



FOR MEMBERS OF RADIO MANUFACTURERS SERVICE

SERVICE BULLETIN
No. 253

SERVICE DATA

Model 37-3640 is a 7 tube superheterodyne receiver for operation on alternating current, having three tuning ranges, covering standard broadcast and short-wave frequencies. The chassis is constructed in three basic assembly units, concentrating the R.F., I.F. and Audio Output circuits in individual units.

The circuit consists of the "PHILCO FOREIGN TUNING SYSTEM"—controlled by the range switch—providing maximum sensitivity and noise reduction, when used with the PHILCO HIGH EFFICIENCY AERIAL. One stage of radio frequency amplification which increases the signal to noise ratio, Automatic Bass Compensation in the volume control circuit, Shadow Tuning, a separate diode circuit for the Automatic Volume Control and a push-pull pentode audio output circuit are also incorporated in this receiver.

Aerial Connections

The Philco High Efficiency Aerial is recommended, for use with this receiver, to obtain maximum performance. A terminal panel is provided at the rear of the chassis for connecting the aerial. This panel contains four screw terminals and a connecting link.

When using the PHILCO HIGH EFFICIENCY AERIAL connect the red and black leads of the Aerial transmission line (lead-in) to terminals 1 and 2 respectively and the ground lead to terminal 3. The connector link should be across terminals 3 and 4.

If a temporary aerial and ground is used shift the connecting link to rest across terminals 2 and 3 and connect the aerial and ground to terminals 1 and 3 respectively.

REMOVING SWITCH AND COIL ASSEMBLIES FROM R.F. UNIT

Remove the center mounting screw on the rear of the R.F. unit. Then lift the rear of the unit and push forward until the rubber mounting grommet, on each side of the unit, clear the mounting slots. The unit is then lifted far enough from the chassis for removal of the two screws holding the selector switch indexing plate and shaft (front of the unit) then pull shaft straight out. Removal of the volume control shaft is also necessary.

IMPORTANT—When selector switch shaft is replaced, care should be taken to have all wafer rotors in the same position so that index projection on the end of shaft will slide freely into notched hole in wafer rotors. Never force shaft into rotors.

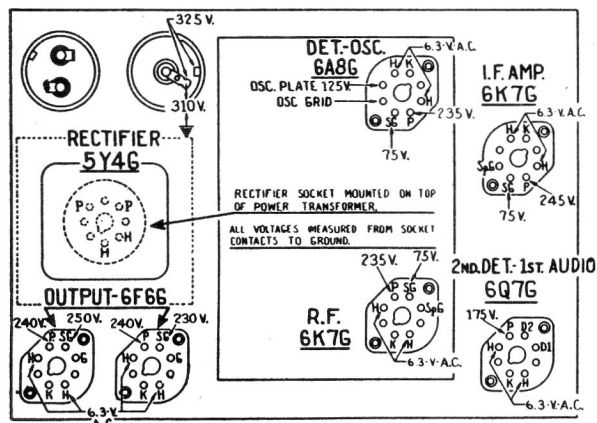


Fig. 1—Socket Voltages
Measured from Underside of Chassis

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.

AERIAL SWITCH AND COIL ASSEMBLY. FIRST SECTION FROM REAR OF UNIT

a. Remove screw holding shield plate to unit base. This screw is located in the right hand corner of shield plate, facing rear underside of chassis.

b. Unsolder the leads connecting the range switch to the aerial panel and I.F. terminal panel; tubular condenser (5) to the tuning condenser stator plate and ground lead from assembly shield to unit frame—lift assembly straight out of unit.

R.F. AMPLIFIER ASSEMBLY, CENTER SECTION

a. Remove screw holding shield plate to unit base.

b. Unsolder the leads connecting the range switch to I.F. terminal panel and 6K7G plate socket contact, tubular condenser (15) to the tuning condenser housing, selector switch contact (D2) to the tuning condenser stator plates, tubular condenser (14) to shield ground lug and shield to R.F. unit base. The amplifier assembly may then be removed.

