

General Description

Philco Model 37-604 is a 5 tube superheterodyne receiver using the new Philco High Efficiency self-centering glass tubes and designed for operation on either alternating or direct current. This receiver has two tuning ranges, covering standard broadcast and short wave reception.

The circuit consists of the Philco Foreign Tuning System—controlled by the range switch which provides maximum sensitivity and noise reduction when used with the **New Philco High Efficiency Aerial**. A 6A8G tube is used as the detector-oscillator; 6K7G tube as the I. F. amplifier; 6Q7G tube for the second detector, first audio and automatic volume control; 25A6G tube for Pentode Power Output, and a 25Z6G tube as the Rectifier.

Automatic Bass Compensation is built into the volume control circuit and a Bias cell is used for supplying grid voltage to the first Audio tube.

The Radio Frequency circuit is assembled in one unit and mounted on the left side of the receiver (facing the front). This unit contains the antenna and oscillator coils for each tuning range, range switch, compensating condensers and other parts necessary for the operation of the associated circuits.

Mounted vertically and cushioned on the chassis is the tuning condenser. The bottom section of this condenser is for the oscillator tuning and the top section for the antenna circuit. Attached to the condenser is the pilot lamp housing.

Electrical Specifications

Type of Circuit: Superheterodyne with pentode output.

Power Supply: 115 V., D.C., or A.C., 25 to 60 cycles.

Power Consumption: 50 watts.

Philco Tubes Used: 1 type 6A8G, Detector-Oscillator; 1 type 6K7G, I. F.; 1 type 6Q7G, 2nd Detector, A. V. C., and 1st audio; 1 type 25A6G, Output; and 1 type 25Z6G, Rectifier.

Tuning Ranges: Two. Range 1.— 530 to 1750 K. C.
Range 2.— 6.0 to 18.0 M. C.

Intermediate Frequency: 470 K. C.

Speaker: B-5

Power Output: 3/4 watt.

Antenna Connections

On the lower front corner of the chassis is a panel containing five terminals. When using the Philco High-Efficiency Aerial terminals 4 and 5 are connected by the metal strap provided on the panel. The red and black leads of the PHILCO High Efficiency Aerial are connected to terminals 1 and 3 respectively and the ground lead to terminal 2.

If a temporary aerial is used shift the strap to rest across terminals 3 and 4 and connect the aerial to terminal 1. A ground connection must not be used when terminals 3 and 4 are connected.

Pilot Lamp Replacement

Facing the front top of the receiver, the pilot lamp housing will be found directly under the dial scale. Two screws will be found on this housing. The right hand screw holds the housing to the tuning condenser and should be removed only when replacing the housing. The center screw holds the pilot lamp socket assembly to the housing. By removing this center screw, the socket assembly may be removed from the housing for replacement of Pilot Lamps.

SOCKET VOLTAGES Measured from Socket Contact to B—

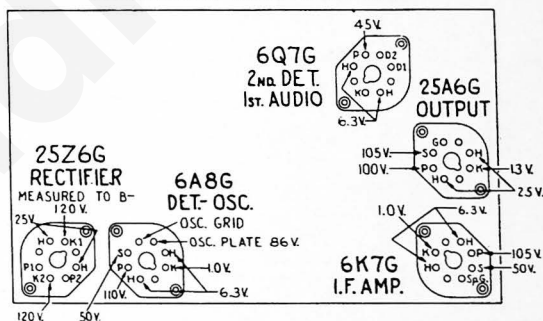


Fig. 1—View of Sockets from Underside of Chassis

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.

Equipment for Adjusting Receiver

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, and two 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 to adjust 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 Wrench No. 3164 and Fibre Handle Screw-driver No. 27-7059 complete the necessary equipment for these adjustments. The locations of the various compensators are shown in Fig. 6.

