

HOME RADIO

PHILCO RADIO MODEL B570, CODE 122

SPECIFICATIONS

CABINET	Molded plastic
CIRCUIT For	r-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	
Standard Broadcast	540 kc. to 1620 kc
AUDIO OUTPUT	
OPERATING VOLTAGE	105 to 120 volts, a.c. or d.c
POWER CONSUMPTION	
AERIAL	High-in pedance loop
INTERMEDIATE FREQUENCY	455 ke
PHILCO TUBES 12BE6 com a.v.o	verter, 12BA6 i-f amplifier, 12AV6 det c1st audio, 35C5 output, 35W4 rectifier



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Figure 1. Dial-Cord Installation Details

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PR-2545



SERVICE HINTS

OVING THE CHASSIS FROM THE CABINET

J remove the chassis from the cabinet, first remove the station selector knob, volume control knob, and, at the bottom-center of the dial scale, remove the dial scale retaining screw. A flat object (knife blade) placed under the bottom edge will assist in prying the scale out of the cabinet. Pull to remove the pointer from the tuning gang shaft. Remove the screws from the cabinet back, and pull the back away from the back of the cabinet (use care to prevent breaking the leads from the loop aerial) far enough to reach in and remove the pilot lamp and socket from the retaining clip. Unsolder the output transformer leads from the speaker. Then remove the chassis mounting screws from beneath the cabinet, and remove the chassis.

REMOVING THE SUBBASE

After removing the chassis from the cabinet remove the subbase, using the following procedure.

- 1. Remove the output transformer and dial light connections by pulling the jacks from the pins on the subbase.
- 2. Unsolder the volume control and a-c switch leads, and unsolder and remove the loop aerial.
- 3. At the rear of the panel, bend the hold down tabs out flush with the subbase, and remove.

PARTS REPLACEMENT

Whenever possible, replace all components and leads from the top side of the chassis. In cases where this is not possible, the components must be unsoldered when removed from the bottom. Use only a lightweight low-wattage iron of approximately 22.5 to 25 watts, and always use a low-melting-point solder. Extreme caution must be used to prevent solder from dropping or splashing, and to avoid lifting of the printed wiring foil. Use only the tip of the soldering iron at the solder point whenever heat is being applied. Hold the subbase in one hand while applying heat to the solder point and throw the solder off, with a downward thrust, as soon as it starts to melt. When the solder is removed, the part to be repaired or replaced can be lifted from its located. Insert the new part and secure it with just a drop of solder at each point.

REPLACING TUBE SOCKETS AND I-F TRANSFORMERS

To replace tube sockets and i-f transformers, follow the procedure given above for removing solder. Then use a sharp knife to sever the remaining thin bond of solder at the connections. With the solder removed, the part can be backed out of the slots. Before inserting the repaired or new part, clean all connections at the unsoldered lugs. Use caution when reinserting parts through the subbase slots, so that the foil is not lifted. When soldering is complete apply an electrical varnish to all repaired areas.

ALIGNMENT PROCEDURE

RADIO CONTROLS—Set volume control to maximum. Set tuning control as indicated in chart. OUTPUT METER—Connect across voice-coil terminals.

SIGNAL GENERATOR—Connect generator and set frequency as indicated in chart. Use modulated output. OUTPUT LEVEL—During alignment, adjust signal-generator output to hold output-meter reading below 1.25 volts.

STEP	SIGNAL GENERATOR				
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Ground lead to B—; output lead through a .1- μ f. condenser to grid (pin 7) of 12BE6.	455 ke.	Tuning gang fully open.	Adjust tuning cores, in order given, for maximum output. TC1 and TC3 are located at top of transformers.	TC4—2nd i-f sec. TC3—2nd i-f pri. TC2—1st i-f sec. TC1—1st i-f pri.
2	Radiating loop (See note helow).	1620 kc.	*1620 kc.	Adjust trimmer for maximum output.	C1-B—osc.
3	Same as step 2.	1500 kc.	1500 kc.	Adjust trimmer for maximum output.	C1-A-aerial

NOTE: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire, connect to signal-generator leads, and place near radio loop. The 1620-kc. index mark is located on the pointer rail, to the extreme right side as viewed from the front.

* For proper adjustment of the oscillator trimmer, fully open the tuning gang and insert a .006-inch non-metallic shim between the heel of the rotor and the top of the stator plates. Close the tuning gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.

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Figure 4. Philco Radio Model B570, Code 122, Schematic Diagram

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Figure 5. Top View, Showing Parts Placement



Figure 6. Bottom View, Showing Parts Placement

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REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Reference Part No. Symbol	Description	Service Part No.
Cl	Condenser, tuning gang	31-2751-16 R5	Resistor, diode load, 47,000 ohms	66-3478340°
CIA	Condenser, aerial trimmer	Part of Cl R6	Resistor, grid return, 10 megohms	66-6108340°
C1B	Condenser, oscillator trimmer	Part of C1 R7	Resistor, plate load, 500,000 ohms	Part of PC1
C2	Condenser, B minus to chassis,	R8	Resistor, grid return, 500,000 ohms	
	100 μμf 62 -	110009001 R9	Resistor, cathode bias, 150 ohms	66-1158340°
C3	Condenser, drift compensation, 7.5 $\mu\mu$ f.	30-1224-83 R10	Resistor, B plus filter, 220 ohms	66-1224340*
C4	Condenser, a-v-c by-pass, .047 µf	30-4650-45 R11	Resistor, B plus filter, 1000 ohms	
C5	Condenser, oscillator grid, .01 µf	30-1238-2 R12	Resistor, tube saver, 100 ohms	
C6	Condenser, screen by-pass, .05 µf.	30-4650-45 S1	Switch, off-on	Part of R4
C7	Condenser, i-f tuning	Part of Z1 T1	Transformer, oscillator	
C8	Condenser, i-f tuning	Part of Z1 T2	Transformer, output	Part of LS1
C9	Condenser, i-f tuning	Part of Z2 W1	Line cord	
C10	Condenser, i-f tuning	Part of Z2 Z1	Transformer, 1st i-f	
C11	Condenser, detector filtering	Part of Z2 Z2	Transformer, 2nd i-f	
C12	Condenser, detector filtering	Part of Z2		
C13	Condenser, audio coupling, .005 µf	30-1238-1		
C14	Condenser, plate by-pass	Part of PC1	MISCELLANEOUS	
C15	Condenser, audio coupling, .005 µf	Part of PC1		
C16	Condenser, compensating	Part of PC1 Description		Service Bost No.
C17	Condenser, tone compensation, .022 μ f.	30-4650-43		Furrino
C18	Condenser, electrolytic, 3-section	30-2583-1 Cabinet.	cardinal	
C18A	Condenser, filter, 30 µf., 150v	Part of C18 Cabinet.	sand	10990-4
C18B	Condenser, filter, 25 µf., 150v	Part of C18 Back-au	nd-loop assembly	76-8515
Ç18Ç	Condenser, filter, 20 uf., 150v	Part of C18 Connector	r interlock male	27-6240-6
C19	Condenser, line by-pass, 0.1 µf.	30-4650-47 Drive cor	d 95 fast mool	AE 9750
11	Lamp, pilot		a, 25-100t spoor	
LAI	Loop, part of cabinet back			
LS1	Speaker, p-m	36-1627-8 Shaft, tur	ning	
PC1	Printed circuit	30-6001 Socket as	sembly, pilot lamp	
RI	Resistor, oscillator grid, 22,000 ohms66	3-3228340° Shield,	pilot lamp	54-8806
R2	Resistor, i-f screen dropping,	Socket, 7	-pin miniature	
	4700 ohms60	5-2748340° Socket, 7	-pin miniature, 12AV6	
R3	Resistor, a-v-c filter, 2.2 megohms	3-5228340° Shield,	tube	
R4	Resistor, volume control, .5 megohm	33-5566-41 Printed w	viring panel (less components)	

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HOME RADIO

SERVICE BULLETIN FOR PHILCO THREE-SPEED AUTOMATIC RECORD CHANGER MODEL M-24

For service information and adjustments pertaining to Philco Three-Speed Automatic Record Changer Model M-24, refer to the Service Manual, PR-2557, for Philco Three-Speed Custom Automatic Record Changer Model M-25. All information contained in the Service Manual for Model M-25 will be adequate for Model M-24 except for the part number differences listed below and a few arrangements in the loading of the tone arm.

Replacement part numbers for Model M-24 which differ from those for Model M-25 are as follows:

Description	Service Part No.
Actuator Assembly	
Tone-arm-actuator assembly	76-6502
Bridge Assembly	
Bearing washer (2)	
Lifter lever	
Spring, lifter lever	
(Spring, lifter lever Part No. 28-9626 not used in Model	M-24)
Changer base plate, tone-arm rest, tone-arm stanchion	
Bumper, tone-arm rest, rubber	
Control Assembly	
Knob, SPEED control assembly	
Knob, FUNCTION control	
Motor and Hardware	
Spacer, mounting (3)	
Motor assembly (complete), 60-cycle	
Motor assembly, 50-60-cycles	
Conversion kit, for 50-cycle operation	
Record-Shelf Assembly	
Hold-down fulcrum arm	
Push-off saddle	
Record-shelf-and-shaft assembly	
Tone-arm assembly (complete)	35-2717
Damper (not included in Model M-25 parts list)	54-8221
Damper (not included in Model M-25 parts list)	54-8222
Retainer plate, front	
Retainer plate, rear	
Spring, cartridge retaining	56-6796
Tone-arm shell	35-2707-1
Trip-arm assembly	76-5910
Turntable	35-2711-3

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PHILCO RADIO-PHONOGRAPH MODEL B1349

SPECIFICATIONS

CABINET Molded plastic
CIRCUIT
FREQUENCY RANGE
AUDIO OUTPUT
OPERATING VOLTAGE
POWER CONSUMPTION
Radio
INTERMEDIATE FREQUENCY
ANTENNABuilt-in high-impedance loop; provision for external antenna
PHILCO TUBES 7A8 converter; 7B7 i-f amplifier; 7C6 detector-a.v.c. lst audio; 35L6GT output; 50Y7GT rectifier.
PHONOGRAPH Philco Model M-24 All-Speed Automatic Record Changer



MODEL B1349



Figure 1. Drive-Cord Installation Details

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Figure 2. Base View, Showing Parts Placement and Alignment Points

TP3-2441

ALIGNMENT PROCEDURE

GENERAL—In order to perform the alignment procedure it is necessary to remove the front of the cabinet from the back portion of the cabinet, which holds the record changer. The front part of the cabinet can be removed by loosening the screws located on the bottom of the cabinet, and the screws located directly under the front of the changer lid.

DIAL POINTER—With the tuning-condenser plates fully meshed, set the dial pointer to coincide with the index mark located on the dial backplate.

CONTROLS-Set the volume control to maximum

and the tone control to the treble position. Set the tuning control as indicated in the chart.

OUTPUT INDICATOR—Connect the output indicator (a 1000-ohms-per-volt voltmeter or an oscilloscope) across the voice-coil terminals.

SIGNAL GENERATOR — Use an amplitude-modulated r-f generator. Connect the ground lead to B—, and the output lead as indicated in the chart.

OUTPUT LEVEL—During the alignment, attenuate the signal-generator output to maintain the output indication below 1 volt.

	SIGNAL GENERATOR				
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	AD JUST TRIMMER
1	Output lead through a .01-µf. condenser to grid (pin 6) of 7A8 converter tube.	455 kc. (modulated)	Gang fully open	Adjust, in order given in next column, for maximum output. TC2 and TC4 are located at top of transformers.	TC4—2nd i-f sec. TC3—2nd i-f pri. TC2—1st i-f sec. TC1—1st i-f pri.
2	Radiating loop. (See NOTE 1 below.)	1620 kc.	1620 kc. (See NOTE 2 below.)	Adjust for maximum output.	C1B—oscillator trimmer
3	Same as step 2.	1520 kc.	1520 kc. (See NOTE 2 below.)	Adjust for maximum output.	C1A—antenna trimmer

ALIGNMENT CHART

NOTE 1: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads, and place near radio loop. NOTE 2: The tuning gang can be set to 1620 kc. and 1520 kc. by turning the tuning control until the pointer coincides with the respective marks on the dial backplate. See figure 1.



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RADIO-PHONOGRAPH

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REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference	Description	Service
зутрої	Description	Part No.
CI	Condenser, tuning gang	31-2751-10
CIA	Condenser, trimmer, antenna	Part of Cl
C1B	Condenser, trimmer, oscillator	Part of C1
C4	Condenser, d-c blocking, 47 µµf.	60-00475420
C5	Condenser, fixed trimmer, 7.5 $\mu\mu$ f	30-1224-65
C6	Condenser, a-v-c by-pass, .1 µf.	30-4650-47*
C7	Condenser, by-pass, .1 µf.	30-4650-47*
C8	Condenser, cathode by-pass, .05 µf.	30-4650-45*
C9	Condenser, screen by-pass, .1 µf.	30-4650-47*
C10	Condenser, d-c blocking, .005 µf.	30-1238-1*
C11	Condenser, d-c blocking, .005 µf.	30-1238-1*
C12	Condenser, high-frequency	
	compensation, 47 µµf.	60-00475420
C13	Condenser, bass compensation, .0047 µf	.30-4650-56*
C14	Condenser, tone, .0047 µf.	30-4650-56*
C15	Condenser, d-c blocking, .005 µf.	Part of PC1
C16	Condenser, tone compensation, .0047 µf.	30-4650-90
C17	Condenser, electrolytic, 4-section	30-2575-41
C17A	Condenser, cathode by-pass, 25 µf., 50v.	Part of C17
C17B	Condenser, filter, 40 µf., 150v	Part of C17
C17C	Condenser, filter, 40 µf., 250v	Part of C17
C17D	Condenser, filter, 40 µf., 250v	Part of C17
C18	Condenser, voltage doubling, 20 µf., 150	v30-2568-22
C19	Condenser, line by-pass, .04 µf.	
C20	Condenser, phono isolation, .01 µf.	30-4650-58*
C22	Condenser, antenna blocking, 5 µµf	
11	Lamp, pilot	
LA1	Loop assembly, antenna	76-2127-21
LSI	Speaker	
PC1	Printed circuit, d-c blocking	
R2	Resistor, grid leak, 100,000 ohms	66-4108340*
R 3	Resistor, B- to chassis, 150,000 ohms	66-4158340*
R4	Resistor, cathode bias, 180 ohms	66-1188340*
R5	Resistor, screen dropping, 27,000 ohms	.66-3278340*
R6	Resistor, i-f filter, 47,000 ohms	66-3478340*
R 7	Resistor, diode return, 470,000 ohms	.66-4478340*
R8	Resistor, diode load, 2.2 megohms	66-5228340*
R 9	Resistor, grid leak, 10 megohms	66-6108340*
R10	Volume control, 2 megohms (with off-on	
	switch and tone control)	33-5563-65
R11	Resistor, bass compensation,	
	68,000 ohms	66-3688340*
R12	Tone control, 5 megohms	Part of R10
R13	Resistor, plate load, 500,000 ohms	Part of PC1
R14	Resistor, grid leak, 500,000 ohms	Part of PC1
R15	Resistor, cathode bias, 180 ohms, 1 watt.	66-1184340*

Reference Symbol	Description	Service Part No.
R16	Resistor, filter, 4700 ohms, 2 watts	
R17	Resistor, filter, 270 ohms, 7 watts	
R18	Resistor, tubesaver, 100 ohms	
R19	Resistor, antenna loading, 150,000 ohn	ns66-4158340*
S1	Switch, off-on	Part of R10
Tl	Transformer, oscillator	
T 2	Transformer, output	
WI	Line cord	L-2183*
WS	Wafer switch	
Z1	Transformer, 1st i-f	
Z 2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Backplate assembly	
Cabinet	10840-12
Bottom cover	
Hinge (2)	
Lid	
Lid support	
Binder post	
Changer Mounting Hardware	
Sleeve, rubber (3)	
Speed nut (3)	W-2 554
Spring, mounting, top (3)	
Spring, mounting, bottom (3)	
Dial scale	
Drive cord, 25-ft. spool	
Foot, rubber (4)	
Knob, off-on-volume	
Knob, radio-phono	
Knob, tuning	
Knob, tone	
Lead assembly, antenna	
Mounting foot (4)	
Panel, wiring	
Pilot-lamp-socket assembly	
Fastener, pilot-lamp shield (2)	W2235-1FA9
Pointer	56-5630-31
Socket, Loktal (3)	27-6207-1*
Socket, octal (2)	27-6174*
Spring, hairpin	56-6552
Tuning shaft	56-8370

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SERVICE BULLETIN FOR PHILCO HOME RADIO MODEL B572, CODE 121



Philco Home Radio Model B572, Code 121, is identical in all respects to Philco Home Radio Model B570, Code 121, except for cabinet styling. For all service information, refer to Service Manual PR-2542, on Model B570, Code 121. Replacement part numbers for Model B572, Code 121, which differ from replacement part numbers for Model B570, Code 121, are listed below.

Description	Service Part No.
Cabinet	
Sand	
Colonial green	
Maroon	
Knob (2)	
Dial scale	
Back-and-loop ass'y.	
Pointer	

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PHILCO RADIO-CLOCK MODEL 53-804

SPEC	CIFICATIONS
CABINET Molded plastic CIRCUIT Five-tube superheterodyne (plus rectifier) FREQUENCY RANGE Broadcast 540 kc, to 1620 kc. Special Services 1700 kc. to 3400 kc. AUDIO OUTPUT 1 watt OPERATING VOLTAGE 105—120 volts, a.c. POWER CONSUMPTION 30 watts ANTENNA Built-in, high-impedance loop INTERMEDIATE FREQUENCY 455 kc. PHILCO TUBES 6BJ6 r-f ampl.; 12BE6 converter; 6BJ6 i-f ampl.; 6AQ5 detector, a.v.c., 1st audio; 35C5 output; 35W4 rectifier	MODEL 53-804



Figure 1. **Drive-Cord Installation Details**

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ALIGNMENT PROCEDURE

GENERAL

RADIO CONTROLS—Set volume control for maximum output and tuning control as given in the alignment chart. Set band switch to broadcast position for first 5 steps, and to special services position for steps 6 and 7.

OUTPUT INDICATOR-Connect output indicator (either on oscilloscope or a 1000-ohms-per-volt, a-c voltmeter) across voice-coil terminals. SIGNAL GENERATOR-Use an AM r-f generator, connected as indicated in the alignment chart.

OUTPUT LEVEL-During alignment, attenuate signal-generator output to maintain output indication below 1 volt.

DIAL POINTER—Before the alignment is started, the dial pointer should be set to coincide with the dial scale mark to the left of "55" when the tuning gang is fully meshed.

	SIGNAL GENERATOR		RADIO		
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Ground lead to $B-$. Output lead through a .01- μ f. condenser to pin 7 (mixer grid) of 12BE6, converter.	455 kc.	Tuning gang fully open.	Adjust, in order given in next column, for maximum output.	TC5–2na i-f sec. TC4–2nd i-f pri. TC3–1st i-f sec. TC2–1st i-f pri.
2	Radiating loop. See Note 1 below.	1620 kc.	1620 kc. See Note 2 below.	Adjust for maximum output.	C1C–ose. trimmer
3	Same as step 2.	1520 kc.	Tune radio to generator signal.	Adjust for maximum output. (High-frequency adjustment)	C1B–mixer-grid trimmer C1A–r-f trimmer
4	Same as step 2.	580 kc.	Same as step 3.	Adjust for maximum output. (Low-frequency adjustment)	TC1-r-f transformer
5	Repeat steps 3 and 4 until no	further imp	rovement is obtained.		
6	Same as step 2.	3200 ke.	Same as step 3.	Adjust for maximum output.	C5–special-services mixer-grid trimmer C2–special-services r-f trimmer
7	Same as step 2.	1800 ke.	Same as step 3.	Adjust for maximum output.	C3–special-services r-f padder

ALIGNMENT CHART

NOTE 1: Make up a 6–8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads and place near radio loop antenna. The loop antenna must be connected to the radio.

NOTE 2: To set the tuning gang to 1620 kc., place a piece of 6-mil flat shim stock beneath the heel of the rotor, and turn the rotor until it holds the shim firmly in place. Then remove the shim.



Figure 2. Top View, Showing Tuning Adjustments



Figure 3. Base View, Showing Parts Placement

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REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be either unchanged or improved. When ordering replacements, use only the "Service Part No."

Reference Symbol		Description	Service Part No.	Reference Symbol	e Description	Service Part No.
Cl	Condenser.	tuning gang, 3-section		R11	Volume control, 500,000 ohms	
CIA	Condenser,	trimmer, antenna	Part of C1	R12	Resistor, grid leak, 10 megohms	
C1B	Condenser,	trimmer, r-f	Part of C1	R13	Resistor, plate load, 500,000 ohms .	Part of PC1
CIC	Condenser,	trimmer, oscillator	Part of Cl	R14	Resistor, grid leak, 500,000 ohms .	Part of PC1
C2	Condenser.	trimmer.		R15	Resistor, cathode bias, 150 ohms,	
	special se	ervices r-f	Part of CA1		1 watt	66-1154340°
C3	Condenser,	padder, special services r-f	Part of CA1	R16	Resistor, B+ filter, 1200 ohms	66-2128340°
C4	Condenser,	r-f by-pass, .05 µf	30-4650-45°	R17	Resistor, B+ filter, 220 ohms, 1 wat	t66-1224340°
C5	Condenser,	trimmer,		R18	Resistor, tube saver, 100 ohms	
-	special s	services mixer-grid	Part of CA1	S2	Switch, band, broadcast-special serv	ices42-1893-3
C6	Condenser,	a-v-c by-pass, .05 μf	30-4650-45°	TI	Transformer, oscillator	
C7	Condenser,	fixed trimmer, 7.5 $\mu\mu$ f	30-1224-65	T2	Transformer, output	
C8	Condenser,	d-c blocking, 47 μμf	60-00475420	W1	Line cord	L-2183°
C9	Condenser,	screen by-pass, .05 µf	30-4650-45°	Z1	Transformer, r-f	32-4399-7A
C10	Condenser,	special, B- to chassis, .2	μf 30-4644	Z2	Transformer, 1st i-f	32-4160A
C11	Condenser,	i-f coupling, 220 μμf6	2-122001001°	Z 3	Transformer, 2nd i-f	
C12	Condenser,	screen by-pass, .002 µf				
C13	Condenser,	audio coupling, .005 μ f.	30-1238-1°			
C14	Condenser,	d-c blocking, .005 µf	Part of PC1		MISCELLANEOUS	
C15	Condenser, .022 µf.	tone compensation,	30-4650-60°	Descriptio	on	Service
C16	Condenser,	electrolytic filter				Part No.
C16A	Condenser,	filter, 30 µf., 150v	Part of C16			
C16B	Condenser,	filter, 30 µf., 150v	Part of C16	Bezel, rad	io	
C16C	Condenser,	filter, 40 µf., 150v	Part of C16	Ring, b	ezel	
C17	Condenser,	line by-pass, .047 µf.	30-4650-45°	Cabinet		
C18	Condenser,	fixed padder, 865 µµf		Back an	nd loop assembly	
CA1	Condenser	assembly, trimmer		Cable ass	embly, clock	
11	Lamp, pilo	ot		Clamp, el	lectrolytic condenser	
11	Connector,	clock cable, female		Clock		41-2044-1
12	Connector.	appliance	76-3931	Cover a	und bracket assembly, clock	
LI	Coil. specia	al services r-f	32-4561-4	Dial scale	and backplate assembly	
L2	Coil. specia	al services mixer-grid	32-4561-4	Drive core	d, 25-ft. spool	45-8750°
L3	Coil oscill	ator shunt	32-4562-1	Spring,	drive-cord	
PCI	Printed cir	cuit	30-6001	Gasket, sr	peaker	
PLI	Connector	clock cable male Part	of clock_cable	Grille		
RI	Besistor se	creen dropping		Knob (2)	******	
	10,000 o	hms	66-3108340°	Knob, bar	nd switch	
R2	Resistor, a-	v-c load, 4.7 megohms	66-5478340°	Pointer		
R3	Resistor, a-	v-c load, 2.2 megohms	66-5228340°	Rubber m	nount, gang mounting	
R4	Resistor, B	- to chassis, 150,000 ohms	66-4158340°	Shaft, tur	ning	
R5	Resistor, gr	id leak, 22,000 ohms	66-3228340°	Spring.	retaining	
R6	Resistor, g	rid leak, 2.2 megohms	66-5228340°	Shield, tu	ıbe (2)	
R7	Resistor. a-	v-c load, 2.2 megohms	66-5228340°	Socket as	sembly, pilot lamp	
R8	Resistor. ca	athode bias, 180 ohms	66-1188340°	Socket, tu	ibe (2)	
R9	Resistor, so	reen dropping 2200 ohms	66-2228340°	Socket. tu	ibe (4)	
R10	Resistor, i-	f filter, 47,000 ohms		Speaker		

MODEL 53-804



Figure 4. Philco Radio Model 53-804, Schematic Diagram

5

World Radio PBr2424

6

.

MODEL 53-804

TP2-2652A





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World Radio History

TP2-2656

ALIGNMENT PROCEDURE

GENERAL

RADIO CONTROLS—Set volume control for maximum output and tuning control as given in the alignment chart. Set band switch to broadcast position for first 5 steps, and to special services position for steps 6 and 7.

OUTPUT INDICATOR—Connect output indicator (either on oscilloscope or a 1000-ohms-per-volt, a-c voltmeter) across voice-coil terminals. SIGNAL GENERATOR-Use an AM r-f generator, connected as indicated in the alignment chart.

OUTPUT LEVEL—During alignment, attenuate signal-generator output to maintain output indication below 1 volt.

DIAL POINTER—Before the alignment is started, the dial pointer should be set to coincide with the dial scale mark to the left of "55" when the tuning gang is fully meshed.

	SIGNAL GENERATOR		R		
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Ground lead to B–. Output lead through a .01- μ f. condenser to pin 7 (mixer grid) of 12BE6, converter.	455 kc.	Tuning gang fully open.	Adjust, in order given in next column, for maximum output.	TC5–2nd i-f sec. TC4–2nd i-f pri. TC3–1st i-f sec. TC2–1st i-f pri.
2	Radiating loop. See Note 1 below.	1620 kc.	1620 kc. See Note 2 below.	Adjust for maximum output.	C1C—osc. trimmer
3	Same as step 2.	1520 ke.	Tune radio to generator signal.	Adjust for maximum output. (High-frequency adjustment)	C1B-mixer-grid trimmer C1A-r-f trimmer
4	Same as step 2.	580 kc.	Same as step 3.	Adjust for maximum output. (Low-frequency adjustment)	TC1–r-f transformer
5	Repeat steps 3 and 4 until no further improvement is obtained.				
6	Same as step 2.	3200 kc.	Same as step 3.	Adjust for maximum output.	C5—special-services mixer-grid trimmer C2—special-services r-f trimmer
7	Same as step 2.	1800 kc.	Same as step 3.	Adjust for maximum output.	C3–special-services r-f padder

ALIGNMENT CHART

NOTE 1: Make up a 6–8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads and place near radio loop antenna. The loop antenna must be connected to the radio.

NOTE 2: To set the tuning gang to 1620 kc., place a piece of 6-mil flat shim stock beneath the heel of the rotor, and turn the rotor until it holds the shim firmly in place. Then remove the shim.

REPLACEMENT PARTS LIST (Continued)

5

Reference Symbol	Description	Service Part No.
R5	Resistor, grid leak,	00 00000 108
20	22,000 ohms	
R6	Resistor, grid leak,	66 50082408
ne	2.2 megonms	
R 7	Resistor, a-v-c load,	66 50083400
DO	2.2 megonins	
Kð	Resistor, cathode blas,	66 1188340*
DO	Desister corece dropping	
К9	Resistor, screen dropping,	66 2228340*
D10	Deviation if filter 47,000 obs	
RIU	Kesistor, 1-1 filter, 47,000 offi	1500-0410040
KII	Volume control, $500,000$ of	22 5566 42
	Models 55-550, 55-554	22 5566 /6
DIO	Model 55-952	
K12	Resistor, grid leak,	66 61082400
D10	TU megonins	00-0100040
K13	Resistor, plate load,	Dout of DC1
D14	Duritary mid look	
K14	Resistor, grid leak,	Dant of DC1
10.1 8	500,000 onms	Fart of FC1
K15	Resistor, cathode blas,	CC 11549400
D10	150 onms, 1 watt	
R16	Resistor, B+ filter,	CC 01002.109
D16	D it D Char	
RI7	Resistor, B+ niter,	00 10049400
D10	220 onms, 1 watt	
KI8	Resistor, tube saver, 100 0	Dout of D11
51	Switch, off-on	
52	Switch, broadcast-special s	40 1000 0
	Model 53-950	42-1090-0
	Model 53-952	42-1090-0
T 1	Model 53-954	42-1090-4
11	Transformer, oscillator	
	Transformer, output	
71	Line cord	20 4000 7 A
L1 70	Transformer, r-r	
	Transformer, 1st 1-1	
LJ	I ransformer, 2nd 1-f	

MISCELLANEOUS

PARTS COMMON TO ALL MODELS

Description	Service
	Part No.
Drive cord, 25-ft. spool	45-8750°
Spring, drive cord	
Rubber mount, gang mtg. (3)	
Shield, tube (2)	6-5629FA3
Socket assembly, pilot lamp	27-6233-6

Description	Service Part No.
Socket tube (2)	27-6203-14
Socket, tube (2)	
Speed nut (4)	1W56920FE7

MODEL 53-950

Cabinet, mahogany	
Cabinet, ivory	
Cabinet back and loop assembly	
Scale, mahogany	54-5152
Scale, ivory	54-5152-1
Knob (2)	54-4718-39
Knob, band switch	
Pointer	
Shaft, tuning	
Spring, retaining	
Speaker	

MODEL 53-952

Cabinet	
Cabinet back and loop assembly	
Knob (2)	
Knob, band switch	54-4998
Panel, diffusing	
Clip, panel diffusing	
Pointer	
Pointer rail assembly	
Scale, dial	
Shaft, tuning	
Spring, retaining	
Speaker	
- F	

MODEL 53-954

Cabinet, mahogany		
Cabinet, blond		
Back assembly, mahogany cabinet		
Back assembly, blond cabinet		
Loop assembly, antenna		
Metal grille	56-10034	
Knob (2), mahogany		
Knob (2), blond		
Knob, band switch		
Panel, diffusing		
Clip, diffusing panel		
Pointer		
Pointer rail assembly		
Shaft, tuning		
Spring, retaining		
Speaker		
1		



Figure 5. Philco Radio Models 53-950, 53-952, and 53-954, Schematic Diagram

TP2-2652



Figure 2. Top View, Showing Tuning Adjustments



Figure 3. Base View, Model 53-950, Showing Parts Placement



Figure 4. Base View, Models 53-952 and 53-954, Showing Parts Placement

REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be either unchanged or improved. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.	Reference Symbol	Description Service Part No.
C1	Condenser, tuning gang, 3 sectio Model 53-950	n 31-2771	C13	Condenser, audio coupling. .005 μf 30-1238-1°
	Models 53-952, 53-954	31-2771-1	C14	Condenser, d-c blocking,
CIA	Condenser, trimmer, antennaI	Part of C1		.005 µfPart of PC1
C1B	Condenser, trimmer, r-f	Part of C1	C15	Condenser, tone compensation,
CIC	Condenser, trimmer, oscillatorH	art of Cl	010	.022 µt
C2	Condenser, trimmer, special services r-f	rt of CA1	C16 C16A	Condenser, electrolytic filter30-2575-27 Condenser, filter, 30 μ f., 150vPart of C16
C 3	Condenser, padder, special services r-f	rt of CA1	C16B C16C	Condenser, filter, 30 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16
C4	Condenser, r-f by-pass, .05 µf,30	4650-45°	C17	Condenser, line by-pass,
C5	Condenser, trimmer, special services mixer-grid Pa	rt of CA1	C18	.047 µt
C6	Condenser, a-v-c by-pass,	-4650-45°	CA1	805 µf. 30-1220-68 Condenser assembly, trimmer31-6477-17
C7	Condenser, fixed trimmer, 7.5 µµf.)-1224-65		Coil, special services r-f
C8	Condenser, d-c blocking, 47 uuf 60-	00475420		Coil, oscillator shunt
C 9	Condenser, screen by-pass,	4650-45°	R1	Resistor, screen dropping,
C10	Condenser, special, $B - to$	30.4644	R2	Resistor, a-v-c load,
C11	Condenser, i-f coupling,	9001001*	R3	Resistor, a-v-c load,
C12	Condenser, screen by-pass, .002 μ f.)-1238-8°	R4	Resistor, B – to chassis, 150,000 ohms





PHILCO TELEVISION SERVICE MANUAL

FOR

AM-FM RADIO TUNER RT-11

USED IN 1953 PHILCO TELEVISION

RECEIVERS



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World Radio History

RADIO ALIGNMENT

GENERAL

Remove the receiver from the cabinet by disconnecting all receiver cables and removing the securing bolts. After the receiver has been removed from the cabinet, reconnect all cables. (On those sets incorporating a phonograph, the phono connections need not be made during alignment.) Remove the bottom cover assembly. Before starting the alignment, allow the receiver to warm up for fifteen minutes.

TEST EQUIPMENT REQUIRED

The following equipment is recommended for aligning the radio:

1. Philco Signal Generator Model 7170, or equivalent.

2. Output indicator (either a 20,000-ohms-per-volt voltmeter or an oscilloscope). A 20,000-ohms-per-volt voltmeter should be used as an output indicator if an AM signal generator is used to make the FM alignment.

RADIO ALIGNMENT PROCEDURE

Follow the procedure given in the applicable alignment charts, and also observe the following instructions:

- 1. Set the function switch to the proper position.
- 2. Set the volume control for maximum output.

3. During the AM alignment, adjust the signal generator to keep the output indication below 1 volt peak-to-peak.

NOTE: It is necessary to make the AM alignment before making the FM alignment.

4. If a signal generator having an output impedance other than 300 ohms is used in making the FM alignment, an impedance-matching network must be used to match the generator output impedance to the 300ohm antenna input impedance. As an example, assume that a generator with an output impedance of 75 ohms is being used to make the alignment. To match the generator output impedance, a resistor of 75 ohms must be placed between the center conductor and the outside shield of the cable. To match the antenna input impedance, a resistor of 225 ohms must be placed in series with the center conductor of the coaxial cable and the input connection of the antenna terminal board, pin 1. The outside shield of the coaxial cable should be connected to pin 2 of the antenna terminal board. With this arrangement, the generator will be matched with the 75-ohm resistor in parallel, and the antenna will be matched with the 75-ohm and the 225-ohm resistors in series to make up the 300 ohms.

STEP	SIGNAL- GENERATOR CONNECTION	OUTPUT- INDICATOR CONNECTION	SIGNAL- GENERATOR SETTING	RADIO-DIAL SETTING	ADJUSTMENT INSTRUCTIONS
1	Connect signal gen- erator through a .1- μ f. condenser to grid (pin 7) of 6BE6.	Connect vertical in- put of oscilloscope (or meter leads) to voice-coil terminals of speaker.	Set signal generator (modulated) to 455 kc.	Condenser fully meshed (540 kc.).	Adjust TC911, TC912, TC905, and TC906 for maxi- mum output indication.
2	Same as step 1.	Same as step 1.	Set signal generator (modulated) to 1630 kc.	Set radio dial to 1630 kc. See NOTE 3.	Adjust C914 for maximum output indication.
3	See NOTE 1.	Same as step 1.	Same as step 2.	Same as step 2.	Adjust C912 and C905 for maximum output indication.
4	Same as step 3.	Same as step 1.	Set signal generator (modulated) to 580 kc.	Tune radio dial to 580 kc.	Adjust TC900 and TC904 for maximum output indication.
5	Repeat steps 3 and 4 until maximum output is obtained on the high and low ends of the band.				

AM ALIGNMENT CHART

NOTE 1: The adjustments given should be made with the loop aerial connected to the receiver. The signal generator should be coupled to the receiver by means of a radiating loop. This radiating loop should be made up of 6 to 8 turns of insulated wire formed into a 6-inch-diameter loop. Connect the signal generator to the radiating loop, and place the radiating loop near the loop aerial of the receiver. NOTE 2: If it should ever become necessary to replace the antenna coil, T900, the adjustment given in step 4 should be made.

NOTE 3: The radio dial can be set to 1630 kc. by opening the condenser gang until the rotor rests against a piece of 6-mil flat shim stock temporarily placed between the stationary and movable sections of the tuning gang. Remove the shim.

STEP	SIGNAL- GENERATOR CONNECTION	OUTPUT- INDICATOR CONNECTION	SIGNAL- GENERATOR SETTING	RADIO-DIAL SETTING	ADJUSTMENT INSTRUCTIONS
1	Connect signal gener- ator through a .01 µf. condenser to pin 7 of 12AT7.	Connect meter leads to pin 7 of 6V8 and ground.	Set signal generator to 9.1 mc., unmodulated.	Set tuning gang fully closed.	Adjust TC909, TC908, TC- 907, TC903, and TC902, respectively, for maximum meter indication.
2	Same as step 1.	See NOTE 3.	Same as step 1.	Same as step 1.	See NOTE 3.
3	Connect center con- ductor of signal gen- erator coaxial cable to TV antenna terminal 1, as explained under the RADIO ALIGNMENT PROCEDURE para- graph of the prelim- inary instructions.	Same as step 1.	Set signal generator to 108.5 mc., unmodu- lated.	See NOTE 2.	Adjust C922 for maximum meter indication.
4	Same as step 3.	Same as step 1.	Set signal generator to 87.5 mc., unmodu- lated.	Same as step 1.	Adjust L912 for maximum meter indication. See NOTE 1.
5	Same as step 3.	Same as step 1.	Set signal generator to 135 mc., unmodulated.	Tune radio to 105 mc.	Adjust C910 and C904 for maximum meter indication.
6	Same as step 3.	Same as step 1.	Set signal generator to 92 mc., unmodulated.	Tune radio to 92 mc.	Adjust L906 (See NOTE 1) and L904 for maximum meter indication.
7 Repeat steps 5 and 6 until no further improvement is obtained.					

FM ALIGNMENT CHART

NOTE 1: Check the resonance of coils L912 and L906 by inserting each end of a powdered-iron tuning core into the coils. (Philco Part No. 56-6100 car. be used for this purpose.) If the output indicator shows an increase in the output when the iron end of the tuning core is inserted, compress the turns slightly. If the output indicator shows an increase in output when the brass end is inserted, spread the coil turns slightly. If the output decreases when each end if inserted, no adjustment is necessary.

NOTE 2: Set the dial by opening the condenser gang until the rotor rests against a piece of 6-mil flat shim stock temporarily

placed between the stationary and movable sections of the tuning gang. Remove the shim.

NOTE 3: Connect two 15,000-ohm resistors in series from pin 7 of the 6V8 to ground. Connect the output indicator from the junction of these two resistors to pin 1 of terminal strip B4. (Pin 1 of terminal strip B4 is the junction point of R928 and C947.) Adjusting TC910 in one direction will cause the indicator needle to swing in a direction indicating negative voltage while adjusting it in the opposite direction will give a positive output indication. TC910 should be adjusted to give a zero indication between the positive and negative indications.



TP2-2041

Figure 1. AM-FM Radio Tuner RT-11, Back View, Showing Location of Tuning Adjustments

NUMBER OF TUBES	TUBE TYPE	FUNCTION
1	6BÅ6, miniature	AM-FM r-f amplifier
1	12AT7, miniature	FM mixer-oscillator
1	6BE6, miniature	AM converter
2	6AU6, miniature	I-F amplifiers
1	6V8, miniature	FM ratio detector, AM detector, phono preamplifier





Figure 2. AM-FM Radio Tuner RT-11, Base Layout



U1

Figure 3. AM-FM Radio Tuner RT-11, Schematic Diagram



Figure 4. AM-FM Radio Tuner RT-11, Drive-Cord Installation Details

REPLACEMENT PARTS LIST

General replacement items commonly stocked by the serviceman are omitted from this parts list. These include Philco molded-bakelite condensers, with a rating of 600-volts or less, and $\frac{1}{2}$ -watt resistors with a 10% or 20% tolerance rating. All parts (whether included in this parts list or not) are symbolized in the schematic diagram and base layouts, for identification purposes.

REFERE	NCE	DESCRIPTION	SERVICE PART NO.	REFER SYMI	ENCE BOL	DESCRIPTION	SERVICE PART NO.
C900 C900A C900B C900C C901 C901A	Condenser, Condenser, Condenser, Condenser, Condenser, Condenser,	AM tuning gang, 3-section tuning, AM r-f tuning, AM converter tuning, AM oscillator FM tuning gang, 2-section tuning, FM mixer	31-2766 Part of C900 Part of C900 Part of C900 Part of C900 Part of C900 Part of C901	C902 C903 C904 C905 C906 C907	Condenser, Condenser, Condenser, Condenser, Condenser, Condenser,	isolating, 3.3 μμf. isolating, 100 μμf. trimmer, FM r-f grid trimmer, AM r-f grid d-c blocking, 100 μμf. cathode by-pass, 33 μμf.	30–1224–49 62–110009001 45–3034 31–6473–6 62–110009001 62–033009001
C901B	Condenser,	tuning, FM oscillator	Part of C901	C908	Condenser,	screen by-pass, 1500 µµf.	62-215001001

REPLACEMENT PARTS LIST (Cont.)

REFERENCE		DESCRIPTION	SERVICE PART NO.
		1 - blocking 56 wit	62-056409001
C909	Condens	er, d-c blocking, 50 µµi.	Part of C901A
C910	Condens	er, trimmer, rM mixer	Part of Z900
C911	Condens	er, r-i coupling	Part of C900B
C912	Condens	er, trimmer, AM converter	62_110009001
C913	Condens	er, trimmer, fixed, 100 $\mu\mu$ i.	Part of C900C
C914	Condens	er, trimmer, AM oscillator	20 1224-26
C915	Condens	er, trimmer, fixed, 10 $\mu\mu$ I.	62 056409001
C916	Condens	er, grid leak, 56 $\mu\mu$ t.	62 110000001
C917	Condens	ser, screen by-pass, $100 \mu\mu$ L	62 122001001
C919	Condens	ser, cathode by-pass, 220 $\mu\mu$ i.	62-122001001
C920	Condens	ser, grid leak, 100 $\mu\mu$ t	
C921	Condens	ser, trimmer, fixed, 7.5 $\mu\mu$ t.	
C922	Condens	ser, trimmer, plate decoupling	g31-0011-14
C923	Condens	ser, d-c blocking, 100 µµt	
C924	Conden	ser, plate by-pass, 100 µµt.	
C925	Conden	ser, plate by-pass, .005 µµt	
C926	Conden	ser, f xed trimmer, 1st FM i-t	Part of 2901
C927	Conden	ser, fixed trimmer, 1st FM i-t	Part of 2901
C928	Conden	ser, r-f by-pass, 1000 µµf.	
C929	Conden	ser, fixed trimmer, 1st AM i-t	Part of 2902
C930	Conden	ser, fixed trimmer, 1st AM i-f	Part of 2902
C931	Conden	ser, cathode by-pass, .005 µf.	
C933	Conden	ser, fixed trimmer, 2nd i-f	
C934	Conden	ser, fixed trimmer, 2nd i-f	Part of 2903
C938	Conder	iser, decoupling, .005 µf.	
C939	Conder	iser, fixed trimmer, FM detec	tor Part of 2904
C940	Conder	iser, fixed trimmer, FM detec	tor Part of 2904
C941	Conder	iser, fixed trimmer, AM detec	tor Part of 2905
C942	Conder	iser, :ixed trimmer, AM detec	tor Part of 2905
C943	Conder	nser, i-f by-pass	Part of 2905
C944	Conde	nser, i-f by-pass	Part of 2905
C945	Conde	nser, electrolytic, filter, 2 µf.	
C946	Conde	nser, i-f by-pass, 100 µf	
C947	Conde	nser, i-f by-pass, 150 µµf	
C949	Conde	nser, plate decoupling, 150 μ	$\mu f_{1} = 60 - 10155417$
C952	Conde	nser, r-f by-pass, 100 µµf	
C954	Conde	nser, r-f by-pass, 100 $\mu\mu$ f	62-110009001
C955 a	nd		
C956	Conde	nsers, filament by-pass, 100 /	$_{\mu\mu}f.$. 62–110009001
C957.			
C958, a	and Conde	ensers, filament by-pass, .005	μ f, 30–1238–1
C959			
C960	Conde	enser, filament by-pass, 100 μ	μf_{1} 62–110009001
C961	Conde	enser, r-f by-pass, 100 $\mu\mu$ f	
1900	Lamp,	pilof	
J401	Conne	ector, volume control, female,	
J900	Conne	ector, AM antenna, male, cha	ussis
J90 1	Conno cha	ector, phono power, female, ssis type	
J902	Conne cha	ector, phono input, female, ssis type	
L900	Coil,	AM antenna	
L901	Coil,	AM antenna	Part of 1900
L902	and		00 4061 0
L903	Coils	, AM r-f grid, 4.1 μ h.	
L904	Coil,	tuning, FM r-f grid	20 4402 10
L905	Coil,	FM r-f choke, $3.3 \mu h.$	
L906	Coil,	FM mixer grid	

2

REFERI SYME	ENCE OL DESCRIPTION	SERVICE PART NO.
L907	Coil, AM r-f primary	
L908	Coil, AM r-f secondary	Part of 2900
L909	Coil, AM converter grid, 4.1 µh.	
L910	Coil, AM oscillator	
L911	Coil, AM oscillator grid, 3.3 µh.	
L912	Coil, FM oscillator	
L913	Coil, r-f choke, 3.3 μ h.	
L914	Coil, FM 1st i-f primary	Part of Z901
L915	Coil, FM 1st i-f secondary	
L916	Coil, AM 1st i-f primary	Part of Z902
L917	Coil, AM 1st i-f secondary	
L918	Coil, 2nd i-f primary	
L919	Coil, 2nd i-f secondary	Part of Z903
L920	Coil, FM detector primary	
L921	Coil, FM detector secondary .	
L922 Coil, FM detector tertiary		
L923	Coil, AM detector primary	
L924	Coil, AM detector secondary	Part of 2905
L925	Coil, r-f choke, filament, 4.1 µh	
PL102	Connector, interchassis	See Misc.
PL401	Connector, volume control	
R903	Resistor, screen dropping, 15,0 1 watt	00 ohms,
R925	Resistor, B+ dropping, 3300 of 7 watts	^{1ms} ,
T900	Transformer, antenna input	
Z900	Transformer, AM r-f	
Z901	Transformer, FM 1st i-f	
Z902	Transformer, AM 1st i-f	
Z903	Transformer, 2nd i-f	
Z904	Transformer, FM detector	
Z905	Transformer, AM detector	

MISCELLANEOUS

DESCRIPTION	SERVICE PART NO.
Backplate ass'y.	.76-8081
Cable-and-socket ass'y., pilot light	.27-6233-6
Cable-and-plug ass'y., audio	.41-4162-1
Cable and plug ass'y, power	.41-4146-7
Clip pilot-light	.56-3545-6
Grommet rubber	. 27-4596
Banal diffusing	.54-8803
Panel, diffusing	. 56–5630–53
	.56-7931-3
Shan, tuning \dots (128T7)	56-5629-5
Shield, tube (12A17)	56-3978-1FA3
Shield, tube	28-8751-2
Spring, drive-cord	56-3841
Spring, diffusing panel	28-8610
Spring, hairpin	27-6265
Socket, tube, 7-pin miniature	27.6265_1
Socket, tube, 7-pin miniature (6BA6)	27 6203 6
Socket, tube, 9-pin miniature	27 6203-18
Socket, tube, 9-pin miniature (6V8)	42 1070
Switch, wave	42-1970



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PHILCO PORTABLE RADIO MODEL 53-651

SPECIFICATIONS



MODEL 53-651

MODEL	53-651
CABINET	Molded plastic
CIRCUIT	Four-tube superheterodyne
SINCEPT	(plus selenium rectifier)
FREQUENCY BANCE	540 kc - 1620 kc
AUDIO OUTPUT	to at the second s
AC or do	150 milliwetts
Rottory	75 milliwatts
OPERATING VOLTACE	and a second sec
Line operation	117 volte a o or d o
Battom operation	9.1) colle and 6716 volt "R" battery
DATTER CONCLUMENTION	
rower consumption	15 wotte
Reterry enumetion	10 ma from 6714 sult "D" bottomu
battery operation	000 ma from 0 D battery;
ANTERNIA	200 ma, from 2 17 cens
ANTENNA	
NTEDNEDUTE PRECUENCY	provision for external antenna
INTERMEDIATE FREQUENCY	455 KC.
PHILCO TUBES	IK5, converter;
	104, i-f ampliher;
	105, detector-a.v.c1st audio;
	3V4, output
BATTERY TYPE	
	2 D cells



Figure 1. Drive-Cord Stringing Arrangement

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Figure 2. Top View, Showing Tuning Adjustments

ALIGNMENT PROCEDURE

DIAL POINTER—With tuning-condenser plates fully meshed, set pointer to coincide with alignment index mark on bottom of chassis.

OUTPUT INDICATOR—Connect output indicator (oscilloscope or 1000-ohms-per-volt a-c voltmeter) across voice-coil terminals.

SIGNAL GENERATOR—Use AM r-f signal generator. Connect output leads as indicated in alignment chart.

RADIO CONTROLS—Set volume control to maximum. Set tuning control as indicated in chart.

OUTPUT LEVEL-During alignment, attenuate

signal-generator output to maintain output level below .5 volt.

NOTE: While the radio is being aligned, the batteries should be in the same position with respect to chassis and loop as they are when in the cabinet.



Figure 3. Front View of Pointer Rail, Showing Alignment Marks

ALIGNM	ENT C	HART
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	SIGNAL GENERATOR				
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Output lead through a $.1-\mu f$. con- denser to antenna section of tun- ing condenser or to pin 6 of con- verter (1R5). Ground lead to B	455 kc.	Tuning gang fully open.	Adjust, in order given, for maxi- mum output.	TC4–2nd i-f sec. TC2–1st i-f pri. TC3–1st i-f sec.
2	Radiating loop. See NOTE below	1620 kc.	1620 kc.†	Adjust for maximum output.	C1B-osc. trimmer
3	Same as step 2.	Between 1400 and 1500 kc.	Tune radio to generator signal.	Adjust for maximum output.	C1A–antenna trimmer
4	Same as step 2.	580 kc.	580 kc.†	Adjust for maximum output. Rock tuning gang while making this adjustment.	TC1-osc. core
5	Repeat steps 2, 3, and 4 until no further improvement is obtained.				

NOTE: Use a 6–8 turn, 6-inch diameter loop made up of insulated wire. Connect to signal-generator leads, and place about 1 foot from radio loop antenna.

[†] The radio can be set to this frequency by tuning it until the dial pointer coincides with the proper alignment mark on the bottom of the chassis. See figure 3.



Figure 4. Philco Portable Radio Model 53-651, Schematic Diagram



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MODEL 53-651



Figure 5. Base View, Showing Parts Placement

REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (°) are general replacement items. These numbers may not be identical with those on factory parts; also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation of the radio will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description Service Part No.	Reference Symbol	Description Service Part No.
C1	Condenser, tuning gang, 2-section31-2735-2	C13	Condenser, electrolytic, 3-section
C1A	Condenser, trimmer, antennaPart of Cl	C13A	Condenser, filter, 40 µf., 150vPart of C13
C1B	Condenser, trimmer, oscillatorPart of Cl	C13B	Condenser, filter, 10 µf., 150vPart of C13
C2	Condenser, neutralizing, 1.5µµf	C13C	Condenser, filter, 50 µf., 150vPart of C13
C3	Condenser, a-v-c by-pass, .05 µf	C14	Condenser, line by-pass, .047 µf30-4650-45°
C4	Condenser, B- to ground, .1 µf30-4650-47°	CR1	Selenium rectifier, 75 ma. at 117 volts
C5	Condenser, d-c blocking, 47 µµf60-00475420	LAI	Loop antenna
C6	Condenser, dual ceramic	LS1	Speaker, 4-inch, p-m
C6A	Condenser, osc. B+ by-pass, .004 µfPart of C6	R1	Resistor, current limiting, 470 ohms66-1478340°
C6B	Condenser, grid by-pass, .004 µfPart of C6	R2	Resistor, grid return, 68,000 ohms
C7	Condenser, temperature compensation,	R3	Resistor, bias, 820 ohms
	7.5 μμf30-1224-83	R4	Resistor, leakage, 150,000 ohms66-4158340°
C8	Condenser, filament by-pass, .25 µf30-4656-1	R5	Resistor, oscillator dropping,
C9	Condenser, neutralizing, 3.3 µµf		15,000 ohms66-3158340°
C10	Condenser, ceramic, 4-section	R6	Resistor, grid return, 3.3 megohms66-5338340°
C10A	Condenser, d-c blocking, .001 µfPart of C10	R7	Resistor, a-v-c filter, 2.2 megohms
C10B	Condenser, screen by-pass, .01 µfPart of C10	R8	Resistor, VOLUME control
C10C	Condenser, d-c blocking, .002 µfPart of C10		(with "off-on" switch), 1 megohm
C10D	Condenser, grid by-pass, 220 µµfPart of C10	R9	Resistor, grid return, 4.7 megohms
C11	Condenser, tone compensation, .004 µf. 30-4650-56°	R10	Resistor, screen dropping, 4.7 megohms66-5478340°
C12	Condenser, electrolytic,	R11	Resistor, plate load, 680,000 ohms
	filament by-pass, 50 μ f., 25v	R12	Resistor, grid return, 2.2 megohms

REPLACEMENT PARTS LIST (Cont.)

Reference Symbol	Description	Service Part No.	Ref Sy
R13	Resistor, bias, 2200 ohms	66-2228340°	
R14	Resistor, filament dropping and filter, 2100 ohms (center-tapped)		(
R15	Resistor, filter, 820 ohms	66-1828340°	(
R16	Resistor, current limiting, 120 ohms	33-1334-14	I
R17	Resistor, bias, 1500 ohms	66-2158340°	J
R18	Resistor, bias, 330 ohms	66-1338340°]
S1	Switch, off-on	Part of R8	ł
TI	Transformer, oscillator		1
Т2	Transformer, output]
Wl	Line cord	L2183]
WS	Wafer switch, voltage change-over		1
ZI	Transformer, 1st i-f	32-4160-4A	1
Z2	Transformer, 2nd i-f	32-4454-1A	I

MISCELLANEOUS

Description	Service Part No.
Cabinet, cherry	
Back, cabinet, cherry	
Cabinet, driftwood	
Back, cabinet, driftwood	
Cabinet, spruce green	

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erence mbol	Description	Service Part No.
Back, cabin	net, spruce green	
Cable, batter	у	
Cover, sub-b	ase	
Cover, switch	1	
Dial scale		
Drive cord (2	25-ft. spool)	45-8750°
Fastener, baf	fle mtg. (4 required)	W2235-7FA9
Handle		
Hinge, R.H		
Hinge, L.H.		
Insulator, car	pacitor mtg	
Knob (2 requ	iired)	
Nameplate		54-4884
Pointer		
Ring, shaft r	etaining	
Rubber mour	nt, tuning capacitor (3 require	ed) 27-4099-3
Screw, hinge	(2 required)	W2537-15FA1
Speed nuts,	nameplate mtg. (2 required)	1W56912FE7
Shaft, tuning		56-7906FA42
Shield, tube	(1U5)	56-3978-1FA3
Socket		
Socket		
Battery cradl	e and antenna ass'y	



PHILCO HOME RADIO MODEL B570, Code 121

SPECIFICATIONS

CABINET	Molded plastic
CIRCUIT	Four-tube superhetercdyne (plus rectifier)
FREQUENCY RANGE Standard Broadcast	540 kc. to 1620 kc.
AUDIO OUTPUT	
OPERATING VOLTAGE	
POWER CONSUMPTION	30 watts
AERIAL	High-impedance loop
INTERMEDIATE FREQUENCY	455 kc.
PHILCO TUBES 12AV6 de	12BE6 converter, 12BA6 i-f amplifier, ta.v.c1st audio, 35C5 output, 35W4 rectifier



MODEL B570





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ALIGNMENT PROCEDURE

RADIO CONTROLS—Set volume control to maximum. Set tuning control and band switch, SW1, as indicated in chart.

OUTPUT METER—Connect across voice-coil terminals. SIGNAL GENERATOR—Connect generator and set frequency as indicated in chart. Use modulated output.

OUTPUT LEVEL—During alignment, adjust signalgenerator output to hold output-meter reading below 1.25 volts.



Figure 2. Top View, Showing Trimmer Locations

	SIGNAL GENERATOR		RADIO			
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND SWITCH SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Ground lead to B-; output lead through a .1-µf. condenser to grid (pin 7) of 12BE6.	455 ke.	Tuning gang fully open.	Broadcast	Adjust tuning cores, in order given, for maximum output. (TC1 and TC3 are located at top of transformers).	TC-4—2nd i-f sec. TC3—2nd i-f pri. TC2—1st i-f sec. TC1—1st i-f pri.
2	Radiating loop (see NOTE below).	1620 kc.	*1620 kc.	Broadcast	Adjust trimmer for maximum output.	Cl-B osc.
3	Same as step 2.	1500 kc.	1500 kc.	Broadcast	Adjust trimmer for maximum output.	C1-A aerial (broadcast).

ALIGNMENT CHART

NOTE: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads and place near radio loop.

* For proper adjustment of the oscillator trimmer, fully open the tuning gang and insert a .006-inch nonmetallic shim between the heel of the rotor and the top of the stator plates. Close the tuning gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.

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Figure 3. Phiko Radio Model B570, Code 121, Schematic Diagram 6.3

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Figure 4. Base View, Showing Symbolized Chassis

REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.
Cl	Condenser, tuning gang	31-2751-14
CIA	Condenser, aerial trimmer	Part of C1
C1B	Condenser, osc. trimmer	Part of C1
C3	Condenser, oscillator grid, 47 $\mu\mu$ f	
C4	Condenser, a-v-c by-pass, .05 µf	.45-3505 -28°
C5	Condenser , drift compensation 7.5 $\mu\mu$ f.	30-1224-83
C6	Condenser, screen by-pass, .05 µf	.45-3505-28°
C7	Condenser, i-f tuning	Part of Z1
C8	Condenser, i-f tuning	Part of Z1
C9	Condenser, i-f tuning	Part of Z2
C10	Condenser, i-f tuning	Part of Z2
CII	Condenser, detector filtering	Part of Z2
C12	Condenser, detector filtering	
C13	Condenser, audio coupling, .005 µf	30-1238-1
C14	Condenser, plate by-pass	Part of PCI
C15	Condenser, audio coupling, .005 µf	Part of PCI
C16	Condenser, compensating	Part of PCI
C17	Condenser, tone compensation, .022 μ f.	45-3505-43°
C18	Condenser, electrolytic, 3-section	30-2575-34
C18A	Condenser, filter, 30 µf., 150v	Part of C18
C18B	Condenser, filter, 25 µf., 150v	Part of C18
C18C	Condenser, filter, 20 µf., 150v	Part of C18
C19	Condenser, line by-pass, .05 μ f.	30-4650-45
C20	Condenser, B- to chassis, .1 µf	.45-3505-47°
H	Lamp, pilot	
LAI	Loop, aerialPart of back-a	nd-loop ass'y.
LSI	Speaker, p-m	
PC1	Printed circuit	
RI	Resistor, oscillator grid, 22000 ohms	66-3228340°
R2	Resistor, i-f screen dropping,	
	4700 ohms	66-2478340°
R3	Resistor, a-v-c filter, 2.2 megohms	66-5228340°
R4	Resistor, volume control	33-5566-41
R5	Resistor, diode load, 47,000 ohms	66-3478340°
R6	Resistor, grid return, 10 megohms	66-6108340°
R7	Resistor, plate load, 500.000 ohms	Part of PC1

Reference Symbol	Description	Service Part No.
R8	Resistor, grid return, 500,000 ohmsPar	t of PC1
R9	Resistor, cathode bias, 150 ohms	158340°
R10	Resistor, B plus filter, 220 ohms	224340°
R11	Resistor, B plus filter, 1000 ohms	108340°
R12	Resistor, tube saver, 100 ohms	3-1343-3
S1	Switch, off-onP	art of R4
T1	Transformer, oscillator	2-4453-6
T2	Transformer, output	2-8384°
W1	Line cord	L-2183°
Z1	Transformor, 1st i-f	2-4161A
Z2	Transformer, 2nd i-f	2-4240A

MISCELLANEOUS

m tot	Service
Description	Part No.
Cabinet	
Cardinal	
Sand	
Back-and-loop ass'y.	
Knob (2)	
Drive cord, 25-foot spool	45-8750
Pointer, dial	
Cardinal cabinet	
Sand cabinet	
Shaft, tuning	
Socket ass'y., pilot lamp	
Socket, 7-pin miniature, 12AV6	
Socket, 7-pin miniature, 12BE6, 12BA6	
Socket, 7-pin miniature, 35C5, 35W4	
Spring, retaining (3)	1W60980FE7
Spring, drive cord	
Bracket, switch operating	
Bracket, switch mounting	
Switch bracket and padder ass'v	76-8477


PHILCO HOME RADIO MODEL B574, CODE 121

SPECIFICATIONS

CABINET	Molded plastic
CIRCUIT	our-tube superheterodyne (plus rectifier)
FREQUENCY RANGE Standard Broadcast Special Services	540 kc. to 1620 kc. 1700 kc. to 3400 kc.
AUDIO OUTPUT	
OPERATING VOLTAGE	105 to 120 volts, a.c. or d.c.
POWER CONSUMPTION	30 watts
AERIAL	High-impedance loop
INTERMEDIATE FREQUENCY	455 kc.
PHILCO TUBES 12AV6 de	12BE6 converter, 12BA6 i-f amplifier, ta.v.c1st audio, 35C5 output, 35W4 rectifier



MODEL B574, CODE 121



Figure 1. Dial-Cord Installation Details

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ALIGNMENT PROCEDURE

RADIO CONTROLS—Set volume control to maximum. Set tuning control and band switch, SW1, as indicated in chart.

OUTPUT METER—Connect across voice-coil terminals.

SIGNAL GENERATOR—Connect generator and set frequency as indicated in chart. Use modulated output.

OUTPUT LEVEL—During alignment, adjust signalgenerator output to hold output-meter reading below 1.25 volts.



Figure 2. Top View, Showing Trimmer Locations

ALIGNMENT CHART

r	SIGNAL GENERATOR RADIO			RADIO		
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND SWITCH SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Ground lead to B-; output lead through a .1-µ1. condenser to grid (pin 7) of 12BE6.	455 kc.	Tuning gang fully open.	Broadcast	Adjust tuning cores, in order given, for maximum output. (TCl and TC3 are located at top of transformers.)	TC4—2nd i-f sec. TC3—2nd i-f pri. TC2—1st i-f sec. TC1—1st i-f pri.
2	Radiating loop (see NOTE below).	1620 kc.	*1620 kc.	Broadcast	Adjust trimmer for maximum output.	Cl-B osc.
3	Same as step 2.	1500 kc.	1500 kc.	Broadcast	Adjust trimmer for maximum output.	Cl-A aerial (broadcast).
4	Same as step 2.	3200 kc.	3200 kc.	Special services	Adjust trimmer for maximum output.	C-21—aerial (special services).

NOTE: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads and place near radio loop.

* For proper adjustment of the oscillator trimmer, fully open the tuning gang and insert a .006-inch nonmetallic shim between the heel of the rotor and the top of the stator plates. Close the tuning gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.



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Figure 4. Base View, Showing Symbolized Chassis

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REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.	Referen Symbo
Cl	Condenser, tuning gang	31-2751-14	R3
CIA	Condenser, aerial trimmer	Part of Cl	R4
C1B	Condenser, osc. trimmer	Part of Cl	R5
C2	Condenser, aerial series tracker,		R6
	944 μμf	30-1220 -65	K7 DO
C3	Condenser, oscillator grid, 47. µµf	30-1230-4	R0 R0
C4	Condenser, a-v-c by-pass, .05 µf4	5-3505-28°	R10
C5	Condenser, drift compensation, 7.5 µµf	30-1224-83	RII
C6	Condenser, screen by-pass, .05 µf4	5-3505-28°	B12
C7	Condenser, i-f tuning	Part of Z1	SI
C8	Condenser, i-f tuning	Part of Z1	ŠW1
C9	Condenser, i-f tuning	Part of Z2	TI
C10	Condenser, i-f tuning	Part of Z2	T2
C11	Condenser, detector filtering	Part of Z2	WI
C12	Condenser, detector filtering	Part of Z2	Z 1
C13	Condenser, audio coupling, .005 µf	30-1238-1	Z2
C14	Condenser, plate by-pass	Part of PC1	
C15	Condenser, audio coupling, .005 µf	Part of PC1	
C16	Condenser, compensating	Part of PC1	
C17	Condenser, tone compensation, .022 µf. 4	5-3505-43°	
C18	Condenser, electrolytic, 3-section	30-2575-34	Descrip
C18A	Condenser, filter, 30 µf., 150v	Part of C18	
C18B	Condenser, filter, 25 µf., 150v	Part of C18	Cabine
C18C	Condenser, filter, 20 µf., 150v	Part of C18	Back-ar
C19	Condenser, line by-pass, .047 µf.	30-4650-45	Knob (
C20	Gondenser, B- to chassis, .1 µf4	5-3505-47°	Drive o
C21	Condenser, trimmer, special service	31-6473-32	Pointer
I 1	Lamp, pilot		Shaft, 1
LAI	Loop, aerialPart of back-and	-loop ass'y.	Socket
Ll	Coil, antenna, special services	32-4561-3	Soulat
L2	Coil, oscillator shunt	32-4562-2	Souket
LS1	Speaker, p-m	36-1627-8	Spring
PC1	Printed circuit		Spring,
RI	Resistor, oscillator grid, 22,000 ohms6	6-3228340°	Bracket
R2	Resistor, i-f screen dropping,		Bracket
	4700 ohm	6-2478340°	Switch

Symbol	Description	Part No.
R3	Resistor, a-v-c filter, 2.2 megohms	66-5228340*
R4	Resistor, volume control	33-5566-41
R5	Resistor, diode load, 47,000 ohms	66-3478340°
R6	Resistor, grid return, 10 megohms	66-6108340*
R7	Resistor, plate load, 500,000 ohms	Part of PC1
R8	Resistor, grid return, 500,000 ohms	Part of PC1
R9	Resistor, cathode bias, 150 ohms	66-1158340*
R10	Resistor, B plus filter, 220 ohms	66-1224340°
R11	Resistor, B plus filter, 1000 ohms	66-2108340°
R12	Resistor, tube saver, 100 ohms	
S1	Switch, off-on	Part of R4
SW1	Switch, broadcast-special services	42-1796-2
TI	Transformer, oscillator	32-4453-6
T2	Transformer, output	32-8384-4
WI	Line cord	L-2183°
Z1	Transformer. 1st i-f	32-4161A
72	Transformer 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Cabinet, spruce	
Back-and-loop ass'y.	
Knob (2)	
Drive cord, 25-foot spool	
Pointer, dial	
Shaft, tuning	
Socket ass'v., pilot lamp	
Socket, 7-pin miniature, 12AV6	
Socket, 7-pin miniature, 12BE6, 12BA6	
Socket, 7-pin miniature, 35C5, 35W4	
Spring, retaining (3)	1W60980FE7
Spring, drive cord	
Bracket, switch operating	
Bracket, switch mounting	
Switch bracket and padder ass'y.	

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PHILCO RADIO MODEL B574, CODE 122

SPECIFICATIONS CABINET CIRCUIT FREOUENCY RANGE Standard Broadcast Special Services AUDIO OUTPUT 1700 kc. to 3400 kc.l watt **OPERATING VOLTAGE** 105 to 120 volts, a.c. or d.c. POWER CONSUMPTION 30 watts AERIAL High-impedance lowp INTERMEDIATE FREQUENCY 455 kc. MODEL B574, CODE 122 PHILCO TUBES 12BE6 converter, 12BA6 i-f amplifier, 12AV6 det .--a.v.c.-1st audio, 35C5 output, 35W4 rectifier



Figure 1. Dial-Cord Installation Details

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SERVICE HINTS

REMOVING THE CHASSIS FROM THE CABINET

To remove the chassis from the cabinet, first remove the station selector knoh, volume control knoh, and, at the bottom-center of the dial scale, remove the dial scale retaining screw. A flat object (knife blade) placed under the bottom edge will assist in prying the scale out of the cabinet. Pull to remove the pointer from the tuning gang shaft. Remove the screws from the cabinet back, and pull the back away from the back of the cabinet (use care to prevent breaking the leads from the loop aerial) far enough to reach in and remove the pilot lamp and socket from the retaining clip. Unsolder the output transformer leads from the speaker. Then remove the chassis mounting screws from beneath the cabinet, and remove the chassis.

REMOVING THE SUBBASE

After removing the chassis from the cabinet, remove the subbase, using the following procedure.

- 1. Remove the output transformer and dial light connections by pulling the jacks from the pins on the subbase.
- 2. Unsolder the volume control and a-c switch leads, and unsolder and remove the loop aerial.
- 3. Spring the Special Services switch bracket off the tuning shaft.
- 4. At the rear of the panel, bend the hold down tabs out flush with the subbase, and remove.

PARTS REPLACEMENT

Whenever possible, replace all components and leads from the top side of the chassis. In cases where this is not possible, the components must be unsoldered when removed from the bottom. Use only a lightweight low-wattage iron of approximately 22.5 to 25 watts, and always use a low-melting-point solder. Extreme caution must be used to prevent solder from dropping or splashing, and to avoid lifting of the printed wiring foil. Use only the tip of the soldering iron at the solder point whenever heat is being applied. Hold the subbase in one hand while applying heat to the solder point and throw the solder off, with a downward thrust, as soon as it starts to melt. When the solder is removed, the part to be repaired or replaced can be lifted from its location. Insert the new part and secure it with just a drop of solder at each point.

REPLACING TUBE SOCKETS AND I-F TRANSFORMERS

To replace tube sockets and i-f transformers, follow the procedure given above for removing solder. Then use a sharp knife to sever the remaining thin bond of solder at the connections. With the solder removed, the part can be backed out of the slots. Before inserting the repaired or new part, clean all connections at the unsoldered lugs. Use caution when reinserting parts through the subbase slots, so that the foil is not lifted. When soldering is complete apply an electrical varnish to all repaired areas.

ALIGNMENT PROCEDURE

RADIO CONTROLS—Set volume control to maximum. Set tuning control and band switch, SW1, as indicated in chart.

OUTPUT METER—Connect across voice-coil terminals.

SIGNAL GENERATOR—Connect generator and set frequency as indicated in chart. Use modulated output. OUTPUT LEVEL—During alignment, adjust signal-generator output to hold output-meter reading below 1.25 volts.

	SIGNAL GENERA	TOR		RADIO		RADIO		
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND SWITCH SETTING	SPECIAL INSTRUCTIONS	ADJUST		
1	Ground lead to B-; output lead through a .1- μ f. condenser to grid (pin 7) of 12BE6.	455 kc.	Tuning gang fully open	Broadcast	Adjust tuning cores, in order given, for maximum output. TC1 and TC3 are located at top of transformers.	TC4—2nd i-f sec. TC3—2nd i-f pri. TC2—1st i-f sec. TC1—1st i-f pri.		
2	Radiating loop (See note below).	1620 kc.	*1620 kc.	Broadcast	Adjust trimmer for maximum output.	Cl·B—osc.		
3	Same as step 2.	1500 kc.	1500 kc.	Broadcast	Adjust trimmer for maximum output.	Cl-A—aerial (broadcast)		
4	Same as step 2.	3200 ke.	3200 kc.	Special Services	Adjust trimmer for maximum output.	C21—aerial (special services).		

NOTE: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire, connect to signal-generator leads, and place near radio loop. The 1620-kc. index mark is located on the pointer rail, to the extreme right side as viewed from the front.

* For proper adjustment of the oscillator trimmer, fully open the tuning gang and insert a .006-inch non-metallic shim between the heel of the rotor and the top of the stator plates. Close the tuning gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.







MODEL B574, CODE 122

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Figure 4. Philco Radio Model B574, Code 122, Schematic Diagram

Figure 3.

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Figure 5. Top View, Showing Parts Placement



Figure 6. Bottom View, Showing Parts Placement

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	S Description P	ervice Reference art No. Symbol	Service Service Description Part No.
Cl	Condenser, tuning gang	751-16 R5	Resistor, diode load, 47,00 ohms
CIA	Condenser, aerial trimmerPar	t of C1 R6	Resistor, grid return, 10 megohms66-6108340°
C1B	Condenser, oscillator trimmerPar	tofCl R7	Resistor, plate load, 500,000 ohmsPart of PC1
C1C	Condenser, trimmer, Special Services31-	6502-4 R8	Resistor, grid return, 500,000 ohmsPart of PC1
C2	Condenser, antenna series tracker,	R9	Resistor, cathode bias, 150 ohms
	944 μμf 30-1	220-65 R10	Resistor, B plus filter, 220 ohms
C3	Condenser, drift compensation, 7.5 $\mu\mu f$. 30-1	224-83 R11	Resistor, B plus filter, 1000 ohms
C4	Condenser, a-v-c by-pass, .047 µf	650-45 R12	Resistor, tube saver, 100 ohms
C5	Condenser, oscillator grid, .01 µf	1238-2 S1	Switch, off-onPart of R4
C6	Condenser, screen by-pass, .05 µf	650-45 S2	Switch, Broadcast-Special Services
C7	Condenser, i-f tuningPar	t of ZI TI	Transformer, oscillator
C8	Condenser, i-f tuning	t of Z1 T2	Transformer, output
C9	Condenser, i-f tuningPar	t of Z2 W1	Line cord
C10	Condenser, i-f tuningPar	t of Z2 Z1	Transformer, 1st i-f
C11	Condenser, detector filteringPar	t of Z2 Z2	Transformer, 2nd i-f
C12	Condenser, detector filteringPar	t of Z2	
C13	Condenser, audio coupling, .005 µf	1238-1	
C14	Condenser, plate by-passPart	of PC1	MISCELLANEOUS
C15	Condenser, audio coupling, .005 µfPart	of PC1	Service
C16	Condenser, compensatingPart	of PC1	
C17	Condenser, tone compensation, .022 μ f. 30-4	650-43 Cabinet, s	pruce
C18	Condenser, electrolytic, 3-section	2583-1 Cabinet, 1	tangerine
C18A	Condenser, filter, 30 µf., 150vPart	of C18 Back-and	d-loop assembly
C18B	Condenser, filter, 25 µf., 150vPart	of C18 Connector,	, interlock, male
C18C	Condenser, filter, 20 µf., 150vPart	of C18 Dial back	plate, spruce
C19	Condenser, line by-pass, .05 µf	650-47 Dial back	plate, tangerine
C20	Condenser, B minus to chassis,	Dial scale	
	100 μμf 62-110 0	09001 Drive core	d, 25-foot spool45-8750
11	Lamp, pilot	4-2068 Knob	
LI	Coil, aerial, Special Services	4561-3 Pointer	
L2	Coil, oscillator shunt	4562-2 Shaft, tun	ing
LA1	Loop, part of cabinet back	6-8362 Bracket, s	witch operating
LS1	Speaker, p-m	627-21 Socket ass	embly, pilot lamp41-4176-2
R1	Resistor, oscillator grid, 22,000 ohms66-322	8340• Shield,	pilot lamp54-8806
R2	Resistor, i-f screen dropping,	Socket, 7-j	pin miniature
	4700 ohms	8340° Socket, 7-	pin miniature, 12AV627-6296-4
R3	Resistor, a-v-c filter, 2.2 megohms66-522	28340° Shield,	tube
R4	Resistor, volume control, .5 megohm33-5	566-41 Printed wi	ring panel (less components)

+



INTERMEDIATE FREQUENCY AM FM PHILCO TUBES (6) 15 watts
Built-in pancake loop for AM, line cord for FM; provision for connecting external nerial
155 kc.
9.1 mc.
12AU6 r-f ampl., 12AT7 converter, 12BA6 1st i-f ampl., 12AU5 2nd i-f ampl., 19V8

MODEL B956



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PHILCO RADIO MODEL

B956

PR-2551

AM ALIGNMENT PROCEDURE

Make alignment with loop aerial connected to radio. The AM alignment should be completed before the FM alignment is made.

DIAL POINTER—With tuning-condenser plates fully meshed, adjust pointer to coincide with index mark at low-frequency end of dial backplate.

RADIO CONTROLS—Set volume control to maximum, set band switch for broadcast reception, and set tuning control as indicated in chart. OUTPUT METER—Connect across voice-coil terminals.

SIGNAL GENERATOR—Use AM r-f signal generator, with modulated output. Connect generator and set frequency as indicated in chart.

OUTPUT LEVEL—During alignment, signal-generator output must be attenuated to hold output-meter reading below 1.25 volts.

AM ALIGNMENT CHART

	SIGNAL GENERATOR		RADIO		
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Ground lead to chassis. Output lead through a $.1$ - μ f. condenser to junction of LA1 and L8.	455 ke.	Gang fully open.	Adjust for maxi- mum output, in order given.	TC10—2nd AM i-f sec. TC9—2nd AM i-f pri. TC1—1st AM i-f sec. TC3—1st AM i-f pri.
2	Radiating loop (see note below).	1620 kc.	1620 kc. (2nd index mark from right).	Adjust for maxi- mum output.	C1C—osc. trimmer.
3	Same as step 2.	1500 kc.	1500 kc.	Adjust for maxi- mum output.	C1A—aerial trimmer.

RADIATING LOOP: Make up a six-to-eight turn, 6-inch-diameter loop from insulated wire; connect to generator terminals, and place near radio loop aerial. Radio loop aerial must be connected.

FM ALIGNMENT PROCEDURE

Make AM alignment first

RADIO CONTROLS—Set volume control to maximum, set band switch for FM reception, and set tuning control as indicated in chart.

OSCILLOSCOPE—Connect ground lead to chassis. Connect vertical input to FM TEST jack, J2; connect horizontal input to horizontal sweep output of sweep generator. (Oscilloscope is used for steps 1 and 2.)

SWEEP GENERATOR—Use FM r-f sweep signal generator. Connect output lead as given in chart. Set frequency and sweep width as indicated in chart.

OUTPUT METER-Connect across voice-coil terminals.

NOTE: Before starting FM alignment, allow radio and signal generator to warm up for 15 minutes.



Figure 2. Characteristic Curve of FM Detector

	SIGNAL GENERATOR			RADIO	
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Ground lead to chassis. Output lead through a $.01-\mu f$, condenser to control grid (pin 1) of $12AU6$ 2nd i-f amplifier.	9.1 mc. (75- kc. devia- tion).	88 mc. (gang meshed).	Balance and adjust detector for max- mum indication on scope, as shown in figure 2.	TC8—detector sec. TC7—detector pri.

FM ALIGNMENT CHART

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Figure 3. Top View, Showing Trimmer Locations

FM ALIGNMENT CHART (Continued)

	SIGNAL GENERATOR			RADIO	
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
2	Ground lead to chassis. Output lead through a .01-µf. condenser to FM tuning gang stator lug, junction of C1 and pin 4 of L2.	Same as step 1.	Same as step 1.	Adjust for maximum indication on scope, as shown in figure 2.	TC6—FM 2nd i-f sec. TC5—FM 2nd i-f pri. TC2—FM 1st i-f sec. TC1—FM 1st i-f pri.
3	Ground lead to lug 3 of TB1. Out- put lead to lug 2 of TB1. See note 1 below.	108.5 mc.	108.5 mc. (1st index mark from right).	Adjust for maximum indication on output meter.	C18-FM osc.
4	Same as step 3.	88 mc.	88 mc. (1st index mark from left).	Adjust for maximum indication on output meter. See note 2 below.	L5-FM osc.
5	Same as step 3.	105 mc.	105 mc.(3rd index mark from right).	Adjust for maximum indication on output meter while rocking tuning condenser.	C1B-FM r-f.
6	Same as step 3.	105 mc.	105 mc.	Adjust for maximum indication on output meter.	C4—FM aerial.
7	Same as step 3.	92 mc.	92 mc. (3rd index mark from left).	Adjust for maximum indication on output meter. See note 3 below.	L2—FM r-f coil.
If FM a	aerial coil, Ll, is replaced, it should be	e adjusted	as directed in	step 8, below.	
8	Same as step 3.	92 mc.	92 mc.	Adjust for maximum indication on output meter.	TC11—FM aerial

NOTE 1: For accurate results, the signal-generator output impedance must be 300 ohms, to match the input impedance of TB1. If the generator impedance is less than 300 ohms, a resistor of the proper value may be used in series with the output lead to make the impedance correct. For example, if the output impedance is 150 ohms, place a 150-ohm resistor in series with the output lead.

NOTE 2: If oscillator does not tune as low as 88 mc., compress the turns on the oscillator coil. If oscillator tunes too low, spread the turns slightly. After coil is adjusted, repeat step 3.

NOTE 3: Check resonance of coil L2 by inserting end of a tuning wand, such as Philco Part No. 56-6100, in the coil. If output increases when iron end is placed in coil, compress turns slightly. If output increases when brass end is placed in coil, spread the turns. If output decreases when either end is placed in coil, no adjustment is necessary. After the coil is adjusted, readjust trimmer C1B and repeat steps 3 through 8 until no further improvement is obtained.



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Figure 4. Philco Radio Model B956, Schematic Diagram

TP2-2262-A

REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.	Reference Symbol	
C1	Condenser, tuning gang, 5-section	.31-2762-1	C38D	Cor
CIA	Condenser, trimmer, BC aerial	Part of C1	C39	Cor
CIB	Condenser, trimmer, FM r-f	Part of C1	C40	Cor
CIC	Condenser, trimmer, BC oscillator	Part of C1	C41	Cor
C2	Condenser, aerial isolating, 3.3 µµf	30-1221	C42	Cor
C3	Condenser, aerial isolating,		CR1	Sel
	220 μμf	22001001°	11	Pile
C4	Condenser, FM aerial trimmer	45-3034	J1	Jac
C5	Condenser, cathode by-pass,		J2	Soc
	33 μμf62-0	033009001	L1	Coi
C6	Condenser, d-c blocking, 470 µµf. 62-14	7001021°		g
C7	Condenser, screen by-pass,		L2	Coi
	220 μμf62-	122001001°	L3	Ch
C8	Condenser, oscillator grid,		L4	Ch
	100 μμf 62 -	110001021°	L5	Coi
C9	Condenser, d-c blocking, 220 µµf62-	122001001°	L6	Ch
C10	Condenser, cathode by-pass,		L7	Ch
	.01 μf	0-4650-58°	LS	Ch
C11	Condenser, neutralizing, 3.3 µµf	0-1224-49	LAL	AN
C12	Condenser, d-e blocking 220 µµf62-	122001001°	LA2	Lin
C13	Condenser, fixed trimmer, 7.5 µµf	0-1224-65	LSI	Spe
C14	Condenser, cathode by-pass.			t
	220 μμf 62-	122001001°	RI	Res
C15	Condenser, r-f by-pass, 220 µµf62-	122001001°	R2	Res
C16	Condenser, plate decoupling, .01 µf5	0-4650-58°		- 4
C17	Condenser, r-f by-pass, 100 µµf62-	110009001°	R3	Res
C18	Condenser, trimmer, FM oscillator	1-6511-10	R4	Res
C19	Condenser, fixed trimmer, $7.5^{\circ} \mu\mu f$.	.30-1224-8	R5	Res
C20	Condenser, a-v-e decoupling, .01 µf	0-4650-58°		6
C21	Condenser, screen by-pass, 002 µf	0-4650-54°	R6	Re
C22	Condenser, neutralizing, .006 µf	80-4650-57°		4
C23	Condenser, i-f by-pass, 100 µµf62-	110001021°	R7	Res
C24	Condenser, cathode by-pass, .01 µf	0-4650-58°	RS	Re
C25	Condenser, screen by-pass, .002 µf	0-4650-54°		ć
C26	Condenser, electrolytic, diode-load filte	r,	R9	Res
	2 µf. 50v	.30-2417-7	R10	Res
C27	Condenser, i-f by-pass, 150 µµf,62-	115001011°	R11	Re
C28	Condenser, d-c blocking, .006 µf	30-4650-57°		1
C29	Condenser, i-f by-pass, 100 µµf,62-	110001021°	R12	Re
C30	Condenser, de-emphasis, .004 µf.	30-4650-56°		2
C31	Condenser, plate decoupling,		R13	Re
	220 µµf	122001001°	R14	Re
C32	Condenser, line by-pass, 100 µµf62-	110001021°	R15	Re
C33	Condenser, plate by-pass, 680 µµf62-	168001001°	R16	Re
C34	Condenser, d-c blocking, 02 uf	- 30-4650-60°	B17	Re
C35	Condenser d-c blocking 006 uf	30-4650-57°		
C36	Condenser filament hy-nass		B18	Re
000	100 unf 62-	110001021*	B19	Re
C37	Condenser tone compensation		B20	Re
001	02 uf	30-4650-60°	R21	Vo
C28	Condensor alectrolation transform	20-4650-46		
C204	Condenser, electrolytic, 4-section	70-4000-40	R99	Ro
COOA	os la osu	Part of C'28	R93	Re
COOP	Condenser flow (0 of 150).	Dart of C22	R94	Re
Case	Condenser, inter, $40 \ \mu t_1$, 1500	Dant of C29	T. 111	ne
U38U	Condenser, inter, $10 \ \mu L$, $1500 \ \dots$	rari of Coo		

rence abol	Description	Service Part No.
8D	Condenser, filter, 40 µf., 150v	Part of C38
	Condenser, filament by-pass, .005 μ	f30-1238-1°
	Condenser, line by-pass, 100 µµf	62-110001021°
	Condenser, filament by-pass, .005	μf30-1238-1°
	Condenser, line by-pass, .047 µf	30-4650-45*
	Selenium rectifier, 100 ma., 117v	
	Pilot lamp, frosted, 117v, 7 watts	
	Jack, male, a-c	
	Socket, FM test	
	Coil, FM aerial, complete with	
	grommet	
	Coil, FM r-f	
	Choke, r-f, 3.3 µh	
	Choke, r-f, 3.3 µh.	
	Coil, FM oscillator	
	Choke, filament, 2.2 µh.	
	Choke, filament, 2.2 µh.	
	Choke, r-f, 4.1 µh.	
	AM loop and support assembly	
	Line-cord aerial, FM	Part of W1
	Speaker, 4" p-m, including output	
	transformer	
	Resistor, cathode bias, 120 ohms	66-1128340*
	Resistor, screen decoupling,	
	470 ohms	66-1478340°
	Resistor, grid return, 15,000 ohms	66-3158340°
	Resistor, grid return, 2.2 megohms	66-5228340°
	Resistor, parasitic suppressor,	
	680 ohms	66-1688340°
	Resistor, parasitic suppressor,	
	470 ohms	66-1478340°
	Resistor, loading, 100 ohms	66-1108340°
	Resistor, plate dropping, AM,	
	47,000 ohms	66-3478340°
	Resistor, plate dropping, 4700 ohm	ns66-2478340°
	Resistor, cathode bias, 47 ohms	66-0478340°
	Resistor, screen decoupling,	
	1000 ohms	66-2108340°
	Resistor, plate decoupling,	
	2700 ohms	66-2278340°
	Resistor, grid return, 1 megohm	66-5108340°
	Resistor, cathode bias, 120 ohms	66-1128340°
	Resistor, a-v-c filter, 2.2 mcgohms	66-5228340*
	Resistor, decoupling, 470 ohms	
	Resistor, FM diode load.	
	47,000 ohms	66-3478340*
	Resistor, de-emphasis, 47,000 ohn	ns66-3478340°
	Resistor, i-f filter, 47,000 ohms	
	Besistor a-v-c load 3.3 megohms	66-5338340
	Volume control (with off-on switch)	
	500.000 ohms	33-5566-90
	Besistor grid return 10 megohme	66-6108340
	Resistor plate lead 470,000 char	
	nesistor, plate load, 470,000 onms	
	Desighton muid not and 47D (WW) shows	· · · · · · · · · · · · · · · · · · ·

REPLACEMENT PARTS LIST (Cont.)

Reference Symbol	Service Description Part No.	
R25	Resistor, cathode bias, 150 ohms	
R26	Resistor, filter, 470 ohms, 1 watt66-1474340°	Der
R27	Resistor, filter, 150 ohms, 2 watts	
R28	Resistor, current limiting, 22 ohms,	
	2 watts]
R29	Resistor, current limiting, 100 ohms33-1343-3]
R30	Resistor, grid return, 2.2 megohms66-5228340*	
S1	Switch, off-onPart of R21]
Tl	Transformer, AM oscillator	Cli
Т2	Transformer, outputPart of LS1	Dr
W1	Line cord	Po
W2	Cable, FM aerial, 72-ohm twin lead41-3987	Sh
WS	Switch, band, 2-wafer	Sp
ZI	Transformer, FM, 1st i-f	Sp
Z2	Transformer, AM, 1st i-f	Ru
Z 3	Transformer, FM, 2nd i-f	So
Z4	Transformer, FM, detector	So
Z5	Transformer, AM, 2nd i-f	So

MISCELLANEOUS

Descripti	on				Service Part No.
Cabinet					
Back,	flange,	and	socket	assembly	



Figure 5. Base View, Showing Parts Placement

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MISCELLANEOUS (Cont.)

Description	Service Part No.
Fastener, back mtg. (4)	W-2235-FA9
Dial scale	
Knob, FM-AM	
Knob, tuning	
Knob, volume-off-on	54-4774-27
Clip, pilot lamp	56-3545-FA3
Drive cord, 25-foot spool	45-8750°
Pointer	
Shaft, drive	.56-7931FA11
Spring, gang drive	
Spring, pointer drive	
Rubber mount, speaker (2)	
Socket, 12BA6 (i-f ampl.)	
Socket, 12AU6 (i-f ampl.)	
Socket, 12AU6 (r-f ampl.)	
Socket, 12AT7	
Socket, 19V8	
Socket, 35C5	
Shield, tube (2)	
Shield, tube base (1)	56-3978-1FA3
Shield, tube base (2)	56-5628-1FA3
Socket, assembly, pilot lamp	
Spring, hairpin	

TP2-2263



PHILCO RADIO-PHONOGRAPH MODEL B1754

SPECIFICATIONS

CABINET	Wood console, mahogany
CIRCUIT	Five-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	
Broadcast	540 kc. to 1620 kc.
Special Services	1700 kc. to 3400 kc.
AUDIO OUTPUT	4.5 watts
OPERATING VOLTAGE	105-120 volts, a.c.
POWER CONSUMPTION	80 watts
ANTENNA	Built-in, low-impedance loop
INTERMEDIATE FREQUENCY	455 kc.
PHILCO TUBES 6BJ6 r-f an 6BJ6 i-f ampl; 6AV6 detector,	ipl; 6BE6 converter, osc., phono preampl; a.v.c., 1st audio; 6AQ5 output; 6X4 rectifier



MODEL B1754



Figure 1. Drive-Cord Installation Details

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ALIGNMENT PROCEDURE

GENERAL

RADIO CONTROLS—Set volume control for maximum output, and set tuning control as indicated in the alignment chart. Set band switch to broadcast position for first 5 steps, then to special services position for steps 6 and 7.

OUTPUT INDICATOR—Connect output indicator (either an oscilloscope or a 1000-ohms-per-volt, a-c voltmeter) across voice-coil terminals. SIGNAL GENERATOR—Use an AM r-f generator, connected as indicated in the alignment chart.

OUTPUT LEVEL—During alignment, attenuate signal-generator output to maintain output indication below 1 volt.

DIAL POINTER—Before the alignment is started, the dial pointer should be set to coincide with the dial scale mark to the left of "55" when the tuning gang is fully meshed.

	SIGNAL GENERATOR			RADIO	
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Ground lead to chassis. Output lead through a .01-µf. condenser to pin 7 (mixer grid) of 6BE6, converter.	455 kc.	Tuning gang fully open.	Adjust, in order given in next column, for maximum output.	TC6—2nd i-f sec. TC3—1st i-f pri. TC5—2nd i-f pri. TC4—1st i-f sec.
2	Radiating loop. See Note 1 below.	1620 kc.	1620 kc. See Note 2 below.	Adjust for maximum output.	C1C—osc. trimmer
3	Same as step 2.	1520 kc.	Tune radio to generator signal.	Adjust for maximum output. (High-fre- quency adjustment).	C1Bmixer-grid trimmer C1Ar-f trimmer
4	Same as step 2.	580 kc.	Same as step 3.	Adjust for maximum output. (Low-frequen- cy adjustment).	TC-2—r-f transformer TC1—ant. transformer
5	Repeat steps 3 and 4 until no further	· improvement	is obtained.		
6	Same as step 2.	3200 kc.	Same as step 3.	Adjust for maximum output.	C10—special serv- ices mixer-grid trimmer C4—special serv- ices r-f trimmer
7	Same as step 2.	1800 kc.	Same as step 3.	Adjust for maximum output.	C2—special serv- ices r·f padder

ALIGNMENT CHART

NOTE 1: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads and place about 1 foot from radio loop antenna. The position of the radio loop with respect to the chassis should be approximately the same as when both are mounted in the cabinet.

NOTE 2: To set the tuning gang to 1620 kc., place a piece of 6-mil flat shim stock beneath the heel of the rotor, and turn the rotor until it holds the shim firmly in place. Then remove the shim.



NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.	Reference Symbol	Description	Service Part No.
C1	Condenser, tuning gang, 3-section	1-2771-3	R10	Resistor, cathode bias, 270 ohms	
CIA	Condenser, trimmer, antennaPa	art of C1	R11	Resistor, screen dropping,	
C1B	Condenser, trimmer, r-f	art of Cl	_	68,000 ohms	66-3688340°
CIC	Condenser, trimmer, oscillatorPa	art of C1	R12	Resistor, plate dropping, 10,000 ol	240° https://https//https://ht
C2	Condenser, padder, special services r-fPar	t of CA1	R13	Resistor, i-f filter, 47,000 ohms	66-3478340°
C3	Condenser, d-c blocking, 100 µµf62-110	001001°	R14	Resistor, diode load, 330,000 ohm	s 66-4338340°
C 4	Condenser, trimmer, special services r-fPar	t of CA1	R15	Resistor, tone compensation	00.0/200/00
C5	Condenser, r-f by-pass, 220 µµf	001001°	B10	(bass boost)	
C6	Condenser, r-f by-pass, 100 µµf	001001°	N10 D17	Resistor, tone control, 5 megonms	
C7	Condenser, r-t by-pass, 5 $\mu\mu$ t	0505020	1010	Resistor, volume control, 2 megon	ms
C8	Condenser, fixed padder, 865 $\mu\mu$ t30-	1220-72	R10	Resistor, grid leak, 10 megonms	
C9	Condenser, harmonic suppression,	0.455.415	R90	Resistor, plate load, 1 megonin	
C10	$47 \mu\mu t$. 60-0 Condenser, trimmer, special services	0475417	R21	Resistor, cathode bias, 330 ohms,	
C11	mixer-grid Par	t of UAI	R00	Posistor P+ filter 1000 ohme	
C19	Condenser, a-v-c by-pass, .047 µr	030-43	R23	Resistor B+ filter 970 ohms	88-1075040°
C12	Condenser, oscillator coupling, $47 \mu\mu$ tbU-U Condenser, if coupling 200f 60 100	04/341/	R24	Resistor diode load 470 000 obme	
C14	Condenser, i-i coupling, 220 $\mu\mu$ i02-122 Condenser screen by mass 047 of 20 4	650-45°	SI	Switch off-on	Part of R18
C15	Condenser plate hypass, 1047 µ1	1238_9*	S2	Switch, off-on	
C16	Condenser audio coupling 0068 of 20.	4650-57		phono motor	4 Record Changer
CI7	Condenser tone compensation	1000-01	T1	Transformer, power	32-8610
	(bass boost), .005 uf	1238-1°	T2	Transformer, output	
C18	Condenser, tone compensation, 47 µµf 60-0	0475417	T3	Transformer, oscillator	
C19	Condenser, tone compensation		W1	Line cord	L-2183°
	(high cut) .01 µf	1238-2°	WS1	Switch, band	
C20	Condenser, audio coupling, .005 µf,30-	1238-1°	Z1	Transformer, r-f	
C21	Condenser, d-c blocking, .007 µfPar	t of PC1	Z2	Transformer, 1st i-f	
C22	Condenser, r-f by-pass, 220 µµfPar	t of PC1	Z 3	Transformer, 2nd i-f	
C23	Condenser, tone compensation,				
	.0033 µf	650-89°		MISCELLANEOUS	
C24	Condenser, electrolytic filter	-2584 - 32			
C24A	Condenser, filter, 20 µfPar	rt of C24			Service
C24B	Condenser, filter, 20 µfPar	rt of C24	Description	n	Part No.
C24C	Condenser, filter, 40 μ t.	rt of C24	Cabinet r	mahogany	10985
C24D	Condenser, filter, 10 μ t.	rt of C24	Back	inanogany	54-8932
225	Condenser, line by-pass, $.0068 \ \mu f.$	4650-57	Hinge, 1	right hand (2)	
20	Condenser, audio coupling (phono),	1000 1	Hinge,	left hand (2)	
C07	\mathcal{O}	J-1238-1	Cabinet, l	blonde oak	10985-1
	Condenser, fixed trimmer, $1.5 \ \mu\mu I$	-1224-00	Back		
	Long assembly, rilat (9)	1 6022 A	Hinge,	right hand (2)	
11	Connector phone input	8 8969 1	Dome (4)	len hand (2)	
19	Connector, phono input	76 9366	Door pull	(2)	56-7062-1
J2 T.1	Coil antenna 34	2_4419_9	Bullet cat	ch (2)	45-6002
1.2	Coil special services ref	2-4561-5	Strike plat	te (2)	
L3	Coil, special services mixer orid	2-4561-5	Changer f	frame ass'y.	
L4	Coil, oscillator shunt	2-4562-1	Rail ass	y., r.h. (changer drawer)	
LAI	Loop antenna 32.	4394-13	Kail ass	s y., I.h. (changer drawer)	
LSI	Speaker (10")	6-1610-6	Spring,	changer mtg. (3)	
PC1	Printed circuit	0-1239-4	Sleeve	changer mtg (3)	
RI	Resistor, r-f a-v-c, 1 megohm	108340°	Pull knob	, changer drawer	
R2	Resistor, cathode bias. 82 ohms	828340°	Frame ass	y	45-9790
R3	Resistor, screen dropping.		Dial back	plate ass'y.	
-	22,000 ohms	225340°	Dial sca	ale	
R4	Resistor, plate load, preampl.		Clip, sc	ale	
	220,000 ohms	4228340	Knob (3) .		
R5	Resistor, cathode bias, 27,000 ohms66-3	278340°	Knob	oft retaining	
R6	Resistor, oscillator grid leak,		Pointer	art retaining	
	33,000 ohms	338340°	Socket (5))	07 6075
R7	Resistor, load (phono), 1 megohm	108340°	Socket (6)	AV6)	27-6203-14
R8	Resistor, a-v-c load, 2.2 megohms	228340°	Rubber m	ount, gang mounting	27-4596
R9	Resistor, grid leak, 470,000 ohms	478340°	Tube shie	ld	



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Figure 2. Top View, Showing Tuning Adjustments





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Figure 4. Philco Radio-Phonograph Model B1754, Schematic Diagram

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PR-2554



PHILCO RADIO-PHONOGRAPH MODEL B1350

SPEC	IFICATIONS	
CABINET	Molded plastic	1
CIRCUIT.	Four-tube superheterodyne plus rectifier	ATTACK TO A THE REAL PROPERTY
FREQUENCY RANGES		Contraction and the second
Broadcast		
Special Services		N Cont
AUDIO OUTPUT	3 watts	
OPERATING VOLTAGE	105—120 volts, 60 cycles, a.c.	
POWER CONSUMPTION		
Radio		
Phonograph		CONTRACTOR NUMBER OF CONTRACTOR OF CONTRACTO
INTERMEDIATE FREQUENCY	(455 ke.	
ANTENNA	Built-in high-impedance loop; provision for external antenna	
PHILCO TUBES		
PHONOGRAPH	Record Changer (For service informa- tion refer to Service Manual PR-2178.)	MODEL B1350



Figure 1. Drive-Cord Installation Details

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Figure 2. Base View, Showing Parts Placement and Alignment Points

ALIGNMENT PROCEDURE

GENERAL—In order to perform the alignment procedure it is necessary to remove the front of the cabinet from the back portion of the cabinet holding the record changer. This front part of the cabinet can be removed by loosening the front screws located on the bottom of the cabinet, and the screws located directly under the front of the changer lid.

DIAL POINTER—With the tuning-condenser plates fully meshed, set the dial pointer to coincide with the index mark located to the left of "55" on the dial scale.

CONTROLS—Set the volume control to maximum and the tone control to the treble position. Set the radio-phono switch to the broadcast position for the first three steps of the procedure, and to the special services position for the last step. Set the tuning control as indicated in the chart.

OUTPUT INDICATOR—Connect the output indicator (a 1000-ohms-per-volt voltmeter or an oscilloscope) across the voice-coil terminals.

SIGNAL GENERATOR—Use an amplitude-modulated r-f generator. Connect the ground lead to B-, and the output lead as indicated in the chart.

OUTPUT LEVEL—During the alignment, attenuate the signal-generator output to maintain the output indication below 1 volt.

	SIGNAL GENERATOR			RADIO		
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST TRIMMER	
1	Output lead through a .01-µf. condenser to grid (pin 6) of 7A8 converter tube.	455 kc. (modulated)	Gang fully open.	Adjust, in order given in next column, for maximum output. TC2 and TC4 are located at top of transformers.	TC4-2nd i-f sec. TC3-2nd i-f pri. TC2-1st i-f sec. TC1-1st i-f pri.	
2	Radiating loop (see note 1 below).	1620 kc.	1620 kc. (see note 2 below).	Adjust for maximum output.	C1B—oscillator trimmer	
3	Same as step 2.	1500 kc.	1500 kc.	Adjust for maximum output.	C1A—antenna trimmer (broadcast)	
4	Same as step 2.	3200 kc.	3200 kc.	Adjust for maximum output.	C2 — antenna trimmer (special services)	

ALIGNMENT CHART

NOTE 1: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads, and place near radio loop. NOTE 2: The tuning gang can be set to 1620 kc. by placing a piece of 6-mil flat shim stock between the heel of the rotor and the top of the stator plates, and moving the rotor until is holds the shim in place. Remove the shim before proceeding with the alignment.



Philco Radio-Phonograph Model B1350, Schematic Diagram

Figure

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RADIO-PHONOGRAPH MODEL B1350

World Radio History

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REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference		Service
\$ymbol	Description	Part No.
CI	Condenser, tuning gang	31-2751-9
CIA	Condenser, trimmer, antenna	Part of C1
CIB	Condenser, trimmer, oscillator	Part of CL
C2	Condenser, trimmer, osernator and	and are or or
	antenna	
C3	Condenser, series tracker, 725 µµf	
C4	Condenser, d-c blocking, 47 µµf.	60-00475420
C5	Condenser, fixed trimmer, 7.5 µµf	
C6	Condenser, a-v-c by-pass, .1 µf.	30-4650-47°
C7	Condenser, by-pass, .1 µf.	30-4650-47°
C8	Condenser, cathode by-pass, .05 µf	30-4650-45°
C9	Condenser, screen by-pass, .1 µf.	30-4650-47°
C10	Condenser, d-c blocking, .005 µf	
C11	Condenser, d-c blocking, .005 µf	
C12	Condenser, high-frequency	
* ***	compensation, 47 $\mu\mu$ f.	60-00475420
C13	Condenser, bass compensation,	00 4050 500
014	$-0.047 \ \mu r$	30-4650-56*
	Condenser, tone, $10047 \ \mu r$.	
	Condenser, d-c blocking, .005 μ t.	Part of PCI
C16	0047 uf	30-4650-56
C17	Condenser electrolytic 4-section	30-2575-32
CI7A	Condenser, cathode by pass 25 uf 50	v Part of C17
C17B	Condenser, filter, 40 uf., 150v	Part of C17
C17C	Condenser, filter, 40 µf., 250v	Part of C17
C17D	Condenser, filter, 40 µf., 250v	Part of C17
C18	Condenser, voltage doubling, 20 µf.	
	200v	
C19	Condenser, line by-pass, .04 µf.	30-1226-17*
C20	Condenser, phono isolation, .01 µf	30-4650-58*
C21	Condenser, a-v-c decoupling,	
~	$220 \ \mu\mu t.$	2-122001001
C22	Condenser, aerial blocking, 5 $\mu\mu$ t	
11	Lamp, pilot	
LI	Coil, antenna, special services	
1.2	Coil, oscillator shunt	
LAI	Loop assembly, antenna	
LSI	Speaker	
PCI	Printed circuit, d-c blocking	
KI DO	Resistor, grid return, 470,000 ohms	
R2	Resistor, grid leak, 100,000 ohms	
R3	Resistor, B- to chassis, 150,000 ohms	66-4158340"
K4	Resistor, cathode bias, 180 ohms	00-1188340*
K5 DC	Resistor, screen dropping, 27,000 onms	
KO	Resistor, 1-t filter, 47,000 onms	
R/	Resistor, diode return, 470,000 ohms	
NÖ	Resistor, diode load, 2.2 megohns	00-7228340°
K9 D10	Resistor, grid leak, 10 megohms	00-0108340°
VI0	would control, 2 megonins (with off switch and tone control)	-00 33.5563.55
R11		
	68,000 ohms	66-3688340°
R12	Tone control, 5 megohms	Part of R10
R13	Resistor, plate load, 500,000 ohms	Part of PC1
R14	Resistor, grid leak, 500,000 ohms	Part of PC1

Reference Symbol	Description	Service Part No.
R15	Resistor, cathode bias, 180 ohms,	
	1 watt	66-1184340°
R16	Resistor, filter, 5000 ohms, 7 watts	33-1335-95
R17	Resistor, filter, 270 ohms, 7 watts	33-1335-91
R18	Resistor, tube saver, 100 ohms	
R19	Resistor, aerial loading, 150,000 ohms.	66-4158340°
S1	Switch, off-on	Part of R10
T1	Transformer, oscillator	
Т2	Transformer, output	
W1	Line cord	L-2183°
WS	Wafer switch, 2-section	
Z1	Transformer, 1st i-f	32-4160A
Z2	Transformer, 2nd i-f	32-4240A

Service

MISCELLANEOUS

Description	Part No.
Cabinet	
Bottom cover	
Hinge (2)	
Lid	
Lid support	
Binder post	
Changer Mounting Hardware	
Sleeve, rubber (3)	
Speed nut (3)	W-2554
Spring, mounting, top (3)	
Spring, mounting, bottom (3)	
Dial scale	
Drive cord, 25 ft. spool	
Foot, rubber (4)	
Gasket, speaker	
Knob, off-on-volume	
Knob, radio-phono-Special Services	
Knob, tuning	
Knob, tone	
Lead assembly, antenna	
Mounting foot (4)	
Mount, rubber (3)	
Panel, diffusing	
Clip, diffusing panel (2)	
Pilot-lamp socket assembly	
Fastener, pilot-lamp shield (2)	
Pointer	
Rail assembly, pointer	
Spring, pointer drive	
Socket, Loktal (3)	
Socket, octal (2)	
Spring, hairpin	
Tuning shaft	56-8370-1



PHILCO RADIO-PHONOGRAPH MODEL B1750

SPECIFICATIONS Wood, mahogany or blond CABINET Four-tube superheterodyne plus rectifier CIRCUIT FREQUENCY RANGES 540-1620 kc. Broadcast 1700-3400 kc. Special Services AUDIO OUTPUT. 3 watts OPERATING VOLTAGE 105-120 volts, 60 cycles, a.c. POWER CONSUMPTION Radio 35 watts 60 watts Phonograph INTERMEDIATE FREQUENCY 455 kc. Built-in high-impedance loop ANTENNA PHILCO TUBES 7A8 converter: 7B7 i-f amplifier; 7C6 detector-a.v.c.-1st audio: 35L6GT output; 50Y7GT rectifier Philco Model M-24 All-Speed Automatic PHONOGRAPH MODEL B1750 Record Changer (For service information refer to Service Manual PR-2178.)





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ALIGNMENT PROCEDURE

GENERAL—In order to make the i-f adjustments, it is necessary to lift the chassis away from the cabinet. This can be done by removing the securing bolts.

DIAL POINTER—With the tuning-condenser plates fully meshed, set the dial pointer to coincide with the index mark located to the left of "55" on the dial scale.

CONTROLS—Set the volume control to maximum and the tone control to the treble position. Set the radio-phono switch to the broadcast position for the first three steps of the procedure, and to the special services position for the last step. Set the tuning control as indicated in the chart.

OUTPUT METER—Connect the output indicator (a 1000-ohms-per-volt voltmeter or an oscilloscope) across the voice-coil terminals.

SIGNAL GENERATOR—Use an amplitude-modulated r-f generator. Connect the ground lead to B—, and the output lead as indicated in the chart.

OUTPUT LEVEL—During the alignment, attenuate the signal-generator output to maintain the output below 1 volt.

	SIGNAL GENERATOR			RADIO	
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST TRIMMER
1	Output lead through a .01-µf. condenser to grid (pin 6) of 7A8 converter tube.	455 ke. (modulated)	Gang fully open.	Adjust, in order given in next column, for maximum output. TC2 and TC4 are located at top of transformers.	TC4—2nd i-f see. TC3—2nd i-f pri. TC2—1st i-f sec. TC1—1st i-f pri.
2	Radiating loop (see note 1 below).	1620 kc.	1620-kc. (see note 2 below),	Adjust for maximum output.	C1B—oscillator trimmer
3	Same as step 2.	1500 ke.	1500 ke.	Adjust for maximum output.	CIA—aerial trimmer (broadcast)
4	Same as step 2.	3200 kc.	3200 kc.	Adjust for maximum output.	C2—aerial trimmer (special services)

ALIGNMENT CHART

NOTE 1: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads, and place near radio loop.

NOTE 2: The tuning gang can be set to 1620 kc, by placing a piece of 6-mil flat shim stock between the heel of the rotor and the top of the stator plates, and moving the rotor until it holds the shim in place. Remove the shim before proceeding with the alignment.



RADIO-PHONOGRAPH

MODEL

B1750

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REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.
Cl	Condenser, tuning gang	31-2751-10
CIA	Condenser, trimmer, antenna	Part of C1
C1B	Condenser, trimmer, oscillator	Part of C1
C2	Condenser, trimmer, special services	01 0450 01
00	antenna	31-6473-31
U3	Condenser, series tracker, $725 \mu\mu r$.	
	Condenser, d-c blocking, $47 \mu\mu$ I.	20.1997.65
C6	Condenser, fixed triffiner, $1.5 \mu \mu f$	20-4650-479
C7	Condenser by pass 1 uf	30-4650-47*
	Condenser, cathode by-pass 05 uf	30-4650-45°
C9	Condenser, carnotae by plass, 100 prime	30-4650-47°
ČIO	Condenser, d-c blocking, .005 µf.	
ČII	Condenser, d-c blocking, .005 µf.	30-1238-1°
C12	Condenser, high-frequency	
	compensation, 47 µµf.	60-00475420
C13	Condenser, bass compensation,	
~	.006 µt.	30-4650-57°
CI4	Condenser, tone, $.0047 \mu f$.	30-4650-56*
C15	Condenser, d-c blocking, .005 µt	Part of PC1
C16	Condenser, tone compensation,	00 4050 500
015	.0047 µr.	
C17A	Condenser, electrolytic, 4-section	
CI7R	Condenser, cathode by-pass, 25 μ 1., 50 Condenser, filter 40 of 1500	Part of C17
	Condenser, filter $40 \ \mu f$ 250v	Part of C17
C17D	Condenser filter 40 μ f 250v	Part of C17
CI	Condenser, voltage doubling.	and are of CTT
010	$20 \ \mu f.$ 200 v	
C19	Condenser, line by-pass, .04 µf.	30-1226-17°
C20	Condenser, phono isolation, .01 µf	30-4650-58°
C21	Condenser, a-v-c decoupling,	
	220 $\mu\mu f$	2-12200100 1°
11	Lamp, pilot	34-2064°
Ll	Coil, antenna, special services	
L2	Coil, oscillator shunt	
LAI	Loop assembly, antenna	
LSI	Speaker	
PCI P1	Printed circuit, d-c blocking	
N1 100	Resistor, grid return, 470,000 ohms	.00+4410340°
R2	Resistor, B- to chassis 150,000 ohms	.00-4100040 66-4158340*
R4	Resistor, D= to chassis, 100,000 onnis.	66.1188340*
R5	Resistor, carlouce mas, roo omns	
110	27.000 ohms	.66-3278340*
R6	Resistor, i-f filter, 47,000 ohms	66-3478340°
R7	Resistor, diode return, 470,000 ohms.	66-4478340°
R8	Resistor, diode load, 2.2 megohms	66-5228340°
R9	Resistor, grid leak, 10 megohms	66-6108340°
R10	Volume control, 2 megohms (with off-	on
	switch and tone control)	33-5563-60
RH	Resistor, bass compensation,	
D 10	68,000 ohms	66-3688340°
K12 D10	Tone control, 5 megohms	Part of R10
N13 D14	Resistor, plate load, 500,000 ohms	Part of PC1
N14 D15	Resistor, grid leak, 500,000 ohms	Part of PC1
N15	resistor, cathode blas, 180 ohms,	66 11949400
B16	Bosistor filter 5000 ohme 7 unsta	22 1995 OF
R17	Resistor filter 270 ohms 7 watte	22,1225 01
R18	Resistor tube saver 100 ohme	33_1949_2
R19	Resistor, phono shunt 1 megohm	66-5108540

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Reference Symbol	Description	Service Part No.
<u>S1</u>	Switch, off-on	Part of R10
ТІ	Transformer, oscillator	32-4453-2
T2	Transformer, output	32-8242-9
Ŵ1	Line cord	L-2183°
WS	Wafer switch, 2-section	42-1989-1
ZI	Transformer, 1st i-f	32-4160A
Z 2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description Service Part No.

MODEL B1750 (MAHOGANY)

Cabinet	
Hinge, top (2)	
Hinge, top leaf (4)	
Hinge, spring (2)	
Tapped stud, spring hinge (8)	
Knob, off-on-volume	
Knob, radio-phono-Special Services	
Knob, tuning	
Knob, tone	
Metal grille	

MODEL B1750 (BLOND)

Cabinet	
Hinge, top (2)	
Hinge, top leaf (4)	
Hinge, spring (2)	
Tapped stud, spring hinge (8)	56-6296-1
Knob, off-on-volume	54-4842-11
Knob, radio-phono-Special Services	54-4842-10
Knob, tuning	76-6353-4
Knob, tone	76-6353-5
Changer Mounting Hardware	
Sleeve, rubber (3)	
Speed nut (3)	W2554
Spring, mounting, top (3)	56-7059FA9
Spring, mounting, bottom (3)	6-7059-1FCP
Dial scale and bezel assembly	
Drive cord, 25 ft. spool	
Foot, cabinet (4)	
Mount, rubber (3)	
Panel, diffusing	
Spring clip, diffusing panel	56-3587-1
Pilot-lamp socket assembly	
Fastener, pilot-lamp shield (2)	V2235-1FA9
Pointer	56-5630-54
Rail assembly, pointer	
Spring, pointer drive	56-2617°
Slide assembly, changer support (2)	76-6742-1
Socket, Loktal (3)	27-6207°
Socket, octal (2)	
Spring, hairpin	56-6552
Tuning shaft	56-8370-2



PHILCO RADIO MODEL B656

	SPECIFICATIONS	
CABINET B656		
CIRCUIT	e superheterodyne (plus selenium rectifier)	
FREQUENCY RANGES Standard broadcast Special services	550—1600 kc. 	0
AUDIO OUTPUT		
OPERATING VOLTAGES	"A" battery and 90-volt "B" battery	
POWER CONSUMPTION A-c or d-c operation		
Battery operation		5 ma. at 9 volts, and 15 ma. at 90 volt
AERIAL		provision for connecting external aeria
INTERMEDIATE FREQUENCY		
PHILCO TUBES	1T4 r-f amplifier, 1R5 converter, 1U4 i-f amplifie	er, 1U5 det.—a.v.c.—1st audio 3V4 outpu
BATTERY TYPE		Philco P-27-



Drive-Cord Installation Details Figure 1.

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ALIGNMENT PROCEDURE

POINTER—Set pointer to coincide with first index mark from left side of dial backplate (looking at front of dial backplate).

RADIO CONTROLS—Set volume control to maximum; set broadcast-special services switch, SW1, as indicated in chart.

OUTPUT METER --- Connect across voice-coil terminals.

SIGNAL GENERATOR-Use modulated output.

OUTPUT LEVEL—During alignment, adjust signalgenerator output to maintain output-meter indication below .5 volt.

CRITICAL LEAD DRESS—To secure proper padding capacity, the green lead from pin 6 of the 1R5 tube to Z1 must be dressed over the wiring panel, away from the chassis. The white lead which connects the low end of the aerial (LA1) to the broadcast-special services switch (SW1), must be dressed taut between the low-end tie lug and the retaining spring.



Figure 2. Top View, Showing Trimmer Locations

	SIGNAL GENERATOR				
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	TRIMMER
1	Through a .1-µf, condenser to pin 6 of 1R5 converter.	265 kc.	1630 kc. (gang fully open)	Set broadcast-special services switch to broadcast position. Adjust, in order given, for maximum output.	TC5—2nd i-f sec. TC4—2nd i-f pri. TC2—1st i-f pri. TC3—1st i-f sec.
2	Radiating loop. See note below.	1630 kc.	*1630 kc. (gang fully open)	Adjust for maximum output, If low-frequency dial tracking is far off, make adjustments in steps 3 and 4 before making this adjustment.	C1B—ose, shunt
3	Same as step 2.	580 kc.	580 kc.	Adjust for maximum output while rocking tuning control.	C12—osc. series
4	Same as step 2.	580 kc.	580 kc.	Adjust for maximum output. This adjustment should not be made unless dial tracking is off, or sensitivity is low at low- frequency end (580 kc.).	TC1—r-f sec.
5	Same as step 2.	1500 ke.	1500 kc. (index mark at right)	Adjust, in order given, for maximum output.	CIA—r-f C19A—BC aerial
6	Repeat steps 3 and 5 until no f	urther improvem	ient is obtained.		
7	Same as step 2.	3000 kc.	3000 kc.	Set broadcast-special services switch to special services position. Adjust, in order given, for maximum output.	C19C—SS aerial C18—r-f
8	Same as step 2.	1900 ke.	1900 ke.	Adjust, in order given, for maximum output.	C19B—SS aerial series tracker
9	Repeat steps 7 and 8, and then	repeat step 5.			

NOTE: Make up a six-to-eight-turn, 6-inch diameter loop using insulated wire; connect to signal-generator leads and place near radio loop.

* For proper adjustment of the oscillator trimmer. fully open the tuning gang and insert a .006-inch, non-metallic shim between the heel of the rotor and the top of the stator plates. Close the tuning gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.

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Figure 3. Philco Radio Model B656, Schematic Diagram

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MODEL B656





REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference		Service
Symbol	Description	Part No.
C1	Condenser, tuning gang, 3-section	
CIA	Condenser, r-f trimmer	Part of C1
CIB	Condenser, osc. trimmer	Part of C1
C2	Condenser, d-c blocking, 100 µµf.	
C3	Condenser, bias filter, .05 uf.	61-0122*
C4	Condenser, converter tracking, 665 uuf.	30-1220-66
C5	Condenser, filament by-pass .05 uf.	61-0122*
C6	Condenser, screen by-pass, .05 uf.	61-0122*
C7	Condenser, neutralization, 1.5 uuf	30-1221-3
C8	Condenser, a-v-c filter 05 uf	61-0122*
C9	Condenser filament by-nass 1 uf	61-0113
C10	Condenser, filament by-pass 1 uf	61-01134
CII	Condenser d-c blocking 47 auf	60.00.175.190
Č12	Condenser ose series padder 700 to 900 "	uf 31_6473_98
CIS	Condenser tone compensation 004 of	61-0170
CIA	Condenser, concerning and and and	
C15	Condenser line by page 01 of	45 2500 09
C16	Condenser, the by-pass, .04 µr.	-2006-64
CIRA	Condenser, ceramic, 4-section	
Cleb	Condenser, screen by-pass, .01 µr.	Part of CIt
CIOD	Condenser, by-pass, 200 µµt.	Part of C1t
CIOC	Condenser, d-c blocking, $.002 \ \mu f$.	Part of C16
CIED	Condenser, d-c blocking, $.001 \mu t$,	Part of C16
C17	Condenser, electrolytic, 4-section	
C17A	Condenser, filament by-pass, 60 µf.	Part of C17
C17B	Condenser, filter, 60 µf.	Part of C17
C17C	Condenser, filter, 10 μ f.	Part of C17
C17D	Condenser, filter, 60 µf.	Part of C17
C18	Condenser, SS hi-frequency r-f trimmer	
C19	Condenser, aerial trimmer, 3-section	31-6477-16
C19A	Condenser, BC hi-frequency	Part of C19
C19B	Condenser, SS low-frequency	Part of C19
CI9C	Condenser SS hi-frequency	Part of C10
C20	Condenser compensating high-frequency	and are or ere
	100 auf	62.1100000019
CB1	Selenium rectifier	24 80024
1.2	Coil oscillator shunt	
T A 1	Coil corial	
ISI	Speaker 5 inch	
DI I	Dior and value accombly betture	
D1	Pusishan mill a dura 0.0	
N1 D0	Posistor, grid return, 2.2 megonins	
R2 R0	Periode a file of the second s	
na na	Resistor, grid return, 4.7 megonms	
K4	Resistor, grid return, 100,000 ohms	
K5	Resistor, oscillator coupling, 1500 ohms	
R6	Resistor, dropping, 15,000 ohms	
R7	Resistor, grid return, 82 ohms	66-0828340°
K8	Resistor, grid return, 220 ohms	
R9	Resistor, a-v-c filter, 4.7 megohms	
R10	Resistor, neutralization, 2200 ohms	
R11	Resistor, a-v-c filter, 4.7 megohms	
R12	Resistor, i-f filter, 100,000 ohms	
R13	Resistor, volume control, 1 megohm	
R14	Resistor, leakage, 150,000 ohms	66-4158340
R15	Resistor, current limiting, 82 ohms	66-08283.104
R16	Resistor, grid return, 4.7 megohns	66-54783409
R17	Resistor, plate load, 680,000 ohms	66-4688340

Symbol	Description	Service Part No.
R18	Resistor, screen dropping, 4.7 megohms	66-5478340°
R19	Resistor, filament, 15,000 ohms	
R20	Resistor, grid return, 3.3 megohms	66-5338340°
R21	Resistor, current limiting, 330 ohms	66-1338340°
R22	Resistor, filter, 1000 ohms	.66-2108340°
R23	Resistor, wire-wound, 2-section	
R23A	Resistor, filament dropping, 950 ohms	Part of R23
R23B	Resistor, filament dropping, 950 ohms	Part of R23
R24	Resistor, wire-wound, current limiting, 120 oh	ms 33-1334-14
R25	Resistor, grid return, 3.3 megohms	
R26	Resistor, bias resistor (battery operation),	
	330 ohms	66-1338340*
S1	Switch, change-over	
S2	Switch, on-off	Part of R13
SW1	Band switch	
T1	Transformer, oscillator	
Т2	Transformer, output	
W1	Line cord	L2183
Z1	Transformer, r-f	
Z2	Transformer, 1st i-f	
73	Transformer, 2nd i-f	32-4240-6A

MISCELLANEOUS	_
Description	Service Part No.
Cabinet, light beige	
Back, light beige	
Clip, back (2)	
Handle assembly	
Scale, light beige	
Knob (2)	
Knob (1)	
Cabinet, pine green	
Back, pine green	
Clip, back (2)	
Handle assembly	
Scale, pine green	
Knob (2)	
Knob (1)	
Cabinet, charcoal gray	
Back, charcoal gray	
Clip, back (2)	
Handle assembly	
Scale, charcoal gray	
Knob (2)	
Nnob (1)	
Dial-backplate assembly	
Drive cord, 25-ft. spool	
Pointer	
Spring, drive cord	
Shart-and-pulley assembly	
Stouin, rubber (5)	
Spring, retaining	
Soulot (2)	
Socket 1115 tube (1)	
Socket 2V.1 tube (1)	
SOUKEL, SYM HUDE (1)	



PHILCO RADIO-CLOCK MODEL B804

SPECIFICATIONS

CABINET	Molded plastic
CIRCUIT Five-tube st	uperheterodyne (plus rectifier)
FREQUENCY RANGE	
Broadcast	540 kc. to 1620 kc.
Special Services	1700 kc. to 3400 kc.
AUDIO OUTPUT	l watt
OPERATING VOLTAGE	
POWER CONSUMPTION	
ANTENNA	Built-in, high-impedance loop
INTERMEDIATE FREQUEN	NCY 455 kc.
PHILCO TUBES 6B 6BJ6 i-f ampl.;	J6 r-f ampl.; 12BE6 converter; 6AQ6 detector. a.v.c., 1st audio; 35C5 output; 35W4 rectifier



MODEL B804



Figure 1. Drive-Cord Installation Details

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ALIGNMENT PROCEDURE

GENERAL

RADIO CONTROLS—Set volume control for maximum output and tuning control as given in the alignment chart. Set band switch to broadcast position for first 5 steps, and to special services position for steps 6 and 7.

OUTPUT INDICATOR — Connect output indicator (either on oscilloscope or a 1000-ohms-per-volt, a-c voltmeter) across voice-coil terminals. SIGNAL GENERATOR—Use an AM r-f generator, connected as indicated in the alignment chart.

OUTPUT LEVEL—During alignment, attenuate signal-generator output to maintain output indication below 1 volt.

DIAL POINTER—Before the alignment is started, the dial pointer should be set to coincide with the dial scale mark below "55" when the tuning gang is fully meshed.

	SIGNAL GENERATOR		F			
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUSI	
1	Ground lead to B—. Output lead through a .01- μ f, condenser to pin 7 (mixer grid) of 12BE6, converter.	455 kc.	Tuning gang fully open.	Adjust, in order given in next column, for maximum output.	TC5—2nd i-f sec. TC4—2nd i-f pri. TC3—1st i-f sec. TC2—1st i-f pri.	
2	Radiating loop. See Note 1 below.	1620 kc.	1620 kc. See Note 2 below.	Adjust for maximum output.	C1C—osc. trimmer	
3	Same as step 2.	1520 kc.	Tune radio to generator signal.	Adjust for maximum output. (High-frequency adjustment)	C1B—mixer-grid trimmer C1A—r-f trimmer	
4	Same as step 2.	580 kc.	Same as step 3.	Adjust for maximum output. (Low-frequency adjustment)	TC1-r-f transformer	
5	Repeat steps 3 and 4 until no further improvement is obtained.					
6	Same as step 2.	3200 kc.	Same as step 3.	Adjust for maximum output.	C5—special-services mixer-grid trimmer C2—special-services r-f trimmer	
7	Same as step 2.	1800 kc.	Same as step 3.	Adjust for maximum output.	C3—special-services r-f padder	

ALIGNMENT CHART

NOTE 1: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads and place near the radio loop antenna. The loop antenna must be connected to the radio.

NOTE 2: To set the tuning gang to 1620 kc., place a piece of 6-mil flat shim stock beneath the heel of the rotor, and turn the rotor until it holds the shim firmly in place. Then remove the shim.

REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

	Service Description Part No.	Reference Symbol	Servic Description Part N	lo.
Cl	Condenser, tuning gang, 3-section	R11	Volume control, 500,000 ohms	51
C1A	Condenser, trimmer, antennaPart of Cl	R12	Resistor, grid leak, 10 megohms	0°
C1B	Condenser, trimmer, r-fPart of Cl	R13	Resistor, plate load, 500,000 ohmsPart of PC	Cl
CIC	Condenser, trimmer, oscillatorPart of Cl	R14	Resistor, grid leak, 500,000 ohmsPart of PC	C1
2	Condenser, trimmer,	R15	Resistor, cathode bias, 150 ohms,	
	special services r-fPart of CAI		1 watt66-115434	0°
3	Condenser, padder, special services r-fPart of CAI	R16	Resistor, B+ filter, 1200 ohms	0°
4	Condenser, r-f by-pass, .01 µf	R17	Resistor, B+ filter, 220 ohms, 1 watt66-122434	0°
j	Condenser, trimmer,	R18	Resistor, tube saver, 100 ohms	-3
	special services mixer-gridPart of CA1	R19	Resistor, tone compensation, 2200 ohms66-22283	4 0
6	Condenser, a-v-c by-pass, .05 µf	S2	Switch, band, broadcast-special services42-1893	3-3
7	Condenser, fixed trimmer, 7.5 µµf	TI	Transformer, oscillator	8-2
8	Condenser, d-c blocking, 47 µµf	Τ2	Transformer, output)-3
9	Condenser, screen by-pass, .05 µf	W1	Line cordL-218	3°
10	Condenser, special, B- to chassis, .2 µf30-4644	ZI	Transformer, r-f	7A
11	Condenser, i-f coupling, 220 µµf62-122001001*	Z 2	Transformer, 1st i-t)A
12	Condenser, screen by-pass, .002 µf,	Z3	Transformer, 2nd i-f	0A
13	Condenser, audio coupling, .005 µf,		, ,	
14	Condenser, d-c blocking, .005 µf			
15	Condenser, tone compensation,		MISCELLANEOUS	
	.047 µf			
6	Condenser, electrolytic filter	Description	n Servic Part N	te Io.
16A	Condenser, filter, 30 uf., 150v			
16B	Condenser, filter, 30 uf., 150vPart of C16	Bezel, rad	io	39
C16C	Condenser, filter, 40 µf., 150 y	Ring, b	ezel	71
0100			100	
7	Condenser, line by-pass, .047 µt	Cabinet		65
17 '8	Condenser, line by-pass, .047 µt	Cabinet Back ar	nd loop assembly	65 98
17 18 141	Condenser, line by-pass, .047 μ f	Cabinet Back ar Cable asse	nd loop assembly	65 98 -4
17 18 A1	Condenser, line by-pass, $.047 \ \mu f$	Cabinet Back ar Cable asse Clamp, eli	nd loop assembly	65 98 -4 66
17 18 11	Condenser, line by-pass, $.047 \ \mu f.$	Cabinet Back ar Cable asse Clamp, ele Clock	ad loop assembly	65 98 -4 66
17 18 A1	Condenser, line by-pass, .047 μ f.	Cabinet Back ar Cable asse Clamp, ele Clock Cover a	nd loop assembly	65 98 -4 66 -1 95
17 18 A1	Condenser, line by-pass, .047 μ f.	Cabinet Back ar Cable asse Clamp, ele Clock Cover a Dial scale	Ind loop assembly	65 98 -4 66 -1 95 94
17 18 41	Condenser, line by-pass, .047 μ f	Cabinet Back ar Cable asse Clamp, ele Clock Cover a Dial scale	109 nd loop assembly	65 98 -4 66 -1 95 94 0°
17 18 41 1 2	Condenser, line by-pass, $.047 \ \mu f.$	Cabinet Back ar Cable asse Clamp, ele Clock Cover a Dial scale Drive core Spring	109 and loop assembly	65 98 -4 66 -1 95 94 0° 7°
C17 C18 CA1 L L L 2 J 3 CL	Condenser, line by-pass, $.047 \ \mu f.$	Cabinet Back ar Cable asse Clamp, ele Clock Cover a Dial scale Drive core Spring, Castet sr	109 nd loop assembly	65 98 -4 66 -1 95 94 0° 7° 71
17 18 A1 2 1 2 3 C1	Condenser, line by-pass, .047 μ f30-4650-45°Condenser, fixed padder, 944 $\mu\mu$ f30-1220-65Condenser assembly, trimmer.31-6477-17Lamp, pilot.34-2068Connector, clock cable, female.27-6275Connector, appliance.76-3331Coil, special services r-f.32-4561-5Coil, special services mixer-grid.32-4561-5Coil, oscillator shunt.32-4562-1Printed circuit.30-6001Competer, clock cable, male.30-6001	Cabinet Back ar Cable asse Clamp, ele Clock Cover a Dial scale Drive core Spring, Gasket, sp Grille	109 nd loop assembly 76-801 embly, clock 41-3909 ectrolytic condenser 56-14 41-2044 41-2044 nd bracket assembly, clock 76-801 and brackplate assembly 76-801 d, 25-ft. spool 45-8751 drive-cord 56-261 beaker 54-86	65 98 -4 66 -1 95 94 0° 7° 71 23
17 18 A1 1 2 3 CI LI	Condenser, line by-pass, .047 μ f	Cabinet Back ar Cable asse Clamp, ele Clock Cover a Dial scale Drive core Spring, Gasket, sp Grille Knob (2)	109 nd loop assembly 76-80 embly, clock 41-3909 ectrolytic condenser 56-14 41-2044 41-2044 nd bracket assembly, clock 76-80 and backplate assembly 76-80 d, 25-ft. spool 45-875 drive-cord 56-261 beaker 54-80 76-807 76-803	65 98 -4 66 -1 95 94 0° 7° 71 23
C17 C18 CA1 1 1 2 .1 .2 .3 'C1 'L1 1 1	Condenser, line by-pass, .047 μ f	Cabinet Back ar Cable asse Clamp, ele Clock Cover a Dial scale Drive core Spring, Gasket, sp Grille Knob (2)	109 nd loop assembly 76-803 embly, clock 41-3909 ectrolytic condenser 56-144 41-2044 41-2044 nd bracket assembly, clock 76-803 and backplate assembly 76-803 d, 25-ft. spool 45-8754 drive-cord 56-261 beaker 54-863 76-6373 76-6373 and switch 54-404	65 98 -4 66 -1 95 94 0° 7° 7° 71 23 -2 98
217 218 2A1 1 2 .1 .2 .3 (C1 L1 .1 2	Condenser, line by-pass, .047 μ f	Cabinet Back ar Cable asse Clamp, ele Clock Cover a Dial scale Drive core Spring, Gasket, sp Grille Knob (2) Knob, bar Pointer	109 nd loop assembly	65 98 -4 66 -1 95 94 0° 7° 71 23 -2 98
C17 C18 CA1 1 1 2 2 L1 2 2 L1 2 2 3 2 C1 2 L1 3 2 C1 2 L1 3 1 2 1 3 1 2 1 1 1 2 2 2 1 3 2 2 1 1 1 2 2 2 1 3 2 2 1 1 1 1	Condenser, line by-pass, .047 μ f	Cabinet Back ar Cable asse Clamp, ele Clock Cover a Dial scale Drive core Spring, Gasket, sp Grille Knob, bar Pointer Rubber m	109 nd loop assembly 76-80 embly, clock 41-3909 ectrolytic condenser 56-14 41-2044 41-2044 nd bracket assembly, clock 76-80 and backplate assembly 76-80 d, 25-ft. spool 45-875 drive-cord 56-261 beaker 54-86 76-6373 76-6373 nd switch 54-49 27-4891 27-4891 ount gang mounting 97-45	65 98 -4 66 -1 95 94 0° 7° 71 23 3-2 98 -2 98
C17 C18 CA1 1 1 2 .1 .2 .3 *C1 C1 L1 k1 k2 k3 k4	Condenser, line by-pass, .047 μ f	Cabinet Back ar Cable asse Clamp, ele Clock Cover a Dial scale Drive core Spring, Gasket, sp Grille Knob, bar Pointer Rubber m Shaft tur	109 nd loop assembly 76-80 embly, clock 41-3909 ectrolytic condenser 56-14 41-2044 41-2044 nd bracket assembly, clock 76-80 and backplate assembly 76-80 d, 25-ft. spool 45-875 drive-cord 56-261 beaker 54-86 76-6373 76-6373 nd switch 54-49 27-4891 0unt, gang mounting 27-45 56-080	65 98 -4 66 -1 95 94 0° 7° 7° 71 23 -2 98 -2 98 -2 96
C17 C18 CA1 L I 2 .1 .1 .2 .3 C1 L1 .1 .2 .3 C1 L1 .1 .2 .3 4 .5	Condenser, line by-pass, .047 μ f	Cabinet Back ar Cable asse Clamp, ele Clock Cover a Dial scale Drive core Spring, Gasket, sp Grille Knob (2) Knob, bar Pointer Rubber m Shaft, tun	109 nd loop assembly 76-80 embly, clock 41-3909 ectrolytic condenser 56-14 41-2044 41-2044 nd bracket assembly, clock 76-80 and backplate assembly 76-80 d, 25-ft. spool 45-875 drive-cord 56-261 beaker 54-80 76-6373 76-6373 nd switch 54-49 27-4891 27-459 ount, gang mounting 27-459 ing 56-9807 92.86 92.86	65 98 -4 66 -1 95 94 0° 7° 71 23 -2 98 -2 98 -2 96 -3 10
17 18 A1 1 2 3 C1 L1 1 2 3 4 5 5	Condenser, line by-pass, .047 μ f	Cabinet Back ar Cable asse Clamp, ele Clock Cover a Dial scale Drive core Spring, Gasket, sp Grille Knob (2) . Knob, bar Pointer Rubber m Shaft, tun Spring, Shield tu	Image: Constraint of the system of the sy	65 98 -4 66 95 95 95 94 0° 7° 71 23 -2 98 -2 98 -2 98 -3 10 8-3
17 18 A1 1 2 3 C1 L1 1 2 3 4 5 6 6 7	Condenser, line by-pass, .047 μ f	Cabinet Back ar Cable asse Clamp, ele Clock Cover a Dial scale Drive core Spring, Gasket, sp Grille Knob (2) . Knob, bar Pointer Rubber m Shaft, tun Spring, Shield, tu	Image: Constraint of the system of the sy	65 98 -4 66 -1 95 94 0° 7° 71 23 -2 98 -2 98 -2 96 7-3 10 A3
17 18 A1 1 2 3 C1 L1 1 2 3 4 5 5 7 8	Condenser, line by-pass, .047 μ f	Cabinet Back ar Cable asse Clamp, ele Clock Cover a Dial scale Drive core Spring, Gasket, sp Grille Knob, bar Pointer Rubber m Shaft, tun Spring, Shield, tu Socket ass	109 nd loop assembly 76-80 2000 76-80 2000 $11-3909$ 2000 $11-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $and backplate assembly, clock 76-803 and backplate assembly 76-803 d, 25-ft. spool 45-8750 drive-cord 56-261 beeaker 54-490 76-6373 76-6373 ad switch 27-4891 aount, gang mounting 27-6238 be (2) 56-5629F be (2) 27-6238 be (2) 27-6238 $	65 98 -4 66 -1 95 94 0° 7° 71 23 -2 98 -2 96 -3 10 A3 -6 14
17 18 A1 1 2 3 C1 L1 1 2 3 4 5 5 5 7 8 9	Condenser, line by-pass, .047 μ f	Cabinet Back ar Cable asse Clamp, ele Clock Cover a Dial scale Drive core Spring, Gasket, sp Grille Knob, bar Pointer Rubber m Shaft, tun Spring, Shield, tu Socket, tu	109 nd loop assembly 76-80 2000 76-80 2000 $1-3909$ 2000 $1-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $41-2044$ $and backplate assembly, clock 76-803 d, 25-ft. spool 45-8750 drive-cord 56-2617 54-600 76-6373 76-6373 76-6373 76-803 76-63749 27-4891 27-4891 0001t, gang mounting 27-623-98677 9000000000000000000000000000000000000$	65 98 -4 66 -1 95 94 0° 7° 71 23 -2 98 -2 98 -2 96 -3 10 A3 -6 14 65



Figure 2. Top View, Showing Tuning Adjustments



Figure 3. Base View, Showing Parts Placement

World Radio History



Figure 4. Philco Radio Model B804, Schematic Diagram

PR-2566

World Radio History

MODEL B804





PHILCO PORTABLE RADIO MODEL B650

SPECIFIC	CATIONS	
CABINET.	Plastic portable	
CIRCUIT	Four-tube superheterodyne	
AUDIO OUTPUT	75 milliwatts	
OPERATING VOLTAGE	1.5-volt "A" battery and 75-volt "B" battery.	
POWER CONSUMPTION	10 ma. from 75-volt "B" battery 260 ma. from 1.5-volt "A" battery	
ANTENNA	Magnecor high-impedance	
NTERMEDIATE FREQUENCY	455 kc.	
PHILCO TUBES	1R5 converter, 1U4 i-f amplifier, 1U5 detector-a.v.c. 1st audio, 3V4 output	
BATTERY TYPE	P144 "B" Lattery P77 "A" hattery	MODEL B650

ALIGNMENT PROCEDURE

GENERAL—Allow the set and the test equipment to warm up for fifteen minutes before starting the alignment procedure.

TUNING DIAL—Before proceeding with the alignment, set the index mark on the tuning dial to coincide with the index mark located on the chassis. See figure 1. The plates of the tuning condensers will be fully meshed.

OUTPUT INDICATOR—Connect the output indicator (a 1000-ohm-per-volt, a-c voltmeter, or an oscilloscope) across the voice-coil terminals. SIGNAL GENERATOR—Use an AM r-f signal generator. Connect the ground lead to the chassis, and connect the output lead as indicated in the alignment chart.

OUTPUT LEVEL — Attenuate the signal-generator output throughout the alignment so as to maintain the output level below .3 volt.

RADIO CONTROLS—Set the volume control to maximum. Set the tuning control as indicated in the alignment chart. Set the Battery Saver Switch to the HI position.

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World Radio History

	SIGNAL GENERATOR		RADIO		
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Connect signal generator through a .1-µf, condenser to pin 6 (con- verter grid) of 1R5.	455 kc.	Tuning gang fully open.	Adjust for maximum output in order given.	TC3—2nd i-f sec. TC2—1st i-f sec. TC1—1st i-f pri.
2	Use radiating loop. (See NOTE 1 below.)	1620 kc.	1620 kc. (See NOTE 2 helow.)	Adjust for maximum output.	C1B—osc. trimmer
3	Same as step 2.	1400 kc.	1400 kc. (See NOTE 2 below.)	Adjust for maximum output.	C1A—antenna trimmer
4	Same as step 2.	600 kc.	600 kc. (See NOTE 2 below.)	Adjust for maximum output. Rock tuning gang while mak- ing this adjustment.	L1—antenna adjusting winding
5	Repeat steps 2, 3, and 4 until no fur	rther improve	ment is obtained	1.	*

ALIGNMENT CHART

NOTE 1: Use a 6-to-8-turn, 6-inch-diameter loop made up of insulated wire. Connect to generator terminals, and place about one foot from radio loop.

NOTE 2: The tuning condenser can be set to the proper frequency by turning the tuning dial until the frequency setting indicated in the chart coincides with the index mark on the charsis. See figure 1.



Figure 1. View Showing Tuning Adjustments and Parts Placement



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MODEL B650

REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.
C 1	Condenser, tuning gang	
C1A	Condenser, trimmer, antenna	Part of Cl
C1B	Condenser, trimmer, oscillator	Part of CI
C2	Condenser, a-v-c by-pass, .03 µf.	30-4650-0
C3	Condenser, d-c blocking, 47 µµf63	2-047009011
C4	Condenser, screen by-pass, .005 µf	30-1238-1
C5	Condenser, grid by-pass, .005 µf	30-1238-1
C6	Condenser, neutralizing, 3.3 $\mu\mu$ f.	
C7	Condenser, audio circuit	
C7A	Condenser, audio coupling, .001 µf	Part of C7
C7B	Condenser, screen by-pass, .01 µf	Part of C7
C7C	Condenser, d-e blocking, .002 µf	Part of C7
C7D	Condenser, plate by-pass, 220 µµf	Part of C7
C8	Condenser, tone compensation, .004 µf	30-4650-56
C9	Condenser, electrolytic, filter, 10 µf	30-2417-32
C10	Condenser, plate by-pass, 8 µµf	30-1224-46
LAI	Coil, antenna	
LS1	Loudspeaker	
RI	Resistor, grid leak, 100,000 ohms	66-4108340
R2	Resistor, grid leak, 3.3 megohms	66-5338340
R3	Resistor, screen dropping, 15,000 ohms	66-3158340
R4	Resistor, a-v-c load, 3.3 megohms	66-5338340
R5	Resistor, volume control, 1 megohm	33-5566-50
R6	Resistor, grid leak, 10 megohms	66-6108340
R7	Resistor, screen dropping, 4.7 megohms	66-5478340
R8	Resistor, plate load, 1 megohm	66-5108340
R9	Resistor, grid leak, 3.3 megohms	66-5338340
R10	Resistor, bias, 3V4, 430 ohms	66-1438340
RII	Resistor, battery economizer, 150 ohms	66-1158340

Referenc Symbol	e Description	Service Part No.
S 1	Switch, on-off	Part of R5
S2	Switch, battery economizer	
T1	Transformer, oscillator	
Т2	Transformer, output	
ZI	Transformer, 1st i-f	
72	Transformer, 2nd i-f	

MISCELLANEOUS

	Service
Description	Part No.
Cabinet, cherry	11006-3
Back, cabinet, cherry	54-6077-3
Handle, cabinet, cherry	54-6078-3
Cabinet, sand	
Back, cabinet, sand	54-6077-1
Handle, cabinet, sand	54-6078-1
Cabinet, colonial green	
Back, cabinet, colonial green	54-6077-2
Handle, cabinet, colonial green	54-6078-2
Cable, battery	41-3988-3
Dial scale	
Handle, battery-saver switch	
Knob, volume	
Knob, tuning	54-6082-1
Socket, tube (2), 1U5, 3V4	
Socket, tube (2), 1R5, 1U4	


PHILCO PORTABLE RADIO MODEL B651

	SPECIFICATIONS	
	MODE	L B651
	CABINET	Molded plastic
	CIRCUIT	Four-tube superheterodyne (plus selenium rectifier)
1111 - 1911	FREQUENCY RANCE	540 kc1620 kc.
	A.C. or d.c.	15 ^g milliwatte
	Battery	75 milliwatts
	OPERATING VOLTAGE	117 volts ac or de
	Battery operation	2 D cells and 671/2-volt "B" battery
	POWER CONSUMPTION	15 moto
	A-C or d-c operation	10 ma, from 6716-volt "B" battery:
	Marine Structure	260 ma. from 2 D cells
	ANTENNA	Magnecor high-impedance loop with
La contractione de la contractio	INTERMEDIATE FREQUENCY	provision for external amenia 455 kc
	PHILCO TUBES	1R5. converter:
MODEL RASI		1U4, i-f amplifier:
MODEL BOST		3V4, output
	BATTERY TYPE	P67 "B" battery:
		2 D cells



Figure 1. Drive-Cord Stringing Arrangement

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Figure 2. Top View, Showing Tuning Adjustments

DIAL POINTER--With tuning-condenser plates fully meshed, set pointer to coincide with alignment index mark on bottom of chassis.

OUTPUT INDICATOR — Connect output indicator (oscilloscope or 1000-ohms-per-volt a-c voltmeter) across voice-coil terminals.

SIGNAL GENERATOR—Use AM r-f signal generator. Connect output leads as indicated in alignment chart.

RADIO CONTROLS—Set volume control to maximum. Set tuning control as indicated in chart.

OUTPUT LEVEL - During alignment, attenuate

signal-generator output to maintain output level below .5 volt.

NOTE: While the radio is being aligned, the batteries should be in the same position with respect to chassis and loop as they are when in the cabinet.



Showing Alignment Marks

	SIGNAL GENERATO	GENERATOR RADIO				
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST	
1	Output lead through a .1- μ f. con- denser to antenna section of tun- ing condenser or to pin 6 of con- verter (1R5). Ground lead to B	455 kc.	Tuning gang fully open.	Adjust, in order given for maxi- mum output.	TC4—2nd i-f sec. TC2—1st i-f pri. TC3—1st i-f sec.	
2	Radiating loop. See NOTE below.	1620 kc.	1620 kc.†	Adjust for maximum output.	C1Bosc. trimmer	
3	Same as step 2.	Between 1400 and 1500 kc.	Tune radio to generator signal.	Adjust for maximum output.	C1A—antenna trimmer	
1	Same as step 2.	580 kc.	580 kc.†	Adjust for maximum output. Rock tuning gang while making this adjustment.	TC1—osc. core	
5	Repeat steps 2, 3, and 4 until no					

ALIGNMENT CHART

NOTE: Use a 6-8 turn, 6-inch diameter loop made up of insulated wire. Connect to signal-generator leads, and place about 1 foot from radio loop antenna.

[†]The radio can be set to this frequency by tuning it until the dial pointer coincides with the proper alignment mark on the bottom of the chassis. See figure 3.



TP1-1164-1A



Figure 5. Base View, Showing Parts Placement

REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (°) are general replacement items. These numbers may not be identical with those on factory parts; also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation of the radio will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Service Description Part No.	Reference Symbol	Service Service Description Part No.
CI	Condenser, tuning gang, 2-section	C13	Condenser, electrolytic, 3-section
CIA	Condenser, trimmer, antennaPart of C1	C13A	Condenser, filter, 40 µf., 150vPart of C13
C1B	Condenser, trimmer, oscillatorPart of C1	C13B	Condenser, filter, 10 µf., 150vPart of C13
C2	Condenser, neutralizing, 1.5µµf	C13C	Condenser, filter, 50 µf., 150vPart of C13
C3	Condenser, a-v-c by-pass, .05 µf	C14	Condenser, line by-pass, .047 µf
C4	Condenser, B- to ground, .1 µf	CRI	Selenium rectifier, 75 ma. at 117 volts
C5	Condenser, d-c blocking, 47 µµf60-00475420	LAI	Loop antenna
C6	Condenser, dual ceramic	LS1	Speaker, 4-inch, p-m
C6A	Condenser, osc. B+ by-pass, .004 µfPart of C6	R1	Resistor, current limiting, 470 ohms66-1478340°
C6B	Condenser, grid by-pass, .004 µfPart of C6	R2	Resistor, grid return, 68,000 ohms
C7	Condenser, temperature compensation,	R3	Resistor, bias, 820 ohms
	7.5 μμf	R4	Resistor, leakage, 150,000 ohms
C8	Condenser, filament by-pass, .25 µf30-4656-1	R5	Resistor, oscillator dropping,
C9	Condenser, neutralizing, 3.3 $\mu\mu$ f		15,000 ohms 66-3158340 °
C10	Condenser, ceramic, 4-section	R6	Resistor, grid return, 3.3 megohms
C10A	Condenser, d-c blocking, .001 µfPart of C10	R7	Resistor, a-v-c filter, 2.2 megohms
C10B	Condenser, screen by-pass, .01 µfPart of C10	R8	Resistor, VOLUME control
C10C	Condenser, d-c blocking, .002 µfPart of C10		(with "off-on" switch), 1 megohm
C10D	Condenser, grid by-pass, 220 µµfPart of C10	R9	Resistor, grid return, 4.7 megohms
C11	Condenser, tone compensation, .004 µf. 30-4650-56°	R10	Resistor, screen dropping, 4.7 megohms66-5478340°
C12	Condenser, electrolytic.	R11	Resistor, plate load, 680,000 ohms
512	filament by-pass, 50 µf., 25v	R12	Resistor, grid return, 2.2 megohnus

REPLACEMENT PARTS LIST (Cont.)

Reference Symbol	Description	Service Part No.	Desc
R13	Resistor, bias, 2200 ohms	.66-2228340°	
R14	Resistor, filament dropping and filter, 2100 chms (center-tanned)	33-3445	C
R15	Resistor, filter, 820 ohms	.66-1828340°	C
R16	Resistor, current limiting, 120 ohms	33-1334-14	Ľ
R17	Resistor, bias, 1500 ohms	.66-2158340°	Ľ
R18	Resistor, bias, 330 ohms	.66-1338340*	F
S1	Switch, off-on	Part of R8	E
T1	Transformer, oscillator		E
T2	Transformer, output		I
W1	Line cord	L2183	I
WS	Wafer switch, voltage change-over		K
Z 1	Transformer, 1st i-f	32-4160-4A	N
Z2	Transformer, 2nd i-f	32-4454-1A	Р

MISCELLANEOUS

Description	Service Part No.
Cabinet, sand	10799-28
Back, cabinet, sand	
Cabinet, driftwood	
Back, cabinet, driftwood	
Cabinet, spruce green	

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ription	Service Part No.
Back, cabinet, spruce green	
Cable, battery	
Cover, sub-base	
Cover, switch	
Dial scale	
Drive cord (25-ft. spool)	
Fastener, baffle mtg. (4 required)	W2235-7FA9
Iandle	
linge, R.H.	
linge, L.H.	
nsulator, capacitor mtg.	
Knob (2 required)	
Vameplate	
Pointer	
Ring, shaft retaining	
Rubber mount, tuning capacitor (3 required	l)
crew, hinge (2 required)	W2537-15FA1
Speed nuts, nameplate mtg. (2 required)	1W56912FE7
Shaft, tuning	56-7906FA42
Shield, tube (1U5)	56- 3978-1FA3
ocket	
ocket	
Battery cradle and antenna ass'y	



PHILCO PORTABLE RADIO MODEL B652

	SPECIFICATIONS	
CABINET CIRCUIT AUDIO OUTPUT	Plastic portable Four-tube superheterodyne (plus selenium rectifier)	1:
A-C or d-c operation Battery operation OPERATING VOLTAGE	100 millivatts 85 millivatts 117 volts, a.e. or d.c. 1.5-volt "A" battery and 75-volt "B" battery	STR.
A-C or d-c operation	11 watts 10 ma. from 75-volt "B" battery (7 ma.: battery-saver operation) 260 ma. from 1.5-volt "A" battery	
ANTENNA INTERMEDIATE ERFOUENCY	Magnecor high-impedance loop with pro- vision for external antenna	
PHILCO TUBES	1R5 converter, 1U4 i-f amplifier, 1U5 detector-a.v.c. 1st audio, 3V4 output	A The second sec
BATTERY TYPE	P144 "B" battery P77 "A" battery	MODEL B652



Figure 1. Dial-Cord Stringing Arrangement

TP2-3225

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PHILCO PORTABLE RADIO MODEL B652



Figure 2. Top View, Showing Tuning Adjustments

GENERAL—Allow the set and the test equipment to warm up for fifteen minutes before starting the alignment procedure.

DIAL POINTER—Before proceeding with the alignment, the dial pointer should be set to coincide with the index mark to the extreme left of the dial backplate when the tuning-condenser plates are fully meshed. See figure 4.

OUTPUT INDICATOR — Connect the output indicator (a 1000-ohm-per-volt, a-c voltmeter, or an oscilloscope) across the voice-coil terminals.

SIGNAL GENERATOR-Use an AM r-f signal gen-

erator. Connect the ground lead to B-, and connect the output lead as indicated in the alignment chart.

OUTPUT LEVEL — Attenuate the signal-generator output throughout the alignment so as to maintain the output level below .5 volt.

RADIO CONTROLS—Set the volume control to maximum. Set the tuning control as indicated in the alignment chart. During alignment of the radio, the batteries should be in the same position with respect to the chassis and the loop antenna as they normally are in the cabinet. It is recommended that a-c power be used when aligning the radio.

	SIGNAL GENERATOR		RADIO		
STEP	CONNECTION TO RADIO	DIAL DIAL SPECIAL INSTRUCTION		SPECIAL INSTRUCTIONS	ADJUST
1	Connect signal generator through a .1-µf. condenser to pin 6 (con- verter grid) of 1R5.	455 kc.	Tuning gang fully open.	Adjust for maximum output in order given.	TC4—2nd i-f sec. TC2—1st i-f pri. TC3—1st i-f sec.
2	Use radiating loop. (See NOTE 1 below.)	1620 kc.	1620 kc. (See NOTE 2 below.)	Adjust for maximum output.	C1B—osc. trimmer
3	Same as step 2.	1400 kc.	1400 kc. (See NOTE 2 below.)	Adjust for maximum output.	ClA—antenna trimmer
4	Same as step 2.	600 kc.	600 kc. (See NOTE 2 below.)	Adjust for maximum output. Rock tuning gang while mak- ing this adjustment.	TC1—osc. core
5	Repeat steps 2, 3, and 4 until no f	urther improve	ement is obtained	•	· · · ·

ALIGNMENT CHART

NOTE 1. Use a 6-to-8-turn, 6-inch-diameter loop made up of insulated wire. Connect to generator terminals, and place about one foot from radio loop.

NOTE 2. The tuning condenser can be set to the proper frequency by turning it until the dial pointer coincides with the respective marks on the dial backplate. See figure 2.



Figure 3. Base View, Showing Parts Placement



Figure 4. Dial Backplate, Showing Alignment Marks

REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference	Service	Reference		Service
Symbol	Description Part No.	Symbol	Description	Part No.
Cl	Condenser tuning gang 31-2735-4	SI	Switch on-off	Part of R8
CIA	Condenser, trimmer, antenna	\$2	Switch, battery economizer	
CIB	Condenser, trimmer, oscillator	TI	Transformer, oscillator	
C2	Condenser, i-f neutralizing, 1.5 µµf,	T2	Transformer, output	
C3	Condenser, screen by-pass, .004 µf	WI	Line cord	L2183°
C4	Condenser, B- to chassis, 1 µf	WS1	Switch, wafer, battery to line	42-1925-1
C5	Condenser d-c blocking 47 uuf	71	Transformer, 1st i-f	
C6	Condenser, grid by-nass 004 µf. 30-1239°	72	Transformer, 2nd i-f	
C7	Condenser, temperature compensating, 7.5 µµf30-1224-83	23		
C8	Condenser, filament by-pass, .25 µf		MISCELLANEOUS	
C9	Condenser, neutralizing 3.3 µµf			Convice
C10	Condenser, audio circuit			Jervice Bent No.
C10A	Condenser, audio coupling .001 µfPart of C10	Descriptio	n	Parr No.
C10B	Condenser, screen by-pass, .01 µfPart of C10	Cabinet,	pine grcon	
C10C	Condenser, d-c blocking, .002 µfPart of C10	Back, 1	pine green	54-6010-5
C10D	Condenser, grid by-pass, 220 µµfPart of C10	Handle	, pine green	54-6012-5
C11	Condenser, tone compensation, .004 µf. 30-4650-56°	Jack, c	over	
C12	Condenser, electrolytic, filament by-pass,	Knob ((2)	
	50 μf 30-2417-12	Cabinet,	cherry	
C13	Condenser, electrolytic, filter	Back, o	cherry	54-6010-6
C13A	Condenser, filter, 40 µfPart of C13	Handle	, cherry	
C13B	Condenser, filter, 10 µfPart of C13	Jack, c	over	54-4967-10
C13C	Condenser, filter, 50 µfPart of C13	Knob ((2)	
C14	Condenser, line by-pass, .047 µf	Cabinet,	spruce green	
C15	Condenser, a-v-c by-pass, .05 µf	Back, s	spruce green	
CR1	Rectifier, selenium	Handle	, spruce green	
J1	Private listening unit	Jack, c	over	
LAI	Coil, antenna	Knob ((2)	54-6016-3
LSI	Loudspeaker	Cabinet,	pearl grey	
R1	Resistor, filament dropping, 820 ohms66-1828340°	Back, 1	pearl grey	
R2	Resistor, grid leak, 68,000 ohms66-3688340°	Handle	, pearl grey	
R3	Resistor, cathode bias, 470 ohms	Jack, co	over	
R4	Resistor, B- to chassis, 150,000 ohms66-4158340°	Knob ((2)	54-6016-9
R5	Resistor, screen dropping, 15,000 ohms 66-3158340°	Cable, ba	attery	
R6	Resistor, grid leak, 3.3 megohms	Clip, cabi	net back (2)	
R7	Resistor, a-v-c load, 2.2 megohms	Dial scale	D	
R8	Volume control, 1 megohm	Backpla	ate assembly, dial	
R9	Resistor, grid leak, 4.7 megohms66-5478340°	Window	v, dial	
R10	Resistor, screen dropping,	Drive cor	d, 25-ft. spool	
	4.7 megohms	Spring,	gang drive	
R11	Resistor, plate load, 680,000 ohms66-4688340°	Spring,	pointer drive	
KIZ DIO	Resistor, grid leak, 2.2 megohms	Fastener,	speaker baffle (2)	W2235-7FA9
K13	Resistor, filament dropping, 2200 ohms 66-2228340°	Hinge, ca	binet (2)	
R14	Resistor, limiting, 2100 ohms	Insulator,	tuning-condenser mtg	
	Resistor, b+ niter, 520 ohms	Pointer a	ssembly	
R10	Resistor, limiting, 120 onms	Ring, han	dle mtg. (2)	
K17	L500 ohms 66-9159240°	Rubber n	nount, tuning-condenser mtg. (3)	
R18	Resistor battery economizer	Shaft, tur	ning	56-7906FA42
1110	150 ohms	Shield, tu	ibe base	
R19	Resistor, battery economizer.	Socket, ti	ıbe (2)	
	430 ohms	Socket, tu	lbe (2)	
R20	Resistor, private listening unit,	Spring, h	airpin, shaft mtg	
	10 ohms66-0108340°	Spring, r	etaining	

MODEL B652

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Figure 5. Philco Portable Radio Model B652, Schematic Diagram



TP2-3166-1



PHILCO RADIO-CLOCK MODEL B710

SPECIFICATIONS

CABINET Molded phenoli
CIRCUIT Four-tube superheterodyne (plus rectifier
FREQUENCY RANGE
AUDIO OUTPUT
OPERATING VOLTAGE
POWER CONSUMPTION
ANTENNA High-impedance loo
INTERMEDIATE FREQUENCY
PHILCO TUBES 12BE6, converter: 12BA6, i-f amplifier
12AV6, det.—a.v.c.—1st audio; 35C
output; 35W4, rectifier

NOTE: The antenna is mounted on the cabinet back. When removing the cabinet back, use care to avoid breaking the antenna leads.



MODEL B710



Figure 1. Base View, Showing Parts Placement

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RADIO CONTROLS-Set volume control to maximum. Set tuning control as indicated in chart.

OUTPUT METER—Connect across voice-coil terminals. SIGNAL GENERATOR—Connect generator and set frequency as indicated in chart. Use modulated output.

OUTPUT LEVEL—During alignment, adjust signalgenerator output to hold output-meter reading below 1.25 volts.

ALIGNMENT CHART

	SIGNAL GENERATOR		RADIO			
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST	
1	Ground lead to B-; output lead through a .1- μ f. condenser to grid (pin 7) of 12BE6.	455 kc.	Tuning gang fully open.	Adjust tuning cores, in order given, for maximum output. (TCl and TC3 are located at top of transformers.)	TC4—2nd i-f sec. TC3—2nd i-f pri. TC-2—1st i-f sec. TC1—1st i-f pri.	
2	Radiating loop (see note below).	1620 kc.	1620 ke.*	Adjust trimmer for maximum output.	C1B—osc.	
3	Same as step 2.	1500 kc.	1500 kc.†	Adjust trimmer for maximum output.	C1A—antenna	

NOTE: make a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads, and place about 1 foot from radio loop. The position of the radio loop with respect to the chassis should be approximately the same as when both are mounted in the cabinet.

* To set the tuning gang to 1620 kc., fully open the gang and insert a .006-inch, nonmetallic shim between the heel of the rotor and the top of the stator plates. Close the gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.

† To set the radio to 1500 kc., place chassis in cabinet, attach knob to indicate previous setting of 1620 kc., and tune until pointer indicates 1500 kc. Then remove knob and take chassis from cabinet without disturbing gang setting.



Figure 2. Top View, Showing Tuning Adjustments

TP3 830



World Radio History

Figure ω Philco Radio-Clock Model B710, Schematic Diagram

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MODEL B710

REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.
Cl	Condenser, tuning gang	2751-13
CIA	Condenser, r-f trimmerPa	rt of Cl
C1B	Condenser, oscillator trimmerPa	rt of Cl
C2	Condenser, B- to chassis, .2 µf	4650-49
C3	Condenser, oscillator grid, 47 µµf	-1230-4
C4	Condenser, a-v-c by-pass, .05 µf	650-45°
C5	Condenser, drift compensation, 7.5 $\mu\mu f$. 30-	1224-83
C6	Condenser, screen by-pass, .05 µf	650-45°
C7	Condenser, i-f tuningPa	rt of Z1
C8	Condenser, i-f tuningPa	rt of Z1
C9	Condenser, i-f tuningPa	rt of Z2
C10	Condenser, i-f tuningPa	rt of Z2
C11	Condenser, detector filteringPa	rt of Z2
C12	Condenser, detector filteringPa	art of Z2
C13	Condenser, audio coupling, .005 µf30	-1238-1
C14	Condenser, plate by-passPar	t of PC1
C15	Condenser, audio coupling, .005 µfPar	t of PC1
C16	Condenser, compensatingPar	t of PC1
C17	Condenser, tone compensation, .022 μ f. 30-4	650-43°
C18	Condenser, electrolytic, 3-section	45-3037
C18A	Condenser, filter, 30 µf., 150vPar	t of C18
C18B	Condenser, filter, 25 µf., 150vPar	t of C18
C18C	Condenser, filter, 20 µf., 150vPar	t of C18
C19	Condenser, line by-pass, .05 µf	650-45°
J1	Jack clock	27-6273
LAI	LoopPart of cabin	net back
LS1	Speaker ass'y., p-m	1627-23
PC1	Printed circuit	30-6001
PL1	Plug, clock assembly54	-4878-2
R1	Resistor, oscillator grid, 22,000 ohms66-3	228340°
R2	Resistor, i-f screen dropping, 4700 ohms 66-2	478340°

Reference Symbol	Service Service Description Part No.
R3	Resistor, a-v-c filter, 2.2 megohms
R4	Resistor, volume control, .5 megohm
R5	Resistor, diode load, 47,000 ohms
R6	Resistor, grid return, 10 megohms
R7	Resistor, plate load, 500,000 ohmsPart of PC1
R8	Resistor, grid return, 500,000 ohmsPart of PC1
R9	Resistor, cathode bias, 150 ohms
R10	Resistor, B plus filter, 220 ohms, 1 watt
R11	Resistor, B plus filter, 1000 ohms66-2108340°
R12	Resistor, tube saver, 100 ohms
TI	Transformer, oscillator
T2	Transformer, outputPart of LS1
W1	Line cord
Z 1	Transformer, 1st i-f
Z2	Transformer, 2nd i-f

MISCELLANEOUS

Description	Service Part No.
Cabinet	10924-11
Knobs	
Clock (3 required)	54-4983-6
Station selector	54-4978-5
Off-on	54-4815-8
Clock	41-2041-4
Back-and-loop assembly	76-7757-3
Shield, tube	56-5629FA3
Socket, miniature (4 required)	
Socket, miniature (12AV6)	27-6203-14
Window, radio dial	54-4977-5



PHILCO RADIO-CLOCK MODEL B711, Code 121

SPECIFICATIONS

CABINET	Molded phenolic
CIRCUIT	Four-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	
AUDIO OUTPUT	
OPERATING VOLTAGE	117 volts, a.c
POWER CONSUMPTION	
ANTENNA	
INTERMEDIATE FREQUENCY	455 kc
PHILCO TUBES	12BE6, converter; 12BA6, i-f amplifier; 12AV6, det.—a.v.c.—1st audio; 35C5, output; 35W4, rectifier

NOTE: The antenna is mounted on the cabinet back. When removing the cabinet back, use care to avoid breaking the antenna leads.



MODEL B711



Figure 1. Base View, Showing Parts Placement

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PR-2540

RADIO CONTROLS—Set volume control to maximum. Set tuning control as indicated in chart.

OUTPUT METER—Connect across voice-coil terminals.

SIGNAL GENERATOR-Connect generator and set

frequency as indicated in chart. Use modulated output.

OUTPUT LEVEL—During alignment, adjust signalgenerator output to hold output-meter reading below 1.25 volts.

ALIGNMENT CHART

	SIGNAL GENERATOR		RADIO		
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	DIAL SPECIAL INSTRUCTIONS	
1	Ground lead to B—; output lead through a .1- μ f. condenser to grid (pin 7) of 12BE6.	455 ke.	Tuning gang fully open.	Adjust tuning cores, in order given, for maximum output. (TC1 and TC3 are located at top of transformers.)	TC4—2nd i-f sec. TC3—2nd i-f pri. TC2—1st i-f sec. TC1—1st i-f pri.
2	Radiating loop (see note below).	1620 kc.	1620 kc.*	Adjust trimmer for maximum output.	C1B-osc.
3	Same as step 2.	1500 kc.	1500 kc.†	Adjust trimmer for maximum output.	C1A—antenna

NOTE: Make a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads, and place about 1 foot from radio loop. The position of the radio loop with respect to the chassis should be approximately the same as when both are mounted in the cabinet.

* To set the tuning gang to 1620 kc., fully open the gang and insert a .006-inch, nonmetallic shim between the heel of the rotor and the top of the stator plates. Close the gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.

[†]To set the radio to 1500 kc., place chassis in cabinet, attach knob to indicate previous setting of 1620 kc., and tune until pointer indicates 1500 kc. Then remove knob and take chassis from cabinet without disturbing gang setting.



Figure 2. Top View, Showing Tuning Adjustments



MODEL

B711,

CODE

121

ω. Philco Radio-Clock Model B711, Code 121, Schematic Diagram

Figure

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REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Service Description Part No	;
Cl	Condenser, tuning gang	3
C14	Condenser, r-f trimmerPart of C	1
C1B	Condenser, oscillator trimmerPart of C	1
C2	Condenser, B- to chassis, .2 µf	9
C3	Condenser, oscillator grid, 47 µµf	4
C4	Condenser, a-v-c by-pass, .05 µf	je.
C5	Condenser, drift compensation, 7.5 µµf. 30-1224-8	3
C6	Condenser, screen by-pass, .05 µf	•
C7	Condenser, i-f tuningPart of Z	1
C8	Condenser, i-f tuningPart of Z	1
C9	Condenser, i-f tuningPart of Z	2
C10	Condenser i-f tuningPart of Z	2
C11	Condenser, detector filteringPart of Z	2
C12	Condenser, detector filteringPart of Z	2
C13	Condenser, audio coupling, .005 µf30-1238-	1
C14	Condenser, plate by-passPart of PC	1.
C15	Condenser, audio coupling, .005 µfPart of PC	1
C16	Condenser, compensatingPart of PC	1
C17	Condenser, tone compensation, .022 µf. 30-4650-43	•
C18	Condenser, electrolytic, 3-section	17
C18A	Condenser, filter, 30 µf., 150vPart of C1	8
C18B	Condenser, filter, 25 µf., 150vPart of Cl	8
C18C	Condenser, filter, 20 µf., 150vPart of CI	8
C19	Condenser, line by-pass, .047 µf	j e
J1	Jack, clock	' 3
LAI	LoopPart of cabinet bac	:k
LSI	Speaker ass'y., p-m	23
PC1	Printed circuit)1
PL1	Plug, clock assembly54-4878	-2
RI	Resistor, oscillator grid, 22,000 ohms 66-3228340)•
R2	Resistor, i-f screen dropping,	
	4700 ohms)°

Reference Symbol	Service Service Part No.
R3	Resistor, a-v-c filter, 2.2 megohms66-5228340°
R4	Resistor, volume control, .5 megohm
R5	Resistor, diode load, 47,000 ohms
R6	Resistor, grid return, 10 megohms
R7	Resistor, plate load, 500,000 ohmsPart of PC1
R8	Resistor, grid return, 500,000 ohmsPart of PC1
R9	Resistor, cathode bias, 150 ohms
R10	Resistor, B plus filter, 220 ohms,
	l watt66-1224340°
R11	Resistor, B plus filter, 1000 ohms
R12	Resistor, tube saver, 100 ohms
Tl	Transformer, oscillator
T2	Transformer, outputPart of LS1
W1	Line cord
Z 1	Transformer, 1st i-f
Z2	Transformer, 2nd i-f

MISCELLANEOUS

Description	Service Part No.
Cabinet	
Knobs	
Clock (4 required)	54-4983-6
Station selector	54-4978-5
Off-on	
Clock	41-2041-6
Back-and-loop assembly	
Shield, tube	.56-5629FA3
Socket, miniature (4 required)	
Socket, miniature, 12BE6	27-6203-14
Window, radio dial	



PHILCO HOME RADIO MODEL B578





MODEL B578

CABINET	
CIRCUIT	Four-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	
Standard Broadcast	540 ke, to 1620 ke.
Special Services	1700 kc. to 3400 kc.
AUDIO OUTPUT	
OPERATING VOLTAGE	
POWER CONSUMPTION	
ANTENNA	
INTERMEDIATE FREQUENCY .	
PHILCO TUBES	12BE6, converter; 12BA6, i-f amplifier;
12AV6, det.—a.v.	clst audio; 35C5, output; 35W4, rectifier
Note: The antenna is mounted on the back, use care to avoid brea	be cabinet back. When removing the cabinet sking the autenna leads.



Figure 1. **Dial-Cord Installation Details**

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PR-2550



Figure 2. Top View, Showing Tuning Adjustments

RADIO CONTROLS — Set volume control to maximum. Set tuning control and band switch, SW1, as indicated in chart.

OUTPUT METER — Connect across voice-coil terminals. SIGNAL GENERATOR—Connect generator and set frequency as indicated in chart. Use modulated output.

OUTPUT LEVEL—During alignment, adjust signalgenerator output to hold output-meter reading below 1.25 volts.

	SIGNAL GENERATOR		RADIO			
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND- SWITCH SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Ground lead to B; output lead through a .1-µf. condenser to grid (pin 7) of 12BE6.	455 kc.	Tuning gang fully open.	Broadcast	Adjust tuning cores, in order given, for maximum output. (TC1 and TC3 are located at top of transformers.)	TC4-2nd if sec. TC3-2nd if pri. TC2-1st if sec. TC1-1st if pri.
2	Use radiating loop (see NOTE below).	1620 kc.	*1620 kc.	Broadcast	Adjust trimmer for maximum output.	C1B—osc.
3	Same as step 2.	1500 kc.	†1500 kc.	Broadcast	Adjust trimmer for maximum output.	C1A—antenna (broadcast)
4	Same as step 2.	3200 kc.	†3200 kc.	Special services	Adjust trimmer for maximum output.	C21—antenna (special services)

ALIGNMENT CHART

NOTE: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads and place about 1 foot from radio loop. The position of the radio loop with respect to the chassis should be approximately the same as when both are mounted in the cabinet.

* To set the tuning gang to 1620 kc., fully open the gang and insert a .006-inch nonmetallic shim between the heel of the rotor and the top of the stator plates. Close the gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.

[†]To set the tuning gang to this frequency, put the chassis into the cabinet, tune the dial until it indicates the proper frequency on the dial scale, and then remove the chassis from the cabinet without disturbing the gang setting.



Figure 3. Philco Radio Model B578, Schematic Diagram

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World Radio History

MODEL

B578



Figure 4. Base View, Showing Parts Placement

TP2-1406

REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reterence		Service
Symbol	Description	Part No.
Cl	Condenser, tuning gang	
C1A	Condenser, antenna trimmer	Part of C1
CIB	Condenser, osc. trimmer	Part of C1
C2	Condenser, antenna series tracker,	
	944 $\mu\mu$ f.	
C3	Condenser, oscillator grid, 47 µf	
C4	Condenser, a-v-c by-pass, .05 µf	30-4650-45°
C5	Condenser, drift compensation, 7.5 µ	ιμf. 30-1 224 -83
C6	Condenser, screen by-pass, .05 µf	30-4650-45°
C7	Condenser, i-f tuning	Part of Z1
C8	Condenser, i-f tuning	Part of Z1
C9	Condenser, i-f tuning	Part of Z2
C10	Condenser, i-f tuning	Part of Z2
C11	Condenser, detector filtering	Part of Z2
C12	Condenser, detector filtering	Part of Z2
C13	Condenser, audio coupling, .005 μ f.	
C14	Condenser, plate by-pass	Part of PC1
C15	Condenser, audio coupling, .005 µf.	Part of PC1
C16	Condenser, compensating	Part of PC1
C17	Condenser, tone compensation, .022 µ	ef. 30-4650-43°
C18	Condenser, electrolytic, 3-section	
C18A	Condenser, filter, 30 µf., 150v	Part of C18
C18B	Condenser, filter, 25 µf., 150v	Part of C18
C18C	Condenser, filter, 20 µf., 150v	Part of C18
C19	Condenser, line by-pass, .05 µf.	30-4650-45°
C20	Condenser, B- to chassis, .1 µf.	
C 2 1	Condenser, trimmer, special services	31-6473-29
1	Lamp, pilot	
LAI	Loop, antennaPart	of cabinet back
LI	Coil, antenna, special services	32-4561-3
L2	Coil, oscillator shunt	32-4562-2
LSI	Speaker, p-m	36-1625-3
PCI	Printed circuit	
R1	Resistor, oscillator grid, 22,000 ohms	66-3228340*
R2	Resistor, i-f screen dropping.	
	4700 ohms	66-2478340°

Reference Symbol	Description	Service Part No.
R3	Resistor, a-v-c filter, 2.2 megohms66-	522834 0°
R4	Resistor, volume control	8-5566-41
R5	Resistor, diode load, 47,000 ohms	3478340°
R6	Resistor, grid return, 10 megohms66-	6108340°
R7	Resistor, plate load, 500,000 ohmsPa	rt of PC1
R8	Resistor, grid return, 500,000 ohmsPa	rt of PC1
R9	Resistor, cathode bias, 150 ohms	1158340*
R10	Resistor, B plus filter, 220 ohms	1224340°
R11	Resistor, B plus filter, 1000 ohms	2108340°
R12	Resistor, tube saver, 100 ohms	3-1343-3
S1	Switch, off-on	Part of R4
SW1	Switch, broadcast-special services4	2-1796-2
TI	Transformer, oscillator	2-4453-6
T2	Transformer, output	32-8384
W1	Line cord	.L-2183°
ZI	Transformer, 1st i-f	32-4161A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Cabinet	
Spruce green	
Mahogany	
Back-and-loop assembly	
Knob (2)	
Drive cord, 25-foot spool	
Pointer, dial	
Shaft, tuning	
Socket assembly, pilot lamp	
Socket, 7-pin miniature (4 used)	
Socket (12AV6) (1)	
Spring, retaining	
Spring, dial cord	

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PHILCO RADIO MODEL B962

SPECIFICATIONS

Cabinet	Phenolic, mahogany or sand
Circuit	
Frequency Range Broadcast Special Services	540—1620 kc. 1700—3400 kc.
Audio Output	1 watt
Operating Voltage	105-120 volts, a.c. or d.c.
Power Consumption	30 watts
Antenna	Built-in, high-impedance loop
Intermediate Frequency	
Philco Tubes 61 6AQ6 de	BJ6 r-f ampl.; 12BE6 converter; 6BJ6 i-f ampl.; et., a.v.c., 1st audio; 35C5 output; 35W4 rectifier



MODEL B962



Figure 1. Drive-Cord Installation Details

PR 2553

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GENERAL

RADIO CONTROLS—Set volume control for maximum output and tuning control as given in the alignment chart. Set band switch to broadcast position for first 5 steps, and to special services position for steps 6 and 7.

OUTPUT INDICATOR—Connect output indicator (either on oscilloscope or a 1000-ohms-per-volt, a-c voltmeter) across voice-coil terminals. SIGNAL GENERATOR—Use an AM r-f generator, connected as indicated in the alignment chart.

OUTPUT LEVEL—During alignment, attenuate signal-generator output to maintain output indication below 1 volt.

DIAL POINTER—Before the alignment is started, the dial pointer should be set to coincide with the dial scale mark below the number "55" when the tuning gang is fully meshed.

	SIGNAL GENERAT	OR	1		
STEP	CONNECTION TO RADIO	CONNECTION DIAL TO RADIO SETTING		SPECIAL INSTRUCTIONS	ADJUST
1	Ground lead to B—. Output lead through a .01- μ f. condenser to pin 7 (mixer grid) of 12BE6, converter.	455 kc.	Tuning gang fully open.	Adjust, in order given in next column, for maximum output.	TC5—2nd i-f sec. TC4—2nd i-f pri. TC3—1st i-f sec. TC2—1st i-f pri.
2	Radiating loop. See note 1 below.	1620 kc.	1620 kc. See note 2 below.	Adjust for maximum output.	C1C—osc. trimmer
3	Same as step 2.	1520 kc.	Tune radio to generator signal.	Adjust for maximum output. (High-frequency adjustment)	C1B—mixer-grid trimmer C1A—r-f trimmer
4	Same as step 2.	580 kc.	Same as step 3.	Adjust for maximum output. (Low-frequency adjustment)	TC1—r·f transformer
5	Repeat steps 3 and 4 until	no further in	nprovement is obtained.		
6	Same as step 2.	3200 kc.	Same as step 3.	Adjust for maximum output.	C5—special-services mixed-grid trimmer C2—special-services r-f trimmer
7	Same as step 2.	1800 kc.	Same as step 3.	Adjust for maximum output.	C3—special-services r-f padder

ALIGNMENT CHART

NOTE 1: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads and place near radio loop antenna. The loop antenna must be connected to the radio.

NOTE 2: To set the tuning gang to 1620 kc., place a piece of 6-mil flat shim stock beneath the heel of the rotor, and turn the rotor until it holds the shim firmly in place. Then remove the shim.



Figure 2. Top View, Showing Tuning Adjustments



Figure 3. Base View, Showing Parts Placement

REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Referen Part No. Symbo	ce I Description	Service Part No.
C1	Condenser, tuning gang, 3 section	R12	Resistor, grid leak, 10 megohms	
	Model 53-950		Resistor, plate load, 500,000 ohms	
	Models 53-952, 53-954	31-2771-1 K14	Resistor, grid leak, 500,000 ohms	Part of PC
CIA	Condenser, trimmer, antenna	Part of C1 R15	Resistor, cathode bias,	
C1B	Condenser, trimmer, r-f	Part of C1	150 ohms, 1 watt	
C1C	Condenser, trimmer, oscillator	Part of Cl R16	Resistor, B+ filter, 1200 ohms	
C2	Condenser, trimmer, special services r-f Pa	rt of CA1 R17	Resistor, B + filter, 220 ohms, 1 v	watt 66-1224340°
C3	Condenser, padder, special services r-f Pa	rt of CA1 R18	Resistor, tube saver, 100 ohms	
C4	Condenser, r-f by-pass, .01 µf	4650-41° \$1	Switch off-on	Part of R11
C5	Condenser, trimmer, special	S2	Switch, broadcast-special services	
	services mixer-gridPa	rt of CA1	Model 53-950	
C 6	Condenser, a-v-c by-pass, .05 µf	4650-45°	Model 53-952	
C7	Condenser, fixed trimmer, 7.5 $\mu\mu$ ł	0-1224-65	Model 53-954	
C8	Condenser, d-c blocking, 47 µµf60-	00475420 T1	Transformer, oscillator	
C9	Condenser, screen by-pass, .05 µf30	-4650-45° T2	Transformer, output	
C10	Condenser, special, B- to chassis, .2 μ f	30-4644 W1	Line cord	L-2183°
C11	Condenser, i-f coupling, 220 µµf62-12	2001001° Z1	Transformer, r-f	
C12	Condenser, screen by-pass, .002 µf	0-1238-8° Z2	Transformer, 1st i-f	
C13	Condenser, audio coupling, .005 µf)-1238-1° Z3	Transformer, 2nd i-f	
C14	Condenser, d-c blocking, .005 µfPi	art of PC1		
C15	Condenser, tone compensation, .022 μ f. 30-	-4650-43°	MISCELLANEOUS	
C16	Condenser, electrolytic filter	0-2575-27	MISCELEANEOUS	
C16A	Condenser, filter, 30 μ f., 150vP	art of C16		Sarvica
C16B	Condenser, filter, 30 μ f., 150vPa	art of C16 Descript	lion	Part No.
C16C	Condenser, filter, 40 µf., 150vP	art of C16		
C17	Condenser, line by-pass, .047 µf	-4650-45° Drive o	ord, 25-ft. spool	
C 18	Condenser, fixed padder, 865 µf	0-1220-68 Sprin	g, drive cord	
CA1	Condenser assembly, trimmer	I-6477-17 Rubber	mount, gang mtg. (3)	
11	Lamp, pilot	34-2068 Shield,	tube (2)	56-5629FA3
LI	Coil, special services r-f	32-4561-4 Socket	assembly, pilot lamp	27-6233-6
L2	Coil, special services mixer-grid	32-4561-4 Socket	tube (2)	97.6902.14
L3	Coil, oscillator shunt	32-4562-1 Socket,	tube (4)	07.0005
PCI	Printed circuit	30- 6001 SUCKEL,	tube (4)	27-0203
RI	Resistor, screen dropping, 10,000 ohms 66-	3108340° Speed	nut (4)	IW56920FE7
R2	Resistor, a-v-c load, 4.7 megohms	5478340° Cabinet	, mahogany	
R3	Resistor, a-v-c load, 2.2 megohms	5228340° Cabinet	, sand	
R4	Resistor, B- to chassis, 150,000 ohms66-	4158340° Cabir	net back and loop assembly	
R5	Resistor, grid leak, 22,000 ohms	3228340° Scale, 1	mahogany	
K6	Resistor, grid leak, 2.2 megohms66-	5228340° Scale,	ivory	
K7	Resistor, a-v-c load, 2.2 megohms	5228340° Knob (2)	54-4718-40
KS	Resistor, cathode bias, 180 ohms	1188340° Knoh h	and switch	54.4998
K9	Resistor, screen dropping, 2200 ohms 66-	2228340° Pointer		E0 000
K10	Resistor, i-t filter, 47,000 ohms	3478340° Fonter		
ĸII	Volume control, 500,000 ohms	Shall,	tuning	
	Models 53-950, 53-954	3-5566-43 Sprin	g, retaining	
	Model 53-952	3-5566-46 Speaker		





Figure 4. Philco Radio Model B962, Schematic Diagram

PR-2553

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PHILCO RADIO MODEL B964

SPECIFICATIONS

CABINET	Phenolic, brown
CIRCUIT Five-t	ube superheterodyne (plus rectifier)
FREQUENCY RANGE Broadcast	540—1620 kc.
Special Services AUDIO OUTPUT	1709—3400 kc. l watt
OPERATING VOLTAGE	
POWER CONSUMPTION	
ANTENNA	Built-in, high-impedance loop
INTERMEDIATE FREQUENCY	455 kc.
PHILCO TUBES 6BJ	5 r-f ampl.; 12BE6 converter; 6BJ6 i-f ampl.; 6AQ6 det., a.v.c., 1st audio; 35C5 output; 35W4 rectifier



MODEL B964



Figure 1. **Drive-Cord Installation Details**

TP3-877

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GENERAL

RADIO CONTROLS—Set volume control for maximum output and tuning control as given in the alignment chart. Set band switch to broadcast position for first 5 steps, and to special services position for steps 6 and 7.

OUTPUT INDICATOR—Connect output indicator (either on oscilloscope or a 1000-ohms-per-volt, a-c voltmeter) across voice-coil terminals. SIGNAL GENERATOR—Use an AM r-f generator, connected as indicated in the alignment chart.

OUTPUT LEVEL—During alignment, attenuate signal-generator output to maintain output indication below 1 volt.

DIAL POINTER—Before the alignment is started, the dial pointer should be set to coincide with the dial scale mark to the left of "55" when the tuning gang is fully meshed.

