

# PHILCO . . . . . Models 38-22 & 38-23



## SERVICE BULLETIN No. 285 for members of RADIO MANUFACTURERS SERVICE

A PHILCO Service Plan

### Model 38-22, Codes 121 & 124 and Model 38-23, Code 121

#### Electrical Specifications

**TYPE OF CIRCUIT:** A six tube AC-DC operated superheterodyne circuit is incorporated in these receivers with features such as two tuning ranges; automatic volume control; bass compensation; and a push-pull pentode audio output circuit using beam power tubes.

The same circuit is used in both models. The features, however, such as the tuning mechanism, speakers and cabinets differ in each model.

**Model 38-22, Code 121** employs the **Philco Cone-Centric Automatic Tuning Mechanism** and is assembled in cabinets types "XX" and "T". Model 38-22 assembled in a "CS" cabinet is identified as Code 124. A few parts of the Code 124 chassis differ from those of Code 121. These parts are listed on the parts list.

**Model 38-23** tuning mechanism is of the manually operated type with vernier control. This receiver is assembled in cabinets types "T", "X" and "K" with KR27 and HR21 speakers.

**POWER SUPPLY:** 115 volts AC or DC.

For operation on a 220 volt power supply the line resistor must be changed. See parts list for part number.

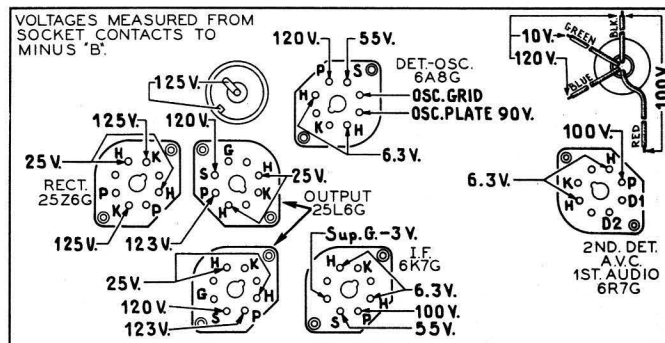
**INTERMEDIATE FREQUENCY:** 470 K. C.

**TUNING RANGE FREQUENCIES:** Range 1—530 to 1720 K. C.  
Range 2—5.7 to 18.0 M. C.

**UNDISTORTED OUTPUT:** 3.5 watts.

**PHILCO TUBES USED:** One 6A8G, Osc. 1st Det.; one 6K7G, I. F. Amp.; one 6R7G, 2nd Det. 1st Audio.; two 25L6G, Output, and one 25Z6G, Rectifier.

**TONE CONTROL:** Three positions.



**Fig. 1—Socket Voltages, Underside of Chassis**

The voltages indicated by arrows were measured with a Philco 026 Circuit Tester which contains a sensitive voltmeter. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

#### CABINETS & SPEAKERS:

Cabinet Type	Speaker Used	Model
K	HR-21	38-23
T	KR-28	38-22
T	KR-27	38-23
X	HR-21	38-23
XX	HR-22	38-22
CS	KR-28	38-22

#### Service Data

##### FOR CONE-CENTRIC TUNING MECHANISM—MODEL 22

Complete information for setting the stations on the cone-centric tuning mechanism of Model 38-22 is covered in the instruction Part No. (39-5533B) which is supplied with each set.

A few major assemblies of the automatic cone-centric tuning mechanism are listed on page 3 of this bulletin. A complete list of replacement parts, however, and detailed service data for the automatic mechanism, will be found in bulletin 282.

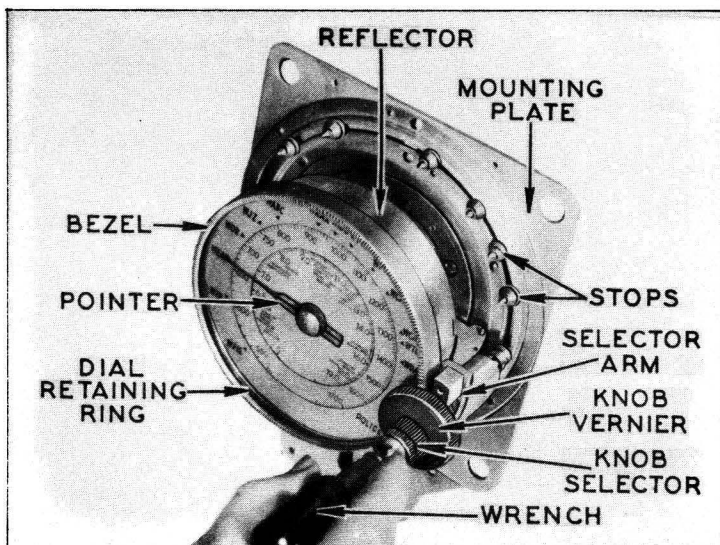
#### Aerial Connections

To obtain the full advantage of the sensitivity of these receivers, the Philco High Efficiency Aerial Part No. 40-6112 must be used.

