2-20 mmf, 12-160 mmf, 4-40 mmf (CH260031-1)
C6a, C6b, C6c	3 sect trimmer: 200-600 mmf, 3-30 mmf, 3-30 mmf (CH260032-1)
C7	1.6 to 18 mmf trim (AH260035-1)
C8	100 mmf $\pm 20\%$, 500v dcw, mica (CH267500-101)
C9, C10, C14, C15, C18, C29, C33	.05 mmf -10% $+30\%$, 200v dcw, paper, (CH267000-503)
C11	18 mmf $\pm 10\%$, 500v dcw, mica (CH267503-180)
C12	1800 mmf $\pm 10\%$, 500v dcw, mica (CH267515-182)
C13, C23	.01 mf -10% $+20\%$, 200v dcw, paper (CH267000-103)
C16a, C16b	20-150 mmf ea of 2 sect, nonreplaceable part of T1
C17a, C17b, C17c, C17d	20-150 mmf, 25-130 mmf, 100mmf, 100 mmf, nonreplaceable part of T2
C20, C22, C30	.1 mf -10% $+20\%$, 200v dcw, paper, (CH267000-104)
C21, C25	.002 mf -10% $+20\%$, 200v dcw, paper, (CH267000-202)
C24	390 mmf $\pm 10\%$, 500v dcw, mica, (CH267503-391)
C26	.05 mf $\pm 10\%$, 120v dcw, molded paper (CH267033-503)
C28, C37	.002 mf $+40\%$ -20% , 600v dcw, paper (CH267003-202)
C31a, C31b, C31c	lug 1, 40 mf $+100\%$ -10% , 150v dcw, lug 2, 20 mf $+100\%$ -10% , 150v dcw, lug 3, 100 mf $+250\%$ -10% , 25v dcw, can is gnd, dry electrolytic (CH267020-1)
C32	47 mmf $\pm 20\%$, 500v dcw, mica, (CH267500-470)
C34	25 mf $+250\%$ -10% , 25v dcw, electrolytic, (CH267014-1)
C36	12-160 mmf, mica, trim (CH260042-4)
	CONNECTORS
J1	Ant rec, one contact (AH266005)
J2	Phone jack (AH274086)
J3	Receptacle for ac/dc plug P3 (AH258020)
	COILS
L1	Best. loop ant (LH254014-2)
L2	Ant coil includes C3 (LH259060-1)
L3	Ant coil (LH259041-1)
L4, L5, L6	Three windings, L5 and L6 series adding (LH259040-1)
L7	Osc coil (LH259034-1)
L8, L9	Osc coil (LH259039-1)
L10	Reactor, aud, approx. 0.49 hy at 1000 cyc (CH265031)
L11	Air band loop ant (NH 251141-1)
L12	Coil, universal winding, i-f trap (CH259068-1)
L13	Choke, 20 mh at 1000 cyc (CH259067-1)
	CONNECTORS
P1	Ant connec, one male contact (AH266032)
P2	Batt plug, 8-contact (AH266037)
P3	Two-prong plug, part of W1
	RESISTORS
R2, R18	220K $\pm 20\%$, 1/4w (CH268500-224)
R3, R13	4.7 meg $\pm 10\%$, 1/4w (CH268504-475)
R4	33K $\pm 20\%$, 1/4w (CH268500-333)
R5, R19, R21	3.3 meg $\pm 20\%$, 1/4w (CH268500-335)
R7	22K $\pm 20\%$, 1/4w, (CH268500-223)
R8, R17	100K $\pm 20\%$, 1/4w (CH268500-104)
R9	8.2 meg $\pm 10\%$, 1/4w (CH268504-825)
R10	6800 ohms $\pm 20\%$, 1/4w (CH268500-682)
R11	47K $\pm 20\%$, 1/4w, part of T2 (CH268500-473)
R12, R29	470K $\pm 20\%$, 1/4w (CH268500-474)
R15	500K $\pm 20\%$, potentiometer (CH262010-1)
R20	1 meg $\pm 20\%$, 1/4w (CH268500-105)
R22	680 ohms $\pm 10\%$, 1/4w (CH268504-681)
R24	100 ohms $\pm 20\%$, 1w (CH268503-101)
R25	50 ohms $\pm 20\%$, 1w, ww, (CH268002-500)
R26	1000 ohms $\pm 20\%$, 1w (CH268503-102)
R27	2200 ohms $\pm 10\%$, 10.9 max w, ww, (CH268004-2)
R28	68K $\pm 10\%$, 1/2w (CH268505-683)
	SPEAKER
LS	Speaker, 5", 3.2 ohm impedance voice coil (LH256009-2)
	SWITCHES
S1	4 position, 3 sect (LH258014)
S2, S3	Rotary switch, 3 pos. 2 pole, (CH258007-1)
	TRANSFORMERS
T1	Resonates at 455 kc, includes C16a, C16b (LH251075-2)
T2	Resonates at 455 kc, includes C17a, C17b, C17c, C17d, R11 (LH251070-1)
T3	Output, pri 10,000 ohms impedance at 400 cyc, secd 3.2/560 ohms impedance at 400 cyc (CH265024-1)
	VACUUM TUBES
V1, V3	1T4
V2	1R5
V4	1S5
V5	3Q4
V6	117Z3
	CABLES
W1	AC-DC line cord, includes P3 (CH268910-2)
W2	Batt cable, includes P2 and J3 (CH251155-1)
	SOCKETS
	Miniature socket (OCH266091)
	MECHANICAL PARTS
	Base for tube shield AH274088 (AH274137 for base)
	Cable, dial (specify 32") special thin linen (AH270001-3)
	Dial, tuning (CH257562)
	Grille cloth for speaker (AH253609)
	Knob, has color-filled index groove (LH269013-1)
	Knob, does not have index groove (LH269013-2)
	Pointer, tuning dial (CH270244-2)
	Shield, tube (AH274088)
	Strap, carrying (CH253573-1)
	Strap and latch assem, entire assem including latches, mtg bracket, and carrying strap (CH251176-1)

MODELS 110, 110W, 111, 111W, 112, 114, 115

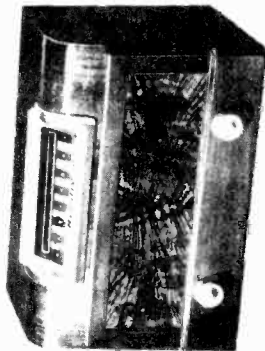
BENDIX RADIO DIV.



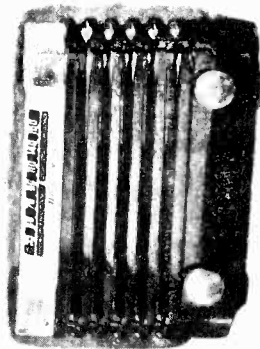
MODEL 110 - Walnut Finish Plastic
MODEL 110W - Ivory Plastic



MODEL 111 - Walnut Finish Plastic
MODEL 111W - Ivory Plastic



MODEL 112 - Walnut



MODEL 114 - Tan & Brown Polystyrene
MODEL 115 - Ivory & Burgundy Polystyrene

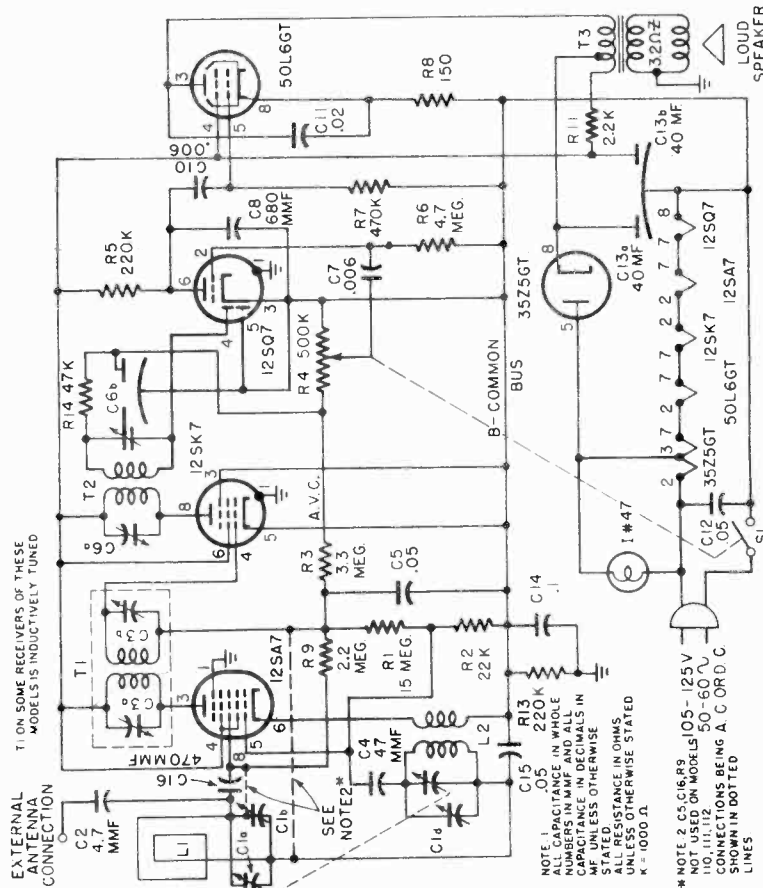
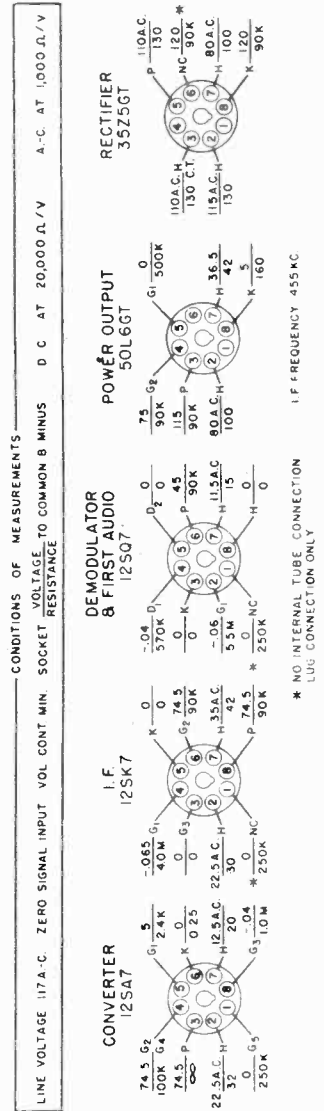


FIG. 1 - SCHEMATIC DIAGRAM MODELS 110, 110W, 111, 111W, 112, 114, 115

SPECIFICATIONS

5 Tube AC-DC Superheterodyne

Power	105-125 V. A.C. or D.C.
Voltage	50-60 Cycles per Second
Frequency	30 Watts
Power Consumption	455 K.C.
I.F. Frequency	540-1620 K.C.
Tuning Range	1.8 Watts
Max. Power Output	P.M.
Loud Speaker	4 Inches
Cone Diameter	180 Cycles, 3.2 Ohms
Voice Coil Impedance	



BENDIX RADIO DIV.

MODELS 110, 110W, 111, 111W, 112, 114, 115

ALIGNMENT CHART

CIRCUITS ALIGNED	DIAL POINTER	INPUT FREQUENCY	APPLY THROUGH	ADJUST
I. F.	Max. to Right	+ 455 K.C.	.01 Mfd	C3a, C3b, C6a, C6b,
Broadcast	1475 Ref. Mark	1475 K.C.	50 Mmf	C1d C1b
Broadcast	965 Ref. Mark	965 K.C.	50 Mmf	Check Calibration*
Broadcast	580 Ref. Mark	580 K.C.	50 Mmf	Check Calibration*

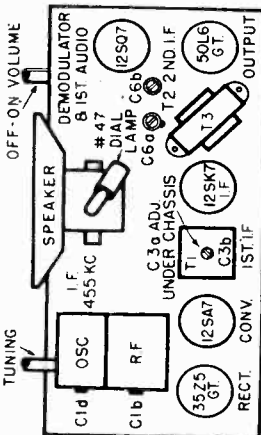


FIG. 2 - TRIMMER LOCATION

GENERAL

Before making any alignment adjustments, turn the receiver and all power operated test equipment on and allow to warm up, if at all possible, for at least five minutes. Turn tuning gang fully closed and set dial pointer directly over Reference mark on dial. See Fig. 3.

After receiver has warmed up and dial pointer has been properly set, turn volume control full on and rotate tuning gang to full open (high frequency end of broadcast band) position. Connect low range of output meter across voice coil and refer to ALIGNMENT CHART

Signal generator to be connected to external antenna connection through an isolating capacitor as given in ALIGNMENT CHART. Keep input signal as low as practical at all times and make all adjustments for maximum output meter reading.

PRECAUTIONS

An isolating transformer should be used between the AC power line and the receiver for protection of any test equipment that must be operated from the same power line.

* If calibration does not check within the frequency mark, both oscillator and antenna sections of the gang condenser must be bent to correct tracking.
+ Signal Generator connected to external antenna connection for complete alignment.

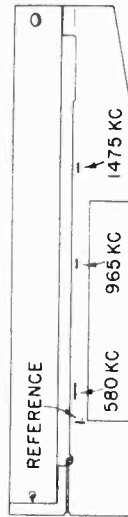


FIG. 3 - DIAL REFERENCE POINTS

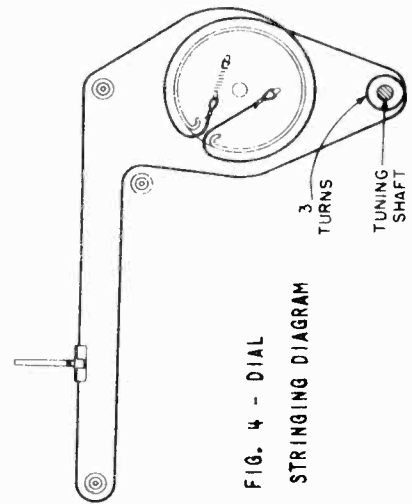


FIG. 4 - DIAL STRINGING DIAGRAM

Stock Number

Description

ELECTRICAL COMPONENTS

CC8A30	CAPACITOR-Ceramicon 47 mmf (C4)....
CC9A18+	CAPACITOR-Ceramicon 4.7 mmf (C2)..
CC9K44	CAPACITOR-Ceramicon 680 mmf 300V (C8).....
CE2D01	CAPACITOR-40-40 mf, 150V. 2 sectio. Electrolytic (C13a, C13b).....
CP4T20+	CAPACITOR-Tubular Paper .006 mfd 400V (C7) (C10).....
CP4T34+	CAPACITOR-Tubular Paper .02 mfd 400V (C11).....
CP4T40+	CAPACITOR-Tubular Paper .05 mfd 400V (C12) (C5).....
CP4T51+	CAPACITOR-Tubular Paper .01 mfd 400V (C14).....
CT2A05	CAPACITOR-2 section Trimmer (C6a, C6b).....
CV0B05	CAPACITOR-VARIABLE (C1).....
LO6B03	COIL-Osc. (L2).....
RC1H40+	RESISTOR-Comp. 22,000 ohms $\frac{1}{2}W$ (R2).
RC1H44	RESISTOR-Comp. 47,000 ohms $\frac{1}{2}W$ (R14).
RC1H54+	RESISTOR-Comp. 220,000 ohms $\frac{1}{2}W$ (R5) (R13).....
RC1H58+	RESISTOR-Comp. 470,000 ohms $\frac{1}{2}W$ (R7).
RC1H68+	RESISTOR-Comp. 3.3 Meg. $\frac{1}{2}W$ (R3)....
RC1H70+	RESISTOR-Comp. 4.7 Meg. $\frac{1}{2}W$ (R6)....
RC1H76+	RESISTOR-Comp. 15 Meg. $\frac{1}{2}W$ (R1).....
3C4E28	RESISTOR-Comp. 2200 ohms 2W (R11)..
RV0S02	POTENTIOMETER-(with switch S1) (R4).
RW1B28+	RESISTOR-Wirewound 150 ohms 1W (R8)
SP4R00	SPEAKER-4" P.M. Rd (less Trans.)..
TA0010	TRANSFORMER-Output (T3).....
TI0C09	TRANSFORMER-1st. IF (T1).....
TI0D12	TRANSFORMER-IF Output (T2).....
#47 +	LAMP-Bayonet Base.....

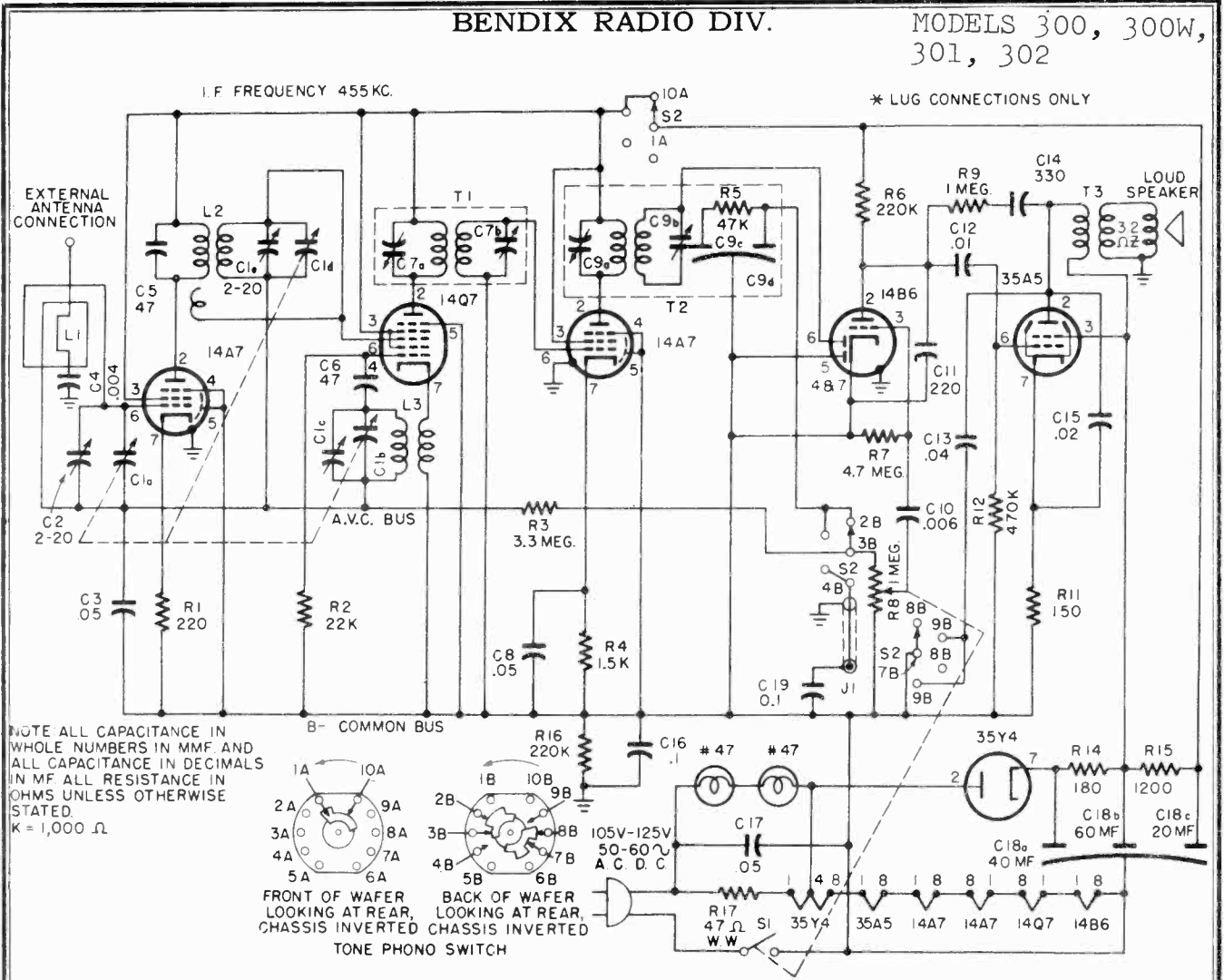
BENDIX RADIO DIV.

MODELS 110, 110W, 111,
111W, 112, 114, 115

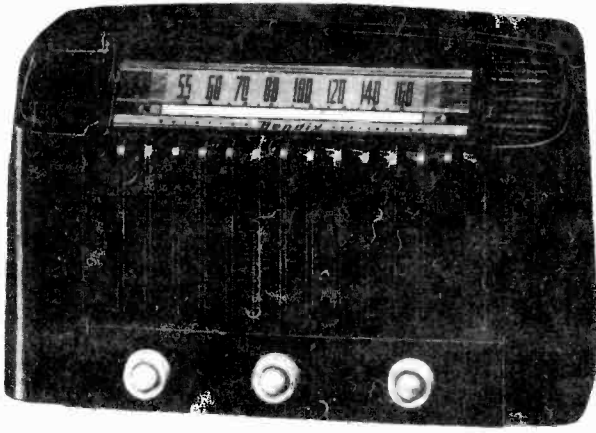
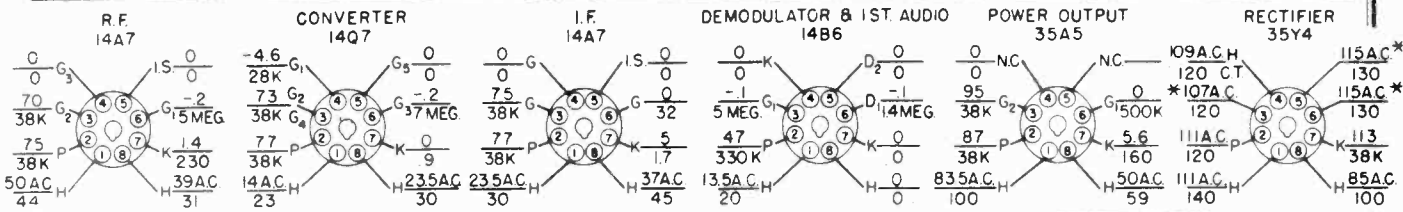
Stock Number	Description	Stock Number	Description
GENERAL MECHANICAL COMPONENTS		CABINET COMPONENTS FOR MODEL 111W	
ADOB02	PLATE-Dial Back.....	DSOA30	DIAL-Scale.....
BT4S04	BOARD-Terminal (4 terminal - 1 Mtg.).....	KCOM01	KNOB-Maroon Control.....
BT4S05	BOARD-Terminal (4 terminal - 1 Mtg.).....	ZPOI02	CABINET-Ivory.....
CL2A06+	CORD-AC Power (Ivory).....	CHASSIS COMPONENTS FOR MODEL 112	
CL2A07+	CORD-A.C. Power (Brown).....	IDOM17	INDICATOR-Dial.....
HROS02+	RIVET-.118 x .218 Shoulder.....	WPOD05	WINDOW-Dial Back.....
HSOC00+	SPRING-Coil Dial Cable.....	CABINET COMPONENTS FOR MODEL 112	
HCOC03+	CLAMP-Dial Cable.....	ALOZ11	BACK-Loop and.....
HCOS00+	CLIP-Tuning Shaft Spring.....	BZOD21	BAFFLE-Grille Assy. &.....
HCOS60	CLIP-1st. IF Mtg.....	EDOM03	ESCUTCHEON-Dial.....
HCOS61	SPRING-Dial Back Plate Window.....	HHOD02	HOLDER-Dial & Escutcheon.....
HZOS08+	STUD-Trimount (Window).....	HPOB03	PLATE-Base.....
IDOM14	INDICATOR-Dial.....	KCOB01	KNOB-Control.....
MBOB00	BEARING-Tuning Shaft.....	ZW5A01	CABINET-Wood.....
MPOI00+	PULLEY-Dial Cord Idler.....	CHASSIS COMPONENTS FOR MODELS 114 - 115	
MSOT00+	SHAFT-Tuning.....	CP4T40+	CAPACITOR-Paper .05 mfd 400V (C15).
PIOP03	PLATE-Line Cord Insulator.....	IDOM18	INDICATOR-Dial.....
SOOD00+	SOCKET-Dial Light.....	RC1H58	RESISTOR-Comp. 470,000 ohms 1/4W (R9).
SO8S01+	SOCKET-Octal Tube.....	WPOD04	WINDOW-Dial Back.....
WPOD01	WINDOW-Dial.....	CABINET COMPONENTS FOR MODELS 114-115	
XSOC00+	STRIP-Dial Cable Protector.....	ALOZ12	LOOP-Back and.....
CABINET COMPONENTS FOR MODEL 110		DSOA28	DIAL-Scale.....
ALOZ10	ANTENNA-Loop (L1).....	GCOD00	GASKET-Dial Mounting Cork.....
BZOD14	BAFFLE-Speaker.....	GROD00+	GASKET-Dial Mounting Rubber.....
DSOA23	DIAL-Scale.....	HKOR00+	RING-Control Knob Retainer.....
HCOS01+	SPRING-Baffle Retainer.....	HPOB03	PLATE-Base.....
HKOR00+	RING-Control Knob Retainer.....	HZOS01	STUD-Loop & Back Mtg.....
HPOB02	PLATE-Base.....	CABINET COMPONENTS FOR MODEL 114	
HZOS00+	STUD-Trimount Dial Scale.....	KCOB13	KNOB-Control (Brown).....
KCOL00	KNOB-Beige Control.....	ZPOT01	CABINET-Plastic (Dark Brown & Light Brown).....
ZPOB01+	CABINET-Brown Plastic.....	ZCOB05	BOTTOM & SIDE SECTIONS-(Light Brown).....
CABINET COMPONENTS FOR MODEL 110W		ZCOT02	TOP & SIDE SECTIONS-(Dark Brown)..
DSOA22	DIAL-Scale.....	CABINET COMPONENTS FOR MODEL 115	
KCOM00	KNOB-Maroon Control.....	KCOI00	KNOB-Ivory Control.....
ZPOI01+	CABINET-Ivory.....	ZPOT00	CABINET-Plastic (Ivory & Maroon)..
CABINET COMPONENTS FOR MODEL 111		ZCOB04	BOTTOM-Front Sections (Maroon)....
BZOD18	BAFFLE-Cloth and Speaker.....	ZCOT01	TOP-& Side Sections Ivory.....
DSOA25	DIAL-Scale.....		
EDOM02	ESCUTCHEON-Dial.....		
HCOD07	SPRING-Escutcheon Retainer.....		
HCOS63	CLIP Spring Baffle Retainer.....		
HHOD01	HOLDER-Dial & Escutcheon.....		
HKOR00+	RING-Control Knob Retainer.....		
HPOB02	PLATE-Base.....		
KCOB12	KNOB-Control.....		
PIOB01	COVER-Asbesto Base Plate.....		
ZPOB03	CABINET-Brown.....		

BENDIX RADIO DIV.

MODELS 300, 300W,
301, 302



CONDITIONS OF MEASUREMENTS
LINE VOLTAGE 117 A.C. ZERO SIGNAL VOL. CONT. MIN. SOCKET VOLTAGE TO COMMON B MINUS D.C. AT 20,000 Ω A.C. AT 1,000 Ω / V.



Model 300 Brown Plastic
Model 300W Ivory Plastic



Model 301 Maple, with Mahogany
finish grille
Model 302 Mahogany finish with
Maple grille

MODELS 300, 300W,
301, 302

ALIGNMENT PROCEDURE

Connect line cord plug to 117 volt, 60 cycles AC power source. Set volume control at maximum clockwise position and tone control (S2) in counterclockwise position. Connect output meter across voice coil. Adjust dial pointer by turning tuning control fully counterclockwise and sliding dial pointer on dial cord to Reference Mark on dial back plate, (See Fig. 5). Make all adjustments in order given in ALIGNMENT CHART on opposite page and for maximum output. Keep input as low as possible at all times.

PRECAUTIONS

An isolating transformer should be used between the power supply and the receiver if any of the test equipment is AC operated. The use of isolating capacitors is not recommended as AC though the capacitor may introduce hum modulation, and if the capacitors should break down the test instruments will likely be damaged.

ALIGNMENT CHART

Circuit Aligned	Input Freq.	Dial Pointer Position	Adjustments
IF	*455 KC	Max. to right	C9b, C9a, C7b, C7a
OSC.	**1475 KC	1475 Ref. Mark	C1c
RF	**1475 KC **965 KC **580 KC	1475 965 580	C1e, C2 +Check Calibration

- * Applied to Antenna Input through .1 mfd. or less.
- ** Applied to Antenna input through 50 mmf. or less.
- + If dial pointer calibration is not within plus or minus 10 KC the gang rotor plates must be bent to cause correct tracking.

SPECIFICATIONS

Model 300 Series

POWER

Voltage Rating, AC or DC.....105-125
 Frequency-Cycles per second.....50-60
 Power Consumption-Watts.....30

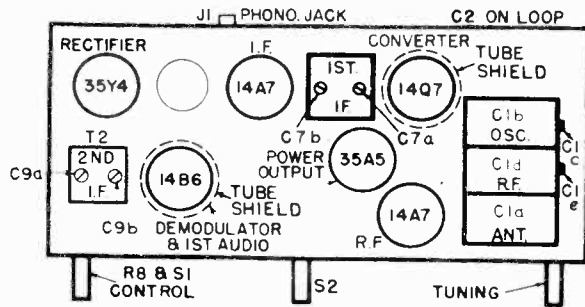
TUNING RANGE-FREQUENCY IN KC.....540-1620
 INTERMEDIATE FREQUENCY (KC).....455
 MAXIMUM POWER OUTPUT IN WATTS.....1.2

LOUD SPEAKER-PM OVAL

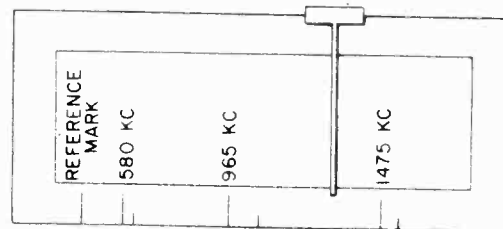
Cone diameter-inches.....4 x 6
 Voice Coil Impedance (ohms at 400 cycles).....3.2

TUBE COMPLEMENT

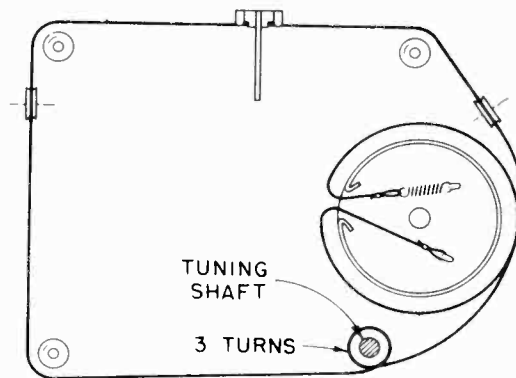
2 - 14A7, 1-14Q7, 1 - 14B6, 1 - 35A5, 1 - 35Y4
 Two #47 dial lamps



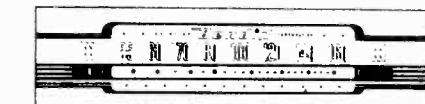
Trimmer Location Diagram



Dial Reference Points



Dial Cord Stringing Diagram



Control Layout

BENDIX RADIO DIV.

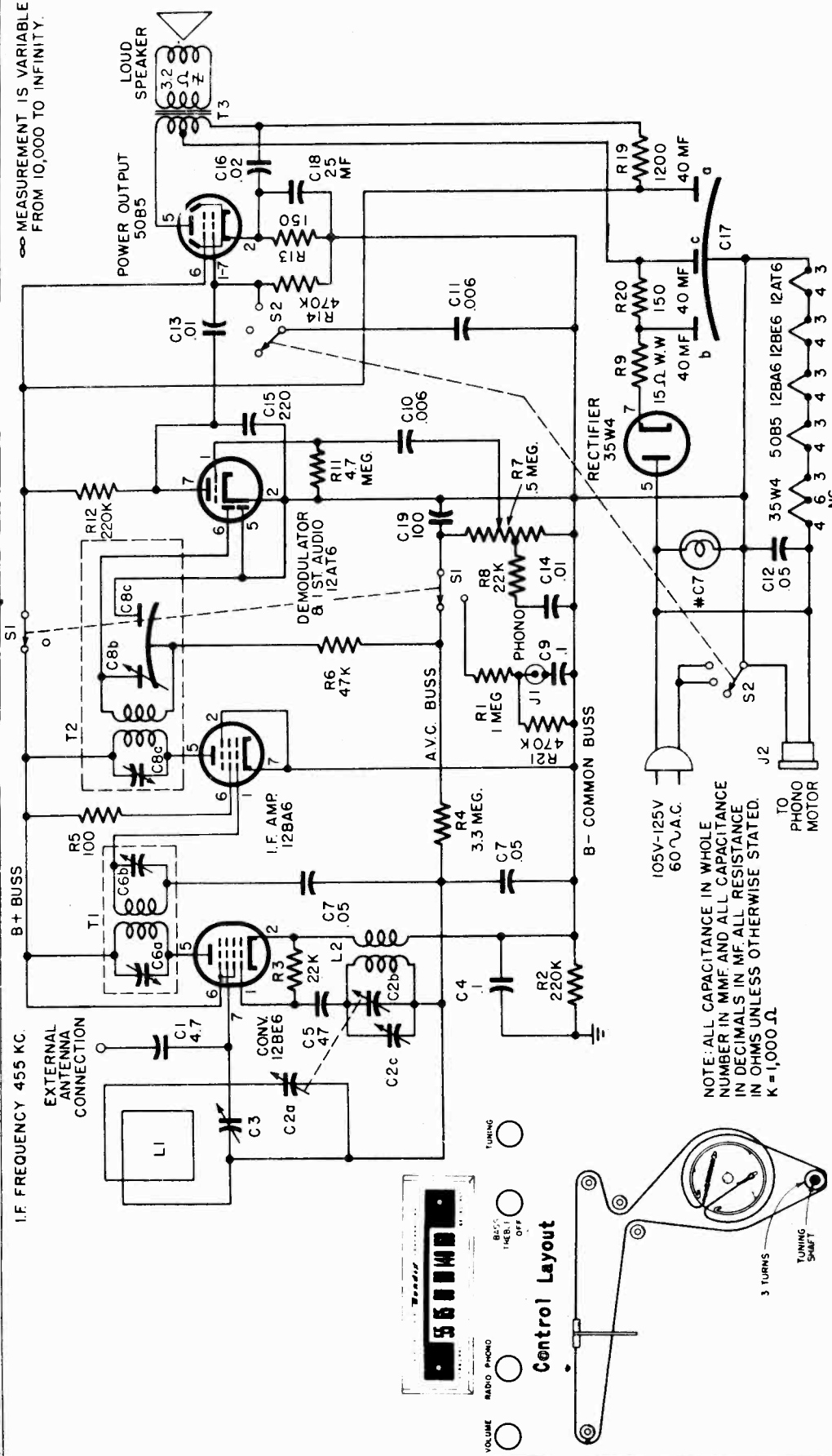
MODELS 300, 300W,
301, 302

Stock Number	Description
ELECTRICAL COMPONENTS	
CC8F40 +	CAPACITOR-Ceramic 330 mmf (C14)..
CE3A00 +	CAPACITOR-Electrolytic, 40, 60, 20 mfd. (C18A,B,C).....
CM5A14 +	CAPACITOR-Mica 47 mmf (C5 (C6)....
CM5A30 +	CAPACITOR-Mica 220 mmf (C11).....
CP4T20 +	CAPACITOR-Paper .006 mfd 400V (C10).....
CP4T31 +	CAPACITOR-Paper .01 mfd 400V (C12).....
CP4T34 +	CAPACITOR-Paper .02 mfd 400V (C15).....
CP4T38 +	CAPACITOR-Paper .04 mfd 400V (C13).....
CP4T40 +	CAPACITOR-Paper .05 mfd 400V (C3) (C8) (C17).....
CP4T51 +	CAPACITOR-Paper .1 mfd 400V (C19) (C16).....
CP6T16 +	CAPACITOR-Paper .004 mfd 600V (C4).....
CT2A06	CAPACITOR-Trimmer (C7a, b).....
CT3A00	CAPACITOR-Trimmer (C9a, b).....
CV0C04 +	CAPACITOR-Variable (C1).....
LO5B01 +	COIL-Oscillator (L3).....
RC4D14 +	RESISTOR-Comp. 200 ohms 2W (R14)..
RC1H16 +	RESISTOR-Comp. 220 ohms $\frac{1}{2}$ W (R1)..
RC1H26 +	RESISTOR-Comp. 1500 ohms $\frac{1}{2}$ W (R4)..
RC1H40 +	RESISTOR-Comp. 22,000 ohms $\frac{1}{2}$ W (R2).....
RC1H44 +	RESISTOR-Comp. 47,000 ohms $\frac{1}{2}$ W (R5).....
RC1H54 +	RESISTOR-Comp. 220K ohms $\frac{1}{2}$ W (R16) (R6).....
RC1H58 +	RESISTOR-Carbon 470K ohms $\frac{1}{2}$ W (R12).....
RC1H62 +	RESISTOR-Comp. 1 Meg $\frac{1}{2}$ W (R9).....
RC1H68 +	RESISTOR-Comp 3.3 Meg. $\frac{1}{2}$ W (R3)...
RC1H70 +	RESISTOR-Comp. 4.7 Meg. $\frac{1}{2}$ W (R7)..
RC3H25 +	RESISTOR-Comp. 1200 ohms 1w (R15)..
RV4S03	POTENTIOMETER-1 Meg. (with switch) (R8) (S1).....
RW1B28 +	RESISTOR-Wirewound 150 ohms 1w (R11).....
RW2S07	RESISTOR-Wirewound 47 ohms 2w $\pm 10\%$ (R17).....
SP4000	SPEAKER-4" x 6" P.M.....
SR4C00 +	SWITCH-3 Pole 4 Position (S2)....
TA0001	TRANSFORMER-output (T3).....
TIOC01 +	TRANSFORMER-I.F. input (T1).....
TIOD03 +	TRANSFORMER-I.F. output.....
TR6L00 +	COIL-R.F. Interstage (L2).....
#47	+* LAMP-Bayonet Base.....

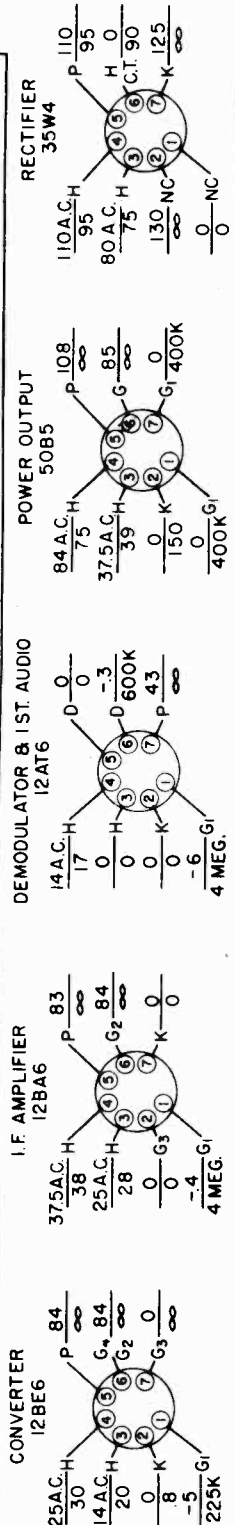
Stock Number	Description
MECHANICAL COMPONENTS	
ADOC07	ASSEMBLY-Dial Back Plate.....
ALOC06 +*	ANTENNA-Loop.....
BT1S00 +	BOARD-Terminal.....
BT2S00 +	BOARD-Terminal.....
BT4S01 +	BOARD-Terminal.....
BZOR00 +	FOOT-Rubber.....
CDOC16	CABLE-Dial 46 $\frac{1}{2}$ ".....
GROS00 +	GROMMET-Capacitor Shockmount....
HBOM00 +	BRACKET-Variable Capacitor.....
HCOC00 +	CLIP-Coil Mtg.....
HCOC03 +	CLAMP-Cable.....
HCOD00 +	FASTENER-Dial (R.H.).....
HCOD01 +	FASTENER-Dial (L.H.).....
HCOS00 +	CLIP-Spring.....
HCOS01 +	CLIP-Baffle Spring Retainer....
HCOS62	CLIP-Window Spring.....
HCOT00 +	CLIP-Tube Shield Ring.....
HKOR00	CLIP-Knob Retainer.....
HPOB01 +	PLATE-Base.....
HROS01 +	RIVET-Shoulder.....
HSOC00 +	SPRING-Dial Cord.....
HS6F01 +	SLEEVE-Spacer.....
HZOS08	STUD-Trimount (Dial back window mounting).....
IDOM15	INDICATOR-Dial.....
JR1S00 +	RECEPTACLE-Phono (J1).....
MBOB00 +	BEARING-Tuning Shaft.....
MPOI00 +	PULLEY-Dial Cord Idler.....
MSOT02 +	SHAFT-Tuning.....
PIOC00 +	PLATE-Filter Capacitor Mtg.....
PIOP02 +	PLATE-Line Cord Insulating.....
RDOA00	REFLECTOR-Dial (Fishpaper).....
SMOT00 +	SHIELD-Tube.....
SOOD11	SOCKET-Dial Light.....
SO8L03	SOCKET-Loktal Tube.....
WPOD02	WINDOW-Dial Back Plate.....

MODEL 613

MEASUREMENT IS VARIABLE FROM 10,000 TO INFINITY.



CONDITIONS OF MEASUREMENTS
 LINE VOLTAGE 117 A.C. ZERO SIGNAL VOL. CONT. MIN. SOCKET VOLTAGE TO COMMON B - D-C AT 20,000 Ω A-C AT 1,000 Ω / V.





Model 613 Radio-Phonograph

The radio chassis used in the model 613A Receiver-Phonograph combination is an AC-DC super-heterodyne design, using four tubes in the radio circuit and one as a vacuum tube rectifier. The chassis will operate on DC but the record changer will operate only on 105-125 volts, 60 cycles AC. All tubes are of the miniature type.

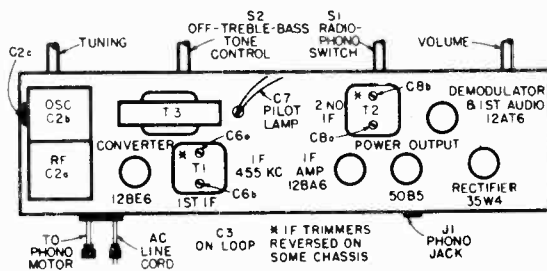
Before making any alignment adjustments, turn the receiver and all power operated test equipment on and allow to warm up, if at all possible, for at least five minutes. Turn tuning gang fully closed and set dial pointer directly over Reference Mark on dial.

After receiver has warmed up and dial pointer has been properly set, turn volume control full on and rotate tuning gang to full open (high frequency end of broadcast band) position. Connect low range of output meter across voice coil and refer to ALIGNMENT CHART on Page 3 for detailed procedure to follow in making adjustments.

Signal generator to be connected to external antenna connection through an isolating capacitor as given in ALIGNMENT CHART. Keep input signal as low as practical at all times and make all adjustments for maximum output meter reading.

PRECAUTIONS

If any test instruments used for alignment or servicing are operated from the AC power line, an isolating transformer should be used to isolate the receiver from the power source. Isolating capacitors are not recommended as hum-modulation may be introduced into the receiver.



Trimmer Location Diagram

SPECIFICATIONS

Power Requirements

105-125 volts, 60 cycles AC

Power Consumption (including phonograph)

60 watts

Speaker

6 inch P.M.

Voice coil impedance

Ohms at 400 cycles - 3.2

Record Changer

Automatic twelve 10-inch or ten 12-inch standard records

Dial Lamp

1 - No. C-7 dial lamp
110 volt, candelabra base

Tuning or Frequency Range

540-1620 KCS

IF Frequency

455 KCS

Tube Complement

1 - 12BE6, 1 - 12BA6, 1 - 12AT6, 1 - 50B5, 1 - 35W4

Maximum Power Output

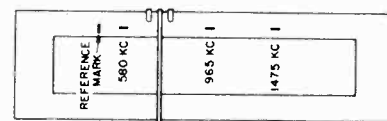
2.0 watts

ALIGNMENT PROCEDURE

Refer to page 1 for general instructions and precautions. The builtin loop antenna must be connected to the chassis during alignment or a 192 u.h. inductance substituted in place of the loop. During alignment of the IF channel the tuning gang should be fully open (high frequency end of band). If calibration does not check within the dial reference marks at 965 and 580 KCS the tuning gang rotor plates must be bent to obtain proper tracking. This is a difficult operation and must be attempted by experienced technicians only.

ALIGNMENT CHART

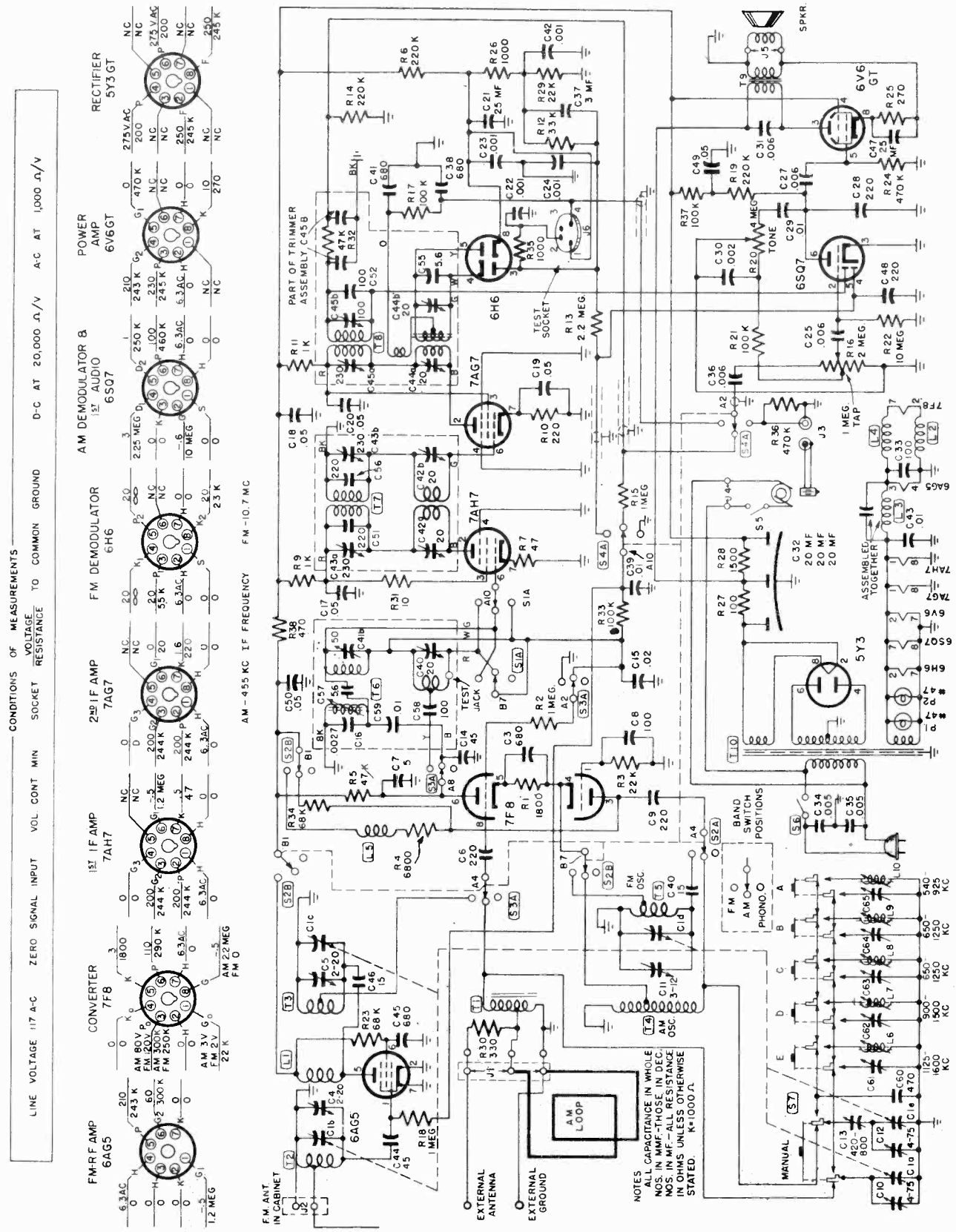
Circuit Aligned	Input Frequency	Apply Through	Adjust
IF	455 KCS	.01 mfd.	C8b, C8a C6b, C6a
Osc.	1475 KCS	50 mmf.	C2c
Antenna	1475 KCS	50 mmf.	C3
	965 KCS		Check
	580 KCS	50 mmf.	Calibration

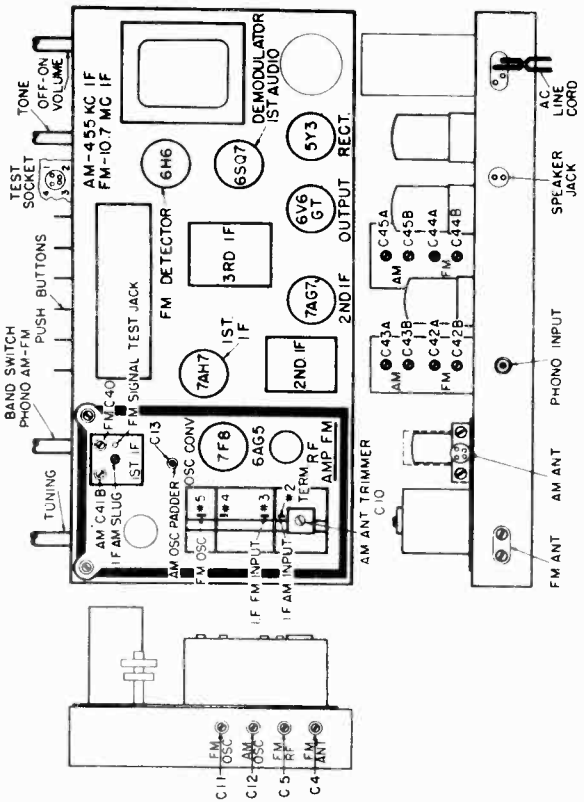


Dial Reference Marks

MODEL 613

Stock Number	Description	Stock Number	Description
ELECTRICAL COMPONENTS			
ALOZ14 *	ANTENNA-Loop.....	RW1B28 +	RESISTOR-Wirewound 150 ohms 1w (R13, 20).....
CC6A30 +	CAPACITOR-Ceramicon 47 mmf (C5)	SP6R01 *	SPEAKER-6" Rd. P.M.
CC6A34 +	CAPACITOR-Ceramicon 100 mmf (C19).....	TA0012	TRANSFORMER-Output (T3).....
CC6A38	CAPACITOR-Ceramicon 220 mmf 500v (C15).....	TI0C08 +	TRANSFORMER-I.F. Input (T1)....
CC9A18 +	CAPACITOR-Ceramic.....	TI0D14	TRANSFORMER-I.F. Output (T2)...
CE3E02 +	CAPACITOR-Electrolytic 40-40- 40 mfd (C17a,b,c).....	C-7 *	LAMP-Dial.....
CE1T04 +	CAPACITOR-Electrolytic 25 mfd 25v (C18).....	MECHANICAL COMPONENTS	
CP4T20 +	CAPACITOR-Paper .006 mfd 400v (C10, 11).....	BT3S06 +	BOARD-Terminal (3 terminal)....
CP4T31 +	CAPACITOR-Paper .01 mfd 400v (C13, C14).....	BT3S07	BOARD-Terminal (3 terminal single mtg.).....
CP4T34 +	CAPACITOR-Paper .02 mfd (C16) 400v.....	BT4S05 +	BOARD-Terminal (4 terminal)...
CP4T40 +	CAPACITOR-Paper .05 mfd 400v (C7, 12).....	BT4S06 +	BOARD-Terminal (4 terminal)...
CP4T51 +	CAPACITOR-Paper .1 mfd 400v (C9).....	CD0C19	CABLE-Dial 42 $\frac{1}{2}$ ".....
CP4T56 +	CAPACITOR-Paper .2 mfd 400v (C4).....	CL2A08 +	CORD-A.C. Power 8 ft. Brown...
CT1A18	CAPACITOR-Mica Trimmer (2-20) mmf (C3).....	GRO500 +	GROMMET-Tuning Gang Shockmtg..
CT2A06 +	CAPACITOR-Trimmer (C6a,C6b)....	HB0M70	BRACKET-Speaker Mtg.....
CT2A12	CAPACITOR-Trimmer (C8a,C8b, C8c).....	HB0M71	BRACKET-Dial Light.....
CV0B04	CAPACITOR-Variable (C2).....	HC0C03 +	CLAMP-Dial Cable.....
LO5B04	COIL-Oscillator (L2).....	HC0M01 +	CLAMP-Dial Light.....
RC3G14	RESISTOR-Comp. 150 ohms 1w (R13).....	HC0M04	CLAMP-Electrolytic Mounting...
RC4G24	RESISTOR-Comp. 1200 ohms 2w (R19).....	HC0S00 +	CLIP-Tuning Shaft Spring.....
RC1H12 +	RESISTOR-Comp. 100 ohms $\frac{1}{2}$ w (R5).....	HPOB05	PLATE-Chassis Mtg.....
RC1H40 +	RESISTOR-Comp. 22,000 ohms $\frac{1}{2}$ w (R3, 8).....	HROS02 +	RIVET-Shoulder (Idler Pulley Mtg.).....
RC1H44 +	RESISTOR-Comp. 47,000 ohms $\frac{1}{2}$ w (R6).....	ES0C00 +	SPRING-Dial Cord.....
RC1H54 +	RESISTOR-Comp. .22 meg $\frac{1}{2}$ w (R2, 12).....	HS6F01 +	SPACER-Tuning Gang Mtg. Sleeve.....
RC1H58 +	RESISTOR-Comp. 470,000 ohms $\frac{1}{2}$ w (R14, 21).....	ID0M19	INDICATOR-Dial.....
RC1H62 +	RESISTOR-Comp. 1 meg $\frac{1}{2}$ w (R1)...	IWC0F00 +	WASHER-Insulator.....
RC1H68 +	RESISTOR-Comp. 3.3 meg $\frac{1}{2}$ w (R4).	JR2010	RECEPTACLE-2 Contact (Phono Power).....
RC1H70 +	RESISTOR-Comp. 4.7 meg $\frac{1}{2}$ w (R11)	JR1S00 +	RECEPTACLE-Phono.....
RV0C02	POTENTIOMETER-500,000 (tapped at 100K) (R7).....	MB0B00 +	BEARING-Shaft.....
RW1A04	RESISTOR-Wirewound 15 ohms 1w (R9).....	MPOI00 +	PULLEY-Dial Cord Idler.....
		MS0T14	SHAFT-Tuning.....
		PB0D04	PLATE-Dial Back.....
		PI0B03	COVER-Asbestos Mtg. Plate.....
		PI0P01 +	PLATE-Line Cord.....
		SM0T05	SHIELD-Tube (Chassis mounted)..
		SO0D12	SOCKET-Dial Light (12" leads)..
		SO7M07	SOCKET-Tube Octal Miniature....
		SR2B02	SWITCH-Rotary Phono-Radio Double Pole - Double Throw (S1).....
		SR3E04	SWITCH-Rotary with A.C. Switch Single Pole - 3 Position (S2).....
		WPOD08	WINDOW-Back Plate.....





CHASSIS TRIMMER LOCATION

- Bracket, Tuning Shaft Bearing.....
- Bracket, Antenna Plug Mfg.....
- Bracket, Shockmount.....
- Bracket, Terminal.....
- Bracket, Bearing Pointer Support.....
- Bracket, Variable Condenser.....
- Clip, Retainer.....
- Clamp, Dial Cable.....
- Clip, Coil.....
- Clip, Binding Post Spring.....
- Clip, Weaving.....
- Clip, Retainer Ring.....
- Pin, Threaded 8-32.....
- Spring, Spacer.....
- Spacer, 3/8" OD 1/4" ID 1/2" Lg.....
- Spacer, Thread Shoulder.....
- Slides, Metal.....
- Hinges, Statury Brze (2 Lids).....
- Lid Support, R.H. Stat. Brze.....
- Lid Support, L.H. Stat. Brze.....
- Indicator, Dial.....
- Plug 1 Contact, Male.....
- Plug 2 Contact, Male.....
- Plug 3 Contact, Male.....
- Receptacle 2 Contact.....
- Receptacle 3 Contact.....
- Knob, Control Indexed Push On.....
- Knob, Control, Brown.....
- Adapter, Slug Adj. Screw 4-40.....
- Bushing, Tuning Shaft.....
- Shaft, Tuning.....
- Nut, Hexagon 6-32 Steel.....
- Nut, Hexagon 8-32 Steel.....
- Nut #8-32 Hex (C.P.).....
- Lockwasher #8.....
- Screw #8 (1/2" Self Tapping).....
- Screw 5/16 #8-32.....
- Screw 1/2" #1/4-20.....
- Screw 3/4" #1/4-20.....
- Screw 1" #1/4-20.....
- Rivet, Tubular 121 Dia. x 1/8" Lg.....
- Rivet, Tubular 121 Dia. x 15/64" Lg.....
- Rivet, Tubular 121 Dia. x 14/64" Lg.....
- Washer, Flat.....
- Washer, Insulating.....
- Washer, Flat.....
- Lug, Soldering.....
- Screw #6 5/8" Lg. Statury Brze.....
- Screw #6 5/8" Lg. Steel Bright Finish.....
- Lockwasher #4.....
- Washer, Lock.....
- Washer, Lock.....
- Nut 3/8 x 1/2.....
- Terminal, Brass Board.....
- Terminal, Motor Board.....
- Lockwasher.....
- Switch, Rotary 3 Position 4 Wafer.....
- SR3100
- SR3101
- SR3102
- SR3103
- SR3104
- SR3105
- SR3106
- SR3107
- SR3108
- SR3109
- SR3110
- SR3111
- SR3112
- SR3113
- SR3114
- SR3115
- SR3116
- SR3117
- SR3118
- SR3119
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- SR3197
- SR3198
- SR3199
- SR3200

FM ALIGNMENT

For reference marks see Fig. 3. Rotate gang condenser fully closed and set pointer to reference mark. Trimming screwdriver must be 100% insulated.

A - CW METER METHOD

Generator output - pure RF or amplitude modulated VTMH must not be AC-DC, or with GND, connected to AC line or through resistor.

Gen. Freq.	Dummy Ant.	Gen. To Term. #3 on gang & chassis	Band Sw. Position	Pointer Setting	Special Conditions	VTMH Connections	Adjust	Remarks
10.7 mc.	.01 mfd		FM-Full counter-clockwise		Short FM osc. term. #5 to chassis	Test socket pins #1 (+) & #2 (-) Low Scale	1st IF-C40 2nd IF-C42A C423 3rd IF-C44A for max. out-put on VTMH	Realign several times to assure max. output. Signal may be fed into "Test Jack" in 1st IF for max. out-put. align. of C44A, C42A & C42B.
10.7 mc.						*Center of Jumper res-istors & test sock. Pin #4 - Fig. #2.	3rd IF-C44B To zero reading on VTMH	**Alternate step #1 (C44A for max. output & step #2 (C44B for zero) several times to assure correct alignment
106 mc.	Std. FM Fig. #4	FM ant input term's.		106 mc. refer. mark	Remove short from osc. term. #5	Test socket pins #1 (+) & #2 (-) Low scale	**Osc.-C11 RF Ant -C4 for max. out-put on VTMH	"Rock" tuning control during alignment
97 mc.				Approx. 97 mc. ref. mark				***Check Calibra-tion
90 mc.				Approx. 90 mc. refer. mark				****Check Calibra-tion

* See Fig. #2 "Test Circuit for FM Alignment".
 ** A VTMH with zero center scale is very convenient for use in this alignment step. A50 microammeter may be used in place of the VTMH, but is not as accurate.
 *** The oscillator circuit has been designed to operate on the high freq. side of the incoming signal. It is possible to adjust the trimmer (C11) at 106 MC such that the osc. is operating on the "Image" or low freq. side of the signal. To check the osc. (C11) adjustment, set sig. gen. to 84.6 MC, freq. modulated, dial pointer at 106 MC. If signal is NOT heard, adjustment of C11 is correct, but if signal IS heard, osc. trimmer C11 has been incorrectly adjusted on the "Image" frequency. Readjust C11 to other setting at 106 MC and recheck with gen. freq. at 84.6 MC. Signal MUST NOT be heard with pointer at 106 MC and sig. gen., freq. modulated, set at 84.6 MC.
 **** If calibration is not within reasonable tolerance at these points, the osc. coil inductance must be ad-justed. If dial pointer reading is on low freq. side, inductance is too low, and turns must be compressed slightly. If pointer reading is on high freq. side, osc. coil is too high and coil turns must be spread slightly.
 To check and adjust inductance of ant. and RF coils, tune receiver to 90 MC signal and observe AVC reading. Insert iron core end of "tuning wand" into RF coil, at same time rocking tuning control to max. AVC. If reading increases as wand is inserted, RF coil inductance is too low and turns must be com-pressed slightly. If reading decreases, reverse wand and insert metal end into coil, again rocking tuning control to max. AVC. If reading decreases (after iron core check), inductance is properly ad-justed. If reading increases, inductance is too high and turns must be spread slightly.
 Ant coil is checked and adjusted exactly like RF coil.

NOTE: THE LATTER OPERATIONS ARE VERY DELICATE AND DIFFICULT PROCEDURE AND MUST BE ATTEMPTED ONLY BY TECHNICIANS WITH CONSIDERABLE HIGH FREQUENCY EXPERIENCE.

BENDIX RADIO DIV.

MODEL 847-B

FM ALIGNMENT

B - Visual Method.

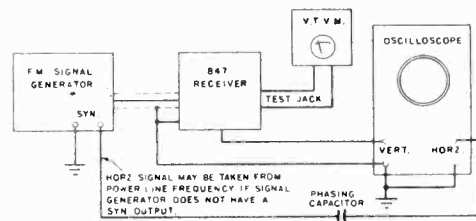
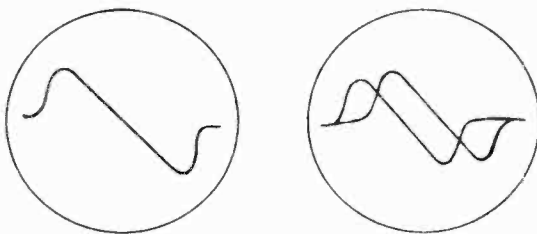
Gen. Freq.	Gen. Mod.	Dummy Ant.	Generator to	Band SW. Position	Special Conditions	Dial Setting	VTVM Conn	Oscillo-scope	Adjust	Remarks
10.7 MC	Pure RF or Amplitude	.05 mfd	High side to Term. #3 Gang Cond. Low side to chassis	FM-Max. CCW.	Short Osc. Stator-Term. #5 to Chassis Gnd.	-----	Test Socket Pins #1 (+) & #2 (-) Low Scale	No conn.	1st IF C40 2nd IF C42A, C42B 3rd IF C44A	Adjust for maximum output on low range of VTVM - Realign each Cond. several times to assure max. output. Signal may be fed into "test jack" in 1st IF can for Prelim. Alignment of C44A, C42A & C42B.
Approx. 10.7 MC	Freq. Mod. 60 Cy-Sweep width max. possible (should be 200 KC Min)	"	"	"	"	-----	No connection	Connect vert. input to Test Socket Pins #4 & Chassis Gnd.	3rd IF C44B	*Adjust for max. symmetrical "S" curve similar to Fig. 5. Alternate adjs. of C44A & C44B to obtain Max desired curve.
106 MC	"	Std. FM Fig. 4	FM Ant. Term's thru dummy	"	Remove short from Term #5.	106 MC ref. mark	No connection	"	FM Osc. C11	**Adjust until "S" curve is centered on Horiz. Sweep scope line.
106 MC	"	"	"	"	-----	"	"	"	FM RF Trimmer C5. FM Ant. Trimmer C-4.	Adj. for Max. height of "S" pattern-"rock" tuning control at same time to keep "S" curve centered on Scope.
97 MC	"	"	"	"	-----	Approx. 97 MC ref. mark	"	"	-----	***Check Calibration
90 MC	"	"	"	"	-----	Approx. 90 MC ref. mark	"	"	-----	***Check Calibration

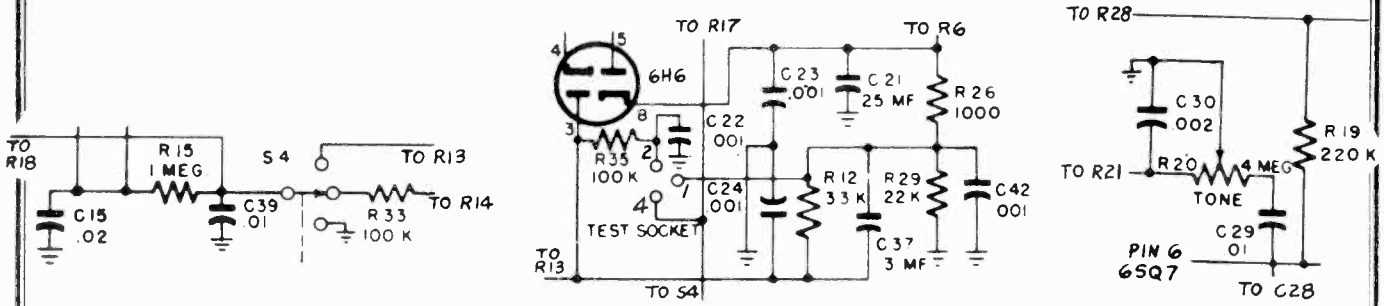
* Some phase shift between the Signal Generator and the scope horizontal sweep may be encountered, resulting in a double trace pattern, shown in Fig. 6. In some Oscilloscopes, provision is made for connecting this phase shift directly in the oscilloscope circuit. If so, rotate the "phase shift" control until the curves coincide as in Fig. 5. If no provision is made in the scope, the connection might be accomplished by inserting a condenser of suitable value in series with the signal generator "Synchronized Sweep Voltage" output. The condenser value will depend upon the amount of phase shift and the horizontal input impedance of the scope - approximate condenser range .01 to .1 mfd. See Fig. 7 for instrument connection diagram.

** See *** Page 5.

*** If calibration is not within tolerance at these points, the inductance of local FM oscillator coil, RF and antenna coils must be adjusted. See **** Page 5.

NOTE: The latter operation is a very delicate and difficult procedure, and must be attempted only by technicians of considerable high frequency experience.



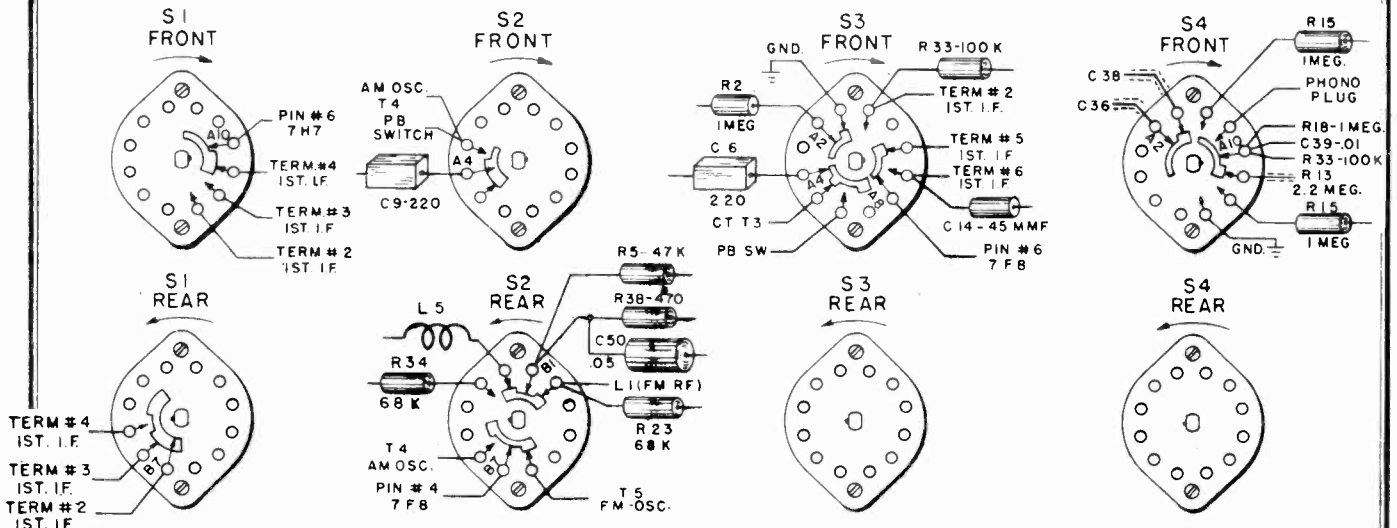


Values of R15 & R33 Changed

Test Socket Connection Changed

R37 Not Used

CIRCUITS USED ON EARLY MODELS



BAND SWITCH SECTIONS

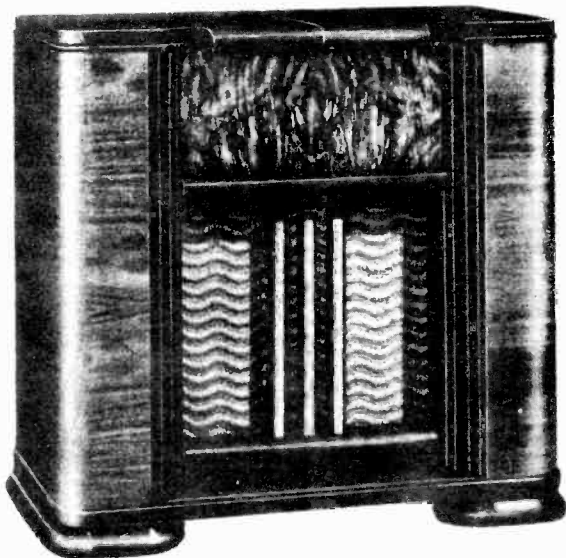
BROADCAST BAND ALIGNMENT

See Fig. 1 for trimmer locations.
 Rotate gang condenser until full closed. Set pointer to reference mark. See Fig. 3.
 Connect output meter across voice coil on lowest scale.
 Signal Generator amplitude modulated.
 Rotate volume control full ON. Keep generator output low as practical.

Apply	Thru	To	Band Switch Position	Dial Setting	Adjust
455 KC	.05 mfd.	Term. #2 gang cond. & chassis	AM-mid-position	Gang cond. full open	IF slug, C41B, C43A, C43B, C45A, C45B for max output
580 KC	Bendix dummy loop A00L00	Dummy loop plugged in AM ant. socket on rear of chassis	"	580 KC ref. mark	C13 for max. output
1475 KC	"	"	"	1475 KC ref. mark	*C12, C10 for max. output
580 KC	"	"	"	Approx. 580 KC ref. mark	C13 for max. output "Rock" gang during adjustment
965 KC	"	"	"	Approx. 965 KC ref. mark	**Check Calibration
580 KC	"	"	"	Approx. 580 KC ref. mark	**Check Calibration

* Repeat 1475 KC and following 580 KC adjustment in rotation several times until receiver is properly aligned.

** If calibration does not check within 10 KC, "knife" oscillator and antenna gang sections. The latter operation must be attempted by experienced technicians only.



MODEL 847-B
8 Tube Phono-radio Combination
SPECIFICATIONS

POWER
 Voltage.....105-125 VAC
 Frequency.....60 Cycles
 Consumption.....100 Watts

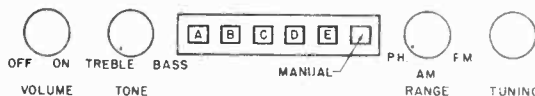
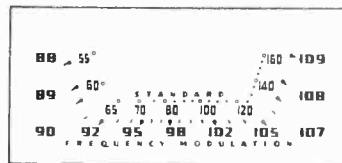
TUNING RANGE
 AM.....540-1620 KC
 FM.....88-108 MC

INTERMEDIATE FREQUENCY
 AM.....455 KC
 FM.....10.7 MC

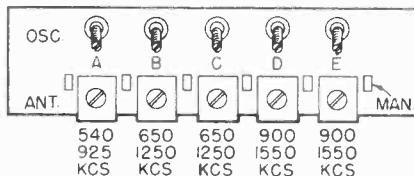
POWER OUTPUT
 Maximum.....4.2 Watts

LOUDSPEAKER - PM.
 Cone diameter.....10 inches
 VC impedance at 400 cycle.....3.2 ohms

CABINET
 33" high, 34-1/2" wide, 18-3/16" deep
 Shipping Weight.....95 pounds

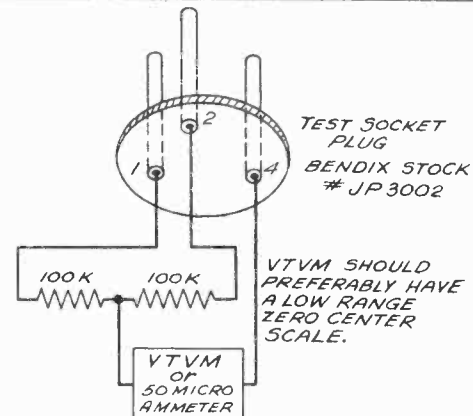
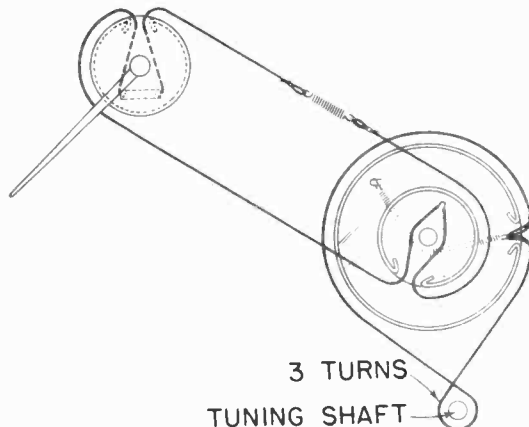


Controls--The various controls are shown in the above drawing. Controls as arranged from left to right are: Volume control, Tone control, Pushbuttons, Range control, and Tuning control. Tone Control rotates to the Bass position in a clockwise direction, to the Treble position in the counterclockwise direction. The range switch is in F.M. position at maximum CCW, broadcast position is mid-position, and phono position is maximum clockwise.

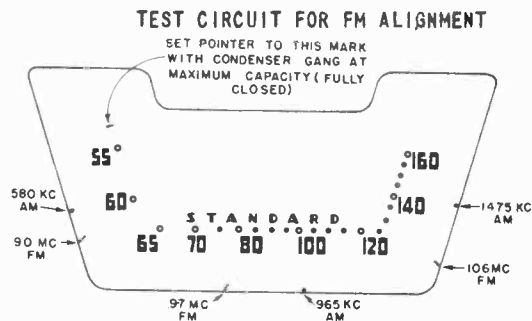


Pushbuttons--The adjustment position of the pushbutton assembly is shown below. Pushbutton operation is provided by rotating the band switch to the center position and depressing the desired Pushbutton. The extreme right hand pushbutton is depressed when MANUAL tuning operation is desired.

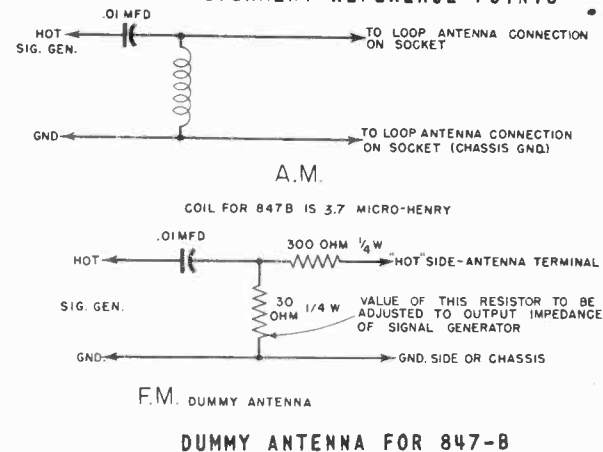
Access to the adjustment screws is obtained by pulling the pushbuttons off the shaft vertically. The osc. and antenna adjustment screws, with the Pushbutton frequency ranges, is shown in the above diagram.