OSCILLATOR SWITCH AND COIL ASSEMBLY. THIRD SECTION FROM REAR OF UNIT

a. The oscillator assembly may now be removed by unscrewing the four screws holding shield to R.F. base. These screws are located on each side of the R.F. base.

b. Unsolder the leads connecting range switch to the 6K7G socket contacts and terminal panel in the I.F. unit, condenser (17) lead from tuning condenser housing and lead connecting selector switch to the tuning condenser stator plates. Then unsolder wires connecting selector switch to electrolytic condenser (16) and 6A8G socket contacts.

Parts are replaced by following the above procedure in the reverse order.

Electrical Specifications

Voltage Rating: 115 A.C.

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

For 25 to 40 cycle operation use Power Transformer marked with asterisk in parts list.

Power Consumption: 80 watts.

Type and Number of Tubes: 2 type 6K7G—R.F. and I.F. Amplifier; 1 type 6A8G—Det. Oscillator; 1 type 6Q7G—2nd Det., 1st Audio, A. V. C.; 2 type 6F6G—Push-pull Output; 1 type 5Y4G—Rectifier.

Undistorted Output: 5 watts.

Intermediate Frequency: 470 K.C.

Tuning Ranges: Three. Range 1—530 to 1720 K.C. Range 2—2.3 to 7.4 M.C. Range 3—7.35 to 22 M.C.

Speakers: K-34 B Cabinet.
H-25 X Cabinet.

POWER TRANSFORMER DATA

Schematic Lead Number	A.C. Volts	Current	Circuit	Color	Resistance
1-2	120		Pri.	White	3 ohms
3-4	5 0	2 0 A	Fil Rect	Blue	1 ohms
5-7	670	100 MA	High Voltage Sec.	Yellow	70 ohms 75 ohms
6			Center Top of 5-7	Yellow Green	
8-9	6 7	3 0 A	Fil. Tubes	Black	1 ohm