For attaching the aerial to the receiver a terminal panel is provided at the rear of the chassis. This panel contains three screw terminals marked "Red", "Blk" and "Gnd". Connect the red and black wires of the Philco High Efficiency Aerial transmission line to the "Red" and "Blk" terminals respectively.

If you use a temporary aerial, connect it to the "Red" terminal.

A good ground connection is necessary for best reception. The terminal marked "Gnd" should be connected to a water pipe or any other good ground source.



**Fig. 2—Cone-Centric Automatic Tuning Mechanism**

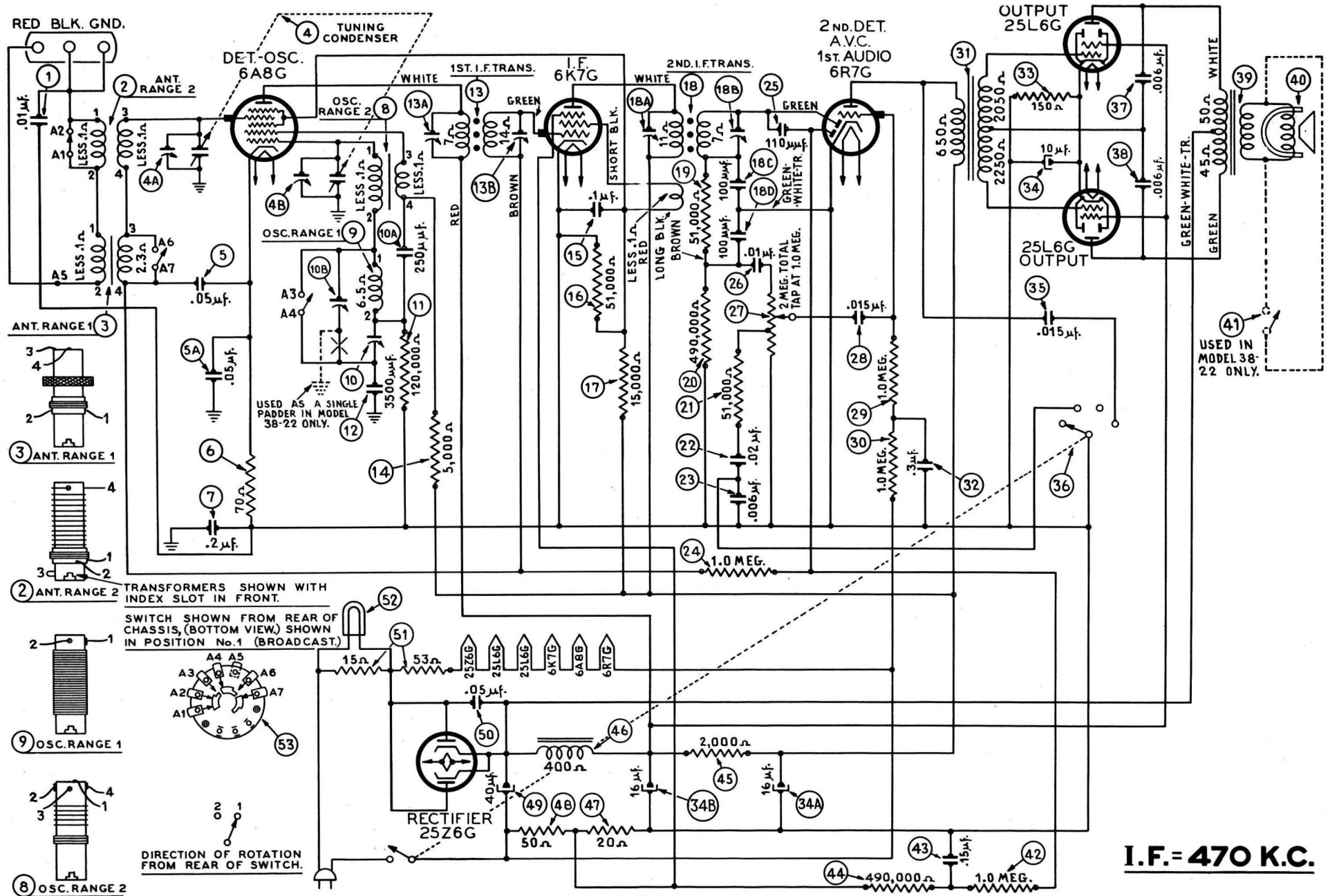


Fig. 3—SCHEMATIC DIAGRAM  
Models 38-22 & 38-23, Code 121

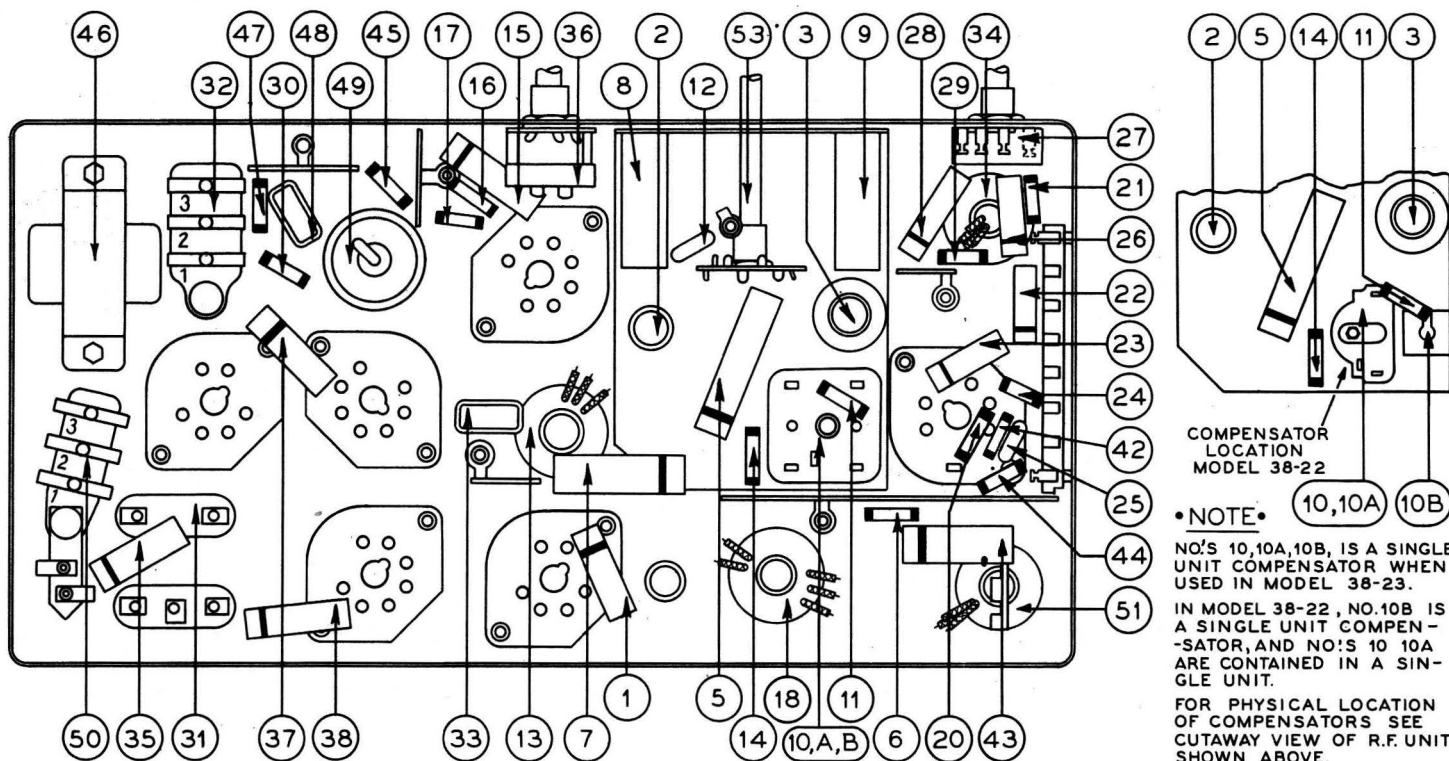


Fig. 4—Part Locations, Underside of Chassis

**REPLACEMENT PARTS—Models 38-22 & 38-23, Code 121**

Schem. No.	Description	Part No.	List Price	Schem. No.	Description	Part No.	List Price	Schem. No.	Description	Part No.	List Price
1	Condenser 0.01 mf. (tubular)	30-4479	\$0.20	40	Cone and Voice Coil Assembly HR21, HR22	36-3797			Dial Retaining Ring	28-5107	\$0.10
2	Antenna Transformer (Range 2)	32-2744	.70	41	Audio Shorting Switch (Model 38-22, Part of Concentric Tuner)				Dial Lamp Socket Assembly	38-9231	
3	Antenna Transformer (Range 1)	32-2657	1.25	42	Resistor 1 meg. (1/2 watt)	33-510339	\$0.20		Escutcheon Ring (Cabinet)	28-5128	.90
4	Tuning Condenser (38-23)	31-2026	5.00	43	Condenser 0.15 mf. (tubular)	30-4191	.25		Gasket (Escutcheon)	27-8893	
5	Condenser 0.05 mf.—0.05 mf. (tubular)	30-4522	.35	44	Resistor 490,000 ohms (1/2 watt)	33-449339	.20		Gear, Tuning Condenser (small)	45-2490	.60
6	Resistor 70 ohms (1/2 watt)	33-070339	.20	45	Resistor 2000 ohms (1/2 watt)	33-220339	.20		Gear, Tuning Condenser (large)	45-2491	.60
7	Condenser 0.2 mf. (tubular)	30-4536		46	Filter Choke	32-7744			Insulator (Tuner Brace)	27-8988	
8	Osc. Transformer (Range 2)	32-2668	1.25	47	Resistor 20 ohms (1/2 watt)	33-020339	.20		Insulator (Tuner)	27-8986	