TEST CIRCUIT FOR DEMODULATOR TRANSFORMER ALIGNMENT



ALIGNMENT REFERENCE POINTS

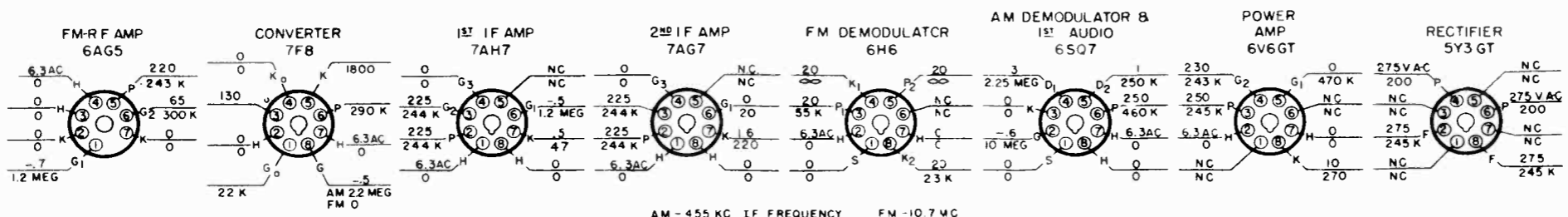


Stock Number	Description	Stock Number	Description
ALOZ08*	Assy. Antenna FM Loop.....	RC2G16	Resistor, Comp. 220 Ohms 1/2W.....
ARO900	Assy. R.F. Osc. Chassis Assy.....	RC2G27	Resistor, Comp. 1800 Ohms 1/2W (R1).....
CC8A24	Capacitor, Ceramic 15 mmf 500V (C46).....	RC1H18	Resistor, Comp. 330 Ohms 1/4W (R30).....
CC8A30	Capacitor, Ceramic 45 mmf 500V (C14, C44).....	RC1H20 +	Resistor, Comp. 470 Ohms 1/4W (R38).....
CCOF18	Capacitor, Ceramic 4.7 mmf 500V (C7).....	RC1H24 +	Resistor, Comp. 1000 Ohms 1/4W (R35).....
CCOF19	Capacitor, Ceramic 5.6 mmf 500V (C53, C57).....	RC1H40 +	Resistor, Comp. 22,000 Ohms 1/4W (R3, R29).....
CE3A01 +	Capacitor, Electrolytic 3 x 20 mf 450V (C32).....	RC1H42 +	Resistor, Comp. 33,000 Ohms 1/4W (R12).....
CE1T00	Capacitor, Electrolytic 25 mmf 25 V.D.C. (C21, C47).....	RC1H44	Resistor, Comp. 47,000 Ohms 1/4W (R32).....
CE1T01	Capacitor, Electrolytic 3 mfd 50V (C37).....	RC1H51 +	Resistor, Comp. 100,000 Ohms 1/4W (R17, 21, 33, 37).....
CL2A02 +	Cord, A C Line Brown.....	RC1H54 +	Resistor, Comp. 220,000 Ohms 1/4W (R6, 14, 19).....
CM4A42	Capacitor, Mica 680 mmf 300V (C38, C41, C45).....	RC1H58 +	Resistor, Comp. 470,000 Ohms 1/4W (R24, 36).....
CM5A22 +	Capacitor, Mica 100 mmf 500V (C39).....	RC1H62 ² +	Resistor, Comp. 1 Meg 1/4W (R2, 15, 18).....
CM5A30 +	Capacitor, Mica 220 mmf 500 V.D.C. (C28, C48).....	RC1H66 +	Resistor, Comp. 2.2 Meg. 1/4W (R13).....
CM6A22	Capacitor, Mica 100 mmf 500V (C52).....	RC1H74 +	Resistor, Comp. 10 Meg. 1/4W (R22).....
CM7A30	Capacitor, Mica 220 mmf 500V (C51, C56).....	RC2H00	Resistor, Comp. 10 Ohms 1/2W (R31).....
CM4142	Capacitor, Mica (Low Loss) 680 mmf 300V (C3).....	RC2H08	Resistor, Comp. 47 Ohms 1/2W (R7).....
CM5L03	Capacitor, Mica (Low Loss) 15 mmf 500V (C49).....	RC2H16	Resistor, Comp. 220 Ohms 1/2W (R10).....
CM5L22	Capacitor, Mica (Low Loss) 100 mmf 500V (C8).....	RC2H24	Resistor, Comp. 1,000 Ohms 1/2W (R9, 11, 26).....
CM5L30	Capacitor, Mica (Low Loss) 220 mmf 500V (C6, C9).....	RC2H34	Resistor, Comp. 6,800 Ohms 1/2W (R4).....
CM6S50 +	Capacitor, Mica 470 mmf 500V. D.C. (C60).....	RC2H44	Resistor, Comp. 47,000 Ohms 1/2W (R5).....
CP2M10	Capacitor, Paper .001 mfd. 200V (C23, C23, C24, C42).....	RC2H46	Resistor, Comp. 68,000 Ohms 1/2W (R23, 34).....
CP4M34	Capacitor, Paper .02 mfd 400V (C15).....	RV4C00	Potentiometer, Tone 4 Meg. (R20).....
CP4M51	Capacitor, Paper .1 mfd 400V (C59).....	RV4S10	Potentiometer, 2 Meg. (R16).....
CP4T31 +	Capacitor, Tubular Paper .01 mfd, 400V 10% (C29).....	RW2A12	Resistor, Wirewound 100 Ohms 2W (R27).....
CP4T40 +	Capacitor, Tubular Paper .05 mfd, 400V (C17, 18, 19, 20, 49, 50).....	RW1B34	Resistor, Wirewound 270 Ohms 1W (R25).....
CP6T12 +	Capacitor, Tubular Paper .002 m. 600V (C30).....	SPOR00*	Speaker, PM 10" Round.....
CP6T18 +	Capacitor, Paper .005 mfd 600V D.C. (C34, C35).....	ST0100	Core, Iron.....
CP6T20 +	Capacitor, Paper .006 mfd 600V (C25, 27, 31, 36).....	TA0007	Transformer, Audio Output (T9).....
CP6T31 +	Capacitor, Paper .01 mfd 600V (C39, 43).....	T100C6	Transformer, I.F. 1st T6.....
CT1A03 +	Capacitor, Trimmer 12 - 160 mmf (C61, 62).....	T100D8	Transformer, I.F. 3rd T8.....
CT1A04 +	Capacitor, Trimmer 45 - 370 mmf (C63, 64).....	T10100	Transformer, I.F. 2nd T7.....
CT1A05 +	Capacitor, Trimmer 120 - 580 mmf (C65).....	TPOJ00	Transformer, Power T10.....
CT1A09	Capacitor, Trimmer 3 - 13 mmf (C11).....	TR8B00	Transformer, Ant. Coil T1.....
CT1A10	Capacitor, Trimmer 4 - 75 mmf (C10).....	TR8F00	Transformer, Ant. R.F. (FM).....
CT1A11	Capacitor, Trimmer 475-1000 mmf (C13).....	TR8P00	Transformer Interstage FM Mixer Coil T3.....
CT1C00	Capacitor, Trimmer 2 - 20 mmf (Ceramic, Insulator) (C4, 5).....	#44 +	Lamp, Pilot.....
CT1C01	Capacitor, Trimmer 4 - 75 mmf (Ceramic, Insulator) (C12).....	ABOC01	MECHANICAL COMPONENTS
CV0D00	Capacitor, Variable (2 Section AM - 3 Section FM) (C1).....	ADOE00	Assy. Pushbutton Switch.....
LF0A00	Coil RF Choke (T11, T12).....	ASOP00	Assy. Dial Back Plate.....
LF0A01	Coil, Choke R.F. (L1, L5).....	BPOB00	Assy. Shaft & Pulley.....
LF0C00	Coil, Filament Choke Assy (L3).....	BT1S00 +	Pushbutton.....
LO8B06	Coil, Oscillator A.M. (T-4).....	BT1S01 +	Strip Terminal (1 Terminal).....
LO8F00	Coil, Oscillator F.M. (T-5).....	BT2S00 + +	Strip Terminal (1) Mtg. 1 Lug.....
LTA0A3	Coil, Pushbutton Osc. Assy. Coi Code Yellow (L-10).....	BT3S00	Strip Terminal.....
LTOA04	Coil, Pushbutton, Osc. Assy. Coi Code Green (L8, L9).....	BZ0D08	Kaffle & Cloth Assy.....
LTO805	Coil, Pushbutton Osc. Assy. Coi Code Black (L6, L7).....	CD0C08	Dial, Cord (Indicator).....
RC4D26	Resistor, Comp. 1500 Ohm, 2W (R-28).....	CD0C10	Dial, Cord (tuning).....
		DS0A19	Dial, Scale (88-109 MC) Paper.....
		DS0A20	Dial, Standard Broadcast.....
		DZ0F08	Decal, Nameplate.....
		DZ0F09	Decal, Volume.....
		DZ0F10	Decal, Tone.....
		DZ0F11	Decal, Range.....
		DZ0F12	Decal, Tuning.....
		EBCM02	Escutcheon 6 Pushbutton.....
		ED0M01	Escutcheon, Dial.....
		GR0100	Grommet, Rubber Insulating.....
		GR0101	Grommet, (Color Code Black).....
		GR0S09	Grommet, Shockmount.....
		GR0S10	Grommet, Rubber Shockmount.....
		H30M15	Bracket, Pointer Bearing Mtg.....
		H30M16	Bracket, Pushbutton Mtg.....

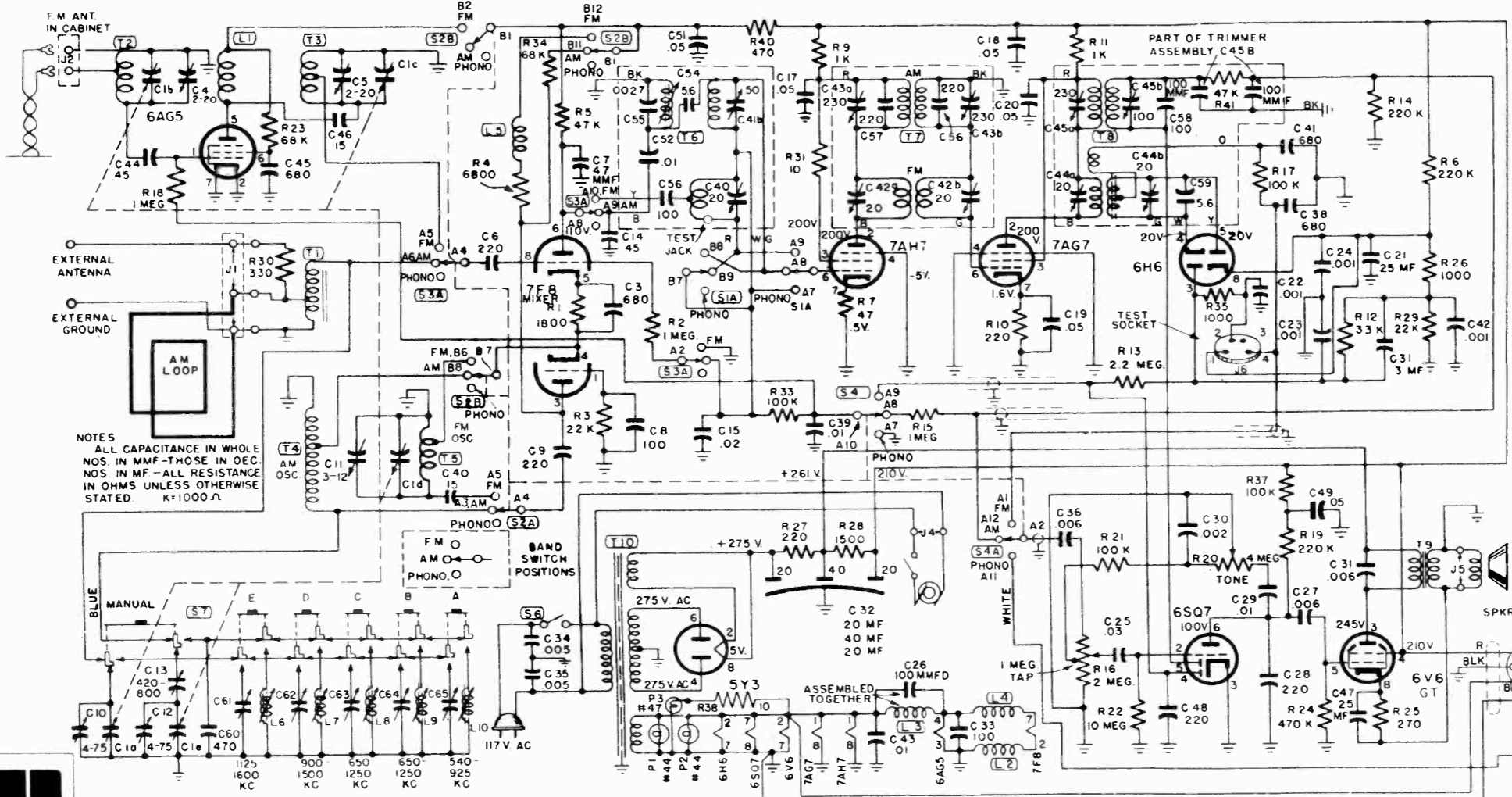
BENDIX RADIO DIV.

MODELS 1518, 1519, 1524, 1525

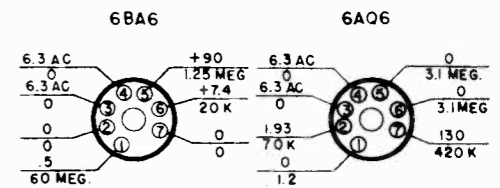
CONDITIONS OF MEASUREMENTS: LINE VOLTAGE 117 A-C, ZERO SIGNAL INPUT, VOL. CONT. MIN, SOCKET VOLTAGE RESISTANCE TO COMMON GROUND, D-C AT 20,000 Ω/V, A-C AT 1,000 Ω/V



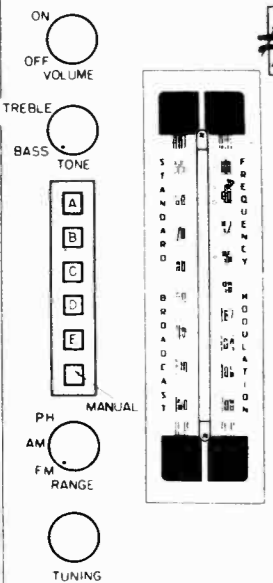
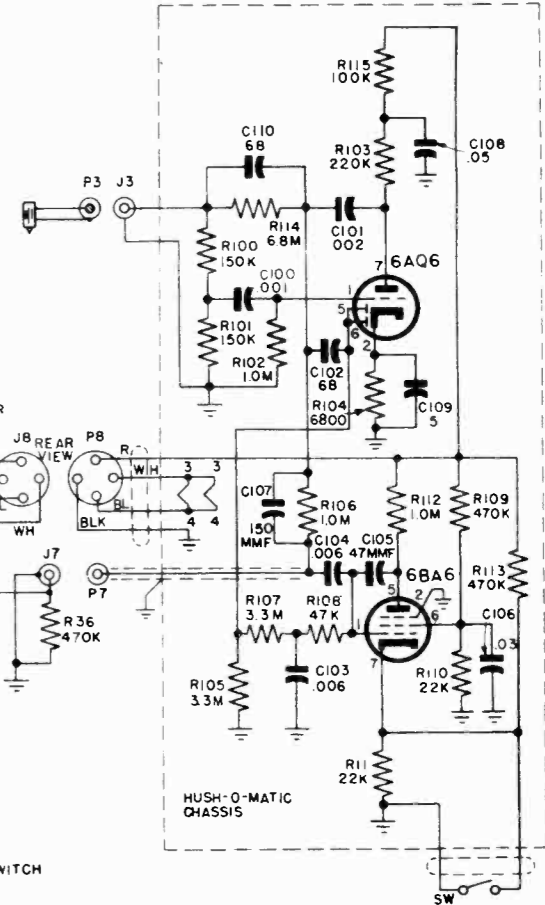
NOTE: Models 1518 and 1519 chassis are identical to this schematic except that Hush-O-Matic circuit (tubes 6BA6 and 6AQ6) is not used.



NOTES: ALL CAPACITANCE IN WHOLE NOS. IN MMF - THOSE IN DEC. NOS. IN MF - ALL RESISTANCE IN OHMS UNLESS OTHERWISE STATED. K=1000 Ω



NOTE - ALL READINGS WITH HUSH-O-MATIC SWITCH ON.

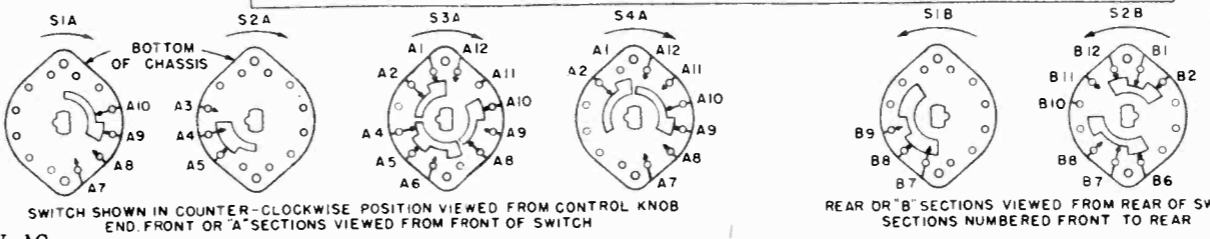


Control Layout Models 1524 & 1525

SPECIFICATIONS

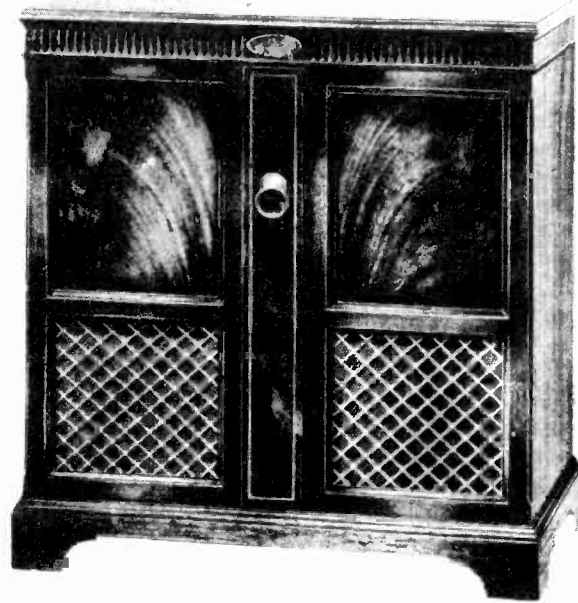
- POWER: Voltage 105-125V AC, Frequency 60 Cycles, Power Consumption 95 Watts. TUNING RANGE: AM 540-1620 KC, FM 88-108 MC.

- INTERMEDIATE FREQUENCY: AM 455 KC, FM 10.7 MC. POWER OUTPUT: Maximum 4.2 Watts.



- LOUDSPEAKER - PM: Cone diameter 12 inches, VC impedance at 400 cycles 3.2 ohms. CABINET: 34" high, 31" wide, 17-1/4" deep.

RECORD CHANGER: Webster Model 50, RCD.CH. 15-1



Models 1518 & 1524 Mahogany
Models 1519 & 1525 Walnut

GENERAL

The Bendix models 1518 and 1519 are seven-tube (plus vacuum tube rectifier) superheterodyne radio-phonograph combinations designed to receive the Standard AM Broadcast Band (540 - 1620 KC) and the 88 - 108 MC FM Band. The only difference between the chassis used in the 1518 and 1519 and the 1524 and 1525 models is in the phono-input circuit used in the 1524 and 1525 models. These two later models incorporate two additional miniature tubes in a dynamic noise reduction circuit designed to reduce to a minimum all noise originating from needle-scratch or from old and worn records. This circuit functions only on phonograph operation and is completely out of the radio circuit.

The schematic diagram shown in Fig. 3 is basically that of models 1524 and 1525, but since this circuit is identically the same as the circuit used in models 1518 and 1519, plus the Hush-O-Matic feature, the one schematic contains all the circuits found in any one of the four models. If either the 1518 or 1519 chassis is being considered then the Hush-O-Matic circuit contained within the dotted lines at the lower right hand corner of Fig. 3 should be disregarded, together with the power cord and jack J8 connected to the main chassis.

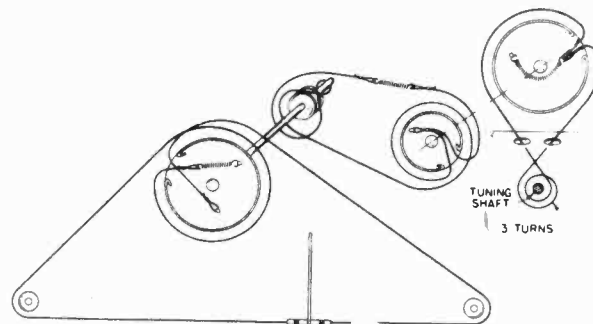
OSC.	A	B	C	D	E	MAN.
	540	650	650	900	900	
	925	1250	1250	1550	1550	
	KCS	KCS	KCS	KCS	KCS	

Pushbutton Frequencies

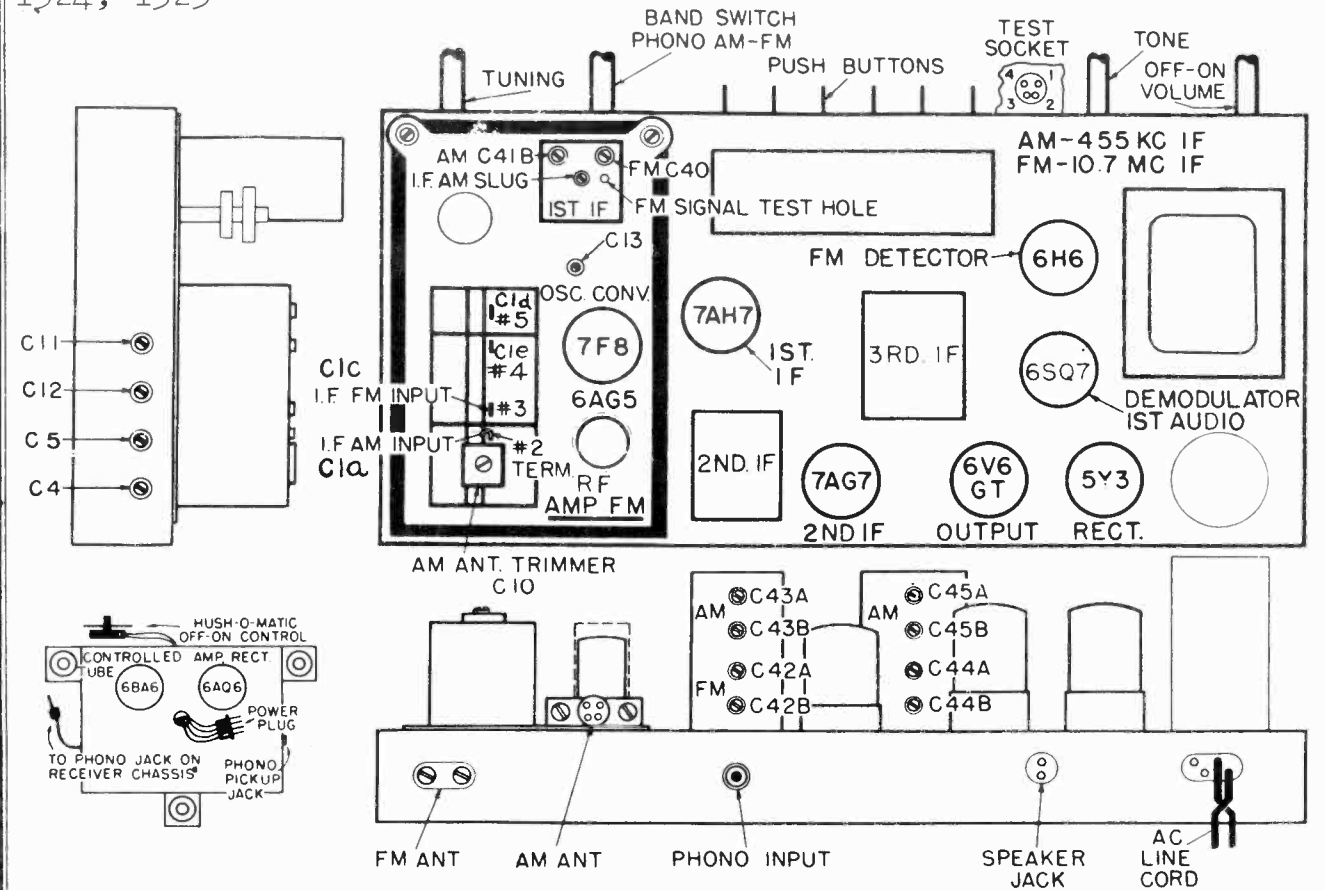
PUSHBUTTON ADJUSTMENT

1. Place the receiver in operation on the Standard Broadcast Band (AM) and tune in manually one of the stations to be selected by pushbuttons and whose carrier frequency is between 540 and 925 KCS. (The MANUAL pushbutton must be depressed when tuning manually. See Fig. 9)
2. Remove all the pushbuttons by pulling them straight up from the panel.
3. Depress the shank for pushbutton "A" and increase the volume slightly.
4. Using a small screwdriver, tune in the desired station by adjusting the long brass screw located above pushbutton "A". It can be reached through the opening in the panel after the pushbuttons have been removed. This screw adjusts the oscillator coil and is marked "OSC" in Fig. 9. Now press the shank for the MANUAL pushbutton and check to make certain the correct station has been tuned in.
5. With pushbutton "A" again depressed and OSC screw adjusted for maximum signal, similarly adjust the screw located just below push-

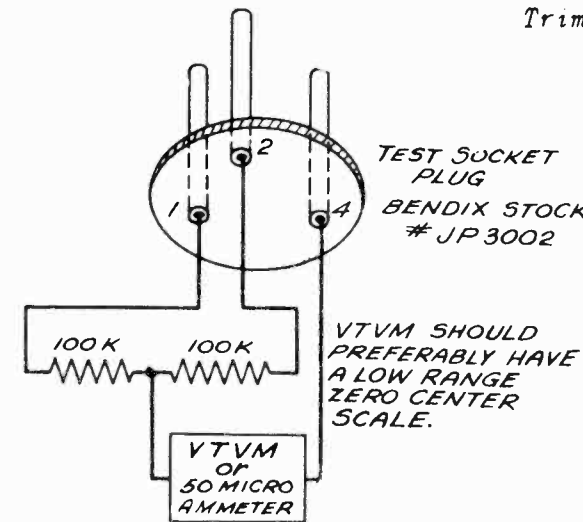
6. Repeat steps 4 and 5 to obtain the best combined adjustments.
7. Pushbuttons B, C, D, and E may be adjusted in exactly the same manner as pushbutton "A" except that the same carrier frequency of the station selected must be within the specified range as given in Fig. 9.
8. Select from the call letter tabs enclosed the station call letters to which the pushbuttons have been tuned and insert through the slots in the side of the pushbuttons. The celluloid protector tabs provided are to be placed over the call letter tabs by the same procedure followed in inserting the call letters.
9. Replace the pushbuttons on the receiver giving proper attention to the location of the call letters.



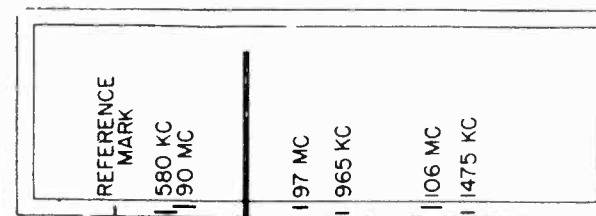
Dial Stringing Diagram



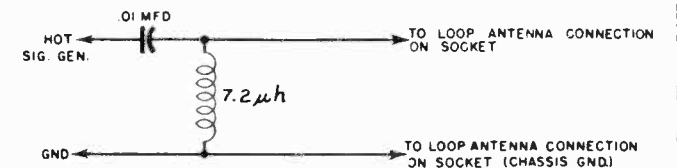
Trimmer Location Diagram



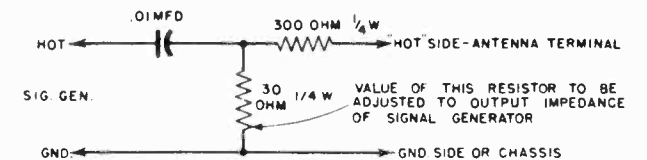
Test Circuit Plug



Alignment Reference Marks



AM DUMMY Antenna
Bendix Part No. AD0L01



FM DUMMY Antenna

BENDIX RADIO DIV.

MODELS 1518, 1519,
1524, 1525

The chassis must be removed from the cabinet in order to align the FM channels. If only the AM channels are to be aligned this is not necessary but will be found to be much more convenient if it is removed. However, if the chassis is removed a dummy antenna, described in detail later in the text, must be used when aligning the antenna circuits, unless these circuits are adjusted after the chassis is again installed in the cabinet.

Unless the various circuits of each channel are much out of alignment, adjustments made on the FM circuits will not appreciably affect the adjustments previously made on the AM circuits. However, if the FM circuits are badly out of alignment, necessitating considerable adjustment, it is best after these adjustments have been made, to go back and check the AM alignment.

An amplitude modulated (AM) signal of the proper frequency may be used for aligning both the AM and FM channels. However, if convenient, an oscilloscope and frequency-modulated signal may be used for aligning the FM channel.

Before making any adjustments, turn "on" the receiver and all AC operated test equipment and allow to warm up for at least five minutes. **IMPORTANT:** All adjustments must be made in the order in which

they are given; i.e., the AM band must be completely aligned before aligning the FM band. The manual push-button must be pressed before the AM oscillator and RF circuits can be aligned.

EQUIPMENT REQUIRED

Signal Generator

AM, 455 KC to 106 MC

Vacuum Tube Voltmeter

DC ranges up to approximately 20 Volts.

Ground, or minus, lead must be isolated from the power line.

Low Range Output Meter

Capacitors

One .01 mfd. and one 50 mmf.

Dummy Antennas

FM Dummy Antenna (See Fig. 8)

AM Dummy Antenna, Bendix Part No. AD0L01, (See Fig. 7).

Test Circuit Plug*

See Fig. 5 and text for details.

Alignment Screwdrivers

Must be 100% non-metallic.

Tuning Wand

May be made from a 1/4" x 8" polystyrene rod with a small brass slug attached to one end and a powdered iron core attached to the other end.

Miscellaneous Hand Tools

AM ALIGNMENT

After the set has warmed up proceed with the alignment in steps as follows:

1. Rotate gang condenser all the way closed and set dial pointer to reference mark. See Fig. 6.
2. Short AM oscillator terminal #4 to chassis. (C1e).
3. Rotate band switch to AM - midposition and press manual push-button.
4. Rotate volume control full on (Clockwise).
5. Set output meter on low range and connect across voice coil.
6. Signal generator adjusted to 455 kc AM.
7. Connect 455 KC signal to terminal #2 (7F8 grid input) through a .01 mfd. capacitor, generator shield lead to receiver chassis and ground. See Fig. 4 for diagram.
8. Align IF AM slug, (center of T6), C41B, C43A, C43B, C45A and C45B for maximum reading on output meter. Keep generator output as low as practical. Refer to Fig. 4 for trimmer location diagram.
9. Rotate tuning control until pointer is at 580 KC reference mark.
10. Set generator to 580 KC, amplitude modulated.
11. Connect signal generator through AM Dummy Antenna to AM antenna terminal,

12. Remove short from gang terminal #4 to chassis.
13. Adjust oscillator padder C13 for maximum output.
14. Turn dial pointer to 1475 KC reference mark.
15. Set Signal Generator at 1475 KC amplitude modulated.
16. Adjust oscillator trimmer C12 and antenna trimmer C10 for maximum output.
17. Turn pointer to 580 KC reference mark.
18. Set generator at 580 KC amplitude modulated.
19. Again adjust oscillator padder C13 to maximum, at same time "rock" gang condenser to obtain maximum output.
20. Repeat steps 13 through 19 several times, until it is apparent receiver is properly aligned.
21. Check calibration at 965 KC and 580 KC reference points.
22. If 965 and 580 calibration do not check within 10 KC, oscillator and antenna sections of gang condenser must be bent to obtain proper tracking.

CAUTION: This last operation must be attempted by experienced technicians only.

MODELS 1518, 1519,
1524, 1525

BENDIX RADIO DIV.

FM ALIGNMENT

1. Preliminary:

- a. Rotate gang condenser until fully closed. Set pointer to Reference Mark.
- b. Rotate band selector to FM band - Maximum counterclockwise position.
- c. Short stator FM oscillator gang (C1d) to chassis - #5 terminal.

I.F. ALIGNMENT

2. Adjust Signal Generator to 10.7 mc, either CW or AM.
3. Connect generator output lead through .01 Mfd. capacitor to terminal #3 (C1c) of tuning gang.
4. Connect D.C. Vacuum Tube Voltmeter to test socket pins #1 (+) and #2 (-) using low scale.
5. Align 1st, 2nd and 3rd IF trimmers for maximum AVC voltage, C40 on 1st IF, C42A and C42B on 2nd, C44A on 3rd. Reduce signal generator output as alignment proceeds, such that reasonable reading is obtained on low scale of D.C. VTVM. If no indication is obtained with maximum signal applied, apply signal to test jack in 1st IF can and tune C42A, C42B, and C44A to approximate peak before moving generator lead to #3 terminal.

Realign IF trimmers (C40, C42A, C42B, and C44A) carefully several times for absolute maximum AVC voltage.

6. Insert test circuit plug in test socket and reconnect DC VTVM between center tap of shunt test resistors and test socket pin #4. See Fig. 5 for details.
7. Remove IF Signal input from receiver.
8. Set DC VTVM to zero reading.
9. Inject 10.7 MC signal to terminal #3, as in Step 3.
10. Adjust secondary of 3rd IF, C44B, to absolute zero reading on VTVM.
11. Alternate adjustments in steps 5 and 10 several times until correct adjustment is obtained.
 - a. Correct adjustment is obtained when Step 5 produces no increase in AVC reading, and Step 10 remains at zero reading.

12. Remove short from terminal #5 to chassis.

R.F. AND OSCILLATOR ALIGNMENT

13. Reconnect VTVM to test socket terminals #1 (+) and #2 (-).
14. Adjust signal generator to 106 MC either CW or AM.
15. Connect generator output to receiver FM antenna posts through standard FM dummy antenna. See Fig. 8.
16. Set dial pointer to 106 MC reference mark - Fig. 6.
17. Adjust FM oscillator C11, RF - C5 and Ant. - C4 to maximum AVC reading,

- a. Tuning control must be "rocked" while adjusting C5 and C4 due to reaction on C11.
- b. The oscillator circuit has been designed to operate on the high frequency side of the incoming signal. It is possible to adjust the trimmer (C11) at 106 MC such that the oscillator is operating on the "image" or low frequency side of the signal. To check the oscillator (C11) adjustment, set signal generator to 84.6 AM, dial pointer still at 106 MC. If signal is NOT heard, adjustment of C11 is correct, but if signal IS heard, oscillator trimmer C11 has been incorrectly set on the "image" frequency. Readjust C11 to other setting at 106 MC and recheck with generator at 84.6 MC. SIGNAL MUST NOT be heard with pointer at 106 MC, and signal generator set at 84.6 MC.

18. Check calibration at 97 MC and 90 MC.

- a. If calibration is not within reasonable tolerance at these points, the inductance of the FM oscillator coil must be adjusted. If dial pointer reading is on low frequency side, inductance of oscillator coil is too low and turns must be compressed slightly. If pointer reading is on high frequency side, oscillator coil inductance is too high and coil turns must be spread slightly. Alternate Steps 17 and 18 until correct calibration is obtained.

19. Check and adjust inductance of RF coil.

- a. Tune receiver to 90 MC signal. Observe AVC reading. Insert iron core end of "tuning wand"* into RF coil, at same time rocking tuning control to maximum reading. If reading increases as wand is inserted, RF coil inductance is too low and turns must be compressed slightly. If reading decreases, reverse wand and insert brass end into coil, again rocking gang to maximum reading. If reading increases, inductance is too high and turns must be separated slightly. If reading decreases (after iron core check) inductance is properly adjusted.

20. Check and adjust inductance of antenna coil.

- a. Use exactly same procedure on antenna coil as in Step 19.

NOTE: Operations 18, 19 and 20 are very difficult and should be attempted only by technicians having had considerable high frequency experience.

* A round rod of insulating material, approximately 8" in length, with an iron core slug on one end, and a non-ferrous metallic slug on the opposite end.

RC1H20	RESISTOR-Comp 470 ohms 1/4w +20% R40.	HRP01	RIVET-Tubular 1/8 x .121	CP6T12	CAPACITOR-Paper 002 mfd 600v
RC1H24	RESISTOR-Comp 1000 ohms 1/4w +20% R40.	HRP02	RIVET-Tubular 1/64 x .121	RC1H34	RESISTOR-Comp 6800 ohms 1/4w (R104)
RC1H40	RESISTOR-Comp 22000 ohms 1/4w +20% R35.	HRS01	RIVET-Shoulder .171 x .118	RC1H40	RESISTOR-Comp 22K ohms 1/4w (R110)
RC1H42	RESISTOR-Comp 3300 ohms 1/4w +20% R12.	HSOC07	RIVET-Shoulder .190 x .185	RC1H44	RESISTOR-Comp 47K ohms 1/4w (R108)
RC1H51	RESISTOR-Comp 100,000 ohms 1/4w +20% (R33, 37, 17, 21)	HSOC68	SPRING-Dial Cord (Puller)	RC1H51	RESISTOR-Comp 100K ohms 1/4w (R115)
RC1H54	RESISTOR-Comp 220,000 ohms 1/4w +20% (R19, R6, R14)	HSOP16	SLEEVE-Spacer	RC1H53	RESISTOR-Comp 150K ohms 1/4w (R100)
RC1H58	RESISTOR-Comp 470,000 ohms 1/4w +20% R24.	HSOS05	SPACER-3/8 x 1/2 x .058	RC1H54	RESISTOR-Comp 220K ohms 1/4w (R103)
RC1H62	RESISTOR-Comp 1 meg 1/4w +20% (R2, R24)	HTOT00	SPACER-Threaded	RC1H58	RESISTOR-Comp 470K ohms 1/4w (R109)
RC1H66	RESISTOR-Comp 2.2 meg 1/4w +20% (R11, R13)	HZOC00	TRACK-Record Changer	RC1H68	RESISTOR-Comp 3.3 meg 1/4w (R105)
RC1H74	RESISTOR-Comp 10 meg 1/4w +20% R22	HZOH04	CATCH-Bullet (Eng Ant)	RC1H62	RESISTOR-Comp 1 meg 1/4w (R102)
RC2H00	RESISTOR-Comp 10 ohms 1/4w +20%	HZOH04	CLIP-Metal	RC1H72	RESISTOR-Comp 1 meg 1/4w (R112)
RC2H08	RESISTOR-Comp 47 ohms 1/4w +20% (R7)	IDM013	HINGE-Lid (Stat Brze.)	RC1H72	RESISTOR-Comp 6.8 meg 1/4w (R114)
RC2H16	RESISTOR-Comp 220 ohms 1/4w +20% R10.	J10A00	SUPPORT-Lid (Stat Brze.)	BT3S06	BOARD-Terminal 3 terminal 1 mtg.
RC2H24	RESISTOR-Comp 1000 ohms 1/4w +20% (R9, 11, 26)	J10002	JEWEL-Pilot Light	BT3S01	BOARD-Terminal 7 terminal 2 mtg.
RC2H34	RESISTOR-Comp 6800 ohms 1/4w +20% (R4)	JP2004	PLUG-1 contact male	ECOM00	FSCUTCHEON-Control Hush-O-Matic
RC2H44	RESISTOR-Comp 47,000 ohms 1/4w +20% (R5)	JP3002	PLUG-2 contact	GROMM03	GROMMET-Shockmount Chassis
RC2H46	RESISTOR-Comp 68,000 ohms 1/4w +20% (R34)(R23)	JR3006	RECEPTACLE-3 contact	WPO003	PLATE-Mtg.
RC4D26	RESISTOR-Comp 1500 ohms 2w +20% (R28)	JR3000	RECEPTACLE-Phono	KC0B10	JACK-Phono
RV4C00	POTENTIOMETER-Tone R20	KC0B11	KNOB-Control (Index)	KR0S00	RECEPTACLE-Phono (Set Type)
SP1009	SPEAKER-12" PM Round	WC0C01	KNOB-Control (Pair)	SM0B02	KNOB-Control (Set Type)
T10C06	TRANSFORMER-Output (T-9)	WFO100	ADAPTER-Screw	SM0T04	SHIELD-Tube
T10D08	TRANSFORMER-1st IF Input (T6)	WFO100	CAN & BUMPER	SM0T06	SOCKET-Miniature
T10E08	TRANSFORMER-3rd IF Assy (T8)	WFO100	PULLY-Idler	SPR0A01	SWITCH-S.P.S.T.
TPO100	TRANSFORMER-2nd IF (T7)	WFO100	RUNNER-Plain	STRIP-Flashpaper .015 x 1-1/4" x 1-1/2"	GENERAL HARDWARE
TRB000	TRANSFORMER-Power (T10)	MS0G00	RUNNER-Guide	SCALNUT-3/8 32	SCREW-Oval Head Phillips 4-40 x 5/8"
#44	LAMP-Bayonet Base 6.3v	MS0T08	SHAFT-Tuning		
AB0C02	ASSY-6 Pushbutton	NE0M00	EMBLEM-Nameplate		
BPOB02	PUSHBUTTON-Brown	PB0D01	PLATE-Back		
BT1S00	STRIP-Terminal (1 soldering lug)	PF0P01	PLATE-Line Cord Insulator		
BT1S01	STRIP-Terminal (1 soldering lug)	PF0R00	PADS-Felt Brown		
BT2S00	STRIP-Terminal (2 soldering lug)	SM0B00	BASE-Min Tube		
BT2S04	STRIP-Terminal (2 soldering lug)	SM0T03	SHIELD-Min Tube		
BT3S00	STRIP-Terminal (3 soldering lug)	SO0D05	SOCKET-Dial Light		
BT3S02	STRIP-Terminal (5 soldering lug)	SO0D10	SOCKET-Dial Light		
DS0C05	DIAL-Scale (35-160 KC)(88-108 MC)	SR3G00	SOCKET-Min Tube		
DZ0F12	DECAL-Swing	SS0P01	SWITCH-Rotary		
DZ0Y00	DECAL-Swing-8-Door	ST0T00	SWITCH-6 Pushbutton		
GRO100	GROMMET-Insulating	WFOF14	WASHER-Insulating (Irrimer Mtg.)		
GRO101	GROMMET-Shockmount Insulating	WFOB00	WINDOVS-Pushbutton		
GRO103	GROMMET-Shockmount	XS0Z02	STRIP-Hall		
GRO104	GROMMET-Shockmount	YZ0R00	CABINET COMPONENTS - MODEL 1519 & 1525		
GZ0M05	GRILLE-Metal (Eng Ant)	BZ0D15	Cardboard Baffle and Cloth (with out cutout)		
HBM019	BRACKET-Pushbutton Mtg	BZ0D16	Cardboard Baffle and Cloth (with out cutout)		
HC0C00	CLIP-Coil Mtg.	ZL8G02	DOOR-Walnut (pair)		
HC0C03	CLAMP-Dial Cable	ZL8G02	LID-Walnut (pair)		
HC0C06	CLIP-Coil Fastener	ZW8G02	CABINET-Walnut (Model 1519)		
HC0D03	CLIP-Bracket	ZW8G05	CABINET-Walnut (Model 1525)		
HC0S09	STOP-Retainer Spring	BZ0D09	CABINET COMPONENTS - MODEL 1518 & 1524		
HC0S09	CLIP-Retainer Ring	BZ0D10	Cardboard Baffle and Cloth (with out cutout)		
HC0S08	CLIP-Washer "C"	ZF8G01	DOOR-BW71		
HC0T03	PULL Door	ZL8G01	LID-BW71 Mahogany Complete top (Permanent & Adjustable)		
HK0R00	CLIP-Retainer Ring	ZW8G01	CABINET-Assy BW71 Mahogany (1518)		
HK0R00	BUSHING-Threaded	ZW8G04	CABINET-Assy Mahogany (1524)		
HRP000	RIVET-Tubular 13/64 x .121	CC9K50	HUSH-O-MATIC ELECTRICAL COMPONENTS FOR 1524-1525		

MODEL 1521



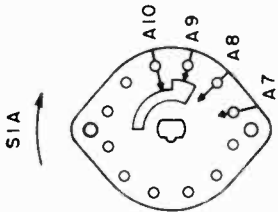
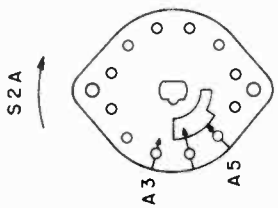
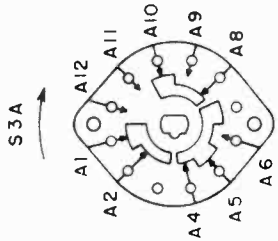
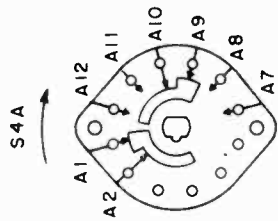
Model 1521
Walnut

GENERAL

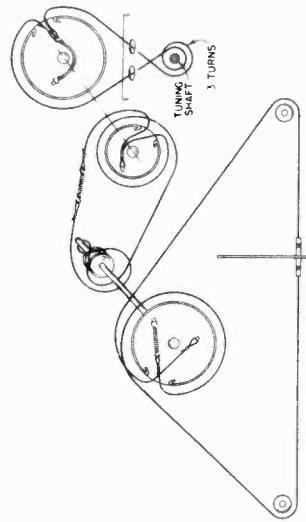
The Bendix Model 1521 is an eight tube AM-FM superheterodyne receiver providing AM reception from 540 KC to 1620 KC and FM reception from 88 MC to 108 MC. A jack on the radio chassis provides 110 volts AC to the record changer motor only when the radio OFF-ON switch is in the ON position. The output of the phonograph is injected into the audio amplifier of the main chassis through a high impedance phono jack also mounted on the rear of the main chassis.

The standard superheterodyne circuit is used, with one stage of tuned Radio Frequency on the FM band; an AM signal is fed directly into the Converter Stage. A low impedance AM Loop Antenna is located on the rear cover of the cabinet as well as the built-in FM Dipole Antenna. AM or FM external antennas may be used with this receiver. When making use of an external FM antenna, disconnect the internal FM antenna at the chassis and replace with the external antenna lead-in. The proper external antenna to be used for FM is a 300 ohm Dipole Antenna such as the Bendix AD1F00.

The 7F8 dual triode is used as a mixer and oscillator for both FM and AM. One diode of the 6SQ7 is used for DAVC in the FM circuit; the remaining diode and triode are the AM detector and 1st audio circuit's respectively.

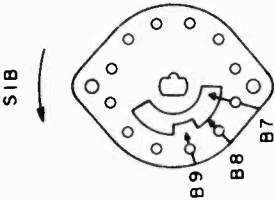
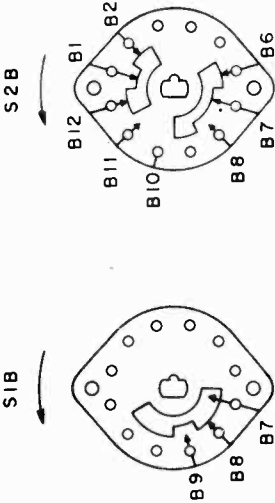


SECTIONS VIEWED FROM FRONT OF CHASSIS
SECTIONS NUMBERED FRONT TO REAR



Dial Stringing Diagram

Record Changer
Automatic - twelve 10-inch or ten 12-inch
standard lateral cut records.

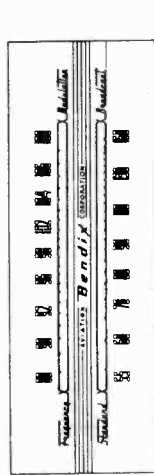


SECTIONS VIEWED FROM REAR OF CHASSIS
SECTIONS NUMBERED FROM FRONT TO REAR

Wafer Connections

SPECIFICATIONS

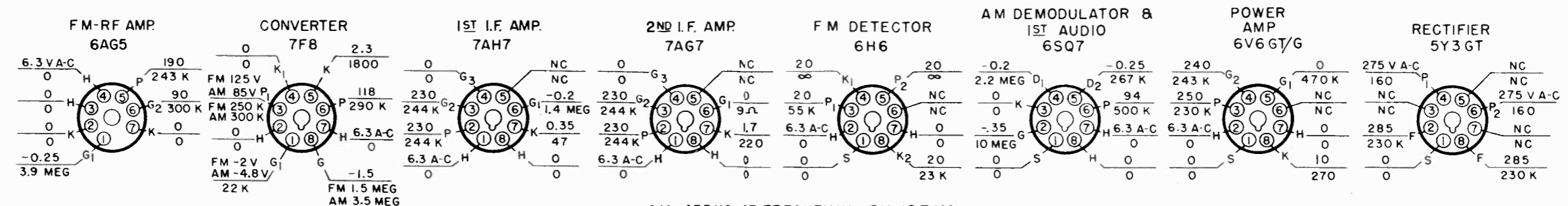
- Power Requirements
105 - 125 volts, 60 cycles AC
- Power Consumption
Radio - 60 watts; Phono-turntable - 25 watts.
- Tuning Frequency Range
AM 540 - 1620 KC
FM 88 - 108 MC
- Intermediate Frequency
AM 455 KC
FM 10.7 MC
- Power Output
Maximum - 4 Watts
- Tube Complement
1-6AG5, 1-7F8, 1-7AH7, 1-7AG7, 1-6H6,
1-6SQ7, 1-6V6GT, 1-5Y3GT. Total 8
- Loudspeaker
12-inch diameter PM



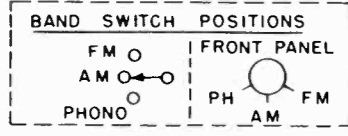
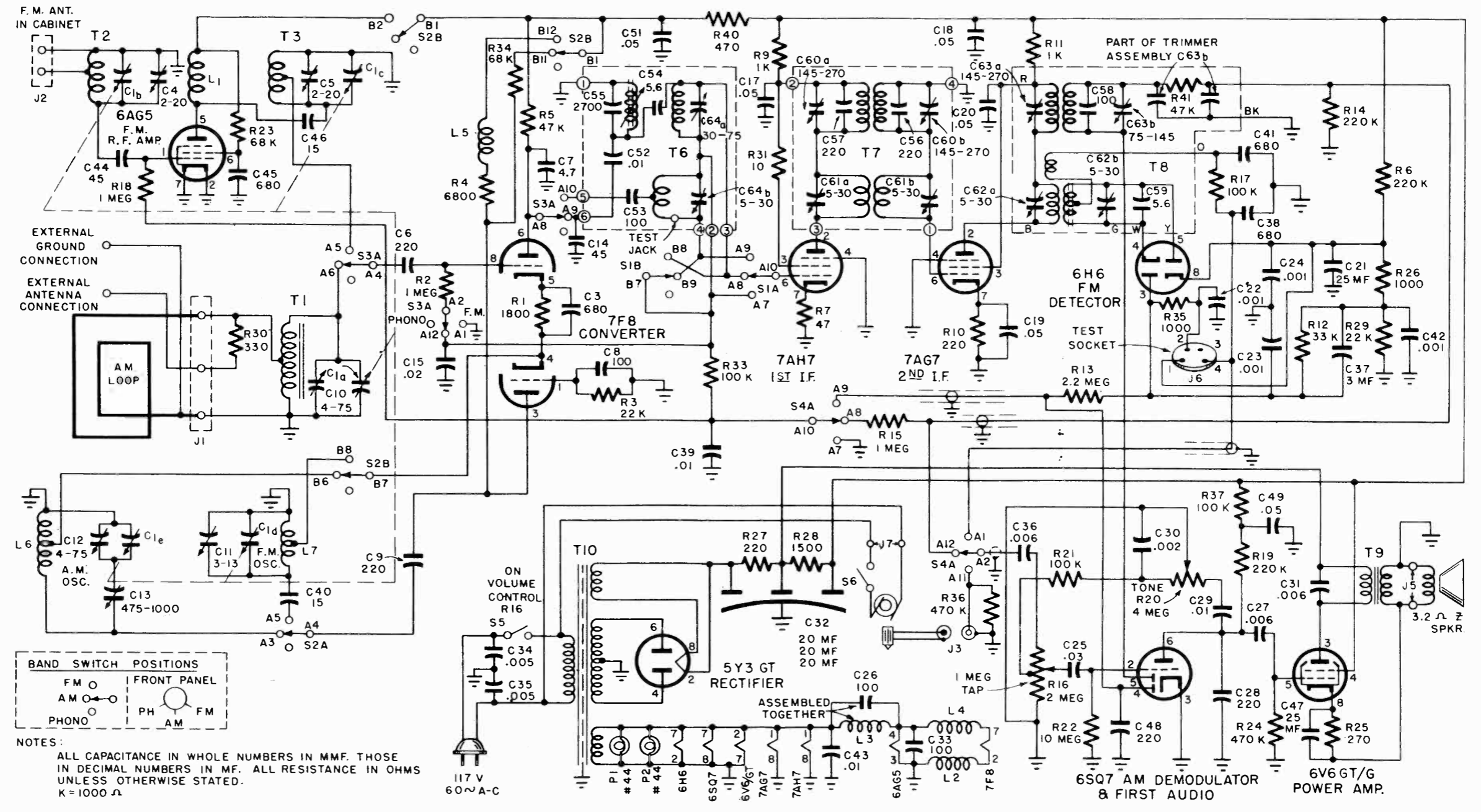
Control Layout

BENDIX RADIO DIV.

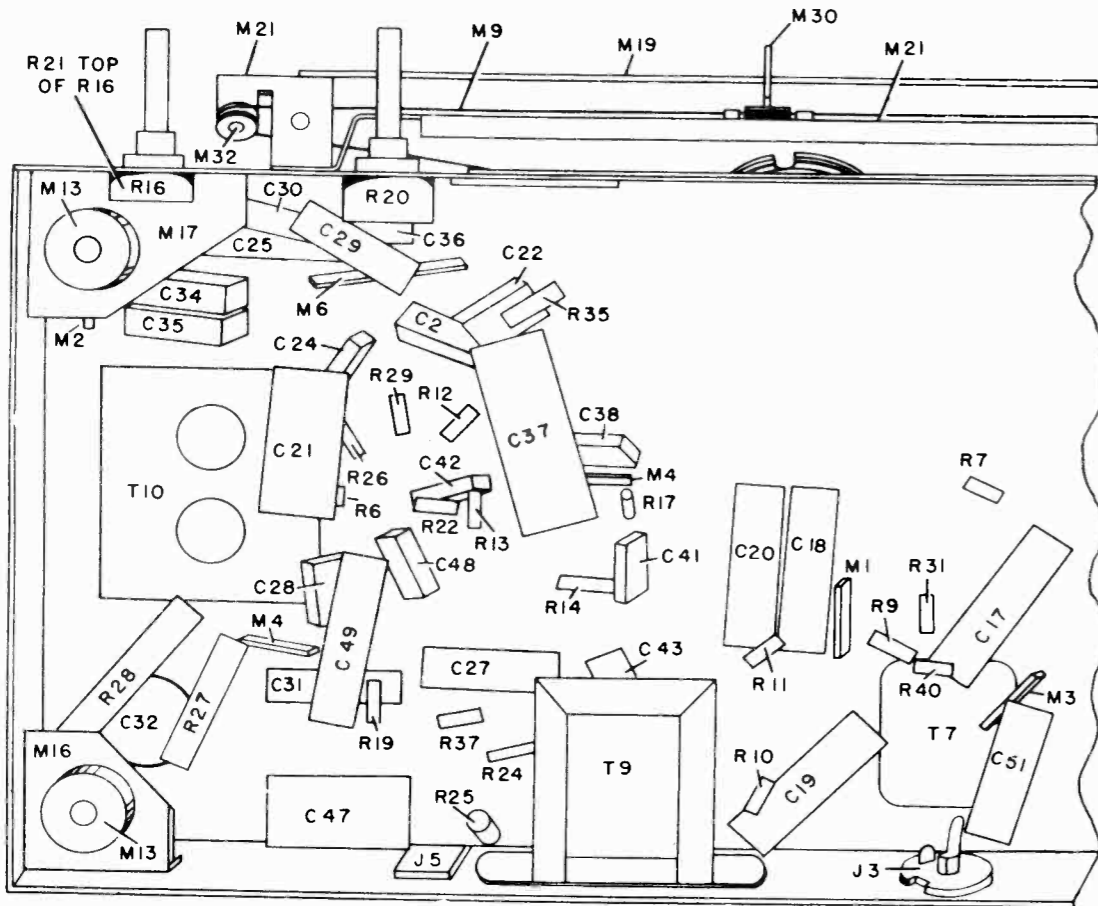
CONDITIONS OF MEASUREMENTS
LINE VOLTAGE 117 A-C ZERO SIGNAL INPUT VOL. CONT. MIN. SOCKET VOLTAGE RESISTANCE TO COMMON GROUND D-C AT 20,000 Ω/V A-C AT 1,000 Ω/V



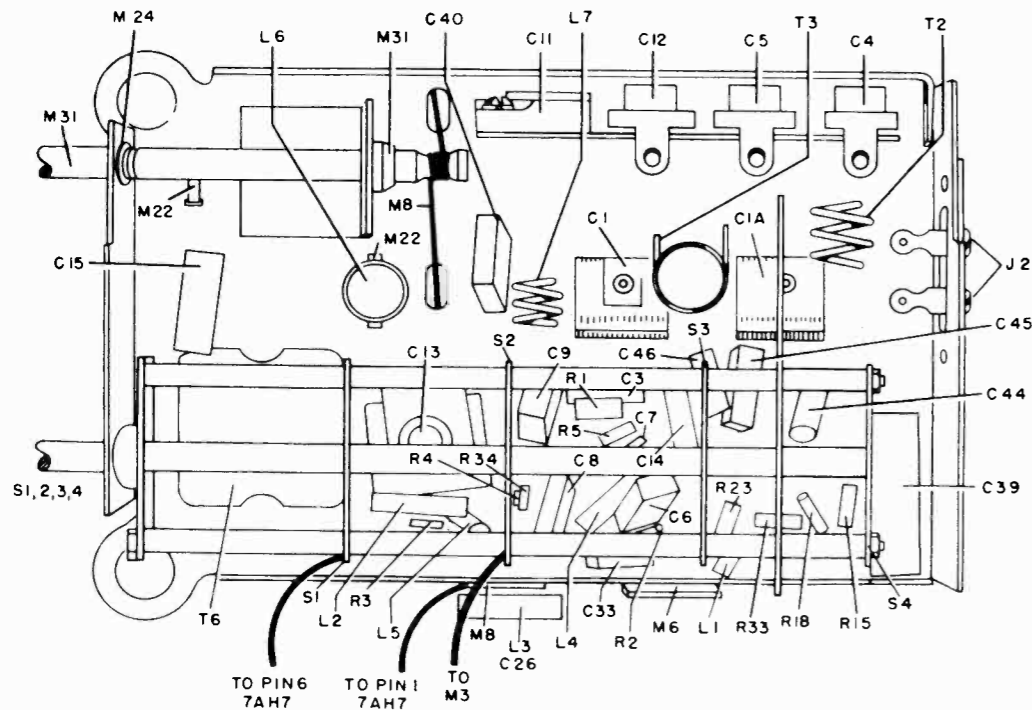
AM-455KC IF FREQUENCY FM-10.7 MC



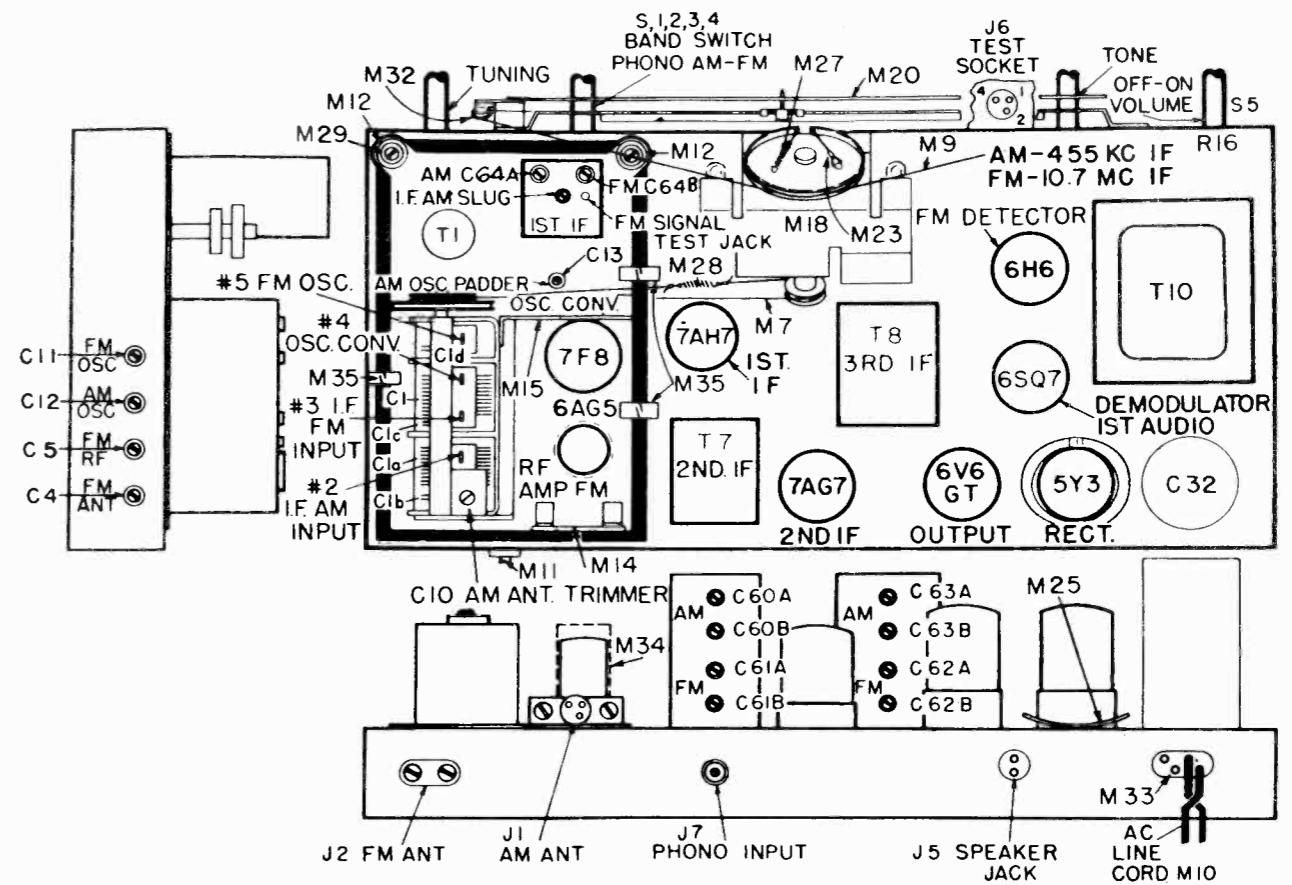
NOTES:
ALL CAPACITANCE IN WHOLE NUMBERS IN MMF. THOSE IN DECIMAL NUMBERS IN MF. ALL RESISTANCE IN OHMS UNLESS OTHERWISE STATED.
K = 1000 Ω



Main Chassis Component Diagram
Bottom View



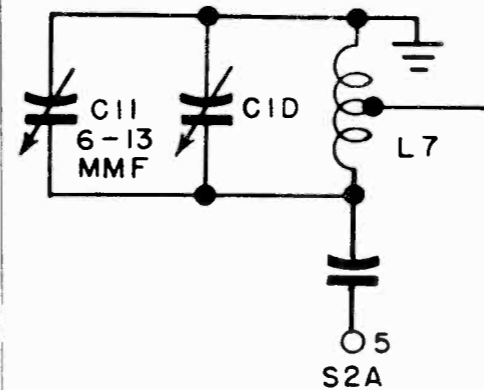
RF Chassis Component Diagram
Bottom View



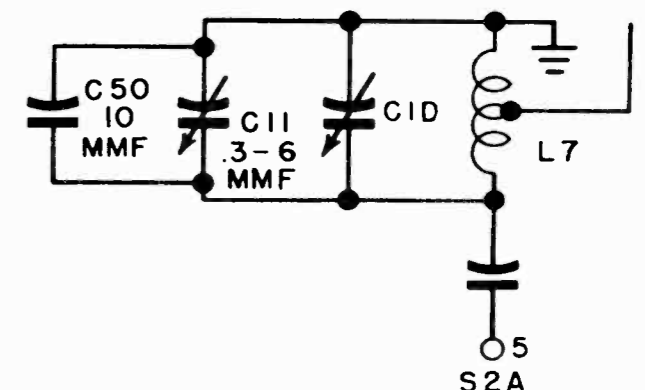
Trimmer Location Diagram

CIRCUIT CHANGES

Some sets of this model, capacitor CT1A09 (C11) has been replaced by two capacitors CT2A14 (C11) and CC5A22 (C50). The FM oscillator is changed as shown



Circuit using 6 - 13 mmf for C11



Circuit using 10 mmf in parallel with .3 - 6 mmf C11.

ALIGNMENT PROCEDURE

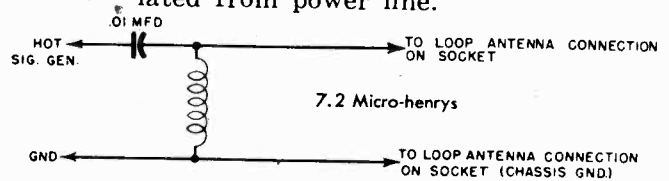
Remove chassis from cabinet and, if possible, have a speaker connected while alignment procedure is carried out. By using an amplitude modulated (30%) test signal whenever possible, weak signals in a detuned receiver may readily be identified. Plug the line cord into 117 volts, 60 cycle A.C. power source and turn the set on. Allow the set and test equipment to "warm up" for five minutes before beginning alignment procedures.

The AM channel is aligned first since the FM alignment will be affected if the AM section is not tuned properly. Refer to Figs. 3, 8, 9, 10 and 11 for trimmer locations, dial reference points, etc.

To set dial pointer, rotate gang condenser until fully closed and set pointer to reference mark at left of scale. See Fig. 10.

TEST EQUIPMENT REQUIRED

- Standard AM Signal Generator
 - FM Signal Generator with range to approximately 108 MC. (For visual alignment.)
 - Bendix AM Dummy Antenna (See Fig. 3)
 - FM Dummy Antenna (See Fig. 9)
 - .01 mfd Capacitor
 - Alignment Screwdriver
 - Special Test Circuit Plug (See Fig. 11)
 - Standard Output Meter
 - Vacuum Tube Voltmeter - Preferable with a zero center scale.
- a. Minus or "ground" lead must be isolated from power line.



*A M Dummy Antenna
Bendix No. AD0L01*

AM ALIGNMENT

PRELIMINARY:

- Connect the output meter across voice coil. Set meter on lowest A C Range.
- Signal Generator Amplitude Modulated (Approx. 30% modulation)
- Rotate Volume Control-full on. Keep Generator output low as possible.

Generator Freq.	Dummy Antenna	Generator Coupling	Band Position	Special Conditions	Dial Setting	Adjust	Remarks
1) 455 KC	.05 mfd	High Side—Term. #2 of gang Cond. Low Side—Chassis Gnd.	AM—Mid-Position	Short AM Osc.—Term. #4 to Chassis	Gang Closed	IF Slug; C64A, C60A, C60B, C63A, C63B.	Adjust for Max. Output
2) 580 KC	Bendix Dummy Antenna AD0L01	Dummy Antenna Plugged in AM Ant. Socket on Rear of Chassis See Fig. 8	AM—Mid-Position	Remove short from Term. #4	580 KC Ref. Mark	AM Osc. Padder C13	"
3) 1475 KC	"	"	"	—	1475 KC Ref. Mark	AM Osc. Trimmer C12, AM Ant. Trimmer C10	"
4) 580 KC	"	"	"	—	580 KC Ref. Mark	C13	Rock Gang Cond. Adjust for Max. Output
5) REPEAT STEPS 3 & 4 UNTIL RECEIVER IS PROPERLY ALIGNED							
6) 965 KC	Bendix Dummy Antenna AD0L01	Dummy Antenna Plugged in AM Ant. Socket on Rear of Chassis, See Fig. 8	AM—Mid-Position	—	965 KC Ref. Mark	—	*Check Calibration
7) 580 KC	"	"	"	—	580 KC Ref. Mark	—	Check Calibration

*If calibration is not within 10 KC in steps 6 & 7, oscillator & antenna gang rotor sections must be bent. This operation should be attempted by experienced technicians only.

FM ALIGNMENT

CW METER METHOD

BE CERTAIN "AM" CHANNEL IS ALIGNED BEFORE BEGINNING "FM" ALIGNMENT.

The CW Meter Method has proved to be very satisfactory for aligning the FM section of a correctly operating Bendix Model 1521 receiver. The advantage of this method over the Visual Alignment procedure is that the equipment required is generally associated with AM receiver alignment. A check by use of the Visual method will reveal any distortion in the output, which is difficult to locate using only the CW Meter Method.

1. Preliminary
 - a. Rotate band selector to FM band - Max. counter-clockwise
 - b. Short stator of FM oscillator gang to chassis - #5 terminal. See Fig. 8.
2. Signal Generator Setting
 - a. Power "ON"
 - b. Frequency - 10.7 MC
 - c. Modulation - pure RF or, preferably, amplitude modulated.
3. Connect generator lead through .01 mfd capacitor to terminal #3 (C1d) of gang condenser.
4. Connect DC Vacuum Tube Voltmeter to test socket pins #1 (+) and #2 (-) using low scale.
5. Align 1st, 2nd, and 3rd IF trimmers for maximum AVC voltage - C64B on 1st IF, C61A and C61B on 2nd, C62A on 3rd. As alignment proceeds, reduce signal generator output, such that reasonable reading is obtained on lowest scale of DC vacuum tube voltmeter. If no indication is obtained with maximum signal applied, apply signal to test jack in 1st IF can and tune C61A, C61B, and C62A to approximate peak before moving generator lead to #3 terminal. Realign all IF trimmers (C64B, C61A, C61B, and C62A) carefully several time for *absolute maximum* AVC voltage.
6. Insert test circuit plug in test socket and connect DC Vacuum Tube Voltmeter between center tap of shunt test resistors and test socket pin #4. See Sketch, Fig. 11.
7. Remove IF signal input from receiver. (Vacuum Tube Voltmeter remains connected to test socket and receiver is still "ON".)
8. Adjust DC Vacuum Tube Voltmeter to zero reading under conditions stated in Step 7.

9. Re-connect Signal Generator to terminal #3 as in Step 2, using the same 10.7 MC signal.
10. Adjust secondary of 3rd IF (C62B) to absolute zero reading on Vacuum Tube Voltmeter. (Same "zero reading" as in Step 8.)
11. Alternate adjustments in Steps 5 and 10 several times until correct adjustment is obtained.
 - a. Correct adjustment is obtained when Step 5 produces no increase in AVC reading, and Step 10 remains at zero reading.
 (Note: When changing from Step 5 to Step 10, Vacuum Tube Voltmeter is adjusted for zero with Signal Generator output removed from chassis. *Do not remove* Vacuum Tube Voltmeter leads from chassis and adjust for zero.)
12. Remove short from terminal #5 to chassis.
13. Reconnect Vacuum Tube Voltmeter to test socket terminals #1 (+) and #2 (-).
14. Reset Signal Generator
 - a. Frequency - 106 MC
 - b. Output - pure RF or amplitude modulated.
15. Connect generator output to receiver FM antenna posts through standard FM dummy antenna. See Fig. 9.
16. Set pointer to 106 MC Reference Mark - Fig. 10.
17. Adjust FM oscillator C11, RF - C5, and antenna - C4, to obtain maximum AVC reading. Repeat several times to insure maximum reading.
 - a. Tuning control must be rocked while adjusting C5 and C4 due to reaction on C11.
18. Check calibration by setting dial pointer on 97 MC Reference Mark (See Fig. 10) and change Signal Generator to 97 MC pure RF or amplitude modulated.
19. Repeat Step 18 for a signal of 90 MC. If calibration in Steps 18 and 19 is off, it will be necessary to readjust inductance of oscillator coil, (RF and antenna coils also, if needed). See Text "FM Alignment - Visual Method" - Paragraph 17.

NOTE: *This operation should be attempted by well experienced technicians ONLY.*

VISUAL ALIGNMENT

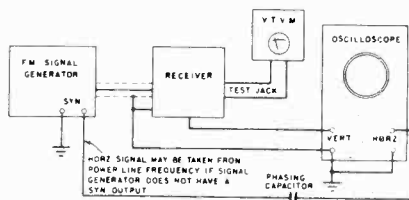
The Bendix Radio Model 1521 receiver uses the ratio detector type of demodulator. Since the limiter stage is omitted, a direct visual alignment of the IF stages by means of an oscilloscope is impractical. However, the ratio detector may readily be aligned visually, and upon completion of the entire alignment procedure, a visual alignment analysis of a signal from antenna to discriminator load will indirectly determine whether the IF transformers are symmetrically aligned.

The general method of alignment, hereafter described, is to first align the IF transformers and the primary of the detector at 10.7 MC by means of a pure RF signal and a Vacuum Tube Voltmeter. After this preliminary alignment, the secondary of the IF detector is aligned visually by means of a frequency modulated RF signal at 10.7 MC and an Oscilloscope across the ratio detector output. It is a definite advantage to use 60 cycle modulation with the frequency modulated RF signal, since no syn-

chronization is needed between the horizontal and vertical signals to keep the scope pattern stationary.

Connect the test instruments as diagramed in Fig. 4 and as directed in the procedure hereafter. The connections for the Vacuum Tube Voltmeter and vertical input to the oscilloscope are changed to different test jack terminals as different steps in the alignment procedure are completed.

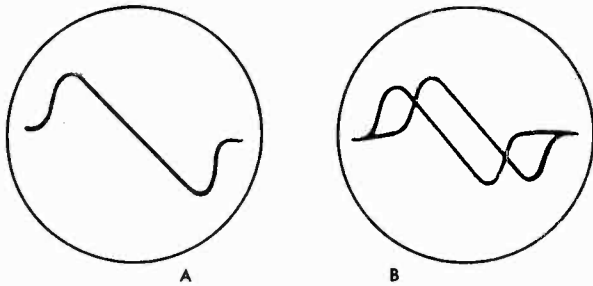
1. Signal Generator Setting
 - a. Power - "ON"
 - b. Frequency setting - 10.7 MC
 - c. Modulation - pure RF or amplitude modulated.
 - d. Output controls - set for workable receiver output.
2. Receiver Settings
 - a. Rotate band selector to FM band - Maximum counter-clockwise.
 - b. Short stator of local FM oscillator to ground.
This connection is #5 terminal on the gang condenser, easily accessible from the top of the chassis. See Fig. 8.
3. Connect generator lead to terminal #3 of gang condenser using .01 mfd coupling capacitor and ground shield to receiver chassis.
4. Connect Vacuum Tube Voltmeter to test socket pins #1 (+) and #2 (-). See Figs. 8 and 11.
5. Align 1st and 2nd IF transformers for maximum AVC voltage, - trimmer C64B on 1st IF, trimmers C61A, C61B on 2nd. As alignment proceeds, reduce signal generator output such that reasonable reading is obtained on lowest scale of DC Vacuum Tube Voltmeter. If no indication is obtained with maximum signal applied, apply signal to test jack in 1st IF can and tune 2nd IF transformer to approximate peak before moving generator input back to #3 terminal. Adjust primary of detector transformer (trimmer C62A) for maximum AVC voltage. Carefully realign all IF trimmers (C64B, C61A, C61B, C62A) several times for absolute maximum AVC voltage.
6. Reset Signal Generator
 - a. Frequency 10.7 MC
 - b. Modulation - 60 cycle FM
 - c. Sweep width - maximum possible (should be a minimum of 200 KC).
7. Connect vertical input of scope to test socket pin #4 and ground as shown in Figs. 4, 8, and 11 and connect a 60 cycle sine wave signal to horizontal input.



Connections for Visual Alignment

A suitable 60 cycle signal may be obtained by removing one of the dial lamp sockets from its bracket and connecting the horizontal input lead directly to the socket or through a small capacitor if required for proper phasing. The sweep circuit in the scope is not used.

8. Adjust Signal Generator frequency until ratio detector curve is centered on the horizontal scope sweep - (This may deviate slightly from 10.7 MC.)
9. Adjust secondary of detector transformer (C62B) for a maximum "S" curve similar to Fig. 5a - (the "S" curve may be reversed depending on the internal circuit of the scope used.) Alternate adjustment of primary (C62A) and secondary (C62B) to obtain maximum desired curve. Some phase shift between the Signal Generator and scope horizontal sweep may be encountered, resulting in a double trace pattern, shown in Fig. 5b. In some oscilloscopes, provision is made for correcting this phase shift directly in the oscilloscope circuit. If so, rotate the "phase shift" control until the curves coincide as in Fig. 5a. If no provision is made in the scope, the correction might be accomplished by inserting a capacitor of suitable value in series with the 60 cycle signal and the horizontal input to the scope. The capacitor value will depend upon the amount of phase shift and the horizontal input impedance of the scope. Approximate capacitors range from .01 to 0.1 mfd. When aligning the secondary of the detector transformer visually, it is advantageous to leave the Vacuum Tube Voltmeter connected to test socket pins #1 (+) and #2 (-) as in Step 4. This will facilitate the adjustment for maximum "S" curve since the meter will indicate the maximum AVC voltage and the scope will indicate the most linear "S" curve. Maximum meter reading obtained at same time best linearity is obtained, indicates correct alignment.
10. Rotate gang condenser such that the pointer is resting on 106 MC reference mark on dial face. Remove short from FM oscillator terminal #5 to ground.
11. Reset Generator
 - a. Frequency - 106 MC
 - b. Modulation - 60 cycle FM
 - c. Sweep - maximum width (should be between 200 KC and 450 KC).
12. Connect Signal Generator lead to receiver antenna post through standard FM dummy antenna (See Fig. 9).
13. Oscilloscope should be connected as in Step #7.
14. Adjust C11, local oscillator trimmer, until "S" curve is centered on scope.
The Oscillator has been designed to operate on the high side of the incoming signal. It is possible to adjust the trimmer (C11) at 106 MC so that the oscillator is operating on the "image" or low frequency side



"S" Curves

of the signal. To check the oscillator (C11) adjustment, set Signal Generator to 84.6 MC, frequency modulated, dial pointer still at 106 MC. If signal is NOT heard, adjustment of C11 is correct, but if signal is heard, oscillator trimmer C11 has been incorrectly set on the "image" frequency. Readjust C11 to other setting at 106 MC and recheck with generator at 84.6 MC. Signal MUST NOT be heard with pointer at 106 MC, and Signal Generator, frequency modulated, set at 84.6 MC.