	SIGNAL GENERATOR		F		
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUSI
1	Ground lead to B— Output lead through a .01-µf. condenser to pin 7 (mixer grid) of 12BE6, converter.	455 kc.	Tuning gang fully open.	Adjust in order given in next column, for maximum output.	TC5—2nd i-f sec. TC4—2nd i-f pri. TC3—1st i-f sec. TC2—1st i-f pri.
2	Radiating loop. See note 1 below.	1620 kc.	1620 kc. See note 2 below.	Adjust for maximum output.	C1C—osc. trimmer
3	Same as step 2.	1520 kc.	Tune radio to generator signal.	Adjust for maximum output. (High-frequency adjustment)	C1B—mixer-grid trimmer C1A—r-f trimmer
4	Same as step 2.	580 kc.	Same as step 3.	Adjust for maximum output. (Low-frequency adjustment)	TC1r-f transformer
5	Repeat steps 3 and 4 until no fu	urther impro	vement is obtained.		
6	Same as step 2.	3200 kc.	Same as step 3.	Adjust for maximum output.	C5—special-services mixer-grid trimmer C2—special-services r-f trimmer
7	Same as step 2.	1800 kc.	Same as step 3.	Adjust for maximum output.	C3—special-services r-f padder

ALIGNMENT CHART

NOTE 1: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads and place near radio loop antenna. The loop antenna must be connected to the radio.

NOTE 2: To set the tuning gang to 1620 kc., place a piece of 6-mil flat shim stock beneath the heel of the rotor, and turn the rotor until it holds the shim firmly in place. Then remove the shim.



NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Şymbol	Service Service Part No.	Reference Symbol	Description	Service Part No.
CI	Condenser, tuning gang, 3 section	R13	Resistor, plate load, 500,000 ohms	sPart of PC1
CIA	Condenser, trimmer, antennaPart of C1	R14	Resistor, grid leak, 500,000 ohms .	Part of PC1
C1B	Condenser, trimmer, r-fPart of C1	R15	Resistor, cathode bias, 150 ohms,	
IC	Condenser, trimmer, oscillatorPart of C1		1 watt	66-1154340°
	Condenser, trimmer, special services r-f Part of CA1	R16	Resistor, B+ filter, 1200 ohms	66-2128340°
3	Condenser, padder, special services r-f Part of CAI	R17	Resistor, B+ filter, 220 ohms, 1 wa	att 66-1224340°
	Condenser, r-f by-pass, .01 µf	R18	Resistor, tube saver, 100 ohms	
	Condenser, trimmer, special services	R19	Resistor, diode load, 470,000 ohm	s66-4478340
	mixer-grid	R20	Resistor, tone control, 5 megohms	Part of R11
6	Condenser, a-v-c by-pass .05 µf	R21	Resistor, tone compensation,	
7	Condenser, fixed trimmer, 7.5 µµf		33,000 ohms	66-3338340
C8	Condenser, d-c blocking, 47 µµf60-00475420	\$1	Switch, off-on	Part of R11
C9	Condenser, screen by-pass05 µf	S2	Switch, broadcast-special services	
0	Condenser, special, B- to chassis1 uf 30-4644-3	Τ1	Transformer, oscillator	
11	Condenser, i-f coupling, 220 µµf62-122001001°	T2	Transformer, output	
12	Condenser, screen by-pass002 µf30-1238-8°	W1	Line cord	L-2183*
13	Condenser, audio coupling, .005 µf30-1238-1°	ZI	Transformer, r-f	
14	Condenser, d-c blocking, 005 µfPart of PC1	Z2	Transformer, 1st i-f	
115	Condenser, tope compensation, 0033 uf, 30-4650-55	Z3	Transformer, 2nd i-f	
210	Condenser, electrolytic filter 45-3037-3	2.0	THEORY MALE IN DECEMBER OF	
C164	Condenser filter 30 uf 150v Part of C16			
CIUA	Condenser, megr, oo pri, 1007 minimum are or or or			
CIGR	Condenser filter 30 uf 150v Part of C16		MISCELLANEOUS	
C16B	Condenser, filter, 30 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16		MISCELLANEOUS	
C16B C16C	Condenser, filter, 30 µf., 150vPart of C16 Condenser, filter, 40 µf., 150vPart of C16 Condenser line by pass 047 µf	-	MISCELLANEOUS PARTS COMMON TO ALL MC	DDELS
C16B C16C C17 C18	Condenser, filter, 30 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16 Condenser, line by-pass, .047 μ f30-4650-45° Condenser, fixed padder, 1030 μ uf30-1220-72		MISCELLANEOUS PARTS COMMON TO ALL MC	DDELS
C16B C16C 17 .8	Condenser, filter, 30 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16 Condenser, line by-pass, .047 μ f30-4650-45° Condenser, fixed padder, 1030 $\mu\mu$ f30-1220-72 Condenser bass comp 01 μ f30-1238-2	Perciptio	MISCELLANEOUS PARTS COMMON TO ALL MC	DDELS Service Part No
C16B C16C C17 C18 C19 C20	Condenser, filter, 30 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16 Condenser, line by-pass, .047 μ f30-4650-45° Condenser, fixed padder, 1030 $\mu\mu$ f30-1220-72 Condenser, bass. comp., .01 μ f30-1238-2 Condenser, phone coupling	Descriptio	MISCELLANEOUS PARTS COMMON TO ALL MC	DDELS Service Part No.
C16B C16C 17 18 19 20 21	Condenser, filter, 30 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16 Condenser, line by-pass, .047 μ f30-4650-45° Condenser, fixed padder, 1030 $\mu\mu$ f30-1220-72 Condenser, bass.comp., .01 μ f30-1238-2 Condenser, phono coupling, .005 μ f30-1238-1 Condenser bith comp. 100 $\mu\mu$ f30-1238-1	Descriptio	MISCELLANEOUS PARTS COMMON TO ALL MC	Service Part No. 45-8750°
C16B C16C C17 C18 C19 C20 C21 C22	Condenser, filter, 30 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16 Condenser, line by-pass, .047 μ f30-4650-45° Condenser, fixed padder, 1030 $\mu\mu$ f30-1220-72 Condenser, bass.comp., .01 μ f30-1238-2 Condenser, phono coupling, .005 μ f30-1238-1 Condenser, high comp., 100 $\mu\mu$ f62-110009001 Condenser tone comp. 002 μ f62-110099001	Descriptio Drive cor Spring	MISCELLANEOUS PARTS COMMON TO ALL MC	Service Part No.
C16B C16C C17 C18 C19 C20 C21 C22 C22	Condenser, filter, 30 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16 Condenser, line by-pass, .047 μ f30-4650-45° Condenser, fixed padder, 1030 $\mu\mu$ f30-1220-72 Condenser, bass.comp., .01 μ f30-1238-2 Condenser, phono coupling, .005 μ f30-1238-1 Condenser, high comp., 100 $\mu\mu$ f62-110009001 Condenser, tone comp., .002 μ f30-1238-8 Condenser cathode by-pass	Descriptio Drive con Spring, Bubber m	MISCELLANEOUS PARTS COMMON TO ALL MC m rd, 25-ft. spool drive cord	DDELS Service Part No.
C16B C16C C17 C18 C19 C20 C21 C22 C23	Condenser, filter, 30 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16 Condenser, line by-pass, .047 μ f30-4650-45° Condenser, fixed padder, 1030 $\mu\mu$ f30-1220-72 Condenser, bass.comp., .01 μ f30-1238-2 Condenser, phono coupling, .005 μ f30-1238-1 Condenser, high comp., 100 $\mu\mu$ f62-110009001 Condenser, tone comp., .002 μ f30-1238-8 Condenser, cathode by-pass, 10 μ f	Descriptio Drive con Spring, Rubber m Shield tu	MISCELLANEOUS PARTS COMMON TO ALL MC m rd, 25-ft. spool drive cord hount, gang mtg. (3)	DDELS Service Part No. 45-8750°
C16B C16C C17 C18 C19 C20 C21 C22 C22 C23 A1	Condenser, filter, 30 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16 Condenser, line by-pass, .047 μ f30-4650-45° Condenser, fixed padder, 1030 $\mu\mu$ f30-1220-72 Condenser, bass.comp., .01 μ f30-1238-2 Condenser, phono coupling, .005 μ f30-1238-1 Condenser, high comp., 100 $\mu\mu$ f62-110009001 Condenser, tone comp., .002 μ f30-1238-8 Condenser, cathode by-pass, 10 μ f., 50v	Descriptio Drive con Spring, Rubber m Shield, tu Socket as	MISCELLANEOUS PARTS COMMON TO ALL MC m rd, 25-ft. spool drive cord hbe (2) seembly pilot lamp	DDELS Service Part No. 45-8750° 56-2617 27-4596 56-5629FA3 27-6232-6
C16B C16C C17 C18 C19 C20 C21 C22 C23 CA1	Condenser, filter, 30 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16 Condenser, line by-pass, .047 μ f30-4650-45° Condenser, fixed padder, 1030 $\mu\mu$ f30-1220-72 Condenser, bass.comp., .01 μ f30-1238-2 Condenser, phono coupling, .005 μ f30-1238-1 Condenser, high comp., 100 $\mu\mu$ f62-110009001 Condenser, tone comp., .002 μ f30-1238-8 Condenser, cathode by-pass, 10 μ f., 50v	Descriptio Drive con Spring, Rubber m Shield, tu Socket as	MISCELLANEOUS PARTS COMMON TO ALL MC m rd, 25-ft. spool drive cord hount, gang mtg. (3) hbe (2) seembly, pilot lamp he (2)	DDELS Service Part No. 45-8750° 56-2617 27-4596 56-5629FA3 27-6233-6 97-6203-14
C16B C16C C17 C18 C19 C20 C21 C22 C22 C23 CA1 L	Condenser, filter, 30 μ f., 150v Part of C16 Condenser, filter, 40 μ f., 150v Part of C16 Condenser, line by-pass, .047 μ f. 30-4650-45° Condenser, fixed padder, 1030 $\mu\mu$ f. 30-1220-72 Condenser, bass.comp., .01 μ f. 30-1238-2 Condenser, phono coupling, .005 μ f. 30-1238-1 Condenser, high comp., 100 $\mu\mu$ f. 62-110009001 Condenser, cathode by-pass, 10 μ f., 50v 10 μ f., 50v 45-3035-6 Condenser assembly, trimmer 31-6477-17 Lamp, pilot 32-4561-5	Descriptio Drive cor Spring, Rubber m Shield, tu Socket as Socket, tu Socket tu	MISCELLANEOUS PARTS COMMON TO ALL MC m rd, 25-ft. spool drive cord hount, gang mtg. (3) be (2) be (2) be (2)	Service Part No. 45-8750° 56-2617 27-4596 56-5629FA3 27-6233-6 27-6203-14 97-6965
C16B C16C C17 C18 C19 C20 C21 C22 C23 CA1 L1 L1	Condenser, filter, 30 μ f., 150v Part of C16 Condenser, filter, 40 μ f., 150v Part of C16 Condenser, line by-pass, .047 μ f. .30-4650-45° Condenser, fixed padder, 1030 $\mu\mu$ f. .30-1220-72 Condenser, bass.comp., .01 μ f. .30-1238-2 Condenser, phono coupling, .005 μ f. .30-1238-1 Condenser, high comp., 100 $\mu\mu$ f. .62-110009001 Condenser, cathode by-pass, 10 μ f. 10 μ f., 50v .45-3035-6 Condenser assembly, trimmer .31-6477-17 Lamp, pilot .32-4561-5 Coil, special services mixer-grid .32-4561-5	Descriptio Drive cor Spring, Rubber m Shield, tu Socket as Socket, tu Socket, tu	MISCELLANEOUS PARTS COMMON TO ALL MC m rd, 25-ft. spool drive cord nount, gang mtg. (3) ube (2) ube (2) ube (4) ube (4)	Service Part No. 45-8750° 56-2617 27-4596 56-5629FA3 27-6233-6 27-6203-14 27-6265 1W56920FF7
C16B C16C C17 C18 C19 C20 C21 C22 C21 C22 C23 CA1 1 .1 .2 2	Condenser, filter, 30 μ f., 150v Part of C16 Condenser, filter, 40 μ f., 150v Part of C16 Condenser, line by-pass, .047 μ f. .30-4650-45° Condenser, line by-pass, .047 μ f. .30-1220-72 Condenser, fixed padder, 1030 $\mu\mu$ f. .30-1238-2 Condenser, bass.comp., .01 μ f. .30-1238-2 Condenser, phono coupling, .005 μ f. .30-1238-1 Condenser, high comp., 100 $\mu\mu$ f. .62-110009001 Condenser, tone comp., .002 μ f. .30-1238-8 Condenser, cathode by-pass, 10 μ f., 50v 10 μ f., 50v .45-3035-6 Condenser assembly, trimmer .31-6477-17 Lamp, pilot .32-4561-5 Coil, special services r-f .32-4561-5 Coil, special services mixer-grid .32-4561-5	Descriptio Drive cor Spring, Rubber m Shield, tu Socket as Socket, tu Socket, tu Speed nu Cabinat	MISCELLANEOUS PARTS COMMON TO ALL MC m rd, 25-ft. spool drive cord nount, gang mtg. (3) ube (2) ube (2) ube (4) ube (4) ut (4)	Service Part No. 45-8750° 56-2617 27-4596 56-5629FA3 27-6233-6 27-6203-14 27-6265 1W56920FE7
C16B C16C C17 C18 C19 C20 C21 C22 C23 CA1 1 .1 .2 .3 C1	Condenser, filter, 30 μ f., 150v Part of C16 Condenser, filter, 40 μ f., 150v Part of C16 Condenser, line by-pass, .047 μ f. .30-4650-45° Condenser, line by-pass, .047 μ f. .30-1220-72 Condenser, fixed padder, 1030 $\mu\mu$ f. .30-1238-2 Condenser, bass.comp., .01 μ f. .30-1238-2 Condenser, phono coupling, .005 μ f.	Descriptio Drive cor Spring, Rubber m Shield, tu Socket as Socket, tu Socket, tu Speed nu Cabinet	MISCELLANEOUS PARTS COMMON TO ALL MC m rd, 25-ft. spool drive cord nount, gang mtg. (3) ube (2) usembly, pilot lamp ube (2) ube (4) t hack and loop ascembly:	Service Part No. 45-8750° 56-2617 27-4596 56-5629FA3 27-6233-6 27-6203-14 27-6265 1W56920FE7 10963 76 2062
C16B C16C C17 C18 C19 C20 C21 C22 C23 CA1 1 L1 L2 L3 CC1	Condenser, filter, 30 μ f., 150v Part of C16 Condenser, filter, 40 μ f., 150v Part of C16 Condenser, line by-pass, .047 μ f. .30-4650-45° Condenser, line by-pass, .047 μ f. .30-1220-72 Condenser, bass.comp., .01 μ f. .30-1238-2 Condenser, phono coupling, .005 μ f. .30-1238-1 Condenser, high comp., 100 $\mu\mu$ f. .62-110009001 Condenser, tone comp., .002 μ f. .30-1238-8 Condenser, cathode by-pass, 10 μ f., 50v 10 μ f., 50v .45-3035-6 Condenser assembly, trimmer .31-6477-17 Lamp, pilot .32-4561-5 Coil, special services r-f .32-4561-5 Coil, oscillator shunt .32-4562-1 Printed circuit .30-6001	Descriptio Drive cor Spring, Rubber m Shield, tu Socket as Socket, tu Socket, tu Speed nu Cabinet Cabinet	MISCELLANEOUS PARTS COMMON TO ALL MC m rd, 25-ft. spool drive cord hount, gang mtg. (3) be (2) seembly, pilot lamp labe (2) ube (4) t back and loop assembly	Service Part No. 45-8750° 56-2617 27-4596 56-5629FA3 27-6233-6 27-6203-14 27-6265 1W56920FE7 10963 76-8068 54 400°
C16B C16C C17 C18 C19 C20 C21 C22 C22 C23 C1 C1 C1 C1 C1 C1 C1 C1 C1 C1 C1 C1 C1	Condenser, filter, 30 μ f., 150v Part of C16 Condenser, filter, 40 μ f., 150v Part of C16 Condenser, line by-pass, .047 μ f. .30-4650-45° Condenser, line by-pass, .047 μ f. .30-1220-72 Condenser, fixed padder, 1030 $\mu\mu$ f. .30-1238-2 Condenser, bass.comp., .01 μ f. .30-1238-2 Condenser, phono coupling, .005 μ f.	Descriptio Drive con Spring, Rubber m Shield, tu Socket as Socket, tu Socket, tu Speed nu Cabinet Knob, ba	MISCELLANEOUS PARTS COMMON TO ALL MC m rd, 25-ft. spool drive cord hount, gang mtg. (3) be (2) seembly, pilot lamp labe (2) labe (4) lat (4) t back and loop assembly ind switch in a volume	Service Part No. 45-8750° 56-2617 27-4596 56-5629FA3 27-6233-6 27-6203-14 27-6265 1W56920FE7 10963 76-8068 54-4998
C16B C16C C17 C18 C19 C20 C21 C22 C23 CA1 L1 L1 L2 L3 PC1 R1 R2	Condenser, filter, 30 μ f., 150v Part of C16 Condenser, filter, 40 μ f., 150v Part of C16 Condenser, line by-pass, .047 μ f. .30-4650-45° Condenser, line by-pass, .047 μ f. .30-1220-72 Condenser, fixed padder, 1030 $\mu\mu$ f. .30-1238-2 Condenser, bass.comp., .01 μ f. .30-1238-2 Condenser, phono coupling, .005 μ f.	Descriptio Drive con Spring, Rubber m Shield, tu Socket as Socket, tu Socket, tu Socket, tu Speed nu Cabinet Knob, ba Knob, off	MISCELLANEOUS PARTS COMMON TO ALL MC m rd, 25-ft. spool drive cord hount, gang mtg. (3) be (2) seembly, pilot lamp labe (2) labe (4) lat (4) t back and loop assembly t back and loop assembly	Service Part No. 45-8750° 56-2617 27-4596 56-5629FA3 27-6233-6 27-6233-6 27-6203-14 27-6265 1W56920FE7 10963 76-8068 54-4998 54-4842-7 76 6252
C16B C16C C17 C18 C19 C20 C21 C22 C23 CA1 L1 L1 L2 L3 PC1 R1 R2 R3	Condenser, filter, 30 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16 Condenser, fixed padder, 150v	Descriptio Drive con Spring, Rubber m Shield, tu Socket as Socket, tu Socket, tu Socket, tu Speed nu Cabinet Cabinet Knob, ba Knob, tor	MISCELLANEOUS PARTS COMMON TO ALL MC m rd, 25-ft. spool drive cord hount, gang mtg. (3) be (2) be (2) be (2) be (4) be	Service Part No. 45-8750° 56-2617 27-4596 56-5629FA3 27-6233-6 27-6233-6 27-6203-14 27-6265 1W56920FE7 10963 76-8068 54-4998 54-4842-7 76-6353-1
C16B C16C C17 C18 C19 C20 C21 C22 C23 CA1 II L1 L2 L3 PC1 R1 R2 R3 R4	Condenser, filter, 30 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16 Condenser, fixed padder, 1630 $\mu\mu$ f30-4650-45° Condenser, fixed padder, 1630 $\mu\mu$ f30-1220-72 Condenser, bass.comp., .01 μ f30-1238-2 Condenser, phono coupling, .005 μ f30-1238-1 Condenser, high comp., 100 $\mu\mu$ f62-110009001 Condenser, tone comp., .002 μ f30-1238-8 Condenser, cathode by-pass, 10 μ f., 50v	Descriptio Drive con Spring, Rubber m Shield, tu Socket as Socket, tu Socket,	MISCELLANEOUS PARTS COMMON TO ALL MC m rd, 25-ft. spool drive cord hount, gang mtg. (3) be (2) be (2) be (2) be (4) be	DDELS Service Part No. 45-8750° 56-2617 27-4596 56-5629FA3 27-6233-6 27-6233-6 27-6203-14 27-6265 1W56920FE7 10963 76-8068 54-4998 54-4842-7 76-6353-1 76-6354-1
C16B C16C C17 C18 C19 C20 C21 C22 C23 CA1 U1 L1 L2 L3 PC1 R1 R2 R3 R4 R5	Condenser, filter, 30 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16 Condenser, line by-pass, .047 μ f30-4650-45° Condenser, line by-pass, .047 μ f30-1220-72 Condenser, bass.comp., .01 μ f30-1238-2 Condenser, phono coupling, .005 μ f30-1238-1 Condenser, high comp., 100 $\mu\mu$ f62-110009001 Condenser, tone comp., .002 μ f30-1238-8 Condenser, cathode by-pass, 10 μ f., 50v	Descriptio Drive con Spring, Rubber m Shield, tu Socket as Socket, tu Socket, tu Socket, tu Speed nu Cabinet Knob, tu Knob, tur Panel, di	MISCELLANEOUS PARTS COMMON TO ALL MC m rd, 25-ft. spool drive cord hount, gang mtg. (3) be (2) be (2) be (2) be (4) be	Service Part No. 45-8750° 56-2617 27-4596 56-5629FA3 27-6233-6 27-6233-6 27-6203-14 27-6265 10963 76-8068 54-4998 54-4842-7 76-6353-1 76-6353-1 76-6354-1 54-8819
C16B C16C C17 C18 C19 C20 C21 C22 C23 CA1 II L1 L2 L3 PC1 R1 R2 R3 R4 R5 R6	Condenser, filter, 30 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16 Condenser, line by-pass, .047 μ f30-4650-45° Condenser, fixed padder, 1030 $\mu\mu$ f30-1220-72 Condenser, bass.comp., .01 μ f	Descriptio Drive con Spring, Rubber m Shield, tu Socket as Socket, tu Socket, tu Socket, tu Speed nu Cabinet Cabinet Knob, ba Knob, tur Panel, di Clip, p	MISCELLANEOUS PARTS COMMON TO ALL MC m rd, 25-ft. spool	Service Part No. 45-8750° 56-2617 27-4596 56-5629FA3 27-6233-6 27-6233-6 27-6203-14 27-6265 10963 76-8068 54-4998 54-4998 54-4842-7 76-6353-1 76-6354-1 54-8819 56-3587-1
C16B C16C C17 C18 C19 C20 C21 C22 C23 CA1 II L1 L2 L3 PC1 R1 R2 R3 R4 R5 R6 R7	Condenser, filter, 30 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16 Condenser, line by-pass, .047 μ f30-4650-45° Condenser, fixed padder, 1030 $\mu\mu$ f30-1220-72 Condenser, bass.comp., .01 μ f30-1238-2 Condenser, phono coupling, .005 μ f30-1238-1 Condenser, high comp., 100 $\mu\mu$ f62-110009001 Condenser, tone comp., .002 μ f30-1238-8 Condenser, cathode by-pass, 10 μ f., 50v45-3035-6 Condenser assembly, trimmer31-6477-17 Lamp, pilot32-4561-5 Coil, special services r-f32-4561-5 Coil, special services mixer-grid32-4562-1 Printed circuit30-6001 Resistor, screen dropping, 10,000 ohms 66-3108340° Resistor, a-v-c load, 4.7 megohms66-5228340° Resistor, B- to chassis, 150,000 ohms 66-4158340° Resistor, grid leak, 2.2 megohms66-5228340° Resistor, grid leak, 2.2 megohms66-5228340°	Descriptio Drive con Spring, Rubber m Shield, tu Socket as Socket, tu Socket,	MISCELLANEOUS PARTS COMMON TO ALL MC m rd, 25-ft. spool	Service Part No. 45-8750° 56-2617 27-4596 56-5629FA3 27-6233-6 27-6233-6 27-6203-14 27-6265 10963 76-8068 54-4998 54-4998 54-4998 54-4998 54-4842-7 76-6353-1 76-6354-1 54-8819 56-3587-1 56-5630-51
C16B C16C C17 C18 C19 C20 C21 C22 C23 CA1 II L1 L2 L3 PC1 R1 R2 R3 R4 R5 R6 R7 R8	Condenser, filter, 30 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16 Condenser, line by-pass, .047 μ f30-4650-45° Condenser, fixed padder, 1030 $\mu\mu$ f30-1220-72 Condenser, bass.comp., .01 μ f	Descriptio Drive con Spring, Rubber m Shield, tu Socket as Socket, tu Socket,	MISCELLANEOUS PARTS COMMON TO ALL MC m rd, 25-ft. spool	Service Part No. 45-8750° 56-2617 27-4596 56-5629FA3 27-6233-6 27-6233-6 27-6203-14 27-6265 1W56920FE7 10963 76-8068 54-4998 54-4998 54-4998 54-4842-7 76-6353-1 76-6353-1 54-8819 56-3587-1 56-5630-51 76-8067
C16B C16C C17 C18 C19 C20 C21 C22 C23 CA1 II L1 L2 L3 PC1 R1 R2 R3 R4 R5 R6 R7 R8 R9 PC1	Condenser, filter, 30 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16 Condenser, line by-pass, .047 μ f30-4650-45° Condenser, fixed padder, 1030 $\mu\mu$ f30-1220-72 Condenser, bass.comp., .01 μ f30-1238-2 Condenser, phono coupling, .005 μ f30-1238-1 Condenser, high comp., 100 $\mu\mu$ f62-110009001 Condenser, tone comp., .002 μ f30-1238-8 Condenser, cathode by-pass, 10 μ f., 50v45-3035-6 Condenser assembly, trimmer31-6477-17 Lamp, pilot32-4561-5 Coil, special services r-f32-4561-5 Coil, special services mixer-grid32-4561-5 Coil, oscillator shunt32-4562-1 Printed circuit30-6001 Resistor, screen dropping, 10,000 ohms 66-3108340° Resistor, a-v-c load, 2.2 megohms66-5228340° Resistor, grid leak, 22,000 ohms66-5228340° Resistor, a-v-c load, 2.2 megohms66-5228340° Resistor, a-v-c load, 2.2 megohms66-5228340°	Descriptio Drive con Spring, Rubber m Shield, tu Socket as Socket, tu Socket,	MISCELLANEOUS PARTS COMMON TO ALL MC m rd, 25-ft. spool drive cord nount, gang mtg. (3) tbe (2) ube (2) ube (4) ube (4) ut (4) t back and loop assembly t back and loop assembly ing iffusing anel diffusing ail assembly	Service Part No. 45-8750° 56-2617 27-4596 56-5629FA3 27-6203-14 27-6203-14 27-6203-14 27-6203-14 27-6203-14 27-6203-14 27-6203-14 27-6203-14 27-6203-14 27-6203-14 27-6203-14 27-6203-14 27-6203-14 27-6203-14 27-6203-14 54-4842-7 76-6353-1 76-6354-1 54-4849 56-3587-1 56-5630-51 76-8067 54-5163 54-5163
C16B C16C C17 C18 C19 C20 C21 C22 C23 CA1 II L1 L2 L3 PC1 R1 R2 R3 R4 R5 R6 R7 R8 R9 R10	Condenser, filter, 30 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16 Condenser, line by-pass, .047 μ f30-4650-45° Condenser, fixed padder, 1030 $\mu\mu$ f30-1238-2 Condenser, bass.comp., .01 μ f30-1238-2 Condenser, phono coupling, .005 μ f30-1238-1 Condenser, high comp., 100 $\mu\mu$ f62-110009001 Condenser, tone comp., .002 μ f30-1238-8 Condenser, cathode by-pass, 10 μ f., 50v31-6477-17 Lamp, pilot31-6477-17 Lamp, pilot32-4561-5 Coil, special services r-f32-4561-5 Coil, special services mixer-grid32-4561-5 Coil, oscillator shunt32-4562-1 Printed circuit30-6001 Resistor, screen dropping, 10,000 ohms 66-3198340° Resistor, a-v-c load, 2.2 megohms66-5228340° Resistor, grid leak, 22,000 ohms66-5228340° Resistor, a-v-c load, 2.2 megohms66-5228340° Resistor, a-v-c load, 2.2 megohms66-3228340° Resistor, a-v-c load, 2.2 megohms66-3228340° Resistor, cathode bias, 180 ohms66-3478340° Resistor, cathode bias, 180 ohms66-3478340° Resistor, i-f filter, 47,000 ohms66-3478340°	Descriptio Drive con Spring, Rubber m Shield, tu Socket as Socket, tu Socket, tu	MISCELLANEOUS PARTS COMMON TO ALL MC m rd, 25-ft. spool drive cord nount, gang mtg. (3) ube (2) ube (2) ube (4) ube (4) ut (4) t back and loop assembly t back and loop assembly ind switch -on-volume ne ne ning ffusing anel diffusing al al	Service Part No. 45-8750° 56-2617 27-4596 56-5629FA3 27-6233-6 27-6203-14 27-6203-14 27-6265 1W56920FE7 10963 76-8068 54-4898 54-4899 54-4819 56-3587-1 56-5630-51 76-8067 54-5163 56-3630-60
C16B C16C C17 C18 C19 C20 C21 C22 C23 CA1 11 L1 L2 L3 PC1 R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11	Condenser, filter, 30 μ f., 150vPart of C16 Condenser, filter, 40 μ f., 150vPart of C16 Condenser, line by-pass, .047 μ f30-4650-45° Condenser, fixed padder, 1030 $\mu\mu$ f30-1238-2 Condenser, bass.comp., .01 μ f30-1238-1 Condenser, phono coupling, .005 μ f30-1238-1 Condenser, high comp., 100 $\mu\mu$ f62-110009001 Condenser, tone comp., .002 μ f30-1238-8 Condenser, cathode by-pass, 10 μ f., 50v31-6477-17 Lamp, pilot31-6477-17 Lamp, pilot32-4561-5 Coil, special services r-f32-4561-5 Coil, special services mixer-grid32-4561-5 Coil, oscillator shunt32-4562-1 Printed circuit30-6001 Resistor, screen dropping, 10,000 ohms 66-3198340° Resistor, a-v-c load, 2.2 megohms66-5228340° Resistor, grid leak, 22,000 ohms 66-4158340° Resistor, grid leak, 2.2 megohms66-5228340° Resistor, a-v-c load, 2.2 megohms66-3228340° Resistor, a-v-c load, 2.2 megohms66-3228340° Resistor, a-v-c load, 2.2 megohms66-3478340° Resistor, a-v-c load, 2.2 megohms66-3478340° Resistor, i-f filter, 47,000 ohms33-5563-64	Descriptio Drive con Spring, Rubber m Shield, tu Socket as Socket, tu Socket, tu Socket, tu Socket, tu Socket, tu Socket, tu Socket, tu Socket, tu Socket, tu Cabinet Knob, ba Knob, tor Knob, tur Panel, di Clip, p Pointer m Scale, dia Shaft, tu Spring,	MISCELLANEOUS PARTS COMMON TO ALL MC m rd, 25-ft. spool drive cord nount, gang mtg. (3) ibe (2) be (2) be (2) be (4) be (Service Part No. 45-8750° 56-2617 27-4596 56-5629FA3 27-6233-6 27-6203-14 27-6203-14 27-6203-14 27-6203-14 27-6203-14 27-6203-14 27-6203-14 27-6203-14 27-6203-14 27-6203-14 54-86920FE7 10963 76-8068 54-48998 54-48998 54-48998 54-48998 54-48998 54-5630-51 76-63587-1 56-3587-1 56-3587-1 56-3630-51 76-8067 54-5163 56-9807-6 28-8610 000000000000000000000000000000000000



Figure 2. Top View, Showing Tuning Adjustments



Figure 3. Base View, Showing Parts Placement



Factory-Supervised Service CO



PR-2562





PHILCO RADIO-CLOCK MODEL B712, CODE 121

SPECIFICATIONS

CABINET	
CIRCUIT	Five-tube Superheterodyne (plus rectifier)
FREQUENCY RANGES Standard Broadcast Special Services	
AUDIO OUTPUT	
OPERATING VOLTAGE	117 volts, a.c.
POWER CONSUMPTION	
AERIAL	
INTERMEDIATE FREQUENCY	455 kc.
PHILCO TUBES	



MODEL B712



Figure 1. Drive-Cord Installation Details

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RADIO CONTROLS—Set volume control to maximum. Set tuning control and band switch as indicated in chart.

OUTPUT METER — Connect across voice-coil terminals. SIGNAL GENERATOR—Connect generator and set frequency as indicated in chart. Use modulated output.

OUTPUT LEVEL—During alignment, adjust signalgenerator output to hold output-meter reading below 1.25 volts.



Figure 2. Top View, Showing Trimmer Locations

ALIGNMENT CHART

	SIGNAL GENERA	SIGNAL GENERATOR		RADIO		
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND SWITCH SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Ground lead to B-; output lead through a .1-µf. condenser to grid (pin 7) of 12BE6.	455 kc.	Tuning gang fully open	Broadcast	Adjust tuning cores, in order given, for maxi- mum output. (TCl and TC3 are located at top of transformers.)	TC4-2nd i-f sec. TC3-2nd i-f pri. TC2-1st i-f sec. TC-1-1st i-f pri.
2	Radiating loop (See note below).	1620 kc.	*1620 kc.	Broadcast	Adjust trimmer for maximum output.	Cl-B—osc.
3	Same as step 2.	1500 kc.	1500 kc.	Broadcast	Adjust trimmer for maximum output.	C1-A—aerial (broadcast)
4	Same as step 2.	3200 kc.	3200 kc.	Special Services	Adjust trimmer for maximum output.	C21—aerial (special services)

NOTE: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads, and place near radio loop.

* For proper adjustment of the oscillator trimmer, fully open the tuning gang and insert a .006-inch, non-metallic shim between the heel of the rotor and the top of the stator plates. Close the tuning gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.



World Radio History

Figure 3. Philco Radio-Clock Model B712, Code 121, Schematic Diagram

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MODEL B712, CODE 121



Figure 4. Base View, Showing Parts Placement

REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.	Reference Symbol	Description	Service Part No.
CI	Condenser, tuning gang		R4	Resistor, volume control, .5	megohm
CIA	Condenser, r-f trimmer	Part of C1	R5	Resistor, diode load, 47,000	ohms
CIB	Condenser, oscillator trimmer	Part of C1	R6	Resistor, grid return, 10 me	gohms 66-6108340°
22	Condenser, aerial series tracker,		R7	Resistor, plate load, 500,000	ohmsPart of PC1
	944 $\mu\mu$ f.		R8	Resistor, grid return, 500,00	0 ohmsPart of PC1
3	Condenser, oscillator grid, 47 µµf		R9	Resistor, cathode bias, 150 d	ohms 66-1158340°
24	Condenser, a-v-c by-pass, .05 µf		RIO	Resistor, B plus filter, 220 oh	ms, 1 watt66-1224340°
25	Condenser, drift compensation, 7.5 μ	μf30 -1224-8 3	R11	Resistor, B plus filter, 1000	ohms66-2108340°
26	Condenser, screen by-pass, .05 µf		R12	Resistor, tube saver, 100 oh	ms 33-1343-3
27	Condenser, i-f tuning	Part of ZI	SWI	Switch, broadcast-special set	rvices 42-1796-2
28	Condenser, i-f tuning	Part of Z1	T1	Transformer, oscillator	
39	Condenser, i-f tuning	Part of Z2	T2	Transformer, output	
210	Condenser, i-f tuning	Part of Z 2	W1	Line cord	L-2183°
CH	Condenser, detector filtering	Part of Z2	Z 1	Transformer, 1st i-f	
C12	Condenser, detector filtering	Part of Z2	Z2	Transformer, 2nd i-f	
C13	Condenser, audio coupling, .005 µf			,	
C14	Condenser, plate by-pass	Part of PC1			
C15	Condenser, audio coupling, .005 µf.	Part of PC1			
C16	Condenser, compensating	Part of PC1		MISCELLANEOU	12
017	Condenser, tone compensation,	30-4650-43*			Service
C18	Condenser electrolytic 3-section	30-2535-36	Description	P	Part No.
C184	Condenser, filter 30 of 150v	Part of C18			
CISR	Condenser filter 25 uf 150v	Part of C18	Cabinet		
CISC	Condenser filter 20 uf 150v	Part of C18	Sand		11013
10	Condenser, line by pass 047 uf	30-4650-45°	Forest	green	11013-1
C 90	Condensor B minus to chassis 1 af	30-4650-47°	Knobs	Breen	
C21	Condenser, b minus to chassis, 1 µ1.	31_6473_90	Clock ((3)	54-6096
241	Condenser, trimmer, special services		Tuning	and volume	54-6095
	920 auf	62-122001001*	Clock	tirte voterine mannamentalitation	41-2047
Т	Lupp pilot	34-2068	Back-and-	loop assembly	76-8703
(1	lack clock	97-6973-7	Scale rad	lia	28-9648FCF
9	Jack, ender internetable a-e	76-3931	Pointer	110	78-8606
1	Coil parial engoial corvious	32.4561.3	Clock cov	۶۶۶۳.	54_4980
10	Coil agaillator shunt	32.4569.9	Shaft tur	siser	98-0475FA9
	Loop antenny Part of heal	and loop arr'y	Shield to	hing	56.5690FCF
LAI I 61	Cooplant n m	96 1697 9	Shidd to	be hase	56 2078FA9
DC1	Coupling notwork	20 6001	Soulat A	be (4)	
	Diver alock accombly	54.4978.0	Socket, tu	DC (4)	
ビルし D 1	Pusiston and 00 000 abuse		Soulist an	with silet have	27-0203-14 97 6999 6
N1 D0	Resistor, oscillator grid, 22,000 onins		Socket ass	sentory, phot samp	
A2	Resistor, 1-f screen dropping,	00 04700400	Spring, di	rive cord	
10	4700 onms		Spring, re	d of A month	
.J	Kesistor, a-v-c filter, 2.2 megohnis	00+0228340*	Drive core	a, 25-11. spool	40-8700
'R-2565					Printed in U.S.A.



PHILCO RADIO-CLOCK MODEL B714, CODES 121 AND 123

SPECIFICATIONS

CABINET
CIRCUITFive-tube Superheterodyne (plus rectifier)
FREQUENCY RANGES Standard Broadcast 540—1620 kc. Special Services 1700—3400 kc.
AUDIO OUTPUT
OPERATING VOLTAGE
POWER CONSUMPTION
AERIAL High-impedance loop
INTERMEDIATE FREQUENCY
PHILCO TUBES12BE6 converter, 12BA6 i-i amplifier, 12AV6 det.—a.v.c.—1st audio, 35C5 output, 35W4 rectifier



MODEL B714, CODES 121 AND 123





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PR-2541

RADIO CONTROLS—Set volume control to maximum. Set tuning control and band switch as indicated in chart.

OUTPUT METER—Connect across voice-coil terminals. SIGNAL GENERATOR—Connect generator and set frequency as indicated in chart. Use modulated output.

OUTPUT LEVEL—During alignment, adjust signalgenerator output to hold output-meter reading below 1.25 volts.



Figure 2. Top View, Showing Trimmer Locations

ALIGNMENT CHART

	SIGNAL GENERATOR		RADIO			
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND SWITCH SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Ground lead to B-; output lead through a .1-µf. condenser to grid (pin 7) of 12BE6.	455 kc.	Tuning gang fully open	Broadcast	Adjust tuning cores, in order given, for maximum output. (TCI and TC3 are located at top of transformers.)	TC.4—2nd i-f sec. TC.3—2nd i-f pri. TC.2—1st i-f sec. TC1—1st i-f pri.
2	Radiating loop (See note below).	1620 kc.	*1620 kc.	Broadcast	Adjust trimmer for maximum output.	Cl-B—osc.
3	Same as step 2.	1500 kc.	1500 kc.	Broadcast	Adjust trimmer for maximum output.	Cl-A—aerial (broadcast)
4	Same as step 2.	3200 kc.	3200 kc.	Special Services	Adjust trimmer for maximum output.	C21—aerial (special services)

NOTE: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads, and place near radio loop.

* For proper adjustment of the oscillator trimmer, fully open the tuning gang and insert a .006-inch, non-metallic shim between the heel of the rotor and the top of the stator plates. Close the tuning gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.

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MODEL

B714,

CODES

121

AND

123

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Figure 4. Base View, Showing Parts Placement

REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.
Cl	Condenser, tuning gang	31-2751-14
CIA	Condenser, r-f trimmer	Part of C1
CIB	Condenser, oscillator trimmer	Part of Cl
C2	Condenser, aerial series tracker,	
	944 μμf.	30-1220-65
C3	Condenser, oscillator grid, 47 µµf	
C4	Condenser, a-v-c by-pass, .05 µf.	30-4650-45°
C5	Condenser, drift compensation, 7.5 µµ	f. 30-1224-83
C6	Condenser, screen by-pass, .05 µf	30-4650-45°
C7	Condenser, i-f tuning	Part of Z1
C .	Condenser, i-f tuning	Part of Z1
C0	Condenser, i-f tuning	Part of 72
C10	Condenser i-f tuning	Part of 72
	Condenser, detector filtering	Part of 79
	Condenser, detector filtering	Dowt of 70
CIZ	Condenser, detector intering	
	Condenser, audio coupling, $000 \ \mu$ i.	
CI4	Condenser, plate by-pass	Part of PCI
CI5	Condenser, audio coupling, .005 μ r	Part of PCI
C16	Condenser, compensating	Part of PCI
C17	Condenser, tone compensation,	
	.022 µt.	30-4650-43°
C18	Condenser, electrolytic, 3-section	
C18A	Condenser, filter, 30 μ f., 150v	Part of C18
C18B	Condenser, filter, 25 μ f., 150v	Part of C18
C18C	Condenser, filter, 20 μ f., 150v	Part of C18
C19	Condenser, line by-pass, .047 µf.	30-4650-45°
C20	Condenser, B minus to chassis, .1 µf.	30-4650-47°
C21	Condenser, trimmer, special services .	31-6473-29
C22	Condenser, a-v-c decoupling,	
022	220 µµf 62	2-122001001*
TI	Lamn pilot	34-2068
19	Lamp night light	34-2477
12	Tackt clock	07 6072
J1 10	Jack, clock	
12	Driveto listoning unit	40 1075 0
10	Coil and a second complete	
	Coll, aerial, special services	
	Coll, oscillator snunt	
LAI	Loop, antennaPart of back-an	id-loop ass y.
LSI	Speaker, p-m	
PCI	Coupling network	
PLI	Plug, clock assembly	
RI	Resistor, oscillator grid, 22,000 ohms	66-3228340°
R2	Resistor, i-f screen dropping,	
	4700 ohms	.66-2478340°
R3	Resistor, a-v-c filter 2.2 megohms	.66-5228340°
R4	Resistor, volume control, 5 megohim	
R5	Resistor, diode load, 47,000 ohms	66-3478340°
	- · · · · · · · · · · · · · · · · · · ·	

Reference Symbol	Service Description Part No	-
R6	Resistor, grid return, 10 megohms66-6108340	a
R7	Resistor, plate load, 500,000 ohmsPart of PC	L
R8	Resistor, grid return, 500,000 ohmsPart of PC	L
R9	Resistor, cathode bias, 150 ohms	Þ
R10	Resistor, B plus filter, 220 ohms,	
	1 watt	5
R11	Resistor, B plus filter, 1000 ohms66-2108340	Þ
R12	Resistor, tube saver, 100 ohms	3
R13	Resistor, private listening unit,	
	3.3 ohms)
S2	Switch, night light	3
SW1	Switch, broadcast-special services	2
TI	Transformer, oscillator	3
T2	Transformer, output	9
W1	Line cord	9
Z1	Transformer, 1st i-f	1
Z2	Transformer, 2nd i-f	k

MISCELLANEOUS

Description	Service Part No.
Cabinet	
White	
Knobs	
Clock (3)	
Tuning and volume	
Clock	
Back-and-loop assembly	
Backplate and clip assembly, pilot lamp	
Scale	
Radio	
Clock	54-4984
Pointer	
Clock cover	
Shaft, tuning	
Shield, tube	56-5629FA3
Shield, tube base	56-3978FA3
Socket, tube (4)	
Socket, tube, 12BE6	
Socket assembly, pilot lamp	
Socket assembly, night light	
Spring, drive cord	
Spring, retaining	
Drive cord, 25-ft. spool	


SERVICE BULLETIN

SUPPLEMENT TO SERVICE MANUAL PR-2542, FOR MODEL B570, CODE 121

Correction to Alignment Procedure

Section under RADIO CONTROLS should read: "Set volume control to maximum. Set tuning control as indicated in chart." Remove column headed BAND SWITCH SETTING in align-

ment chart.

Deletion from Schematic Notes

Delete SW1 SHOWN IN STANDARD BROADCAST POSI-TION.

Correction to Parts List

Cabinet

Gebillet		
Cardinal		10990-3
Sand		10990-4
Maroon	••••	10990-5

Deletion from Parts List

Delete last three items from Parts List, as follows:

Bracket, switch	operating	28-9473FA3
Bracket, switch	mounting	28-9474FA3
Switch, bracket	and padder ass'y	76-8477

SUPPLEMENT TO SERVICE MANUAL PR-2544, FOR MODEL B574, CODE 121

Correction to Parts List

SUPPLEMENT TO SERVICE MANUAL PR-2547, FOR MODEL B574, CODE 122

Correction to Specifications

The specifications for the cabinet should read: CABINETMolded plastic, spruce or tangerine

Corrections to Alignment Procedure

The section under RADIO CONTROLS should read: "Set volume control to maximum. Set tuning control and band switch, S2, as indicated in chart."

Change the Special Services trimmer in step 4 of the alignment procedure from C21 to C1C.

The sentence "The 1620-kc. index mark is located on the pointer rail, to the extreme right side as viewed from the front." should be removed from the alignment chart note.

Addition to Schematic Diagram

The voltages at the various points in the schematic diagram should be as follows:

	12BE6 CONVERTER	12BA6 IF AMPL	12AV6 DET-AVC-1st AUDIO	35C5 OUTPUT
Plate Screen grid	88v 88v	60v 60v	52v	104v 88v
Control grid Cathode	4v to6v			6.5v

At the junction of R11 and C18C: 88v.

At the cathode, pin 7 of the 35W4 rectifier: 123v.

Correction to Schematic Notes

Note SW1 SHOWN IN BROADCAST POSITION should read S2 SHOWN IN BROADCAST POSITION.

Addition to Parts List

SUPPLEMENT TO SERVICE MANUAL PR-2539, FOR MODEL B710, CODE 121

Correction to Schematic Diagram

The correct schematic for Model B710 is given in figure 1. The original schematic should be deleted from the manual.

SUPPLEMENT TO SERVICE MANUAL PR-2541, FOR MODEL B714, CODE 121

Correction to Parts List

Cabinet, white 11027

SUPPLEMENT TO SERVICE MANUAL PR-2553, FOR MODEL B962, CODE 121

Corrections to Parts List

Cabinet, sand 10938-6

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At the junction of R11, R10, and C18B: 110v.

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Figure 1. Philco Radio Model B710, Code 121, Schematic Diagram



PHILCO RADIO-PHONOGRAPH MODEL B1752

SPECIFICATIONS	
CABINET	
Radio	
put; 50Y7GT rectifier PHONOGRAPH Phileo Model M-24 All-Speed Automatic Record Changer (For service informa- tion, refer to Service Manual PR-2178)	MODEL B1752



Figure 1. Drive-Cord Installation Details

TP2-2587A

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Figure 2. Base View, Showing Parts Placement and Tuning Adjustments TP3-1211

ALIGNMENT PROCEDURE

GENERAL—In order to perform the alignment procedure, it is necessary to remove the chassis from the cabinet. This can be done by removing the securing bolts on the bottom of the chassis, removing the central knobs, and pulling the chassis toward the rear of the cabinet, away from the front panel. Be careful not to break the antenna leads.

CONTROLS—Set the volume control to maximum. and the tone control to the treble position. Set the wafer switch, WS1, to the Broadcast position for the first four steps of the procedure, and to the Special Services position for the last step. Set the tuning control as indicated in the chart. OUTPUT INDICATOR—Connect the output indicator (a 1000-ohms-per volt voltmeter or an oscilloscope) between test point B (located on the antenna terminal board) and ground. (Location of test point B is shown in figure 2.)

SIGNAL GENERATOR—Use an amplitude-modulated r-f generator. Connect the ground lead to B minus, and the output lead as indicated in the chart.

OUTPUT LEVEL—During the alignment, attenuate the signal-generator output to maintain the output indication below 1 volt.

	SIGNAL GENERATOR RADIO			RADIO	
SIEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Connect output lead through a .01-µf condenser to control grid (pin 6) of 7A8 oscmixer tube.	455 ke. (modulated)	Gang fully open.	Adjust in order given in next column. for maximum output. TC2 and TC4 are located at top of transformers.	TC4—2nd i-f sec. TC3—2nd i-f pri. TC1—1st i-f pri. TC2—1st i-f sec.
2	See NOTE 1 below.	1620 kc.	1620 kc (see NOTE 2 below).	Adjust for maximum output.	C1B—oscillator trimmer
3	Same as step 2.	1500 kc.	1500 ke.	Adjust for maximum output.	CIA—antenna trimmer (broadcast)
4	Same as step 2.	580 kc.	580 kc.	Adjust for maximum output.	TC5 -tuning core antenna
5	Same as step 2.	3200 kc.	3200 kc.	Adjust for maximum output.	C2 — antenna - trimmer (Special Services)

ALIGNMENT CHART

NOTE 1: If the loop antenna is used, make up a 6-8 turn, 6-inch-diameter test loop from insulated wire: connect to signal generator leads, and place near the radio loop. Make sure that the radio loop is connected to the radio. If an external antenna is used, connect the signal generator to the external antenna lead.

NOTE 2: The tuning gang can be set to 1620 kc, by placing a piece of 6-mil flat shim stock between the heel of the rotor and the top of the stator plates, and rotating the rotor until it holds the shim in place. Remove the shim before proceeding with the alignment. Be careful not to disturb the gang setting when removing the shim.

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Figure ω Philco **Radio-Phonograph** Model B1752, **Schematic Diagram**

RADIO-PHONOGRAPH MODEL B1752

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REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.
C1	Condenser, tuning gang	31-2751-10
CIĀ	Condenser, trimmer, antenna	Part of Cl
CIB	Condenser, trimmer, oscillator	Part of Cl
C2	Condenser, trimmer, Special Services	
	antenna	31-6473-31
C3	Condenser, series tracker, 725 $\mu\mu$ I.	
C4	Condenser, d-c blocking, 47 µµ1.	30.1224.65
CS CE	Condenser, fixed triffiner, 7.5 $\mu\mu$ i	30.4650.47*
C7	Condenser, by-pass, 1 µf.	
C8	Condenser, cathode by-pass, .05 µf.	30-4650-45*
C9	Condenser, screen by-pass, .1 µf.	30-4650-47*
C10	Condenser, audio coupling, .005 µf	30-1238-1
C11	Condenser, d-c blocking, .005 µf	30-1238-1*
C12	Condenser, bass compensation, .01 μ f	30-4650-41*
C13	Condenser, cathode by-pass, 50 μ f., 25v.	45-3035-2
C14	Condenser, tone, .0047 μ t.	
C15	Condenser, d-c blocking, .005 µ1.	26 4650 00*
C16	Condenser, tone compensation, $.0047 \ \mu I$.	30.2575.38
C17A	Condenser, screen filter, 10 µf., 150y	Part of C17
C17B	Condenser, filter, 40 µf., 150v	Part of C17
CITC	Condenser, filter, 40 µf, 250v	Part of C17
C17D	Condenser, filter 40 uf. 250v	Part of C17
C18	Condenser, voltage doubling, 20 µf., 150v	
C19	Condenser, line by-pass, 04 uf	
C20	Condenser, phono isolation, 01 µf.	
C21	Condenser, r-f by-pass, 220 µµf.	60-10225417*
C22	Condenser, antenna blocking, 8 µµf.	30-1224-46
C23	Condenser, phono attenuator, 220 µµf,6	2.122001001*
n	Lamp. pilot	34-2064*
LI	Coil. antenna. Special Services	32-4561-3
L2	Coil oscillator shunt	32.4562.1
LAI	Loop antenna	See Note
LSI	Speaker	36.1651.5
PC1	Printed circuit d.c blocking	30.6001
RI	Besistor grid return 470.000 ohme	66-4479340*
R2	Resistor grid leak 100.000 ohms	66.4108340*
R3	Resistor, B- to chassis 150,000 ohms	66.4158340*
R4	Resistor cathode bigs 180 ohms	66.1188340*
R5	Resistor, califord Dias, 100 Olinis	66-3278340*
R6	Resistor, if filter 47 000 ohms	
R7	Resistor, diode return 470,000 ohms	66-4478340*
RS	Resistor, diode load 22 meaching	66-5228340*
R9	Resistor and leak 10 megohme	66-6108340*
R10	Volume control 2 megohine (with off-on sw	itch
	and tone control)	33-5563-55
R11	Resistor, bass compensation, 68,000 ohms	
R12	Tone control. 5 megohms	Part of R10
R13	Resistor, plate load, 500.000 ohms	Part of PC1
R14	Resistor, arid leak, 500.000 ohms	Part of PC1
R15	Resistor, cathode bigs 180 ohms 1 watt	.66-1184340

PR	-2	5	6	3
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Reference Symbol	Description	Service Part No.
R16	Resistor, filter, 5000 ohms. 7 watts	33-1335-95
R17	Resistor, filter, 270 ohms, 7 watts	33-1335-91
R18	Resistor, tube saver, 100 ohms	33-1343-3
R19	Resistor, antenna loading, 150,000 ohms	.66-4158340*
R20	Resistor, cathode bias, 4700 ohms	.66-2478340*
R21	Resistor, preampl. load, 220,000 ohms	.66-4228340*
R22	Resistor, phono attenuator, 470,000 ohms	.66-4478340*
R23	Resistor, grid return, 470,000 ohms	.66-4478340*
R24	Resistor, feedback, 10 ohms	.66-0108340
S1	Switch, off-on	Part of R10
T1	Transformer, oscillator	32-4453-2
T2	Transformer, output	32-8242-14
T3	Transformer, antenna	32-4614
W1	Line cord	L-2183*
ws	Wafer switch, 2-section	
Z 1	Transformer, 1st i-f	32-4160
Z2	Transformer, 2nd i-f	

MISCELLANEOUS

Description	Part No.
Āntenna lead	
Cabinet, mahogany	
Cabinet back, mahogany	
Cabinet Parts	
Bullet catch	
Changer frame	
Dome	
Door pull	
Hinge, r.h.	
Hinge, l.h.	
Scale strap	
Strike plate	
Dial scale	
Knob tone	
Knob, tuning	
Knob, tuning	
Knob, water swhen	.54-6093-1
Parel diffusing	54-8575-2
Spring alia agaal	56-3841
Deinter	56-5630-60
Pointer	76-8621
Rall, pointer	56-8370-1
Shalt, tuning	56.6552
Hairpin, shart retaining	27.6174
Socket, octal	27.6207.1
Socket, Loktai	
Note: LA1 consists of a 17 ^{1/2} -foot length of No. 1	14 Insulated
stranded wire, attached to the rear of the car	met irame.

Service

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PHILCO RADIO MODEL B572, CODE 122

8	SPECIFICATIONS	The second s
CABINET	Molded plastic	11
CIRCUITFour-tube	superheterodyne (plus rectifier)	
FREQUENCY RANGE		
Standard Broadcast		
AUDIO OUTPUT		
OPERATING VOLTAGE		
POWER CONSUMPTION		
AERIAL	High-impedance loop	-
NTERMEDIATE FREQUENCY		MODEL 8570 CODE 100
PHILCO TUBES 12BE6 converter.	12BA6 i-f amplifier, 12AV6 det.—	MODEL B572, CODE 122
a.v.clst	udio, 35C5 output, 35W4 rectifier	





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PHILCO RADIO MODEL 8572, CODE 122

SERVICE HINTS

REMOVING THE CHASSIS FROM THE CABINET

To remove the chassis from the cabinet, first remove the station selector knob, volume control knob, and, at the bottom-center of the dial scale, remove the dial scale retaining screw. A flat object (knife blade) placed under the bottom edge will assist in prying the scale out of the cabinet. Pull to remove the pointer from the tuning gang shaft. Remove the screws from the cabinet back, and pull the back away from the back of the cabinet (use care to prevent breaking the leads from the loop aerial) far enough to reach in and remove the pilot lamp and socket from the retaining clip. Unsolder the output transformer leads from the speaker. Then remove the chassis mounting screws from beneath the cabinet, and remove the chassis.

REMOVING THE SUBBASE

After removing the chassis from the cabinet remove the subbase, using the following procedure.

- 1. Remove the output transformer and dial light connections by pulling the jacks from the pins on the subbase.
- 2. Unsolder the volume control and a-c switch leads, and unsolder and remove the loop aerial.
- 3. At the rear of the panel, bend the hold down tabs out flush with the subbase, and remove.

PARTS REPLACEMENT

Whenever possible, replace all components and leads from the top side of the chassis. In cases where this is not possible, the components must be unsoldered when removed from the bottom. Use only a lightweight low-wattage iron of approximately 22.5 to 25 watts, and always use a low-melting-point solder. Extreme caution must be used to prevent solder from dropping or splashing, and to avoid lifting of the printed wiring foil. Use only the tip of the soldering iron at the solder point whenever heat is being applied. Hold the subbase in one hand while applying heat to the solder point and throw the solder off, with a downward thrust, as soon as it starts to melt. When the solder is removed, the part to be repaired or replaced can be lifted from its located. Insert the new part and secure it with just a drop of solder at each point.

REPLACING TUBE SOCKETS AND I-F TRANSFORMERS

To replace tube sockets and i-f transformers, follow the procedure given above for removing solder. Then use a sharp knife to sever the remaining thin bond of solder at the connections. With the solder removed, the part can be backed out of the slots. Before inserting the repaired or new part, clean all connections at the unsoldered lugs. Use caution when reinserting parts through the subbase slots, so that the foil is not lifted. When soldering is complete apply an electrical varnish to all repaired areas.

ALIGNMENT PROCEDURE

RADIO CONTROLS—Set volume control to maximum. Set tuning control as indicated in chart. OUTPUT METER—Connect across voice-coil terminals.

SIGNAL GENERATOR—Connect generator and set frequency as indicated in chart. Use modulated output.

OUTPUT LEVEL-During alignment, adjust signal-generator output to hold output-meter reading below 1.25 volts.

	SIGNAL GENERATOR					
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST	
1	Ground lead to $B-$; output lead through a .1- μ f. condenser to grid (pin 7) of 12BE6.	455 kc.	Tuning gang fully open.	Adjust tuning cores, in order given, for maximum output. TC1 and TC3 are located at top of transformers.	TC4—2nd i-f sec. TC3—2nd i-f pri. TC2—1st i-f sec. TC1—1st i-f pri.	
2	Radiating loop (See note below).	1620 kc.	*1620 kc.	Adjust trimmer for maximum output.	C1-B—ose.	
3	Same as step 2.	1500 kc.	1500 kc.	Adjust trimmer for maximum output.	Cl-A—aerial	

NOTE: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire, connect to signal-generator leads, and place near radio loop. The 1620-kc. index mark is located on the pointer rail, to the extreme right side as viewed from the front.

* For proper adjustment of the oscillator trimmer, fully open the tuning gang and insert a .006-inch non-metallic shim between the heel of the rotor and the top of the stator plates. Close the tuning gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.

World Radio History



Figure 3. **Base View, Showing Printed Wiring Circuit**

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Figure 4. Philco Radio Model B572,



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123 V

MODEL B572, CODE 122



Figure 5. Top View, Showing Parts Placement



Figure 6. Bottom View, Showing Parts Placement

REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Service Description Part No.	Reference Symbol	Description	Service Part No.
C1	Condenser, tuning gang	R7	Resistor, plate load, 500,000 ohms	Part of PC1
CIA	Condenser, aerial trimmerPart of C1	R8	Resistor, grid return, 500,000 ohms	Part of PC1
C1B	Condenser, oscillator trimmerPart of C1	R9	Resistor, cathode bias, 150 ohms	
C2	Condenser, B minus to chassis,	R10	Resistor, B plus filter, 220 ohms	66-1224340°
	100 μμf62-110009001	RH	Resistor, B plus filter, 1000 ohms	
C3	Condenser, drift compensation, 7.5 µµf. 30-1224-83	R12	Resistor, tube saver, 100 ohms	
C4	Condenser, a-v-c by-pass, .047 µf	S1	Switch, off-on	Part of R4
C5	Condenser, oscillator grid, .01 µf	Т1	Transformer, oscillator	
C6	Condenser, screen by-pass, .05 µf	T2	Transformer, output	
C7	Condenser, i-f tuningPart of Z1	W1	Line cord	L-2183°
C8	Condenser, i-f tuningPart of Z1	Z 1	Transformer, 1st i-f	
С9	Condenser, i-f tuningPart of Z2	Z 2	Transformer, 2nd i-f	
C10	Condenser, i-f tuningPart of Z2			
C11	Condenser, detector filteringPart of Z2			
C12	Condenser, detector filteringPart of Z2		MISCELLANEOUS	
C13	Condenser, audio coupling, .005 µf			
C14	Condenser, plate by-passPart of PC1	Descriptio	n	Service Part No.
C15	Condenser, audio coupling, .005 µfPart of PC1			
C16	Condenser, compensatingPart of PC1	Cabinet, s	spruce	
C17	Condenser, tone compensation, .022 µf. 30-4650-43	Cabinet, t	angerine	
C18	Condenser, electrolytic, 3-section	Baek-ar	nd-loop assembly	
C18A	Condenser, filter, 30 µf., 150vPart of C18	Connector	r, interlock, male	
C18B	Condenser, filter, 25 µf., 150vPart of C18	Dial back	plate, spruce	54-4972-2
C18C	Condenser, filter, 20 µf., 150vPart of C18	Dial back	plate, tangerine	
C19	Condenser, line by-pass, 0.1 µf	Dial scale		
11	Lamp, pilot	Drive cor	d, 25-foot spool	
LAI	Loop, part of cabinet back76-8515	Knob		
LSI	Speaker, p-m	Pointer		
PC1	Printed circuit	Shaft, tur	ning	
RI	Resistor, oscillator grid, 22,000 ohms66-3228340°	Bracket, s	witching operating	
R2	Resistor, i-f screen dropping,	Socket as	sembly, pilot lamp	
	4700 ohms	Shield,	pilot lamp	
R3	Resistor, a-v-c filter, 2.2 megohms66-5228340°	Socket, 7	-pin miniature	
R4	Resistor, volume control, .5 megohm	Socket, 7	-pin miniature, 12AV6	
R5	Resistor, diode load, 47,000 olims	Shield,	tube	
R6	Resistor, grid return, 10 megohms66-6108340°	Printed w	viring panel (less components)	



PHILCO RADIO-PHONOGRAPH MODEL B1352

SPECIFICATIONS	
CABINET	
FREOUENCY RANGES	
Broadcast	
Special Services	
AUDIO OUTPUT	
OPERATING VOLTAGE 105-120 volts, 60 cycles, a.c.	
POWER CONSUMPTION	
Radio	
Phonograph	EALLER
INTERMEDIATE FREQUENCY455 kc.	
ANTENNABuilt-in Magnecor antenna; provision	
for external antenna	
PHILCO TUBES	THE MILLION
amplifier; 7C6 detector-a.v.c1st audio;	O
35L6GT output; 50Y7GT rectifier	1
PHONOGRAPH	
Record Changer (For service informa-	MODEL B1352
tion, refer to Service Manual PR-2178)	



Figure 1. Drive-Cord Installation Details

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Figure 2. Base View, Showing Parts Placement

TP3-1211A

ALIGNMENT PROCEDURE

GENERAL—In order to perform the alignment procedure, it is necessary to remove the chassis from the cabinet. This can be done by first removing the cabinet bottom and then removing the chassis mounting board. Be careful not to break the Magnecor antenna leads when removing the chassis. CONTROLS—Set the volume control to maximum, and the tone control to the treble position. Set the wafer switch, WS1, to the broadcast position for the first three steps of the procedure, and to the Special Services position for the last step. Set the tuning control as indicated in the chart.

()UTPUT INDICATOR—Connect the output indicator (a 1000-ohms-per-volt voltmeter or an oscilloscope) between test point B (located on the antenna terminal board) and ground. (Location of test point B is shown in figure 2.)

SIGNAL GENERATOR—Use an amplitude-modulated r-f generator. Connect the ground lead to B minus and the output lead as indicated in the chart.

OUTPUT LEVEL—During the alignment, attenuate the signal-generator output to maintain the output indication below 1 volt.

1	SIGNAL GENERATOR			RADIO		
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST	
1	Connect output lead through a .01-µf condenser to control grid (pin 6) of 7A8 oscmixer tube.	455 kc. (modulated)	Gang fully open.	Adjust in order given in next column, for -maximum output. TC2 and TC4 are located at top of transformers.	TC4-2nd i-f sec. TC3-2nd i-f pri. TC2-1st i-f sec. TC1-1st i-f pri.	
2	See NOTE 1 below.	1620 kc.	1620 kc (see N O T E 2 below).	Adjust for maximum output.	C1B—oscillator trimmer	
3	Same as step 2.	580 kc.	580 kc.	Adjust for maximum output.	TC5—oscillator tuning core	
4	Same as step 2.	1500 kc.	1500 kc.	Adjust for maximum output.	C1A—antenna trimmer (Broadcast)	
5	Same as step 2.	3200 kc.	3200 kc.	Adjust for maximum output.	C2 — antenna trimmer (Special Services)	

ALIGNMENT CHART

NOTE 1: If the Magnecor antenna is used, make up a 6-8 turn, 6-inch-diameter test loop from insulated wire; connect to signalgenerator leads, and place near the Magnecor antenna. If an external antenna is used, connect the signal generator to the external antenna lead.

NOTE 2: The tuning gang can be set to 1620 kc. by placing a piece of 6-mil flat shim stock between the heel of the rotor and the top of the stator plates, and rotating the rotor until it holds the shim in place. Remove the shim before proceeding with the alignment. Be careful not to disturb the setting of the gang when removing the shim.



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RADIO-PHONOGRAPH MODEL B1352

TP3-1212A

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REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

C1 Condenser, tuning gang 31-2751-10 C1A Condenser, trimmer, antenna Part of C1 C1B Condenser, trimmer, oscillator Part of C1 C2 Condenser, trimmer, special Services antenna antenna 31-8476-27 C3 Condenser, trimmer, spice tracker 31-8476-27 C4 Condenser, d-c blocking, 47 $\mu\mu$ f. 60-00475420 C5 Condenser, d-c blocking, 14. 30-1224-65 C6 Condenser, a-v-c by-pass, 1 μ f. 30-4650-47* C7 Condenser, by-pass, 1 μ f. 30-4650-445* C10 Condenser, d-c blocking, .005 μ f. 30-1238-1* C11 Condenser, d-c blocking, .005 μ f. 30-1238-1* C12 Condenser, cathode by-pass, 50 μ f. 30-4650-45* C13 Condenser, tone, .0047 μ f. 30-4650-45* C14 Condenser, tone, .0047 μ f. .30-4651-86 C15 Condenser, filter, 40 μ f., 150v Part of C17 C17 Condenser, filter, 40 μ f., 150v Part of C17 C175 Condenser, filter, 40 μ f., 250v Part	Reference Symbol	Description	Service Part No.
C1A Condenser, trimmer, antenna Part of C1 C1B Condenser, trimmer, secial services antenna 31.6476.27 C3 Condenser, trimmer, series tracker 31.6476.27 C4 Condenser, d-c blocking, 47 $\mu \mu f.$ 60-00475420 C5 Condenser, d-v-c by-pass, 1 $\mu f.$ 30-1224.65 C6 Condenser, av-c by-pass, 1 $\mu f.$ 30-4669 C7 Condenser, athode by-pass, 0.5 $\mu f.$ 30-4650.47* C7 Condenser, athode by-pass, 0.5 $\mu f.$ 30-4650.45* C10 Condenser, athode by-pass, 0.5 $\mu f.$ 30-4650.45* C11 Condenser, bass compensation, 0.1 $\mu f.$ 30-4650.41* C12 Condenser, tone, 0.047 $\mu f.$ 30-4650.41* C13 Condenser, tone compensation, 0.01 $\mu f.$ 30-4650.56* C14 Condenser, filter, 10 $\mu f.$ 150v Part of C1 C16 Condenser, filter, 10 $\mu f.$ 150v Part of C17 C17A Condenser, filter, 40 $\mu f.$ 250v Part of C17 C17D Condenser, phono isolation, 0.1 $\mu f.$ 30-4225417* C20	Cl	Condenser, tuning gang	31-2751-10
C1B Condenser, trimmer, oscillator Part of C1 C2 Condenser, trimmer, Special Services antenna 31.6476-27 C3 Condenser, dc blocking, 47 $\mu\mu$ f. 60.00475420 C5 Condenser, dc-vb.ypass, 1 μ f. 30.4689 C64 Condenser, acv-c by-pass, 1 μ f. 30.4689 C7 Condenser, acv-c by-pass, 10 μ f. 30.4689 C8 Condenser, actiode by-pass, 05 μ f. 30.4689 C11 Condenser, actiode by-pass, 0.05 μ f. 30.4689 C12 Condenser, actiode by-pass, 50 μ f. 30.4689 C13 Condenser, dc-blocking, 005 μ f. 30.4689 C14 Condenser, tone, 0047 μ f. 30.4650-56* C15 Condenser, tone compensation, 001 μ f. 30.4671-86 C17 Condenser, filter, 40 μ f. 150v Part of C17 C18 Condenser, filter, 40 μ f. 30.42575-38 C17A C17D Condenser, filter, 40 μ f. 30.4250-58* C17 C17D Condenser, filter, 40 μ f. 250v Part of C17 C17D Condenser, phono	CIA	Condenser, trimmer, antenna	Part of C1
C2 Condenser, trimmer, Special Services antenna 31-6476-27 C3 Condenser, dc blocking, 47 $\mu d.$ 60-00475420 C5 Condenser, dc blocking, 47 $\mu d.$ 30-4650-47 C7 Condenser, acvc by-pass, 1 $\mu d.$ 30-4650-47 C7 Condenser, acvc by-pass, 1 $\mu d.$ 30-4650-45 C8 Condenser, acthode by-pass, 05 $\mu d.$ 30-1238-1* C11 Condenser, acthode by-pass, 50 $\mu d.$ 30-1238-1* C12 Condenser, acthode by-pass, 50 $\mu d.$ 30-4650-45* C13 Condenser, cathode by-pass, 50 $\mu d.$ 30-4650-45* C14 Condenser, tone, 0047 $\mu d.$ 30-4650-45* C15 Condenser, tone compensation, 001 $\mu d.$ 30-4650-56* C16 Condenser, tone compensation, 001 $\mu d.$ 30-4650-56* C17 Condenser, filter, 40 $\mu d.$ 250* Part of C17 C17B Condenser, filter, 40 $\mu d.$ 250* Part of C17 C17D Condenser, filter, 40 $\mu d.$ 250* Part of C17 C17D Condenser, phono isolation, 01 $\mu d.$ 30-4256-17 <t< th=""><th>CIB</th><th>Condenser, trimmer, oscillator</th><th>Part of Cl</th></t<>	CIB	Condenser, trimmer, oscillator	Part of Cl
antenna 31-6476-27 C3 Condenser, trimmer, series tracker 31-6476-27 C4 Condenser, d-c blocking, 47 $\mu \mu f.$ 60-00475420 C5 Condenser, av-c by-pass, 1 $\mu f.$ 30-1224-65 C6 Condenser, av-c by-pass, 1 $\mu f.$ 30-4659-47* C7 Condenser, av-c by-pass, 1 $\mu f.$ 30-4659 C8 Condenser, av-c by-pass, 0.5 $\mu f.$ 30-4659-45* C10 Condenser, av-c boy-pass, 0.5 $\mu f.$ 30-4650-45* C11 Condenser, av-c boy-pass, 0.05 $\mu f.$ 30-1238-1* C12 Condenser, cathode by-pass, 50 $\mu f.$ 30-4650-45* C13 Condenser, tone, 0.047 $\mu f.$ 30-4650-56* C14 Condenser, tone, 0.047 $\mu f.$ 30-4650-56* C15 Condenser, electrolytic, 4-section 30-2575-38 C174 Condenser, filter, 40 $\mu f.$ 250* Part of C17 C175 Condenser, filter, 40 $\mu f.$ 250* Part of C17 C176 Condenser, filter, 40 $\mu f.$ 250* Part of C17 C177 Condenser, phono isolation, 01 $\mu f.$ 30-4650-58* </th <th>C2</th> <th>Condenser, trimmer, Special Services</th> <th></th>	C2	Condenser, trimmer, Special Services	
C3 Condenser, trimmer, series tracker 31-5476-27 C4 Condenser, dice blocking, 47 $\mu\mu f.$ 60-00475420 C5 Condenser, dived trimmer, 7.5 $\mu\mu f.$ 30-1224-65 C6 Condenser, a-v-c by-pass, 1 $\mu f.$ 30-4669 C7 Condenser, cathode by-pass, 0.5 $\mu f.$ 30-4669 C8 Condenser, action coupling, 0.05 $\mu f.$ 30-4659-445* C10 Condenser, action coupling, 0.05 $\mu f.$ 30-4659-445* C11 Condenser, actobe by-pass, 50 $\mu f.$ 30-4659-45* C12 Condenser, tone, 0.047 $\mu f.$ 30-4650-56* C13 Condenser, tone compensation, 0.01 $\mu f.$ 30-4671-86 C17 Condenser, screen filter, 10 $\mu f.$ 150v Part of PC1 C18 Condenser, filter, 40 $\mu f.$ 150v Part of C17 C17D Condenser, filter, 40 $\mu f.$ 150v Part of C17 C17D Condenser, filter, 40 $\mu f.$ 250v Part of C17 C17D Condenser, filter, 40 $\mu f.$ 250v Part of C17 C17D Condenser, phono isolation, 0.1 $\mu f.$ 30-1225-17 <	_	antenna	31-6476-27
C4 Condenser, d-c blocking, 47 $\mu\mu$ f. .60-00475420 C5 Condenser, fixed trimmer, 7.5 $\mu\mu$ f. .30-1224-65 C6 Condenser, α -v-c by-pass, 1 μ f. .30-4659-47* C7 Condenser, α -v-c by-pass, .1 μ f. .30-4650-45* C10 Condenser, acthode by-pass, .05 μ f. .30-4650-45* C11 Condenser, d-c blocking, .005 μ f. .30-1238-1* C12 Condenser, d-c blocking, .005 μ f. .30-4650-45* C13 Condenser, cathode by-pass, 50 μ f. .30-4650-45* C14 Condenser, cathode by-pass, 50 μ f. .30-4650-45* C15 Condenser, tone, .0047 μ f. .30-4650-55* C16 Condenser, tone, .0047 μ f. .30-4650-55* C17 Condenser, filter, 40 μ f., 150v Part of C17 C17B Condenser, filter, 40 μ f., 250v Part of C17 C17D Condenser, filter, 40 μ f., 250v Part of C17 C17D Condenser, roltage doubling, 20 μ f. .50-10225417* C20 Condenser, ref by-pass, 220 μ f. .50-10225417* C21 Condenser, phono attenuator, 47 $\mu\mu$ f.	СЗ	Condenser, trimmer, series tracker	31-6476-27
CS Condenser, fixed trimmer, 7.5 $\mu\mu f.$.30-1224.65 C6 Condenser, a-v-c by-pass, .1 $\mu f.$.30-4650-47* C7 Condenser, cathode by-pass, .05 $\mu f.$.30-4650 C10 Condenser, cathode by-pass, .05 $\mu f.$.30-4650 C11 Condenser, d-c blocking, .005 $\mu f.$.30-1238-1* C12 Condenser, d-c blocking, .005 $\mu f.$.30-4650-441* C13 Condenser, cathode by-pass, 50 $\mu f.$.30-4650-441* C13 Condenser, cathode by-pass, 50 $\mu f.$.30-4650-441* C13 Condenser, cathode by-pass, 50 $\mu f.$.30-4650-56* C14 Condenser, d-c blocking, .005 $\mu f.$ Part of PC1 C16 Condenser, dectrolytic, 4-section .30-4657-38 C17 Condenser, filter, 40 $\mu f.$.150v Part of C17 C17B Condenser, filter, 40 $\mu f.$.250v Part of C17 C17D Condenser, filter, 40 $\mu f.$.250v Part of C17 C17D Condenser, roltage doubling, 20 $\mu f.$.30-1226-17 C22 Condenser, roltage doubling, 3.3 $\mu \mu f.$.30-1221 <th< th=""><th>C4</th><th>Condenser, d-c blocking, 47 µµf.</th><th>60-00475420</th></th<>	C4	Condenser, d-c blocking, 47 µµf.	60-00475420
C6 Condenser, a-v-c by-pass, .1 μ f. .30-4650-47* C7 Condenser, athode by-pass, .05 μ f. .30-4659 C8 Condenser, athode by-pass, .05 μ f. .30-4650-45* C10 Condenser, athode by-pass, .05 μ f. .30-1238-1* C11 Condenser, action coupling, .005 μ f. .30-1238-1* C12 Condenser, d-c blocking, .005 μ f. .30-4650-41* C13 Condenser, tone, .0047 μ f. .30-4650-45* C14 Condenser, tone compensation, .001 μ f. .30-4650-56* C15 Condenser, tone compensation, .001 μ f. .30-4650-56* C16 Condenser, filter, 40 μ f. .50v Part of PC1 C17 Condenser, filter, 40 μ f. .150v Part of C17 C17D Condenser, filter, 40 μ f. .25v Part of C17 C17D Condenser, pilter, 40 μ f. .25v Part of C17 C17D Condenser, niter, 40 μ f. .25v Part of C17 C17D Condenser, niter, 40 μ f. .30-425-17 C20 Condenser, antenna blocking, .3. μ f. .30-1221 <t< th=""><th>C5</th><th>Condenser, fixed trimmer, 7.5 µµf.</th><th>30-1224-65</th></t<>	C5	Condenser, fixed trimmer, 7.5 µµf.	30-1224-65
C7 Condenser, by-pass, .1 μ f. .30-4669 C8 Condenser, cathode by-pass, .05 μ f. .30-4650-45* C10 Condenser, audio coupling, .005 μ f. .30-1238-1* C11 Condenser, d-c blocking, .005 μ f. .30-4650-45* C12 Condenser, d-c blocking, .005 μ f. .30-4650-41* C13 Condenser, cathode by-pass, 50 μ f. .30-4650-56* C14 Condenser, d-c blocking, .005 μ f. Part of PC1 C16 Condenser, d-c blocking, .005 μ f. Part of PC1 C16 Condenser, d-c blocking, .001 μ f. .30-4650-56* C17 Condenser, screen filter, 10 μ f., 150v Part of C17 C17B Condenser, filter, 40 μ f., 250v Part of C17 C17D Condenser, filter, 40 μ f., 250v Part of C17 C17D Condenser, roltage doubling, 20 μ f. .30-425-17 C20 Condenser, roltage doubling, .01 μ f. .30-425-17 C21 Condenser, rib-pass, .220 μ f. .60-10225417* C22 Condenser, rel by-pass, .220 μ f. .30-1221 C33 Condenser, rib-pass, .220 μ f. .	C6	Condenser, a-v-c by-pass, .1 µf	30-4650-47*
C8 Condenser, cathode by-pass, .05 μ f. .30-4650-45* C10 Condenser, audio coupling005 μ f. .30-1238-1* C11 Condenser, d-c blocking, .005 μ f. .30-4650-41* C12 Condenser, tanto de by-pass, .05 μ f. .30-4650-41* C13 Condenser, tanto de by-pass, .00 μ f. .30-4650-56* C14 Condenser, tanto de by-pass, .00 μ f. .30-4650-56* C15 Condenser, tanto de by-pass, .00 μ f. .30-4671-86 C17 Condenser, tanto compensation, .001 μ f. .30-4671-86 C17 Condenser, filter, 40 μ f., 250v Part of C17 C17D Condenser, notage doubling, 20 μ i. 150v. .45:3041 C19 Condenser, phono isolation, .01 μ f. .30-1226-17 C20 Condenser, fiby-pass, .20 $\mu\mu$ f. .60-10225417* C21 Condenser, phono attenuator, 47 $\mu\mu$ f. .90-1022 C21 C	C7	Condenser, by-pass, .1 µf.	
C10 Condenser, audio coupling005 μ f. .30-1238-1* C11 Condenser, d-c blocking, .005 μ f. .30-1238-1* C12 Condenser, bass compensation, .01 μ f. .30-4650-41* C13 Condenser, tone, .0047 μ f. .30-4650-56* C14 Condenser, tone, .0047 μ f. .30-4651-56* C15 Condenser, tone compensation, .001 μ f. .30-4671-86 C17 Condenser, tone compensation, .001 μ f. .30-4671-86 C17 Condenser, tilter, 40 μ f., 150v Part of C17 C17B Condenser, filter, 40 μ f., 250v Part of C17 C17D Condenser, filter, 40 μ f., 250v Part of C17 C17D Condenser, line by-pass, .04 μ f. .30-1226-17 C20 Condenser, phono isolation, .01 μ f. .30-4650-58* C21 Condenser, fiby-pass, .20 μ gf. .30-1225417* C22 Condenser, phono attenuator, 47 μ gf. .30-1225417* C23 Condenser, phono attenuator, 47 μ gf. .30-1225417* C24 Condenser, phono attenuator, 47 μ gf. .30-1225417* C23 Condenser, phono attenuator, 47 μ	C8	Condenser, cathode by-pass, .05 µf	30-4650-45*
C11 Condenser, d-c blocking, .005 μ f. .30-1238-1* C12 Condenser, bass compensation, .01 μ f.	C10	Condenser, audio coupling005 µí	30-1238-1*
C12 Condenser, bass compensation, 01 μ f.	C11	Condenser, d-c blocking, .005 µf	30-1238-1*
C13 Condenser, cathode by-pass, 50 μf., 25v	C12	Condenser, bass compensation, .01 μ f	30-4650-41*
C14 Condenser, tone, .0047 μf. .30-4650-56° C15 Condenser, d-c blocking, .005 μf. Part of PC1 C18 Condenser, tone compensation, .001 μf. .30-4671-86 C17 Condenser, electrolytic, 4-section .30-2575-38 C17A Condenser, screen filter, 10 μf., 150v Part of C17 C17B Condenser, filter, 40 μf., 250v Part of C17 C17C Condenser, filter, 40 μf., 250v Part of C17 C17D Condenser, filter, 40 μf., 250v Part of C17 C18 Condenser, voltage doubling, 20 μf., 150v	C13	Condenser, cathode by-pass, 50 µf., 25v	45-3035-2
C15 Condenser, d-c blocking, .005 μ f. Part of PC1 C18 Condenser, tone compensation, .001 μ f.	C14	Condenser, tone, .0047 µf.	30-4650-56*
C16 Condenser, tone compensation, .001 μf.	C15	Condenser, d-c blocking, .005 µf	Part of PC1
C17 Condenser, electrolytic, 4-section	C16	Condenser, tone compensation, .001 μ f	30-4671-86
C17A Condenser, screen filter, 10 μf., 150v Part of C17 C17B Condenser, filter, 40 μf., 150v Part of C17 C17C Condenser, filter, 40 μf., 250v Part of C17 C17D Condenser, filter, 40 μf., 250v Part of C17 C17D Condenser, filter, 40 μf., 250v Part of C17 C18 Condenser, voltage doubling, 20 μf., 150v45-3041 C19 Condenser, line by-pass, .04 μf.	C17	Condenser, electrolytic, 4-section	30-2575-38
C17B Condenser, filter, 40 μf., 150v Part of C17 C17C Condenser, filter, 40 μf., 250v Part of C17 C17D Condenser, filter, 40 μf., 250v Part of C17 C18 Condenser, voltage doubling, 20 μf., 150v Part of C17 C19 Condenser, voltage doubling, 20 μf., 150v 45-3041 C19 Condenser, phono isolation, 01 μf. 30-1226-17 C20 Condenser, phono isolation, 01 μf. 30-4650-58* C21 Condenser, antenna blocking, 3.3 μμf. 30-1221 C23 Condenser, antenna blocking, 3.3 μμf. 30-1221 C23 Condenser, phono attenuator, 47 μμf. Part of PC2 I1 Lamp, pilot 34-2064* L2 Coil, oscillator shunt 32-4552-1 LA1 Loop antenna, Magnecor 30-6001 PC1 Printed circuit, d-c blocking 30-6002-1 R1 Resistor, grid return, 470,000 ohms 66-4108340* R2 Resistor, grid leak, 100,000 ohms 66-418840* R3 Resistor, screen dropping, 27,000 ohms 66-3278340* R4 Resisto	C17A	Condenser, screen filter, 10 µf., 150v	Part of C17
C17C Condenser, filter, 40 μf., 250v Part of C17 C17D Condenser, filter, 40 μf., 250v Part of C17 C18 Condenser, voltage doubling, 20 μf., 150v A45-3041 C19 Condenser, line by-pass, .04 μf. .30-1226-17 C20 Condenser, phono isolation, .01 μf. .30-4650-58* C21 Condenser, phono isolation, .01 μf. .30-4650-58* C22 Condenser, antenna blocking, 3.3 μμf. .30-1221 C23 Condenser, antenna blocking, 3.3 μμf. .30-1221 C23 Condenser, phono attenuator, 47 μμf. Part of PC2 I1 Lamp, pilot .34-2064* L2 Coil, oscillator shunt .32-4562-1 LA1 Loop antenna, Magnecor .30-6001 PC2 Printed circuit, d-c blocking .30-6002-1 R1 Resistor, grid return, 470,000 ohms .66-4108340* R2 Resistor, grid leak, 100,000 ohms .66-4188340* R3 Resistor, acthode bias, 180 ohms .66-1188340* R4 Resistor, screen dropping, 27,000 ohms .66-3278340* R5	C17B	Condenser, filter, 40 µf., 150v	Part of C17
C17D Condenser, filter, 40 μf., 250v Part of C17 C18 Condenser, voltage doubling, 20 μf., 150v45-3041 C19 Condenser, line by-pass, .04 μf. .30-1226-17 C20 Condenser, phono isolation, .01 μf. .30-4650-58* C21 Condenser, rf by-pass, 220 μμf. .60-10225417* C22 Condenser, antenna blocking, 3.3 μμf. .30-1221 C23 Condenser, phono attenuator, 47 μμf. Part of PC2 I1 Lamp, pilot .34-2064* L2 Coil, oscillator shunt .32-4552-1 LA1 Loop antenna, Magnecor .30-6001 PC1 Printed circuit, d-c blocking .30-6002-1 R1 Resistor, grid return, 470,000 ohms .66-4478340* R2 Resistor, grid leak, 100,000 ohms .66-4188340* R4 Resistor, screen dropping, 27,000 ohms .66-3278340* R5 Resistor, diode return, 470,000 ohms .66-3478340* R4 Resistor, diode load, 2.2 megohms .66-188340* R4 Resistor, diode load, 2.2 megohms .66-3478340* R4 Resistor, dio	C17C	Condenser, filter, 40 µf., 250v	Part of C17
C18 Condenser, voltage doubling, 20 μf., 150v45-3041 C19 Condenser, line by-pass, .04 μf. .30-1226-17 C20 Condenser, phono isolation, .01 μf. .30-4650-58* C21 Condenser, rf by-pass, .220 μμf. .60-10225417* C22 Condenser, antenna blocking, 3.3 μμf. .30-1221 C23 Condenser, antenna blocking, 3.3 μμf. .30-1221 C23 Condenser, phono attenuator, 47 μμf. Part of PC2 I1 Lamp, pilot .34-2064* L2 Coil, oscillator shunt .32-4552-1 LA1 Loop antenna, Magnecor .32-4455-9 LS1 Speaker .36-1631-8 PC1 Printed circuit, d-c blocking .30-6001 PC2 Printed circuit, phono hi-comp. .30-6002-1 R1 Resistor, grid return, 470,000 ohms .66-4188340* R2 Resistor, grid leak, 100,000 ohms .66-4188340* R3 Resistor, screen dropping, 27,000 ohms .66-3278340* R4 Resistor, diode return, 470,000 ohms .66-3478340* R5 Resistor, diode load, 2.2 megohms	C17D	Condenser, filter, 40 µf., 250v	Part of C17
C19 Condenser, line by-pass, .04 μf. .30-1226-17 C20 Condenser, phono isolation, .01 μf. .30-4650-58* C21 Condenser, r-f by-pass, .220 μμf. .60-10225417* C22 Condenser, antenna blocking, 3.3 μμf. .30-1221 C23 Condenser, phono attenuator, 47 μμf.	C18	Condenser, voltage doubling, 20 μ f., 150v	
C20 Condenser, phono isolation, .01 µf. .30-4650-58* C21 Condenser, r-f by-pass, 220 µµf. .60-10225417* C22 Condenser, antenna blocking, 3.3 µµf. .30-1221 C23 Condenser, phono attenuator, 47 µµf.	C19	Condenser, line by-pass, .04 µf.	30-1226-17
C21 Condenser, r-f by-pass, 220 μμf. 60-10225417° C22 Condenser, antenna blocking, 3.3 μμf. 30-1221 C23 Condenser, phono attenuator, 47 μμf. Part of PC2 I1 Lamp, pilot 34-2064° L2 Coil, oscillator shunt 32-4562-1 LA1 Loop antenna, Magnecor 32-4552-1 LA1 Loop antenna, Magnecor 30-6001 PC1 Printed circuit, d-c blocking 30-6002-1 R1 Resistor, grid return, 470,000 ohms 66-4178340° R2 Resistor, grid leak, 100,000 ohms 66-4188340° R3 Resistor, acthode bias, 180 ohms 66-1188340° R4 Resistor, screen dropping, 27,000 ohms 66-3278340° R5 Resistor, diode return, 470,000 ohms 66-3478340° R6 Resistor, diode load, 2.2 megohms 66-5228340° R9 Resistor, grid leak, 10 megohms 66-6108340° R10 Volume control, 2 megohms (with off-on switch and tone control) 33-5563-55 R11 Resistor, bass compensation, 68,000 ohms 66-3688340° R12	C20	Condenser, phono isolation, .01 µł	30-4650-58*
C22 Condenser, antenna blocking, 3.3 μμf.	C21	Condenser, r-f by-pass, 220 µµf.	60-10225417°
C23 Condenser, phono attenuator, 47 μμf. Part of PC2 II Lamp, pilot	C22	Condenser, antenna blocking, 3.3 $\mu\mu f$	
II Lamp, pilot	C23	Condenser, phono attenuator, 47 $\mu\mu f$	Part of PC2
L2 Coil, oscillator shunt	11	Lamp, pilot	34-2064*
LA1 Loop antenna, Magnecor	L2	Coil, oscillator shunt	32-4562-1
LS1 Specker 36-1631-8 PC1 Printed circuit, d-c blocking 30-6001 PC2 Printed circuit, phono hi-comp. 30-6002-1 R1 Resistor, grid return, 470,000 ohms 66-4478340° R2 Resistor, grid leak, 100,000 ohms 66-4108340° R3 Resistor, B- to chassis, 150,000 ohms 66-4188340° R4 Resistor, cathode bias, 180 ohms 66-1188340° R5 Resistor, screen dropping, 27,000 ohms 66-3278340° R6 Resistor, i-f filter, 47,000 ohms 66-3478340° R7 Resistor, diode return, 470,000 ohms 66-4478340° R8 Resistor, diode load, 2.2 megohms 66-5228340° R9 Resistor, grid leak, 10 megohms 66-6108340° R10 Volume control, 2 megohms (with off-on switch and tone control) 33-5563-55 R11 Resistor, bass compensation, 68,000 ohms 66-3688340° R12 Tone control, 5 megohms Part of R10	LAI	Loop antenna, Magnecor	32-4455-9
PC1 Printed circuit, d-c blocking	LSI	Speaker	36-1631-8
PC2 Printed circuit, phono hi-comp.	PCI	Printed circuit, d-c blocking	
R1 Resistor, grid return, 470,000 ohms	PCZ	Printed circuit, phono hi-comp.	30-6002-1
R2 Resistor, grid leck, 100,000 ohms 66-4108340* R3 Resistor, B- to chassis, 150,000 ohms 66-4158340* R4 Resistor, cathode bias, 180 ohms 66-1188340* R5 Resistor, screen dropping, 27,000 ohms 66-3278340* R6 Resistor, i-f filter, 47,000 ohms 66-3478340* R7 Resistor, diode return, 470,000 ohms 66-3478340* R8 Resistor, diode load, 2.2 megohms 66-5228340* R9 Resistor, grid leak, 10 megohms 66-6108340* R10 Volume control, 2 megohms (with off-on switch and tone control) 33-5563-55 R11 Resistor, bass compensation, 68,000 ohms 66-3688340* R12 Tone control, 5 megohms Part of R10	RI Do	Resistor, grid return, 4/0,000 onms	66-4478340
R3 Resistor, b ⁻ to chassis, 150,000 ohms 50-4138340 ⁻ R4 Resistor, cathode bias, 180 ohms 66-1188340 ⁻ R5 Resistor, screen dropping, 27,000 ohms 66-3278340 ⁻ R6 Resistor, screen dropping, 27,000 ohms 66-3478340 ⁻ R7 Resistor, diode return, 470,000 ohms 66-3478340 ⁻ R8 Resistor, diode load, 2.2 megohms 66-5228340 ⁻ R9 Resistor, grid leak, 10 megohms 66-6108340 ⁻ R10 Volume control, 2 megohms (with off-on switch and tone control) 33-5563-55 R11 Resistor, bass compensation, 68,000 ohms 66-3688340 ⁻ R12 Tone control, 5 megohms Part of R10	RZ	Resistor, grid leak, 100,000 ohms	66-4108340*
Re Resistor, cathode bids, 160 onms	R3 R4	Resistor, B- to chassis, 150,000 ohms	66-4158340
R5 Resistor, screen dropping, 27,000 ohms B5-3278340 ⁻¹ R6 Resistor, i-f filter, 47,000 ohms G6-3478340 ⁻¹ R7 Resistor, diode return, 470,000 ohms G6-3478340 ⁻¹ R8 Resistor, diode load, 2.2 megohms G6-5228340 ⁻¹ R9 Resistor, grid leak, 10 megohms G6-6108340 ⁺ R10 Volume control, 2 megohms (with off-on switch and tone control) 33-5563-55 R11 Resistor, bass compensation, 68,000 ohms G6-3688340 ⁺ R12 Tone control, 5 megohms Part of R10	114	Resistor, cathode blas, 180 onms	
R0 Resistor, Fr Inter, 47,000 ohms	n5 De	Resistor, screen dropping, 27,000 onms	
R8 Resistor, diode lead, 2.2 megohms	87	Resistor diode roture 470.000 abre-	00-J4/834U"
R9 Resistor, dicte loca, 2.2 megohms	BS	Resistor diode load 22 magahma	00+44/0340*
R10 Volume control, 2 megohms (with off-on switch and tone control)	Rg	Resistor and leak 10 measures	
and tone control)	B10	Volume control 2 merchane (with off on an	
R11 Resistor, bass compensation, 68,000 ohms66-3688340* R12 Tone control, 5 megohms Part of R10		and tone control)	33-5563-55
R12 Tone control, 5 megohmsPart of R10	R11	Resistor, bass compensation, 68.000 ohms	
	R12	Tone control, 5 megohms	Part of R10

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Reference Symbol	Description	Service Part No.
R13	Resistor, plate load, 500,000 ohmsP	art of PC1
R14	Resistor, grid leak, 500,000 ohmsP	art of PC1
R15	Resistor, cathode bias, 180 ohms, 1 watt6	6-1184340*
R16	Resistor, filter, 5000 ohms, 7 watts	3-1335-95
R17	Resistor, filter, 270 ohms, 7 watts	3-1335-91
R18	Resistor, tube saver, 100 ohms	.33-1343-3
R19	Resistor, antenna loading, 150,000 ohms6	6-4158340*
R20	Resistor, cathode bias, 4700 ohms6	6-2478340*
R21	Resistor, preamplifier plate, 220,000 ohms6	6-4228340
R22	Resistor, phono attenuator, 470,000 ohmsP	art of PC2
R23	Resistor, grid leak, 470,000 ohms6	6-4478340*
R24	Resistor, feedback, 10 ohms6	6-0108340
S1	Switch, off-onP	art of R10
T1	Transformer, oscillator	.32-4574-3
T2	Transformer, output	32-8242-14
W1	Line cord	L-2183*
WS	Wafer switch, 2-section	42-2017
Z 1	Transformer, 1st i-f	32-4160
Z2	Transformer, 2nd i-f	32-4240

MISCELLANEOUS

	Service
Description	Part No.
Antenna lead ass'y.	
Cabinet, birch	
Cabinet bottom	
Dial scale	
Hardware, Changer Mounting	
Sleeve (3)	
Speed nut (3)	W2554
Spring, top (3)	56-7059FA9
Spring, bottom (3)	56-7059-1FCP
Knob, tone	
Knob, tuning	
Knob, volume-on-off	
Knob, wafer switch	
Panel, diffusing	54-8575-3
Spring clip, diffusing panel (2)	
Pointer	
Rail ass'y., pointer	
Rubber mount, tuner mtg	
Shaft, tuning	
Hairpin, shaft retaining	
Spring clamp, tone arm	56-8554
Socket, Loktal	27-6207-1
Socket, octal	



SERVICE BULLETIN FOR PHILCO RADIO-PHONOGRAPH MODEL B1753



Philco Radio-Phonograph Model B1753 is identical in all respects to Philco Radio-Phonograph Model B1752 except for cabinet styling. For all service information, refer to the Service Manual, PR-2563, for Model B1752. Part numbers which differ from Model B1752 are listed below.