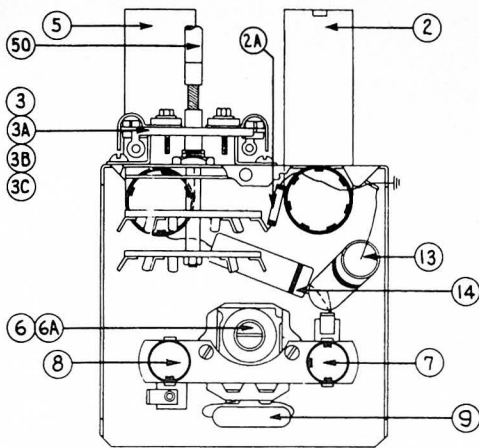


Fig. 3—Rear View of R. F. Unit

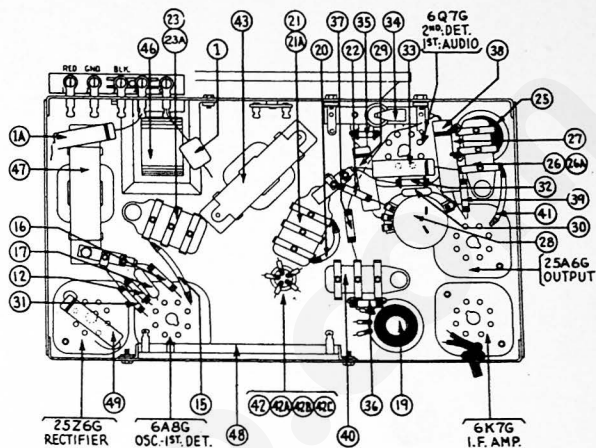


Fig. 4—Base View of Chassis—Underside of Chassis

Replacement Parts—Model 37-604

Schem. No.	Description	Part No.	List Price	Schem. No.	Description	Part No.	List Price
1	Condenser (235 mmfd. mica)	30-1037	\$0.25	45	Field Coil Assembly	36-3620	\$2.75
1a	Condenser (.001 mfd. tubular)	30-4453	.20	46	Filter Choke	32-7572	1.00
2	Antenna Transformer (Broadcast)	32-2141	.90	47	Filter Choke	32-7569	1.30
2a	Resistor (15,000 ohms ½ watt)	33-315339	.20	48	Filament Resistor (15-133 ohms)	33-3235	.55
3	Compensator Ant. (1500 K. C.)	31-6085	.60	49	Condenser (.05 mfd. Tubular)	30-4020	.20
4	Tuning Condenser	31-1796	3.25	50	Range Switch	38-7631	1.50
5	Antenna Transformer (S. W.)	32-2179	.55		Speaker Assembly	36-1204	5.00
6	Compensator (Osc. Series, screw, 600 K. C.)	31-6027	.70		Pilot Lamp Socket Assembly	38-7616	.80
7	Oscillator Transformer (Broadcast)	32-2047	.45		Pilot Lamp Housing Assembly	31-1816	.20
8	Oscillator Transformer (S. W.)	32-2048	.45		Pilot Lamp	34-2068	.16
9	Condenser (3250 mmfd.)	30-1061	.45		Dial and Hub Assembly	31-1799	.60
10	Pilot Lamp (Broadcast)	34-2068	.16		Socket 8 prong	27-6058	.11
11	Pilot Lamp (S. W.)	34-2068	.16		Socket 7 prong	27-6057	.11
12	Resistor (13000 ohms ½ watt)	33-313339	.20		Tube Shield	28-2726	.10
13	Condenser (.15 mfd. tubular)	30-4191	.20		Tube Shield Base	28-3898	.03
14	Condenser (.05 mfd. tubular)	30-4020	.20		Bias Cell Panel Assembly	38-7436	.15
15	Resistor (200 ohms Wirewound)	33-3010	.20		Terminal Panel Assembly	38-7848	.00
16	Resistor (170000 ohms ½ watt)	33-412339	.20		Terminal Panel Insulator	27-8360	.12
17	Condenser (250 mmfd. mica)	30-1032	.25		Mtg. Bracket Tuning Condenser	28-3538	.02
18	Compensator (Pri. & Sec.)	Part of 19			Mtg. Bracket Washer	27-4307	.00
19	1st I. F. Transformer (470 K. C.)	32-2059	3.00		Mtg. Bracket Washer	3914	.03
20	Resistor (200 ohms wirewound)	33-3010	.20		Mtg. Bracket Sleeve	28-3806	.00
21	Condenser (.1 mfd. twin bakelite)	4989-ODU	.40		Mtg. Bracket Screw	W-1446A	Per C .40
21a	Condenser (.1 mfd.)	Part of 21			Shaft Centering Plate	28-3805	.08
22	Resistor (2.0 megohms ½ watt)	33-520339	.20		Split Gear Assembly	31-1787	.30
23	Condenser (.1 mfd. Twin Bakelite)	4989-ODU	.40		Gear Tuning Shaft	28-6436	Per C .60
23a	Condenser (.1 mfd. Bakelite)	Part of 23			Retaining Ring	28-8604	.02
24	Compensator (Pri. & Sec.)	Part of 25			Nut, Volume & Range Switch	W-684	Per C 1.25
25	2nd I. F. Transformer (470 K. C.)	32-2049	1.50		Oscillator Coil Mtg. Plate	28-3808	.02
26	Condenser (110 mmfd. Mica Twin Bakelite)	8035-ODU	.25		Spacers	27-8228	.01
26a	Condenser (110 mmfd. Mica Twin Bakelite)	Part of 26			Wire Panel R. F. Unit	38-7178	.02
27	Resistor (51000 ohms ½ watt)	33-351339	.20		Screw Mtg. Coil		
28	Volume Control (AC Switch)	38-7630	1.45		Bottom Shield & Insulator Assembly	38-7908	.00
29	Condenser (.01 mfd. Tubular)	30-4124	.20		Felt Ring Assembly	36-3605	.10
30	Condenser (110 mmfd. Mica)	30-1049	.20		Baffle & Silk Assembly	40-5918	.20
31	Resistor (25000 ohms ½ watt)	33-325339	.20		Cabinet Top	27-4300	.00
32	Resistor (32000 ohms ½ watt)	33-332339	.20		Spring	28-8602	.00
33	Condenser (.01 mfd. Tubular)	30-4124	.20		Cup	28-3842	.00
34	Bias Cell (1.0 Volt)	41-8009	.20		Washer	27-8255	.00
35	Resistor (1.0 megohm ½ watt)	33-510339	.20		Felt Washer	27-8258	.00
36	Resistor (70000 ohms ½ watt)	33-370339	.20		Felt Washer	27-8235	.00
37	Resistor (240000 ohms ½ watt)	33-424339	.20		Knob Tuning	27-4330	.10
38	Condenser (.01 mfd. Tubular)	30-4169	.20		Knob Vernier	27-4331	.10
39	Resistor (490000 ohms ½ watt)	33-449339	.20		Knob Volume & Range Switch	27-4332	.10
40	Condenser (.01 mfd. Twin Bakelite)	3903-OSU	.25		R. F. Housing Side	28-3770	.15
41	Resistor (400 ohms Wirewound)	33-3122	.25		R. F. Housing Back	28-3814	.00
42	Condenser (10; 16; and 8 mfd.)	30-2154	3.25		Screw Chassis Mtg.	W-599	Per C .50
43	Output Transformer	32-7568	.95		Washer Chassis Mtg.	W-151	Per C .20
44	Cote & Voice Coil	36-3029	.60				

