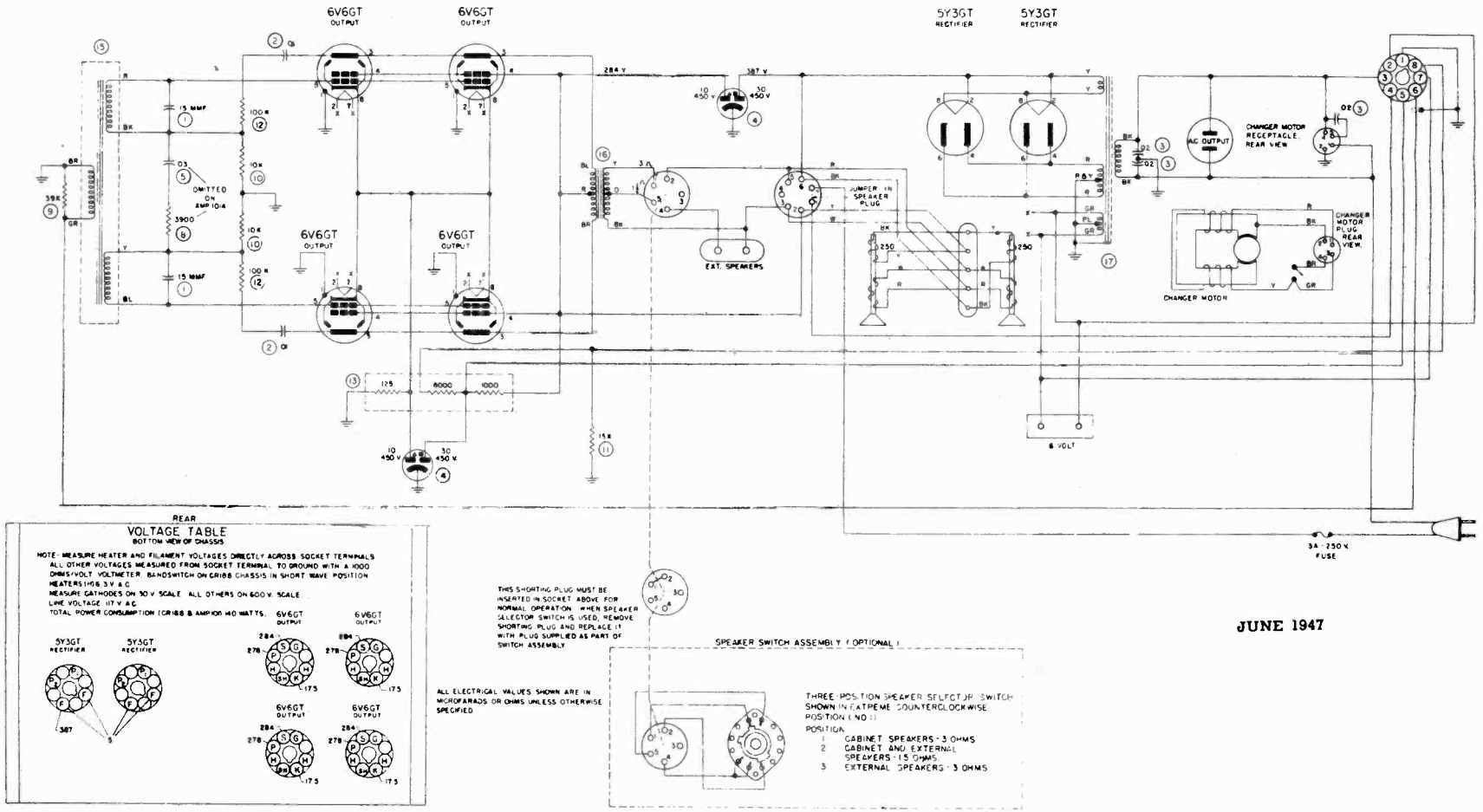


JUNE 1947

SPECIFICATIONS

Power supply	117 volts 50/60 cycles AC
Power consumption	*140 watts
Power output	20 watts
Output impedance	2.5/1.7 ohms

Tubes:

Power output (push-pull parallel stage)	(4) 6V6GT
Rectifiers	(2) 5Y3G

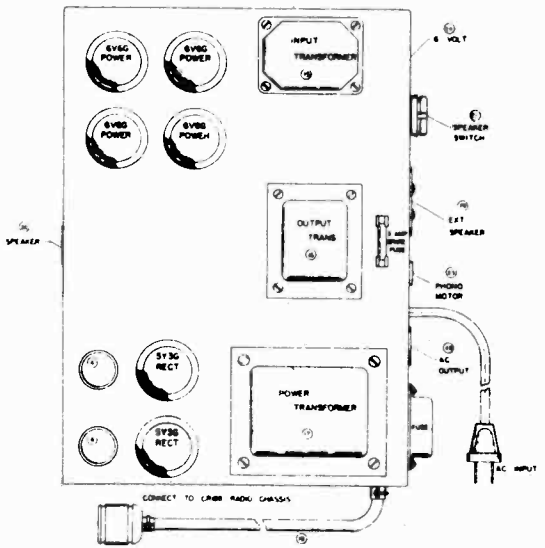
Speakers:

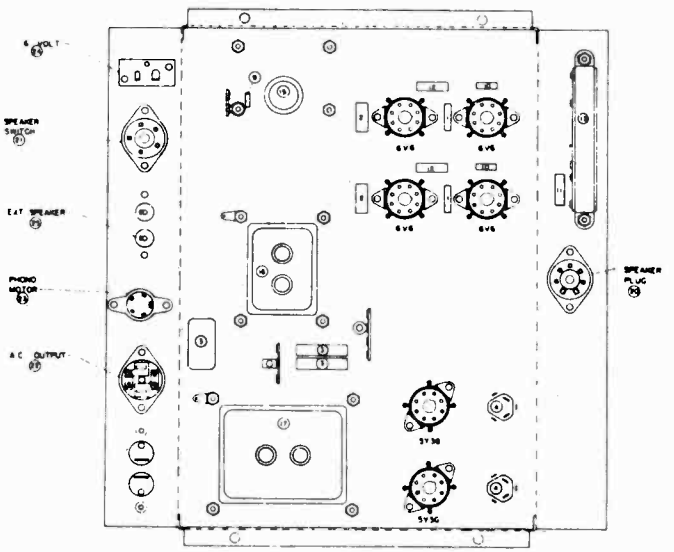
	No. 582815	No. 582869
Field coil resistance	250 ohms	250 ohms
Voice coil impedance (400 cycles)	5.0 ohms	5.0 ohms

*Power consumption is for amplifier and CR-188 radio chassis.

PARTS LIST

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Capacitor, molded mica, 15 mmf	250107G93
2	Capacitor, paper, .01 mfd. 600 V	250129G2
3	Capacitor, paper, .02 mfd. 600 V	250129G3
4	Capacitor, electrolytic, 30-10 mfd. 450 V	270023G2
5	Capacitor, paper, .03 mfd. 400 V. (AMP-101B only)	250129G4
8	Resistor, composition, 3900 ohm ± 10%, 1/2 W.	2300084G69
9	Resistor, composition, 39,000 ohm 1/2 W.	230084G81
10	Resistor, composition, 10,000 ohm 1/2 W.	230084G19
11	Resistor, composition, 15,000 ohm 2 W.	230086G20
12	Resistor, composition, 100,000 ohm 1 W.	230085G25
13	Resistor, wire wound, 125-8000-1000 ohm	240037G1
15	Transformer, input	320017G1
16	Transformer, output	330024G1
17	Transformer, power, 117 V. 50-60 cycle	300026G1
19	Cable and plug assembly	460557G1
20	Socket, speaker connection	180504G16
21	Socket, speaker switch	180504G6
22	Socket, power connection	180428G1
23	Socket, phonograph motor connection	180501G5
24	Socket, 6-volt	189788G2
	Socket, octal	180194G4
	Terminal board—external speaker connection	209601G2
	Fuse mounting	182467G1
	Fuse cover	182467G2
	Fuse, 3 amp. 250 V., cartridge	180157G10
	Fuse clip for spare fuse (2 required)	180236G1





METHOD FOR REMOVING CHASSIS FROM CABINET

To remove the chassis, first remove all plugs and cables from the receptacles and the connector from the rear of the radio chassis. The amplifier chassis is mounted to the cabinet shelf with four screws and nuts; after they have been removed, the amplifier may be lifted from the cabinet.

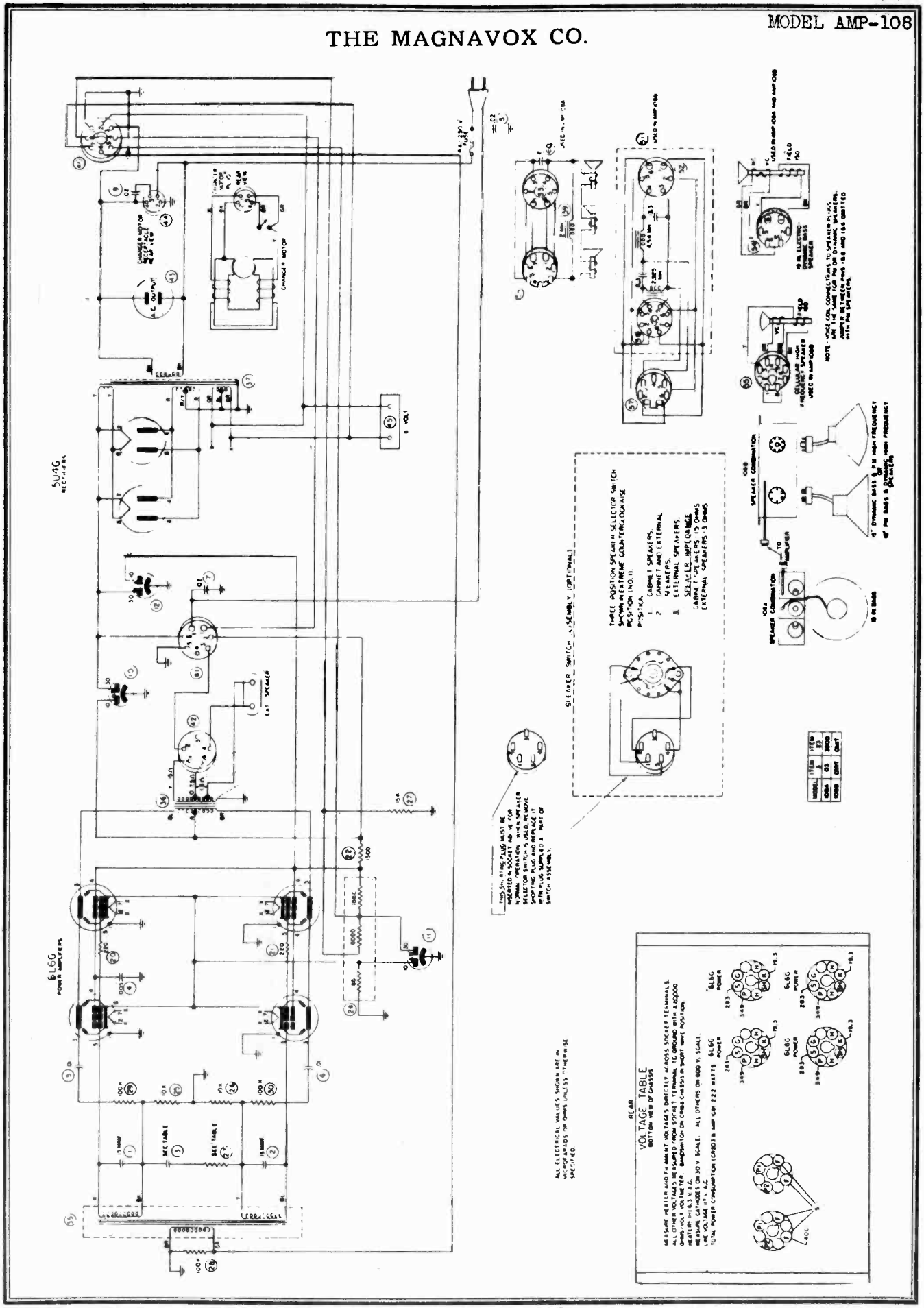
ACCESSORIES

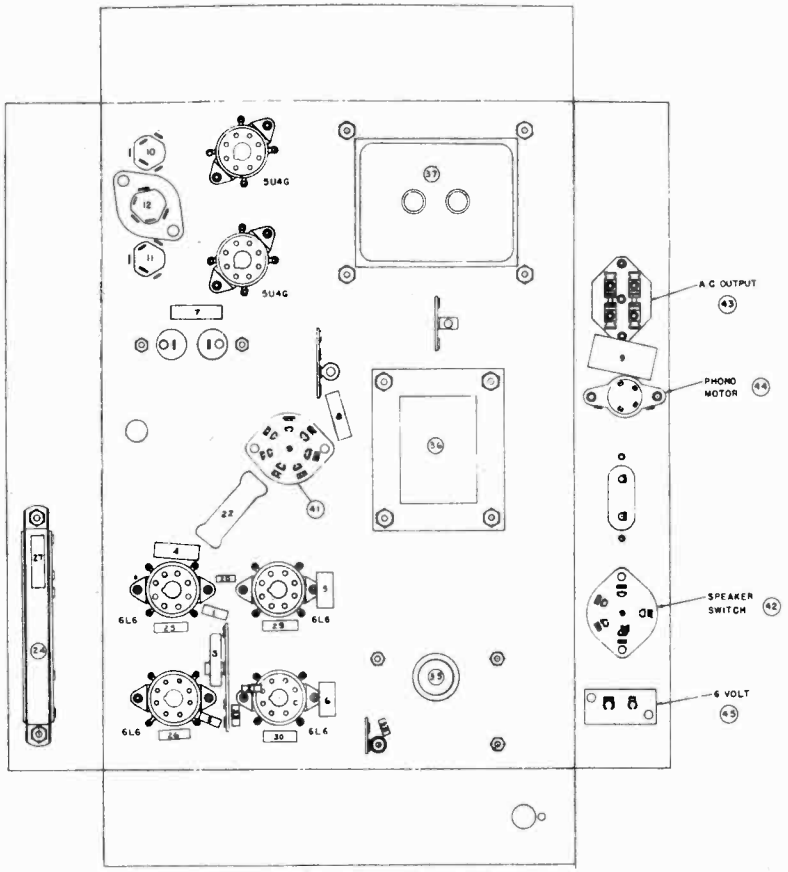
EXTENSION SPEAKER—Two screw terminals are provided on the rear of the amplifier chassis for the connection of an extension speaker line. High-fidelity permanent-magnet extension speakers are available through all authorized Magnavox dealers.

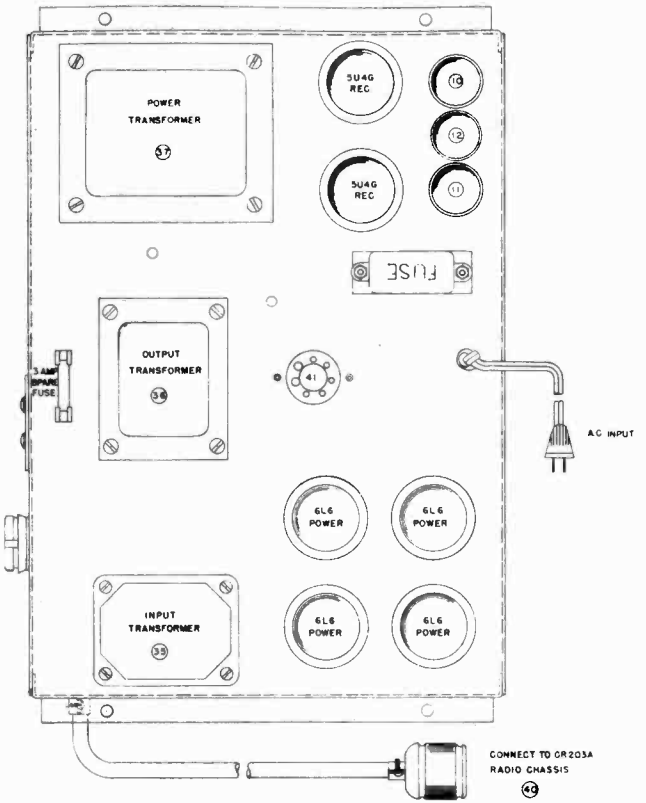
SPEAKER SELECTOR SWITCH—Provision is made in this amplifier for connecting extension speakers and a speaker selector switch. By means of this switch, the cabinet and extension speakers may be operated separately or together while maintaining the proper load on the amplifier. This is accomplished by means of a rotary switch with a connecting plug that may be purchased from any authorized Magnavox dealer. When shipped from the factory, a shorting plug is inserted in the amplifier receptacle stamped SPEAKER SWITCH. This plug must not be removed unless the speaker selector switch is added. Then the shorting plug is replaced with a plug that is supplied as a part of the selector switch assembly.

THE MAGNAVOX CO.

MODEL AMP-108







SPECIFICATIONS

Power supply	117 volts 50/60 cycles AC
Power consumption	*220 watts
Power output	45 watts
Output impedance	15/7.5/1.5 ohms
Tubes:	
Power output (push-pull parallel stage)	(4) 6L6G
Rectifiers	(2) 5U4G

*Power consumption is for amplifier and CR-203 or CR-207 radio chassis.
†Voice coil resistance of one speaker.

AMP-108A Speakers:	No. 583002 (Bass)	(3) No. 583003 (Tweeter)
Field coil resistance	150 ohms	PM
Voice coil resistance	12 ohms	†3.2 ohms
AMP-108B Speakers:	No. 583002 (Bass)	No. 580005 (Tweeter)
Field coil resistance	150 ohms	PM
Voice coil resistance	12 ohms	11 ohms
or;	No. 582999 (Bass)	No. 580006 (Tweeter)
Field coil resistance	PM	150 ohms
Voice coil resistance	12 ohms	11 ohms

PARTS LIST

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Capacitor, molded mica, 15 mmf	250159G93
2	Capacitor, molded mica, 15 mmf	250159G93
3	Capacitor, paper, .03 mfd, 400 V, (AMP 108A only)	250152G25
4	Capacitor, paper, .005 mfd, 600 V	250152G41
5	Capacitor, molded paper, .01 mfd, 600 V	250159G2
6	Capacitor, molded paper, .01 mfd, 600 V	250159G2
7	Capacitor, molded paper, .02 mfd, 600 V	250159G3
8	Capacitor, molded paper, .02 mfd, 600 V	250159G3
9	Capacitor, molded paper, .02 mfd, 600 V	250159G3
10	Capacitor, electrolytic, 30-10 mfd, 475 V	270023G2
11	Capacitor, electrolytic, 30-10 mfd, 475 V	270023G2
12	Capacitor, electrolytic, 30-10 mfd, 475 V	270023G2
20	Resistor, composition, 220 ohm, ½ W	230084G9
21	Resistor, composition, 220 ohm, ½ W	230084G9
22	Resistor, wire wound, 1500 ohm, ± 10%, 10 W	240021G12
23	Resistor, composition, 3900 ohm, ± 10%, ½ W (AMP 108A only)	230084G69
24	Resistor, wire wound, 80-8000-1000 ohm, 3 W	240038G1
25	Resistor, composition, 10,000 ohm, ½ W	230084G19
26	Resistor, composition, 10,000 ohm, ½ W	230084G19
27	Resistor, composition, 15,000 ohm, 2 W	230086G20
28	Resistor, composition, 100,000 ohm, ± 10%, ½ W	230084G86
29	Resistor, composition, 100,000 ohm, 1 W	230085G25
30	Resistor, composition, 100,000 ohm, 1 W	230085G25
35	Transformer, input	320017G1
36	Transformer, output	330028G1
37	Transformer, power, 117 V, 50-60 cycle	300039G1
40	Cable & Plug assembly	460616G1
41	Socket, speaker connection	180504G16
42	Socket, speaker switch	180504G6
43	Socket, FM power connection	180428G1
44	Socket, phonograph motor connection	180501G5
45	Socket, 6 volt outlet	189788G2
46	Terminal board-external speaker connection	209601G2
51	Filter assembly (AMP 108B only)	350041G1
52	Socket, 15″ speaker connection to filter (AMP 108B only)	180504G2
53	Socket, 15″ speaker to tweeters (AMP 108A only)	180504G2
54	Plug, 15″ speaker	180503G3
55	Plug, tweeter (AMP 108B only)	180503G5
56	Socket, octal (AMP 108B only)	180194G4
57	Plug, filter to Amplifier connection (AMP 108B only)	180503G4
58	Plug, tweeter to Amplifier connection (AMP 108A only)	180503G4
59	Coil, choke, A.F. (AMP 108A only)	350042G1
60	Capacitor, paper, 8 mfd, 100 V (AMP 108A only)	250167G1

METHOD FOR REMOVING CHASSIS FROM CABINET

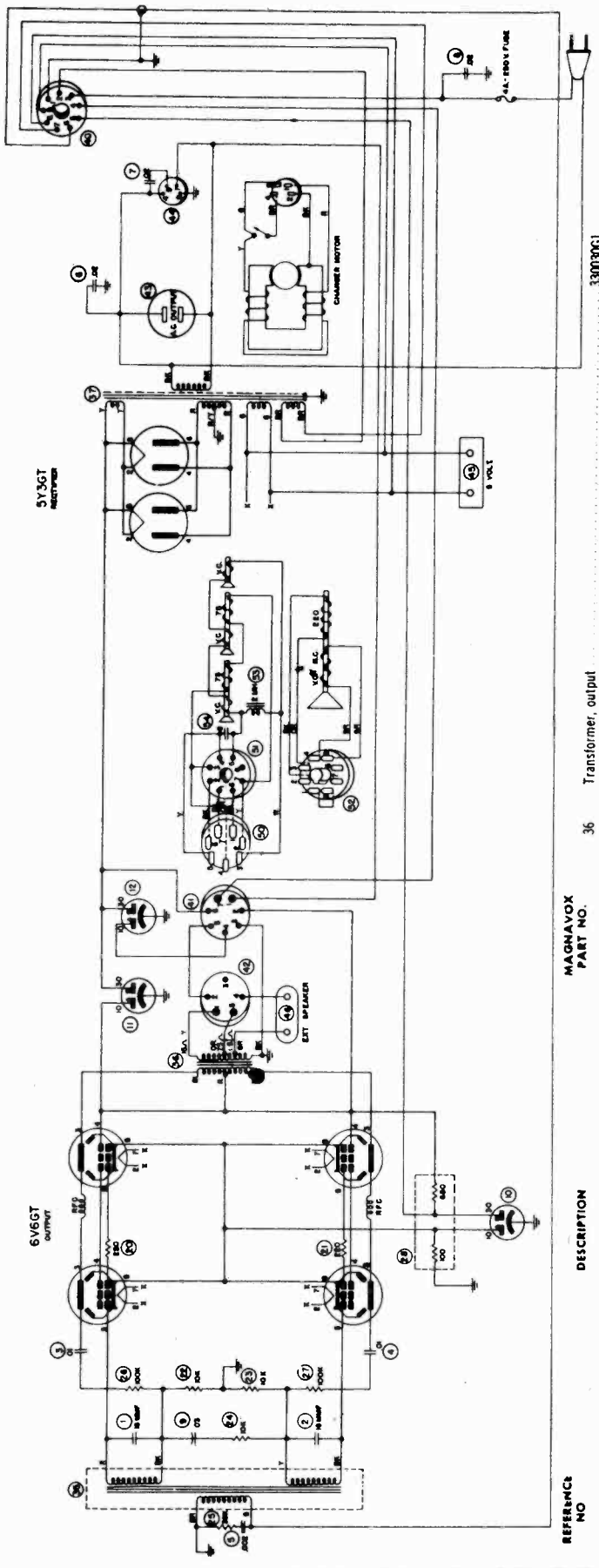
To remove the chassis, first remove all plugs and cables from the receptacles and the connector from the rear of the radio chassis. The amplifier chassis is mounted to the cabinet shelf with four screws. After they have been removed, the amplifier may be lifted from the cabinet.

ACCESSORIES

SPEAKER SELECTOR SWITCH—Provision is made in this amplifier for connecting extension speakers and a speaker selector switch. By means of this switch, the cabinet and extension speakers may be operated separately or together while maintaining the proper load on the amplifier. This is accomplished by means of a rotary switch with a connecting plug that may be purchased from any authorized Magnavox dealer. When shipped from the factory, a shorting plug is inserted in the amplifier receptacle stamped SPEAKER SWITCH. This plug must not be removed unless the speaker selector switch is added. Then the shorting plug is replaced with a plug that is supplied as a part of Selector switch assembly No. 880364.

EXTENSION SPEAKER—Two screw terminals are provided on the rear of the amplifier chassis for the connection of an extension speaker line. No. 582888 12-inch permanent-magnet extension speakers are available through all authorized Magnavox dealers.

MODEL AMP-116 THE MAGNAVOX CO.



REFERENCE NO	DESCRIPTION	MAGNAVOX PART NO.
1	Capacitor, molded mica, 15 mmf, 500 V	250159G93
2	Capacitor, molded mica, 15 mmf, 500 V	250159G93
3	Capacitor, paper, .01 mfd, 600 V	250129G2
4	Capacitor, paper, .01 mfd, 600 V	250129G2
5	Capacitor, paper, .002 mfd, ± 10%, 600 V	250169G2
6	Capacitor, paper, .02 mfd, 600 V	250129G3
7	Capacitor, paper, .02 mfd, 600 V	250129G3
8	Capacitor, paper, .02 mfd, 600 V	250129G3
9	Capacitor, tubular, .03 mfd, 400 V	250152G25
10	Capacitor, electrolytic, 30-10 mfd, 475 V	270023G2
11	Capacitor, electrolytic, 30-10 mfd, 475 V	270023G2
12	Capacitor, electrolytic, 30-10 mfd, 475 V	270023G2
20	Resistor, composition, 220 ohm, ½ W	230084G9
21	Resistor, composition, 220 ohm, ½ W	230084G9
22	Resistor, composition, 10,000 ohm, ½ W	230084G19
23	Resistor, composition, 10,000 ohm, ½ W	230084G19
24	Resistor, composition, 10,000 ohm, ± 10%, ½ W	230084G74
25	Resistor, composition, 39,000 ohm, ± 10%, ½ W	230084G81
26	Resistor, composition, 100,000 ohm, 1 W	230085G25
27	Resistor, composition, 100,000 ohm, 1 W	230085G25
28	Resistor, wire wound, 100-650 ohm, 7 W	240040G1
35	Transformer, input	320021G2
36	Transformer, output	330030G1
37	Transformer, power	300037G1
40	Cable & Plug assembly	460634G1
41	Socket, speaker connection	180504G16
42	Socket, speaker switch	180504G6
43	Socket, AC power connection	180428G1
44	Socket, phonograph motor connection	180501G5
45	Socket, 6 volt outlet	189788G2
46	Terminal Board-external speaker connection	209601G2
50	Plug, speaker	180503G4
51	Socket, tweeter	180403G2
52	Plug, bass speaker	180503G5
53	Choke Assembly	350042G2
54	Capacitor, paper, 8 mfd, 100 V	250167G1

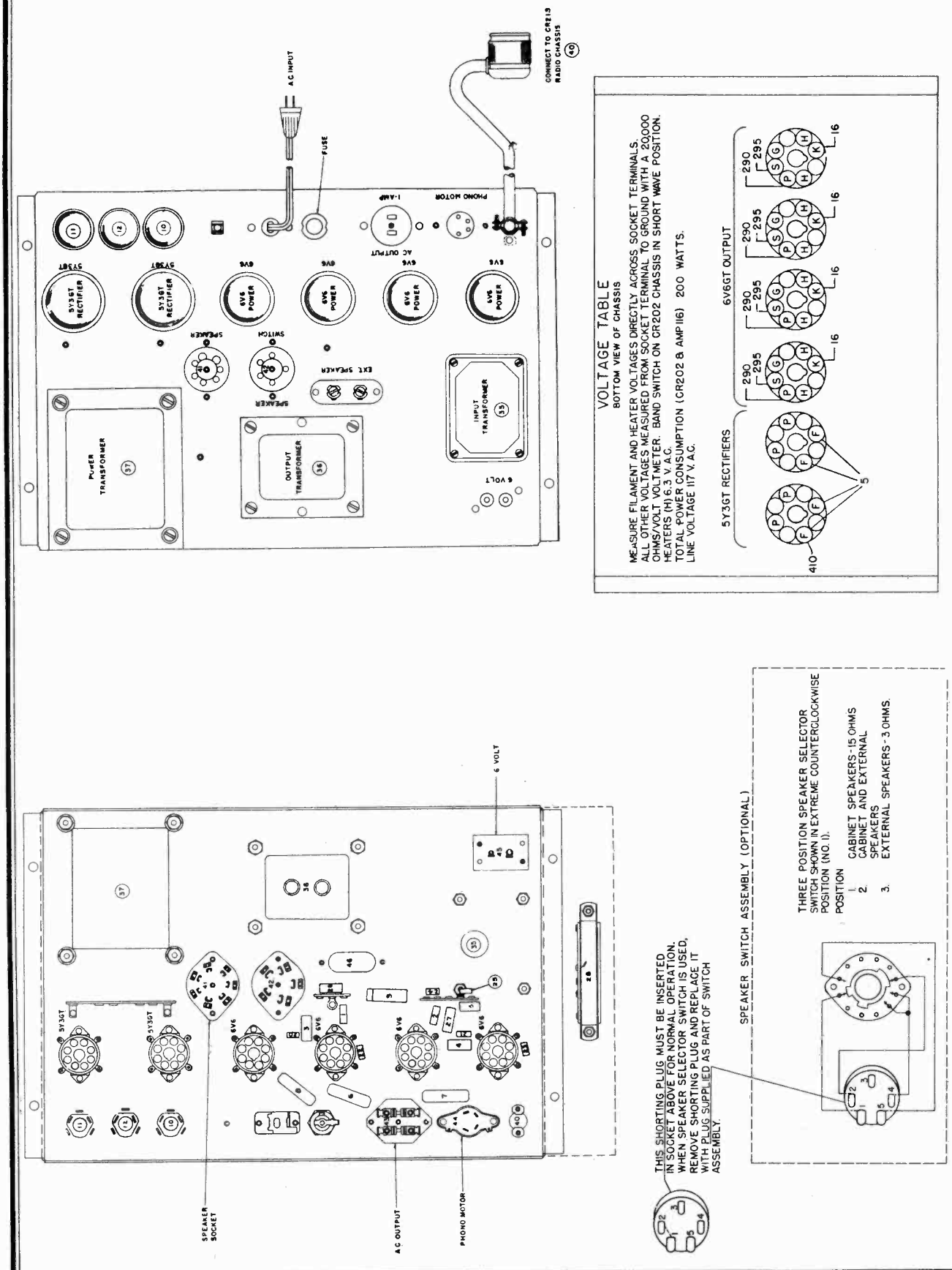
SPECIFICATIONS

Power supply	117 volts 50/60 cycles AC
Power consumption	*200 watts
Power output	45 watts
Output impedance	15/7.5/1.5 ohms
Tubes:	
Power output (push-pull parallel stage)	(4) 6L6G
Rectifiers	(2) 5U4G

Speakers:	No. 583113 (Bass)	No. 580005 (Tweeter)	(2) No. 583112 (Tweeter)
Field coil resistance	225 ohms	PM	75 ohms
Voice coil resistance	12 ohms	3.2 ohms	†3.2 ohms

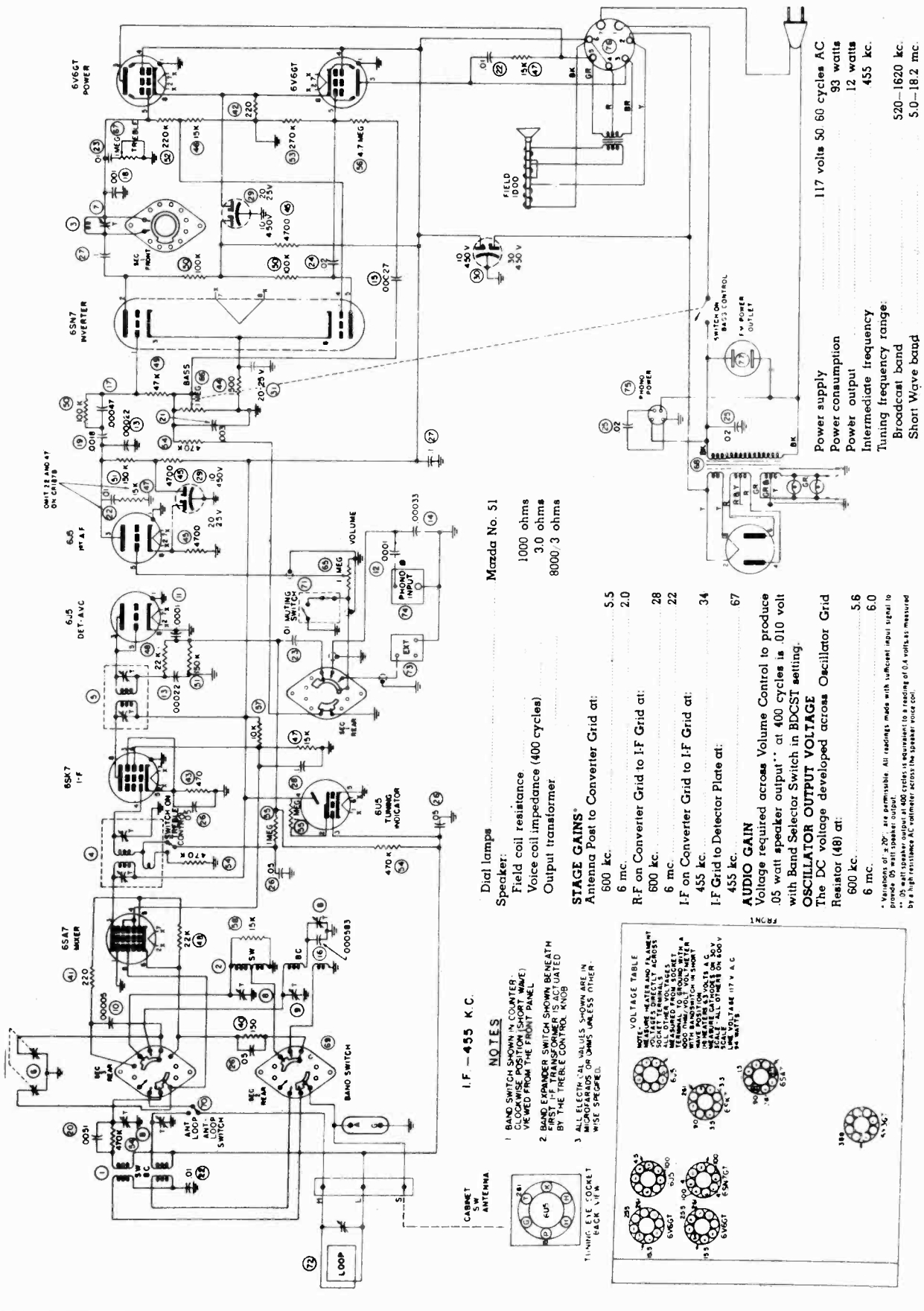
*Power consumption is for amplifier and CR-213 radio chassis.
†Voice coil resistance of one speaker.

THE MAGNAVOX CO. MODEL AMP-116



MODEL CR-187

THE MAGNAVOX CO.



Dial lamps	Mazda No. 51
Speaker:	
Field coil resistance	1000 ohms
Voice coil impedance (400 cycles)	3.0 ohms
Output transformer	8000/3 ohms

STAGE GAINS*

Antenna Post to Converter Grid at:	
600 kc.	5.5
6 mc.	2.0
R-F on Converter Grid to I-F Grid at:	
600 kc.	28
6 mc.	22
I-F on Converter Grid to I-F Grid at:	
455 kc.	34
I-F Grid to Detector Plate at:	
455 kc.	67

AUDIO GAIN

Voltage required across Volume Control to produce .05 watt speaker output** at 400 cycles is .010 volt with Band Selector Switch in BDCST setting.

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across Oscillator Grid Resistor (48) at:

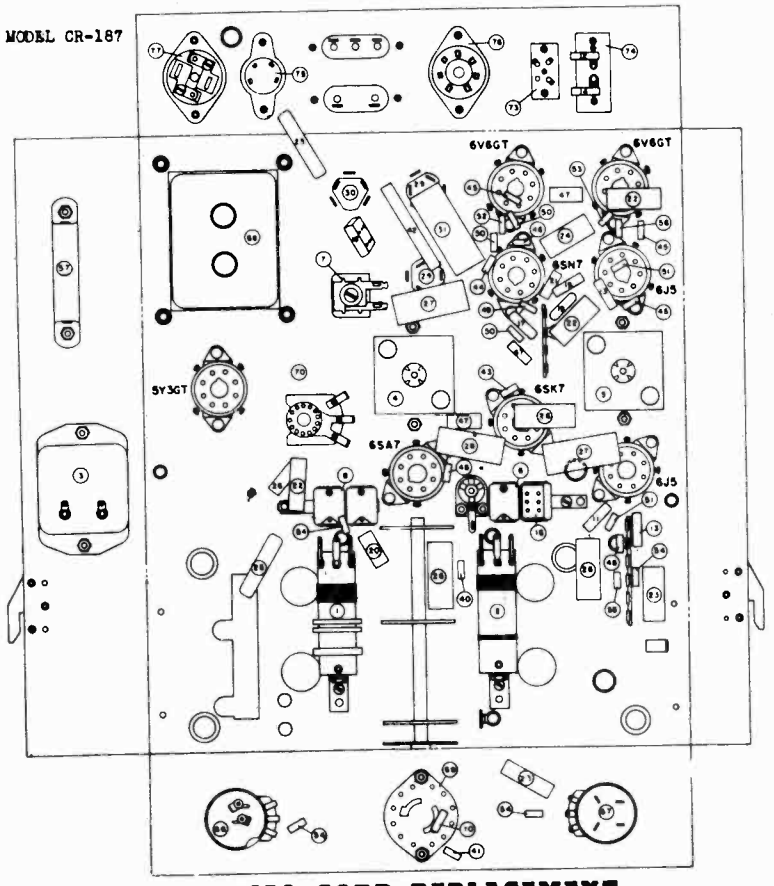
600 kc.	5.6
6 mc.	6.0

* Variations of ±20% are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.

** .05 watt speaker output at 400 cycles is equivalent to a reading of 0.4 volts, measured by a high resistance AC voltmeter across the speaker voice coil.

Power supply	117 volts 50 60 cycles AC
Power consumption	93 watts
Power output	12 watts
Intermediate frequency	455 kc.
Tuning frequency range:	
Broadcast band	520—1620 kc.
Short Wave band	5.0—18.2 mc

MODEL CR-187



DIAL CORD REPLACEMENT

Rotate the brass pulley designated "A" in Figure 1 until the dial pointer strikes the stop at the high frequency end of the dial calibration. In this condition the slot in pulley "A" should be approximately ten degrees to the left of being vertical—see Figure 1. If the slot in the pulley is in some other position under the above mentioned conditions, the pointer set screw is probably loose and has allowed the pointer to slip.

To correct this condition, first remove the glass dial and loosen the pointer screw. Then while holding pulley "A" so that its slot is approximately ten degrees to the left of vertical (when viewed from the rear) adjust the pointer until it is resting against the stop at the high frequency end of its travel. Then tighten the pointer set screw securely and replace the glass dial.

Completely unmesh the condenser gang and check the location of the hole or slot in pulley "D." If this hole is not approximately 45 degrees back from vertical as shown on Figure 1, loosen the two No. 6 Allen set screws in the hub of pulley "D" and slip the pulley on its shaft (while holding the condenser gang unmeshed) until the specified adjustment is obtained; then tighten one of the set screws securely. It will be shown later that this is a temporary setting. Next, tie a double knot in the exact center of a 25-inch length of dial cable and fold the cable back on itself so that the knot is at one end. The correct method for tying this knot is shown as an inset on Figure 1. Grasp the cable near the knotted end and slide it into the pulley slot so that the knot is against the inside rim of the pulley as shown in the sketch

The piece of cable nearest the dial frame should be wound in the direction shown for one-half turn; then over the lower pulley "B," around the bottom of the large pulley "D" and into the hole. Pull the cable taut and wrap the end around the small hook on pulley "D" temporarily.

The remaining piece of cable should be wound around pulley "A" in the direction shown, for one complete turn, over the upper pulley "C," and over the top of pulley "D." Thread the end through the small hole in pulley "D" and pull both ends of the cable taut. With one end of tension spring "E" fastened to the hook on pulley "D" lace the two free ends of the cable through the opposite end of the spring and tie a knot at a point that will allow ¼" to 5/16" of cable between the spring and the inside rim of pulley "D." Be sure to tie the knot around one coil of the spring in the manner shown.

Now with the condenser gang completely meshed, check the position of the dial pointer. If it is not in line with the last calibration mark at the low frequency end of the dial, loosen the set screw in pulley "D" and turn it until the pointer is in the specified position. Be sure that the condenser gang does not move during this adjustment. Then tighten the two screws in pulley "D" securely completing the operation.

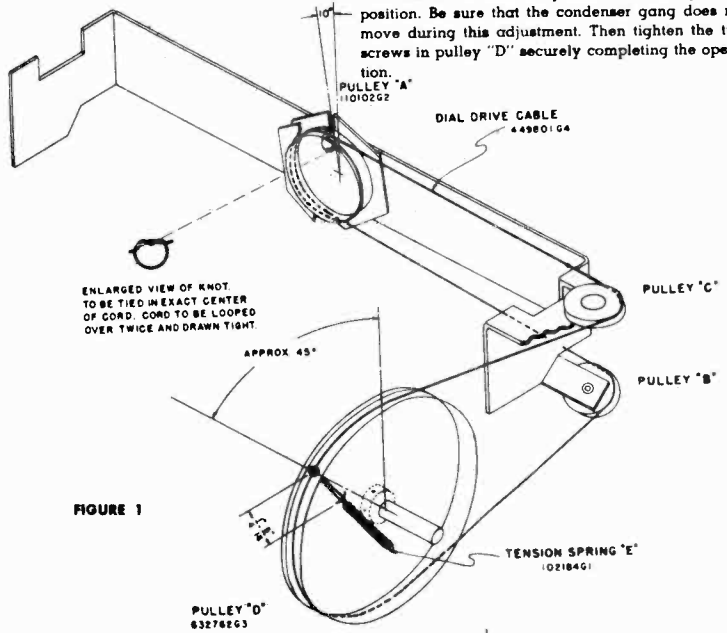


FIGURE 1

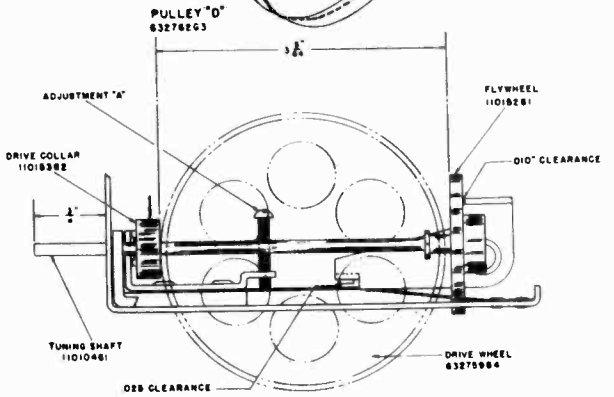


FIGURE 2

CONDENSER GANG DRIVE ADJUSTMENTS

Whenever any of the mechanical parts in the condenser gang drive assembly require replacement due to rough handling or for any other reason, it is extremely important that clearances and adjustments shown on Figures 2 and 3 are affected; otherwise the tuning mechanism will be sluggish or it may slip during operation.

In reassembling the mechanism after any part was replaced, follow the procedure outlined below:

1. Assemble the Tuning Shaft, Drive Collar, Compression Spring, Spring Retainer and Flywheel in the manner shown on Figure 3. The Tuning Shaft must extend ¾" from the front of the assembly and that the spacing between the rear of the Drive Collar and the front of the Flywheel must be 3-5/64" as specified on Figure 2. Any excess length in the Tuning Shaft may extend beyond the rear of the Flywheel.

2. The distance between the rubber-tired Drive Wheel and the smaller diameter section of the Spring Retainer must be 1/32" to 1/16." This adjustment is effected by loosening the two No. 6 Allen set screws in the Drive Wheel hub and sliding the wheel on its shaft until the required clearance is obtained. When the adjustment is completed, tighten the two screws in the hub of the Drive Wheel. See Figure 3.

3. While pressing down on the Treadle Bar at the location shown on Figure 3, adjust the Thrust Bracket until the clearance between the rest of the Flywheel and the projection on the Thrust Bracket is .010" as shown on the diagram. To make this adjustment, loosen the two No. 6 Allen set screws (use No. 6 Allen Wrench—Magnavox Part No. 800044G2) in the hub of Thrust Bracket and rotate the bracket until the specified clearance is obtained when the push buttons are NOT actuated. Tighten the two screws securely when the adjustment is completed. Press each push button and check that the Drive Collar is pushed away from the rubber-tired Drive Wheel.

4. Next, adjust the clearance in the muting switch contacts by turning the Phillips-head screw designated Adjustment "A" on Figure 2, until the specified clearance of .025" is obtained (when the push buttons are NOT actuated.)

5. While pressing any one of the push buttons in as far as possible, turn the screw designated Adjustment "B" (Figure 3) until a minimum clearance of .015" is obtained between the front surface of the Drive Collar and the switch spring directly in front of it. This setting should also cause a minimum clearance of .010" between the switch contacts actuated by pressure of the front surface of the Drive Collar, when the Tuning Shaft is pulled out. The function of this switch is to open the muting circuit when setting up the push buttons. As its contacts are wired in series with the large muting switch (contacts are shorted by pressing any push button), pulling out on the Tuning Shaft causes the small switch contacts to open the muting circuit so that a station can be heard while the push button is held in and tightened. On rare occasions it may be necessary to adjust the relation between the push button bars and the Treadle Bar. Such adjustment might be required if when pushing any of the push buttons, sufficient motion is not transmitted to the Treadle Bar to cause a disengagement between the Drive Collar and the Drive wheel.

This can usually be accomplished by loosening the two screws designated "C" and "D" on Figure 3, and moving plate "B" in the direction required to correct this condition.

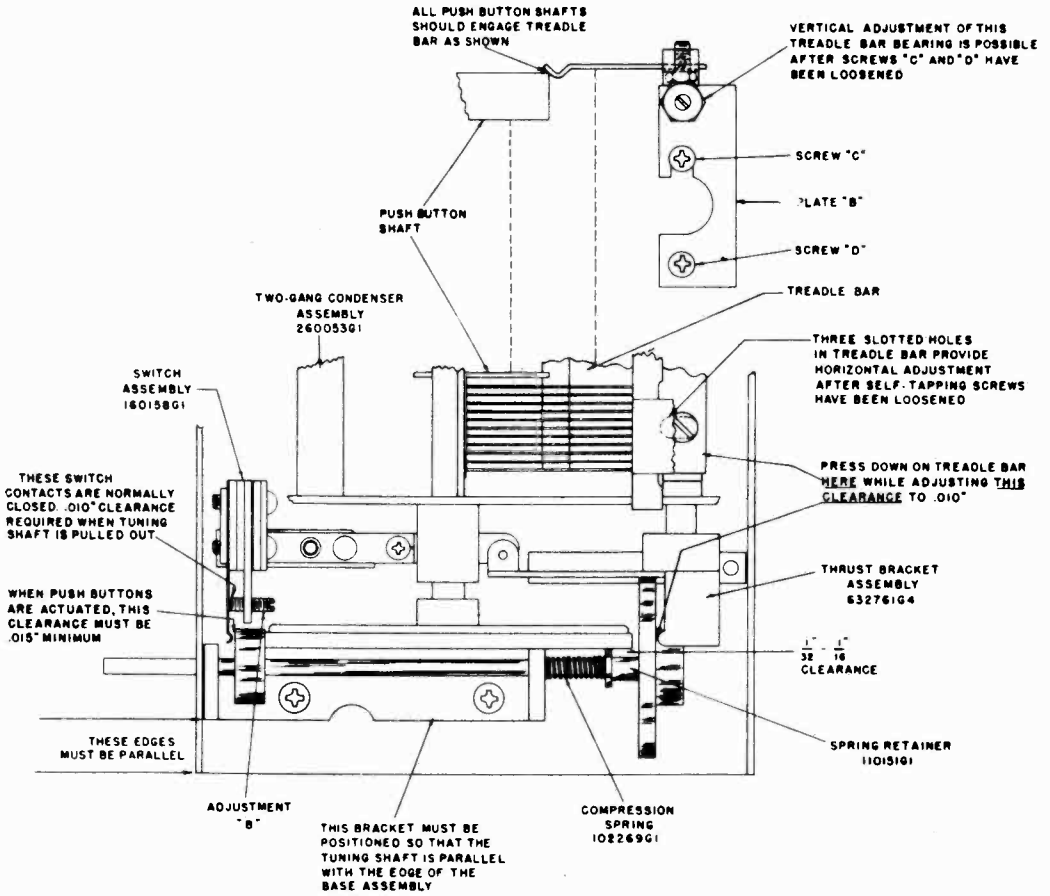


FIGURE 3

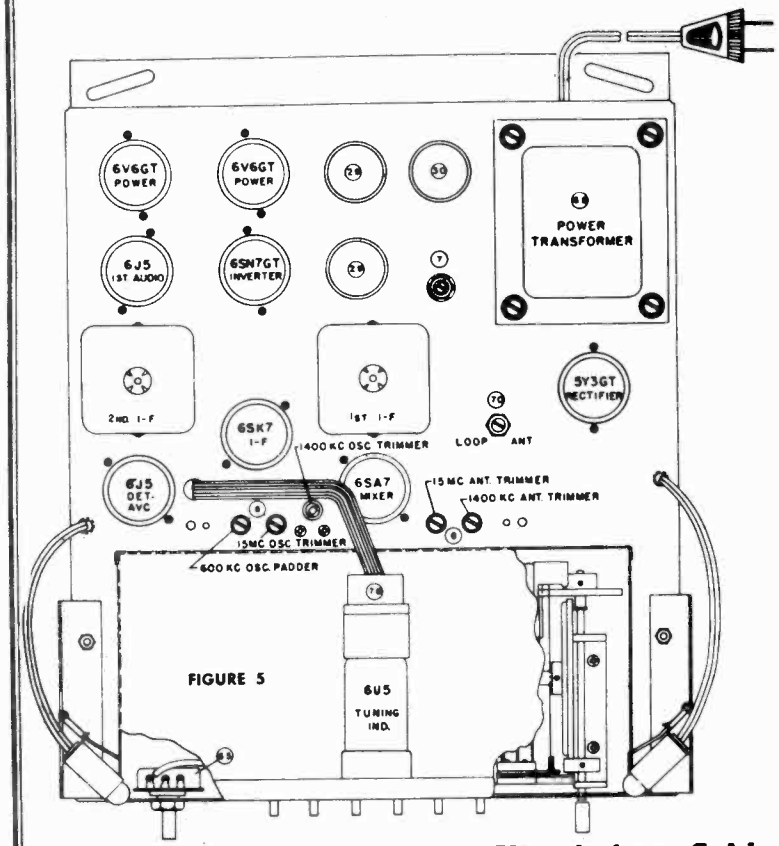


FIGURE 5

Method for Removing Chassis from Cabinet

Model CR-187 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service.

To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back. Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio panel in place when the chassis is replaced. In replacing the chassis, slide it so that the small hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hook should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated S-L-H. The end of the short wave antenna that is fastened to the inside of the cabinet connects to S. Always disconnect this antenna from terminal S when an outdoor antenna is used as it may pick up noise. The two terminals on the loop are designated L and H. The leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.

The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 5. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings. *Always set the Selectivity Switch to SHARP TUNE before aligning the i-f stages.* This is done by turning the Treble Control counter-clockwise as far as possible.

I-F ALIGNMENT

1. Connect the output of the signal generator to the oscillator grid (pin No. 5) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.

2. Turn the condenser gang until it is completely meshed, (low-frequency end of dial calibration) and set the band selector switch to BDCST as for broadcast band reception.

3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

On early models of the CR-187 chassis, the two i-f trimmers are located in the top of the respective i-f transformers. In later production, one trimmer is accessible from the top and the other from the bottom of each transformer as shown in the layout diagram, Figure 5.

BROADCAST BAND ALIGNMENT

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The ANT-LOOP switch (70) must be in the ANT. setting.
2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, loosen the set screws in the hub of pulley "D" shown on Figure 1 and make the necessary adjustment.
3. With the band selector still set for broadcast band reception, adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.
4. Set the signal generator and the radio receiver to 1400 kc.; adjust the 1400 kc. oscillator trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.
5. If the loop antenna trimmer is out of adjustment it should be set after the radio chassis is in the cabinet. Set the ANT-LOOP switch (70) to the LOOP position. Adjust the signal generator to 1400 kilocycles and connect its output to a loop containing approximately five turns of wire eight inches in diameter placed eighteen inches from the receiver loop and in the same plane.
6. Set the receiver to 1400 kc. and adjust the trimmer on the receiver loop for maximum output.

SHORT WAVE BAND ALIGNMENT

1. Set the band selector switch to SW as for short wave reception and substitute a 400 ohm resistor for the capacitor in series with the signal generator lead connected to the antenna terminal on the receiver.
2. Set the signal generator and the radio receiver to 15 mc.; then adjust the 15 mc. oscillator trimmer and the 15 mc. antenna trimmer for maximum output. While adjusting the 15 mc. oscillator trimmer two peaks may be observed; only one is the correct peak for 15 mc. alignment. Screw in the trimmer to maximum capacity—then decrease the capacity until the first peak is observed. This is the correct one.

10 KC FILTER ADJUSTMENT

This chassis incorporates a 10 kc. filter circuit to eliminate the beat note heard as a whistle between stations on the broadcast band. If the trimmer is out of adjustment, the following procedure should be observed.

1. Set the Selectivity Switch to FULL RANGE by turning the Treble Control knob clockwise as far as possible.
2. Connect the output of an audio oscillator to the phonograph pickup socket on the radio chassis and adjust the oscillator to EXACTLY 10,000 cycles.
3. Set the band selector to PHONO and adjust the 10 kc. trimmer (7) for minimum output.
4. If an audio oscillator is not available for making this adjustment, set the band selector to BDCST, connect an antenna to the receiver and set the gang condenser to a point between two stations on adjacent channels having approximately the same power. If the 10 kc. trimmer is out of adjustment, a whistle will be heard. Adjust the trimmer until the whistle is eliminated.

MODEL CR-187
MODEL CR-194

THE MAGNAVOX CO.

CR-187

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, r-f, two band	360238G1
2	Coil assembly, oscillator, two band	360239G1
3	Coil assembly, 10 kc filter	360240G1
4	Transformer, first i-f	360266G1
5	Transformer, second i-f	360267G1
6	Capacitor, variable, two-gang tuning	260053G1
7	Capacitor, variable, 10 kc trimmer	250008G1
8	Capacitor, variable, 2 gang trimmer	260021G1
9	Capacitor, variable, oscillator padder	260042G2
10	Capacitor, ceramic, 50 mmf.	250088G24
11	Capacitor, molded mica, 100 mmf. ±20%	250159G98
12	Capacitor, molded mica, 100 mmf. ±10%	250159G82
13	Capacitor, molded mica, 220 mmf.	250159G100
14	Capacitor, molded mica, 330 mmf.	250159G88
15	Capacitor, molded mica, 270 mmf.	250159G87
16	Capacitor, silvered mica, 583 mmf. ±1%	250085G33
17	Capacitor, molded mica, 470 mmf.	250159G102
18	Capacitor, molded mica, 1000 mmf.	250160G82
19	Capacitor, molded mica, 1800 mmf.	250160G67
20	Capacitor, molded mica, 5100 mmf. ±2%	250161G6
21	Capacitor, paper, .003 mfd. 400 V.	250152G43
22	Capacitor, paper, .01 mfd. 600 V.	250152G38
23	Capacitor, paper, .01 mfd. 200 V.	250152G18
24	Capacitor, paper, .02 mfd. 400 V.	250152G26
25	Capacitor, molded paper, .02 mfd. 600 V.	250129G3
26	Capacitor, paper, .05 mfd. 200 V.	250152G15
27	Capacitor, paper, .1 mfd. 400 V.	250152G22
28	Capacitor, paper, .1 mfd. 200 V.	250152G13
29	Capacitor, electrolytic, 10 mfd. 450 V., 20 mfd. 25V.	270023G6
30	Capacitor, electrolytic, 10-30 mfd. 450 V.	270023G2
31	Capacitor, electrolytic, 20 mfd. 25V.	270027G2
40	Resistor, composition, 150 ohm ½ W.	230084G8
41	Resistor, composition, 220 ohm ½ W.	230084G9
42	Resistor, composition, 220 ohm 3 W.	230064G54
43	Resistor, composition, 470 ohm ½ W.	230084G1
44	Resistor, composition, 1500 ohm ½ W.	230084G14
45	Resistor, composition, 4700 ohm ½ W.	230084G17
46	Resistor, composition, 15,000 ohm ±5% ½ W.	230084G187
47	Resistor, composition, 15,000 ohm 1 W.	230085G20
48	Resistor, composition, 22,000 ohm ½ W.	230084G21
49	Resistor, composition, 47,000 ohm ½ W.	230084G23
50	Resistor, composition, 100,000 ohm ½ W.	230084G25
51	Resistor, composition, 150,000 ohm ½ W.	230084G26
52	Resistor, composition, 220,000 ohm ±5% ½ W.	230084G215
53	Resistor, composition, 270,000 ohm ½ W.	230084G91
54	Resistor, composition, 470,000 ohm ½ W.	230084G29
55	Resistor, composition, 1 megohm ½ W.	230084G31
56	Resistor, composition, 4.7 megohm ½ W.	230084G35
57	Resistor, wire wound, 10,000 ohm	240035G2
58	Resistor, composition, 15,000 ohm ½ W.	230084G20
65	Control, volume, 1 megohm	220044G15
66	Control, bass, 1 megohm, with power switch	220045G2
67	Control, trebie, 1 megohm, with band expander switch	220071G2
68	Transformer, power, 117 V. 50/60 cycle	300025G1
69	Switch, rotary, band selector	160156G1
70	Switch, rotary, loop to outdoor antenna	160157G1
71	Switch assembly, muting	160158G1
72	Antenna, loop assembly	*
73	Socket, external input	180060G1
74	Socket, phonograph input	189741G1
75	Socket, phonograph motor	180501G5
76	Socket, speaker	180393G3
77	Socket, FM power	180422G1
78	Socket & Cable assembly, tuning indicator	180423G1

CR-194

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, r-f, two band	360256G1
2	Coil assembly, oscillator, two band	360255G1
3	Coil assembly, 10 kc filter	360240G1
4	Transformer, first i-f	360266G1
5	Transformer, second i-f	360267G1
6	Capacitor, variable, two-gang tuning	260056G1
7	Capacitor, variable, 10 kc trimmer	250008G1
8	Capacitor, variable, 2 gang trimmer	260021G1
9	Capacitor, variable, oscillator trimmer	260042G2
10	Capacitor, ceramic, 50 mmf.	250088G24
11	Capacitor, molded mica, 100 mmf. ±20%	250159G98
12	Capacitor, molded mica, 100 mmf. ±10%	250159G82
13	Capacitor, molded mica, 220 mmf. ±20%	250159G100
14	Capacitor, molded mica, 330 mmf. ±10%	250159G88
15	Capacitor, molded mica, 270 mmf. ±10%	250159G87
16	Capacitor, silvered mica, 529 mmf. ±1%	250085G34
17	Capacitor, molded mica, 470 mmf. ±20%	260159G102
18	Capacitor, molded mica, 1000 mmf. ±20%	250160G82
19	Capacitor, molded mica, 1800 mmf. ±10%	250160G67
20	Capacitor, molded mica, 5600 mmf. ±2%	250161G7
21	Capacitor, paper, .003 mfd. 600 V.	250152G43
22	Capacitor, paper, .01 mfd. 600 V.	250152G38
23	Capacitor, paper, .01 mfd. 200 V.	250152G18
24	Capacitor, paper, .02 mfd. 400 V.	250152G26
25	Capacitor, molded paper, .02 mfd.	250129G3
26	Capacitor, paper, .05 mfd. 200 V.	250152G15
27	Capacitor, paper, .1 mfd. 400 V.	250152G22
28	Capacitor, paper, .1 mfd. 200 V.	250152G13
29	Capacitor, electrolytic, 10 mfd. 450 V.-20 mfd. 25 V.	270023G6
30	Capacitor, electrolytic, 10-30 mfd. 450 V.	270023G2
31	Capacitor, electrolytic, 20 mfd. 25 V.	270027G2
40	Resistor, composition, 150 ohm ½ W.	230084G8
41	Resistor, composition, 220 ohm ½ W.	230084G9
42	Resistor, wire wound, 125 ohm	240021G11
43	Resistor, composition, 470 ohm ½ W.	230084G11
44	Resistor, composition, 1500 ohm ½ W.	230084G14
45	Resistor, composition, 4700 ohm ½ W.	230084G17
46	Resistor, composition, 15,000 ohm ±5% ½ W.	230084G187
47	Resistor, composition, 15,000 ohm 1 W.	230085G20
48	Resistor, composition, 22,000 ohm ½ W.	230084G21
49	Resistor, composition, 47,000 ohm ½ W.	230084G23
50	Resistor, composition, 100,000 ohm ½ W.	230084G25
51	Resistor, composition, 150,000 ohm ½ W.	230084G26
52	Resistor, composition, 220,000 ohm ±5% ½ W.	230084G215
53	Resistor, composition, 270,000 ±10% ½ W.	230084G91
54	Resistor, composition, 470,000 ohm ½ W.	230084G29
55	Resistor, composition, 1 megohm ½ W.	230084G31
56	Resistor, composition, 4.7 megohm ½ W.	230084G35
57	Resistor, wire wound, 10,000 ohm	240035G2
58	Resistor, composition, 15,000 ohm ½ W.	230084G20
59	Resistor, composition, 1000 ohm 2W.	230064G62
65	Control, volume, 1 megohm	220044G15
66	Control, bass, 1 megohm, with power switch	220045G2
67	Control, treble, 1 megohm, with band expander sw.	220071G2
68	Transformer, power, 117 V. 50/60 cycle	300032G1
69	Switch, rotary, band selector	160156G1
70	Switch, rotary, loop to outdoor antenna	160157G1
72	Antenna, loop assembly	*
73	Socket, external input	180060G1
74	Socket, phonograph input	189741G1
75	Socket, phonograph motor	180501G5
76	Socket, speaker	180393G3
77	Socket, FM power	180422G1
78	Socket and cable assembly, tuning indicator	180423G1

Due to the fact that a change was made in the mechanical construction of the dial assembly after the first CR-187 radio chassis production run, it is important that you follow the procedure outlined below in ordering replacement glass dials.

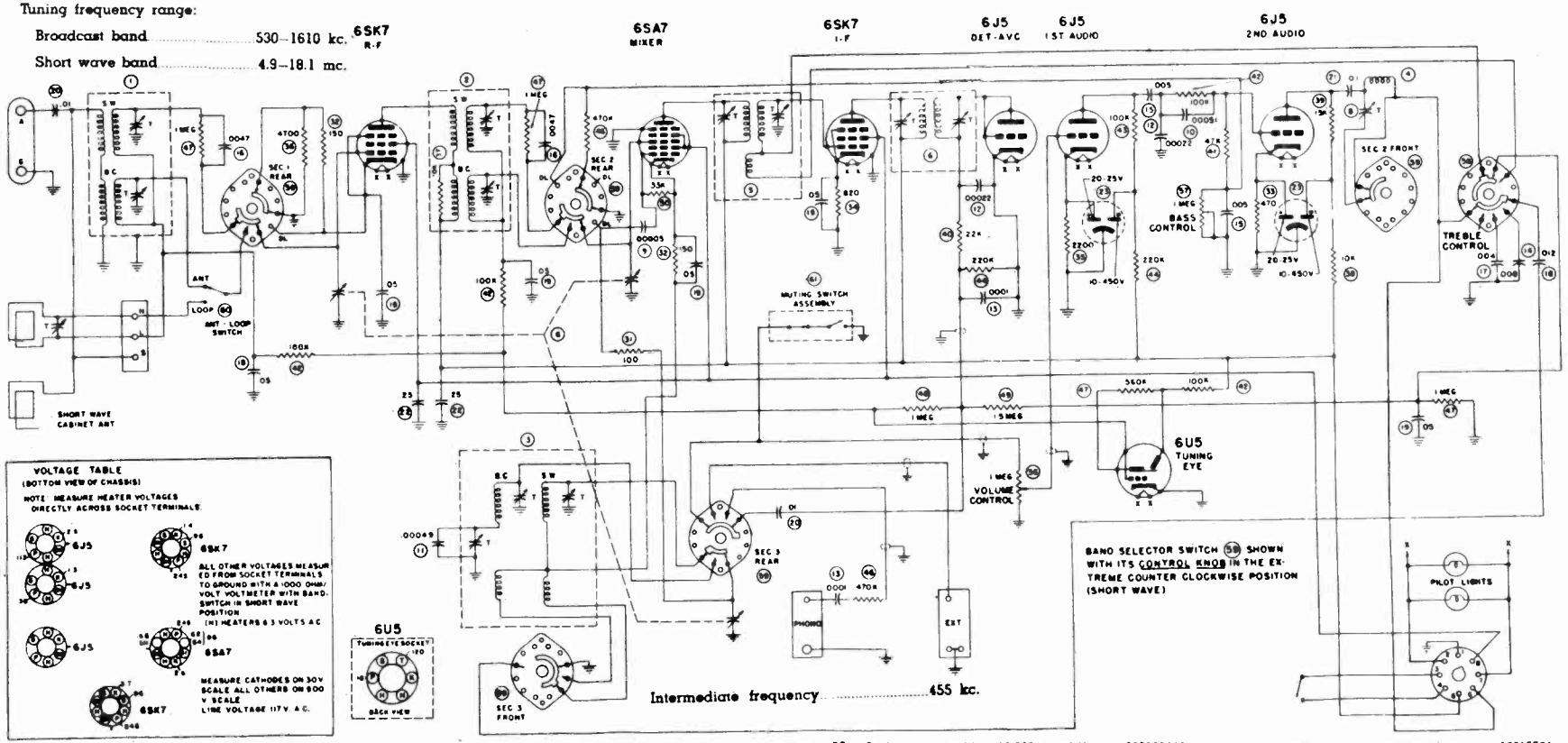
If the glass dial for which a replacement is required is marked 150260, order a 150276 dial glass assembly. If the glass is marked 150281, order a 150283 dial glass assembly. These assemblies include the rubber strips cemented in their correct positions.

*The part number of the loop antenna assembly changes with different cabinets. It is therefore important that you specify the Style Number of the instrument when ordering a replacement loop antenna assembly.

Tuning frequency range:

Broadcast band ..... 530–1610 kc.

Short wave band ..... 4.9–18.1 mc.

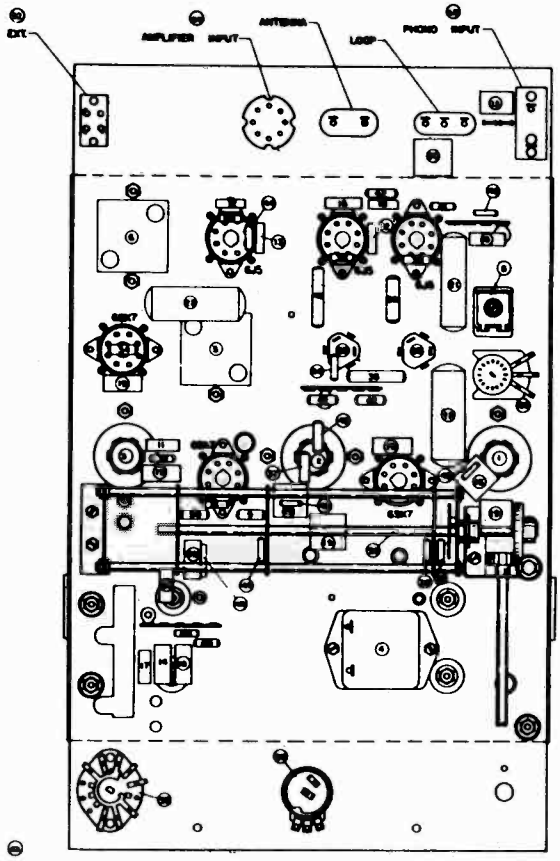


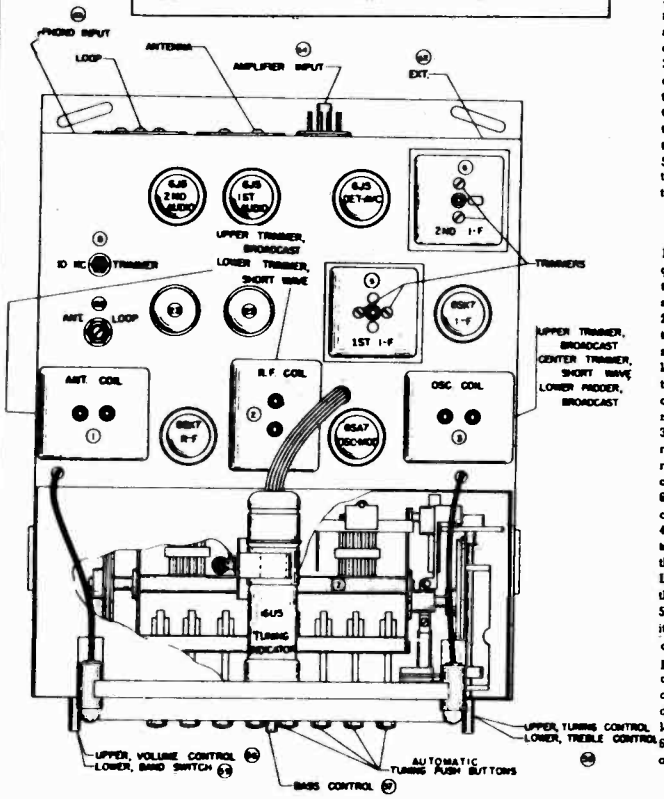
REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil Assembly, antenna, two band	360254G1
2	Coil Assembly, r-f, two band	360254G2
3	Coil Assembly, oscillator, two band	360253G1
4	Coil Assembly, 10 kc. filter	360244G1
5	Transformer, first i-f	360266G1
6	Transformer, second i-f	360267G1
7	Capacitor, variable, three-gang tuning	260054G1
8	Capacitor, variable, 10 kc. trimmer	259610G1
9	Capacitor, ceramic, 50 mmf.	250088G25
10	Capacitor, molded mica, 510 mmf.	250159G64
11	Capacitor, silvered mica, 490 mmf. ±1%	250085G32
12	Capacitor, molded mica, 220 mmf.	250159G100
13	Capacitor, molded mica, 100 mmf.	250159G98
14	Capacitor, paper, 008 mfd.	250129G11
15	Capacitor, paper, .005 mfd.	250129G10
16	Capacitor, molded mica, .0047 mfd.	250161G5
17	Capacitor, paper, .004 mfd.	250129G7
18	Capacitor, paper, .012 mfd.	250129G13
19	Capacitor, paper, .05 mfd.	250129G5
20	Capacitor, paper, .01 mfd.	250129G9
21	Capacitor, paper, 0.1 mfd.	250152G22
22	Capacitor, paper, 0.25 mfd.	250152G21
23	Capacitor, electrolytic, 20 mfd. 25V–10 mfd. 450V.	270023G6
31	Resistor, composition, 100 ohm ½ W.	230084G7
32	Resistor, composition, 150 ohm ½ W.	230084G8
33	Resistor, composition, 470 ohm ½ W.	230084G11
34	Resistor, composition, 820 ohm ½ W.	230084G61
35	Resistor, composition, 2200 ohm ½ W.	230084G15
36	Resistor, composition, 4700 ohm ½ W.	230084G17
37	Resistor, composition, 10,000 ohm ½ W.	230084G19
38	Resistor, composition, 10,000 ohm 1 W.	230085G19
39	Resistor, composition, 15,000 ohm 1 W.	230085G20
40	Resistor, composition, 22,000 ohm ½ W.	230084G21
41	Resistor, composition, 47,000 ohm ½ W.	230084G23
42	Resistor, composition, 100,000 ohm ½ W.	230084G25
43	Resistor, composition, 100,000 ohm 1 W.	230085G25
44	Resistor, composition, 220,000 ohm ½ W.	230084G27
46	Resistor, composition, 470,000 ohm ½ W.	230084G29
47	Resistor, composition, 560,000 ohm ½ W.	230084G95
48	Resistor, composition, 1 megohm ½ W.	230084G31
49	Resistor, composition, 1.5 megohm ½ W.	230084G32
50	Resistor, composition, 33,000 ohm ½ W.	230084G22
56	Control, volume, 1 megohm	220044G15
57	Control, bass, 1 megohm with switch	220045G2
58	Switch, rotary, treble control	160161G1
59	Switch, rotary, band selector	160160G1
60	Switch, rotary, loop to outdoor antenna	160157G1
61	Switch assembly, muting	160158G2
62	Socket, external input	180060G1
63	Socket, phonograph input	189741G1
64	Plug, octal, amplifier connection	180511G1
	Antenna, loop assembly	*
	Dial glass assembly	150285

* The part number of the loop antenna changes with different cabinets. It is therefore important that you specify the Style Number of the instrument when ordering a replacement loop antenna assembly.

MODEL CR-188

THE MAGNAVOX CO.





STAGE GAINS*

Antenna Post to R-F Grid at:	
600 kc.	7.0
6 mc.	1.63
R-F to Converter Grid at:	
600 kc.	3.4
6 mc.	3.6
R-F on Converter Grid to I-F Grid at:	
600 kc.	40.0
6 mc.	35.5
I-F on Converter Grid to I-F Grid at:	
455 kc.	58
I-F Grid to Detector Plate at:	
455 kc.	68

AUDIO GAIN

Voltage required across Volume Control to produce .05 watt speaker output** at 400 cycles is .014 volt with Band Selector Switch in BDCST setting.

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across Oscillator Grid Resistor (60) at:

600 kc.	5.8
6 mc.	6.6

* Variations of ±10% are permissible. All readings made with voltmeter across signal to provide .05 watt speaker output.

** .05 watt speaker output at 400 cycles is equivalent to a reading of 0.25 volts as measured by a high resistance AC voltmeter across the voice coil of either speaker.

Model CR-188 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service. To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flanges at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back. Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio panel in place when the chassis is replaced. In replacing the chassis, slide it so that the small hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hooks should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated S-L-H. The end of the short wave antenna that is fastened to the inside of the cabinet connects to S. Always disconnect this antenna from terminal S when an outdoor antenna is used as it may pick up noise. The two terminals on the loop are designated L and H. The leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.

ALIGNMENT PROCEDURE

The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 5. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings. *Always set the Treble Control to SHARP TUNE before aligning the i-f stages.* This is done by turning the Treble Control Knob to the No. 1 position.

I-F ALIGNMENT

1. Connect the output of the signal generator to the oscillator grid (pin No. 5) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.
2. Turn the condenser gang until it is completely meshed, (low-frequency end of dial calibration) and set the band selector switch to BDCST on for broadcast band reception.
3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

On early models of the CR-188 chassis, the two i-f trimmers are located in the top of the respective i-f transformers as shown in the layout diagram Figure 5. In later production, one trimmer is accessible from the top and the other from the bottom of each transformer.

BROADCAST BAND ALIGNMENT

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The ANT-LOOP switch (60) must be in the ANT. setting.
2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, loosen the set screws in the hub of pulley "D" shown on Figure 1 and make the necessary adjustment.
3. With the band selector still set for broadcast band reception, adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.
4. Set the signal generator and the radio receiver to 1400 kc.; adjust the 1400 kc. oscillator trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.
5. If the loop antenna trimmer is out of adjustment it should be set after the radio chassis is in the cabinet. Set the ANT-LOOP switch (60) to the LOOP position. Adjust the signal generator to 1400 kilocycles and connect its output to a loop containing approximately five turns of wire eight inches in diameter placed eighteen inches from the receiver loop and in the same plane.
6. Set the receiver to 1400 kc. and adjust the trimmer on the receiver loop for maximum output.

SHORT WAVE BAND ALIGNMENT

1. Set the band selector switch to SW on for short wave reception and substitute a 400 ohm resistor for the capacitor in series with the signal generator lead connected to the antenna terminal on the receiver.
2. Set the signal generator and the radio receiver to 15 mc.; then adjust the 15 mc. oscillator trimmer and the 15 mc. antenna trimmer for maximum output. While adjusting the 15 mc. oscillator trimmer two peaks may be observed; only one is the correct peak for 15 mc. alignment. Screw in the trimmer to maximum capacity—then decrease the capacity until the first peak is observed. This is the correct one.

10 KC FILTER ADJUSTMENT

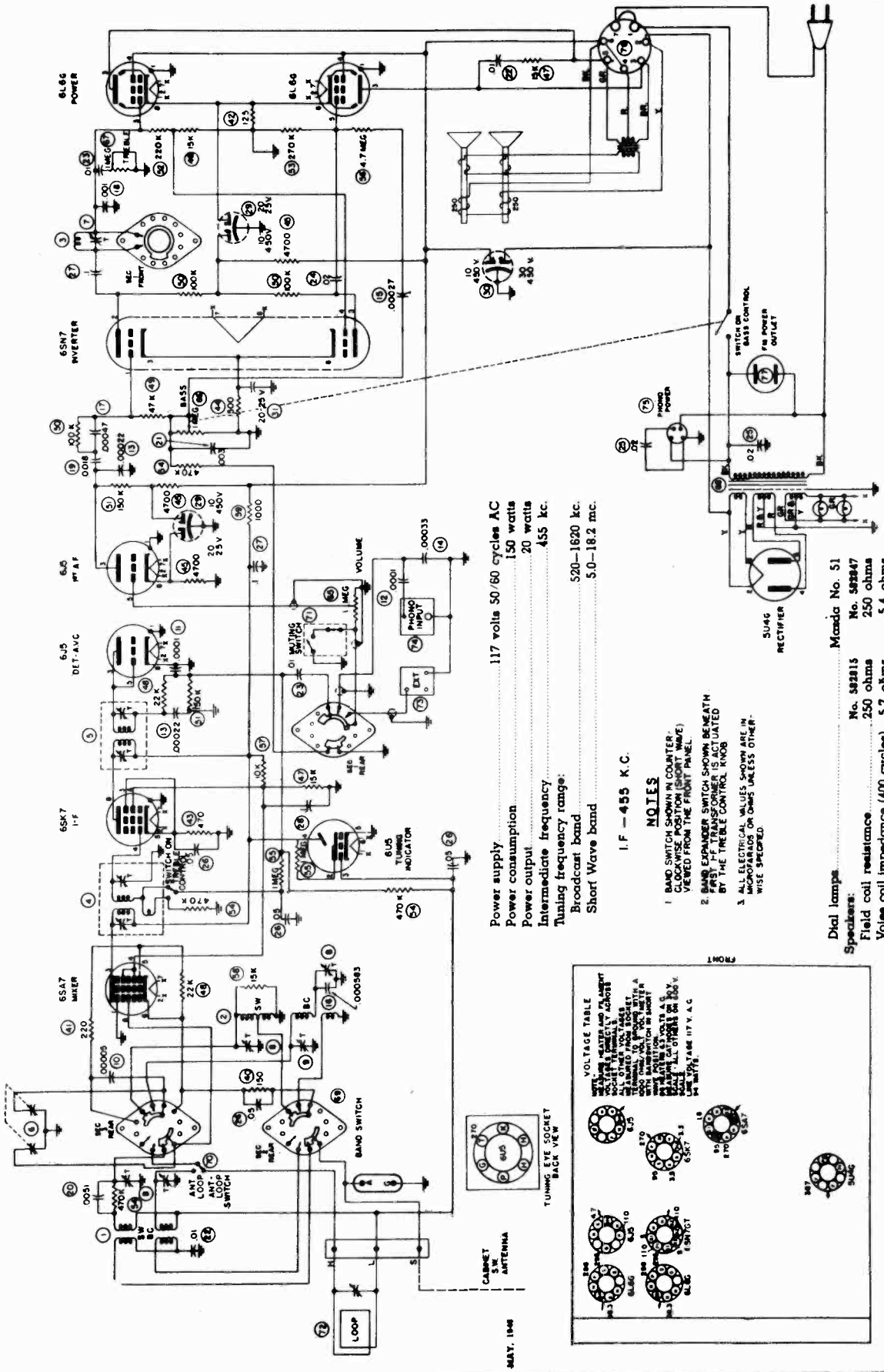
This chassis incorporates a 10 kc. filter circuit to eliminate the beat note heard on a whistle between stations on the broadcast band. If the trimmer is out of adjustment, the following procedure should be observed.

1. Turn the Treble Control to FULL RANGE (No. 4 position).
2. Connect the output of an audio oscillator to the phonograph pickup socket on the radio chassis and adjust the oscillator to EXACTLY 10,000 cycles.
3. Set the band selector to PHONO and adjust the 10 kc. trimmer (8) for minimum output.
4. If an audio oscillator is not available for making this adjustment, set the band selector to BDCST, connect an antenna to the receiver and set the gang condenser to a point between two stations on adjacent channels having approximately the same power. If the 10 kc. trimmer is out of adjustment, a whistle will be heard. Adjust the trimmer until the whistle is eliminated.

Model CR-188 radio chassis is a two-band tuner that must be used in conjunction with a power amplifier, such as the Model AMP-101 for speaker operation. Heater and plate voltages for the CR-188 radio chassis are supplied from the amplifier chassis; it is therefore essential that the radio and amplifier chassis be interconnected during alignment or for other electrical service operations.

MODEL CR-193

THE MAGNAVOX CO.



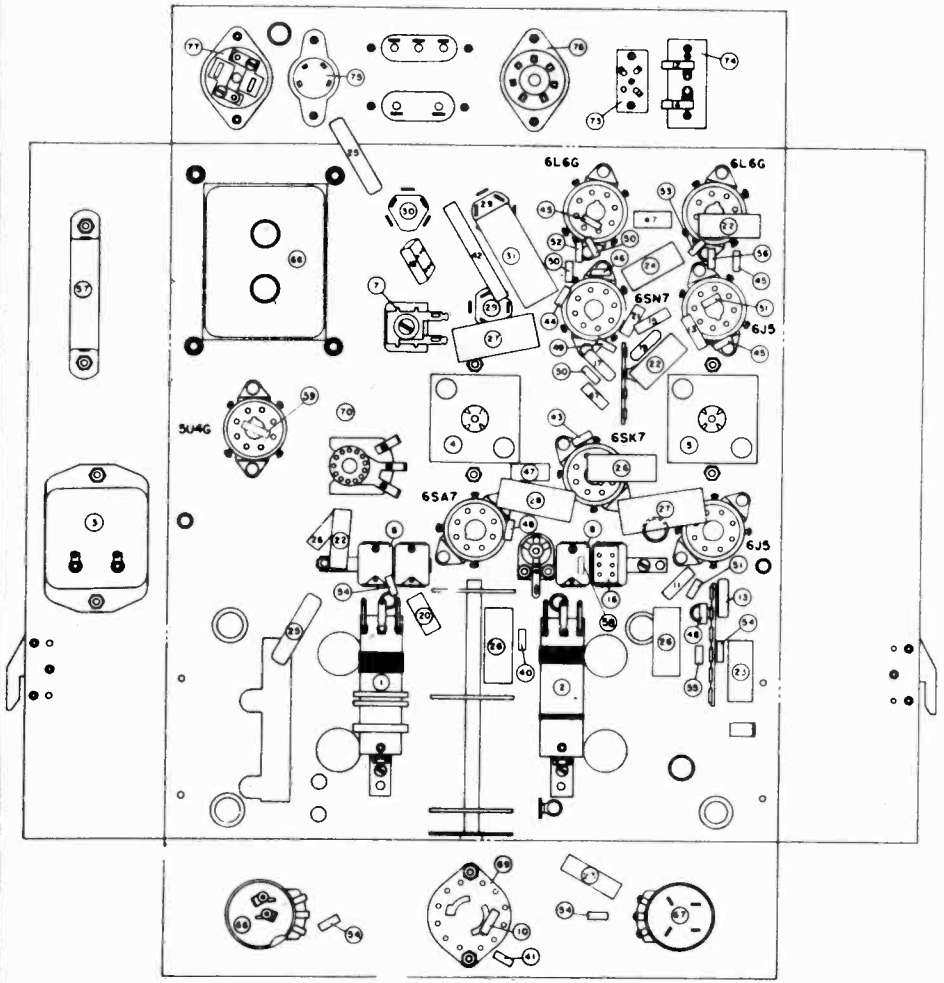
Power supply ..... 117 volts 50/60 cycles AC
Power consumption ..... 150 watts
Power output ..... 20 watts
Intermediate frequency ..... 455 kc.
Tuning frequency range:
Broadcast band ..... 520—1620 kc.
Short Wave band ..... 5.0—18.2 mc.

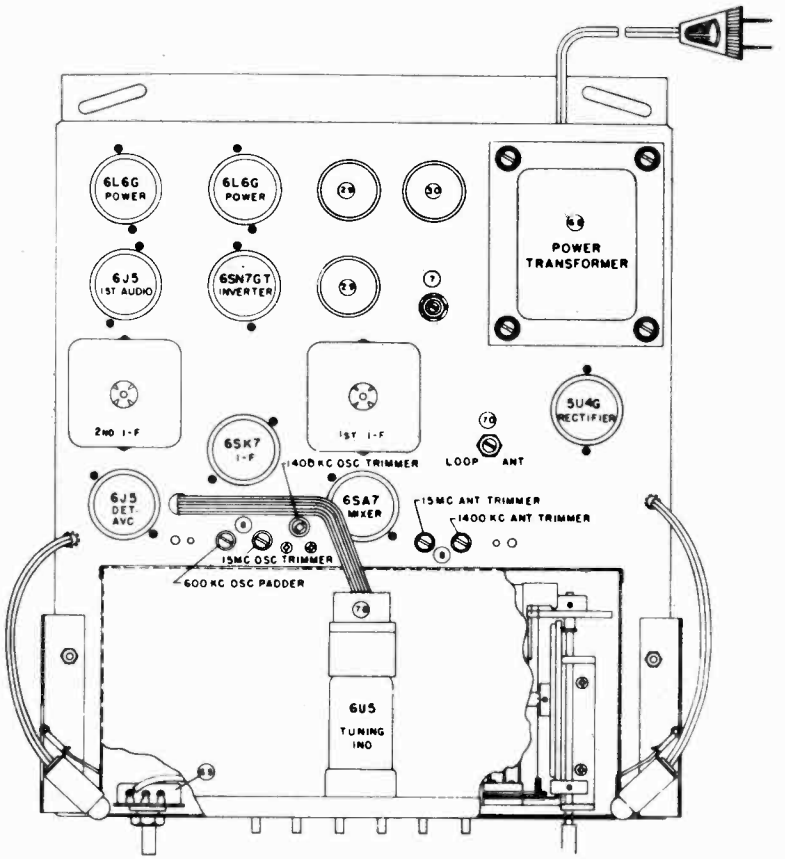
I.F — 455 K.C.

NOTES

1. BAND SWITCH SHOWN IN COUNTER-CLOCKWISE POSITION (SHORT WAVE) VIEWED FROM THE FRONT PANEL.
2. BAND EXPANDER SWITCH SHOWN BENEATH FAST I-F TRANSFORMER IS ACTUATED BY THE TREBLE CONTROL KNOB.
3. ALL ELECTRICAL VALUES SHOWN ARE IN MICROFARADS OR OHMS UNLESS OTHERWISE SPECIFIED.

Dial lamps ..... Mazda No. 51
Speakers:
Field coil resistance ..... No. 582815 ..... No. 582847
Voice coil impedance (400 cycles) ..... 250 ohms ..... 250 ohms
Output transformer ..... 5.7 ohms ..... 5.4 ohms
..... None ..... 5,000/3 ohms





The following information is provided for the service man who has a vacuum tube voltmeter or a simliai measuring instrument available.

STAGE GAINS*

Antenna Post to Converter Grid at:
- 600 kc.
- 6 mc.

R-F on Converter to I-F Grid at:
- 600 kc.
- 6 mc.

I-F on Converter Grid to I-F Grid at:
- 455 kc.

5.5 I-F Grid to Detector Plate at:
2.0 - 455 kc.

OSCILLATOR OUTPUT VOLTAGE

28 The DC voltage developed across Oscillator Grid
22 Resistor (48) at:
- 600 kc. — 5.6
34 - 6 mc. — 6.0

67

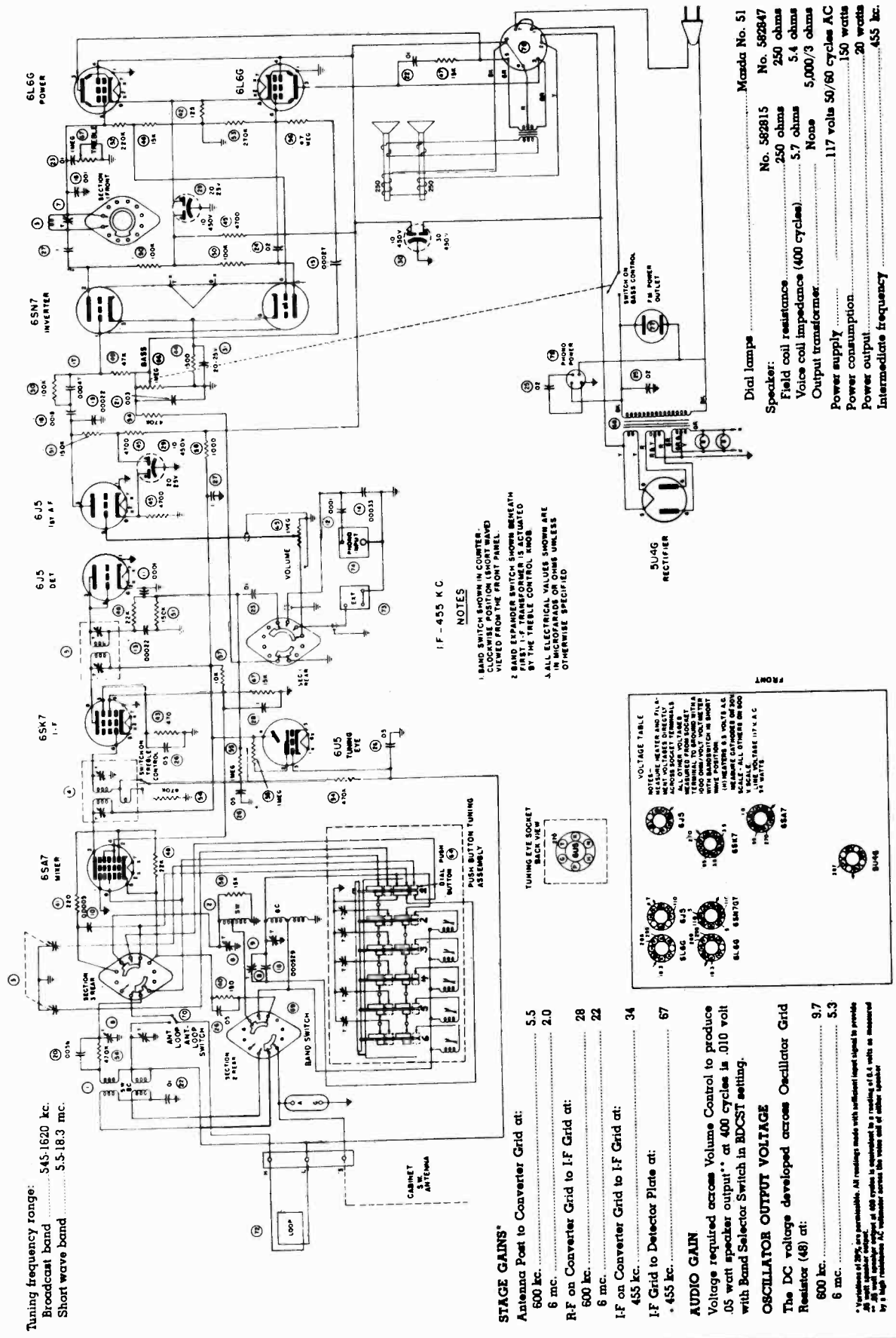
AUDIO GAIN

Voltage required across Volume Control to produce .05 watt speaker output** at 400 cycles is .010 volt with Band Selector Switch in BDCST setting.

* Variations of ± 20% are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.
** .05 watt speaker output at 400 cycles is equivalent to a reading of 0.4 volts as measured by a high resistance AC voltmeter across the voice coil of either speaker.

MODEL CR-194

THE MAGNAVOX CO.



Tuning frequency range:
Broadcast band ..... 545-1620 kc.
Short wave band ..... 5.5-18.3 mc.

STAGE GAINS*

Antenna Post to Converter Grid at:
600 kc. 5.5
6 mc. 2.0

R-F on Converter Grid to I-F Grid at:
600 kc. 28
6 mc. 22

I-F on Converter Grid to I-F Grid at:
455 kc. 34

I-F Grid to Detector Plate at:
455 kc. 67

AUDIO GAIN

Voltage required across Volume Control to produce .05 watt speaker output** at 400 cycles is .010 volt with Band Selector Switch in BDCST setting.

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across Oscillator Grid Resistor (48) at:
600 kc. 9.7
6 mc. 5.3

*Variations of 25% are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.
**Input required at 400 cycles is equivalent to a reading of 0.5 volts as measured by a high resistance AC voltmeter across the voice coil of either speaker

Dial lamps ..... Mazda No. 51

Speaker:	No. 582815	No. 582847
Field coil resistance	250 ohms	250 ohms
Voice coil impedance (400 cycles)	5.7 ohms	5.4 ohms
Output transformer	None	5,000/3 ohms

Power supply ..... 117 volts 50/60 cycles AC
Power consumption ..... 150 watts
Power output ..... 20 watts
Intermediate frequency ..... 455 kc.

MODEL CR-194

THE MAGNAVOX CO

METHOD FOR REMOVING CHASSIS FROM CABINET

Model CR-194 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service. To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back.

Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio panel in place when the chassis is replaced.

In replacing the chassis, slide it so that the small hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hooks should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated S-L-H. The end of the short wave antenna that is fastened to the inside of the cabinet connects to S. Always disconnect this antenna from terminal S when an outdoor antenna is used as it may pick up noise. The two terminals on the loop are designated L and H. The leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.

ALIGNMENT PROCEDURE

The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 4. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings. *Always set the Selectivity Switch to SHARP TUNE before aligning the i-f stages.* This is done by turning the Treble Control counter-clockwise as far as possible.

I-F Alignment

1. Connect the output of the signal generator to the oscillator grid (pin No. 5) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.

2. Turn the condenser gang until it is completely meshed (low-frequency end of dial calibration). and set the band selector switch to BDCST as for broadcast band reception.

3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

Broadcast Band Alignment

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The ANT-LOOP switch (70) must be in the ANT setting.

2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, slide the pointer on its string to the correct position. Be sure to crimp the lugs (on the rear of the pointer) tightly around the string to hold the pointer in adjustment.

3. With the band selector still set for broadcast band reception, adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.

4. Set the signal generator and the radio receiver to 1400 kc.; adjust the 1400 kc. oscillator trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.

Short Wave Band Alignment

1. Set the band selector switch to SW as for Short Wave reception and substitute a 400 ohm resistor for the capacitor in series with the signal generator lead connected to the antenna terminal on the receiver.

2. Set the signal generator and the radio receiver to 15 mc.; then adjust the 15 mc. oscillator trimmer and the 15 mc. antenna trimmer for maximum output.

While adjusting the 15 mc. oscillator trimmer two peaks may be observed; only one is the correct peak for 15 mc. alignment. Screw in the trimmer to maximum capacity—then decrease the capacity until the first peak is observed. This is the correct one.

10 KC Filter Adjustment

This chassis incorporates a 10 kc. filter circuit to eliminate the beat note heard as a whistle between stations on the broadcast band. If the trimmer is out of adjustment, the following procedure should be observed.

1. Set the Selectivity Switch to FULL RANGE by turning the Treble Control knob clockwise as far as possible.

2. Connect the output of an audio oscillator to the phonograph pickup socket on the radio chassis and adjust the oscillator to EXACTLY 10,000 cycles.

3. Set the band selector to PHONO and adjust the 10 kc. trimmer (7) for minimum output.

4. If an audio oscillator is not available for making this adjustment, set the band selector to BDCST, connect an antenna to the receiver and set the gang condenser to a point between two stations on adjacent channels having approximately the same power. If the 10 kc. trimmer is out of adjustment, a whistle will be heard. Adjust the trimmer until the whistle is eliminated.

MODEL CR-194

THE MAGNAVOX CO.

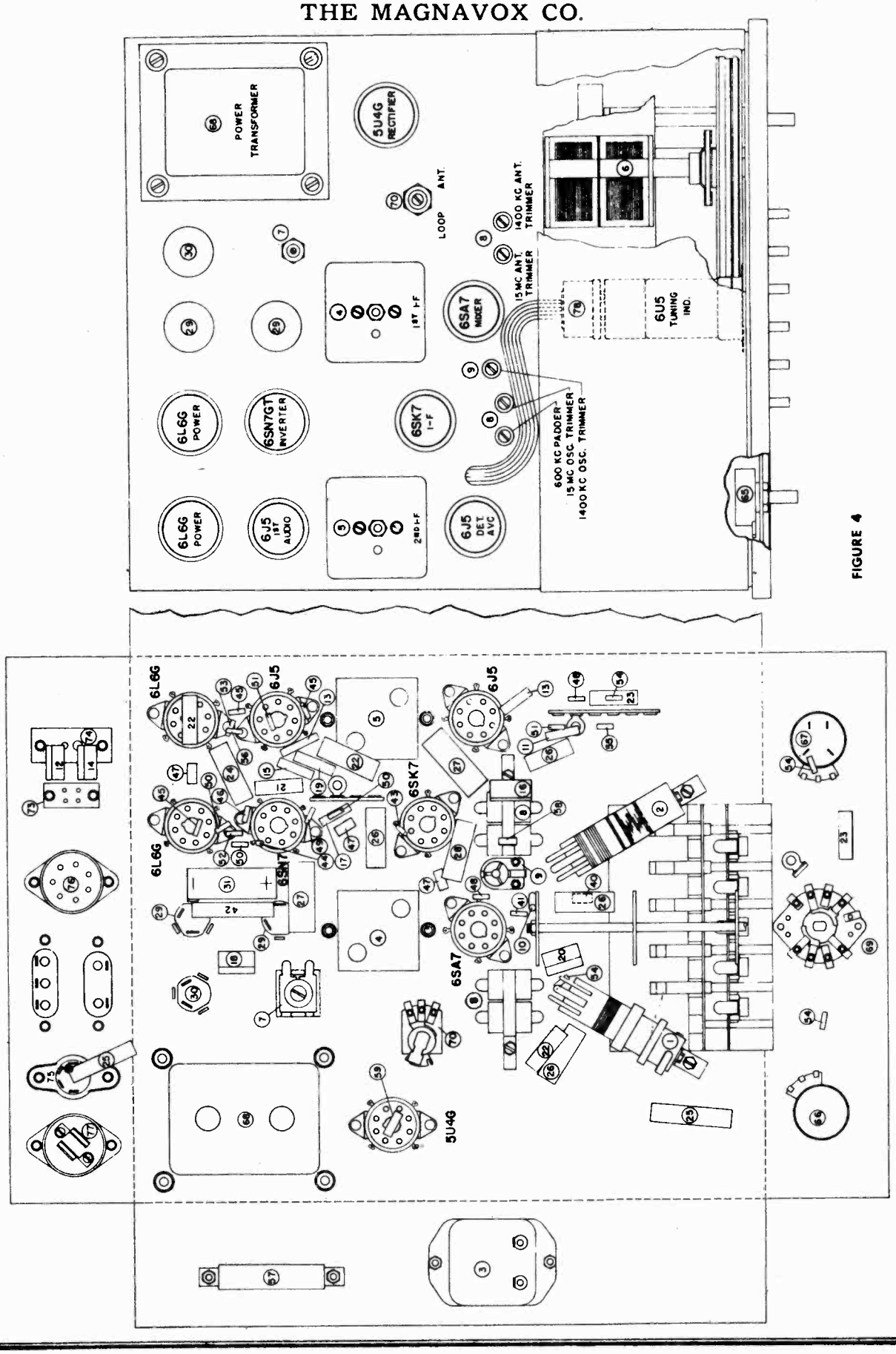


FIGURE 4

DIAL CORD REPLACEMENT

Two separate drive cables are used in the CR-194 dial assembly. One cable is used to transmit the motion from the dial tuning knob to the large pulley that is coupled to the condenser gang; the other cable actuates the dial pointer whenever the large pulley on the condenser gang is moved. Separate instructions for replacing either of these cables is given in the following paragraphs.

CONDENSER DRIVE CABLE REPLACEMENT

Slide a short length (approximately ½-inch) of sleeving over one end of a 19-inch length of dial cable, form a small loop and tie a knot in the manner shown on Figure 1. Hook this loop over the metal hook in pulley "C" and lace the cable through the pulley slot and around the pulley in a counter-clockwise direction when viewed from the rear of the panel, keeping the cable to the rear of the pulley groove. Lace the cable in the direction indicated by the arrow on the drawing wrapping 2½ turns around the smaller diameter portion of the tuning control shaft *from front to back;* then around the opposite side of pulley "C." Loop one end of tension spring "D" on the right-hand edge of the slot in pulley "C"; thread the free end of the drive cable through the opposite end of spring "D" and pull back on the cable until the spring coils are stretched to approximately one inch. Tie a double knot in the cable while maintaining tension on the spring, completing the operation.

DIAL POINTER DRIVE CABLE REPLACEMENT

Rotate the tuning control shaft until the slot in the groove of pulley "C" is up. Cut a piece of dial cable approximately 40 inches long and slide a short piece of sleeving over the cable Tie a small loop in one end of the cable and temporarily hook it over the metal hook in pulley "C." Lace the other end through the slot in the pulley groove and in a counter-clockwise direction around the large pulley, then around pulley "B" and straight across the back of the dial frame; over pulley "A" and in a counter-clockwise direction around pulley "C." This last wrap around pulley "C" must be at the front of the pulley groove or nearest the panel. *This is important!* Lace the free end of the cable through the slot in pulley "C" and remove the other end of the cable from the hook.

Fasten one end of tension spring "E" over the pulley hook and lace the two free ends of the drive cable through the other end of the spring. Now pull back on the cable until the tension spring coils are stretched to approximately 1⅝ inches. Tie a double knot in the cable while maintaining tension on the spring.

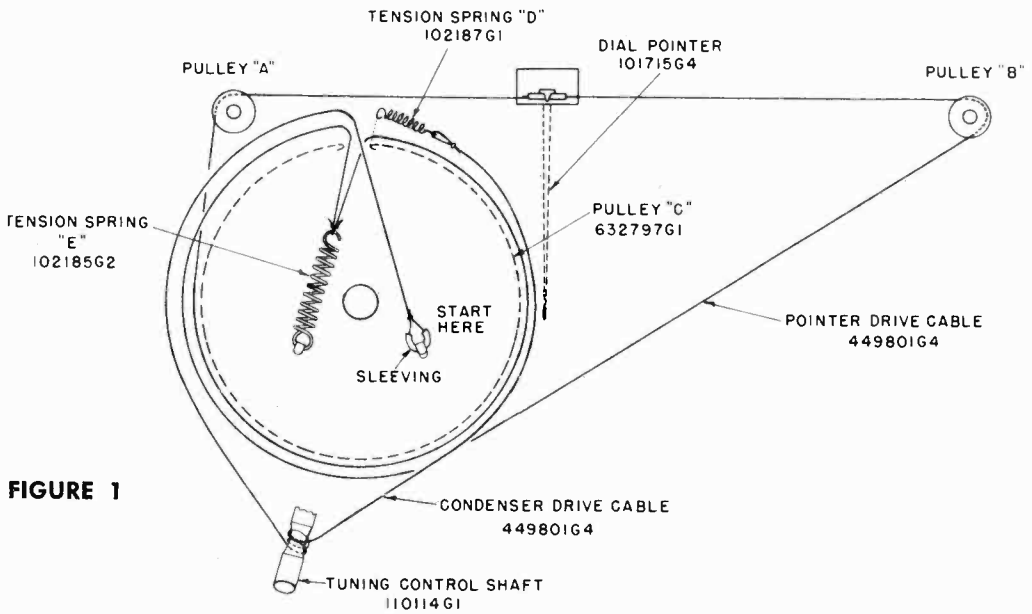
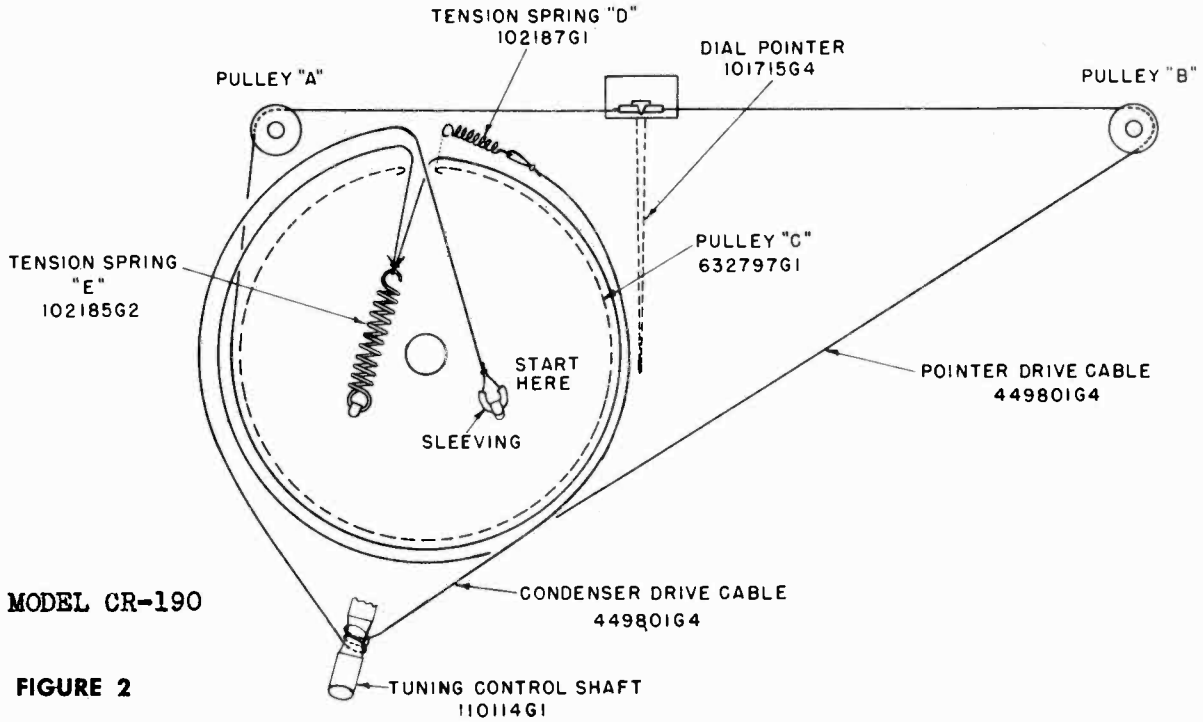


FIGURE 1

Turn the tuning control shaft until the condenser gang is completely meshed and slide the dial pointer on its track until it is in line with the last calibration mark at the low frequency end of the dial. The short piece of sleeving installed prior to the stringing operation should be slid to the rear of the dial pointer and the crimping lugs on the dial pointer pressed together over the sleeving. After checking to see that the condenser gang is still completely meshed and the dial pointer is in the position specified previously, apply a few drops of cement to each end of the sleeving to which the dial pointer is fastened. This completes the operation.

THE MAGNAVOX CO.

MODEL CR-190A,
CR-190B
MODEL CR-194



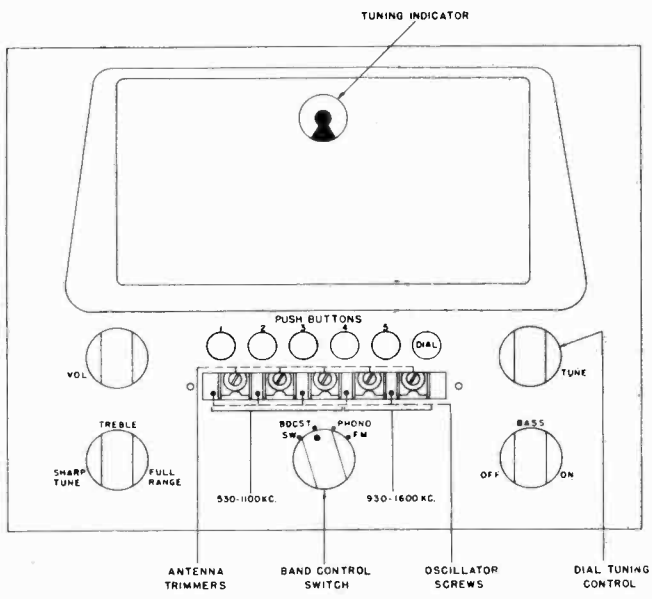
MODEL CR-190

FIGURE 2

MODEL CR-190 PUSH BUTTON ADJUSTMENTS MODEL CR-194

There are six push buttons on the panel of the receiver, five of which may be pre-set to any station whose frequency is within the range covered by the respective buttons. See Figure 3. The right-hand button must be pressed for dial tuning.

Set-up Procedure—Turn on the receiver and allow it to operate for at least five minutes to permit tubes to reach normal operating conditions. Remove the push button escutcheon plate and proceed in the following manner.



1. Turn the Band Control Switch knob to BDCST and press the push button at the right end of the assembly to permit dial tuning.

2. Using the Dial Tuning Control, carefully tune in the station to which the No. 1 push button is to be set and note the program. Be sure that the frequency of the station selected is within the frequency range covered by the No. 1 button.

3. Press the No. 1 button and carefully turn the oscillator screw for that button until the station that was tuned manually is heard. Carefully adjust the screw until the tuning indicator tube shows maximum deflection.

4. Adjust the No. 1 antenna trimmer for maximum speaker volume (tuning indicator tube shows maximum deflection).

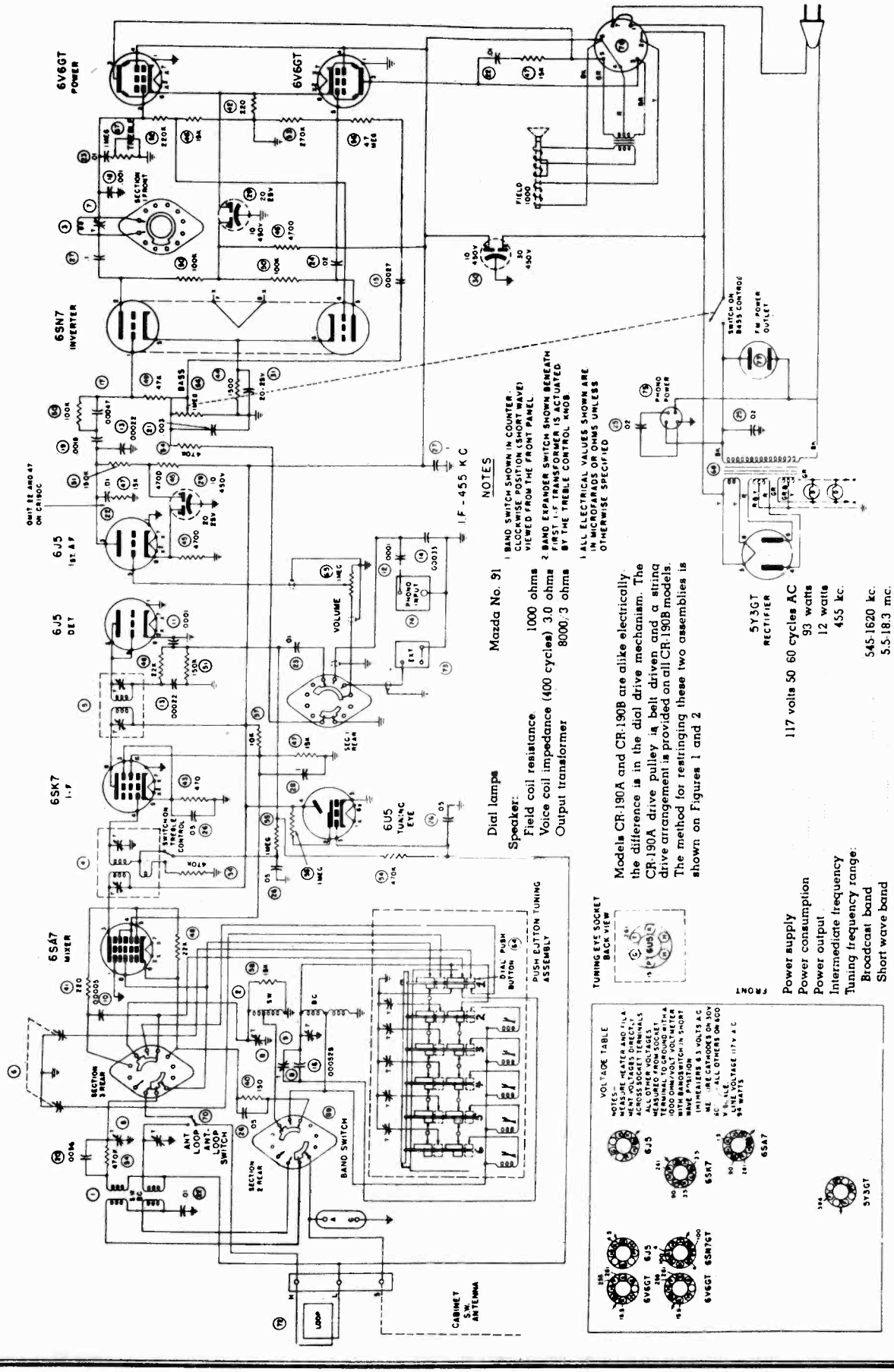
5. Press the DIAL button to verify that the same station that was tuned manually was set up on the No. 1 button.

6. This completes the set-up of the No. 1 button. Follow the same procedure in setting up the remaining four buttons always adjusting the oscillator screw first, then the antenna trimmer screw.

7. After all five buttons have been set up, replace the escutcheon plate and insert the correct call letter tab in the space provided under each push button.

MODEL CR-190A, 190B

THE MAGNAVOX CO.



NOTES

1 BAND SWITCH SHOWN IN COUNTER-CLOCKWISE POSITION (SHORT WAVE) VIEWED FROM THE FRONT PANEL

2 BAND EXPANDER SWITCH SHOWN BENEATH FIRST I.F. TRANSFORMER IS ACTUATED BY THE TREBLE CONTROL KNOB.

1 ALL ELECTRICAL VALUES SHOWN ARE IN MICROFARADS OR OHMS UNLESS OTHERWISE SPECIFIED

Mazda No. 91

Dial lamps

Speaker:

Field coil resistance	1000 ohms
Voice coil impedance (400 cycles)	3.0 ohms
Output transformer	8000/3 ohms

Models CR-190A and CR-190B are alike electrically; the difference is in the dial drive mechanism. The CR-190A drive pulley is belt driven and a string drive arrangement is provided on all CR-190B models. The method for restringing these two assemblies is shown on Figures 1 and 2

Power supply	117 volts 50 60 cycles AC
Power consumption	93 watts
Power output	12 watts
Intermediate frequency	455 kc.
Tuning frequency range:	
Broadcast band	545-1620 kc.
Short wave band	5.5-18.3 mc.

DIAL CORD REPLACEMENT

As mentioned previously in this Service Bulletin, two types of drive mechanisms are used to transmit the motion from the dial tuning knob to the large pulley that is coupled to the condenser gang. These two arrangements are shown on Figures 1 and 2. The cable used to drive the dial pointer is strung the same on all CR-190A and CR-190B receivers. Separate instructions for installing a replacement belt or string on the CR-190A or CR-190B chassis are given below.

CR-190A Condenser Drive Belt Replacement—Hook one end of the belt on the right-hand edge of the slot in pulley "C" so that the smooth side contacts the pulley surface. Keeping the belt near the back of the groove in pulley "C" wrap it in a clockwise direction around that pulley (as indicated by the arrows on Figure 1) over the idler pulley and under the tuning control shaft; then around the opposite side of pulley "C." One end of the belt tension spring is hooked on the free end of the belt and the other end on the left-hand edge of the slot in pulley "C," completing the operation.

CR-190B Condenser Drive Cable Replacement—Slide a short length (approximately ½-inch) of sleeving over one end of a 19-inch length of dial cable, form a small loop and tie a knot in the manner shown on Figure 2. Hook this loop over the metal hook in pulley "C" and lace the cable through the pulley slot and around the pulley in a counter-clockwise direction when viewed from the rear of the panel, keeping the cable to the rear of the pulley groove. Lace the cable in the direction indicated by the arrow on Figure 2 wrapping 2½ turns around the smaller diameter portion of the tuning control shaft *from front to back;* then around the opposite side of pulley "C." Loop one end of tension spring "D" on the right-hand edge of the slot in pulley "C"; thread the free end of the drive cable through the opposite end of spring "D" and pull back on the cable until the spring coils are stretched to approximately one inch. Tie a double knot in the cable while maintaining tension on the spring, completing the operation.

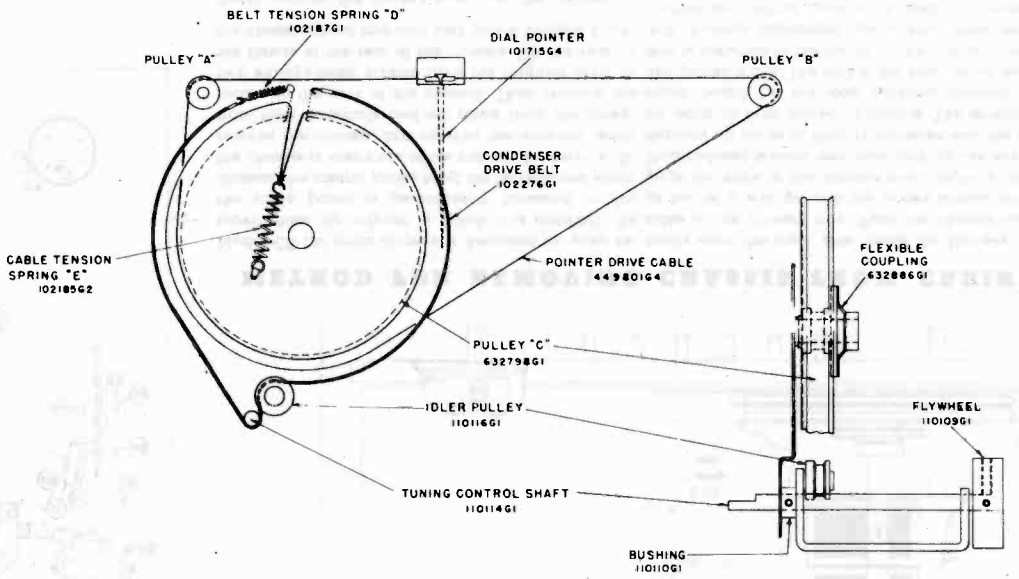


FIGURE 1

CR-190A and CR-190B Dial Pointer Drive Cable Replacement—Rotate the tuning control shaft until the slot in the groove of pulley "C" is up. Cut a piece of dial cable approximately 40 inches long and slide a short piece of sleeving over the cable. Tie a small loop in one end of the cable and temporarily hook it over the metal hook in pulley "C." Lace the other end through the slot in the pulley groove and in a counter-clockwise direction around the large pulley, then around pulley "B" and straight across the back of the dial frame; over pulley "A" and in a counter-clockwise direction around pulley "C." This last wrap around pulley "C" must be at the front of the pulley groove or nearest the panel. *This is important!* Lace the free end of the cable through the slot in pulley "C" and remove the other end of the cable from the hook. Fasten one end of tension spring "E" over the pulley hook and lace the two free ends of the drive cable through the other end of the spring. Now pull back on the cable until the tension spring coils are stretched to approximately 1⅝ inches. Tie a double knot in the cable while maintaining tension on the spring.

Turn the tuning control shaft until the condenser gang is completely meshed and slide the dial pointer on its track until it is in line with the last calibration mark at the low frequency end of the dial. The short piece of sleeving installed prior to the stringing operation should be slid to the rear of the dial pointer and the crimping lugs on the dial pointer pressed together over the sleeving. After checking to see that the condenser gang is still completely meshed and the dial pointer is in the position specified previously, apply a few drops of cement to each end of the sleeving to which the dial pointer is fastened. This completes the operation.

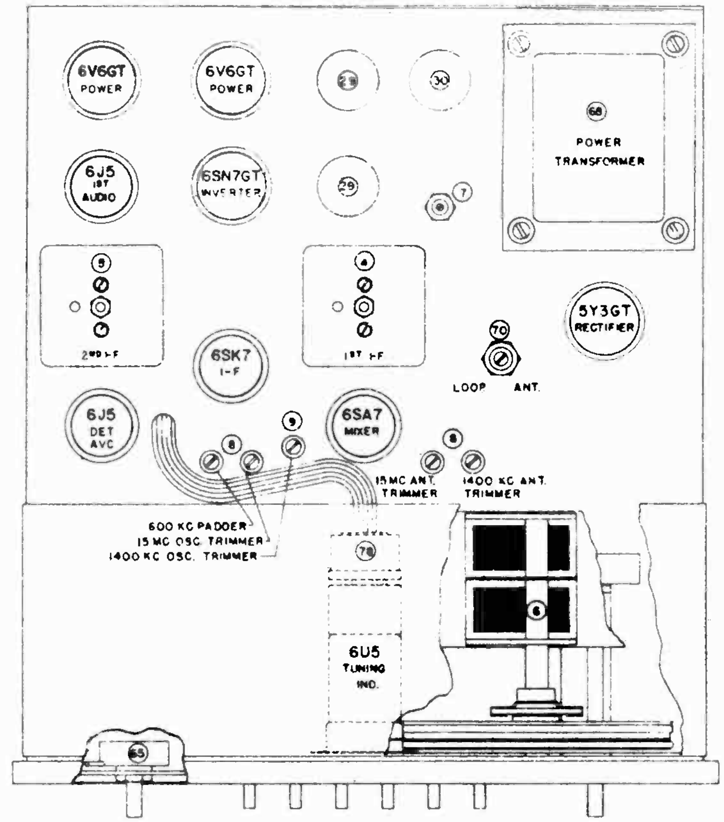
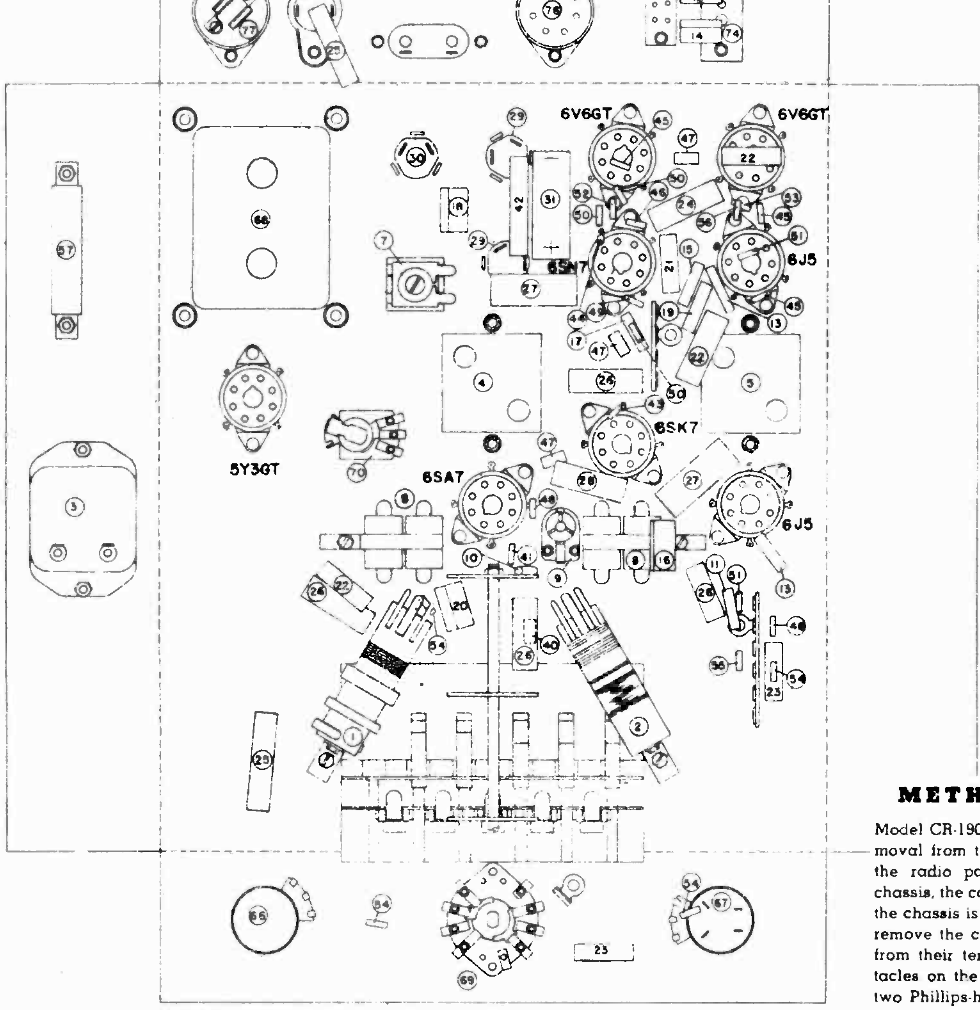


FIGURE 5



METHOD FOR REMOVING CHASSIS FROM CABINET

Model CR-190 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service. To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back.

Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio panel in place when the chassis is replaced.

In replacing the chassis, slide it so that the small hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hooks should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated S-L-H. The end of the short wave antenna that is fastened to the inside of the cabinet connects to S. Always disconnect this antenna from terminal S when an outdoor antenna is used as it may pick up noise. The two terminals on the loop are designated L and H. The leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.

The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 5. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings. *Always set the Selectivity Switch to SHARP TUNE before aligning the i-f stages.* This is done by turning the Treble Control counter-clockwise as far as possible.

I-F Alignment

1. Connect the output of the signal generator to the oscillator grid (pin No. 5) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.

2. Turn the condenser gang until it is completely meshed (low-frequency end of dial calibration). and set the band selector switch to BDCST as for broadcast band reception.

3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

On early models of CR-190 chassis, the two i-f trimmers are located in the top of the respective i-f transformers as shown in the layout diagram, Figure 5. In later production, one trimmer is accessible from the top and the other from the bottom of each transformer.

Broadcast Band Alignment

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The ANT-LOOP switch (70) must be in the ANT setting.

2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, slide the pointer on its string to the correct position. Be sure to crimp the lugs (on the rear of the pointer) tightly around the string to hold the pointer in adjustment.

3. With the band selector still set for broadcast band reception, adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.

4. Set the signal generator and the radio receiver to 1400 kc.; adjust the 1400 kc. oscillator trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.

Short Wave Band Alignment

1. Set the band selector switch to SW as for Short Wave reception and substitute a 400 ohm resistor for the capacitor in series with the signal generator lead connected to the antenna terminal on the receiver.

2. Set the signal generator and the radio receiver to 15 mc.; then adjust the 15 mc. oscillator trimmer and the 15 mc. antenna trimmer for maximum output.

While adjusting the 15 mc. oscillator trimmer two peaks may be observed; only one is the correct peak for 15 mc. alignment. Screw in the trimmer to maximum capacity—then decrease the capacity until the first peak is observed. This is the correct one.

10 KC Filter Adjustment

This chassis incorporates a 10 kc. filter circuit to eliminate the beat note heard as a whistle between stations on the broadcast band. If the trimmer is out of adjustment, the following procedure should be observed.

1. Set the Selectivity Switch to FULL RANGE by turning the Treble Control knob clockwise as far as possible.

2. Connect the output of an audio oscillator to the phonograph pickup socket on the radio chassis and adjust the oscillator to EXACTLY 10,000 cycles.

3. Set the band selector to PHONO and adjust the 10 kc. trimmer (7) for minimum output.

4. If an audio oscillator is not available for making this adjustment, set the band selector to BDCST, connect an antenna to the receiver and set the gang condenser to a point between two stations on adjacent channels having approximately the same power. If the 10 kc. trimmer is out of adjustment, a whistle will be heard. Adjust the trimmer until the whistle is eliminated.

Special Service Information

The following information is provided for the serviceman who has a vacuum tube voltmeter or a similar measuring instrument available.

STAGE GAINS*

Antenna Post to Converter Grid at:

600 kc.	5.5
6 mc.	2.0

R-F on Converter Grid to I-F Grid at:

600 kc.	28
6 mc.	22

I-F on Converter Grid to I-F Grid at:

455 kc.	34

I-F Grid to Detector Plate at:

455 kc.	67

AUDIO GAIN

Voltage required across Volume Control to produce .05 watt speaker output** at 400 cycles is .010 volt with Band Selector Switch in BDCST setting.

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across Oscillator Grid Resistor (48) at:

600 kc.	9.7
6 mc.	5.3

* Variations of ±20% are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.

** .05 watt speaker output at 400 cycles is equivalent to a reading of 0.4 volts as measured by a high resistance AC voltmeter across the speaker voice coil.

MODEL CR-190A,
CR-190B
MODEL CR-193

THE MAGNAVOX CO.

CR-190

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, r-f, two band	360256G1
2	Coil assembly, oscillator, two band	360255G1
3	Coil assembly, 10 kc filter	360240G1
4	Transformer, first i-f	360266G1
5	Transformer, second i-f	360267G1
6	Capacitor, variable, two-gang tuning	260056G1
7	Capacitor, variable, 10 kc trimmer	250008G1
8	Capacitor, variable, 2 gang trimmer	260021G1
9	Capacitor, variable, oscillator trimmer	260042G2
10	Capacitor, ceramic, 50 mmf.	250088G24
11	Capacitor, molded mica, 100 mmf. ±20%	250159G98
12	Capacitor, molded mica, 100 mmf. ±10%	250159G82
13	Capacitor, molded mica, 220 mmf. ±20%	250159G100
14	Capacitor, molded mica, 330 mmf. ±10%	250159G88
15	Capacitor, molded mica, 270 mmf. ±10%	250159G87
16	Capacitor, silvered mica, 529 mmf. ±1%	250085G34
17	Capacitor, molded mica, 470 mmf. ±10%	260159G102
18	Capacitor, molded mica, 1000 mmf. ±20%	250160G82
19	Capacitor, molded mica, 1800 mmf. ±10%	250160G67
20	Capacitor, molded mica, 5600 mmf. ±2%	250161G7
21	Capacitor, paper, .003 mfd. 600 V.	250152G43
22	Capacitor, paper, .01 mfd. 600 V.	250152G38
23	Capacitor, paper, .01 mfd. 200 V.	250152G18
24	Capacitor, paper, .02 mfd. 400 V.	250152G26
25	Capacitor, molded paper, .02 mfd.	250129G3
26	Capacitor, paper, .05 mfd. 200 V.	250152G15
27	Capacitor, paper, .1 mfd. 400 V.	250152G22
28	Capacitor, paper, .1 mfd. 200 V.	250152G13
29	Capacitor, electrolytic, 10 mfd. 450 V.-20 mfd. 25 V.	270023G6
30	Capacitor, electrolytic, 10-30 mfd. 450 V.	270023G2
31	Capacitor, electrolytic, 20 mfd. 25 V.	270027G2
40	Resistor, composition, 150 ohm ½ W.	230084G8
41	Resistor, composition, 220 ohm ½ W.	230084G9
42	Resistor, composition, 220 ohm 2 W.	230064G54
43	Resistor, composition, 470 ohm ½ W.	230084G11
44	Resistor, composition, 1500 ohm ½ W.	230084G14
45	Resistor, composition, 4700 ohm ½ W.	230084G17
46	Resistor, composition, 15,000 ohm ±5%, ½ W.	230084G187
47	Resistor, composition, 15,000 ohm 1 W.	230085G20
48	Resistor, composition, 22,000 ohm ½ W.	230084G21
49	Resistor, composition, 47,000 ohm ½ W.	230084G23
50	Resistor, composition, 100,000 ohm ½ W.	230084G25
51	Resistor, composition, 150,000 ohm ½ W.	230084G26
52	Resistor, composition, 220,000 ohm ±5%, ½ W.	230084G215
53	Resistor, composition, 270,000 ±10%, ½ W.	230084G91
54	Resistor, composition, 470,000 ohm ½ W.	230084G29
55	Resistor, composition, 1 megohm ½ W.	230084G31
56	Resistor, composition, 4.7 megohm ½ W.	230084G35
57	Resistor, wire wound, 10,000 ohm	240035G2
58	Resistor, composition, 15,000 ohm ½ W.	230084G20
65	Control, volume, 1 megohm	220044G15
66	Control, bass, 1 megohm, with power switch	220045G2
67	Control, treble, 1 megohm, with band expander sw.	220071G2
68	Transformer, power, 117 V. 50/60 cycle	300025G1
69	Switch, rotary, band selector	160156G1
70	Switch, rotary, loop to outdoor antenna	160157G1
71	Switch assembly, muting	160158G1
72	Antenna, loop assembly	*
73	Socket, external input	180060G1
74	Socket, phonograph input	189741G1
75	Socket, phonograph motor	180501G5
76	Socket, speaker	180393G3
77	Socket, FM power	180422G1
78	Socket and cable assembly, tuning indicator	180423G1

CR-193

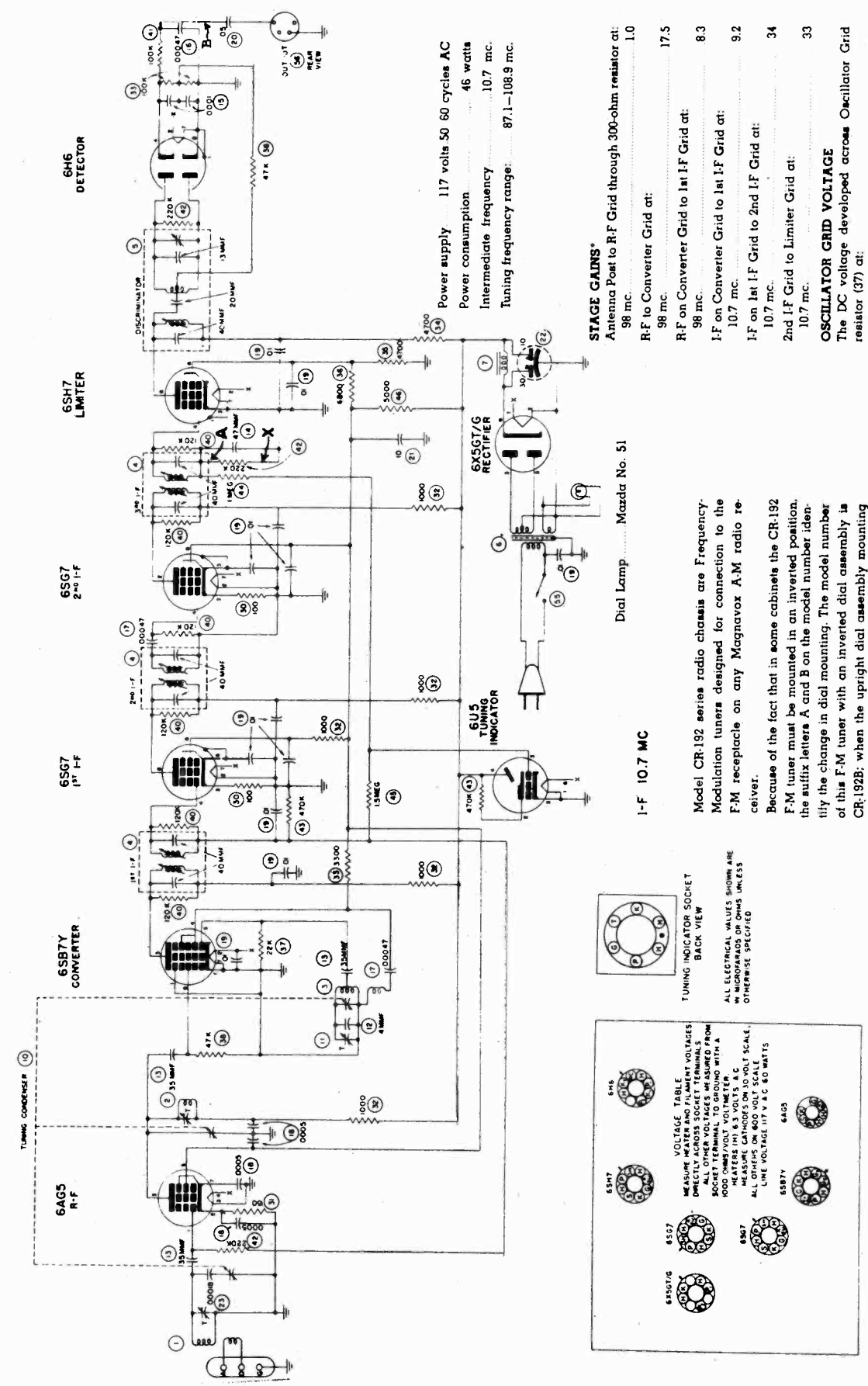
REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, r-f, two band	360238G1
2	Coil assembly, oscillator, two band	360239G1
3	Coil assembly, 10 kc filter	360240G1
4	Transformer, first i-f	360266G1
5	Transformer, second i-f	360267G1
6	Capacitor, variable, two-gang tuning	260053G1
7	Capacitor, variable, 10 kc trimmer	250008G1
8	Capacitor, variable, 2 gang trimmer	260021G1
9	Capacitor, variable, oscillator padder	260042G2
10	Capacitor, ceramic, 50 mmf.	250088G24
11	Capacitor, molded mica, 100 mmf. ±20%	250159G98
12	Capacitor, molded mica, 100 mmf. ±10%	250159G82
13	Capacitor, molded mica, 220 mmf.	250159G100
14	Capacitor, molded mica, 330 mmf.	250159G88
15	Capacitor, molded mica, 270 mmf.	250159G87
16	Capacitor, silvered mica, 583 mmf. ±1%	250085G33
17	Capacitor, molded mica, 470 mmf.	250159G102
18	Capacitor, molded mica, 1000 mmf.	250160G82
19	Capacitor, molded mica, 1800 mmf.	250160G67
20	Capacitor, molded mica, 5100 mmf. ±2%	250161G6
21	Capacitor, paper, .003 mfd. 400 V.	250152G43
22	Capacitor, paper, .01 mfd. 600 V.	250152G38
23	Capacitor, paper, .01 mfd. 200 V.	250152G18
24	Capacitor, paper, .02 mfd. 400 V.	250152G26
25	Capacitor, molded paper, .02 mfd. 600 V.	250129G3
26	Capacitor, paper, .05 mfd. 200 V.	250152G15
27	Capacitor, paper, .1 mfd. 400 V.	250152G22
28	Capacitor, paper, .1 mfd. 200 V.	250152G13
29	Capacitor, electrolytic, 10 mfd. 450 V., 20 mfd. 25V.	270023G6
30	Capacitor, electrolytic, 10-30 mfd. 450 V.	270023G2
31	Capacitor, electrolytic, 20 mfd. 25V.	270027G2
40	Resistor, composition, 150 ohm ½ W.	230084G8
41	Resistor, composition, 220 ohm ½ W.	230084G9
42	Resistor, wire wound 125 ohm 10 W.	240021G11
43	Resistor, composition, 470 ohm ½ W.	230084G1
44	Resistor, composition, 1500 ohm ½ W.	230084G14
45	Resistor, composition, 4700 ohm ½ W.	230084G17
46	Resistor, composition, 15,000 ohm ±5%, ½ W.	230084G187
47	Resistor, composition, 15,000 ohm 1 W.	230085G20
48	Resistor, composition, 22,000 ohm ½ W.	230084G21
49	Resistor, composition, 47,000 ohm ½ W.	230084G23
50	Resistor, composition, 100,000 ohm ½ W.	230084G25
51	Resistor, composition, 150,000 ohm ½ W.	230084G26
52	Resistor, composition, 220,000 ohm ±5%, ½ W.	230084G215
53	Resistor, composition, 270,000 ohm ½ W.	230084G91
54	Resistor, composition, 470,000 ohm ½ W.	230084G29
55	Resistor, composition, 1 megohm ½ W.	230084G31
56	Resistor, composition, 4.7 megohm ½ W.	230084G35
57	Resistor, wire wound, 10,000 ohm	240035G2
58	Resistor, composition, 15,000 ohm ½ W.	230084G20
59	Resistor, composition, 1000 ohm 2 W.	230064G62
65	Control, volume, 1 megohm	220044G15
66	Control, bass, 1 megohm, with power switch	220045G2
67	Control, treble, 1 megohm, with band expander switch	220071G2
68	Transformer, power, 117 V. 50/60 cycle	300032G1
69	Switch, rotary, band selector	160156G1
70	Switch, rotary, loop to outdoor antenna	160157G1
71	Switch assembly, muting	160158G1
72	Antenna, loop assembly	*
73	Socket, external input	180060G1
74	Socket, phonograph input	189741G1
75	Socket, phonograph motor	180501G5
76	Socket, speaker	180393G3
77	Socket, FM power	180422G1
78	Socket & Cable assembly, tuning indicator	180423G1
	Dial glass assembly	150283G1

Due to the fact that a change was made in the mechanical construction of the dial assembly after the first CR-190 radio chassis production run, it is important that you follow the procedure outlined below in ordering replacement glass dials.
If the glass dial for which a replacement is required is marked 150269, order a 150278 dial glass assembly. If the glass is marked 150282, order a 150280 dial glass assembly. These assemblies include the rubber strips cemented in their correct positions.

*The part number of the loop antenna assembly changes with different cabinets. It is therefore important that you specify the *Style Number* of the instrument when ordering a replacement loop antenna assembly.

THE MAGNAVOX CO.

MODEL CR-192A, CR-192B



MODEL CR-192A,
CR-192B

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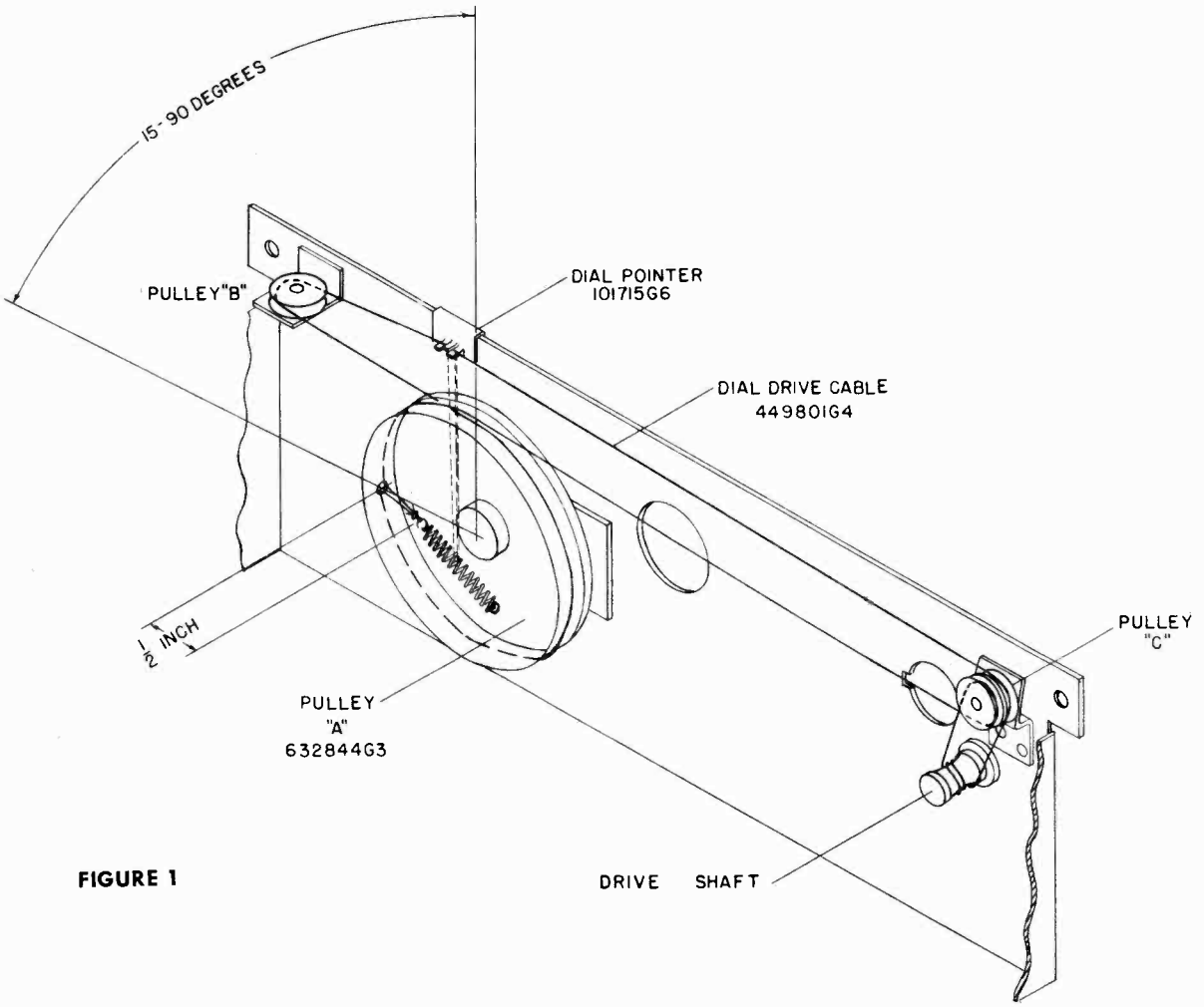


FIGURE 1

DIAL CORD REPLACEMENT

A single cable transmits motion from the dial tuning knob to rotate the condenser gang and to move the dial pointer. A 30-inch length of string is required to restring this assembly. After the broken cable is removed, turn pulley "A" (see Figure 1) until the condenser gang plates are completely meshed. In this condition, the small hole in the rim of pulley "A" should be within the limits of 15 to 90 degrees to the left of being vertical as shown in Figure 1. If this hole is at a different position from the condition specified, loosen the two screws in the coupling to the condenser gang and turn pulley "A" while holding the condenser plates meshed. Tighten the two set screws after the adjustment has been made.

Lace one end of the new length of cable through the hole in pulley "A" and temporarily fasten it to the hook to which the spring is normally fastened. Make a complete turn around pulley "A" in a counter-clockwise direction, lace it around pulley "B," then across the rear of the dial scale and over the top of the front groove in pulley "C." Proceed down around the tuning shaft for 2½ turns in a clockwise direction and wrapping the cable over pulley "D" from front to back. Continue up over the rear groove of pulley "C" in a clockwise direction for one turn and extend the cable to the left so that the loose end is to the rear of the section of cable that it crosses. The loose end of the cable should now be wound over the top of pulley "A" so that it is nearest the dial frame and into the hole in the pulley groove. Remove the other end of the cable from the hook and while holding both ends taut, insert one end of the spring on the hook in pulley "A." Lace the two free ends of the cable through the opposite end of the spring and pull the cable until the spring is stretched to within ½-inch of the rim on the pulley. Tie a double knot so that the knot is around one coil of the spring, while maintaining tension on the cable.

Turn the tuning control shaft until the condenser gang is completely meshed and slide the dial pointer on its track until it is in line with the last calibration mark at the low frequency end of the dial. Press the crimping lugs on the dial pointer together over the cable. After checking to see that the condenser gang is still completely meshed and the dial pointer is in the position specified previously, apply a few drops of cement to the cable where it is crimped by the pointer. This completes the operation.

THE MAGNAVOX CO.

MODEL CR-192A,
CR-192B

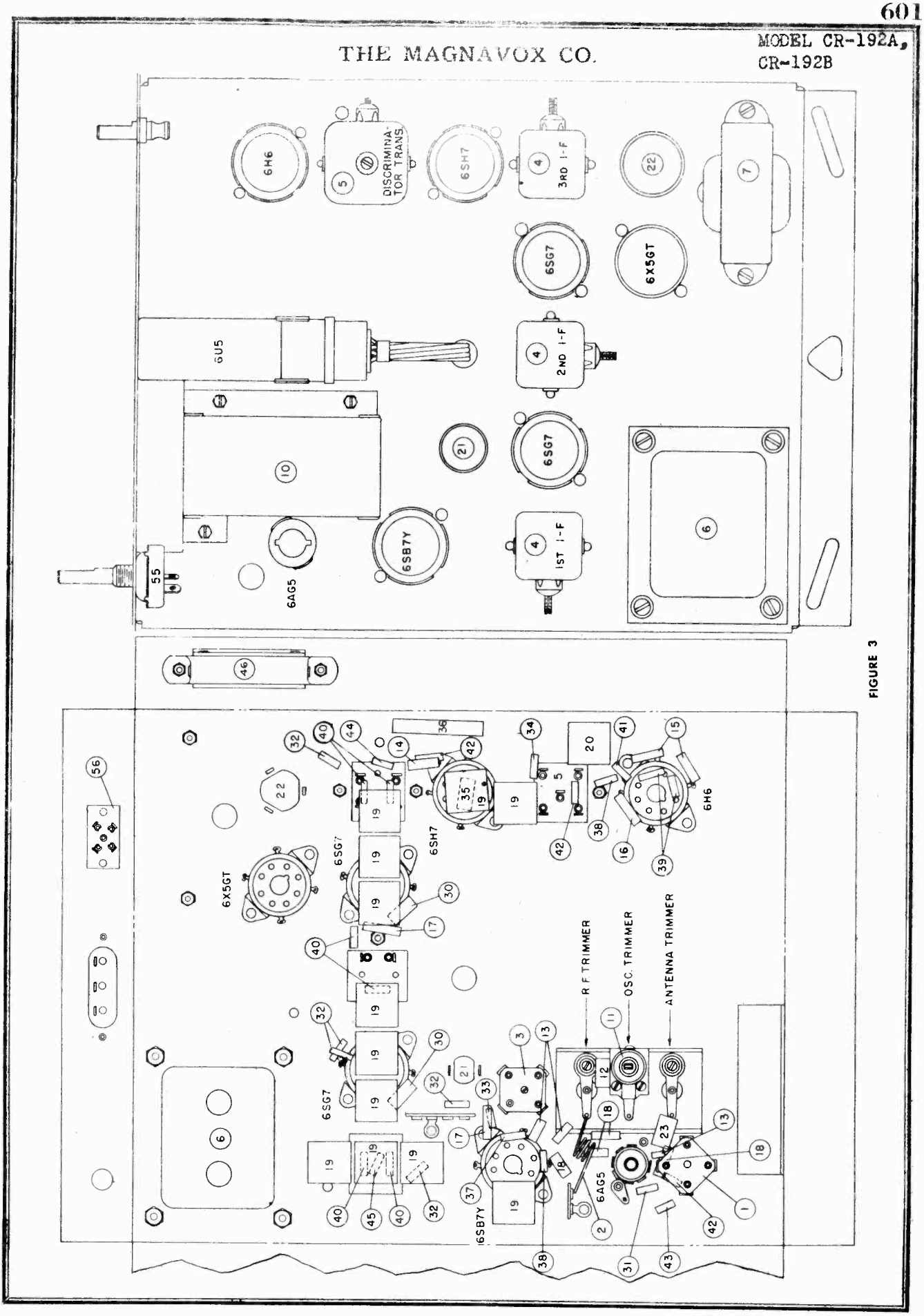


FIGURE 3

MODEL CR-192A, CR-192B

THE MAGNAVOX CO.

The alignment of this F-M tuner is made in three major steps namely, I-F alignment, Discriminator alignment and R-F alignment. An F-M generator is not required in aligning this F-M tuner. Any accurately calibrated signal generator covering a range in the vicinity of 10.7 megacycles may be used in aligning the I-F and the Discriminator stages. For R-F alignment, the generator must cover the tuning range of the tuner or approximately 87 to 110 megacycles. If such a signal generator is not available, this alignment may be made by using an F-M radio station as a frequency standard.

I-F ALIGNMENT

1. Connect the "high" side of the signal generator to Grid 3 (pin #8) of the 6SB7Y converter tube and the "low" side of the generator to the radio chassis.

2. If a vacuum tube voltmeter is available, connect it across the 220,000 ohm resistor in the grid circuit of the 6SH7 limiter tube at points designated "A" and "X" on the schematic diagram (Figure 2) to measure the limiter grid bias voltage. Set the signal generator to exactly 10.7 megacycles and adjust the third, the second and the first i-f transformer trimmers in that order for maximum reading on the meter. A reading of 2 to 8 volts should be considered normal.

3. If a vacuum tube voltmeter is not available, connect a 0-50 or 0-200 microammeter in series with the "ground" end of the 220,000 ohm resistor in the grid circuit of the 6SH7 limiter tube at point "X" on the schematic diagram. Set the signal generator to exactly 10.7 megacycles and adjust the third, the second and the first i-f transformer trimmers in that order for maximum meter readings. A normal reading will be in the range of 10 to 35 microamperes. At the completion of these adjustments, remove the microammeter and ground the 220,000 ohm resistor to the point where it was originally connected.

ALIGNMENT PROCEDURE

DISCRIMINATOR ALIGNMENT

The accurate alignment of the discriminator transformer cannot be overemphasized. Incorrect alignment will result in badly distorted reception. The following steps should be followed in the order given:

1. A DC vacuum tube voltmeter is connected to the output circuit by connecting it from ground to point "B" on the schematic diagram. This measures the detector output voltage. Adjust the signal generator frequency to exactly 10.775 megacycles and adjust both trimmers on the discriminator transformer for maximum reading. If the indicated voltage is less than 3 volts readjust the output of the generator until the meter indicates 3 volts or more. Now adjust the signal generator frequency to 10.7 megacycles and turn the trimmer screw on the top of the discriminator until the voltage is zero. *This is an extremely important adjustment.* Reset the generator frequency to 10.775 and record the meter reading.

2. Reverse the meter connections and set the signal generator frequency to 10.625 megacycles. The meter reading now obtained must be within 10% of the reading recorded in the previous operation—if it is not, the discriminator alignment was not done accurately and must be repeated.

3. The discriminator may also be aligned using a 0-50 or 0-200 microammeter if a vacuum tube voltmeter is not available. In this case, the detector output current is measured. Connect the microammeter to the same points specified in paragraph 1 and proceed in the manner outlined in paragraphs 1 and 2 of this section. In the operation described in paragraph 1, the meter reading should be at least 20 microamperes when the trimmers are peaked at 10.775 megacycles; if not, the generator should be adjusted until that value is obtained.

R-F ALIGNMENT

1. Check that the dial pointer is in line with the last mark at the low frequency end of the dial calibration when the condenser gang is fully meshed. If it is not, slide the pointer on its string to the correct position, and crimp the lugs (on the rear of the pointer) tightly around the string and apply a drop of cement to hold the pointer in adjustment.

2. Connect the vacuum tube voltmeter to points "A" and "X" on the schematic diagram or connect a 0-50 or 0-200 microammeter in series with the "ground" end of the 220,000 ohm resistor in the grid circuit of the 6SH7 limiter tube at point "X" on the schematic diagram.

3. An extremely accurate signal generator is a necessity in making the following adjustments and it should be connected to the antenna post through a 300 ohm resistor. If such a generator is not available, connect an F-M antenna to the antenna terminal (A) and use an F-M transmitter for a frequency standard. It is preferable that this station be located in the high frequency end of the band—102 to 108 megacycles.

4. Set the signal generator (if one is used) and the F-M tuner to exactly 108 megacycles—if an F-M station is used as a frequency standard accurately set the tuner to the frequency of the F-M station and adjust the oscillator trimmer for a maximum reading on the meter. Then adjust the antenna trimmer and the r-f trimmer for a maximum meter indication. If too much signal is fed to the tuner, it might appear at several settings of the tuning dial and confuse the adjustment. When the adjustments are completed, the second harmonic of the oscillator frequency will be 10.7 megacycles lower than the signal frequency.

METHOD FOR REMOVING CHASSIS FROM CABINET

As the control panel is permanently fastened to the tuner in all models except those mounted in the Regency Symphony combination, it is not necessary to remove the control knobs from the cabinet. The instructions immediately following are for all combinations except the Regency Symphony. Separate instructions for removing the CR-192A chassis from that instrument are shown in this section.

Before removing the chassis, disconnect the antenna and ground leads from their terminals, and the output and the power cables from their receptacles. While holding the rear of the chassis in place with one hand, remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Then while lowering the chassis, pull back on it to disengage the hooks from the slots in the tray to which the chassis is mounted, and withdraw the chassis from the cabinet.

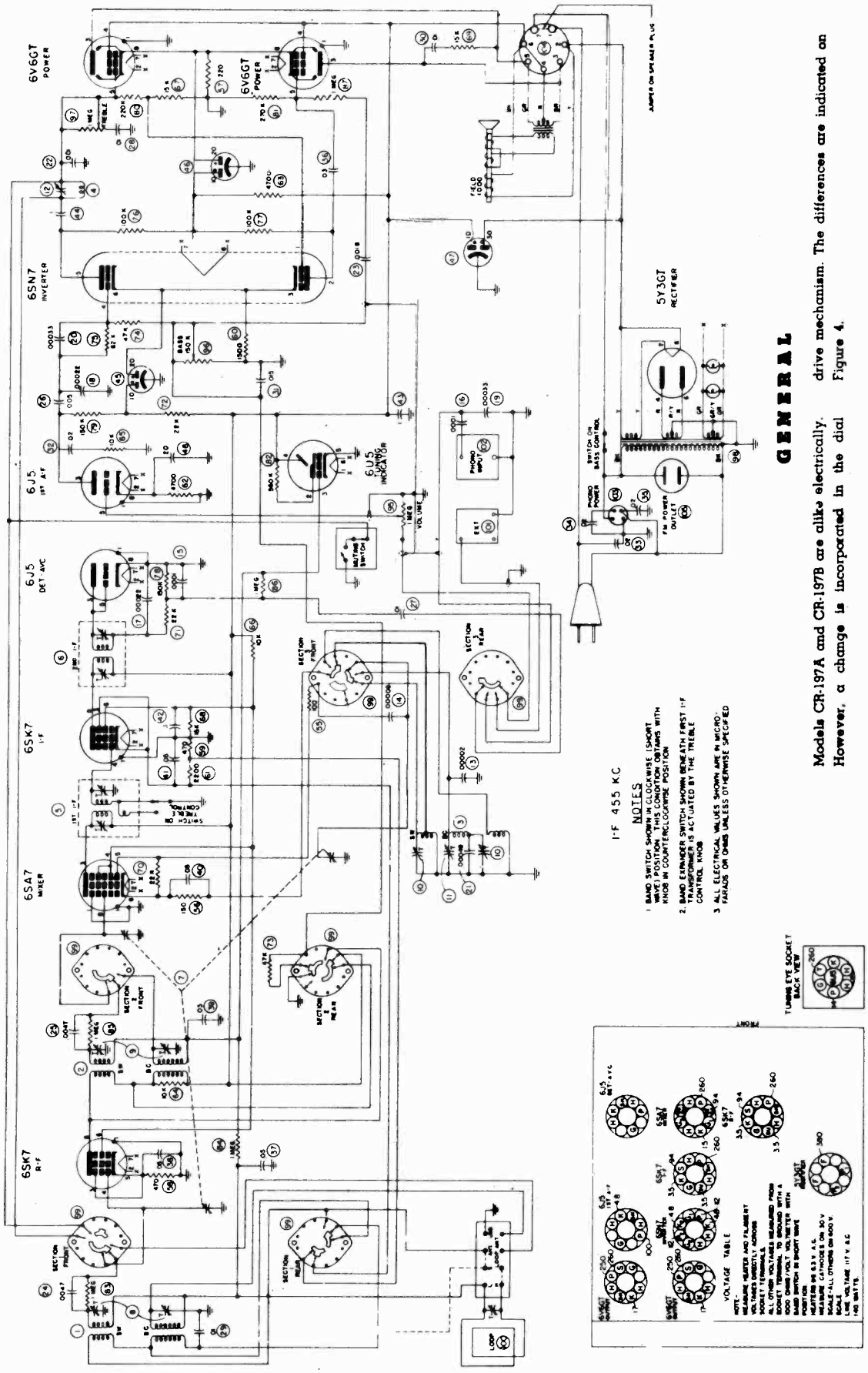
In replacing the chassis, slide it in so that the small hooks near the front ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go so that the hooks engage the slots in the chassis tray; then lift up the rear of the chassis until the guide pin in the chassis tray projects through the triangular opening the flange on the rear of the F-M chassis. Now pull back on the chassis. A ledge on the guide pin referred to above, will hold the chassis in place while the mounting screws are started into the captivated nuts on the top of the chassis tray. These nuts are accessible through the angular slots in the chassis flange and the Phillips-head screws should be turned in to within a few turns of being tight. Now slide the chassis forward until its panel is flush with the panel of the A-M radio chassis and tighten the two Phillips-head screws securely, completing the replacement operation.

REGENCY SYMPHONY. To remove the CR-192A chassis from the Regency Symphony first remove the antenna and ground leads from their terminals and the output and power cables from their receptacles. Then pull the control knobs from their shafts and remove the two fancy-head screws from the front panel. Next, remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis and pull the chassis out of the rear of the cabinet.

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, antenna	360270G1
2	Coil assembly, r-f	360271G1
3	Coil assembly, oscillator	360263G1
4	Transformer, i-f	360258G1
5	Transformer, discriminator	360259G1
6	Transformer, power, 117 volt 50 60 cycle	300030G1
7	Choke, filter	350032G1
10	Capacitor, variable, three-gang tuning	260059G1
11	Capacitor, trimmer 1.5 -7 mmf.	260067G1
12	Capacitor, ceramic, 4 mmf.	250088G28
13	Capacitor, ceramic, 35 mmf.	250088G26
14	Capacitor, molded mica, 47 mmf.	250159G96
15	Capacitor, molded mica, 100 mmf.	250159G98
16	Capacitor, molded mica, 470 mmf. +10%	250159G90
17	Capacitor, molded mica, 470 mmf. +20%	250159G102
18	Capacitor, ceramic, 500 mmf	250088G31
19	Capacitor, paper, .01 mfd. 600V.	250129G2
20	Capacitor, paper, .05 mfd. 600V.	250129G5
21	Capacitor, electrolytic, 10 mfd. 450V.	270026G3
22	Capacitor, electrolytic, 30-10 mfd. 475V.	270023G2
23	Capacitor, molded mica, 180 mmf.	250159G53
30	Resistor, composition, 100 ohm ½ W.	230084G7
31	Resistor, composition, 220 ohm ½ W.	230084G9
32	Resistor, composition, 1000 ohm ½ W.	230084G13
33	Resistor, composition, 3300 ohm ½ W.	230084G16
34	Resistor, composition, 4700 ohm ½ W.	230084G17
35	Resistor, composition, 4700 ohm 1 W.	230085G17
36	Resistor, composition, 6800 ohm 2 W.	230061G18
37	Resistor, composition, 22,000 ohm ½ W.	230084G21
38	Resistor, composition, 47,000 ohm ½ W.	230084G23
39	Resistor, composition, 100,000 ohm ½ W. ±20%	230084G25
40	Resistor, composition, 120,000 ohm ½ W. ±10%	230084G87
41	Resistor, composition, 100,000 ohm ½ W. ±10%	230084G86
42	Resistor, composition, 220,000 ohm ½ W.	230084G27
43	Resistor, composition, 470,000 ohm ½ W.	230084G29
44	Resistor, composition, 1 megohm ½ W.	230084G31
45	Resistor, composition, 1.5 megohm ½ W.	230084G32
46	Resistor, wire wound, 5000 ohm, 5 W	240035G4
55	Switch, rotary, power	160163G1
56	Socket, output	180060G1
	Calibrated glass dial—CR-192A	150287G1
	Calibrated glass dial—CR-192B	150287G2

THE MAGNAVOX CO.

MODELS CR-197, CR-197A, CR-197B



GENERAL

Models CR-197A and CR-197B are alike electrically. However, a change is incorporated in the dial drive mechanism. The differences are indicated on Figure 4.

FIGURE 6

MODELS CR-197, CR-197A, CR-197B

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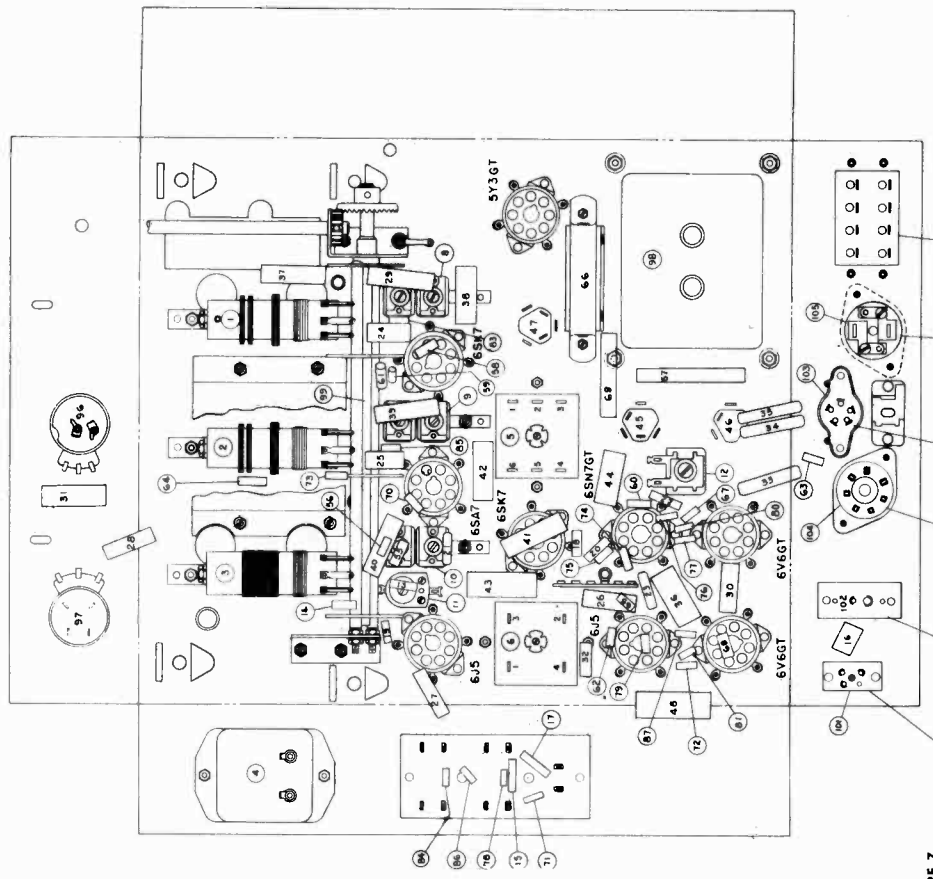


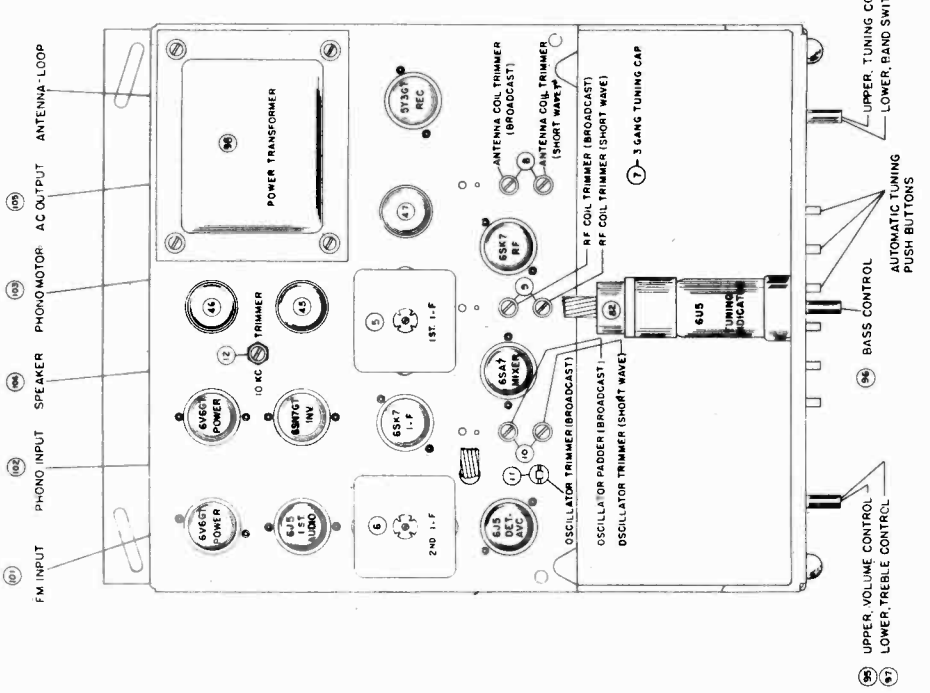


FIGURE 7

SPECIFICATIONS

Power supply	117 volts 50/60 cycles AC
Power consumption	95 watts
Power output	12 watts
Intermediate frequency	455 kc.
Tuning frequency range:	
Broadcast band	525–1630 kc.
Short Wave band	4.95–18.4 mc.
Tubes:	
R-F Amplifier	6SK7
Converter	6SA7
I-F Amplifier	6SK7
Detector and AVC	6J5
First Audio	6J5
Inverter	6SN7GT
Power output (push-pull stage)	(2) 6V6GT
Rectifier	5Y3GT
Tuning Indicator	6U5
Dial lamps	Mazda No. 44
Speakers:	
Field coil resistance	1000 ohms
Voice coil impedance (400 cycles)	3.0 ohms
Output transformer	8,000/3 ohms

Method for Removing Chassis from Cabinet

THE DATA ON THIS ENTIRE PAGE ALSO APPLIES TO THE CR-198 SERIES

Model CR-197 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service.

To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back. Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio panel in place when the chassis is replaced. In replacing the chassis, slide it so that the small hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hook should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated S-L-H. The end of the short wave antenna that is fastened to the inside of the cabinet connects to S. Always disconnect this antenna from terminal S when an outdoor antenna is used as it may pick up noise. The two terminals on the loop are designated L and H. The leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.

ALIGNMENT PROCEDURE

The alignment of this receiver requires the use of an accurately calibrated i-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 7. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings. *Always set the Selectivity Switch to SHARP TUNE before aligning the i-f stages.* This is done by turning the Treble Control counter-clockwise as far as possible.

I-F Alignment

1. Connect the output of the signal generator to the oscillator grid (pin No. 5) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.

2. Turn the condenser gang until it is completely meshed, (low-frequency end of dial calibration) and set the band selector switch to BDCST as for broadcast band reception.

3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

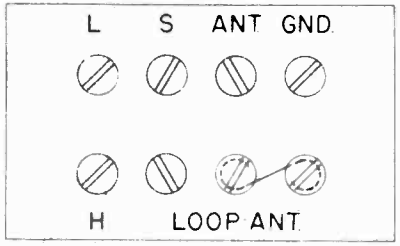


FIGURE 1

On some models of the CR-197 chassis, the two i-f trimmers are located in the top of the respective i-f transformers, while in others one trimmer is accessible from the top and the other from the bottom of each transformer as shown in the layout diagram, Figure 7.

Broadcast Band Alignment

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The link on the antenna terminal board must be set in the ANT position as shown in Figure 1.

2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, loosen the set screws in the hub of pulley "D" shown on Figure 3 and make the necessary adjustment.

3. With the band selector still set for broadcast band reception, adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.

4. Set the signal generator and the radio receiver to 1400 kc., adjust the 1400 kc. oscillator trimmer, the 1400 kc. r-f trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.

5. If the loop antenna trimmer is out of adjustment it should be set after the radio chassis is in the cabinet. Set the link on the antenna terminal board to the LOOP position as shown in Figure 2. Adjust the signal generator to 1400 kilocycles and connect its output to a loop containing approximately five turns of wire eight inches in diameter placed eighteen inches from the receiver loop and in the same plane.

6. Set the receiver to 1400 kc. and adjust the trimmer on the receiver loop for maximum output.

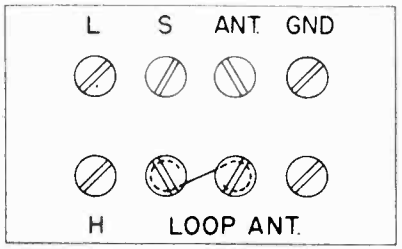


FIGURE 2

SHORT WAVE BAND ALIGNMENT

1. Set the band selector switch to SW as for short wave reception and substitute a 400 ohm resistor for the capacitor in series with the signal generator lead connected to the antenna terminal on the receiver.

2. Set the signal generator and the radio receiver to 15 mc.; then adjust the 15 mc. oscillator trimmer, the 15 mc. r-f trimmer and the 15 mc. antenna trimmer for maximum output. While adjusting the 15 mc. oscillator trimmer two peaks may be observed; only one is the correct peak for 15 mc. alignment. Screw in the trimmer to maximum capacity then decrease the capacity until the first peak is observed. This is the correct one.

10 KC FILTER ADJUSTMENT

This chassis incorporates a 10 kc. filter circuit to eliminate the beat note heard as a whistle between stations on the broadcast band. If the trimmer is out of adjustment, the following procedure should be observed.

1. Set the Selectivity Switch to FULL RANGE by turning the Treble Control knob clockwise as far as possible.
2. Connect the output of an audio oscillator to the phonograph pickup socket on the radio chassis and adjust the oscillator to EXACTLY 10,000 cycles.
3. Set the band selector to PHONO and adjust the 10 kc. trimmer for minimum output.
4. If an audio oscillator is not available for making this adjustment, set the band selector to BDCST, connect an antenna to the receiver and set the gang condenser to a point between two stations on adjacent channels having approximately the same power. If the 10 kc. trimmer is out of adjustment, a whistle will be heard. Adjust the trimmer until the whistle is eliminated.

SETTING THE PUSH BUTTONS

1. Loosen each of the push button knobs several turns.
2. Select a station that is to be automatically tuned by one of the push buttons, using the Dial Tuning knob. Be sure to set the Selectivity Switch to Sharp Tune and observe that the shaded portion of the green circle in the tuning indicator is as narrow as possible.
3. Press inward on the Dial Tuning knob (without turning it to the left or right) to hold the station in tune and press one of the push button knobs in as far as it will go while holding it in this position, tighten the push button knob by turning it clockwise as far as possible.
4. Insert the correct tab with the call letters of the selected station in the space provided and proceed with setting up the remaining push buttons in the same manner. Stations should be set up on the push buttons in the order of their frequency so that the lowest frequency station is tuned by the button at the extreme left of the assembly; the highest frequency station should be selected by the button at the right end.

SPECIAL SERVICE INFORMATION

The following information is provided for the service man who has a vacuum tube voltmeter or a similar measuring instrument available.

STAGE GAINS*

Antenna Post to Converter Grid at:

600 kc.	4.1
6 mc.	1.85

R-F to Converter Grid at:

600 kc.	14.3
6 mc.	2.8

R-F on Converter to I-F Grid at:

600 kc.	46
6 mc.	42

I-F on Converter Grid to I-F Grid at:

455 kc.	60

I-F Grid to Detector Plate at:

	BDCST	SW
455 kc.	30	70

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across Oscillator Grid Resistor (48) at:

600 kc.	6.6
6 mc.	5.3

AUDIO GAIN

Voltage required across Volume Control to produce .05 watt speaker output** at 400 cycles is .0075 volt with Band Selector Switch in BDCST setting.

* Variations of ± 20% are permissible. All readings made with softest input signal to provide .05 watt speaker output.
** .05 watt speaker output at 400 cycles is equivalent to a reading of 0.4 volts as measured by a high resistance AC voltmeter across the voice coil of either speaker.

DIAL CORD REPLACEMENT

Rotate the brass pulley designated "A" in Figure 3 until the dial pointer strikes the stop at the high frequency end of the dial calibration. In this condition the slot in pulley "A" should be approximately ten degrees to the left of being vertical—see Figure 3. If the slot in the pulley is in some other position under the above mentioned conditions, the pointer set screw is probably loose and has allowed the pointer to slip.

To correct this condition, first remove the glass dial and loosen the pointer screw. Then while holding pulley "A" so that its slot is approximately ten degrees to the left of vertical (when viewed from the rear) adjust the pointer until it is resting against the stop at the high frequency end of its travel. Then tighten the pointer set screw securely and replace the glass dial.

Completely unmesh the condenser gang and check the location of the hole or slot in pulley "D". If this hole is not approximately 45 degrees back from vertical as shown on Figure 3, loosen the two No. 6 Allen set screws in the hub of pulley "D" and slip the pulley on its shaft (while holding the condenser gang unmeshed) until the specified adjustment is obtained; then tighten one of the set screws securely. It will be shown later that this is a temporary setting. Next, tie a double knot in the exact center of a 25-inch length of dial cable and fold the cable back on itself so that the knot is at one end. The correct method for tying this knot is shown as an inset on Figure 3. Grasp the cable near the knotted end and slide it into the pulley slot so that the knot is against the inside rim of the pulley as shown in the sketch. The piece of cable nearest the dial frame should be wound in the direction shown for one-half turn; then over the lower pulley "B" around the bottom of the large pulley "D" and into the hole. Pull the cable taut and wrap the end around the small hook on pulley "D" temporarily.

The remaining piece of cable should be wound around pulley "A" in the direction shown, for one complete turn, over the upper pulley "C" and over the top of pulley "D". Thread the end through the small hole in pulley "D" and pull both ends of the cable taut. With one end of tension spring "E" fastened to the hook on pulley "D" lace the two free ends of the cable through the opposite end of the spring and tie a knot at a point that will allow ¼" to 5/16" of cable between the spring and the inside rim of pulley "D". Be sure to tie the knot around one coil of the spring in the manner shown.

Now with the condenser gang completely meshed, check the position of the dial pointer. If it is not in line with the last calibration mark at the low frequency end of the dial, loosen the set screw in pulley "D" and turn it until the pointer is in the specified position. Be sure that the condenser gang does not move during this adjustment. Then tighten the two screws in pulley "D" securely completing the operation.

CONDENSER GANG DRIVE ADJUSTMENTS

Whenever any of the mechanical parts in the condenser gang drive assembly require replacement due to rough handling or for any other reason, it is extremely important that clearances and adjustments shown on Figures 4 and 5 are correct; otherwise, the tuning mechanism will be sluggish or it may slip during operation.

In reassembling the mechanism after any part was replaced, follow the procedure outlined below:

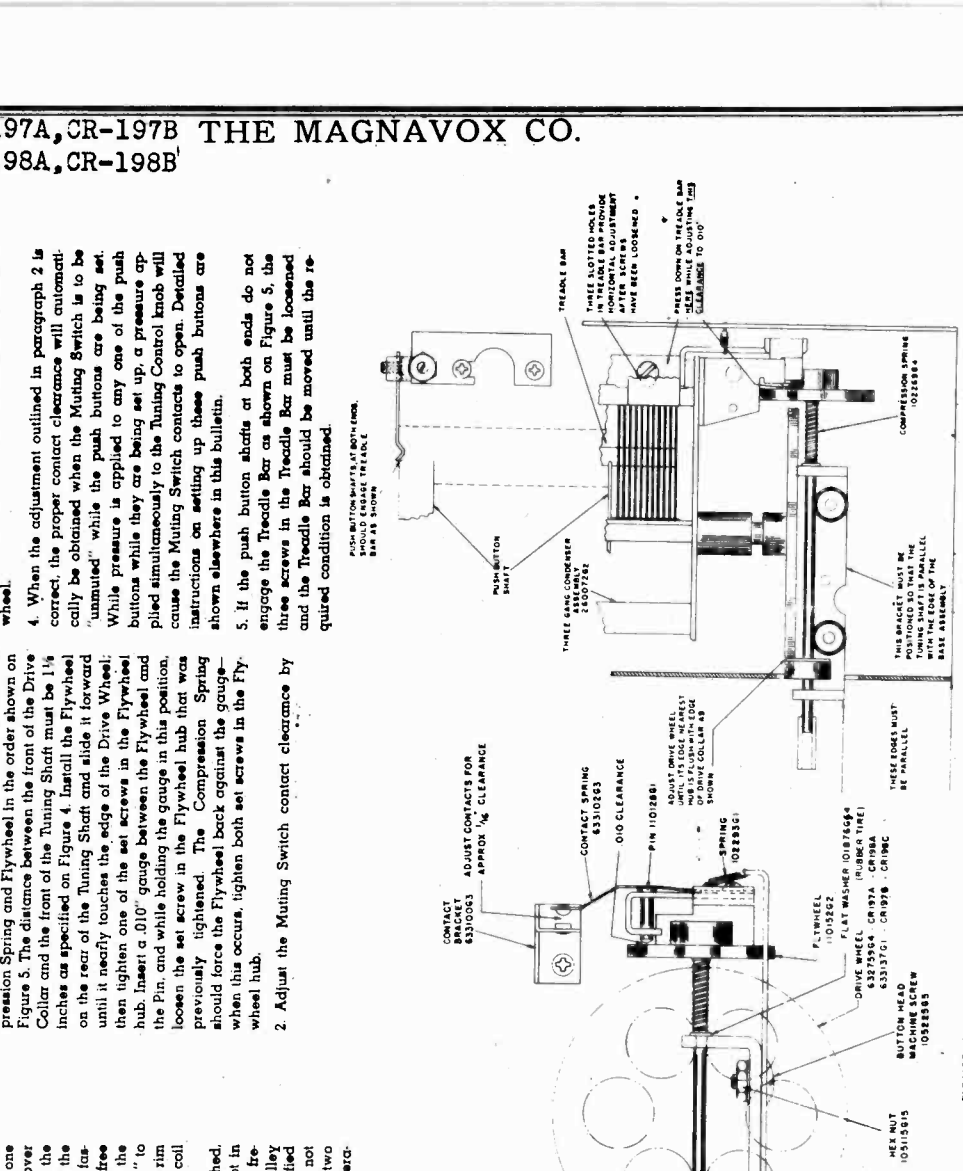
1. Assemble the Tuning Shaft, Drive Collar, Compression Spring and Flywheel in the order shown on Figure 5. The distance between the front of the Drive Collar and the front of the Tuning Shaft must be 1⅛ inches as specified on Figure 4. Install the Flywheel on the rear of the Tuning Shaft and slide it forward until it nearly touches the edge of the Drive Wheel; then tighten one of the set screws in the Flywheel hub. Insert a .010" gauge between the Flywheel and the Pin, and while holding the gauge in this position, loosen the set screw in the Flywheel hub that was previously tightened. The Compression Spring should force the Flywheel back against the gauge—when this occurs, tighten both set screws in the Flywheel hub.

2. Adjust the Muting Switch contact clearance by loosening the two screws in the Contact Bracket and sliding the bracket in the required direction until a 1/16" clearance is obtained. If this adjustment cannot be obtained in the manner prescribed, bend the Contact Bracket until proper clearance is realized.

3. The Drive Wheel is properly located on its shaft when its edge nearest the hub is in line with the outside edge of the Drive Collar as shown on Figure 5. Two Allen set screws in the Drive Wheel hub provide a means of adjusting the position of this wheel.

4. When the adjustment outlined in paragraph 2 is correct, the proper contact clearance will automatically be obtained when the Muting Switch is to be "unmuted" while the push buttons are being set. While pressure is applied to any one of the push buttons while they are being set up, a pressure applied simultaneously to the Tuning Control knob will cause the Muting Switch contacts to open. Detailed instructions on setting up these push buttons are shown elsewhere in this bulletin.

5. If the push button shafts at both ends do not engage the Treadle Bar as shown on Figure 5, the three screws in the Treadle Bar must be loosened and the Treadle Bar should be moved until the required condition is obtained.



