SERVICE BULLETIN No. 281 for members of RADIO MANUFACTURERS SERVICE

A PHILCO Service Plan

Electrical Specifications

TYPE CIRCUIT: An eight tube A. C. operated superheterodyne circuit is incorporated in these receivers with features, such as Philco foreign tuning system; a high gain R. F. amplifier; two tuning ranges; iron core adjusted I. F. transformers; automatic volume control; bass compensation, and a pentode push-pull audio output circuit.

Model 38-C4 employs the **Philco Cone-Centric Automatic Tuning System;** Type "H29" dynamic speaker unit and is assembled in a console cabinet type "XX."

POWER SUPPLY:	Voltage	Frequency	Consumption
	110	60 cycle	95 watts
	110	25 to 40 cycle	95 watts
	115/230	50 to 60 cycle	95 watts

Different transformers are required for operation on the frequencies listed above. The part numbers of these transformers are listed on page 3.

INTERMEDIATE FREQUENCY: 470 K. C.

TUNING RANGES: Two—Range one: 540 to 1720 K.C.
Range two: 5.7 to 18.2 M. C.

UNDISTORTED OUTPUT: 5 watts.

TUBES USED: Eight— 6U7G, R. F. amp.; 6A8G, Det. Osc.; 6K7G, I. F. amp.; 6J5G, 2nd Det., A. V. C.; 6K5G, 1st audio; two 6F6G, audio output; and one 5Y4G rectifier.

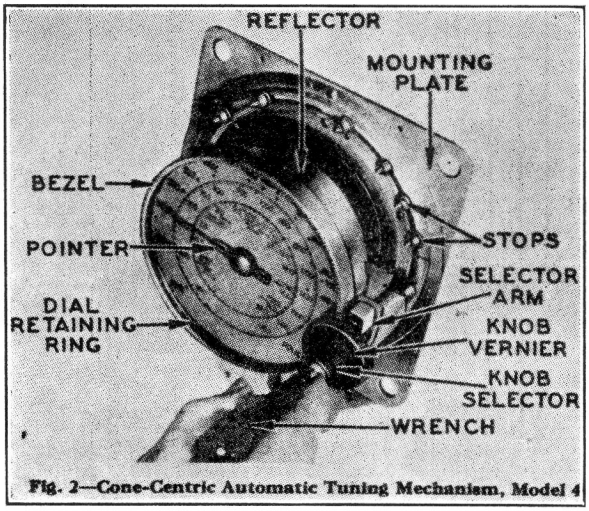


Fig. 2—Cone-Centric Automatic Tuning Mechanism, Model 4

Fig. 2—Cone-Centric Automatic Tuning Mechanism, Model C4

TONE CONTROL: Four positions.

SPEAKER: XX Cabinet—H29.

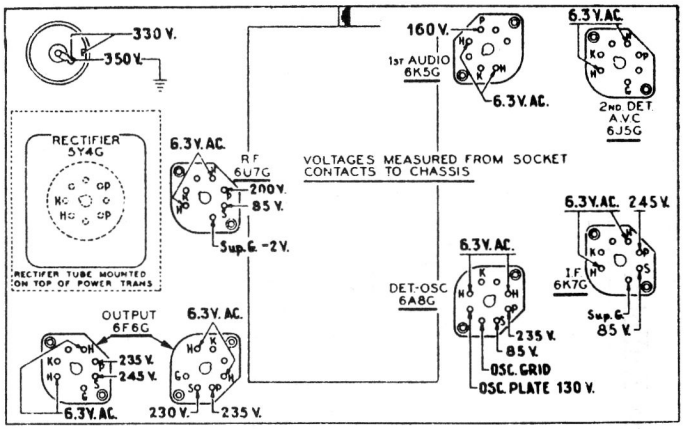


Fig. 1—Socket Voltages—Underside of Chassis View

The Voltages indicated by arrows were measured with a **Philco 025A Circuit Tester** which contains a sensitive voltmeter. Volume Control at minimum, range switch in broadcast position, line voltage 115 A. C.

Service Data

FOR CONE-CENTRIC TUNING MECHANISM—MODEL C4

Complete information for setting the stations on the Cone-Centric Tuning mechanism of Model 38-C4 will be found in the instruction sheet (Form No. 39-5533A) which is supplied with each set.

The locations of a few assemblies of the Cone-Centric, Automatic Tuning mechanism is illustrated in Fig. 2. The part numbers of these assemblies are listed on page 3. A complete list of replacement parts and detailed service data for the 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 mark "Gnd" should be connected to a water pipe or any other good ground source.