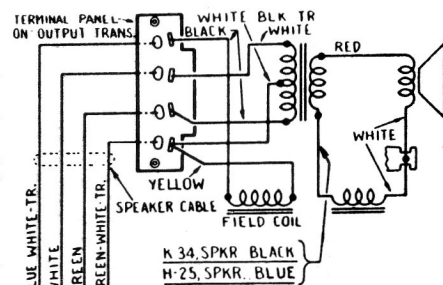
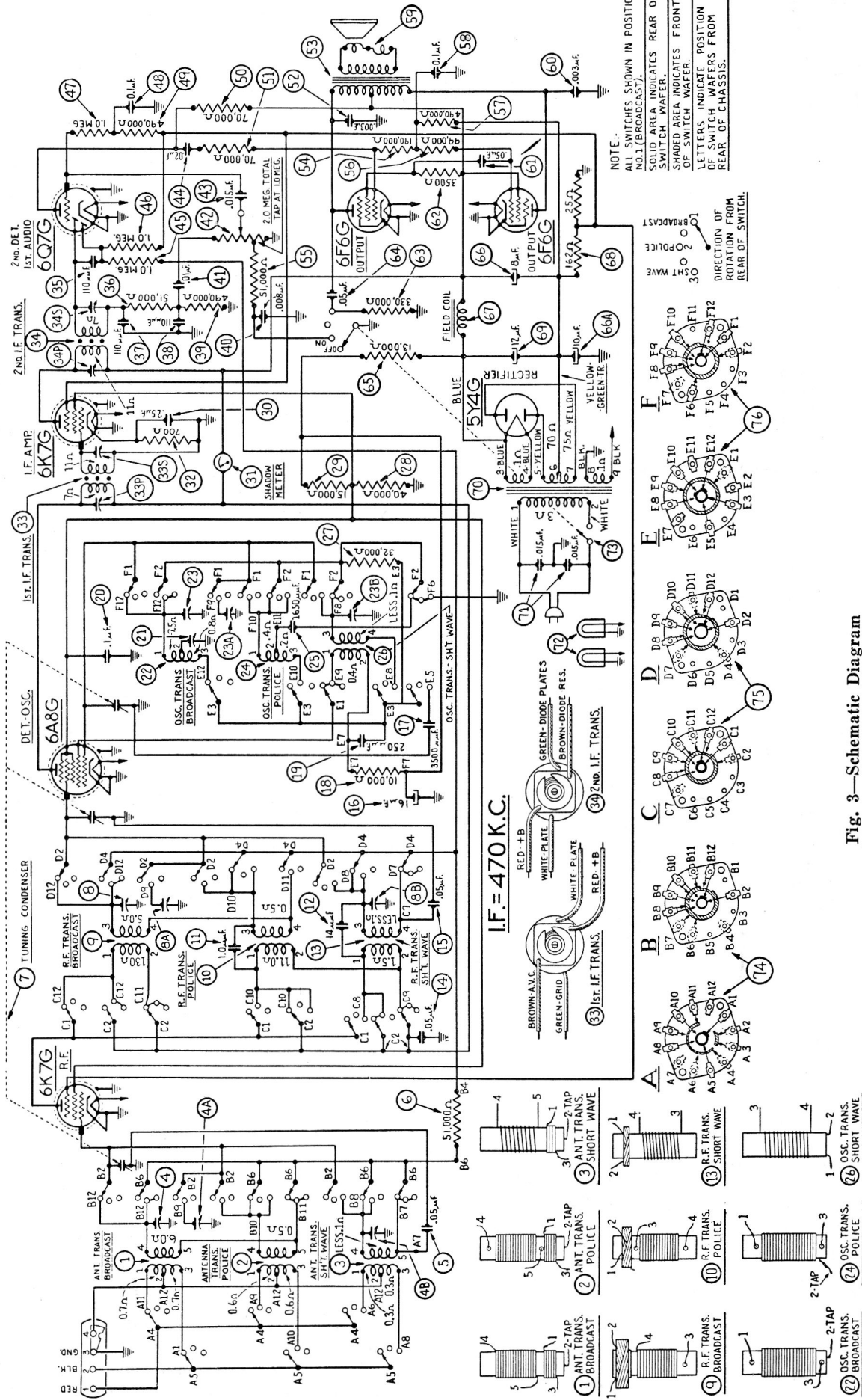