15. Adjust C5, at same time "rocking" receiver tuning control to keep "S" curve centered on horizontal sweep line on scope, for maximum height of the "S" pattern.
16. Adjust C4 for maximum height of the "S" pattern.
17. Check calibration of 97 MC and 90 MC.
 - a. If calibration is not within reasonable tolerance at these points, the inductance of the FM oscillator coil must be adjusted. If dial pointer reading is

on low frequency side, inductance of oscillator coil is too low and turns must be compressed slightly. If pointer reading is on high frequency side, oscillator coil inductance is too high and coil turns must be spread slightly. Repeat Steps 14 to 17 until correct calibration is obtained.

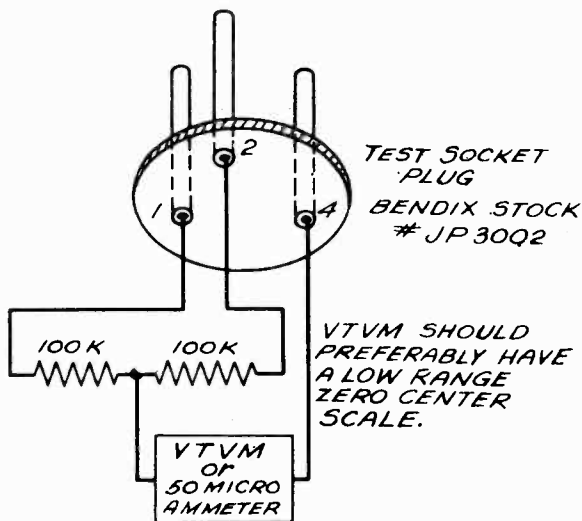
18. Check and adjust inductance of RF coil.
 - a. Tune receiver at 90 MC signal. Observe AVC reading. Insert iron core end of "tuning wand" * into RF coil at same time "rocking" tuning control to maximum reading. If reading increases as wand is inserted, RF coil inductance is too low and turns must be compressed slightly. If reading decreases, reverse wand and insert brass end into coil, again "rocking" gang to maximum reading. If reading increases, inductance is too high and turns must be separated slightly. Insertion of either end of tuning wand should cause meter reading to decrease.

19. Check and adjust inductance of antenna coil.

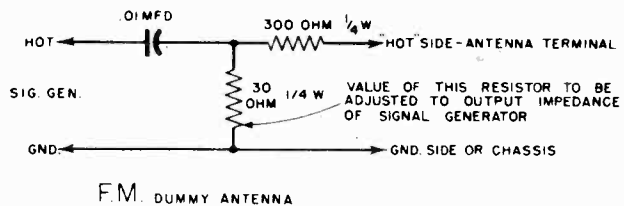
- a. Use exactly same procedure on antenna coil as in Step 18.

NOTE. Operations 17, 18 and 19 are very difficult and should be attempted only by technicians who have had more than average high frequency experience.

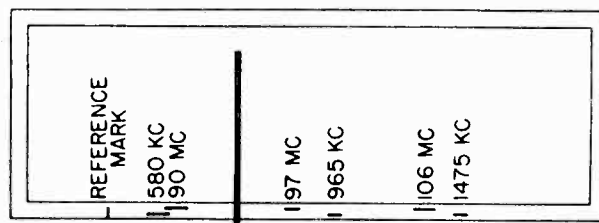
* A round rod of insulating material, approximately 6" in length, with an iron core slug on one end, and a non-ferrous metallic slug on the opposite end.



Test Circuit for Demodulator Transformer Alignment



FM Dummy Antenna



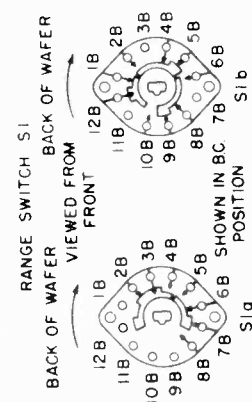
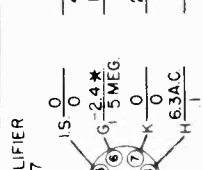
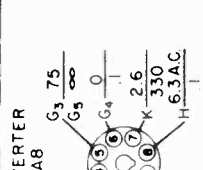
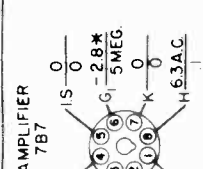
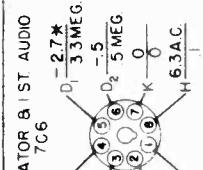
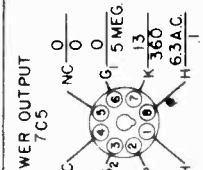
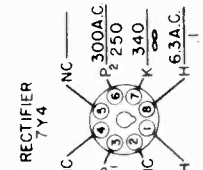
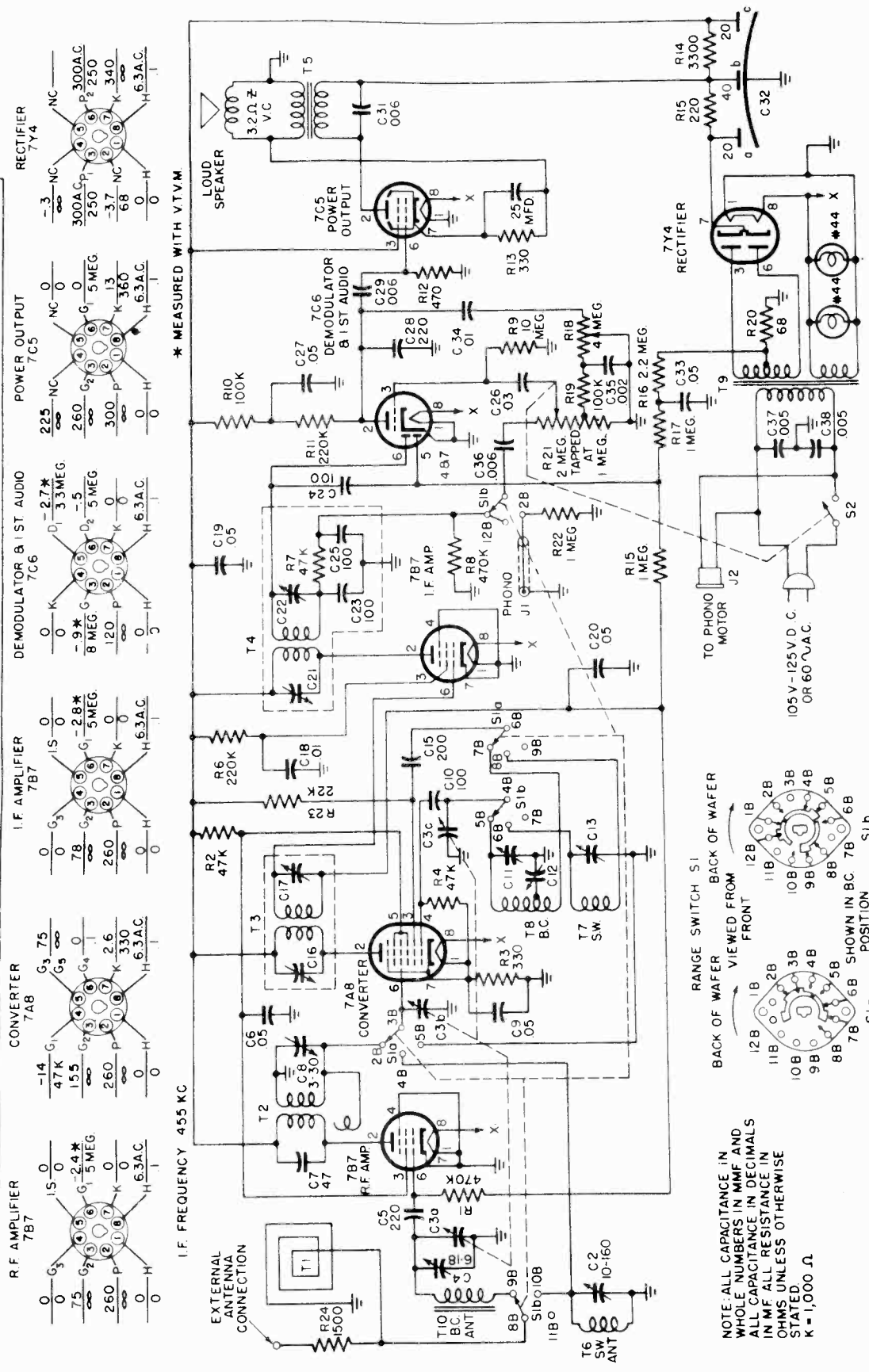
Dial Reference Points

BENDIX RADIO DIV.

MODEL 1521

Part Number	Description	Part Number	Description	Part Number	Description
CC5A22	CAPACITOR—Ceramic 10 mmf 500V (C50)	RC2127†	RESISTOR—Comp 1800 ohms ½ W (R1)	HB0M451	BRACKET—Chassis Shock Mtg. (M16)
CC8A24†	CAPACITOR—Ceramic 15 mmf 500V (C46)	RC1H18†	RESISTOR—Comp 330 ohms ¼ W (R30)	HB0M16†	BRACKET—Chassis Shock Mtg. (M17)
CC8A30†	CAPACITOR—Ceramic 45 mmf 500V (C14, 44)	RC1H20†	RESISTOR—Comp 470 ohms ¼ W (R40)	HB0M52†	BRACKET—Pulley & Shaft Center, Top Chassis (M18)
CC0F18†	CAPACITOR—Ceramic 4.7 mmf (C7)	RC1H24†	RESISTOR—Comp 1000 ohms ¼ W (R35)	HB0M54†	FRAME—Dial Back Plate (Bottom) (M19)
CC0F19†	CAPACITOR—Ceramic 5.6 mmf (C54)	RC1H40†	RESISTOR—Comp 22,000 ohms ¼ W (R3 29)	HB0M55†	FRAME—Dial Back Plate (Top) (M20)
CE3A03†	CAPACITOR—Electrolytic 20 x 20 x 40mfd (450 DC) (C32)	RC1H42†	RESISTOR—Comp 33,000 ohms ¼ W (R12)	HB0M68	BRACKET—Slide Pointer Support (M21)
CE1T00†	CAPACITOR—Electrolytic 25 mfd 25VDC (C21, 47)	RC1H44†	RESISTOR—Comp 47,000 ohms (R41)	HC0C00†	CLIP—Coil Mtg. (for T1 and L6 (M22))
CE1T01†	CAPACITOR—Electrolytic 3 mfd (C37)	RC1H51†	RESISTOR—Comp 100,000 ohms ¼ W (R17, 21, 33, 37)	HC0C03†	CLAMP—Dial Cable (M23)
CM4A42†	CAPACITOR—Mica 680 mmf 300V (C41, 38, 45)	RC1H54†	RESISTOR—Comp 220,000 ohms ¼ W (R19, 5, 14)	HC0S28†	CLIP—Tuning Shaft "C" Washer (M24)
CM5A22	CAPACITOR—Mica 100 mmf 500V (C33) (C53)	RC1H58†	RESISTOR—Comp 470,000 ohms ¼ W (R24, 36)	HC0T01	CLAMP—Tube (M25)
CM5A30	CAPACITOR—Mica 220 mmf 500V (C28) (48)	RC1H62†	RESISTOR—Comp 1 meg ¼ W (R2, R15, R18)	HPM701	PIN—8-32 Threaded (M26)
CM6A22	CAPACITOR—Mica 100 mmf (C58)	RC1H66†	RESISTOR—Comp 2.2 meg ¼ W (R13)	HR0P02	RIVET—Tubular 11/64 x 121
CM7A30	CAPACITOR—Mica 220 mmf (C56, 57)	RC1H74†	RESISTOR—Comp 10 meg ¼ W (R22)	HS0C01†	SPRING—Shoulder .171 x .118
CM4L42	CAPACITOR—Mica 680 mmf 300V (C3)	RC2H00†	RESISTOR—Comp 10 ohms ¼ W (R31)	HS0C04†	SPRING—Dial Cord (Tuning & Idler) (M27)
CM5L03	CAPACITOR—Mica 15 mmf 500V (C40)	RC2H08†	RESISTOR—Comp 47 ohms ¼ W (R7)	HS0C08†	SPRING—Dial Cord (Indicator Pulley) (M28)
CM5L22	CAPACITOR—Mica 100 mmf 500V (C8)	RC2H16†	RESISTOR—Comp 220 ohms ½ W (R10)	HS0P16	SPACER—Plain Sleeve (RF Shock Mtg.) (M29)
CM5L30	CAPACITOR—Mica 220 mmf 500V (C4, 9)	RC2H24†	RESISTOR—Comp 1,000 ohms ¼ W (R9, 11, 26)	ID0M13†	INDICATOR—Dial (M30)
CM8S70	CAPACITOR—Mica 2700 mmf 500V (C55)	RC2H34†	RESISTOR—Comp 6,800 ohms ¼ W (R1)	JR2C006†	RECEPTACLE—2 Contact Speaker (J-5)
CP2M10	CAPACITOR—Paper .001 mfd 200V (C23, 24, 22, 42)	RC2H44†	RESISTOR—Comp 47,000 ohms ½ W (R5)	JR3C000†	RECEPTACLE—3 Contact—Test Socket (J6) (J1)
CP3M34	CAPACITOR—Paper .02 mfd 400V (C15)	RC2H46†	RESISTOR—Comp 68,000 ohms ½ W (R34, 23)	JR1S004	RECEPTACLE—Phone (J7)
CP4M51	CAPACITOR—Paper .03 mfd 20V (C26)	RV4C00†	POTENTIOMETER—Tone (R20)	MF9008†	SHAFT—Tuning (M31)
CP2T36	CAPACITOR—Paper .03 mfd 20V (C26)	RV4S10†	POTENTIOMETER—(with S.P.S.T. Switch) (R16)	PH0D02†	PULLEY—Dial Cable Idler (M32)
CP4T31	CAPACITOR—Tub Paper .01 mfd 400V (C29)	RW2A16†	RESISTOR—Wirewound 220 ohms 2W (R27)	P10P014	PLATE—Dial Back
CP4T40	CAPACITOR—Paper .05 mfd 400V (C17, 18, 19, 20, 49, 51)	RW1B34†	RESISTOR—Wirewound 270 ohms 1W (R25)	SM0B004	BASE—Min. Tube (M34)
CP6T12	CAPACITOR—Paper .002 mfd 600V (C30)	TA0009	TRANSFORMER—Output (T9)	SH0EJ3	SHIELD—Min. Tube (M34)
CP6T18	CAPACITOR—Paper .005 mfd 600V (C34, C35)	T10C06†	TRANSFORMER—1st IF Input (T6)	SOCKET—Dial Light (F1) (12" lead)	
CP6T20	CAPACITOR—Paper .005 mfd 600V (C31, 36, 27)	T10D08†	TRANSFORMER—Assy. 3rd IF (T8)	SOCKET—Dial Light (F2) (91/2" lead)	
CP6T31	CAPACITOR—Paper .01 mfd 600V (C39, C43)	TF0J00†	TRANSFORMER—Power (T10)	SOCKET—Loktal Black Bakelite (M35)	
CT1A09	CAPACITOR—Trimmer (C11) (4-75 mmf)	TR8B02†	TRANSFORMER—Ant. (T1)	SOCKET—Loktal Black Bakelite (M35)	
CT1A11	CAPACITOR—Trimmer Mica (C10) (4-75 mmf)	TR8F00†	TRANSFORMER—FM Ant. (T2)	SOCKET—Miniature "Zip In" Type (M36)	
CT2A09	CAPACITOR—Trimmer (C13) (475-1000 mmf)	TR8F00†	TRANSFORMER—FM Mixer (T3)	STRIP—Copper (.004 x 5/16 x 1 1/8) (M36)	
CT2A10	CAPACITOR—Trimmer (5-30 mmf) (C16, C16b, C62a, C62b)	TR8F00†	TRANSFORMER—FM Mixer (T3) #44†	BACK & LOOP—Cabinet	
CT2A11	CAPACITOR—Trimmer (145-270 mmf) (C63a, C63b)	BT1S00†	BOARD—Terminal (1 Soldering Lug)	BAFFLE—Board (1/8" Chipboard)	
CT2A14	CAPACITOR—Trimmer (145-270 mmf) (C60a, C60b)	BT1S01†	BOARD—Terminal (1 Soldering Lug)	DIAL—Scale AM - FM Bands (SS-160KC) (88-108 MC)	
CT2A14	CAPACITOR—Trimmer (5-30 mmf) (C64) (30-75 mmf - C64a)	BT1S04†	BOARD—Terminal (2 Soldering Lugs)	DECAL—Volume	
CT1B01	CAPACITOR—Midset Trimmer 3-6 mmf (C11 on models using C50) (0.2-20 mmf)	BT2S04†	BOARD—Terminal (1 Soldering Lug)	DECAL—Tone	
CT1C00	CAPACITOR—Trimmer (C4, C5) (0.2-20 mmf)	BT2T00	BINDING POST—2 Term. (FM Ant.) (J2)	DECAL—Range	
CT1C01	CAPACITOR—Trimmer (C12) (4-75 mmf)	BT3S00†	BOARD—Terminal (3 Soldering Lugs)	DECAL—Tuning	
CV0D00	CAPACITOR—Variable C1	CI0C13†	CABLE—Dial Indicator (M6)	ESCUTCHEON—Dial	
LF0A00	COIL—RF Choke (L1)	CD0C14†	CABLE—Dial Tuning (M8)	GRILLE—Perforated Metal	
LF0A01†	COIL—RF Choke (L1)	CD0C22	CABLE—Dial Tuning Idler (M9)	RETAINDER—Spring (Dial Glass)	
LF0C00†	COIL—Filament Choke (L3)	CI2A08†	CORD—AC Line (M10)	CLIP—Ring Retainer (Control Knobs)	
LF0B00†	COIL—AM Oscillator (L5)	GR0S09†	CROMMET—Shock Mtg. (Rear, RF Chassis) (M11)	PULLP—(Door Handle)	
LF0P00†	COIL—FM Oscillator (L7)	GH0S10†	CROMMET—Shock Mtg. (Top, RF Chassis) (M12)	WASHER—Finishing (Back Cabinet)	
RC4D28†	RESISTOR—Comp 1500 ohm 2W (R28)	GR0S17	CROMMET—Shock Mtg. Chassis Main Chassis to Cabinet (M13)	CATCH & STRIKE—Bullet	
		HR0M18	BRACKET—Ant. Plug (M11)	GLIDES—Metal	
		HB0M22	BRACKET—Capacitor Support (M15)	HINGES—Door	
				HINGES—Lid	
				SUPPORT—Lid	
				PLUG (2 Contact) Speaker	
				PLUG (3 Contact) Antenna	
				KNOB—Control (Index) Dark Brown	
				KNOB—Control (Plain) Dark Brown	
				KNOB—Control (Plain) Dark Brown	
				FANFL—Felt	
				FANFL—Felt	
				SPACER—12" Rd P M	
				WASHER—Felt	
				STRIP—Fishpaper (Line & Audio Cord) 5/8 x 1 1/2 x .015	
				CABINET—Assy. (Bendix 68)	

CONDITIONS OF MEASUREMENTS
 LINE VOLTAGE 117A-C ZERO SIGNAL VOL & TONE CONT AT MIN SOCKET RESISTANCE
 VOLTAGE TO COMMON GROUND DC AT 20,000.0 Ω A.C. AT 1,000.0 Ω/V



NOTE: ALL CAPACITANCE IN WHOLE NUMBERS IN MMF AND ALL CAPACITANCE IN DECIMALS IN MF ALL RESISTANCE IN OHMS UNLESS OTHERWISE STATED
 K = 1,000 Ω

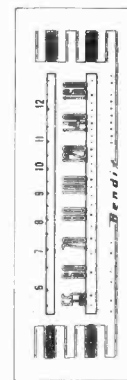
Loudspeaker — 12 inch PM
 Impedance at 400 cycles — 3.2 ohms
 Maximum Power Output — 5 watts

Record Changer
 Automatic, twelve 10-inch or ten 12-inch standard records

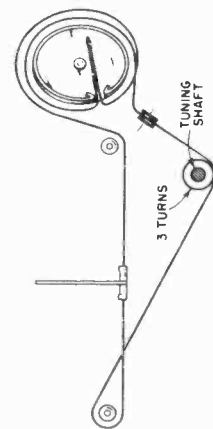
ALIGNMENT PROCEDURE

Connect line cord plug to 117 volt, 60 cycles AC power source. Set volume control at maximum clockwise position and tone control (R18) in counterclockwise position. Connect output meter across voice coil. Adjust dial pointer by turning tuning control fully counterclockwise and sliding dial pointer on dial cord until it is exactly over Reference Mark on dial back plate. (See Fig. 7.) Make all adjustments in order given in table and for maximum output. Keep input as low as possible at all times. Range switch in ST'D position except as noted in table. The dial back plate is marked as shown in Fig. 7 giving the tolerance at all alignment points called for in the ALIGNMENT CHART. Tuning gang tube fully open during alignment of I.F.

The builtin loop consists of approximately 4-3/4 turns of polyethylene covered wire, close wound, on a 14-5/16" x 22-5/16" frame. If loop is detached during alignment a 43 uh inductance must be connected across the loop terminals when adjusting the antenna trimmers on either the Standard Broadcast or Shortwave Band. If such an inductance is not connected across the loop



Control Layout



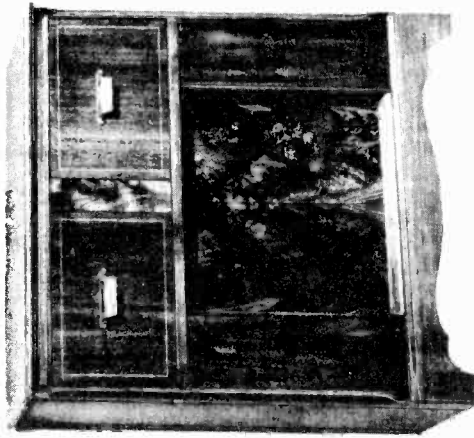
Dial Stringing Diagram

terminals, C4 (Broadcast Antenna Trimmer) and C2 (Shortwave Antenna Trimmer) must be adjusted after the chassis is installed in the cabinet and the builtin loop attached.

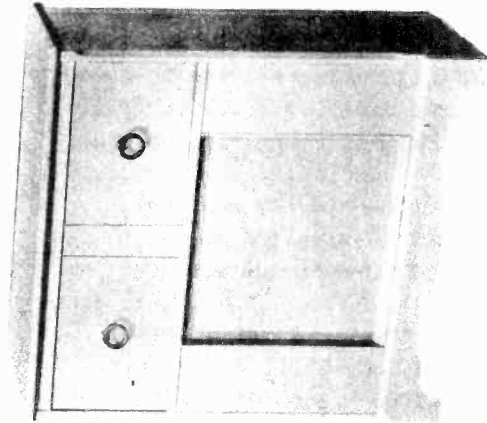
ALIGNMENT CHART

Circuit Aligned	Input Frequency	Adjustments
IF	*455 KCS	C22, C21, C17, C16
OSC	**580 KCS	C12
Broadcast	**1475 KCS	C11
RF	**1475 KCS	C8, C4
Broadcast	965 KCS	Check
+OSC	580 KCS	Calibration
+RF	**11 MCS	C13
Shortwave	**11 MCS	C2

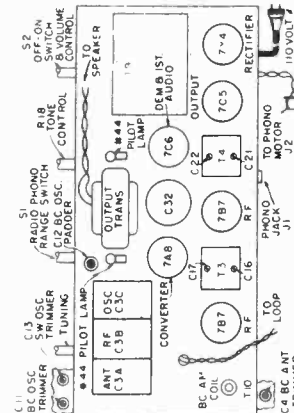
NOTE: Repeat above procedure until no further improvement can be made on any adjustments. Tuning gang rotor plates must be bent if tracking is not correct at 965 and 580 KCS check points.
 *Applied to antenna through .1 mfd. or less.
 **Applied to antenna through 50 mmf. or less.
 +Range switch in SW position.



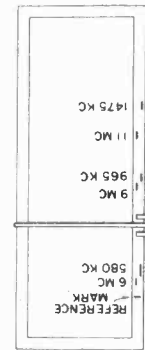
Model 1531 Mahogany



Model 1533 Wheat Mahogany

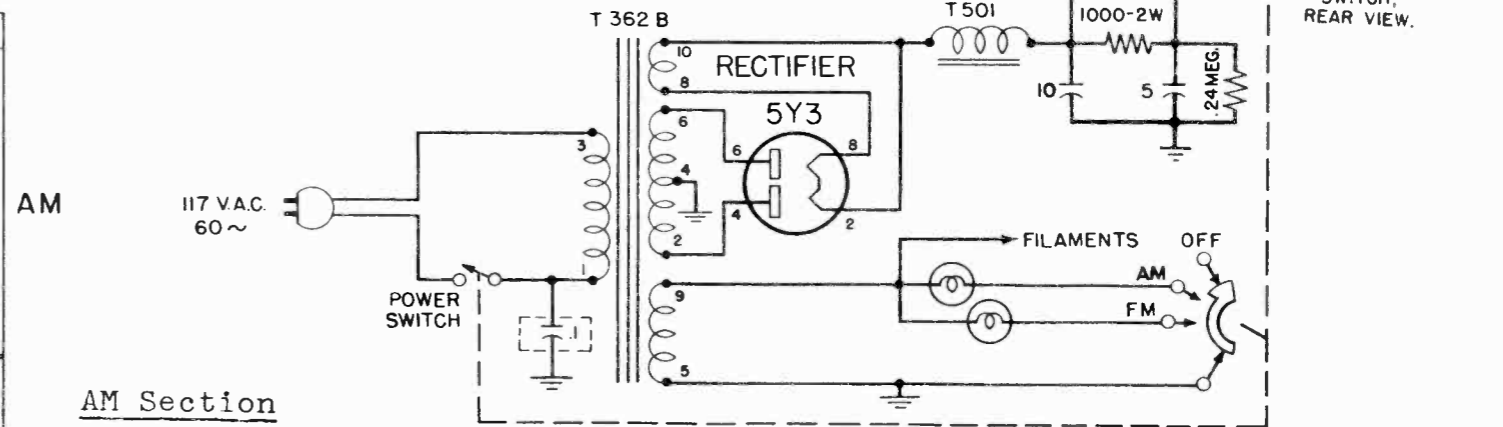
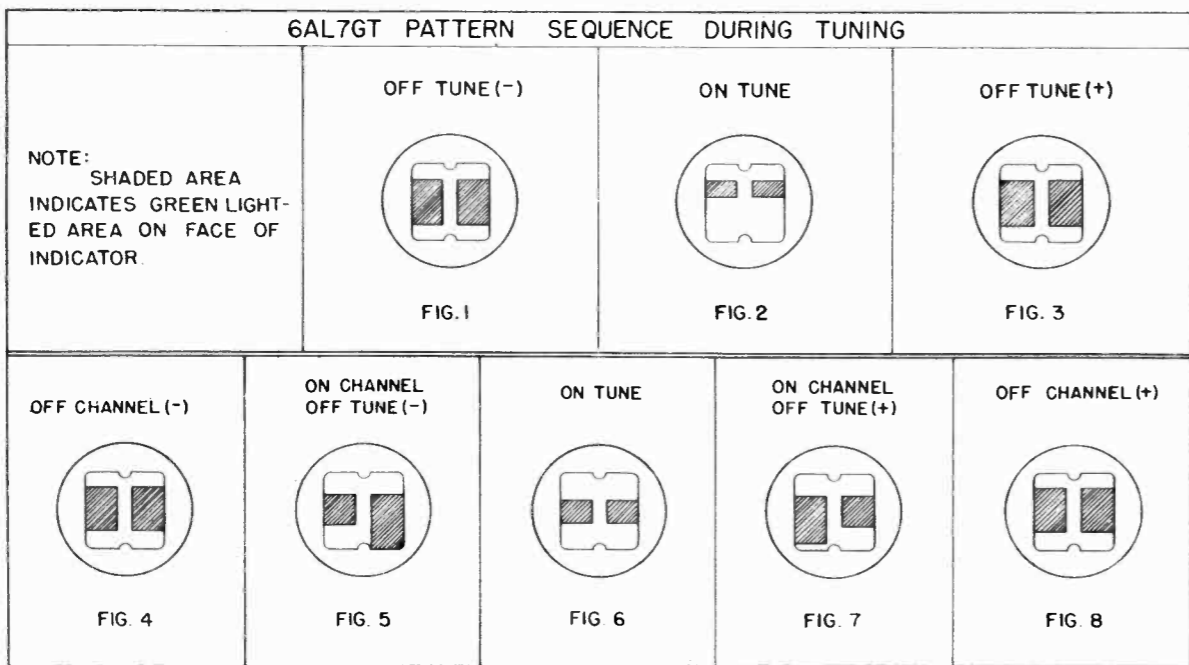
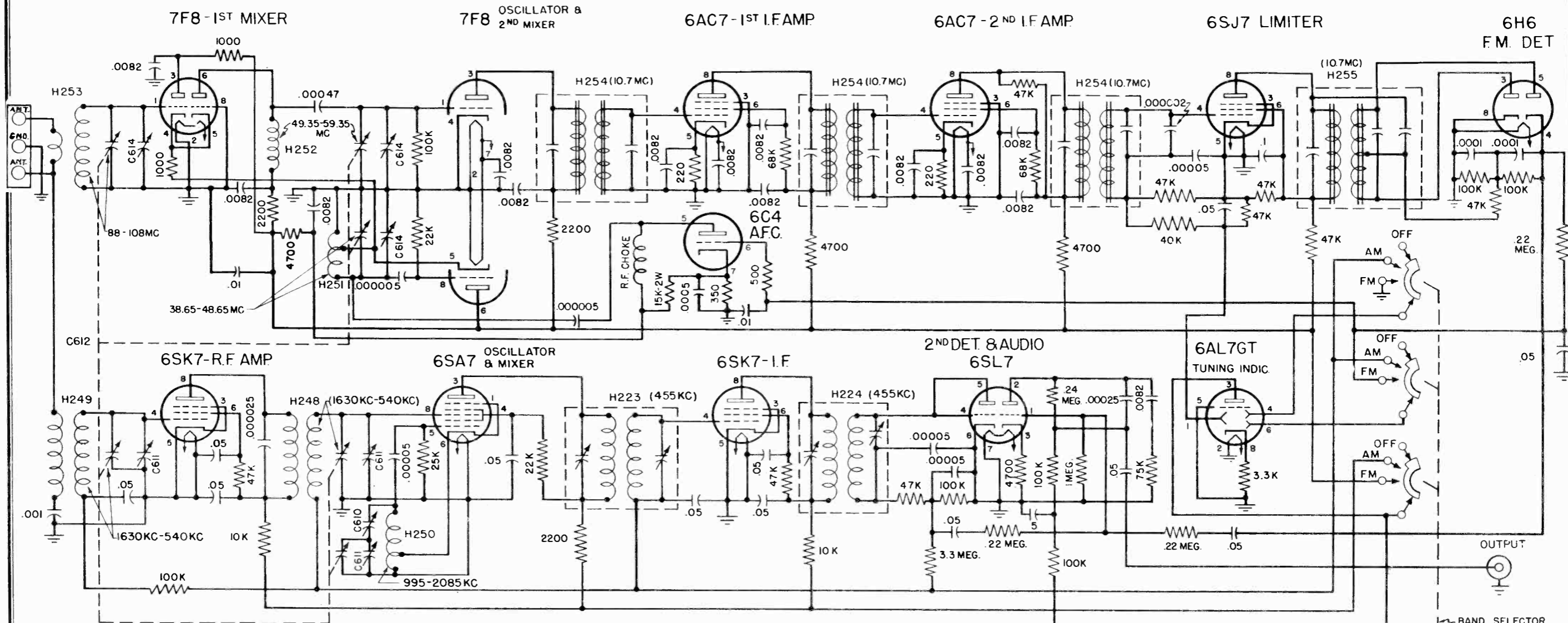


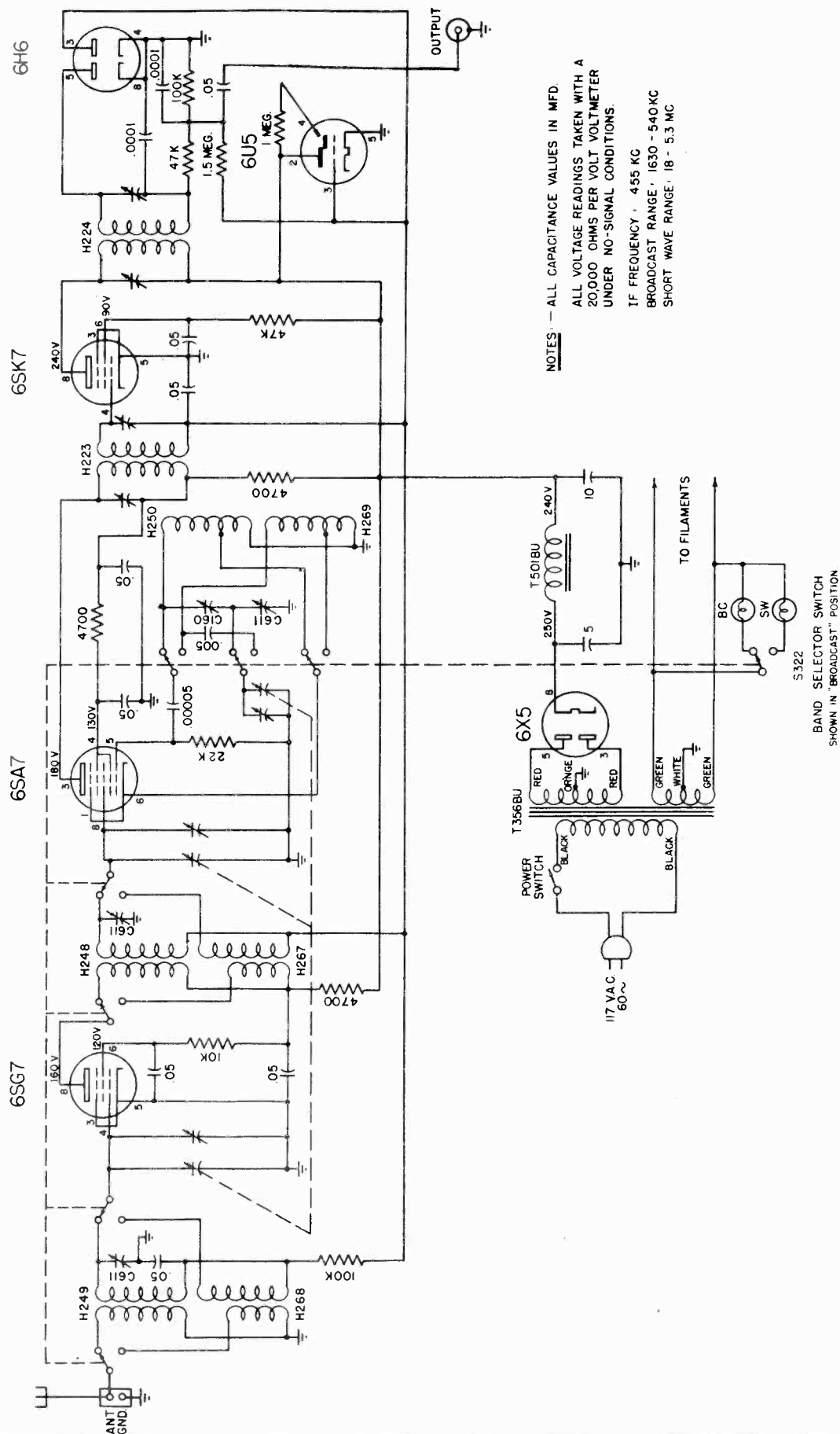
Trimmer Location Diagram



Dial Reference Marks

Stock Number	Description	Stock Number	Description
ELECTRICAL COMPONENTS		MECHANICAL COMPONENTS	
CC6A34	CAPACITOR-Ceramic 100 mfd 500v (C24).....	BT2S06 +	BOARD-2 Terminal.....
CE3A03 +	CAPACITOR-Electrolytic 20-20-40 mfd (C32).....	BT3S06 +	BOARD-3 Terminal.....
CE1T00 +	CAPACITOR-Electrolytic 25 mfd 25v (C30).....	BT4S06	BOARD-4 Terminal.....
CM5A14 +	CAPACITOR-Mica 47 mmf (C7).....	CD0C18	CABLE-Dial 52½".....
CM5A22 +	CAPACITOR-Mica 100 mmf (C10).....	CL2A08 +	CORD-A.C. Power.....
CM5A30 +	CAPACITOR-Mica 220 mmf (C5, 15, 28).....	GROS00 +	GROMMET-Tuning Gang Shockmtg.....
CP2T40 +	CAPACITOR-Paper .05 mfd 200v (C9, 20, 33).....	GROS16	GROMMET-Chassis Shockmount.....
CP4T31 +	CAPACITOR-Paper .01 mfd 400v (C18, 34).....	HBOM55	FRAME-Back Plate Top.....
CP4T36 +	CAPACITOR-Paper .03 mfd 400v (C26).....	HBOM63	BRACKET-Variable Capacitor Mtg...
CP4T40 +	CAPACITOR-Paper .05 mfd 400v (C8, 19, 27).....	HBOM64	BRACKET-Chassis Shockmount.....
CP6T12 +	CAPACITOR-Paper .002 mfd 800v (C35).....	HBOM65	BRACKET-Pointer Slide.....
CP6T18 +	CAPACITOR-Paper .005 mfd 600v (C37, 38).....	HBOM66	BRACKET-Lamp (L.H.).....
CP6T20 +	CAPACITOR-Paper .006 mfd 600v (C29, 31, 36).....	HBOM67	BRACKET-Lamp (R.H.).....
CT1A11 +	CAPACITOR-Trimmer 420-800 mmf (C12).....	HCOC00	CLIP-Coil Mtg.....
CT1A16	CAPACITOR-Trimmer (1.6-18 mmf) (C4).	HCOS00 +	CLIP-Hairpin Spring.....
CT2A06	CAPACITOR-Trimmer (C16, 17).....	HR0S01 +	RIVET-.171 x .083 Shoulder.....
CT2A07	CAPACITOR-Trimmer (4-70 mmf) (10-160 mmf) (C11, 13).....	HSOC00 +	SPRING-Dial Cord.....
CT2A08	CAPACITOR-Trimmer (10-160 mmf) (3-30 mmf) (C2 & C8).....	HSOF16	SPACER-Transformer Flat.....
CT3A00	CAPACITOR-Trimmer (20-150 mmf) (25-130 mmf) (C21, 22).....	HS6F00 +	SPACER-Flared Sleeve (Gang Mtg.).
CVOC06	CAPACITOR-Variable gaug (C3).....	IDOM13 +	INDICATOR-Dial.....
LAOB00 +	COIL-BC Ant. (T10).....	JR2009	RECEPTACLE-2 Contact Phono Power.
LAOC00 +	COIL-SW Ant. (T6).....	JR1S00 +	RECEPTACLE-Single Control Phono..
LOGB03	COIL-AM Oscillator (T8).....	MBOB00 +	BEARING-Tuning Shaft.....
LOGC00	COIL-SW Oscillator (T7).....	MPOI00 +	PULLEY-Dial Cord Idler.....
RC4D16	RESISTOR-Comp. 22 ohms 2w (R15)..	MSOT13	SHAFT-Tuning.....
RC4G30	RESISTOR-Comp. 3300 ohms 2w (R14)	PBOD02	PLATE-Dial Back.....
RC1H18 +	RESISTOR-Comp. 330 ohms ½w (R3)..	PBOD05 +	FRAME-Back Plate Bottom.....
RC1H26 +	RESISTOR-Comp. ½w (R24).....	PIOP01 +	PLATE-Line Cord Insulating.....
RC1H44 +	RESISTOR-Comp. 47K ½w (R4).....	SOOD02 +	SOCKET-Dial Light.....
RC1H51 +	RESISTOR-Comp. 100K ½w (R10,19)..	SO8L03 +	SOCKET-Loktal Tube.....
RC1H54 +	RESISTOR-Comp. 220K ½w (R6,11)..	XSOC08	STRIP-Copper .025 x ½ x 1-3/16.▲
RC1H58 +	RESISTOR-Comp. 470K ½w (R1,8,12)..	XSOZ02 +	STRIP-Fishpaper (line & audio)...
RC1H62 +	RESISTOR-Comp. 1 Meg ½w (R5,17,22)	<p>The Bendix models 1531 & 1533 radios incorporate the same model chassis. It is a six tube superheterodyne, two-band circuit, providing radio reception on the Standard AM Broadcast Band (540 to 1620 KC) and the 6 to 12 MC Shortwave Band. A high-impedance phono input jack is provided. The continually variable tone control is of the high frequency cut, bass boost, feed-back type. All six tubes are of the loktal type. One stage of tuned RF is provided on the Standard Broadcast Band. The built-in low-impedance loop antenna functions on both the Broadcast and Shortwave Bands. Better shortwave reception will of course be obtained by using a good outside antenna. A suitable binding screw for attaching such an antenna is provided on the rear of the cabinet.</p> <p>SPECIFICATIONS Power Requirements 105-125 volts, 60 cycles AC Power Consumption (including record changer) 75 watts Tuning Frequency Range Broadcast Band 540-1620 KCS Shortwave Band 6-12 MCS Intermediate Frequency — 455 KCS Tube Complement 2-7B7, 1-7A8, 1-7C6, 1-7C5, 1-7Y4 Two No. 44 dial lamps are used</p>	
RC1H66 +	RESISTOR-Comp. 2.2 Meg ½w (R16)..		
RC1H74 +	RESISTOR-Comp. 10 Meg ½w (R9)....		
RC3H10	RESISTOR-Comp. 68 ohms 1w (R20)..		
RC3H18	RESISTOR-Comp. 330 ohms 1w (R13)..		
RC3H80	RESISTOR-Comp. 22K, 1w (R23).....		
RC3H88	RESISTOR-Comp. 47K, 1w (R2).....		
RV4C00 +	POTENTIOMETER-Tone (R18).....		
RV4S10 +	POTENTIOMETER-Volume (R21 & S2)..		
SPIR01 *	SPEAKER-12" Rd. P.M.....		
SR3E01	SWITCH-Rotary 2 Pole - 3 Position (S-1).....		
TA0011	TRANSFORMER-Output (T5).....		
TI0C02	TRANSFORMER-IF Input (T3).....		
TI0D13	TRANSFORMER-IF Output (T4).....		
TPOF02	TRANSFORMER-Power (T9).....		
TRGL07	TRANSFORMER-R.F. Interstage (T2).		
#44	* LAMP-Bayonet Base.....		





NOTES - ALL CAPACITANCE VALUES IN MFD.
 ALL VOLTAGE READINGS TAKEN WITH A
 20,000 OHMS PER VOLT VOLTMETER
 UNDER NO-SIGNAL CONDITIONS.
 I.F. FREQUENCY - 455 KC
 BROADCAST RANGE - 1630 - 540 KC
 SHORT WAVE RANGE - 18 - 5.3 MC

BAND SELECTOR SWITCH
 SHOWN IN "BROADCAST" POSITION

Input Voltage: 117 volts

Power Frequency: 60 cycles

Range: 540 KC to 1630 KC and 5.3 MC to 18 MC.

Intermediate Frequency: 455 KC

Tubes: Total, 6: 1-6SG7, 1-6SA7, 1-6SK7, 1-6H6, 1-6U5,
 1-6X5

Output: The output matches a high impedance phonograph line.

Installation: Connect an antenna and ground to the terminals
 marked "ANT" and "GND". From the audio output jack, connect
 with a single conductor shielded wire (to reduce the possibil-
 ity of hum pickup) to the amplifiers.

Aligning Instructions: Allow tuner to warm up for 10 minutes
 before aligning.

I.F. Alignment:

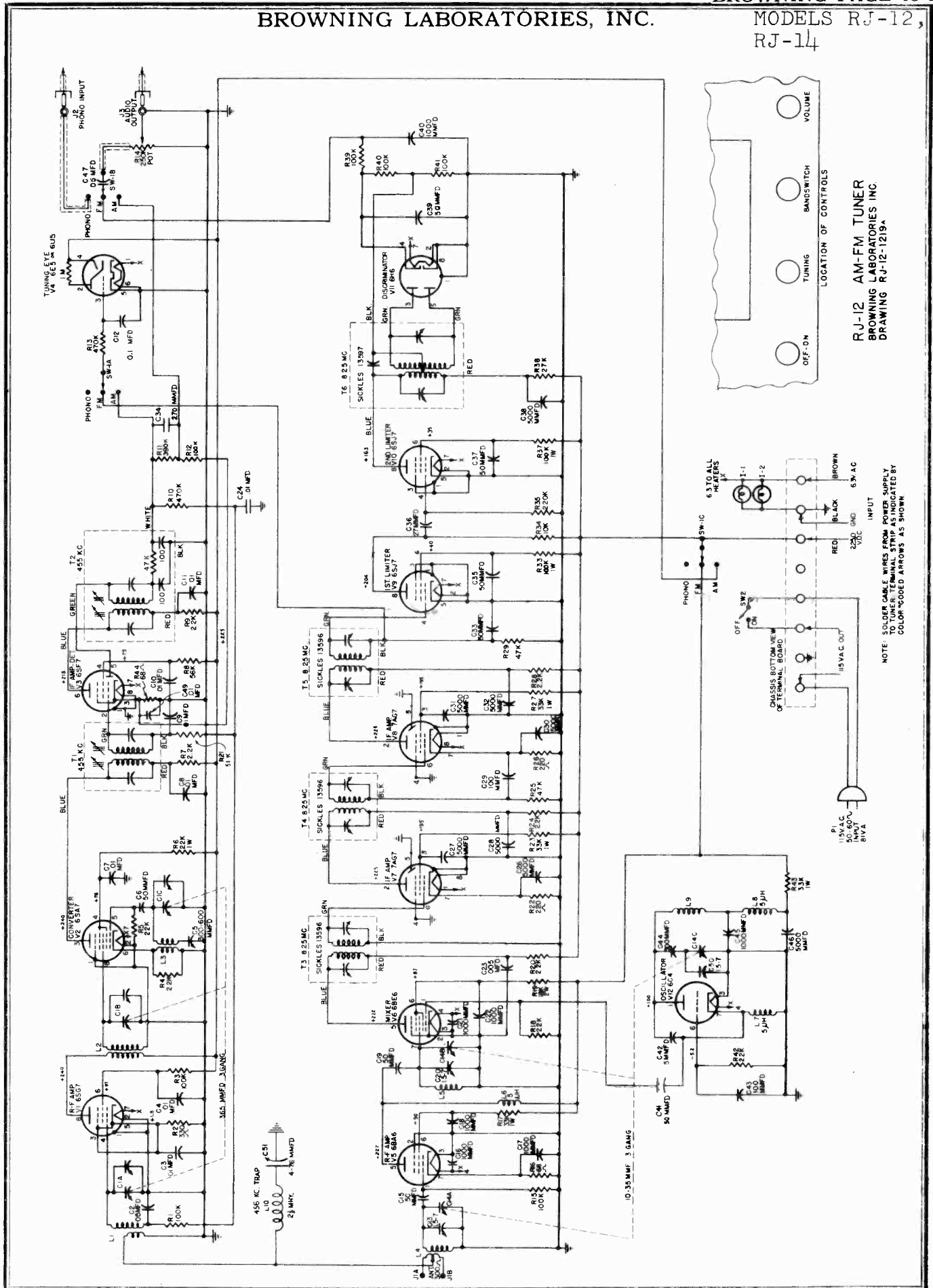
- 1- Connect the test oscillator output to R.F. section of var-
 iable condenser.
- 2- With "Band Selector Switch" in "Broadcast" position turn
 station selector to 540 KC.
- 3- Tune test oscillator to 455KC and adjust its output so that
 the tuning indicator tube starts to close.
- 4- Adjust the I.F. trimmers for the narrowest shadow in the
 tuning eye, readjusting the oscillator output as necessary.

Short Wave Band Alignment:

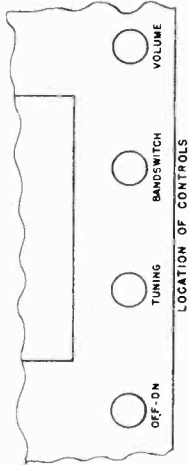
- 1- Connect the test oscillator output to the "ANT" and "GND"
 terminals of the tuner.
- 2- Set both the test oscillator and tuner dials to 18 MC.
- 3- Make certain that the tuner's variable condenser plates
 are fully open when the dial pointer is at 18 MC.
- 4- Adjust trimmer on the oscillator section of the variable
 condenser for minimum shadow in tuning indicator.
- 5- Set both test oscillator and tuner dials to 16 MC.
- 6- Adjust trimmers on the Antenna and R.F. sections of the var-
 iable condenser for minimum shadow in tuning indicator.

Broadcast Band Alignment:

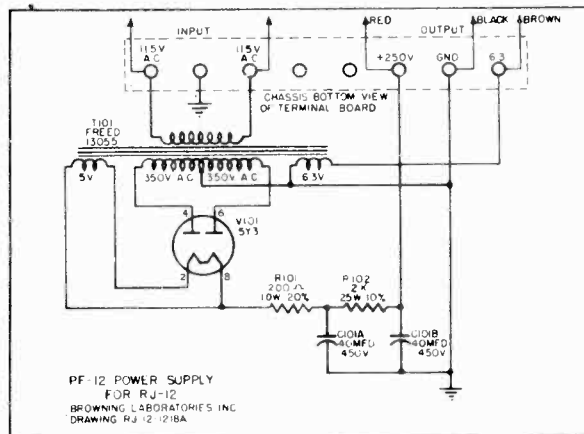
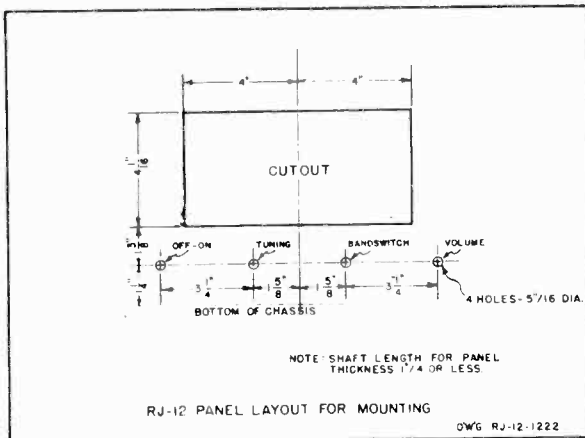
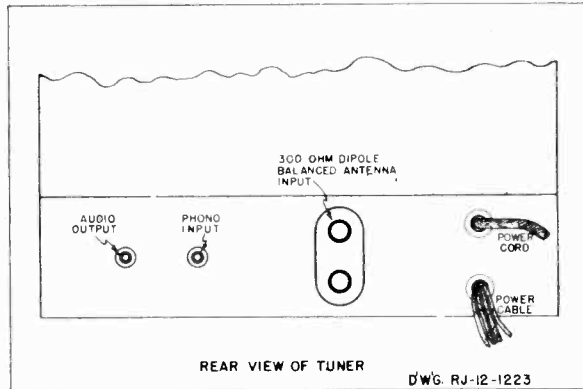
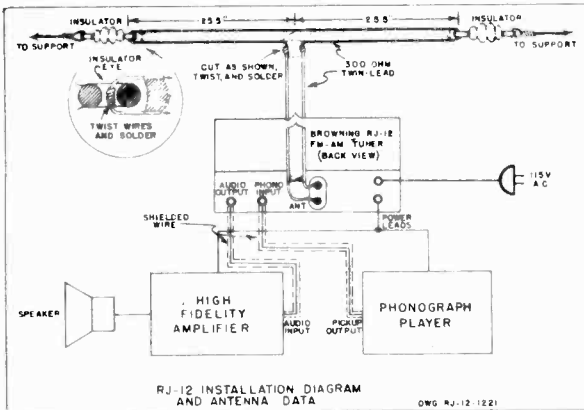
- 1- Put "Band Selector Switch" in the "Broadcast" position.
- 2- Set both the test oscillator and tuner dials to 540 KC.
- 3- Adjust padder condenser for minimum shadow in indicator
 tube.
- 4- Set both the test oscillator and tuner dials to 1630 KC.
- 5- Make certain that the tuner's variable condenser plates
 are fully open when the dial pointer is at 1630 KC.
- 6- Adjust "broadcast" trimmer of oscillator for minimum shad-
 ow in tuning indicator.
- 7- Set both test oscillator and tuner dials to 1400 KC.
- 8- Adjust "Broadcast" trimmers of antenna and R.F. circuit
 for minimum shadow in indicator tube.
- 9- Set both the test oscillator and tuner dials to 600 KC.
- 10- Readjust padder condenser for minimum shadow in indicator
 tube
- 11- Set both the test oscillator and tuner dials to 1400 KC.
- 12- Readjust "broadcast" trimmers of antenna and R.F. circuit
 for minimum shadow in indicator tube.



RJ-12 AM-FM TUNER
BROWNING LABORATORIES INC.
DRAWING RJ-12-1219A



NOTE: SOLDER CABLE WIRES FROM POWER SUPPLY TO TUNER TERMINAL STRIP AS INDICATED BY COLOR-CODED ARROWS AS SHOWN.



F-M CHANNEL NUMBERS

The table below gives the frequencies for the even-numbered F-M channels. The intervening ones can be obtained by adding or subtracting 0.2 MC., which is the spacing between channels.

No.	MC.	No.	MC.	No.	MC.	No.	MC.
201	88.1	226	93.1	250	97.9	276	103.1
202	88.3	228	93.5	252	98.3	278	103.5
204	88.7	230	93.9	254	98.7	280	103.9
206	89.1	232	94.3	256	99.1	282	104.3
208	89.5	234	94.7	258	99.5	284	104.7
210	89.9	236	95.1	260	99.9	286	105.1
212	90.3	238	95.5	262	100.3	288	105.5
214	90.7	240	95.9	264	100.7	290	105.9
216	91.1	242	96.3	266	101.1	292	106.3
218	91.5	244	96.7	268	101.5	294	106.7
220	91.9	246	97.1	270	101.9	296	107.1
222	92.3	248	97.5	272	102.3	298	107.5
224	92.7	250	97.9	274	102.7	300	107.9
226	93.1			276	103.1		

BROWNING LABORATORIES, INC.

MODELS RJ-12,
RJ-14

Designed for high-fidelity reception in the new high frequency FM band as well as quality reception in the standard AM broadcast band, the Browning Universal FM-AM Tuner Model RJ-12 is primarily intended for those who wish to build radio sets into bookcases, drawers, shelves, walls, or cabinets. Its extreme sensitivity and high fidelity are not exceeded in the most expensive of commercial home radios. The Model KJ-14 is the RJ-12 mounted on a rack panel for laboratory and special uses. Employs Major Armstrong's circuit on FM.

INSTALLATION:

In mounting the unit, due consideration must be given to ventilation. Approximately 65 watts of heat must be dissipated. Position of mounting of the unit is unimportant.

The loudspeaker used should, for best results, be located a few feet from the RJ-12 and the audio amplifier. If the speaker is in the same cabinet with the tuner and audio amplifier, placing these latter two units on felt or rubber padding may improve the quality of reception.

The following components are necessary to complete a radio receiving system with the RJ-12: a high-fidelity audio amplifier, loudspeaker, antenna, and a power supply. The power supply may be omitted if the audio amplifier can provide the proper voltages and currents.

Any high quality audio amplifier and loudspeaker should work satisfactorily with the RJ-12 tuner. The audio gain should be such that an input voltage of 0.1 volt will provide ample volume.

The tuner is designed for maximum performance when used with a 300 ohm FM antenna. Most any commercial FM antenna having this impedance should work satisfactorily. It is important that no part of the antenna system be grounded, because of the balanced feed required on FM operation. On AM operation the entire antenna and feeder system act as the antenna. The antenna system should be located as high as possible. For those who wish to build their own, a drawing has been provided to furnish the necessary information.

Shielded leads from the tuner to the amplifier and also from the phonograph pickup to the female connectors in the rear of the RJ-12 chassis are essential. The two male connectors will be found plugged into the female connectors in the RJ-12 and several feet of shielded wire is packed with each tuner. Since individual installations will vary, this wire is uncut and not attached to the male connectors.

When making up the cables, the center conductor should be stripped and tinned, inserted in the center sleeve of the male connector, and heated until the solder flows making a good joint. Bring the braid up on the outside shell of the plug and solder all the way around.

There are some cases where the shield on the lead between the audio output of the RJ-12 and the amplifier employed may not be a sufficient ground bond between the two. In cases where there is any hum (not present in the audio amplifier itself), try bonding the RJ-12 chassis to the audio amplifier with copper braid or number 16 or larger wire.

Power requirements for the RJ-12 tuner are 250 volts DC at 65 milliamperes and 6.3 volts AC or DC at 4 amperes. Often times these voltages can be made available from the audio amplifier. If these voltages are not available, a separate power supply should be provided such as the Browning Model PF-12, a schematic diagram of which is shown.

OPERATION:

After proper installation, the set may be put into operation by turning the ON-OFF switch clockwise; the dial should be immediately illuminated. Within a minute of warming up, the tuning eye should emit a bright green glow. The set is ready for operation on AM. Allow a 10 minute warm-up period for FM.

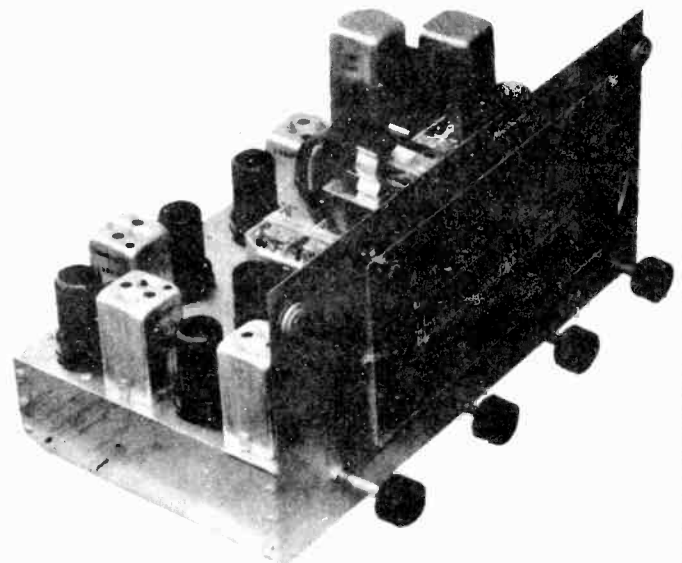
AM or FM reception can be selected by the AM-FM-PHONO switch. Starting with the band switch knob in the farthest counter-clockwise position and rotating clockwise gives AM-FM-PHONO reception. Rotate the TUNING knob to select the desired station. As the tuning approaches the station, the tuning eye will gradually close. Correct tuning is indicated by maximum eye closing. Increase the volume to the desired level by rotating the VOLUME knob clockwise. In tuning in FM stations, always tune for the complete elimination of noise. In cases where the signal strength of the FM station is too low to saturate the dual limiter, some background noise may be expected.

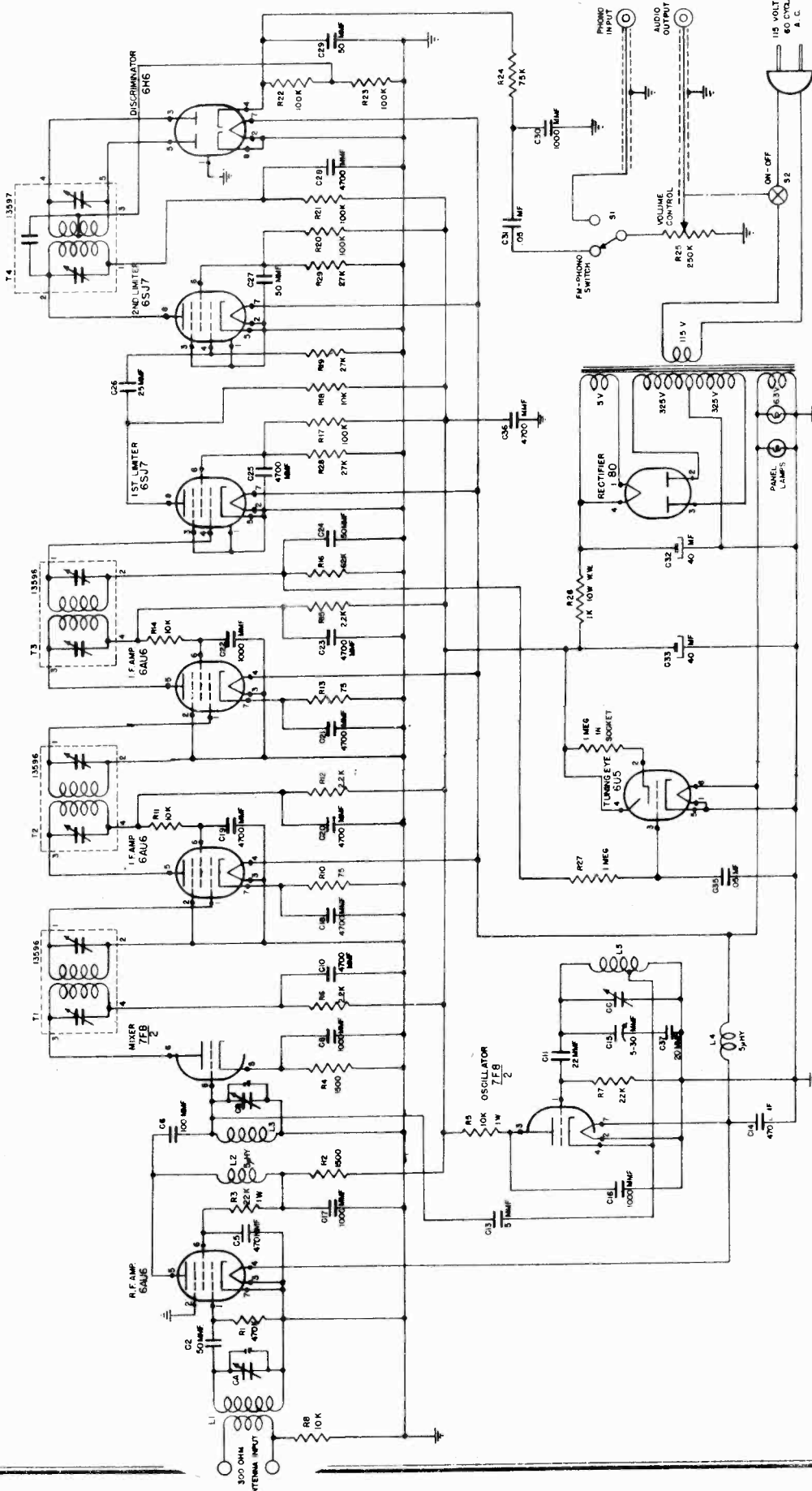
For those who wish to incorporate phonograph connections to the tuner, a phono input connector is provided at the rear of the chassis. By turning the selector switch to the PHONO position, the phonograph input is connected to the amplifier through the VOLUME control; thus eliminating a separate volume control for phonograph operation.

It should be noted that while tuning between stations, both on FM and AM, the rushing noise is normal for the tuner. The extreme high sensitivity is responsible for picking up random atmospherics, but this will be eliminated when a station is tuned in unless the signal strength of the station is of the same order of magnitude as that of the atmospheric noise.

ADJUSTMENT:

No adjustment should be made on the tuner aside from the panel controls. Adjustments and alignment on the FM portion should only be made by experienced personnel with the proper visual alignment equipment. Ordinary meters or aural methods are in general unsatisfactory for alignment. Replacement of tubes can usually be made without realignment.





MODEL RV-10 FM TUNER
BROWNING LABORATORIES, INC.
WINCHESTER, MASS. U.S.A.

DWG NO. RV-10-1703

BROWNING LABORATORIES, INC.

MODELS RV-10,
RV-11

ALIGNMENT PROCEDURE:

The following equipment is recommended for alignment of these models:

1. Standard signal generator.
2. FM signal generator capable of sweeping at least 200 kc. at 8.25 mc.
3. Oscilloscope.
4. Voltmeter of 20,000 ohm/volt or better.

RV-10 IF ALIGNMENT:

Visual Method: To align the IF section of the tuner using the visual method, connect the sweep voltage output of the frequency-modulated signal generator to the horizontal deflection input of the oscilloscope, and adjust the controls until the horizontal sweep nearly fills the screen. Adjust the FM signal generator to sweep from about 8.0 to 8.4 mc., and apply the output to the grid of the second IF stage. Connect the vertical deflection input of the oscilloscope across C24 in the grid circuit of the first limiter. The rectifying action of the grid circuit of this stage will provide a signal corresponding to the amplitude response of the preceding circuits. Adjusting the controls of the scope should produce a picture of the response curve. Always use as small a signal from the generator as possible consistent with a good image. In order to provide a frequency marker for alignment, apply a signal of exactly 8.25 mc. from the AM signal generator to the same grid where the FM signal is applied. This is best done by using a small mica isolation condenser in series with the 8.25 mc. source. Adjust the amplitude of the 8.25 mc. AM signal until a small marker pip appears on the response pattern, as shown in Fig. 7. Use only enough marker voltage in all cases so that the pip is just discernible. The location of this marker pip on the curve indicates the center alignment frequency of the amplifier. The adjustment screws of T3 should now be set for the desired characteristic. In all cases, the marker pip should be left at the center or axis of symmetry of the curve. Adjustment of the screws will produce varied patterns. For guidance, the curves of typical misalignment and proper alignment are shown in Fig. 7. Greater amplitude of the pattern indicates higher gain, so adjustments should be made not only for best symmetry but for optimum gain as well. Having adjusted T3 in this fashion, the output from the signal generators must now be applied to the grid of the first IF amplifier. Next, T2 should be adjusted in the same manner. Signal generator outputs should be reduced as a stage of gain has been added. When T2 is aligned satisfactorily, apply the signal

generators to the grid of the mixer tube. Align T2 for the best possible response curve. The pattern appearing on the screen at this point is the overall response of the whole IF amplifier and should be similar to that shown in Fig. 7 for proper alignment before going on to align the discriminator.

Meter Method: Satisfactory alignment can be made using only an AM signal generator and a high impedance DC voltmeter by the following method, although it is considerably more time-consuming than the visual procedure. The meter should have an impedance of at least 20,000 ohms per volt, and be capable of reading negative DC voltage of approximately 3 volts. Connect this meter across C24 in the grid circuit of the first limiter, with the ground side of the meter going to the grounded side of the condenser. The tuning eye employed in the tuner can be used for indicating maximum response. However, this is not as satisfactory as a meter. Apply the output of the AM signal generator to the control grid of the second IF amplifier tube. Set the signal generator to 8.25 mc. When making these adjustments, always use an input signal level which results in meter readings of from 1 to 2 volts.

Adjust the screws on T3 for maximum meter reading. The frequency of the signal generator should be changed in steps of 20 or 30 kc. above and below 8.25 mc., and the readings noted in order to determine if the curve is symmetrical about the 8.25 mc. center frequency. If the results show that the curve is not symmetrical, further adjustments must be made and rechecked until a well-balanced curve results. When checks show the desired result, apply the signal to the grid of the first IF stage. Tune transformer T2 in the manner prescribed for T3. When this has been accomplished, transfer the AM signal generator to the grid of the mixer.

FM DISCRIMINATOR ALIGNMENT:

Visual Method: Alignment of the discriminator is easy with the visual method. Apply the output of the frequency-modulated generator to the grid of the first limiter. Apply a signal from the AM generator at 8.25 mc. to the same point. Connect the vertical input of the oscilloscope across C29 in the output of the discriminator. Make certain that the ground of the oscilloscope goes to the ground side of this condenser. Adjust the controls for the best image, using as small RF signals from both generators as practical. Alignment must be made for symmetry about the 8.25 mc. marker pip, and linearity above and below this point as shown in Fig. 8.

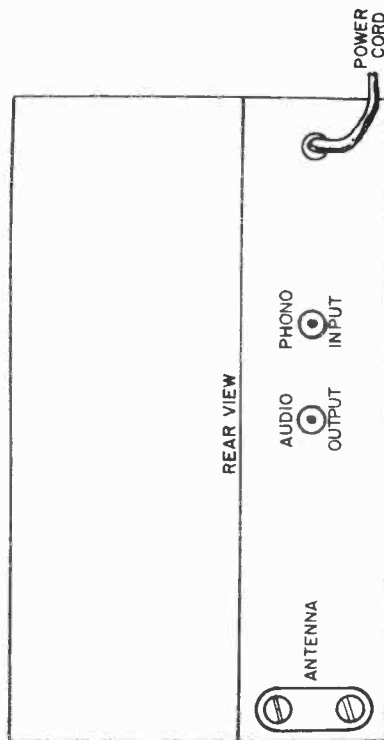
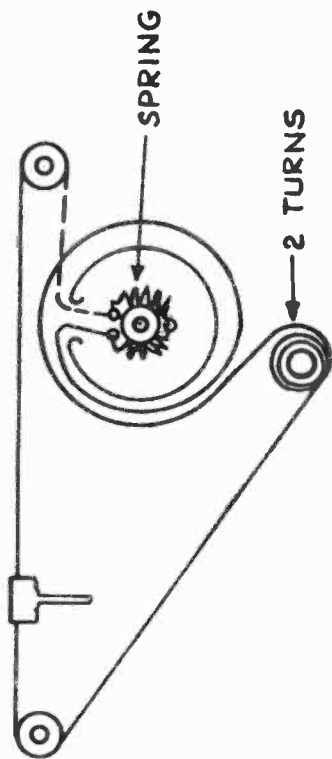
BROWNING LABORATORIES, INC. MODELS RV-10, RV-11

Meter Method: When only a meter and AM signal generator are available, connect the output of the generator to the grid of the first limiter, and a vacuum tube voltmeter, reading plus or minus DC voltage of about 2.0 volts, across C29 in the discriminator output. Set the frequency of the signal generator to exactly 8.25 mc. Adjust the secondary of the discriminator until the meter reads zero. Change the frequency of the generator in 20 kc. steps above and below 8.25 mc., and note the voltage generated at each step. Readings should increase linearly each side of center frequency out to 75 kc. Should more voltage be generated on one side than the other, adjust the primary of this transformer and recheck. A number of trials and checks should result in a curve very similar to that shown in Fig. 8.

FM RF ALIGNMENT: To align the RF portion of the tuner, a signal generator covering 88 to 108 mc. and a DC meter having an impedance of at least 20,000 ohms per volt and capable of reading 3.0 volts are required. Apply the signal generator to the antenna terminals and connect the meter across C24 in the first limiter. Set the signal generator at 108 mc. and set the tuner dial to the same frequency. Adjust the HF Osc. Trimmer (on top of chassis at rear of variable condenser) until the signal is heard or the meter indicates maximum voltage. Set the tuner dial at 90 mc., and the signal generator to correspond. With a non-conducting rod, compress or expand the oscillator inductance as needed to tune in the signal. Return the generator and dial to the high-frequency end and recheck. Readjust the trimmer if necessary. Adjustments of the inductance and trimmer are interacting, and several adjustments of each may be required for exact alignment. Reset the signal generator and tuner dial to 108 mc. Rock the tuning for maximum voltage indication on the meter. Adjust the signal level as necessary to maintain the voltage at less than 2.0 volts. Adjust the "RF Trimmer" (trimmer on the center section of variable) for highest meter reading. Set the generator and dial to 90 mc. and rock the tuning for highest meter reading. Adjust the RF coil inductance with the non-conducting rod for best gain. Here again, several adjustments at both ends of the band will be necessary for the best alignment since adjustment at the one end will affect tuning at the other. The antenna circuit can simply be trimmed at the high frequency end of the band and left, since the application of antenna or signal generator to the antenna terminals severely damps this circuit and the tuning is not critical. When this adjustment has been made, the tuner is completely aligned.

DIAL STRINGING CHART:

NOTE: Remove dial plate to make pulleys and drum accessible.



In most cases, the shield braid will provide sufficient ground between tuner and amplifier. In infrequent cases, some hum may be encountered which can be cured by connecting the amplifier chassis to the tuner chassis with a piece of heavy copper braid. The hum level out of the tuner is very low and the hum experienced will generally be found in the amplifier used or in the method of connection to the tuner.

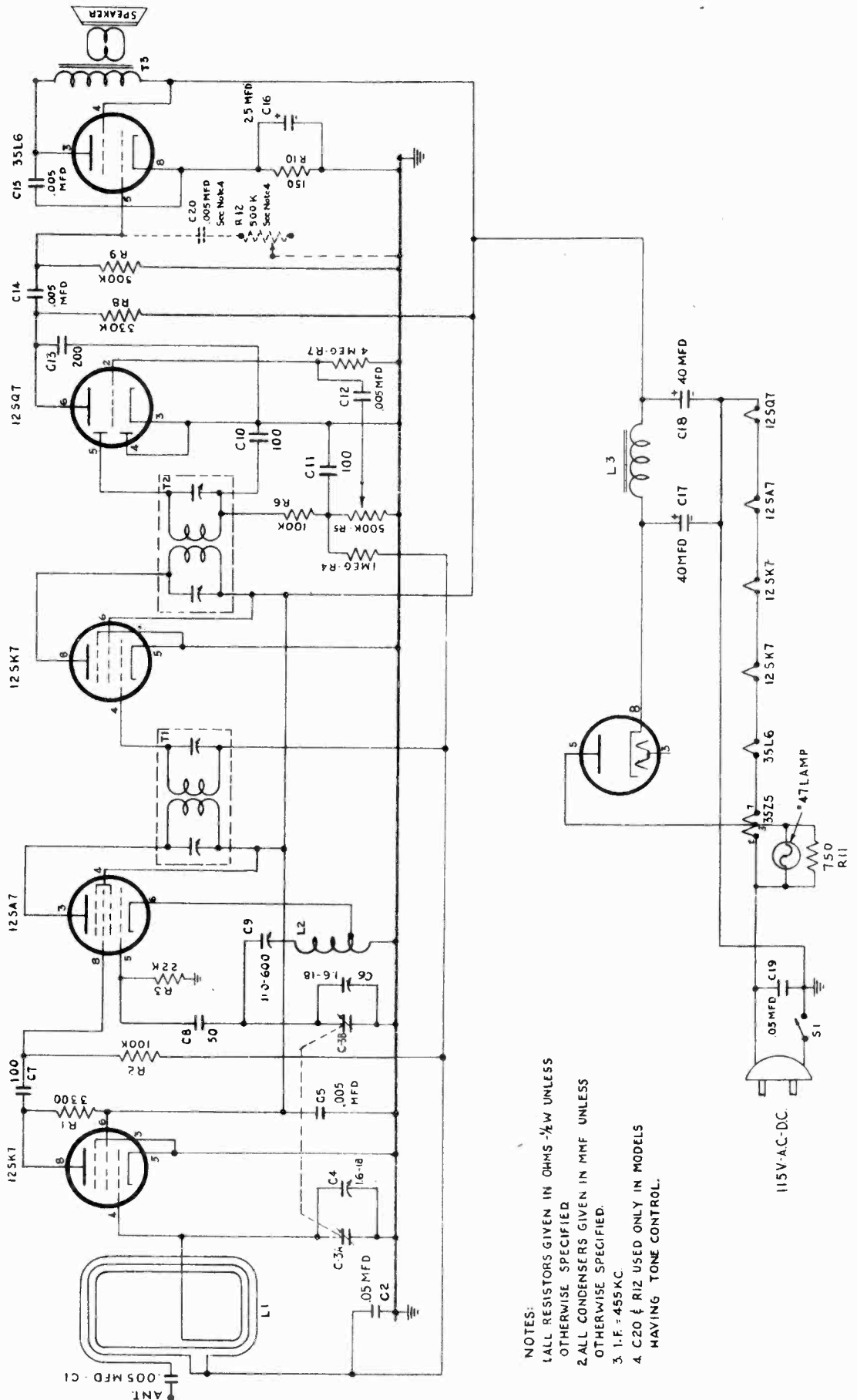
The tuner is designed for best performance with a 300 ohm FM antenna. Many such antennae are commercially available and should produce good results. Signal strength increases as the height of the antenna is increased, therefore, the antenna should be erected in the highest possible location. Losses in lead-in up to 75 ft. in length are unimportant. For those who wish to build their own antenna, dimensions are given on the drawing. The folded dipole shown gives good results over the entire band. It possesses a directional pickup pattern and should be oriented broadside toward the station of most interest or most difficult to receive.

Shielded leads from tuner to amplifier and from phono pickup to tuner are essential. Two male connectors will be found plugged into the female connectors in the RV-10 and eight feet of shielded wire is packed with each unit. Since individual requirements vary, this wire is supplied uncut and not attached to the male connectors.

