

PHILCO

Model 38-3—Code 121



SERVICE BULLETIN No. 277 for members of RADIO MANUFACTURERS SERVICE

A PHILCO Service Plan

Electrical Specifications

TYPE CIRCUIT: Superheterodyne, with such features as: magnetic tuning control on the broadcast range; automatic volume control; Iron core adjusted first I. F. transformer; push-pull Pentode audio output, using screen phase inversion; Bass compensation in the Volume Control circuit, and the Philco Automatic Tuning Mechanism.

POWER SUPPLY: Voltage 115
Frequency 50 to 60 cycles
Consumption 110 watts

Different Transformers are required for operation on the frequencies list above. These are shown on the parts list.

INTERMEDIATE FREQUENCY: 470 K. C.

UNDISTORTED OUTPUT: 5 watts.

PHILCO TUBES USED: Nine. One 6U7GRF, one 6K7G I. F. amplifier; one 6A8G, Det. Osc.; one 6N7G, osc. control; one 6H6G, discriminator; one 6Q7G, 2nd det. 1st audio; two 6F6G output, and one 5Y4G rectifier.

TUNING RANGE: Three. Range one—530 to 1720 K. C. Range two—2.3 to 7.4 M. C. Range three—7.35 to 22 M. C.

TO NE CONTROL: Four positions.

SPEAKER: H29.

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator; Philco Model 077 signal generator, using fundamental frequency from 115 to 36000 K. C. is the correct instrument for the purpose; (2) Output meter; Philco model 026 circuit tester incorporates a sensitive output meter and is recommended; (3) Philco fibre handle screw-driver, part No. 27-7059 and fibre wrench part No. 3164.

OUTPUT METER: The 026 output meter is connected to the plate and cathode terminals of one of the 6F6G tubes. Adjust the meter to use the (0-30) volt scale and advance volume control of receiver until a readable indication is noted after signal generator is connected in the following adjustments.

DIAL CALIBRATION: In order to adjust this receiver correctly the dial must be aligned to track properly with the tuning condenser. To do this proceed as follows:

1. Loosen the shaft coupling set screws. Then turn the tuning condenser fully closed and the dial to the first index line. Now tighten the shaft coupling set screws, and rotate the dial until the 520 K. C. mark is midway between the index line and the glowing beam indicator.

2. With condenser in this position loosen the set screws of the shaft coupling on the tuning condenser.

3. Then turn the tuning dial until the glowing beam indicator is entered on the index line.

NOTE: Be careful when turning the dial that the position of the tuning condenser is not disturbed.

4. Now tighten the shaft coupling set screws.

INTERMEDIATE FREQUENCY CIRCUIT

With signal generator output lead connected through a .1 mfd. condenser to the grid of the 6A8G det-osc. tube; and controls set as follows, adjust I. F. compensators for maximum output.

- a. Magnetic Tuning Knob (34) off
- b. Tone Control (93) normal
- c. Volume Control (68) maximum
- d. Receiver dial 580 K. C.
- e. Signal generator 470 K. C.
- f. Range Switch position (Broadcast)
- g. Compensators in order (53), (51A), (45A), (45B).

RADIO FREQUENCY CIRCUIT

Tuning Range 530 to 1720 K. C.

1. Connect the signal generator output lead through a .1 mfd. condenser to "RED" terminal of the aerial panel and the generator ground to the chassis of the receiver.

2. Other controls set as given under intermediate frequency circuit, with the exception of those as follows: Adjust compensators for maximum output as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
1	1600 K. C.	1600 K. C.	(27) (7B) (7A)
1	580 K. C.	580 K. C.	(28) Roll gang through signal when padding this compensator. (See Note B)
1	1600 K. C.	1600 K. C.	(27)
1	1500 K. C.	1500 K. C.	(7B) (7A)