THE MAGNAVOX CO. MODELS CR-197,CR-197A,CR-197B
MODELS CR-198.CR-198A,CR-198B

PARTS LIST

MODELS CR-197,CR-197A,CR-197B

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil Assembly, Antenna, two band	360273G1
2	Coil Assembly, r-f, two band	360274G1
3	Coil Assembly, Oscillator, two band	360275G1
4	Coil Assembly, 10KC filter	360278G1
5	Transformer, First i-f	360024G1
6	Transformer, Second i-f	360025G1
7	Capacitor, Variable, three-gang, tuning	260071G1
	Push button assembly for 260071G1 capacitor	260063G1
8	Capacitor, Variable, two-gang trimmer	260021G1
9	Capacitor, Variable, two-gang trimmer	260021G1
10	Capacitor, Variable, two-gang trimmer	260021G1
11	Capacitor, Variable, Oscillator padder	260067G3
12	Capacitor, Variable, 10 KC trimmer	250008G1
13	Capacitor, Ceramic, 20 mmf	250088G32
14	Capacitor, Ceramic, 50 mmf	250088G24
15	Capacitor, molded mica, 100 mmf ± 20%	250159G98
16	Capacitor, molded mica, 100 mmf ± 10%	250159G82
17	Capacitor, molded mica, 220 mmf ± 20%	250159G100
18	Capacitor, molded mica, 220 mmf ± 20%	250159G100
19	Capacitor, molded mica, 330 mmf ± 10%	250159G88
20	Capacitor, molded mica, 330 mmf ± 10%	250159G88
21	Capacitor, silvered mica, 490 mmf ± 1%	250085G32
22	Capacitor, molded mica, 1000 mmf ± 20%	250160G82
23	Capacitor, molded mica, 1800 mmf ± 10%	250160G67
24	Capacitor, molded mica, 4700 mmf ± 2%	250160G5
25	Capacitor, molded mica, 4700 mmf ± 2%	250160G5
26	Capacitor, paper .005 mfd, 400V	250152G30
27	Capacitor, paper .01 mfd, 200V	250152G18
28	Capacitor, paper .01 mfd, 200V	250152G18
29	Capacitor, paper .01 mfd, 600V	250152G38
30	Capacitor, paper .01 mfd, 600V	250152G38
31	Capacitor, paper .015 mfd, 200V	250152G70
32	Capacitor, paper, .02 mfd, 400V	250152G26
33	Capacitor, molded paper, .02 mfd, 600V	250129G3
34	Capacitor, molded paper, .02 mfd, 600V	250129G3
35	Capacitor, molded paper, .02 mfd., 600V	250129G3
36	Capacitor, paper, .03 mfd, 400V	250152G25
37	Capacitor, paper, .05 mfd, 200V	250152G15
38	Capacitor, paper, .05 mfd, 200V	250152G15
39	Capacitor, paper, .05 mfd, 200V	250152G15
40	Capacitor, paper, .05 mfd, 200V	250152G15
41	Capacitor, paper, .05 mfd, 200V	250152G15
42	Capacitor, paper, .1 mfd, 200V	250152G13
43	Capacitor, paper, .1 mfd, 400V	250152G22
44	Capacitor, paper, .1 mfd, 400V	250152G22
45	Capacitor, electrolytic, 10 mfd, 450V, 20 mfd, 25V	270023G6
46	Capacitor, electrolytic, 10 mfd, 450V, 20 mfd, 25V	270023G6
47	Capacitor, electrolytic, 10-30 mfd, 450V	270023G2
48	Capacitor, electrolytic, 20 mfd, 25V	270027G2
55	Resistor, composition, 100 ohms, ½ W	230084G7
56	Resistor, composition, 150 ohms, ½ W	230084G8
57	Resistor, composition, 220 ohm, 2W ± 10%	230064G54
58	Resistor, composition, 470 ohms, ½ W	230084G11
59	Resistor, composition, 470 ohms, ½ W	230084G11
60	Resistor, composition, 1500 ohms, ½ W	230084G14
61	Resistor, composition, 2200 ohms, ½ W	230084G15
62	Resistor, composition, 4700 ohms, ½ W	230084G17
63	Resistor, composition, 4700 ohms, ½ W	230084G17
64	Resistor, composition, 10,000 ohms, ½ W	230084G19
65	Resistor, composition, 10,000 ohms, ½ W	230084G31
66	Resistor, Wire wound, 10,000 ohms, 3 W ± 10%	240035G2
67	Resistor, composition, 15,000 ohms, ± 5%, ½ W	230084G187
68	Resistor, composition, 15,000 ohms, 2 W	230086G20
69	Resistor, composition, 15,000 ohms, 1 W	230085G20
70	Resistor, composition, 22,000 ohms, ½ W	230084G21
71	Resistor, composition, 22,000 ohms, ½ W	230084G21
72	Resistor, composition, 22,000 ohms, ½ W	230084G21
73	Resistor, composition, 47,000 ohms, ½ W	230084G23
74	Resistor, composition, 47,000 ohms, ½ W	230084G23
75	Resistor, composition, 82,000 ohms, ± 10%, ½ W	230084G85
76	Resistor, composition, 100,000 ohms, ½ W	230084G25
77	Resistor, composition, 100,000 ohms, ½ W	230084G25
78	Resistor, composition, 150,000 ohms, ½ W	230084G26
79	Resistor, composition, 150,000 ohms, ½ W	230084G26
80	Resistor, composition, 220,000 ohms ± 5%, ½ W	230084G215
81	Resistor, composition, 270,000 ohms, ± 10%, ½ W	230084G91
82	Resistor, composition, 560,000 ohms, ± 10%, ½ W	230084G95
83	Resistor, composition, 1 megohm, ½ W	230084G31
84	Resistor, composition, 1 megohm, ½ W	230084G31
85	Resistor, composition, 1 mehohm, ½ W	230084G31
86	Resistor, composition, 1 megohm, ½ W	230084G31
87	Resistor, composition, 1 megohm ± 10%, ½ W	230084G98
95	Control, Volume, 1 megohm	220044G23
96	Control, Bass, 150,000 ohm with Power Switch	220045G61
97	Control, Treble, 1 megohm with Band Expander Switch	220071G2
98	Transformer, Power, 117 V., 50/60 cycle	300034G1
99	Switch, Rotary, Band Selector	160126G1
100	Antenna Loop Assembly	*
101	Socket, FM Input	180060G1
102	Socket, Phonograph Input	189741G1
103	Socket, Phonograph Motor	180501G5
104	Socket, Speaker	180504G16
105	Socket, FM Power	180428G1
	Dial Glass Assembly	150291G1

PARTS LIST

MODELS CR-198,CR-198A,CR-198B

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil Assembly, Antenna, two band	360273G1
2	Coil Assembly, r-f, two band	360274G1
3	Coil Assembly, Oscillator, two band	360275G1
4	Coil Assembly, 10KC filter	360278G1
5	Transformer, First i-f	360024G1
6	Transformer, Second i-f	360025G1
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	Push Button assembly for 260071G1	260063G1
8	Capacitor, Variable, two gang trimmer	260021G1
9	Capacitor, Variable, two gang trimmer	260021G1
10	Capacitor, Variable, two gang trimmer	260021G1
11	Capacitor, Variable, Oscillator padder	260067G3
12	Capacitor, Variable, 10KC trimmer	250008G1
13	Capacitor, Ceramic, 20 mmf	250088G32
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18	Capacitor, molded mica, 220 mmf ±20%	250159G100
19	Capacitor, molded mica, 330 mmf ±10%	250159G88
20	Capacitor, silvered mica, 490 mmf ±1%	250085G32
21	Capacitor, molded mica, 680 mmf ±10%	250159G131
22	Capacitor, molded mica, 1000 mmf ±20%	250160G82
23	Capacitor, molded mica, 1800 mmf ±10%	250160G67
24	Capacitor, molded mica, 4700 mmf ±2%	250161G5
25	Capacitor, molded mica, 4700 mmf ±2%	250161G5
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27	Capacitor, paper .01 mfd, 200 V	250152G18
28	Capacitor, paper .01 mfd, 200V	250152G18
29	Capacitor, paper .01 mfd, 600V	250152G38
30	Capacitor, paper .01 mfd, 600V	250152G38
31	Capacitor, paper .015 mfd, 200V, ±10%	250152G70
32	Capacitor, molded paper, .02 mfd, 600V	250129G3
33	Capacitor, molded paper, .02 mfd, 600V	250129G3
34	Capacitor, molded paper, .02 mfd, 600V	250129G3
35	Capacitor, paper, .03 mfd, 400V	250152G25
36	Capacitor, paper, .05 mfd, 200V	250152G15
37	Capacitor, paper, .05 mfd, 200V	250152G15
38	Capacitor, paper, .05 mfd, 200V	250152G15
39	Capacitor, paper, .05 mfd, 200V	250152G15
40	Capacitor, paper, .05 mfd, 200V	250152G15
41	Capacitor, paper, .1 mfd, 200V	250152G13
42	Capacitor, paper, .1 mfd, 400V	250152G22
43	Capacitor, paper, .1 mfd, 400V	250152G22
44	Capacitor, electrolytic, 10 mfd, 450V, 20 mfd, 25V	270023G6
45	Capacitor, electrolytic, 10 mfd, 450V, 20 mfd, 25V	270023G6
46	Capacitor, electrolytic, 10-30 mfd, 450V	270023G2
47	Capacitor, electrolytic, 20 mfd, 25V	270027G2
55	Resistor, composition, 100 ohms, ½ W	230084G7
56	Resistor, Wire wound, 125 ohms, 5 W	240021G11
57	Resistor, composition, 150 ohms, ½ W	230084G8
58	Resistor, composition, 470 ohms, ½ W	230084G11
59	Resistor, composition, 470 ohms, ½ W	230084G11
60	Resistor, composition, 1000 ohms, 2 W ±10%	230064G62
61	Resistor, composition, 1500 ohms, ½ W	230084G14
62	Resistor, composition, 2200 ohms, ½ W	230084G15
63	Resistor, composition, 4700 ohms, ½ W	230084G17
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66	Resistor, Wire wound, 10,000 ohms, ±10%, 3 W	240035G2
67	Resistor, composition, 15,000 ohms, ±5%, ½ W	230084G187
68	Resistor, composition, 15,000 ohms, 2 W	230086G20
69	Resistor, composition, 15,000 ohms, 1 W	230085G20
70	Resistor, composition, 22,000 ohms, ½ W	230084G21
71	Resistor, composition, 22,000 ohms, ½ W	230084G21
72	Resistor, composition, 22,000 ohms, ½ W	230084G21
73	Resistor, composition, 47,000 ohms, ½ W	230084G23
74	Resistor, composition, 47,000 ohms, ½ W	230084G23
75	Resistor, composition, 82,000 ohms, ±10%, ½ W	230084G85
76	Resistor, composition, 100,000 ohms, ½ W	230084G25
77	Resistor, composition, 100,000 ohms, ½ W	230084G25
78	Resistor, composition, 150,000 ohms, ½ W	230084G26
79	Resistor, composition, 150,000 ohms, ½ W	230084G26
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81	Resistor, composition, 270,000 ohms, ±10%, ½ W	230084G91
82	Resistor, composition, 560,000 ohms, ±10%, ½ W	230084G95
83	Resistor, composition, 680,000 ohms, ½ W	230084G30
84	Resistor, composition, 1 megohm, ±10%, ½ W	230084G98
85	Resistor, composition, 1 megohm, ½ W	230084G31
86	Resistor, composition, 1 megohm, ½ W	230084G31
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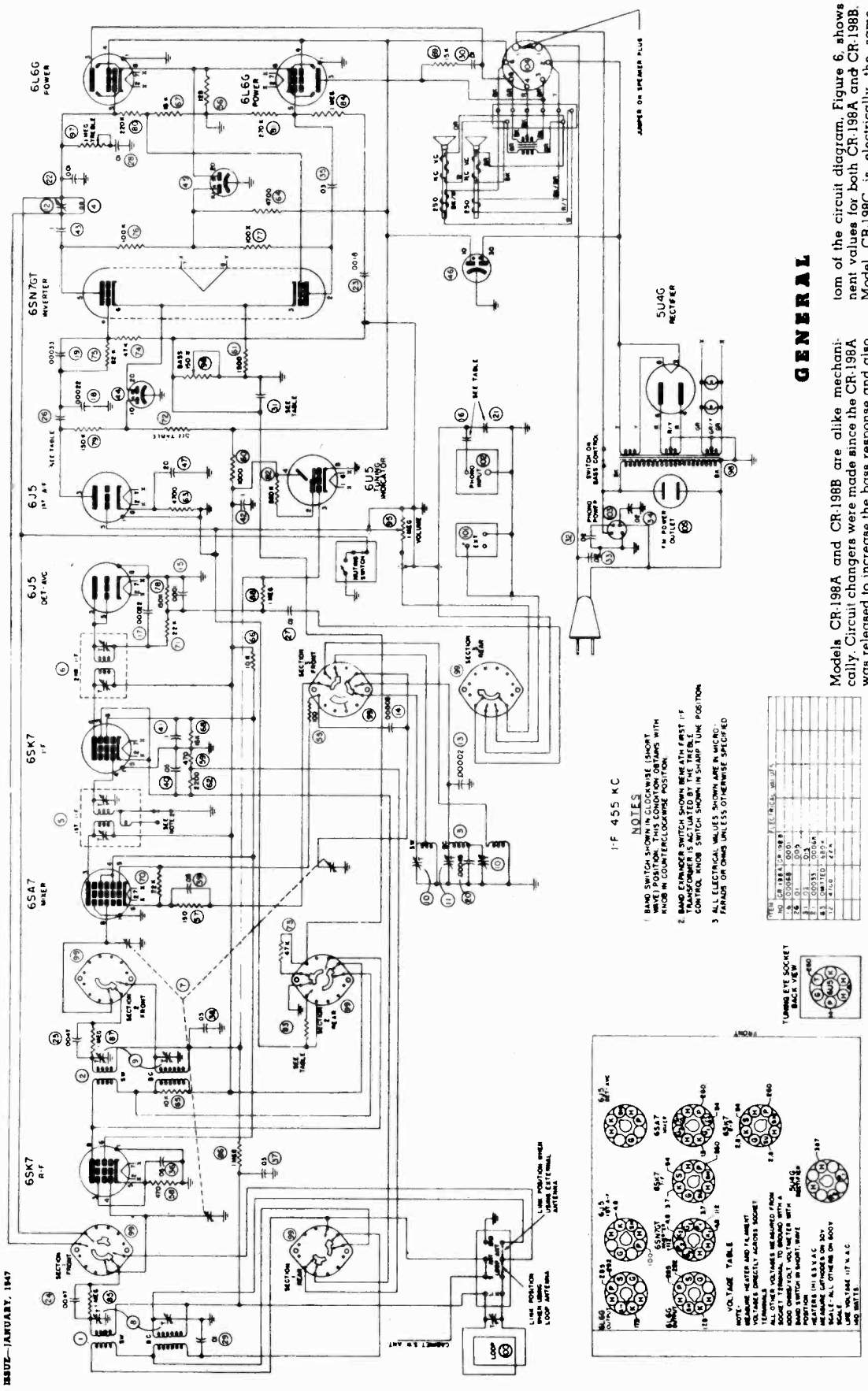
95	Control, Volume, 1 megohm	220044G23
96	Control, Bass, 150,000 ohm with Power Switch	220045G6
97	Control, Treble, 1 megohm with Band Expander Switch	220071G2
98	Transformer, Power, 117 V., 50/60 cycle	300035G1
99	Switch, Rotary, Band Selector	160172G1
100	Antenna Loop Assembly	*
101	Socket, FM Input	180060G1
102	Socket, Phonograph Input	189741G1
103	Socket, Phonograph Motor	180501G5
104	Socket, Speaker	180504G16
105	Socket, FM Power	180428G1
	Dial Glass Assembly	150291G1

*The part number of the loop antenna assembly changes with different cabinets. It is therefore important that you specify the *Style Number* of the instrument when ordering a replacement loop antenna assembly.

MODELS CR-198, CR-198A, CR-198B

THE MAGNAVOX CO.



GENERAL

Models CR-198A and CR-198B are alike mechanically. Circuit changers were made since the CR-198A was released to increase the bass response and also to increase the effective range of the bass control. Model CR-198B identifies the receiver in which these changes were incorporated and the table at the bottom of the circuit diagram. Figure 6, shows component values for both CR-198A and CR-198B. Model CR-198C is electrically the same as CR-198B, however, a change is incorporated in the dial drive mechanism. The differences are indicated on Figure 4.

FIGURE 6

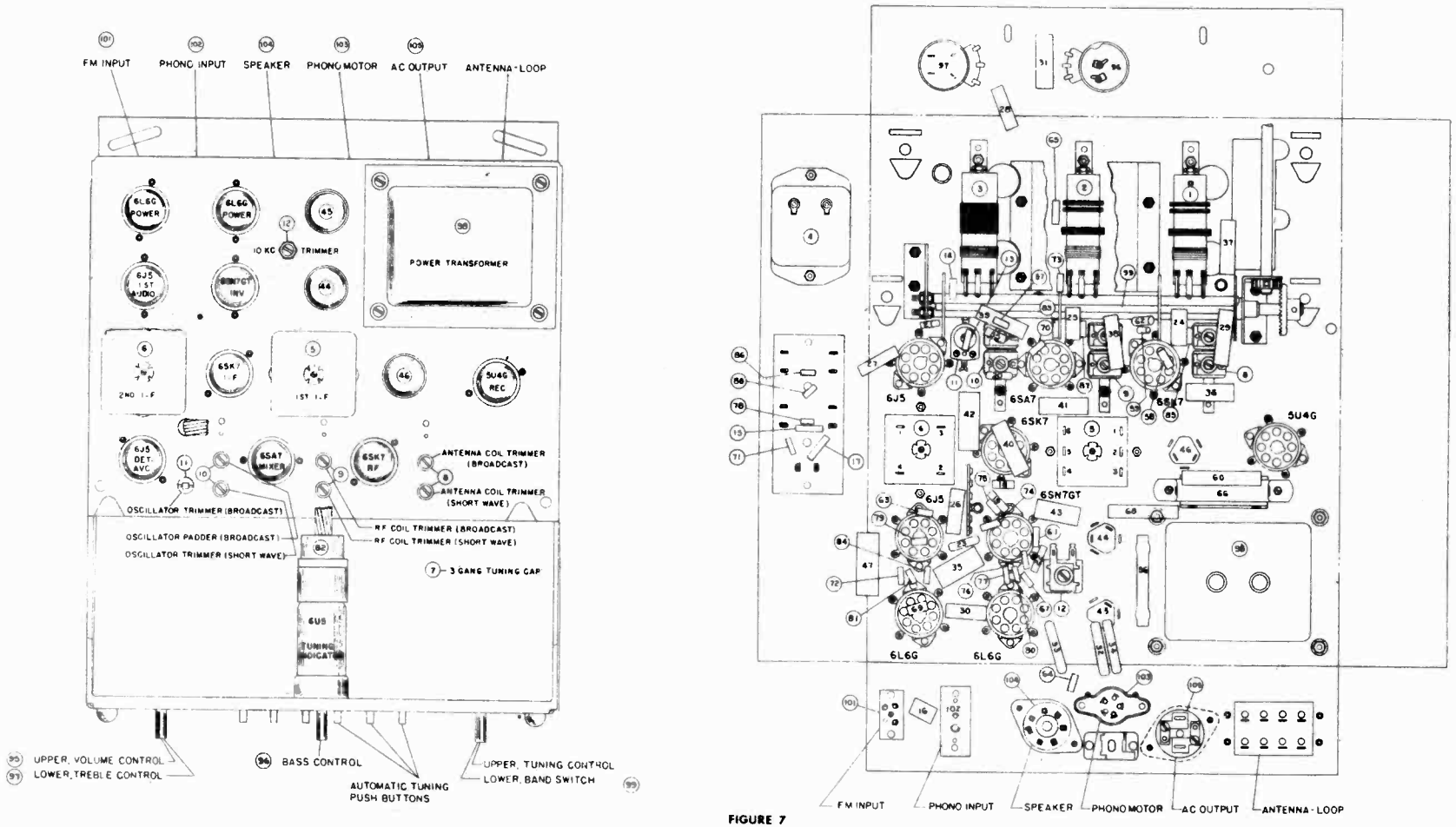


FIGURE 7

SPECIFICATIONS

Power supply	117 volts 50 60 cycles AC
Power consumption	140 watts
Power output	20 watts
Intermediate frequency	455 kc.
Tuning frequency range:	
Broadcast band	525–1630 kc.
Short Wave band	4.95–18.4 mc.
Tubes:	
R-F Amplifier	6SK7
Converter	6SA7
I-F Amplifier	6SK7
Detector and AVC	6J5
First Audio	6J5
Inverter	6SN7GT
Power output (push-pull stage)	(2) 6L6G
Rectifier	5U4G
Tuning Indicator	6U5
Dial lamps	Mazda No. 44

Speakers:	No. 582815	No. 582847
Field coil resistance	250 ohms	250 ohms
Voice coil impedance (400 cycles)	5.7 ohms	5.4 ohms
Output transformer	None	5,000/3 ohms

MODEL CR-199 THE MAGNAVOX CO.

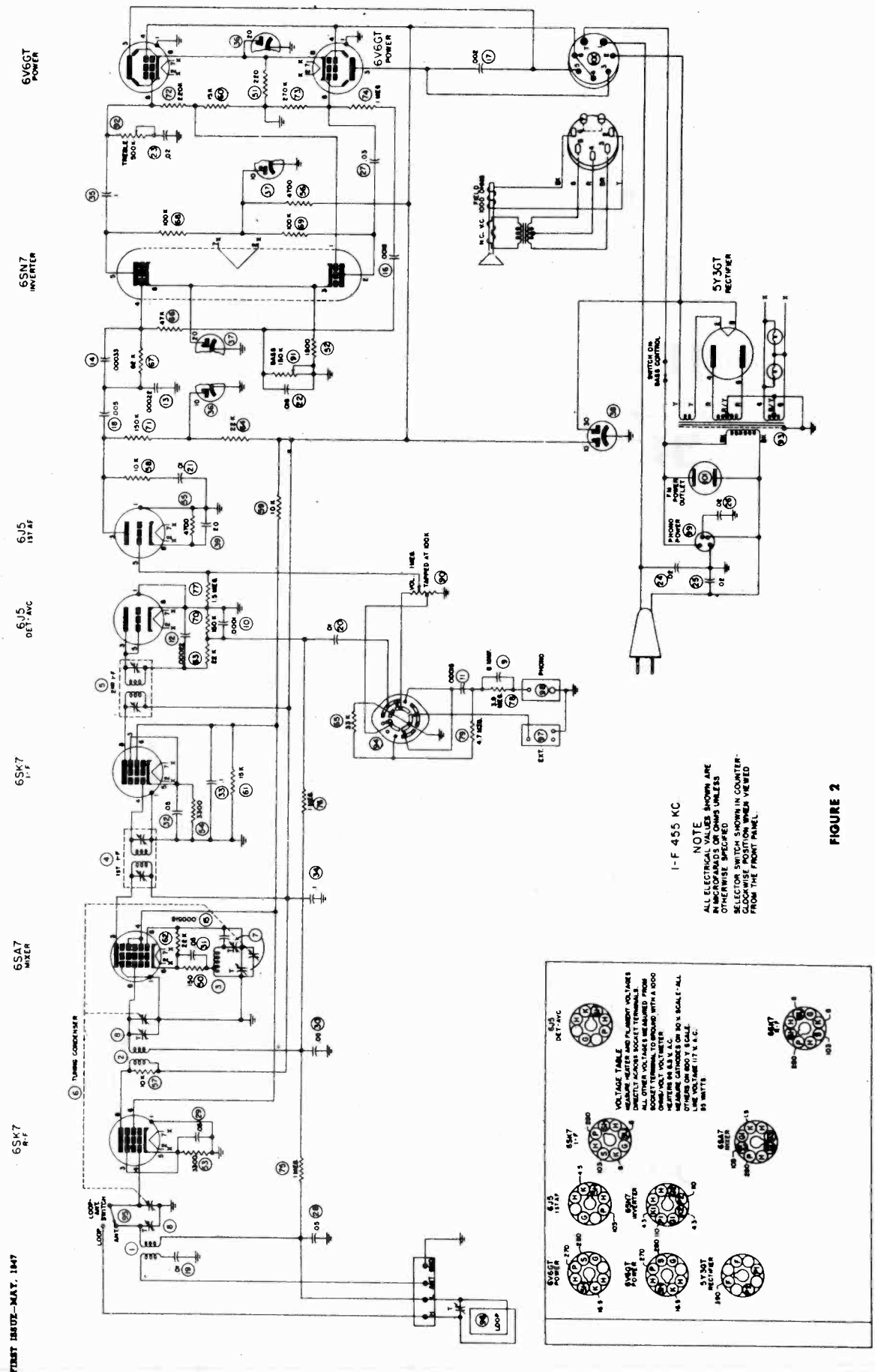


FIGURE 2

METHOD FOR REMOVING CHASSIS FROM CABINET

Model CR-199 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service.

To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back. Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio panel in place when the chassis is replaced. In replacing the chassis, slide it so that the small hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hook should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated L-H. The two terminals on the loop are designated L and H; the leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.

ALIGNMENT PROCEDURE

The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram. Figure 3. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings.

I-F ALIGNMENT

1. Connect the output of the signal generator to the control grid (pin No. 8) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.

2, Turn the condenser gang until it is completely meshed, (low-frequency end of dial calibration) and set the input selector switch to RAD.

3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

BROADCAST BAND ALIGNMENT

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The Ant-Loop switch on top of the chassis must be in the ANT setting.

2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, slide the pointer on its string to the correct position. Be sure to crimp the lugs (on the rear of the pointer) tightly around the string to hold the pointer in adjustment.

3. Adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.

4. Set the signal generator and the radio receiver to 1400 kc., adjust the 1400 kc. oscillator trimmer, the 1400 kc. r-f trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.

5. If the loop antenna trimmer is out of adjustment it should be set after the radio chassis is in the cabinet. Set the ANT-LOOP switch on the top of the chassis to the LOOP setting. Adjust the signal generator to 1400 kilocycles and connect its output to a loop containing approximately five turns of wire eight inches in diameter placed eighteen inches from the receiver loop and in the same plane.

6. Set the receiver to 1400 kc. and adjust the trimmer on the receiver loop for maximum output.

SPECIAL SERVICE INFORMATION

The following information is provided for the service man who has a vacuum tube voltmeter or a similar measuring instrument available.

STAGE GAINS*

Antenna Post to R-F Grid at:	
600 kc.	4.88
R-F Grid to Converter Grid at:	
600 kc.	4.7
R-F on Converter to I-F Grid at:	
600 kc.	42.6
I-F on Converter Grid to I-F Grid at:	
455 kc. (gang closed)	50.7
I-F Grid to Detector Plate at:	
455 kc.	72

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across the Oscillator Grid Resistor at:

600 kc. ..... 12 V.

or 0.55 ma. through 22,000 ohm Oscillator Grid Resistor (62).

AUDIO GAIN

Voltage required across the Volume Control to produce .05 watt speaker output** at 400 cycles is .011 volt with Input Selector Switch in RAD setting.

* Variations of ± 20% are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.

** .05 watt speaker output at 400 cycles is equivalent to a reading of 0.4 volts as measured by a high resistance AC voltmeter across the voice coil of speaker.

DIAL CORD REPLACEMENT

Two separate drive cables are used in the CR-199 dial assembly. One cable is used to transmit the motion from the tuning knob to the large pulley that is coupled to the condenser gang; the other cable actuates the dial pointer whenever the large pulley on the condenser gang is rotated. Separate instructions for replacing either of these cables is given in the following paragraphs.

CONDENSER DRIVE CABLE REPLACEMENT

Remove dial assembly after taking out two screws on each side of chassis. Slide a short length (approximately ½ inch) of sleeving over one end of a length of dial cable, form a small loop and tie a knot in the manner shown on Figure 1. Tie spring to opposite end of cable making length including spring 20¾ inches. Hook loop over the metal hook in pulley "C" and lace the cable through the pulley slot and around the pulley in a counterclockwise direction when viewed from the rear of the chassis keeping the cable to the rear of the pulley groove. Lace the cable around the smaller diameter portion of the tuning control shaft wrapping 2½ turns *from front to back;* then around the opposite side of pulley "C" into the pulley through the slot. Hook the end of tension spring "D" in the hole provided in pulley "C"; completing this operation.

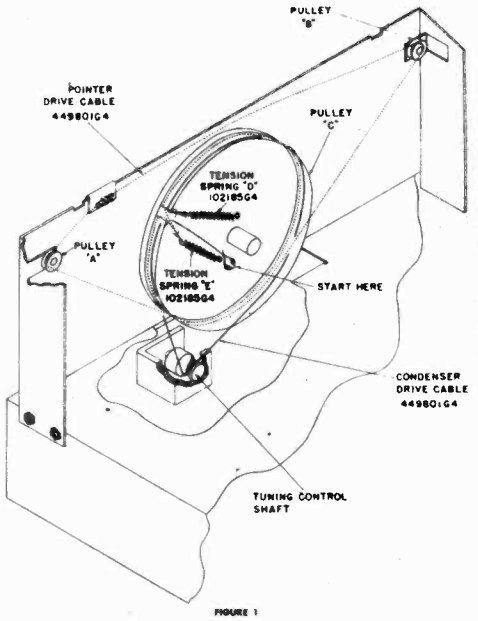


FIGURE 1

DIAL POINTER DRIVE CABLE REPLACEMENT

Remove dial assembly after taking out two screws on each side of chassis. Slip a one-half inch length of sleeving into a 42-inch length of dial cable. Tie the two ends to the loop end of the cable spring "E" securely so that the cable doubled measures 20¾ inches end to end including spring.

Place spring hook in bottom hole and draw cable through slot of pulley "C". Loop one end of cable around pulley "C" in a clockwise direction in front of condenser drive cable (viewing chassis from front) then loop the remaining end around pulley in a counterclockwise direction. Secure both ends of cable to chassis at edge of pulley slot with scotch tape, keeping piece of sleeving on remaining loop of cable.

Replace dial assembly and loop cable over pulley "A". While holding cable taut remove scotch tape and loop cable over pulley "B".

Turn the tuning control shaft until the condenser gang is completely meshed and slide the dial pointer on its track until it is in line with the last calibration mark at the low frequency end of the dial. The short piece of sleeving installed prior to the stringing operation should be slid to the rear of the dial pointer and the crimping lug on the pointer pressed over the sleeving. After checking to make certain that the condenser gang is completely meshed and the dial pointer is in the position specified previously, apply a few drops of cement to each end of the sleeving to which the dial pointer is fastened. This completes the operation.

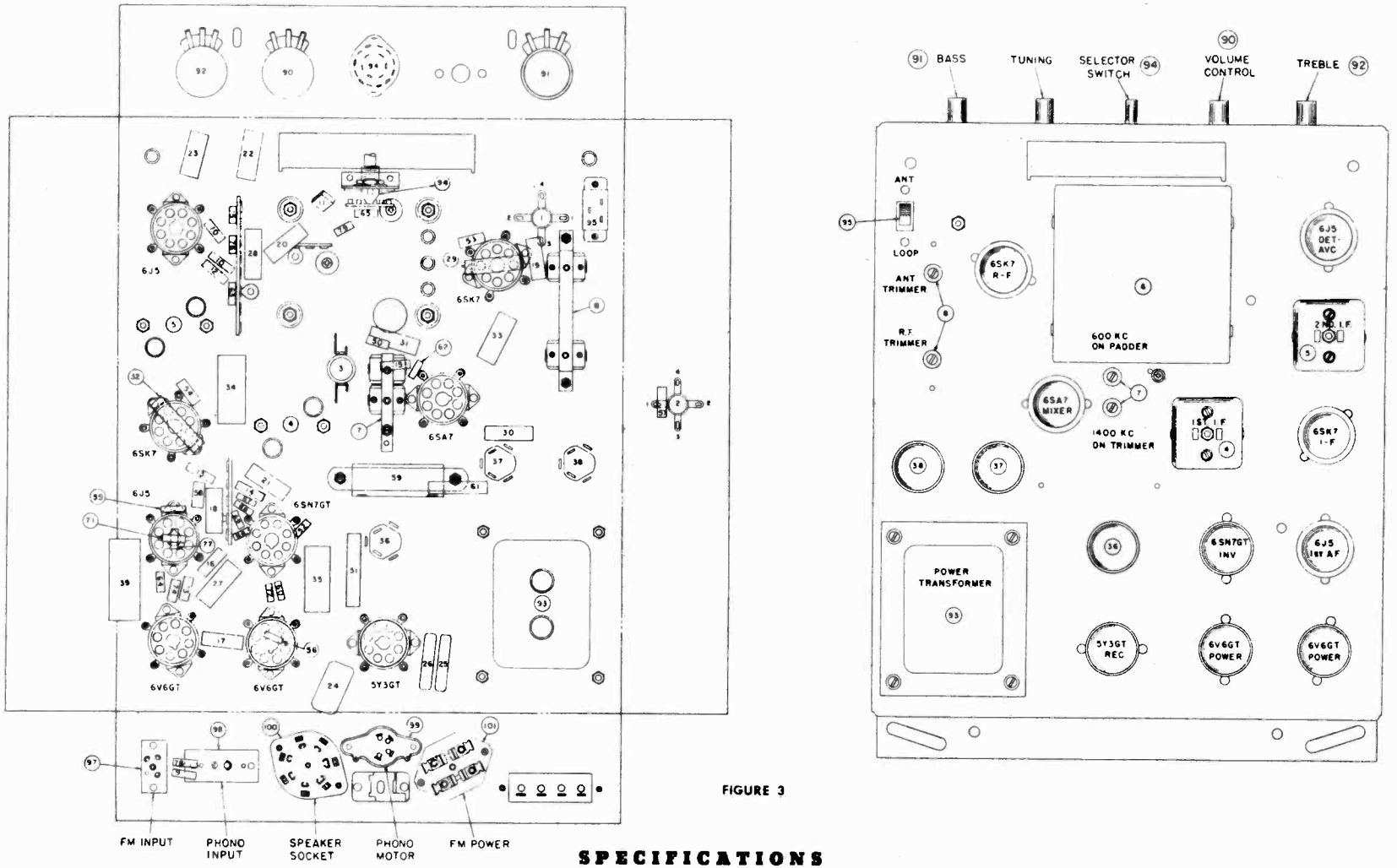


FIGURE 3

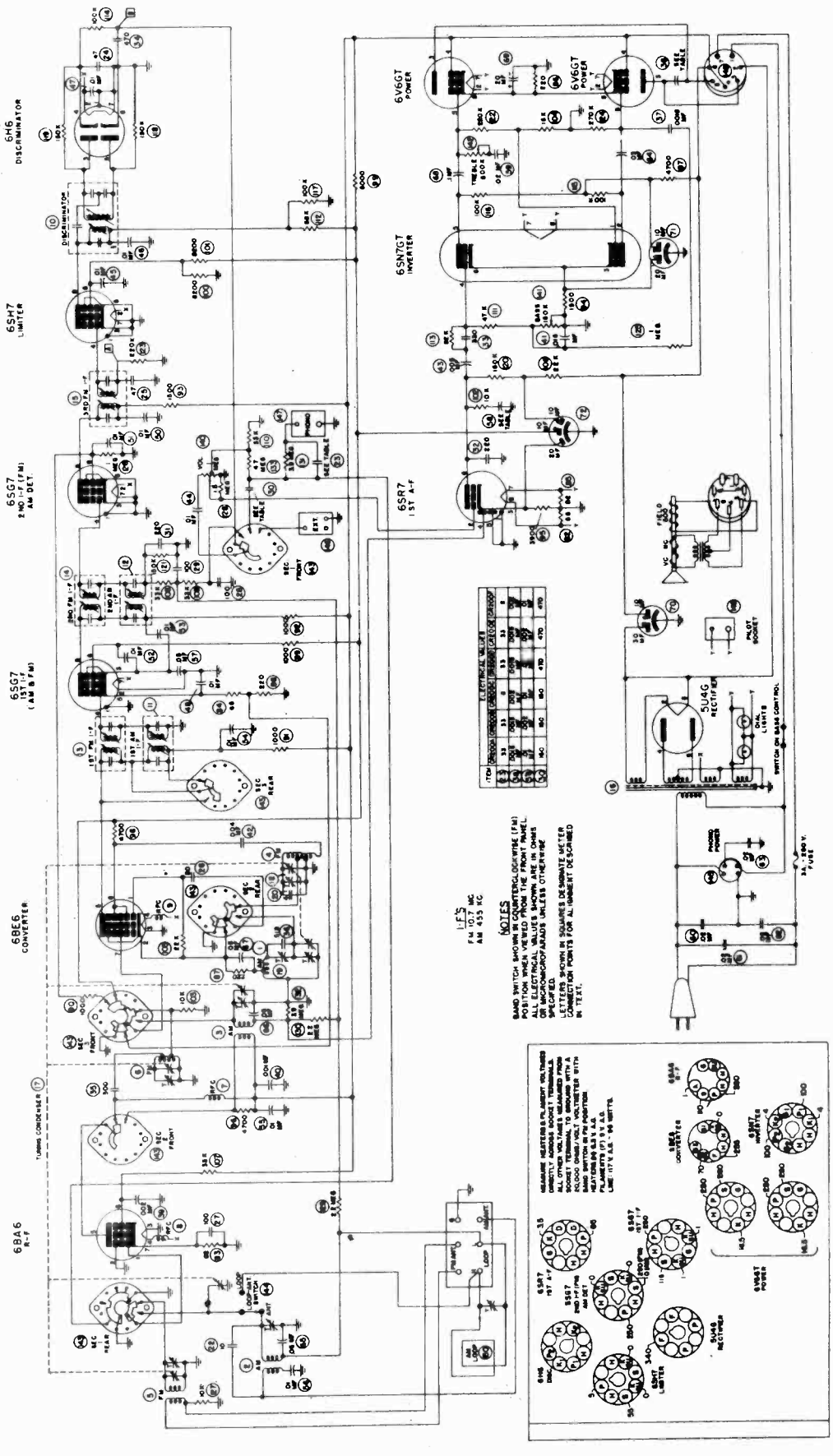
SPECIFICATIONS

Power supply	117 volts 50/60 cycles AC
Power consumption	85 watts
Power output	10 watts
Intermediate frequency	455 kc.
Tuning frequency range	534–1620 kc.
Tubes:	
R-F Amplifier	6SK7
Converter	6SA7
I-F Amplifier	6SK7
Detector and AVC	6J5
First Audio	6J5
Inverter	6SN7GT
Power output (push-pull stage)	(2) 6V6GT
Rectifier	5Y3GT
Dial lamps	Mazda No. 44
Speakers:	
Field coil resistance	1090 ohms
Voice coil impedance (400 cycles)	3.0 ohms
Output transformer	3,000/3 ohms

PARTS LIST

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, antenna	360279G1
2	Coil assembly, r-f	360280G1
3	Coil assembly, oscillator	360281G1
4	Transformer, first i-f	363700G1
5	Transformer, second i-f	363700G1
6	Capacitor, variable, three-gang tuning	260074G1
7	Capacitor, variable, two-gang trimmer	260021G1
8	Capacitor, variable, two-gang trimmer	260078G1
9	Capacitor, 8 mmf.	250164G1
10	Capacitor, molded mica, 100 mmf. ±20%	250159G98
11	Capacitor, molded mica, 150 mmf. ±10%	250159G84
12	Capacitor, molded mica, 220 mmf. ±20%	250159G100
13	Capacitor, molded mica, 220 mmf. ±20%	250159G100
14	Capacitor, molded mica, 330 mmf. ±10%	250159G88
15	Capacitor, silvered mica, 518 mmf. ±1%	250085G35
16	Capacitor, molded mica, 1800 mmf. ±10%	250160G67
17	Capacitor, paper, .002 mfd. 600 V.	250152G44
18	Capacitor, paper, .005 mfd. 600 V.	250152G41
19	Capacitor, paper, .01 mfd. 200 V.	250152G18
20	Capacitor, paper, .01 mfd. 200 V.	250152G18
21	Capacitor, paper, .01 mfd. 400 V.	250152G27
22	Capacitor, paper, .015 mfd. ±10%, 200 V.	250152G70
23	Capacitor, paper, .02 mfd. 200 V.	250152G17
24	Capacitor, molded paper, .02 mfd. 600 V.	250129G3
25	Capacitor, molded paper, .02 mfd. 600 V.	250129G3
26	Capacitor, molded paper, .02 mfd. 600 V.	250129G3
27	Capacitor, paper, .03 mfd. 400 V.	250125G25
28	Capacitor, paper, .05 mfd. 200 V.	250152G15
29	Capacitor, paper, .05 mfd. 200 V.	250152G15
30	Capacitor, paper, .05 mfd. 200 V.	250152G15
31	Capacitor, paper, .05 mfd. 200 V.	250152G15
32	Capacitor, paper, .05 mfd. 200 V.	250152G15
33	Capacitor, paper, .1 mfd. 200 V.	250152G13
34	Capacitor, paper, .1 mfd. 400 V.	250152G22
35	Capacitor, paper, .1 mfd. 400 V.	250152G22
36	Capacitor, electrolytic, 10 mfd. 450 V., 20 mfd. 25 V.	270023G6
37	Capacitor, electrolytic, 10 mfd. 450 V., 20 mfd. 25 V.	270023G6
38	Capacitor, electrolytic, 10-30 mfd. 475 V.	270023G2
39	Capacitor, electrolytic, 20 mfd. 25 V.	270027G2
50	Resistor, Composition, 150 ohm, ½ W.	230084G8
51	Resistor, wire wound, 220 ohm, ±10%, 2 W.	230064G54
52	Resistor, composition, 1500 ohm, ½ W.	230084G14
53	Resistor, composition, 3300 ohm, ½ W.	230084G16
54	Resistor, composition, 3300 ohm, ½ W.	230084G16
55	Resistor, composition, 4700 ohm, ½ W.	230084G17
56	Resistor, composition, 4700 ohm, ½ W.	230084G17
57	Resistor, composition, 10,000 ohm, ½ W.	230084G19
58	Resistor, composition, 10,000 ohm, 1 W.	230085G19
59	Resistor, wire wound, 10,000 ohm ±10%, 3 W.	240035G2
60	Resistor, composition, 15,000 ohm ±5%, ½ W.	230084G187
61	Resistor, composition, 15,000 ohm, 2 W.	230086G20
62	Resistor, composition, 22,000 ohm, ½ W.	230084G21
63	Resistor, composition, 22,000 ohm, ½ W.	230084G21
64	Resistor, composition, 22,000 ohm, ½ W.	230084G21
65	Resistor, composition, 33,000 ohm, ½ W.	230084G22
66	Resistor, composition, 47,000 ohm, ½ W.	230084G23
67	Resistor, composition, 82,000 ohm, ±½ W.	230084G85
68	Resistor, composition, 100,000 ohm, ½ W.	230084G25
69	Resistor, composition, 100,000 ohm, ½ W.	230084G25
70	Resistor, composition, 150,000 ohm, ½ W.	230084G26
71	Resistor, composition, 150,000 ohm, ½ W.	230084G26
72	Resistor, composition, 220,000 ohm, ±5%, ½ W.	230084G215
73	Resistor, composition, 270,000 ohm, ±10%, ½ W.	230084G91
74	Resistor, composition, 1 megohm, ±10%, ½ W.	230084G98
75	Resistor, composition, 1 megohm, ½ W.	230084G31
76	Resistor, composition, 1 megohm, ½ W.	230084G31
77	Resistor, composition, 1.5 megohm, ½ W.	230084G32
78	Resistor, composition, 3.9 megohm, ±10%, ½ W.	230084G105
79	Resistor, composition, 4.7 megohm, ±10%, ½ W.	230084G106
90	Control, volume, 1 megohm with 100,000 ohm tap	220074G1
91	Control, bass, 150,000 ohm with power switch	220045G6
92	Control, treble, 500,000 ohm	220044G22
93	Transformer, power, 117 V. 50-60 cycle	300036G1
94	Switch, rotary, band selector	160175G1
95	Switch, slide, SPDT antenna loop	160176G1
96	Antenna loop assembly	*
97	Socket, fm input	180060G1
98	Socket, phonograph input	189741G1
99	Socket, phonograph motor	180501G5
100	Socket, speaker	180504G16
101	Socket, fm power	180428G1
	Dial glass assembly	150293G1
97	Socket, FM input	180060G1
101	Socket, FM power	180428G1
	Dial Glass Assembly	150293G1

All resistor tolerances not given are ±20%



Models CR-200A, CR-200B and CR-200C are alike except for circuit variations to provide correct response in each of three different cabinets. In later production of the CR-200 series chassis, CR-200A, B and C were replaced by CR-200D, E and F respectively that incorporate a circuit change to provide increased bass response at low volume settings in phonograph position. These circuit variations are all shown in the table on the schematic diagram, Figure 2.

CR-200A/D chassis is incorporated in the Model 240 Traditional, CR-200B/E in the Model 235 Chairside and CR-200C/F in the Model 239 Mayfair.

ALIGNMENT PROCEDURE

Alignment of this receiver requires the use of an accurately calibrated RF signal generator, range 455 kc. to 107 mc., an output meter, and a vacuum tube voltmeter of greater than 10 megohm input impedance. All trimmer condensers can be identified by stampings on the chassis and gang condenser cover and are shown on the chassis layout diagram.

AM ALIGNMENT

I-F ALIGNMENT

1. Set volume, treble, and bass controls to maximum. Set Band Switch to Broadcast position, and dial pointer to 1000 kc.

2. Tune the signal generator to EXACTLY 455 kc.

3. Connect output of modulated signal generator to the signal grid of the 6BE6 (pin 7) through a .01 mfd. capacitor and signal generator ground to radio chassis.

4. AM and FM i-f transformers on this model are separate and can be identified on the chassis layout diagram Figure 3.

5. Connect output meter across voice coil of speaker and adjust the i-f transformers for peak output as indicated on the output meter.

ALTERNATE VISUAL ALIGNMENT OF I-F STAGES

1. Connect 455 kc. sweep generator having approximately 40 kc. sweep to signal grid of 6BE6 (pin 7) through a .01 mfd. capacitor. Connect an oscilloscope through a 1 megohm isolating resistor across the 150,000 ohm diode load resistor. Align for best possible peak and symmetry.

R-F ALIGNMENT

1. Connect signal generator through .00025 mfd. capacitor to antenna and ground terminals on antenna terminal strip on rear of chassis. Be sure "Ant-loop" switch on top of the chassis is in the ANT. position. Connect output meter as for AM i-f alignment.

2. Tune signal generator to 1400 kc.

3. Set dial to 1400 kc. and adjust oscillator, r-f and antenna trimmers to maximum output on meter.

4. Set signal generator to 600 kc. and tune radio to signal. Adjust the 600 kc. padder to maximum output while simultaneously rocking the dial.

5. 1400 kc. calibration should then be checked and re-adjusted if necessary with the 1400 kc. oscillator trimmer.

The pointer on the radio dial should line up with the first vertical mark on the low frequency end of the dial glass. If the pointer does not line up, loosen the pointer on the dial string and move it to correct position. Re-tighten and re-cement the pointer to the string. Be sure the gang is fully meshed for this pointer alignment. Align AM first.

FM ALIGNMENT

DISCRIMINATOR ALIGNMENT

1. Tune signal generator to EXACTLY 10.775 mc. and connect to pin 4 of the 6SH7 Limiter tube socket through a .01 mfd. capacitor.

2. Connect a DC vacuum tube voltmeter between point "B" on schematic diagram and ground (across .00047 mfd. capacitor—Pin 6 on 6H6 to ground).

3. Peak both discriminator slugs at 10.775 mc.

4. Retune signal generator to exactly 10.7 mc. and adjust bottom slug for zero volts.

5. The DC voltage at 10.625 mc. should be within 10% of the voltage at 10.775 mc. and of opposite polarity.

Note: If the signal generator is not capable of sufficient output to produce a readable DC voltage, the amplification of the last i-f stage can be used to increase the signal input to the limiter for discriminator alignment. To accomplish this, align the last i-f stage as indicated in "IF Alignment". Then align discriminator as above leaving the signal generator connected to the grid of the 6SG7 2nd i-f tube.

I-F ALIGNMENT

1. Connect high side of signal generator, through a .01 mfd. capacitor and a 1000 ohm resistor in series, to pin 4 of the 6SG7 2nd i-f tube. Connect low side of generator to chassis.

2. Close gang condenser and connect vacuum tube voltmeter across 220,000 ohm limiter grid resistor; (Point "A" on schematic to ground). Adjust signal generator output until a reading of at least 3 volts is obtained. In order to reduce regeneration caused by the vacuum tube voltmeter leads, a 1-megohm isolating resistor, connected with as short leads as possible to point "A" should be used in series with the vacuum tube voltmeter. Align the 3rd i-f transformer for best peak as indicated on voltmeter.

3. Repeat above for each succeeding transformer by connecting signal generator to signal grid of first i-f tube 6SG7 then to the signal grid of 6BE6 converter. The i-f stages should be aligned in this order.

WARNING—After each i-f stage has been aligned, do not repeak with the signal into the grid of the 6BE6.

ALTERNATE VISUAL ALIGNMENT OF I-F STAGES

1. Replace signal generator with sweep generator having approximately 300 kc. sweep and tune generator to 10.7 mc. Connect oscilloscope across 220,000 ohm limiter grid resistor through a 1-megohm isolating resistor. The order of alignment is the same as when using a vacuum tube voltmeter. Each i-f transformer should be individually aligned for best peak and symmetry.

R-F ALIGNMENT

1. Connect vacuum tube voltmeter across limiter grid resistor as in FM I-F alignment.

2. Ground one side of the FM Antenna by placing a wire jumper from one FM connection on the antenna terminal strip to the ground connection.

3. Connect unmodulated signal generator through a 300 ohm resistor to ungrounded antenna post and chassis, and tune signal generator to 107 mc.

4. Set radio dial to 107 mc. and tune oscillator trimmer to peak output on vacuum tube voltmeter. Adjust signal generator output until a reading of at least 3 volts is obtained.

5. Tune 107 mc. r-f and antenna trimmers for maximum indication on voltmeter—it may be necessary to rock the dial while adjusting the r-f trimmer.

SPECIAL SERVICE INFORMATION

The following information is provided for the service man who has a vacuum tube voltmeter or a similar measuring instrument available.

STAGE GAINS*

Antenna Post to R-F Grid at:
- 600 kc. 6.60
- 98 mc. 1.15

R-F Grid to Converter Grid at:
- 600 kc. 17.8
- 98 mc. 9.4

R-F on Converter Grid to 455 kc. on I-F Grid at:
- 600 kc. 6.9
- 98 mc. 3.2

I-F on Converter Grid to 1st I-F Grid at:
- 455 kc. (gang closed) 8.8

1st I-F Grid to 2nd I-F Grid** at:
- 455 kc. 95
- 10.7 mc. 33

2nd I-F Grid to Limiter Grid at:
- 10.7 mc. 33.4

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across the Oscillator Grid Resistor (105) at:

- 600 kc. ..... 6.6V.
- 98 mc. ..... 6.0V.

or 0.3 ma. through 22,000 ohm Oscillator Grid Resistor at 600 kc. and 0.27 ma. at 98 mc.

AUDIO GAIN

Voltage required across the Volume Control to produce 0.1 watt speaker output*** at 400 cycles is .016 volt with Input Selector Switch in BDCST. setting.

*Variations of ±20% are permissible. All readings made with sufficient input signal to provide 0.5 watt speaker output. 0.5 speaker output at 400 cycles is equivalent to a reading of 1.25V. as measured by a high resistance AC voltmeter across the voice coil of the speaker.

**Detector Plate on AM.

***0.1 watt speaker output at 400 cycles is equivalent to a reading of 0.55 volts as measured by a high resistance AC voltmeter across the voice coil of speaker.

SPECIFICATIONS

Power supply	117 volts 50/60 cycles AC
Power consumption	95 watts
Power output	10 watts
Intermediate frequency	455 kc./10.7 mc.
Tuning frequency range:	
Broadcast Band	540-1620 kc.
FM Band	88—108 mc.
Tubes:	
R-F Amplifier	6BA6
Converter	6BE6
1st I-F Amplifier (AM-FM)	6SG7
2nd I-F (FM), Detector and AVC (AM)	6SG7
Limiter	6SH7
Discriminator	6H6
First Audio	6SR7
Inverter	6SN7GT
Power output (push-pull stage)	(2) 6V6GT
Rectifier	5U4G
Dial Lamps	Mazda No. 44
Speaker:	
Field coil resistance	500 ohms
Voice coil impedance (400 cycles)	3.0 ohms
Output transformer	8,000/3 ohms

DIAL CORD REPLACEMENT

Two separate drive cables are used in the CR-200 dial assembly. One cable is used to transmit the motion from the tuning knob to the large pulley that is coupled to the condenser gang; the other cable actuates the dial pointer whenever the large pulley on the condenser gang is rotated. Separate instructions for replacing either of these cables is given in the following paragraphs.

CONDENSER DRIVE CABLE REPLACEMENT

Remove dial assembly after taking out four screws on each side of chassis. Slide a short length (approximately ½ inch) of sleeving over one end of a length of dial cable, form a small loop and tie a knot in the manner shown on Figure 1. Tie spring to opposite end of cable making length excluding spring 19½ inches. Hook loop over the metal hook in pulley "D" and lace the cable through the pulley slot and around the pulley in a counterclockwise direction when viewed from the rear of the dial assembly keeping the cable to the rear of the pulley groove. Lace the cable around the smaller diameter portion of the tuning control shaft wrapping 2½ turns *from front to back;* then around the opposite side of pulley "D" into the pulley through the slot. Hook the end of tension spring "F" in the hole provided in pulley "D", completing this operation.

DIAL POINTER DRIVE CABLE REPLACEMENT

Remove dial assembly after taking out four screws on each side of chassis. Slip a one-half inch length of sleeving over a 42-inch length of dial cable. Tie the two ends to the loop end of the cable spring "E" securely so that the cable doubled measures 19⅝ inches end to end excluding spring.

Place spring hook in top hole and draw cable through slot of pulley "D". Loop one end of cable around pulley "D" in a clockwise direction in front of condenser drive cable (viewing dial assembly from front) then loop the remaining end around pulley in a counterclockwise direction. Secure both ends of cable to chassis at edge of pulley slot with scotch tape, keeping piece of sleeving on remaining loop of cable.

Replace dial assembly and loop cable over pulley "A". While holding cable taut remove scotch tape and loop cable over pulleys "B" and "C" as shown in Figure 1.

Turn the tuning control shaft until the condenser gang is completely meshed and slide the dial pointer on its track until it is in line with the last calibration mark at the low frequency end of the dial. The short piece of sleeving installed prior to the stringing operation should be slid to the rear of the dial pointer and the crimping lug on the pointer pressed over the sleeving. After checking to make certain that the condenser gang is completely meshed and the dial pointer is in the position specified previously, apply a few drops of cement to each end of the sleeving to which the dial pointer is fastened. This completes the operation.

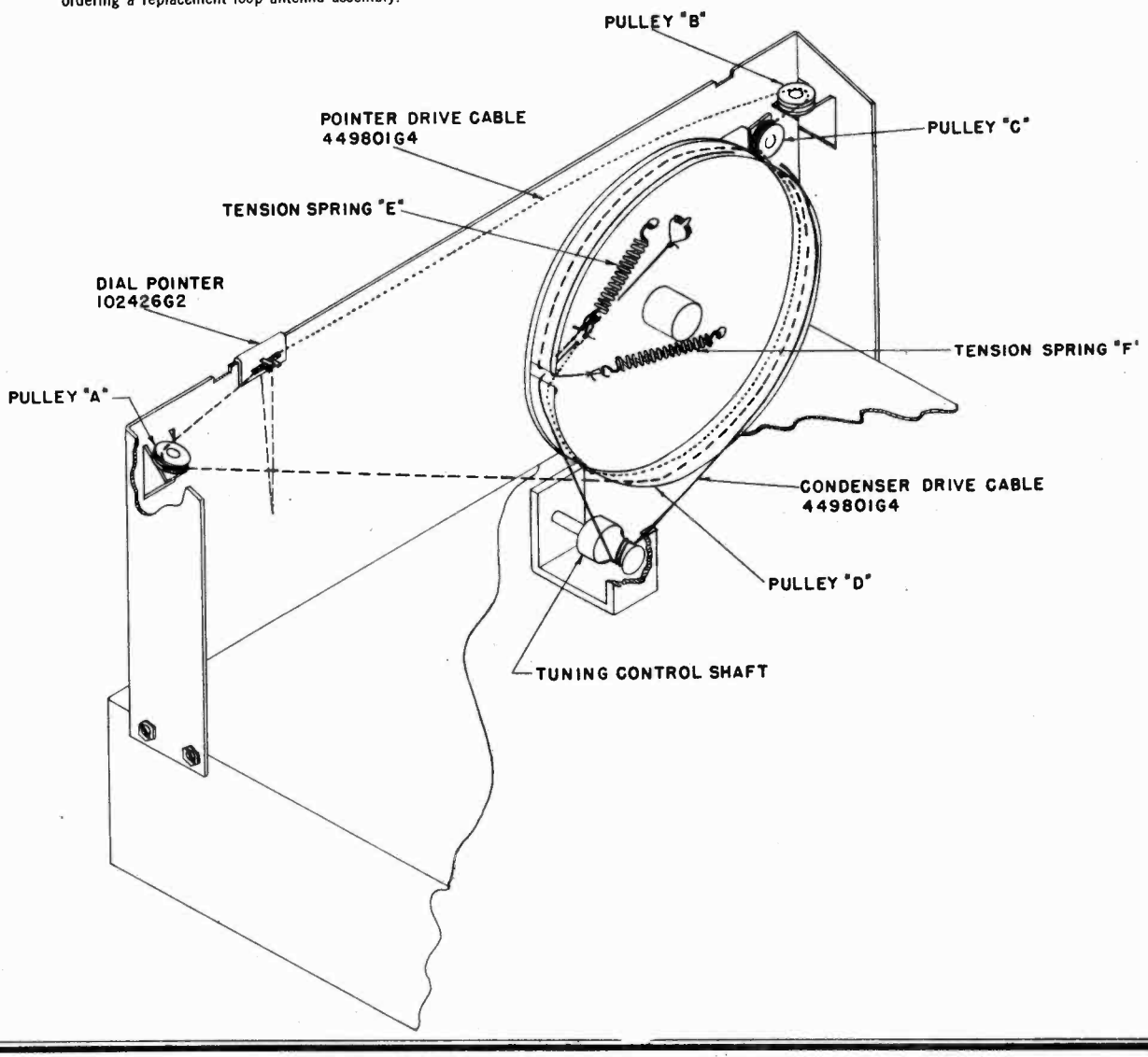
PARTS LIST

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, oscillator (AM)	360318G1
2	Coil assembly, antenna (AM)	360320G1
3	Coil assembly, r-f (AM)	360319G1
4	Coil assembly, oscillator (FM)	360323G1
5	Coil assembly, antenna (FM)	360321G2
6	Coil assembly, r-f (FM)	360322G2
7	Coil, choke	360284G1
8	Coil, choke	360264G1
9	Coil, choke	360264G1
10	Transformer, discriminator	360317G1
11	Transformer, first i-f	360315G1
12	Transformer, i-f (2nd AM)	360315G2
13	Transformer, i-f (FM)	360316G1
14	Transformer, i-f (FM)	360316G1
15	Transformer, i-f (FM)	360316G1
16	Transformer, power	300041G1
17	Capacitor, variable, three-gang tuning	260089G1
18	Capacitor, variable trimmer	260067G1
19	Capacitor, variable trimmer	250046G1
20	Capacitor, ceramic, 4 mmf	250088G28
22	Capacitor, composition, 10 mmf	250164G3
23	Capacitor, composition, 33 mmf—CR-200A, B, D & E	250164G4
	Capacitor, composition, 8 mmf—CR-200C & F	250164G1
24	Capacitor, mica, 47 mmf.	250159G96
25	Capacitor, mica, 47 mmf.	250159G96
26	Capacitor, ceramic, 50 mmf. ± 10%	250088G39

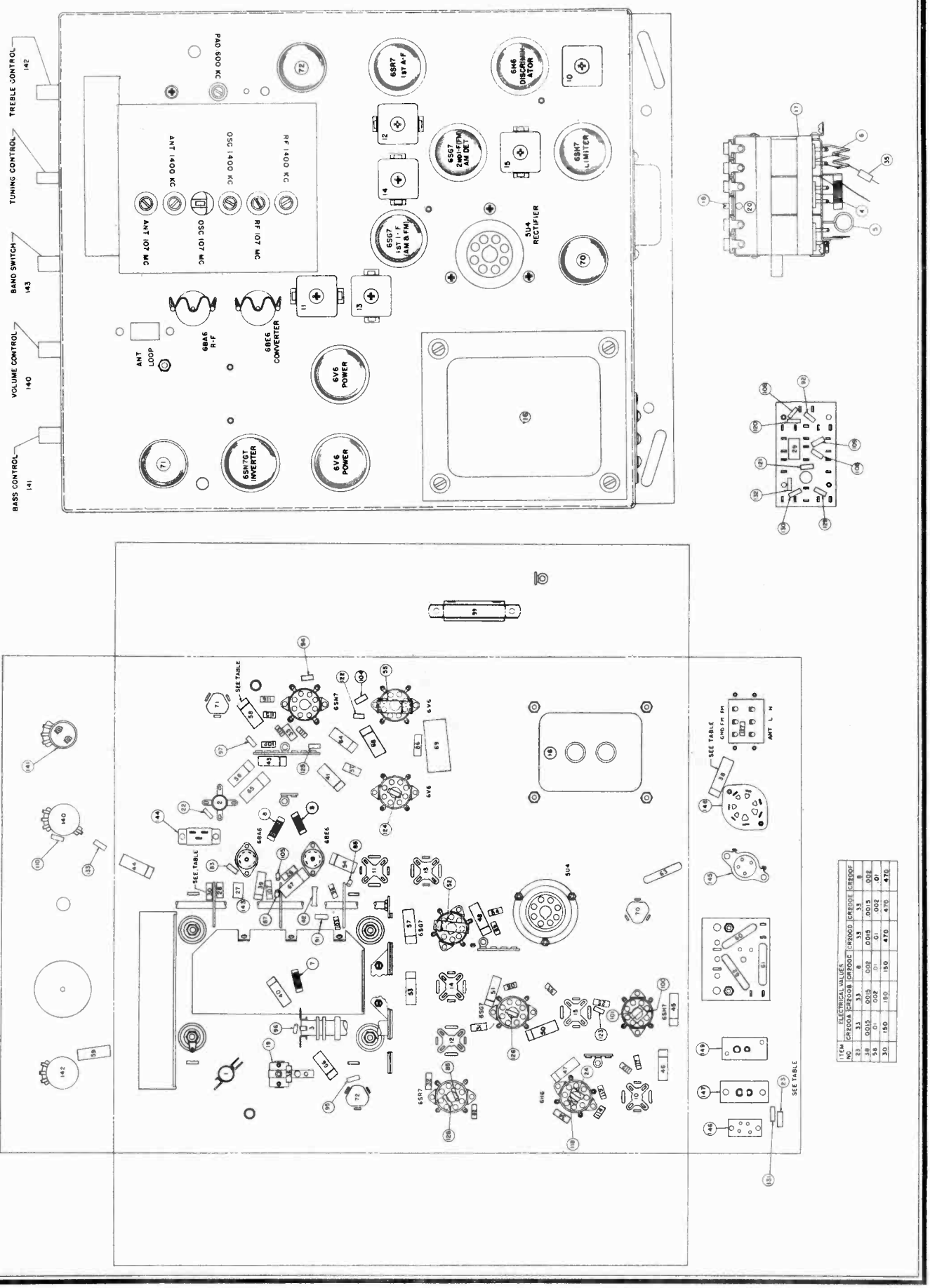
REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
27	Capacitor, mica, 100 mmf.	250159G98
28	Capacitor, mica, 100 mmf.	250159G98
29	Capacitor, mica, 100 mmf.	250159G98
30	Capacitor, mica, 150 mmf. ± 10% CR-200A, B & C	250159G84
	Capacitor, mica, 470 mmf. ± 10%—CR-200D, E & F	250159G90
31	Capacitor, mica, 220 mmf.	250159G100
32	Capacitor, mica, 220 mmf.	250159G100
33	Capacitor, mica, 330 mmf. ± 10%	250159G88
34	Capacitor, mica, 470 mmf.	250159G102
35	Capacitor, ceramic, 500 mmf.	250088G31
36	Capacitor, silver mica, 518 mmf. ±1%	250085G35
37	Capacitor, mica, 1800 mmf. ±5%	250160G44
38	Capacitor, paper, .0015 mfd. ±10%, 600 V—CR-200A, B, D & E	250169G1
	Capacitor, paper, .002 mfd. ±10%, 600 V—CR-200C & F	250169G2
39	Capacitor, paper, .002 mfd. 600 V.	250152G44
40	Capacitor, paper, .001 mfd. 600 V.	250152G45
41	Capacitor, paper, .015 mfd. ±10%, 200 V.	250169G5
42	Capacitor, ceramic, .004 mfd.	250088G34
43	Capacitor, paper, .005 mfd. 600 V.	250152G41
44	Capacitor, paper, .01 mfd. 200 V.	250152G18
45	Capacitor, paper, .01 mfd. 200 V.	250152G18
46	Capacitor, paper, .01 mfd. 200 V.	250152G18
47	Capacitor, paper, .01 mfd. 200 V.	250152G18
48	Capacitor, paper, .01 mfd. 200 V.	250152G18
50	Capacitor, paper, .01 mfd. 400 V.	250152G27
51	Capacitor, paper, .01 mfd. 400 V.	250152G27
52	Capacitor, paper, .01 mfd. 400 V.	250152G27
53	Capacitor, paper, .01 mfd. 400 V.	250152G27
54	Capacitor, paper, .01 mfd. 400 V.	250152G27
55	Capacitor, paper, .01 mfd. 400 V.	250152G27
56	Capacitor, paper, .01 mfd. 400 V.	250152G27
57	Capacitor, paper, .05 mfd. 200 V.	250152G15
58	Capacitor, paper, .01 mfd. 400 V.—CR-200A, C, D & F	250152G27
	Capacitor, paper, .002 mfd. ±10%, 600 V.—CR-200B & E	250169G2
59	Capacitor, paper, .02 mfd. 200 V.	250152G17
60	Capacitor, paper, .02 mfd. 600 V.	250129G3
61	Capacitor, paper, .02 mfd. 600 V.	250129G3
62	Capacitor, paper, .02 mfd. 600 V.	250129G3
63	Capacitor, paper, .02 mfd. 600 V.	250129G3
64	Capacitor, paper, .03 mfd. 400 V.	250152G25
65	Capacitor, paper, .05 mfd. 200 V.	250152G15
66	Capacitor, paper, .05 mfd. 200 V.	250152G15
67	Capacitor, paper, .05 mfd. 200 V.	250152G15
68	Capacitor, paper, .1 mfd. 400 V.	250152G22
69	Capacitor, electrolytic, 20 mfd. 25 V.	270027G2
70	Capacitor, electrolytic, 10 mfd. 475 V.—30 mfd. 475 V.	270023G2
71	Capacitor, electrolytic, 10 mfd. 450 V.—20 mfd. 20 V.	270023G6
72	Capacitor, electrolytic, 10 mfd. 450 V.—10 mfd. 450 V.— 20 mfd. 25 V.	270023G7
82	Resistor, composition, 33 ohms, ½ W.	230084G4
83	Resistor, composition, 68 ohms, ½ W.	230084G6
84	Resistor, composition, 68 ohms, ½ W.	230084G6
85	Resistor, composition, 82 ohms, ±10%, ½ W.	230084G49
86	Resistor, composition, 220 ohms, 2 W.	230086G9
87	Resistor, composition, 220 ohms, ½ W.	230084G9
88	Resistor, composition, 220 ohms, ½ W.	230084G9
89	Resistor, composition, 1000 ohms, ½ W.	230084G13
90	Resistor, composition, 1000 ohms, ½ W.	230084G13
91	Resistor, composition, 1000 ohms, ½ W.	230084G13
92	Resistor, composition, 1000 ohms, ½ W.	230084G13
93	Resistor, composition, 1500 ohms, ½ W.	230084G14
94	Resistor, composition, 1500 ohms, ½ W.	230084G14
95	Resistor, composition, 3900 ohms, ±10%, ½ W.	230084G69
96	Resistor, composition, 4700 ohms, ½ W.	230084G17
97	Resistor, composition, 4700 ohms, ½ W.	230084G17
98	Resistor, composition, 4700 ohms, ½ W.	230084G17
99	Resistor, wire wound, 6000 ohms, ±10%, 7.5 W.	240035G6
100	Resistor, composition, 8200 ohms, ±10%, 1 W.	230085G73
101	Resistor, composition, 8200 ohms, ±10%, 1 W.	230085G73
102	Resistor, composition, 10,000 ohms, 1 W.	230085G19
103	Resistor, composition, 10,000 ohms, ½ W.	230084G19
104	Resistor, composition, 15,000 ohms, ±5%, ½ W.	230084G187
105	Resistor, composition, 22,000 ohms, ½ W.	230084G21
106	Resistor, composition, 22,000 ohms, ½ W.	230084G21
107	Resistor, composition, 33,000 ohms, 1 W.	230085G22
108	Resistor, composition, 33,000 ohms, ½ W.	230084G22
109	Resistor, composition, 33,000 ohms, ½ W.	230084G22
110	Resistor, composition, 33,000 ohms, ½ W.	230084G22
111	Resistor, composition, 47,000 ohms, ½ W.	230084G23
112	Resistor, composition, 68,000 ohms, ±10%, ½ W.	230084G84
113	Resistor, composition, 82,000 ohms, ±10%, ½ W.	230084G85
114	Resistor, composition, 100,000 ohms, ±10%, ½ W.	230084G86
115	Resistor, composition, 100,000 ohms, ½ W.	230084G25
116	Resistor, composition, 100,000 ohms, ½ W.	230084G25
117	Resistor, composition, 100,000 ohms, ½ W.	230084G25
118	Resistor, composition, 150,000 ohms, ±10%, ½ W.	230084G88
119	Resistor, composition, 150,000 ohms, ±10%, ½ W.	230084G88
120	Resistor, composition, 150,000 ohms, ½ W.	230084G26
121	Resistor, composition, 150,000 ohms, ½ W.	230084G26

122	Resistor, composition, 220,000 ohms, ±5%, ½ W.	230084G215
123	Resistor, composition, 220,000 ohms, ½ W.	230084G27
124	Resistor, composition, 270,000 ohms, ±10%, ½ W.	230084G91
125	Resistor, composition, 1 megohm, ±5%, ½ W.	230084G231
126	Resistor, composition, 1 megohm, ½ W.	230084G31
127	Resistor, composition, 10,000 ohms, ½ W.	230084G19
128	Resistor, composition, 1.5 megohm, ½ W.	230084G32
129	Resistor, composition, 2.2 megohm, ½ W.	230084G33
130	Resistor, composition, 2.2 megohm, ½ W.	230084G33
131	Resistor, composition, 3.9 megohm, ±10%, ½ W.	230084G105
132	Resistor, composition, 3.9 megohm, ±10%, ½ W.	230084G105
133	Resistor, composition, 4.7 megohm, ±10%, ½ W.	230084G106
140	Potentiometer, volume control	220074G1
141	Potentiometer, bass control, with switch	220073G5
142	Potentiometer, treble control	220072G8
143	Switch, band selector	160182G1
144	Switch, loop-ant	160176G1
145	Socket, motor	180501G5
146	Socket, input, FM	180060G1
147	Socket, phonograph input	189741G1
148	Socket, speaker	180504G16
149	Socket, 6-volt	189788G2
150	Antenna loop assembly	*

*The part number of the loop antenna assembly changes with different cabinets. It is therefore important that you specify the Style Number of the instrument when ordering a replacement loop antenna assembly.



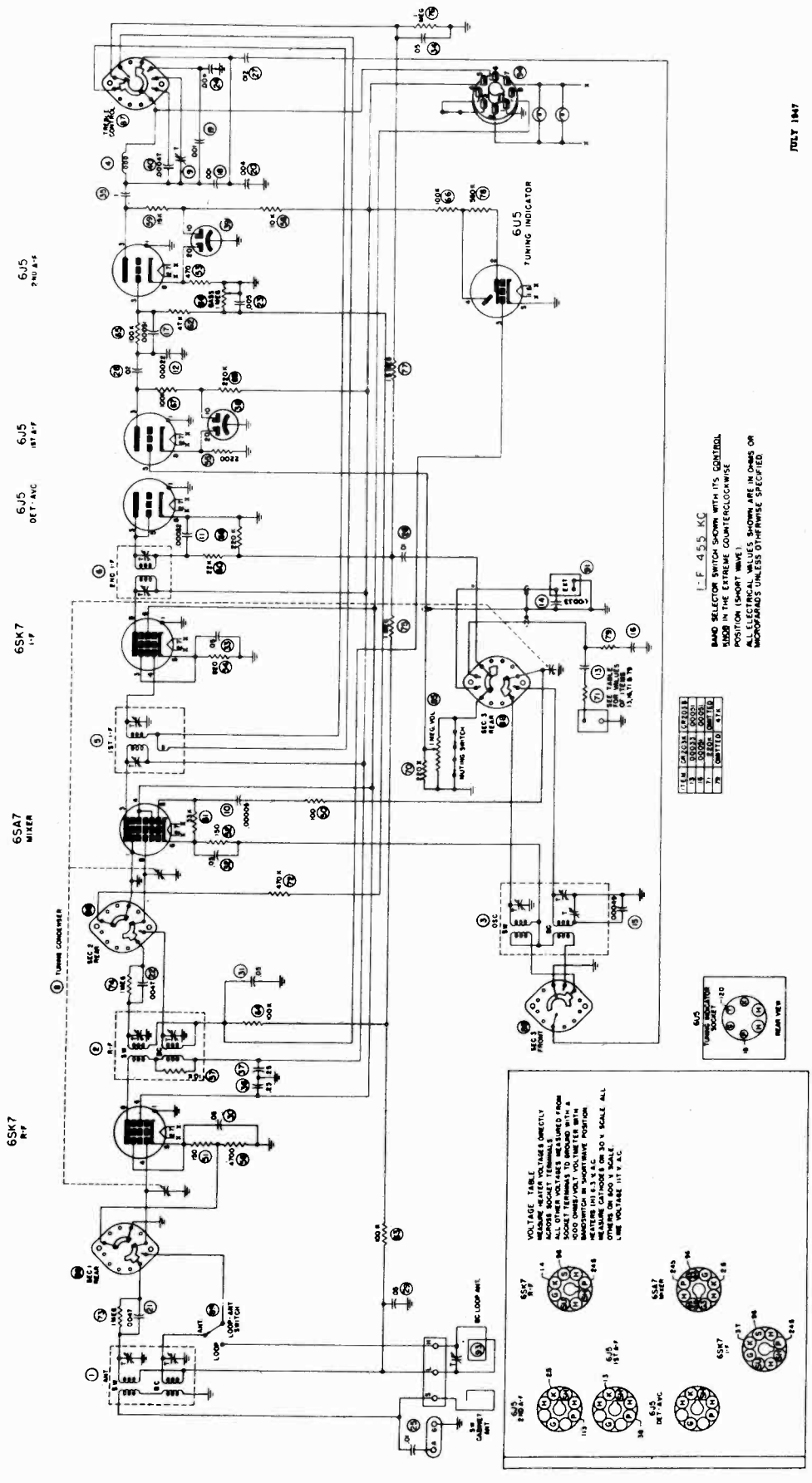
MODELS CR-200 SERIES THE MAGNAVOX CO.



ITEM NO.	ELECTRICAL VALUES CR200A	CR200B	CR200C	CR200D	CR200E	CR200F
33	33	33	8	33	33	8
38	.0015	.005	.002	.005	.002	.001
58	.01	.002	.001	.002	.001	.01
30	150	150	150	470	470	470

THE MAGNAVOX CO.

MODELS CR-203A, CR-203B



Intermediate frequency	455 kc.
Tuning frequency range:	
Broadcast band	530–1610 kc.
Short wave band	4.9–18.1 mc.

Tubes:	
R-F Amplifier	6SK7
Converter	6SA7
I-F Amplifier	6SK7
Detector and AVC	6J5
First Audio	6J5
Second Audio	6J5
Tuning Indicator	6U5
Dial lamps	Mazda No. 44

CONDENSER GANG DRIVE ADJUSTMENTS

Whenever any of the mechanical parts in the condenser gang drive assembly require replacement due to rough handling or for any other reason, it is extremely important that clearances and adjustments shown on Figures 2 and 3 are effected; otherwise the tuning mechanism will be sluggish or it may slip during operation.

In reassembling the mechanism after any part was replaced, follow the procedure outlined below:

1. Assemble the Tuning Shaft, Drive Collar, Compression Spring, Spring Retainer and Flywheel in the manner shown on Figure 3. Note that the Tuning Shaft must extend ¾" from the front of the assembly and that the spacing between the rear of the Drive Collar and the front of the Flywheel must be 3-5/64". Any excess length in the Tuning Shaft may extend beyond the rear of the Flywheel. See Figure 2.

2. The distance between the rubber-tired Drive Wheel and the smaller diameter section of the Spring Retainer must be 1/32" to 1/16" (Figure 3). This adjustment is effected by loosening the two No. 6 Allen set screws in the Drive Wheel hub and sliding the wheel on its shaft until the required clearance is obtained. When the adjustment is completed, tighten the two screws in the hub of the Drive Wheel.

3. While pressing down on the Treadle Bar at the location shown on Figure 3, adjust the Thrust Bracket until the clearance between the rear of the Flywheel and the projection on the Thrust Bracket is .010" as shown on the diagram. To make this adjustment, loosen the two No. 6 Allen set screws (use No. 6 Allen Wrench—Magnavox Part No. 800044G2) in the hub of Thrust Bracket and rotate the bracket until the specified clearance is obtained when the push buttons are NOT actuated. Tighten the two screws securely when the adjustment is completed. Press each push button and check that the Drive Collar is pushed away from the rubber-tired Drive Wheel.

4. Next, adjust the clearance in the muting switch contacts by turning the Phillips-head screw designated Adjustment "A" on Figure 2, until the specified clearance of .025" is obtained (when the push buttons are NOT actuated.)

5. While pressing any one of the push buttons in as far as possible, turn the screw designated Adjustment "B" until a minimum clearance of .015" is obtained between the front surface of the Drive Collar and the switch spring directly in front of it. This setting should also cause a minimum clearance of .010" between the switch contacts actuated by pressure of the front surface of the Drive Collar, when the Tuning Shaft is pulled out. The function of this switch is to open the muting circuit when setting up the push buttons. As its contacts are wired in series with the large muting switch (contacts are shorted by pressing any push button), pulling out on the Tuning Shaft causes the small switch contacts to open the muting circuit so that a station can be heard while the push button is held in and tightened. On rare occasions it may be necessary to adjust the relation between the push button bars and the Treadle Bar. Such adjustment might be required if when pushing any of the push buttons, sufficient motion is not transmitted to the Treadle Bar to cause a disengagement between the Drive Collar and the Drive wheel.

This can usually be accomplished by loosening the two screws designated "C" and "D" on Figure 3, and moving plate "B" in the direction required to correct this condition.

SPECIAL SERVICE INFORMATION

The following information is provided for the service man who has a vacuum tube voltmeter or a similar measuring instrument available.

STAGE GAINS*

Antenna Post to R-F Grid at:	
600 kc.	7.0
6 mc.	1.63
R-F to Converter Grid at:	
600 kc.	3.4
6 mc.	3.4
R-F on Converter Grid to I-F Grid at:	
600 kc.	40.0
6 mc.	35.5
I-F on Converter Grid to I-F Grid at:	
455 kc.	59
I-F Grid to Detector Plate at:	
455 kc.	68

AUDIO GAIN

Voltage required across Volume Control to produce 0.1 watt speaker output** at 400 cycles is .0072 volt with Band Selector Switch in BDCST setting.

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across Oscillator Grid Resistor at:

600 kc.	5.8
6 mc.	6.6

* Variations of ±20% are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.

** .05 watt speaker output at 400 cycles is equivalent to a reading of 0.35 volts as measured by a high resistance AC voltmeter across the voice coil of either speaker.

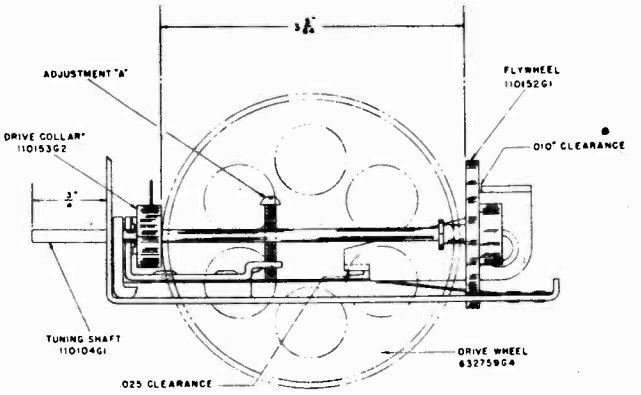


FIGURE 2

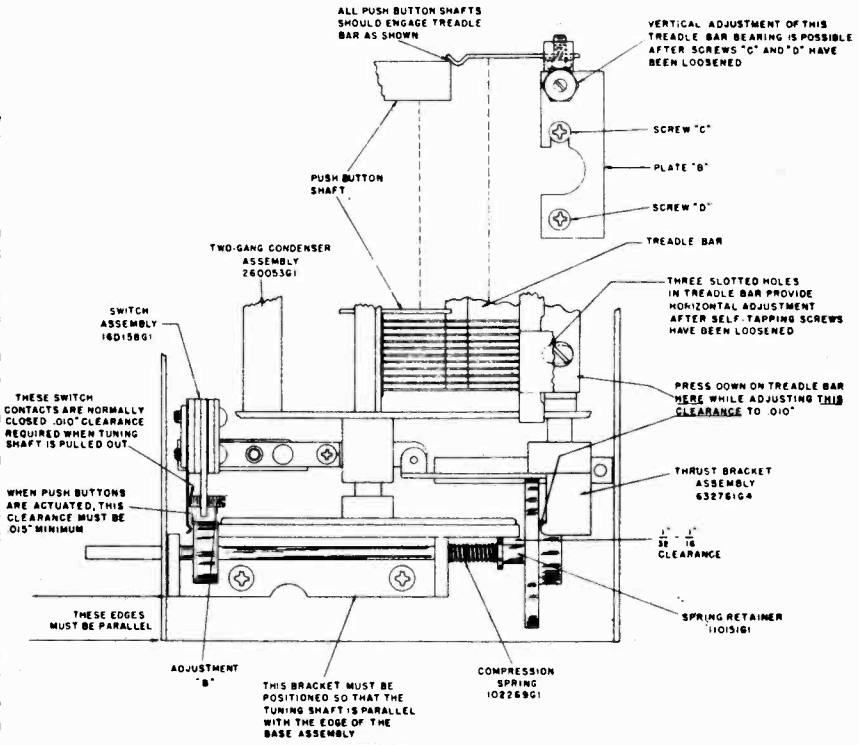


FIGURE 3

ALIGNMENT PROCEDURE

The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 5. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings. *Always set the Treble Control to SHARP TUNE before aligning the i-f stages.* This is done by turning the Treble Control Knob to the No. 1 position.

I-F ALIGNMENT

1. Connect the output of the signal generator to the control grid (pin No. 8) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.
2. Turn the condenser gang until it is completely meshed, (low-frequency end of dial calibration) and set the band selector switch to BDCST as for broadcast band reception.
3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

On some models of the CR-203 chassis, the two i-f trimmers are located in the top of the respective i-f transformers as shown in the layout diagram Figure 7. In other models, one trimmer is accessible from the top and the other from the bottom of each transformer.

BROADCAST BAND ALIGNMENT

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The ANT-LOOP switch (89) must be in the ANT. setting.
2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, loosen the set screws in the hub of pulley "D" shown on Figure 1 and make the necessary adjustment.
3. With the band selector still set for broadcast band reception, adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.
4. Set the signal generator and the radio receiver to 1400 kc.; adjust the 1400 kc. oscillator trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.
5. If the loop antenna trimmer is out of adjustment it should be set after the radio chassis is in the cabinet. Set the ANT-LOOP switch (89) to the LOOP position. Adjust the signal generator to 1400 kilocycles and connect its output to a loop containing approximately five turns of wire eight inches in diameter placed eighteen inches from the receiver loop and in the same plane.
6. Set the receiver to 1400 kc. and adjust the trimmer on the receiver loop for maximum output.

SHORT WAVE BAND ALIGNMENT

1. Set the band selector switch to SW as for short wave reception and substitute a 400 ohm resistor for the capacitor in series with the signal generator lead connected to the antenna terminal on the receiver.
2. Set the signal generator and the radio receiver to 15 mc.; then adjust the 15 mc. oscillator trimmer and the 15 mc. antenna trimmer for maximum output. While adjusting the 15 mc. oscillator trimmer two peaks may be observed; only one is the correct peak for 15 mc. alignment. Screw in the trimmer to maximum capacity—then decrease the capacity until the first peak is observed. This is the correct one.

10 KC FILTER ADJUSTMENT

This chassis incorporates a 10 kc. filter circuit to eliminate the beat note heard as a whistle between stations on the broadcast band. If the trimmer is out of adjustment, the following procedure should be observed.

1. Turn the Treble Control to FULL RANGE (No. 4 position).
2. Connect the output of an audio oscillator to the phonograph pickup socket on the radio chassis and adjust the oscillator to EXACTLY 10,000 cycles.
3. Set the band selector to PHONO and adjust the 10 kc. trimmer (9) for minimum output.
4. If an audio oscillator is not available for making this adjustment, set the band selector to BDCST, connect an antenna to the receiver and set the gang condenser to a point between two stations on adjacent channels having approximately the same power. If the 10 kc. trimmer is out of adjustment, a whistle will be heard. Adjust the trimmer until the whistle is eliminated.

DIAL CORD REPLACEMENT

Rotate the brass pulley designated "A" in Figure 1 until the dial pointer strikes the stop at the high frequency end of the dial calibration. In this condition the slot in pulley "A" should be approximately ten degrees to the left of being vertical—see Figure 1. If the slot in the pulley is in some other position under the above mentioned conditions, the pointer set screw is probably loose and has allowed the pointer to slip.

To correct this condition, first remove the glass dial and loosen the pointer screw. Then while holding pulley "A" so that its slot is approximately ten degrees to the left of vertical (when viewed from the rear) adjust the pointer until it is resting against the stop at the high frequency end of its travel. Then tighten the pointer set screw securely and replace the glass dial.

Completely unmesh the condenser gang and check the location of the hole or slot in pulley "D." If this hole is not approximately 45 degrees back from vertical as shown on Figure 1, loosen the two No. 6 Allen set screws in the hub of pulley "D" and slip the pulley on its shaft (while holding the condenser gang unmeshed) until the specified adjustment is obtained; then tighten one of the set screws securely. It will be shown later that this is a temporary setting. Next, tie a double knot in the exact center of a 25-inch length of dial cable and fold the cable back on itself so that the knot is at one end. The correct method for tying this knot is shown as an inset on Figure 1. Grasp the cable near the knotted end and slide it into the pulley slot so that the knot is against the inside rim of the pulley as shown in the sketch. The piece of cable nearest the dial frame should be wound in the direction shown for one-half turn; then over the lower pulley "B," around the bottom of the large pulley "D" and into the hole. Pull the cable taut and wrap the end around the small hook on pulley "D" temporarily.

The remaining piece of cable should be wound around pulley "A" in the direction shown, for one complete turn, over the upper pulley "C," and over the top of pulley "D." Thread the end through the small hole in pulley "D" and pull both ends of the cable taut. With one end of tension spring "E" fastened to the hook on pulley "D" lace the two free ends of the cable through the opposite end of the spring and tie a knot at a point that will allow ¼" to 5/16" of cable between the spring and the inside rim of pulley "D." Be sure to tie the knot around one coil of the spring in the manner shown.

Now with the condenser gang completely meshed, check the position of the dial pointer. If it is not in line with the last calibration mark at the low frequency end of the dial, loosen the set screw in pulley "D" and turn it until the pointer is in the specified position. Be sure that the condenser gang does not move during this adjustment. Then tighten the two screws in pulley "D" securely completing the operation.

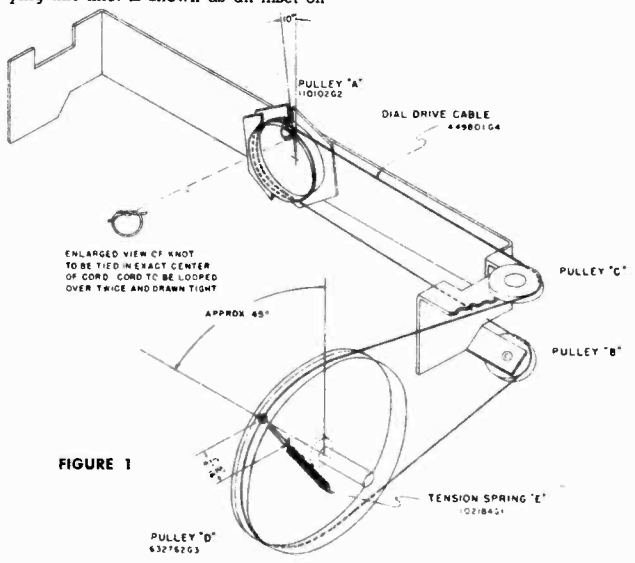


FIGURE 1

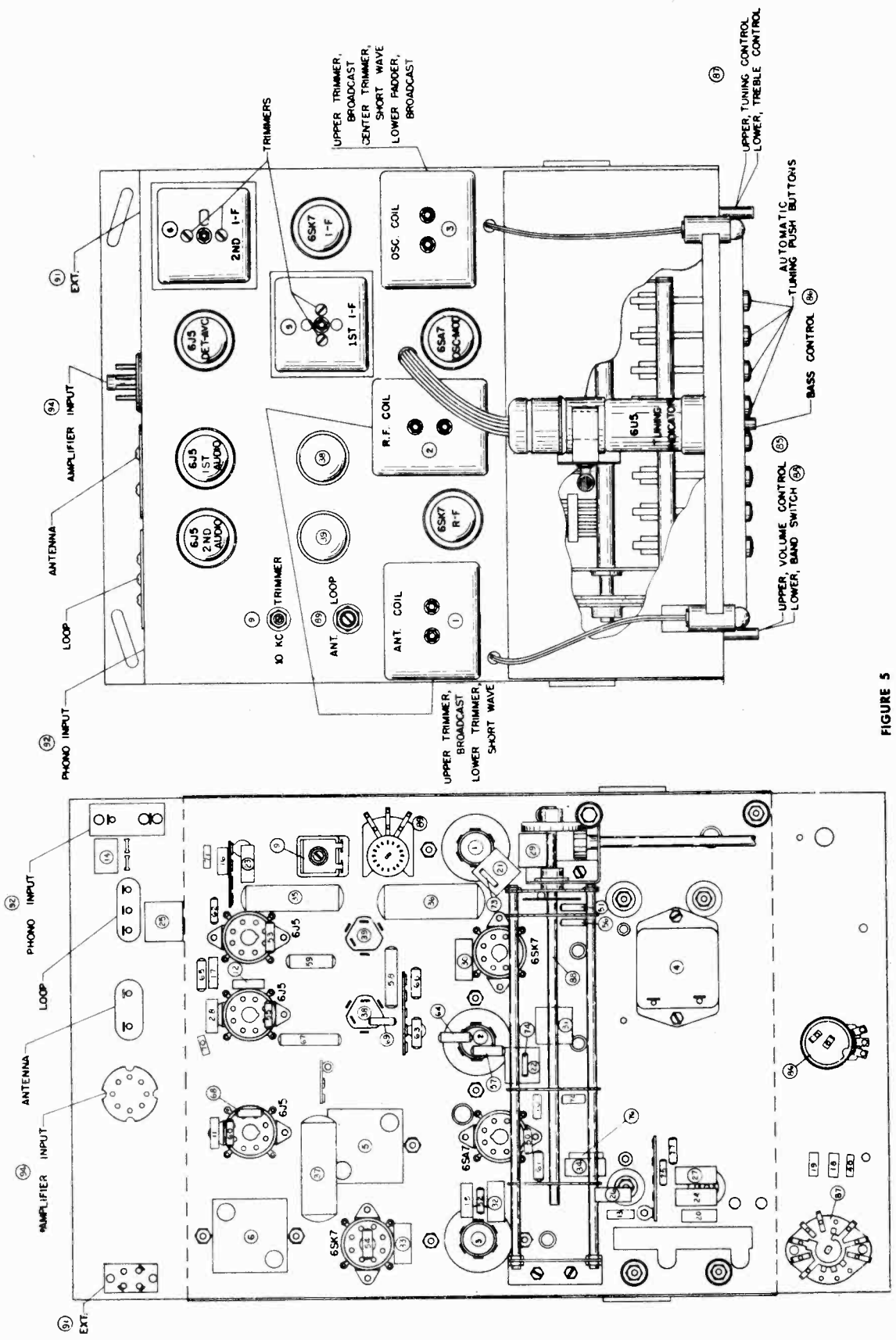


FIGURE 5

PARTS LIST

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, antenna, two band	360254G3
2	Coil assembly, r-f, two band	360254G4
3	Coil assembly, oscillator, two band	360253G2
4	Coil assembly, 10kc, filter	360244G1
5	Transformer, first i-f	360024G1
6	Transformer, second i-f	360025G1
8	Capacitor, variable, three-gang tuning	260054G2
	Push Button Assembly for 260054G2	260064G1
9	Capacitor, variable, 10kc, trimmer	259610G2
10	Capacitor, ceramic, 50 mmf	250088G25
11	Capacitor, molded mica, 220 mmf	250159G100
12	Capacitor, molded mica, 220 mmf	250159G100
13	Capacitor, molded mica, 330 mmf—CR-203A only	250159G88
	Capacitor, molded mica, 510 mmf—CR-203B only	250159G64
14	Capacitor, molded mica, 330 mmf	250159G88
15	Capacitor, silvered mica, 490 mmf, ±1%	250085G32
16	Capacitor, molded mica, 510 mmf	250159G64
17	Capacitor, molded mica, 510 mmf	250159G64
18	Capacitor, molded mica, .001 mfd	250159G133
19	Capacitor, molded mica, .001 mfd	250159G133
20	Capacitor, paper, .004 mfd	250129G7
21	Capacitor, molded mica, .0047 mfd, ±5%	250161G24
22	Capacitor, molded mica, .0047 mfd, ±5%	250161G24
23	Capacitor, paper, .005 mfd	250129G10
24	Capacitor, paper, .004 mfd	250129G7
25	Capacitor, paper, .01 mfd	250129G9
26	Capacitor, paper, .01 mfd	250129G9
27	Capacitor, paper, .012 mfd	250129G13
28	Capacitor, paper, .02 mfd	250129G3
29	Capacitor, paper, .05 mfd	250129G5
30	Capacitor, paper, .05 mfd	250129G5
31	Capacitor, paper, .05 mfd	250129G5
32	Capacitor, paper, .05 mfd	250129G5
33	Capacitor, paper, .05 mfd	250129G5
34	Capacitor, paper, .05 mfd	250129G5
35	Capacitor, paper, 0.1 mfd	250152G22
36	Capacitor, paper, 0.25 mfd	250152G21
37	Capacitor, paper, 0.25 mfd	250152G21
38	Capacitor, electrolytic, 20 mfd, 25 V., 10 mfd, 450 V	270023G6
39	Capacitor, electrolytic, 20 mfd, 25 V., 10 mfd, 450 V	270023G6
40	Capacitor, molded mica, 470 mmf, ±10%	250159G90
50	Resistor, composition, 100 ohm, ½ W	230084G7
51	Resistor, composition, 150 ohm, ½ W	230084G8
52	Resistor, composition, 150 ohm, ½ W	230084G8
53	Resistor, composition, 470 ohm, ½ W	230084G11
54	Resistor, composition, 820 ohm, ±10%, ½ W	230084G61
55	Resistor, composition, 2200 ohm, ½ W	230084G15
56	Resistor, composition, 4700 ohm, ½ W	230084G17
57	Resistor, composition, 10,000 ohm, ½ W	230084G19
58	Resistor, composition, 10,000 ohm, 1 W	230085G19
59	Resistor, composition, 15,000 ohm, 1 W	230085G20
60	Resistor, composition, 22,000 ohm, ½ W	230084G21
61	Resistor, composition, 33,000 ohm, ½ W	230084G22
62	Resistor, composition, 47,000 ohm, ½ W	230084G23
63	Resistor, composition, 100,000 ohm, ½ W	230084G25
64	Resistor, composition, 100,000 ohm, ½ W	230084G25
65	Resistor, composition, 100,000 ohm, ½ W	230084G25
66	Resistor, composition, 100,000 ohm, ½ W	230084G25
67	Resistor, composition, 100,000 ohm, 1 W	230085G25
68	Resistor, composition, 220,000 ohm, ½ W	230084G27
69	Resistor, composition, 220,000 ohm, ½ W	230084G27
70	Resistor, composition, 220,000 ohm, ±10%, ½ W	230084G90
71	Resistor, composition, 220,000 ohm, ±10%, ½ W	230084G90
72	Resistor, composition, 470,000 ohm, ½ W	230084G29
73	Resistor, composition, 1 megohm, ½ W	230084G31
74	Resistor, composition, 1 megohm, ½ W	230084G31
75	Resistor, composition, 1 megohm, ½ W	230084G31
76	Resistor, composition, 1 megohm, ½ W	230084G31
77	Resistor, composition, 1.5 megohm, ½ W	230084G32
78	Resistor, composition, 560,000 ohms, (in tuning eye socket) ±10%, ½ W	230084G95
79	Resistor, composition, 47,000 ohm ½ W.—CR-203B only	230084G23
85	Control, volume, 1 megohm	220044G15
86	Control, bass, 1 megohm, (with switch)	220045G2
87	Switch, rotary, treble control	160161G1
88	Switch, rotary, band selector	160160G1
89	Switch, rotary, loop to outdoor antenna	160157G1
91	Socket, external, input	180061G1
92	Socket, phonograph input	189741G1
93	Antenna, loop assembly	
94	Plug, octal, amplifier connection	180427G1
	Dial Glass Assembly	150285G1

* The part number of the loop antenna changes with different cabinets. It is therefore important that you specify the *STYLE NUMBER* of the instrument when ordering a replacement loop antenna assembly.

GENERAL

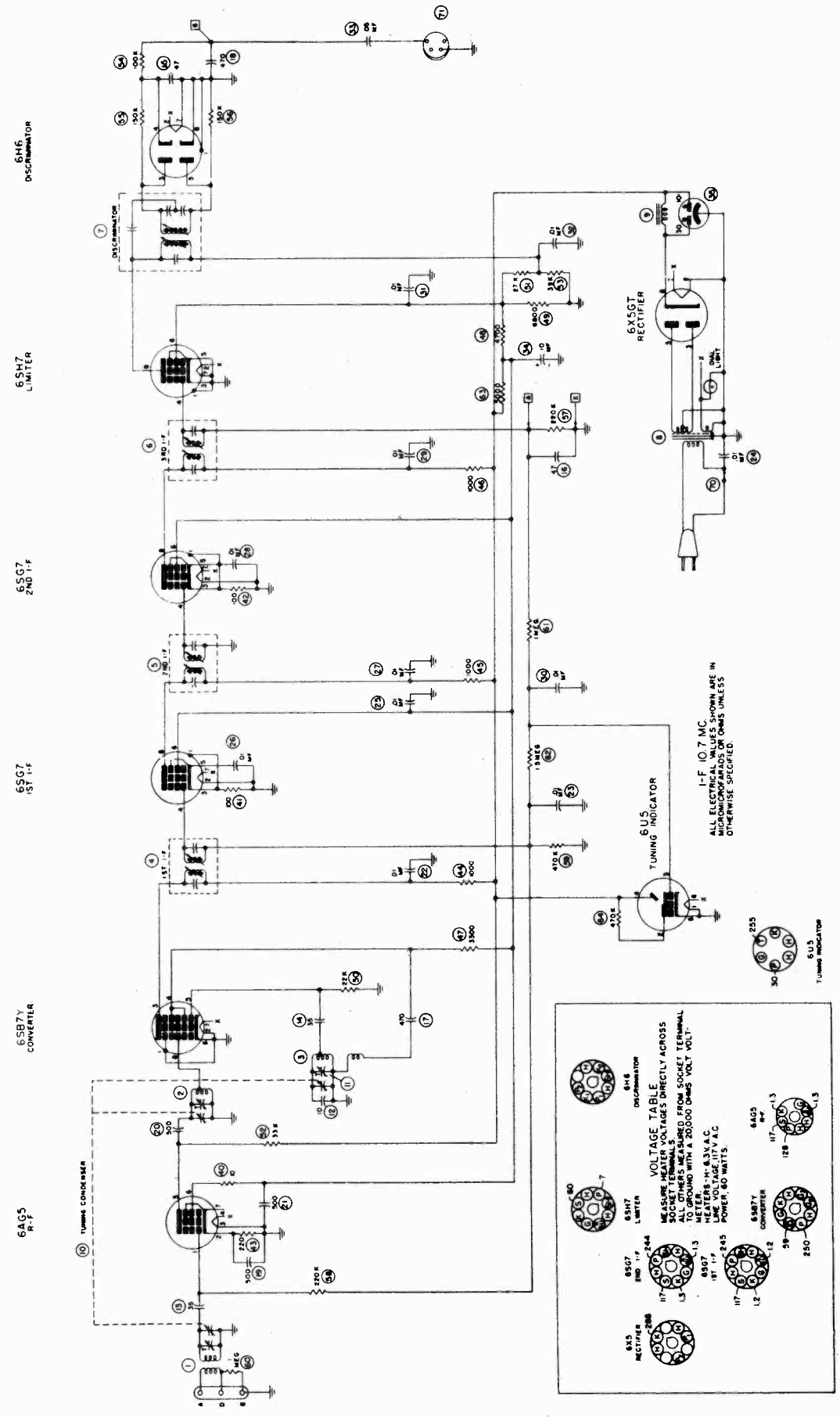
Model CR-203 radio chassis is a two-band tuner that must be used in conjunction with a power amplifier, such as the Model AMP-108A for speaker operation. Heater and plate voltages for the CR-203 radio chassis are supplied from the amplifier chassis; it is therefore essential that the radio and amplifier chassis be interconnected during alignment or for other electrical service operations. Models CR-203A and 203B are alike mechanically; they differ electrically in the phonograph input circuit. Circuit variations are shown on the table on Figure 4.

METHOD FOR REMOVING CHASSIS FROM CABINET

Model CR-203 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service. To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back. Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio panel in place when the chassis is replaced. In replacing the chassis, slide it so that the small hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hooks should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated S-L-H. The end of the short wave antenna that is fastened to the inside of the cabinet connects to S. Always disconnect this antenna from terminal S when an outdoor antenna is used as it may pick up noise. The two terminals on the loop are designated L and H. The leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.

MODEL CR-206

THE MAGNAVOX CO.

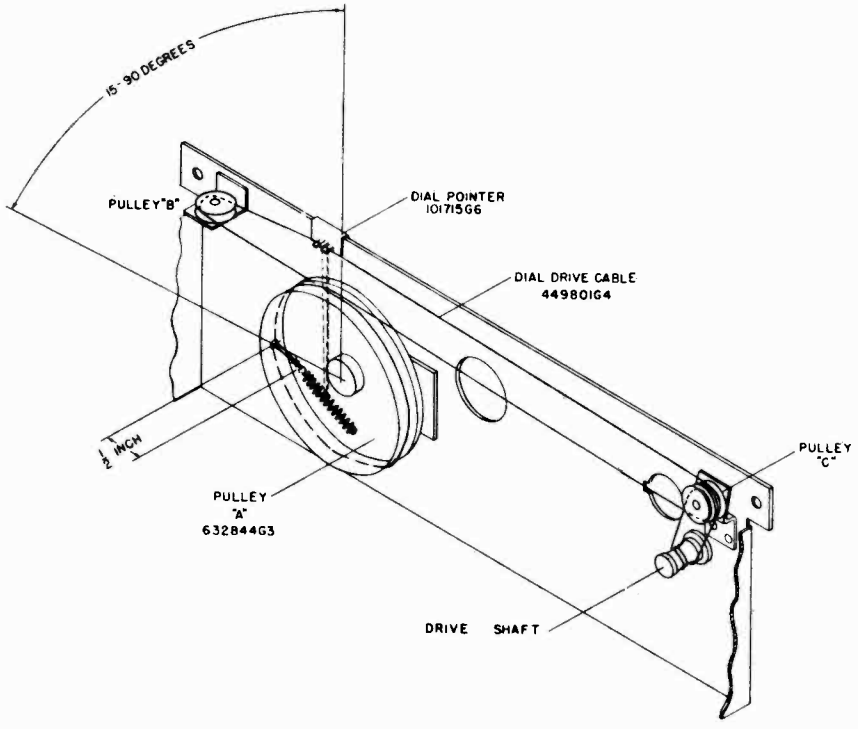


DIAL CORD REPLACEMENT

A single cable transmits motion from the dial tuning knob to rotate the condenser gang and to move the dial pointer. A 30-inch length of string is required to restring this assembly. After the broken cable is removed, turn pulley "A" (see Figure 1) until the condenser gang plates are completely meshed. In this condition, the small hole in the rim of pulley "A" should be within the limits of 15 to 90 degrees to the left of being vertical as shown in Figure 1. If this hole is at a different position from the condition specified, loosen the two screws in the coupling to the condenser gang and turn pulley "A" while holding the condenser plates meshed. Tighten the two set screws after the adjustment has been made.

Lace one end of the new length of cable through the hole in pulley "A" and temporarily fasten it to the hook to which the spring is normally fastened. Make a complete turn around pulley "A" in a counter-clockwise direction, lace it around pulley "B," then across the rear of the dial scale and over the top of the front groove in pulley "C." Proceed down around the tuning shaft for 2½ turns in a clockwise direction and wrapping the cable over pulley "D" from front to back. Continue up over the rear groove of pulley "C" in a clockwise direction for one turn and extend the cable to the left so that the loose end is to the rear of the section of cable that it crosses. The loose end of the cable should now be wound over the top of pulley "A" so that it is nearest the dial frame and into the hole in the pulley groove. Remove the other end of the cable from the hook and while holding both ends taut, insert one end of the spring on the hook in pulley "A." Lace the two free ends of the cable through the opposite end of the spring and pull the cable until the spring is stretched to within ½-inch of the rim on the pulley. Tie a double knot so that the knot is around one coil of the spring, while maintaining tension on the cable.

Turn the tuning control shaft until the condenser gang is completely meshed and slide the dial pointer on its track until it is in line with the last calibration mark at the low frequency end of the dial. Press the crimping lugs on the dial pointer together over the cable. After checking to see that the condenser gang is still completely meshed and the dial pointer is in the position specified previously, apply a few drops of cement to the cable where it is crimped by the pointer. This completes the operation.



ALIGNMENT PROCEDURE

The alignment of this F-M tuner is made in three major steps namely, I-F alignment, Discriminator alignment and R-F alignment. An F-M generator is not required in aligning this F-M tuner. Any *accurately calibrated* signal generator covering a range in the vicinity of 10.7 megacycles may be used in aligning the I-F and the Discriminator stages. For R-F alignment, the generator must cover the tuning range of the tuner or approximately 87 to 110 megacycles. If such a signal generator is not available, this alignment may be made by using an F-M radio station as a frequency standard.

I-F ALIGNMENT

1. Connect the "high" side of the signal generator to Grid 3 (pin #8) of the 6SB7Y converter tube and the "low" side of the generator to the radio chassis.

2. If a vacuum tube voltmeter is available, connect it across the 220,000 ohm resistor in the grid circuit of the 6SH7 limiter tube at points designated "A" and "X" on the schematic diagram (Figure 2) to measure the limiter grid bias voltage. Set the signal generator to exactly 10.7 megacycles and adjust the third, the second and the first i-f transformer trimmers in that order for maximum reading on the meter. A reading of 2 to 8 volts should be considered normal.

3. If a vacuum tube voltmeter is not available, connect a 0-50 or 0-200 microammeter in series with the "ground" end of the 220,000 ohm resistor in the grid circuit of the 6SH7 limiter tube at point "X" on the schematic diagram. Set the signal generator to exactly 10.7 megacycles and adjust the third, the second and the first i-f transformer trimmers in that order for maximum meter readings. A normal reading will be in the range of 10 to 35 microamperes. At the completion of these adjustments, remove the microammeter and ground the 220,000 ohm resistor to the point where it was originally connected.

DISCRIMINATOR ALIGNMENT

The accurate alignment of the discriminator transformer cannot be overemphasized. Incorrect alignment will result in badly distorted reception. The following steps should be followed in the order given:

1. A DC vacuum tube voltmeter is connected to the output circuit by connecting it from ground to point "B" on the schematic diagram. This measures the detector output voltage. Adjust the signal generator frequency to exactly 10.775 megacycles and adjust both trimmers on the discriminator transformer for maximum reading. If the indicated voltage is less than 3 volts readjust the output of the generator until the meter indicates 3 volts or more. Now adjust the signal generator frequency to 10.7 megacycles and turn the trimmer screw on the top of the discriminator until the voltage is zero. *This is an extremely important adjustment.* Reset the generator frequency to 10.775 and record the meter reading.

2. Reverse the meter connections and set the signal generator frequency to 10.625 megacycles. The meter reading now obtained must be within 10% of the reading recorded in the previous operation—if it is not, the discriminator alignment was not done accurately and must be repeated.

3. The discriminator may also be aligned using a 0-50 or 0-200 microammeter if a vacuum tube voltmeter is not available. In this case, the detector output current is measured. Connect the microammeter to the same points specified in paragraph 1 and proceed in the manner outlined in paragraphs 1 and 2 of this section. In the operation described in paragraph 1, the meter reading should be at least 20 microamperes when the trimmers are peaked at 10.775 megacycles; if not, the generator should be adjusted until that value is obtained.

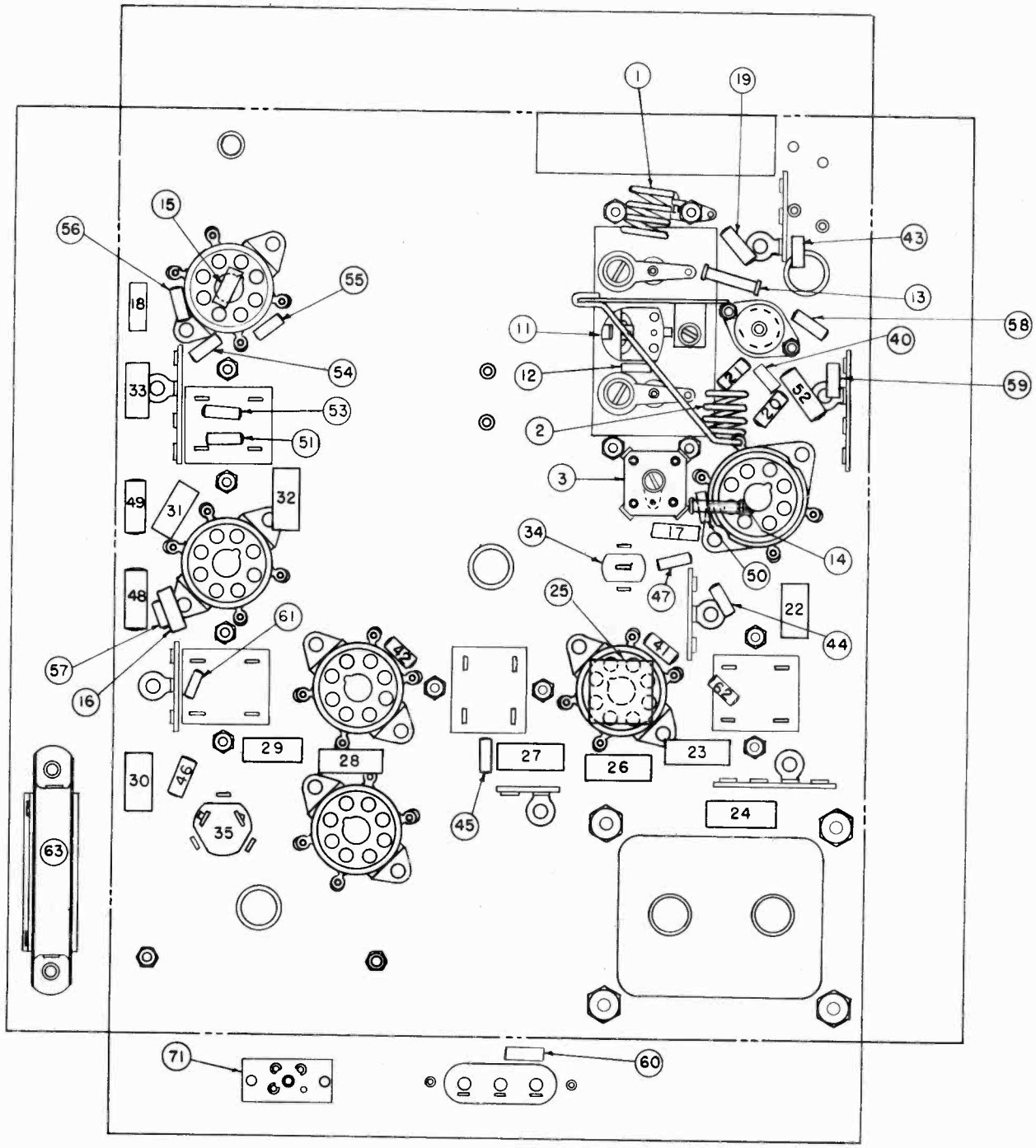
R-F ALIGNMENT

1. Check that the dial pointer is in line with the last mark at the low frequency end of the dial calibration when the condenser gang is fully meshed. If it is not, slide the pointer on its string to the correct position, and crimp the lugs (on the rear of the pointer) tightly around the string and apply a drop of cement to hold the pointer in adjustment.

2. Connect the vacuum tube voltmeter to points "A" and "X" on the schematic diagram or connect a 0-50 or 0-200 microammeter in series with the "ground" end of the 220,000 ohm resistor in the grid circuit of the 6SH7 limiter tube at point "X" on the schematic diagram.

3. An extremely accurate signal generator is a necessity in making the following adjustments and it should be connected to the antenna post through a 300 ohm resistor. If such a generator is not available, connect an F-M antenna to the antenna terminal (A) and use an F-M transmitter for a frequency standard. It is preferable that this station be located in the high frequency end of the band—102 to 108 megacycles.

4. Set the signal generator (if one is used) and the F-M tuner to exactly 108 megacycles—if an F-M station is used as a frequency standard accurately set the tuner to the frequency of the F-M station and adjust the oscillator trimmer for a maximum reading on the meter. Then adjust the antenna trimmer and the r-f trimmer for a maximum meter indication. If too much signal is fed to the tuner, it might appear at several settings of the tuning dial and confuse the adjustment. When the adjustments are completed, the second harmonic of the oscillator frequency will be 10.7 megacycles lower than the signal frequency.



Special Service Information

The following information is provided for the service man who has a vacuum tube voltmeter or a similar measuring instrument available.

STAGE GAINS*

Antenna Post to R-F Grid through 300-ohm resistor at:
98 mc. 1.1

R-F to Converter Grid at:
98 mc. 13.8

R-F on Converter Grid to 1st I-F Grid at:
98 mc. 5.0

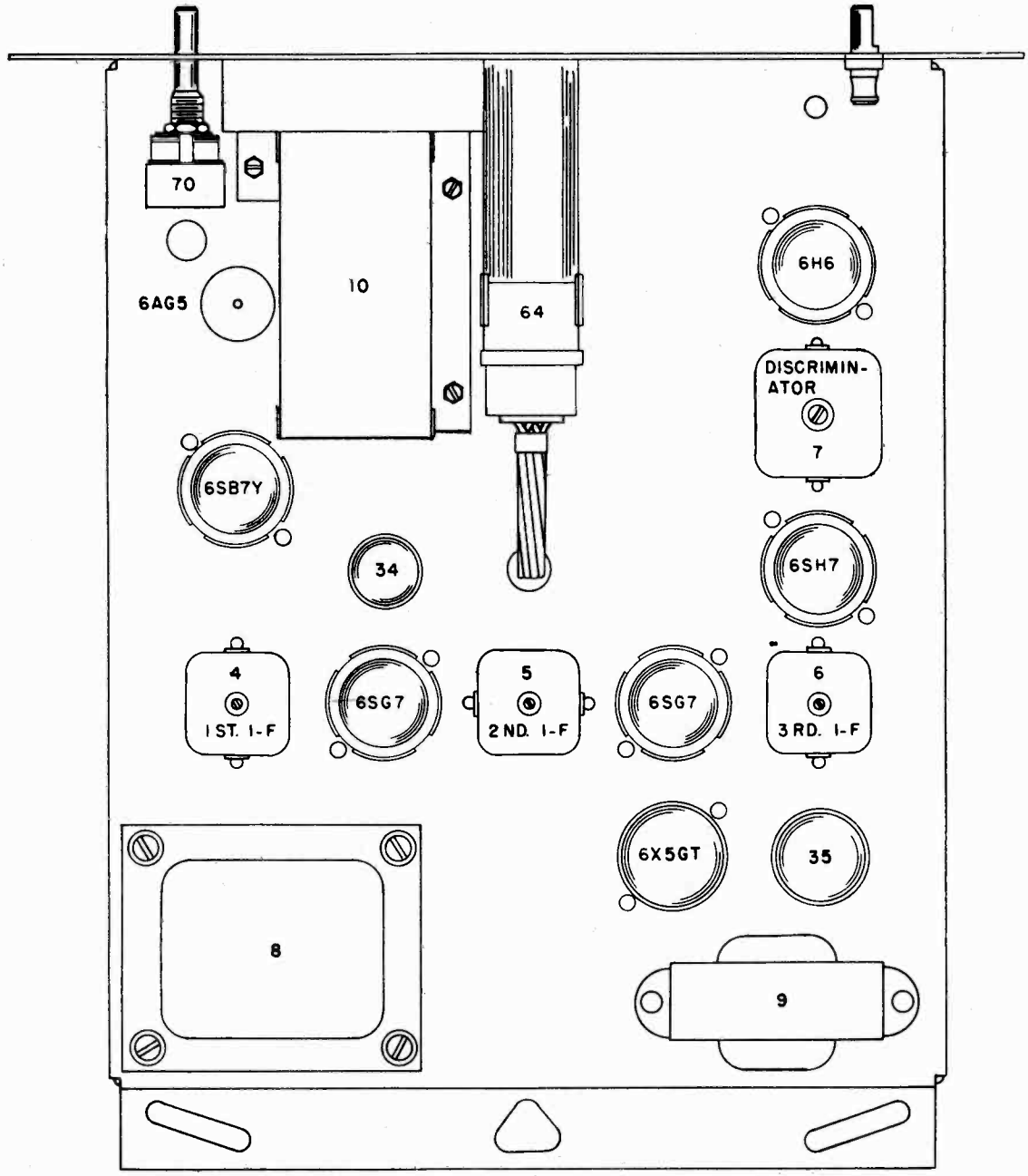
I-F on 1st I-F Grid to 2nd I-F Grid at:
10.7 mc. 35

2nd I-F Grid to Limiter Grid at:
10.7 mc. 33

OSCILLATOR GRID VOLTAGE

The DC voltage developed across Oscillator Grid resistor (37) at:
98 mc. 7.0

*Variations of ± 20% are permissible. All readings made with sufficient signal to provide 15 millivolts output at 400 cycles with 22.5 kc. modulation.



Power supply	117 volts 50/60 cycles AC
Power consumption	46 watts
Intermediate frequency	10.7 mc.
Tuning frequency range:	87.1–108.9 mc.

Tubes:

R-F Amplifier	6AG5
Converter	6SB7Y
First I-F Amplifier	6SG7
Second I-F Amplifier	6SG7
Limiter	6SH7
Detector	6H6
Rectifier	6X5GT/G
Tuning Indicator	6U5
Dial Lamp	Mazda No. 51

THE MAGNAVOX CO. MODEL CR-206

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, antenna	360311G2
2	Coil assembly, r-f	360312G2
3	Coil assembly, oscillator	360263G2
4	Transformer, 1st i-f	360304G1
5	Transformer, 2nd i-f	360304G1
6	Transformer, 3rd i-f	360304G1
7	Transformer, discriminator	360305G1
8	Transformer, power	300030G1
9	Choke, filter	350032G1
10	Capacitor, variable, three-gang tuning	260059G1
11	Capacitor, trimmer	260067G1
12	Capacitor, ceramic, 10 mmf	250088G8
13	Capacitor, ceramic, 35 mmf	250088G26
14	Capacitor, ceramic, 35 mmf	250088G26
15	Capacitor, mica, 47 mmf	250159G96
16	Capacitor, mica, 47 mmf	250159G96
17	Capacitor, mica, 470 mmf	250159G102
18	Capacitor, mica, 470 mmf, ± 10%	250159G90
19	Capacitor, ceramic, 500 mmf	250088G31
20	Capacitor, ceramic, 500 mmf	250088G31
21	Capacitor, ceramic, 500 mmf	250088G31
22	Capacitor, paper, .01 mfd, 600 V	250129G2
23	Capacitor, paper, .01 mfd, 600 V	250129G2
24	Capacitor, paper, .01 mfd, 600 V	250129G2
25	Capacitor, paper, .01 mfd, 600 V	250129G2
26	Capacitor, paper, .01 mfd, 600 V	250129G2
27	Capacitor, paper, .01 mfd, 600 V	250129G2
28	Capacitor, paper, .01 mfd, 600 V	250129G2
29	Capacitor, paper, .01 mfd, 600 V	250129G2
30	Capacitor, paper, .01 mfd, 600 V	250129G2
31	Capacitor, paper, .01 mfd, 600 V	250129G2
32	Capacitor, paper, .01 mfd, 600 V	250129G2
33	Capacitor, paper, .05 mfd, 600 V	250129G5
34	Capacitor, electrolytic, 10 mfd, 450 V	270026G3
35	Capacitor, electrolytic, 30-10 mfd, 475 V	270023G2
40	Resistor, composition, 10 ohms, ½ W	230084G1
41	Resistor, composition, 100 ohms, ½ W	230084G7
42	Resistor, composition, 100 ohms, ½ W	230084G7
43	Resistor, composition, 220 ohms, ½ W	230084G9
44	Resistor, composition, 1000 ohms, ½ W	230084G13
45	Resistor, composition, 1000 ohms, ½ W	230084G13
46	Resistor, composition, 1000 ohms, ½ W	230084G13
47	Resistor, composition, 3300 ohms, ½ W	230084G16
48	Resistor, composition, 4700 ohms, ± 5% 2 W	230061G175
49	Resistor, composition, 6800 ohms, ± 5% 2 W	230061G179
50	Resistor, composition, 22,000 ohms, ½ W	230084G21
51	Resistor, composition, 27,000 ohms, ± 10% ½ W	230084G79
52	Resistor, composition, 33,000 ohms, ± 10% 1 W	230085G80
53	Resistor, composition, 39,000 ohms, ± 10% ½ W	230084G81
54	Resistor, composition, 100,000 ohms, ± 10% ½ W	230084G86
55	Resistor, composition, 150,000 ohms, ± 10% ½ W	230084G88
56	Resistor, composition, 150,000 ohms, ± 10% ½ W	230084G88
57	Resistor, composition, 220,000 ohms, ½ W	230084G27
58	Resistor, composition, 220,000 ohms, ½ W	230084G27
59	Resistor, composition, 470,000 ohms, ½ W	230084G29
60	Resistor, composition, 1 megohm, ½ W	230084G31
61	Resistor, composition, 1 megohm, ½ W	230084G31
62	Resistor, composition, 1.5 megohm, ½ W	230084G32
63	Resistor, wire wound, 5000 ohms, 5 W	240035G4
64	Resistor, composition, 470,000 ohms, ½ W. (in tuning eye socket)	230084G29
70	Switch, rotary power	160174G1
71	Socket, output	180060G1

MODELS CR-207B, CR-207D

Whenever any of the mechanical parts in the condenser gang drive assembly require replacement due to rough handling or for any other reason, it is extremely important that clearances and adjustments shown on Figures 4 and 5 are correct; otherwise, the tuning mechanism will be sluggish or it may slip during operation.

In reassembling the mechanism after any part was replaced, follow the procedure outlined below:

1. Assemble the Tuning Shaft, Drive Collar, Compression Spring and Flywheel in the order shown on Figure 5. The distance between the front of the Drive Collar and the front of the Tuning Shaft must be 1⅛ inches as specified on Figure 4. Install the Flywheel on the rear of the Tuning Shaft and slide it forward until it nearly touches the edge of the Drive Wheel; then tighten one of the set screws in the Flywheel hub. Insert a .010" gauge between the Flywheel and the Pin, and while holding the gauge in this position, loosen the set screw in the Flywheel hub that was previously tightened. The Compression Spring should force the Flywheel back against the gauge—when this occurs, tighten both set screws in the Flywheel hub.

2. Adjust the Muting Switch contact clearance by loosening the two screws in the Contact Bracket and sliding the bracket in the required direction until a 1/16" clearance is obtained. If this adjustment cannot be obtained in the manner prescribed, bend the Contact Bracket until proper clearance is realized.

3. The Drive Wheel is properly located on its shaft when its edge nearest the hub is in line with the outside edge of the Drive Collar as shown on Figure 5. Two Allen set screws in the Drive Wheel hub provide a means of adjusting the position of this wheel.

4. When the adjustment outlined in paragraph 2 is correct, the proper contact clearance will automatically be obtained when the Muting Switch is to be "unmuted" while the push buttons are being set. While pressure is applied to any one of the push buttons while they are being set up, a pressure applied simultaneously to the Tuning Control knob will cause the Muting Switch contacts to open. Detailed instructions on setting up these push buttons are shown elsewhere in this bulletin.

5. If the push button shafts at both ends do not engage the Treadle Bar as shown on Figure 5, the three screws in the Treadle Bar must be loosened and the Treadle Bar should be moved until the required condition is obtained.

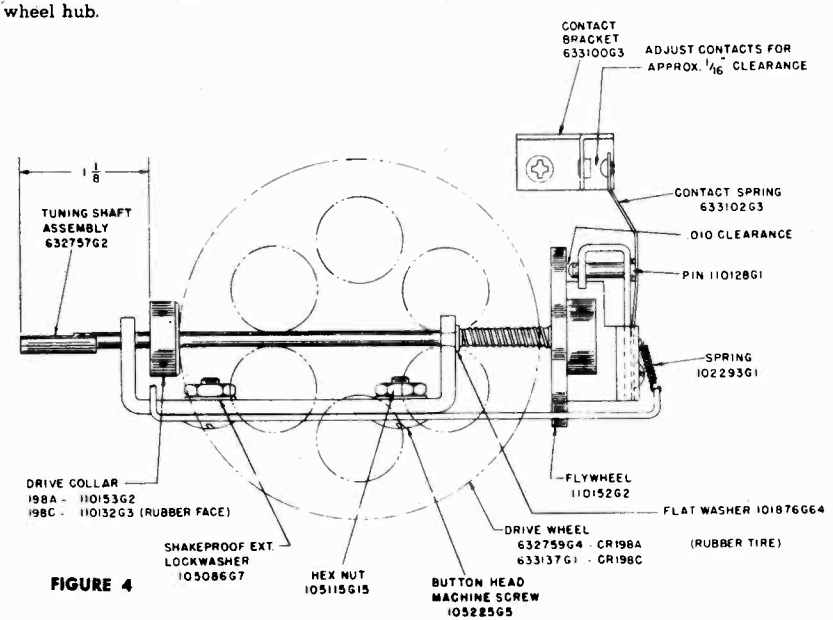


FIGURE 4

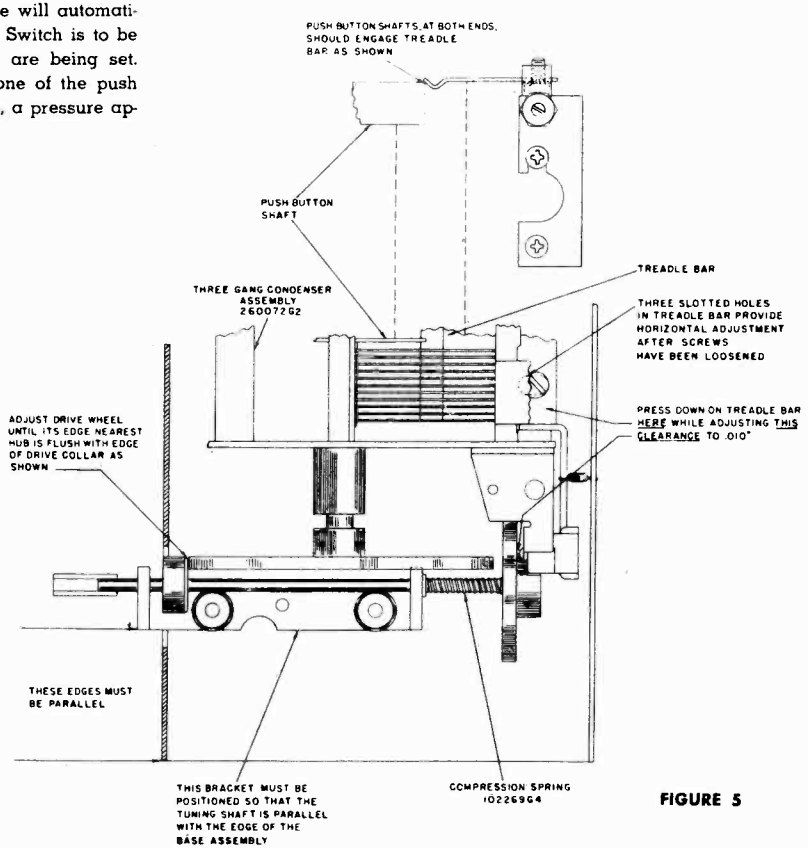
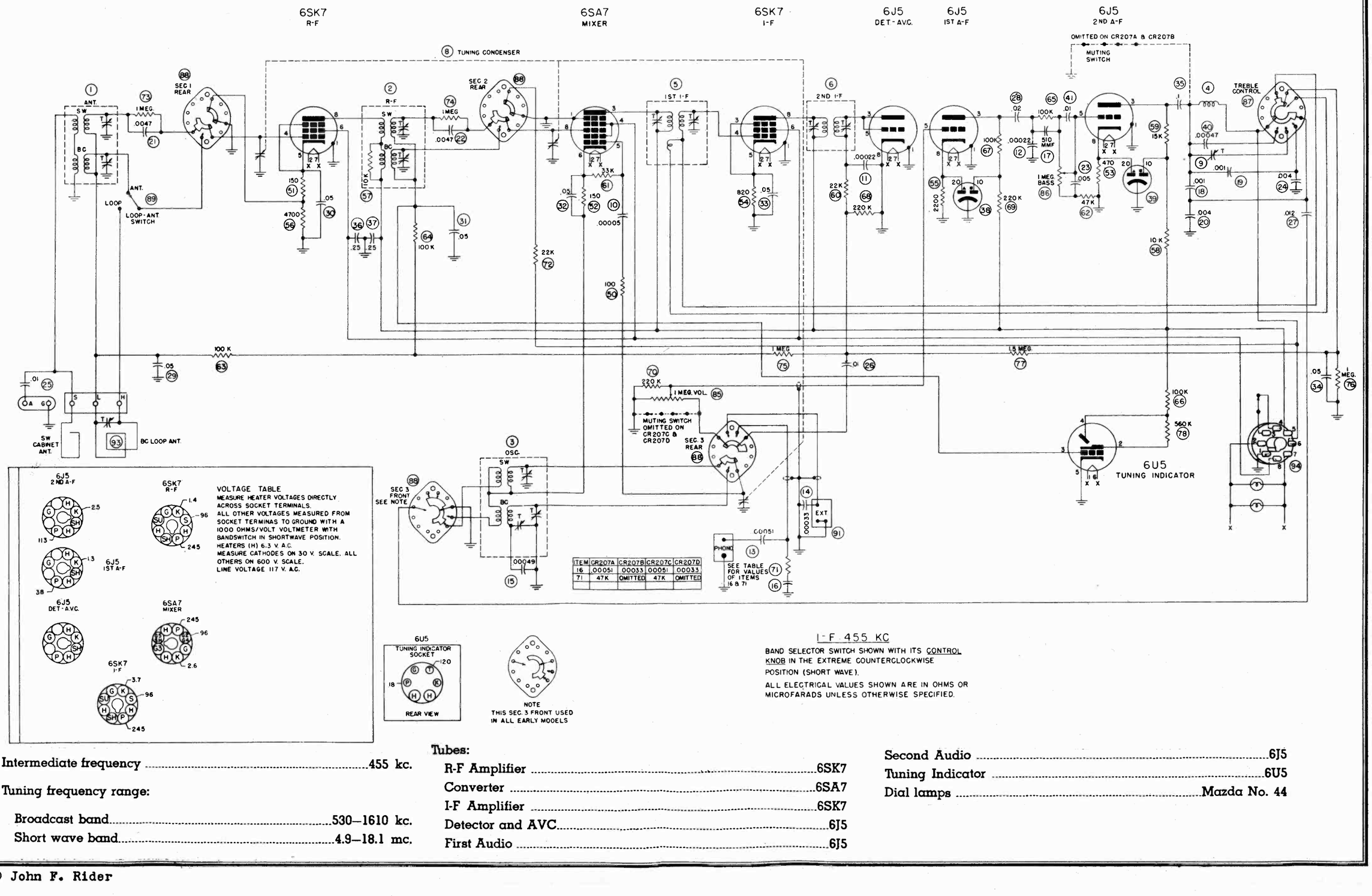


FIGURE 5

THE MAGNAVOX CO.

MODELS CR-207A, CR-207B, CR-207C, CR-207D



ITEM	CR207A	CR207B	CR207C	CR207D
16	.00051	00033	0051	00033
71	47K	OMITTED	47K	OMITTED

Intermediate frequency ..... 455 kc.

Tuning frequency range:

Broadcast band ..... 530—1610 kc.
Short wave band ..... 4.9—18.1 mc.

Tubes:

R-F Amplifier 6SK7
Converter 6SA7
I-F Amplifier 6SK7
Detector and AVC 6J5
First Audio 6J5
Second Audio 6J5
Tuning Indicator 6U5
Dial lamps ..... Mazda No. 44

ALIGNMENT PROCEDURE

The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 7. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings. *Always set the Treble Control to SHARP TUNE before aligning the i-f stages.* This is done by turning the Treble Control Knob to the No. 1 position.

I-F ALIGNMENT

1. Connect the output of the signal generator to the control grid (pin No. 8) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.
2. Turn the condenser gang until it is completely meshed, (low-frequency end of dial calibration) and set the band selector switch to BDCST as for broadcast band reception.
3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

On some models of the CR-207 chassis, the two i-f trimmers are located in the top of the respective i-f transformers as shown in the layout diagram Figure 7. In other models, one trimmer is accessible from the top and the other from the bottom of each transformer.

BROADCAST BAND ALIGNMENT

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The ANT-LOOP switch (89) must be in the ANT. setting.
2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, loosen the set screws in the hub of pulley "D" shown on Figure 1 and make the necessary adjustment.
3. With the band selector still set for broadcast band reception, adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.
4. Set the signal generator and the radio receiver to 1400 kc.; adjust the 1400 kc. oscillator trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.
5. If the loop antenna trimmer is out of adjustment it should be set after the radio chassis is in the cabinet. Set the ANT-LOOP switch (89) to the LOOP position. Adjust the signal generator to 1400 kilocycles and connect its output to a loop containing approximately five turns of wire eight inches in diameter placed eighteen inches from the receiver loop and in the same plane.
6. Set the receiver to 1400 kc. and adjust the trimmer on the receiver loop for maximum output.

SHORT WAVE BAND ALIGNMENT

1. Set the band selector switch to SW as for short wave reception and substitute a 400 ohm resistor for the capacitor in series with the signal generator lead connected to the antenna terminal on the receiver.
2. Set the signal generator and the radio receiver to 15 mc.; then adjust the 15 mc. oscillator trimmer and the 15 mc. antenna trimmer for maximum output. While adjusting the 15 mc. oscillator trimmer two peaks may be observed; only one is the correct peak for 15 mc. alignment. Screw in the trimmer to maximum capacity—then decrease the capacity until the first peak is observed. This is the correct one.

10 KC FILTER ADJUSTMENT

This chassis incorporates a 10 kc. filter circuit to eliminate the beat note heard as a whistle between stations on the broadcast band. If the trimmer is out of adjustment, the following procedure should be observed.

1. Turn the Treble Control to FULL RANGE (No. 4 position).
2. Connect the output of an audio oscillator to the phonograph pickup socket on the radio chassis and adjust the oscillator to EXACTLY 10,000 cycles.
3. Set the band selector to PHONO and adjust the 10 kc. trimmer (9) for minimum output.
4. If an audio oscillator is not available for making this adjustment, set the band selector to BDCST, connect an antenna to the receiver and set the gang condenser to a point between two stations on adjacent channels having approximately the same power. If the 10 kc. trimmer is out of adjustment, a whistle will be heard. Adjust the trimmer until the whistle is eliminated.

DIAL CORD REPLACEMENT

Rotate the brass pulley designated "A" in Figure 1 until the dial pointer strikes the stop at the high frequency end of the dial calibration. In this condition the slot in pulley "A" should be approximately ten degrees to the left of being vertical—see Figure 1. If the slot in the pulley is in some other position under the above mentioned conditions, the pointer set screw is probably loose and has allowed the pointer to slip.

To correct this condition, first remove the glass dial and loosen the pointer screw. Then while holding pulley "A" so that its slot is approximately ten degrees to the left of vertical (when viewed from the rear) adjust the pointer until it is resting against the stop at the high frequency end of its travel. Then tighten the pointer set screw securely and replace the glass dial.

Completely unmesh the condenser gang and check the location of the hole or slot in pulley "D." If this hole is not approximately 45 degrees back from vertical as shown on Figure 1, loosen the two No. 6 Allen set screws in the hub of pulley "D" and slip the pulley on its shaft (while holding the condenser gang unmeshed) until the specified adjustment is obtained; then tighten one of the set screws securely. It will be shown later that this is a temporary setting. Next, tie a double knot in the exact center of a 25-inch length of dial cable and fold the cable back on itself so that the knot is at one end. The correct method for tying this knot is shown as an inset on Figure 1. Grasp the cable near the knotted end and slide it into the pulley slot so that the knot is against the inside rim of the pulley as shown in the sketch. The piece of cable nearest the dial frame should be wound in the direction shown for one-half turn; then over the lower pulley "B," around the bottom of the large pulley "D" and into the hole. Pull the cable taut and wrap the end around the small hook on pulley "D" temporarily.

The remaining piece of cable should be wound around pulley "A" in the direction shown, for one complete turn, over the upper pulley "C," and over the top of pulley "D." Thread the end through the small hole in pulley "D" and pull both ends of the cable taut. With one end of tension spring "E" fastened to the hook on pulley "D" lace the two free ends of the cable through the opposite end of the spring and tie a knot at a point that will allow ¼" to 5/16" of cable between the spring and the inside rim of pulley "D." Be sure to tie the knot around one coil of the spring in the manner shown.

Now with the condenser gang completely meshed, check the position of the dial pointer. If it is not in line with the last calibration mark at the low frequency end of the dial, loosen the set screw in pulley "D" and turn it until the pointer is in the specified position. Be sure that the condenser gang does not move during this adjustment. Then tighten the two screws in pulley "D" securely completing the operation.

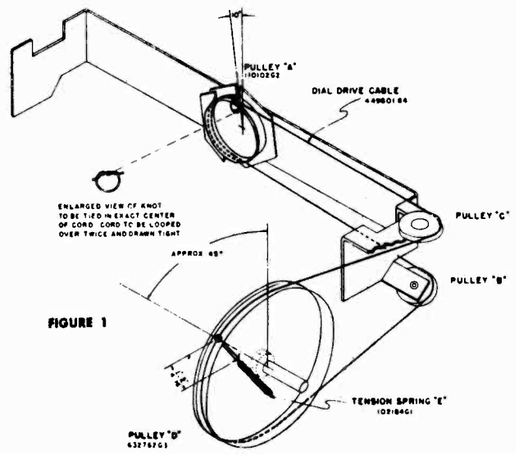
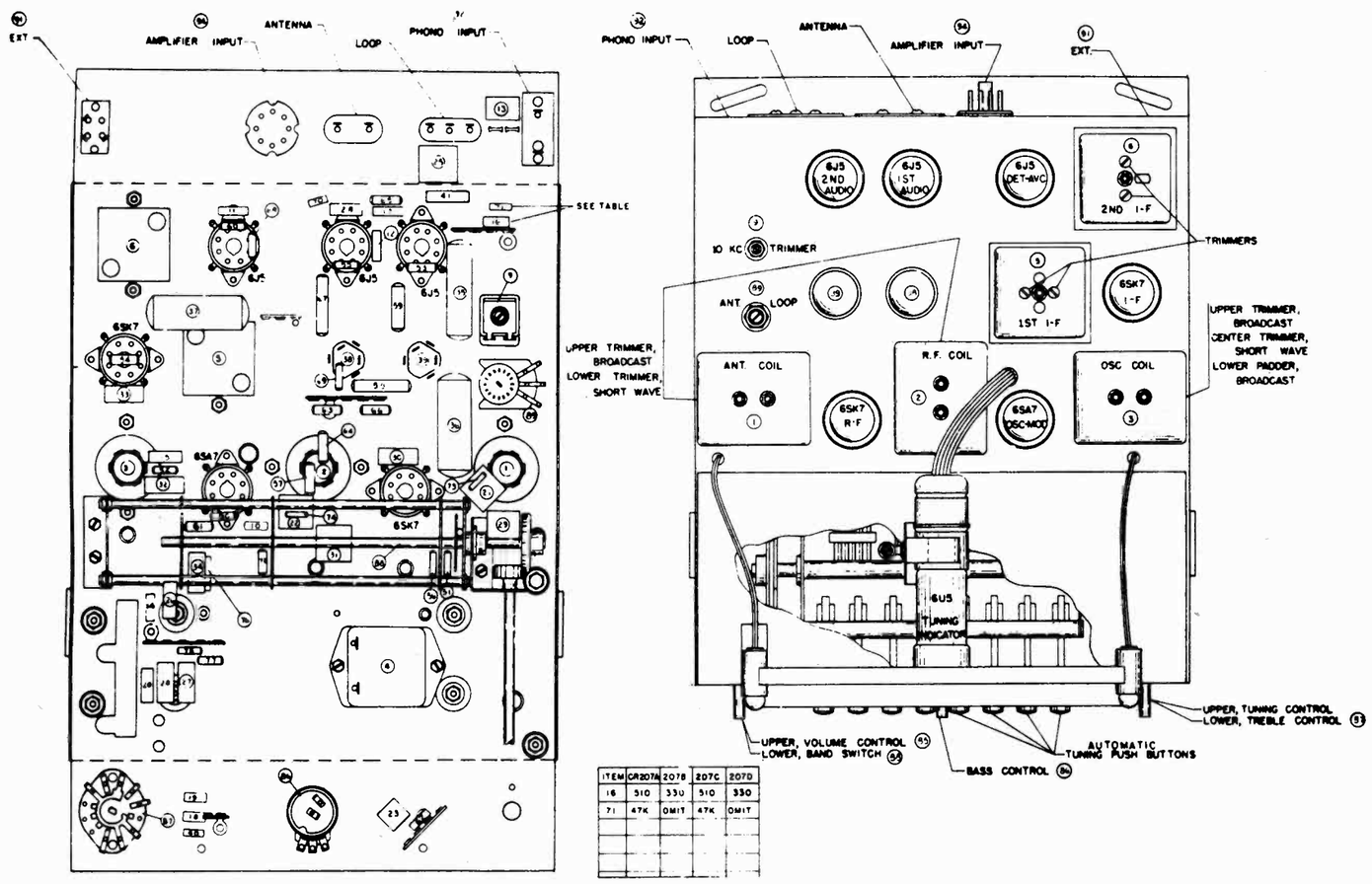


FIGURE 1



ITEM	CR207A	207B	207C	207D
16	510	330	510	330
71	47K	OMIT	47K	OMIT

FIGURE 7

CONDENSER GANG DRIVE ADJUSTMENTS

MODELS CR-207A, CR-207C

Whenever any of the mechanical parts in the condenser gang drive assembly require replacement due to rough handling or for any other reason, it is extremely important that clearances and adjustments shown on Figures 2 and 3 are effected; otherwise the tuning mechanism will be sluggish or it may slip during operation.

In reassembling the mechanism after any part was replaced, follow the procedure outlined below:

1. Assemble the Tuning Shaft, Drive Collar, Compression Spring, Spring Retainer and Flywheel in the manner shown on Figure 3. Note that the Tuning Shaft must extend ¾" from the front of the assembly and that the spacing between the rear of the Drive Collar and the front of the Flywheel must be 3-5/64". Any excess length in the Tuning Shaft may extend beyond the rear of the Flywheel. See Figure 2.

2. The distance between the rubber-tired Drive Wheel and the smaller diameter section of the Spring Retainer must be 1/32" to 1/16" (Figure 3). This adjustment is effected by loosening the two No. 6 Allen set screws in the Drive Wheel hub and sliding the wheel on its shaft until the required clearance is obtained. When the adjustment is completed, tighten the two screws in the hub of the Drive Wheel.

3. While pressing down on the Treadle Bar at the location shown on Figure 3, adjust the Thrust Bracket until the clearance between the rear of the Flywheel and the projection on the Thrust Bracket is .010", as shown on the diagram. To make this adjustment, loosen the two No. 6 Allen set screws (use No. 6 Allen Wrench—Magnavox Part No. 800044G2) in the hub of Thrust Bracket and rotate the bracket until the specified clearance is obtained when the push buttons are NOT actuated. Tighten the two screws securely when the adjustment is completed. Press each push button and check that the Drive Collar is pushed away from the rubber-tired Drive Wheel.

4. Next, adjust the clearance in the muting switch contacts by turning the Phillips-head screw designated Adjustment "A" on Figure 2, until the specified clearance of .025" is obtained (when the push buttons are NOT actuated.)

5. While pressing any one of the push buttons in as far as possible, turn the screw designated Adjustment "B" until a minimum clearance of .015" is obtained between the front surface of the Drive Collar and the switch spring directly in front of it. This setting should also cause a minimum clearance of .010" between the switch contacts actuated by pressure of the front surface of the Drive Collar, when the Tuning Shaft is pulled out. The function of this switch is to open the muting circuit when setting up the push buttons. As its contacts are wired in series with the large muting switch (contacts are shorted by pressing any push button), pulling out on the Tuning Shaft causes the small switch contacts to open the muting circuit so that a station can be heard while the push button is held in and tightened.

On rare occasions it may be necessary to adjust the relation between the push button bars and the Treadle Bar. Such adjustment might be required if when pushing any of the push buttons, sufficient motion is not transmitted to the Treadle Bar to cause a disengagement between the Drive Collar and the Drive wheel.

This can usually be accomplished by loosening the two screws designated "C" and "D" on Figure 3, and moving plate "B" in the direction required to correct this condition.

SPECIAL SERVICE INFORMATION

The following information is provided for the service man who has a vacuum tube voltmeter or a similar measuring instrument available.

STAGE GAINS*

Antenna Post to R-F Grid at:	
600 kc.	7.0
6 mc.	1.63
R-F to Converter Grid at:	
600 kc.	3.4
6 mc.	3.4
R-F on Converter Grid to I-F Grid at:	
600 kc.	40.0
6 mc.	35.5
I-F on Converter Grid to I-F Grid at:	
455 kc.	59
I-F Grid to Detector Plate at:	
455 kc.	68

AUDIO GAIN

Voltage required across Volume Control to produce 0.1 watt speaker output** at 400 cycles is .0072 volt with Band Selector Switch in BDCST setting.

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across Oscillator Grid Resistor at:

600 kc.	5.8
6 mc.	6.6

* Variations of ±20% are permissible. All readings made with sufficient input signal to provide .05 watt speaker output

** .05 watt speaker output at 400 cycles is equivalent to a reading of 0.35 volts as measured by a high resistance AC voltmeter across the voice coil of 15-inch speaker.

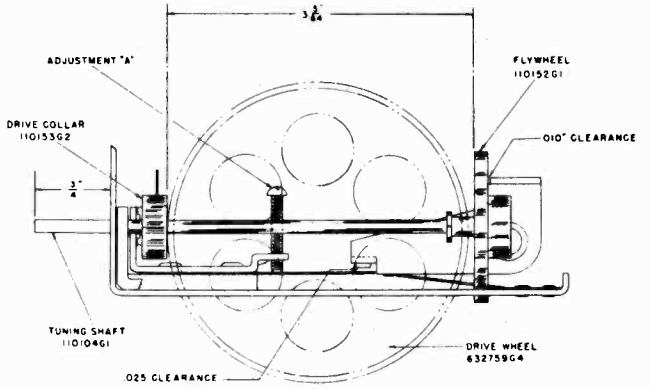


FIGURE 2

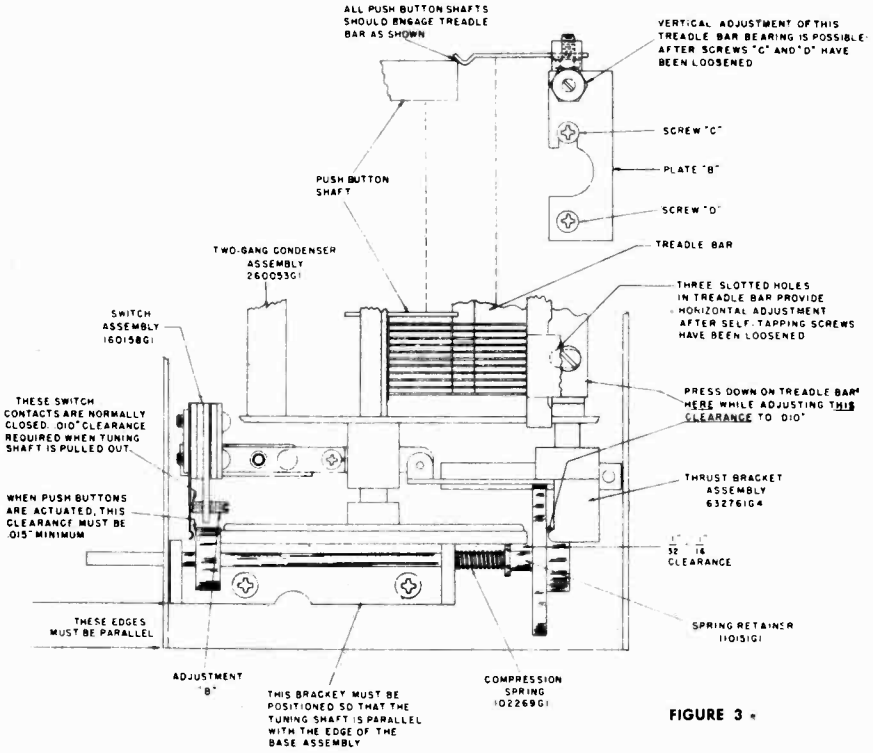


FIGURE 3

PARTS LIST

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, antenna, two band	360254G3
2	Coil assembly, r-f, two band	360254G4
3	Coil assembly, oscillator, two band	360253G2
4	Coil assembly, 10kc, filter	360244G1
5	Transformer, first i-f	360024G1
6	Transformer, second i-f	360025G1
8	Capacitor, variable, three-gang tuning	260054G2
	Push Button Assembly for 260054G2	260064G1
9	Capacitor, variable, 10kc, trimmer	259610G2
10	Capacitor, ceramic, 50 mmf	250088G25
11	Capacitor, molded mica, 220 mmf	250159G100
12	Capacitor, molded mica, 220 mmf	250159G100
13	Capacitor, molded mica, 510 mmf	250159G64
	Capacitor, molded mica, 510 mmf—CR-203B only	250159G64
14	Capacitor, molded mica, 330 mmf	250159G88
15	Capacitor, silvered mica, 490 mmf, ±1%	250085G32
16	Capacitor, molded mica, 510 mmf (CR-207A/207C only)	250159G64
	Capacitor, molded mica, 330 mmf (CR-207B, 207D only)	250159G88
17	Capacitor, molded mica, 510 mmf	250159G64
18	Capacitor, molded mica, .001 mfd	250159G133
19	Capacitor, molded mica, .001 mfd	250159G133
20	Capacitor, paper, .004 mfd 600V	250129G7
21	Capacitor, molded mica, .0047 mfd, ±5%	250161G24
22	Capacitor, molded mica, .0047 mfd, ±5%	250161G24
23	Capacitor, paper, .005 mfd 400 V	250129G10
24	Capacitor, paper, .004 mfd. 600 V	250129G7
25	Capacitor, paper, .01 mfd. 400 V	250129G9
26	Capacitor, paper, .01 mfd. 400 V	250129G9
27	Capacitor, paper, .012 mfd. 200 V	250129G13
28	Capacitor, paper, .02 mfd 600 V	2501293G
29	Capacitor, paper, .05 mfd. 120 V	250129G5
30	Capacitor, paper, .05 mfd. 120 V	250129G5
31	Capacitor, paper, .05 mfd. 120 V	250129G5
32	Capacitor, paper, .05 mfd. 120 V	250129G5
33	Capacitor, paper, .05 mfd. 120 V	250129G5
34	Capacitor, paper, .05 mfd. 120 V	250129G5
35	Capacitor, paper, 0.1 mfd. 400 V	250152G22
36	Capacitor, paper, 0.25 mfd. 400 V	250152G21
37	Capacitor, paper, 0.25 mfd. 400 V	250152G21
38	Capacitor, electrolytic, 20 mfd, 25 V., 10 mfd, 450 V	270023G6
39	Capacitor, electrolytic, 20 mfd, 25 V., 10 mfd, 450 V	270023G6
40	Capacitor, molded mica, 470 mmf, ±10% 500 V	250159G90
50	Resistor, composition, 100 ohm, ½ W	230084G7
51	Resistor, composition, 150 ohm, ½ W	230084G8
52	Resistor, composition, 150 ohm, ½ W	230084G8
53	Resistor, composition, 470 ohm, ½ W	230084G11
54	Resistor, composition, 820 ohm, ±10%, ½ W	230084G61
55	Resistor, composition, 2200 ohm, ½ W	230084G15
56	Resistor, composition, 4700 ohm, ½ W	230084G17
57	Resistor, composition, 10,000 ohm, ½ W	230084G19
58	Resistor, composition, 10,000 ohm, 1 W	230085G19
59	Resistor, composition, 15,000 ohm, 1 W	230085G20
60	Resistor, composition, 22,000 ohm, ½ W	230084G21
61	Resistor, composition, 33,000 ohm, ½ W	230084G22
62	Resistor, composition, 47,000 ohm, ½ W	230084G23
63	Resistor, composition, 100,000 ohm, ½ W	230084G25
64	Resistor, composition, 100,000 ohm, ½ W	230084G25
65	Resistor, composition, 100,000 ohm, ½ W	230084G25
66	Resistor, composition, 100,000 ohm, ½ W	230084G25
67	Resistor, composition, 100,000 ohm, 1 W	230085G25
68	Resistor, composition, 220,000 ohm, ½ W	230084G27
69	Resistor, composition, 220,000 ohm, ½ W	230084G27
70	Resistor, composition, 220,000 ohm, ±10%, ½ W	230084G90
71	Resistor, composition, 47,000 ohm, ½ W (CR-207A/207C only)	230084G23
72	Resistor, composition, 22,000 ohm, ½ W	230084G21
73	Resistor, composition, 1 megohm, ½ W	230084G31
74	Resistor, composition, 1 megohm, ½ W	230084G31
75	Resistor, composition, 1 megohm, ½ W	230084G31
76	Resistor, composition, 1 megohm, ½ W	230084G31
77	Resistor, composition, 1.5 megohm, ½ W	230084G32
78	Resistor, composition, 560,000 ohms, (in tuning eye socket) ±10%, ½ W	230084G95
79	Resistor, composition, 47,000 ohm ½ W.—CR-203B only	230084G23
85	Control, volume, 1 megohm	220044G15
86	Control, bass, 1 megohm, (with switch)	220045G2
87	Switch, rotary, treble control	160161G1
88	Switch, rotary, band selector	160160G1
89	Switch, rotary, loop to outdoor antenna	160157G1
91	Socket, external, input	180060G1
92	Socket, phonograph input	189741G1
93	Antenna, loop assembly	*
94	Plug, octal, amplifier connection	180427G1
	Dial Glass Assembly	150285G1

* The part number of the loop antenna changes with different cabinets. It is therefore important that you specify the *STYLE NUMBER* of the instrument when ordering a replacement loop antenna assembly.

GENERAL

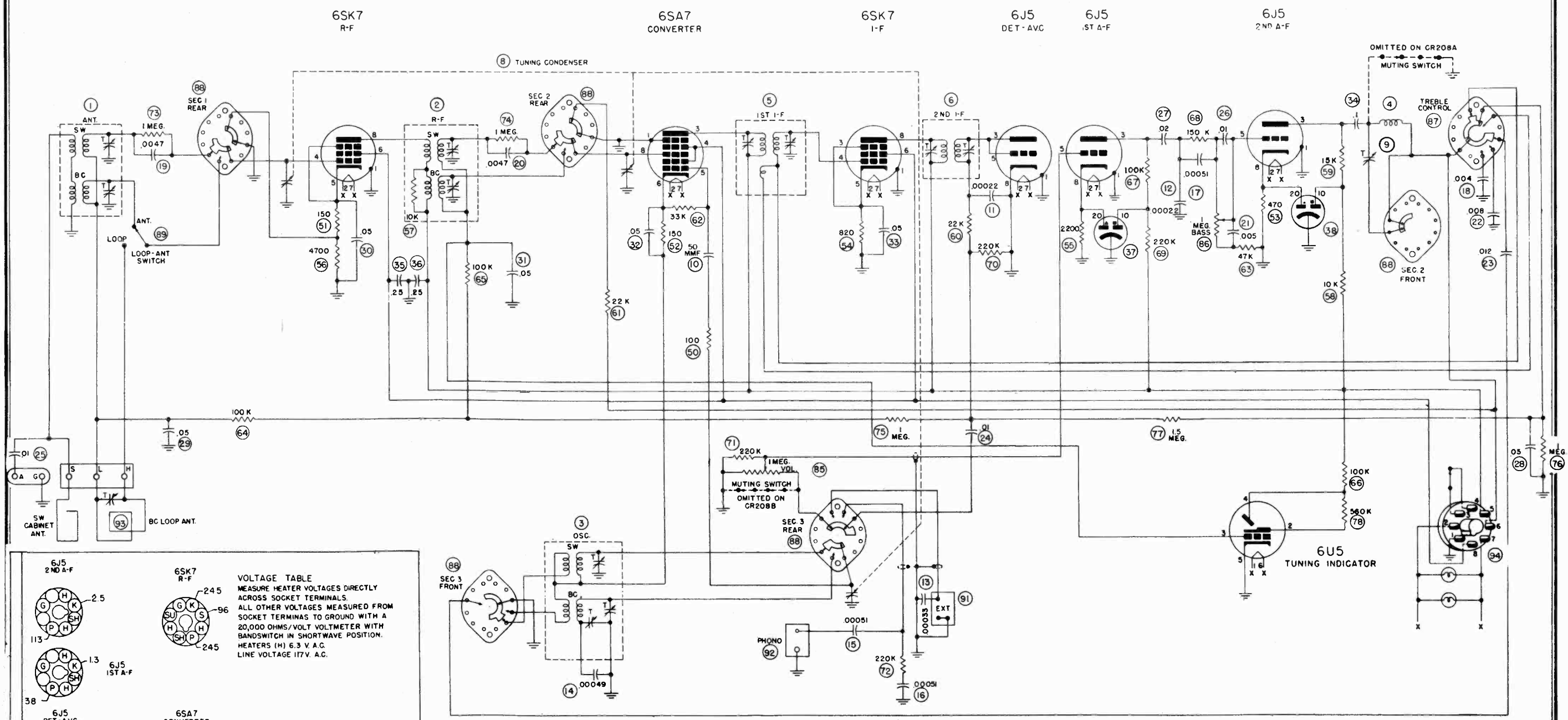
Model CR-207 radio chassis is a two-band tuner that must be used in conjunction with a power amplifier, such as the Model AMP-108 or AMP-110 for speaker operation. Heater and plate voltages for the CR-207 radio chassis are supplied from the amplifier chassis; it is therefore essential that the radio and amplifier chassis be interconnected during alignment or for other electrical service operations. Models CR-207A and 207C are alike electrically; they differ mechanically in the dial drive assembly. Models CR-207B and 207D are also alike electrically and differ mechanically in the dial drive assembly. Figures 2 and 3 illustrate the CR-207A and CR-207C dial drive and Figures 4 and 5 illustrate the CR-207B and CR-207D assembly. The electrical differences between CR-207A/207C and CR-207B/207D are shown on the schematic diagram, Figure 6.

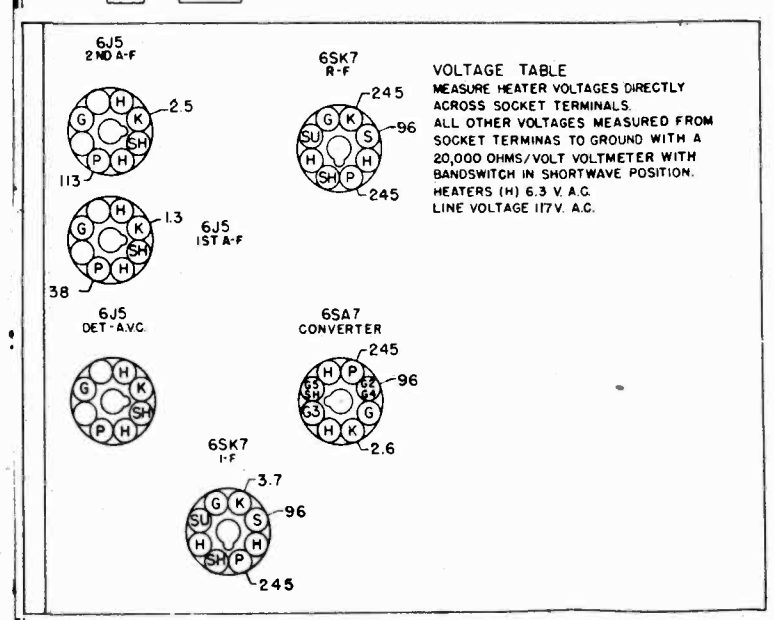
METHOD FOR REMOVING CHASSIS FROM CABINET

Model CR-207 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service. To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back. Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio panel in place when the chassis is replaced. In replacing the chassis, slide it so that the small hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hooks should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated S-L-H. The end of the short wave antenna that is fastened to the inside of the cabinet connects to S. Always disconnect this antenna from terminal S when an outdoor antenna is used as it may pick up noise. The two terminals on the loop are designated L and H. The leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.

THE MAGNAVOX CO.

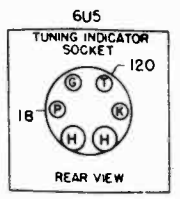
MODELS CR-208A, CR-208B





VOLTAGE TABLE

MEASURE HEATER VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS.
ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINAS TO GROUND WITH A 20,000 OHMS/VOLT VOLTMETER WITH BANDSWITCH IN SHORTWAVE POSITION.
HEATERS (H) 6.3 V. A.C.
LINE VOLTAGE 117 V. A.C.



I-F 455 KC

BAND SELECTOR SWITCH SHOWN WITH ITS CONTROL KNOB IN THE EXTREME COUNTERCLOCKWISE POSITION (SHORT WAVE).

ALL ELECTRICAL VALUES SHOWN ARE IN OHMS OR MICROFARADS UNLESS OTHERWISE SPECIFIED.

Intermediate frequency	455 kc.
Tuning frequency range:	
Broadcast band	530—1610 kc.
Short wave band	4.9—18.1 mc.

Tubes:

R-F Amplifier	6SK7
Converter	6SA7
I-F Amplifier	6SK7
Detector and AVC	6J5
First Audio	6J5
Second Audio	6J5
Tuning Indicator	6U5
Dial lamps	Mazda No. 44

ALIGNMENT PROCEDURE

The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 7. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings. *Always set the Treble Control to SHARP TUNE before aligning the i-f stages.* This is done by turning the Treble Control Knob to the No. 1 position.

I-F ALIGNMENT

1. Connect the output of the signal generator to the control grid (pin No. 8) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.
2. Turn the condenser gang until it is completely meshed, (low-frequency end of dial calibration) and set the band selector switch to BDCST as for broadcast band reception.
3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

On some models of the CR-207 chassis, the two i-f trimmers are located in the top of the respective i-f transformers as shown in the layout diagram Figure 7. In other models, one trimmer is accessible from the top and the other from the bottom of each transformer.

BROADCAST BAND ALIGNMENT

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The ANT-LOOP switch (89) must be in the ANT. setting.
2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, loosen the set screws in the hub of pulley "D" shown on Figure 1 and make the necessary adjustment.
3. With the band selector still set for broadcast band reception, adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.
4. Set the signal generator and the radio receiver to 1400 kc.; adjust the 1400 kc. oscillator trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.
5. If the loop antenna trimmer is out of adjustment it should be set after the radio chassis is in the cabinet. Set the ANT-LOOP switch (89) to the LOOP position. Adjust the signal generator to 1400 kilocycles and connect its output to a loop containing approximately five turns of wire eight inches in diameter placed eighteen inches from the receiver loop and in the same plane.
6. Set the receiver to 1400 kc. and adjust the trimmer on the receiver loop for maximum output.

SHORT WAVE BAND ALIGNMENT

1. Set the band selector switch to SW as for short wave reception and substitute a 400 ohm resistor for the capacitor in series with the signal generator lead connected to the antenna terminal on the receiver.
2. Set the signal generator and the radio receiver to 15 mc.; then adjust the 15 mc. oscillator trimmer and the 15 mc. antenna trimmer for maximum output. While adjusting the 15 mc. oscillator trimmer two peaks may be observed; only one is the correct peak for 15 mc. alignment. Screw in the trimmer to maximum capacity--then decrease the capacity until the first peak is observed. This is the correct one.

10 KC FILTER ADJUSTMENT

This chassis incorporates a 10 kc. filter circuit to eliminate the beat note heard as a whistle between stations on the broadcast band. If the trimmer is out of adjustment, the following procedure should be observed.

1. Turn the Treble Control to FULL RANGE (No. 4 position).
2. Connect the output of an audio oscillator to the phonograph pickup socket on the radio chassis and adjust the oscillator to EXACTLY 10,000 cycles.
3. Set the band selector to PHONO and adjust the 10 kc. trimmer (9) for minimum output.
4. If an audio oscillator is not available for making this adjustment, set the band selector to BDCST, connect an antenna to the receiver and set the gang condenser to a point between two stations on adjacent channels having approximately the same power. If the 10 kc. trimmer is out of adjustment, a whistle will be heard. Adjust the trimmer until the whistle is eliminated.

DIAL CORD REPLACEMENT

Rotate the brass pulley designated "A" in Figure 1 until the dial pointer strikes the stop at the high frequency end of the dial calibration. In this condition the slot in pulley "A" should be approximately ten degrees to the left of being vertical--see Figure 1. If the slot in the pulley is in some other position under the above mentioned conditions, the pointer set screw is probably loose and has allowed the pointer to slip.

To correct this condition, first remove the glass dial and loosen the pointer screw. Then while holding pulley "A" so that its slot is approximately ten degrees to the left of vertical (when viewed from the rear) adjust the pointer until it is resting against the stop at the high frequency end of its travel. Then tighten the pointer set screw securely and replace the glass dial.

Completely unmesh the condenser gang and check the location of the hole or slot in pulley "D." If this hole is not approximately 45 degrees back from vertical as shown on Figure 1, loosen the two No. 6 Allen set screws in the hub of pulley "D" and slip the pulley on its shaft (while holding the condenser gang unmeshed) until the specified adjustment is obtained; then tighten one of the set screws securely. It will be shown later that this is a temporary setting. Next, tie a double knot in the exact center of a 25-inch length of dial cable and fold the cable back on itself so that the knot is at one end. The correct method for tying this knot is shown as an inset on Figure 1. Grasp the cable near the knotted end and slide it into the pulley slot so that the knot is against the inside rim of the pulley as shown in the sketch. The piece of cable nearest the dial frame should be wound in the direction shown for one-half turn; then over the lower pulley "B," around the bottom of the large pulley "D" and into the hole. Pull the cable taut and wrap the end around the small hook on pulley "D" temporarily.

The remaining piece of cable should be wound around pulley "A" in the direction shown, for one complete turn, over the upper pulley "C," and over the top of pulley "D." Thread the end through the small hole in pulley "D" and pull both ends of the cable taut. With one end of tension spring "E" fastened to the hook on pulley "D" lace the two free ends of the cable through the opposite end of the spring and tie a knot at a point that will allow ¼" to 5/16" of cable between the spring and the inside rim of pulley "D." Be sure to tie the knot around one coil of the spring in the manner shown.

Now with the condenser gang completely meshed, check the position of the dial pointer. If it is not in line with the last calibration mark at the low frequency end of the dial, loosen the set screw in pulley "D" and turn it until the pointer is in the specified position. Be sure that the condenser gang does not move during this adjustment. Then tighten the two screws in pulley "D" securely completing the operation.

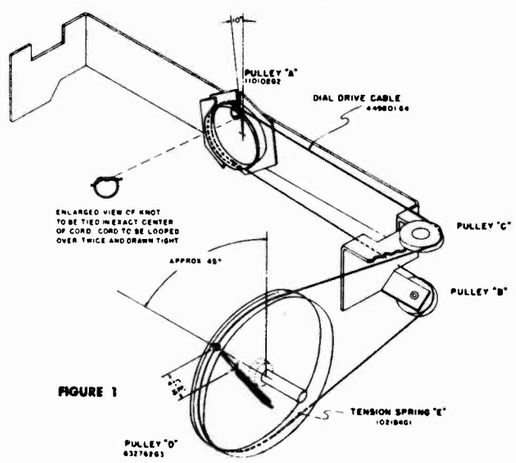


FIGURE 1

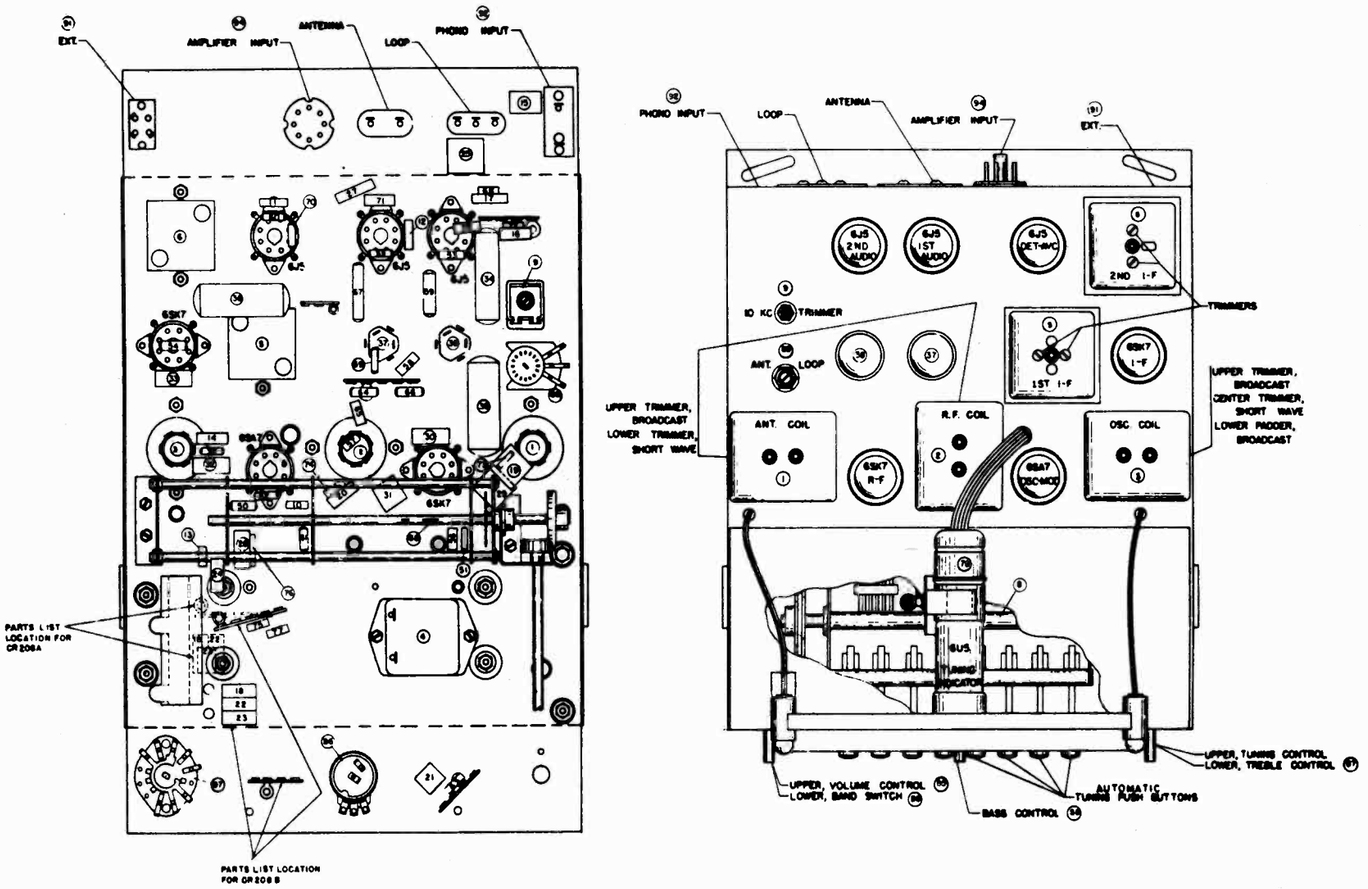


FIGURE 7

CONDENSER GANG DRIVE ADJUSTMENTS

MODEL CR-208A

Whenever any of the mechanical parts in the condenser gang drive assembly require replacement due to rough handling or for any other reason, it is extremely important that clearances and adjustments shown on Figures 2 and 3 are effected; otherwise the tuning mechanism will be sluggish or it may slip during operation.

In reassembling the mechanism after any part was replaced, follow the procedure outlined below:

1. Assemble the Tuning Shaft, Drive Collar, Compression Spring, Spring Retainer and Flywheel in the manner shown on Figure 3. Note that the Tuning Shaft must extend ¾" from the front of the assembly and that the spacing between the rear of the Drive Collar and the front of the Flywheel must be 3 5/64". Any excess length in the Tuning Shaft may extend beyond the rear of the Flywheel. See Figure 2.
2. The distance between the rubber-tired Drive Wheel and the smaller diameter section of the Spring Retainer must be 1 /32" to 1 16" (Figure 3). This adjustment is effected by loosening the two No. 6 Allen set screws in the Drive Wheel hub and sliding the wheel on its shaft until the required clearance is obtained. When the adjustment is completed, tighten the two screws in the hub of the Drive Wheel.
3. While pressing down on the Treadle Bar at the location shown on Figure 3, adjust the Thrust Bracket until the clearance between the rear of the Flywheel and the projection on the Thrust Bracket is .010" as shown on the diagram. To make this adjustment, loosen the two No. 6 Allen set screws (use No. 6 Allen Wrench—Magnavox Part No. 800044G2) in the hub of Thrust Bracket and rotate the bracket until the specified clearance is obtained when the push buttons are NOT actuated. Tighten the two screws securely when the adjustment is completed. Press each push button and check that the Drive Collar is pushed away from the rubber-tired Drive Wheel.
4. Next, adjust the clearance in the muting switch contacts by turning the Phillips-head screw designated Adjustment "A" on Figure 2, until the specified clearance of .025" is obtained (when the push buttons are NOT actuated.)
5. While pressing any one of the push buttons in as far as possible, turn the screw designated Adjustment "B" until a minimum clearance of .015" is obtained between the front surface of the Drive Collar and the switch spring directly in front of it. This setting should also cause a minimum clearance of .010" between the switch contacts actuated by pressure of the front surface of the Drive Collar, when the Tuning Shaft is pulled out. The function of this switch is to open the muting circuit when setting up the push buttons. As its contacts are wired in series with the large muting switch (contacts are shorted by pressing any push button), pulling out on the Tuning Shaft causes the small switch contacts to open the muting circuit so that a station can be heard while the push button is held in and tightened. On rare occasions it may be necessary to adjust the relation between the push button bars and the Treadle Bar. Such adjustment might be required if when pushing any of the push buttons, sufficient motion is not transmitted to the Treadle Bar to cause a disengagement between the Drive Collar and the Drive wheel.

This can usually be accomplished by loosening the two screws designated "C" and "D" on Figure 3, and moving plate "B" in the direction required to correct this condition.

SPECIAL SERVICE INFORMATION

The following information is provided for the service man who has a vacuum tube voltmeter or a similar measuring instrument available.

STAGE GAINS*

Antenna Post to R-F Grid at:	
600 kc.	0.4
6 mc.	2.26
R-F to Converter Grid at:	
600 kc.	3.6
6 mc.	3.6
R-F on Converter Grid to I-F Grid at:	
600 kc.	34
6 mc.	26
I-F on Converter Grid to I-F Grid at:	
455 kc.	50.5
I-F Grid to Detector Plate at:	
455 kc.	68

AUDIO GAIN

Voltage required across Volume Control to produce 0.1 watt speaker output** at 400 cycles is .015 volt with Band Selector Switch in BDCST setting.

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across Oscillator Grid Resistor at:

600 kc.	7.26
6 mc.	7.59

* Variations of ±20% are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.

** 0.1 watt speaker output at 400 cycles is equivalent to a reading of 0.548 volts as measured by a high resistance AC voltmeter across the voice coil of either speaker.

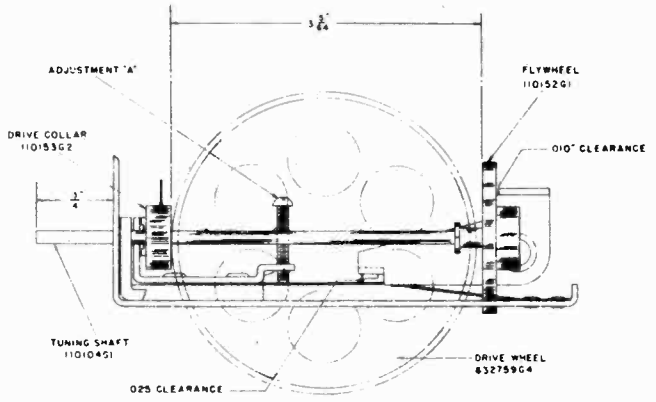


FIGURE 2

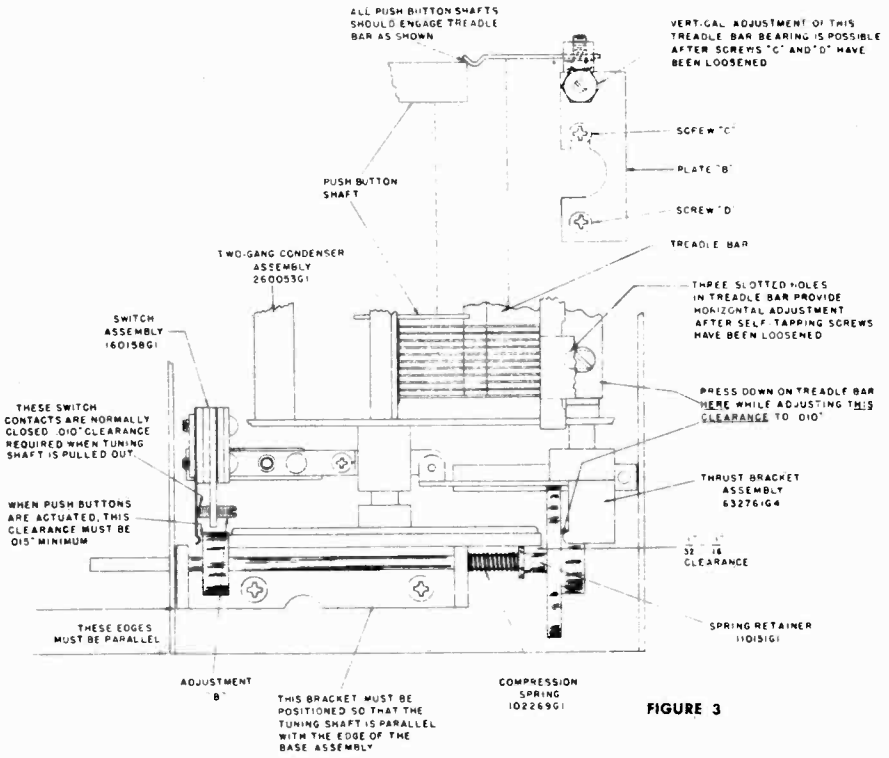


FIGURE 3

MODEL CR-208B

Whenever any of the mechanical parts in the condenser gang drive assembly require replacement due to rough handling or for any other reason, it is extremely important that clearances and adjustments shown on Figures 4 and 5 are correct; otherwise, the tuning mechanism will be sluggish or it may slip during operation.

In reassembling the mechanism after any part was replaced, follow the procedure outlined below:

1. Assemble the Tuning Shaft, Drive Collar, Compression Spring and Flywheel in the order shown on Figure 5. The distance between the front of the Drive Collar and the front of the Tuning Shaft must be 1⅛ inches as specified on Figure 4. Install the Flywheel on the rear of the Tuning Shaft and slide it forward until it nearly touches the edge of the Drive Wheel; then tighten one of the set screws in the Flywheel hub. Insert a .010" gauge between the Flywheel and the Pin, and while holding the gauge in this position, loosen the set screw in the Flywheel hub that was previously tightened. The Compression Spring should force the Flywheel back against the gauge—when this occurs, tighten both set screws in the Flywheel hub.

2. Adjust the Muting Switch contact clearance by loosening the two screws in the Contact Bracket and sliding the bracket in the required direction until a 1/16" clearance is obtained. If this adjustment cannot be obtained in the manner prescribed, bend the Contact Bracket until proper clearance is realized.

3. The Drive Wheel is properly located on its shaft when its edge nearest the hub is in line with the outside edge of the Drive Collar as shown on Figure 5. Two Allen set screws in the Drive Wheel hub provide a means of adjusting the position of this wheel.

4. When the adjustment outlined in paragraph 2 is correct, the proper contact clearance will automatically be obtained when the Muting Switch is to be "unmuted" while the push buttons are being set. While pressure is applied to any one of the push buttons while they are being set up, a pressure applied simultaneously to the Tuning Control knob will cause the Muting Switch contacts to open. Detailed instructions on setting up these push buttons are shown elsewhere in this bulletin.

5. If the push button shafts at both ends do not engage the Treadle Bar as shown on Figure 5, the three screws in the Treadle Bar must be loosened and the Treadle Bar should be moved until the required condition is obtained.

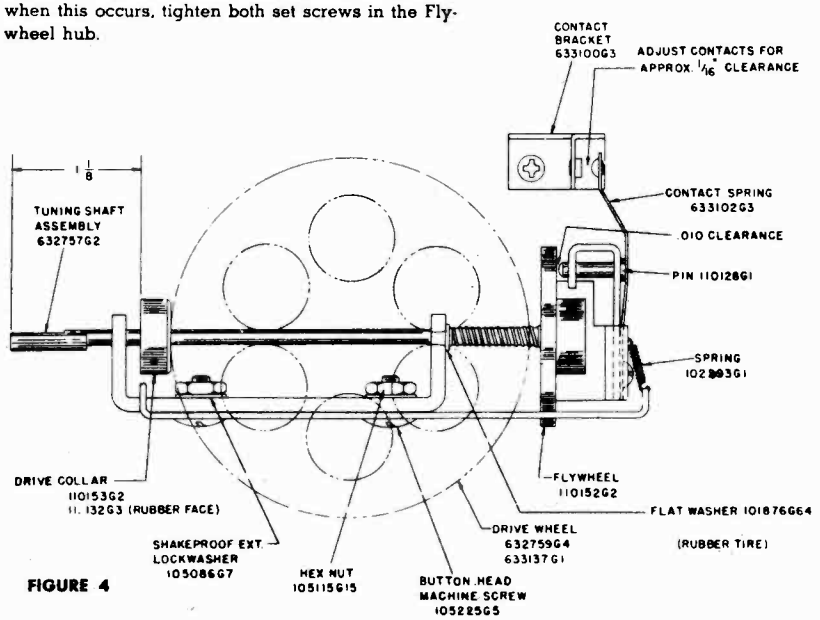


FIGURE 4

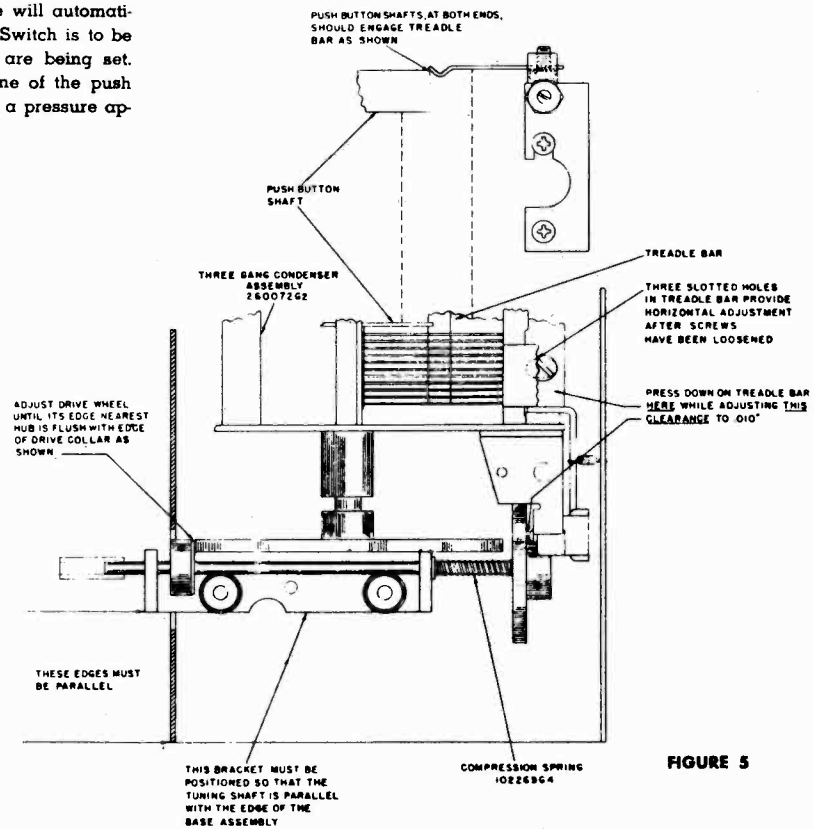


FIGURE 5

PARTS LIST

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, antenna, two-band	360254G3
2	Coil assembly, r-f, two-band	360254G4
3	Coil assembly, oscillator, two-band	360253G2
4	Coil assembly, 10kc, filter	360244G1
5	Transformer, first i-f	360024G1
6	Transformer, second i-f	360025G1
8	Capacitor, variable, three gang tuning	260054G2
9	Capacitor, variable, 10kc, trimmer	259610G2
10	Capacitor, ceramic, 50 mmf, 500 V	250088G25
11	Capacitor, molded mica, 220 mmf, 500 V	250159G100
12	Capacitor, molded mica, 220 mmf, 500 V	250159G100
13	Capacitor, molded mica, 330 mmf, 500 V	250159G88
14	Capacitor, silvered mica, 490 mmf, ±1%, 500 V	250085G32
15	Capacitor, molded mica, 510 mmf, 500 V	250159G64
16	Capacitor, molded mica, 510 mmf, 500 V	250159G64
17	Capacitor, molded mica, 510 mmf, 500 V	250159G64
18	Capacitor, paper, .004 mfd, 600 V	250129G7
19	Capacitor, paper, .0047 mfd, ±5%, 500 V	250161G24
20	Capacitor, paper, .0047 mfd, ±5%, 500 V	250161G24
21	Capacitor, paper, .005 mfd, 400 V	250129G10
22	Capacitor, paper, .008 mfd, ±10%, 400 V	250152G1028
23	Capacitor, paper, .012 mfd, ±10%, 400 V	250152G1071
24	Capacitor, paper, .01 mfd, 400 V	250129G9
25	Capacitor, paper, .01 mfd, 400 V	250129G9
26	Capacitor, paper, .01 mfd, 600 V	250152G38
27	Capacitor, paper, .02 mfd, 600 V	250129G3
28	Capacitor, paper, .05 mfd, 120 V	250129G5
29	Capacitor, paper, .05 mfd, 120 V	250129G5
30	Capacitor, paper, .05 mfd, 120 V	250129G5
31	Capacitor, paper, .05 mfd, 120 V	250129G5
32	Capacitor, paper, .05 mfd, 120 V	250129G5
33	Capacitor, paper, .05 mfd, 120 V	250129G5
34	Capacitor, paper, .1 mfd, 400 V	250152G22
35	Capacitor, paper, .25 mfd, 400 V	250152G21
36	Capacitor, paper, .25 mfd, 400 V	250152G21
37	Capacitor, electrolytic, 20 mfd, 25 V, 10 mfd, 450 V	270023G6
38	Capacitor, electrolytic, 20 mfd, 25 V, 10 mfd, 450 V	270023G6
50	Resistor, composition, 100 ohm, ½ W	230084G7
51	Resistor, composition, 150 ohm, ½ W	230084G8
52	Resistor, composition, 150 ohm, ½ W	230084G8
53	Resistor, composition, 470 ohm, ½ W	230084G11
54	Resistor, composition, 820 ohm, ½ W, ±10%	230084G61
55	Resistor, composition, 2200 ohm, ½ W	230084G15
56	Resistor, composition, 4700 ohm, ½ W	230084G17
57	Resistor, composition, 10,000 ohm, 1 W	230084G19
58	Resistor, composition, 10,000 ohm, 1 W	230085G19
59	Resistor, composition, 15,000 ohm, ½ W	230085G20
60	Resistor, composition, 22,000 ohm, ½ W	230084G21
61	Resistor, composition, 22,000 ohm, ½ W	230084G21
62	Resistor, composition, 33,000 ohm, ½ W	230084G22
63	Resistor, composition, 47,000 ohm, ½ W	230084G23
64	Resistor, composition, 100,000 ohm, ½ W	230084G25
65	Resistor, composition, 100,000 ohm, ½ W	230084G25
66	Resistor, composition, 100,000 ohm, ½ W	230084G25
67	Resistor, composition, 100,000 ohm, 1 W	230085G25
68	Resistor, composition, 150,000 ohm, ½ W	230084G26
69	Resistor, composition, 220,000 ohm, ½ W	230084G27
70	Resistor, composition, 220,000 ohm, ½ W	230084G27
71	Resistor, composition, 220,000 ohm, ½ W ±10%	230084G90
72	Resistor, composition, 220,000 ohm, ½ W ±10%	230084G90
73	Resistor, composition, 1 megohm, ½ W	230084G31
74	Resistor, composition, 1 megohm, ½ W	230084G31
75	Resistor, composition, 1 megohm, ½ W	230084G31
76	Resistor, composition, 1 megohm, ½ W	230084G31
77	Resistor, composition, 1.5 megohm, ½ W	230084G32
78	Resistor, composition, 560,000 ohm, ½ W, ±10% (in tuning eye socket)	230084G95
85	Control, volume, 1 megohm	220044G15
86	Control, bass, 1 megohm (with switch)	220045G2
87	Switch, rotary, treble control	160161G1
88	Switch, rotary, band selector	160160G2
89	Switch, rotary, (LOOP-ANT)	160157G1
91	Socket, external, input	180060G1
92	Socket, phono, input	189741G1
93	Antenna loop assembly	*
94	Plug, octal, amplifier connection	180427G1
	Dial Glass Assembly	150285G1

* The part number of the loop antenna assembly changes with different cabinets. It is therefore important that you specify the *STYLE NUMBER* of the instrument when ordering a replacement loop antenna assembly.

GENERAL

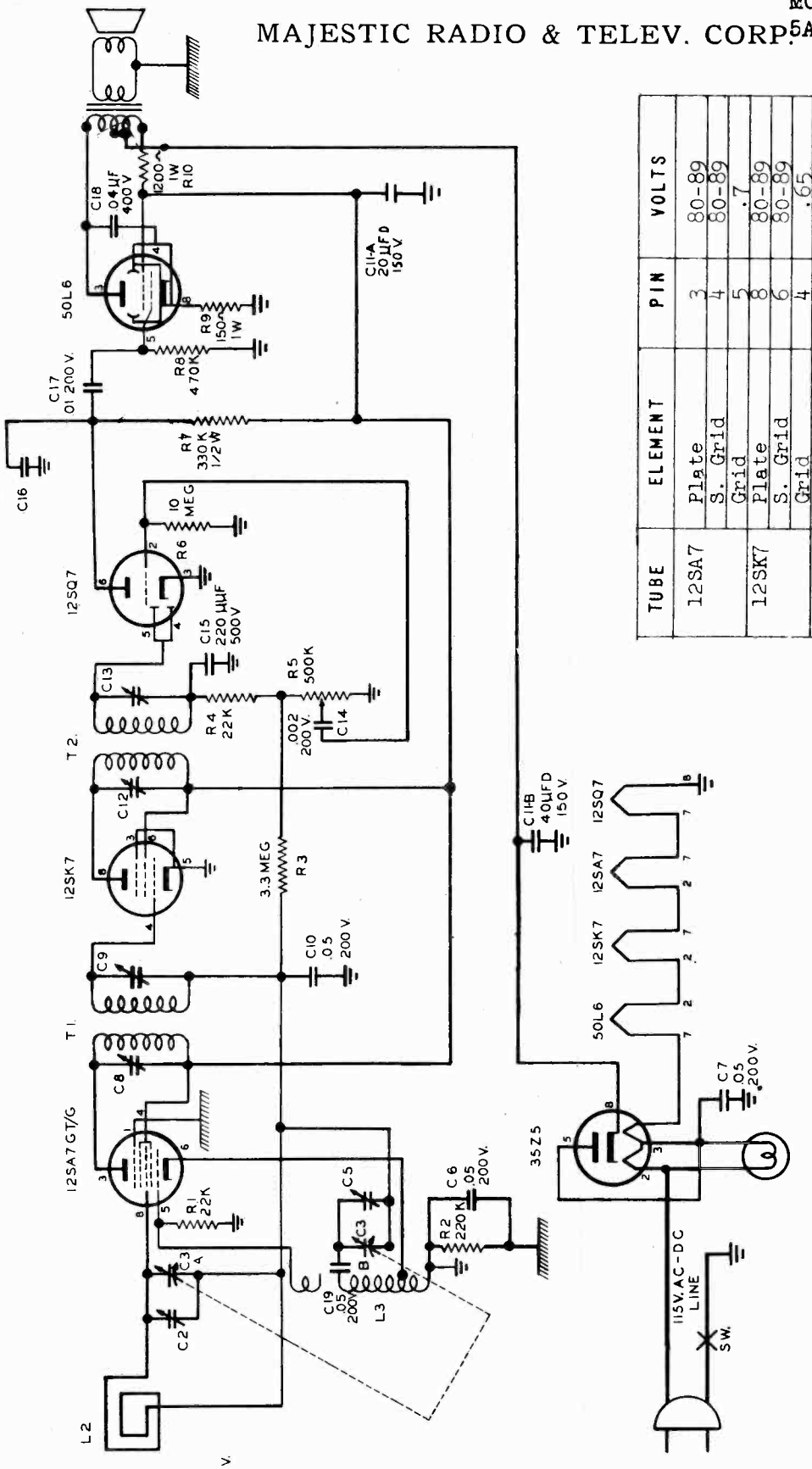
Model CR-208 radio chassis is a two-band tuner that must be used in conjunction with a power amplifier such as the AMP-101 for speaker operation. Heater and plate voltages for the CR-208 radio tuner are supplied from the amplifier chassis; it is therefore essential that the radio and the amplifier chassis be inter-connected during alignment or for other electrical service operations. Models CR-208A and 208B are alike electrically; they differ mechanically in the dial drive assembly. Figures 2 and 3 illustrate the CR-208A dial drive and Figures 4 and 5 the CR-208B assembly.