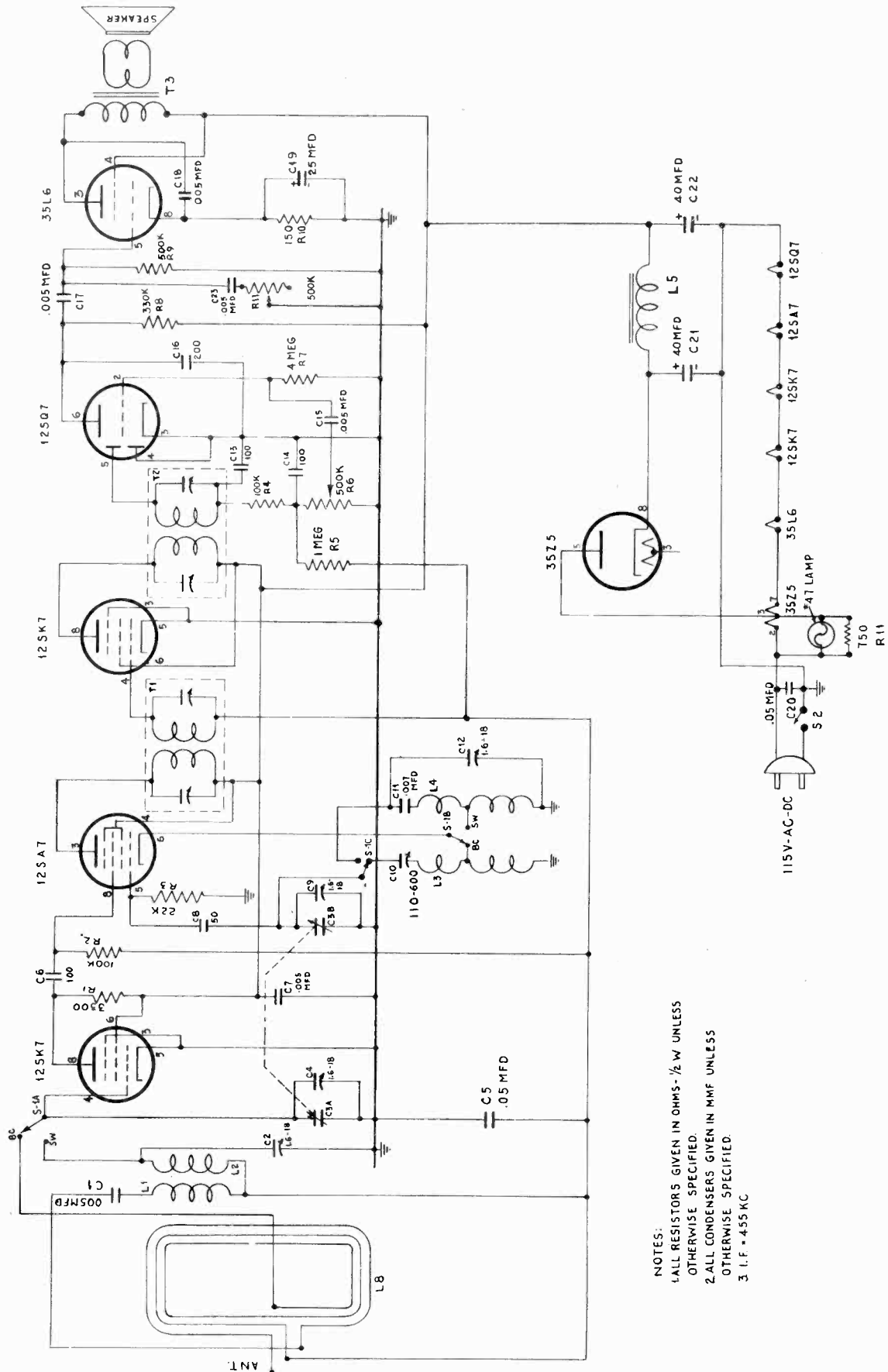
When making up the cables, the center conductor should be stripped of insulation and tinned, inserted in the center sleeve of the male connector, and heated until the solder flows making a good joint. Bring the braid up on the outside shell of the plug and solder all the way around.

CAPITOL RADIO CORPORATION

MODEL UN61



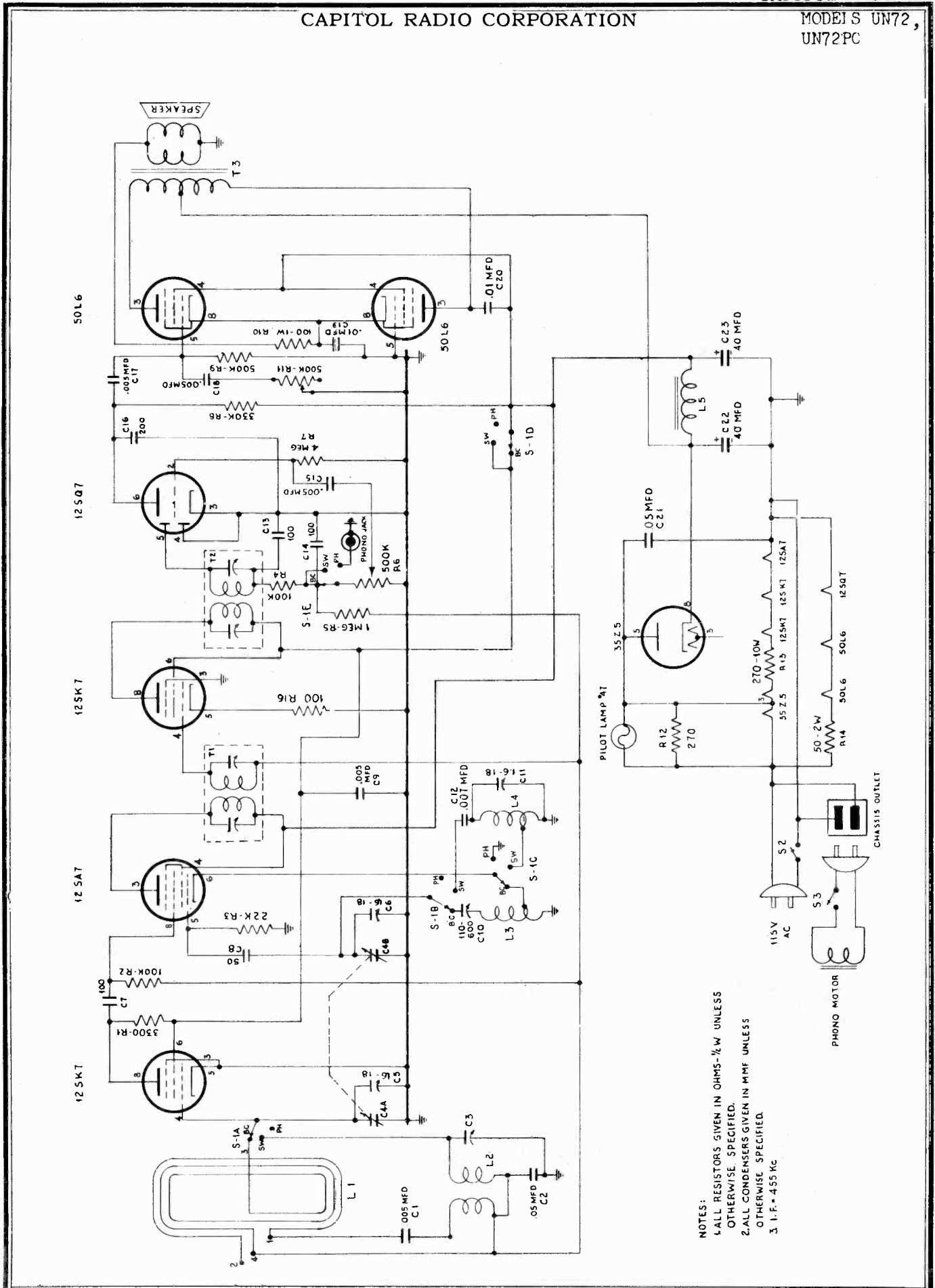
- NOTES:
1. ALL RESISTORS GIVEN IN OHMS - $\frac{1}{2}$ W UNLESS OTHERWISE SPECIFIED.
 2. ALL CONDENSERS GIVEN IN MMF UNLESS OTHERWISE SPECIFIED.
 3. 1-F = 455 KC.
 4. C20 & R12 USED ONLY IN MODELS HAVING TONE CONTROL.



NOTES:
 1. ALL RESISTORS GIVEN IN OHMS - 1/2 W UNLESS OTHERWISE SPECIFIED.
 2. ALL CONDENSERS GIVEN IN MMF UNLESS OTHERWISE SPECIFIED.
 3. I. F. = 455 KC

CAPITOL RADIO CORPORATION

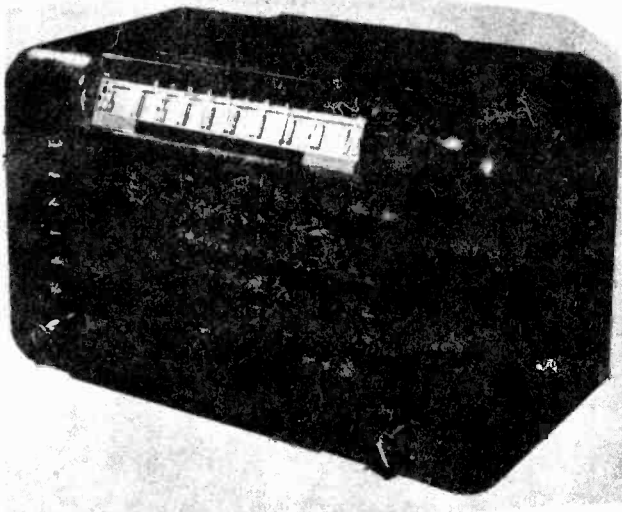
MODEL S UN72,
UN72PC



NOTES:
 1-ALL RESISTORS GIVEN IN OHMS- $\frac{1}{2}$ W UNLESS OTHERWISE SPECIFIED.
 2-ALL CONDENSERS GIVEN IN MMF UNLESS OTHERWISE SPECIFIED.
 3 I. F.-455 Kc

CAPITOL RADIO CORPORATION

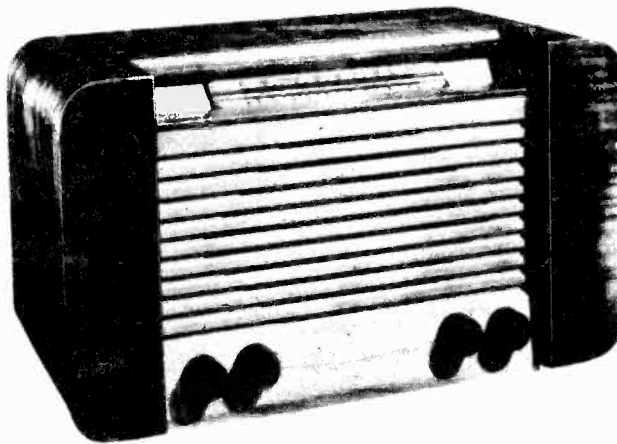
MODELS UN61,
UN72, UN72PC



MODEL UN-61 "MUSIC MASTER"

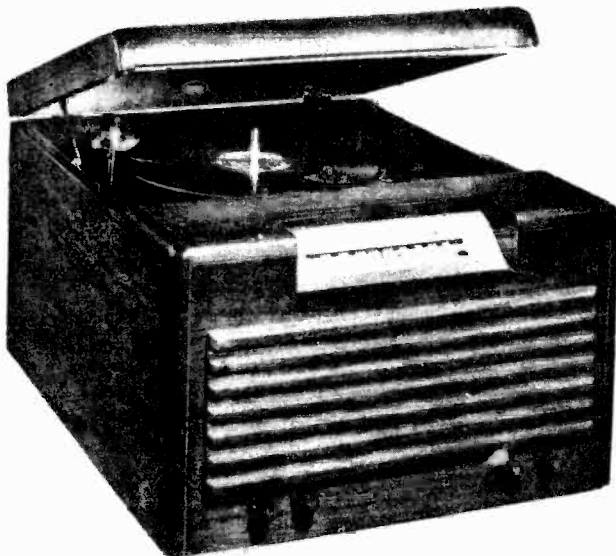
6 tube AC-DC broadcast band, R.F. stage, Iron core I.F. coils, High Q. shielded loop, 1.47oz. Alnico 5 permanent magnet, 5" speaker, A.V.C.

MODEL UN-72

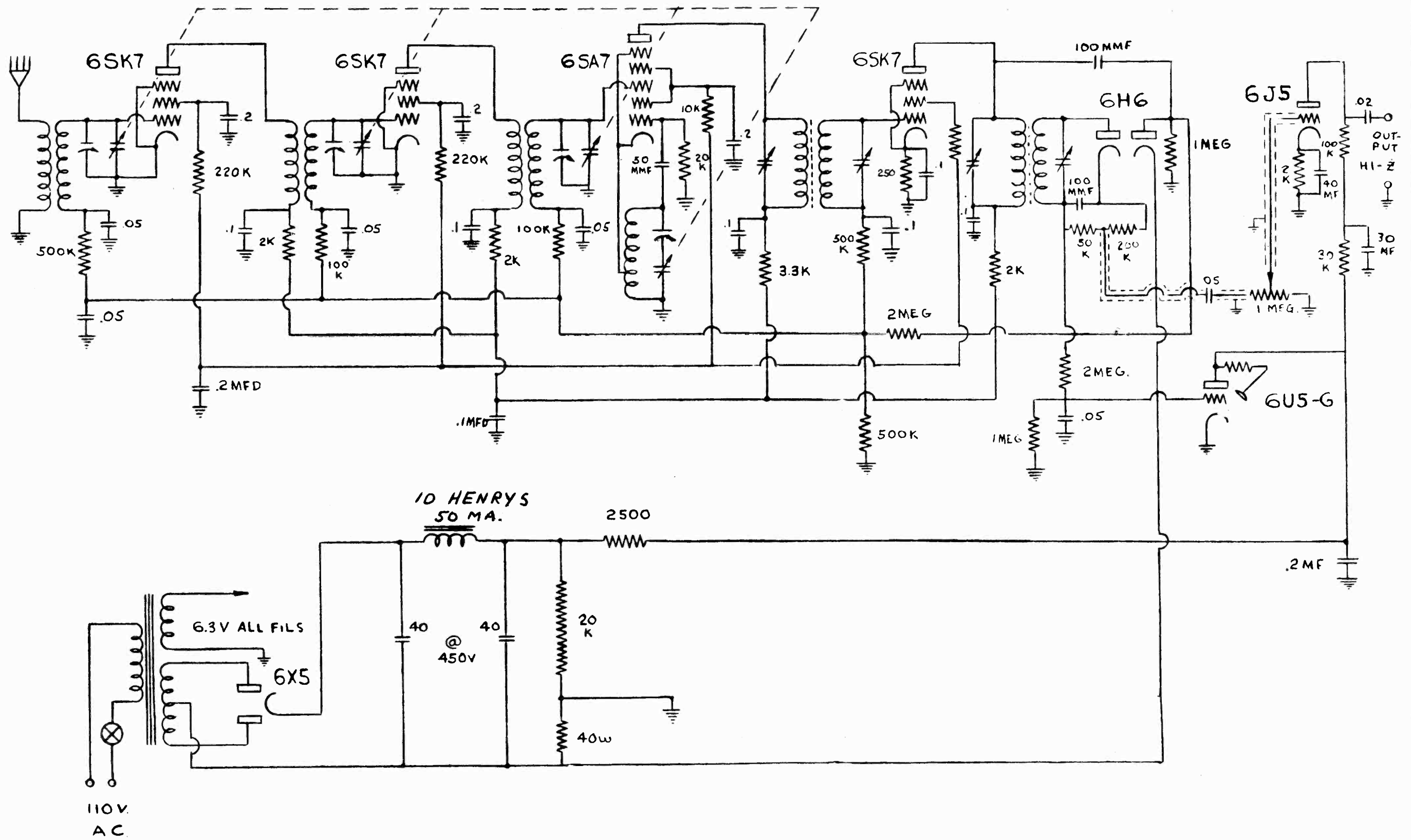


"HIGH FIDELITY SYMPHONIC"

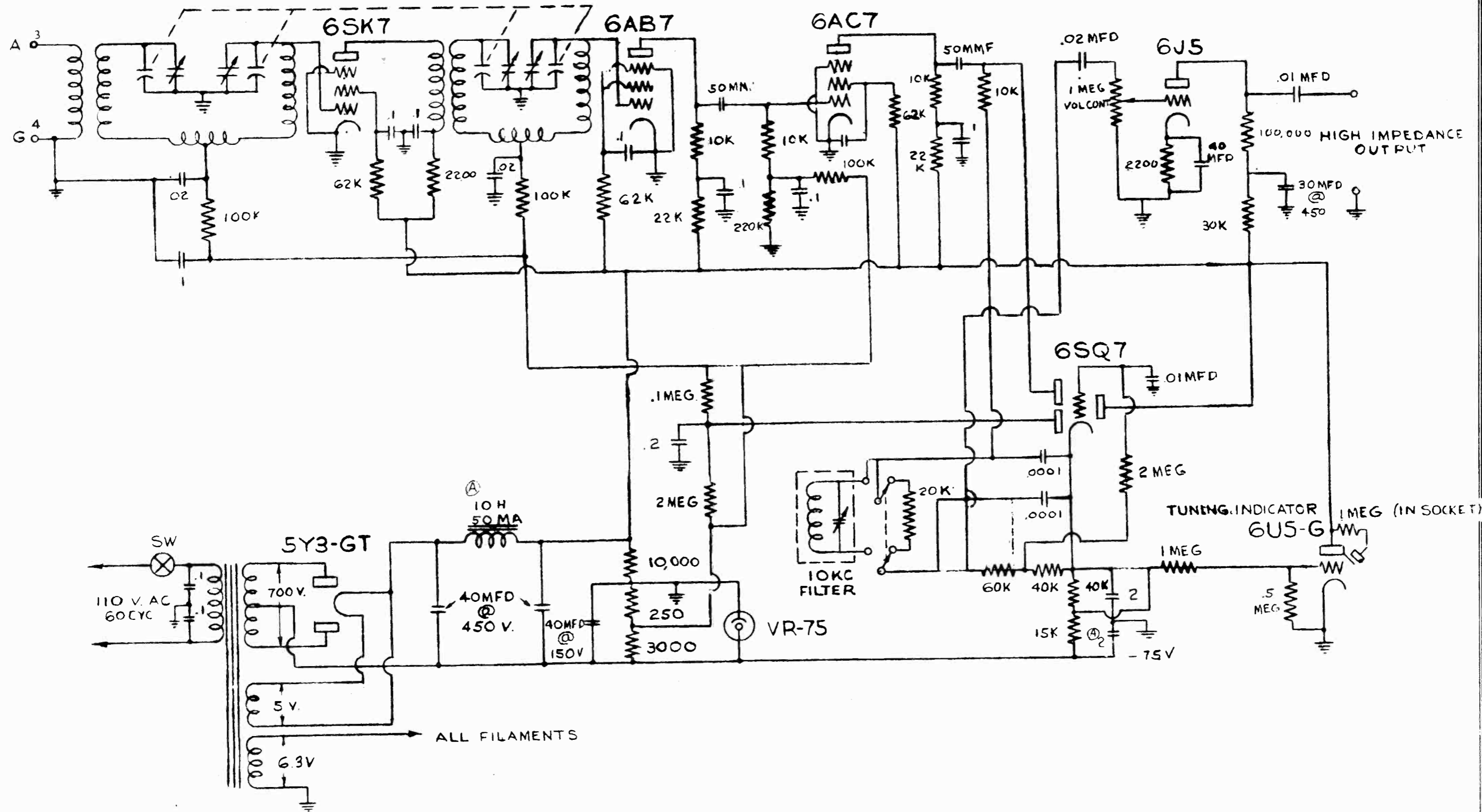
7 tube broadcast and short wave bands, R.F. stage, I.F. coils, high Q. shielded loop, Alnico 5, 3.16oz. magnet, 6" speaker, A.V.C.



MODEL UN-72P

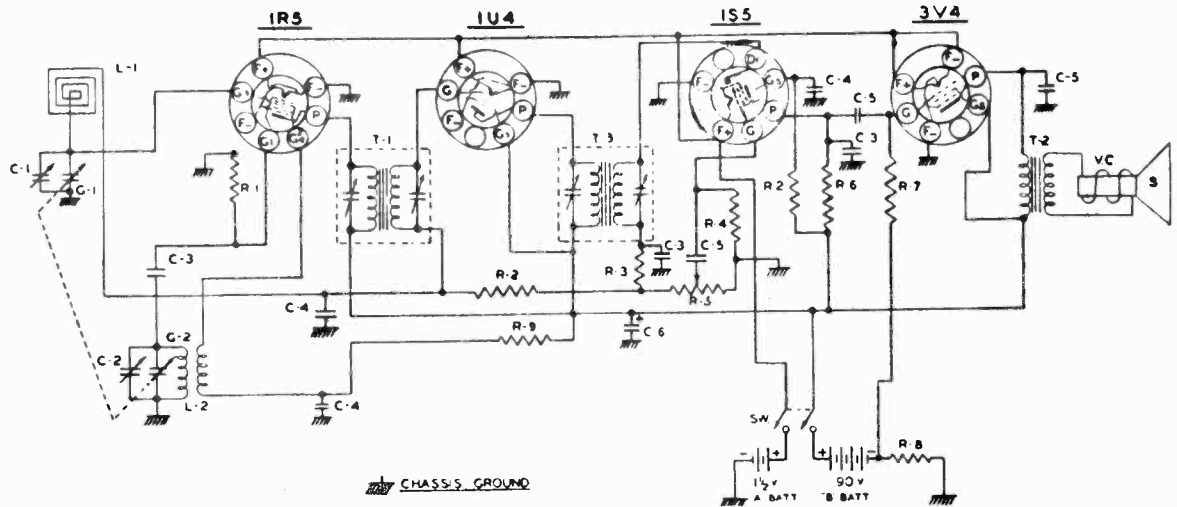


MODEL 25-C



CONCORD RADIO CORP.

MODELS 1-404,
1-405



ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment. A signal generator is required having the following frequencies: 455 KC and 1400 KC. An output meter should be connected across the speaker.

PART NO		DESCRIPTION
1R-20	R-1	220M Ω RESISTOR 1/2W 20%
1R-23	R-2	33MEG RESISTOR 1/2W 20%
1R-31	R-3	82M Ω RESISTOR 1/2W 10%
1R-3	R-4	10MEG RESISTOR 1/2W 20%
VC-8	R-5	1MEG VOLUME CONTROL
1R-12	R-6	1MEG RESISTOR 1/2W 20%
1R-13	R-7	2.2MEG RESISTOR 1/2W 20%
1R-39	R-8	620 Ω RESISTOR 1/2W 5%
1R-37	R-9	10M Ω RESISTOR 1/2W 20%
TC-7	C-1	ANT TRIMMER
	C-2	OSC TRIMMER ON GANG
MC-2	C-3	100MMFD MICA CONDENSER
PC-7	C-4	01 MFD 400V CONDENSER
PC-6	C-5	005MFD 600V CONDENSER
EC-7	C-6	20MFD 80WV ELECTROLYTIC
GC-5	G-1	GANG CONDENSER
	G-2	
LL-5	L-1	LOOP ANTENNA
LO-12	L-2	OSC COIL
LI-3	T-1	IF TRANSFORMER INPUT
	SW	DPST SWITCH ON VOLUME CONTROL
SPK-5	T-2	SPEAKER TRANSFORMER
	VC	VOICE COIL
	S	PM SPEAKER
LI-4	I-3	IF TRANSFORMER OUTPUT
TU-30		1R5 1U4 1S5 3V4

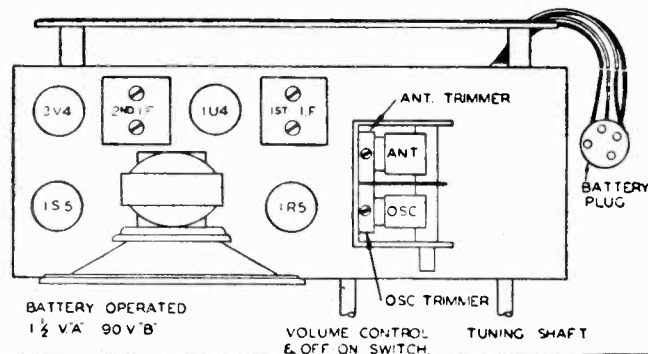
FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD. condenser. The ground lead from the generator may be connected to any spot on the metal chassis. Turn the gang condenser to complete minimum capacity. Set the generator to 455 KC. Adjust the movable trimmers in the IF cans, until a maximum reading is noted on the output meter.

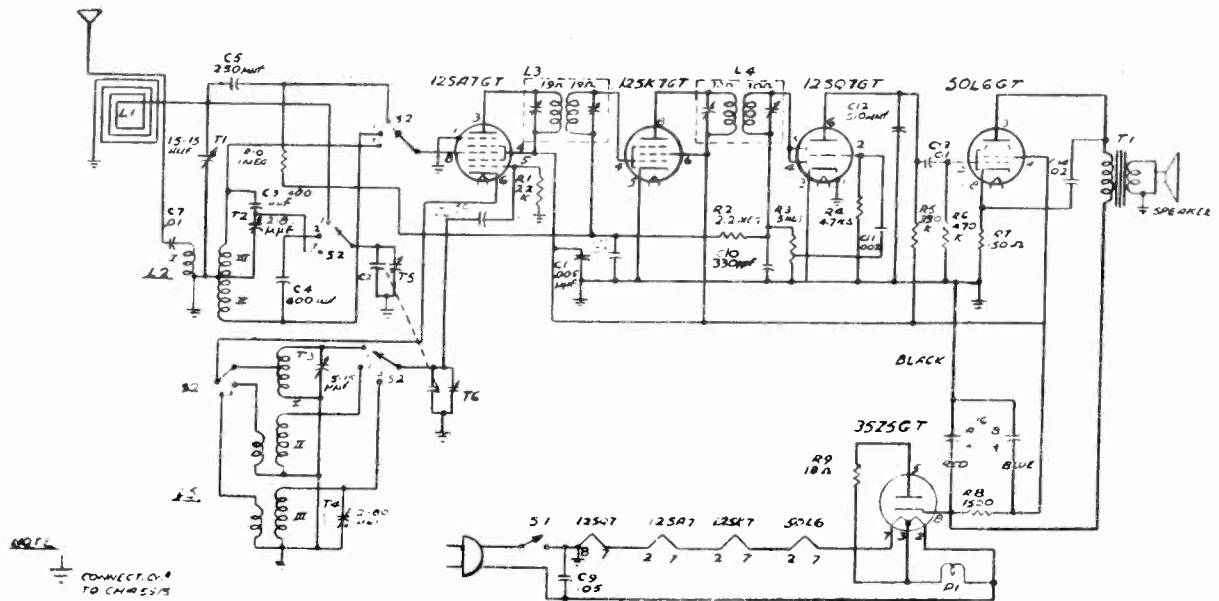
The volume control of the receiver should be turned to maximum during the IF and all subsequent alignment and the generator output as low as possible to prevent the AVC from working and giving false readings.

SECOND STEP: With the leads from the generator still connected as in IF alignment, adjust the generator to 400 KC. Set the dial pointer to 1400 KC on the dial scale. Adjust the oscillator trimmer until the signal is tuned in.

THIRD STEP: Remove the generator leads from the condenser. Connect the hot lead from the generator through a 200 MMFD. condenser to one of the leads which project from the back of the loop antenna. Connect the ground lead of the generator to the remaining lead. With the generator and the receiver still tuned to 1400 KC, adjust the antenna trimmer until a maximum reading is noted on the output meter.

TUBE AND TRIMMER LOCATION





POS 1 BROADCAST 537-1800 KC
 POS 2 SHORTWAVE 6-15 MC
 POS 3 SHORTWAVE 13-23 MC

ALIGNMENT PROCEDURE

Output meter connection.....Across voice coil
 Output meter reading 1/2 watt 1.25V for 3.2 Ohm voice coil
 Connection of generator ground.....Receiver chassis
 Generator modulation.....Approximately 30% @ 400 cycles
 Position of volume control.....Fully clockwise

WAVE BAND SW.	POSITION OF DIAL POINTER	GEN. FREQ.	GEN. CONN.	DUMMY ANT.	TRIMMERS ADJ. IN ORDER	TRIMMER FUNCTION
B. C.	550	455	12SA7 Grid	1 mfd.	I. F. Trimmers	I. F.
S. W. 1	14	14	Ant. Post	R.M.A. Std.	T6*	Osc.
	14	14	Ant. Post	R.M.A. Std.	T5	Osc.
S. W. 2	23	23	Ant. Post	R.M.A. Std.	T4*	Osc.
	23	23	Ant. Post	R.M.A. Std.	T2	R. F.
B. C.	1500	1500	Ant. Post	R.M.A. Std.	T3	R. F.
	1500	1500	Ant. Post	R.M.A. Std.	T1	R. F.

NOTE:

* If two peaks can be had the correct one is with the trimmer screw further out, the other peak is the image. Align set in order shown.

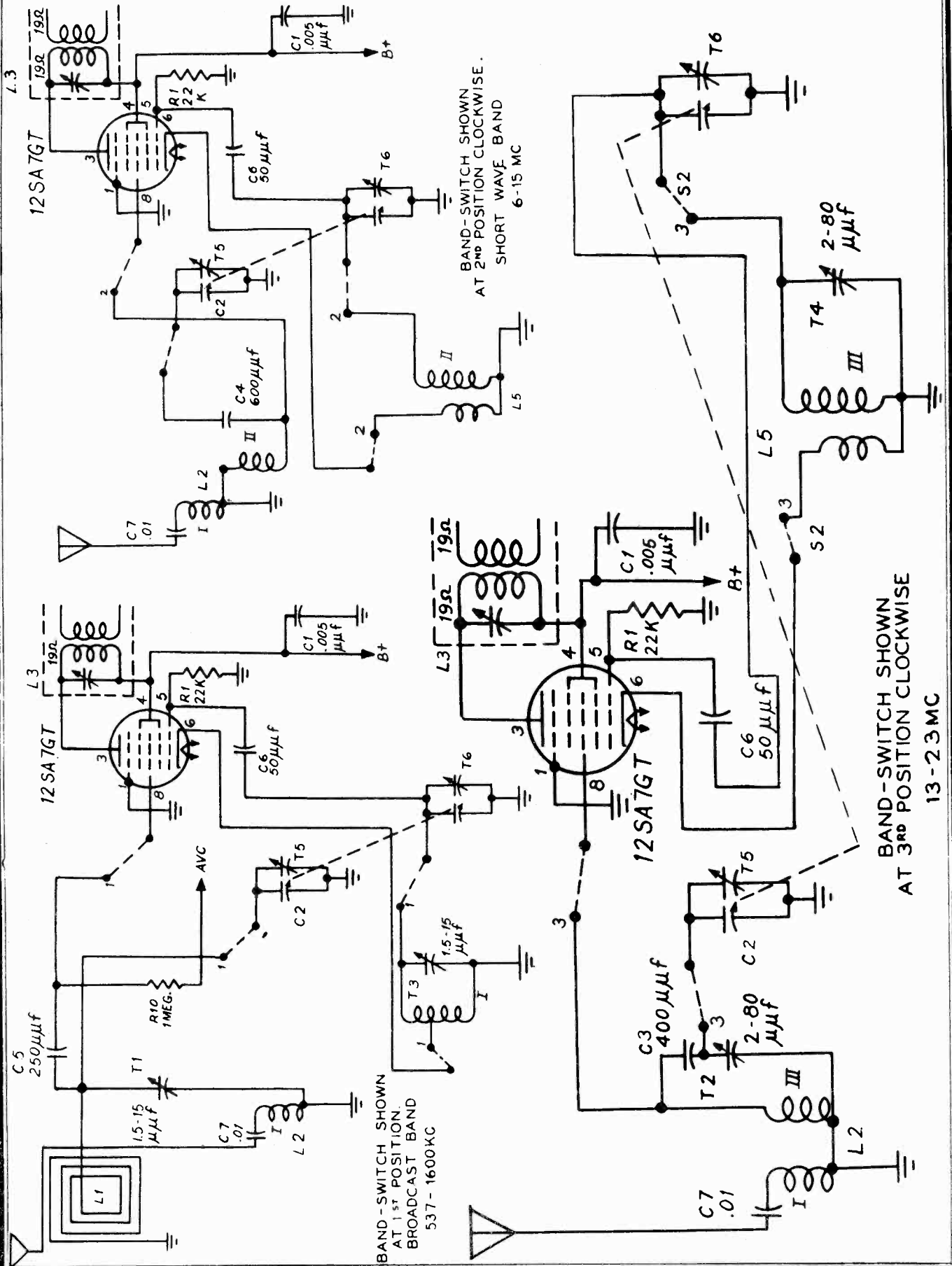
CLARI - SKEMATIX

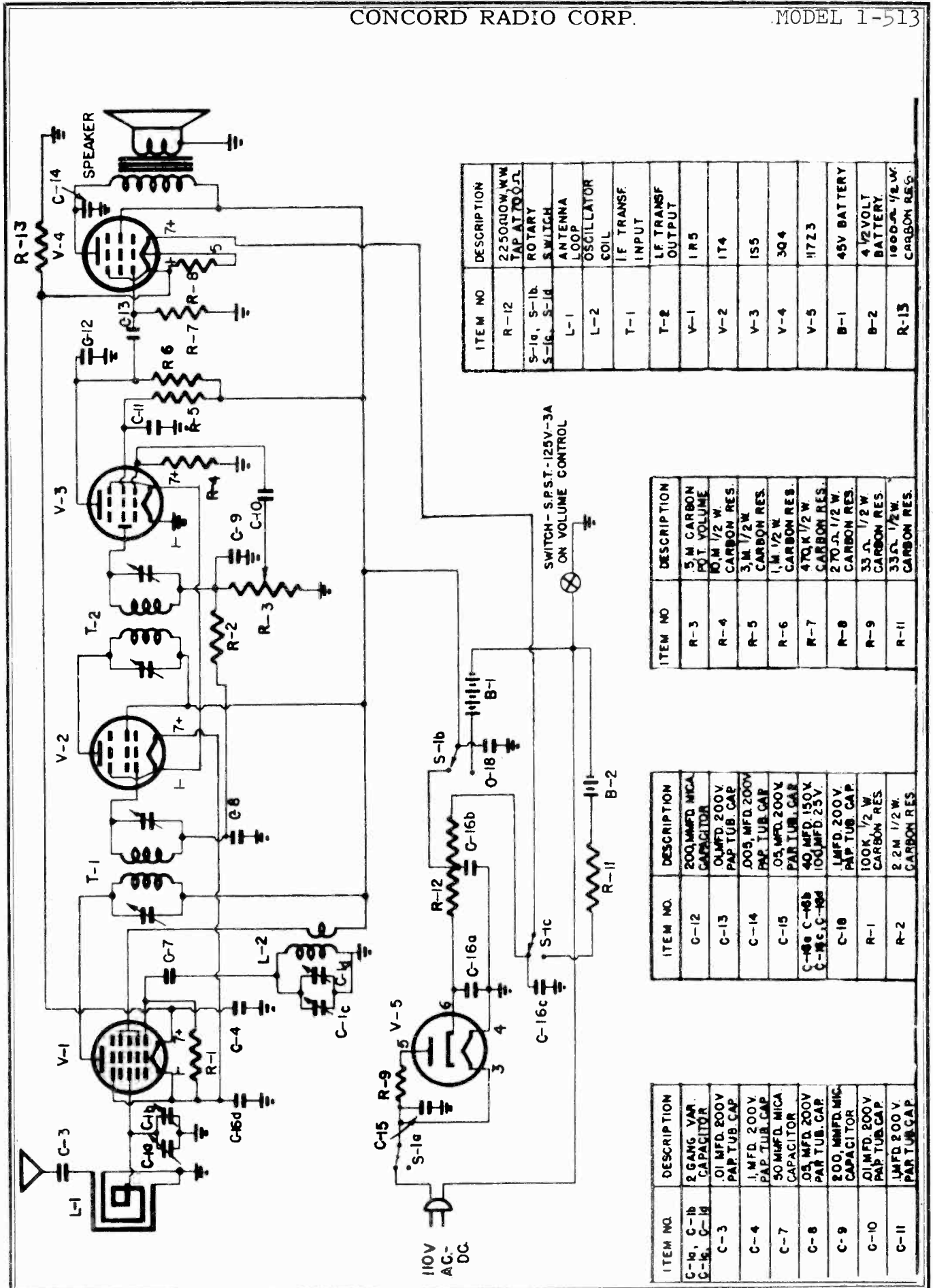
Registered Trademark

PAGE 18-4 CONCORD

CONCORD RADIO CORP.

MODELS 1-507,
1-508





ITEM NO	DESCRIPTION
R-12	2250Ω 0.5 W W. POT. AT 100 Ω
S-1a, S-1b	ROTARY SWITCH
S-1c, S-1d	SWITCH
L-1	ANTENNA LOOP
L-2	OSCILLATOR COIL
T-1	IF TRANSF. INPUT
T-2	LF TRANSF. OUTPUT
V-1	1R5
V-2	1T4
V-3	1S5
V-4	3Q4
V-5	11723

ITEM NO	DESCRIPTION
R-3	5 M CARBON POT. VOLUME
R-4	10 M 1/2 W CARBON RES.
R-5	3 M 1/2 W CARBON RES.
R-6	1 M 1/2 W CARBON RES.
R-7	470 K 1/2 W CARBON RES.
R-8	270 Ω 1/2 W CARBON RES.
R-9	33 Ω 1/2 W CARBON RES.
R-11	33 Ω 1/2 W CARBON RES.

ITEM NO.	DESCRIPTION
G-12	200 MFD MICA CAPACITOR
G-13	0.1 MFD 200V PAP. TUB. CAP.
C-14	0.05 MFD 200V PAP. TUB. CAP.
C-15	0.05 MFD 200V PAR. TUB. CAP.
C-16a	40 MFD 150V PAR. TUB. CAP.
C-16b	100 MFD 25V PAR. TUB. CAP.
C-18	1 MFD 200V PAP. TUB. CAP.
R-1	100K 1/2 W CARBON RES.
R-2	2.2 M 1/2 W CARBON RES.

ITEM NO.	DESCRIPTION
C-1a, C-1b	2 GANG VAR. CAPACITOR
C-1c, C-1d	0.1 MFD 200V PAP. TUB. CAP.
C-3	0.1 MFD 200V PAP. TUB. CAP.
C-4	1 MFD 200V PAP. TUB. CAP.
C-7	50 MFD MICA CAPACITOR
C-8	0.5 MFD 200V PAR. TUB. CAP.
C-9	200 MFD MICA CAPACITOR
C-10	0.1 MFD 200V PAP. TUB. CAP.
C-11	1 MFD 200V PAP. TUB. CAP.

VOLTAGE MEASUREMENT

All reading in AC-DC position of power selector switch with 20,000 ohms per meter. Readings taken are referred to ground.

11723			RESISTANCE IN OHMS		
PIN	AC	DC	PIN	DC	RESISTANCE IN OHMS
1	117V	—	1	—	540
2	—	120V	2	—	2000
3	—	—	3	—	500
4	117V	—	4	—	—
5	—	—	5	—	500
6	117V	—	6	—	2000
7	120V	—	7	—	—

3Q4			1S5		
PIN	DC	RESISTANCE IN OHMS	PIN	DC	RESISTANCE IN OHMS
1	4.8V	50	1	—	—
2	86V	2000	2	—	—
3	—	500,000	3	—	400,000
4	88V	1500	4	19V	3,000,000
5	6V	50	5	7.8V	1,500,000
6	86V	2000	6	—	10,000,000
7	7.6V	70	7	1.5V	260

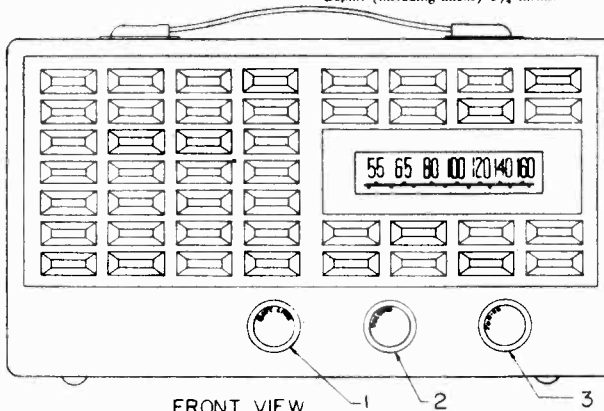
1T4			1R5		
PIN	DC	RESISTANCE IN OHMS	PIN	DC	RESISTANCE IN OHMS
1	1.5V	260	1	3.3V	45
2	88V	1500	2	88V	1500
3	88V	1500	3	88V	1500
4	—	2,000,000	4	—	85
5	1.6V	2,200,000	5	1.6V	45
6	—	—	6	—	—
7	3.3V	45	7	2.3V	50

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Tuning Range: Standard Broadcast 540-1640 KCS
 Power Supply: Direct Current 105-125 volts or alternating current 105-125 volts, 50-60 Cycle or Batteries.
 Power Consumption: AC or DC—12 watts
 Battery Complement: 2—4½ Volt "A" Batteries
 Eveready No. 746 or equivalent.
 2—45 Volt "B" Batteries
 Eveready No. 482 or equivalent.
 Tube Complement: 1R5—Converter
 1T4—I. F. Amplifier
 1S5—2nd Det.—AVC—1st Audio
 3Q4—Power Amplifier
 11723—Rectifier

Mechanical Characteristics: Dimensions — Height: (including feet) 7¼ inches
 Width: 13 inches
 Depth: (including knobs) 6¼ inches



FRONT VIEW
SERVICING NOTES

All specifications and measurements based on 117 Volts, 60 Cycles, and all readings based on a 20,000 ohms per volt meter. All readings are taken with volume control (switch No. 2) in maximum clockwise position. Apply the lowest signal level from the signal generator.
 Output: 50 mw into a 3.2 ohm voice coil impedance.

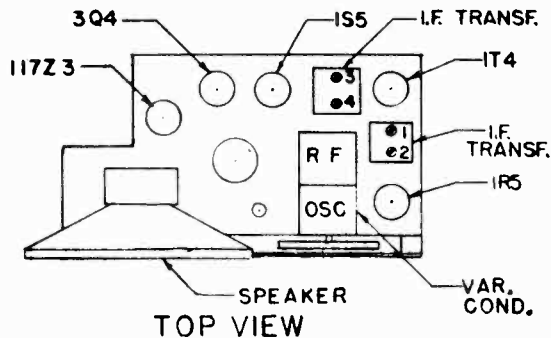
Approximate reading 0.4 Volt.

I. F. ALIGNMENT: With signal generator, set at 455 KC, apply signal through a .1 MFD condenser dummy to R.F. grid of converter (1R5) or the stator of RF section of the variable condenser (condenser must be fully meshed). Peak I.F. trimmers 1, 2, 3, 4 (top view diagram) to give maximum reading on output meter connected across voice coil. (Note: If for any possible reason the signal does not come through indicating the receiver is way out of alignment, apply the signal to the grid of the I.F. Amplifier (1T4) and tune signal in by trimmers 3, 4 of second I.F. Transformer. Peak for maximum and once this stage is tuned, repeat above procedure.)

R.F. Alignment: With signal generator, set at 1400 KC, apply signal through a dummy antenna (200 nmf condenser) to the antenna loop wire. Set dial of receiver to 1400 KC and peak trimmers 5 & 6 to give maximum reading of output meter. Then set signal generator at 600 KC and tune receiver to 600 KC mark on dial. This setting should fall on calibrated point.

CORRECTIONS

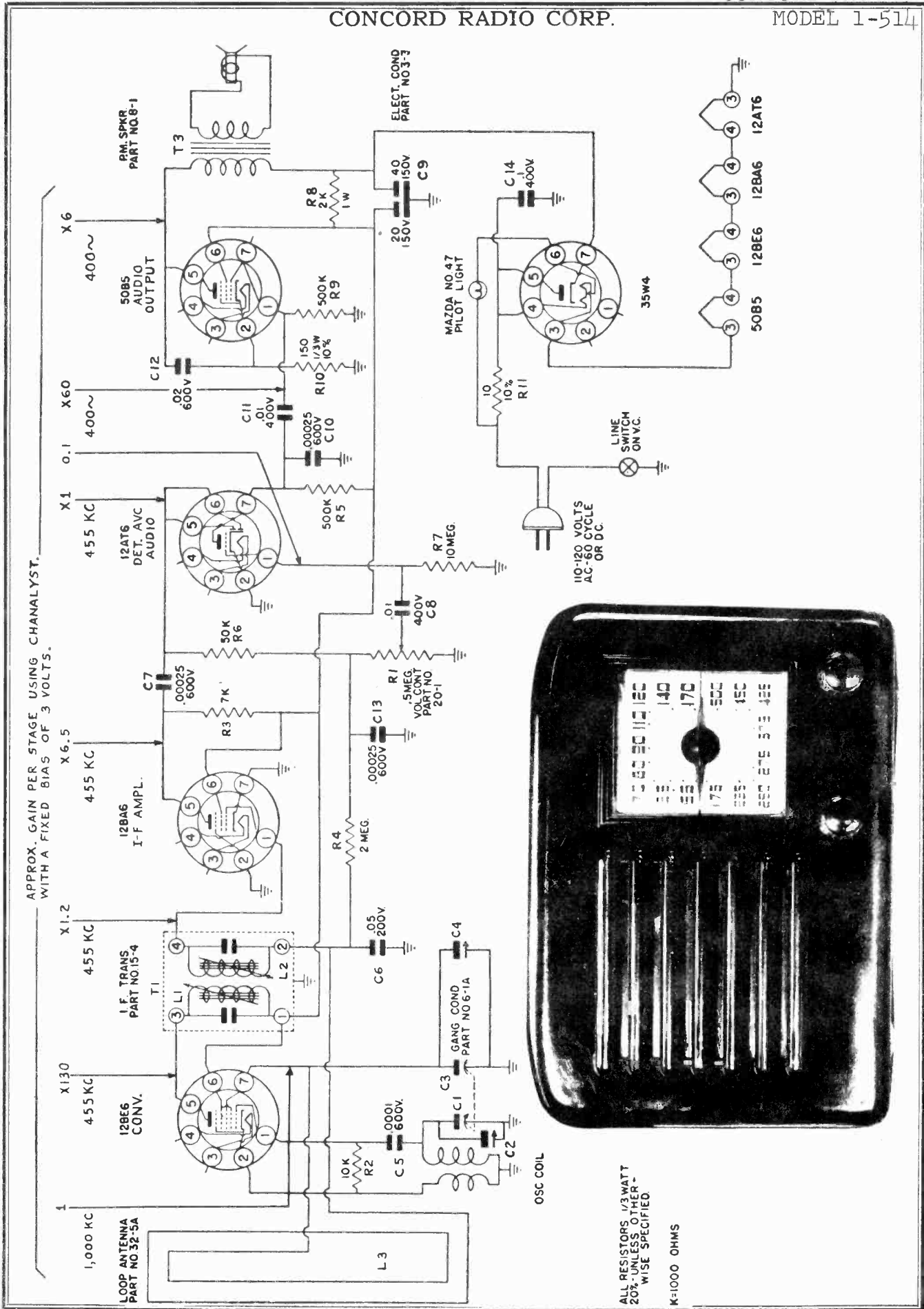
1. Servicing Notes Section: Stator large section gang open to read; Stator large section gang closed.
2. Voltage Measurements Section: 20,000 ohms per meter to read; 20,000 ohms per volt D. C. 1,000 ohms per volt A. C. meter 11723 to read: 11723
3. Schematic Diagram Section: No S-Id C 18: .1 mfd, 200 volts to read; .1 mfd, 400 volts 1000 mfd - 6v D.C. Pin # 1 of V2 to ground.



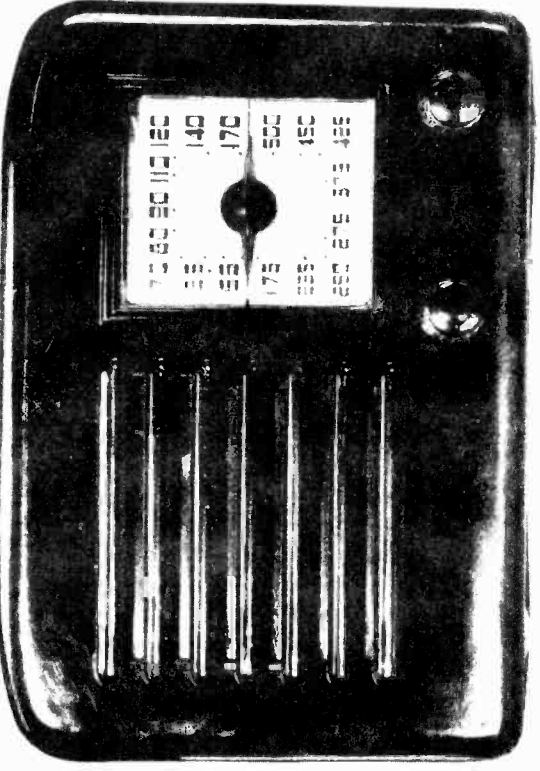
Generator Connection	Dummy Ant.	Freq.	Adj. Trimmers	Output	Sensitivity uv.
Stator large section gang open	.1 MFD cond.	455 KC	1, 2, 3, 4	Max.	120
Antenna loop wire	200 nmf cond.	1400 KC	5 & 6	Max.	50
Antenna loop wire	200 nmf	600 KC	Variable Plates	Max.	150

CONCORD RADIO CORP.

MODEL 1-514

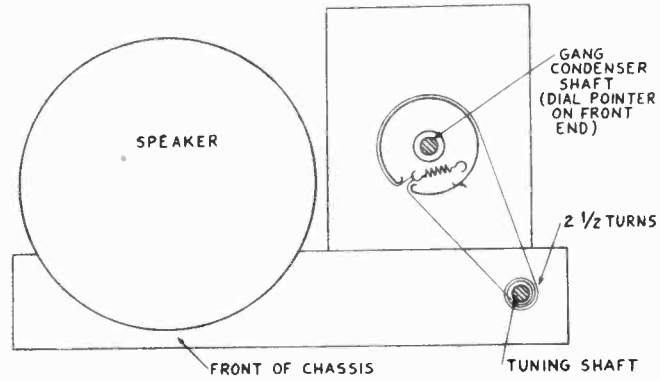
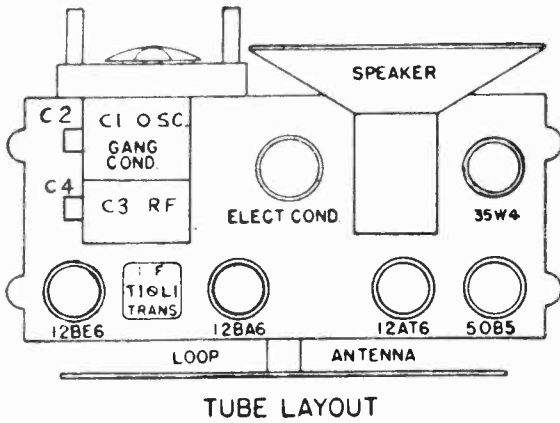


APPROX. GAIN PER STAGE USING CHANALYST, WITH A FIXED BIAS OF 3 VOLTS.



ALL RESISTORS 1/3 WATT
20% UNLESS OTHER-
WISE SPECIFIED
K=1000 OHMS

DIAL CORD DRIVE



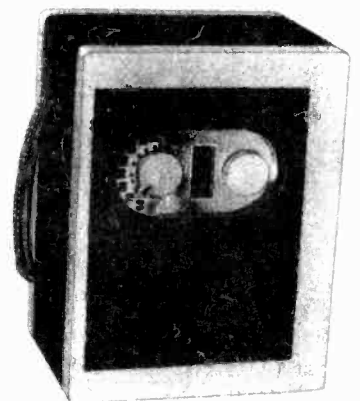
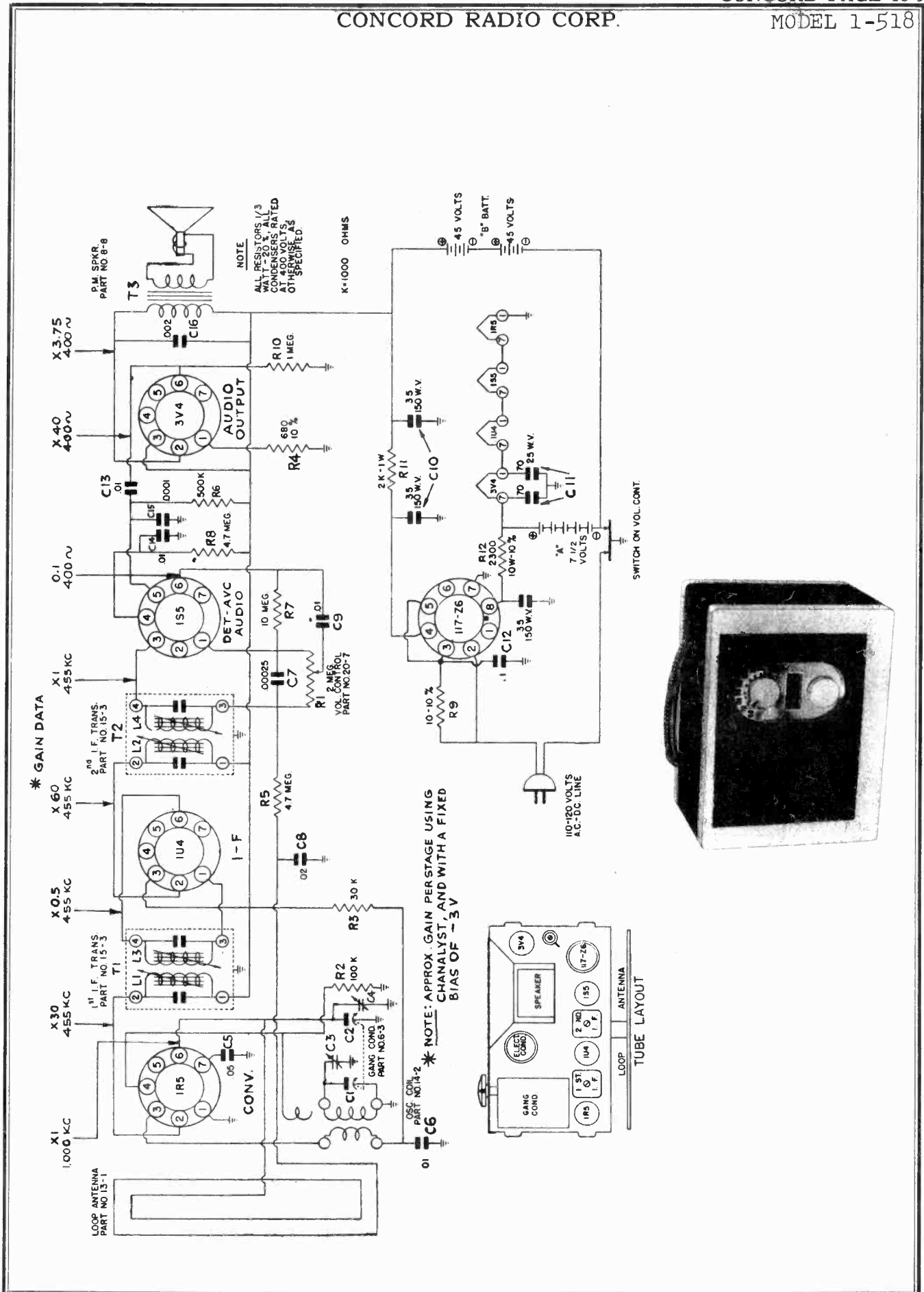
SOCKET	PIN	V _{SYM}	20,000Ω/P.V.	1,000Ω/P.V.	RESISTANCE
12BB6 CONV.	1	-6	-6	-6 ON 100V SCALE -3.5 ON 10V SCALE	10K
	2	0	0	0	0
	3	AC	AC	AC	45Ω
	4	AC	AC	AC	30Ω
	5	+82	+82	+82	OVER 5 MEGS
	6	+82	+82	+82	OVER 5 MEGS
	7	-1.0	-0.5	-0.2	3 MEGS
12BA6 I.F. AMPL.	1	-1.0	-0.5	-0.2	3 MEGS
	2	0	0	0	0
	3	AC	AC	AC	25Ω
	4	AC	AC	AC	15Ω
	5	+25	+24	+22	OVER 5 MEGS
	6	+82	+82	+82	OVER 5 MEGS
	7	0	0	0	0
12AT6 DET. AUDIO	1	-0.5	-0.2	0	10 MEGS
	2	0	0	0	0
	3	0	0	0	0
	4	AC	AC	AC	15Ω
	5	-0.5	-0.2	0	500K
	6	-0.5	-0.2	0	500K
	7	+40	+38	+15	OVER 5 MEGS
50B5 AUDIO OUTPUT	1	0	0	0	500K
	2	+5	+5	+5	150Ω
	3	AC	AC	AC	85Ω
	4	AC	AC	AC	35Ω
	5	+120	+120	+120	OVER 5 MEGS
	6	+82	+82	+82	OVER 5 MEGS
	7	-	-	-	-
35W4 RECT.	1	AC	AC	AC	110Ω
	2	-	-	-	-
	3	AC	AC	AC	85Ω
	4	AC	AC	AC	115Ω
	5	AC	AC	AC	115Ω
	6	AC	AC	AC	110Ω
	7	+125	+125	+125	OVER 5 MEGS

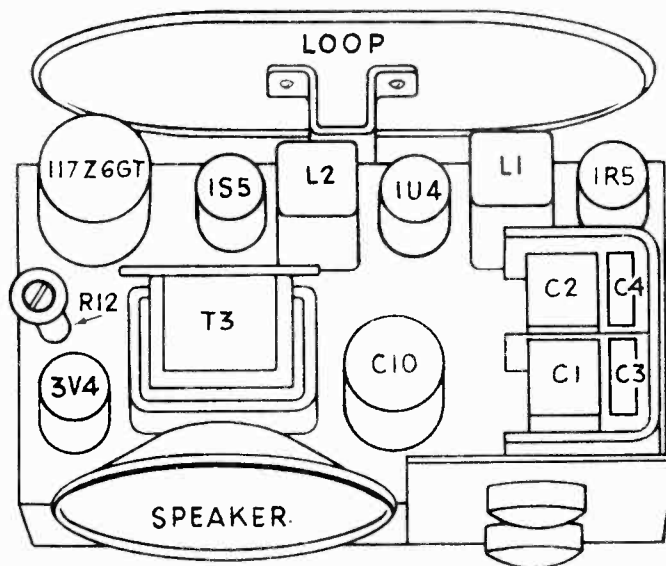
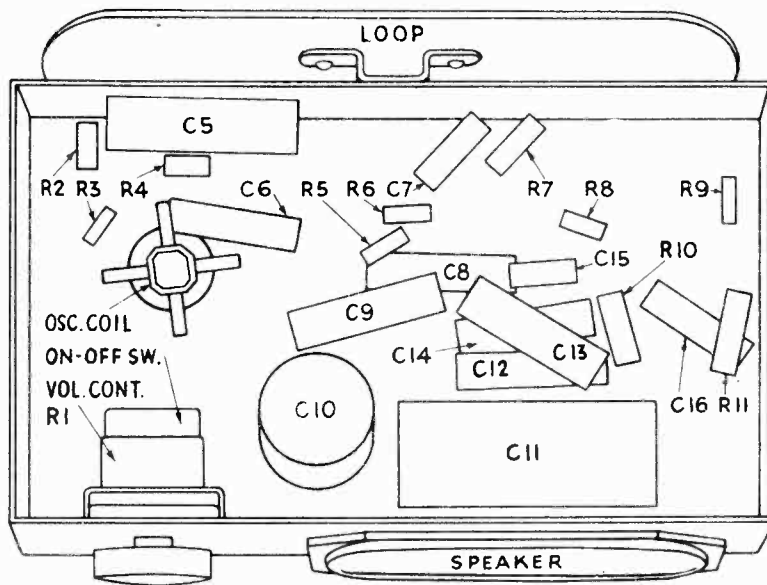
ALL VOLTAGE AND RESISTANCE MEASUREMENT MADE WITH RESPECT TO CHASSIS GROUND AND WITH A LINE VOLTAGE OF 116 V. A. C.

A L I G N M E N T

THE CHASSIS MUST BE REMOVED FROM THE CABINET IN ORDER TO ALIGN THE RECEIVER. CONNECT THE OUTPUT METER ACROSS THE VOICE COIL. CONNECT THE SIGNAL GENERATOR TO THE STANDARD HAZELTINE MODEL 1150 LOOP, AND COUPLE LOOSELY TO THE RECEIVER LOOP. SET THE RECEIVER VOLUME CONTROL AT MAXIMUM.

THE TUNING CONDENSER PLATES SHOULD BE FULLY MESHED WHEN THE DIAL POINTER IS AT THE INDEX MARK AT THE LOW FREQUENCY END OF THE DIAL. THE SIGNAL GENERATOR OUTPUT SHOULD BE SUFFICIENT TO GIVE HALF SCALE DEFLECTION ON THE LOWEST SCALE OF THE OUTPUT METER. SET THE SIGNAL GENERATOR TO 455 KC. ADJUST THE I.F. TUNING SLUGS FOR MAXIMUM METER DEFLECTION IN THE FOLLOWING SEQUENCE: L2, L1. SET THE GENERATOR AND RECEIVER TO 700 KC AND ADJUST OSCILLATOR TRIMMER C2 FOR MAXIMUM OUTPUT. SET THE GENERATOR AND RECEIVER TO 1400 KC AND ADJUST LOOP TRIMMER C4 FOR MAXIMUM OUTPUT.





ALIGNMENT

The chassis is removed from the cabinet in order to align this receiver.

Connect the output meter across the voice coil. Connect the signal generator to the standard Hazeltine loop, Model 1150, and couple loosely to the receiver loop. Set the receiver volume control to maximum. The tuning condenser plates should be fully meshed when the dial pointer is at the index mark at the low frequency end of the dial. The signal generator output should be sufficient to give a readable deflection on the output meter.

Set the signal generator to 455 kc. Adjust the I.F. tuning slugs, L4, L3, L2, L1, for maximum output on the output meter. Set the signal generator and receiver to 1600 kc and adjust the oscillator trimmer C4 for maximum output. Set the signal generator and receiver to 1400 kc and adjust R.F. trimmer C3 for maximum output.

CONCORD RADIO CORP.

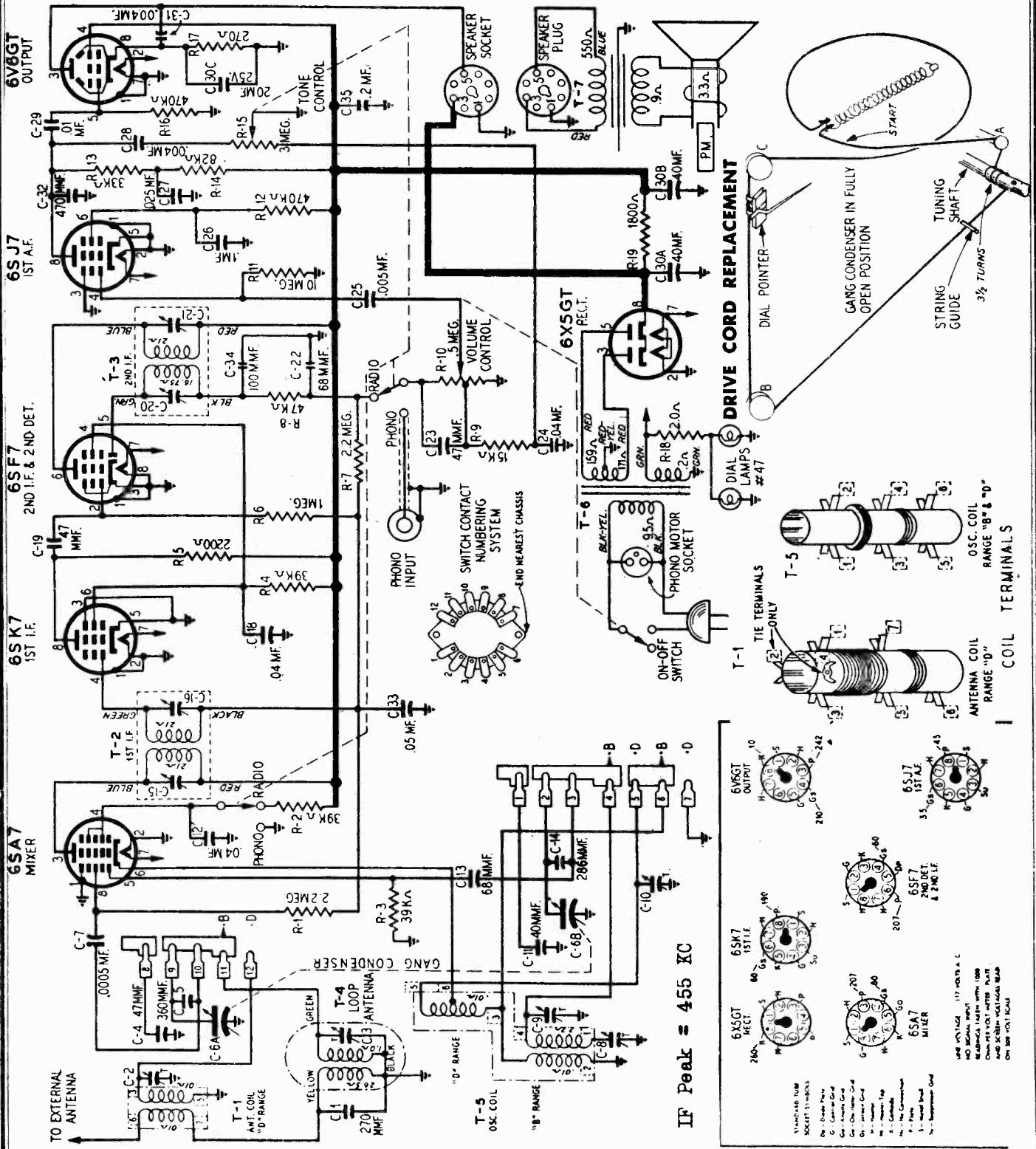
MODEL 1-518

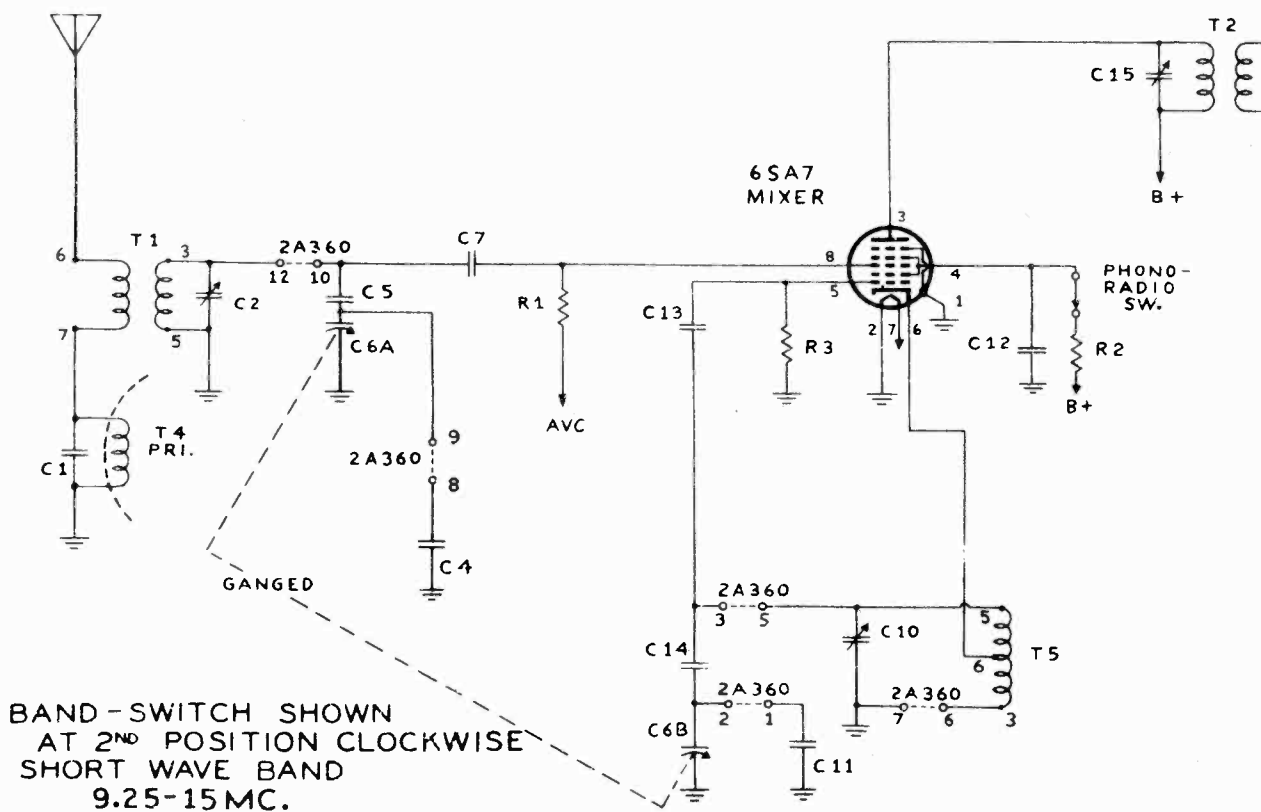
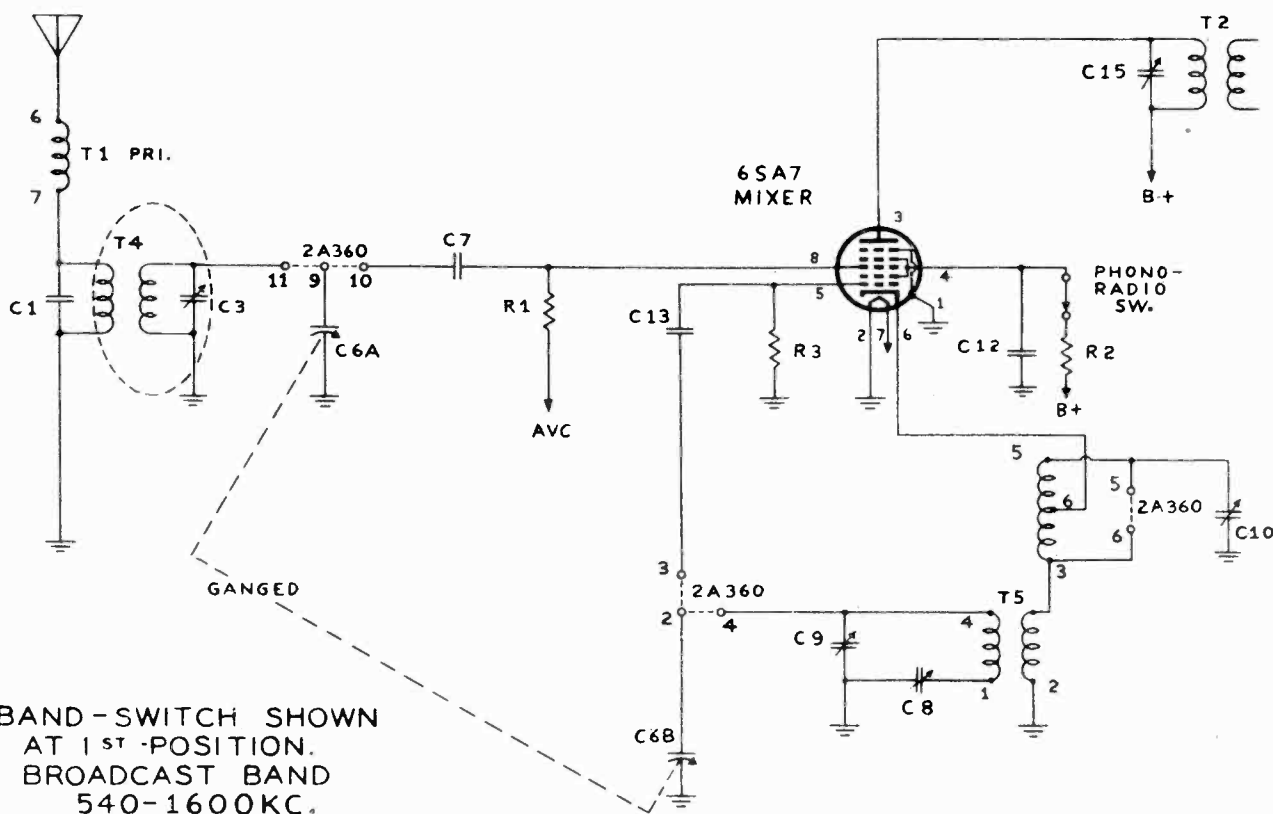
TUBE	PIN	VTVM	20,000 P.V.	1,000 P.V.	RESISTANCE
IR5 Conv	1	0	0	0	0
	2	105	105	105	Over 5 megs
	3	44	44	42	Over 5 megs
	4	-5	-2.6	0	100 K
	5	0	0	0	0
	6	0	0	0	5.5 megs
	7	1.7	1.7	1.7	12 Ω
IU4 I.F. Ampl	1	3.3	3.3	3.3	22 Ω
	2	105	105	105	Over 5 megs
	3	105	105	105	Over 5 megs
	4	0.6	0.1	0	5.5 megs
	5	3.6	3.6	3.6	22 Ω
	6	3.3	3.3	3.3	34 Ω
	7	5	5	5	34 Ω
IS5 Det. AVC Audio Amp	1	1.7	1.7	1.7	12 Ω
	2	0	0	0	0
	3	1.2	0.2	0	1.7 megs
	4	23	20	3	5.5 megs
	5	46	42	12	Over 5 megs
	6	1.1	0	0	8 megs
	7	3.3	3.3	3.3	22 Ω
3V4 Audio Output	1	5	5	5	32 Ω
	2	100	100	100	Over 5 megs
	3	105	105	105	Over 5 megs
	4	105	105	105	Over 5 megs
	5	-	-	-	-
	6	0	0	0	1 meg
	7	8	8	8	52 Ω
117Z6 Rect	1	0	0	0	0
	2	AC	AC	AC	235 Ω
	3	AC	AC	AC	240 Ω
	4	135	135	135	Over 5 megs
	5	AC	AC	AC	240 Ω
	6	105	105	105	Over 5 megs
	7	0	0	0	0
	8	120	120	120	Over 5 megs

All values are positive unless indicated otherwise.

MODELS 1-601,
1-602, 1-603

CONCORD RADIO CORP.

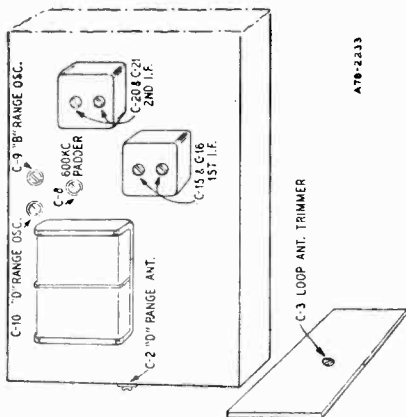




MODELS 1-601,
1-602, 1-603

REMOVAL OF CHASSIS FROM CABINET

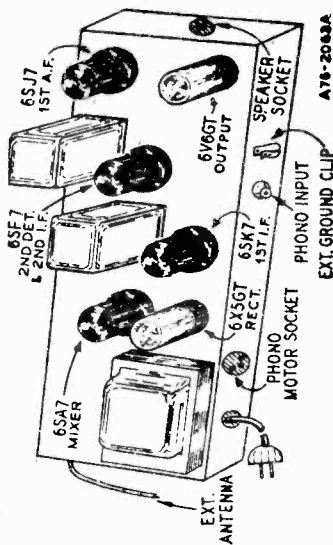
Before the chassis may be taken from the cabinet, it is necessary to pull off the 4 control knobs, remove the 4 chassis mounting bolts, disconnect the leads running to the loop antenna, record changer and speaker and loosen the screw and remove the black lead fastened to the lower left corner of the chassis.



A76-2233

NOTE A—Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn rotor back and forth and adjust the trimmer until peak of greatest intensity is obtained.



ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I.F. 455 KC	Grid of 6SA7 Pin 8	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C15) & (C16) 2nd I.F. (C20) & (C21)
RANGE B 1620 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C9)
1400 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output Ant.	Range B (C3) See Note A
600 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output Oscillator (C8)	See Note B

Repeat above steps at 1620 and 600 KC until readjusting the oscillator range B Trimmer (C9) causes no further improvement of output.

