



FOR MEMBERS OF RADIO MANUFACTURERS SERVICE

SERVICE BULLETIN
No. 251

General Description

Model 37-3630 is a 6 tube superheterodyne receiver for operation on alternating current, having three tuning ranges, covering standard broadcast and short-wave frequencies, and using the new Philco Designed High-Efficiency self-centering glass tubes.

The circuit includes the Philco "Foreign Tuning System" controlled by the tuning range switch which provides maximum sensitivity and noise reduction, when used with the **Philco High Efficiency Aerial**. One stage of Radio Frequency amplification which greatly increases the signal to noise ratio, automatic bass compensation in the volume control circuit, shadow tuning and a separate diode circuit for automatic volume control are also incorporated in this receiver.

The red and black leads of the High-Efficiency Aerial "transmission line" are connected to terminals 1 and 2 respectively, of the terminal panel provided at the rear of the chassis. Connect the jumper on the terminal panel across terminals 3 and 4.

If a temporary aerial is used, the jumper should be across terminals 2 and 3. The aerial connects to terminal 1 and the ground to terminal 3.

A good ground connection is desirable in all installations. Make the ground connection from the nearest water or radiator pipe to terminal 3 on the terminal panel.

The chassis is constructed in three basic assembly units, concentrating each circuit in a single unit.

The Radio Frequency unit, located in the center of the chassis, contains a 6K7G tube which functions as a Radio Frequency Amplifier; a 6A8G tube, for the Detector-Oscillator circuit; individual Antenna, R.F. Amplifier and Oscillator coils for each tuning range; selector switch; compensating condensers for all coils; and other parts necessary

for the associated circuits. The unit is separately mounted on rubber grommets, cushioning it from the main chassis.

The Intermediate Frequency unit, mounted on the right hand side of the chassis (facing front of set) consists of the Intermediate Frequency transformers, compensating condensers, a 6K7G for the I.F. Amplifier stage, and a 6Q7G tube as the second detector—automatic volume control and first audio stage. All voltages supplied to the I.F. and R.F. units are furnished from a terminal strip mounted in this unit.

The Power Pack and Audio Output circuits, together with the required voltage dividers and filter condensers are mounted in the power unit. This unit contains a 6F6G tube and a 5Y4G tube for the Power Output and Rectifier Circuits respectively, and the combined tone control and power switch.

Schematic Diagram, Fig. 5, is numbered, indicating all important parts. These numbers correspond with the parts layout shown in Fig. 6. In addition, the range switch wafers are shown on the schematic diagram. The contacts on each wafer are numbered and lettered to indicate their connection points in the schematic diagram, which are also lettered and numbered. The physical drawings of each coil used in the receiver are also shown on schematic diagram Fig. 5. The connections of these coils are numbered on the coil drawing and on the schematic diagram.

Fig. 1 shows the Voltage measurements taken from the bottom of the socket at each contact. In Fig. 2, the correct position of the dial indicator, for proper adjustment of the compensator condenser is shown. Fig. 3 and 4 are the locations of the I.F. and R.F. compensators respectively.

Electrical Specifications

Voltage Rating: 115 Volts A.C.

Frequency Rating: 25-40 or 50-60 cycles.

For 25 to 40 cycle operation the Power Transformer marked with asterisk in parts list is used.

Power Consumption: 65 Watts.

Types and Number of Tubes: 2 type 6K7G, R.F. and I.F. Amplifiers; 1 type 6A8G, Detector-Oscillator; 1 type 6Q7G, 2nd Detector, Automatic Volume Control and 1st

Audio; 1 type 6F6G, Output; and 1 type 5Y4G Rectifier.

Undistorted Output: 3 watts.

Intermediate Frequency: 470 K.C.

Tuning Ranges: Three. Range 1.—530 to 1720 Kilocycles; Range 2.—2.3 to 7.4 Megacycles; Range 3.—7.35 to 22 Megacycles.