Description	Service Part No.
Cabinet, light	11014-1
Back, cabinet	54-9099-1
Door pull	28-9608-1
Hinge, r.h.	56-9922-2
Hinge, 1.h.	56-9922-3

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SERVICE BULLETIN FOR PHILCO PORTABLE RADIO MODEL B649



Philco Portable Radio Model B649 is identical in all respects to Philco Portable Radio Model B650 except for cabinet styling. For all service information, refer to the Service Manual, PR-2536, for Model B650. Part numbers which differ from Model B650 are listed below.

Description	Service	Part No.
Cabinet		11006-4
Back, cabinet		54-6077-4
Handle, cabinet		54-6078-4
Dial scale		54-6083-1
Grille		54-6079-1
Knob, volume		54-6082-2
Knob, tuning		54-6082-3
Handle, battery-saver switch		54-6081-4
Strap, handle, upper (2)		28-9568-1
Strap, handle, lower (2)		28-9569

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SERVICE BULLETIN FOR PHILCO RADIO CLOCK MODEL B714X, CODE 121

Philco Radio-Clock Model B714X, Code 121, is identical to Philco Radio-Clock Model B714, Code 121, except for the private listening jack and the night light. The private listening jack and the night light are not included in Model B714X, Code 121. For all service information refer to the Service Manual, PR-2541, for Model B714, Code 121. Part numbers which differ from Model B714, Code 121, are listed below.

Description	Service Part No.
Cabinet, spruce	10940-20
Knob, volume or tuning	54-4986-2
Cabinet, maroon	10940-18
Knob, volume or tuning	54-4986
Back-and-loop ass'y.	76-8730-2
Knob, clock (3)	54-4983-5
Dial, radio	54-4985-1
Bezel, radio	56-9845
Bezel, clock	56-9844
Clock	41-2042-5
Cover, clock	54-4989-2
Cable, clock	41-3909-7
Backplate ass'y.	76-8421
Shield, light	54-9018
Shaft, tuning	28-9475
Bracket, switch operating	28-9473

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HOME RADIO

PHILCO RADIO-CLOCK MODELS B712, CODE 122, AND B714, CODE 122

SPECIFICATIONS

CABINET	Molded plastic
CIRCUIT F	our-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	
Standard Broadcast	540 kc. to 1620 kc.
Special Services	1700 kc. to 3400 kc.
AUDIO OUTPUT	l watt
OPERATING VOLTAGE	105 to 120 volts, a.c. or d.c.
POWER CONSUMPTION	
AERIAL	High-impedance loop
INTERMEDIATE FREQUENC	Y
PHILCO TUBES 12BE6 con a	verter, 12BA6 i-f amplifier, 12AV6 det. – .v.c1st audio, 35C5 output, 35W4 rectifier







Figure 1. Dial-Cord Installation Details

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SERVICE HINTS

REMOVING THE CHASSIS FROM THE CABINET

B712, Code 122

To remove the chassis from the cabinet, first remove the station selector knob and volume control knob, and, at the bottom-center of the dial scale, remove the dial-scale cover retaining screw. Loosen the dial-scale cover by gently rocking it up and down with the finger tips until the cover comes away from the cabinet. Remove the pointer by gently pulling it off the tuning-gang shaft. Remove the chassis mounting screws from beneath the cabinet, and slide the chassis out.

B714, Code 122

To remove the chassis from the cabinet, first remove the station selector knob and the volume control knob. Then remove the chassis mounting screws from beneath the cabinet, and slide the chassis out.

REMOVING THE SUBBASE

After removing the chassis from the cabinet, remove the subbase, using the following procedure.

- 1. Remove the output transformer and dial light connections by pulling the jacks from the pins on the subbase.
- 2. Unsolder the volume control and a-c leads, and unsolder and remove the loop aerial.
- 3. Spring the Special Services switch bracket off the tuning shaft.
- 4. At the rear of the panel, bend the hold down tabs out flush with the subbase, and remove.

PARTS REPLACEMENT

Whenever possible, replace all components and leads from the top side of the chassis. In cases where this is not possible, the components must be unsoldered when removed from the bottom. Use only a lightweight low-wattage iron of approximately 22.5 to 25 watts, and always use a low-melting-point solder. Extreme caution must be used to prevent solder from dropping or splashing, and to avoid lifting of the printed wiring foil. Use only the tip of the soldering iron at the solder point whenever heat is being applied. Hold the subbase in one hand while applying heat to the solder point and throw the solder off, with a downward thrust, as soon as it starts to melt. When the solder is removed, the part to be repaired or replaced can be lifted from its location. Insert the new part and secure it with just a drop of solder at each point.

REPLACING TUBE SOCKETS AND I-F TRANSFORMERS

To replace tube sockets and i-f transformers, follow the procedure given above for removing solder. Then use a sharp knife to sever the remaining thin bond of solder at the connections. With the solder removed, the part can be backed out of the slots. Before inserting the repaired or new part, clean all connections at the unsoldered lugs. Use caution when reinserting parts through the subbase slots, so that the foil is not lifted. When soldering is complete apply an electrical varnish to all repaired areas.

ALIGNMENT PROCEDURE

RADIO CONTROLS-Set volume control to maximum. Set tuning control and band switch, S2, as indicated in chart.

OUTPUT METER—Connect across voice-coil terminals.

SIGNAL GENERATOR-Connect generator and set frequency as indicated in chart. Use modulated output.

OUTPUT LEVEL-During alignment, adjust signal-generator output to hold output-meter reading below 1.25 volts.

	SIGNAL GENERA					
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND SWITCH SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Ground lead to B—; output lead through a .1-µf. condenser to grid (pin 7) of 12BE6.	455 kc.	Tuning gang fully open	Broadcast	Adjust tuning cores, in order given, for maximum output. TC1 and TC3 are located at top of transformers.	TC1—2nd i-f sec. TC3—2nd i-f pri. TC2—1st i-f sec. TC1—1st i-f pri.
2	Radiating loop (See note below).	1620 kc.	*1620 kc.	Broadcast	Adjust trimmer for maximum output.	C1-B—osc.
3	Same as step 2.	1500 kc.	1500 ke.	Broadcast	Adjust trimmer for maximum output.	Cl-A—aerial (broadcast)
4	Same as step 2.	3200 Kc.	3200 kc.	Special Services	Adjust trimmer for maximum output.	C1-C—aerial (special services).

NOTE: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire, connect to signal-generator leads, and place near radio loop.

* For proper adjustment of the oscillator trimmer, fully open the tuning gang and insert a .006-inch non-metallic shim between the heel of the rotor and the top of the stator plates. Close the tuning gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.

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B/12, CODE 122, AND B/14, CODE 122

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Figure 5. Top View, Showing Parts Placement



Figure 6. Bottom View, Showing Parts Placement

REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Service Description Part No.	Reference Symbol
CI	Condenser, tuning gang	J 1
CIA	Condenser, antenna trimmer	J 2
C1B	Condenser, oscillator trimmer	Ll
CIC	Condenser, trimmer, Special Services	L2
C2	Condenser, antenna series tracker,	LAI
	944 μμf	LS1
C3	Condenser, drift compensation, 7.5 µµf 30-1224-83	LS1
C4	Condenser, a-v-c bypass, .047 µf	R1
C5	Condenser, oscillator grid, .01 µf	R2
C6	Condenser, screen bypass, .047 µf	R3
C7	Condenser, i-f tuning Part of Z1	R4
C8	Condenser, i-f tuning	R5
C9	Condenser, i-f tuning Part of Z2	R6
C10	Condenser, i-f tuning Part of Z2	R7
CII	Condenser, detector filtering Part of Z2	R8
C12	Condenser, detector filtering	Ro
C13	Condenser, audio coupling, .005 µf	R10
C14	Condenser, plate bypass Part of PC1	R10
C15	Condenser, audio coupling, .005 µf Part of PC1	111
C16	Condenser, compensating	R12
C17	Condenser, tone compensation, .022 µf 30-4650-43	K13
C18	Condenser, electrolytic, 3-section	DO
C18A	Condenser, filter, 30 µf., 150v	PUI
C18B	Condenser, filter, 25 µf., 150v Part of C18	51
C18C	Condenser, filter, 20 µf., 150v	S2
C19	Condenser, line by-pass, 0.1 µf	TI
C20	Condenser, B minus to chassis,	T2
	100 μμf	W1
I1	Lamp, pilot	Zl
I2	Lamp, night light (Model B714) 34-2477	Z2

	MISCELLANEOUS	
Cabinet		Window,
Model B712		Model
Sand		Shaft, tu
Forest green		Bracket,
Model B714		Ring, ret
Pearl grey	10940-16	Connecto
Knobs		Connector
Model B712		Connecto
Clock (3)		Connecto
Tuning or volume		Socket, ti
Model B714		Socket, ti
Clock (3)		Socket, ti
Tuning or volume		Socket, ti
Dial scale, radio (Model B712)	28-9648	Back, loo
Window, radio (Model B712)	.54-6091	Model
Pointer		Model
Model B712	76-8706	Shield, p
Model B714	56-9846FCP	Model
Iewel (Model B712)	54.4304.5	Shield, p
Clock		Model
Model B719	41.9047	Socket as
Model D112	41 9049 7	Model
		Switch, n
Llock cover	F1 1000 0	Model
Model B714		Printed v

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nence mbol	Description	Service Part No.
	Jack, appliance receptacle, a-c	76-3931
	Jack, private listening unit (Model B714) 42-1975-2
	Coil, antenna, Special Services	32-4561-3
	Coil, oscillator shunt	32-4562-2
	Antenna loop	rabinet back
	Speaker, p-m (Model B712)	
	Speaker, p-m (Model B714)	36-1627-26
	Resistor, oscillator grid, 22,000 ohms	66-3228340*
	Resistor, i-f screen dropping, 4700 ohms	66-2478340*
	Resistor, a-v-c filter, 2.2 megohms	66-5228340*
	Resistor, volume control, .5 megohm	33-5565
	Resistor, diode load, 47,000 ohms	66-3178340*
	Resistor, grid return, 10 mogohms	66-6108340*
	Resistor, plate load, 500,000 ohms	Part of PC1
	Resistor, grid return, 500,000 ohms	Part of PC1
	Resistor, cathode bias, 150 ohms	66-1158340*
	Resistor, B plus filter 220 ohms	66-1224340*
	Resistor B plus filter 1000 ohms	66.2108340*
	Resistor, 10 plus inter, 100 ohms	22 12/2 2
	Desister minete listening unit 2.2 share	
	(Model D714)	66 0221210
	(Moder D/14)	00-9334340
	Switch, off-on, night light (Model B/14)	42-2023
	Switch, Broadcast—Special Services	
	Transformer, oscillator	
	Transformer, output	. Part of LS1
	Line cord	41-3865
	Transformer, 1st i-f	32-4583
	Transformer, 2nd i-f	
US		
dow.	clock	
odel 1	B712	
it, tun	ing	
cket, s	witch operating	
g. reta	ining	W60980FE7
nector	interlock	27-6240-6
nector	· · · · · · · · · · · · · · · · · · ·	76-3931
nector	. male (4)	28-2669-2
nector	ass'v_ pilot light	41-4176-5
cet. tu	be. 12AV6	27-6296-4
ket, tu	be (12BA6)	27-6296-6
ket, tu	be (12BE6, 35C5)	27-6296-7
cet. tu	be $(35W4)$	27-6296-8
k. looi	and line-cord ass'v.	
odel	B712	76-8736
odel	B714	76-8731
eld, pi	lot light, back	
odel	B714	
eld, pi	lot light, front	
odel	8714	54-9088
ket ass	'v., pilot-night light	
odel I	3714	27-6233-110
tch. ni	ght light	
odel 1	R714	42.2023
ited w	iring nanel (less components)	54.6058
ncu w	ning paner (ress components)	



PHILCO HOME RADIO MODEL B569, Code 121

SPECIFICATIONS

CABINET
CIRCUIT
FREQUENCY RANGE
AUDIO OUTPUT
OPERATING VOLTAGE
POWER CONSUMPTION
ANTENNA
INTERMEDIATE FREQUENCY
PHILCO TUBES





Figure 1. Base View, Showing Symbolized Chassis

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ALIGNMENT PROCEDURE

RADIO CONTROLS—Set volume control to maximum. Set tuning control as indicated in chart. OUTPUT METER—Connect across voice-coil terminals.

SIGNAL GENERATOR--Connect generator and set

frequency as indicated in chart. Use modulated output.

OUTPUT LEVEL—During alignment, adjust signalgenerator output to hold output-meter reading below 1.25 volts.

	SIGNAL GENERATOR			RADIO	
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Ground lead to B-; output lead through a .1-µf. condenser to grid (pin 7) of 12BE6.	455 kc.	Tuning gang fully open.	Adjust tuning cores, in or- der given, for maximum output. (TCl and TC3 are located at top of trans- formers).	TC-4-2nd i-f sec. TC3-2nd i-f pri. TC2-lst i-f sec. TC1-lst i-f pri.
2	Radiating loop (see NOTE below).	1620 kc.	*1620 kc.	Adjust trimmer for maxi- mum output.	С1-В овс.
3	Same as step 2.	1500 kc.	1500 kc.	Adjust trimmer for maxi- mum output.	Cl-A antenna

ALIGNMENT CHART

NOTE: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads and place near radio loop.

* For proper adjustment of the oscillator trimmer, fully open the tuning gang and insert a .006-inch nonmetallic shim between the heel of the rotor and the top of the stator plates. Close the tuning gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.



TP3-829B

Figure 2. Top View, Showing Trimmer Locations



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MODEL

B569,

CODE

121

REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.	Reference Symbol	S Description P	iervice art No.
Cl ClA	Condenser, tuning gang31-2 Condenser, antenna trimmerPa	2751-13 rt of Cl	R5	Resistor, diode load, 47.000 ohms	3340*
C1B	Condenser, osc. trimmerPa	rt of Cl	R6	Resistor, grid return.	
C2	Condenser, cathode bypass, .2 µf30-4	650-49*		10 megohms	3340×
C3	Condenser, oscillator grid, 47 µµf30	-1230-4	B 7	Resistor, plate load.	
C4	Condenser, a-v-c by-pass, .047 µf45-3	3505-28*	~~~	500,000 ohms Part of	PC1
C7	Condenser, i-f tuningPa	rt of Zl	R8	Resistor, grid return.	
C8	Condenser, i-f tuning	rt of Zl	110	500.000 ohms Part of	PC1
С9	Condenser, i-f tuningPa	rt of Zl	R9	Resistor, cathode hias, 150 ohms, 66-1158	8340*
C10	Condenser, i-f tuningPa	rt of Zl	R10	Resistor, B plus filter, 100 ohms 66-1104	1340*
C11	Condenser, detector filteringPa	rt of Z2	RII	Resistor B plus filter	
C12	Condenser, detector filteringPa	rt of Z2		1000 ohms 66-2108	3340*
C13	Condenser, audio-coupling,		R12	Resistor tube saver 100 ohms 33.13	43.3
	.005 μf	-1238-1	S1	Switch off on Part o	ER4
C14	Condenser, plate bypassPart	of PC1	51 TT1	Thom former conflictor 29.44	526
C15	Condenser, audio-coupling,		11 T9	Transformer, oscillator	020/>
	.005 µf	of PC1		Transformer, output	0102
C16	Condenser, compensatingPart	of PC1	W 1 71		6100
C17	Condenser, tone compensating,		21	Transformer, 1st 1-1	IOLA -
	.022 μ f	4650-43*	Z2	Transformer, 2nd i-f	40A
C18	Condenser, electrolytic, 2-section .30-2	2575-40			
C18A	Condenser, filter, 80 μ fPart	t of C18		MISCELLANEOUS	
C18B	Condenser, filter, 20 μ f Part	t of C18			
C19	Condenser, line bypass, $.05 \ \mu f30$	4650-45*	California	1.	1090
	Loop aerial Part of back-and-loo	p ass'y.	Cabinet .		1027
LSI	Speaker, p-m	36-1654	Back-and-l	oop ass'y	3777
PCI	Printed circuit	30-6001	Knob, tun	ing	69-2
ĸı	Kesistor, oscillator grid,		Knob, vol	ume	5-13
DO	22,000 ohms	228340*	Socket, 7-1	oin miniature, 12AV6	3-14
RZ D2	Resistor, cathode bias, 56 ohms66-0	568340	Socket 7	ain miniature 19866 19846 3505	
П.Э р <i>а</i>	nesisior, a-v-c filter, Z.Z megohms. 66-5	228340	35WA	911 manature, 12DEU, 12DAU, 99UJ, 974	6265
114	nesisior, volume control,		JJW4 .		1000
	.5 megohm	5566-41	Tube shiel	d	/FA3



SERVICE BULLETIN FOR PHILCO RADIO-CLOCK

MODEL B712X, CODE 122

Philco Radio-Clock Model B712X, Code 122, is similar to Philco Radio-Clock Model B712, Code 122, except for the Special Services band. The Special Services band is not included in Model B712X, Code 122. For all service information refer to the Service Manual, PR-2570, for Model B712, Code 122. Any references in the alignment procedure, base and top views, schematic diagram, and parts list which refer to the Special Services band cannot be applied to Model B712X, Code 122. Part numbers which differ from Model B712, Code 122, are listed below. Figure 1 is the schematic diagram for Model B712X, Code 122.

Description	Service Part No.
Cabinet, pearl gray	11013-2
Cabinet, maroon	11013-3
Dial scale	28-9648-1
Knob, tuning or volume	54-6095-1
Pointer	54-4617-1
Clock	41-2047-1
Shaft, tuning	56-9807-7

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World Radio History

Philco Radio-Clock Model B712X, Code 122 Schematic Diagram

Printed in U.S.A.

PR-2557





TPO-620-1

PHILCO THREE-SPEED CUSTOM AUTOMATIC RECORD CHANGER

MODEL M-25

SERVICE MANUAL

INTRODUCTION

The Philco Three-Speed Custom Automatic Record changer, Model M-25, has a dual-needle cartridge for general use and a hi-fidelity cartridge and needle for hi-fi reproduction. Both cartridges are equipped with replaceable needles. A damaged or worn needle should be replaced immediately in order to avoid record damage. A worn needle can usually be identified by poor or distorted reproduction or by visual damage to the record grooves.

This de luxe record changer is designed to play automatically, 78-, 45-, or $33\frac{1}{3}$ -r.p.m. records of 7-inch, 10-inch, or 12-inch size. The changer will play twelve 7-inch, twelve 10-inch, or ten 12-inch records at one loading. It operates from a 105—125-volt, 60-cycle, a-c supply. The time interval between the last note of one record and the first note of the next one is minimized by the use of a velocity trip. The possibility of damaging the changer by holding the tone arm during a change cycle is prevented by spring-loading all actuating levers.

The controls are conveniently grouped near the front of the changer, and the knobs are concentrically mounted in the front right-hand corner. The tone-arm head is immediately behind the control knobs, and the record shelf is in the front left-hand corner.

The tone-arm set-down indexing is established by the record-shelf position. The nodding spindle, rather than a complicated system of levers and blades, accomplishes the record-dropping. Most of the working parts are mounted on a bridge sub-assembly, a feature which makes the parts easily accessible for servicing.

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DESCRIPTION OF OPERATING CYCLE

At the completion of a record, the changer trips, and allows the dog latch to engage the spur of the turntable hub gear. This rotates the cam gear, allowing the teeth of the cam gear and hub gear to engage. As the cam rotates, it forces the lifter lever down, raising the tone arm from the record. As the tone arm reaches maximum height, the tone-arm actuator, activated by the cam gear, contacts the triparm stud and swings the tone arm against the rest post. After the tone arm reaches the rest post, the push-off lever rotates, nodding the spindle and dropping the next record onto the turntable. After the record has dropped, the return lever contacts the stud of the trip arm, and starts the tone arm inward. The tone arm is now controlled by the actuator and return levers, in contact with the stud of the trip arm. The return lever continues swinging the tone arm inward until it is stopped by the set-down lever, whose position is dependent upon the setting of the record shelf. This stoppage of the inward travel of the tone arm by the established position of the return lever accomplishes the set-down indexing. The tone arm is thus held above the set-down point. The lifter lever now moves upward, slowly dropping the tone arm to the record surface. As the cam gear continues to rotate, the actuator lever is moved outward and away from the trip-arm stud. The tone-arm return lever then moves away from the trip-arm stud, but the spring portion of the actuator momentarily remains in contact with the stud, preventing a sudden release of the tone arm, which could cause the needle to jump into the modulated groove. The tripplate supporting finger now engages the dog latch, and the index lever locks the cam gear in a neutral position. The tone arm is now free to play the record.

As the tone arm advances toward the spindle, the friction-clutch trip finger engages the end of the trip plate. Through the applied pressure of the fraction finger (approximately 2 grams) against the trip plate, the trip-plate finger supporting the dog latch begins to move, lessening the engagement of the trip-plate finger and dog latch, preparatory to releasing the latch. This engagement is slowly lessened while the needle is in the playing grooves, giving the reset cam an opportunity (once each revolution of the turntable) to reset the trip plate into full engagement and slip the friction finger into the friction clutch. As the needle rides in the lead-out or eccentric groove of the record, the velocity of the friction finger is increased. The speed of the disengagement of the trip-plate supporting finger and the dog latch is also increased sufficiently to allow complete disengagement of the dog latch before it has been restored by the reset cam.

ADJUSTMENTS

SPINDLE

The spindle should be checked for perpendicularity (use square on turntable surface) when the changer is out of cycle. To adjust, bend the ear on the pushoff-lever assembly; bending the lever toward the spindle spring throws the top of the spindle away from the record shelf. This ear is shown in figures 3 and 6.

RECORD SHELF

CAUTION: This adjustment must be made immediately after a change cycle is completed.

With the changer function control turned to the OFF position, place a record-shelf gauge, Part No. 45-6647, on the record shelf. The edge of the gauge should fit snugly against the edge of the raised portion of the shelf. Remove all play without flexing the spindle.



TPO-1839A

Figure 1. Record-Shelf Adjustment and 10-Inch, 12-Inch, and Fine Set-Down



Figure 2. Tone-Arm Height and Lift Adjustments and Vertical Timing Adjustments

If the gauge does not fit properly, loosen the two saddle mounting screws which hold the record shelf to the base plate (figure 1), and adjust the position of the record shelf. Then tighten the screws.

TONE-ARM HEIGHT AND LIFT

With the changer out of cycle, and the tone arm over the base plate, the needle point should be $\frac{1}{6}$ inch $\pm \frac{1}{6}$ inch above the base plate. To adjust the clearance, bend the protruding ear of the swivel post, at the rear of the tone arm heel. See figure 2. Bending the ear upward decreases the clearance; bending it downward increases the clearance. Raise the tone arm to its maximum height, and place it against the rest post. There should be approximately $\frac{3}{32}$ -inch clearance between the lower edge of the tone arm and the top of the rest-post hook. Bend the ear of the swivel to obtain the most satisfactory adjustment of both the rest-post clearance and the base-plate clearance.

VERTICAL TIMING

Adjust the vertical timing by bending the end of the lifter lever (shown in figure 2), which attaches to the pull-cord, so that there is approximately $\frac{1}{32}$ inch to $\frac{1}{16}$ -inch slack in the pull-cord for all tonearm positions between the tone-arm rest post and the spindle, when the changer is out of cycle. Check by cycling the changer; make certain that the lifter lever and pull-cord will raise the tone arm straight up to its maximum height, and then move it horizontally to the tone-arm rest post after the slack adjustment has been made.

SET-DOWN

Set the record shelf to the 12-inch position. Set the eccentric stud to its center position toward the corner of the base plate. This stud is accessible through a hole in the base plate near the push-off saddle (see figure 5). Place a 7-inch record on the turntable, set the record shelf to the 7-inch position. and cycle the changer by hand until the tone arm is just above the record. Loosen the hex-head clamp screw on the trip arm (see figure 3), and swing the tone arm until the needle is $\frac{1}{6}$ inch in from the edge of the record. Tighten the clamp screw, and check the adjustment by putting the changer through another cycle. If the set-down point is slightly incorrect, it may be corrected by means of the eccentric stud mentioned above. Recheck the needle set-down. The trip arm should be positioned vertically so that the friction finger is midway between the base plate and the lifter lever. Remove the 7-inch record. Set the record shelf to the 10-inch position, and place a 10-inch record on the turntable. Rotate the turntable until the needle is just above the record. If the needle is not $\frac{1}{8}$ inch in from the edge of the record, an adjustment may be made by bending the car of the set-down cam which is in contact with the eccentric stud. See figure 1. Bending the ear outward moves the set-down point away from the spin-



Figure 3. Adjustment of Trip Arm for 7-Inch Set-Down



Figure 4. Trip Adjustment

dle; bending the ear in toward the shelf shaft moves the set-down point toward the spindle. Recheck the needle set-down. Using a 12-inch record, with the shelf set to the 12-inch position, repeat the adjustment, bending the corresponding ear of the set-down cam (figure 1).

The eccentric stud mentioned above (shown in figures 1 and 5) provides a fine adjustment of the set-down position. This adjustment varies the set-down position for all sizes of records over a total range of $\frac{3}{16}$ inch. Do not use this adjustment unless it is desired to change all three set-down positions by an equal amount.

TRIP

CAUTION: Do not adjust the friction clutch until the trip-plate engagement is properly set, as explained below.

The proper trip action is greatly dependent upon the proper engagement of the dog latch and the finger of the trip plate supporting it. The correct engagement is $\frac{5}{64}$ inch (or approximately one-half the width of the supporting finger of the trip plate) when the ear of the reset arm is contacting the peak point of the reset cam. This condition is illustrated in figure 4. The extent of this engagement is adjustable by bending the ear of the trip plate, shown in figure 6. Bending the ear inward decreases the amount of engagement, and bending the ear outward increases the amount of engagement. This adjustable ear is accessible through the large hole in the bridge, and should be bent by using long-nose pliers. NOTE: Too much engagement will prevent tripping, while too little engagement will cause pretripping.

After the trip-latch engagement is set, check the changer for trip action. If the trip action is faulty, i.e., if the changer pretrips or does not trip at all, recheck the trip-latch adjustment. If the changer still does not operate propertly, check for tight tonearm lead dress or excessive friction in the tone-armshaft bearing. If this does not clear the trouble, the friction clutch can be adjusted, although this should not be necessary. This adjustment is made by means of a screw which is accessible from under the motorhoard. (See figures 3 and 14.) Adjust the screw, which is located on the trip arm, by turning it counterclockwise until it is snug (not tight); then loosen one turn. Check the adjustment by playing several records. If the changer pretrips, loosen the screw (turn clockwise) a bit more. This trip arm and clutch assembly is shown in figure 14.

UNEVEN TURNTABLE SPEED (WOWS)

Uneven turntable speed may be caused by any of the following conditions:

1. Dirt under and around the idler-wheel assembly.

- 2. Idler-wheel spring loose or missing.
- 3. Flat spot on idler-wheel tire or turntable.
- 4. Loose, worn, or distorted pulley belt.

5. Oil or grease on idler-wheel tire, pulley, pulley belt, or drive shaft.

6. Speed-control knob not in proper position.



Figure 5. Top View, Showing Lubrication Points





Figure 6. Bottom View, Showing Lubrication Points

TP2-519A



Figure 7. Bottom View, Bridge Removed, Showing Lubrication Points

LUBRICATION

LUBRICANTS

- 2. Oil: S.A.E. 20.
- 2. Grease: Motor cup grease.
- 3. Contact lubricant: Dow Corning "DC-4."

PARTS NOT TO BE LUBRICATED

- 1. Motor drive shaft.
- 2. Motor pulley.
- 3. Drive belt.
- 4. Idler tire.
- 5. Dog latch (on cam gear).
- 6. Lifting lever (where dog rides).
- 7. Trip-plate assembly.
- 8. Friction washer and tone-arm stanchion.
- 9. Friction finger.
- 10. Friction washer.

11. Spindle latch (may be lubricated with powdered graphite or talcum powder).

PARTS TO BE GREASED

- 1. Actuator assembly.
 - a. Lifting lever, where lever contacts cam gear.
- b. Tone-arm-actuator lever where it contacts stud of friction-clutch assembly.

2. Base Plate.

a. Switch lever, detent spring, and slot where switch-lever ear rides in base plate.

b. Actuating stud on the Function knob, where it engages the switch lever.

c. Motor-speed-shift plate, where it rides in guide slots, and slot that rides on cam-gear spindle; control link where it rides on base plate.

3. Bridge Assembly.

a. Push-off lever where end slides on bridge, where stud rides in slot of bridge, and at pivot pin.

b. Cam gear, all cam surfaces and gear teeth except dog latch.

c. Stud of friction-clutch assembly where return lever and tone-arm actuator ride.

d. Turntable spindle.

4. Motor.

NOTE: When lubricating the motor, use grease or oil very sparingly. Excessive lubrication will cause erratic operation.

- a. Cam surfaces of idler-wheel lifter.
- b. Detent surfaces.

c. Extension of idler shaft in contact with lower shifter plate.
- 5. Record Shelf.
 - a. Record-shelf-shaft bearing.
 - b. Detents for record shelf.
 - c. Hold-down pin and detents.
 - d. Hold-down shaft.
 - e. Set-down cam. where eccentric stud rides.
- 6. Index Lever.

PARTS TO BE OILED

- 1. Cam-gear spindle.
- 2. Control-knob shafts.
- 3. Motor.
 - a. Idler-assembly pivot shaft.
 - b. Idler-wheel shaft.
 - c. Slider bar, four points.
 - d. Two shift roller pins.
 - e. Pulley shaft (wipe dry and apply one drop).
 - f. Under pivot bushing of shifter plate.
- 4. Reject-lever pivot.

5. Tone-arm shaft where it rotates in bridge and in base plate.

6. Tone-arm-pivot pin where it goes through swivel assembly.

- 7. Trip-plate-assembly pivot in bushing only.
- 8. Turntable bearings, top and bottom.
- 9. Actuator spindle.

10. Bearing surfaces between actuator lever, washer, set-down lever, index lever, washer, and return lever (grease end of return lever where it contacts stud of friction-clutch assembly).

CAUTION: When lubricating the motor, remove the rubber belt and idler wheel. When lubrication is completed, make sure that the motor shaft and pulley are free from oil and grease. Failure to observe this precaution may result in slippage.

CONTACT LUBRICATION

Apply Dow Corning "DC-4" to the contacts of the cartridge contact plate, and to the dimple of the carriage retaining spring. See figure 13.

REPLACEMENT OF PARTS AND ASSEMBLIES

The following procedures are recommended for the correct removal of parts and assemblies. The parts should be replaced by reversing the order of

1. Crystal Cartridge.

Grasp crystal cartridge with fingernails. With the other hand, hold tone arm and apply slight pressure on switch handle. Pull cartridge down and to the outside. Replace cartridge by holding contacts toward spindle, and pushing upward until firmly seated.

The Hi-Fi cartridge is removed and replaced in the same manner. This cartridge is locked in the 45-LP position.

2. Needle.

Remove crystal cartridge (see paragraph 1). Lift needle out gently with prying motion, using fingernail or knife at pivot point. When replacing needle, align key of needle shaft with keyway in chuck of cartridge; then push needle into cartridge.

3. Turntable.

Remove spring retainer and washer located on the top of the turntable spindle bushing. Lift turntable off.

NOTE: When replacing turntable, position Speed control knob midway between LP and 45 or 45 and SP. This holds the idler wheel in a retracted position. Then replace turntable. This method will prevent damage to the idler-wheel tire; then replace washer and retainer. removal. Adjustments should be made according to the directions given in the ADJUSTMENTS section of this manual.

4. Spindle. See figure 6.

Disengage spindle spring. Remove spindle. Do not lose spring washer under spindle lever.

5. Bridge. See figure 9.

a. Remove set-down-lever spring. See figure 8. b. Remove the three hex-head bridge mounting screws and the two plastic cable clamps.

c. Remove "E" washer from tone-arm spindle.

d. Remove hex-head drive screw from camgear spindle. This screw is located on the top of the motorhoard, under the turntable. See figure 5.

e. Remove pull-cord and disconnect tone-arm wires.

f. Carefully lift off bridge, cam gear, spindle bushing, trip-plate assembly, lifter lever, spindle lever, and push-off lever.

6. Cam Gear.

a. Remove bridge. See paragraph 5.

b. Remove "E" washer from cam-gear spindle.

c. Lift off cam gear.

7. Push-off-Lever Assembly and Spindle Lever.

a. Remove cam gear. See paragraph 6.

b. Remove "E" washer from push-off lever stud. See figure 6.

c. Rotate push-off lever so that stud is in large hole, and lift off both push-off lever and spindle lever.



Figure 8. Actuator Assembly

- 8. Trip-Plate Assembly.
 - a. Remove cam gear. See paragraph 6.

b. Remove clip from trip stud (see figure 4), and lift assembly from bushing.

9. Trip Reset Cam, Neoprene Washer, and Ball Bearing.

a. Remove cam gear. See paragraph 6.

b. Remove spring retaining ring. See figure 9.c. The trip reset cam, neoprene washer, ball cover, balls, and race may be removed in that order.

10. Trip-Arm Assembly. See figure 14.

a. Remove "E" washer from end of tone-arm shaft. See figure 6.

b. Disengage pull-cord.

- c. Loosen trip-arm-clamp screw. See figure 7.
- d. Raise tone arm sufficiently to clear trip arm.
- e. Remove trip-arm assembly.
- 11. Tone Arm. See figure 13.
 - a. Place Function control in the OFF position.
 - b. Unsolder the four tone-arm leads.
 - c. Remove pull-cord from lifter lever.
 - d. Remove "E" washer from end of tone-arm

shaft.

- e. Loosen trip-arm-clamp screw.
- f. Remove tone-arm-shaft spring.
- g. Lift out tone arm.

12. Motor Assembly. See figure 11.

a. Remove turntable. See paragraph 3.

b. Unsolder motor lead from switch on hase plate, and free other lead from tape and spaghetti.

c. Remove the three hex-head drive screws, washers, and spacers from motor frame.

d. Tilt motor so that rubber grommet is free of ear of motor-speed-shift plate.

e. Lift motor out.

13. Control Shaft and Links. Figure 10 shows the control assembly.

a. Place Function control knob in the OFF position.

b. Remove turntable, and detent spring from motor board.

c. Pull off Speed control knob.

d. Remove "E" washer, flat washer, and spring washer.

e. Pull off Function control knob.

f. Push speed-change shaft and crank assembly through the bushing in the base plate.

g. Disengage shaft and crank assembly from its link.

h. Remove the speed-shift link. See figure 7.

i. Remove "E" washer and flat washer from control bushing.



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Figure 9 Bridge Assembly

9

MODEL M-25



Figure 10. Control Assembly

j. Remove off-on switch lever by lifting it over the control bushing and rotating it away from the record shelf to release the reject link and the switch lever. Pull toward the corner of the base plate to lift the ear out of the "T" slot in the motor board.

k. To remove the reject link, the reject lever must be removed by disengaging the reject spring, "E" washer, and spring washer. See figure 5.

l. Remove reject link from reject lever.

14. Record Shelf. See figures 7 and 12.

a. Remove "E" washer from bottom of recordshelf shaft.

b. Remove cupped washer.

c. Loosen set-down cam clamp screw. See figure 12.

d. Remove set-down cam, record-shelf spring, and spacer. See figure 12.

e. Lift record shelf from saddle.

15. Actuator Levers. See figure 8.

a. Remove bridge. See paragraph 5.

b. Remove spring from tone-arm return lever.

c. Remove "E" washer, washer, and compression spring from actuator support stud.

d. Remove "E" washer and washer from tonearm-actuator support stud.

e. Remove tone-arm-actuator assembly.

f. Remove spacer washer from actuator support stud.



Figure 11. Motor Assembly

TP9-204A



Figure 12. Record-Shelf Assembly

g. Remove set-down lever.

h. Remove cam-gear index lever.

i. Remove motor-shift plate by first removing turntable (see paragraph 3) and removing the set of motor mounting hardware nearest record shelf. With Speed control in "45" position, free shift-lever ear from motor grommet by tilting motor upward from motor board. Return freed shift lever to an outward position. Lift and turn free end of speed-shift plate toward tone arm; this will free ear in large slot. With free end, carefully twist plate down between return lever support stud and spring-anchor stud. Ear in small slot will come free.

j. Remove large spacer washer from actuator stud.

k. From top of base plate (under the turntable), remove reject spring, "E" washer, and spring washer. Free reject lever of stud, and remove reject link from lever.

l. Remove tone-arm-return lever.

NOTE: When replacing the index-lever spring, the tone-arm-actuator spring, and the return-lever spring, recement the ends to the spring mounting stud, using glyptal. This will prevent the springs from coming loose as a result of shock.





Figure 14. Trip-Arm Assembly





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TPO-1842A

TPO-2313A

REPLACEMENT PARTS LIST

	Service
Description	Part No.
Actuator Assembly	
Cam-gear index lever	. 76-5895 *
Spring, index lever	56-8094
Compression spring	
Return lever	
Spring, return lever	
Set-down lever	76-5894
Spring, set-down lever	
Tone-arm-actuator assembly	
Spring, actuator	56-8095
Bridge Assembly	
Rall hearing 1/4 inch dia. (3)	5W2017
Rearing cover	56.8129
Rearing rotainer hall	56-8128
Bearing weether (2)	56 9197.1
Com more accombly	76 5005
Deg letek	E6 0120
Dog laten	
Fin, dog-laten mounting	00.0605
Spring, litter lever	
Spring, lifter lever	
Neoprene washer	
Push-off-lever assembly	76-5908
Ketaining ring, reset cam and bearing	IW42311FE7
Spindle lever	56-8130
Spring, spindle	56-8131
Trip-plate assembly	76-5906
Trip-reset cam	54-8139
Changer base plate, tone-arm rest, and tone	•arm
stanchion	76-7701-1
Bumper, tone-arm rest, rubber	54-8136-1
Switch, motor power	42-1867
Switch, pickup	42-1873
Changer Mounting Hardware	
Sleeve, rubber (3)	54-7798
Spring, heavy, top (3)	. 56-7059FA9
Spring, light, bottom (3)	6-7059-1FCP
Speed nut (3)	
Control Assembly	
Knob. Speed control assembly	76-7700-1
Knob Function control	54.4971.1
Lever off-on switch	56.9769
Link reject	56.0761
Link, reject	
Washen "F" autob laws	W60000EE7
Cropk and shaft successful	W0U98UFE /
Moton and Hondware	
Drive hele	E4 70E0
Idier wheel	
Plate, motor-speed shift	
Pulley assembly	45-6499
Screw, motor mounting (3)1	W21561FA3
Spacer, mounting (3)	56-4926-1

	Service
Description	Part No.
Washer, mounting (3)1	W52100FA3
Shock mount (3)	54-4501
Motor, 117 volts, 60 cycles	35-1508
Record-Shelf Assembly	
Hold-down assembly	76-5897
Hold-down fulerum arm	56-8301-2
Hold-down pin	56-8300
Hold-down shaft	
Hold-down spring	
Push-off saddle	
Kecord-shelt-and-shaft assembly	
Set-down cam	56-8149FA3
Spacer	56 0022
Spring record shelf	EL 0000
Washer cunned	56-8080
Reject lever	56-8079
Spring, detent	56.9758
Spring, reject	
Spindle, record	76-5909
Tone-arm assembly (complete)	35-9795
Bracket, mounting for shaft and swivel	56.9763
Cartridge and needle ass'v. Hi-Fidelity	45.9792
Needle. Hi-Fidelity	45.1993
Contact plate	
Cartridge and needle ass'v., regular	
Needle, regular	
Pin, shaft and swivel	56-7011
Pull-cord, vertical timing	76-2982-4
Retainer plate, front	28-9632
Retainer plate, rear	56-8973
Screw, shoulder (3)	. 56-7408-1
Shaft-and-swivel assembly	76-5911
Shock mount, bracket mounting (3)	54-4729
Spring, cartridge retaining	. 56-6796-1
Spring, needle pressure	28-9832
Spring, tone-arm shaft	56-8773
Tone-arm shell	35-2724
Washer, horizontal friction (plastic)	54-8103
Trip-arm assembly	76-8598
Finger, friction trip	56-8112
Nut, clamp screw	56-7042
l'lunger	56-8110
Screw, friction-trip adjustment	56-8109
Spring, friction-screw lock	56-8108
Wowless Act	
Washer, fraction eluteh (plastic) (2)	54 0140
Washer, "C"	56 9702
Washer, lead (3)	98.0698
Turntable	25 9711 4
Retainer. turntable	56.8007
Washer, turntable	56.8096



* This replacement part may not be identical to the production part incorporated in the changer. In any case, the replacement part will serve as well as the original one.

World Radio History

Printed in U. S. A.



PHILCO

Phonorama" "

MODEL B1756



SPECIFICATIONS

Cabinet	Wood console
Circuit	
R-F Chassis	Eight-tube superheterodyne
Power ChassisFiv	e-tube audio amplifier plus rectifier
Frequency Range	•
AM	
FM	
Audio Output	Push-pull, 10-watt, undistorted
Operating Voltage	

Power Consumption	
Antenna	Built-in, low-impedance loop
Intermediate Frequency	
AM	
FM	
Record Changer	Phileo Three-Speed Custom Automatic Record Changer Model M-25 (Refer to Service Manual PR-2557.)

TUBE COMPLEMENT

R-F CHASSIS

TUBE NUMBER	TUBE TYPE	TUBE FUNCTION
Vī	6AU5, miniature	FM r-f amplifier
V2	6BA6, miniature	AM-FM r-f amplifier
V3	12AT7, miniature	Mixer-oscillator
V4	6BAő, miniature	lst i-f amplifier
V5	6AU6, miniature	2nd i-f amplifier
V6	6AL5, miniature	FM detector
V7	6AL5, miniature	AM detector, automatic-volume-control
V8	6C4A, miniature	Cathode follower

POWER CHASSIS

TUBE NUMBER	TUBE TYPE	TUBE FUNCTION
V9	12AU7, miniature	Audio amplifier
V10	6C4, miniature	Audio amplifier
V11	12AX7, miniature	Audio amplifier, phase splitter
V12 and	6V6G	Output
V13		
V14	5U4GT	Rectifier

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CHASSIS REMOVAL INSTRUCTIONS

The chassis may be removed from the cabinet by first removing the following items:

- 1. Cabinet back
- 2. Chassis mounting screws
- 3. Control knobs
- 4. A-C line-cord plug
- 5. Phono connecting plugs
- 6. Phono bin-light plug
- 7. Loop-antenna plug
- 8. Speaker plug
- 9. Off-on indicator light assembly

After these items have been removed, the chassis may be taken from the cabinet. If necessary, disconnect all chassis interconnecting sockets and plugs, and remove each chassis separately.

After removal, make sure that all plugs are in their proper sockets for test purposes. To connect the chassis to the a-c supply, use an a-c line cord, Philco Part No. 41-3865.

SERVICE HINTS

The Philco "Phonorama" Radio, Model B1756, provides high-quality reproduction of both radio broadcasts and recorded sound. This is the result of careful design and good production methods. The range of frequencies needed to provide Hi-Fidelity is much broader than that achieved in most radios, and for that reason the circuits in this model have been given careful consideration. To maintain this high-quality reproduction, it is necessary that any repair and maintenance work performed on the radio keep the circuit specifications the same as when the radio was produced. This can be accomplished by using replacement parts as indicated in the replacement parts list, and by following careful repair techniques. The use of parts different from those specified and careless repair techniques may result easily in loss of reproduction quality and, therefore, customer dissatisfaction.

GENERAL CARE AND TREATMENT OF RECORDINGS AND NEEDLES

Modern long-playing and standard records are constantly being improved for lower distortion, a wider range of frequency reproduction, and smoother, more noise-free surfaces. By applying a few simple practices, as indicated below, the utmost advantage can be taken from these improvements.

Before playing any record, make sure that its surface is clean. If the surface is slightly dusty, a very soft artist's paint brush may be used to dust the surface, or a moistened chamois may be lightly applied to the record surface in the direction of the grooves. If the record is very dirty, perform the previous operation under cool, running water.

Never store records stacked one on top of the other, even if they are housed in folders; any grit or dirt will, by the pressure of the other records, be pressed into the soft surface, and appear as a "pop" in subsequent playings. Never expose records to heat or sunlight, as serious warping may result. Commercial solutions for repelling dust from the surfaces of records will be effective only for a limited time, and may jam up the grooves and cause distortion.

To achieve maximum play-back fidelity, a long-life, jewel-tipped needle should be used. A jewel-tipped needle will last far longer than an osmium-tipped or plain needle. However, although these jewels are very hard, they can easily be chipped through misuse, such as failure to put the hold-down lever in place after a stack of records have been positioned on the spindle. In this case, if a record is playing and the changer is jarred, another record may be pushed loose and fall on the tone arm, causing damage to both the needle and the record. A chipped needle will act as a chisel on records, and will ruin them.

AM ALIGNMENT PROCEDURE

GENERAL—The AM alignment should be completed before the FM alignment is made. Before beginning the alignment, allow the radio and the test equipment to warm up for fifteen minutes.

CHASSIS—Remove both the r-f chassis and the power chassis from the cabinet. (Refer to the CHASSIS RE-MOVAL INSTRUCTIONS given above.)

ANTENNA—Make up a loop antenna from No. 14 stranded wire having the same dimensions as the loop antenna attached to the cabinet. Connect this made-up antenna to the antenna plug, PL1. If convenient, use the loop antenna attached to the cabinet.

DIAL POINTER—With the tuning-condenser plates fully meshed, adjust the pointer to coincide with the left-hand edge of bass note #10. This is the index mark.

RADIO CONTROLS—Set the volume control to maximum, set the function switch to the AM position, and set the tuning control as indicated in the AM ALIGN-MENT CHART.

OUTPUT INDICATOR—Use a 1000-ohms-per-volt a-c voltmeter or an oscilloscope connected between the test jack, J4, located on the back of the r-f chassis, and ground.

SIGNAL GENERATOR—Use an AM r-f signal generator with modulated output. Connect the generator and set the frequency as indicated in the AM ALIGN-MENT CHART.

OUTPUT LEVEL—During alignment, the signal generator must be attenuated to maintain the output indication below .15 volt, a.c.

TUNING TOOLS—Use a non-metallic tuning tool, such as Philco Part No. 45-8879, for the i-f adjustments and all screw adjustments.

AM ALIGNMENT CHART

	SIGNAL GENERATOR		RADIO			
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST	
1.	Ground lead to chassis. Output lead through a .05- μ f, condenser to pin 1 of V5, 6AU6.	455 kc.	Gang fully open.	Adjust, in order given, for maxi- mum output.	TC115—3rd AM i-f secondary (top) TC114—3rd AM i-f primary (bottom)	
2.	Ground lead to chassis. Output lead through a .05- μ f. condenser to pin 1 of V4, 6BA6.	455 ke.	Gang fully open.	Place a 1000-ohm resistor across primary of Z103 (pins 3 and 4). Adjust for maximum output. Re- move 1000-ohm resistor from across primary, and place across second- ary of Z103 (pins 1 and 2). Adjust for maximum output.	TC111—2nd AM i-f secondary (top) TC110—2nd AM i-f primary (bottom)	
3.	Ground lead to chassis. Output lead through a .05-µf. condenser to lug of C100D or to pin 4 of T101.	455 kc.	Gang fully open.	Remove 1000-ohm resistor from across secondary of Z103, and place across primary of Z101 (pins 3 and 4). Adjust for maximum out- put. Remove 1000-ohm resistor from across primary, and place across secondary of Z101 (pins 1 and 2). Adjust for maximum output.	TC107—1st AM i-f secondary (top) TC106—1st AM i-f primary (bottom)	
4.	All connections same as step 3. Ren Equal peaks should occur at 452 and symmetrical, touch-up TC110—2nd A	nove 100-oh 458 kc. Th M i-f prin	m resistor fro e output shoul nary. If this d	m circuit. Rock signal generator and no d drop off equally at 450 and 460 kc. oes not give symmetry, repeat steps l.	te output indication. If the peaks are not 2, and 3.	
5.	Radiating loop. (See NOTE 1 below.)	1620 kc.	1620 kc. (See NOTE 2 below.)	Adjust for maximum output.	C131—AM osc. trimmer	
6.	Same as step 5.	1500 kc.	1500 kc. (See NOTE 2 below.)	Adjust, in order given, for maxi- mum output.	C125—AM r·f trimmer C111—AM antenna trimmer	
7.	Same as step 5.	580 kc.	580 kc. (See NOTE 2 below.)	Adjust, in order given, for maxi- mum output.	TC102—AM r-f padder TC101—AM antenna padder	
8.	8. Repeat steps 6 and 7 until no further improvement is obtained.					

NOTE 1: Make up a loop of wire of the same dimensions as the radio loop, and place it close to, and in the same plane as, the radio loop.

NOTE 2: The radio may be tuned to the respective frequencies by setting the pointer the following distances from the index mark: 1620 kc.-6-1/16 inches; 1500 kc.-5-10/16 inches; 580 kc.-11/16 inch.

FM ALIGNMENT PROCEDURE

AM METHOD (Using AM Test Equipment)

GENERAL—The AM alignment should be completed before the FM alignment is made. Before beginning the alignment, allow the radio and test equipment to warm up for fifteen minutes.

CHASSIS—Remove both the r-f chassis and the power chassis from the cabinet. (Refer to the CHASSIS RE-MOVAL INTRUCTIONS given above.)

ANTENNA—Make up a loop antenna from No. 14

stranded wire having the same dimensions as the loop antenna attached to the cabinet. Connect this madeup antenna to the antenna plug, PL1. If convenient, use the loop antenna attached to the cabinet.

DIAL POINTER—With the tuning-condenser plates fully meshed, adjust the pointer to coincide with the left-hand edge of bass note #10. This is the index mark.

RADIO CONTROLS-Set the volume control to maximum, set the function switch to the FM position, and set the tuning control as indicated in the FM ALIGN-MENT CHART (AM METHOD).

OUTPUT INDICATOR-Use a 20,000-ohms-per-volt d-c voltmeter. See GENERAL NOTE below.

SIGNAL GENERATOR-Use an AM r-f signal generator with modulated output. Connect the generator and set the frequency as indicated in the FM ALIGN-MENT CHART (AM METHOD).

OUTPUT LEVEL-The output level should be between 5 and 10 volts for all steps except the first one. Adjust the generator to maintain the output between these two limits.

TUNING TOOLS-Use a non-metallic tuning tool. such as Philco Part No. 45-8879, for the i-f adjustments and all screw adjustments. Use a tuning wand, such as Philco Part No. 56-6100, to check the resonance of the FM air coils.



Figure 1. Base View, R-F Chassis, Showing Parts Placement and Tuning Adjustments

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GENERAL NOTE: In order to perform this alignment it is necessary to place two 100,000-ohm resistors in series between the junction of R131 and C148 (pin 2 of V6, FM detector) and ground. For the first step of the alignment, the 20,000-ohms-per-volt voltmeter must be placed between the junction of these two 100,000-ohms resistors and lug 1 of terminal panel B6, which is the junction point of R130 and C157. For the first step, the meter needle should be set off zero to the first major scale mark by adjusting the meter zero-adjust knob. After the first step has been completed, the needle can be set back to the zero mark. The purpose of this adjustment is to enable the serviceman to see a negative indication on the meter. For the remaining steps of the alignment the meter should be connected between the junction of the two 100,000-ohm resistors and ground, with the negative meter lead at the junction of the two resistors.

The two resistors should be as nearly equal in value as possible (at least within 5% of each other).

FM ALIGNMENT CHART (AM METHOD)

	SIGNAL GENERATOR		RADIO		
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1.	Ground lead to chassis. Output lead through a .05-µf. condenser to pin 1 of V5, 6AU6.	9.1 mc.	Gang fully closed.	Adjust for balance (zero indication on meter).	TC113—Discriminator secondary (top)
2.	Same as step 1.	Same as step 1.	Same as step 1.	Change output-meter connections as directed in the GENERAL NOTE above. Adjust for maximum output.	TC112—Discriminator primary (bottom)
3.	Ground lead to chassis. Output lead through a .05-µf. condenser to pin 1 of V4, 6BA6.	Same as step 1.	Same as step 1.	Adjust, in order given, for maxi- mum output.	TC109—2nd FM i-f secondary (top) TC108—2nd FM i-f primary (bottom)
4.	Ground lead to chassis. Output lead through a $.05-\mu f$. condenser to lug of C100C (pin 1 of L106).	Same as step 1.	Same as step 1.	Adjust, in order given, for maxi- mum output.	TC105—1st FM i-f secondary (top) TC104—1st FM i-f primary (bottom)
5.	Radiating loop. (See NOTE 1 below.)	108.5 mc.	108.5 mc. (See NOTE 2 below.)	Adjust for maximum output.	C135—FM osc. trimmer
6.	Same as step 5.	88 mc.	88 mc. (See NOTE 2 below.)	Adjust for maximum output. (See NOTE 3 below.)	L108—FM osc. coil
7.	Repeat steps 5 and 6 until no furth	er improve	ment is obtain	ed in oscillator tracking.	
8.	Same as step 5.	105 mc.	105 mc. (See NOTE 2 below.)	Adjust, in order given, for maxi- mum output.	C124—2nd FM r-f trimmer C107—1st FM r-f trimmer C102—FM antenna trimmer
9.	Same as step 5.	92 me.	92 mc. (See NOTE 2 below.)	Adjust, in order given, for maxi- mum output. (See NOTE 3 below.)	L106—2nd FM r-f coil L102—1st FM r-f coil TC100—FM antenna tuning core
10.	Repeat steps 8 and 9 until no further improvement is obtained in r-f tracking.				

NOTE 1: Make up a loop of wire of the same dimensions as the radio loop, and place it close to, and in the same plane as, the radio loop.

NOTE 2: The radio may be tuned to the respective frequencies by setting the pointer the following distances from the index mark:

108.5 mc.---6-1/4 inches 105 mc.—4 inches 92 mc.—1-1/16 inches 88 mc.—3/16 inch

NOTE 3: Check the tuning of the oscillator and r-f coils by inserting each end of a tuning wand (Philco Part No. 56-6100) into the coils. If the output meter shows an increase when the iron end of the wand is inserted, compress the turns slightly. If the output meter shows an increase when the brass end of the wand is inserted, spread the turns slightly. If the output decreases when each end is inserted, no adjustment is necessary. (Do not disturb the setting of the tuning gang while making any necessary adjustments.)

FM ALIGNMENT PROCEDURE

FM METHOD (Using FM Test Equipment)

GENERAL—The AM alignment should be completed before the FM alignment is made. After the chassis have been removed from the cabinet, allow the radio and the test equipment to warm up for fifteen minutes. CHASSIS—Remove both the r-f chassis and the power chassis from the cabinet. (Refer to the CHASSIS RE-MOVAL INSTRUCTIONS given above.)

DIAL POINTER—With the tuning condenser plates fully meshed, adjust the pointer to coincide with the left-hand edge of bass note #10. This is the index mark.

RADIO CONTROLS—Set the volume control to maximum, set the function switch to the FM position, and set the tuning control as indicated in the FM ALIGN-MENT CHART (FM METHOD).

OUTPUT INDICATOR—Use an oscilloscope. Connect the ground leads to the chassis. Connect the vertical-input lead to test jack J4, and the horizontalinput lead to the horizontal-sweep output of the sweep signal generator. SIGNAL GENERATOR—Use an FM sweep signal generator. Connect the generator and set the frequency and sweep width as indicated in the FM ALIGNMENT CHART (FM METHOD).

For accurate results on the r-f adjustments, the signal-generator output impedance must be 300 ohms, to match the input impedance of the radio. If the signal-generator output impedance is other than 300 ohms, use an impedance-matching network to match it to the radio.

OUTPUT LEVEL—Adjust the sweep signal generator output to maintain the scope indication at a convenient level.

TUNING TOOLS—Use a non-metallic tuning tool, such as Philco Part No. 45-8879, for the i-f adjustments and all screw adjustments. Use a tuning wand, such as Philco Part No. 56-6100, to check the resonance of the FM air coils.



Figure 2. Top View, R-F Chassis, Showing Parts Placement and Tuning Adjustments

FM ALIGNMENT CHART (FM METHOD)

	SIGNAL GENERATOR		RADIO			
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST	
1.	Ground lead to chassis. Output lead through a .05-µf. condenser to pin I of V5, 6AU6.	9.1 mc. (80-kc. devia- tion)	Gang fully closed.	Adjust TC113 for balance (cen- tered in sweep range). Adjust TC112 for maximum indication (maximum slope) on scope.	TC113—FM detector secondary (top) TC112—FM detector primary (bottom)	
2.	Ground lead to chassis. Output lead through a .05-µf. condenser to pin 1 of V4, 6BA6.	9.1 mc. (80-kc. devia- tion)	Gang fully closed.	Adjust, in order given, for maxi- mum output (maximum slope).	TC109—2nd FM i-f secondary (top) TC108—2nd FM i-f primary (bottom)	
3.	Ground lead to chassis. Output lead through a .05- μ f. condenser to lug of C100C (pin 1 of L106).	9.1 mc. (80-kc. devia- tion)	Gang fully closed.	Adjust for maximum output.	TC105—1st FM i-f secondary (top) TC104—1st FM i-f primary (bottom)	
4.	Connect to terminals on TB100. If necessary, use a matching network as directed in the instructions above.	108.5 mc. (80-kc. devia- tion)	108.5 mc. (See NOTE 1 below.)	Adjust for maximum output.	C135—FM osc. trimmer	
5.	Same as step 4.	88 mc. (80-kc. devia- tion)	88 mc. (See NOTE 1 below.)	Adjust for maximum output. (See NOTE 2 below.)	L108—FM osc. coil	
6.	Repeat steps 4 and 5 until no furth	er improven	nent is obtaine	d.		
7.	Same as step 4.	105 mc. (80-kc. devia- tion)	105 mc. (See NOTE 1 below.)	Adjust for maximum output.	C124—2nd FM r-f trimmer C107—1st FM r-f trimmer C102—FM antenna trimmer	
8.	Same as step 4.	92 mc. (80-kc. devia- tion)	92 mc. (See NOTE 1 below.)	Adjust for maximum output.	L106—2nd FM r-f coil L102—1st FM r-f coil TC100—FM antenna tuning core	
9.	Repeat steps 7 and 8 until no further improvement is obtained.					

NOTE 1: The radio may be tuned to the respective frequencies by setting the pointer the following distances from the index mark:

108.5 mc.—6-1/4 inches 105 mc.—4 inches 92 mc.—1-1/16 inches 88 mc.—3/16 inch

NOTE 2: Check the tuning of the oscillator and r-f coils by inserting each end of a tuning wand (Philco Part No. 56-6100) into the coils. If the output increases when the iron end of the wand is inserted, compress the turns slightly. If the output increases when the brass end is inserted, spread the turns slightly. If the output decreases when each end is inserted, no adjustment is necessary. (Do not disturb the setting of the tuning gang while making any necessary adjustments.)



Figure 3. Top View, Power Chassis, Showing Parts Placement





TP3-1861



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Figure 5. Base View, Power Chassis, Showing Parts Placement



Figure 6. Drive-Cord Installation Details, Pointers and Tuning

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MODEL B1756





.

| B1756, Schematic Diagram

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B+ AND FILAMENT JACK AND CABLE (PL14 J14 VOLUME CONTROL TOP PLUG PL5 J5 TAPE RECORDER J2 JACK PL2 J3

MODEL B1756





REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service . Part No.	Re
	SECTION 1-R-F CHAS	SIS	C
C100	Condenser, tuning gang, 6-section		Č
C100A	Condenser, tuning, FM r-f amplif	ier Part of C100	L C
C100B	Condenser, tuning, AM antenna	Part of C100	- L
C100C	Condenser, tuning, 2nd FM r-f am	plifier Part of C100	L.
C100D	Condenser, tuning, AM r-f amplif	ier Part of C100	C
C100E	Condenser, tuning, AM oscillator	Part of C100	- L
C100F	Condenser, tuning, FM oscillator	Part of C100	L.
C101	Condenser, FM antenna coupling,	30-1224-103	C
C102	Condenser, trimmer, FM antenna	tuning 31-6511-10	~
C103	Condenser, cathode by-pass, 56 µµ	f. 62-056409001	- C.
C104	Condenser, screen by pass, 220 µµ	f. 62-122001001*	C
C105	Condenser, r-f by-pass, 100 µµf.	62-110009001	C
C106	Condenser, d.c. blocking 220 unf	62-122001001*	C
C107	Condenser, trimmer,	Dant of C100	C (
C109	Condenses asthede he need 100 m		
C100	Condenser de blocking 220 \sim f	69.199001041	C
C109 C110	Condenser, der Diocking, 220 µµi.	iting,	C II
0111	$3.3 \ \mu\mu$ 1.		II
CIII	Condenser, trimmer,		П
	AM antenna tuning	Part of C100	L
CH2	Condenser, filament by-pass, .005	μf 30-1238-1	L
CH3	Condenser, screen by-pass, $.005 \ \mu f$		L
CH4	Condenser, r-f by-pass, 56 $\mu\mu$ f		L
CH5	Condenser, B^+ by pass, .047 μf_* .		L
C116	Condenser, filament by-pass, .005	μf	Ē
C117	Condenser, line by-pass, record cl 100 $\mu\mu$ f.	hanger, 	L
C118	Condenser, line by-pass, record ch	anger,	Ē
_	100 $\mu\mu f$.		Ē
C119	Condenser, $B + by$ -pass, 220 $\mu\mu f$.		Ē
C120	Condenser, filament by-pass, 220 /	μμf. 62-122001001*	Ē
C122	Condenser, d-c blocking, 470 $\mu\mu f$.		I I
C123	Condenser, d-c blocking, 470 $\mu\mu f$.		
C124	Condenser, trimmer, 2nd FM r-f amplifier	Part of C100	L
C125	Condenser, trimmer, AM r-f ampl	ifier Part of C100	
C126	Condenser, AM pilot-light by-pass	62-11001021*	L
C127	Condenser, FM pilot-light by-pass,	62.11001021*	
C128	Condenser, neutralizing, 2.2 uf	30.1221.4	
C129	Condenser, cathode hy.nass 01	30.1938.9	
C130	Condenser, temperature compensa 7.5 uf	ting, 30,1991.65	L
C131	Condenser, trimmer, AM oscillator tuning	Dart of (100	E P
C132	Condenser grid noturn 100		R
C133	Condenser de blocking 990	69 199001041*	R
C134	Condenser onthodo hypers 990		R
C125	Condenser, cambde by-pass, 220 μ	ALL FARLOT PUL	R
C196	Condenser, trimmer, FM oscillato	r tuning 31-6524	R
C100	Condenser, r-r by-pass, 200 $\mu\mu$ t,	02-122001001=	R
C120	Condenser, $B \perp by-pass, .01 \ \mu f$.		R
C120	Condenser, a-v-c by-pass, .01 µf.		R
C140	Condenser, a-v-c by-pass, .01 μ f	30-4650-58*	
G140	Condenser, cathode by pass, 220 μ	ut. 62-122001001*	
U141	Condenser, B + by-pass 100 µµf.	62-110001021*	

eference Symbol	Description	Service Part No.
1 42	Condenser, r-f by-pass, 150 µµf,	60-10155417
143	Condenser, screen by-pass, .0022 μ f	30-4650-54*
144	Condenser, r-f by-pass, 150 $\mu\mu$ f	60-10155417
145	Condenser, cathode by pass, .01 µf	30-4650-58*
146	Condenser, a-v-c coupling, 15 $\mu\mu$ f	60-00155417
147	Condenser, de-emphasis, 150 µµf.	62-115001011*
148	Condenser, filter, 2 µf.	
149	Condenser, screen by-pass, .0022 μ f.	30-4650-54*
150	Condenser, neutralizing, .005 µf.	
151	Condenser, cathode by-pass, .01 µf	30-4650-58*
152	Condenser, electrolytic, plate by-pass,	45.3035.39
153	Condenser audio coupling 0068 "f	30-4650-57*
154	Condenser ref by mass 100 unf	69.110001021*
155	Condenser audio coupling 022 uf	30-1650-60*
156	Condenser r.f. hy.nass 100 unf	62,110001021*
157	Condenser de emphasis 0033 «f	30.1650.55*
159	Condenser, temperature compensating,	
	3.3 $\mu\mu$ f.	
160	Condenser, r-f by-pass, 3.3 $\mu\mu$ f.	
161	Condenser, switch by-pass, .0047 µf	30-4650-56*
00	Lamp, pilot, dial	
.01	Lamp, pilot, AM	
02	Lamp, pilot, FM	
100	Coil, FM antenna tuning	
101	Coil, FM r-f choke, 3.3 μ h.	32-4422-10
102	Coil, FM r-f amplifier tuning	32-4415-5
103	Coil, AM r-t transformer primary	Part of T101
104	Coil, AM r-t transformer secondary	Part of T101
105	Coll, FM r-1 choke, $3.3 \mu h$.	
100	Coll, and FM r-t amplifier tuning	
107 100	Coll, r-I choke, 3.3 μ B.	
100	Coil lat EM : 6 minutes	D+ - (7100
109	Coil let FM if accordance	Part of Z100
111	Coil lot AM is minimum	D
119	Coil lst AM if accordance	Part of Z101
112	Coil let AM if tontions	Dant of Z101
113	Coil and FM is primary	Fart of Z101
115	Coil 2nd FM is secondary	Part of 7102
116	Coil 2nd AM is primary	Part of 7102
117	Coil 2nd AM isf secondary	Part of 7103
118	Coil. FM discriminator primary	Part of Z101
119	Coil, FM discriminator tertiary	Part of Z101
120	Coil. FM discriminator secondary	Part of Z101
121	Coil, 3rd AM i-f primary	Part of Z105
122	Coil, 3rd AM i-f secondary	Part of Z105
123	Coil, AM antenna choke	32-4061-3
A100	Loop antenna	NOTE below
CI	Printed circuit, FM oscillator cathode	30-6002
100	Resistor, cathode bias, 120 ohms	66-1128340*
101	Resistor, screen dropping, 470 ohms	66-1478340*
102	Resistor, B+ dropping, 220 ohms	66-12283-40*
103	Resistor, B+ loading, 4200 ohms, 5 wa	tts 33-1335-101
104	Resistor, cathode bias, 68 ohms	66-0688340*
105	Resistor, a-v-c return, 2.2 megohms	66-5228340*
106	Resistor, phono input, 1.0 megohm	66-5108340*
107	Resistor, screen dropping, 470 ohms	66-1478340*

NOTE: LA100 consists of one loop of No. 14 stranded wire attached to the back of the cabinet frame.

REPLACEMENT PARTS LIST (Cont.)

Reference Symbol	Description	Service Part No.
	SECTION 1-R-F CHASSIS (Con	t.)
R108	Resistor, grid leak, 2.2 megohms	
R109	Resistor, cathode bias, 2700 ohms	66-2278340*
R110	Resistor, grid leak, 15,000 ohms	66-3158340*
R111	Resistor, B+ dropping, 47,000 ohms	66-3478340*
R112	Resistor, cathode bias, 470 ohms	Part of PC1
R113	Resistor, B+ dropping, 4700 ohms	66-2478340*
R114	Resistor, a-v-c filter, 2.2 megohms	66-5228340*
R115	Resistor, a-v-c filter, 2.2 megohms	66-5228340*
R116	Resistor, cathode bias, 47 ohms	66-0478340*
R117	Resistor, cathode bias, 33 ohms	66-0338340*
R118	Resistor, cathode bias, 2200 ohms	66-2228340*
R119	Resistor, screen dropping, 1000 ohms	66-2108340*
R120	Resistor, cathode bias, 120 ohms	66-1128340*
R121	Resistor, B+ dropping, 470 ohms	66-1478340*
R122	Resistor, B+ dropping, 10,000 ohms	66-3108340*
R123	Resistor, cathode bias, 47,000 ohms	66-3478340*
R124	Resistor, cathode load, 4700 ohms	66-2478340*
R125	Resistor, grid leak, 1.0 megohm	66-5108340*
R126	Resistor, neutralizing, 10 ohms	66-0108340*
R127	Resistor, diode load, 220,000 ohms	66-3228340
R128	Resistor, diode load, 100,000 ohms	66-4108340*
R129	Resistor, de-emphasis, 100 ohms	66-1108340*
R130	Resistor, de-emphasis, 39,000 ohms	66-3398340*
R131	Resistor, discriminator filter,	
	47,000 ohms	66-3478340*
R132	Resistor, a-v-c load, 2.2 megohms	66-5228340*
R133	Resistor, delayed a-v-c return,	
_	2.2 megohms	66-5228340*
R134	Resistor, cathode load, 120,000 ohms	66-4128340*
R135	Resistor, volume control, 100,000 ohms	33-5565-74
R136	Resistor, bass control, 1.0 megohm	33-5565-67
R137	Resistor, treble control, 250,000 ohms	33-5565-66
T 100	Transformer, AM antenna	
T101	Transformer, AM r-f	
T102	Transformer, AM oscillator	32-4569-2
WSI	Wafer switch, function	
through		
WS6		
Z100	Transformer, 1st FM i-f	32-4518A
Z101	Transformer, 1st AM i-f	32-4606-1A
Z102	Transformer, 2nd FM i-f	32-4518-1A
Z103	Transformer, 2nd AM i-f	32-4601-1A
Z104	Transformer, discriminator	32-4310-4A
Z105	Transformer, 3rd AM i-f	32-4607-1A

SECTION 2-POWER CHASSIS

C200	Condenser, audio coupling, .01 uf 30.4650.58*
C201	Condenser, bass compensation, .0022 µf. 30-4650-54*
C202	Condenser, d-c blocking, .022 µf
C203	Condenser, bass boost, .022 µf. 30-4650-60*
C204	Condenser, d-c blocking, .022 µf
C205	Condenser, treble compensation,
	510 μμf
C206	Condenser, bass boost, .022 µf. 30-4650-60*
C207	Condenser, treble boost, .0068 µf
C208	Condenser, cathode by-pass, .01 µf
C209	Condenser, d-c blocking, .0047 µf
C210	Condenser, electrolytic 30-2584-36
C210A	Condenser, filter, 40 µf., 450v Part of C210
C210B	Condenser, filter, 30 µf., 300v Part of C210
C210C	Condenser, filter, 10 µf., 450v Part of C210
C210D	Condenser, cathode by-pass, 50 µf., 50v Part of C210
C211	Condenser, filter, 10 µf., 475v
C212	Condenser, plate by-pass, 470 µµf, 62-147001021*
C213	Condenser, d-c blocking, .01 µf

Reference Symbol	Description	Service Part No.
C214	Condenser, d-c blocking, .047 µf.	
C215	Condenser, d-c blocking, .047 µf.	
C216	Condenser, bass compensation, .0022 µf.	30-4650-122
C217	Condenser, line by-pass, .01 µf.	30-4650-58*
C218	Condenser, line by pass, .01 µf.	. 30-4650-58*
C219	Condenser, B+ filter, 20 µf.	Part of C211
I200 and	Lamp, pilot, tone	
I201		
I202	Lamp, pilot, tone	
I203	Lamp, off-on	
I204 and	Lamp, record-changer bin	
I205		
L200	Coil, filter choke	
LS200	Loudspeaker	
R200	Resistor, grid leak, 470,000 ohms	66-4478340*
R201	Resistor, cathode bias, 1000 ohms	66-2108340*
R202	Resistor, cathode bias, 1000 ohms	66-2108340*
R203	Resistor, bass compensation,	
	220,000 ohms	66-4228340*
R204	Resistor, plate load, 47,000 ohms	66-3478340*
R205	Resistor, bass compensation,	<< 3990340#
D 904	22,000 onms	00-3228340*
R200	Resistor, cathode blas, 1000 onms	. 00-2108340*
R207	Resistor, plate load, 47,000 ohms	00-3478340*
R208	Resistor, treble compensation,	66 1990210#
D 900	Pasistan mid lash 22,000 shure	00+1446340*
R209 P910	Resistor, grid leak, 22,000 ohms	00-3448340*
R210 D911	Resistor, bass boost, 62,000 onms	00+3848340*
R411 D919	Resistor, canode plas, 2200 onms	00-2228340*
R212 D912	Resistor, plate load, $47,000$ ohms	00-3+18340*
R415 D914	Resistor, D – niter, 10,000 onms	00-3108340*
N414 D915	Resistor, grid leak, LU megonm	00-5108340*
R415 R916	Resistor, callode bias, 4700 ohms	
R410 D917	Resistor, BT filter, 10,000 ohms, I watt	00-3104340*
R417 D910	Resistor, plate load, 270,000 ohms	00-4278340*
R410 R910	Resistor, grid leak, 1.0 megonm	
R419 R990	Resistor, callode blas, 3500 ohms	00-2338340*
R220 R221	Resistor, canode load, 120,000 ohms	. 00-4128340*
R441 R999	Resistor, grid leak, 470,000 onms	00-44/8340*
R222	Resistor, plate load, 120,000 ohms	00-4128340*
R223	Resistor, grid leak, 470,000 ohms	
R444	Resistor, canode blas, 270 onms, 7 watt	8 33-1335-91
R440 R440	Resistor, feedback, 0800 ohms	00-2088340*
R220	Resistor, bass compensation, 10,000 ohm 2 watts	
R227	Resistor, B+ filter, 3500 ohms	33-3446-12
S200	Switch, off-on Part of nowe	r-cable ass'v
T200	Transformer, power	32-8638
T201	Transformer, output	32-8640

JACKS, PLUGS, AND CABLE ASSEMBLIES

J1	Jack, AM antenna loop	
12	Jack, tape recorder	
J3	Jack, tape-recorder input .	
J 4	Jack, FM test	
J5	Jack, volume control	
J6	Jack, volume control	
		control-arm cable ass'y.
J7	Jack, bass control	.27-6273-24
J 8	Jack, treble control	
J 9	Jack, speaker	
J10	Jack, B+ and filament	27-6273-35
J11	Jack, a-c and pilot light	
J12	Jack, power cord	Part of power-cable ass'y.
J14	Jack, B+ and filament	Part of B+
		and filament cable ass'v.

REPLACEMENT PARTS LIST (Cont.)

Reference Symbol	Description	Service Part No.
JACKS,	PLUGS, AND CABLE AS	SSEMBLIES (Cont.)
J 15	Jack, phono power	Part of phono-
	power a	nd pilot-light cable ass'y.
J16	Jack, phono power	
J17	Jack, phono input	
J18	Jack, bin light	27-4419-7
PLI	Plug, AM antenna	54-4878-8
PL2	Plug, tape-recorder input	Part of tape
	riug, uperecorder input	recorder cable ass'v
DIS	Plug volume control top	Part of volume
I LJ	ring, volume-control top	internal and of volume.
DLZ		control-top cable ass y.
PL0	Plug, volume control	
PL7	Plug, bass control	Part of base-
		control cable ass'y.
PL8	Plug, treble control	Part of treble-
		control cable ass'y.
PL9	Plug, speaker	Part of speaker
		cable ass'y.
PL10	Plug, B+ and filament	
	_	and filament cable ass'v.
PLII	Plug, phono power and pilot	light Part of phono-
	bower a	nd pilot-light cable ass'y
PL12	Plug, a-c nower connector	27.6940.3
PL13	Plug as power	Part of power
	ring, are power	
DT 14		cable ass y.
	Plug, B T and niament	
PLI5	Plug, phone power	
PL16	Plug, phone power	Part of phono-
		power cable ass'y.
PL17	Plug, phono input	Part of M25
	v	Record Changer
PL18	Plug, bin light	
Cable Ass	emblies:	
Bass co	ntrol	41-4192-1
Bin ligh	nt	41-4200
B+ and	filament	41-4189
Phone r	ower	76-2172-8
Phone	ower and pilot light	41,4199.9
Power	power and prior light	2-001k 1k
Sneakon		
Tana	aandaa	
Tape re		
Irebie	control	
Volume	control arm	
Volume	control top	

MISCELLANEOUS

(Cabinet Parts)

Description	Service Part No.
Cabinet, light	
Back, cabinet	54-9066-1
Ball strike	
Clip, spring	56-7654-1
Hinge, concealed, left-hand	28-9644-6
Hinge, concealed, right-hand	28-9611-7
Hinge, continuous	56-3627-18
Knob (3)	76-8671-1
Knob, function switch	78-8672-1
Lid support	

Description	Service Part No.
Cabinet, Mahogany	
Back, cabinet	
Ball strike	
Clip, spring	
Hinge, concealed, left-hand	
Hinge, concealed, right-hand	
Hinge, continuous	
Knob (3)	
Knob, function switch	
Lid support	
Dial scale	
Dome, cabinet feet (4)	
Grille, metal	
Knob, off-on switch (both cabinets)	
Knob, tuning (both cabinets)	
Trim, window (2)	
Trim, window (2)	
Window, decorative	

MISCELLANEOUS

(Chassis Parts)

Description	Service Part No.
Changer Mounting Hardware:	
Sleeve	
Speed nut	
Spring, mounting, bottom	56-7059-1FCP
Spring, mounting, top	
Clip, bin light	
Core, iron (L100)	
Dial backplate	
Lead assembly, antenna	
Panel, diffusing, blue, treble	
Panel, diffusing, red, bass	
Spring, (both diffusing panels)	28-9767
Pointer, AM	
Pointer, FM	
Holder, pointer (2)	
Spring, intermediate	
Springer. pointer	
Tie rod, pointer	
Pully and hub (2)	
Shield, pilot light	
Shield, tube (5)	
Shield, tube (12AT7)	
Shield, tube base (5)	
Shield, tube base (12AT7)	56-5628-1FA3
Sleeve, tuning shaft	
Socket, octal (3)	27-6174
Socket, 7-pin (6)	
Socket, 7-pin, r-f amplifiers (2)	
Socket, 9-µin (3)	
Socket ass'y,, pilot light (3)	
Spring, hairpin	
Spring, shaft ground	
Spring, shutter	
Switch, bin light	
Switch, function	



World Radio History



SERVICE BULLETIN FOR PHILCO RADIO-CLOCK

MODEL B712X, CODE 122

Philco Radio-Clock Model B712X, Code 122, is similar to Philco Radio-Clock Model B712, Code 122, except for the Special Services band. The Special Services band is not included in Model B712X, Code 122. For all service information refer to the Service Manual, PR-2570, for Model B712, Code 122. Any references in the alignment procedure, base and top views, schematic diagram, and parts list which refer to the Special Services band cannot be applied to Model B712X, Code 122. Part numbers which differ from Model B712, Code 122, are listed below. Figure 1 is the schematic diagram for Model B712X, Code 122.

Description	Service Part No.
Cabinet, pearl gray	
Cabinet, maroon	
Dial scale	28-9648-1
Knob, tuning or volume	54-6095-1
Pointer	54-4617-1
Clock	41-2047-1
Shaft, tuning	56-9807-7

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World Radio History

Figure 1. Philco Radio-Clock Model B712X, Code 122 Schematic Diagram





TPO-620-1

PHILCO THREE-SPEED CUSTOM AUTOMATIC RECORD CHANGER

MODEL M-25

SERVICE MANUAL

INTRODUCTION

The Philco Three-Speed Custom Automatic Record changer, Model M-25, has a dual-needle cartridge for general use and a hi-fidelity cartridge and needle for hi-fi reproduction. Both cartridges are equipped with replaceable needles. A damaged or worn needle should be replaced immediately in order to avoid record damage. A worn needle can usually be identified by poor or distorted reproduction or by visual damage to the record grooves.

This de luxe record changer is designed to play automatically, 78-, 45-, or $33\frac{1}{3}$ -r.p.m. records of 7-inch, 10-inch, or 12-inch size. The changer will play twelve 7-inch, twelve 10-inch, or ten 12- nch records at one loading. It operates from a 105-125-volt, 60-cycle, a-c supply. The time interval between the last note of one record and the first note of the next one is minimized by the use of a velocity trip. The possibility of damaging the changer by holding the tone arm during a change cycle is prevented by spring-loading all actuating levers.

The controls are conveniently grouped near the front of the changer, and the knobs are concentrically mounted in the front right-hand corner. The tone-arm head is immediately behind the control knobs, and the record shelf is in the front left-hand corner.

The tone-arm set-down indexing is established by the record-shelf position. The nodding spindle, rather than a complicated system of levers and blades, accomplishes the record-dropping. Most of the working parts are mounted on a bridge sub-assembly, a feature which makes the parts easily accessible for servicing.

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DESCRIPTION OF OPERATING CYCLE

At the completion of a record, the changer trips, and allows the dog latch to engage the spur of the turntable hub gear. This rotates the cam gear, allowing the teeth of the cam gear and hub gear to engage. As the cam rotates, it forces the lifter lever down, raising the tone arm from the record. As the tone arm reaches maximum height, the tone-arm actuator, activated by the cam gear, contacts the triparm stud and swings the tone arm against the rest post. After the tone arm reaches the rest post, the push-off lever rotates, nodding the spindle and dropping the next record onto the turntable. After the record has dropped, the return lever contacts the stud of the trip arm, and starts the tone arm inward. The tone arm is now controlled by the actuator and return levers, in contact with the stud of the trip arm. The return lever continues swinging the tone arm inward until it is stopped by the set-down lever, whose position is dependent upon the setting of the record shelf. This stoppage of the inward travel of the tone arm by the established position of the return lever accomplishes the set-down indexing. The tone arm is thus held above the set-down point. The lifter lever now moves upward, slowly dropping the tone arm to the record surface. As the cam gear continues to rotate, the actuator lever is moved outward and away from the trip-arm stud. The tone-arm return lever then moves away from the trip-arm stud. but the spring portion of the actuator momentarily remains in contact with the stud, preventing a sudden release of the tone arm, which could cause the needle to jump into the modulated groove. The tripplate supporting finger now engages the dog latch, and the index lever locks the cam gear in a neutral position. The tone arm is now free to play the record.

As the tone arm advances toward the spindle, the friction-clutch trip finger engages the end of the trip plate. Through the applied pressure of the fraction finger (approximately 2 grams) against the trip plate, the trip-plate finger supporting the dog latch begins to move, lessening the engagement of the trip-plate finger and dog latch, preparatory to releasing the latch. This engagement is slowly lessened while the needle is in the playing grooves, giving the reset cam an opportunity (once each revolution of the turntable) to reset the trip plate into full engagement and slip the friction finger into the friction clutch. As the needle rides in the lead-out or eccentric groove of the record, the velocity of the friction finger is increased. The speed of the disengagement of the trip-plate supporting finger and the dog latch is also increased sufficiently to allow complete disengagement of the dog latch before it has been restored by the reset cam.

ADJUSTMENTS

SPINDLE

The spindle should be checked for perpendicularity (use square on turntable surface) when the changer is out of cycle. To adjust, bend the ear on the pushoff-lever assembly; bending the lever toward the spindle spring throws the top of the spindle away from the record shelf. This ear is shown in figures 3 and 6.

RECORD SHELF

CAUTION: This adjustment must be made immediately after a change cycle is completed.

With the changer function control turned to the OFF position, place a record-shelf gauge, Part No. 45-6647, on the record shelf. The edge of the gauge should fit snugly against the edge of the raised portion of the shelf. Remove all play without flexing the spindle.



TPO-1839A

Figure 1. Record-Shelf Adjustment and 10-Inch, 12-Inch, and Fine Set-Down



Figure 2. Tone-Arm Height and Lift Adjustments and Vertical Timing Adjustments

If the gauge does not fit properly, loosen the two saddle mounting screws which hold the record shelf to the base plate (figure 1), and adjust the position of the record shelf. Then tighten the screws.

TONE-ARM HEIGHT AND LIFT

With the changer out of cycle, and the tone arm over the base plate, the needle point should be $\frac{1}{8}$ inch $\pm \frac{1}{6}$ inch above the base plate. To adjust the clearance, bend the protruding ear of the swivel post, at the rear of the tone arm heel. See figure 2. Bending the ear upward decreases the clearance; bending it downward increases the clearance. Raise the tone arm to its maximum height, and place it against the rest post. There should be approximately $\frac{3}{32}$ -inch clearance between the lower edge of the tone arm and the top of the rest-post hook. Bend the ear of the swivel to obtain the most satisfactory adjustment of both the rest-post clearance and the base-plate clearance.

VERTICAL TIMING

Adjust the vertical timing by bending the end of the lifter lever (shown in figure 2), which attaches to the pull-cord, so that there is approximately $\frac{1}{32}$ inch to $\frac{1}{16}$ -inch slack in the pull-cord for all tonearm positions between the tone-arm rest post and the spindle, when the changer is out of cycle. Check by cycling the changer; make certain that the lifter lever and pull-cord will raise the tone arm straight up to its maximum height, and then move it horizontally to the tone-arm rest post after the slack adjustment has been made.

SET-DOWN

Set the record shelf to the 12-inch position. Set the eccentric stud to its center position toward the corner of the base plate. This stud is accessible through a hole in the base plate near the push-off saddle (see figure 5). Place a 7-inch record on the turntable, set the record shelf to the 7-inch position, and cycle the changer by hand until the tone arm is just above the record. Loosen the hex-head clamp screw on the trip arm (see figure 3), and swing the tone arm until the needle is $\frac{1}{8}$ inch in from the edge of the record. Tighten the clamp screw, and check the adjustment by putting the changer through another cycle. If the set-down point is slightly incorrect, it may be corrected by means of the eccentric stud mentioned above. Recheck the needle set-down. The trip arm should be positioned vertically so that the friction finger is midway between the base plate and the lifter lever. Remove the 7-inch record. Set the record shelf to the 10-inch position, and place a 10-inch record on the turntable. Rotate the turntable until the needle is just above the record. If the needle is not $\frac{1}{8}$ inch in from the edge of the record, an adjustment may be made by bending the car of the set-down cam which is in contact with the eccentric stud. See figure 1. Bending the ear outward moves the set-down point away from the spin-



Figure 3. Adjustment of Trip Arm for 7-Inch Set-Down

3



Figure 4. Trip Adjustment

dle; bending the ear in toward the shelf shaft moves the set-down point toward the spindle. Recheck the needle set-down. Using a 12-inch record, with the shelf set to the 12-inch position, repeat the adjustment, bending the corresponding ear of the set-down cam (figure 1).

The eccentric stud mentioned above (shown in figures 1 and 5) provides a fine adjustment of the set-down position. This adjustment varies the set-down position for all sizes of records over a total range of $\frac{3}{16}$ inch. Do not use this adjustment unless it is desired to change all three set-down positions by an equal amount.

TRIP

CAUTION: Do not adjust the friction clutch until the trip-plate engagement is properly set, as explained below.

The proper trip action is greatly dependent upon the proper engagement of the dog latch and the finger of the trip plate supporting it. The correct engagement is $\frac{5}{64}$ inch (or approximately one-half the width of the supporting finger of the trip plate) when the ear of the reset arm is contacting the peak point of the reset cam. This condition is illustrated in figure 4. The extent of this engagement is adjustable by bending the ear of the trip plate, shown in figure 6. Bending the ear inward decreases the amount of engagement, and bending the ear outward increases the amount of engagement. This adjustable ear is accessible through the large hole in the bridge, and should be bent by using long-nose pliers. NOTE: Too much engagement will prevent tripping, while too little engagement will cause pretripping.

After the trip-latch engagement is set, check the changer for trip action. If the trip action is faulty, i.e., if the changer pretrips or does not trip at all, recheck the trip-latch adjustment. If the changer still does not operate propertly, check for tight tonearm lead dress or excessive friction in the tone-armshaft bearing. If this does not clear the trouble, the friction clutch can be adjusted, although this should not be necessary. This adjustment is made by means of a screw which is accessible from under the motorboard. (See figures 3 and 14.) Adjust the screw, which is located on the trip arm, by turning it counterclockwise until it is snug (not tight); then loosen one turn. Check the adjustment by playing several records. If the changer pretrips, loosen the screw (turn clockwise) a bit more. This trip arm and clutch assembly is shown in figure 14.

UNEVEN TURNTABLE SPEED (WOWS)

Uneven turntable speed may be caused by any of the following conditions:

1. Dirt under and around the idler-wheel assembly.

2. Idler-wheel spring loose or missing.

3. Flat spot on idler-wheel tire or turntable.

4. Loose, worn, or distorted pulley belt.

5. Oil or grease on idler-wheel tire, pulley, pulley belt, or drive shaft.

6. Speed-control knob not in proper position.



Figure 5. Top View, Showing Lubrication Points



Figure 6. Bottom View, Showing Lubrication Points

TP2-519A



Figure 7. Bottom View, Bridge Removed, Showing Lubrication Points

LUBRICATION

LUBRICANTS

- 2. Oil: S.A.E. 20.
- 2. Grease: Motor cup grease.
- 3. Contact lubricant: Dow Corning "DC-4."

PARTS NOT TO BE LUBRICATED

- 1. Motor drive shaft.
- 2. Motor pulley.
- 3. Drive belt.
- 4. Idler tire.
- 5. Dog latch (on cam gear).
- 6. Lifting lever (where dog rides).
- 7. Trip-plate assembly.
- 8. Friction washer and tone-arm stanchion.
- 9. Friction finger.
- 10. Friction washer.

11. Spindle latch (may be lubricated with powdered graphite or talcum powder).

PARTS TO BE GREASED

I. Actuator assembly.

a. Lifting lever, where lever contacts cam gear.

b. Tone-arm-actuator lever where it contacts stud of friction-clutch assembly.

2. Base Plate.

a. Switch lever, detent spring, and slot where switch-lever ear rides in base plate.

b. Actuating stud on the Function knob, where it engages the switch lever.

c. Motor-speed-shift plate, where it rides in guide slots, and slot that rides on cam-gear spindle; control link where it rides on base plate.

3. Bridge Assembly.

a. Push-off lever where end slides on bridge, where stud rides in slot of bridge, and at pivot pin.

b. Cam gear, all cam surfaces and gear teeth except dog latch.

c. Stud of friction-clutch assembly where return lever and tone-arm actuator ride.

d. Turntable spindle.

4. Motor.

NOTE: When lubricating the motor, use grease or oil very sparingly. Excessive lubrication will cause erratic operation.

a. Cam surfaces of idler-wheel lifter.

b. Detent surfaces.

c. Extension of idler shaft in contact with lower shifter plate.