9	Osc. Transformer (Range 1)	32-2559	.50	48	Resistor 50 ohms (1/2 watt)	33-1260			Knob (Tuning, Small)	27-4572	.10
10	Compensator (Model 38-23)	31-6188	.50	49	Condenser 40 mf. (wet electrolytic 38-23)	30-2237	1.00		Knob (Vernier, Large)	45-2477	
10a	Compensator (Model 38-22)	31-6210	.40		Condenser 40 mf. (dry electrolytic 38-22 Code 124)	30-2256			Knob (Spring)	28-8761	.04
10b	Compensator (250 mmfd.) Part of 10			50	Condenser (0.05 mf. Bakelite)	3615-SU	.35		Knob Retaining Screw	28-8672	.10
11	Resistor 120,000 ohms (1/2 watt)	33-412339	.20	51	Condenser (.05 mfd. 38-22, Code 124)	3615-OSU	.35		Pilot Lamp Assembly (38-22)	38-9232	
12	Condenser (Model 38-22) 3500 mmf. (Mica)	30-1094	.40	52	Line Resistor, 110 Volt operation	33-3334			Pointer Assembly	38-8925	.25
13	1st I. F. Transformer	32-2580	2.20	53	Line Resistor, 110/220 Volt operation	33-3333			Reflector Assembly	45-2478	
14	Resistor 5000 ohms (1/2 watt)	33-250339	.20		Pilot Lamp (38-22, 38-23)	34-2184	.15		Selector Crank Assembly	45-2476	
15	Condenser 0.1 mf. (tubular)	30-4499	.20		Wave Switch	42-1325	.75		Shaft (Coupling)	28-8675	
16	Resistor 51,000 ohms (1/2 watt)	33-351339	.20		Cable (Power) 38-22 and 23, 121	L-2778	.40		Stop Assembly	31-2065	
17	Resistor 15,000 ohms (1/2 watt)	33-315339	.20		Cable (Power) 38-22—Code 124	L-2183	.40		Stop Cover Ring (Mtd. on Selector Crank)	28-5088	.70
18	2nd I. F. Transformer	32-2676			Cable (Speaker) 38-22—Code 121	41-3372			Terminal Panel (Ant.)	38-8746	.15
19	Resistor 51,000 ohms (1/2 watt)	33-351339	.20		Cable (Speaker) 38-22—Code 124	41-3373			Wrench (Setting stations)	45-2475	.45
20	Resistor 490,000 ohms (1/2 watt)	33-449339	.20		Cable (Speaker) Model 38-23	41-3336					
21	Resistor 51,000 ohms (1/2 watt)	33-351339	.20		Dial (Model 38-22)	27-5356			<b>38-22T CABINET</b>		
22	Condenser 0.02 mf. (tubular)	30-4215	.20		Clip (R. F. Trans.)	28-5002	.02		Speaker KR28	36-1377	
23	Condenser 0.006 mf. (tubular)	30-4467	.20		Dial (Model 38-23)	27-8327	.60		<b>38-22XX CABINET</b>		