Speakers: X Cabinet—H24

B Cabinet—K21

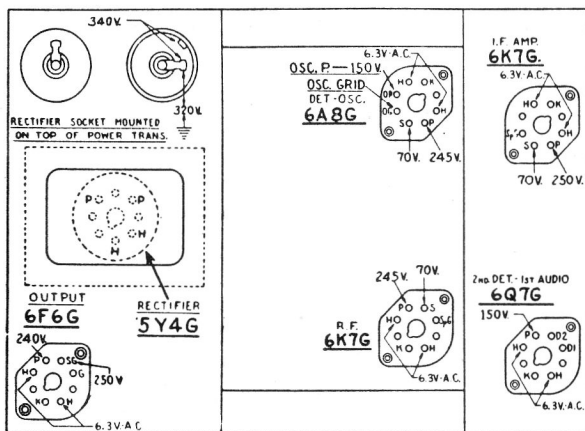
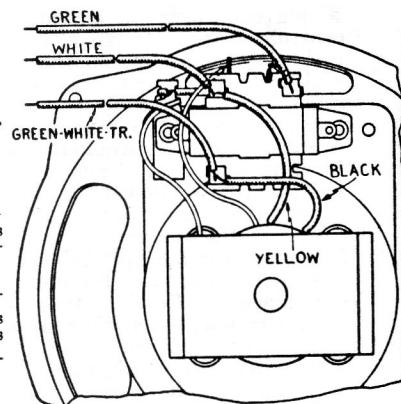


Fig. 1. Socket Voltages
Measured from Socket Contact to Ground
Underside of Chassis View

The voltages indicated by arrows were measured with a Philco 025 Circuit Tester which contains a voltmeter having a resistance of 1000 ohms per volt. Volume Control at minimum. Range Switch in broadcast position. Line voltage 115 A.C.

POWER TRANSFORMER DATA

Lead No. Shown on Schematic	A.C. Volts	Current	Circuit	Color	Resistance
1-2	120	—	Pri.	White	5 ohms
3-4	5.0	2.0 A.	Fil. Rectifier	Blue	.1 ohm
5-7	670	70 Ma.	High Voltage Sec.	Yellow	145 ohms 155 ohms
6	—	—	Center Tap of 5-7	—	—
8-9	6.7	2.1 A.	Fil.	Black	.1 ohm



Speaker Wiring

When replacing any part of the speaker, the hum bucking coil connections should be connected for minimum hum.

Run 2.

While the circuit arrangement remains the same, the locations of the parts are slightly changed in this Run. Bakelite condenser (67) Part No. 3793-DG is removed from front and placed in the rear of the chassis. Tubular condenser (57) Part No. 30-4380 is replaced with a Part No. 8318-SU bakelite condenser placed in the position formerly held by 3793-DG.