Fig. 2—Speaker Wiring



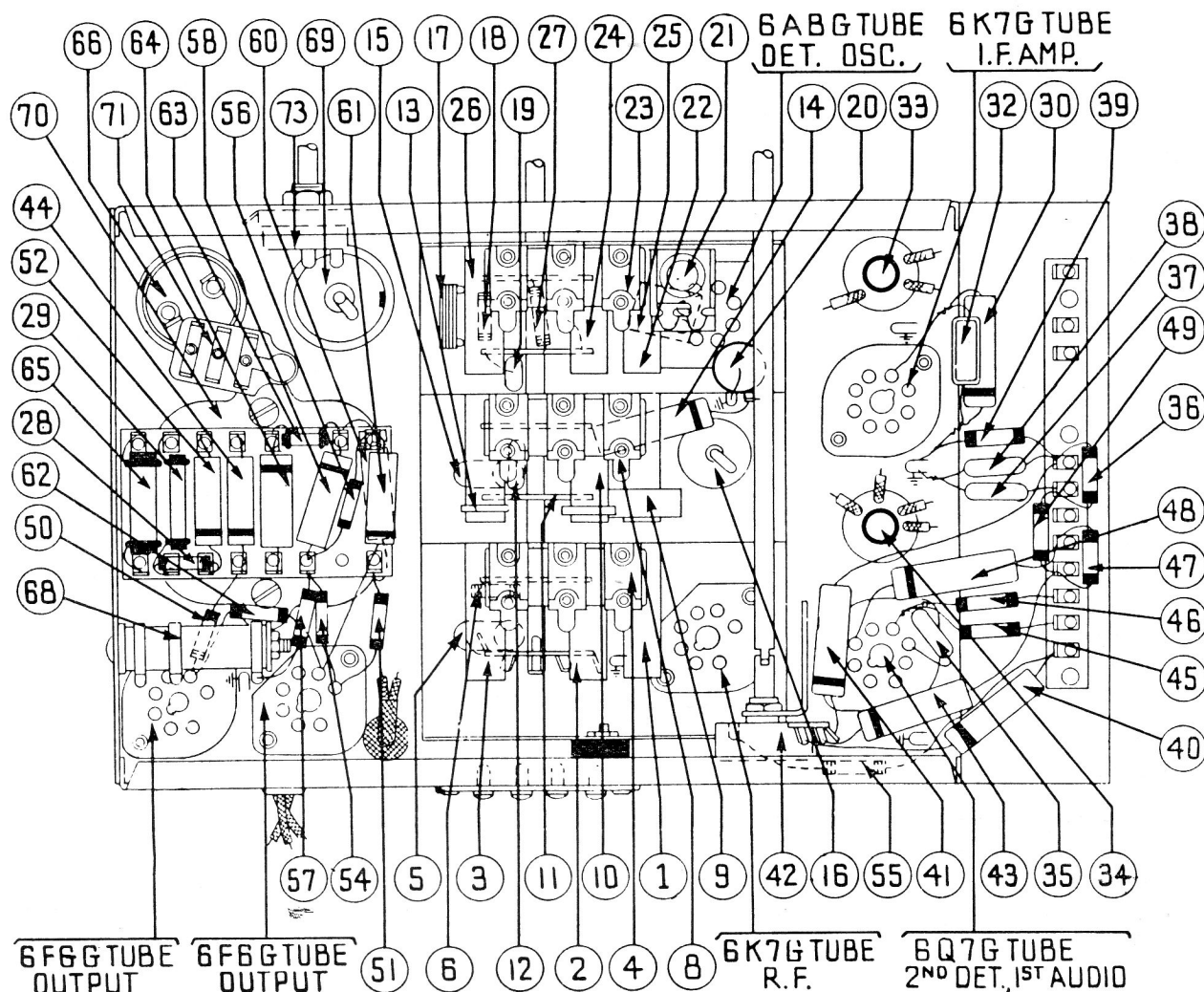


Fig. 4—Base View

Replacement Parts—Model 37-3640

Schem. No.	Description	Part No.	Schem. No.	Description	Part No.	Schem. No.	Description	Part No.
1	Antenna Trans. (Broadcast).....	32-2108	47	Resistor (1 megohm ½ watt).....	33-510334		Mask	27-5198
2	Antenna Trans. (Police).....	32-2119	48	Condenser (.1 mfd. tubular).....	30-4122		Mask Arm Assembly.....	31-1866
3	Antenna Trans. (S.W.).....	32-2109	49	Resistor (490000 ohms ½ watt).....	33-449334		Mask Guide Lamp Brack. Support	38-7844
4	Compensating Condensers Ant.....	31-6092	50	Resistor (70000 ohms ½ watt).....	33-370334		Mask Washer	27-8318
5	Condenser (.05 mfd. tubular).....	30-4020	51	Resistor (70000 ohms ½ watt).....	33-370334		Indicator Brack. & Lens Assem.	38-7912
6	Resistor (51000 ohms ½ watt).....	33-351334	52	Condenser (.003 mfd. tubular).....	30-4042		Spring	28-8624
7	Tuning Condenser	31-1820	53	Output Transformer B. X.....	32-7659		Lens	27-8310
8	Compensating Condensers R.F.....	31-6092	54	Resistor (190000 ohms ½ watt).....	33-419334		Volume Control Shaft.....	28-6499
9	R.F. Transformer (Broadcast).....	32-2105	55	Resistor (51000 ohms ½ watt).....	33-351334		Volume Control Shaft Spring.....	28-4117
10	R.F. Transformer (Police).....	32-2106	56	Resistor (99000 ohms ½ watt).....	33-399334		Retaining Clips	28-8610
11	Condenser	31-1820	57	Resistor (490000 ohms ½ watt).....	33-449334		Washer	28-4186
12	Condenser (14 mmfd. mica).....	30-1073	58	Condenser (.1 mfd. tubular).....	30-4122		Washer	4436
13	R.F. Transformer (S.W.).....	32-2126	59	Cone & Voice Coil K-34 Speaker	36-3174		Socket Power Trans.....	27-6052
14	Condenser (.05 mfd. tubular).....	30-4123		Cone & Voice Coil H-25 Speaker	02625		Socket 8 prong.....	27-6058
15	Condenser (.05 mfd. tubular).....	30-4020	60	Condenser (.003 mfd. tubular).....	30-4042		Socket 7 prong.....	27-6057
16	Electrolytic Condenser (16 mfd.)	30-2118	61	Condenser (.05 mfd. tubular).....	30-4123		Tube Shield	28-2726
17	Cond. (3500 mmfd. semi-fixed).....	31-6097	62	Resistor (3500 ohms ½ watt).....	33-235334		Tube Shield Base.....	28-3898
18	Resistor (10000 ohms ½ watt).....	33-310334	63	Resistor (330000 ohms ½ watt).....	33-433334		I.F. Shield	38-7763
19	Condenser (250 mmfd. mica).....	30-1032	64	Condenser (.05 mfd. tubular).....	30-4454		Terminal Panel I.F. Unit.....	38-7703
20	Condenser (.1 mfd. tubular).....	30-4170	65	Resistor (13000 ohms 2 watt).....	33-315534		Spacer	28-4001