24	Resistor 1 meg. (1/2 watt)	33-510339	.20		Dial Clamp (Model 38-23)	28-5089	.03		Speaker HR22	36-1378	
25	Condenser 110 mmf. (mica)	30-1031	.20		Dial Washer	27-4598	.03		<b>38-23T CABINET</b>		
26	Condenser 0.01 mf. (tubular)	30-4479	.20		Knob (Model 38-23) Tuning	27-4330	.10		Speaker KR27	36-1360	
27	Volume Control	33-8228			Knob (Model 38-23) Vernier	27-4331	.10		Bezel Frame Assembly	40-6124	.90
28	Condenser 0.015 mf. (tubular)	30-4358	.20		Knob (Model 38-23) Tone & Volume	27-4332	.10		Bezel Gasket	27-8312	.01
29	Resistor 1 meg. (1/2 watt)	33-510339	.20		Insulator (Volume Control)	27-8876			Bezel Glass	27-8298	.05
30	Resistor 1 meg. (1/2 watt)	33-510339	.20		Mtg. Rubber (Chassis)	27-4564	.10		Bezel Ring	28-5078	.55
31	Input Transformer	32-7849	3.00		Mtg. Rubber (Tuning Condenser)	27-4599	.04				
32	Condenser (0.3 mf., bakelite)	6287-ODU	.40		Pilot Lamp Assembly (38-23)	38-8968	.45		<b>38-23 "X" and "K" CABINETS</b>		
33	Resistor 150 ohms	33-1270			Screen (38-23)	27-5320	.10		Speaker HR21	36-1352	
34	Electrolytic Condenser 16, 16, 10 mf.	30-2239	2.00		Socket (7 prong)	27-6087	.11		Bezel Frame Assembly	40-6123	
35	Condenser 0.015 mf. (tubular)	30-4226	.20		Socket (6 prong)	27-6086	.11		Bezel Gasket	27-8312	.01
36	Tone Control & Off-On Switch	42-1361			Socket	27-6057	.11		Bezel Glass	27-8299	.06
37	Condenser 0.006 mf. (tubular)	30-4445	.20		Vernier Drive (38-23)	31-2072	1.00		Bezel Ring	28-5079	.70
38	Condenser 0.006 mf. (tubular)	30-4445	.20						<b>38-23F CABINET</b>		
39	Output Transformer KR28, KR27, HR21, HR22	32-7863	1.60		Brace Mtg. Unit	28-5475			Bezel Frame Assembly	40-6126	1.00
	Cone and Voice Coil Assembly (KR27, KR28)	36-3540	1.00		Bearing (Main Shaft)	28-7242	.60		Bezel Gasket	27-8312	.01
					Bezel Assembly (scale)	40-6136	1.20		Bezel Glass	27-8299	.06
					Coupling (Tuner to Condenser)	31-2056			Bezel Ring	28-5079	.60
					Cone-Centric Tuner Complete	31-2103					