- 5. Record Shelf.
 - a. Record-shelf-shaft bearing.
 - b. Detents for record shelf.
 - c. Hold-down pin and detents.
 - d. Hold-down shaft.
 - e. Set-down cam, where eccentric stud rides.
- 6. Index Lever.

PARTS TO BE OILED

- 1. Cam-gear spindle.
- 2. Control-knob shafts.
- 3. Motor.
 - a. Idler-assembly pivot shaft.
 - b. Idler-wheel shaft.
 - c. Slider bar, four points.
 - d. Two shift roller pins.
 - e. Pulley shaft (wipe dry and apply one drop).
 - f. Under pivot bushing of shifter plate.
- 4. Reject-lever pivot.

5. Tone-arm shaft where it rotates in bridge and in base plate.

REPLACEMENT OF PARTS AND ASSEMBLIES

The following procedures are recommended for the correct removal of parts and assemblies. The parts should be replaced by reversing the order of

1. Crystal Cartridge.

Grasp crystal cartridge with fingernails. With the other hand, hold tone arm and apply slight pressure on switch handle. Pull cartridge down and to the outside. Replace cartridge by holding contacts toward spindle, and pushing upward until firmly seated.

The Hi-Fi cartridge is removed and replaced in the same manner. This cartridge is locked in the 45-LP position.

2. Needle.

Remove crystal cartridge (see paragraph 1). Lift needle out gently with prying motion, using fingernail or knife at pivot point. When replacing needle, align key of needle shaft with keyway in chuck of cartridge; then push needle into cartridge.

3. Turntable.

Remove spring retainer and washer located on the top of the turntable spindle bushing. Lift turntable off.

NOTE: When replacing turntable, position Speed control knob midway between LP and 45 or 45 and SP. This holds the idler wheel in a retracted position. Then replace turntable. This method will prevent damage to the idler-wheel tire; then replace washer and retainer.

6. Tone-arm-pivot pin where it goes through swivel assembly.

- 7. Trip-plate-assembly pivot in bushing only.
- 8. Turntable bearings, top and bottom.
- 9. Actuator spindle.

10. Bearing surfaces between actuator lever, washer, set-down lever, index lever, washer, and return lever (grease end of return lever where it contacts stud of friction-clutch assembly).

CAUTION: When lubricating the motor, remove the rubber belt and idler wheel. When lubrication is completed, make sure that the motor shaft and pulley are free from oil and grease. Failure to observe this precaution may result in slippage.

CONTACT LUBRICATION

Apply Dow Corning "DC-4" to the contacts of the cartridge contact plate, and to the dimple of the carriage retaining spring. See figure 13.

removal. Adjustments should be made according to the directions given in the ADJUSTMENTS section of this manual.

4. Spindle. See figure 6.

Disengage spindle spring. Remove spindle. Do not lose spring washer under spindle lever.

5. Bridge. See figure 9.

a. Remove set-down-lever spring. See figure 8.

b. Remove the three hex-head bridge mounting screws and the two plastic cable clamps.

c. Remove "E" washer from tone-arm spindle.

d. Remove hex-head drive screw from camgear spindle. This screw is located on the top of the motorboard, under the turntable. See figure 5.

e. Remove pull-cord and disconnect tone-arm wires.

f. Carefully lift off bridge, cam gear, spindle bushing, trip-plate assembly, lifter lever, spindle lever, and push-off lever.

6. Cam Gear.

a. Remove bridge. See paragraph 5.

b. Remove "E" washer from cam-gear spindle.

c. Lift off cam gear.

7. Push-off-Lever Assembly and Spindle Lever.

a. Remove cam gear. See paragraph 6.

b. Remove "E" washer from push-off lever stud. See figure 6.

c. Rotate push-off lever so that stud is in large hole, and lift off both push-off lever and spindle lever.



Figure 8. Actuator Assembly

- 8. Trip-Plate Assembly.
 - a. Remove cam gear. See paragraph 6.
- b. Remove clip from trip stud (see figure 4), and lift assembly from bushing.

9. Trip Reset Cam, Neoprene Washer, and Ball Bearing.

a. Remove cam gear. See paragraph 6.

b. Remove spring retaining ring. See figure 9.c. The trip reset cam, neoprene washer, ball

cover, balls, and race may be removed in that order.

10. Trip-Arm Assembly. See figure 14.

a. Remove "E" washer from end of tone-arm shaft. See figure 6.

- b. Disengage pull-cord.
- c. Loosen trip-arm-clamp screw. See figure 7.
- d. Raise tone arm sufficiently to clear trip arm.
- e. Remove trip-arm assembly.
- 11. Tone Arm. See figure 13.
 - a. Place Function control in the OFF position.
 - b. Unsolder the four tone-arm leads.
 - c. Remove pull-cord from lifter lever.
- d. Remove "E" washer from end of tone-arm shaft.
 - e. Loosen trip-arm-clamp screw.
 - f. Remove tone-arm-shaft spring.
 - g. Lift out tone arm.

12. Motor Assembly. See figure 11.

a. Remove turntable. See paragraph 3.

b. Unsolder motor lead from switch on base plate, and free other lead from tape and spaghetti.

c. Remove the three hex-head drive screws, washers, and spacers from motor frame.

d. Tilt motor so that rubber grommet is free of ear of motor-speed-shift plate.

e. Lift motor out.

13. Control Shaft and Links. Figure 10 shows the control assembly.

a. Place Function control knob in the OFF position.

b. Remove turntable, and detent spring from motor board.

c. Pull off Speed control knob.

d. Remove "E" washer, flat washer, and spring washer.

e. Pull off Function control knob.

f. Push speed-change shaft and crank assembly through the bushing in the base plate.

- g. Disengage shaft and crank assembly from its link.
 - h. Remove the speed-shift link. See figure 7.

i. Remove "E" washer and flat washer from control bushing.





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MODEL M-25

RECORD CHANGER



j. Remove off-on switch lever by lifting it over the control bushing and rotating it away from the record shelf to release the reject link and the switch lever. Pull toward the corner of the base plate to lift the ear out of the "T" slot in the motor board.

k. To remove the reject link, the reject lever must be removed by disengaging the reject spring, "E" washer, and spring washer. See figure 5.

l. Remove reject link from reject lever.

14. Record Shelf. See figures 7 and 12.

a. Remove "E" washer from bottom of recordshelf shaft.

b. Remove cupped washer.

c. Loosen set-down cam clamp screw. See figure 12.

d. Remove set-down cam, record-shelf spring, and spacer. See figure 12.

e. Lift record shelf from saddle.

15. Actuator Levers. See figure 8.

a. Remove bridge. See paragraph 5.

b. Remove spring from tone-arm return lever.

c. Remove "E" washer, washer, and compression spring from actuator support stud.

d. Remove "E" washer and washer from tonearm-actuator support stud.

e. Remove tone-arm-actuator assembly.

f. Remove spacer washer from actuator support stud.



Figure 11. Motor Assembly

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Figure 12. Record-Shelf Assembly

h. Remove cam-gear index lever.

g. Remove set-down lever.

i. Remove motor-shift plate by first removing turntable (see paragraph 3) and removing the set of motor mounting hardware nearest record shelf. With Speed control in "45" position, free shift-lever ear from motor grommet by tilting motor upward from motor board. Return freed shift lever to an outward position. Lift and turn free end of speed-shift plate toward tone arm; this will free ear in large slot. With free end, carefully twist plate down between return lever support stud and spring-anchor stud. Ear in small slot will come free.

j. Remove large spacer washer from actuator stud.

k. From top of base plate (under the turntable), remove reject spring, "E" washer, and spring washer. Free reject lever of stud, and remove reject link from lever.

l. Remove tone-arm-return lever.

NOTE: When replacing the index-lever spring, the tone-arm-actuator spring, and the return-lever spring, recement the ends to the spring mounting stud, using glyptal. This will prevent the springs from coming loose as a result of shock.









Figure 15. Wiring Diagram for Model M-25

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TPO-2313A

REPLACEMENT PARTS LIST

	Service
Description	Part No.
Actuator Assembly	
Cam-gear index lever	76-5895*
Spring, index lever	56-8094
Compression spring	. 56-8087
Roturn loven	76-5893*
Suring seture lever	56-8092
Spring, return lever	76.5804
Set-down lever	E6 0002
Spring, set-down lever	
Ione-arm-actuator assembly	(0-0302-1
Spring, actuator	30-6093
Bridge Assembly	
Ball bearing, $\frac{1}{8}$ inch dia. (3)	5W2017
Bearing cover	
Bearing retainer, ball	
Bearing washer (2)	56-8127-1
Cam-gear assembly	76-5905
Dog latch	56-8138
Pin, dog-latch mounting	56-8139
Lifter lever	28-9625
Spring, lifter lever	56-8133
Spring, lifter lever	28-9626
Neoprene washer	54-8140
Push-off-lever assembly	76-5908
Retaining ring, reset cam and bearing 1W	42311FE7
Spindle lever	
Spring spindle	56-8131
Trin.nlote essembly	76-5906
Trip-plate assembly	54.8139
Changer has a plate tone arm rest and tone ar	
stanchion	76 7701 1
Pummon tone come next subbon	54 9126 1
Sector matter and sector secto	49 1067
Switch, motor power	40 1072
Switch, pickup	42-18/3
Changer Mounting Hardware	
Sleeve, rubber (3)	54-7798
Spring, heavy, top (3)	-7059FA9
Spring, light, bottom (3)	059-IFCP
Speed nut (3)	W-2554
Control Assembly	
Knob, Speed control assembly	76-7700-1
Knob, Function control	54-4971-1
Lever, off-on switch	56-9762
Link, reject	56-9761
Link, speed shift	
Washer, "E", switch lever	60980FE7
Crank-and-shaft assembly	76-7698-1
Motor and Hardware	
Drive belt	. 54-7959
Idler wheel	. 76-5267
Plate, motor-speed shift	.56-8083
Pulley assembly	.45-6499
Screw, motor mounting (3)	21561FA3
Spacer, mounting (3)	56-4926-1
The second	

Service Part No. Description Washer, mounting (3)1W52100FA3 Shock mount (3)54-4501 **Record-Shelf Assembly** Bracket, mounting for shaft and swivel 56-9763 Cartridge and needle ass'y., Hi-Fidelity45-9792 Retainer plate, rear56-8973 Shock mount, bracket mounting (3)54-4729 Spring, tone-arm shaft56-8773 Washer, horizontal friction (plastic)54-8103 Screw, friction-trip adjustment56-8109 Washer, friction clutch (plastic) (2)54-8142 Retainer, turntable56-8097

* This replacement part may not be identical to the production part incorporated in the changer. In any case, the replacement part will serve as well as the original one.



Service

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PHILCO

66 "Phonorama"

MODEL B1756



SPECIFICATIONS

Cabinet	Wood console
Circuit	
R-F Chassis	Eight-tube superheterodyne
Power Chassis	
Frequency Range	
AM	
FM	
Audio Output,	Push-pull, 10-watt, undistorted
Operating Voltage	105-120 volts, a.c.

Power Consumption	
Antenna	
Intermediate Frequency	
AM	
FM	
Record Changer	Philco Three-Speed Custom Automatic Record Changer Model M-25 (Refer to Service Manual PR-2557.)

TUBE COMPLEMENT

R-F CHASSIS

TUBE NUMBER	TUBE TYPE	TUBE FUNCTION
V1	6AU6, miniature	FM r-f amplifier
$\mathbf{V2}$	6BA6, miniature	AM-FM r-f amplifier
V3	12AT7, miniature	Mixer-oscillator
$\mathbf{V4}$	6BA6, miniature	1st i-f amplifier
V 5	6AU6, miniature	2nd i-f amplifier
V6	6AL5, miniature	FM detector
V7	6AL5, miniature	AM detector, automatic-volume-control
V8	6C4A, miniature	Cathode follower

POWER CHASSIS

TUBE NUMBER	TUBE TYPE	TUBE FUNCTION
V9	12AU7, miniature	Audio amplifier
V10	6C4, miniature	Audio amplifier
V11	12AX7, miniature	Audio amplifier, phase splitter
V12 and	6V6G	Output -
V13		
V14	5U4GT	Rectifier

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CHASSIS REMOVAL INSTRUCTIONS

The chassis may be removed from the cabinet by first removing the following items:

- 1. Cabinet back
- 2. Chassis mounting screws
- 3. Control knobs
- 4. A-C line-cord plug
- 5. Phono connecting plugs
- 6. Phono bin-light plug
- 7. Loop-antenna plug
- 8. Speaker plug
- 9. Off-on indicator light assembly

After these items have been removed, the chassis may be taken from the cabinet. If necessary, disconnect all chassis interconnecting sockets and plugs, and remove each chassis separately.

After removal, make sure that all plugs are in their proper sockets for test purposes. To connect the chassis to the a-c supply, use an a-c line cord, Philco Part No. 41-3865.

SERVICE HINTS

The Philco "Phonorama" Radio, Model B1756, provides high-quality reproduction of both radio broadcasts and recorded sound. This is the result of careful design and good production methods. The range of frequencies needed to provide Hi-Fidelity is much broader than that achieved in most radios, and for that reason the circuits in this model have been given careful consideration. To maintain this high-quality reproduction, it is necessary that any repair and maintenance work performed on the radio keep the circuit specifications the same as when the radio was produced. This can be accomplished by using replacement parts as indicated in the replacement parts list, and by following careful repair techniques. The use of parts different from those specified and careless repair techniques may result easily in loss of reproduction quality and, therefore, customer dissatisfaction.

GENERAL CARE AND TREATMENT OF RECORDINGS AND NEEDLES

Modern long-playing and standard records are constantly being improved for lower distortion, a wider range of frequency reproduction, and smoother, more noise-free surfaces. By applying a few simple practices, as indicated below, the utmost advantage can be taken from these improvements.

Before playing any record, make sure that its surface is clean. If the surface is slightly dusty, a very soft artist's paint brush may be used to dust the surface, or a moistened chamois may be lightly applied to the record surface in the direction of the grooves. If the record is very dirty, perform the previous operation under cool, running water.

Never store records stacked one on top of the other, even if they are housed in folders; any grit or dirt will, by the pressure of the other records, be pressed into the soft surface, and appear as a "pop" in subsequent playings. Never expose records to heat or sunlight, as serious warping may result. Commercial solutions for repelling dust from the surfaces of records will be effective only for a limited time, and may jam up the grooves and cause distortion.

To achieve maximum play-back fidelity, a long-life, jewel-tipped needle should be used. A jewel-tipped needle will last far longer than an osmium-tipped or plain needle. However, although these jewels are very hard, they can easily be chipped through misuse, such as failure to put the hold-down lever in place after a stack of records have been positioned on the spindle. In this case, if a record is playing and the changer is jarred, another record may be pushed loose and fall on the tone arm, causing damage to both the needle and the record. A chipped needle will act as a chisel on records, and will ruin them.

AM ALIGNMENT PROCEDURE

GENERAL—The AM alignment should be completed before the FM alignment is made. Before beginning the alignment, allow the radio and the test equipment to warm up for fifteen minutes.

CHASSIS—Remove both the r-f chassis and the power chassis from the cabinet. (Refer to the CHASSIS RE-MOVAL INSTRUCTIONS given above.)

ANTENNA—Make up a loop antenna from No. 14 stranded wire having the same dimensions as the loop antenna attached to the cabinet. Connect this made-up antenna to the antenna plug, PL1. If convenient, use the loop antenna attached to the cabinet.

DIAL POINTER—With the tuning-condenser plates fully meshed, adjust the pointer to coincide with the left-hand edge of bass note #10. This is the index mark.

RADIO CONTROLS—Set the volume control to maximum, set the function switch to the AM position, and set the tuning control as indicated in the AM ALIGN-MENT CHART.

OUTPUT INDICATOR—Use a 1000-ohms-per-volt a-c voltmeter or an oscilloscope connected between the test jack, J4, located on the back of the r-f chassis, and ground.

SIGNAL GENERATOR—Use an AM r-f signal generator with modulated output. Connect the generator and set the frequency as indicated in the AM ALIGN-MENT CHART.

OUTPUT LEVEL—During alignment, the signal generator must be attenuated to maintain the output indication below .15 volt, a.c.

TUNING TOOLS—Use a non-metallic tuning tool, such as Philco Part No. 45-8879, for the i-f adjustments and all screw adjustments.

FM ALIGNMENT PROCEDURE

FM METHOD (Using FM Test Equipment)

GENERAL—The AM alignment should be completed before the FM alignment is made. After the chassis have been removed from the cabinet, allow the radio and the test equipment to warm up for fifteen minutes. CHASSIS—Remove both the r-f chassis and the power chassis from the cabinet. (Refer to the CHASSIS RE-MOVAL INSTRUCTIONS given above.)

DIAL POINTER—With the tuning condenser plates fully meshed, adjust the pointer to coincide with the left-hand edge of bass note #10. This is the index mark.

RADIO CONTROLS—Set the volume control to maximum, set the function switch to the FM position, and set the tuning control as indicated in the FM ALIGN-MENT CHART (FM METHOD).

OUTPUT INDICATOR—Use an oscilloscope. Connect the ground leads to the chassis. Connect the vertical-input lead to test jack J4, and the horizontalinput lead to the horizontal-sweep output of the sweep signal generator. SIGNAL GENERATOR—Use an FM sweep signal generator. Connect the generator and set the frequency and sweep width as indicated in the FM ALIGNMENT CHART (FM METHOD).

For accurate results on the r-f adjustments, the signal-generator output impedance must be 300 ohms, to match the input impedance of the radio. If the signal-generator output impedance is other than 300 ohms, use an impedance-matching network to match it to the radio.

OUTPUT LEVEL—Adjust the sweep signal generator output to maintain the scope indication at a convenient level.

TUNING TOOLS—Use a non-metallic tuning tool, such as Philco Part No. 45-8879, for the i-f adjustments and all screw adjustments. Use a tuning wand, such as Philco Part No. 56-6100, to check the resonance of the FM air coils.



Figure 2. Top View, R-F Chassis, Showing Parts Placement and Tuning Adjustments

FM ALIGNMENT CHART (FM METHOD)

STEP	SIGNAL GENERATOR		RADIO		
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1.	Ground lead to chassis. Output lead through a .05-µf. condenser to pin I of V5, 6AU6.	9.1 mc. (80-kc. devia- tion)	Gang fully closed.	Adjust TC113 for balance (cen- tered in sweep range). Adjust TC112 for maximum indication (maximum slope) on scope.	TC113—FM detector secondary (top) TC112—FM detector primary (bottom)
2.	Ground lead to chassis. Output lead through a .05-µf, condenser to pin 1 of V4, 6BA6.	9.1 mc. (80-kc. devia- tion)	Gang fully closed.	Adjust, in order given, for maxi- mum output (maximum slope).	TC109—2nd FM i-f secondary (top) TC108—2nd FM i-f primary (bottom)
3.	Ground lead to chassis. Output lead through a .05- μ f. condenser to lug of C100C (pin 1 of L106).	9.1 mc. (80-kc. devia- tion)	Gang fully closed.	Adjust for maximum output.	TC105—1st FM i-f secondary (top) TC104—1st FM i-f primary (bottom)
4.	Connect to terminals on TB100. If necessary, use a matching network as directed in the instructions above.	108.5 mc. (80-kc. devia- tion)	108.5 mc. (See NOTE 1 helow.)	Adjust for maximum output.	C135—FM osc. trimmer
5.	Same as step 4.	88 mc. (80-kc. devia- tion)	88 mc. (See NOTE 1 below.)	Adjust for maximum output. (See NOTE 2 below.)	L108—FM osc. coil
6.	Repeat steps 4 and 5 until no furthe	er improven	nent is obtaine	d.	
7.	Same as step 4.	105 mc. (80-kc. devia- tion)	105 mc. (See NOTE 1 below.)	Adjust for maximum output.	C124—2nd FM r-f trimmer C107—1st FM r-f trimmer C102—FM antenna trimmer
8.	Same as step 4.	92 mc. (80·kc. devia- tion)	92 mc. (See NOTE 1 below.)	Adjust for maximum output.	L106—2nd FM r-f coil L102—1st FM r-f coil TC100—FM antenna tuning core

NOTE 1: The radio may be tuned to the respective frequencies by setting the pointer the following distances from the index mark:

108.5 mc.—6-1/4 inches 105 mc.—4 inches 92 mc.—1-1/16 inches 88 mc.—3/16 inch

NOTE 2: Check the tuning of the oscillator and r-f coils by inserting each end of a tuning wand (Philco Part No. 56-6100) into the coils. If the output increases when the iron end of the wand is inserted, compress the turns slightly. If the output increases when the brass end is inserted, spread the turns slightly. If the output decreases when each end is inserted, no adjustment is necessary. (Do not disturb the setting of the tuning gang while making any necessary adjustments.)



Figure 3. Top View, Power Chassis, Showing Parts Placement



TP3-1861



Figure 4. Drive-Cord Installation Details, Tone Controls

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AM ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1.	Ground lead to chassis. Output lead through a .05- μ f. condenser to pin 1 of V5, 6AU6.	455 ke.	Gang fully open.	Adjust, in order given, for maxi- mum output.	TC115—3rd AM i-f secondary (top) TC114—3rd AM i-f primary (bottom)
2.	Ground lead to chassis. Output lead through a .05-µf. condenser to pin 1 of V4, 6BA6.	455 kc.	Gang fully open.	Place a 1000-ohm resistor across primary of Z103 (pins 3 and 4). Adjust for maximum output. Re- move 1000-ohm resistor from across primary, and place across second- ary of Z103 (pins 1 and 2). Adjust for maximum output.	TC111—2nd AM i-f secondary (top) TC110—2nd AM i-f primary (bottom)
3.	Ground lead to chassis. Output lead through a .05-µf. condenser to lug of C100D or to pin 4 of T101.	455 ke.	Gang fully open.	Remove 1000-ohm resistor from across secondary of Z103, and place across primary of Z101 (pins 3 and 4). Adjust for maximum out- put. Remove 1000-ohm resistor from across primary, and place across secondary of Z101 (pins 1 and 2). Adjust for maximum output.	TC107—1st AM i-f secondary (top) TC106—1st AM i-f primary (bottom)
4.	All connections same as step 3. Remove 100-ohm resistor from circuit. Rock signal generator and note output indication. Equal peaks should occur at 452 and 458 kc. The output should drop off equally at 450 and 460 kc. If the peaks are not symmetrical, touch-up TC110-2nd AM i-f primary. If this does not give symmetry, repeat steps 1, 2, and 3.				
5.	Radiating loop. (See NOTE 1 below.)	1620 kc.	1620 kc. (See NOTE 2 below.)	Adjust for maximum output.	C131—AM osc. trimmer
6.	Same as step 5.	1500 kc.	1500 kc. (See NOTE 2 below.)	Adjust, in order given, for maxi- mum output.	C125—AM r-f trimmer C111—AM antenna trimmer
7.	Same as step 5.	580 kc.	580 kc. (See NOTE 2 below.)	Adjust, in order given, for maxi- mum output.	TC102—AM r-f padder TC101—AM antenna padder
8.	Repeat steps 6 and 7 until no further improvement is obtained.				

NOTE 1: Make up a loop of wire of the same dimensions as the radio loop, and place it close to, and in the same plane as, the radio loop.

NOTE 2: The radio may be tuned to the respective frequencies by setting the pointer the following distances from the index mark: 1620 kc.-6-1/16 inches; 1500 kc.-5-10/16 inches; 580 kc.-11/16 inch.

FM ALIGNMENT PROCEDURE AM METHOD

(Using AM Test Equipment)

GENERAL-The AM alignment should be completed before the FM alignment is made. Before beginning the alignment, allow the radio and test equipment to warm up for fifteen minutes.

CHASSIS—Remove both the r-f chassis and the power chassis from the cabinet. (Refer to the CHASSIS RE-**MOVAL INTRUCTIONS** given above.)

ANTENNA-Make up a loop antenna from No. 14

stranded wire having the same dimensions as the loop antenna attached to the cabinet. Connect this madeup antenna to the antenna plug, PL1. If convenient, use the loop antenna attached to the cabinet.

DIAL POINTER-With the tuning-condenser plates fully meshed, adjust the pointer to coincide with the left-hand edge of bass note #10. This is the index mark.

BADIO CONTROLS—Set the volume control to maximum, set the function switch to the FM position, and set the tuning control as indicated in the FM ALIGN-MENT CHART (AM METHOD).

OUTPUT INDICATOR-Use a 20,000-ohms-per-volt d-c voltmeter. See GENERAL NOTE below.

SIGNAL GENERATOR-Use an AM r-f signal generator with modulated output. Connect the generator and set the frequency as indicated in the FM ALIGN-MENT CHART (AM METHOD).

OUTPUT LEVEL-The output level should be between 5 and 10 volts for all steps except the first one. Adjust the generator to maintain the output between these two limits.

TUNING TOOLS-Use a non-metallic tuning tool, such as Philco Part No. 45-8879, for the i-f adjustments and all screw adjustments. Use a tuning wand, such as Philco Part No. 56-6100, to check the resonance of the FM air coils.





Figure 1. Base View, R-F Chassis, Showing Parts Placement and Tuning Adjustments

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3

GENERAL NOTE: In order to perform this alignment it is necessary to place two 100,000-ohm resistors in series between the junction of R131 and C148 (pin 2 of V6, FM detector) and ground. For the first step of the alignment, the 20,000-ohms-per-volt voltmeter must be placed between the junction of these two 100.000-ohms resistors and lug 1 of terminal panel B6, which is the junction point of R130 and C157. For the first step, the meter needle should be set off zero to the first major scale mark by adjusting the meter zero-adjust knob. After the first step has been completed, the needle can be set back to the zero mark. The purpose of this adjustment is to enable the serviceman to see a negative indication on the meter. For the remaining steps of the alignment the meter should be connected between the junction of the two 100.000-ohm resistors and ground, with the negative meter lead at the junction of the two resistors.

The two resistors should be as nearly equal in value as possible (at least within 5% of each other).

FM ALIGNMENT CHART (AM METHOD)

	SIGNAL GENERATOR		RADIO			
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST	
1.	Ground lead to chassis. Output lead through a .05-µf. condenser to pin 1 of V5, 6AU6.	9.1 mc.	Gang fully closed.	Adjust for balance (zero indication on meter).	TC113—Discriminator secondary (top)	
2.	Same as step 1.	Same as step 1.	Same as step 1.	Change output-meter connections as directed in the GENERAL NOTE above. Adjust for maximum output.	TC112—Discriminator primary (bottom)	
3.	Ground lead to chassis. Output lead through a .05-µf. condenser to pin 1 of V4, 6BA6.	Same as step 1.	Same as step 1.	Adjust, in order given, for maxi- mum output.	TC109—2nd FM i-f secondary (top) TC108—2nd FM i-f primary (bottom)	
4.	Ground lead to chassis. Output lead through a $.05 \cdot \mu f$. condenser to lug of C100C (pin 1 of L106).	Same as step 1.	Same as step 1.	Adjust, in order given, for maxi- mum output.	TC105—1st FM i-f secondary (top) TC104—1st FM i-f primary (bottom)	
5.	Radiating loop. (See NOTE 1 below.)	108.5 mc.	108.5 mc. (See NOTE 2 below.)	Adjust for maximum output.	C135—FM osc. trimmer	
6.	Same as step 5.	88 mc.	88 mc. (See NOTE 2 below.)	Adjust for maximum output. (See NOTE 3 below.)	L108—FM osc. coil	
7.	Repeat steps 5 and 6 until no further improvement is obtained in oscillator tracking.					
8.	Same as step 5.	105 mc.	105 mc. (See NOTE 2 below.)	Adjust, in order given, for maxi- mum output.	C124—2nd FM r-f trimmer C107—1st FM r-f trimmer C102—FM antenna trimmer	
9.	Same as step 5.	92 mc.	92 mc. (See NOTE 2 below.)	Adjust, in order given, for maxi- mum output. (See NOTE 3 below.)	L106—2nd FM r-f coil L102—1st FM r-f coil TC100—FM antenna tuning core	
10.	Repeat steps 8 and 9 until no further improvement is obtained in r-f tracking.					

NOTE 1: Make up a loop of wire of the same dimensions as the radio loop, and place it close to, and in the same plane as, the radio loop.

NOTE 2: The radio may be tuned to the respective frequencies by setting the pointer the following distances from the index mark:

- 108.5 mc.--6-1/4 inches 105 mc.-4 inches 92 mc.-1-1/16 inches
- 88 mc.--3/16 inch

NOTE 3: Check the tuning of the oscillator and r-f coils by inserting each end of a tuning wand (Philco Part No. 56-6100) into the coils. If the output meter shows an increase when the iron end of the wand is inserted, compress the turns slightly. If the output meter shows an increase when the brass end of the wand is inserted, spread the turns slightly. If the output decreases when each end is inserted, no adjustment is necessary. (Do not disturb the setting of the tuning gang while making any necessary adjustments.)


Figure 5. Base View, Power Chassis, Showing Parts Placement



Figure 6. Drive-Cord Installation Details, Pointers and Tuning

9





I B1756, Schematic Diagram

TP3-1742

ANTENNA LOOP B+ AND FILAMENT JACK AND CABLE **R-F CHASSIS** B+ AND FILAMENT (PLI4 J14 PLUG VOLUME CONTROL TOP PLUG M 25 RECORD VOLUME CONTROL JACK CHANGER J5 PL5 PHONO INPUT JACK PHONO POWER JACK PHONO PLUG TAPE RECORDER JI7 PLI5 JI6 (O J4 J2 0 FM TEST JACK PLI6 -PLI TBIOO FM ANTENNA INPUT PLIT JI5 PHONO POWER PLUG AND CABLE PL2 J3 AM PHONO POWER AND PILOT LIGHT JACK AND CABLE PLUG TAPE RECORDER TAPE PHONO INPUT JACK RECORDER AM ANTENNA PLUG INPUT JI PLUG AND CABLE **POWER CHASSIS** TREBLE TREBLE CONT. 0 PL8 PLUG AND CABLE TREBLE CONTROL JB JACK BASS BASS CONT. CONTROL 0 PL7 PLUG AND CABLE B+ AND FILAMENT PLUG AND CABLE BASS CONTROL J7 JACK A-C AND PILOT LIGHT PHONO POWER AND BIN LIGHT BIN LIGHT JACK PILOT LIGHT PLUG SOCKET PLUG VOLUME VOLUME CONT. AND CABLE 0 **J6** TO BIN VOLUME CONTROL 8+ AND JACK AND PL6 JH PLI8 JЮ PLII JI8 PLUG FILAMENT JACK LIGHT CABLE SPEAKER PL12 19 JACK A-C POWER 0 POWER CORD LINE JACK AND CABLE PL9 0 J12 PL13 A-C POWER PLUG SPEAKER PLUG AND CABLE TP3-1898

MODEL B1756

Figure .09 Philco "Phonorama" Model B1756, Chassis Interconnecting Diagram

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.	Reference Symbol	Description	Service Part No
	SECTION 1-R-F CHASSIS		C142	Condenser, r-f by-pass, 150 µµf.	60-10155417
			C143	Condenser, screen by-pass, .0022 µf	30-4650-54*
C100	Condenser tuning gang desection	31-2773	C144	Condenser, r-f by-pass, 150 µµf,	
C100 A	Condenser tuning FM r.f amplifier Par	t of C100	C145	Condenser, cathode by-pass, .01 µf	
CIOOR	Condenser tuning AM antenna Par	t of C100	C146	Condenser, a-v-c coupling, 15 $\mu\mu$ f	
C100D	Condenser, tuning, and EM r-f umplifier Par	t of C100	C147	Condenser, de-emphasis, 150 µµf.	. 62-115001011*
C100C	Condenser tuning AM r.f amplifier Par	t of C100	C148	Condenser, filter, 2 μ f.	
C100E	Condenser tuning AM oscillator Par	t of C100	C149	Condenser, screen by-pass, .0022 µf	30-4650-54*
C100E	Condenser tuning, FM oscillator Par	t of C100	C150	Condenser, neutralizing, .005 µf.	
C101	Condenser FM antenna coupling	1010100	C151	Condenser, cathode by-pass, .01 µf	
0101	3.3 uuf. 30	1224-103	C152	Condenser, electrolytic, plate by-pass,	
C102	Condenser, trimmer, FM antenna tuning 3	1-6511-10		$10 \ \mu f.$	
C103	Condenser, cathode by-pass, 56 µµf, 62-0	56409001	C153	Condenser, audio coupling, .0068 μ f.	30-4650-57*
C104	Condenser, screen by pass, 220 µµf. 62-12	2001001*	C154	Condenser, r-f by-pass, 100 $\mu\mu$ f.	62-110001021*
C105	Condenser, r-f by-pass, 100 µµf. 62-1	10009001	C155	Condenser, audio coupling, .022 μ f	
C106	Condenser, d-c blocking, 220 µµf. 62-12	2001001*	C156	Condenser, r-t by-pass, $100 \mu\mu t$.	62-110001021
C107	Condenser, trimmer.		C157	Condenser, de-emphasis, .0033 μ f	30-4650-55*
0101	FM r-f amplifier tuning Par	t of C100	C159	Condenser, temperature compensating	,
C108	Condenser, cathode by-pass, 100 µµf. 62-11	0001021*	01/0	$3.3 \ \mu\mu$ 1,	
C109	Condenser, d-c blocking, 220 µµf, 62-12	2001001*	C160	Condenser, r-t by-pass, 3.3 $\mu\mu$ t.	
C110	Condenser, temperature compensating.		CIGI	Condenser, switch by-pass, .0047 μ t,	
0110	3.3 uuf. 30	-1224-103	1100	Lamp, pilot, dial	
C111	Condenser, trimmer.		1101	Lamp, pilot, AM	
	AM antenna tuning Par	1 of C100	1102	Lamp. pilot, FM	
C112	Condenser, filament by pass, .005 µf.	30-1238-1	L100	Coil, FM antenna tuning	
C113	Condenser, screen by pass, .005 µf.	30-1238-1	L101 ,	Coil, FM r-f choke, 3.3 μ h.	
C114	Condenser, r-f by-pass, 56 µµf. 62-0	56409001	L102	Coil, FM r-f amplifier tuning	32-4415-5
C115	Condenser, B+ by-nass, .047 uf. 30	-4650-62*	L103	Coil, AM r-f transformer primary	Part of T10
C116	Condenser, filament by pass, 005 uf	30-1238-1	L104	Coil, AM r-f transformer secondary	Part of T10
C117	Condenser line by pass record changer.		L105	Coil, FM r-f choke, 3.3 µh.	32-4422-10
0111	100 µµf. 62-11	0001021*	L106	Coil, 2nd FM r-f amplifier tuning	
C118	Condenser, line by-pass, record changer.		L107	Coil, r-f choke, 3.3 μ h.	
0110	100 µµf. 62-11	0001021*	L108	Coil, FM oscillator	
C119	Condenser, $B + by$ -pass, 220 µ4f, 62-12	2001001*	L109	Coil, 1st FM i-f primary	Part of Z100
C120	Condenser, filament by pass, 220 µµf, 62-12	2001001*	LIIO	Coil, 1st FM i-t secondary	Part of Z100
C122	Condenser, d-c blocking, 470 µµf. 62-14	7001021*		Coil, 1st AM i-t primary	Part of Z10.
C123	Condenser, d-c blocking, 470 µµf, 62-14	7001021*	L112	Coil, 1st AM i-t secondary	Part of Z10
C124	Condenser, trimmer.			Coll, 1st AM [*] 1-t tertiary	Part of Z10
	2nd FM r-f amplifier Par	t of C100	LII4	Coll, 2nd FM 1-f primary	Part of Z102
C125	Condenser, trimmer, AM r-f amplifier Par	t of C100	LIIS	Coll, 2nd FM 1-1 secondary	Part of Z102
C126	Condenser, AM pilot-light by-pass.		LIIO	Coil, 2nd AM 1-f primary	Part of Z10
	100 µµf. 62-1	1001021*	LIII	Coll, 2nd AM 1-t secondary	Part of Z10.
C127	Condenser, FM nilot-light hy-rass		LII8	Coil, FM discriminator primary	Part of Z104
0101	100 µµf. 62-1	1001021*	L119	Coil, FM discriminator tertiary	Part of Z10
C128	Condenser, neutralizing, 2.2 uf.	30-1221-4	L120	Coil, FM discriminator secondary	Part of Z10
C129	Condenser, cathode by pass. 01 uf	30-1238-2	L121	Coil, 3rd AM i-t primary	Part of Z103
C130	Condenser, temperature compensating.		1.122	Coil, 3rd AM i-t secondary	. Part of Z103
GIUU	7.5 uf	0.1224.65	L123	Coil, AM antenna choke	32-1061-3
C131	Condenser, trimmer		LA100	Loop antenna	e NOTE belov
0101	AM oscillator tuning Par	1 of C100	PGI	Printed circuit, FM oscillator cathode	e 30-600
C132	Condenser, grid return 100 auf 62.11	0001021*	RI00	Resistor, cathode bias, 120 ohms	66-1128340
C133	Condenser, d.c. blocking 220 unf 62-12	2001001*	R101	Resistor, screen dropping, 470 ohms	66-1478340*
C134	Condenser, at blocking, 220 µµf Pa	rt of PC1	R 102	Resistor, B+ dropping, 220 ohms	
C135	Condenser, trimmer FM ascillator tuning	31.6524	R103	Resistor, B+ loading, 4200 ohms, 5 w	atts 33-1335-10.
C136	Condenser, r-f by-pass 200 uuf 62-12	2001001*	K104	Resistor, cathode bias, 68 ohms	
C137	Condenser, $B \pm by$ -pass 01 uf	30.1238.2	K105	Resistor, a-v-c return, 2.2 megohms	66-5228340
C138	Condenser avec by pass, or ar and and and	.1650.58*	K106	Resistor, phono input, 1.0 megohm	
C130	Condenser avec by pass, or $\mu_1, \dots, 30$	-1650.58*	K107	Resistor, screen dropping, 470 ohms	66-1478340*
C140	Condenser cathode by ness 990	2001001*	NOTE	C. I A 100 consists of one loop of No. 1	1 strandad
CI4I	Condenser \mathbf{R} + by nose 100 m.f	0001021*	uire -	attached to the back of the achiever from	r suanucu
0174	ουπαστισεί, μ. μ. μ. μ. μαθό του μμι	0001061	4116.1	anather to the back of the cabinet in	

REPLACEMENT PARTS LIST (Cont.)

Reference Symbol	Description				Service Part No.
	SECTION	1—R-F	CHASSIS	(Cont	.)
R108	Resistor,	grid leak, 2	2.2 megohms		66-5228340*
R109	Resistor,	cathode bia	s, 2700 ohms		66-2278340*
R110	Resistor,	grid leak, l	5,000 ohms		.66-3158340*
R111	Resistor,	B+ droppi	ng, 47,000 oh	ms	66-3478340*
R112	Resistor,	cathode bia	is, 470 ohms		Part of PC1
R113	Resistor,	B+ droppi	ng, 4700 ohr	ns	.66-2478340*
R114	Resistor,	a-v-c filter,	2.2 megohn	18	66-5228340*
R115	Resistor,	a-v-c filter,	2.2 megohm	8	.66-5228340*
R116	Resistor,	cathode bia	is, 47 ohms		66-0478340*
R117	Resistor,	cathode bia	s, 33 ohms .		66-0338340*
R118	Resistor,	cathode bia	is, 2200 ohm	8	.66-2228340*
R119	Resistor,	screen droj	pping, 1000	ohms	.66-2108340*
R120	Resistor,	cathode bia	is, 120 ohms		.66-1128340*
R121	Resistor,	B+ droppi	ing, 470 ohm	8	.66-1478340*
R122	Resistor,	B+ droppi	ng, 10,000 oł	s	66-3108340*
R123	Resistor,	cathode bia	is, 47,000 ohr	ns	.66-3478340*
R124	Resistor,	cathode loa	id, 4700 ohm	8	.66-2478340*
R125	Resistor,	grid leak, l	.0 megohm		.66-5108340*
R126	Resistor,	neutralizing	g, 10 ohms		.66-0108340*
R127	Resistor,	diode load,	220,000 ohm	18	66-3228340
R128	Resistor,	diode load,	, 100,000 ohn	ns	.66-4108340*
R129	Resistor,	de-emphasi	s, 100 ohms .		.66-1108340*
R130	Resistor,	de-emphasi	s, 39,000 ohr	ns	.66-3398340*
R131	Resistor,	discriminat	or filter,		
	47,000 c	hms			.66-3478340*
R132	Resistor,	a-v-c load,	2.2 megohm	S	66-5228340*
R133	Resistor,	delayed a-v	-c return,		
	2.2 meg	ohms			.66-5228340*
R134	Resistor,	cathode loa	id, 120,000 oł	1 ms	.66-4128340*
R135	Resistor,	volume cor	itrol, 100,000	ohms .	33-5565-74
R136	Resistor,	bass contro	l, 1.0 megoh	m	33-5565-67
R137	Resistor,	treble cont	rol, 250,000 (ohms	33-5565-66
T100	Transform	ier, AM ar	itenna	•••••••••	
T101	Transform	ier, AM r-f			
T102	Transform	ter, AM os	cillator		32-4569-2
WSI	Wafer sw	itch, functio	on		
through					
W 50	an c				
Z100 Z101	Transform	ner, 1st FM	1-1		
Z101 7109	Transform	ner, 1st AM	1-1		32-4606-1A
Z102	Transform	ier, 2nd FA	/I 1-t		32-4518-1A
Z105	Transform	ner, 2nd A	W1 i-t		32-4601-1A
Z104 7105	1 ransform	ier, discrim	unator		32-4310-4A
Z102	1 ransform	ner, 3rd AM	/I 1-ł		

SECTION 2-POWER CHASSIS

C200	Condenser.	audio coupling, .01 µf.	30-4650-58*
C201	Condenser.	bass compensation, .0022	μf. 30-4650-54*
C202	Condenser.	d-c blocking, .022 uf.	30-4650-60*
C203	Condenser.	bass boost022 µf.	30-4650-60*
C204	Condenser,	d-c blocking, .022 µf.	30-4650-60*
C205	Condenser,	treble compensation,	
	510 μμf.	• ·	
C206	Condenser,	bass boost, .022 µf.	
C207	Condenser,	treble boost, .0068 µf.	30-4650-57*
C208	Condenser,	cathode by-pass, .01 µf.	
C209	Condenser,	d-c blocking, .0047 µf.	
C210	Condenser,	electrolytic	30-2584-36
C210A	Condenser,	filter, 40 µf., 450v	Part of C210
C210B	Condenser,	filter, 30 µf., 300v	Part of C210
C210C	Condenser,	filter, 10 µf., 450v	Part of C210
C210D	Condenser,	cathode by-pass, 50 µf., 5	0v . Part of C210
C211	Condenser,	filter, 10 µf., 475v	
C212	Condenser,	plate by-pass, 470 µµf	62-147001021*
C213	Condenser,	d-c blocking, .01 µf.	

Reference Symbol	Service Description Part No	;).
C214	Condenser, d-c blocking, .047 µf	2
C215	Condenser, d-c blocking, .047 µf	2
C216	Condenser, bass compensation, .0022 µf. 30-4650-12	2
C217	Condenser, line by-pass, .01 µf,	*
C218	Condenser, line by-pass, .01 µf,	*
C219	Condenser, B+ filter, 20 µf. Part of C21	1
I200 and I201	Lamp, pilot, tone	4
1202	Lamp, pilot, tone	8
1203	Lamp, off-on 34-206	8
I204 and I205	Lamp, record-changer bin	8
1.200	Coil filter choke 32-863	9
LS200	Loudspeaker 36.165	ŝ
B200	Resistor, grid leak, 470,000 ohms 66-4478340	*
R201	Resistor, gitu leak, 410,000 ohms 66-2108340	*
R202	Resistor, cathode bias, 1000 ohms 66.2108340	*
R203	Resistor, bass compensation.	
1100	220.000 ohms 66-4228340	*
R 204	Resistor, plate load 47,000 ohms 66-3478340	*
R205	Resistor, bass compensation,	*
D 206	Pasistan anthodo bios 1000 obras 66 210220	*
R200	Resistor, canode blas, 1000 onms	*
R208	Resistor, plate load, 41,000 onins	*
D 900	220,000 onms	
R209	Resistor, grid leak, 22,000 ohms	
R210 D911	Resistor, Dass Doost, 82,000 ohms	
R411 R919	Resistor, catnode blas, 2200 onms	
R414 D912	Resistor, plate load, 47,000 onms	
R213 D914	Resistor, D Inter, 10,000 onms	*
R214 R915	Resistor, griu leak, 1.0 megonin	*
R215 R216	Resistor, Cathole Dias, 4700 oning $$	*
R210	Resistor plate load 270 000 ohms 66.4278340	*
R218	Resistor grid leak 10 merchine 66-5108340	*
R210	Resistor cathode bias 3300 ohme 66.2338340	*
R21)	Resistor, cathode load 120.000 ohms 66.4128340	*
R221	Resistor grid leak 470 000 ohms 66.4478340	*
R222	Resistor, plate load 120,000 ohms 66-4128340	*
R223	Resistor grid leak 470 000 ohms 66.4478340	
R224	Resistor, cathode hias 270 ohms 7 watts 33-1335-9	'n
R225	Resistor, feedback 6800 ohms 66-2688340	*
R226	Resistor, hass compensation, 10,000 ohms	
Daag	2 watts	*
R22/	Resistor, B^+ filter, 3500 ohms	2
5200	Switch, on-on	y.
1200	1 ransformer, power	18
1201	I ransformer, output	10

JACKS, PLUGS, AND CABLE ASSEMBLIES

J 1	Jack, AM antenna loop	
J2	Jack, tape recorder	
J 3	Jack, tape-recorder input	42-1805-3
J4	Jack, FM test	
J 5	Jack, volume control	27-6273-27
J 6	Jack, volume control	Part of volume-
		control-arm cable ass'y.
J7	Jack, bass control	27-6273-24
J 8	Jack, treble control	
J9	Jack, speaker	
J10	Jack, B+ and filament	27-6273-35
J 11	Jack, a-c and pilot light	27-6273-11
J 12	Jack, power cord	Part of power-cable ass'y.
J 14	Jack, B+ and filament	Part of B+
		and manent (abic abo y.

REPLACEMENT PARTS LIST (Cont.)

Reference Symbol	Description	Service Part No
JACKS,	PLUGS, AND CABLE	ASSEMBLIES (Cont.)
J 15	Jack, phono power	Part of phono
117	power	and pilot-light cable ass'y
J10	Jack, phono power	27-0200
J 17	Jack, phono input	
118	Jack, bin light	
PLI	Plug, AM antenna	
PL2	Plug, tape-recorder input	Part of tape
		recorder cable ass'y
PL5	Plug, volume-control top	Part of volume
		control-top cable ass'y
PL6	Plug, volume control	
PL7	Plug, bass control	Part of base
		control cable ass'v
PL8	Plug, treble, control	Part of treble
		control cable ass'v
PIO	Plug sneaker	Part of speak a
1 1.7	i lug, speaker	and a page
DI 10		Cable ass y
	Trug, D and mament	
DT 11	DI I 1 1	and filament cable ass y
PLII	Flug, phono power and pil	of light Part of phono
DF 10	power	and pilot-light cable ass'y
PL12	Plug, a-c power connector	
PL13	Plug, a-c power	Part of power
		cable ass'y
PL14	Plug, B+ and filament	
PL15	Plug, phone power	
PL16	Plug, phone power	
		power cable ass'y
PL17	Plug, phono input	Part of M2
	0,1 1	Record Change
PL18	Plue hin light	27-4785-3
Cable Ass	emblies.	
Bass co	ntrol	41.4109.
Rin lial	at	41.490/
\mathbf{D} in the second s	n. I flamant	41 410
D and		41-410
r nono p		(0-21/2-
Phono j	power and pilot light	41-4188-
Power .	•••••••••••••••••••••••••••••••••••••••	
Speaker		
Tape re	corder	
Treble	control	
Volume	-control arm	
Volume	-control top	41-4193-

MISCELLANEOUS

(Cabinet Parts)

Description	Service Part No.
Cabinet, light	
Back, cabinet	54-9066-1
Ball strike	
Clip, spring	56-7654-1
Hinge, concealed, left-hand	
Hinge, concealed, right-hand	28-9614-7
Hinge, continuous	
Knob (3)	
Knob, function switch	78-8672-1
Lid support	

Description	Service Part No.
Cabinet, Mahogany	
Back, cabinet	
Ball strike	
Clip, spring	56-7654
Hinge, concealed, left-hand	
Hinge, concealed, right-hand	28-9644-5
Hinge, continuous	
Knob (3)	
Knob, function switch	
Lid support	
Dial scale	
Dome, cabinet feet (4)	
Grille, metal	
Knob, off-on switch (both cabinets)	
Knob, tuning (both cabinets)	54-6087
Trim, window (2)	
Trim, window (2)	28-9788-1
Window, decorative	

MISCELLANEOUS

(Chassis Parts)

Description	Service Part No.
Changer Mounting Hardware:	
Sleeve	
Speed nut	
Spring, mounting, bottom	
Spring, mounting, top	
Clip, bin light	
Core, iron (L100)	
Dial backplate	
Lead assembly, antenna	
Panel, diffusing, blue, treble	
Panel, diffusing, red, bass	
Spring, (both diffusing panels)	
Pointer, AM	
Pointer, FM	54-9127
Holder, pointer (2)	
Spring, intermediate	
Springer, pointer	
Tie rod, pointer	
Pully and hub (2)	76-8688
Shield, pilot light	
Shield, tube (5)	
Shield, tube (12AT7)	
Shield, tube base (5)	
Shield, tube base (12AT7)	
Sleeve, tuning shaft	
Socket, octal (3)	27-6174
Socket, 7-pin (6)	27-6275
Socket, 7-pin, r-f amplifiers (2)	27-6275-1
Socket, 9-pin (3)	27-6203-6
Socket ass'y, pilot light (3)	27-6233-6
Spring, hairpin	
Spring, shaft ground	
Spring, shutter	28-9490
Switch, bin light	41-4199-1
Switch, function	42-2014





PHILCO HOME RADIO MODEL B569, Code 121

SPECIFICATIONS

CABINET	Molded plastic
CIRCUITF	our-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	540 kc. to 1620 kc.
AUDIO OUTPUT] watt
OPERATING VOLTAGE	105 to 120 volts, a.c. or d.e.
POWER CONSUMPTION	
ANTENNA	High-impedance loop
INTERMEDIATE FREQUENCY	455 kc.
PHILCO TUBES	12BE6 converter, 12BA6 i-f amplifier, .v.c1st audio, 35C5 ontput, 35W4 rectifier





Figure 1. Base View, Showing Symbolized Chassis

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ALIGNMENT PROCEDURE

RADIO CONTROLS—Set volume control to maximum. Set tuning control as indicated in chart. OUTPUT METER—Connect across voice-coil terminals.

SIGNAL GENERATOR-Connect generator and set

frequency as indicated in chart. Use modulated output.

OUTPUT LEVEL—During alignment, adjust signalgenerator output to hold output-meter reading below 1.25 volts.

STEP	SIGNAL GENERAT	GENERATOR		RADIO		
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST	
1	Ground lead to B-; output lead through a .1-µf. condenser to grid (pin 7) of 12BE6.	455 kc.	Tuning gang fully open.	Adjust tuning cores, in or- der given, for maximum output. (TCl and TC3 are located at top of trans- formers).	TC-4-2nd i-f sec. TC3-2nd i-f pri. TC2-1st i-f sec. TC1-1st i-f pri.	
2	Radiating loop (see NOTE below).	1620 kc.	*1620 kc.	Adjust trimmer for maxi- mum output.	Cl-B osc.	
3	Same as step 2.	1500 kc.	1500 kc.	Adjust trimmer for maxi- mum output.	Cl-A antenna	

ALIGNMENT CHART

NOTE: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads and place near radio loop.

* For proper adjustment of the oscillator trimmer, fully open the tuning gang and insert a .006-inch nonmetallic shim between the heel of the rotor and the top of the stator plates. Close the tuning gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.



TP3-829B

Figure 2. Top View, Showing Trimmer Locations



Figure ω Philco Radio Model B569, Code 121, **Schematic Diagram**

ω

World Radio History

MODEL

B569,

CODE

121

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.	Reference Symbol	Description	Service Part No.
C1 C1A	Condenser, tuning gang31 Condenser, antenna trimmerPa	-2751-13 art of Cl	R5	Resistor, diode load, 47,000 ohms	3478340*
C1B	Condenser, ose. trimmerP	art of Cl	R6	Resistor, grid return,	
C2	Condenser, cathode bypass, $.2 \ \mu f30$	•4650•49*		10 megohms	5108340*
C3	Condenser, oscillator grid, 47 $\mu\mu$ f3	0-1230-4	R7	Resistor, plate load,	
C4	Condenser, a-v-e by-pass, .047 µf45	-3505-28 °		500,000 ohmsPar	t of PC1
C7	Condenser, i-f tuningP	art of Zl	R8	Resistor, grid return,	
C8	Condenser, i-f tuningP.	art of Z1		500,000 ohmsPar	t of PC1
C9	Condenser, i-f tuningP	art of Zl	R9	Resistor, cathode bias, 150 ohms.66-	1158340*
C10	Condenser, i-f tuningP	art of Zl	R10	Resistor, B plus filter, 100 ohms. 66-1	104340*
CH	Condenser, detector filteringP	art of Z2	R11	Resistor, B plus filter,	
C12	Condenser, detector filteringP	art of Z2		1000 ohms	2108340*
C13	Condenser, audio-coupling,		R12	Resistor, tube saver, 100 ohms3	3-1343-3
	$.005 \ \mu f. \ldots$	0-1238-1	SI	Switch, off-onPa	rt of R4
C14	Condenser, plate bypass	rt of PC1	TI	Transformer, oscillator	2-4453-6
C15	Condenser, audio-coupling,		T2	Transformer, output	32.8384*
	.005 µfPai	rt of PC1	W I	Line cord	12183
C16	Condenser, compensating Par	rt of PC1	71	Transformer 1st i.f.	2.41614
C17	Condenser, tone compensating,	4450 400	79	Transformer 2nd i.f	2.42404
C10	$022 \ \mu t.$	-4650-43*	#.i 6e		
C184	Condenser, electrolytic, 2-section .30	-23/3-40			
C18R	Condenser, inter, ov μ 1,, μ			MISCELLANEOUS	
C19	Condenser line by $\alpha \in \Omega$ of Ω	A650.45*			
LAI	Loop aerial Part of back-and-lo	on ass'v.	Cabinet .		11029
LS1	Speaker, p-m	.36-1654	Back-and-l	000 ass ⁹ v.	76-8777
PCI	Printed circuit	.30-6001	Knoh tun	ing 5	4.4969.2
RI	Resistor, oscillator grid,		Kilob, tun	ng	4017 12
	22,000 ohms	3228340*	Knob, vol	ume	4013-13
R2	Resistor, cathode bias, 56 ohms66-	0568340	Socket, 7-	pin miniature, 12AV627-	6203-14
R3	Resistor, a-v-c filter, 2.2 megohms.66-	5228340	Socket, 7-j	pin miniature, 12BE6, 12BA6, 35C5,	
R4	Resistor, volume control, .5 megohm33	-5566-41	. 35W4 Tube shiel	d	27-6265 5629FA3

PHILCO Factory-Supervised Service Service

HOME RADIO

PHILCO RADIO-CLOCK MODELS B712, CODE 122, AND B714, CODE 122

SPECIFICATIONS

CABINET	Molded plastic
CIRCUIT	Four-tube superneterodyne (plus rectifier)
FREQUENCY RANGE	
Standard Broadcast	540 kc. to 1620 kc.
Special Services	1700 kc. to 3400 kc.
AUDIO OUTPUT	l watt
OPERATING VOLTAGE	105 to 120 volts, a.e. or d.e.
POWER CONSUMPTION	30 watts
AERIAL	High-impedance loop
INTERMEDIATE FREQUEN	CY 455 kc.
PHILCO TUBES 12BE6 ed	onver er, 12BA6 i-f amplifier. 12AV6 det
	a.v.c. 1st audio, 35C5 output, 35W4 rectifier







Figure 1. Dial-Cord Installation Details

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SERVICE HINTS

REMOVING THE CHASSIS FROM THE CABINET

8712, Code 122

To remove the chassis from the cabinet, first remove the station selector knob and volume control knob, and, at the bottom-center of the dial scale, remove the dial-scale cover retaining screw. Loosen the dial-scale cover by gently rocking it up and down with the finger tips until the cover comes away from the cabinet. Remove the pointer by gently pulling it off the tuning-gang shaft. Remove the chassis mounting screws from beneath the cabinet, and slide the chassis out.

B714, Code 122

To remove the chassis from the cabinet, first remove the station selector knob and the volume control knob. Then remove the chassis mounting screws from beneath the cabinet, and slide the chassis out.

REMOVING THE SUBBASE

After removing the chassis from the cabinet, remove the subbase, using the following procedure.

- 1. Remove the output transformer and dial light connections by pulling the jacks from the pins on the subbase.
- 2. Unsolder the volume control and a-c leads, and unsolder and remove the loop aerial.
- 3. Spring the Special Services switch bracket off the tuning shaft.
- 4. At the rear of the panel, bend the hold down tabs out flush with the subbase, and remove.

PARTS REPLACEMENT

Whenever possible, replace all components and leads from the top side of the chassis. In cases where this is not possible, the components must be unsoldered when removed from the bottom. Use only a lightweight low-wattage iron of approximately 22.5 to 25 watts, and always use a low-melting-point solder. Extreme caution must be used to prevent solder from dropping or splashing, and to avoid lifting of the printed wiring foil. Use only the tip of the soldering iron at the solder point whenever heat is being applied. Hold the subbase in one hand while applying heat to the solder point and throw the solder off, with a downward thrust, as soon as it starts to melt. When the solder is removed, the part to be repaired or replaced can be lifted from its location. Insert the new part and secure it with just a drop of solder at each point.

REPLACING TUBE SOCKETS AND I-F TRANSFORMERS

To replace tube sockets and i-f transformers, follow the procedure given above for removing solder. Then use a sharp knife to sever the remaining thin bond of solder at the connections. With the solder removed, the part can be backed out of the slots. Before inserting the repaired or new part, clean all connections at the unsoldered lugs. Use caution when reinserting parts through the subbase slots, so that the foil is not lifted. When soldering is complete apply an electrical varnish to all repaired areas.

ALIGNMENT PROCEDURE

RADIO CONTROLS—Set volume control to maximum. Set tuning control and band switch, S2, as indicated in chart.

OUTPUT METER—Connect across voice-coil terminals.

SIGNAL GENERATOR—Connect generator and set frequency as indicated in chart. Use modulated output.

OUTPUT LEVEL—During alignment, adjust signal-generator output to hold output-meter reading below 1.25 volts.

	SIGNAL GENERA	TOR	RADIO			
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND SWITCH SETTING	SPECIAL INSTRUCTIONS	ADJUST
]	Ground lead to B-; output lead through a .1-µf. condenser to grid (pin 7) of 12BE6.	455 kc.	Tuning gang fully open	Broadcast	Adjust tuning cores, in order given, for maximum output. TC1 and TC3 are located at top of transformers.	TC1—2nd i-f sec. TC3—2nd i-f pri. TC2—1st i-f sec. TC1—1st i-f pri.
2	Radiating loop (See note below).	1620 kc.	*1620 kc.	Broadcast	Adjust trimmer for maximum output.	CI+B—ose.
3	Same as step 2.	1500 kc.	1500 kc.	Broadcast	Adjust trimmer for maximum output.	Cl-A—aerial (broadcast)
-1	Same as step 2.	3200 kc.	3200 kc.	Special Services	Adjust trimmer for maximum output.	C1-C—aerial (special services).

NOTE: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire, connect to signal-generator leads, and place near radio loop.

* For proper adjustment of the oscillator trimmer, fully open the tuning gang and insert a .006-inch non-metallic shim between the heel of the rotor and the top of the stator plates. Close the tuning gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.







12 AV6 DET-AVC IST AUDIO

AUD OUT

CIB CIC

TC4(TOP)

SN

CIA

MODELS B712, CODE 122, AND B714, CODE 122

4

w



Figure 5. Top View, Showing Parts Placement



Figure 6. Bottom View, Showing Parts Placement

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.	Reference Symbol	Description	Service Part No.
C1	Condenser, tuning gang	31-2751-16	JI	Jack, appliance receptacle, a-c	76-3931
CIA	Condenser, antenna trimmer	Part of Cl	J 2	Jack, private listening unit (Model B71) 42-1975-2
CIB	Condenser, oscillator trimmer	Part of Cl	Ll	Coil, antenna, Special Services	32-4561-3
CIC	Condenser, trimmer, Special Services	31-6502-4	L2	Coil, oscillator shunt	32-4562-2
C2	Condenser, antenna series tracker,		LA1	Antenna loop Part of	cabinet back
	944 μμf.	30-1220-65	LS1	Speaker, p-m (Model B712)	. 36-1627-8
C3	Condenser, drift compensation, 7.5 µµf.	30-1224-83	LSI	Speaker, p-m (Model B714)	
€4	Condenser, a-v-c bypass, .047 µf.	30-4650-45	R1	Resistor, oscillator grid, 22,000 ohms	66-3228340*
C5	Condenser, oscillator grid, .01 µf.	30-1238-2	R2	Resistor, i-f screen dropping, 4700 ohms	66-2478340*
C6	Condenser, screen bypass, .047 µf.	30-4650-45	R3	Resistor, a-v-c filter, 2.2 megohms	66-5228340*
C7	Condenser, i-f tuning	Part of Z1	R1	Resistor, volume control, .5 megohm	33-5565
C8	Condenser, i-f tuning	Part of Z1	R5	Resistor, diode load, 47,000 ohms	66-3478340*
С9	Condenser, i-f tuning	Part of Z2	R6	Resistor, grid return, 10 megohms	66-6108340*
C10	Condenser, i-f tuning	Part of Z2	R7	Resistor, plate load, 500,000 ohms	Part of PC1
C11	Condenser, detector filtering	Part of Z2	R8	Resistor, grid return, 500,000 ohms	Part of PC1
C12	Condenser, detector filtering	Part of Z2	R9	Resistor, cathode bias, 150 ohms	66-1158340*
C13	Condenser, audio coupling, .005 µf.	. 30-1238-1	R10	Resistor, B plus filter, 220 ohms	66-1224340*
C14	Condenser, plate bypass	Part of PC1	R11	Resistor B plus filter 1000 ohms	66-2108340*
C15	Condenser, audio coupling, .005 µf.	Part of PC1	R12	Resistor, tube saver 100 ohms	33,1313,3
C16	Condenser, compensating	Part of PC1	D12	Resiston, tube saver, 100 onins	00-10 10-0
C17	Condenser, tone compensation, .022 µf.	30-4650-43	1415	(Model B711)	66.0331340
C18	Condenser, electrolytic, 3-section	30-2583-1	DC1	Drinted circuit	20 6001
C18A	Condenser, filter, 30 µf., 150v	Part of C18	r GI	= 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1	40.9092
C18B	Condenser, filter, 25 µf., 150v	Part of C18	51	Switch, off-on, night light (Model B714)	42-2023
C18C	Condenser, filter, 20 µf., 150v	Part of C18	52	Switch, Broadcast—Special Services	12-1796-1
C19	Condenser, line by-pass, 0.1 μ f.	30-4650-47	TI	Transformer, oscillator	32-1582
C20	Condenser, B minus to chassis,		T2	Transformer, output	Part of LS1
	100 μμf	2-110009001*	W1	Line cord	41-3865
11	Lamp, pilot	34-2605	Z 1	Transformer, 1st i-f	32-4583
12	Lamp, night light (Model B714)	31-2177	Z2	Transformer, 2nd i-f	32-4584
Cabinet		MISCELLA	NEOUS	alaak	
Model F	3712		window, Madal	CIOCK D719	51,6000
Sand	//10	11013	Shaft tun	D/12	28,9312
Forest	graan	11013-1	Dunakat a	ing	28.0313
Model F	2714	11013-1	Dracket, s	when operating	1W/60080FF7
Door!	011+ (nov	10040-16	Connector	uning	27.62.10.6
L'uche	grey		Connector	, INCEIOCK	76.3031
Model 1	0719		Connector	mala (1)	28-2660-2
Clock	(2)	\$1,6006	Connector	ass'y pilot light	41.4176.5
Turk			Socket tu	$h_{a} = 19 \Lambda V 6$	27.6296.1
1 unin	lg or volume		Socket tu	$h_{\rm res} = 12 R A 6$	27.6296.6
Model	B/14	51 1000 5	Socket tu	$he^{(120A0)}$	27-6296-7
Clock	(3)	51-1983-5	Socket tu	ba = (35W'1)	27-6296-8
Tunin	g or volume	51-1986-3	Rack loo	n and line.cord ase'v	
Dial scale	, radio (Model B712)		Model		76,8736
Window.	radio (Model B712)		Model	R714	76.8731
Pointer			Shield ni	ilat light back	
Model 1	B712	76-8706	Model	R711	51,9087
Model l	B711	56-9846FCP	Shield ni	lot light front	01 /001
Jewel (Mo	odel B712)	54-1304-5	Model	R714	51.0088
Clock			Socket	e'v nilot-night light	
Model	B712	41-2047	Modal	8 y., prior-mgne ngne 12714	27.6233.110
Model I	3714	41-2042-5	Switch -	ant light	
Clock cov	er		Model	R711	19,9093
Model I	8714	51-1989-2	Printad	viring namel (less components)	54.6058
			1 Inneu W	ming paner (ress components)	01-0000

PR-2570 10-53

World Radio History

5



PHILCO RADIO MODELS 52-540, 52-540-I, 52-541, 52-541-I, AND 52-542-I

SPECIFICATIONS

CABINET					
Model	52-540	Phenolic.	mottled	maho	ogany
Model	52-540-1		Phe	nolic,	ivory
Model	52-541	Phenolic,	mottled	mah	ogany
Model	52-541-I		Phe	nolic,	ivory
Model	52-542-I		Phe	nolic,	ivory

CIRCUIT
FREQUENCY RANGE
AUDIO OUTPUT
OPERATING VOLTAGE
POWER CONSUMPTION
AERIAL
INTERMEDIATE FREQUENCY
PHILCO TUBES (5) 788, 12886, 12846, 5018GT 3575GT



MODEL 52-542-1



TP1-1136







TP-7865F-1

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TP1-1130

Figure 3. Top View, Showing Trimmer Locations

ALIGNMENT PROCEDURE

CONTROLS: Turn on radio and set volume control to maximum.

DIAL POINTER: Turn tuning condenser to full-mesh position. Set dial pointer to index mark, located to left of "55."

OUTPUT METER: Connect across voice-coil terminals.

SIGNAL GENERATOR: Connect as indicated in chart. Use modulated output.

OUTPUT LEVEL: During alignment, attenuate signal-generator output to maintain outputmeter indication below 1.25 volts.

	SIGNAL GENERA	TOR			
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Ground lead to B—; output lead through .1-uf. conden- ser to pin 6 of 7A8 con- verter.	455 kc.	540 kc. (gang fully meshed)	Adjust tuning cores, in order given, for maximum output.	TC42nd i-f sec. TC32nd i-f pri. TC21st i-f sec. TC11st i-f pri.
2	Radiating loop; see note below.	1600 kc.	1600 kc.	Adjust trimmer for maximum output.	C1B—osc.
3	Same as step 2.	1500 kc.	1500 kc.	Adjust trimmer for maximum output.	C1A—aerial

RADIATING LOOP: Make up a 6—8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads and place near radio loop antenna.





Figure 4. Drive-Cord Installation Details, Models 52-541 and 52-541-1





MODELS

52-540,

52-540-I,

52-541,

52-541-1 AND

52-542-1



w

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be either unchanged or improved. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No
C1	Condenser tuning gang	ran no.
01	Model 52 540	01 0751 6
	Models 52-540	31-2/31-0
C2	Condenser if hunges 1 uf	£1.0112*
C3	Condenser, Pr Dypuss, 1 pr	01-0113 81.0122*
CA	Condenser, divid by pass, 103 µi	CO 00475417*
C5	Condenser, a-c blocking, 47 µµ1.	61 0109*
CB	Condenser, screen by-puss, .003 µr	63 0100*
C7	Condenser, d.c. Diocking, .01 pl	20 1220 4
C7.8	Condenser, dua blocking 007 uf	
C7B	Condenser, and by page 220 wit	Part of C7
C8	Condenser, grid by-puss, 220 µµi	Putt of C/
00	Models 52,540 and 52,541: 05 uf	61.0122*
	Model 52-542: 02 ut	61.0108*
C9	Condenser electrolytic 3-section	30.2573
C9.5	Condenser filter 20 uf 150v	Part of C9
C9B	Condenser, filter, 25 µf, 150v	Part of C9
C9C	Condenser filter, 30 uf 150v	Part of C9
C10	Condenser, line by-pass, .04 uf	45-3500-2*
C11	Condenser, external-gerial coupling, 4.7	uuf. 30-1230
II	Pilot lamp (Models 52-541 and 52-542-1 or	1y) 34.2068
LAI	Loop gerigi	
	Models 52-540 and 52-540-I	32.4052.33
	Models 52-541 and 52-541-I	32-4052-31
	Model 52-542-I	32-4052-38
LSI	Speaker, p-m	
	Models 52-540, 52-540-I, 52-541 and	
	52-541-I	36-1627-5
	Model 52-542-I	36-1625-3
Rl	Resistor, leakage, 150,000 ohms	.66-4158340*
R2	Resistor, grid return, 100,000 ohms	.66-4108340*
R3	Resistor, screen dropping, 39,000 ohms	.66-3398340*
R4	Resistor, grid return, 2.2 megohms	.66-5228340*
R5	Resistor, cathode bias, 68 ohms	.66-0688340*
R6	Resistor, i-f filter, 47,000 ohms	.66-3478340*
H7	Resistor, diode load, 2.2 megohms	.66-5228340*
KS	Volume control, 500,000 ohms	
	Models 52-540 and 52-540-1	33-5538-7
	Models 52-541 and 52-541-1	33-5566-4
Po	Model 52-542-1	33-5566-4
NJ BIO	Resistor, grid return, 3.3 megohms	.66-5338340*
RII	Resistor, plate load, 470,000 ohms	.66-4478340*
R12	Resistor, grid return, \$70,000 omms	.00-44/834U 66.1133260*
R13	Resistor, filter, 1200 ohms	.66-2128340*
R14	Resistor, filter, 220 ohms, 1 watt	66-1224340*
R15	Resistor, tone compensation, 2200 ohm	S
	(Models 52-540, 52-540-I, 52-541 and	ł
Die	52-541-I only)	66-2228340
R10 R1	nesistor, aerial isolating, 150,000 ohms	66-4158340
T1	Transformer oscillator	Part of R8
T2	Transformer, output	
WI	Line cord	1.2183*
Z1	Transformer, st i-f	32-4160-6A
Z2	Transformer, 2nd i-f	32.4240.8

MISCELLANEOUS

Convice

Description	Part No.
MODELS 52-540 AND 52-540-1	
Cabinet, mottled mahogany	
Cabinet, ivory	
Back	
Fastener, back mounting (4)	W2235-2FA9
Baffle, speaker	
Dial-backplate assembly	
Knob (2)	
Mount, rubber (3)	
Pointer	
Pulley-and-shaft assembly	
MODELS 52-541 AND 52-541-1	
Cabinet, mahogany	
Knob (2)	
Cabinet, ivory	
Knob (2)	
Back	
Fastener, back mounting (4)	W2235FA9
Baffle, speaker	
Backplate, bracket and pulley assembly	
Dial-backplate assembly	
Fastener, pilot-lamp shield mounting (2)	W2235-1FA9
Speed clip, grille mounting (4)	1W56920FE7
Jewel	
Mount, rubber (3)	
Pointer	
Spring, pointer drive	56-3167
Pulley-and-shaft assembly	
Scale strap, dial mounting	
LH	
RH	
Socket assembly, pilot lamp	
MODEL 52-542-I	
Cabinet incom	

Cabinet, lvory	
Back	
Fastener, back mounting (4)	W2235FA9
Clips, baffle mounting	1W56920FE7
Baffle, speaker	
Dial scale	
Screw, scale mounting (2)	1W14504FA1
Dial-backplate assembly	
Knob (2)	
Backplate, bracket-and-pulley assembly	
Fastener, pilot-lamp shield mounting (2)	W2235-1FA9
Grille, plastic	
Mount, rubber (3)	
Pointer	
Spring, pointer drive	
Pulley-and-shaft assembly	
Socket assembly, pilot lamp	27-6233-6

PARTS COMMON TO ALL MODELS

Bushing, pulley and shaft	
Clamp, electrolytic mounting	
Drive cord, 25-foot spool	45-8750*
Fastener, hairpin, pulley and shaft	57-1468FA3
Socket, Loktal (1)	
Socket, miniature (2)	
Socket, octal (2)	
Spring, gang drive	



PHILCO RADIO-CLOCK MODELS 52-544, 52-544-I AND 52-544-W

SPECIFICATIONS

CABINET

Model 52-544Molded phenolic, mahogany
Model 52-544-IMolded phenolic, ivory
Model 52-544-WMolded phenolic, white
FREQUENCY RANGE
AUDIO OUTPUT
OPERATING VOLTAGE
POWER CONSUMPTION
AERIAL
INTERMEDIATE FREQUENCY
PHILCO TUBES (5)



MODEL 52-544-1



Figure 1. Base View, Showing Symbolized Chassis

PHILCO RADIO-CLOCK MODELS 52-544, 52-544-I AND 52-544-W; PR-1950

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ALIGNMENT PROCEDURE

RADIO CONTROLS — Set volume control to maximum. Set tuning control as indicated in chart.

OUTPUT METER — Connect across voice-coil terminals.

SIGNAL GENERATOR --- Connect generator and set frequency as indicated in chart. Use modulated output.

OUTPUT LEVEL — During alignment, adjust signal-generator output to hold output-meter reading below 1.25 volts.

	SIGNAL GENERATO	R	RADIO			
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST	
1	Connect ground lead to B—; out- put lead through .1-µi. condenser to grid (pin 8) of 7A8.	455 kc.	Tuning con- denser fully meshed.	Adjust tuning cores, in order giv- en, for maximum output.	TC4—2nd i-f sec. TC3—2nd i-f pri. TC2—1st i-f sec. TC1—1st i-f pri.	
2	Radiating loop (see note below).	1600 kc.	1600 kc.	Adjust trimmer for maximum out- put.	C1B—Osc.	
3	Same as step 2.	1500 kc.	1500 kc.	Adjust trimmer for maximum out- put.	C1A—Aerial	

RADIATING LOOP: Make up a 6-8 turn. 6-inch-diameter loop, from insulated wire; connect to signal-generator leads and place near radio loop aerial.



Figure 2. Top View, Showing Trimmer Locations

TP1-1140





MODELS 52-544, 52-544-I AND 52-544-W

World Radio History

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NOTE: Part numbers marked with an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts; also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation of the radio will be either unchanged or improved. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.
Cl	Condenser, tuning gang, 2-section	31-2751-5
C1A	Condenser, trimmer, aerial	Part of Cl
CIB	Condenser, trimmer, oscillator	Part of Cl
C2	Condenser, aerial coupling, 5 µµf	30-1230
C3	Condenser, d-c blocking, 47 µµf	60-00475417*
C4	Condenser, temperature compensating, 7.5 µµf.	30-1224-65
C5	Condenser, screen by-pass, .05 µf	61-0122*
C6	Condenser, a-v-c by-pass, .05 µf	61-0122*
C7	Condenser, by-pass, .2 µf	45-3500-3*
C8	Condenser, d-c blocking, .01 µf	45-3505-58
C9	Condenser, d-c blocking, .01 µf	45-3505-58
C10	Condenser, parasitic suppressor, 330 µµf.	60-10335417°
C11	Condenser, tone compensation, .02 $\mu f.$	61-0108*
C12	Condenser, electrolytic, 3-section	30-2575-27
C12Å	Condenser, filter, 30 $\mu f.,\ 150v$	Part of C12
C12B	Condenser, filter, 25 μ f., 150v	Part of C12
C12C	Condenser, filter, 20 µf., 150v	Part of C12
C13	Condenser, line filter, .04 µf	45-3500-2*
11	Pilot lamp	34-2068
J1	Socket, clock motor and switch	
J2	Receptacle, appliance, a-c	76-3931
LA1	Loop aerial	32-4052-32
LS1	Speaker, p-m	36-1627-8
R1	Resistor, isolating, 150,000 ohms	66-4158340*
R2	Resistor, grid return, 100,000 ohms	66-4108340*
R3	Resistor, screen dropping, 27,000 ohms	66-3278340*
R4	Resistor i-f filter 47,000 ohms	66-3478340*
R5	Resistor, diode load, 2.2 megohms	66-5228340*
R6	Volume control, 500,000 ohms	33-5565-6
R7	Resistor, grid return, 3.3 megohms	66-5338340*
R8	Resistor, plate load, 470,000 ohms	66-4478340*
R9	Resistor, grid return, 470,000 ohms	66-4478340*
R10	Resistor, cathode bias, 130 ohms	66-1138340*
R11	Resistor, filter, 1200 ohms	66-2128340*
R12	Resistor, filter, 220 ohms, 1 watt	66-1224340*
R13	Resistor, leakage, 150,000 ohms	66-4158340*
R14	Resistor, cathode bias, 68 ohms	66-0688340
S 1	Switch, AUTO-OFF-ONPart of cloc	k assembly
T1	Transformer, oscillator	
T2	Transformer, output	Part of LS1
Wl	Line cord	L-2183*
Z1	Transformer, 1st i-f	32-4160-6A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description Part No. Cabinet
MODEL 52.544 10745
MODEL 51-544-1
MODEL 52-544-W
Back
r dstener (4), back mounting
Baffie-and-cloth assembly
Model 52-544
Model 52.544-1
Inder 02-011-W
Jewel (used on manogany and ivory cabinets)
Jewel (used on white cabinet only)
MODEL 52-544
VOLUME
AUTO-OFF-ON
DELAYED OFF54-4736
AUTO SET54-4736-2
TIME SET
MODEL 52-544-I
VOLUME 54-4118
AUTO-OFF-ON
DELAYED OFF54-4736-1
AUTO SET
TIME SET
MODEL 52-544-W
VOLUME
AUTO-OFF-ON
DELAYED OFF
AUTO SET
TIME SET
Clamp, electrolytic mounting
Clip, pilot-lamp mounting56-3545-6FA3
Clock-and-cable assembly
MODEL 52-544, 60-cycle
MODEL 52-544-1, 60-cycle
Clock cover
Dial scale, mahogany and ivory54-5055-2
Dial scale, white54-5055-4
Lead assembly, aerial76-1472
Mount, rubber, gang mounting (3)
Shield, pilot lamp
Socket, Clock
Socket octal (2) 27.6174
Socket, minigture (1) 27.6265
Socket assembly, pilot lamp



PHILCO RADIO MODELS 52-640 AND 52-641

SPECIFICATIONS	
CABINETPlastic, portable	Many rise forces stratified war with
CIRCUIT	Contraction of the local division of the loc
FREQUENCY RANGE	A CONTRACTOR
AUDIO OUTPUT	A BUILDER REAL
A-c or d-c operation	
Battery operation Model 52.640 150 milliwatts	PHA MERRY JOL
Model 52-641	
OPERATING VOLTAGES	
Model 52-640	
Model 52-641	MODEL 52-640
POWER CONSUMPTION	
A-c or d-c operation11 watts	
Model 52-640	
"A" battery	7
Model 52-641	
AERIAL	
Model 52-640High-impedance loop; provision for connecting external aerial	S-
Model 52-641 Magnecor high-impedance loop; provision for connecting external aerial	
INTERMEDIATE FREQUENCY455 kc.	
PHILCO TUBES (4)	
BATTERY TYPE	MODEL 52-641
Model 52-640	
riouai 32-041	



Figure 1. Bottom View, Showing Symbolized Chassis

TP1-1167

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ALIGNMENT PROCEDURE

DIAL POINTER—With tuning-condenser plates fully meshed, set pointer to coincide with first index hole above pointer.

OUTPUT METER—Connect across speaker voice coil terminals.

SIGNAL GENERATOR—Connect signal generator as indicated in chart. Use modulated output.

RADIO CONTROLS—Set volume control to maximum. Set tuning control and signal-generator frequency as indicated in chart.

OUTPUT LEVEL—During alignment, signal-generator output must be attenuated to maintain output-meter reading below .5 volt.

NOTE: While the radio is being aligned, the batteries (if used) should be in the same position with respect to the chassis and loop as they are in the cabinet.



Figure 2. Top View, Showing Trimmer Locations

TP0-392

	SIGNAL GENERATO	R			
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Through .1-µf. condenser to antenna section of tuning con- denser.	455 kc.	Tuning gang fully meshed	Adjust, in order given, for maxi- mum output.	TC4—2nd i-i sec. TC3—1st i-f sec. TC2—1st i-f pri.
2	Radiating loop. See note be- low.	1620 kc.	1620 kc.	Adjust for maximum output.	C1B-osc. trimmer
3	Same as step 2.	1500 kc.	1500 kc.	Adjust for maximum output.	C1A—aerial trimmer
4	Same αs step 2.	535 kc.	Tuning gang fully meshed	Adjust for maximum output; then repeat steps 2 and 3 until no further increase in output is ob- tained. This step SHOULD NOT be necessary unless the oscillator transformer has been replaced.	TC1—osc. core

ALIGNMENT CHART

RADIATING LOOP: Make up a six-to-eight turn, 6-inch-diameter loop, using insulated wire; connect to signal-generator leads, and place near radio loop aerial.



MODELS

52-640 AND 52-641



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NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts; also, the electrical values of some replace-ment items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation of the radio will be either unchanged or improved. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.
Cl	Condenser, tuning gang, 2-section	
	Model 52-640	31-2735-3
	Model 52-641	
CIĀ	Condenser, trimmer, antenna	Part of Cl
C1B	Condenser, trimmer, oscillator	Part of Cl
C2	Condenser, neutralizing, 1.5 µµf	
C3	Condenser, a-v-c by-pass, .05 µf	61-0122*
C4	Condenser, i-f by-pass, .1 µf	61-0113*
C5	Condenser, d-c blocking, 47 µµf	62-051009001*
C6	Condenser, dual ceramic	
C6A	Condenser, osc. B+ by-pass, .004 µf	Part of C6
C6B	Condenser, grid by-pass, .004 µf	Part of C6
C7	Condenser, temperature compensation,	
	7.5 μμf	30-1224-83
C8	Condenser, filament by-pass, .25 µf	30-4656-1
C9	Condenser, neutralizing, 1.5 µµf	
C10	Condenser, ceramic, 4-section	
CIUA	Condenser, d-c blocking, .001 µf.	Part of C10
CIOB	Condenser, screen by-pass, .01 µf	Part of C10
CIUC	Condenser, d-c blocking, .002 µt.	Part of CIU
CIUD	Condenser, grid by-pass, 220 µµf.	Part of CIU
CIA	Condenser, tone compensation, .004 µt.	
012	Condenser, electrolytic, illament by-pass	
C12	SU µI., 25V	30-2417-12
C128	Condenser, electrolync, 3-section	30-2568-39
CIBR	Condenser, inter, 40 µi., 150v	Part of C13
CISC	Condenser, inter, 10 µi., 150v	Part of C12
CIA	Condenser, line by page 047 uf	45.3505.45*
C15	Condenser, antenna coupling 001 uf	45.3500 5
CRI	Selenium rectifier. 75 mg. at 117 volts	34-8003-1*
LAI	Loop gerigi	
	Model 52-640 (flat loop)	32-4052-52
	Model 52-641 (Magnecor)	32-4455
LS1	Speaker, 4-inch p.m.	
RI	Resistor, current limiting, 470 ohms	66-1478340*
R2	Resistor, grid return, 68,000 ohms	66-3688340*
R3	Resistor, bias, 880 ohms	66-1888340*
R4	Resistor, leakage, 150,000 ohms	66-4158340*
R5	Resistor, oscillator dropping, 15,000 ohms	66-3158340*
R6	Resistor, grid return, 3.3 megohms	66-5338340*
R7	Resistor, a-v-c filter, 2.2 megohms	66-5228340*
R8	Resistor, VOLUME control (with "off-on"	/
	switch), 1 megohm	
R9	Resistor, grid return, 4.7 megohms	66-5478340*



Reference Symbol	Description	Service Part No.
R10	Resistor, screen dropping, 4.7 megohms	66-5478340*
R11	Resistor, plate load, 1 megohm	66-5108340*
R12	Resistor, grid return, 2.2 megohms	66-5228340*
R13	Resistor, bias, 2200 ohms	6-2228340*
R14	Resistor, filament dropping and filter, 2100 ohms (center-tapped)	33.3445
R15	Resistor, filter, 820 ohms	56-1828340*
R16	Resistor, current limiting, 120 ohms	33-1334-14
R17	Resistor, bias, 1500 ohms	66-2158340°
R18	Resistor, bias, 330 ohms	66-1338340*
S1	Switch, off-on	Part of R8
T 1	Transformer, oscillator	32-4453-1
T2	Transformer, output	32-8434
W1	Line cord	L2183
WS	Wafer switch, voltage change-over	
Z1	Transformer, 1st i-f	32-4160-4A
Z2	Transformer, 2nd i-f	32-4454-1A

MISCELLANEOUS

Description	Service Part No.
Cabinet, Model 52-640, maroon	10816-3
Back, maroon	
Clip (2), back	
Handle-and-bracket assembly	
Handle	
Knob assembly (2)	
Pointer	
Cabinet, Model 52-641, marcon	
Back, maroon	
Cabinet, Model 52-641, red	
Back, red	
Cabinet, Model 52-641, Nile	10799-4
Back, Nile	54-4767-4
Cabinet, Model 52-641, sand	
Back, sand	
Chp (2), back	
Handle and handlest a 11	W2235-7FA9
Handle-and-bracket assembly	
Hinge 1h	
Hinge, th	
Knob (2)	
Pointer	
Scale dial	
Baffle-and-cloth assembly	
Insulator, electrolytic-condenser mounting	
Cable-and-connector assembly, battery	41.3988
Drive cord (25-ft. spool)	45.8750*
Mount, rubber, tuning gang	27-4099-3
Retaining ring	1W60978FA3
Spring, drive cord	
Socket (2), tube, 1R5 and 1U4	
Socket (2), tube, 1U5 and 3V4	
Tube shield, 1U5	
Tuning shaft	

Figure 4. Drive-Cord-Installation Details

TP0-390



PHILCO RADIO MODEL 52-643

SPECIFICATIONS

CABINET	and a state of the
CIRCUIT	
AUDIO OUTPUT160 milliwatts	A CONTRACTOR OF THE OWNER
OPERATING VOLTAGES 117 volts, c.c. or d.c.; or 9-volt "A" battery and 90-volt "B" battery	
POWER CONSUMPTION	
A-c or d-c operation 15 watts	
Battery operation	A CARLES AND A DECK
AERIAL	
INTERMEDIATE FREQUENCY	
PHILCO TUBES (5)	MODEL 52-643
BATTERY TYPEPhilco P-363	



TP1-1711

Figure 1. Drive-Cord-Installation Details

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ALIGNMENT PROCEDURE

POINTER—Set pointer to coincide with first index mark from left side of dial backplate (looking at backplate).

RADIO CONTROLS-Set volume control to maximum.

OUTPUT METER-Connect across voice-coil terminals.

SIGNAL GENERATOR-Use modulated output.

- OUTPUT LEVEL—During alignment, adjust signal-generator output to maintain output-meter indication below .5 volt.
- SPECIAL NOTE—The orientation of the loop with respect to the chassis and battery is critical for correct tracking. During

alignment, with the cabinet back (containing the loop) lying flat on the bench, the chassis should be laid on its back in approximately its normal relation to the loop, with a $\frac{1}{4}$ "thick wooden board separating the loop and chassis. The battery should also be placed as close as possible to its normal position with respect to the chassis and loop.

CRITICAL LEAD DRESS—To secure proper padding capacity, the green lead from pin 6 of the 1R5 tube to Z1 must be dressed over wiring panel, away from chassis, and the green lead from Z1 to the tuning condenser must be dressed away from chassis.



Figure 2. Top View, Showing Trimmer Locations

ALIGNMENT CHART

	SIGNAL GENER	ATOR	RADIO		
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Through a .1-µf. con- denser to pin 6 of the 1R5 converter.	265 kc.	1620 kc. (gang fully open)	Adjust, in order given, for maximum output.	TC5-2nd i-f sec. TC4-2nd i-f pri. TC2-lst i-f pri. TC3-lst i-f sec.
2	Radiating loop. See note below.	1620 kc.	l620 kc. (gang fully open)	Adjust for maximum output. If low-frequency dial tracking is far off, make adjustments in steps 3 and 4 before making this adjustment.	ClC—osc. shunt
3	Same as step 2.	580 kc.	580 kc.	Adjust for maximum output while rocking tun- ing control.	C13-osc. series
4	Same as step 2.	580 kc.	580 kc.	Adjust for maximum output. This adjustment should not be made unless dial tracking is off. or sensitivity is low at low-frequency end (580 kc.).	TC1r-r sec.
5	Same as step 2.	1500 kc.	1500 kc. (index mark at right)	Adjust, in order given, for maximum output.	C1B—r-f trimmer C1A—aerial trimmer
6	6 Repeat steps 3 and 5 until no further improvement is obtained.				

RADIATING LOOP: Make up a six-to-eight-turn. 6-inch-diameter loop using insulated wire; connect to signal-generator leads and place near radio loop.



World Radio History

Figure 3. Philco Radio Model 52-643, Schematic Diagram

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MODEL 52-643

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts: also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation of the radio will be either unchanged or improved. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.
C1	Consender, tuning gang, 3-section	31.2747.2
CIA	Condenser, antenna trimmer	Part of C1
CIB	Condenser, r-f trimmer	Part of Cl
CIC	Condenser, osc. trimmer	Part of Cl
C2	Condenser, d-c blocking, 100 µuf6	2-110009001*
C3	Condenser, bias filter, .05 µf.	61-0122*
C4	Condenser, fixed trimmer, 4.7 µµf.	
C5	Condenser, filament by-pass, .05 µf	61-0122*
C6	Condenser, screen by-pass, .05 µf	61-0122*
C7	Condenser, neutralization, 1.5 µµf.	30-1221-3
C8	Condenser, a-v-c filter, .05 µf.	61-0122*
C9	Condenser, filament by-pass, .1 µf	61-0113*
C10	Condenser, filament by-pass, .1 µf	61-0113*
C11	Condenser, d-c blocking, 47 µµf	60-00475417*
C12	Condenser, osc. series padder, 600 to	21 6472 16
C13	Condenser, tone compensation 004 uf	61.0179*
C14	Condenser, screen neutralizing 003 uf	61.0109*
C15	Condenser, line by-pass 04 uf	45.3500.2*
C16	Condenser, ceramic, 4-section	30.1237
C16A	Condenser, screen by-pass, 01 uf	Part of C16
C16B	Condenser, by-pass, 200 unit	Part of C16
C16C	Condenser, d-c blocking, .002 uf	Part of C16
C16D	Condenser, d-c blocking, .001 uf.	Part of C16
C17	Condenser, electrolytic, 4-section	
C17A	Condenser, filament by-pass, 60 µf.	Part of C17
C17B	Condenser, filter, 30 µf.	Part of C17
C17C	Condenser, filter, 10 µf.	Part of C17
C17D	Condenser, filter, 60 µf.	Part of C17
CRI	Selenium rectifier	
LAI	Coil, antenna	32-4455-4
LSI	Speaker, 5-inch	
PLI	Plug and cable, battery	41-3712-5
ni Do	Resistor, grid return, I megohm	66-5108340*
R2	Resistor, current limiting, 100 ohms	
RA	Resistor, grid return, 4.7 megohms	
R5	Resistor, grid return, 100,000 ohms	
R6	Resistor dropping 15,000 ches	
87	Resistor and roturn 92 ohme	00-3158340"
417	itesision, grid return, 62 onms	

Reference	Description	Service Bart No
Do	Besister wild waters 000 1	Fart INU.
No Do	Resistor, gria return, 220 ohms	55-1228340*
NJ DIO	Resistor, a-v-c liller, 4.7 megonms	55-547834U*
RIU BU	Resistor, neutralization, 2200 onms	66-222834U-
RII Dio	Resistor, a-v-c filter, 4.7 megohms	66-547834U*
RIZ	Resistor, 1-1 filter, 100,000 ohms	56-4108340*
RIJ	Resistor, VOLUME control, I megohm	.33-5566-11
RI4	Resistor, leakage, 150,000 ohms	66-4158340*
RIS	Resistor, current limiting, 82 ohms	66-0828340*
R16	Hesistor, grid return, 4.7 megohms	66-5478340*
R17	Resistor, plate load, 1 megohm	66-51083 40
RIS	Resistor, screen dropping, 4.7 megohms.	66-5478340°
R19	Resistor, grid return, 4.7 megohms	66-5478340°
R20	Resistor, grid return, 2.2 megohms	66-5228340°
R21	Resistor, current limiting, 330 ohms	66-1338340*
R22	Resistor, filter, 1000 ohms	66-2108340*
R23	Resistor, wire wound, 2-section	33-3431-7
R23A	Resistor, filament dropping, 950 ohmsP	art of R23
R23B	Resistor, filament dropping, 950 ohmsP	art of R23
R24	Resistor, wire wound, current limiting,	
	120 ohms	.33-1334-14
S 1	Switch, change-over	42-1899
S2	Switch, on-offP	art of R13
T 1	Transformer, oscillator	32-4263-2
T2	Transformer, output	32-8528
W1	Line cord	L2183
Z 1	Transformer, r-f	32-4399A
Z2	Transformer, 1st i-f	32-4160-2A
Z3	Transformer, 2nd i-f	32-4240-6A

MISCELLANEOUS

weseription	Service Part NO.
Cabinet complete	
Back	
Clip (2), back	
Handle assembly	
Scale	
Dial backplate assembly	
Backplate	
Drive cord, 25-ft. spool	
Pointer	
Spring, drive cord	
Shaft-and-pulley assembly	
Bushing	
Clip (1)	
Knob (2)	
Mount (3), rubber	
Spring, retaining	
Shield, 1U5 tube	
Socket (4)	
Socket (1), 1U5 tube	



Description

Figure 4. Bottom View, Showing Symbolized Chassis



PHILCO RADIO MODELS 52-940, 52-941 AND 52-942



MODEL 52-940



MODEL 52-941 SPECIFICATIONS



MODEL 52-942

JE CONTRACTOR J					
CABINET					
Model 52-940	Molded plastic, mahogany or gray, wide-angle dial				
Model 52-941	Molded plastic, ivory, wide-angle dial				
Model 52-942	Molded plastic, maroon, wide-angle dial				
CIRCUIT	Five-tube superheterodyne (plus rectifier)				
FREQUENCY RANGE	.540—1620 kc.				
AUDIO OUTPUT	.1 watt				
OPERATING VOLTAGE	.105—120 volts, a.c. or d.c.				
POWER CONSUMPTION	.30 watts				
AERIAL	High-impedance loop; provision for connecting external aerial				
INTERMEDIATE FREQUENCY	.455 kc.				
PHILCO TUBES (6)	.7B7 r-f ampl., 7A8 converter, 7B7 i-f ampl., 14B6 deta.v.c lst audio, 35L6GT output, 3525GT rectifier				



Figure 1. Dial-Cord Installation Details

TP9-636A

PHILCO RADIO MODELS 52-940, 52-941, AND 52-942, PR-1953

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Figure 2. Bottom View, Showing Symbolized Chassis

ALIGNMENT PROCEDURE

DIAL POINTER: Turn tuning condenser to full-mesh position. Adjust pointer so that center of pointer carriage coincides with the first scribe line from the left.