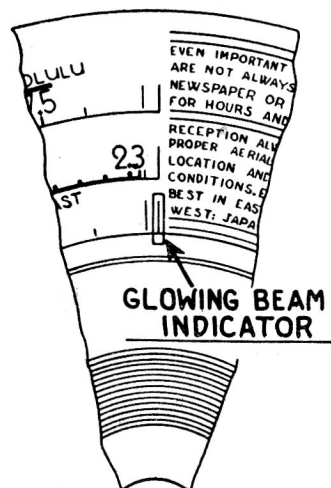


Fig. 2—Dial Calibration

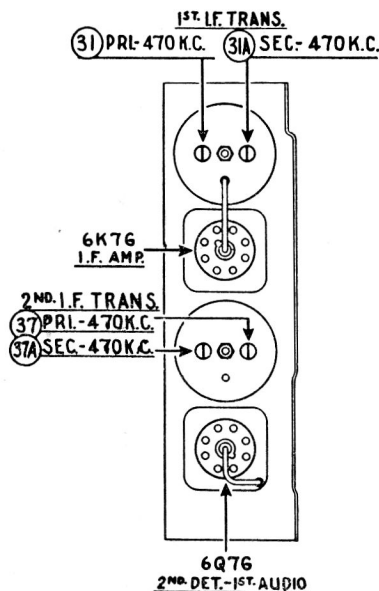


Fig. 3—Locations of I. F. Compensators

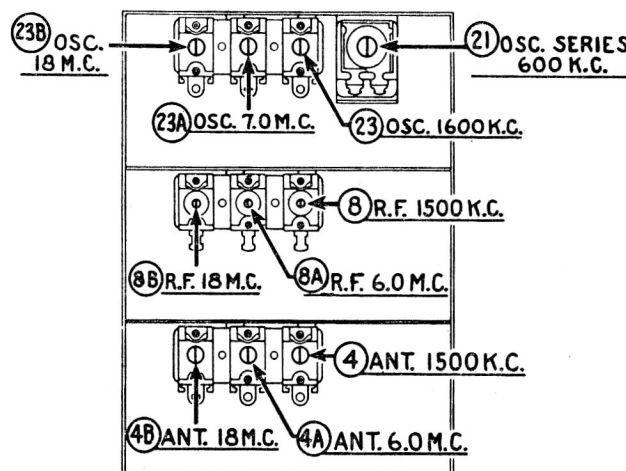


Fig. 4—Locations of R. F. Compensators

Alignment of the Compensators

The accurate adjustment of the various compensating condensers is vital to the proper functioning of this receiver. There are four compensating condensers in the I.F. Circuit, four in the Oscillator Circuit, three in the R.F. Amplifier Circuit and three in the Antenna Circuit. Incorrect adjustment will cause loss of sensitivity, unsatisfactory tone, and poor selectivity.

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

Philco Fibre Handle Screw-Driver No. 27-7059 completes the necessary equipment for these adjustments. The locations of the various compensators are shown in Figs. 3 and 4.

The following procedure must be observed in adjusting the compensators:—

Dial Calibration—In order to adjust this receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, rotate the tuning condenser control to the extreme counter-clockwise position (maximum capacity). Loosen the screw of dial hub, then turn dial until the glowing indicator is centered on the first index line of dial scale (see Fig. 2). Now tighten the dial hub set screw in this position.

Shadow Meter Adjustment—Remove aerial and allow tubes to warm up. Then adjust shadow meter as follows:

- 1 Move the Shadow meter coil backwards and forwards, until the shadow is within one-eighth of an inch of each side of the screen.

- 2 Remove the Rectifier tube from its socket, and rotate the shadow meter coil for minimum shadow width.

- 3 Replace the Rectifier tube. The shadow should then return to maximum width or within one-eighth of an inch of each side of the screen. If the shadow does not return to maximum width, operations 1 and 2 should be continued until it does.

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

During the I.F. and R.F. adjustments, the signal generator output should be maintained at the lowest possible level that will give an indication on the output meter.

INTERMEDIATE FREQUENCY CIRCUIT

Frequency 470 K.C.

- 1 Connect the 088 Signal Generator output lead, through a .1 mfd. condenser, to the control grid of the 6A8G tube; and the ground connection of the output lead to the chassis.

- 2 Set the range switch in position No. 1 (Broadcast), then

rotate the tuning condenser of the receiver to the maximum capacity position (counter-clockwise), and adjust the signal generator for 470 K.C.

- 3 Adjust compensators (37)a 2nd I.F. Sec., (37) 2nd I.F. Pri., (31)a 1st I.F. Sec., and (31) 1st I.F. Pri. for maximum reading on output meter.

RADIO FREQUENCY CIRCUIT

Tuning Range—7.3 to 22.0 M.C.

- 1 Remove the signal generator output lead from the grid of 6A8G tube, and connect it through a .1 mfd. condenser to terminal No. 1 on aerial input panel, and the generator ground lead to terminal No. 3, rear of chassis. (a) Terminals 2 and 3 of aerial input panel must be connected with connector link provided on the panel, during these adjustments.