METHOD FOR REMOVING CHASSIS FROM CABINET

Model CR-208 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service. To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back. Never remove the chassis tray from the cabinet--it has been properly positioned to bring the radio panel in place when the chassis is replaced. In replacing the chassis, slide it so that the small hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hooks should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated S-L-H. The end of the short wave antenna that is fastened to the inside of the cabinet connects to S. Always disconnect this antenna from terminal S when an outdoor antenna is used as it may pick up noise. The two terminals on the loop are designated L and H. The leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.

MODELS 5A410,Ch.4501;
5A430,Ch.4504

MAJESTIC RADIO & TELEV. CORP.



TUBE	ELEMENT	PIN	VOLTS
12SA7	Plate	3	80-89
	S. Grid	4	80-89
	Grid	5	.7
12SK7	Plate	8	80-89
	S. Grid	6	80-89
	Grid	4	.65
12SQ7	Plate	6	55-65
	Grid	2	.8
50L6	Plate	3	110-118
	S. Grid	4	80-89

NOTE: ALL VOLTAGES MEASURED WITH VOLT-OHMYST TO B MINUS (LOW END OF VOL. CONTROL, PIN 8 OF 12SQ7, etc.) LINE VOLTAGE 117 VOLTS, NO SIGNAL, VOLUME CONTROL FULL OFF.

MODELS 5A410,Ch.4501;
5A430,Ch.4504

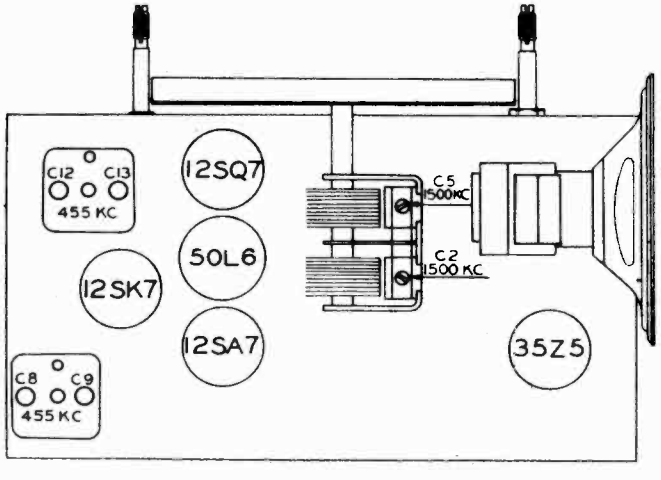
MAJESTIC RADIO & TELEV. CORP.

Before aligning, set the dial pointer as follows: Close the tuning gang condenser (plates fully meshed). Set dial pointer so that its left hand edge is in line with the right hand edge of the last mark at the low frequency end of the dial scale.

While aligning this receiver, turn the volume control full on, and keep the signal generator output as low as possible to prevent AVC action and false readings.

STEP	DUMMY ANT.	TEST OSC. CONNECTION	TEST OSC. FREQUENCY	RECEIVER DIAL	ADJUST	REMARKS
1	.01 mfd.	12SA7 grid (pin No.5)	455 kc. modulated	Any quiet spot	C13,C12,C9,C8 for max. output	Repeat in reverse order
2	--------	Loop*	1500 kc. modulated	150	C5 for maximum output	
3	--------	Loop*	1500 kc. modulated	150	C2 for maximum output	Rock gang while adjusting
4	REPEAT COMPLETE ALIGNMENT PROCEDURE CAREFULLY					

* Make a two or three turn loop about 12 inches in diameter. Connect to output terminals of the signal generator. Place this loop in a plane parallel to the receiver loop antenna and about a foot away from the receiver loop. IMPORTANT: WHEN MAKING RF. ADJUSTMENTS, THE RECEIVER LOOP ANTENNA MUST BE MOUNTED ON THE CHASSIS EXACTLY AS WHEN THE RECEIVER IS IN THE CABINET.

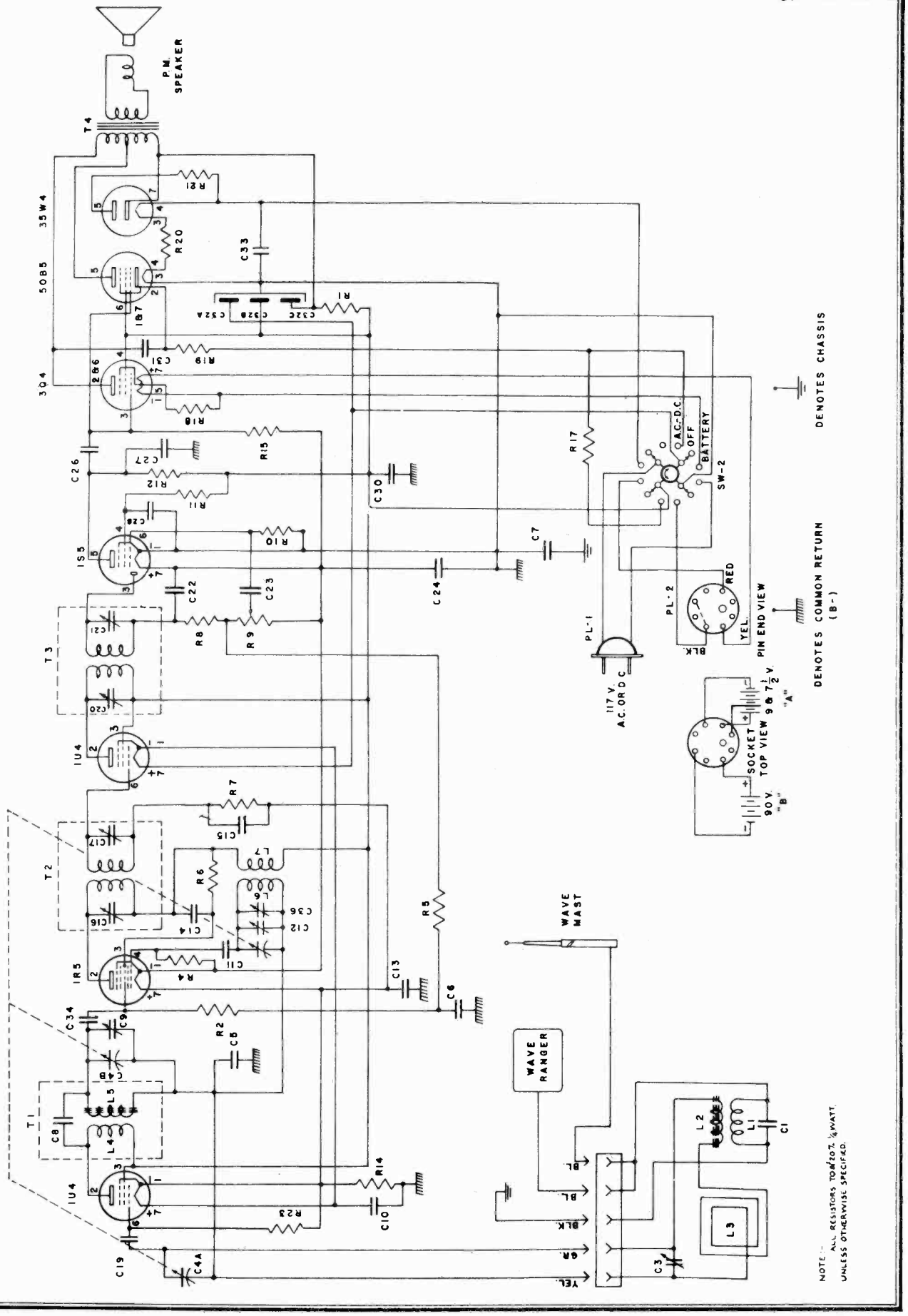


TUBE LAYOUT

ITEM	DESCRIPTION	PART NO.
R1,R4	22,000 ohm 20% 1/3 watt	9-184
R2	220,000 ohm 20% 1/3 watt	9-182
R3	3.3 megohm 20% 1/3 watt	9-206
R5	Volume Control with switch	13-14
R6	10 megohm 20% 1/3 watt	9-160
R7	330,000 ohm 20% 1/2 watt	9-89
R8	470,000 ohm 20% 1/3 watt	9-207
R9	150 ohm 20% 1 watt	9-251
R10	1,200 ohm 10% 1 watt	9-216
C1,C17	.01 mfd +20% -10% 200 v	6-112
C2,C3,C5	Ganged Tuning Condenser	7-16
C6	.05mfd +40% -10% 200 v	5-40
C7,C10	.05 mfd +40% -10% 200 v	5-40
C8,C9, C12,C13	Trimmer, 135 mmfd, mica	8-46
C11	20-40 mfd 150 v electrolytic	19-24
C14	.002 mfd +40% -10% 200 v	5-52
C15,C16	220 mmfd 20% 500 v mica	6-151
C18	.04 mfd +20% -10% 400 v	5-58
C19	.05 mfd + 40% - 10% 200 v	5-40
T1	1st IF Transformer	3-116
T2	2nd IF Transformer	3-117
L3	Oscillator Coil Assembly	3-158
	Speaker	22-12
	Dial Glass	117-30
	Dial Cord Tension Spring	129-29
	Dial Pointer	135-5
	MODEL 5A410	
	Cabinet, walnut	116-1
	Cabinet, white	116-2
	Loop antenna & back cover	20-7
	Knobs, walnut	128-23
	Knobs, black	128-25
	MODEL 5A430	
	Cabinet	115-6
	Loop antenna & back cover	20-17
	Knobs	128-32

MAJESTIC RADIO & TELEV. CORP.

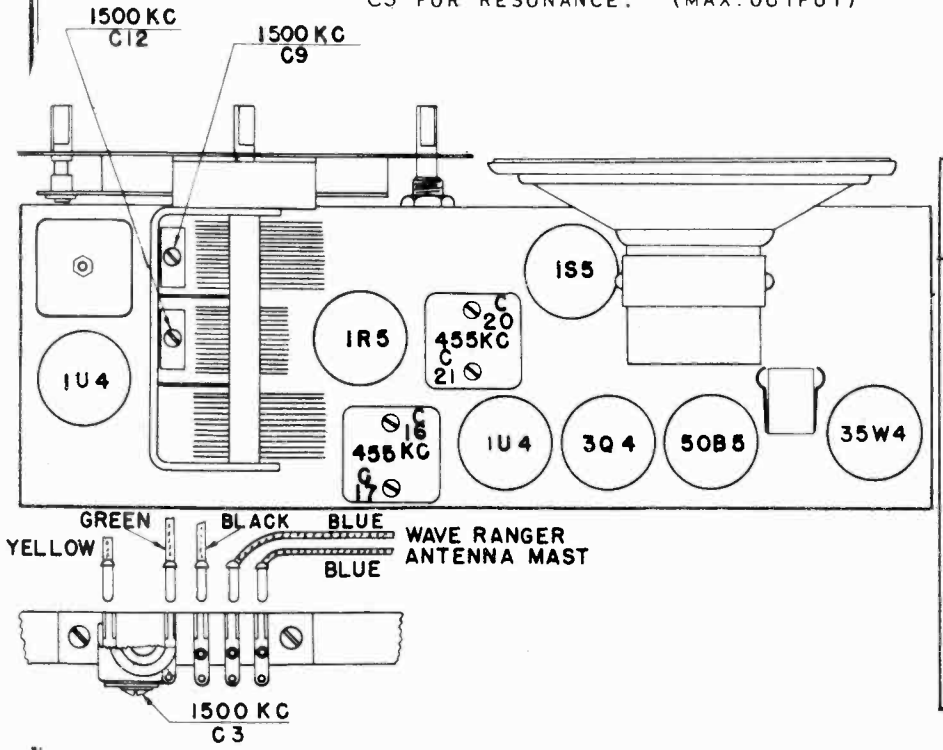
MODEL 7P420, CHASSIS 4705



ALIGNMENT PROCEDURE

STEP	DUMMY ANTENNA	TEST OSCILLATOR CONNECTION	TEST OSCILLATOR FREQUENCY	RECEIVER DIAL	ADJUST FOR MAXIMUM	NOTES
1	.01 MFD.	1R5 GRID	455 KC	ANY QUIET SPOT	C16, C17 C20, C21	
2	LOOP		1500 KC	150	C12, C9, C3	NOTE #1

NOTE #1 ADJUST C12 FIRST FOR DIAL CALIBRATION. THEN ADJUST C9. C3 FOR RESONANCE. (MAX: OUTPUT)



SERVICE NOTES:

1. Before adjusting the loop trimmer, have complete set and loop assembled in the cabinet.

VOLTAGE TABLE

TUBE		FILAMENT	PLATE	SCREEN E_s	CATHODE E_k	GRID E_g
(R. F. AMP.)	1U4	1.47	86	86	-	.05
(CONVERTER)	1R5	1.28	87	55	-	.85
(I. F.)	1U4	1.5	84	84	-	1.5
(DET. A.V.C. - A.F.)	1S5	1.3	12.7	19.6	-	0.3
(OUTPUT - (A.C.))	50B5	47	108	88	7.4	1.4
(OUTPUT - (BATT.))	3Q4	2.4	69	78	-	4.6
(RECTIFIER	35W4	29	100AC		117	

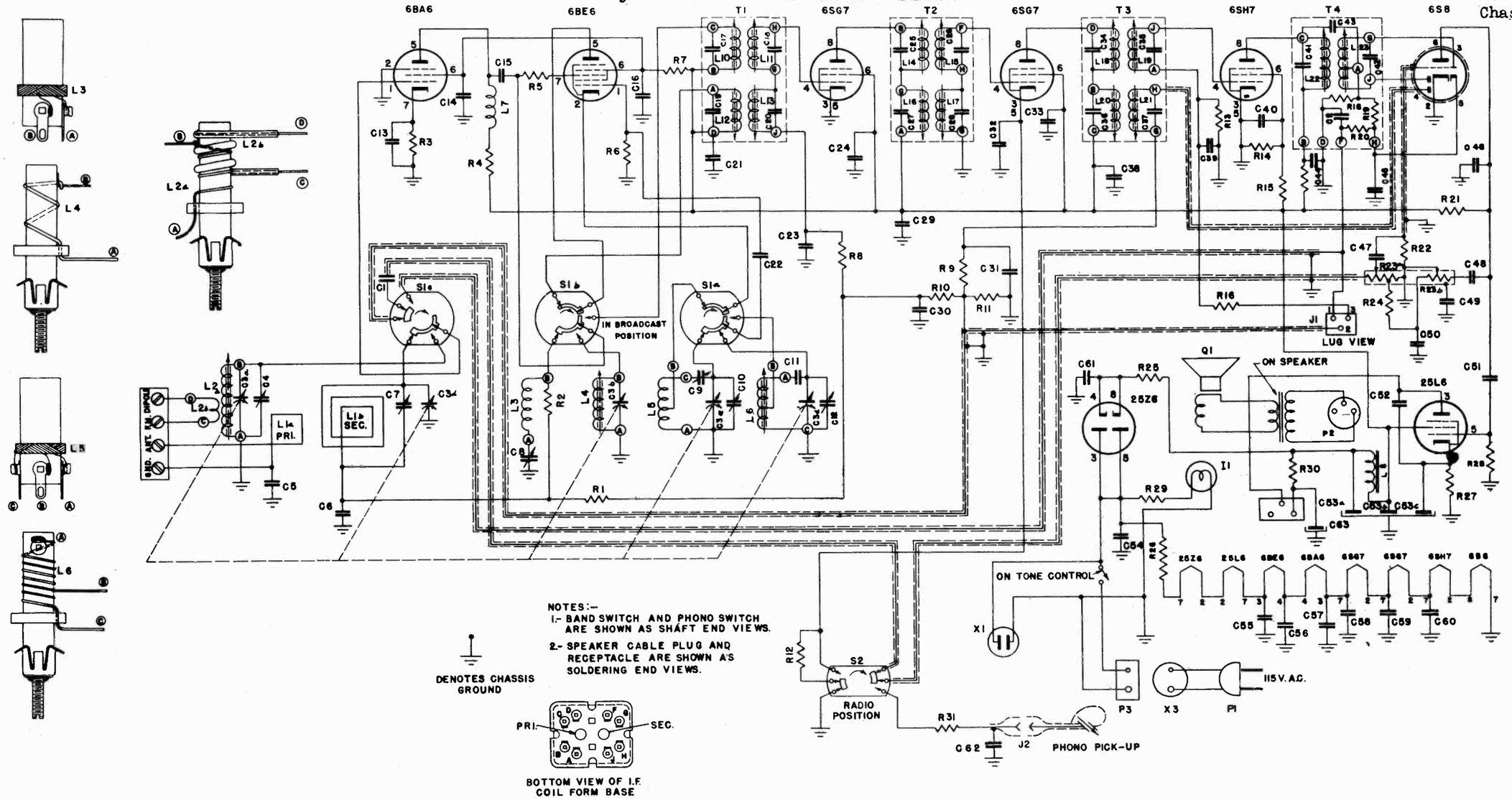
ALL VOLTAGES MEASURED WITH A 20,000 OHM PER VOLT METER.

MAJESTIC RADIO & TELEV. CORP. MODEL 7P420, CHASSIS 4705

ITEM	DESCRIPTION	PART NO.
L6, L7	Oscillator coil	3-125
L4, L5	R. F. coil	3-126
T1, (incl. C16, C17)	1st I. F. transformer	3-127
T2, (incl. C20, C21)	2nd I. F. transformer	3-128
C5, C6, C10	0.1 mfd. + 40% - 10% 200v paper	5-39
C28, C30	.002 mfd. + 80% - 25% 400v paper	6-184
C26	.001 mfd. + 20% - 10% 200v paper	5-50
C14	.05 mfd. ± 20% 400v paper	5-64
C33	.05 mfd. + 40% - 10% 200v paper	5-40
C7, C13, C24	.002 mfd. + 40% - 10% 200v paper	5-52
C15, C26	220 mmfd. ± 20% 500v mica	6-86
C22, C25, C27, C34	100 mmfd. ± 20% 500v mica	6-232
C11	Tuning condenser	7-13
C4A, C4B, C4C incl. (C9, C12, C36	10 megohms ± 20% 1/4 w.	9-213
R10	1200 ohms ± 10% 1 w.	9-216
R1	3.3 megohms ± 20% 1/4 w.	9-221
R2, R11	470,000 ohms + 20% 1/4 w.	9-223
R7, R15	1 megohm ± 20% 1/4 w.	9-255
R5, R12	100,000 ohms ± 20% 1/4 w.	9-304
R4	12,000 ohms ± 10% 1/4 w.	9-305
R6	47,000 ohms ± 20% 1/4 w.	9-306
R8	2.2 megohms + 20% 1/4 w.	9-114
R23	27 ohms ± 10% 1/3 w.	9-204
R21	270 ohms ± 10% 1/4 w.	9-310
R18	390 ohms ± 10% 1/4 w.	9-315
R14	5000 ohms ± 5% 2 w.	9-317
R17	56 ohms ± 10% 1/2 w.	9-314
R19	Power switch	11-62 or 11-49
S2	Volume control	13-17
R9	70 mfd. 150v, 20 mfd. 150v, 200 mfd. 10v	19-37
C32A, C32B, C32C	Speaker	22-9
	Battery plug & cable	27-269
	Power cord & plug	27-202
	Dial scale	117-45
	Drive cord spring	129-34
	Drive cord	134-7
	Dial pointer	135-15
	Loop assembly	20-12
	Wave Ranger assembly	20-13
	Antenna mast	20-25
	Cabinet	116-13
	Escutcheon	122.32
	Knob (power switch)	128-59
	Knob (tuning-volume)	128-58

MAJESTIC RADIO & TELEV. CORP.

MODEL 8FM776
Chassis 8B07D



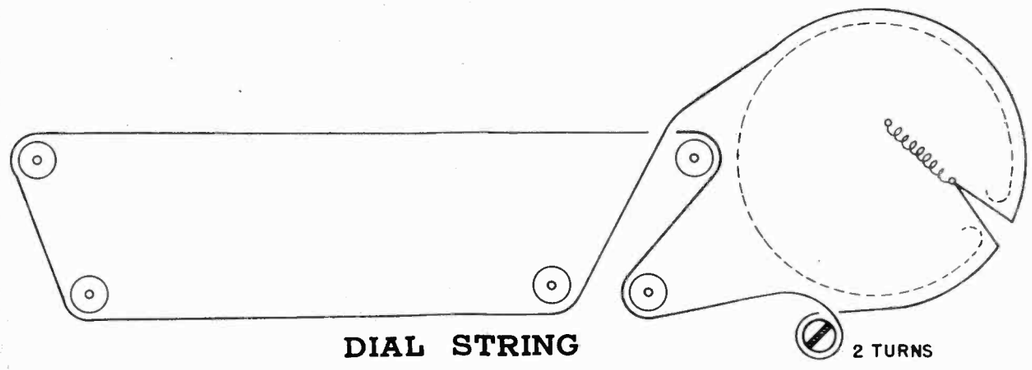
NOTES:—
1.- BAND SWITCH AND PHONO SWITCH ARE SHOWN AS SHAFT END VIEWS.
2.- SPEAKER CABLE PLUG AND RECEPTACLE ARE SHOWN AS SOLDERING END VIEWS.

DENOTES CHASSIS GROUND

BOTTOM VIEW OF I.F. COIL FORM BASE

VOLTAGE TABLE

TUBE	FUNCTION	PLATE	CATHODE	SCREEN	GRID
6BA6	RF Amplifier	80	0.5	78	----
6BE6	Converter	100	0	78	----
6SG7	1st IF Amplifier	100	0	100	-0.6
6SG7	2nd IF Amplifier	100	.7	100	----
6SH7	Limiter Amplifier	70	0	21	-0.4
6S8GT	Discriminator, Det., AVC	50	0	—	----
25L6	Power Amplifier	105	7	100	----
2525	Rectifier	117AC	105	---	----



DIAL STRING

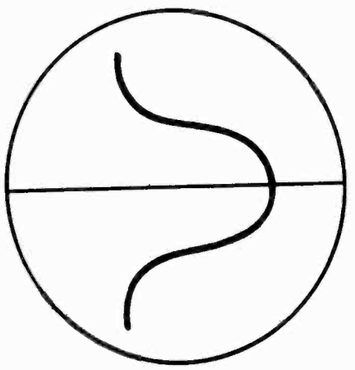


FIGURE 1

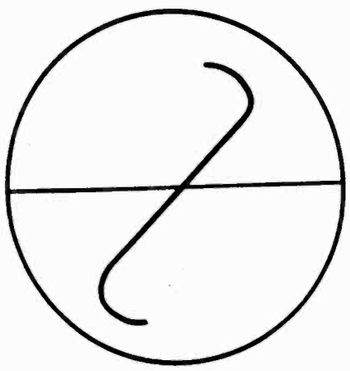
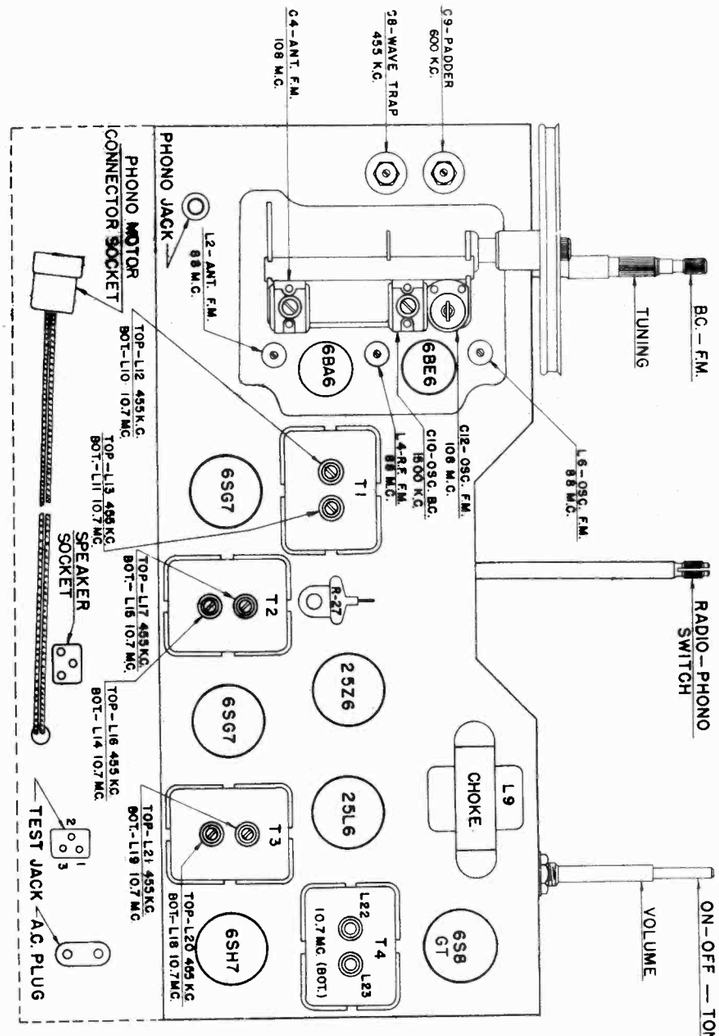


FIGURE 2

TUBE LAYOUT



ALIGNMENT

OPERATION	CONNECT TEST OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL TO	ADJUST TRIMMERS	PURPOSE
1	Stator Plates of C3d	.05mfd.	455 KC	BC	600 KC	L12, L13, L16, L17, L20, L21	Align if channel for maximum output.
2	Stator Plates of C3d	.05mfd.	455 KC Modulated	BC	600 KC	C8	Adjust wave trap for maximum output.
3	2 TURNS 8" DIAMETER COUPLED LOOSELY TO LOOP ANTENNA	------	1500 KC Modulated	BC	1500 KC	C10	Set oscillator to dial scale.
4		------	1500 KC Modulated	BC	1500 KC	C7	Align antenna for maximum output.
5		------	600 KC Modulated	BC	600 KC	C9	Rock gang to track BC padder
6(a)	Pin 4 (Grid) on 6SH7 Limiter Socket	.05mfd.	10.7 MC Unmodulated	FM	------	L22 Coil Slug Primary Discriminator	Align Primary of discriminator for maximum reading.
7(b)	Pin 4 (Grid) on 6SH7 Limiter Socket	.05mfd.	10.7 MC Unmodulated	FM	------	L23 Coil Slug Secondary Discriminator	Adjust secondary of discriminator for zero reading.
8(c)	Pin 4 (Grid) on 6SG7 2nd IF Socket	.05mfd.	10.7 MC Unmodulated	FM	------	L18 and L19, Pri. and Sec. 3rd IF Coil	Align 3rd IF Transformer for maximum reading.
9(c)	Pin 4 (Grid) on 6SG7 1st IF Socket	.05mfd.	10.7 MC Unmodulated	FM	------	L14 and L15 Pri. and Sec. 2nd IF Coil	Align 2nd IF Transformer for maximum reading.
10(c)	Lug "B" on Coil L4	.05mfd.	10.7 MC Unmodulated	FM	------	L10 and L11 Pri. and Sec. 1st IF Coil	Align 1st IF Transformer for maximum reading.
11(c)	Antenna Terminals	300ohm Resistorr	106 MC Unmodulated	FM	106 MC	C12 Oscillator Trimmer	Set oscillator to dial scale.
12(c)	Antenna Terminals	300ohm Resistor	106 MC Unmodulated	FM	106 MC	C4 Antenna Trimmer	Align antenna stage for maximum reading.
13(c)	Antenna Terminals	300ohm Resistor	88 MC Unmodulated	FM	88 MC	L6 Oscillator Slug	Set Oscillator to dial scale.
14(c)	Antenna Terminals	300ohm Resistor	88 MC Unmodulated	FM	88 MC	L4, L2 Slugs	Align Antenna and RF stages for maximum reading.
15(c)	Antenna Terminals	Repeat steps 11, 12, 13, and 14 until tracking is perfect at 88 and 106 MC.					

IMPORTANT: Alignment of this chassis will in most cases be unnecessary unless an IF or RF transformer is replaced or the adjustment has been tampered with. A vacuum tube voltmeter must be used for FM alignment. An AC output meter connected across the primary or secondary of the output transformer will be satisfactory for all AM adjustments. The signal generator output should be kept just high enough to get an indication on the meter.

NOTES: (a) Vacuum tube voltmeter pin "A" on discriminator transformer to chassis (half discriminator load).
(b) Vacuum tube voltmeter pin 1 of test jack to chassis (full discriminator load).
(c) Vacuum tube voltmeter pin 3 of test jack to chassis (limiter grid load).

A much more satisfactory IF and discriminator alignment may be obtained by using a 10.7 MC signal generator, frequency modulated at an audio frequency and swept approximately 600 KC (±300 KC). An oscilloscope should be connected to test jack pin 3 and all IF slugs adjusted for a symetrical pattern of highest amptitude. See Fig. 1. For discriminator alignment, connect oscilloscope to test jack pin 1 and adjust T4 for highest linear symetrical pattern. See Fig. 2.

PARTS LIST

ITEM	PART NO.	DESCRIPTION
C1,C48	017-4	.005 mfd, 600V
C2,C14,C15,C16, C55,C56,C57	6-230	1000 mmf, 300V Ceramic
C3	7-25	Gang Tuning Condenser FM-AM
C4,C10	8-35	Trimmer, 2.5 - 30 mmf
C5,C23,C30,C32 C49,C50	015-5	.01 mfd, 200V
C6,C62	015-8	.05 mfd, 200V
C7	8-59	Trimmer, 2-30 mmf
C8	8-63	Trimmer, 1 5-115 mmf
C9	8-65	200 - 600 mmf Padder
C11	6-218	1000 mmf, 500V, Mica
C12	8-38	Trimmer, 3-13 mmf
C13,C22	6-159	47 mmf, 500V Ceramic
C17,C41	6-247	24 mmf, Ceramic Special
C18,C25,C26,C34,C35 C19,C20,C27,C28, C36,C37	6-246	33 mmf, Ceramic Special
C21,C29,C38,C44,C51 C24,C33,C40,C58, C59,C60	6-250	750 mmf Mica Special
C31,C46,C61	016-5	.01 mfd, 400V
C39,C45	6-259	.005 mfd minimum disk-type Ceramic
C42	6-151	220 mmf, 500V Mica
C43	6-232	100 mmf, 500V Mica
C47	6-249	62 mmf, Ceramic, Special
C52	6-248	15 mmf, Ceramic, Special
C53	017-2	.002 mfd, 600V
	017-5	.01 mfd, 600V
	19-37	100 mfd-- 150V, 200 mfd - 150B, 200 mfd - 10V Electrolytic
C54	016-8	.05 mfd, 400V
C63	19-32	20 mfd 150V Electrolytic
R1,R8,R11,R16 R21,R28	01-199	470K ohm, 1/4 watt
R2,R13,R17,R20	01-157	47K ohm, 1/4 watt
R3,R12	01-37	68 ohm, 1/4 watt
R4,R14	02-108	3300 ohm, 1/2 watt
R5	01-3	10 ohm, 1/4 watt
R6,R9	01-143	22K ohm, 1/4 watt
R7	01-101	2200 ohm, 1/4 watt
R10,R31	01-227	2.2 meg ohm, 1/4 watt
R15	02-132	12K ohm, 1/2 watt
R18,R19	01-174	120K ohm, 1/4 watt
R22	01-255	10 meg ohm, 1/4 watt
R23	03-32	Volume - Tone Control with switch
R24	01-132	12K ohm, 1/4 watt
R25	02-20	27 ohm, 1/2 watt
R26	9-332	100 ohm candohm
R27	02-52	150 ohm, 1/2 watt
R29	04-69	390 ohm, 2 watt
R30	01-45	100 ohm, 1/4 watt
L1	S1400	Loop Antenna Assembly
L2	S1407	FM Antenna Coil
L3	S-1410	Wave Trap Coil
L4	S-1408	FM RF Coil
L5	S-1411	AM Oscillator Coil
L6	S-1409	FM Oscillator Coil
L7	S-1384	R.F. Plate Choke
L8	2-32	Filter Choke
T1	S-1389	1st I.F. Transformer
T2	S-1390	2nd I.F. Transformer
T3	S-1391	3rd I.F. Transformer
T4	S-1392	Discriminator Transformer
Q1	22-45	Speaker, 10" PM
I1		Dial Lamp
J1	15-91	Test Jack
J2	15-87	Phono jack
S1	11-71	Switch Shaft
S1a	11-71-1	Switch Wafer, Section 1
S1b	11-71-2	Switch Wafer, Section 2
S1c	11-71-3	Switch Wafer, Section 3
S2	11-72	Phono Switch
P1	27-201	Plug and line cord
X1	15-123	A.C. Receptacle (Phono)
X2	15-91	Speaker Receptacle
P3	18-50	Plug, power connector
X3	15-137	Socket, power connector
	18-81	Tube, Socket, Octal
	15-87	Socket, Phono Pickup
	15-114	Socket, miniature tube
	16-34	Miniature tube shield
	16-39	Tube Shield, 6S8 tube
	34-20	I.F. Iron Core
	38-5	Insulator, Phono Pickup Socket
	38-8	Insulator, Shaft
	38-9	Insulator, Plug
	117-95	Dial Scale
	129-21	Dial Spring
	134-7	Dial Cord
	135-21	Dial Pointer
	21-24	Oak Record Changer
	115-37-1	Cabinet, Oak Cut-out
	122-37	Escuthcheon
	123-28	Back, Cabinet
	128-70	Knob (Volume)
	128-71	Knob (band switch) (Phono-Radio)
	128-72	Knob (Tuning)
	128-73	Knob (Tone, On-Off)
	128-76	Knob (Dummy)
	148-97	Carton and fillers
	19-262	Instruction Sheet

ITEM	PART NO.	DESCRIPTION
C1,C2	7-17	Ganged Tuning Condenser.
C3,C8,C10	8-38	Trimmer, 3-3 mmf.
C4,C55,C71	6-159	47 mmf, 500V, ceramic.
C5,C6,C9		
C13,C73,C74	6-230	.001 mfd., 400V. ceramic
C7	6-143	24 mmf, 500V ceramic
C11	6-218	1000 mmf. 500V Mica.
C12	6-199	15 mmf. 500V ceramic
C14,C23,C27,C34, C48,C52,C54,C66,C67		
C79,C82	5-74	.01 mfd 600V
C15,C16,C51		
C53	.....	Part of 1st. IF transformer, T2.
C17,C22,C26	6-231	.002 mfd. 400V Ceramic
C18,C19,C45,C47	.....	Part of 2nd IF transformer, T3
C21,C24,C25	.....	Part of 3rd. IF transformer, T4.
C28,C29,C30	.....	Part of discriminator transformer, T5.
C31	6-232	100 mmf. 500V Mica
C32,C40,C46	6-86	220 mmf. 500V. Mica.
C33,C49	5-63	.02 mfd. 500V.
C35	5-69	.006 mfd. 600V.
C37A,C37B	19-34	10-10 mfd. 450V Electrolytic
C38,C39	5-77	.05 mfd. 600V.
C41	5-84	.001 mfd. 1600 V.
C42	6-102	470 mmf. Mica 500V.
C43	19-35	30 mfd. 450 V. Electrolytic.
C44	6-234	1200 mmf. 500V.
C50,C68	5-64	.05 mfd. 400V.
C56	6-207	220 mmf. 2% 500V. Ceramic.
C57	8-65	200-600 Podder
C58,C59	.....	Part of coil assembly L5
C61,C62,C63,C65	.....	Part of coil assembly T7
C69	.....	Part of coil assembly T8
C72	8-35	Trimmer 2½ 30 mmf. ceramic
C75,C76,C77,C78	6-182	.01mfd. 500V Mica.
C81	8-63	15-115 mmf. Trimmer (Wave Trap).
L1	20-27	Broadcast Loop Antenna
L2	.....	Loading Coil, Part of Loop 20-27
L3	3-184	FM RF Coil
L4	3-189	FM Oscillator Coil
L5	3-171	AM Oscillator Coil Assembly.
L6	3-1468	Wave Trap Coil Assembly.
R1	9-294	68 ohms 1/4 watt
R2	9-293	47,000 ohms, 1 watt.
R3,R11,R37,R42	9-130	5600 ohms 1 watt
R4	01-2	10 ohms 1/4 watt
R5,R41	9-222	22,000 ohms 1/4 watt
R6,R40	9-209	22,000 ohms 2 watt
R7,R39	9-253	22,000 homs 1/2 watt
R8,R10,R25,R28, R43	9-235	47,000 ohms 1/2 watt
R9	9-283	82 ohms 1/2 watt
R12	.....	47,000 ohms (Part of T4)
R13,R20,R35, R38,R44,R45	9-223	470,000 ohms 1/4 watt.
R14	9-256	33,000 ohms 1/2 watt
R15	9-8	100,000 ohms 1/2 watt.
R16	9-211	470,000 ohms 1/2 watt.
R17,R19	.....	470,000 ohms (part of T5).
R18	9-121	47,000 ohms 1/4 watt
R21	9-213	10 megohms 1/4 watt.
R22	13-25	Volume Control, 2 megohms.
R23	9-225	18,000 ohms 1/4 watt
R24	14-7	Tone control, 2 megohms, with switch
R26,R36	9-255	1 megohm 1/4 watt.
R27	9-7	2200 ohms 1/2 watt
R29,R31	9-295	270,000 ohms 1/4 watt.
R30	9-290	250 ohms 5 watt, wire wound.
R32	9-264	12,000 ohms 1/2 watt
R33	9-240	2.2 megohms 1/2 watt
R34	01-160	56K ohms 1/4 watt.
R50	01-44	100 ohm 1/4 watt
RFC2	3-187	6BA6 plate choke
RFC2,RFC3	3-188	Filament chokes.
RFC4	3-104	Diode plate choke.
S1	11-58	Band switch (r.f.)
S2	11-59	Band switch (pilot lights and audio)
S3	.....	Part of tone control
T1	3-183	F.M. Ant. transformer.
T2	3-173	1st IF transformer
T3	3-174	2nd IF transformer
T4	3-175	3rd IF transformer
T5	3-176	Discriminator transformer.
T6	2-19	Power transformer.
T7	3-186	B. C. and S. W. R. F. Transformer.
T8	3-185	S.W. Ant. transformer.
	15-87	phone pickup socket.
	15-98	A.C. receptaole (phono).
	26-7	pilot lamp #44 blue bevel.
	26-2	pilot lamp #47 brown bevel
	S-1277	condenser push rod
	129-46	tension spring, dial
	134-7	dial cord, silk.
	135-4	dial pointer
	117-63	dial plate FM.
	117-61	dial plate BC 41201 chassis.
	117-90	dial plate BC 12B26E chassis
	117-62	dial plate SW 41201 chassis.
	117-91	dial plate SW 12B26E chassis
C80	19-36	100 MF 10V electrolytic Model 12FM475.
R46	9-297	2 ohm 5 watt wirewound, Model 12FM475.
R47,R48	13-23	Potentiometer, 25 ohm, 25 watt, Model 12FM475
	22-17	6" speaker, P.M. Model 12FM475
	22-28	10" speaker with output transformer and cable Model 12FM475.
	22-43	12" speaker with transformer and cable Model 12FM778--12FM779
T9	22-28-2	Output transformer Model 12FM475
T9	22-43-2	Output transformer Model 12FM778--12FM779.
	115-13	Cabinet Model 12FM475.
	115-34	Cabinet Model 12FM778.
	115-40	Cabinet Model 12FM779.
	122-16	Dial grill Model 12FM475
	122-44	Dial grill Model 12FM778--12FM779.
	21-13	Record changer, VM 400
	122-20	Escutcheon glass all Models.
	S1424	Push button assembly - all Models.
	122-25	Push button Base escutcheon - all Models
	117-50	Dial masking plate - all Models.
	128-61	Knob - "Acoustic Blender" Model 12FM475.
	128-60	Knob - "Hi-Lo-Balancer" Model 12FM475.
	128-44	Knob Band Switch all Models.
	128-37	Knob Tone, Tuning, volume all Models
	129-46	Spring Band Switch Knob.
		R.F. Shelf Assy.

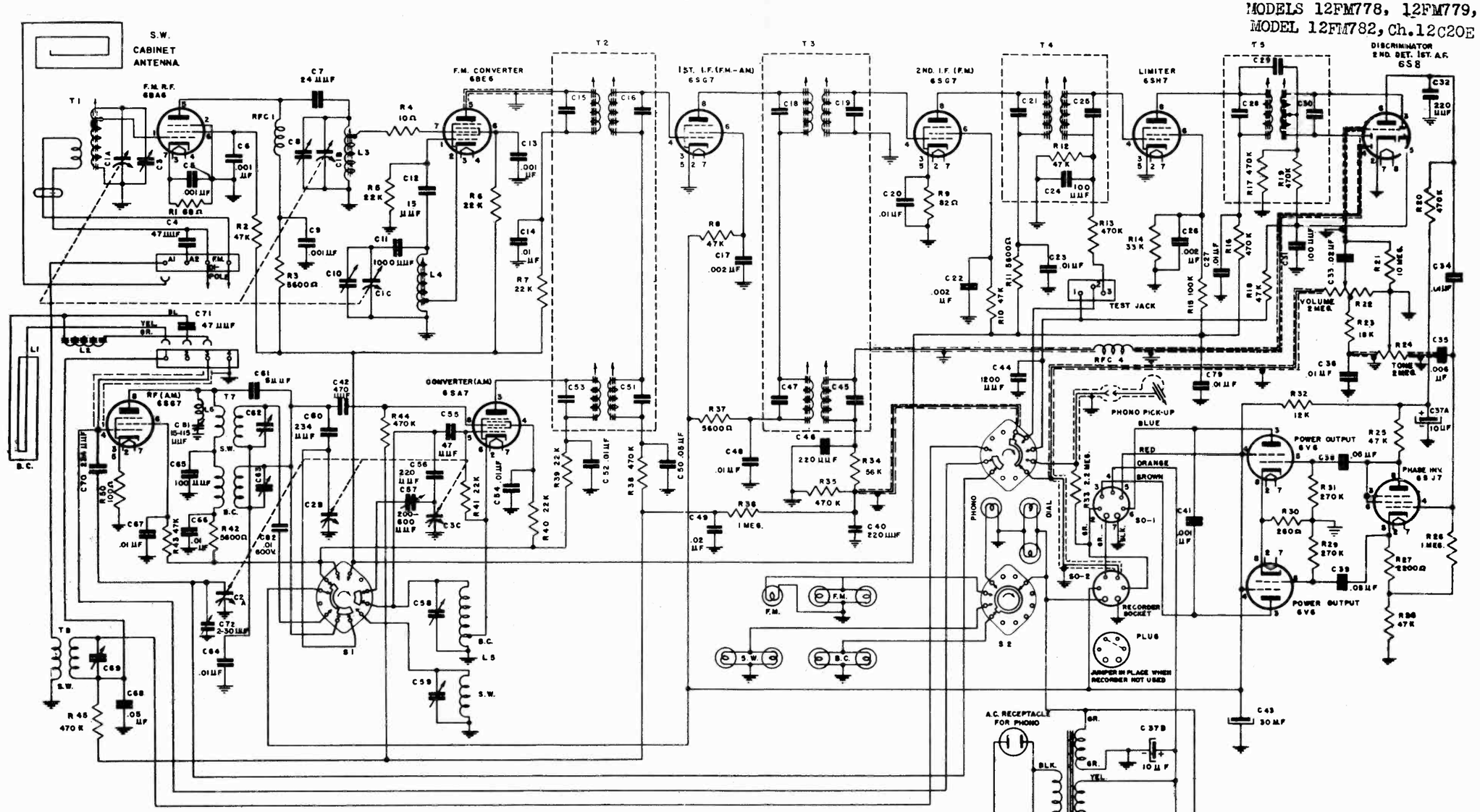
Majestic 12FM782, Chassis 12C30E

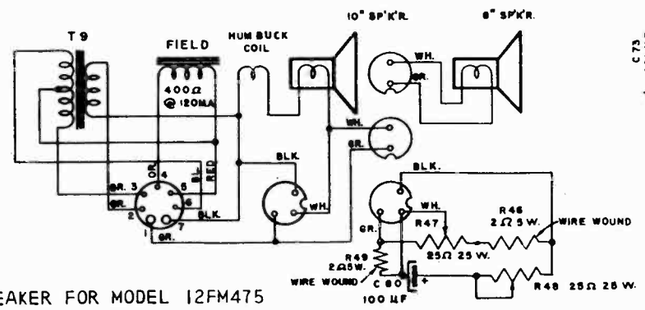
The following additions should be made to the parts list.

Part #	Description
115-45-2	Cabinet—console combination
21-32	Changer, oak
22-43	Speaker, 12" including output transformer
20-27	A-m loop antenna (less cover)
122-20	Escutcheon glass (large)
122-44	Dial grill
128-37	Knob (vol-tuning-tone)
128-85	Knob (band switch)
128-46	Spring insert for above knob

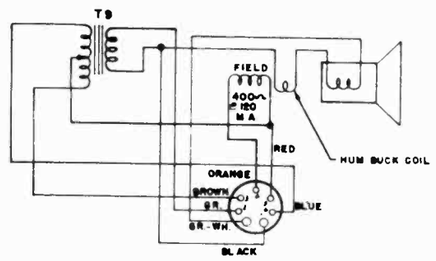
MAJESTIC RADIO & TELEV. CORP.

MODEL 12FM475, Chassis 41201
MODELS 12FM778, 12FM779, Chassis 12B26E
MODEL 12FM782, Ch. 12C20E



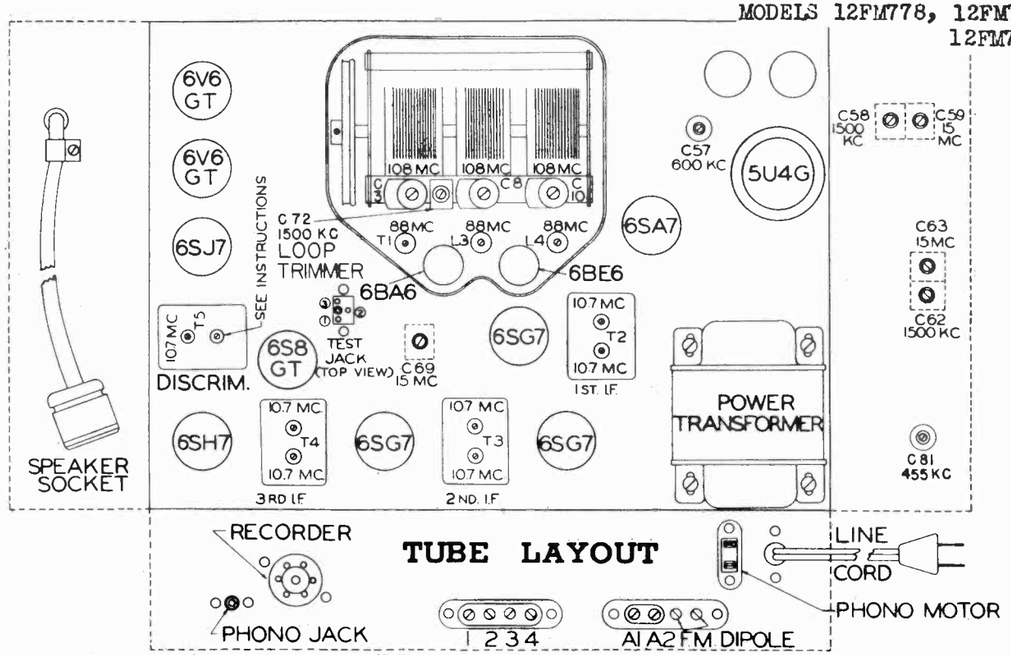


DUAL SPEAKER FOR MODEL 12FM475



SINGLE SPEAKER FOR MODELS 12FM778 AND 12FM779

MAJESTIC RADIO & TELEV. CORP. MODEL 12FM475
MODELS 12FM778, 12FM779
12FM782



TUBE LAYOUT

VOLTAGE TABLE

Measurements made at 117 volts line; volume control at minimum; zero signal input. Measurements made to chassis ground with vacuum tube voltmeter.

FUNCTION	TYPE	E_F	E_P	E_S	E_K	E_G
FM RF AMP.	6BA6	6.3	210	90	1	0
FM CONVERTER	6BE6	6.3	210	100	0	0
AM RF AMP.	6SG7	6.3	260	180	1	-1
AM CONVERTER	6SA7	6.3	250	90	0	---
1ST IF AMP.	6SG7	6.3	240	125	0	-1
2ND IF AMP.	6SG7	6.3	240	125	1	0
LIMITER	6SH7	6.3	3	60	0	-.6
DISC.; 2ND AMDET: AUDIO	6S8GT	6.3	80	---	0	-.8
PHASE INVERTER	6SJ7	6.3	160	---	80	0
POWER AMP.	6V6GT	6.3	260	270	15	
POWER AMP.	6V6GT	6.3	260	270	15	
RECTIFIER	5V4G	5	---	---	300	

TOTAL B CURRENT FROM RECTIFIER 120 MA.

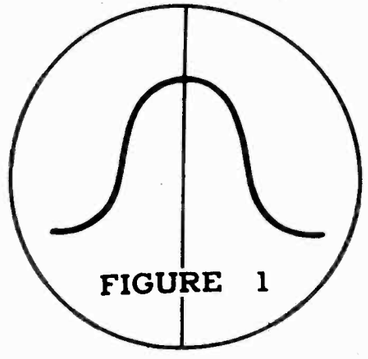


FIGURE 1

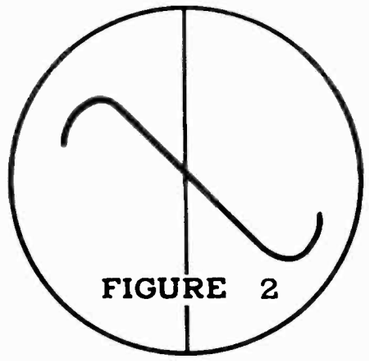


FIGURE 2

MODEL 12FM475 MAJESTIC RADIO & TELEV. CORP.
MODELS 12FM778, 12FM779
12FM782

ALIGNMENT

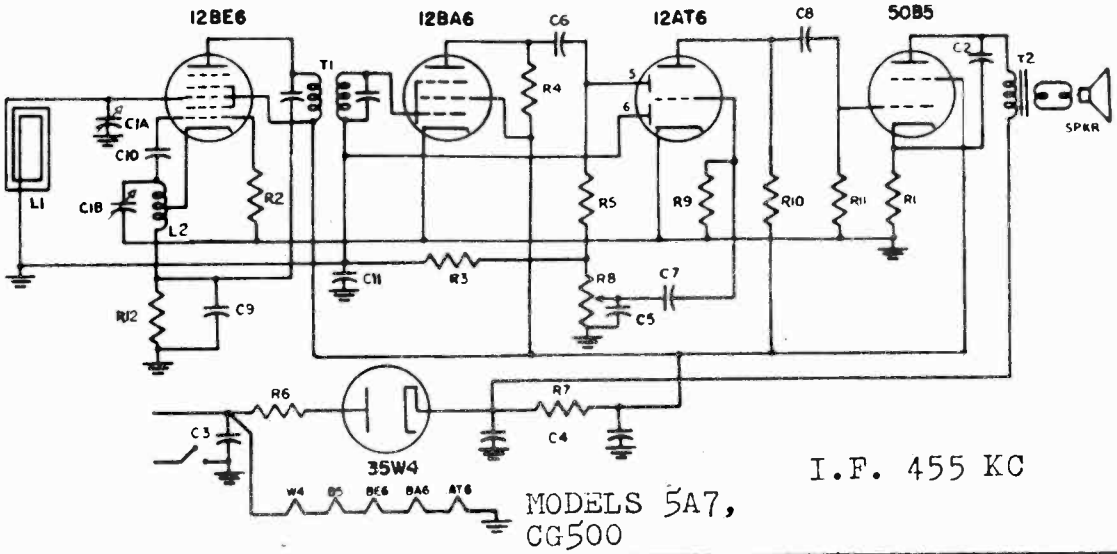
	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
1	Conv. Grid	.01mfd	455 KC	BC	600 KC	T2,T3 Bottom	Align I.F.'s
2	ONE TURN LOOP MADE WITH GENERATOR LEADS		455 KC	BC	600KKC	C81	I.F. trap adjustment for minimum I.F. signal
3			1500 KC	BC	1500 KC	C58	Set BC osc. to scale at 1500 KC
4			1500 KC	BC	1500 KC	C63,C72	Align BC RF. and Loop
5			600 KC	BC	600 KC	C57	Rock Gang to track BC padder
6	A1-Gnd.	400ohm	15 MC	SW	15 MC	C59	Scale osc. at 15 MC
7	A1-Gnd.	400ohm	15 MC	SW	15 MC	C62,C69	Align SW RF and Ant.
8	6SG7 2nd I.F. Grid	.01mfd.	10.7 MC	FM	88 MC	T4 top	Align for max. voltage at test jack pin 3 Rock gen. over 10.7 MC to check for symmetrical I.F. response.
9	6SG7 1st. I.F. Grid	.01mfd.	10.7 MC	FM	88 MC	T3 top	Align for max. voltage at test jack pin 3 Rock gen. over 10.7 MC to check for symmetrical I.F. response.
10	Converter	.01mfd.	10.7 MC	FM	88 MC	T2 top	Align for max. voltage at text jack pin 3 Rock gen. over 10.7 MC to check for symmetrical I.F. response. Re-check peaking of T4, and T3.
11	Converter grid 6BE6	.01mfd.	10.7 MC	FM	88 MC	T5 primary	Align for max. voltage across ½ discriminator Load (un-used Lug bottom of T5 to ground)
12	Converter grid 6B6E	.01mfd.	10.7 MC	FM	88 MC	T5 secondary	Align for zero voltage across full discriminator load (Test jack pin 1 to ground)
13	FM ant.term.	direct	108 MC	FM	108 MC	C10	Scale OSC at 108 MC (max. voltage Test jack pin 3.
14	FM ant.term.	direct	108 MC	FM	108 MC	C8,C3	Align FM RF and Ant. (max. voltage Test jack pin 3.
15	FM ant.term.	direct	88 MC	FM	88 MC	L4	Scale osc. at 88 MC.
16	FM ant.term.	direct	88 MC	FM	88 MC	L3,T1	Align RF and Ant. at 88 MC repeat steps 13, 14, 15, 16 as necessary.

NOTE: 1. A much more satisfactory IF and discriminator alignment may be obtained by using a 10.7 MC Signal generator frequency modulated at an audio frequency and swept approximately 600 KC (±300 KC). An oscilloscope should be connected to Test jack pin 3 and all IF screws adjusted for a symmetrical pattern of highest amplitude.. See Fig. 1. For discriminator alignment, connect scope to Test jack pin 1 and adjust T5 for highest symmetrical pattern. See Fig. 2.

NOTE: 2. In all FM alignment calling for a voltage measurement at Test jack pin 3 (limiter grid resistor) keep signal generator output to such a value as will result in approximately 2 volts measured with a vacuum Tube voltmeter such as the Voltohmyst, Vomax or equiv.

JOHN MECK IND., INC.

MODELS 5A7, CG500
MODEL 5D7-W18

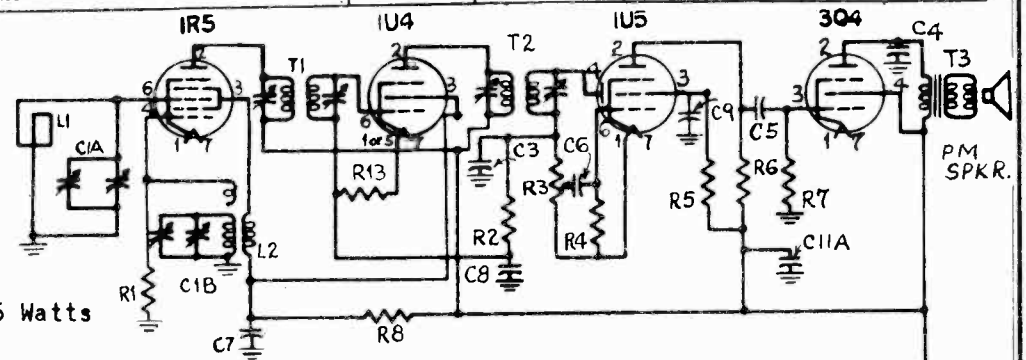


MODELS 5A7, CG500

I.F. 455 KC

Part No.	Circuit Symbol	Description
CV-10008	C1	Variable condenser for Model 5A7
CPP-14203	C2	Condenser paper tub .02 mfd-400V
CPP-14503	C3	Condenser paper tub .05 mfd-400V
CLP-10007	C4	Condenser electrolytic 50-30 mfd-150V
CMP-15251	C5, C6	Condenser mica 250 mmf-500V
CPP-12103	C7, C8	Condenser paper tub .01 mfd-200V
CPP-11103	C9	Condenser paper tub .01 mfd-150V
CMP-15500	C10	Condenser mica 50 mmf-500V
CPP-12203	C11	Condenser paper .02 mfd-200V
RCP-31500	R1, R12	Resistor carbon 150 ohm ½ watt
RCP-31002	R2	Resistor carbon 10,000 ohm ½ watt
RCP-32204	R3	Resistor carbon 2.2 megohm ½ watt
RCP-35801	R4	Resistor carbon 6800 ohm ½ watt
RCP-31003	R5	Resistor carbon 100,000 ohm ½ watt

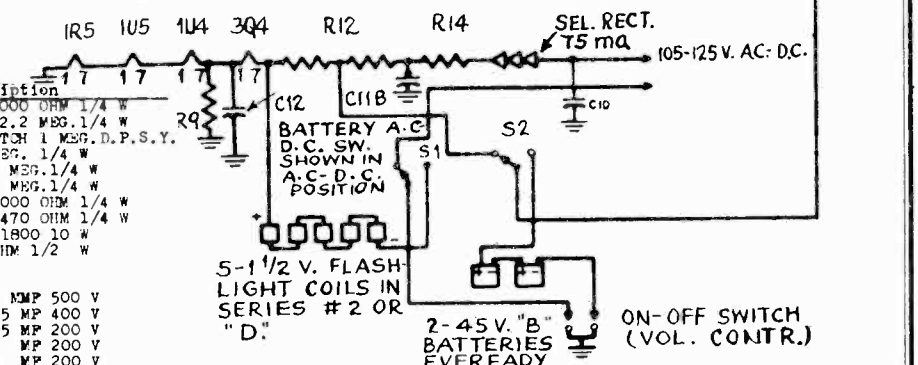
Part No.	Circuit Symbol	Description
RCP-30220	R6	Resistor carbon 22 ohm ½ watt
RCP-41001	R7	Resistor carbon 1000 ohm 1 watt
VCP-10105	R8	Volume control 1 megohm and switch
VCP-12105	R8	Volume control for Model 5A7- 1 megohm
RCP-31005	R9	Resistor carbon 10 megohm ½ watt
RCP-32203	R10	Resistor carbon 220,000 ohm ½ watt
RCP-34703	R11	Resistor carbon 470,000 ohm ½ watt
ALP-10013	L1	Loop antenna
TRCP-10000-C	L2	Oscillator coil
TSP-10002	T1	I.F. Transformer
TOP-10000	T2	Output transformer
SRP-10005	SPKR	Speaker P.M. 3" round for Model 5A7



MODEL 5D7-W18

Power Consumption 15 Watts

I.F. 455 KC



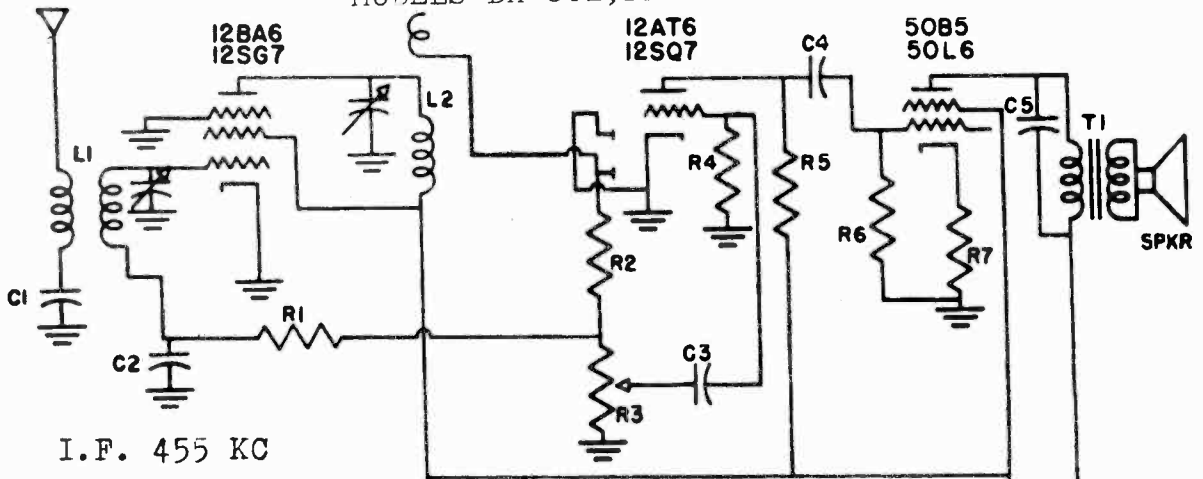
105 to 125 VOLTS A.C. (50 to 60 CYCLES) OR D.C.

Circuit Sym	Part No.	Description
R1	RC-11003	RESISTOR CARBON 100,000 OHM 1/4 W
R2,7,13	RC-32204	" " 2.2 MEG. 1/4 W
R3	VC-21105	VOLUME CONTROL & SWITCH 1 MEG. D.P.S.Y.
R4	RC-11005	RESISTOR CARBON 10 MEG. 1/4 W
R5	RC-13304	" " 3.3 MEG. 1/4 W
R6	RC-11004	" " 1 MEG. 1/4 W
R8	RC-11002	" " 10,000 OHM 1/4 W
R9	RC-14700	" " 470 OHM 1/4 W
R12	RX-10004	" WW. 700-1800 10 W
R14	RC-30220	" CARBON 22 OHM 1/2 W
C1	CV-10008	CONDENSER VARIABLE
C3	CM-15251	" MICA 250 MMF 500 V
C4	CP-14502	" PAPER .005 MF 400 V
C5	CP-12502	" " .005 MF 200 V
C7,9	CP-12103	" " .01 MF 200 V
C8	CP-12203	" " .02 MF 200 V
C10	CP-14503	" " .05 MF 400 V
C11	CL-10010	" ELECT. A-90 B-20 150 V
C12	CL-10009	" " 100 MF 25 V
L1	AL-10015	LOOP ANTENNA
L2	TRC-10015	OSCILLATOR COIL
S1,2	VS-10005	SWITCH AC-DC BATTERY
T1	TS-10018A	I.F. TRANSFORMER INPUT
T2	TS-10019A	I.F. TRANSFORMER OUTPUT
T3	TO-10007	OUTPUT TRANSFORMER
SPKR.	SR-10000	SPEAKER 4" PM - ROUND
C6	CP-12202	CONDENSER PAPER .002 MF 200 V

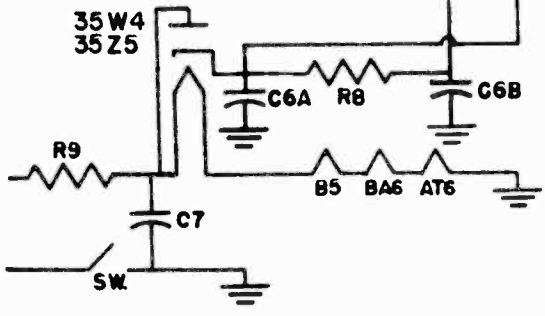
JOHN MECK IND., INC.

MODELS DA-601, DB-602

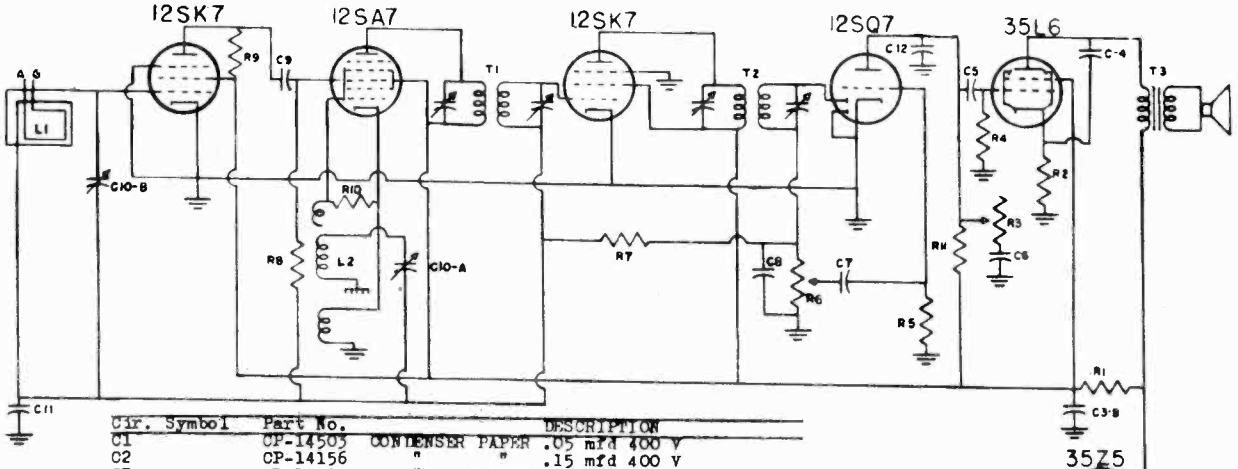
MODELS DA-601, DB-602
MODEL 6B8



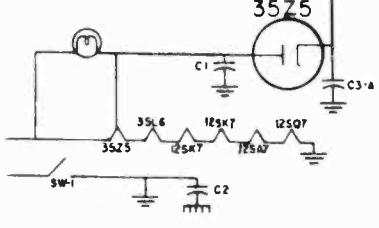
Ckt. Symb.	Part No.	DESCRIPTION
CL3A,5	CP-12103	Condenser paper tubular .01mfd 200 V.
C2,7	CP-12203	" " " .02mfd 200 V.
C6A,C6B	CL-10017	" Electrolytic 30/20 MFD
R1	RC-22204	Resistor carbon 2.2 meg. ohm 1/3 W.
R2	RC-21003	" " 100,000 ohm 1/3 W.
R3	VC-12106	Volume control STSP 1 meg ohm.
R4	RC-21005	Resistor carbon 10 meg ohm 1/3 W.
R5,6	RC-24703	" " 470,000 ohm 1/3 W.
R7	RC-21500	" " 150 ohm 1/3 W.
R8	RC-21001	" " 1000 ohm 1/3 W.
R9	RC-40220	" " 22 ohm 1 W.
L1	TRF10010-B	Antenna Coil
L2	TRF10011-B	Interstage coil 15uuf capacity turn
T1	TO-10000	Output transformer
SPKR.	SR-10005	Round 3" speaker



MODEL 6B8



Cir. Symbol	Part No.	DESCRIPTION
C1	CP-14503	CONDENSER PAPER .05 mfd 400 V
C2	CP-14156	" " .15 mfd 400 V
C3	CL-10021	" ELECTR. A-50 mfd B-30 mfd 150 V
C4	CP-14203	" PAPER .05 mfd 400 V
C5	CP-12502	" " .005 mfd 200 V
C6	CP-12302	" " .003 mfd 200 V
C7	CP-12202	" " .002 mfd 200 V
C8,C12	CM-15221	" MICA 220 mmf 500 V
C9	CM-15101	" " 100 mmf 500 V
C10 A-B	CV-10009	" VARIABLE
C11	CP-12104	" PAPER .1 mfd 200 V
L1	AL-10021	ANTENNA LOOP
L2	TRC-10013	OSCILLATOR COIL
R1	RC-51001	RESISTOR CARBON 1000 OHM 2 WATT
R2	RC-31500	" " 150 OHM 1/2 WATT
R3	VC-13105	1 MEG TONE CONTROL
R4	RC-15003	RESISTOR CARBON 500,000 OHM 1/4 WATT
R5	RC-11005	" " 10 MEG OHM 1/4 WATT
R6	VC-11105	1 MEG VOLUME CONTROL WITH SWITCH
R7	RC-12204	RESISTOR CARBON 2.2 MEG OHM 1/4 WATT
R8	RC-11003	" " 100,000 OHM 1/4 WATT
R9	RC-14701	" " 4700 OHM 1/4 WATT
R10	RC-12202	" " 22,000 OHM 1/4 WATT
R11	RC-12203	" " 220,000 OHM 1/4 WATT
T1	TSP-10020	INPUT I.F. TRANSFORMER
T2	TSP-10021	OUTPUT I.F. TRANSFORMER
T3	TO-10011	OUTPUT TRANSFORMER

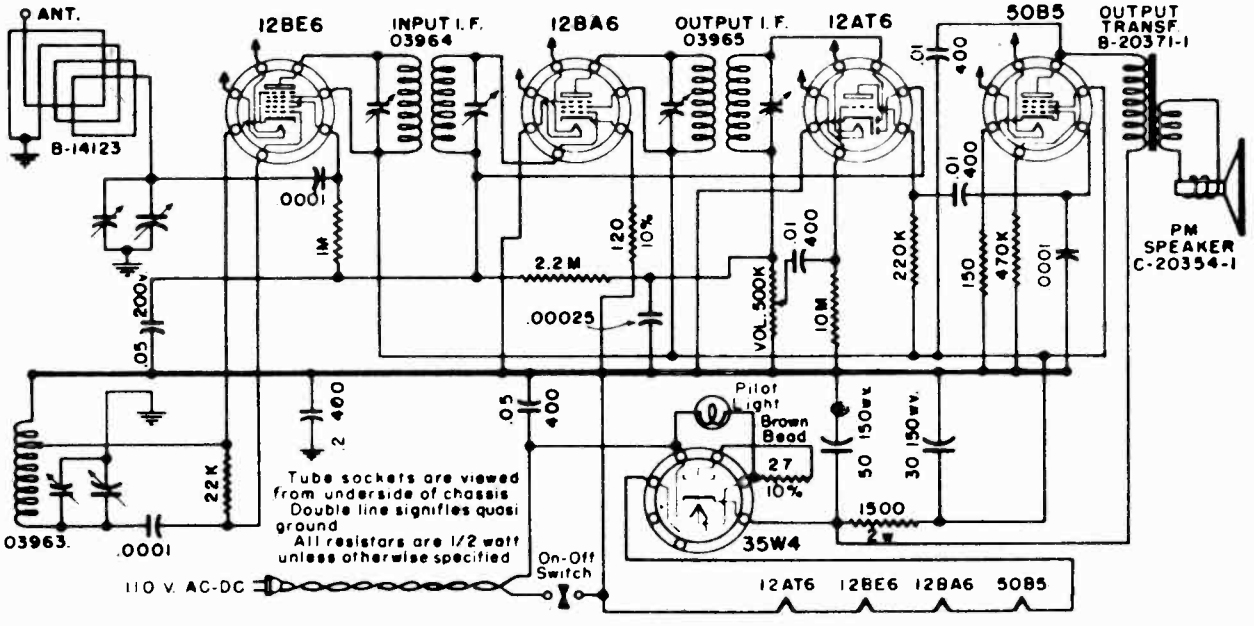


I.F. 455 KC

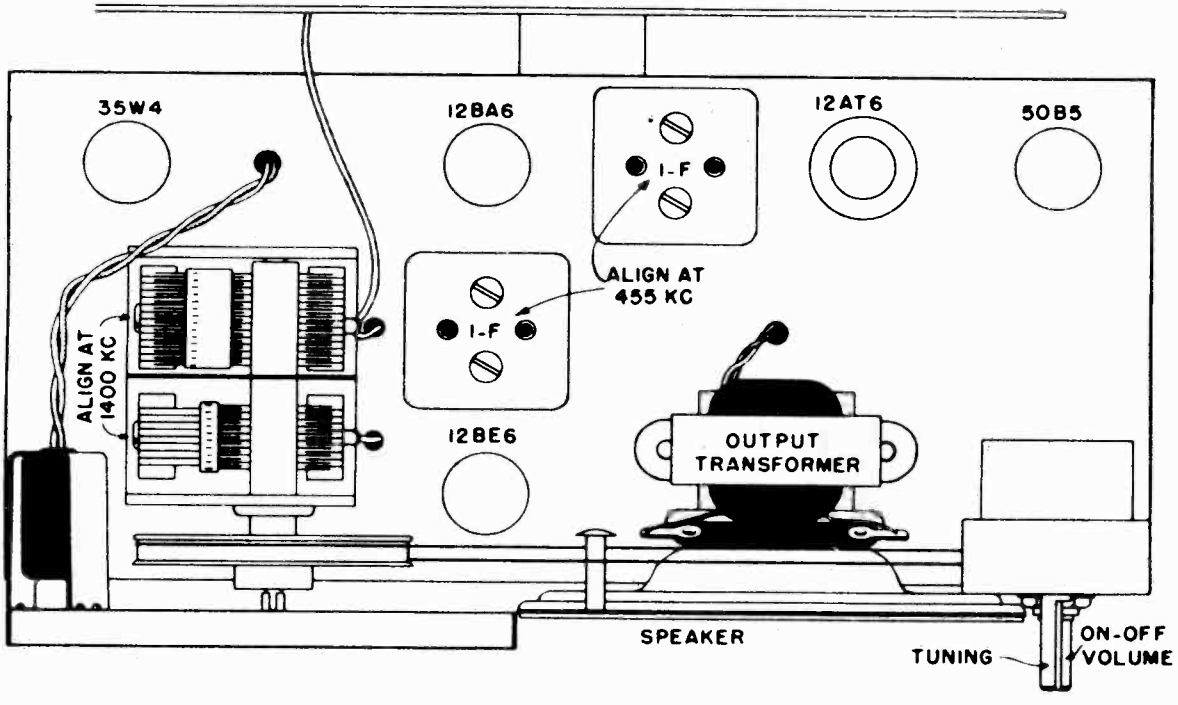
MEISSNER MFG. DIV.
MAGUIRE INDUSTRIES, INC.

MODELS 5A, 574

CIRCUIT DIAGRAM

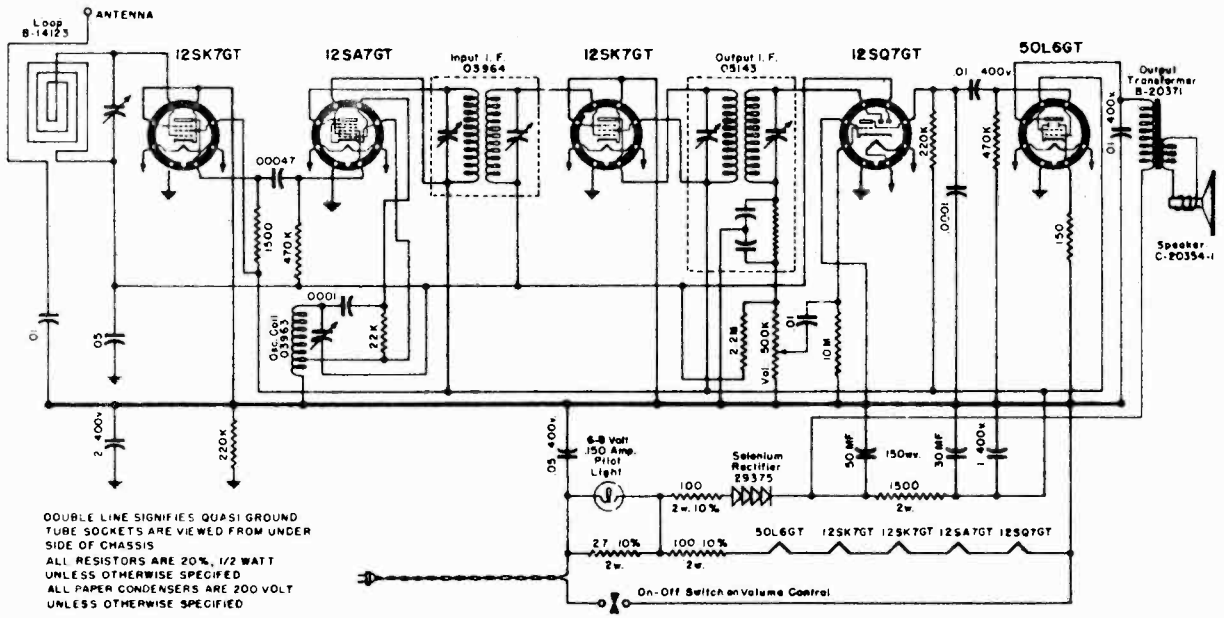


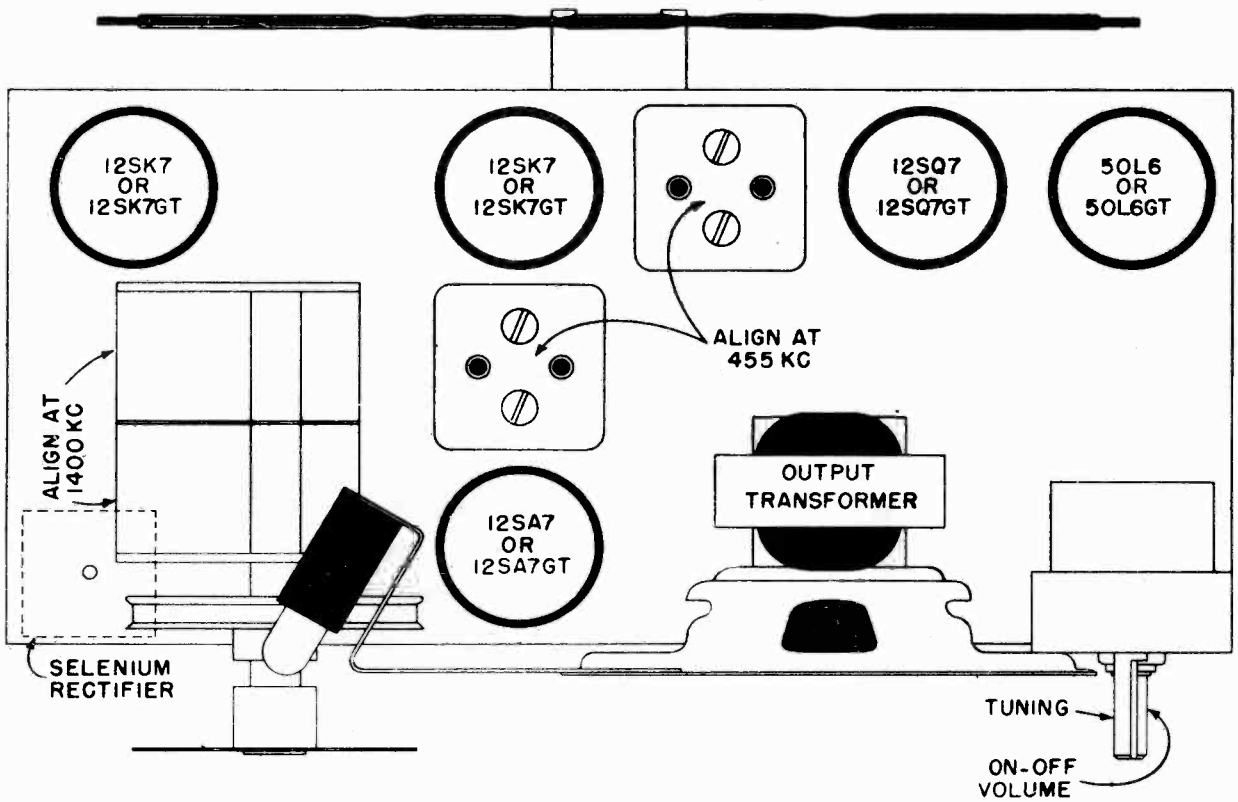
TUBE LAYOUT



MODELS 6H, 661

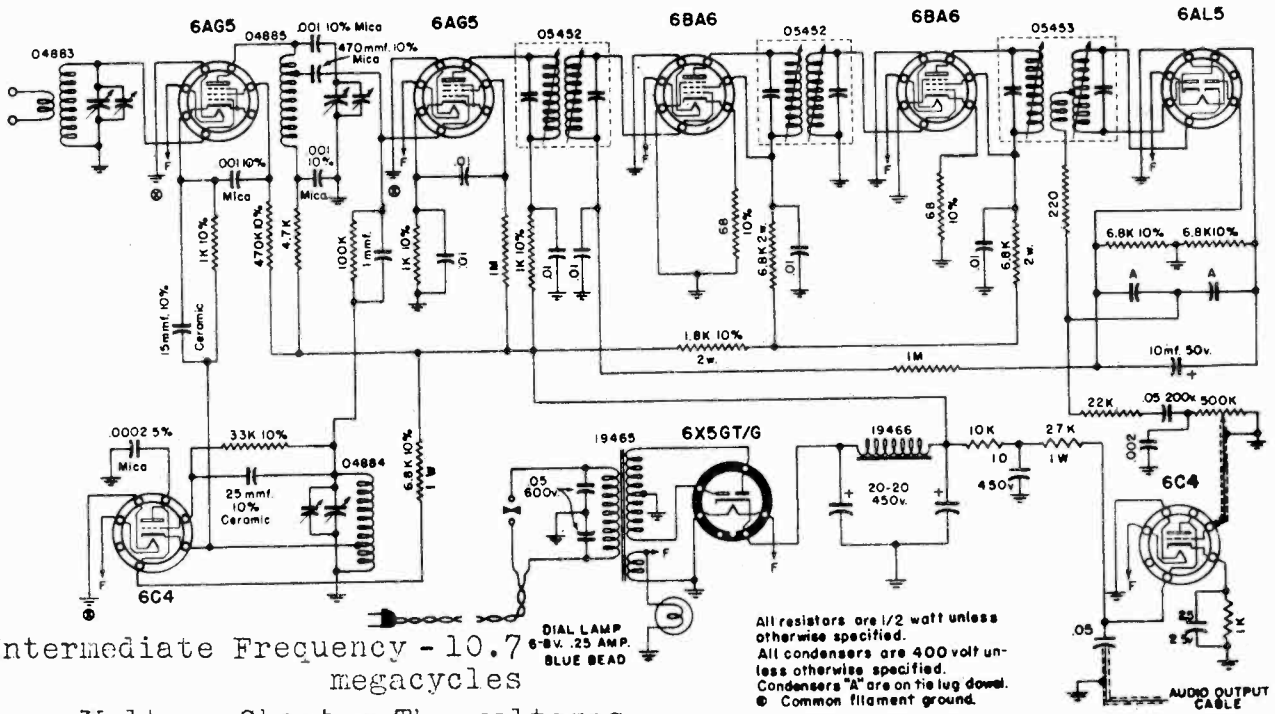
MEISSNER MFG. DIV.
MAGUIRE INDUSTRIES, INC.





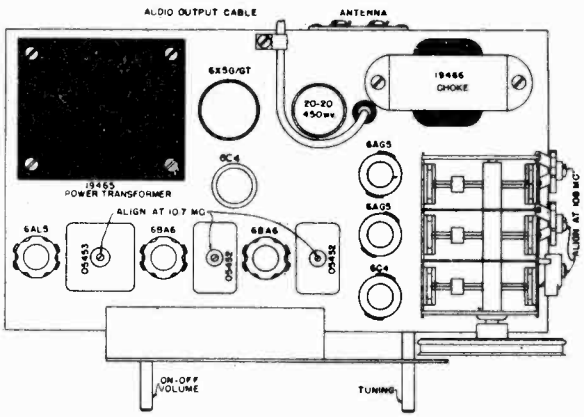
MEISSNER MFG. DIV.
MAGUIRE INDUSTRIES, INC.

MODEL 8-C



Intermediate Frequency - 10.7 megacycles

Voltage Chart - The voltages tabulated in the table below are the correct voltages which should be measured between the socket terminal and chassis with nominal line voltage and no signal. All voltages measured with a high impedance voltmeter. Allowance should be made for loading if a low impedance voltmeter is used for checking.



Power consumption - 35 watts

VOLTAGE CHART

Terminal Number	1	2	3	4	5	6	7	8
6AG5 1st Converter	0	2.1	6.3V RMS	0	260	63	2.1	
6AG5 2nd Converter	0	1.2	6.3V RMS	0	270	37	1.2	
6C4 Oscillator	184	0	6.3V RMS	0	184	—	0	
6BA6 1st I.F. Amp	-0.4	0	6.3V RMS	0	95	95	0.95	
6BA6 2nd I.F. Amp	0	0	6.3V RMS	0	84	84	0.95	
6AL5 Detector	0	0	6.3V RMS	0	0	0	0	
6C4 Audio	105	0	6.3V RMS	0	150	0	3.4	
6X5GT/G Rectifier	NC	0	240V RMS	Tie Point	240V RMS	Tie Point	6.3V RMS	287

MODEL 8-C

MEISSNER MFG. DIV.
MAGUIRE INDUSTRIES, INC.

POWER SUPPLY

Connections: This receptor must be operated on 105 - 125 volt, 50 or 60 cycle A.C. supply only.

The power cord may be inserted in the line receptacle in either one of two ways, but a reversal should be tried for any possible hum reduction during reception.

CONNECTIONS TO AN A.C. RECEIVER

Although the receptor will operate with any radio receiver, large or small, that has terminals for a phonograph pickup, the audio quality inherent in the Frequency Modulation System will be more apparent when it is used with a regular type radio receiver having a large speaker and baffle as well as a good audio amplifier. The shielded rubber-covered lead from the receptor carries the audio output of the unit and is to be connected to the phonograph input terminals of the receiver.

Various input arrangements to the audio amplifier will be encountered in receivers of different manufacture, such as jacks of various types, terminal strips and binding posts. Your dealer will be able to supply an appropriate plug to make connections with the jack on your set. For instance, if the radio with which it is to be used is provided with a phonograph "jack", the corresponding type "plug" should be connected to the shielded lead, the outside metal shielding being connected to the frame of the plug and the inside insulated wire being connected to the high-potential (tip) side of the plug. With the receptor placed conveniently close to the receiver, the phonograph plug may be inserted and the receptor is ready for use. When terminal strips or binding posts are used, the shielded lead from the receptor connects directly to these points without additional parts. In all cases, the outside shielding connects to the terminal which connects directly (or through a coupling condenser) to the chassis.

If your receiver has no "Phono" or "Television Sound" terminals, the additional switch and terminals can easily be installed by any competent radio service man.

CONNECTIONS TO A.C.-D.C. RECEIVER

This receptor is not recommended for use with any A.C.-D.C. receiver because of the hazards involved in connecting this unit to an A.C.-D.C. set and because of almost insurmountable hum troubles on such sets.

OPERATING THE RECEPTOR

Turn the left hand control knob clockwise till the click is heard and the dial scale is illuminated. The radio receiver to which the receptor is connected must also be turned on, switched to the "Phonograph" position, and its volume control well advanced. Allow period of about 30 seconds warm-up time. Now with the receptor volume control turned counterclockwise, advance the volume control on

the radio receiver until the hum level can be heard, but not far enough that the hum level is objectionable. This is the correct operating point for the receiver volume control and it should be returned to approximately this setting whenever the receptor is used. If the above procedure is not used for determining the correct setting of the radio receiver volume control, then unsatisfactory reception may result due to overload and distortion in the receptor. Stations are selected by the right hand or tuning knob. Proper tuning will be accomplished when maximum volume level and maximum noise reduction have been attained. Although these points are very nearly coincident, tuning should always be accomplished by tuning for the "no noise" point after the maximum volume point has been located.

It is characteristic of F.M. receptors using the "ratio detector" system to show three points of tuning, located very close together on the dial, for each station. Only the center point of these three points will give best noise reduction and this is the one that should always be chosen.

NORMAL CARE AND MAINTENANCE

No maintenance of this receptor should be necessary except when poor performance indicates the deterioration of tubes or components. In case poor performance indicates the tubes and components should be checked, it should be done only by a competent service man who is equipped for the servicing of F.M. equipment.

ALIGNMENT

The equipment required for proper alignment of this receptor is an unmodulated R.F. signal generator which will cover 10.7 megacycles and a range of 88 to 108 megacycles, and a D.C. voltmeter having a low range of 1 to 5 volts D.C.

Connect the positive lead of the D.C. voltmeter to pin #5 of the 6AL5 detector tube and the negative lead to pin #7 of the 6AL5. Apply an unmodulated 10.7 megacycle signal to the grid of the second 6BA6 I.F. amplifier tube, through an .05 microfarad coupling condenser. Tune the bottom adjustment screw of the detector coil for maximum indication on the D.C. voltmeter. This completes this part of the adjustment. Next, locate the 22,000 ohm resistor which is in series with the audio lead from the detector coil. Connect the negative lead of the D.C. voltmeter to the junction of this 22,000 ohm resistor and a 200 ohm resistor. Connect the positive lead of the voltmeter to the receptor chassis. With the 10.7 megacycle signal still applied to the grid of the second 6BA6, tune the top adjustment screw of the detector coil for a point of zero voltage. If more than a half turn adjustment was necessary in either of the preceeding steps then both of the adjustments should be repeated.

I.F. ALIGNMENT

Without changing the signal generator frequency, introduce the 10.7 megacycle signal at a relatively high level into the antenna terminals. Connect the D.C. voltmeter between pins #5 and 7 of the 6AL5 detector tube. Ro-

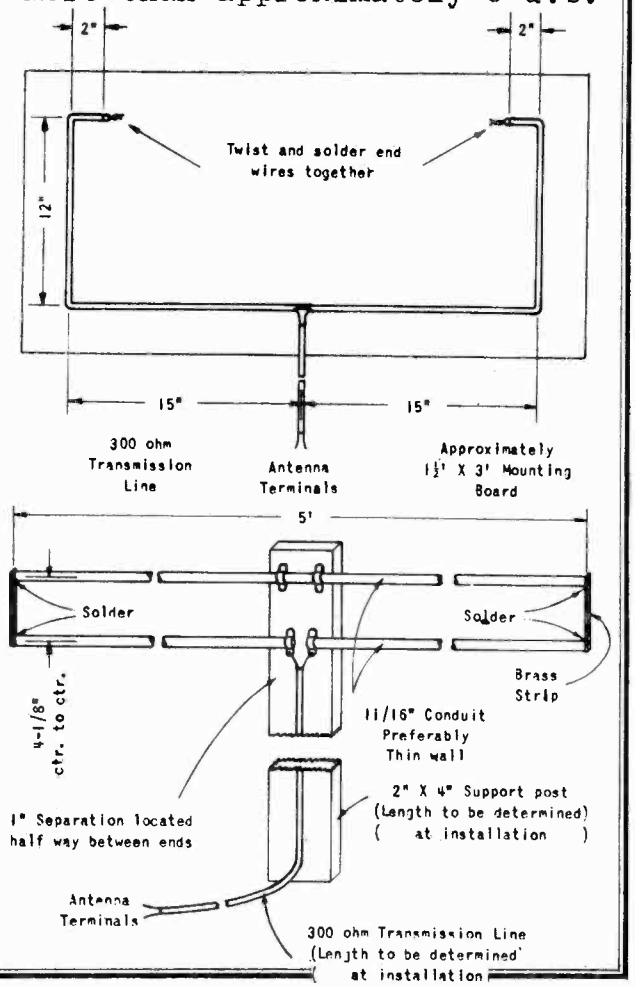
MODEL 8-C

MEISSNER MFG. DIV.
MAGUIRE INDUSTRIES, INC.

tate the tuning knob slightly to determine that the receptor is not receiving a harmonic of the signal generator and is receiving the 10.7 megacycle signal. Adjust both top and bottom screws of the two I.F. transformers for maximum D.C. indication on the meter, keeping the signal level from the generator low enough so that this D.C. voltage does not exceed 5 volts.

R.F. ALIGNMENT

The R.F. section contains a double converter system in which the oscillator operates at one half signal frequency, minus 5.35 megacycles. The image frequency is so far away from the signal frequency that it is normally not necessary to locate or pay any particular attention to the image during the alignment procedure. The D.C. voltmeter should be connected to pins #5 and #7 of the 6AL5 as it was during the alignment of the I.F. Since the chassis must be removed from the cabinet and away from the dial scale for any alignment work, index points have been stamped on the dial backing plate to facilitate alignment. Rotate the tuning knob until the gang condenser is in the fully meshed position and index the pointer with the calibration marker line farthest from the dial drum. Now rotate the gang condenser until the pointer is indexed with the marker line nearest the dial drum. The receptor should now be tuned to 108 megacycles. If the signal generator indicates that it is not tuned to 108 megacycles, rotate the oscillator trimmer (nearest the dial drum) a small amount until the signal is tuned in with the maximum voltage indication on the meter. The receptor is now properly calibrated to the dial markers and the antenna trimmer (farthest from the dial drum) and the converter trimmer (center) should be adjusted for maximum voltage indication on the D.C. voltmeter. The converter trimmer has a slight effect on the oscillator circuit and the tuning knob should be rocked back and forth slightly during the alignment of the converter trimmer in order to locate the point of maximum output. This completes the alignment of the receptor. The sensitivity should be checked over the band and normally should not vary more than approximately 6 d.b.



MODELS 9-1084, 9-1086
6D

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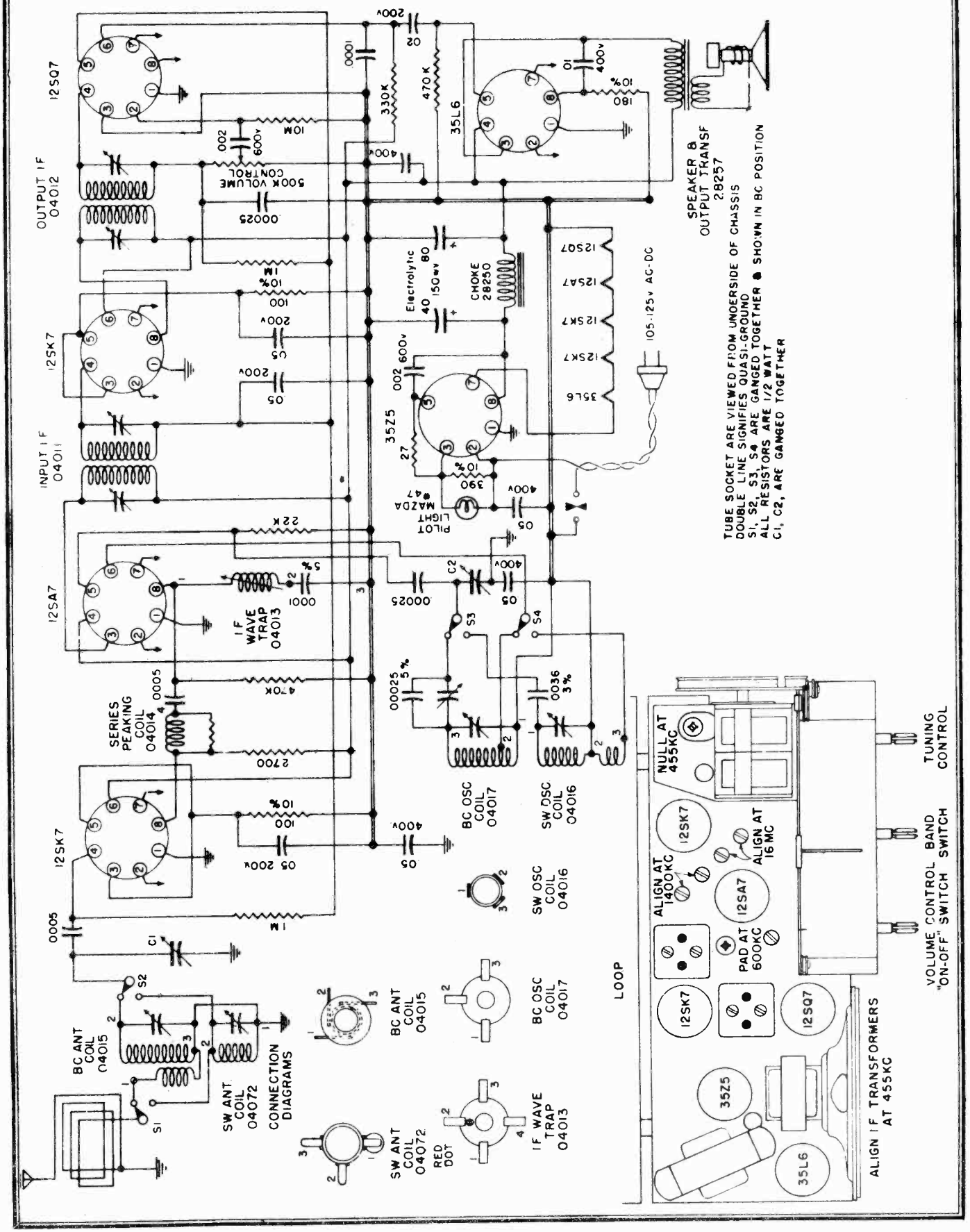

MODEL 9-1085

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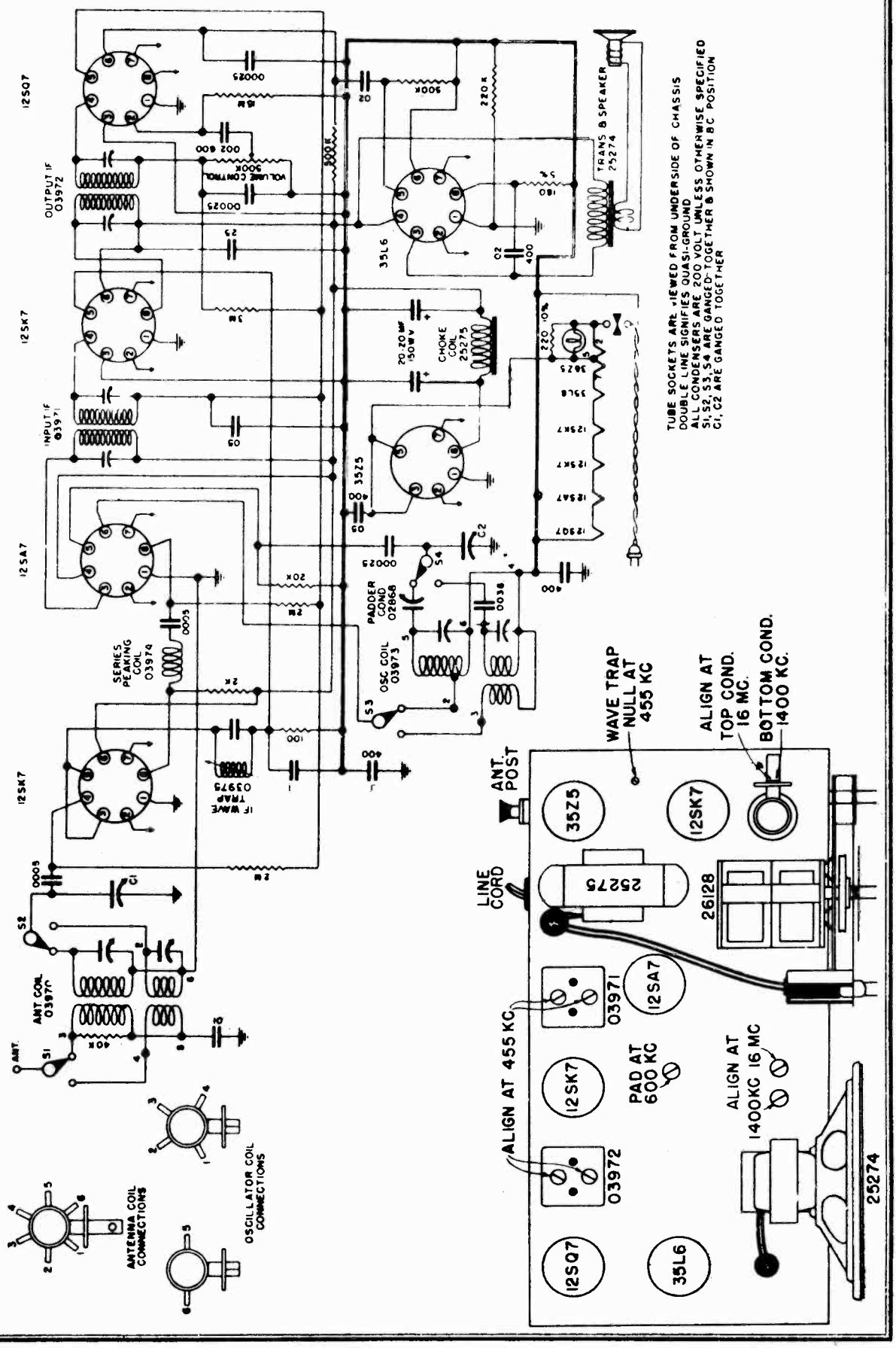
MAGUIRE INDUSTRIES INC.



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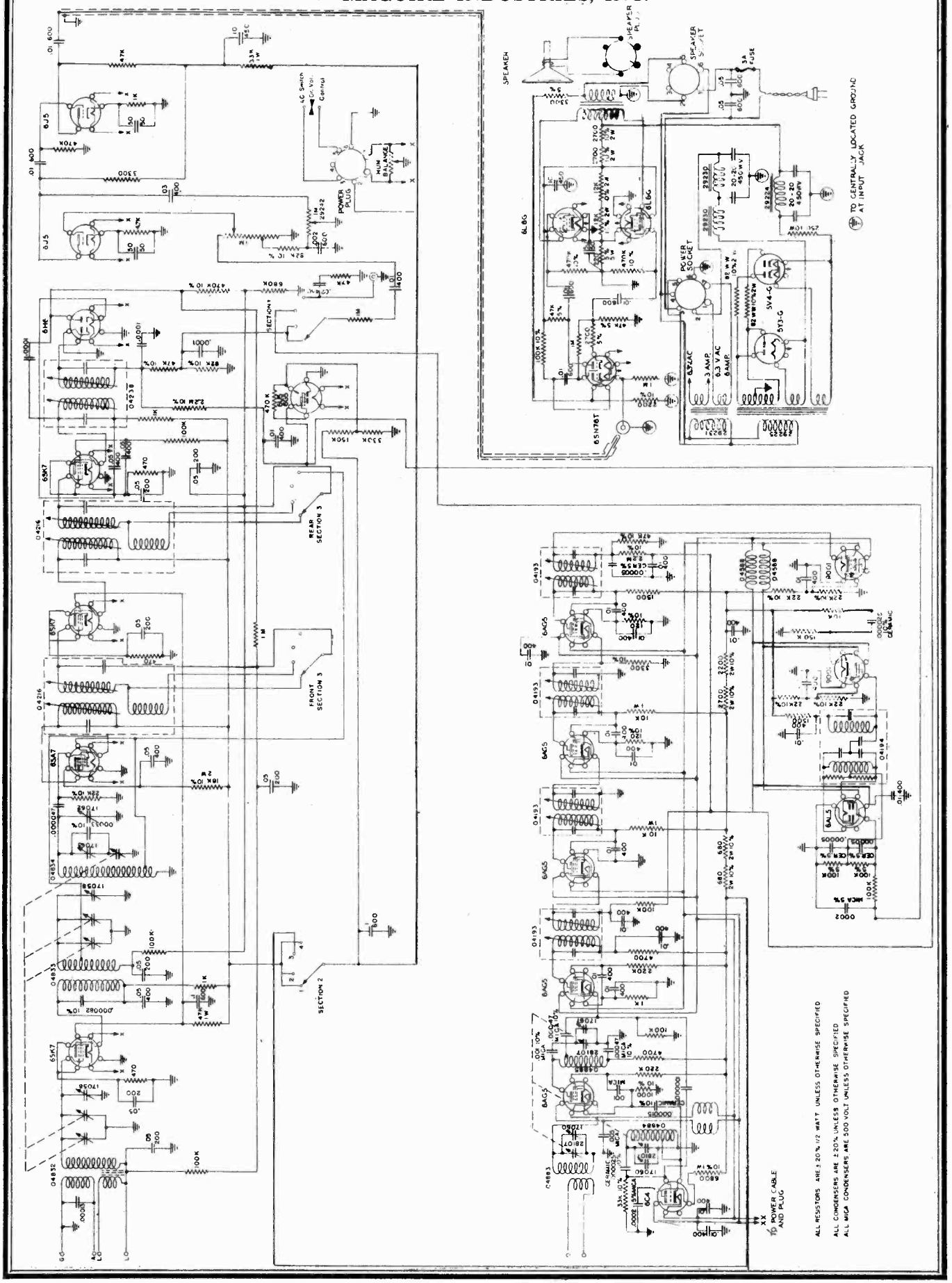
MODEL 9-1093



MODEL 9-1093

MEISSNER MFG. DIV.
MAGUIRE INDUSTRIES, INC.

Broadcast Band Alignment Data -

Intermediate Frequency	455 Kilocycles
Adjust Trimmers at	1550 Kilocycles
Adjust Oscillator Padder at	580 Kilocycles

Frequency Modulation Band Alignment -

Equipment required for alignment: unmodulated R.F. signal generator that will cover 10.7 Megacycles and a range of 88 to 108 Megacycles, a D.C. vacuum tube voltmeter, and a microammeter capable of reading 50 microamperes. A more satisfactory discriminator alignment may be obtained if the following additional equipment is available. An F.M. generator capable of 200 kilocycles deviation at 10.7 megacycles and a cathode-ray oscilloscope.

Discriminator Alignment - (With F.M. signal and oscilloscope)

Remove 2nd I.F. tube.

Apply 1 V. modulated, 200 kc. deviation, 10.7 mc. signal to 1st limiter grid through .005 mica capacitor. Adjust bottom slug of discriminator transformer so that peaks of curve are symmetrical about the vertical axis. Adjust top slug to give maximum amplitude of peaks.

Discriminator Alignment - (With unmodulated signal and vacuum tube voltmeter)

Remove 2nd I.F. tube.

Apply 1 V. unmodulated signal 10.7 mc. to 1st limiter grid through .005 mica capacitor. Connect vacuum tube voltmeter (with high impedance input) from the junction of two .000050 ceramic condensers in discriminator output circuit to chassis and adjust top slug of discriminator transformer for maximum voltmeter reading. Then connect VT meter from discriminator audio output lead to chassis and balance bottom slug for zero reading.

I.F. Alignment -

Remove second 9001 limiter from socket. Insert microammeter in series with 47K 1st limiter grid resistor to ground. With 10.7 mc. signal input to antenna, adjust each I.F. transformer for maximum limiter grid current.

R.F. Alignment -

The R.F. section contains a double converter system in which the oscillator operates at one half signal frequency, minus 5.35 mcs. The image frequency is so far away from the signal frequency that it is normally not necessary to locate or pay any particular attention to the image during the alignment procedure.

Trimmers should be adjusted for maximum output at limiter stage with generator set to 108 mcs.

Standard Broadcast	535-1620 Kilocycles
Frequency Modulation	88-108 Megacycles

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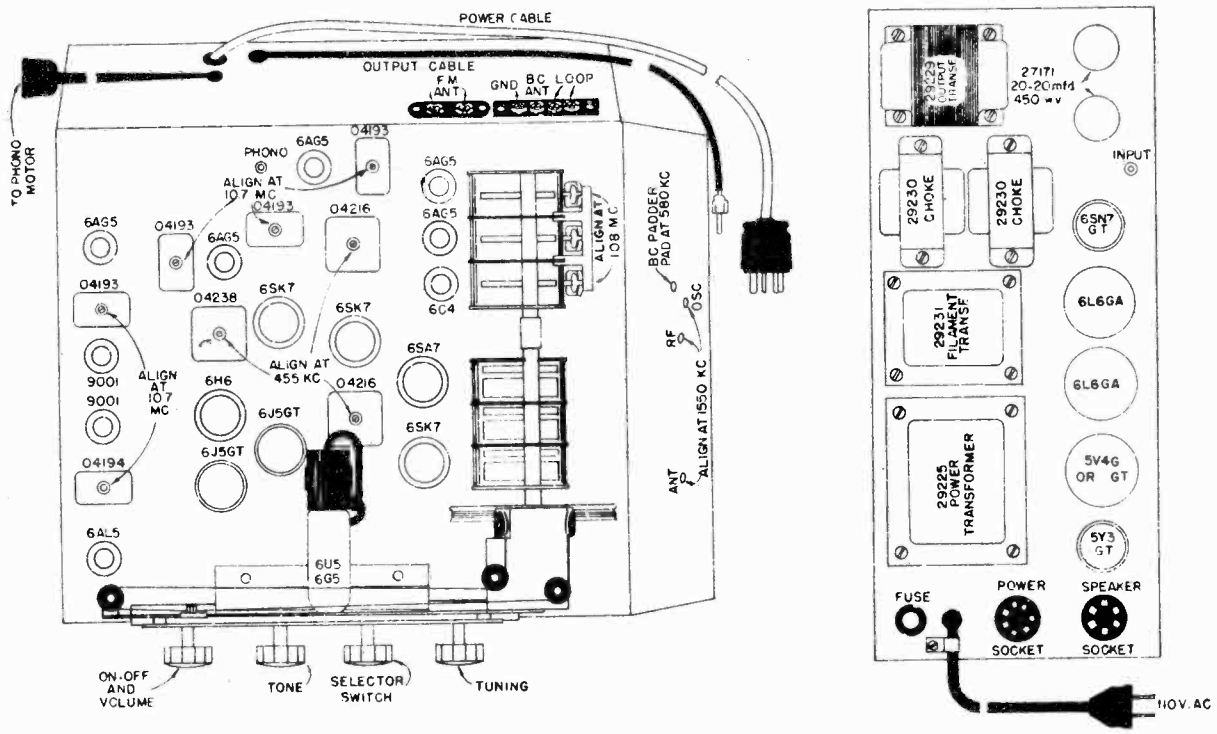

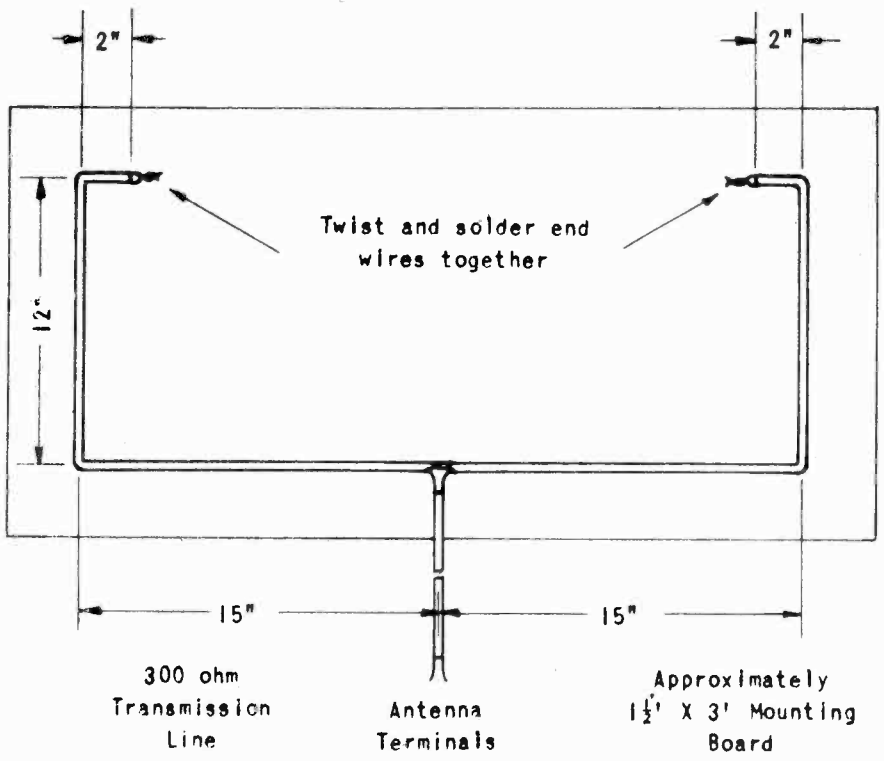

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D.C. VOLTAGE TABLE

Tube	Function	Plate	Screen	Cathode
6SK7	R.F.	280	107	4.4
6SA7	Converter	285	108	-
6SK7	1st I.F.	285	107	4.7
6SK7	2nd I.F.	280	111	5
6H6	Detector	-	-	(Pin 4) 5 (Pin 8) 0
6J5	1st Audio	150	-	6.7
6J5	2nd Audio	67.5	-	1.7
6E5	Tuning Eye	125	-	-
6AG5	1st Conv.	260	107	2.7
6AG5	2nd Conv.	270	133	2.9
6C4	Osc.	180	-	-
6AG5	1st. I.F.	100	100	0
6AG5	2nd I.F.	125	125	1.1
6AG5	3rd I.F.	102	102	1
9001	1st Limiter	98	46.5	-
9001	2nd Limiter	117	45	-
6AL5	Discriminator	-	-	(Pin 5) 3.4
6SN7G	Driver	(Pin 2) 76 (Pin 5) 197.5	-	(Pin 3) 2.6 (Pin 6) 83
6L6G	Output	365	270	22.2
5Y3G	Rectifier	-	-	310
5V4G	Rectifier	-	-	405

Power Supply

This receiver is designed to operate from a power supply main of 105-125 volts, 50-60 cycle alternating current (A.C.). NEVER PLUG INTO ANY OTHER SUPPLY !!

Speaker

The power amplifier is designed to operate a permanent magnet type of speaker with a voice coil impedance of 12 ohms.

D.C. Voltage Table -

The voltages in the table above are the correct voltages which should be measured between the socket terminal and chassis with nominal line voltage and no signal. All voltages measured with a high impedance voltmeter (20,000 ohms/volt). Allowance should be made for loading if a low impedance voltmeter is used.

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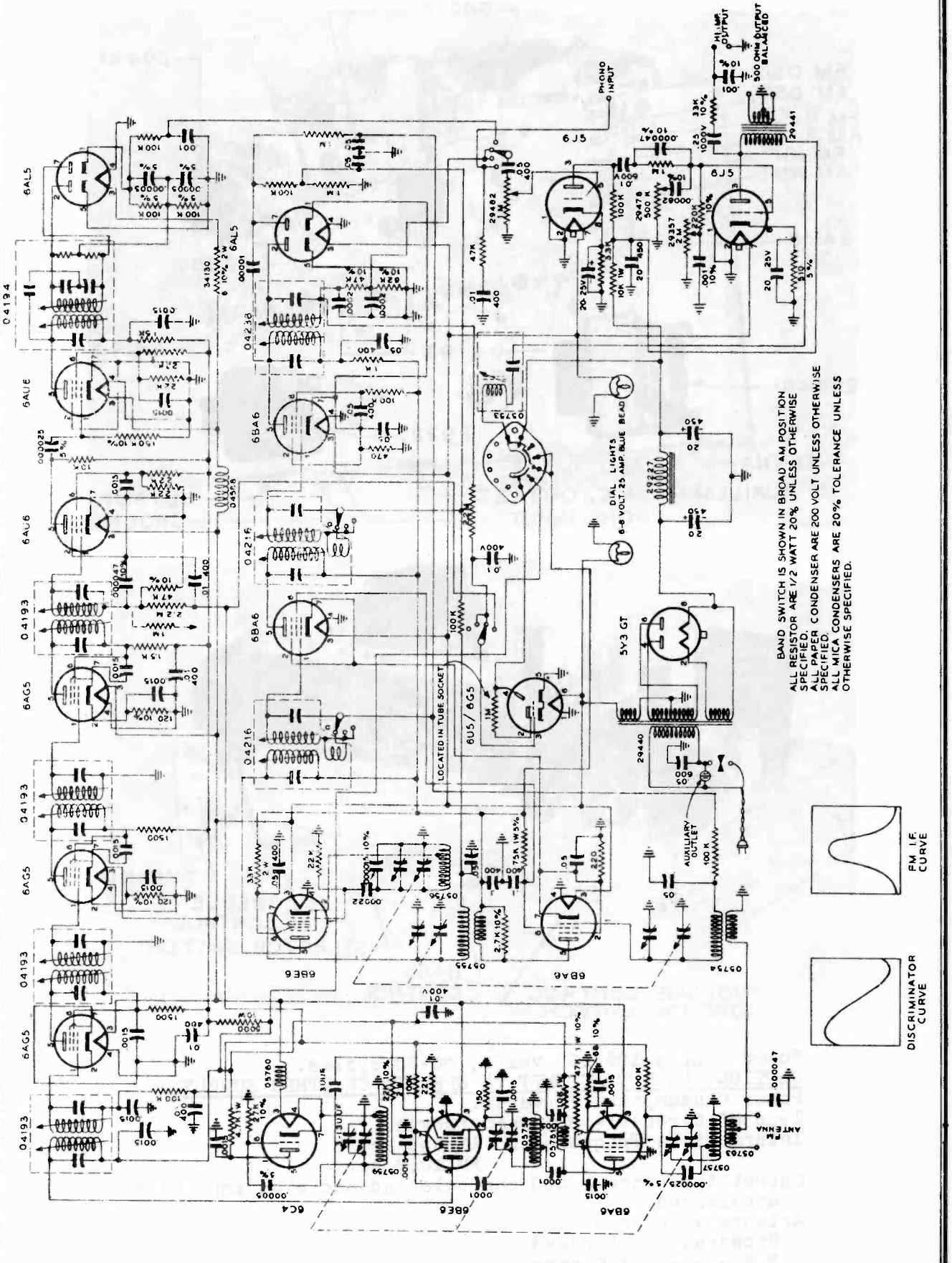
MODEL 9-1091C



MODEL 9-1091C

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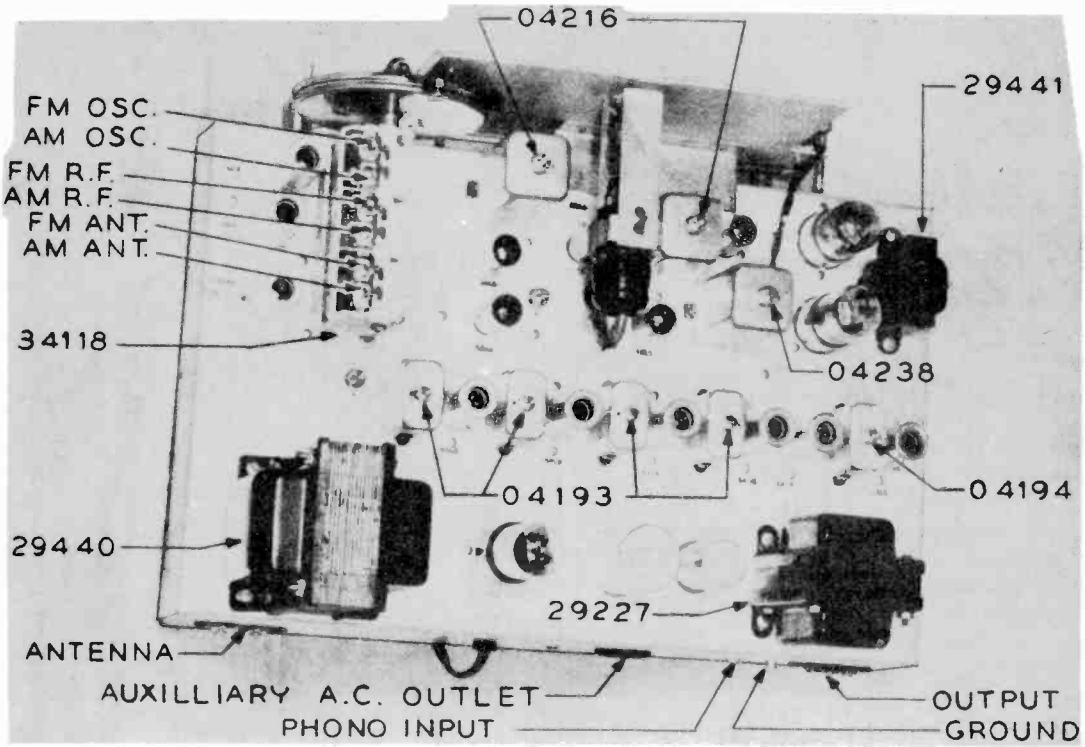

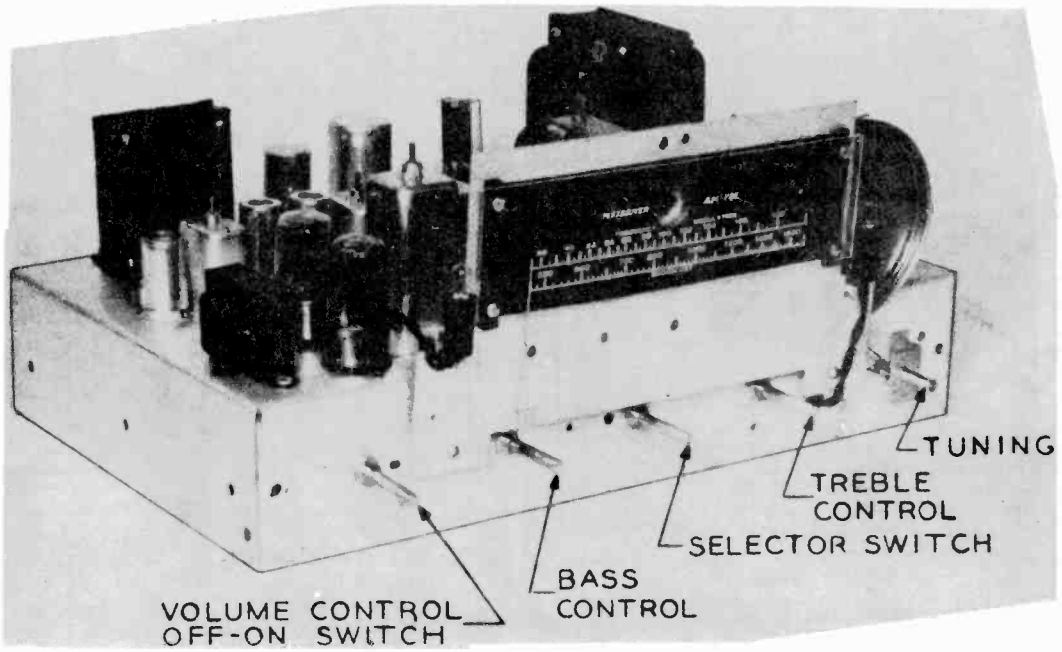

Power Supply 105-125 volts, 50-60 cycles.
CAUTION, DO NOT ATTEMPT TO OPERATE ON OTHER SUPPLY.
Power Consumption 75 watts.
Type of Circuit - Superheterodyne.
Intermediate Frequencies AM 455 kc.
FM 10,7 mc.
Output impedance - 500 ohm balanced and high impedance unbalanced.
Antenna impedance
Broadcast - Standard
F M - - - - 300 ohms.

Alignment AM

The AM alignment may be carried out with an AM signal generator and an output meter. Connect a 500 ohm resistor across the 500 ohm output terminals of the Tuner. The output meter may be connected from the high impedance output terminal to chassis.

For IF alignment introduce a 455 kc. 30% modulated signal into the signal grid of the 6BE6 (Pin #7) through a .1 ufd. coupling condenser. The output of the signal generator should at all times be kept as low as will give a satisfactory reading on the output meter. With the selector switch in the sharp position, adjust the top and bottom adjustments of IF transformers 04216, 04216, and 04238 for maximum output. Now move the selector switch to the broad position and check the symmetry of the IF response curve by swinging the signal generator frequency. The response in the broad position should be double peaked, the dip between the peaks falling at 455 kc. The peaks should be equally spaced on either side of 455 kc. and should be of approximately the same amplitude. The gain in the broad position will be less than the gain in the sharp position. If the above conditions do not exist, then a careful recheck of alignment in the sharp position should be carried out.

For RF alignment introduce a 30% modulated signal through a 200 uuf. dummy antenna to one of the FM antenna terminals. First check dial pointer position by turning the gang condenser to full mesh and setting the pointer to the last reference mark at the low end of the dial scale. With signal generator and Tuner set to 1400 kc., adjust the oscillator trimmer for maximum output, then adjust RF and antenna trimmers for maximum output.

Alignment FM

For FM alignment a frequency modulated generator (60 to 400 cycle modulation, 400 kc. sweep) and an oscilloscope are required. Connect the modulation source on the signal generator into the horizontal amplifier of the oscilloscope. It may be necessary to connect a phase shifting network in this line between the signal generator modulating source and the oscilloscope horizontal amplifier in order to get the correct pattern on the oscilloscope. Connect the Tuner output to the vertical amplifier input of the oscilloscope.

Introduce a 10.7 mc. (400 kc. sweep) signal into the grid of the first 6AU6 limiter tube (Pin #1) through a .01 ufd. condenser. Make the ground connection of the generator to the center post of the 6AU6 socket with as short a lead as

possible. Remove the last 6AG5 IF amplifier tube to avoid the possibility of stray signals coming through the IF system and confusing the discriminator alignment procedure. Adjust the signal generator sweep and signal amplitude, and the oscilloscope for a pattern like the discriminator pattern shown in Fig. 3. Adjust the top adjustment on the 04194 discriminator coil for maximum vertical amplitude on the oscilloscope pattern and adjust the bottom adjustment on this coil for best symmetry of the pattern about the center. Repeat these two adjustments until no further improvement can be made. This completes the adjustment of the discriminator coil. Replace IF tube.

For alignment of the IF amplifier the same oscilloscope set-up is retained except the input to the vertical amplifier. Feed the input to the vertical amplifier with audio taken from the first limiter grid return. This point is identified as point X on the circuit diagram of Fig. 3. Connection should be made to this point through a 1 megohm isolating resistor as shown by dotted line in Fig. 3.

Introduce a 10.7 mc. (400 kc. sweep) signal into the signal grid of the 6BE6 (Pin #7) through a .01 ufd. condenser. Make the ground connection of the signal generator to the center post of the 6BE6 socket with as short a lead as possible. Adjust signal generator and oscilloscope to obtain a pattern like the IF pattern shown in Fig. 3. Adjust top and bottom adjustments on the four 04193 IF coils for maximum amplitude and symmetry of the pattern, keeping the signal level from the generator as low as possible throughout the adjustment. If the pattern tends to become double peaked or badly unsymmetrical during adjustment the trouble is probably due to incorrect placement of some of the connecting leads in the test set-up. Corrections should be made to eliminate the trouble and the adjustments repeated.

For the high frequency adjustments the same oscilloscope set-up may be retained. In connecting the signal generator to the antenna terminals the signal generator is not connected to chassis as in the previous connections. Connect two 150 ohm resistors to the two antenna terminals on the tuner. Connect the other ends of these two resistors to the two generator output terminals. If the setting of the dial pointer has been previously checked during AM alignment it is not necessary to recheck it at this point. Set the signal generator and the Tuner to 106 mc. and adjust the oscillator trimmer (identified in Fig. 1) to bring the pattern to center on the oscilloscope. In case this is possible with two different positions of the oscillator trimmer, use the position of least capacity. Adjust the RF and Antenna trimmers (identified in Fig. 1) for the greatest amplitude of the pattern keeping the generator output as low as possible during the process of adjustment.

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Voltage Readings

DC taken with 20,000 ohm per volt meter.
AC taken with 1,000 ohm per volt meter.
No signal - AM sharp position except * taken in FM position.
Line voltage 117.

Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
*6BA6	Slight negative DC	0	6.3 AC	0	170 DC	87 DC	0.8 DC	-----
*6BE6	Slight negative DC	1.4 DC	6.3 AC	0	240 DC	87 DC	Slight negative DC	-----
*6C4	170 DC	0	6.3 AC	0	170 DC	Slight negative DC	0	-----
*6AG5	Slight negative DC	0	6.3 AC	0	83 DC	85 DC	0	-----
*6AG5	0	0.7 DC	6.3 AC	0	83 DC	85 DC	0.7 DC	-----
*6AG5	0	0.7 DC	6.3 AC	0	83 DC	85 DC	0.7 DC	-----
*6AU6	Slight negative DC	0	6.3 AC	0	84 DC	44 DC	0	-----
*6AU6	Slight negative DC	0	6.3 AC	0	93 DC	42 DC	0	-----
*6AL5	**-1.3 DC	**-0.7 DC	4.5 AC	0	0	0	**-7.5 DC	-----
6BA6	0	2.2 DC	6.3 AC	0	280 DC	82 DC	2.2 DC	-----
6BE6	-5 DC	0	6.3 AC	0	280 DC	73 DC	0	-----
6BA6	0	2.2 DC	6.3 AC	0	280 DC	82 DC	2.2 DC	-----
6BA6	0	2.8 DC	6.3 AC	0	278 DC	95 DC	2.8 DC	-----
6AL5	2.8 DC	Slight negative DC	6.3 AC	0	0	0	0	-----
6J5	0	0	95 DC	0	0	0	6.3 AC	4.0 DC
6J5	0	0	186 DC	280 DC	0	0	6.3 AC	4.6 DC
6U5/6G5	Green 0	———	Yellow 0	Red 280 DC	Brown 0	Blue 6.3 AC	-----	-----
5Y3	0	284 DC	0	260 AC	0	260 AC	280 DC	284 DC

NOTE: Normal tolerance on components makes possible a variation of ± 20% in all DC voltage readings.

** Subject to wide variation.

Sensitivity - less than 10 microvolts.
Audio fidelity
  Flat within ± 2 db. from 30 to 15000 cycles.
Band width at 1000 kc.
  Sharp 7 kc.
  Broad 14 kc.
Output
  High impedance 11 volts maximum for 2-1/2% distortion.
  500 ohm 2 volts maximum for 2-1/2% distortion.
Distortion
  2-1/2% at full rated output
  Less at lower levels
Tone control action
  Bass boost at 40 cycles - 12 db.
  Treble suppression at 8000 cycles - 12 db.
Hum
  Maximum - 0.5 micro watts.

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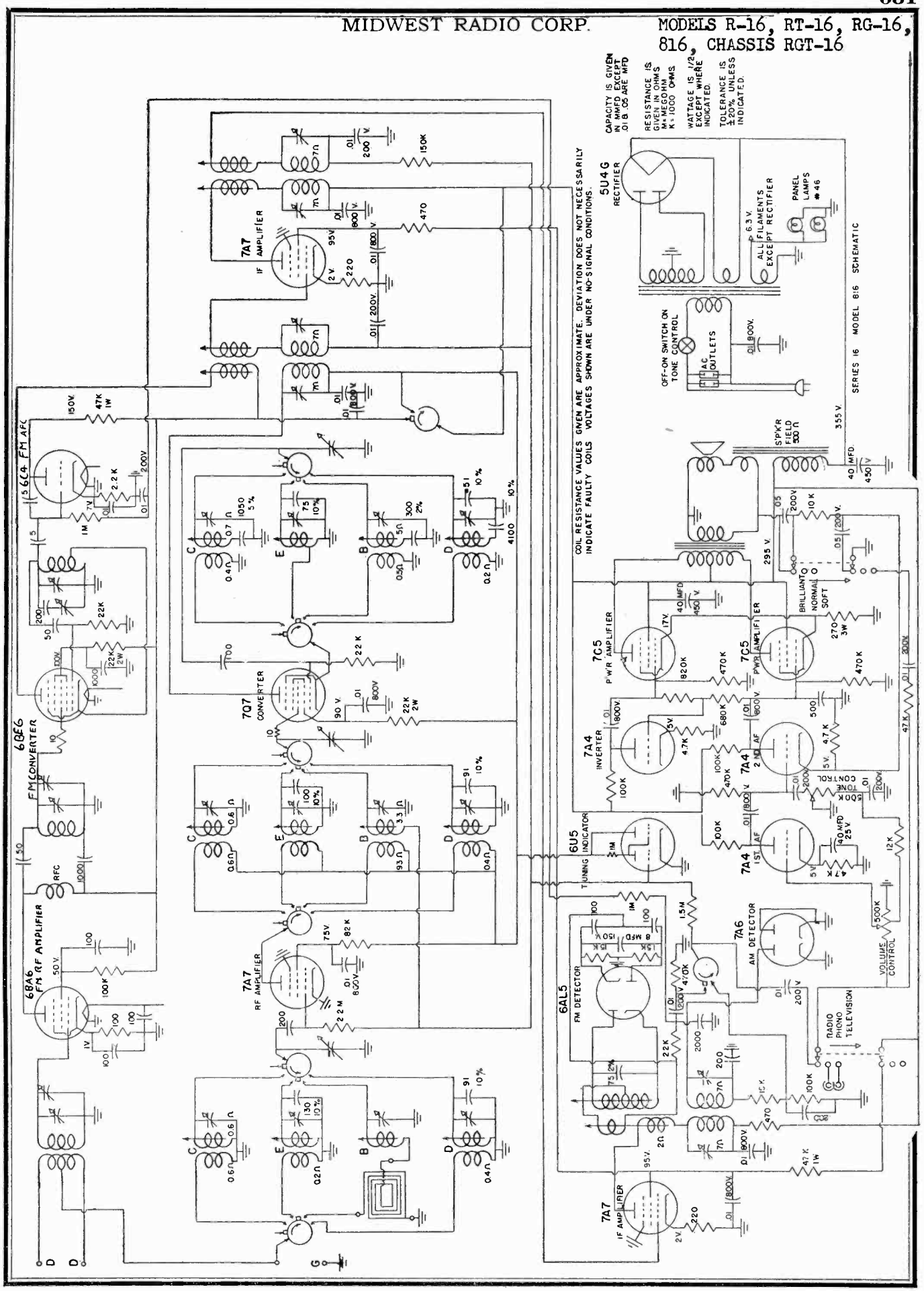
DC Resistance Readings

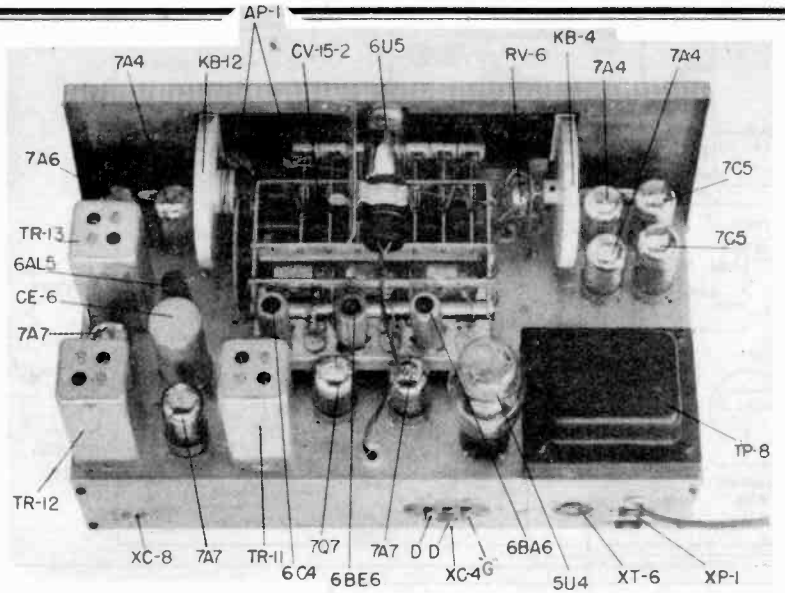
Band Switch in BC sharp position.
Measured from specified tube pin to chassis.
Tuner turned off.
*Resistance readings in the B/ circuits may vary widely depending on the condition of the filter condensers and the polarity of the ohmmeter.
**With bass control set clockwise.

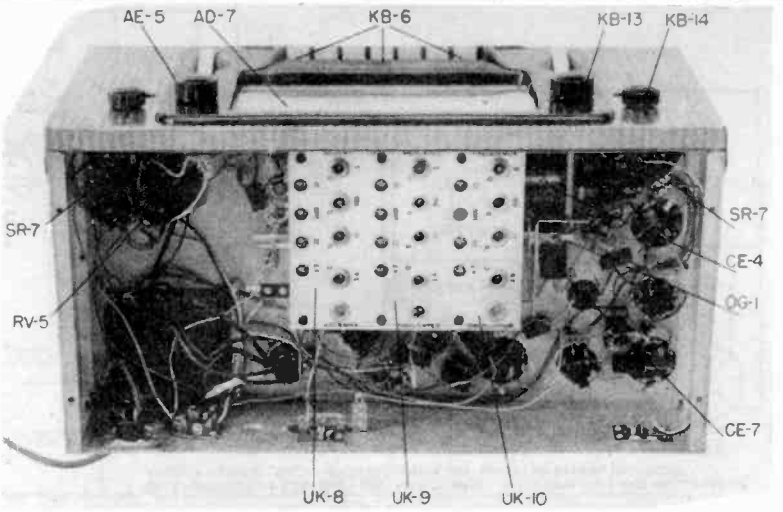
Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
	Values below given in ohms							
6BA6	2.35M	0	0	0	37K	74K	68	-----
6BE6	22K	150	0	0	27K	49K	2.35M	-----
6C4	32K	Inf.	Less than 1	0	32K	15K	0	-----
6AG5	2.35M	0	0	0	23K	23K	0	-----
6AG5	Less than 1	120	0	0	23K	23K	120	-----
6AG5	Less than 1	120	0	0	23K	23K	120	-----
6AU6	47K	0	0	0	32K	15K	0	-----
6AU6	150K	0	Less than 1	0	23K	15K	0	-----
6AL5	200K	150K	2.5	0	0	Inf.	150K	-----
6BA6	2.2M	220	0	0	*500K	*500K	220	-----
6BE6	22K	Less than 1	0	0	*500K	*500K	1.1M	-----
6BA6	2.1M	220	0	0	*500K	*500K	220	-----
6BA6	1M	470	0	0	*500K	*500K	470	-----
6AL5	470	130K	0	0	0	Inf.	1.1M	-----
6J5	0	0	*500K	Inf.	0 to 200	Inf.	0	3.3K
6J5	0	0	*500K	*500K	**220K	0	0	510
6U5/6G5	Green 0	-----	Yellow 2.3M	Red *500K	Brown 0	Blue 0	-----	-----
5Y3	Inf.	*500K	Inf.	95	Inf.	95	*500K	*500K

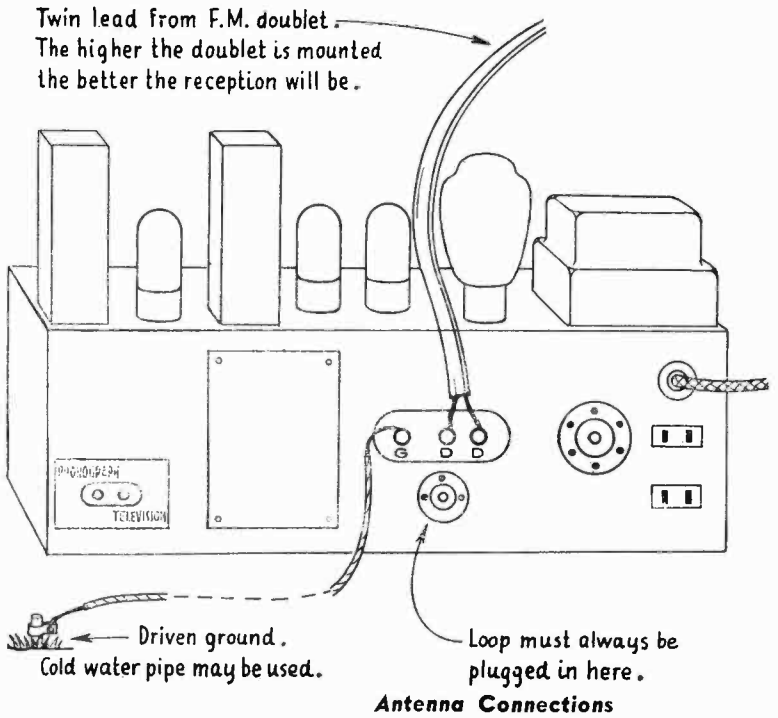
Power Amplifier

If this Meissner tuner is to be used with a power amplifier, a power amplifier should be chosen which will give full power output when driven with the maximum output of the Tuner (see "Nominal Performance" ratings). It is not essential that the power amplifier have exactly the right gain, but if best results are to be obtained the gain of the power amplifier should not greatly exceed the requirement. If, for instance, the power amplifier has an input jack for a phonograph pickup, then the Tuner might be fed into this jack through a voltage divider made from a 30,000 ohm potentiometer. This potentiometer should be adjusted to a level where full rated output (11 volts) from the Tuner will just produce full power output from the power amplifier. It is not recommended that the Tuner be fed into the Microphone input jack of a power amplifier.


MIDWEST RADIO CORP.
MODELS R-16, RT-16, RG-16, 816, CHASSIS RGT-16
CAPACITY IS GIVEN IN MMFD EXCEPT .01 & .05 ARE MFD
RESISTANCE IS GIVEN IN OHMS M=MEGOHM K=1000 OHMS
WATTAGE IS 1/2 EXCEPT WHERE INDICATED.
TOLERANCE IS ±20% UNLESS INDICATED.
COIL RESISTANCE VALUES GIVEN ARE APPROXIMATE. DEVIATION DOES NOT NECESSARILY INDICATE FAULTY COILS VOLTAGES SHOWN ARE UNDER NO-SIGNAL CONDITIONS.
SERIES 16 MODEL 816 SCHEMATIC
5U4G RECTIFIER
ALL FILAMENTS EXCEPT RECTIFIER
PANEL LAMPS #46
OFF-ON SWITCH ON TONE CONTROL
AC OUTLETS
SPK'R FIELD 500 Ω
7A7 IF AMPLIFIER
7Q7 CONVERTER
7A7 RF AMPLIFIER
6BA6 FM RF AMPLIFIER
6BE6 FM CONVERTER
5654 FM AFC
7C5 PWR AMPLIFIER
7A4 INVERTER
7A4 2ND AF
7A4 1ST AF
6U5 TUNING INDICATOR
6AL5 FM DETECTOR
7A6 AM DETECTOR
VOLUME CONTROL
TONE CONTROL
BRILLIANT NORMAL SOFT
RADIO PHONO TELEVISION







Antenna Connections

PARTS LIST

Part	Description
AD-6	Short Wave Dial
AD-7	Glass Dial
AD-9	Tone Disc Assembly
AD-10	Selector Disc Assembly
AE-5	Escutcheon
AP-1	Wood Pulley
AP-21	Pointer
AS-1	Wood Pulley Stud
CE-6	Filter Condenser 40-40
CE-4	Cathode Bypass 40 mfd. 25v
CE-7	Electrolytic 8 mfd. 150v
*CV-15-2	Tuning Gang
EG-5	Speaker Grommet
ES-12	Miniature Tube Shield
HE-7	Speaker Mtg. Eyelet
IL-1	Panel Lamp 6-8v
KB-4	Volume Knob
KB-12	Tuning Knob
KB-13	Tone & Band Knob
KB-14	Tone & Selector Knob, Small
KB-6	Push Buttons, Set of 7
OG-1	Miter Gear, Pair
PC-3	Loop Plug
PC-5	Phono & Television Plug
RV-5	Tone Control
RV-6	Volume Control
SP-2	Speaker
TP-8	Power Transformer
*TR-11	1st IF Transformer
*TR-12	2nd IF Transformer
*TR-13	3rd IF Transformer
*UK-8	RF Coil Plate
*UK-9	Mixer Coil Plate
*UK-10	Oscillator Coil Plate

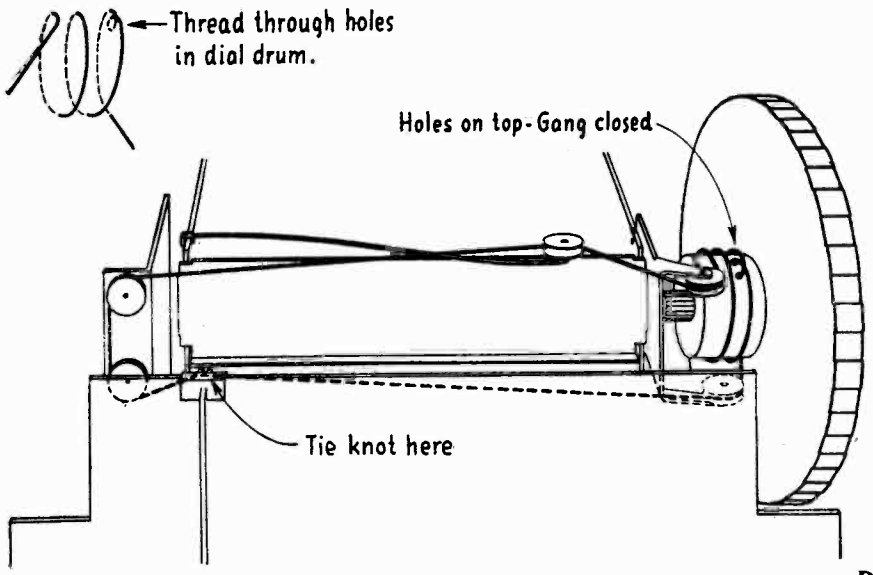
Note: Order resistors and condensers by value, tolerance and wattage or voltage.

Note: When ordering include serial number of chassis, since Midwest records of changes in parts specifications are kept by that number.

ALIGNMENT — Refer to the alignment chart for step by step procedure. It is preferable to align the FM IF stages with an AM or CW Signal. It should be noted that all adjustment are made for peak avc reading except the secondary of the third transformer. At this point, if you use an AM signal, it may be tuned for minimum audio signal; or the discriminator voltage may be used, reading it with a VTM, and the secondary may be adjusted to the zero voltage. There may be some discrepancy between these methods, and if it is not excessive, is of no importance.

The FM RF alignment should be made using an FM signal and either avc or audio for peaking. In doing this alignment, or when feeding the IF signal into the FM mixer grid, care must be taken not to move the wiring. If the wiring is displaced so as to affect the inductance of the RF circuits it is difficult to re-establish the RF-Oscillator tracking.

The AM, RF and IF alignment should be done with a VTVM across the avc. The recommended signal value is one which will generate 10 volts of avc. When aligning the "B" band the loop must be plugged in and you need not adjust the RF padder core. The RF padder is very broad and can be aligned only if the converter grid lead is connected to an RF type VTVM as indicator; this will usually involve a signal level greater than is normally available.



Series 16 Dial Stringing

ALIGNMENT CHART

Coupling	Signal	Band Switch	Dial	Adjustment
To 7Q7 converter grid through .05 mfd. capacitor.	456 KC AM	B	1000 KC	Peak 1st, 2nd and 3rd IF trimmers on top of IF cans.
To "D" on antenna ground terminal strip through 200 mfd. and 400 ohms in service.	1600 KC AM	B	1600 KC	Peak RF, converter and oscillator trimmers marked "B".
	550 KC AM	B	550 KC	Peak converter and oscillator padder cores marked "B". Loop must be plugged in. Do not adjust RF.
	4.7 MC AM	C	4.7 MC	Peak "C" trimmers.
	1.6 MC AM	C	1.6 MC	Peak "C" cores.
	10 MC AM	D	10 MC	Peak "D" trimmer
	5 MC AM	D	5 MC	Peak "D" cores.
	22 MC AM	E	22 MC	Peak "E" trimmer.
	11.5 MC AM	E	11.5 MC	Peak "E" cores.
To 6BE6 mixer grid direct.	10.7 MC AM or CW *	A	100 MC	Peak core adjustments for avc (around 3 volts) at 1st, 2nd and primary of 3rd IF. Adjust secondary of 3rd IF for audio null from 30% amplitude modulated 10.7 MC IF signal.
To "D" and "D" on doublet terminal strip above "A-G" strip through a pair 150 ohm resistors.	105 MC FM	A	105 MC	Peak RF mixer and oscillator trimmers for avc or audio.

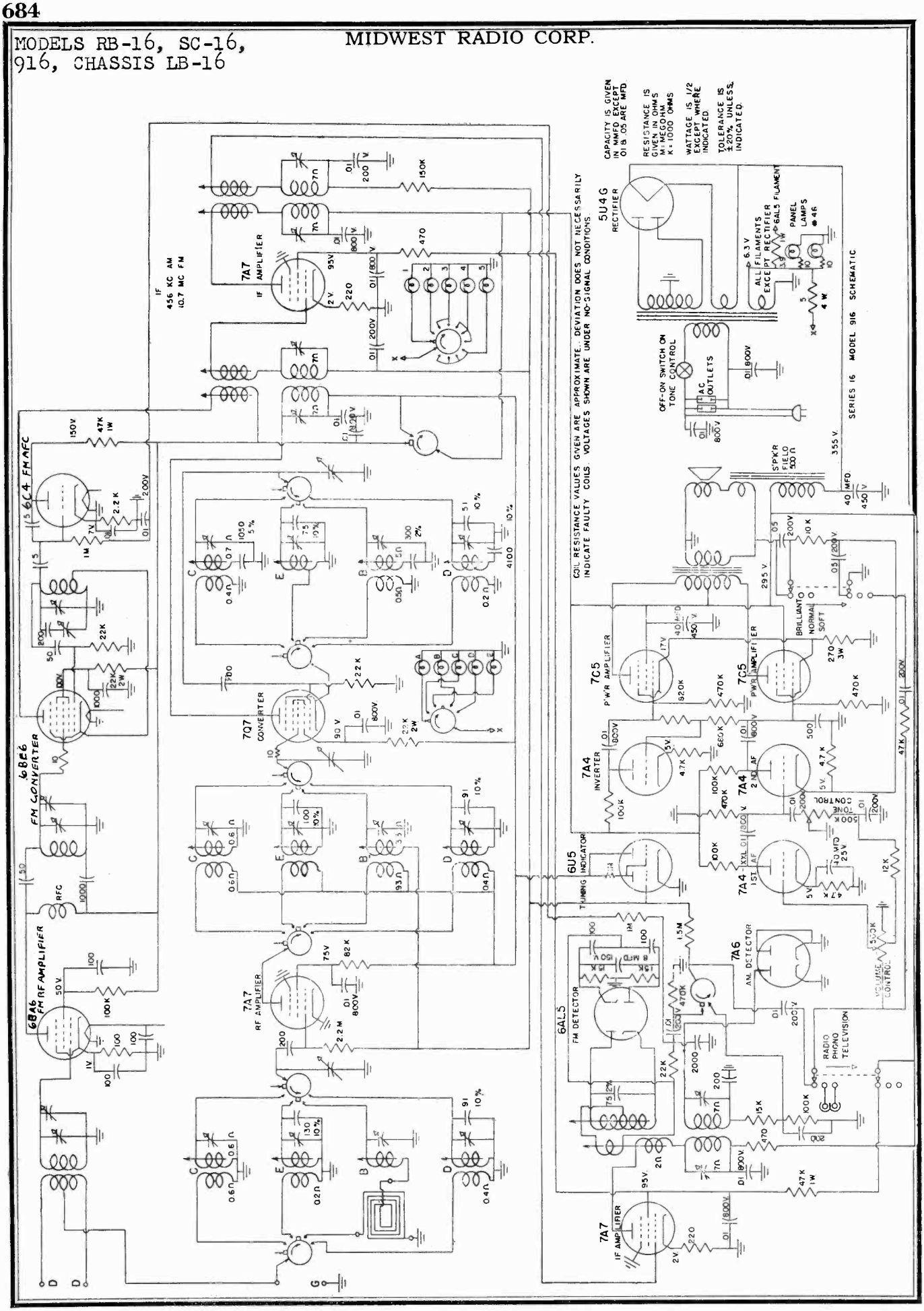
*Read text for use of CW for FM-IF alignment.

DIAL STRINGING — Use a light weight flexible dial cord when replacing worn or broken cord such as Beven-Wilcox FSN-25-12.

REPLACEMENT PARTS — Certain parts are available on an exchange basis; these are shown on the parts list with an "*."

MODELS RB-16, SC-16, 916, CHASSIS LB-16

MIDWEST RADIO CORP.



ALIGNMENT — Refer to the alignment chart for step by step procedure. It is preferable to align the FM IF stages with an AM or CW Signal. It should be noted that all adjustment are made for peak avc reading except the secondary of the third transformer. At this point, if you use an AM signal, it may be tuned for minimum audio signal; or the discriminator voltage may be used, reading it with a VTVM, and the secondary may be adjusted to the zero voltage. There may be some discrepancy between these methods, and if it is not excessive, is of no importance.

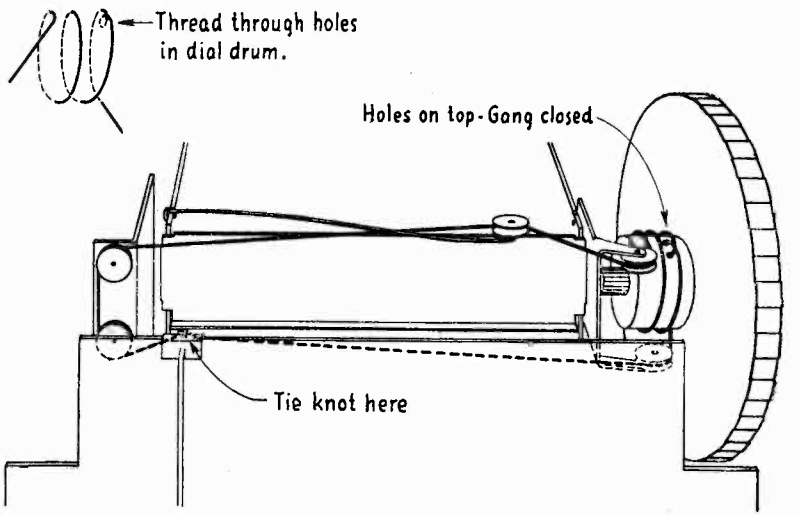
The FM RF alignment should be made using an FM signal and either avc or audio for peaking. In doing this alignment, or when feeding the IF signal into the FM mixer grid, care must be taken not to move the wiring. If the wiring is displaced so as to affect the inductance of the RF circuits it is difficult to re-establish the RF-Oscillator tracking.

The AM, RF and IF alignment should be done with a VTVM across the avc. The recommended signal value is one which will generate 10 volts of avc. When aligning the "B" band the loop must be plugged in and you need not adjust the RF padder core. The RF padder is very broad and can be aligned only if the converter grid lead is connected to an RF type VTVM as indicator; this will usually involve a signal level greater than is normally available.

ALIGNMENT CHART

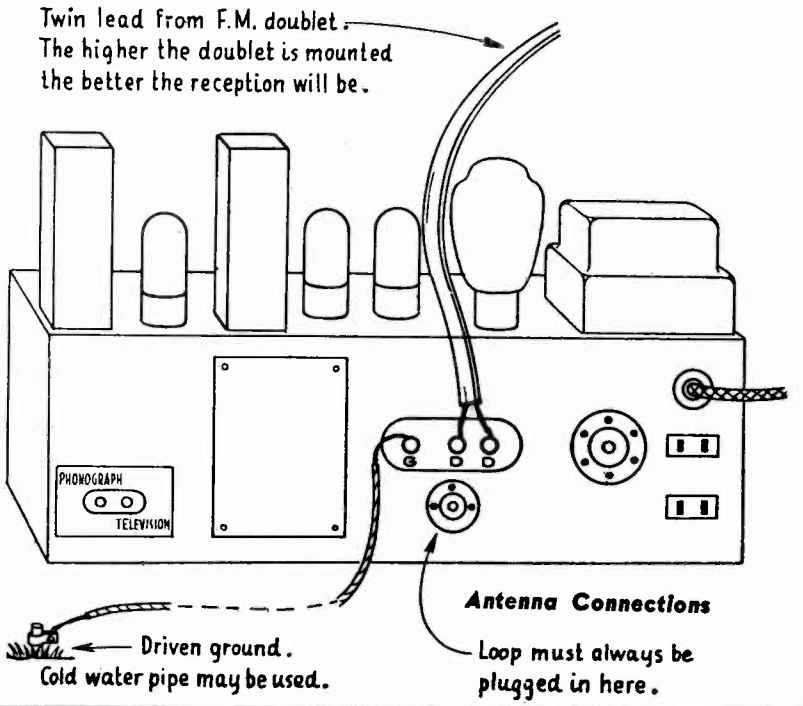
Coupling	Signal	Band Switch	Dial	Adjustment
To 7Q7 converter grid through .05 mfd. capacitor.	456 KC AM	B	1000 KC	Peak 1st, 2nd and 3rd IF trimmers on top of IF cans.
To "D" on antenna ground terminal strip through 200 mfd. and 400 ohms in series.	1600 KC AM	B	1600 KC	Peak RF, converter and oscillator trimmers marked "B".
	550 KC AM	B	550 KC	Peak converter and oscillator padder cores marked "B". Loop must be plugged in. Do not adjust RF.
	4.7 MC AM	C	4.7 MC	Peak "C" trimmers.
	1.6 MC AM	C	1.6 MC	Peak "C" cores.
	10 MC AM	D	10 MC	Peak "D" trimmer
	5 MC AM	D	5 MC	Peak "D" cores.
	22 MC AM	E	22 MC	Peak "E" trimmer.
	11.5 MC AM	E	11.5 MC	Peak "E" cores.
To 6BE6 mixer grid direct.	10.7 MC AM or CW *	A	100 MC	Peak core adjustments for avc (around 3 volts) at 1st, 2nd and primary of 3rd IF. Adjust secondary of 3rd IF for audio null from 30% amplitude modulated 10.7 MC IF signal.
To "D" and "D" on doublet terminal strip above "A-G" strip through a pair 150 ohm resistors.	105 MC FM	A	105 MC	Peak RF mixer and oscillator trimmers for avc or audio.

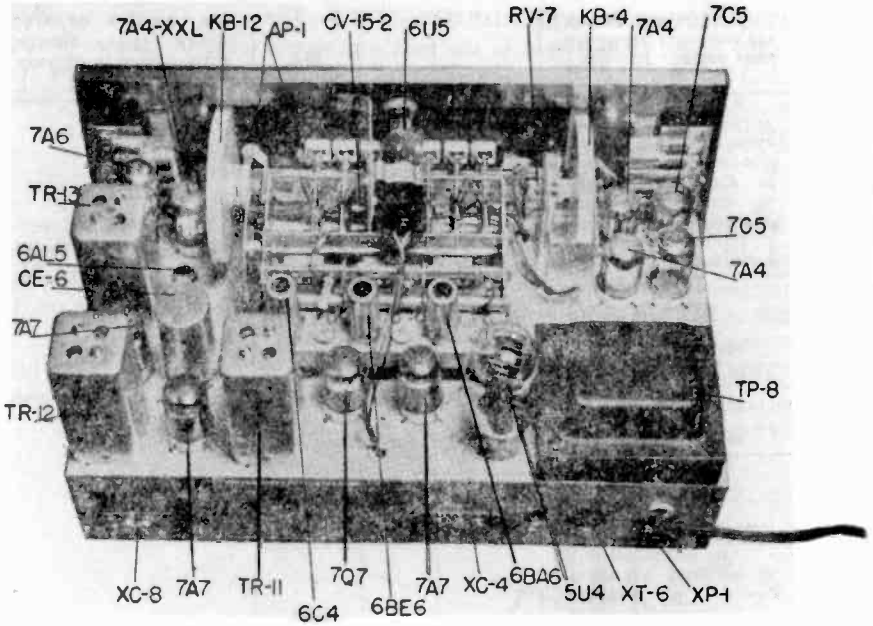
*Read text for use of CW for FM-IF alignment.



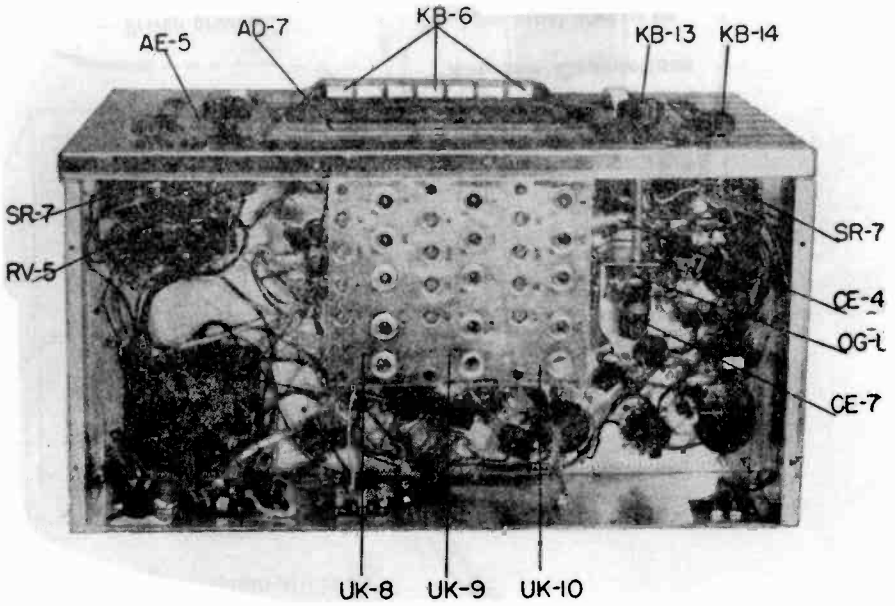
Dial Stringing

DIAL STRINGING — Use a light weight flexible dial cord when replacing worn or broken cord such as Beven-Wilcox FSN-25-12.





Top View of Series 16 Chassis



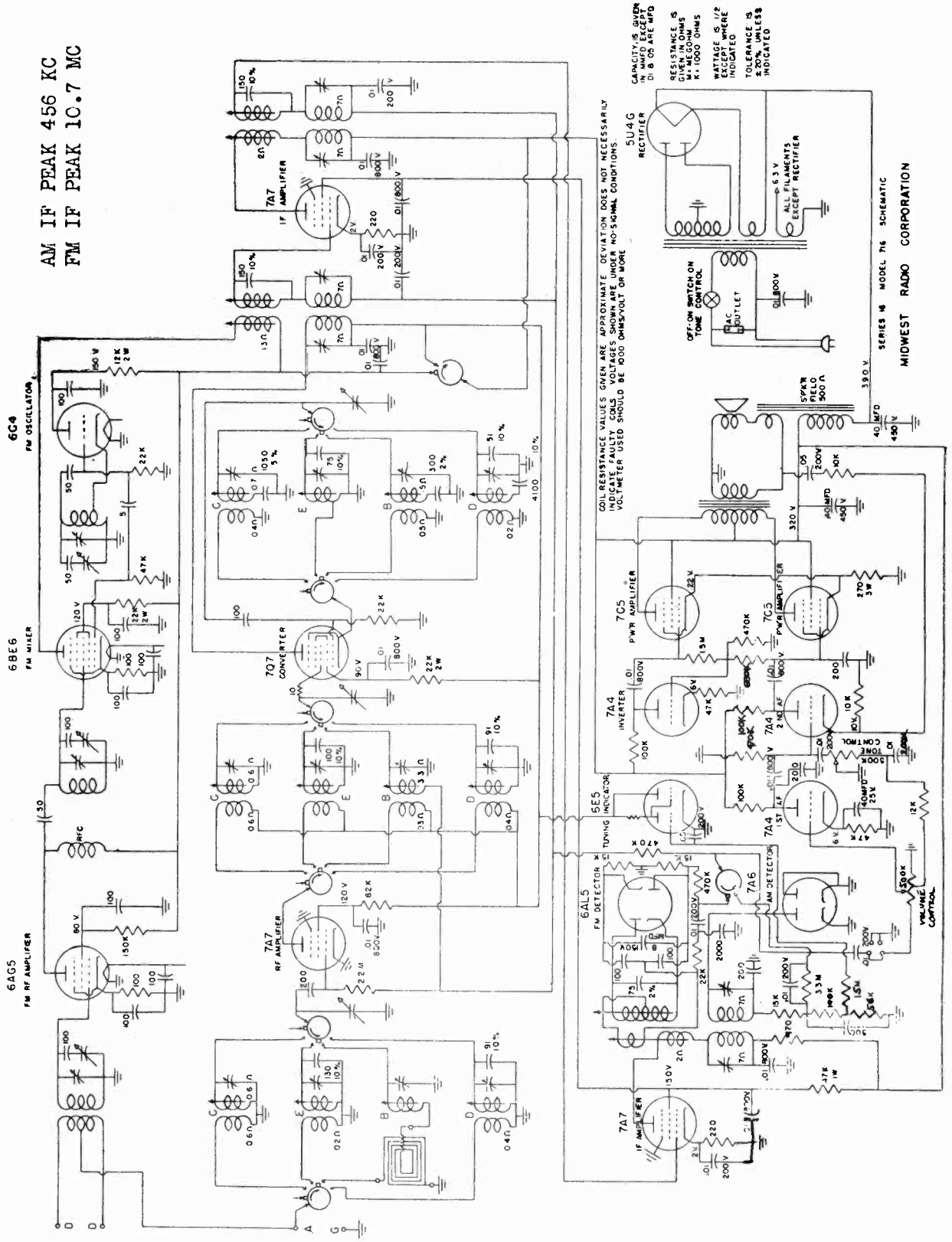
Bottom View of Series 16 Chassis

Part	Description
AD-6	Short Wave Dial
AD-7	Glass Dial
AD-9	Tone Disc Assembly
AD-10	Selector Disc Assembly
AE-5	Escutcheon
AP-1	Wood Pulley
AP-21	Pointer
AS-1	Wood Pulley Stud
CE-6	Filter Condenser 40-40
CE-4	Cathode Bypass 40 mfd. 25v
CE-7	Electrolytic 8 mfd. 150v
*CV-15-2	Tuning Gang
EG-5	Speaker Grommet
ES-12	Miniature Tube Shield
HE-7	Speaker Mtg. Eyelet
IL-1	Panel Lamp 6-8v
KB-4	Volume Knob
KB-12	Tuning Knob
KB-13	Tone & Band Knob
KB-14	Tone & Selector Knob, Small
KB-6	Push Buttons, Set of 7
OG-1	Miter Gear, Pair
PC-3	Loop Plug
PC-5	Phono & Television Plug
RV-5	Tone Control
RV-7	Volume Control
SP-2	Speaker
TP-8	Power Transformer
*TR-11	1st IF Transformer
*TR-12	2nd IF Transformer
*TR-13	3rd IF Transformer
*UK-8	R.F. Coil plate
*UK-9	Mixer coil plate
*UK-10	Oscillator coil plate

REPLACEMENT PARTS — Certain parts are available on an exchange basis; these are shown on the parts list with an "*."

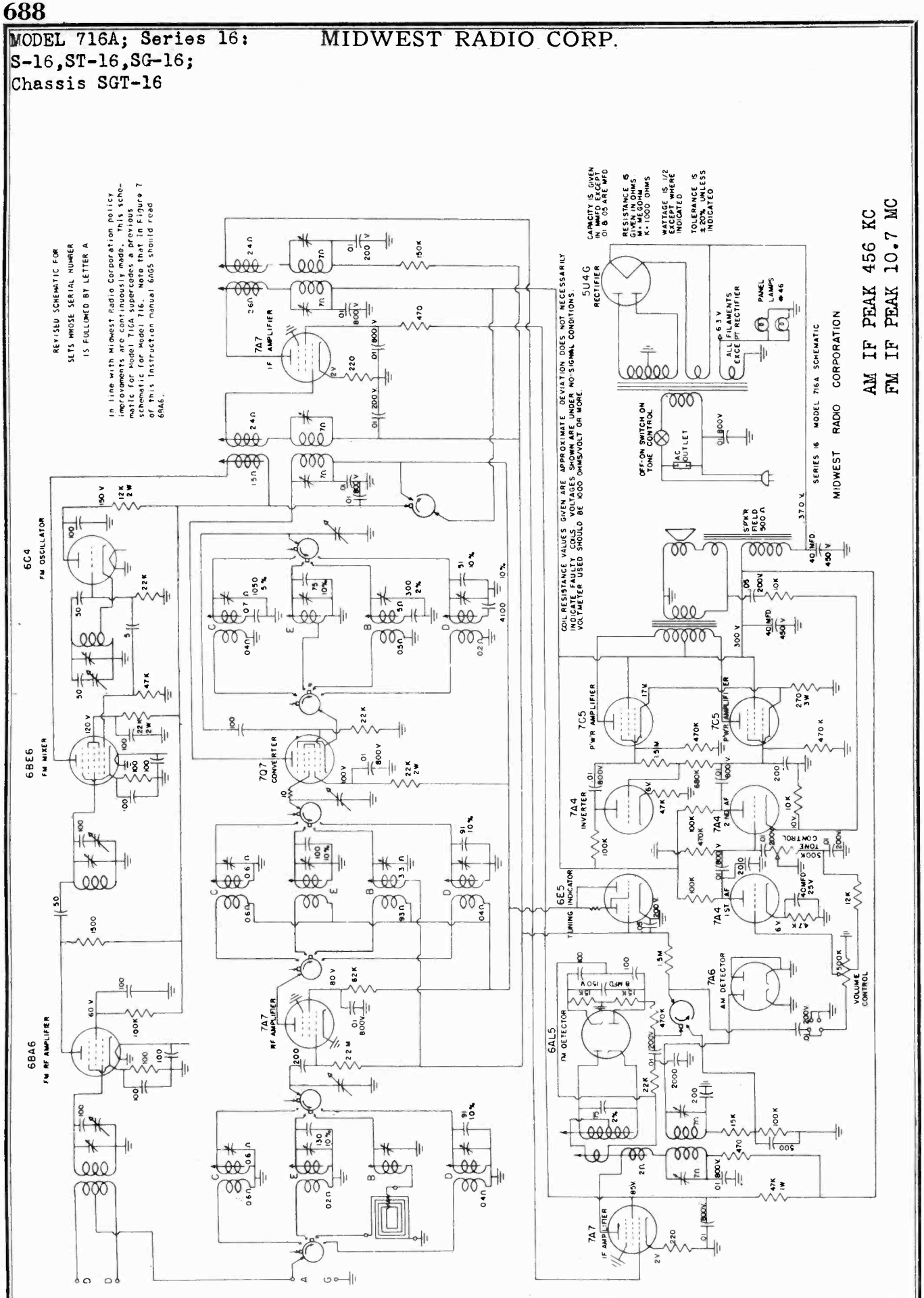
MIDWEST RADIO CORP.

MODEL 716; Series 16:
S-16, ST-16, SG-16;
Chassis SGT-16



MODEL 716A; Series 16:
S-16,ST-16,SG-16;
Chassis SGT-16

MIDWEST RADIO CORP.



ALIGNMENT — Refer to the alignment chart for step by step procedure. It is preferable to align the FM IF stages with an AM or CW Signal. It should be noted that all adjustment are made for peak avc reading except the secondary of the third transformer. At this point, if you use an AM signal, it may be tuned for minimum audio signal; or the discriminator voltage may be used, reading it with a VTVM, and the secondary may be adjusted to the zero voltage. There may be some discrepancy between these methods, and if it is not excessive, is of no importance; it is simply an indication of the exactness of equivalent capicitative and inductive coupling balance in the transformer.

The FM RF alignment should be made using an FM signal and either avc or audio for peaking. In doing this alignment, or when feeding the IF signal into the FM mixer grid, care must be taken not to move the wiring. If the wiring is displaced so as to affect the inductance of the RF circuits it is difficult to re-establish the RF-Oscillator tracking.

The AM, RF and IF alignment should be done with a VTVM across the avc. The recommended signal value is one which will generate 10 volts of avc. When aligning the "B" band the loop must be plugged in and you need not adjust the RF padder core. The RF padder is very broad and can be aligned only if the converter grid lead is connected to an RF type VTVM as indicator; this will usually involve a signal level greater than is normally available.

Coupling	Signal	Band Switch	Dial	Adjustment
To 7Q7 converter grid through .05 mfd. capacitor.	456 KC AM	B	1000 KC	Peak 1st, 2nd and 3rd IF trimmers on top of IF cans.
To "A" on antenna ground terminal strip through 200 mfd. and 400 ohms in service.	1600 KC AM	B	1600 KC	Peak RF, converter and oscillator trimmers marked "B".
	550 KC AM	B	550 KC	Peak converter and oscillator padder cores marked "B". Loop must be plugged in. Do not adjust RF.
	4.7 MC AM	C	4.7 MC	Peak "C" trimmers.
	1.6 MC AM	C	1.6 MC	Peak "C" cores.
	10 MC AM	D	10 MC	Peak "D" trimmer
	5 MC AM	D	5 MC	Peak "D" cores.
	22 MC AM	E	22 MC	Peak "E" trimmer.
	11.5 MC AM	E	11.5 MC	Peak "E" cores.
To 6BE6 mixer grid direct.	10.7 MC AM or CW	A	100 MC	Peak core adjustments for avc (around 3 volts) at 1st, 2nd and primary of 3rd IF. Adjust secondary of 3rd IF for audio null from 30% amplitute modulated 10.7 MC IF signal.
To "D" and "D" on doublet terminal strip above "A-G" strip through a pair 150 ohm resistors.	105 MC FM	A	105 MC	Peak RF mixer and oscillator trimmers for avc or audio.

*Read text for use of CW for FM-IF alignment.

PUSH BUTTONS — The push buttons are for your convenience in selecting stations without the bother of making the exact tuning adjustments necessary for best reception. There are seven buttons and each button may be set for a station. The station may be at any point on the dial.

It is not recommended that the buttons be used for short wave stations.

To set the push buttons this exact procedure should be followed. A small screw driver will be needed.

1. Turn on the receiver and allow at least three minutes to warm up.
2. Remove the push button by pulling straight out. A hooked instrument will assist in removing the end buttons.
3. Loosen the LOCK SCREW at least one half turn.
4. Using the screw driver with the blade in the screw slot, push the mechanism in firmly. Hold in during step 5. The mechanism may bind at first. Use sufficient force to break loose so that the push button and tuning control are independent.
5. Tune the pointer past the desired station then back to the desired station and make the tuning adjustment as carefully as you know how.
6. Tighten the LOCK SCREW.
7. Check the setting of this push button by tuning away from the station manually, then pushing in firmly. Pushing the button must return the pointer to the position it had when the LOCK SCREW was tightened. If the station is not now tuned in perfectly repeat the steps 2 to 6 carefully.
8. Adjust each of the seven buttons, or as many as you wish to set, exactly as outlined above.

Any button can be set for any pointer position, however, you may find it more desirable to select the button nearest the pointer position so that each successive adjustment moves the pointer in the same direction. That is, the "M" button will be set for a station at the left of the dial, the "W" button will set for a station near the center, etc.

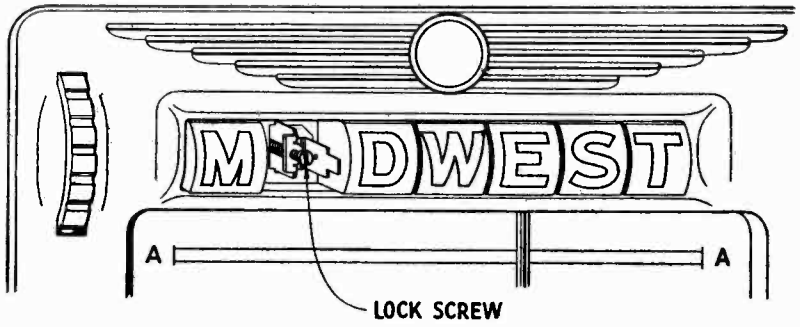


Figure 4. Push Button Mechanism

SERVICE — Series 16, Model 716, is a straight forward design, containing no trick circuits. Servicing of the coil plates or IF transformers should be avoided, except under special conditions, and rather than attempt to repair these assemblies a replacement should be ordered.

DIAL STRINGING — Use a light weight flexible dial cord when replacing worn or broken cord such as Beven-Wilcox FSN-25-12.

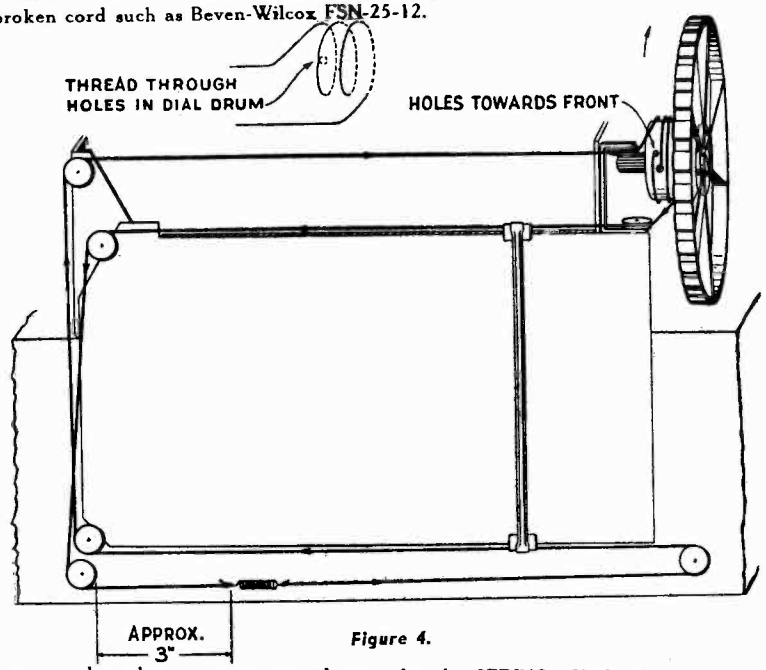


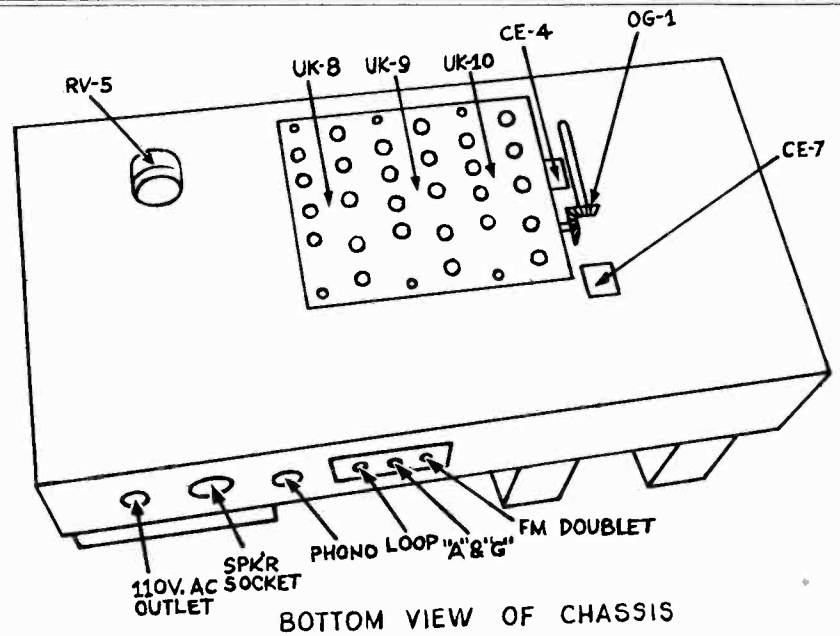
Figure 4.

Care must be taken to assure travel room for the SPRING. If the dial is strung with parts approximately as shown in Figure 4, there will not be too much adjustment necessary. The final step should be to set the pointer after replacing the dial, at the low frequency end of the dial in line with the end of the calibration base line. Use a small piece of gummed tape on the string so that clamping the pointer does not cut the dial cord.

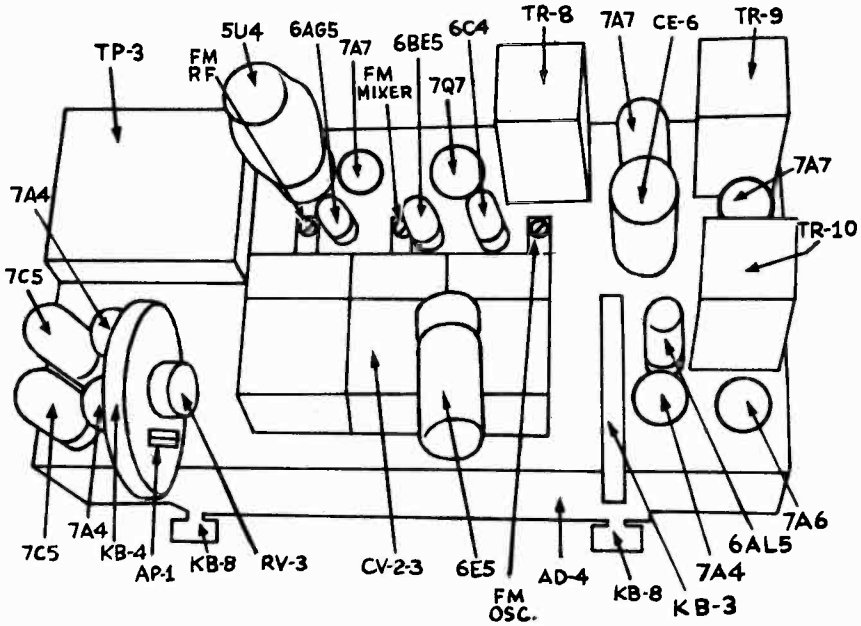
PARTS LIST

Part	Description
AD-4	Dial
AE-1	Escutcheon
AK-2	Coil plate cover
AP-1	Wood pulley
AP-6	Pointer
AS-1	Wood pulley mtg. stud
CE-6	Filter condenser 40-40
CE-4	Cathode by pass 40 mfd. 25v
CE-7	Electrolytic 8 mfd. 150v
*CV-2-3	Tuning gang
EG-2	Speaker grommet
ES-12	Tube shield
HE-1	Speaker mtg. eyelet
IL-1	Panel lamp 6-8 volts
KB-3	Tuning knob
KB-4	Volume control knob
KB-8	Tone or Band knob
KB-6	Push buttons, set of 7
OG-1	Miter gear, pair
OS-3	Dial string spring
PC-3	Loop plug
PC-4	Phonograph plug
RV-3	Volume control
RV-5	Tone control
*SP-2	Speaker, 14 inch
TP-3	Power transformer
TP-4	Universal power transformer
*TR-8	1st IF transformer
*TR-9	2nd IF transformer
*TR-10	3rd IF transformer
*UK-8	R.F. Coil plate
*UK-9	Mixer coil plate
*UK-10	Oscillator coil plate

REPLACEMENT PARTS — Certain parts are available on an exchange basis; these are shown on the parts list with an "*."



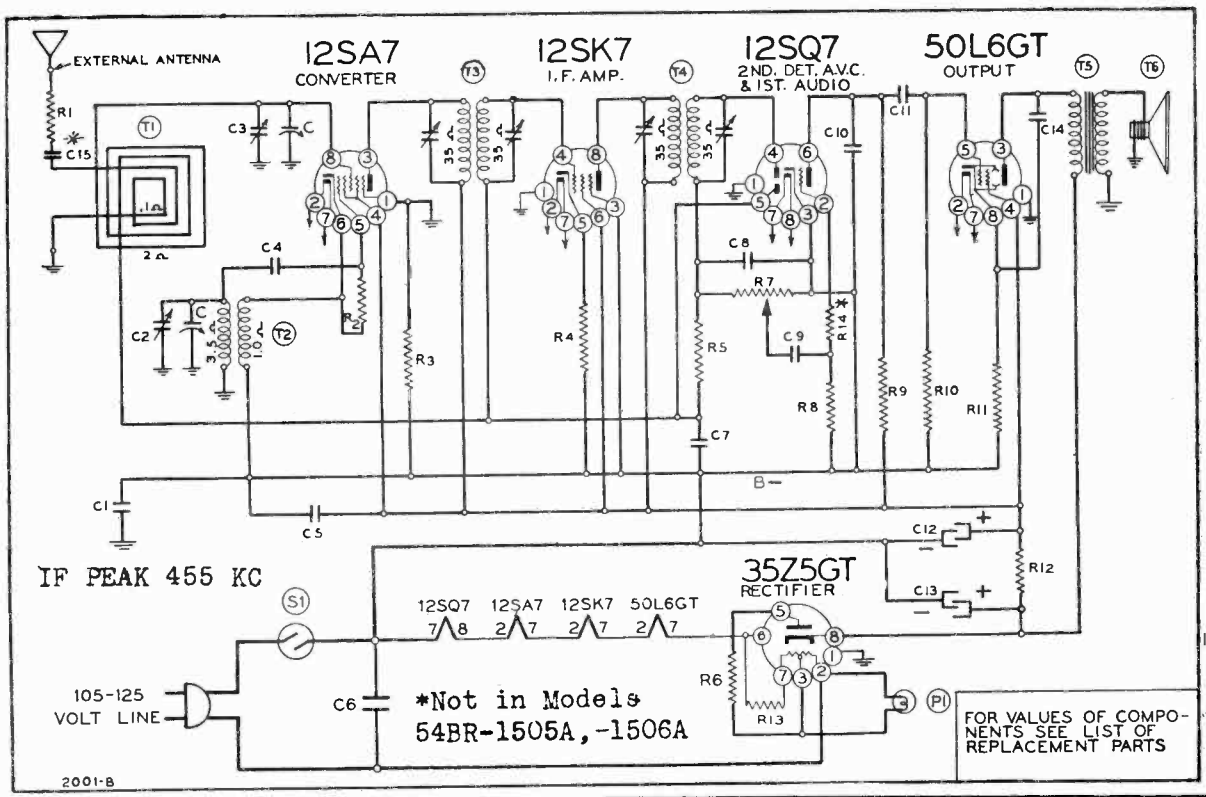
BOTTOM VIEW OF CHASSIS



TOP VIEW OF CHASSIS

MONTGOMERY WARD

MODELS 54BR-1505A, 54BR-1506A, MODELS 54BR-1505B, 54BR-1506B



Part No.	Schematic Diagram Reference	Description	No. Used In Set
		CONDENSERS	
BE100110	C1	.2 x 400 volt tubular condenser	1
BE12921	C4	.0002 mica type condenser, 20%	1
BE1009	C5, C7	.05 x 200 volt tubular condenser	2
BE1001	C6	.1 x 400 volt tubular condenser	1
BE1295	C8	.0001 mica type condenser, 20%	1
BE10025	C9	.002 x 600 volt tubular condenser	1
BE12912	C10	.00025 mica type condenser, 20%	1
BE100106	C11	.004 x 600 volt tubular condenser	1
BE11992	C12, C13	Electrolytic filter condenser, 50 to 60 cycles, 20 mfd.–40 mfd. x 150 volts	1
BE11993	C12, C13	Electrolytic filter condenser, 25 cycles, 40 mfd.–60 mfd. x 150 volts	1
BE10026	C14	.02 x 400 volt tubular condenser	1
BEC-8D-10778	C15 *	.002 x 600 volt tubular condenser	1
		RESISTORS*	
BEA-9B1-13	R1	1,000 ohm, ½ watt resistor, 20%	1
BEA-9B1-82	R2	47,000 ohm, ½ watt resistor, 10%	1
BEA-9B1-27	R3	220,000 ohm, ½ watt resistor, 20%	1
BEA-9B1-46	R4	47 ohm, ½ watt resistor, 10%	1
BEA-9B1-34	R5	3.3 megohm, ½ watt resistor, 20%	1
BEA-9B1-42	R6	22 ohm, ½ watt resistor, 10%	1
BEA-9B1-35	R8	4.7 megohm, ½ watt resistor, 20%	1
BEA-9B1-29	R9	470,000 ohm, ½ watt resistor, 20%	1
BEA-9B1-30	R10	680,000 ohm, ½ watt resistor, 20%	1
BEA-9B1-52	R11	150 ohm, ½ watt resistor, 10%	1
BEA-9B2-63	R12	1200 ohm, 1 watt resistor, 10%	1
BEA-9B2-4	R13	33 ohm, 1 watt resistor, 20%	1
BEA-9B1-23	R14 *	47,000 ohm, ½ watt resistor, 20%	1
		COILS	
BE108140K	T3	Input I.F. coil, complete in can	1
BE108141F	T4	Output I.F. coil, complete in can	1
BE110145	T2	Oscillator coil	1
BE111252B	T1	Loop antenna only (less back)	1
BE128724		Back for loop, brown	1
BE128724B		Back for loop, ivory	1

*SPECIAL NOTE ON RESISTORS: The values of all resistors listed above are based on RMA standards. Due to conditions beyond our control some receivers have been shipped with resistors of pre-standardized values. This receiver will operate equally well with resistors of either group. An illustration of the difference follows:

Pre-standardized value—50,000 ohms, ±10%, 1/3 watt
RMA value—47,000 ohms, ±10%, 1/2 watt

NOTE ON TUBE REPLACEMENT

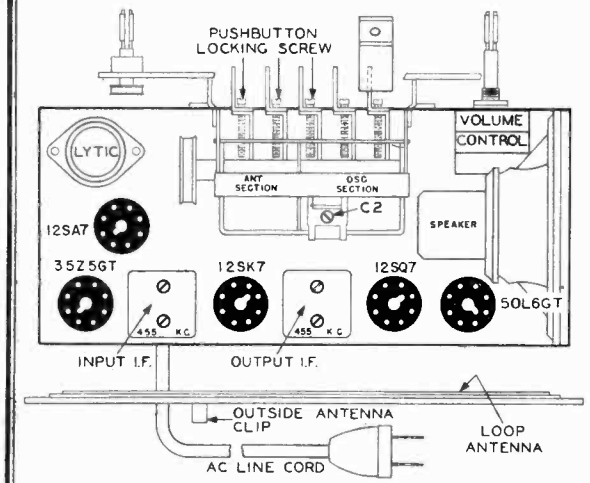
Replace a defective metal 12SK7 tube wtih another metal tube. Replace a glass 12SK7 tube with either a metal tube or with an exact duplicate of the tube now in the set.

Part No.	Schematic Diagram Reference	Description	No. Used in Set
		SPEAKER	
BE114248C	T6	Five-inch P.M. dynamic speaker (less utput transformer)	1
BE105108B	T5	Output transformer for speaker	1
		MISCELLANEOUS	
BE101265	R7, S1	Volume control and switch (1 megohm)	1
BEB-8A-10209	C, C2, C3	Two-gang variable condenser with 5-button automatic tuner assembly	1
BE107-98		Line cord and plug	1
BE121210		Eight-prong octal socket	5
BE107249	P1	6-8 volt pilot light bulb, type T-47	1
BE107358		Socket assembly for pilot light	1
BE132264		No. 8-18 x ¾ chassis mounting screw	1
BE134123		Rubber bumper for bottom of cabinet	4
BE128655-46		Bakelite cabinet, walnut	1
BE128655-9		Bakelite cabinet, ivory	1
		DIAL AND TUNING PARTS	
BE112945B		Dial plate	1
BEB-6D-10117		Dial scale (Model 54BR-1505A only)	1
BEB-6D-10117-1		Dial scale (Model 54BR-1506A only)	1
BEB-2G-10118		Pointer	1
BE112969		Crystal for dial	1
BEA-2M-7758		Button for fastening dial scale	2
BE120375		String for dial	3 ft.
BE120372		Coiled tension spring for dial string	1
BE112959		Pulley for dial	1
BE117910		Pointer shaft	1
BEA-3A-10119		Tuning shaft	1
BE117902		Rod for pushbuttons	1
BE128795-47		Pushbutton, left, walnut	2
BE128794-47		Pushbutton, right, walnut	3
BE128795-8		Pushbutton, left, ivory	2
BE128794-8		Pushbutton, right, ivory	3
BE112973		Set of station call letters	1 set
BE112979		Set of celluloid tabs	1 set
BE128686-47		Knob, "Volume," walnut	1
BE128687-47		Knob, "Tuning," walnut	1
BE128686-8		Knob, "Volume," ivory	1
BE128687-8		Knob, "Tuning," ivory	1
BE131383		Screwdriver	1

ALIGNMENT PROCEDURE

Volume control setting—Maximum (extreme clockwise) for all adjustments.
Connect ground lead of signal generator to B— of radio chassis through a 0.1 mfd. condenser.
The loop antenna should be connected to the radio and in its proper position when making all adjustments.