RANGE D 15.6 MC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)
14 MC	Antenna Lead	400 Ohm	D Range	Tune Rotor to Max. Output Ant.	Range D (C2)
LOOP RANGE B 1400 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output Ant.	Range B (C3)

SPECIFICATIONS

Power Consumption (at 117 Volts AC)	40 Watts (normal)	Intermediate Frequency	455 KC
	58 Watts (phono operating)	Selectivity	40 KC Broad at 1000 Times Signal
Power Output	4 Watts, Maximum	Sensitivity (For 0.5 Watt Output, with External Antenna)	
	2.3 Watts, 10% Distortion	B Range	9 Microvolts Average
Tuning Frequency Range		D Range	20 Microvolts Average
B Range	540-1660 Kilocycles		
D Range	9.25-15 Megacycles		

REPLACEMENT PARTS LIST

NOTICE: There is a Model Number label on the chassis. This label identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

MISCELLANEOUS

PART NO.	DESCRIPTION
12A442	6" P.M. Speaker complete with Output Transformer
12A436	8" P.M. Speaker complete with Output Transformer Cone and Voice Coil Assembly (Specify part number and letters stamped on speaker) Output Transformer (Specify part number and letters stamped on speaker)
3A303	Tube Socket—Octal (8 prong) Molded
3A304	Phono Motor Socket
3A305	Phono Socket—Single Pin Tip
2A360	Band Change Switch
13X328	Line Cord and Plug Assembly
10A614	Knob (Tuning)
10A615	Knob (Volume)
10A616	Knob (Tone—R.P.)
10A617	Knob (SW-BC)

CAPACITORS

PART NO.	DESCRIPTION	VALUES	TYPE
C-1	47X445	270 mmf	Molded
C-2	17A164	5-50 mmf	Trimmer
C-3	17A235	2-12 mmf	Trimmer
C-4	47X473	47 mmf	Silvered Mica
C-5	47X474	360 mmf	Silvered Mica
C-6A, C-6B	14A184	Gang Condenser	
C-7	B66501	.0005 mf 200 V	Tubular
C-8	17A155	350-430 mmf	Trimmer
C-9, C-10	17A109	2.5-35 mmf	Dual Trimmer
C-11	47X472	40 mmf	Silvered Mica
C-12, C-18	D66403	.04 mf 400 V	Tubular
C-13	47X466	68 mmf	Molded
C-14	47X481	286 mmf	Silvered Mica
C-15, C-16	Part of T-2 (1st I-F Coil Assem.)		
C-19, C-23	47X463	47 mmf	Molded
C-20, C-21	Part of T-3 (2nd I-F Coil Assem.)		
C-22	47X471	68 mmf	Molded
C-24	D64403	.04 mf 400 V	Tubular
C-25	D66592	.005 mf 400 V	Tubular
C-26	D67104	.10 mf 400 V	Tubular
C-27	D64253	.025 mf 400 V	Tubular
C-28	D56402	.004 mf 400 V	Tubular
C-29	D66103	.01 mf 400 V	Tubular
C-30A		40 mf	Three Section Electrolytic
C-30B		40 mf	
C-30C	45X346	20 mf 25 V	
C-31	F66402	.004 mf 600 V	Tubular
C-32	47X505	470 mmf	Molded
C-33	B66503	.05 mf 200 V	Tubular
C-34	47X476	100 mmf	Molded
C-35	D67204	.2 mf 400 V	Tubular

RESISTORS

PART NO.	DESCRIPTION	OHMS	WATTS	TYPE
R-1, R-7	B85225	2.2 meg.	0.5	Carbon
R-2, R-4	C84393	39 K	1.0	Carbon
R-3	B84393	39 K	0.5	Carbon
R-5	B84222	2200	0.5	Carbon
R-6	B85105	1 meg.	0.5	Carbon
R-8	B85473	47 K	0.5	Carbon
R-9	B84153	15 K	0.5	Carbon
R-10	36X357	.5 meg.		Volume Control & Switch
R-11	B85106	10 meg.	0.5	Carbon
R-12, R-16	B85474	470 K	0.5	Carbon
R-13	B84333	33 K	0.5	Carbon
R-14	B84823	82 K	0.5	Carbon
*R-15	40X277	3 meg.		Tone Control & Radio Phono Switch
R-17	C84271	270	1.0	Carbon
R-18	43X213	2.0	0.5	Wire-wound
R-19	D84182	1800	2.0	Carbon

DIAL AND DRIVE ASSEMBLY

6X21	Rubber Grommet	Mtg. Gang Condenser
20X329	Cond. Cushion Stud	
26A443	Dial Bracket Assembly complete with Spacers, Pulleys Diffusers and Dial Background less Dial Glass	
58X676	Dial Glass	
26A444	Idle Bracket Assembly	
26X486	Drive Shaft	
19X192	"C" Washer (for drive shaft)	
15X163	Pointer	
10X38	Drive Cord Assembly or 50" Cord	
28X113	Drive Cord Tension Spring	
7X199	Pilot Light Socket Assembly	
4X353	No. 47 Pilot Light Escutcheon	

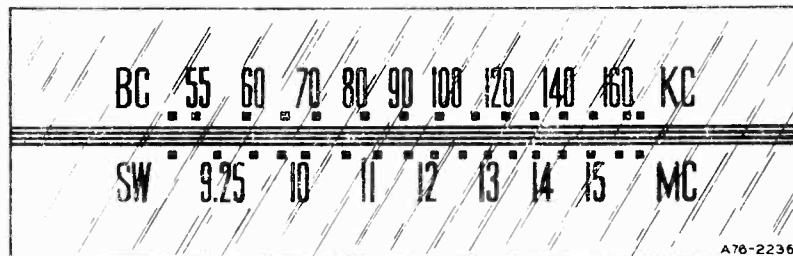
TRANSFORMERS AND COILS

T-1	9A1812	"D" Range Antenna Coil Assembly
T-2	9A1814	1st I-F Coil Assembly
T-3	9A1815	2nd I-F Coil Assembly
T-4	26A449	"B" Range Loop Antenna Assembly
T-5	9A1813	"B" and "D" Range Oscillator Coil Assembly
T-6	53X282	117 Volt, 60 Cycle, Standard Power Transformer
T-7		Output Transformer (See Miscellaneous)

SUBSTITUTE PARTS

The following parts are used in some receivers only. Check part numbers on old part before ordering and order part originally used in receiver

- *40X282 Tone Control (Substitute for 40X277)
- *25X1539 Radio Phono Switch Lever (Use with 40X282)
- *2A161 D.P.D.T. Switch (Use with 40X282)



A76-2236

ON-OFF SWITCH AND
VOLUME CONTROL



BAND SWITCH

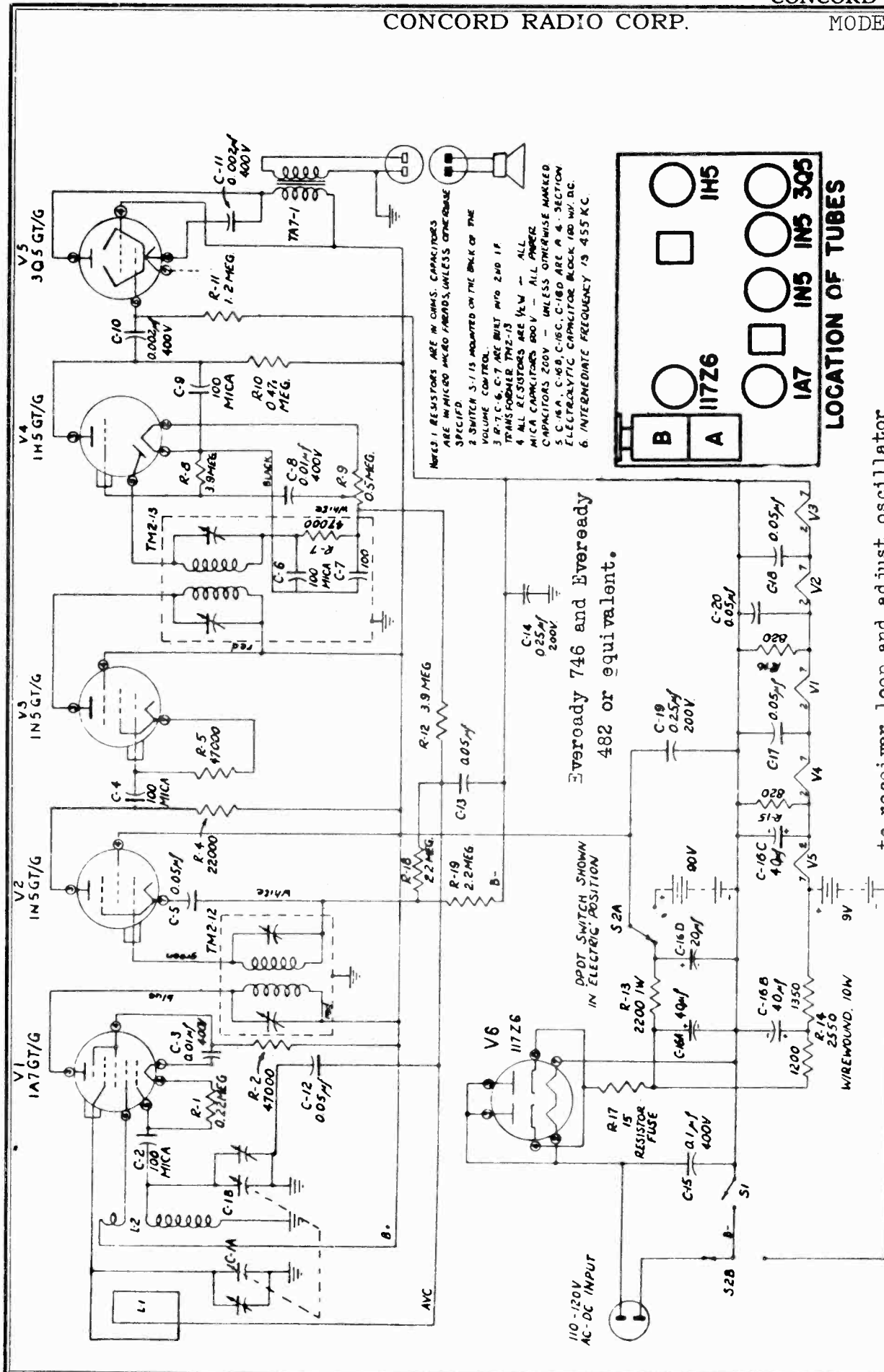


TUNING KNOB

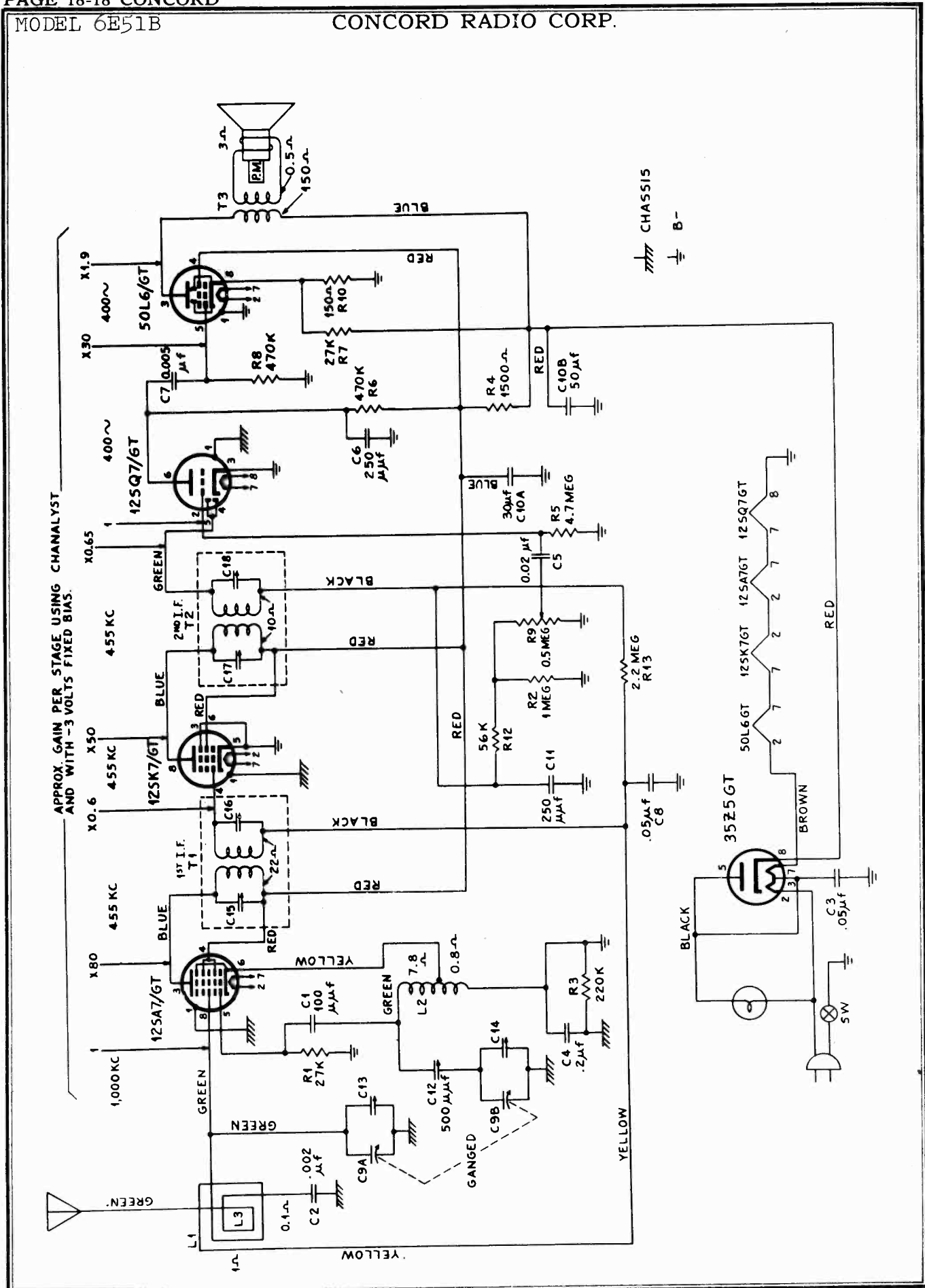


TONE CONTROL AND
PHONO-RADIO SWITCH





- Using .01 mfd. capacitor, align i-f trimmers to 455 kc with smallest input.
- With capacitor plates out of mesh, use 8 inch loop from signal generator to receiver loop and adjust oscillator trimmer B to 1700 kc.
- Adjust r-f trimmer A to 1550 kc for maximum response. Range is 532 to 1700 kc.



CHASSIS
 B-

CONCORD RADIO CORP.

MODEL 6E51B

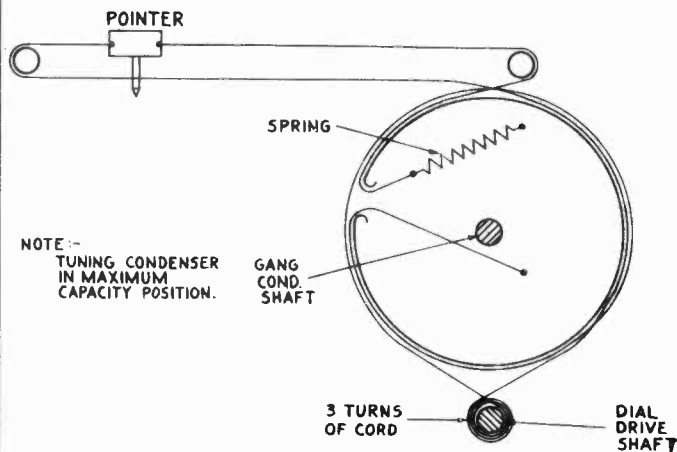
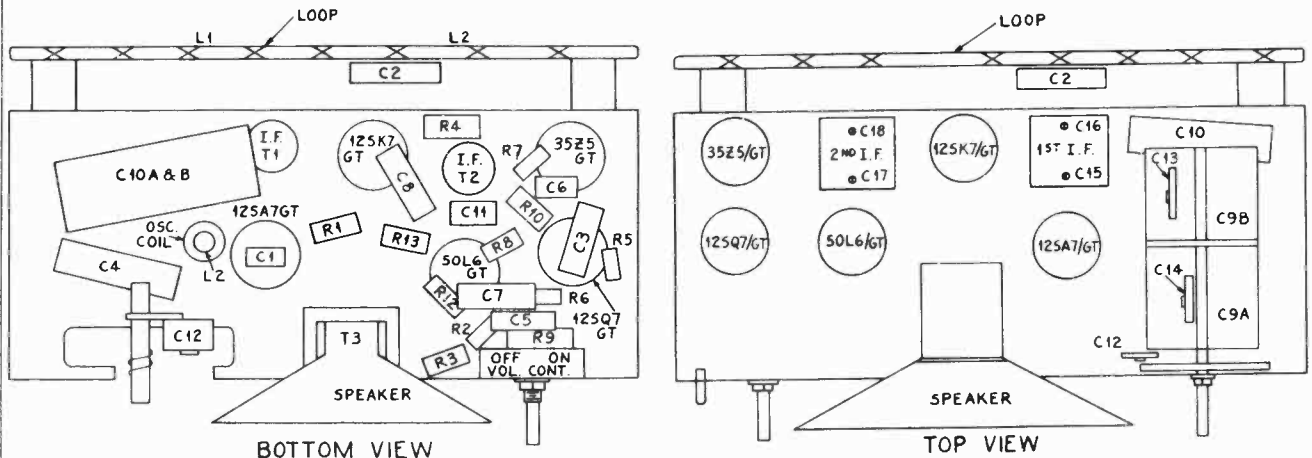
ALIGNMENT

Remove the chassis from the cabinet. Connect the output meter across the voice coil. Connect the signal generator to the Standard Hazeltine Model 1150 loop and couple loosely to the receiver loop. Set the receiver volume control at maximum.

The tuning condenser plates should be fully meshed when the dial pointer is at the low-frequency index. The signal generator output should be just sufficient to obtain a small deflection on the output meter.

Short the oscillator grid (12SA) pin 5 to B-). Set the signal generator to 455 KC. Adjust the IF trimmers in the following order: C18, C17, C16, C15. Set the generator and receiver at 1600 KC and remove the short from the oscillator and adjust oscillator trimmer C14 for maximum output. Set the signal generator and receiver at 600 KC and adjust oscillator padder C 12 for maximum output.

Go back to 1600 KC and adjust oscillator trimmer C 14 for maximum output. Return to 600 KC and readjust oscillator padder C 12 for maximum output, rocking the main tuning condenser during this adjustment for maximum output. Set the receiver and signal generator at 1400 KC and adjust the RF trimmer for maximum output. This completes the alignment.



MODEL 6E51B

CONCORD RADIO CORP.

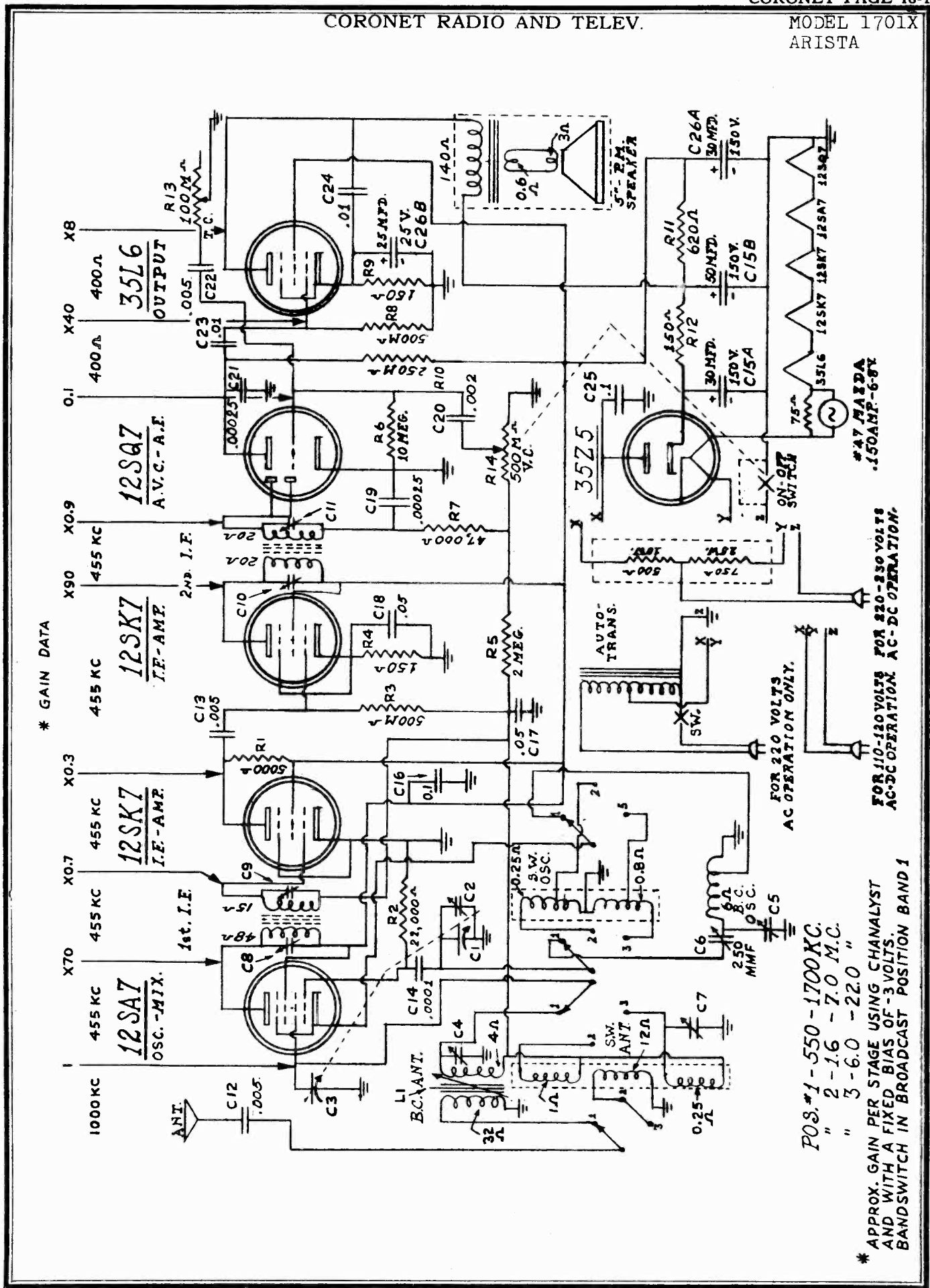
SOCKET	PIN	VTVM	20,000Ω P.V.	1,000Ω P.V.	RESISTANCE
12SA7GT CONV.	1	0	0	0	240K
	2	AC	AC	AC	35Ω
	3	+86	+86	+86	30K
	4	+86	+86	+86	30K
	5	-7.6	-6.2	-3	27K
	6	0	0	0	1Ω
	7	AC	AC	AC	15Ω
	8	-0.7	-0.4	-0.2	2MEGS.
12SK7GT 1-F AMPL.	1	0	0	0	240K
	2	AC	AC	AC	30Ω
	3	0	0	0	0
	4	-0.7	-0.4	-0.2	2MEGS.
	5	0	0	0	0
	6	+86	+86	+86	30K
	7	AC	AC	AC	40Ω
	8	+86	+86	+86	30K
12SQ7GT	1	0	0	0	240K
	2	-0.9	-0.6	-0.3	5MEGS.
	3	0	0	0	0
	4	-0.7	-0.5	-0.2	650K
	5	-0.7	-0.5	-0.2	650K
	6	+44	+42	+15	500K
	7	AC	AC	AC	15Ω
	8	0	0	0	0
50L6GT AUDIO OUTPUT	1	0	0	0	0
	2	AC	AC	AC	90Ω
	3	+115	+115	+115	28K
	4	+86	+86	+86	30K
	5	0	0	0	450K
	6	-0.7	-0.5	-0.2	650K
	7	AC	AC	AC	40Ω
	8	+6	+6	+6	150Ω
35Z5GT	1	-	-	-	-
	2	AC	AC	AC	120Ω
	3	AC	AC	AC	115Ω
	4	-	-	-	-
	5	AC	AC	AC	115Ω
	6	-	-	-	-
	7	AC	AC	AC	90Ω
	8	+120	+120	+120	28K

All voltage and resistance measurements were made with respect to B-
With a line voltage of 116 V. A.C.

Resistance from B- to chassis ground=240K

CORONET RADIO AND TELEV.

MODEL 1701X
ARISTA



CLARI-SKEMATIX

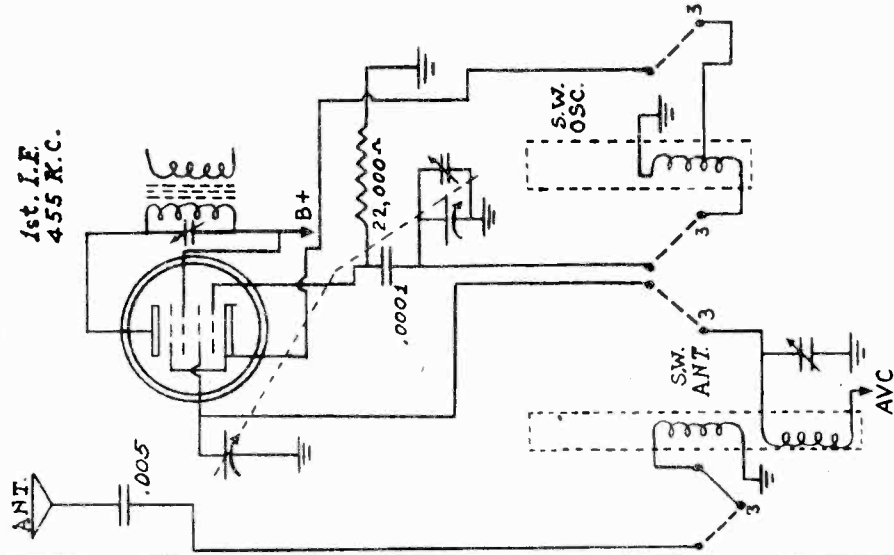
Registered Trademark

MODEL 1701X
ARISTA

CORONET RADIO AND TELEV.

12SA7
OSC.-MIX.

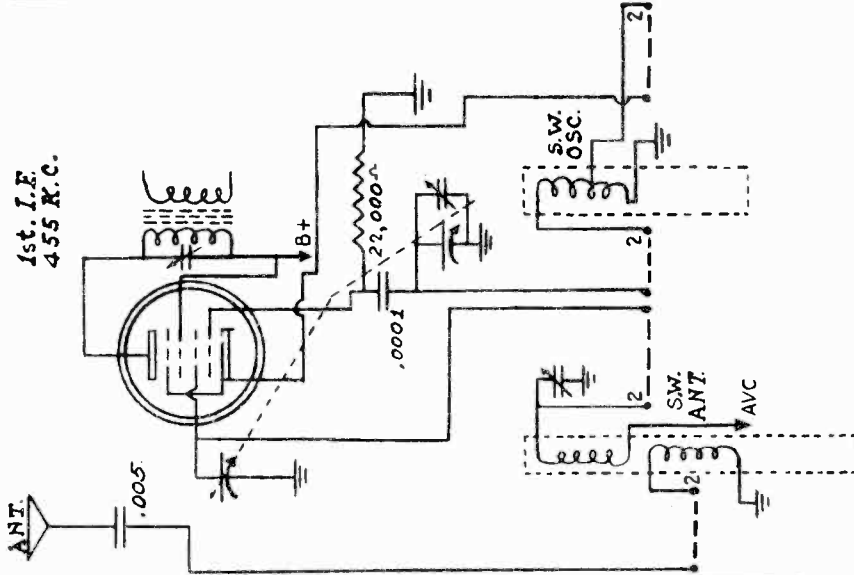
1st. I.F.
455 K.C.



BAND-SWITCH SHOWN
AT 3RD POSITION.
SHORT WAVE BAND
6.0 - 21.0 MC

12SA7
OSC.-MIX.

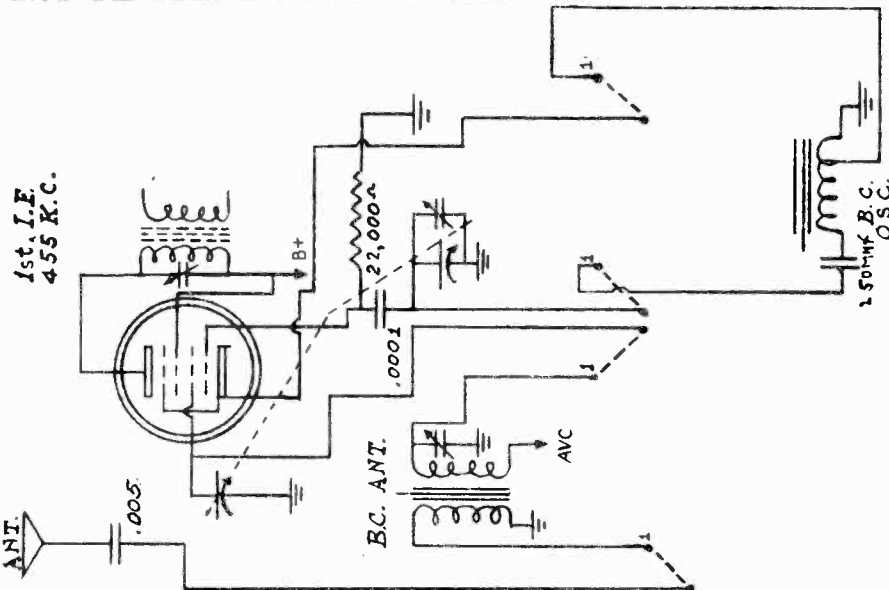
1st. I.F.
455 K.C.



BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND
1.7-7.0 MC

12SA7
OSC.-MIX.

1st. I.F.
455 K.C.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540-1700 KC

ALIGNMENT OF CORONET MODEL 1701X
I.F. ALIGNMENT

Connect an output meter across the voice coil.

Connect the signal generator to pin 8 of the 12SA7GT, through a 0.01 mf capacitor. Tune the signal generator to 455 KC, and fully mesh the main tuning capacitor of the receiver.

Keep the receiver volume control at maximum and the output of the signal generator sufficient to give a readable deflection on the output meter.

Adjust for maximum IF Trimmers C11, C10, C9, and C8.

R.F. - Osc. Adjustments.

The short wave band 3 should be tuned first, short wave band 2, second, and Broadcast band 1 last.

Turn the band switch clockwise to position 3.

Keep the same setup used for I.F. alignment; and apply a 16 mc. signal to antenna coupling capacitor C12, located on top rear of chassis. Tune the receiver to 16 mc. and adjust for maximum oscillator trimmer C2.

Adjust antenna trimmer C7 for maximum output at 16 mc.

Turn the band switch counter clockwise to position 2.

This band has no trimmer for the antenna coil, and since Oscillator trimmer C2 is used for both band 3 and 2, the calibration of band 2 is dependent on the calibration of band 3; And vice versa.

Tune the signal generator and receiver to 5 mc., and check the calibration of band 2. It should be fairly accurate. If it is off to any great extent, Oscillator trimmer C2 can be used to balance the discrepancy in frequency between band 3 and 2.

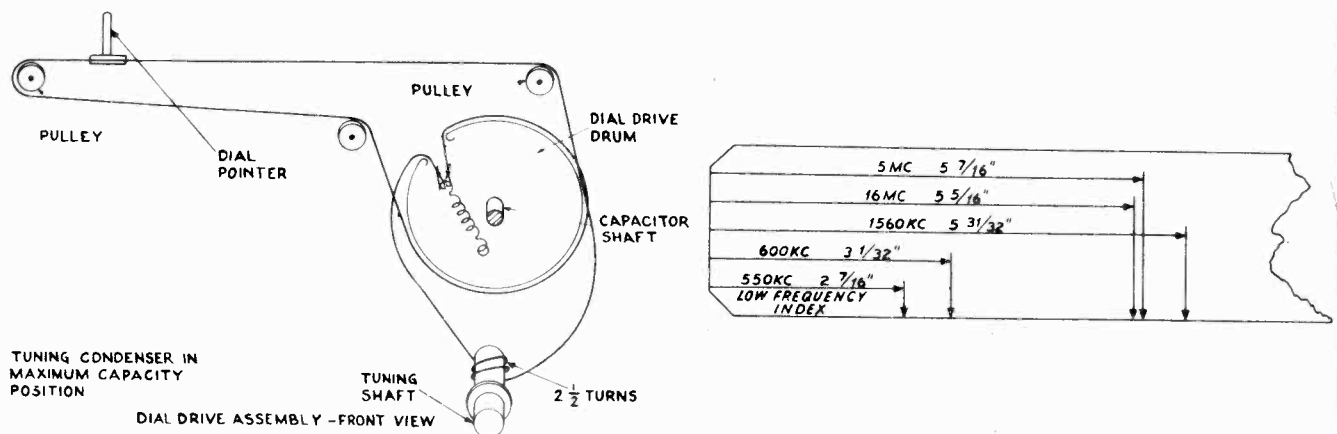
Turn the band switch counter clockwise to position 1 broadcast band.

Tune the signal generator and receiver to 1560 KC. Adjust oscillator trimmer C5 for maximum.

Tune the signal generator and receiver to 600 KC and adjust low frequency padder C6 for maximum while rocking the main tuning capacitor.

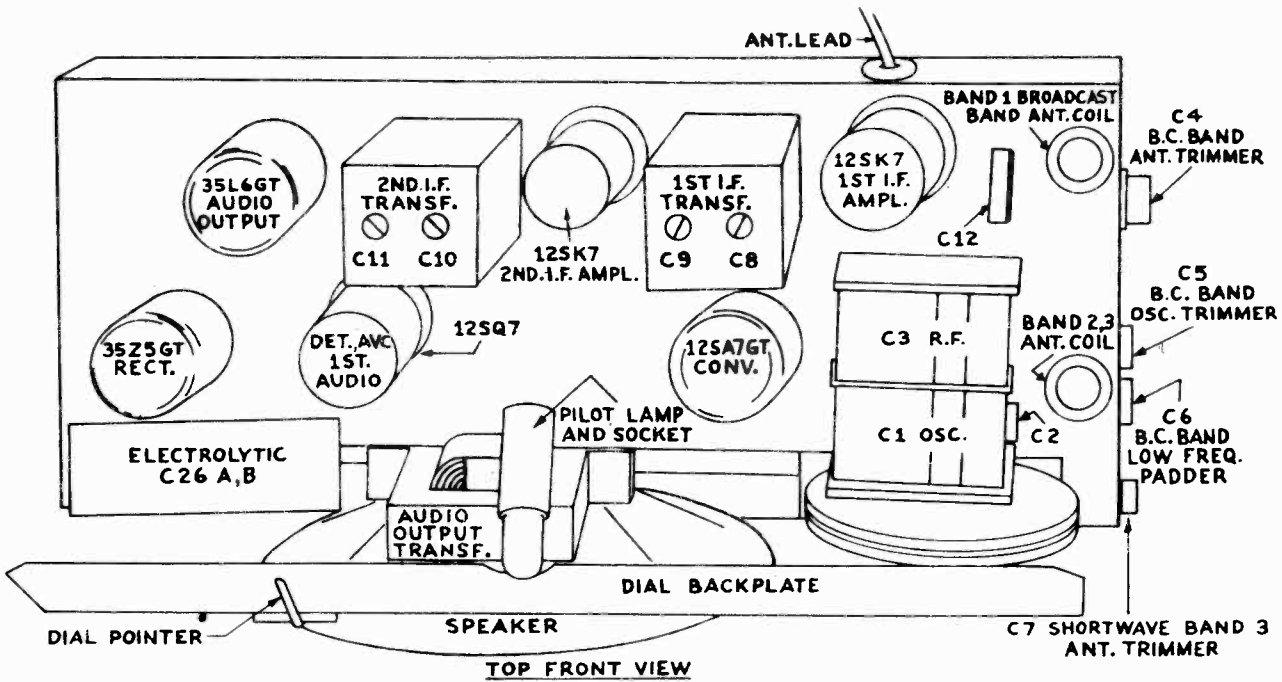
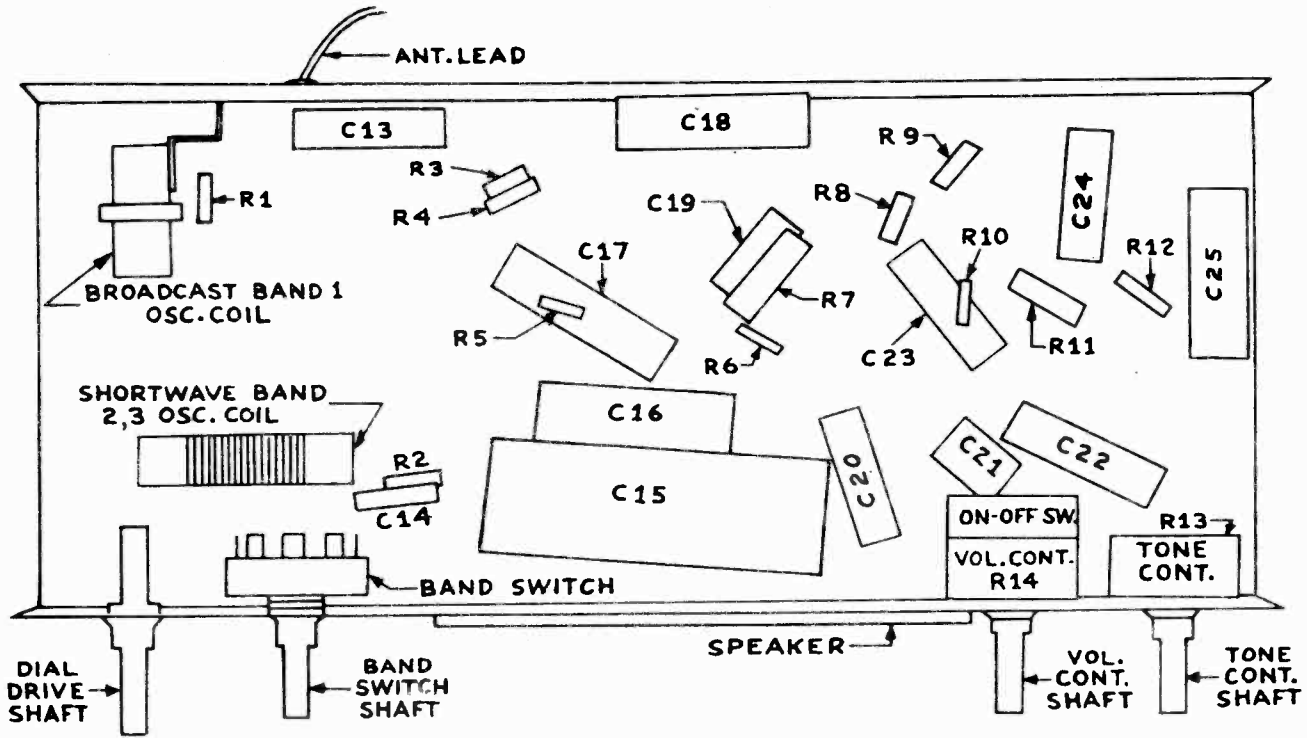
Tune the signal generator and receiver to 1560 KC and adjust antenna trimmer C4 for maximum output. Then tune the signal generator and receiver to 600 KC and adjust tuning slug L1 for maximum output.

The entire procedure for the broadcast band should be repeated for best results.



MODEL 1701X
ARISTA

CORONET RADIO AND TELEV



CORONET RADIO AND TELEV.

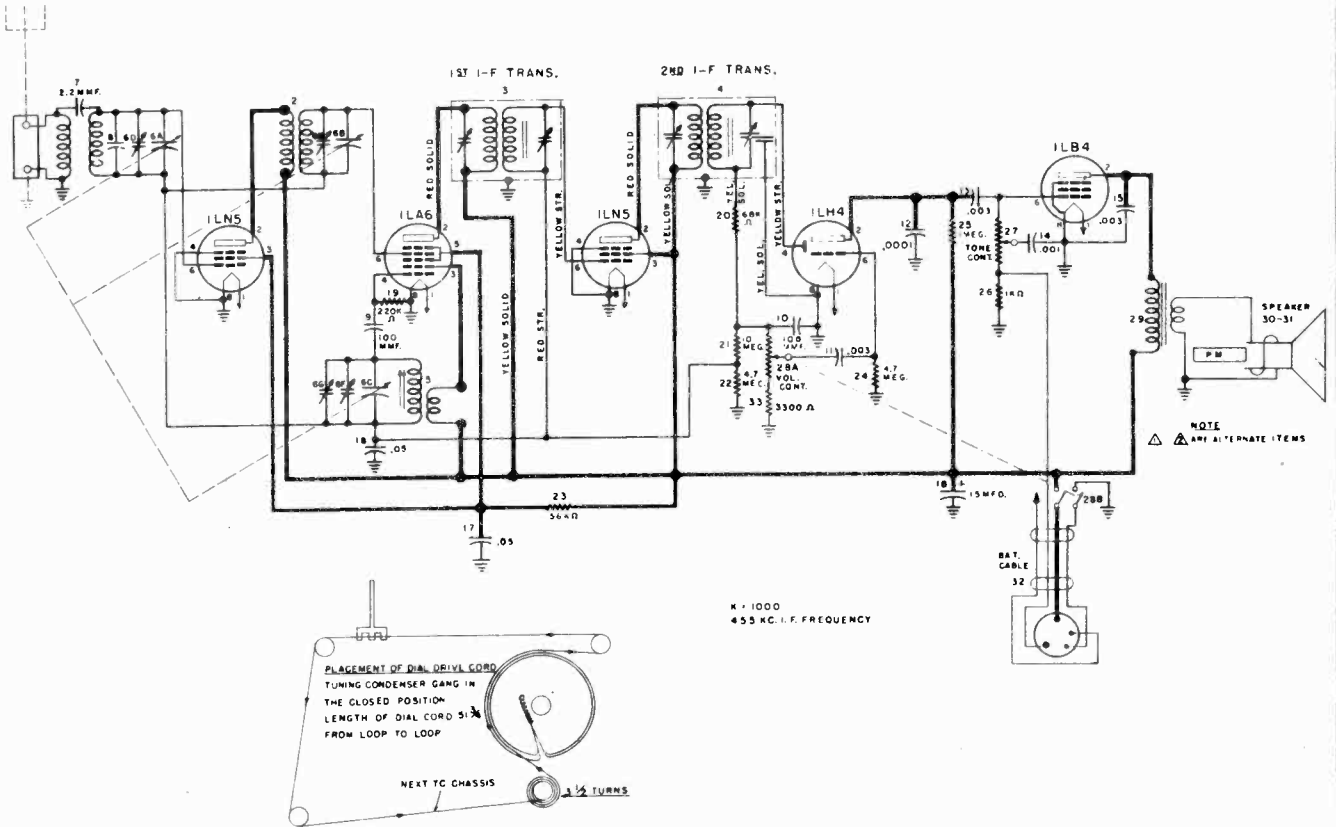
MODEL 1701X

TUBE	PIN	VTVM	20,000 OHM	1,000 OHM	ARISTA	
			P.V.	P.V.	RESISTANCE	
12SA7GT CONV.	1	0	0	0	0	
	2	AC	AC	AC	12 OHM	
	3	+90	+90	+90	OVER 1 MEG	
	4	+90	+90	+90	OVER 1 MEG	
	5	BAND,1, 550 KC.	-7	-5	-3.5	20K
		BAND,1, 1500 KC.	-9.5	-9	-5	20K
		BAND,2, 1600 KC.	-4	-3	-1.5	20K
		BAND,2, 7 mc.	-7	-5	-2.5	20K
		BAND 3, 6 mc.	-3	-1	-0.2	20K
		BAND 3, 22 mc.	-7.5	-2.5	-0.2	20K
		6	0	0	0	0.6 OHM
		7	0	0	0	24 OHM
		8	-0.5	-0.3	-0.1	2.6 MEG.
12SK7 1st I.F. Ampl.	1	0	0	0	0	
	2	AC	AC	AC	38 OHM	
	3	0	0	0	0	
	4	-0.5	-0.3	-0.1	2.6 MEG.	
	5	0	0	0	0	
	6	+90	+90	+90	OVER 1 MEG.	
	7	AC	AC	AC	24 OHM	
	8	+30	+30	+30	OVER 1 MEG.	
12SK7 2nd I.F. Ampl.	1	0	0	0	0	
	2	AC	AC	AC	38 OHM	
	3	+1.5	+1.5	+1.5	145 OHM	
	4	-0.5	-0.3	-0.1	3 MEG.	
	5	+1.5	+1.5	+1.5	145 OHM	
	6	+90	+90	+90	OVER 1 MEG.	
	7	AC	AC	AC	50 OHM	
	8	+90	+90	+90	OVER 1 MEG.	
12SQ7 DET. A.V.C. 1st AUDIO	1	0	0	0	0	
	2	-0.8	-0.5	-0.2	10 MEG.	
	3	0	0	0	0	
	4	-0.5	-0.3	-0.1	500K	
	5	-0.5	-0.3	-0.1	500K	
	6	+60	+58	+24	OVER 1 MEG.	
	7	AC	AC	AC	12 OHM	
	8	0	0	0	0	
35L6GT AUDIO OUTPUT	1	+5	+5	+5	180 OHM	
	2	AC	AC	AC	85 OHM	
	3	+105	+105	+105	OVER 1 MEG.	
	4	+112	+112	+112	OVER 1 MEG.	
	5	0	0	0	575 K	
	6	0	0	0	0	
	7	AC	AC	AC	50 OHM	
	8	+5	+5	+5	180 OHM	
35Z5 RECT	1	+110	+110	+110	OVER 1 MEG.	
	2	AC	AC	AC	115 OHM	
	3	AC	AC	AC	112 OHM	
	4	--	--	--	--	
	5	AC	AC	AC	112 OHM	
	6	--	--	--	--	
	7	AC	AC	AC	85 OHM	
	8	+120	+120	+120	OVER 1 MEG.	

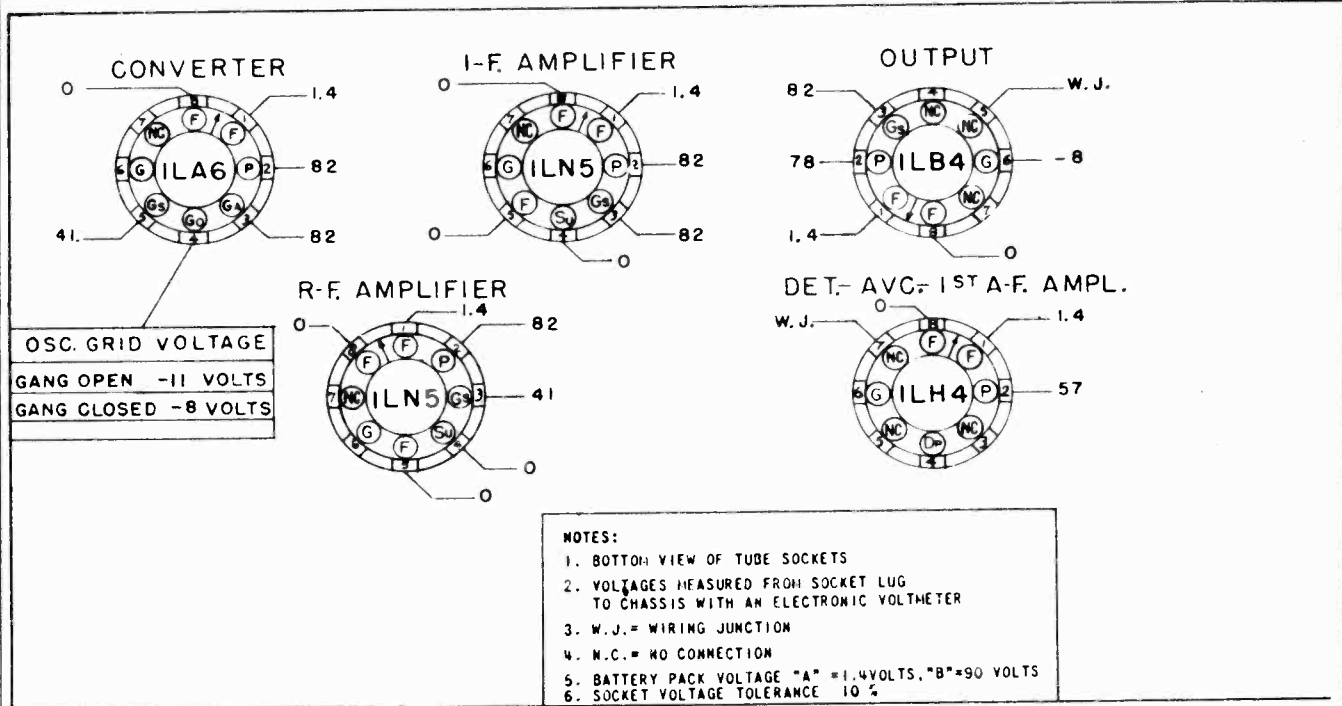
All voltage and resistance measurements made with respect to chassis ground and with a line voltage of 116 V.A.C. Band switch in broadcast position.

CROSLY DIV.
AVCO MFG. CORP.

MODEL 9-101



SCHMATIC DIAGRAM



SOCKET VOLTAGE CHART

ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be fed to the receiver as indicated in the alignment chart. Connect the low side (ground) of the signal generator to the chassis.
4. Turn the tone control to its treble position.
5. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

ALIGNMENT CHART

Alignment adjustment locations are shown on page 1, Chassis, Rear View.

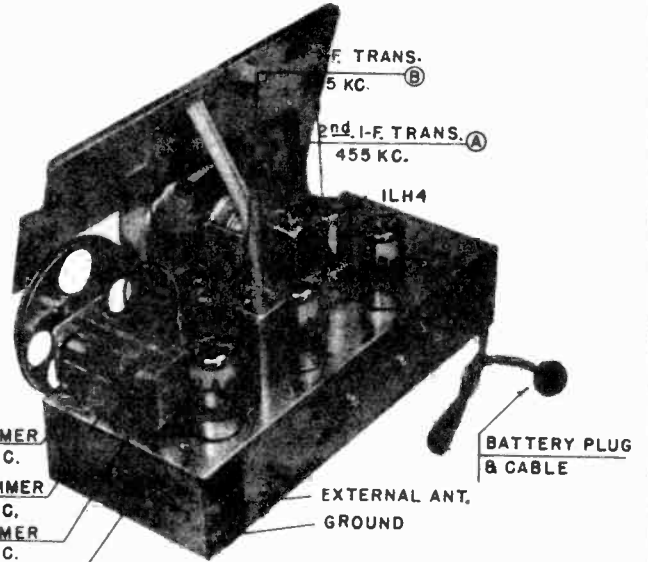
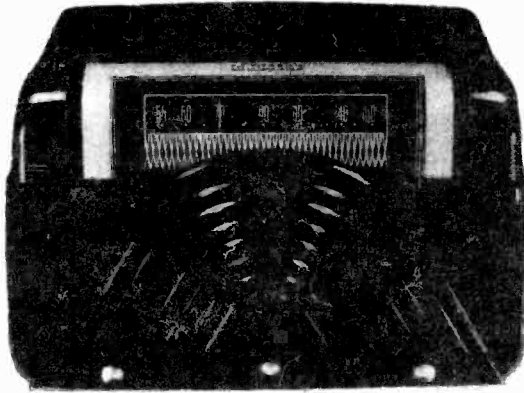
Alignment Sequence	Signal Generator Output			Position of Dial Pointer or Var. Cond.	Adjust for Maximum Output	Remarks
	Frequency in kc.	In Series With	To			
1	455	.01 mfd.	R.F. Grid	Closed	A & B	
2	600	.01 mfd.	R.F. Grid	600 kc.	C	Preset "G" to $\frac{1}{4}$ turn from the closed position and "E" to $\frac{1}{2}$ turn from its closed position.
3	1620	.01 mfd.	Ant.	Open	E	
4	1400	200 mmf.	Ant.	Tune to Signal	D & F	
5	600	200 mmf.	Ant.	Tune to Signal	C	Rock Gang.
6	Repeat steps 3, 4, and 5 until circuits align and dial tracks.					
7	Conclude alignment by repeating step 4.					

TUBE COMPLEMENT:

Type	Function		
1LA6	Mixer	1LN5	R. F. Amplifier
1LN5	I. F. Amplifier,	1LH4	Detector, AVC 1st A. F. Amplifier
		1LB4	A. F. Power Output

CROSLY DIV.
AVCO MFG. CORP.

MODEL 9-101



FREQUENCY RANGE: 540 to 1600 kc.

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: Crosley "A-B" Battery Pack, CR69.

VOLTAGE RATING: 1½ v. "A"; 90 v. "B".

POWER OUTPUT: 175 mw. maximum.

CHASSIS REAR VIEW

TYPE: Five-tube, single-band superheterodyne.

For satisfactory operation it is necessary that an antenna and ground be connected to this receiver.

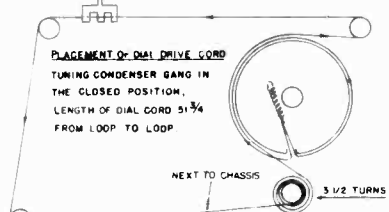
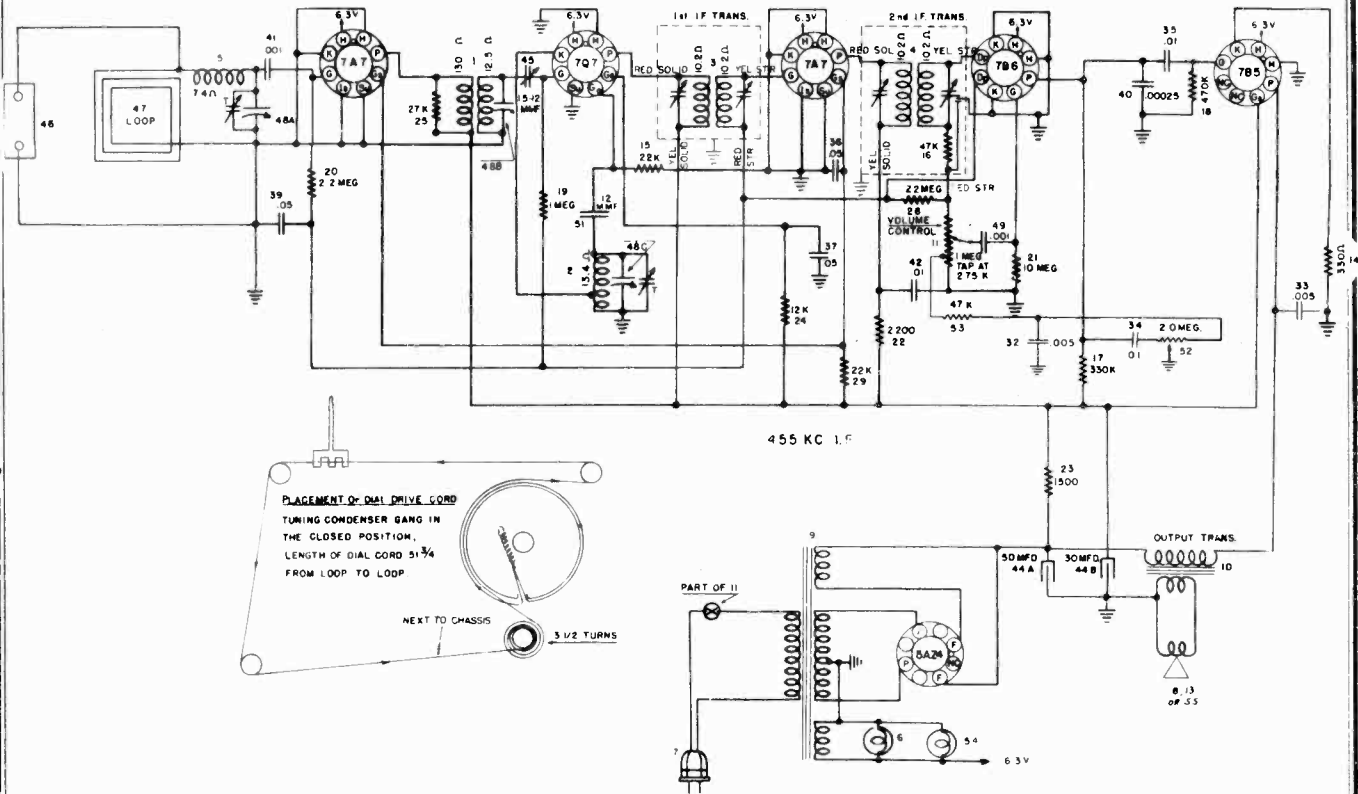
REPLACEMENT PARTS LIST—MODEL 9-101

Figures in first column correspond to figures in Schematic Diagram.

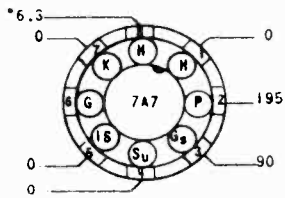
Item No.	Part No.	Description	Item No.	Part No.	Description
1	AW-142997	Coil, Antenna	24	39373-102	Resistor, 4.7 megohm, ½ w.
2	AW-142993	Coil, R.F.	25	39373-92	Resistor, 1 megohm, ½ w.
3	AC-143013	Transformer, 1st I.F.	26	39373-33	Resistor, 1000 ohm, ½ w.
4	AC-143034	Transformer, 2nd I.F.	27	39368-11	Control, Tone (2 megohm)
5	AW-142975	Coil, Oscillator	28A	39368-14	Control, Volume (1 megohm)
6A	AC-137073-20	Condenser, Variable	28B	39369-2	Switch, Power
6B		Condenser, Variable	29	B-143018	Transformer, Output
6C		Condenser, Variable	31	143688	Speaker
6D	Part of Item 6A	Condenser, Trimmer	32	B-130493	Cable and Plug Assy., Battery
6E	Part of Item 6B	Condenser, Trimmer	33	39373-44	Resistor, 3300 ohm, ½ w.
6F	Part of Item 6C	Condenser, Trimmer		R-138573-5	Cabinet
6G	Part of Item 6C	Condenser, Trimmer		C-143245	Dial Glass
7	W-137398-4	Condenser, 2.2 mmf., 500 v.		W-134055	Grommet, Var. Cond. Mtg.
8	C-137727-47	Condenser, 10 mmf., 500 v., ceramic		W-143041	Grommet, Battery Cable
9	C-137727-1	Condenser, 100 mmf., 300 v., ceramic		C-39012-81	Iron Core, Osc. Coil
10	C-137727-1	Condenser, 100 mmf., 300 v., ceramic		B-138574-4	Knob
11	39001-76	Condenser, .003 mfd., 600 v., paper		W-46065	Mounting (Rubber), Speaker
12	39001-1	Condenser, .0001 mfd., 600 v., paper		W-132366-2	Nut, Locking (Osc. Iron Core)
13	39001-76	Condenser, .003 mfd., 600 v., paper		B-143115	Pointer, Dial
14	39001-7	Condenser, .001 mfd., 600 v., paper		W-137939-1	Pulley, Drive Cord Idler
15	39001-76	Condenser, .003 mfd., 600 v., paper		W-51071	Ring, Retaining (Drive Shaft)
16	39001-17	Condenser, .05 mfd., 600 v., paper		B-135075-5	Shaft, Dial Drive
17	39001-17	Condenser, .05 mfd., 600 v., paper		39441	Socket, Tube
18	39358-13	Condenser, 16 mfd., 150 v., Elect.		W-51752	Spring, Dial Drive Cord
19	39373-80	Resistor, 220,000 ohm, ½ w.		B-138649	Strip, Dial Glass
20	39373-71	Resistor, 68,000 ohm, ½ w.		W-138568	Strip, Dial Pointer
21	39373-107	Resistor, 10 megohm, ½ w.		AC-138443-3	Support and Pulley Assy., Dial
22	39373-102	Resistor, 4.7 megohm, ½ w.		W-134916	Washer, Spring (Drive Shaft)
23	39373-69	Resistor, 56,000 ohm, ½ w.			

MODELS 9-102,
9-118W

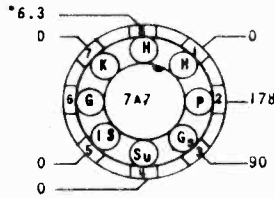
CROSLLEY DIV.
AVCO MFG. CORP.



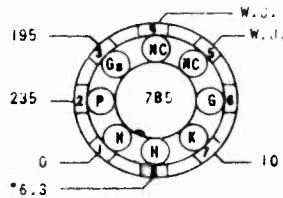
R. F. AMPLIFIER



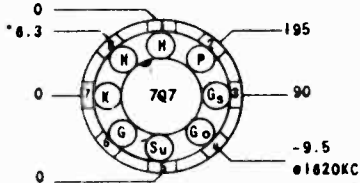
I. F. AMPLIFIER



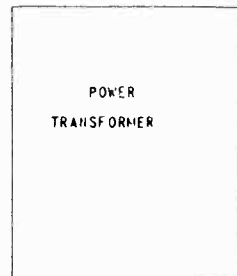
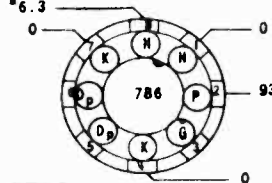
POWER OUTPUT



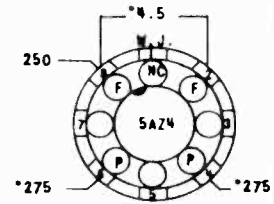
CONVERTER



DET.-AFC.-1st. A.F. AMPL.



RECTIFIER

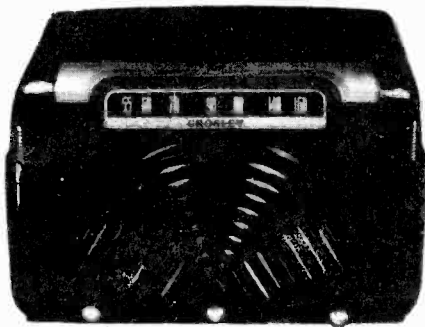


- NOTES:
1. Bottom View of Sockets
 2. Measure Voltage From Socket Lug To -B (Chassis)
 3. Voltages Measured With An Electronic Voltmeter
 4. W.J. = Wiring Junction.
 5. N.C. = No Connection.
 6. * = A.C. Voltage
 7. Voltage Tolerance, 10%
 8. Line Voltage 117 V, 60 ~ A.C.

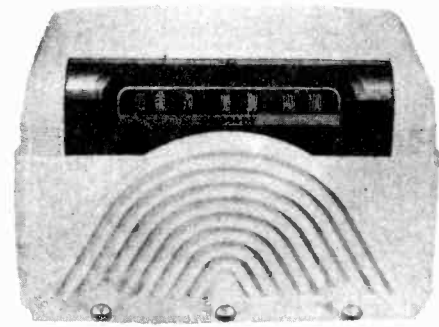
SOCKET VOLTAGE CHART

CROSLEY DIV.
AVCO MFG. CORP.MODELS 9-102,
9-118W

9-102,



9-118W

**ALIGNMENT PROCEDURE**

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the low frequency end of the dial scale.
2. Turn the tone control to the treble (clockwise) position.
3. Connect the output meter across the speaker voice coil.
4. The r. f. signal input from the signal generator should be connected through a condenser as indicated in the alignment chart. Connect the signal generator ground to the receiver chassis.
5. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.
6. Loop antenna must remain connected at all times.

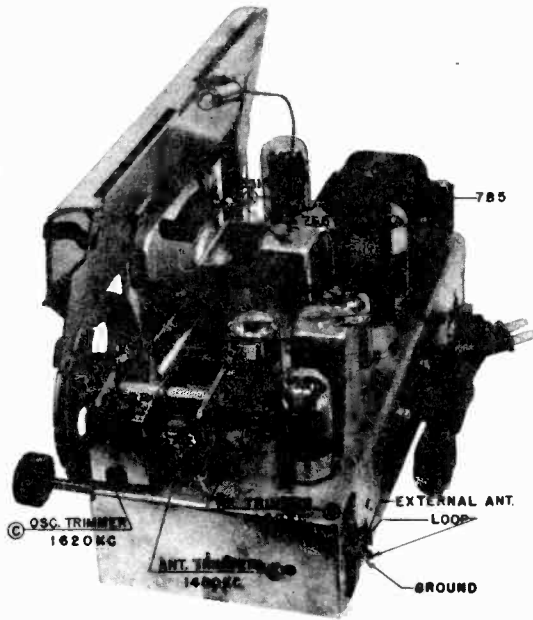
ALIGNMENT CHART

Alignment adjustments are shown in "CHASSIS, SIDE VIEW,"

Alignment Sequence	Signal Generator Output			Position of Tuning Dial or Var. Cond.	Adjust for Maximum Output
	Frequency in KC	In Series with	To		
1	455	.05 mfd.	Pin 6 7Q7	open	A & B
2	1620	4 mmf.	Top Ant. Clip	open 1620	C
3	1400	4 mmf.	Top Ant. Clip	1400	D
4	1400	4 mmf.	Top Ant. Clip	1400	E
5	1400	4mmf.	Top Ant. Clip	1400	Rock var. cond. and repeat 3 & 4

MODELS 9-102,
9-118W

CROSLLEY DIV.
AVCO MFG. CORP.



CHASSIS, SIDE VIEW

TYPE: Six-tube, single band, superheterodyne.

FREQUENCY RANGE: 540 to 1600 kc.

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: 60 cycle a. c. only

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 50 watts maximum

POWER OUTPUT: 2.5 watts maximum

TUBE COMPLEMENT:

TYPE	FUNCTION
7A7	R. F. Amplifier
7Q7	Converter
7A7	I. F. Amplifier
7B6	Detector, AVC, 1st A. F. Amplifier
7B5	A. F. Power Output
5AZ4	Rectifier

REPLACEMENT PARTS LIST—MODELS: 9-102, 9-118W

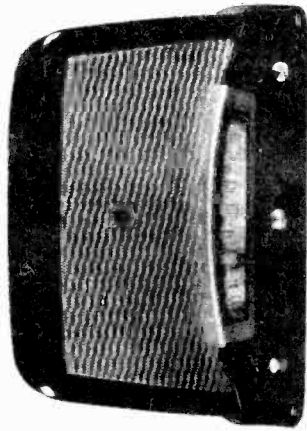
Figures in first column correspond to figures in Schematic Diagram

Item No.	Part No.	Description	Item No.	Part No.	Description
1	AW-137800	Coil, R. F.	41	39001-7	Condenser .001 mfd., 600 v., paper
2	AW-137724	Coil, Osc.	42	39001-13	Condenser, .01 mfd., 600 v., paper
3	AC-137933	Transformer, 1st I. F.	44A	B-136596	Condenser, 50 mfd., 300 v. } Two Sect.
4	AC-137934	Transformer, 2nd I. F.	44B		Condenser, 30 mfd., 300 v. } elect. filter
5	AW-138546	Coil, Antenna Loading	45	W-132267-1	Condenser, Trimmer
6	W-48858	Bulb (Dial), Type 47, 6.3 v., .15 amp.	46	AB-138584	Terminal Board
7	C-132300-1	Cable & Plug Assy., Power	47	AC-138464	Loop Antenna Assy.
9	B-135102	Transformer, Power	48A	AC-138595-2	Condenser, Variable } Three Sect.
10	B-138131-4	Transformer, Output	48B		Condenser, Variable }
11	39368-18	Control, Volume	48C		Condenser, Variable }
	39370-2	Shaft, Volume Control (Knurled)	49	39001-7	Condenser, .001 mfd., 600 v., paper
	39369-1	Switch, Power	51	C-137727-52	Condenser, 12 mmf., 500 v., ceramic
13	C-138246	Speaker	52	39368-11	Control, Tone
14	39373-23	Resistor, 330 ohm, ½ w.	53	39373-67	Resistor, 47,000 ohms, ½ w.
15	39373-60	Resistor, 22,000 ohms, ½ w.	54	W-48858	Bulb (Dial), Type 47, 6.3 v., .15 amp.
16	39373-67	Resistor, 47,000 ohms, ½ w.		C-137750	Back, Cabinet
17	39373-84	Resistor, 330,000 ohms, ½ w.		R-138573-1	Cabinet (9-102)
18	39373-87	Resistor, 470,000 ohms, ½ w.		R-138573-2	Cabinet (9-118W)
19	39373-92	Resistor, 1.0 megohm, ½ w.		D-143931	Dial
20	39373-97	Resistor, 2.2 megohms, ½ w.		AC-143143	Dial Plate Assy.
21	39373-107	Resistor, 10 megohms, ½ w.		W-134055	Grommet, Variable Condenser
22	39373-40	Resistor, 2,200 ohms, ½ w.		B-138574-5	Knob (9-102)
23	39372-7	Resistor, 1,500 ohms, 10 w.		B-138574-2	Knob (9-118W)
24	39373-165	Resistor, 12,000 ohms, 1 w.		B-143115	Pointer, Dial
25	39373-62	Resistor, 27,000 ohms, ½ w.		W-137939-1	Pulley, Idler
27	39373-97	Resistor, 2.2 megohm, ½ w.		W-51071	Ring, Retaining (Dial Drive Shaft)
28	39373-97	Resistor, 2.2 megohm, ½ w.		39220-36CP	Screw, Chassis Mtg.
29	39373-60	Resistor, 22,000 ohms, ½ w.		B-135075-5	Shaft, Drive
32	39001-11	Condenser, .005 mfd., 600 v., paper		W-46065	Shock Mount, Speaker
33	39001-11	Condenser, .005 mfd., 600 v., paper		D-136565-16	Socket, Dial Light
34	39001-13	Condenser, .01 mfd., 600 v., paper		39441	Socket, Tube
35	39001-13	Condenser, .01 mfd., 600 v., paper		W-51752	Spring, Dial Drive
36	39001-17	Condenser, .05 mfd., 600 v., paper		W-138568	Strip, Pointer
37	39001-17	Condenser, .05 mfd., 600 v., paper		W-132124-5	Trimount Stud, Cabinet Back
39	39001-17	Condenser, .05 mfd., 600 v., paper		W-134916	Washer, Spring (Dial Drive Shaft)
40	39001-73	Condenser, .00025 mfd., 600 v., paper			

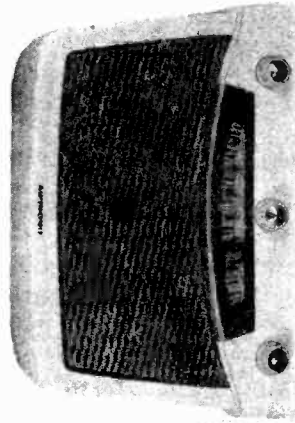
CROSLY DIV.
AVCO MFG. CORP.

MODELS 9-103,
9-104W

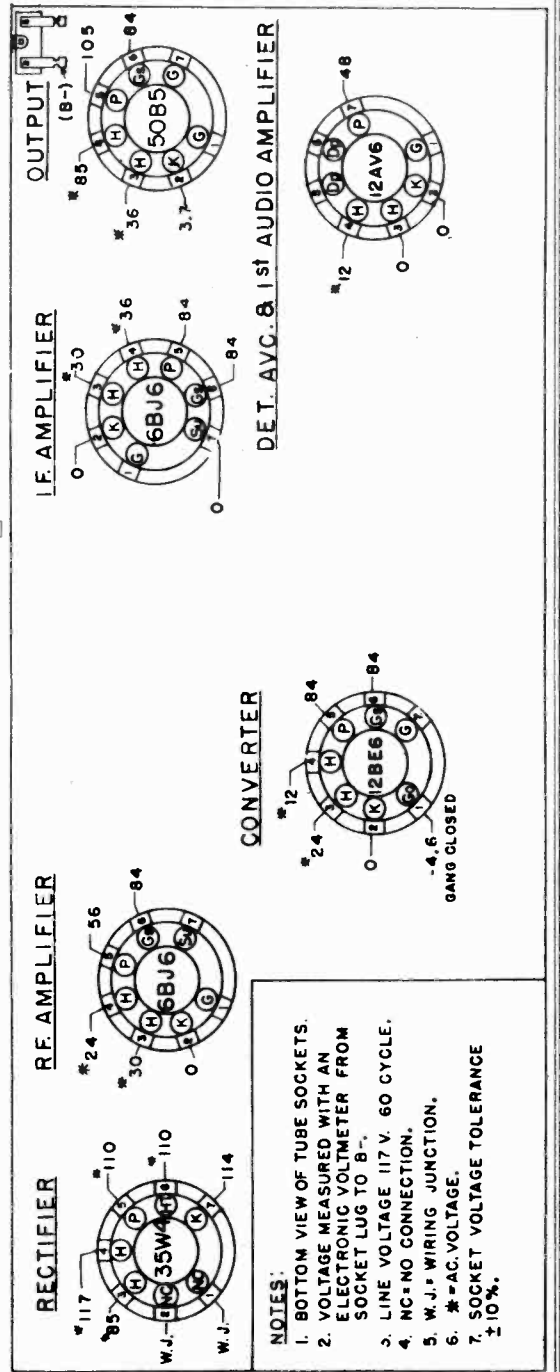
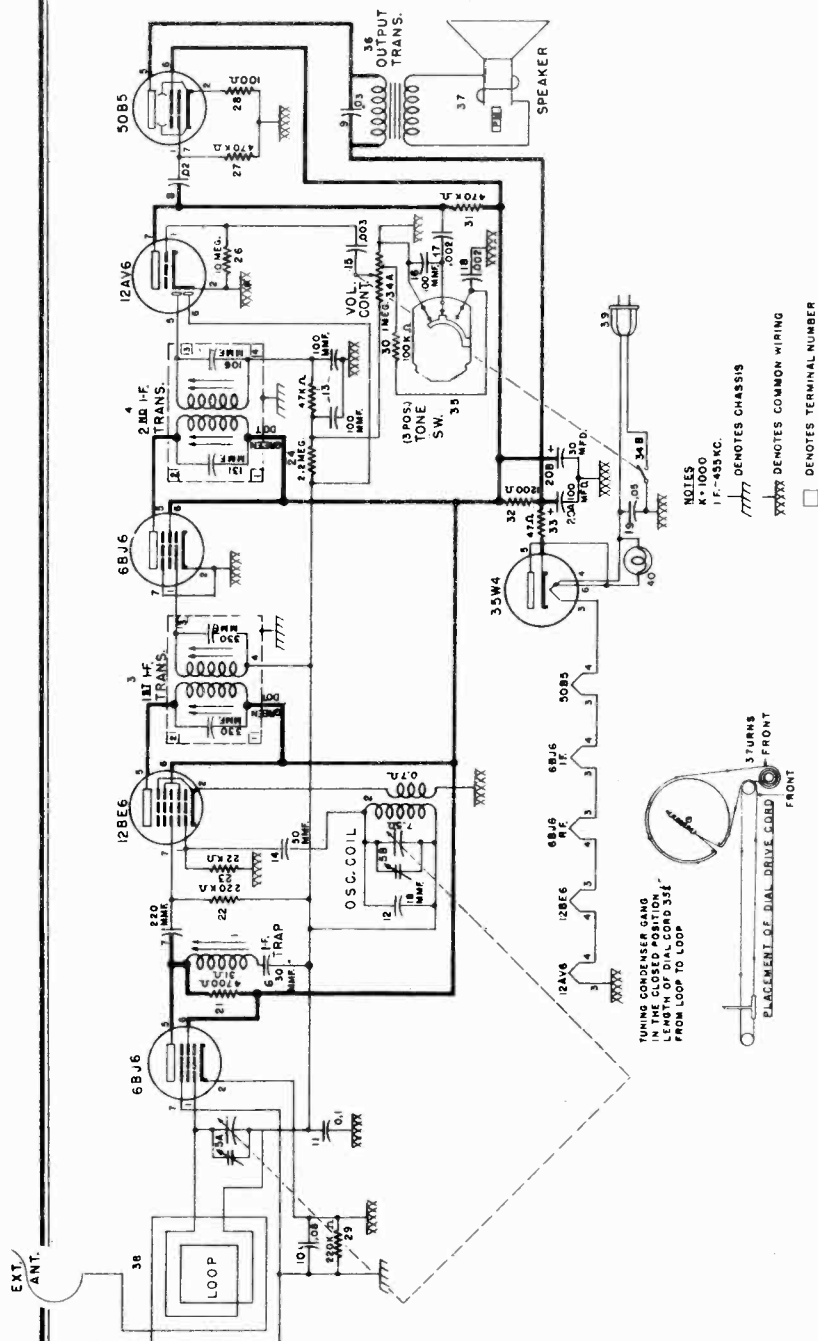
9-103



9-104W



SOCKET VOLTAGE CHART



MODELS 9-103,
9-104WCROSLEY DIV.
AVCO MFG. CORP.

ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference notch at the low frequency end of the dial background.
2. Turn the tone control to the treble (clockwise) position.
3. Connect the output meter across the speaker voice coil.
4. The r. f. signal input from the signal generator should be connected through a condenser as indicated in the alignment chart. Connect the signal generator ground through a 0.1 mfd. condenser to B— (pin 2 on 6BJ6 tube socket).
5. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.
6. Loop antenna must remain connected at all times.

ALIGNMENT NOTES

1. Turn I. F. trap core "A" counter-clockwise to stop.
2. To perform step 5 and 6, attach the chassis bottom to chassis and move loop antenna as far away from chassis as the loop brackets will permit.
3. Adjust for maximum output.