OUTPUT METER: Connect across speaker voice coil.

SIGNAL GENERATOR: Connect as indicated in chart. Use modulated output.

OUTPUT LEVEL: During alignment, attenuate signalgenerator output to maintain an output-meter indication of 1.25 volts.

VOLUME CONTROL: Set to maximum.

CRITICAL DRESS: The green lead from the osc. section of C1 to C5 must be dressed away from the chassis, with all excess under the chassis.



Figure 3. Top View, Showing Trimmer Locations

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Through a .1-µi. condens- er to stator of r-f section of gang. Ground lead to B	455 kc.	Gang fully meshed	Adjust, in order given, for maximum output.	TC5—2nd i-f sec. TC4—2nd i-f pri. TC3—1st i-f sec. TC2—1st i-f pri.
2	Radiating loop. (See note below.)			Preset ½ turn from right.	C5osc. series
3	Same as step 2.	1620 kc.	1620 kc.	Adjust for maximum.	C1B-osc. shunt
4	Same as step 2.	1500 kc.	1500 kc.	Adjust for maximum.	ClCr-f ClAaerial
5	Same as step 2.	580 kc.	580 kc.	Adjust for maximum while rocking tuning control.	C5—osc. series TC1—r-f core
6	Repeat steps 3 and 4.			· · · · · · · · · · · · · · · · · ·	

RADIATING LOOP: Make up a 6—8 turn. 6-inch-diameter loop from insulated wire; connect to signal-generator leads and place near radio loop aerial. The loop aerial must be connected to the radio.



<u>+</u> Philco Radio Models 52-940, 52-941, and 52-942, Schematic Diagram

MODELS 52-940, 52-941, AND 52-942

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NOTE: Part numbers marked with an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts; also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation of the radio will be either unchanged or improved. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.
Cl	Condenser, tuning, 3-section	31-2748-1
CIĀ	Condenser, trimmer, aerial	Part of Cl
CIB	Condenser, trimmer, osc	Part of Cl
CIC	Condenser, trimmer, r-f	Part of Cl
C2	Condenser, by-pass, .1 µf	61-0113*
C3	Condenser, by-pass, .05 µf	61-0122*
C4	Condenser, fixed trimmer, temperature	
	comp., 13 μμf	30-1224-68
C5	Condenser, padder, osc. series	31-6473-17
C6	Condenser, d-c blocking, 47 µµf	.60-00475417
C7	Condenser, electrolytic, 3-section	30-2575-27
C7A	Condenser, filter, 30 µf., 150v	Part of C7
C7B	Condenser, filter, 40 µf., 150v	Part of C7
C7C	Condenser, filter, 40 µf., 150v	Part of C7
C8	Condenser, line by-pass .047 µf	45-3505-45
C9	Condenser, a-v-c filter, .05 µf	61-0122*
C10	Condenser, d-c blocking, .01 µf	61-0120*
C11	Condenser, dual ceramic	30-1239-4
CIIA	Condenser, d-c blocking, .007 µf	Part of C11
CIIB	Condenser, by-pass, 220 µµf	Part of C11
C12	Condenser, tone compensation, .02 μf .	61-0108*
C13	Condenser, antenna coupling, 5 µµf	
11	Pilot lamp, 6—8v	34-2068
J1	Jack, aerial input	27-6214-1
LA1	Loop aerial, Model 52-940	32-4052-57
LA1	Loop aerial, Model 52-941	32-4052-58
LA1	Loop aerial, Model 52-942	32-4052-59
LSI	Speaker, p-m, 4 in. x 6 in. oval	36-1633-1
P1	Loop-aerial plug	27-4788
R1	Resistor, a-v-c load, 2.2 megohms	66-5228340*
R2	Resistor, leakage, 150,000 ohms	66-4158340*
R3	Resistor, dropping, 22,000 ohms	66-3228340*
R4	Resistor, grid return, 100,000 ohms	66-4108340*
R5	Resistor, filament dropping, 100 ohms	33-1343-3
R6	Resistor, filter, 220 ohms, 1 watt	66-1224340°
R7	Resistor, i-f filter, 47,000 ohms	66-3478340*
R8	Resistor, diode load, 2.2 megohms	66-5228340*
R9	Resistor, grid return, 3.3 megohms	66-5338340*
R10	Resistor, VOLUME control (with on-off	
D 11	switch), 500,000 ohms	33-5566-13
	Resistor, plate load, 470,000 ohms	66-4478340*
R12 R12	Resistor, grid return, 470,000 ohms	66-4478340*
RIJ DIA	Resistor, cathode bias, 130 ohms	66-1138340*
D15	Resistor, filter, 1200 ohms	.66-2128340*
n15 01	Resistor, leakage, 150,000 ohms	66-4158340*
51 T1	Swiich, on-on	art of R10
* I T2	Transformer, oscillator	32-4263-2
14 W1	Fine and	32-8310-3
Z1	Transformer z f	L-2183*
 Z2	Transformer let if	32-4399-2A
Z3	Transformer, 2nd i.f	
		.54-7640-JA

MISCELLANEOUS	
Description	Service Part No.
Cabinet, Model 52-940, mahogany	
Cabinet, Model 52-940, gray	
Back	
Fastener (4), back	W-2235FA9
Backplate, ornamental, mahogany cabinet	56-7426FCP
Backplate, ornamental, gray cabinet	56-7426-1FCP
Fastener, backplate mtg	W-2235-1FA9
Baffle	
Fastener (4), baffle mtg	W-2235-2FA9
Bezel, metal	
Speed nut (2), bezel mtg.	1W60196FE7
Dial scale, mahogany cabinet	
Dial scale, gray cabinet	
Clip, scale mtg.	
Knob (2), mahogany cabinet	
Knob (2), gray cabinet	
Cabinet Model 52.941	76-5341-1
Back	
Fastener (A) back	
Backplate ornamental	
Fastener backplate mia	W/ 2225 25 80
Baffle, cardboard	54.7922
Eastener (4) baffle mia	W.2235.2F & 9
Dial scale	54-5071
Clip, dial mta.	56-7808FE7
Knob (2)	
Pointer	
Cabinet, Model 52-942	
Back	
Fastener (4), back	W-2235FA9
Backplate, ornamental	
Fastener, backplate mtg	W-2235-1FA9
Baffle, cardboard	54-7919-2
Fastener (4), baffle mtg.	W-2235-2FA9
Bezei, metal	
Digl. scale	
Clip (2), dial mtg.	56.7572FF11
Knob (2)	54.4718.3
Pointer	
Backplate, pulley-and-clip assembly	
Clamp, electrolytic mtg.	
Dial cord, 25-foot spool	
Spring, gang drive	
Spring, pointer drive	
Drive shaft	
Bushing, drive shaft	
Panel wiring external and a	
Panel wiring Alug	
Plug gerial Apin	
Rubber mount (4) cons mis	
Shield tube 1486	
Socket (4). Loktal	
Socket (2), octal	
Socket assembly, pilot lamp	


PHILCO RADIO MODEL 52-548

SPECIFICATIONS

CABINET	Molded plastic, marcon
CIRCUIT	Four-tube superheterodyne
	pius rechier
FREQUENCY RANGE	
AUDIO OUTPUT	l watt
OPERATING VOLTAGE	105-120 volts, a.c. or d.c.
POWER CONSUMPTION	
INTERMEDIATE FREQUENCY	455 kc.
AERIAL	Magnecor high-impedance loop; provision for connecting external aerial
PHILCO TUBES	7A8 converter, 7B7 i-f ampli- fier, 7C6 2nd det., avc., 1st audio. 50C5 output, 35W4 rec- tifier



POINTER 56-5630-40

Figure 1. Drive-Cord Installation Details

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PR-1954

PHILCO RADIO MODEL 52-548

ALIGNMENT PROCEDURE

DIAL POINTER—Turn tuning condenser to full-mesh position. Set dial pointer to index mark, located to the left of "55".

CONTROLS—Set volume control to maximum, and tuning control as indicated in chart.

OUTPUT METER—Connect across voice-coil terminals.

SIGNAL GENERATOR—Ground lead to B—, output lead as indicated in chart.

OUTPUT LEVEL—During alignment, attenuate signalgenerator output to hold output-meter indication below 1.25 volts.

STEP	SIGNAL GENERATOR			ADJUST	
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	TRIMMER
1	Through a .01-µf. con- denser to pin 6 of 7A8 converter tube.	455 kc.	Gang fully open.	Adjust, in order given, for maximum output. TC1 and TC4 are located at top of trans- formers.	TC4—2nd i-f sec. TC3—2nd i-f pri. TC2—1st i-f sec. TC1—1st i-f pri.
2	Radiating loop (see note below).	1600 kc.	1600 kc.	Ādjust for maximum.	C1B—osc. trimmer
3	Same as step 2.	1500 kc.	1500 kc.	Adjust for maximum.	CIA—ant. trimmer

RADIATING LOOP: Make up a 6--8-turn, 8-inch-diameter loop from insulated wire, connect to signal generator output leads, and place near radio loop.



Figure 2. Base View, Showing Parts Placement and Alignment Points

TP1-1840



Figure 3. Philco Radio Model 52-548, Schematic Diagram

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MODEL 52-548

REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts; also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation of the radio will be either unchanged or improved. When ordering replacements, use only the "Service Part No."

1

Reference Symbol	Description	Service Part No.
Cl	Condenser, tuning gang	31-2751-10
CIA	Condenser, trimmer, aerial	Part of Cl
CIB	Condenser, trimmer, oscillator	Part of Cl
C2	Condenser, osc. grid, d-c blocking,	
	47 μμf.	60-00475417*
C3	Condenser, leakage, .1 µf	45-3505-47
C4	Condenser, temperature compensating,	
	7.5 μf	30-1224-65*
C5	Condenser, screen by-pass, .1 μf	
C6	Condenser, a-v-c by-pass, .1 µf	61-0113*
C7	Condenser, cathode by-pass, .05 μf	
C8	Condenser, $B + by$ -pass, .1 μf .	45-3505-47*
C9	Condenser, audio coupling, .01 μf	45-3505-58*
C10	Condenser, dual ceramic	
C10A	Condenser, audio coupling, .007 μf	Part of C10
C10B	Condenser, grid by-pass, 220 µµf	Part of C10
C11	Condenser, electrolytic, 4-section	
C11 A	Condenser, cathode by-pass, 25 μ f	Part of C11
CIIB	Condenser, filter, 40 µf.	Part of C11
CIIC	Condenser, filter, 40 µf.	Part of Cl1
CIID	Condenser, filter, 40 µf.	Part of Cl1
C12	Condenser, tone compensation, .01 μf .	45-3505-58*
C13	Condenser, line by-pass, .04 μf	
C14	Condenser, aerial, fixed trimmer, 10 $\mu\mu$. 30-1224-26*
11	Pilot lamp, type 47	
Ll	Coil, oscillator	
LAI	Loop antenna (Magnecor)	
LSI	Speaker, 5¼" round	36-1639-9
Rl	Resistor, leakage, 150,000 ohms	66-4158340*
R2	Resistor, grid return, 100,000 ohms	66-4108340*
R3	Resistor, dropping, 27,000 ohms	66-3278340*
R4	Resistor, cathode bias, 180 ohms	66-1188340*
R5	Resistor, i-f filter, 47,000 ohms	66-3478340*
R6	Resistor, volume control, .5 megohm	
	(with switch)	33-5566-36

Reference		Service
Symbol	Description	Part No.
R7	Resistor, diode load, 2.2 megohms	66-5228340*
R8	Resistor, grid return, 10 megohms	66-6108340*
R9	Resistor, plate load, 470,000 ohms	66-4478340*
R10	Resistor, grid return, 470,000 ohms	66-4478340*
R11	Resistor, cathode bias, 150 ohms	66-1154340*
R12	Resistor, filter, 220 ohms, 2 watts	66-1225340*
R13	Resistor, filter, 1200 ohms	66-2128340*
R14	Resistor, surge limiting, 880 ohms cold,	
	100 ohms hot	33-1343-3
S 1	Switch, off-on	Part of R6
T1	Transformer, output	
W1	Line cord	L2183.
Z 1	Transformer, 1st i-f	32-4160A
Z2	Transformer, 2nd i-f	.32-4240A

MISCELLANEOUS

Description	Service Part No
Cabinet	
Fastener (5 required)	W2235-1FA9
Knob (2 required)	
Knob escutcheon (2 required)	
Dial backplate assembly	
Drive cord, 25-foot spool	45-8750
Dial scale	
Lamp assembly, pilot	27-6233-18
Pointer	56-5630-40
Shaft, tuning	56-9272
Spring	56-2617
Spring, hairpin	57-1468FA3
Mount, rubber (3 required)	27-4596
Socket, Locktal (3 required)	27-6207
Socket, miniature (2 required)	27-6265



PHILCO RADIO MODEL 52-944

SPECIFICATIONS	
CABINET	
CIRCUIT	
FREQUENCY RANGES	
Broadcast	
FM	1
AUDIO OUTPUTl watt	COHOL: COHOL
OPERATING VOLTAGE	
POWER CONSUMPTION	MODEL 52-944
AERIALBuilt-in pancake loop for AM. line cord for FM; provision for connecting external aerial	
INTERMEDIATE FREQUENCY	
AM	
FM	
PHILCO TUBES (6)	i-f ampl., 12AU6 2md i-f ampl., 19V8
	TP1-1703



TPO-373

Figure 1. Dial-Cord Installation Details

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World Radio History

PR-1955

AM ALIGNMENT PROCEDURE

Make alignment with loop aerial connected to radio. The AM alignment should be completed before the FM alignment is made.

DIAL POINTER—With tuning-condenser plates fully meshed, adjust pointer to coincide with index mark at low-frequency end of dial backplate.

RADIO CONTROLS—Set volume control to maximum, set band switch for broadcast reception, and set tuning control as indicated in chart.

OUTPUT METER-Connect across voice-coil terminals.

SIGNAL GENERATOR—Use AM r-f signal generator, with modulated output. Connect generator and set frequency as indicated in chart.

OUTPUT LEVEL—During alignment, signal-generator output must be attenuated to hold output-meter reading below 1.25 volts.

AM ALIGNMENT CHART

	SIGNAL GENERATOR		RAI	010		
STEP	CONNECTION TO RADIO	DIAL SETTING	° DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST	
1	Ground lead to chassis. Output lead through a .1-µf. condenser to junction of LA1 and L8.	455 kc.	Gang fully open	Adjust for maxi- mum output.	TC10—2nd AM i-f sec. TC9—2nd AM i-f pri. TC4—1st AM i-f sec. TC3—1st AM i-f pri.	
2	Radiating loop. See note below.	1620 kc.	1620 kc. (2nd index mark from right)	Adjust for maxi- mum output.	CIC—osc. trimmer	
3	Same as step 2.	1500 kc.	1500 kc.	Adjust for maxi- mum output.	ClA—aerial trimmer	

RADIATING LOOP: Make up a six-to-eight turn, 6-inch-diameter loop from insulated wire; connect to generator terminals, and place near radio loop aerial. Radio loop aerial must be connected.

FM ALIGNMENT PROCEDURE

Make AM alignment first

RADIO CONTROLS-Set volume control to maximum, set band switch for FM reception, and set tuning control as indicated in chart.

OSCILLOSCOPE—Connect ground lead to chassis. Connect vertical input to FM TEST jack, J2; connect horizontal input to horizontal sweep output of sweep generator. (Oscilloscope is used for steps 1 and 2.)

SWEEP GENERATOR—Use r-f sweep signal generator. Connect ground lead to chassis. Connect output lead and set frequency and sweep width as indicated in chart.

OUTPUT METER—Connect across voice-coil terminals.

NOTE: Before starting FM alignment, allow radio and signal generator to warm up for 15 minutes.





FM ALIGNMENT CHART

SIGNAL GENERATOR					
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Connect FM signal generator through a .01-µf. condenser to control grid (pin 1) of 12AU6 2nd i-f amplifier.	9.1 mc. (75- kc. devia- tion).	88 mc. (gang meshed).	Balance and adjust detector for maxi- mum indication on scope as shown in figure 5.	TC8—detector sec. TC7—detector pri.



Figure 3. Top View, Showing Trimmer Locations

FM ALIGNMENT CHART (Cont.)

	SIGNAL GENERATOR		RADIO		
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
2	Connect FM signal generator through a .01-µf. condenser to FM tuning gang stator lug, junction of C1 and pin 4 of L2.	Same as step 1.	Same as step l.	Adjust for maximum indication on scope as shown in figure 5.	TC6FM 2nd i-f sec. TC5FM 2nd i-f pri. TC2FM 1st i-f sec. TC1FM 1st i-f pri.
3	Connect FM signal generator to lug 2 of TB1, and ground side of generator to lug 3 of TB1. See note 1 below.	108.5 mc.	108.5 mc. (1st index mark from right).	Adjust for maximum indication on output meter.	C18—FM osc.
4	Same as step 3.	88 mc.	88 mc. (1st index mark from left).	Adjust for maximum indication on output meter. See note 2 below.	L5—FM osc.
5	Same as step 3.	105 mc.	105 mc. (3rd index mark from right).	Adjust for maximum indication on output meter while rocking tuning con- denser.	C1B—FM r-f
6	Same as step 3.	105 mc.	105 mc.	Adjust for maximum indication on output meter.	C47—FM aerial.
7	Same as step 3.	92 mc.	92 mc. (3rd index mark from left).	Adjust for maximum indication on output meter. See note 3 below.	L2—FM r-f coil.
If L1 is	replaced, adjust antenna inductance as i	ollows:			
8	Same as step 3.	92 mc.	92 mc.	Adjust for maximum indication on output meter.	TC11—FM aerial.

NOTE 1: For proper and accurate results, the signal-generator output impedance must be 300 ohms to match the input impedance of TB1. If the signal-generator output impedance is less than 300 ohms, a resistor of the proper value may be used in series with the output lead to make the impedance correct. For example, if the output impedance is 150 ohms, place a 150-ohm resistor in series with the output lead.

NOTE 2: If oscillator frequency does not tune as low as 88 mc., compress the turns on the oscillator coil. If oscillator frequency tunes too low, spread the turns slightly. After coil is adjusted, repeat step 3.

NOTE 3: Check resonance of coil L2 by inserting end of a tuning wand, such as Philco Part No. 56-6100, in the coil. If output increases when iron end is placed in coil, compress turns slightly. If output increases when brass end is placed in coil, spread the turns. If output decreases when either end is placed in coil, no adjustment is necessary. After the coil is adjusted, readjust trimmer C1B and repeat steps 3 through 8 until no further adjustment is necessary.



4

FOLD

OUT

MODEL 52-944

REPLACEMENT PARTS LIST

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts; also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation of the radio will be either unchanged or improved. When ordering replacements, use only the "Service Part No."