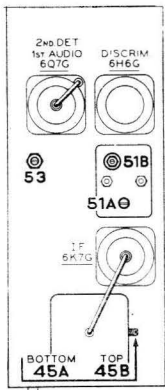


Fig. 2. I. F. Compensators Top of Chassis

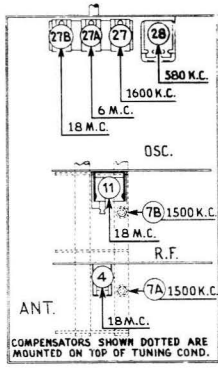


Fig. 3. R. F. Compensators Underside of Chassis

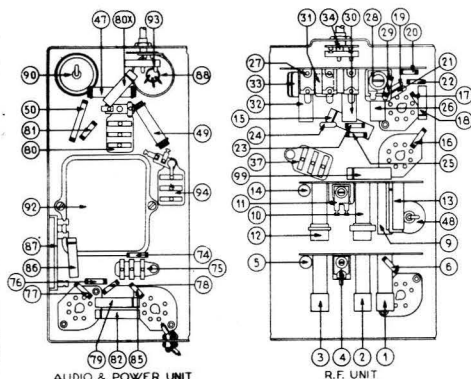


Fig. 4. Schematic Diagram Model 38-3

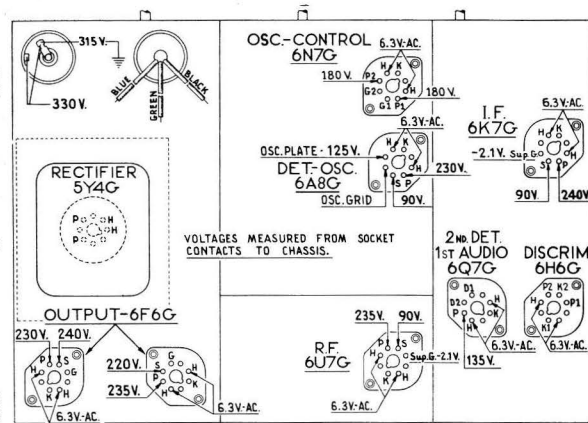


Fig. 1. Socket Voltages, Underside of Chassis—The voltages indicated by arrows were measured with a Philco 026 Circuit Tester which contains an accurate voltmeter. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

Tuning Range 2.3 to 7.4 M. C. Adjust compensators for maximum output as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
2	6 M. C.	6 M. C.	(27A)

Tuning Range 7.35 to 22 M. C. Adjust compensators for maximum output as follows:

Range Switch	Signal Generator	Receiver Dial	Compensators in Order
3	18 M. C.	18 M. C.	(27B) check image at 17.06 M. C. (See Note A)
3	18 M. C.	18 M. C.	(11) (4) Use shunt condenser on (27B) or rock gang through signal when padding compensator No. 11 (See Note C)

MAGNETIC TUNING ADJUSTMENT: Set the range switch in position one (530 to 1720 K. C.) and the magnetic tuning switch in the "out" position. Now turn the signal generator and receiver dial to any frequency in the Broadcast band. The receiver dial must be adjusted very accurately for maximum output.

Set the magnetic tuning control in the "on" position (clockwise). Compensator (51B) of the magnetic tuning transformer is now adjusted for maximum output.

The above adjustment is now checked for accuracy, by turning the magnetic tuning control "off" and "on." In either position, there should be no change in the tone of the signal. If a change of tone or hiss develops, it indicates a shift in frequency and the adjustment must be repeated.

NOTE A—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). Then slowly turn compensator counter-clockwise until a second maximum peak is obtained on the output meter. This second peak is the fundamental signal, and the compensator must be adjusted for maximum output with it. The first peak from maximum capacity position of the compensator is the image signal and must not be used in adjusting this compensator.

If the above procedure is correctly performed, the image signal will be found (much weaker) 940 K. C. below the frequency being used on any high frequency range.

NOTE B—First tune compensator (28) for maximum output, then vary the tuning condenser of the receiver for maximum output about the 580 K. C. dial mark. Now turn compensator (28) slightly to the right or left and vary the receiver tuning condenser for maximum output. If the output reading increases, turn compensator (28) in the same direction a trifle more, and again vary the tuning condenser for maximum output. If the output decreases, set the compensator in the opposite direction. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

NOTE C—To eliminate the effect of the R. F. compensator detuning the Osc. circuit, a variable tuning condenser of approximately 350 mmfd. is connected from the oscillator compensator to ground when designated in the padding instruction above. Tune the added condenser until the second harmonic of the receiver oscillator beats against the signal from the generator, resulting in a maximum indication on the output meter. Then adjust compensators as noted for maximum output.