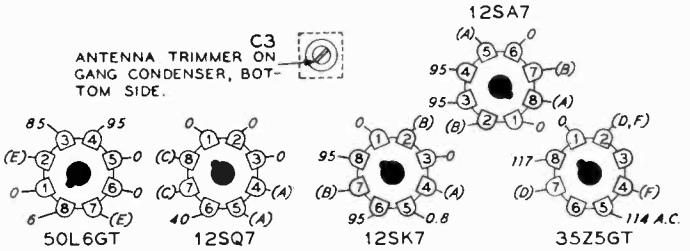
BAND	Signal Generator Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmer Adjusted to Maximum
I. F.	455 Kc.	.1 mfd.	Grid of 12SK7 I. F.	Rotor full open (Plates out of mesh)	Two trimmers on top of Output I. F.
	455 Kc.	.1 mfd.	Grid of 12SA7 Mixer	Rotor full open (Plates out of mesh)	Two trimmers on top of Input I. F.
BROADCAST	1600 Kc.	200 mmf.	Grid of 12SA7	Rotor full open (Plates out of mesh)	B.C. Osc. trimmer C2 on Gang
	1400 Kc.	200 mmf.	External Antenna and B—	Set Dial at 1400 K. C.	B.C. Ant. trimmer C3 under Gang



A-CANNOT BE MEASURED BY VOLTMETER
B-11 VOLTS A.C. ACROSS PINS 2 AND 7
C-11 VOLTS A.C. ACROSS PINS 7 AND 8
D-33 VOLTS A.C. ACROSS PINS 2 AND 7
E-48 VOLTS A.C. ACROSS PINS 2 AND 7
F-117 VOLTS A.C. ACROSS PINS 2 AND 4

ALL VOLTAGES MEASURED WITH A 1000-OHMS/VOLT VOLTMETER BETWEEN TERMINAL INDICATED AND B-. LINE VOLTAGE 117 VOLTS A.C.

Voltages at tube socket terminals



Technical Data

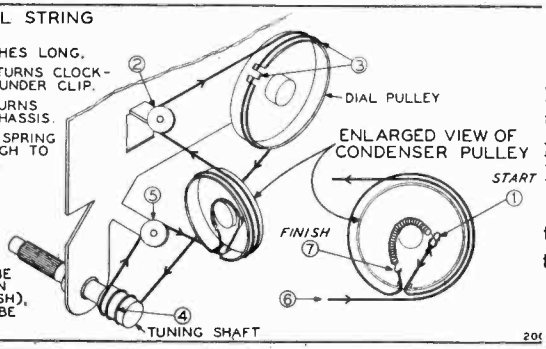
Tuning range	535 to 1600 Kc.
Intermediate Frequency	455 Kc.
Power consumption	35 watts
Sensitivity (for 0.05 watt output)	30 microvolts average
Selectivity	58 Kc. broad at 1000 times signal at 1000 Kc.
Power output (in voice coil)	
Undistorted	1.0 watt at 10%
Maximum	1.7 watts
Voice coil impedance	3.2 ohms

BOTTOM VIEW OF CHASSIS

REPLACING DIAL STRING

NOTES:
USE STRING 36 INCHES LONG.
IN STEP 3, WIND 1½ TURNS CLOCKWISE. PASS STRING UNDER CLIP.
IN STEP 4, WIND 3 TURNS TOWARD FRONT OF CHASSIS.
IN STEP 7, BE SURE SPRING IS STRETCHED ENOUGH TO TAKE UP ALL SLACK.

IMPORTANT!
WHEN CONDENSER PULLEY IS IN EXTREME CLOCKWISE POSITION (ROTORS OUT OF MESH), DIAL POINTER MUST BE AT 16 (1600 KC).



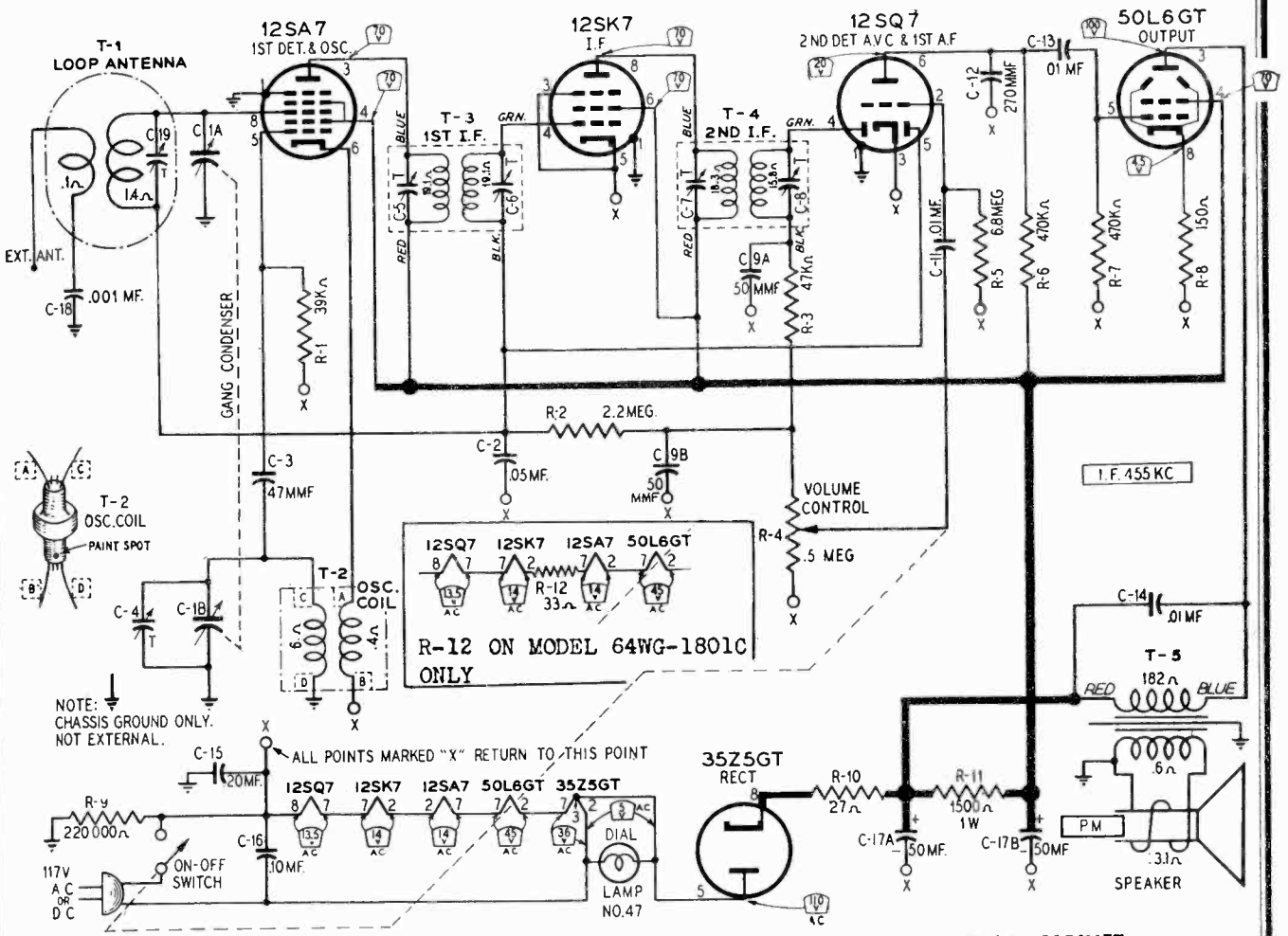
SETTING THE PUSHBUTTONS

The pushbuttons may be used, after adjustment, for the automatic tuning of any five 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 five stations from the sheets supplied with this manual.
3. Insert the long thin screwdriver (supplied with the set) into the hole in one of the pushbuttons and turn the pushbutton locking screw several turns to the left.
4. With the screwdriver still engaged in the locking screw slot, push the screw all the way in. Hold it in this position and with the tuning knob tune in the station you want.
5. Now turn the pushbutton locking screw to the right and **tighten it firmly.** Remove the screwdriver.
6. Press the pushbutton all the way in (this tunes in the station) and, by rotating the tuning dial back and forth, determine whether the button has been properly set. If it has not, repeat the procedure described above.
7. Insert the call letters for the station in the button and put one of the celluloid tabs over the letters.
8. Set each of the four other buttons, one for each station, in the same way. If you are unable to set a station on any particular button, it is probably because the pushbutton locking screw has not been loosened.
9. Any of the five stations may now be tuned in simply by pushing the proper button in as far as it will go.

MONTGOMERY WARD

MODELS 54WG-1801A, 54WG-1801B, 64WG-1801C



Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the heater and dial lamp are between the socket terminal and "X" point.

The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage.....117 volts AC
Volume control.....maximum
Signal input.....none

REMOVAL OF CHASSIS FROM CABINET

To remove the chassis from the cabinet it is necessary to pull the two control knobs and the dial pointer from their shafts. Remove the four screws in the bottom of the cabinet and the four snap pins that hold the cabinet back in place.

Care must be taken when removing the dial pointer that it is not damaged in such a manner that reinstallation will not be possible.

RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volts across this resistor will be equivalent to a 50 milliwatt output with the speaker connected. The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of plus or minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR 50 MILLIWATT OUTPUT
Freq.	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	Loop Antenna—external antenna clip	Chassis	24 microvolts
1000 kc	.05 mf	12SA7 1st Detector pin 8	Point "X" (12SK7 pin 3)	125 microvolts
455 kc	.05 mf	12SA7 1st Detector pin 8	Same as above	100 microvolts
455 kc	.05 mf	12SK7, I-F Amp. pin 4	Same as above	2500 microvolts
400 cycles	.05 mf	12SQ7, 1st AF, pin 2	Same as above	.042 volts
400 cycles	.05 mf	50L6GT Output, pin 5	Same as above	1.9 volts

MODELS 54WG-1801A,54WG-1801B
MODEL 64WG-1801C
MODEL 54WG-2007A,54WG-2007B

MONTGOMERY WARD

MODELS 54 WG-1801A,54 WG-2007A

Volume Control—Maximum All Adjustments.

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

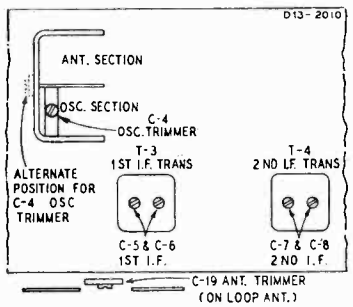
The equipment in column at right is required for aligning: Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed. Output Indicating Meter; Non-Metallic Screwdriver. Dummy Antennas—.1 mf., 50 mf.

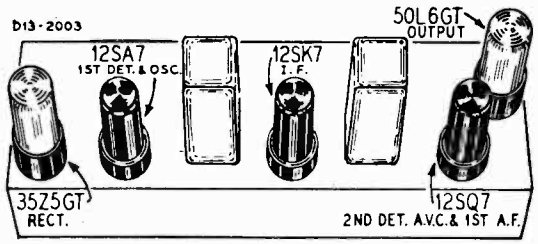
SIGNAL GENERATOR				CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM See Trimmer Illustration
Frequency Setting	Coupling Capacitor	Connection To Radio	Ground Connection		
455 kc	.1 mf	Control Grid 12SK7—I-F	Point "X" 12SK7—I-F Prong No. 3	Turn Rotor to full open	2nd I-F (C7) & (C8)
455 kc	.1 mf	Control Grid 12SA7—1st Det.	Same as above	Turn Rotor to full open	1st I-F (C5) & (C6)
1600 kc	.1 mf	Control Grid 12SA7—1st Det.	Same as above	Turn Rotor to full open	Oscillator (C4)
1400 kc	50 mmf	External Antenna Clip on Loop See Note A	Chassis	Turn Rotor to Max. Output Set Indicator to 1400 KC— See Note B	Antenna (C19)

NOTE A—Re-assemble chassis in cabinet. Replace back on cabinet.

NOTE B—Tune in a 1400 KC signal. If pointer is not at the 1400 KC mark on the dial scale, pull pointer off shaft. Set pointer at the 1400 KC mark and push back on shaft.

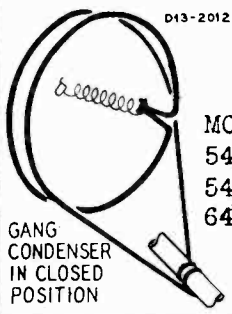
TRIMMER POSITIONS



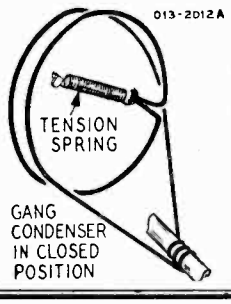


MODELS 54WG-1801B
64WG-1801C

DRIVE CORD DIAGRAM



MODELS
54WG-1801A
54WG-2007A
64WG-2007B



Power Supply	105-125 volts AC—50-60 cycles—30 watts 105-125 volts DC
Frequency Range	535 to 1620 KC
Intermediate Frequency	455 KC
Selectivity	55.5 KC broad at 1000 times signal, 1000 KC
Sensitivity (for .05 watt output) with external antenna	25 microvolts average
Power Output	1.5 watts maximum, .9 watt (10% distortion)
Loud speaker	5" PM dynamic
Voice coil impedance	3.2 ohms at 400 cycles

DRIVE CORD REPLACEMENT

MODELS 54 WG-1801A,54 WG-2007A

Turn the gang condenser to the fully closed position. Use a new drive cord 12 inches in length and tie one end to the tension spring. Fasten the other end of the tension spring to the hook on the drive pulley. Pass the cord through the slot in the drive pulley rim and continue around pulley one half turn, counterclockwise. Wind 2½ turns counterclockwise (from front of chassis) around tuning shaft. Turns should progress toward rear of chassis. (Wind 3 1/2 turns in tuning shaft for 54 WG-1801-B.) Wind cord counterclockwise around drive pulley in back of previous ½ turn. Pass cord through the slot in the pulley rim. Stretch tension spring and tie free end of cord to the spring. Cut off any excess string.

MODELS 54 WG-1801A, 54 WG-1801B, 64WG-1801C

Ref. No.	Part No.	Description	Qty. Used in Set
		CAPACITORS	
C-1A C-1B	14A176	Gang condenser with pulley	1
C-2	B66503	.05 mf 200 V Tubular	1
C-3	47X446	47 mmf Molded	1
C-4		Part of C-1	
C-5		Part of T-3 1st I-F Transformer	
C-6			
C-7		Part of T-4 2nd I-F Transformer	
C-8			
C-9A C-9B	47X112	Dual mica condenser, 50 mmf	1
C-10 C-13 C-14	B66103	.01 mf 200 V Tubular	3
C-12	47X445	270 mmf Molded	1
C-15	B66204	.20 mf 200 V Tubular	1
C-16	D66104	.10 mf 400 V Tubular	1
C-17A C-17B	45X341	50 mf 150 V Dry electrolytic 50 mf 150 V condenser	1
C-18	D66102	.001 mf 400 V Tubular	
C-19	17A116	2.5-23 mmf Trimmer	1
		RESISTORS	
		Ohms Watts	
R-1	B84393	39,000 0.5 Carbon	1
R-2	B85225	2.2 meg 0.5 Carbon	1
R-3	B85473	47,000 0.5 Carbon	1
R-4	36X340	.5 meg Volume control and switch	1
R-5	B85685	6.8 meg 0.5 Carbon	1
R-6	B84474	470,000 0.5 Carbon	1
R-7	B85474	470,000 0.5 Carbon	1
R-8	B83151	150 0.5 Carbon	1
R-9	B85224	220,000 0.5 Carbon	1
R-10	B84270	27 0.5 Carbon	1
R-11	C85152	1500 1.0 Carbon	1
R-12	C85330	33 1.0 Carbon	1
		TRANSFORMERS AND COILS	
T-1	9A1734	"B" Band Loop antenna	1
T-2	9A1805	Oscillator coil assembly	1
T-3	9A1782	1st I-F Transformer and can assembly	1
T-4	9A1783	2nd I-F Transformer and can assembly	1
T-5	51X123	Output Transformer	1

MODEL 64WG-1801C ONLY

		MISCELLANEOUS
12A429		5" P.M. speaker 1 Cone and voice coil assembly for the above speaker (specify part number and letters stamped on above speaker) 1
3A303		Tube socket—octal (8 prong) molded 5
10A297		Knob (on-off switch, volume control) tuning 2
28X292		Snap button (mounting loop to cabinet) 4
13X328		Line cord and plug assembly 1
		DIAL AND DRIVE ASSEMBLY
25X1380		Gang condenser mounting bracket 1
58X585		Dial 1
20X1444		Screws, dial 4
		Speed nuts, 2-56 No. 102 4
15X216		Pointer 1
		Clip No. 2401 (for pointer) 1
26X463		Drive shaft (tuning) 1
19X192		"C" washer for drive shaft 2
7A185		Pilot light cable & socket assembly 1
		No. 47 Pilot light bulb 1
28X310		Drive cord tension spring 1
		12" drive cord (18 lb. test) 1

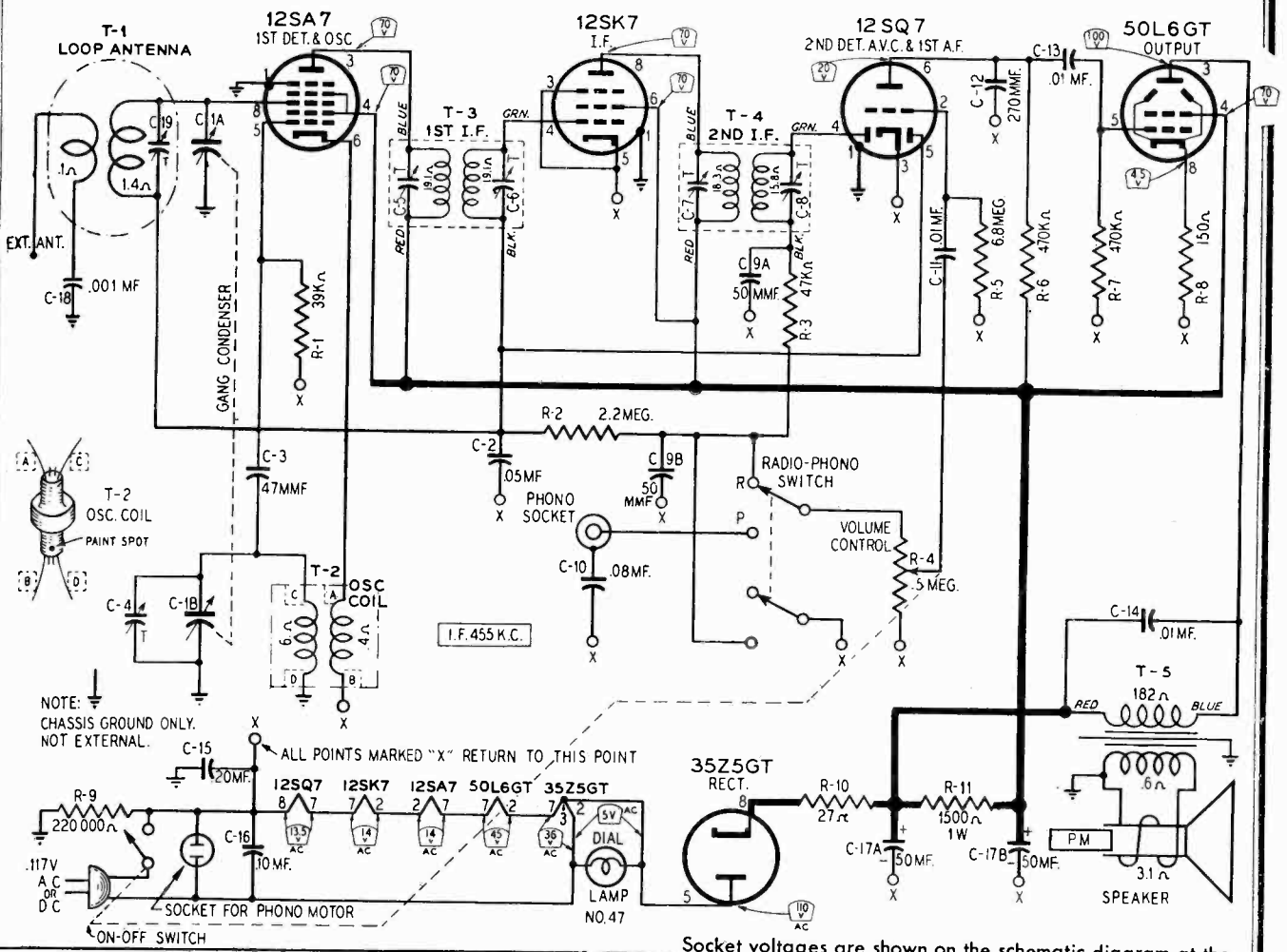
MODELS 54WG-2007A, 64WG-2007B

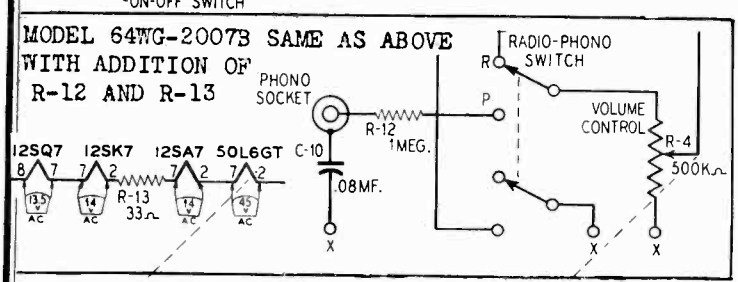
Ref. No.	Part No.	Description	Qty. Used in Set
		CAPACITORS	
C-1A C-1B	14A176	Gang condenser with pulley	1
C-2	B66503	.05 mf 200 V Tubular	1
C-3	47X446	47 mmf Molded	1
C-4		Part of C-1	
C-5 C-6		Part of T-3 1st I-F Transformer	
C-7 C-8		Part of T-4 2nd I-F Transformer	
C-9A C-9B	47X112	Dual mica condenser, 50 mmf	1
C-10	B66803	.08 mf 200 V Tubular	1
C-11 C-13 C-14	B66103	.01 mf 200 V Tubular	3
C-12	47X445	270 mmf Molded	1
C-15	B66204	.20 mf 200 V Tubular	1
C-16	D66104	.10 mf 400 V Tubular	
C-17A C-17B	45X341	50 mf 150 V Dry electrolytic 50 mf 150 V condenser	1
C-18	D66102	.001 mf 400 V Tubular	
C-19	17A116	2.5-23 mmf Trimmer	1
		RESISTORS	
		Ohms Watts	
R-1	B84393	39,000 0.5 Carbon	1
R-2	B85225	2.2 meg 0.5 Carbon	1
R-3	B85473	47,000 0.5 Carbon	1
R-4	36X340	.5 meg Volume control and switch	1
R-5	B85685	6.8 meg 0.5 Carbon	1
R-6	B84474	470,000 0.5 Carbon	1
R-7	B85474	470,000 0.5 Carbon	1
R-8	B83151	150 0.5 Carbon	1
R-9	B85224	220,000 0.5 Carbon	1
R-10	B84270	27 0.5 Carbon	1
R-11	C85152	1500 1.0 Carbon	1
R-12*	B85105	1 meg 0.5 Carbon	1
R-13*	C85330	33 1.0 Carbon	1
T-1	9A1795	"B" Band Loop Antenna	1
T-2	9A1805	Oscillator coil assembly	1
T-3	9A1782	1st I-F Transformer and can assembly	1
T-4	9A1783	2nd I-F Transformer and can assembly	1
T-5	51X119	Output Transformer	1
		MISCELLANEOUS	
	12A429	5" P.M. speaker 1 Cone and voice coil assembly for the above speaker (specify part number and letters stamped on above speaker).	
	3A303	Tube socket—octal (8 prong) molded	5
	3A305	Single pin tip socket (Phono)	1
	10A297	Knob (on-off switch and volume control, tuning)	2
	10A526	Knob (Phono-Switch)	1
	28X292	Snap button (mounting loop to cabinet)	4
	13X328	Line cord and plug assembly	1
	2A355	Radio phono switch	1
	28A112	Phono-motor assembly	1
	2A170	Phono on-off switch	1
	6A227	Two prong motor plug	1
	28A113	Pickup arm	1
	13X542	Phono motor socket and cable assembly	1
		DIAL AND DRIVE ASSEMBLY	
	25X1380	Gang condenser mounting bracket	1
	58X585	Dial	1
	20X1444	Screws, dial	4
		Speed nuts, 2-56 No. 102	4
	15X216	Pointer	1
		Clip No. 2401 (for pointer)	1
	26X463	Drive shaft (tuning)	1
	19X192	"C" washer for drive shaft	2
	7A185	Pilot light cable and socket assembly	1
		No. 47 Pilot light bulb	1
	28X310	Drive cord tension spring	1
		12" drive cord (18 lb. test)	1

* IN MODEL 64WG-2007B ONLY

MODELS 54WG-2007A, 64WG-2007B

MONTGOMERY WARD





Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the heater and dial lamp are between the socket terminal and "X" point.

The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

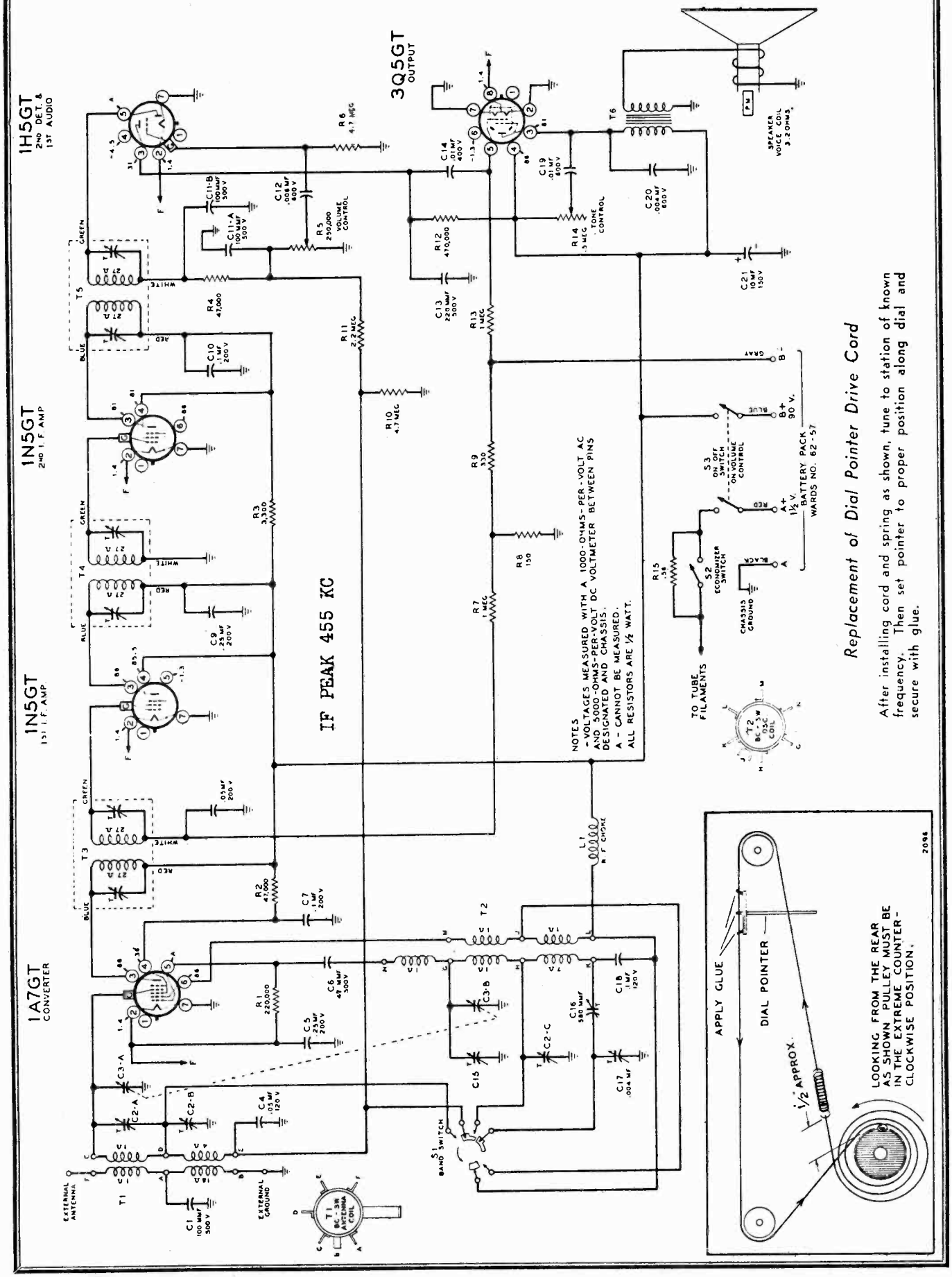
Line voltage . . . . . 117 volts AC
Volume control . . . . . maximum
Signal input . . . . . none

The table below lists the sensitivity at the input of each stage. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volts across this resistor will be equivalent to a 50 milliwatt output with the speaker connected. The volume control must be set to maximum. The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of Plus or Minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR 50 MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	Loop Antenna—external antenna clip	Chassis	24 microvolts
1000 kc	.05 mf	12SA7 1st Detector Pin 8	Point "X" (12SK7 Pin 3)	125 microvolts
455 kc	.05 mf	12SA7 1st Detector Pin 8	Same as above	100 microvolts
455 kc	.05 mf	12SK7, I-F Amp. Pin 4	Same as above	2500 microvolts
400 cycles	.05 mf	12SQ7, 1st A-F, Pin 2	Same as above	.042 volts
400 cycles	.05 mf	50L6GT Output, Pin 5	Same as above	1.9 volts

MONTGOMERY WARD

MODELS 64BR-1208A, 64BR-2200A

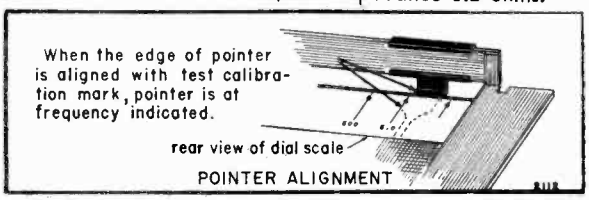


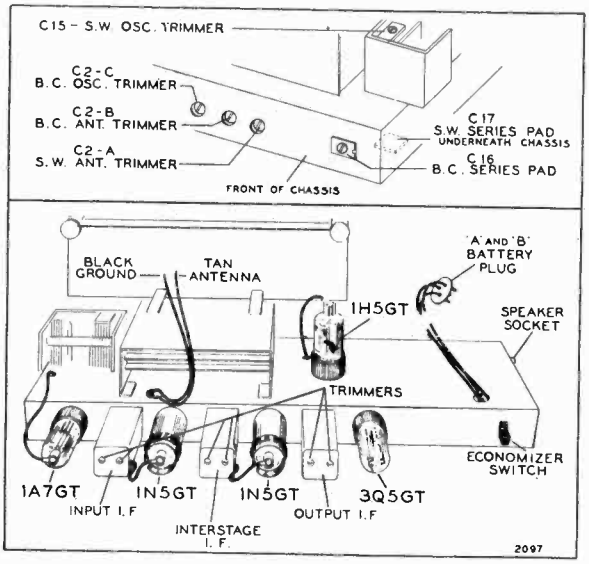
Replacement of Dial Pointer Drive Cord

After installing cord and spring as shown, tune to station of known frequency. Then set pointer to proper position along dial and secure with glue.

ELECTRICAL SPECIFICATIONS

Power Supply	Wards Battery Pack No. 62-57. Size: 16" x 6⅝" x 4½". "A"- 1½ volts, 300 ma. "B"- 90 volts, 13 ma.
Frequency Range	Broadcast—535 to 1720 kc. Short Wave—5.6 to 18.1 mc.
Intermediate Freq.	455 kc.
Selectivity	At 1000 kc, 36 kc at 1000 x signal.
Sensitivity	10 microvolts average for 50-milliwatt output.
Power Output	150 milliwatts undistorted. 250 milliwatts maximum.
Speaker	6" (1208A) or 8" (2200A). P.M., v.c. impedance 3.2 ohms.





View of Chassis and Trimmers

ALIGNMENT PROCEDURE

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

BAND SWITCH SETTING	SIGNAL GENERATOR Frequency	Coupling Capacitor	Connection to Radio	TUNER SETTING	ADJUST TO MAXIMUM OUTPUT (in order shown)
BROADCAST *(counter-clockwise)*	455 kc	.1 mf	Second I.F. (1N5GT) grid cap	Rotor full open (plates out of mesh)	Trimmers on top of output I.F. can
	455 kc	.1 mf	First I.F. (1N5GT) grid cap	Rotor full open (plates out of mesh)	Trimmers on top of interstage I.F. can
	455 kc	.1 mf	Converter (1A7GT)	Rotor full open (plates out of mesh)	Trimmers on top of input I.F. can
SHORT WAVE *(clockwise)*	18.1 mc	400 ohms	Antenna lead	Rotor full open (plates out of mesh)	S.W. osc. trimmer C15
	16 mc	400 ohms	Antenna lead	16 mc* (see below for pointer alignment)	S.W. ant. trimmer C2-A
	6 mc	400 ohms	Antenna lead	6 mc (see below for pointer alignment)	S.W. osc. series pad C17†
BROADCAST *(counter-clockwise)*	1720 kc	200 mmf	Antenna lead	Rotor full open (plates out of mesh)	B.C. osc. trimmer C2-C
	1500 kc	200 mmf	Antenna lead	1500 kc (see below for pointer alignment)	B.C. ant. trimmer C2-B
	600 kc	200 mmf	Antenna lead	600 kc (see below for pointer alignment)	B.C. osc. series pad C16†

* First set signal generator to 16 mc; then, with gang all the way out, approach 16 mc by slowly rotating gang inward. The first signal is the one on which the alignment should be made. The next signal is the image; do not align on this signal.

† Turn the dial back and forth slightly (rock) and adjust padder until peak output is obtained. After this adjustment check previous adjustments for interlocking effects.

RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 kc for all readings on the standard broadcast band and to 10 mc for the short-wave readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm, 5-watt resistor across the secondary winding of the output transformer. A reading of 0.4 volts AC across this resistor will be equivalent to a 50-milliwatt output with the speaker connected.

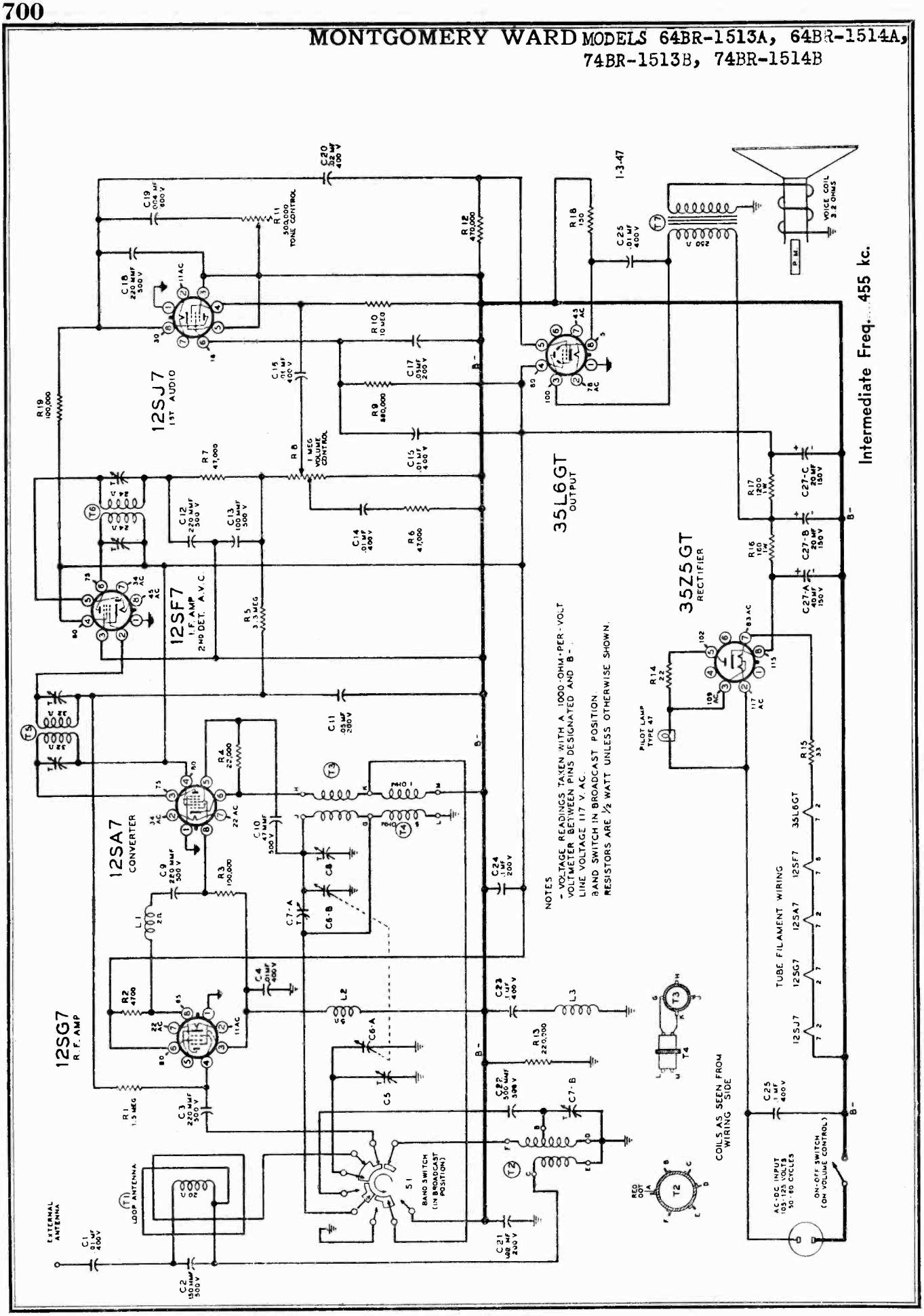
The signal source must be an accurately calibrated signal generator capable of supplying the frequencies designated, modulated 30% with a 400-cycle audio signal. Variations in sensitivities of plus or minus 25% are usually permissible.

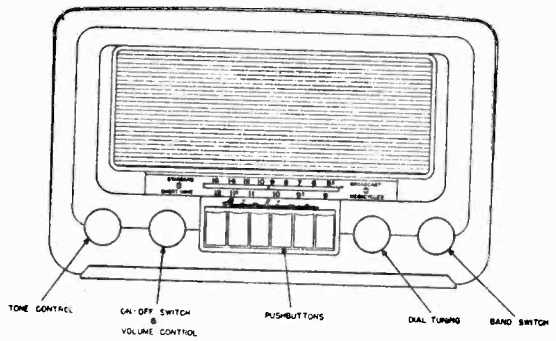
The volume control should be set at maximum, and the tone control at maximum treble.

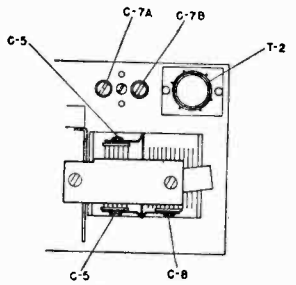
SIGNAL GENERATOR				INPUT FOR 50-MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection	
10 mc	400 ohms	Antenna lead	Ground lead	18 microvolts
1000 kc	200 mmf	Antenna lead	Ground lead	10 microvolts
10 mc	.1 mf	Converter (1A7GT) grid cap	Ground lead	32 microvolts
1000 kc	.1 mf	Converter (1A7GT) grid cap	Ground lead	35 microvolts
455 kc	.1 mf	Converter (1A7GT) grid cap	Ground lead	32 microvolts
455 kc	.1 mf	First I.F. (1N5GT) grid cap	Ground lead	630 microvolts
455 kc	.1 mf	Second I.F. (1N5GT) grid cap	Ground lead	.01 volt
400 cycles	.1 mf	Audio amp. (1H5GT) grid cap	Ground lead	.06 volt
400 cycles	.1 mf	Power amp. (1A5GT) grid (pin 5)	Ground lead	3 volts

Ref. No.	Part No.	Description	Qty. Used in Set
		CAPACITORS	
C1	BE1295	100 mmf, mica, 20%	1
C2-A, -B, -C	BE124171	Triple trimmer; S.W. antenna, C2-A; B.C. antenna, C2-B; B.C. oscillator, C2-C. Range of each is approx. 4-30 mmf	1
C3-A, -B C15	BEB-8A-10243	Two-gang variable capacitor, including S.W. oscillator trimmer	1
C4	BE100128	.05 mf, 120 volts, 25%	1
C5, C9	BE1006	.25 mf, 200 volts, 20%	2
C6	BE12939	50 mmf, mica, 20%	1
C7, C10	BE10020	.1 mf, 200 volts, 25%	2
C8	BE10022	.05 mf, 200 volts, 25%	1
C11-A, -B	BE129161	Dual, mica, 100 mmf each section	1
C12	BE10019	.006 mf, 600 volts, 25%	1
C13	BE12921	200 mmf, mica, 20%	1
C14	BE10011	.01 mf, 400 volts, 25%	1
C16	BE124173	B.C. series padder; range 420-780 mmf	1
C17	BE129125	S.W. series padder; mica, 4000-4350 mmf	1
C18	BE100133	.1 mf, 120 volts, 25%	1
C19	BE10087	.01 mf, 600 volts, 25%	1
C20	BE10071	.004 mf, 600 volts, 25%	1
C21	BE119130	10 mf, 150 volts, electrolytic	1
		RESISTORS*	
R1	BEA-9B1-27	220,000 ohms, 1/2 watt, 20%	1
R2, R4	BEA-9B1-23	47,000 ohms, 1/2 watt, 20%	2
R3	BEA-9B1-16	3300 ohms, 1/2 watt, 20%	1
R5, S3	BE101257	Volume control (250,000 ohms) and on-off switch	1
R6, R10	BEA-9B1-35	4.7 megohms, 1/2 watt, 20%	2
R7, R13	BEA-9B1-31	1 megohm, 1/2 watt, 20%	2
R8	BEA-9B1-8	150 ohms, 1/2 watt, 20%	1
R9	BEA-9B1-10	330 ohms, 1/2 watt, 20%	1
R11	BEA-9B1-33	2.2 megohms, 1/2 watt, 20%	1
R12	BEA-9B1-29	470,000 ohms, 1/2 watt, 20%	1
R14	BE101264	Tone control (500,000 ohms)	1
R15	BE130346	.56 ohms, 1/3 watt, 10%, wirewound	1
		COILS AND TRANSFORMERS	
T1	BE111248	Broadcast and S.W. antenna coil	1
T2	BE110183	Broadcast and S.W. oscillator coil	1
T3	BE108204	Input I.F. coil complete in can. Range of trimmers: 80-150 mmf each	1
T4	BE108204B	Interstage I.F. coil complete in can. Range of trimmers: 80-150 mmf each	1
T5	BE108188B	Output I.F. coil complete in can. Range of trimmers: 80-150 mmf each	1
T6	BE105119B	Output transformer	1
L1	BE1233	R.F. choke coil	1
		MISCELLANEOUS	
	BE114245	Speaker, 6-inch, P.M. (1208A)	1
	BEC-18A-11471	Speaker, 8-inch, P.M. (2200A)	1
	BE121280	Socket, for speaker plug	1
	BE121171	Socket, for tubes	5
S1	BE125160	Band switch	1
S2	BE12588B	Battery economizer switch	1
	BE107377	Battery cable assembly	1
	BE115396	Tube shield	2
	BE134128	Rubber grommet for mounting speaker	4
	BEB-6D-10043	Dial scale	1
	BED-5C-10007-37	Escutcheon	1
	BE112530	Clip for mounting escutcheon	4
	BE128686B-37	Knob, volume	1
	BE128681-37	Knob, tuning	1
	BE128680-37	Knob, tone	1
	BE128683-37	Knob, band switch	1
	BE112961	Station call letters	1 set
		TUNER ASSEMBLY PARTS	
	BE117907	Tuning shaft	1
	BE117798	Pinion gear on tuning shaft	1
	BEB-2C-7245	Gear segment	1
	BE115618	Drive link and drive link bushing	1
	BE115617	Driven link and collar	1
	BE115616	Connecting link	1
	BE120372	Spring for connecting link assembly	1
	BE128678-37	Pushbutton	6
	BE112819	Pushrod assembly, complete	6
	BEA-49A-7186	Spring for pushrod return	6
	BE112974	Paper background for dial	1
	BE112806	Drive pulley and bushing	1
	BE112971	Pointer	1
	BE120214	Cord for dial pointer drive	2 ft.
	BE120377	Spring for pointer drive cord	1

MONTGOMERY WARD MODELS 64BR-1513A, 64BR-1514A, 74BR-1513B, 74BR-1514B







NOTE: C-5 should read C-8.
C-8 should read C-5.

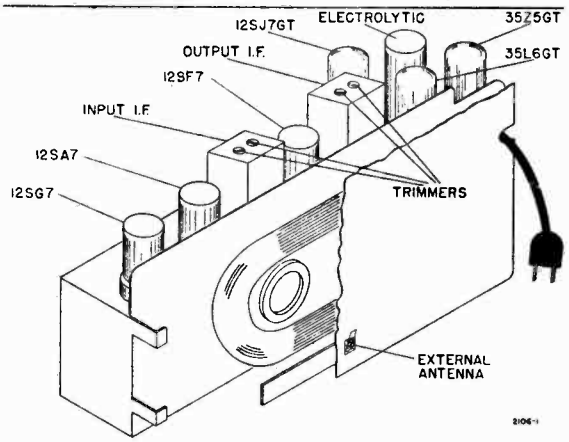
RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm, 5-watt resistor across the secondary winding of the output transformer. A reading of 0.4 volts AC across this resistor will be equivalent to a 50-milliwatt output with the speaker connected.

The signal source must be an accurately calibrated signal generator capable of supplying the necessary frequencies modulated 30% with a 400-cycle audio signal. Variations of plus or minus 25% are usually permissible.

The volume control must be set on maximum.

The tone control must be set at maximum high.



Chassis View, Showing Trimmer Location

SIGNAL GENERATOR				INPUT FOR 50-MILLIWATT OUTPUT
Frequency	**Coupling Capacitor**	**Connection to Radio**	**Ground Connection**	
1000 kc	200 mmf or RMA dummy antenna	External antenna clip	Pin 3 of 12SF7 (B-of set)	11 microvolts
1000 kc	0.1 mf	Grid (pin 8) of converter (12SA7)	Pin 3 of 12SF7 (B-of set)	138 microvolts
455 kc	0.1 mf	Grid (pin 8) of converter (12SA7)	Pin 3 of 12SF7 (B-of set)	107 microvolts
455 kc	0.1 mf	Grid (pin 2) of I.F. amp. (12SF7)	Pin 3 of 12SF7 (B-of set)	3200 microvolts
12 mc	200 mmf or RMA dummy antenna	External antenna clip	Pin 3 of 12SF7 (B-of set)	15 microvolts

ALIGNMENT PROCEDURE

- Output meter across 3.2-ohm output load.
- Volume control at maximum for all adjustments.
- Tone control at maximum high.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.
- Loop antenna should be connected to receiver and in its proper position when making adjustments.

SIGNAL GENERATOR				TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)
Frequency	**Coupling Capacitor**	**Connection to Radio**	**Ground Connection**		
455 kc	0.1 mf	Grid (pin 2) of 12SF7	Pin 3 of 12SF7 (B-of set)	Capacitor full open (plates out of mesh)	2 trimmers on T6 output IF can
455 kc	0.1 mf	Grid (pin 8) of 12SA7	Pin 3 of 12SF7 (B-of set)	Capacitor full open (plates out of mesh)	2 trimmers on T5 input IF can
1400 kc	200 mmf	External antenna clip	Pin 3 of 12SF7 (B-of set)	Set dial pointer at 1400 kc	Ant. trimmer C5 and oscillator trimmer C8 on gang
12 mc	200 mmf	External antenna clip	Pin 3 of 12SF7 (B-of set)	Set dial pointer at 12 m.c.	Ant. trimmer C7-B and oscillator trimmer C7-A

REPLACEMENT PARTS LIST

Use Only Genuine Factory Replacement Parts

HOW TO ORDER PARTS—When ordering, specify *PART* number, schematic diagram reference number when applicable, and *CHASSIS MODEL* number. The model number appears on a label on the chassis.

Ref. No.	Part No.	Description	Qty. Used In Set
		CAPACITORS*	
C6-A, C6-B	B-8A-10827	Two gang variable condenser with C5 and C8 trimmers	1
C27-A, C27-B C27-C.	A-8C-10077	Electrolytic filter condenser 40 mfd., 150 volts, 20 mfd., 150 volts, 20 mfd., 150 volts	1
C7-B, C7-A.	A-8H-10839	Dual trimmer—for short-wave antenna and oscillator	1
C19	C-8D-10783	.004 mf x 600 volts, tubular	1
C20	C-8D-10774	.02 mf x 400 v., 20%, tubular	1
C23-C25	C-8D-10760	.1 mf x 400 v., 10%, tubular	2
C24	C-8D-10771	.1 mf x 200 v., 10%, tubular	1
C11-17	C-8D-10770	.05 mf x 200 v., 20%, tubular	2
C1-C4-14-15 16-26	C-8D-10761	.01 mf x 400 v., 20%, tubular	6
C21	C-8D-11304	.02 mf x 200 v., 20%, tubular	1
C3-9-12-18	C-8F3-10	220 mmf, 500 v., 20%, mica	4
C10	C-8F3-109	47 mmf, 500 v., 10%, mica	1
C22	C-8F3-10910	500 mmf, 500 v., 3%, silver mica	1
C13	C-8F3-8	100 mmf, 500 v., 20%, mica	1
C2	C-8F3-115	150 mmf, 500 v., 10%, mica	1
		RESISTORS*	
R8	A-10A-10688	Volume control—1 megohm, and on-off switch	1
R11	A-11B-10690	Tone control—500K ohm	1
R14	C-9B1-42	22 ohm, ½ watt, 10%	1
R16	C-9B2-53	180 ohm, 1 watt, 10%	1
R18	C-9B1-52	150 ohm, ½ watt, 10%	1
R10	C-9B1-37	10 megohm, ½ watt, 20%	1
R5	C-9B1-34	3.3 megohm, ½ watt, 20%	1
R4	C-9B1-78	22K ohm, ½ watt, 10%	1
R12	C-9B1-94	470K ohm, ½ watt, 10%	1
R2	C-9B1-70	4700 ohm, ½ watt, 10%	1
R1	C-9B1-32	1.5 megohm, ½ watt, 20%	1
R17	C-9B2-63	1200 ohm, 1 watt, 10%	1
R19	C-9B1-86	100K ohm, ½ watt, 10%	1
R9	C-9B1-95	560K ohm, ½ watt, 10%	1
R7-R6	C-9B1-82	47K ohm, ½ watt, 10%	2
R13	C-9B1-27	220K ohm, ½ watt, 20%	1
R3	C-9B1-25	100K ohm, ½ watt, 20%	1
R15	C-9B2-44	33 ohm, 1 watt, 10%	1
		COILS	
T6	B-13B-10794-1	Output I. F. coil	1
T5	B-13B-10091-2	Input I. F. coil	1
T2	B-13E-10834	S. W. antenna coil	1
T3	B-13D-10833	S. W. oscillator coil	1
T4	A-13D-10838	B. C. oscillator coil	1
L2	A-16A-10835	R. F. choke	1
L3	A-16A-10836	R. F. choke	1
L1	A-16A-10837	R. F. choke	1
T1	C-212-11095	Loop antenna assembly—Walnut—for 62-1513 —or—	1
T1	C-212-11095-1	Loop antenna assembly—Ivory —for 62-1514	1

		DIAL AND TUNING PARTS	
B-6D-10704-1	Dial scale—for 62-1513		1
B-6D-10704	Dial scale—for 62-1514		1
A-6A-10687	Diffuser		1
A-2G-10685	Pointer		1
B-5B-10710-17	Band switch knob—Walnut		1
B-5B-10710-8	Band switch knob—Ivory		1
B-5B-10711-17	Tuning knob—Walnut		1
B-5B-10711-8	Tuning knob—Ivory		1
B-5B-10712-17	Volume control knob—Walnut		1
B-5B-10712-8	Volume control knob—Ivory		1
B-5B-10713-17	Tone control knob—Walnut		1
B-5B-10713-8	Tone control—Ivory		1
B-5B-10041-17	Pushbutton—Walnut		6
B-5B-10041-8	Pushbutton—Ivory		6
B-2C-10707	Dial plate		1
A-23L-10934	Set station call letters		1
A-6C-10819	Set acetate tabs—(6)		1
200-10683	Lever assembly—Right hand roller		4
200-10683-1	Lever assembly—Left hand roller		2
A-3F-10656	Yoke lock screw		1
A-2C-10658	Cam		6
A-2C-10680	Key washer		13
B-29E-1812	Spring washer		1
B-3C-11069	Spacer, ¼" inside x .285 long		2
B-3C-10698	Spacer, ¼" inside x .519 long		2
B-3C-11071	Spacer, ¼" inside x .754 long		1
B-3C-11072	Spacer, ¼" inside x .498 long		1
B-3C-11073	Spacer, ¼" inside x .156 long		1
A-2D-11077	Take-up arm		1
A-49A-10646	Spring for take-up arm		1
A-49A-12484	Springs for levers		6
B-2C-10695	Diffuser plate		1
A-49A-10887	Spring for dial string and pointer		1
A-53A-10989	String for dial (30" used)	1 yd.	
A-52A-870	Set screw—6/32x⅛ for drum		1
A-200-10884	Segment gear and bushing assembly		1
A-3L-7192	Pinion gear—for tuning shaft		1
A-3A-10675	Manual tuning shaft—less pinion gear		1
A-2C-10655	Cam yoke		1
A-2C-10654	Retainer yoke—U shape		1
	OUTPUT TRANSFORMER		
B-12C-10826	Output transformer for speaker		1
	SPEAKER		
B-18A-10260	Speaker—4x6 inch P. M., less output transformer		
	MISCELLANEOUS		
121-171	Tube socket		1
A-15B-10440	Tube socket		5
A-23A-7240	Line cord lock		1
B-14M-10088	Line cord and plug		1
B-20A-10259	Band change switch		1
A-47A-10694	Pilot light socket		1
A-46A-10793	T-47, 6-8 volt, Pilot light bulb		1
5C-10002-46	Bakelite cabinet—Walnut		1
5C-10002-9	Bakelite cabinet—Ivory colored		1
B-2M-7758	Snap-in rivets, to fasten diffuser		2
B-2M-11205	Stud—(short) for antenna mounting		5
A-2M-10096	Stud—(long) for antenna mounting		2
A-2J-10981	Clip—for antenna mounting brackets		4
42A-10874	No. 8-18x¾ hex. head chassis mounting screw		2
B-2G-10702	Grille escutcheon		1
B-5C-12219	Grille		1
B-23K-12447	Grille cloth		1
B-23J-12448	Baffle		1
C-23J-11328	Back only for loop		1

*The values of the resistors and mica capacitors listed above are based on RMA standards. Due to conditions beyond our control some receivers have been shipped with components of pre-standardized values. This receiver will operate equally well with components of either group. An illustration of the differences in both resistors and capacitors follows:

Pre-standardized value—50,000 ohms, ⅓ watt, 10%
RMA value—47,000 ohms, ½ watt, 10%
Pre-standardized value—220 mmf, 500 volts, 20%
RMA value—220 mmf, 500 volts, 20%

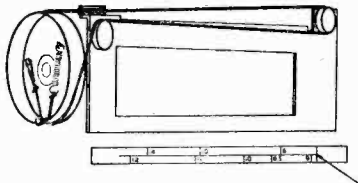
Dial Stringing Diagram

REPLACING DIAL STRING

1- RESTRING DIAL AS SHOWN.

2- TURN TUNING SHAFT CLOCKWISE TO COMPLETELY CLOSE THE GANG.

3- FASTEN POINTER TO STRING AT STARTING MARKER ON CALIBRATION SCALE.



STARTING MARKER

ELECTRICAL SPECIFICATIONS

Power Supply.....105 to 125 volts, DC or 50-60 cycle AC, 25 watts.

Frequency Range.....530 to 1600 kc.; 9 mc to 12 mc.

Selectivity.....At 1000 kc, 56 at 1000 x signal. At 10 mc, 85 kc at 1000 x signal.

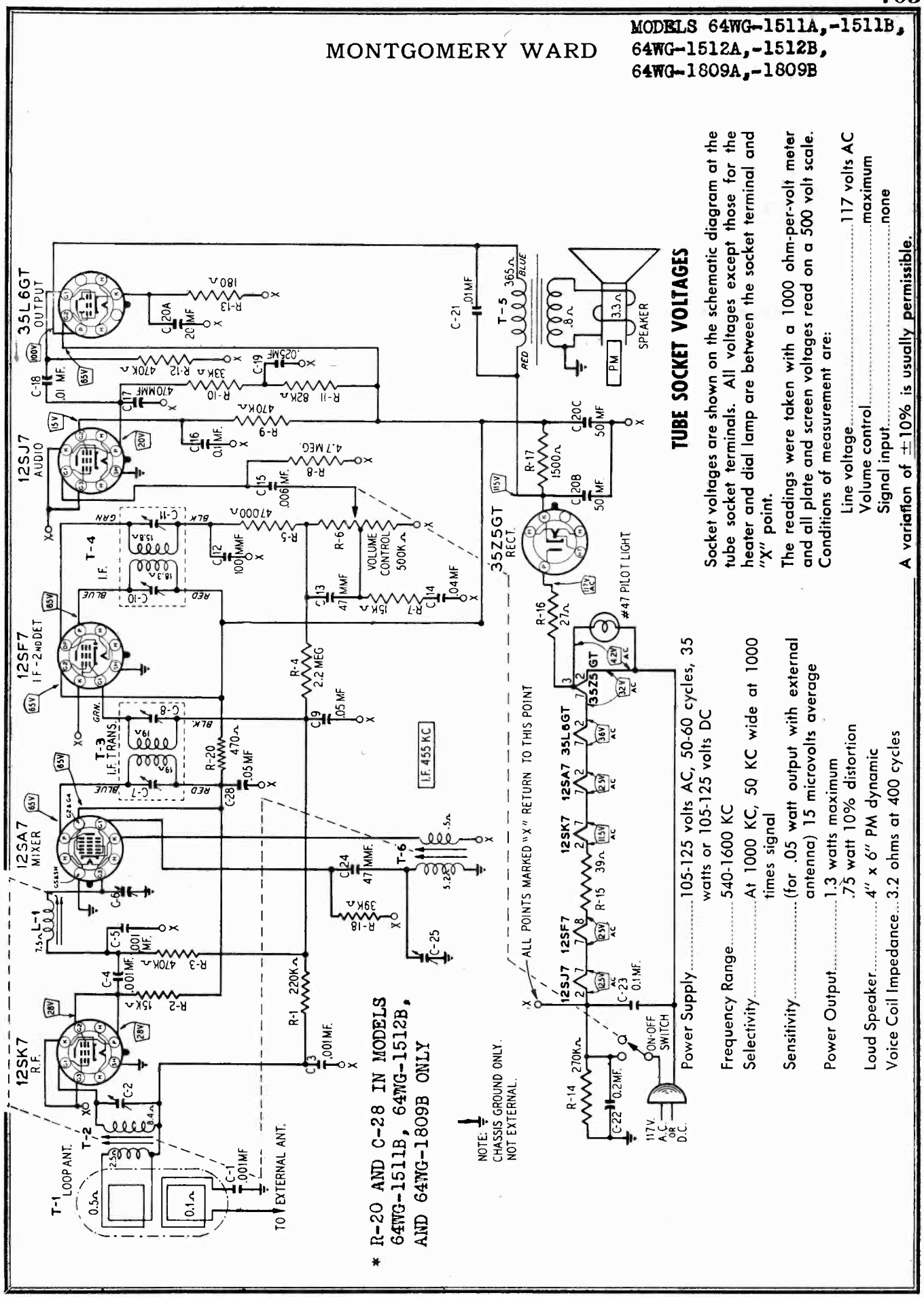
Sensitivity.....10 microvolts average for .05-watt output on broadcast band. 15 microvolts average for short-wave band.

Power Output.....0.85 watt undistorted, 1.0 watt maximum.

Loud Speaker.....4" x 6" oval, P.M., v.c. impedance 3.2 ohms.

MONTGOMERY WARD

**MODELS 64WG-1511A,-1511B,
64WG-1512A,-1512B,
64WG-1809A,-1809B**



TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the heater and dial lamp are between the socket terminal and "X" point.

The readings were taken with a 1000 ohm-per-volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage.....117 volts AC
Volume control.....maximum
Signal input.....none

A variation of ±10% is usually permissible.

Power Supply.....105-125 volts AC, 50-60 cycles, 35 watts or 105-125 volts DC

Frequency Range.....540-1600 KC

Selectivity.....At 1000 KC, 50 KC wide at 1000 times signal

Sensitivity.....(for .05 watt output with external antenna) 15 microvolts average

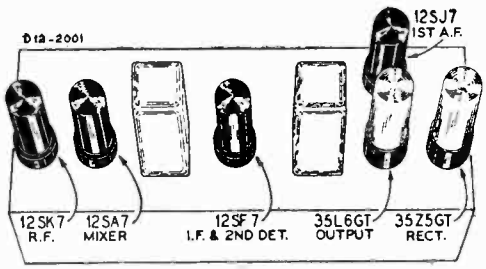
Power Output.....1.3 watts maximum
.75 watt 10% distortion

Loud Speaker.....4" x 6" PM dynamic

Voice Coil Impedance...3.2 ohms at 400 cycles

MODELS 64WG-1511A,-1511B,
64WG-1512A,-1512B,
64WG-1809A,-1809B

MONTGOMERY WARD

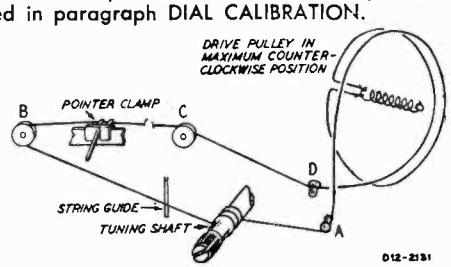


DRIVE CORD REPLACEMENT

Turn the large drive pulley counterclockwise to the stop position. Use a new drive cord 36" long and tie one end to the tension spring. Hook the other end of the tension spring over the tab on the drive pulley. Pass the cord through the slot on the drive pulley rim and continue around pulley 1¼ turns counterclockwise. Pass cord around stud A and wind three turns clockwise (from front of chassis) around the tuning shaft. Turns must progress away from chassis. Run the cord in front of the string guide, then pass cord around pulleys B and C and stud D. Pass cord under drive pulley and wind ¾ turn counterclockwise around drive pulley. Stretch tension spring and tie free end of cord to spring. Cut off any excess string.

Note: On sets having a black vinylite sleeve on the tuning shaft wind only two turns clockwise around the tuning shaft.

Attach the dial pointer to the cord and position, as instructed in paragraph DIAL CALIBRATION.

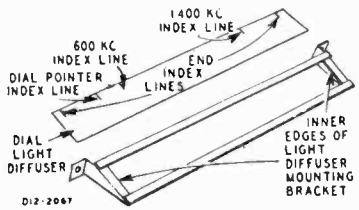


DIAL CALIBRATION

In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial light diffuser for this purpose.

Before aligning the receiver (or when replacing the dial light diffuser) check the position of the diffuser strip, making certain that the two end index lines are aligned with the inner edges of the diffuser mounting bracket opening. The bracket should be crimped at one point to prevent movement of the diffuser strip. To position the dial pointer, adjust the radio to the stop position at the low frequency end of the dial. The dial pointer should be directly over the dial pointer index line (see illustration). If not, move the pointer along the drive cord until it is directly over the index line.

The 1400 KC index line is for use when aligning the receiver.



TUNING ASSEMBLY SERVICE

Exacting requirements in the tuning assembly make it impractical to replace the drive cord, coils and components in this assembly other than the trimmer condensers. Should the drive cord break, or components other than the trimmer condensers require service, the entire assembly must be ordered and replaced as a unit.

ALIGNMENT PROCEDURE

Check dial pointer position, see Dial Calibaration paragraph.

Volume Control—Maximum All Adjustments.

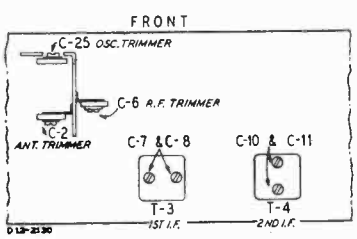
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The equipment in column at right is required for aligning:

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

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 50 mmf.



NOTE A:—Index line is on dial light diffuser strip. See DIAL CALIBRATION paragraph.

SIGNAL GENERATOR			Coupling Capacitor	DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM OUPUT IN ORDER SHOWN (See Trimmer Illustration)
Frequency Setting	Connection to Receiver	Ground Connection			
455 kc	Control Grid 12SF7—I-F (Prong No. 2)	Point "X" 12SK7—R-F (Prong No. 3)	.1 mf	1600 kc	2nd I-F (C10) & (CT1)
455 kc	Control Grid 12SA7—1st Det. (Prong No. 8)	Same as above	.1 mf	1600 kc	1st I-F (C7) & (C8)
1400 kc	Control Grid 12SA7—1st Det. (Prong No. 8)	Same as above	.1 mf	1400 kc Index Line. See Note A	Oscillator (C25)
1400 kc	External Antenna Clip on Loop	Chassis	50 mmf	1400 kc Index Line. See Note A	R-F (C-6) Antenna (C-2)

MONTGOMERY WARD

MODELS 64WG-1511A,-1511B,
64WG-1512A,-1512B,
64WG-1809A,-1809B

RECEIVER STAGE SENSITIVITIES — SIGNAL GENERATOR

Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	INPUT FOR 50 MILLIWATT OUTPUT
1000 kc	200 mmf or RMA Dummy Antenna	Loop Antenna—External antenna clip	Chassis	15 microvolts
1000 kc	.05 mf.	12SA7 Mixer—Pin 8	Point "X" (12SK7 Pin 3)	100 microvolts
455 kc	.05 mf.	12SA7 Mixer—Pin 8	Same as above	80 microvolts
455 kc	.05 mf.	12SF7 I-F—Pin 2	Same as above	3500 microvolts
400 cycles	.05 mf.	12SJ7 1st A-F—Pin 4	Same as above	.042 volts
400 cycles	.05 mf.	35L6GT Output—Pin 5	Same as above	1 volt

Ref. No.	Part No.	Description	Qty. Used in Set
		CAPACITORS	
C-1	D67102	.001 mf 400 V Tubular	1
C-2	17A238	4-70 mmf Trimmer	1
C-3, C-4, C-5	B67102	.001 mf 200 V Tubular	3
C-6	17A243	4-70 mmf Trimmer	1
C-7, C-8		Part of T-3, 1st I-F Transformer	
C-9	B66503	.05 mf 200 V Tubular	1
C-10, C-11		Part of T-4, 2nd I-F Transformer	
C-12	47X476	100 mmf Molded	1
C-13	47X463	47 mmf Molded	1
C-14	B67403	.04 mf 200 V Tubular	1
C-15	B67602	.006 mf 200 V Tubular	1
C-16	B66104	0.1 mf 200 V Tubular	1
C-17	47X467	470 mmf Molded	1
C-18, C-21	B66103	.01 mf 200 V Tubular	2
C-19	B67253	.025 mf 200 V Tubular	1
C-20A	45X344	20 mf 25 V Dry electrolytic capacitor	1
C-20B	45X344	50 mf 150 V Dry electrolytic capacitor	1
C-20C	45X344	50 mf 150 V Dry electrolytic capacitor	1
C-22	B67204	0.2 mf 200 V Tubular	1
C-23	D67104	0.1 mf 400 V Tubular	1
C-24	47X446	47 mmf Molded	1
C-25	17A239	40-370 mmf Trimmer	1
*C-28	B67503	.05 mf Tubular	1
		RESISTORS	
		OHMS WATTS	
R-1	B85224	220,000 0.5 Carbon	1
R-2, R-7	B84153	15,000 0.5 Carbon	2
R-3, R-12	B85474	470,000 0.5 Carbon	2
R-4	B85225	2.2 meg. 0.5 Carbon	1
R-5	B85473	47,000 0.5 Carbon	1
R-6	36X347	500,000 Volume control and switch	1
R-8	B85475	4.7 meg. 0.5 Carbon	1
R-9	B84474	470,000 0.5 Carbon	1
R-10	B84333	33,000 0.5 Carbon	1
R-11	B84823	82,000 0.5 Carbon	1
R-13	B83181	180 0.5 Carbon	1
R-14	B84274	270,000 0.5 Carbon	1
R-15	D84390	39 2.0 Carbon	1
R-16	B84270	27 0.5 Carbon	1
R-17	C84152	1500 1.0 Carbon	1
R-18	B84393	39,000 0.5 Carbon	1
*R-20	B85471	470 0.5 Carbon	1

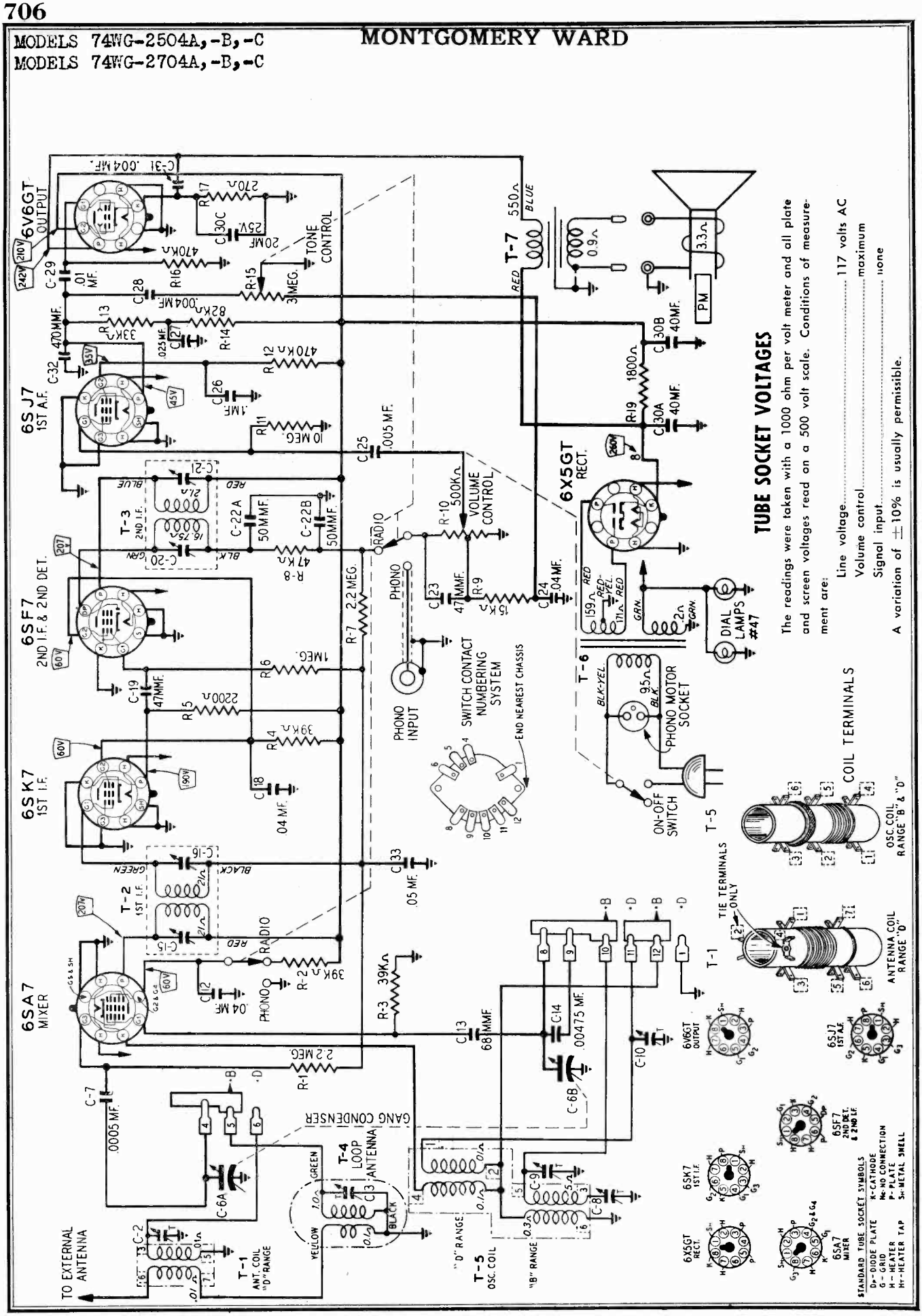
Ref. No.	Part No.	Description	Qty. Used in Set
		TRANSFORMERS AND COILS	
L-1		Part of tuning assembly	
T-1	9A1803	"B" Range loop antenna (for ivory plastic cabinet)	1
T-1	9A1773	"B" Range loop antenna (for walnut plastic cabinet)	1
T-1	9A1863	"B" Range loop antenna (for walnut wood cabinet)	1
T-2		Part of tuning assembly	
T-3	9A1775	1st I-F Transformer and can assembly	1
T-4	9A1776	2nd I-F Transformer and can assembly	1
T-5	51X116	Output transformer	1
T-6		Part of tuning assembly	
		DIAL AND DRIVE ASSEMBLY	
	20A97	Tuning assembly complete with coils, trimmers, etc.	1
	11X119	Fibre shield (tuner housing)	1
	28X518	Trimaunt stud (mtg. fibre shield)	5
	26X464	Drive shaft	1
	28X512	Ground spring (drive shaft)	1
	19X192	"C" washer	2
	25X1384	Pointer bracket	1
	24X446	Idler pulley	2
	41X78	Dial light diffuser	1
	25X1385	Holder, light diffuser	1
	15X217	Pointer	1
	25X1398	Pilot light bracket	1
		3 ft. drive cord (18 lb. test)	1
	28X95	Drive cord tension spring	1
	7A192	Pilot light socket assembly	1
		Pilot light No. 47	1
	58X645	Dial (for ivory plastic cabinet)	1
	58X646	Dial (for walnut plastic cabinet)	1
	58X650	Dial (for walnut wood cabinet)	1
	25X1461	Dial Bracket (for walnut wood cabinet only)	1
	4X884	Escutcheon (for walnut wood cabinet only)	1
	25X1460	Escutcheon Mtg. Bracket (for walnut wood cabinet only)	2
		MISCELLANEOUS	
	12A431	4" x 6" speaker with mounting bracket	1
		Cone and voice coil assembly for speaker (specify part number and letters stamped on speaker)	1
	3A303	Tube socket—octal (8 prong) molded	5
**	26A426	Tube socket and shield assembly	1
	10A297	Knob, volume control and line switch; tuning (for walnut cabinets)	2
	10A300	Knob, volume cantrol and line switch; tuning (for ivory plastic cabinet)	2
	28X292	Snap button (mtg. loop to cabinet)	2
		6 x ¼" slotted hex head P-K type "Z" screw (mtg. loop to chassis)	2
	55X249	Cabinet (ivory plastic)	1
	55X264	Cabinet (walnut plastic)	1
	13X328	Line cord and plug assembly	1

* IN MODELS 64WG-1511B,64WG-1512B,64WG-1809B ONLY

** PART NO. 3A421 IN MODELS 64WG-1511A,64WG-1512A,64WG-1809A

MODELS 74WG-2504A,-B,-C
MODELS 74WG-2704A,-B,-C

MONTGOMERY WARD



TUBE SOCKET VOLTAGES

The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

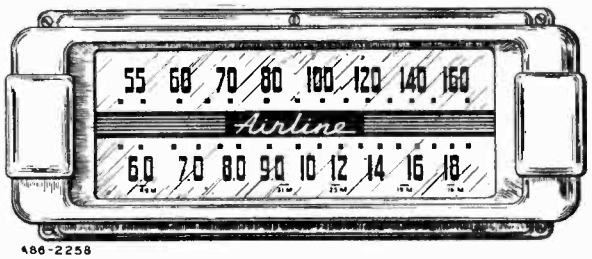
Line voltage..... 117 volts AC
Volume control..... maximum
Signal input..... none

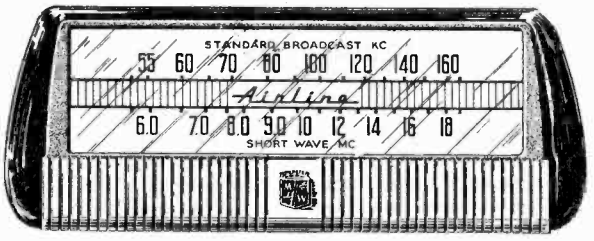
A variation of ±10% is usually permissible.

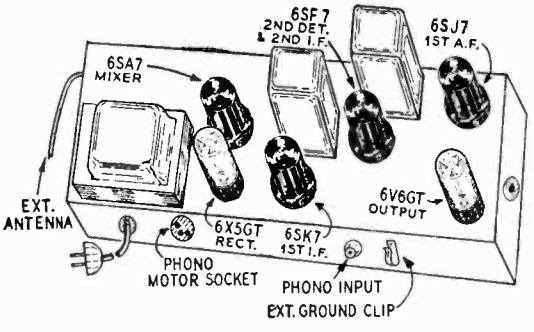
MONTGOMERY WARD

MODELS 74WG-2504A,-B,-C
MODELS 74WG-2704A,-B,-C

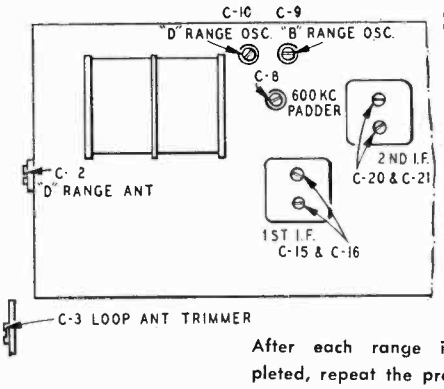
2504A, 2704A







2504C, 2704C



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.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 50 mmf., and 400 ohms.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, re-set pointer at the 1400 KC mark on the dial scale.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

	SIGNAL GENERATOR		Dummy Antenna	Band Switch Setting	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
	Frequency Setting	Connection at Radio				
I-F	455 kc	6SA7, Pin 8	.1 mf	B Range	Turn Rotor to Full Open	2nd I-F (C-20) & (C-21) 1st I-F (C-15) & (C-16)
RANGE B	1620 kc	Antenna Lead	50 mmf	B Range	Turn Rotor to Full Open	Oscillator Range B (C9)
	1400 kc	Antenna Lead	50 mmf	B Range	Tune Rotor to Max. Output. Set Indicator to 1400 KC. See Note A	Antenna Range B (C3)
	600 kc	Antenna Lead	50 mmf	B Range	Tune Rotor to Max. Output	600 kc (C8) Rock Rotor—See Note B
Repeat above oscillator adjustments at 1620 and 600 KC until readjusting the oscillator Range B Trimmer (C9) causes no further improvement in output.						
RANGE D	18.3 mc	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)
	16 mc	Antenna Lead	400 Ohm	D Range	Tune Rotor to Max. Output	Antenna Range D (C2) Rock Rotor—See Note B
LOOP RANGE B	Reassemble chassis in cabinet. 1400 kc	Antenna Lead	50 mmf	B Range	Tune Rotor to Max. Output	Antenna Range B (C3)

MODELS 74WG-2504A,-B,-C
MODELS 74WG-2704A,-B,-C

MONTGOMERY WARD

GENERAL DESCRIPTION

This model is a five tube (plus rectifier tube) AC console receiver with automatic record changer. Controls are provided for tuning, volume, tone, and band selection. The dial scale is calibrated in two bands, the broadcast band in channel numbers to cover frequencies between 540-1600 KC and the short wave band directly in megacycles from 5.75 to 18.3 MC. Other features include a built-in Air Wave Aerial, automatic volume control, beam power audio output stage and a PM dynamic speaker. A switch is provided on the tone control for selection of either radio or phono operation. This applies to Models 2504A, B, and C with the exception that the latter have no record changers.

ELECTRICAL SPECIFICATIONS

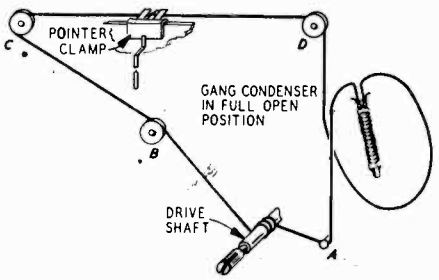
Frequency Range	B range—540-1600 KC D range—5.75 to 18.3 MC
Intermediate Frequency	455 KC
Selectivity	40 KC broad at 1000 times signal, 1000 KC
Sensitivity	(for .5 watt output) with external antenna B range—9 microvolts average D range—20 microvolts average
Power Output	4 watts maximum 2.3 watts, 10% distortion
Loud Speaker	10" PM dynamic
Voice Coil Impedance	3.2 ohms at 400 cycles
Record Changer	See Manual No. 5050
Tube and Dial Light Complement	1 6SA7 Mixer 1 6SK7 1st I-F Amplifier 1 6SF7 2nd I-F Amplifier & 2nd Det. 1 6SJ7 1st A-F Amplifier 1 6V6GT Power Output 1 6X5GT Rectifier 2 No. 47 Dial Lamps

Operating Voltages--Chassis for Models 2504A and 2704A are available for operation on the following power supply:

105-125 volts, AC, 60 cycles

Operating Voltages--Chassis for Models 2504C and 2704C are available for operation on the following power supply:

105-125 volts AC, 50-60 cycles.



2504A, 2704A DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully open position. Use a new 10X63 drive cord assembly or a piece of cord 48 inches long and tie one end to the tension spring. Hook the other end of the tension spring to the tab on the drive pulley. Pass the cord through the slot in the drive pulley rim around idler stud A and wind three and one-half turns clockwise around the tuning shaft (turns must progress away from chassis). Then pass cord over idler pulley B and around pulleys C and D. Wrap cord counterclockwise around drive pulley, stretch tension spring and tie free end of cord to spring.

2504C, 2704C DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully open position. Use a new 10X65 drive cord assembly or a piece of cord 48 inches long and tie one end to the tension spring. Hook the other end of the tension spring to the tab on the drive pulley. Pass the cord through the slot in the drive pulley rim around idler stud A and wind three and one-half turns clockwise around the tuning shaft (turns must progress away from chassis). Then pass cord over idler pulleys B and C. Wrap cord counterclockwise around drive pulley, stretch tension spring and fasten free end of cord to spring.

RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of .5 watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm, 5 watt resistor across the secondary winding of the output transformer. A reading of 1.26 volts across this resistor will be equivalent to a .5 watt output with the speaker connected. The volume control must be set to maximum. The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of Plus or Minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR .5 WATT OUTPUT
Frequency	**Coupling Capacitor**	**Connection to Receiver**	**Ground Connection**	
1000 kc	200 mmf or RMA Dummy Antenna	External antenna lead	Chassis	9 microvolts
1000 kc	.05 mf	6SA7 Mixer, Pin 8	Same as above	42 microvolts
455 kc	.05 mf	6SA7 Mixer, Pin 8	Same as above	40 microvolts
455 kc	.05 mf	6SK7 1st I-F, Pin 4	Same as above	1075 microvolts
455 kc	.05 mf	6SF7 2nd I-F, Pin 2	Same as above	3900 microvolts
400 cycles	.05 mf	6SJ7 1st A-F, Pin 4	Same as above	.08 volt
400 cycles	.05 mf	6V6GT Output, Pin 5	Same as above	3.75 volts

2504B,C REPLACEMENT PARTS LIST 2704B,C

Ref. No.	Part No.	Description	Qty. Used in Set
CAPACITORS			
C-2	17A164	5-50 mmf Trimmer	1
C-3	17A235	2-24 mmf Trimmer	1
C-6A, C-6B	14A196	Gang Condenser with Drive Pulley	1
C-7	B66501	.0005 mf 200 V Tubular	1
C-8	17A155	350-430 mmf Trimmer	1
C-9, C-10	17A109	2.5-35 mmf Dual Trimmer	1
C-12, C-18	D66403	.04 mf 400 V Tubular	2
C-13	47X466	68 mmf Moulded	1
C-14	46X289	.00475 mf Tubular	1
C-15, C-16		Part of T-2 (1st I-F Coil Assy.)	
C-19, C-23	47X463	47 mmf Moulded	2
C-20, C-21		Part of T-3 (2nd I-F Coil Assy.)	
C-22A, C-22B	47X112	50-50 mmf Dual Mica	1
C-24	D64403	.04 mf 400 V Tubular	1
C-25	D66502	.005 mf 400 V Tubular	1
C-26	D67104	.10 mf 400 V Tubular	1
C-27	D64253	.025 mf 400 V Tubular	1
C-28	D66402	.004 mf 400 V Tubular	1
C-29	D66103	.01 mf 400 V Tubular	1
C-30A	45X346	40 mf 450 V 3 Section Electrolytic	1
C-30B		40 mf 450 V	
C-30C		20 mf 25 V	
C-31	H66402	.004 mf 800 V Tubular	1
C-32	47X467	470 mmf Moulded	1
C-33	B66503	.05 mf 200 V Tubular	1
RESISTORS			
		OHMS WATTS	
R-1, R-7	B85225	2.2 meg. 0.5 Carbon	2
R-2, R-4	C84393	39 K 1.0 Carbon	2
R-3	B84393	39 K 0.5 Carbon	1
R-5	B84222	2200 0.5 Carbon	1
R-6	B85105	1 meg. 0.5 Carbon	1
R-8	B85473	47 K 0.5 Carbon	1
R-9	B84153	15 K 0.5 Carbon	1
R-10	36X358	500 K Volume Control & Line Switch	1
R-11	B85106	10 meg. 0.5 Carbon	1
R-12, R-16	B85474	470 K 0.5 Carbon	2
R-13	B84333	33 K 0.5 Carbon	1
R-14	B84823	82 K 0.5 Carbon	1
R-15	40X276	3.0 meg. Tone Control & Radio Phono Switch	1
R-17	C84271	270 1.0 Carbon	1
R-19	D84182	1800 2.0 Carbon	1
TRANSFORMERS AND COILS			
T-1	9A1917	"D" Range Antenna Coil Assembly	1
T-2	9A1814	1st I-F Coil Assembly	1
T-3	9A1815	2nd I-F Coil Assembly	1
T-4	26A474	"B" Range Loop Antenna Assembly	1
T-5	9A1918	"B" & "D" Range Oscillator Coil Assembly	1
T-6	53X282	117 Volt, 60 Cycle, Standard Power Transformer	1
T-7	51X134	Output Transformer	1
DIAL AND DRIVE ASSEMBLY			
	6X21	Rubber Grommet } Mtg. Gang Cond.	3
	20X329	Cond. Cushion Stud } Mtg. Gang Cond.	3
	26X485	Drive Shaft	1
	19X192	"C" Washer (For Drive Shaft)	2
MISCELLANEOUS			
	12A476	10" P.M. Speaker	1
	3A303	Tube Socket—Octal (8 prong) moulded	6
	3A304	Phono Motor Socket	1
	3A305	Phono Socket—Single Pin Tip	1
	2A372	Band Change Switch	1
	13X328	Line Cord and Plug Assembly	1

This list applies also to Models 2504A and 2704A with the exception that the description of capacitor C-31 should read: C-31 F66402 .004 mf 600 V Tubular 1

2504C, 2704C

DIAL AND DRIVE ASSEMBLY

S-58X13	Dial Bracket Assembly (including Dial Bracket, Idler Pulley, Rivets, and Dial Glass)	1
15X241	Pointer	1
28X113	Drive Cord Tension Spring	1
10X65	Drive Cord Assembly	1
7A199	Pilot Light Socket Assembly	1
7A103	No. 47 Pilot Light Bulb	2
58X696	Dial Glass	1
4X999	Escutcheon	1

MISCELLANEOUS

10A644	Knob (Tuning)	1
10A645	Knob (Off-On Volume)	1
10A646	Knob (SW-BC)	1
10A643	Knob (Tone—R.P.)	1

CAPACITORS 2504A, 2704A

C-35	D67204	.2 mf 400 V Tubular	1

DIAL AND DRIVE ASSEMBLY

26A473	Dial Bracket Assembly (including Dial Bracket, Idler Pulley, Rivets, and Dial Background)	1
15X190	Pointer	1
28X113	Drive Cord Tension Spring	1
10X63	Drive Cord Assembly	1
7A214	Pilot Light Socket Assembly	1
	No. 51 Pilot Light Bulb	2
58X690	Dial Glass	1
4X962	Escutcheon	1

MISCELLANEOUS

10A604	Knob (Tuning)	1
10A605	Knob (Off-On Volume)	1
10A606	Knob (SW-BC)	1
10A581	Knob (Tone—R.P.)	1

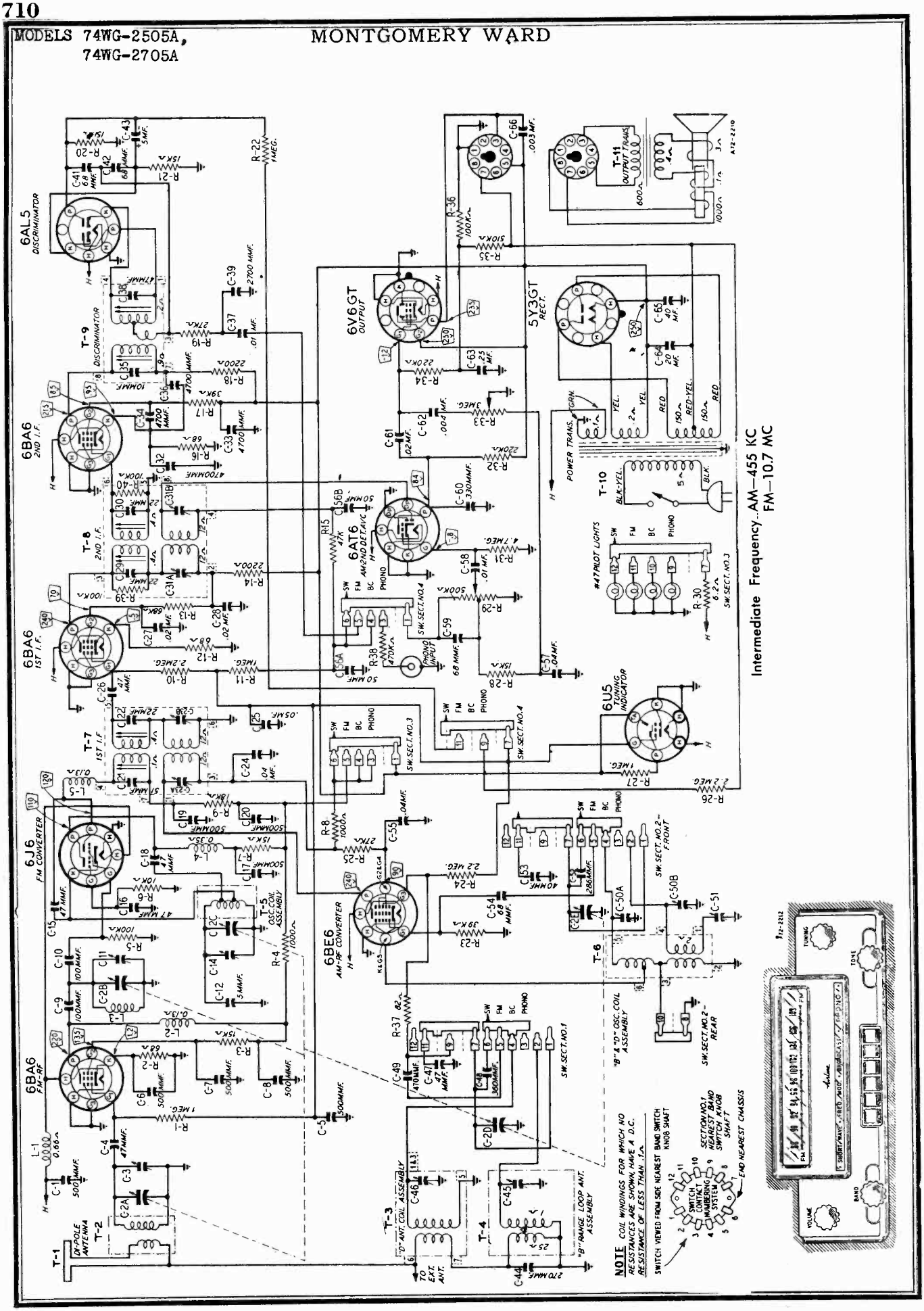
2704A, 2704B, 2704C

TYPE V-28A139 RECORD CHANGER PARTS

V-961-B	Motor Assembly, 60 cycles, 115-120 V	1
Shure P30-1	Crystal Cartridge and Semi-Permanent Needle Assembly	1
	Semi-Permanent Needle	1
	(Specify part number and letters stamped on crystal)	

MODELS 74WG-2505A,
74WG-2705A

MONTGOMERY WARD



NOTE COIL WINDINGS FOR WHICH NO RESISTANCES ARE SHOWN, HAVE A D.C. RESISTANCE OF LESS THAN 1Ω.

RECEIVER STAGE SENSITIVITIES
AM AND AUDIO STAGES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of .5 watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm, 5 watt resistor across the secondary winding of the output transformer. A reading of 1.26 volts across this resistor will be equivalent to a .5 watt output.

The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations in sensitivity of Plus or Minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR .5 WATT OUTPUT
FREQUENCY	COUPLING CAPACITOR	CONNECTION TO RECEIVER	GROUND CONNECTION	
1000 KC	200 mmf or RMA Dummy Antenna	External Antenna Lead	Chassis	25 Microvolts
1000 KC	.05 mf	6BE6 Converter Pin 7	Chassis	60 Microvolts
455 KC	.05 mf	6BE6 Converter Pin 7	Chassis	58 Microvolts
455 KC	.05 mf	6BA6 1st I-F Pin 1	Chassis	2400 Microvolts
400 cycles	.05 mf	6AT6 1st A-F Pin 1	Chassis	.05 Volt
400 cycles	.05 mf	6V6GT Output Pin 5	Chassis	2.8 Volts

FM STAGES

The table below lists the sensitivity for the FM stages of the receiver. The receiver must be tuned to 98 MC for all readings. Measurements are based on a .5 watt output the same as for the AM and Audio stage measurements.

The signal source must be an accurately calibrated signal generator capable of supplying a 98 MC signal modulated by a 400 cycle audio signal. For these measurements the generator must be adjusted for a 22.5 KC deviation. This will correspond to 30% AM modulation.

SIGNAL GENERATOR				INPUT FOR .5 WATT OUTPUT
FREQUENCY	COUPLING TO RECEIVER	CONNECTION TO RECEIVER	GROUND CONNECTION	
98 MC	300 ohms	External Antenna Terminal	External Ant. Terminal	30 microvolts
10.7 MC	.01 mf	6BA6 1st I-F Pin 1	Chassis	1200 microvolts
10.7 MC	.01 mf	6BA6 2nd I-F Pin 1	Chassis	37,000 microvolts

ALIGNMENT PROCEDURE
AM BROADCAST AND SHORT WAVE BAND

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.
The following equipment is required for aligning: An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas—.1 mf, 200 mmf, and 400 ohms.

	SIGNAL GENERATOR		DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
	FREQUENCY SETTING	CONNECTION AT RADIO				
I-F	455 kc	6BE6 Pin 7	.1 mf	Broadcast	Rotor Fully Open	2nd I-F C-31B & C-31A, 1st I-F C-23B & C-23A
Broadcast	1620 kc	External ant. lead	200 mmf	Broadcast	Rotor Fully Open	Oscillator C-50B
	1400 kc	External antenna lead	200 mmf	Broadcast	Turn Rotor to Max. Output Set pointer to 1400 kc See Note A	Antenna C-45
	600 kc	External antenna lead	200 mmf	Broadcast	Turn Rotor to Max. Output and Rack See Note B	600 Kc padder C-51
Repeat above oscillator adjustments at 1620 and 600 KC until readjusting the oscillator Range B Trimmer C-50B causes no further improvement in output.						
Short Wave	15.5 MC	External antenna lead	400 ohm	Short Wave	Rotor Fully Open	Oscillator C-50A
	15 MC	External antenna lead	400 ohm	Short Wave	Turn Rotor to Max. Output	Antenna C-46
Reassemble chassis in cabinet						
Broadcast	1400 kc	External antenna lead	200 mmf	Broadcast	Turn Rotor to Max. Output	Antenna C-45

After each range is completed, repeat the procedure as a final check.
Note A—If the pointer is not at 1400 KC on the dial, reset pointer at the 1400 KC mark on the dial scale.

Note B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

MODELS 74WG-2505A, 74WG-2705A

MONTGOMERY WARD

ALIGNMENT PROCEDURE

FM STAGES

Allow chassis and signal generator to warm up for several minutes. The following equipment is required for aligning:

An accurately calibrated signal generator providing unmodulated signals at the test frequencies listed below.

Non-metallic screwdriver.

Dummy Antennas and I-F Loading Resistor—.01 mf, 300 ohms and 5000 ohms.

Zero center scale DC vacuum tube voltmeter having a range of approximately 3 volts.

(If a zero center scale meter is not available, a standard scale vacuum tube voltmeter may be used by reversing the meter connections for negative readings.)

	SIGNAL GENERATOR		DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUSTMENT FOR MAX. METER DEFLECTION
	FREQUENCY SETTING	CONNECTION AT RADIO				
Discriminator	10.7 MC Note B	6BA6 2nd I-F Pin 1 and Chassis	.01 mf	FM	Rotor to Full Open	Disc. Pri. (1) Note A
	10.7 MC Note B	Same as above	.01 mf	FM	Same as above	Disc Sec. Note C (2)
	10.7 MC Note B	Same as above	.01 mf	FM	Same as above	Disc. Pri. (1) Note A
	10.7 MC Note B	Same as above	.01 mf	FM	Same as above	Disc. Sec. Note C (2)
I-F	10.7 MC	6BA6 1st I-F. Pin 1 and Chassis	.01 mf	FM	Same as above	2nd I-F Pri. Note A and D (3) 2nd I-F Sec. Note A and E (4)
	10.7 MC	Connect to the FM-RF Gang Condenser terminal on underside of chassis	.01 mf	FM	Same as above	1st I-F Pri. (5) 1st I-F Sec. (6) Note A
Recheck I-F Adjustments in order given						
R-F & Osc.	108.4	Disconnect dipole and connect generator to dipole terminals with resistor in series	300 ohms	FM	Rotor to full open	Oscillator C-14
	104.5	Same as above	300 ohms	FM	Tune Rotor for Max. AVC voltage	R.F. C-11
	104.5	Same as above	300 ohms	FM	Same as above	Ant. C-3
Recheck R-F and Osc. Adjustments in order given						

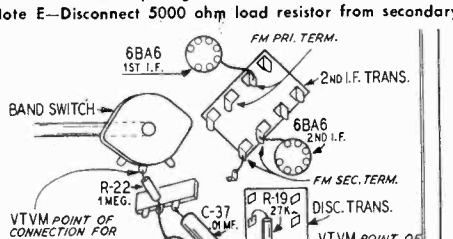
Note A—Test Equipment connections are as given in the table. The zero center scale DC vacuum tube voltmeter is to be connected between chassis ground and the AVC line at the 1 megohm resistor R-22 and the band switch terminal (as shown in the illustration) for all adjustments except the discriminator secondary adjustment, for which see Note C.

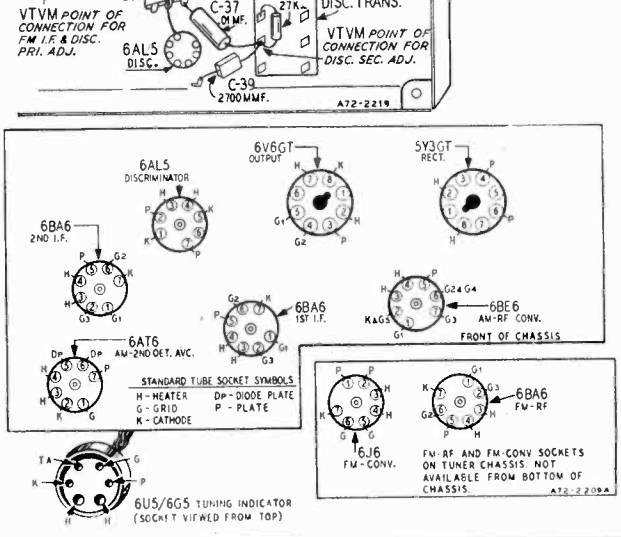
Note B—A signal of .1 volt must be fed into the receiver for this adjustment.

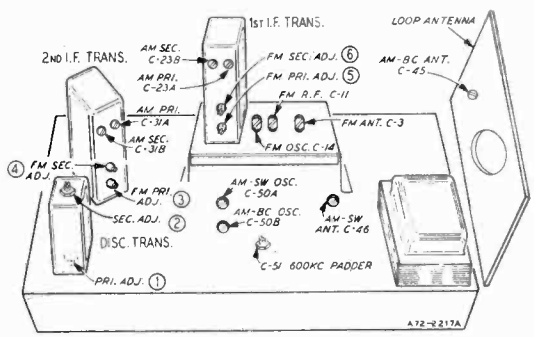
Note C—Disconnect zero center DC vacuum tube voltmeter from AVC and reconnect to junction of R-19, C-37 and C-39 (See illustration). Adjust for zero voltage indication.

Note D—Before adjusting Pri. core connect 5000 ohm load resistor across the 2nd I.F. secondary terminals, (See illustration).

Note E—Disconnect 5000 ohm load resistor from secondary terminals and reconnect across the 2nd I.F. primary terminals, (See illustration).







TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages are between the socket terminal and chassis ground. Plate, screen and cathode voltages were taken with a 1000 ohm-per-volt meter with a 300 volt scale used for plate and screen voltages. Audio grid voltages were read with a vacuum tube volt-meter. Conditions of measurement are:

Line voltage.....117 Volts AC

Signal Input.....None

A variation of ±10% is usually permissible.

OPERATING VOLTAGES— Chassis for Models 74WG-2505A are available for operation on the following power supply:

105-125 volts AC, 50-60 cycles

HOW TO ORDER PARTS– Should it be necessary to write us or to order any repair parts, it is important that the complete model number which appears on the label attached to the rear of the chassis be specified. Repair parts should be ordered from your nearest Wards Retail Store, Catalog Order office or Mail Order House.

REPLACEMENT PARTS LIST

Use only genuine factory tested parts to insure service jobs you can depend on and to obtain original set performance

CAPACITORS

Ref. No.	Part No.	Description			Qty. Used In Set
C-1, C-5, C-6, C-7, C-8, C-17, C-19, C-20	47X496	500 mmf		Ceramic	8
C-2	26A433	Tuner & Gang Condenser Assembly			1
C-3	17A249	5-35 mmf		Trimmer	1
C-4, C-16, C-26	47X495	47 mmf		Ceramic	3
C-9, C-10	47X497	100 mmf		Ceramic	2
C-11, C-14	17A247	3-12 mmf		Trimmer	2
C-12	47X500	5 mmf		Ceramic	1
C-15, C-38	47X459	47 mmf		Ceramic	2
C-18	47X498	47 mmf		Ceramic	1
C-21	47X428	51 mmf		Ceramic	1
C-22, C-29, C-30	47X467	22 mmf		Ceramic	3
C-23A, C-23B, C-31A, C-31B	17A248	70-150 mmf		Dual Trimmer	2
C-24, C-55	D66403	.04 mf	400 V	Tubular	2
C-25	B65503	.05 mf	200 V	Tubular	1
C-27, C-28, C-61	D66203	.02 mf	400 V	Tubular	3
C-32, C-33, C-34, C-36	47X491	4700 mmf		Molded	4
C-35	47X489	10 mmf		Ceramic	1
C-37, C-58	B66103	.01 mf	200 V	Tubular	2
C-39, C-41	47X492	2700 mmf		Molded	1
C-42, C-54, C-59	47X501	68 mmf		Ceramic	4
C-43	45X352	5 mf	250 V	Dry Electrolytic	1
C-44	47X445	270 mmf		Molded	1
C-45	17A123	1.5-12 mmf		Trimmer	1
C-46	17A244	5-50 mmf		Trimmer	1
C-47	47X503	47 mmf		Ceramic	1
C-48	47X474	360 mmf		Silvered Mica	1
C-49	47X467	470 mmf		Molded	1
C-50A, C-50B	17A246	3.2-35 mmf		Dual Trimmer	1
C-51	17A241	300-475 mmf		Trimmer	1
C-52	47X481	286 mmf		Silvered Mica	1
C-53	47X504	40 mmf		Ceramic	1
C-56A, C-56B	47X112	50 mmf		Dual Mica	1
C-57	B66403	.04 mf	200 V	Tubular	1
C-60	47X470	330 mmf		Molded	1
C-62	B66402	.004 mf	200 V	Tubular	1
C-63	B66254	.25 mf	200 V	Tubular	1
C-64	45X351	20 mf	450 V	Dry Electrolytic	1
C-65	45X302	40 mf	450 V	Dry Electrolytic	1
C-66	D66302	.003 mf	400 V	Tubular	1

RESISTORS

Ref. No.	Part No.	Ohms	Watts		Qty. Used In Set
R-1, R-11, R-22	885105	1 meg	0.5	Carbon	3
R-2, R-12, R-16	B83680	68	0.5	Carbon	3
R-3, R-28	885153	15K	0.5	Carbon	2
R-4, R-8	885102	1K	0.5	Carbon	2
R-5	883104	100K	0.5	Carbon	1
R-6	884103	10K	0.5	Carbon	1
R-7	D85153	15K	2.0	Carbon	1
R-9	C85183	18K	1.0	Carbon	1
R-10, R-24, R-26	885225	2.2 meg	0.5	Carbon	3
R-13	C84683	68K	1.0	Carbon	1
R-14, R-18	885222	2200	0.5	Carbon	2
R-15	885473	47K	0.5	Carbon	1
R-17	C84393	39K	1.0	Carbon	1
R-19	884273	27K	0.5	Carbon	1
R-20, R-21	883153	15K	0.5	Carbon	2
R-23	884393	39K	0.5	Carbon	1
R-25	C84273	27K	1.0	Carbon	1
R-27	Part of 13X549 Cable and Socket assembly				1
R-29	36X363	500K		Volume Control	1
R-30	43X217	6.2	0.5	W.W.	1
R-31	885475	4.7 meg	0.5	Carbon	1
R-32, R-34	885224	220K	0.5	Carbon	2
R-33	40X259	3.0 meg		Tone Control	1
R-35	883514	510K	0.5	Carbon	1
R-36	883104	100K	0.5	Carbon	1
R-37	884820	82	0.5	Carbon	1
R-38	885474	470K	0.5	Carbon	1
R-39, R-40	884104	100K	0.5	Carbon	2

TRANSFORMERS AND COILS

Ref. No.	Part No.	Description	Qty. Used In Set
L-1	9A1881	Filament Choke Assembly	1
L-2, L-5	9A1880	FM Mixer Plate Choke	2
L-3	9A1874	R-F Coil	1
L-4	9A1882	FM Oscillator Plate Choke	1
T-1	9A1900	Di-Pole Antenna	1
T-2	9A1875	Antenna Coil Assembly	1
T-3	9A1812	"D" Antenna Coil Assembly	1
T-4	26A436	"B" Range Loop Antenna Assembly	1
T-5	9A1873	Oscillator Coil Assembly	1
T-6	9A1813	"B" and "D" Oscillator Coil Assembly	1
T-7	9A1876	1st I-F Coil Assembly	1
T-8	9A1877	2nd I-F Coil Assembly	1
T-9	9A1895	Discriminator Coil Assembly	1
T-10	53X286	Power Transformer (60 cycle)	1
T-10	53X287	Power Transformer (25 cycle	1
T-10	53X288	Power Transformer (40 cycle)	1
T-11		Output Transformer (see miscellaneous)	1

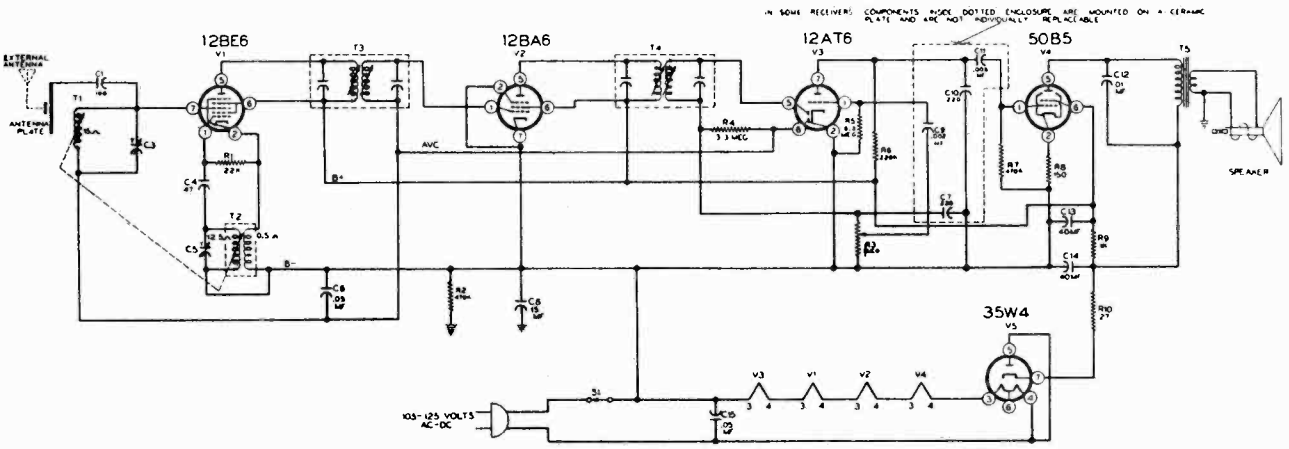
MISCELLANEOUS

Ref. No.	Part No.	Description	Qty. Used In Set
	12A470	10" E.D. Speaker complete with output transformer	1
		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	3
	3A425	Tube socket—miniature	5
	32X386	Tube shield—miniature	7
	3A427	Tube socket—Miniature (for FM R-F and Converter Tubes)	2
	13X549	Cable and socket assembly—tuning indicator	1
	3A305	Phono Socket—single pin	1
	3A304	Phono motor socket	1
	2A367	Band switch	1
	13X328	Line cord and plug assembly	1
	10A510	Knob—tuning-band-tone	3
	10A513	Knob—volume control and switch	1
	10A509	Push Button	6
	2EX320	Push Button Spring	6
	26A439	Escutcheon Assembly	1
	4X870	Escutcheon Eye	1

DIAL AND DRIVE ASSEMBLY

Ref. No.	Part No.	Description	Qty. Used In Set
	26A435	Dial Bracket Assembly	1
	58X590	Dial	1
	58X591	Dial Background	1
	15X221	Pointer	1
	26A438	Dial Drum Assembly	2
	26X500	Dial Drum Shaft	1
	26A440	Pulley and Collar Assembly (For Dial Drum Shaft)	1
	26A437	Pulley Assembly (For Band Switch)	1
	26X469	Band Switch Shaft	1
	24X553	Pinion Gear (For Band Switch Shaft)	1
	26A441	Crown Gear Assembly (For Mtg. to Band Switch)	1
	26A434	Idler Bracket Assembly	1
	25X1389	Drive Shaft Bracket	1
	26X467	Drive Shaft	1
	24X551	Drive Shaft Spool	1
	10X60	Drive Cord and Clip Assembly (Band Change)	1
	28X524	Tension Spring (Band Change)	1
	10X61	Drive Cord and Clip Assembly (Dial Drive)	1
	28X530	Tension Spring (Dial Drive)	1
	7A209	Indicator Light Socket Assembly	4
	41X72	Light Shield	4
	7A187	Pilot Light Socket Assembly (Dual)	1
	41X35	Light Shield	2
		No. 47 Pilot Light	6
	25X498	Tuning Eye Clamp	1
	25X1396	Tuning Eye Bracket	1

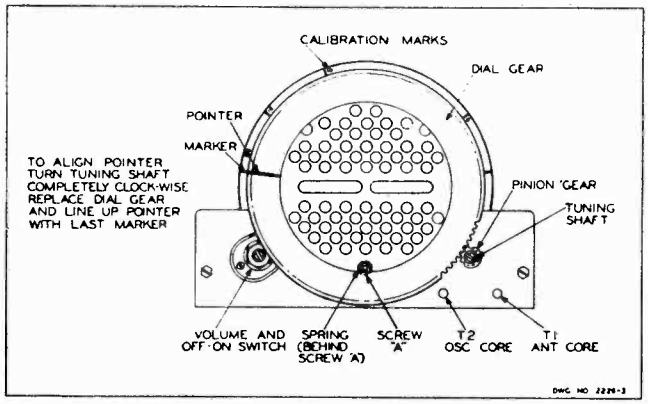
MODELS 84BR-1515A, 84BR-1516A, MONTGOMERY WARD 84BR-1815A, 84BR-1816A

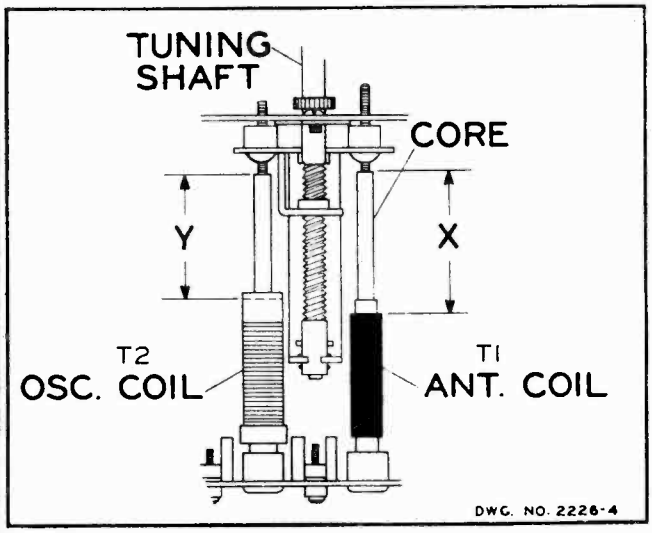


On some sets the four condensers C7, C9, C10, C11 are in one unit. Replace a defective section with an external single unit.

GENERAL DESCRIPTION

This radio is a permeability-tuned, AC-DC set using 4 tubes plus a rectifier. The metal back plate of the cabinet serves as a self-contained antenna. A clip is provided for connection of an external antenna; it is riveted to a washer which is capacity-coupled to the back plate. Simple AVC voltage is applied to the converter and IF-amplifier tubes. The filament string is across the AC line.





With tuner all the way out, dimension "Y" is 1-15/64". Dimension "X" is 1½".

ELECTRICAL SPECIFICATIONS

Power Supply	105 to 125 volts, DC or 50-60 cycles AC, 35 watts.
Frequency Range	535 to 1620 kc.
Intermediate Freq.	455 kc.
Selectivity	At 1000 kc., 55 kc. at 1000 x signal.
Sensitivity	20 microvolts average for .05 watt output.
Power Output	0.7 watts undistorted, 1.0 watts maximum.
Loud Speaker	4", P.M., v.c. impedance 3.2 ohms.
Tube Complement	12BE6, converter 12BA6, I.F. amplifier 12AT6, detector, AVC, audio amplifier 50B5, output amplifier 35W4, rectifier.

ALIGNMENT PROCEDURE AND RECEIVER STAGE SENSITIVITIES

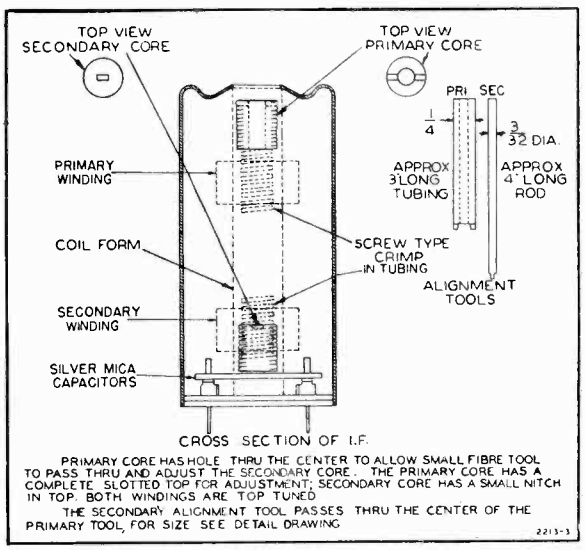
The signal source must be an accurately calibrated signal generator capable of supplying R. F. signals modulated 30% with a 400-cycle audio signal. A 400-cycle source is necessary for the audio measurements.

The table below lists the sensitivity at various points. All measurements are based on an output of 50-milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm, 5-watt resistor across the secondary winding of the output transformer. A reading of .4 volts AC across this resistor will be equivalent to a 50-milliwatt output with the speaker connected. Variations of plus or minus 25% are usually permissable. Volume control at maximum for all adjustments.

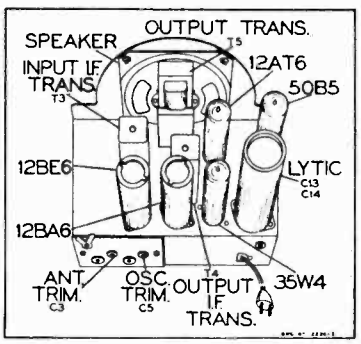
SIGNAL GENERATOR				TUNER SETTING	ADJUST FOR MAXIMUM OUTPUT	INPUT FOR 50-MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection			
455 kc.	.1 mf	12BE6, Pin 7	12AT6, Pin 2	Iron cores all the way out	Cores in output and input I.F. cans	45 microvolts
1620 kc.	.1 mf	12BE6, Pin 7	12AT6, Pin 2	Iron cores all the way out	Oscillator trimmer C5	———
1620 kc.	2 mmf see note	External antenna clip	12AT6, Pin 2	1620 kc.	Antenna trimmer C3*	20 microvolts
1400 kc.	2 mmf see note	External antenna clip	12AT6, Pin 2	1400 kc.	Adjust position of ant. core (see coil illustration view)	20 microvolts
400 cycles	.1 mf	12AT6, Pin 1	12AT6, Pin 2	———	———	.03 volts

*After the antenna coil has been tracked at 1400 kc., it is necessary to check the antenna trimmer C3 again at 1620 kc. If no appreciable change in trimmer adjustment is necessary, the coil is in track. If the trimmer requires considerable change, the position of the antenna core at 1400 kc. must be readjusted. These two adjustments should be made several times, until no trimmer adjustment is required at 1620 kc.

NOTE: Anything larger than 2 mmfd. will produce mistrack.



CAUTION—The I.F. transformer construction is such that two resonance peaks occur for each winding, one peak when the slug is above its coil and another peak when the slug is below its coil. Be sure the upper core is above the top coil and the lower core is below the bottom coil (see coil drawing above).



ANTENNA AND GROUND—The plate antenna on the rear of the cabinet is sufficient for receiving programs from local stations and from powerful nearby stations. 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. 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.

No ground wire is required with this radio.

POWER—This receiver has been designed to operate on 105-125 volts, either DC or 50- to 60-cycle AC. 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.

INSTALLATION

This radio is a superheterodyne set which may be operated from either alternating (AC) or direct (DC) current. The plate antenna on the rear of the cabinet serves as a built-in antenna for the set, which tunes over the standard broadcast band, 535 to 1620 kilocycles.

OPERATION

CONTROLS—The knob on the left is both the on-off switch and the volume control. When this control is turned all the way to the left the set is off. A slight ro-

tation to the right clicks the switch and turns the set on. The knob may then be used to regulate the volume. Be sure your radio is turned completely off when not in use; otherwise the tubes will wear out unnecessarily.

The knob on the right is the tuning knob; it may be used to tune in stations on the standard broadcast band. When selecting a station turn the knob back and forth until the tone is clearest and loudest. Do not use the tuning knob to regulate volume; the volume control should be used for that purpose after the station has been tuned in properly.

The operating frequency, in kilocycles, of each of your local stations is usually listed in the radio section of your newspaper. The numbers on the radio dial may be converted into kilocycles by multiplying by 10. For example, 80 on the dial represents 800 kilocycles.

DC OPERATION—On direct current the set will not operate with the plug in one position in the receptacle, but will operate normally with the plug in the other position. Insert the plug and turn the volume control to the right. If no sound is heard after one minute, reverse the plug.

AC OPERATION—Insert the line-cord into your AC receptacle. Turn the set on and wait 30 seconds for tubes to warm up; tune in a station; keep the volume low. A low steady hum may be heard. Reverse the plug in the receptacle and notice whether there is any difference. Leave the plug in the position which gives less hum.

Ref. No.	Part No.	Description	Qty. Used
		CAPACITORS	
C13, C14	A-8C-15030	Electrolytic, 40 mfd x 40 mfd x 150 volts	1
C4	C-8G-12198	.000047 mfd, ceramic	1
C1	C-8G-11734	100 mmf, 20%, ceramic	1
C7, C10	C-8G-11733	.00022 mmf, ceramic	2
C9	C-8D-10778	.002 x 600 volts, paper	1
C11	C-8D-10935	.005 x 600 volts, paper	1
C12	C-8D-11738	.01 x 200 volts, paper	1
C6	C-8D-10770	.05 x 200 volts, paper	1
C15	C-8D-10813	.05 x 400 volts, paper	1
C8	C-8D-10953	.15 x 400 volts, paper	1
C5	A-2M-14468	Trimmer plate for osc. small, with 1 ear	1
C3	A-2M-12618	Trimmer plate for antenna, small, with 2 ears	1
C3, C5	A-2M-14467	Trimmer bottom plate, for both trimmers. Large, flat, with 1 ear	2
	A-6M-12616	Insulator, clear, for antenna	1
	B-6M-12616-S-2	Insulator, silvered, for osc.	1
		RESISTORS	
R3, S1	A-10A-12380	Volume control (1 megohm) and switch	1
R1	C-9B1-78	22K ohms, 1/2 watt, 10%	1
R10	C-9B1-43	27 ohms, 1/2 watt, 10%	1
R4	C-9B1-34	3.3 megohms, 1/2 watt, 20%	1
R8	C-9B1-52	150 ohms, 1/2 watt, 10%	1
R9	C-9B2-62	1000 ohms, 1 watt, 10%	1
R2, R7	C-9B1-94	470K ohms, 1/2 watt, 10%	2
R6	C-9B1-90	220K ohms, 1/2 watt, 10%	1
R5	C-9B1-36	6.8 megohms, 1/2 watt, 20%	1
		SPEAKER	
	B-18A-14390	Speaker, 4" P.M., less trans former	1
T5	B-12C-14320	Output transformer, for speaker	1
		COILS	
T3	B-13A-13071	Input I.F. transformer	1
T4	B-13B-13072	Output I.F. transformer	1
T2	A-13D-14418	Oscillator coil assembly	1
T1	A-13E-14417	Antenna coil assembly	1
	B-51A-13812 or A-51A-12443	Iron core for oscillator coil	1
	B-51A-14463 or B-51A-14396	Iron core for antenna coil	1

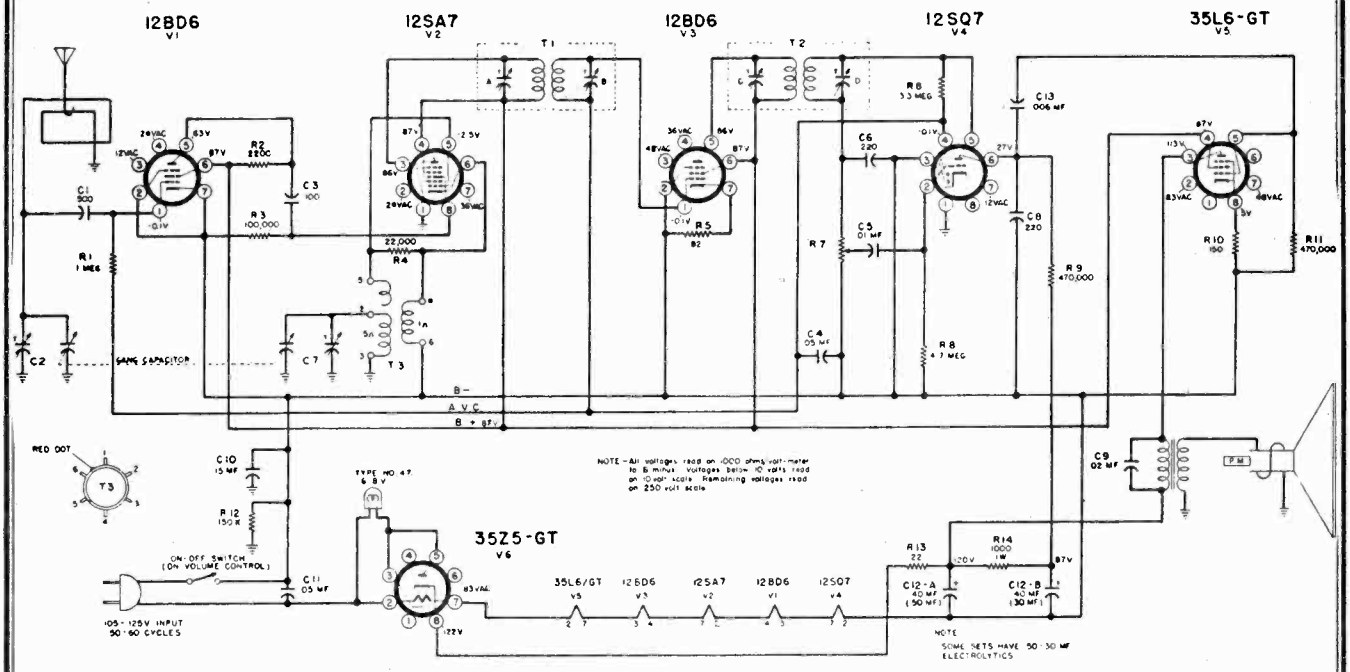
NOTE: Ref. No. C8, Part No. C-8D-10935 should be C-8D-10953

Ref. No.	Part No.	Description	Qty. Used
		DIAL AND TUNING PARTS	
	B-29A-7479	Washer, used with tension spring	1
	A-2J-13522	Tension spring for dial ring gear	1
	A-3A-13478	Drive shaft	1
	A-3L-12388	Drive pinion	1
	A-200-14497	Dial ring gear and pointer assembly	1
		MODELS 84BR-1515A 84BR-1516A	
	B-23G-13951	Dial scale, (Decal)	1
	A-5B-13948-8	Knob, Ivory	2
	A-5B-13948-37	Knob, Walnut	2
		MODELS 84BR-1815A 84BR-1816A	
	B-6D-15086	Dial scale	1
	A-5B-15067-63	Knob, Ivory	2
	D-5C-14466-64	Escutcheon	1
	A-43D-15144	Push-on clips	2
		MISCELLANEOUS	
	A-2M-10096	Snap-in rivet to fasten top of antenna plate	2
	B-2M-11205	Snap-in rivet to fasten bottom of antenna plate	2
	A-15C-13174	Socket, 7-prong, miniature	5
	B-14M-10088-3	Line cord	1
	A-2H-10974	Tube shield	2
		MODELS 84BR-1515A 84BR-1516A	
	5C-12514-9	Cabinet, Ivory color	1
	5C-12514-36	Cabinet, Walnut color	1
	B-13E-14421	Antenna plate	1
		MODELS 84BR-1815A 84BR-1816A	
	D-24D-14321	Cabinet, walnut	1
	D-24D-14321	Cabinet, bleached	1
	B-13E-15100	Antenna plate	1

NOTE:— CORRECT DRIVE SHAFT NUMBER IS: A-3A-15154.

MONTGOMERY WARD

MODELS 84BR-1517A, 84BR-1518A



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.

GENERAL DESCRIPTION

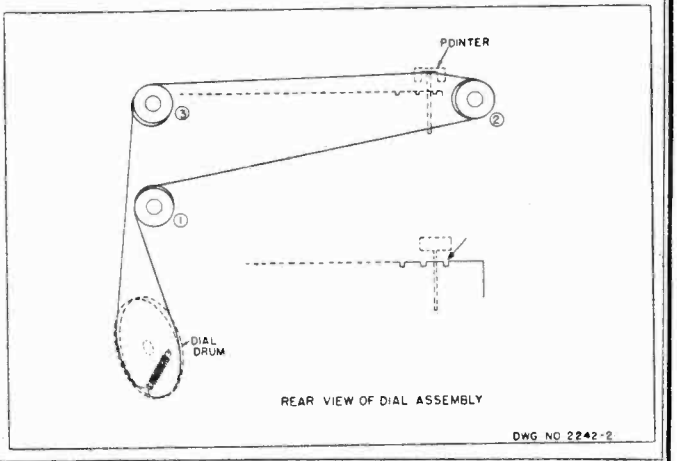
This receiver is a single-band, AC-DC set which uses 5 tubes plus a rectifier. The antenna input and oscillator circuits are tuned by a two-gang capacitor. A loop antenna is built into the cabinet; provision is made also for the connection of an external antenna. AVC voltage is applied to the grids of the R.F.-Amplifier, and IF-amplifier tubes.

ELECTRICAL SPECIFICATIONS

Power Supply	105 to 125 volts, DC or 50-60 cycle AC, 35 watts.
Frequency Range	530 to 1650 kc.
Intermediate Freq.	455 kc.
Selectivity	At 1000 kc, 55 kc at 1000 x signal.
Sensitivity	40 microvolts average for .05 watt output.
Power Output	0.8 watts undistorted, 1 watt maximum.
Loud Speaker	5" P.M., v.c. impedance 3.2 ohms.
Tube Complement	12BD6, R. F. stage. 12SA7, converter. 12BD6, I. F. amplifier. 12SQ7, detector, AVC, audio amplifier. 35L6GT, output amplifier. 35Z5GT, rectifier.

REPLACING DIAL POINTER DRIVE CORD—

1. Rotate tuning knob to extreme clockwise position. This closes the tuning condenser. Knob should remain in this postion until installation of cord is completed.
2. Tie cord to loop in spring in drum. Pass around drum in direction shown.
3. Pass over idler pulley number 1, then around idler pulley number 2 as shown.
4. Pass cord over idler pulley number 3, then down around drum as shown. Tie to loop in spring in such a manner that the spring is partly stretched.
5. Place pointer on top edge of dial plate. Guide cord through the three fingers on the back of the pointer.
6. Make sure the tuning knob is in the extreme clockwise position. Slide the dial pointer along the edge of the dial plate until the left edge of the pointer coincides with the right hand notch on the gold background plate, when viewed from the front.
7. Push the cord firmly into the three fingers and clamp them tightly together.



MODELS 84BR-1517A, 84BR-1518A

MONTGOMERY WARD

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 sheets 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.

ALIGNMENT PROCEDURE AND RECEIVER STAGE SENSITIVITIES

The signal source must be an accurately calibrated signal generator capable of supplying R. F. signals modulated 30% with a 400-cycle audio signal. A 400-cycle source is necessary for the audio measurement.

The table below lists the sensitivity at various points. All measurements are based on an output of 50-milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm, 5-watt resistor across the secondary winding of the output transformer. A reading of .4 volts AC across this resistor will be equivalent to a 50-milliwatt output with the speaker connected. Variations of plus or minus 25% are usually permissable. Volume control at maximum for all adjustments.

SIGNAL GENERATOR				TUNER SETTING	ADJUST FOR MAXIMUM OUTPUT	INPUT FOR 50-MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection			
455 kc.	.1 mf.	Pin No. 8 of 12SA7	12SQ7 Pin 3	Rotor full open	Trimmers on output and input I.F. cans	100 microvolts
1650 kc.	.1 mf.	Pin No. 8 of 12SA7	12SQ7 Pin 3	Rotor full open	Oscillator trimmer C7 (on bottom)	———
1400 kc.	none	See note A	none	Set dial at 1400	Antenna trimmer C2 (on bottom)	———
1400 kc.	.1 mf.	External antenna clip	12SQ7 Pin 3	1400 kc.	———	13 microvolts
400 cycles	.1 mf.	12SQ7, Pin 2	12SQ7 Pin 3	———	———	.05 volts

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

MONTGOMERY WARD

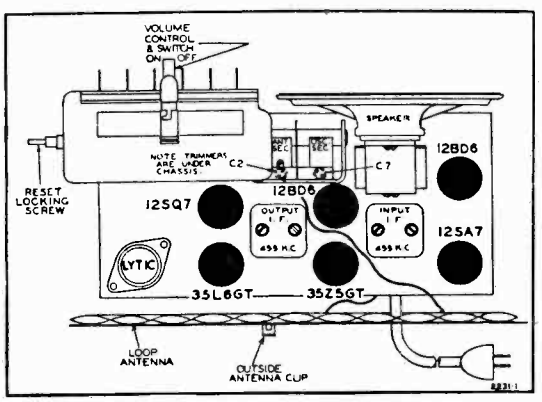
MODELS 84BR-1517A, 84BR-1518A

REPLACEMENT PARTS LIST

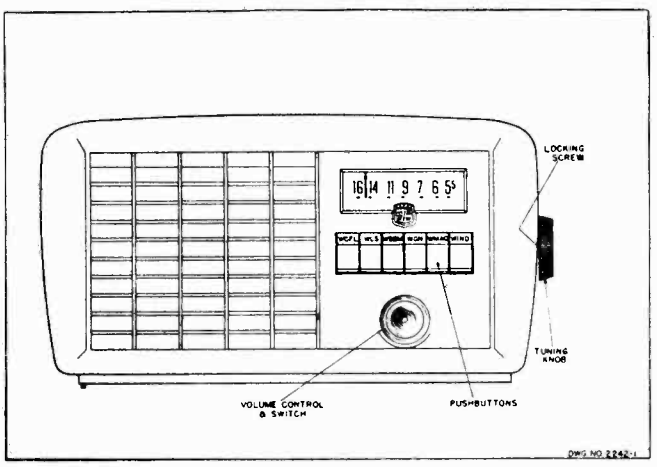
Use Only Genuine Factory Replacement Parts

Ref. No.	Part No.	Description
		CONDENSERS
C12A, C12B	A-8C-15030 or A-8C-15262	Filter cond., 40 mfd. x 40 mfd. x 150 volts 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
		RESISTORS
R14	C-9B2-62	1000 ohms, 1 watt, 10%
R9, R11	C-9B1-94	470K ohms, ½ watt, 20%
R8	C-9B1-35	4.7 megohms, ½ watt, 20%
R6	C-9B1-34	3.3 megohms, ½ watt, 20%
R4	C-9B1-78	2.2K ohms, ½ watt, 20%
R13	C-9B1-42	22 ohms, ½ watt, 10%
R3	C-9B1-25	100K ohms, ½ watt, 20%
R2	C-9B1-66	2200 ohms, ½ watt, 10%
R12	C-9B1-26	150K ohms, ½ watt, 20%
R1	C-9B1-31	1 megohm, ½ watt, 20%
R10	C-9B1-52	150 ohms, ½ watt, 10%
R5	C-9B1-49 or C-9B1-55	82 ohms, ½ watt, 10% 270 ohms, ½ watt, 10%
		COILS
	C-13E-16257	Loop antenna assembly, complete on back
T3	B-13D-15277	Oscillator coil
T1	108140Q or B-13A-12023-1	Input I.F. coil in can, 455 Kc.
T2	108145H or B-13B-12022-1	Output I.F. coil in can, 455 Kc.
(See note on page 3)		
		SOCKETS
	A-15C-16110	7-prong, tube socket
	121171	8-prong socket, laminated
	121216 or B-15B-10076	Socket base, bakelite
	A-47A-15451	Pilot light socket assembly

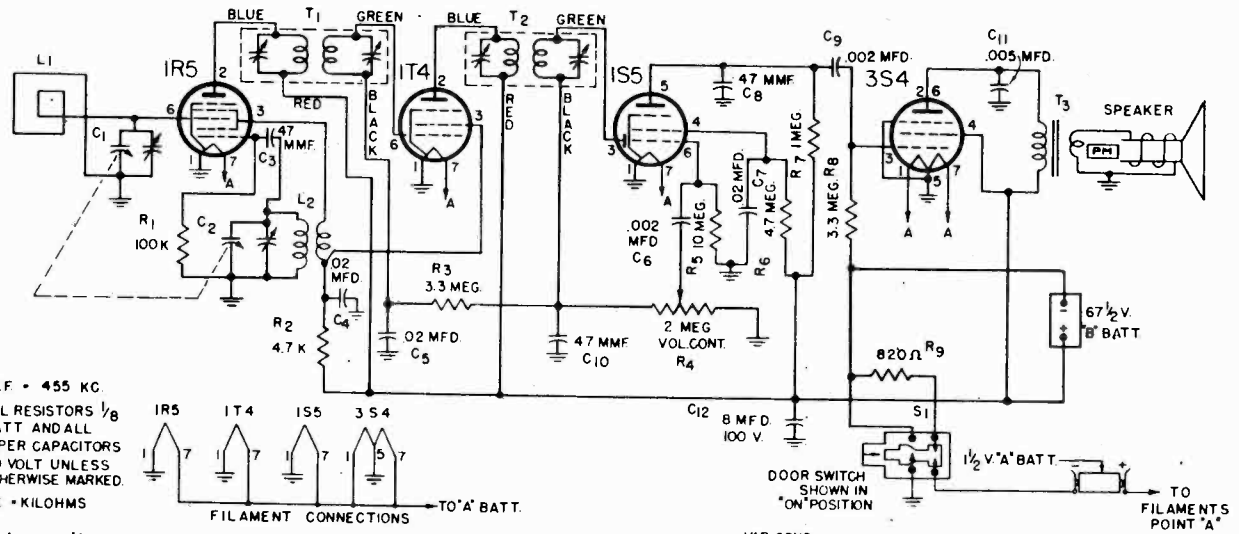
Ref. No.	Part No.	Description
		SPEAKER
	114197	5-inch P.M. speaker
	B-12C-15278	Output transformer for speaker
		DIAL AND TUNER PARTS
	115448	End plate (right hand bracket)
	115448C	End plate (left hand bracket)
	115146	Cams
	115143	Key washer (12 used on cam shaft)
	115143C	Key washer (one used)
	117528	Brass spacer (one used on cam-shaft)
	117602	Brass spacer (four used on cam-shaft)
	131181	Spring washer for locking collar
	117604	Locking collar
	117600	Lever shaft
	115361	Lever with roller
	120283	Return spring for levers
	A-2G-15449	Pointer
	A-55A-10989	Dial cord, 24 inches used
	C-2C-15428	Dial plate assembly
	A-200-15463	Drum pulley
	A-3H-10299	Idler pulley
	120285	Drum spring
	B-2M-10383	Cinch button
	C-6D-15422	Dial scale
	B-2M-15200	Cinch button for dial scale
	A-2C-15450	Background plate
		MISCELLANEOUS
	10798	Line cord and plug
R7	101218 or A-10A-10626	Volume control and switch, 1 meg.
C1-A, C1-B	B-8A-10211	2-gang variable condenser
	107249	Pilot light bulb, type T-47
	134123	Rubber bumper (bottom of cabinet)
	13141	Cinch buttons, to cover trimmer holes in cabinet
	B-5B-14298-8	Pushbutton (6 used), Ivory
	A-23L-11900	Station call letters, set
	A-6C-14299	Acetate tabs for call letters
	5C-14286-9	Cabinet, bakelite, ivory color
	B-5B-15085-8	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-14286-36	Cabinet, walnut
	A-2H-10715	Tube shield



CHASSIS VIEW, SHOWING TUBE LOCATIONS
(See note on I.-F.'s.)

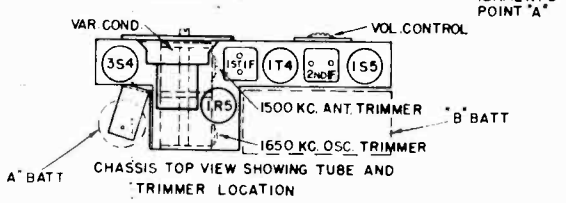


MONTGOMERY WARD MODEL 84GCB-1062A

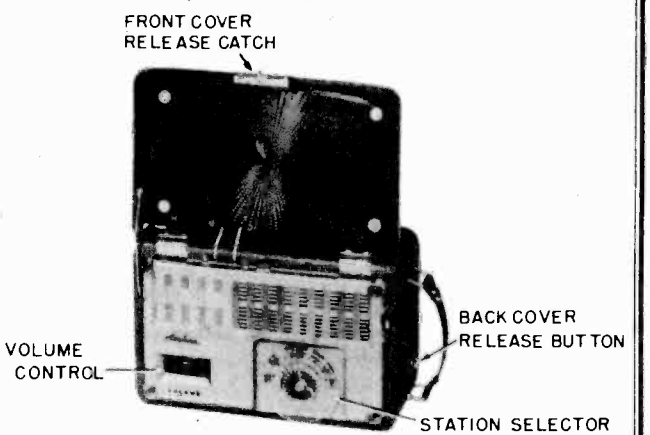


This radio is a condenser tuned receiver using cut plate tracking oscillator section and employs four tubes in a superheterodyne circuit. A highly efficient litz wound loop is assembled in a low loss polystyrene cover and is connected to the receiver input by means of flexible plastic covered leads passing through an insulating bushing. No provision is made for the use of an external antenna.

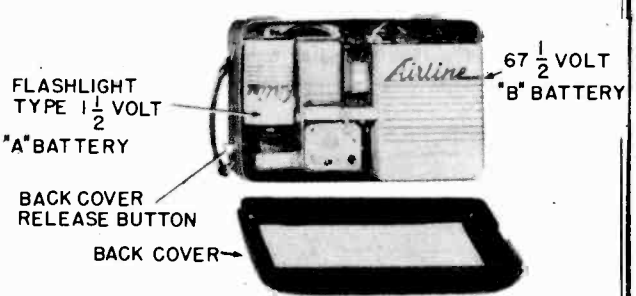
Power is obtained from a single 1½ volt flashlight type cell and a 67½ volt "B" battery. All tube filaments are connected in parallel. A.V.C. voltage is applied to the I.F. amplifier tube only. Bias for the output tube is obtained from a resistor in the minus B lead.



CHASSIS TOP VIEW SHOWING TUBE AND TRIMMER LOCATION



RECEIVER IN OPERATING POSITION



REAR VIEW - BACK COVER REMOVED SHOWING LOCATION OF BATTERIES

ELECTRICAL SPECIFICATIONS

Power Supply.....1½ volt "A" cell @ 250 MA and 67½ volt "B" battery @ 9 MA (with fresh batteries)

Frequency Range....540 to 1650 KC

Intermediate Freq. ..455 KC

Selectivity .....At 1000 Kilocycles, 28 KC at 10 X signal

Sensitivity .....400 Microvolts per meter average for .05 watt ouput.

Power Output .....70 Milliwatts undistorted (with fresh batteries)

Loud Speaker .....2½" P.M. v.c. impedance 3.2 ohms

Tube Complement....1R5 Converter
1T4 I.F. Amplifier
1S5 Detector, AVC, audio amplifier
3S4 Power Amplifier

BATTERY REQUIREMENTS—The following batteries are required:

QUANTITY	TYPE	MANUFACTURER
1	1½ volt "A"	Airline #62-23, Eveready size "D", Burgess No. 2, Ray-O-Vac size "D" or equivalent.
1	67½ volt "B"	Airline #62-43 or #62-10, Eveready #467, Burgess type XXD, Ray-O-Vac Type #4367 or equivalent.

ALIGNMENT PROCEDURE AND RECEIVER STAGE SENSITIVITIES

The signal source must be an accurately calibrated signal generator capable of supplying R.F. signals modulated 30% with a 400-cycle audio signal. A 400-cycle source is necessary for the audio measurements.

In order to make the adjustments listed in the table below, it is necessary to first remove the front panel in order to remove the chassis from the cabinet. The loop leads must also be disconnected (unsolder) and extended by means of short leads. The table below lists the sensitivity at various points. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm, 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volts AC across this resistor will be equivalent to a 50-milliwatt output with the speaker connected. Variations of plus or minus 25% are usually permissible. Volume control at maximum for all adjustments.

SIGNAL GENERATOR				DIAL SETTING	ADJUST FOR MAXIMUM OUTPUT	INPUT FOR 50-MILLIWATT OUTPUT
Frequency	Coupling	Connection to Radio	Ground Connection			
455 KC	.1 mfd condenser	Stator lug Var. Capacitor (front section)	Chassis	Variable Condenser fully open	Trimmers 1st and 2nd I.F. transformer	100 microvolts
1650 KC	Coupling loop see note 1	None	None	Variable Condenser fully open	Oscillator Trimmer (Rear section)	———
1500 KC	Coupling loop see note 2	None	None	1500 KC	Ant. trimmer (front section)	———
400 cycles	.1 mfd condenser	High side of volume control	Chassis	———	———	.045 volts

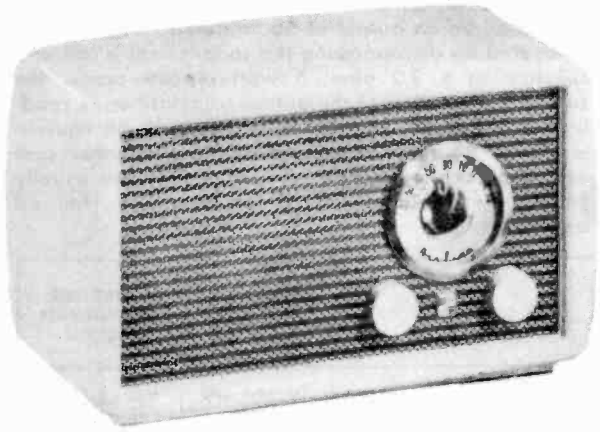
Note 1 — Connect signal generator leads to a three turn radiating loop approximately 4" in diameter placed about 8" from the loop of the receiver.

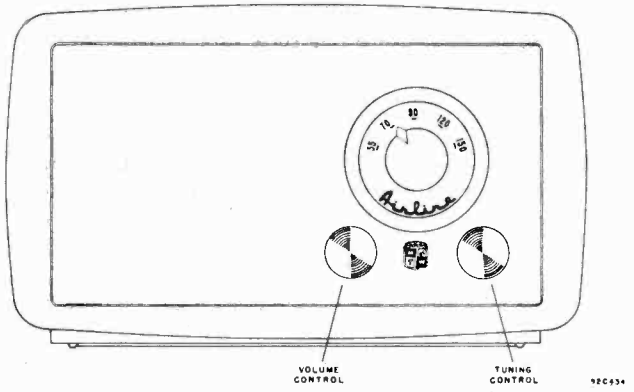
Note 2 — After chassis is installed in cabinet and reconnected to its loop re-adjust the antenna trimmer by ear, with low signal input.

Ref. No.	Part No.	Description	Qty. Used
		CAPACITORS	
C12	5.417	Electrolytic, 8 mfd. 100 V.	1
C3, C8, C10	4.109-12	47 mmf. Ceramic	3
C6, C9	3.101-3	.002 x 150 volts, Paper	2
C11	3.101-5	.005 x 150 volts, Paper	1
C4, C5, C7	3.101-11	.02 x 150 volts, Paper	3
		RESISTORS	
R4	8.216-1	Volume Control (2 meg-ohms)	1
R9	7.105-185	820 ohms ⅛ watt, 20%	1
R2	7.105-13	4.7 K ⅛ watt, 20%	1
R1	7.105-45	100 K ohms, ⅛ watt, 20%	1
R3, R8	7.105-101	3.3 Meg ohm, ⅛ watt, 20%	2
R6	7.105-164	4.7 meg ohm, ⅛ watt, 20%	1
R5	7.105-171	10 meg ohm, ⅛ watt, 20%	1
		SPEAKER	
	30.315	Speaker, 2½" P.M., less trans.	1
T3	9.207-A	Output Transformer	1
		COILS	
T1	1.412-2	Input I.F. Transformer	1
T2	1.413-2	Output I.F. Transformer	1
L2	1.466	Oscillator Coil	1
L1	35.209	Loop Ant. Assembled to plate	1
		DIAL PARTS	
	13.123	Tuning Knob	1
	13.124	Volume Knob	1
		MISCELLANEOUS	
	35.246	Cabinet complete (less loop plate and front panel and baffle) specify color	1
	13.155	Back Cover (specify Color)	1
	35.244	Front Cover (with catch and stay arm)	1
	35.245	Front Panel (with screws)	1
	35.198	Handle with loops	1
	33.172	Snap-in Rivet, for holding loop antenna	4
	24.220	Socket, 7 prong, miniature	4
	35.243	Door Switch (with resistor)	1
	35.242	"A" Battery holder assembly (less output transformer)	1
	35.210	"B" Battery connector ass'y	1

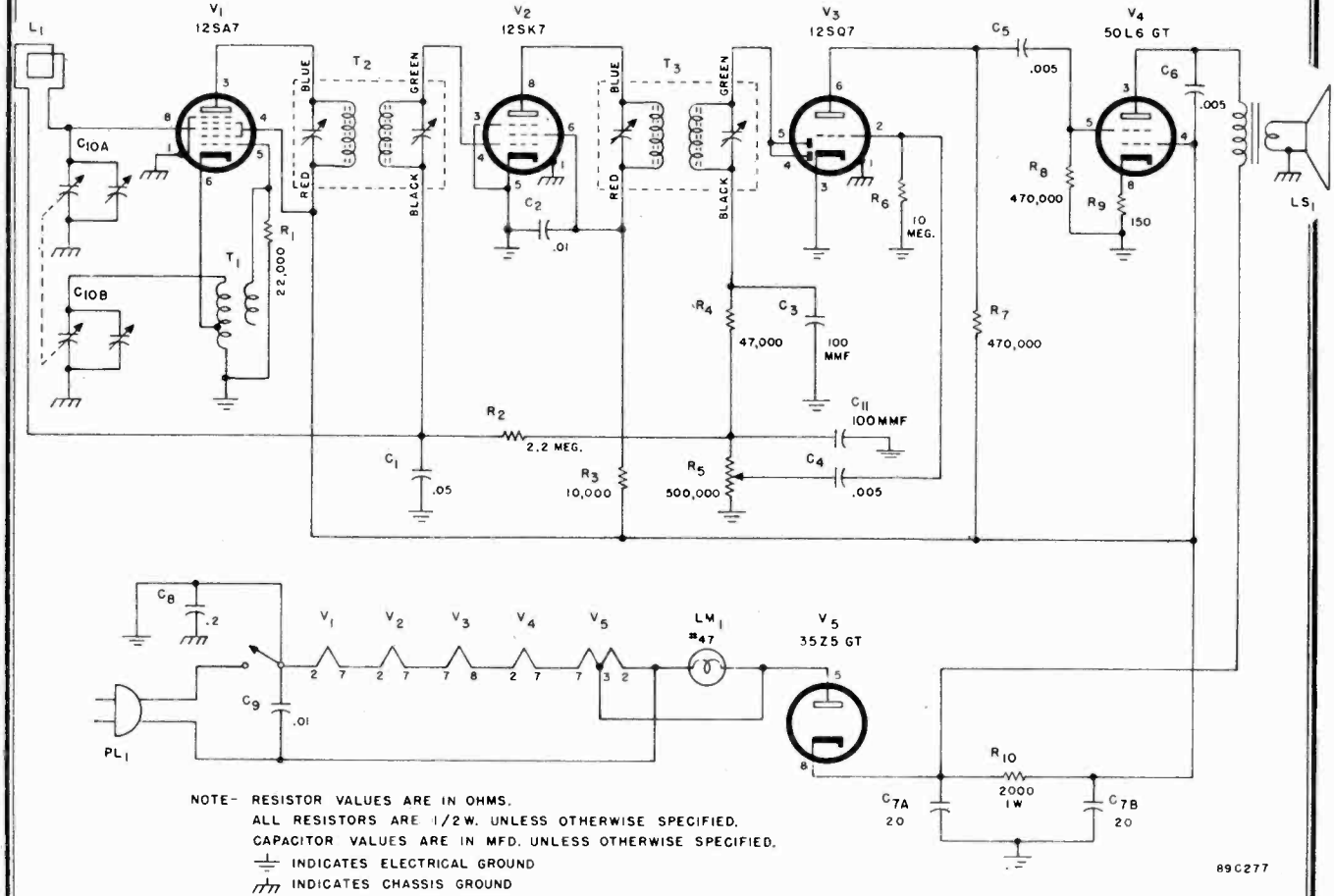
MONTGOMERY WARD

MODELS 84HA-1527A, 84HA-1528A





This radio is a condenser tuned receiver using a cut plate tracking mixer section and employs four tubes in a conventional superheterodyne circuit. The loop provides for signal pickup as well as the inductive component in the tuned circuit of the mixer stage. No provision is made for the use of an external antenna.



NOTE- RESISTOR VALUES ARE IN OHMS.
ALL RESISTORS ARE 1/2W. UNLESS OTHERWISE SPECIFIED.
CAPACITOR VALUES ARE IN MFD. UNLESS OTHERWISE SPECIFIED.
⏚ INDICATES ELECTRICAL GROUND
⏚ INDICATES CHASSIS GROUND

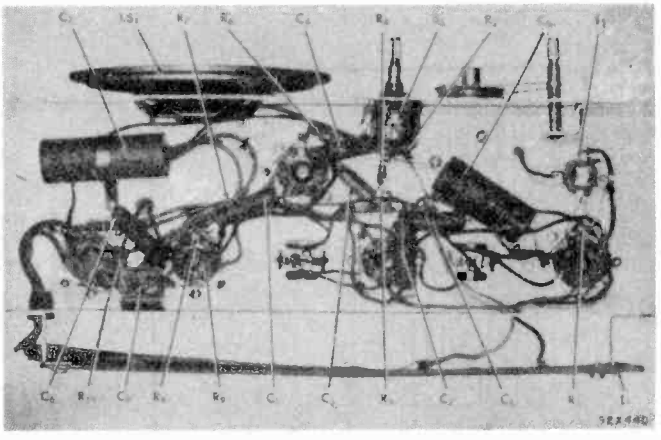
LAST RESISTOR SYMBOL — R-10
LAST CAPACITOR SYMBOL — C-10

MODELS 84HA-1527A, 84HA-1528A

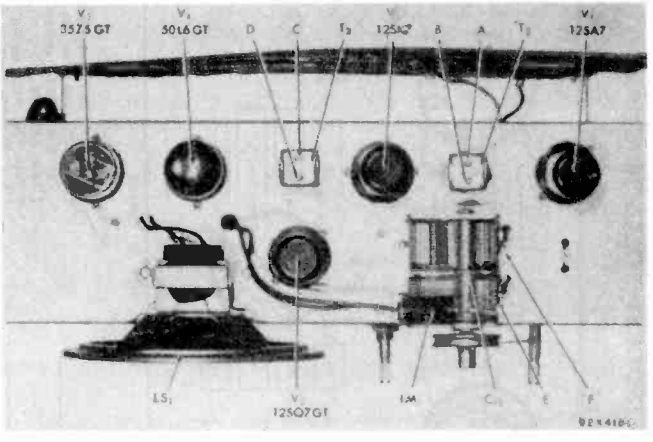
MONTGOMERY WARD

ELECTRICAL SPECIFICATIONS

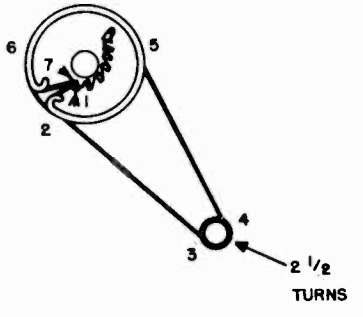
Power Supply	105-125 volts DC or 60 cycle AC, 25 watts
Frequency Range	Broadcast 540-1620 KC
Intermediate Frequency	455 KC
Antenna	Built in loop
Power Output	0.6 watt
Speaker	5 inch P.M.
Voice Coil Impedance	3 ohms
Tube and Dial Lamp Complement	12SA7 Mixer 12SK7 I.F. Amplifier 12SQ7 Detector & Audio 50L6GT Power Amplifier 35Z5GT Rectifier Mazda No. 47 Dial Lamp



For placement of these tubes, see the diagram showing tube layout.



DIAL CORD STRINGING INSTRUCTIONS



To restring the dial cable, pull the two control knobs and dial pointer from their shafts remove the chassis bolts and pull the chassis from the cabinet. Restring the dial drive with a 12-inch length of 30 lb. test dial cord following the stringing sequence shown in the accompanying illustration. Reinstall the receiver chassis and replace the knobs. Set the tuning condenser at maximum capacity and clip on the dial pointer so that its pointer falls on the left hand limit of the dial scale.

ALIGNMENT PROCEDURE

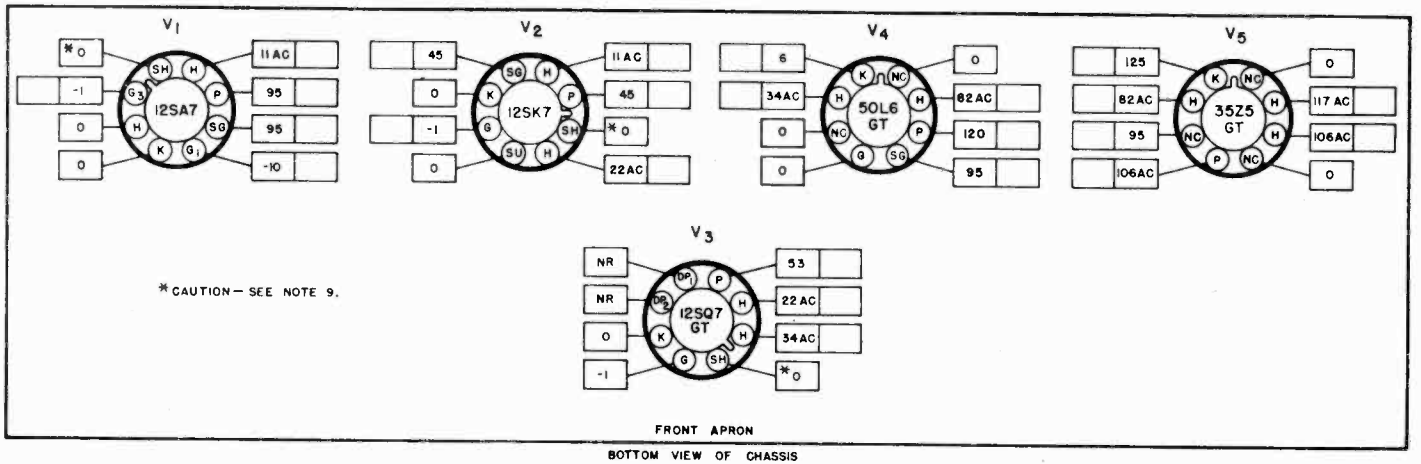
Output meter connection	Across voice coil
Generator ground	To chasis
Volume control position	Maximum

ALIGNMENT CHART

Dummy Antenna	Signal Generator Coupling	Signal Generator Frequency	Radio Tuned To	Adjust	Remarks
0.01 mfd. cap.	Connect to pin #5 of of 12SA7 through dummy ant.	455 kc	1000 kc	A,B,C.D	Adjust for max. output. IF sensitivity for 50 milliwatt output is approx. 150 microvolts.
None	Do not couple directly to loop, pickup generator signal by radiation only	1500 kc	1500 kc	E*F	Adjust for max. output.

*Note - Calibration adjustment.

TUBE SOCKET VOLTAGE CHART



NOTES-

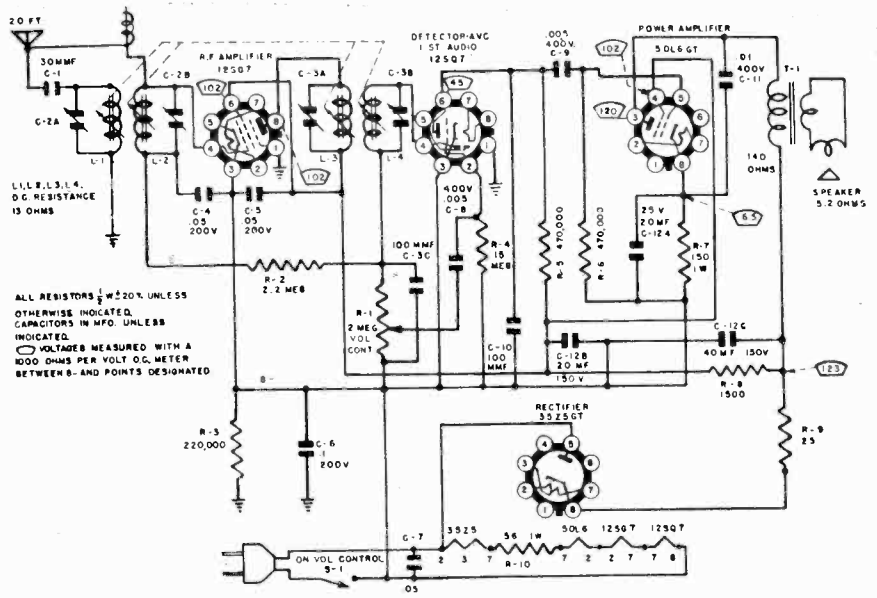
1. SOCKET VIEWS ARE BOTTOM VIEWS.
2. ALL VOLTAGES ARE MEASURED BETWEEN TUBE SOCKET TERMINALS AND ELECTRICAL GROUND (NOT CHASSIS) WITH ZERO SIGNAL INPUT.
3. LINE VOLTAGE ___ 117 V. AC.
4. ALL VOLTAGES SHOWN ARE DC UNLESS OTHERWISE SPECIFIED. AC VOLTAGES SHOWN BECOME DC WHEN OPERATING FROM A DC LINE.
5. DC VOLTAGES SHOWN WERE MEASURED WITH AN ELECTRONIC VOLTMETER.
6. "NC"___NO CONNECTION. (VOLTAGE SHOWN FOR THIS TERMINAL ONLY WHEN TERMINAL IS USED AS A TIE LUG).
7. "NR"___NOT READABLE. (READING GENERALLY MEANINGLESS).
8. [ ] SPACE PROVIDED FOR SERVICE METER READINGS.
9. ALL READINGS TAKEN WITH LINE PLUG POLARIZED SO THAT GROUND BUSS AND CHASSIS ARE AT THE SAME POTENTIAL WITH THE CHASSIS GROUNDED.

92C428

REPLACEMENT PARTS LIST

Ref. No.	Part No.	Description
		CONDENSERS
C-1	46AY503J	.05 mfd. 600 V., tubular
C-2	46AZ103J	.01 mfd. 600 V., tubular
C-3,C-11	CM20A101M	100 mmf. 500 V., mica
C-4,5,6	46AZ502J	.005 mfd. 600 V., tubular
C-7	45B127	20-20 mfd. 150., electrolytic
C-8	46AX204H	.2 mfd. 600., tubular
C-9	46AG103J	.01 mfd. 600., tubular
C-10	48B201	Tuning condenser
		RESISTORS
R-1	RC20AE223M	22,000 ohms ½ watt, carbon
R-2	RC20AE225M	2.2 megohms ½ watt, carbon
R-3	RC20AE103M	10,000 ohms ½ watt, carbon
R-4	RC20AE473M	47,000 ohms ½ watt, carbon
R-5	25B641	Volume control
R-6	RC20AE106M	10 megohms ½ watt, carbon
R-7,8	RC20AE474M	470,000 ohms ½ watt, carbon
R-9	RC20AE151M	150 ohms ½ watt, carbon
R-10	RC30AE202M	2000 ohms 1 watt, carbon
		COILS AND TRANSFORMERS
L-1	57C119	Loop antenna
T-1	51B1058	Oscillator coil
T-2,3	50B374	Transformer IF & Det.

		MISCELLANEOUS
LS-1	85C073	Speaker
	86B066	Pilot light socket & bracket
	6A296	Socket, octal
	87B1669	Line cord
	76A397	Line cord lock
	7C073	Escutcheon
	82B150	Pointer
	22B209	Dial scale
	15B068	Knob, ivory
	15B068-3	Knob, brown
	66E450	Cabinet, ivory finish
	66E450-1	Cabinet, brown finish



ANTENNA—For maximum operating performance unwind the full length of the antenna wire from the back of the radio. For local stations it is not necessary to unwind more than sufficient length to obtain satisfactory volume.

CAUTION—Do not use a ground connection or attoch to a water pipe in any manner.

POWER SUPPLY — This radio will operate on a power supply of 117 volts AC, 50 to 60 cycle or 117 volts DC. Reverse the line plug, selecting the position which gives the least hum.

CAUTION — 117 Volt DC Operation — When used on a DC line, if the set does not operate after one minute, reverse the line plug.

GENERAL DESCRIPTION

This model is a 3 tube (plus rectifier) tuned radio frequency receiver using four core tuned circuits.

ELECTRICAL SPECIFICATIONS

POWER SUPPLY	105-125 Volt AC or DC 50-60 Cycles
FREQUENCY RANGE	540-1620 KC
SELECTIVITY	80 KC Broad at 100 times signal, 1,000 KC
SENSITIVITY	450 Microvolts input for 50 MW (.05 watts) output
POWER OUTPUT	1.6 Watts maximum
LOUD SPEAKER	4" PM Dynamic
VOICE COIL IMPEDANCE	3.2 Ohms at 400 cycles
ANTENNA	20 Ft. of Antenna wire attached to radio
TUBE COMPLEMENT	1-12SG7 R.F. Amplifier 1-12SQ7 Det., 1st Audio A.V.C. 1-50L6 Power Output 1-35Z5 Rectifier

RECEIVER STAGE SENSITIVITIES

SIGNAL GENERATOR			INPUT FOR 50 MW OUTPUT
FREQUENCY	COUPLING CAPACITOR	CONNECTION TO RECEIVER	
1000 KC	50 MMF	Disconnect Antenna and use 50 MMF coupling capacitor	450 Microvolts
1000 KC	.05 MFD	12SG7 R.F., Pin 4	1,400 Microvolts
1000 KC	.05 MFD	12SQ7 DET., Pin 4	13,000 Microvolts
400 Cycle	.05 MFD	12SQ7 1st A.F., Pin 2	.024 Volts
400 Cycle	.05 MFD	50L6 Output, Pin 5	1.1 Volts

NOTE: Generator Grounded to B—.

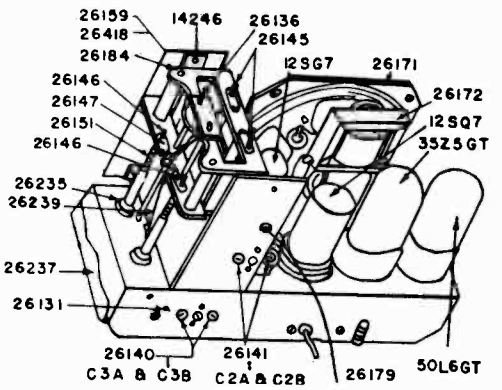
ALIGNMENT PROCEDURE

Volume Control—Maximum for all adjustments. Use output meter across voice coil terminals. Core adjustment tool can be made by slotting end of Bakelite rod.

CAUTION: Do not make any alignment adjustments except at frequencies shown on chart.

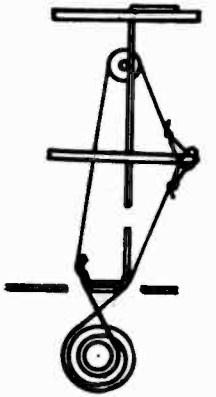
SIGNAL GENERATOR		RADIO	
FREQUENCY SETTING	CONNECTION TO RADIO	DIAL SETTING	ADJUST TO MAXIMUM
1620 KC	No direct connection (See Note)	High frequency extreme (Cores backed out of coils)	Trimmer Condensers 26140, 26141 (Remove cardboard back to expose trimmer adjustment)
1400 KC	No direct connection (See Note)	1400 KC	Cores 26145, 26146 (Be sure there is a resonance point on all 4 cores)

NOTE: Unwind attached antenna wire and place near a short wire connected to signal generator terminal. Do not make direct connection between radio and generator. No ground connection required.



REF. NO.	PART NO.	DESCRIPTION	QTY. USED IN SET
	26236	Ivory White Cabinet	1
	26291	Red Cabinet	1
	26290	Green Cabinet	1
	26289	Yellow Cabinet	1
	26292	Blue Cabinet	1
	26184	Assembly Carriage	1
L 1 2-4	26238	Assembly Coil	3
	26239	Assembly Dial Cord	1
L 3	26247	Assembly Plate Coil and Terminal Panel	1
	26180-D	Back—Cabinet—Cardboard	1
	26189-A	Clip—Electrolytic Condenser Mounting	1
C 2-A, 2-B	26141-B	Condenser—Trimmer—Input	1
C 3-A, 3-B, 3-C	26140-C	Condenser—Trimmer—Output	1
12-A-B-C	26156-B	Condsr.—Electrolytic 40-20-150V., 20-25V.	1
C 10	26190	Condenser—100 MMF	1
C 6	26157	Condenser—Tubular .1 — 200V.	1
C 11	8583	Condenser—Tubular .01 — 400V.	1
C 4-5-7	8661	Condenser—Tubular .05 — 200V.	3
C 8 9	17646	Condenser—Tubular .005 — 400V.	2
C 1	26412	Condenser—Ceramic 30 MMF	1
R 1 - S 1	26177-A	Control—Volume with Sw. 2.2 Meg.	1
	26145-F	Core—Iron (Short Screw)	2
	26146-F	Core—Iron (Long Screw)	2
	26235	Grommets—Coil	4
	26136-B	Guide—Carriage (Brass Rods)	2
	26161-B	Ivory White Knob	2
	26408	Red Knob	2
	26409	Green Knob	2

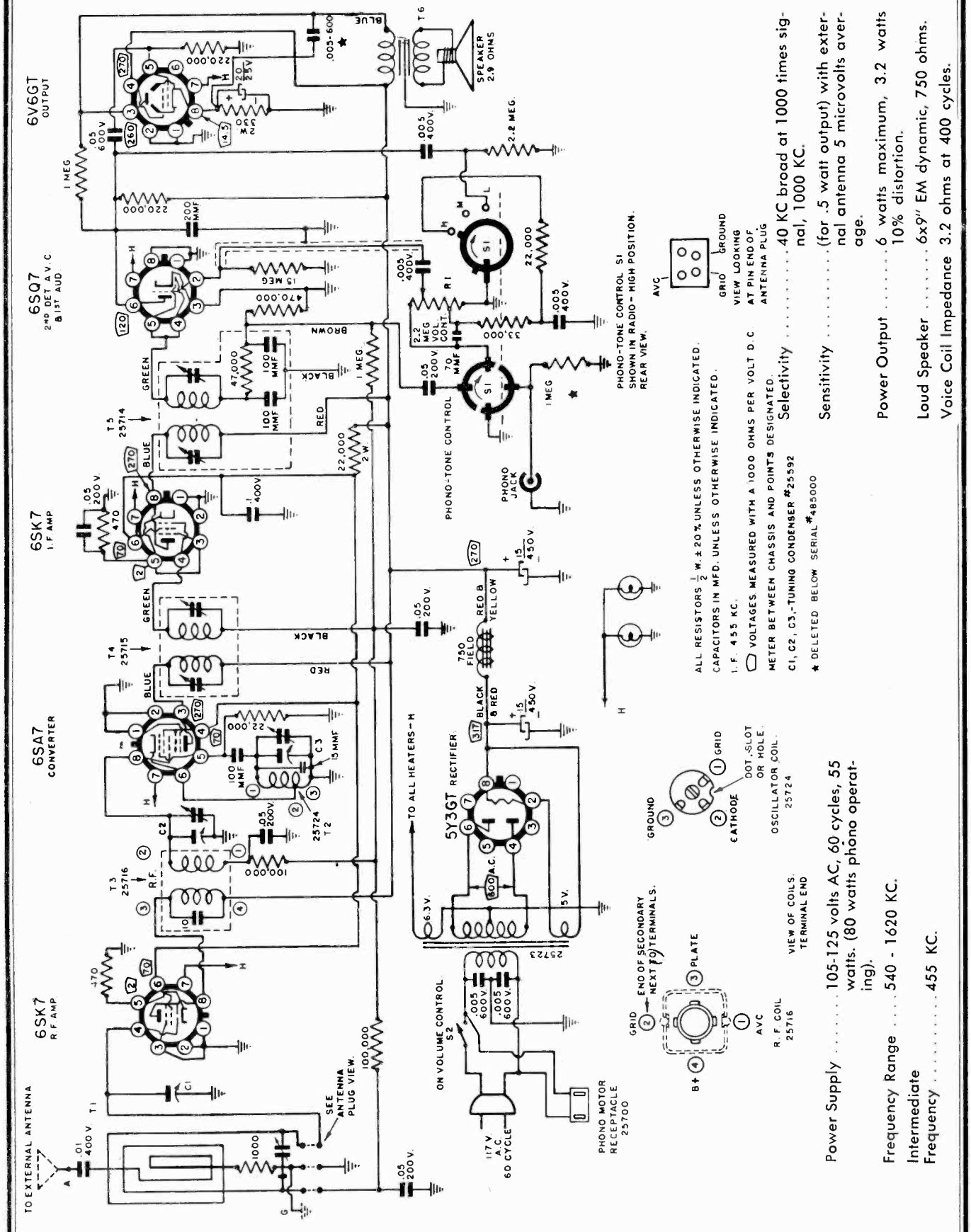
REF. NO.	PART NO.	DESCRIPTION	QTY. USED IN SET
	26410	Yellow Knob	2
	26411	Blue Knob	2
	26147	Nut—Stamped (Used on Cores)	4
	26135-A	Pulley—Dial	1
R 7	26110	Resistor—Carbon 150 Ohm 1W.	1
R 9	26006	Resistor—Fuse 25 Ohm	1
R 5-6	25042	Resistor—Carbon 470,000 Ohm 1/2W.	2
R 8	26169	Resistor—Carbon 1500 Ohm 1/2W.	1
R 2	25134	Resistor—Carbon 2.2 Meg. 1/2W.	1
R 3	25041	Resistor—Carbon 220,000 1/2W.	1
R 4	14365	Resistor—Carbon 15 Meg. 1/2W.	1
R 10	26168-A	Resistor—Wire Wound 56 Ohm 1W.	1
	26170-A	Screw—Chassis Mounting	2
	26159-A	Scale—Dial—Ivory-Red	1
	26418	Scale—Dial—Gold-White	1
	26131	Shaft—Tuning	1
	26171-B	Speaker—4" (Less Transformer)	1
	26148-A	Spring—Pulley Bearing	1
	26150	Spring—Core Lock (Short)	2
	26151	Spring—Core Lock (Long)	2
	26149	Spring—Tuning Shaft	1
	26237	Spring—Chassis to Cabinet	1
T 1	26172-C	Transformer (For Speaker only)	1
	14246	Tri-Mounts (For Dial Scale)	2
	26267	Tri-Mounts (For Back)	3
	26152-A	Washer—.250 O.D., .090 I.D.	4
	26181-A	Washer—Cup—Antenna Spool	3
	26179	Wire—Antenna 20 Ft.	



DIAL STRING 9-9/16" over loops

MONTGOMERY WARD

MODEL 84KR-2723A



Power Supply . . . . . 105-125 volts AC, 60 cycles, 55 watts. (80 watts phono operating).

Frequency Range . . . . 540 - 1620 KC.

Intermediate Frequency . . . . . 455 KC.

Selectivity . . . . . 40 KC broad at 1000 times signal, 1000 KC.

Sensitivity . . . . . (for .5 watt output) with external antenna 5 microvolts average.

Power Output . . . . . 6 watts maximum, 3.2 watts 10% distortion.

Loud Speaker . . . . . 6x9" EM dynamic, 750 ohms.

Voice Coil Impedance 3.2 ohms at 400 cycles.

MODEL 84KR-2723A MONTGOMERY WARD

ALIGNMENT PROCEDURE

VOLUME CONTROL — MAXIMUM FOR ALL ADJUSTMENTS.

Tone control — In "HIGH" position.

Connect radio chassis to ground connection of Signal Generator.

Allow the chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

A signal generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output indicating meter; non-metallic screw driver.

Dummy antennas — .1 mfd., 200 mmfd.

Place loop antenna in its normal relation to the chassis.

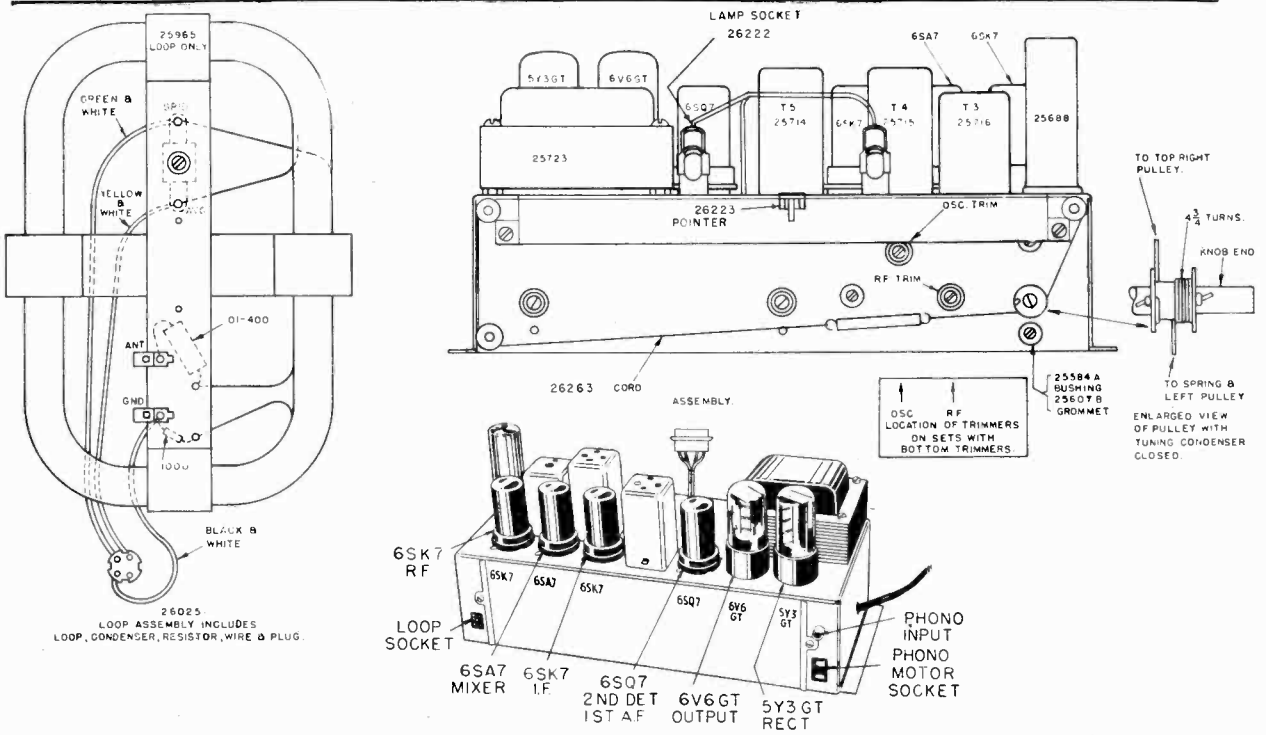
Signal Generator		Connection To Radio	Condenser Setting	Adjust Trimmers To Maximum
Frequency Setting	Dummy Antenna			
455 kc	.1 Mfd.	6SA7, Pin 8	Turn rotor plates to full open	1st IF Transformer. 2nd IF Transformer.
1620 kc	200 Mmfd.	Antenna Lead	Turn rotor plates to full open	Osc. trimmer on tuning condenser.
1400 kc	200 Mmfd.	Antenna Lead	Tune rotor to maximum output.	RF Section trimmer on tuning condenser. Antenna trimmer on loop antenna.

The dial pointer may be adjusted to the scale calibration by slipping the pointer on the dial cord.

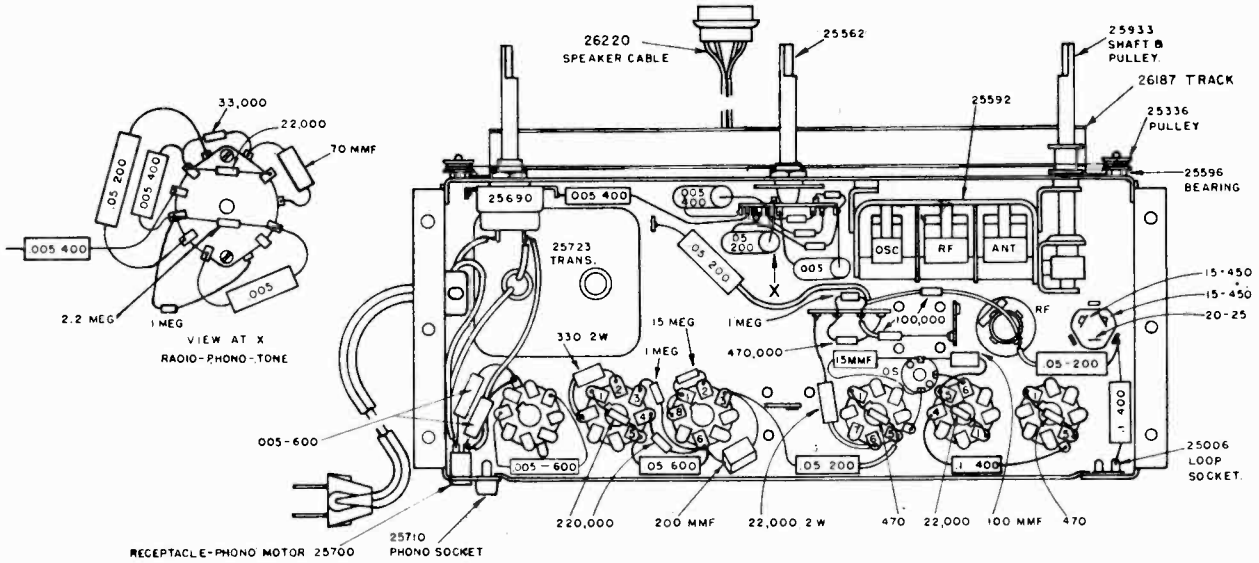
RECEIVER STAGE SENSITIVITIES

The following table lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of .5 watts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm, 5 watt resister across the secondary winding of the output transformer. A reading of 1.26 volts across this resistor will be equivalent to a .5 watt output with the speaker connected. The volume control must be set to maximum. The signal source must be an accurately calibrated signal generator capable of supply both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of Plus or Minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR .5 WATT OUTPUT
Frequency	Coupling Capacitor	Connection to Reciever	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	External Antenna Lead	Chassis	5 microvolts
1000 kc	.05 mfd.	6SA7 Mixer, Pin 8	Same as above	175 microvolts
455 kc.	.05 mfd.	6SA7 Mixer, Pin 8	Same as above	160 microvolts
455 kc.	.05 mfd.	6SK7 1-F, Pin 4	Same as above	1600 microvolts
400 cycles	.05 mfd.	6SQ7 1st A-F, Pin 2	Same as above	.12 volts
400 cycles	.05 mfd.	6V6GT Output, Pin 5	Same as above	4.32 volts



MONTGOMERY WARD MODEL 84KR-2723A

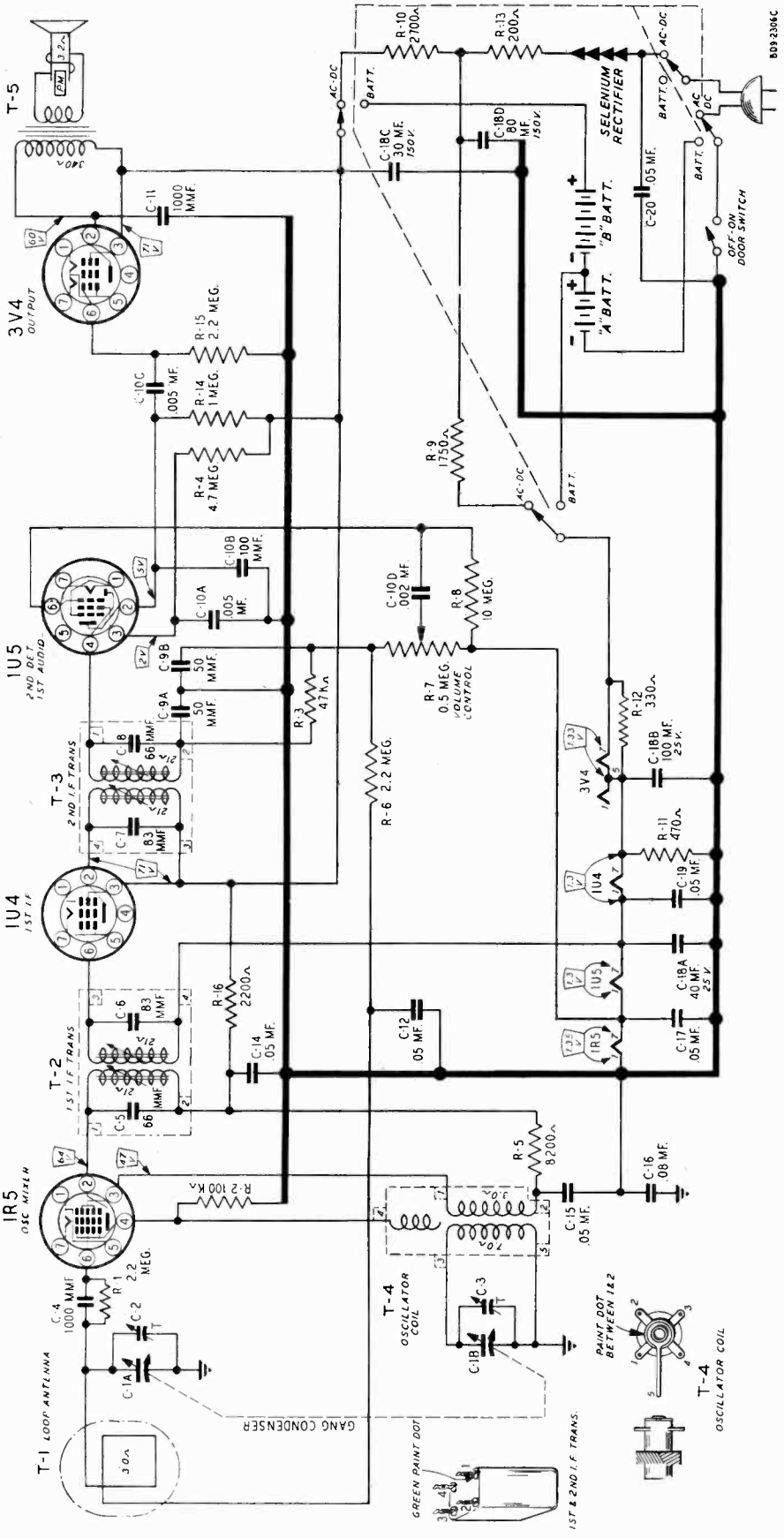


Ref. No.	Part No.	Description	Qty. Used In Set
		CAPACITORS	
	26221	.000015 Ceramic	1
C 1-2-3	25592	Gang Tuning Capacitor Trimmers	1
	25688	Electrolytic 15-15 Mfd. 450V., 20 Mfd. 25V	1
	8878	.05 Mfd.—600V, Tubular	1
	8661	.05 Mfd.—200V. Tubular	5
	17646	.005 Mfd.—400V. Tubular	3
	17647	.1 Mfd.—400V. Tubular	1
	8583	.01 Mfd. — 400V Tubular	1
	14370	.0002 Mfd. Mica	1
	8872	.0001 Mfd. Mica	1
	25689	.005 Mfd. 600V. Moulded	2
	25964	70 Mmfd. Mica	1
	14061	.005 MMFD—600V Tubular	1
		RESISTORS	
	25414	1000 Ohm ½W. Carbon	1
	25742	330 Ohm 2W. Carbon	1
	25085	470 Ohm ½W. Carbon	2
	25721	22,000 Ohm, 2W. Carbon	1
	25038	22,000 Ohm ½W. Carbon	2
	25144	33,000 Ohm ½W. Carbon	1
	25042	470,000 Ohm ½W. Carbon	1
	8885	100,000 Ohm ½W. Carbon	2
	25041	220,000 Ohm ½W. Carbon	2
	8766	1,000,000 Ohm ½W. Carbon	3
	25134	2.2 Megohm ½W. Carbon	1
	14365	15 Megohm ½W. Carbon	1
R 1	25690	Volume Control With Switch S2	1
		TRANSFORMERS AND COILS	
T 1	25965	Loop Antenna	1
T 2	25724	Coil — Oscillator	1
T 3	25597	Coil — RF	1
T 4	25715	Transformer — IF Input	1
T 5	25714	Transformer — IF Output	1
T 6	26226	Transformer — Output Speaker	1
	25723	Transformer — Power — 60 cycle	1

Ref. No.	Part No.	Description	Qty. Used In Set
		DIAL AND DRIVE ASSEMBLY	
	25596	Bearing for Wood Pulleys	3
	25572	Bracket - Tuning Condenser — Front	1
	25573	Bracket - Tuning Condenser — Rear	1
	26263	Cord-Dial	1
	26214	Dial Scale — Plastic	1
	26223	Dial Pointer	1
	26209	Knob — Tone	1
	26208	Knob - Volume — Tuning	2
	25336	Pulley — Wood — Small	3
	25933	Pulley — Manual Drive With Shaft	1
	25607	Rubber — Grommets	3
	26026	Screw — Set for Worm Gear (Tuning Condenser)	2
	26222	Socket — Dial Lamp	2
	25963	Spring — Dial Cord	1
	26187	Track	1
	26192	Dial - Escutcheon	1
		MISCELLANEOUS	
	26264	6x9" EM SPEAKER — With Transformer and Plug	1
	25620	Socket — Octal	6
	25700	Receptacle — Phono Motor	1
	25006	Socket - For Loop Antenna	1
	25008	Socket - Phono Pick-up	1
S 1	25562	Switch — Tone	1
	25068	Cord — AC and Plug	1
	25693	Plug — For Loop	1
		RECORD CHANGER PARTS	
	26034	Motor, 60 cycle, 117 volts	1
	26035	Shure P-30 Crystal Pickup Cartridge and Needle	1
	26036	Replacement Needle Only	1
	26116	Storage Shaft Assembly	1

MODEL 84WG-1060C

MONTGOMERY WARD



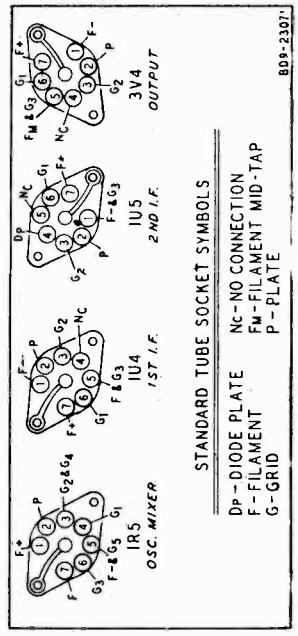
TUBE SOCKET VOLTAGES

Socker voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the filaments are between the socket terminals and the negative terminal on C-18.