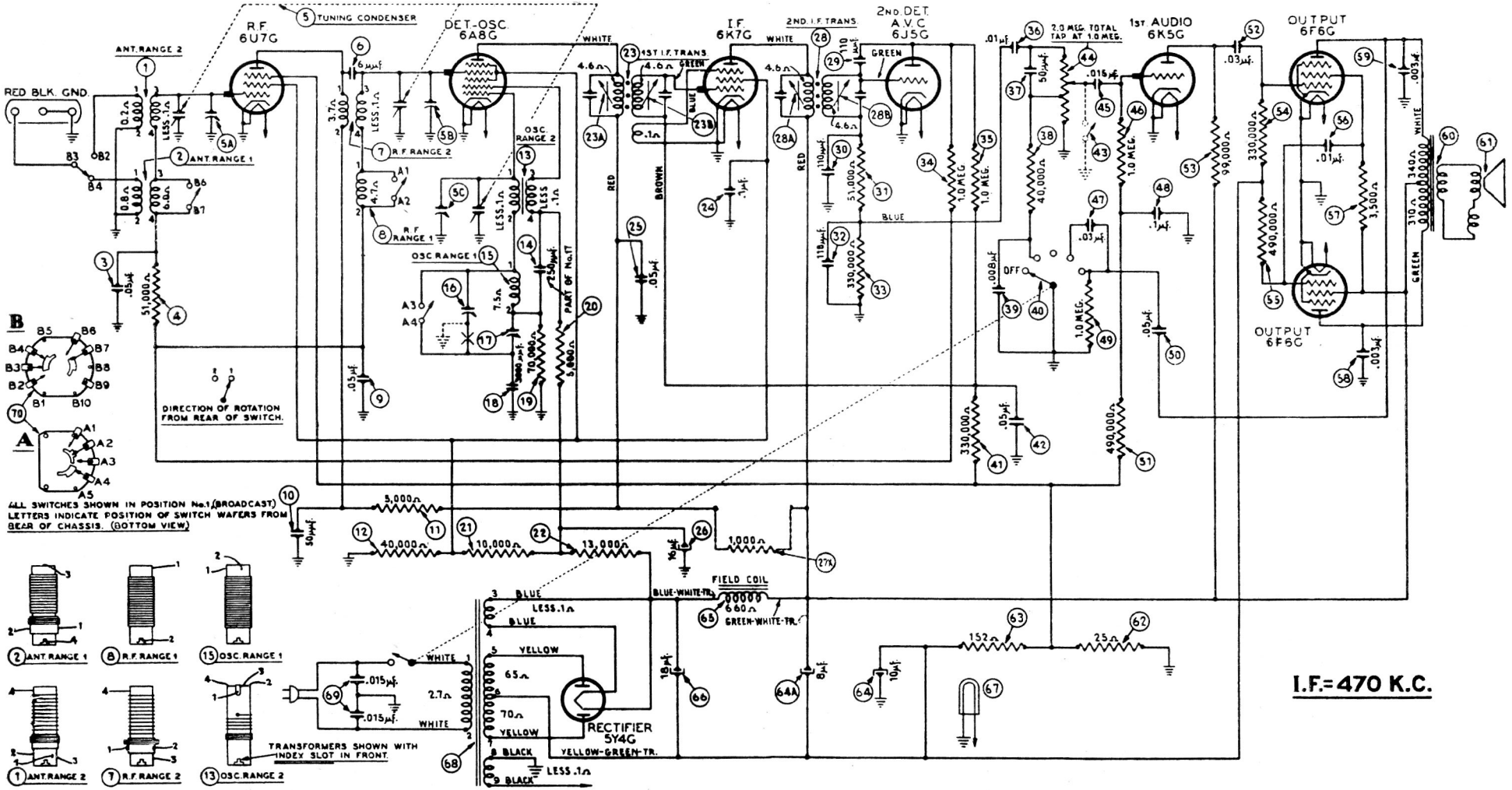


Fig. 3 — SCHEMATIC DIAGRAM

Model 38-C4; Code 121

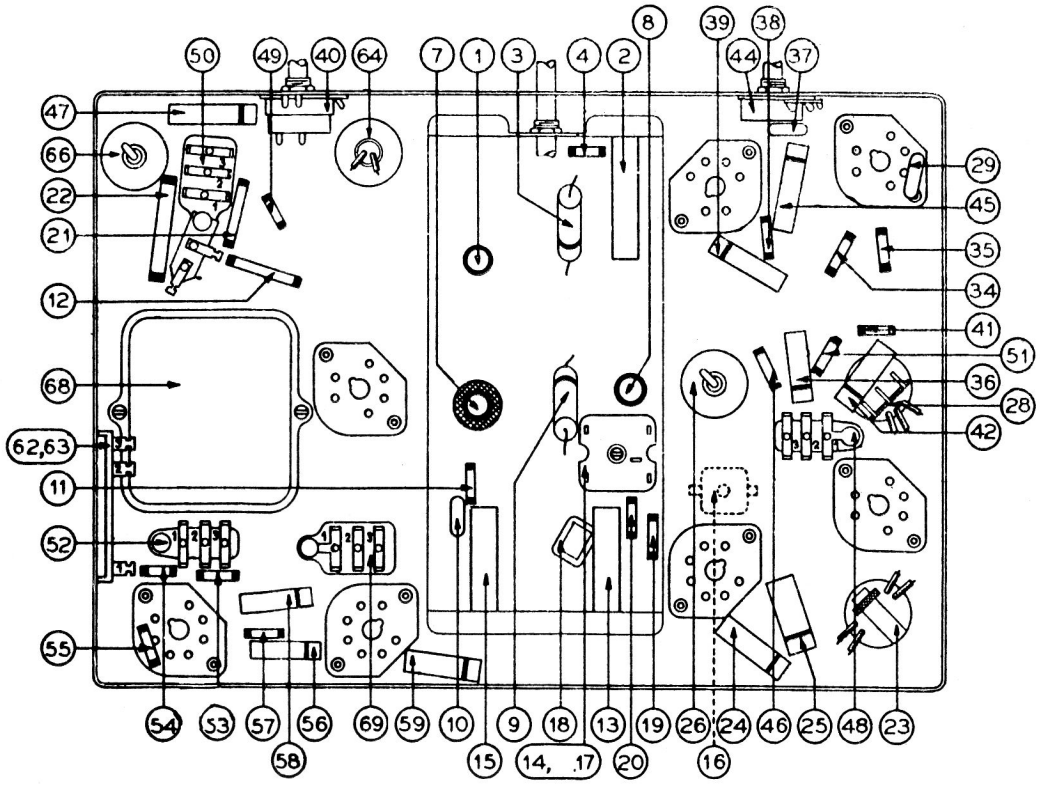


Fig. 4—Locations of Parts, Underside of Chassis

REPLACEMENT PARTS—Model 38-C4

Schem. No.	Description	Part No.
1	Antenna transformer (range 2)	32-2558
2	Antenna transformer (range 1)	32-2629
3	Condenser (.05 mfd. tubular)	30-4444
4	Resistor (51,000 ohms, ½ watt)	33-351344
5	Tuning Condenser Assembly	31-2038
6	Condenser (strip of copper foil, 6 mmd.)	
7	R. F. transformer (range 2)	32-2632
8	R. F. transformer (range 1)	32-2630
9	Condenser (.05 mfd., tubular)	30-4444
10	Condenser (50 mmfd., mica)	30-1029
11	Resistor (5000 ohms, ½ watt)	33-250344
12	Resistor (40,000 ohms, 1 watt)	33-340434
13	Osc. transformer (range 2)	32-2633
14	Condenser (250 mmfd.) on compensator section	
15	Osc. transformer (range 1)	32-2631
16	Compensators (air type, 1500 K. C.	31-6196
17	Compensator (580 K. C., condenser 14 is part of this unit)	31-6199
18	Condenser (3000 mmfd., mica)	30-1028
19	Resistor (70,000 ohms, ½ watt)	33-370344
20	Resistor (5000 ohms, ½ watt)	33-250344
21	Resistor (10,000 ohms, 1 watt)	33-310434
22	Resistor (13,000 ohms, 2 watts)	33-313534
23	First I. F. transformer	32-2643
24	Condenser (0.1 mfd., tubular)	30-4455
25	Condenser (0.05 mfd., tubular)	30-4123
26	Condenser (electrolytic, 16 mfd.)	30-2212
27X	Resistor (1000 ohms, ½ watt)	33-210344
28	Second I. F. transformer	32-2645
29	Condenser (110 mmfd., mica)	30-1031
30	Condenser (110 mmfd., mica)	30-1031
31	Resistor (51,000 ohms, ½ watt)	33-351344
32	Condenser (110 mmfd., mica)	30-1031
33	Resistor (330,000 ohms, ½ watt)	33-433344
34	Resistor (1.0 megohm, ½ watt)	33-510344