21	Compensator (Osc. Series Broad.)	31-6056	66	Electrolytic Condenser	30-2163		Grommet Mtg. Tuning Condenser	27-4325
22	Osc. Transformer (Broadcast).....	32-2120	67	Field Coil Assembly K-34 Speaker	36-3239		Grommet R.F. Unit.....	27-4317
23	Compensating Condensers Osc.....	31-6092		Field Coil Assembly H-25 Speaker	36-3218		Sleeve Mtg. R.F. Unit.....	28-2257
24	Osc. Transformer (Police).....	32-2121	68	Bias Resistor	33-8276		Spacer Mtg. R.F. Unit.....	27-7807
25	Cond. (1650 mmfd. semi-fixed).....	31-6096	69	Electrolytic Cond. (12 mfd.).....	30-2024		Screw Mtg. R.F. Unit.....	W-729
26	Osc. Transformer (S.W.).....	32-2110	70	Power Trans. 115 V., 50-60 cycles	32-7597		Washer Mtg. R.F. Unit.....	28-3927
27	Resistor (32000 ohms ½ watt).....	33-332334		*Power Trans. 115 V., 25-40 cycles	32-7598		Ins. Mtg. Electrolytic Cond.....	27-7194
28	Resistor (40000 ohms ½ watt).....	33-340334	71	Cond. (.015-.015 mfd. double).....	3793-DG		Bracket Mtg. Electrolytic Cond.....	6440
29	Resistor (15000 ohms 1 watt).....	33-315434	72	Pilot Lamp	34-2039		Nut Mtg. Volume & Tone Con.....	W-684
30	Condenser (.25 mfd. tubular).....	30-4446	73	Tone Control + A.C. Switch.....	42-1231		Antenna Panel	38-7714
31	Shadow meter	45-2189	74	Ant. Switch	42-1170		Speaker Cable	41-3208
32	Resistor, 700 ohms, Violet, Black		75	R.F. Range Switch.....	42-1226		A.C. Cord	L-1149A
	Brown	33-1220	76	Osc. Range Switch.....	42-1172		Knob Tuning	27-4330
33	1st I.F. Transformer.....	32-2100		Selector Switch Indexing Plate &			Knobs Tuning Vernier.....	27-4331
34	2nd I.F. Transformer.....	32-2102		Shaft	42-1173		Knob Wave Switch.....	27-4326
35	Condenser (110 mmfd. mica).....	30-1031		Pilot Lamp Assembly.....	38-7706		Knob Tone & Volume.....	27-4332
36	Resistor (51000 ohms, ½ watt).....	33-351334		Dial	27-5214		Shadow Meter Mtg. Spring.....	28-8623
37	Condenser (110 mmfd. mica).....	30-1031		Dial Hub	28-7187		Speaker K-34, B Cabinet.....	36-1230
38	Condenser (110 mmfd. mica).....	30-1031		Dial Clamp	28-2837		Speaker H-25	36-1237
39	Resistor (490000 ohms ½ watt).....	33-449334		Set Screw	W-1641			
40	Condenser (.008 mfd. tubular).....	30-4112		Dial Guard	27-8324			
41	Condenser (.01 mfd. tubular).....	30-4124		Dial Gear	28-7185			
42	Volume Control	33-5158		Thrust Spring	28-8611			
43	Condenser (.015 mfd. tubular).....	30-4358		C Washer	28-3904			
44	Condenser (.02 mfd. tubular).....	30-4113		Thrust Washer	28-3976			
45	Resistor (1 megohm ½ watt).....	33-510334		Drive Gear	31-1884			
46	Resistor (1 megohm ½ watt).....	33-510334		Vernier Drive	31-1871			