Figures in black type indicate circled figures in base view.

Prices Subject to Change Without Notice

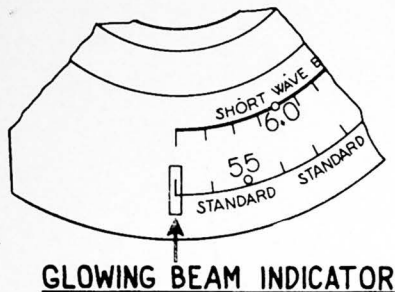


Fig. 5—Dial Calibration

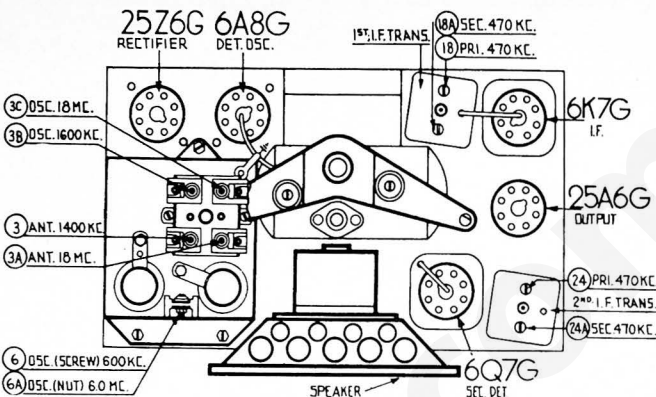


Fig. 6—Location of Compensating Condensers

Adjusting Compensating Condensers

The following procedure must be observed in adjusting the compensators: **DIAL ADJUSTMENT**—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 set 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.

OUTPUT METER—The 025 Output Meter is connected to the plate and cathode terminals of the 25A6G tube. Adjust the meter to use the (0-30) volt scale. Before adjusting the compensators of each circuit, the signal generator attenuator should be set to give approximately $\frac{1}{4}$ scale reading on output meter.