The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 300 volt scale. Conditions of measurement are:

Line voltage.....117 volts AC
Volume control.....maximum
Signal input.....none

A variation of ±10% is usually permissible.



MONTGOMERY WARD MODEL 8LWG-1060C

ALIGNMENT PROCEDURE

The following equipment is required for aligning.

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

Output Indicating Meter — Non-Metallic Screwdriver.

Dummy Antenna—.1 mf.

Volume Control — Maximum All Adjustments.

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

SIGNAL GENERATOR				RECEIVER	
Frequency Setting	Coupling Capacitor	Connection to Radio	Ground Connection	Condenser Setting	Adjust for maximum output. See trimmer illustration.
Remove chassis from case (See paragraph Removal of Chassis From Case) and temporarily solder a .5 megohm resistor across the two loop terminals on the chassis.					
455 kc	.1 mf	Control Grid 1R5—Pin 6	"X" Point See Note "B"	Rotor fully open	1st IF Pri. & Sec. 2nd IF Pri. & Sec.
Remove temporary resistor, replace chassis in case and resolder loop leads to terminals.					
1610 kc		Loop See Note A	Loop See Note A	Rotor fully open	Oscillator (C-3)
1500 kc		Loop See Note A	Loop See Note A	Turn Rotor to Maximum Output	Set Pointer at 1500 kc
1400 kc		Loop See Note A	Loop See Note A	Turn Rotor to Maximum Output	Antenna (C-2)

NOTE A: Connect a loop of wire approximately one foot in diameter across the antenna and ground posts of the signal generator. Place radio approximately 2 feet from loop.

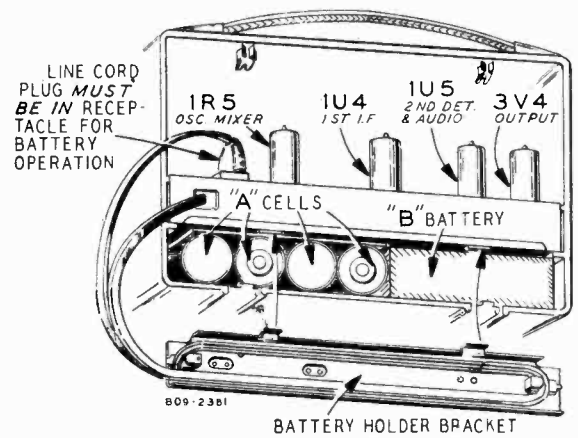
NOTE B: Heavy lines (B-) on circuit diagram designate "X" Point.

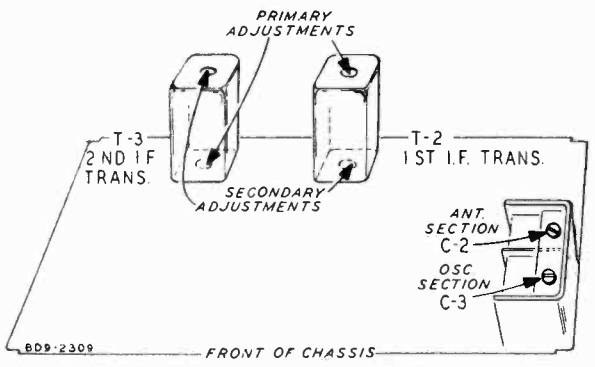
RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer.

A reading of .4 volt across this resistor will be equivalent to a 50 milliwatt output. The volume control must be set to maximum. The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations in sensitivity of plus or minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR 50 MILLIWATT OUTPUT
Freq.	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	.1 mf	1R5 Mixer Pin 6	X Point (Note B, Page 2)	130 microvolts
455 kc	.1 mf	1R5 Mixer Pin 6	X Point (Note B, Page 2)	120 microvolts
455 kc	.1 mf	1U4 IF Amp. Pin 6	X Point (Note B, Page 2)	4000 microvolts
400 cycles	.1 mf	1U5 2nd Det. Pin 6	X Point (Note B, Page 2)	.053 volt
400 cycles	.1 mf	3V4 Output Pin 6	X Point (Note B, Page 2)	3.2 volts





ELECTRICAL SPECIFICATIONS

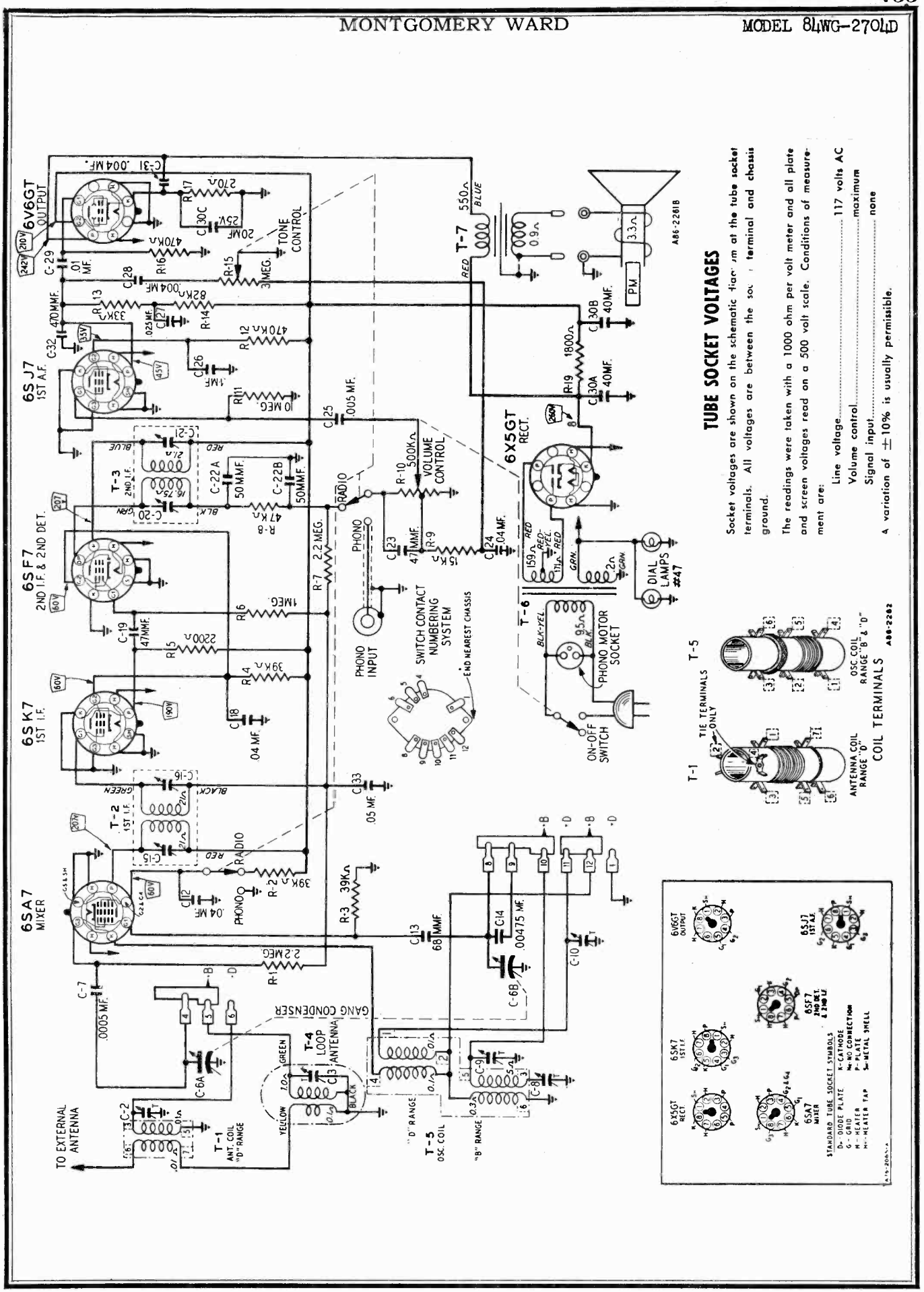
Power Supply	One—67½ Volt "B" Battery Four—1½ Volt "A" Batteries (Size "D" Flashlight Cells) 105-125 volts AC, 25-60 cycles, 10 watts or 105-125 volts DC
Wards Battery Numbers	62-43 or 62-10 "B" Battery 62-23—"A" Battery (4 required)
Frequency Range	540-1600 kc
Intermediate Frequency	455 kc
Selectivity	At 1000 kc, 45 kc wide at 1000 times signal
Sensitivity	300 microvolts per meter average (for .05 watt output)
Power Output	.100 watt maximum .060 watt 10% distortion
Loud Speaker	4" PM Dynamic
Voice Coil Imp	3.2 ohms at 400 cycles

Tube Complement

1	1R5 Mixer
1	1U4 IF Amplifier
1	1U5 2nd Detector AVC and 1st AF Amplifier
1	3V4 Output

Ref. No.	Part No.	Description	Qty. Used in Set
CAPACITORS			
C-1A, C-1B	14A200	Gang Condenser Assembly	1
C-2, C-3		Part of C-1 Gang Condenser	
C-4, C-11	47X519	1000 mmf Ceramic	2
C-5, C-6		Part of T-2 1st I.F. Trans.	
C-7, C-8		Part of T-3 2nd I.F. Trans.	
C-9A, C-9B		Part of 76X1 Resistor Capacitor Combination (See Miscellaneous)	
C-10A, C-10B, C-10C, C-10D	76X2	Multiple Capacitor Combination	1
C-12, C-14, C-15, C-17, C-19, C-20	46X393	.05 200 V. Tub. (Hi-Temp)	6
C-16	B66803	.08 mf 200 V Tubular	1
C-18A, C-18B, C-18C, C-18D	45X356	40 mf 25 V, 100 mf 25 V, 30 mf 150 V, 80 mf 150 V Dry Electrolytic	1
RESISTORS		OHMS WATTS	
R-1, R-6, R-15	B85225	2.2 Meg. 0.5 Carbon	3
R-2	B84104	100 K 0.5 Carbon	1
R-3		Part of 76X1 Resistor Capacitor Combination (See Miscellaneous)	
R-4	B85475	4.7 Meg. 0.5 Carbon	1
R-5	B84822	8200 0.5 Carbon	1
R-7	36X375	0.5 Meg. Volume Control	1
R-8	B85106	10 Meg. 0.5 Carbon	1
R-9	43X226	1750 6.0 Wire Wound	1
R-10	B84272	2700 0.5 Carbon	1
R-11	B83471	470 0.5 Carbon	1
R-12	B83331	330 0.5 Carbon	1
R-13	43X225	200 6.0 Wire Wound	1
R-14	B85105	1 Meg. 0.5 Carbon	1
R-16	B84222	2200 0.5 Carbon	1

Ref. No.	Part No.	Description	Qty. Used in Set
TRANSFORMERS AND COILS			
T-1	9A1951	Loop Antenna	1
T-2, T-3	9A1995	1st and 2nd I.F. Transformers	2
T-4	9A1952	Oscillator Coil	1
T-5		Output Transformer (See Miscellaneous)	
MISCELLANEOUS			
	76X1	Resistor Capacitor Combination	1
	66X8	Selenium Rectifier	1
	12A483	4" P.M. Speaker Complete with Output Transformer	1
	13X600	Line Cord & Plug Assembly	1
	2A379	Changeover Switch	1
	2A380	On-Off Switch	1
	3A426	Miniature Tube Socket	4
	15X243	Painter	1
	28X545	Drive Cord Tension Spring	1
	10A709	Knob (Tuning)	1
	10A710	Knob (Volume)	1
	13X596	"B" Battery Cable Assembly	1
	16X127	Rectifier Shield	1
	28X548	Spring (Mtg. Rear Cover to Case)	2
	14X440	Baffle	1
	14X441	Grille	1
	26A479	Rear Cover Assembly Complete with Clips and Pins	1
	26A482	Front Cover Assembly	1
	9X215	Loop Back (Less Loop Antenna)	1
	26A495	Escutcheon (Handle) Assembly Complete with Mtg. Hardware	2
	4X1003	Right Hinge Assembly	1
	4X1004	Left Hinge Assembly	1
	26A481	Case Assembly Complete with Bumpers, Spring Holders, Spring Washers, Release Button, Case, Latch and Springs, (Less Front and Rear Cover)	1


6V6GT OUTPUT
6SJ7 1ST A.F.
6SF7 2ND I.F. & 2ND DET.
6SK7 1ST I.F.
6SA7 MIXER
6X5GT RECT.
T-1 ANT. COIL "D" RANGE
T-2 1ST I.F.
T-3 2ND I.F.
T-4 LOOP ANTENNA
T-5 OSC. COIL
T-6
T-7
TONE CONTROL
VOLUME CONTROL
PHONO INPUT
PHONO MOTOR SOCKET
SWITCH CONTACT NUMBERING SYSTEM
END NEAREST CHASSIS
ON-OFF SWITCH
DIAL LAMPS #47
GANG CONDENSER
TO EXTERNAL ANTENNA
"D" RANGE
"B" RANGE
TIE TERMINALS ONLY
ANTENNA COIL RANGE "D"
OSC. COIL RANGE "B" & "D"
COIL TERMINALS
A86-2282
A86-2261B
TUBE SOCKET VOLTAGES
Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages are between the socket terminal and chassis ground.
The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:
Line voltage..... 117 volts AC
Volume control..... maximum
Signal input..... none
A variation of ±10% is usually permissible.
STANDARD TUBE SOCKET SYMBOLS
D- DIODE PLATE
G - GRID
H - HEATER
H'- HEATER TAP
K-CATHODE
NC-NO CONNECTION
P-PLATE
S-METAL SHELL
6X5GT RECT.
6SK7 1ST I.F.
6SA7 MIXER
6V6GT OUTPUT
6SJ7 1ST A.F.
6SF7 2ND DET. & 2ND I.F.

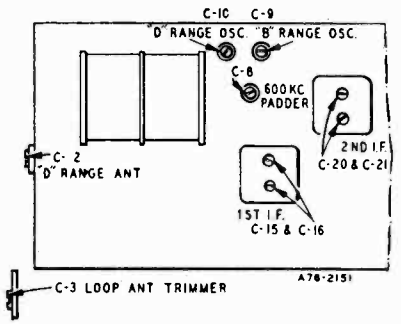
ALIGNMENT PROCEDURE

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.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 50 mmf., and 400 ohms.



After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, re-set pointer at the 1400 KC mark on the dial scale.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

	SIGNAL GENERATOR		Dummy Antenna	Band Switch Setting	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
	Frequency Setting	Connection at Radio				
I-F	455 kc	6SA7, Pin 8	.1 mf	B Range	Turn Rotor to Full Open	2nd I-F (C-20) & (C-21) 1st I-F (C-15) & (C-16)
RANGE B	1620 kc	Antenna Lead	50 mmf	B Range	Turn Rotor to Full Open	Oscillator Range B (C9)
	1400 kc	Antenna Lead	50 mmf	B Range	Tune Rotor to Max. Output. Set Indicator to 1400 KC. See Note A	Antenna Range B (C3)
	600 kc	Antenna Lead	50 mmf	B Range	Tune Rotor to Max. Output	600 kc (C8) Rock Rotor—See Note B
Repeat above oscillator adjustments at 1620 and 600 KC until readjusting the oscillator Range B Trimmer (C9) causes no further improvement in output.						
RANGE D	18.3 mc	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)
	16 mc	Antenna Lead	400 Ohm	D Range	Tune Rotor to Max. Output	Antenna Range D (C2) Rock Rotor—See Note B
LOOP RANGE B	Reassemble chassis in cabinet: 1400 kc	Antenna Lead	50 mmf	B Range	Tune Rotor to Max. Output	Antenna Range B (C3)

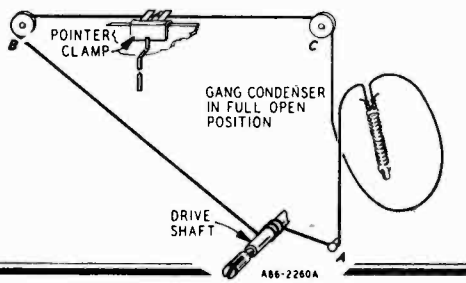
RECEIVER STAGE SENSITIVITIES

The toble below lists the sensitivity ot the input of each stoge. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of .5 watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm, 5 watt resistor across the secondary winding of the output transformer. A reading of 1.26 volts across this resistor will be equivalent to a .5 watt output with the speaker connected. The volume control must be set to maximum. The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of Plus or Minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR .5 WATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	External antenna lead	Chassis	9 microvolts
1000 kc	.05 mf	6SA7 Mixer, Pin 8	Same as above	42 microvolts
455 kc	.05 mf	6SA7 Mixer, Pin 8	Same as above	40 microvolts
455 kc	.05 mf	6SK7 1st I-F, Pin 4	Same as above	1075 microvolts
455 kc	.05 mf	6SF7 2nd I-F, Pin 2	Same as above	3900 microvolts
400 cycles	.05 mf	6SJ7 1st A-F, Pin 4	Same as above	.08 volt
400 cycles	.05 mf	6V6GT Output, Pin 5	Same as above	3.75 volts

DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully open position. Use a new 10X65 drive cord assembly or a piece of cord 48 inches long and tie one end to the tension spring. Hook the other end of the tension spring to the tab on the drive pulley. Pass the cord through the slot in the drive pulley rim around idler stud A and wind three and one-half turns clockwise around the tuning shaft (turns must progress away from chassis). Then pass cord over idler pulleys B and C. Wrap cord counterclockwise around drive pulley, stretch tension spring and fasten free end of cord to spring.



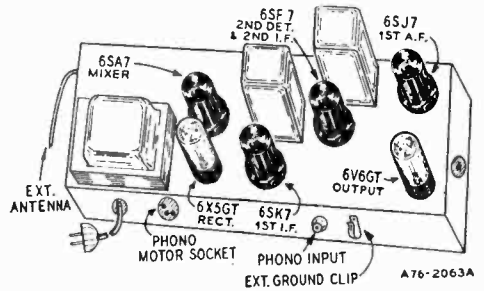
GENERAL DESCRIPTION

This model is a five tube (plus rectifier tube) AC console receiver with automatic record changer. Controls are provided for tuning, volume, tone, and band selection. The dial scale is calibrated in two bands, the broadcast band in channel numbers to cover frequencies between 540-1600 KC and the short wave band directly in megacycles from 5.75 to 18.3 MC. Other features include a built-in Air Wave Aerial, automatic volume control, beam power audio output stage and a PM dynamic speaker. A switch is provided on the tone control for selection of either radio or phono operation.

50 CYCLE OPERATION

If it is desired to use the record changer on a 50 cycle power supply, it will be necessary to replace the drive sleeve assembly on the record changer motar shaft with a 50 cycle drive sleeve assembly. This assembly is listed in the parts list.

To change the sleeve turn the record selector shelf to the 12" position and lift the turntable off of the record changer. Loosen the set screw holding the drive sleeve on the motor shaft and remove the old sleeve. Install the new 50 cycle drive sleeve and replace the turntable.



Power Supply	105-125 volts AC, 60 cycles, 45 watts. (65 watts phono operating)
Frequency Range	B range—540-1600 KC D range—5.75 to 18.3 MC
Intermediate Frequency	455 KC
Selectivity	40 KC broad at 1000 times signal, 1000 KC
Sensitivity	(for .5 watt output) with external antenna B range—9 microvolts average D range—20 microvolts average
Power Output	4 watts maximum 2.3 watts, 10% distortion
Loud Speaker	10" PM dynamic
Voice Coil Impedance	3.2 ohms at 400 cycles

CAPACITORS

Ref. No.	Part No.	Description	Qty. Used in Set
C-2	17A164	5-50 mmf Trimmer	1
C-3	17A235	2-24 mmf Trimmer	1
C-6A, C-6B	14A196	Gang Condenser with Drive Pulley	1
C-7	B66501	.0005 mf 200 V Tubular	1
C-8	17A155	350-430 mmf Trimmer	1
C-9, C-10	17A109	2.5-35 mmf Dual Trimmer	1
C-12, C-18	D66403	.04 mf 400 V Tubular	2
C-13	47X466	68 mmf Moulded	1
C-14	46X289	.00475 mf Tubular	1
C-15, C-16		Part of T-2 (1st I-F Coil Assy.)	
C-19, C-23	47X463	47 mmf Moulded	2
C-20, C-21		Part of T-3 (2nd I-F Coil Assy.)	
C-22A, C-22B	47X112	50-50 mmf Dual Mica	1
C-24	D64403	.04 mf 400 V Tubular	1
C-25	D66502	.005 mf 400 V Tubular	1
C-26	D67104	.10 mf 400 V Tubular	1
C-27	D64253	.025 mf 400 V Tubular	1
C-28	D66402	.004 mf 400 V Tubular	1
C-29	D66103	.01 mf 400 V Tubular	1
C-30A	45X346	40 mf 450 V	1
C-30B		40 mf 450 V 3 Section Electrolytic	
C-30C		20 mf 25 V	
C-31	H66402	.004 mf 800 V Tubular	1
C-32	47X467	470 mmf Moulded	1
C-33	B66503	.05 mf 200 V Tubular	1

RESISTORS

Ref. No.	Part No.	OHMS	WATTS		Qty. Used in Set
R-1, R-7	B85225	2.2 meg.	0.5	Carbon	2
R-2, R-4	C84393	39 K	1.0	Carbon	2
R-3	B84393	39 K	0.5	Carbon	1
R-5	B84222	2200	0.5	Carbon	1
R-6	B85105	1 meg.	0.5	Carbon	1
R-8	B85473	47 K	0.5	Carbon	1
R-9	B84153	15 K	0.5	Carbon	1
R-10	36X358	500 K		Volume Control & Line Switch	1
R-11	B85106	10 meg.	0.5	Carbon	1
R-12, R-16	B85474	470 K	0.5	Carbon	2
R-13	B84333	33 K	0.5	Carbon	1
R-14	B84823	82 K	0.5	Carbon	1
R-15	40X276	3.0 meg.		Tone Control & Radio Phono Switch	1
R-17	C84271	270	1.0	Carbon	1
R-19	D84182	1800	2.0	Carbon	1

TRANSFORMERS AND COILS

Part No.	Ref. No.	Description	Qty. Used in Set
	T-1	"D" Range Antenna Coil Assembly	1
	T-2	1st I-F Coil Assembly	1
	T-3	2nd I-F Coil Assembly	1
	T-4	"B" Range Loop Antenna Assembly	1
	T-5	"B" & "D" Range Oscillator Coil Assembly	1
53X282	T-6	117 Volt, 60 Cycle, Standard Power Transformer	1
51X134	T-7	Output Transformer	1

DIAL AND DRIVE ASSEMBLY

S-58X13	Dial Bracket Assembly (including Dial Bracket, Idler Pulley, Rivets, and Dial Glass)	1
6X21	Rubber Grommet } Mtg. Gang	3
20X329	Cond. Cushion Stud } Cond.	3
26X485	Drive Shaft	1
19X192	"C" Washer (For Drive Shaft)	2
15X241	Pointer	1
28X113	Drive Cord Tension Spring	1
10X65	Drive Cord Assembly	1
7A199	Pilot Light Socket Assembly	1
7A103	No. 47 Pilot Light Bulb	2
58X696	Dial Glass	1
4X999	Escutcheon	1

MISCELLANEOUS

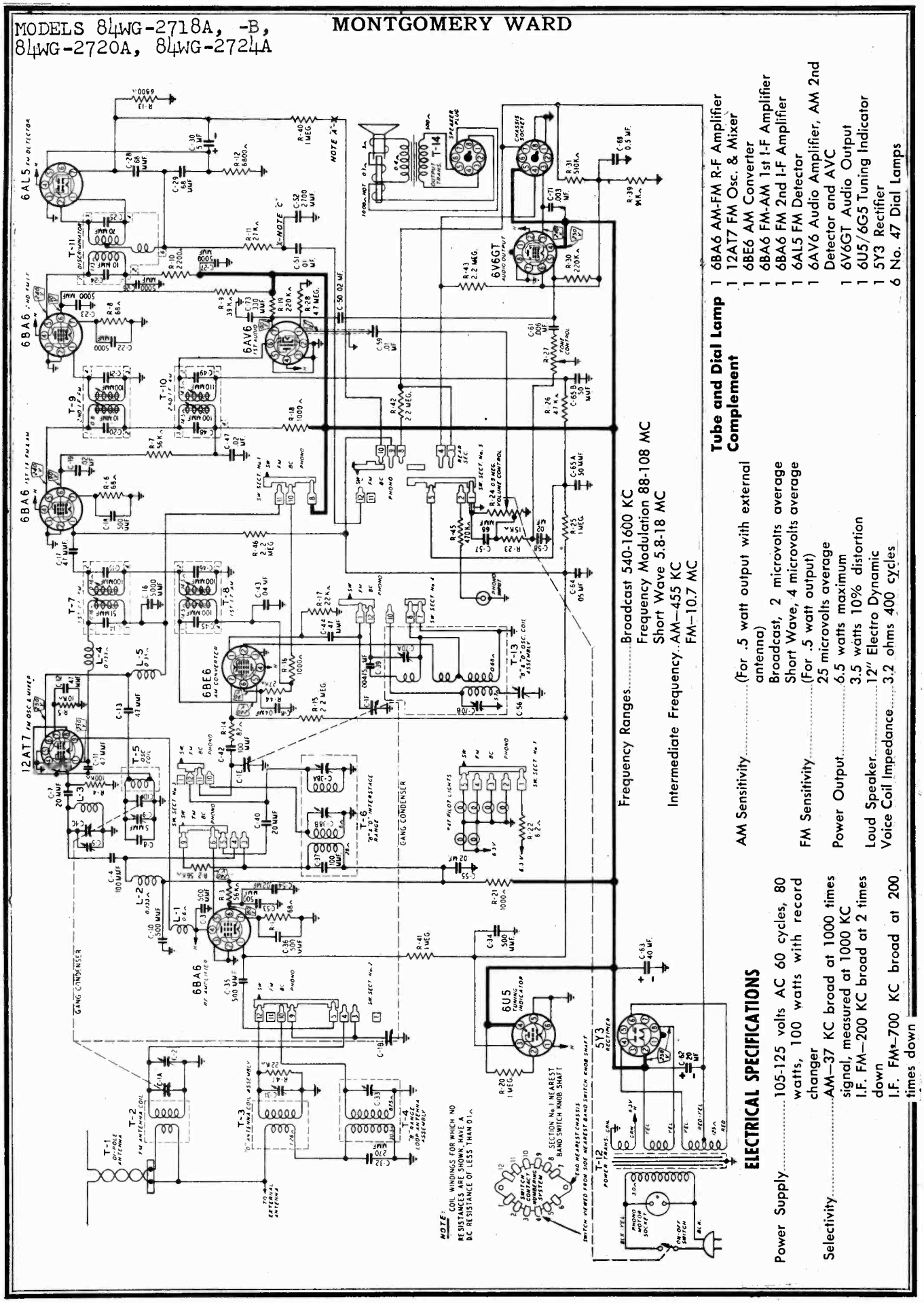
12A476	10" P.M. Speaker	1
3A303	Tube Socket—Octal (8 prong) moulded	6
3A304	Phono Motor Socket	1
3A305	Phono Socket—Single Pin Tip	1
2A372	Band Change Switch	1
13X328	Line Cord and Plug Assembly	1
10A651	Knob (Tuning)	1
10A652	Knob (Off-On Volume)	1
10A653	Knob (SW-BC)	1
10A650	Knob (Tone—R.P.)	1

TYPE W-28A148 RECORD CHANGER PARTS

W-15X090-1	Motor Assembly, 60 cycles, 115-120 V.	1
W-17X412-11	50 Cycle Drive Sleeve Assembly	1
Shure P30-1	Crystal Cartridge and Semi-Permanent Needle Assembly	1
	Semi-Permanent Needle (Specify part number and letters stamped on crystal)	1

MODELS 84WG-2718A, -B,
84WG-2720A, 84WG-2724A

MONTGOMERY WARD



MODELS 84WG-2718A, -B, 84WG-2720A, 84WG-2724A

MONTGOMERY WARD

RECEIVER STAGE SENSITIVITIES
AM AND AUDIO STAGES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of .5 watt. This may be measured by disconnecting the speaker voice coil and substituting an 8 ohm, 10 watt resistor across the secondary winding of the output transformer. A reading of 2 volts across this resistor will be equivalent to a .5 watt output.

The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Voriotions in sensitivity of Plus or Minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR .5 WATT OUTPUT
FREQUENCY	COUPLING CAPACITOR	CONNECTION TO RECEIVER	GROUND CONNECTION	
1000 KC	200 mmf or RMA Dummy Antenno	External Antenna Lead	Chassis	2 Microvolts
1000 KC	.05 mf	6BA6 Interstage Pin 1	Chassis	8 Microvolts
1000 KC	.05 mf	6BE6 Converter Pin 7	Chassis	65 Microvolts
455 KC	.05 mf	6BE6 Converter Pin 7	Chassis	55 Microvolts
455 KC	.05 mf	6BA6 1st I-F Pin 1	Chassis	2500 Microvolts
400 cycles	.05 mf	6AV6 1st A-F Pin 1	Chassis	.05 Volt
400 cycles	.05 mf	6V6GT Output Pin 5	Chassis	2.8 Volts

FM STAGES

The table below lists the sensitivity for the FM stages of the receiver. The receiver must be tuned to 98 MC for all readings. Measurements are based on a .5 watt output the same as for the AM and Audio stage measurements.

The signal source must be an accurately calibrated signal generator capable of supplying a 98 MC signal modulated by a 400 cycle audio signal. For these measurements the generator must be adjusted for a 22.5 KC deviation. This will correspond to 30% AM modulation.

SIGNAL GENERATOR				INPUT FOR .5 WATT OUTPUT
FREQUENCY	COUPLING TO RECEIVER	CONNECTION TO RECEIVER	GROUND CONNECTION	
98 Mc	300 ohms	External Antenna Terminal	External Ant. Terminal	25 Microvolts
10.7 MC	.01 mf	6BA6 1st I-F Pin 1	Chassis	2200 Microvolts
10.7 MC	.01 mf	6BA6 2nd I-F Pin 1	Chassis	50,000 Microvolts

ALIGNMENT PROCEDURE
AM BROADCAST AND SHORT WAVE BAND

The following is required for aligning:
An All Wave Signal Generator Which Will Provide an Accurately Calibrated Signal at the Test Frequencies as Listed.
Output Indicating Meter, Non-Metallic Screwdriver, Dummy Antennos — .1 mf, 200 mmf and 400 ohms.

Volume Control—Maximum all Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allaw Chassis and Signal Generator to "Heat Up" for Several Minutes.

	SIGNAL GENERATOR		THROUGH DUMMY ANTENNA	BAND SWITCH SETTING	GANG CONDENSER SETTING	ADJUST	ADJUST FOR
	FREQUENCY SETTING	CONNECT GENERATOR OUTPUT TO					
I-F	455 kc	6BE6 Pin 7 and Chassis	.1 mf	Broadcast	Rotor Fully Open	1st I-F Pri. & Sec. (3) & (4) 2nd I.-F. Pri. & Sec. (1) & (2)	Maximum Output
Broadcast	1620 kc	External ant. lead	200 mmf	Broadcast	Rotor Fully Open	Broadcast Oscillator C-70B	
	1400 kc	External ant. lead	200 mmf	Broadcast	Turn Rotor to Max. Output Set pointer to 1400 kc See Note A	Broadcast Interstage C-38B	
	1400 kc	External ant. lead	200 mmf	Broadcast		Loop Antenna C-33	
	600 kc	External ant. lead	200 mmf	Broadcast	Turn Rotor to Max. Output and Rock See Note B	600 kc padder C-56	
Repeat above oscillator adjustments at 1620 and 600 KC until readjusting the oscillator Range B Trimmer C-70B causes no further improvement in output.							
Short Wave	18.3 MC	External ant. lead	400 ohm	Short Wave	Rator Fully Open	SW Oscillator C-70A	Maximum Output
	17 MC	External ant. lead	400 ohm	Short Wave	Turn Rotor to Max. Output	SW Interstage C-38A "D" Antenna C-31	
Reassemble chassis in cobinet							
Broadcast	1400 kc	External ant. lead	200 mmf	Broadcast	Turn Rotor to Max. Output	Loop Antenna C-33	

After each range is completed, repeat the procedure as a final check.
Note A—If the pointer is not at 1400 KC on the dial, reset pointer at the 1400 KC mark on the dial scale.

Note B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

ALIGNMENT PROCEDURE
FM STAGES

The following equipment is required for aligning:

An accurately calibrated signal generator providing unmodulated signals at the test frequencies listed below.

Non-metallic screwdriver.

Dummy Antennas and I-F Loading Resistor—.01 mf, 300 ohms and 5000 ohms.

Zero center scale DC vacuum tube voltmeter having a range of approximately 3 volts.

(If a zero center scale meter is not available, a standard scale vacuum tube voltmeter may be used by reversing the meter connections for negative readings.

Allow chassis and signal generator to warm up for several minutes.

	SIGNAL GENERATOR		THROUGH DUMMY ANTENNA	BAND SWITCH SETTING	GANG CONDENSER SETTING	ADJUST	ADJUST FOR
	FREQUENCY SETTING	CONNECT GENERATOR OUTPUT TO					
Discriminator	10.7 MC Note B	6BA6 2nd I-F Pin 1 and Chassis	.01 mf	FM	Rotor Fully Open	Disc. Pri. (5) Note A	Maximum Deflection
	10.7 MC Note B	6BA6 2nd I-F Pin 1 and Chassis	.01 mf	FM	Rotor Fully Open	Disc. Sec. (6) Note C	Zero Center
	10.7 MC Note B	6BA6 2nd I-F Pin 1 and Chassis	.01 mf	FM	Rotor Fully Open	Disc. Pri. (5) Note A	Maximum Deflection
	10.7 MC Note B	6BA6 2nd I-F Pin 1 and Chassis	.01 mf	FM	Rotor Fully Open	Disc. Sec. (6) Note C	Zero Center
I-F	10.7 MC Note F	6BA6 1st I-F, Pin 1 and Chassis	.01 mf	FM	Rotor Fully Open	2nd I-F Pri. Note A and D (7) 2nd I-F Sec. Note A and E (8)	Maximum Deflection
	10.7 MC Note F	FM-RF Gang Condenser terminal on top of chassis	.01 mf	FM	Rotor Fully Open	1st I-F Pri. (9) 1st I-F Sec. (10) Note A	Maximum Deflection
Recheck I-F Adjustments in order given							
R-F & Osc.	108.4	Disconnect dipole and connect generator to dipole terminals with resistor in series	300 ohms	FM	Rotor Fully Open	Oscillator C-9 Note G	Maximum Deflection
	104.5	Disconnect dipole and connect generator to dipole terminals with resistor in series	300 ohms	FM	Tune Rotor for Max. AVC voltage	RF. C-5	Maximum Deflection
	104.5	Disconnect dipole and connect generator to dipole terminals with resistor in series	300 ohms	FM	Tune Rotor for Max. AVC voltage	Ant. C-2	Maximum Deflection
Recheck R-F and Osc. Adjustments in order given							

NOTE A—Test Equipment connections are as given in the table. The zero center scale DC vacuum tube voltmeter is to be connected between chassis ground and the AVC line at the 1 megohm resistor R-40 and the band switch terminal for all adjustments except the discriminator secandary adjustment, for which see Note C.

NOTE B—A signal of .1 volt must be fed into the receiver for this adjustment.

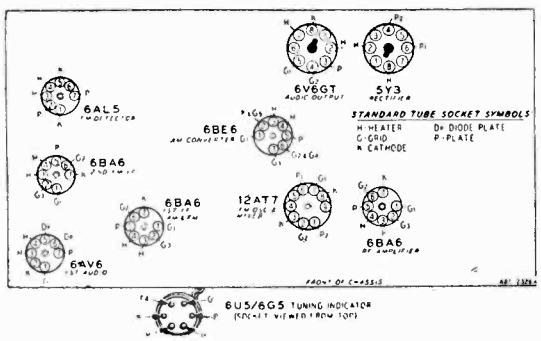
NOTE C—Disconnect zero center DC vacuum tube voltmeter from AVC and reconnect to junction of R-11, C-51 and C-52. Adjust for zero voltage indication.

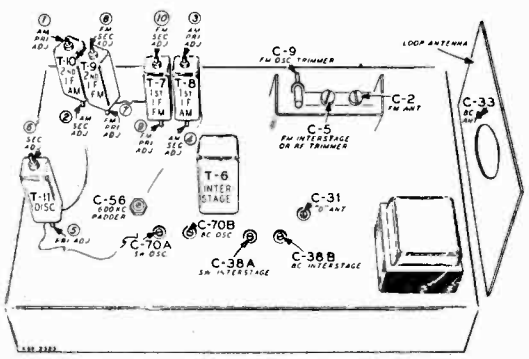
NOTE D—Before adjusting Pri. care connect 5000 ohm load resistor across the 2nd I.F. secondary terminals.

NOTE E—Disconnect 5000 ohm load resistor from secondary terminals and reconnect across the 2nd I.F. primary terminals.

NOTE F—Input can be reduced to 10,000 microvolts.

NOTE G—Oscillator frequency below signal frequency.





TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages are between the socket terminal and chassis ground. Plate, screen and cathode voltages were taken with a 1000 ohm-per-volt meter with a 300 volt scale used for plate and screen voltages. Audio grid voltages were read with a vacuum tube volt-meter. Conditions of measurement are:

Line voltage.....117 Volts AC

Signal Input.....None

A variation of ±10% is usally permissible.

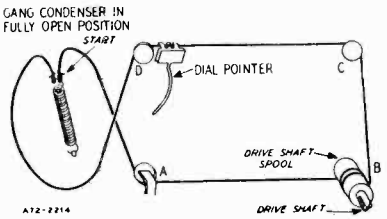
MODELS 84WG-2718A, -B,
84WG-2720A, 84WG-2724A

MONTGOMERY WARD

DRIVE CORD REPLACEMENT

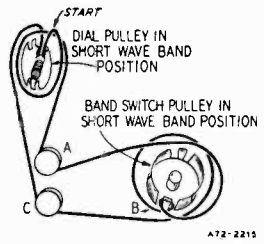
DIAL POINTER CORD

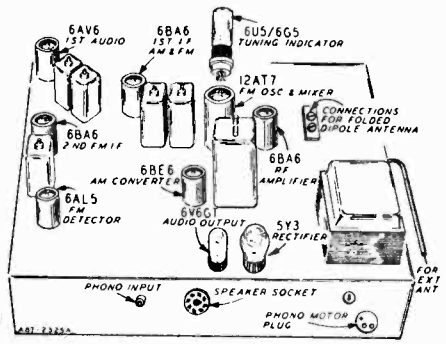
Use a new 10X66 drive cord assembly or a new length of cord 50 inches long for the installation. Install the cord as shown in the illustration, winding three turns counterclockwise around the drive shaft spool with the turns progressing towards the front end of the drive shaft. After completing the installation rotate the drive shaft a few turns to take up the slack in the cord.



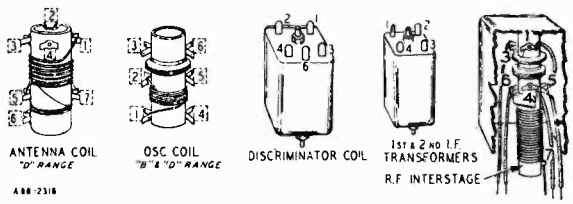
DIAL ROTATION CORD

Use a new 10X60 drive cord assembly or a new length of cord 21 inches long for the installation. Both the dial pulley and the band switch pulley must be turned to the short wave band position as shown in the illustration. Install the new cord exactly as shown then change the position of the band switch several times and note the movement of the dial.





This is a three band, eight tube (plus tuning eye and rectifier tube) receiver with automatic record changer, for the reception of both AM and FM stations. The R-F and I-F stages use the latest type high gain miniature type tubes and built-in Air Wave Aerials are provided for the FM and Broadcast bands. Features include the new Roto-Selector dial with only one band visible at a time, compensator circuits to prevent oscillator drift, automatic volume control, beam power output stage, electro dynamic loud speaker and an electrostatic shield in the power transformer to reduce power line noise.



50 CYCLE AC OPERATION

If it is desired to operate this radio on a 50 cycle 105-125 volt AC power source no changes are necessary to the radio chassis.

If it is desired to use the record changer on a 50 cycle power supply, it will be necessary to replace the drive sleeve assembly on the record changer motor shaft with a 50 cycle drive sleeve assembly. This assembly is listed in the parts list.

To change the sleeve turn the recorder selector shelf to the 12" position and lift the turntable off of the record changer. Loosen the set screw holding the drive sleeve on the motor shaft and remove the old sleeve. Install the new sleeve and replace the turntable.

Ref. No.	Part No.	Description			Qty. Used in Set
		CAPACITORS			
C-1	26A483	Tuner and Gang Assembly			1
C-2, C-5	17A247	3.0-12 mmf		Trimmer	2
C-3, C-10, C-18, C-34, C-35, C-36, C-53	47X496	500 mmf		Ceramic	7
C-4, C-42	47X497	100 mmf		Ceramic	2
C-7	47X516	20mmf		Ceramic	1
C-8	47X500	5 mmf		Ceramic	1
C-9	17A255	1-8 mmf		Trimmer	1
C-11	47X499	47 mmf		Ceramic	1
C-12, C-13, C-44	47X498	47 mmf		Ceramic	3
C-14, C-15	Part of T-7 1st I-F (FM)				
C-16, C-22, C-23, C-26, C-27	47X507	5000 mmf		Ceramic	5
C-17	47X495	47 mmf		Ceramic	1
C-19, C-47, C-50, C-54, C-55	D66203	.02 mf	400 V	Tubular	5
C-20, C-21, C-24, C-25, C-28, C-57	Part of T-9 2nd I-F (FM)				
C-29	47X501	68 mmf		Ceramic	3
C-30	45X361	5 mf	100 V	Dry Electrolytic	1
C-31	17A253	5-50 mmf		Trimmer	1
C-32	47X445	270 mmf		Molded	1
C-37	47X57	100 mmf		Molded	1
C-39	46X289	.00475 mf	180 V	Tubular	1
C-38A, C-38B	17A252	1.3-12 mmf		Dual Trimmer	1
C-40	47X516	20 mmf		Ceramic	1
C-41, C-43, C-45, C-46	D66403	.04 mf	400 V	Tubular	2
C-48, C-49, C-51	Part of T-8 1st I-F (AM)				
C-59	Part of T-10 2nd I-F (AM)				
		MODELS 84WG-2718A, 84WG-2720A			
C-52	47X492	2700 mmf		Molded	1
		MODELS 84WG-2718B, 84WG-2724A			
C-52	47X528	1500 mmf		Molded	1
C-56	17A241	300-475 mmf		Trimmer	1
C-58	B66203	.02 mf	200 V	Tubular	1

MONTGOMERY WARD

MODELS 84WG-2718A, -B,
84WG-2720A, 84WG-2724A

Ref. No.	Part No.	Description			Qty. Used in Set
C-61	D66602	.006 mf	400 V	Tubular	1
C-62	45X351	20 mf	450 V	Dry Electrolytic	1
C-63	45X302	40 mf	450 V	Dry Electrolytic	1
C-64	B66503	.05 mf	200 V	Tubular	1
C-65A, C-65B	47X112	50-50 mmf		Dual Mica	1
C-69	A66504	.5 mf	100 V	Tubular	1
C-70A, C-70B	17A246	3.2-35 mmf		Dual Trimmer	1
C-71	D66302	.003 mf	400 V	Tubular	1
C-73	47X470	330 mmf		Molded	1

RESISTORS

Ref. No.	Part No.	Ohms	Watts		Qty. Used in Set
R-1, R-6, R-8	B83680	68	0.5	Carbon	3
R-2	C85223	22K	1.0	Carbon	1
R-3	B85563	56K	0.5	Carbon	1
R-4	B84104	100K	0.5	Carbon	1
R-5	B84103	10K	0.5	Carbon	1
R-7	C84563	56K	1.0	Carbon	1
R-9	C84393	39K	1.0	Carbon	1
R-10	B85222	2200	0.5	Carbon	1
R-11	B84273	27K	0.5	Carbon	1
R-12, R-13	B83682	6800	0.5	Carbon	2
R-14	B84820	82	0.5	Carbon	1
R-15, R-42, R-46	B85225	2.2 meg.	0.5	Carbon	3
R-16, R-18, R-21	B85102	1000	0.5	Carbon	3
R-17, R-47	B84223	22K	0.5	Carbon	2
R-19, R-30	B85224	220K	0.5	Carbon	2
R-20	Part of 13X549 Cable and Socket Assembly				
R-22	43X217	6.2		Wire Wound	1
R-23	B85153	15K	0.5	Carbon	1
R-24	36X363	.5 meg.		Volume Control	1
R-25, R-40, R-41	B85105	1 meg.	0.5	Carbon	3
R-26	B85473	47 K	0.5	Carbon	1
R-27	40X286	3 meg.		Tone Control	1
R-28	B85475	4.7 meg.	0.5	Carbon	1
R-31	B83514	510K	0.5	Carbon	1
R-39	B83913	91K	0.5	Carbon	1
R-43	B84225	2.2 meg.	0.5	Carbon	1
R-44	C84273	27K	1.0	Carbon	1
R-45	B85474	470K	0.5	Carbon	1

TRANSFORMERS AND COILS

Ref. No.	Part No.	Description	Qty. Used in Set
L-1	9A1881	Filament Choke Assembly	1
L-2, L-4	9A1880	FM R-F Plate Choke	2
L-3	9A1946	FM R-F Coil	1
L-5	9A1882	FM Oscillator Plate Choke	1

MODELS 84WG-2718A,
84WG-2720A

T-1	9A1960	Di-Pole Antenna Assembly	1
T-2	9A1945	FM Antenna Coil	1

MODELS 84WG-2718B,
84WG-2724A

T-1	9A1968	Di-Pole Antenna Assembly	1
T-2	9A1966	FM Antenna Coil	1
T-3	9A1957	"D" Antenna Coil Assembly	1
T-4	26A436	Loop Antenna Assembly	1
T-5	9A1948	Oscillator Coil (FM)	1
T-6	9A1947	Interstage "B" & "D" Range Coil Assembly	1
T-7	9A1950	1st I-F Transformer (FM)	1
T-8	9A1934	1st I-F Transformer (AM)	1
T-9	9A1933	2nd I-F Transformer (FM)	1
T-10	9A1935	2nd I-F Transformer (AM)	1
T-11	9A1936	Discriminator Coil	1
T-12	53X286	Power Transformer	1
T-13	9A1918	"B" & "D" Oscillator Coil Assembly	1
T-14		Output Transformer	1

Ref. No.	Part No.	Description	Qty. Used in Set

MISCELLANEOUS

Part No.	Description	Qty. Used in Set
12A482	12" E.D. Speaker complete with output transformer	1
3A303	Tube socket—octal (8 prong) molded	3
3A425	Tube socket (miniature)	5
32X346	Tube shield (miniature	6
32X388	Tube Shield (For 12AT7)	1
3A436	Tube socket (For 12AT7)	1
3A427	Tube socket (R-F Amp)	1
3A304	Phonp Motor Socket	1
3A305	Phono Socket—Single pin	1
2A377	Band Switch	1
13X328	Line Cord and Plug Assembly	1
26A486	Escutcheon and Crystal Assy. (Walnut)	1
26A487	Escutcheon and Crystal Assy. (Blond)	1
10A509	Tuner Buttons (Walnut)	6
10A674	Tuner Buttons (Blond)	6
28X320	Springs (Tuner Button)	6
4X870	Escutcheon Eye (Walnut)	1
4X1015	Escutcheon Eye (Blond)	1
10A662	Knob, Band (Walnut)	1
10A667	Knob, Tuning (Walnut)	1
10A668	Knob, On-Off, Volume (Walnut)	1
10A669	Knob, Tone (Walnut)	1
10A670	Knob, Tuning (Blond)	1
10A671	Knob, Tone (Blond)	1
10A672	Knob, Band (Blond)	1
10A673	Knob, On-Off, Volume (Blond)	1
25X498	Tuning Eye Clamp	1
25X1396	Tuning Eye Bracket	1
13X549	Cable and Socket Assembly—Tuning Indicator	1
6X21	Rubber Grommets (Mtg. Gang Cond.)	4
20X329	Condenser Cushion Stud (Mtg. Gang Cond.)	4

DIAL AND DRIVE ASSEMBLY

Part No.	Description	Qty. Used in Set
26A435	Dial Bracket Assembly	1
26A484	Dial and Drum Assembly Complete with Dial Background, Collar, Dial Drum and Dial Scale	1
15X221	Pointer	1
26X500	Dial Drum Shaft	1
26A440	Pulley and Collar Assembly (For dial drum shaft)	1
26A437	Band Switch Pulley Assembly	1
26X468	Band Switch Shaft	
26A441	Crown Gear Assembly (For Mtg. to Band Switch)	2
26A434	Idler Bracket Assembly	1
25X1389	Drive Shaft Bracket	1
26X467	Drive Shaft	1
24X551	Drive Shaft Spool	1
10X60	Drive Cord Assembly (Band Change)	1
28X524	Tension Spring (Band Change)	1
10X66	Drive Cord and Clip Assembly (Dial Drive)	1
28X530	Tension Spring (Dial Drive)	1
41X72	Light Shield (Band Indicator)	4
41X35	Light Shield (Dial)	2
7A103	No. 47 Pilot Light	6
7A187	Pilot Light Socket Assembly (Dual)	1
7A209	Indicator Light Socket Assembly	4

MODELS 84WG-2718A, 2720A

TYPE W-28A147 RECORD CHANGER PARTS

W-15X090-1	Motor Assembly, 60 cycles, 115-120 V.	1
W-17X412-11	50 Cycle Drive Sleeve Assembly	1
Shure P30-1	Crystol Cartridge and semi-Permanent Needle Assembly	1
	Semi-Permanent Needle (Specify part number and letters stamped on crystal)	1

MODELS 84WG-2718B, 2724B

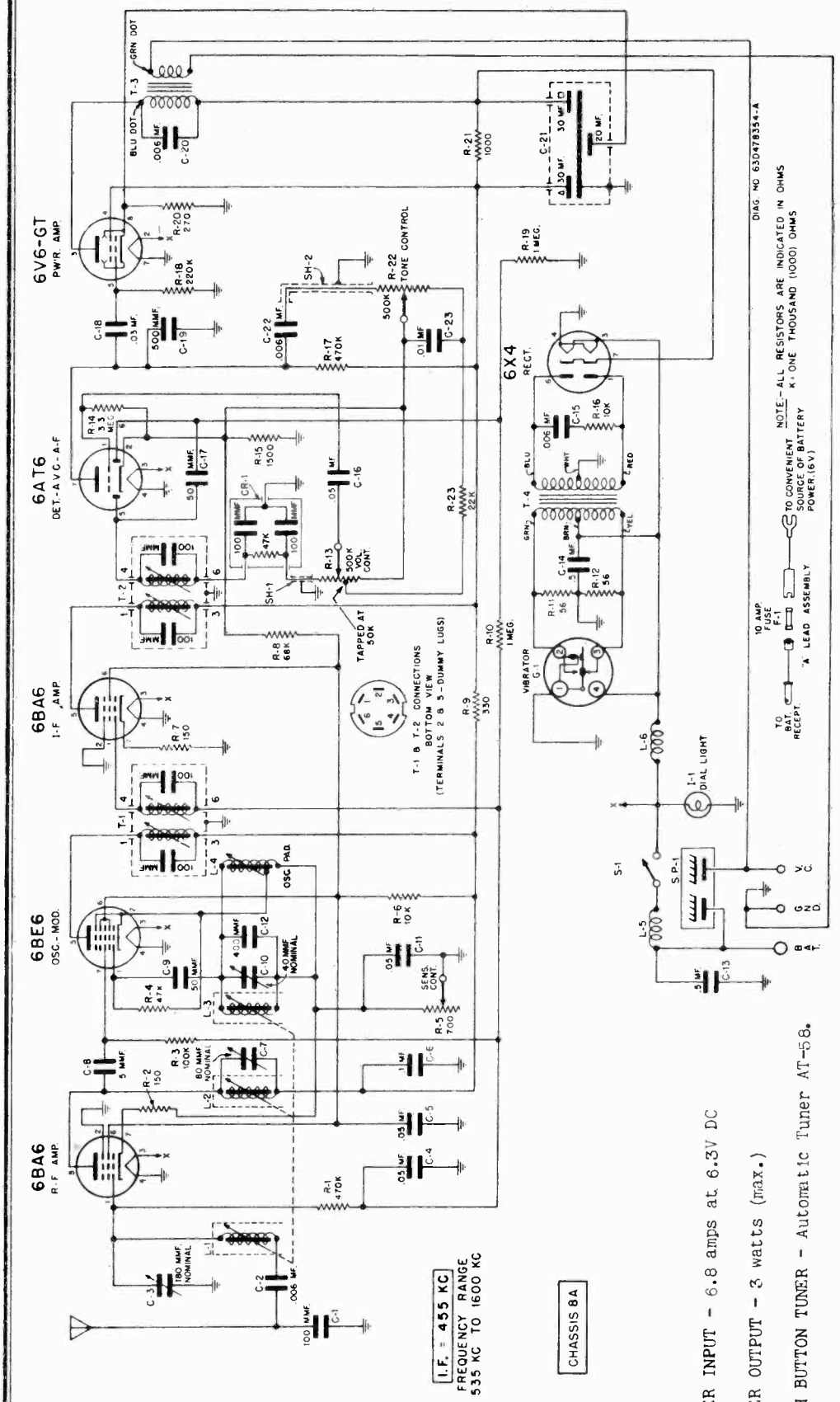
TYPE V-28A150 RECORD CHANGER PARTS

V-1525-A or V-1923	Motor Assembly, 60 cycles, 115-120 V.	1
	Motor Assembly, 50 Cycles, 115-120 V.	1
Shure P30-1	Crystal Cartridge and Semi-Permanent Needle Assembly	1
	Semi-Permanent Needle (Specify part number and letters stamped on crystal)	1

MODELS OE8, PC3, PC8, SR6, 8FDT, 8GMT, etc.
CHASSIS 8A

MOTOROLA INC.

MODELS BK8, BK8X, CT8, FD8, KR8, NH8, OE2



POWER INPUT - 6.8 amps at 6.3V DC

POWER OUTPUT - 3 watts (max.)

PUSH BUTTON TUNER - Automatic Tuner AT-58.

TO SET THE PUSH BUTTONS

1. Turn radio ON and allow it to warm up for a few minutes.

2. Push the number "1" button in as far as it will go and HOLD IT THAT WAY.

3. With the tuning knob, tune in the station you desire to set up. Tune carefully until you are exactly on the station; tuning to either side of it will result in poor quality. Release button and knob after tuning-in station.

4. Follow above steps 2 and 3 for the remaining four buttons.

ALIGNMENT

EQUIPMENT REQUIRED

1. A special tool for adjusting the tuner cores. Use Alignment Tool, Motorola Part No. 66A76278.

2. A small screwdriver for IF & RF alignment.

3. An accurately calibrated AM modulated signal generator.

4. A low range output meter.

5. A special dummy antenna for RF alignment. Construct dummy antenna as shown in Figure 1. The 21" coaxial lead needed in its construction is the same type as used for lead-in on Motorola car antennas.

PROCEDURE

1. Expose alignment adjustment screws as follows:

Remove the top and bottom covers; replace three front plate screws to hold front plate in position after making sure that the plastic idler gear engages gear on tuner and power switch operating stud engages power switch throw plate. On some models it will also be necessary to remove the escutcheon and escutcheon spacer.

2. Connect a PM speaker (3.2 ohm VC) to VC and GND terminals and connect the output meter across voice coil.

3. Connect a 6 volt storage battery to GND (or chassis) and BAT terminals of receiver; turn receiver on and allow it to warm up for a few minutes. Set receiver volume control at maximum. Push "M" button (far enough so it will lock in) to place tuner in manual position.

4. Sensitivity Control. This control must be set to provide 2 ± 1/2 volts bias on the RF tubes before alignment is started. Measure this voltage between sensitivity control terminal and chassis.

5. For greatest accuracy, keep output of receiver at approximately 1 watt (1 watt = 1.79 volts on output meter) throughout alignment by reducing generator output (not receiver volume control) as stages are brought into alignment.

6. IF & RF ALIGNMENT - See Alignment Chart

IMPORTANT: Do not push in on the alignment tool when adjusting the tuner cores. The slightest inward pressure on the alignment tool may move the tuner carriage and result in inaccurate alignment.

7. SETTING THE SENSITIVITY CONTROL - After alignment is completed, set signal generator to 600 Kc and adjust its output to 1.3 microvolts. Adjust the sensitivity control to provide 1 watt output (1 watt = 1.79 volts on output meter).

8. ANTENNA TRIMMER ADJUSTMENT - Once alignment has been satisfactorily performed, no further adjustment of any alignment screws should be made except to align the antenna trimmer (7) to car antenna after receiver is installed in car. This adjustment should be made with antenna fully extended and receiver set to approximately 1400 Kc. Peak the trimmer for maximum volume of a weak station or background noise between stations.

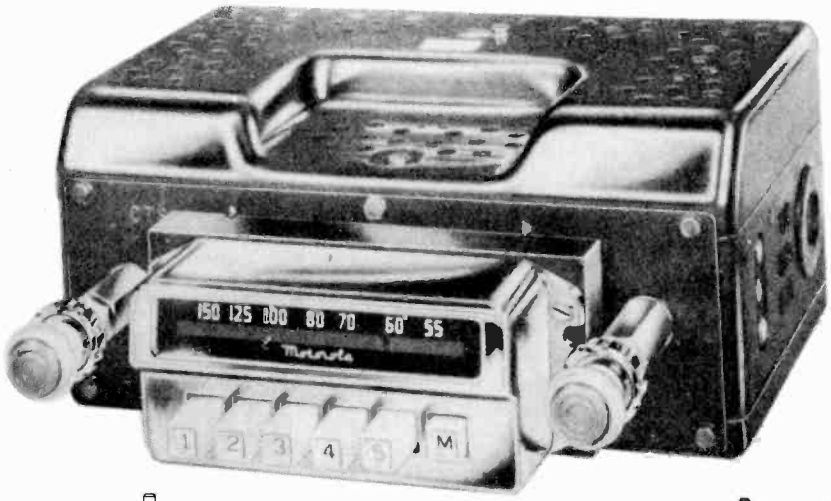
9. POINTER ADJUSTMENT - The pointer can be moved slightly for calibration correction by turning the eccentric adjustment rivet. This rivet has a 1/4" hex head and is exposed only when tuner is tuned to high frequency end. See Figure 1 for its location.

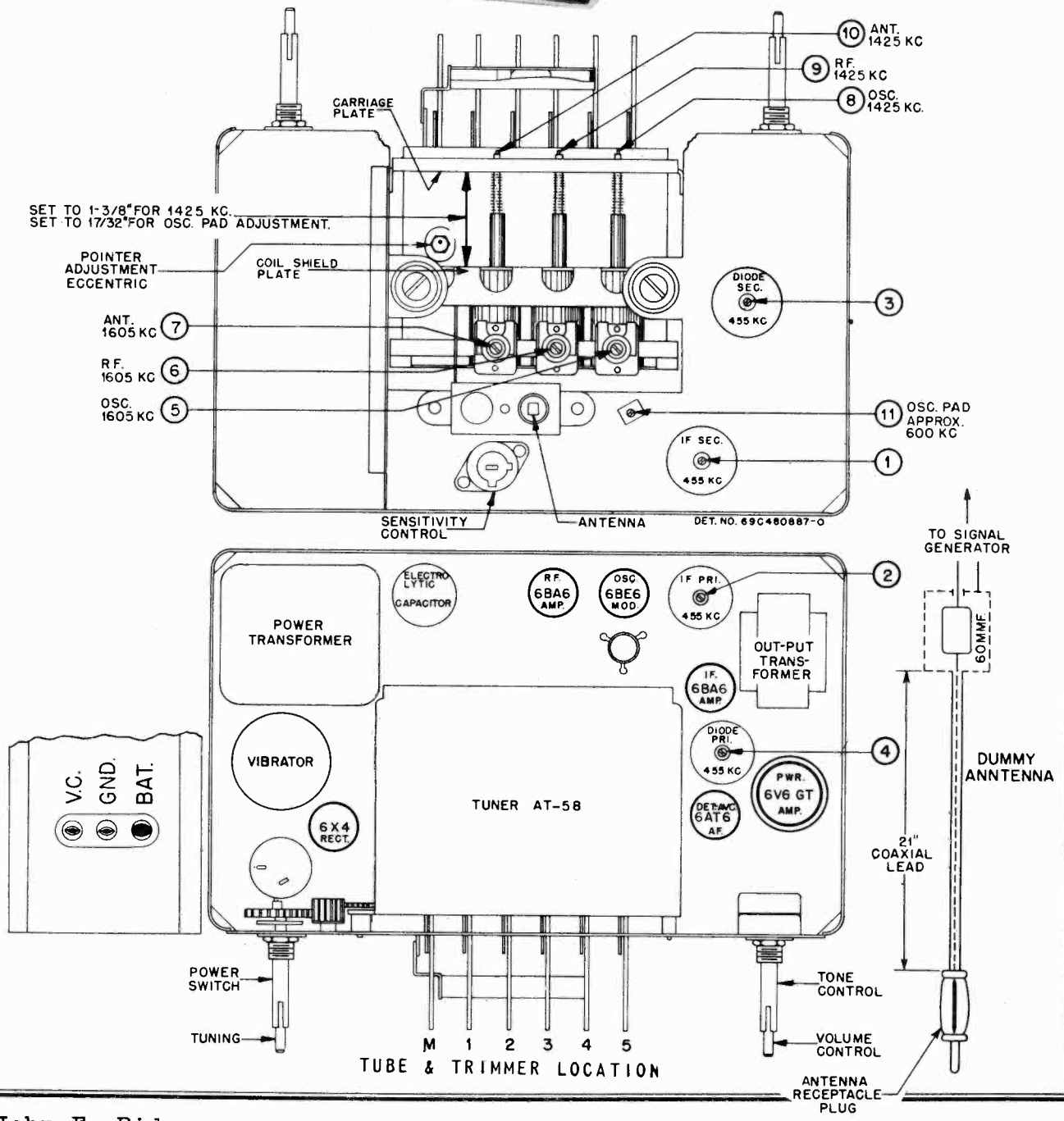
STEP	TUNER SET TO	DUMMY ANTENNA	SIGNAL GENERATOR CONNECTED TO	SIGNAL GENERATOR FREQUENCY	ADJUST TRIMMER OR CORE	REMARKS
1.	High frequency end (cores out)	.1 mf	Hi side - 6BE6 grid (pin #7) Lo side - chassis	455 Kc	1,2,3&4	Peak for maximum in order indicated. Check by repeating procedure.
2.	High frequency end. Cores should project 1-1/8" from cans. (Screw out if necessary).	Special -See Fig. 1.	Ant. receptacle through special dummy.	1605 Kc	5,6 & 7	Peak for max. in order indicated.
3.	Set spacing between carriage plate and coil shield plate to 1-3/8".	"	"	1425 Kc	8, 9 & 10	Peak for max. in order indicated.
4.	Set spacing between carriage plate and coil shield plate to 17/32"	"	"	Turn generator power off.	11	Peak oscillator padder for maximum noise. See *
5.	Approx. 1400 Kc	-	-	-	7	With set installed in car, peak antenna trimmer for maximum noise or volume of a weak station. Car antenna should be fully extended.

* If padder core (11) must be moved more than 1/2 turn from its original position, repeat steps 2, 3 & 4 until it is necessary to move the padder core less than 1/2 turn in this step.

CHASSIS 8A,
All Models

MOTOROLA INC.





CHASSIS 8A,
All Models

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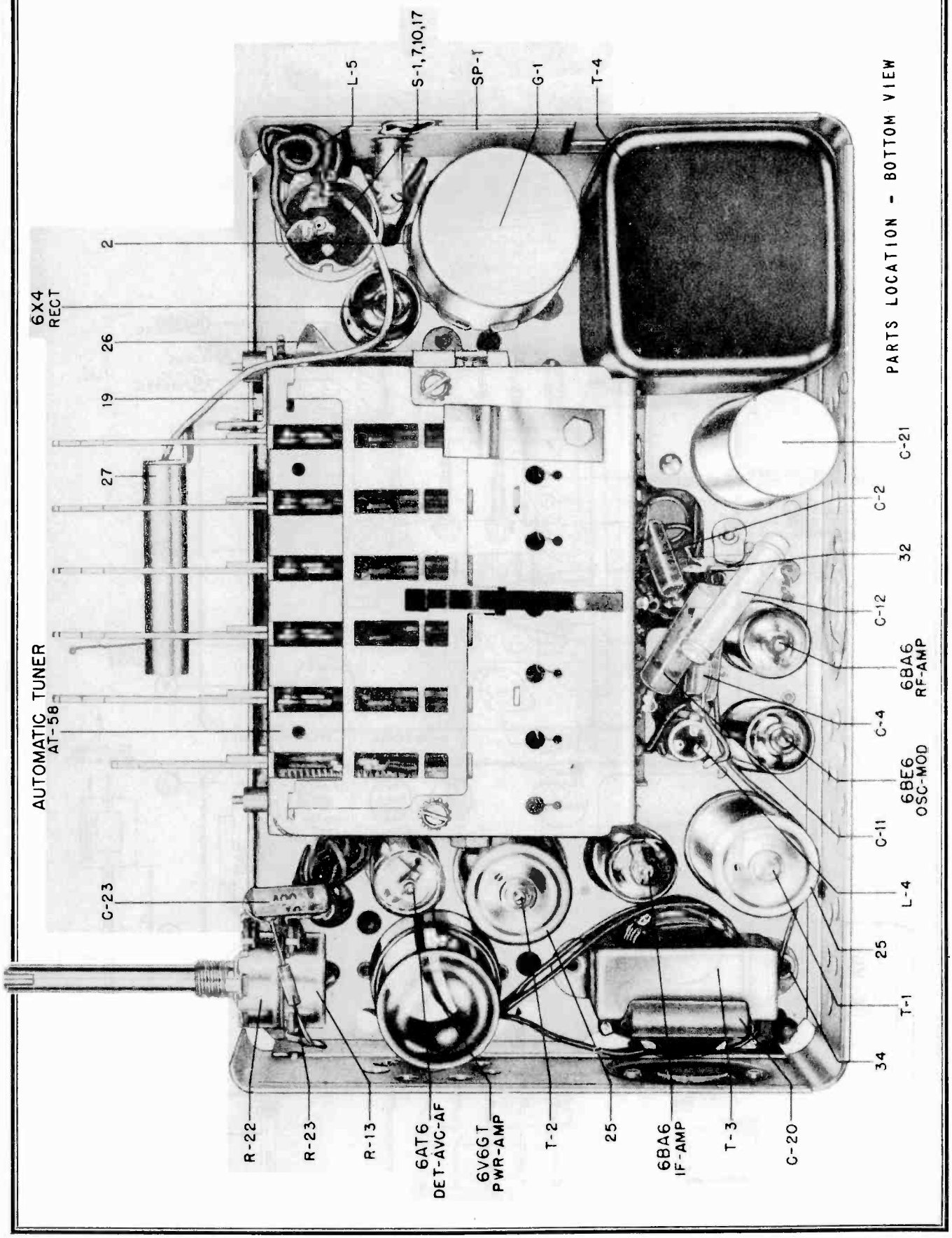
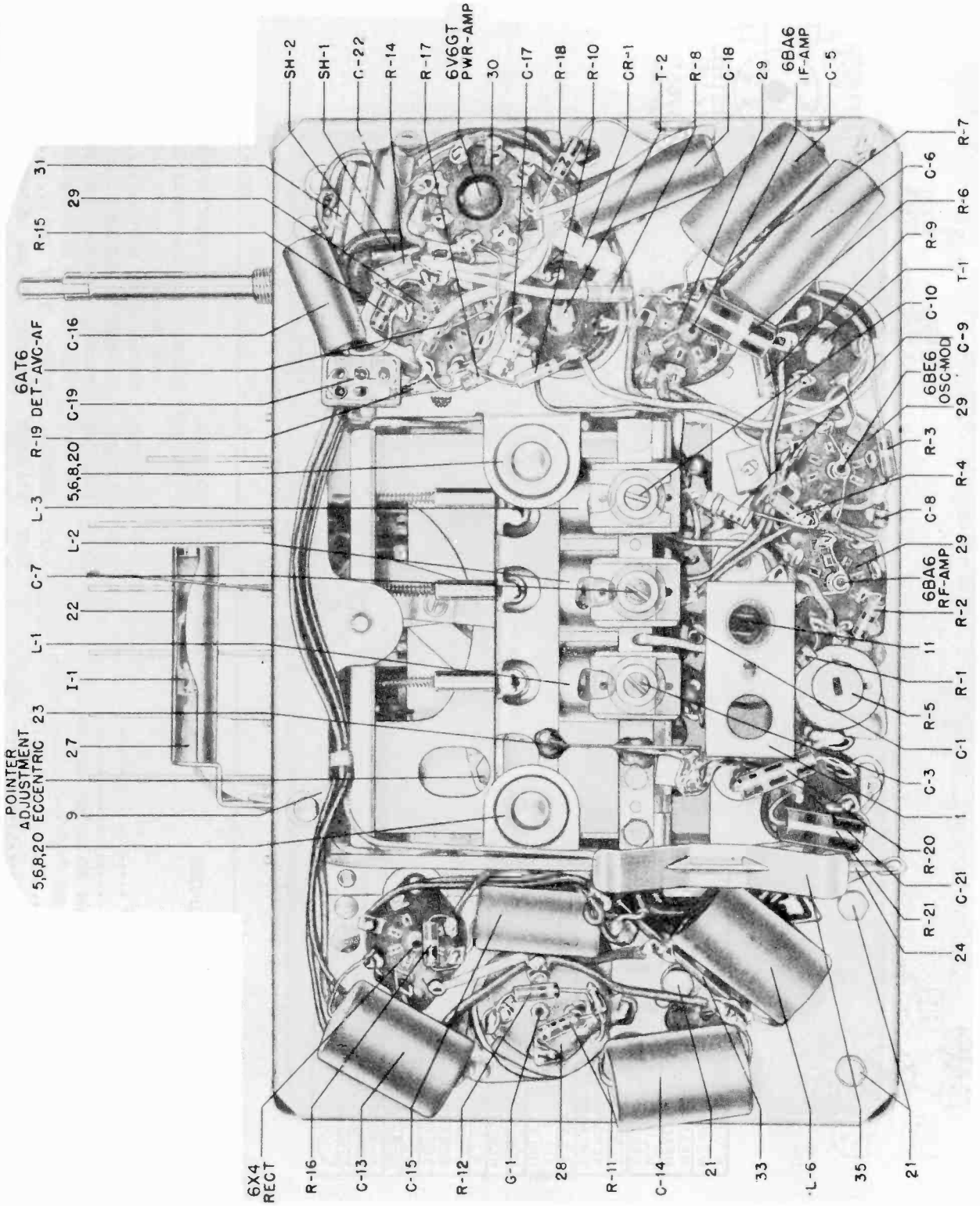
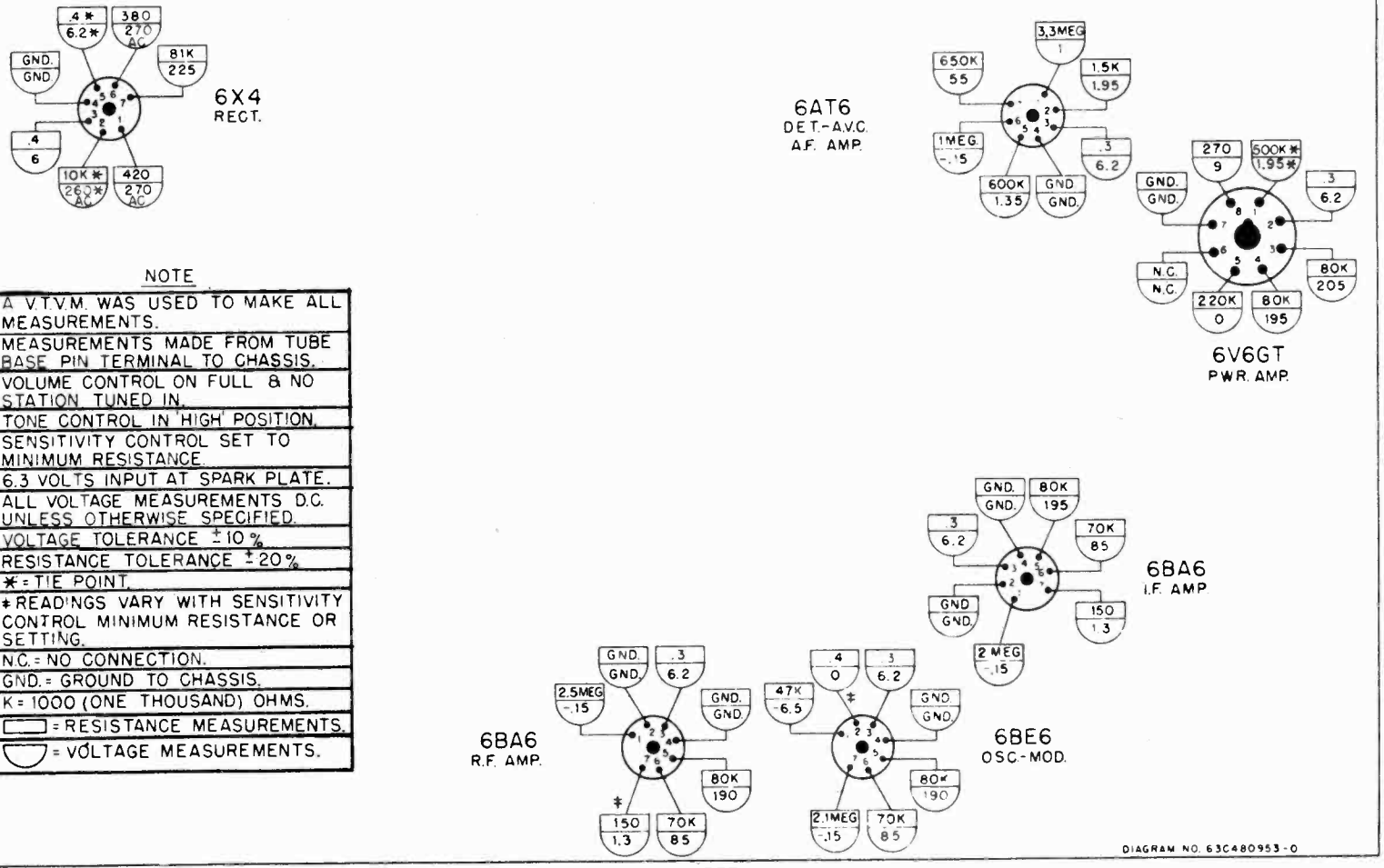




CHASSIS 8A PARTS LOCATION - BOTTOM VIEW



CHASSIS 8A ELECTRICAL PARTS

CAPACITORS

REF. NO.	PART NO.	DESCRIPTION
C-1	21B77562	Ceramic: 100 mmf 500V .....
C-2	8A4529	Paper: .006 mf 100V .....
C-3	20A480600	Trimmer, variable mica: 50 to 180 mmf; on same bracket as C-7 and C-10 .....
C-4	8A13514	Paper: .05 mf 100V .....
C-5	8A14791	Paper: .05 mf 400V .....
C-6	8K13166	Paper: .1 mf 400V .....
C-7	20A480600	Trimmer, variable mica: 50 to 180 mmf; on same bracket as C-3 & C-10 .....
C-8	21K70720	Molded: 5 mmf 500V .....
C-9	21K74661	Ceramic: 50 mmf 300V .....
C-10	20A480600	Trimmer, variable mica: 30 to 80 mmf; on same bracket as C-3 & C-7 .....
C-11	8A13514	Paper: .05 mf 100V .....
C-12	21A71872	Ceramic: 400 mmf 5% 500V .....
C-13	8A17028	Paper: .5 mf 100V .....

CHASSIS 8A, All models MOTOROLA INC.

REF. NO.	PART NO.	DESCRIPTION
C-14	8A17028	Paper: .5 mf 100V
C-15	8A12840	Paper: .006 mf 1600V
C-16	8A13514	Paper: .05 mf 100V
C-17	21K74661	Ceramic: 50 mmf 300V
C-18	8A71911	Paper: .03 mf 400V
C-19	21R6639	Mica: 500 mmf 500V
C-20	8A71910	Paper: .006 mf 400V
C-21	23A473015	Electrolytic: 30-30-20 mf/350-300-25V...
C-22	8A71910	Paper: .006 mf 400V
C-23	8A472754	Paper: .01 mf 100V
CAPACITOR-RESISTOR		
CR-1	21A472571	Capacitor-Resistor: 100 mmf-47,000 ohms 100 mmf
FUSE		
F-1	65A10266	Fuse: 10 amp; type 3AG
VIBRATOR		
G-1	48E3333	Vibrator: non-sync; 4 pin
DIAL LIGHT		
I-1	65X10867	Bulb: 6.3V; .25A; bayonet base; clear...
COILS		
L-1,2	24B71881	RF & Antenna coil (specify color of paint dot on old coil when ordering)
L-3	24B71879	Oscillator coil (specify color of paint dot on old coil when ordering)
L-4	24B70227	Oscillator padder coil: complete with iron tuning core
L-5	24K78026	Choke
L-6	24A472535	Choke, hash
RESISTORS		
NOTE:	All resistors are 1/2W 20% carbon insulated type unless otherwise specified.	
R-1	6R6032	470,000
R-2	6R3992	150
R-3	6R6075	100,000
R-4	6R6056	47,000
R-5	18K77552	Sensitivity control: 700 ohms
R-6	6R476060	10,000 2W
R-7	6R3992	150
R-8	6R6001	68,000
R-9	6R6010	330
R-10	6R6004	1 meg
R-11	6R5614	56 10%
R-12	6R5614	56 10%
R-13	18A472863	Volume Control 500,000 ohms; tapped at 50,000 ohms (dual-also includes tone control R-22)
R-14	6R2118	3.3 Meg
R-15	6R6161	1500
R-16	6R6054	10,000
R-17	6R6032	470,000
R-18	6R6015	220,000
R-19	6R6004	1 meg
R-20	6R6336	270 10% 1W
R-21	6R476004	1,000 2W
R-22	18A472863	Tone Control: 500,000 ohms (dual - also includes volume control R-13)
R-23	6R6028	22,000
SWITCH		
S-1	1A472891	Power Switch: complete with mounting stud
SHIELDS		
SH-1	30K472998	Cable, volume control: single-conductor; white; shielded
SH-2	30K472997	Cable, volume control: single-conductor; blue; shielded
SPARK PLATE		
SP-1	1A472606	Spark Plate Assembly
TRANSFORMERS		
T-1,2	24B76553	Diode or IF, 455 Kc: complete with padding capacitors & tuning cores, but less shield
T-3	25B70171	Output transformer
T-4	25B472533	Power transformer
TUNER		
	1X472770	AT-58 Automatic Tuner (see separate Service Manual-Motorola Part No. 54P480955 for complete breakdown)
CHASSIS 8A MECHANICAL PARTS		
1	7A472580	Bracket, antenna receptacle mtg
2	42A4215	Clip, vibrator grounding
3	15K472593	Cover, bottom
4	15C472592	Cover, top
5	4A51289	Cupwasher (tuner mtg)
6	37A12949	Grommet, rubber (tuner mtg)
7	4S7657	Lockwasher: #8 external; cad. pl. (power sw. mtg)
8	4S7671	Lockwasher: #8 split; cad. pl. (tuner mtg)
9	29R5239	Lug, soldering
10	64A472735	Plate, throw (power switch actuating plate)
11	1X70641	Receptacle, antenna
12	5S7771	Rivet: .088 x 3/16 steel; nickel plated ((tube socket mtg)
13	7S7708	Rivet: .122 x 1/8 steel; nickel plated (term. strip mtg)
14	5S7707	Rivet: .122 x 5/32 steel; nickel plated (tube socket mtg)
15	5S7701	Rivet: .122 x 3/16 steel; nickel plated (vib. socket & output trans. mtg)
16	5S7751	Rivet: .122 x 1/4 steel; antique copper finish (spark plate mtg)
17	3S7150	Screw: #8 x 3/16 slotted binderhead machine screw, cad. pl. (pwr. switch mtg)
18	3S7456	Screw: #8 x 1/4 PKA slotted acorn head sheet metal screw; antique copper finish (housing screws)
19	3S7454	Screw: #8 x 1/4 PKZ plain hex head sheet metal screw; cad. pl (pilot light socket mounting)
20	3S7154	Screw: 8-32 x 1/4 slotted binderhead machine screw; cad. pl. (tuner mtg)
21	3S3397	Screw: #8 x 5/16 PKZ plain hex head sheet metal screw; cad pl. (pwr trans mtg)
22	1X473150	Shield Assembly, light
23	26A473201	Shield, hash
24	26A472560	Shield, hash
25	1A71049	Shield & Sleeve Assembly (for T-1 & T-2)
26	26A472602	Shield, tuner
27	9A472905	Socket, pilot light: includes brackets..
28	9A70208	Socket, tube: 4 pin; with grounding lug (vibrator socket)
29	9A472534	Socket, tube: miniature; 7 prong
30	9A6788	Socket, tube: octal
31	31K37504	Strip, terminal: 1 insulated lug, #1 mtg
32	31K86126	Strip, terminal: 2 insulated lugs, #2 mtg
33	31A472574	Strip, terminal: 4 insulated lugs, #4 mtg
34	4S7555	Washer: 1/4-.128-.033; steel; cad. pl. (output trans. mtg)
35	39A26088	Wiper, grounding

MODEL CR-6, Ch. AS-19

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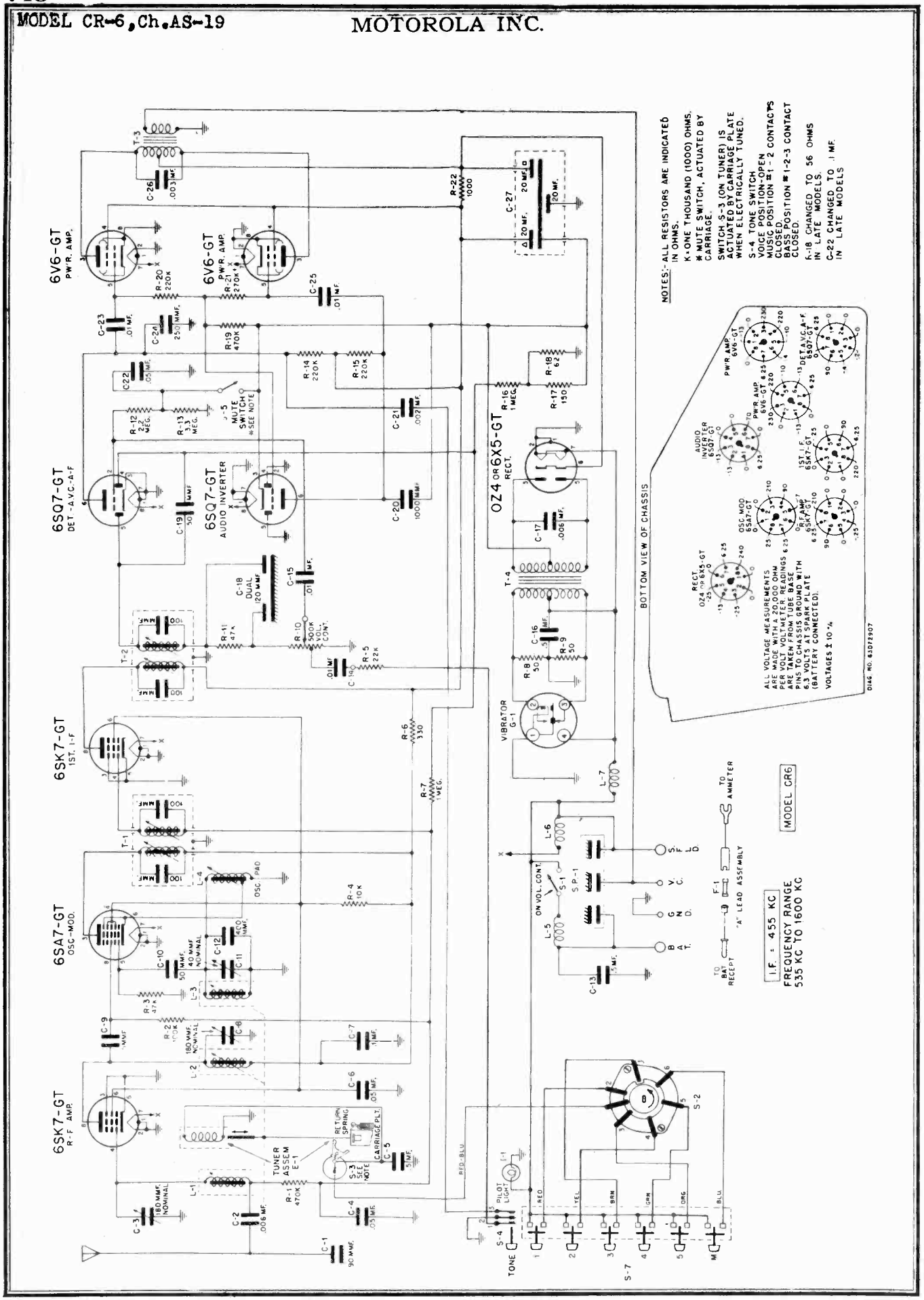

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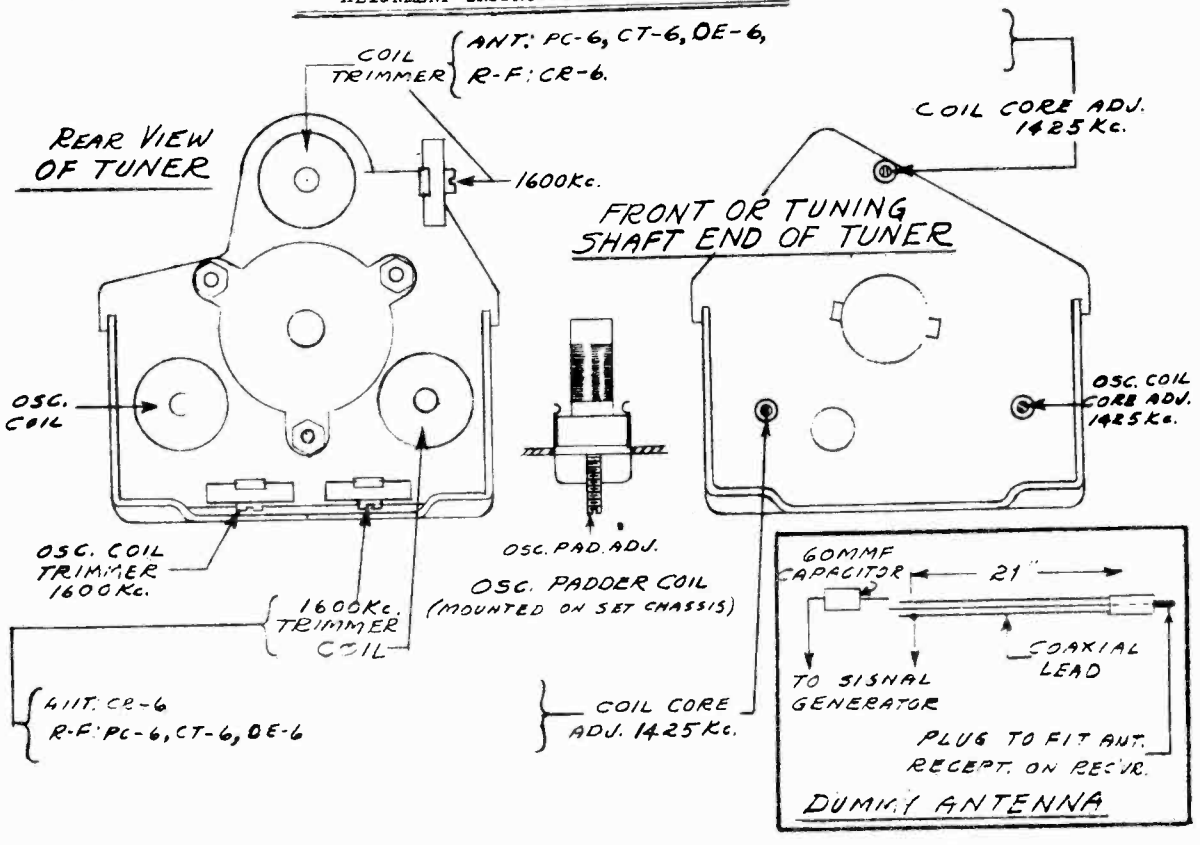
MODEL CR-6
MODELS CT-6, OE-6, PC-6

Motorola

ALIGNMENT INSTRUCTIONS FOR 1946 AUTO SETS



A special tool for adjusting the tuner cores will be required. Use Alignment Tool, Motorola Part Number 66A76278. Keep volume control at maximum throughout alignment. For maximum accuracy, use an output meter connected across the voice coil.

Operations In Order	Tuner Set At	Dummy Antenna	Generator connected to (through dummy)	Adjust following cores or trimmers	Generator Set At
1.	High frequency end.	.1 mf	Osc-Mod grid	Peak: 4 I.F. core screws	455 Kc.
2.	High frequency end (cores are to be projecting 1-1/8" from ends of cans and tuning shaft up against its stop).	60 mmf & 21" coaxial lead. Capacitor to be at generator end. (See Detail)	Antenna Receptacle	Peak: Osc. trimmer R.F. trimmer ANT. trimmer	1600 Kc.
3.	EXACTLY one full turn in from high frequency end, as indicated by marking manual tuning shaft insulated coupling).	"	"	Peak: Osc. core R.F. core ANT. core	1425 Kc.
4.	EXACTLY four more full turns in (as indicated by marking manual tuning shaft insulated coupling)	"	"	Peak: Osc-padder core (mounted on chassis) for maximum noise.	Generator power turned off, but leave generator and dummy antenna connected to antenna receptacle.
5.	1400 Kc.	Install set in car & connect car antenna.	———	Peak: Antenna trimmer for maximum noise.	———

NOTE: If padder core adjustment is too far off, repeat entire procedure (except I.F.). It may be necessary to repeat it more than once if the padder adjustment has been indescriminately tampered with.

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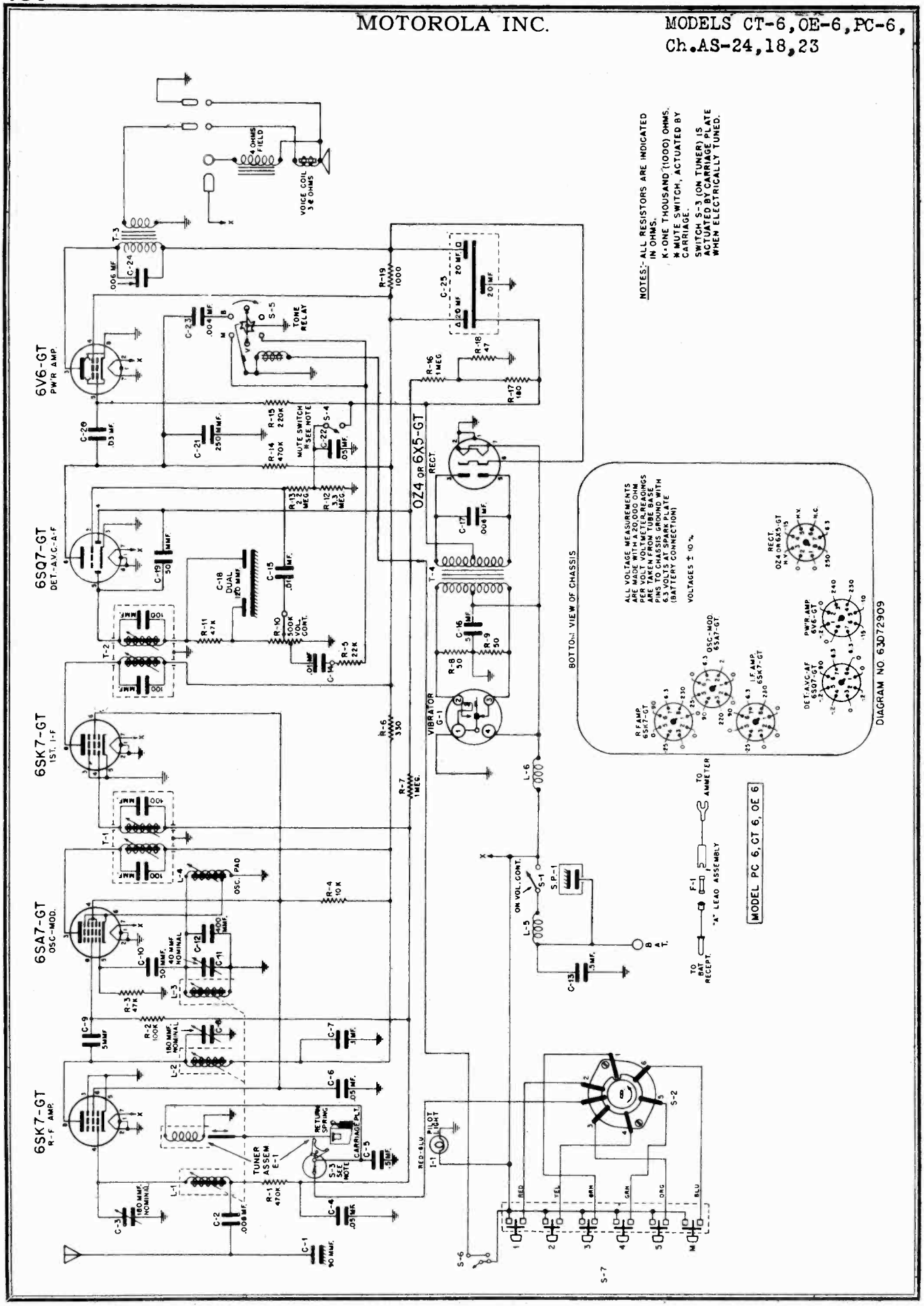
MODELS CT-6, OE-6, PC-6, Ch. AS-24, 18, 23



RECEIVER AND SPEAKER INSTALLATION

Install the antenna following instructions supplied with antenna. (Use Motorola Antenna M-276, M-277, M-280, M-255 or M-306).

Refer to Figure 1 for installation detail.

1. Expose the radio openings in the instrument panel.
2. Screw the four speaker mounting screws into the holes provided in the back of the grille. The screws are thread-forming type and may start hard; use a 1/4" Spin-tite wrench for easier installation. Install the speaker on the screws as shown.
3. Assemble the receiver mounting bracket to instrument panel brace. Do not tighten as yet.
4. Plug antenna lead-in into antenna receptacle located on the top of the set.
5. Remove knobs and mounting nuts from receiver and lift receiver into position behind instrument panel.
6. Holding receiver in position, place mounting nuts on control shaft bushings and tighten securely.
7. Assemble receiver mounting bracket to receiver rear mounting stud. Use the hole which most closely lines up with the receiver rear mounting stud. Adjust position of the mounting bracket so the receiver is supported without any undue strain being placed on the control shafts bushings, then tighten all mounting nuts.
8. If the receiver is installed in a Plymouth car,

POWER INPUT - 9 Amps at 6.3V

POWER OUTPUT - 6 watts (max.)

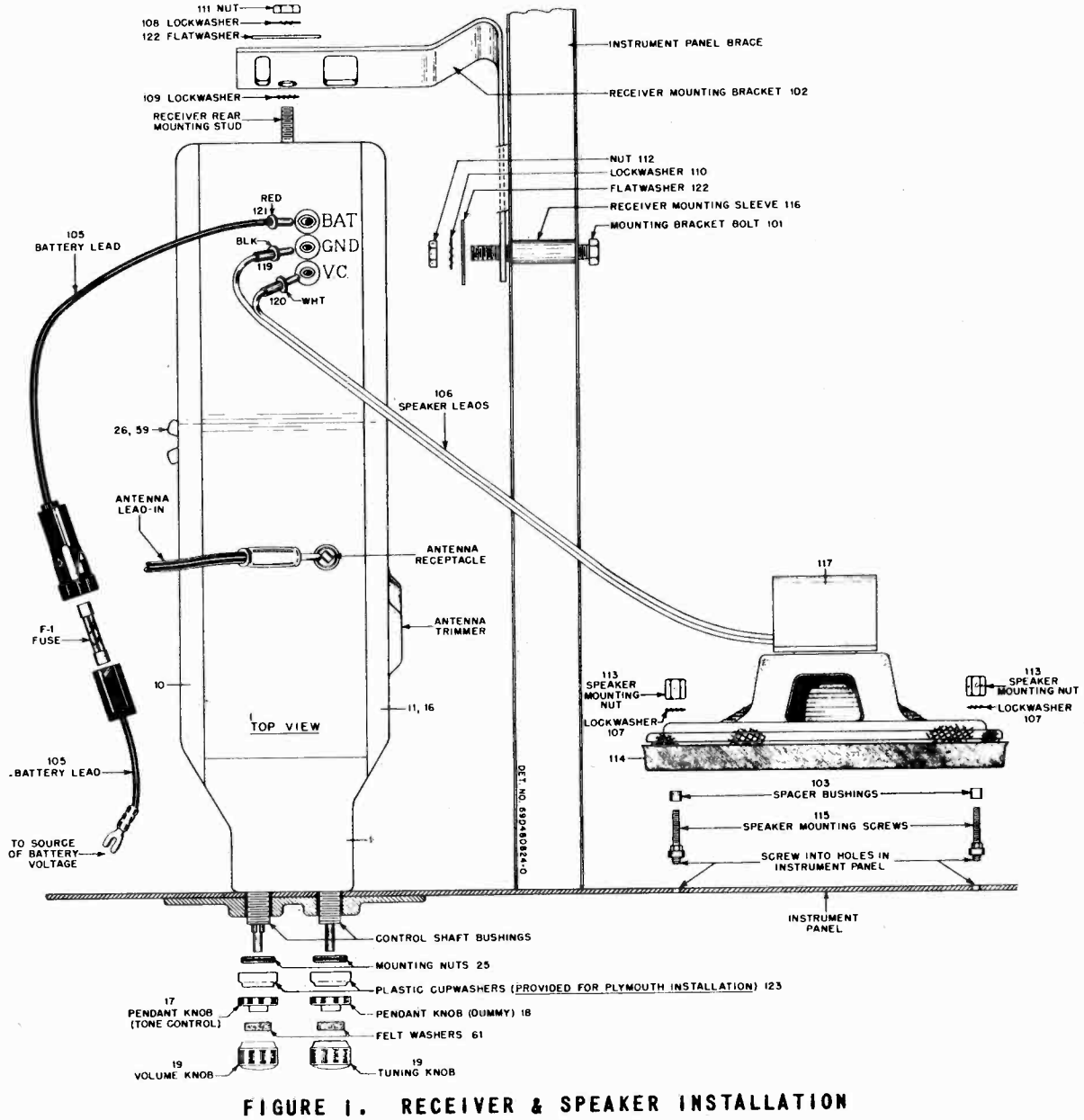


FIGURE 1. RECEIVER & SPEAKER INSTALLATION

use the plastic cup washers to cover the exposed portions of the shaft bushings.
9. Place the tone control and dummy pendant knobs on the shafts.
10. Place a felt washer over each pendant knob.
11. Place knobs on volume and tuning shafts and tighten setscrews securely.
12. Connect speaker leads as shown.
13. Connect the battery lead plug terminal to receiver receptacle marked "BAT" and the lug terminal to a convenient source of battery voltage.
14. Turn radio on. (See OPERATING INSTRUCTIONS). With the dial set to 1400 Kc, the volume control on full, and the antenna fully extended, adjust the antenna trimmer for maximum volume of a weak station or background noise.

TO SET THE PUSH BUTTONS

1. Turn radio on by pushing the top button "in". Allow radio to warm up for a few minutes.
2. Push the number "1" button in as far as it will go and HOLD IT THAT WAY.
3. With the tuning knob, tune in the station you desire to set up. The pointer will indicate the frequency of the station. Tune carefully until you are exactly on the station; tuning to either side of it will result in poor tone quality. Release button and knob after tuning in station.
4. Follow above steps 2 and 3 for the remaining four buttons.

WARNING

Many late model cars develop exceedingly high voltage due to improper adjustment of voltage regulator; this shortens life of radio tubes, vibrator and all other car electrical equipment. If the voltage exceeds 7.4 volts with no load on a fully charged battery when motor is running at a speed which corresponds to 35 miles per hour, the voltage regulator is defective. Have your auto mechanic replace the voltage regulator.

ELIMINATE INTERFERENCE AS FOLLOWS:

1. Install generator capacitor (Part No. 8A4491) as shown in Figure 2. **WARNING:** Do not connect capacitor to field terminal.

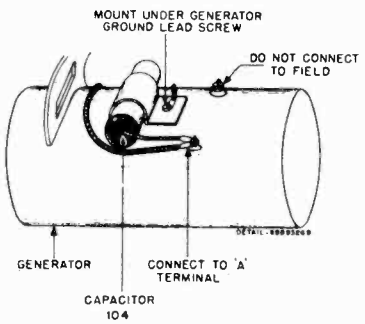


FIGURE 2.

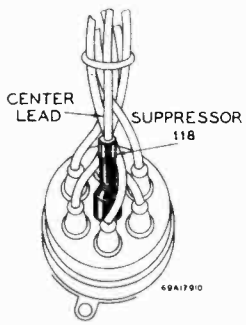


FIGURE 3.

2. Install distributor suppressor as shown in Figure 3.
3. When checking the car for motor noise, clamp the hood down tight. If necessary, install Hood Bond at the shoulder so that the hood makes a good ground to the cowl of the car on the side the antenna is mounted.

OPERATING INSTRUCTIONS

POWER SWITCH. The top button turns the radio ON and OFF. Radio is ON when button is in. Alternate pushes on this button will turn radio on and off.

VOLUME CONTROL. The left-hand knob operates the volume control.

MANUAL TUNING. Push the "M" button in far enough so that it will lock in, then tune stations with the right-hand knob. The dial scale is read in kilocycles by adding one zero to the figures. Always tune carefully until you are exactly on the station; tuning to either side of it will result in poor tone quality.

PUSH BUTTON TUNING. After push buttons have been set up, it is only necessary to push in the button (1, 2, 3, 4 or 5) that has been set to the desired station. Push the button far enough so that it will lock in. The dial pointer will indicate the frequency of the station being received.

TONE CONTROL. Tone can be varied by turning pendant tone knob which is located on the same shaft but behind the volume knob.

ALIGNMENT

EQUIPMENT REQUIRED

1. A special tool for adjusting the tuner cores. Use Alignment Tool, Motorola Part No. 66A76278.
2. A small screwdriver for IF & RF alignment.
3. An accurately calibrated AM modulated signal generator.
4. A low range output meter.
5. A special dummy antenna for RF alignment. Construct dummy antenna as shown in Figure 4. The 21" coaxial lead needed in its construction is the same type as used for lead-in on Motorola car antennas.

PROCEDURE

1. Remove the right and left housing covers. Also remove the chrome plated escutcheon from the front of the set. All adjustments are now exposed.
2. Connect a PM speaker (3.2 ohm VC) to VC and GND. terminals and connect the output meter across the voice coil.
3. Connect a 6 volt storage battery to chassis and BAT. terminals of receiver; turn receiver on and allow it to warm up for a few minutes. Push "M" button to place tuner in manual position. Set re-

ceiver volume control at maximum and tone control to treble (high) position.

4. Sensitivity Control. This control must be set to provide 2 ± 1/2 volts bias on the RF rubes before alignment is started. Measure this voltage between sensitivity control terminal and chassis.

5. For greatest accuracy, keep output of receiver at approximately 1 watt (1 watt = 1.79 volts on output meter) throughout alignment by reducing generator output (not receiver volume control) as stages are brought into alignment.

6. IF ALIGNMENT

A. Connect high side of signal generator through .1 mf capacitor to 6BE6 grid (pin #7) and the low side to chassis. Set generator to 455 Kc and peak adjustments (1, 2, 3 & 4), in this order, for maximum output.

7. RF ALIGNMENT

A. Connect signal generator to antenna receptacle through special dummy antenna (60 mmf capacitor in series with 21" coax lead).

B. With the tuning knob, tune to the extreme high frequency position and screw coil cores out so that at least 1-1/8" of all three cores shall be outside of the coil shield can. Set signal generator to 1605 Kc and peak trimmers (5, 6 & 7), in this order.

C. Turn the tuning knob until carriage plate is spaced exactly 1-3/8" from coil shield plate. Set signal generator to 1425 Kc and adjust coil cores (8, 9 & 10), in this order, for maximum output.

D. Turn the tuning knob until the carriage plate is spaced approx. 17/32" from coil shield plate. Leave signal generator connected but turn signal generator power off. Peak oscillator padder core (11) for maximum noise. If the padder core must be moved more than 1/2 turn from its original position, the carriage plate should be moved to extreme high frequency position, the coil cores (8, 9 & 10) should be screwed out so that 1-1/8" of each core is exposed and steps 7A, B, C & D repeated until it is necessary to move the padder

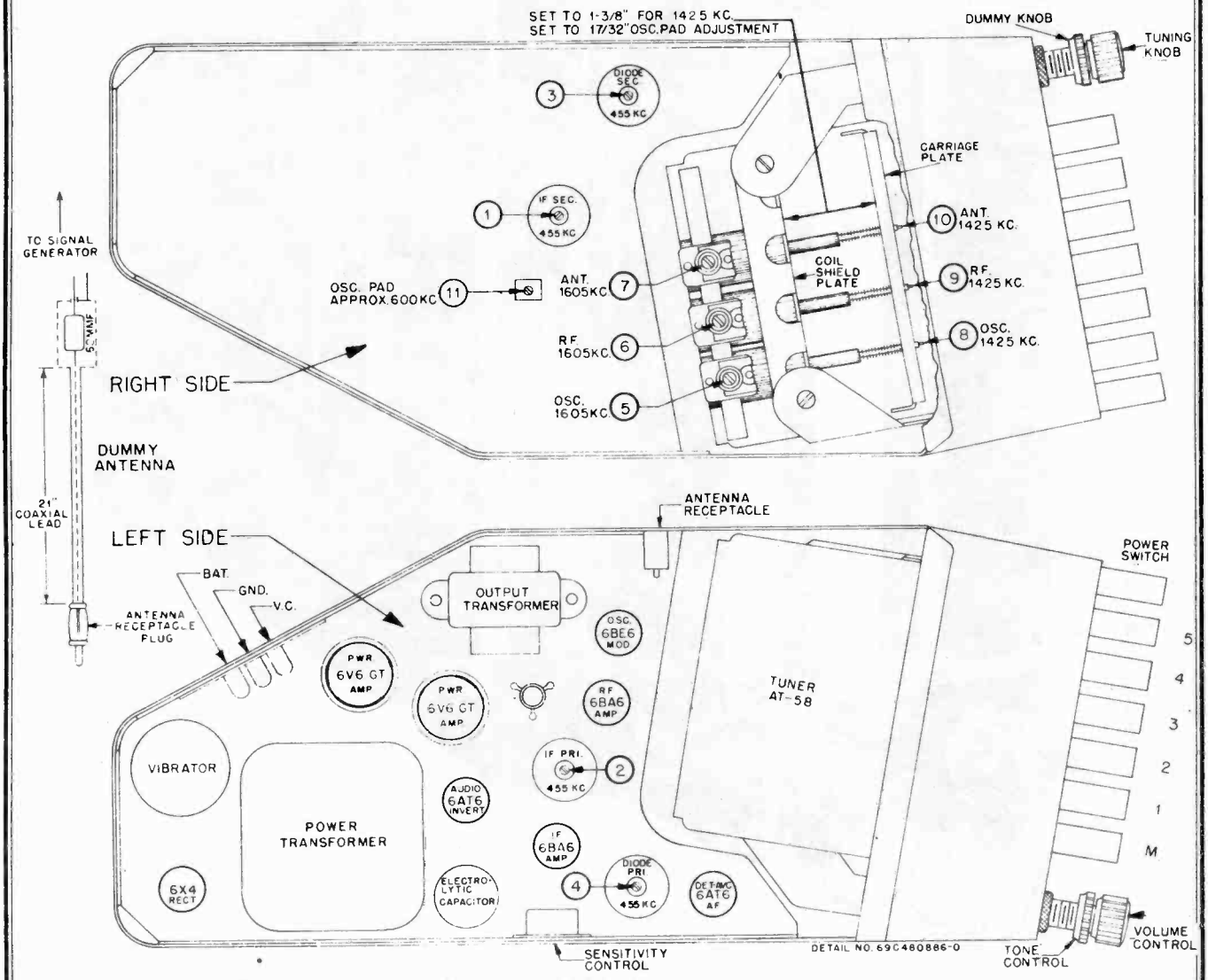


FIGURE 4. TUBE & TRIMMER LOCATIONS

core less than 1/2 turn in this step.

IMPORTANT: Do not push in on the alignment tool when adjusting the tuner cores. The slightest inward pressure on the alignment tool may move the tuner carriage and result in inaccurate alignment.

8. SETTING THE SENSITIVITY CONTROL. After alignment is completed, set signal generator to 600 Kc and adjust its output to 1.3 microvolts. Adjust the sensitivity control to provide 1 watt output (1 watt = 1.79 volts on output meter).

9. ANTENNA TRIMMER ADJUSTMENT. Once steps 7A, B, C, D & 8 have been satisfactorily performed, no further adjustment of any alignment screws should be made except to align the antenna trimmer (7) to car antenna after receiver is installed in car. This adjustment should be made with antenna fully extended and receiver set to approximately 1400 Kc. Peak the trimmer for maximum volume of a weak station or background noise between stations.

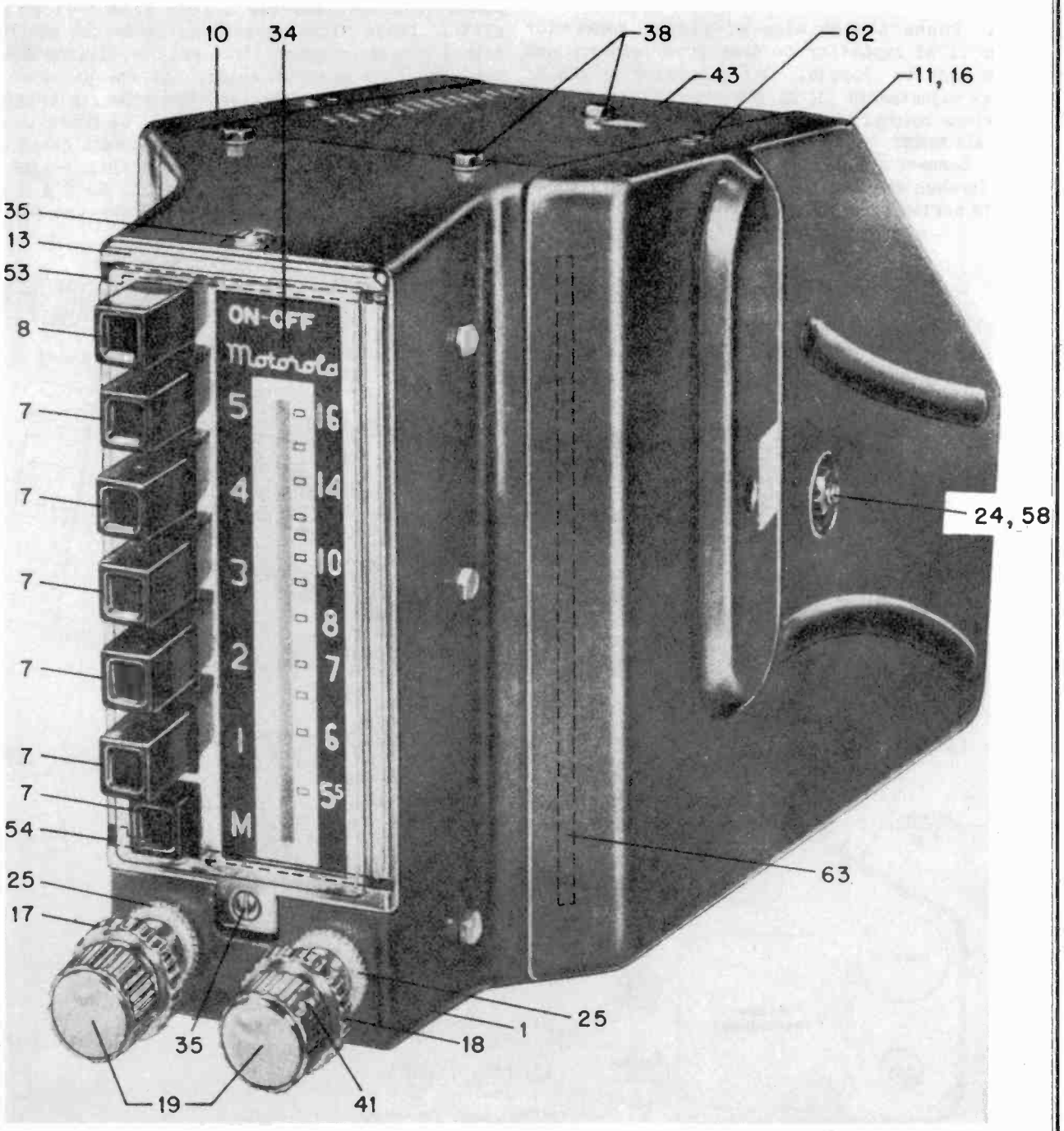


FIGURE 5. PARTS LOCATION - FRONT OF RECEIVER

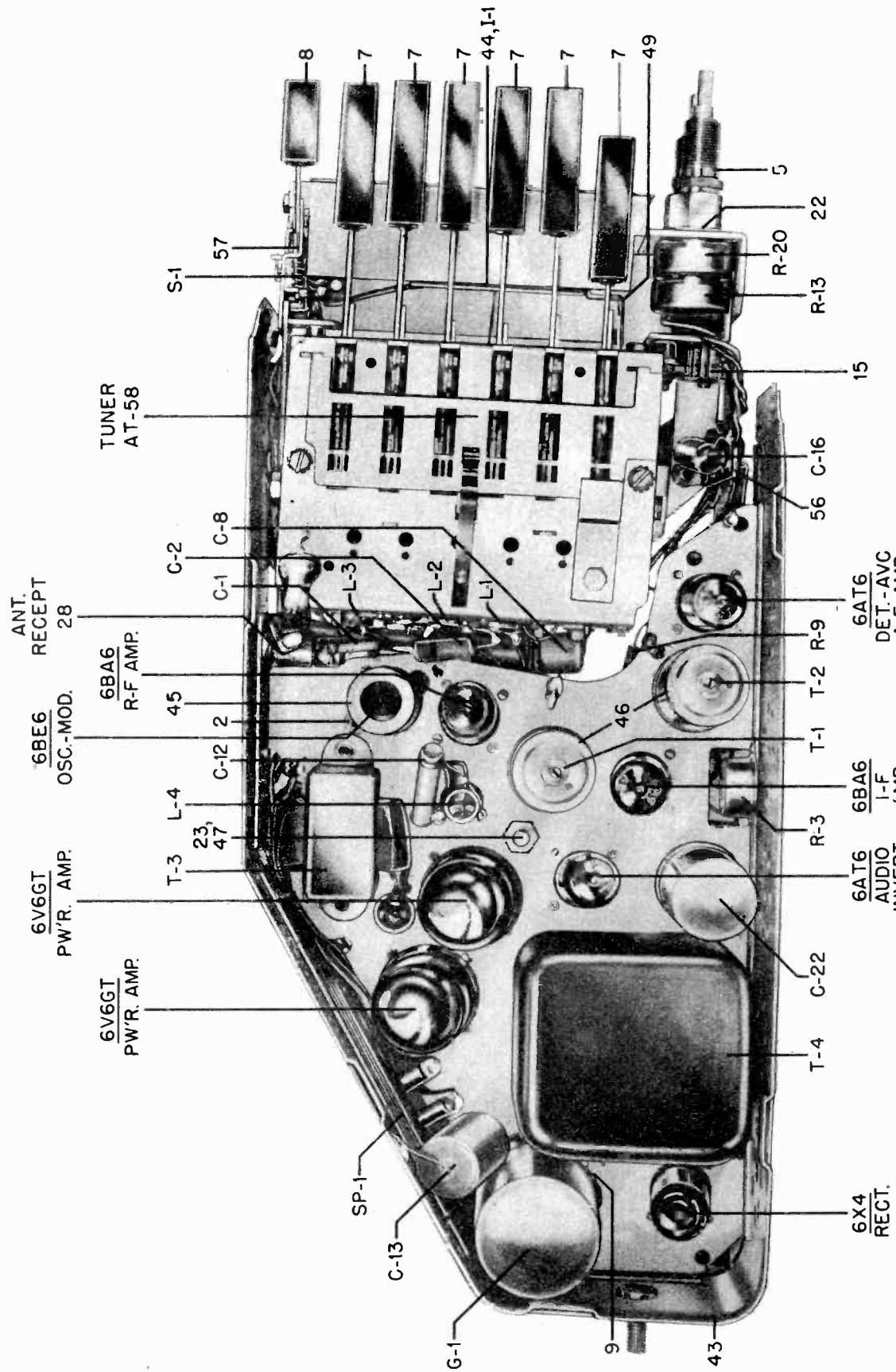


FIGURE 6. PARTS LOCATION - LEFT SIDE OF RECEIVER

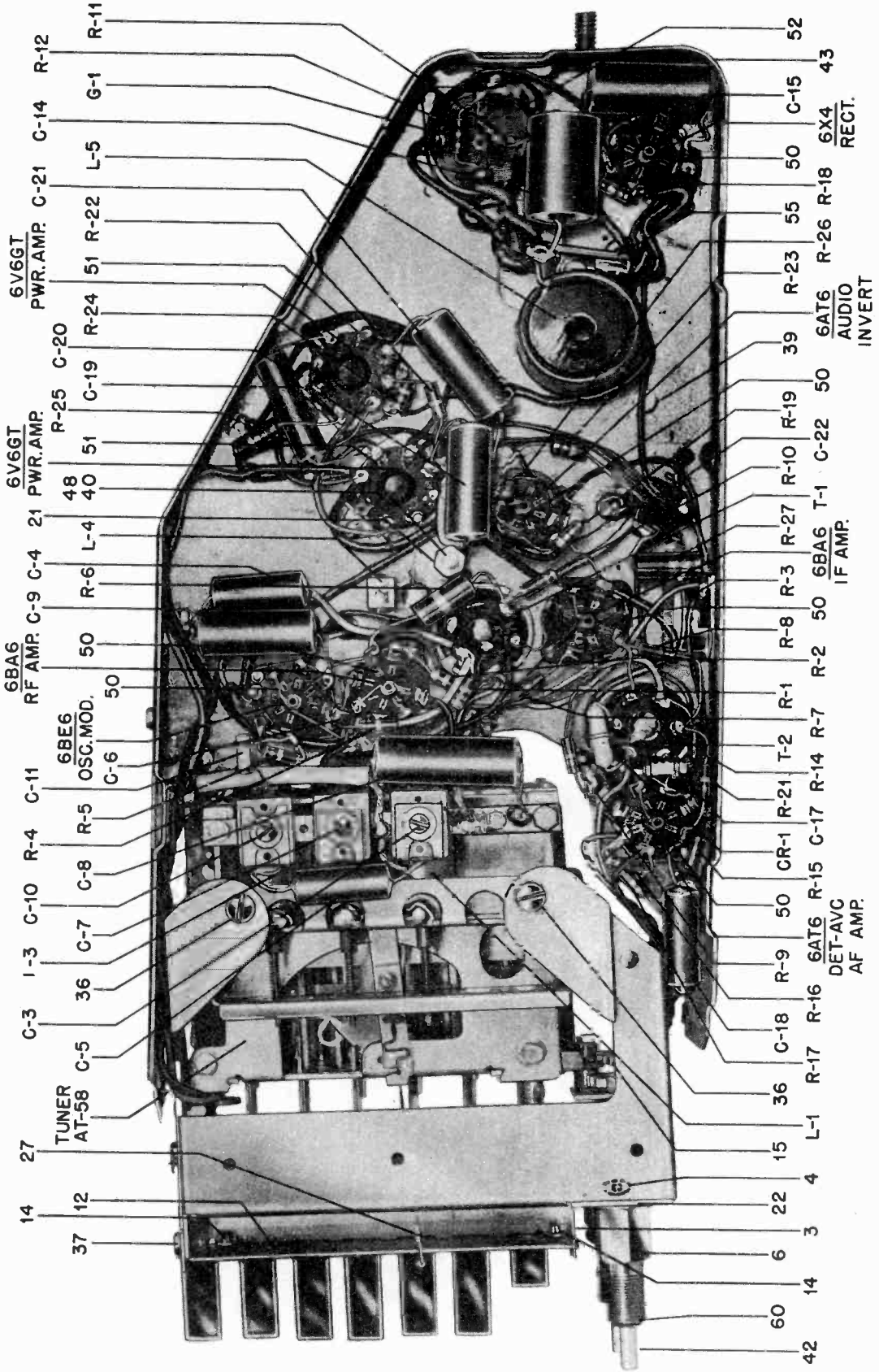


FIGURE 7. PARTS LOCATION - RIGHT SIDE OF RECEIVER

ELECTRICAL PARTS

CAPACITORS

C-1	21B77562	Ceramic: 100 mmf .....
C-2	8C4529	Paper: .006 mf 100V .....
C-3	20A480600	Trimmer, variable mica: 50 to 180 mmf; on same bracket as C-7 and C-10 .....
C-4	8A13514	Paper: .05 mf 100V .....
C-5	8A13514	Paper: .05 mf 100V .....
C-6	21K70720	Molded: 5 mmf .....
C-7	20A480600	Trimmer, variable mica: 50 to 180 mmf; on same bracket as C-3 and C-10 .....
C-8	8K13166	Paper: .1 mf 400V .....
C-9	8A14791	Paper: .05 mf 400V .....
C-10	20A480600	Trimmer, variable mica: 30 to 60 mmf; on same bracket as C-3 and C-7 .....
C-11	21R6513	Mica: 50 mmf 300V .....
or	21K74661	Ceramic: 50 mmf 300V .....
C-12	21A71872	Ceramic: 400 mmf .....
C-13	8A17028	Paper: .5 mf 100V .....
C-14	8A17028	Paper: .5 mf 100V .....
C-15	8K15166	Paper: .007 mf 1600V .....
C-16	8A13514	Paper: .05 mf 100V .....
C-17	21R6513	Mica: 50 mmf 300V .....
or	21K74661	Ceramic: 50 mmf 300V .....
C-18	8A71910	Paper: .006 mf 400V .....
C-19	8K71911	Paper: .03 mf 400V .....
C-20	8K13165	Paper: .003 mf 1000V .....
C-21	8K71911	Paper: .03 mf 400V .....
C-22	23A472570	Electrolytic: 20-30 mf/ 400-350V .....

CAPACITOR-RESISTOR

CR-1	21A472571	Capacitor-Resistor: 100 mmf - 47,000 ohms; 100 mmf .....

FUSE

F-1	65K4165	Fuse: 15 amp; type 3AG .....

VIBRATOR

G-1	48B3333	Vibrator: non-sync; 4 pin .....

PILOT LIGHT

I-1	65X10867	Bulb: 6.3V, .25A; bayonet base; clear ...

COILS

L-1,2	24B71881	RF and Antenna Coil (specify color of paint dot on old coil when ordering) ..
L-3	24B71879	Oscillator Coil (specify color of paint dot on old coil when ordering) .....
L-4	24B70227	Oscillator padder coil: complete with iron tuning core .....
L-5	24A473954	Choke, hash .....

RESISTORS

Note: All resistors are 1/2 watt, 20% carbon, insulated type unless otherwise specified.

R-1	6R6032	470,000 .....
R-2	6R3992	150 .....
R-3	18K77552	Sensitivity control: 700 ohms .....
R-4	6R6075	100,000 .....
R-5	6R6056	47,000 .....
R-6	6R476060	10,000 2W .....
R-7	6R3992	150 .....
R-8	6R6004	1 meg .....
R-9	6R6001	68,000 .....
R-10	6R6010	330 .....
R-11	6R5614	56 10% .....
R-12	6R5614	56 10% .....
R-13	18A472999	Volume Control: 500,000 ohms (dual -also includes tone control R-20) .....
R-14	6R6004	1 meg .....
R-15	6R6004	1 meg .....
R-16	6R2118	3.3 meg .....
R-17	6R6161	1500 .....
R-18	6R6054	10,000 .....
R-19	6R6069	2200 10% .....
R-20	18A472999	Tone control: 500,000 ohms (dual -also includes volume control R-13) .....
R-21	6R6015	220,000 .....
R-22	6R6015	220,000 .....
R-23	6R6015	220,000 .....
R-24	6R6015	220,000 .....
R-25	6R6389	220 10% 1W .....
R-26	6R6320	10,000 10% .....
R-27	6R476130	2200 2W .....

SWITCH

S-1	40B473204	Power switch: SPST; switch only .....

SPARK PLATE ASSEMBLY

SP-1	1X480604	Spark Plate Assembly: complete .....

TRANSFORMERS

T-1,2	24B76553	Diode or IF, 455 Kc: complete with padding capacitors and tuning cores, but less shield
T-3	25B472558	Output Transformer .....
T-4	25C472586	Power transformer .....

TUNER

	1X472770	AT-58 Automatic Tuner (See separate Service Manual -Motorola Part No. 54P480955 for complete breakdown)

MECHANICAL PARTS

1	13D472973	Base, escutcheon
2	28A473002	Base, tube shield mounting
3	7B473037	Bracket, dial background mtg
4	43A472869	Bushing, mounting (tuning shaft bushing mtg)
5	43K472992	Bushing, receiver mtg: with groove (volume shaft bushing)
6	43B472978	Bushing, receiver mounting: without groove (tuning shaft bushing)
7	1X473153	Button, push: includes clip (station selector)
8	1X473154	Button, push: includes clip (on-off button)
9	42A4215	Clip, vibrator grounding
10	1X473005	Cover Assembly, left-hand
11	1X473007	Cover Assembly, right-hand
12	1X473941	Dial Background and Strip Assembly
13	13C472961	Escutcheon, front plate: polished chrome finish; less dial scale
14	5S7805	Eyelet: .140 x .141 (dial backgrnd mtg).
15	44B472979	Gear, compound idler
16	14B480671	Insulator, guard (used on right-hand cover)
17	36B473120	Knob, pendant (tone control)
18	36K482504	Knob, pendant (dummy)
19	1X473155	Knob, control: includes setscrew
20	4S7651	Lockwasher: #8 internal; cad.pl. (tuner mounting)
21	4S7658	Lockwasher: #10 internal; cadmium plated (on cover mounting screw)
22	4S7655	Lockwasher: 3/8 internal; cadmium plated (vol. & tuning shaft bushing mtg)
23	2S7030	Nut: #10-24 x 3/8 hex; brass (cover screw mounting)
24	2S8351	Nut: #10-24 x 3/8 hex; copper oxide finish (cover mounting)
25	2K473140	Nut, mounting: round; knurled (receiver mounting)
26	2A17569	Nut, wing: 10-24 x 1-3/8; copper oxide finish (cover mounting)
27	1X473152	Pointer & Sleeve Assembly
28	1X70646	Receptacle, antenna
29	5S7771	Rivet: .088 x 3/16 steel; nickel plated (tube socket mtg)
30	5S7707	Rivet: .122 x 5/32 steel; nickel plated (tube socket mtg)
31	5S7706	Rivet: .122 x 1/8 steel; nickel plated (sensitivity control mtg, switch assembly mtg and terminal strip mtg)
32	5S7701	Rivet: .122 x 3/16; nickel plated (vibrator grounding clip and output trans. mtg)
33	5S7728	Rivet: .122 x 5/16 steel; nickel plated (spark plate mtg)
34	34B473122	Scale, dial: glass
35	3S8022	Screw: 4-40 x 1/4 slotted binder head machine screw; cadmium plated (escutcheon mtg)
36	3S7150	Screw: #8-32 x 3/16 slotted binder head machine screw; (tuner mtg)
37	3S7454	Screw: #8 x 1/4 PKZ slotted hex head sheet metal screw; cad. pl. (pilot light bracket, dial background mtg, etc.,)
38	3S7456	Screw: #8 x 1/4 PKA slotted acorn head sheet metal screw; antique copper finish (housing screws)
39	3S3397	Screw: #8 x 5/16 PKZ plain hex head sheet metal screw; cad. pl. (pwr. trans mtg).
40	3A17388	Screw, cover mtg: 10-24 thread, 4-3/8" long; has formed nut near one end
41	3S7104	Setscrew: 8-32 x 3/16 slotted headless machine screw; cad. pl.
42	1A472975	Shaft Assembly, tuning: consists of tuning shaft and gear
43	15D472967	Shell, housing
44	1X473150	Shield, pilot light
45	26A90301	Shield, tube
46	1A71049	Shield and Sleeve Assembly (for T-1 & T-2)
47	43K17389	Sleeve, cover spacer (long)
48	43K17390	Sleeve, cover spacer (short)
49	9A472905	Socket, pilot light and bracket
50	9A472534	Socket, tube: miniature; 7 prong
51	9A6788	Socket, tube: octal
52	9A70208	Socket, tube: 4 pin (for vibrator)
53	42K473148	Strap, dial scale mtg (top)
54	42K473149	Strap, dial scale mtg (bottom)
55	31A472573	Strip, terminal: 2 insulated lugs, #2 mtg
56	31A473004	Strip, terminal: 3 insulated lugs, end mtg
57	1X473142	Switch Assembly: complete; includes push arm, bracket and switch
58	4S7611	Washer: 1/2-7/32-.048; copper oxide finish (cover mtg)
59	4S7613	Washer: 3/4-.203-.027; copper oxide finish (cover mtg)
60	4A21577	Washer, "C" (tuning shaft and idler gear retainer)
61	4K481587	Washer, felt (used behind control knobs)
62	39A17383	Wiper, contact (cover grndng wiper)
63	39A17391	Wiper, housing: brass strip; 5/32 wide x 5/8 long

MOUNTING PARTS & ACCESSORIES

101	3A18008	Bolt, hex head: 5/16-18 x 2-1/4 long (bracket mtg) .....
102	7B24365	Bracket, receiver mounting .....
103	43K26242	Bushing, spacer: brass (speaker mtg) ...
104	8A4491	Capacitor, generator .....
105	9K473160	Lead Assembly, fuse: complete with 15 amp fuse
106	1X76859	Lead Assembly, speaker: 2 conductor: 36" long; pin terminals on one end .....
107	4S7660	Lockwasher: #8 external; phosphor bronze (speaker mtg) .....
108	4S7670	Lockwasher: 1/4 internal; cadmium plated (receiver mtg) .....
109	4S7678	Lockwasher: 1/4 external; cadmium plated (receiver mtg) .....
110	4S7674	Lockwasher: 5/16 internal; cadmium plated (receiver mtg) .....
111	2S7022	Nut: 1/4-20 x 7/16 hex; cadmium plated (receiver mtg) .....
112	2S2863	Nut: 5/16-18 x 9/16 hex; cadmium plated (receiver mtg) .....
113	2K74308	Nut, speaker mtg: 8-32 thread x 3/8 thk.
114	64B17583	Screen, speaker: includes gasket .....
115	1X17921	Screw, speaker mounting: includes bushing
116	43K17931	Sleeve, receiver mounting .....
117	50B473253 or 50B473698 or 50B461519	Speaker: 7" PM; 3.2 ohm VC; less spkr lead Exchange
118	6X17117	Suppressor, distributor .....
119	29A76280	Terminal, pin: black (speaker lead) ....
120	29K76282	Terminal, pin: white (speaker lead) ....
121	29K76284	Terminal, pin: red (fuse lead) .....
122	4S7849	Washer: 1-5/16 x 11/32 x .067 thick; cadmium plated (receiver mounting) .....
123	4K472205	Washer, cup: plastic (for Plymouth installation only; used to conceal mtg bushing)
124	39A4205	Wiper, hood (hood grounding bond) .....

NOTES:

A VTVM WAS USED TO MAKE ALL MEASUREMENTS. MEASUREMENTS MADE FROM TUBE BASE PIN TERMINAL TO CHASSIS.
VOLUME CONTROL ON FULL.
TONE CONTROL IN 'HIGH' POSITION.
SENSITIVITY CONTROL SET TO MINIMUM RESISTANCE.
6.3 VOLTS INPUT AT SPARK PLATE.
ALL VOLTAGE MEASUREMENTS DC UNLESS OTHERWISE SPECIFIED.
VOLTAGE TOLERANCE ±10%.
RESISTANCE TOLERANCE ±20%.
* = TIE POINT.
N.C. = NO CONNECTION.
GND = GROUND TO CHASSIS.
K = 1000 (ONE THOUSAND) OHMS.
▭ = RESISTANCE MEASUREMENTS.
◡ = VOLTAGE MEASUREMENTS.
‡=THESE READINGS WILL VARY WIDELY WITH SENSITIVITY CONTROL SETTING. READINGS NOTED ARE FOR AVERAGE SET.

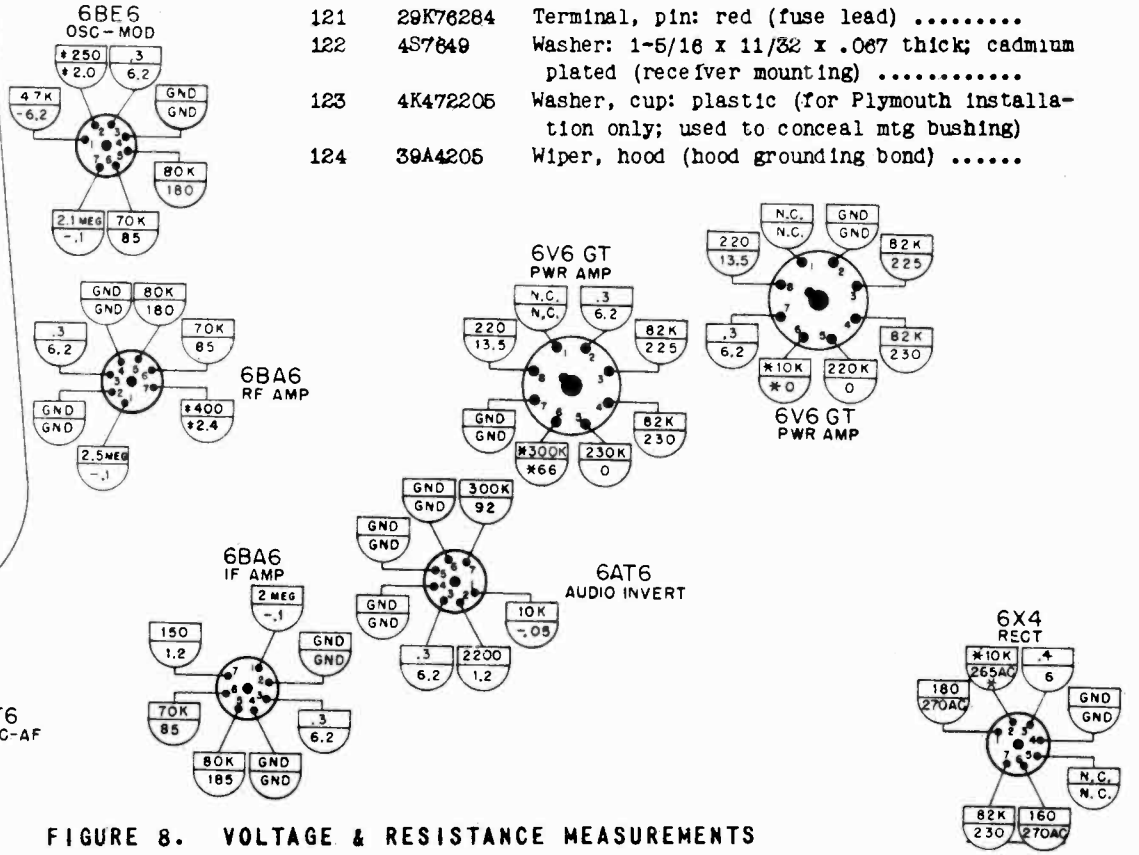


FIGURE 8. VOLTAGE & RESISTANCE MEASUREMENTS

MODEL CR8 MOTOROLA INC.

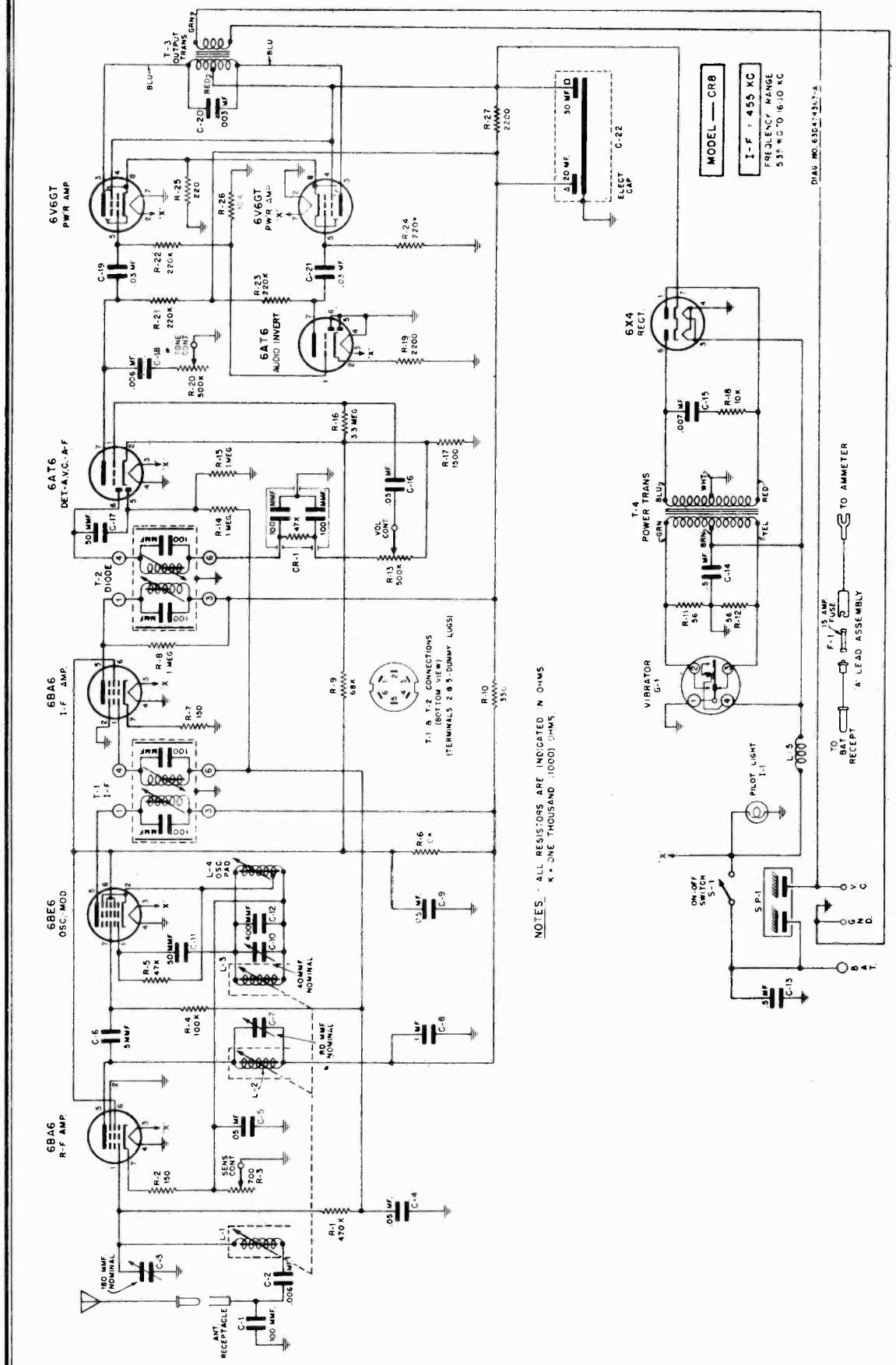
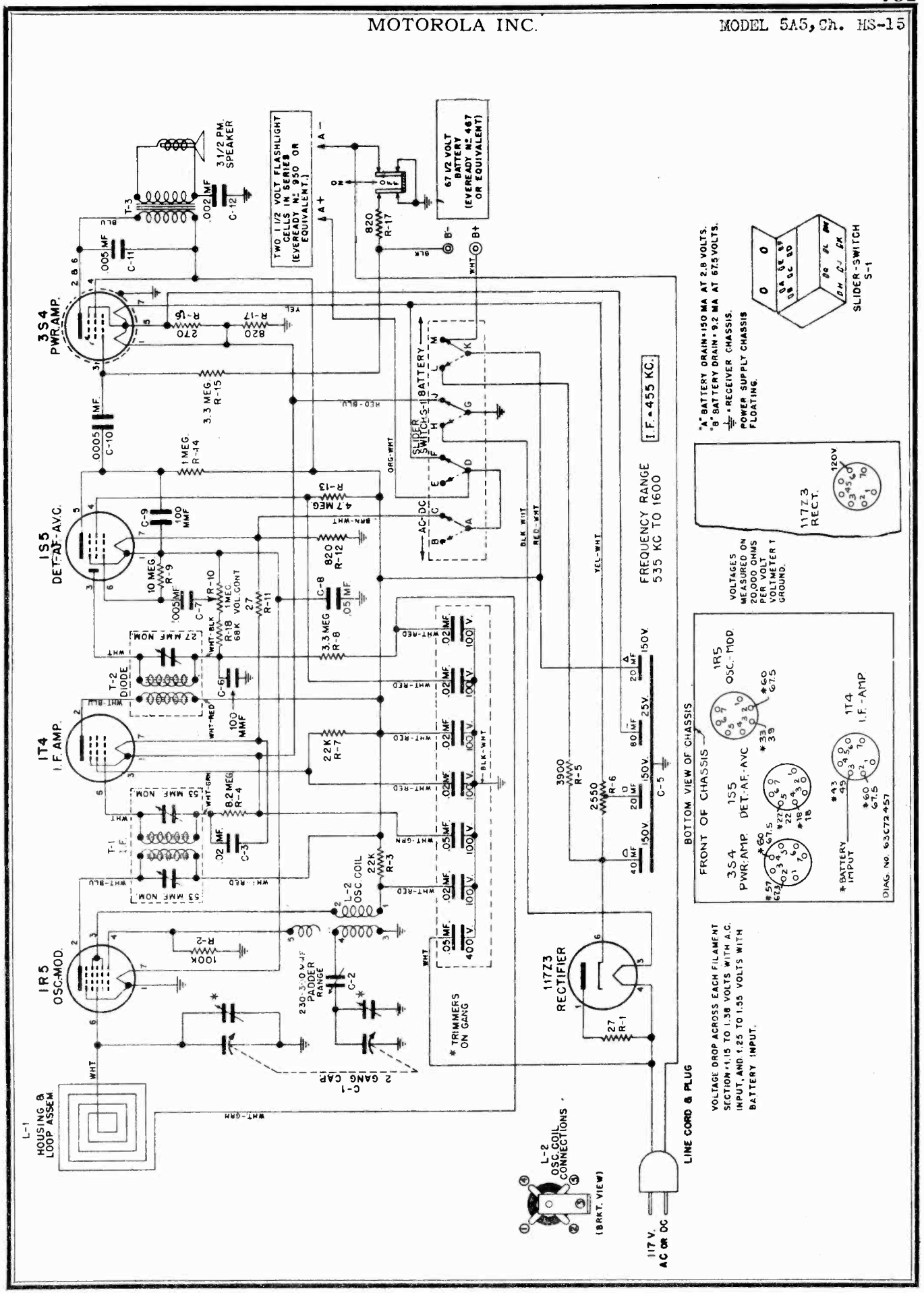


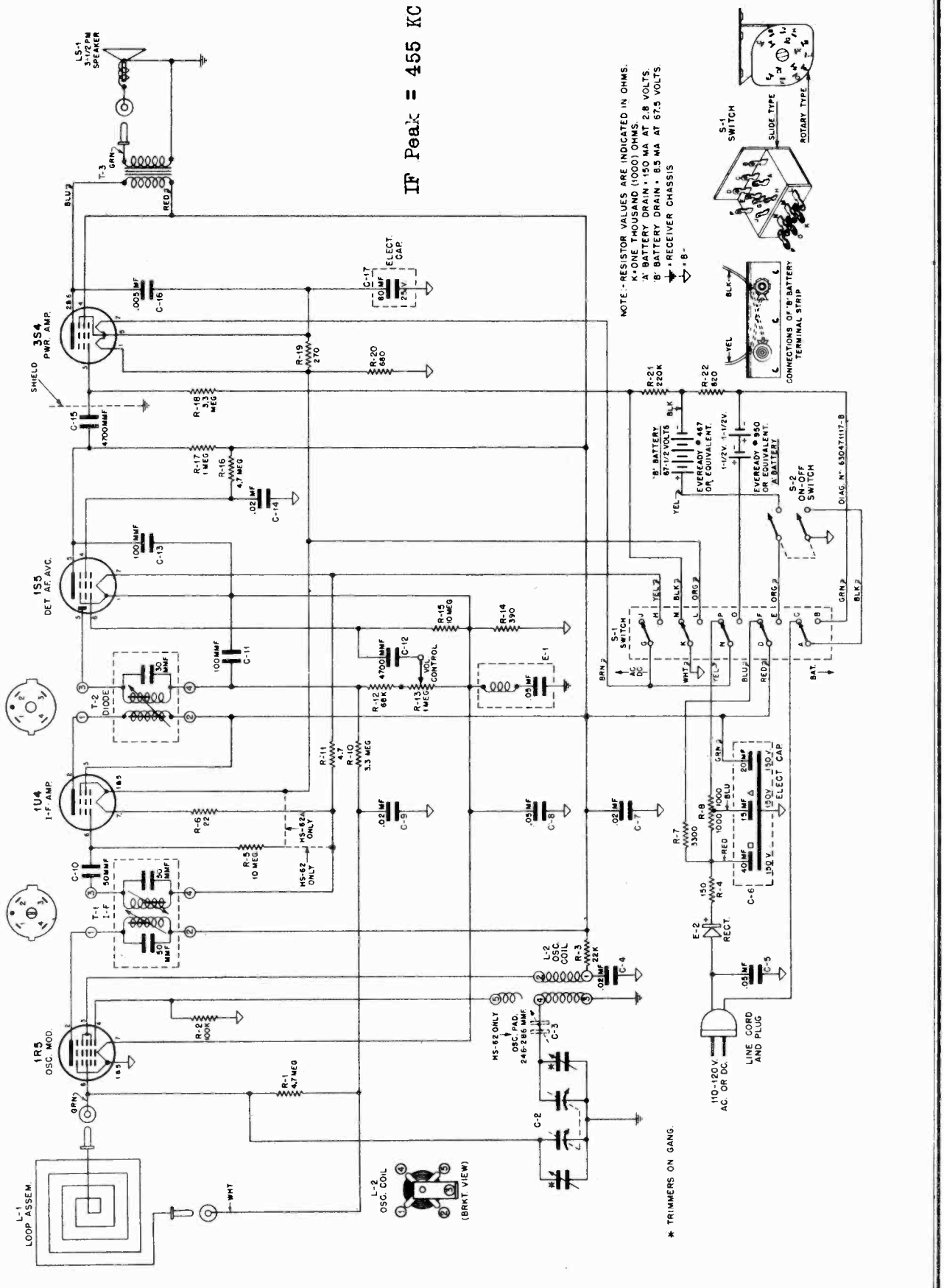
FIGURE 9. SCHEMATIC DIAGRAM

MOTOROLA INC. MODEL 5A5, Ch. HS-15



MODEL 5A7, Chassis HS-62
MODEL 5A7A, Chassis HS-62A

MOTOROLA INC.



Placement of the four tubes (1R5, 1U4, 1S5 and 3S4) is such that they may be easily removed for servicing by opening the back cover of the set. To reduce microphonic howl, rubber shock mounting is provided for the small chassis holding the tubes and coils. A thin piece of braid serves to bond the two chassis. This braid, as well as all leads connecting the small chassis wiring to the large chassis, should be carefully dressed and free in movement to insure a good floating action of the small chassis.

Insulation between the cabinet (front, back and wrap-around) and chassis is provided for by the bakelite bushing mountings on the sides and by a wrap of armite riveted to the inside of the cabinet.

The chassis itself is isolated from the line and power circuit by a capacitor-choke assembly which eliminates shock hazard. To further guarantee any annoyance from a minor shock the chassis is insulated from the cabinet.

To remove the chassis from the cabinet, remove the two 4-40 screws (one on each side of the cabinet), pull off the tuning knobs, remove the front panel, disconnect the two loop leads from the pin receptacles, and slide the chassis out of the cabinet.

To remove the chassis cover plate, remove the two slotted screws holding the plate to the edge of the large chassis and with the set lying with the speaker cone down, lift the plate up from the chassis.

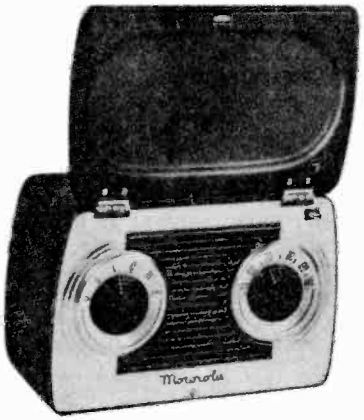
To remove the gang condenser, the screws holding the small chassis to the large chassis should be removed. This makes it possible to pull the small chassis strip out of the way so that access can be had to the screws holding the gang.

For access to some of the wiring, the "A" battery boxes may have to be removed. To do this, remove the two hex-headed screws over the slide switch leaving the center screw in. The two boxes and the connecting bracket may now be separated from the chassis. The bottom plates of the battery boxes are wired to the set, but the plates may be removed by bending the ears on the boxes outward.

The speaker is held in place by one screw located in the back of the 1S5 tube and a locating ear under the diode coil can. To replace the speaker remove the 8-32 hex-headed screw, disconnect the voice coil lead from the pin receptacle on the speaker and pull the speaker out from the front of the set.

Turning the set on or off is accomplished by opening or closing the front cover which actuates a push rod connected to a switch. Overthrow has been provided in the switch so that the switch is open circuited before the cover is completely closed. This prevents tolerance between the cover and front panel from causing switch failure. Inserting the line cord plug into the two slots between the battery boxes operates a slide switch which changes the circuit wiring to battery operation.

The oscillator coil and tuning capacitor leads should be dressed close to the chassis. This will minimize shifting of oscillator frequency when chassis is installed in its cabinet.



GENERAL INFORMATION

TYPE - Models 5A7 and 5A7A are three power (AC/DC-Battery) portable radio receivers of the personal type. Four miniature type tubes and a selenium rectifier are used in a superheterodyne circuit.

Chassis HS-62 is used in Model 5A7; Chassis HS-62A is used in Model 5A7A.

Models 5A7 (Chassis HS-62) and 5A7A (Chassis HS-62A) differ as follows:

Model 5A7 uses a tuning capacitor having same shaped plates in both sections and an oscillator padding capacitor. Model 5A7A uses a tuning capacitor having a cut plate oscillator tuning section and, therefore, an oscillator padder is not required. The tuning capacitors, oscillator coils, loop antennas, and front panels are, therefore, unique for each model. The front panels differ because of differences in calibration curves between the cut plate and full plate tuning capacitors.

TUNING - 5A7 - 535 to 1600 Kc
5A7A - 535 to 1620 Kc

IF FREQUENCY - 455 Kc

TUBE COMPLEMENT - 1R5 - Oscillator-Modulator
1U4 - IF Amplifier
1S5 - Detector, AVC & 1st AF Amplifier
3S4 - Power Amplifier
Rect. - Selenium type - for AC/DC operation

POWER SUPPLY - Operates from 110-120V AC/DC (15 watts) or from the following batteries:
2 - 1-1/2V flashlight cells (Eveready #950 or equivalent)
1 - 67-1/2 "B" battery (Eveready #467 or equivalent)

BOTTOM VIEW OF CHASSIS

= VOLTAGE MEASUREMENTS.
= RESISTANCE MEASUREMENTS
T.L. = TIE LUG.
* = MEASUREMENTS MAY VARY DEPENDING ON CONDITION OF ELECTROLYTIC CAPACITORS.

CONDITIONS OF MEASUREMENTS.

A VTVM WAS USED TO MAKE ALL VOLTAGE MEASUREMENTS.
LOOP IS DISCONNECTED AND NO STATION IS TUNED IN.
MEASUREMENTS ARE MADE FROM TUBE BASE PIN TO B-(⏚)
SET IS OPERATED FROM FRESH BATTERIES DURING VOLTAGE MEASUREMENTS.
SET IS IN BATTERY' POSITION AND BATTERIES ARE REMOVED DURING RESISTANCE MEASUREMENTS.
VOLTAGE TOLERANCE ±10%. RESISTANCE TOLERANCE ±20%.

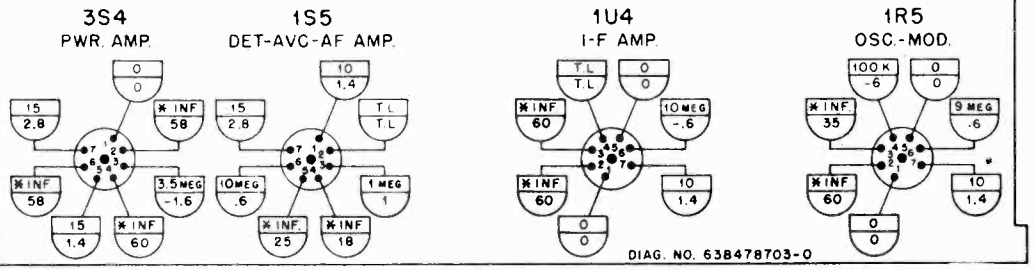


FIGURE 9. VOLTAGE & RESISTANCE DIAGRAM-CHASSIS HS-62 & HS-62A-BATTERY OPERATED

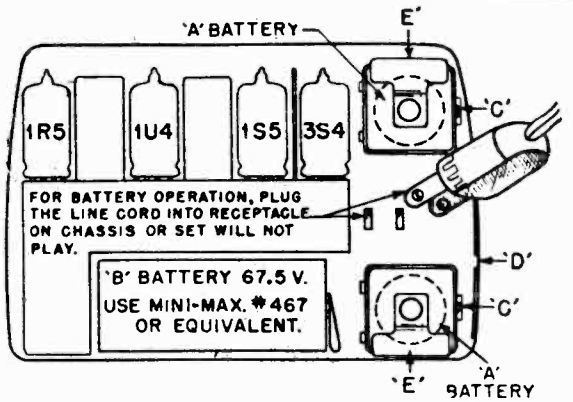


FIGURE 1. BATTERY INSTALLATION DETAIL

'A' Batteries: 1½ V. flashlight cells. Use Eveready No. 950 or equiv. Install with Center Terminal facing back of set. 2 used.

To open 'A' Battery Compartments push Catches 'C' to the right.

When playing from house current, pass Line Cord through Slot 'D' in cabinet.

When line cord is not in use, wind it around Cord Clamps 'E'.

BOTTOM VIEW OF CHASSIS

= VOLTAGE MEASUREMENTS.
= RESISTANCE MEASUREMENTS.
T.L. = TIE LUG.

CONDITIONS OF MEASUREMENTS

A VTVM WAS USED TO MAKE ALL VOLTAGE MEASUREMENTS.
LOOP IS DISCONNECTED AND NO STATION TUNED IN.
MEASUREMENTS ARE MADE FROM TUBE BASE PINS TO B-(⏚)
SET IS OPERATED FROM 117 V. AC DURING VOLTAGE MEASUREMENTS.
SET IS IN AC/DC POSITION AND BATTERIES ARE REMOVED DURING RESISTANCE MEASUREMENTS.
VOLTAGE TOLERANCE ±10%. RESISTANCE TOLERANCE ±20%.

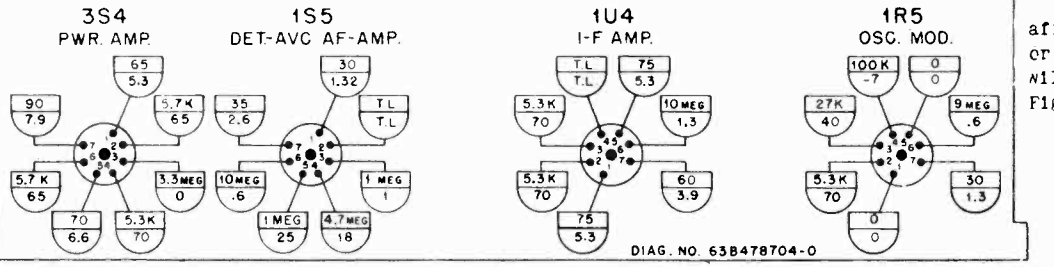


FIGURE 10 VOLTAGE & RESISTANCE DIAGRAM-CHASSIS HS-62 & 62A-AC OPERATED

BATTERY REPLACEMENT. When low volume or fuzzy tone is noticed, replace the flashlight cells. Normally, the 67-1/2 "B" battery will last for 3 or 4 changes of the flashlight cells.

NOTE: The condition of the batteries will not affect operation of receiver from 110-120 volts AC or DC. Complete battery replacement instructions will be found inside the receiver back cover (or see Figure 1).

CHART I. MODEL 5A7 (CHASSIS HS-62) ALIGNMENT PROCEDURE

(Refer to Figure 2 for location of all alignment trimmers and cores)

STEP	DIAL SET TO	DUMMY	SIGNAL GENERATOR CONNECTED TO	SIGNAL GENERATOR SET AT	ADJUST TRIMMER OR CORE	REMARKS
IF ALIGNMENT						
1.	Gang fully opened	.1 mf	Osc-Mod grid & B- *	455 Kc	1,2 & 3	Adjust for maximum
RF ALIGNMENT						
2.	Gang fully opened	.1 mf	Osc-Mod grid & B- *	1600 Kc	4	This sets oscillator to dial scale
3.	-	-	-	-	-	Install chassis in cabinet, leaving output meter connected to speaker.
4.	1400 Kc.	None	Radiation loop**	1400 Kc	5	Tune signal in on receiver, then adjust loop trimmer (5) for maximum. Loop trimmer is reached through hole under plug button on side of cabinet.
5.	600 Kc	None	Radiatior loop**	600 Kc	6	Tune signal in on receiver. Adjust osc pad (6) through hole in back of shield plate inside back cover (while rocking gang capacitor) for maximum output.

NOTE: If oscillator padder (6) has been indiscriminately tampered with, it may be necessary to repeat Steps 2, 3, 4 & 5 several times to secure correct tuning range and proper tracking.

* A convenient point for these connections is the stator of the loop section of the tuning capacitor and the rear left hand lug on the power switch. See Figure 2.

** Connect output of signal generator to a 5" diameter, 3 turn loop and bring loop close enough to receiver loop to obtain output of 50 milliwatts (.40 V) on output meter. Vary distance between loops to maintain this output during alignment. Minimum distance between loops should never be less than 12".

ALIGNMENT

Maximum performance can only be obtained if extreme care is exercised during alignment. Follow the procedure carefully.

If the receiver is operated from an AC line during alignment, it is suggested that an I ating transformer be used between receiver and pow line.

A low range output meter should be connected to the speaker voice coil terminal and receiver chassis. Set receiver volume control to maximum. For greatest accuracy, keep output of receiver at approximately .05 watt (.05 watt = .40 volt on output meter) throughout alignment by reducing generator output (not receiver volume control) as stages are brought into alignment.

The IF & diode transformer tuning cores are slotted for a small size fibre screwdriver. Do not press hard on the fibre screwdriver during alignment as damage to the coil forms or tuning cores may result.

Chart I gives complete alignment procedure for Model 5A7 (Chassis HS-62). Chart II gives complete alignment procedure for Model 5A7A (Chassis HS-62A).

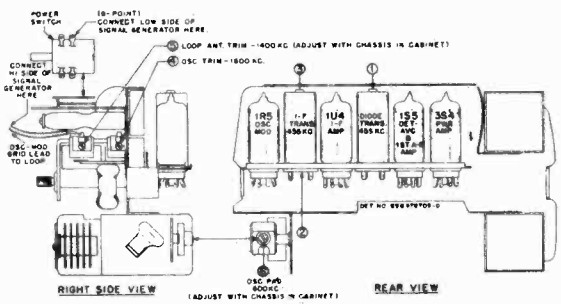


FIGURE 2. CHASSIS HS-62 TUBE & TRIMMER LOCATIONS

CHART II. MODEL 5A7A (CHASSIS HS-62A) ALIGNMENT PROCEDURE

(Refer to Figure 3 for location of all alignment trimmers and cores).

STEP	DIAL SET TO	DUMMY	SIGNAL GENERATOR CONNECTED TO	SIGNAL GENERATOR SET AT	ADJUST TRIMMER OR CORE	REMARKS
IF ALIGNMENT						
1.	Gang fully opened	.1 mf	Osc-Mod grid & B- *	455 Kc	1,2 & 3	Adjust for maximum.
RF ALIGNMENT						
2.	Gang fully opened	.1 mf	Osc-Mod grid & B- *	1620 Kc	4	This sets oscillator to dial scale.
3.	-	-	-	-	-	Install chassis in cabinet, leaving output meter connected to speaker.
4.	1400 Kc	None	Radiation loop **	1400 Kc	5	Tune signal in on receiver, then adjust loop trimmer (5) for maximum. Loop trimmer is reached through hole under plug button on side of cabinet.

* A convenient point for these connections is the stator of the loop section of the tuning capacitor and the rear left hand lug on the power switch. See Figure 3.

** Connect output of signal generator to a 5" diameter, 3 turn loop and bring loop close enough to receiver loop to obtain output of 50 milliwatts (.40 V) on output meter. Vary distance between loops to maintain this output during alignment. Minimum distance between loops should never be less than 12".

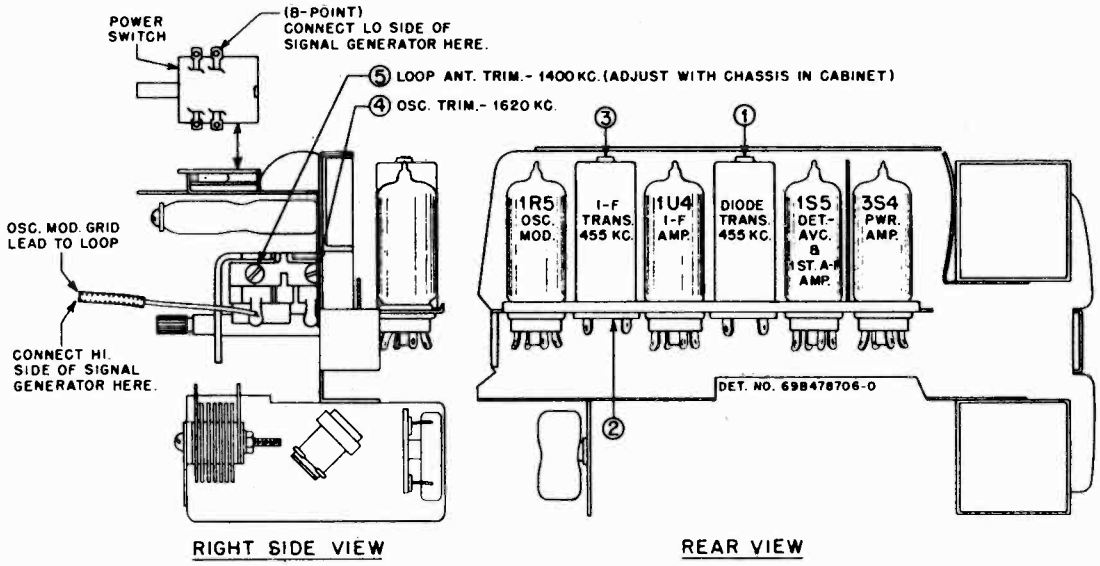


FIGURE 3. CHASSIS HS-62A TUBE & TRIMMER LOCATIONS

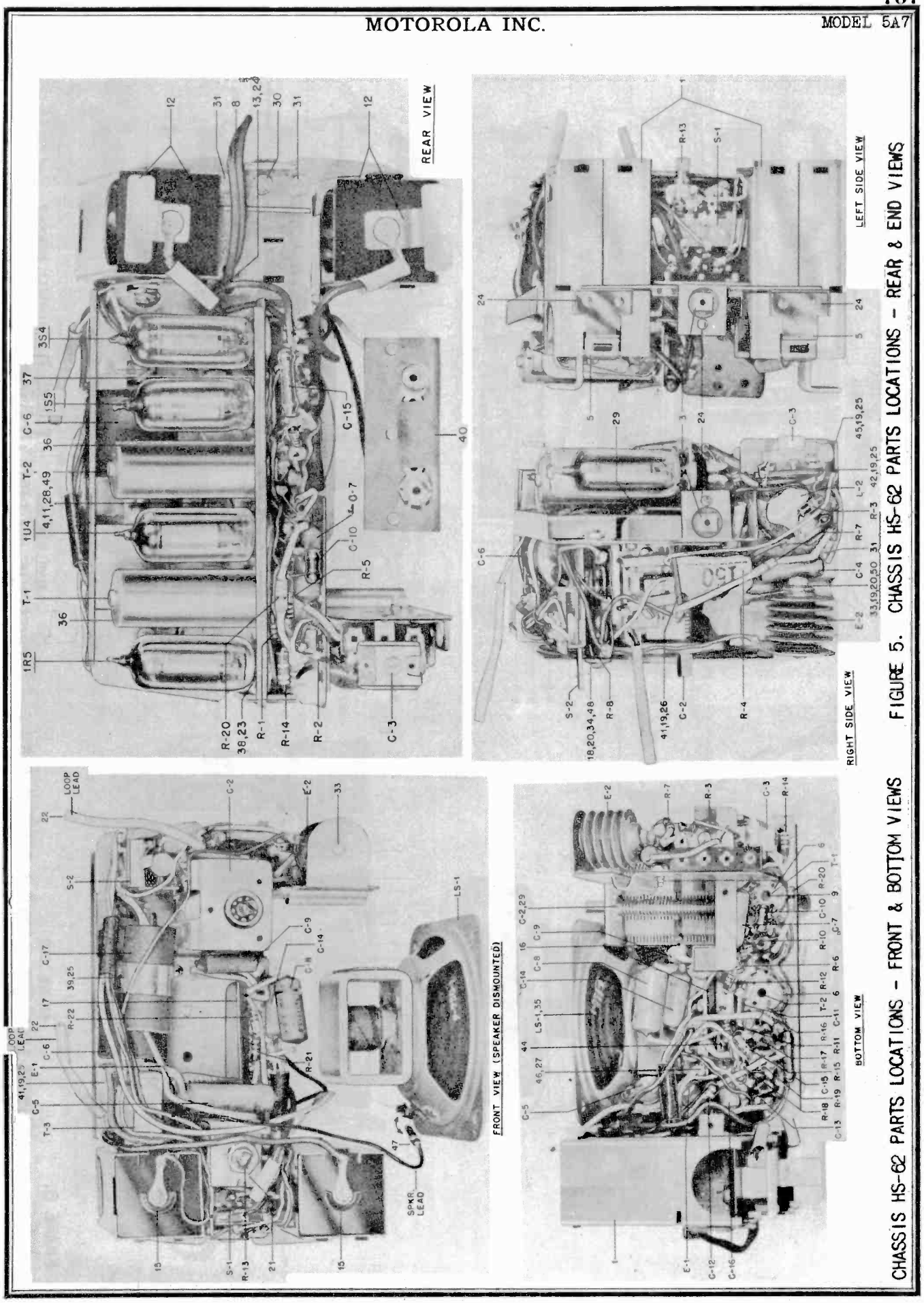
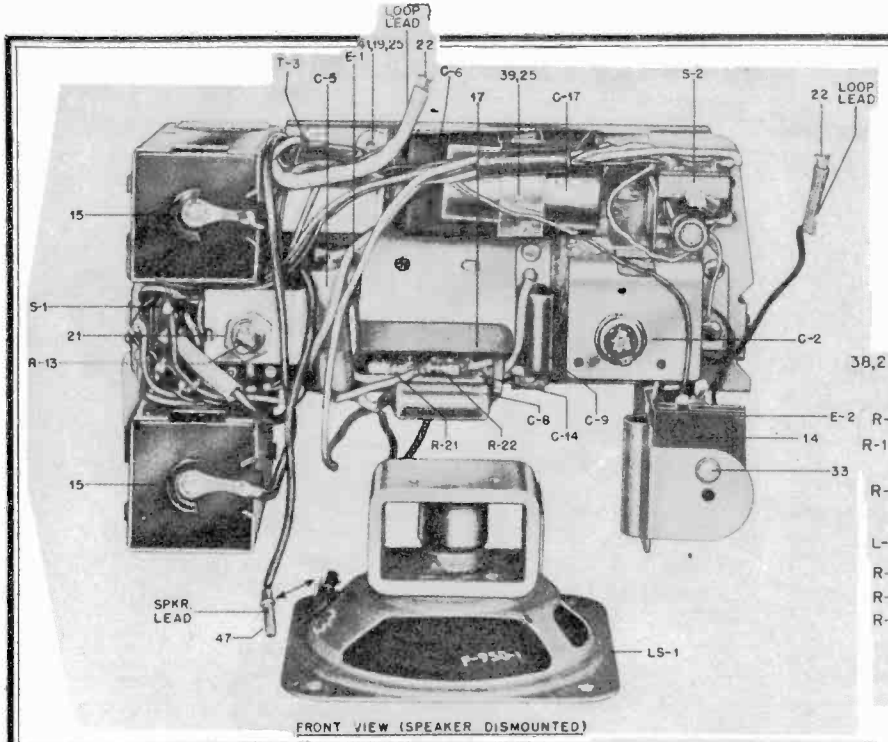


FIGURE 5. CHASSIS HS-62 PARTS LOCATIONS - REAR & END VIEWS

CHASSIS HS-62 PARTS LOCATIONS - FRONT & BOTTOM VIEWS



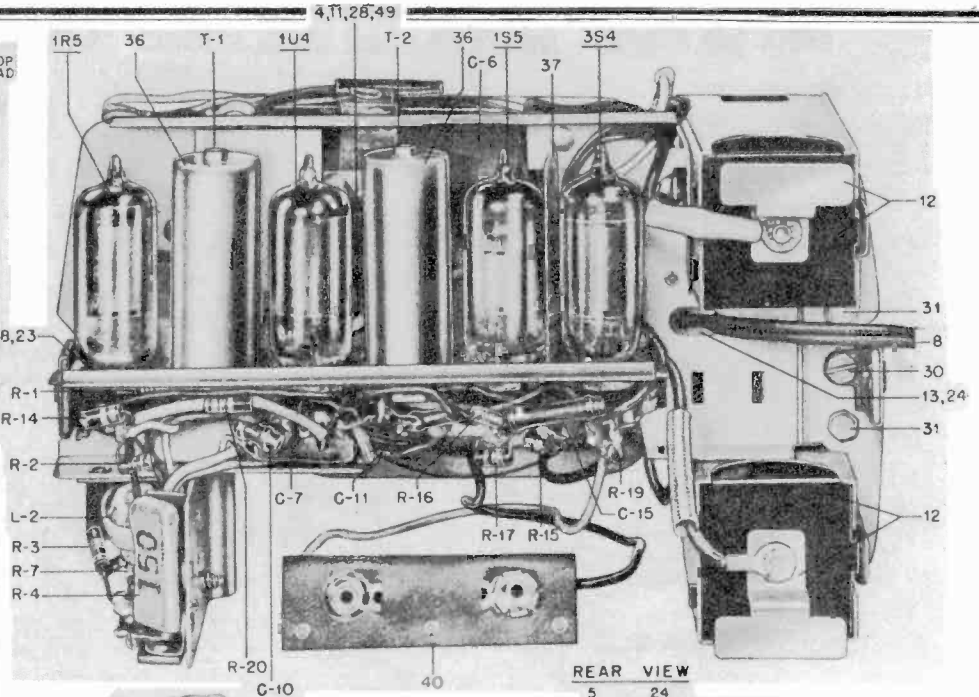


FIGURE 6. CHASSIS HS-62A PARTS LOCATIONS - FRONT & BOTTOM VIEWS

FIGURE 7. CHASSIS HS-62A PARTS LOCATIONS - REAR & END VIEWS

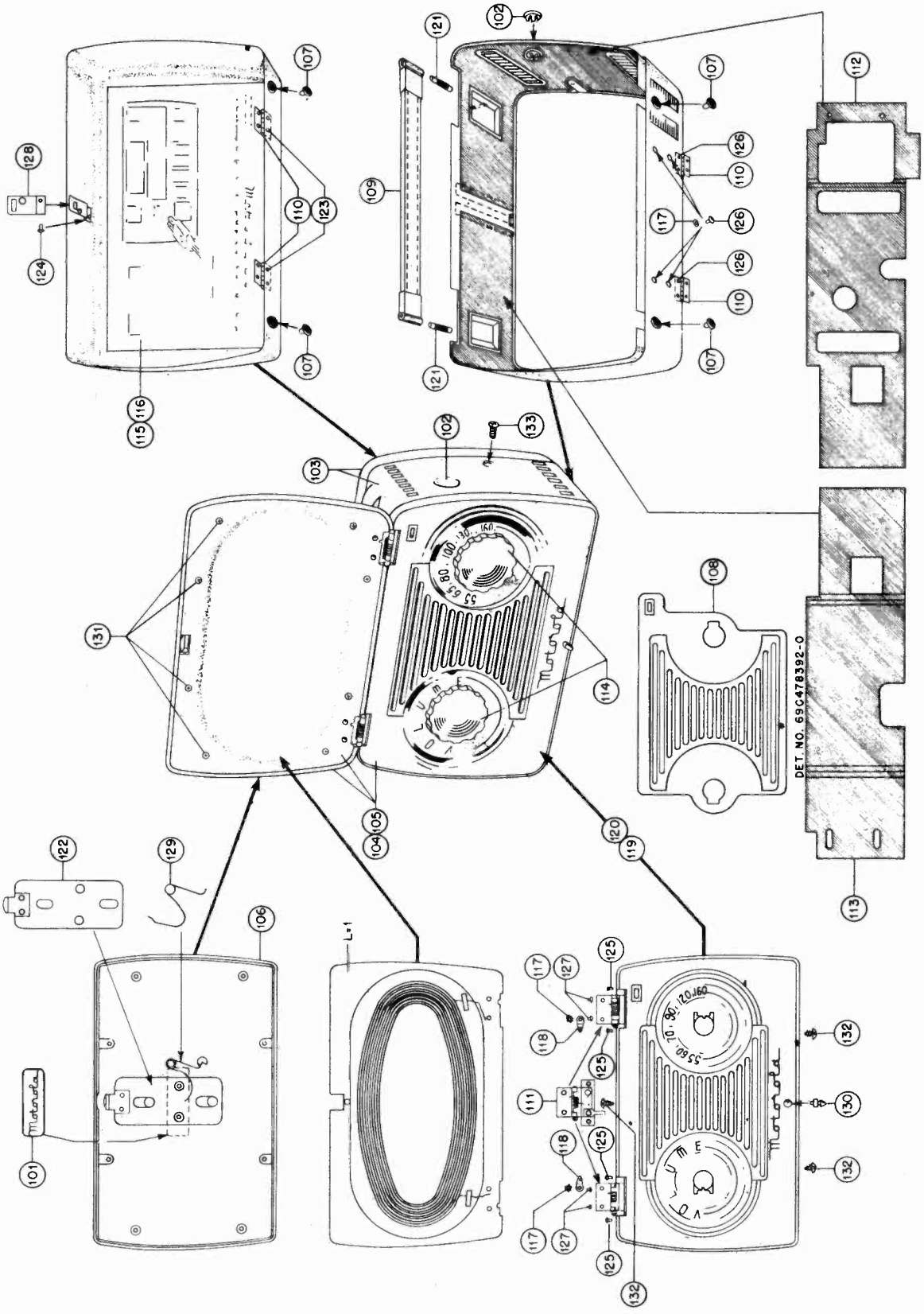


FIGURE 8. MODELS 5A7 & 5A7A CABINET PARTS LOCATIONS

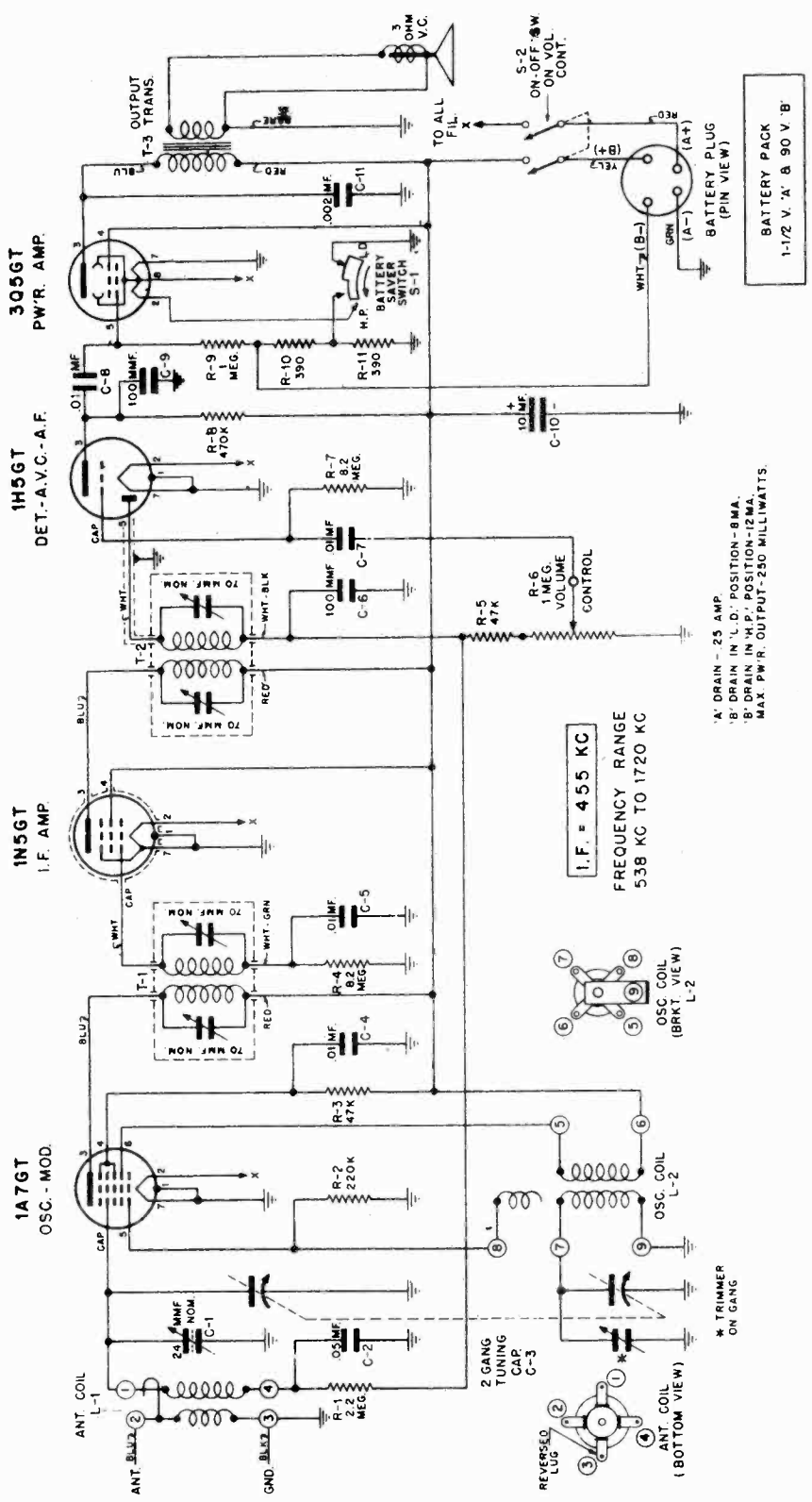
REPLACEMENT PARTS LIST

CHASSIS PARTS - HS-62 & HS-62A

REF. NO.	PART NO.	DESCRIPTION
CAPACITORS		
C-2	19B470623	Variable, 2 gang: full plates (HS-62 only)
	19B478016	Variable, 2 gang: cut oscillator plates (HS-62A only)
C-3	20A71206 or 20K478061	Trimmer, mica: 246 to 286 mmf range (Osc. pad - HS-62 only)
C-4	8K471628	Paper: .02 mf 100V
C-5	8A470606	Paper: .05 mf 400V
C-6	23B470692	Electrolytic: 40-20-15 mf/150V
C-7	8K471628	Paper: .02 mf 100V
C-8	8A71213	Paper: .05 mf 100V
C-9	8K471628	Paper: .02 mf 100V
C-10	21K77373	Ceramic: 50 mmf 500V
C-11	21B77286	Ceramic: 100 mmf 500V
C-12	21B470567	Ceramic: 4700 mmf 500V
C-13	21B77286	Ceramic: 100 mmf 500V
C-14	8K71628	Paper: .02 mf 100V
C-15	21B470567	Ceramic: 4700 mmf 500V
C-16	8A24966	Paper: .005 mf 100V
C-17	23B470693	Electrolytic: 80 mf 25V
CHOKE & CAPACITOR		
E-1	24A470628	Choke & Tubular Capacitor (.05 mf 200V capacitor)
RECTIFIER		
E-2	48B478111	Selenium Rectifier: half-wave
COILS		
L-1	24B470993	Loop Antenna & Panel Assembly (HS-62 only)
	24K478008	Loop Antenna & Panel Assembly (HS-62A only)
L-2	24A25548	Oscillator (HS-62 only)
	24A478022	Oscillator (HS-62A only)
SPEAKER		
LS-1	50B470620	Speaker: 3-1/2" PM; 3.2 ohm VC (HS-62 & HS-62A)
	50B478023	Speaker: 3-1/2" PM; 3.2 ohm VC (HS-62A only)
RESISTORS		
Note: All resistors are insulated carbon type, 1/2W, 20% unless otherwise specified.		
R-1	6R2122	4.7 meg
R-2	6R6031	100,000
R-3	6R6397	22,000 10%
R-4	17A76986	Wirewound: 150 10% 2-1/2W
R-5	6R2109	10 meg
R-6	6R6406	22 10%
R-7	6R6036	3,300
R-8	17A470618	Wirewound: 2,000 10% 5W centertapped
R-10	6R2118	3.3 meg
R-11	17K77629	Wirewound: 4.7 10% 1/2W
R-12	6R6001	68,000
R-13	18A471705	Volume Control: 1 megohm
R-14	6R5554	390 10%
R-15	6R2109	10 meg
R-16	6R2122	4.7 meg
R-17	6R6004	1 meg
R-18	6R2118	3.3 meg
R-19	6R6432	270 10%
R-20	6R6040	680 10%
R-21	6R6015	220,000
R-22	6R6269	820 10%
SWITCHES		
S-1	40A470619 or 40B471927	Slide switch: 5PDT (AC-DC/Battery selector-interchangeable with 40B471927) Rotary Change-over Switch: 5PDT (AC-DC Battery Selector-interchangeable with 40A470619)
S-2	40A470837	Slide switch (on-off)
TRANSFORMERS		
T-1	24B470894	IF, 456 Kc: complete with padding capacitors and tuning cores; less shield NOTE: WHEN USING REPLACEMENT IF TRANSFORMER, IT MAY BE NECESSARY TO ENLARGE HOLE IN SHIELD SLIGHTLY
T-2	24B470896	Diode, 456 Kc: complete with padding capacitor and tuning core;less shield NOTE: WHEN USING REPLACEMENT DIODE TRANSFORMER, IT MAY BE NECESSARY TO ENLARGE HOLE IN SHIELD SLIGHTLY
T-3	25B470822	Output
1	1X470935	Battery Box & Bracket Assembly: two complete "A" battery boxes assembled together; includes negative contacts and positive contact insulator catches only
2	7A478012	Bracket, speaker mounting (used only with 50B478023 speaker only)
3	1X470836	Bushing & Insulator Assembly (chassis insulated mtg)
4	43K13458	Bushing, plain: brass (used inside subchassis shock mtg grommets)
5	55A470913	Catch, battery insulator: phosphor bronze
6	42A470887	Clip, transformer mounting (IF & diode trans. mtg)
7	42A470861	Clip, tuning core (IF & diode trans. tuning core retainer)
8	30B470821	Cord, line & plug: 2 conductor; 6 ft lg.
9	46A470885	Core, iron: threaded (IF & diode trans. tuning)
10	15C470942	Cover, chassis (bottom chassis cover)
11	5K470916	Grommet, insulating: rubber (sub-chassis shock mounting)
12	1X470933	Insulator, Lead & Lug Assembly: includes cord clamp ("A" battery box positive contact)
13	14A470814	Insulator, line cord lock: fibre
14	14A478112	Insulator, rectifier: armite
15	1X470936	Insulator, Spring, Lead & Lug Assembly ("A" battery box negative contact)
16	14A470817	Insulator, terminal strip: armite; small
17	14A470815	Insulator, terminal strip: armite; large
18	4S7666	Lockwasher: #6 external (resistor mtg)
19	4S7650	Lockwasher: #6 internal (term. strip & rectifier mtg)
20	2S7005	Nut: 6-32 x 1/4 hex; cadmium plated (resistor & rectifier mtg)
21	2S7018	Nut: 3/8-32 x 1/2 hex; cadmium plated (vol. cont. mtg)
22	9A470980	Receptacle, loop lead
23	5S7769	Rivet: .088 x 3/32 steel; nickel plated (socket mtg, etc.)
24	5S7770	Rivet: .088 x 5/32 steel; nickel plated (line cord lock,battery insulator catch and chassis insulator mtg)
25	5S7706	Rivet: .122 x 1/8 steel; nickel plated (electrolytic strap mtg, etc)
26	5S7707	Rivet: .122 x 5/32 steel; nickel plated (term. strip mtg)
27	5S7701	Rivet: .122 x 3/16 steel; nickel plated (term. strip mtg)
28	3S2681	Screw: #4 x 3/8 Phillips fillister head thread cutting screw; cadmium plated (sub-chassis mtg)
29	3S7247	Screw: 6-32 x 3/16 slotted hex head locking type machine screw; cadmium plated (gang mtg)
30	3S7462	Screw: #6 x 3/16 slotted hex head thread cutting screw; cadmium plated (AC-DC/Battery sw. mtg-center)
31	3S7506	Screw: #6 x 1/4 PKZ plain hex head sheet metal screw; cadmium plated (osc. coil & battery box mtg)
32	3S7460	Screw: #6 x 1/4 slotted binderhead thread-cutting screw; cadmium plated (chassis cover mtg)
33	3S9663	Screw: 6-32 x 1-1/8 slotted round head machine screw; cadmium plated (rectifier mounting)
34	3S1451	Screw: 6-32 x 2" slotted round head machine screw; cadmium plated (resistor mounting)
35	3S7205	Screw: 8-32 x 1/4 slotted hex head locking type machine screw; cadmium plated (speaker mtg)
36	1A470891	Shield & Sleeve Assembly (for T-1 & T-2)
37	28A470908	Shield, tube
38	9A470506	Socket, tube: miniature 7 prong
39	42A470807	Strap, electrolytic: retainer
40	31K470880	Strip, "B" battery terminal
41	31A84794	Strip, terminal: 1 insulated lug, end mtg
42	31A478049	Strip, terminal: 2 insulated lugs, #2 mtg (3/8 spacing)
43	31K86126	Strip, terminal: 2 insulated lugs, #2 mtg (3/8 spacing)HS-62A
44	31A38311	Strip, terminal: 2 insulated lugs, #2 mtg (1/4" spacing)
45	31A71196	Strip, terminal: 3 insulated lugs, #1 mtg
46	31A470612	Strip, terminal: 6 insulated lugs, hole
47	29K5414	Terminal, plain pin: .125 dia. (speaker plug)
48	4K470939	Washer, insulating: 3/8 x .136 x .062 thick; armite (resistor mounting)
49	4S7554	Washer: 3/8 x 1/8 x .033 thick, steel; cadmium plated (sub-chassis mtg)
50	4S7552	Washer: 7/16 x 9/64 x .042 thick; cadmium plated (rectifier mtg)

CABINET PARTS - MODELS 5A7 & 5A7A

REF. NO.	PART NO.	DESCRIPTION
101	38A470978	Button, loop cover: plastic
102	38K470999	Button, plug: wrinkle maroon finish (cover for loop ant. trim hole)
103	1X478033	Cabinet: complete; includes: die cast housing, rear cover with catch, felt feet and armite housing insulators; does not include carrying handle, handle retaining pins or front cover and loop assembly
104	1X478027	Cover, Loop & Front Panel Assembly: includes: satin-finished chrome front panel, latch retainer stud, two insulated hinges, molded speaker grille, loop antenna and loop cover with latch (for 5A7 only-use only with Chassis HS-62)
105	1X478034	Cover, Loop & Front Panel Assembly: as above except for 5A7A only-use only with Chassis HS-62A
106	1X470992	Cover & Latch Assembly: loop antenna cover with complete latch assembly
107	55A27113	Foot, felt
108	13C470873	Grille, speaker: maroon plastic
109	55A470994	Handle, carrying: complete
110	55K30198	Hinge, back cover
111	1X478029	Hinge & Insulator Assembly (front cover hinge)
112	14D478014	Insulator, inner housing: right hand; armite
113	14K478079	Insulator, inner housing: left hand; armite
114	36B470967	Knob, control: maroon plastic
115	54B471078	Label, composite: operating instructions & cover insulator (for 5A7)
116	54K471872	Label, composite: operating instructions & cover insulator (for 5A7A)
117	4S8406	Lockwasher: #2 internal; cadmium plated (housing insulator mtg & loop lug mtg)
118	29R5399	Lug, soldering: #3
119	15K478017	Panel, front: metal; satin chrome finish (5A7 only)
120	15K478020	Panel, front: metal; satin chrome finish (5A7A only)
121	46A470997	Pin, handle retainer
122	1X470989	Plate & Latch Assembly
123	5S8487	Rivet: .088 x 3/32 steel; black nickel finish (mounts rear cover to hinge)
124	5S2831	Rivet: .088 x 3/32 steel; statuary bronze finish (rear cover catch mtg)
125	5S2829	Rivet: .088 x 1/4 steel; statuary bronze finish (mounts hinge to front panel)
126	5S8490	Rivet: .088 x 5/32 steel; black nickel finish (mounts hinge to die cast housing & housing insulator mtg)
127	5S2827	Rivet: .088 x 5/32 steel: statuary bronze finish (mounts hinge to loop panel)
128	1X470983	Spring & Button Assembly (rear cover catch)
129	41A470909	Spring, loop door catch
130	4B470961	Stud, latch retainer
131	3S3389	Screw: #2 x 1/4 PKZ Phillips flat head sheet metal screw; statuary bronze finish (mount loop to loop cover)
132	3S3390	Screw: #4 x 3/16 PKA Phillips stove head sheet metal screw; statuary bronze finish (mount front panel to housing)
133	3S478038	Screw: 4-40 x 1/4 Phillips binderhead machine screw; statuary bronze finish (chassis to cabinet mtg)



This receiver is a 4 tube battery operated superheterodyne, covering the broadcast band from 538 to 1720 kc. The I.F. frequency is 455 kc.