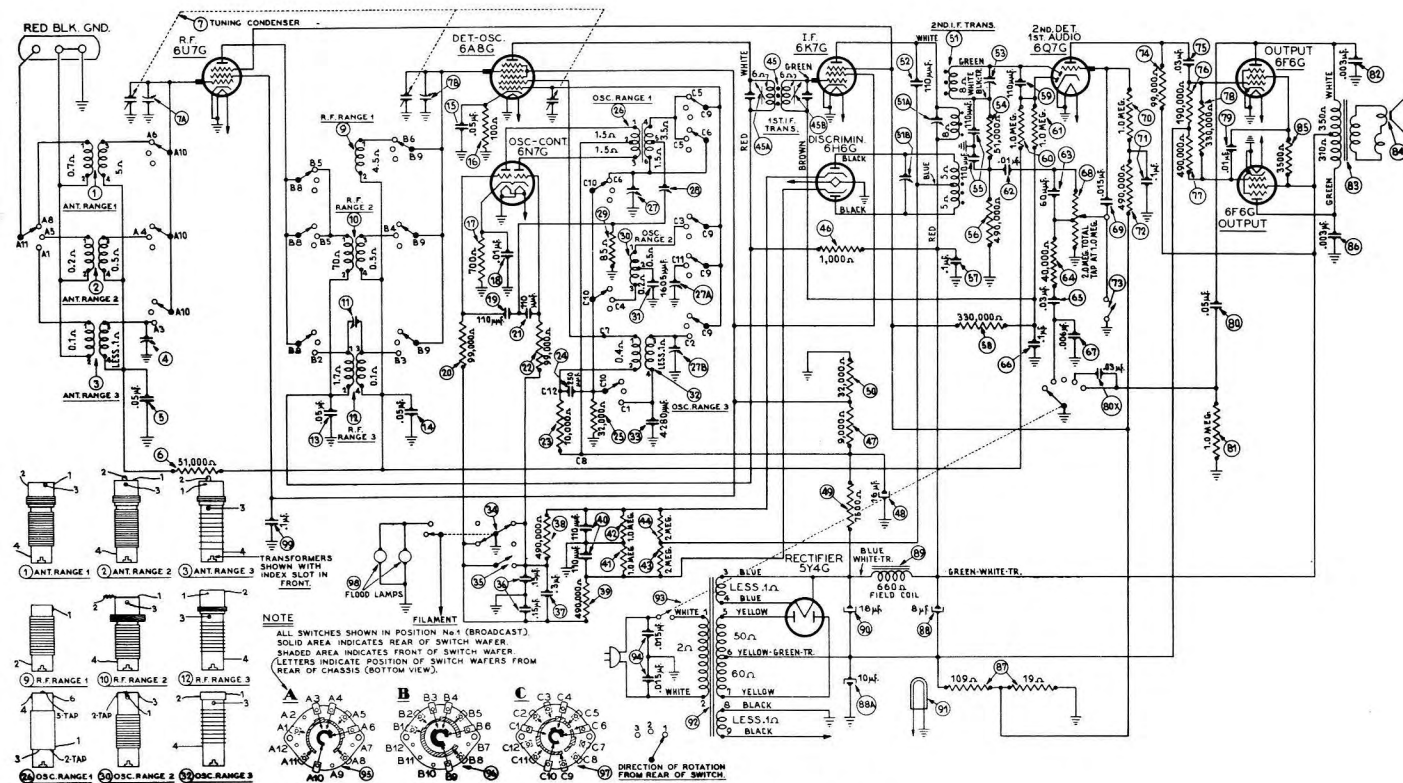


Fig. 5. Part Locations, Underside of Chassis

Replacement Parts — Model 38-3

Schem. No.	Description	Part No.	List Price	Schem. No.	Description	Part No.	List Price	Schem. No.	Description	Part No.	List Price
1	Antenna transformer (range 1)	32-2575		50	Resistor (32,000 ohms, 1 watt)	33-32439	\$0.20	93	Power transformer (110/220 volts, 50 to 60 cycles)	32-7608	\$8.00
2	Antenna transformer (range 2)	32-2576		51	2nd I. F. transformer (discriminator)	32-2376	3.30	94	Tone Control and A. C. Switch	42-1268	.75
3	Antenna transformer (range 3)	32-2573		52	Condenser (110 mmf. mica) mounted in 51	30-1031	.20	95	Condensers (0.015 mf. dual bakelite)	3793 DG	.40
4	Compensator antenna, single	31-6161	\$0.30	53	Compensator	31-6147	.40	96	Range Switch (antenna)	42-1324	.75
5	Condenser (0.05 mf. tubular)	30-4444	.20	54	Resistor (51,000 ohms, 1/2 watt)	33-351339	.20	97	Range Switch (R. F.)	42-1314	.75
6	Resistor (51,000 ohms, 1/2 watt)	33-351339	.20	55	Condenser (110 mmf. dual bakelite)	8035 DG	.25	98	Range Switch (osc.)	42-1284	.75
7	Tuning Condenser	31-1963	4.00	56	Resistor (490,000 ohms, 1/2 watt)	33-349339	.20	99	Flood Lamps	34-2039	.07
8	Remove prior to production			57	Condenser (0.1 mf. tubular)	30-4455	.25		Condenser (0.1 mf. tubular)	30-4455	.25
9	R. F. transformer (range 1)	32-2379	.40	58	Resistor (330,000 ohms, 1/2 watt)	33-333339	.20				
10	R. F. transformer (range 2)	32-2382	1.00	59	Condenser (110 mmf. mica)	30-1031	.20				
11	Compensator (single) R. F.	31-6160	.30	60	Resistor (1.0 meg., 1/2 watt)	33-510339	.20				
12	R. F. Transformer (range 3)	32-2385	1.20	61	Resistor (1.0 meg., 1/2 watt)	33-510339	.20				
13	Condenser (0.05 mf. tubular)	30-4123	.20	62	Condenser (0.01 mf. tubular)	30-4479	.20				
14	Condenser (0.05 mf. tubular)	30-4020	.20	63	Condenser (0.03 mf. mica)	30-1040	.20				
15	Condenser (0.05 mf. tubular)	30-4020	.20	64	Resistor (40,000 ohms, 1/2 watt)	33-340339	.20				
16	Resistor (100 ohms, 1/2 watt)	33-110339	.20	65	Condenser (0.03 mf. tubular)	30-4449	.20				
17	Resistor (700 ohms, 1/2 watt)	33-170339	.20	66	Condenser (0.1 mf. dual bakelite)	4989 DG	.40				
18	Condenser (0.01 mf. tubular)	30-4479	.20	67	Condenser (0.006 mf. tubular)	30-4445	.20				
19	Condenser (110 mmf. mica)	30-1031	.20	68	Volume Control	33-5158	1.00				
20	Resistor (99,000 ohms, 1/2 watt)	33-399339	.20	69	Condenser (0.015 mf. tubular)	30-4358	.20				
21	Condenser (110 mmf. mica)	30-1031	.20	70	Resistor (1.0 meg., 1/2 watt)	33-510339	.20				
22	Resistor (99,000 ohms, 1/2 watt)	33-399339	.20	71	Part of 66						