Prices subject to change without notice.

### Alignment of Compensators

**EQUIPMENT REQUIRED:** (1) Signal Generator, using a fundamental frequency covering the intermediate frequency and tuning ranges of the receivers. Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36000 K. C. is the correct instrument for this 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; (4) Philco Set Transformer, Part No. 32-2763.

**OUTPUT METER:** The 026 Output Meter is connected to the plate and cathode terminals of one of the 25L6G tubes. Adjust the meter to use the (0-30) volt scale and advance the attenuator control of the generator until a readable indication is noted on the output meter.

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

**Model 38-22:**

1. Loosen the shaft coupling set screws, using Wrench, Part No. 45-2481; then turn the tuning condenser to the maximum capacity position (plate fully meshed). Now turn the selector knob until the dial pointer is on the small black dot at the low frequency end of the Range One scale. With condenser and pointer set in this position, tighten set screws.

2. Now turn the selector knob (clockwise) until the dial pointer moves  $\frac{1}{16}$  of an inch from the small black dot (clockwise). See Fig. 5. Leave pointer in this position and loosen coupling set screws.

3. After loosening set screws, turn the selector knob until pointer is again on the small black dot at the low frequency end of Range One scale. Be careful when turning the selector knob that the position of tuning condenser is not disturbed. Tighten coupling set screws with condenser and dial pointer in this position.