POWER DRAIN:

'A' drain - .25 AMP. at 1.5 V.

'B' drain in 'L.D.' position - 8 MA. at 90 V.

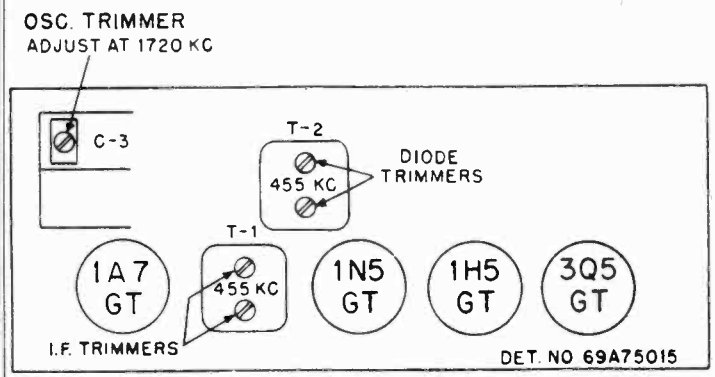
'B' drain in 'H.P.' position - 12 MA. at 90 V.

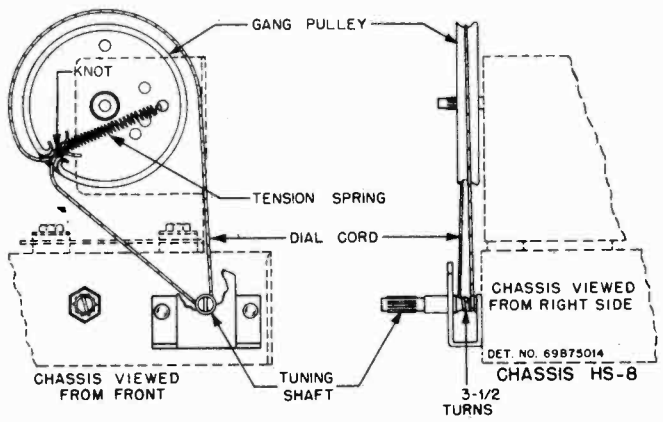
MODEL 45B12, Ch. HS-8 MOTOROLA INC.

Turn Battery Saver Switch to 'H.P.' (high power) position.
Connect output meter across speaker voice coil (.38V = .05 watts).
Volume control set at maximum for all operations.
The adjusting screwdriver or alignment tool should be of the insulated type, such as Motorola Part No. 66A71008.

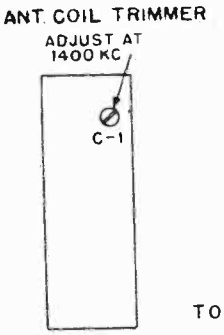
OPERATIONS IN ORDER	GANG CAPACITOR SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER NO.	GENERATOR SET AT (400~ 30% MODULATED)	AVERAGE INPUT FOR 38V OUTPUT
1. Adjust I.F.'s for maximum	Minimum Capacity	.1 mf	Osc.-Mod. grid	T-1 & T-2 (2 trimmers on each)	455 Kc	3750 microvolts to I.F. grid. 80 microvolts to Osc.-Mod. grid.
2. Set Oscillator trimmer	Minimum Capacity	.1 mf	Osc.-Mod. grid	Trimmer on C-3	1720 KC	100 microvolts
3. Adjust R.F. trimmer for maximum	1400 Kc.	200 mmf	Antenna Lead	C-1	1400 Kc	10 microvolts

4. Repeat above steps for maximum accuracy.



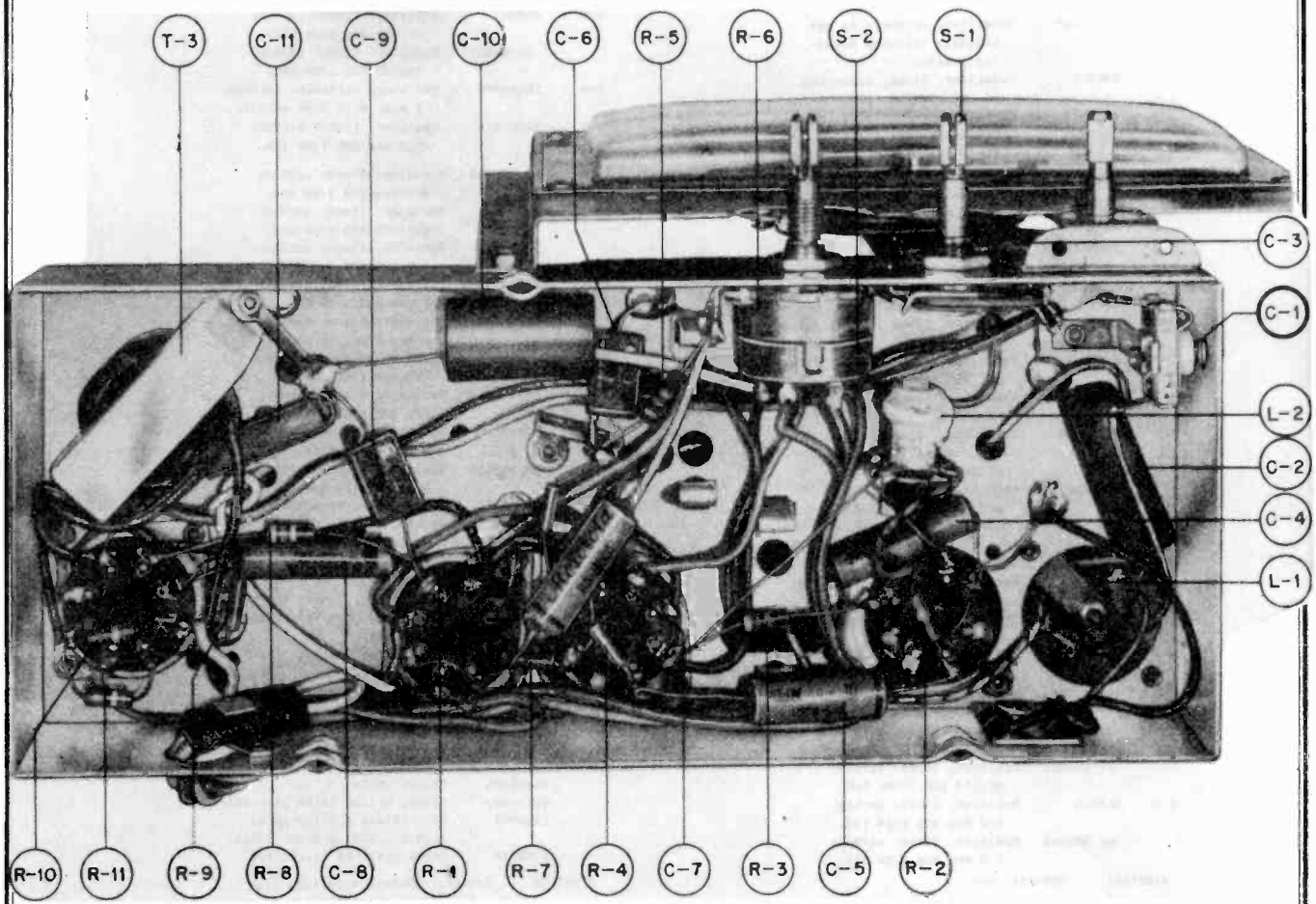


DIAL CORD LAYOUT



TO REPLACE DIAL CORD

1. Remove set from cabinet by pulling the knobs off and unscrewing the three chassis retaining screws from the bottom.
2. Remove the dial crystal by pushing out the four snap-in eyelets. Avoid damaging crystal and dial scale by pushing the eyelets out from the back. Do not remove the dial scale.
3. Remove the dial pointer by carefully pulling it off.
4. Next the dial plate is taken off by removing two screws.
5. Remove the old cord and replace with a new piece of 24 lb. fish line. See Figure 1. 2. 3. 4.
6. Secure the cord knot with a drop of cement.
7. Reassemble dial mechanism by working in reverse order. The pointer should be adjusted so that it is horizontal and pointing to the low frequency end when the gang capacitor is fully closed.



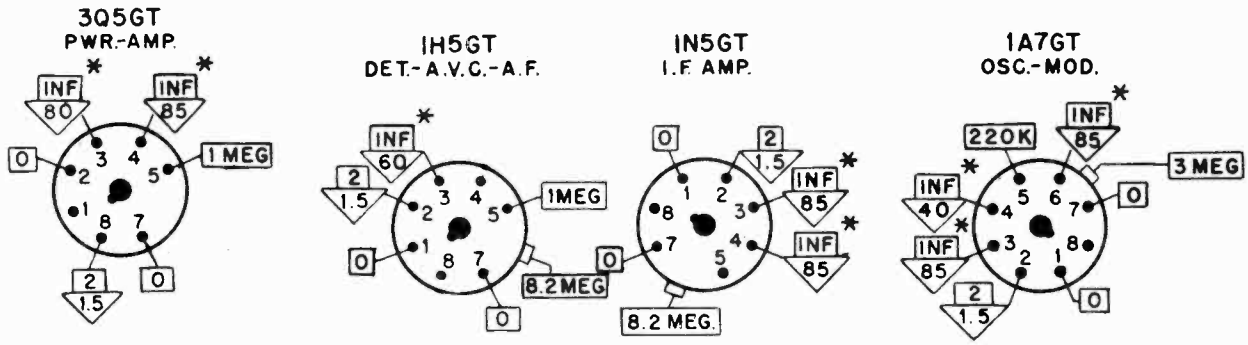
CHASSIS BOTTOM VIEW

VOLTAGES MEASURED ON A 20,000 Ω PER VOLT VOLTMETER TO CHASSIS WITH BATTERY SAVER SWITCH IN H.P. POSITION.

▽ =VOLTAGE MEASUREMENTS.

▭ =RESISTANCE MEASUREMENTS.

* DISCONNECT ONE SIDE OF ELECTROLYTIC CAPACITOR C-10 WHEN MAKING RESISTANCE MEASURMENTS. CHECK ELECTROLYTIC CAPACITOR BY PUTTING POSITIVE OF CAPACITOR TO POSITIVE TERMINAL OF OHM-METER BATTERY. THE RESISTANCE SHOULD BE .5 MEG. OR SO.



BOTTOM VIEW OF CHASSIS

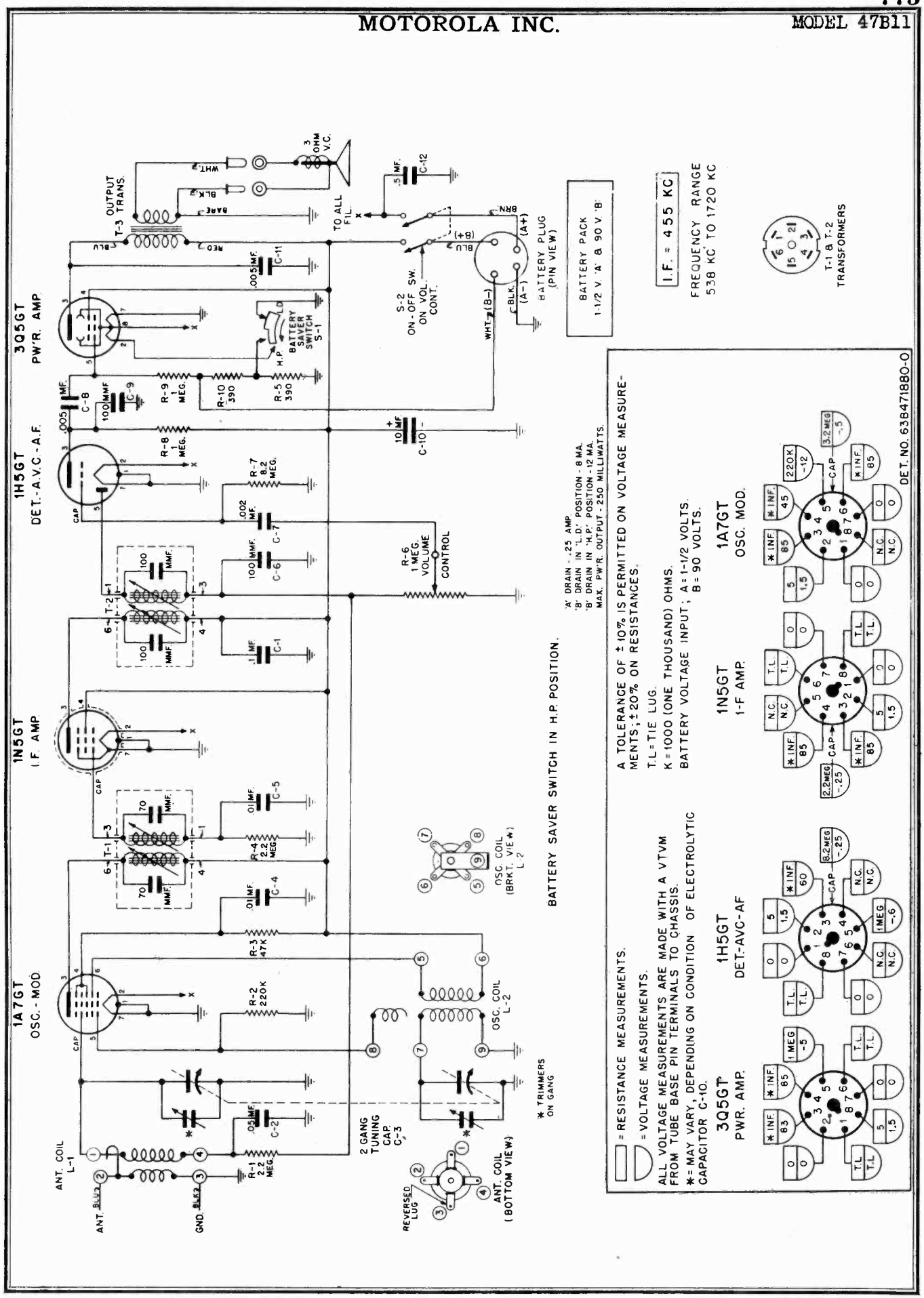
VOLTAGE AND RESISTANCE CHART

REF. NO.	PART NO.	DESCRIPTION
C-1	20A26941	Capacitor, trimmer: 24 mmf nominal; includes mounting bracket.
C-2	8S9805	Capacitor, fixed: paper; .05 mf 20% 100 VDC.
C-3	1X20506	Capacitor, variable: 2 gang. Cut oscillator plates; (includes pulley).
C-4	8S9801	Capacitor, fixed: paper; .01 mf 20% 200 VDC.
C-5	8S9801	Capacitor, fixed: paper; .01 mf 20% 200 VDC.
C-6	21R6641	Capacitor, fixed: mica; 100 mmf 20% 500 VDC.
C-7	8S9801	Capacitor, fixed: paper; .01 mf 20% 500 VDC.
C-8	8S9825	Capacitor, fixed: paper; .01 mf 20% 200 VDC.
C-9	21R6641	Capacitor, fixed: mica; 100 mmf 20% 500 VDC.
C-10	23A14727	Capacitor, electrolytic; 10 mf 150 V.
	20A20525	Capacitor, trimmer: dual; 70 mmf nominal (In I.F. & diode cans).
	or 20A72754	Capacitor, trimmer: dual; 70 mmf nominal (In I.F. & diode cans).
L-1	24A30442	Coil, antenna: iron core type
L-2	24A27349	Coil, oscillator.
R-1	6R6202	Resistor, fixed: carbon; 2.2 meg 20% 1/3W Ins.
	or 6R3927	Resistor, fixed: carbon; 2.2 meg 20% 1/2W Ins.
R-2	6R6204	Resistor, fixed: carbon; 220,000 20% 1/3W Ins.
	or 6R6015	Resistor, fixed: carbon; 220,000 20% 1/2W Ins.
R-3	6R6321	Resistor, fixed: carbon; 47,000 20% 1/3W Ins.
	or 6R6056	Resistor, fixed, carbon; 47,000 20% 1/2W Ins.
R-4	6R6310	Resistor, fixed, carbon: 8.2 meg 20% 1/3W Ins.
	or 6R3938	Resistor, fixed: carbon; 8.2 meg 20% 1/2W Ins.
	61B27421	Crystal, dial
	37A14809	Cushion, socket (for 1A7 socket)
	1X27422	Dial Plate & Indicator Assem.
	5S7805	Eyelet, Snap-In: .156 x .141; CP (dial scale mtg).
	5A19658	Eyelet, steel: .296 x .212. Cop. Pl. (gang mtg).
	5S7820	Eyelet, brass: .470 x .129 (spkr. lead tip).
	5S7855	Eyelet, brass: .484 x .156 (spkr. lead tip).
	37A12691	Grommet, rubber (gang cushioning)
	37A14810	Grommet, rubber (1A7 tube socket).
	52A27419	Indicator, ON-OFF.
	36A15813	Knob, control: molded; blank (for tuning and volume shafts).
	36K21243	Knob, control: molded; lined (for battery saver switch).
	4S7666	Lockwasher, steel: #6 external; CP (osc. coil mtg.)
	4S7660	Lockwasher, phosphor bronze: #8 external (spkr. mtg.)
	29R5207	Lug, soldering (gang gnd.)
	29R5209	Lug, soldering: dumb-bell type (chassis gnd).
	2S7070	Nut: 6/32 x 1/4, Inverted Palnut (ant. coil mtg.)
	2S7000	Nut, brass: 8-32 x 5/16 (speaker mtg.)
	2S7051	Nut: 3/8-32 x 9/16, Palnut; CP (volume control)
	28X11366	Plug, 4 prong (for bat cable)
	52K27662	Pointer, dial
	5S7707	Rivet, steel: 5/32 x .122, Pol. Nkl. (tube socket mtg.)
	5S7701	Rivet, steel: 3/16 x .122: Pol. Nkl. (output trans mtg. etc.)
	5S7703	Rivet, steel: 7/32 x .122; Pol. Nkl. (Ant. & Gnd strip mtg.)
	5S7732	Rivet, steel: 1/2 x .122; Pol. Nkl. (1A7 tube socket mtg.)

REF. NO.	PART NO.	DESCRIPTION
R-5	6R6321	Resistor, fixed: carbon; 47,000 20% 1/3W Ins.
	or 6R6056	Resistor, fixed: carbon; 47,000 20% 1/2W Ins.
R-6	18A19979	Resistor, variable, carbon; 1 meg. With DPST switch.
R-7	6R6310	Resistor, fixed: carbon; 8.2 meg 20% 1/3W Ins.
	or 6R3938	Resistor, fixed: carbon; 8.2 meg 20% 1/2W Ins.
R-8	6R6160	Resistor, fixed: carbon; 470,000 20% 1/3W Ins.
	or 6R6032	Resistor, fixed: carbon; 470,000 20% 1/2W Ins.
R-9	6R6159	Resistor, fixed: carbon; 1 meg 20% 1/3W Ins.
	or 6R6004	Resistor, fixed: carbon; 1 meg 20% 1/2W Ins.
R-10	6R6345	Resistor, fixed: carbon; 390 10% 1/3W Ins.
	or 6R5554	Resistor, fixed: carbon; 390 10% 1/2W Ins.
R-11	6R6345	Resistor, fixed: carbon; 390 10% 1/3 WIns.
	or 6R5554	Resistor, fixed: carbon; 390 10% 1/2W Ins.
S-1	40A30444	Switch, battery saver; SPDT.
S-2	Part of R-6	Switch, ON-OFF: DPST.
T-1	1X28276	Transformer, I.F.; 455 Kc; complete with shield and trimmers.
T-2	1X28277	Transformer, Diode: 455 Kc; complete with shield and trimmers.
T-3	25X15786	Transformer, output
	1X21246	Battery Cable Assembly
	7B18748	Bracket, gang mounting
	7A14610	Bracket, tuning shaft
	16C70088	Cabinet, table model: wood (complete)
	42K13135	Clamp, cable
	35K70089	Cloth, grille (Olek #421.12)
	1X19897	Coil Shield & Clips Assem. (for I.F. & Diode coils)
	11M8749	Cord, dial: 24 lb., black
	37K20865	Rubber, channel: 9/16 long (for dial plate support bracket)
	3S2683	Screw: #6 x 3/16 PK Z PlHH; CP (osc. coil mtg.)
	3S7152	Screw: 6-32 x 1/4 SlHHMS; CP (gang & lug mtg.)
	3S7350	Screw (lockscrew): 6-32 x 1/4 SlHHMS; CP (gang mtg.)
	3S7454	Screw: #8 x 1/4 PK Z PlHH; CP (dial plate mtg.)
	3S7246	Screw; 8-32 x 1/8 Pl HHMS; CP (dial plate mtg.)
	3S7512	Screw: #8 x 1/2 PK Z PlHH; CP (gang brkt mtg.)
	3S8117	Screw: #8 x 1 PK Z SlHWH; antique copper pl. (chassis mtg.)
	34B27418	Scale, dial
	47A14635	Shaft, tuning control
	26A14760	Shield, tube: bantam (for 1N5)
	9A6738	Socket, tube: octal, saddle (for IN5, IH5 & 3Q5)
	9A6766	Socket, tube: octal, wafer (for 1A7)
	50B71087	Speaker: 6" PM; 3 ohm V.C.
	41A14244	Spring, tension coil (dial cord).
	41A19997	Spring, indicator (actuates ON-OFF indicator)
	41A72506	Spring, tension (for ON-OFF indicator)
	14A19980	Strip, antenna & ground lead insulating
	4A70015	Washer "C" (used on tuning shaft)
	35K19943	Washer, paper: 11/16 x 17/64 1/32 thick (used under knobs)
	4S7625	Washer, steel: 1/4 x .128 x .016 thick; CP (1A7 tube socket)
	4S7646	Washer, steel: 11/16 x 3/16 x .065 thick; Cop. Pl. (chassis mtg.)

MOTOROLA INC.

MODEL 47B11



Maximum performance can only be obtained if extreme care is exercised during alignment. Follow the procedure carefully.

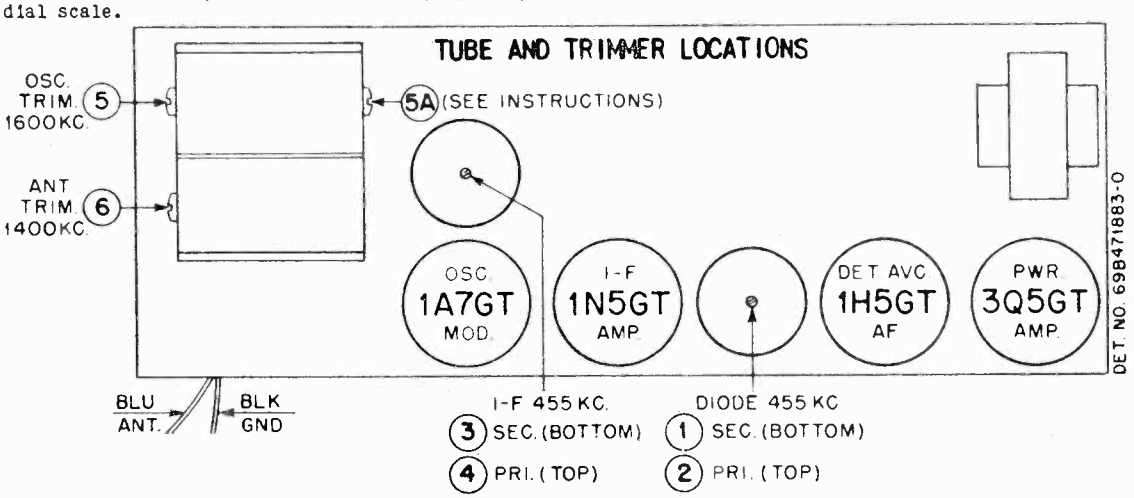
A low range output meter should be connected across the speaker voice coil. Set LO DRAIN-HI POWER switch to HI POWER. Set receiver volume control to maximum; for greatest accuracy keep output of receiver at approximately .05 watt throughout alignment by reducing signal generator output (not receiver volume control) as stages are brought into alignment. (.05 watt = .40 volt on output meter.) The alignment tool should be of an insulated type, such as Motorola Part No. 66A71008.

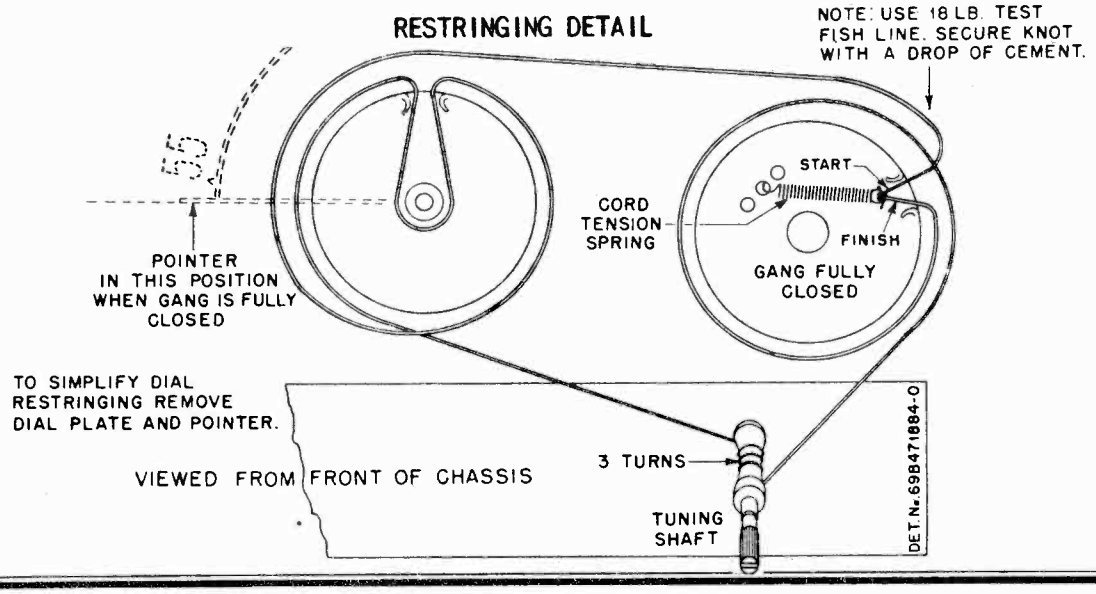
Refer to Figure 1 for location of all adjustments.

Normally, oscillator can be set with trimmer 5. However, if setting of trimmer 5A has been tampered with, it may be necessary to increase or decrease setting of 5A before trimmer 5 will peak correctly.

STEP	DIAL SET TO	DUMMY	SIGNAL GENERATOR CONNECTED TO	SIGNAL GENERATOR SET TO	ADJUST TRIMMER OR CORE	REMARKS
			ALIGNMENT			
IF ALIGNMENT						
1.	Gang fully opened.	.1 mf.	High side to Osc-Mod grid (cap). Lo side to chassis.	455 Kc.	1,2,3 & 4	Peak for maximum output.
RF ALIGNMENT						
2.	1600 Kc *	200 mmf.	High side to Ant. lead. Lo side to ground lead.	1600 Kc.	5	This sets oscillator to dial scale.
3.	1400 Kc	200 mmf.	"	1400 Kc.	6	Peak for maximum output.

* First check setting of pointer. With gang fully closed, pointer should be parallel with horizontal line on dial scale.





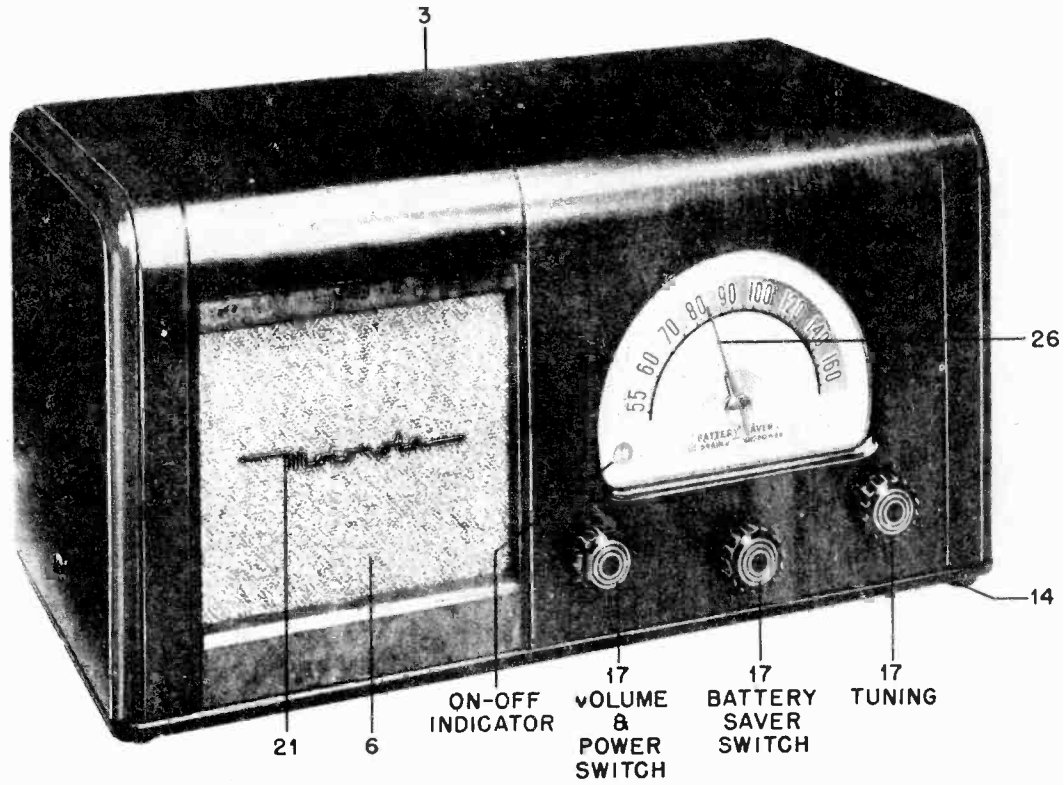


FIGURE 3. PARTS LOCATION - CABINET FRONT

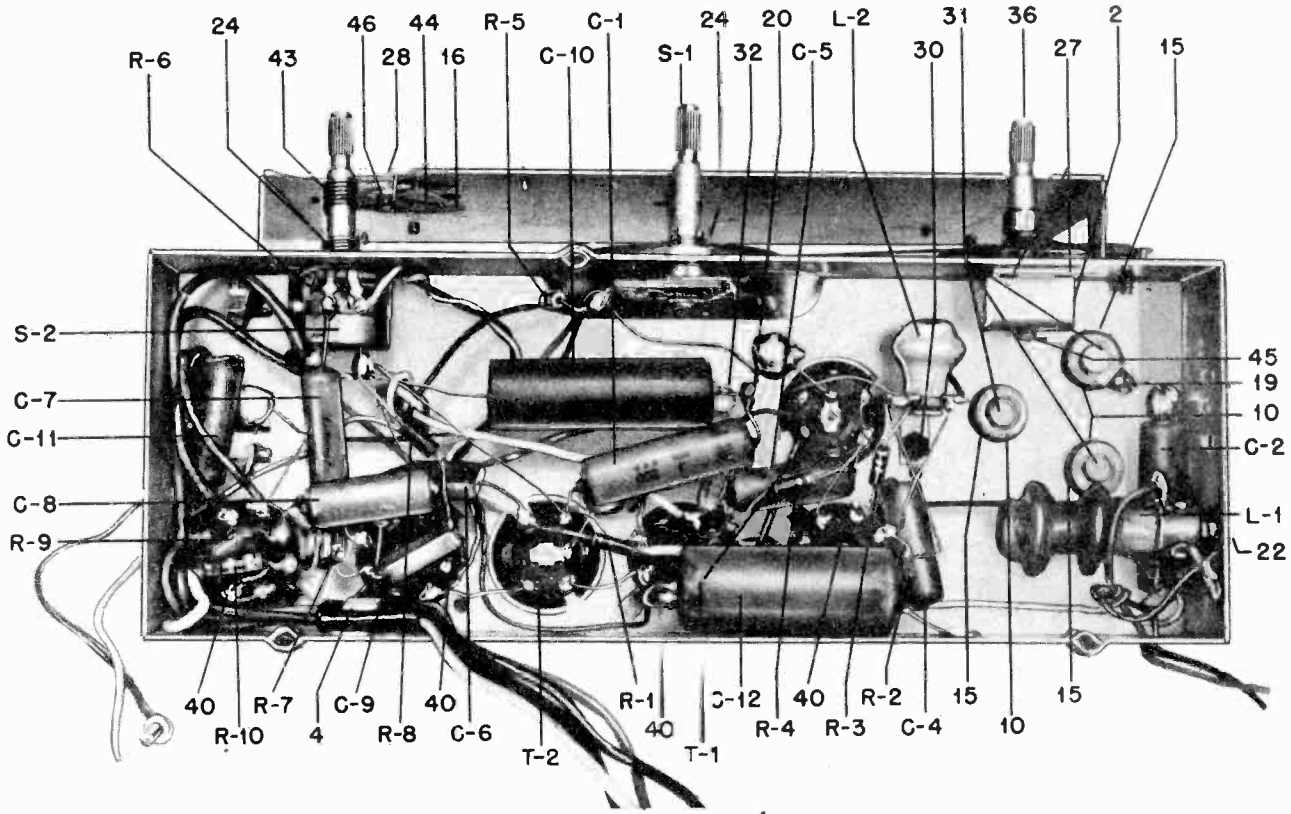


FIGURE 6. PARTS LOCATION - CHASSIS BOTTOM

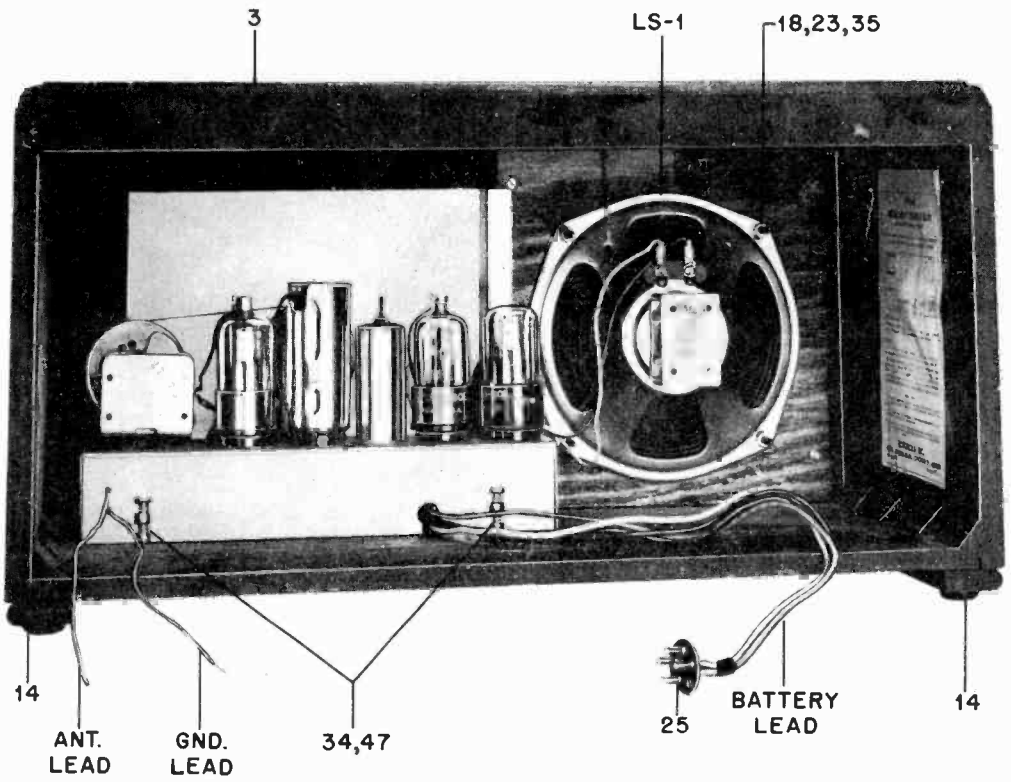
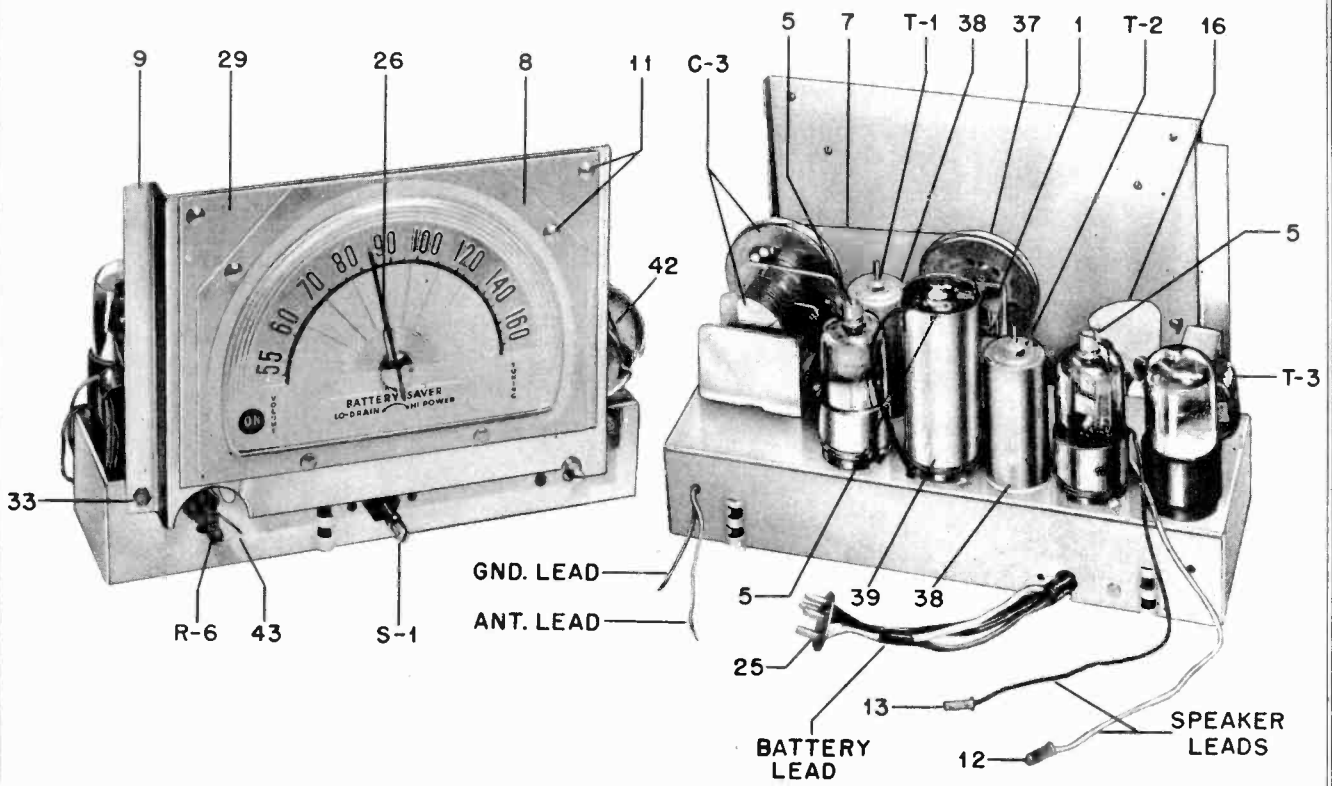


FIGURE 4. PARTS LOCATION - CABINET REAR



PARTS LOCATION - CHASSIS TOP

REPLACEMENT PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
MISCELLANEOUS		
1	71X47007	Bracket Assembly, pointer shaft
2	7A77337	Bracket, tuning shaft mounting
3	16E77626	Cabinet: wood; walnut finish
4	42K13135	Clamp, cable
5	42A5480	Clip, grid: small
6	13K77699	Cloth, grille
7	11M8944	Cord, dial: 18 lb; black
8	61B77625	Crystal, dial
9	1X77696	Dial Scale Mtg. Plate & Indicator Assembly (less dial scale & dial crystal)
10	5A19658	Eyelet (gang mtg)
11	5S7805	Eyelet, snap-in (dial scale & crystal mtg)
12	5S7855	Eyelet: .484 long x .156 diameter
13	5S7820	Eyelet: .450 long x .125 diameter
14	37K15841	Foot, rubber (cabinet foot)
15	5A70404	Grommet, rubber (gang cushions)
16	52A77612	Indicator, ON-OFF
17	36B77659	Knob, control
18	4S7660	Lockwasher: #8 external; phosphor bronze (speaker mtg)
19	29K3010	Lug, soldering
20	29R5348	Lug, soldering: #8
21	62K76926	Nameplate, Motorola
22	2S7070	Nut: 6-32 x 1/4 palnut; cadmium plated (ant. coil mtg)
23	2S7003	Nut: 8-32 x 5/16; hex; brass (speaker mtg)
24	2S7051	Nut: 3/8-32 x 9/16; hex palnut; cadmium plated (volume cont. mtg)
25	28X11368	Plug, 4 prong
26	52A77632	Pointer
27	5S7701	Rivet: .122 x 3/16 steel; polished nickel finish (tuning shaft bracket mtg)
28	5A27675	Rivet, shoulder (ON-OFF indicator mtg)
29	34B77621	Scale, dial
30	3S2683	Screw: #6 x 3/16 plain hex head; sheet metal type; black parkerized finish (osc. coil mtg)
31	3S2294	Screw: 6-32 x 1/2 plain hex head locking type machine screw; cadmium plated (gang mtg)
32	3S7205	Screw: 8-32 x 1/4 slotted hex head locking type machine screw (pointer shaft bracket mtg)
33	3S7454	Screw: #8 x 1/4 plain hex head sheet metal screw; cadmium plated (dial plate mounting)
34	3S7526	Screw: #8 x 1-1/8 slotted hex head sheet metal screw; cadmium plated (chassis mtg)
35	3K653	Screw: speaker mounting
36	1X77694	Shaft, tuning
37	1X77695	Shaft & Drive Pulley Assembly (pointer shaft)
38	1A71049	Shield & Iron Core Sleeve Assembly (for T-1 and T-2)
39	26A14760	Shield, tube: bantam
40	9A6790 or	Socket, tube: molded octal
41	9A6788	Socket, tube: (replacement) molded octal (to be used in place of 9A6790 when socket mounting lugs on chassis break off)
42	41A14244	Spring, tension coil
43	41A77611	Spring, indicator
44	41A72506	Spring, tension (ON-OFF indicator)
45	4A70015	Washer, C
46	4S7554	Washer: 3/8 x 1/8 x .033 thick; cadmium plated (ON-OFF indicator assem)
47	4S8204	Washer: 1" x .203 x .067 thick (chassis mtg)
CAPACITORS		
C-1	8S9806	Paper: .1 mf 200V
C-2	8S9816	Paper: .05 mf 400V
C-3	1X77683	Variable, 2 gang: includes 2" pulley
C-4	8S9809	Paper: .01 mf 400V
C-5	8S9809	Paper: .01 mf 400V
C-6	21R6641	Mica: 100 mmf 500V
C-7	8S9824	Paper: .002 mf 400V
C-8	8S9813	Paper: .005 mf 600V
C-9	21R6641	Mica: 100 mmf 500V
C-10	23A14727	Electrolytic: 10 mfd 150V
C-11	8S9813	Paper: .005 mf 600V
C-12	8S9822	Paper: .5 mf 200V
COILS		
L-1	24A30442	Antenna: iron core type; incl. mtg. screw
L-2	24A27349	Oscillator
SPEAKER		
LS-1	50B71087	PM: 6"; 3.2 ohm voice coil
RESISTORS		
Note:		All resistors are carbon, 20%, insulated type unless otherwise specified.
R-1	6R3927	2.2 meg 1/2W
R-2	6R6015	220,000 1/2W
R-3	6R6056	47,000 1/2W
R-4	6R3927	2.2 meg 1/2W
R-5	6R5554	390 10% 1/2W
R-6	18K77615	Volume control: 1 meg; with DPST switch S-2
R-7	6R5585	8.2 meg 10% 1/2W
R-8	6R6004	1 meg 1/2W
R-9	6R6004	1 meg 1/2W
R-10	6R5554	390 10% 1/2W
SWITCHES		
S-1	40K77620	Battery Saver
S-2	-	DPDT (part of volume control R-6)
TRANSFORMERS		
T-1	24B77677	IF: 455 Kc; complete with iron cores and padding capacitor, but less shield
T-2	24B70531	Diode: 455 Kc; complete with iron cores and padding capacitors, but less shield
T-3	25B76952 or 25B76987	Output

MOTOROLA INC.

MODELS 55X11,55X12,55X13, Ch.HS-1;55X11A,55X12A, 55X13A,Ch.HS-50

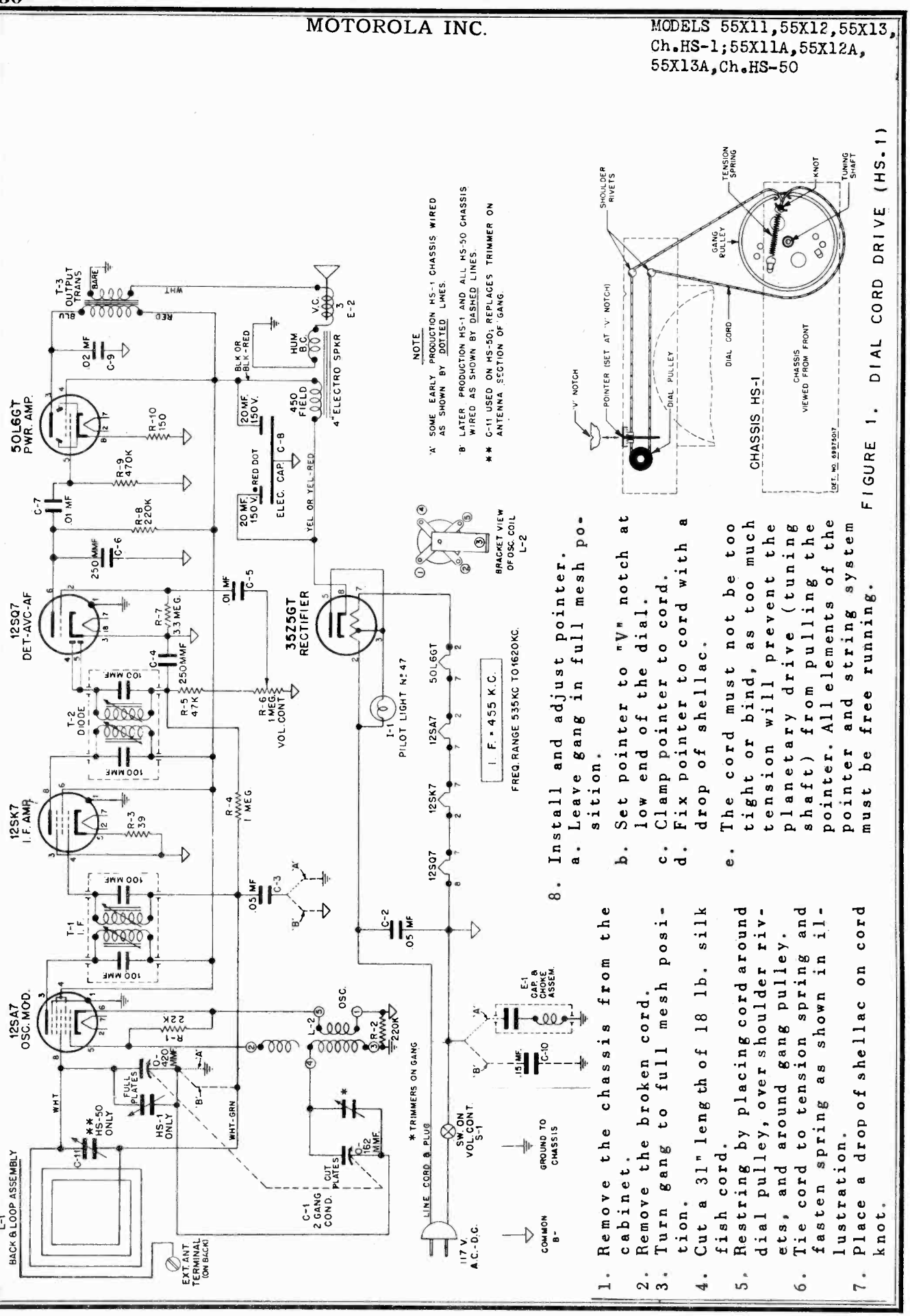


FIGURE 1. DIAL CORD DRIVE (HS.1)

1. Remove the chassis from the cabinet.
2. Remove the broken cord.
3. Turn gang to full mesh position.
4. Cut a 31" length of 18 lb. silk fish cord.
5. Restring by placing cord around dial pulley, over shoulder rivets, and around gang pulley.
6. Tie cord to tension spring and fasten spring as shown in illustration.
7. Place a drop of shellac on cord knot.
8. Install and adjust pointer.
   a. Leave gang in full mesh position.
   b. Set pointer to "V" notch at low end of the dial.
   c. Clamp pointer to cord.
   d. Fix pointer to cord with a drop of shellac.
   e. The cord must not be too tight or bind, as too much tension will prevent the planetary drive (tuning shaft) from pulling the pointer. All elements of the pointer and string system must be free running.

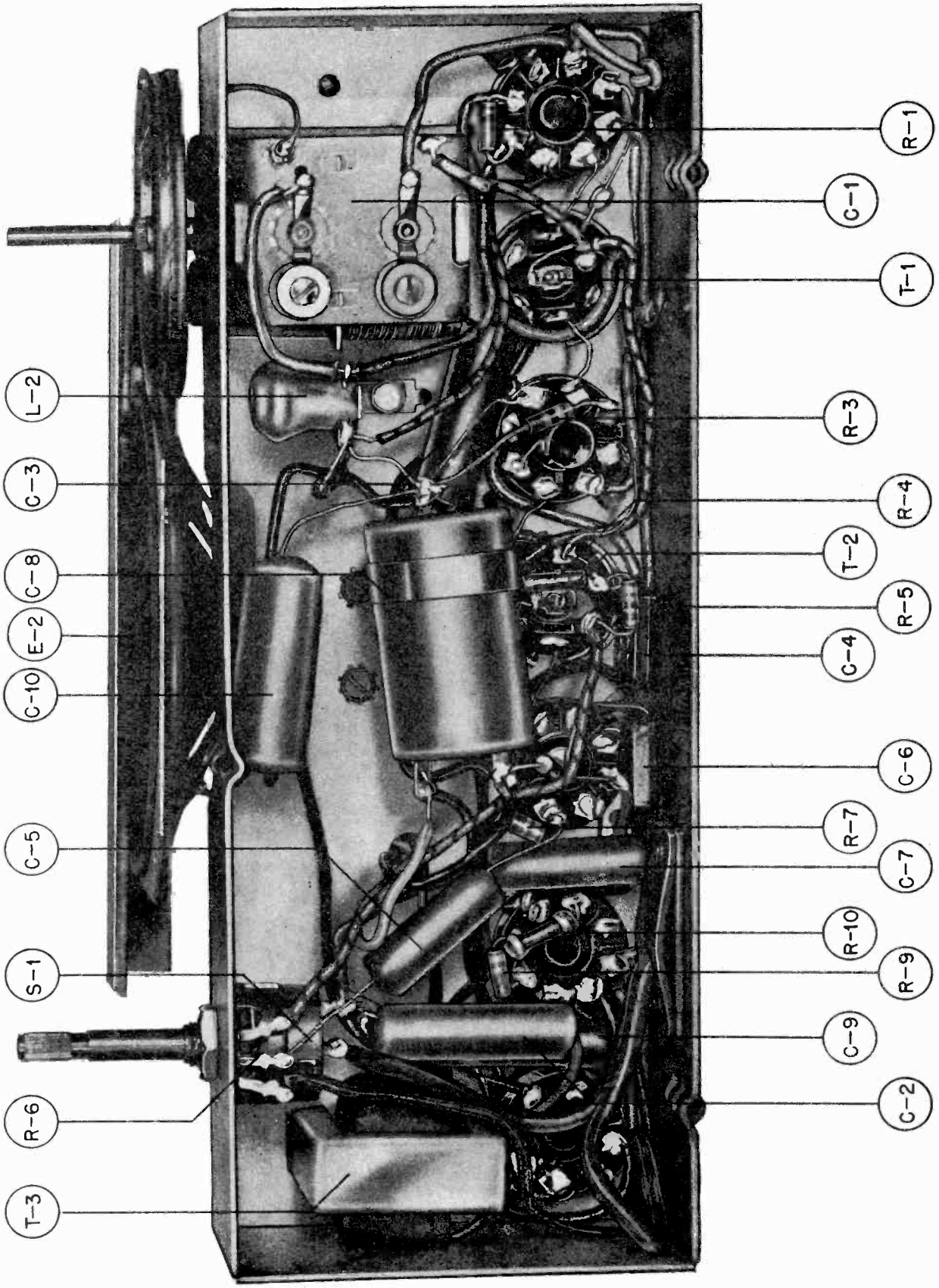


FIGURE 6. BOTTOM VIEW (CHASSIS HS-1)

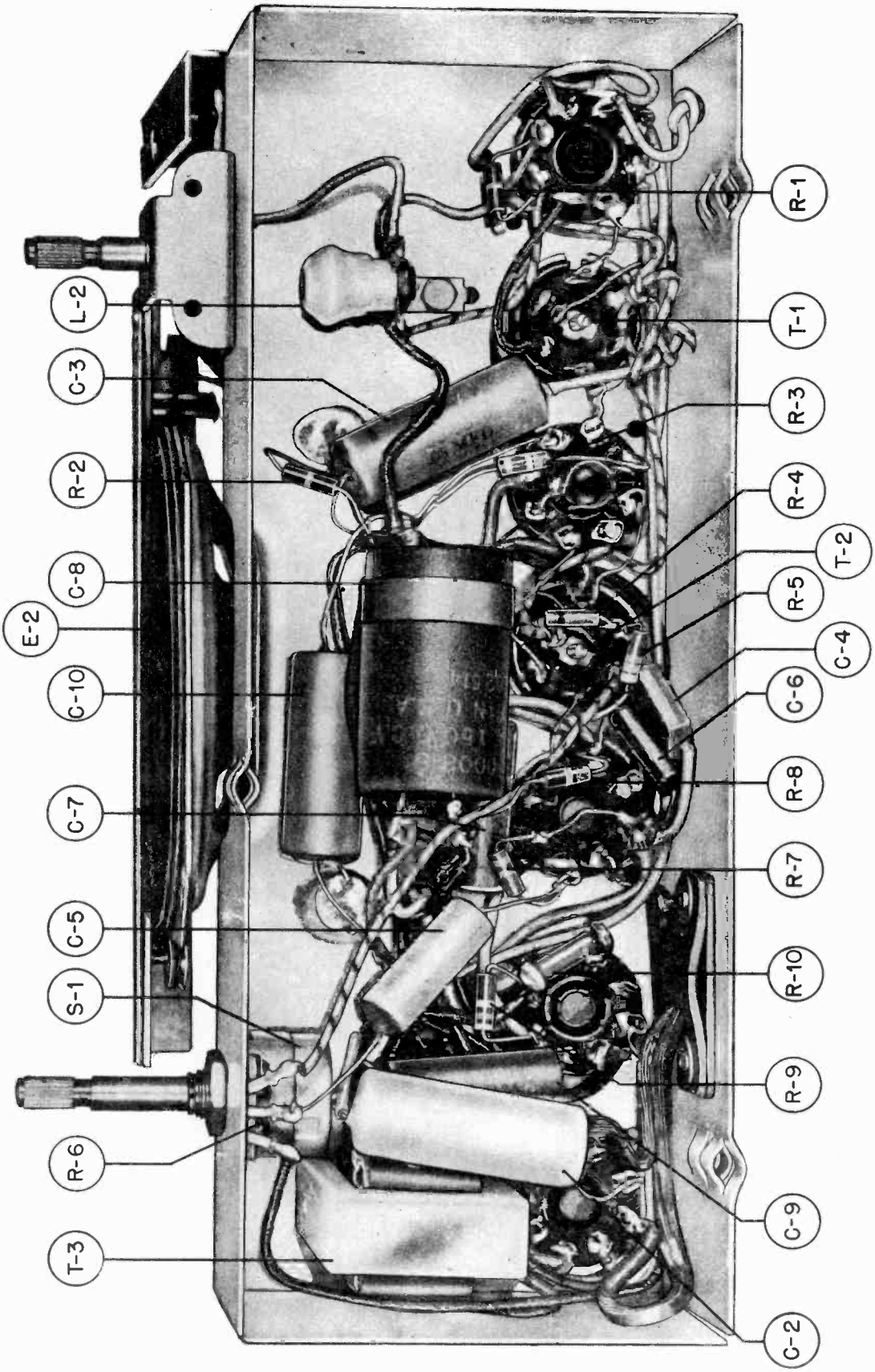


FIGURE 7. BOTTOM VIEW (CHASSIS HS.50)

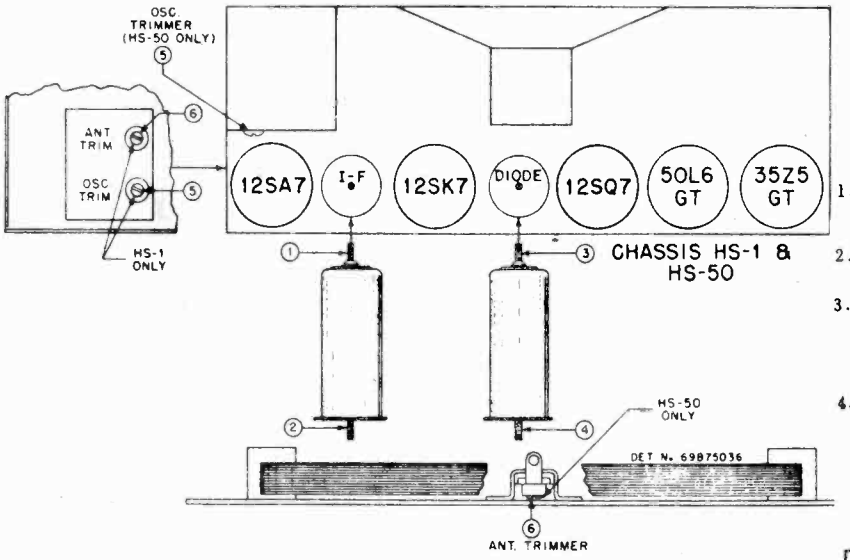


FIGURE 2. TUBE AND TRIMMER LOCATION

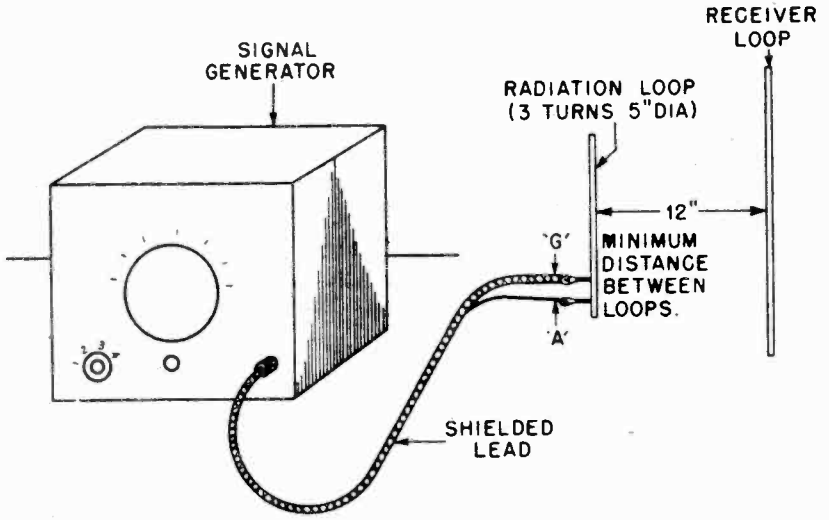


FIGURE 4. METHOD OF RADIATING SIGNAL TO THE RECEIVER

ALIGNMENT CHART

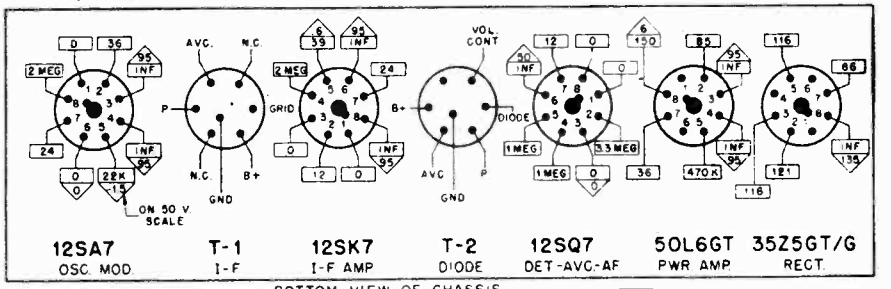
Connect output meter across speaker voice coil (.38 V = .05 watt)
Volume control set at maximum for all operations
The adjusting screwdriver or alignment tool should be of the insulated type, such as Motorola Part No. 66A71008

	OPERATIONS IN ORDER	GANG CAPACITOR SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER TO	GENERATOR SET AT 400~ 30% MODULATED	AVERAGE MICROVOLT INPUT FOR .38V OUTPUT
1.	Align I.F. and Diode for Maximum	Minimum	.1 mf	Osc.-Mod.* Grid & B-	1-2-3-4	455 Kc	3000 Microvolts to I. F. Grid
2.	Set Oscillator to dial scale	1620 Kc	.1 mf	Osc.-Mod.* Grid & B-	5	1620 Kc	
3.	Align R.F. for Maximum	1400 Kc	None	**Radiation	6	1400 Kc	45 Microvolts to Osc.-Mod Grid thru .1 mf dummy .03 Volts at 400~ to 1st A.F.Grid

4. Repeat above steps for maximum accuracy.

* A convenient point for connection to B-, is the common terminal of the electrolytic capacitor, located in the middle of the chassis (bottom).

** Connect output of signal generator to a 5" diameter, 3 turn loop. With volume on full, and output meter connected across voice coil, bring loop close enough to receiver loop until output of 50 milliwatts is obtained (.38V on output meter) Vary distance between generator and receiver loops to maintain this output during alignment.



NOTE: ALL VOLTAGES MEASURED ON A 20,000 OHM PER VOLT VOLTMETER TO B-.

ALL RESISTANCES ARE MEASURED IN OHMS UNLESS OTHERWISE SPECIFIED TO B-.

K = ONE THOUSAND (1000) OHMS.

B- IS INDICATED BY ▽ ON SCHEMATIC DIAG.

FIGURE 5. VOLTAGE AND RESISTANCE CHART

Chassis HS-1 is used in Models 55X11, 55X12 and 55X13. Chassis HS-50 is used in Models 55X11A, 55X12A and 55X13A. Models differ in cabinet and hardware (see parts list.) Chassis differ in circuit

REF. NO.	PART NO.	DESCRIPTION
	49A12646	Pulley, Cord: 7/32" groove (dial string 55X11A, 12A & 13A)
	49A15045	Pulley, Cord: 11/64" groove (dial string 55X11A, 12A & 13A)
	49A21552	Pulley, Cord: 1/2" groove (dial string)
	or 49A71078	
	5A13896	Rivet, shoulder: .312" Sh; Pol.Nkl. (dial string)
	5A15045	Rivet, shoulder: .437" Sh; Pol.Nkl. (dial string 55X11A, 12A & 13A)
	5S7708	Rivet, Steel: 9/32 x .122; Pol. Nkl. (line cord lock)
	5S7707	Rivet, Steel: 5/32 x .122; Pol. Nkl. (tube socket mtg. & C-8 mtg.)
	5S7716	Rivet, Steel: 5/32 x .122 Pol. Nkl. (mounting clip - loop and back)
	5S7718	Rivet, Steel; 3/16 x .122; Ant. Cop. (Terminal strip mtg. loop)
	34B74430	Scale, dial: glass (55X11A, 12A & 13A)
	34B70435	Scale, dial: glass (55X11, 12 & 13)
	3S7401	Screw, Steel: #2 x 3/8 PhOHWS; Ant. Cop. (55X13 & 55X13A dial brkt. mtg.)
	3S7506	Screw, Steel: #6 x 1/4 PKZ P1 HH; Cad. Pl. (gang cover and L-2 mtg.)
	3S7331	Screw, Steel: 6-32 x 3/8 S1 FHMS; Cad. Pl. (gang mtg. 55X11, 12 & 13)
	3S8117	Screw, Steel: #8 x 1 PKZP S1 HMH; Ant. Cop. (Chassis mtg. 55X11, 12, 11A & 12A)

1. Remove the chassis from the cabinet.
2. Remove the broken cord.
3. Turn gang to full mesh position.
4. Cut a 27" length of 18 lb. silk fish cord.
5. Replace new cord as follows:
   a. Tie one end of cord to tension spring on gang pulley.
   b. Make one complete turn around gang pulley in a counter-clockwise direction.
   c. Route the cord under and over shoulder rivets #1 and #2.
   d. Route the cord the length of dial scale, around the dial pulley, and over shoulder rivet #3.
   e. Make 3-1/2 turns around the tuning shaft in a counter-clockwise direction.
   f. Place cord over the bracket pulley and shoulder rivet #4 to the gang pulley.
   g. Place cord around the gang pulley counter-clockwise to the tension spring and tie.
6. Place a drop of shellac on the cord knots.
7. Install and adjust pointer.
   a. Leave gang in full mesh position.
   b. Set pointer to "V" notch at low end of the dial.
   c. Clamp pointer to cord.
   d. Fix pointer to cord with a drop of shellac or household cement.

REF. NO.	PART NO.	DESCRIPTION
	3S7119	Screw, Steel: 6/32 x 1/4 S1 ABHD; Cad.Pl. (Replace gang brkt.)
	3S7526	Screw, Steel: #8 - 1-1/8 PKA S1 HH; Cad. Pl. (Chassis mtg. 55X13 & 13A)
	29A70422	Screw, terminal (loop and back)
	47A72659	Shaft, Tuning (55X11A, 12A & 13A)
	1A71049	Shield and Sleeve Assembly (I.F. & Diode Coils)
	41A70705	Spring, Coil (used in T1 & T2)
	41A73619	Spring, Tension Coil (dial cord 55X11A, 12A & 13A)
	41A22596	Spring, Tension Coil (dial cord 55X11, 12 & 13)
	42A70423	Strap, ground (loop and back)
	35A70074	Strip, Dial background
	31K15026	Strip, terminal: 2 Ins. #2 mtg: 3/8" (loop and back 55X11, 12 & 13)
	46A72766	Stud, Trimount; black
	9A70070	Socket, Pilot Light and Leads
	9A6790	Socket, tube; octal; (for 35Z5, 50L6, 12SA7, & 12SQ7)
	or 9A6787	
	or 9A6788	
	9A6792	Socket, tube: octal; (for 6SK7)
	or 9A70165	
	4S177C	Washer, brass: .365-.234-.025 (gang mtg. 55X11, 12 & 13)
	4A70015	Washer "C" (Tuning shaft 55X11A, 12A & 13A)
	4K22505	Washer, paper: 11/16 x 17/64 x 1/32 (under knobs 55X12A)
	35K70460	Washer, paper: 11/16 x 9/64 x 1/32 (used under tuning knob 55X11, 12 & 13)
	35K19943	Washer, paper: 11/16 x 17/64 x 1/32 (used under knobs 55X11A 13A and under volume control 55X11, 12 & 13)
	32A20575	Washer, spacer: 3/8-.171-.062 (Chassis mtg. 55X11 & 12)
	4S8204	Washer, Steel: 1"-.203-.067; Cop.Pl. Chassis mtg. 55X13 & 13A only)
	4S1719	Washer, Steel: 3/8-.140-.030; Cad.Pl.(Line cord lock mtg.)

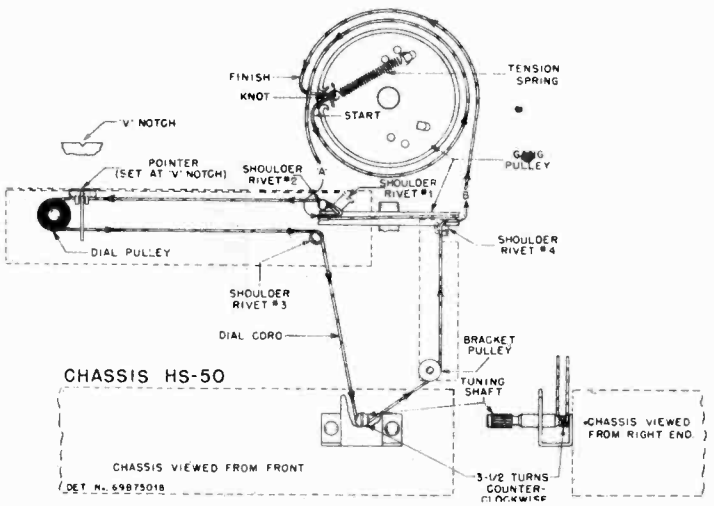


FIGURE 3. DIAL CORD DRIVE (HS-50)

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MODELS 55X11, 55X12, 55X13 55X11A, 55X12A, 55X13A

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
C-1	19B70080	Capacitor, variable: 2 gang and pulley assembly (55X11,
	or 1X72550	Capacitor, variable: 2 gang 12&13) and pulley assembly
C-1	1X74747	Capacitor, variable: 2 gang and pulley assembly (55X11A, 12A & 13A)
C-2	8S9816	Capacitor, fixed: paper, .05 mf 20% 400 vdc
C-3	8S9816	Capacitor, fixed: paper; .05 mf 20% 400 vdc
C-4	21R6648	Capacitor, fixed: mica; 250 mmf 20% 500 vdc
C-5	8S9809	Capacitor, fixed: paper; .01 mf 20% 400 vdc
C-6	21R6648	Capacitor, fixed: mica; 250 mmf 20% 500 vdc
C-7	8S9809	Capacitor, fixed: paper; .01 mf 20% 400 vdc
C-8	23A70008	Capacitor, fixed: electrolytic; dual 20 mf 150 vdc
C-9	8S9802	Capacitor, fixed: paper; .02 mf 20% 400 vdc
C-10	8A72686	Capacitor, fixed: paper; .15 mf 20% 200 vdc
	or 8A75566	Capacitor, fixed: paper; .15 mf 20% 400 vdc
	20A74404	Capacitor, trimmer; includes "A" brkt (loop back) 55X11A, 12A & 13A
	21B70826	Capacitor, fixed; mica; dual (used in T1 & T2)
E-1	1X70081	Capacitor and choke assembly
E-2	50B70076	Speaker, electrodynamic; 4 inch (HS-1 & HS-50)
	or 50K76379	Speaker, electrodynamic; 4 inch (HS-50 only)
I-1	65X11854	Bulb: 6.3V - .15A; tubular bayonet #47
L-1	24C70439	Coil; antenna loop and panel assembly 55X11
	24K70440	Coil; antenna loop and panel assembly 55X12
	24K70441	Coil: antenna loop and panel assembly 55X13
	24C74406	Coil; antenna loop and panel 55X11A
	24C74407	Coil; antenna loop and panel 55X12A
L-1	24K74408	Coil: antenna loop and panel (55X13A)
L-2	24A70424	Coil: oscillator (55X11, 12 & 13)
	24A74616	Coil: oscillator (55X11A, 12A & 13A)
R-1	6R6028	Resistor: fixed; carbon; 22,000 ohms 20% 1/2W Ins.
R-2	6R6015	Resistor, fixed; carbon; 220,000 ohms 20% 1/2W. Ins.
R-3	6R2085	Resistor, fixed; carbon; 39 ohms 10% 1/2W Ins.
R-4	6R6004	Resistor, fixed; carbon; 1 megohm 20% 1/2W. Ins.
R-5	6R6056	Resistor, fixed; carbon; 47,000 ohms 20% 1/2W. Ins.
R-6	18A70032	Resistor, variable; carbon; 1 megohm with SPST. switch
R-7	6R2116	Resistor, fixed; carbon; 3.3 megohms 20% 1/2W. Ins.
R-8	6R6015	Resistor, fixed; carbon; 220,000 ohms 20% 1/2W. Ins.
R-9	6R6032	Resistor, fixed; carbon; 470,000 ohms 20% 1/2W Ins.
R-10	6R6392	Resistor, fixed; carbon; 150 ohms 10% 1/2 W M.I.
S-1		Switch, SPST: part of R6 (volume control)

REF. NO.	PART NO.	DESCRIPTION
T-1	24B70531	Transformer, I.F.; 455 Kc; complete less shield
T-2	24B70533	Transformer, diode; 455 Kc; complete less shield
T-3	25B70063	Transformer, output
	1X72550	Assembly, pulley and bushing (55X11, 12 & 13 replacement)
	1X74746	Assembly, gang mtg. brkt: less gang (55X11A, 12A, 13A)
	1X74738	Assembly dial background mtg. (55X11A, 12A & 13A)
	1X70084	Bracket, dial brkt. and pulley (55X11, 12 & 13)
	7A72488	Bracket, dial scale retainer; cad. pl (55X13 & 13A)
	7A14684	Bracket, tuning shaft; cad. pl; (55X11A, 12A & 13A)
	38A10544	Button, plug; 1/4" for 1/16"; cop. oxd. (55X11, 12 & 13)
	16E70027	Cabinet, plastic; brown finish (55X11)
	16K70475	Cabinet, plastic; ivory finish (55X12)
	51X70401	Cabinet, walnut veneer (55X13)
	16K72776	Cabinet, plastic; brown finish (55X11A)
	56K72777	Cabinet, plastic; ivory finish (55X12A)
	16K72779	Cabinet, walnut veneer (55X13A)
	42B70721	Clip, coil (used on T1 & T2)
	42A18764	Clip, mounting (loop and back)
	35K70445	Cloth, grille (55X13 & 13A)
	11M8944	Cord: dial; 18# black; 27"
	30A151	Cord. line; 6 ft. and plug
	46A70023	Core, Iron and Screw (used in T1 & T2)
	15A70026	Cover, gang (55X11, 12 & 13)
	5A70078	Eyelet, gang mounting (55X11, 12 & 13)
	587805	Eyelet, snap-in; .156 x .141; cad. pl. (dial background)
	37K15841	Foot, rubber; 3/4 dia. (55X13 & 13A)
	5A72680	Grommet: rubber (gang cushion 55X11, 12 & 13)
	37A12691	Grommet: rubber (gang cushion 55X11A, 12A & 13A)
	36K25724	Knob, control; molded; ivory (volume control 55X12, Tuning and volume 55X12A)
	36K70486	Knob, control; molded; ivory with clip (Tuning control 55X12)
	36A21887	Knob, control; molded; brown (volume control 55X11 & 13 Tuning and volume 55X11A & 13A)
	36A70447	Knob, control; molded; brown with clip (tuning control 55X11 & 13)
	32A24815	Lock, line cord
	387205	Lockscrew, steel: 6-32 x 1/4 81 HH: Cad. Pl. (speaker Mtg)
	487695	Lockwasher; #5 Int. Cad. Pl. (loop and back 55X11, 12 & 13)
	287051	Nut: 3/8-32 x 9/16, Palnut: C.P. (volume control)
	2B70703	Nut, Special Palnut (used in T1 & T2)
	2A70775	Nut, Speed: Tinnerman #520 (dial brkt. mtg.)
	2A70434	Nut, Speed: Tinnerman #156 (dial scale mtg. 55X11, 12 & 13)
	38A25507	Plug, split; 5/8": Cop. Ox. (Back and loop)
	52A71079	Pointer, dial

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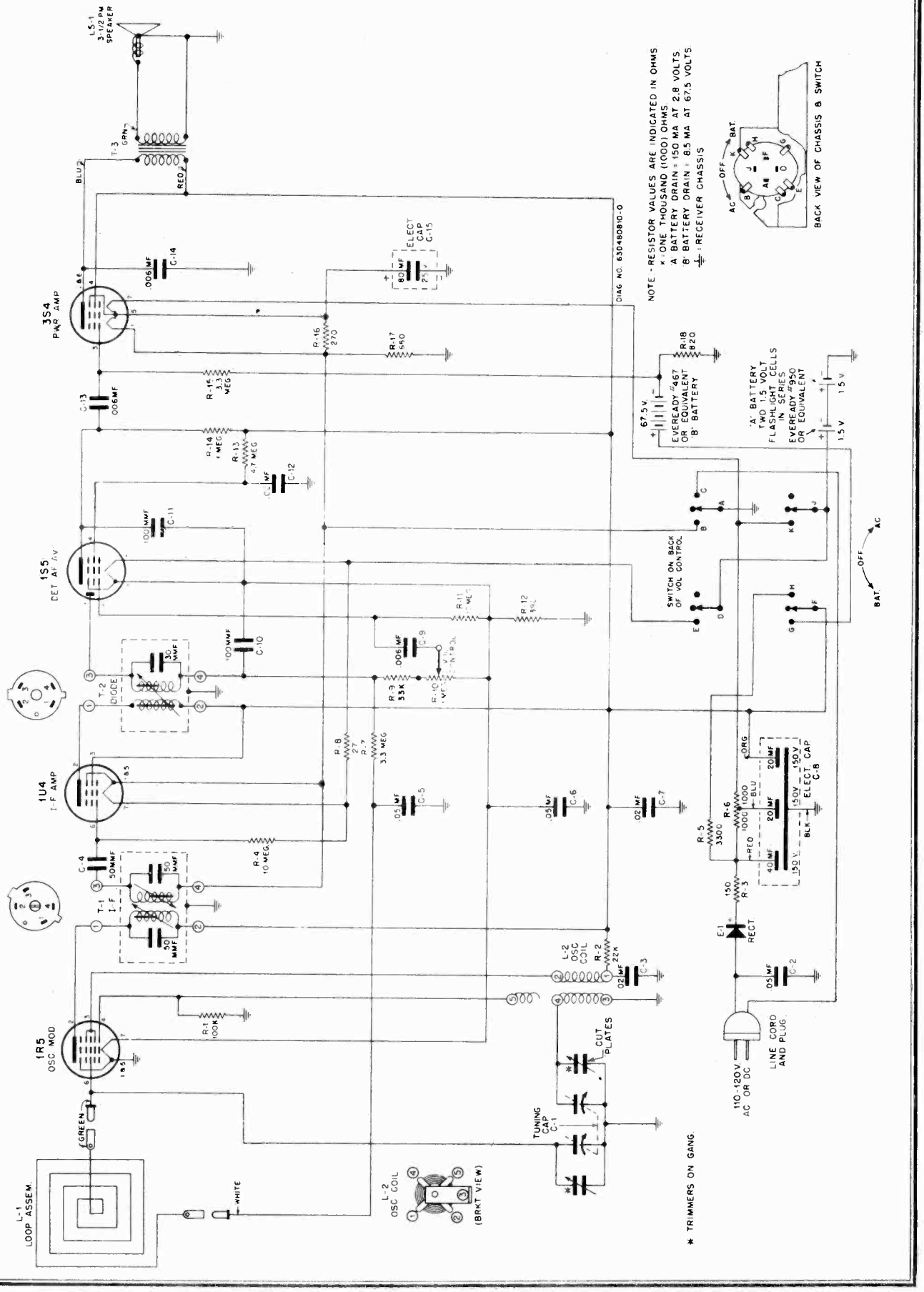
MODEL 58L11, CHASSIS HS-114



MODEL 58L11, CHASSIS HS-114

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ALIGNMENT

Maximum performance can only be obtained if extreme care is exercised during alignment. Follow the procedure carefully.

If the receiver is operated from an AC power line during alignment, use an isolating transformer between receiver and power line.

A low range output meter should be connected to the speaker voice coil terminal and receiver chassis. Set receiver volume control to maximum.

For greatest accuracy, keep output of receiver at approximately .05 watt (.05 watt = .40 volt on output meter) throughout alignment by reducing generator output (not receiver volume control) as stages are brought into alignment.

The IF & diode transformer tuning cores are slotted for a small size fibre screwdriver. Do not press hard on the fibre screwdriver during alignment as damage to the coil forms or tuning cores may result.

Loop antenna should be connected to chassis during alignment.

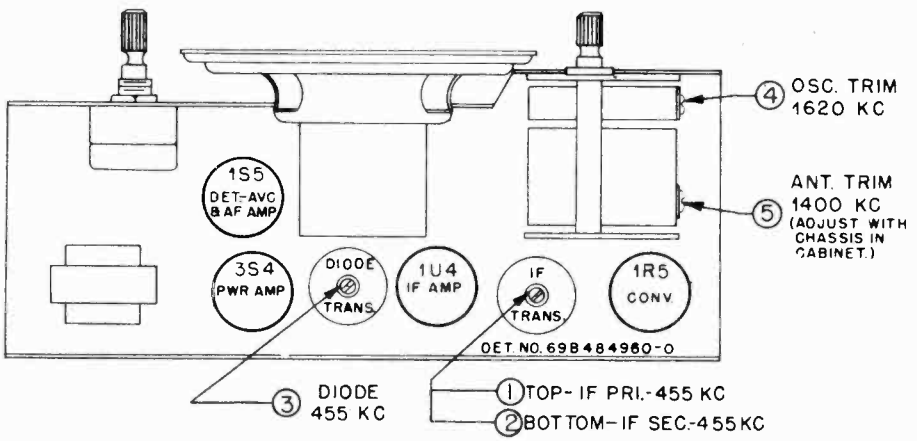
CHART I. ALIGNMENT PROCEDURE

(Refer to Figure 2 for location of all alignment trimmers and cores).

STEP	DIAL SET TO	DUMMY	SIGNAL GENERATOR CONNECTED TO	SIGNAL GENERATOR SET AT	ADJUST TRIMMER OR CORE	REMARKS
IF ALIGNMENT						
1.	Gang fully opened	.1 mf	Converter Grid* & chassis	455 Kc	1,2 & 3	Adjust for maximum.
RF ALIGNMENT						
2.	Gang fully opened	.1 mf	Converter grid* & chassis	1620 Kc	4	This sets oscillator to dial scale.
3.	-	-	-	-	-	Install chassis in cabinet, leaving output meter connected to speaker.
4.	1400 Kc	None	Radiation loop**	1400 Kc	5	Tune signal in on receiver, then adjust loop trimmer (5) for maximum. Loop trimmer is reached through hole under plug button on side of cabinet.

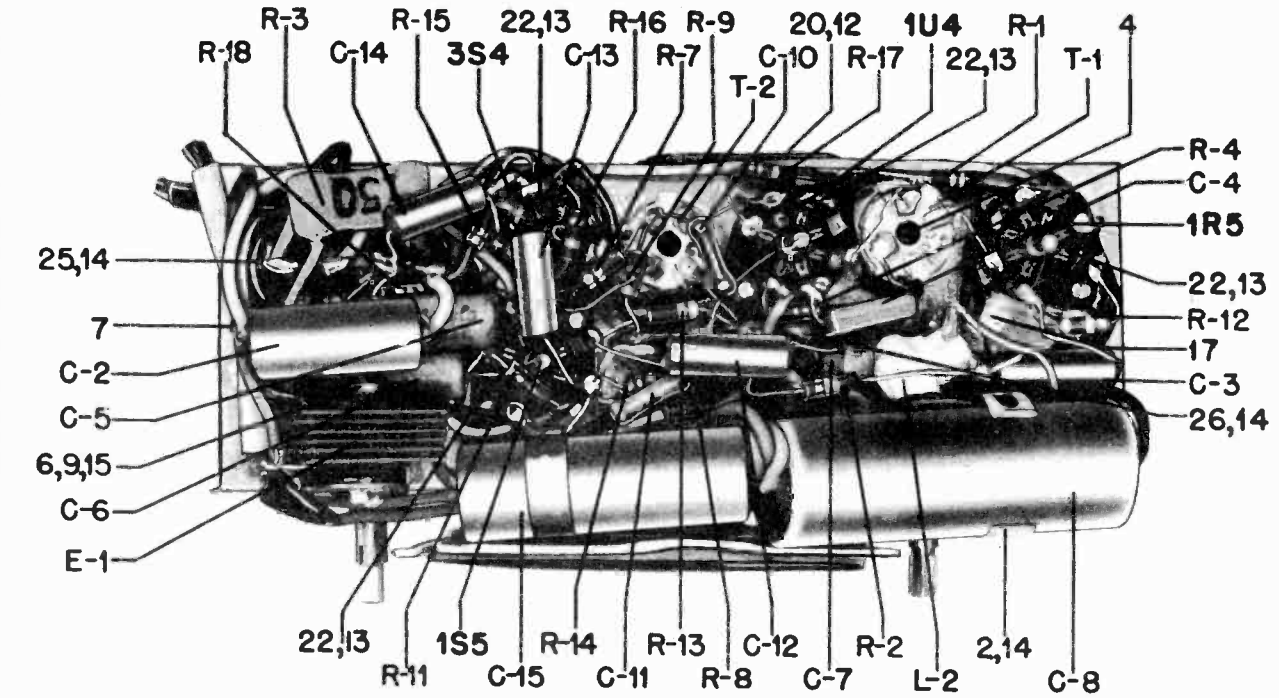
* A convenient point for this connection is the stator lug of the loop section of the tuning capacitor.

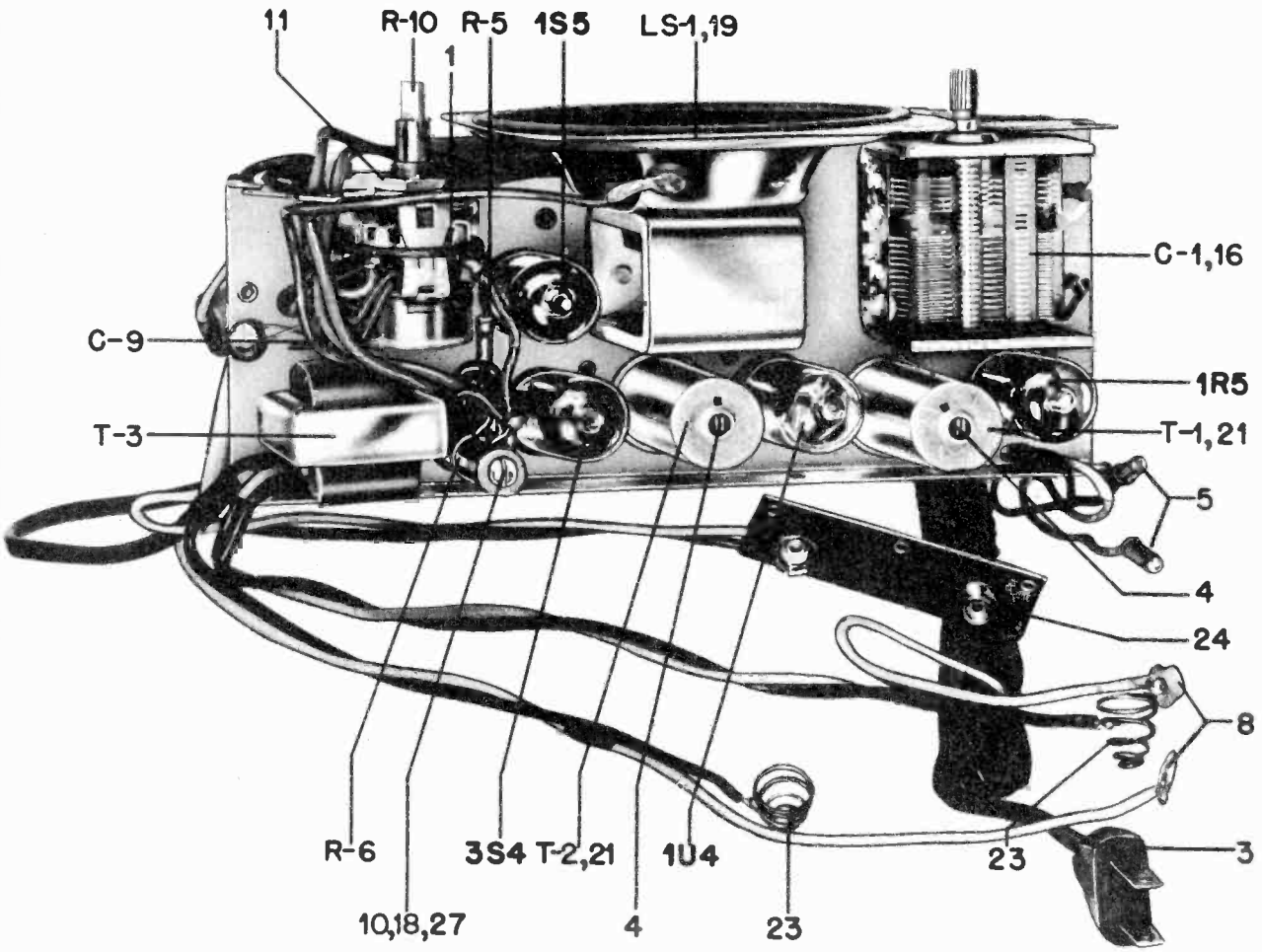
** Connect output of signal generator to a 5" diameter, 3 turn loop and bring loop close enough to receiver loop to obtain output of 50 milliwatts (.40V) on output meter. Vary distance between loops to maintain this output during alignment. Minimum distance between loops should never be less than 12".



TUBE & ALIGNMENT ADJUSTMENT LOCATIONS

MOTOROLA INC. MODEL 58L11, CHASSIS HS-114





PARTS LOCATION - TOP & BOTTOM VIEWS

MODEL 58L11, CHASSIS HS-114

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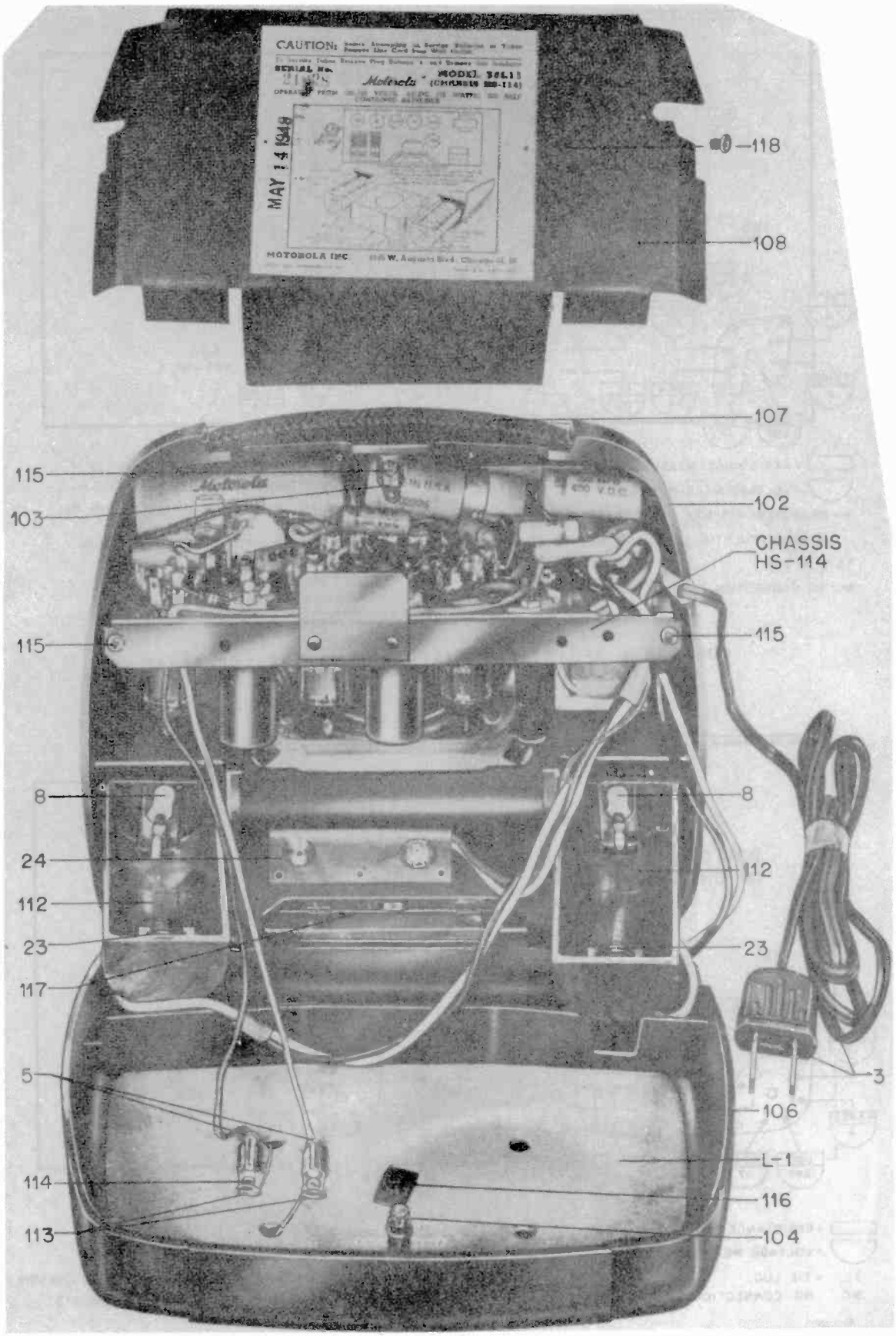

PARTS LOCATIONS - REAR VIEW

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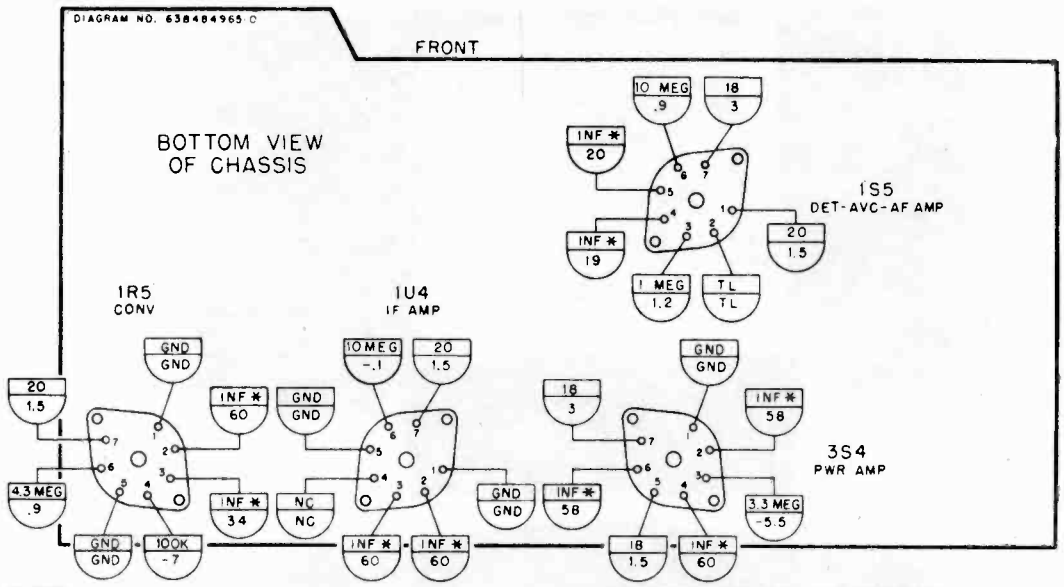


= RESISTANCE MEASUREMENTS.

= VOLTAGE MEASUREMENTS.

* = MEASUREMENTS MAY VARY, DEPENDING ON CONDITION OF ELECTROLYTIC CAPACITOR.

TL = TIE LUG.

NC = NO CONNECTION.

CONDITIONS OF MEASURMENTS

A VTVM WAS USED TO MAKE ALL MEASUREMENTS

MEASUREMENTS ARE MADE FROM TUBE BASE PIN INDICATED TO CHASSIS.

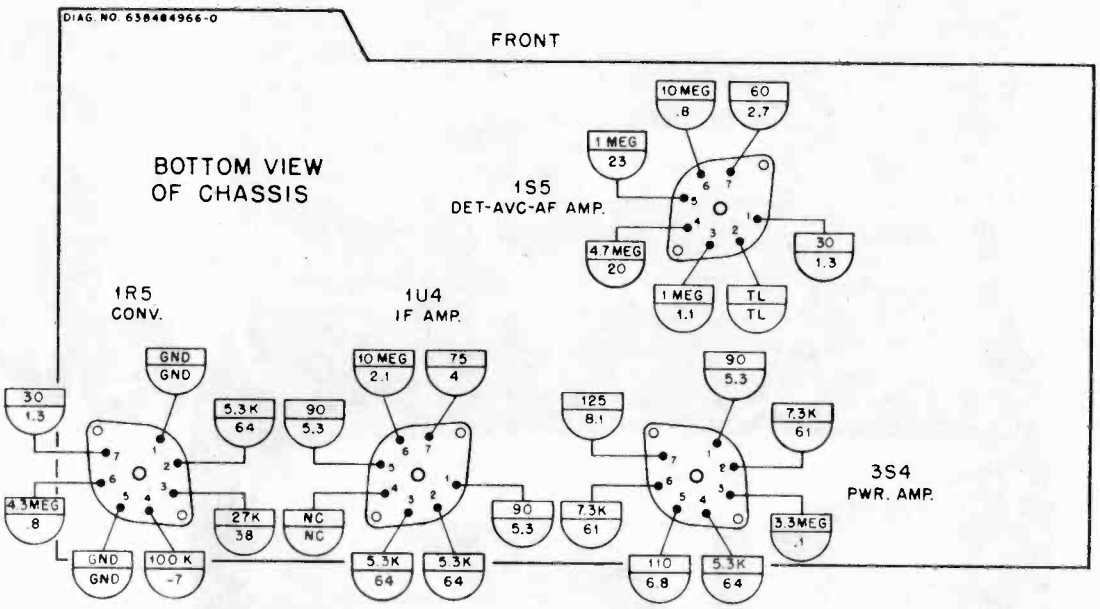
SET IS OPERATED FROM FRESH BATTERIES DURING VOLTAGE MEASUREMENTS.

SWITCH LEVER IS SET TO 'BAT.' POSITION.

VOLTAGE TOLERANCE ± 10%.

RESISTANCE TOLERANCE ± 20%.

VOLTAGE & RESISTANCE DIAGRAM - BATTERY OPERATED



= RESISTANCE MEASUREMENTS.

= VOLTAGE MEASUREMENTS

TL = TIE LUG.

NC = NO CONNECTION.

CONDITIONS OF MEASUREMENTS

A VTVM WAS USED TO MAKE ALL MEASUREMENTS.

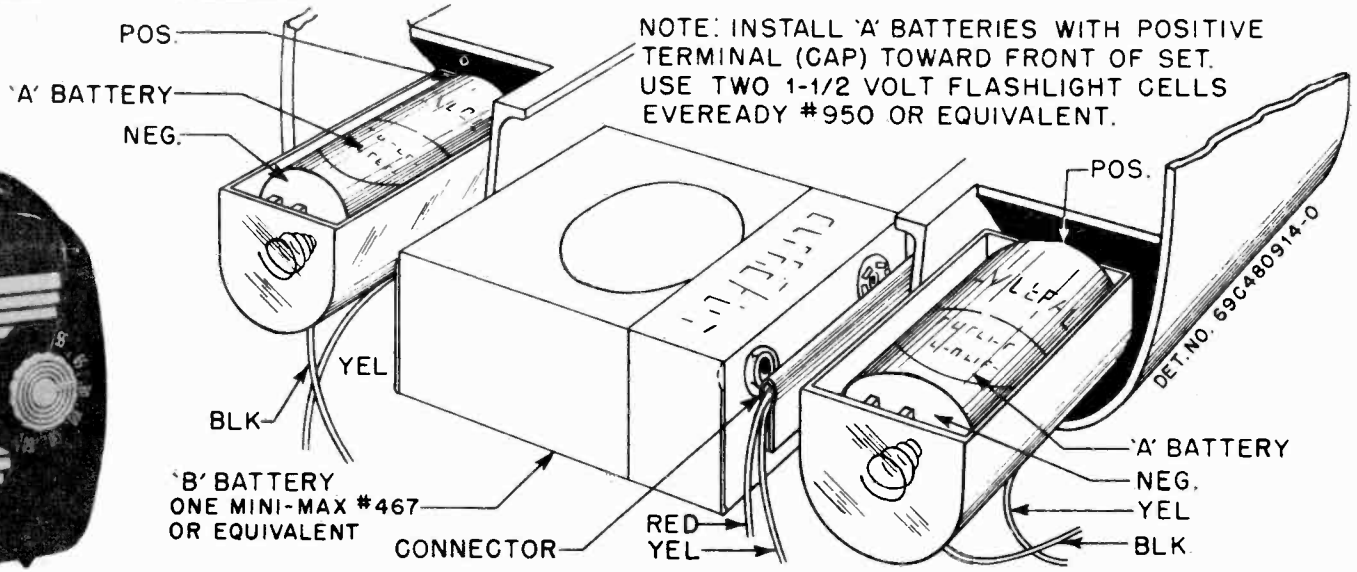
MEASUREMENTS ARE MADE FROM TUBE BASE PIN INDICATED TO CHASSIS.

SET IS OPERATED FROM 117 V AC DURING VOLTAGE MEASUREMENTS.

SWITCH LEVER IS SET TO AC/DC POSITION.

VOLTAGE TOLERANCE ±10%. RESISTANCE TOLERANCE ±20%.

VOLTAGE & RESISTANCE DIAGRAM - AC OPERATED



BATTERY REPLACEMENT DETAIL

TUBE COMPLEMENT - 1R5 - Converter
1U4 - IF Amplifier
1S5 - Detector, AVC & 1st AF Amplifier
3S4 - Power Amplifier
Rectifier - Selenium type - for AC/DC operation

POWER SUPPLY - Operates from 105-125 volts AC/DC (15 watts) or from the following self-contained batteries:
Two 1-1/2V flashlight cells (Eveready #950 or equivalent)
One 67-1/2V "B" battery (Eveready #467 or equivalent)

NOTE: The chassis of this receiver is connected directly to the power line. When operating chassis outside of its cabinet (from an AC power line) use an isolating transformer between power line and receiver to reduce possibility of electrical shock.

Tubes can be replaced without removing chassis from cabinet. Just open back cover and remove chassis insulator to expose tubes. Two plug buttons hold chassis insulator in position.

To remove the chassis from the cabinet:

1. Remove control knobs.
2. Open back cover and remove chassis insulator.
3. Disconnect the two loop leads from the pin receptacles.
4. Remove the two Phillips head screws on each end of chassis and slide chassis out of cabinet.

MOTOROLA INC. MODEL 58L11, CHASSIS HS-114

REF. NO.	PART NO	DESCRIPTION
		ELECTRICAL PARTS
		CAPACITORS
C-1	19K480051	Variable: 2 gang
C-2	8K14791	Paper: .05 mf 400V
C-3	8K471628	Paper: .02 mf 100V
C-4	21K77373	Ceramic: 50 mmf 500V
C-5	8A71213	Paper: .05 mf 100V
C-6	8A71213	Paper: .05 mf 100V
C-7	8K471628	Paper: .02 mf 100V
C-8	23B75808	Electrolytic: 40-20-20 mf/150V
C-9	8C4529	Paper: .006 mf 100V
C-10	21B77286	Ceramic: 100 mmf 500V
C-11	21B77286	Ceramic: 100 mmf 500V
C-12	8K471628	Paper: .02 mf 100V
C-13	8C4529	Paper: .006 mf 100V
C-14	8C4529	Paper: .006 mf 100V
C-15	23A25888	Electrolytic and strap: 80 mf-25V
		RECTIFIER
E-1	48B478111	Selenium Rectifier: half-wave
		COILS
L-1	24B480092	Panel and Loop Assembly
L-2	24A478022	Oscillator Coil
		SPEAKER
LS-1	50B480048 or 50B480050 or 50B482759	Speaker: 3-1/2"; PM Exchange
		TRANSFORMERS
T-1	24B480042	IF, 455 Kc: complete but less shield
T-2	24B480040	Diode, 455 Kc: complete but less shield.
T-3	25B470622	Output Transformer
		RESISTORS
		Note; All resistors are 1/2 watt, 20%, carbon, insulated type unless otherwise specified.
R-1	6R6031	100,000 10%
R-2	6R6397	22,000 10%
R-3	17A76986	Wirewound: 150 10% 2-1/2W
R-4	6R2109	10 meg
R-5	6R5581	3,300 10%
R-6	17A470618	Wirewound: 2,000 10% 5W; center tapped
R-7	6R2118	3.3 meg
R-8	6R5663	27 10%
R-9	6R6012	33,000
R-10	18B480049	Volume Control: 1 meg; with switch
R-11	6R2109	10 meg
R-12	6R5554	390 10%
R-13	6R2122	4.7 meg
R-14	6R6004	1 meg
R-15	6R2118	3.3 meg
R-16	6R6432	270 10%
R-17	6R6040	680 10%
R-18	6R6269	820 10%
		CHASSIS PARTS - MECHANICAL
1	15A481339	Baffle, switch
2	42K75826	Clip, electrolytic mtg
3	30B470621	Cord, line & plug: 6 feet long
4	46A470885	Core, iron: threaded (T-1 & T-2 tuning).
5	5S7855	Eyelet: .156-.484 (loop lead tips)
6	4S7695	Lockwasher: #5 internal; cad pl (rectifier mtg)
7	29R3019	Lug, soldering: #6 (line cord anchor)
8	29R3020	Lug, soldering (battery contact)
9	2S7010	Nut: 5-40 x 1/4 hex; cad pl (rect. mtg).
10	2S7005	Nut: 6-32 x 1/4 hex; cad pl (resistor mtg)
11	2S7051	Nut: 3/8-32 x 9/16 hex; cad pl (volume control mtg)
12	5S7769	Rivet: .088 x 3/32 steel; nkl pl (circuit shield mtg)
13	5S7771	Rivet: .088 x 3/16 steel; nkl pl (socket mounting)
14	5S7706	Rivet: .122 x 1/8 steel; nkl pl (electrolytic clip & term strip mtg)
15	3S7311	Screw: 5-40 x 7/8 slotted hex head machine screw; cad pl (rectifier mtg)
16	3S7247	Screw: 6-32 x 3/16 slotted locking hex head machine screw; cad pl (gang mtg)
17	3S7506	Screw: #6 x 1/4 PKZ plain hex head sheet metal screw; cad pl (osc coil mtg)
18	3S1451	Screw: 6-32 x 2 slotted round head machine screw; cad pl (resistor mtg)
19	3S7205	Screw: 8-32 x 1/4 slotted locking type hex head machine screw; cad pl (spkr mtg)
20	26A480034	Shield, circuit
21	1K482716	Shield & Sleeve Assembly (for T-1 & T-2)
22	9A472534	Socket, tube: 7 prong miniature; wafer type
23	41A480057	Spring, battery contact
24	31A480032	Strip, terminal ("B" battery connector).
25	31K51511	Strip, terminal: 3 insulated lugs, #3 gnd; 3/8 spacing
26	31K471565	Strip, terminal: 3 insulated lugs, #4 gnd; 3/8 spacing
27	9K470939	Washer, insulating: 3/8-.136-.062; armite (R-6 insulating)
		CABINET PARTS
101	38K480148	Button, plug: 1/4"; maroon
102	1X480149	Cabinet Assembly: complete with handle, grille and back cover catch. Less back cover and hinge spring
103	42A480079	Clip, fuse (cover catch)
104	42A480078	Clip, speed (on back cover catch stud)
105	42K482797	Clip, speed (on volume knob)
106	16D480088	Cover, cabinet back
107	55B478415	Handle, carrying
108	14C480095	Insulator, chassis: gray fibre
109	36K480195	Knob, control (tuning)
110	36B480082	Knob, volume control: includes clip
111	36B480086	Lever, switch (BAT-OFF-AC/DC switch lever)
112	15B481896	Retainer, "A" battery; plastic
113	9A481743	Receptacle, 1-pin (on loop)
114	5S7720	Rivet: .083 x 1/8 steel; nkl pl (loop receptacle mtg)
115	3S488008	Screw: #4 x 1/4 Phillips round head, thread cutting screw (cover retainer mtg & chassis retainer)
116	2S7089	Speednut: for .187 round; 3/8 x 5/8; black parkerized finish (loop retainer)
117	41A480094	Spring, hinge (back cover)
118	46B480108	Stud, trimount (chassis insulator mtg)

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SERVICE NOTE

MODELS 58R11, 58R12, 58R13, 58R14, 58R15, 58R16, CHASSIS HS-116

The chassis of this receiver is connected directly to the power line. When operating chassis outside of its cabinet (from an AC power line) use an isolating transformer between power line and receiver to reduce possibility of electrical shock.

ALIGNMENT

Maximum performance can only be obtained if extreme care is exercised during alignment. Follow the procedure carefully.

A low range output meter should be connected to the speaker voice coil terminal and receiver chassis. Set receiver volume control to maximum. For greatest accuracy, keep output of receiver at approximately .05 watt (.05 watt = .40 volt on output meter) throughout alignment by reducing generator output (not receiver volume control) as stages are brought into alignment.

ALIGNMENT PROCEDURE

Refer to Figure 1 for location of all alignment trimmers and cores.

STEP	DIAL SET TO	DUMMY	SIG. GEN. CONNECTED TO	SIG. GEN. SET AT	ADJUST TRIMMER OR CORE	REMARKS
	IF ALIGNMENT					
1.	Gang fully opened	.1 mf	Converter Grid & chassis*	455 Kc	1,2,3 & 4	Adjust for maximum.
	RF ALIGNMENT					
2.	Gang fully opened	.1 mf	Converter Grid & Chassis*	1620 Kc	5	This sets oscillator to dial scale.
3.	1400 Kc	None	Radiation loop**	1400 Kc	6	Tune signal in on receiver, then adjust loop trimmer (6) for maximum.

* A convenient point for this connection is the stator lug of the loop section of the tuning capacitor.

** Connect output of signal generator to a 5" diameter, 3 turn loop and bring loop close enough to receiver loop to obtain output of 50 milliwatts (.40) on output meter. Vary distance between loops to maintain this output during alignment. Minimum distance between loops should never be less than 12".

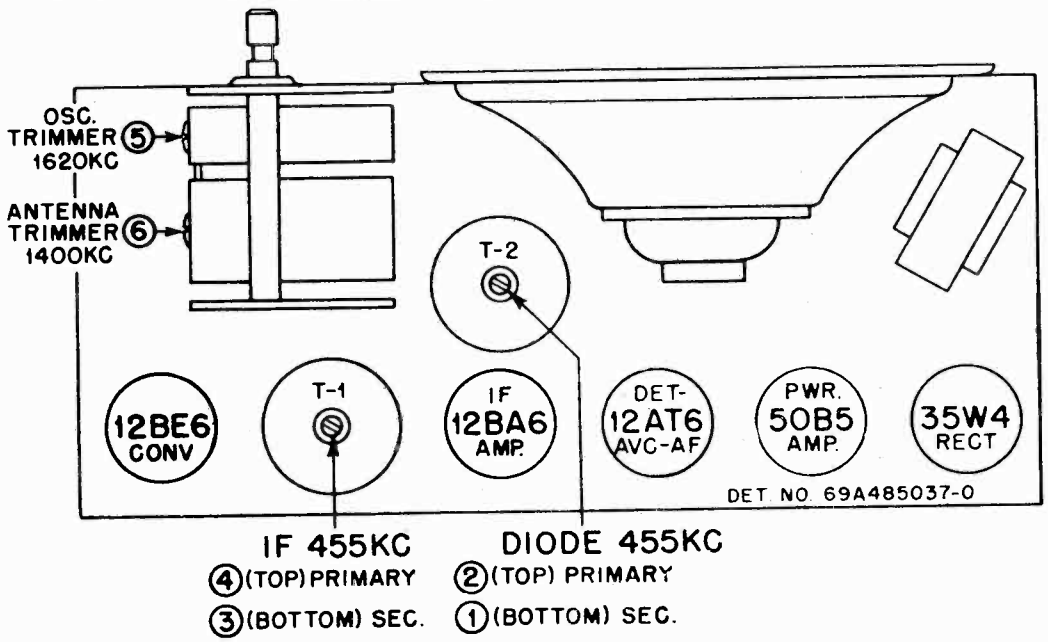

FIGURE 1. CHASSIS HS-116 TUBE & TRIMMER LOCATIONS

MODELS 58R11, 58R12, 58R13, 58R14, 58R15, 58R16, CHASSIS HS-116

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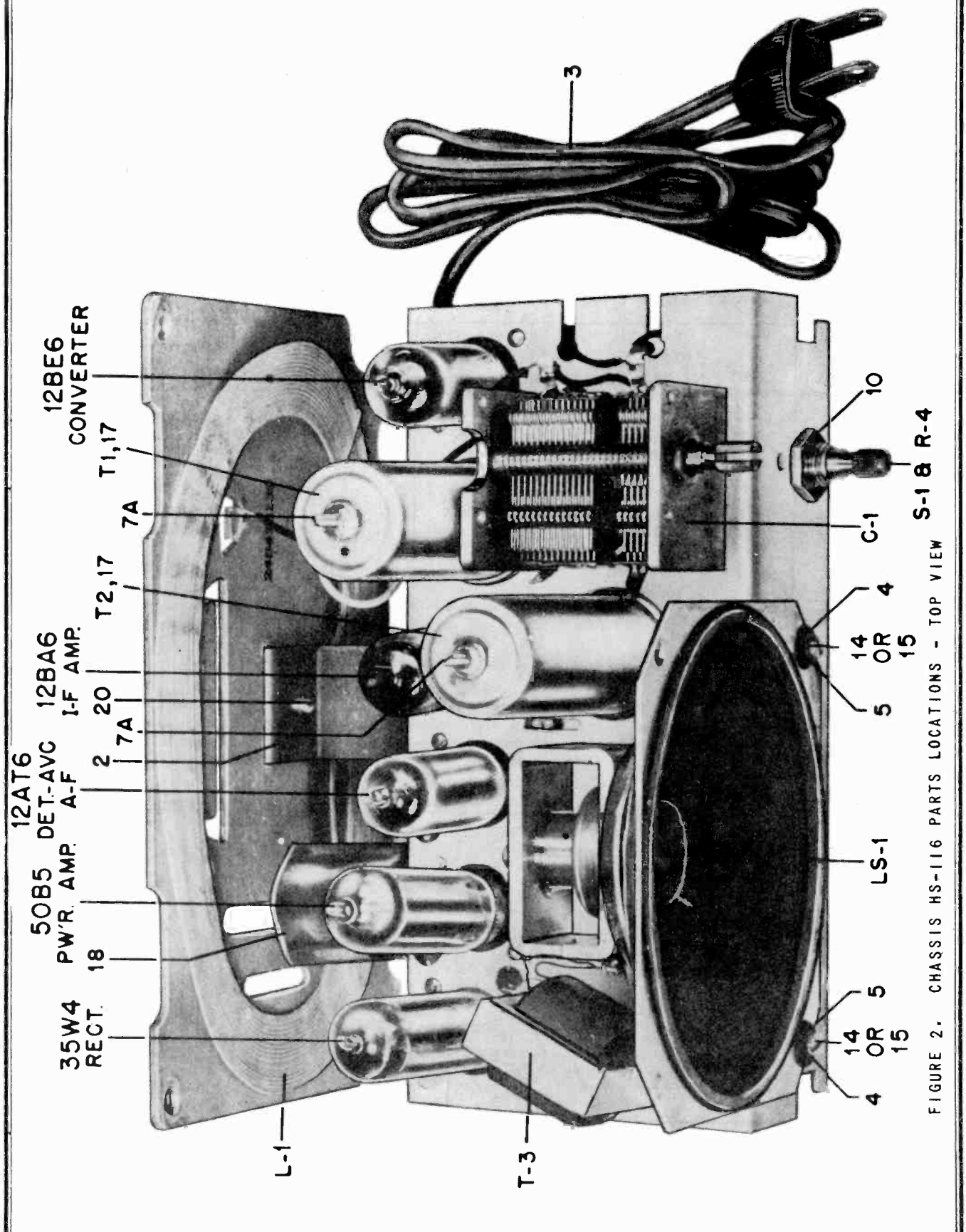

FIGURE 2. CHASSIS HS-116 PARTS LOCATIONS - TOP VIEW

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MODELS 58R11, 58R12, 58R13, 58R14, 58R15, 58R16, CHASSIS HS-116

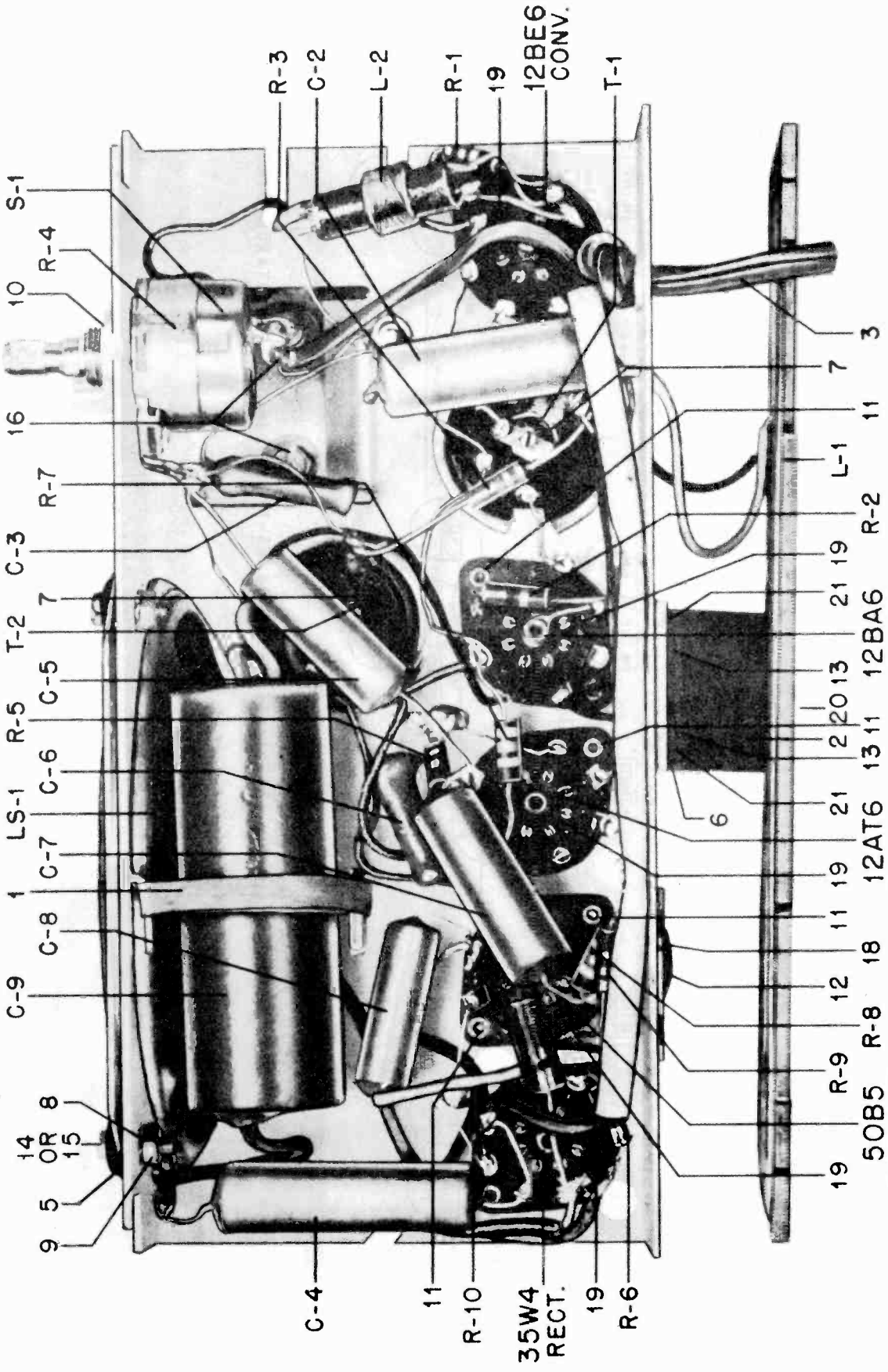


FIGURE 3. CHASSIS HS-116 PARTS LOCATIONS - BOTTOM VIEW

= RESISTANCE READINGS.

= VOLTAGE READINGS.

GND. = GROUND CONNECTIONS TO CHASSIS.

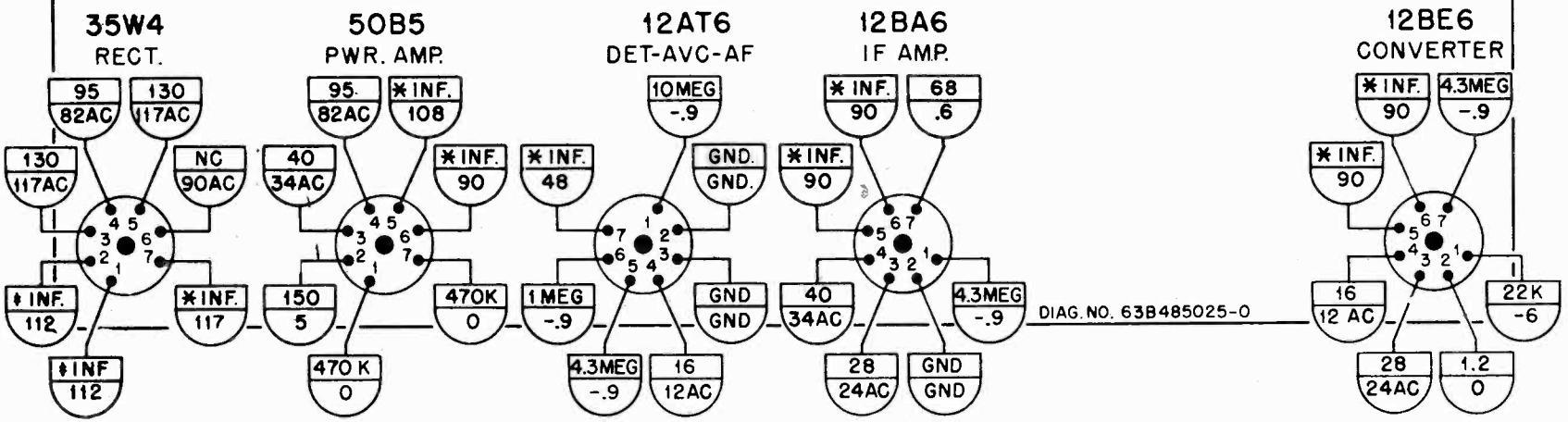
NC = NO CONNECTION.

* = MAY VARY DEPENDING ON CONDITION OF ELECTROLYTIC CAPACITOR.

♦ = TIE POINT.

K = ONE THOUSAND (1000) OHMS.

NOTE: A VTVM WAS USED TO TAKE VOLTAGE MEASUREMENTS. VOLUME CONTROL SET AT MINIMUM & NO SIGNAL TUNED IN.
MEASUREMENTS TAKEN FROM TUBE SOCKET TERMINALS TO CHASSIS.
ALL VOLTAGE MEASUREMENTS TAKEN WITH 117 V. AC INPUT TO SET.
ALL VOLTAGE MEASUREMENTS DC UNLESS OTHERWISE SPECIFIED.
VOLTAGE MEASUREMENTS ± 10%.
RESISTANCE MEASUREMENTS ± 20%.



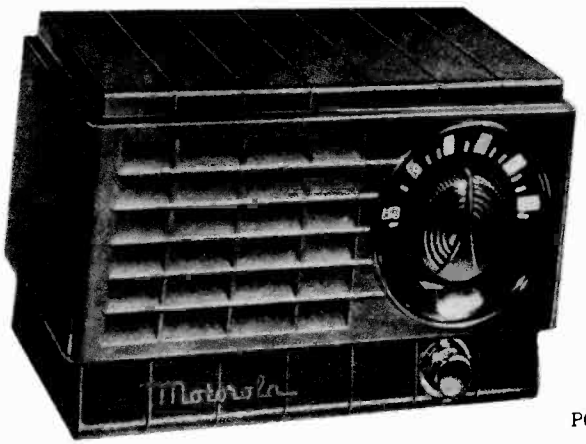


FIGURE 4. CHASSIS HS-116 VOLTAGE & RESISTANCE DIAGRAM

POWER SUPPLY - Operates from 105-125 volts AC or DC, 50 to 60 cycles, 35 watts

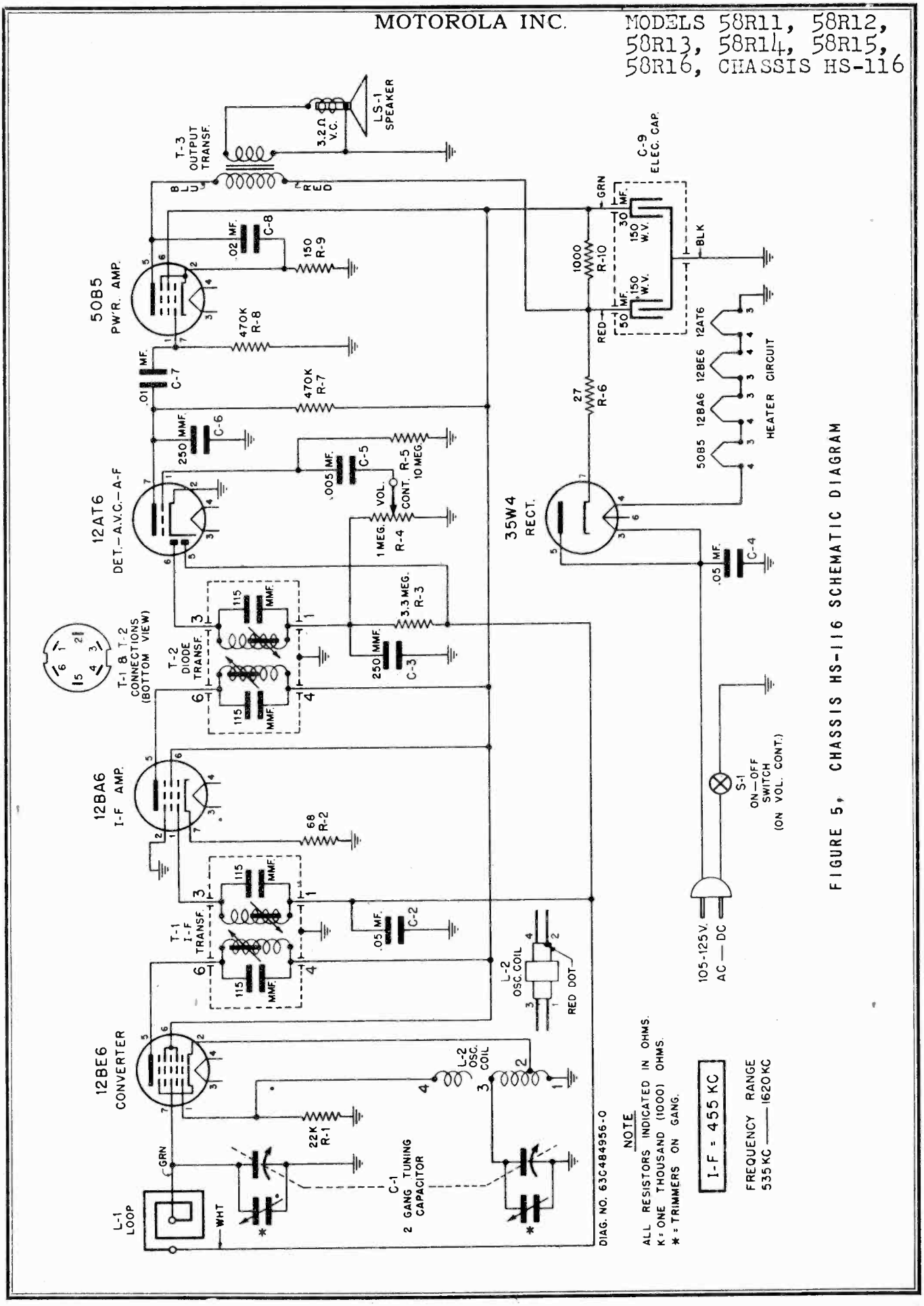


FIGURE 5. CHASSIS HS-116 SCHEMATIC DIAGRAM

CHASSIS PARTS - ELECTRICAL

CAPACITORS

C-1	19B478128	Variable: 2 gang .....
C-2	8S9821	Paper: .05 mf 200V .....
C-3	21K77375	Ceramic: 250 mmf .....
C-4	8S9816	Paper: .05 mf 400V .....
C-5	8S9813	Paper: .005 mf 600V .....
C-6	21K77375	Ceramic: 250 mmf .....
C-7	8S9809	Paper: .01 mf 400V .....
C-8	8S9802	Paper: .02 mf 400V .....
C-9	23B478135	Electrolytic: 50-30 mf 150V ....

COILS

L-1	24B478139	Loop Antenna: includes panel ....
L-2	24A478129	BC Oscillator .....

SPEAKER

LS-1	50C478138	Speaker: 4" PM; 3.2 ohm VC .....

TRANSFORMERS

T-1,2	24B478123	IF & Diode, 455 Kc: complete with tuning cores but less shield .....
T-3	25B478121	Output Transformer .....

RESISTORS

Note: All resistors are insulated carbon type, 20%, 1/2W, unless otherwise specified.

R-1	6R6028	22,000 .....
R-2	6R6007	68 .....
R-3	6R2118	3.3 meg .....
R-4	18A478122	Volume control: 1 meg; with SPST switch
R-5	6R2109	10 meg .....
R-6	6R5683	27 10% .....
R-7	6R6032	470,000 .....
R-8	6R6032	470,000 .....
R-9	6R3992	150 .....
R-10	6R3953	1,000 1 watt .....

CHASSIS PARTS - MECHANICAL

1	37A27142	Band, rubber (capacitor mtg) .....
2	7A478118	Bracket, loop mtg .....
3	30K478137	Cord, line, and plug: 6 ft long .....
4	5S7946	Eyelet, speaker mtg .....
5	5A484268	Grommet, speaker mtg: rubber .....
6	14A478119	Insulator, loop mtg .....
7	1X71048	Iron Core & Clip Assembly (IF & Diode trans. bottom core) .....
7A	1X71047	Iron Core & Palnut Assembly (IF & diode trans. top core) .....
8	4S7686	Lockwasher: #5 ext (speaker mtg - use with 3S7324 mounting screw only) .....
9	2S7010	Nut: #5 - 40 x 1/4 hex; steel; cad plated (speaker mtg -use with 3S7327 mtg screw only) .....
10	2S7051	Nut: 3/8-32 x 9/16 hex; steel; cad plated; Palnut (vol. cont. mtg).....
11	5S7771	Rivet: .088 x 3/16; steel; nickel plated (tube socket mtg) .....
12	5S7707	Rivet: .122 x 5/32; steel; nickel plated (electrostatic shield mtg and output transformer mtg) .....
13	5S7703	Rivet: .122 x 7/32; steel; nickel plated (antenna bracket mtg) .....
14	3S3367	Screw: #5 x 3/8 PKA plain hex head sheet metal screw; black parkerized (speaker mtg-late production sets only) .....
	or	
15	3S7327	Screw: 5-40 x 3/8 plain hex head machine screw; cad pl (speaker mtg-used in early production sets) .....
16	3S7247	Screw: 6-32 x 3/16; slotted hex head machine screw; steel cad plated; lock-screw (gang mtg) .....
17	24B70107	Shield, coil: for IF and diode trans-formers .....
18	26A478117	Shield, electrostatic .....
19	9A472534	Socket, tube: miniature .....
20	46A478145	Stud, tri-mount (antenna mtg) .....
21	14A11493	Washer, fibre: insulating (antenna bracket mtg) .....

CABINET PARTS

101	16D478088	Cabinet, plastic: brown (58R11) ....
102	16K484338	Cabinet, plastic: white (58R12) ....
103	16K484340	Cabinet, plastic: red (58R13) .....
104	16K485161	Cabinet, plastic: gray (58R14) .....
105	16K485162	Cabinet, plastic: green (58R15) ....
106	16K485163	Cabinet, plastic: yellow (58R16) ...
107	36B478147	Knob, tuning (58R11) .....
108	36A478148	Knob, volume control (58R11) .....
109	36K484377	Knob, tuning: ivory (58R12 & 58R13)
110	36K484375	Knob, volume control: ivory (58R12 & 58R13) .....
111	36K485157	Knob, tuning: gold (58R14, 58R15 & 58R16)
112	36K485156	Knob, volume control; gold (58R14, 58R15 & 58R16) .....
113	38A25507	Plug, split: copper oxide finish (mounts loop panel to cabinet) .....
114	3S476083	Screw: 6-32 x 5/16 slotted hex head; steel, cad plated; lockscrew (chassis mounting) .....
115	11M476113	Tape, aluminum foil: 3-1/2" wide x 7" long (heat shield) .....

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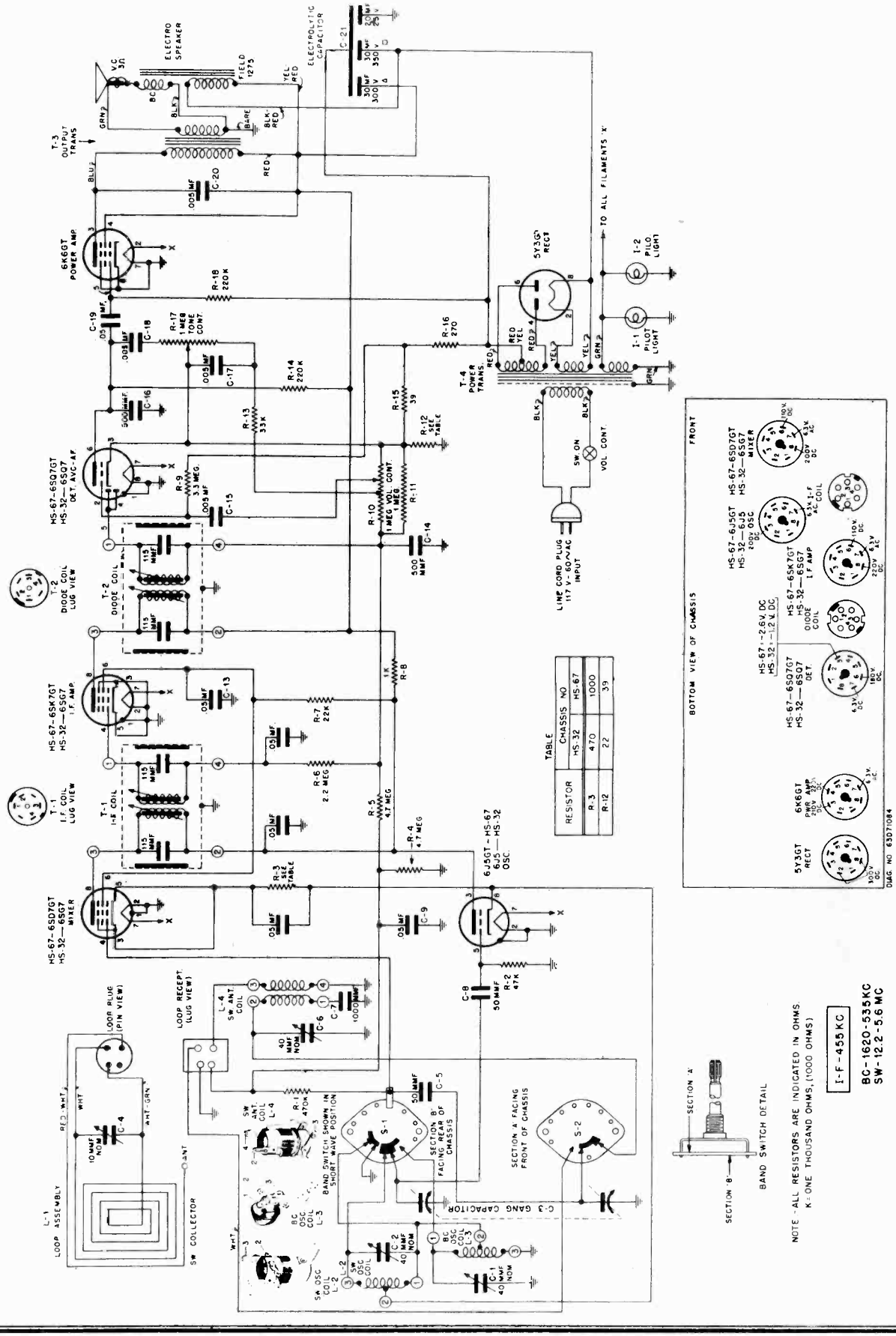
MODELS 65T21,Ch.HS-32;
65T21-B,Ch.HS-67



MODEL 65T21, Chassis HS-32
MODEL 65T21B, Chassis HS-67

MOTOROLA INC.

ALIGNMENT AND SENSITIVITY CHART

Connect output meter across speaker voice coil (.38V = .05 watts)
Volume control set at maximum for all operations.
The adjusting screwdriver or alignment tool should be of the insulated type, such as Motorola Part No. 66A71008.
Refer to Figure 2 for location of all adjustment trimmers & cores

OPERATION IN ORDER	GANG CAPACITOR SET AT	BAND SWITCH SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER OR IRON CORE	GENERATOR SET AT (400 ∿ 30% MODULATED)	AVERAGE INPUT FOR .38V OUTPUT
Adjust I.F's for maximum	Minimum	B.C.	.1 mf	Osc. - Mod. grid	1-2-3-4	455 Kc	900 microvolts to I.F. grid 4.5 microvolts to Osc.-Mod. grid (455 Kc)
Set B.C. Oscillator trimmer	1620 Kc	B.C.	None	Radiation loop*	5 B.C. Osc. trimmer C-1	1620 Kc	———
Adjust B.C. loop trimmer for maximum	1400 Kc	B.C.	None	Radiation loop*	6 B.C. loop trimmer C-4 (on loop) should be adjusted with set in cabinet	1400 Kc	6.5 microvolts to Osc.-Mod. grid through .1 mf dummy
Set S.W. Oscillator trimmer	12.2 Mc	S.W.	50 mmf.	Antenna terminal	7 S.W. Osc. trimmer C-2	12.2 Mc	———
Adjust S.W.	11.5 Mc	S.W.	50 mmf.	Antenna terminal	8 S.W. Antenna trimmer C-6	11.5 Mc	5 microvolts to Antenna terminal
Repeat above steps for maximum accuracy							.045 volt to 1st A.F. grid (400 ∿ cycle audio)

Connect output of signal generator to a 5" dia. 3 turn loop. See Fig. 3. With volume control on full, bring loop close enough to receiver loop until an output of 50 milliwatts is obtained. (.38V on output meter). The distance between loops should never be less than 12 inches. Vary distance between generator and receiver loops or adjust generator output to maintain .38V output during alignment.

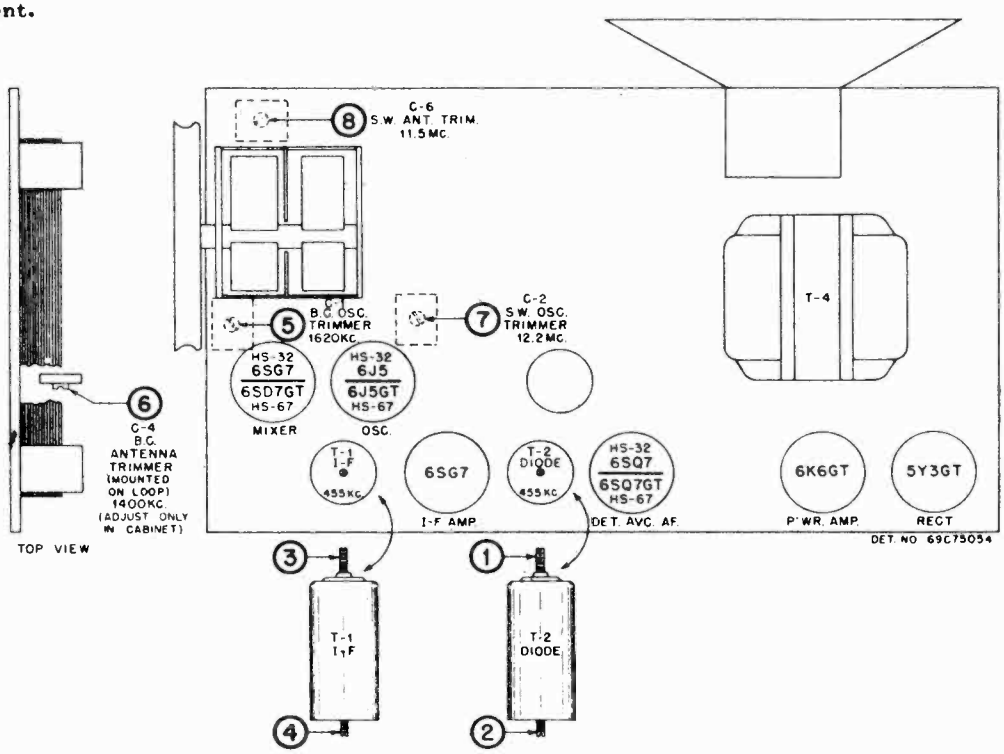


FIGURE 2. TUBE & TRIMMER LOCATION DETAIL

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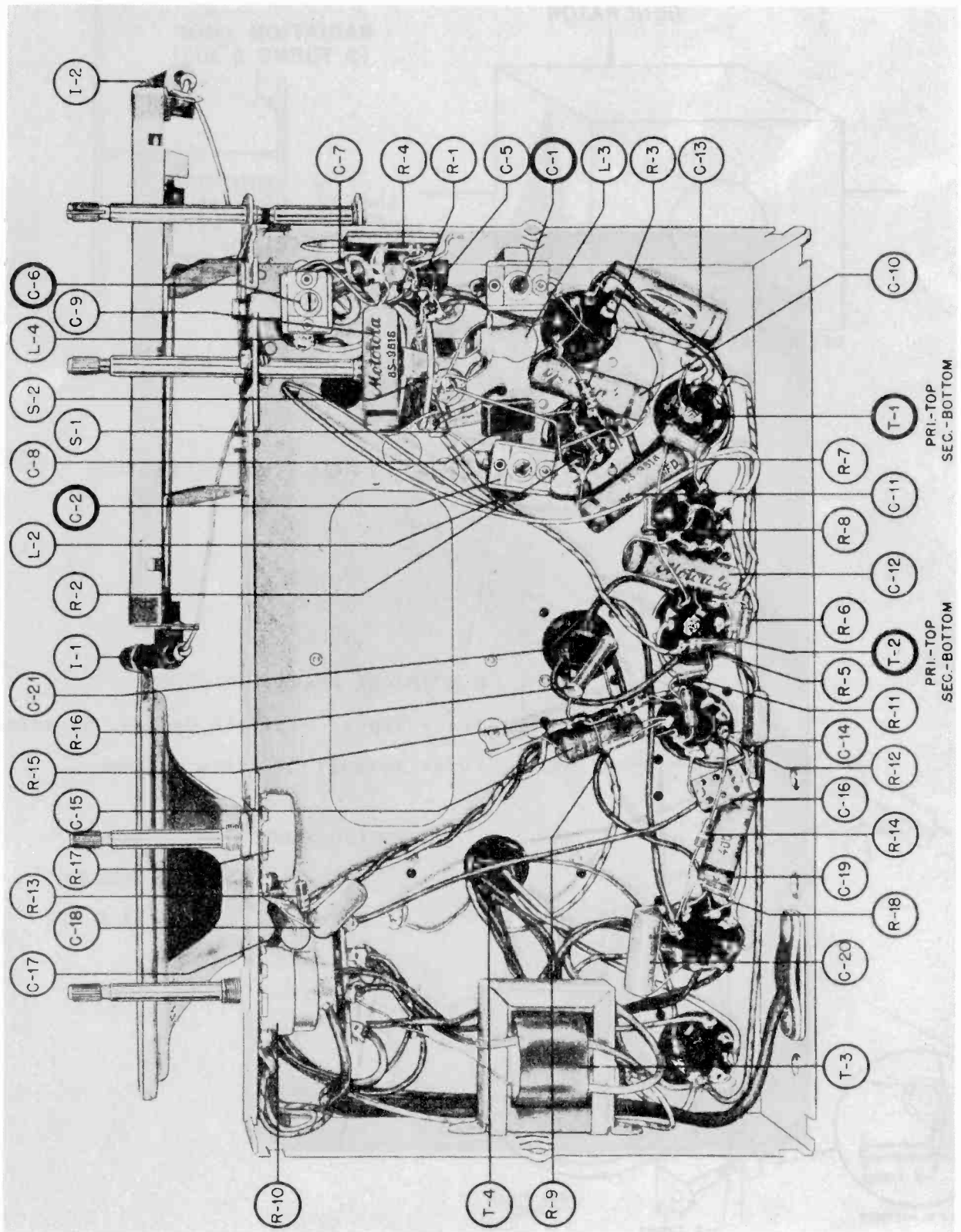
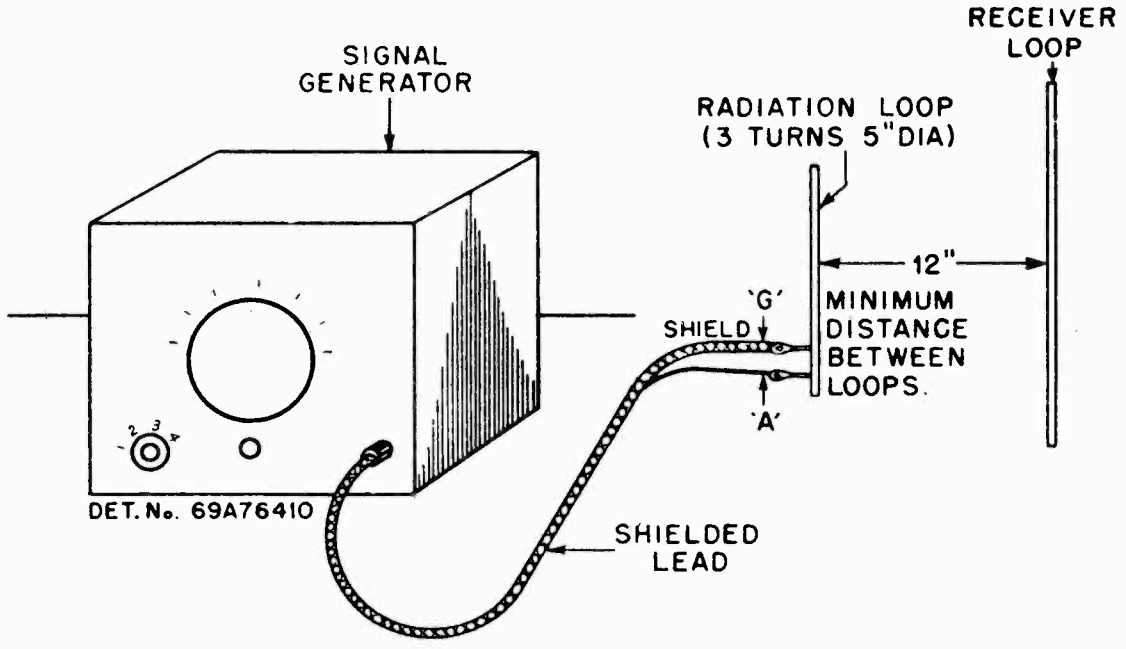
MODEL 65T21
MODEL 65T21B



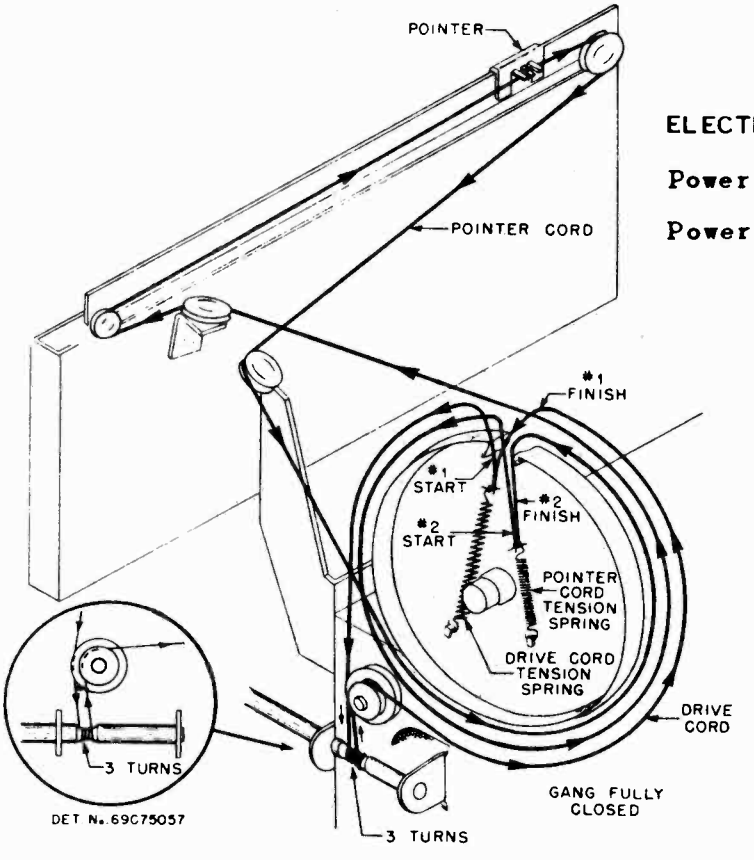
CHASSIS HS-32 & HS-67 - BOTTOM VIEW

MODEL 65T21
MODEL 65T21B

MOTOROLA INC.



METHOD OF RADIATING SIGNAL INTO RECEIVER



STRING DRIVE DETAIL

ELECTRICAL CHARACTERISTICS

Power input: 117V-60 cycles, 65 watts

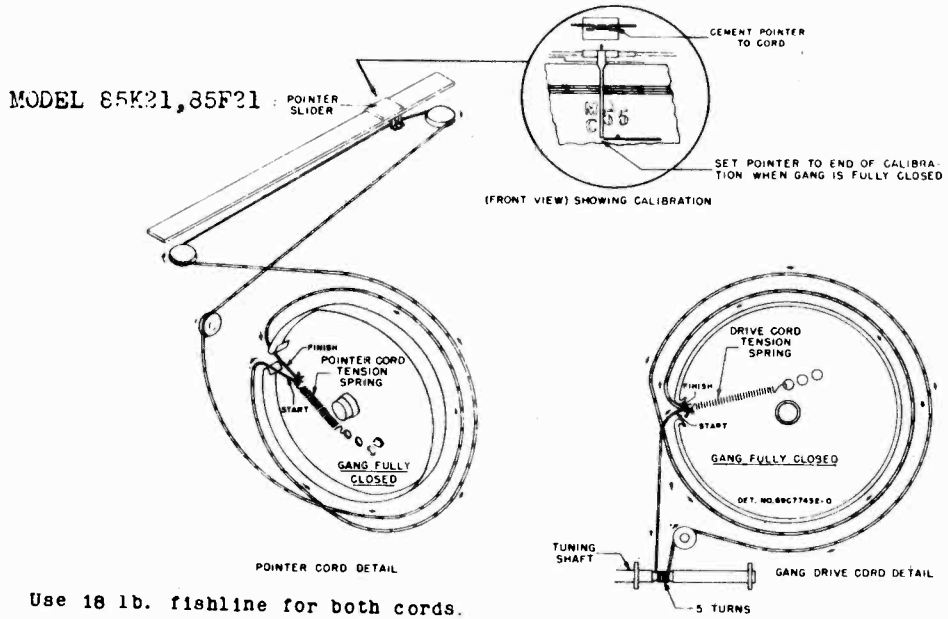
Power output: 3 watts minimum

TUNING RANGE

B.C.	535 to 1620 Kc.
S.W.	5.6 to 12.2 Mc.

MOTOROLA INC.

MODEL 65T21
MODEL 65T21B
MODEL 85F21
MODEL 85K21



Use 18 lb. fishline for both cords.

FIGURE 1. POINTER AND DRIVE CORD RESTRINGING DETAIL

MODEL 65T21, 65T21B

PART NO.	DESCRIPTION
4S1719	Washer, steel: 3/8 x .140 x .030 thick; cadmium plated (line cord lock mounting)
4S7589	Washer, steel: 7/8 x 9/32 x .027 thick; cadmium plated (used on chassis retainer screws)
4S7650	Lockwasher, steel: #6 internal; cadmium plated (output trans. mtg.)
4S7655	Lockwasher, steel: 3/8 internal; cadmium plated (band switch)
2S1376	Nut, steel: 3/8-32 x 1/2 hex; cadmium plated (band switch mtg.)
3S7475	Screw, steel: #8 x 1/4 PKZ slotted acorn head; cadmium plated (power trans. & band switch shaft bearing strip mounting)
3S8011	Screw, steel: 8-32 x 1/2 slotted hex head locking type machine screw; cadmium plated (gang mtg.)
3S7512	Screw, steel: #8 x 1/2 PKZ plain hex head; (cadmium plated)
3S7534	Screw, steel: #8 x 1-3/8 PKZ slotted hex head; cadmium plated (chassis retainer screws)
1A71049	Shield & Iron Core Sleeve Assembly (I.F. & diode coil shield, and sleeve type iron core)
6A15094	Shield, dial light
47A71129	Shaft, tuning
9A6790	Socket, tube: molded octal; regular type (for all but I.F. amp.)
9A6788	Socket; tube: replacement (to be used only when mounting lugs on chassis break off)
9A6792	Socket, tube: molded octal; with center shield (for I.F. amp.)
9A70165	Socket, tube: replacement; with center shield (to be used only when mounting lugs on chassis break off)
9K72592	Socket, pilot light: with mounting bracket
50B71147	Speaker and bracket: 6" electro
41A14244	Spring, tension coil (drive cord)
41A22596	Spring, tension coil (pointer drive)
37K70556	Strip, channel: rubber; 1/2" long (dial scale mounting)
37K21114	Strip, channel: rubber; 1" long (dial scale mounting)
32A27678	Strip, shaft bearing: fibre. (supports band switch shaft)
31A51251	Strip, terminal: 1 insulated lug, #1 ground (on loop)
5A71130	Grommet, chassis retainer: rubber; 1/4 x 1/2 diameter body; 3/4 diameter head (cushions under chassis retainer screws)
5A71092	Grommet, chassis mounting: rubber; 5/8 x 3/4 diameter (used on each corner of chassis)
5A70404	Grommet, rubber (gang and speaker cushions)
36K70514	Knob, control: plain; (65T21)
36K70516	Knob, control: branded (65T21)
36K72889	Knob, control: plain (65T21B)
36K72890	Knob, control: branded (65T21B)
32A24815	Lock, line cord: fibre (Holds line cord to chassis)

REF NO.	PART NO.	DESCRIPTION
C-1	20A71140	Capacitor, trimmer: 10-80 mmf, with "L" mounting bracket
C-2	20A71141	Capacitor, trimmer; 10-80 mmf
C-3	1X71757	Capacitor, variable: 2 gang; cut oscillator plates: includes pulley
C-4	20A71051	Capacitor, trimmer: 4-20 mmf; with "L" mounting bracket (on loop)
C-5	21R6642	Capacitor, fixed: mica; 50 mmf 500V
C-6	20A71125	Capacitor, trimmer: 10-60; with "L" mounting bracket
C-7	21R2724	Capacitor, fixed: mica; 1000 mmf 5% 300V
C-8	21R6642	Capacitor, fixed: mica; 50 mmf 500V
C-9	889816	Capacitor, fixed: paper; .05 mf 400V
C-10	889816	Capacitor, fixed: paper; .05 mf 400V
C-11	889816	Capacitor, fixed: paper; .05 mf 400V
C-12	889816	Capacitor, fixed: paper; .05 mf 400V
C-13	889816	Capacitor, fixed: paper; .05 mf 400V
C-14	21R6639	Capacitor, fixed: mica; 500 mmf 500V
C-15	889813	Capacitor, fixed: paper; .005 mf 600V
C-16	21R6639	Capacitor, fixed: mica; 500 mmf 500V
C-17	889813	Capacitor, fixed: paper; .005 mf 600V
C-18	889813	Capacitor, fixed: paper; .005 mf 600V
C-19	889816	Capacitor, fixed: paper; .05 mf 400
C-20	889813	Capacitor, fixed: paper; .005 mf 600V
C-21 or	23A27716 23A74827	Capacitor, electrolytic; 30-30-20 mf/360-300-25V
	5A71735	Rivet, shoulder: 1/2 long; nickel plated (mounts 2 idler pulleys to chassis)
	587707	Rivet, steel: .122 x 5/32 nickel plated (terminal strip, trimmer, socket & output trans. mounting)
	587701	Rivet, steel: .122 x 3/16; nickel plated (band switch bracket and electrolytic wafer mounting)
	587700	Rivet, steel: .122 x 1/4; nickel plated (loop receptacle mounting)
	587708	Rivet, steel: .122 x 9/32; nickel plated (line cord lock mounting)
	34B70558	Scale, dial: glass
	382663	Screw, steel: #6 x 3/16 PKZ plain hex head; black parkerized finish (B.C. oscillator coil mounting)
	387454	Screw, steel: #8 x 1/4 PKZ plain hex head; cadmium plated (dial mtg.)
	4A21577	Washer "C" (Holds tuning shaft in place)

REF NO.	PART NO.	DESCRIPTION
I-1& I-2	65I10867	Bulb: 6.3V, .25A; tubular bayonet #44
L-1	24C72483	Loop Antenna and Panel (Complete)
L-2	24A70549	Coil, S.W. Oscillator
L-3	24A70546	Coil, B.C. oscillator
L-4	24A70548	Coil, S.W. antenna
R-1	6R6032	Resistor, fixed: carbon; 470,000 1/2W Ins.
R-2	6R6056	Resistor, fixed: carbon; 47,000 1/2W Ins.
R-3	6R6090	Resistor, fixed: carbon; 470 10% 1/2W Ins. (HS-32)
	6R6229	Resistor, fixed: carbon; 1000 10% 1/2W Ins. (HS-67)
R-4	6R2122	Resistor, fixed: carbon; 4.7 meg 1/2W Ins.
R-5	6R2122	Resistor, fixed: carbon; 4.7 meg 1/2W Ins.
R-6	6R3927	Resistor, fixed: carbon; 2.2 meg 1/2W Ins.
R-7	6R6068	Resistor, fixed: carbon; 22,000 1/2W M.I.
R-8	6R6053	Resistor, fixed: carbon; 1000 1/4W M.I.
R-9	6R2118	Resistor, fixed: carbon; 3.3 meg 1/2W Ins.
R-10	18A70068	Resistor, variable: carbon; 1 meg; with SPST switch; tapped at 300 K
R-11	6R6004	Resistor, fixed: carbon; 1 meg 1/2W Ins.
R-12	6R6406	Resistor, fixed: carbon; 22 10% 1/2W Ins. (HS-32)
	6R2058	Resistor, fixed: carbon; 39 10% 1/2W Ins. (HS-67)
R-13	6R6012	Resistor, fixed: carbon; 33,000 1/2W Ins.
R-14	6R6016	Resistor, fixed: carbon; 220,000 1/2W Ins.
	287051	Nut, steel: 3/8-32 x 9/16; cadmium plated (volume and tone control mounting)
	9A12705	Plate, electrolytic capacitor mounting: bakelite
	28K19871	Plug, 4-prong (loop plug)
	52B70519	Pointer, dial
	49A23960	Pulley, cord: 1/4" groove (dial cord idler pulley)
	49A21741	Pulley, cord: 3/8" groove (dial cord idler pulley)
	49A21552	Pulley, cord: 1/2" groove (dial cord idler pulley)
	9K28049	Receptacle, 4-prong (loop socket)
	5A71246	Rivet, shoulder: .187 long; nickel plated (idler pulley shaft)
	5A12814	Rivet, shoulder: .156 long; nickel plated (idler pulley shaft)
	31E74933	Strip, terminal: 2 insulated lugs, #3 mounting
	31A71126	Strip, terminal: 3 insulated lugs, #2 ground

REF NO.	PART NO.	DESCRIPTION
R-15	6R2056	Resistor, fixed: carbon; 39 10% 1/2W Ins.
R-16	6R6035	Resistor, fixed: carbon 270 10% 1W M.I.
R-17	18K70057	Resistor, variable: carbon; 1 meg
R-18	6R6015	Resistor, fixed: carbon 220,000 1/2W Ins.
S1 & S-2	40A71256	Switch, band: 2 position
T-1	24B70545	Transformer, I.F.: 455 Kc; complete less shield and iron core sleeve (HS-32)
	24B70551	Transformer, I.F.: 455 Kc; complete less shield and iron core sleeve (HS-67)
T-2	24B70537	Transformer, diode: 455 Kc; complete; less shield and iron core sleeve (HS-34)
	24B70533	Transformer, diode: 455 Kc; complete; less shield and iron core sleeve (HS-67)
T-3	25B21175	Transformer, output
T-4	25B21246	Transformer, power
	34B70518	Background, dial; cardboard
	7A70412	Bracket, band switch
	16K70563	Cabinet, table model: walnut veneer (65T21)
	16K71033	Cabinet, table model: blonde mahogany veneer (65T21B)
	42B5528	Clip, fahnestock: #18; double
	35K71090	Cloth, grille (65T21)
	35K71099	Cloth, grille (65T21B)
	11N8944	Cord, dial: 18 lb. black
	30A151	Cord, line: 6 ft. long; with plug
	1X71048	Core & Clip Assembly (I.F. & diode coil bottom tuning iron core and clip)
	1X71047	Core & Palnut Assembly (I.F. & diode coil top tuning iron core and nut)
	1X71758	Dial, Bracket & Plate Assembly: includes dial plate, pointer slider rail, 4 cord idler pulleys, 2 pilot light sockets, dial plate mounting bracket, dial background and glass dial scale. Pointer not included.
	13B70577	Escutcheon, dial
	581611	Eyelet, snap in: .140 x 141; copper oxide (dial background mounting)
	5A71081	Eyelet, chassis mounting: 1/4 x 1/ diameter body; 1/2 diameter head (used on each corner of chassis)
	5A70098	Eyelet: 23/64 x 7/32 diameter body; 1/2 diameter head (used under chassis retainer screws and gang and speaker mounting)
	37K15841	Foot, rubber: 3/4 diameter (cabinet foot)
	4A71133	Washer, spring (used on tuning shaft)

MODELS 65X11, 65X12, 65X13, 65X14, 65X14B, Ch. HS-2; 65X11A, 65X12A, 65X13A, 65X14A, 65X14BA, Ch. HS-51

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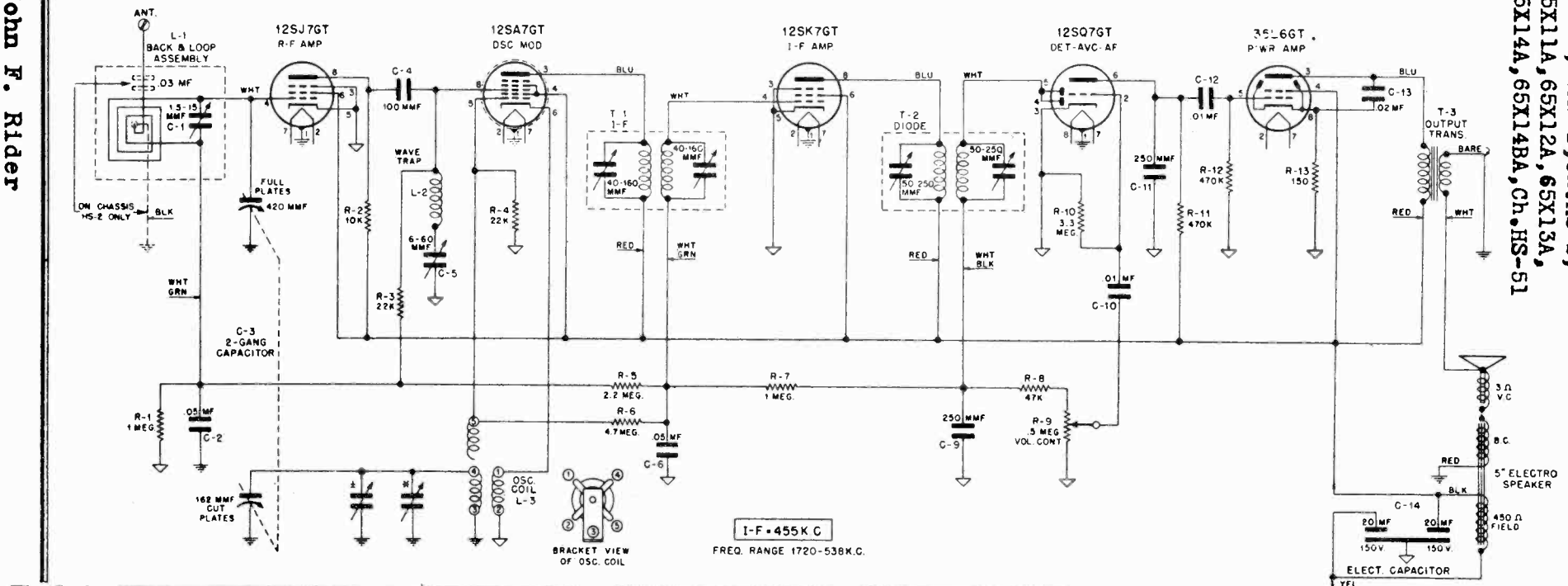
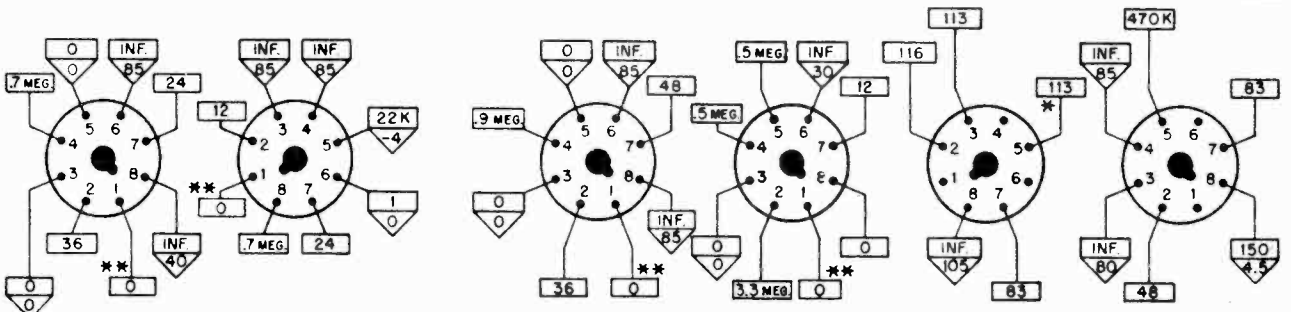
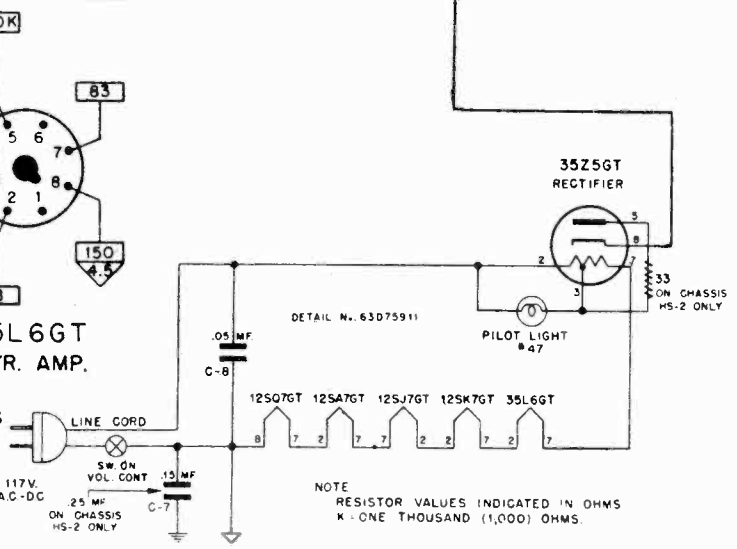






NOTE:- ALL VOLTAGES ARE MEASURED BETWEEN B- (⏚) AND TUBE BASE PIN TERMINALS WITH A 1000 OHM PER VOLT VOLTMETER.

RESISTANCE MEASUREMENTS ARE MADE WITH ELECTROLYTIC CAPACITOR C-14 DISCONNECTED AT B- (⏚).

CHECK ELECTROLYTIC CAPACITOR BY PUTTING POSITIVE OF CAPACITOR TO POSITIVE TERMINAL OF OHMMETER. RESISTANCE SHOULD BE APPROX. .5 MEGOHM.

▭ = RESISTANCE MEASUREMENTS

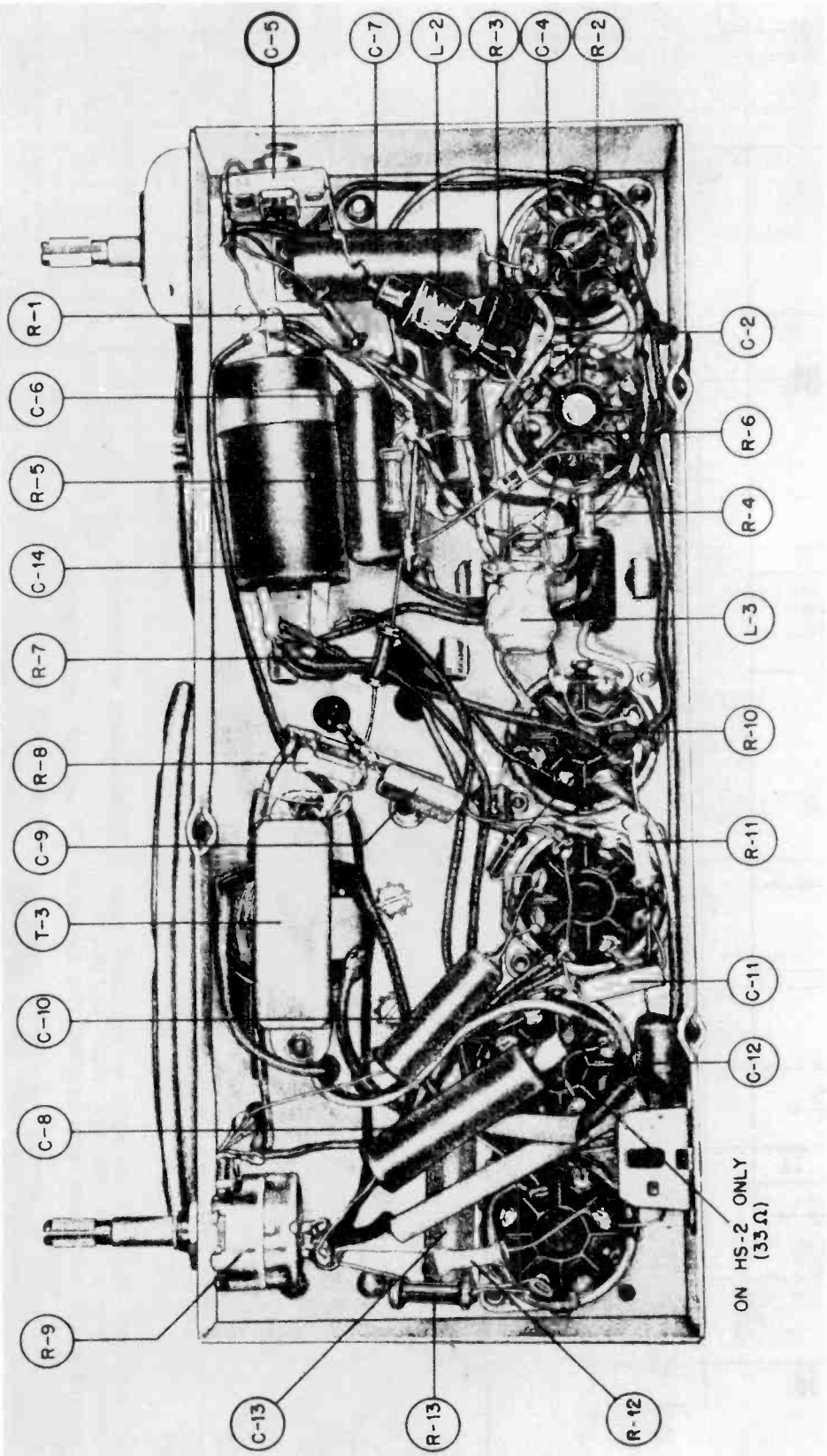
▽ = VOLTAGE MEASUREMENTS

** = MEASURED TO CHASSIS

* = 146 ON HS-2 ONLY

BOTTOM VIEW OF CHASSIS

MODELS 65X11,65X12,65X13, MOTOROLA INC.
65X14,65X14B,Ch.HS-2;
65X11A,65X12A,65X13A,
65X14A,65X14BA,Ch.HS-51



BOTTOM VIEW OF CHASSIS

This receiver is a 6 tube AC-DC superheterodyne, with a self contained loop antenna and a stage of R.F. amplification. The frequency range is 538 to 1720 kc and the I.F. frequency is 455 kc.

POWER INPUT: 117 V. AC-DC, 30 WATTS.

MOTOROLA INC.

MODELS 65X11,65X12,65X13, 65X14,65X14B,Ch.HS-2; 65X11A,65X12A,65X13A, 65X14A,65X14BA,Ch.HS-51

ALIGNMENT PROCEDURE

Connect output meter across speaker voice coil (.38V = .05 watt) Volume control set at maximum for all operations. The adjusting screwdriver or alignment tool should be of the insulated type, such as Motorola Part No. 66A71008

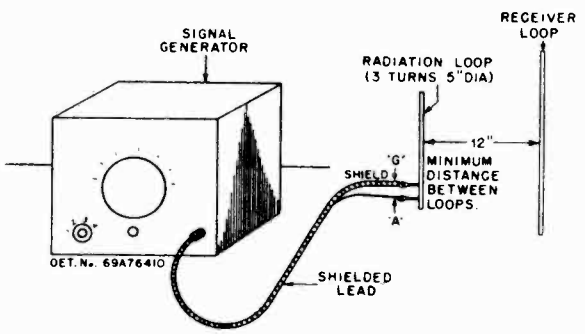
OPERATION IN ORDER	GANG CAPACITOR SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER NO.	GENERATOR SET AT (400 ∿ 30% MODULATED)	AVERAGE MICROVOLT INPUT FOR .38V OUTPUT
1. Align I.F.'s for maximum	Minimum	.1 mf	Osc.-Mod. grid	T-1 & T-2 (2 trimmers on each)	455 Kc	4000 Microvolts to I. F. Grid
2. Adj. wave-trap for minimum response	Minimum	.1 mf	R.F. Grid	C-5	455 Kc	- - - - - - -
3. Set Oscillator to dial scale	Minimum	None	Radiation Loop*	C-3	1720 Kc	- - - - - - -
4. Align R.F. for maximum	1400 Kc	None	Radiation Loop*	C-1 (on loop) Should be adjusted with set in cabinet	1400 Kc	60 microvolts to Osc.-Mod. grid through .1 mf. dummy. 5.5 microvolts to R.F grid through .1 mf dummy .31 volt at 400∿ to 1st A.F. grid.

5. Repeat above steps for maximum accuracy.

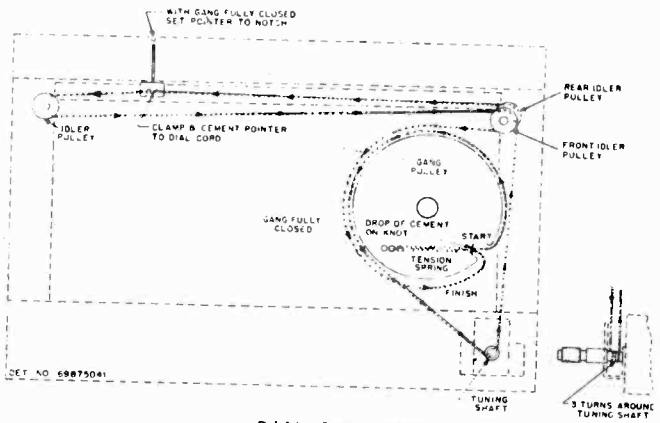
* *Connect output of signal generator to a 5" diameter 3 turn loop. See Fig. 2. With volume control on full, bring loop close enough to receiver loop until an output of 50 milliwatts is obtained (.38V on output meter). The distance between loops should never be less than 12" Vary distance between generator and receiver loops or adjust generator output to maintain .38V output during alignment.*

TO REPLACE DIAL CORD:

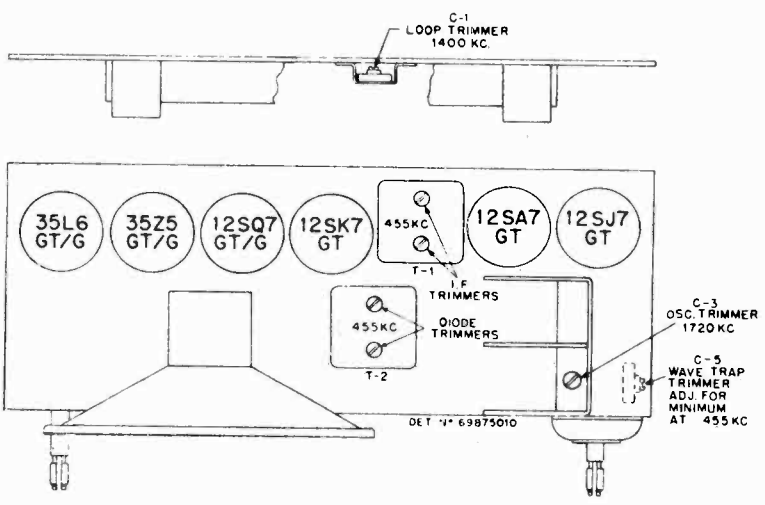
1. Remove loop from cabinet (see instruction on loop back).
2. Remove chassis from cabinet by pulling the knobs off and unscrewing the three chassis retaining screws from the bottom.
3. Remove the old dial cord and replace with a new piece of 18 lb. cord. See Figure 1 for procedure.
4. With the gang fully closed, set pointer to left hand notch of dial background and clamp to cord. In clamping, be careful not to cut the cord.
5. Secure the pointer to cord and dial cord knot with a drop of cement.
6. Reassemble by working in reverse order.



METHOD OF RADIATING SIGNAL TO THE RECEIVER



DIAL CORD RESTRINGING



TUBE AND TRIMMER LOCATION

MOTOROLA INC.

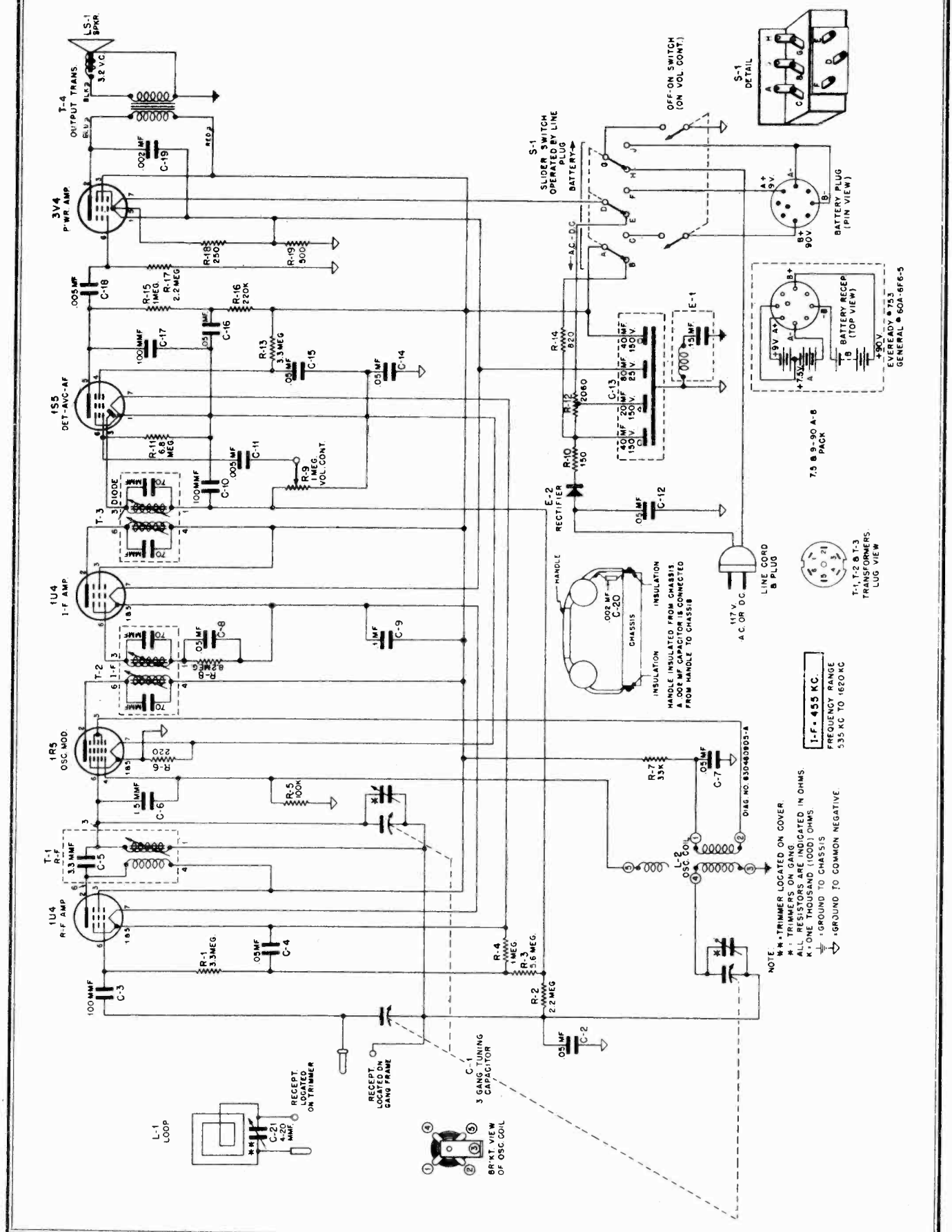
MODELS 65X11,65X12,65X13, 65X14,65X14B,Ch.HS-2; 65X11A,65X12A,65X13A, 65X14A,65X14BA,Ch.HS-51

REF. NO.	PART NO.	DESCRIPTION
C-1	20A18740	Capacitor, trimmer: 1.5-15 mmf; includes "U" mounting bracket
C-2	8S9805	Capacitor, fixed: paper; .05 mf 20% 100 vdc
C-3	1X26949	Capacitor, variable: 2 gang, cut oscillator plates: includes pulley
C-4	21R6841	Capacitor, fixed: mica; 100 mmf 20% 500 vdc
C-5	20A26941	Capacitor, trimmer: 6-60 mmf; includes "L" mounting bracket
C-6	8S9805	Capacitor, fixed: paper; .05 mf 20% 100 vdc
C-7	8A72686	Capacitor, fixed: paper; .15 mf 20% 200 vdc (HS-51)
	or 8A75586	Capacitor, fixed: paper; .15 mf 20% 400 vdc (HS-51)
	or 8S9810	Capacitor, fixed: paper; .25 mf 20% 100 vdc (HS-2)
C-8	8S9816	Capacitor, fixed: paper; .05 mf 20% 400 vdc
C-9	21R6848	Capacitor, fixed; mica: 250 mmf 20% 500 vdc
C-10	8S9801	Capacitor, fixed: paper; .01 mf 20% 100 vdc
C-11	21R6848	Capacitor, fixed: mica; 250 mmf 20% 500 vdc
C-12	8S9825	Capacitor, fixed: paper; .01 mf 20% 200 vdc
C-13	8S9802	Capacitor, fixed: paper; .02 mf 20% 400 vdc
C-14	23A70008	Capacitor, electrolytic; 20-20 mf 150 WV; with mounting strap
	20A14619	Capacitor, dual trimmer: 40-160 mmf each section (In IF can)
	or 20A72757	Capacitor, dual trimmer: 40-160 mmf each section (In IF can)
	20K20649	Capacitor, dual trimmer: 50-250 mmf each section (In diode can)
	or 20A72756	Capacitor, dual trimmer: 50-250 mmf each section (In diode can)
	5S7707	Rivet, steel: 5/32 x .122, Pol. Nkl. (tube socket mtg.)
	5S7716	Rivet, steel: 5/32 x .122, antique cop. (loop mtg. clip and trimmer mtg.)
	5S7701	Rivet, steel: 3/16 x .122, Pol. Nkl. (tuning shaft brkt.mtg.)
	5K74560	Rivet, shoulder: .312 shoulder; Pol.Nkl.(cord pulley mtg.)
	34B25759	Scale, dial: glass (65X11, 65X11-A 65X12, 65X12-A, 65X14, 65X14-A, 65X14-B and 65X14-BA)
	34B29469	Scale, dial: glass (65X13 & 65X13-A)
	3S7431	Screw, steel: #2 x 1/4 Ph RH WS; Cop. Ox. (dial scale mtg.)(65X14 65X14-A, 65X14B & 65X14-BA)
	3S7526	Screw, steel: #8 x 1-1/8 PKZ Sl HH; plain (set mtg.- wood models)
	47A14635	Shaft, tuning control
	26A26283	Shield, tube
	60A25758	Socket, dial light: with mtg. clip and leads.
	9A6736	Socket, tube; octal, saddle type
	50B23173	Speaker, electro: 5 inch
	or 50B20653	Speaker, electro: 5 inch
	2S7098	Speednut: for .180 round stud (mounts dial scale to escutcheon in 65X13 & 65X13-A)
	41A14111	Spring, tension coil (dial cord)
	42A70423	Strap, ground (used behind loop screw terminal)
	31A12847	Strip, terminal:.2 ins. lugs, #3 mtg.
	31K15026	Strip, terminal: 2 ins. lugs, #2 mtg.
	29A70422	Terminal, screw (external antenna term. on loop assem.)(Use with ground strap)
	4A70015	Washer, "C" (tuning shaft retainer
	35K19943	Washer, paper: brown (used between knobs and cabinet on dark models)

REF. NO.	PART NO.	DESCRIPTION
L-1	1X70002	Cabinet back & Loop assembly (65X11)
	1X70005	Cabinet back & Loop assembly (65X12)
	1X70014	Cabinet back & Loop assembly (65X13)
	1X71739	Cabinet back & Loop assembly (65X14)
	1X71776	Cabinet back & Loop assembly (65X14B)
	1X74455	Cabinet back & Loop assembly (65X11-A)
	1X74458	Cabinet back & Loop assembly (65X12-A)
	1X74461	Cabinet back & Loop assembly (65X13-A)
	1X74464	Cabinet back & Loop assembly (65X14-A)
	1X74467	Cabinet back & Loop assembly (65X14-BA)
L-2	24A21858	Coil, wave trap
L-3	24A26942	Coil, oscillator
R-1	6R6071	Resistor, fixed: carbon; 1 meg. 20% 1/3W N.I.
R-2	6R6113	Resistor, fixed: carbon; 10,000 20% 1/3W N.I.
R-3	6R6050	Resistor, fixed: carbon; 22,000 20% 1/3W N.I.
R-4	6R6050	Resistor, fixed: carbon; 22,000 20% 1/3W N.I.
R-5	6R6049	Resistor, fixed: carbon; 2.2 meg 20% 1/3W N.I.
R-6	6R6446	Resistor, fixed: carbon; 4.7 meg 10% 1/2W Ins.
R-7	6R6071	Resistor, fixed: carbon; 1 meg 20% 1/3W N.I.
R-8	6R6020	Resistor, fixed: carbon; 47,000 20% 1/3W N.I.
R-9	18A14629	Resistor, variable; carbon; .5 meg. with SPST switch
	or 18A72888	Resistor, variable: carbon; .5 meg. with SPST switch
R-10	6R2118	Resistor, fixed: carbon; 3.3 meg. 20% 1/2W Ins.
R-11	6R6011	Resistor, fixed: carbon; 470,000 20% 1/3W N.I.
R-12	6R6011	Resistor, fixed: carbon; 470,000 20% 1/3W N.I.
R-13	6R6392	Resistor, fixed: carbon; 150 10% 1/2W N.I.
T-1	1X26946	Transformer, I.F.; 455 Kc; complete with shield and trimmers
	3S7526	Screw, steel: #8 x 1-1/8 PKZ Sl HH; plain (set mtg.- wood models)
	47A14635	Shaft, tuning control
	26A26283	Shield, tube
	60A25758	Socket, dial light: with mtg. clip and leads.
	9A6736	Socket, tube; octal, saddle type
	50B23173	Speaker, electro: 5 inch
	or 50B20653	Speaker, electro: 5 inch
	2S7098	Speednut: for .180 round stud (mounts dial scale to escutcheon in 65X13 & 65X13-A)
	41A14111	Spring, tension coil (dial cord)
	42A70423	Strap, ground (used behind loop screw terminal)
	31A12847	Strip, terminal:.2 ins. lugs, #3 mtg.
	31K15026	Strip, terminal: 2 ins. lugs, #2 mtg.
	29A70422	Terminal, screw (external antenna term. on loop assem.)(Use with ground strap)
	4A70015	Washer, "C" (tuning shaft retainer
	35K19943	Washer, paper: brown (used between knobs and cabinet on dark models)
	35K22505	Washer, paper: ivory (used between knobs and cabinet
	5S7707	Rivet, steel: 5/32 x .122, Pol. Nkl. (tube socket mtg.)
	5S7716	Rivet, steel: 5/32 x .122, antique cop. (loop mtg. clip and trimmer mtg.)
	5S7701	Rivet, steel: 3/16 x .122, Pol. Nkl. (tuning shaft brkt.mtg.)
	5K74560	Rivet, shoulder: .312 shoulder; Pol.Nkl.(cord pulley mtg.)
	34B25759	Scale, dial: glass (65X11, 65X11-A 65X12, 65X12-A, 65X14, 65X14-A, 65X14-B and 65X14-BA)
	34B29469	Scale, dial: glass (65X13 & 65X13-A)

MODEL 68L11, CHASSIS HS-119

MOTOROLA INC.