23	Resistor (10,000 ohms, 1/2 watt)	33-310339	.20	72	Resistor (490,000 ohms, 1/2 watt)	33-449339	.20				
24	Condenser (250 mmf. mica)	30-1032	.25	73	Audio shorting switch (stationary insulated section)	28-4110	.15				
25	Resistor (32,000 ohms, 1/2 watt)	33-322339	.20	74	Audio shorting switch (movable section)	45-2350	.15				
26	Osc. transformer (range 1)	32-2373	1.60	75	Resistor (99,000 ohms, 1/2 watt)	33-399339	.20				
27	Compensator (osc. series)	31-6151	.40	76	Condenser (0.03 mf. bakelite)	8318 SU	.35				
28	Compensator osc.	31-6170	.75	77	Resistor (190,000 ohms, 1/2 watt)	33-319339	.20				
29	Resistor (85 ohms, 1/2 watt)	33-085339	.20	78	Resistor (490,000 ohms, 1/2 watt)	33-349339	.20				
30	Osc. transformer (range 2)	32-2383	.70	79	Resistor (330,000 ohms, 1/2 watt)	33-433339	.20				
31	Condenser (1605 mmf. tracking)	31-6155	.40	78	Condenser (0.01 mf. tubular)	30-4169	.20				
32	Osc. transformer (range 3)	32-2386	.70	80	Condenser (0.05 mf. bakelite)	8326 SU	.25				
33	Condenser (4280 mmf. tracking)	31-6156	.60	80A	Condenser (0.03 mf. tubular)	30-4447	.20				
34	Switch (magnetic tuning, manual)	42-1269	.75	81	Resistor (1.0 meg., 1/2 watt)	33-510339	.20				
35	Switch (magnetic tuning, automatic dial)	45-2330	1.20	82	Condenser (0.003 mf. tubular)	30-4469	.20				
36	Condensers (0.15 mf. dual bakelite)	6287 DG	.40	83	Output transformer	32-7754	1.50				
37	Condenser (0.3 mf. double bakelite)	6287 DU	.40	84	Cone and voice coil assembly	36-3801	1.40				
38	Resistor (490,000 ohms, 1/2 watt)	33-449339	.20	85	Resistor (3500 ohms, 1/2 watt)	33-235339	.20				
39	Resistor (490,000 ohms, 1/2 watt)	33-449339	.20	86	Condenser (0.003 mf. tubular)	30-4469	.20				
40	Condensers (110 mmf. dual bakelite)	8035 DG	.25	87	Resistor (bias 128 ohms)	33-3280	.30				
41	Resistor (1.0 meg., 1/2 watt)	33-510339	.20	88	Condenser (electrolytic 8 mf., 10 mf.)	30-2201	1.75				
42	Resistor (2.0 meg., 1/2 watt)	33-520339	.20	89	Field Coil Assembly	36-3218	4.25				
43	Resistor (2.0 meg., 1/2 watt)	33-520339	.20	90	Condenser (electrolytic 18 mf.)	30-2200	1.40				
44	Resistor (2.0 meg., 1/2 watt)	33-520339	.20	91	Pilot Lamp	34-2039	.07				
45	1st I. F. transformer	32-2604		92	Power transformer (115 volts, 50 to 60 cycles)	32-7606	6.25				
46	Resistor (1000 ohms, 1/2 watt)	33-210339	.20		Power transformer (115 volts, 25 cycle)	32-7607	9.00				
47	Resistor (9000 ohms, 2 watts)	33-290539	.30								
48	Condenser (16 mf. electrolytic)	30-2194	1.60								
49	Resistor (7500 ohms, 3 watts)	33-275639	.30								