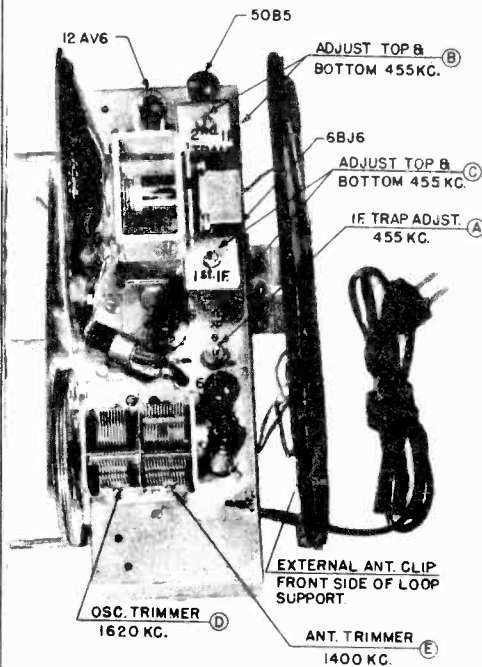
ALIGNMENT CHART

Alignment adjustments are shown in "CHASSIS VIEW,"

Alignment Sequence	Signal Generator Output			Position of Tuning Dial or Var. Cond.	Adjust	Remarks
	Frequency in KC	In Series with	To			
1					A	See Note 1
2	455	200 mmf.	Ant. Clip	open	B	See Note 3
3	455	200 mmf.	Ant. Clip	open	C	See Note 3
4	455	200 mmf.	Ant. Clip	open	A	Adj. for min. signal
5	1620	200 mmf.	Ant. Clip	open	D	See Note 2 and 3
6	1400	200 mmf.	Ant. Clip	Tune in Signal	E	See Note 2 and 3

CROSLEY DIV.
AVCO MFG. CORP.

MODELS 9-103,
9-104W



CHASSIS, VIEW

TYPE: Six-tube, single band, superheterodyne.

FREQUENCY RANGE: 540 to 1600 kc.

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: a.c.—d.c.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 30 watts nominal.

POWER OUTPUT: 1.5 watts maximum.

TUBE COMPLEMENT:

TYPE	FUNCTION
6BJ6	R. F. Amplifier
12BE6	Converter
6BJ6	I. F. Amplifier
12AV6	Detector, AVC 1st A. F. Amplifier
50B5	A. F. Power Output
35W4	Rectifier

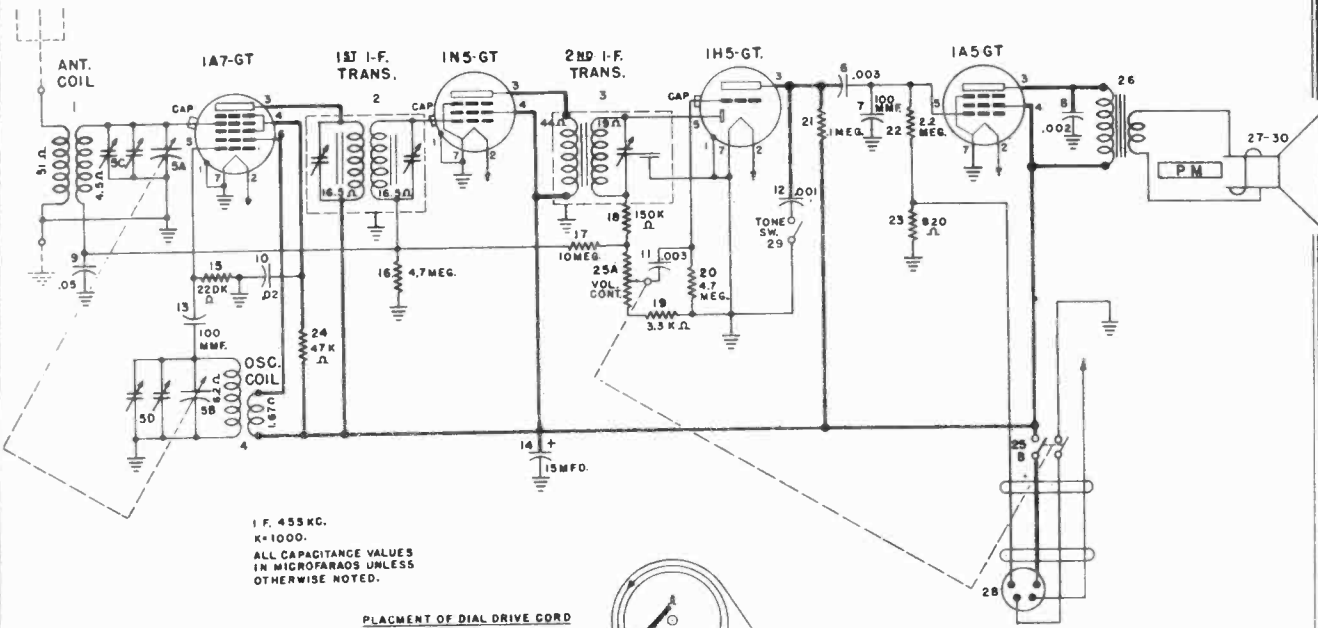
REPLACEMENT PARTS LIST

Figures in first column correspond to figures in Schematic Diagram

Item No.	Part No.	Description	Item No.	Part No.	Description
1	AW-143474	Coil, I.F. Trap	32	39373-144	Resistor, 1,200 ohms, 1 w.
2	AW-144325	Coil, Osc.	33	39373-119	Resistor, 47 ohms, 1/2 w.
3	AB-143678	Transformer, 1st I.F.	34	39368-14	Control, Volume, 1.0 meg.
4	AB-143679	Transformer, 2nd I.F.		39369-1	Switch, Power
5A	AC-137073-24	Condenser, Variable } Two	35	B-143494	Switch, Tone
5B		Condenser, Variable } Sect.	36	B-137723	Transformer, Audio
	Part of Item 5	Pulley	37	136420	Speaker
6	B-137498-12	Condenser, 30 mmf., 500 v., mica	38	AC-143698	Loop Antenna Assy.
7	B-137498-38	Condenser, 220 mmf., 500 v., mica	39	C-132300-1	Cable & Plug Assy., Power
8	39001-80	Condenser, .02 mfd., 600 v., paper	40	W-48858	Bulb (Dial) Type 47, 6.3 v., .15 amp.
9	39001-17	Condenser, .05 mfd., 600 v., paper		R-143113-1	Cabinet (9-103)
10	39001-19	Condenser, .1 mfd., 600 v., paper		R-143113-2	Cabinet (9-104W)
11	39001-19	Condenser, .1 mfd., 600 v., paper		W-131154-1	Cotter, External
12	C-137727-66	Condenser, 18 mmf., 500 v., ceramic		C-143884	Dial
13	B-142951-2	Filter Assy., Diode		B-143907	Escutcheon
14	C-137727-21	Condenser, 50 mmf., 500 v., ceramic		W-143514	Foot, Rubber
15	39001-76	Condenser, .003 mfd., 600 v., paper		AW-143791	Grille Cloth & Baffle Assy.
16	B-143686-3	Condenser, 100 mmf., 500 v., ceramic		39012-87	Iron Core, I.F. Trap
17	39001-74	Condenser, .002 mfd., 600 v., paper		39012-89	Iron Core, 1st I.F.
18	39001-74	Condenser, .002 mfd., 600 v., paper		39012-89	Iron Core, 2nd I.F.
19	39001-17	Condenser, .05 mfd., 600 v., paper		B-138576-8	Knob (9-103)
20A	B-143680	Condenser, 100 mfd., 150 v. } Two Sect.		B-138576-7	Knob (9-104W)
20B		Condenser, 30 mfd., 150 v. } Elect. Fil.		143289	Pointer, Dial
21	39373-47	Resistor, 4,700 ohms, 1/2 w.		W-137939-2	Pulley, Idler
22	39373-80	Resistor, 220,000 ohms, 1/2 w.		39156-49CP	Screw, Chassis Mtg.
23	39373-60	Resistor, 22,000 ohms, 1/2 w.		B-135075-2	Shaft, Drive
24	39373-97	Resistor, 2.2 megohms, 1/2 w.		W-46065	Shock Mount, Variable Cond.
26	39373-107	Resistor, 10 megohms, 1/2 w.		D-136565-25	Socket, Dial Light
27	39373-87	Resistor, 470,000 ohms, 1/2 w.		W-51752	Spring, Dial Drive
28	39373-14	Resistor, 100 ohms, 1/2 w.		C-135038-12	Terminal Strip, Two Lug
29	39373-80	Resistor, 220,000 ohms, 1/2 w.		C-135038-15	Terminal Strip, Three Lug
30	39373-74	Resistor, 100,000 ohms, 1/2 w.		W-134916	Washer, Dial Drive
31	39373-87	Resistor, 470,000 ohms, 1/2 w.			

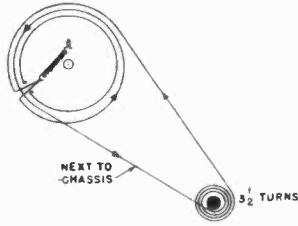
CROSLLEY DIV.
AVCO MFG. CORP.

MODEL 9-117

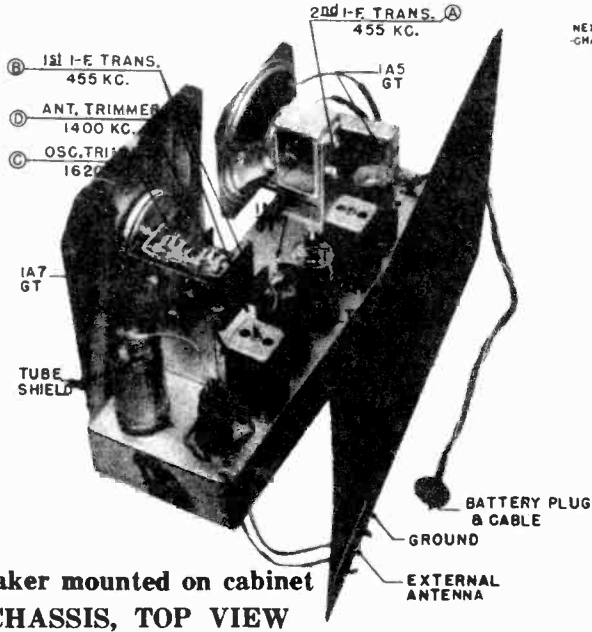


I F. 455 KC.
K=1000.
ALL CAPACITANCE VALUES
IN MICROFARADS UNLESS
OTHERWISE NOTED.

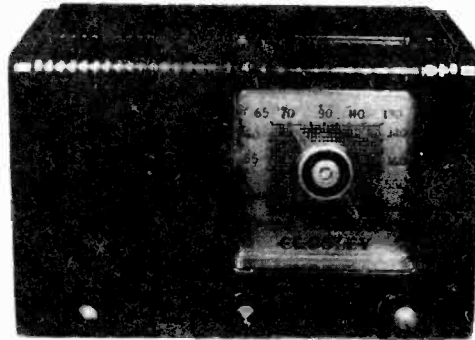
PLACEMENT OF DIAL DRIVE CORD
TUNING CONDENSER GANG IN
THE CLOSED POSITION.
LENGTH OF DIAL CORD 2 1/2 INCHES
FROM LOOP TO LOOP.



MODEL 9-117



Speaker mounted on cabinet
CHASSIS, TOP VIEW

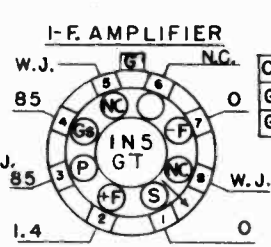
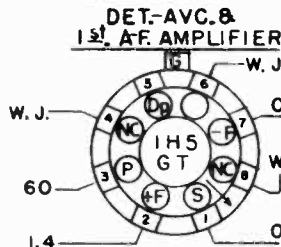
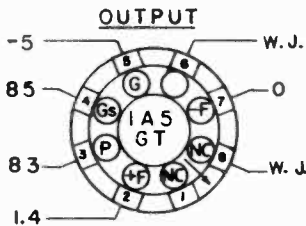
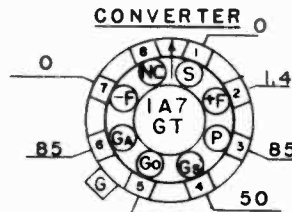


SOCKET VOLTAGE CHART

NOTES:

1. BOTTOM VIEW OF TUBE SOCKETS.
2. VOLTAGES MEASURED FROM SOCKET LUG TO CHASSIS WITH AN ELECTRONIC VOLTMETER.
3. W.J.= WIRING JUNCTION.

4. N.C.= NO CONNECTION.
5. BATTERY PACK VOLTAGE "A"=1.4V. "B"=90 V.
6. SOCKET VOLTAGE TOLERANCE 10%.



OSCILLATOR GRID VOLTS
GANG OPEN -9 VOLTS
GANG CLOSED -5VOLTS

CROSLY DIV.
AVCO MFG. CORP.
ALIGNMENT PROCEDURE

MODEL 9-117

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer in a horizontal position.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the antenna terminal as indicated in the alignment chart. Connect the low side (ground) of the signal generator to the chassis.
4. Turn the volume control on full and the tone control to treble. Adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

ALIGNMENT CHART

Alignment Sequence	Signal Generator Output		Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Tuning Dial	
1	455	200 mmf.	Ant.	540	A & B
2	1620	200 mmf.	Ant.	1620	C
3	1400	200 mmf.	Ant.	1400	D

TYPE: Four-tube, single-band superheterodyne.

TUBE COMPLEMENT:

FREQUENCY RANGE: 540 to 1600 kc.

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: Crosley "A-B" Battery Pack, CR69.

VOLTAGE RATING: 1½ v. "A"; 90 v. "B".

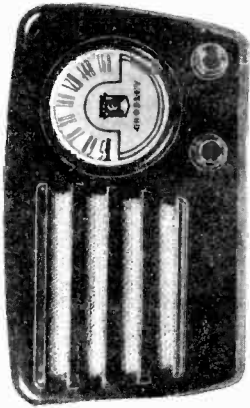
POWER OUTPUT: 150 mw. maximum.

TYPE	FUNCTION
1A7GT/G	Mixer
1N5GT/G	I.F. Amplifier
1H5GT/G	Detector, AVC, 1st A.F. Amplifier
1A5GT/G	A.F. Power Output

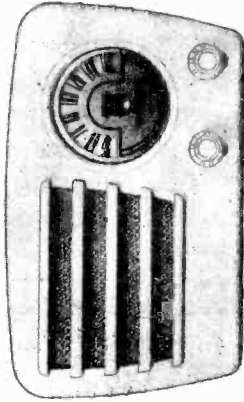
For satisfactory operation it is necessary that an antenna and ground be connected to this receiver.

Item No.	Part No.	Description	Item No.	Part No.	Description
1	AW-142997	Coil, Antenna	24	39373-67	Resistor, 47,000 ohm, ½ w.
2	AW-134348	Transformer, 1st I.F.	25A	39368-14	Control, Volume (1.0 megohm)
3	AW-134349	Transformer, 2nd I.F.	25B	39369-2	Switch, Power
4	AW-143261	Coil, Oscillator	26	B-138131-6	Transformer, Output
5A	B-143204	Condenser, Variable	27	AD-139631	Speaker
5B		Condenser, Variable	28	B-130493	Cable & Plug Assy., Battery
5C	Part of Item 5A	Condenser, Trimmer	W-143207		Switch, Tone
5D	Part of Item 5B	Condenser, Trimmer	AC-143274		Back Assy., Cabinet
6	39001-76	Condenser, .003 mfd., 600 v., Paper	R-143226		Cabinet
7	C-137727-1	Condenser, 100 nf., 300 v., Ceramic	W-134667		Clip, Dial Pointer
8	39001-74	Condenser, .002 mfd., 600 v., Paper	AB-143234		Dial & Support Assy.
9	39001-17	Condenser, .05 mfd., 600 v., Paper	W-143290		Grille Cloth
10	39001-80	Condenser, .02 mfd., 600 v., Paper	B-138576-4B		Knob
11	39001-76	Condenser, .003 mfd., 600 v., Paper	B-132258		Lens, Dial
12	39001-7	Condenser, .001 mfd., 600 v., Paper	W-45580		Mounting Rubber, Var. Cond. Mtg.
13	137727-1	Condenser, 100 mmf., 300 v., Ceramic	B-143252		Pointer, Dial
14	B-143027	Condenser, 15 mfd., 100 v., Elect. Filter	W-51071		Ring, Retaining (Dial Drive Shaft)
15	39373-80	Resistor, 220,000 ohms, ½ w.	39296-29CP		Screw, Chassis Mtg.
16	39373-102	Resistor, 4.7 megohm, ½ w.	W-143206		Shaft, Dial Drive
17	39373-107	Resistor, 10.0 megohm, ½ w.	G-39204		Socket, Tube
18	39373-77	Resistor, 150,000 ohm, ½ w.	W-51752		Spring, Dial Drive Cord
19	39373-44	Resistor, 3300 ohm, ½ w.	W-136630		Stud, Trimount (Dial Lens Mtg.)
20	39373-102	Resistor, 4.7 megohm, ½ w.	W-132124		Stud, Trimount (Cabinet Back)
21	39373-92	Resistor, 1.0 megohm, ½ w.	W-134916		Washer, Spring (Dial Drive Shaft)
22	39373-97	Resistor, 2.2 megohm, ½ w.	CR-69		"A-B" Battery Pack
23	39373-32	Resistor, 820 ohm, ½ w.			

9-119



9-120W



TUBE COMPLEMENT

Type	Function
12BE6	Converter
12BA6	I. F. Amplifier
12AT6	Detector, AVC, 1st A.F. Amplifier
50B5	A.F. Power Output
35W4	Rectifier

TYPE: Five-tube, single band, Superheterodyne.

FREQUENCY RANGE: 540 to 1600 kc.

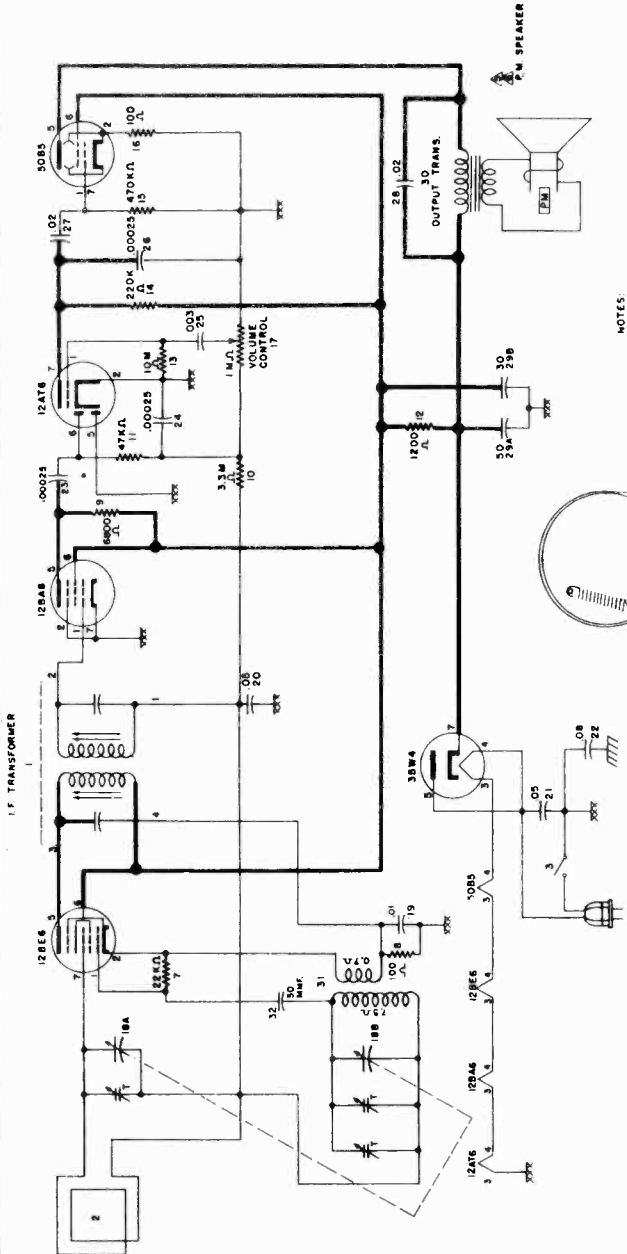
INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: a.c.-d.c.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 30 watts.

POWER OUTPUT: 1.5 watts maximum.



- NOTES:
1. K=1000
 2. M=1000000
 3. μ =.000001
 4. ALL CAPACITANCE VALUES IN MFD. UNLESS OTHERWISE NOTED
 5. /TTTT/ DENOTES CHASSIS GROUND
 6. XXX DENOTES COMMON WIRING OMITTED FROM DRAWING FOR SAKE OF CLARITY



TUNING CONDENSER GANG
IN CLOSED POSITION,
LENGTH OF DIAL CORD
118 INCHES FROM LOOP
TO LOOP.

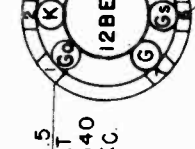
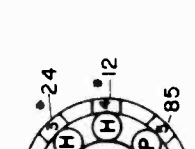
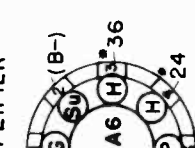
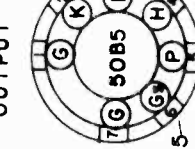
3 TURNS
TOWARD
CHASSIS

OUTPUT

I. F. AMPLIFIER

RECTIFIER

DET., AVC., 1st A.F. AMPL.



- NOTES:
1. BOTTOM VIEW OF TUBE SOCKETS.
 2. MEASURE VOLTAGE WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO B-PIN 2 ON THE 12BA6.
 3. LINE VOLTAGE 117V 60 ~
 4. NC=NO CONNECTION
 5. WJ=WIRING JUNCTION
 6. * = AC. VOLTAGE
 7. SOCKET VOLTAGE TOLERANCE $\pm 10\%$

SOCKET VOLTAGE CHART

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MODELS 9-119,
9-120W

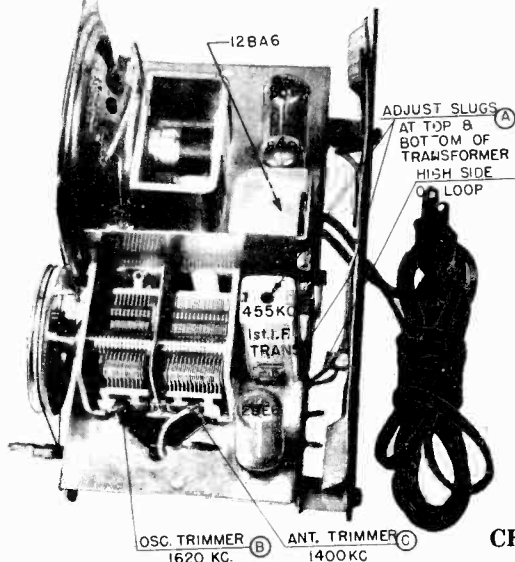
ALIGNMENT PROCEDURE

1. Connect an output meter across the speaker voice coil.
2. The r.f. signal input from the signal generator should be connected to the high side of loop antenna. Connect the signal generator ground through a 0.1 mfd. condenser to B— (pin 2 on 12BA6 tube socket).
3. Turn the volume control on full and adjust the signal generator output to produce approximately midscale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

ALIGNMENT CHART

Alignment Sequence	Signal Generator Output			Position of Dial Pointer	Adjust for Maximum Output
	Frequency in kc.	In Series with	To		
1	455	200 mmf.	High Side of Loop	1620	A
2	1620	*Radiated to Loop		1620	B
3	1400	*Radiated to Loop		1400	C

* Place signal generator output lead near the loop antenna.



CHASSIS, TOP VIEW

When using direct current it may be necessary to reverse the position of the power plug in the electric outlet for correct polarity.

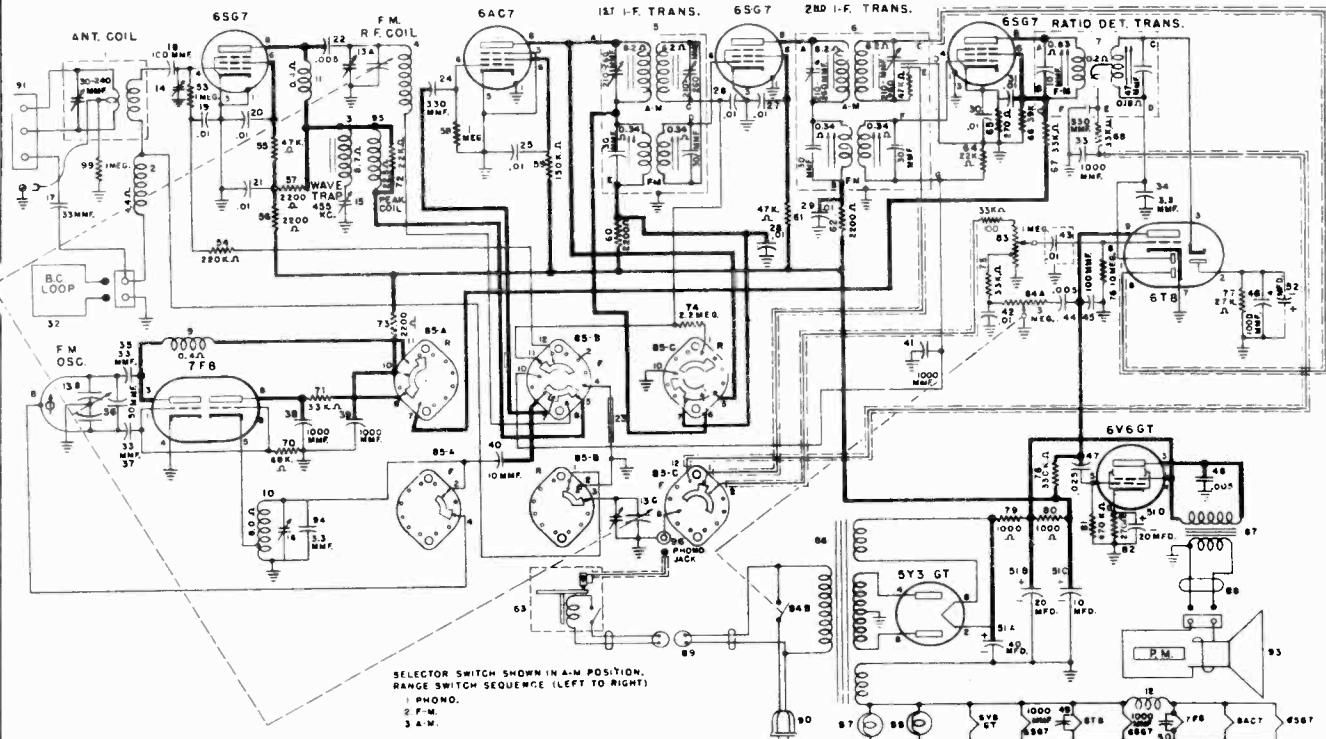
Reversing the position of the power plug when alternating current is used may reduce hum.

Under no circumstances should a ground be connected to this receiver.

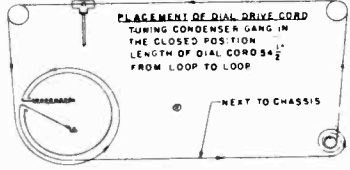
1	139919	Transformer, I.F.	24	39001-73	Condenser, 250 mmf., 600 v., paper
2	139873	Antenna Loop and Back Assy.	25	39001-76	Condenser, .003 mfd., 600 v., paper
3	39369-1	Switch, Power	26	39001-73	Condenser, 250 mmf., 600 v., paper
4	142769	Cable and Plug Assy., Power	27	39001-80	Condenser, .02 mfd., 600 v., paper
5	138459	Speaker (Less Transformer)	28	39001-80	Condenser, .02 mfd., 600 v., paper
7	39373-60	Resistor, 22,000 ohm, 1/2 w.	29A	136770	Condenser, 50 mfd., 150 v. } Two Sect.
8	39373-14	Resistor, 100 ohm, 1/2 w.	29B		Condenser, 30 mfd., 150 v. } Elec. Filt.
9	39373-161	Resistor, 6,800 ohm, 1 w.	30	138131-1	Transformer, Output
10	39373-100	Resistor, 3.3 megohm, 1/2 w.	31	144325	Coil Assy., Oscillator
11	39373-67	Resistor, 47,000 ohm, 1/2 w.	32	137727-21	Condenser, 50 mmf., 500 v., ceramic
12	39373-144	Resistor, 1,200 ohm, 1 w.		144244-1	Cabinet (9-119)
13	39373-107	Resistor, 10 megohm, 1/2 w.		144242	Cabinet (9-120W)
14	39373-80	Resistor, 220,000 ohm, 1/2 w.		144243	Dial
15	39373-87	Resistor, 470,000 ohm, 1/2 w.		144240	Grill Cloth
16	39373-14	Resistor, 100 ohm, 1/2 w.		139925-1	Knob (9-119)
17	39368-14	Control, Volume (1 megohm)		139925-2	Knob (9-120W)
18A	137073-17	Condenser, Variable } Two		144239	Pointer Disc, Dial
18B		Condenser, Variable } Section		144224	Ring, Calibrated Dial
19	39001-13	Condenser, .01 mfd., 600 v., paper		51071	Ring, Retaining
20	39001-17	Condenser, .05 mfd., 600 v., paper		135075-4	Shaft, Drive
21	39001-17	Condenser, .05 mfd., 600 v., paper		39462-1	Socket, Tube
22	39001-19	Condenser, .1 mfd., 600 v., paper		51752	Spring, Dial Drive Cord
23	39001-73	Condenser, 250 mmf., 600 v., paper		132124	Stud, Trimount
				134916	Washer, Spring

MODELS 9-201,
9-202M, 9-203B

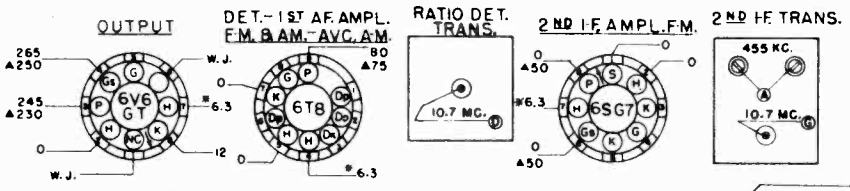
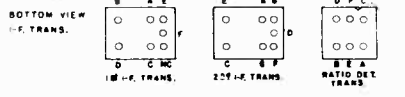
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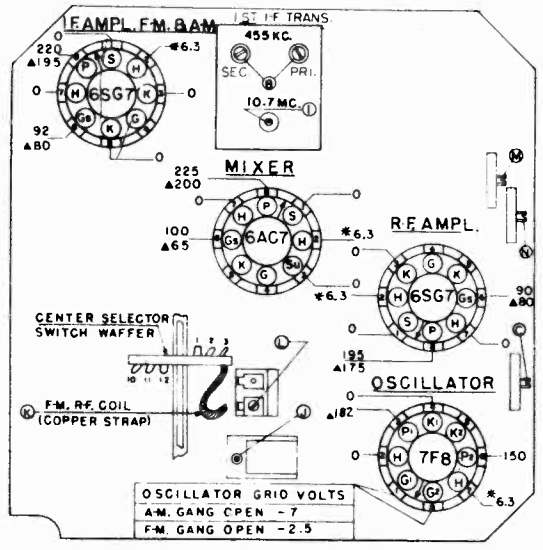
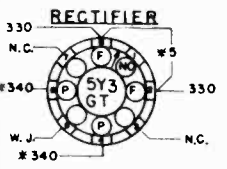
SELECTOR SWITCH SHOWN IN A-M POSITION.
RANGE SWITCH SEQUENCE (LEFT TO RIGHT)
1 PHONO.
2 F-M.
3 A-M.



- NOTES
1. I-F, 10.7 MC F.M.
2. I-F, 455 KC. A.M.
3. K=1000
4. ALL CAPACITANCE VALUES IN MICROFARADS UNLESS OTHERWISE NOTED
5. χ DENOTES CHASSIS
6. TEM 10 100 13K χ RESISTOR MAY BE OMITTED ON SOME RECEIVERS.



- NOTES:
1. BOTTOM VIEW OF SOCKETS.
2. VOLTAGE MEASURED FROM SOCKET LUG TO CHASSIS WITH AN ELECTRONIC VOLTMETER.
3. VOLTAGE MEASURED WITH SWITCH IN A.M. POSITION EXCEPT WHERE MARKED WITH DELTA (Δ).
4. Δ SELECTOR SWITCH IN F.M. POSITION.
5. W.J. WIRING JUNCTION. N.C. NO CONNECTION. * AC VOLTAGE.
6. ALL VOLTAGES TAKEN AT NOMINAL OPERATING VOLTAGE, 117 V., 60 \sim
7. SOCKET VOLTAGE TOLERANCE 10%



SOCKET VOLTAGE CHART

SOCKET VOLTAGE TOLERANCE 10%

OSCILLATOR GRID VOLTS
A-M. GANG OPEN - 7
F-M. GANG OPEN - 2.5

**CROSLEY DIV.
AVCO MFG. CORP.
REPLACEMENT CABINET PARTS—MODEL 9-201**

MODELS 9-201,
9-202M, 9-203B

Item No.	Part No.	Description	Item No.	Part No.	Description
	144113	Baffle, Speaker		143734	Pull, Record Changer Drawer
	143403	Cabinet		143485	Rubber Bumper
	143733	Drawer, Panel, Record Changer		143478	Slides, Record Changer Drawer
	143735	Grille Cloth			

REPLACEMENT CABINET PARTS—MODEL 9-202M

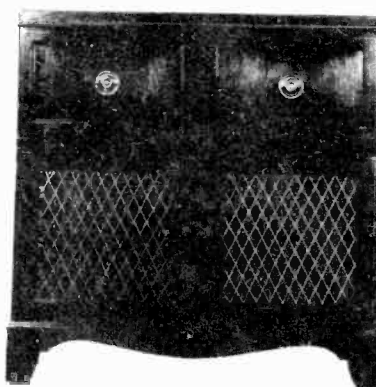
Item No.	Part No.	Description	Item No.	Part No.	Description
	143957	Baffle, Speaker		143510	Leg and Base Assy. (Side)
	143458	Cabinet		143491	Pull, Drawer and Radio Compartment
	139319-SB	Catch and Strike Assy.		142912-EA	Pull Record Compartment Door
	143504	Drawer Panel and Radio Compartment Door		143504	Radio Dial Panel
	143956	Grille Cloth		143490	Record Changer Drawer Frame Assy.
	137266-SB	Hinge, Door		143953	Record Compartment Door
	143958	Leg and Base Assy. (Front)		143485	Rubber Bumper, Doors
				143478	Slides, Record Changer Drawer

REPLACEMENT CABINET PARTS—MODEL 9-203B

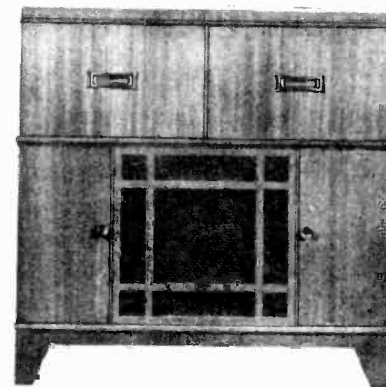
Item No.	Part No.	Description	Item No.	Part No.	Description
	143485	Bumper, Rubber, Compt. Door		143480-BR	Pull, Door, Radio and Record Changer
	143409	Cabinet		143487-BR	Pull, Door, Record Storage Compt.
	139319-BR	Catch and Strike Assy.		143431-BR	Screw, Door Pull, Radio and Record Changer Compartment
	143488	Doors, Compartment, Record Storage		39176-78-BR	Screw, Door Pull, Record Storage Compartment
	143483	Door and Record Changer Drawer Front		143479	Shelf Assy., Record Changer
	143484	Grille Cloth		143478	Slides, Record Changer Drawer
	144505-BR	Hinge, Door		139319-BR	Strike and Catch Assembly
	143489	Leg and Base Assembly			
	143482	Panel, Radio Dial			



9-201



9-202M



9-203B

TYPE: Eight-tube, two-band, superheterodyne.

FREQUENCY RANGE: American Broadcast Band, 540 to 1600 kc. (Selector Switch at AM.)

FM Band, 88 to 108 MC; Channels 201 to 300. (Selector Switch at FM.)

INTERMEDIATE FREQUENCY: Broadcast Band 455 kc. Frequency Modulated Band 10.7 mc.

POWER SUPPLY: 60 cycle a. c. only.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 80 watts maximum. 20 watts additional for record changer.

POWER OUTPUT: 4.5 watts maximum.

TUBE COMPLEMENT:

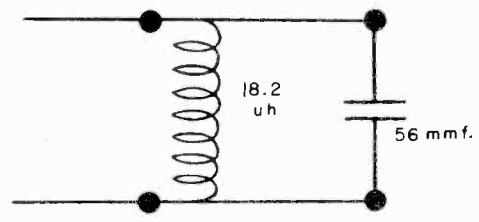
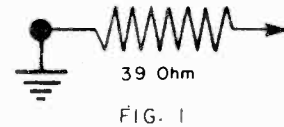
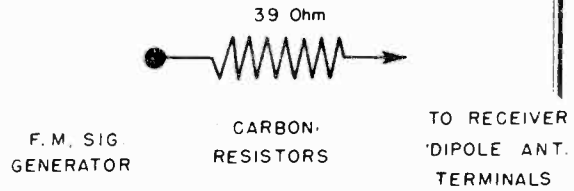
Type	FUNCTION
6SG7	R. F. Amplifier
7F8	Oscillator
6AC7	Mixer
6SG7	I. F. Amplifier AM and FM
6SG7	2nd I. F. Amplifier FM
6T8	Det. 1st Audio Amplifier AM and FM, A.V.C., AM
6V6GT	Output
5Y3GT	Rectifier

MODELS 9-201,
9-202M, 9-203B

CROSLEY DIV.
AVCO MFG. CORP.

ALIGNMENT PROCEDURE NOTES

1. Shunt a 1000 ohm resistor across the primary (A to E) on the first I.F. transformer (5) and adjust transformer secondary trimmer for maximum output. Remove shunt and transfer it to transformer secondary (C to D) and adjust transformer primary trimmer for maximum output.
2. Connect the two 100,000 ohm resistors in series and connect these resistors from the No. 2 lug of the 6T8 to the chassis. Connect an electronic voltmeter from the center of these resistors to the shielded lead junction of the 33,000 ohm resistor (68) and the 1000 mmf. condenser, (33). Adjust the ratio detector transformer secondary (D) for zero volts on the electronic voltmeter. Remove the two 100,000 ohm resistors.
3. Connect the electronic voltmeter across the 27,000 ohm load resistor (77) and adjust primary of core (A) of the ratio detector transformer (7) for maximum DC output.
4. Connect output of marker generator across sweep generator output. Connect CRO across the 22,000 ohm resistor (64) in the grid circuit of the second I.F. amplifier.
5. CRO connections same as note 4.
6. For dummy antenna see figure 1.
7. Tune in signal and adjust for maximum sensitivity by a slight movement in either direction from the hairpin loop.
8. Tune in signal and adjust for greatest sensitivity.
9. Connect CRO in series with 100,000 ohm resistor to grid of R.F. amplifier and chassis. Connect output of marker generator across output of sweep generator. Adjust (M-N) until pattern and markers approximate figure in alignment chart.
- 9a. Shunt primary of FM antenna transformer with a 10 ohm carbon resistor and adjust (M) for maximum output. Remove shunt and place it across FM antenna transformer secondary and adjust (N) for maximum output. Remove shunt.
10. Connect BC. dummy loop (Fig. 2) across loop terminals on rear of chassis.



MEGACYCLES TO CHANNEL NUMBERS

Cross index between frequency calibrations in megacycles on the dial and channel numbers follow:

Frequency in Megacycles	Channel No.	Frequency in Megacycles	Channel No.
87.9	200	98.9	255
88.9	205	99.9	260
89.9	210	100.9	265
90.9	215	101.9	270
91.9	220	102.9	275
92.9	225	103.9	280
93.9	230	104.9	285
94.9	235	105.9	290
95.9	240	106.9	295
96.9	245	107.9	300
97.9	250		

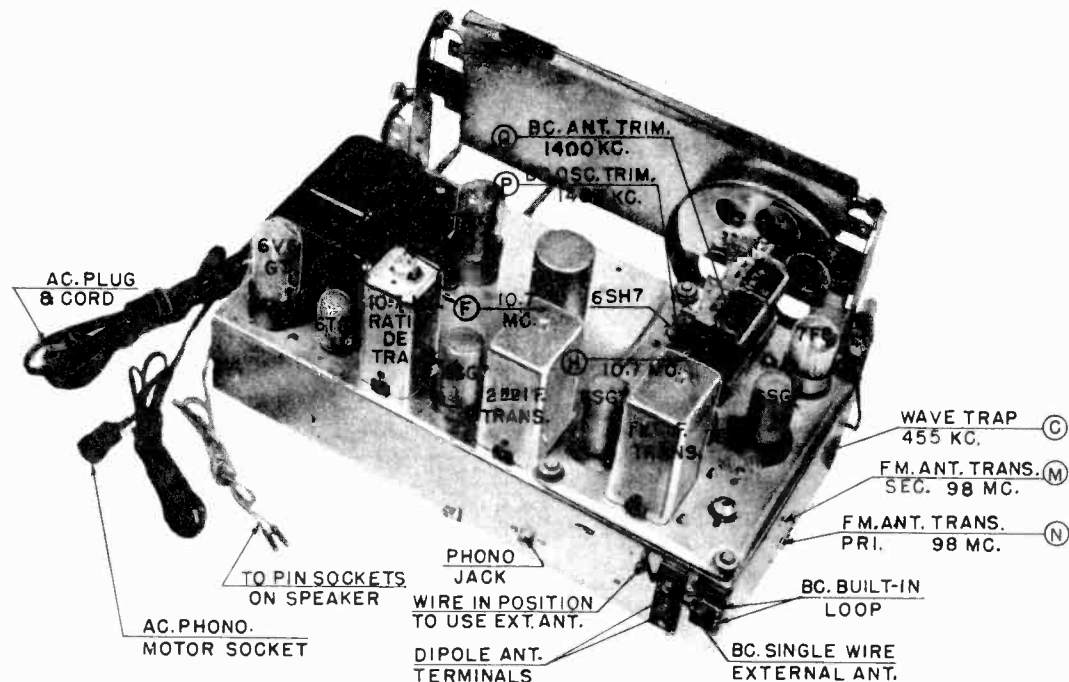
To find the frequency in megacycles for CHANNEL NUMBERS between those given above, add .2 megacycle for every whole number added to the CHANNEL NUMBER; for example Channel 204 would be 88.7 megacycles and 251 would be 98.1 megacycles.

CROSLEY DIV.
AVCO MFG. CORP.

MODELS 9-201,
9-202M, 9-203B

ALIGNMENT PROCEDURE

1. This receiver has been aligned at the factory for best performance, and no attempt should be made to realign it unless the proper test equipment is available.
2. Turn the tuning condenser to full mesh against stop and position the pointer 2-3/8 inches from left side of dial background. In the FM band, the pointer is 5-7/16" from the left side at 98 mc. and in the AM band 8-13/32" from the left side for 1400 kc.
3. Connect the output meter across the speaker voice coil (3.2 ohms). Connect the CRO as indicated in the alignment procedure notes.
4. Feed an R.F. amplitude modulated signal, modulated 30% at 400 cycles to the receiver as indicated in the alignment chart. When the FM signal generator is used, connect as indicated in the alignment chart. A 30% modulated signal is equal to a deviation of 22.5 kc.
5. Turn the volume control knob to maximum clockwise position and adjust the signal generator output to produce a noticeable output meter reading. Keep the signal generator output as low as possible to prevent excessive AVC action in the receiver.
6. Set the tone control to treble position.
7. The broadcast band must be aligned with the built-in loop antenna connected. If the chassis is removed from the cabinet, a suitable dummy antenna consisting of a coil of 18.2 uh. inductance in parallel with a 56 mmf. capacitor must be used. (See circuit)
8. The short lead wire with the spade lug on the rear of the chassis should be removed from the upper screw on the antenna terminal strip, if it is connected.
9. For complete receiver alignment, see the alignment procedure chart ----- and alignment procedure notes.
10. For position of trimmers, refer to chassis rear view ----- and socket voltage chart. - - (See schematic diagram - - - - for item No's.)





CHASSIS, REAR VIEW

MODELS 9-201,
9-202M, 9-203B

CROSLLEY DIV.
AVCO MFG. CORP.

ALIGNMENT PROCEDURE CHART

Step No.	Signal Generator Output		Position Of		Adjust	Type of Selectivity Curve	Output Meter	Remarks
	Frequency	In Series With	To	Band Switch				
1	455 kc.	.01 mfd.	1st I. F. Grid	AM	Gang open	A	Max. Output	
2	455 kc.	.01 mfd.	Stator, 21 Plate Section of gang	AM	Gang open	B	Max. Output	See Note 1
3	455 kc.	.01 mfd.	Stator, 21 Plate Section of gang	AM	Gang open	C	Null	Adjust for Minimum Output
4	10.7 MC Unmodulated	1000 mmf.	Grid 2nd I. F.	FM	Gang closed	D		See Note 2
5	10.7 MC Unmodulated	1000 mmf.	Grid 2nd I. F.	FM	Gang closed	E		See Note 3
6	RF Sweep 450 kc. Marker 10.7 MC	1000 mmf.	Grid 1st I. F.	FM	Gang closed	F & G		See Note 4
7	RF Sweep 450 kc. Marker 10.7 MC	1000 mmf.	Stator, 3 Plate Section of gang	FM	Gang closed	H & I		See Note 5
8	FM; RF Gen. 98 MC	FM Dummy Ant.	Dipole ant. Terminals	FM	98 MC	J		See Note 6
9	FM; RF Gen. 92 MC	FM Dummy Ant.	Dipole ant. Terminals	FM	92 MC	K		See Note 7
10	FM; RF Gen. 104 MC	FM Dummy Ant.	Dipole ant. Terminals	FM	104 MC	L		See Note 8
11	FM Sweep Gen. 30 MC Marker Gen. 92-98-104 MC	FM Dummy Ant.	Dipole ant. Terminals	FM	Gang closed	M-N	Max. Output	See Notes 9
12	AM; RF Gen. 1400 kc.	200 mmf.	AM ant. Terminals	AM	1400 kc.	P	Max. Output	See Note 10
13	AM; RF Gen. 1400 kc.	200 mmf.	AM ant. Terminals	AM	1400 kc.	Q	Max. Output	

CROSLEY DIV.
AVCO MFG. CORP.MODELS 9-201,
9-202M, 9-203B

Figures in First Column Correspond to Figures in Schematic Diagram

Item No.	Part No.	Description	Item No.	Part No.	Description
1	143650	Coil, Antenna (F.M.)	71	39373-64	Resistor, 33,000 ohms, ½ w.
2	144010	Coil, Antenna (B.C.)	72	39373-60	Resistor, 22,000 ohms, ½ w.
3	143179	Coil, Wave Trap, 455 Kc.	73	39373-40	Resistor, 2,200 ohms, ½ w.
4	143502	Coil, R.F. (F.M.)	74	39373-97	Resistor, 2.2 megohm, ½ w.
5	143090	Transformer, 1st I.F.	75	39373-64	Resistor, 33,000 ohms, ½ w.
6	143105	Transformer, 2nd I.F.	76	39373-107	Resistor, 10 megohm, ½ w.
7	143378	Transformer, Ratio Det.	77	39373-62	Resistor, 27,000 ohms, ½ w.
8	143305	Coil Assy., Oscillator (F.M.)	78	39373-84	Resistor, 330,000 ohms, ½ w.
9	143752	Coil, Choke	79	39371-5	Resistor, 1,000 ohms, 10 w.
10	143180	Coil, Osc. (B.C.)	80	39373-253	Resistor, 1,000 ohms, 2 w.
11	143752	Coil, Choke	81	39373-87	Resistor, 470,000 ohms, ½ w.
12	136720	Coil, Choke (Heater)	82	39373-131	Resistor, 270 ohms, 1 w.
13A	142775	Condenser, Variable	83	39368-14	Control, Volume, (1 megohm), Knurled
13B		Condenser, Variable	84A	39368-22	Control, Tone (3 megohm)
13C		Condenser, Variable		39370-2	Shaft, Tone Control (Knurled)
14	137219-4	Condenser, Trimmer	84B	39369-1	Switch, Power
15	137219-5	Condenser, Trimmer	85A	142968	Switch, Band
16	143014	Condenser, Trimmer	85B		Switch, Band
17	143686-2	Condenser, 33 mmf., 500 v., ceramic	85C		Switch, Band
18	137727-1	Condenser, 100 mmf., 300 v., ceramic	86	135105	Transformer, Power
19	39001-13	Condenser, .01 mfd., 600 v., paper	87	138131-2	Transformer, Output
20	39001-13	Condenser, .01 mfd., 600 v., paper	88	144068	Cable and Pin Assy., Speaker
21	39001-13	Condenser, .01 mfd., 600 v., paper	89	139727-5	Cable, Phono Motor
22	137727-48	Condenser, .005 mfd., 500v., ceramic	90	132300-2	Cable and Plug Assy., Power
23	139115-5	Strip, Copper	91	39019-3	Terminal Board, Antenna
24	143223-10	Condenser, 330 mmf., 500 v., mica	92	143404	Terminal Board, Loop antenna
25	39001-13	Condenser, .01 mfd., 600 v., paper	93	138762-5	Speaker
26	39001-13	Condenser, .01 mfd., 600 v., paper	94	137398-5	Condenser, 3.3 mmf., 500 v.
27	39001-13	Condenser, .01 mfd., 600 v., paper	95	143606	Coil, Band Pass (B.C.)
28	39001-13	Condenser, .01 mfd., 600 v., paper	96	136998	Phono Jack
29	39001-13	Condenser, .01 mfd., 600 v., paper	97	138437-1	Bulb (Dial), Type 47, 6-8 v., .15 amp.
30	39001-13	Condenser, .01 mfd., 600 v., paper	98	138437-1	Bulb (Dial), Type 47, 6-8 v., .15 amp.
31	39001-13	Condenser, .01 mfd., 600 v., paper	99	39373-92	Resistor, 1 megohm, ½ w.
32	139692	Loop Ant. (Transmission Line)	100	39373-64	Resistor, 33,000 ohms, ½ w.
33	137727-8	Condenser, 1000 mmf., 300 v., ceramic		143397	Background Assy., Dial
34	137398-5	Condenser, 3.3 mmf., 500 v., ceramic		41405-2CP	Bushing, Sub-Chassis Mtg.
35	137727-53	Condenser, 33 mmf., 500 v., ceramic		139477-1	Button, Loop (with shoulder)
36	143112	Condenser, 50 mmf., ceramic		139477-2	Button, Loop (without shoulder)
37	137727-53	Condenser, 33 mmf., 500 v., ceramic		136853	Cushion, Rubber (Dial Mtg.)
38	137727-8	Condenser, 1000 mmf., 300 v., ceramic		143413	Dial Glass
39	137727-8	Condenser, 1000 mmf., 300 v., ceramic		143700	Escutcheon, Dial
40	137727-44	Condenser, 10 mmf., 500 v., ceramic		46065	Grommet, Rubber, Sub-Chassis Mtg.
41	137727-8	Condenser, 1000 mmf., 300 v., ceramic		45056	Grommet, Chassis Support Bracket
42	39001-13	Condenser, .01 mfd., 600 v., paper		39012-84	Iron Core, 1st I.F.
43	39001-13	Condenser, .01 mfd., 600 v., paper		39012-84	Iron Core, 2nd I.F.
44	39001-11	Condenser, .005 mfd., 600 v., paper		138576-6	Knob
45	39001-1	Condenser, 100 mmf., 600 v., paper		143778	Knob (Band Switch)
46	137727-8	Condenser, 1000 mmf., 500 v., ceramic		45580	Mounting, Rubber (Speaker)
47	39001-80	Condenser, .02 mfd., 600 v., paper		143414	Pointer, Dial
48	39001-11	Condenser, .005 mfd., 600 v., paper		143453	Pulley and Hub Assy. (Variable Condenser)
49	137727-8	Condenser, 1000 mmf., 300 v., ceramic		136979	Pulley, Dial Drive Idler
50	137727-8	Condenser, 1000 mmf., 300 v., ceramic		143513	Record Changer (W-148)
51A	143089	Condenser, 40 mfd., 450 v. } Four Section		51071	Ring, Retaining (Dial Drive Shaft)
51B		Condenser, 20 mfd., 450 v. } Section		39220-40CP	Screw, Chassis Mtg. (9-202M)
51C		Condenser, 10 mfd., 450 v. } Elect.		39220-38CP	Screw, Chassis Mtg. (9-201)
51D		Condenser, 20 mfd., 25 v. } Filter		39220-30CP	Screw, Chassis Mtg.
52	142958	Condenser, 4 mfd., 50 v., Elect.		136565-24	Socket, Dial Light
53	39373-92	Resistor, 1.0 megohm, ½ w.		39232-1	Socket, Tube, Octal
54	39373-80	Resistor, 220,000 ohms, ½ w.		136470	Socket, Loctal
55	39373-67	Resistor, 47,000 ohms, ½ w.		143114	Socket, 9 prong
56	39373-40	Resistor, 2,200 ohms, ½ w.		143398	Shaft, Drive Dial
57	39373-40	Resistor, 2,200 ohms, ½ w.		137148	Spacer
58	39373-92	Resistor, 1.0 megohm, ½ w.		51752	Spring, Dial Drive Cord
59	39373-77	Resistor, 150,000 ohms, ½ w.		143552	Strip, Dial Pointer
60	39373-40	Resistor, 2,200 ohms, ½ w.		135038-51	Terminal Strip, Six Lug
61	39373-67	Resistor, 47,000 ohms, ½ w.		135038-4	Terminal Strip, One Lug
62	39373-40	Resistor, 2,200 ohms, ½ w.		135038-56	Terminal Strip, Two Lug
63	143513	Record Changer (W-148)		135038-57	Terminal Strip, Seven Lug
64	39373-60	Resistor, 22,000 ohms, ½ w.		142756	Tuning Blade, F.M. Osc.
65	39373-21	Resistor, 270 ohms, ½ w.		134916	Washer, Spring (Dial Drive Shaft)
66	39373-65	Resistor, 39,000 ohms, ½ w.			
67	39373-174	Resistor, 33,000 ohms, 1 w.			
68	39373-64	Resistor, 33,000 ohms, ½ w.			
70	39373-71	Resistor, 68,000 ohms, ½ w.			

**CROSLEY DIV.
AVCO MFG. CORP.
ALIGNMENT PROCEDURE**

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the 550 kilocycle end of the scale.
2. Connect the output meter across the speaker voice coil.
3. Connect a 47,000 ohm resistor from the antenna trimmer lug on the tuning condenser to the lug on the terminal board next to the tuning condenser.
4. Connect the high side of the signal generator, through a 200 mmf. condenser, to the antenna trimmer lug. Connect the signal generator ground through a 0.1 mmf. condenser to B—(Black wire or Electrolytic Filter Condenser.)
5. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

ALIGNMENT CHART

Alignment adjustment locations are shown on

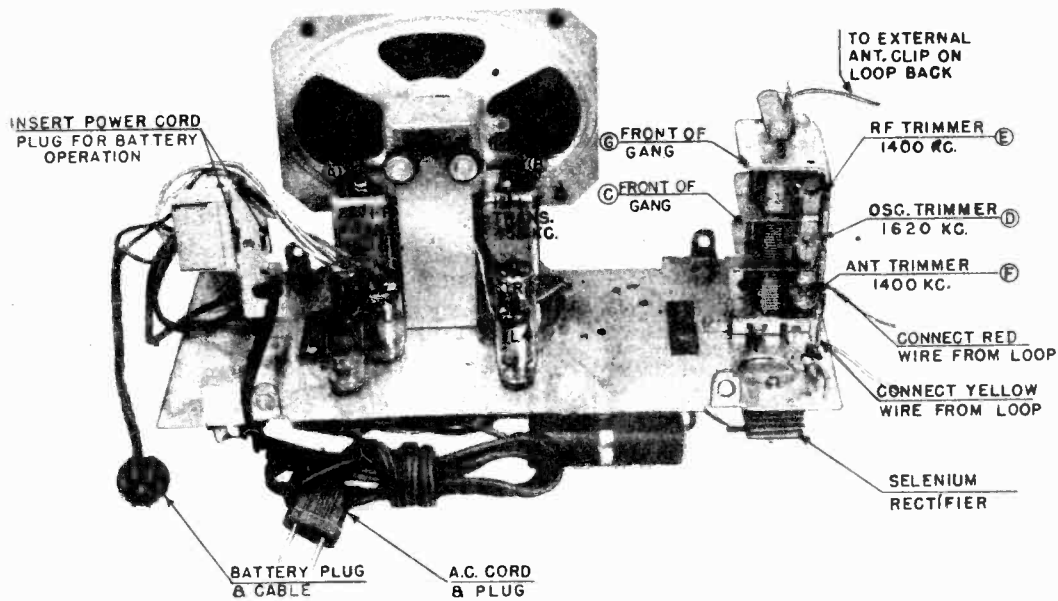
Chassis View—Model 9-302

Alignment Sequence	Signal Generator Output			Position of Dial pointer or Var. Cond.	Adjust for Maximum Output	Remarks
	Frequency in KC	In Series with	To			
1	455	200 mmf.	Antenna Trimmer Lug	Closed	A & B	See steps 3 & 4 of Alignment procedure
2	1620	200 mmf.	Antenna Trimmer Lug	Open	D	See note 1 of Alignment notes
3	1400	200 mmf.	Antenna Trimmer Lug	1400 kc	E	See note 2 of Alignment notes
4	1400	200 mmf.	Antenna Clip	1400 kc	F	See note 3 of Alignment notes

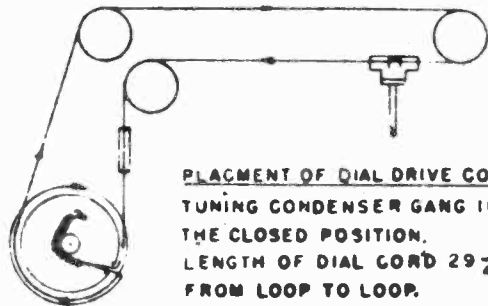
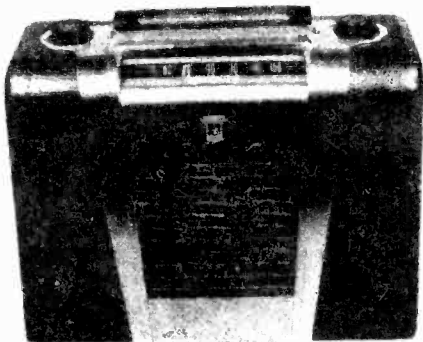
ALIGNMENT NOTES

1. Preset "C" to $\frac{1}{8}$ turn from its closed position before adjusting "D".
2. Preset "G" to $\frac{1}{4}$ turn from its closed position before adjusting "E".
3. Remove the 47,000 ohm resistor from the antenna trimmer lug and the Terminal board lug. Replace the chassis in the cabinet, install the battery pack in the cabinet under the chassis and close the cabinet back panel. Remove the hole plug from the cabinet back and adjust trimmer "F". Replace hole plug.

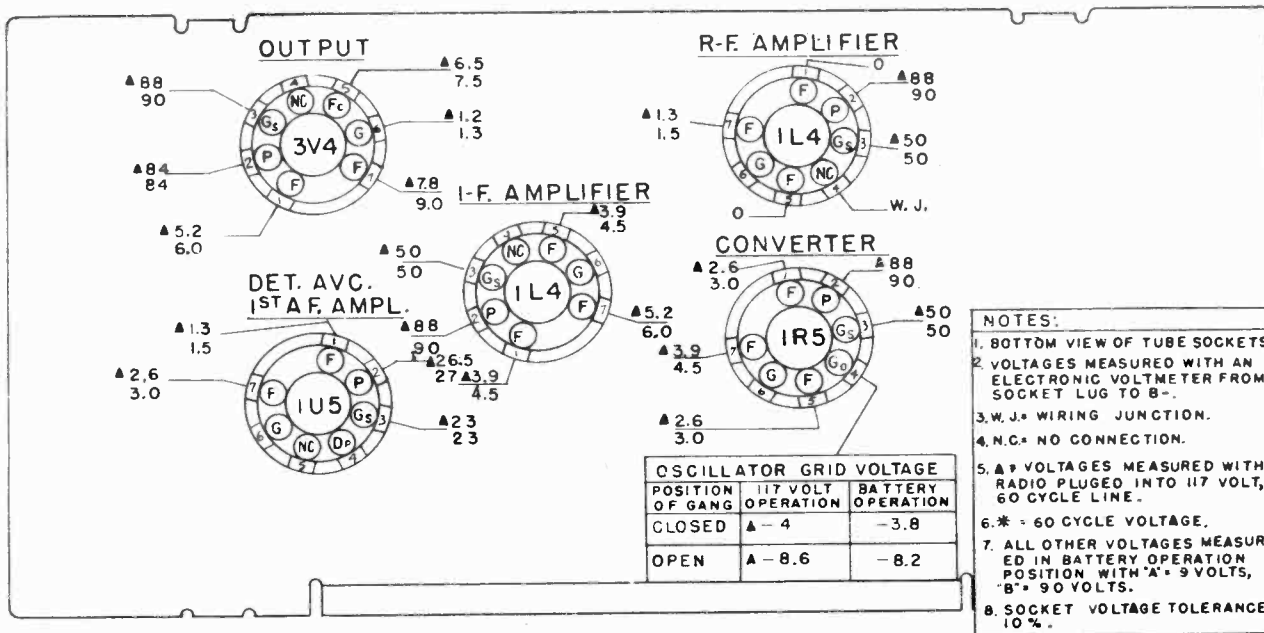
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CHASSIS, TOP VIEW



PLACEMENT OF DIAL DRIVE CORD
TUNING CONDENSER GANG IN
THE CLOSED POSITION.
LENGTH OF DIAL CORD $29\frac{1}{4}$ "
FROM LOOP TO LOOP.



SOCKET VOLTAGE CHART

CROSLY DIV.
AVCO MFG. CORP.

MODEL 9-302

DESCRIPTION

TYPE: Five-tube, combination, battery Portable and AC-DC Superheterodyne with Selenium Rectifier.

FREQUENCY RANGE: 540 to 1600 kilocycles.

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: AC-DC or Battery.

VOLTAGE RATING: AC-DC, 110 to 120 volts.
Battery "A" 7½ volts, "B" 90 volts.

POWER OUTPUT: 200 M.W. maximum

POWER CONSUMPTION: 15 watts at 125 volts, 60 cycle.

"A-B" BATTERY PACK: one Crosley CR68, 7.5 "A" volts—90 "B" volts.

TUBE COMPLEMENT:

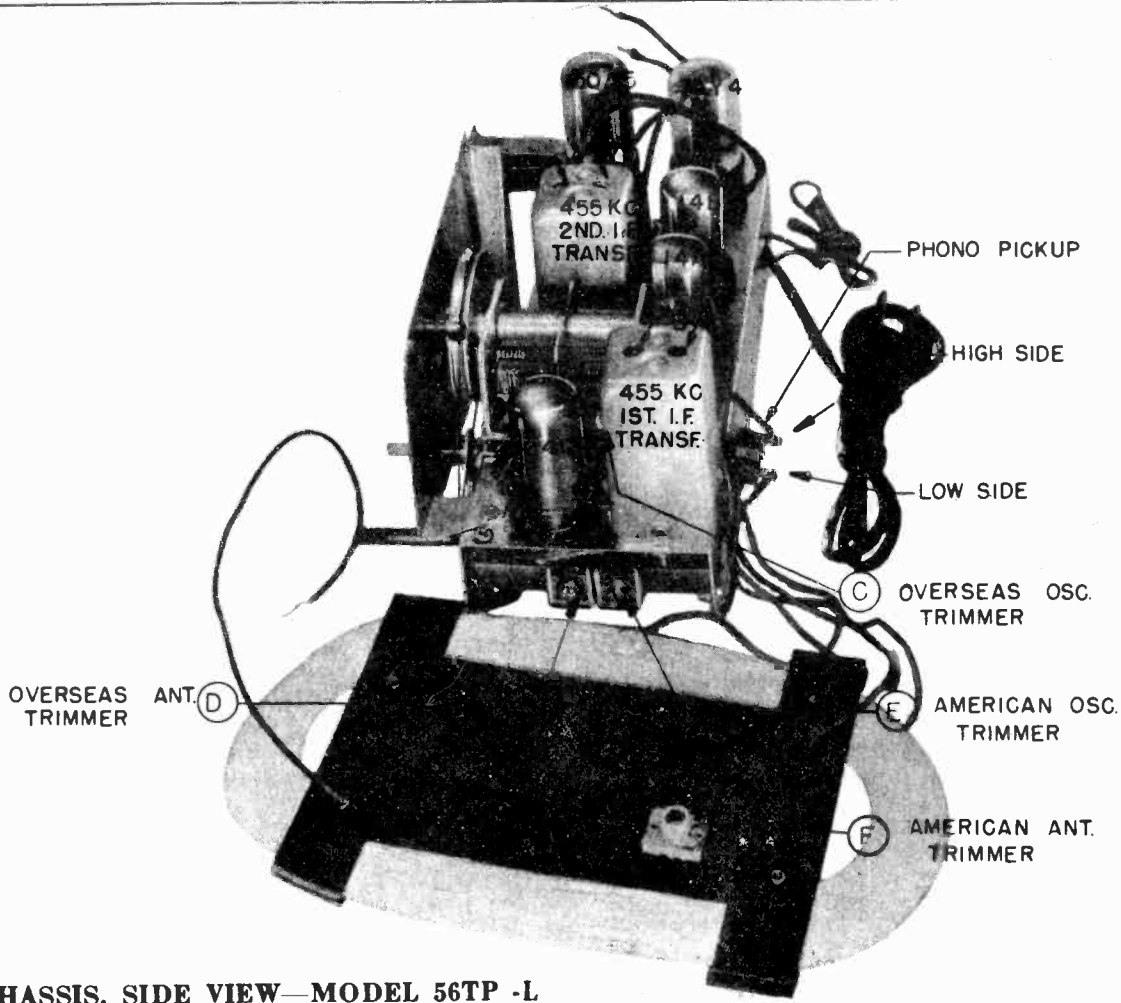
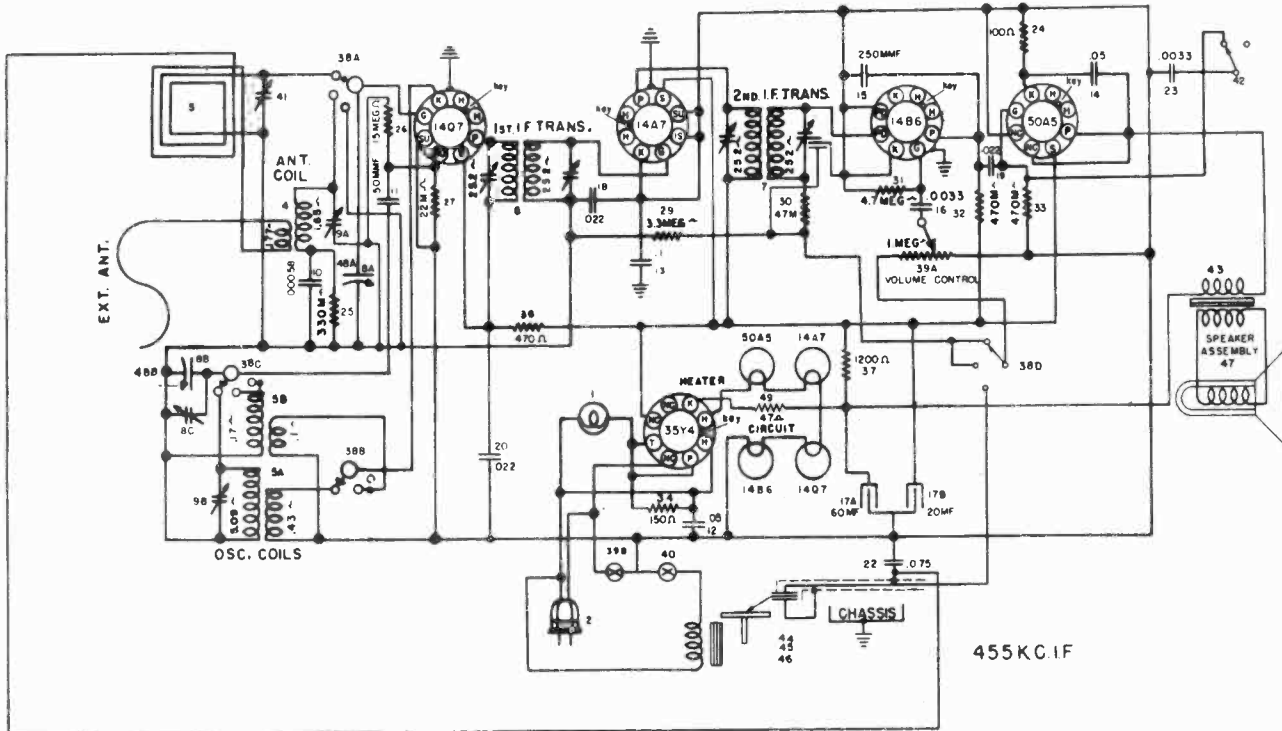
Type	Function
1L4	R.F. Amplifier
1R5	Mixer
1L4	I.F. Amplifier
1U5	Detector, AVC, 1st A.F. Amplifier
3V4	A.F. Power Output

REPLACEMENT PARTS LIST—MODEL 9-302

Figures in the first column correspond to figures in Schematic Diagram.

Item No.	Part No.	Description	Item No.	Part No.	Description
1	AC-143080	Loop Antenna Assembly	30	39373-40	Resistor, 2,200 ohm, ½ w.
2	AW-136966	Coil Assy., R.F.	31	39373-100	Resistor, 3.3 megohm, ½ w.
3	AW-136288	Transformer, 1st I.F.	32	39373-57	Resistor, 15,000 ohm, ½ w.
4	AW-156289	Transformer, 2nd I.F.	33	39373-107	Resistor, 10 megohm, ½ w.
5	AW-144209	Coil Assy. Oscillator	34	39373-33	Resistor, 1,000 ohm, ½ w.
6A	AB-143151	Condenser, Variable	35	39373-36	Resistor, 1,500 ohm ½ w.
6B		Three Section Assy. Includes Pulley and Pinion Drive Assy.	36	W-143123	Resistor, 2,000 ohm, 6 w. (wire-wound)
6C			37A	39368-14	Control, Volume (1 megohm)
		Condenser, Variable	37B	39369-2	Switch, Power
		Condenser, Variable	38A	AB-143068	Switch, Power Line-Battery
	AB-143140	Pulley & Pinion Drive Assy. only. (Var. Cond.)	38B		Switch, Power Line-Battery Assy.
6D	Part of Item 6A	Condenser, Trimmer	39	C-132300-3	Cable & Plug Assembly, Power
6E	Part of Item 6B	Condenser, Trimmer	40	AB-139513-2	Cable & Plug Assembly, Battery
6F	Part of Item 6C	Condenser, Trimmer		W-134126	Plug (only), Battery
7	C-137727-58	Condenser, 22 mmf., 300 v., ceramic	41	B-135878	Transformer, Output
8	39001-13	Condenser, .01 mfd., 600 v., paper	42	138246	Speaker
9	39001-17	Condenser, .05 mfd., 600 v., paper	44	B-135459	Condenser, 1000 mfd., 10 v., Elect.
10	39001-7	Condenser, .001 mfd., 600 v., paper	45	39373-34	Resistor, 1,200 ohm, ½ w.
11	C-137727-22	Condenser, 75 mmf., 500 v., ceramic	46	39373-100	Resistor, 3.3 megohm, ½ w.
12	39001-76	Condenser, .003 mfd., 600 v., paper	47	39373-129	Resistor, 220 ohm, 1 w.
13	39001-76	Condenser, .003 mfd., 600 v., paper	48	39373-233	Resistor, 82 ohm, 2 w.
14	39001-19	Condenser, .1 mfd., 600 v., paper	49	B-143883-2	Rectifier, Selenium
15	39001-19	Condenser, .1 mfd., 600 v., paper	50	C-137727-66	Condenser, 18 mmf., 500 v., ceramic
16	39001-19	Condenser, .1 mfd., 600 v., paper		39354-23	Bumper, Handle
17	39001-87	Condenser, .25 mfd., 600 v., paper		39176-72CP	Button. Hole Plug
18	39001-7	Condenser, .001 mfd., 600 v., paper		R-143031	Cabinet
19	39001-19	Condenser, .1 mfd., 600 v., paper		C-143121	Dial Glass
20	C-137727-22	Condenser, 75 mmf., 500 v., ceramic		D-143124	Escutcheon
21	39001-19	Condenser, .1 mfd., 600 v., paper		AB-139484-2	Handle
22	39001-17	Condenser, .05 mfd., 600 v., paper		W-135590-3	Knob
23A	B-136294	Three Section Electric Filter		C-143139	Plate, Dial Background
23B				B-139482	Pointer, Dial
23C				AW-139424	Pulley & Bracket Assy., Idler (Dial Drive)
24	39373-97	Resistor, 2.2 megohm, ½ w.		AB-143140	Pulley & Drive Assy. (only)
25	39373-74	Resistor, 100,000 ohm, ½ w.		W-143146	Screw, Handle
26	39373-67	Resistor, 47,000 ohm, ½ w.		W-51752	Screw, Escutcheon
27	39373-90	Resistor, 680,000 ohm, ½ w.		W-138171	Screw, Chassis Mtg. (8/32 x ¾)
28	39373-100	Resistor, 3.3 megohm, ½ w.		39458-42	Screw, Chassis Mtg. (8/32 x ½)
29	39373-52	Resistor, 1. megohm, ½ w.		39176-71CP	Socket, Tube (Minature)
				W-143846	Spring, Dial Drive Cord
				W-143054	Strip, Dial Pointer

CROSLLEY DIV.
AVCO MFG. CORP.



CHASSIS, SIDE VIEW—MODEL 56TP -L

CROSLY DIV.
AVCO MFG. CORP.

MODEL 56TP-L

ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to -B (pin 3 on 12SK7 tube socket).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

ALIGNMENT CHART

Alignment adjustment locations are shown on Chassis, Side View—Model 56TP -L

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	Left	1,620	A & B
2	15,300	400 ohms	Ant.	Right	15,300	C
3	15,000	400 ohms	Ant.	Right	15,000	D
4	1,620	200 mmf.	Ant.	A	1,620	E
5	1,400	200 mmf.	Ant.	A	1,400	F

NOTE: When aligning the short-wave oscillator trimmer (C), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: Tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak; i.e., the oscillator trimmer may be adjusted to the image or one of the harmonics instead of the fundamental frequency. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.

SOCKET VOLTAGE CHART

OSCILLATOR GRID VOLTAGES	I. F. AMPLIFIER	DET - A.V.C. - 1ST AF	RECTIFIER
BAND	FREQUENCY	VOLTS	
AMERICAN	540 KC	- 4.9	
OVERSEAS	5.7 MC	- 3.8	

MIXER

I. F. AMPLIFIER

DET - A.V.C. - 1ST AF

RECTIFIER

POWER OUTPUT

NOTES

- 1 TUBE SOCKETS ARE BOTTOM VIEWS
- 2 MEASURE VOLTAGES FROM SOCKET LUG TO -B (PIN 4 ON THE 14A7)
- 3 VOLTAGES AS MEASURED WITH AN ELECTRONIC VOLTMETER
- 4 WJ - WIRING JUNCTION
- 5 NC - NO CONNECTION
- 6 * - AC VOLTAGES
- 7 VOLTAGE TOLERANCE, 10%
- 8 LINE VOLTAGE 117V, 60 C AC

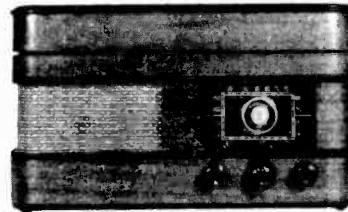
MODEL 56TP-L

CROSLLEY DIV.
AVCO MFG. CORP.

Figures in first column correspond to figures in schematic diagram.