ALIGNMENT

Maximum performance can only be obtained if extreme care is exercised during alignment. Follow the procedure carefully.

A suitable output meter should be connected across the speaker voice coil. Set receiver volume control to maximum; for greatest accuracy keep output of receiver at approximately .05 watt throughout alignment by reducing generator output (not receiver volume control) as stages are brought into alignment. (.05 watt = .40 volt on output meter). The alignment tool should be of an insulated type such as Motorola part number 66A71008.

If receiver is operated from AC line during alignment, it is suggested that an isolating transformer be used between receiver and power line. If no isolation transformer is used and hum is encountered during alignment, connect the ground side of the signal generator to B- instead of the receiver chassis.

Refer to Figure 1 for location of all adjustments.

Normally, alignment can be made with trimmers 5, 6 & 7. However, if range of these trimmers is insufficient to obtain peak, adjustment can be made with trimmers 5A and 6A.

R.F. COIL. The inductance of this coil is set at time of manufacture by adjusting the iron core. No resetting of this core should be made unless it has been tampered with. If so, readjustment can be made by proceeding as follows:

Tune in 600 Kc signal and peak Padder Adj. (8). Next tune in 1400 Kc signal and peak trimmer (6). Repeat both adjustments until maximum response is obtained at both ends; the last adjustment should be trimmer (6).

ALIGNMENT PROCEDURE CHART

STEP	DIAL SET TO	DUMMY	SIGNAL GENERATOR CONNECTED TO	SIGNAL GENERATOR SET TO	ADJUST TRIMMER OR CORE	REMARKS
IF ALIGNMENT						
1.	Gang fully opened	.1 mf	OSC-MOD grid*	455 Kc	1,2,3 & 4	Adjust for maximum output
RF ALIGNMENT						
2.	1600 Kc**	-	Radiation loop***	1600 Kc	5	This sets osc. to dial scale
3.	1400 Kc	-	Radiation loop***	1400 Kc	6 & 7	Tune signal for max. with receiver tuning knob, then peak trimmers 6 & 7.
4.	1400 Kc	-	Radiation loop***	1400 Kc	7	With chassis assembled into cabinet, repeak antenna trimmer. Cabinet rear cover should be closed.

* A convenient point is the stator of the tuning capacitor.

** First close gang fully and set last mark on dial scale tape to calibration mark as shown in Figure 2, then set to 1600 Kc.

*** Connect output of signal generator to a 5" diameter, 3 turn loop and bring loop close enough to receiver loop to obtain output of 50 milliwatts (.40V) on output meter. Vary distance between loops to maintain this output during alignment. Minimum distance between loops should never be less than 12".

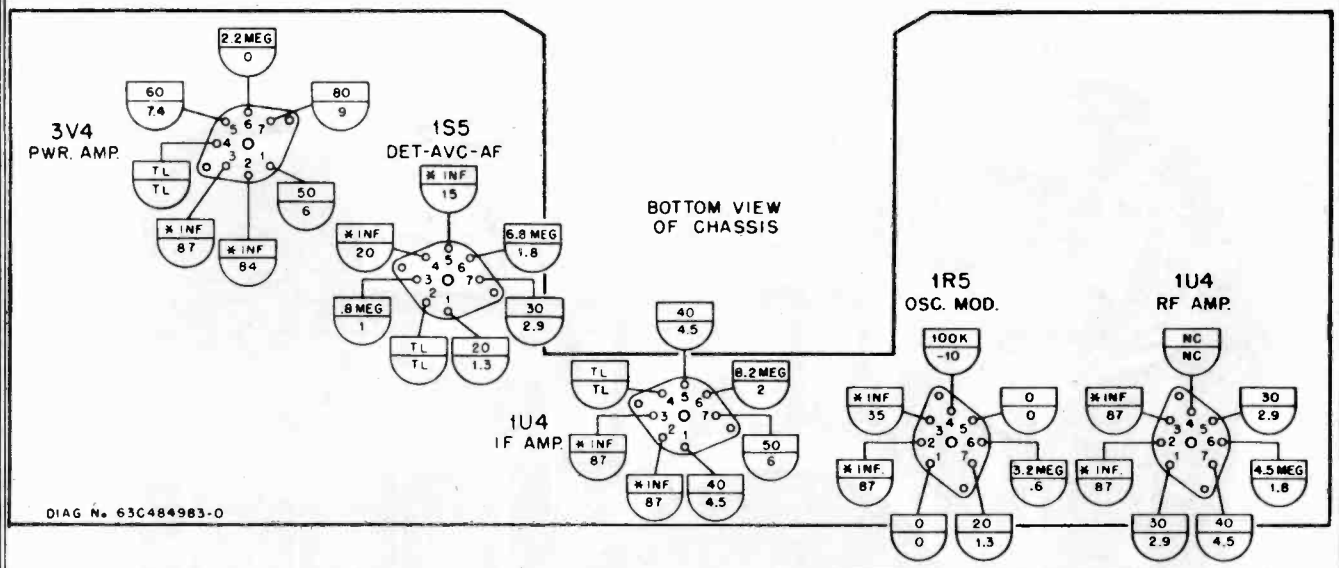
TUNING RANGE - 535 to 1620 Kc **IF FREQUENCY** - 455 Kc

TUBE COMPLEMENT - 1U4 - RF Amplifier
1R5 - Oscillator-Modulator
1U4 - IF Amplifier
1S5 - Detector, AVC & 1st AF Amplifier
3V4 - Power Amplifier
Rectifier - Selenium type (for house current operation)

POWER SUPPLY - Operates from 105-125 volts AC or DC (15 watts), or self-contained battery pack. Use Eveready #753 or General #60A-6F6-5.

MODEL 68L11, CHASSIS HS-119

MOTOROLA INC.



NOTE: A VTVM WAS USED TO MAKE MEASUREMENTS.

MEASUREMENTS ARE MADE FROM TUBE BASE PIN TO B-(▽)

SET WAS OPERATED FROM FRESH BATTERY FOR VOLTAGE MEASUREMENTS.

SET WAS IN 'BATTERY' POSITION AND POWER SWITCH WAS 'ON' FOR RESISTANCE MEASUREMENTS; BATTERY WAS DISCONNECTED.

VOLTAGE TOLERANCE ±10%. RESISTANCE TOLERANCE ±20%.

▭ = RESISTANCE MEASUREMENTS.

◡ = VOLTAGE MEASUREMENTS

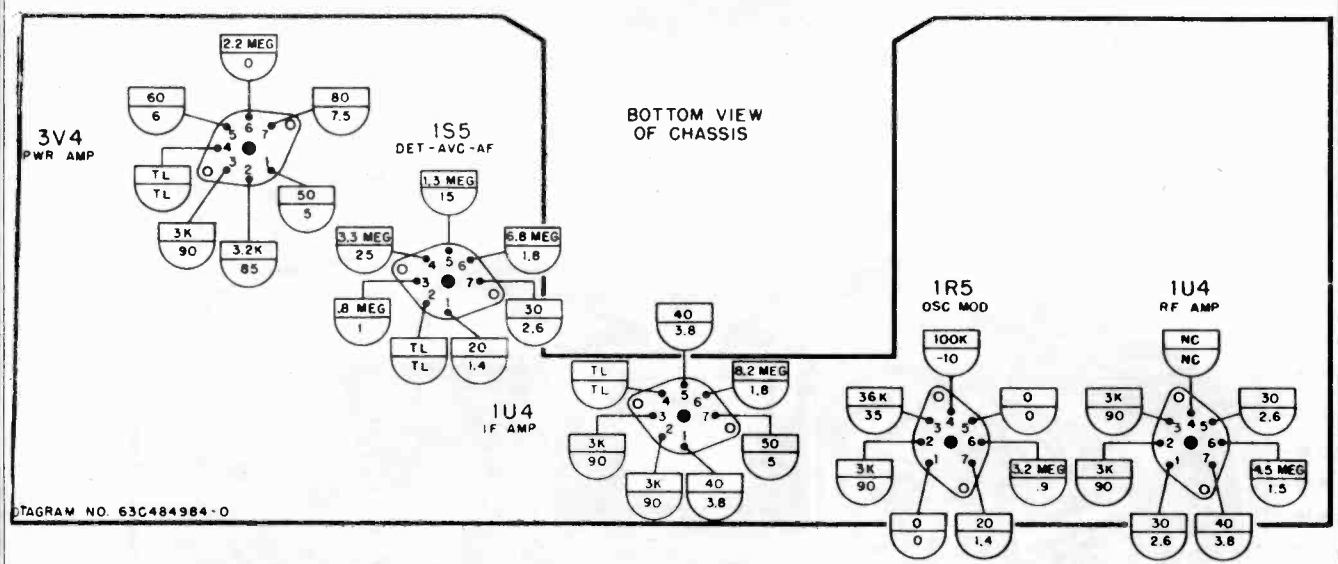
K = ONE THOUSAND (1000) OHMS.

TL = TIE LUG.

NC = NO CONNECTIONS

* = WILL VARY, DEPENDING ON CONDITION OF ELECTROLYTIC CAPACITOR.

VOLTAGE & RESISTANCE DIAGRAM - BATTERY OPERATED



NOTE: A VTVM WAS USED TO MAKE MEASUREMENTS. MEASUREMENTS ARE MADE FROM TUBE BASE PIN TO B-(▽).

SET WAS OPERATED FROM 117 V. AC LINE FOR VOLTAGE MEASUREMENTS.

SET WAS IN AC POSITION AND POWER SWITCH WAS 'ON' FOR RESISTANCE MEASUREMENTS.

▭ = RESISTANCE MEASUREMENTS

◡ = VOLTAGE MEASUREMENTS.

K = 1000 (ONE THOUSAND) OHMS.

VOLTAGE TOLERANCE ±10%

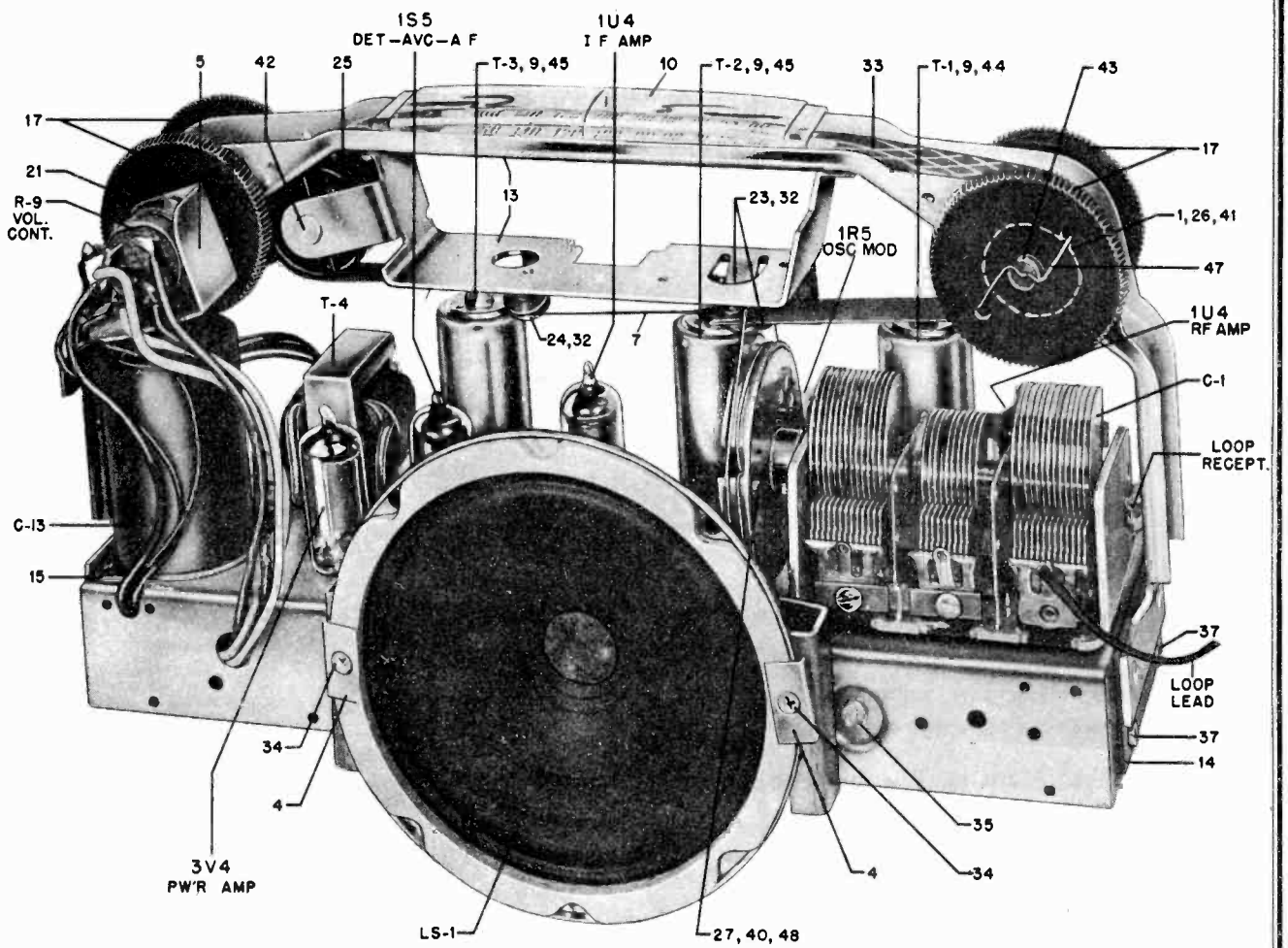
RESISTANCE TOLERANCE ±20%

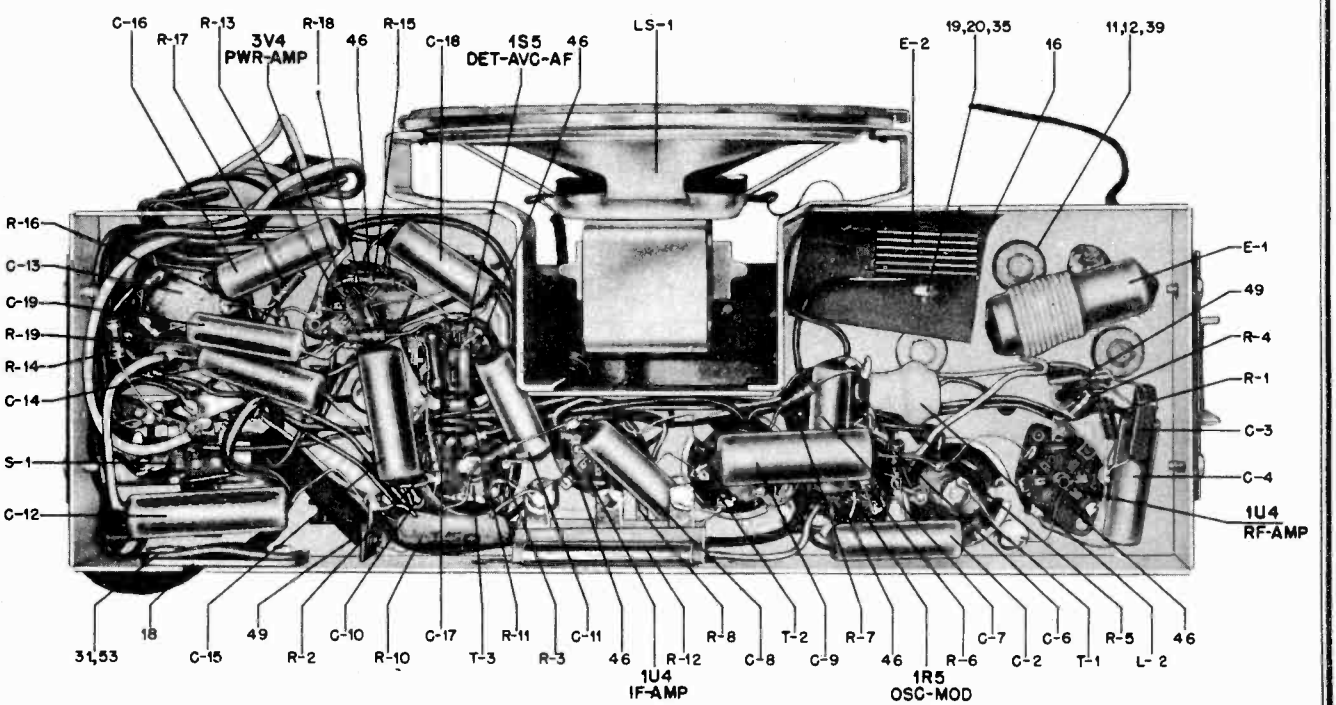
TL = TIE LUG

NC = NO CONNECTION

VOLTAGE & RESISTANCE DIAGRAM - AC OPERATED

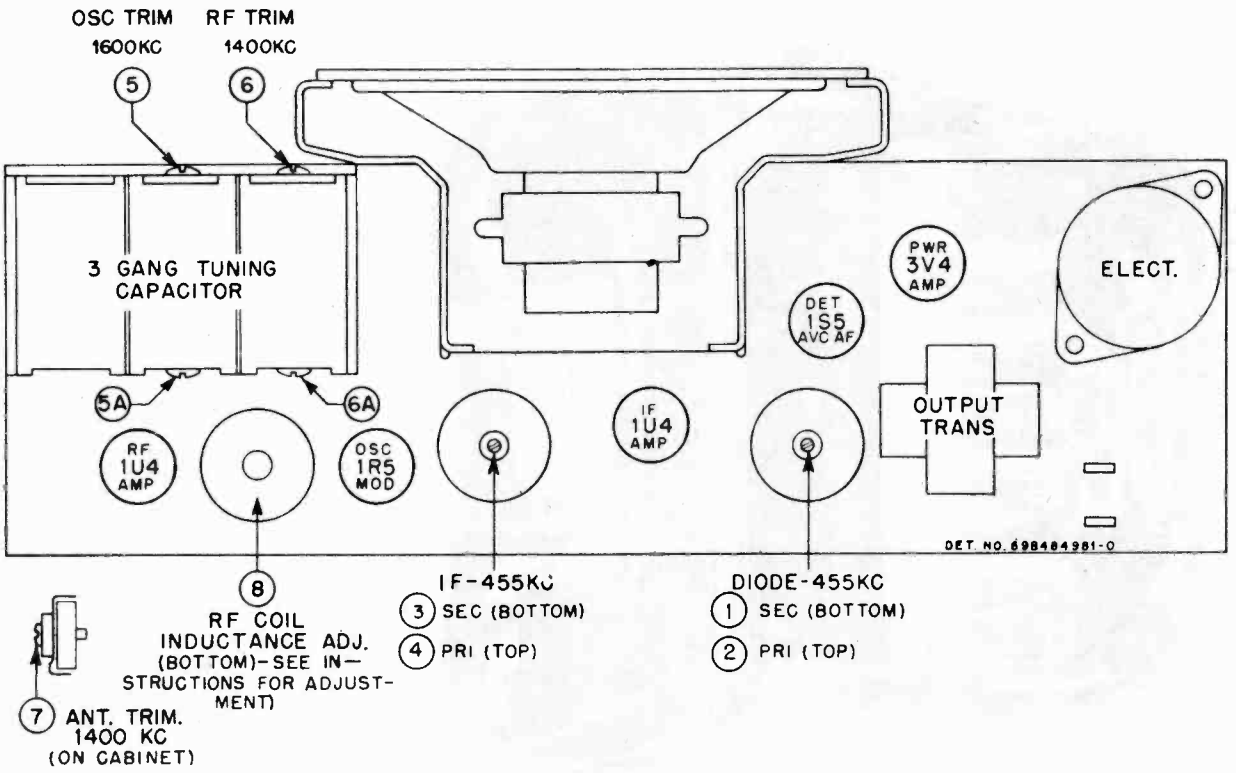
MOTOROLA INC. MODEL 68L11, CHASSIS HS-119



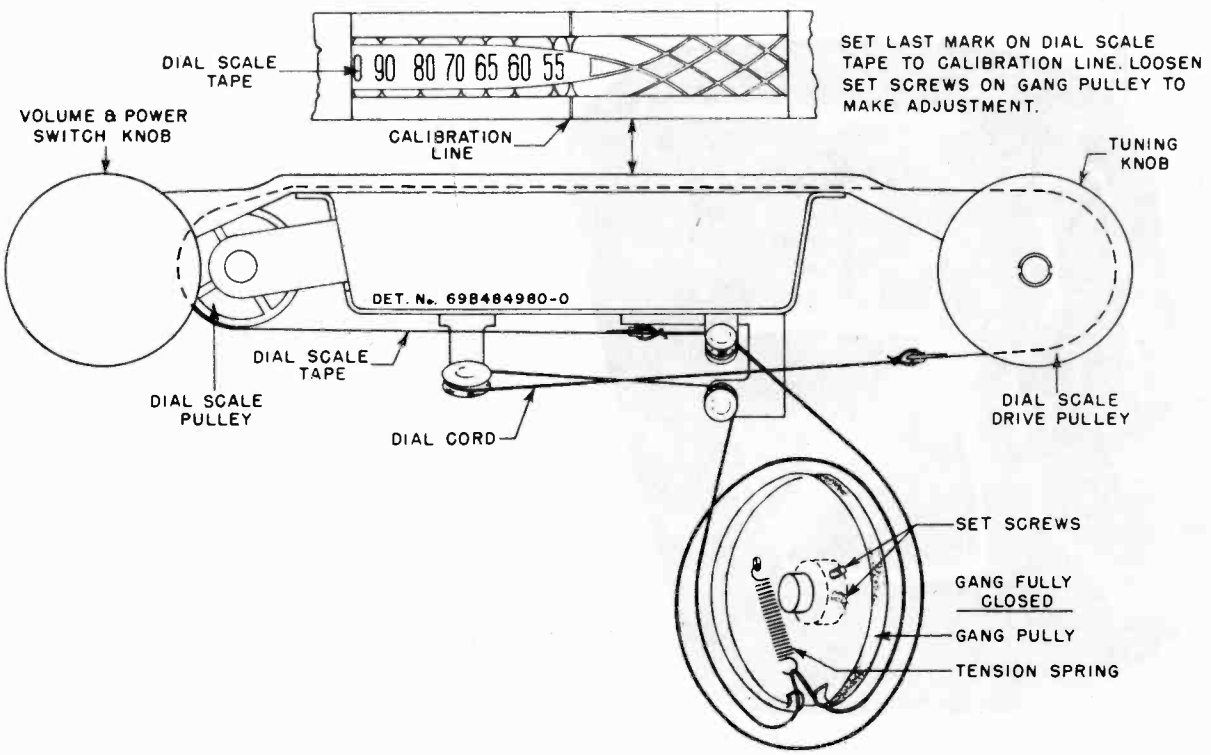


PARTS LOCATIONS - TOP & BOTTOM

MODEL 68L11, CHASSIS HS-119 MOTOROLA INC.

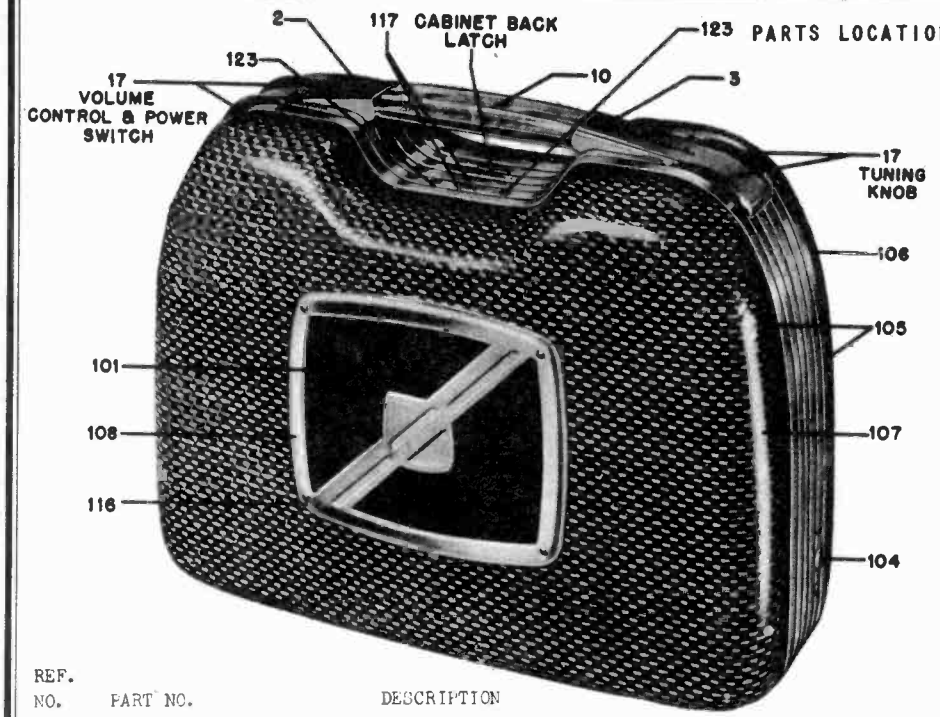


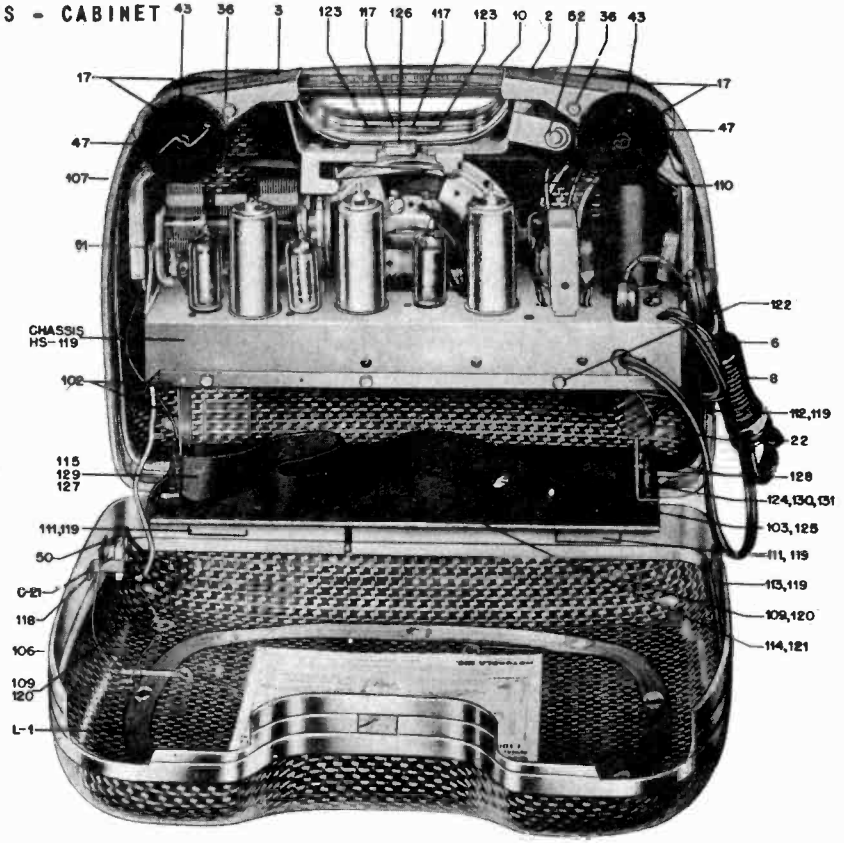
TUBE & ALIGNMENT ADJUSTMENT LOCATIONS



DIAL CORD RESTRINGING DETAIL

PARTS LOCATIONS - CABINET

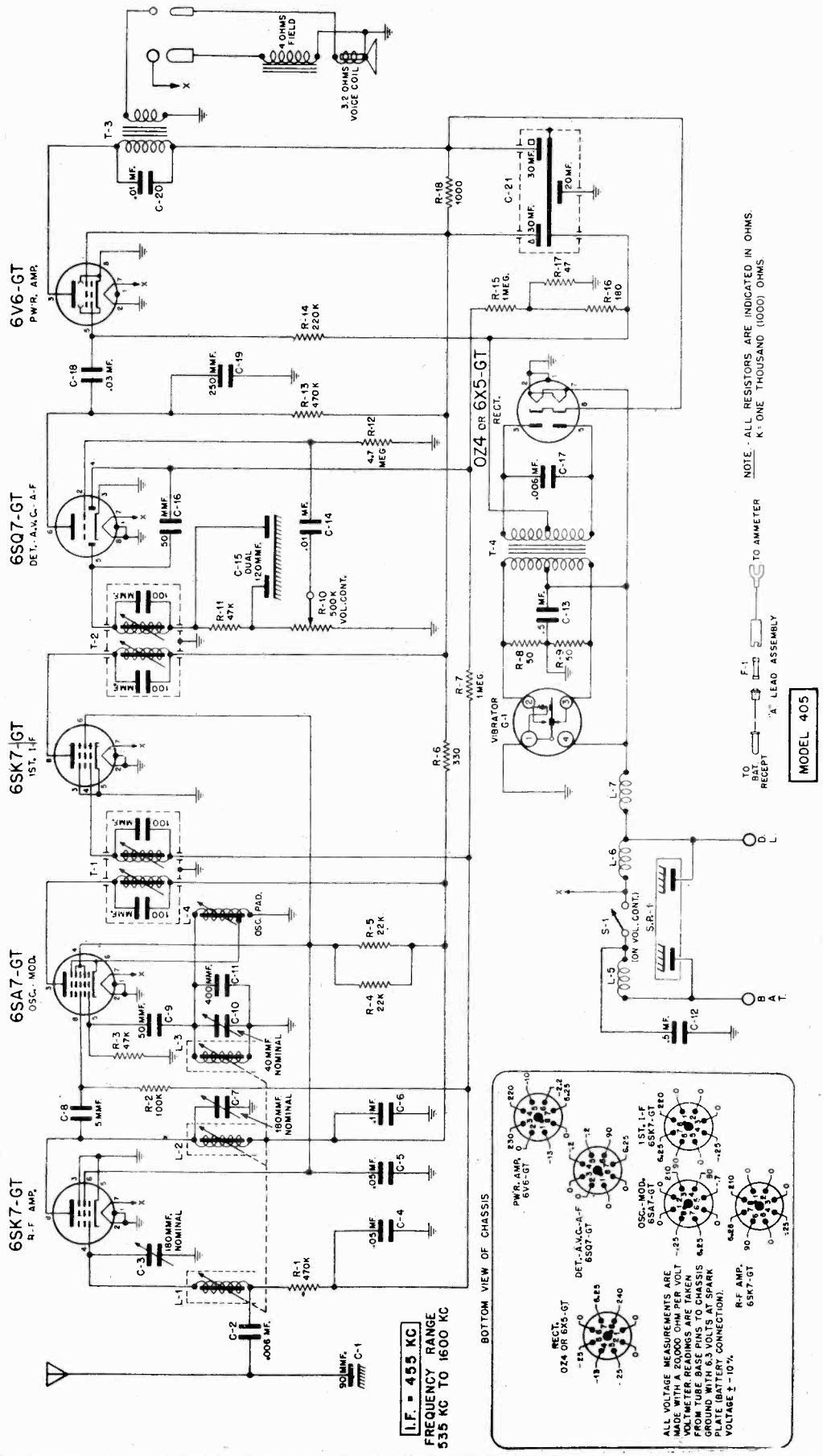




REF. NO.	PART NO.	DESCRIPTION
CABINET PARTS		
101	16K481854	Baffle & Grille Cloth Assembly .....
102	1X480192	Bottom Cover, Bracket and Strap Assembly
103	38A480111	Button, battery strap .....
104	38K480170	Button, plug .....
105	16C480183	Cabinet, portable: complete .....
106	1X480191	Cabinet, back section: includes loop and trimmer .....
107	16X480186	Cabinet, front section: includes baffle, escutcheon and cloth .....
108	13C480169	Escutcheon, cabinet .....
109	37K480189	Foot, rubber .....
110	32B484259	Gasket, speaker: rubber .....
111	55K480188	Hinge; cabinet .....
112	14A482140	Insulator, cord outlet (cabinet front)..
113	14A482141	Insulator, cord retainer (cabinet back).
114	64B480168	Panel, cabinet bottom; fibre board .....
115	537771	Rivet: .088 x 3/16; steel; nkl pl. (stud & strap mtg) .....
116	536841	Rivet: .088 x 1/4; brass; nkl pl (escutcheon mtg). .....
117	536843	Rivet: .083 x 3/16 steel; nkl pl (latch spring mtg)
118	531683	Rivet: .122 x 3/16; brass; nkl pl (trimmer mtg) .....
119	536842	Rivet: .140 x 7/32; steel; nkl pl (hinge & insulator mtg) .....
120	538484	Rivet: .140 x 1/4; steel; nkl pl (rubber foot mtg) .....
121	532840	Rivet: .140 x 3/8 steel; nkl pl (bottom panel mtg) .....
122	382695	Screw: #6 x 3/16 PKZ slotted hex head sheet metal screw; cad pl (chassis bottom cover assembly mtg) .....
123	384488125	Screw: 6-32 x 3/8 Phillips flat head machine screw cad pl (chassis mtg) .....
124	383360	Screw: #6 x 1/2 PKZ plain hex head sheet metal screw cad pl (chassis mtg) .....
125	9A480110	Socket, battery strap .....
126	41A480158	Spring, cabinet latch .....
127	1X480193	Strap and Button Assembly .....

REF. NO.	PART NO.	DESCRIPTION
ELECTRICAL PARTS		
CAPACITORS		
C-1	19B480125	Variable: 3 gang
C-2	8S9805	Paper: .06 mf 100V
C-3	21R6641	Mica: 100 mmf 500V
C-4	8S9805	Paper: .06 mf 100V
C-5	21K77268	Mica: 3.3 mmf; part of T-1
C-6	21B77267	Molded: 1.5 mmf
C-7	8S9805	Paper: .06 mf 100V
C-8	8S9805	Paper: .06 mf 100V
C-9	8S9806	Paper: .1 mf 200V
C-10	21B77286	Ceramic: 100 mmf 500V
C-11	8S9813	Paper: .005 mf 600V
C-12	8S9816	Paper: .06 mf 400V
C-13	23K76965	Electrolytic: 40-40-20-80 mf/150-150-150-25V includes cover
C-14	8S9805	Paper: .06 mf 100V
C-15	8S9805	Paper: .05 mf 100V
C-16	8S9805	Paper: .06 mf 100V
C-17	21B77286	Ceramic: 100 mmf 500V
C-18	8S9813	Paper: .005 mf 600V
C-19	8S9824	Paper: .002 mf 400V
C-20	8S9824	Paper: .002 mf 400V
C-21	20A480185	Trimmer, mica: 4 mmf to 20 mmf
CAPACITOR-CHOKE		
E-1	1A77283	Capacitor and Choke Assembly: includes .15 mf 200V paper capacitor & coil
RECTIFIER		
E-2	48B478111	Selenium Rectifier: half-wave
COILS		
L-1	24C480184	Loop Antenna: winding only
L-2	24A76943	Oscillator coil
SPEAKER		
LS-1	50K480198	Speaker: 5"; PM
or	50C76853	Speaker: 5"; PM (used in early sets)
RESISTORS		
NOTE: All resistors are 1/2W, 20% carbon, insulated type unless otherwise specified.		
R-1	6R2118	3.3 meg 1/2W
R-2	6R3927	2.2 meg 1/2W
R-3	6R3986	5.6 meg 10% 1/2W
R-4	6R6004	1 meg 1/2W
R-5	6R6075	100,000 1/2W
R-6	6R3933	220 1/2W
R-7	6R6012	33,000 1/2W
R-8	6R5585	8.2 meg 10% 1/2W
R-9	18A480103	Volume Control: 1 meg; with power switch
R-10	17A76986	150 10% 2-1/2W; wirewound; coated
R-11	6R3987	6.8 meg 1/2W
R-12	17K75249	2060 5% 5W wirewound
R-13	6R2118	3.3 meg 1/2W
R-14	6R6269	820 10% 1/2W
R-15	6R6004	1 meg 1/2W
R-16	6R6015	220,000 1/2W
R-17	6R3927	2.2 meg 1/2W
R-18	6R2088	250 10% 1/2W
R-19	6R5632	500 10% 1/2W
SWITCH		
S-1	40A27114	Slider switch: 3 PDT
TRANSFORMERS		
T-1	24B76988	RF Broadcast: includes coupling capacitor (C-5) but less shield
T-2	24B76990	IF, 455 Kc: includes padding capacitors but less shield
T-3	24B77264	Diode, 455 Kc; includes padding capacitors but less shield
T-4	24B76952	Output Transformer
CHASSIS PARTS - MECHANICAL		
1	37K480147	Band, rubber (on scale tape drive pulley)
2	7B480132	Bracket, knob shaft: left side; marked "ON"
3	7K480133	Bracket, knob shaft: right side; marked "Motorola"
4	7A76939	Bracket, speaker mtg
5	7A480117	Bracket, volume control mtg
6	1X480178	Cable Assembly (battery): includes 9-pin plug
7	11M8944	Cord, dial: 18# black
8	30B20329	Cord, line: with plug; 6 ft long
9	46A70023	Core, Iron & Screw (T-1, T-2, T-3 tuning)
10	61B480126	Crystal, dial
11	5A70098	Eyelet, spacer (gang mtg)
12	5A70404	Grommet, rubber (gang mtg)
13	1X480179	Handle and Idler Pulley Bracket Assembly: does not include dial, crystal, scale tape pullies, shafts or volume control mtg bracket; includes cord pullies & chassis insulators
14	14A482729	Insulator, bracket mtg
15	9A22056	Insulator, electrolytic mtg
16	14A470428	Insulator, rectifier: armite paper
17	36B480128	Knob, control
18	32A24815	Lock, line cord: fibre
19	4S7696	Lockwasher: #6 internal; cad pl (rectifier mtg)
20	2S7010	Nut: 5/40 x 1/4 hex; cad pl (rect. mtg)
21	2S7061	Nut: 3/8-32 x 9/16 hex; Palnut; cad pl (volume control mtg)
22	28K77272	Plug, 9 pin (battery connector)
23	49A12646	Pulley, cord: 7/32 groove
24	49A21741	Pulley, cord: 3/8 groove
25	49K480116	Pulley, scale tape: plain
26	49K480115	Pulley, scale tape: tapped for setscrew
27	1X480174	Pulley and Bushing Assembly: less setscrews (gang drive)
28	5S7771	Rivet: .088 x 3/16 steel; nkl pl (tube socket mtg)
29	5S7707	Rivet: .122 x 5/32 steel; nkl pl (terminal strip mtg)
30	5S7701	Rivet: .122 x 3/16; steel; nkl pl (electrolytic insulator mtg and insulator bracket mtg)
31	5S7708	Rivet: .122 x 9/32; steel; nkl pl (line cord lock mtg)
32	5A71246	Rivet, shoulder: .187" long; nkl pl
33	34B480127	Scale, dial: flexible tape
34	3S2974	Screw: 4-40 x 5/16; Phillips head machine screw; cad pl (speaker mtg)
35	3S7311	Screw: 5-40 x 7/8 slotted hex head machine screw; cad pl (rectifier mtg)
36	3S2695	Screw: #6 x 3/16 PKZ plain hex head sheet metal screw; cad pl (slider switch mtg and knob shaft bracket mtg)
37	4S3376	Screw: #6 x 1/4 PKZ slotted hex head sheet metal screw; cad pl (handle assembly mtg & volume control bracket mtg)
38	3S7506	Screw: #6 x 1/4 PKZ plain hex head sheet metal screw steel; cad pl (osc coil mtg)
39	3S2294	Screw: 6-32 x 1/2 plain hex head locking type machine screw; cad pl (gang mtg)
40	3S7113	Setscrew: 8-32 x 1/4 slab head machine screw; (gang pulley mtg)
41	3S2654	Setscrew: 8-32 x 3/8 Allenhead; cad pl (scale tape pulley retainer)
42	47A480113	Shaft, idler pulley
43	47A480124	Shaft, volume and tuning
44	26B70107	Shield, coil (for T-1)
45	1A71049	Shield and Sleeve Assembly (for T-2 & T-3)
46	9A472534	Socket, tube: miniature 7-prong
47	41A480151	Spring, knob retainer
48	41A14244	Spring, tension coil (dial drive)
49	31A84795	Strip, terminal: 2 insulated lugs, #1 mtg
50	29K5419	Terminal, plain pin: small
51	29A5400	Terminal, plain pin: large
52	4K24124	Washer "C": shaft retainer
53	4S1719	Washer: 3/8 x .140 x .030 (line cord lock mtg)

MODEL 405, Ch. AS-13 MOTOROLA INC.



Two types of I.F.-Diode transformers have been used. The transformer shields for the late units have a powdered iron sleeve whereas none was used with the early I.F.-Diode transformers. See Figure 5

The late transformer or shield assemblies are not interchangeable with the early ones. Although a late transformer and shield can be used to replace an early transformer and shield combination, it is not recommended because of difficulty in replacing shields which are staked to the chassis. Do not attempt to intermix the transformers and shields. If the wrong combination of transformer and shield is used the transformer will not peak at the I.F. frequency of 455 Kc.

Replace transformer coil assemblies if necessary, with same type as in the receiver.

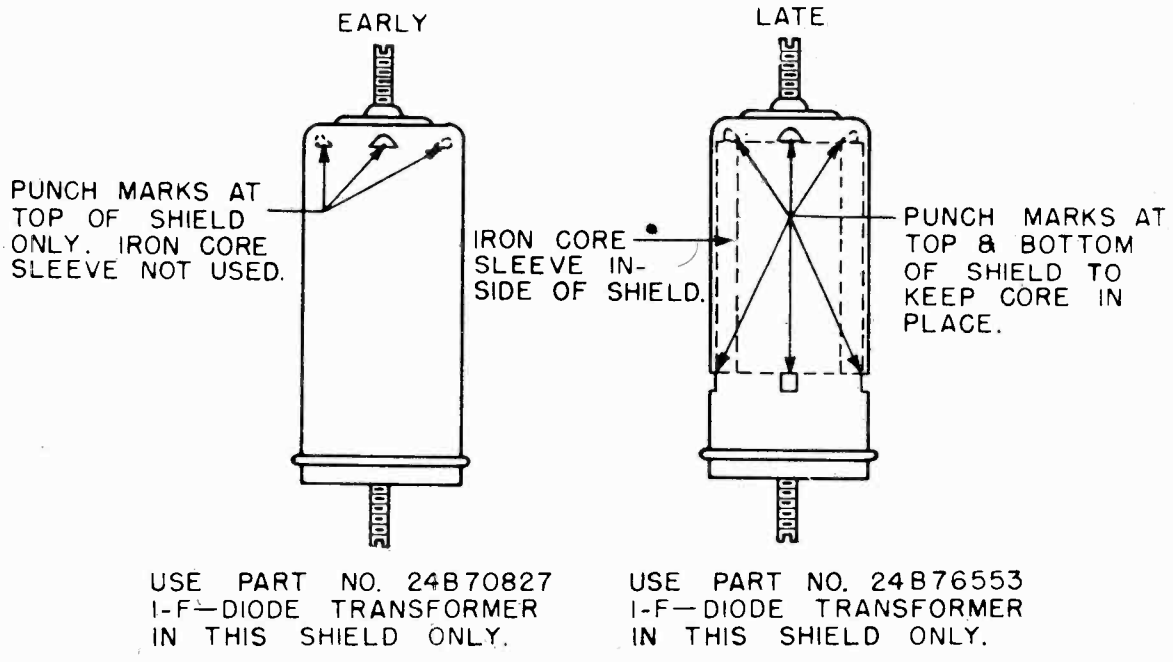
The capacitor across each winding of both types of I.F.-Diode transformers is a dual 100 mmf. wafer type silver mica, which is a part of the transformer assembly.

EARLY SETS

Transformer, I.F. or diode:
Part No. 24B70827
Shield: Part No. 26B70107

LATE SETS:

Transformer, I.F. or diode:
Part No. 24B76553.
Shield & Iron Core Sleeve Assembly: Part No. 1A71049.



I.F.-DIODE (EARLY-LATE) TRANSFORMER IDENTIFICATION DETAIL

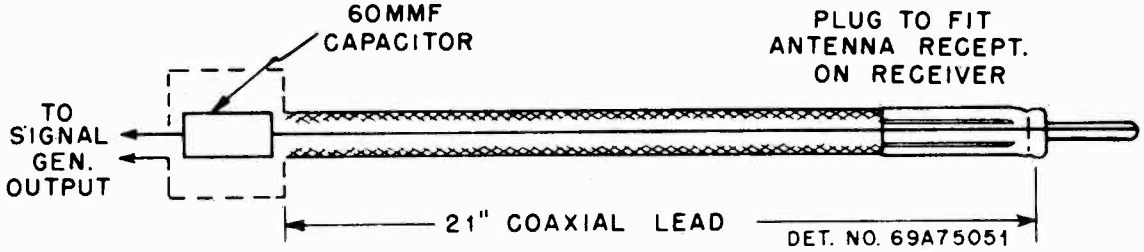


FIGURE 2. DUMMY ANTENNA CONSTRUCTION DETAIL

ALIGNMENT

EQUIPMENT REQUIRED

1. A special tool for adjusting the tuner cores. Use alignment tool, Motorola Part No. 66A76278.

2. A small screwdriver for I.F. and R.F. Alignment.

3. A modulated signal generator that can be accurately tuned to the frequencies indicated in the alignment chart.

4. A special dummy antenna for R.F. alignment. Construct dummy antenna per instructions given in Figure 2. The 21" coaxial lead needed in its construction is the same type as used for lead-in on Motorola car antenna.

5. A low range output meter.

6. A special tuner gauge, Motorola Part No. 66X76825, for accurately setting tuner to exact alignment frequencies is available. Instructions on its use come with the gauge. Receiver can be aligned without using gauge, but use of gauge will help you to do a speedier and more accurate job.

PROCEDURE

1. Remove the front and rear covers. All adjustments are now exposed. Refer to Figure 3 for their location.

2. Turn the receiver on and allow it to warm up for a few minutes. Press the "M" button to place automatic tuner in manual tuning position.

3. Connect the output meter across the speaker voice coil.

4. Set receiver volume control at maximum and tone control to voice position (high position).

5. Refer to the following alignment chart for procedure.

STEP	TUNER POSITION SET TO	DUMMY ANTENNA	SIGNAL GENERATOR LEAD CONNECTED TO	SIG. GEN. SET AT	ADJUST FOR PEAK ON OUTPUT METER
1.	High frequency end (cores out)	.1 mfd. at Sig. Gen.	Osc Mod grid (#5 pin)	455 Kc	#1 and 2 P & S in T-1 #3 and 4 P & S in T-2
2.	High frequency end, tuning shaft against stop. Cores should be set to project 1-1/8" from cans. *	60 mmf. at Sig. Gen. in series with 21" long coax lead.	Antenna receptacle	1600 Kc	#5 Osc. coil trimmer #6 R.F. coil trimmer #7 Ant. coil trimmer
3.	EXACTLY one full turn in from high frequency end. Use knob set screw as an indicator. Start measuring turn the moment tuner carriage starts moving inward *	"	"	1425 Kc	#8 Osc. coil core #9 R.F. coil core #10 Ant. coil core
4.	EXACTLY four more full turns in (as indicated by knob setscrew)	"	"	Power turned Off.	#11 Osc. Pad. core for maximum noise
	NOTE: If oscillator padder core adjustment is too far off, repeat alignment procedure, steps 2, 3, and 4. It may be necessary to repeat alignment more than once if padder adjustment has been indiscriminately tampered with.				
5.	Assemble receiver and peak antenna trimmer (#7) to car antenna. The antenna trimmer is located at the top of the receiver and is inaccessible when the receiver is installed behind instrument panel, therefore, it is necessary to adjust antenna trimmer before final installation. Proceed by laying set on floor of car, connect antenna and "A" leads, tune set to a spot around 1400 kc that is free of stations and adjust antenna trimmer for maximum noise. The antenna should be fully extended.				

IMPORTANT: Do not push in on the alignment tool when adjusting the tuner cores. The slightest inward pressure on the alignment tool may move the tuner carriage and result in inaccurate alignment.

TUNING RANGE

535 to 1600 K.C.

I. F. Frequency - 455 kc.

ELECTRICAL CHARACTERISTICS

Power Input: 6 Amp. at 6.3V (with P.M. dynamic type speaker)
7.5 Amp. at 6.3V (with electrodynamic type speaker)

Power Output: 5.6 watts (max.)

OVERALL SENSITIVITY

Frequency	1400 Kc	1000 Kc	600 Kc
Sensitivity	1.4uv	1.6uv	1.4 uv

Standard output is to be 1 watt and is measured across the 3 ohm resistive load. (1 watt = 1.74 volts). Test is made with 30% 400 cycle modulation. Tone control is set to voice position (high) and volume control at maximum. Signal is fed through 60 mmf. dummy to antenna connector of set through 21" coaxial lead. See Figure 2 for dummy antenna detail.

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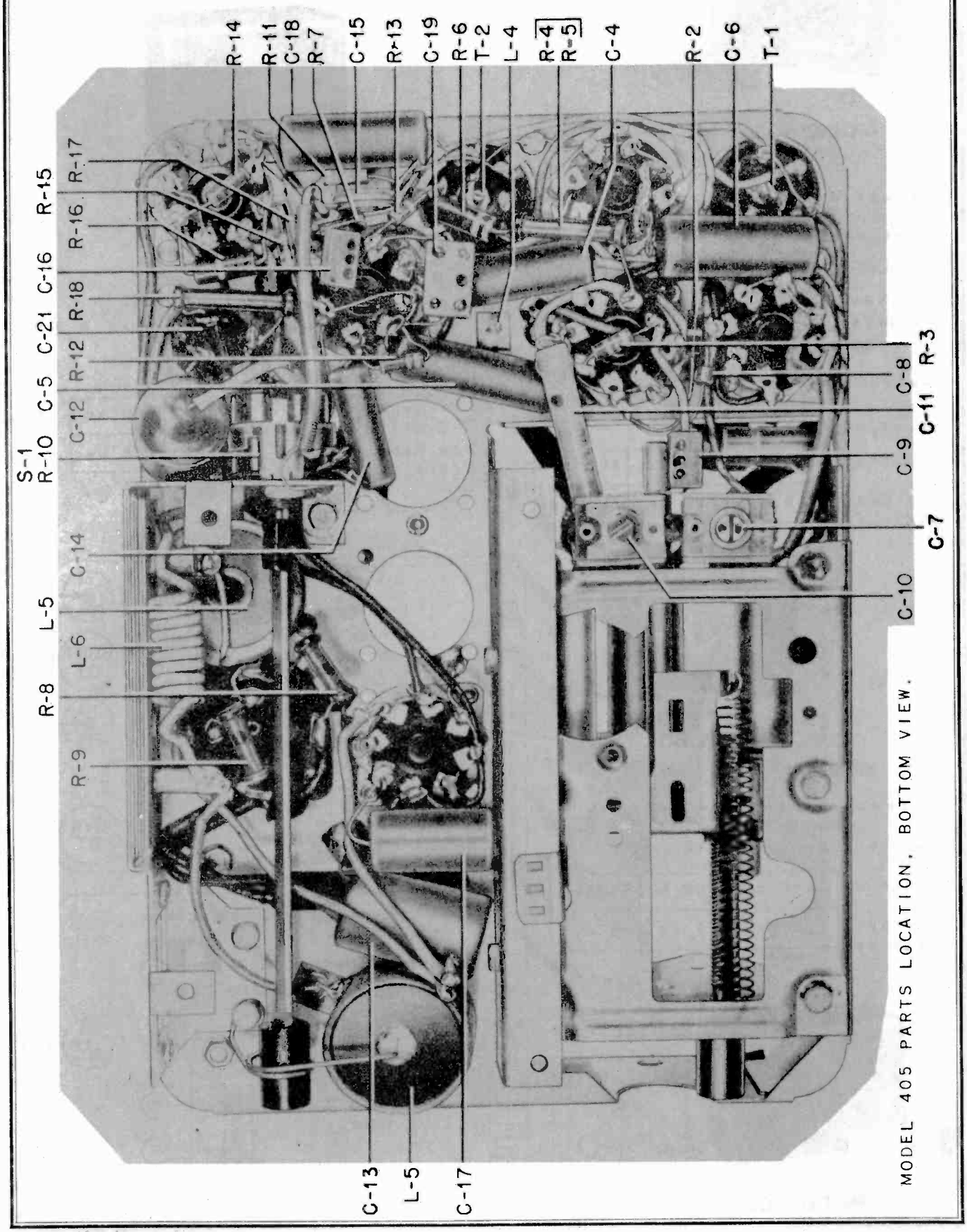
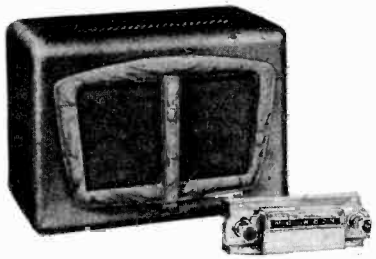


MODEL 405 PARTS LOCATION, BOTTOM VIEW.

MOTOROLA, INC.

MODEL 405, MODEL 505
MODEL 605, MODEL 705



MODEL 405

MODEL 405

Current drain - 7.5 amps at 6.3 volts

Power output - 5.6 watts

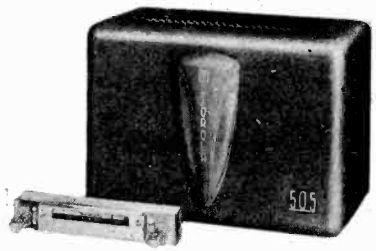
Frequency	1400 kc	1020 kc	600 kc
Max. Sensitivity	1.4 uv	1.3 uv	1.1 uv

MODEL 605

Current drain - 7.5 amps at 6.3 volts

Power output - 5.6 watts

Frequency	1400 kc	1020 kc	600 kc
Max. Sensitivity	1.4 uv	1.6 uv	1.45 uv



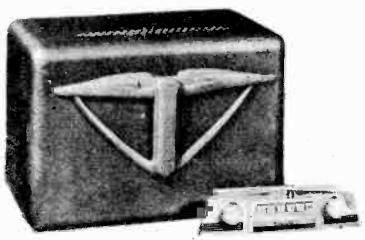
MODEL 505

MODEL 505

Current drain - 7.5 amps at 6.3 volts

Power output - 5.6 watts

Frequency	1400 kc	1000 kc	600 kc
Max. Sensitivity	1.5 uv	1.4 uv	1.5 uv



MODEL 605

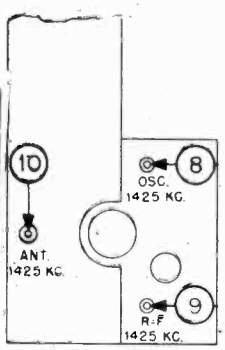
MODEL 705

Current drain - 10 amps at 6.3 volts

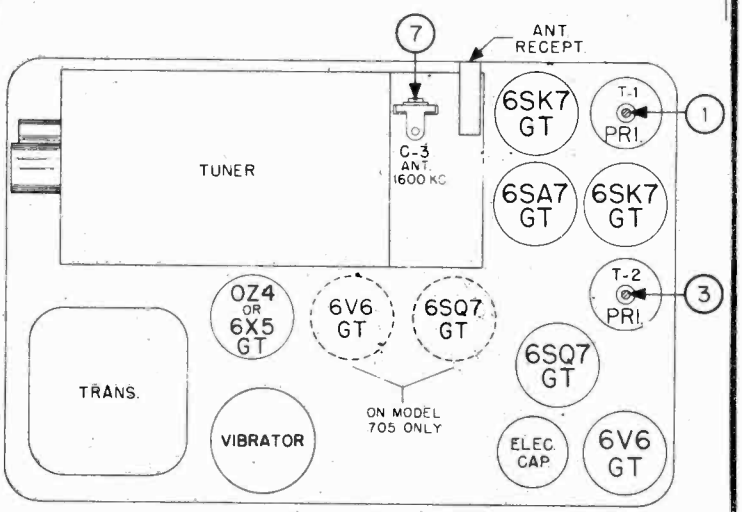
Power output - 9 watts

Frequency	1400 kc	1000 kc	600 kc
Max. Sensitivity	1.5 uv	1.6 uv	.9 uv

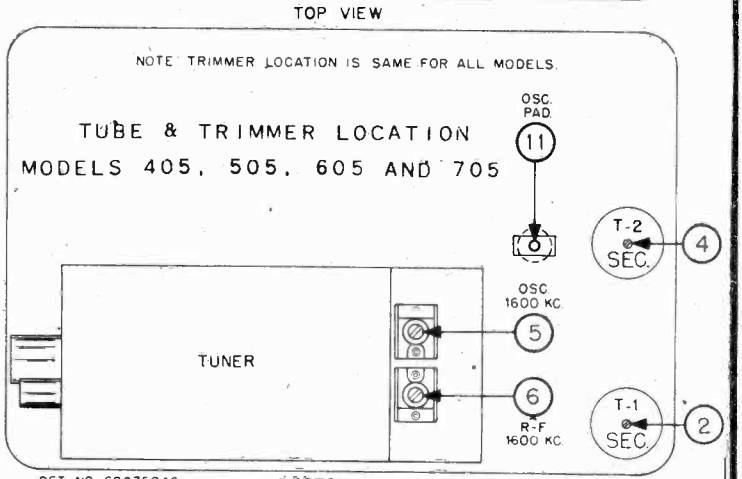
MODEL 705



END VIEW



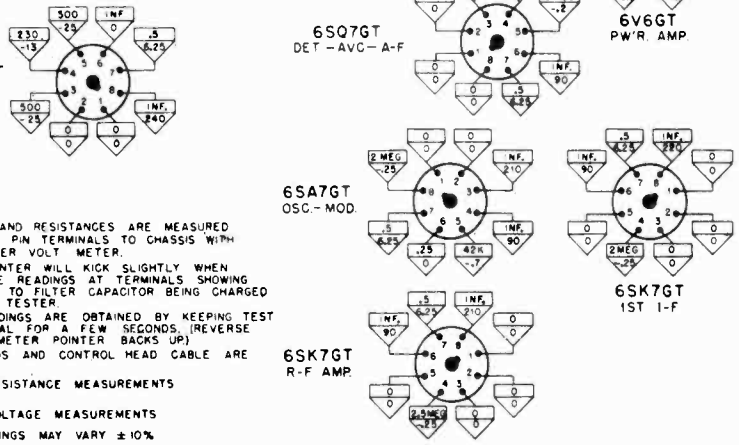
TOP VIEW



DET. NO. 69C75046

BOTTOM VIEW

MODEL 405 VOLTAGE AND RESISTANCE DIAGRAM



NOTE - VOLTAGES AND RESISTANCES ARE MEASURED FROM TUBE BASE PIN TERMINALS TO CHASSIS WITH A 20,000 OHM PER VOLT METER.

METER POINTER WILL KICK SLIGHTLY WHEN TAKING RESISTANCE READINGS AT TERMINALS SHOWING 'INF' VALUES DUE TO FILTER CAPACITOR BEING CHARGED BY BATTERY OF TESTER.

TRUE READINGS ARE OBTAINED BY KEEPING TEST PROD ON TERMINAL FOR A FEW SECONDS. (REVERSE TEST PRODS IF METER POINTER BACKS UP.)

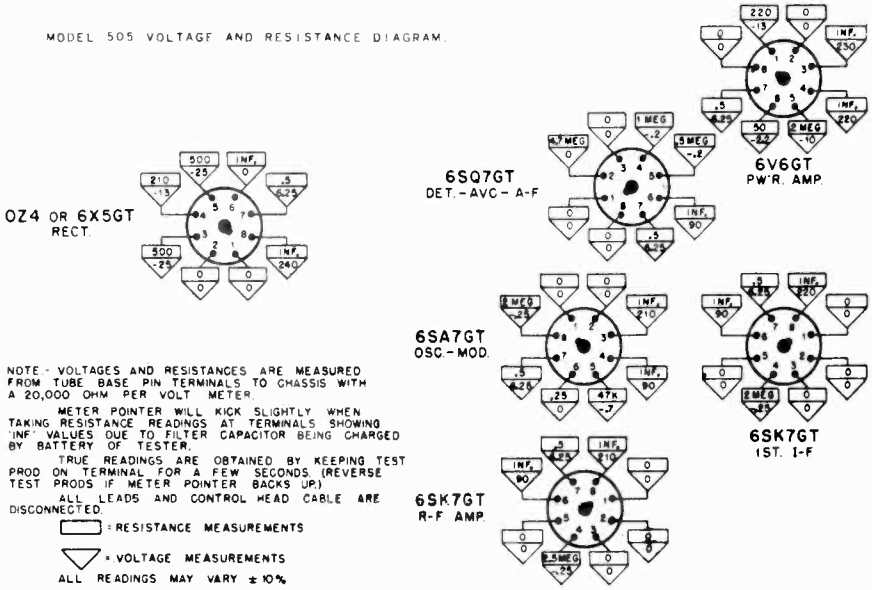
ALL LEADS AND CONTROL HEAD CABLE ARE DISCONNECTED.

▭ = RESISTANCE MEASUREMENTS

▽ = VOLTAGE MEASUREMENTS

ALL READINGS MAY VARY ± 10%

MODEL 505 VOLTAGE AND RESISTANCE DIAGRAM



NOTE - VOLTAGES AND RESISTANCES ARE MEASURED FROM TUBE BASE PIN TERMINALS TO CHASSIS WITH A 20,000 OHM PER VOLT METER.

METER POINTER WILL KICK SLIGHTLY WHEN TAKING RESISTANCE READINGS AT TERMINALS SHOWING 'INF' VALUES DUE TO FILTER CAPACITOR BEING CHARGED BY BATTERY OF TESTER.

TRUE READINGS ARE OBTAINED BY KEEPING TEST PROD ON TERMINAL FOR A FEW SECONDS. (REVERSE TEST PRODS IF METER POINTER BACKS UP.)

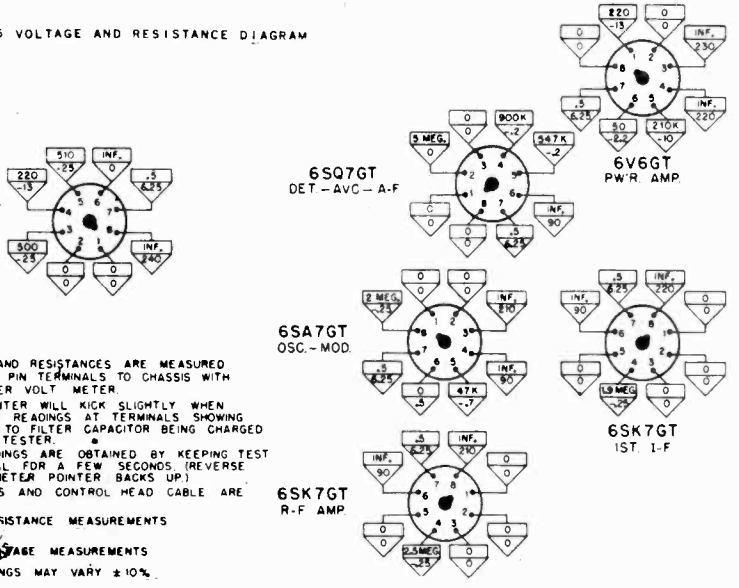
ALL LEADS AND CONTROL HEAD CABLE ARE DISCONNECTED.

▭ = RESISTANCE MEASUREMENTS

▽ = VOLTAGE MEASUREMENTS

ALL READINGS MAY VARY ± 10%

MODEL 605 VOLTAGE AND RESISTANCE DIAGRAM



NOTE - VOLTAGES AND RESISTANCES ARE MEASURED FROM TUBE BASE PIN TERMINALS TO CHASSIS WITH A 20,000 OHM PER VOLT METER.

METER POINTER WILL KICK SLIGHTLY WHEN TAKING RESISTANCE READINGS AT TERMINALS SHOWING 'INF' VALUES DUE TO FILTER CAPACITOR BEING CHARGED BY BATTERY OF TESTER.

TRUE READINGS ARE OBTAINED BY KEEPING TEST PROD ON TERMINAL FOR A FEW SECONDS. (REVERSE TEST PRODS IF METER POINTER BACKS UP.)

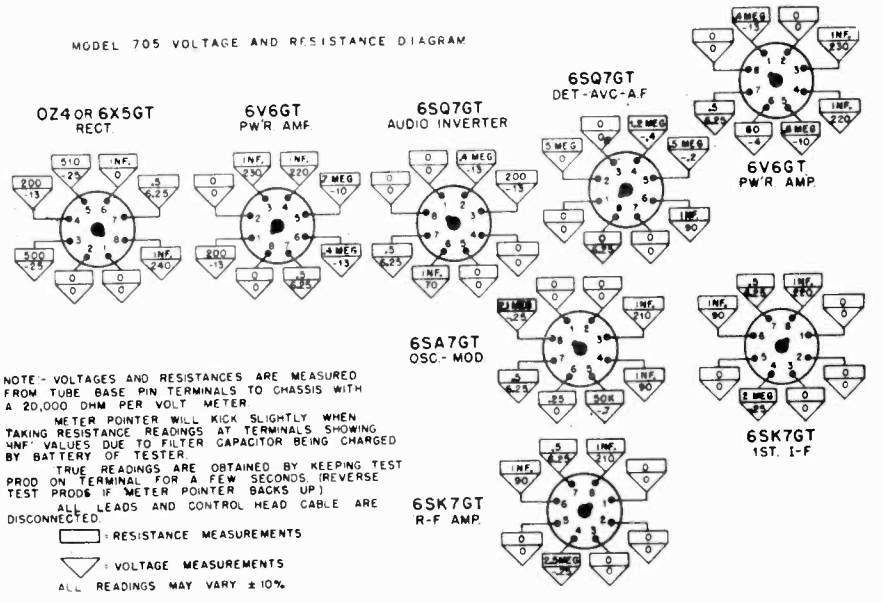
ALL LEADS AND CONTROL HEAD CABLE ARE DISCONNECTED.

▭ = RESISTANCE MEASUREMENTS

▽ = VOLTAGE MEASUREMENTS

ALL READINGS MAY VARY ± 10%

MODEL 705 VOLTAGE AND RESISTANCE DIAGRAM



NOTE - VOLTAGES AND RESISTANCES ARE MEASURED FROM TUBE BASE PIN TERMINALS TO CHASSIS WITH A 20,000 OHM PER VOLT METER.

METER POINTER WILL KICK SLIGHTLY WHEN TAKING RESISTANCE READINGS AT TERMINALS SHOWING 'INF' VALUES DUE TO FILTER CAPACITOR BEING CHARGED BY BATTERY OF TESTER.

TRUE READINGS ARE OBTAINED BY KEEPING TEST PROD ON TERMINAL FOR A FEW SECONDS. (REVERSE TEST PRODS IF METER POINTER BACKS UP.)

ALL LEADS AND CONTROL HEAD CABLE ARE DISCONNECTED.

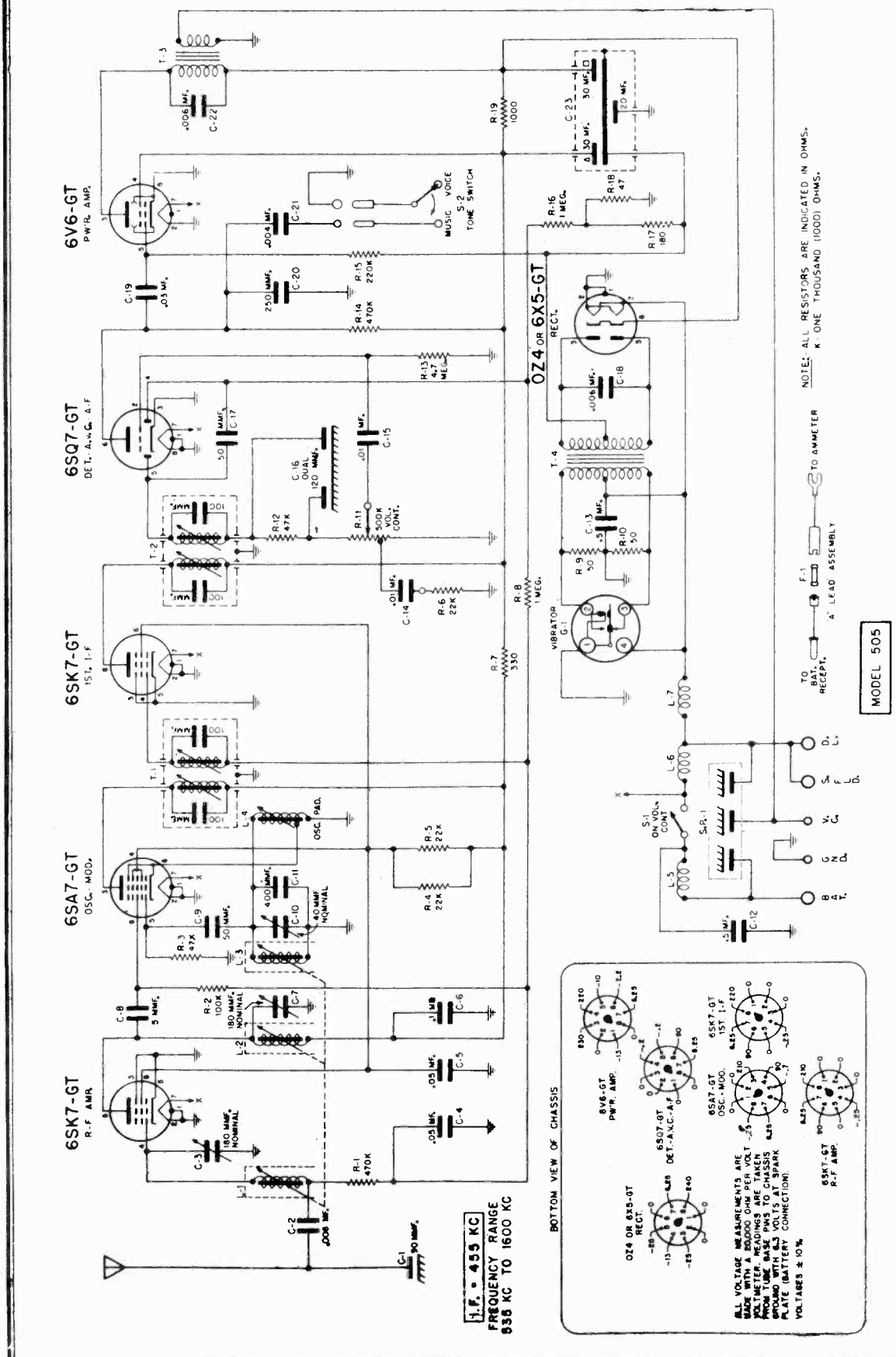
▭ = RESISTANCE MEASUREMENTS

▽ = VOLTAGE MEASUREMENTS

ALL READINGS MAY VARY ± 10%

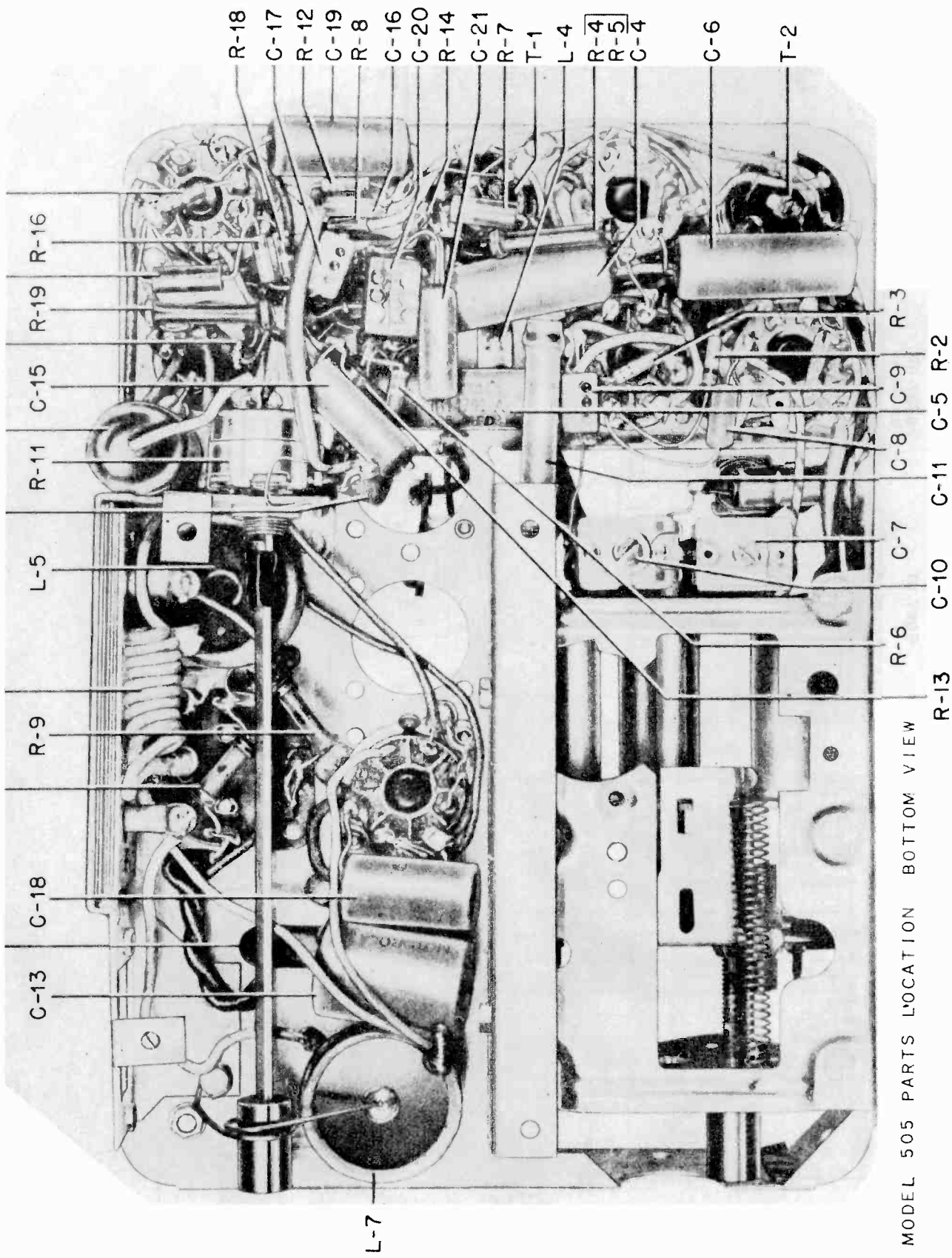
MODELS USED ON 405	505	605	705	REF. NO.	PART NO.	DESCRIPTION
•	•	•	•	C-1	21AS0877	Capacitor, fixed: metal mica; 90 mmf.
•	•	•	•	C-2	8A4589	Capacitor, fixed: paper; .006 mf. 100V
•	•	•	•	C-3	20A70601 ↕	Capacitor, variable: mica; 50-180 mmf; with mounting bracket
•	•	•	•	C-4	8A14791	Capacitor, fixed: paper; .05 mf. 400V
			•	C-5	8A19133 ↕	Capacitor, fixed: paper; .5 mf. 100V
•	•	•		C-5	8A14791	Capacitor, fixed: paper; .05 mf. 400V
			•	C-6	8A14791	Capacitor, fixed: paper; .05 mf. 400V
•	•	•		C-6	8A13166	Capacitor, fixed: paper; .1 mf. 400V
			•	C-7	8A13166	Capacitor, fixed: paper; .1 mf. 400V
•	•	•		C-7	20A70601 ↕	Capacitor, variable: mica; 50-180 mmf; with mounting bracket
			•	C-8	20A70601 ↕	Capacitor, variable: mica; 50-180 mmf; with mounting bracket
•	•	•		C-8	21K70780	Capacitor, fixed: mica; 5 mmf.
			•	C-9	21K70780	Capacitor, fixed: mica; 5 mmf.
•	•	•		C-9	21R6513 or 21A74661	Capacitor, fixed: mica; 50 mmf. 300V Capacitor, fixed: ceramic; 50 mmf. 300V
			•	C-10	21R6513 or 21A74661	Capacitor, fixed: mica; 50 mmf. 300V Capacitor, fixed: ceramic; 50 mmf. 300V
•	•	•		C-10	20A70214 ↕	Capacitor, variable: mica; 30-60 mmf; with mounting bracket
			•	C-11	20A70214 ↕	Capacitor, variable: mica; 30-60 mmf; with mounting bracket
•	•	•		C-11	21A71872	Capacitor, fixed: ceramic; 400 mmf.
			•	C-12	21A71872	Capacitor, fixed: ceramic; 400 mmf.
•	•	•		C-12	8A17088	Capacitor, fixed: paper; .5 mf. 100V
			•	C-13	8A17088	Capacitor, fixed: paper; .5 mf. 100V
•	•	•		C-13	8A19133	Capacitor, fixed: paper; .5 mf. 100V
•	•	•	•	C-14	8A23690	Capacitor, fixed: paper; .01 mf. 400V
	•	•	•	C-15	8A23690	Capacitor, fixed: paper; .01 mf. 400V
•				C-15	21A70176	Capacitor, fixed: mica; dual 180 mmf.
	•	•		C-16	21A70176	Capacitor, fixed: mica; dual 180 mmf.
•				C-16	21R6513	Capacitor, fixed: mica; 50 mmf. 300V
			•	C-16	8A19133	Capacitor, fixed: paper; .5 mf. 100V
	•	•		C-17	21R6513	Capacitor, fixed: mica; 50 mmf. 300V
•			•	C-17	8A12840	Capacitor, fixed: paper; .006 mf. 1600V
	•	•		C-18	8A12840	Capacitor, fixed: paper; .006 mf. 1600V
•				C-18	8A71911	Capacitor, fixed: paper; .05 mf. 400V
			•	C-18	21A70176	Capacitor, fixed: mica; dual 180 mmf.
•				C-19	21R6648	Capacitor, fixed: mica; 250 mmf. 500V
	•	•		C-19	8A71911	Capacitor, fixed: paper; .05 mf. 400V
			•	C-19	21R6513	Capacitor, fixed: mica; 50 mmf. 300V
•				C-20	8A23690	Capacitor, fixed: paper; .01 mf. 400V
	•	•		C-20	21R6648	Capacitor, fixed: mica; 250 mmf. 500V
			•	C-20	21R6636	Capacitor, fixed: mica; 1000 mmf. 500V
•				C-21	23A75429	Capacitor, electrolytic: 20-20 mf. 400V, 20 mf. 25V
	•			C-21	8A71909	Capacitor, fixed: paper; .004 mf. 400V
		•		C-21	8K13166	Capacitor, fixed: paper; .1 mf. 400V
			•	C-21	8A4736	Capacitor, fixed: paper; .002 mf. 400V
	•			C-22	8A71910	Capacitor, fixed: paper; .006 mf. 400V
		•		C-22	8A71909	Capacitor, fixed: paper; .004 mf. 400V
			•	C-22	8K13166	Capacitor, fixed: paper; .1 mf. 400V
	•			C-23	23A75429	Capacitor, electrolytic: 20-20 mf. 400V, 20 mf. 25V
		•		C-23	8A71910	Capacitor, fixed: paper; .006 mf. 400V
			•	C-23	8K23690	Capacitor, fixed: paper; .01 mf. 400V
		•		C-24	23A75429	Capacitor, electrolytic: 20-20 mf. 400V, 20 mf. 25V
			•	C-24	21R6648	Capacitor, fixed: mica; 250 mmf. 500V
		•		C-25	8A19133 ↕	Capacitor, fixed: paper; .5 mf. 100V
			•	C-25	8A23690	Capacitor, fixed: paper; .01 mf. 400V
			•	C-26	8K13165	Capacitor, fixed: paper; .003 mf. 1000V
			•	C-27	23A75429	Capacitor, electrolytic: 20-20 mf. 400V, 20 mf. 25V
•	•	•	•		8A4491	Capacitor, generator
•	•	•	•	F-1	65X4657	Fuse: 20 Amp; type 3AG
•	•	•	•	G-1	48A3535	Vibrator: full wave; non-sync.

MODELS USED ON 405	505	605	705	REF. NO.	PART NO.	DESCRIPTION
•	•	•	•	L-1	1A71881 ↓	Coil, antenna or R. F. (specify color of paint dots on old coil when ordering)
•	•	•	•	L-2	1A71861 ↕	Coil, antenna or R. F. (specify color of paint dots on old coil when ordering)
•	•	•	•	L-3	1A71879 ↕	Coil, oscillator (specify color of paint dots on old coil when ordering)
•	•	•	•	L-4	24A70227	Coil, oscillator padder: includes mounting clip and adjustable iron core
•	•	•	•	L-5	24K70840	Coil, "A" choke
•	•	•	•	L-6	24K73636	Coil, dial light and speaker field choke: 9 turn #16 yellow wire
•	•	•	•	L-7	24A70199	Coil, "A" choke: with mounting bracket
•	•	•	•	R-1	6R6032	Resistor, fixed: carbon; 470,000 1/2W Ins.
•	•	•	•	R-2	6R6076	Resistor, fixed: carbon; 100,000 1/2W Ins.
•	•	•	•	R-3	6R6056	Resistor, fixed: carbon; 47,000 1/2W Ins.
•	•	•	•	R-4 & R-5	6R6028	Resistor, fixed: carbon; 22,000 1/2W Ins.
•	•	•	•	Note:		R-4 and R-5 are replaced with one 10,000, 1 watt resistor in later models.
					6R6106	Resistor, fixed: carbon; 10,000 1W M.I.
•				R-6	6R6147	Resistor, fixed: carbon; 330 1W Ins.
	•	•	•	R-6	6R6028	Resistor, fixed: carbon; 22,000 1/2W Ins.
•				R-7	6R6004	Resistor, fixed: carbon; 1 meg 1/2W Ins.
	•	•	•	R-7	6R6147	Resistor, fixed: carbon; 330 1W Ins.
•				R-8	6R6005	Resistor, fixed: carbon; 50 1/2W M.I.
	•	•	•	R-8	6R6004	Resistor, fixed: carbon; 1 meg 1/2W Ins.
•				R-9	6R6005	Resistor, fixed: carbon; 50 1/2W M.I.
•				R-10	18A70170 or 18A71920	Resistor, variable: carbon; 500,000; with S.P.S.T. switch
	•	•	•	R-10	6R6005	Resistor, fixed: carbon; 50 1/2W M.I.
•				R-11	6R6056	Resistor, fixed: carbon; 47,000 1/2W Ins.
•				R-11	18A70172 or 18A71925	Resistor, variable: 500,000; tapped at 50,000 ohms; with SPST switch
•				R-12	6R2122	Resistor, fixed: carbon; 4.7 meg 1/2W Ins.
	•	•	•	R-12	6R6056	Resistor, fixed: carbon; 47,000 1/2W Ins.
•				R-13	6R6032	Resistor, fixed: carbon; 470,000 1/2W Ins.
	•			R-13	6R2122	Resistor, fixed: carbon; 4.7 meg 1/2W Ins.
		•		R-13	6R2118	Resistor, fixed: carbon; 3.3 meg 1/2W Ins.
			•	R-13	6R3927	Resistor, fixed: carbon; 2.2 meg 1/2W Ins.
•				R-14	6R6015	Resistor, fixed: carbon; 220,000 1/2W Ins.
	•			R-14	6R6032	Resistor, fixed: carbon; 470,000 1/2W Ins.
		•		R-14	6R3927	Resistor, fixed: carbon; 2.2 meg 1/2W Ins.
			•	R-14	6R2118	Resistor, fixed: carbon; 3.3 meg 1/2W Ins.
•	•	•	•	R-15	6R6004	Resistor, fixed: carbon; 1 meg 1/2W Ins.
	•		•	R-15	6R6015	Resistor, fixed: carbon; 220,000 1/2W Ins.
		•		R-15	6R6032	Resistor, fixed: carbon; 470,000 1/2W Ins.
•				R-16	6R6390	Resistor, fixed: carbon; 180 10% 1W Ins.
		•	•	R-16	6R6015	Resistor, fixed: carbon; 220,000 1/2W Ins.
	•			R-16	6R6004	Resistor, fixed: carbon; 1 meg 1/2W Ins.
				R-17	6R5550	Resistor, fixed: carbon; 47 10% 1/2W Ins.
				R-17	6R6390	Resistor, fixed: carbon; 180 10% 1W Ins.
		•	•	R-17	6R6004	Resistor, fixed: carbon; 1 meg 1/2W Ins.
•				R-18	6R6184	Resistor, fixed: carbon; 1000 1W M.I.
	•			R-18	6R5550	Resistor, fixed: carbon; 47 10% 1/2W Ins.
		•		R-18	6R6390	Resistor, fixed: carbon; 180 10% 1W Ins.
			•	R-18	6R6253	Resistor, fixed: carbon; 180 10% 1W M.I.
	•			R-19	6R6184	Resistor, fixed: carbon; 1000 1W M.I.
		•		R-19	6R5550	Resistor, fixed: carbon; 47 10% 1/2W Ins.
			•	R-19	6R5614	Resistor, fixed: carbon; 56 10% 1/2W Ins. (62 ohms used in earlier models)
		•		R-20	6R6184	Resistor, fixed: carbon; 1000 1W M.I.
			•	R-20	6R6015	Resistor, fixed: carbon; 220,000 1/2W Ins.
			•	R-21	6R6407	Resistor, fixed: carbon; 220,000 10% 1/2W Ins.
			•	R-22	6R6414	Resistor, fixed: carbon; 270,000 10% 1/2W Ins.
			•	R-23	6R6184	Resistor, fixed: carbon; 1000 1W M.I.
•	•	•	•	S-1		Switch; On-Off (part of volume control
	•			S-2	40A70872	Switch, tone control: slider type
		•	•	S-2	40B70952 ↕	Switch, selector
		•	•	S-3	1B70944 ↕	Switch, solenoid: with mtg. plate
		•	•	S-4	40A70931 ↕	Switch, mute
		•	•	S-5	1X71470	Relay, MR-5 tone control: complete
•				S.P.-1	1B70841	Spark Plate Assembly: with mounting bracket
	•			S.P.-1	1X72054	Spark Plate Assembly: with mounting bracket
		•	•	S.P.-1	1X72047	Spark Plate Assembly: with mounting bracket
				T-1, T-2	24B70827	Transformer, I. F. or diode: 455 Kc; iron core tuned; less shield can (used in early sets only)
				or	84B76553	Transformer, I. F. or diode: 455 Kc; iron core tuned; less shield can (used in late sets only)
•	•	•		T-3	25B70171	Transformer, output
			•	T-3	25B70619	Transformer, output
•	•	•	•	T-4	25B70950	Transformer, power
•	•	•	•		5A51494	Bolt, 4-40 (receiver mounting)
•	•	•	•		7A76566	Bracket, volume control shaft alignment
•	•				45X4151	Bulb: 6-8V, bayonet base; type #51
•					50B73947 or	
					50B75631	Speaker: 6-1/4"; 3 ohm VC; with connecting leads
					50B71900	Speaker: 6"; 3 ohm VC; less connecting leads


6V6-GT
PWR. AMP.
6SQ7-GT
DET., A.V.C., A-F
6SK7-GT
1ST I-F
6SA7-GT
OSC.-MOD.
6SK7-GT
R-F AMP.
OZ4 OR 6X5-GT
RECT.
VIBRATOR
G-1
T-1
T-2
T-3
T-4
L-1
L-2
L-3
L-4
L-5
L-6
L-7
S-1 ON VOL. CONT
S-2 TONE SWITCH
MUSIC VOICE
F-1
TO AMMETER
TO BAT. RECEPT.
A' LEAD ASSEMBLY
OSC. PAD.
I.F. - 455 KC
FREQUENCY RANGE
538 KC TO 1600 KC
BOTTOM VIEW OF CHASSIS
NOTE: ALL RESISTORS ARE INDICATED IN OHMS.
K ONE THOUSAND (1000) OHMS.
MODEL 505

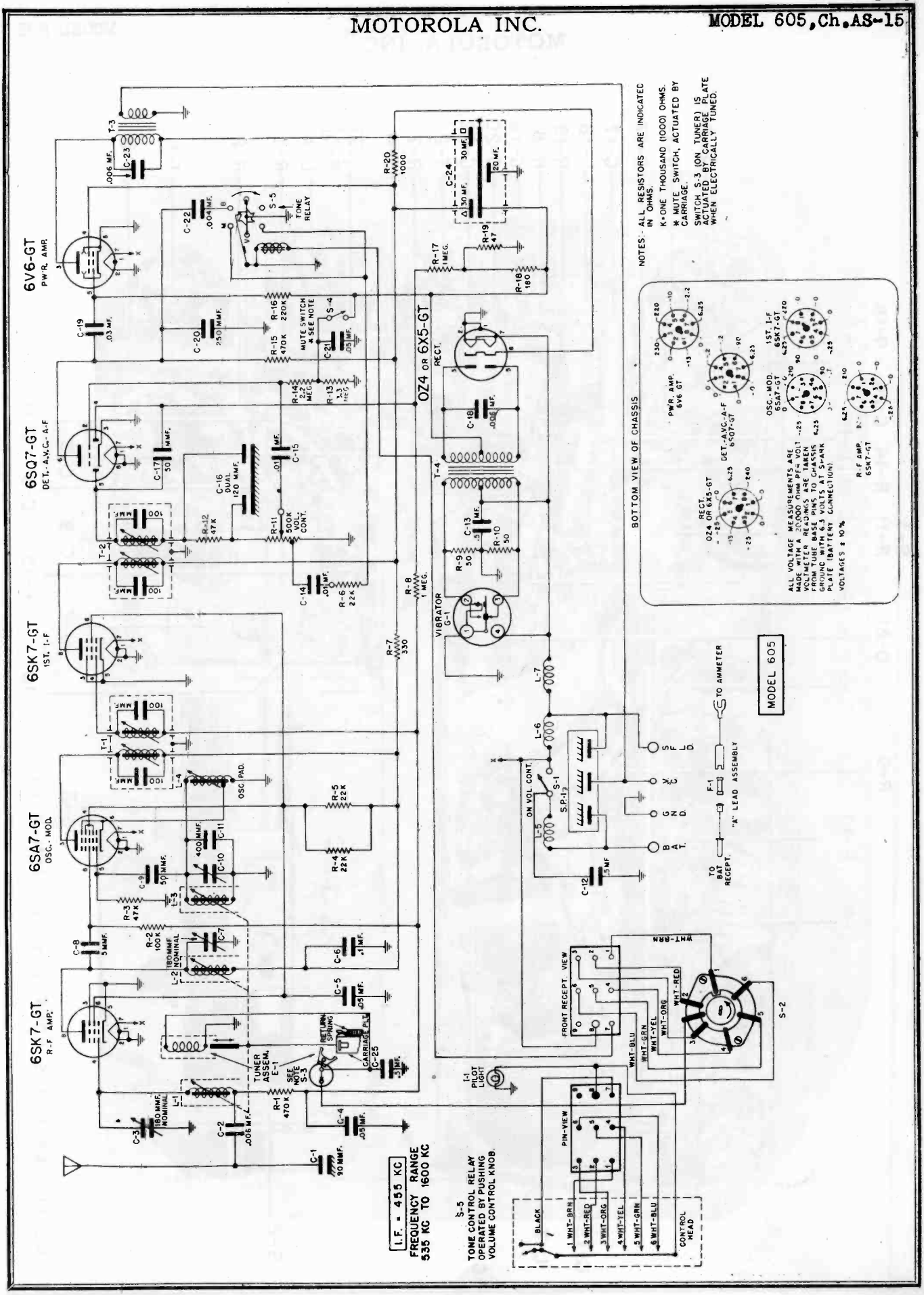
MODEL 505

MOTOROLA, INC.



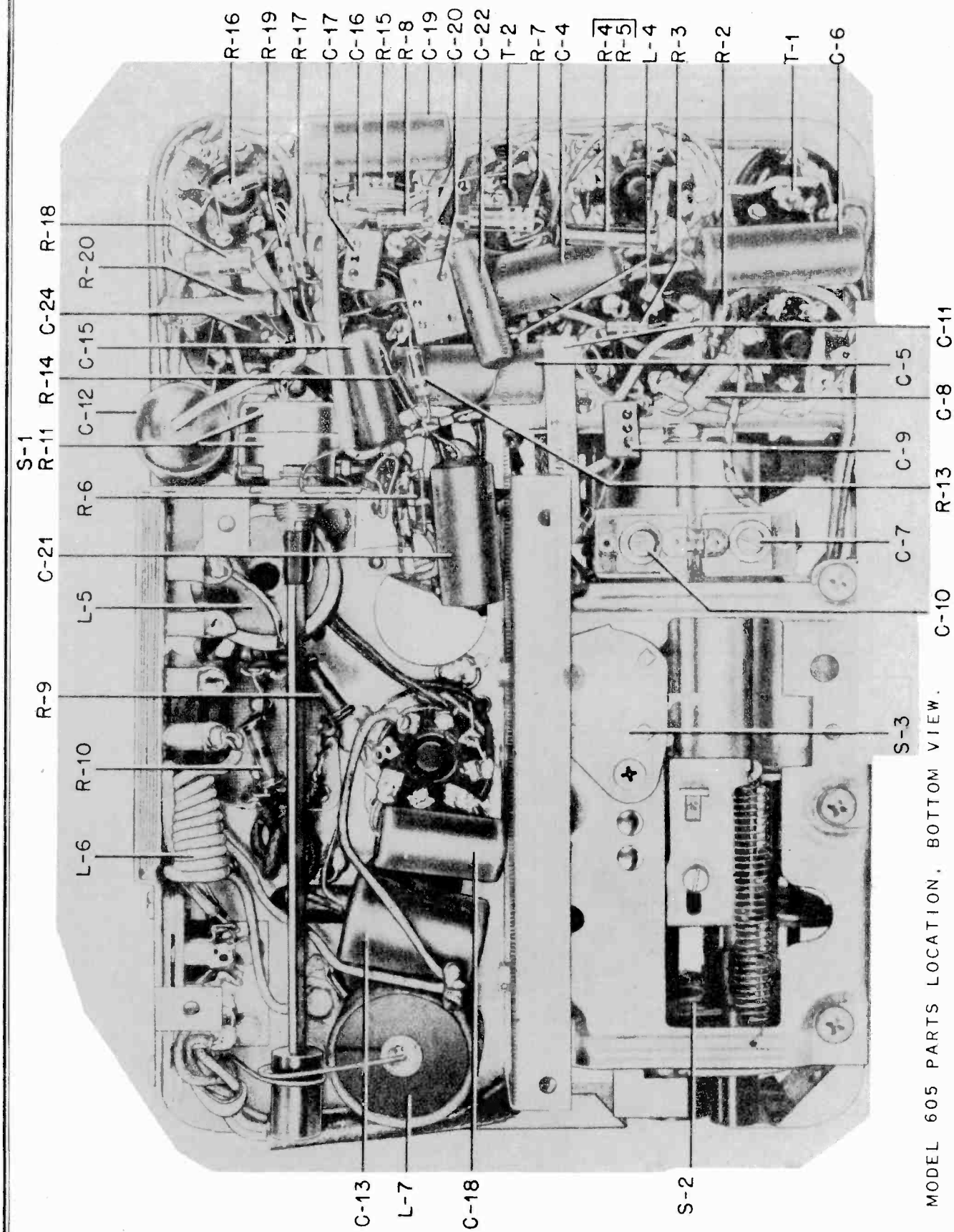
MODEL 505 PARTS LOCATION BOTTOM VIEW

MOTOROLA INC. MODEL 605, Ch. AS-15



MOTOROLA, INC.

MODEL 605



MODEL 605 PARTS LOCATION, BOTTOM VIEW.

MODEL 605
MODEL 705

MOTOROLA, INC.

PROCEDURE FOR SETTING UP PUSHBUTTONS (MODELS 605 & 705)

1. Receiver must be turned on for a few minutes before setting up push-buttons.
2. Extend antenna fully.
3. Press manual button "M" on the control head till tuner in the receiver stops cycling.
4. Turn tuning knob on the control head till the desired station is heard. (Make mental note of the program).
5. Keep volume low, so that you can tell when a station is tuned in correctly.
6. Press desired button in and hold till tuning mechanism completes its operation.

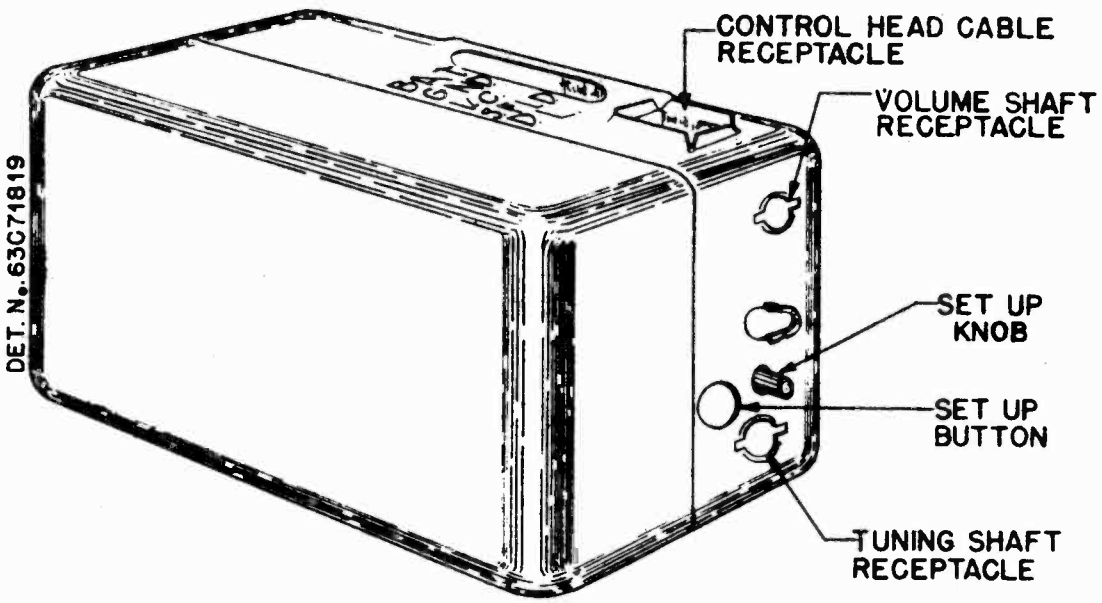
NOTE:

It will be necessary to hold the push-button in only when an early type of control head is used. On later model control heads, the push-buttons latch when pressed in.

7. Press "set-up button" in till click is heard (see Figure 4)
8. Turn "set-up knob" till previously noted program is heard. See Figure 4
9. Press the "M" button and that station is set.
10. Repeat the above procedure for each additional station desired.

IMPORTANT:

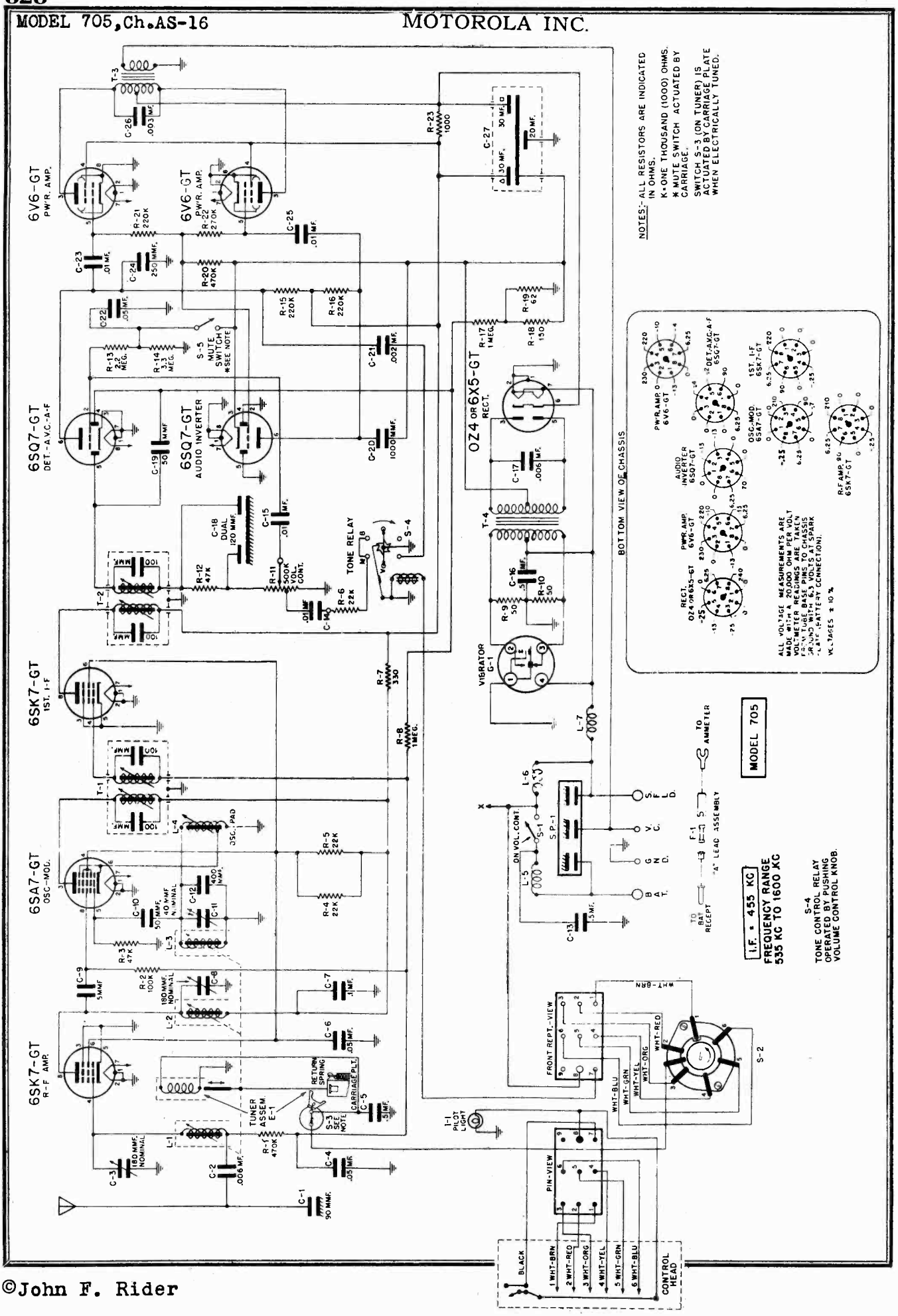
To check whether push-buttons were set accurately, press the "M" button in, tune in a station manually that is set to a push-button, then press the push-button in that was set to that station. There should be no difference in quality or volume when a push-button is set correctly. Make this check for each push-button.



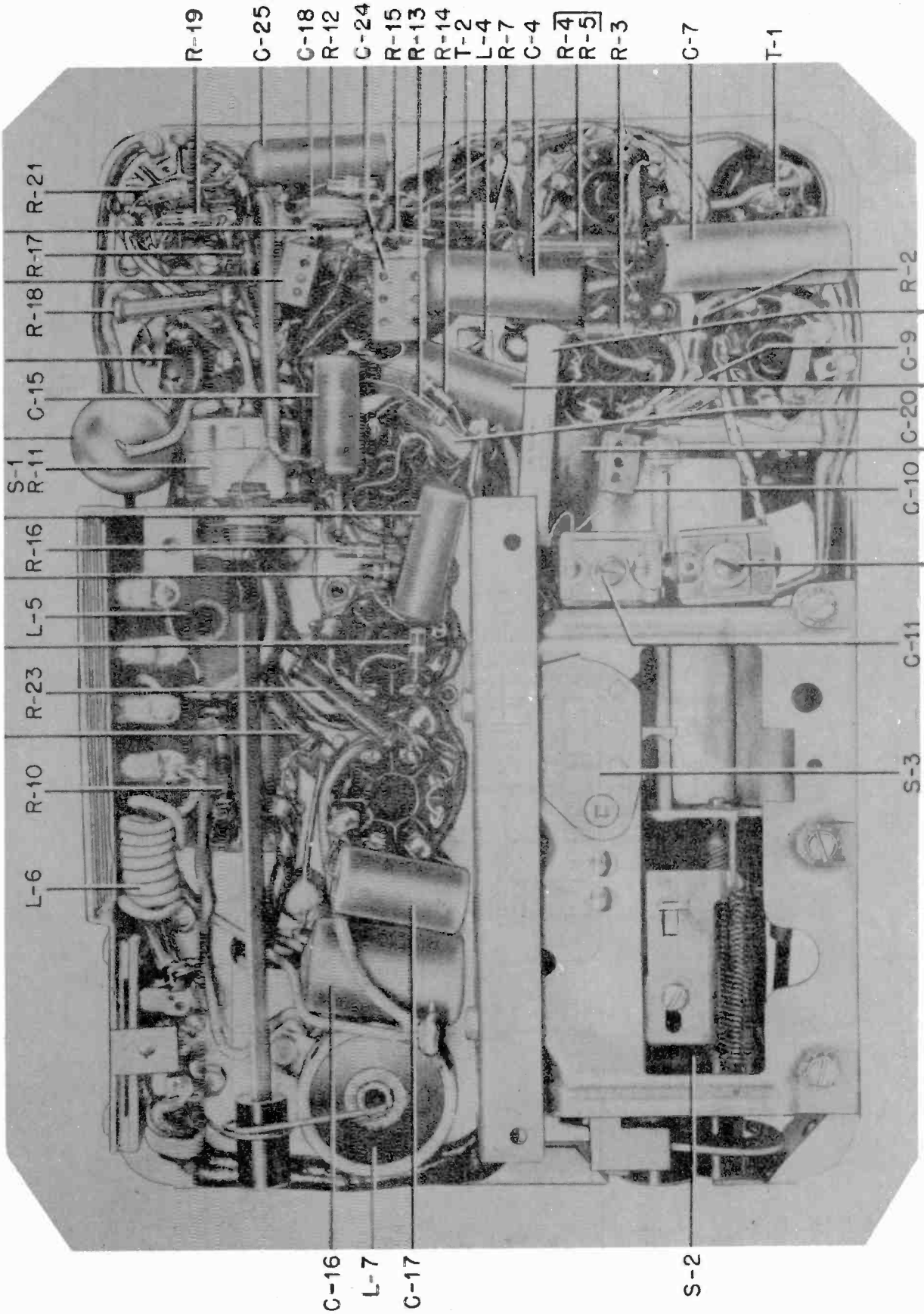
LOCATION OF "SET-UP BUTTON" AND "SET-UP KNOB."

FIGURE 4 PUSH-BUTTON MODELS 605. AND 705.

MODEL 705, Ch. AS-16 MOTOROLA INC.

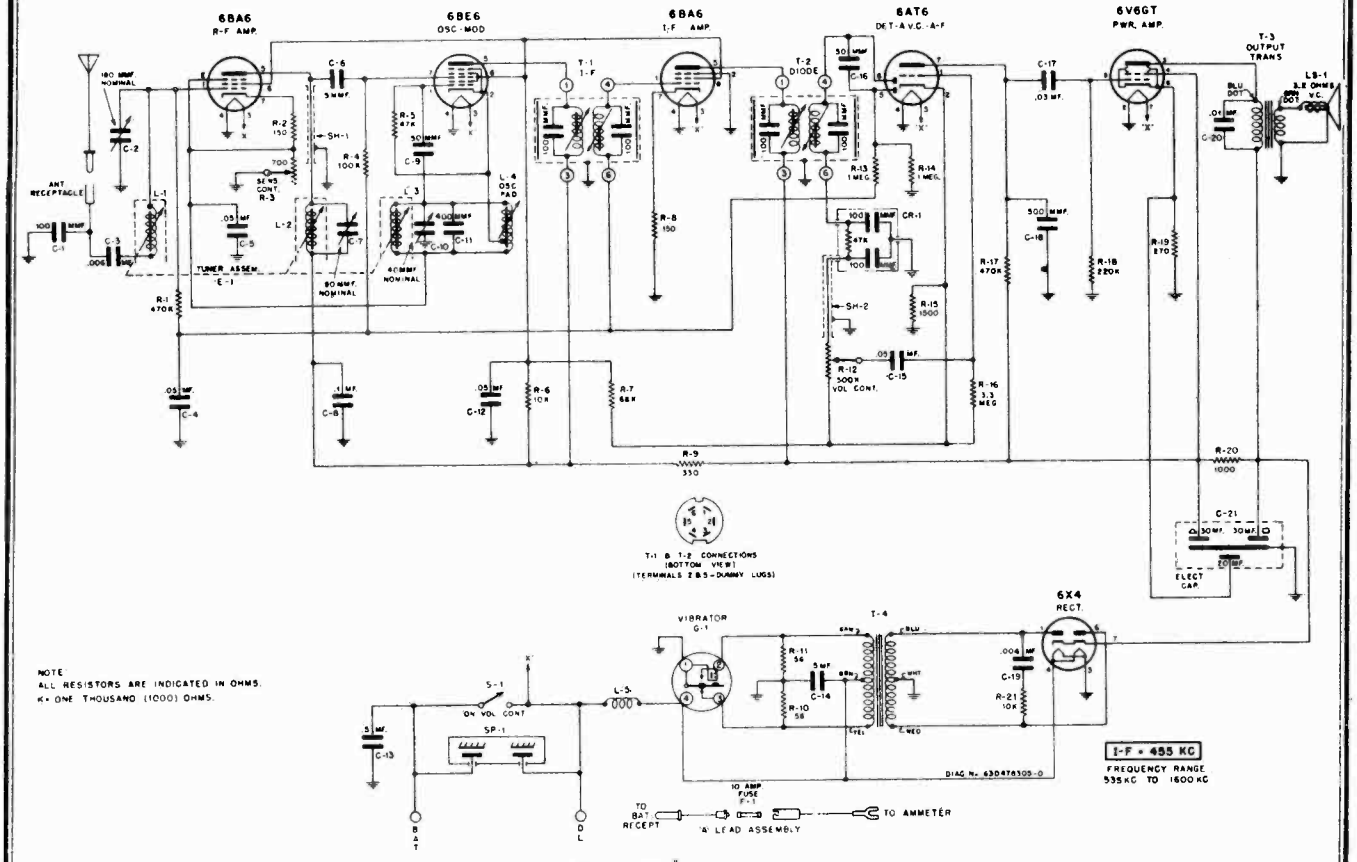


MOTOROLA, INC.

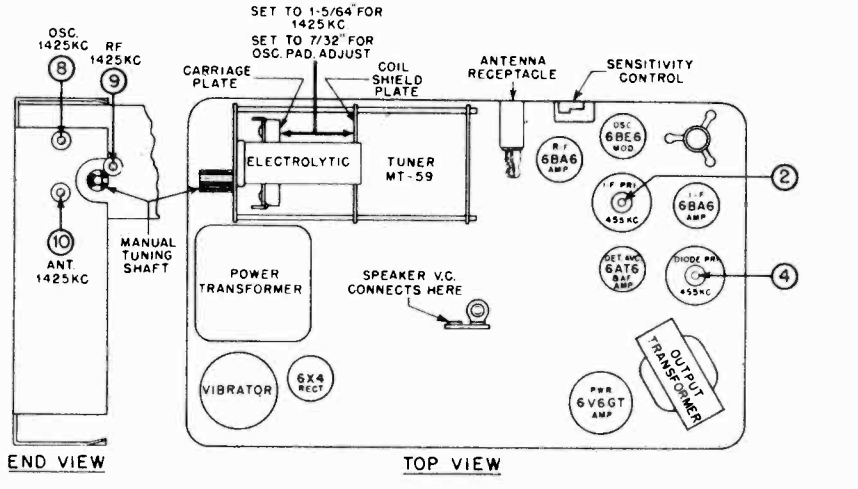


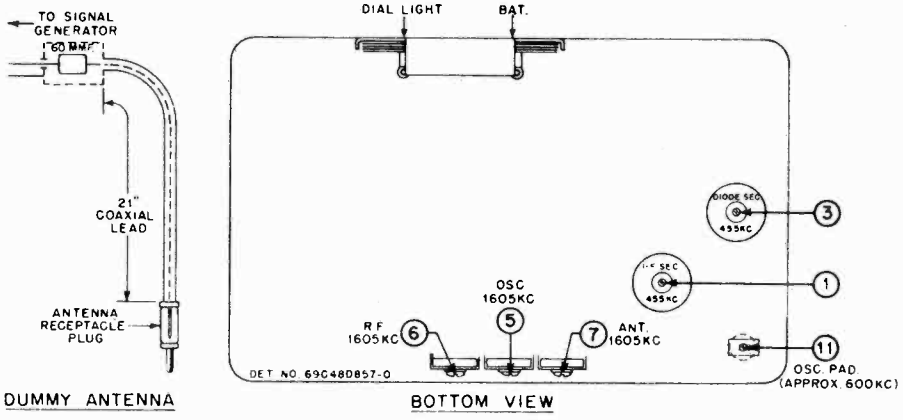
MODEL 705 PARTS LOCATION BOTTOM VIEW

MODEL 408 MOTOROLA INC.



NOTE
ALL RESISTORS ARE INDICATED IN OHMS.
K = ONE THOUSAND (1000) OHMS.





ALIGNMENT

EQUIPMENT REQUIRED

1. A special tool for adjusting the tuner cores. Use Alignment Tool, Motorola Part No. 66A76278.
2. A small screwdriver for IF & RF alignment.
3. An accurately calibrated AM modulated signal generator.
4. A low range output meter.
5. A special dummy antenna for RF alignment. Construct dummy antenna as shown in Figure 1. The 21" coaxial lead needed in its construction is the same type as used for lead-in on Motorola car antenna.

PROCEDURE

1. Remove the front and rear housings. All adjustments are now exposed.
2. Connect a PM speaker (3.2 ohm VC) to VC terminal and chassis of receiver and connect the output meter across the voice coil. If the receiver internal speaker is used, ground receiver front housing to chassis.
3. Connect a 6 volt storage battery to chassis and BATT terminal of receiver; turn receiver on and allow it to warm up for a few minutes. Set receiver volume control at maximum.
4. SENSITIVITY CONTROL - This control must be set to provide 2 ± 1/2 volts bias on the RF tubes before alignment is started. Measure this voltage between sensitivity control terminal and chassis.
5. For greatest accuracy, keep output of receiver at approximately 1 watt (1 watt = 1.79 volts on output meter) throughout alignment by reducing generator output (not receiver volume control) as stages are brought into alignment.
6. IF ALIGNMENT
   A. Connect high side of signal generator through .1 mf capacitor to 6BE6 grid (pin #7) and the low side to chassis. Set generator to 455 Kc and peak adjustments (1, 2, 3 & 4), in this order, for maximum output.
   B. Check alignment by repeating procedure.
7. RF ALIGNMENT
   A. Connect signal generator to antenna receptacle through special dummy antenna (60 mmf capacitor in series with 21" coax lead).
   B. Move carriage plate (by turning manual tuning shaft) to extreme high frequency position and screw coil cores out so that at least 1-1/8" of all three cores shall be outside of the coil shield can. Set signal generator to 1605 Kc and peak trimmers (5, 6 and 7), in this order.
   C. Move the carriage plate (by turning manual shaft) so carriage plate is spaced exactly 1-5/64" from coil shield plate. Set signal generator to 1425 Kc and adjust coil cores (8, 9 & 10), in this order, for maximum output.
   D. Move carriage plate (by turning manual tuning shaft) so carriage plate is spaced approximately 7/32" from coil shield plate. Leave signal generator connected but turn signal generator power off. Peak oscillator padder core (11) for maximum noise. If the padder core must be moved more than 1/2 turn from its original position, the carriage plate should be moved to extreme high frequency position, the coil cores (8. 9 & 10) should be screwed out so that 1-1/8" of each core is exposed and steps 7A, B, C & D repeated until it is necessary to move the padder core less than 1/2 turn in this step.

   IMPORTANT: Do not push in on the alignment tool when adjusting the tuner cores. The slightest inward pressure on the alignment tool may move the tuner carriage and result in inaccurate alignment.
8. SETTING THE SENSITIVITY CONTROL - After alignment is completed, set signal generator to 600 Kc and adjust its output to 1.3 microvolts. Adjust the sensitivity control to provide 1 watt output (1 watt = 1.79 volts on output meter).
9. ANTENNA TRIMMER ADJUSTMENT - Once steps 7A, B, C, D & 8 have been satisfactorily performed, no further adjustment of any alignment screws should be made except to align the antenna trimmer (7) to car antenna after receiver is installed in car. This adjustment should be made with antenna fully extended and receiver set to approximately 1400 Kc. Peak the trimmer for maximum volume of a weak station or background noise between stations.

MODEL 408

HOUSING PARTS

13D472890	Escutcheon (complete) .....
1X472751	Housing, front: includes 2 grounding wipers; less escutcheon .....
15D472547	Housing, rear .....
5S7730	Rivet: .122 x 1/8 steel; antique copper finish (grounding wiper mtg) .....
3S3394	Screw: #8 x 1/4 slotted hex head thread cutting type: cad. pl. (escutch.mtg) ..
3S7456	Screw: #8 x 1/4 PKA slotted acorn head sheet metal screw; antique copper finish (housing screws) .....
3S2696	Screw: #10 x 3/8 PKA plain hex washer head sheet metal screw; cad. pl. (spkr.mtg)
39K470032	Wiper, grounding .....

ACCESSORIES

3A51494	Bolt, "J" (receiver mtg) .....
8A4491	Capacitor, generator .....
1X74340	Lead Assembly, dial light: complete with bulb
9B473111	Lead Assembly, fuse: complete with 10 amp fuse
4S7653	Lockwasher: 5/16 int-ext; cadmium plated (receiver mtg) .....
3S2863	Nut: 5/16-18 x 9/16 hex; cad.pl(receiver mounting) .....
1K75148	Shaft, flexible: with hsng; 24" long ...
6X4141	Suppressor, distributor .....

REF. NO.	PART NO.	DESCRIPTION
CHASSIS PARTS - ELECTRICAL		
CAPACITORS		
C-1	21B77562	Ceramic: 100 mmf 500V
C-2	20B472549	Trimmer, variable mica: range 50 to 180 mmf (on same bracket as C7 & C10 and sold only as assembly)
C-3	8A4529	Paper: .006 mf 100V
C-4	8A13514	Paper: .05 mf 100V
C-5	8A13514	Paper: .05 mf 100V
C-6	21K70720	Molded: 5mmf 500V
C-7	20B472549	Trimmer, variable mica: range 50 to 180 mmf (on same bracket as C2 & C10 and sold only as assembly)
C-8	8K13166	Paper: .1 mf 400V
C-9	21R6513	Mica: 50 mmf 300V
or	21K74661	Ceramic: 50 mmf 300V
C-10	20B472549	Trimmer, variable mica: range 30 to 60 mmf (on same bracket as C2 & C7 and sold only as assembly)
C-11	21A71872	Ceramic: 400 mmf 5% 500V
C-12	8A14791	Paper: .05 mf 400V
C-13	8A17028	Paper: .5 mf 100V
C-14	8A19133	Paper: .5 mf 100V
C-15	8A13514	Paper: .05 mf 100V
C-16	21R6513	Mica: 50 mmf 300V
or	21K74661	Ceramic: 50 mmf 300V
C-17	8A71911	Paper: .03 mf 400V
C-18	21R6639	Mica: 500 mmf 500V
C-19	8A12840	Paper: .006 mf 1600V
C-20	8K23690	Paper: .01 mf 400V
C-21	23A473015	Electrolytic: 30-30-20 mf/350-300-25V
CAPACITOR-RESISTOR		
CR-1	21A473040	Capacitor-Resistor: 100 mmf 47,000 ohms, 100 mmf
FUSE		
F-1	65A10266	10 Amp (3AG)
VIBRATOR		
G-1	48B3333	Non-sync: 4 pin
COILS		
L-1 & L-2*	24B71881	RF & Antenna Coil: (Specify color of paint dots on old coil when ordering)
L-3*	24B71879	Oscillator Coil (Specify color of paint dot on old coil when ordering)
L-4	24B70227	Oscillator padder coil: complete with iron tuning core
L-5	24A472535	Choke, hash
SPEAKER		
LS-1	50B76582 or 50B473955	5-1/4" PM; 3.2 ohm VC
RESISTORS		
Note: All resistors are 1/2W, 20% insulated carbon type, unless otherwise specified.		
R-1	6R6032	470,000
R-2	6R3992	150
R-3	18K77557	Sensitivity Control: 700 ohms
R-4	6R6075	100,000
R-5	6R6056	47,000
R-6	6R476060	10,000 2W
R-7	6R6001	68,000
R-8	6R3992	150
R-9	6R6010	330
R-10	6R5614	56 10%
R-11	6R5614	56 10%
R-12	18A480773	Volume Control: 500,000; with SPST switch
R-13	6R6004	1 Meg
R-14	6R6004	1 Meg
R-15	6R6161	1,500
R-16	6R2118	3.3 Meg
R-17	6R6032	470,000
R-18	6R6015	220,000
R-19	6R6336	270 10% 1W
R-20	6R476004	1,000 2W
R-21	6R6054	10,000
SWITCHES		
S-1		Power Switch (Part of volume control)
SHIELD		
SH-1 & SH-2	30K472998	Cable shielded: 5" long, single conductor
SPARK PLATE		
SP-1	1X472741	Spark Plate Assembly
TRANSFORMERS		
T-1 & T-2	24B76553	Diode or IF, 455 Kc: complete with padding capacitors and tuning iron cores, but less shield
T-3	25B70171	Output
T-4	25B472533	Power
TUNER		
	1X472702	Manual Tuner MT-59

CHASSIS PARTS - MECHANICAL

42A4215	Clip, vibrator grounding
58A480774	Coupling, tinnerman shaft (on vol. control)
1X70646	Receptacle, antenna
5S7771	Rivet: .088 x 3/16 steel; nickel plated (tube socket mtg)
5S7706	Rivet: .122 x 1/8 steel; nickel plated (terminal strip mtg and sensitivity control mtg)
5S7707	Rivet: .122 x 5/32 steel; nickel plated (tube socket mtg)
5S7701	Rivet: .122 x 3/16 steel; nickel plated (vibrator grounding clip mtg and output transformer mtg)
3S8140	Screw: #8 x 3/16 PKZ plain hex head sheet metal screw; cadmium plated (tuner mtg).
3S7454	Screw: #8 x 1/4 PKZ plain hex head sheet metal screw; cadmium plated (spark plate assembly & capacitor assembly mtg)
3S3397	Screw: #8 x 5/16 PKZ plain hex head sheet metal screw; cad. pl. (pwr. transf. mtg)
26A472747	Shield, hash
1A71049	Shield and Sleeve Assembly (for T-1 & T-2)
9A70208	Socket, tube: 4 prong (for vibrator)
9A472534	Socket, tube: miniature; 7 prong
9A6788	Socket, tube: octal
31K37504	Strip, terminal: 1 insulated lug, #1 mtg
31K86126	Strip, terminal: 2 insulated lugs, #2 mtg
31A472573	Strip, terminal: 2 insulated lugs, #2 mtg
7A472614	Support, vol. cont. shaft alignment
4S7555	Washer: 1/4 x .128 x .033 thick; cadmium plated (output transf. mtg)

*Part of Tuner MT-59

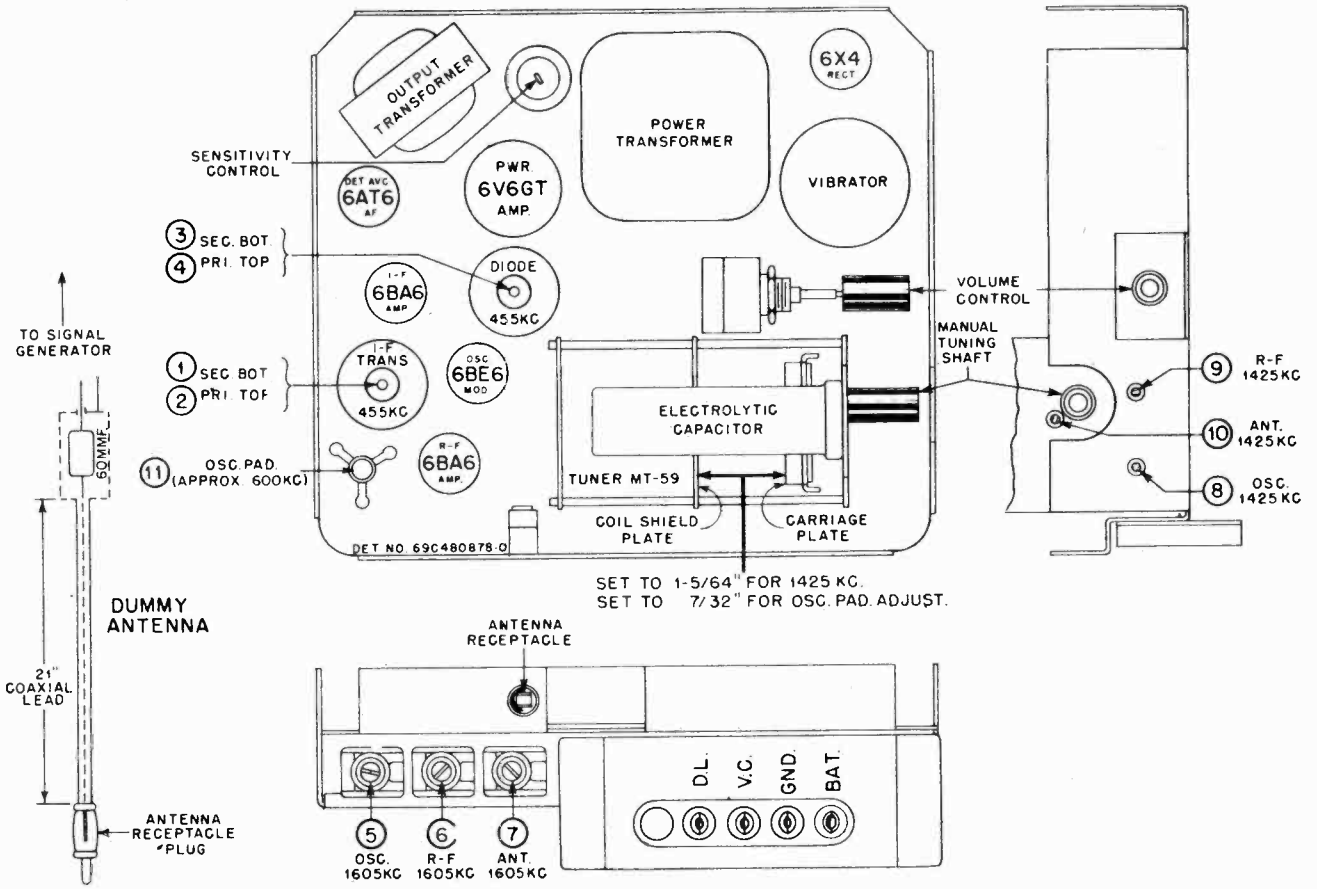


FIGURE 1. TUBE & TRIMMER LOCATIONS

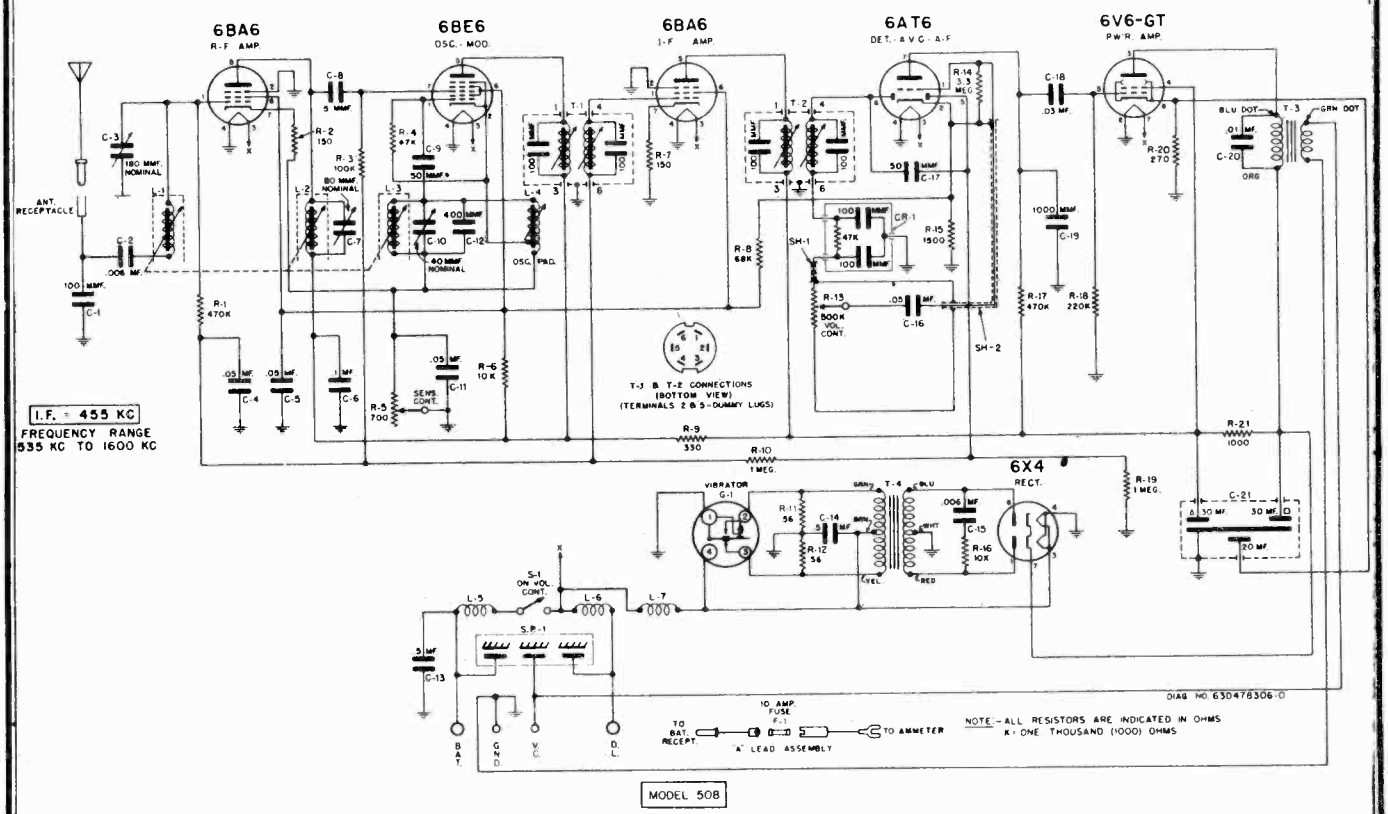


FIGURE 2. SCHEMATIC DIAGRAM

CHASSIS PARTS - ELECTRICAL

CAPACITORS

C-1	21B77562	Ceramic: 100 mmf 500V
C-2	8A4529	Paper: .006 mf 100V
C-3	20B77538	Trimmer, variable: 50 to 180 mmf; on same bracket as C-7 and C-10 (sold only as assembly)
C-4	8A13514	Paper: .05 mf 100V
C-5	8A14791	Paper: .05 mf 400V
C-6	8K13166	Paper: .1 mf 400V
C-7	20B77538	Trimmer, variable: 50 to 180 mmf; on same bracket as C-2 and C-10 (sold only as assembly)
C-8	21K70720	Molded: 5 mmf 500V
C-9	21R6513	Mica: 50 mmf 300V
or	21K74661	Ceramic: 50 mmf 300V
C-10	20B77538	Trimmer, variable: 30 to 60 mmf; on same bracket as C-2 and C-7 (sold only as assembly)
C-11	8A13514	Paper: .05 mf 100V
C-12	21A71872	Ceramic: 400 mmf 5% 500V
C-13	8A17028	Paper: .5 mf 100V
C-14	8A17028	Paper: .5 mf 100V
C-15	8A12840	Paper: .006 mf 1600V
C-16	8A13514	Paper: .05 mf 100V
C-17	21R6513	Mica: 50 mmf 300V
or	21K74661	Ceramic: 50 mmf 300V
C-18	8A71911	Paper: .03 mf 400V
C-19	21K478410	Ceramic: 1000 mmf 500V
C-20	8K23690	Paper: .01 mf 400V
C-21	23A473015	Electrolytic: 30-30-20 mf/350-300-25V

CAPACITOR-RESISTOR

CR-1	21A472571	Capacitor-Resistor: 100 mmf - 47,000 ohms 100 mmf

FUSE

F-1	65A10266	10 Amp (3AG)

VIBRATOR

G-1	48B3333	Non-sync: 4 pin

COILS

*L-1,2	24B71881	RF & Antenna Coil (specify color of paint dots on old coil when ordering)
*L-3	24B71879	Oscillator Coil (specify color of paint dots on old coil when ordering)
L-4	24B70227	Oscillator Padder Coil: complete with iron tuning core
L-5,6	24K78026	Choke
L-7	24A472535	Choke, hash

RESISTORS

Note; All resistors are 1/2W 20% carbon insulated type unless otherwise specified.

R-1	6R6032	470,000
R-2	6R3992	150
R-3	6R6075	100,000
R-4	6R6056	47,000
R-5	18K77552	Sensitivity Control: 700 ohms
R-6	6R476060	10,000 2W
R-7	6R3992	150
R-8	6R6001	68,000
R-9	6R6010	330
R-10	6R6004	1 Meg
R-11	6R5614	56 10%
R-12	6R5614	56 10%
R-13	1A472531	Volume Control: 500,000 ohms; includes SPST switch
R-14	6R2118*	3.3 Meg
R-15	6R6161	1,500
R-16	6R6054	10,000
R-17	6R6032	470,000
R-18	6R6015	220,000
R-19	6R6004	1 Meg
R-20	6R6336	270 10% 1W
R-21	6R476004	1,000 2W

SWITCHES

S-1		Power (part of volume control)

SHIELD

SH-1	30A77553	Cable, shield: 5" long
SH-2	30K472991	Cable, shield 10" long

SPARK PLATE

SP-1	1X78041	Spark Plate Assembly: mtg. brkt. included

*Part of Tuner MT-59

	31A472573	Strip, terminal: 2 insulated lugs, #2 mtg
	31K16330	Strip, terminal: 3 insulated lugs, #3 mtg

HOUSING PARTS

	42A472033	Clip, chassis retainer .....
	13C472812	Escutcheon, plastic .....
	1X78020	Housing and Bushing Assembly, rear .....
	15C77560	Housing, front: less escutcheon .....
	3S3394	Screw: #8 x 1/4 slotted hex head thread cutting screw; cad. pl. (escutcheon mounting) .....
	3S7456	Screw: #8 x 1/4 PKA slotted acorn head sheet metal screw; antique copper finish (housing screws) .....

ACCESSORIES

	65X4151	Bulb, pilot light: 6-8V; clear; bayonet base
	8A4491	Capacitor, generator .....
	9B473111	Lead Assembly, fuse: complete with 10 amp fuse .....
	1X74340	Lead Assembly, dial light: complete with bulb
	1X76859	Lead Assembly, speaker: 2 conductor, 36" long, with pin terminals on one end ...
	4S7653	Lockwasher: 5/16 int-ext; cad. pl. (receiver mounting) .....
	2S2863	Nut: 5/16-18 x 9/16 hex; cadmium plated (receiver mtg) .....
	1K75148	Shaft, flexible: with housing; 24" long
	50B473118	or
	50B473119	or
	50B473696	or
	50B473697	or
	50B473783	Speaker: 8" PM; 3.2 ohm V.C; less speaker lead ..... Exchange
	3A77542	Stud, receiver mtg .....
	8X4141	Suppressor, distributor .....

TRANSFORMERS

T-1 & T-2	24B76553	Diode or IF, 455 Kc: complete with padding capacitors and tuning iron cores, but less shield .....
T-3	25B70171	Output Transformer .....
T-4	25B472533	Power Transformer .....

TUNER

	1X472702	Manual Tuner MT-59 .....

CHASSIS PARTS - MECHANICAL

	42A13177	Clip, center post grounding .....
	42A4215	Clip, vibrator grounding .....
	1X70646	Receptacle, antenna .....
	5S7771	Rivet: .088 x 3/16 steel; nickel plated (tube socket mtg) .....
	5S7706	Rivet: .122 x 1/8 steel; nickel plated (terminal strip mtg, sensitivity control and center post ground clip mtg .....
	5S7707	Rivet: .122 x 5/32 steel; nickel plated (tube socket mtg) .....
	5S7701	Rivet: .122 x 3/16 steel; nickel plated (vibrator grounding clip and output transformer mtg) .....
	3S8140	Screw: #8 x 3/16 PKZ plain hex head sheet metal screw; cad. pl. (tuner, capacitor bracket assembly and spark plate mtg) .
	3S3397	Screw: #8 x 5/16 PKZ plain hex head sheet metal screw; cad. pl. (power transformer mtg) .....
	1A71049	Shield and Sleeve Assembly (for T-1 & T-2)
	9A70208	Socket, tube: 4 pin; with grounding lug (vibrator socket) .....
	9A472534	Socket, tube: miniature; 7 prong .....
	9A6788	Socket, tube: octal .....
	31C4079	Strip, terminal; 1 insulated lug, end mtg

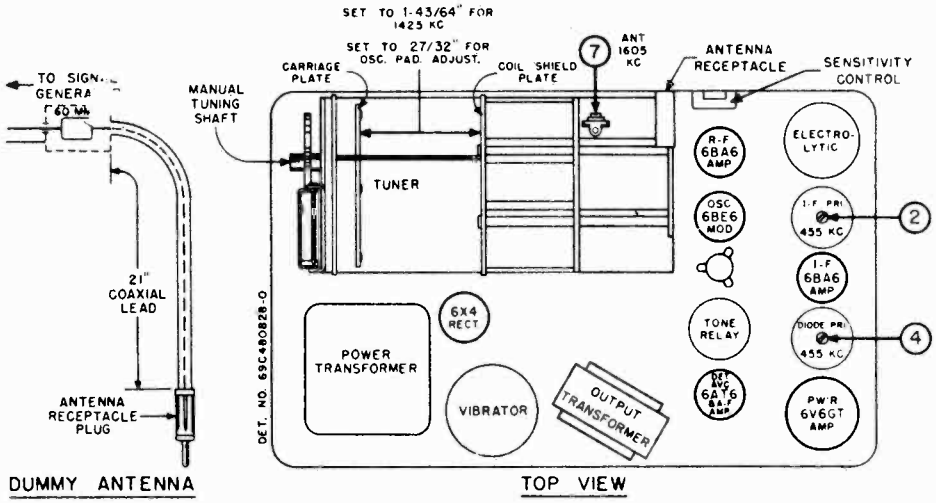
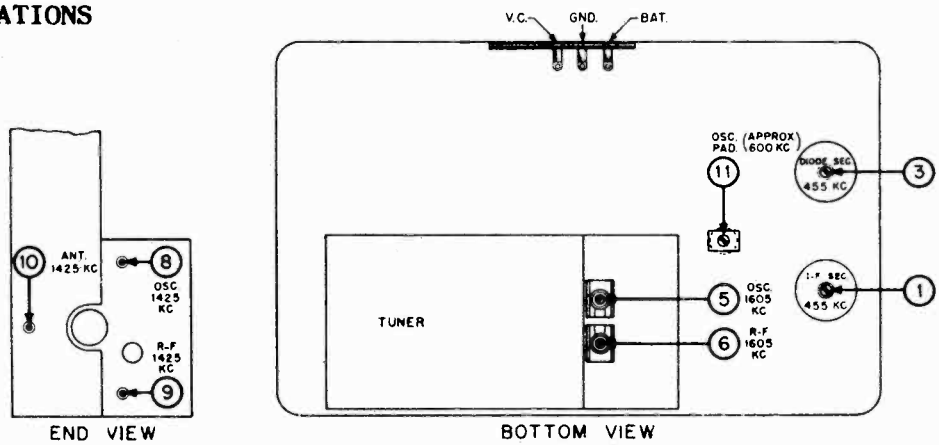


FIGURE 1.

TUBE & TRIMMER LOCATIONS



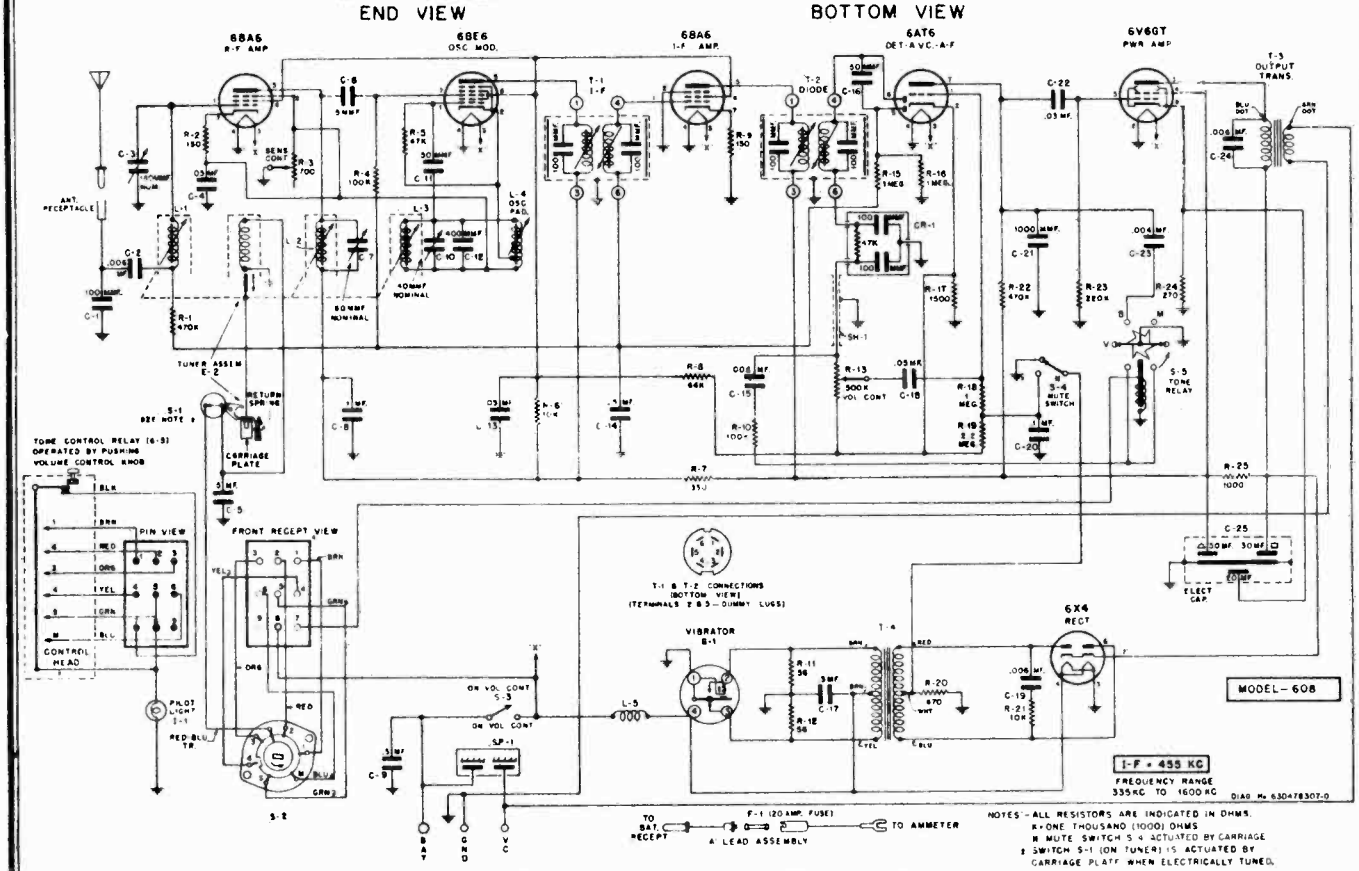


FIGURE 2. SCHEMATIC DIAGRAM

ELECTRICAL CHASSIS PARTS

CAPACITORS

C-1	21B77562	Ceramic: 100 mmf 500V .....
C-2	8A4529	Paper: .006 mf 100V .....
C-3*	20K472613	Trimmer, variable mica: range 50 to 180 mmf; with bracket .....
C-4	8A13514	Paper: .05 mf 100V .....
C-5	8A19133	Paper: .5 mf 100V .....
C-6	21K70720	Molded: 5 mmf 500V .....
C-7*	20K472613	Trimmer, variable mica: range 50-180 mmf; with bracket .....
C-8	8K13166	Paper: .1 mf 400V .....
C-9	8A17028	Paper: .5 mf 100V .....
C-10*	20K472612	Trimmer, variable mica: range 30 to 60 mmf; with bracket .....
C-11	21R6513	Mica: 50 mmf 300V .....
C-12	21A71872	Ceramic: 400 mmf 5% 500V .....
C-13	8A14791	Paper: .05 mf 400V .....
C-14	8A13514	Paper: .05 mf 100V .....
C-15	8A71910	Paper: .006 mf 400V .....
C-16	21R6513	Mica: 50 mmf 300V .....
C-17	8A19133	Paper: .5 mf 100V .....
C-18	8A13514	Paper: .05 mf 100V .....
C-19	8A12840	Paper: .006 mf 1600V .....
C-20	8A472035	Paper: .1 mf 100V .....
C-21	21K478410	Ceramic: 1000 mmf 500V .....
C-22	8A71911	Paper: .03 mf 400V .....
C-23	8A71909	Paper: .004 mf 400V .....
C-24	8A71910	Paper: .006 mf 400V .....
C-25	23A473015	Electrolytic: 30-30-20 mf/350-300-25V ..

CAPACITOR-RESISTOR

CR-1	21A472571	Capacitor-Resistor: 100 mmf-47,000 ohms-100 mmf .....

FUSE

F-1	65K4637	Fuse: 20 Amp (3AG) .....

VIBRATOR

G-1	48B3333	Vibrator, non-sync: 4 pin .....

COILS

L-1 & L-2*	24B71881	RF & Antenna coil (specify color of paint dots on old coil when ordering) .....
L-3*	24B71879	Oscillator Coil (specify color of paint dots on old coil when ordering) .....
L-4	24B70227	Osc. padder coil: complete with iron tuning core .....
L-5	24A472535	Choke, hash .....

RESISTORS

NOTE: All resistors are 1/2 watt, 20% insulated, carbon type unless otherwise specified.

R-1	6R6032	470,000 .....
R-2	6R3992	150 .....
R-3	18K77552	Control, sensitivity: 700 ohm .....
R-4	6R6075	100,000 .....
R-5	6R6056	47,000 .....
R-6	6R476060	10,000 2W .....
R-7	6R6010	330 .....
R-8	6R6001	68,000 .....
R-9	6R3992	150 .....
R-10	6R6075	100,000 .....
R-11	6R5614	56 10% .....
R-12	6R5614	56 10% .....
R-13	18A480773	Volume Control: 500,000; with SPST switch
R-15	6R6004	1 meg .....
R-16	6R6004	1 meg .....
R-17	6R6161	1500 .....
R-18	6R6004	1 meg .....
R-19	6R3927	2.2 meg .....
R-20	6R3949	470 .....
R-21	6R6054	10,000 .....
R-22	6R6032	470,000 .....
R-23	6R6015	220,000 .....
R-24	6R6336	270 10% 1W .....
R-25	6R476004	1,000 2W .....

SWITCHES

S-1*	1B70944	Solenoid Switch: with mtg plate .....
S-2*	40B70952	Selector switch .....
S-3	-	Power Switch (part of volume control)...
S-4*	40A472644	Mute Switch .....
S-5	1X78040	Type MR6 Tone Relay .....

*Part of Tuner ST-60

SHIELD

SH-1	30K472998	Cable. volume control: 5" lg; single cond.

SPARK PLATE

SP-1	1X472624	Spark Plate Assembly .....

TRANSFORMERS

T-1 & T-2	24B76553	Diode or IF, 455 Kc: complete with padding capacitors and tuning iron cores, but less shield .....
T-3	25B70171	Output .....
T-4	25B472533	Power .....

TUNER

	1X472634	Tuner: ST-60 ..... Exch.

MECHANICAL CHASSIS PARTS

42A4215	Clip, vibrator grounding .....
58A480774	Coupling, tinnerman shaft (on volume control)
14A76883	Insulator, contact: fibre .....
4S7650	Lockwasher: #6 internal; cadmium plated.
4S7657	Lockwasher: #8 external; cad. pl. (tone relay mtg) .....
2S7007	Nut: 8-32 x 1/4 hex; cad. plated .....
2S7051	ut: 3/8-32 x 9/16 hex; cad. pl. (volume control mtg) .....
1X70646	Receptacle, antenna lead-in .....
5S7771	Rivet: .088 x 3/16 steel; nickel plated (miniature tube socket mtg) .....
5S7706	Rivet: .122 x 1/8 steel; nkl plated ...
5S7707	Rivet: .122 x 5/32 steel; nickel plated.
5S7701	Rivet: .122 x 3/16 steel; nickel plated (vib. socket mtg) .....
3S8140	Screw: #8 x 3/16 PKZ plain hex head sheet metal screw; cad. pl. (tuner mtg & on vol. control shaft coupling setscrew) .....
3S7454	Screw: #8 x 1/4 PKZ plain hex head sheet metal screw; cad. pl. (tuner mtg) .....
3S3397	Screw: #8 x 5/16 PKZ plain hex head sheet metal screw; cad. pl.(pwr. trans.mtg)..
47B480768	Shaft & Coupling Assembly (for vol.cont)
1A71049	Shield & Sleeve Assembly (for T-1 & T-2)
9A70208	Socket, tube: 4 prong (for vibrator) ...
9A472534	Socket, tube: miniature 7 prong .....
9A6788	Socket, tube: octal .....
31A472573	Strip, terminal: 2 insulated lugs, #2 mtg.
31K14655	Strip, terminal: 3 insulated lugs, #3 mtg .....
7A472576	Support, volume cont. shaft alignment ..
5S7555	Washer: 1/4 x .128 x .033 thick; cad pl (output trans. mtg) .....

HOUSING PARTS

13D472779	Escutcheon (complete) .....
1X472616	Housing, front: includes 2 grounding wipers; less escutcheon .....
15D472579	Housing,rear .....
38A71874	Knob (automatic tuner station set-up); plastic; with clamp spring .....
5S7730	Rivet: .122 x 1/8 steel; antique copper finish (grounding wiper mtg) .....
3S3394	Screw: #8 x 1/4 slotted hex head thread cutting type; cad. pl. (escutch. mtg)..
3S7456	Screw: #8 x 1/4 PKA slotted acorn head sheet metal screw; ant. cop. finish) housing screws) .....
39K470032	Wiper, grounding .....

ACCESSORIES

3A51494	Bolt, "J" (receiver mtg) .....
8A4491	Capacitor, generator .....
9K473161	Lead Assembly, fuse: comp. with 20 amp fuse
1X76859	Lead Assembly, speaker; 2 conductor; 36" lg; with pin terminals on one end .....
4S7653	Lockwasher: 5/16 int-ext; cad. plated (receiver mtg) .....
2S2863	Nut: 5/16-18 x 9/16 hex; cad. pl. (receiver mtg) .....
1K75148	Shaft, flexible: with hsng; 24" long ...
50B473783	or
50B473696	or
50B473697	or
50B473118	or
50B473119	Speaker: 6" PM; 3.2 ohm V.C.; less spkr.lead Exchange
6X4141	Suppressor, distributor .....

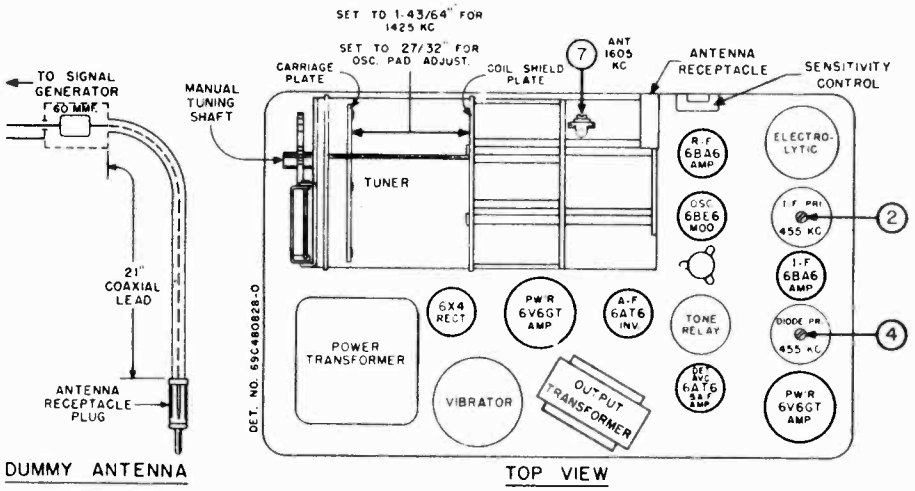
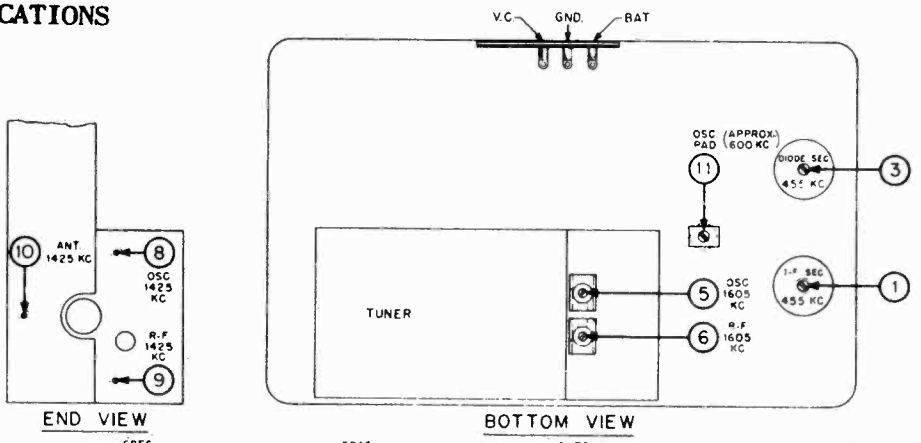


FIGURE 1.

TUBE & TRIMMER LOCATIONS



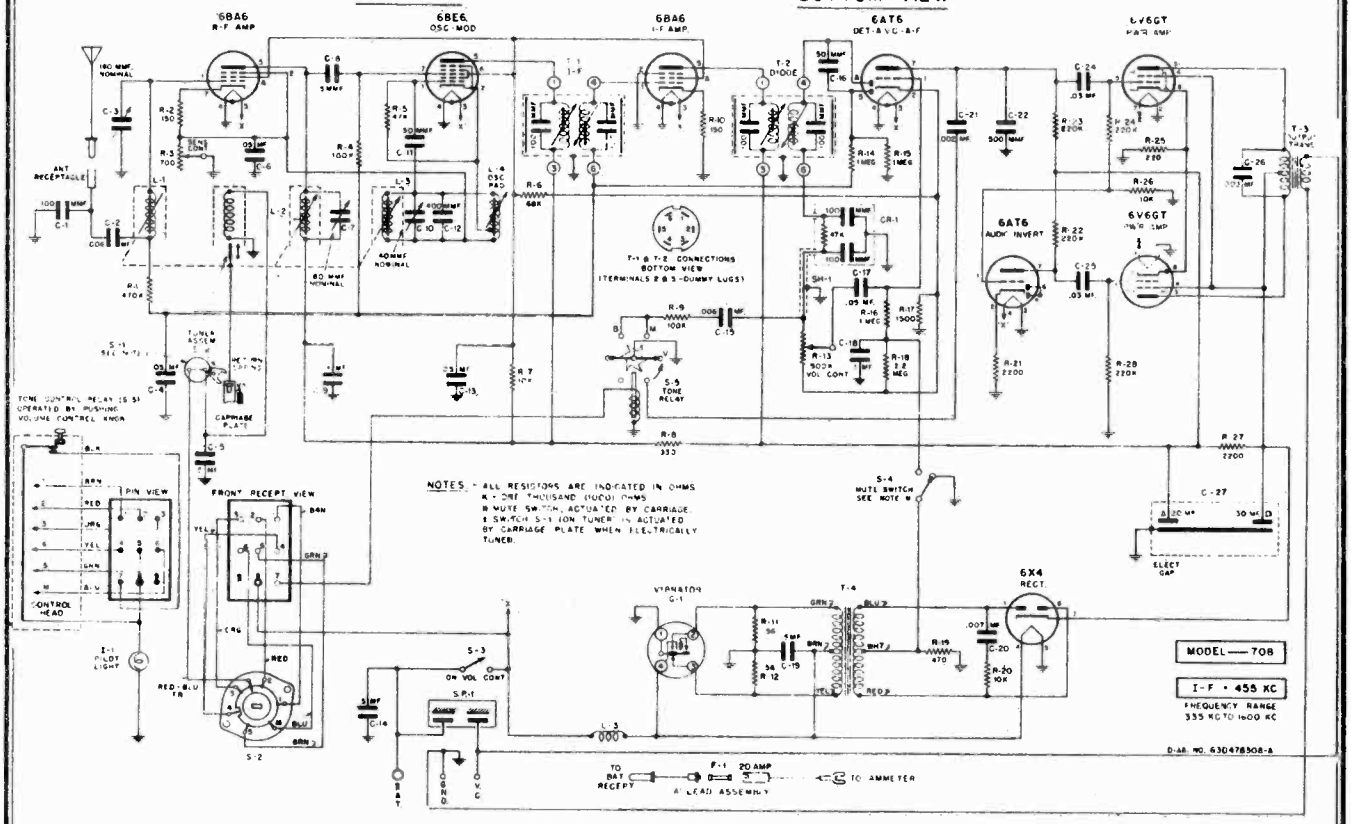


FIGURE 2. SCHEMATIC DIAGRAM

REF. NO.	PART NO.	DESCRIPTION
CHASSIS PARTS - ELECTRICAL		
CAPACITORS		
C-1	21B77562	Ceramic: 100 mmf 500V
C-2*	8A4529	Paper: .006 mf 100V
C-3*	20K472613	Trimmer, variable mica: 50 to 180 mmf; includes mounting bracket
C-4	8A13514	Paper: .05 mf 100V
C-5*	8A19133	Paper: .5 mf 100V
C-6	8A13514	Paper: .05 mf 100V
C-7*	20K472613	Trimmer, variable: mica: 50 to 180 mmf; includes mounting bracket
C-8	21K70720	Molded: 5 mmf 500V
C-9	8K13166	Paper: .1 mf 400V
C-10*	20K472612	Trimmer, variable mica: 30 to 60 mmf; includes mounting bracket
C-11	21R6513 or 21K74661	Mica: 50 mmf 300V Ceramic: 50 mmf 300V
C-12	21A71872	Ceramic: 400 mmf 5% 500V
C-13	8A14791	Paper: .05 mf 400V
C-14	8A17028	Paper: .5 mf 100V
C-15	8A4529	Paper: .006 mf 100V
C-16	21R6513 or 21K74661	Mica: 50 mmf 300V Ceramic: 50 mmf 300V
C-17	8A13514	Paper: .05 mf 100V
C-18	8A472035	Paper: .1 mf 100V
C-19	8A19133	Paper: .5 mf 100V
C-20	8K15166	Paper: .007 mf 1600V
C-21	8A4736	Paper: .002 mf 400V
C-22	21R6639	Mica: 500 mmf 500V
C-24	8K71911	Paper: .03 mf 400V
C-25	8K71911	Paper: .03 mf 400V
C-26	8K13165	Paper: .003 mf 1000V
C-27	23A472570	Electrolytic: 30-20 mf/400-350V
CAPACITOR-RESISTOR		
CR-1	21A472571	Capacitor-Resistor: 100 mmf - 47,000 ohms 100 mmf
FUSE		
F-1	65K4637	Fuse: 20 Amp (3AG)
VIBRATOR		
G-1	48B3333	Vibrator, non-sync:4 pin

*Part of Tuner S T-60

REF. NO.	PART NO.	DESCRIPTION
PILOT LIGHT		
I-1	65X4151	Bulb; 6-8V; bayonet base; type #51
COILS		
L-1 & L-2*	24B71881	RF & Antenna Coil (Specify color of paint dots on old coil when ordering)
L-3*	24B71879	Oscillator coil (Specify color of paint dots on old coil when ordering)
L-4	24B70227	Oscillator padder coil: complete with iron tuning core
L-5	24C473954	Choke, hash
RESISTORS		
Note: All resistors are 1/2 watt, 20%, insulated carbon type, unless otherwise specified.		
R-1	6R6032	470,000
R-2	6R3992	150
R-3	18K77552	Sensitivity Control: 700 ohms
R-4	6R6075	100,000
R-5	6R6056	47,000
R-6	6R6001	68,000
R-7	6R476060	10,000 2W
R-8	6R6010	330
R-9	6R6075	100,000
R-10	6R3992	150
R-11	6R5614	56 10%
R-12	6R5614	56 10%
R-13	18A480773	Volume Control: 500,000 ohms; with SPST Sw.
R-14	6R6004	1 Meg
R-15	6R6004	1 Meg
R-16	6R6004	1 Meg
R-17	6R6161	1500
R-18	6R3927	2.2 Meg
R-19	6R3949	470
R-20	6R6054	10,000
R-21	6R6069	2,200 10%
R-22	6R6015	220,000
R-23	6R6015	220,000
R-24	6R6015	220,000
R-25	6R6389	220 10% 1W
R-26	6R6320	10,000 10%
R-27	6R476130	2,200 2W
R-28	6R6015	220,000

SWITCHES

S-1*	1B70944	Solenoid Switch .....
S-2*	40B70952	Selector Switch .....
S-3	-	Power Switch (part of volume control)
S-4*	40A472644	Mute Switch .....
S-5	1X78040	Type MR6 Tone Relay .....

SHIELD

SH-1	30K472998	Cable, volume control: 5" long; single cond.

SPARK PLATE

SP-1	1X472624	Spark Plate Assembly .....

TRANSFORMERS

T-1 & T-2	24B76553	Diode or IF, 455 Kc; complete with padding capacitors and tuning iron cores, but less shield .....
T-3	25B472558	Output .....
T-4	25C472586	Power .....

TUNER

	1X472634	Solenoid Tuner ST-60 ..... Exch.

CHASSIS PARTS - MECHANICAL

42A4215	Clip, vibrator grounding .....
58A480774	Coupling, tinnerman shaft (on volume cont.)
14A76883	Insulator, contact; fibre .....
4S7650	Lockwasher: #6 internal; cadmium plated (terminal strip mtg) .....
4S7657	Lockwasher: #8 external; cadmium plated (tone relay mtg) .....
2S7007	Nut: 8-32 x 1/4 hex; cadmium plated (tone relay mtg) .....
2S7051	Nut: 3/8-32 x 9/16 hex; cadmium plated; (volume control mtg) .....
1X70646	Receptacle, antenna lead-in .....
5S7771	Rivet: .088 x 3/16; steel; nickel plated (tube socket mtg) .....
5S7706	Rivet: .122 x 1/8; nickel plated (sensitivity control mtg) .....
5S7707	Rivet: .122 x 5/32; steel; nickel plated (tube socket mtg, terminal strip mtg)
5S7701	Rivet: .122 x 3/16; steel; nickel plated (tube socket mtg, output transf. mtg)
3S8140	Screw: #8 x 3/16 PKZ plain hex head sheet metal screw; cad. pl. (tuner mtg & vol. control shaft coupling setscrew) .....
3S7454	Screw: #8 x 1/4 PKZ plain hex head sheet metal screw; cad. pl. (tuner mtg) .....
3S3397	Screw: #8 x 5/16 PKZ plain hex head sheet metal screw; cad. pl. (pwr. transf. mtg) .
47B480768	Shaft & Coupling Assembly (for vol. cont)
1A71049	Shield and Sleeve Assembly (for T-1 & T-2)
9A70208	Socket, tube: 4 prong (for vibrator) ...
9A472534	Socket, tube: miniature; 7 prong .....
9A6788	Socket, tube: octal .....
31K86126	Strip, terminal: 2 insulated lugs, #2 mtg
31A472573	Strip, terminal: 2 insulated lugs, #2 mtg
7A472576	Support, volume control shaft alignment..
4S7555	Washer: 1/4 x .128 x .033; cadmium plated (output transf. mtg) .....

*Part of Tuner ST-60

HOUSING PARTS

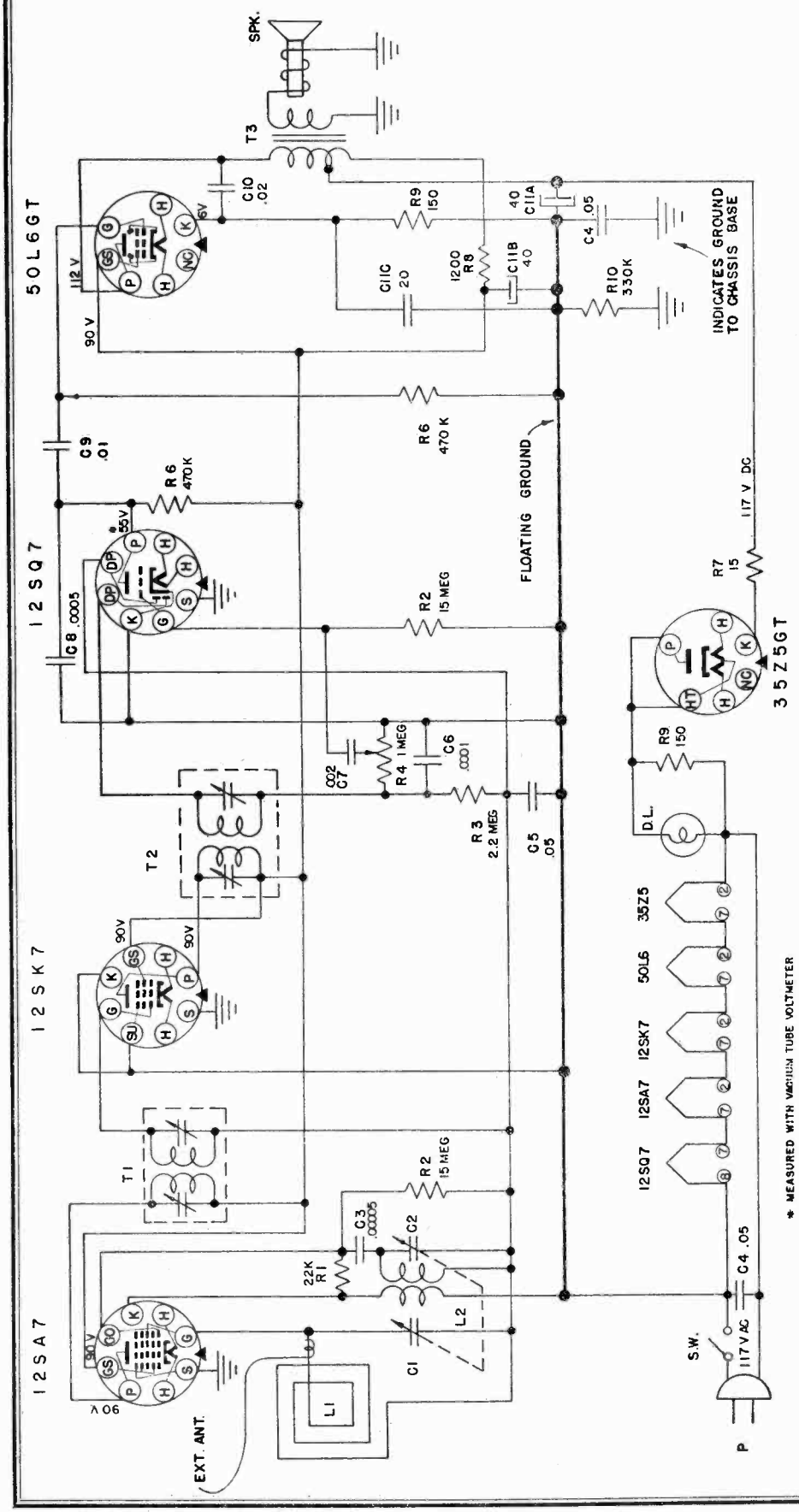
13D472778	Escutcheon .....
1X472738	Housing, front: includes 2 grounding wipers; less escutcheon .....
15K472584	Housing, rear .....
38A71874	Knob (automatic tuner station set-up): plastic; with clamp spring .....
5S7730	Rivet: .122 x 1/8 steel; antique cop. finish .....
3S3394	Screw: #8 x 1/4 slotted hex head thread cutting type; cad. pl. (escutch. mtg.)...
3S7456	Screw: #8 x 1/4 PKA slotted acorn head sheet metal screw; antique copper finish (housing screws) .....
39K470032	Wiper, grounding .....

ACCESSORIES

3A51494	Bolt, "J" (recvr mtg) .....
8A4491	Capacitor, generator .....
9K473161	Lead Assembly, fuse: complete with 20 amp fuse .....
1X76859	Lead Assembly, speaker: 2 conductor; 36" long; with pin terminals on one end ...
4S7653	Lockwasher: 5/16 int-ext; cad. plated (receiver mtg) .....
2S2863	Nut: 5/16-18 x 9/16 hex; cad. plated (receiver mtg) .....
1K75148	Shaft, flexible: with hsng; 24" long ...
50B473118 or 50B473696 or 50B473697 or 50B473783	Speaker: 6" PM; 3.2 ohm VC; less spkr. lead Exch.
6X4141	Suppressor, distributor .....

NOBLITT-SPARKS INDUSTRIES, INC.

MODELS 152T, 153T
CHASSIS RE-233



SPECIFICATIONS

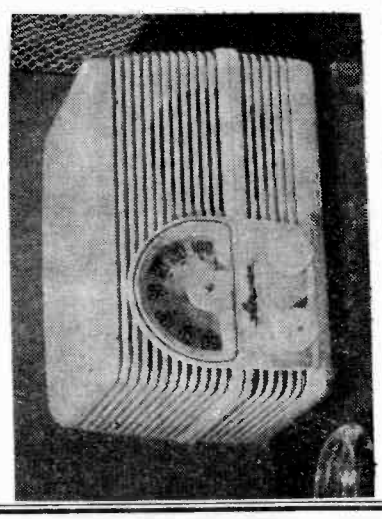
POWER SUPPLY
105-125 Volts, AC-DC, 35 Watts

FREQUENCY RANGE
Broadcast ..... 540-1600 kc
IF ..... 455 kc

POWER OUTPUT
Undistorted ..... .8 Watts
Maximum ..... 2.5 Watts
Plate load ..... 2000 Ohms

TUBES AND FUNCTIONS
12SA7 ..... Mixer-oscillator
12SK7 ..... IF Amp.
12SQ7 ..... DET-AVC AF Amp.
50L6 ..... Output
35Z5GT ..... Rectifier

LOUD SPEAKER
Type: Permanent magnet
Size: 4 Inch
Voice coil impedance ..... 3.2 Ohms



MODELS 152T, 153T
CHASSIS RE-233

NOBLITT-SPARKS INDUSTRIES, INC.

ALIGNMENT PROCEDURE

PRELIMINARY:

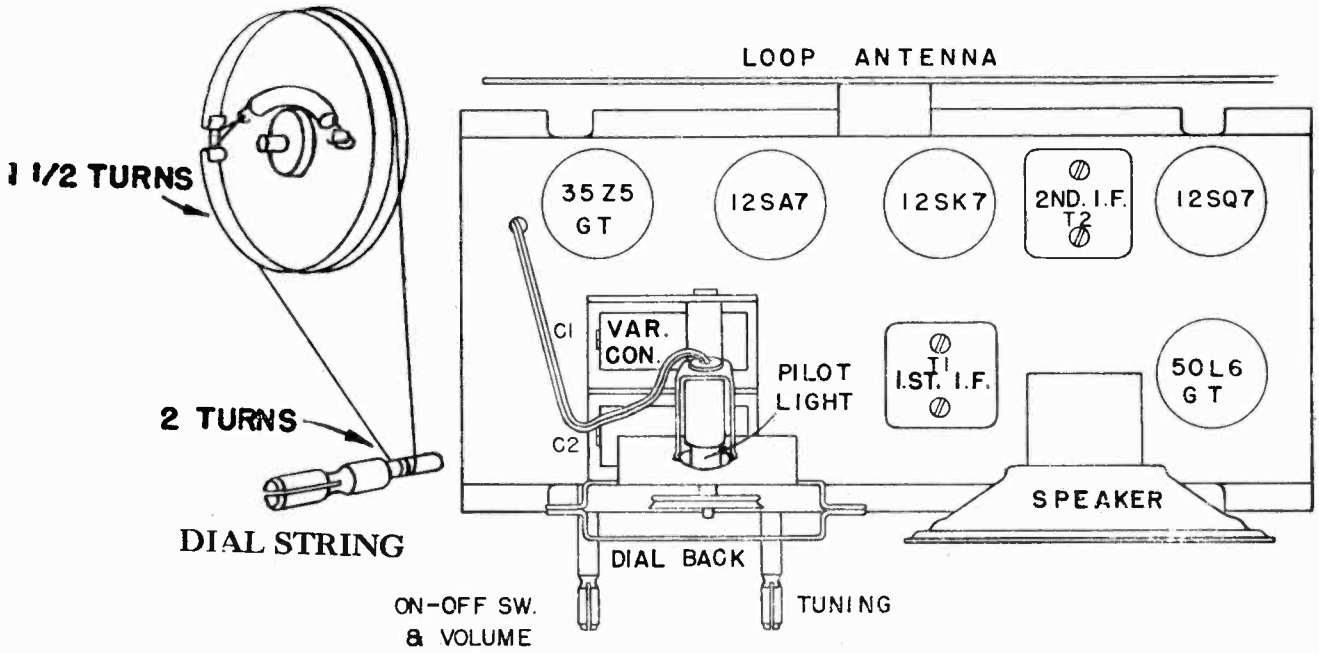
Output meter connection	Across loudspeaker voice coil
Output meter reading to indicate 200 milliwatts (standard output)	.8 volts
Dummy antenna value to be used in series with generator output	See chart below
Connection of generator output lead	See chart below
Connection of generator ground lead	Floating ground
Generator modulation	30% 400 cycles
Position of volume control	Fully clockwise
Position of dial pointer with variable fully closed	Last mark at left end of dial

Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers Adjusted in Order Shown for Maximum Output	Function of Trimmer
Open	455	.05 mfd.	12SA7 Grid (Stator of C1)	Top of 2nd & 1st IF trans. T2 & T1	IF
1400	1400		*Test Loop	C2; C1, Trimmers on Variable Condenser	Osc. Ant.
600	600		*Test Loop	Check Point	

*Standard Hazeltine Test Loop Model 1150 or 3 turns of wire about 6" in diameter, placed about one foot from the set loop.

The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the AVC action of the receiver ineffective.

TUBE LAYOUT



This receiver is designed to operate without a ground connection and no attempt should be made to use one.

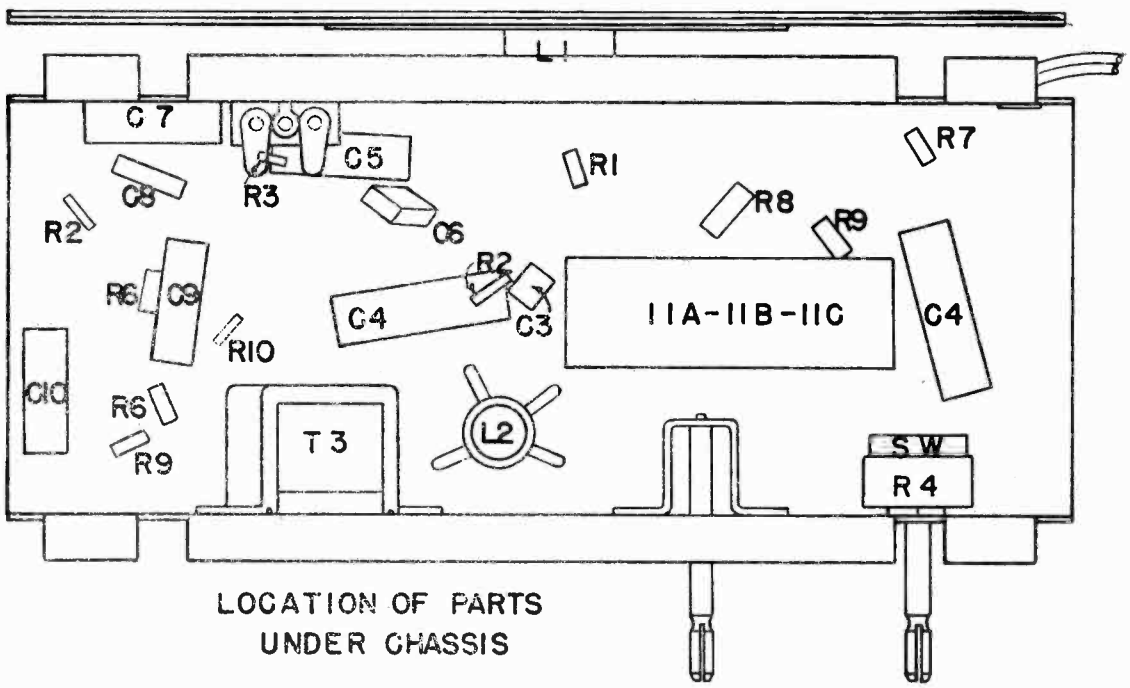
Models 152-T and 153-T are identical except for cabinets. Model 152-T is in a walnut cabinet. Model 153-T is in an ivory cabinet.

NOBLITT-SPARKS INDUSTRIES, INC. MODELS 152T, 153T
CHASSIS RE-233

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
R1	C20060-223	Resistor, 22,000 ohm, ¼ watt
R2	C20060-156	Resistor, 15 megohm, ¼ watt
R3	C20060-225	Resistor, 2.2 megohm, ¼ watt
R4	C21511	Volume Control and Switch, 1 megohm
R6	C20060-474	Resistor, 470 K ohm, ¼ watt
R7	C20060-150	Resistor, 15 ohm, ¼ watt
R8	C20070-122	Resistor, 1200 ohm, 1 watt
R9	C20060-151	Resistor, 150 ohm, ¼ watt
R10	C20060-334	Resistor, 330 K ohm, ¼ watt
C1-C2	C21481	Variable Condenser & Pulley Assembly
C3	A21643	Capacitor, .00005, 350V
C4	C20068-503	Condenser, .05, 400V
C5	C20067-503	Condenser, .05, 200V
C6	C20065-101	Condenser, .0001, 500V (Mica)
C7	C20068-202	Condenser, .002, 600V
C8	C20065-501	Condenser, .0005, 500V (Mica)
C9	C20068-103	Condenser, .01, 400V
C10	C20068-203	Condenser, .02, 400V
C11	A21499	Electrolytic Condenser, 40-20 mfd., 150V, 20 mfd., 25V
L1	A21521-1	Antenna Loop Assembly
L2	AC21492-1	Oscillator Coil Assembly
T1	AC21495-1	1st I. F. Coil Assembly
T2	AC21496-1	2nd I. F. Coil Assembly
T3	AC21497-1	Output Transformer Assembly
Spk	C21517	Speaker Assembly
P	B20138-5	Line Cord and Plug Assembly
DL	A19351	Dial Light Bulb
	AA21877	Cabinet Assembly (Walnut)
	AA21878	Cabinet Assembly (Ivory)
	A21485	Dial Crystal
	A21501-1	Knob (Walnut)
	A21501-2	Knob (Ivory)
	AC21696-1	Cabinet Rear Cover Assembly (152-T)
	AC21696-2	Cabinet Rear Cover Assembly (153-T)

REF. NO.	PART NO.	DESCRIPTION
	A20072-8Z	Rivet, for Mounting Dial Crystal (25)
	A20222-1C	Speed Nut—for Mounting Dial Crystal (15)
	A20216-1C	Speed Nut—for Mounting Name Plate (25)
	A19124	Snap-on Button—for Rear Cover (10)
	A21504	Carton with Fillers
	A21482	Tuning Shaft
	C19926	Dial Scale
	A20077-3	Grommet—Under Variable Condenser
	A19361	Hair Pin Clip
	A19132	Dial Drive Cord
	A19133	Spring—Dial Drive Cord
	A19138-3	Spacer Eyelet
	A19138-1	Spacer Eyelet—for Mounting Variable Condenser
	A19141	Terminal Strip
	A19205-3	Cap Mounting Clip
	A21346-1	Socket—Dial Light
	A19233-1	Socket—Tube
	A18254-1	Socket—Tube
	AA21542-1	Dial Pointer Assembly
	A21330	Name Plate



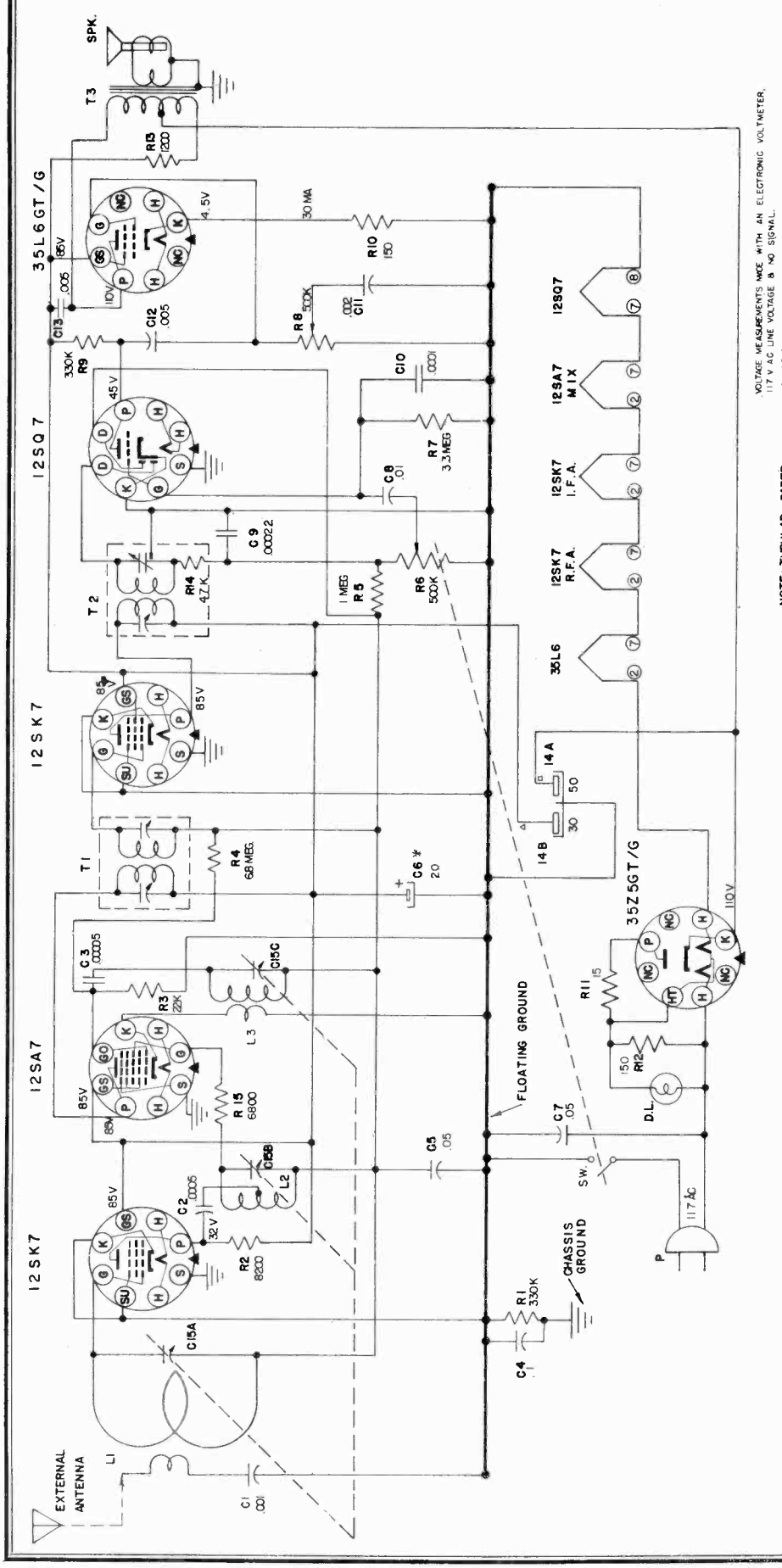
LOCATION OF PARTS UNDER CHASSIS

CIRCUIT CHANGES

Some sets were made with a 330 Ohm instead of a 150 Ohm resistor in shunt with the dial light, and the 15 ohm resistor R7 in the plate circuit of the 35Z5 tube instead of the Cathode Circuit.

NOBLITT-SPARKS INDUSTRIES, INC.

MODEL 160T, 161T, CHASSIS RE-232



*Used only on sets with 50-30 uf. Electrolytic Condenser.

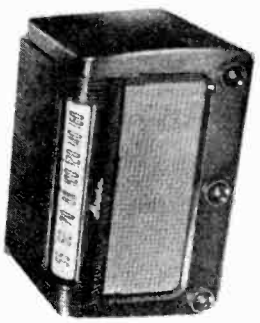
SPECIFICATIONS

FREQUENCY RANGE
- Broadcast ---------- 540-1600 kc
- IF ---------- 455 kc

TUBES AND FUNCTIONS
- 12SK7 ---------- RF Amp.
- 12SA7 ---------- Mixer-oscillator
- 12SK7 ---------- IF Amp.
- 12SQ7 ---------- DET-AVC AF Amp.
- 35L6 ---------- Output
- 35Z5GT ---------- Rectifier

LOUD SPEAKER
- Type: Permanent magnet, 2.15 oz. Alnico 5
- Size: 5¼ Inch
- Voice coil impedance ---------- 3.2 Ohms

POWER OUTPUT
- Undistorted ---------- .8 Watts
- Maximum ---------- 1.1 Watts
- Plate load ---------- 2000 Ohms



MODEL 160T, 161T,
CHASSIS RE-232

NOBLITT-SPARKS INDUSTRIES, INC.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection	Across loudspeaker voice coil
Output meter reading to indicate 200 mw (standard output)	.8 volts
Connection of generator ground lead	Floating ground
Generator modulation	30% 400 cyclees
Position of volume control	Fully clockwise
Position of dial pointer with variable fully closed	Last mark at left end of dial

1. Connect signal generator lead through a .05 uf. condenser to converter grid. Open tuning condenser. Set signal generator to 455 Kc. Tune I. F. Transformers for maximum output.

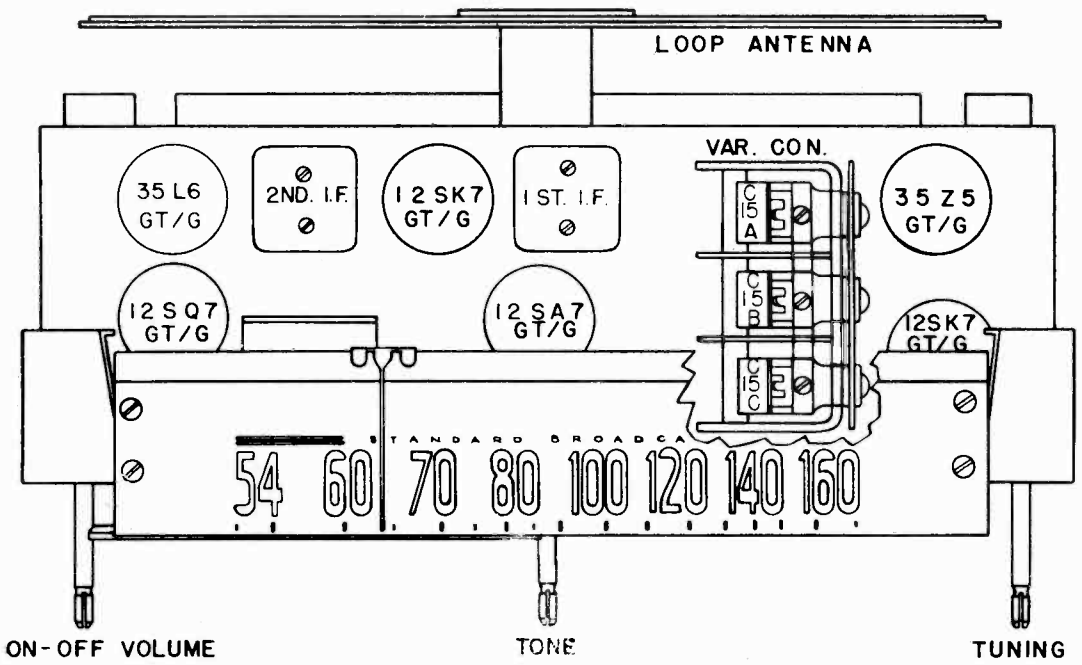
2. Close tuning condenser and set pointer at end mark of dial. Open tuning condenser. Connect signal generator to test loop or to blue lead on set loop. Set signal generator to 1620 Kc. Tune trimmer on (C15C) oscillator section of tuning condenser for maximum output.

3. Set signal generator to 1400 Kc. Adjust tuning shaft until maximum output is abtained. Tune R. F. trimmer (C15B) and antenna trimmer (C15A) on tuning condenser for greatest output. Reset tuning shaft until output is again a maximum. Retune R. F. and antenna trimmers. Repeat this cycle of operations at 1400 Kc until no further increase of output can be obtained. Keep generator output at a low value to prevent detuning by A. V. C. action.

4. Set signal generator to 600 Kc. Adjust tuning shaft for maximum output. Adjust tuning condenser plates for maximum output.

Approximate stage by stage sensitivities with 117V. AC line voltage and .8 V. output across voice coil, should be: I. F. grid, 455 Kc – 10,000 uv.. Mixer grid, 455 Kc – 130 uv., Mixer grid, 1000 Kc – 170 uv; Antenna, 1400 Kc – 100 uv/m.