- 2 Set the tuning range switch in position No. 3 (Short Wave). Turn the signal generator and receiver dials to 18 M.C. and adjust compensators (23)b Osc., (8)b R.F. and (4)b Ant. for maximum output. (See Note (a) below).

(a) The adjustment of the Radio Frequency compensator on the high frequency range causes a slight detuning of the oscillator circuit. In order to overcome this detuning effect, connect a variable condenser of approximately 350 mmfd., having a good vernier drive, across the oscillator section of the tuning condenser. Leaving the signal generator and receiver dials at 18 M.C., tune the added condenser so that the second harmonic of the receiver oscillator will beat against the signal from the 088 signal generator bringing in the signal. The antenna and R.F. compensators (4)b and (8)b should then be adjusted to give maximum output. Now remove the external condenser and turn compensator (23)b to maximum capacity (clockwise) then without moving signal generator or receiver tuning condenser, back off compensator (23)b (counter-clockwise) until a second peak is reached on the output meter. The first peak is caused by tuning to the image frequency signal and must not be used.

Tuning Range 2.3 to 7.4 M.C.

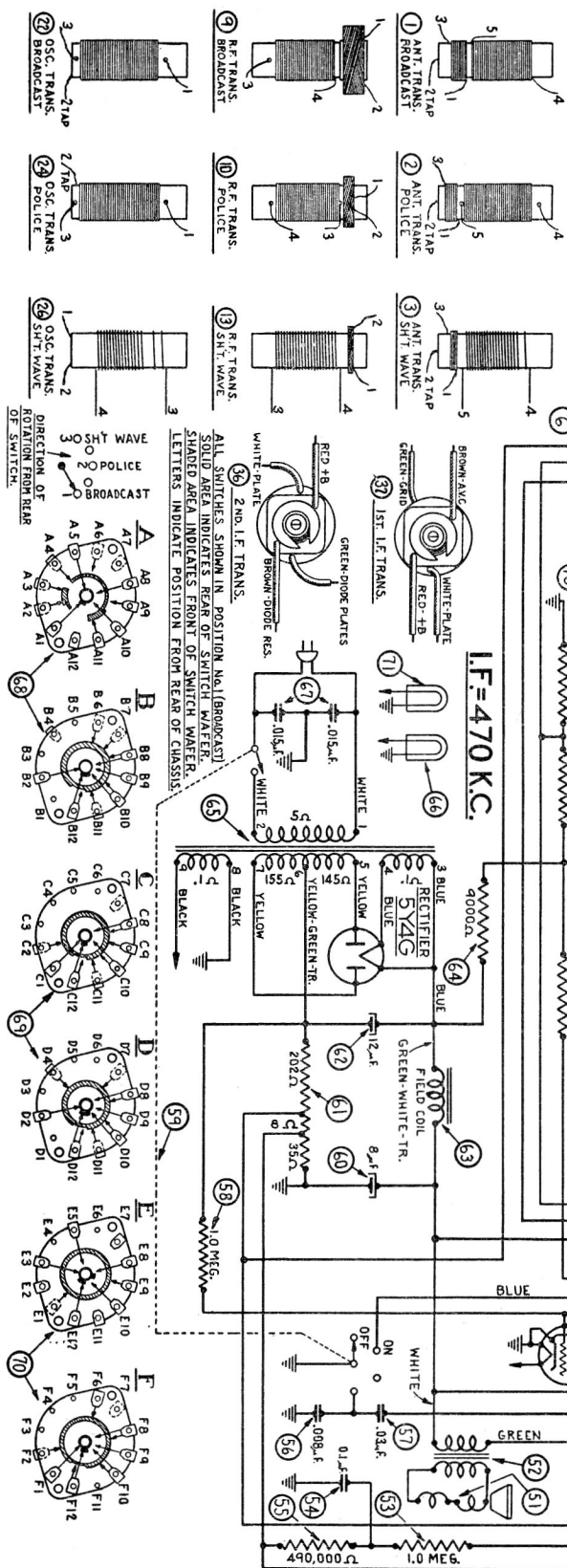
- 1 Turn the range switch to position No. 2 (Police). Rotate the signal generator and receiver dials to 7.0 M.C. Then adjust compensator (23)a for maximum output. Now turn the signal generator and receiver dials to 6.0 M.C. and adjust compensators (8)a R.F. and (4)a Ant. for maximum reading on the output meter.