Model B & X Cabinets

Bottom Shield Plate.....	28-4340
Bezel Frame & Plate Assembly.....	40-5945
Gasket	27-8312
Screws	W-1644
Glass	27-8299
Ring	28-3987

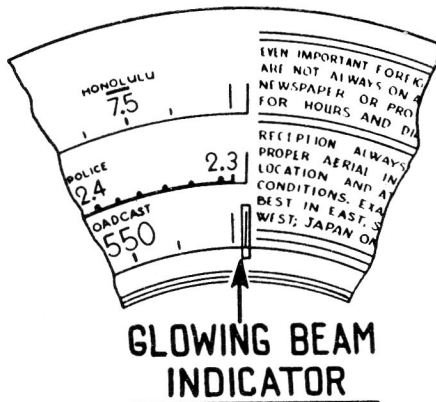


Fig. 5—Dial Calibration

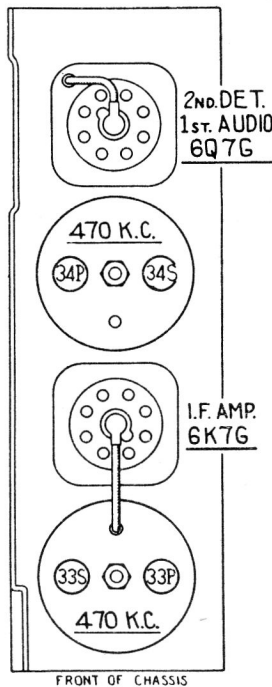


Fig. 6—Location of I. F. Compensators

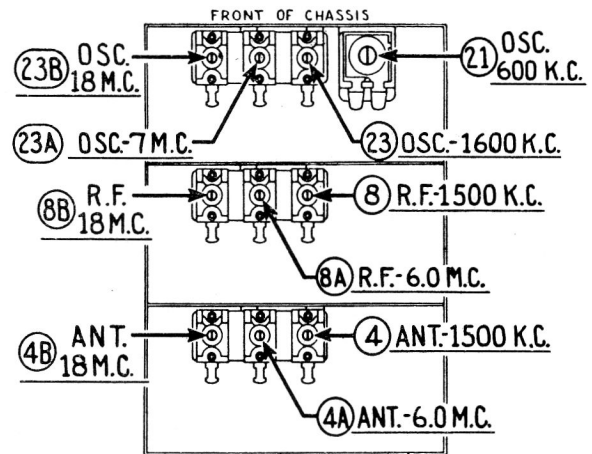


Fig. 7—Locations of R. F. Compensators

Alignment of 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. 6 and 7.

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. 5). 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 one (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 (34)s 2nd I.F. Sec., (34)p 2nd I.F. Pri., (33)s 1st I.F. Sec., and (33)p 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 the .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. compensator (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 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 tuning condenser is continued until maximum output is obtained at the 600 K.C. frequency.

- 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.

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