35	Resistor (1.0 megohm, ½ watt)	33-510344
36	Condenser (0.01 mfd., tubular)	30-4124
37	Condenser (50 mmfd., mica)	30-1029
38	Resistor (40,000 ohms, ½ watt)	33-340344
39	Condenser (0.008 mfd., tubular)	30-4112
40	Tone Control Switch and off-on switch	42-1341
41	Resistor (330,000 ohms, ½ watt)	33-433344
42	Condenser (0.05 mfd., tubular)	30-4519
43	Audio shorting switch, section of 45-2476 Selector arm	
44	Volume Control (Model C4)	33-5225
45	Condenser (0.015 mfd., tubular)	30-4358
46	Resistor (1.0 megohms, ½ watt)	33-510344
47	Condenser (.03 mfd., tubular)	30-4447
48	Condenser (0.1 mfd., bakelite)	4989 SG
49	Resistor (1.0 megohms, ½ watt)	33-510344
50	Condenser (.05 mfd., bakelite)	8326 SU
51	Resistor (490,000 ohms, ½ watt)	33-449344
52	Condenser (0.03 mfd., bakelite)	8318 SU
53	Resistor (99,000 ohms, ½ watt)	33-399344
54	Resistor (330,000 ohms, ½ watt)	33-433344
55	Resistor (490,000 ohms, ½ watt)	33-449344
56	Condenser (0.01 mfd., tubular)	30-4169
57	Resistor (3500 ohms, ½ watt)	33-235344
58	Condenser (0.003 mfd., tubular)	30-4469
59	Condenser (0.003 mfd., tubular)	30-4469
60	Output transformer (H29)	32-7754
61	Voice Coil and Cone Assembly (H29)	36-3801
62	Bias resistors (25 ohms and 152 ohms)	33-3317
63	Part of 62, 152-ohm Section	
64	Dual Electrolytic Condenser (8 and 10 mfd.)	30-2201
65	Field Coil and Pot Assembly (H29)	36-3218
66	Electrolytic Condenser (18 mfd.)	30-2200
67	Pilot Lamp	34-2064
68	Power Transformer, 115V, 50/60 cycles	32-7837
	Power Transformer, 115V, 25/40 cycles	32-7598
	Power Transformer, 115/230V, 50/60 cycles	32-7839
69	Condensers (0.015 mfd., dual bakelite)	3793 DG
70	Range Switch	42-1340