INTERMEDIATE FREQUENCY CIRCUIT

- 1—Connect the 088 Signal Generator output lead through a .1 mfd condenser to the control grid of the 6K7G tube and the ground connection of the output lead to the chassis.
- 2—The range switch is set in position No. 1 (Broadcast). Rotate the tuning condenser of the receiver to the maximum capacity position (counter-clockwise) and adjust the signal generator for 470 K. C.
- 3—Now adjust compensators @a 2nd I. F. Sec. and @ 2nd I. F. Pri. for maximum output.
- 4—Remove the signal generator output lead and .1 mfd. condenser from the 6K7G tube and connect them to the grid of the 6A8G tube. Now adjust compensators @a 1st I. F. Sec. and @ 1st I. F. Pri. for maximum output.

RADIO FREQUENCY CIRCUIT

Tuning Range—6.0 to 18.6 M. C.

- 1—Remove the signal generator output lead and series condenser from the 6A8G tube and connect them to terminal No. 1 on aerial input panel, and the generator ground lead to terminal No. 3, front of chassis.
 - (a) Terminal 4 and 5 of aerial input panel must be shorted with connector link provided on the panel, during the following adjustments.
- 2—Set range switch in position No. 2 (Shortwave). Turn signal generator and receiver dials to 18 M. C. and adjust compensator @c Osc. for maximum output.
- 3—The adjustment of the antenna 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 (bottom section). 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 signal generator bringing in the signal. The antenna compensator @a should then be adjusted to give maximum output.
- 4—Now remove the external condenser from the tuning condenser of receiver and turn compensator @c Osc. to the maximum capacity position (clockwise). Then without moving signal generator or receiver tuning condenser, turn compensator @c (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. Compensator @c is adjusted on the second peak to give maximum output.

A further check on the image signal may be obtained by turning the signal generator attenuator to maximum output. Then turn dial of receiver to approximately 17.060. If the receiver is aligned correctly and the signal from the generator is strong enough, the image signal will be heard at this point.

- 5—The low frequency compensator @a is now adjusted by turning signal generator and receiver dials to 6 M. C. and adjusting compensator @a Osc. series (see note (a) below) for maximum output.
 - (a) When compensator @a Osc. series is being adjusted, the tuning condenser must be rolled for maximum output. This procedure is accomplished as follows:—First tune compensator @a for maximum output at 6.0 M. C. Then vary the tuning condenser back and forth about the 6.0 M. C. dial mark until maximum output is obtained. Now retune compensator @a, and again vary the tuning condenser back and forth at 6.0 M. C. for maximum output. This operation of first tuning the compensator, then the tuning condenser is continued until the maximum output is obtained at or near the 6.0 M. C. frequency. The maximum output point of this adjustment may fall slightly above or below the 6.0 M. C. dial setting.
- 6—Compensator @c Osc. and @a Ant. are now retuned as given in paragraphs 3 and 4 above.

Tuning Range—530 to 1750 K. C.

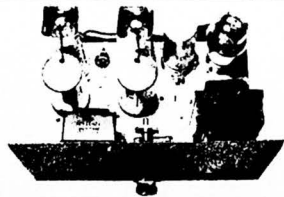
- 1—Set range switch in position No. 1 (Broadcast). Turn the 088 Signal Generator indicator to 800 K. C. and the receiver dial to 1600 K. C. The second harmonic of the 800 K. C. signal, to which the signal generator is tuned, is used for the 1600 K. C. adjustment. Now adjust compensators @b Osc. and @ Ant. for maximum output.
- 2—Turn the signal generator and receiver dials to 600 K. C. and adjust compensator @c Osc. series (screw)—see note (a) below—for maximum reading on the output meter.
 - (a) When compensator @c Osc. series is being adjusted, the tuning condenser must be rolled for maximum output. This procedure is accomplished as follows:—First tune compensator @c for maximum output at 600 K. C. Then vary the tuning condenser back and forth until the maximum output point is reached. Now retune compensator @c and again vary the tuning condenser back and forth at 600 K. C. for maximum output. This operation of first tuning the compensator then the tuning condenser is continued until the maximum output is obtained at, or near, the 600 K. C. frequency. The maximum output point of this adjustment may fall slightly above or below the 600 K. C. dial mark.
- 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 signal generator and receiver dials to 1400 K. C. and readjust compensator @ Ant. for maximum output.

TO TEST SPEAKERS, USE

PHILCO 055 Vario Frequency Speaker Tester

To properly test a speaker for response over the entire audio range, an audio frequency signal generator is required. Here is such an instrument, supplied in kit form ready to assemble. Will detect any defect in a speaker, thus assuring that no repair job you turn out will be spoiled by a defective speaker.

List Price
\$25.00



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Parts and Service Division