Tuning Range 530 to 1720 K.C.

- 1 Set the range switch in position No. 1 (Broadcast). Set the 088 Signal Generator indicator at 800 K.C. and the receiver dial at 1600 K.C.

(a) In adjusting the receiver at 1600 K.C. the second harmonic of 800 K.C., to which the signal generator is tuned, is used. The second harmonic of 800 K.C. is 1600 K.C. Now adjust compensators (23) Osc., (8) R.F. and (4) Ant. for maximum reading on output meter.

- 2 The low frequency end of the range is now tuned by turning the signal generator and receiver dials to 600



Model 37-3630

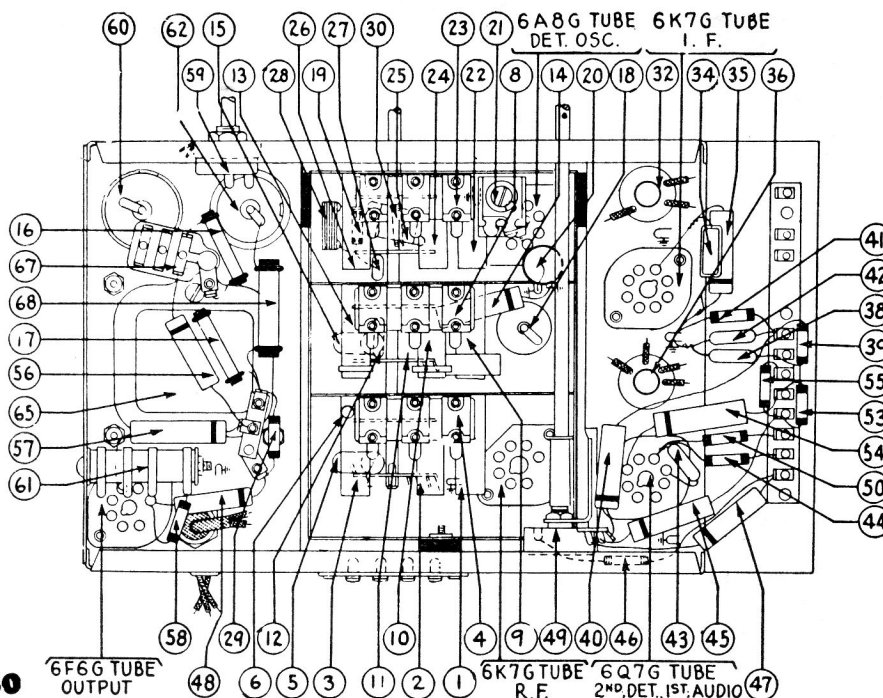
K.C. and adjusting compensator (21) Osc. Series—(see Note (a) below)—for maximum reading on output meter. (a) While compensator (21) is being adjusted, the tuning condenser must be rolled for maximum output. This is accomplished as follows:—First tune compensator (21) for maximum output. Then vary the tuning condenser for maximum output at 600 K.C. Now retune compensator (21), and again vary the tuning condenser back and forth at 600 K.C. for maximum output. This operation of first turning the compensator then the

- 3 After the low frequency (600 K.C.) end of the range is adjusted, the 1600 K.C. end is readjusted, as given in Paragraph (1) above, to correct any variation that the low frequency series compensator may have caused in the alignment of the high frequency end.
- 4 Now turn the signal generator and receiver dials to 1500 K.C. and readjust compensators (4) Ant., and (8) R.F., for maximum output.

Use . . .