TUBE LAYOUT



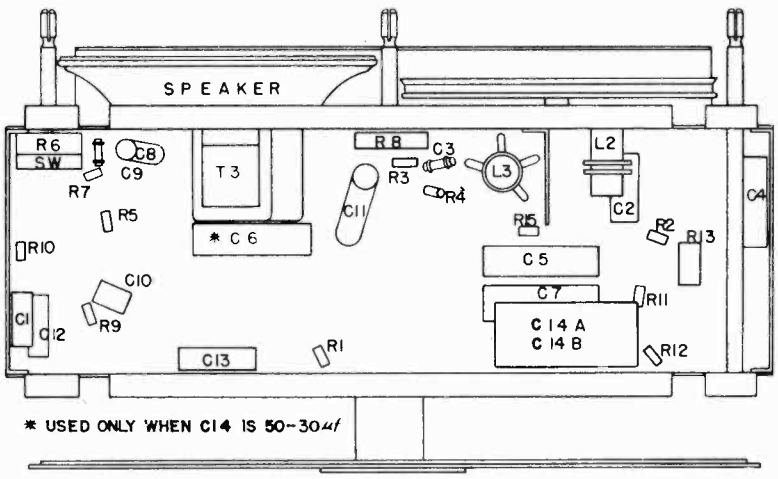
NOBLITT-SPARKS INDUSTRIES, INC. MODEL 160T, 161T, CHASSIS RE-232

PARTS LIST

Schematic Location	Part No.	Description
R1, 9	C20060-334	Resistor, 330,000 Ohms, 1/4 W
R2	C20120-822	Resistor, 8200 Ohms, 1/4 W
R3	C20060-223	Resistor, 22,000 Ohms, 1/4 W
R4	C20060-685	Resistor, 6.8 Megohm, 1/4 W
R5	C20060-105	Resistor, 1 Megohm, 1/4 W
R6	C21554	Volume Control, 500,000 Ohms
R7	C20060-335	Resistor, 3.3 Megohm, 1/4 W
R8	C21553	Tone Control & Switch, 500,000 Ohms
R10, 12 R11	C20060-151	Resistor, 150 Ohms, 1/4 W
R13	C20223-122	Resistor, 1200 Ohms, 2 W
R14	C200601473	Resistor, 47,000 Ohms, 1/4 W
R15	C20060-473	Resistor, 6800 Ohms, 1/4 W
C1	C20067-102	Condenser, .001 uf., 200 V., P. T.
C2	C20069-501	Condenser, .0005 uf., 600 V., P. T.
C3	C20204-500	Condenser, .00005 uf., 500 V., Ceramic
C4	C20067-104	Condenser, .1 uf., 200 V., P. T.
C5	C20067-503	Condenser, .05 uf., 200 V., P. T.
°C6	A22110	Condenser, 20 uf., 150 V. Elect.
C7	C20068-503	Condenser, .05 uf., 400 V., P. T.
C8	C20068-103	Condenser, .01 uf., 400 V., P. T.
C9	C20226-221	Condenser, .00022 uf., 350 V., Ceramic
C10	C20065-101	Condenser, .0001 uf., 500 V., Mica
C11	C20068-202	Condenser, .002 uf., 400 V., P. T.
C12, 13	C20068-502	Condenser, .005 uf., 400 V., P. T.
*C14A, B	A21578	Electrolytic Condenser, 50 uf., 150 V., 30 uf., 150 V.
°°C14A, B	C22111	Electrolytic Condenser, 50 uf., 150 V. 50 uf., 150 V.
C15A, B, C	AD21569-1	Variable Condenser & Pulley Assy.
L1	AD21576-1	Antenna Loop Assembly
L2	AC21575-1	R. F. Coil Assembly
L3	AC21576-1	Oscillator Coil Assembly
T1	AC21572-1	1st I. F. Coil Assembly
T2	AC21573-1	2nd I. F. Coil Assembly
T3	AC21577-1	Output Transformer Assembly
Spk.	C21570-1	Speaker, 5-1/4" P. M.
P	A18254-1	Socket, Wafer, Plain

Schematic Location	Part No.	Description
	A19124	Snap-on Button for Mtg. Rear Cover to Cabinet
	A19132	Dial Drive Cord
	A20149-8	
	A19138-1	Spacer Eyelet for Mtg. Variable Condenser
	A19205-3	Capacitor Mtg. Clip, for Mtg. Electrolytic Condenser
	A19233-1	Socket, Wafer, Center Pin Shielded
	A19344-2	Idler Pulley
	A19351	Dial Light Bulb, Mazda C47
	A19361	Hair Pin Clip
	A20040-9	Washer, Brown Felt behind knobs (Model 160-T) (10)
	A20040-14	Washer, White Felt behind Knobs (Model 161-T) (10)
	A20077-3	Grommet, Rubber for Mtg. Variable Condenser
	A20216-1B	Speed Nut for Mtg. Name Plate (10)
	A20228-1B	Speed Nut for Mtg. Name Plate (10)
	A20229-1B	Speed Nut for Mtg. Speaker Baffle (10)
	A21330	Name Plate
	A21346-2	Socket, Dial Light
	E21536-1	Cabinet, Walnut (160-T)
	E21536-2	Cabinet, Ivory (161-T)
	C21559	Dial Crystal
	C21561	Grille
	C21562	Speaker Baffle
	C21564	Dial Pointer
	A21568	Tuning Shaft
	C21579	Felt Baffle
	A21607	Carton, Complete with Fillers
	A21737-1	Knob, Walnut (160-T)
	A21737-2	Knob, Ivory 0(161-T)
	A21979	Cabinet, Rear Cover Assembly, Walnut (160-T)
	A21980	Cabinet, Rear Cover Assembly, Ivory (161-T)
	A21981	Dial Scale & Backing Plate Assembly

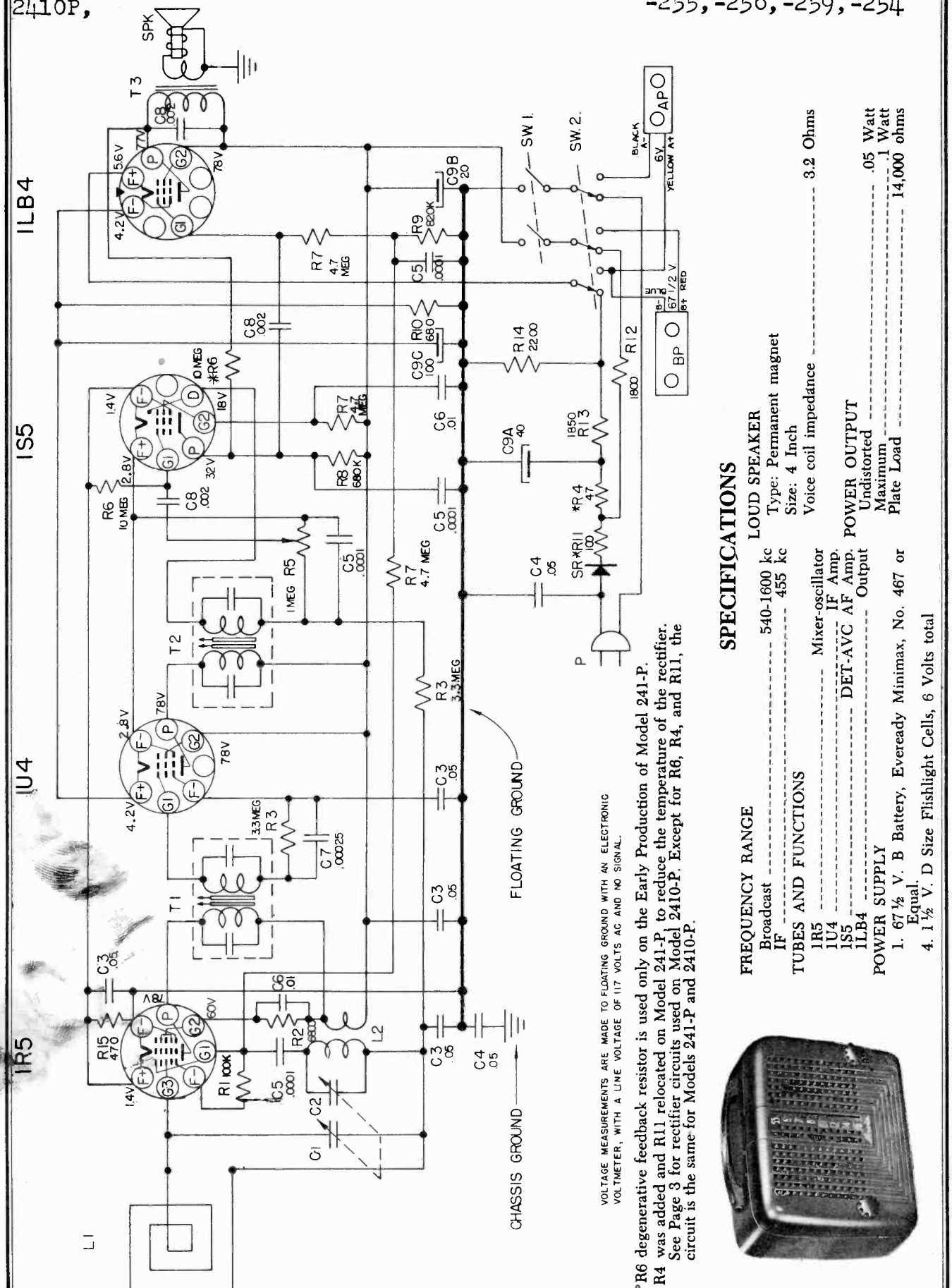
° used on first 18000 sets produced.
°° used on sets Produced after first 18,000.



LOCATION OF PARTS UNDER CHASSIS

Models 160T is in a walnut cabinet. Model 161T is in an ivory cabinet. The Chassis is the same in both models.

MODELS 241P, 244P, 2410P, NOBLITT-SPARKS INDUSTRIES, INC. CHASSIS RE-244, -255, -256, -259, -254



*R6 degenerative feedback resistor is used only on the Early Production of Model 241-P.
R4 was added and R11 relocated on Model 241-P to reduce the temperature of the rectifier. See Page 3 for rectifier circuits used on Model 2410-P. Except for R6, R4, and R11, the circuit is the same for Models 241-P and 2410-P.

SPECIFICATIONS

FREQUENCY RANGE
Broadcast ..... 540-1600 kc
IF ..... 455 kc

TUBES AND FUNCTIONS
1R5 ..... Mixer-oscillator
1U4 ..... IF Amp.
1S5 ..... DET-AVC AF Amp.
1LB4 ..... Output

POWER SUPPLY
1. 67½ V. B Battery, Eveready Minimax, No. 467 or Equal.
4. 1½ V. D Size Flishlight Cells, 6 Volts total

LOUD SPEAKER
Type: Permanent magnet
Size: 4 Inch
Voice coil impedance ..... 3.2 Ohms

POWER OUTPUT
Undistorted ..... .05 Watt
Maximum ..... 1 Watt
Plate Load ..... 14,000 ohms

NOBLITT-SPARKS INDUSTRIES, INC. MODELS 241P, 244P, 2410P, CHASSIS RE-244, -255, -256, -259, -254

ALIGNMENT PROCEDURE

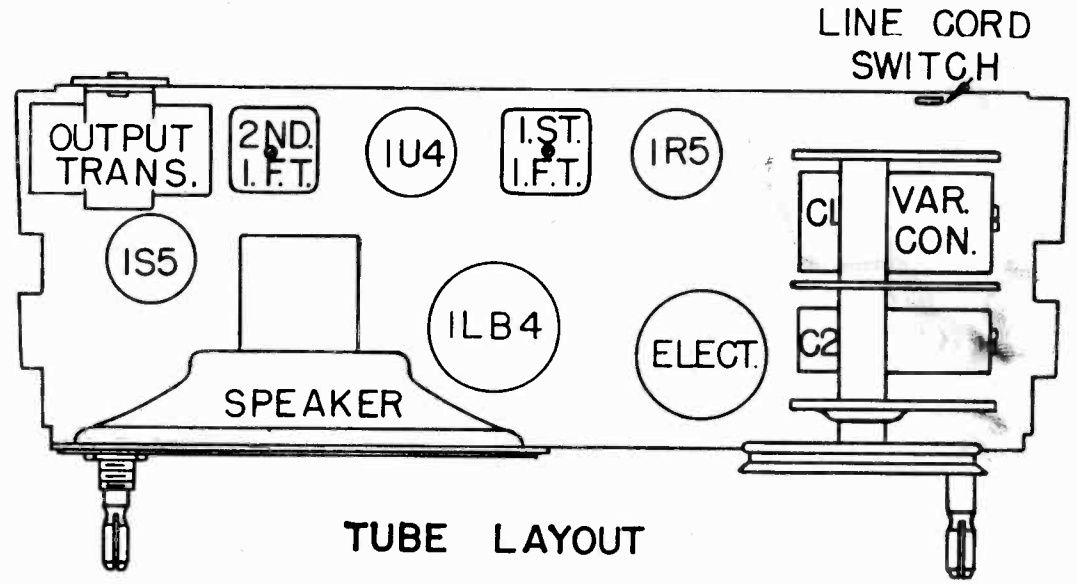
PRELIMINARY:

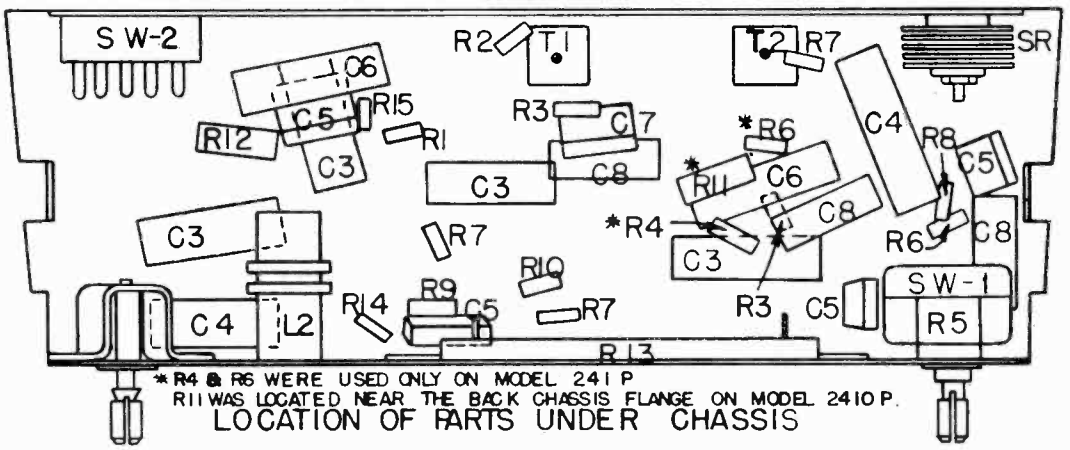
Output meter connection	Across loudspeaker voice coil
Output meter reading to indicate 50 MW (Standard Output)	.4 volts
Dummy antenna value to be used in series with generator output	See chart below
Connection of generator output lead	See chart below
Connection of generator ground lead	Floating ground
Generator modulation	30% 400 cycles
Position of volume control	Fully clockwise

With variable condester closed, place top edge of pointer across center of top hole on dial backing plate.
When adjusting C1, place the set loop the same distance from and in the same position with respect to the chassis and batteries, as it would be when mounted in the cabinet.

Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers Adjusted in Order Shown for Maximum Output	Function of Trimmer
Open	455	.05 mfd.	1R5 Grid (Stator of C1)	Top & Bottom of IF Trans. T2 & T1.	IF
1400	1400		°Test Loop	C2; C1, Trimmers on Variable Condenser	Oscillator Antenna
600	600		°Test Loop	°°Check Point	

° Standard Hazeltine Test Loop Model 1150 or 3 turns of wire about 6" diameter, placed about one foot from the set loop.
°°If weak, adjust variable condenser plates for maximum output.
The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the AVC action of the receiver ineffective.





*R4 & R6 WERE USED ONLY ON MODEL 241P
R11 WAS LOCATED NEAR THE BACK CHASSIS FLANGE ON MODEL 2410P.
LOCATION OF PARTS UNDER CHASSIS

MODELS 241P, 244P, 2410P, CHASSIS RE-244, -255, -256, -259, -254

NOBLITT-SPARKS INDUSTRIES, INC.

241P, 244P & 2410P PARTS LIST

Schematic Location	Part No.	Description
R1	C20060-104	Resistor, 100,000 Ohm, 1/4 Watt
R2	C20060-682	Resistor, 6800 Ohm, 1/4 Watt
R3	C20060-335	Resistor, 3.3 Megohm, 1/4 Watt
R4 241 only	C20060-470	Resitor, 47 Ohm, 1/4 Watt
R4 2410-P c	C20060-680	Resistor, 68 Ohms 1/4 Watt
R5	C21782	Volume Control & Switch, 1 Megohm
R6	C20060-106	Resistor, 10 Megohm, 1/4 Watt
R7	C20060-475	Resistor, 4.7 Megohm, 1/4 Watt
R8	C20060-684	Resistor, 680,000 Ohm, 1/4 Watt
R9	C20120-824	Resistor, 820,000 Ohm, 1/4 Watt, + or − 10%
R10	C20060-681	Resistor, 680 Ohm, 1/4 Watt
R11	C20070-101	Resistor, 100 Ohm, I Watt, + or − 10%
R12	C20070-182	Resistor, 1800 Ohms, 1 Watt, + or − 10%
R13	A21816	Resistor, 1850 Ohms, 10 Watt, + or − 10%
R14	C20060-222	Resistor, 2200 Ohms, 1/4 Watt
R15	C20060-471	Resistor, 470 Ohms, 1/4 Watt
C1, C2	C19822	Condenser, Variable
C3	C20067-503	Condenser, .05 uf., 200 Volts, P. T.
C4	C20068-503	Condenser, .05 uf., 400 Volts, P. T.
C5	C20065-101	Condenser, .0001 uf., 500 Volts, Mica
C6	C20068-103	Condenser, .01 uf., 400 Volts, P. T.
C7	C20065-251	Condenser, .00025 uf., 500 Volts, Mica
C8	C20069-202	Condenser, .002 uf., 600 Volts, P. T.
C9	A21815	Condenser, Electrolytic, 40-20 uf., 150 Volts, 100 uf., 10 Volts
L1	°AC21795-( )	Antenna Loop & Cabinet Back Assy.
L2	AC21796-1	Oscillator Coil Assy.

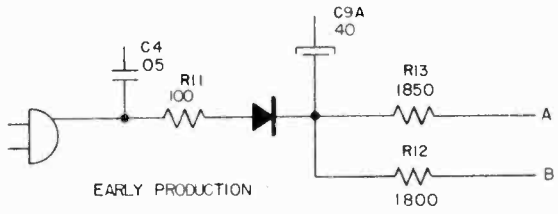
Schematic Location	Part No.	Description
T1	C21797-1	1st I. F. Coil Assy.
T2	C21797-2	2nd I. F. Coil Assy.
T3	AC21799-1	Output Transformer Assy
SR	A20207-1	Selenium Rectifier, 75 Ma., Federal
or	A20207-2	Selenium Rectifier, 100 Ma., Radio Receptor
Spk	C21768	Speaker, 4" P. M.
Sw-2	A21051	Slide Switch
AP	A21861	"A" Battery Cable & Terminal Strip
BP	A21842	"B" Battery Cable & Terminal Strip
P	B20246-1	Line Cord & Plug Assy.
	°AA21957-( )	Cabinet Assy., Front Sec., with Grill Cloth & Latch
	°C21766-( )	Handle
	°A21764-( )	Knob
	A21801	Line Cord Hook
	A21802	Spring, Hinge (Set of two)
	A21803	Mtg. Stud for Handle
	A21241-1A	Speed Nut for Mtg. Handle (Set of two)
	A21838	Carton (Complete with Fillers)
	A21785	Tuning Shaft
	A20077-3	Grommet, Variable Con. Mtg.
	A19138-1	Eyelet, Spacer, Variable Condenser Mtg.
	A19361	Hair Pin Clip for Tuning Shaft
	A19132	Dial Drive Cord
	°A21783-( )	Pointer
	A21792	Spring Clip, IF Coil Mtg.
	A19133	Spring, Dial Cord
	A20243-3	Socket, Miniature, Shielded
	A20243-1	Socket, Miniature, Unshielded
	A21851-1	Socket, Loctal Molded
	A21852	Electrolytic Mtg. Wafer
	AC21858-1	Battery Clip Assy.
	C21767-1	Spring Latch

° When ordering these parts use the following dash numbers as suffixes to the Part numbers.
Ivory − 1 for handle, 3 for all other Cabinet Parts; Red − 1 for all Colored Parts;
Tan − 1 for Pointer & handle − 3 for knobs, − 4 for Cabinet parts;
Green − 1 for Pointed, − 5 for knobs Cabinet parts & handle.

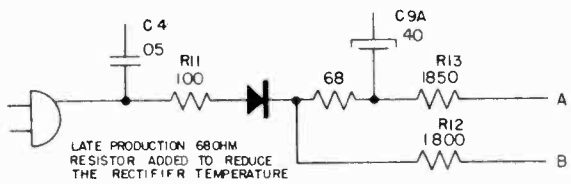
Model Number & Chassis Number Combinations.

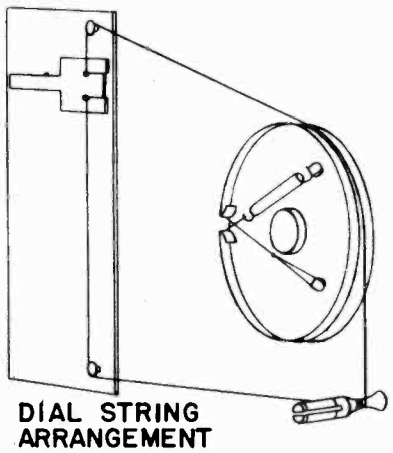
Model	Chassis	Model	Chassis
241P Ivory	Re-244	241P Red	RE-245
241P Tan	RE-255	244P Green	RE-259

The above Chassis are identical except for Colored parts Model 2410 P − Chassis RE-254 was produced in Red, Ivory & Tan, all using the same Chassis Number. It has Certain Circuit Variations which are covered in this bulletin.



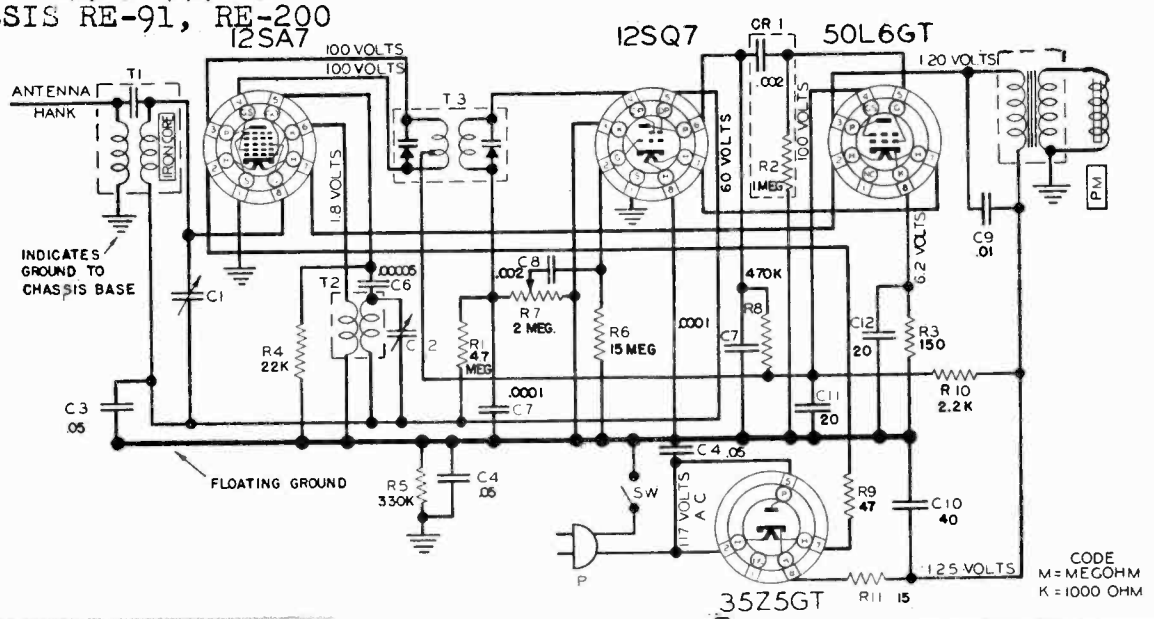
2410 P

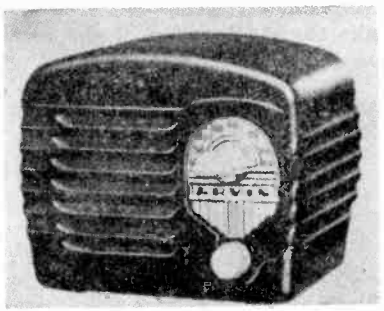


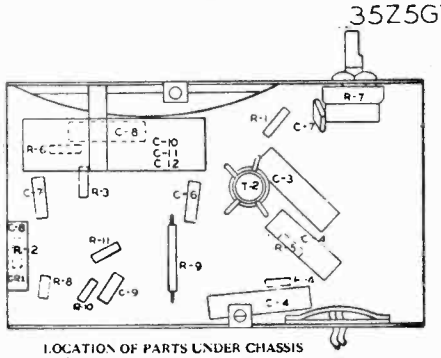


DIAL STRING ARRANGEMENT

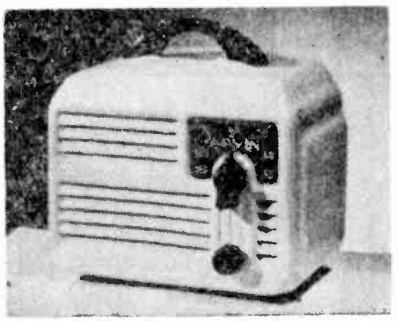
MODELS 442, 444AH, CHASSIS RE-91, RE-200 — NOBLITT-SPARKS INDUSTRIES, INC.







LOCATION OF PARTS UNDER CHASSIS



Model 444-AH is the same as Model 444 except for the handle and cabinet.

Model 442 is wired from the same Schematic Diagram as the Model 444 and 444-AH but has different components as indicated in the Parts List.

Some of the first Model 442 chassis had the same components as the Model 444 chassis except for the chassis base.

The symbol CR1 on the Schematic Diagram represents a capristor which contains a .002 condenser and a 1 megohm resistor in one unit. This is used only on the Model 442.

FREQUENCY RANGE
- Broadcast ..... 540-1600 kc
- IF ..... 455 kc

TUBES AND FUNCTIONS
- 12SA7 ..... Mixer-oscillator
- 12SQ7 ..... Detector-AVC-AF
- 50L6GT ..... Output
- 35Z5GT ..... Rectifier

POWER SUPPLY
- 105-125 Volts AC-DC, 35 Watts

POWER OUTPUT
- Type: Beam tube
- Undistorted ..... .8 Watts
- Maximum ..... 2.5 Watts
- Plate load ..... 2000 ohms

LOUD SPEAKER
- Type: Permanent magnet
- Size: 4 inch
- Voice coil impedance ..... 3.2 ohms

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
R1	C20060-475	Resistor, 4.7 megohms, ¼ watt
*R2	Part of A21642	Resistor, 1 megohm
**R2	C20060-105	Resistor, 1 megohm, ¼ watt
R3	C20060-151	Resistor, 150 ohms, ¼ watt
R4	C20060-223	Resistor, 22,000 ohms, ¼ watt
R5	C20060-334	Resistor, 330,000 ohms, ¼ watt
R6	C20060-156	Resistor, 15 megohms, ¼ watt
R7	C21630	Resistor, 2 megohms, Vol. control & sw.
R8	C20060-474	Resistor, 470,000 ohms, ¼ watt
R9	A19177	Resistor, 47 ohms, 1 watt
R10	C20070-222	Resistor, 2,200 ohms, 1 watt
R11	C20060-150	Resistor, 15 ohms, ¼ watt
C1, C2	B17115	Condenser, variable
C3	C20067-503	Condenser, .05 mfd., 200 volt
C4	C20068-503	Condenser, .05 mfd., 400 volt
*C6	A21643	Condenser, .00005 mfd
**C6	C20065-500	Condenser, .00005 mfd., 500 volt
*C7	A21645	Condenser, .0001 mfd.
**C7	C20065-101	Condenser, .0001 mfd., 500 volt
*C8	C20068-202	Condenser, .002 mfd., 400 volt
**C8	C20069-202	Condenser, .002 mfd., 500 volt
*C9	C20203-103	Condenser, .01 mfd., 350 volt, ceramic
**C9	C20068-103	Condenser, .01 mfd., 400 volt
C10)		Condenser, 40 mfd., 150 volt
C11)	A19176	Condenser, 20 mfd., 150 volt
C12)		Condenser, 20 mfd., 25 volt
T1	AC18255-1	Coil, Antenna
T2	AC18256-1	Coil, Oscillator
T3	AC18257-1	Coil, I. F.
T4	AC18258-1	Output Transformer
	A18263	Dial Scale Emblem
	*D16511-2	Cabinet, Black
	**E18124-3	Cabinet, Ivory
	*A18592-2	Knob, Tuning, Ivory
	**A18261-3	Knob, Tuning, Ivory
	*A21632	Knob, Volume, Ivory
	**A18262-3	Knob, Volume, Ivory
*Spk.	C21626	Speaker
**Spk.	B17209	Speaker
C5	C20068-502	Condenser, .005 mfd., 400 volt
*CR-1	A21642	Capristor, 002 uf., condenser and 1 megohm Resistor
	**A17010	Handle
	A21635	Carton with Fillers
	**A21666	Carton with Fillers
	B20237-1	Line Cord and Plug Assembly

*Used on Model 442 only.
**Used on Model 444AH only.

NOBLITT-SPARKS INDUSTRIES, INC. MODELS 442, 444AH, CHASSIS RE-91, RE-200

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection	Across loudspeaker voice coil
Output meter reading to indicate 200 milliwatts (standard output)	0.8 volts
Dummy antenna to be in series with signal generator output	See chart below
Connection of generator ground lead	Floating ground
Generator modulation	30% 400 cycles
Position of Volume Control	Fully clockwise
Position of pointer with variable fully closed	54 on dial

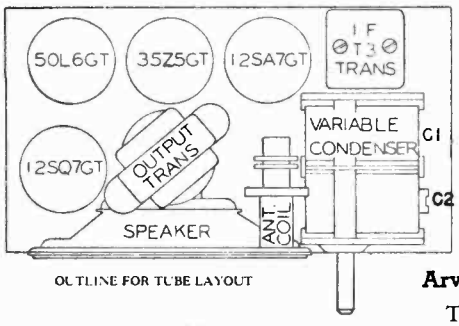
Position of Variable	Generator Frequency	Dummy Antenna	Generator Output Connection	Trimmers Adjuster	Trimmer Function	Approximate Sensitivity
Open	455 Kc	.05 uf	12SA7 Grid (Stator of C-1)	2 trimmers on top of T-3	IF	3000 uv
1400 Kc	1400 Kc	.00005 uf	Antenna lug with Ant. Removed	**C-2	Oscillator	360 uv

**Since the antenna section of the variable has no trimmer, the rotor of the variable should be rocked back and forth on both sides of 1400 Kc while adjusting the oscillator trimmer for maximum output. This is to obtain the combination of rotor and trimmer setting to give perfect tracking of the two sections of the variable condenser and consequently give maximum output.

Check sensitivity at 600 Kc. If weak, adjust antenna section plates for maximum output at 600 Kc. Tracking of the condenser at points other than 1400 Kc is accomplished by bending the outside plates on the variable condenser rotor, which are cut for this purpose. When bending plates to track the condenser at any given frequency, keep in mind the fact that this will affect the tracking at all frequencies below the point where the plates are bent. A tuning wand is very helpful in checking the tracking of this condenser, to indicate whether more or less capacity is needed.

The alignment procedure should be repeated stage by stage in the original order for greatest accuracy.

Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

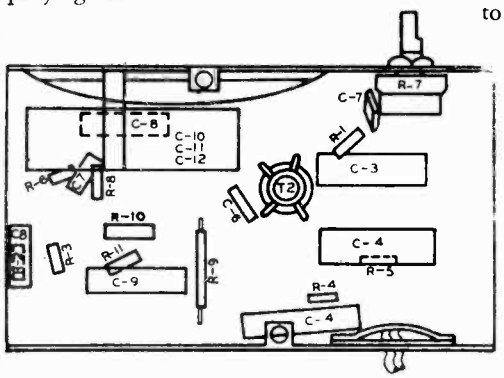


OUTLINE FOR TUBE LAYOUT

Noblitt-Sparks 444M, 444AM, Chassis RE-200M

The schematic for this model is the same as the 444,444A chassis RE-200 except for the substitution of miniature tubes for the regular metal and GT tubes. This set uses the 12BE6, 12AT6, 50B5, and 35W4 in place of the 12SA7 12SQ7, 50L6GT, and 35Z5GT.

The location of parts under chassis has been reoriented as shown in the accompanying sketch.



Location of reoriented parts under chassis for Noblitt-Sparks model 444M, 444AM, chassis RE-200.

Arvin 544 and 544R (Noblitt-Sparks)

The following changes have been made in the circuit to reduce low level hum and hum modulation.

1. The capacity of the electrolytic capacitor A19136 (C7) is changed from 40-20μμf, 150v, 20μμf, 25v, to 50-20μμf, 150C, 20μμf, 25c.
2. The rotor of the variable capacitor is now connected to AVC instead of to chassis. (This is the same circuit that was used in sets built previous to March 1946.)
3. C11 0.1μf, 400v, capacitor from AVC to chassis is deleted.
4. The bypass capacitor from B+ to chassis is changed from C9, 0.05μf, 400v, to C11, 0.1μf, 400v, to prevent oscillation.
5. A fiber washer part 20198 ¼ inch ID, ½ inch OD, ⅛ inch thick, is added under the pointer to prevent the pointer from touching the dial and shorting AVC to the chassis.
6. The floating ground wiring is changed; the jumper from the oscillator coil to the #3 lug on the 12SK7 socket is removed and replaced by a jumper from the ground side of the volume control to the a-c switch lug.
7. The top of the dial scale backing plate has been cut off even with the top of the dial, to allow the dial to set in a more vertical position. The part number remains the same, and the old and new plates are interchangeable.

The parts list for these models remains the same as that enumerated except for the changes noted.

Part No.	*Description*
A19136	Capacitor, electrolytic 50-30μμf, 150v. 20μμf, 25v.
A20198	Washer, fiber

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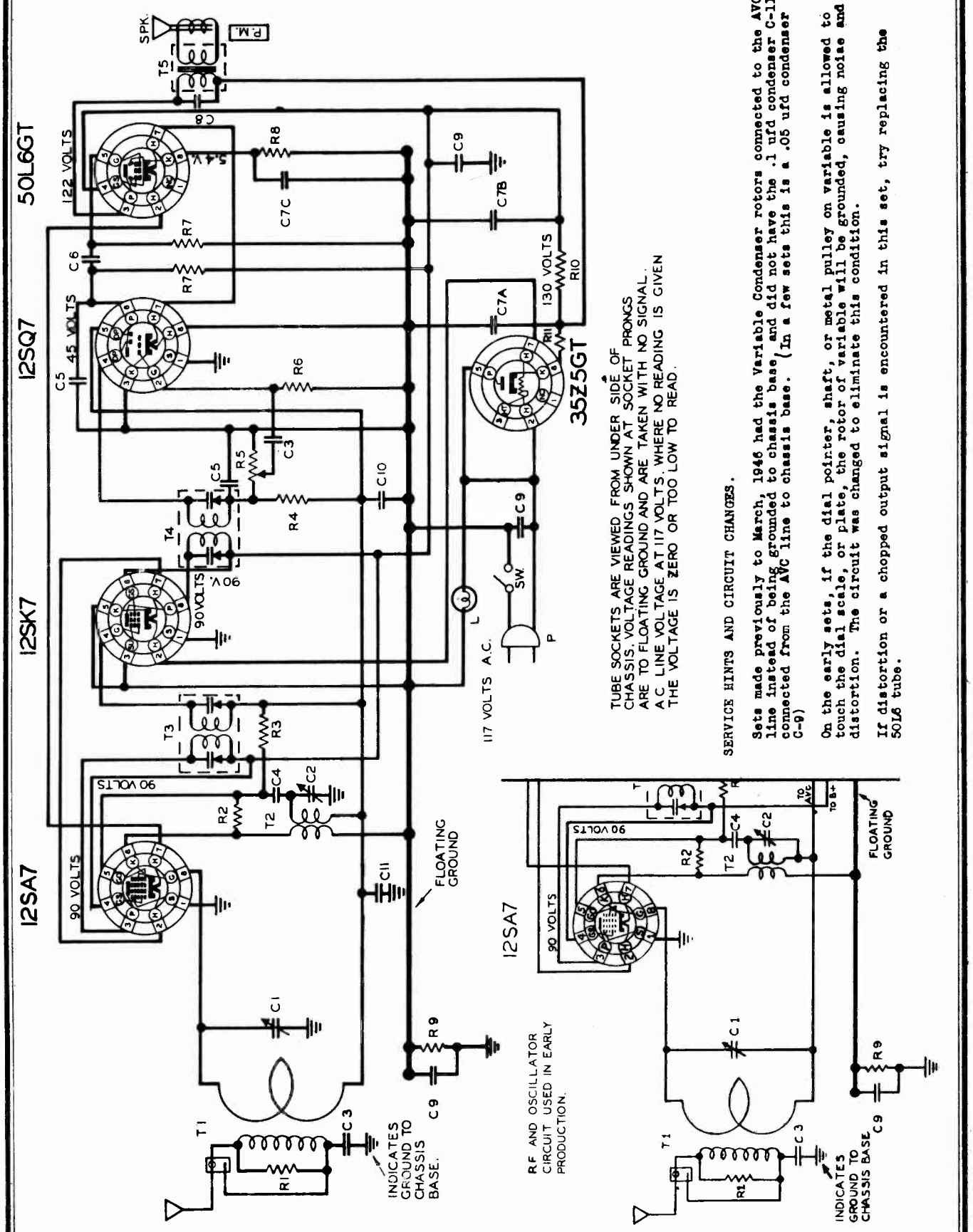
MODELS 544,544A,
Chassis RE-201



SERVICE HINTS AND CIRCUIT CHANGES.

Sets made previously to March, 1946 had the Variable Condenser rotors connected to the AVC line instead of being grounded to chassis base, and did not have the .1 ufd condenser C-11 connected from the AVC line to chassis base. (In a few sets this is a .05 ufd condenser C-9)

On the early sets, if the dial pointer, shaft, or metal pulley on variable is allowed to touch the dial scale, or plate, the rotor of variable will be grounded, causing noise and distortion. The circuit was changed to eliminate this condition.

If distortion or a chopped output signal is encountered in this set, try replacing the 50L6 tube.

MODELS 544, 544A,
Chassis RE-201

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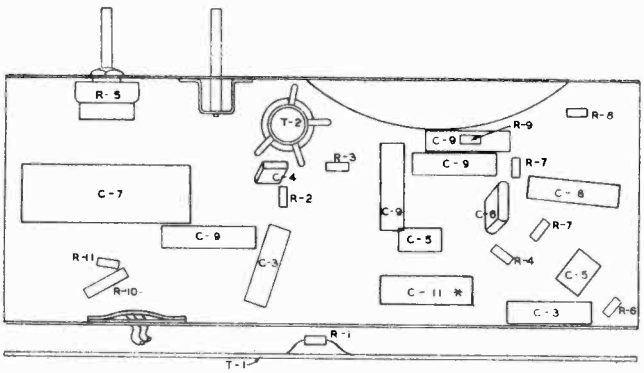
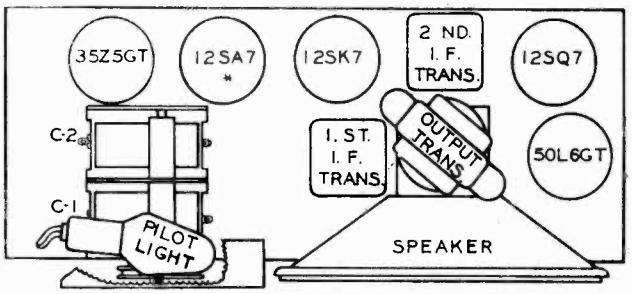


LOCATION OF PARTS UNDER CHASSIS



OUTLINE FOR TUBE LAYOUT

* ON SETS MADE PREVIOUS TO MAY 1946 THE 12SA7 TUBE WAS LOCATED BETWEEN THE VARIABLE CONDENSER AND 1ST I.F. TRANSFORMER

PRELIMINARY.

Output meter connection ..... Across loudspeaker voice coil
Output meter reading to indicate 200 milliwatts (standard output)..... .8 volts
Dummy antenna value to be used in series with generator output ..... See chart below
Connection of generator output lead ..... See chart below
Connection of generator ground lead ..... *Floating ground
Generator modulation ..... 30% 400 cycles
Position of Volume Control ..... Fully clockwise
Position of dial pointer with variable fully closed ..... Horizontal
Place the set loop in the same position with respect to the rear of the chassis, and the same distance from the chassis, as it would be with the set mounted in the cabinet.

Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers adjusted in Order Shown for Max. Output	Function of Trimmer
Open	455	.01 mfd.	12SA7 Grid (Stator of front section of variable condenser)	Top of 2nd & 1st IF Trans.	IF
1400	1400	.00005 mfd.	Antenna Clip (With blue wire removed)	C2; C1, trimmers on Rear & Front sections of Variable Condenser	Osc. Ant.
600	600	.00005 mfd.	Antenna Clip (With blue wire removed)	**Adj. antenna section plates of variable cond. for Max. output.	Antenna

If a standard test loop is used with the signal generator for alignment of the receiver, the blue wire will be left in the antenna clip, and the approximate sensitivities should be 300 uv/m and 250 uv/m or less at 600 Kc and 1400 Kc respectively.

Approximate stage by stage sensitivities for 200 Milliwatt output.

IF. - 455 Kc. -------- 3350 uv
Mixer 455 Kc. -------- 75 uv
Mixer 1000 Kc.-------- 60 uv
Antenna 1000 Kc -------- 50 uv
Antenna 1400 Kc -------- 25 uv
Antenna 600 Kc -------- 50 uv

The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the AVC action of the receiver ineffective.

*A floating ground connection can be obtained on either of the lugs on the back of the AC switch or the black lead on the Volume Control.

**AS THE CONDENSERS ARE ALL TRACKED BEFORE LEAVING THE FACTORY IT IS NOT PROBABLE THAT THE PLATES WILL NEED TO BE ADJUSTED UNLESS WIDE VARIATIONS IN TUBES ARE ENCOUNTERED.

The outside plates on the antenna section of the variable condenser are cut, so they can be bent in or out to give more or less capacity at any given position of the rotor, after the trimmers on the variable have been adjusted at 1400 Kc. A disc type tuning wand affords a quick method of determining whether more or less capacity is needed in the antenna circuit. If the output increases when the Iron end of the wand is placed near the loop, the plates should be bent in to give more capacity. If the output increases when the brass or aluminum end of the wand is placed near the loop the plates should be spread out. If the wand indicates

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that the plates should go closer, but cannot go closer without shorting, the oscillator section plates can be spread, but the calibration should be checked after adjusting the oscillator section. Also the band coverage should be checked to see that 540 Kc can be received.

If the receiver is weak at 1000 Kc the same procedure can be followed at 1000 Kc as outlined above for 600 Kc but this will change the tracking at 600 Kc and may affect 1400 Kc so that all points should be rechecked in the original order.

The condenser should be checked for any possible shorting of the plates after the alignment is completed.

FREQUENCY RANGE

Broadcast	540-1600 kc
IF	455 kc

TUBES & FUNCTIONS

12SA7	Mixer-oscillator
12SK7	IF Amp.
12SQ7GT	DET-AVC-AF
50L6GT	Output
35Z5GT	Rectifier

LOUD SPEAKER

Type:	Permanent magnet
Size:	5 inch
Voice coil impedance	3.2 ohms

POWER SUPPLY

105-125 Volts AC-DC, 35 Watts

POWER OUTPUT

Undistorted	.8 Watts
Maximum	2.5 Watts
Plate load	2000 ohms

Due to variations in tubes some sets which are equipped with 12SK7GT tubes may have a tendency to oscillate. This condition can usually be corrected by placing a shield on the 12SK7GT tube or replacing it with a 12SK7 metal tube. In some cases the IF transformers may need to be repeaked after changing this tube.

Several cases of weak sets have been caused by a defective 12SA7GT tube which will check good on the average tube tester. Alignment should be checked after changing this tube.

Arvin 544R, 544AR

These models are the same as models 544 and 544A except for the changes following.

The variable capacitor has been changed. The antenna section of this variable capacitor now has a capacitance of 420-$\mu\mu$f. The loop inductance has been made less to match this larger capacity.

The parts list for the Arvin 544R and 544AR is the same as that enumerated except for the following changes:

Part No.	*Description*
A18640-2	Dial scale
A19473	Dial pointer
AC19867-1	Antenna loop assembly
AC19866	Var. capacitor and pulley assy

REF. NO.	PART NO.	DESCRIPTION
	E17232-1	Cabinet, Walnut
	E17232-2	Cabinet, Ivory
	A17304	Dial Crystal
	A19474-1	Knobs
	A19125	Grille Cloth
	A17296	Tuning Shaft
	A18640-1	Dial Scale
	A19132	Dial Drive Cord
	A19133	Spring
	A19205-3	Cap. Mtg. Clip
	A19253-1	Socket
	A18254-1	Socket
	A19134-1	Dial Light Socket
	A19135	Dial Light Bulb
	A16482	Tube Shield
	B20064-1	Line Cord & Plug Assy.
C1	B18669	Variable Condenser
C2		
C3	C20068-103	Cond., .01 mfd - 400 V P.T.
C4	C20065-500	Cond., .00005 mfd - 500 V Mica
C5	C20065-501	Cond., .0005 mfd - 500 V Mica
C6	C20069-202	Cond., .002 mfd - 600 V P.T.
C7	A19136	Cond., Electrolytic
C8	C20068-303	Cond., .03 mfd - 400 V P.T.

REF. NO.	PART NO.	DESCRIPTION
C9	C20068-503	Cond., .05 mfd - 400 V P.T.
C10	C20067-503	Cond., .05 mfd - 200 V P.T.
C11	C20068-104	Cond., .1 mfd - 400 V P.T.
R1	C20060-103	Resistor, 10,000 ohms ½ W
R2	C20060-223	Resistor, 22,000 ohm ½ W
R3	C20060-156	Resistor, 15 meg. ½ W
R4	C20060-225	Resistor, 2.2 meg. ½ W
R5	B17291	Volume Cont. & Sw., 1 meg.
R6	C20060-475	Resistor, 4.7 meg. ½ W
R7	C20060-474	Resistor, 470,000 ohm ½ W
R8	C20060-151	Resistor, 150 ohm ½ W
R9	C20060-334	Resistor, 330,000 ohm ½ W
R10	C20070-152	Resistor, 1,500 ohm 1 W
R11	C20060-150	Resistor, 15 ohm ½ W
T1	AC18645-1	Antenna Loop Assy.
T2	AC18646-1	Oscillator Coil
T3	AC18908-1	1st. I.F. Coil
T4	AC18909-1	2d. I.F. Coil
T5	AC18647-1	Output Transformer
Spk.	C19114	Speaker
	A19473	Dial Pointer
	A19141	Term. Strip
	A19547	Two Conductor Shielded Leads
	AC19193-1	Sp. & Trans. Assy.

MODEL 6640
Chassis RE-206-2

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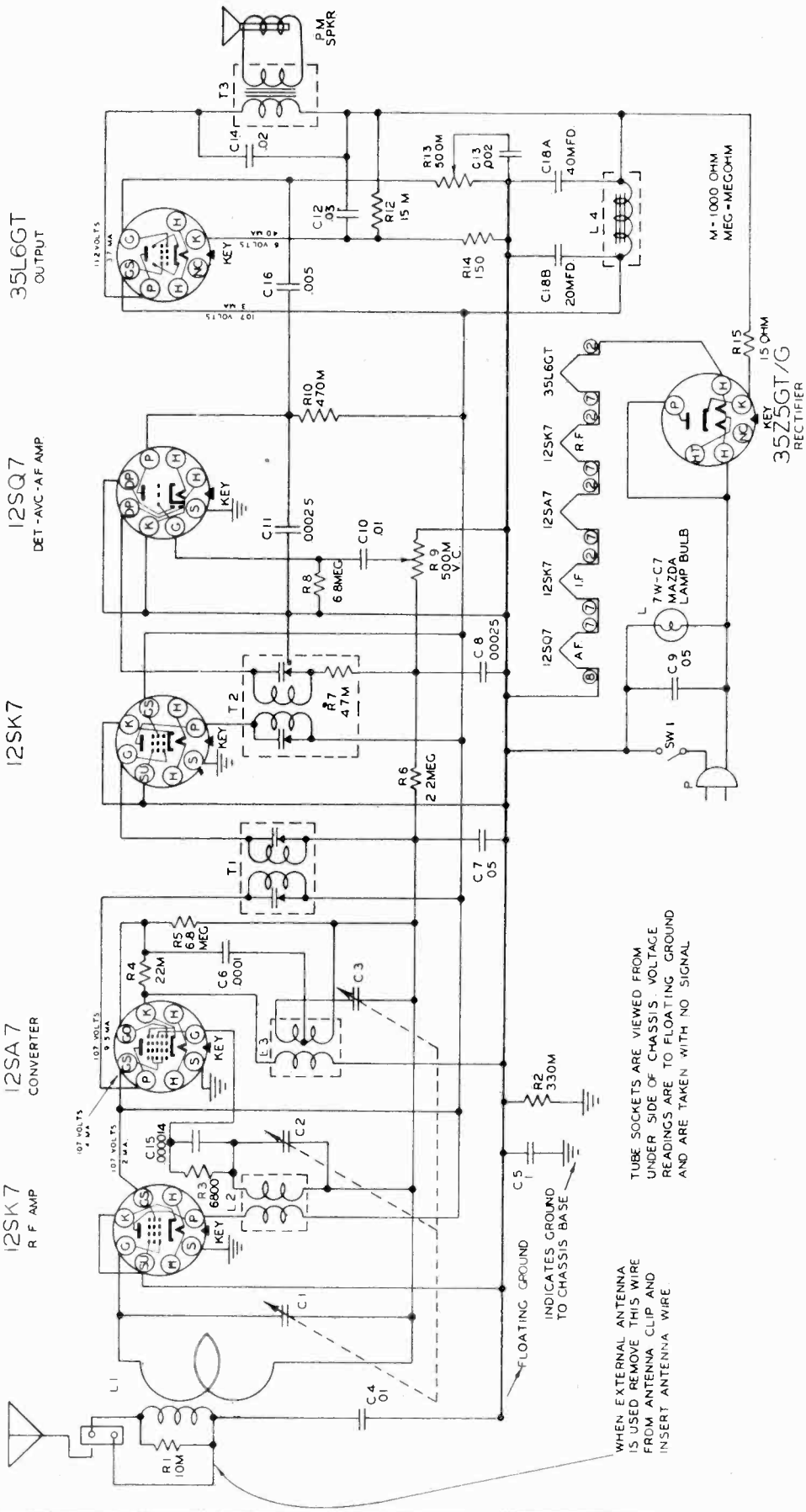


NOTE:
The chassis RE-206-2 is identical with chassis RE-206-1 used in the Model 664, with exception of the loop assembly.

ALIGNMENT PROCEDURE

PRELIMINARY.

Output meter connection	Across loudspeaker voice coil
Output meter reading to indicate 200 milliwatts (standard output)	.8 volts
Dummy antenna value to be used in series with generator output	See chart below
Connection of generator output lead	See chart below
Connection of generator ground lead	Floating ground
Generator modulation	30% 400 cycles
Position of Volume Control	Fully clockwise
Position of dial pointer with variable fully losed	Vertical

Place the set loop in the same position with respect to the rear of the chassis, and the same distance from the chassis, as it would be with the set mounted in the cabinet. This distance is 1-11/32" from the back of the chassis to the front of the loop. If the position of the loop is not correct while adjustments are made on the antenna circuit, the antenna circuit will not track and the set will be weak, when placed in the cabinet.

Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers adjusted in Order Shown for Max. Output	Function of Trimmer
Open	455	.01 mfd.	12SA7 Grid or (Stator of center section of variable condenser)	Top of 2nd & 1st IF Trans.	IF
1400	1400	.00005 mfd.	Antenna Clip (With black wire removed)	*C3, C2, C1, trimmers on Variable Condenser	Osc. RF Ant.
600	600	.00005 mfd.	Antenna Clip (With black wire removed)	**Adj. plates of variable cond. for Max. output.	Osc. RF Ant.

If a standard test loop is used with the signal generator for alignment of the receiver, the black wire will be left in the antenna clip, and the approximate sensitivities should be 250 uv/m and 150 uv/m or less at 600 Kc and 1400 Kc respectively. Sets using glass 12SA7 tube may have slightly weaker sensitivities.

Approximate stage by stage sensitivities for 200 Milliwatt output.

IF. - 455 Kc.	10,000 uv	Antenna 1000 Kc	15 uv
Mixer 455 Kc.	150 uv	Antenna 1400 Kc	15 uv
Mixer 1000 Kc.	170 uv	Antenna 600 Kc	25 uv

The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the AVC action of the receiver ineffective.
*Trimmer C3 (oscillator) is located either on the top or bottom of the variable condenser, depending on the type variable used on any particular set.

CAUTION:
**AS THE CONDENSERS ARE ALL TRACKED BEFORE LEAVING THE FACTORY IT IS NOT PROBABLE THAT THE PLATES WILL NEED TO BE ADJUSTED UNLESS WIDE VARIATIONS IN TUBES ARE ENCOUNTERED OR THE CONDENSER HAS BEEN DAMAGED. PLATE BENDING SHOULD NOT BE ATTEMPTED WITHOUT THE PROPER EQUIPMENT, OR BY ANYONE NOT EXPERENCED AT TRACKING CONDENSERS.

The outside plates on the antenna & RF sections of the variable condenser are cut, so they can be bent in or out to give more or less capacity at any given position of the rotor, after the trimmers on the variable have been adjusted at 1400 Kc. A disc type tuning wand affords a quick method of determining whether more or less capacity is needed in antenna circuit. If the output increases when the Iron end of the wand is placed near the loop, the plates should be bent in to give more capacity. If the output increases when the brass or aluminum end of the wand is placed near the loop the plates should be spread out. If the wand indicates that the plates should go closer, but cannot go closer without shorting, the oscillator section plates can be spread, or vice versa, but the calibration should be checked after adjusting the oscillator section. Also the band coverage should be checked to see that 540 Kc can be received.

Since the osc. section has much less capacity than the RF & antenna sections, plate bending will be much more effective in the osc. circuit, and a small change in or out in the plates of this section will have the same effect as a large change in the opposite direction in the other sections.

If the receiver is weak at 1000 Kc the same procedure can be followed at 1000 Kc as outlined above for 600 Kc but this will change the tracking at 600 Kc and may affect 1400 Kc so that all points should be rechecked in the original order.

The condenser should be checked for any possible shorting of the plates after the alignment is completed.

MODEL 6640 NOBLITT-SPARKS INDUSTRIES, INC.

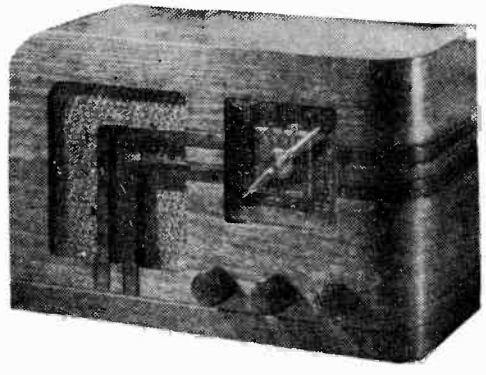
FREQUENCY RANGE
Broadcast ..... 540-1600 kc
IF ..... 455 kc

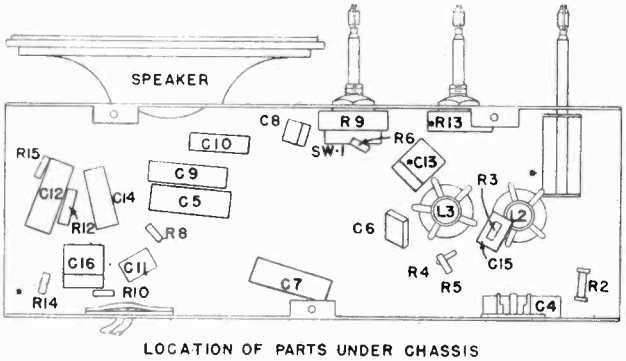
TUBES & FUNCTIONS
12SK7 ..... RF Amp.
12SA7 ..... Mixer-oscillator
12SK7 ..... IF Amp.
12SQ7 ..... DET-AVC AF Amp.
35L6 ..... Output
35Z5GT ..... Rectifier

POWER SUPPLY
105-125 Volts AC-DC, 45 Watts

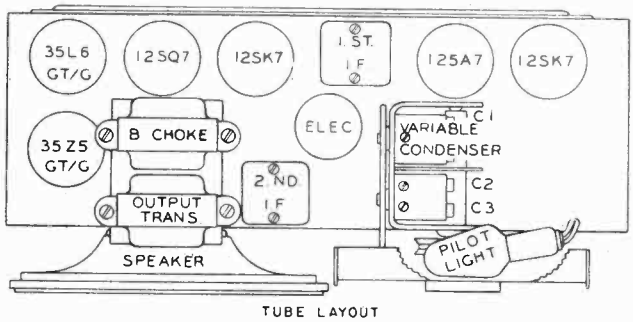
POWER OUTPUT
Undistorted ..... .8 Watts
Maximum ..... 2.5 Watts
Plate load ..... 2000 Ohms

LOUD SPEAKER
Type: Permanent magnet
Size: 5¼ inch
Voice coil impedance ..... 3.2 ohms





LOCATION OF PARTS UNDER CHASSIS



TUBE LAYOUT

PARTS LIST

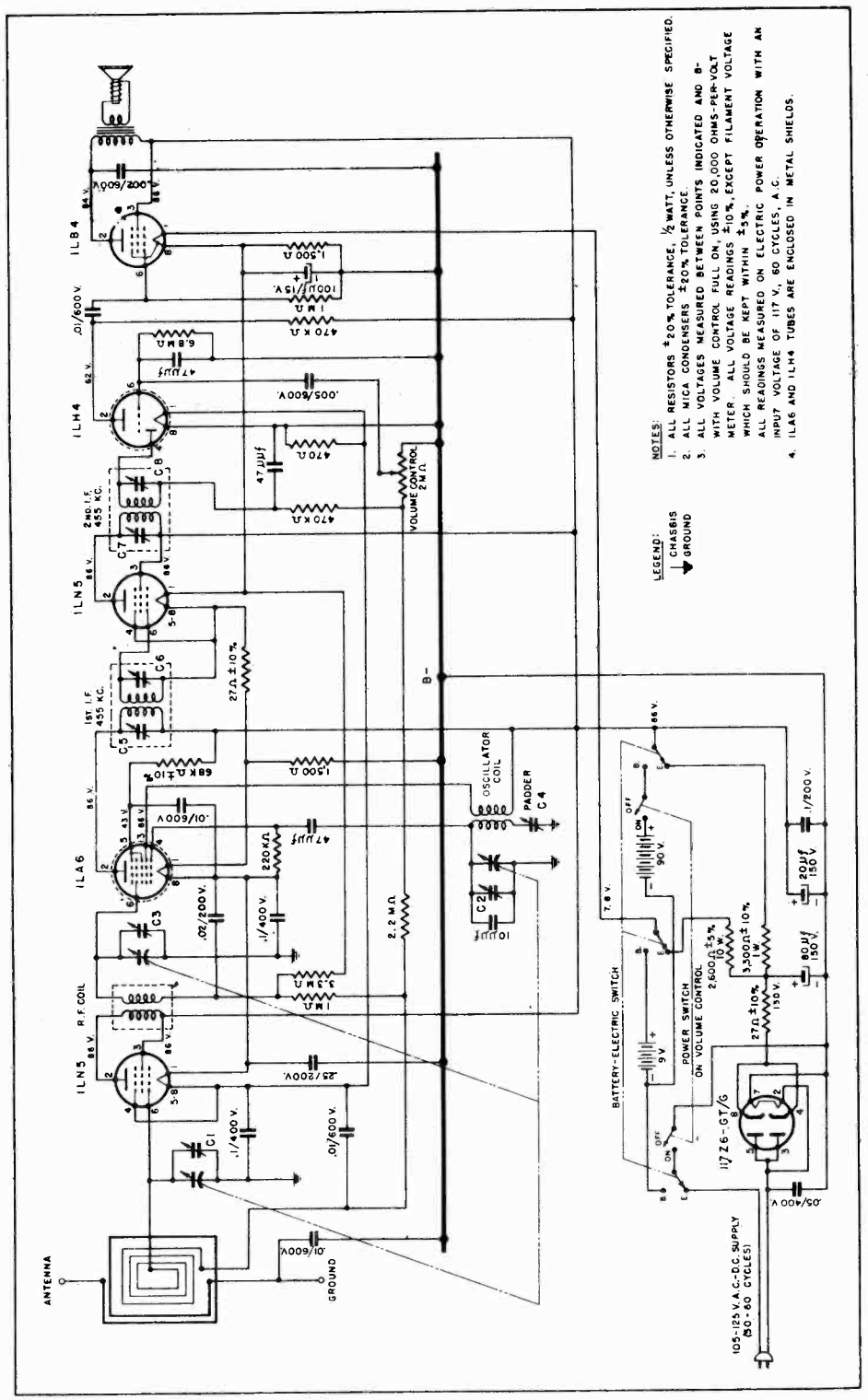
REF. NO.	PART NO.	DESCRIPTION
R1	C20060-103	Resistor, 10,000 ohm ¼W
R2	C20060-334	Resistor, 330,000 ohm ¼W
R3	C20060-332	Resistor, 6800 ohm ¼ W
R4	C20060-223	Resistor, 22,000 ohm ¼ W
R5, R8	C20060-685	Resistor, 6.8 megohm ¼ W
R6	C20060-225	Resistor, 2.2 megohm ¼ W
R7	C20060-473	Resistor, 47,000 ohm ¼ W
R9	C19244	Vol. Cont. & Sw. 500,000 ohms
R10	C20060-474	Resistor, 470,000 ohm ¼ W
R12	C20070-153	Resistor, 15,000 ohms 1 W
R13	C19965	Tone Control, 500,000 ohm
R14	C20060-151	Resistor, 150 ohm ¼ W
R15	C20060-150	Resistor, 15 ohm ¼ W
C1	B18564	**Variable Condenser, 3 gang
C2	or	
C3	C19853	
C4, C10	C20068-103	Cond., .01 uf. 400 VPT
C5	C20068-104	Cond., .1 uf. 400 VPT
C6	C20065-101	Cond., .0001 uf. 500 V Mica
C7, C9	C20068-503	Cond., .05 uf. 400 VPT
C8, C11	C20065-251	Cond., .00025 uf. 500 V Mica
C12	C20068-303	Cond., .03 uf. 400 VPT
C13	C20069-202	Cond., .002 uf. 600 V
C14	C20068-203	Cond., .02 uf. 400 VPT.
C15	A19182	Cond., 14 mmf. 600V Mica
C16	C20069-502	Cond., .005 uf. 600 VPT.
C18A	A19239	Cond., Electrolytic 40-20 uf 150V
C18B	A19674	Terminal Strip

REF. NO.	PART NO.	DESCRIPTION
	A19138-1	Spacer Eyelet for Mtg. Var. Cond.
	E21410	Cabinet, Wood, Walnut
	A18272	Dial Crystal
	A19783-1	Knobs, Walnut
L1	AD21423-1	Antenna Loop & Rear Cover Assy.
L2	AC19860-1	R. F. Coil
L3	AC18580-1	Oscillator Coil
L4	AC18583-1	Iron Core Choke
T1	AC21009-1	1st I. F. Coil
T2	AC18578-1	2nd I. F. Coil
T3	AC18582-1	Output Transformer
Spk.	AC19872-1	Speaker Assy. (Spk with Trans. Mtg. Brkt.)
Spk.	C18550	Speaker only
	A19293	Tuning Shaft
	C18432-D	Dial Scale
	A21173	Dial Pointer
	A19132	Dial Drive Cord
	A18254-1	Socket, Tube, Wafer Type
	A16668	Elect. Mtg. Wafer
	A19234	Antenna Socket
	A19134-2	Dial Light Socket
	A19135	Dial Light Bulb, Mazda C7 Night Light, 7W
	B20064-8	Line Cord and Plug Assy.
	A20077-3	Rubber Grommet for Mtg. Var. Cond. B18564 & 19853
	A19328-2	Rubber Grommet for Mtg. Var. Cond. C19583 Only
	A21422	Carton with Fillers

** When ordering a replacement Variable Condenser, be sure to use the part number which is stamped on the back of the original Condenser.

OLYMPIC RADIO & TELEV. INC.

MODEL 6-606-U



ALIGNMENT PROCEDURE CHART

STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO -	SET SIGNAL GENERATOR TO -	SET POINTER TO -	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.)
1	R.F. SECTION OF VARIABLE CONDENSER IN SERIES WITH .1 MFD. COND.	455 KC.	EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN)	C8, C7, C6, C5 AND REPEAT IN SAME ORDER (1ST. AND 2ND. I.F. TRANSFORMERS)
2	ANTENNA TERMINAL	1500 KC.	1500 KC. (150 ON DIAL)	C2, C3, C1 (OSCILLATOR, R.F. AND ANTENNA TRIMMERS)
3	OF ANTENNA LOOP IN SERIES WITH	600 KC	600 KC. (APPROX. 60 ON DIAL)	C4 (PADDER) ROCK DIAL FOR MAXIMUM SIGNAL
4	50 MMFD. COND.	REPEAT STEPS 2 AND 3		

REPLACEMENT PARTS

Part No.	Description
BK-405	Bracket-Resistor mounting bracket
CA-229	Cabinet-portable cabinet
CB-335	Cable-battery cable
CL-176	Coil-R.F. coil, shielded
CL-177	Coil-oscillator coil
CO-182	Condenser-80/20/150W.V. & 100/15W.V. electrolytic condenser
CR-299	Crystal-dial crystal
CT-388	Condenser-220-680 mmfd padder condenser
CV-146	Condenser-3 gang variable condenser (with pulley)
DL-391	Dial-metal dial scale
ES-274-1	Escutcheon-moulded escutcheon
KN-260	Knob-walnut knob
KN-261	Knob-walnut knob with dot
LC-223	Line Cord
LP-178	Loop-Antenna
PO-395	Pointer-dial pointer
PT-383	Control-volume control 2 megohms with D.P.S.T. switch
RCM20A100M	Condenser-10 mmfd ±20% mica condenser
RCM20A470M	Condenser-47 mmfd ±20% mica condenser
RCP10W2104A	Condenser-.1/200W.V. paper tubular condenser
RCP10W2203A	Condenser-.02/200W.V. paper tubular condenser
RCP10W2254A	Condenser-.25/200W.V. paper tubular condenser
RCP10W4104L	Condenser-.1/400W.V. paper tubular condenser
RCP10W4503A	Condenser-.05/400W.V. paper tubular condenser
RCP10W6103A	Condenser-.01/600W.V. paper tubular condenser
RCP10W6202M	Condenser-.002/600W.V. paper tubular condenser
RCP10W6502A	Condenser-.005/600W.V. paper tubular condenser
RE-407	Resistor-2600 ohms ±5% 10 watt resistor
REB105M	Resistor-1 megohm ±20% 1/2 watt resistor
REB152M	Resistor-1500 ohms ±20% 1/2 watt resistor
REB224M	Resistor-220,000 ohms ±20% 1/2 watt resistor
REB225M	Resistor-2.2 megohms ±20% 1/2 watt resistor
REB270K	Resistor-27 ohms ±10% 1/2 watt resistor
REB335M	Resistor-3.3 megohms ±20% 1/2 watt resistor
REB471M	Resistor-470 ohms ±20% 1/2 watt resistor
REB474M	Resistor-470,000 ohms ±20% 1/2 watt resistor
REB683K	Resistor-68,000 ohms ±10% 1/2 watt resistor
REB685M	Resistor-6.8 megohms ±20% 1/2 watt resistor
REC332K	Resistor-3300 ohms ±10% 1 watt resistor
SD-607	Shield-Tube Shield
SK-156	Speaker-5" P.M. Speaker with output transformer
SP-191	Spring-Drive shaft retaining spring
SW-193	Switch-battery-electric T.P.D.T. slide switch
TR-186	Transformer-I.F. 455 K.C. Transformer

OLYMPIC RADIO & TELEV. INC.

MODEL 6-606-U
MODEL 6A-606-U

Frequency Range 530 - 1700 kc.

Power Requirement 105 - 125 volts a-c, 50 to 60 cycles, or 105 - 125 volts d-c, or 9 volts "A" and 90 volts "B' battery supply.

Power Consumption on electric operation — 20 watts

Model 6-606 is a portable six tube superheterodyne receiver designed for operation on a-c and d-c, as well as on self contained batteries. It will operate on 105-125 volts a-c, 50 to 60 cycles; 105-125 volts d-c or on 9 volts "A" and 90 volts "B" batteries.

BATTERIES

The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

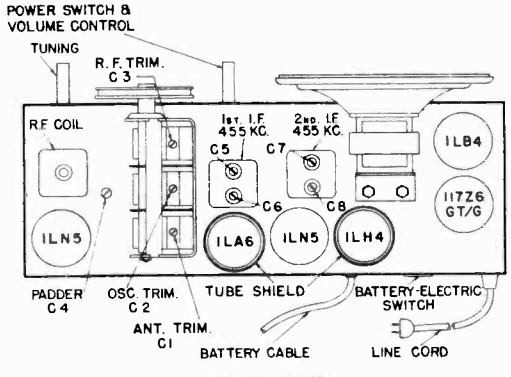
ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

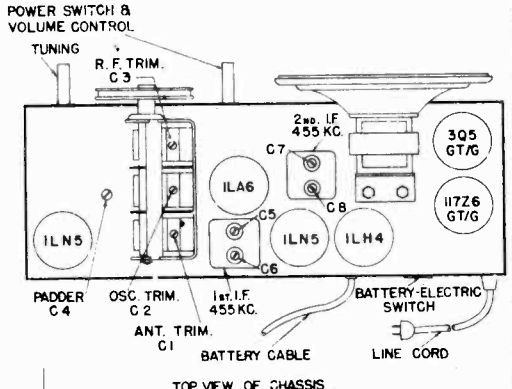
Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.



TOP VIEW OF CHASSIS

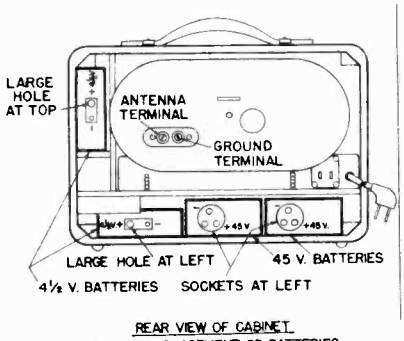
NOTE:
1LA6 AND 1LH4 TUBES ARE ENCLOSED IN METAL SHIELDS.

MODEL 6-606-U



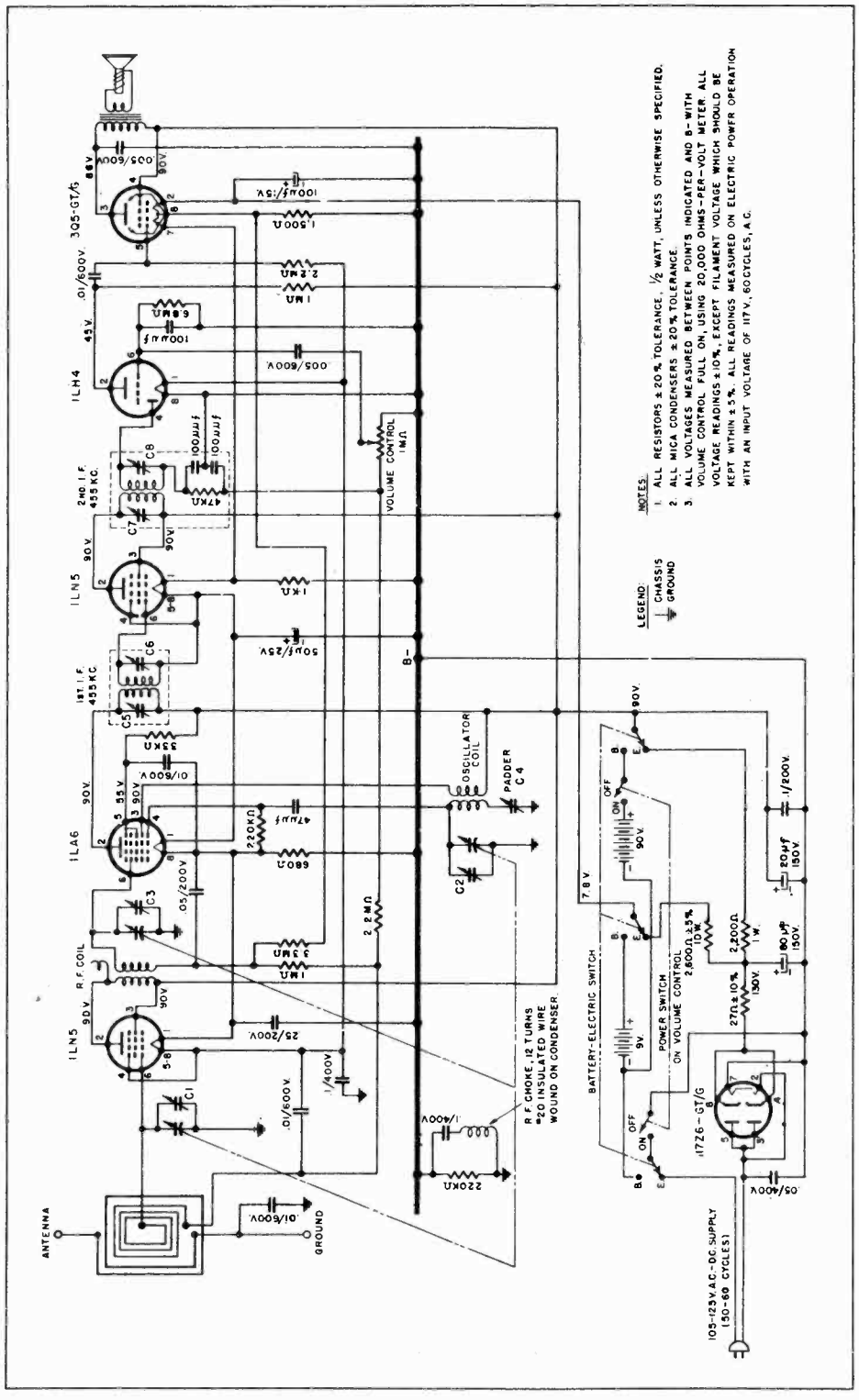
TOP VIEW OF CHASSIS

MODEL 6A-606-U



REAR VIEW OF CABINET SHOWING PLACEMENT OF BATTERIES

MODEL 6A-606-U OLYMPIC RADIO & TELEV. INC.



ALIGNMENT PROCEDURE CHART

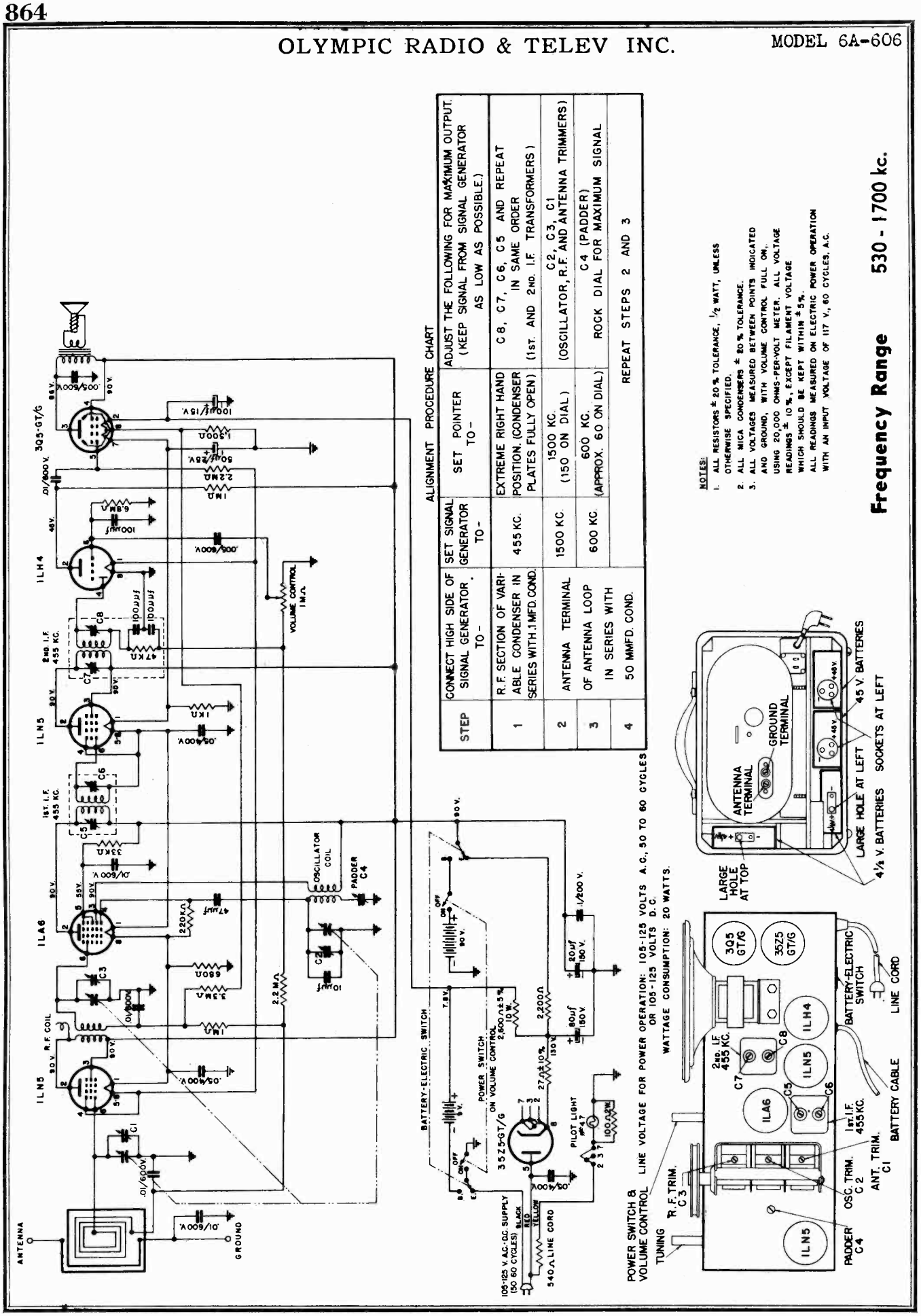
STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO -	SET SIGNAL GENERATOR TO -	SET POINTER TO -	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.)
1	R.F. SECTION OF VARIABLE CONDENSER IN SERIES WITH 1 MFD. COND.	455 KC.	EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN)	C8, C7, C6, C5 AND REPEAT IN SAME ORDER (1ST. AND 2ND. I.F. TRANSFORMERS)
2	ANTENNA TERMINAL	1500 KC.	1500 KC. (150 ON DIAL)	C2, C3, C1 (OSCILLATOR, R.F. AND ANTENNA TRIMMERS)
3	OF ANTENNA LOOP IN SERIES WITH	600 KC.	600 KC. (APPROX. 60 ON DIAL)	C4 (PADDER) ROCK DIAL FOR MAXIMUM SIGNAL
4	50 MMFD. COND.	REPEAT STEPS 2 AND 3		

REPLACEMENT PARTS

Part No.	Description
BK-405	Bracket-Resistor mounting bracket
CA-229	Cabinet-portable cabinet
CB-335	Cable-battery cable
CL-177	Coil-oscillator coil
CL-630	Coil-R.F. coil
CO-182	Condenser-80/20/150WV & 100/15WV electrolytic condenser
CO 808	Condenser-50 mfd /25 W.V. electrolytic condenser
CR-299	Crystal-dial crystal
CT-388	Condenser-220-680 mmfd padder condenser
CV-146	Condenser-3 gang variable condenser (with pulley)
DL-391	Dial-metal dial scale
ES-274-1	Escutcheon-moulded escutcheon
KN-260	Knob-walnut knob
KN-261	Knob-walnut knob with dot
LP-178	Loop-Antenna
PO-395	Pointer-dial pointer
PT-576	Control-volume control 1 megohm with D.P.S.T. switch
RCM20A101M	Condenser-100 mmf ±20% mica condenser
RCM20A470M	Condenser-47 mmfd ±20% mica condenser
RCP10W2254A	Condenser-.25/200W.V. paper tubular condenser
RCP10W4104L	Condenser-.1/400W.V. paper tubular condenser
RCP10W4503A	Condenser-.05/400WV paper tubular condenser
RCP10W6103A	Condenser-.01/600WV paper tubular condenser
RCP10W6502A	Condenser-.005/600WV paper tubular condenser
RE-407	Resistor-2600 ohms ±5% 10 watt resistor
REB102M	Resistor-1000 ohms ±20% 1/2 watt resistor
REB105M	Resistor-1 megohm ±20% 1/2 watt resistor
REB152M	Resistor-1500 ohms ±20% 1/2 watt resistor
REB224M	Resistor-220,000 ohms ±20% 1/2 watt resistor
REB225M	Resistor-2.2 megohms ±20% 1/2 watt resistor
REB270K	Resistor-27 ohms ±10% 1/2 watt resistor
REB333M	Resistor-33,000 ohms ±20% 1/2 watt resistor
REB335M	Resistor-3.3 megohms ±20% 1/2 watt resistor
REB681M	Resistor-680 Ohms ±20% 1/2 watt resistor
REB685M	Resistor-6.8 megohms ±20% 1/2 watt resistor
REC 222M	Resistor-2200 ohms ±20% 1 watt resistor
SK-476	Speaker-5" P.M. Speaker with output transformer
SP-191	Spring-Drive shaft retaining spring
SW-193	Switch-battery-electric T.P.D.T. slide switch
TR-707	Transformer-I.F. 455 K.C. input-Transformer
TR-708	Transformer-Output I.F. 455 K.C. Transformer with built-in I.F. filter

OLYMPIC RADIO & TELEV INC.

MODEL 6A-606



MODEL 6A-606

OLYMPIC RADIO & TELEV. INC.

WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

BATTERIES

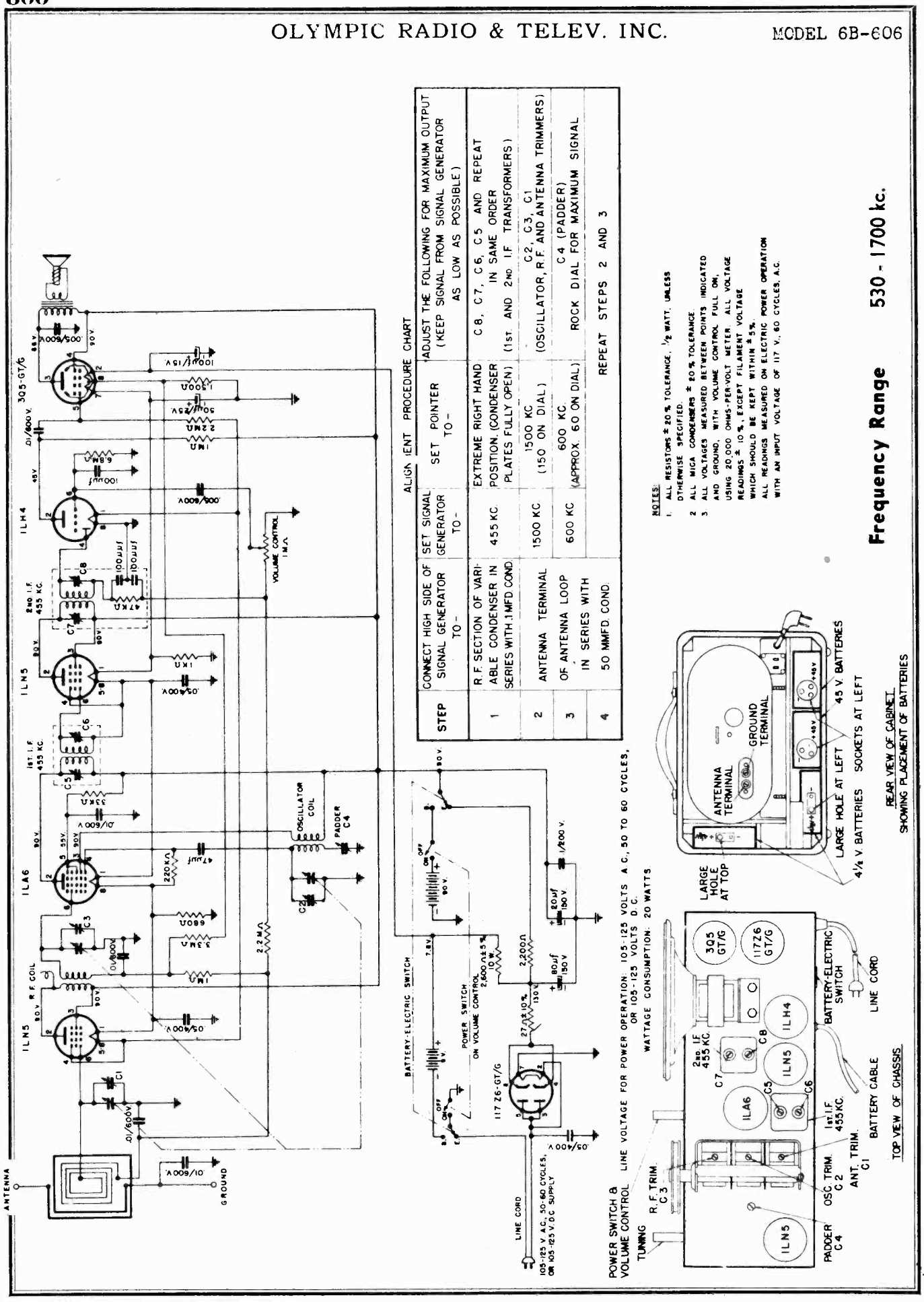
The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

REPLACEMENT PARTS

Part No.	Description
BK-405	Bracket-Resistor mounting bracket
BU-187	Bulb-pilot light bulb 6.3v (#47 Mazda)
CA-229	Cabinet-portable cabinet
CB-335	Cable-battery cable
CL-177	Coil-oscillator coil
CL-630	Coil-R.F. coil
CO-182	Condenser-80/20/150WV & 100/15WV electrolytic condenser
CO 808	Condenser-50 mfd /25 W.V. electrolytic condenser
CR-299	Crystal-dial crystal
CT-388	Condenser-220-680 mmfd padder condenser
CV-146	Condenser-3 gang variable condenser (with pulley)
DL-391	Dial-metal dial scale
ES-274-1	Escutcheon-moulded escutcheon
KN-260	Knob-walnut knob
KN-261	Knob-walnut knob with dot
LC-315	Line Cord-540 ohms resistance line cord
LP-178	Loop-Antenna
PO-395	Pointer-dial pointer
PT-576	Control-volume control 1 megohm with D.P.S.T. switch
RCM20A100M	Condenser-10 mmfd ±20% mica condenser
RCM20A101M	Condenser-100 mmf ±20% mica condenser
RCM20A470M	Condenser-47 mmfd ±20% mica condenser
RCP10W2104A	Condenser-.1/200WV paper tubular condenser
RCP10W4503A	Condenser-.05/400WV paper tubular condenser
RCP10W6103A	Condenser-.01/600WV paper tubular condenser
RCP10W6502A	Condenser-.005/600WV paper tubular condenser
RE-407	Resistor-2600 ohms ±5% 10 watt resistor
REB102M	Resistor-1000 ohms ±20% ½ watt resistor
REB105M	Resistor-1 megohm ±20% ½ watt resistor
REB152M	Resistor-1500 ohms ±20% ½ watt resistor
REB 222M	Resistor-2200 ohms ±20% ½ watt resistor
REB224M	Resistor-220,000 ohms ±20% ½ watt resistor
REB225M	Resistor-2.2 megohms ±20% ½ watt resistor
REB270K	Resistor-27 ohms ±10% ½ watt resistor
REB333M	Resistor-33,000 ohms ±20% ½ watt resistor
REB335M	Resistor-3.3 megohms ±20% ½ watt resistor
REB 681M	Resistor-680 Ohms ±20% ½ watt resistor
REB685M	Resistor-6.8 megohms ±20% ½ watt resistor
RED101M	Resistor-100 ohms ±20% 2 watt resistor
SK-476	Speaker-5" P.M. Speaker with output transformer
SO-572	Socket-pilot light socket assembly
SP-191	Spring-Drive shaft retaining spring
SW-185	Switch-battery-electric D.P.D.T. slide switch
TR-707	Transformer-I.F. 455 K.C. input-Transformer
TR-708	Transformer-Output I.F. 455 K.C. Transformer with built-in I.F. filter

OLYMPIC RADIO & TELEV. INC.

MODEL 6B-606



ALIGNMENT PROCEDURE CHART

STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO-	SET SIGNAL GENERATOR TO-	SET POINTER TO-	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE)
1	R.F. SECTION OF VARIABLE CONDENSER IN SERIES WITH .1 MFD COND.	455 KC	EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN)	C8, C7, C6, C5 AND REPEAT IN SAME ORDER (1ST AND 2ND I.F TRANSFORMERS)
2	ANTENNA TERMINAL	1500 KC	1500 KC (150° ON DIAL)	C2, C3, C1 (OSCILLATOR, R.F. AND ANTENNA TRIMMERS)
3	OF ANTENNA LOOP IN SERIES WITH	600 KC	600 KC. (APPROX. 60° ON DIAL)	C4 (PADDER) ROCK DIAL FOR MAXIMUM SIGNAL
4	50 MMFD. COND.	REPEAT STEPS 2 AND 3		

NOTES:
1. ALL RESISTORS ± 20% TOLERANCE, ½ WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MFD CONDENSERS ± 20% TOLERANCE.
3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON, USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS ± 10%, EXCEPT FILAMENT VOLTAGE WHICH SHOULD BE KEPT WITHIN ± 5%. ALL READINGS MEASURED ON ELECTRIC POWER OPERATION WITH AN INPUT VOLTAGE OF 117 V., 60 CYCLES, A.C.

Frequency Range 530 - 1700 kc.

WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

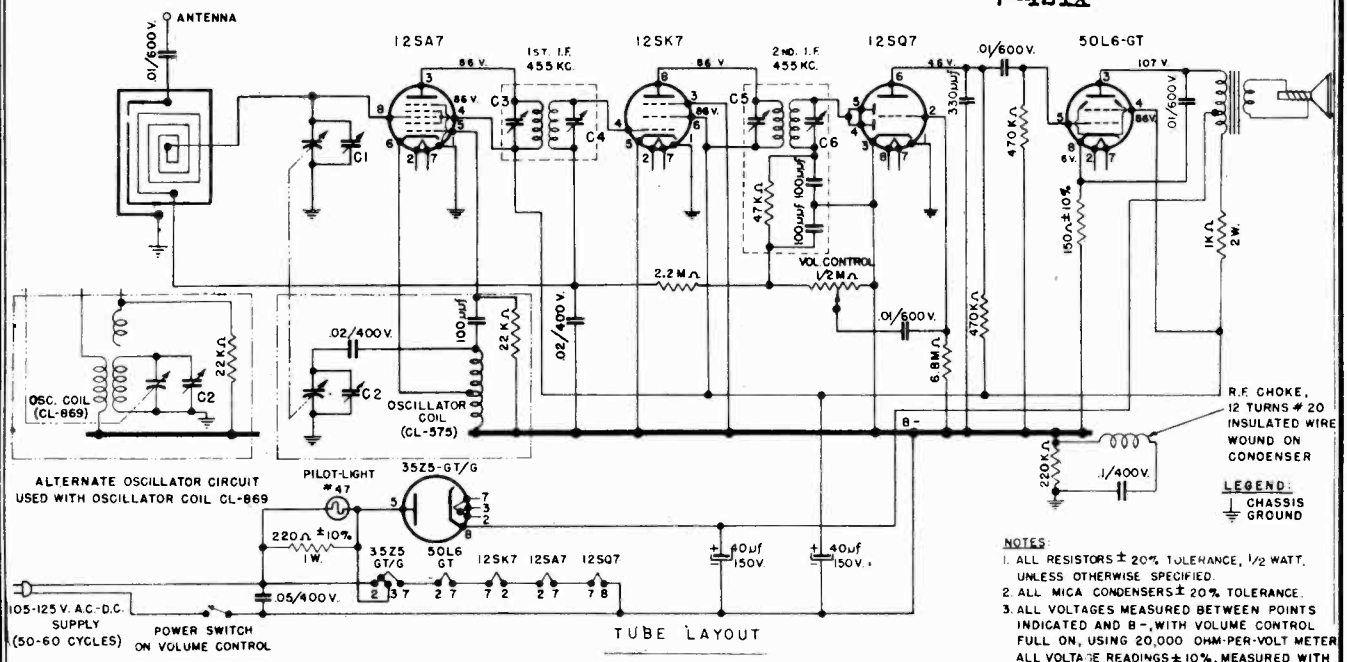
BATTERIES

The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

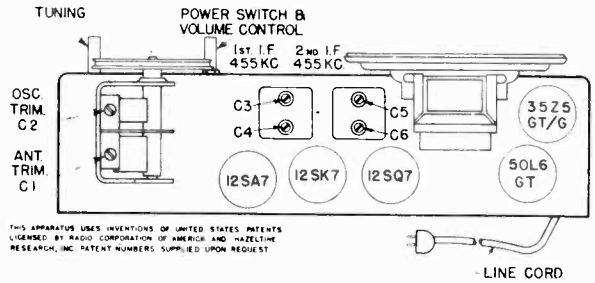
REPLACEMENT PARTS

Part No.	Description
BK-405	Bracket-Resistor mounting bracket
CA-229	Cabinet-portable cabinet
CB-335	Cable-battery cable
CL-177	Coil-oscillator coil
CL-630	Coil-R.F. coil
CO-182	Condenser-80/20/150WV & 100/15WV electrolytic condenser
CO 808	Condenser-50 mfd /25 W.V. electrolytic condenser
CR-299	Crystal-dial crystal
CT-388	Condenser-220-680 mmfd padder condenser
CV-146	Condenser-3 gang variable condenser (with pulley)
DL-391	Dial-metal dial scale
ES-274-1	Escutcheon-moulded escutcheon
KN-260	Knob-walnut knob
KN-261	Knob-walnut knob with dot
LP-178	Loop-Antenna
PO-395	Pointer-dial pointer
PT-576	Control-volume control 1 megohm with D.P.S.T. switch
RCM20A101M	Condenser-100 mmf ±20% mica condenser
RCM20A470M	Condenser-47 mmfd ±20% mica condenser
RCP10W2104A	Condenser-.1/200WV paper tubular condenser
RCP10W4503A	Condenser-.05/400WV paper tubular condenser
RCP10W6103A	Condenser-.01/600WV paper tubular condenser
RCP10W6502A	Condenser-.005/600WV paper tubular condenser
RE-407	Resistor-2600 ohms ±5% 10 watt resistor
REB102M	Resistor-1000 ohms ±20% ½ watt resistor
REB105M	Resistor-1 megohm ±20% ½ watt resistor
REB152M	Resistor-1500 ohms ±20% ½ watt resistor
REB 222M	Resistor-2200 ohms ±20% ½ watt resistor
REB224M	Resistor-220,000 ohms ±20% ½ watt resistor
REB225M	Resistor-2.2 megohms ±20% ½ watt resistor
REB270K	Resistor-27 ohms ±10% ½ watt resistor
REB 333M	Resistor-33,000 ohms ±20% ½ watt resistor
REB335M	Resistor-3.3 megohms ±20% ½ watt resistor
REB 681M	Resistor-680 Ohms ±20% ½ watt resistor
REB685M	Resistor-6.8 megohms ±20% ½ watt resistor
RED101M	Resistor-100 ohms ±20% 2 watt resistor
SK-476	Speaker-5" P.M. Speaker with output transformer
SP-191	Spring-Drive shaft retaining spring
SW-185	Switch-battery-electric D.P.D.T. slide switch
TR-707	Transformer-I.F. 455 K.C. input-Transformer
TR-708	Transformer-Output I.F. 455 K.C. Transformer with built-in I.F. filter

OLYMPIC RADIO & TELEV. INC. MODELS 7-421V, 7-421W, 7-421X



TUBE LAYOUT



Note:

In case of dial light failure, replace the lamp (Mazda #47) as soon as possible to prevent damage to the 35Z5 tube

ALIGNMENT PROCEDURE CHART

STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO -	SET SIGNAL GENERATOR TO -	TURN RECEIVER DIAL TO -	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE)
1	ANTENNA SECTION TUNING CONDENSER IN SERIES WITH .1 MFD COND.	455 KC.	FULL CLOCKWISE POSITION (CONDENSER PLATES FULLY OPEN)	C6, C5, C4, C3 AND REPEAT IN SAME ORDER (1ST. AND 2ND. I.F. TRANSFORMERS)
2	ANTENNA TERMINAL OF ANTENNA LOOP IN SERIES WITH 50 MMFD. COND.	1700 KC.	1700 KC (170 ON DIAL)	C 2 (OSCILLATOR)
3		1400 KC	MAXIMUM SIGNAL (APPROX. 140 ON DIAL)	C1 (ANTENNA)
4		REPEAT STEPS 2 AND 3		

ALIGNMENT INSTRUCTIONS

Equipment Required:

Modulated R.F. signal generator; output meter; insulated screw-driver; two .1 mfd 400 volt condensers.

To insure proper alignment a radiated signal will be required during part of the alignment procedure. To radiate a signal connect a loop of about 6" to 8" diameter (one turn of #14 or #12 wire) across the output of the signal generator and place this loop parallel to the loop of the receiver to be aligned at a distance of about 8" or 10".

To align the receiver it is necessary to remove the chassis from the cabinet, check that the pointer is horizontal and coincides with the two horizontal reference lines on the dial. In this position the condenser should be completely closed. Connect the output meter and signal generator as follows:

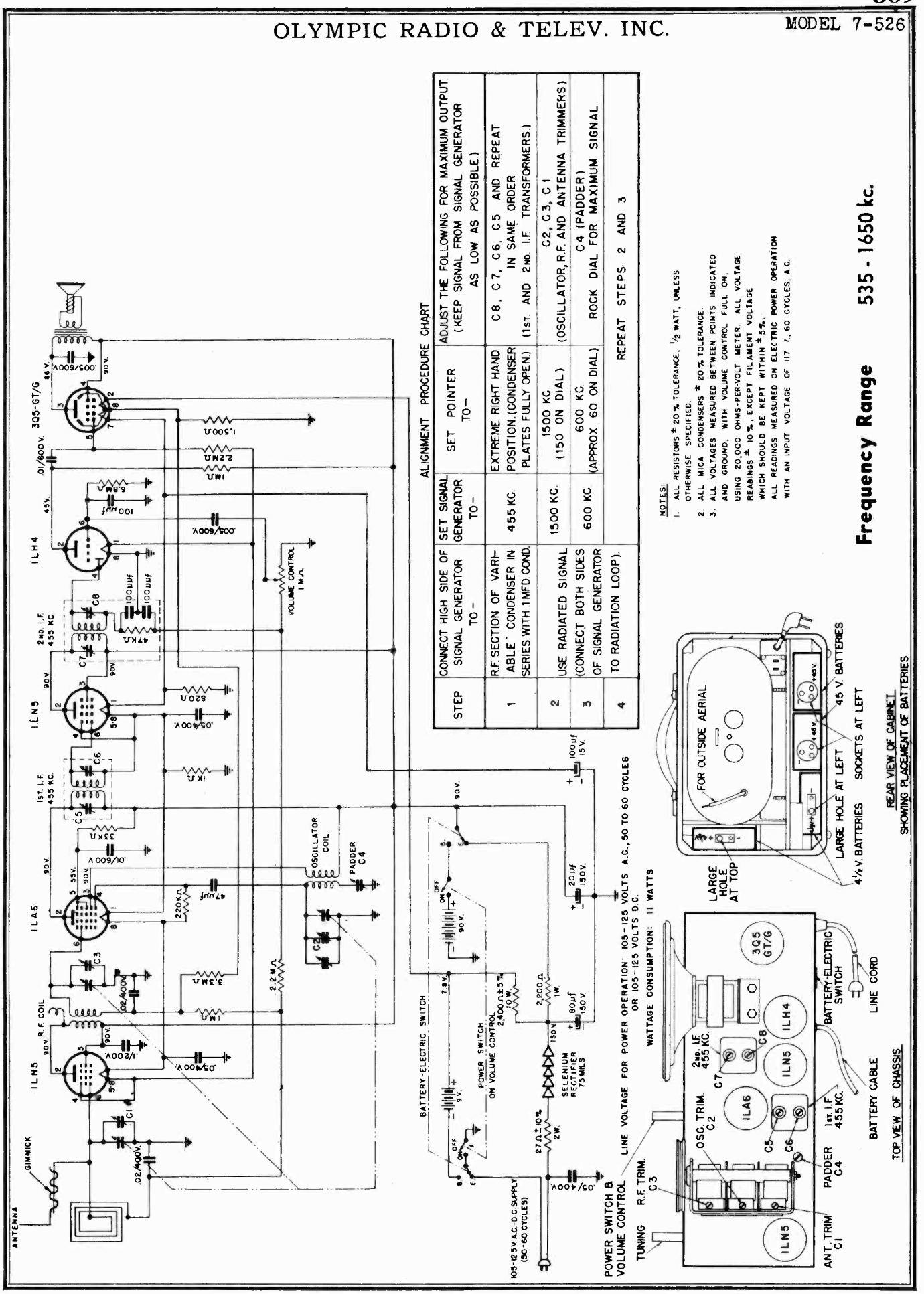
Output meter — Connect across voice coil and turn volume control to maximum.
Signal generator — Connect the low side of the signal generator to the common B-bus thru a .1 mfd condenser and keep the output as low as possible, then proceed in the sequence shown on the alignment chart.

Models 7-421 W (Walnut), 7-421 V (Ivory), 7-421 X (Black)

Frequency Range 535 — 1700 K.C.
Power Requirement 105 — 125 volts alternating current 50-60 cycles or 105 — 125 volts direct current
Power Consumption 30 watts

OLYMPIC RADIO & TELEV. INC.

MODEL 7-526



MODEL 7-526

OLYMPIC RADIO & TELEV. INC.

WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

To insure proper alignment, it is suggested to use a radiated signal. To radiate a signal connect a loop of about 6" to 8" diameter 1 turn of #14 or #12 wire across the output of the signal generator and place this loop parallel to the loop of the receiver to be aligned at a distance of about 8" or 10".

ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

BATTERIES

The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

REPLACEMENT PARTS

Part No.	Description
BK-405	Bracket-resistor mounting bracket
CA-229	Cabinet-portable cabinet
CB-335	Cable-battery cable
CL-954	Coil-r-f coil
CL-957	Coil-oscillator coil
CO-182	Condenser-80/20/150 W.V. & 100/15 W.V. elect. condenser
CT-388	Condenser-220/680 mmfd. padder condenser
CV-816	Condenser-3 gang variable condenser
DL-872	Dial-metal dial scale
ES-274-1	Escutcheon-molded escutcheon
KN-352	Knob-walnut knob
KN-947	Knob-walnut knob with dot
LP-993	Loop-antenna
PO-395	Pointer-dial pointer
PT-576	Control-volume control
RCM20A101M	Condenser-100 mmfd. ±20% mica condenser
RCM20A470M	Condenser-47 mmfd. ±20% mica condenser
RCP10W2104A	Condenser-.1/200 W.V. tubular paper condenser
RCP10W4203A	Condenser-.02/400 W.V. tubular paper condenser
RCP10W4503A	Condenser-.05/400 W.V. tubular paper condenser
RCP10W6103A	Condenser-.01/600 W.V. tubular paper condenser
RCP10W6502A	Condenser-.005/600 W.V. tubular paper condenser

Part No.	Description
RE-879	Resistor-2400 ohms ±5% 10 watt resistor
REB102M	Resistor-1000 ohms ±20% ½ watt resistor
REB105M	Resistor-1 megohm ±20% ½ watt resistor
REB152M	Resistor-1500 ohms ±20% ½ watt resistor
REB224M	Resistor-220,000 ohms ±20% ½ watt resistor
REB225M	Resistor-2.2 megohms ±20% ½ watt resistor
REB333M	Resistor-33,000 ohms ±20% ½ watt resistor
REB335M	Resistor-3.3 megohms ±20% ½ watt resistor
REB685M	Resistor-6.8 megohms ±20% ½ watt resistor
REB821M	Resistor-820 ohms ±20% ½ watt resistor
REC222M	Resistor-2200 ohms ±20% 1 watt resistor
RED270K	Resistor-27 ohms ±10% 2 watt resistor
RF-770	Rectifier-75 mils selenium rectifier
SK-476	Speaker-5" P.M. speaker
SP-191	Spring-drive shaft retaining spring
SP-295	Spring-pointer drive spring
SW-185	Switch-battery electric slide switch
TR-707	Transformer-455 kc first I.F. transformer
TR-708	Transformer-455 kc second I.F. transformer with diode filter

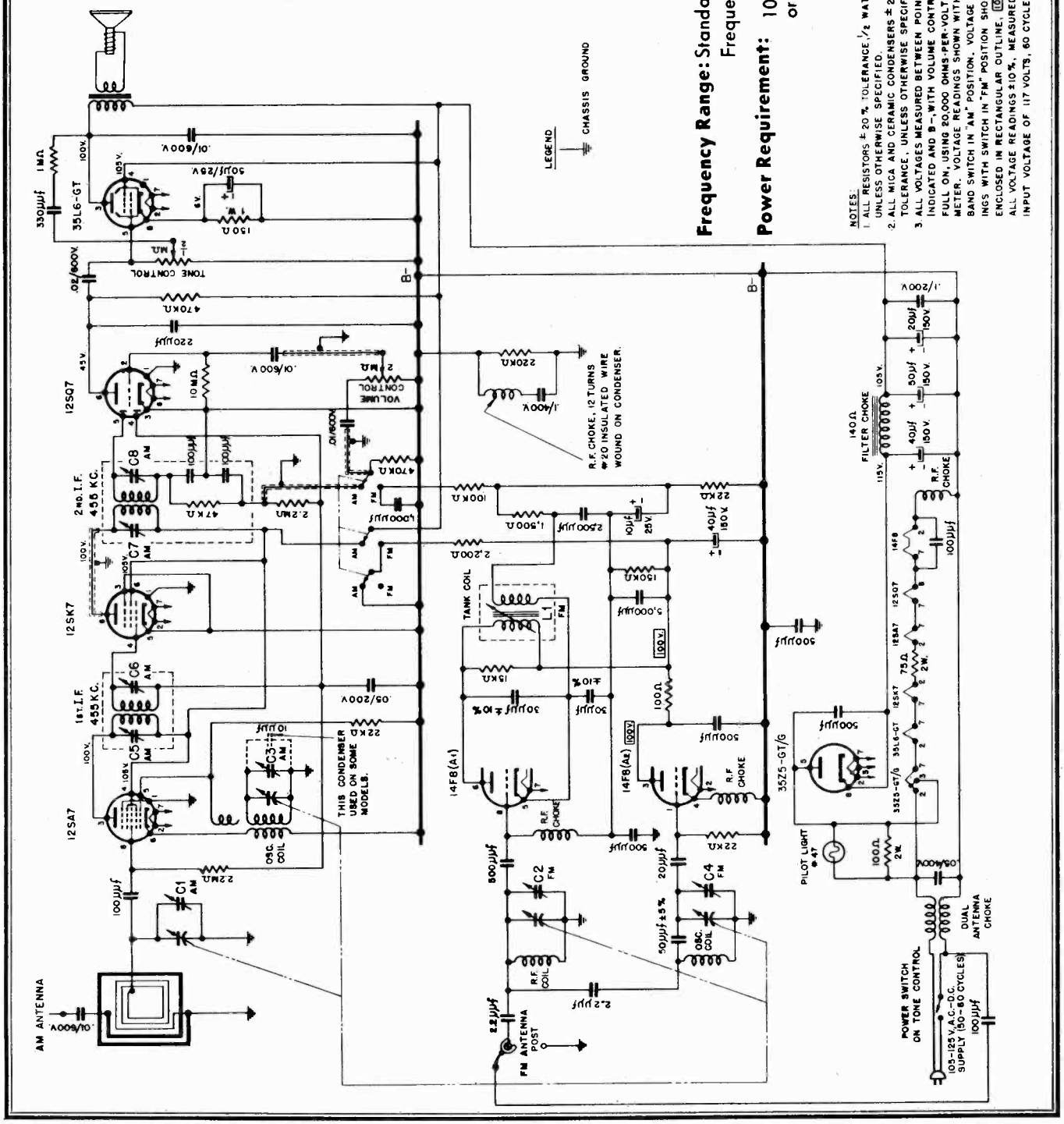
OLYMPIC RADIO & TELEV. INC.

MODELS 7-532V, 7-532W

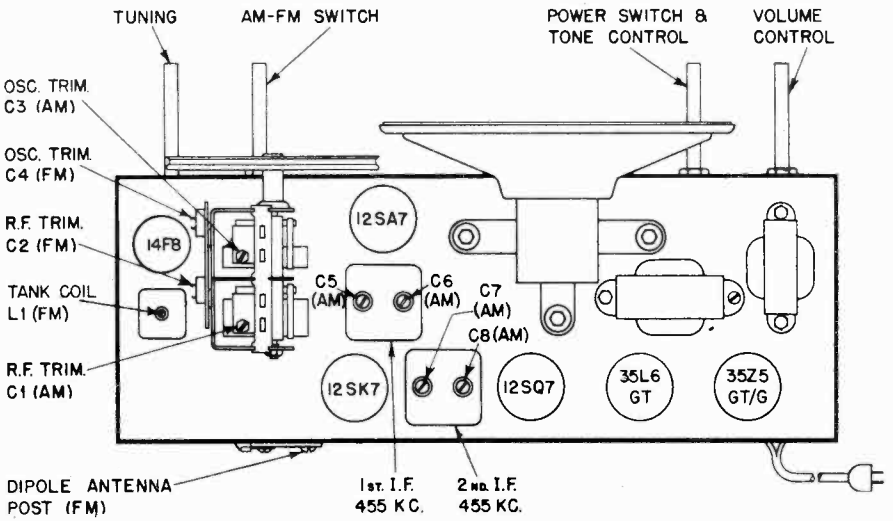
Model 7-532W Walnut
Model 7-532V Ivory

Frequency Range: Standard Broadcast 530-1700 kc.
Frequency Modulation (FM) 88-108 MC

Power Requirement: 105-125 volts a-c 50-60 cycles
or 105-125 volts d-c



TUBE & TRIMMER LAYOUT



ALIGNMENT PROCEDURE CHART

STEP	SET BAND SWITCH ON	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO—	SET SIGNAL GENERATOR TO—	TURN POINTER DIAL TO—	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE)
1	A.M.	R.F. SECTION OF VARIABLE CONDENSER OR PIN 4 OF THE 12SK7 TUBE IN SERIES WITH A .1MFD 400 VOLT CONDENSER	455 KC.	EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN).	C8 AND C7 (2nd. I.F. TRANSFORMER)
2	A.M.	R.F. SECTION OF VARIABLE CONDENSER OR PIN 8 OF THE 12SA7 TUBE IN SERIES WITH A .1MFD 400 VOLT CONDENSER	455 KC.	EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN).	C6 AND C5 (1st. I.F. TRANSFORMER)
3	A.M.	REPEAT STEPS 1 AND 2			
4	A.M.	USE RADIATED SIGNAL (CONNECT BOTH SIDES OF SIGNAL GENERATOR TO RADIATION LOOP)	1700 KC.	1700 KC. CALIBRATION POINT ON DIFFUSER PLATE.	C3 (OSCILLATOR TRIMMER)
5	A.M.		1400 KC.	RESONANCE, APPROXIMATELY 1400 KC. CALIBRATION POINT ON DIFFUSER PLATE.	C1 (ANTENNA TRIMMER)

STEP	SET BAND SWITCH ON	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO—	SET SIGNAL GENERATOR TO—	TURN POINTER DIAL TO—	ADJUST THE FOLLOWING FOR MINIMUM NOISE USING AN UNMODULATED SIGNAL (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE)
6	F.M.	F.M. ANTENNA POST IN SERIES WITH A 300 OHM RESISTOR.	21.75 MC.	EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN).	L1 (TUNING SLUG ON TANK COIL)
7	F.M.		107 MC.	107 MC. CALIBRATION POINT ON DIFFUSER PLATE.	C4 (OSCILLATOR TRIMMER)
8	F.M.		103 MC.	RESONANCE, APPROXIMATELY 103 MC. CALIBRATION POINT ON DIFFUSER PLATE.	C2 (ANTENNA TRIMMER) ROCK VARIABLE FOR MAXIMUM SIGNAL

Note: All tubes and the pilot light may be replaced without removing chassis from cabinet. Remove the cardboard back, and the screw holding the loop to the mounting bracket, then lift loop carefully off the bracket so as to avoid breaking of the wires connecting the loop to the chassis.

SERVICE AND ALIGNMENT INSTRUCTIONS

This receiver has been carefully aligned in the factory and the circuit is unusually stable. Realigning should only be attempted when necessary and only with a proper signal generator and in accordance with the service instructions. The receiver cannot be aligned on modulated signals. To insure proper broadcast alignment it is recommended to use a radiated signal. To radiate the signal connect a loop of about 6" to 8" diameter 1 turn of #14 or #12 wire across the output of the signal gener ator and place this loop parallel to the loop of the receiver to be aligned at a distance of 8" or 10". For complete alignment instructions on AM and FM Bands see alignment chart.

ALIGNMENT Equipment required: Modulated r-f signal generator, output meter, insulated screw driver, two .1 mfd. 400 volt condensers, one 300 ohm resistor. An FM signal generator is not required for the alignment of this receiver.

With the receiver removed from the cabinet connect output meter across voice coil. Connect ground side of the signal generator in series with a .1/400 volt condenser to the common B—; turn volume control fully on, and keeping the output of the signal generator as low as possible, proceed in the sequence as shown on the alignment chart.

To facilitate alignment of the receiver when removed from cabinet, calibration points are provided on the light diffuser plate, which is mounted to the chassis.

CAUTION: The diffuser strip is assembled to the chassis with 2 PK screws. The one at the left is fastened down tight. The one on the right should be backed off about 2 turns from tight position in order to permit free expansion of the strip and thereby avoid warpage which will interfere with proper movement of the pointer.

Before aligning, close the variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the reference dot (extreme left dot) on the diffuser plate.

MODELS 7-532V, 7-532W — OLYMPIC RADIO & TELEV. INC. — MODELS 7-532W, 7-532V, MODELS 7-537W, 7-537V

REPLACEMENT PARTS LIST

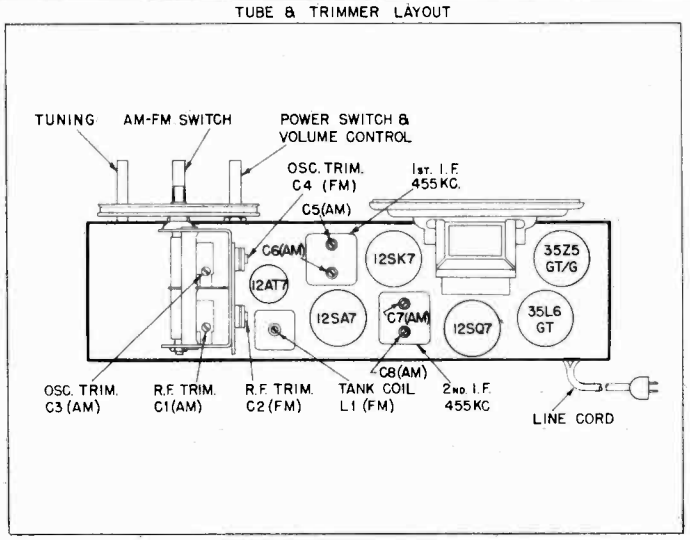
Part No.	Description
BU-187	Bulb—#47 Mazda pilot light bulb
CA-154-1W	Cabinet—walnut bakelite cabinet
CA-154-1V	Cabinet—ivory bakelite cabinet
CCA-101M	Condenser—100 mmfd. ±20% ceramic condenser
CCA-102M	Condenser—1000 mmfd. ±20% ceramic condenser
CCA-200M	Condenser—20mmfd. ±20% ceramic condenser
CCA-501M	Condenser—500 mmfd. ±20% ceramic condenser
CCA-L300K	Condenser—30 mmfd. ±10% ceramic condenser (negative 080)
CCA-U500J	Condenser—50 mmfd. ±5% ceramic condenser (negative 750)
CCD-502X	Condenser—5000 mmfd. disc condenser
CCR-252M	Condenser—2500 mmfd. ±20% ceramic condenser
CK-114	Choke—140 ohms 85 mils filter choke
CK-1109	Choke—dual antenna choke
CK-1127	Choke—r-f choke
CL-1111	Coil—F.M. r-f coil
CL-1113	Coil—F.M. oscillator coil
CL-1129	Coil—broadcast oscillator coil
CO-791	Condenser—50+20+40/150 W.V. electrolytic condenser
CO-808	Condenser—50 mfd. 25 W.V. electrolytic condenser
CO-1112	Condenser—2.2 mmfd. ±20% fixed condenser
CO-1133	Condenser—10 mfd. 25 W.V. electrolytic condenser
CO-1248	Condenser—40 mfd. 150 W.V. electrolytic condenser
CT-1114	Condenser—3-12 mmfd. ceramic trimmer condenser
CV-841	Condenser—2 gang variable condenser
DL-1115	Dial—glass dial scale
KN-671	Knob—walnut knob marked "Volume"
KN-672	Knob—walnut knob marked "Off-On Tone"
KN-673	Knob—walnut knob marked "Tuning"
KN-1117	Knob—walnut knob marked "AM-FM"
KN-675	Knob—ivory knob marked "Volume"
KN-676	Knob—ivory knob marked "Off-On Tone"
KN-677	Knob—ivory knob marked "Tuning"
KN-1118	Knob—ivory knob marked "AM-FM"
LP-1122	Loop—loop antenna
PO-334	Pointer—dial pointer
PT-105	Control—2 megohms volume control
PT-106	Control—½ megohm tone control with S.P.S.T. switch
RCM20A100M	Condenser—10 mmf. ±20% mica condenser
RCM20A221M	Condenser—220 mmf. ±20% mica condenser
RCM20A331M	Condenser—330 mmf. ±20% mica condenser
RCP10W2104A	Condenser—.1/200 W.V. tubular paper condenser
RCP10W2503A	Condenser—.05/200 W.V. tubular paper condenser
RCP10W4104L	Condenser—.1/400 W.V. tubular paper condenser*
RCP10W4503A	Condenser—.05/400 W.V. tubular paper condenser.
RCP10W6103A	Condenser—.01/600 W.V. tubular paper condenser
RCP10W6203A	Condenser—.02/600 W.V. tubular paper condenser
REB-101M	Resistor—100 ohms ±20% ½ watt resistor
REB-104M	Resistor—100,000 ohms ±20% ½ watt resistor
REB-105M	Resistor—1 megohm ±20% ½ watt resistor
REB-106M	Resistor—10 megohms ±20% ½ watt resistor
REB-152M	Resistor—1500 ohms ±20% ½ watt resistor
REB-153M	Resistor—15,000 ohms ±20% ½ watt resistor
REB-154M	Resistor—150,00 ohms ±20% ½ watt resistor
REB-222M	Resistor—2200 ohms ±20% ½ watt resistor
REB-223M	Resistor—22,000 ohms ±20% ½ watt resistor
REB-224M	Resistor—220,000 ohms ±20% ½ watt resistor
REB-225M	Resistor—2.2 megohms ±20% ½ watt resistor
REB-474M	Resistor—470,000 ohms ±20% ½ watt resistor
REC-151M	Resistor—150 ohms ±20% 1 watt resistor
RED-101M	Resistor—100 ohms ±20% 2 watt resistor
SK-792	Speaker—6" p.m. speaker
SP-191	Spring—drive shaft retaining spring
SP-218	Spring—dial drive spring
ST-412	Back—printed cardboard back
ST-1120	Diffuser—light diffuser plate with calibration marks
SW-1121	Switch—3 pole double throw switch
TR-781	Transformer—455 kc I.F. input transformer
TR-782	Transformer—455 kc I.F. output transformer
TR-904	Transformer—output transformer for 35L6
TR-1123	Coil—tank coil

* When ordering specify "with r-f choke"

MODELS 7-537V, 7-537W

PART NUMBER	DESCRIPTION
BU 187	Bulb—#47 Mazda pilot light bulb
CA 327W	Cabinet—walnut bakelite cabinet
CA 327V	Cabinet—ivory bakelite cabinet
CA 327X	Cabinet—black bakelite cabinet
CCA 101M	Condenser—100 mmfd ±20% ceramic condenser
CCA 102M	Condenser—1000 mmfd ±20% ceramic condenser
CCA 200M	Condenser—20 mmfd ± 20% ceramic condenser
CCA 501M	Condenser—500 mmfd ±20% ceramic condenser
CCA L300K	Condenser—30 mmfd ±10% ceramic condenser (negative 080
CCA U500J	Condenser—50 mmfd ±5% ceramic condenser (negative 750)
CCD 502X	Condenser—5000 mmfd disc type condenser
CCR 252M	Condenser—2500 mmfd ±20% ceramic condenser
CK 1109	Choke—dual antenna choke
CK 1127	Choke—r-f choke (F.M.)
CL 1111	Coil—F. M. r-f coil
CL 1113	Coil—F.M. oscillator coil
CL 1129	Coil—B.C. oscillator coil
CO 111	Condenser—40+40/150 W.V. & 50/25 W.V. electrolytic condenser
CO 1112	Condenser—2.2 mmfd ±20% fixed condenser
CO 1133	Condenser—10 mfd 25 W.V. electrolytic condenser
CO 1222	Condenser—10 mfd 150 W.V. electrolytic condenser
CR 169	Crystal—round dial crystal
CT 1114	Condenser—3-12 mmfd zero temperature coefficient trimmer condenser
CV 1141	Condenser—2 gang variable a-m; f-m condenser
DL 1144	Dial—plastic dial
KN 1077	Knob—walnut knob marked "Off-On Volume"
KN 1078	Knob—Walnut knob marked "Tuning"
KN 1224	Knob—walnut knob marked "AM-FM"
KN 1103	Knob—ivory knob marked "Off-On Volume"
KN 1104	Knob—ivory knob marked "Tuning"
KN 1225	Knob—ivory knob marked "AM-FM"
LP 1268	Loop—loop-antenna
PO 259W	Pointer—molded walnut pointer
PO 259V	Pointer—molded ivory pointer
PT 102	Control—½ megohm volume control with s.p.s.t. switch
RCM20A 100M	Condenser—10 mmfd ±20% mica condenser
RCM20A 221M	Condenser—220 mmfd ±20% mica condenser
RCP10W 2104A	Condenser—.1/200 W.V. tubular paper condenser
RCP10W 2503A	Condenser—.05/200 W.V. tubular paper condenser
RCP10W 4203A	Condenser—.02/400 W.V. tubular paper condenser
RCP10W 4503A	Condenser—.05/400 W.V. tubular paper condenser
RCP10W 6103A	Condenser—.01/600 W.V. tubular paper condenser
RCP10W 6502A	Condenser—.005/600 W.V. tubular paper condenser
REB 101M	Resistor—100 ohms ±20% ½ watt resistor
REB 104M	Resistor—100,000 ohms ±20% ½ watt resistor
REB 106M	Resistor—10 megohms ±20% ½ watt resistor
REB 152M	Resistor—1500 ohms ±20% ½ watt resistor
REB 153M	Resistor—15,000 ohms ±20% ½ watt resistor
REB 154M	Resistor—150,000 ohms ±20% ½ watt resistor
REB 222M	Resistor—2200 ohms ±20% ½ watt resistor
REB 223M	Resistor—22,000 ohms ±20% ½ watt resistor
REB 225M	Resistor—2.2 megohms ±20% ½ watt resistor
REB 474M	Resistor—470,000 ohms ±20% ½ watt resistor
REC 151M	Resistor—150 ohms ±20% 1 watt resistor
REC 221K	Resistor—220 ohms ±10% 1 watt resistor
RED 102M	Resistor—1000 ohms ±20% 2 watt resistor
RED 750M	Resistor—75 ohms ±20% 2 watt resistor
SK 1128	Speaker—5" permanent magnet speaker
SO 1260	Socket—pilot light socket assembly
SP 191	Spring—drive shaft retaining spring
SP 218	Spring—pointer drive spring
ST 255-1	Back—cardboard back
SW 1158	Switch—T.P.D.T. band switch
TR 707	Transformer—455 k.c. input I.F. transformer
TR 708	Transformer—455 k.c. output I.F. transformer
TR 1123	Transformer—f.m. tank coil

TUBE & TRIMMER LAYOUT



ALIGNMENT PROCEDURE CHART

STEP	SET BAND SWITCH ON	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO—	SET SIGNAL GENERATOR TO—	TURN RECEIVER DIAL TO—	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE)
1	A.M.	R.F. SECTION OF VARIABLE CONDENSER OR PIN 4 OF THE 12SK7 TUBE IN SERIES WITH A .1 MFD. 400 VOLT CONDENSER.	455 KC.	FULL CLOCKWISE POSITION (CONDENSER PLATES FULLY OPEN).	C8 AND C7 (2ND. I.F. TRANSFORMER)
2	A.M.	R.F. SECTION OF VARIABLE CONDENSER OR PIN 8 OF THE 12SA7 TUBE IN SERIES WITH A .1 MFD. 400 VOLT CONDENSER.	455 KC.	FULL CLOCKWISE POSITION (CONDENSER PLATES FULLY OPEN).	C6 AND C5 (1ST. I.F. TRANSFORMER)
3	A.M.	REPEAT STEPS 1 AND 2			
4	A.M.	USE RADIATED SIGNAL (CONNECT BOTH SIDES OF SIGNAL GENERATOR TO RADIATION LOOP).	1700 KC.	1700 K.C. (170 ON DIAL)	C 3 (OSCILLATOR TRIMMER)
5	A.M.		1400 KC.	RESONANCE (APPROX 140 ON DIAL)	C 1 (ANTENNA TRIMMER)

STEP	SET BAND SWITCH ON	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO—	SET SIGNAL GENERATOR TO—	TURN RECEIVER DIAL TO—	ADJUST THE FOLLOWING FOR MINIMUM NOISE, AS INDICATED ON OUTPUT METER, USING AN UNMODULATED SIGNAL. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE)
6	F.M.	R.F. SECTION OF VARIABLE CONDENSER IN SERIES WITH A 300 OHM RESISTOR.	21.75 MC.	FULL CLOCKWISE POSITION (CONDENSER PLATES FULLY OPEN).	L 1 (TUNING SLUG ON TANK COIL)
7	F.M.		107 MC.	107 MC. (APPROX. 107 ON DIAL).	C 4 (OSCILLATOR TRIMMER)
8	F.M.		103 MC.	RESONANCE (APPROX. 103 ON DIAL).	C 2 (ANTENNA TRIMMER) ROCK VARIABLE FOR MAXIMUM SIGNAL.

SERVICE AND ALIGNMENT INSTRUCTIONS

This receiver has been carefully aligned in the factory and the circuit is unusually stable. Realigning should only be attempted when necessary and only with a proper signal generator and in accordance with the service instructions. The receiver cannot be aligned on modulated signals. To insure proper broadcast alignment it is recommended to use a radiated signal. To radiate the signal connect a loop of about 6" to 8" diameter 1 turn of #14 or #12 wire across the output of the signal generator and place this loop parallel to the loop of the receiver to be aligned at a distance of 8" or 10". For complete alignment instructions on AM and FM Bands see alignment chart.

ALIGNMENT

Equipment required: Modulated r-f signal generator, output meter, insulated screw driver, two .1 mfd. 400 volt condensers, one 300 ohm resistor. An FM signal generator is not required for the alignment of this receiver.

With the receiver removed from the cabinet connect output meter across voice coil. Connect ground side of the signal generator in series with a .1/400 volt condenser to the common B—; turn volume control fully on, and keeping the output of the signal generator as low as possible, proceed in the sequence as shown on the alignment chart.

Before aligning, close the variable condenser fully counter clockwise (plates fully closed) and check that pointer coincides with the reference line. (horizontal line running through center of dial).

OLYMPIC RADIO & TELEV. INC.

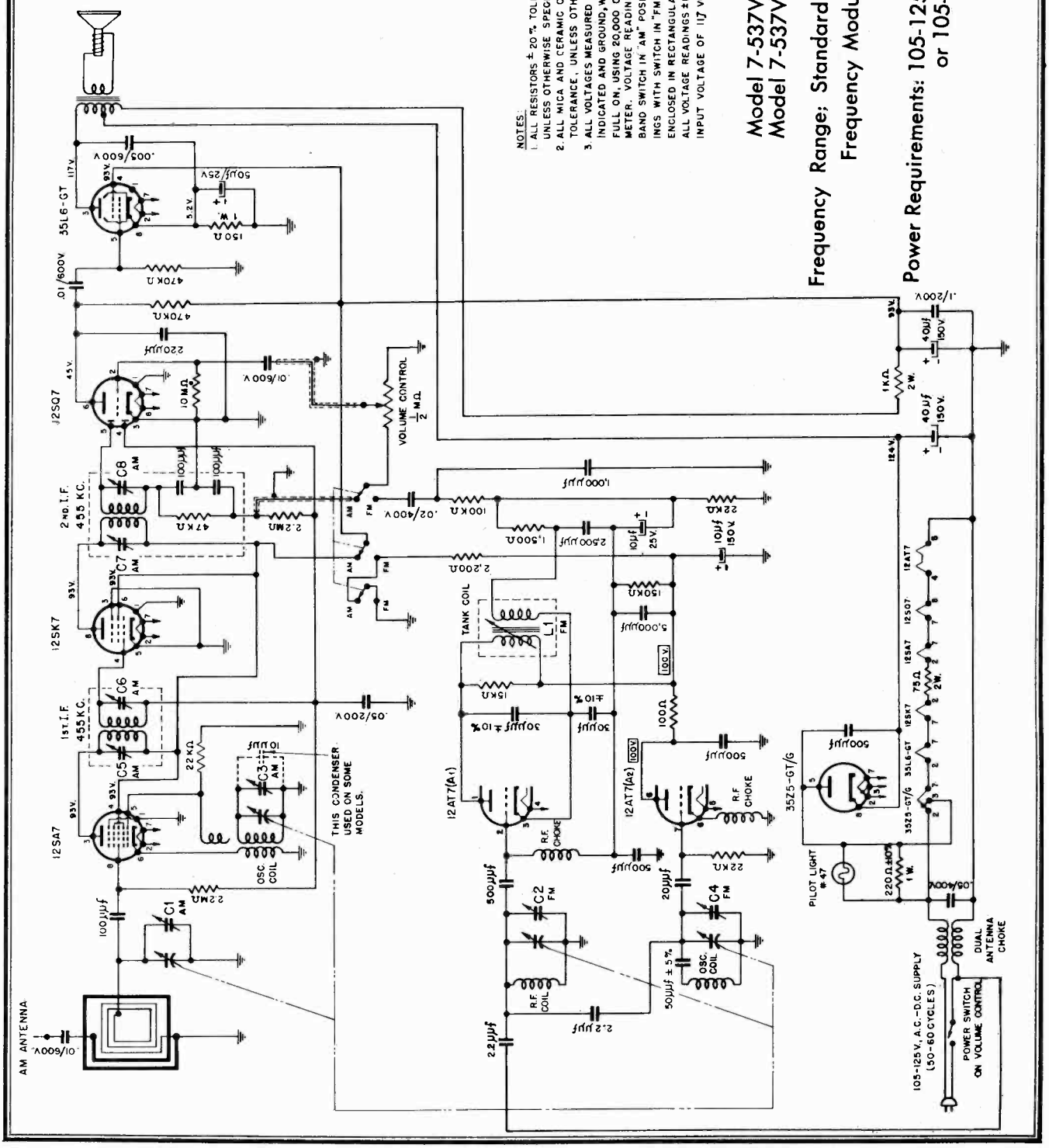
MODELS 7-537V, 7-537W

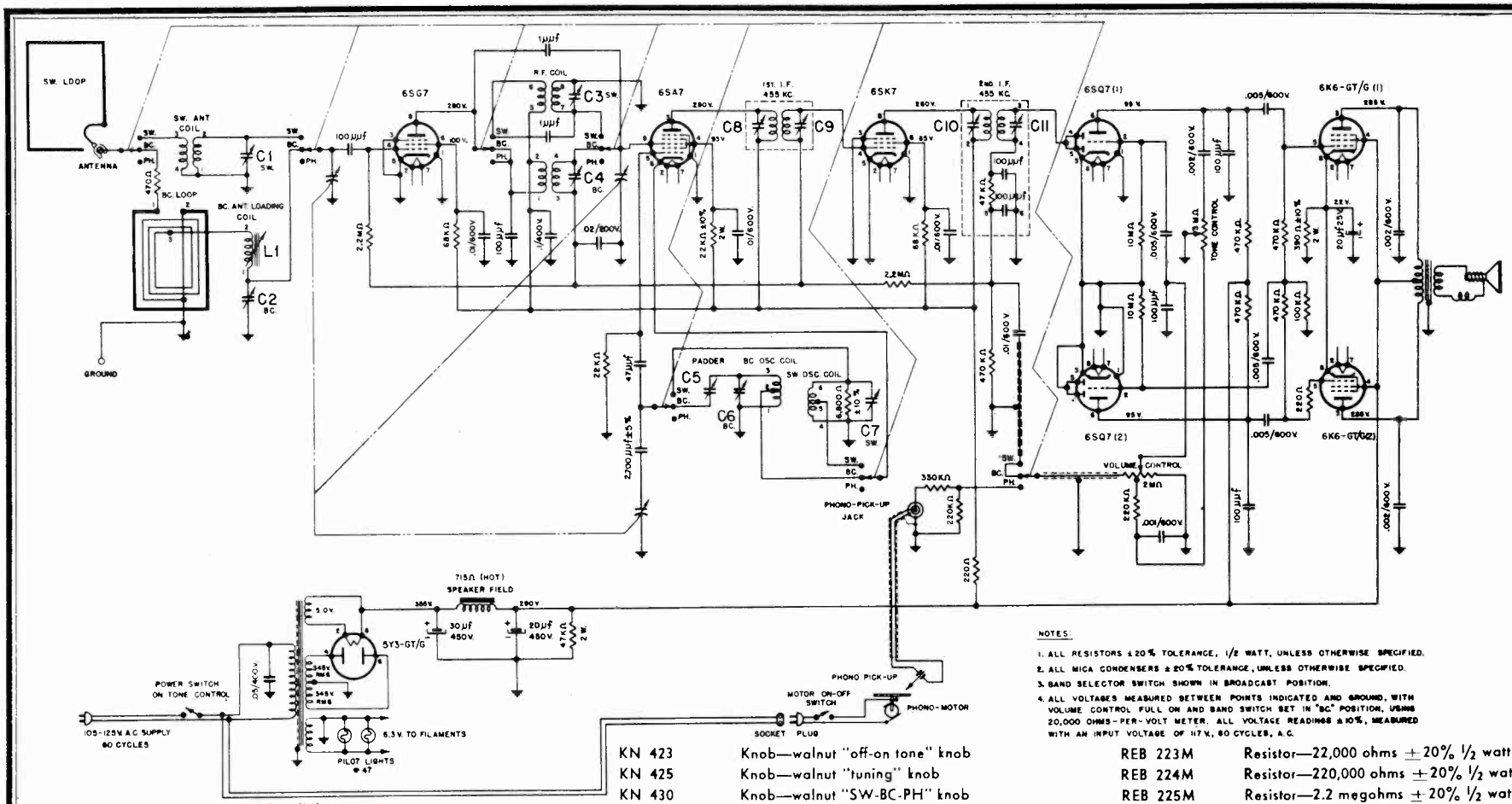
Model 7-537W Walnut
Model 7-537V Ivory

Frequency Range: Standard Broadcast 535-1700 kc.
Frequency Modulation (FM) 88-108 MC

Power Requirements: 105-125 volts a-c 50-60 cycles
or 105-125 volts d-c

NOTES:
1. ALL RESISTORS ± 20%, TOLERANCE 1/2 WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA AND CERAMIC CONDENSERS ± 20% TOLERANCE, UNLESS OTHERWISE SPECIFIED.
3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON, USING 20,000 OHMS-PER-VOLT METER. VOLTAGE READINGS SHOWN WITH BAND SWITCH IN "AM" POSITION. VOLTAGE READINGS WITH SWITCH IN "FM" POSITION SHOWN ENCLOSED IN RECTANGULAR OUTLINE. [100V.] ALL VOLTAGE READINGS ±10%, MEASURED WITH INPUT VOLTAGE OF 117 VOLTS, 60 CYCLES, A.C.





NOTES:

1. ALL RESISTORS ±20% TOLERANCE, 1/2 WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ±20% TOLERANCE, UNLESS OTHERWISE SPECIFIED.
3. BAND SELECTOR SWITCH SHOWN IN BROADCAST POSITION.
4. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON AND BAND SWITCH SET IN "BC" POSITION, USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS ±10%, MEASURED WITH AN INPUT VOLTAGE OF 117 V., 60 CYCLES, A.C.

Part No.	Description
BU 187	Bulb—#47 pilot light bulb
CB 1020	Coble—speaker cable assembly
CL 998	Coil—antenna loading coil (BC)
CL 999	Coil—antenna transformer coil (SW)
CL 1000	Coil—R.F. coil (BC & SW)
CL 1001	Coil—oscillator coil (BC & SW)
CO 768	Condenser—30/20/450 W.V. & 20/25 W.V. electrolytic condenser
CO 311	Condenser—1.0 MMFD. 20% fixed condenser
CT 389	Condenser—dual 3-35 MMFD. trimmer condenser
CT 440	Condenser—350-780 MMFD. padder condenser
CT 1002	Condenser—1.6-18 MMFD. trimmer condenser
CV 144	Condenser—3 gang variable condenser
DL 1003	Dial—glass dial scale
IC 1015	Core—iron core
KN 422	Knob—walnut "volume" knob
KN 423	Knob—walnut "off-on tone" knob
KN 425	Knob—walnut "tuning" knob
KN 430	Knob—walnut "SW-BC-PH" knob
LP 1008	Loop—antenna loop
NE 322	Needle—permanent needle
PO 1011	Pointer—dial-pointer
PT 567	Control—2 megohms tapped volume control
PT 568	Control—3 megohms tone control (S.P.S.T.)
RCM20A101M	Condenser—100 MMFD. 20% mica condenser
RCM20A470M	Condenser—47 MMFD. 20% mica condenser
RCM30B272J	Condenser—2700 MMFD. 5% mica condenser
RCP10W2203A	Condenser—.02/200 W.V. paper tubular condenser
RCP10W4104L	Condenser—.1/400 W.V. paper tubular condenser
RCP10W4503A	Condenser—.05/400 W.V. paper tubular condenser
RCP10W6102A	Condenser—.001/600 W.V. paper tubular condenser
RCP10W6103A	Condenser—.01/600 W.V. paper tubular condenser
RCP10W6202M	Condenser—.002/600 W.V. paper tubular condenser
RCP10W6502A	Condenser—.005/600 W.V. paper tubular condenser
REB 104M	Resistor—100,000 ohms ±20% 1/2 watt resistor
REB 106M	Resistor—10 megohms ±20% 1/2 watt resistor
REB 221M	Resistor—220 ohms ±20% 1/2 watt resistor
REB 223M	Resistor—22,000 ohms ±20% 1/2 watt resistor
REB 224M	Resistor—220,000 ohms ±20% 1/2 watt resistor
REB 225M	Resistor—2.2 megohms ±20% 1/2 watt resistor
REB 334M	Resistor—330,000 ohms ±20% 1/2 watt resistor
REB 471M	Resistor—470 ohms ±20% 1/2 watt resistor
REB 474M	Resistor—470,000 ohms ±20% 1/2 watt resistor
REB 682K	Resistor—6,800 ohms ±10% 1/2 watt resistor
REB 683K	Resistor—68,000 ohms ±10% 1/2 watt resistor
RED 223K	Resistor—22,000 ohms ±10% 2 watt resistor
RED 391K	Resistor—390 ohms ±10% 2 watt resistor
RED 473M	Resistor—47,000 ohms ±20% 2 watt resistor
SK 384	Speaker—12" dynamic speaker 715 ohms (12,000 ohms transformer)
SP 191	Spring—lock spring (for dial drive)
SP 218	Spring—pointer drive spring
SW 985	Switch—3 wafer—3 position band switch
TR 781	Transformer—input I.F. transformer-shielded
TR 782	Transformer—output I.F. transformer-shielded
TR 981	Transformer—power transformer

ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; one .1 mfd 400 volts and one 400 ohm resistor.

With the receiver removed from the cabinet, connect output meter across voice coil. Connect ground side of the signal generator to chassis; turn volume control fully on, and keeping the output of the signal generator as low as possible, proceed in the sequence as shown on the alignment chart.

Before aligning, close the variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the "reference line" on the dial scale. THIS IS THE LINE DIRECTLY UNDERNEATH THE LETTERS SW ON UPPER SCALE.

To insure proper alignment, it is suggested to use a radiated signal. To radiate a signal connect the loop of about 6" to 8" diameter 1 turn of #14 or #12 wire across the output of the signal generator and place this loop parallel to the loop of the receiver to be aligned at a distance of about 8" or 10".

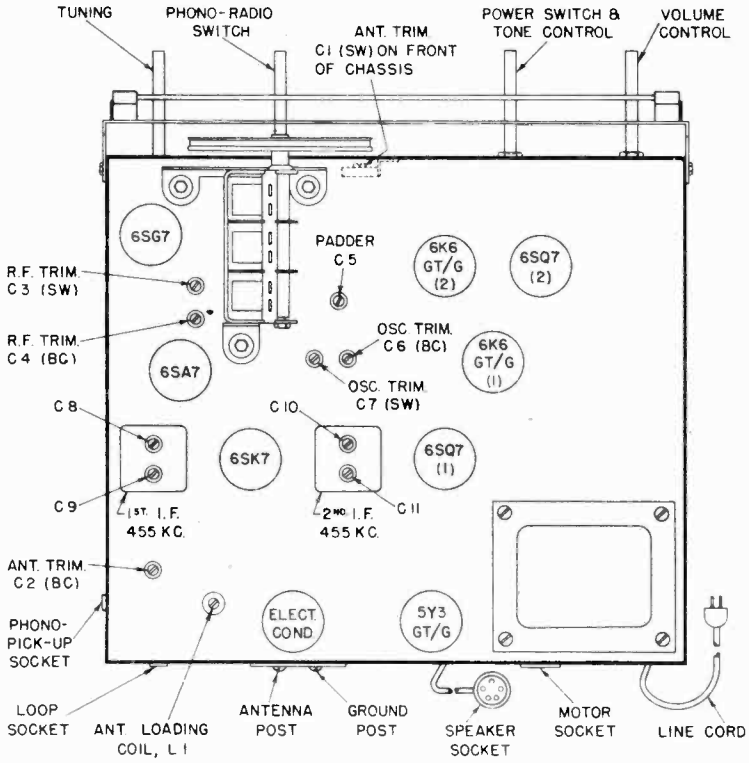
To remove this receiver from the console it is first necessary to disconnect the connector plugs for the loop; speaker; phono input and phono motor from the chassis, and the female connector plug from the speaker. Then remove the four knobs and the four screws holding the chassis to its mounting panel. CAUTION: WHEN REMOVING THE CHANGER BE SURE TO PLACE IT IN A POSITION WHEREBY THE CHANGER MECHANISM WILL NOT BE DAMAGED.

ALIGNMENT PROCEDURE CHART

STEP	SET BAND SWITCH ON	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO-	SET SIGNAL GENERATOR TO-	TURN POINTER TO-	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.)
1	B.C	R.F. SECTION OF VARIABLE CONDENSER OR PIN 8 OF THE 6SA7 TUBE IN SERIES WITH A 1MFD, 400 VOLT CONDENSER.	455 KC.	EXTREME RIGHT HAND POSITION (CONDENSER PLATES FULLY OPEN).	C11 AND C10 (2nd I.F. TRANSFORMER)
2	B.C				C9 AND C8 (1st I.F. TRANSFORMER)
3	B.C	REPEAT STEPS 1 AND 2			
4	B.C	ANTENNA SECTION OF VARIABLE CONDENSER OR PIN 4 OF THE 6SG7 TUBE IN SERIES WITH A 1MFD, 400 VOLT CONDENSER	1700 KC.	1700 KC CALIBRATION POINT.	C6 (OSCILLATOR TRIMMER)
5	B.C		1500 KC.	RESONANCE, APPROXIMATELY 1500 KC CALIBRATION POINT.	C4 (R.F. TRIMMER)
6	B.C		600 KC.	RESONANCE, APPROXIMATELY 600 KC CALIBRATION POINT.	C5 (PADDER) ROCK VARIABLE FOR MAXIMUM SIGNAL.
7	B.C	REPEAT STEPS 4, 5, AND 6			
8	B.C	USE RADIATED SIGNAL (CONNECT BOTH SIDES OF SIGNAL GENERATOR TO RADIATION LOOP).	600 KC.	RESONANCE, APPROXIMATELY 600 KC CALIBRATION POINT.	L1 (ANTENNA LOADING COIL) ROCK VARIABLE FOR MAXIMUM SIGNAL.
9	B.C		1500 KC.	RESONANCE, APPROXIMATELY 1500 KC CALIBRATION POINT.	C2 (ANTENNA TRIMMER)
10	B.C	REPEAT STEPS 8 AND 9			
11	S.W	ANTENNA POST IN SERIES WITH A 400 OHM RESISTOR	18 MC.	18 MC CALIBRATION POINT	C7 (OSCILLATOR TRIMMER) SECOND PEAK FROM TIGHT POSITION C3 (R.F. TRIMMER) FIRST PEAK FROM TIGHT POSITION C1 (ANTENNA TRIMMER) FIRST PEAK FROM TIGHT POSITION ROCK VARIABLE FOR MAXIMUM SIGNAL
12	S.W		6 MC.	RESONANCE	CHECK THAT POINTER (AT RESONANCE) COINCIDES WITH 6 MC CALIBRATION POINT IF NOT, REPEAT STEP 11
13	S.W	REPEAT STEPS 11 AND 12			

NOTE: In order to adjust the short wave oscillator trimmer accurately to the fundamental frequency and not to the image signal, turn the trimmer first to the maximum capacity position (fully tight). From this position loosen the trimmer through one peak indication on the output meter until a second peak is obtained. Adjust for maximum output on this second peak.

To check whether this procedure has been accurately performed, ascertain that an image signal can be received (much weaker) by tuning the signal generator to a frequency 910 kilocycles above the alignment frequency.



MODELS 7-925, 7-934, 7-936, 7-939

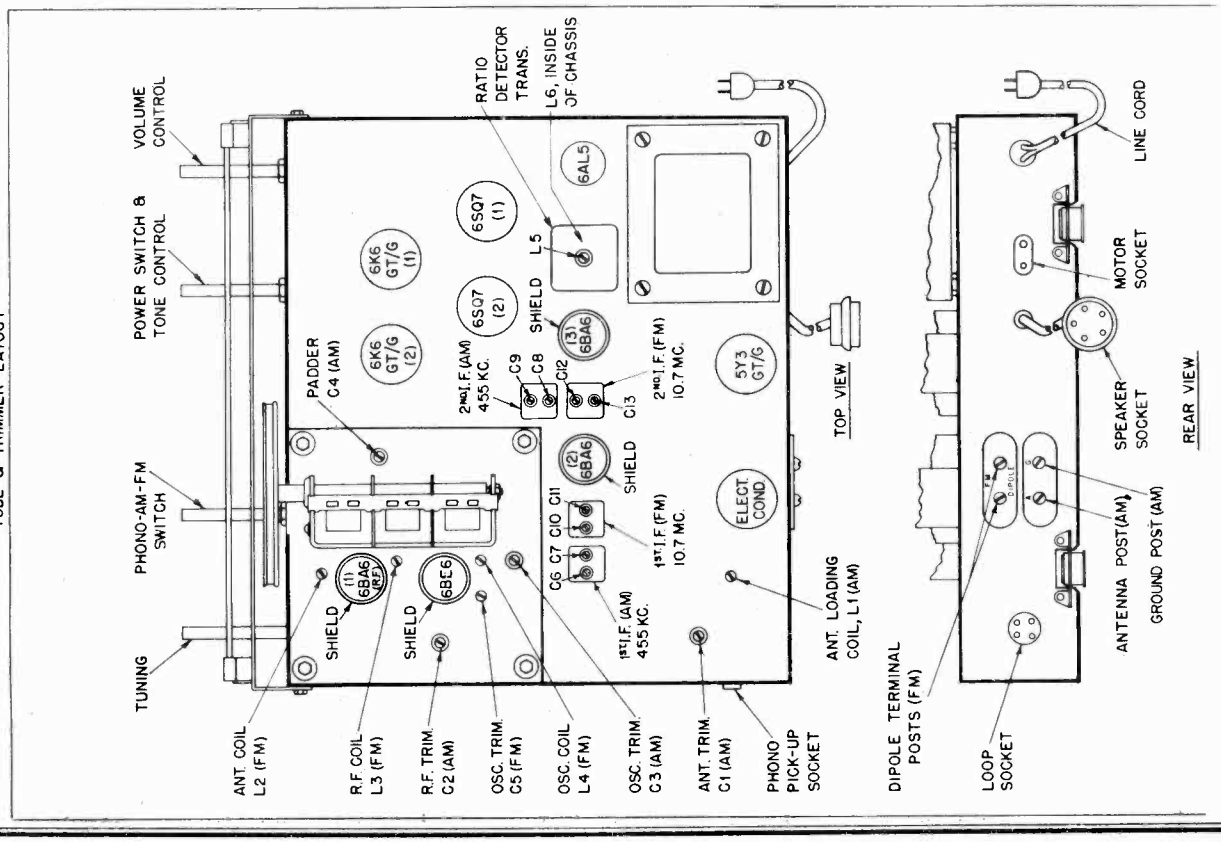
OLYMPIC RADIO & TELEV. INC.

MODEL 7-936

Frequency Range: A.M. 535-1700 kc. and F.M. 88-108 mc

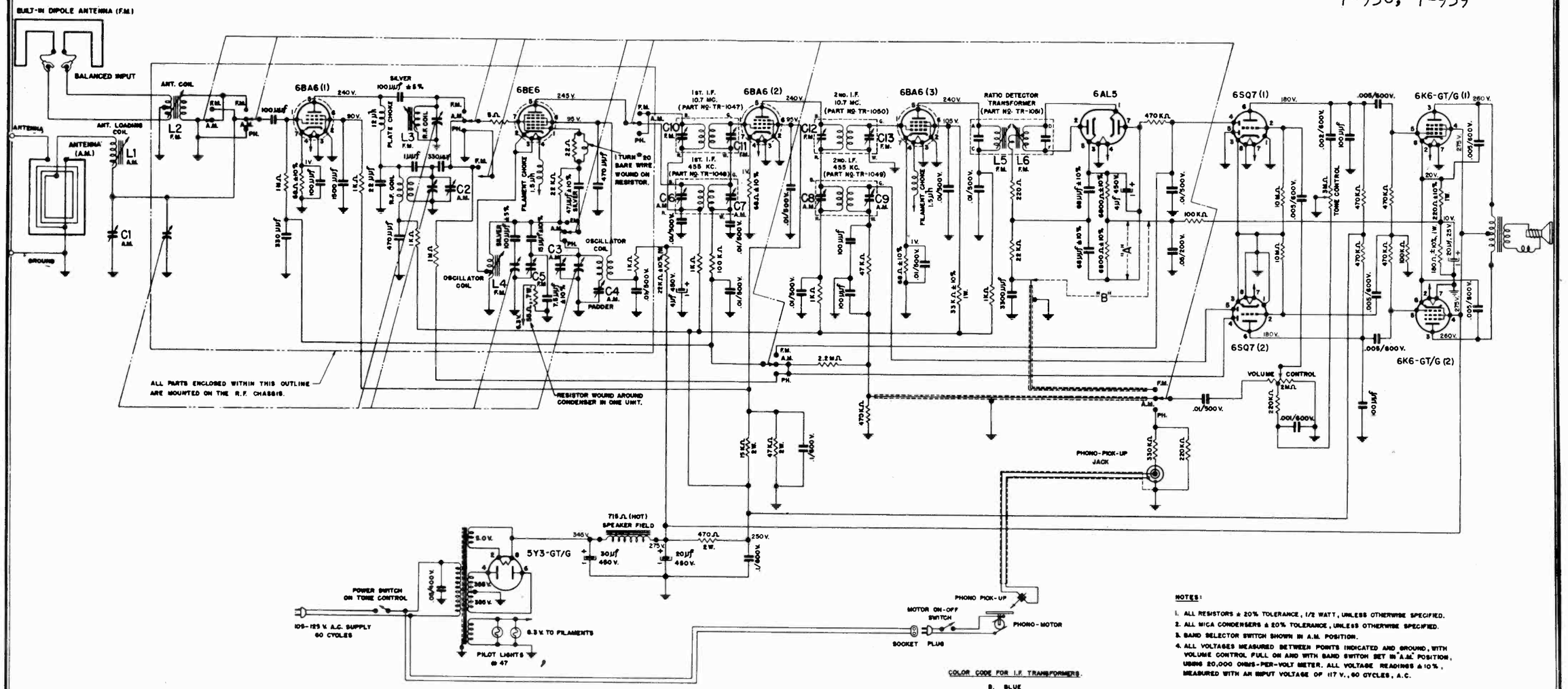
Power Requirement: 105-125 Volts a-c 60 cycles

Power Consumption: Receiver on a-m: 103 watts
Receiver with Record Changer: 120 watts



OLYMPIC RADIO & TELEV. INC.

MODELS 7-925, 7-934, 7-936, 7-939



NOTES:

1. ALL RESISTORS ± 20% TOLERANCE, 1/2 WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ± 20% TOLERANCE, UNLESS OTHERWISE SPECIFIED.
3. BAND SELECTOR SWITCH SHOWN IN A.M. POSITION.
4. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON AND WITH BAND SWITCH SET IN "A.M." POSITION, USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS ± 10%, MEASURED WITH AN INPUT VOLTAGE OF 117 V., 60 CYCLES, A.C.

COLOR CODE FOR I.F. TRANSFORMERS

B. BLUE
G. GREEN
R. RED
W. WHITE

REPLACEMENT PARTS

Part No.	Description
CA-846	Cabinet—console used for model #7-934
CA-847	Cabinet—console used for model #7-925
CA-907	Cabinet—console used for model #7-936
CA-1101	Cabinet—console used for model #7-939
CCA-332M	Condenser—3300 mmfd. ±20% Hi K ceramicon
CCA-U150K	Condenser—15 mmfd. ±10% (N750) ceramicon
CCR-152M	Condenser—1500 mmfd. ±20% Hi K ceramicon
CK-1057	Choke—12 μh plate choke
CK-1058	Choke—1.5 μh filament choke
CL-998	Coil—broadcast antenna loading coil
CL-1025	Coil—broadcast oscillator coil
CL-1026	Coil—broadcast r-f coil
CL-1031	Coil—F.M. antenna coil
CL-1032	Coil—F.M. r-f coil
CL-1033	Coil—F.M. oscillator coil
CO-311	Condenser—1 mmfd. ±20% fixed condenser (gimmick)
CO-715	Condenser—.05/400 W.V. molded paper condenser
CO-768	Condenser—30/20/450 W.V. & 20/25 W.V. electrolytic condenser
CO-890	Condenser—7.5 mmfd. ±10% (N750) ceramic condenser with 55 ohm heater
CO-1056	Condenser—4 mfd. 450 W.V. electrolytic condenser
CO-M-5103	Condenser—.01/500 W.V. midget tubular paper condenser
CT-388	Condenser—220-680 mmfd. padder
CT-939	Condenser—3-35 mmfd. trimmer
CT-1002	Condenser—1.6-18 mmfd. trimmer
CT-1036	Condenser—3-12 mmfd. F.M. trimmer
CV-1053	Condenser—3 gang variable condenser
DL-1070	Dial—glass dial scale
IC-1015	Core—iron core for CL-998
IC-1088	Core—iron core for CL-1031
KN-422	Knob—walnut knob marked "Volume"
KN-423	Knob—walnut knob marked "Off-On-Tone"
KN-425	Knob—walnut knob marked "Tuning"
KN-1074	Knob—walnut knob marked "FM-AM-Phono"
LP-1008	Loop—loop antenna
PO-1011	Pointer
PT-567	Control—2 megohm tapped volume control
PT-568	Control—3 megohm tone control with S.P.S.T. switch
RCM20A101M	Condenser—100 mmfd. ± 20% mica condenser
RCM20A220M	Condenser—22 mmfd. ± 20% mica condenser
RCM20A331M	Condenser—330 mmfd. ± 20% mica condenser
RCM20A471M	Condenser—470 mmfd. ± 20% mica condenser
RCM20A680K	Condenser—68 mmfd. ± 10% mica condenser
RCM20CX101J	Condenser—100 mmfd. ± 5% silver mica
RCM20CX470K	Condenser—47 mmfd. ±10% silver mica
RCP10W2503A	Condenser—.05/200 W.V. paper tub. condenser
RCP10W6102A	Condenser—.001/600 W.V. paper tub. condenser
RCP10W6103A	Condenser—.01/600 W.V. paper tub. condenser
RCP10W6104A	Condenser—.1/600 W.V. paper tub. condenser
RCP10W6202M	Condenser—.002/600 W.V. paper tub. condenser
RCP10W6502A	Condenser—.005/600 W.V. paper tub. condenser
REB 100M	Resistor—10 ohms ±20% 1/2W. resistor
REB 102M	Resistor—1000 ohms ±20% 1/2W. resistor
REB 104M	Resistor—100,000 ohms ±20% 1/2W. resistor
REB 105M	Resistor—1 megohm ±20% 1/2W. resistar
REB 106M	Resistor—10 megohms ±20% 1/2W. resistor
REB 220M	Resistor—22 ohms ±20% 1/2W. resistor
REB 221M	Resistor—220 ohms ±20% 1/2W. resistor
REB 223M	Resistor—22,000 ohms ±20% 1/2W. resistor
REB 224M	Resistor—220,000 ohms ±20% 1/2W. resistor
REB 225M	Resistor—2.2 megohms ±20% 1/2W. resistor
REB 334M	Resistor—330,000 ohms ±20% 1/2W. resistor
REB 473M	Resistor—47,000 ohms ±20% 1/2W. resistor
REB 474M	Resistor—470,000 ohms ±20% 1/2W. resistor
REB 680K	Resistor—68 ohms ±10% 1/2W. resistor
REB 682K	Resistor—6800 ohms ±10% 1/2W. resistor
REC 181K	Resistor—180 ohms ±10% 1W. resistor
REC 221K	Resistor—220 ohms ±10% 1W. resistor
REC 223K	Resistor—22,000 ohms ±10% 1W. resistor
REC 333K	Resistor—33,000 ohms ±10% 1W. resistor
RED 153M	Resistor—15,000 ohms ±20% 2W. resistor
RED 471M	Resistor—470 ohms ±20% 2W. resistor
RED 473M	Resistor—47,000 ohms ±20% 2W. resistor
RX-844	Automatic record changer for model 7-925 only
RX-227-1	Automatic record changer for models 7-934 and 7-936
RX-524	Automatic record changer for model 7-939
SK-384	Speaker—12" dynamic speaker (715 ohms)
SP-191	Spring—dial drive lock spring
SP-218	Spring—pointer drive spring
SW-843	Switch—band switch
TR-1047	Transformer—10.7 mc first F.M. I.F. transformer
TR-1048	Transformer—455 kc first A.M. I.F. transformer
TR-1049	Transformer—455 kc second A.M. I.F. transformer
TR-1050	Transformer—10.7 mc second F.M. I.F. transformer
TR-1051	Transformer—ratio detector transformer
TR-1052	Transformer—power transformer (110 mA.)
WI-1018	Wire—3 conductor parallel cable
WI-1079	Wire—300 ohms transmission line

OLYMPIC RADIO & TELEV. INC. MODELS 7-925, 7-934, 7-936, 7-939

ALIGNMENT PROCEDURE CHART

STEP	SET BAND SWITCH ON-	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO-	SET SIGNAL GENERATOR TO-	TURN- POINTER TO-	READ OUTPUT ON-	ADJUST THE FOLLOWING- (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE).
1	F.M.	PIN 1 OF 6BA6 (3) TUBE FOR .1 VOLT SIGNAL.	10.7 MC. UNMODULATED SIGNAL.	EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN).	VACUUM TUBE VOLTMETER ACROSS 6800 OHM RESISTOR (SEE "A" ON CIRCUIT DIAGRAM).	L5 (RATIO DETECTOR) FOR MAXIMUM READING.
					VACUUM TUBE VOLTMETER ACROSS "B" ON CIRCUIT DIAGRAM.	L6 (RATIO DETECTOR) FOR ZERO READING.
2	F.M.	PIN 7 OF 6BE6 TUBE IN SERIES WITH A .1MFD., 400 VOLT CONDENSER.			VACUUM TUBE VOLTMETER ACROSS 6800 OHM RESISTOR (SEE "A" ON CIRCUIT DIAGRAM).	C13 AND C12 (2nd. I.F. TRANSFORMER) FOR MAXIMUM READING.
3	F.M.					C11 AND C10 (1st. I.F. TRANSFORMER) FOR MAXIMUM READING.
4	A.M.	R.F SECTION OF VARIABLE CONDENSER OR PIN 7 OF THE 6BE6 TUBE IN SERIES WITH A .1 MFD., 400 VOLT CONDENSER.	455 KC.		OUTPUT METER ACROSS SPEAKER VOICE COIL.	C9 AND C8 (2nd. I.F. TRANSFORMER) FOR MAXIMUM OUTPUT.
5	A.M.					C7 AND C6 (1st. I.F. TRANSFORMER) FOR MAXIMUM OUTPUT.
6	F.M.	REPEAT STEPS 2 AND 3.				
7	A.M.	ANTENNA SECTION OF VARIABLE CONDENSER OR PIN 1 OF THE 6BA6 TUBE IN SERIES WITH A .1MFD., 400 VOLT CONDENSER.	1700 KC.	1700 KC. ON DIAL.	OUTPUT METER ACROSS SPEAKER VOICE COIL.	C3 (OSCILLATOR TRIMMER) FOR MAXIMUM OUTPUT.
8	A.M.		1500 KC.	RESONANCE, APPROXIMATELY 1500 KC. ON DIAL.		C2 (R.F. TRIMMER) FOR MAXIMUM OUTPUT.
9	A.M.		600 KC.	RESONANCE, APPROXIMATELY 600 KC. ON DIAL.		C4 (PADDER) ROCK VARIABLE FOR MAXIMUM SIGNAL.
10	A.M.	REPEAT STEPS 7, 8 AND 9.				
11	A.M.	USE RADIATED SIGNAL (CONNECT BOTH SIDES OF SIGNAL GENERATOR TO RADIATION LOOP).	600 KC.	RESONANCE, APPROXIMATELY 600 KC. ON DIAL.	OUTPUT METER ACROSS SPEAKER VOICE COIL.	L1 (ANTENNA LOADING COIL) ROCK VARIABLE FOR MAXIMUM SIGNAL.
12	A.M.		1500 KC.	RESONANCE, APPROXIMATELY 1500 KC. ON DIAL.		C1 (ANTENNA TRIMMER) FOR MAXIMUM OUTPUT.
13	A.M.	REPEAT STEPS 11 AND 12.				
14	F.M.	CONNECT F.M. SIGNAL GENERATOR TO DIPOLE TERMINAL POSTS WITH A 150 OHM RESISTOR IN SERIES WITH EACH SIDE. 30% MODULATED SIGNAL.	108 MC.	108 MC. ON DIAL.	OUTPUT METER ACROSS SPEAKER VOICE COIL.	C5 (OSCILLATOR TRIMMER) FOR MAXIMUM OUTPUT.
15	F.M.		88 MC.	88 MC. ON DIAL. (CHECK IMAGE AT 109.4 MC.).		L4 (OSCILLATOR COIL) FOR MAXIMUM OUTPUT.
16	F.M.	REPEAT STEPS 14 AND 15.				
17	F.M.		102 MC.	102 MC. ON DIAL.	OUTPUT METER ACROSS SPEAKER VOICE COIL.	L3 (R.F. COIL) FOR MAXIMUM OUTPUT. L2 (ANTENNA COIL) FOR MAXIMUM OUTPUT.

The pick-up is of the low-pressure crystal type and is equipped with a permanent needle which will give about 4,000 playings before requiring replacement. When first used a pronounced needle scratch will be heard which will be greatly reduced after about twenty playings. This "breaking in" period is essential on all needles of the permanent type in order to permit the point to become polished.

This instrument is equipped with a sensitive 9 tube plus rectifier superheterodyne receiver. The rotatable built-in loop antenna will provide satisfactory reception under all normal operating conditions. The loop is mounted between springs, so that it can be freely rotated to the best position for reception. Once this position is established it is no longer necessary to make any further loop adjustments. The directional characteristic of the loop is particularly useful for the elimination of elevator noises or other local electrical disturbances.

SERVICE AND ALIGNMENT INSTRUCTIONS

To remove the chassis from the console, it is first necessary to disconnect the loop connector plug, the female connector plug on the speaker, the phono input plug, the motor plug and the two F.M. lugs on the F.M. antenna terminal post. Then remove the four knobs and the four screws holding the chassis to its mounting panel.

CAUTION: WHEN REMOVING THE CHANGER BE SURE TO PLACE IT IN A POSITION IN WHICH THE CHANGER MECHANISM WILL NOT BE DAMAGED.

ALIGNMENT

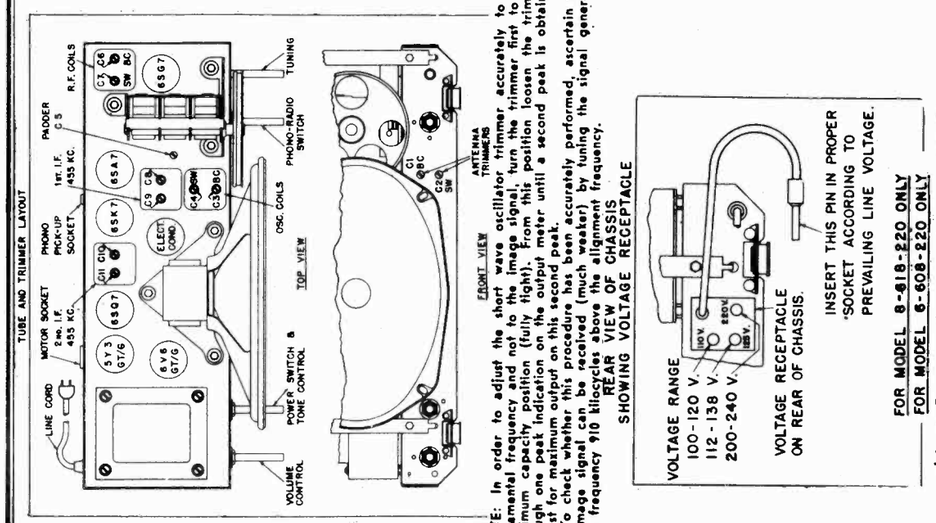
Equipment Required: Modulated a-m, r-f signal generator; modulated f-m signal generator covering the range from 88 to 108 megacycles; vacuum tube voltmeter; output meter; insulated screw driver; radiation loop (1 turn of about 6" to 8" diameter of #12 or #14 wire connected across output of signal generator and placed parallel to receiver loop about 8" or 10" away); one .1 mfd 400 volt condenser; two 150 ohm resistors.

With the receiver removed from the cabinet, connect output meter, or vacuum tube voltmeter and signal generator as indicated in the alignment procedure chart and keeping the output of the generator as low as possible, proceed exactly in the sequence as shown on the chart.

Before aligning, close the variable condenser fully counter clockwise (plates fully closed) and check that pointer coincides with the reference line on the dial.

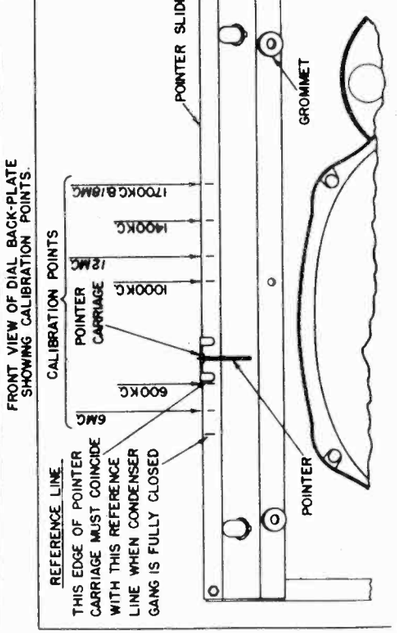
MODELS 8-618, 8-618-220

OLYMPIC RADIO & TELEV. INC.



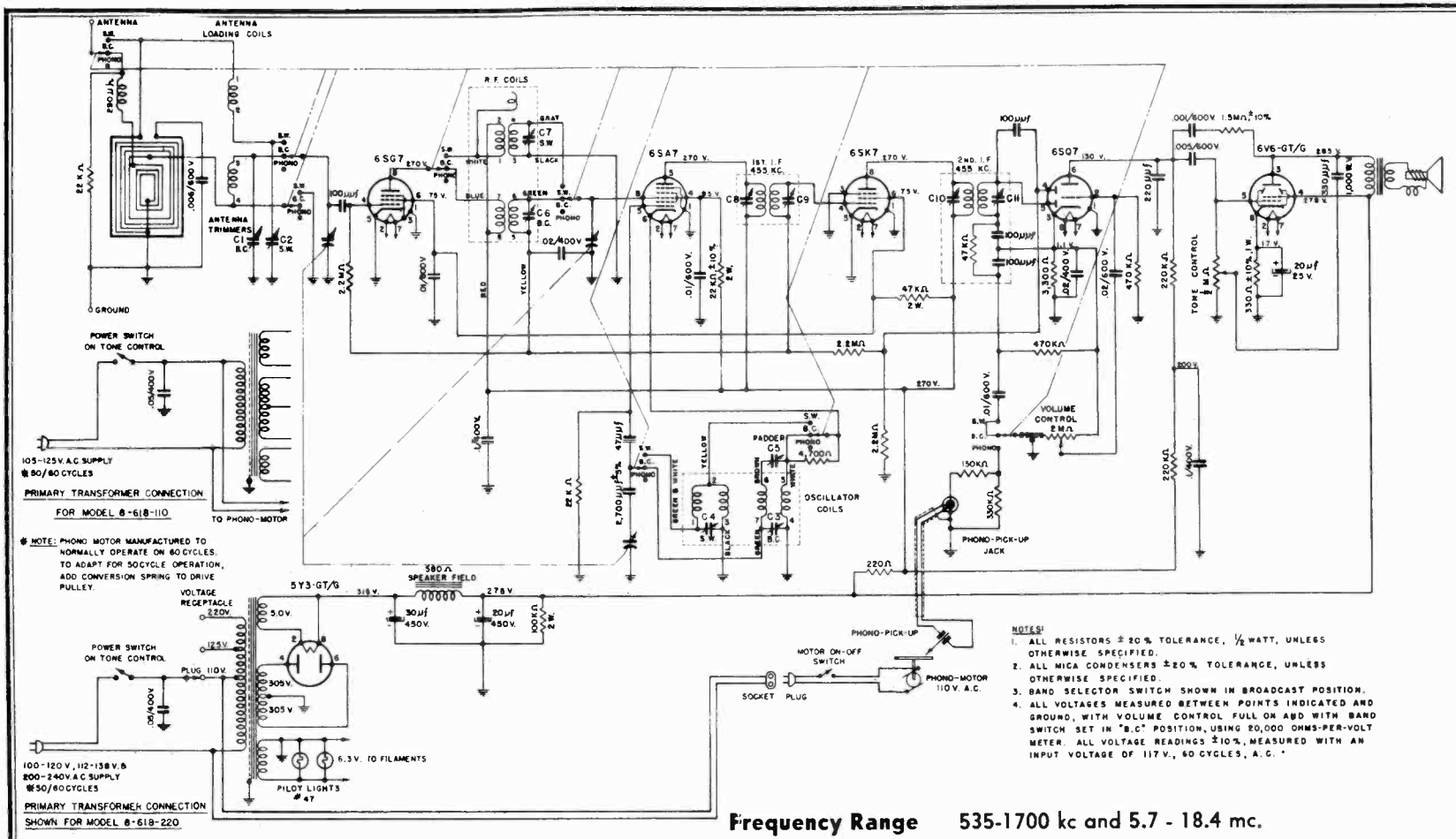
ALIGNMENT PROCEDURE CHART

STEP	SET BAND SWITCH ON	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO-	SET SIGNAL GENERATOR TO-	TURN POINTER TO-	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE).
1	B.C.	R.F. SECTION OF VARIABLE CONDENSER OR PIN 4 OF THE 6SK7 TUBE IN SERIES WITH A .1 MFD. 400 VOLT CONDENSER.	455 KC.	EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN).	C11 AND C10 (2nd. I.F. TRANSFORMER)
2	B.C.	R.F. SECTION OF VARIABLE CONDENSER OR PIN 6 OF THE 6SA7 TUBE IN SERIES WITH A .1 MFD. 400 VOLT CONDENSER.	455 KC	EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN).	C9 AND C8 (1st. I.F. TRANSFORMER)
3	B.C.	REPEAT STEPS 1 AND 2			
4	B.C.	USE RADIATED SIGNAL (CONNECT BOTH SIDES OF SIGNAL GENERATOR TO RADIATION LOOP).	1700 KC.	1700 KC. CALIBRATION POINT ON DIFFUSER PLATE	C3 (OSCILLATOR TRIMMER)
5	B.C.		1400 KC.	RESONANCE, APPROXIMATELY 1400 KC. CALIBRATION POINT ON DIFFUSER PLATE.	C6 AND C1 (R.F. AND ANTENNA TRIMMERS)
6	B.C.		600 KC.	RESONANCE, APPROXIMATELY 600 KC. CALIBRATION POINT ON DIFFUSER PLATE.	C5 (PADDER) ROCK VARIABLE FOR MAXIMUM SIGNAL
7	B.C.	REPEAT STEPS 4, 5 AND 6			
8	S.W.		18 MC.	18 MC. CALIBRATION POINT ON DIFFUSER PLATE	C4 (OSCILLATOR TRIMMER) SECOND PEAK FROM TIGHT POSITION. C7 (R.F. TRIMMER) FIRST PEAK FROM TIGHT POSITION. C2 (ANTENNA TRIMMER) CHECK THAT POINTER (AT RESONANCE) COINCIDES WITH 6 MC. CALIBRATION POINT. IF NOT REPEAT STEP 8.
9	S.W.		6 MC	RESONANCE	
10	S.W.	REPEAT STEPS 8 AND 9			



Note: Dial lights may, in case of failure, be replaced without removing chassis from cabinet. Remove the three bronze plated screws which hold the metal-front-shield to the motorboard and lift the shield. The two sockets holding the pilot lights will then be accessible for replacement of the bulbs.

The pick-up is of the low pressure crystal type and is equipped with a permanent type needle which will give about 4,000 playings before requiring replacement. When first used a pronounced needle scratch will be heard which will be greatly reduced after about twenty playings. This "breaking in period" is essential on all needles of the permanent type in order to permit the point to become polished.



NOTES:
1. ALL RESISTORS ± 20% TOLERANCE, ½ WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ±20% TOLERANCE, UNLESS OTHERWISE SPECIFIED.
3. BAND SELECTOR SWITCH SHOWN IN BROADCAST POSITION.
4. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON AND WITH BAND SWITCH SET IN "B.C" POSITION, USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS ±10%, MEASURED WITH AN INPUT VOLTAGE OF 117 V., 60 CYCLES, A.C.

Frequency Range 535-1700 kc and 5.7 - 18.4 mc.

Power Requirement 105-125 volts 60 cycles a-c.

Power Consumption Receiver—70 watts. Receiver with Record Changer—85 watts.

ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; one .1 mfd 400 volt condenser; one 400 ohm resistor, and one radiation loop.

With the receiver removed from the cabinet, connect output meter across voice coil. Connect ground side of the signal generator to chassis; turn volume control fully on, and keeping the output of the signal generator as low as possible, proceed in the sequence as shown on the alignment chart.

To facilitate alignment of the receiver when removed from cabinet, calibration points are provided on the pointer slide bar (see drawing).

Before aligning, close the variable condenser fully counterclockwise (plates fully closed) and check that pointer carriage coincides with the "reference line" on the pointer slide bar.

REPLACEMENT PARTS LIST

PART NUMBER	DESCRIPTION
BU-187	Bulb—#47 6.3 volt pilot light bulb
CA-865	Cabinet—
CL-211	Coil—antenno loading coil
CL-212	Coil—oscillator coil
CL-224	Coil—r-f coil
CO-715	Condenser—.05/400 W.V. molded paper condenser
CO-768	Condenser—30+20/450 W.V. & 20/25 W.V. electrolytic cond.
CT-389	Condenser—3-35 mmfd dual trimmer condenser
CT-440	Condenser—350-780 mmfd padder condenser
CV-144	Condenser—3 section variable condenser gang
DL-718	Dial—glass dial scale
KN-418	Knob—walnut knob marked "Volume"
KN-419	Knob—walnut knob marked "Off-On-Tone"
KN-421	Knob—walnut knob marked "Tuning"
KN-736	Knob—walnut knob marked "SW-BC-PH"
LP-213	Loop—loop-antenna
PO-181	Pointer—
PT-105	Control—2 megohm volume control
PT-106	Control—½ megohm tone control with Off-On switch
RCM20A101M	Condenser—100 mmfd ±20% mica condenser
RCM20A221M	Condenser—220 mmfd ±20% mica condenser
RCM20A470M	Condenser—47 mmfd ±20% mica condenser
RCM30B272J	Condenser—2700 mmfd ±5% mica condenser
RCM40A331M	Condenser—330 mmfd ±20% mica condenser (1000 W.V.)
RCP10W4104L	Condenser—.1/400 W.V. tubular paper condenser
RCP10W4203A	Condenser—.02/400 W.V. tubular paper condenser
RCP10W6102A	Condenser—.001/600 W.V. tubular paper condenser
RCP10W6103A	Condenser—.01/600 W.V. tubular paper condenser
RCP10W6203A	Condenser—.02/600 W.V. tubular paper condenser
RCP10W6502A	Condenser—.005/600 W.V. tubular paper condenser
RCP10W6602K	Condenser—.006/600 W.V. tubular paper condenser
REB-154M	Resistor—150,000 ohms ±20% ½ watt resistor
REB-155K	Resistor—1.5 megohms ±10% ½ watt resistor
REB-221M	Resistor—220 ohms ±20% ½ watt resistor
REB-223M	Resistor—22,000 ohms ±20% ½ watt resistor
REB-224M	Resistor—220,000 ohms ±20% ½ watt resistor
REB-225M	Resistor—2.2 megohms ±20% ½ watt resistor
REB-332M	Resistor—3300 ohms ±20% ½ watt resistor
REB-334M	Resistor—330,000 ohms ±20% ½ watt resistor
REB-472M	Resistor—4700 ohms ±20% ½ watt resistor
REB-474M	Resistor—470,000 ohms ±20% ½ watt resistor
REC-331K	Resistor—330 ohms ±10% 1/watt resistor
RED-104M	Resistor—100,000 ohms ±20% 2 watt resistor
RED-223K	Resistor—22,000 ohms ±10% 2 watt resistor
RED-473M	Resistor—47,000 ohms ±20% 2 watt resistor
SK-325	Speaker—6"x9" oval electrodynamic speaker
SO-189	Socket—pilot light socket assembly
SP-191	Spring—drive shaft retaining spring
SP-218	Spring—pointer drive spring
ST-369	Back—masonite back
SW-140	Switch—band switch
TR-112	Transformer—95 mils power transformer for 110 V. operation
TR-523	Transformer—power transformer for 220 V. operation
TR-781	Transformer—455 kc input I.F. transformer
TR-782	Transformer—455 kc output I.F. transformer

SERVICE AND ALIGNMENT INSTRUCTIONS

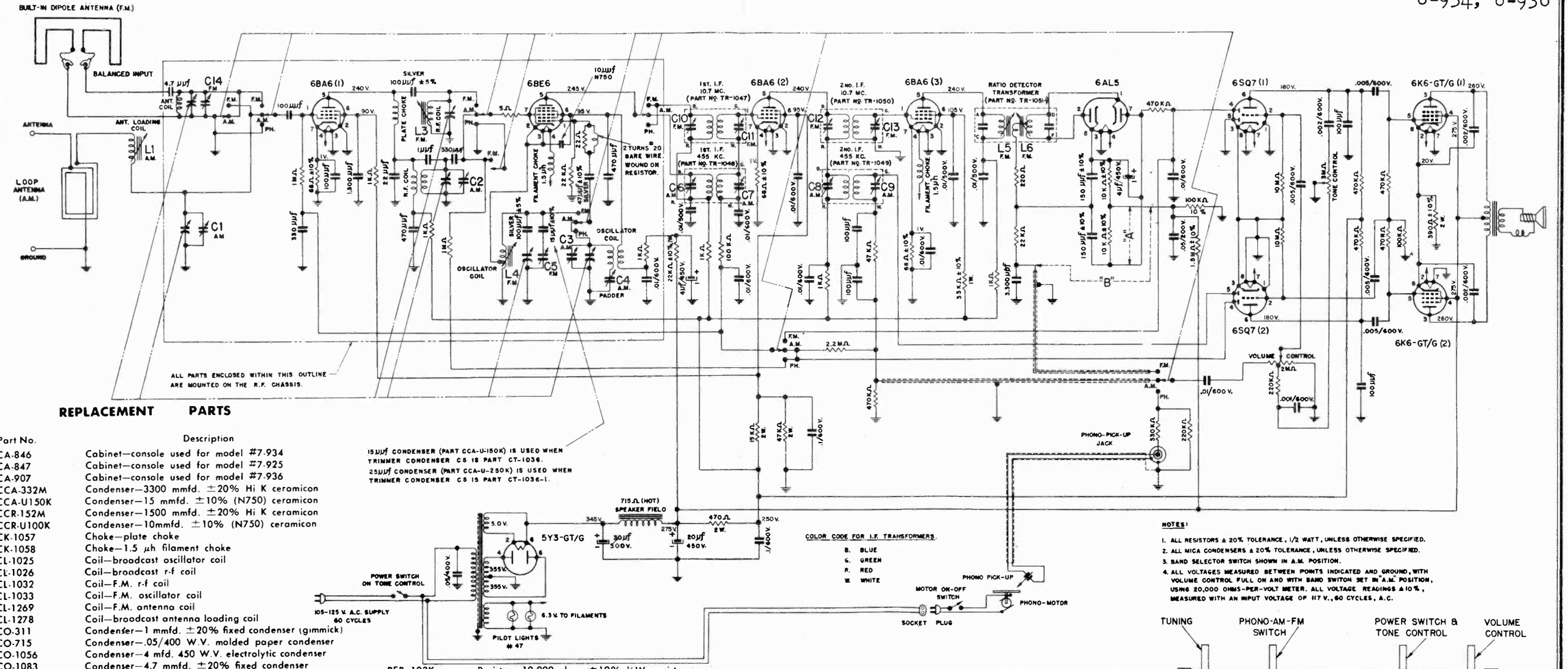
To insure proper alignment a radiated signal will be required during part of the alignment procedure. To radiate a signal connect a loop of about 6" to 8" diameter 1 turn of #14 or #12 wire across the output of the signal generator and place this loop parallel to the loop of the receiver to be aligned at a distance of about 8" or 10".

To service this receiver it is first necessary to remove the motorboard with the record changer and then remove the chassis through the top opening of the cabinet. To lift the entire motorboard with the changer, unfasten the six screws holding the motorboard in place, disconnect motor and pick-up plugs from chassis, and lift up.

CAUTION: WHEN REMOVING THE CHANGER BE SURE TO PLACE IT IN A POSITION WHEREBY THE CHANGER MECHANISM WILL NOT BE DAMAGED.

OLYMPIC RADIO & TELEV. INC.

MODELS 8-925, 8-934, 8-936



REPLACEMENT PARTS

Part No.	Description
CA-846	Cabinet—console used for model #7-934
CA-847	Cabinet—console used for model #7-925
CA-907	Cabinet—console used for model #7-936
CCA-332M	Condenser—3300 mmfd. ±20% Hi K ceramicon
CCA-U150K	Condenser—15 mmfd. ±10% (N750) ceramicon
CCR-152M	Condenser—1500 mmfd. ±20% Hi K ceramicon
CCR-U100K	Condenser—10mmfd. ±10% (N750) ceramicon
CK-1057	Choke—plate choke
CK-1058	Choke—1.5 µh filament choke
CL-1025	Coil—broadcast oscillator coil
CL-1026	Coil—broadcast r-f coil
CL-1032	Coil—F.M. r-f coil
CL-1033	Coil—F.M. oscillator coil
CL-1269	Coil—F.M. antenna coil
CL-1278	Coil—broadcast antenna loading coil
CO-311	Condenser—1 mmfd. ±20% fixed condenser (gimmick)
CO-715	Condenser—.05/400 W.V. molded paper condenser
CO-1056	Condenser—4 mfd. 450 W.V. electrolytic condenser
CO-1083	Condenser—4.7 mmfd. ±20% fixed condenser
CO-1270	Condenser—30/500 W.V. & 20+4/450 W.V. electrolytic condenser
CO-M-5103	Condenser—.01/500 W.V. midget tubular paper condenser
CT-388	Condenser—220-680 mmfd. padder
CT-939	Condenser—3-35 mmfd. trimmer
CT-1002	Condenser—1.6-18 mmfd. trimmer
CT-1036	Condenser—3-12 mmfd. F.M. trimmer
CV-1053	Condenser—3 gang variable condenser
DL-1070-1	Dial—glass dial scale
IC-1015	Core—iron core for CL-1278
KN-422	Knob—walnut knob marked "Volume"
KN-423	Knob—walnut knob marked "Off-On-Tone"
KN-425	Knob—walnut knob marked "Tuning"
KN-1074	Knob—walnut knob marked "FM-AM-Phono"
PO-1011	Pointer
PT-567	Control—2 megohm tapped volume control
PT-568	Control—3 megohm tone control with S.P.S.T. switch
RCM20A101M	Condenser—100 mmfd. ±20% mico condenser
RCM20A151K	Condenser—150 mmfd. ±10% mico condenser
RCM20A220M	Condenser—22 mmfd. ±20% mica condenser
RCM20A331M	Condenser—330 mmfd. ±20% mica condenser
RCM20A471M	Condenser—470 mmfd. ±20% mico condenser
RCM20CX101J	Condenser—100 mmfd. ±5% silver mica
RCM20CX470K	Condenser—47 mmfd. ±10% silver mica
RCP10W2503A	Condenser—.05/200 W.V. paper tub. condenser
RCP10W6102A	Condenser—.001/600 W.V. paper tub. condenser
RCP10W6103A	Condenser—.01/600 W.V. poper tub. condenser
RCP10W6104A	Condenser—.1/600 W.V. paper tub. condenser
RCP10W6202M	Condenser—.002/600 W.V. paper tub. condenser
RCP10W6502A	Condenser—.005/600 W.V. poper tub. condenser
REB 100M	Resistor—10 ohms ±20% ½W. resistor
REB 102M	Resistor—1000 ohms ±20% ½W. resistor
REB 103K	Resistor—10,000 ohms ±10% ½W. resistor
REB 104K	Resistor—100,000 ohms ±10% ½W. resistor
REB 104M	Resistor—100,000 ohms ±20% ½W. resistor
REB 105M	Resistor—1 megohm ±20% ½W. resistor
REB 106M	Resistor—10 megohms ±20% ½W. resistor
REB 155K	Resistor—1.5 megohms ±10% ½W. resistor
REB 220M	Resistor—22 ohms ±20% ½W. resistor
REB 221M	Resistor—220 ohms ±20% ½W. resistor
REB 223M	Resistor—22,000 ohms ±20% ½W. resistor
REB 224M	Resistor—220,000 ohms ±20% ½W. resistor
REB 225M	Resistor—2.2 megohms ± 20% ½W. resistor
REB 334M	Resistor—330,000 ohms ±20% ½W. resistor
REB 473M	Resistor—47,000 ohms ±20% ½W. resistor
REB 474M	Resistor—470,000 ohms ±20% ½W. resistor
REB 680K	Resistor—68 ohms ±10% ½W. resistor
REC 223K	Resistor—22,000 ohms ±10% 1W. resistor
REC 333K	Resistor—33,000 ohms ±10% 1W. resistor
RED 153M	Resistor—15,000 ohms ±20% 2W. resistor
RED 391M	Resistor—390 ohms ±20% 2W. resistor
RED 471M	Resistor—470 ohms ±20% 2W. resistor
RED 473M	Resistor—47,000 ohms ±20% 2W. resistor
SK-384	Speaker—12" dynamic speaker (715 ohms)
SP-191	Spring—dial drive lock spring
SP-218	Spring—pointer drive spring
SW-843	Switch—band switch
TR-1047	Transformer—10.7 mc first F.M. I.F. transformer
TR-1048	Transformer—455 kc first A.M. I.F. transformer
TR-1049	Transformer—455 kc second A.M. I.F. transformer
TR-1050	Transformer—10.7 mc second F.M. I.F. transformer
TR-1051-1	Transformer—ratio detector transformer
TR-1052	Transformer—power transformer (110 mA.)
WI-1079	Wire—300 ohms transmission line

TUBE & TRIMMER LAYOUT