Reference		Service	Reference		Service
Symbol	Description	Part No.	Symbol	Description	Part No.
Cl	Condenser, tuning gang, 5-section	31-2762	C47	Condenser, FM aerial trimmer	45-3034
C1Ā	Condenser, trimmer, BC aerial	Part of Cl	CRI	Selenium rectifier, 100 ma., 117v	34-8003-1
CIB	Condenser, trimmer, FM r-f	Part of Cl	11	Pilot lamp, frosted, 117v, 7 watts	
CIC	Condenser, trimmer, BC oscillator	art of Cl	J1	Jack, male, a-c	27-4785-13
C2	Condenser, aerial isolating, 3.3 µµf	30-1224-49	J2	Socket, FM test	
C3	Condenser, aerial isolating, 220 µµf62-	122001001*	LI	Coil, FM gerial, complete with grommet	
C4	Condenser, aerial isolating, .01 µf	45-3505-41	L2	Coil. FM r-f	
C5	Condenser, cathode by-pass, 22 µµf62-	022009001	L3	Choke. r-f. 3.3 uh.	32-4422-10
C6	Condenser, d-c blocking, 100 µµf62-	110001001	L4	Choke, r-f. 3.3 uh.	32-4422-10
C7	Condenser, screen by-pass, 220 µµf62-	122001011*	L5	Coil, FM oscillator	
C8	Condenser, oscillator grid, 100 µµf62-	110001021*	LG	Choke, filament, 2.2 µh.	32-4422-8
C9	Condenser, d-c blocking, 220 µµf62-	122001001	L7	Choke, filament, 2.2 µh.	
C10	Condenser, d-c blocking, .01 µf	30-1226-10	LS	Choke, r-f, 4.1 µh.	32-4061-3
C11	Condenser, neutralizing, 3.9 µµf	30-1221-14	LAI	AM loop and support assembly	
C12	Condenser, d-c blocking, 220 µµf62-	122001001	LA2	Line-cord aerial, FM	Part of W1
C13	Condenser, fixed trimmer, temperature		LS1	Speaker, 4" p.m. including output trans-	
	compensating, 7.5 µµf	.30-1224-8		former	36-1614-6
C14	Condenser, d-c blocking, 220 µµf62-	122001001	R1	Resistor, cathode bias, 120 ohms	66-1128340*
C15	Condenser, r-i by-pass, 220 µµi62-	122001001	R2	Resistor, screen decoupling, 470 ohms .	66-1478340*
C16	Condenser, plate decoupling, .01 µf	30-4572	R3	Resistor, grid return, 15,000 ohms	66-3158340*
C17	Condenser, r-f by-pass, 100 µµf62-	110001001*	R4	Resistor, grid return, 2.2 megohms	66-5228340*
C18	Condenser, trimmer, FM oscillator	31-6511	R5	Resistor, parasitic suppressor, 680 ohms	s66-1688340*
C19	Condenser, fixed trimmer, temperature	00 1004 0	R6	Resistor, parasitic suppressor, 470 ohms	s66-1478340*
~~~	compensating, 7.5 µµ1.	.30-1224-0	R7	Resistor, plate dropping, FM, 1000 ohms.	66-2108340*
C20	Condenser, a-v-c accoupling, .01 µi	C1 0062*	R8	Resistor, plate dropping, AM, 47,000	
C21	Condenser, screen by-pass, .002 µi.	45 2500 7*		ohms	66-3478340*
C22	Condenser, neutralizing, .000 µl.	10001021*	Ra	Resistor, plate dropping, 4700 ohms	66-2478340*
C23	Condenser, 1-1 by-pass, 100 µµ.	61.0120	RIU	Resistor, cathode bias, 47 ohms	66-0478340
C25	Condenser, comode by-pass, .or pr.	61-0062*	RII B12	Resistor, screen decoupling, 1000 onms.	00-2106340
C26	Condenser, electrolytic diode.logd filter		RI2	Resistor, plate decoupling, 2700 onms .	00-22/0340
010	2 μf., 50v	.30-2417-7	R15 R14	Resistor, gria return, i megonin	00-3108340 66 1129240*
C27	Condenser, i-f by-pass, 150 µµf60	-10155407	RIS '	Resistor, cuthoue blus, 120 onnis	EE 5229240*
C28	Condenser, d-c blocking, .006 µf.	.45-3500-7*	B16	Resistor decoupling 470 obms	66-1478340*
C29	Condenser, i-f by-pass, 100 µµf62-	10001021*	B17	Resistor, EM diode load 47,000 ohms	66.3478340*
C30	Condenser, de-emphasis, .004 µf	61-0179*	R18	Resistor, de-emphasis, 47,000 ohms	
C31	Condenser, i-f by-pass, 100 µµf62-	10001001*	R19	Resistor i-f filter, 47 000 ohms	66-3478340*
C32	Condenser, i-f by-pass, 100 µµf62-	10001001*	R20	Resistor, g-v-c logd, 3.3 megohms	
C33	Condenser, plate by-pass, 680 µµf62-	68001001	B21	Volume control (with off-on switch),	
C34	Condenser, d-c blocking, .02 µf.	61-0108*		500,000 ohms	33-5566-20
C35	Condenser, d-c blocking, .006 µf.	61-0105*	R22	Resistor, grid return, 10 megohms	66-4478340*
C36	Condenser, grid by-pass, 100 µµf62-	10001001	R23	Resistor, plate load, 470,000 ohms	66-4478340*
C37	Condenser, tone compensation, .02 µf	61-0108-	R24	Resistor, grid return, 470,000 ohms	66-4478340*
C38	Condenser, electrolytic, 4-section	30-2570-46	R25	Resistor, cathode bias, 150 ohms	66-1158340*
C38A	Condenser, cathode by-pass, 25 µL, 25vPd	irt of C38	R26	Resistor, filter, 470 ohms, 1 watt	66-1474340*
CJ8B	Condenser, filter, 40 µf., 150vPo	irt of C38	R27	Resistor, filter, 150 ohms, 2 watts	66-1155340*
C38C	Condenser, filter, 70 µL, 150vPo		H28	Resistor, current limiting, 22 ohms,	66.0225360
C38D	Condenser, filter, 40 µI., 150vPo	20 1229 1	<b>B</b> 29	Besistor current limiting 100 ohms	33.1343.3
C39	Condenser, mament by-pass, .005 µr	.30-1238-1	R30	Resistor grid return 2.2 megohns	66-5228340*
CAL	Condenser, nine by-pass, 100 ppn	30.1239	R31	Resistor, logding, 100 ohms	
CALA	Condenser, terumic, 2-section	rt of CA1	S1	Switch off-on	Part of R21
CAIR	Condenser, indment by-pass, .004 uf Pa	rt of C41	TI	Transformer, AM oscillator	32-4458-4
C42	Condenser, line by pass, .004 uf.		T2	Transformer, output	Part of LS1
C43	Condenser, filament by-pass, 100 uuf, 62-1	10001021*	<b>W</b> 1	Line cord	L2183
C44	Condenser, plate decoupling, 220 mit	22001001	W2	Cable, FM aerial, 72-ohm twin lead	41-3987
C45	Condenser, line by-pass, 100 µµf62-1	10001021*	WS	Switch, band, 2-wafer	42-1924-1
C46	Condenser, r-f by-pass, 100 µµf62-1	10001001		(Continued on next page)	
					_

	REPLA	CEMENT PA	ARTS LIST (Cont.)	
Reference Symbol	Description	Service Part No.	MISCELLANEOUS (C	ont.) Servic
<b>Z</b> 1	Transformer, FM, 1st i-f	32-4518A	Description	Part No
Z2	Transformer, AM, 1st i-f	32-4516A	Dial backplate assembly,	
Z3	Transformer, FM, 2nd i-f	32-4518-1A	Drive cord, 25-foot spool	
Z4	Transformer, FM, 3rd i-f	32-4310-4A	Pointer	
Z5 Transformer, AM, 2nd i-f		32-4517A	Shaft, drive	
			Spring, gang drive	
	MISCELLANEOUS		Spring, pointer drive	
	Description	Service Part No	Rubber mounts, gang (5)	
Cabinet	Description		Rubber mounts, speaker (2)	
Back, fl	ange, and socket assembly		Socket, 12BA6 (i-f ampl.)	
Fas	stener, back mtg. (4)	W-2235-FA9	Socket, 12AU6 (i-f ampl.)	
Baffle a	nd cloth assembly		Socket, 12AU6 (r-f ampl.)	
Fas	stener, baffle mtg. (2)	W-2235-2FA9	Socket, 12AT7	
Dial sco	ale	54-5089-2	Socket, 19V8	27-6203-5
Clip	p, scale mtg. (3)	56-7808FE11	Socket 35C5	27.6203.12
Knob, I	гм-АМ		Spacer "T" spacker mtg (2)	10/20155532
Knob	runing		Weeker another mits (0)	
KHOD, Y	orume-on-on		wasner, speaker mig. (2)	I W 52205F A9

	REPLA	CEMENT PA	ARTS LIST (Cont.)	
Reference Symbol	Description	Service Part No.	MISCELLANEOUS (Co	ont.) Servic
<b>Z</b> 1	Transformer, FM, 1st i-f	32-4518A	Description	Part No
Z2	Transformer, AM, 1st i-f	32-4516A	Dial backplate assembly,	
Z3	Transformer, FM, 2nd i-f	32-4518-1A	Drive cord, 25-foot spool	
Z4	Transformer, FM, 3rd i-f	32-4310-4A	Pointer	
25 Transformer, AM, 2nd i-f		32-4517A	Shaft, drive	
			Spring, gang drive	
	MISCELLANEOUS		Spring, pointer drive	
	Description	Service Part No	Rubber mounts, gang (5)	
Cabinet	Description	10796	Rubber mounts, speaker (2)	
Back, fl	ange, and socket assembly		Socket, 12BA6 (i-f ampl.)	
Fas	stener, back mtg. (4)	W-2235-FA9	Socket, 12AU6 (i-f ampl.)	
Baffle a	and cloth assembly		Socket, 12AU6 (r-f ampl.)	
Fas	stener, baffle mtg. (2)	W-2235-2FA9	Socket, 12AT7	
Dial sc	ale	54-5089-2	Socket, 19V8	27-6203-5
Cli	p, scale mtg. (3)	56-7808FE11	Socket 3505	27.6203.12
Knob,	FM-AM		Spager "T" aparles mtr (2)	14/20166532
Knob,	Tuning		Spacer, I, speaker mig. (2)	I W 23135F A3
Knob,	volume-on-on		wasner, speaker mtg. (2)	IW 52265FA9



Figure 5. Symbolized Chassis, Showing Parts Placement

5

FOLD

OUT

6

PR-1955

TP1-1761



# PHILCO RADIO-PHONOGRAPH MODEL 52-1340, CODES 121 AND 122

SPECIFICATIONS	
CABINET Molded plastic, mottled mahogany CIRCUIT Five-tube superheterodyne FREQUENCY RANGE 540-1620 kc. AUDIO OUTPUT 3 watts OPERATING VOLTAGE 105-120 volts, 60 cycles, a.c. POWER CONSUMPTION Radio Position 35 watts Phonograph Position 60 watts INTERMEDIATE FREQUENCY 455 kc. AERIAL Built in high-impedance loop; provision for external aerial	
PHILCO TUBES (5)	
PHONOGRAPH	MODEL 52-1340 TP1-1836



Figure 1. Drive-Cord Installation Details

TP1-1835

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# ALIGNMENT PROCEDURE

DIAL POINTER—Turn tuning condenser to fullmesh position. Set dial pointer to index mark, located to left of "55".

CONTROLS—Set volume control to maximum, radiophono switch to RADIO position, and tuning control as indicated in chart. OUTPUT METER—Connect across voice-coil terminals.

SIGNAL GENERATOR—Ground lead to B-, and output lead as indicated in chart.

OUTPUT LEVEL—During alignment, attenuate signal-generator output to hold output-meter indication below 1.25 volts.



Figure 2. Base View, Showing Parts Placement and Alignment Points

# ALIGNMENT CHART

	SIGNAL GENERA	ATOR		ADULCT			
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS			
1	Through $\alpha$ .01- $\mu$ f. condenser to pin 6 of 7A8 converter tube.	455 kc.	Gang fully open.	Adjust, in order given, for maximum output. TC2 and TC4 are located at top of transformers.	TC4—2nd i-f sec. TC3—2nd i-f pri. TC2—1st i-f sec. TC1—1st i-f pri.		
2	Radiating loop (see note below).	1600 kc.	1600 kc.	Adjust for maximum.	C1B—osc. trimmer		
3	Same as step 2.	1500 kc.	1500 kc.	Adjust for maximum.	ClĀ—ant. trimmer		

RADIATING LOOP: Make up a 6 to 8 turn, 8-inch-diameter loop from insulated wire, connect to signal generator output leads, and place near radio loop.

#### World Radio History



Figure 3. Philco Radio-Phonograph Model 52-1340, Schematic Diagram

w

World Radio History

MODEL 52-1340

# **REPLACEMENT PARTS LIST**

NOTE: Part numbers marked with an asterisk (*) are general replacement items. These numbers may not be identical with those on factory assemblies: also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation of the receiver will be either unchanged or improved. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.
Cl	Condenser, tuning gang	31-2751-9
C1A	Condenser, trimmer, aerial	Part of Cl
CIB	Condenser, trimmer, osc	Part of Cl
C2	Condenser, osc. grid, d-c blocking, 47 μμf60-	00515307*
C3	Condenser, temperature compensating, 7.5 µµf3	0-1224-65
C4	Condenser, a-v-c by-pass, .1 µf	61-0113*
C5	Condenser, by-pass, .1 µf	61-0113*
C6	Condenser, screen by-pass, .1 µf	61-0113*
C7	Condenser, cathode by-pass, .05 µf	61-0112
C8	Condenser, coupling, .01 µf	61-0120*
C9	Condenser, dual ceramic	30-1239-4
C9A	Condenser, d-c blocking, .007 µf	Part of C9
C9B	Condenser, r-f by-pass, 220 µµf	Part of C9
C10	Condenser, tone compensation, .0047 µf4	5-3505-56
C11	Condenser, electrolytic, 4-section	0-2575-32*
C11 <b>A</b>	Condenser, cathode by-pass, 25 µfPe	art of C11
CIIB	Condenser, filter, 40 µfPe	art of C11
CIIC	Condenser, filter, 40 µfPe	art of C11
CIID	Condenser, filter, 40 µfPe	art of C11
C12	Condenser, line by-pass, .04 µf3	0-1226-17
C13	Condenser, phono isolation, .01 µf	61-0120*
C14	Condenser, voltage doubling, 20 µf. 200v3	0-2568-22
C15	Condenser, aerial blocking, 5µµf	30-1230
C16	Condenser, high-frequency compensation, 47 µµf60	00515307
C17	Condenser, bass compensation, .0047 µf4	5-3505-56
11	Pilot lamp, type 47	34-2064
Ll	Coil, oscillator	32-4263
LA1	Loop antenna (Code 121)	6-2127-13
LAI	Loop antenna (Code 122)	6-2127-14
LSI	Speaker, 5¼" round	36-1639-1
RI	Resistor, grid return, 100,000 ohms6	6-4108340
R2	Resistor, leakage, 150,000 ohms	6-4158340*
R3	Resistor, dropping, 27,000 ohms6	6-3278340
R4	Resistor, i-f filter, 47,000 ohms6	6-3478340
R5	Resistor, diode return, 470,000 ohms6	6-4478340
R6	Resistor, diode load, 2.2 megohms	6-5228340
R7	Resistor, grid return, 10 megohms6	6-6108340
R8	Volume control, 2 megohms (with switch )	3-5564-11
R9	Resistor, plate load, 470,000 ohms6	6-4478340

Reference Symbol	Service Description Part No	) ) )
R10	Resistor, grid return, 470,000 ohms	•
R11	Resistor, cathode bias, 180 ohms	
R12	Resistor, filter, 5000 ohms	
R13	Resistor, filter, 270 ohms, 2 watts	
R14	Resistor, surge limiting, 880 ohms cold, 100 ohms hot	
R15	Resistor, cathode bias, 180 ohms	l.
R16	Resistor, bass compensation, 68,000 ohms66-3688340	1
R17	Resistor, aerial loading, 150,000 ohms66-4158340	ł
S1	Switch, off-onPart of R8	6
T1	Transformer, output	1
W1	Line cordL2183	1
WS1	Wafer switch, radio-phono	1
<b>Z</b> 1	Transformer, 1st i-f	
Z2	Transformer, 2nd i-f	

# MISCELLANEOUS

Description	Service Part No.
Backplate assembly	
Cabinet, complete, Code 121	
Cabinet, complete, Code 122	
Hinge (2)	
Lid	54-4838
Lid support	
Changer Mounting Hardware	
Sleeve, rubber (3)	
Speed nut (3)	W-2554
Spring, heavy, top (3)	
Spring, light, bottom (3)	56-7059-1FJ47
Dial scale	
Knob, off-on-volume	
Knob, radio-phono	
Knob, tuning	
Pilot-lamp socket assembly	
Fastener, pilot-lamp shield (2)	W2235-1FA9
Pointer	
Spring, pointer drive	
Socket, Loktal (3)	
Socket, octal (2)	
Tuning shaft	



# PHILCO RADIO-PHONOGRAPH MODEL 53-1754



Figure 1. Drive-Cord Installation Details

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# ALIGNMENT PROCEDURE

#### GENERAL

**RADIO CONTROLS**—Set volume control for maximum output, and set tuning control as indicated in the alignment chart. Set band switch to broadcast position for first 5 steps, then to special services position for steps 6 and 7.

OUTPUT INDICATOR-Connect output indicator (either an oscilloscope or a 1000-ohms-per-volt, a-c voltmeter) across voice-coil terminals. SIGNAL GENERATOR—Use an AM r-f generator, connected as indicated in the alignment chart. OUTPUT LEVEL—During alignment, attenuate signal-generator output to maintain output indication below 1 volt.

**DIAL POINTER**—Before the alignment is started, the dial pointer should be set to coincide with the dial scale mark to the left of "55" when the tuning gang is fully meshed.

	SIGNAL GENERATOR		RADIO									
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST							
1	Ground lead to chassis. Output lead through a .01-µf. condenser to pin 7 (mixer grid) of 6BE6, converter.	455 kc.	Tuning gang fully open.	Adjust, in order given in next column, for maximum output.	TC6–2nd i-f sec. TC3–1st i-f pri. TC5–2nd i-f pri. TC4–1st i-f sec.							
2	Radiating loop. See Note 1 below.	1620 kc.	1620 kc. See Note 2 below.	Adjust for maximum output.	C1C-osc. trimmer							
3	Same as step 2.	1520 kc.	Tune radio to generator signal.	Adjust for maximum output. (High-fre- quency adjustment)	C1B-mixer-grid trimmer C1A-r-f trimmer							
4	Same as step 2.	580 ke.	Same as step 3.	Adjust for maximum output. (Low-frequen- cy adjustment)	TC2-r-f trans- former							
5	Repeat steps 3 and 4 until no furth	er improvemer	nt is obtained.									
6	Same as step 2.	3200 kc.	Same as step 3.	Adjust for maximum output.	C10-special serv- ices mixer-grid trimmer C4-special serv- ices r-f trimmer							
7	Same as step 2.	1800 kc.	Same as step 3.	Adjust for maximum output.	C2–special serv- ices r-f padder							

# ALIGNMENT CHART

NOTE 1: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads and place about 1 foot from radio loop antenna. The position of the radio loop with respect to the chassis should be approximately the same as when both are mounted in the cabinet.

NOTE 2: To set the tuning gang to 1620 kc., place a piece of 6-mil flat shim stock beneath the heel of the rotor, and turn the rotor until it holds the shim firmly in place. Then remove the shim.







Figure 3. Base View, Showing Parts Placement

# **REPLACEMENT PARTS LIST**

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No,"

Reference Symbol	Description	Service Part No.	Referenc Symbol	e Description	Service Part No.
CI	Condenser, tuning gang, 3-section	31-2771-3	R10	Resistor, cathode bias, 270 ohms	66-1275340*
CIA	Condenser, trimmer, antenna	Part of C1	R11	Resistor, screen dropping, 68,000 ohms	
C1B	Condenser, trimmer, r-f	Part of C1	R12	Resistor, plate dropping, 10,000 ohms	66-3108340*
C1C	Condenser, trimmer, oscillator	Part of C1	R13	Resistor, i-f filter, 47,000 ohms	66-3478340*
C2	Condenser, padder, special services r-f	Part of CA1	R14	Resistor, diode load, 330,000 ohms	. 66-4338340°
C3	Condenser, d-c blocking, 100 $\mu\mu$ f.	62-110001001°	R15	Resistor, tone compensation (bass boost)	66-3478340*
C4	Condenser, trimmer, special services r-f	Part of CA1	R16	Resistor, tone control, 5 megohms	33-5566-48
C5	Condenser, cathode by-pass, .047 µf.		R17	Resistor, volume control, 2 megohms	33-5535-36
C6	Condenser, screen by-pass, .047 µf.		R18	Resistor, grid leak, 10 megohms	66-6108340°
C7	Condenser, r-f by-pass, 5 µµf.	60-90505020	R19	Resistor, plate load, 220,000 ohms	66-4228340*
C8	Condenser, fixed padder, 944 $\mu\mu$ f.	30-1220-65	R20	Resistor, grid leak, 470,000 ohms	66-4478340*
C9	Condenser, d-c blocking, 100 µµf.	62-110001001*	R21	Resistor, cathode bias, 330 ohms, 1 watt	66-1334340*
C10	Condenser, trimmer, special services mixer-	grid. Part of CA1	R22	Resistor, B ⁺ filter, 1000 ohms	66-2105340*
C11	Condenser, a-v-c by-pass, .047 µf.	30-4650-45*	R23	Resistor, B+ filter, 270 ohms	66-1275340*
C12	Condenser, oscillator coupling, 47 µµf.	60-00475417	R24	Resistor, plate load, preampl., 220,000 ohms	66-4228340°
C13	Condenser, i-f coupling, 220 µµf.	62-122001001*	S1	Switch, off-on	Part of R16
C14	Condenser, screen by-pass, .047 µf.	30-4650-45*	\$2	Switch, off-on, phono motor Part of M-24 I	Record Changer
C15	Condenser, plate by-pass, .01 µf.	30-1238-2*	TI	Transformer, power	
C16	Condenser, audio coupling, .0068 µf.		T2	Transformer, output	32-8242-13
C17	Condenser, tone compensation (bass boost)	,	Т3	Transformer, oscillator	32-4453-2
	.005 μf.		W1	Line cord	L2183*
C18	Condenser, tone compensation, 47 $\mu\mu$ f.	60-00475417	WS1	Switch, band	42-1997
C19	Condenser, tone compensation (high cut) .0	1 μf. 30-1238-2°	ZI	Transformer, r-f	32-4399-7A
C20	Condenser, audio coupling, .005 µf.	30-1238-1*	Z2	Transformer, 1st i-f	32-4160A
C21	Condenser, d-c blocking, .007 µf.	Part of PC1	Z3	Transformer, 2nd i-f	32-4240A
C22	Condenser, r-f by-pass, 220 µµf.	Part of PC1		· · · · · · · · · · · · · · · · · · ·	
C23	Condenser, tone compensation, .0033 $\mu$ f.	30-4650-89*		MISCELLANEOUS	
C24	Condenser, electrolytic filter	30-2584-32	Descriptio	pn	Service
C24A	Condenser, filter, 20 µf.	Part of C24			Part No.
C24B	Condenser, filter, 20 µf.	Part of C24	Cabinet		10985
C24C	Condenser, filter, 40 µf.	Part of C24	Back		54-8932
C24D	Condenser, filter, 10 µf.	Part of C24	Dome (4)		45-6190
C25	Condenser, line by-pass, .01 µf.	30-1238-2	Door pull	(2)	56-7062-1
C26	Condenser, line by-pass, .01 µf.	30-1238-2	Hinge, rig	ht hand (2)	56-0027
C27	Condenser, audio coupling (phono), .005 µf	. 30-1238-1	Hinge, lef	t hand (2)	56.0022.1
C28	Condenser, fixed trimmer, 7.5 uuf.	30-1224-65	Bullet c	atch (2)	45-6002
CAI	Condenser assembly, trimmer	31-6477-17	Strike n	late (2)	45-6002
1	Lamp assembly, pilot (2)	27.6233.4	Chonger f	rome ass'y	76.6600.2
л	Connector, phono input	76-8262-1	Rail as	'v ch (chonger drawer)	74 4507
J2	Connector, phono a-c	76-8366	Roil ass	'v Lb (changer drawer)	76 6359
1	Coil. ontenno	32-4413-2	Spring	changer mtg (3)	54 7050540
12	Coil special services r-f	32.4561.5	Spring,	changer mig. (3)	56 7050 JECD
13	Coil special services mixer avid	22 4541 5	Spring,	changer mig. (3)	54 7700
14	Coil oscillator shunt	22 4542 1	Bull kach	changer mig. (5)	54-7798
141		32-4302-1	FUT KNOD,	changer arawer	
151	Speaker (10")	32-4394-13	Diet beste	γ	
PC1	Printed circuit	30 1220 4			
P1	Peristor r-f. g.y.c. 1 megohm		Clin see		
R2	Peristor cathode big: 92 obm:	44 00202401	Knob (2)		
R3	Resistor screen dropping 22,000 akm	AA 22252401	Kilob (3)		
R4	Resistor, screen gropping, 22,000 onms		5	-44	
P5	Resistor, grid leak, i megonm		opring, sh	arr retaining	28-8610
RÁ	Perinter excillator exist to 1,000 onms		Pointer		
p7	Resistor, oscillator grid leak, 33,000 ohms Peristor, lead (above) 1		Socket (5)		27-6275
b9	Resistor, load (prono), I megohm	66-5108340°	Socket (6A	(VO)	27-6203-14
PO	Posistor and Lat 470.000	00-5228340*	Rubber mo	ount, gang mounting	27-4596
25.0	nearaior, gria reak, 4/0,000 ohms		Tube shiel	d	56-5620FA3

World Radio History



Figure 4. Philco Radio-Phonograph Model 53-1754, Schematic Diagram

6 World Radio History

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TP2-1398



# SERVICE BULLETIN

# SUPPLEMENT TO SERVICE MANUAL PR-2173, FOR MODELS 53-561, 53-562, AND 53-564

#### Additions to Parts List

Cabinet, cherry (Model 53-561)	10925-8
Cabinet, yellow (Model 53-561)	109 <b>25-9</b>
Cabinet, sand (Model 53-562)	10926-16
Backplate, dial	54-4972-3
Cabinet, spruce green (Model 53-562)	10926-17
Backplate, dial	54- <u>4</u> 972-2

#### **Changes to Parts List**

Change part number of R2, Resistor, i-f screen dropping, 4700 ohms from 66-2748340* to 66-2478340*. Change Socket, Part No. 27-6265, to: Socket (12AV6), Part No. 27-6203-14.

# Addition to Schematic Diagram and Parts List

A 220-µµf. by-pass condenser, C22, Part No. 122001001*, was added, between the a-v-c line and B-, to reduce noise on the special services band.

### **Removal of Chassis from Cabinet**

To remove the chassis from the cabinet, proceed as follows:

- 1. Remove the dial cover by loosening the holding screw at the bottom of the cover.
- 2. Remove the pilot light and socket from the pilot-light clip.
- 3. Remove the pointer by pulling it straight away from the cabinet. Use care to avoid bending the pointer.
- 4. Remove the control knobs and the screws from the bottom of the cabinet. The chassis is now free.
- To replace the chassis in the cabinet, reverse the procedure.

To set the pointer to indicate the correct frequency, turn the tuning-control shaft until the tuning gang is fully closed. Then place the pointer on the shaft so that it falls over the index mark directly below the "55" mark.

# SUPPLEMENT TO SERVICE MANUAL PR-2177, FOR MODELS 53-700 AND 53-701

#### **Changes to Specifications**

CIRCUIT, five-tube superheterodyne (pulse rectifier) should be: CIRCUIT, four-tube superheterodyne (plus rectifier).

AERIAL, high-impedance loop; connector for external aerial should be: AERIAL, high-impedance loop.

#### Change to Base View, Figure 1

Remove R9, connected between pin 1 of 35C5, audio output tube, and pin 3 of J1, jack (clock).

# SUPPLEMENT TO SERVICE MANUAL PR-2418, FOR MODELS 53-702, 53-706,

#### Addition to Parts List

**MODEL 53-702** Cabinet, spruce

AND 53-707

10940-4

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### **Change to Specifications**

CIRCUIT, five-tube superheterodyne (plus rectifier) should be: CIRCUIT, four-tube superheterodyne (plus rectifier).

## Change to Base View, Figure 1

Remove R9, connected between pin 1 of 35C5, audio output tube, and pin 3 of J1, jack (clock).

### **Dial-Cord Lengths**

The fo	llowi	ng fi	gure	s gi	ive	the	ler	ngth	is o	f tł	ne	dial	l co	rds	on	each	h m	node	el,	inc	ludi	ng	a 1⁄	4"	loo	p at	each	end.
53-702																												. 103/4″
53-706																												. 161/2"
53-707							, .																					161/2"

# SUPPLEMENT TO SERVICE MANUAL PR-2420, FOR MODEL 53-956

## **Changes to Schematic Diagram and Parts List**

Change cathode by-pass condenser C5, 22  $\mu\mu f$ ., Part No. 62-022009001, to 33  $\mu\mu f$ ., Part No. 62-033009001. Change d-c blocking condenser C6, 220  $\mu\mu f$ ., Part No. 30-6002, to 470  $\mu\mu f$ ., Part No. 62-1475420.

#### Addition to Schematic Diagram and Parts List

Add R31, resistor, FM line-cord antenna, 100 ohms, Part No. 66-1108340*. This resistor is connected from terminal 2 of TB1 in series with LA2, FM line-cord antenna.

#### **Change to Parts List**

Change part number of C38, Condenser, electrolytic, 4-section, from 30-4650-46 to 30-2570-46.

#### **Removal of Chassis from Cabinet**

To remove the chassis from the cabinet, proceed as follows:

- 1. Remove the dial scale by loosening the screw holding the scale.
- 2. Remove the dial pointer by pulling it straight away from the cabinet.
- 3. Do not attempt to remove the knobs from the cabinet. They are secured by a lock-type washer inside the cabinet. Merely remove the knobs from the shafts by pulling away from the cabinet.
- 4. Loosen the screws on the bottom of the cabinet; then remove the chassis from the cabinet.

To replace the chassis in the cabinet, reverse the above procedure.

To set the dial pointer to indicate the correct frequency, turn the tuning control until the tuning gang is fully closed. Place the pointer on the shaft so that it coincides with the index mark at the low-frequency end of the dial.

## SUPPLEMENT TO SERVICE MANUAL PR-2421, FOR MODEL 53-958

# **Change to Schematic Diagram and Parts List**

Change cathode by-pass condenesr C5, 22 µµf., Part No. 62-022009001, to 33 µµf., Part No. 62-033009001.

### Addition to Schematic Diagram and Parts List

Add R31, resistor, FM line-cord antenna, 100 ohms, Part No. 66-1108340*. This resistor is connected from terminal 2 of TB1 in series with LA2, FM line-cord antenna.

# SUPPLEMENT TO SERVICE MANUAL PR-2423, FOR MODEL 53-1750

## **Additions to Parts List**

45-6758
45-6759

#### **Removal of Chassis from Cabinet**

To lift the top to gain access to the radio chassis, merely loosen the screws holding the top in place. These screws are located on the side of the cabinet near the front, beneath the top leaves.

# SUPPLEMENT TO SERVICE MANUAL PR-2178, FOR MODEL M-24 RECORD CHANGER

#### **Changes to Figure 14 and Parts List**

Change Cartridge, Part No. 45-9612, to: Cartridge and needle assembly, Part No. 45-9785.

Change part number of Needle from 45-9588 to 45-9784.



# PHILCO RADIO MODEL 53-559



CABINET CIRCUIT FREQUENCY RANGE	.Four-tube superheterodyne (plus rectifier)
Standard Broadcast	
Special Services	
AUDIO OUTPUT	l watt
OPERATING VOLTAGE	
POWER CONSUMPTION	
ANTENNA	
INTERMEDIATE FREQUENCY	
PHILCO TUBES	E6, converter; 12BA6, i-f amplifier; 12AV6, .c1st audio; 35C5, output; 35W4, rectifier
NOTE The antenna is mounted on the cabinet back, use care to avoid	the cabinet back. When removing the I breaking the antenna leads.

**SPECIFICATIONS** 



### Figure 1. Base View, Showing Parts Placement

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#### **World Radio History**



## Figure 2. Top View, Showing Tuning Adjustments

# ALIGNMENT PROCEDURE

RADIO CONTROLS-Set volume control to maximum. Set tuning control and band switch as indicated in chart.

SIGNAL GENERATOR-Connect generator and set frequency as indicated in chart. Use modulated output.

OUTPUT METER-Connect across voice-coil terminals.

OUTPUT LEVEL—During alignment, adjust signalgenerator output to hold output-meter reading below 1.25 volts.

	SIGNAL GENERATOR					
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND- SWITCH SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Ground-lead to B-; output lead through a .1-µ£. condenser to grid (pin 7) of 12BE6.	455 kc.	Tuning gang fully open	Broadcast	Adjust tuning cores, in order given, for maximum output. (TC1 and TC3 are located at top of transformers.)	TC4—2nd if sec. TC3—2nd if pri. TC2—1st if sec. TC1—1st if pri.
2	Radiating loop (see note below).	1620 kc.	1620 kc.*	Broadcast	Adjust trimmer for maximum output.	C1Bosc.
3	Same as step 2.	1500 kc.	1500 kc.†	Broadcast	Adjust trimmer for maximum output.	ClA-antenna (broadcast)
4	Same as step 2.	3200 kc.	3200 kc.†	Special services	Adjust trimmer for maximum output.	C21—antenna (special services)

## ALIGNMENT CHART

NOTE: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads, and place about 1 foot from radio loop. The position of the radio loop, with respect to the chassis, should be approximately the same as when both are mounted in the cabinet.

* To set the tuning gang to 1620 kc., fully open the tuning gang and insert a .006 inch nonmetallic shim between the heel of the rotor and the top of the stator plates. Close the tuning gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.

† To set the radio to this frequency, place chassis in cabinet, attach knob, and tune until pointer indicates the correct frequency. Then remove knob and take chassis from cabinet without disturbing the setting of the gang.

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MODEL 53-559

# **REPLACEMENT PARTS LIST**

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be either unchanged or improved. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.
Cl	Condenser, tuning gang3	1-2751-13
CIĂ	Condenser, r-f trimmerF	art of Cl
CIB	Condenser, oscillator trimmerF	art of Cl
C2	Condenser, antenna series tracker, 944 µµf	0-1220-65
C3	Condenser, oscillator grid, 47 $\mu\mu$ f	30-1230-4
C4	Condenser, a-v-c by-pass, .05 µf	0-4650-45*
C5	Condenser, drift compensation, 7.5 $\mu\mu$ f3	0-1224-83
C6	Condenser, screen by-pass, .05 µf	0-4650-45°
C7	Condenser, i-f tuningI	Part of Z1
C8	Condenser, i-f tuning	Part of Z1
C9	Condenser, i-f tuningl	Part of Z2
C10	Condenser, i-f tuning	Part of Z2
C11	Condenser, detector filtering	Part of Z2
C12	Condenser, detector filtering	Part of Z2
C13	Condenser, audio coupling, .005 µf	30-1238-1
C14	Condenser, plate by-passPo	rt of PC1
C15	Condenser, audio coupling, .005 µfPo	rt of PC1
C16	Condenser, compensatingPc	rt of PC1
C17	Condenser, tone compensation, .022 µf3	0-4650-43
C18	Condenser, electrolytic, 3-section	30-2573
C18A	Condenser, filter, 30 µf., 150vPo	art of C18
C18B	Condenser, filter, 25 µf., 150vPo	art of C18
C18C	Condenser, filter, 20 µf., 150vPo	art of C18
C19	Condenser, line by-pass, .047 µf3	0-4650-45*
C20	Condenser, B- to chassis, .2 µf	0-4650-49°
C21	Condenser, trimmer, special services3	1-6473-29
C22	Condenser, r-1 by-pass, 220 µµf60-	10225417
Ll	Coil, antenna, special services	32-4561-3
L2	Coil, oscillator shunt	32-4562-2
LA1	LoopPart of cabi	net back
LS1	Speaker, p-m	36-1627-8
PC1	Printed circuit	30-6001
Rl	Resistor, oscillator grid, 22,000 ohms66	-3228340*
R2	Resistor, i-f screen dropping, 4700 ohms66	-2478340*

Reference Symbol	Service Description Part No
R3	Resistor, a-v-c filter, 2.2 megohms
R4	Resistor, volume control, .5 megohm
R5	Resistor, diode load, 47,000 ohms
R6	Resistor, grid return, 10 megohms
R7	Resistor, plate load, 500,000 ohmsPart of PC1
R8	Resistor, grid return, 500,000 ohmsPart of PC1
R9	Resistor, cathode bias, 150 ohms66-1158340
R10	Resistor, B plus filter, 220 ohms
R11	Resistor, B plus filter, 1000 ohms
R12	Resistor, tube saver, 100 ohms
S1	Switch, off-onPart of R4
SW1	Switch, broadcast-special services
T1	Transformer, oscillator
T2	Transformer. output
WI	Line cordL-2183
Z1	Transformer, 1st i-f
Z2	Transformer, 2nd i-f

# MISCELLANEOUS

Description	Part No.
Back-and-loop ass'y.	
Cabinet	
Driftwood	10921-5
Mahogany	10921-6
Dial scale	
Drive cord (25-ft. spool)	
Fastener, back	W2235FA9
Knob, tuning	54-4978-2
Knob, volume	
Shield, tube	56-5629FA3
Socket, tube (4)	
Socket, tube (12AV6)	27-6203-14*



# PHILCO PORTABLE RADIO MODEL 53-652

SPECIFICATIONS	
CABINETPlastic portable CIRCUITFour-tube superheterodyne (plus selenium rectifier)	
AUDIO OUTPUT	
A-C or d-c operation150 milliwatts	
Battery operation90 milliwatts (75 milliwatts: battery-saver operation)	
OPERATING VOLTAGE	
POWER CONSUMPTION	
A-C or d-c operation11 watts	
Battery operation	
ANTENNAMagnecor high-impedance loop with pro- vision for external antenna	
INTERMEDIATE FREQUENCY455 kc.	augurun and a second
PHILCO TUBES	
1U5 detector-a.v.c. 1st audio,	
3V4 output	
BATTERY TYPEP144 "B" battery	TP2-3223
P77 "A" battery	MODEL 53-652



### Figure 1. Dial-Cord Stringing Arrangement

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#### World Radio History

PHILCO PORTABLE RADIO MODEL 53-652



Figure 2. Top View, Showing Tuning Adjustments

# ALIGNMENT PROCEDURE

**GENERAL**—Allow the set and the test equipment to warm up for fifteen minutes before starting the alignment procedure.

**DIAL POINTER**—Before proceeding with the alignment, the dial pointer should be set to coincide with the index mark to the extreme left of the dial backplate when the tuning-condenser plates are fully meshed. See figure 4.

**OUTPUT INDICATOR**—Connect the output indicator (a 1000-ohm-per-volt, a-c voltmeter, or an oscilloscope) across the voice-coil terminals.

SIGNAL GENERATOR-Use an AM r-f signal gen-

erator. Connect the ground lead to  $B_{-}$ , and connect the output lead as indicated in the alignment chart.

OUTPUT LEVEL—Attenuate the signal-generator output throughout the alignment so as to maintain the output level below .5 volt.

**RADIO CONTROLS**—Set the volume control to maximum. Set the tuning control as indicated in the alignment chart. During alignment of the radio, the batteries should be in the same position with respect to the chassis and the loop antenna as they normally are in the cabinet. It is recommended that a-c power be used when aligning the radio.

SIGNAL GENERATOR		ATOR RADIO					
STEP	CONNECTION TO RADIO	CONNECTION TO RADIO DIAL SETTING		DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST	
1	Connect signal generator through a .1-µf. condenser to pin 6 (con- verter grid) of 1R5.	455 kc.		Tuning gang fully open.	Adjust for maximum output in order given.	TC4—2nd i-f sec. TC3—1st i-f sec. TC2—1st i-f pri.	
2	Use radiating loop. (See NOTE l below.)	1620 kc.		1620 kc. (See NOTE 2 below.)	Adjust for maximum output.	C1B—osc. trimmer	
3	Same as step 2.	1400 kc.		1400 kc. (See NOTE 2 below.)	Adjust for maximum output.	ClÅ—antenna trimmer	
4	Same as step 2.	600 kc.		600 kc. (See NOTE 2 below.)	Adjust for maximum output. Rock tuning gang while mak- ing this adjustment.	TC1-osc. core	
5	Repeat steps 2, 3, and 4 until no further improvement is obtained.						

ALIGNMENT CHART

NOTE 1. Use a 6-to-8-turn, 6-inch-diameter loop made up of insulated wire. Connect to generator terminals, and place about one foot from radio loop.

NOTE 2. The tuning condenser can be set to the proper frequency by turning it until the dial pointer coincides with the respective marks on the dial backplate. See figure 2.



Figure 3. Base View, Showing Parts Placement



Figure 4. Dial Backplate, Showing Alignment Marks

**REPLACEMENT PARTS LIST** 

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will either be unchanged or improved. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.	Reference Symbol	Description	Service Part No.
Cl	Condenser, tuning gang	31-2735-4	R17	Resistor, filament dropping, 1500 ohm	s66-2158340*
CIĀ	Condenser, trimmer, antenna	.Part of Cl	R18	Resistor, battery economizer, 330 ohm	s66-1338340*
CIB	Condenser, trimmer, oscillator	.Part of Cl	R19	Resistor, battery economizer, 560 ohm	s66-1568340*
C2	Condenser, i-f neutralizing, 1.5 µµf.	30-1221-7	R20	Resistor, private listening unit, 10 ohn	ns66-0108340*
C3	Condenser, screen by-pass, .004 µf.		SI	Switch, on-off	Part of R8
C4	Condenser, B- to chassis, .1 µf.	30-4650-47*	S2	Switch, battery economizer	
C5	Condenser, d-c blocking, 47 µµf.	60-00475420°	T1	Transformer, oscillator	
C6	Condenser, grid by-pass, .004 µf.		T2	Transformer, output	
C7	Condenser, temperature compensating.		W1	Line cord	<b>L</b> 2183°
	7.5 μμf	30-1224-83	WS1	Switch, wafer, battery to line	
C8	Condenser, filament by-pass, .25 µf	30-4656-1	Z1	Transformer, 1st i-f	32-4160-4A
C9	Condenser, neutralizing, 1.5 µµf	30-1221-7	Z2	Transformer, 2nd i-f	32-4454-1A
C10	Condenser, audio circuit	30-1237			
C10A	Condenser, audio coupling, .001 µf	Part of C10			
C10B	Condenser, screen by-pass, .01 µf	Part of C10		MISCELLANEOUS	
C10C	Condenser, d-c blocking, .002 uf	Part of C10			
CIOD	Condenser, grid by-pass, 220 µµf	Part of C10			Service
C11	Condenser, tone compensation, .004 $\mu$ f	30-4650-56*	Description		Part No.
C12	Condenser, electrolytic, filament by-pas 50 µf.	s. 30-2417-12	Cabinet, lig	ht beige	
C13	Condenser, electrolytic, filter	30-2568-39	Back, c	abinet, light beige	
C13Å	Condenser, filter, 40 µf.	Part of C13	Handle,	, cabinet, light beige	
C13B	Condenser, filter, 10 µf.	Part of C13	Cabinet, sp	ruce green	10954-2
C13C	Condenser, filter, 50 µf	Part of C13	Back, c	abinet, spruce green	
C14	Condenser, line by-pass, .047 µf.	30-4650-45*	Handle,	, cabinet, spruce green	
C15	Condenser, a-v-c by-pass05 µl	30-4650-45*	Cable, batte	эгу	
CRI	Rectifier, selenium	34-8003	Clip, cabine	et back (2)	
J1	Private listening unit	42-1975-2	Dial scale		56-9986
LAI	Coil, antenna	32-4455-9	Backplo	rte assembly, dial	
LS1	Loudspeaker		Window	v, dial	54-6011
R1	Resistor, filament dropping, 820 ohms	66-1828340*	Drive cord,	25-ft. spool	45-8750*
R2	Resistor, grid leak, 68,000 ohms	66-3688340*	Spring,	gang drive	
R3	Resistor, cathode bias, 470 ohms	66-1478340*	Spring,	pointer drive	
R4	Resistor, B- to chassis, 150,000 ohms	66-4158340*	Fastener, sp	beaker baffle (2)	W2235-7FA9
R5	Resistor, screen dropping, 15,000 ohms	66-3158340*	Hinge, cabi	net (2)	56-5457
R6	Resistor, grid leak, 3.3 megohms	66-5338340°	Insulator, tu	ning-condenser mtg	
R7	Resistor, a-v-c load, 2.2 megohms	66-5228340*	Knobs, (2) li	ight beige or spruce green	54-6016
R8	Volume control, 1 megohm	33-5566-21	Pointer ass	embly	
R9	Resistor, grid leak, 4.7 megohms	66-5478340*	Ring, handl	e mtg. (2)	
R10	Resistor, screen dropping, 4.7 megohms	66-5478340*	Rubber mou	unt, tuning-condenser mtg. (3)	27-4099-3
R11	Resistor, plate load, 680,000 ohms	66-4688340*	Shaft, tunin	g	56-7906FA42
R12	Resistor, grid leak, 2.2 megohms	66-5228340*	Shield, tube	e base	56-3978-1FA3
R13	Resistor, filament dropping, 2200 ohms	66-2228340*	Socket, tube	(2)	
R14	Resistor, limiting, 2100 ohms	33-3445	Socket, tube	ə (2)	27-6203-12
R15	Resistor, B+ filter, 820 ohms	66-1828340*	Spring, hair	pin, shaft mtg	
R16	Resistor, limiting, 120 ohms	33-1334-14	Spring, reta	lining	57-1868FA11

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Figure 5. Philco Portable Radio Model 53-652, Schematic Diagram







# SERVICE BULLETIN FOR PHILCO RADIO-CLOCK MODEL 53-800

Philco Radio-Clock Model 53-800 is identical to Philco Radio-Clock Model 53-804 except for the changes listed below. For specifications, alignment instructions, schematic diagram, base and top views, and parts list, refer to the service manual for Model 53-804, manual number PR-2424.

Description Servic		
Bezel, clock	28-9128	
Bezel, radio	<b>28-9128-1</b>	
Ring, bezel	<b>28-9171</b>	
Cabinet	10970	
Back and loop assembly	76-8204	
Clock	41-2044	
Cover, clock	54-4989	
Knob, clock (3)	54-4983-4	
Crystal, dial (plastic window)	54-6032	
Dial scale and backplate assembly	76-8205	
Grille, screen	28-9156	
Knob (2)	54-6035	
Pointer	27-4891-3	

# Replacement Parts List Changes For Model 53-800

PR-2437

World Radio History

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# HOME RADIO

# PHILCO HOME RADIO MODEL 53-565



CABINET Molded plastic CIRCUIT Four-tube superheterodyne (plus rectifier) FREQUENCY RANGE Standard Broadcast 540 kc. to 1620 kc. **Special Services** 1700 kc. to 3400 kc. AUDIO OUTPUT 1 watt OPERATING VOLTAGE 105 to 120 volts, a.c. or d.c. POWER CONSUMPTION 30 watts ANTENNA High-impedance loop INTERMEDIATE FREQUENCY 455 kc. -PHILCO TUBES 12BE6, converter; 12BA6, i-f amplifier; 12AV6, det .--- a.v.c.--- 1st audio; 35C5, output; 35W4, rectifier Note: The antenna is mounted on the cabinet back. When removing the cabinet back, use care to avoid breaking the antenna leads.

**SPECIFICATIONS** 



Figure 1. Dial-Cord Installation Details

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**Top View, Showing Tuning Adjustments** Figure 2.

#### TP2-1407

## ALIGNMENT PROCEDURE

RADIO CONTROLS-Set volume control to maximum. Set tuning control and band switch, SW1, as indicated in chart.

**OUTPUT METER-Connect across voice-coil** terminals.

SIGNAL GENERATOR-Connect generator and set frequency as indicated in chart. Use modulated output.

OUTPUT LEVEL-During alignment, adjust signalgenerator output to hold output-meter reading below 1.25 volts.

## ALIGNMENT CHART

	SIGNAL GENERATOR			RADI	0	
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND- SWITCH SETTING	SPECIAL INSTRUCTIONS	ADJUST
I	Ground lead to B—; output lead through a $.1-\mu f$ . condenser to grid (pin 7) of 12BE6.	455 kc.	Tuning gang fully open.	Broadcast	Adjust tuning cores, in order given, for maximum output. (TC1 and TC3 are located at top of transformers.)	TC4–2nd i-f sec. TC3–2nd i-f pri. TC2–1st i-f sec. TC1–1st i-f pri.
2	Use radiating loop (see NOTE below).	1620 kc.	° 1620 kc.	Broadcast	Adjust trimmer for maximum output.	C1B-osc.
3	Same as step 2.	1500 kc.	†1500 ke.	Broadcast	Adjust trimmer for maximum output.	C1A—antenna (broadcast)
4	Same as step 2.	3200 kc.	†3200 kc.	Special services	Adjust trimmer for maximum output.	C21—antenna (special services)

NOTE: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads and place about 1 foot from radio loop. The position of the radio loop with respect to the chassis should be approximately the same as when both are mounted in the cabinet.

• To set the tuning gang to 1620 kc., fully open the gang and insert a .006-inch nonmetallic shim between the heel of the rotor and the top of the stator plates. Close the gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.

*†* To set the tuning gang to this frequency, put the chassis into the cabinet, tune the dial until it indicates the proper frequency on the dial scale, and then remove the chassis from the cabinet without disturbing the gang setting.



Figure ω Philco Radio Model 53-565, Schematic Diagram

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MODEL

53-565



Figure 4. Base View, Showing Parts Placement

TP2-1406

# **REPLACEMENT PARTS LIST**

NOTE: Part numbers identified by an asterisk (°) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be unchanged. When ordering replacements, use only the "Service Part No."

Referen Symbol	ce Description	Service Part No.	Reference Symbol	Description	Service Part No
C1	Condenser, tuning gang	31-2751-14	R3	Resistor, a-v-c filter, 2.2 megohms	66-5228340*
CIA	Condenser, antenna trimmer	Part of C1	R4	Resistor, volume control	33-5566-41
C1B	Condenser, osc. trimmer	Part of C1	R5	Resistor, diode load, 47,000 ohms	66-3478340*
C2	Condenser, antenna series tracker, 944 µµf.	30-1220-65	R6	Resistor, grid return, 10 megohms	66-6108340*
C3	Condenser, oscillator grid, 47 µf.	30-1230-4	R7	Resistor, plate load, 500,000 ohms	Part of PC1
C4	Condenser, a-v-c by-pass, .05 µf.	30-4650-45°	R8	Resistor, grid return, 500,000 ohms	Part of PC1
C5	Condenser, drift compensation, 7.5 µµf.	30-1224-83	R9	Resistor, cathode bias, 150 ohms	66-1158340*
C6	Condenser, screen by-pass, .05 µf.	30-4650-45°	R10	Resistor, B plus filter, 220 ohms	66-1224340*
C7	Condenser, i-f tuning	Part of Z1	R11	Resistor, B plus filter, 1000 ohms	66-2108340*
C8	Condenser, i-f tuning	Part of Z1	R12	Resistor, tube saver, 100 ohms	33-1343-3
C9	Condenser, i-f tuning	Part of Z2	S1	Switch, off-on	Part of R4
C10	Condenser, i-f tuning	Part of Z2	SW1	Switch, broadcast-special services	42-1796-2
C11	Condenser, detector filtering	Port of Z2	TI	Transformer, oscillator	32-4453-6
C12	Condenser, detector filtering	Part of Z2	T2	Transformer, output	
C13	Condenser, audio coupling, .005 µf.	30-1238-1	WI	Line cord	L-2183*
C14	Condenser, plate by-pass	Part of PC1	Z 1	Transformer, 1st i-f	. 32-4161A
C15	Condenser, audio coupling, .005 µf.	Part of PC1	Z2	Transformer, 2nd i-f	32-4240A
C16	Condenser, compensating	Part of PC1			
C17	Condenser, tone compensation, .022 µf.	30-4650-43*		MISCELLANEOUS	
C18	Condenser, electrolytic, 3-section	30-2575-34			Service
C18A	Condenser, filter, 30 µf., 150v	Part of C18	Description	on	Part No.
C18B	Condenser, filter, 25 µf., 150v	Part of C18	Cabinet		
C18C	Condenser, filter, 20 µf., 150v	Part of C18	Spruc	e	10927-4
C19	Condenser, line by-pass, .05 µf.	30-4650-45*	Ebony		10927
C20	Condenser, B- to chassis, .1 µf.	30-4650-47*	Back-and-I	oop assembly	76.7769
C21	Condenser, trimmer, special services	31-6473-29	Knob (2)		54-4982-1
11	Lamp, pilot	34-2068	Drive cord	1. 25-foot spool	45-8750*
LA1	Loop, antenna Part of	f cabinet back	Pointer, d	ial .	54.4979
L1	Coil, antenna, special services	32-4561-3	Shaft, tun	ing	56-9807FA11
L2	Coil, oscillator shunt	32-4562-2	Socket as	embly, pilot lamp	27-6233-6
LSI	Speaker, p-m	36-1625-3	Socket, 7-	pin miniature	27-6265*
PCI	Printed circuit	30-6001	Socket (12	(AV6)	27-6203-14*
R1	Resistor, oscillator grid, 22,000 ohms	66-3228340*	Spring, re	taining	28-8610
R2	Resistor, i-f screen dropping, 4700 ohms	66-2478340°	Spring, di	al cord	56-2617

PR-2480



# PHILCO RADIO-CLOCK MODEL 53-701X



TP2-3233

MODEL 53-701X SPECIFICATIONS

CABINET
CIRCUIT
FREQUENCY RANGE
AUDIO OUTPUT
OPERATING VOLTAGE
POWER CONSUMPTION
ANTENNA

INTERMEDIATE FREQUENCY 12AV6, det.-a.v.c.-1st audio; 35C5, output; 35W4, rectifier

NOTE: The antenna is mounted on the cabinet back. When removing the cabinet back, use care to avoid breaking the antenna leads.



#### Figure 1. Base View, Showing Parts Placement

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PHILCO RADIO-CLOCK MODEL 53-701X

# ALIGNMENT PROCEDURE

**RADIO CONTROLS**—Set volume control to maximum. Set tuning control as indicated in chart.

**OUTPUT METER**—Connect across voice-coil terminals. SIGNAL GENERATOR—Connect generator and set frequency as indicated in chart. Use modulated output.

**OUTPUT LEVEL**—During alignment, adjust signalgenerator output to hold output-meter reading below 1.25 volts.

## ALIGNMENT CHART

SIGNAL GENERATOR			RADIO		
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Ground lead to $B-$ ; output lead through a .1- $\mu$ f. condenser to grid (pin 7) of 12BE6.	455 kc.	Tuning gang fully open.	Adjust tuning cores, in order given, for maximum output. (TC1 and TC3 are located at top of transformers.)	TC4—2nd i-f sec. TC3—2nd i-f pri. TC2—1st i-f sec. TC1—1st i-f pri.
2	Radiating loop (see note below).	1620 kc.	1620 kc.*	Adjust trimmer for maximum output.	C1B—osc.
3	Same as step 2.	1500 kc.	1500 kc.†	Adjust trimmer for maximum output.	C1Ā—antenna

NOTE: Make a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads, and place about 1 foot from radio loop. The position of the radio loop with respect to the chassis should be approximately the same as when both are mounted in the cabinet.

• To set the tuning gang to 1620 kc., fully open the gang and insert a .006-inch, nonmetallic shim between the heel of the rotor and the top of the stator places. Close the gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.

⁺To set the radio to 1500 kc., place chassis in cabinet, attach knob to indicate previous setting of 1620 kc., and tune until pointer indicates 1500 kc. Then remove knob and take chassis from cabinet without disturbing gang setting.



Figure 2. Top View, Showing Tuning Adjustments

TP2-3232





MODEL 53-701X

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# **REPLACEMENT PARTS LIST**

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be either unchanged or improved. When ordering replacements, use only the "Service Part No."

Reference Symbol	Service Description Part No.
C1	Condenser, tuning gang31-2751-13
CIĀ	Condenser, r-f trimmerPart of Cl
CIB	Condenser, oscillator trimmerPart of Cl
C2	Condenser, B - to chassis, .2 µf
C3	Condenser, oscillator grid, 47 $\mu\mu$ f
C4	Condenser, a-v-c by-pass, .05 µf
C5	Condenser, drift compensation, 7.5 $\mu\mu f.$ 30-1224-83
C6	Condenser, screen by-pass, .05 µf
C7	Condenser, i-f tuningPart of Z1
C8	Condenser, i-f tuningPart of Z1
C9	Condenser, i-f tuningPart of Z2
C10	Condenser, i-f tuningPart of Z2
C11	Condenser, detector filteringPart of Z2
C12	Condenser, detector filteringPart of Z2
C13	Condenser. audio coupling, .005 µf30-1238-1
C14	Condenser, plate by-passPart of PC1
C15	Condenser, audio coupling, .005 µfPart of PC1
C16	Condenser, compensatingPart of PC1
C17	Condenser, tone compensation, .022µf30-4650-43
C18	Condenser, electrolytic, 3-section
C18A	Condenser, filter, 30 µf., 150vPart of C18
C18B	Condenser, filter, 25 µf., 150vPart of C18
C18C	Condenser, filter, 20 µf., 150vPart of C18
C19	Condenser, line by-pass, .047 µf
I1	Lamp, pilot
Л	Jack, clock
J2	Jack, appliance receptacle, a-c
LA1	LoopPart of cabinet back
LSI	Speaker, p-m
PC1	Printed circuit
PL1	Plug, clock assembly27-6273
Rl	Resistor, oscillator grid, 22,000 ohms66-3228340
R2	Resistor, i-f screen dropping, 4700 ohms66-2478340

Reference Symbol	Service Description Part No.
R3	Resistor, a-v-c filter, 2.2 megohms
R4	Resistor, volume control, .5 megohm33-5566-41
R5	Resistor, diode load, 47,000 ohms66-3478340*
<b>R</b> 6	Resistor, grid return, 10 megohms
R7	Resistor, plate load, 500,000 ohmsPart of PC1
R8	Resistor, grid return, 500,000 ohmsPart of PC1
R9	Resistor, cathode bias, 150 ohms66-1158340*
R10	Resistor, B plus filter, 220 ohms, 1 watt66-1224340*
R11	Resistor, B plus filter, 1000 ohms66-2108340*
R12	Resistor, tube saver, 100 ohms
T1	Transformer, oscillator
T2	Transformer, output
W1	Line cordL2183*
Z1	Transformer, 1st i-f
Z2	Transformer, 2nd i-i

# MISCELLANEOUS

Description	Service Part No.
Cabinet	
Knobs	
Clock (4 required)	
Station selector	
Off-on	
Clock	
Back-and-loop assembly	
Shield, tube	56-5629FA3
Clip, pilot lamp	W2563FA3
Socket, miniature (5 required)	
Socket assembly, pilot lamp	
Window, radio dial	

#### World Radio History


### PHILCO HOME RADIO MODEL 53-568



MODEL 53-568

SPECIFICATIO	ONS
CABINET CIRCUIT Four-tub FREQUENCY RANGE	Molded plastic e superheterodyne (plus rectifier)
Standard Broadcast Special Services AUDIO OUTPUT	
POWER CONSUMPTION ANTENNA	
PHILCO TUBES	erter; 12BA6, i-f amplifier; 12AV6 dio; 35C5, output; 35W4, rectifier
NOTE: The antenna is mounted on the cabin cabinet back, use care to avoid breakin	net back. When removing the g the antenna leads.



#### Figure 1. Dial-Cord Installation Details

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### ALIGNMENT PROCEDURE

**RADIO CONTROLS**—Set volume control to maximum. Set tuning control and band switch, SW1, as indicated in chart.

**OUTPUT METER**—Connect across voice-coil terminals. SIGNAL GENERATOR—Connect generator and set frequency as indicated in chart. Use modulated output.

**OUTPUT LEVEL**—During alignment, attenuate signal-generator output to hold output-meter reading below 1.25 volts.

### ALIGNMENT CHART

	SIGNAL CENERATOR		RADIO				
STEP	CONNECTION TO RADIO	DIAL	DIAL	BAND- SWITCH SETTING	SPECIAL INSTRUCTIONS	ADJUST	
1	Ground-lead to B-; output lead through a .1-µf. condenser to grid (pin 7) of 12BE6.	455 kc.	Tuning gang fully open.	Broadcast	Adjust tuning cores, in order given, for maximum output. (TC1 and TC3 are located at top of transformers.)	TC4—2nd i-f sec. TC32nd i-f pri. TC2—1st i-f sec. TC1—1st i-f pri.	
2	Radiating loop (see NOTE below).	1620 kc.	1620 kc.*	Broadcast	Adjust trimmer for maximum output.	ClBosc.	
3	Same as step 2.	1500 kc.	1500 kc.†	Broadcast	Adjust trimmer for maximum output.	ClĂ—antenna (broadcast)	
4	Same as step 2.	3200 kc.	3200 kc.†	Special services	Adjust trimmer for maximum output.	C21—antenna · (special services)	

NOTE: Make up a 6-8 turn, 6-inch diameter loop from insulated wire; connect to signal-generator leads, and place 1 foot from radio loop. The position of the radio loop (LA1) with respect to the chassis, should be approximately the same as when both are mounted in the cabinet.

* To set the tuning gang to 1620 kc., fully open the tuning gang and insert a .006-inch nonmetallic shim between the heel of the rotor and the top of the stator plates. Close the tuning gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting. Then proceed with the remainder of step 2.

† Place radio chassis in cabinet and set pointer to proper frequency; then remove chassis and proceed with adjustment of designated trimmer.



Figure 2. Base View, Showing Placement of Parts

TP2-3195

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Figure 3. Philco Radio Model 53-568, Schematic Diagram

MODEL 53-568

TP2-3192

w



TP2-3196

Service

### Figure 4. Top View, Showing Trimmer Locations

### **REPLACEMENT PARTS LIST**

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may dif-fer from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will be either unchanged or improved. When ordering replacements, use only the "Service Part No."

Reference Symbol	Description	Service Part No.	Reference Symbol	Description
Cl	Condenser, tuning gang	31-2751-15	R6	Resistor, grid return, 10 megoh
CIA	Condenser, antenna trimmer	Part of Cl	R7	Resistor, plate load, 500,000 oh:
CIB	Condenser, osc. trimmer	Part of C1	R8	Resistor, grid return, 500,000 ol
C2	Condenser, aerial series tracker, 944 µ	μf30-1220-65	R9	Resistor, cathode bias, 150 ohm
C3	Condenser, oscillator grid, 47 µµf		R10	Resistor, B plus filter, 220 ohm
C4	Condenser, a-v-c by-pass, .05 µf	30-4650-45	R11	Resistor, B plus filter, 1000 oh
C5	Condenser, drift compensation, 7.5 $\mu\mu$	30-1224-83	R12	Resistor, tube saver, 100 ohms
C6	Condenser, screen by-pass, .05 µf	30-4650-45	S1	Switch, off-on
C7	Condenser, i-f tuning	Part of Z1	SW1	Switch, broadcast-special servi
C8	Condenser, i-f tuning	Part of Z1	T1	Transformer, oscillator
C9	Condenser, i-f tuning	Part of Z2	T2	Transformer, output
C10	Condenser, i-f tuning	Part of Z2	W1	Line cord
C11	Condenser, detector filtering	Part of Z2	Z1	Transformer. 1st i-f
C12	Condenser, detector filtering	Part of Z2	Z2	Transformer, 2nd i-f
C13	Condenser, audio coupling, .005 µf.	30-1238-1		
C14	Condenser, plate by-pass	Part of PC1		
C15	Condenser, audio coupling, .005 uf.	Part of PC1		MISCELLANEOUS
C16	Condenser, compensating	Part of PC1		
C17	Condenser, tone compensation, 022	d 30.4650		
C18	Condenser, electrolytic, 3-section	30.2753	Description	
C18Ă	Condenser, filter, 30 uf., 150v	Part of C18		
C18B	Condenser, filter 25 uf 150v	Part of C19	Cabinat an	
C18C	Condenser, filter 20 uf 150v	Part of C19	Cabinet, gra	bask and least second la
C19	Condenser line by pass 05 of	20 4650 45	Cabinel	l back-ana-loop assembly
C20	Condenser B- to chassis 1 ut	20 4650 47*	Dial	Dinet Dack
C21	Condenser trimmer special services	21 6472 20	Diai scale	A
C22	Condenser of hunges	ED 10005417	васкріс	
0	Lamp pilot	24 2000	Clip, sc	ale mounting (4 required)
11	Bracket and socket assembly, phone		Knob (2 req	uired)
	Coil gntenng special services		Drive cord	(25-toot spool)
1.2	Coil oscillator shurt		Pointer, dia	· · · · · · · · · · · · · · · · · · ·
LAI	Loop gatanag		Hail as	sembly, pointer
LSI	Specker nm		Shaft, tunin	g
PCI	Printed circuit		Socket asse	mbly, pilot lamp
RI	Registor oscillator avid 22,000 -1		Bracket and	clip, pilot lamp
R2	Besistor if scroop dropping 4700		Socket, 7-pin	n miniature (4 required)
83	Bosistor, aug filter 2.2 man	s	Socket (12A)	V6)
R/	Resistor, u-v-c liller, Z.Z megohms		Shield, tube	
RS	Register diede land 47.000		Spring	
	nesision, aloae load, 47,000 ohms	66-3478340"	Spring, reta	ining

eference Symbol	Description	Service Part No.
6	Resistor, grid return, 10 megohms	66-6108340*
7	Resistor, plate load, 500,000 ohms	Part of PC1
8	Resistor, grid return, 500,000 ohms	Part of PC1
9	Resistor, cathode bias, 150 ohms	66-1158340*
10	Resistor, B plus filter, 220 ohms	66-1224340*
11	Resistor, B plus filter, 1000 ohms	66-2108340*
12	Resistor, tube saver, 100 ohms	
1	Switch, off-on	Part of R4
W1	Switch, broadcast-special services	
1	Transformer, oscillator	
2	Transformer, output	
/1	Line cord	L-2183*
1	Transformer. 1st i-f	32-4161A
2	Transformer, 2nd i-f	32-4240A

Description	Part No
Cabinet, gray	
Cabinet back-and-loop assembly	
Cabinet back	
Dial scale	
Backplate, dial	
Clip, scale mounting (4 required)	1W60211FE7
Knob (2 required)	
Drive cord (25-foot spool)	
Pointer, dial	
Rail assembly, pointer	
Shaft, tuning	
Socket assembly, pilot lamp	
Bracket and clip, pilot lamp	
Socket, 7-pin miniature (4 required)	
Socket (12AV6)	
Shield, tube	
Spring	
Spring, retaining	



## HOME RADIO SERVICE BULLETIN

### PRODUCTION CHANGES and CRITICAL LEAD DRESS INFORMATION

(Complete to March 31)

DATE - 4-1-52

### Supplement to PR-1949, Service Manual for Models 52-540, 52-541 & 52-542

### LEAD DRESS

- 1—All wiring and components must be dressed away from R14, the 220 ohm filter resistor, and R12, the 130 ohm output tube cathode resistor.
- 2—C6, the 12AV6 grid coupling condenser, must be dressed against front of chassis, away from C8, the output tube plate by-pass condenser. This is to prevent audio regeneration.
- 3—The white lead from 2nd IF transformer to volume control must be dressed to chassis, and away from rectifier socket and its components. This is to reduce hum.
- 4—Tube saver resistor must be dressed up and away from chassis and all wiring must be dressed away from the resistor.
- 5—Dress pilot light leads up from chassis and away from 12AV6 tube socket and volume control. This is to reduce hum.
- 6—The loop must be wired as follows: loop lead from back or rear edge of cabinet must wire to the antenna section of the tuning condenser, the inner lead wires to frame lug of tuning condenser.

#### PRODUCTION CHANGES MODEL 52-540, CODE 122

Run #2—To improve sensitivity, R3, the screen dropping resistor, was changed in value to 33,000 ohms, part number 66-3338340.

Run #3-Wiring change to facilitate production. No change in manual.

#### Models 52-541 and 52-542

Run #2—Start of Production. No Run #1 manufactured. Run #3—Wiring change to facilitate production. No change in manual.

### Supplement to PR-1950, Service Manual for Model 52-544 Code 121

### PRODUCTION CHANGES __ Run #1 only

CODE 122-

This code incorporates the "tube saver" resistor. The changes are as follows: The resistor, Part No. 33-1343-3, is wired across a three lug terminal panel at the oscillator end of the chassis. Electrically, this resistor is in the series filament string between the output tube, which is now a 35L6GT, and the 12BA6, IF amplifier.

### Code 122—Run #1 only manufactured.

### Supplement to PR-1954, Service Manual for Model 52-548

#### LEAD DRESS

- 1-Dress all wiring and components away from R14, the "tube saver" resistor.
- 2-Dress R14 up from chassis to prevent shorts to chassis.
- 3—Dress all wiring and components away from R12, the 220 ohm filter resistor.
- 4—Lead from oscillator section of tuning condenser to wiring panel must be dressed down below bottom edges of chassis to prevent frequency shift in mounting.
- 5—White and green audio leads to volume control must be dressed into corner of chassis to reduce hum pickup.
- 6—Dress blue lead from T1, the output transformer, underneath R11, the 150 ohm cathode resistor, and then to pin 7 of the 50C5. This is to prevent audio oscillation.

### PRODUCTION CHANGES- None Run #1 only

### Supplement to PR-1951, Service Manual for Models 52-640 and 52-641

Run #2-Same as Run #1.

Run #3-R11, 1U5 plate load resistor is changed to 680,000 ohms, Part No. 66-4688340.



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### SERVICING HINTS ON OVEN UNITS

All Philco oven units are the removable type. To the newcomer in electric range servicing, this means that, unlike the fixed or stationary units in older type ranges, both our upper (Broil) and lower (Bake) oven units and the oven receptacles are the push-in type, and either unit can easily be pulled out completely free from the oven.

The lower or (Bake) units in all Philco Ranges also have a removable baffle. These baffles have two bent tabs which hook over the front of the unit frame and a slot at the rear which fits over a wing nut. If the range user has some baking spill-over, she can turn the wing nut and lift off the baffle for cleaning. If the spill-over runs down to the bottom of the oven liner or if the liner is greasy from roast spattering, the user will want to remove the unit to clean the oven. To do so, it is only necessary to grasp the front of the unit by its handles or by the curved end of the baffle and pull out the unit.

The baffle and frame of the unit can be cleaned or wiped but no attempt should be made to scrape or wipe the heating coil. As the coil gets red hot, any grease or spillage will always burn itself off. This also applies to the upper unit which can be removed the same as the lower unit, whenever it is necessary to clean the top of the oven liner.

On new installations, instructions or educational service calls, to render that extra service which pays good dividends, it is a good idea to remove the oven units and check the alignment of the unit prongs. As the unit is pushed rearward between the guides on the liner, watch how the prongs line up with the receptacle holes. Each prong can be bent separately to better the alignment or the whole prong block can

# THE AIR CONDITIONING AND REFRIGERATION SERVICEMAN



Probably the most important function of the Air Conditioner & Refrigeration serviceman is establishing customer confidence in himself and in the retail appliance dealer and his service organization. The serviceman can rapidly gain or lose business standing for himself and the dealer, by his attitude, his appearance, and his degree of competence as evidenced by the manner in which he does his work.

A neat appearance, both in the person of the serviceman and in his tools and service equipment, gives the customer the immediate



impression that the serviceman is an expert, and represents a highquality sales and service organization.

His equipment should contain all the tools and test equipment necessary for competent, speedy, service work.

Upon receipt of a call from the customer, prompt action should be taken. If you force him to wait an extended length of time before taking action, you will destroy his confidence. All promises should be kept. Therefore, make only reasonable ones, then spare no effort in living up to them. Broken promises quickly shatter confidence.



Courtesy is a must in meeting the customer. Never engage in an argument, even though you know that the customer is wrong. The serviceman's prime function, after all, is to render speedy, competent service. Do not hesitate to admit a mistake, since your customer will respect your truthfulness, and will call you again.

Always try to have the customer in attendance while tests and inspections are being made. It is poor policy to work on an appliance in the home unless the customer or one of his family is present.

Be extremely careful to avoid damaging any article in the customer's home.

(Continued on page 2)

# ADJUSTING AUTO RADIO ANTENNA COMPENSATORS

As in any radio, the antenna stage circuitry and performance are affected by the antenna and lead-in. In designing the front end of an auto radio, the capacitance of the antenna, the antenna to car body, and the lead to braid ground must be taken into consideration as part of the tuning capacitance. These factors are as much a part of the antenna tuning circuit as the coil and fixed padder and probably of more importance than such items as tube input capacity and wiring capacity. These capacitive effects are shown in the accompanying illustration.

The antenna tuning circuit is designed with less capacity than is necessary for the circuit to tune. The remaining capacity is made up by  $C_1$ ,  $C_2$ , and  $C_3$ . The mid-point value of  $C_1$  is chosen so that it, added to the average values of  $C_2$ and  $C_3$  in various installations, will make up the remaining necessary capacitance. Since all values were chosen with reference to the midpoint value of  $C_1$ ,  $C_1$  can be adjusted to compensate for variations of individual radios and installations.

Therefore, for the set to operate at maximum efficiency, the final antenna stage adjustment must be



$$C_{T} = \frac{C_{1} (C_{2} + C_{3})}{C_{1} + (C_{2} + C_{3})}$$

The action of the antenna compensator is quite evident. Its purpose is to equalize the capacitive effects of the antenna system of a particular car to the proper value necessary to make a given radio track properly. This value of external capacitance will vary from car to car as will the value needed by the radio's antenna system due to variations in coil capacity, tube input capacity, distributed wire capacity, etc. When the radio is engineered, a set of average or center line values are established. made with the set installed in the car, the antenna lead-in connected, and the antenna fully extended. This adjustment should be performed by using a weak station at or near 1400 KC; tuning the antenna compensator for maximum.

If this adjustment is not made (even though the radio has been carefully aligned on the bench) the set may not track properly, may suffer great loss of sensitivity and selectivity, and may be noticeably poor on image rejection.

### CONVERSION OF 50-T1600 TYPE CHASSIS TO USE TWO 5U4G RECTIFIER TUBES FOR IMPROVED PERFORMANCE

(Continued from page 2)

NOTE: It is suggested that a label or tag be attached to the chassis in a prominent place to inform future service personnel that the chassis has been modified to use two 5U4G rectifier tubes. The information on the tag or label should also point out that one of the sockets is not used.

As an alternative to the above change, and this is suggested only as a very temporary fix, the three 5Y3 tubes can be removed and replaced with two 5U4 tubes. Do not use a combination of 5Y3 and 5U4 tubes.

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### SERVICING HINTS ON OVEN UNITS (Continued from page 1)

be bent somewhat up or down to make an easier entry. A customer is going to like her range a great deal better if she can easily reinstall the oven units.

When servicing older or out-ofwarranty ranges, the oven unit should always be given top consideration, not only on a non-operating oven complaint, but also on a general check over. In the September issue of the PHILCO SERVICE-MAN, the article on electric ranges stated the first thing to check on a non-operating oven was the position of the "set" knob on the control clock. The next quick service check to be made is to see if the oven unit is pushed completely in position with the terminal block up against the receptacle housing, so the prongs make good contact. Many service calls and burned oven receptacle contacts have resulted from loosely or partially installed oven units.

A good serviceman, doing range service, is in a position to offer that "extra service" and provide range maintenance, by carrying a set of oven receptacle contacts in his kit. These spring contact assemblies, Part No. 179310, only list at a few cents each, so the inventory investment is inconsequential.

In checking an oven there are three items to check: The unit coil, the unit prongs and due to the close

relationship, the unit receptacle contacts.

Turn the unit over and inspect for a broken insulator bead or a sagging section of coil. After a lot of use, the coil loses some of its tension and it may sag between the insulators. If necessary, this can be corrected by disconnecting the nearest prong and re-threading the loose section to take up the slack. On reconnecting, this will not necessitate cutting off more than one or two inches of coil wire which will not appreciably affect the wattage. When re-threading the slack, do not stretch the wire coils.

Loose connections on the prongs are an uncommon condition, but if a prong shows signs of burning, the terminal block should be removed and the prong connections examined.

The receptacle spring contacts can give years of service when the unit prongs make good contact, but will overheat and lose their temper or springiness, from a contact that arcs. They are easily accessible for inspection by removing receptacle plate (2 screws) at rear of range. A crystallized spring contact should be replaced and if the end of the supply wire is brittle from overheating, it should be cut off and stripped back to make a better connection.

### **CONVERSION OF** 50-T1600 TYPE CHASSIS TO USE TWO 5U4G **RECTIFIER TUBES FOR** IMPROVED PERFORMANCE

In the event of failure of one of the 5Y3 rectifier tubes the added current drain on the remaining 5Y3's may cause these tubes to fail with possible damage to the receiver. It is strongly recommended that a simple circuit change be made to permit the use of two 5U4 rectifier tubes in order to provide a greater safety factor.

The change consists of revising the existing wiring so as to connect the plates of each envelope in parallel, thus having each tube operate as a half wave rectifier. This connection eliminates the possibility of plate to plate shorts and increases the safety factor by virtue of the greater current handling capacity of the 5U4 tube.

The changes to be made are listed as follows: Refer to figure 1.



1. Remove connection to pin 4 of socket A. Leave other end of

2. Remove connection to pin 6 of socket B. Leave other end of wire connected.

wire connected.

3. Connect wire (which was removed from pin 4 of socket A) to pin 6 of socket B.

4. Connect wire (which was removed from pin 6 of socket B) to pin 4 of socket A.

(Continued on page 3)

# THE AIR CONDITIONING AND REFRIGERATION SERVICEMAN (Continued from page 1)

The serviceman will find it profitable to be a good listener. He should never encourage long-winded, time-consuming discussions on subjects irrelevant to his business of keeping the customer satisfied by providing a faultlessly performing air conditioner or refrigerator.

A customer should never be told that the equipment he purchased is anything but the very best. Praising the equipment substantiates the customer's feeling that he displayed good judgment when he made his purchase.

Complete familiarity with all functions and possible uses of the appliance is essential, so that questions may be intelligently answered to the customer's entire satisfaction. Such knowledge is obviously invaluable to the serviceman as it enables him to quickly diagnose the causes of troubles.





## SERVICE BULLETIN PHILCO-MOPAR AUTO RADIOS

### PHILCO MODEL NO.

### MOPAR MODEL NO.

C-5211	(Special	Custom-Built	Radio	for	Chrysler	Imperio	al and Crown	Imperial)	823
C-5212	(Special	Custom-Built	Radio	for	Chrysler	Crown	Imperial)		 822

### SPECIFICATIONS

CABINET	Die-cast or sheet-metal housing for
	Radio Control Unit
CIRCUIT	7-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	535 kc. to 1605 kc.
AUDIO OUTPUT	5.5 watts
PUSH BUTTONS (7)	5 station selectors, 1 manual tuning,
	and 1 "off" switch
POWER INPUT	4.3 amp. at 13.2 volts
ANTENNA	Vertical whip, fender mounting
	(40 $^{\mu\mu}$ f. series—40 $^{\mu\mu}$ f. shunt)
INTERMEDIATE FREQUENCY	455 kc.
PHILCO TUBES USED	12BA6, r-f amplifier;
	12BE6, converter; 12BA6, i-f amplifier;
12AV6,	deta.v.c1st audio; 12G4, phase inverter;
	12AQ5 (2), output; 12X4, rectifier

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Philco-Mopar auto radios Models C-5211 and C-5212 are identical to Philco-Mopar auto radio Model C-5209 except for tube types and the parts listed below. For trouble-shooting information, alignment procedure, parts placement, setting of push buttons, and replacement parts list, refer to the service manual for Model C-5209 (PR-2408). The circuit is also the same except for the power supply (see diagram below).

The parts and part numbers that are different from those in Model C-5209 are as follows:

#### PARTS COMMON TO MODELS C-5211 AND C-5212

Description	Service Part No.
"A" lead	41-3910-20
Condenser, primary buffer, .5 µf. (C106)	61-0137
Fuse lead	41-3910-14
Fuse	45-2658
Housing, radio control unit	
Lamp, pilot (2)	
Resistor, damping, 220 ohms, 1 watt (R101 and R102)	66-1224340
Transformer, power	
Vibrator	83-0025-1

### PARTS FOR MODEL C-5211 ONLY

Escutcheon, push buttons	56-8928-1FA54
Knob assembly, (2), tuning and volume	27-4687-10
Knob (2), tone and dimmer	
Push-button cover	





TP2-3271



# PHILCO AUTO RADIO MODEL S-5327 **STUDEBAKER MODEL AC-2300**

#### SPECIFICATIONS



Figure 1. Model S-5327, Front View

TP2-2475

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### PHILCO AUTO RADIO MODEL S-5327



TP2-2750

### Figure 2. Base View of R-F Unit, Showing Parts Placement

### ALIGNMENT PROCEDURE

GENERAL—The r-f unit must be removed from its cover in order to perform the alignment procedure. Allow the set and the test equipment to warm up for fifteen minutes before starting the alignment procedure. Make sure all plugs and cables have been connected to their proper receptacles.

OUTPUT INDICATOR—Connect the output indicator (an oscilloscope or a 1000-ohms-per-volt voltmeter) across the voice-coil terminals.

SIGNAL GENERATOR—Use an AM r-f signal generator. Connect the ground lead to the chassis, and the output lead as indicated in the alignment chart.

OUTPUT LEVEL—Attenuate the signal-generator output throughout the procedure to hold the output indication below 1 volt.

RADIO CONTROLS—Set the volume control to maximum, set the tone control to HI, and set the tuning control as indicated in the alignment chart.

DUMMY ANTENNA—Connect the signal-generator output lead through a  $40 \cdot \mu \mu f$ . capacitor to the antenna receptacle, and connect another  $40 \cdot \mu \mu f$ . capacitor from the antenna receptacle to the chassis when making the r-f and antenna tuning adjustments.

PUSH BUTTONS—Each push button may be set for any station throughout the broadcast band. This can be done by performing the following steps:

- (1) Manually tune to the desired station.
- (2) Firmly grasp the end of the push button, and pull out.
- (3) Push the button in until it is firmly seated. The push button is now set to the desired station.

	SIGNAL GENERA	TOR	RADIO				
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST		
1	Connect signal generator through a .05-μf. conden- ser to pin 7 (converter grid) of 6BE6.	455 kc. (modulated)	1605 kc. (tuning slugs fully out)	Make tuning adjustments, in order given, for maxi- mum output.	TC301B—2nd i-f sec. TC301A—2nd i-f pri. TC300B—1st i-f sec. TC300A—1st i-f pri.		
2	Connect signal generator through a dummy antenna as explained in notes preceding this chart.	1605 kc. (modulated)	Same as step 1.	Adjust for maximum out- put.	C407 osc. trimmer		
3	Same as step 2.	1400 kc. (modulated)	1400 kc.	Adjust for maximum out- put.	C401—antenna padder C405—r-f trimmer		

#### ALIGNMENT CHART



TP2-2752

Figure 3. Top View of R-F Unit, Showing Parts Placement and Tuning Adjustments

The charts given below indicate the voltages which will be present at the respective elements of the tubes with no signal applied and with an input to the "A" lead as indicated for each chart. Although the radio usually operates at 6.6 volts input in the automobile, it may be impossible to obtain this voltage in the service shop; therefore, the various voltages are given for the benefit of the serviceman.

> NOTE: The voltages at the output of the rectifier tube may vary as much as plus or minus 10 volts. In this case the other voltages will also vary. Voltage variations are partly due to normal tolerance variations in the transformer and contact timing of the vibrator.

TUBE TYPE	PLATE	SCREEN	CATHODE
6BA6 (r-f)	180	49	1.0
6BE6	205	49	
6BA6 (i-f)	205	49	1.4
6A¥6	95		
6C4	113		92
6AQ5 (2)	218	205	15.1
6X4			220
Filter output-	-205		<u>.                                    </u>

#### **VOLTAGES WITH 6.0 VOLTS INPUT**



Figure 4. Bottom View of R-F Unit, Showing Parts Placement

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### VOLTAGES WITH 6.3 VOLTS INPUT

TUBE TYPE	PLATE	SCREEN	CATHODE
6BA6 (r-f)	193	51	1.05
6BE6	217	51	
68A6 (i-f)	217	51	1.5
6AV6	98		
6C4	118		97
6AQ5 (2)	232	217	16
6X4			235
Filter output-	-217		I

### VOLTAGES WITH 6.6 VOLTS INPUT

TUBE TYPE	PLATE	SCREEN	CATHODE
68A6 (r-f)	206	54	1.1
6BE6	230	54	
6BA6 (i-f)	230	54	1.6
6AV6	102		
6C4	125		100
6AQ5 (2)	245	230	17
6X4			250
Filter output-	-230		

PHILCO AUTO RADIO MODEL S-5327



Figure 5. Philco Auto Radio S-5327, Schematic Diagram

World Radio History

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PHILCO AUTO RADIO MODEL S-5327

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Figure 6. Rear View of Power Unit, Showing Parts Placement

### **REPLACEMENT PARTS LIST**

NOTE: Part numbers identified by an asterisk (\$) are general replacement items. These numbers may not be identical with those on factory parts; also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation of the radio will be either unchanged or improved. When ordering replacements, use only the "Service Part No."

### SECTION 1—POWER SUPPLY

Reference Symbol	Description	Service Part No.	Reference Symbol	Description	Service Part No.
100	Condenser, "A" lead filter, .5 µf.	61-0183	C104 C105	Condenser, buffer, .0068 $\mu$ f. 30-4 Condenser, electrolytic filter6	4661-8 1-0086
101	Condenser, feed-through, $300 \mu\mu f. \dots 300$	)-1235-1	C105A C105B	Condenser, filter, 30 $\mu$ f Part o Condenser, filter, 10 $\mu$ f Part o	f C105 f C105
2102 2103	Condenser, hash filter, $.5 \mu f$ Condenser, spark filter,	61-0183	C106	Condenser, by-pass, 330 μμf	01001*
	330 μμt	3001001*	F100	Fuse, 14-ampere4	5-2559~

## **REPLACEMENT PARTS LIST (Continued)**

#### SECTION 1—POWER SUPPLY (Continued)

Reference Symbol	Description	Service Part No.	Reference Symbol	Service Description Part No.
100 101 _100 _101 &100	Pilot lamp Pilot lamp Choke, "A" lead Choke, vibrator	.34-6024 .34-6024 .32-1644 2-4170-4	R101 R102 S100 T100 VB100	Resistor, damping, 100 ohms, 1 watt
		SECTION 2-	AUDIO	
200	Condenser, d-c blocking, .0047 µf	-4650-56*	R200	Resistor, grid lead, 15 megohms
201	Condenser, d-c blocking,	-4650-41 *	R201	Resistor, plate load, 220,000 ohms
202	Condenser, d-c blocking,		R202	Resistor, cathode load, 220,000

	.01 μf	0.202
C203	Condenser, cathode by-pass,	R203
	20 μf	0204
C204	Condenser, tone compensation,	KZU4
	.0068 µf	P205
C205	Condenser, by-pass, 330	1205
	μμf	\$200
LS200	Speaker	T200

### SECTION 3-I-F, A-V-C, 1st AUDIO

C300	Condenser, screen by-pass, .047 µf	R302
C301	Condenser, r-f by-pass, $100 \mu\mu f$ ,, $62-110001021$ *	R303
C302	Condenser, audio coupling, .0047 µf	R304
C303	Condenser, tone compensa- tion. 01 uf 30-4650-41*	R305
C304	Condenser, inverse feedback,	R306
C305	Condenser, inverse feedback,	R307
R300	Resistor, screen dropping,	R308
R301	27,000 ohms, 1 watt66-3274340* Resistor, cathode bias, 330 ohms	S300 Z300 Z301

### SECTION 4-R-F AND CONVERTER

C400	Condenser, spark suppressor,	C404	(
C401	Condenser, antenna compen-	C405	
0.400	sator	C405	
C402	Condenser, a-v-c by-pass,	C406	(
C403	.047 µf		
	Condenser, d-c blocking, 10	C407	(
	$\mu\mu$ · · · · · · · · · · · · · · · · · ·		

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### Resistor, grid leak, 470,000 Resistor, grid leak, 470,000 Resistor, cathode bias, 330 Switch, rear-seat speaker .....42-2000 Transformer, output .....32-8316-7

Resistor, a-v-c load, 1 Resistor, volume control, Resistor, a-v-c filter, 22,000 Resistor, grid leak, 15 Resistor, plate load, 220,000 Resistor, inverse feedback, Resistor, inverse feedback, Switch, tone control ..., Part of R303 Transformer, 2nd i-f ..... 32-4240A

Condenser, r-f trap, 200
μμf
Condenser, r-f trimmer Part of CA400
Condenser, d-c blocking, 60
μμf
Condenser, oscillator
trimmer Part of CA400



Figure 7. Base View of Power Unit, Showing Parts Placement

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### **REPLACEMENT PARTS LIST (Continued)**

### SECTION 4-R-F AND CONVERTER (Continued)

Reference Symbol	Description	Service Part No.	Reference Symbol	Description	Service Part No.
C408	Condenser, oscillator tank,		R402	Resistor, plate load, 10,000	
CA400	65 μμf	1224-87	R403	ohms	-3108340*
L400 L401	Choke, antenna	4422-24 65-0378	Z400	ohms66 Tuning unit assembly, manual- push button	-3228340* .76-7856
R400	Resistor, cathode bias, 330 ohms	1338340*	Antenna Oscillator	coil assembly	. 32-4586 . 32-4587
R401	Resistor, grid return, 68,000 ohms66-3	3688340*	R-F coil a Tuning co	assembly	. 32-4585 . 28-9336

#### MISCELLANEOUS

t Number	Description	Part Number
10-16	Pinion shaft and drive disk assembly.	.76-8376
-9920	Pointer arm assembly	.76-8378
5-7972	Spring, backlash	.28-9334
5-9855 Fi 10FA3 1075-2 Hi 1807-4 Ki 1807-4 Ki r cable 1-5153 Ki 96FE7 Li 5-8375 №	r-f unit	.76-7859 -3910-10 .76-7851 -4687-20 .54-4995 .56-9974 .56-9860 4257FA1
5-8377	Condenser, generator 5 $\mu$ f., 100v	. 30-4674
	Number 10-16 -9920 -7972 -9855 10FA3 075-2 H 807-4 K cable -5153 K 96FE7 La -8375 N -9335 -8377	NumberDescription10-16Pinion shaft and drive disk assembly9920Pointer arm assembly7972Spring, backlash9855Front cover and bushing assembly,-9855r-f unit10FA3r-f unit075-2Fuse lead807-4Knob, manual (2)Knob, push-button (5)5153Knob, tone, rear-seat speaker (2)96FE7Lock washer, speaker mounting(4)

### MISCELLANEOUS (Continued)

Description	Part Number
Screw, binding head (2)	8452FA3
Nut, speaker mounting (4)1W1	9988FA3
Pointer, dial	. 56-9895
Pointer, tone	. 56-9890
Screw, 8" x 1/4" hex head, cover	
mounting1W1	9907FA3
Socket assembly, pilot lamp27	-6233-52
Socket, antenna	1243FA3
Socket, miniature (4)	. 27-6294

Description	Part Number
Socket, miniature (4)2	7-6294-1
Socket, power cable (J200)	. 27-6273
Socket, speaker field	27-6252-4
Socket, rear-seat speaker	. 27-6149
Socket, vibrator	. 27-6245
Rear-Seat Speaker Kit	
Cable and plug assembly	.41-4172
Rear-seat speaker (LS201)3	6-1649-4
Reinforcement, grille	. 54-8907
Rim	. 28-9133
Screen	.76-8172

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## PHILCO AUTO RADIO MODEL S-5323 STUDEBAKER MODEL AC-2301

### SPECIFICATIONS

CABINET	INTERMEDIATE FREQUENCY 455 kc.
CIRCUITFive-tube superheterodyne (plus rectifier)	ANTENNA
FREQUENCY RANGE	PHILCO TUBES
AUDIO OUTPUT	6BA6 i-f ampl.; 6AV6 det., a.v.c. 1st audio: 6AO5 output:
POWER INPUT	6X4 rectifier



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Figure 2. Front View of R-F Unit, Showing Parts Placement

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### ALIGNMENT PROCEDURE

GENERAL—The r-f unit must be removed from its cover in order to perform the alignment procedure. Allow the set and the test equipment to warm up for fifteen minutes before starting the alignment procedure. Make sure that all plugs and cables are connected to their proper receptacles.

OUTPUT INDICATOR—Connect the output indicator (an oscilloscope or a 1000-ohms-per-volt, a-c voltmeter) across the voice-coil terminals.

SIGNAL GENERATOR—Use an AM r·f signal generator. Connect the ground lead to the chassis, and the output lead as indicated in the alignment chart. OUTPUT LEVEL—Attenuate the signal-generator output throughout the procedure to hold the output indication below 1 volt.

RADIO CONTROLS—Set the volume control to maximum. Set the tone control to HI. Set the tuning control as indicated in the alignment chart.

DUMMY ANTENNA—Connect the signal-generator output lead through a  $40 \cdot \mu\mu f$ . condenser to the antenna receptacle, and connect another  $40 \cdot \mu\mu f$ . condenser from the antenna receptacle to the chassis when making the r-f and antenna tuning adjustments.

	SIGNAL GENERATOR			RADIO		
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST	
1	Connect signal generator through a $.05-\mu f$ . condenser to pin 7 (mixer grid) of 6BE6.	455 kc. (modulated)	1605 kc. (tuning slugs fully out)	Make tuning adjustments, in order given, for maximum output.	TC301B—2nd i-f sec. TC301A—2nd i-f pri. TC300B—1st i-f sec. TC300A—1st i-f pri.	
2	Connect signal generator through a suitable dummy antenna, as explained in notes preceding this chart.	1605 kc. (modulated)	Same as step 1	Adjust for maximum out- put.	C407—osc. trimmer	
3	Same as step 2.	1400 kc. (modulated)	1400 kc.	Adjust for maximum out- put.	C401—antenna padder C405—r-f trimmer	

### ALIGNMENT CHART



Figure 3. Top View of R-F Unit, Showing Parts Placement and Tuning Adjustments

TPZ-2469

### TUBE-ELEMENT VOLTAGES WITH VARIOUS INPUT VOLTAGES

The charts given below indicate the cathode, plate, and screen voltages which will be present at the tubes with no signal applied and with various inputs to the "A" lead. Although the radio usually operates at 6.6 volts input in the automobile, it may be impossible to obtain this voltage in the service shop; therefore, the various voltages are given for the benefit of the serviceman.

> NOTE: The voltage at the output of the rectifier tube may be different from the value given by as much as ten volts, plus or minus, due to normal tolerance variations in transformers and variations in the contact timing of vibrators.

#### 6.0 VOLTS INPUT

TUBE TYPE	CATHODE	PLATE	SCREEN
6BA6 (r.f.)	1.25v	167v	51.9v
6886 6886 (i.f.)	1.3v	190v 190v	51.9v 51.9v
6AQ5 6X4	9v 225v	215v	190v
Filter output, 190v			

### PHILCO AUTO RADIO MODEL S-5323



Figure 4. Bottom View of R-F Unit, Showing Parts Placement

### 6.3 VOLTS INPUT

TUBE TYPE	CATHODE	PLATE	SCREEN
6BA6 (r.f.)	1.3v	175v	52v
6 <b>8</b> E6		200v	52v
6BA6 (i.f.)	1.4v	200v	52v
6AQ5	9.5v	223v	200v
6X4	235v		
Filter output,	200v		·

### 6.6 VOLTS INPUT

TUBE TYPE	CATHODE	PLATE	SCREEN
6BA6 (r.f.)	1.4v	182v	53v
6 <b>BE</b> 6		210v	53v
6BA6 (i.f.)	1.5v	210v	53v
6AQ5	10.5v	234v	210v
6X4	250v		
Filter output,	210v		

### PHILCO AUTO RADIO MODEL S-5323

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### Figure 5. Philco Auto Radio S-5323, Schematic Diagram

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Figure 6. Top View of Power Unit, Showing Parts Placement

### **REPLACEMENT PARTS LIST**

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts; also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation of the radio will be either unchanged or improved. When ordering replacements, use only the "Service Part No."

### SECTION 1-POWER SUPPLY

Reference Symbol	Description	Service Part No.	Reference Symbol	Description	Service Part No.
C100	Condenser, "A" lead filter,	0103	C105	Condenser, electrolytic filter 61-0	086-7
C101		-0183	C105A	Condenser, filter, 30 $\mu$ f Part of	FC105
CIUI	Condenser, feed through,	235 1	C105B	Condenser, filter, 10 $\mu$ f Part of	FC105
C102	Condenser hash filter $5 \text{ of } 61$	-0183	F100	Fuse, 14-ampere	5-2559*
C103	Condenser spark filter	-0105	1100	Pilot lamp	-6024
0.05	330 μμf	01001 *	1101	Pilot lamp	1-6024
C104	Condenser, buffer, .0068 µf 30-4	661-8	L100	Choke, ''A'' lead	2-1644

### **REPLACEMENT PARTS LIST (Continued)**

### SECTION 1—POWER SUPPLY (Continued)

Reference Symbol	Description	Service Part No.	Reference Symbol	Description	Service Part No.
L101	Choke, vibrator	32-4170-4	R102	Resistor, filter, 2200 ohms,	
R100	Resistor, damping, 100 ohms, 1 watt	5-1104340	S100	l watt66 Switch, off-onPa	-2224340* rt of <mark>R30</mark> 3
R101	Resistor, damping, 100 ohms, 1 watt66	5-1104340*	T100 VB100	Transformer, power	32-8313-1 .83-0035

### SECTION 2-AUDIO

C200	Condenser, d-c blocking, 01 "f 30-4650-41"	R201
C201	Condenser, inverse feedback, 01 "f 30-4650-41*	R202
LS200	Speaker	R203
R200	Resistor, grid lead, 470,000 ohms66-4478340*	T200

### SECTION 3----I-F, A-V-C, 1st AUDIO

C300	Condenser, screen by-pass, .047 μf	R302
C301	Condenser, r-f by-pass, 100 μμf62-110001021*	R303
C302	Condenser, audio coupling, .0047 μf	R304
C303	Condenser, tone compensation, .01 µf	R305
C304	Condenser, tone compensation, .01 µf	R307
R300	Resistor, screen dropping, 27,000 ohms, 1 watt66-3274340*	\$300
R301	Resistor, cathode bias, 330 ohms	Z300 Z301

### SECTION 4-R-F AND CONVERTER

C400	Condenser, spark suppressor,	C408
C401	Condenser, antenna com- pensator	CA400
C402	Condenser, a-v-c by-pass	L400
	.047 μf	L401
C403	Condenser, d-c blocking, 10 μμf	R400
C404	Condenser, r-f trap, 200	R401
C405	Condenser r-f trimmer Part of CA400	P402
C406	Condenser, d-c blocking,	
C 407	$60 \mu\mu$ t	R403
C407	Condenser, oscillator trim- merPart of CA400	Z400

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Resistor, inverse feedback,
22,000 ohms
Resistor, inverse feedback,
22,000 ohms
Resistor, cathode bias, 220
ohms, 1 watt
Transformer, output

Condenser, oscillator tank,
65 μμf
Condenser assembly31-6522-2
Choke, antenna
Choke, antenna
Resistor, cathode bias, 330 ohms
Resistor, grid return, 68,000 ohms
Resistor, plate load, 10,000 ohms
Resistor, grid leak, 22,000 ohms
Manual tuning unit



Figure 7. Base View of Power Unit, Showing Parts Placement

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## **REPLACEMENT PARTS LIST (Continued)**

### MISCELLANEOUS

Description	Service Part No.	Description	Service Part No
"A'' lead	.41-3910-16	Manual shaft assembly	76-8379
Back cover	56-9920	Master Kit	
Background plate assembly, dial	76-7972	Condenser, spark coil, .5 µf. 100v	
Bezel overlay	56-9855-1	Condenser, generator, .5 µf. 100v	30-4674
Nut, retaining (2)	.56-9910FA3	Screw, binding head (2)	1W18452FA3
Cable, power	41-4075-2	Nut, speaker mounting (4)	1W19988FA3
Coil assemblies:		Plug, power cable (PL200) Part o	of power cable
Antenna coil assembly	32-4586	Pointer, dial	56-9895
Oscillator coil assembly	32-4587	Pointer, tone	56-9890
R-F coil assembly	32-4585	Pointer arm assembly	76-8378
Tuning core (3)	28-9336	Screw, 8 x $\frac{1}{4}$ ", hex head, cover	
Clip, fuse holder	56-3807-4	mounting	1W19907FA3
Dial glass	54-5153	Socket assembly, pilot lamp (2)	27-6233-52
Clip, dial retaining (2)	W60196FE7	Socket, antenna	.57-1243FA3
Front cover and bushing assembly,	76 7050	Socket, miniature tube (4)	27-6294
Fuse lead	41 2010 10	Socket, miniature tube (2)	27-6294-1
Housing refunit	.41-3910-10	Socket, power unit (J200)	27-6273
Knob manual $(2)$		Socket, speaker field	27-6252-4
Knob tone	.21-4087-20	Socket, vibrator	27-6245
lock washer speaker mounting		Spring backlash	
(4)	W24257FA1	"C" washer	
		0 1100.00 11111111111111111111111111111	





### PHILCO AUTO RADIO MODEL S-5124

### **SPECIFICATIONS**

CIRCUITSix-tube superhetero- dyne
FREQUENCY RANGE
AUDIO OUTPUT
PUSH BUTTONSFour automatic pre- set station selectors
POWER INPUT5.1 amperes at 6.6 volts, d.c.
INTERMEDIATE FREQUENCY265 kc.
PHILCO TUBES6BA6 (2), 6BE6, 6AV6, 6AQ5, and 6X4



Figure 1. Philco Auto Radio Model S-5124

### ALIGNMENT PROCEDURE

OUTPUT METER — Connect across voice coil.

SIGNAL GENERATOR — Connect ground lead to chassis; connect output lead as indicated in chart. Use modulated output.

RADIO CONTROLS — Set volume control to maximum and tone control to center of rotation. Set tuning control as indicated in chart.

OUTPUT LEVEL — During alignment, attenuate signal generator to hold output meter indication below 1.5 volts. DUMMY ANTENNA — Connect signal generator output lead through a 40  $\mu\mu f$ . condenser to J1, the antenna receptacle; connect a 40  $\mu\mu f$ . condenser from J1 to chassis.

PUSH BUTTONS — Each push button may be set to any station throughout the broadcast band. To set up: manually tune to desired station, loosen push button and press in firmly, release push button and tighten. Repeat for other buttons. Allow radio to warm up for 15 minutes before adjusting.

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Fig. 3. Base View Showing Parts Placement

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World Radio History
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	SIGNAL GENERA	TOR	RADIO		ADJUST
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SPECIAL INSTRUCTIONS		TRIMMER
1	Through a .05 $\mu f$ . con- denser to converter grid (pin 7 of 6BE6).	265 kc.	Maximum counter- clockwise	Adjust cores, in order given, for maximum output. TC4A and TC3A are accessible through holes in bottom of i-f transformers.	TC4B—2nd i-f sec. TC4A—2nd i-f pri. TC3B—1st i-f sec. TC3A—1st i-f pri.
2	Through dummy antenna.	1605 kc.	Maximum clockwise	Adjust trimmers, in order given, for maximum output.	C10—osc. trimmer C7—r-f trimmer C2—ant. comp.
Use step 3 only if a core has been replaced.					
3	Through dummy antenna.	1400 kc.	1400 kc.	Adjust cores, in order given, for maximum output. Use non-metallic padding stick. Cores are accessible from rear, through coil form.	TC1C—osc. tuning core TC1B—r.f tuning core TC1A—ant. tuning core
4	Through dummy antenna.			Repeat steps 2 and 3 until no further improvement is noted and set tracts properly.	
5	Through dummy antenna.	580 kc.	580 kc.	Adjust core for maximum output while rocking tuning control.	TC2—osc. shunt core
6	~		Tune to a weak station near 1400 kc.	Re-adjust antenna compensator with radio installed and antenna fully extended.	C2—ant. comp.



ALIGNMENT CHART

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### **REPLACEMENT PARTS LIST**

NOTE: Part numbers marked with an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts: also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation of the radio will be either unchanged or improved. When ordering replacements, use only the "Service Part No.".

Reference Symbol	Description	Service Part No.
C1	Condenser, spark suppressor	
C2	Condenser, aerial trimmer	31-6472
C3	Condenser, hash filter, 300 µµf.	
C4	Condenser, d-c blocking, 180 µµf	
C5	Condenser, a-v-c by-pass, .047 µf	
C6	Condenser, image trap, 100 $\mu\mu f$	62-110009001*
C7	Condenser, r-f trimmer	63-0055
C8	Condenser, screen by pass, .047 $\mu f$ .	
Clo	Condenser, d-c blocking, 100 $\mu\mu J$	62-110009001*
CIU	Condenser, osc. trimmer	30 1220 A
C12	Condenser, temperature compensator, 54.5 unf	61.0149
C13	Condenser, i-f	Part of Z1
C14	Condenser, i-f	Part of Z1
C15	Condenser, inverse feedback, .01 $\mu f$ .	45-3505-58*
C16	Condenser, i-f	Part of Z2
C17	Condenser, i-t	Part of Z2
C18	Condenser, 1-1 lilter	Part of Z2
C20	Condenser, 1-1 inter	
C21	Condenser, plate by pass 220 unf	62-122001001
C22	Condenser, tone control, $01 \ \mu f$ .	45-3505-41*
C23	Condenser, d-c blocking, .01 $\mu f$ .	
C24	Condenser, hash filter, .5 $\mu f$ .	
C25	Condenser, "A" lead filter, 330 µf	62-133001001
C26	Condenser, electrolytic, 2 sections	61-0086-6
C26A	Condenser, filter, 20 $\mu f$ ., 350 wvdc	Part of C26
CZ6B	Condenser, filter, 10 $\mu$ J., 350 wvdc	Part of C26
C27	Condenser, spurk suppressor, $5 \mu f$ .	20 4661 0
C29	Condenser, vibrator filter, 330 $\mu f$ .	62-133001001
F1	Fuse, 14 amp.	
11	Pilot lamp, 6—8v, 150 ma., brown be	ad
12	Pilot lamp, 6-8v, 150 ma., brown be	ad
<u>J1</u>	Socket, aerial	
LI	Choke, deridi	
LZ I 2	Coil corial	65 0442 22
1.4	Coil rf	65.0443-22
L5	Coil. osc. shunt	32.4395.2
L6	Coil, osc.	65-0443-24
L7A & B	Coils, first i-f	Part of Z1
L8A & B	Coils, second i-f	Part of Z2
L9	Choke, vibrator	
L10	Choke, "A" filter	
LSI	Speaker, b round	
R1 22	Resistor, cuthode blas, 4/0 onms	
R3	Resistor, plate load, 10 000 ohms	68.3108340*
R4	Resistor, grid return, 22.000 ohms	
R5	Resistor, cathode bias, 470 ohms	
R6	Resistor, a-v-c filter, 1 megohm	
R7	Resistor, dropping, 27,000 ohms,	
Do	1 Watt	
R9	Volume control 250 000 ohmo	
R10	Resistor, arid return 15 meaching	
R11	Resistor, plate load. 220.000 ohms	66-4228340*
R12	Tone control, 500,000 ohms	Part of R9
R13	Resistor, grid return, 420,000 ohms	66-4478340*
R14	Resistor, cathode bias, 220 ohms,	
	1 watt	
R15	Resistor, filter, 2200 ohms, 1 watt	
K16	Resistor, vibrator filter, 100 ohms,	00 110 40 40 4
B17	1 Wall Resistor vibrator filter 100 chm	
	l watt	66.1104340*
R18	Resistor, feedback, 22.000 ohms	66-3228340*
R19	Resistor, feedback, 22,000 ohms	
S1	Switch, off-on	Part of R9

Reference Symbol	Description	Service Part No.
<b>T</b> 1	Transformer, output	
T2 TC1 A	Transformer, power	
B, C	Tuning core (3), ant. r-f osc.	56-3612-8
VB1	Vibrator	
Z1	Transformer, 1st i-f	
Z2	Transformer, 2nd i-f	

### **MISCELLANEOUS**

Description	Service Part No
"A" lead	
Back cover and clip assembly	76.6551
Background plate	56 0210
Bezel	76 5070
Bolt set mounting (2)	
Pola see mounting (2)	
Lockwasher #8 external (4)	W1582FA26
Nut. 8-32 hex-head (4)	1W10000F52
Clip fuse holder	EC 0007 4
Digl -loss	
Clip dial retaining (2)	1W56012EE7
Spring, dial retaining (2)	56.7564FE11
Front cover	76 6377
Fuen logd	41 0030 0
Gasket speaker	
Gusket, speaker	
nousing	
Knob, manual	
Knob, tone and manual (2)	
Knob, volume	56-755 <b>6FA</b> 8
Master Kit	
Bolt, hook	
Condenser spark coil	
Condenser, generator	30.4632
Lockwasher	1W24257FA1
Lockwasher, 1/4" ext. teeth	1W24260FA1
Nipple, distributor cable	
Nut	1W19988FA3
Nut, wing, 1/4—20	
Resistor	
Screw, suppression	1W19828FA3
Strap ground	76.5398
Washer	1W52237FA3
Pilot lamp socket assembly (2)	27.6233.4
Pilot lamp filter (2)	54.7974
Pilot lamp shield (2)	EC 5725 1732
Prob human (A)	
Push button (4)	
Screw, 8 x 1/4" hex head drive, cover mount	ing1W19907FA3
Socket, miniature (3) with center shield	
Socket, miniature (3)	
Socket, vibrator	
Tuning unit complete	
Grommet (2), r-f and ant. coil	
Balnut (4) shield can to backplate min	
Spring nut, osc, shunt coil	W-1775FA3
Washer, bezel mounting (2)	54.8072

4

# PHILCO PHILCO SERVICE AUTO RADIO

### PHILCO RADIO MODEL S-5123 STUDEBAKER MODEL AC 2113

### SPECIFICATIONS CIRCUIT ______Six-tube superheterodyne FREQUENCY RANGE...540—1600 kc. AUDIO OUTPUT _____3.25 watts POWER INPUT _____3.25 watts POWER INPUT _____5.1 amperes at 6.6 volts, d.c. INTERMEDIATE FREQUENCY _____455 kc. PHILCO TUBES (6) ___6BA6 (2), 6BE6, 6AV6, 6AQ5, 6X4



#### Figure 1. Philco Auto Radio Model S-5123



#### Figure 2. Drive-Cord Installation Details

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World Radio History

### **ALIGNMENT PROCEDURE**

OUTPUT METER - Connect across voice coil.

SIGNAL GENERATOR - Connect ground lead to chassis; connect output lead as indicated in chart. Use modulated output.

RADIO CONTROLS --- Set volume control to maximum and tone control to center of rotation. Set tuning control as indicated in chart.

OUTPUT LEVEL - During alignment, attenuate signal generator to hold output meter indication below 1.5 volts.

DUMMY ANTENNA -- Connect signal-generator output lead through a 40  $\mu\mu f$ . condenser to J1, the antenna receptacle; connect a 40  $\mu\mu f$ . condenser from J1 to ch'assis.

	SIGNAL GENER	ATOR	RADIO		
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	TRIMMER
1	Through $\alpha$ .05 $\mu f$ . condenser to con- verter grid (pin 7 of SBE6).	455 kc.	Maximum counterclock- wise	Adjust cores, in order given, for maximum output. TC4A and TC3A are reached through holes in bottom of i-f transformers.	TC4B—2nd i-f sec. TC4A—2nd i-f pri. TC3B—1st i-f sec. TC3A—1st i-f pri.
2	Through dummy antenna.	1605 kc.	Maximum clockwise	Adjust, in order given, for maximum output.	C10—osc. trimmer C7—r-f trimmer C2—antenna compensator
Use st	ep 3 only if a core	has been i	replaced.		
3	Through dummy antenna.	1400 kc.	1400 kc.	Adjust cores, in order given, for maximum output. Use non-metallic padding stick. Cores are accessible from rear, through coil form.	TC1C—osc. tuning core TC1B—r-f tuning core TC1A—antenna tun- ing core
4				Repeat steps 2 and 3 until no further improvement is noted and set trucks pro- perly.	
5	Through dummy antenna.	580 kc.	580 kc.	Adjust for maximum output while rocking tuning con- trol.	TC2—osc. shunt core
6			Tune to weak station near 1400 kc.	With radio installed in car and antenna fully extended.	C2—antenna comp <b>ens</b> ator





Figure 5. Schematic Diagram, Philco Auto Radio Model S-5123 World Radio History MODEL 5-5123

### **REPLACEMENT PARTS LIST**

ltem No.	Description	Part Number
C1	Condenser, spark suppresso	Dr,
	$10 \ \mu\mu f.$	60-00105407*
C2	Condenser, antenna trimme	er
C3	Condenser, hash filter, .5 µ	·61-0137°
C4	Condenser, d.c. blocking, 180 $\mu\mu f$ .	60-10185417*
C5	Condenser, a-v-c by-pass, .047 µf.	45-3505-28*
C6	Condenser, image trap, 180 $\mu\mu f$ .	Part of C7
<b>C7</b>	Condenser, r.f. trimmer	
C8	Condenser, screen by-pass, .047 µf.	45-3505-28*
C9	Condenser, d.c. blocking, 100 µµf.	60-10105 <b>407*</b>
<b>C</b> 10	Condenser, oscillator trimm	er31-6473-23
C11	Condenser, oscillator tank,	60-10405237*
C12	Condenser, inverse feedbac	k,
	.01 <i>µf</i> .	
C13	Condenser, i.f.	Part of Z1
C14	Condenser, i.f.	Part of Z1
C15	Condenser, feed through, $300 \ \mu\mu f$ .	
C16	Condenser, i.f.	Part of <b>Z2</b>
C17	Condenser, i.f.	Part of Z2
C18	Condenser, i.f. filter	Part of <b>Z2</b>
C19	Condenser, i.f. filter	Part of Z2
C20	Condenser, d.c. blocking, .0047 µf.	
C21	Condenser, plate by-pass, 100 µµf.	60-10105407*
C22	Condenser, tone control, .01 µf.	
C23	Condenser, d.c. blocking, $.01 \ \mu f$ .	
C24	Condenser, vibrator filter	62-133001001*
C25	Condenser, "A" filter	
C26	Condenser, electrolytic.	
	2 section	61-0086
C26A	Condenser, filter, 20 $\mu f$ , 350 wvdc	Part of C26
C26B	Condenser, filter, 10 µf., 350 wvdc	Part of C26
C27	Condenser, "A" filter, .5 µf.	61-0137*
C28	Condenser, buffer, .0068 µf. 1600 wvdc	
F1	Fuse, 14 amp	
11	Pilot lamp, 6—8 volt	
12	Pilot lamp, 6—8 volt	34-2068
<b>J</b> 1	Āntenna socket	57-1243FA3
L1	Choke, antenna	
L2	Choke, antenna	
L3	Coil, antenna	
14	Coil, r.t.	
15	Coil, oscillator	
LS	Coil, oscillator, shunt	
	Continued on next page	

### **REPLACEMENT PARTS LIST (Cont.)**

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will either be unchanged or improved. When ordering replacements, use only the "Service Part No."

ltem No.	Description	Part Number
L7A, B	Coils, 1st i.f.	Part of Z1
<b>L8A</b> , B	Coils, 2nd i.f.	Part of Z2
L9	Choke, vibrator	
L10	Choke, "A" filter	32-1374-2
LSI	Speaker, p-m. 6"	36-1613-6
BI	Besistor cathode bias	
	180 ohms	66-1188340*
R2	Resistor, grid return, 68,000 ohms	66-3688340*
R3	Resistor, plate load, 10,000 ohms	66-3108340*
<b>R4</b>	Resistor, grid return, 22,000 ohms	66-3228340*
R5	Resistor, cathode bias, 470 ohms	66-1478340
R6	Resistor, α-v-c filter, l megohm	66-5108340*
R7	Resistor, dropping, 27,000 ohms, 1 watt	66-3274340*
<b>R</b> 8	Resistor, i-f filter, 22,000 ohms	66-3228340*
<b>R9</b>	Volume control, 350,000 ohm	ns33-5557-8
R10	Resistor, grid return, 15 megohms	66-6158340*
R11	Resistor, plate load, 220.000 ohms	
R12	Tone control. 500.000 ohms	Part of R9
R13	Resistor, output, grid,	
	470,000 ohms	66-4478340*
R14	Resistor, cathode bias, 220 ohms, 1 watt	66-1224340*
R15	Resistor, filter, 2200 ohms, 1 watt	66-2224340*
R16	Resistor, vibrator, 100 ohms, 1 watt	66-1104340*
R17	Resistor, vibrator, 100 ohms, 1 watt	
R18	Resistor, inverse feedback, 22,000 ohms	
R19	Resistor, inverse feedback, 22,000 ohms	66-3228340*
<b>S</b> 1	Switch, off-on	Part of R9
TI	Transformer, output	
T2	Transformer, power	
TCIA,	Tuning cores, tuner	
D, C VRI	Vibrator	00 0000
<b>Z</b> 1	Transformer Jet j-f	32_4160 B
72	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS	
Description	Part Number
"A" lead	
Background plate assembly	
Bezel	
Washer, bezel mounting	
Bolt, set mounting (2)	56-7566FA3
Clip, fuse holder	
Cover, rivet assembly	
Cover, tube side	76-5269-2FA2
Dial Glass	
Spring, dial retaining	
Filter, pilot lamp (2)	
Fuse lead	41-3910-8
Knob and Shall Assy, Volume and	10ne76-5279-1
Knob, tuning	
Bolt book	56 7565 <b>F</b> 8 9
Braid	95_0073
Condenser	30-4632
Condenser	30-4007-1
Ground strap	76-5388
Lockwasher	1W24257FA1
Lockwasher, 1/4" external teeth	1W24260FA1
Nipple, distributor cable	
Nut	1W19988FA3
Resistor	
Screw	1W18828FA3
Screw	1W1063FA3
Washer	1W52237FA3
Wing Nut, ¼"-20	19W23753
Pilot lamp socket assembly	
Pointer	56-7834FCP
Shield, pilot lamp (2)	56-5733-1FA3
Shunt coil and padder assembly	
Socket, miniature (3)	
Socket, miniature (3)	
Socket, vibrator	
Speaker gasket	54-8266
Bolt (4) speaker mounting	W1582FA3
Lockwasher (4), speaker mounting	1W24257FA1
Nut (4), speaker mounting	1W19988FA3
Tuning unit assembly	
Backlash nut	
Backlash spring	
Grommet (2)	
Grommet	
Finion and shaft assembly	
Retaining spring (2)	
Spiral and shall assembly	76-5631
Spring (4)	IA 1000 00501 AI
vibrator clamp	

#### **PR-1914**

4
# PHILCO SERVICE AUTO RADIO

## PHILCO RADIO MODEL S-5127 STUDEBAKER MODEL AC 2111

### SPECIFICATIONS

CIRCUIT .....Eight-tube superheterodyne FREQUENCY RANGE ...540-1600 kc.

PUSH BUTTONS ......Six for automatic station selection

PHILCO TUBES (8) ......6BA6 (2), 6BE6, 6AV6, 6C4, 6AQ5 (2), 6X4



Figure 1. Philco Auto Radio Model S-5127

## **ALIGNMENT PROCEDURE**

OUTPUT METER — Connect across voice coil.

SIGNAL GENERATOR — Connect ground lead to chassis; connect output lead as indicated in chart. Use modulated output.

**RADIO CONTROLS** — Set volume control to maximum, and tone control to center of rotation. Set tuning control as indicated in chart.

OUTPUT LEVEL — During alignment, signal generator must be attenuated to hold output-meter indication below 1.5 volts. PUSH BUTTONS — Each push button may be set for any station throughout the broadcast band. Manually tune to desired station. Loosen knurled portion of push button. Push button in firmly and release. Tighten knurled portion of push button. Repeat for each push button. Allow 15 minutes for set to warm up.

DUMMY AERIAL — Connect signal-generator output lead through a 40  $\mu\mu f$ . condenser to J1, the aerial receptical; connect a 40  $\mu\mu f$ . condenser from J1 to ground.

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	SIGNAL GENER	ATOR		RADIO	ADIUCT
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	TRIMMER
1	Through α .05 μf. con- denser to converter grid (pin 7 of 6BE6).	285 kc.	540 kc.	Adjust cores, in order given, for maximum output. Cores TC3A and TC4A are reached through holes in bottom of i-f transformers.	TC4B-2nd if sec. TC4A-2nd if pri. , TC3B-1st if sec. TC ³ A-1st if pri.
2	Through dummy aerial.	1605 kc.	Maximum clock- wise	Adjust trimmers, in order given, for maximum output.	C9—osc. trimmer C6—r-f trimmer C'—aerial trimmer
3	Through dummy aerial.	1400 kc.	1400 kc.	Adjust cores, in order given, for maximum output. Use non-metallic padding stick. Cores are accessible from rear, through coil form.	TC1C—osc. core TC1B—r.f core TC1A—aerial core
4				Repeat steps 2 and 3 until no further improvement is noted and set tracks properly.	
5	Through dummy aerial.	580 kc.	580 kc.	Adjust core for maximum output while rocking tuning control.	TC2-osc. shunt co:e
6				Recheck C9 at 1605 kc. Repeat ad- justment of C9 and TC2 until no further improvement is noted and set tracks.	
7			Tune to a weak station near 1400 kc.	Readjust trimmer C1, with radio in- stalled and aerial fully extended.	Cl—aerial trimmer



World Radio History





Figure 4. Detail Photo of Tuner



3

### REPLACEMENT PARTS LIST

Item No.	Description Part Number	
Cl	Condenser, antenna padder	
C2	Condenser, hash filter, $330 \ \mu\mu f$	
C3	Condenser, d.c. blocking, 180 µµf	
C4	Condenser, α-v-c filter, .047 μf	
C5	Condenser, image trap, 100 μμf62-110009001*	
C6 C7	Condenser, r-f trimmer	
C8	.047 µf45-3505-28*	
C0	$100 \ \mu\mu f$ . 62-110009001*	
	Condenser, osc. mininer	
	Condenser, osc. lank, 215 µµ/·30-1220-4	
CII	Condenser, temperature	
	compensation, 54.5 $\mu\mu$	
C12	Condenser, i-i Part of ZI	
C13	Condenser, i-f	
C14	Condenser, feed through,	
	$300 \ \mu\mu f$	
C15	Condenser, i-f Port of Z2	
C16	Condenser, i-f	
C17	Condenser, i-f filter	
C18	Condenser, i-f filter	
C19	Condenser, d.c. blocking, .0047 µf	
C20	Condenser, plate by-pass, 220 µµf	
C21	Condenser, tone control, .01 µf	
C22	Condenser, d.c. blocking, .0047 µf	
C23	Condenser, inverse feedback,	
C24	Condenser, inverse feedback,	
C25	Condenser, d.c. blocking,	
C26	Condenser, d.c. blocking,	
C27	Condenser, cathode by-pass,	
C28	Condenser, output transformer,	
C29	Condenser, electrolytic,	
C29Å	Condenser, filter, $20 \ \mu f$ ,	
C29B	Condenser, filter, $10 \ \mu f$ , 250v Down of C29	
C30	Condenser "A" load filter 5 #f. 61-0137*	
C31	Condenser, buffer, .0068 #f-, 1600rr, 30.4661.8	
C32	Condenser, hash filter, 330 µµf. 62-133001001	
C33	Condenser hash filter 5 "f. 61-0137*	
C34	Condenser, spark suppressor,	
FI	Fue A5.2550	
Î.	Pilot Jamp 34.9069	
Ī2	Pilot lamp34-2068	

#### Continued on next page

## **REPLACEMENT PARTS LIST (Cont.)**

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the 'electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation will either be unchanged or improved. When ordering replacements, use only the "Service Part No."

ltem No.	Description	Part Number
J1	Socket, antenna	_57-1243FA3
Ll	Choke, antenna	65-0378
L2	Choke, antenna	65-0443-22
L3	Coil, r-f	65-0443-23
L4	Coil, osc. shunt	
L5	Coil, osc.	65-0443-24
L6, A, B	Colls, 1st 1-t	Part of ZI
L7, A, B	Chalce without a	POPT OI 22
LO TQ	Choke, vibidior	
	Choke antenna	32-4499-94
LSI	Speaker, 6" x 9" oval	36-1631
RI	Resistor, cathode bias.	
	560 ohms	66-1568340*
R2	Resistor, grid return,	
	68,000 ohms	66-3688340*
R3	Resistor, plate load,	
	10,000 ohms	66-3108340*
R4	Resistor, osc. grid,	
	22,000 ohms	66-3228340*
R5	Resistor, a-v-c filter,	
20	l megohm	66-5108340*
R6	Resistor, screen dropping,	CC 00800401
77	27,000 ohms	55-3278340*
n/	Loop obma	66 2109240*
Do	Register if filter	00-4100340
no	22 000 ohms	66.3228340*
<b>R</b> 9	Volume control 350 000 ohms	33-5557-7
RIO	Resistor, feedback voltage	
	divider, 180 ohms	66-1188340*
R11	Resistor, grid return,	
	15 megohms	66-6158340*
R12	Resistor, plate load,	
	220,000 ohms	66-4228340*
R13	Resistor, grid return,	
	15 megohms	66-6158340*
KI4	Tone control, 2 megohms	Part of R9
R15	Resistor, inverse feedback,	~~ ~~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~
DIC	2200 Onms	00-2228340
AIO	220 000 abms	66.4228240*
B17	Resistor arid return	00-4440340
	470.000 ohms	66-4478340*
R18	Resistor, grid return.	
	470,000 ohms	66-4478340*
R19	Resistor, cathode bias,	
	330 ohms, 1w	66-1334340*
R20	Resistor, plate load,	
	220,000 ohms	66-4228340*
R21	Resistor, vibrator filter,	
Dag	100 ohms, lw	66-1104340*
RZZ	Resistor, filter, 1000 ohms,	00 010 10 101
<b>P</b> 22	IW	00-2104340~
N23	100 obma le	66 1104040*
SI	Switch off-on	Dom of 20
Ťi	Transformer, output	32,0215
T2	Transformer, power	32.8313.1
	The second secon	······································

tem No.	Description	Part Number
ICIA,	Tuning core (3), ant. r-f	
B, C	and osc.	
VB1	Vibrator	
21	Transformer, 1st i-f	
Z2	Transformer, 2nd i-f	32-4293-1 <b>A</b>

#### MISCELLANEOUS

Description	Part Number
"A" lead	
Back cover	76-5269-2FA2
Background plate	
Bezel	
Bolt, set mounting (2)	
Bolt, speaker mounting,	
8—32 x ⁵ %" (4)	W-1582FA26
Lockwasher #8 external (4)	1W24257FA1
Nut 8—32 hex head	1W19988FA3
Clip, fuse holder	
Dial glass	
Clip, dial retaining (2)	1W56913FE7
Spring, dial retaining	
Front cover	
Fuse lead	
Gasket, speaker	
Housing	76-6348FA2
Knob, manual	27-4687-14
Knob, tone and manual (2)	27-4687-11
Knob, volume	56-7556FA8
Lockwasher, electrolytic, mounting	1W24514FA2
Master Kit	
Belt, hook	56.7565FA3
Braid	95-0073
Condenser, spork coil	30-4007-1
Condenser, generator	30-4632
Lockwasher	1W24257FA1
Lockwasher 1/4" ext teeth	1W24260FA1
Nipple distributor cable	54.7159
Nut	1W19988FA3
Nut wing $\frac{1}{4}$ - 20	19W23753
Resistor	22,1222
Screw suppression	1W10020FA2
Screw suppression	1W10626FA2
Strap ground	76.5200
Washer	11152227582
Pilot Jamp socket assembly (2)	07 6000 A
Pilot lamp filter (2)	
Pilot lamp shield (2)	56 5795 1FX9
Pueh button (6)	
Screw 8 x 1/4" hay machon hard	/0-3543
COVER mounting	11110007582
Socket, minigture (3) with center shi	ald 97 6909
Socket miniature (5)	27 6202 12
Socket, vibrator	
Tuning Unit Complete	76 E007
Grommet (2) v f and ant acit	
Grommet one seil	
Dalnut (A) baakplate mounting	J38/000045 = 0
Spring put occ shurt soil	I VV 43U841 A3
Washer herel mounting (2)	
	J9-0U/X

PR-1916

# AUTO RADIO

PHILCO

## PHILCO AUTO RADIO MODEL C-4908

#### **Circuit Description**

21170

In manual operation of Model C-4908, the aerial, r-f, and oscillator circuits are tuned. In push-button operation, pre-tuned aerial and oscillator coils are selected by the switch, while the r-f coil is a broad-tuned, r-f band-pass transformer containing an i-f wave trap. This transformer is designed to give maximum signal transfer in the broadcast band, while greatly attenuating all other frequencies.

The r-f signal from the aerial is amplified by the r-f amplifier, and fed to the converter stage. This stage converts the signal to the intermediate frequency of 455 kc., which is applied via a tuned transformer to the i-f amplifier. A second tuned transformer passes the amplified 455-kc. signal on to the detector (the diode section of the 6AV6), where it is rectified, and the audio-frequency modulation separated from it. Automatic volume control is provided by smoothing and filtering the rectified 455-kc. voltage, and applying it to the grids of the r-f amplifier and converter.

The audio signal from the detector is applied, through the volume control, to the first audio amplifier (the triode section of the 6AV6). From the plate of the first audio, the signal is applied, by resistance coupling, to the grid of the phase inverter. The phase inverter provides two signals 180 out of phase, which are applied, by resistance coupling, to the grids of the push-pull output tubes. The output transformer, which constitutes the plate load of the power amplifier, transmits the signal to the voice coil of the separately mounted p-m speaker.

The power supply, which is designed for a 6.6-volt input, is of the nonsynchronous-vibrator type. The high-voltage output is well filtered by a two-section resistor-condenser network, and is adequately by-passed for the suppression of hash.

#### Philco TROUBLE-SHOOTING Procedure

For rapid trouble shooting, the radio circuit is divided into four sections, with test points specified for each section; these sections and test points are indicated in the schematic diagram. The trouble-shooting procedure given for each section includes a simplified test chart and a bottom view of the chassis showing the locations of the test points and the components of that section.

In each chart, the first step is a master check for determining whether trouble exists in that section without going through the entire test procedure.

Failure to obtain the "NORMAL INDICATION" in any given step indicates trouble within the circuit under test.



ZERAICE

After isolating the trouble to a single stage, the defect is located by: first, testing the tube; second, measuring tube-electrode voltages; third, measuring circuit resistances; fourth, substituting condensers. The trouble revealed should be corrected before testing further.

#### **Preliminary Checks**

To avoid possible damage to the radio, the following preliminary checks should be made before it is turned on:

1. Inspect both the top and the bottom of the chassis. Make sure that all tubes are secure is the proper sockets, and look for any broken or sported connections, burned resistors, or other obvious indications of trouble.

2. Measure the resistance between B+, test point D (pin 7 of 6X4 rectifier) and classis, test point C. When the ohmmeter test leads are connected in the proper polarity, the highest resistance reading will be obtained. If the reading is ower than 3600 ohms, check condensers C105A, CN5B, and C106 for leakage or shorts. The resistance value given is much lower than normal, and is not intended as a quality check of these condensers; the value given is the lowest at which the rectifier will operate safely while the voltage checks of Section 1 (power supply) are performed.

3. A 14-ampere fise must be used in the "A" circuit when testing the receiver.

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## TROUBLE SHOOTING Section 1

#### **Power Supply**

For the tests in this section, use a d-c voltmeter. Connect the negative lead to the chassis, test point C; connect the positive lead to the test points in-dicated in the chart. The voltage readings given were taken with a 20,000-ohms-per-volt meter at an input voltage of 6.6 volts, d.c.

Turn on the power and select manual operation by depressing PB6. Set the volume control to minimum, and the tone control to MUSIC position.

If the "NORMAL INDICATION" is obtained in



Figure 1. Bottom View, Showing Section 1 Test Points step 1, proceed with the tests for Section 2 (audio circuits); if not, isolate and correct the trouble in this section.

STEP	TEST POINT	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	Å	210v		Trouble in this section. Isolate by the following tests.
2	В	6.3▼	No voltage Low voltage	Open: L100, L101, F100, PB7. Shorted: C101, C102, C103, C107. Leaky: C102, C103, C107, weak battery.
3	D	250∀	No voltage Low voltage High voltage	Defective: VB100, 6X4. Open: T100. Shorted: C104, C105A, C106. Defective: VB100, 6X4. Leaky: C105A. Shorted: C105B, T100. Open: C105A, T100. Open: R102, R211*, T200*.
4	E	240v	No voltage Low voltage High voltage	Open: R102. Shorted: C105B. Leaky: C105B. Changed resistance: R102. Open: R103. R207°.
5	Ā	210-	No voltage Low voltage	Shorted: C105C. Open: R103. Leaky: C105C. Changed resistance: R103.
Listening	Test: Abnorma	l hum may be cau	sed by open C105/	A, C105B, or C104.