**PHILCO
MODEL 088
SIGNAL
GENERATOR**

The Instrument Designed
and Specified by Philco
Engineers for Adjusting
Philco Radios

Parts Lists—Model 37-3630

Schematic No.	Description	Part No.
1	Antenna Transformer (Broadcast).....	32-2108
2	Antenna Transformer (Police).....	32-2119
3	Antenna Transformer (S.W.).....	32-2109
4	Compensator Ant. 1500 K.C.....	31-6092
5	Condenser (.05 mfd. Tubular).....	30-4020
6	Resistor (51000 ohms, 1/2 watt).....	33-351344
7	Tuning Condenser.....	31-1818
8	Compensator (R.F. 1500 K.C.).....	31-6092
9	R.F. Transformer (Broadcast).....	32-2105
10	R.F. Transformer (Police).....	32-2106
11	Condenser (1.0 mmfd.).....	30-1073
12	Condenser (14 mmfd. Mica).....	30-1073
13	R.F. Transformer (S.W.).....	32-2126
14	Condenser (.05 mfd. Tubular).....	30-4123
15	Condenser (.05 mfd. Tubular).....	30-4020
16	Resistor (51000 ohms 1 watt).....	33-351444
17	Resistor (20000 ohms 1 watt).....	33-320444
18	Electrolytic Condenser (16 mfd.).....	30-2118
19	Resistor (10000 ohms 1/2 watt).....	33-310344
20	Condenser (.1 mfd. Tubular).....	30-4170
21	Compensator (Osc. 600 K.C.).....	31-6056
22	Osc. Transformer (Broadcast).....	32-2120
23	Compensator (Osc. 1600 K.C.).....	31-6092
24	Osc. Transformer (Police).....	32-2121
25	Condenser (1650 mmfd. Semi-fixed).....	31-6096
26	Osc. Transformer (S.W.).....	32-2110
27	Condenser (250 mmfd. Mica).....	30-1032
28	Condenser (3500 mmfd. Semi-fixed).....	31-6097
29	Resistor (70000 ohms 1/2 watt).....	33-370344
30	Resistor (32000 ohms 1/2 watt).....	33-332344
31	Compensator (1st I.F. Pri. 470 K.C.).....	Part of 39
32	1st I.F. Transformer.....	32-2100
33	Shadowmeter.....	45-2189
34	Resistor 700 ohm Bakelite.....	33-1220
35	Condenser (.25 mfd. Tubular).....	30-4446
36	2nd I.F. Transformer.....	32-2102
37	Compensator (2nd I.F. Pri. 470 K.C.).....	Part of 42
38	Condenser (110 mmfd. Mica).....	30-1031
39	Resistor (51000 ohms 1/2 watt).....	33-351344
40	Condenser (.01 mfd. Tubular).....	30-4124
41	Resistor (490000 ohms 1/2 watt).....	33-449344
42	Condenser (110 mmfd. Mica).....	30-1031
43	Condenser (110 mmfd. Mica).....	30-1031
44	Resistor (1 megohm 1/2 watt).....	33-510344
45	Condenser (.015 mfd. Tubular).....	30-4358
46	Resistor (51000 ohms, 1/2 watt).....	33-351344
47	Condenser (.006 mfd. Tubular).....	30-4112
48	Condenser (.015 mfd. Tubular).....	30-4226
49	Volume Control.....	33-5158
50	Resistor (1 megohm 1/2 watt).....	33-510344
51	Voice Coil and Cone, H24 Speaker.....	02625
52	Voice Coil and Cone, K21 Speaker.....	36-3174
53	Output Transformer H24.....	2571
54	Output Transformer K21.....	2571
55	Resistor (1 megohm 1/2 watt).....	33-510344
56	Condenser (0.1 mfd. Tubular).....	30-4122
57	Resistor (490000 ohms 1/2 watt).....	33-449344
58	Condenser (.008 mfd. Tubular).....	30-4112
59	Condenser (.03 mfd. Bakelite).....	8318-SU
60	Resistor (1 megohm 1/2 watt).....	33-510344
61	Tone Control and A.C. Switch.....	42-1231
62	Electrolytic Condenser (8 mfd.).....	30-2024
63	Bias Resistor.....	33-3277
64	Electrolytic Condenser (12 mfd.).....	30-2117
65	Field Coil Assembly, H24 Speaker.....	36-3665
66	Field Coil Assembly, K21 Speaker.....	36-3352
67	Resistor (9000 ohms, 2 watt).....	33-290534
68	Power Transformer (115 Volt 50-60 cycle) Code 121.....	32-7583
69	Power Transformer (115 Volt 25-40 cycle) Code 121.....	32-7584