	Brace (Tuning Unit)	28-5119
	Cable (Speaker)	41-3324
	Cable (Power)	L-2778
	Clip (R. F. Transformer)	28-5002
	Dial (Supplied by Distributor in each district)	27-5337
	Dial Pointer Assembly	38-8925
	Gear (Small) Cone-Centric	45-2490
	Gear (Large) Cone-Centric	45-2491
	Knob Assembly Vernier (Large)	45-2477
	Knob Assembly Selector (Small)	27-4572
	Knob (Tone and Volume)	27-4332
	Mtg. Plate Assembly, Cone-Centric Tuning Mechanism	45-2479
	Mtg. Washer, Rubber (Chassis)	27-4571
	Mtg. Cushion (Tuning Condenser)	27-4599
	Mtg. Corners (Chassis)	27-4564
	Reflector Assembly Cone-Centric Mechanism	45-2478
	Selector Arm Assembly (Cone-Centric)	45-2476
	Socket (7 prong)	27-6087
	Socket (6 prong)	27-6086
	Socket (6 prong) Power Tubes	27-6057
	Terminal Panel (Ant.)	38-8746
	Tube Shield (Square)	28-2726
	Tube Shield (Round)	28-5031
	Tube Shield Base (Square)	28-2725
	Tube Shield Base (Round)	28-5030
	Wrench (Station, Setting)	45-2475
	Wrench (Set Screws)	45-2481
	Bezel Ring (Cabinet)	28-5128
	Bezel Gasket	27-8893
	Speaker H29	36-1293

Alignment of Compensators

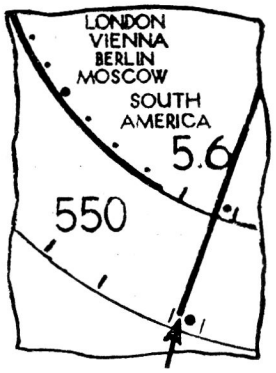
EQUIPMENT REQUIRED: (1) Signal Generator, having a fundamental frequency range covering the tuning and intermediate frequencies of the receiver. Philco Model 088 Signal Generator which has a fundamental frequency range from 110 to 20,000 K. C. is the correct instrument for this purpose; (2) Output meter, Philco Model 025A 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 025A 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 the attenuator control of the generator until a readable indication is noted on the output meter after signal is applied.