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28-4119	Brace	.05
1-2778	Cable A. C.	
41-3258	Cable Speaker	.50
31-1961	Coupling (Tuning Condenser)	.80
28-7198	Coupling (Range Switch)	.15
28-4394	Clip (volume shaft)	.01
31-1898	Control Screw (station index)	.15
28-5092	*Cover (handle)	
27-5283	Dial	.90
45-2472	*Dial & Station Tab Escutcheon	
38-8802	Floodlight Socket Assembly	
45-2348	Gear, Dial Assembly (small)	.60
45-2347	Gear, Dial Assembly (large)	.60
45-2329	Handle (Dial)	.75
45-2354	Hub Assembly (Handle)	.50
28-7196	Housing (Control Screws)	1.00
27-4330	Knob Tuning	.10
27-4331	Knob Vernier	.10
27-4332	Knob Tone & Volume	.10
27-4326	Knob (Range Switch)	.10
28-4118	Mask Guide	.25
45-2401	Mask & Link Assembly	.70
27-4564	Mtg. Feet-Rubber-(Chassis)	.10
38-7706	Pilot Lamp Assembly	.35
28-4609	Reflector Ring	.35
28-7195	Ring Retaining Mask Assembly	.20
31-2053	Screen Holder Assembly	1.40
38-8285	Shaft (Vol. Cont.)	.12
42-1287	Shaft & Plate (Range Switch)	.50
27-6087	Socket (7 prong)	
27-6086	Socket (6 prong)	
36-1293	Speaker H-29	
45-2342	Vernier Drive Assembly	2.40

*A complete list of the automatic tuning mechanism parts is given in Bulletin 273. Those parts shown above marked with an asterisk differ from those shown on Bulletin 273.

PHILCO RADIO AND TELEVISION CORPORATION

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