Schematic No.	Description	Part No.
66	Pilot Lamp.....	34-2039
67	Condenser (.015-.015 mfd. Double Bakelite).....	3793DG
68	Wave Switch Antenna.....	42-1170
69	Wave Switch R.F.....	42-1171
70	Wave Switch Osc.....	42-1172
	Wave Switch Indexing Plate & Shaft.....	42-1173
	Pilot Lamp Assembly.....	38-7706
	Dial.....	27-5214
	Dial Hub.....	28-7187
	Dial Clamp.....	28-2837
	Dial Hub Set Screw.....	W-1641
	Dial Gear.....	28-7185
	Dial Guard.....	27-8324
	Thrust Spring.....	28-8611
	Thrust Washer.....	28-8976
	"C" Washer.....	28-3904
	Drive Gear.....	31-1884
	Vernier Drive.....	31-1871
	Mask.....	27-5198
	Mask Arm Assembly.....	31-1866
	Mask Guide on Lamp Bracket Support.....	28-7844
	Mask Washer.....	27-8318
	Dial Screen Assem.....	38-7912
	Spring.....	28-8624
	Lens.....	27-8310
	Volume Control Shaft.....	28-6499
	Volume Control Shaft Spring.....	28-4117
	Retaining Clips.....	28-8610
	Washer.....	28-4186
	Socket 8 prong.....	27-6058
	Socket 7 prong.....	27-6057
	Tube Shield.....	28-2726
	Tube Shield Base.....	28-3598
	I.F. Shield.....	38-7763
	Terminal Panel I.F. Unit.....	38-7703
	Washer I.F. Unit.....	28-4001
	Wiring Panel.....	38-6306
	Wiring Panel Power Unit.....	38-5864
	Grommet Mtg. Tuning Condenser.....	27-4325
	Grommet R.F. Unit.....	27-4317
	Sleeve Mtg. R.F. Unit.....	28-2257
	Spacer Mtg. R.F. Unit.....	27-8339
	Screw Mtg. R.F. Unit.....	W-729
	Washer Mtg. R.F. Unit.....	28-3927
	Insulator Mtg. Electrolytic Condenser.....	27-7194
	Bracket Mtg. Electrolytic Condenser.....	6440
	Antenna Panel.....	38-7714
	Speaker Cable.....	L-2185
	A.C. Cord.....	L-1149A
	Knobs Tuning.....	27-4330
	Knobs Tuning Vernier.....	27-4331
	Knob Wave Switch.....	27-4326
	Knobs Tone & Volume.....	27-4332
	Shadowmeter Lamp Shield.....	28-2917
	Shadowmeter Mtg. Spring.....	28-8623
	MODEL B CABINET	
	Bezel Frame & Plate Assembly.....	40-5937
	Bezel Frame Gasket.....	27-8311
	Bezel Frame Glass.....	27-8298
	Bezel Frame Ring.....	28-3967
	Speaker K21.....	36-1127
	Baffle & Silk Assembly.....	40-5974
	MODEL X CABINET	
	Bezel Frame & Plate Assembly.....	40-5945
	Bezel Frame Gasket.....	27-8312
	Bezel Frame Glass.....	27-8299
	Bezel Frame Ring.....	28-3987
	Speaker H-24.....	36-1228
	Baffle and Silk Assembly.....	40-5972