* This part, located in another section, may cause abnormal indication in this section.

## TROUBLE SHOOTING

#### Section 2

#### Audio Circuits

For the tests in this section, use an audio-frequency signal generator. Connect the generator ground lead to the chassis, test point C; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

With PB6 depressed, and the tone control set at MUSIC position, set the volume control to maximum.

If the "NOR.MAL INDICATION" is obtained in step 1, proceed with the tests for Section 3 (i-f, detector, and a-v-c circuits); if not, isolate and correct the trouble in this section.





STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear speaker output with weak generator input.	Trouble in this section. Isolate by the following tests.
2	B (Remove 6C4)	Moderate output with strong input.	Defective: 6AQ5, LS200. Shorted or leaky: <b>C209</b> , T200, C210, C208. Open: R209, R211, T200, C207.
3	D (6C4 removed)	Same as step 2.	Defective: 6AQ5. Open: T200, R210, C206. Shorted: T200, C206.
4	E (Replace 6C4)	Loud, clear output with moderate	Open: R206, R207, R208. Shorted or leaky: C202, C203 (rotate R201). Defective: 6C4.
5	A	Same as step 1.	Defective: 6AV6, R200 (rotate throughout range). Open: R200, R204, R203, C200. Shorted: C301D*.
Listening	Test: Rotate tone co	ntrol R201' throughout range. Lack of	treble attenuation may be caused by open C203 or R201. Lack

of bass accentuation may be caused by open R205, R201, or C205. or by shorted or leaky C200, C202, C206, or C207.

* This part, located in another section, may casuse abnormal indication in this section.

### **MODEL C-4908**

DIAL POINTER-With tuning core fully meshed, adjust pointer to coincide with index mark at lowfrequency end of scale, to left of "54."

RADIO CONTROLS-Set volume control to maximum. Set tone control to MUSIC position. Set push buttons and tuning control as indicated in chart. OUTPUT METER-Connect across voice coil.

ALIGNMENT PROCEDURE

SIGNAL GENERATOR-Use AM r-f signal generator, with modulated output. Connect ground lead to chassis, and connect output lead as indicated in chart.

-						
STEP	CONNECTION OF GENERATOR TO RADIO	GENERATOR DIAL SETTING	RADIO CONTROL SETTING	SPECIAL INSTRUCTIONS	ADJUST TRIMMER	
2	Through .05-mf. condenser to mixer grid, pin 7 of 6BE6.	455 kc.	Depress manual push button.	Adjust, in order given, for maximum out- put. (TC301A and TC300A are reached through holes in the bottom of the i-f transformer.)	TC301B—2nd i-f sec. TC301A—2nd i-f pri. TC300B—1st i-f sec. TC300A—1st i-f pri.	Z400 Z300
2	Through dummy aerial to aerial receptacle. See note below.	455 kc.	Depress any sta- tion-selector push button.	Adjust for minimum output.	TC400i-i trap	GAO3B
3	Same as step 2.	1605 kc.	Depress manual push button.	Adjust for maximum output.	C410-osc. trimmer	
4	Same as step 2.	1400 kc.	Depress manual push button.	Adjust for maximum output.	C400B—aerial trimmer C403A—r-f trimmer	2402 C C C C C C C C C C C C C C C C C C C
5	Same as step 2.	580 kc.	Depress manual push button.	Adjust for maximum output while rock- ing tuning control.	TC403—osc. shunt	
6	Same as step 2.			Repeat steps 3 and 4.		L403
7	Same as step 2.			If there was considerable change in step 6, repeat step 5.		
8	Same as step 2.	1200 kc.	Depress PB5.	Set PB5 tuning core to signal (1200 kc.), and adjust C400A for maximum output.	C400A—PB aerial trimmer	ALRIAL SUCKET CAUS C210 BA
9			Depress manual push button.	With the radio and aerial installed, ad- just for maximum, using a weak signal at or near 1400 kc.	C400B—manual aerial irimmer	* C410 IS LOCATED ON UNDERSIDE OF CHASSIS.
10			Depress PB5.	Same as step 9 except use a station at or near 1200 kc.	C400A—PB aerial trimmer	

DUMMY AERIAL: Connect signal-generator output lead through 40-mmf. condenser to aerial receptacle; connect another 40-mmf. condenser from aerial receptacle to chassis. It is important that these dummy-aerial instructions be carefully followed if the radio is to perform at its best after being installed in the car.

Re

*While performing steps 3 through 10 inclusive, the wiring-side cover must be fastened in place.

#### SETTING PUSH BUTTONS

1. Turn on the power, set the tone control to VOICE position, and set the volume control to give an appropriate volume level.

2. Couple the signal generator through a dummy aerial, as directed in the note following the ALIGNMENT PROCE-DURE chart.

Allow the radio to warm up for a period of 15 minutes. 4. Starting with the lowest frequency desired, set the signal generator, depress station-selector push button PB1, and adjust the associated tuning core for maximum output.

5. Turn off the signal generator and make a final adjustment of the tuning core while listening to the station for which the adjustment is being made. 6. Repeat steps 4 and 5 for each remaining station-selector

push button, in the order listed below.

TUNING RANGES OF PUSH BUTTONS

PB1	530—1020	kc.
PB2	610-1200	kc.
PB3	700-1410	kc.
PB4	740-1480	kc.
PB5	840-1605	kc.

## **REPLACEMENT PARTS LIST**

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts; also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation of the radio will be either unchanged or improved. When ordering replacements, use only the "Service Part No."

#### SECTION 1

#### POWER SUPPLY

Reference Symbol	Descrip	otion	Service Part No.
C100	Condenser, feed-through	, 300 mmf.	
C101	Condenser, feed-through	, 300 mmf.	
C102	Condenser, filter, spark,	330 mmf.	60-10335407
C103	Condenser, filter, "A,"	.5 mf	61-0137*
C104	Condenser, buffer, .0033	mf	

Figure 6. Top View of Chassis, Showing Trimmer Locations

## **REPLACEMENT PARTS LIST (Continued)**

SECTION 1 (Continued) DOWED SUDDLY

	FOWER JOFFET	
Reference Symbol	Service Description Part No.	Referen Symbo
Symbol C105 C105A C105B C105C C106 C107 F100 I100 I100 I101 I102	Description    Part No.      Condenser, electrolytic (4 sections)	C200 C201 C202 C203 C204 C205 C206 C207 C208
L100 L101 PB7 R100 R101 R102 R103 T100 VB100	Choke, "A" lead  32-1644    Choke, hash  32-4170-2    Switch assembly  Part of 85-0157-1    Resistor, damping, 100 ohms, 1 watt  .66-1104340    Resistor, diapping, 100 ohms, 1 watt  .66-1104340    Resistor, filter, 1000 ohms, 1 watt  .66-2104340    Transformer, power  .32-8313-1    Vibrator  .83-0026	C209 C210 LS200 R200 R201 R202

**MODEL C-4908** 

L403

L404

8

Coil, osc. shunt .

OUTPUT LEVEL-During alignment, signal-generator output must be attenuated to hold output-meter reading below 1.5 volts.



#### SECTION 2 AUDIO CIRCUITS

Description	Part	N
Condenser, d-c blocking, .0047 mf	.45-3	502
Condenser, r-f by-pass, 100 mmf	0105	407
Condenser, d-c blocking, .0047 mf	.45-3	502
Condenser, tone compensation, .01 mf	.61-0	120
Condenser, inverse feedback, .25 mf	.61-0	125
Condenser, inverse feedback, .1 mf	.61-0	113
Condenser, d-c blocking, .01 mf	.61-0	120
Condenser, d-c blocking, .01 mf.	.61-0	120
Condenser, cathode by-pass, 10 mf.,		
25vPart	of (	C10
25vPart Condenser, tone compensation, .0068 mf	of ( 45-35	C10
25vPart Condenser, tone compensation, .0068 mf Condenser, 330 mmf60	of ( 45-35 1033	540
25vPart Condenser, tone compensation, .0068 mf Condenser, 330 mmf60 Speaker	of ( 45-35 1033 36-	C10 00 540 163
25vPart Condenser, tone compensation, .0068 mf Condenser, 330 mmf	of ( 45-35 1033 36- 33-55	C10 00- 540 163 57-
25v Part Condenser, tone compensation, .0068 mf Condenser, 330 mmf	of ( 45-35 1033 36- 33-55	540 57.
25v Part Condenser, tone compensation, .0068 mf Condenser, 330 mmf	of 0 45-35 1033 36- 33-55 of I	210 540 163 57-
25v Part Condenser, tone compensation, .0068 mf. Condenser, 330 mmf	of ( 45-35 1033 36- 33-55 of I	C10 540 163 57- 820
25v  Part    Condenser, tone compensation, .0068 mf.  Condenser, 330 mmf.    Condenser, 330 mmf.  .60    Speaker	of C 45-35 1033 36- 33-55 of F 5-118	210 540 163 57- 120

Service

## **REPLACEMENT PARTS LIST (Continued)**

## SECTION 2 (Continued) AUDIO CIRCUITS

Reference Symbol	Service Description Part No.
R203	Resistor, grid return, 15 megohms
R204	Resistor, plate load, 220,000 ohms
R205	Resistor, inverse feedback, 2200 ohms66-2223340
R206	Resistor, grid return, 15 megohms
R207	Resistor, cathode load, 220,000 ohms66-4223340
R208	Resistor, plate load, 220,000 ohms66-4223340
R209	Resistor, grid return, 470,000 ohms
R210	Resistor, grid return, 470,000 ohms
R211	Resistor, cathode bias, 330 ohms, 1 watt66-1334340
T200	Transformer, output
	SECTION 3

#### I-F. DETECTOR, AND A-V-C CIRCUITS

C300A	Condenser, fixed, silver micaPart of Z300
C300B	Condenser, fixed, silver mica
C301A	Condenser, fixed, silver mica Part of Z301
C301B	Condenser, fixed, silver mica Part of 7301
C301C	Condenser diode filter Part of 7301
C301D	Condenser, diode filter
C302	Condenser, albede hur page 0/7 m/ 610122*
0.002	Condenser, calnode by-pass, .047 mi
LJUUA	Coil, 1st 1-1 primaryPart of Z300
L300B	Coil, 1st i-f secondaryPart of Z300
L301A	Coil, 2nd i-f primaryPart of Z301
L301B	Coil, 2nd i-f secondaryPart of Z301
R300	Resistor, cathode bias, 1500 ohms
R301	Resistor, i-f filter, 22,000 ohms
R302	Resistor, a-v-c filter, 1 megohm66-5103340
R303	Resistor, screen dropping, 27,000 ohms,
	1 watt
TC300A	Tuning corePart of Z300
TC300B	Tuning core
TC301A	Tuning core
TC301B	Tuning corePart of Z301
Z300	Transformer, 1st i-f
Z301	Transformer, 2nd i-f 32-4240 A

#### SECTION 4 **R-F AND CONVERTER CIRCUITS**

C400	Condenser, trimmer, 2 sections63-0035-7
C400A	Condenser, aerial trimmer, PBPart of C400
C400B	Condenser, aerial trimmer, manualPart of C400
C401	Condenser, d-c blocking, 180 mmf
C402	Condenser, cathode by-pass, .047 mf
C403	Condenser, trimmer assembly
C403Ā	Condenser, trimmer, r-f variablePart of C403
C403B	Condenser, fixed, silver mica, 180 mmfPart of C403
C404	Condenser, band-pass
C405	Condenser, i-f trap
C406	Condenser, a-v-c filter, .047 mf
C407	Condenser, d-c blocking, 100 mmf
C408	Condenser, screen by-pass, .047 mf
C409	Condenser, osc. temp. comp. 54.5 mmf61-0149
C410	Condenser, osc. trimmer and shunt
R400	Resistor, cathode bias, 330 ohms
R401	Resistor, cathode bias (PB only), 330
	ohms
R402	Resistor, g-v-c. 2.2 megohms 66-5223340
R403	Resistor, band-pass, 10,000 ohms 66-3103340
R404	Resistor, plate load, 10,000 ohms 66,310,3340
R405	Resistor, grid return, 22,000 ohms 66-3223340
R406	Resistor, grid return, 68,000 ohms 66.3683340
L400A	Coil, band-pass Part of 7400
L400B	Coil, i-f wave trap Part of Z400
L401A	Coil, gerial, manual 65-0443-16
L401B	Coil. r-f. manual 65-0443-17
L401C	Coil. osc., manual 65-0443-18
L402A	
through	Coil, oscillator, push button
L402E	erre public public and a star
L402F	
through	Coil, gerial, push button Part of 7402
L4021	Pass secon monomical at or grou
1.403	Choke hash-interference elimination 65 0437

#### SECTION 4 (Continued) **R-F AND CONVERTER CIRCUITS**

Reference Symbol	Service Description Part No.
PB1	
through PB6	Switch assemblyPart of 85-0157-1
TC400	Core, iron, i-f trapPart of Z400
through	Tuning core, r-f, osc., aerial (manual)56-3612-7
TC402	Core-and-key assembly
TC403	Tuning core, osc. shuntPart of L404
Z400	Transformer assembly, r-f band-pass, i-f
	trap
Z401	Manual-tuning-unit assembly
Z402	Push-button-tuning-unit assembly 76.4560.1

#### **MISCELLANEOUS**

Service

Description	Part No.
"Ă" lead	41-3910-7
Fuse lead	41.3910.6
Aerial socket	57.0590.1783
Bezel	56.6743588
Nut bezel mounting (2)	97 0001 5 8 2
Indicator strip (push huuon)	56 87/17F 8 6
Diffusing screen	
Nut (Indicator strip, and diffusing spream mounting)	
Cable speaker	I W OU ISSE AS
Chaption mounties and (0)	
Chassis mounting nut (2)	97-0091FA3
Control knob (2)	
lone knob	56-6846FA8
Dummy knob (nut cover)	
Cover assembly, front	76-4610FA2
Spring clip, grounding	
Cover, tube side	56-6734FA2
Cover, push button	56-6708FA8
Coil-adjusting nut, brass, push button	
Coil-adjustment spring, push-button osc. coil	57-168 <b>0FA</b> 3
Condenser, generator-interference	76-5061
Coupling, brass, push-button adjusting sleeve	
Dial cord (25-foot spool)	45-8750*
Dial-background plate	
Dial scale, glass	
Dial clip	56-6760FE11
Drive-shaft-and spiral assembly	
Drum assembly, tone	
Filter, pilot lamp	
Fuse	
Gasket screen (speaker-mounting assembly)	
Housing assembly	76-4611FA2
Link, PB adjustment	56-4034FCP
Manual tuner, complete	76-4564-1
Mounting bracket	56-7006FA3
Mounting-bracket bolt	1W16154FA3
Pilot lamp	
Pinion-and-shaft assembly (manual tuner)	76-4562
Pointer	
Push-button assembly, complete	
Socket, miniature (8)	
Socket, pilot lamp (3)	
Socket, speaker	
Socket, vibrator	
Spring, backlash	57-1705FA1
Spring, pointer	57-0992-1FA1
Spring, tone drum	28-8945FA38
Spring, cord anchor, tone shaft	57-1701FA38
Spring, window-retaining (2)	56-6687FE11
Spring, pinion-gear tension	56-6696FA1
Window, glass	
Miscellaneous Mounting Hardware	
Radio mtg. stud and ext. lock-washer assembly	56-6693FA3
Plain washer	W2555FA1
Lock washer (2)	1W57224FA1
Nut	1W21293FA3
Radio speaker mtg. stud and spacer (4)	77-0400
Radio speaker mtgstud nut (4)	1W19988FA3
Radio speaker mta-stud lock washer (4)	1W24257FA1

.32-4110-2

## TROUBLE SHOOTING Section 3

#### I-F. Detector, and A-V-C Circuits

For the tests in this section, use an r-f signal generator, with modulated output, set at 455 kc. Connect the generator ground lead to the chassis, test point C; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

With PB6 depressed, the volume control set at maximum, and the tone control set at MUSIC position, rotate the tuning control until the tuning core is fully meshed.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 4 (r-f and converter circuits); if not, isolate and correct the trouble in this section.



To provide a complete i-f-amplifier check, test point A for this section is placed at the grid of the mixer in Section 4; therefore, the effectiveness of step 1 as a master check is dependent upon the condition of certain parts in the mixer circuit. These parts are listed below under the "POSSIBLE CAUSE OF ABNORMAL INDICATION."

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear speaker output with weak generator input.	Trouble in this section. Isolate by the following tests.
2	В	Moderate, clear output with weak input.	Defective: 6AV6 (diode section), 6BA6. Misaligned: Z301. Open: L301A, L301B, R303, R300, C301A, C301B, R301. Shorted: C301C, C301A, C301B, C301D, C300B, L300B.
3	Ā	Same as step 1.	Defective: 6BE6*. Misaligned: Z300. Open: L300A, L300B. L404*. Shorted: C300A, C300B, C408*.

* This part, located in another section, may cause abnormal indication in this section.

## TROUBLE SHOOTING

### Section 4

#### **R-F and Converter Circuits**

For the tests in this section, with the exception of the oscillator test, use an r-f signal generator with modulated output. Connect the generator ground lead to the chassis, test point C; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

With the volume control set at maximum, and the tone control set at MUSIC position, set the push buttons, tuning control, and signal-generator frequency as indicated in the chart.

If the "NORMAL INDICATION" is not obtained in step 1, isolate and correct the trouble in this section. If the trouble is not revealed by the tests for this section, check the alignment.



Figure 4. Bottom View, Showing Section 4 Test Points

Γ	STEP	TEST POINT	SIG. GEN. FREQ.	RADIO TUNING	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
-	1(α)	Ā	1000 kc.	Depress manual push button. Tune to sig- nal.	Loud, clear speaker output with weak generator input.	Trouble in manual-tuning circuits. Isolate by the tests in steps 2 and 3, and correct trouble before proceeding with step 1(b).
	1(b)	Ā	Tune to frequency of each push button.	Depress each station- selector push button.	Same as step 1(a).	Trouble in push-button-tuning circuits. Isolate by the tests in steps 4 and 5.
-	2	B (Osc. test; see note below.)		Depress manual push button. Tune through range.	Negative 1 to 1.5 volts.	Defective: 6BE6 (osc. section). Open: R405, C407, L404, L401C, C410, C409, PB6. Shorted: L404, L401C, C409, C410, PB1 through PB5.
	3	Ā	1000 kc.	Same as step 1(a).	Same as step 1(a).	Defective: 6BA6. Open: L403, L401A, L401B, R400, R402, R406, R404, C401, PB6, C400B, R401. Shorted: C403A, C403B, C401, C402, L401A, L401B, C408.
	4	B (Osc. test; see note below.)		Same as step 1(b).	Negative 1 to 1.5 volts.	Open: oscillator coil or switch asso- ciated with push button. Shorted: oscillator coil associated with push button.
ŀ	5	Ā	Same as step 1(b).	Same as step 1(b).	Same as step 1(a).	Open: L400A, C404, C400A, aerial coil associated with push button. Shorted: L400B, C400A, C405, C404.





OSCILLATOR TEST: Connect the positive lead of a high-resistance voltmeter to the oscillator cathode (pin 2 of 6BE6), test point D; connect the prod end of the negative lead through a 100.000ohm isolating resistor to the oscillator grid (pin 1 of 6BE6), test point B. Use a suitable meter range, such as 0-10 volts. Proper operation of the oscillator is indicated by negative voltage of approximately the value given in the chart (measured with 20,000-ohms-per-volt meter) throughout the tuning range.

## **MODEL C-4908**

Figure 5. Philco Auto Radio Model C-4908, Sectionalized Schematic Diagram, Showing Test Points

TP-7700-1

# AUTO RADIO

PHILCO

## PHILCO AUTO RADIO MODEL PD-4908

#### **Circuit Description**

2:11(<)

Philco Model PD-4908 is a custom-built auto radio. Permeability tuning is used in all r-f and i-f stages. Of the seven push buttons, five are used for instant, automatic station selection, one is used to select manual tuning, and the other is the "off" switch. An unusually high signal-to-noise ratio is achieved in this set by the use of permeability-tuned circuits. In manual tuning, the antenna, r-f, and oscillator circuits are tuned. In pushbutton operation, two tuned circuits are used plus a broad-band r-f transformer (Z400) that contains an i-f wave trap. This transformer is designed to give maximum signal transfer in the broadcast band, while greatly attenuating all other frequencies.

The circuit includes a 6BA6 r-f amplifier, a 6BE6 converter, a 6BA6 i-f amplifier, a 6AV6 detector—first audio amplifier, a 6C4 phase inverter, and a pair of 6AQ5's in push-pull output. The power supply has a nonsynchronous vibrator and a 6X4 rectifier. An iron core choke (L101) is used for hash elimination.

#### **Philco TROUBLE-SHOOTING Procedure**

For rapid trouble shooting, the radio circuit is divided into four sections, with test points specified for each section; these sections and test points are indicated in the schematic diagram. The trouble-shooting procedure given for each section includes a simplified test chart and a bottom view of the chassis showing the locations of the test points and the components of that section.

In each chart, the first step is a master check for determining whether trouble exists in that section, without going through the entire test procedure.

Failure to obtain the "NORMAL INDICATION" in any given step indicates trouble within the circuit under test.

After isolating the trouble to a single stage, the defect is located by: first, testing the tube; second, measuring tube-electrode voltages; third, measuring circuit resistances; fourth, substituting condensers. The trouble revealed should be corrected before testing further.

#### **Preliminary Checks**

To avoid possible damage to the radio, the following preliminary checks should be made before it is turned on:

1. Inspect both the top and the bottom of the chassis. Make sure that all tubes are secure in the proper sockets,



ZERAIGE

and look for any broken or shorted connections, burned resistors, blown fuse, or other obvicus indications of trouble.

2. Measure the resistance between B+ (pin 7 of 6X4 rectifier) and the chassis, test point C. When the ohmmeter test leads are connected in the proper polarity, the highest resistance reading will be obtained. If the reading is lower than 2775 chms, check condensers C105A and C105B for leakage or shorts.

The resistance value given is much lower than normal, and is not intended as a quality check of these condensers; the value given is the lowest at which the rectifier will operate safely while the voltage checks of Section 1 (power supply) are performed.

3. If the fuse is blown, check the vibrator before installing a new fuse; if the vibrator is defective, check the buffer condenser, C104, before installing a new vibrator.

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## **TROUBLE SHOOTING**

#### **POWER SUPPLY**

For the tests in this section, use a d-c voltmeter. Connect the negative lead to the chassis, test point C; connect the positive lead to the test points indicated in the chart. The voltage readings given were taken with a 20,000-ohms-per-volt meter with a voltage supply of 6.6 volts, d.c. Turn on the power, set the volume control to minimum, and turn the tone control fully clockwise.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 2 (audio circuits); if not, isolate and correct the trouble in this section.

STEP	TEST POINT	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	210v		Trouble in this section. Isolate by the following tests.
2	В	6.3v	No voltage Low voltage	Open: L100, L101. Leaky: C102, C103. Weak battery.
3	D	250v	No voltage Low voltage High voltage	Defective: VB100, 6X4. Open: T100. Shorted: C104, C105A. Defective: VB100, 6X4. Leaky: C105A, C105B. Shorted: C105B, T100. Open: C105A, T100. Open: R102, R207°, T200°.
4	E	240 <del>v</del>	No voltage Low voltage High voltage	Open: R102. Shorted: C105B. Leaky: C105B. Changed resistance: R102. Open: R103, R207°.
5	A	210v	No voltage Low voltage	Shorted: C105C. Open: R103. Leaky: C105C. Changed resistance: R103.
Listening	a Test: Abnorn	nal hum may be caused	by open C105A, C105B,	or C104.

* This part, located in another section, may cause abnormal indication in this section.



#### Figure 1. Bottom View, Showing Section 1 Test Points

## **TROUBLE SHOOTING**

#### **AUDIO CIRCUITS**

For the tests in this section, use an audio-frequency signal generator. Connect the generator ground lead to the chassis, test point C; connect the output lead through a .1-mf. condenser to the test points in the chart.

Set the volume control to maximum, and turn the

tone control fully clockwise.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 3 (i-f, detector, and a-v-c circuits); if not, isolate and correct the trouble in this section.

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	Ā	Loud, clear speaker output with weak signal input.	Trouble in this section. Isolate by the following tests.
2	B (Remove 6C4)	Moderate output with strong input.	Defective: 6AQ5, LS200. Shorted or leaky: C204, T200. Open: R209, R211, T200, C207.
3	D (6C4 removed)	Same as step 2.	Defective: 6AQ5. Open: T200. Shorted: T200, C206.
4	E (Replace 6C4)	Loud, clear output with moderate input.	Open: R206, R207, R208. Shorted or leaky: C201, C202, C203 (rotate R201). Defective: 6C4.
5	K	Same as step 1.	Defective: 6AV6, R200 (rotate through range). Open: R200, R204, C200.
T 1	T. 4 D.4 4		

Listening Test: Rotate tone control R201 through range. Lack of treble attenuation may be caused by open C203 or R201. Lack of bass accentuation may be caused by open R205, R201, or C205, or by shorted or leaky C205. Distortion may be caused by leaky C200, C202, C206, or C207.



Figure 2. Bottom View, Showing Section 2 Test Points

#### World Radio History

## TROUBLE SHOOTING

#### I-F, DETECTOR, AND A-V-C CIRCUITS

For the tests in this section, use an r-f signal generator, with modulated output, set at 455 kc. Connect the generator ground lead to the chassis, test point C; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

Set the volume control to maximum, and turn the tone control fully clockwise. Rotate the tuning control until the tuning condenser is fully meshed.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 4 (r-f and converter circuits); if not, isolate and correct the trouble in this section.

To provide a complete i-f-amplifier check, test point A for this section is placed at the grid of the mixer in Section 4; therefore, the effectiveness of step 1 as a master check is dependent upon the condition of certain parts in the mixer circuit. These parts are listed below under the "POSSIBLE CAUSE OF ABNORMAL INDICATION."

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	Ā	Loud, clear speaker output with weak signal input.	Trouble in this section. Isolate by the following tests.
2	В	Moderate, clear output with weak input.	[•] Defective: 6AV6 (diode section), 6BA6. Misaligned: Z301. Open: L301A, L301B, R303, R300, C301A, C301B, R301. Shorted: C301C, C301A, C301B, C301D, C300B.
3	Ä	Same as step 1.	Defective: 6BE6°. Misaligned: Z300. Open: L300A, L300B, L404°, C408°. Shorted: C300A, C300B.

* This part, located in another section, may cause abnormal indication in this section.



Figure 3. Bottom View, Showing Section 3 Test Points

#### PD-4908 ALIGNMENT PROCEDURE (REVISED)

	SIGNAL GENERATOR		RADIO			
STEP	CONNECTION TO RAEIO	DIAL SETT <b>IN</b> G	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST	
1	Through .05-mf. condenser to mixer grid (pin 7) of 6BE6.	455 kc.	Depress manual push button. Tune to 1600 kc.	Adjust, in order given, for maximum output. (TC301A and TC300A are reached through holes in bottom of i-f transformers.)	TC301B-2nd i-f sec. TC301A-2nd i-f pri. TC300B-1st i-f sec. TC300A-1st i-f pri.	
2	Through dummy aerial to aerial receptacle. See note below.	455 kc.	Depress any station- selector push button.	Adjust for minimum output.	TC400-i-f trap	
3	Same as step 2.	1605 kc.	Depress manual push button. Set dial at ex- treme high frequency setting.	Adjust for maximum output. (C410 is mounted on TC403 and is accessible through bottom case cover.)	C410 osc.	
4	Same as step 2.	1400 kc.	Depress manual push button. Tune to signal.	Adjust, in order given, for maximum output.	C400B-aerial series C403A-r-f shunt	
5	Same as step 2.	580 kc.	Depress manual push button. Tune to signal.	Adjust for maximum output while rocking tuning control.	TC403-osc. shunt	
6	Repeat steps 3, 4, and 5 unti	l no further in	nprovement is obtained.			
7	Same as step 2.	1200 kc.	Depress push button 5, high frequency, tune to signal at 1200 kc.	Adjust for maximum output.	C400A push button aerial series	
8	8 After installing aerial in car and connecting aerial, depress manual push button and tune to a weak station at or near 1400 kc. Adjust aerial series trimmer C400B for maximum output. Depress high-frequency-station-selector push button, tune it to a weak station at or near 1200 kc., and adjust aerial series trimmer C400A for maximum output.					

1. DUMMY AERIAL: Connect the signal-generator output lead through a 40-mmf. condenser to the aerial receptacle; connect another 40-mmf. condenser from the receptacle to the chassis. IMPORTANT! These instructions for the use of a dummy aerial must be carefully followed otherwise the aerial circuit cannot be aligned.

2. Bottom case cover must be on during alignment.



Figure 6. Top View, Showing Trimmer Locations

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## **TROUBLE SHOOTING**

### **R-F AND CONVERTER CIRCUITS**

For the tests in this section, with the exception of the oscillator test, use an r-f signal generator with modulated output. Connect the generator ground lead to the chassis, test point C; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

Set the volume control to maximum, and turn the tone control fully clockwise. Set the push buttons, the tuning control, and the signal-generator frequency as indicated in the chart.

If the "NORMAL INDICATION" is not obtained in step 1, isolate and correct the trouble in this section. If the trouble is not revealed by the tests for this section, check the alignment.

STEP	TEST POINT	SIGNAL- GENERATOR FREQUENCY	RADIO TUNING	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1(α)	A	1000 kc.	Depress manual push button. Tune to signal.	Loud, clear speaker output with weak signal input.	Trouble in manual-tuning circuits. Iso- late by the tests in steps 2 and 3 and correct trouble before proceeding with step 1(b).
1(b)	A	Tune to fre- quency of each push button.	Depress each station - selector push button.	Same as step 1(a).	Trouble in push-button-tuning circuits. Isolate by the tests in steps 4 and 5.
2	B (Osc. test; see note below.)		Depress manual push button. Tune through range.	Negative 1 to 1.5 volts.	Defective: 6BE6 (osc. section). Open: R405, C407, L404, L401C, C410, C409, PB6. Shorted: L404, L401C, C409, C410, PB1 through PB5, C408.
3	Ā	1000 kc.	Same as step l(a).	Same as step 1(a).	Defective: 6BA6. Open: L403, L401A, L401B, R400, R402, R406, R404, C401, PB6, C400B, R401. Shorted: C403A, C403B, C401, C402, L401A, L401B.
4	B (Osc. test; see note below.)		Same as step l(b).	Negative 1 to 1.5 volts.	Open: oscillator coil or switch associ- ated with push button. Shorted: oscil- lator coil associated with push button.
5	Ā	Same as step 1(b).	Same as step l(b).	Same as step 1(a).	Open: L400B, C404, C400A, aerial coil associated with push button. Shorted: L400B, C400A, C405.

OSCILLATOR TEST: Connect the positive lead of a high-resistance voltmeter to the oscillator cathode (pin 2 of 6BE6), test point D; connect the prod end of the negative lead through a 100,000-ohm isolating resistor to the oscillator grid (pin 1 of 6BE6), test point B. Use a suitable meter range, such as 0—10 volts. Proper operation of the oscillator is indicated by negative voltage of approximately the value given in the chart (measured with 20,000-ohms-per-volt meter) throughout the tuning range.



Figure 4. Bottom View, Showing Section 4 Test Points

## **REPLACEMENT PARTS LIST**

NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory assemblies; also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in any case are so chosen that the operation of the radio will be either unchanged or improved. When ordering replacements, use only the "Service Part No."

#### SECTION 1-POWER SUPPLY

Reference Symbol	Description		Service Part No.
C100	Condenser, feed-through, 300 mmf.		30-1235
C101	Condenser, feed-through, 300 mmf.		30-1235
C102	Condenser, filter, spark, 330 mmf.		62-133001001*
C103	Condenser, filter, "A," .5 mf.		61-0137°
C104	Condenser, buffer, .0033 mf.		61-0109*
C105	Condenser, electrolytic, 4-section		61-0150*
C105Ä	Condenser, filter, 20 mf., 350 v		Part of C105
C105B	Condenser, filter, 10 mf., 350 v		Part of C105
C105C	Condenser, filter, 5 mf., 300 v		Part of C105
L100	Choke,"A" lead		32-1644
L101	Choke, vibrator		32-4170-2
R100	Resistor, damping, 100 ohms		66-1104340°
R101	Resistor, damping, 100 ohms		66-1104340°
R102	Resistor, filter, 1,000 ohms, 1 watt		66-2104340°
R103	Resistor, filter, 4700 ohms, 1 watt		66-2474340*
T100	Transformer, power		32-8314-3
VELOO			83-0025
VBIUU	VIDIGIOI	or	83-0026

#### SECTION 2-AUDIO CIRCUITS

C200	Condenser, d-c blocking, .0047 mf.	45-3502*
C201	Condenser, r-f by-pass, 220 mmf.	30-1224-20*
C202	Condenser, d-c blocking, .0047 mf.	45-3502*
C203	Condenser, tone compensation, .01 mf.	61-0120*
C204	Condenser, inverse feedback, .25 mf.	61-0125*
C205	Condenser, inverse feedback, .1 mf.	61-0113*
C208	Condenser, d-c blocking, .01 mf.	61-0120°
C207	Condenser, d-c blocking, .01 mf.	61-0120*
C208	Condenser, cathode by-pass, 10 mf., 25 v	Part of C105
C209	Condenser, tone compensation, .0068 mf.	45-3500-7*
LS200	Speaker	36-1631
R200	Resistor, volume control 350,000 ohms	33-5557-4
R201	Resistor, tone control, 2 megohms each	
	side of center	Part of R200
R202	Resistor, voltage divider, inverse feed-	
	back, 180 ohms	66-1183340*
R203	Resistor, grid return, 15 megohms	66-6153340*
R204	Resistor, plate load, 220,000 ohms	66-4223340*
R205	Resistor, inverse feedback, 2200 ohms	66-2223340*
R206	Resistor, grid return, 15 megohms	66-6153340*
R207	Resistor, cathode load, 220,000 ohms	66-4223340*
R208	Resistor, plate load, 220.000 ohms	66-4223340*
R209	Resistor, grid return, 470,000 ohms	66-4473340*
R210	Resistor, grid return, 470,000 ohms	66-4473340*
R211	Resistor, cathode bias, 330 ohms	66-1334340*
T200	Transformer, output	32-8316-3
	-	

#### SECTION 3-I-F, DET., AND A-V-C CIRCUITS

C300A	Condenser, fixed, silvered mica	Part of Z300
C300B	Condenser, fixed, silvered mica	Part of Z300
C301A	Condenser, fixed, silvered mica	Part of Z301
C301B	Condenser, fixed, silvered mica	Part of Z301
C301C	Condenser, diode filter	Part of Z301
C301D	Condenser, diode filter	Part of Z301
C302	Condenser, cathode by-pass, .047 mf.	61-0122*
R300	Resistor, cathode bias, 1200 ohms	66-2123340*
R301	Resistor, i-f filter, 22,000 ohms	66-3223340°
R302	Resistor, a-v-c filter, 1 megohm	66-5103340*
R303	Resistor, screen dropping, 27,000 ohms	66-3273340°
TC300A	Tuning core, 1st i-f pri.	Part of Z300
TC300B	Tuning core, 1st i-1 sec.	Part of Z300
TC301A	Tuning core, 2nd i-f pri.	Part of Z301

#### SECTION 3-I-F, DET., AND A-V-C CIRCUITS (Cont.)

Reference Symbol	Description	Service Part No.
TC301B	Tuning core, 2nd i-f sec.	Part of Z301
Z300	Transformer, 1st i-f	32-4160A
Z301	Transformer, 2nd i-f	32-4240A

#### SECTION 4-R-F AND CONVERTER CIRCUITS

C400	Condenser, trimmer, 2-section	63-0035-7
C400A	Condenser, aerial trimmer, PB	Part of C400
C400B	Condenser, aerial trimmer, manual	Part of C400
C401	Condenser, d-c blocking, 180 mmf.	60-10205307
C402	Condenser, cathode by-pass, .047 mf.	61-0122*
2403	Condenser, trimmer, 2-section	31-6513
C403 8	Condenser, variable trimmer	Part of C403
CAO2B	Condenser, fixed trimmer silvered	1011010400
CIUJD	mice 190 mmf	Part of C402
C404	Condonoon band name	Part of 7400
C405	Condenser, bana-pass	Part of 7400
C405	Condenser, 1-1 trap	FUIL 01 2400
	Condenser, d-v-c liller, .U4/ ml.	01-0144
C407	Condenser, d-c blocking, 100 mml.	60-10103407
C408	Condenser, screen by-pass, .047 mi.	61-0122
C409	Condenser, osc. temp. comp., 54.5 mmt.	61-0149 ⁻
C410	Condenser, osc. trimmer and shunt	31-6473-12
L400A	Coil, band-pass	Part of Z400
L400B	Coil, i-f wave trap	Part of Z400
L401A	Coil, aerial, manual	65-0443-16
L401B	Coil, r-f. manual	65-0443-17
L401C	Coil, osc., manual	65-0443-18
L402A		
through	Coil, osc., PB	Part of Z402
L402E		
L402F		
through	Coil, aerial, PB	Part of Z402
L402J		
L403	Choke, interference elimination	65-0437
L404	Coil, osc., shunt	32-4110-2
PBl		
through	Switch assembly, PB	85-0157
PB6		
R400	Resistor, cathode bias, 330 ohms	66-1333340°
R401	Resistor, cathode bias, 330 ohms	
	(manual only)	66-1333340°
R402	Resistor, a-v-c, 2.2 megohms	66-5223340*
R403	Resistor, band-pass, 10,000 ohms	66-3103340°
R404	Resistor, plate load, 10,000 ohms	66-3103340°
R405	Resistor, grid return, 22.000 ohms	66-3223340*
R406	Resistor, grid return, 68,000 ohms	66-3683340*
TC400	Tuning core, i-f trap	Part of Z400
TC401A	Core assembly, aerial	56-3612-7
TC401B	Core assembly, r-f	56-3612-7
TC401C	Core assembly, osc.	56-3612-7
TC402	Core and key assembly	77-0915-3
TC403	Tuning core, osc. shunt	Part of L404
Z400	Transformer, r-f band-pass and i-f trap	32-4349A
Z401	Manual-tunning-unit assembly	76-4564
Z402	Push-button-tuning-unit assembly	76-4560
	a manumentant antitation a second and second and second a second and second a	

#### **MISCELLANEOUS**

#### Service Description Part No. 76-4674-2 "A"-cable assembly 57-0590-1FA3 Antenna socket 56-6685FA8 Bezel 97-0091FA3 Nut, bezel mounting (2 required)

Continued on Page 10



Figure 5. Philco Auto Radio Model PD-4908, Sectionalized Schematic Diagram, Showing Test Points

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## ALIGNMENT PROCEDURE

DIAL POINTER-Set tuning core to full-mesh position. Adjust dial pointer to coincide with index mark, to the left of "55."

OUTPUT METER—Connect across voice coil.

SIGNAL GENERATOR-Connect ground lead to chassis; connect output lead as indicated in chart. Use modulated output.

RADIO CONTROLS-Set volume control to maximum, and tone control fully clockwise. Set tuning control and push buttons as indicated in chart.

OUTPUT LEVEL-During alignment, adjust signalgenerator output to maintain output-meter indication below 1.5 volts.

	SIGNAL GENERA	TOR		RADIO		NOTE- TC 300A AND	
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST	- TC301A ARE LOCATED ON UNDERSIDE OF CHASSIS.	_
1	Through .05-mf. con- denser to mixer grid (pin 7) of 6BE6.	455 kc.	Depress manual push button. Tune to 1600 kc.	Adjust, in order given, for maximum output. (TC301A and TC300A are reached through holes in bottom of i-f transformers.)	TC301B —2nd i-f sec. TC301A—2nd i-f pri. TC300B—1st i-f sec. TC300A—1st i-f pri.		
2	Through .05-mf. con- denser to aerial re- ceptacle.	455 kc.	Depress any sta- tion-selector push button.	Adjust for minimum output.	TC400—i-f trap		1
3	Through dummy aerial to aerial receptacle. See note below.	580 kc.	Depress manual push button. Tune to 580 kc.	Adjust for maximum output while rock- ing tuning control.	ТС403—овс.		2
4	Same as step 3.	1605 kc.	Depress manual push button. Tune to signal.	Adjust, in order given, for maximum output.	C400B—aerial series C403A—r-f shunt		( and the second
5	Same as step 3.	1605 kc.	Depress high-fre- quency push but- ton, previously tuned to signal.	Adjust for maximum output.	C400A—aerial series	GBAG TO	T20
6	Repeat steps 3, 4, and	5 until no fu	urther improvement is c	btained.		GAUS GCA AND	
7	After installing aerial Adjust aerial series trin station near 1400 kc., c	in car and nmer C400B i rnd adjust a	connecting aerial, dep for maximum output. Do erial series trimmer C4	ress manual push button and tune to a st press high-frequency-station-selector push b DOA for maximum output.	ation near 1400 kc. button, tune it to a		

DUMMY AERIAL: Connect the signal-generator output lead through a 40-mmf. condenser to the aerial receptacle; connect another 40-mmf condenser from the receptacle to the chassis. IMPORTANT! These instructions for the use of a dummy aerial must be carefully followed if the radio is to perform at its best after being installed in the car.

#### SETTING THE PUSH BUTTONS

The tuning ranges of the station-selector push buttons are as follows:

- 530-1020 kc. PB1
- 610-1200 kc. PB2
- PB3 700-1410 kc.
- PB4 740-1500 kc.
- PB5 840-1605 kc.

To set the push buttons for the desired stations, proceed as follows:

- 1. Turn on the power, set the tone control to the nearly off position, and set the volume control to give the appropriate volume level.
- 2. Couple the signal generator through a dummy aerial to the aerial receptacle. See DUMMY AERIAL note following the alignment chart.
- 3. Allow the radio to warm up for 15 minutes.
- 4. Starting with the lowest frequency desired, set the signal generator, push the button, and adjust the associated oscillator tuning core and aerial tuning core for maximum output.
- 5. Detune the signal generator and make a final adjustment of the oscillator and aerial tuning cores while listening to the station for which the adjustment is being made.
- 6. Repeat steps 4 and 5 for each remaining station-selector push button.

#### SYMBOLIZATION

The components in the radio circuit are symbolized according to the types of parts and the sections of the radio in which the parts are located. The prefix letter of the symbol designates the type of part as follows:

C—condenser	R—resistor
I—pilot lamp	Sswitch
L-choke or coil	Ttransformer
LS—loud-speaker	Z—electrical assembly

The number of the symbol designates the section in which the part is located, as follows:

- 100-series components are in Section 1-the power supply. 200-series components are in Section 2-the audio circuits. 300-series components are in Section 3-the i-f, detector, and a-v-c circuits.
- 400-series components are in Section 4-the r-f and converter circuits.

Figure 6. Top View, Showing Trimmer Locations

## **REPLACEMENT PARTS LIST-Continued**

Service

#### **MISCELLANEOUS** (Continued)

	DOIAICO	
Description	Part No.	
Clip. ground	28-3445	
Coil-adjusting nut, brass, PB	57-1681	M
Coil-adjustment spring, osc. coil, PB	57-1680FA3	N
Coupling, brass, push-button-adjusting sleeve	57-1700	N
Cover assembly, front	76-4559FA2	Т
Cover, tube side	56-6672FA2	v
Cover, wiring side	76-4667	Pilc
Cover, push button	56-6708FA8	Pin
Dial cord (25-ft. spool)	45-8750*	Poi
Dial scale	56-6681	Scre
Drive-shaft-and-spiral assembly	76-4563	Sho
Drum assembly, tone	76-4568	Shi
โนรอ	57-4273°	Shie
Gasket, speaker, rubber	54203-1	Soc
lousing assembly	76-4557FA2	Soc
Link, PB adjustment	56-4034	Soc
Master kit	13-5182	Spr
Chassis-mtg. nut (2 required)	97-0091FA3	Spr
Chassis-mtg. nut cover	56-6713FA8	Spr
Control knob (2 required)	27-4687-8	Spr
Distributor interference suppressor	76-2270	Spri
Interference capacitor	76-2705	Spr
Lock washer, mounting	1W35050FA1	Spri
Lock washer, mounting bolt	1W35049FA1	Wα
Mounting bolt	1W16109FA3	Wir

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PR-1689



Description

#### **MISCELLANEOUS** (Continued)

Mounting-stud-and-ext.-lock-washer assembly Nut. mounting Nut, mounting bolt Tone-control knob Washer, plain ot lamp ion-and-shaft assembly (manual) inter ew, dial scale mtg. ift, manual tuning ield base, tube ield, tube cket, miniature (8 required) ket, pilot lamp (2 required) cket, vibrator ring, backlash ring clip, grounding ring, cord anchor, tone shaft ring, manual tuner, core-bar support ring, pointer cord ring, tone drum ing, window retaining (2 required) asher, "C," manual shaft ndow, glass

Service Part No.

56-6693FA3 1W21293FA3 1W21291FA3 56-6712FA8 1W52793FA3 34-2039* 76-4562 56-6684 1W19802FA15 56-6688FA3 56-3978FA3 56-3979-1FA3* 27-6203* 76-1677-3 27-6245 57-1705FA1 57-1335 57-1701FA38 56-6696FA1 57-0992-1FA1 57-1701FA38 56-6687FE11 56-2793FA38 54-7755

# AUTO RADIO

SERVICE

# PHILCO-MOPAR AUTO RADIOS

PHILCO MODEL NO.	MOPAR MODEL NO.	PHILCO MODEL NO.	MOPAR	MODEL NO
P-5106	812	C-5110		816
D-5107	813	C-5111		817
C-5109	815			

#### **SPECIFICATIONS**

CABINET	Die cast metal housing for Radio Control Unit
CIRCUIT	8-tube superheterodyne
FREQUENCY RANGE Broadcast	535 kc. to 1605 kc.
AUDIO OUTPUT	5.5 watts
PUSH BUTTONS (7)	5 station selectors, 1 manual tuning, and 1 "off" switch
POWER INPUT	8.6 amp. at 6.6 volts, d.c.
AERIAL	Vertical whip, fender mounting (40 $\mu\mu f$ . series 40 $\mu\mu f$ . shunt)
INTERMEDIATE FREQUENCY	455 kc.
PHILCO TUBES USED	.6BA5, r-f amp.; 6BE6, osc. converter; 6BA6, i-f amp.; 6AV6, det. 1st audio; 6C4, phase con- verter; 6AQ5(2), output; 6X4, rectifier



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#### **Philco TROUBLE-SHOOTING Procedure**

21170

For rapid trouble shooting, the radio circuit is divided into four sections, with test points specified for each section; these sections and test points are indicated in the schematic diagram. The trouble-shooting procedure given for each section includes a simplified test chart and a bottom view of the chassis showing the locations of the test points and the components of that section.

In each chart, the first step is a master check for determining whether trouble exists in that section without going through the entire test procedure.

Failure to obtain the "NORMAL INDICATION" in any given step indicates trouble within the circuit under test.

After isolating the trouble to a single stage, the defect is located by: first, testing the tube; second, measuring tubeelectrode voltages; third, measuring circuit resistances; fourth, substituting condensers. The trouble revealed should be corrected before testing further.

#### **Preliminary Checks**

To avoid possible damage to the radio, the following preliminary checks should be made before it is turned on:

1. Inspect both the top and the bottom of the chassis. Make sure that all tubes are secure in the proper sockets, and look for any broken or shorted connections, burned resistors, or other obvious indications of trouble.

2. Measure the resistance between B+, test point C (pin 7 of 6X4 rectifier) and chassis. When the ohmmeter test leads are connected in the proper polarity, the highest resistance reading will be obtained. If the reading is lower than 3600 ohms, check condensers C104A and C104B for leakage or shorts. The resistance value given is much lower than normal, and is not intended as a quality check of these condensers; the value given is the lowest at which the rectifier will operate safely while the voltage checks of Section 1 (power supply) are performed.

3. A 14-ampere fuse must be used in the "A" circuit when testing the receiver.

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## **TROUBLE SHOOTING ***

#### SECTION 1 - POWER SUPPLY

For the tests in this section, use a d-c voltmeter. Connect the negative lead to the chassis, connect the positive lead to the test points indicated in the chart. The voltage readings given were taken with a 20,000-ohms-per-volt meter at an input voltage of 6.6 volts, d.c.

Turn on the power and select manual operation by depress-

#### SECTION 2 - AUDIO CIRCUITS

For the tests in this section, use an audio-frequency signal generator. Connect the generator ground lead to the chassis, connect the output lead through a  $.1-\mu f$ , condenser to the test points indicated in the chart.

#### SECTION 3 - I-F, DETECTOR, A-V-C, AND 1st AUDIO CIRCUITS

For tests A and C in this section, use an r-f signal generator, with modulated output, set at 455 kc. For test B use an audiofrequency signal generator. Connect the generator ground lead to the chassis; connect the output lead through a  $.1-\mu f$ . condenser to the test points indicated in the chart.

With PB7 depressed, the volume control set at maximum, and the tone control set at MUSIC position, rotate the tuning control until the tuning core is fully meshed.

#### SECTION 4 - R-F AND CONVERTER CIRCUITS

For the tests in this section, with the exception of the oscillator tests, use an r-f signal generator with modulated output. Connect the generator ground lead to the chassis; connect the output lead through the dummy antenna as indicated in the chart.

With the volume control set at maximum, and the tone con-*** SEE CHARTS ON PAGE THREE** 

ing PB7. Set the volume control to minimum, and the tone control to MUSIC position.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 2 (audio circuits); if not, isolate and correct the trouble in this section.

With PB7 depressed, and the tone control set at MUSIC position, set the volume control to maximum. If the "NORMAL INDICATION" is obtained in step 1,

proceed with the tests for Section 3 (i-f, detector, and a-v-c circuits); if not, isolate and correct the trouble in this section.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 4 (r-f and converter circuits); if not, isolate and correct the trouble in this section.

To provide a complete i-f-amplifier check, test point A for this section is placed at the grid of the mixer in Section 4; therefore, the effectiveness of step 1 as a master check is dependent upon the condition of certain parts in the mixer circuit. These parts are listed under the "POSSIBLE CAUSE OF AB-NORMAL INDICATION."

trol set at MUSIC position, set the push buttons, tuning control, and signal-generator frequency as indicated in the chart.

If the "NORMAL INDICATION" is not obtained in step 1, isolate and correct the trouble in this section. If the trouble is not revealed by the tests for this section, check the alignment.

C 2027

6C4

PHASE

6AQ5

OUTPUT

R203

£101

C101

C103

C102

R102

**VB100** 

R101





Figure 5. Philco-Mopar Auto Radio, Sectionalized Schematic Diagram, Showing Test Points

OSCILLATOR TEST: Connect the positive lead of a high-resistance voltmeter to the oscillator cathode (pin 2 of 6BE6), test point C; connect the prod end of the negative lead through a 100,000-ohm isolating resistor to the oscillator grid (pin 1 of 6BE6), test point B. Use a suitable meter range, such as 0-10 volts. Proper operation of the oscillator is indicated by negative voltage of approximately the value given in the chart (measured with 20,000-ohms-per-volt meter) throughout the tuning range.

## ALIGNMENT PROCEDURE

DIAL POINTER-With tuning cores fully meshed, adjust pointer to coincide with index mark at low frequency end of scale, to left of "54".

RADIO CONTROLS-Set volume control to maximum. Set tone control to MUSIC position. Set push buttons and tuning control as indicated in chart.

OUTPUT METER-Connect across voice coil.

SIGNAL GENERATOR-Use AM r-f signal generator, with

modulated output. Connect ground lead to chassis and output lead as indicated in chart.

OUTPUT LEVELS—During alignment, signal-generator output must be attenuated to hold output-meter indication below 1.5 volts.

DUMMY ANTENNA-Connect signal-generator output lead through 40  $\mu\mu f$ . condenser to antenna receptacle; connect another 40 µµf. condenser from antenna receptacle to chassis. It is important that these dummy-antenna instructions be carefully followed if the radio is to perform at its best after being installed in the car.

	SIGNAL GENER	ATOR		RADIO		
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	TRIMMER	
1	Through a .05 pf con- denser to mixer grid, pin 7 of 6BEô.	455 kc	Depress man- ual push but- ton. Tune to 540 kc.	Adjust, in order given, for maximum output.	TC301B - 2nd IF sec. TC301A - 2nd IF Pri. TC300B - 1st IF sec. TC300A - 1st IF Pri.	
2	Through dummy anten- na to antenna recep- tacle. See Alignment Prozedure Note above:	455 kc	Depress any station - select- or button.		TC401 - i-f trap.	
3	Same as Step 2. See Note below.	1605 kc	Depress man- ual push but- ton.	Set pointer to 1605 kc. Adjust for maximum output.	C405C - osc. trimmer.	
4	Same as Step 2.	1400 kc	Depress man- ual push but- ton.	Set pointer to 1400 kc. Adjust for maximum output.	C401 - Ant. Comp. C405B - 18-f trimmer.	
5	Same as Step 2.	580 kc	Depress man- ual push but-	Adjust for maximum output while rock- ing tuning control.	TC402 - osc. shunt.	
6	Same as Step 2.			Repeat steps 3 and 4.		
7	Same as Step 2.			If there was considerable change in step 6, repeat steps 5, 3, and 4 in that order.		
8	Same as Step 2.	1200 kc	Depress PB6.	Set PB6 tuning core to signal (1200 kc) and adiust C400 for maximum output.	C400 - PB Ant. Comp.	
9			Depress man- ual push but- ton.	With the radio and antenna installed, adjust for maximum, using a weak sig- nal at or near 1400 kc.	C401 - Manual Ant. comp.	
10			Depress PB6.	Same as step 9 except use a station at or near 1200 kc.	C400 - PB Ant. Comp.	

NOTE: While performing steps 3 through 8 inclusive, the housing MUST be fastened in place.



Figure 6. Top View, Showing Trimmer Locations



## SETTING PUSH BUTTONS

1. Turn on the power, set the tone control to VOICE position, and set the volume control to give an appropriate volume level.

2. Couple the signal generator through a dummy antenna.

3. Allow the radio to warm up for a period of 15 minutes.

4. Starting with the lowest frequency desired, set the signal generator, depress station-selector PB2, and adjust the associated tuning core for maximum output.

5. Repeat for each remaining station-selector push button in the order listed below.



Figure 8. Dial-Cord Installation Details

TUNING RANGES OF PUSH BUTTONS

PB2	530 — 1020 kc.	TC403A
PB3	610 — 1200 kc.	 TC403B
PB4	700 — 1410 kc.	TC403C
PB5	740 — 1480 kc.	TC403I)
PB6	840 - 1605 kc.	TC403E

6. With the radio and antenna installed make a final adjustment of each tuning core while listening to the station for which the adjustment is being made.

	STEP	TEST POINT	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
	1	Ā	200 V		Trouble in this section. Isolate by the following tests.
	2	В	6.3 V	No Voltage Low Voltage	Open: L100, L101, F100, PB1. Shorted: C100, C101, C102. Leaky: C102, C101, weak battery.
	3	С	215 V	No Voltage Low Voltage High Voltage	Defective: VB100, 6X4, Open: T100, Shorted: C103, C104A. Defective: VB100, 6X4, Leαky: C104A, Shorted: C104B, T100, Open: C104A, T100, Open: R103, R206 ⁺ , T200 ⁺ .
	4	A	200 V	No Voltage Low Voltage	Shorted: C104B. Open: R103. Leaky: C104B. Changed Resistance: R103.
Listening Test: Abnormal hum may be caused by open C104A, C104B, or C103.			4A, C104B, or C103.		

'This part, located in another section, may cause abnormal indication in this section.

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSES OF ABNORMAL INDICATION
1	A	Loud, clear speaker output with moderate generator input.	Trouble in this section. Isolate by the following tests.
2	B (Remove 6C4)	Moderate output with strong input.	Defective: 6AQ5, LS200. Shorted or Leaky: C203, T200, C204, C201. Open: R204, R206, T200, C201.
3	C (Remove 6C4)	Same as step 2.	Defective: 6AQ5. Shorted or leaky: T200, C202. Open: C202, R205, T200.
4	A (Replace 6C4)	Same as step 1.	Defective: 6C4. Shorted or leaky: C200, C301* (rotate R307*), C304*. Open: R200, R201, R202.
Listening Tes	st: Distortion m	ay be caused by leaky C200, C20	)1, or C202.

Alstennig real subtrion may so caused sy today eres, eres, or eres

*This part, located in another section, may cause abnormal indication in this section.

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION	
1	A.	Loud, clear speaker output with weak generator input.	Trouble in this section. Isolate by the following tests.	
2	B†	Loud, clear output with weak input.	Defective: 6AV6. Open: R304, C300, R308, R306. Shorted: C300, C301, C304.	
3	С	Moderate, clear output with weak input.	Defective: 6BA6, 6AV6 (diode sections) Open: R300, Z301, R301, R303. Shorted: Z301, C407*. Misaligned: Z301.	
4	A	Loud, clear output with weak input.	Defective: 6BE5°. Misaligned: Z300. Open: Z300, L402°. Shorted: Z300.	

Listening Test: While performing the test under step 2 rotate tone control R507 throughout its range. Lack of treble attenuation may be caused by open C301 or R307. Lack of bass accentuation may be caused by open R203*, R307, or C302( or by shorted or leaky C302. Distortion may be caused by leaky C300 or C301.

'This part, located in another section, may cause abnormal indication in this section.

STEP	TEST POINT	SIG. GEN. FREQ.	RADIO TUNING	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1(α) 1(b)	A	1000 kc Tune to freq. each push buttoa.	Depress manual push button. Tune to signals, Depress each station selector push button.	Loud, clear speaker output with weak generator input. Same as Step 1(a).	Trouble in manual-tuning circuits. Isolate by the tests in steps 2 and 3, and correct before proceeding with Step 1(b). Trouble in push-button-tuning circuits. Isolate by the tests in Steps 4 and 5.
2	2 B (ocs. test; see note below)		Depress manual push button. Tune through range.	Negative 1 to 1.5 volts.	Defective: 6BE3 (osc. section). Open: R404, C405D, L402, C405C, C406, Man. osc. coil PB7. Shorted: L402, C406, C405C, Man. osc. coil, PB2 through PB6.
3	A	1000 kc	Same as Step 1(a).	Same as Step 1(a).	Defective: 6BA6, 6BE6. Open: L400, Man. ant. or r-f coil, R400, R401, R402, R403, C401, C402, PB7. Shorted: Man. ant. or r-f coil, L401A, C405A, C405B, C402, C404.
4	B (ocs. test; see note below)		Same as Step 1(b).	Negative 1 to 1.5 volts.	Open: L403A-E, PB2-6. Shorted: L403A-E.
5	A	Same as step 1(b).	Same as Step 1(b).	Same as Step 1(a).	Open: C400, L401B, L403F-J. Shorted: C400, L403F-J, L401B.

# SECTION 1

SECTION 2

SECTION 3

SECTION 4

#### **World Radio History**

#### REPLACEMENT PARTS LIST

NOTE: Parts marked with an asterisk (*) are general replacement items, and the numbers may not be identical with those on factory assemblies; also, the electrical values of some replacement items furnished may differ from the values indicated in the schematic and parts list. The values substituted in any case are so chosen that the operation of the radio will be either unchanged or improved. When order-ing replacements, use only the "Service Part No." in this parts list.

SECTION 1

Reference Symbol	Description	Service Part No.
C100	Condenser, feed-through, 300 uuf.	30-1235-1
C101	Condenser, "A" filter, .5 uf.	
C102	Condenser, spark filter, 330 uuf.	62-133001001*
C103	Condenser, buffer, .0047 uf., 1600v	30-4661-1
C104	Condenser, 3-section, electrolytic	61-0086
C104Ā	Condenser, filter, 20 uf., 350v	Part of C104
C104B	Condenser, filter, 10 uf., 350v	Part of C104
F100	Fuse, 14 amp.	45-2559
1100	Pilot lamp, 6.6v	34-2064
1101	Pilot lamp, 6.6v	34-2064
L100	Choke, "Å" legd	32-1644
L101	Choke, vibrator	32-4170-2
PB1	Switch, off-on, Part of 42-1956	67-0046-1
R100	Dimmer control, 15 ohms-P-5106 and D-510	7 33-5568
R101	All Chryslers	33-5568-1
R102	Resistor, damping, 100 ohms, 1 watt	66-1104340*
R103	Resistor, damping, 100 ohms, 1 watt	66-1104340°
T100	Resistor, filter, 1000 ohms, 1 watt	66-2104340°
	Trausformer, power	32-8313-1*
VB100	Vibrator	83-0025

#### SECTION 2

C200	Condenser, d-c blocking, .0047 uf.	45-3505-56*
C201	Condenser, d-c blocking, .01 uf.	45-3505-41*
C202	Condenser, d-c blocking, .01 uf.	45-3505-41*
C203	Condenser, electrolytic, cathode by-pass,	
	20 uf., 25v	Part of C104
C20 +	Condenser, tone compensation, .0068 uf.	45-3505-91*
LS200	Speaker	36-1631*
R2Ó0	Resistor, grid return, 15 megohms	66-6158340*
K201	Resistor, plate load, 220,000 ohms	66-4228340*
R202	Resistor, cathode load, 220,000 ohms	66-4228340*
R203	Resistor, feedback, 2200 ohms	66-2228340*
R204	Resistor, grid return, 470,000 ohms	66-4478340*
R205	Resistor, grid return, 470,000 ohms	66-4478340*
R206	Resistor, Čathode bias, 330 ohms, 1 watt	66-1334340*
T200	Transformer, output	32-8316*

#### SECTION 3

C300 C301	Condenser, d-c blocking, .0047 uf. 45-3505-56° Condenser, tone compensation.	
	hi-cut, .01 uf	
C302	Condenser inverse feedback, .1 uf. 45-3505-30*	
C333	Condenser, inverse feedback, .25 uf. 61-0125*	
C394	Condenser, r-f by-pass, 100 uuf	
R300	Resistor, cathode blas, 330 ohms	
R301	Resistor, dropping, 27,000 ohms, 1 watt 66-3274340*	
R302	Resistor, a-v-c filter, 1 megohm	
R303	Resistor, i-f filter, 22,000 ohms 66-3228340*	
R304	Volume control, 350,000 ohms-All Chryslers 33-5557-10	
	P-5106 and P-5107 33-5557-9	
R305	Resistor, voltage divider, inverse feedback,	
	180 ohms	
R306	Resistor, plate load, 220,000 ohms	
R307	Tone control, 2 megohms each side	
	of center	Ŗ.
R308	Resistor, grid return, 15 megohms 66-6158340*	
Z300	Transformer, 1st i-f 32-4160A	
7301	Transformer, 2nd i-f 32-4240A	

#### **SECTION 4**

C400 C401 C402 C403 C405A C405A C405B C405B C405D C405D C407 C409 L400 L400 L400 L401 L402 L403F L403F L403G L403H L403I L403I L403J	Condenser, antenna compensator, PB Condenser, artenna compensator, man. Condenser, d-c blocking, 56 uuj. Condenser, i-f trap, 39 uuf. Condenser, i-f trap, 39 uuf. Condenser, trimmer assembly Condenser, trimmer assembly Condenser, trimmer Condenser, cost. trimmer Condenser, osc. trimmer Condenser, d-c blocking, 56 uuf. Condenser, d-c blocking, 56 uuf. Condenser, a-v-c filter, .047 uf. Condenser, osc. temp. comp., 54.5 uuf. Condenser, osc. temp. comp., 54.5 uuf. Coli, sic. trap and PB r-1 Coil, osc. shunt Coil, osc. PB2 Coil, osc. PB2 Coil, osc. PB4 Coil, osc. PB5 Coil, osc. PB5	Part of Z401 Part of Z401 60-00565417 60-00395417 60-00105407* 31-6522-2 Part of C405 Part of C405 Part of C405 Part of C405 45-3505-28* 61-0149 32-4422-24 32-4422-24 32-4410-5 Part of Z401 32-4179-6 32-4179-7 32-4179-7 32-4179-9
PB2 through PB7 B400	Switch, push button	42-1956
11100	reprototy controuc prody 000 0111113	00.100000

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#### **SECTION 4 (Continued)**

Reterence		Service
Symbol	Description	Part No.
R401	Resistor, cathode bias, 330 ohms	66-1338340*
R402 R403	Resistor, grid return, 68,000 ohms Resistor, plate load, 10,000 ohms	
R404	Resistor, grid return, 22,000 ohms	66-3228340*
2400	P-5106 and D-5107	76-6634-1
Z401	Antenna coil assy., PB	76-4602-1

#### **MISCELLANEOUS**

Service Part No.

P-5106	
Bezel and stud assy.	
Dial scale and background assy.	
Housing, radio control unit	
Pointer	56-8850
Window, glass	54-8357
Master Kit	
Condenser, interference	30-4007-3
Lockwasher, No. 10 split (4), power unit mtg.	1W24258FA1
Knob assy., tuning and volume (2)	
Knob assy., tone and dimmer (2)	76-5590
Nut, 10-32 (4), power unit mtg.	1W19991FA3
Nut (2), radio control unit mtg., front Screw and cup washer, radio control unit mtg.,	97-0091FA3
side	56-6190-13FA1

#### D-5107

Description

Bezel and stud assy.	76-6662
Dial scale and background assy.	76-6655
Housing, radio control unit	
Pointer	56-8906
Window, glass	54-8366
Master Kit	
Bracket, power unit mtg.	56-8929FA3
Condenser, interference	30-4007-3
Hook bolt, radio control unit mtg., back	
Knob assy., tuning and volume (2)	27-4687-13
Knob assy., tone and dimmer (2)	76-6676
Nut, bracket mtg. (2)	56-8930FE7
Nut, radio control unit mtg., front (2)	97-0091FA3
Scew, 10-32 x 9/16", powe unit mtg., lowe	(2) IW11513FA1
Wind nut, nook polt	IW23750FA3

#### Chrysier, All Models

Bezel	
Dial scale and background assyC-5109	76-6656
C-5110	76-6656-1
C-5111	
Housing, bracket, and rivet assy., radio control unit	76-6680
Pointer	56-8935
Knob assy., tuning and volume (2)-C-5109 and C-5110	27-4687-9
C-5111	27-4687-10
knob assy., tone and dimmer (2)-C-5109 and C-5110	57-1682-7FA8
Window minstin	57-1682-6FA54
Window, plushe	54-8370
Muster Kit	
Condenser, interierence	30-4007-3
Lockwasher, No. 10 split (4), radio control unit mtg.	
and speaker lower mtg.	1W24258FA1
Lockwasher (2), speaker upper mtg.	1W35047FA1
Nut, 10—32 (5), power unit mtg. and	
speaker upper mtg.	1W19991FA3
Screw, power unit mtg., lower	1W11881FA3
Stud (3), radio control unit mtg.	56-8937FA3
Stud and spacer (2), speaker upper mtg.	77-0400-1

#### Parts Common to All Models

"A" lead	41-3910-7-15
Adjusting shaft (2), ant. comp.	54-4872
Retainer spring, adj. shaft	56-8965
Clamp, vibrator	57-1637-3
Clip, dial lamp mtg. (2)	56-3545-5
Cover, tube side, radio control unit	56-8851
Drive cord, 25 ft. spool	45-8750*
Fuse lead	41-3910-10
Pilot lamp socket assy., RH	27-6233-52
Pilot lamp socket assy., LH	27-6233-55
Power cable and plug assy. Post	41-4075
Power socket	27-6273
Push button cover (7)-P-5106, D-5107, C-5109, C-5110	56-6708FA8
C-5111	56-6708-1FA54
Core and key assy. (5)	77-0915-5
Key (2)	56-7637-2
Link (5)	56-8852
Socket, miniature (3), 6BA6 (2) and 6BE6	27-6203
Socket, miniature (5)	27-6203-12
Socket, vibrator	27-6245
Spring, pointer cord guide	. 56-8913
Tone drum	76-4568
Spring, tone cord tension	28-8945
Spring, tone cord anchor	57-1701FA3

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## SERVICE INFORMATION FOR PHILCO-MOPAR AUTO RADIOS







PLYMOUTH

DODGE

CHRYSLER

Figure 1.	Philco-Mopar Auto	Radios
		MODAD

PHILCO MODEL NO.	MOPAR	MODEL	NO.
P-5206		819	
D-5207		82 <mark>0</mark>	
С-5209		824	

	SPECIFIC	CATIONS
CABINET	Die cost or sheet metal housing for Radio Control Unit	POWER INPUT
FREQUENCY RANGE	7-tube superheterodyne (plus rectifier)	(40 $\mu\mu f.$ series—40 $\mu\mu f.$ shunt) INTERMEDIATE FREQUENCY455 kc.
Broadcast AUDIO OUTPUT	535 kc. to 1605 kc.	PHILCO TUBES USED
PUSH BUTTONS (7)	ing, and 1 "off" switch	verter; 6AQ5 (2), output; 6X4, r tifier

#### Philco TROUBLE-SHOOTING Procedure

In order to aid the serviceman in performing rapid trouble shooting of the radio, this manual contains a schematic which shows the radio circuit divided into four functional sections; a trouble-shooting procedure and chart on each section; pictorial views of the chassis, showing the locations of component parts; and an alignment procedure.

The first step in each of the trouble-shooting charts is a master check, for determining whether trouble exists in that section. If there is a normal indication on this first step, the remaining steps need not be performed. Failure to obtain the "NORMAL INDICATION" in any given step indicates trouble within that section.

After isolating the trouble to a single stage, the defect is located by: first, testing the tube; second, measuring tube-electrode voltages; third, measuring circuit resistances. In any case, the trouble revealed should be corrected before testing further.

#### **Preliminary Checks**

To avoid possible damage to the radio, the following preliminary checks should be made before it is turned on:

1. Inspect both the top and the bottom of the chassis. Make sure that all tubes are secure in the proper sockets, and look for any broken or shorted connections, burned resistors, or other obvious indications of trouble.

2. Measure the resistance between B+, test point C (pin 7 of 6X4 rectifier) and chassis. When the ohmmeter test leads are connected in the proper polarity, the highest resistance reading will be obtained. If the reading is lower than 3600 ohms, check condensers C104A and C104B for leakage or shorts. The resistance value given is much lower than normal, and is not intended as a quality check of these condensers; the value given is the lowest at which the rectifier will operate safely while the voltage checks of Section 1 (power supply) are performed.

3. A 14-ampere fuse must be used in the "A" circuit when testing the receiver.

PR-2408

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## **TROUBLE SHOOTING ***

#### SECTION 1-POWER SUPPLY

For the tests in this section, use a d-c voltmeter. Connect the negative lead to the chassis; connect the positive lead to the test points indicated in the chart. The voltage readings given were taken with a 20,000-ohmsper-volt voltmeter at an input voltage of 6.6 volts, d.c. Turn on the power and select manual operation by

#### SECTION 2-AUDIO CIRCUITS

For the tests in this section, use an audio-frequency signal generator. Connect the generator ground lead to the chassis; connect the ouput lead through a  $.1-\mu f$ . condenser to the test points indicated in the chart.

With PB7 depressed, and the tone control set at

#### SECTION 3---I-F, DETECTOR, A-V-C, AND 1st AUDIO CIRCUITS

For tests A and C in this section, use an r-f signal generator, with modulated output, set at 455 kc. For test B use an audio-frequency signal generator. Connect the generator ground lead to the chassis; connect the output lead through a .1-µf. condenser to the test points indicated in the chart.

With PB7 depressed, the volume control set at maximum, and the tone control set at MUSIC position, rotate the tuning control until the tuning core is fully meshed.

#### SECTION 4-R-F AND CONVERTER CIRCUITS

For the tests in this section, with the exception of the oscillator tests, use an r-f signal generator with modulated output. Connect the generator ground lead to the chassis; connect the output lead through the dummy antenna as indicated in the chart.

With the volume control set at maximum, and the tone control set at MUSIC position, set the push butdepressing PB7. Set the volume control to minimum, and the tone control to MUSIC position.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 2 (audio circuits); if not, isolate and correct the trouble in this section.

MUSIC position, set the volume control to maximum. If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 3 (i-f, detector, a-v-c, and 1st audio circuits); if not, isolate and correct the trouble in this section.

If the "NORMAL INDICATION" is obtained in step 1, proceed with the tests for Section 4 (r-f and converter circuits); if not, isolate and correct the trouble in this section.

To provide a complete i-f-amplifier check, test point A for this section is placed at the grid of the mixer in Section 4; therefore, the effectiveness of step 1 as a master check is dependent upon the condition of certain parts in the mixer circuit. These parts are listed under the "POSSIBLE CAUSE OF ABNORMAL INDICATION."

tons, tuning control, and signal-generator frequency as indicated in the chart.

If the "NORMAL INDICATION" is not obtained in step 1, isolate and correct the trouble in this section. If the trouble is not revealed by the tests for this section, check the alignment.



#### *** SEE CHARTS ON PAGE THREE**

Figure 2. Top View, Showing Parts Placement in Radio Control Unit

#### PHILCO-MOPAR AUTO RADIOS

ſ	STEP	TEST POINT	NORMAL	ABNORMAL	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	1	A	200*		If the indication is abnormal, proceed with step 2.
	2	В	6.3v	No voltage Low voltage	Open: L100, L101, F100, PB1. Shorted: C100, C101, C102. Leaky: C102, C101. Weak bottery.
SECTION	3	с	215*	No voltage Low voltage High voltage	Defective: VB100, 6X4. Open: T100. Shorted: C103, C104A. Defective: VB100, 6X4. Leaky: C104A. Shorted: C104B, T100. Open: C104A, T100. Open R103, R206 ^a , T200 ^a .
ľ	4	A	200+	No voltage Low voltage	Shorted: C104B. Open: R103. Leaky: C104B. Changed resistance: R103.
	Listening Te	l st: Abnormal hi	um may be caused	by open C104A, C1	04B, or C103.

SECTION 2

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION		
1	A Loud, clear speaker output with moderate generator input.		A Loud, clear speaker output with If moderate generator input.		If the indication is obnormal, proceed with step 2.
2	B (Remove 6C4)	Moderate output with strong input.	Defective: 6AQ5, LS200. Shorted or leaky: C203, T200, C204, C201. Open: R204, R206, T200, C201.		
3	C (Remove 6C4)	Same as step 2.	Defective: 6AQ5. Shorted or leaky: T200, C202. Open: C202, R205, T200.		
4	A (Replace 6C4)	Same as step 1.	Defective: 6C4. Shorted or leaky: C200, C301© (rotate R307©), C304©. Open: R200, R201, R202.		

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear speaker output with weak generator input.	If the indication is abnormal, proceed with step 2.
2	B†	Loud, clear autput with weak input.	Defective: 6AV6. Open: R304, C300, R308, R306. Shorted: C300, C301, C304.
3	c	Mcderate, clear output with weak input.	Defective: 6BA6, 6AV6 (diode sections). Open: R300, Z301, R301, R303. Shorted: Z301, C407 th . Misaligned: Z301.
4	A	Loud, clear output with weak input.	Defective: 68E6 [®] . Misoligned: Z300. Open: Z300, L402 [®] . Shorted: Z300.

Lack of treble attenuation may be caused by open C301 or R307. Lack of bass accentual or C302 (or by shorted or leaky C302). Distortion may be caused by leaky C300 or C301.

	STEP	TEST	SIG. GEN. FREQ.	RADIO TUNING	NORMAL	POSSIBLE CAUSE OF ABNORMAL INDICATION
	1 (а) 1 (b)	A A	1000 kc. Tune to freq. each push button.	Depress manual push button. Tune to signal. Depress each station selector push button.	Loud, clear speaker output with weak generator input. Same as step 1(a).	Trouble in manual-tuning circuits. Isolate by the tests in steps 2 and 3, and correct before proceeding with step 1(b). Trouble in push-button-tuning circuits. Isolate by the tests in steps 4 and 5.
+ NO	2	B (osc.test; see note below)		Tune through range.	Negative 1 to 1.5 volts.	Defective: 6BE6 (osc. section). Open: R404, C405D, L402, C405C, C406, man. osc. coil, PB7. Shorted: L402, C406, C405C, man. osc. coll, PB2 through PB6.
SLCT	3	A	1000 kc.	Same as step 1(a).	Same as step 1(a).	Defective: 6BA6, 6BE6. Open: L400, man. ant. or r-f coil, R400, R401, R402, R403, C401, C402, PB7. Shorted: man. ant. or r-f coil, L401A, C405A, C405B, C402, C404.
	4	B (osc.test; see note below)		Same as step 1(b).	Negative 1 to 1.5 volts.	Open: L403F-J, PB2-6. Shorted: L403F-J.
Ĩ	5	A	Same as step 1 (b).	Same as step 1(b).	Same as step 1(a),	Open: C400, L401B, L403A-E. Shorted: C400, L403A-E, L401B.

* This part, located in another section, may cause abnormal indication in this section.

OSCILLATOR TEST: Connect the positive lead of a highresistance voltmeter to the oscillator cathode (pin 2 of 6BE6), test point C; connect the negative lead through a 100,000-ohm isolating resistor to the oscillator  $g_{\tau id}$  (pin 1 of 6BE6), test point B. Use a suitable meter range, such as 0-10 volts. Proper operation of the oscillator is indicated by negative voltage of approximately the value given in the trouble-shooting chart (measured with 20,000-ohms-per-volt voltmeter) throughout the tuning range.



Figure 3. Front View, Showing Parts Placement in Radio Control Unit



Figure 4. Base View, Showing Parts Placement in Power Unit World Radio History

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**RADIO CONTROL CHASSIS** 



Figure 5. Philco-Mopar Auto Radio, Sectionalized Schematic Diagram, Showing **Test Points** 

PHILCO-MOPAR AUTO RADIOS

## **POWER UNIT AND SPEAKER**

TP2-2227

6

## ALIGNMENT PROCEDURE

DIAL POINTER-With tuning cores fully meshed, adjust pointer to coincide with index mark at low-frequency end of scale, to left of "54".

RADIO CONTROLS-Set volume control to maximum. Set tone control to MUSIC position. Set push buttons and tuning control as indicated in chart.

OUTPUT METER-Connect across voice coil.

SIGNAL GENERATOR-Use AM r-f signal generator, with modulated output. Connect ground lead to chassis and output lead as indicated in chart.

OUTPUT LEVEL-During alignment, signal-generator output must be attenuated to hold output-meter indication below 1.5 volts.

DUMMY ANTENNA-Connect signal-generator output lead through 40-µµf. condenser to antenna receptacle; connect another 40- $\mu\mu$ f. condenser from antenna receptacle to chassis. It is important that these dummy-antenna instructions be carefully followed if the radio is to perform at its best after being installed in the car.

	SIGNAL GENE	RATOR		RADIO	
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST TRIMMER
1	Through a .05-µf. condenser to mixer grid, pin 7 of 6BE6.	455 kc.	Depress man- ual push but- ton. Tune to 540 kc.	Adjust, in order given, for maximum output.	TC301B - 2nd i-f sec. TC301A - 2nd i-f pri. TC300B - 1st i-f sec. TC300A - 1st i-f pri.
2	Through dummy an- tenna to antenna receptacle. S e e Alignment Proced- ure Note above.	455 kc.	Depress any station- selector but- ton.	Adjust for minimum output.	TC401 - i-f trap.
3	Same as step 2. See Note below.	1605 kc.	Depress man- ual push but- ton.	Set pointer to 1605 kc. Adjust for maximum output.	C405C - osc. trimmer.
4	Same as step 2.	1400 kc.	Depress man- ual push but- ton.	Set pointer to 1400 kc. Adjust for maximum output.	C401 - ant. comp. C405B - r-f trimmer.
5	Same as step 2.	580 kc.	Depress man- ual push but- ton.	Adjust for maximum output while rocking tuning control.	TC402 - osc. shunt.
6	Same as step 2.			Repeat steps 3 and 4.	
7	Same as step 2.			If there was considerable change in step 6, repeat steps 5, 3, and 4 in that order.	
8	Same as step 2.	1200 kc.	Depress PB6.	Set PB6 tuning core to signal (1200 kc.), and adjust C400 for maximum output.	C400 - PB ant. comp.
9			Depress man- ual push but- ton.	With the radio and antenna installed, adjust for maximum, using a weak sig- nal at or near 1400 kc.	C401 - manual ant. comp.
10			Depress PB6.	Same as step 9 except use a station at or near 1200 kc.	C400 - PB ant. comp.

NOTE: While performing steps 3 through 8 inclusive, the housing MUST be fastened in place.

STEP	ADJUST TRIMMER
	TC301B 2nd i-f sec.
	TC301A 2nd i-f pri.
'	TC300B 1st i-f sec.
	TC300A 1st i-f pri.
2	TC401 i-f trap
3	C405C osc. trimmer
4	C401 ant. comp.
	C405B r-f trimmer
5	TC402 osc. shunt
8	C400 PB ant. comp.
9	C401 man. ant. comp.
10	C400 PB ant. comp.



Figure 6. Top View, Radio Control Unit, Showing Trimmer Locations

#### PHILCO-MOPAR AUTO RADIOS



Figure 7. Bottom View, Radio Control Unit, Showing Trimmer Locations

# SETTING PUSH BUTTONS

1. Turn on the power, set the tone control to VOICE position, and set the volume control to give an appropriate volume level.

2. Allow the radio to warm up for a period of 15 minutes. 3. Couple the signal generator through a dummy antenna. 4. Starting with the lowest frequency desired, set the signal generator, depress station-selector push button PB2, and adjust the associated tuning core for maximum output.

5. Repeat for each remaining station-selector push button in the order listed below.

PB2 PB3 **PB4** PB5 PB6



D-5207 - 13 5/8 6-5209 - 14 % P-5206 - 14 1/1

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TUNING RANGES OF PUSH BUTTONS

 530 - 1020	kc.		, .		 TC403A
 610 — 1200	kc.				 TC403B
 700 - 1410	kc.				TC403C
740 — 1480	kc.				 TC403D
840 - 1605	kc.				TC403E

6. With the radio and antenna installed make a final adjustment of each tuning core while listening to the station for which the adjustment is being made.

#### PHILCO-MOPAR AUTO RADIOS



Figure 9. Power Unit, Top View

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## **REPLACEMENT PARTS LIST**

NOTE: Part numbers identified by an asterisk (*) are general replacement items, commonly stocked by the serviceman. The electrical values of some replacement items furnished may differ from the values indicated in the schematic diagram and parts list, but the values substituted in any case are so chosen that the operation of the radio will be either unchanged or improved. When ordering replacements, use only the "Service Part No." in this parts list.

Reference Symbol	Description P	art No.	Reference Symbol	Description	Part No.
	SECTION 1-POWER SUPPLY		R200	Resistor, grid return, 15 megohms	66-6158340*
6100		1226 1	R201	Resistor, plate load, 220,000 ohms	.66-4228340*
C100	Condenser, feed-through, $300\mu\mu f$ . $30-1$	233-1	R202	Resistor, cathode load, 220,000 ohms	66-4228340*
CIUI	Condenser, A filter, 5 µf.	1-013/	R203	Resistor, feedback, 2200 ohms	66-2228340*
C102	Condenser, spark filter, 330 µµt. 62-1330	01001	R204	Resistor, grid return, 470,000 ohms	.66-4478340*
C103	Condenser, buffer, $.0047 \mu f.$ , $1600v = 30-4$	1001-1	R205	Resistor, grid return, 470,000 ohms	.66-4478340*
C104	Condenser, 3-section, electrolytic 6.	1-0086	R206	Resistor, cathode bias, 330 ohms, 1	
C104A	Condenser, filter, 20 µf., 350v Part of	C104		watt	66-1334340*
C104B	Condenser, filter, 10 µt., 350v Part of	C104	<b>T200</b>	Transformer, output	32-8316-7
F100	Fuse, 14 amp. 4	5-2559			411010
1100	Pilot lamp, 5.3v 34	4-2064	SECT	TION 3-1-F, DEL., A-V-C, AND 1st	AUDIO
1101	Pilot lamp, 6.3v 34	1-2064		CIRCUITS	
L100	Choke, "A" lead	2-1644	<b>Ca</b> a a		10 2000 0/4
L101	Choke, vibrator 32-4	4170-4	C300	Condenser, d-c blocking, .0047 µt.	42-3202-20*
P <b>B</b> 1	Switch, off-on (part of push button switch assembly) 67-1	0046-1	C301	.01 uf.	ut, 45-3505-41*
R100	Dimmer control, 15 ohms	00101	C302	Condenser, inverse feedback, .1 µf.	45-3505-30*
	Model P-5206 33.	5568.2	C303	Condenser, inverse feedback, .25 µf.	
	Model D-5207 33.	5568.3	C304	Condenser, r-f by-pass, 100 µµf.	60-10105407*
	Model C-5209 33-	5568-1	R300	Resistor, cathode bias, 330 ohms	66-1338340*
R101	Resistor, damping, 100 ohms 1 watt 66-11	04340	R301	Resistor, dropping, 27,000 ohms, 1	
R102	Resistor, damping, 100 ohms, 1 watt 66-11	04340*		watt	.66-3274340*
R103	Resistor, filter, 1000 ohms, 1 watt 66-21	04340*	R 302	Resistor, a-v-c filter, 1 megohm	.66-5108340*
T100	Transformer, power 32.	8313.1	R 303	Resistor, i-f filter, 22,000 ohms	66-3228340*
VB100	Vibrator	5-6711	R 304	Volume control, 350,000 ohms	
	1			Model P-5206	33-5557-11
	SECTION 2-AUDIO CIRCUITS			Model D-5207	
				Model C-5209	33-5557-13
C200	Condenser, d-c blocking, .0047 µf. 45-33	505-56*	R 305	Resistor, voltage divider, inverse fee	edback,
C201	Condenser, d-c blocking, .01 µf. 45-3	505-41*		180 ohms	.66-1188340*
C202	Condenser, d-c blocking, .01 µf. 45-3	505-41*	R 306	Resistor, plate load, 220,000 ohms	66-4228340*
C203	Condenser, electrolytic, cathode by-pass.		R 307	Tone control, 2 megohms each side	of
	20µf., 25v Part o	E C104	10,07	center F	Part of R304
C204	Condenser, tone compensation0068		R 308	Resistor, grid return, 15 megohms	66-6158340*
	μf	505-91*	7.300	Transformer, 1st i-f	32-4160A
LS200	Speaker 36-	1631-2	Z301	Transmormer, 2nd i-f	

Reference

Symbol

## **REPLACEMENT PARTS LIST (Continued)**

Service

Part No.

#### Service Description Part No. Background plate . . 56-9938 Housing, radio control unit 76-8164FA3 56-8906-1 Pointer Bezel overlay Master Kit Bracket, strap 28-9027FA3 Bracket, mtg. 30-4007-5 Condenser, interference Knob ass'y. (2), tuning and volume 27-4687-19 Knob ass'y. (2), tone and dimmer 57-1682-4FA8 Nut (2), radio control unit mtg., front 97-0091FA3 Nut and washer, power unit mtg. W2589-4FA3 W2600FA1 Screw Screw (2), 10-32, power unit mtg., lower 1W11514FA3 Screw and cupped washer ass'y. (2) 56-6190-17

#### MODEL C-5209 ONLY

. .

#### PARTS COMMON TO ALL MODELS

"A" lead	41-3910-16
Adjusting shaft (2), ant. comp.	
Retainer spring, adj. shaft	
Clip (2), dial lamp mtg.	
Cover, tube side, radio control unit	56-8851
Drive cord, 25-ft. spool	
Foot, disk	
Fuse lead	
Model P-5206	41-3910-8
Models D-5207, C-5209	41-3910-10
Pilot lamp socket ass'y., r. h.	
Models P-5206, D-5207	27-6233-4
Model C-5209	27-6233-52
Pilot lamp socket ass'y., l. h.	
Power cable and plug ass'y.	
Model D-5207	41-4075-2
Models C-5209, P-5206	41-4075-1
Power socket	
Push button cover (7)	56-6708FA8
Core and key ass'y.	
Models P-5206, D-5207 (5)	
Model C-5209(7)	
Key (2), Models P-5206, D-5207	
Link (5)	
Socket, antenna	57-1243FA3
Socket, miniature (3), 6BA6 (2), and 6BE6	27-6203
Socket, miniature (5)	27-6203-12
Socket, vibrator	27-6245
Spring, pointer-cord guide	56-8913
Spring, PB tension, Models P-5206, D-5207	56-9406-1
Tone drum	76-4568
Spring tone-cord tension	28-8945
Spring, tone-cord tension	57.1701FA3
opring, tone-cord anchor	JITIOILAJ
Shart and pully ass y., manual tuning	110 6212 2
Model D-5207	
Models P-5206, C-5209	

#### Description SECTION 4-R-F AND CONVERTER CIRCUITS

C400	Condenser, antenna compensator, PB Part of 7401
C401	Condenser, antenna compensator,
C (02	Condenses de bloching 56 mil 60.00565417
C402	Condenser, d-c blocking, 50 $\mu\mu$ i
C405	Condenser, 1-1 trap, $39 \ \mu\mu$ 1
C404	Condenser, manual r-t shunt, 10 $\mu\mu f$ . 60-00105407*
C405	Condenser, trimmer assembly
C405A	Condenser, fixed Part of C405
C405B	Condenser, r-f trimmer
C405C	Condenser, osc. trimmer
C405D	Condenser, d-c blocking, 60 µµf. Part of C405
C406	Condenser osc temp comp. 65 unf 30-1224-87
C407	Condenser, by pass 047 uf 45.3505-28*
C40/	Condenser, by pass, $1047 \ \mu$ i
C408	Condenser, a-v-c niter, $.047 \ \mu i$
C409	Condenser, $B + $ decoupling, $.04/ \mu I$ . $.30-4050-02$
L400	Choke, spark-interference elimination 32-4422-24
L401	Coil, i-f trap and PB r-f
L402	Coil, osc. shunt
L403A-E	Coil, antenna Part of Z401
L403F	Coil, osc. PB2 32-4179-5
L403G	Coil. osc. PB3 32-4179-6
1403H	Coil osc PB4 32-4179-7
14031	Coil osc PB5 32-4170-9
1 4021	Coll as DP6 22 /170 0
L403J	Coll, OSC. PD0
PBZ	
through	6 1 1 1 1 1 (2.105)
PB/	Switch assembly, push button
K400	Resistor, cathode bias, 120 ohms 66-1128340*
R401	Resistor, cathode bias, 330 ohms 66-1338340*
R402	Resistor, grid return, 68,000 ohms 66-3688340*
R403	Resistor, plate load, 10,000 ohms 66-3108340*
R404	Resistor, grid return, 22,000 ohms 66-3228340*
Z400	Manual tuning unit assembly
	Model P-5206 76-6634-3
	Model D-5207 76-6634-2
	Model C-5209 76-6634-1
	Coil antenna (all models) 312-5120
	Coil, aft (all models) $3125129$
	Coll, r-r (all models) $312-3129-1$
<b>H</b> ( <b>a</b> 4	Coll, Oscillator (all models) 512-5151
<b>Z401</b>	
	MODEL P-5206 ONLY
Bezel and b	ushing ass'y
Dial_scale	
Backgro	ound plate 56-9953-1
Frame, push	1-button ass'y
Housing ass	'y., radio control unit
Pointer	56-8906
Window, gla	ass
Master Kit	
Bracket	29 0020F 4 3
Dracket	angle 20-0020E43
Bracket.	, strap 28-9028FA3
Conden	ser, interference 30-4007-5
Lock wa	asher, No. 10 split, power unit mtg. 1W52427FA3
Knob a	ss'v (2) tuning and volume 27.4687.10
Kaab a	(2), (2), (2), (2), (2), (2), (2), (3), (3), (3), (3), (3), (3), (3), (3
Knod a	ss y. (2), tone and dimmer
Nut, 10	-52 (2), power unit mtg. W2589-4FA3
Stud as	s'y., power unit mtg. 76-7897
Nut (2	), radio control unit mtg. front 97.0001FA2
Spacer	(2) mounting bose st out
Score	
Screw a	ind cup washer (2), radio control unit
mtg.,	side
Screw a	nd lock, 10-32, power unit mtg. 1W31813FA1
	MODEL D-5207 ONLY
Bezel and hu	shing ass'v. 76.7014
Dial scale	
	34-3158

World Radio History

#### PRINTED IN U.S.A.

# PHILCO AUTO RADIO MODELS P-5506 and C-5509



PHILCO

Factory-Supervised

#### SPECIFICATIONS

CIRCUIT 7	tube superhetrodyne (plus rectifier)	
FREQUENCY RANGE	540 kc. to 1605 kc.	
AUDIO OUTPUT	5.5 watts	
PUSH BUTTONS (6)	5 station selectors and	
	1 "off" switch	
POWER INPUT	8.6 amp. at 6.6 volts, d.c.	
AERIAL		
	(40mmf series — 40mmf shunt)	
INTERMEDIATE FREQ	UENCY 265 kc	
PHILCO TUBES USED	6BA6, r-f amp.;	
6BE6, osc. converter; 6BA6, i-f amp.;		
6AV6, det. avc. 1st audio; 6C4, phase inverter;		
6A(	25 (2), audio output; 6X4, rectifier.	



Top View Showing Component Layout



Bottom View Showing Component Layout

MOPAR MODEL NO. PHILCO MODEL NO. 832 P-5506 835 C-5509



Model C-5509



Model P-5506

#### ALIGNMENT PROCEDURE

GENERAL - The cover must be removed in order to perform the alignment procedure. Allow the set and the test equipment to warm up for fifteen minutes before starting the alignment procedure. Make sure that all plugs and cables are connected to their proper receptacles.

OUTPUT INDICATOR - Connect the output indicator (an oscilloscope or a 1000-ohms-per-volt, a-c voltmeter) across the voice-coil terminals.

SIGNAL GENERATOR — Use an AM r-f signal generator. Connect the ground lead to the chassis, and the output lead as indicated in the alignment chart.

OUTPUT LEVEL - Attenuate the signal-generator output throughout the procedure to hold the output indication below 1 volt.

RADIO CONTROLS - Set the volume control to maximum. Set the tone control to mid range. Set the tuning control as indicated in the alignment chart.

DUMMY ANTENNA - Connect the signal-generator output lead through a 40 mmf. condenser to the antenna receptacle, and connect another 40 mmf. condenser from the antenna receptacle to the chassis when making the r-f and antenna tuning adjustments.

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World Radio History

	SIGNAL GENERATOR		RADIO		
STEP	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST
1	Connect signal generator through a .05-mf. condenser to pin 7 (mixer grid) of 6BE6.	265 kc. (modu- lated)	Tuning slugs fully out	Make tuning adjustments, in order given, for maximum output.	TC7-2nd i-f sec. TC6-2nd i-f pri. TC5-1st i-f sec. TC4-1st i-f pri.
2	Connect signal generator through a suitable dummy antenna, as ex- plained in notes preceding this chart.	1605 kc. (modu- lated)	1695 kc.	Adjust for maximum output.	C2B—osc. trimmer
3	Same as step 2.	1400 kc. (modu- lated)	1400 kc.	Adjust for maximum output.	C1antenna padder C2Ar-f trimmer
4	When radio is reinstalled in car, tune in a weak station near 1400 KC.			Adjust for maximum output.	C1—antenna padder

#### ALIGNMENT CHART

#### ALIGNMENT PROCEDURE WHEN ANTENNA COIL OR CORE IS REPLACED

1. After replacement of the coil or core, set the core so its leading edge (farthest from the core bar) is inside the coil form but not yet into the coil with the core bar to its extreme "out" position. Set the generator to 1605 KC using a dummy antenna, and adjust the antenna padder, C1, for maximum signal.

2. Set the generator to 1000 KC and tune for signal. Screw the antenna core in and out for maximum signal.

Ł

3. If a large movement of the core is necessary, repeat steps 1 and 2 and then go through steps 1 to 3 under general alignment.

#### ALIGNMENT PROCEDURE WHEN THE RF COIL OR CORE IS REPLACED

This procedure is the same as for the antenna coil except that, in step 1, the RF padder, C2A, is used in place of the antenna padder.

#### ALIGNMENT PROCEDURE WHEN THE OSCILLATOR COIL OR CORE IS REPLACED

1. Perform step 1 as under "Antenna Coil Replacement" but adjust all three padders [oscillator (C2B), RF (C2A) and antenna (C1)] for maximum signal.

2. Set the generator to 1000 KC and adjust the tuner until pointer is over 1000 KC calibration point. Adjust the oscillator core to tune in 1000 KC signal.

#### SERVICE HINTS

#### **ON-OFF PUSH BUTTON SPRING**

Occasionally, an early production set may be found in which the on-off button does not pop out sufficiently to actuate the on-off switch. This may be caused by the combination of a weak spring and a slightly stiff switch. One method of remedying this situation is to bend the switch mounting bracket backward. This lifts the switch actuating fork up on the ear of the push button lever so as to gain leverage. The other alternative is to remove the push button spring, stretch it so as to increase its power and replace. The spring may be removed by first removing the two switch mounting screws.

Stations may be set up in any order. However, for convenience in remembering, it is suggested that stations be set up in frequency sequence.

NOTE: In metropolitan areas, it is recommended that the push-buttons be set up in a shielded place where signals are weak, such as under a viaduct or in a steel-constructed building. In this way, accuracy of adjustment is assured. Then adjust the antenna and RF cores for maximum signal (do not move the oscillator core after the initial setting).

3. If a large movement of the two cores is necessary repeat steps 1 and 2 and then go through steps 1 to 3 under general alignment.

#### PUSH BUTTON BINDING

If the push buttons are not free moving so that they don't return to their full out position, there is a possibility that the drive latch will not be sufficiently engaged and the manual tuning will slip. If such occurs, relieve the binding around the offending push button. Such binding may be caused by the antirattle felt in the bezel. This felt may be cut down in thickness at the push button involved. On later production sets the felt will be removed and a special anti-rattle spring installed.

#### SETTING PUSH BUTTONS

1. Turn radio on and allow to operate for fifteen minutes. Antenna should be fully extended.

2. Unlock push buttons by pulling them out.

3. Accurately tune in a station with the manual tuning knob.

4. Lock one push button to that station by pushing firmly in.

5. Repeat above procedure for remaining push buttons.



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#### **REPLACEMENT PARTS LIST**

#### FOR MODELS P-5506 and C-5509

Reference		Service
Symbol	Description	Part No.
C1	Condenser, antenna padder	31-6502-5
C2	Condenser, 2 section padder, r-f and oscillator	31-6522-5
C3	Condenser, r-f plate coupling, 25 mmf	62-022409001
C4	Condenser, image rejection, 15 mmf	62-015409011
C5	Condenser, r-f trap, 200 mmf	Part of C2
C6	Condenser, screen by-bass, .047 mfd	30-4650-45
C7	Condenser, Oscillator coupling, 60 mmf	Part of C2
C8	Condenser, temperature compensating, oscillator, 245 mmf	30-1224-129
C9	Condenser, B+ by-pass, .047 mfd	
C10	Condenser, A-V-C by-pass, .047 mfd	30-4650-45
C11	Condenser, audio coupling, .005 mfd	30-1238-1
C12	Condenser, inverse feedback, .1 mfd	30-4650-47
C13	Condenser, inverse feedback, .25 mfd	30-4650-49
C14	Condenser, Tone control, .01 mfd	30-1238-2
C15	Condenser, i-f filter, 220 mmf	62-122001001
C16	Condenser, coupling, .005 mfd	30-1238-1
C17	Condenser, coupling, .01 mfd	30-4650-58
C18	Condenser, coupling, .01 mfd	30-4650-58
C19	Condenser, electrolytic, 3 section, cathode by-pass	61-0086A
C20	Condenser, tone compensation, .0068 mfd., 1000V	30-4650-91
C21	Condenser, feed thru, hash filter, 300 mmf	30-1254
C22	Condenser, "A" lead filter, .5 mfd	61-0183
C23	Condenser, spark filter, 330 mmf	62-133001001
C24	Condenser, hash filter, .5 mfd	61-0183
C25	Condenser, buffer, .022 mfd, 1600V	30-4650-128
C26	Condenser, feed thru, pilot light, 300 mmf .	30-1235-2
F1	Fuse, 14 amp, type SFE	AD-2243-4
11	Pilot Lamp, type 44, bayonet base, 6-8 volts	34-2064
12	Pilot Lamp	34-2064
Л	Jack, antenna input	57-1243FA3
J2	Socket, rear seat speaker	27-6273-17
L1	Antenna choke	32-4422-24
L2	Antenna coil assy.	32-4641-1
L3	R-F coil assy.	32-4641
L4	Choke ''A'' lead	32-1374-5

Reference Symbol	Description	Service Part No.
15	Choke, vibrator	32-4170-4
LS1	Speaker	36-1632-7
R1	Resistor, cathode bias, 330 ohms	66-1338340
R2	Resistor, grid return, 68,000 ohms	66-3688340
R3	Resistor, plate load, 10,000 ohms	66-3108340
R4	Resistor, grid return, 22,000 ohms	66-3228340
R5	Resistor, screen dropping, 27,000 ohms, 1 watt	66-3274340
R6	Resistor, a-v-c filter, 1 megohm	66-5108340
R7	Resistor, cathode bias, 330 ohms	66-1338340
R8	Resistor, i-f filter, 22,000 ohms	66-3228340
R9	Resistor, grid return, 10 megohms	66-6108340
R10	Resistor, plate load, 220,000 ohms	66-4228340
R11	Volume Control, 350,000 ohms (Plus Tone Control) P-5506	33-555714
	C-5509	33-5557-15
R12	Resistor, feedback voltage divider, 180 ohms	66-1188340
R13	Tone Control, 2 megohims each side of center	Part of R11
R14	Resistor, inverse feedback, 2200 ohms	66-2228340
R15	Resistor, arid return, 10 megohms	66-6108340
R16	Resistor, cathode load, 220,000 ohms	66-4228340
R17	Resistor, grid return, 470,000 ohms	66-4478340
R18	Resistor, grid return, 470,000 ohms	66-4478340
R19	Resistor, plate load, 220,000 ohms	66-4228340
R20	Resistor, cathode bias, 330 ohms, 1 watt	66-133430
R21	Fader control, rear seat speaker C-5509	33-5576-1
	Fader control, rear seat speaker P-5506	33-5576
R22	Resistor, filter, 1000 ohms, 1 watt	66-2104340
R23	Resistor, vibrator damping, 68 ohms, 1 watt	66-0684340
R24	Resistor, vibrator damping, 68 ohms, 1 watt	66-0684340
\$1	Switch, on-off	42-2044
T1	Transformer, oscillator assy.	32-4641-2
T2	Transformer, audio output	32-8316-7
T3	Transformer, power	32-8314-5
V81	Vibrator	83-0035
Z1	Transformer, 1st IF	32-4160-17A
Z2	Transformer, 2nd IF	32-4240-12A

#### MISCELLANEOUS

Description	Service Part No.
"A" Lead	41-3910-11
Background Plate, dial, C-5509 only	28-10331
Bezel, P-5506	28-10327
Bezel, C-5509	28-10328
Cable and disconnect assy. (pilot lamp dimmer)	41-4060-3
Clip, pilot lamp (2)	56-3545-5
Clamp, vibrator	57-1637-3
Cover, tube side	28-10392
Cover, wiring side, P-5506	
Cover, wiring side, C-5509	
Dial Scale, P-5506	
Dial Scale, C-5509	54-9351
Frame	
Fuse Lead	
Gasket, speaker mounting, P-5506	54-9337
Gasket, speaker mounting, C-5509	
Glass, window	
Housing assy., P-5506	
Housing assy., C-5509	
Knob, tone and fader (2), P-5506	28-10341
Knob, tone and tader (2), C-5509	28-10342
Knob, tuning and volume (2), P-5506	
Knob, tuning and volume (2), C-5509	27-4687-23

Description	Service Part No.
Bracket, set mounting, P-5506 only Condenser, generator Condenser, ignition	28-10352 30-4007-3 30-4007-5
Nut and washer assy., mounting bracket to panel (2) and speaker intg. (3) Nut, set mounting (with bracket) (P-5506 only) (2)	W2589-4FA3 28-10337
Screw, mtg. bracket to radio	56-6190-17
Pilot lamp socket assy. (2)	27-6233-4 28-10332 54-6176
Push buttons (6), C-5509	28-10338-1
Socket, 7 pin min. (3) 66AV6, 6C4, 6AQ5 (2) and 6X4 Socket, 7 pin min. (5) 6AV6, 6C4, 6AQ5 (2) and 6X4	27-6294-1 27-6245
Tuner Assembly	00 10500
Cores, tuning, powered iron, ant and r-t Cores, tuning, powered iron, oscillator Clutch assembly	28-10522-1 28-10522-1 76-9451
Drive shaft and bearing assembly (front) P-5506 Drive shaft and bearing assembly (front) C-5509	76-9448
Drive shaft and gear assembly (rear) Pointer arm assembly	76-9450
Torsion spring	28-10520 28-10523

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Service
# AUTO RADIO SERVICE MANUAL PHILCO MODEL: C-5595, (MOPAR 902) PHILCO MODEL: C-5596, (MOPAR 903)

# PHILCO Factory-Supervised Service AUTO RADIO

#### SPECIFICATIONS

CIRCUIT	<u>8 tube superheterodyne (plus rectifier)</u>	
FREQUENCY RANGE		
AUDIO OUTPUT	5.5 watts	
PUSH BUTTONS	5 station selectors plus 1 Search Tune Touch Bar	
POWER INPUT	8.6 amp. at 6.6 volts, d.c. When search func- tion is operating, motor and solenoid will draw an additional 4 amps.	
AERIAL	Vertical whip, fender mounting (40 mmf series	
INTERMEDIATE	- to mint shull()	and have a second the second s
FREQUENCY	265 kc.	
PHILCO TUBES USED	6BA6, r-f amp.; 6BE6, osc. converter;	
	6CS6 search ture phase det 124117 coarch	
	tune relay control and audio phase inverter:	Figure 1 — Philco Model C-5595
	6AQ5(2), audio output; 6X4, rectifier.	(MOPAR 902)
IMPO	PTANT: When connecting undie to "A" and	melle sidh an in sur
	A SU	IDDIY, either in car or on 1

IMPORTANT: When connecting radio to "A" supply, either in car or on test bench, polarity must be observed. "A" lead is negative, "A + " is chassis ground.

## PHILCO SEARCH TUNING OPERATIONAL DESCRIPTION

This system of automatic signal seeking is comprised of three basic sections — the motor-drive components, the switching circuits and the control circuits.

The sequence of operation is as follows. When the search tuning bar is depressed, B+ is shorted to ground through the relay coil L5 and current limiting resistor, R22. The current thus drawn closes the relay and performs the following: The audio phase inverter grid is shorted to ground (muted), the clutch solenoid, L6, is actuated which changes the clutch from manual tuning to motor drive, the motor, M1, is started, places the sensitivity control in the circuit, and a phase shifting condenser is connected across the output i-f secondary (this same contact acts as a hold completing the relay tube cathode and grid return to ground). The motor continues to drive as long as the relay holds due to the current drawn by the relay control, one half of a 12AU7. When the next station is tuned in. the relay control tube is cut off, thus de-energizing the relay and in turn shutting off the motor, returning the clutch to manual drive, restoring the audio, removing C16 from across the i-f and allowing the set to operate at maximum sensitivity. If, during the search operation, the unit drives to the high frequency limit, the carriage is released and rap dly returns to the low frequency end to continue its station search. There is an automatic start switch at the extreme low frequency position (actually only a physical extension of the touch bar switch) which prevents the set from stopping on the return sweep due to an integrated trigger pulse which could be developed when making the rapid sweep in a strong signal area.

The sensitivity control, mentioned above, is a four position switch in the cathode return lead from the r-f and i-f amplifier tubes. Normally, this switch is shorted out to ground by the relay when in open (non-search) position. In this position the set operates at maximum sensitivity. When the relay is energized, this ground is opened and the cathode return is then made by the ground arm of the sensitivity control switch, sensitivity depending upon the switch position, which may be directly to ground or through one or more of the resistors, R38, R39 or R40.

The electronic control circuit has the job of accurately stopping the search tune operation so that the station is properly tuned in. Since there are functional delays in stopping the tuning action (such as contact opening time of the relay) the trigger point must be slightly ahead of the center station point.

As can be seen from the schematic, the control circuit connects to the primary and secondary windings of the output i-f transformer. The first tube, a 6CS6, is operated as a phase detector and is used to develop the trigger voltage which is applied to the grid of the relay control tube  $(1/2 \ 12AU7)$ .

Operation of the phase detector is based on the fact that the i-f transformer primary signal voltage has a 90° phase relationship with the secondary signal voltage at the resonant frequency. At frequencies slightly below resonance, these voltages become more than 90° apart in phase and at frequencies slightly above resonance, these voltages approach an in-phase condition. Signal from the i-f transformer secondary is connected to the 6CS6 #1 grid and the 2nd detector diode. This #1 grid functions as a self biasing diode and gate for current flow to the #3 grid. Tube plate current flow is further modified by the i-f transformer primary signal which is coupled into the #3 grid, and there will be an increase or decrease in plate current depending upon its phase relationship with the #1 grid signal. The plate voltage curve (when tuning through a signal) would appear as a modified frequency discriminator characteristic. Overloading of the #3 grid on strong signals is prevented by coupling a small amount of the primary signal into the 2nd diode plate of the 2nd detector tube. The negative voltage thus developed is applied to the #3 grid and, although less than the coupled signal voltage, biases the grid correctly in accordance with signal strength. This biasing action also serves as a limiter to strong noise impulses which might tend to develop a triggering pulse.

AUTO RADIO SERVICE MANUAL, PHILCO MODELS C-5595 & C-5596 (MOPAR 902 20 903) -0 R-2 00 -C

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The negative swinging portion of the discriminator curve can be used as a triggering voltage to reduce the relay tube plate current and open the relay but it is not sufficiently frequency selective. With the motor driven tuner used, we are required to open the relay approximately 4 kc. ahead of center tuning. This curve could result in triggering action 5 kc. beyond center frequency tuning.

The first step in reducing the frequency span of the discriminator curve was to establish a 6CS6 cathode bias so that the tube operates near plate current cut-off with no received signal. This distorts the plate voltage (discriminator) curve. However, this curve still does not yield a sharp, high amplitude negative swing ahead of center tuning. A desirable characteristic is obtained by switching in a detuning (phase shifting) capacitor, C16, only when the relay is closed during the "signal seeking" operation. This capacitor is shunted across the i-f transformer secondary and shifts the discriminator curve ahead of center tuning by a fixed amount. Besides shifting this curve, it also distorts it in that the negative peak (representing an "in phase" condition) is moved close to center i-f tuning and is thus tremendously amplified. This curve is further sharpened by operating the 6CS6 with low plate voltage so that saturation is quickly reached. The negative voltage swing is now a sharp trigger voltage occurring a definite number of kc. ahead of center i-f tuning and this curve remains essentially the same whether very weak or very strong signals are being received. There is, of course, a threshold limit where the incoming signal is too weak to develop the necessary negative swing to cause triggering of the relay tube.

This trigger voltage is now applied to the grid of the relay tube. The RC coupling circuit comprising R1, R2, C2 and C3 provides a differentiating action which compensates for variations in rate of speed of tuning. If the tuning speed is reduced, the 6CS6 plate voltage will have to fall to a lower value before the relay tube grid voltage reaches the trigger point.



Figure 2 - Top View, Showing Component Layout of Power and Audio Chassis

1	οι	TA.	GE	CHART	MODEL	C-5595	(MOPAR	<b>902</b> )
•	_						(*** · · · · ·	

	<b>R-F</b> 6BA6	1 <b>ST. DET.</b> 6BE6	1-F 6BA6	2ND. DET. 6AV6	PHASE INV. 1/2 12AU7	TRIGGER CONT. 1/2 12AU7	PHASE DET. 6CS6	0U1 6AQ5	6AQ5	RECT. 6X4
PLATE	- <del> </del> -205V	+225V	-+225 <b>V</b>	+-95V	+110V	+220V	+70V	+235₩	+235V	250V AC
SCREEN	+60V	+60V	+60V					+225V	+225V	
GRID	—.4V		PHASE	6V	12V	—96V		PHASE	PHASE	
CATHODE	+2.8V	PHASE	+1.5V	PHASE	90V	-+-220V	-+4.2V	+25 <b>V</b>	+25V	+235V

All measurements are from point indicated to chassis. Measurements were taken with a 20,000 ohms volt meter, except voltages on Phase Det. Plate, which were taken with an electronic volt meter.

#### World Radio History

## ALIGNMENT PROCEDURE MODEL C-5595

Caution: The alignment of this set is straightforward with one exception. Due to the requirements of the Search Tune circuit, it is imperative that the secondary of the output i-f must be accurately tuned to 265 kc. Any error in setting TC7 will also appear as a search stopping error. This cannot be done with sufficient accuracy with an output meter across the speaker voice coil. A satisfactory method is to use a V.T.V.M. across R13, the positive lead to chassis and the negative lead to the junction of R13, R12 and R9.

*Radio Controls*: Set volume control to maximum. Set tone control to mid-position. Set tuning control as indicated in chart.

Tuning Indicator: A V.T.V.M. across R13.

Signal Generator: Use an AM r-f signal generator with modulated output. Connect ground lead to chassis and output lead as indicated in chart.

*Output Level*: During alignment, signal-generator output must be maintained to hold V.T.V.M. indication at approximately 1.0 volt.

Dummy Antenna: Connect signal-generator output lead through a 40 mmf condenser to the antenna receptacle; connect another 40 mmf condenser from the antenna receptacle to chassis. It is important that these dummy-antenna instructions be carefully followed if the radio is to perform at its best after being installed in the car.

	SIGNAL GENERATO	R		RADIO		
STEP	Connection to Radio	Dial Setting	Dial Setting Special Instructions		ADJUST TRIMMER	
1	Through a .05 mfd. conden- ser to mixer grid, pin 7 of 6BE6.	265 kc.	See Note 1	Ādjust, in order given for maximum output.	TC6—2nd i-f pri. TC5—1st i-f sec. TC4—1st i-f pri.	
2	Same as Step 1.	265 kc.	See Note 1	Adjust, very carefully for maximum dip. See Note 2.	TC7—2nd i-f sec.	
3	Through dummy antenna to J1. See Alignment Proce- dure above.	1605 kc.	See Note 1	Adjust for maximum output.	C2B—osc. trimmer	
4	Same as Step 3.	1400 kc.	1400 kc.	Ādjust for maximum output.	C2A—r-f trimmer C1—ant. compensator	
5				With radio and antenna installed in car, adjust for maximum, using a weak station at or near 1400 kc.	C1—ant. compensator	

ALIGNMENT CHART

- Note 1: Set tuner so that latch pawl just touches trigger ear on frame, see figure 4. If latch is tripped, set will start searching and will not stop unless a signal is encountered. Where there is no signal the set must be momentarily turned off to stop the search action.
- Note 2: The adjustment, in step 2, for a dip is very critical. Rock TC7 back and forth to be sure the indicator dip is caused by resonance at 265 kc. and not by mistuning on either side.

#### MODEL C-5596

This set is a 12 volt version of the model C-5595 and is identical but for the following exceptions:

Tubes are 12 volt tubes of the same type, i.e.

- 12BA6 r-f amp.
- 12BE6 osc. converter
- 12BA6 i-f amp.
- 12AV6 det., a-v-c, 1st audio
- 12CS6 phase detector
- 12AU7 relay control and phase inverter (same tube as used in C-5595 but pin 9 is not used, pin 4 connects to ground

and pin 5 is connected to the filament line.) 12AQ5 output 12X4 rectifier

I1, I2	Pilot lamps, 12 volt type	
M1	Motor, 12 volt	
R36, R37	Resistor, vibrator damping, 22 ohms 66-122434	0
T2	Transformer, power 32-8592-1	
VBI	Vibrator, 12 volt type	
	Solenoid, 12 volt	

# STATION PUSH-BUTTON ADJUSTMENT

Stations may be set up in any order. However, for convenience in remembering, it is suggested that stations be set up in frequency sequence. THIS SEQUENCE FOR PUSH-BUTTON ADJUSTMENT MUST BE FOLLOWED:

- 1. Tune in desired station with manual tuning knob or search tuning.
- 2. Pull off push button cover.
- 3. Turn radio OFF.

4. Push in push button.

- 5. Turn radio ON.
- 6. Rotate knurled knob of push button until station is heard. (No sound will be heard until this point is reached) (do not force knob beyond limit of rotation).
- 7. Replace push button cover. Set up other push buttons in same manner.

# LUBRICATION OF TUNER

NOTE: This tuner has been properly lubricated at the factory and normally requires no further lubrication for the life of the set.

Lubricants-Oil-Speedometer oil, Mopar part number 1265805. Grease-Dow-Corning #4 or #5 (the #5 is new and contains a corrosion inhibiter).

Lubricants used must be as above specified or binding will develop at temperatures of 32°F, or below,

SERVICE HINTS

All units are wired for connection with POSITIVE GROUND. If the set is connected backwards, the motor will drive in reverse (from high frequency end to low frequency end) and may jam. If this occurs, nothing is destroyed but the tuning mechanism can not be moved except by removing the top cover and turning the clutch discs clockwise (looking from front) by hand. This is true of first production sets. Later production sets will have the cam backup stops removed so that if the set is connected in reversed polarity, the motor

Lightly oil all moving parts of gear drive mechanism except those (latch and shaft worm) that have a carbon dag coating. These two parts have a dry lubricant to prevent the collection of dust.

No oil on nylon parts.

No oil on manual drive clutch.

Grease lightly (using Dow-Corning #5) the push button traveling contacts, the rubbing points of the latch bar and the search "start" switch contacts.

will continue driving the tuning shaft but no tuning or jamming action will occur.

If the motor is reversed or the latching pawl is accidently tripped before tuning reaches the high frequency end, a number of clockwise revolutions of the manual tuning knob may be required to again engage the cam.

Where a set is dead, first check radio in car for jumper in rear seat speaker socket. See figure 3.



Figure 3 — Component Layout in Tuner Chassis

#### World Radio History



Figure 4 — Top View of Tuner Assembly Parts. Identification and Lubrication Numbers Refer to Tuner Assembly in Parts List



Figure 5 — Bottom View of Tuner Assembly Parts. Identification and Lubrication Numbers Refer to Tuner Assembly in Parts List



# REPLACEMENT PARTS LIST - MODELS C-5595 AND C-5596

Reference Symbol

Reference Symbol	Description	Service Part No.
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10	Condenser, antenna padder Condenser, 2 section padder, r-f and osc. Condenser, cathode by-pass, 047 mfd., 200v. Condenser, a-v-c by-pass, 047 mfd., 200v. Condenser, r-f plate coupling, 18 mmf. Condenser, r-f tank image rejection, 15 mmf. Condenser, i-f trap, 200 mmf. Condenser, i-f trap, 200 mmf. Condenser, screen by-pass, 1 mfd., 400v. Condenser, cathode by-pass, 047 mfd., 200v Condenser, oscillator coupling, 60 mmf.	31-6502-5 31-6522-5 30-4650-45 30-4650-45 62-022409001 62-015409011 Part of C2 30-4650-47 30-4650-47 Part of C2
C11 C12 C13 C14	Condenser, temperature compensaturg, 245 mmf. Condenser, phase detector a-v-c, 5 mmf. Condenser, phase detector coupling	30-1224-129 30-1221-5 62-122001001
C15	100 mmf. Condenser, phase detector coupling,	62.110009001
C16 C17 C18 C29 C20 C22 C22 C22 C22 C22 C22 C22 C22 C22	100 mmf. Condenser, cathode by-pass, .047 mfd., 200v Condenser, screen by-pass, .047 mfd., 200v Condenser, screen by-pass, .01 mfd. Condenser, differentiating network, .033 mfd Condenser, differentiating network, .033 mfd Condenser, tone control, high cut, .01 mfd. Condenser, rudio coupling, .005 mfd. Condenser, inverse feed back, .1 mfd. Condenser, rudio coupling, .005 mfd. Condenser, cudio coupling, .01 mfd., 600v. Condenser, cudio coupling, .01 mfd., 600v. Condenser, audio coupling, .01 mfd., 600v. Condenser, electrolytic, 3 section Condenser, electrolytic, 3 section Condenser, buffer, .022 mfd., 1600v. Condenser, buffer, .022 mfd., 100v. Condenser, feed through, .00 mmf. Condenser, feed through, .00 mmf. Condenser, fash filter, .5 mfd., 100v. Fuse, J4 amp. Pilot lamp Pilot lamp Socket, antenna Socket, antenna Socket, foot switch Chole, antenna Coil, r-f tuning Part of Coil J Coil, r-f tuning Part of Coil J Relay, search	82-110005001 -30-4650-45 30-1238-2 30-1238-2 30-1238-2 30-1238-2 30-1238-2 30-1238-1 30-4650-45 30-1238-1 30-4650-58 30-4650-58 30-4650-58 30-4650-58 30-4650-58 30-4650-58 30-4650-58 30-4650-128 -1-0066A 30-4650-128 -1-0183 62-133001001 30-1235-2 30-1254 -1-0183 AD-2243-4 -34-2064 34-2064 34-2064 32-422-24 Xas'y. 76-9238 Xas'y. 76-92
L7 L8 LS1 M1	C-5596, 12 volts Choke, "A" lead Choke, vibrator Speaker Motor, C-5555, 6 volts	42-4027-1 32-1374-5 32-4170-4 36-1632-7 41-2050
R1 R2 R3 R4 R5 R6 R7 R8 R9	C-3596, 12 volts Resistor, rf cathode, 1000 ohms Resistor, grid return, 68,000 ohms Resistor, grid return, 22,000 ohms Resistor, screen dropping, 27,000 ohms, 1 w Resistor, a-v-c filter, 1 meqohm Resistor, i-f filter, 22,000 ohm Resistor, i-f filter, 22,000 ohm Resistor, a-v-c voltage divider, phase det	66-2108340 66-3688340 66-3108340 66-3228340 66-3274340 66-5108340 66-5138340 66-3228340 66-5108340
R10 R11 R12 R13	Resistor, grid return, 10 megohms Resistor, audio plate load, 220,000 chms Resistor, grid return, phase det., 1 megohm Resistor, a-v-c voltage divider, phase det.,	66-6108340 66-4228340 a 66-5108340
R14 R15 R16	l megohm Resistor, grid return, phase det., l megohn Resistor, cathode bias, 3300 ohms Resistor, voltage divider, phase det.	66-2338340 66-4108340
R17 R18 R19 R20 R21 R22 R23 R24 R25 R26 R27	Resistor, screen dropping, 68,000 ohms Resistor, plate load, 1 megohm Resistor, voltage divider, 100,000 ohms Resistor, critage divider, 100,000 ohms Resistor, critage starting, 15,000 ohms Volume control, 350,000 ohms Resistor, inverse feed back, 180 ohms Tone Control Resistor, grid return, 10 megohms Resistor, grid return, 10 megohms	66-3698340 66-5108340 66-5108340 66-5108340 66-3108340 66-3158340 33-5557-16 66-1188340 Part of R22 66-2228340 66-6108340 66-6108340
R28	Resistor, cathode load, 220,000 ohms	00-4228340

Reference Symbol	Description	Service Part No.
R29 R30 R31 R32 R33 R34 R35 R36 R36 R37 R38 R38 R39 R40 S1 S2 S3	Resistor, plate load, 220,000 ohms Resistor, grid return, 470,000 ohms Resistor, grid return, 470,000 ohms Resistor, grid return, 470,000 ohms Resistor, cathode bias, 330 ohms, 1 watt Resistor, 68 ohms, 1 watt Resistor, 81 filter, 1000 ohms, 1 watt Resistor, vibrator damping, 68 ohms, 1 watt Resistor, sensitivity control, 820 ohms Resistor, sensitivity control, 820 ohms Resistor, sensitivity control, 820 ohms Resistor, sensitivity control, 820 ohms Resistor, sensitivity control, 5600 ohms Switch, off-on Relay contacts, Part of 42-4026 Switch, auto, start, motor search	66-4228340 .66-4478340 .66-1478340 .66-1334340 .32-5576-1 .66-0684340 .66-0684340 .66-0684340 .66-1828340 .66-1828340 .66-2568340 .06-2568340 .06-2568340 .06-2568340 .06-10 funa .06
S4	Switch, start, search tone Switch	Assembly
S5 S6	Switch, sensitivity control, includes knob Switch, push button control	42-2040 irt of Tuner h Assembly
T1 T2	Transformer, audio output Transformer, power, C-5595 C-5596	32-8316-10 32-8314-5 32-8592-1
VBI	Vibrator, C-5595	83-0035 83-0035-1
Z1 Z2	Transformer, 1st i-f Transformer, 2nd i-f	32-4160-17A 32-4240-12A

#### Miscellaneous

	Service Dark No
Description	Part no.
"A" Lead	41-3910-11
Background, dial	
Bezel and Bushing assembly	
Cable and disconnect assy., pilot light dimm	107 41-4060-3
Clamp, vibrator	
Clip, pilot light (2)	
Cover, tube side	76 0272
Cover, wiring side	54.9357
Dial Scale	41.2910.10
Fuse Lead	28-10080
Housing	28-10342
Knob, tone and tuder (2)	27.4687.23
Knob, volume and luning (2)	
Master Kit	30-4007-3
Condenser, generation	30-4007-5
Contenser, ignition	54-9353
Nut set mtg (2)	28-10337
Nut and washer $1/4 - 28$ , set mtg. (2)	W2589-8FA1
Nut and washer ignition switch terminal	W2589-4FA1
Screw No. 10 x 1/2, set mtg. (2)	1W22402FA3
Stud long speaker mig	28-10335
Stud, short speaker mig.	28-10335-1
Pilot Jamp socket assy. (2)	27-6233-4
Push Bar	28-10343
Push Button assy. (5)	
Cover, push button (5)	56-6708FA8
Spring, push button (5)	56-6709
Spring, push button tension	28-10348
Socket, 7 pin min, 6BA6 (2) and 6BE6	27-6294
Socket, 7 pin min, (5)	27-6294-1
Socket, 9 pin min, 12AU7	27-6294-3
Socket, 4 pin rear seat speaker	27-6273-17
Socket, vibrator	27-6245
Spring, yoke (2)	
Tuner Assembly	
Coil assy., includes ant., r-f and osc.	76-9238
Clutch, ratchet, nylon	28-10452
Gear housing assy. (nylon gear and wor	m) 76-9366
Manual shaft assy.	
Motor, 6 volt	41-2050
12 volt	41-2050-1
Pointer arm assy.	76-9365
Pointer support assy.	
Solenoid, 6 volt	42-402/
12 volt	42-4027-1
Spring, carriage (approx. 4" long)	28-10450
Spring, coupling (motor to worm)	
Spring, lever (high frequency end releas	20 10449
Spring, plate (on pointer arm assy.)	20 10447
Spring, torsion (on pointer arm assy.)	20-10448
Switch assy.	20 10405
Tuning core, osc., ant. and r-t (2)	
Window, glass	



Figure 6 — Schematic Diagram — Philco Model C-5595 (Mopar 902)

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