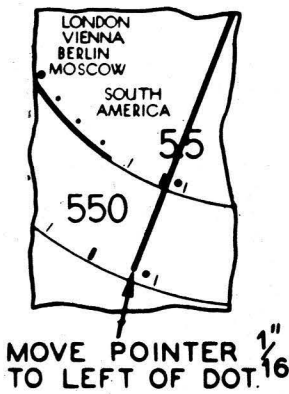


Fig. 5—Dial Calibration Model 38-22

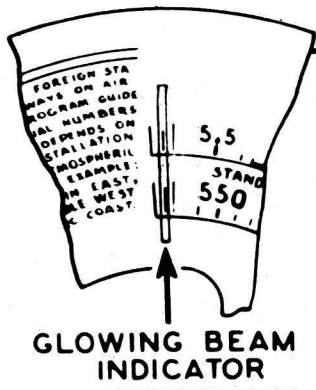


Fig. 6—Dial Calibration Model 38-23

**Model 38-23:**

1. Turn the tuning condenser to maximum capacity position (plates fully meshed).

2. Loosen the clamp of dial, then turn the dial—being careful that position of tuning condenser is not disturbed—until the glowing indicator is centered on the middle index line at the low frequency end of Range One scale. See Fig. 6. Tighten the dial clamp in this position.

**INTERMEDIATE FREQUENCY CIRCUIT**

**Note:** Before the following adjustments are performed, the receiver must be turned on and allowed to heat for 15 minutes.

When adjusting the following compensators, a Philco Set Transformer Part No. 32-2763 must be connected in the signal generator output circuit as follows: Insert the signal generator output lead into the "Med" jack and the ground lead into the "Gnd" jack of the signal generator. Connect the other end of the output lead to

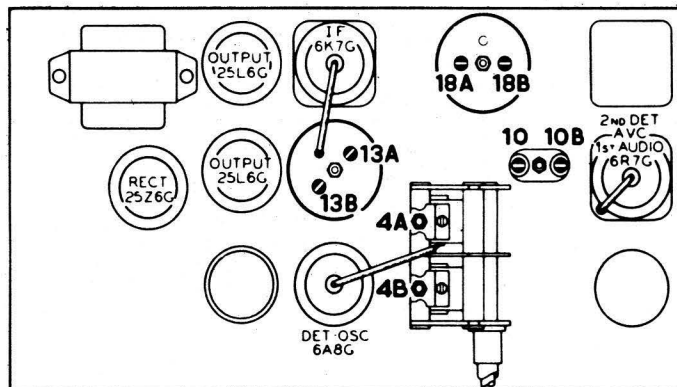


Fig. 7—Locations of Compensators

terminal No. 1 on the Set Transformer and the cable ground to terminal No. 2. Terminals No. 3 and 4 of the Set Transformer are then connected to the chassis ground terminal and 6A8G grid respectively of the receiver with short pieces of wire. Insert a 0.1 mfd. in series with the No. 4 lead which connects to the grid.

1. Set Signal Generator at 470 K. C. Turn "Multiplier" Control to 1000 and the "Attenuator" for maximum output.
2. Turn the receiver dial to 580 K. C.
3. Receiver Volume Control maximum.
4. Range Switch Broadcast Position.
5. Adjust compensators (18B), (18A), (13B) and (13A) for maximum output.

If the output meter goes off scale when adjusting the compensators retard signal generator attenuator.

**RADIO FREQUENCY CIRCUIT**

**Tuning Range: 5.7 to 18 M. C.**

1. Remove terminal No. 4 lead of set transformer from the 6A8G grid and connect to the red terminal of the aerial panel of the receiver through a .1 mfd. condenser.

2. Leave the receiver volume control at maximum. Then set the controls and adjust the R. F. compensators as follows:

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
2	18 M. C.	(4B) See Note A

**Tuning Range: 530 to 1720 K. C.**

Set the controls and adjust the R. F. compensators as follows:

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
1	1550 K. C.	(10B), (4A)
1	580 K. C.	(10)
1	1550 K. C.	(10B)

**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). Now, slowly turn compensator counter-clockwise until a second maximum peak is obtained on the output meter. The second peak is the fundamental signal, and must be used in adjusting the receiver for maximum output. 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) by turning the receiver dial 940 K. C. below the frequency being used on any high frequency range.

**PHILCO RADIO AND TELEVISION CORPORATION**

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