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 proceed as follows:

1. Loosen the tuning condenser shaft coupling set screws (use Wrench part No. 45-2481), and turn the tuning condenser to the maximum capacity position (plates fully meshed). 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 to the left of the small dot and the first straight line on the scale (See Fig. 6). Hold pointer and condenser in this position, and carefully loosen shaft coupling set screws.



MOVE POINTER 1/16"
TO LEFT OF DOT.

Fig. 6—Dial Calibration

3. After set screws are loose, turn the selector knob until dial 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 the tuning condenser is not disturbed.

Tighten shaft coupling set screws with condenser and dial pointer in this position.

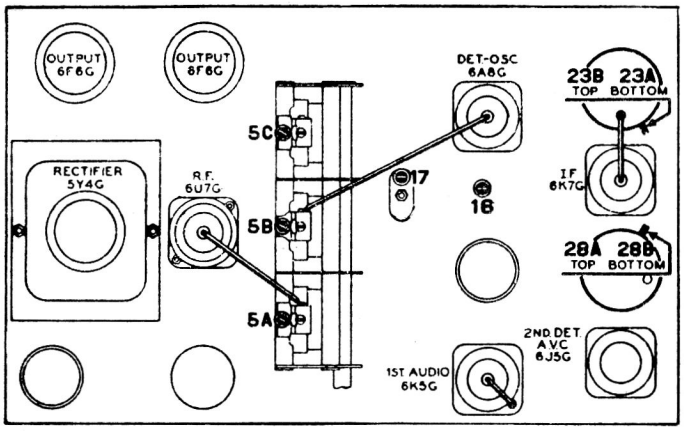


Fig. 5—Locations of Compensators—Top of Chassis

INTERMEDIATE FREQUENCY CIRCUIT

Insert the signal generator shielded output lead into the "Med" jack on the panel of the generator. Connect the other end of the output lead through a .1 mfd. condenser to the grid of the 6A8G, det. osc. tube and the ground connection of the signal generator to the chassis. Set the signal generator and receiver controls, and adjust the I. F. compensators as follows:

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 (28B), (28A), (23B) and (23A) 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 18.2 M. C.

1. With one end of the shielded lead of the signal generator output lead in the "Med" jack, connect the other end through the .1 mfd. condenser to the "Red" terminal of the aerial panel of the receiver. The output lead ground must be connected to the black terminal or to the chassis.
2. Set the controls and adjust the R. F. compensators as follows:

Volume Control	Range Switch	Signal Generator and Receiver Dial	Compensators in Order
Max.	2	18 M. C.	(5C) See Note A

Tuning Range: 530 to 1720 K. C.

Range Switch	Signal Generator and Receiver Dial	Compensators in Order
1	1500 K. C.	(16), (5B), (5A)
1	580 K. C.	(17)
1	1500 K. C.	(16), (5B), (5A)

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). From this position slowly turn the compensator counter-clockwise until a second maximum peak is obtained on the output meter. Adjust the compensator for maximum output using this second peak. The first peak from maximum capacity position of the compensator is the image signal and must not be used in adjusting the 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 this high frequency range.

PHILCO PRODUCTS LIMITED

Toronto

July, 1937 Printed in Canada

MODEL 38-C4
Supplementary Service Bulletin to Bulletin #281

Shown on this bulletin are corrections to the original service bulletin #281, together with changes that were made during the various production runs of this model.

25 Cycle Chassis Only

#30-4289 Condenser .1 mfd., is added across the speaker field. This is not shown in Bulletin #281.

Run #2

(16) #31-6196 Osc. Padder 1500 K.C. changed to #31-6206,

#31-6227 Thermal Compensating Condenser added to eliminate frequency drift due to thermal effects. This condenser wired in parallel with the 1500 K.C. padder #31-6206.

(67) #34-2184 pilot lamp is used in place of #34-2064 as shown in the bulletin.

(40) #42-1349 Tone Control Switch & On-Off Switch is used instead of #42-1341 as shown in the bulletin.

March, 1938.

PHILCO PRODUCTS LIMITED
Service Department.