Item No.	Part No.	Description	Item No.	Part No.	Description
1	W-48858	Bulb(Dial Light, Type 47, 6.3v., .15 amp)	W-134939	Switch, S. P. S. T. (Slide Type)	
2	C-132300-1	Cable and Plug (Power)	W-135371	Socket (Tube)	
3	AC-134605	Antenna Loop Assembly	39017-4	Socket (Dial Light) Assembly	
4	AW-134994	Antenna Coil Assembly	C-134869	Face (Dial)	
5A	AW-134993	Coil (B. C. Oscillator) } Two	B-134952	Pointer (Dial)	
5B		Coil (H. F. Oscillator) } Section	W-134667	Clip (Dial Pointer)	
6	AW-134065	Transformer (1st I. F.)	W-134917	Shaft (Drive)	
7	AW-134158	Transformer (2nd I. F.)	AB-134697	Toggle Link Assembly	
8A	B-134995	Condenser (Variable) } Two	W-51071	Ring (Retaining)	
8B		Condenser (Variable) } Section	W-134916	Washer (Spring)	
8C	Part of Item #8B	Condenser (Trimmer)	W-49829	Spring (Lock)	
9A	AB-134982	Condenser (Trimmer) } Two	W-51752	Spring (Dial Cord)	
9B		Condenser (Trimmer) } Section	W-49770	Stud, Trimount (Dial Face and Chassis Bottom)	
10	GC-210685-143	Condenser, 580 mmf., 300 v., Mica	W-136630	Stud, Trimount (Toggle Link)	
11	B-226638-53	Condenser, 50 mmf., 500 v., Mica	W-134055	Grommet	
12	39001-65	Condenser, .05 mfd., 200 v., Paper	R-135021	Cabinet	
13	39001-67	Condenser, .1 mfd., 200 v., Paper	B-134931	Lens (Dial)	
14	39001-65	Condenser, .05 mfd., 200 v., Paper	W-134882	Knob (Volume or Dial)	
15	39001-73	Condenser, 250 mmf., 500 v., Mica	W-134742	Knob (Tone)	
16	39001-10	Condenser, 3300 mmf., 600 v., Paper	W-134924	Knob (Band Change)	
17A	W-134988	Condenser, 60 mfd., 150 v.v. } Two	AB-134935.	Floating Jewel Needle Assembly	
17B		Condenser, 20 mfd., 100 v.v. } Section	W-131126	Spring, Ratio Change	
			136774-68	Pickup Cartridge	
18	39001-63	Condenser, .022 mfd., 200 v., Paper	136774-129	Phono Motor (only)	
19	39001-63	Condenser, .022 mfd., 200 v., Paper	131104	Turntable	
20	39001-63	Condenser, .022 mfd., 200 v., Paper	131098	Grommet (Motor Mounting)	
22	39001-66	Condenser, .075 mfd., 200 v., Paper	131101	Bushing (Motor Mounting)	
23	39001-10	Condenser, 3300 mmf., 600 v., Paper	131102	Idler Wheel	
24	39281-7	Resistor, 100 ohm, 1/2 w.	131207	Spindle (Turntable)	
25	39281-28	Resistor, 330,000 ohm, 1/2 w.	131097	Phono Mounting Plate	
26	39281-38	Resistor, 15 megohm, 1/2 w.	131103	Spring (Idler Wheel)	
27	39281-21	Resistor, 22,000 ohm, 1/2 w.			
29	39281-34	Resistor, 3.3 megohm, 1/2 w.			
30	39281-23	Resistor, 47,000 ohm, 1/2 w.			
31	39281-35	Resistor, 4.7 megohm, 1/2 w.			
32	39281-29	Resistor, 470,000 ohm, 1/2 w.			
33	39281-29	Resistor, 470 000 ohm, 1/2 w.			
34	39281-8	Resistor, 150 ohm, 1/2 w.			
36	39281-11	Resistor, 470 ohm, 1/2 w.			
37	39015-26	Resistor, 1200 ohm, 1 w.			
38A	B-134720	Switch (Band Change) } Four			
38B		Switch (Band Change) } Section			
38C		Switch (Band Change)			
38D		Switch (Band Change)			
39A	C-46846-6	Control, Volume (1 megohm) } Assembly			
39B		Switch (Power) } bly			
41	Part of Item #3	Condenser (Antenna Trimmer)			
42	W-134939	Switch (Tone Control)			
43	B-134940	Transformer (Output)			
44	C-134724	Phono. Motor and Spindle Assembly			
46	B-134245	Tone Arm and Cartridge Assembly			
47	B-135023	Speaker			
49	W-137367	Resistor, 47 ohm, 1 w.			

MODEL: 56TP -L



Reversing the position of the power plug when alternating current is used may reduce power hum.
Under no circumstances should a ground be connected to this receiver.

TYPE: Five-tube, two-band, superheterodyne.

FREQUENCY RANGE: American Broadcast Band: 540 to 1600 kc. (Selector switch at A.)

Overseas Short-wave Band: 5.8 to 15 mc. (Selector switch at 0.)

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: 60 cycle a.c. only.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 35 watts nominal.

POWER OUTPUT: 1.5 watts minimum.

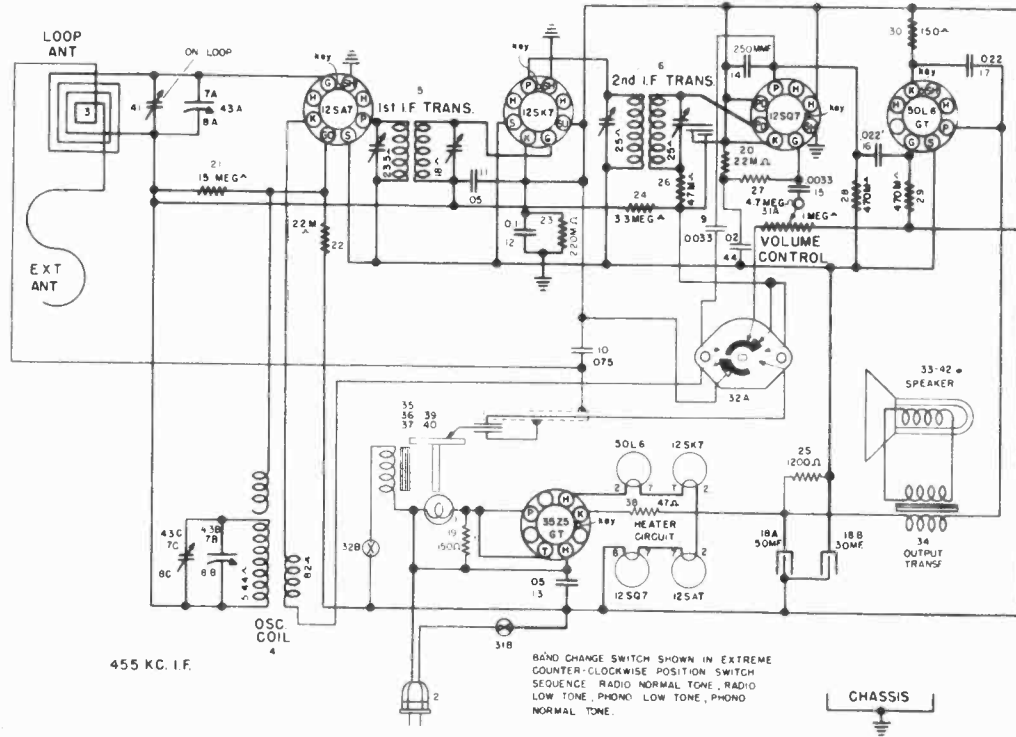
TUBE COMPLEMENT:

Type	Function
14Q7	Mixer
14A7	I. F. Amplifier
14B6	Detector, AVC, 1st A.F. Amplifier
50A5	A.F. Power Output
35Y4	Rectifier

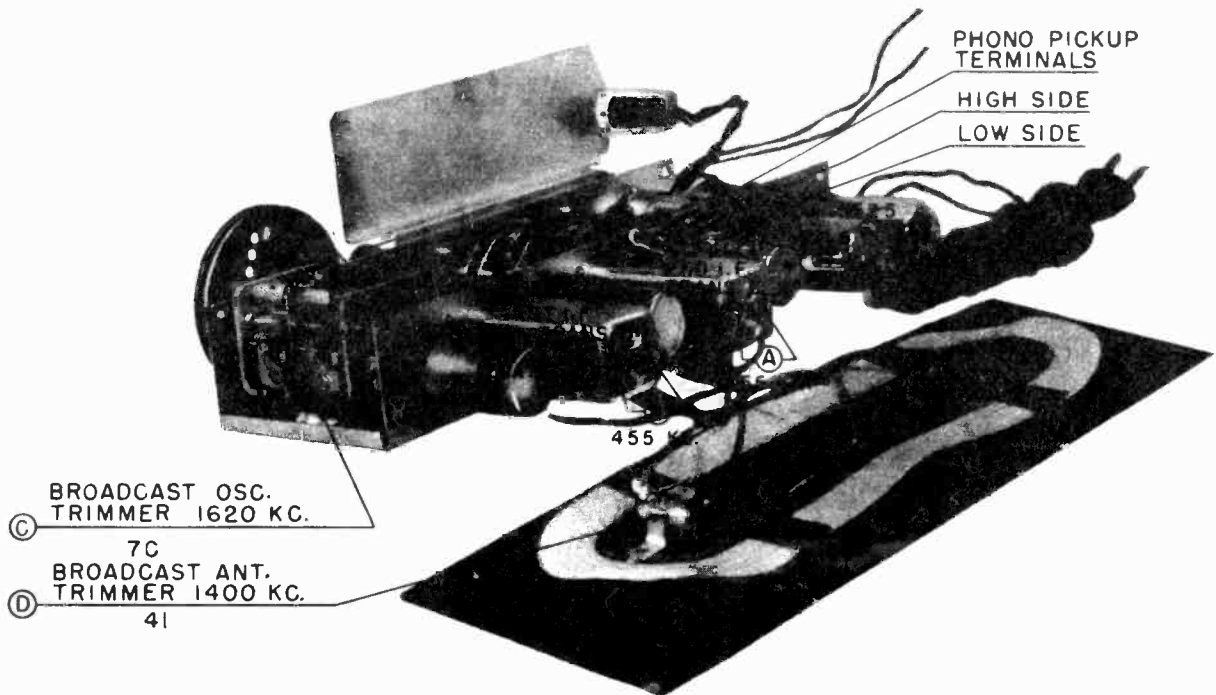
DIAL BULB: Type 47, 6.3 volts, .15 amp.

CROSLY DIV.
AVCO MFG. CORP.

MODELS 56TR,
56TS



Reversing the position of the power plug may reduce power hum.
Under no circumstances should a ground be connected to this receiver.



CHASSIS, SIDE VIEW—MODELS: 56TR, 56TS

MODELS 56TR,
56TS

CROSLEY DIV.
AVCO MFG. CORP.

ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Turn tone control switch to normal tone position.
3. Connect the output meter across the speaker voice coil.
4. The r.f. signal input from the signal generator should be connected to the external antenna clip. Connect the signal generator ground through a 0.1 mfd. condenser to—B (pin 3 on 12SK7 tube socket).
5. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

ALIGNMENT CHART

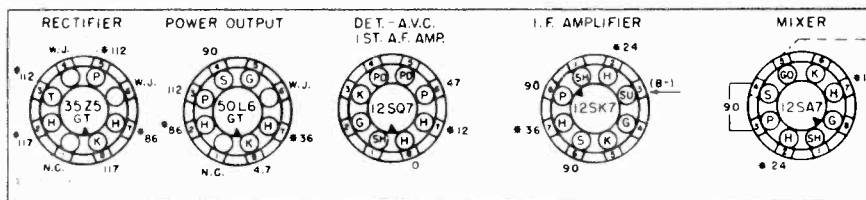
Alignment adjustment locations are shown on Chassis, Side View—Models 56TR, 56TS

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	Right	1620	A & B
2	1620	200 mmf	Ant.	Right	1620	C
3	1400	200 mmf	Ant.	Right	1400	D

Note: Model 56TS uses the Model G-5 (Part No. D-134921) automatic record changer. and parts list.

SOCKET VOLTAGE CHART

OSCILLATOR GRID VOLTAGE		
BAND	FREQUENCY	VOLTS
AMERICAN	540 KC	-5.5



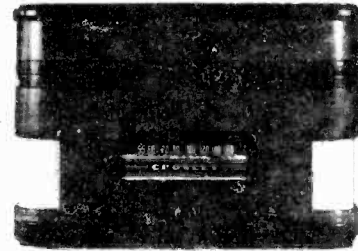
- NOTES:
1. THESE ARE BOTTOM VIEWS OF TUBE SOCKETS.
 2. MEASURE VOLTAGES FROM SOCKET LUGS TO "B" (PIN 3 ON THE 12SK7).
 3. THESE VOLTAGES WERE MEASURED USING AN ELECTRONIC VOLTMETER.
 4. W. J. — WIRING JUNCTION.
 5. N. C. — NO CONNECTION.
 6. * — 60 CYCLE A. C. VOLTAGES.
 7. SOCKET VOLTAGE TOLERANCE, 10%.
 8. LINE VOLTAGE 117V, 60~ A. C.

CROSLLEY DIV.
-AVCO MFG. CORP.

MODELS 56TR,
56TS



56TR



56TS

TYPE: Five-tube superheterodyne.

FREQUENCY RANGE: 540 to 1600 kc.

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: 60 cycle a.c. only.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION:

Radio position—30 watts.

Phono position—45 watts.

POWER OUTPUT: 1.5 watts minimum.

TUBE COMPLEMENT:

Type	Function
12SA7	Converter
12SK7	I.F. Amplifier
12SQ7	Detector, AVC, 1st I.F. Amplifier
50L6GT	A.F. Power Output
35Z5GT	Rectifier

DIAL BULB: Type 47, 6.3 volts, .15 amp.

Figures in first column correspond to figures in schematic diagram.

Item No.	Part Number	Description	Item No.	Part Number	Description
1	W-48858	Bulb (Dial), Type 47, 6.3 v., .15 amp.	G-39204	Socket, Tube	
2	C-132300-1	Cable & Plug (Power)	D-136565-15	Socket, Dial Light	
3	AC-135840	Ant. Loop & Back Assy.	AB-135575	Plate & Stud Assy., Dial	
4	AW-135730	Coil Assy., Oscillator	W-135074	Pulley, Idler (Wood)	
5	AW-135729	Transformer, 1st I. F.	W-131154-1	Cotter, External (Idler Pulley)	
6	AW-135731	Transformer, 2nd I. F.	W-51752	Spring, Dial Drive Cord	
7A	B-135570	Condenser, Variable Two	B-135460	Pointer, Dial	
7B		Condenser, Variable Section	B-135568	Shaft, Drive	
7C	Part of Item #7B	Condenser, Trimmer	W-51071	Ring, Retaining (Drive Shaft)	
9	39001-76	Condenser, .003 mfd., 600 v., Paper	W-134916	Washer, Spring (Drive Shaft)	
10	39001-17	Condenser, .05 mfd., 600 v., Paper	W-134055	Grommet	
11	39001-17	Condenser, .05 mfd., 600 v., Paper	W-135164	Bumper	
12	39001-19	Condenser, .1 mfd., 600 v., Paper	R-137483	Cabinet (56TR)	
13	39001-17	Condenser, .05 mfd., 600 v., Paper	R-137982	Cabinet (56TS)	
14	39001-73	Condenser, 250 mmf., 600 v., Paper	B-135751	Dial Glass	
15	39001-76	Condenser, .003 mfd., 600 v., Paper	W-137200	Spring, Retaining (Dial Glass)	
16	39001-80	Condenser, .02 mfd., 600 v., Paper	W-135929	Knob (Dial or Volume)	
17	39001-80	Condenser, .02 mfd., 600 v., Paper	W-135930	Knob (Radio-Phono)	
18A	B-136770	Condenser, 50 mfd., 150 v.v. Two	AB-134935	Floating Jewel Needle Assy.	
18B		Condenser, 30 mfd., 150 v.v. Section	136774-68	Cartridge, Pickup	
19	39294-8	Resistor, 150 ohm, 1/2 w.	W-131126	Spring, Ratio Change (56TR)	
**20	39294-21	Resistor, 22,000 ohm, 1/2 w.	W-138271	Motor & Spindle Assy. (Less Turntable), 56TR	
21	39294-38	Resistor, 15.0 megohm, 1/2 w.	131104	Turntable (56TR)	
22	39294-21	Resistor, 22,000 ohm, 1/2 w.	131098	Grommet, Motor Mtg. (56TR)	
23	39294-27	Resistor, 220,000 ohm, 1/2 w.	131101	Bushing, Motor Mtg. (56TR)	
24	39294-34	Resistor, 3.3 megohm, 1/2 w.	131102	Idler Wheel, Phono (56TR)	
25	39015-26	Resistor, 1200 ohm, 1 w.	131103	Spring, Idler Wheel (56TR)	
26	Part of Item #6	Resistor, 47,000 ohm, 1/2 w.	131207	Spindle, Turntable (56TR)	
27	39294-35	Resistor, 4.7 megohm, 1/2 w.	131097	Plate, Phono Mtg. (56TR)	
28	39294-29	Resistor, 470,000 ohm, 1/2 w.	W-134247	Rest, Tone Arm (56TR)	
29	39294-29	Resistor, 470,000 ohm, 1/2 w.	W-134246	Spacer, Tone Arm (56TR)	
30	39294-8	Resistor, 150 ohm, 1/2 w.	W-134955	Bumper (56TS)	
31A	B-135692	Control, Volume (1.0 megohm) Assy.	W-45056	Grommet (56TS)	
31B		Switch, Power (Radio)	AB-137859	Support, Lid (56TS)	
*	39368-14	Control, Volume	AB-137884	Support, Lid (56TR)	
*	39369-1	Switch, Power (Radio)			
32A	B-135641	Switch (Radio, Phono, Tone) Assy.			
32B		Switch, Power (Phono.)			
33	C-135633	Speaker (Less Transformer)			
34	B-137723	Transformer, Output			
36	D-134921	Record Changer, G5 (56TS)			
37	C-134724	Phono Motor & Turntable Assy. (56TR)			
38	W-137367	Resistor, 47 ohm, 1 w.			
39	B-134245	Tone Arm & Cartridge Assy. (56TR)			
41	Part of Item #3	Condenser, Trimmer			
**44	39001-80	Condenser, .02 mfd., 600 v. Paper			

*These parts will replace the original equipment parts.

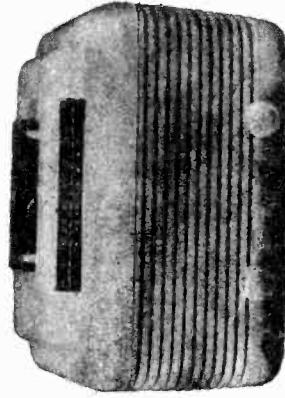
**Early models used a three section Filter Condenser, Part No. B-135732. Item No. 20 and No. 44 were not used.

MODELS 56TU-0,
56TV-0

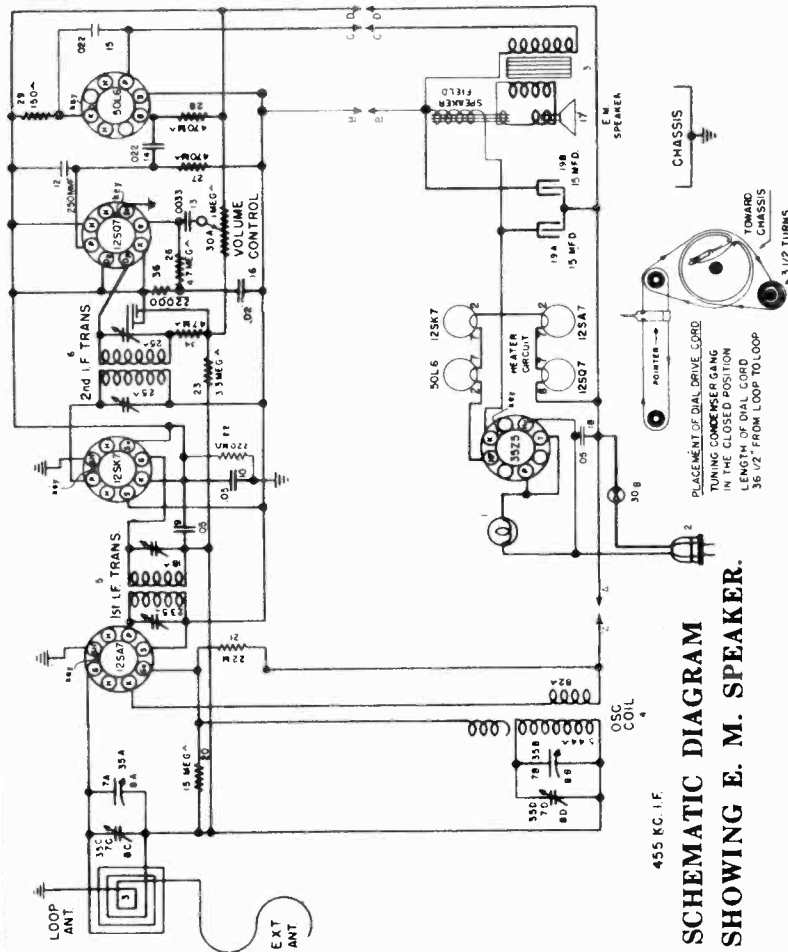
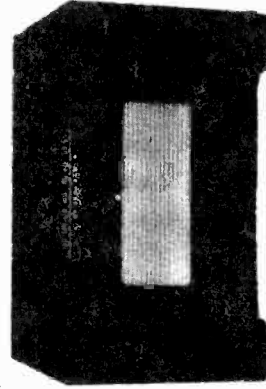
CROSLLEY DIV.
AVCO MFG. CORP.

ALTERNATE WIRING WHEN P. M. SPEAKER IS USED.

56TU-0



56TV-0



455 KC. I.F.
**SCHEMATIC DIAGRAM
SHOWING E. M. SPEAKER.**

**RESISTANCE OF SPEAKER FIELD: 450 ohms.
SPEAKER FIELD CURRENT: 60 ma.
TUBE COMPLEMENT:**

Type	Function
12SA7 (or GT/G)	Mixer
12SK7 (or GT/G)	I.F. Amplifier
12SQ7 (or GT/G)	Detector, AVC, 1st A.F. Amplifier
50L6GT	A.F. Power Output
35Z5GT/G	Rectifier

DIAL BULB: Type 47, 6.3 volts, .15 amp.

CROSLEY DIV.
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MODELS 56TU-0,
56TV-0

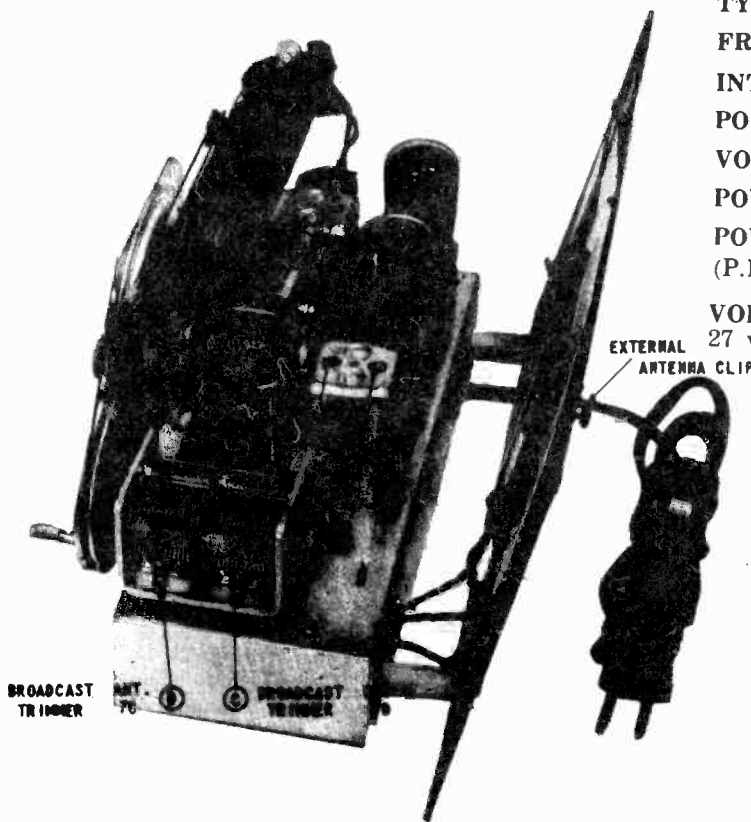
ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to —B (pin 3 on 12SK7 tube socket).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

ALIGNMENT CHART

Alignment adjustment locations are shown on Chassis, Side View—Models 56TU-0, 56TV-0

Alignment Sequence	Signal Generator Output		To	Position of Tuning Dial	Adjust for Maximum Output
	Frequency in kc.	In Series with			
1	455	200 mmf.	Ant.	1,620	A & B
2	1,620	200 mmf.	Ant.	1,620	C
3	1,400	200 mmf.	Ant.	1,400	D



TYPE: Five-tube, single band, superheterodyne.
FREQUENCY RANGE: 540 to 1600 kc.
INTERMEDIATE FREQUENCY: 455 kc.
POWER SUPPLY: a.c.—d.c.
VOLTAGE RATING: 105-125 volts.
POWER CONSUMPTION: 35 watts nominal.
POWER OUTPUT: (E.M. Speaker) 1 watt maximum
(P.M. Speaker) 1.75 watts maximum
VOLTAGE DROP ACROSS SPEAKER FIELD: 27 volts.

When using direct current it may be necessary to reverse the position of the power plug in the electric outlet for correct polarity.

Reversing the position of the power plug when alternating current is used may reduce power hum.

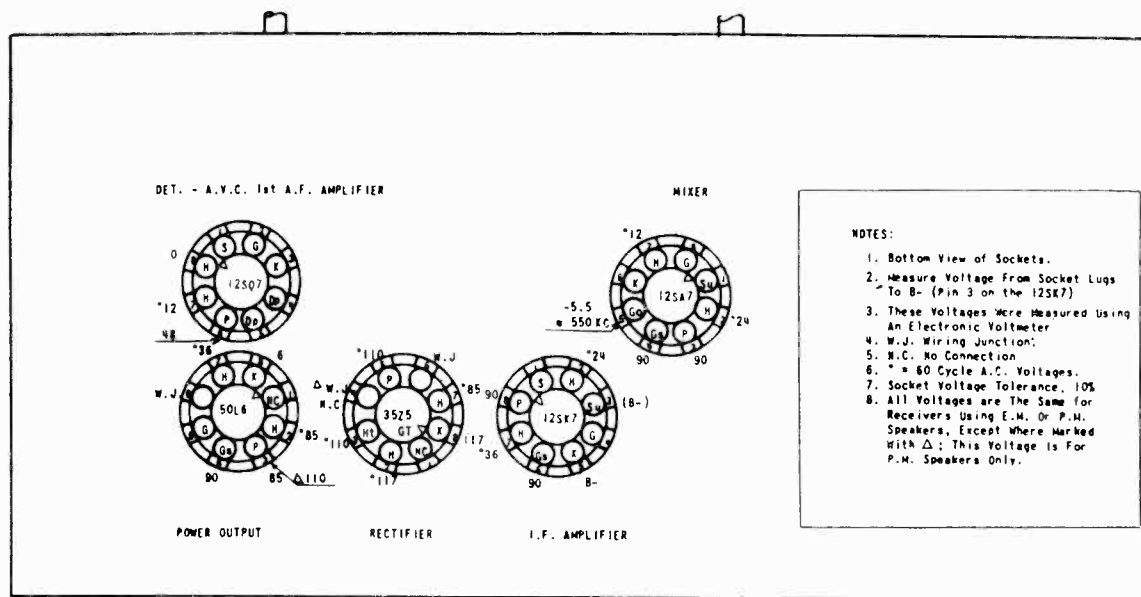
Under no circumstances should a ground be connected to this receiver.

CHASSIS, SIDE VIEW

MODELS 56TU-0,
56TV-0

CROSLLEY DIV.
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SOCKET VOLTAGE CHART



Figures in first column correspond to figures in Schematic Diagram

Item No.	Part No.	Description	Item No.	Part No.	Description
1	W-48858	Bulb (Dial), Type 47, 6.3 v., .15 amp.	26	39294-35	Resistor, 4.7 megohm, 1/2 w.
2	C-132300-1	Cable and Plug (Power)	27	39294-29	Resistor, 470,000 ohm, 1/2 w.
3	AC-135506	Antenna Loop & Back Assy. (56TU-0)	28	39294-29	Resistor, 470,000 ohm, 1/2 w.
3	AC-137489	Antenna Loop & Back Assy. (56TV-0)	29	39294-8	Resistor, 150 ohm, 1/2 w.
4	AW-135195	Coil Assembly (Oscillator)	30A	B-135127	Control, Volume (1 megohm)
5	AW-137665	Transformer (1st. I. F.)	30B		Switch (Power)
6	AW-137667	Transformer (2nd. I. F.)		39368-14	Control (Volume)
7A	B-135202	Condenser (Variable) } Two		39369-1	Switch (Power)
7B		Condenser (Variable) } Section	31	B-135077	Transformer (Output)
7C	Part of Item #7A	Condenser (Trimmer)	**32	W-137367	Resistor, 47 ohm, 1 w.
7D	Part of Item #7E	Condenser (Trimmer)	34	Part of Item #6	Resistor, 47,000 ohm, 1/2 w.
9	39001-17	Condenser, .05 mfd., 600 v., Paper	**36	39294-21	Resistor, 22,000 ohm, 1/2 w.
10	39001-17	Condenser, .05 mfd., 600 v., Paper		G-39204	Socket, Tube
12	39001-73	Condenser, 250 mmf., 600 v., Paper		39017-5	Socket (Dial Light)
13	39001-76	Condenser, .003 mfd., 600 v., Paper		AB-135135	Plate Assembly (Dial)
14	39001-80	Condenser, .02 mfd., 600 v., Paper		W-135074	Pulley (Idler)
15	39001-80	Condenser, .02 mfd., 600 v., Paper		B-135094	Pointer (Dial)
**16	39001-80	Condenser, .02 mfd., 600 v., Paper		B-135075	Shaft (Drive)
**17	B-136768	Speaker, P. M.		W-134916	Washer (Spring)
*17	AD-135632	Speaker, E. M.		W-51071	Ring (Retaining)
18	39001-17	Condenser, .05 mfd., 600 v., Paper		W-131154-1	Cotter (External)
		Two		W-51752	Spring (Drive Cord)
** { 19A	B-136770	Condenser, 50 mfd., 150 w.v. } Section		W-134055	Grommet
19B		Condenser, 30 mfd., 150 w.v. } Elect.		W-49770	Stud (Trimount)
		Filter		D-137324	Cabinet (56TV-0)
		Two		R-135446	Cabinet & Handle Assy. (56TU-0)
* { 19A	B-135073	Condenser, 15 mfd., 150 w.v. } Section		R-135444	Cabinet, Only (56TU-0)
19B		Condenser, 15 mfd., 150 w.v. } Elect.		B-135403	Handle (56TU-0)
		Filter		W-137511	Spring, Handle (56TU-0)
20	39294-38	Resistor, 15 megohm, 1/2 w.		W-50325	Clip (56TU-0)
21	39294-21	Resistor, 22,000 ohm, 1/2 w.		B-135713	Dial Glass
22	39294-27	Resistor, 220,000 ohm, 1/2 w.		W-135455	Knob (56TV-0)
23	39294-34	Resistor, 3.3 megohm, 1/2 w.		W-135454	Knob (56TU-0)
**24	39294-8	Resistor, 150 ohm, 1/2 w.		W-132124	Stud, Trimount (56TU-0)
**25	39015-26	Resistor, 1200 ohm, 1 w.		136571	Support, Dial

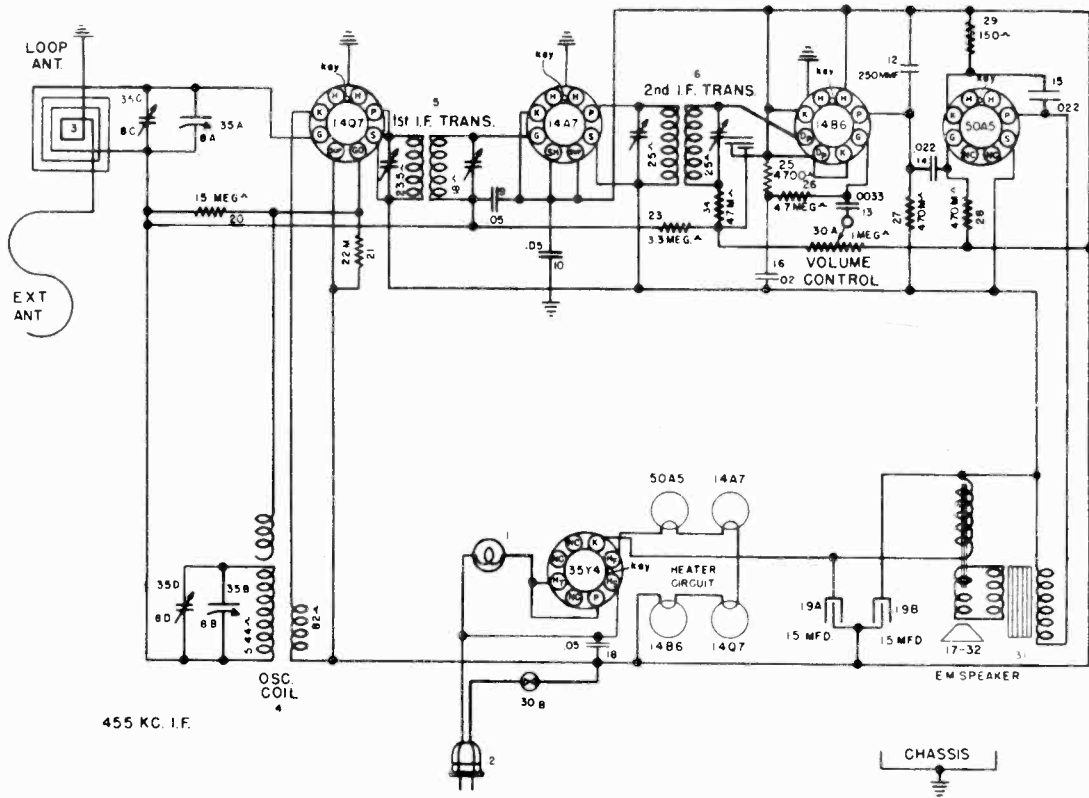
*These parts are used only on the above models which are equipped with E. M. speakers.

**These parts are used only on the above models which are equipped with P. M. speakers.

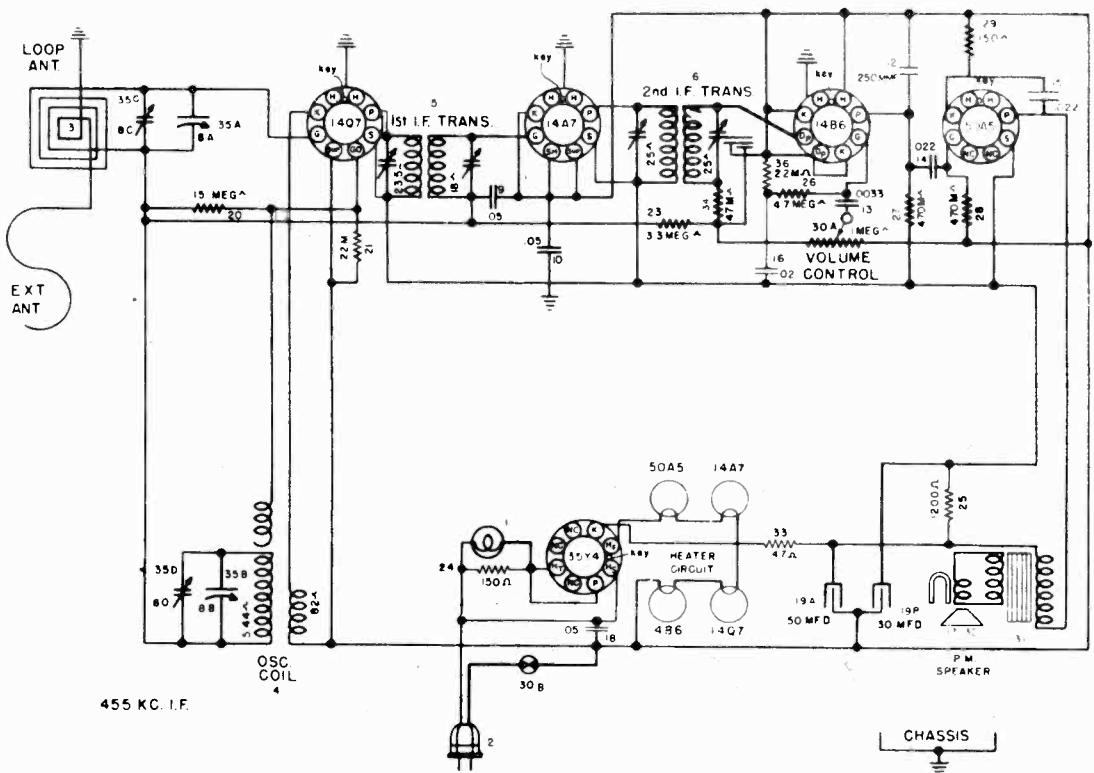
‡These parts will replace the original equipment parts.

CROSLY DIV.
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MODEL 58TH



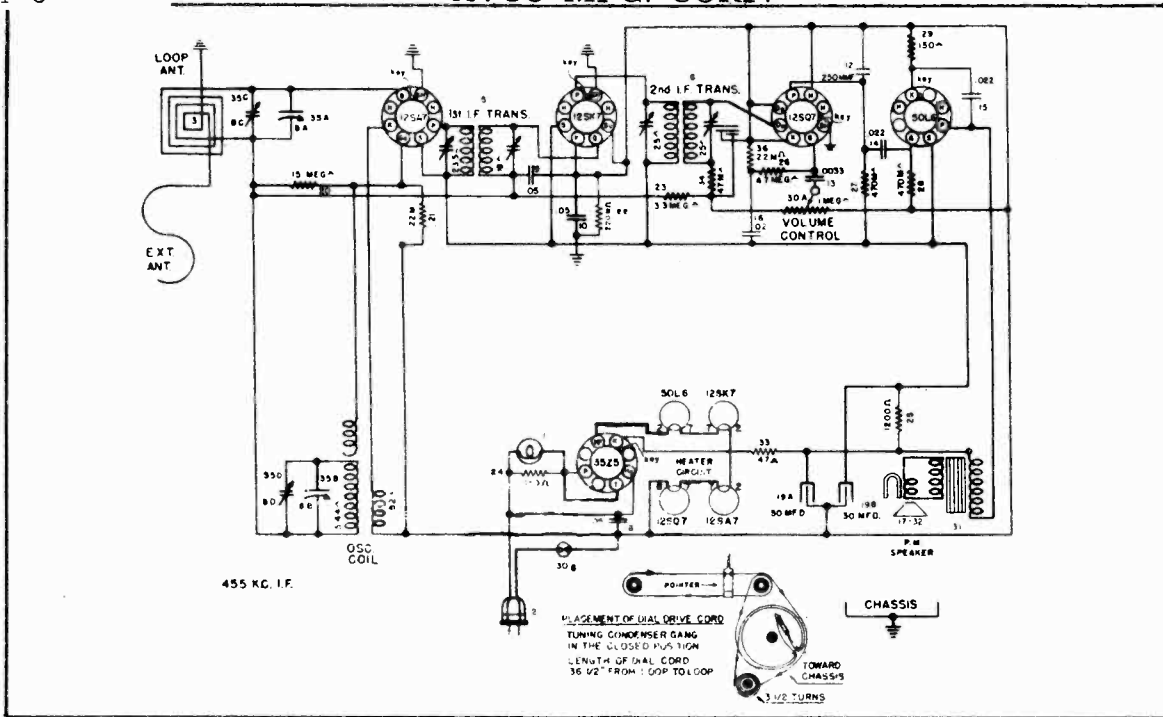
SCHEMATIC DIAGRAM -MODEL 58TH (E. M. SPEAKER)



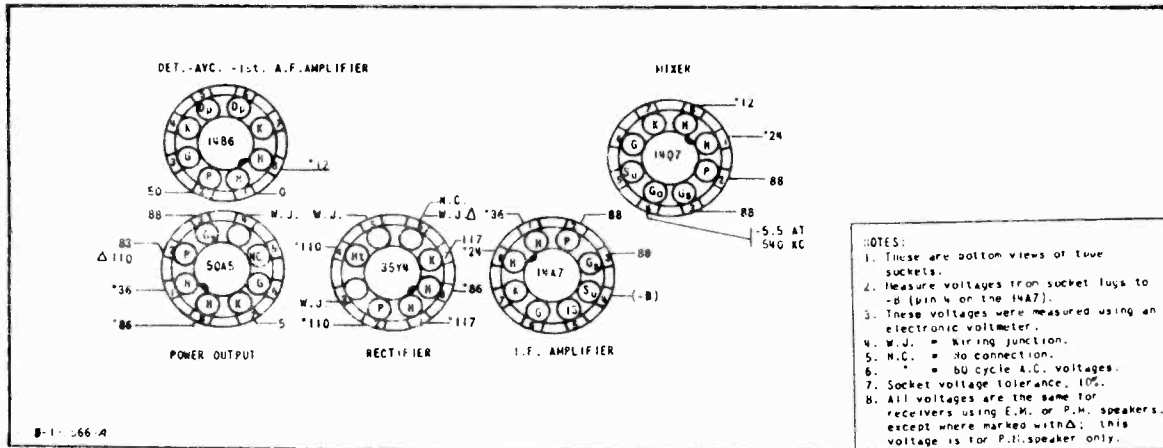
SCHEMATIC DIAGRAM -MODEL 58TH (P. M. SPEAKER)

MODELS 58TH,
58TH-0

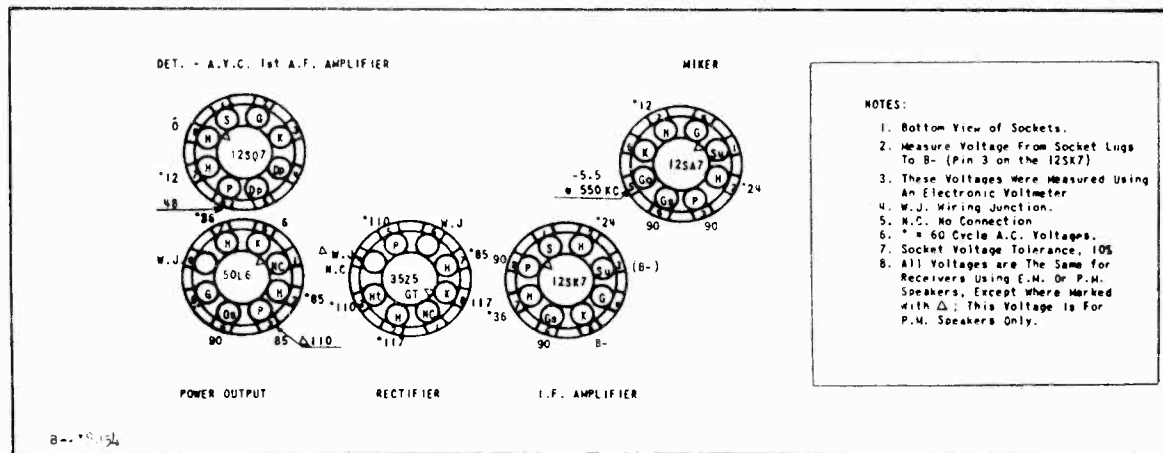
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SCHEMATIC DIAGRAM - MODEL 58TH-0



SOCKET VOLTAGE CHART - MODEL 58TH



SOCKET VOLTAGE CHART - MODEL 58TH-0

**CROSLLEY DIV.
AVCO MFG. CORP.
ALIGNMENT PROCEDURE**

MODELS 58TH,
58TH-0

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to —B (See Socket Voltage Chart).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

ALIGNMENT CHART

Alignment adjustment locations are shown on Chassis, Side View—Models 58TH, 58TH-0

Alignment Sequence	Signal Generator Output		To	Position of Tuning Dial	Adjust for Maximum Output
	Frequency in kc.	In Series with			
1	455	200 mmf.	Ant.	1,620	A & B
2	1,620	200 mmf.	Ant.	1,620	C
3	1,400	200 mmf.	Ant.	1,400	D

REPLACEMENT PARTS LIST—MODELS 58TH, 58TH-0

Figures in first column correspond to figures in Schematic Diagram.

Item No.	Part No.	Description	Item No.	Part No.	Description
1	W-48858	Bulb (Dial), Type 47, 6.3 v., .15 amp.	26	39373-102	Resistor, 4.7 megohm, 1/2 w.
2	C-132300-2	Cable and Plug Assy., Power	27	39373-87	Resistor, 470,000 ohm, 1/2 w.
3	AC-135253	Antenna Loop and Back Assy.	28	39373-87	Resistor, 470,000 ohm, 1/2 w.
4	AW-135195	Coil Assy., Oscillator	29	39373-16	Resistor, 150 ohm, 1/2 w.
5	AW-137665	Transformer, 1st I. F.	30 A	C-135127	Control, Volume (1 megohm)
6	AW-137667	Transformer, 2nd I. F.	30 B		Switch, Power Assy.
8 A	B-135056	Condenser, Variable Two	*	39368-14	Control, Volume
8 B		Condenser, Variable Section	*	39369-1	Switch, Power
8 C	Part of Item 8A	Condenser, Trimmer	31	B-137723	Transformer, Output
8 D	Part of Item 8B	Condenser, Trimmer	**33	W-137367	Resistor, 47 ohm, 1 w.
9	39001-17	Condenser, .05 mfd., 600 v., paper	34	Part of Item 6	Resistor, 47,000 ohm, 1/2 w.
10	39001-17	Condenser, .05 mfd., 600 v., paper	**36	39373-60	Resistor, 22,000 ohm, 1/2 w.
12	39001-73	Condenser, 250 mmf., 600 v., paper		W-135164	Bumper
13	39001-76	Condenser, .003 mfd., 600 v., paper		R-135236	Cabinet
14	39001-80	Condenser, .02 mfd., 600 v., paper		W-131154-1	Cotter, External
15	39001-80	Condenser, .02 mfd., 600 v., paper		B-135713	Dial Glass
16	39001-80	Condenser, .02 mfd., 600 v., paper		W-134055	Grommet
**17	B-136768	Speaker (P. M.)		W-135391	Knob
†17	B-135082	Speaker (E. M.)		AB-135135	Plate, Dial
18	39001-17	Condenser, .05 mfd., 600 v., paper		B-135094	Pointer, Dial
**19 A	B-136770	Condenser, 50 mfd., 150 v. Two Section		W-135074	Pulley, Idler
**19 B		Condenser, 30 mfd., 150 v. (Elect. Filter		W-51071	Ring, Retaining
†19 A	B-135073	Condenser, 15 mfd., 150 v. Two Section		W-135603	Screw, Back Mtg.
†19 B		Condenser, 15 mfd., 150 v. (Elect. Filter		B-135075-1	Shaft, Drive
20	39373-109	Resistor, 15 megohm, 1/2 w.		W-46447-1	Shield, Tube
21	39373-60	Resistor, 22,000 ohm, 1/2 w.		39017-5	Socket, Dial Light
22	39373-80	Resistor, 220,000 ohm, 1/2 w. (58TH-O)		39441	Socket, Tube (58TH)
23	39373-100	Resistor, 3.3 megohm, 1/2 w.		39232-1	Socket, Tube (58TH-O)
**24	39373-16	Resistor, 150 ohm, 1/2 w. (58TH-O)		W-51752	Spring, Dial Drive Cord
**25	39373-144	Resistor, 1200 ohm, 1 w.		W-49770	Trimount Stud (Bottom Mtg.)
†25	39373-47	Resistor, 4700 ohm, 1/2 w.		W-134916	Washer, Spring

*These parts will replace the original equipment parts.

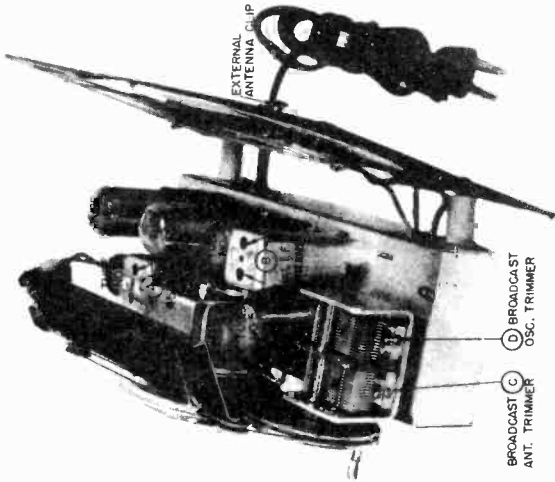
**Used only on models equipped with P. M. speakers.

†Used only on models equipped with E. M. speakers.

MODELS 58TH,
58TH-0

CROSLEY DIV.
AVCO MFG. CORP.

CHASSIS SIDE VIEW



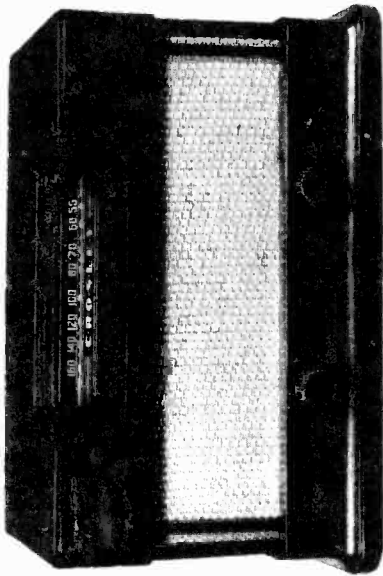
TUBE COMPLEMENT (Model 58TH)

Tube No.	Type	Function
5	14Q7	Mixer
4	14A7	I. F. Amplifier
3	14B6	Detector, AVC, 1st A. F. Ampl.
1	50A5	A. F. Power Output
2	35Y4	Rectifier

TUBE COMPLEMENT (Model 58TH-0)

Tube No.	Type	Function
5	12SA7 (or GT/G)	Mixer
4	12SK7 (or GT/G)	I. F. Amplifier
3	12SQ7 (or GT/G)	Detector, AVC, 1st A. F. Ampl.
1	50L6GT	A. F. Power Output
2	35Z5GT/G	Rectifier

DIAL BULB: Type 47, 6.3 volts, .15 amp.



TYPE: Five-tube, single-band, superheterodyne.

FREQUENCY RANGE: 540 to 1600 kc.

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: a.c.-d.c.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 35 watts nominal.

POWER OUTPUT: (E. M. Speaker) 1 watt maximum. (P. M. Speaker) 1.75 watts maximum.

VOLTAGE DROP ACROSS SPEAKER FIELD: 27 volts.

SPEAKER FIELD RESISTANCE: 450 ohms.

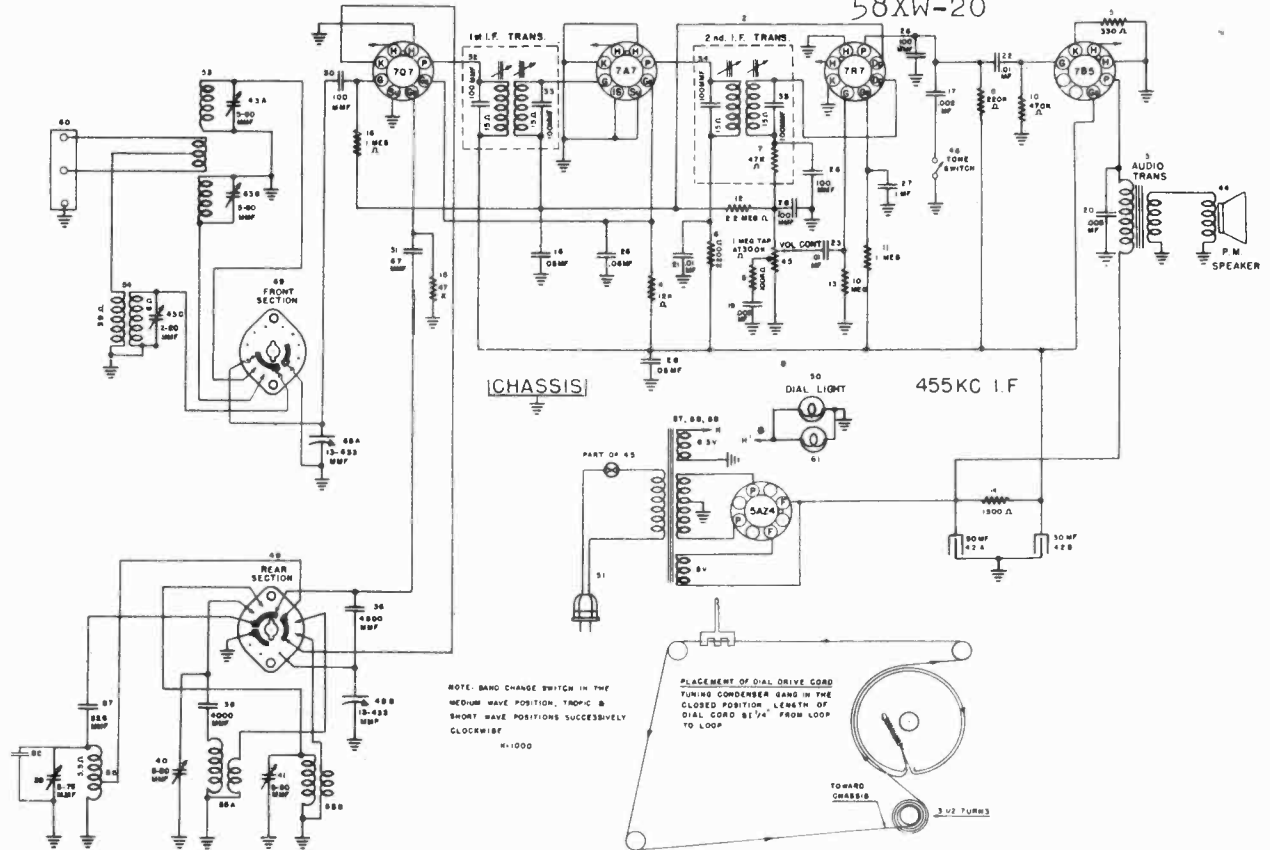
SPEAKER FIELD CURRENT: 60 ma.

When using direct current it may be necessary to reverse the position of the power plug in the electric outlet for correct polarity.

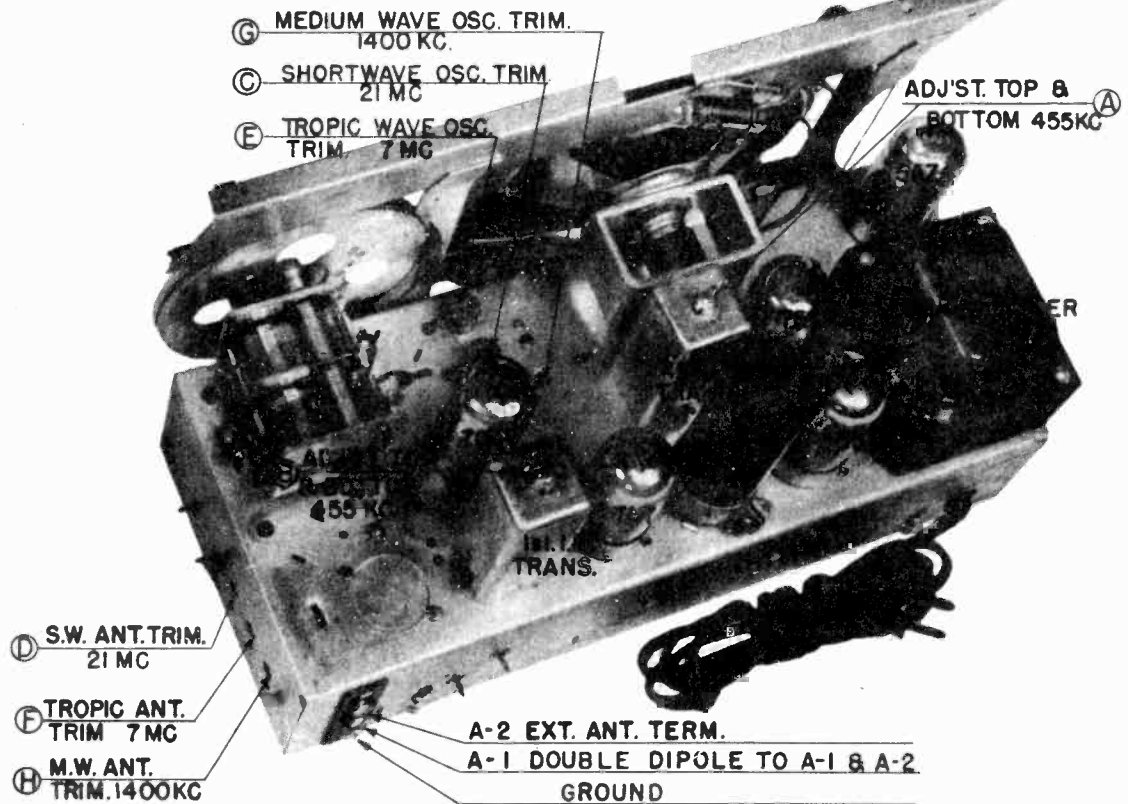
Reversing the position of the power plug when alternating current is used may reduce power hum.

Under no circumstances should a ground be connected to this receiver.

CROSLEY DIV. MODELS 58XA, 58XA-10,
AVCO MFG. CORP. 58XA-20, 58XW, 58XW-10,
58XW-20



**SCHEMATIC DIAGRAM
CHASSIS TOP VIEW**



MODELS 58XA, 58XA-10,
58XA-20, 58XW

CROSLEY DIV.
AVCO MFG. CORP.

MODELS 58XW-10, 58XW-20

ALIGNMENT PROCEDURE

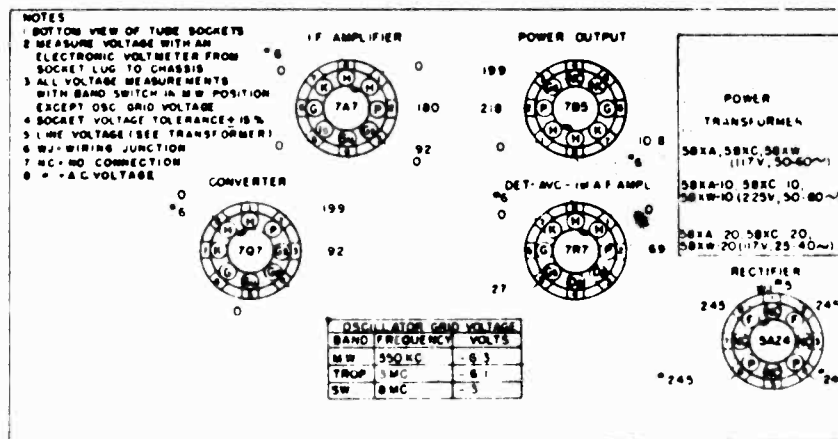
1. Turn the tuning condenser to the completely closed position against the stop, and set the dial pointer to the reference line at the low frequency end of the dial scale.
2. Turn the tone control to the high or treble position.
3. Connect the output meter across the speaker voice coil.
4. The r. f. signal input from the signal generator should be connected to the external antenna terminal (A-2), as indicated in the alignment chart. Connect the signal generator ground to the chassis.
5. Turn the volume control on full, and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

ALIGNMENT CHART

Alignment Sequence	SIGNAL GENERATOR OUTPUT			POSITION OF		Adjust for Maximum	Osc. Frequency	Remarks
	Frequency	In Series with	To	Band Switch Knob to	Dial Pointer			
1	455 kc.	200 mmf.	Ant. (A-2)	Left	1650 kc.	A & B	
2	21.0 mc.	70 ohm Resistor	Ant. (A-2)	Right	21.0 mc.	C	Above	Ground Ant. (A-1).
3	21.0 mc.	70 ohm Resistor	Ant. (A-2)	Right	21.0 mc.	D	Above	Rock gang as trimmer is aligned.
4	7.0 mc.	70 ohm Resistor	Ant. (A-2)	Midway	7.0 mc.	E	Above	Ground Ant. (A-1)
5	7.0 mc.	70 ohm Resistor	Ant. (A-2)	Midway	7.0 mc.	F	Above	Rock gang as trimmer is aligned.
6	1400 kc.	200 mmf.	Ant. (A-2)	Left	1400 kc.	G	Above	Remove ground from Ant. (A-1).
7	1400 kc.	200 mmf.	Ant. (A-2)	Left	1400 kc.	H	Above	

NOTE: When aligning the short-wave oscillator trimmer (C), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: Tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.

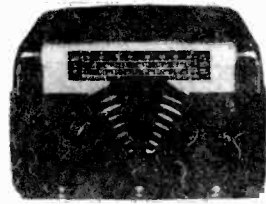
SOCKET VOLTAGE CHART



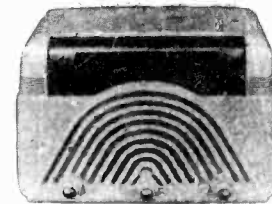
MODELS 58XW-10, 58XW-20

CROSLEY DIV.
AVCO MFG. CORP.

MODELS 58XA, 58XA-10,
58XA-20, 58XW



MODELS 58XA, (-10) (-20)



MODELS 58XW, (-10) (-20)

DESCRIPTION

TYPE: Five-tube, three-band superheterodyne.
FREQUENCY RANGE: Medium Wave Band: 540 to 1600 kc. (555 to 188 meters), Band Switch to left. Tropical Wave Band: 3.0 to 8.0 mc. (100 to 37.5 meters), Band Switch to midway position. Short Wave Band: 8.0 to 22.0 mc. (37.5 to 13.7 meters), Band Switch to right.
INTERMEDIATE FREQUENCY: 455 kc.
POWER SUPPLY: Models 58XA, 58XA-10, 58XW, 58XW-10, 50-60 cycle a. c. only. Model 58XA-20, 58XW-20, 25-40 cycles a. c. only.
VOLTAGE RATING: Models 58XA, 58XA-20, 58XW, 58XW-20, 105-130 volts. Models 58XA-10, 58XW-10, 210-260 volts.
POWER CONSUMPTION: 50 watts maximum.
POWER OUTPUT: 2.5 watts maximum.

TUBE COMPLEMENT

Type	Function
7Q7	Mixer
7A7	I. F. Amplifier
7R7	Detector, AVC, 1st A. F. Amplifier
7B5	Power Amplifier
5AZ4	Rectifier

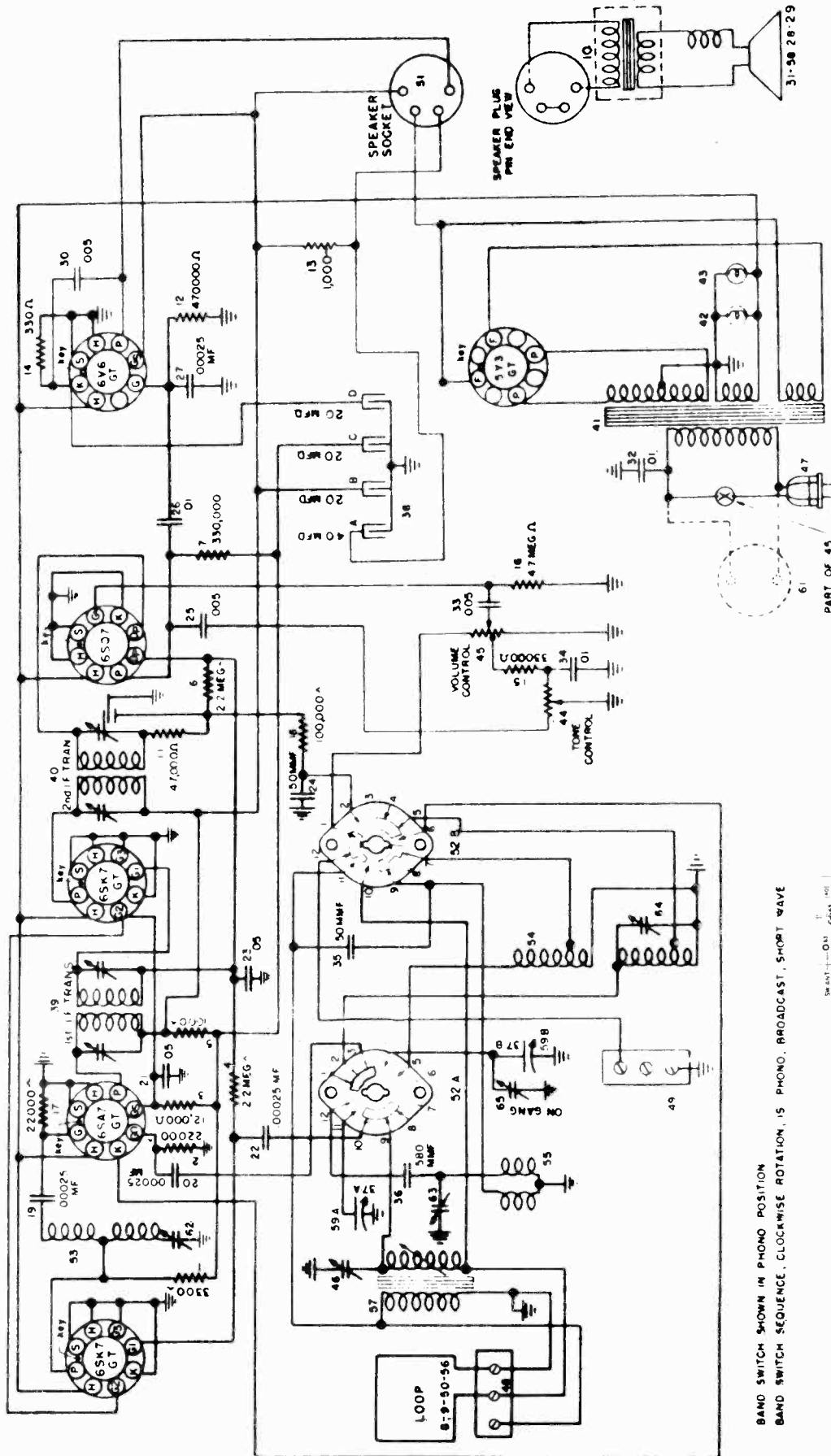
DIAL BULB: Type 47, 6.3 volts, .15 amp.

REPLACEMENT PARTS LIST—

Figures in first column correspond to figures in Schematic Diagram

Item No.	Part No.	Description	Item No.	Part No.	Description
1	AB-138744	Transformer, 1st I. F.	44	138246	Speaker (Less Transformer)
2	AB-138745	Transformer, 2nd I. F.	45	39368-18	Control, Volume (1 meg., Tap 300,000 ohm.)
3	B-138692	Transformer, Output		39370-2	Shaft, Volume Control
4	39373-275	Resistor, 12,000 ohm, 2 w.		39369-1	Switch, Power
5	39373-23	Resistor, 330 ohm, 1/2 w.		W-138775	Switch, Tone
6	39373-40	Resistor, 2200 ohm, 1/2 w.	46	AW-138775	Condenser, Variable
7	39373-67	Resistor, 47,000 ohm, 1/2 w.	48 A	AC-137073-10	Condenser, Variable } Two Section
8	39373-80	Resistor, 220,000 ohm, 1/2 w.	48 B		Switch, Band Change
9	39373-74	Resistor, 100,000 ohm, 1/2 w.	49	B-138691	Bulb (Dial), Type 47, 6.3 v., .15 amp.
10	39373-87	Resistor, 470,000 ohm, 1/2 w.	50	W-48858	Cable & Plug Assy., Power
11	39373-92	Resistor, 1 megohm, 1/2 w.	51	C-132300-1	Coil, Antenna
12	39373-97	Resistor, 2.2 megohm, 1/2 w.	53	AW-138746	Coil, Antenna (Med. Wave)
13	39373-107	Resistor, 10 megohm, 1/2 w.	54	AW-138743	Coil, Oscillator (Trop. & S.W.)
14	39372-7	Resistor, 1500 ohm, 3 w.	55 A	AW-138747	Coil, Oscillator (Trop. & S.W.) Section
15	39373-67	Resistor, 47,000 ohm, 1/2 w.	55 B		Coil, Oscillator (Med. Wave)
16	39373-92	Resistor, 1 megohm, 1/2 w.	56	AW-138689	Transformer, Power (58XA) (58XW)
17	39001-74	Condenser, .002 mfd., 600 v., paper	57	B-138076	Transformer, Power (58XA-20) (58XW-20)
18	39001-17	Condenser, .05 mfd., 600 v., paper	58	B-138844	Transformer, Power (58XA-10) (58XW-10)
19	39001-11	Condenser, .005 mfd., 600 v., paper	59	B-138845	Terminal Board
20	39001-11	Condenser, .005 mfd., 600 v., paper	60	39439-3	Bulb (Dial), Type 47, 6.3 v., .15 amp.
21	39001-13	Condenser, .01 mfd., 600 v., paper	61	W-48858	Condenser, 12 mmf., 500 v., ceramic
22	39001-13	Condenser, .01 mfd., 600 v., paper	62	C-137727-52	Arm & Link Assy., Toggle
23	39001-13	Condenser, .01 mfd., 600 v., paper		AB-138766	Back, Cabinet
24	39001-17	Condenser, .05 mfd., 600 v., paper		C-137750	Cabinet (58XA, 58XA-10, 58XA-20)
25	39001-17	Condenser, .05 mfd., 600 v., paper		R-138573-1	Cabinet (58XW, 58XW-10, 58XW-20)
26	39001-1	Condenser, .0001 mfd., 600 v., paper		AW-138663	Dial Glass
27	39001-19	Condenser, .1 mfd., 600 v., paper		D-143173	Grommet, Var. Cond. Mtg.
28	137727-25	Condenser, 100 mmf., 500 v., ceramic		W-134055	Knob (Volume & Tuning) } 58XA,
29	137727-25	Condenser, 100 mmf., 500 v., ceramic		B-138574-5	Knob (Band Change) } 58XA-10,
30	137727-25	Condenser, 100 mmf., 500 v., ceramic		B-138575-5	Knob (Tone) } 58XA-20
31	137727-31	Condenser, 47 mmf., 300 v., ceramic		B-138576-5	Knob (Volume & Tuning) } 58XW,
32	137727-25	Condenser, 100 mmf., 500 v., ceramic		B-138574-2	Knob (Band Change) } 58XW-10,
33	137727-25	Condenser, 100 mmf., 500 v., ceramic		B-138575-2	Knob (Tone) } 58XW-20
34	137727-25	Condenser, 100 mmf., 500 v., ceramic		B-138576-2	Lock Spring, Dial Drive Bearing
35	137727-25	Condenser, 100 mmf., 500 v., ceramic		W-49829	Mounting Rubber, Speaker Bracket
36	137498-18	Condenser, 4500 mmf., 300 v., mica		W-46065	Pointer, Dial
37	137498-21	Condenser, 526 mmf., 300 v., mica		B-143142	Pulley, Dial Drive Idler
38	137498-20	Condenser, 4000 mmf., 300 v., mica		W-137939-1	Ring (Retaining), Dial Drive Shaft
39	W-142439	Condenser, Trimmer		W-51071-CP	Screw, Dial Glass Strip
40	W-138820	Condenser, Trimmer		W-136613-3CP	Screw, Chassis Mtg.
41	W-138820	Condenser, Trimmer		39220-36CP	Shaft, Dial Drive
42 A	B-139726	Condenser, 50 mfd., 400 v. } Two Sec. Elec.		B-135075-5	Socket, Tube
42 B		Condenser, 30 mfd., 350 v. } 58XA-20		39440	Socket, Dial Light
		58XW-20		D-136565-16	Spring, Dial Drive Cord
42 A	B-138693	Condenser, 50 mfd., 400 v. } Two Sec. Elec.		W-51752	Strip, Pointer
42 B		Condenser, 30 mfd., 350 v. } 58XA, 58XW,		W-138568	Strip, Dial Glass
		58XA-10		B-138649	Support & Pulley Assy., Dial
		58XW-10		AC-138443-1	Trimount Stud
43 A	R-132386-7	Condenser, Trimmer		W-132124-SB	Washer (Spring), Dial Drive Shaft
43 B		Condenser, Trimmer		W-134916	
43 C		Condenser, Trimmer			

CROSLLEY DIV.
AVCO MFG. CORP.



BAND SWITCH SHOWN IN PHONO POSITION
 BAND SWITCH SEQUENCE, CLOCKWISE ROTATION, IS PHONO, BROADCAST, SHORT WAVE



CROSLEY DIV.
AVCO MFG. CORP.

MODEL 66CS(0)

ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r. f. signal input from the signal generator should be connected to the external antenna post as indicated in the alignment chart. Connect the low side (ground) of the signal generator to the chassis.
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain the signal generator output as low as possible to prevent AVC action in the receiver.

NOTE: The Signal Web antenna must remain connected, or if the chassis is removed from cabinet, a suitable dummy loop antenna should be connected in its place.

ALIGNMENT CHART

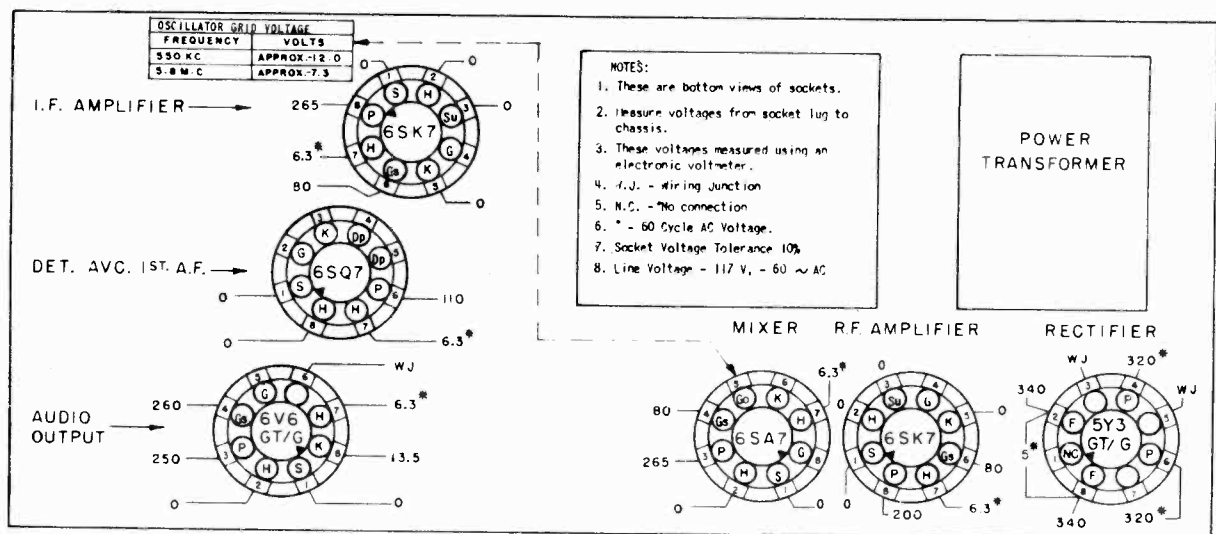
Alignment adjustment locations are shown on Chassis, Rear View—Model 66CS(0)

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series With	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	A	1620	A & B
2	455	200 mmf.	Ant.	A	1620	C*
3	15,300	400 ohms	Ant.	O	15.3	D
4	15,000	400 ohms	Ant.	O	15.0	E
5	1620	200 mmf.	Ant.	A	1620	F
6	1400	200 mmf.	Ant.	A	1400	G
7	600	200 mmf.	Ant.	A	600	H
8	1400	200 mmf.	Ant.	A	1400	Recheck G

*Adjust for Minimum Output (Wave Trap).

NOTE: When aligning the "Overseas" oscillator (D), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower in frequency as indicated on the dial. To check: tune in signal generator frequency, then increase the generator output and tune in the image frequency which should be audible, but weaker than the fundamental frequency. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak. The correct peak is the second peak of the trimmer from the closed position.

SOCKET VOLTAGE CHART

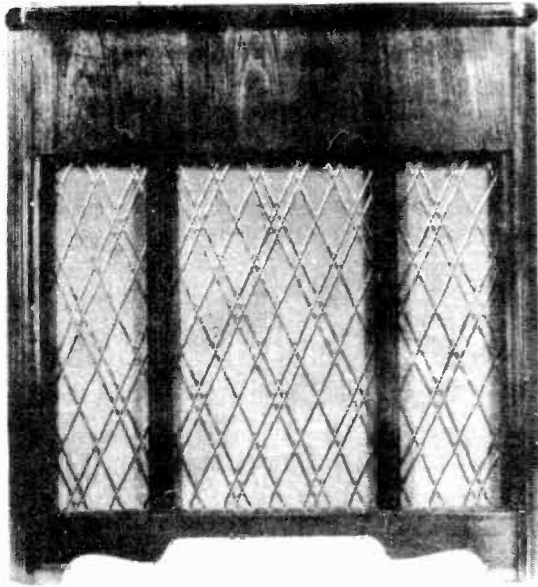


SOCKET VOLTAGE TOLERANCE: 10%

MODEL 66CS(O)

CROSLEY DIV.
AVCO MFG. CORP.

TUBE COMPLEMENT:



Type	Function
6SA7 (GT/G)	Mixer
6SK7 (GT/G)	R. F. Amplifier
6SK7 (GT/G)	I. F. Amplifier
6SQ7 (GT/G)	Detector, AVC, 1st A.F. Amplifier
6V6 (GT/G)	A. F. Power Output
5Y3 (GT/G)	Rectifier

DIAL BULB: Type 51, 7.5 volts, .25 amp.

TYPE: Six-tube, two-band, superheterodyne.

FREQUENCY RANGE: American Broadcast Band, 540 to 1600 kc. (Selector Switch at A.)

Overseas Short-wave Band, 5.8 to 15 mc. (Selector Switch at O.)

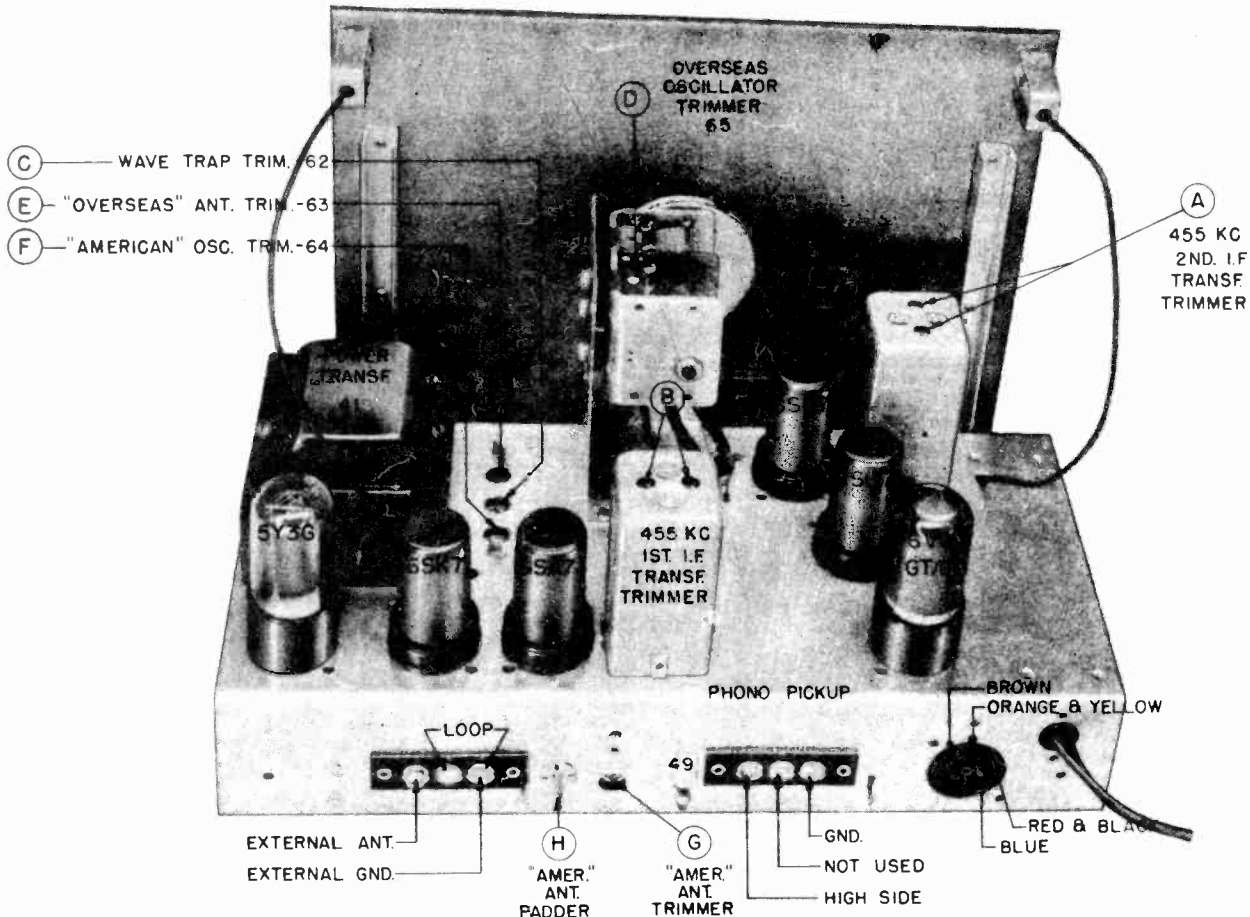
INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: 60 cycle a. c. only.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 65 watts maximum, 20 watts additional for record changer.

POWER OUTPUT: 4.5 watts maximum.



CHASSIS, REAR VIEW—MODEL 66CS(O)

CROSLY DIV.
AVCO MFG. CORP.

MODEL 66CS(O)

REPLACEMENT PARTS LIST—MODEL 66CS(O)

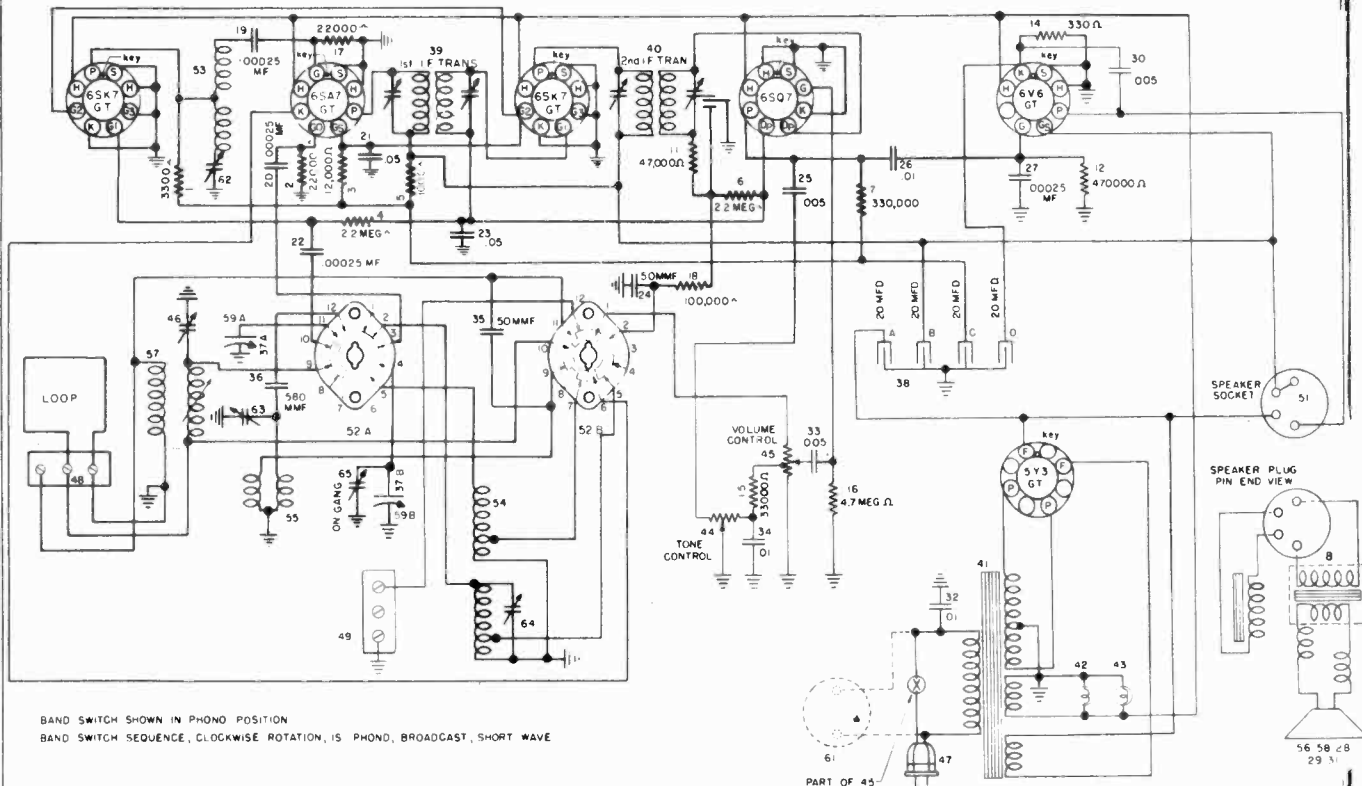
Figures in first column correspond to figures in Schematic Diagram.

Item No.	Part Number	Description	Item No.	Part Number	Description
1	39373-44	Resistor, 3,300 ohm, ½ w.	*	{ 39368-18 39369-1 39370-1	Control, Volume
2	39373-60	Resistor, 22,000 ohm, ½ w.			Switch, Power
3	39373-275	Resistor, 12,000 ohm, 2 w.			Shaft, Plug-in
4	39373-97	Resistor, 2.2 megohm, ½ w.	46	W-132267-1	Condenser, Trimmer
5	39373-143	Resistor, 1,000 ohm, 1 w.	47	B-132300-1	Cable & Plug Assy., Power
6	39373-97	Resistor, 2.2 megohm, ½ w.	48	39019-3	Terminal Board Assy.
7	39373-84	Resistor, 330,000 ohm, ½ w.	49	39019-3	Terminal Board Assy.
8	W-137143	Antenna (Transmission Line)	51	W-134968-1	Socket, Speaker
10	B-138131-2	Transformer, Output	52A	B-134639	Switch, Band Change / Two
11	39373-67	Resistor, 47,000 ohm, ½ w.	52B		Switch, Band Change \ Section
12	39373-87	Resistor, 470,000 ohm, ½ w.	53	AW-135907	Coil Assy., R. F.
13	39371-5	Resistor, 1,000 ohm, 5 w.	54	AW-135908	Coil Assy., Osc.
14	39373-133	Resistor, 330 ohm, 1 w.	55	AW-135909	Coil Assy., Ant.
15	39373-64	Resistor, 33,000 ohm, ½ w.	57	AW-135910	Coil Assy., Ant. Loading
16	39373-102	Resistor, 4.7 megohm, ½ w.	58	B-137082	Speaker & Transformer Assy.
17	39373-60	Resistor, 22,000 ohm, ½ w.	62	B-132386-7	Condenser, Trimmer } Three
18	39373-74	Resistor, 100,000 ohm, ½ w.	63		Condenser, Trimmer } Section
19	39001-73	Condenser, .00025 mfd., 600 v., paper	64		Condenser, Trimmer } Assy.
20	39001-73	Condenser, .00025 mfd., 600 v., paper		G-39012-8	Core, Iron
21	39001-17	Condenser, .05 mfd., 600 v., paper		G-39204	Socket, Tube
22	39001-73	Condenser, .00025 mfd., 600 v., paper		39017-3	Socket, Dial Light
23	39001-17	Condenser, .05 mfd., 600 v., paper		AW-134793	Face Assy., Dial
24	39004-5	Condenser, 50 mmf., 500 v., mica		B-134571	Pointer, Dial
25	39001-11	Condenser, .005 mfd., 600 v., paper		W-134667	Clip, Dial Pointer
26	39001-13	Condenser, .01 mfd., 600 v., paper		W-51752	Spring, Dial Cord
27	39001-73	Condenser, .00025 mfd., 600 v., paper		W-134917	Shaft, Drive
30	39001-11	Condenser, .005 mfd., 600 v., paper		W-51071	Ring, Retaining
32	W-30805	Condenser, .01 mfd., 400 v., paper		W-134916	Washer, Spring
33	39001-11	Condenser, .005 mfd., 600 v., paper		W-132366-2	Nut, Iron Core Locking
34	39001-13	Condenser, .01 mfd., 600 v., paper		39196-29	Screw, Dial Mtg.
35	B-226638-53	Condenser, 50 mmf., 500 v., ceramic		W-134055	Grommet, Variable Condenser Mtg.
36	210685-143	Condenser, 580 mmf., 300 v., mica		R-139206	Cabinet
37A	134995	Condenser, Variable / Two		C-134773	Lens, Dial
37B		Condenser, Variable \ Section		D-137057	Record Changer (Model "O D")
33A	137076	Condenser, 40 mfd., 450 w. v. } Four		AB-134935	Floating Jewel Needle Assy.
38B		Condenser, 20 mfd., 450 w. v. } Section		W-134959	Cable, Phono
38C		Condenser, 20 mfd., 450 w. v. } Elect.		W-135248	Knob
38D		Condenser, 20 mfd., 25 w. v. } Filter		W-45580	Rubber Mounting., Speaker
39	AW-134065	Transformer, 1st I. F.		W-45580	Rubber Mtg., Chassis
40	AW-134158	Transformer, 2nd I. F.		W-23880	Thumbscrew, Chassis Mtg.
41	B-134625	Transformer, Power		W-134966	Nut, Spring Lock
42	W-43567	Bulb (Dial), Type 51, 7.5 v., .25 amp.			(Record Changer Mtg.)
43	W-43567	Bulb (Dial), Type 51, 7.5 v., .25 amp.		AW-134961	Lead Assy., Shielded
44	B-135651	Control, Tone (3 megohm)			(Record Changer)
*	39368-10	Control, Tone		AC-137885	Lid Support, Cabinet
45	B-135859	Control, Volume (1 megohm) & Switch		W-138330	Hinge, Cabinet Lid

*These parts will replace the original equipment parts.

MODEL 66CT

CROSLLEY DIV.
AVCO MFG. CORP.



BAND SWITCH SHOWN IN PHONO POSITION
BAND SWITCH SEQUENCE, CLOCKWISE ROTATION, IS PHONO, BROADCAST, SHORT WAVE

SOCKET VOLTAGE CHART

OSCILLATOR GRID VOLTAGES		
BAND	FREQUENCY	VOLTS
AMERICAN	550 KC	APPROX -12.0
OVERSEAS	5.8 M.C.	APPROX -7.3

I.F. AMPLIFIER → 265, 6.3*, 80

DET. AVC. 1ST. A.F. → 0, 0, 110, 6.3*

AUDIO OUTPUT → 260, 250, WJ, 6.3*, 13.5

MIXER → 80, 265, 0, 6.3*

R.F. AMPLIFIER → 0, 6.3*, 80, 200, 6.3*

RECTIFIER → WJ, 320*, 340, WJ, 340, 320*

NOTES :-

1. THESE ARE BOTTOM VIEWS OF SOCKETS.
2. MEASURE VOLTAGES FROM SOCKET LUG TO CHASSIS.
3. THESE VOLTAGES MEASURED USING AN ELECTRONIC VOLTMETER.
4. WJ - WIRING JUNCTION.
5. NC - NO CONNECTION.
6. * - 60 CYCLE AC VOLTAGE.

POWER TRANSFORMER

SOCKET VOLTAGE TOLERANCE: 10%

TYPE: Six-tube, two-band, superheterodyne.
FREQUENCY RANGE: American Broadcast Band, 540 to 1600 kc. (Selector Switch at A.)
 Overseas Short-wave Band, 5.8 to 15 mc. (Selector Switch at 0.)
INTERMEDIATE FREQUENCY: 455 kc.
POWER SUPPLY: 60 cycle a. c. only.

VOLTAGE RATING: 105-125 volts.
POWER CONSUMPTION: 60 watts maximum.
POWER OUTPUT: 4.5 watts minimum.
VOLTAGE DROP ACROSS SPEAKER FIELD: 76 volts.
RESISTANCE OF SPEAKER FIELD: 900 ohms.

CROSLY DIV.
AVCO MFG. CORP.
ALIGNMENT PROCEDURE

MODEL 66CT

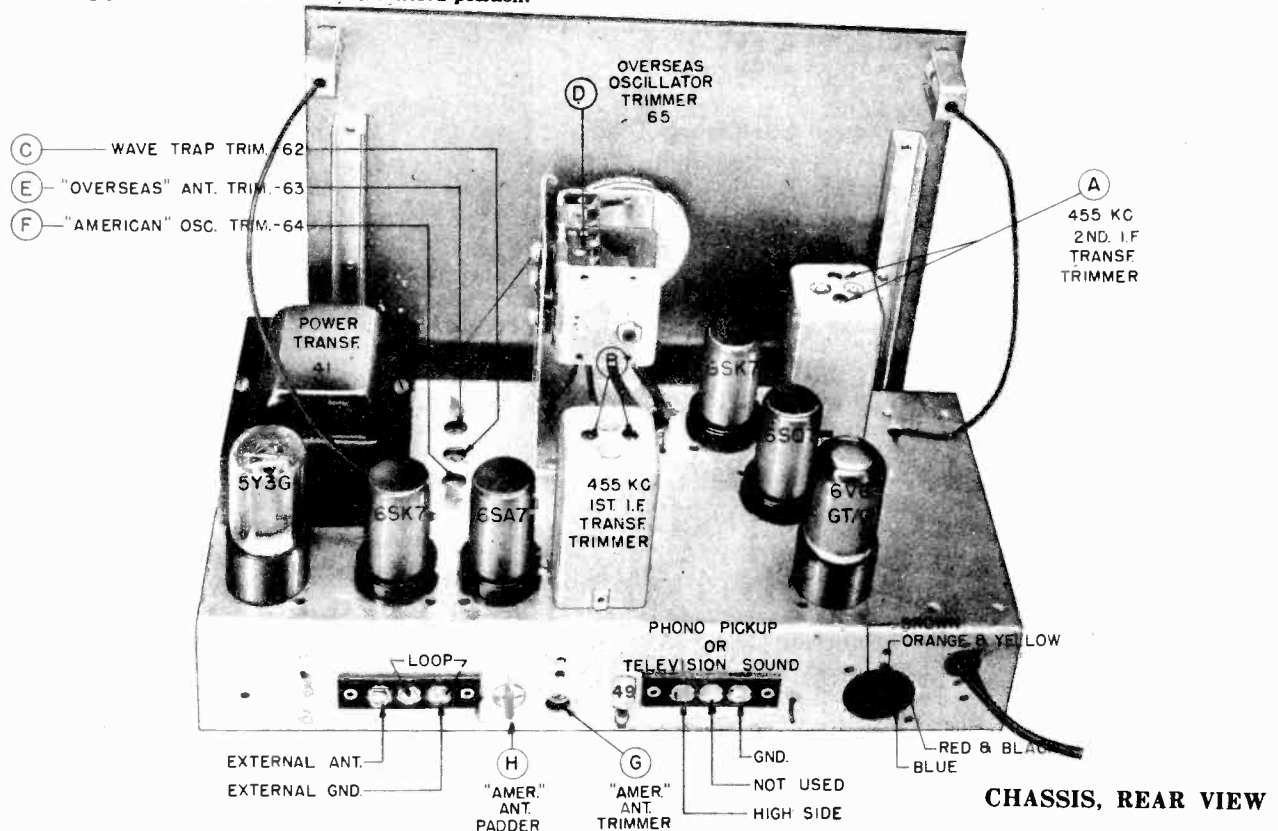
1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r. f. signal input from the signal generator should be connected to the external antenna post as indicated in the alignment chart. Connect the low side (ground) of the signal generator to the chassis.
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain the signal generator output as low as possible to prevent AVC action in the receiver.

Alignment adjustment locations are shown on Chassis, Rear View-

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series With	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	A	1620	A & B
2	455	200 mmf.	Ant.	A	1620	C*
3	15,300	400 ohms	Ant.	O	15,300	D
4	15,000	400 ohms	Ant.	O	15,000	E
5	1620	200 mmf.	Ant.	A	1620	F
6	1400	200 mmf.	Ant.	A	1400	G
7	600	200 mmf.	Ant.	A	600	H
8	1400	200 mmf.	Ant.	A	1400	Recheck G

*Adjust for Minimum Output (Wave Trap).

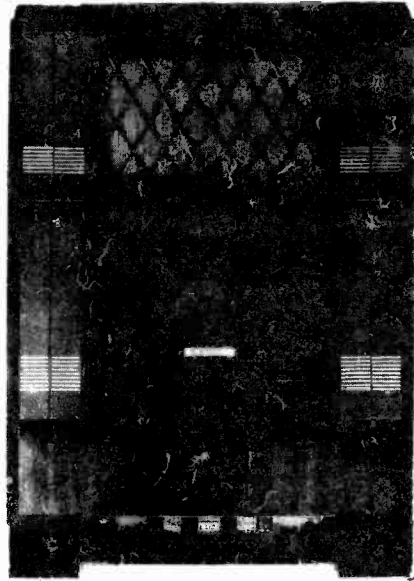
NOTE: When aligning the "Overseas" oscillator trimmer (D), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak of the trimmer from the closed position.



MODEL 66CT

CROSLLEY DIV.
AVCO MFG. CORP.
PARTS LIST—MODEL 66CT

Item No.	Part Number	Description	Item No.	Part Number	Description
1	39294-16	Resistor, 3300 ohm, 1/2 w.	62	B-132386-7	Condenser, Trimmer) Three
2	39294-21	Resistor, 22,000 ohm, 1/2 w.	63		Condenser, Trimmer Section
3	39016-38	Resistor, 12,000 ohm, 2 w.	64		Condenser, Trimmer) Assembly
4	39294-33	Resistor, 2.2 megohm, 1/2 w.	65	Part of Item # 37B	Condenser, Trimmer
5	39040-13	Resistor, 1,000 ohm, 1 w.		G-39204	Socket, Tube
6	39294-33	Resistor, 2.2 megohm, 1/2 w.		39017-4	Socket, Dial Light
7	39294-28	Resistor, 330,000 ohm, 1/2 w.		G-39012-8	Iron Core
8	B-138131-2	Transformer, Output		W-132366-2	Nut, Locking (Iron Core)
11	39294-23	Resistor, 47,000 ohm, 1/2 w.		AW-134793	Face Assy., Dial
12	39294-29	Resistor, 470,000 ohm, 1/2 w.		B-134571	Pointer, Dial
14	39015-19	Resistor, 330 ohm, 1 w.		W-134667	Clip, Dial Pointer
15	39294-22	Resistor, 33,000 ohm, 1/2 w.		W-51752	Spring, Dial Drive Cord
16	39294-35	Resistor, 4.7 megohm, 1/2 w.		W-134917	Shaft, Drive
17	39294-21	Resistor, 22,000 ohm, 1/2 w.		W-51071	Ring, Retaining (Drive Shaft)
18	39294-25	Resistor, 100,000 ohm, 1/2 w.		W-134916	Washer, Spring (Drive Shaft)
19	39001-73	Condenser, 250 mmf., 600 v., Paper		W-134055	Grommet (Var. Cond. Mtg.)
20	39001-73	Condenser, 250 mmf., 600 v., Paper		39196-29	Screw (Dial Mtg.)
21	39001-17	Condenser, .05 mfd., 600 v., Paper		39172-200	Screw, Chassis Mtg. (Front)
22	39001-73	Condenser, 250 mmf., 600 v., Paper		W-45580	Grommet, Chassis Mtg.
23	39001-17	Condenser, .05 mfd., 600 v., Paper		W-137199	Nut, Tee (Chassis Mtg)
24	39004-5	Condenser, 50 mmf., 500 v., Mica		R-138151	Cabinet
25	39001-11	Condenser, .005 mfd., 600 v., Paper		C-134773	Lens, Dial
26	39001-13	Condenser, .01 mfd., 600 v., Paper		W-137201	Pull, Drawer
27	39001-73	Condenser, 250 mmf., 600 v., Paper		W-135248	Knob
30	39001-11	Condenser, .005 mfd., 600 v., Paper		D-134945-1	Record Changer (Model "K")
32	W-30805	Condenser, .01 mfd., 400 v., Paper		AW-138145	Shielded Wire Assy.
33	39001-11	Condenser, .005 mfd., 600 v., Paper	61	W-137213	Cable & Plug Assy. (Phono.)
34	39001-13	Condenser, .01 mfd., 600 v., Paper		W-134956	Nut, Tee (Record Changer Mtg.)
35	B-226638-53	Condenser, 50 mmf., 500 v., Ceramic		W-134966	Nut, Spring Lock (Record Changer Mtg.)
36	GC-210685-143	Condenser, 580 mmf., 300 v., Mica		AW-137232	Screw & Washer Assy. (Record Changer Mtg.)
37A	B-134995	Condenser, Variable } Two			
37B		Condenser, Variable (Section			
38A	B-132807	Condenser, 20 mfd., 360 w.v. } Four		C-137173	Album (12" Record)
38B		Condenser, 20 mfd., 275 w.v. } Section		C-137236	Album (10" Record)
38C		Condenser, 20 mfd., 245 w.v. } Elect.		AB-134935	Needle, Floating Jewel Assy.
38D		Condenser, 20 mfd., 25 w.v. } Filter			
39	AW-137495	Coil Assy., 1st. I.F.			
40	AW-134158	Coil Assy., 2nd. I.F.			
41	B-134625	Transformer, Power			
42	W-43567	Bulb (Dial), Type 51, 7.5 v., 0.2 amp.			
43	W-43567	Bulb (Dial), Type 51, 7.5 v., 0.2 amp.			
44	B-135651	Control, Tone (3 megohm)			
*	39368-10	Control, Tone *			
45	B-135859	Control, Volume (1 meg.) & Switch Assy.			
	39368-18	Control, Volume			
*	39369-1	Switch, Power			
	39370-1	Shaft, Volume (Plug in)			
46	W-132267-1	Condenser, Trimmer			
47	B-132300-1	Cable & Plug Assy. (Power)			
48	39019-3	Terminal Board Assy.			
49	39019-3	Terminal Board Assy.			
51	W-134968-1	Socket, Speaker			
52A	B-134639	Switch, Band Change } Two			
52B		Switch, Band Change } Section			
53	AW-135907	Coil Assy., R. F.			
54	AW-135908	Coil Assy., Oscillator			
55	AW-135909	Coil Assy., Antenna			
56	B-134700	Speaker & Transformer Assy.			
57	AW-135910	Coil Assy., Antenna Loading			



*These parts will replace the original equipment parts.

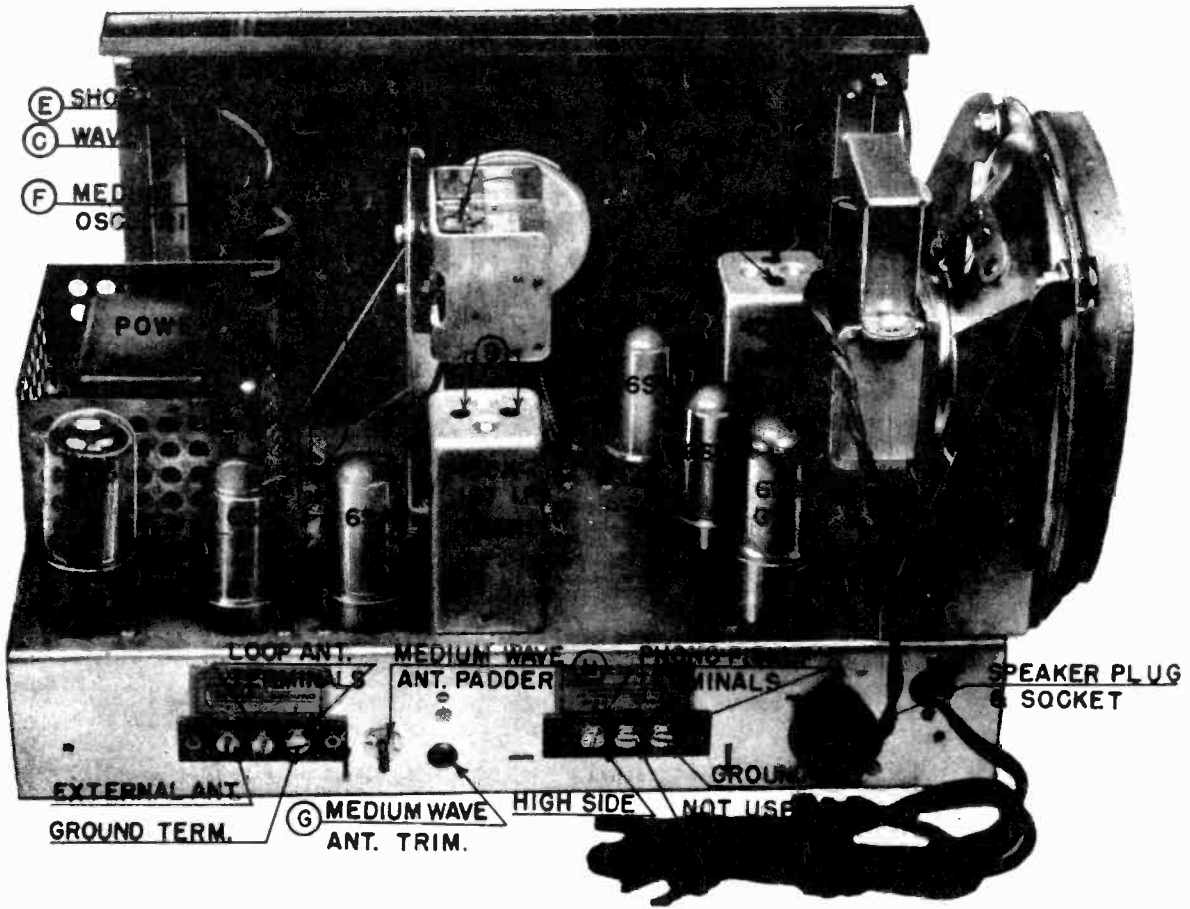
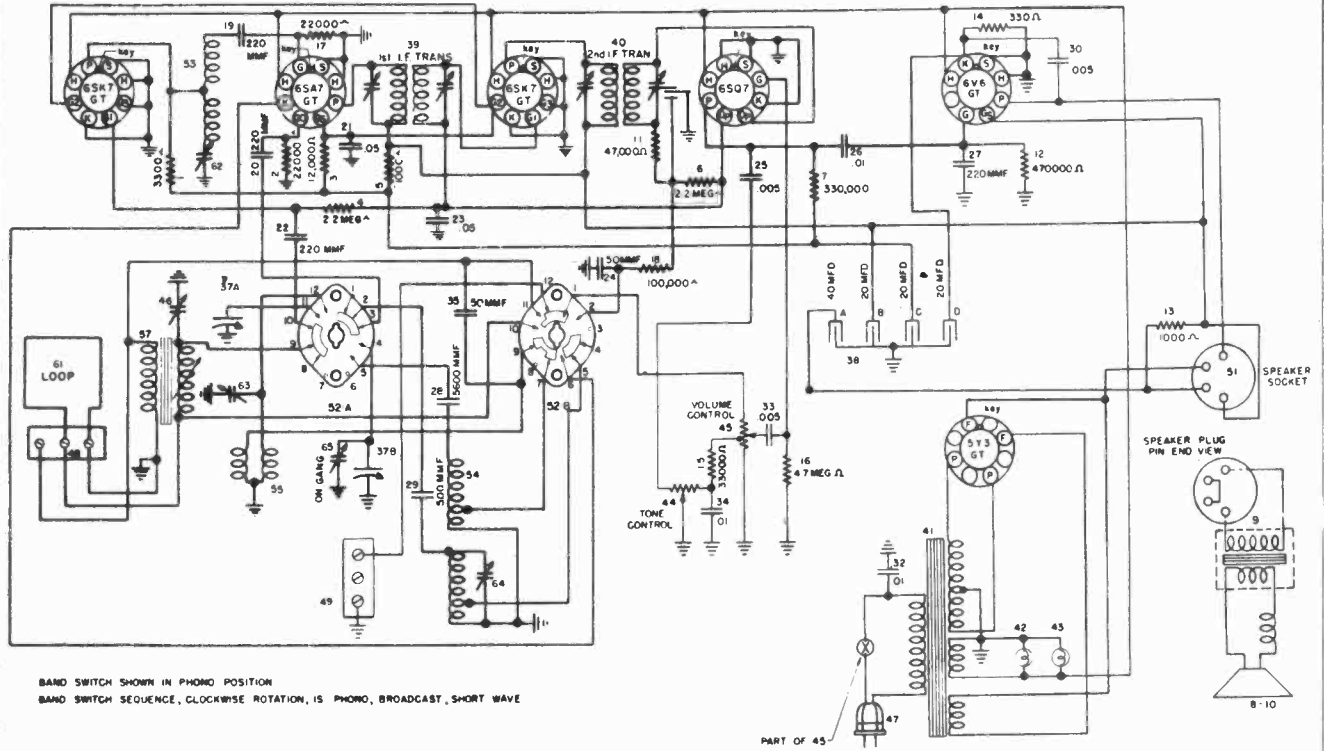
TUBE COMPLEMENT:

Type	Function		
6SA7 (or GT/G)	Mixer	6SQ7 (or GT/G)	Detector, AVC, 1st A.F. Amplifier
6SK7 (or GT/G)	R. F. Amplifier	6V6 GT	A. F. Power Output
6SK7 (or GT/G)	I. F. Amplifier	5Y3 G	Rectifier

DIAL BULB: Type 51, 7.5 volts, .25 amp.

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MODELS 66XTA,
66XTA-10, 66XTA-20



MODELS 66XTA,
66XTA-10, 66XTA-20CROSLEY DIV.
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ALIGNMENT PROCEDURE

1. Turn the tuning capacitor to the completely closed position against the stop, and set the dial pointer to the reference line at the end of the dial scale.
2. Turn the tone control to the high or treble position.
3. Connect the output meter across the speaker voice coil.
4. The r. f. signal input from the signal generator should be connected to the external antenna post. Connect the signal generator ground to the chassis.
5. Turn the volume control on full, and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.
6. Loop antenna must be connected when making alignments.

ALIGNMENT CHART

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in k c.	In Series with	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	M	1650 KC	A & B
2	455	200 mmf.	Ant.	M	1650 KC	C*
3	15,500	400 ohms	Ant.	S	15.5 MC	D
4	15,000	400 ohms	Ant.	S	20 M	E
5	1650	200 mmf.	Ant.	M	1650 KC	F
6	1400	200 mmf.	Ant.	M	1400 KC	G
7	600	200 mmf.	Ant.	M	500 M	H
8	1400	200 mmf.	Ant.	M	1400 KC	Recheck G

*Adjust for minimum output (wavetrap).

NOTE: When aligning the short-wave oscillator trimmer (D), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: Tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.

TYPE: Six-tube, two band superheterodyne with terminals provided for record player.

FREQUENCY RANGE: Medium wave band: 540 to 1650 kc. (555 to 182 meters), Band Switch at (M). Shortwave Band: 4.7 to 15.5 mc. (63 to 19.35 meters), Band Switch at (S).

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: Models 66XTA, 66XTA-10, 50-60 cycle a. c. only. Model 66XTA-20, 25-40 cycles a. c. only.

VOLTAGE RATING: Models 66XTA, 66XTA-20, 105-125 volts. Model 66XTA-10, 210-250 volts.

POWER CONSUMPTION: 60 watts maximum.

POWER OUTPUT: 4.5 watts maximum.

TUBE COMPLEMENT

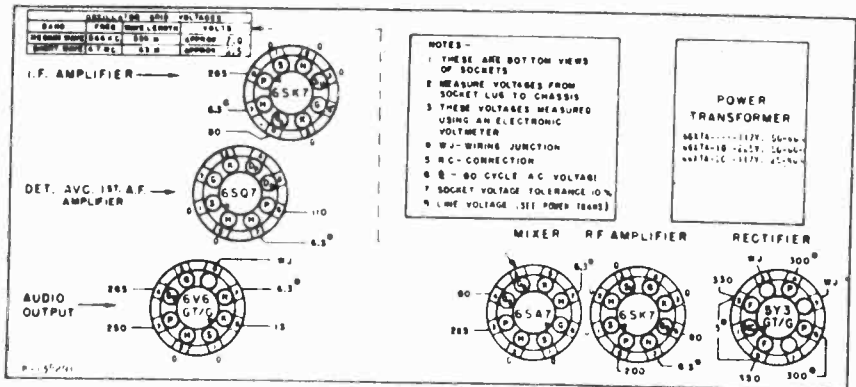
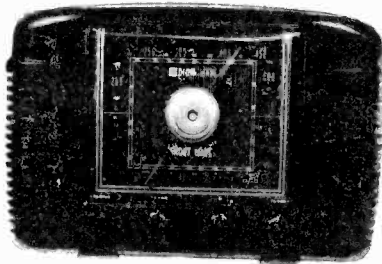
Type	Function
6SK7	R. F. Amplifier
6SA7	Mixer
6SK7	I. F. Amplifier
6SQ7	Detector, AVC, 1st A. F. Amplifier
6V6 GT/G	Power Amplifier
5Y3 GT/G	Rectifier

DIAL BULB: Type 51, 7.5 volts, 0.2 amp.

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MODELS 66XTA,
66XTA-10, 66XTA-20

SOCKET VOLTAGE CHART



Figures in first column correspond to figures in Schematic Diagram

Item No.	Part No.	Description	Item No.	Part No.	Description
1	39373-38	Resistor, 3300 ohm, 1/2 w.	41	B-136132	Transformer, Power (66XTA-10)
2	39373-60	Resistor, 22,000 ohm, 1/2 w.	41	B-136131	Transformer, Power (66XTA-20)
3	39373-275	Resistor, 12,000 ohm, 2 w.	42	W-43567	Bulb (dial), Type 51, 7.5 v., 0.2 amp.
4	39373-97	Resistor, 2.2 megohm, 1/2 w.	43	W-43567	Bulb (dial), Type 51, 7.5 v., 0.2 amp.
5	39373-143	Resistor, 1,000 ohm, 1 w.	44	B-135651	Control, Tone (3 megohm)
6	39373-97	Resistor, 2.2 megohm, 1/2 w.	*	39368-10	Control, Tone
7	39373-84	Resistor, 330,000 ohm, 1/2 w.	45	B-135859	Control, Volume (1 megohm) and Switch Assy.
9	B-138131-2	Transformer, output		39368-18	Control, Volume
10	C-135933	Speaker and Transformer Assy.		39370-1	Shaft, Volume (Plug in)
11	39373-67	Resistor, 47,000 ohm, 1/2 w.	*	39369-1	Switch, Power
12	39373-87	Resistor, 470,000 ohm, 1/2 w.	46	W-132267-1	Condenser, Trimmer
13	39371-5	Resistor, 1,000 ohm, 10 w.	47	C-132300-2	Cable and Plug, Power
14	39373-133	Resistor, 330 ohm, 1 w.	48	W-135479	Terminal Board Assy.
15	39373-64	Resistor, 33,000 ohm, 1/2 w.	49	W-135479	Terminal Board Assy.
16	39373-102	Resistor, 4.7 megohm, 1/2 w.	51	W-134968-2	Socket, Speaker
17	39373-60	Resistor, 22,000 ohm, 1/2 w.	52A	B-135936	Switch, Band Change
18	39373-74	Resistor, 100,000 ohm, 1/2 w.	52B		Switch, Band Change
19	39004-9	Condenser, 220 mmf., 500 v., mica	53	AW-135907	Coil Assy., R. F.
20	39004-9	Condenser, 220 mmf., 500 v., mica	54	AW-136360	Coil Assy., Osc.
21	39001-17	Condenser, .05 mfd., 600 v., paper	55	AW-136361	Coil Assy., Ant.
22	39004-9	Condenser, 220 mmf., 500 v., mica	57	AW-135954	Coil Assy., Ant. Loading
23	39001-17	Condenser, .05 mfd., 600 v., paper	61	AC-138210	Antenna Loop and Back Assy.
24	39004-5	Condenser, 50 mmf., 500 v., mica	62	B-132386-7	Condenser Trimmer
25	39001-11	Condenser, .005 mfd., 600 v., paper	63		Condenser Trimmer
26	39001-13	Condenser, .01 mfd., 600 v., paper	64		Condenser Trimmer
27	39004-9	Condenser, 220 mmf., 500 v., mica	65	Part of Item #37B	Condenser Trimmer
28	210685-188	Condenser, 5600 mmf., 500 v., mica	39388		Socket, Tube
29	210685-165	Condenser, 500 mmf., 500 v., mica	39017-3		Socket, Dial Light
30	39001-11	Condenser, .005 mfd., 600 v., paper	G-39012-8		Iron Core
32	W-30805	Condenser, .01 mfd., 400 v., paper	W-132366-2		Nut, Iron Core Locking
33	39001-11	Condenser, .005 mfd., 600 v., paper	AW-137205		Dial Face Assy.
34	39001-13	Condenser, .01 mfd., 600 v., paper	B-134571		Pointer, Dial
35	39004-5	Condenser, 50 mmf., 500 v., mica	W-134667		Clip, Dial Pointer
37A	B-136207	Condenser, Variable	W-51752		Spring, Dial Drive Cord
37B		Condenser, Variable	W-134917		Shaft, Drive
38A	B-135934	Condenser, 40 mfd., 360 w.v.	W-51071		Ring, Retaining
38B		Condenser, 20 mfd., 275 w.v.	W-134916		Washer, Spring
38C		Condenser, 20 mfd., 245 w.v.	W-135164		Bumper
38D		Condenser, 20 mfd., 22 w.v.	W-134055		Grommet, Variable Cond. Mtg.
		Filter used on Models 66XTA, 66XTA-10	R-134592		Cabinet
38A	B-137372	Condenser, 40 mfd., 360 w.v.	C-132688		Lens, Dial
38B		Condenser, 20 mfd., 275 w.v.	W-130197		Knob
38C		Condenser, 20 mfd., 245 w.v.	W-132709		Grille Cloth
38D		Condenser, 20 mfd., 22 w.v.	W-45580		Grommet
39	AW-137495	Transformer, Assy., 1st I. F.	B-134660		Gasket, Speaker
40	AW-134158	Transformer Assy., 2nd I. F.	W-132124		Stud, Trimount
41	B-135937	Transformer, Power (66XTA)	W-136584		Washer, Rubber

*These parts will replace the original equipment parts.

MODELS 88TA,
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Under no circumstances should a ground be connected to this receiver. Never place the receiver chassis on a metal bench or grounded object when the power plug is connected to the electric outlet. To avoid shock, when making repairs or adjustments, do not permit any part of the body to contact grounded metal objects.

ALIGNMENT EQUIPMENT

The following equipment is used as indicated in the alignment chart and alignment notes:

SIGNAL GENERATORS:

1. Amplitude Modulated Signal Generator with 400 cycle modulated signal to cover 455 to 1600 kc.
2. Frequency Modulated Signal Generator to cover 10.7 to 108 mc., with sweep to cover 450 kc. for the 10.7 mc. alignment.

CATHODE RAY OSCILLOGRAPH:**METERS:**

1. Suitable Output Meter.
2. Field Strength Meter (Fig. 1). This meter may consist of a D.C. 100 microampere (full scale) meter, shunted by a 1000 mmf. mica by-pass condenser; a germanium crystal rectifier connected in series with the meter and a five foot, 75 ohm twisted pair of leads. Shunt the meter end of the leads with a 75 ohm carbon resistor. The open ends of the leads are connected to the F.M. dipole antenna terminals. Connect the condenser directly across meter terminals, and the crystal directly to one terminal of meter. Keep connecting leads as short as possible.

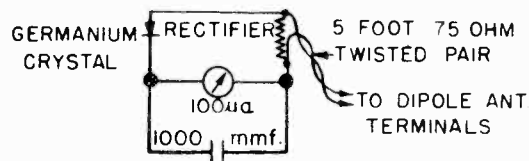


FIGURE 1

DUMMY ANTENNA:

1. 78 ohm Dummy Antenna (Fig. 2).

CONDENSERS:

1. 0.1 mfd. Condenser.
2. 100 mmf. Condenser.
3. 220 mmf. Condenser.
4. 30 mmf. Condenser.

SHUNT:

1. 10 ohm carbon Resistor.

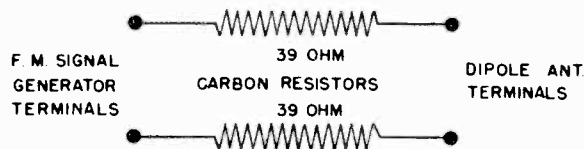


FIGURE 2

ALIGNMENT PROCEDURE

This receiver has been aligned at the factory for best performance and no attempt should be made to realign it unless the proper test equipment is available.

1. Turn the tuning condenser to full mesh, against stop, and set the dial pointer to the reference point at the left end of the dial.
2. Set the tone control knob to the full treble position (extreme right).
3. For Amplitude Modulated signal readings, connect output meter across voice coil (3.2 ohms).
4. All Amplitude Modulated input signals are modulated 30% at 400 cycles with the High side of the signal generator connected to receiver as indicated in the alignment chart. Connect the low side of signal generator thru a 0.1 mfd condenser to the receiver chassis. If hum is encountered, use a 1 to 1 isolating transformer between the power line outlet and the receiver power line cord. Then connect the low side of the signal generator directly to the receiver chassis.
5. All Frequency Modulated signals are modulated 30% at 400 cycles. 30% modulation is equal to a deviation of 22.5 kilocycles.
6. Turn the volume control to maximum clockwise position and adjust signal generator output to produce a noticeable output meter reading. Keep signal generator output as low as possible to prevent AVC action in the receiver.

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ALIGNMENT CHART

Alignment adjustment locations are shown on pages 1 and 2

Alignment Sequence	Type Generator	Signal Generator Output			Position of		Adjust	Type of Selectivity Curve	Osc. Frequency	Remarks
		Frequency	In Series with	To	Range Switch	Dial Pointer or Var. Cond.				
1	AM	455 kc	100 mmf.	Mixer Grid 6SH7	AM	Open	A & B	Single Peak	See Note 1	
2	AM	1400 kc.	100 mmf.	Stator Plates, Ant. Section of Var. Cond.	AM	1400 kc.	C		Above	See Notes 1 and 2
3	AM	1400 kc.	220 mmf.	Loop Primary	AM	1400 kc.	D		Above	See Note 1.
4	FM	10.7 mc.	30 mmf.	2nd I.F. Grid 6SH7	FM	Closed	E	~		See Notes 1, 3, 4, 5 & 6.
5	FM	10.7 mc.	30 mmf.	1st I.F. Grid 6SG7	FM	Closed	F	~		See Notes 3, 5 & 6.
6	FM	10.7 mc.	30 mmf.	F.M. Ant. Terminals	FM	Closed	G	~		See Notes 3, 5 & 6.
7	FM	98.0 mc.	*78 ohm Dummy	F.M. Ant. Terminals	FM	98 mc.	H & I	Single Peak		See Notes 7 & 9
8	Disconnect Generator. Connect Field Strength Meter.*				FM	92 mc.	J			Adjust for null point. See Note 8.
9	If Trimmer (J) in Step 8 is turned more than ¼ turn, repeat Step 7.									
10	Repeat Step 8 if Step 9 was necessary.									
11	FM	98.0 mc.	*78 ohm Dummy	F.M. Ant. Terminals	FM	98 mc.	K			Adjust for maximum output.

*See Circuit.

ALIGNMENT NOTES

1. Connect low side of signal generator as explained in "Alignment Procedure".
2. Receiver should tune thru peaks at 540 and 1600 kc.
3. Sweep generator alignment. (For 10.7 mc. I.F. alignment use approximately 450 kc. sweep width).
4. Sweep generator output 0.1 to 1 volt R. M. S.
5. Connect high side of scope to discriminator transformer terminal at shielded lead wire junction. Connect low side of scope to the receiver chassis.
6. Align for maximum peak amplitude. Peak separations should be 150 to 170 kc.
7. Disconnect scope. Connect output meter to voice coil (3.2 ohms).
8. It is important that the radiation balance trimmer be adjusted to the null point for proper operation of the Frequency Modulation band. To check the null point, connect a Field Strength Meter across the F.M. antenna primary trimmer.
9. Align F.M. Antenna band pass circuit as follows:
 - (a) With the F.M. signal generator set to 98.0 megacycles, feed a signal, modulated with 400 cycles at 30% to the receiver as indicated in the alignment chart. Shunt the antenna primary trimmer with a 10 ohm carbon resistor and adjust trimmer (H) for maximum output.
 - (b) Place the 10 ohm carbon resistor across the F.M. antenna secondary trimmer and adjust trimmer (I) for maximum output. Remove 10 ohm carbon resistor from secondary trimmer.

MODELS 88TA,
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DESCRIPTION

TYPE: Eight-tube, two-band, superheterodyne.

FREQUENCY RANGE: Standard American Broadcast Band; 540 to 1600 kc. (Selector Switch to left). Frequency Modulation Band; 88 to 108 megacycles (Selector Switch to right).

INTERMEDIATE FREQUENCY: Standard American Broadcast Band; 455 kc.

Frequency Modulation Band; 10.7 mc.

POWER SUPPLY: a.c.—d.c.

VOLTAGE RATING: 105-125 volts.

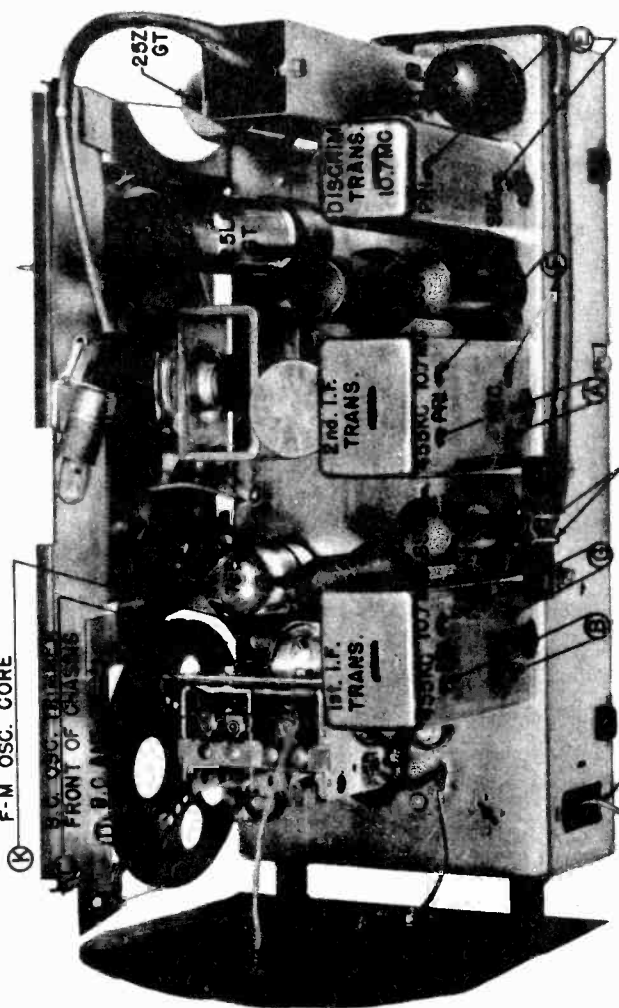
POWER CONSUMPTION: 45 watts at normal power supply voltage (117 volts).

POWER OUTPUT: 1.5 watts maximum.

TUBE COMPLEMENT

Type	Function
6SH7	Mixer
7F8	Oscillator
6SG7	1st I. F. Amp. (F. M. and A. M.)
6SH7	2nd F. M. I. F. Ampl. and A. M. Det.
6H6	F. M. Det. (Discriminator)
6SJ7	1st Audio Ampl.
25L6GT	Output
25Z6GT	Rectifier

DIAL BULB: Type 47, 6.3 v., .15 amp.

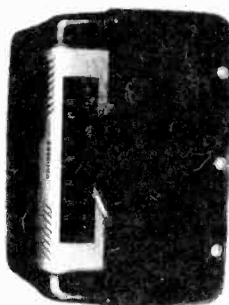


TO EXT. ANT. TERMINAL

TO DIPOLE ANT. TERMINALS

INTERLOCK PINS TO POWER CORD

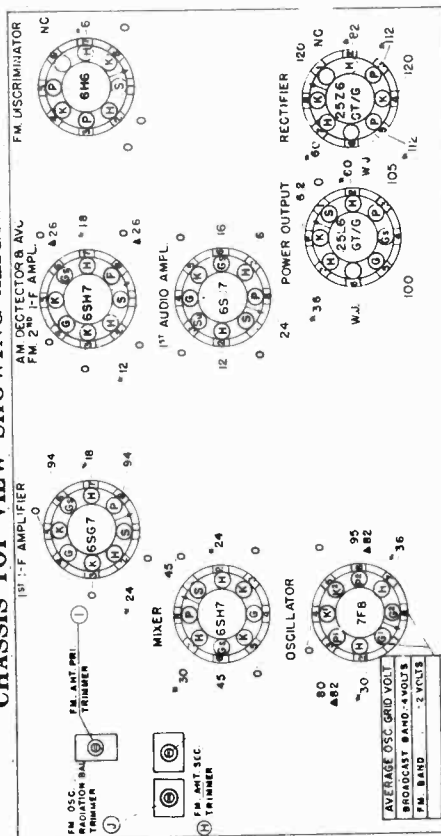
88TA



88TC



CHASSIS TOP VIEW SHOWING ALIGNMENT ADJUSTMENTS



SOCKET VOLTAGE CHART

NOTES:
 1. BOTTOM VIEW OF TUBE SOCKETS
 2. F.M. BAND SOCKET CLIP TO CHASSIS FOR BE & FM EXCEPT
 3. ALL VOLTAGES ARE THE SAME FOR BE & FM EXCEPT
 WHERE MARKED WITH DECIMAL. THIS IS THE VOLTAGE
 WITH BAND SWITCH IN THE FM POSITION

4. LINE VOLTAGE 117V., 80 ~
 5. F.M. BAND SOCKET CLIP TO CHASSIS FOR BE & FM EXCEPT
 6. W.A. WIRING JUNCTION
 7. D.C. VOLTAGE
 8. SOCKET VOLTAGE TOLERANCE 10%

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A kit of materials (part No. 143964) will be forwarded, free of charge, upon receipt of a request and the serial number of the radio for which it is required.

1. Change the resistor (item No. 32) to a 22,000 ohm, $\frac{1}{2}$ watt, resistor (part No. 39373-60) as shown in Fig. 1.
2. Add one 10,000 ohm $\frac{1}{2}$ watt, resistor (part No. 39373-54) as shown in Fig. 1. (88TC only)
3. Add one 1,000 mmf., 300 volt ceramic condenser (part No. 137727-8) as shown in Fig. 1.
4. Change the condenser (item No. 61) to a 1000 mmf., 300 volt ceramic condenser (part No. 137727-8) as shown in Fig. 1. (88TC only)
5. Replace the two lower screws, that fasten the speaker brackets to the front of the chassis, with two No. 8 x 1" hex. headed self threading screws (part No. 39220-36 CP). Add one headed bushing (part No. 41405-3) to each of these screws, and add one rubber bumper (part No. 135164) to the head of each of these screws. (88TC only)
6. Add one Shock mount (part No. 46065) in the upper right hole of speaker mounting bracket. Do not fasten the speaker to this shock mount.
7. Cement condenser (item No. 85 in schematic wiring diagram) to the chassis with Plastic adhesive (part No. 138905).
8. Apply a heavy coat of plastic adhesive (part No. 138905) to the original variable condenser as shown in Fig. 2. Care must be taken so that the adhesive does not interfere with the mechanical operation of the condenser.

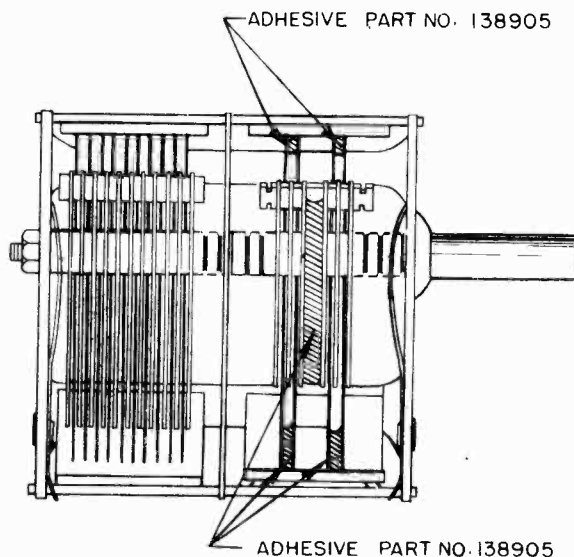


FIG. 2

9. Secure the insulator at the top of the 1st I.F., 2nd I.F., and discriminator transformers to the transformer shields with a heavy coat of adhesive (part No. 86646).
10. Add one rubber washer (part No. 136584) between the underneath side of the cabinet and each large metal washer used on the chassis mounting screws. (88TC only)

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MODELS 88TA, 88TC, LONG-DISTANCE SWITCH INSTALL.

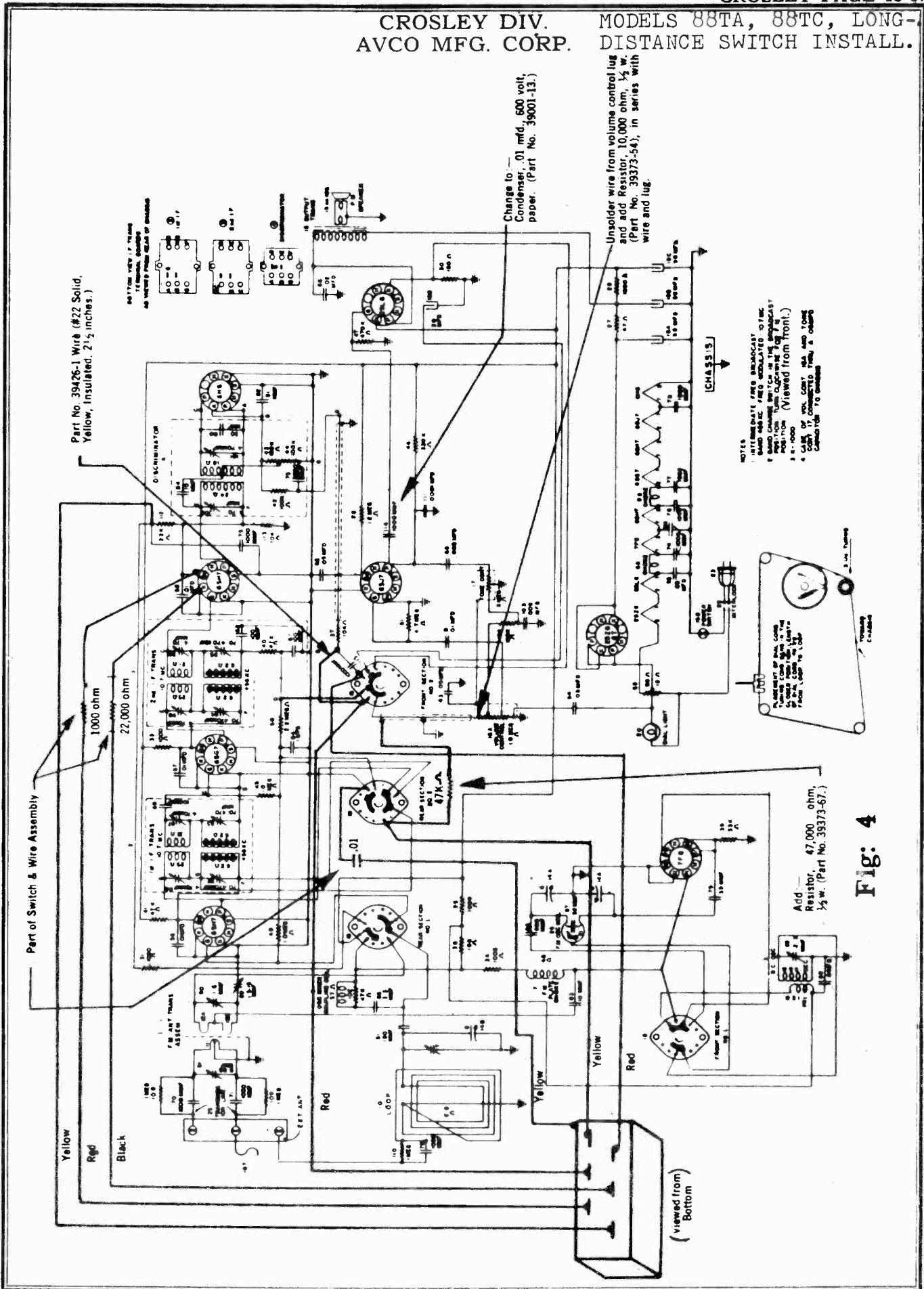


Fig: 4

MODELS 88TA,
88TC

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INSTALLATION OF KIT (PART NO. AW-144330) - To install this kit, proceed as follows:

1. Mounting The Switch - The switch is mounted to the inside of the cabinet back in the following manner:

- (a) Mark dimensions on cabinet back as shown in Fig. 3.
- (b) Drill the two small holes "A" and "B" with a 1/8" drill.
- (c) The large hole may be started by drilling a

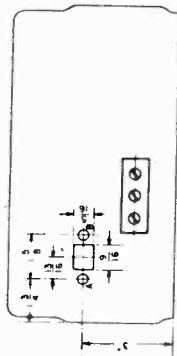


Fig. 3

hole 9/32 of an inch in diameter and then enlarge it with a small hole saw or file to the illustrated dimensions.

- (d) With the two small screws (part No. 39170-31CP), washers (part No. 39027-2CP), and nuts (part No. 39033-6CP), secure the switch to the inside of the cabinet back, in a position so that the side of the switch case with the yellow wire soldered to it is toward the top of the cabinet back.

(e) The gummed local-distance label (part No. W-144338) should be fastened on the outside of the cabinet back at approximately 1/8" directly above the switch.

2. Placement of the Switch Wires and Their Connection to the Chassis

Circuits - With the chassis and cabinet back turned upside down proceed as explained in the following:

- (a) Place the red wire, black wire, and yellow wire, from the three lugs at the left of the switch, (looking down on switch from rear) through the large hole located in the rear of the receiver chassis, near the
- (b) Tie an overhand knot in the wires, making certain that no surplus wire remains inside the chassis. These three wires must be placed against the inside of the chassis and dressed under the shield, which is located near the 6SH7 tube socket. (2nd F.M. I.F. Amplifier and A.M. Detector tube).

(c) If a 1000 ohm resistor is connected from lug 5 to lug 6 of this socket, remove and discard the resistor.

(d) With reference to Fig. 4, solder the 22,000 ohm resistor, from the black wire, to lug 5 and the 1000 ohm resistor, from the red wire, to lug 6 of this 6SH7 socket. Be sure to slide the two pieces of tubing over the resistors, permitting it to cover the soldered connections to the wires.

(e) The yellow wire must be soldered to the junction of the 22,000 ohm resistor (item 112, Fig. 4) and 1000 mmf., condenser (item 73, Fig. 4), which is secured to the center lug (viewed in chassis) of the discriminator transformer.

(f) The twisted pair of wires (red wire and yellow wire), which has the yellow wire soldered to the switch case, must be placed through the middle hole in the insulating strip located at the right rear of chassis. Tie an overhand knot in these wires, making certain that no surplus wire remains inside the chassis.

(g) With the chassis upside down and viewing it from the front, solder the red wire to the first lug of the front portion of band switch section No. 2 (to locate lugs, count clockwise from the band switch section spacer that is uninsulated).

(h) Slip the short piece of tubing (part No. 39431-16) over the yellow wire which is soldered to the local-distance switch case. Solder a .01 mfd. condenser (part No. 39001-13) to this wire and slide the tubing over the connection. Solder the other end of this condenser to the first lug of the rear portion of band switch section No. 2.

(i) Place the remaining pair of twisted wires (red wire and yellow wire) through the remaining hole in the insulating strip and tie an overhand knot in the wires, being careful that no surplus wire remains inside the chassis.

(j) Solder the yellow wire to the sixth lug of the rear portion of band switch section no. 2. Also solder one end of the 47,000 ohm resistor (part No 39373-67) to this lug.

(k) Unsolder the shielded wire from both the band switch spacer and the fourth lug of the front portion of band switch section No. 2. Slip the 3 inch length of tubing (part No. 39431-14) over the shielded wire so that the braided shield protrudes slightly from the end of the tubing. Resolder the shielded wire to the fourth lug. The loose end of the 47,000 ohm resistor should be soldered to the protruding end of the wire's braided shield. Do not resolder braided shield to the band switch spacer.

(l) Unsolder the other end of the shielded wire from the volume control lug and solder the 10,000 ohm resistor (part No. 39373-54) in series with the wire and lug. Push the tubing over the resistor and dress the shielded wire against the inside of the chassis front over the volume control.

(m) Remove the condenser (item 114, Fig. 4) and replace it with a .01 mfd. condenser (part No. 39001-13).

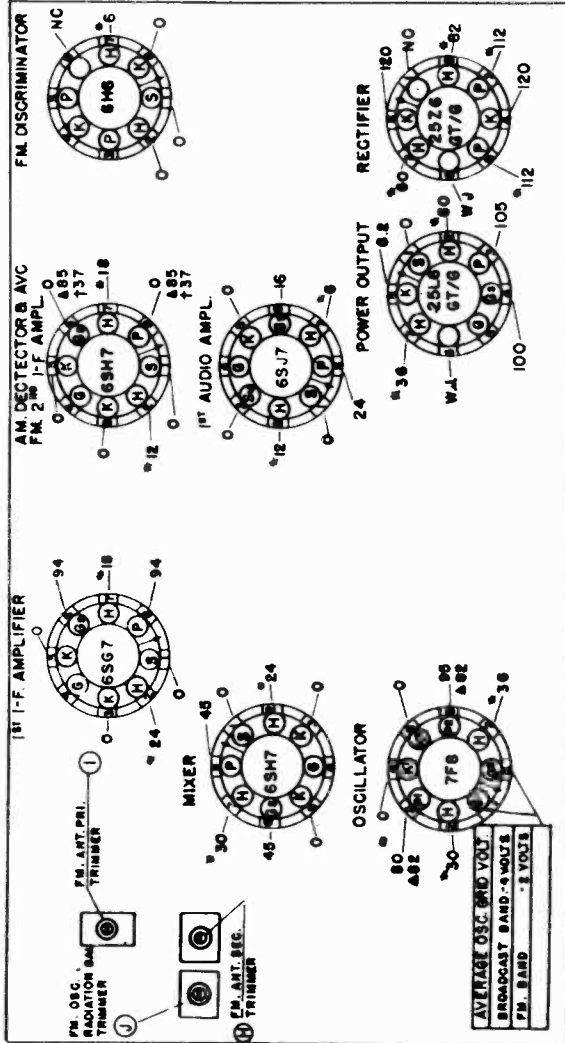
(n) The remaining red wire from the local-distance switch and one end of the 2 1/2 inch piece of yellow insulated wire (Part No. 39426-1) should be soldered to the fifth lug of the front portion of band switch section No. 2. The other end of the 2 1/2 inch piece of wire must be soldered to the junction of resistor (item 37, Fig. 4) and condenser (item 115, Fig. 4).

(o) The four wires placed through the insulated strip must be twisted together inside the chassis and dressed in a direct line to their place of connection on the band switch. Solder the 1 1/4 inch piece of bare wire (part No. 39209-22) to the pressed out grounding loop, which is located inside the rear of chassis, near the insulating strip. Then wrap this wire around the four wires so that the four wires are held toward the rear of chassis.

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MODELS 88TA,
88TC

The following socket voltage chart shows the proper voltages of a receiver that incorporates a local distance switch.



SOCKET VOLTAGE NOTES:

1. BOTTOM VIEW OF TUBE SOCKETS.
2. MEASURE VOLTAGE WITH AN ELECTRONIC VOLTMETER FROM SOCKET LUG TO CHASSIS.
3. ALL VOLTAGES ARE THE SAME FOR BC. & FM., EXCEPT WHERE MARKED WITH DELTA (Δ). THIS IS THE VOLTAGE WITH BAND SWITCH IN THE FM. POSITION.
4. LINE VOLTAGE 117V 60~
5. NC = NO CONNECTION.
6. WJ = WIRING JUNCTION.
7. ~ = AC. VOLTAGE.
8. SOCKET VOLTAGE TOLERANCE 10%
9. \dagger LOCAL - DISTANCE SWITCH IN LOCAL POSITION

SOCKET VOLTAGE CHART

LOCAL-DISTANCE SWITCH KIT (Part No. AW-144330
MODELS 88TA, 88TC

QTY.	PART NO.	DESCRIPTION	QTY.	PART NO.	DESCRIPTION
(1)	39373-60	Resistor 22,000 ohm $\frac{1}{2}$ W	1	AB-144339	Switch & Twisted Wire Assy.
(1)	137727-8	Condenser 1000 mmf. 300 volt, ceramic	1	W-144338	Label (Gummed), Local-Distance
(2)	39220-36CP	Screw #8 x 1" hex hd. self threading	1	39431-14	Tubing (3 inches in length)
(2)	41405-3	Bushing-Headed	1	39431-16	Tubing (1 inch in length)
(2)	135164	Bumper-Rubber	2	39001-13	Condensers, .01 mfd., 500v., paper
(1)	46065	Shock Mount	1	39373-54	Resistor, 10,000 ohm, $\frac{1}{2}$ W. (Brown, Black, Orange)
(X)	138905	Plastic Adhesive (in an oil can - Part No. 448931)	1	39373-67	Resistor, 47,000 ohm, $\frac{1}{2}$ W. (Yellow, Violet, Orange)
(X)	86646	Adhesive (in an oil can - Part No. 448931)	1	39426-1	Wire (#22 Solid, Yellow Insulated, 2 $\frac{1}{2}$ inches in length)
(3)	136584	Washer-Rubber	1	39209-22	Wire (#22 Solid, Bare, 1 $\frac{1}{2}$ inches in length)
(1)	144407	Packing List	2	39170-31CP	Screw (#4-40 x 5/16), C. R. Machine
			2	39033-6CP	Nut (#4-40, Hex.)
			2	39027-2CP	Washer (#4 Internal Shakeproof)
			1	W-144331	Packing List
			1	91995	Carton

MODELS 88TA,
88TCCROSLLEY DIV.
AVCO MFG. CORP.REPLACEMENT PARTS LIST—MODELS 88TA, 88TC
Figures in first column correspond to figures in Schematic Diagram

Item No.	Part No.	Description	Item No.	Part No.	Description
1	AC-137783	Transformer Assy., Antenna (F.M.)	76	C-137727-8	Condenser, 1000 mmf., 300 v., ceramic
2	AC-138819-B	Transformer Assy., 1st I.F.	77	C-137727-8	Condenser, 1000 mmf., 300 v., ceramic
3	AC-139094-C	Transformer Assy., 2nd I.F.	78	Part of Item 10	Condenser, 1000 mmf., 300 v., ceramic
4	AC-139077-B	Transformer Assy., Discriminator	79	C-137727-19	Condenser, 39 mmf., 300 v., ceramic
5	AW-138924	Coil Assy., Oscillator (Broadcast)	80	Part of Item 4	Condenser, 50 mmf., 500 v., ceramic
6	AW-138950	Coil Assy., Oscillator Mixer Coupling	81	C-137727-24	Condenser, 180 mmf., 500 v., ceramic
7	AW-138978	Choke Assy., Plate (F.M. Osc.)	82	C-137727-28	Condenser, 51 mmf., 500 v., ceramic
8	AW-139056	Condenser Assy., .01 mfd., 200 v., (shielded)	83	C-137727-37	Condenser, 10 mmf., 300 v., ceramic
9A	AW-136720	Choke, R.F. Heater } Assy.	84	Part of Item 4	Condenser, 10 mmf., 300 v., ceramic
9B		Choke, R.F. Heater } Assy.	85	B-137499-5	Condenser, 500 mmf., 300 v., silver mica
10	AB-139118	Loop and Support Assy., Antenna	86	Part of Item 6	Condenser, 3.3 mmf., 500 v.
11	Part of Item 1	Coil Assy.	87	W-139285	Condenser, 52 mmf., ceramic
12A	Part of Item 1	Coil } Two Section Assy.	88	W-138268	Condenser, Trimmer
12B		Coil } Two Section Assy.	89	C-136327-29	Condenser, Trimmer
13	AD-138246	Speaker	90	Part of Item 1	Condenser, Trimmer
14A	C-139028	Condenser, Variable } Two	91	Part of Item 1	Condenser, Trimmer
14B		Condenser, Variable } Section	92	Part of Item 2	Condenser, Trimmer
15	B-137364	Transformer, Output	93	Part of Item 2	Condenser, Trimmer
16A	B-137781	Control, Volume (1 megohm) } Assy.	94	Part of Item 3	Condenser, Trimmer
16B		Switch, Power } Assy.	95	Part of Item 3	Condenser, Trimmer
	39368-18	Control, Volume	96	Part of Item 2	Condenser, Trimmer
	39370-2	Shaft, Plug, in	97	Part of Item 2	Condenser, Trimmer
	39369-1	Switch, Power	98	Part of Item 3	Condenser, Trimmer
17	B-137782	Control, Tone (2 megohm)	99	Part of Item 3	Condenser, Trimmer
*	39368-11	Control, Tone	100	Part of Item 4	Condenser, Trimmer
18A	B-137976	Condenser, 50 mfd., 200 v. } Four	101	Part of Item 4	Condenser, Trimmer
18B		Condenser, 50 mfd., 200 v. } Section	102	Part of Item 6	Resistor, 47,000 ohm, 1/2 w.
18C		Condenser, 50 mfd., 150 v. } Elect.	103	39001-11	Condenser, .005 mfd., 600 v., paper
18D		Condenser, 20 mfd., 25 v. } Filter	104	39373-74	Resistor, 100,000 ohm, 1/2 w.
19	B-137986	Switch, Band Change	105	C-137727-8	Condenser, 1000 mmf., 300 v., ceramic
20	W-48858	Bulb (Dial), Type 47, 6.3 v., .15 amp.	108	39373-92	Resistor, 1 megohm, 1/2 w.
21	39012-70	Iron Core, F.M. Oscillator Coil	109	39373-92	Resistor, 1 megohm, 1/2 w.
22	AB-138971	Interlock Assy.	110	Part of Item 10	Resistor, 1 megohm, 1/2 w.
23	C-132300-6	Cable and Plug Assy., Power	111	39001-1	Condenser, .0001 mfd., 600 v., paper
25	W-137143	Transmission Line, 75 ohm	112	39373-60	Resistor, 22,000 ohm, 1/2 w.
26	W-139286	Coil, Oscillator (F.M.)	113	39373-54	Resistor, 10,000 ohm, 1/2 w.
27	39373-9	Resistor, 47 ohm, 1/2 w.	114	C-137727-8	Condenser, 1000 mmf., 300 v., ceramic
28	39373-93	Resistor, 1.2 megohm, 1/2 w.	115	C-137727-8	Condenser, 1000 mmf., 300 v., ceramic
29	39373-143	Resistor, 1000 ohm, 1 w.		AB-138910	Back & Power Cable Assy. (88TA)
30	39373-16	Resistor, 150 ohm, 1/2 w.		AB-139643	Back & Power Cable Assy. (88TC)
31	39373-33	Resistor, 1000 ohm, 1/2 w.		W-135164	Bumper, Rubber (Chassis, Front)
33	39373-33	Resistor, 1000 ohm, 1/2 w.		R-138573-3	Cabinet (88TA)
34	39373-33	Resistor, 1000 ohm, 1/2 w.		R-139647	Cabinet (88TC)
35	39373-33	Resistor, 1000 ohm, 1/2 w.		AB-139105	Dial Assy.
37	39373-54	Resistor, 10,000 ohm, 1/2 w.		AW-139148	Dipole Antenna Kit
38	39373-54	Resistor, 10,000 ohm, 1/2 w.		W-138660	Foot, Rubber (88TA)
39	39373-64	Resistor, 33,000 ohm, 1/2 w.		W-134055	Grommet (Var. Cond. Mtg.)
40	Part of Item 3	Resistor, 47,000 ohm, 1/2 w.		B-138574-3	Knob, Volume or Tuning (88TA)
41	39373-67	Resistor, 47,000 ohm, 1/2 w.		B-138575-3	Knob, Band Change (88TA)
42	Part of Item 4	Resistor, 100,000 ohm, 1/2 w.		B-138576-3	Knob, Tone (88TA)
43	Part of Item 4	Resistor, 100,000 ohm, 1/2 w.		B-138574-1	Knob, Volume or Tuning (88TC)
44	Part of Item 4	Resistor, 100,000 ohm, 1/2 w.		B-138575-1	Knob, Band Change (88TC)
46	39373-84	Resistor, 330,000 ohm, 1/2 w.		B-138576-6	Knob, Tone (88TC)
47	39373-87	Resistor, 470,000 ohm, 1/2 w.		W-132366-1	Nut, Locking (Trimmer)
48	39373-92	Resistor, 1 megohm, 1/2 w.		W-132366-2	Nut, Locking (Osc. Coil)
49	39373-92	Resistor, 1 megohm, 1/2 w.		W-137460	Pointer, Dial
50	39373-97	Resistor, 2.2 megohm, 1/2 w.		W-51071	Ring, Retaining
51	39373-102	Resistor, 4.7 megohm, 1/2 w.		W-211101	Ring, Socket Retaining
52	W-139035	Resistor, 80 ohm (Wire Wound) } Two		39311-60	Screw, Set (Toggle Arm)
		Resistor, 18 ohm (Wire Wound) } Section		W-137751-2	Shaft, Drive
54	39001-17	Condenser, .05 mfd., 600 v., paper		W-46065	Shock Mount, Rubber (speaker)
55	39001-17	Condenser, .05 mfd., 600 v., paper		39232-1	Socket, Tube (25Z6)
56	39001-13	Condenser, .01 mfd., 600 v., paper		39232-2	Socket, Tube (25L6)
57	39001-13	Condenser, .01 mfd., 600 v., paper		39232-7	Socket, Tube (6H6)
58	39001-13	Condenser, .01 mfd., 600 v., paper		39232-10	Socket, Tube (6SH7)
60	39001-13	Condenser, .01 mfd., 600 v., paper		39232-10	Socket, Tube (6SG7)
62	39001-17	Condenser, .05 mfd., 600 v., paper		39232-10	Socket, Tube (6SJ7)
63	39001-17	Condenser, .05 mfd., 600 v., paper		W-136470	Socket, Tube (7F8)
64	39001-19	Condenser, .1 mfd., 600 v., paper		D-136565-17	Socket, Dial Light
65	39001-76	Condenser, .003 mfd., 600 v., paper		W-138656	Spring, Dial
66	39001-80	Condenser, .02 mfd., 600 v., paper		W-51752	Spring, Dial Drive Cord
67	Part of Item 3	Condenser, 100 mmf., 300 v., ceramic		W-49829	Spring, Lock
68	Part of Item 3	Condenser, 100 mmf., 300 v., ceramic		W-138568	Strip, Dial Pointer
69	Part of Item 2	Condenser, 100 mmf., 300 v., ceramic		C-139844	Strip, Dial Trim
70	C-137727-8	Condenser, 1000 mmf., 300 v., ceramic		B-138649	Strip, Dial Window
71	C-137727-8	Condenser, 1000 mmf., 300 v., ceramic		AB-139099	Toggle Arm & Link Assy.
72	C-137727-8	Condenser, 1000 mmf., 300 v., ceramic		W-132124-58	Trimount Stud, Back (88TA)
73	C-137727-8	Condenser, 1000 mmf., 300 v., ceramic		W-136584	Washer, Rubber (Chassis Mtg.)
74	C-137727-8	Condenser, 1000 mmf., 300 v., ceramic		W-134916	Washer, Spring
75	Part of Item 4	Condenser, 1000 mmf., 300 v., ceramic		C-139037	Window, Dial

*These parts will replace the original equipment parts.